

# FURUNO

## OPERATOR'S MANUAL

**Electronic Chart Display and  
Information System (ECDIS)**

---

**MODEL      FEA-2100/2105**

---



**FURUNO ELECTRIC CO., LTD.**  
NISHINOMIYA, JAPAN

© **FURUNO ELECTRIC CO., LTD.**

9-52, Ashihara-cho,  
Nishinomiya, Japan

Telephone: 0798-65-2111  
Telefax: 0798-65-4200

•Your Local Agent/Dealer

All rights reserved.

Printed in Japan

FIRST EDITION : SEP. 1999  
E : JAN. 19, 2001

PUB. No. OME-41200-E  
FEA-2100/2105

**APPLICATION FOR MANUAL REVISIONS**

Upon receipt of this manual, please fill in the necessary data. It is important that the addressee be the end user so that the operating personnel will receive all revisions to the manual.

**EQUIPMENT NAME** .....

**SERIAL No** .....**MODEL** .....

**MANUAL TITLE** .....

..... **MANUAL PART NUMBER** .....

**ISSUE INDEX** ..... **REVISION INDEX** .....

**PURCHASING AGENCY** .....

**NAME OF USER** .....

**ADDRESS OF USER** .....

.....  
 .....  
 .....

**ATTN:**.....

**CHANGE RECORD**

RCS CODE/REV. INDEX	DATE	PURPOSE OF THE CHANGE	CHANGE REQUESTED BY
1.0	22.05.1999	Initial release of Operators Manual for software release B1.17	
1.1	07.09.1999	New release of Operators Manual for software release B1.18	
1.11	3.11.1999	New release of Operators Manual for software release B1.19	
2.0	24.01.2000	New release of Operators Manual for software release 02.00	
2.01	26.04.2000	New release of Operators Manual for software release 02.01	
2.02	07.12.2000	New release of Operators Manual for software release 02.02	

# Contents

<b>Changes since release 02.01</b>	<b>1</b>
Overall operation related changes.....	1
Chart related changes.....	2
Steering related changes .....	2
<b>Changes since release 02.00</b>	<b>3</b>
Overall operation changes .....	3
Chart related changes.....	3
<b>Changes since release B1.16</b>	<b>4</b>
Overall operation related changes.....	4
Chart related changes.....	7
Used presentation .....	8
<b>Introduction</b>	<b>9</b>
Manual Applicability .....	9
System Configuration .....	10
How to read this manual .....	11
<b>Abridged Operator Instructions</b>	<b>13</b>
Introduction .....	13
Own ship.....	13
Vessel position .....	13
Ship symbol.....	13
Own vessel past track .....	13
Chart information.....	14
Chart motion.....	14
Chart Legend .....	14
Chart datum .....	14
Cursor datum.....	14
Display datum.....	15
Define datum .....	15
Chart Management.....	15
Move chart .....	15
Chart type .....	15
Alarms .....	16
System alarm .....	16
Steering alarm.....	16
Acknowledge alarm.....	16
System Failure.....	16
<b>Navigation Tasks</b>	<b>17</b>
Overview .....	17
Voyage planning.....	18
Route Planning .....	18

Route Calculation.....	19
Chart planning.....	19
User Chart planning .....	19
Positioning.....	20
Direct Positioning sensors .....	20
Dead Reckoning equipment .....	20
Reference Targets.....	21
Manual Correction .....	21
Monitoring.....	22
Display of electronic sea chart .....	22
Alarms .....	22
Man Over Board.....	23
Data Logging.....	23
Data Distribution.....	23

## **ECDIS Screen 25**

Overview .....	25
Electronic chart area .....	26
Electronic charts in ECDIS .....	26
Dialogbox area .....	28
Upper statusbar.....	28
Lower statusbar .....	29
Information Area .....	30

## **Control Panel 31**

Overview .....	31
Operative push buttons .....	32
Direct function push buttons.....	32
Menu push buttons.....	34
INFO & HELP pushbutton .....	35
ECDIS Control Panel used from software .....	36

## **Set up before departure 37**

Update Chart material.....	37
Display/Approve date for S57 charts and manual updates .....	37
Set Chart Alarm calculation.....	37
Create or update Route, User chart, Reference targets and Pilot data .....	37
Select User chart.....	37
Recalculate Route.....	38
Recalculate timetable and ETA values .....	38
Check your route against Chart Alarms.....	38
Route Monitoring menu.....	39
Select Route .....	39
Select Next Waypoint.....	39
Select Final Waypoint .....	39
Center line for ARPA radar.....	39
Channel borders for ARPA radar .....	39
Select Pilot Data .....	40
Select Reference Targets .....	40
Verify configuration of navigation sensors.....	40
Verify GYRO settings .....	40
Verify SPEED settings .....	40
Verify RADAR settings.....	41
Verify POSITION sensors .....	41
Verify KALMAN FILTER.....	41
Verify ALIGNMENT.....	41
Set Depth alarm limit.....	42

Start Reference target position calculation .....	42
Reset distance counter and logs .....	43
Verify Datum .....	43
<b>Conditions required to replace paper charts</b>	<b>45</b>
Introduction .....	45
How to detect ENC coverage in S57 Chart display .....	48
<b>Vector Chart material</b>	<b>50</b>
Introduction .....	50
S57 Charts .....	50
Introduction .....	50
Chart legend of S57 chart .....	52
Permanent warnings of S57 charts .....	53
How to load S57 charts .....	54
Flow chart of the loading of S57 Charts into ECDIS .....	54
How to load S57 charts from a CD-ROM, floppy or LAN .....	56
How to load S57 charts, which are not fully compliant with the standards .....	62
S57 SENC Conversion details .....	63
How to make SENC conversion faster .....	63
How to select automatic SENC conversion and Display Until date .....	63
How to view progress of SENC conversion .....	64
How to use Failed SENC conversion window .....	65
How to use SENC Conversion history log .....	66
How to use SENC convert window to initiate SENC conversion .....	68
Some features of Chart Plan menu .....	69
Overview of Chart Plan menu .....	69
Catalogue of S57 cells .....	72
Group of S57 Chart cells .....	73
How to view status and date dependency of S57 Chart cells and their updates ..	77
How to later use CD Catalogue created during load of S57 charts .....	78
How to remove S57 Charts from the system .....	79
Introduction to the S57 chart service from a RENC .....	80
Introduction .....	80
Permits .....	80
Product List .....	80
Authentication .....	80
Available service types .....	81
Subscription types .....	81
Service provided by a RENC .....	82
How to view the Coverage of the RENC service .....	82
How to know up-to-date status of a chart from a RENC .....	83
How to know up-to-date status of the RENC Product List .....	84
How to manage Permits from a RENC .....	85
How to manage Public key from a RENC .....	86
CD-ROM service from a RENC .....	87
How to get started with S57 charts using a RENC .....	87
How to keep S57 charts up to date using a RENC .....	88
How to enlarge chart coverage using a RENC .....	89
A BASE CD-ROM from a RENC .....	90
An UPDATE CD-ROM from a RENC .....	92
How to view Coverage of a BASE or UPDATE CD-ROM from a RENC .....	93
A Permit CD-ROM or floppy disk from the RENC .....	94
RENC security system .....	96
Standard messages in S57 Chart Load .....	96
Additional messages in S57 Chart Load .....	96
Standard messages in S57 SENC conversion .....	98
Additional messages in S57 SENC conversion .....	98

Telecomm service from a RENC.....	99
How to get started with S57 charts using a RENC .....	99
How to keep S57 charts up to date using a RENC .....	100
How to establish a Telecomm connection to a RENC.....	102
How to close the Telecomm connection to a RENC .....	103
Common Telecomm receive sequence .....	104
Typical error messages of the Telecomm connection to a RENC .....	105
How to order Product List from a RENC by Telecomm .....	107
How to make user defined Group for use with RENC Telecomm.....	108
How to order Permits from a RENC by Telecomm.....	110
How to order Charts from a RENC by Telecomm .....	111
A complete example how to order a single Chart from a RENC by Telecomm.....	112
A complete example how to order a group of Permits from a RENC by Telecomm.....	113
A complete example how to update a group of charts from a RENC by Telecomm.....	114
Messages of Chart Load from a RENC by Telecomm .....	115
Vector chart display.....	118
How to select Vector chart material in use.....	118
How to select charts for viewing .....	118
How to select a chart by its name on display.....	119
Control of visible chart features .....	120
Display Base.....	123
Control of visible navigation features .....	123
Store and recall of Chart Display Settings for visible chart and navigational features .....	126
Sailing directions, Tidal tables etc. features of Vector charts.....	127
Date dependent and periodical features of Vector chart.....	128
Introduction.....	128
How to approve and highlight Vector chart updates .....	128
How to set Display Until date .....	129
How to set Approve Until date.....	129
A little learning about date dependency of S57 standard .....	130
Symbology used in Vector charts .....	135
How to change presentation library used for Vector chart features.....	135
Request information about Vector chart objects.....	136
How to set visible Vector chart features.....	136
How to select desired object from the list of found objects.....	136
How to view properties of a Vector chart object.....	137
A little learning about Vector Chart coding .....	138
Seldom used features of Vector charts .....	144
Cell Status .....	144
S57 Cell Details.....	144
How to use Cell Status window to initiate SENC conversion .....	145

## **Raster Chart material 147**

ARCS Charts .....	147
Chart legend of ARCS chart.....	147
T&P Notices, Details and Warnings of ARCS .....	148
Datum and ARCS Charts.....	151
Difference between ARCS chart local datum and positions in WGS84 datum	151
ARCS chart managing .....	156
Chart plan.....	156
ARCS licence information .....	157
How to get started with ARCS charts.....	157
How to load chart permits .....	158
How to remove chart permits .....	159
How to load a new ARCS chart into the system.....	160
How to update ARCS chart.....	163

How to view update status of your ARCS charts.....	165
ARCS Catalogue .....	166
Group of ARCS charts.....	169
How to remove ARCS chart from the system.....	173
ARCS chart display .....	174
How to select ARCS chart material on display.....	174
How to select used Datum .....	174
How to view different charts .....	176
How to select an ARCS chart by its number on display .....	179
Control of visible chart features .....	181
Control of visible navigation features.....	185
Store and recall of Chart Display Settings for visible chart and navigational features .....	188
<b>Manual Updates</b>	<b>189</b>
Introduction .....	189
Display of Manual Updates .....	190
How to control visible chart objects from Manual Updates .....	190
Control of date dependency of Manual updates.....	190
How to set current date for viewing.....	190
Manual Update editor .....	191
Manual Update Planning .....	191
How to delete existing chart object .....	192
How to modify existing chart object.....	193
How to insert a new chart object .....	194
How to edit properties of a manual update chart object .....	200
Seldom used features of Manual updates.....	203
How to check in details the creation and usage history of manual updates .....	203
<b>Chart Alarms</b>	<b>205</b>
General .....	205
Chart alarms.....	206
How to select safety contour .....	206
How to select objects used in Chart Alarms .....	207
How to highlight Chart Alarm .....	209
How to include User Chart Symbols, Lines and Areas in Chart Alarm .....	209
How to activate own ship check .....	211
Route planning.....	213
How to find Chart Alarms leg by leg.....	213
How to find Chart Alarms by their category.....	215
Route monitoring.....	216
Chart Alarm using ARCS charts .....	217
<b>Navigation tools</b>	<b>219</b>
Display mode.....	219
Navigation marks.....	220
How to move EBL.....	221
How to move VRM .....	221
How to move Reference point .....	221
<b>Route planning</b>	<b>223</b>
Introduction .....	223
Route planning main menu .....	224
Select datum .....	225
How to create a new route .....	226
Create a new route.....	226
Waypoint sheet.....	227



Fill in the Parameter sheet .....	229
Chart Alarms sheet .....	230
Prepare sheet .....	231
How to modify already existing route.....	232
Parameters .....	232
How to select waypoint to be modified .....	232
Change waypoint position .....	233
Change other waypoint data .....	234
Add a new waypoint in the end of a route .....	234
Delete a waypoint.....	234
Insert a waypoint .....	234
Import waypoint from other routes.....	235
Reverse sailing order of a route.....	235
Optimization .....	236
Available Optimization strategies .....	236
How to optimize .....	236
How to plan a speed profile.....	237
Backup to floppy .....	238
Restore from floppy.....	238
Move to planning or navigation station .....	238
Read from planning or navigation station.....	238
WP table report.....	238
Full WP report.....	239
VOS operations .....	240
How to test ECDIS and VOS together .....	240

## **Route monitoring 243**

Introduction .....	243
How to select route to be monitored.....	245
How to select next waypoint.....	245
How to select final waypoint .....	245
Display of the route on the electronic chart screen.....	246
Display of the route on the ARPA radar screen.....	246
How to monitor route .....	247
How to ask ETA .....	248
Route monitoring related alarms.....	250

## **User chart control 251**

Introduction .....	251
What is a User Chart Point and for which purpose it is used ? .....	253
How to select User Chart.....	255
Select datum .....	255
How to create User Chart .....	255
Point sheet .....	256
Symbol sheet .....	257
Line sheet .....	258
Tidal sheet.....	260
Area Sheet .....	261
Add a new Point, Symbol, Line or Tidal to User chart .....	264
How to select Point, Symbol, Line or Tidal to be modified .....	265
Change position of Point, Symbol, Line or Tidal .....	265
Change other data of Point, Symbol, Line or Tidal .....	266
Delete a Point, Symbol, Line or Tidal.....	266
Import Points, Symbols, Lines or Tidal from other User chart.....	266
Display on ECDIS screen .....	267
Backup to floppy .....	270
Restore from floppy.....	270
Move to planning or navigation station .....	270

Read from planning or navigation station .....	270
How to load User Chart in the old Vector system format .....	270
How to save User Chart in the old Vector system format .....	270
Point report .....	271
Line report .....	272
Area Object report .....	272
Symbols report.....	273
Full report .....	273
Report for Radar .....	274

## **Reference targets 275**

Introduction .....	275
How to select Reference targets.....	276
Select datum .....	277
How to create Reference target.....	277
Add a new Reference target record .....	278
How to select Reference target to be modified .....	279
Change Reference target position.....	279
Change other data of Reference target.....	280
Delete a Reference target record .....	280
Import record of Reference target from other chart.....	280
Associated alarms .....	281
Backup to floppy .....	281
Restore from floppy.....	281
Move to planning or navigation station .....	281
Read from planning or navigation station.....	281
How to load Reference Targets in the old Vector system format .....	281
How to save Reference Targets in the old Vector system format .....	281
Reference target report .....	282

## **Pilot data 283**

Introduction .....	283
How to use normally.....	284
How to select pilot data .....	285
Current record sheet .....	286
Edit record sheet.....	287
How to create a new Pilot data .....	288
Add new Pilot data record .....	288
How to select Pilot data record to be modified .....	289
Change Pilot data record position.....	289
Change other data of Pilot data record .....	289
Delete a Pilot data record .....	289
Import Pilot data from other routes .....	290
Backup to floppy .....	290
Restore from floppy.....	290
Move to planning or navigation station .....	290
Read from planning or navigation station.....	290
Pilot data report .....	290

## **Backup Operations 291**

Introduction .....	291
How to find out right file category.....	292
How to make a copy of file.....	292
How to copy a file to an other name .....	293
Backup to floppy .....	293
Restore from floppy.....	293
How to delete file .....	293

Move to planning or navigation station .....	293
Read from planning or navigation station.....	294
How to load chart and route files in the old Vector system format.....	294
How to save chart and route files in the old Vector system format .....	294
Backup of chart material.....	295
Restore of chart material.....	296

## **Navigation Sensors 297**

How to select Navigation sensors.....	297
How to set initial value of a Gyro1.....	298
Source of position.....	301
Primary and Secondary position of own ship .....	302
Position discrepancy alarm.....	302
Source of smg, cmg, speed, heading, rot, drift and docking speed components .....	303
No speed or course available.....	305
Filter Operation .....	306
Filter and automatic Route Steering .....	306
How to use position alignment .....	308
Position alignment by means of the ECDIS .....	308
How to reset position alignment .....	309
Position alignment by means of the ARPA radar .....	310
Gyro error correction.....	312
How to enable Gyro error correction .....	313
Use Reference targets for automatic Gyro error correction.....	315
Wind sensor.....	316
Depth sensor .....	317
Sensor related alarms.....	318

## **Target functions 319**

Display of ARPA radar targets .....	319
Display of dangerous ARPA radar targets.....	319
Display of lost ARPA radar targets .....	319
Display of True or Relative speed vectors .....	320
Display of ARPA target data .....	321
How to view ARPA target tracking data of normal targets .....	321
How to view ARPA target tracking data of reference targets.....	322
Source of ARPA radar targets .....	323
Source of ARPA radar targets related alarms.....	323
Display ARPA target past positions .....	324
ARPA Target recording functions .....	325
Using ARPA targets for chart align.....	325
Using ARPA targets for position calculation.....	325
Using ARPA targets for gyro error correction.....	325

## **Radar Echo Overlay 327**

Introduction .....	327
How to activate radar echo overlay on the ECDIS .....	328
Source of radar echo overlay .....	328
Display modes of radar echo overlay .....	329
How to adjust radar echo overlay visual image .....	330
Radar overlay source.....	330
Gain.....	330
Sea clutter filter .....	330
Rain clutter filter .....	331
Echo trail time and trail presentation mode.....	331
Interference reject.....	332
Noise display.....	332

Transparency .....	332
Echo Stretch .....	333
Echo Overload situation .....	333
How to adjust radar echo overlay to match positions of chart features.....	334
Error sources of radar echo image and chart display miss match .....	334
Error sources of radar echo image and display of ARPA target miss match ....	334
How to adjust bearing error .....	335
How to adjust position error .....	336
<b>Recording functions</b>	<b>337</b>
Introduction .....	337
Events and Man Over Board functions .....	337
Voyage recording .....	338
Details log .....	338
Voyage log .....	339
Danger targets log .....	342
How to save past track of a selected ARPA target .....	343
Chart usage log .....	343
How to print Details, Voyage or Danger Targets log .....	344
How to make backup copy from Details, Voyage or Danger Targets log .....	345
How to reset distance counter.....	345
How to reset Voyage and Danger Targets logs .....	345
How to make an User chart from the log (Past track).....	346
Alarms log .....	347
<b>Datum</b>	<b>349</b>
General .....	349
Paper charts .....	349
Electronic sea charts .....	349
Positioning devices and Datum.....	349
ECDIS and Datum .....	350
ECDIS and user selectable local Datum .....	350
<b>Parameters setup</b>	<b>351</b>
Parameters .....	351
How to access to installation parameters.....	352
How to select Datum .....	352
Navigation parameters setting .....	353
Optimization parameters setting .....	356
<b>Colour Calibration</b>	<b>357</b>
Settings of colour calibration.....	357
Colour test for ARCS charts.....	357
Colour Differentiation test for S57 charts .....	358
Grey Scale test.....	359
<b>Steering with EMRI Trackpilot</b>	<b>361</b>
Introduction .....	361
Steering modes of the system.....	361
Hand steering.....	362
Trackpilot steering.....	362
Waypoint mode .....	362
Track mode.....	362
Radar assisted turns .....	362
Track Pilot Control Panel .....	363
How to operate steering functions .....	363

Manual steering operations.....	365
Course control.....	365
Radius control.....	365
Program course change.....	365
Program track turn.....	365
Radar Steering.....	366
Summary of Manual steering modes.....	366
Automatic Route steering.....	367
Mode Goto Waypoint.....	368
Mode Goto Track.....	368
Summary of Route Steering modes.....	368
Preconditions for Route steering.....	369
How to activate Route steering.....	369
Arrival to a Waypoint.....	370
Route Steering Alarms.....	373
Collision avoidance manoeuvre during automatic route steering.....	375
How to stop or modify already enabled route turn.....	376
Radar steering available from selected ARPA radar models.....	377
Notes.....	377
Other possible operations with EMRI Track Pilot.....	379
Speed used by Track Pilot.....	379
Control strategy used by Track Pilot.....	379
Load condition used by Track Pilot.....	379
Description of alarms with EMRI Track Pilot.....	379
Alarms.....	379
Errors.....	381
How to use the Curved EBL.....	382
Structure of the Curved EBL.....	383
How to use the Predictor.....	384

## **Steering with Yokogawa Autopilot 385**

Steering modes of the system.....	385
Hand steering.....	385
Autopilot steering.....	385
Waypoint mode automatic Route Steering.....	385
Automatic route steering.....	386
Characteristics of automatic route steering.....	387
Summary of Route Steering.....	387
Preconditions for Route steering.....	387
How to activate route steering.....	387
Arrival to a Waypoint.....	388
Route Steering Alarms.....	390
Collision avoidance manoeuvre during automatic route steering.....	391
How to stop or modify already enabled route turn.....	391
Notes.....	392
Description of alarms with Yokogawa Autopilot.....	392
Alarms.....	392
Errors.....	392
How to use the Curved EBL with Yokogawa Autopilot.....	393

## **Alarms 395**

Overview.....	395
Alarms generated by Navigation Calculation.....	395
Alarms generated by Chart Calculation.....	395
Alarms generated by Steering Calculation.....	395
Description of the alarm priority system.....	396
List of alarms.....	397
List of Navigation alarms.....	397

List of Chart alarms .....	406
List of Steering alarms with EMRI Trackpilot .....	407
List of Steering alarms with Yokogawa Autopilot.....	411
<b>Definition of Terms</b>	<b>415</b>
List of terms .....	415
Figure 1 .....	418
Figure 2 .....	418
Figure 3 .....	418
<b>Appendix 1</b>	<b>419</b>
IHO ECDIS chart 1.....	419
<b>Appendix 2</b>	<b>425</b>
Short introduction to interpret display of S57 charts .....	425
Paper Chart or Simplified Symbols .....	425
Two colour or Multi colour Depth .....	425
Plain or Symbolised Boundaries.....	426
Limited or Full Light sectors .....	426
Shallow, Safety and Deep Contours .....	426
Shallow pattern.....	427
Sheet Standard: Unknown object or Presentation.....	427
Sheet Standard: Chart data coverage .....	428
Sheet Standard: Land features .....	428
Sheet Standard: Water and seabed features .....	428
Sheet Standard: Traffic routes .....	429
Sheet Standard: Cautionary areas .....	429
Sheet Standard: Information areas.....	429
Sheet Standard: Buoys and beacons .....	430
Sheet Standard: Lights.....	430
Sheet Standard: Fog signals.....	430
Sheet Standard: Radars.....	430
Sheet Standard: Services .....	431
Sheet Other: Information about chart data.....	431
Sheet Other: Land features .....	431
Sheet Other: Soundings .....	432
Sheet Other: Depth contours, current magnetic .....	432
Sheet Other: Seabed and Obstructions .....	432
Sheet Other: Services and small craft facilities .....	433
Sheet Other: Special areas .....	433
Sheet Other: Additional information available .....	433
Sheet Other: Important text .....	434
Sheet Other: Other text.....	434
<b>Appendix 3</b>	<b>437</b>
C-MAP Charts .....	437
Introduction .....	437
S57 Chart Legend with C-MAP charts .....	437
S57 chart managing with C-MAP charts.....	438
Licence system used by the C-MAP.....	438
How to get started with C-MAP charts.....	438
How to keep up to date your C-MAP charts.....	438
How to define subscription of C-MAP charts.....	439
How to load C-MAP charts from a CD into the system.....	444
Use of CD Catalogue.....	447
Catalogue of S57 cells with C-MAP charts .....	448
Group of S57 cells with C-MAP charts .....	450

How to make conversion into SENC and set display date automatically with C-MAP charts .....	453
How to remove C-MAP charts from the system.....	454
How to view status and history of C-MAP charts by a group.....	454

This page is intentionally left blank



# Changes since release 02.01

---

## Overall operation related changes

### Navigation sensors

- If position alignment is used then user is reminded of it every 30 minutes. Alarm "**2011 ChartAlign: over 30 min**".
- In multiple sensor case the Kalman filter indicates changes in its position sources with a new alarm "**2010 Filter: Pos source change**".
- Kalman filter uses always higher priority for known high precision position sensors than for normal position sensors (i.e. A DGPS has always higher influence to estimate than a GPS or LORAN)
- Alarm "**4027 DGPS pos source change**" uses now always a continuous beep until acknowledged. Before the beep style was dependent of the steering mode. Also the priority of this alarm is readjusted (before some less important alarm could suppress it in the priority list).
- Alarm "**2008 Filter. Speed below 4kt**" is now based on ground speed (before water speed). The Kalman filter indicates this situation also with an permanent indication of BAD FILTER.
- Reference target based gyro error correction has now an alarm for lost correction value. Alarm "**2353 RefTgt: Lost gyro corr.**".
- Activation of Reference target requires that there is at least 8 free tracking channels available. If the connected ARPA radar has less than 8 free tracking channels then there is an alarm "**2353 RefTgt: Tracking full**".

### Route Monitoring

- Selection of "Center and border lines for ARPA radar display" .in route monitoring window is dependent of used radar display type.
- Alarm "**2457 Route: Outside channel limit**" is activated once when the ship goes out of the channel limits. Before the alarm was reactivated every 5 minute. NOTE the permanent indication of "OUTSIDE CHANNEL" operates as before and give always an indication of route tracking status.

### Past Tracks

Own ship has now three separate past tracks:

- "System", which is the past track of the system position used for navigation and steering.
- "Primary", which is the past track of a position sensor selected as Primary.
- "Secondary", which is the past track of position sensors selected as Secondary.

### Speed Vectors

- There is now a selection between true and relative speed vectors for own ship and ARPA targets. Before only true vectors were available.

Radar echo overlay

- There is now a selection between true and relative radar echo trails. Before only relative trails were available.

Details log

- details log for last 12 hours include now course over ground and gyro correction in order to provide more complete recording

---

## Chart related changes

S57 and ARCS charts

- chart display has more alternatives to individually select visibility of different text on chart
- Info Request has now transparent area fill for better indication of the area in question
- Info Request show now the coded text for each picked object. Before only attributes and their values were available. This change eases for example usage of light descriptions.

S57 Chart

- Chart Catalogue uses colour coding to indicate up-to-date chart and non up-to-date charts.
- Telecomm order of Charts and updates open now automatically "Order queue window" and inform the user about end of orders when all requested transactions are complete.

---

## Steering related changes

Goto Track steering mode requires Kalman filter and a high precision position sensor such as DGPS, new alarms related to it are:

- alarm "**2491 Disabled: Needs diff pos.**"
- alarm "**2492 Route: Needs diff pos.**"

Program Track Turn steering mode requires Kalman filter and a high precision position sensor such as DGPS, new alarms related to it are:

- alarm "**2493 ProgTurn: Needs filter ON.**"
- alarm "**2494 ProgTurn: Needs diff pos.**"
- alarm "**2495 ProgTurn: Needs log sens..**"

Display of curved EBL shows correctly "program course changes" of more than 180 degrees.

# Changes since release 02.00

---

## Overall operation changes

### Route Planning

- The maximum value of radius in a waypoint has been increased from 2.0 nm to 3.0 nm.

---

## Chart related changes

### S57 charts

- Compatibility with the official encrypted ENC chart service from a RENC has been added. This service is available using CD-ROMs and Telecomm, see chapter "Introduction to the S57 charts service from a RENC"
- Load using CD Catalogue identifies the issue data of a CD-ROM, see "How to load S57 Charts from a CD-ROM, floppy or LAN"
- Load using CD Catalogue has a new selector "Missing only", see chapter "How to load S57 Charts from a CD-ROM, floppy or LAN"
- Remove has been added in Load or View CD Catalogue "How to load S57 Charts from a CD-ROM, floppy or LAN"
- A world chart at scale 1:12 000 000 has been added as a backdrop in the Catalogue. It makes easier to view the coverage of S57 charts.

# Changes since release B1.16

---

## Overall operation related changes

Unused push button “Cursor mode” of the Control panel has been renamed as “Radar” and it controls ARPA target source and a new feature radar overlay.

Voyage recording has following new features

- **Current alarms** - a window to view the queue of current alarms
- **Chart Usage** - a detailed log of chart usage
- Reset **Trip counter** - reset for added trip counter
- “**Record**” flip card has been added to take care of recording of the position fixes. Alternative position fixes to be recorded are: Connected position sensor, Kalman filter, Dead reckoning, Visual, Astronomical and MFDF.
- Used time zone (which is always UTC) is indicated in “Chart Usage Log”

Following features of the Voyage recording has been changed:

- Details log - limited chart usage log previously available has been moved to chart usage

Route Planning has following new features:

- **Passage Plan** - A combine report from Route Plan and Pilot Data
- Total length of the planned route is now easier available than before. Total length has been included in standard WP and Params sheets of the Route Plan. Before the total length was only available from Report of the Route Plan.
- Route Plan window has now an indicator to show if the planned route is currently selected as visible on ECDIS chart screen. This has been added to remove confusion about non visible items. Indicator has following alternatives: “displayed”, “not displayed” and “partly displayed”

User Chart has following new features:

- If the Symbol-field of a Symbol-object is empty, then the content of the Name-field is displayed on ECDIS screen.
- A **Report** has been added for Area Objects
- **Combine** - a feature to easily import all objects from other user charts instead of individually importing them.
- **Drawing Point** has been renamed as **Point**. To ease the use of User Chart the system can now operate without any point defined, if the User Chart has less than 60 lines and 20 symbols.
- “**Tidal**” flip card has been added to control user defined symbols of actual and predicted tidal information.
- User Chart edit ergonomic has been improved
  - Each User Chart item window has now an indicator to show if the used feature is currently selected as visible on ECDIS chart screen. This has been added to remove confusion about non visible items. Indicator has following alternatives: “displayed”, “not displayed” and “partly displayed”
  - User Char “Line” item has been changed to indicate a small cross at line start when the line end is not yet defined. This removes confusion about acceptance of the line start point.

- User Char “Area” item has been changed to indicate a small cross at area corner points, when there are less than 3 corners which is a minimum for a real area. This removes confusion about acceptance of the corner points.
- Symbols and Lines of User chart can be used for Chart Alarms
- Info Request can be used to pick all User Chart features

#### Pilot Data

- Pilot Data has been modified to show its text also over chart on ECDIS screen
- Pilot data window has now an indicator to show if the used Pilot data is currently selected as visible on ECDIS chart screen. This has been added to remove confusion about non visible items. Indicator has following alternatives: “displayed”, “not displayed” and “partly displayed”

#### Reference Target

- Reference Target window has now an indicator to show if Reference Target is currently selected as visible on ECDIS chart screen. This has been added to remove confusion about non visible items. Indicator has following alternatives: “displayed” and “not displayed”
- Info Request can be used to pick Reference Targets

#### Route monitoring

- Alarms 2451, 2457 and 2458 are now operative during Route Monitoring. Earlier they were available only during automatic Route Steering.

Backup and Restore (Previously File Maintenance) operates also with following file types

- **Chart Display Settings** - user settings of Chart details
- **Paper Chart Setup** -Digitizer files - setting of chart corners, scales etc.
- **Presentation Libraries** DAI - S52 Presentation libraries (new format used for current editions)
- Presentation 000 - S52 Presentation libraries (old format used until 1997)
- **All Charts & Updates** – to copy charts between main and backup ECDIS processors
- **Logs**

#### Radar Echo Overlay

- A new feature, which is optionally available, has been added.

#### Selftest

- Selftest has been enlarged to include Colour Calibration of the monitor and it is moved to ECDIS EC 1000 Technical Manual.

Navigation sensor and navigation calculation have following new features:

- Kalman filter can only be used when the speed is over 4 knots. The reason is to avoid automatically the use of Kalman filter during unsuitable periods. The Kalman filter is designed for Automatic Route Steering.
- User can select alarm or no alarm for change of status of differential signal of a DGPS. PRIMARY and SECONDARY options give alarm if differential signal is lost or recovered. PRIMARY NO ALARM and SECONDARY NO ALARM will not activate an alarm.
- Loss of differential signal has permanent indication in upper Information area of the ECDIS screen. Red text LOST DGPS indicates that differential signal has been lost.
- Kalman filter indicates bad position sensors in Sensor window. Their position data is red instead of normal black.. Red text BAD FILTER indicates permanently this situation in upper information area of the ECDIS.
- Speed/course over ground calculation point has been changed from sensor (dual axis log) or antenna (position receiver) to conning position
- Speed/course over ground and Drift calculation has been changed from longitudinal speed/heading + drift with filtered drift to sensor measurement of smg/cmng compared to longitudinal speed/heading. And the drift is calculated using a filter from sensor measurement of smg/cmng compared to longitudinal speed/heading.
- Non valid own ship position is indicated as NO POSIT instead of DEADREC if there are no valid dead reckoning sensors available.
- Sensor operating mode is now indicated where appropriate (example: Bottom or Water for log etc.).

- Own ship gyro, smg , smg and drift source is now indicated.
- Depth value is now indicated as “Depth below transducer”
- Wind speed units can be changed between "m/s" and "Kt".

#### Alarms

- Following alarms has been added or have changed text: 1101, 1102, 2000, 2005, 2006, 2009, 2055, 2061, ,2071, 2072, 2101, 2351, 2352, 2459, 2460, 2469,2471, 2480, 2488, 2489, 4021, 4033

#### Antigrounding and Safe water calculation

- The new name of the identical function is **Chart Alarms**.

#### Past track

- A bug related to Past track presentation with ARCS has been fixed.

#### Predictor

- Predictor time has been changed from 1 min to 30 sec

#### ARPA Targets

- Label for a normal ARPA target has been changed from R1, R2, .. to 1, 2, ..
- Label for an ARPA target used as reference target has been changed from I1, I2, ...to R1, R2,
- A target in “query” state is indicated as “query” instead of “tracking”

#### Max speed of own vessel

- Max speed of the own vessel was defined in two different parameter windows: Ship and Route parameter and Optimisation parameters. Now it is available only in Ship and Route parameter -window.

#### VRM and EBL

- You can set numeric value for EBL and VRM. You can also move VRM or EBL with CHART ALIGN from any point of VRM circle or EBL line.

---

# Chart related changes

## Change of visible chart area

- The visible chart area is now significantly wider than before. In a standard 21 inch monitor the chart is 12 millimetres wider than before.

## Improvements of the S57 ENC chart loading and usage

- The whole process to load S57 ENC charts from CD-ROMs has been revised and simplified.
- Date Dependent (previously Update History) window has Cell Status soft key which gives an easy and fast path to view details of any chart cell. Old and still available method was to use S57 Chart Plan - Cell Status - Cells to select and view status. Date Dependent include a warning check for both Displayed Until and Approved Until dates.
- An ENC to SENC conversion history window is now available in SENC Convert dialogue. This gives an easy to read summary of all SENC conversion.
- Wrong operation around 180E / 180W border has now been fixed

## Improvement of S57 Info request

- Now it is easier to familiarise with the used S57 chart symbology because a direct menu option to open examples of presentation has been added. It can be found under S57 Chart Plan - **ECDIS Chart 1**.
- It is possible to view contents of Picture files associated with the S57 ENC charts
- It is possible to view contents of Text files associated with the S57 ENC charts
- Tidal Stream Panel is now available also as formatted text and it is easier to understand
- Graphical peek window for a master object includes also graphical presentation of the slave objects (i.e. graphical presentation of a picked buoy includes now light, fog signal, top hat etc.)

## Improvements of the ARCS chart usage

- Indicated ARCS displayed scale match now 21 inch CRT monitor size. Before the indicated scale was equal to the original paper chart scale.
- "Show system info" has been changed to "ARCS Update Status"

## Chart details selection windows has small adjustments:

- Selection of **Mariner text** and **Manufacturer text** is moved from Other to Standard page

## New Manual Update editor

- A Manual Update Editor has been added for S57 and ARCS charts. It can be used to enter Notices to Mariners and Navtex warnings manually into the chart display

## Improvement of backup facilities for S57 and ARCS charts

- Backup and Restore has now an easy option to keeps charts identical in double ECDIS installations

## Used presentation

The ECDIS uses S52 standard presentation for all non chart objects. Both S57 and ARCS uses S52 standard presentation. User can check the used presentation library from both S57 and ARCS: Chart Plan - System - S52 Presentation library. The reason for changes has been ECDIS type approval requirements together with legal presentations defined in ECDIS type approval standards. As a consequence following non chart object has significantly changed presentation:

Object	Old presentation	New presentation
User Chart Line features	Various blue lines	Various dark yellow or red lines. Red is used if the Line is set as dangerous.
User Chart Area features	Transparent blue area with blue line around	Transparent dark yellow area with either dark yellow or red line around. Red is used if the Area is set as dangerous.
User Chart Symbol features	Various blue characters	Various dark yellow or red characters. Red is used if the Symbol is set as dangerous.
User Chart Drawing point features	Blue box with a blue D symbol inside	Dark yellow circle with a line inside
Reference Target features	Blue box with a blue R symbol inside	Dark yellow circle with a ! symbol inside
Pilot data	Orange box with a orange i symbol inside and an orange range circle.	Orange box with a orange i symbol inside. and an orange range circle and back text.
Planned route center line	Red dashed line	Orange dotted line
Planned route border line	Red dashed line	Orange solid line
Monitored route center line	Red solid line	Red filled circle line
Monitored route border line	Red solid line	Red solid line
Own ship speed vector	Black line with a hole at each minute. No arrow head mark.	Black line with a short line at each minute. An arrow head mark in the end of speed vector which indicates water or ground stabilisation.
ARPA target speed vector	Green solid line. No arrow head mark.	Green line with a short line at each minute. An arrow head mark in the end of speed vector which indicates water or ground stabilisation.
Nav Mark VRM features	Two different line styles of orange colour - one for first VRM and another for second VRM	Theoretically two different line styles of orange colour as before, but because of drawing rules defined in ECDIS standards they are both presented normally as dashed lines.



# Introduction

---

## Manual Applicability

The Operators Manual of ECDIS EC 1000 provides information of following things:

- Abridged operator instructions.
- Screen interpretation and use of Control panel.
- Set up before departure.
- Rules to replace paper charts with electronic ones.
- Chart material handling.
- Manual Updates which are used to manually enter Notices to Mariners and Navtex warnings.
- Chart Alarm calculation.
- Route planning and monitoring.
- Various user tools such as User Charts, Pilot Data, Reference targets and Navigation tools.
- Backup operations.
- Use of navigation sensors.
- Use of ARPA targets.
- Radar Echo Overlay.
- Various recording functions.
- Essential information of the Datum used by the charts and the ECDIS.
- Steering related operations.
- List of alarms.

The Technical Manual of ECDIS EC 1000, which is published separately, provides information of following things:

- Hardware configurations.
- Installation instructions.
- Troubleshooting.
- Failure mode analysis.

---

## System Configuration

ECDIS processor displays electronic seachart and operates as user interface.

ECDIS processor is connected to various sensors, does navigation calculations and route monitoring. Connections to interfaces are typically made with serial communication lines.

ECDIS processor can be used for both route planning and route monitoring. If required, there can be an additional identical ECDIS processor which is used for route planning. ECDIS processors are connected together with Local Area Network of ETHERNET type.

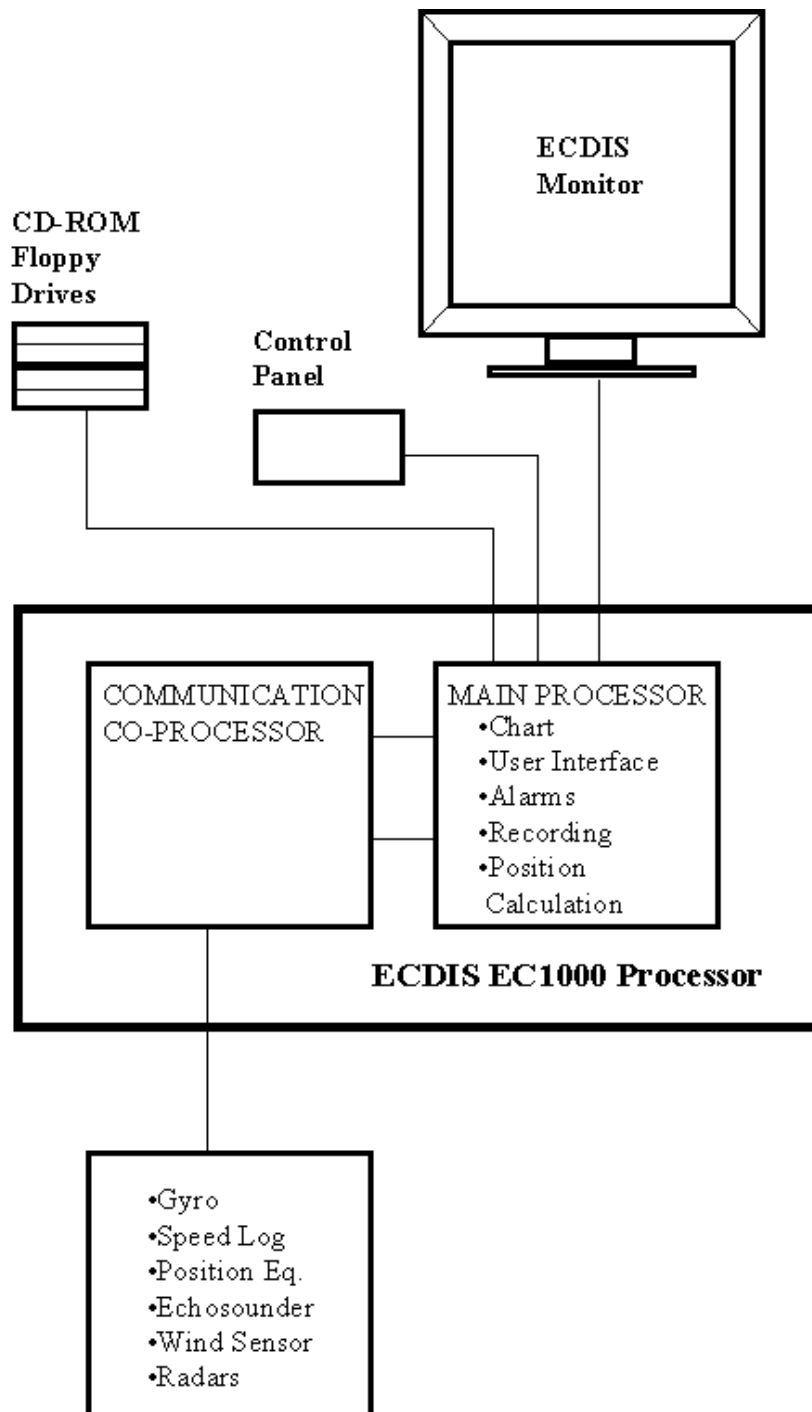


FIG 1.1. Configuration of ECDIS EC 1000.

---

## How to read this manual

The ECDIS is built on the platform of Windows NT. So the windows, menus and dialogues outfit seem same as in other Windows application. If you are not familiar with Windows 3.x or Windows NT refer for more information to manuals of Windows NT.

Below are explanations for a few terms used in this manual:

Set time
Parameter Backup
Digitizer
Backup and Restore
Installation parameters
Navigation parameters ▶
Optimization parameters ▶
Chart Alarm parameters
Print Navigation parameters ▶
Print Optimization parameters ▶
Selftest
Presentation library

This is typical menu of ECDIS. From this menu user can execute appropriate function. There can be two kinds of function in the menu:

1. Command, which executes directly function.
2. Command followed small triangle. By selecting function like that it will appear submenu where user can select appropriate function to execute.

There can also be command which is grey. Greyed commands are not active or they are for future use. They are not selectable.

A list box:

**Scale**       ▾

An edit box:

**Echo alarm depth**       m

Selected check box:

**Drying line**

A check box not selected:

**Spot soundings**

This page is intentionally left blank

# Abridged Operator Instructions

---

## Introduction

These instructions follow a logical order enabling the navigator to quickly gain an insight into the systems operation. The source of abridged instructions is Warsash Maritime Center, Southampton, UK.

---

## Own ship

These instructions follow a logical order enabling the navigator to quickly gain an insight into the systems operation.

## Vessel position

On the Control Panel, single press **SHIP OFF CENTER**. This will place the vessel at the position of the cursor. Press **ZOOM IN** to increase scale, or **ZOOM OUT** for smaller scale.

## Ship symbol

The vessel position is indicated by a circle, the centre indicates the antenna position of fixing system.

At large scale the vessel is indicated by a ship shape the intersection indicates the antenna position of the fixing system.

Vessel **ground track** is shown by a dashed vector.

Vessel **heading** is shown by a solid vector.

To change the length of the own ship vector:

1. Press **CHART DISPLAY** in the Control Panel.
2. Place cursor on CHART and press **SELECT**.
3. A box will open showing **Vector Time**, place cursor on box next to Vector Time and press **SELECT**.
4. A numerical table now opens select the required time using cursor and **SELECT** button.
5. Place cursor on **OK** and select to enter new vector length.

## Own vessel past track

Press **CHART DISPLAY** in Control Panel, open "**Tracking**" page. In the box "Past Tracks" the first panel below this title refers to own ship. Use the cursor and select button to activate desired settings.

**Off** turns off the displayed information in that particular line.

**Std** activates the tracking information on the current display.

**Other** activates the tracking information on the current display until **STANDARD DISPLAY** button is pressed, then selection is removed as Off position.

**Primary** the tracking information uses the primary position source.

**Secondary** the tracking information uses the secondary position source.

**Length** use cursor and select to adjust length of track history.

**Labels** use cursor and select to specify interval between dots on the history track.

---

# Chart information

## Chart motion

1. Press the **DISPLAY MODE** in the Control Panel, a menu opens.
2. Place cursor over **DISPLAY MODE** and select using **SELECT** button.
3. A sub menu opens with **True motion** and **Relative motion**.
4. Use cursor to select desired motion.

## Chart Legend

Press **CANCEL** in the Control Panel until panel appears with Chart Number as top item. This is the Chart Legend display and contains information about edition date and updates of displayed chart as follows:

<b>Chart Number</b>	Number of current displayed chart.
<b>Country of origin</b>	Country which produced chart data.
<b>Latest NM</b>	Date of latest Notices to Mariners included on chart.
<b>Edition Date</b>	Date chart issued.
<b>Publication Date</b>	Issue date of Update CD used to update the system.
<b>WGS shift status</b>	Indicates shift between local Datum and WGS 84 as: <b>DEFINED</b> =Shift is known <b>UNDEFIND</b> =shift unknown or user defined <b>PARTIAL DEFINED</b> =shift known only at some parts of the chart

### T&P Notices

Selecting this function with the cursor will open a panel containing information about Notices to mariners after the edition date.

### Details

Selecting this function with the cursor will open a panel regarding detailed information of the chart displayed. Of great importance is the lower section showing the shift of datum comparing WGS 84 position and the same position in local datum.

### Warnings

Recent warnings not included in the Notices to Mariners.

---

# Chart datum

## Cursor datum

1. Press **INITIAL SETTINGS** button in Control Panel.
2. The panel containing datum will appear (**This should always be set at WGS 84**)
3. To change datum place cursor over desired datum and select.
4. This will change only the cursor read out and ship position read out but NOT the displayed position.

## Display datum

1. Press **CANCEL** button until Chart Legend panel appears.
2. Place cursor over **Details** button and select.
3. Place cursor over **WGS84 Shift** and select.
4. The **ARCS WGS84 Shift** page opens, at the bottom is the box **Output**, this must be set to **Chart WGS Shift**.
5. This will apply the datum shift indicated by CHART SHIFT to the display and ensure the cursor and display is operating on the same datum.

## Define datum

This can only be used when **WGS shift status** is **UNDEFINED** or **PARTIAL DEFINED**.

1. Press and hold down **CHART ALIGN** button with the cursor over own ship.
2. With button still pressed move cursor to correct position and release **CHART ALIGN** button.
3. To reset datum to original values press **Reset** button.

---

# Chart Management

## Move chart

Place cursor in desired position of chart and press **SET CHART CENTER** in the Control Panel.

## Chart type

1. Press **CHART PLAN** button in the Control Panel.
2. In the menu select 

<b>Activate S57 chart</b>	for vector chart
<b>Activate ARCS chart</b>	for raster chart

**This system will automatically load charts as the operators zooms in or out.**

### Open ARCS chart

1. Select **Catalogue** from the menu
2. The ARCS catalog window will open containing the box **View Filters**.
3. Select required settings from the box **View Filters**:

<b>Insets</b>	Displays insets (plans) included in charts
<b>Names</b>	Displays chart numbers
<b>All Charts</b>	Display limits of all available ARCS charts
<b>Permit Charts</b>	Display limits of all charts with permits
<b>Group Charts</b>	Display limits of user defined group charts
4. Select scale required as **Planing, Ocean, Coastal, Approach, Harbour**.
5. The different colour borders indicate the following:

<b>Green</b>	available for use
<b>Magenta</b>	chart not loaded but permit available
<b>Red</b>	chart not loaded and no permit is available
6. Place the cursor on the boarder of the required chart and select
7. Information about the chart will appear in the **Selected Chart** box
8. **Preview** allows the chart to be viewed in a small scale
9. **Open** opens the selected chart

### Open known chart

1. Press **CHART PLAN** and select from the menu **Open**
2. Select **Manual** from the sub menu, ARCS Open box appears
3. Select required chart from the list with the cursor
4. Press **Open** to open chart

---

# Alarms

## System alarm

When the ECDIS generates an alarm the warning will appear in red at the lower left-hand corner of the display replacing UTC time.

## Steering alarm

When a failure of an integrated system generates an alarm this will appear in red at the centre of the lower part of the display replacing local time

## Acknowledge alarm

Both these alarm will generate an audio alarm which can be accepted by pressing **ALARM ACK** in the Control Panel

## System Failure

This lamp is lit and an audible alarm is generated in case of internal failure that has serious effects for operation.

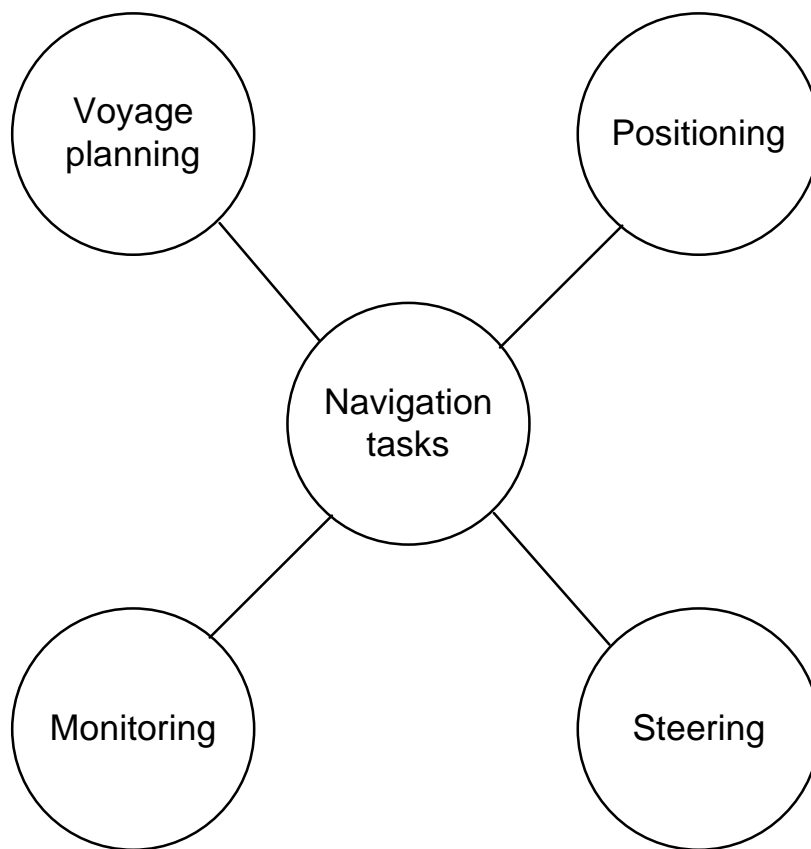


# Navigation Tasks

---

## Overview

Navigation tasks can be divided to four basic tasks:



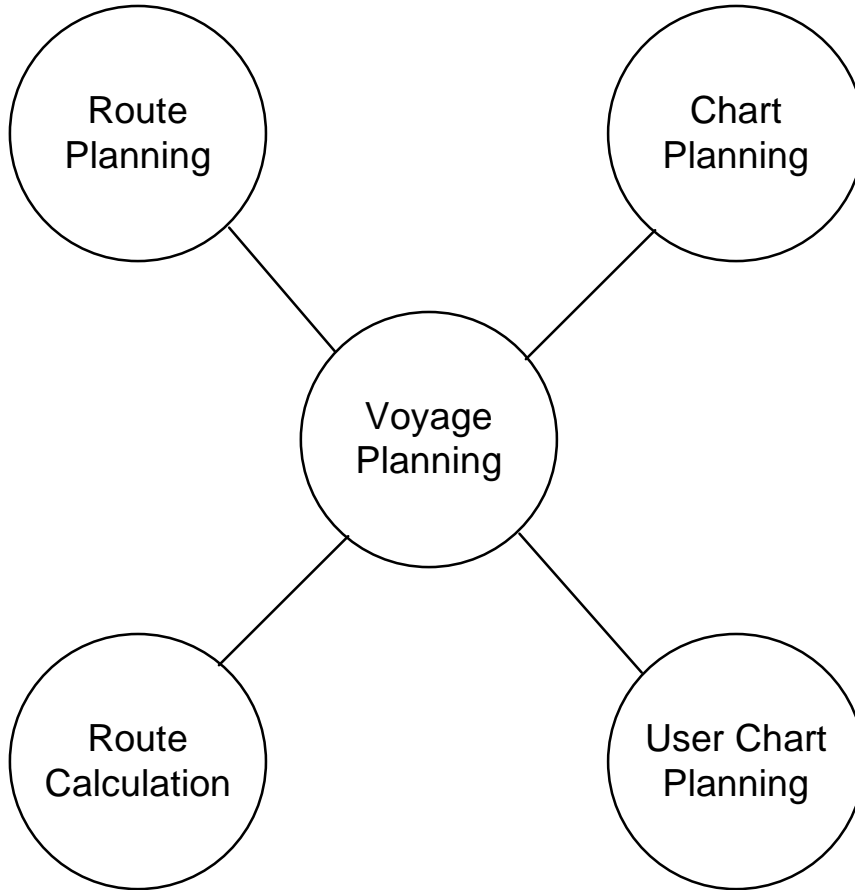
*Navigation Tasks*

---

## Voyage planning

Voyage planning is a preparation phase for coming voyage. Preparation includes route definition, route calculation and optimisation.

Required sea charts are also prepared in voyage planning either by updating existing charts or creating new ones.



### Route Planning

Modification an existing route or creating the whole new route is the way to do Route planning.

1. Definition of route consists following:
  - Position of each waypoint
  - Turning instruction for each waypoint
  - Safety limits between waypoints (channel limits)
  - Safe water calculation based on Safety limits
  - Required steering accuracy for individual leg
  - Speed restrictions for a leg
2. Information notebook
  - Information pages to alert operator at a given waypoint or in the selected area.
  - Automatic and/or manual notebook function to tell operator position based information.
3. Voyage optimisation parameters.

## Route Calculation

Route calculation for voyage planning includes following:

1. Route profile calculation
  - Distance between consecutive waypoints
  - Course between waypoints
  - Calculation of wheel over point
  - Total distance
  - Estimated time for voyage
2. Route check
  - Grounding alarm based on available depth information in digital chart data base
3. Voyage optimisation
  - Time table optimisation
  - Optimisation based on economical factors
  - The ECDIS processor calculates optimum speed and course between each waypoint, ETA and fuel consumption, based on the defined data. There are 4 calculation strategies: Max. Speed, Timetable, Lowest Cost and Best Profit. In case of great circle sailing between two waypoints the ECDIS calculates max. and min latitudes and if needed adds an extra waypoint not to go over min or max. latitude.

## Chart planning

1. Loading of new S57 and ARCS charts
2. Updating on existing S57 and ARCS charts
3. Handling of chart permits
4. Manual update

## User Chart planning

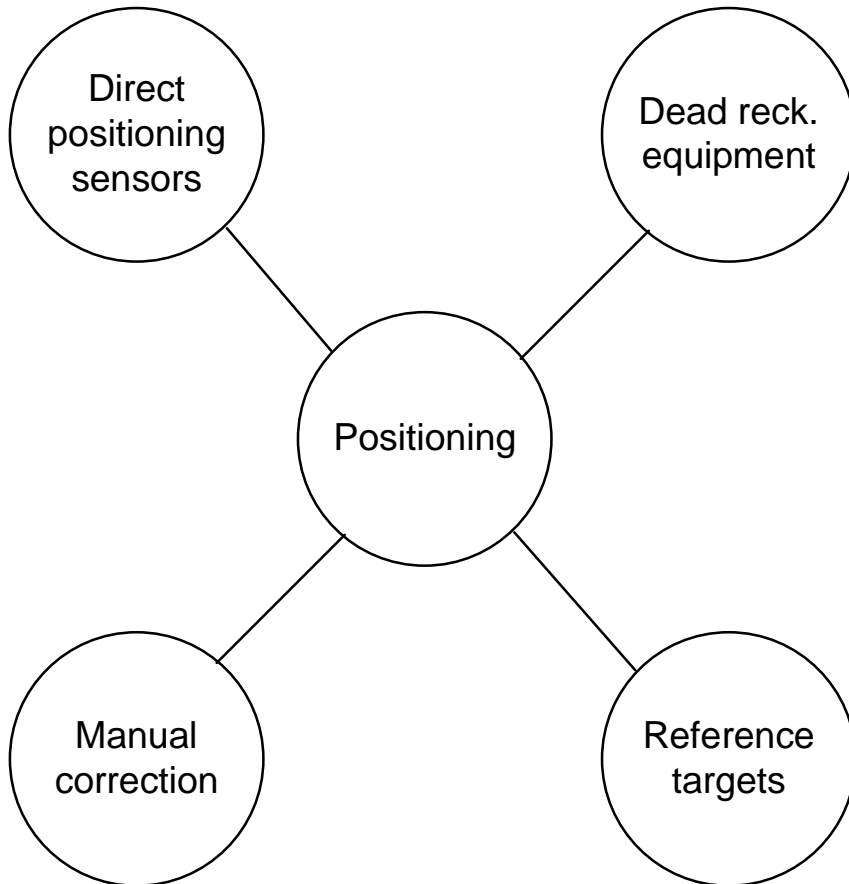
1. User generated navigation charts
2. User defined chart alarms based on symbols, lines and areas of User chart

---

# Positioning

Positioning means all available methods to calculate and keep updated ship's position during a voyage.

The calculation of ship's position is based on available navigation sensors. The system integrates valid information from different sensors and uses the Kalman filter technology for final position calculation.



## Direct Positioning sensors

a) Radio navigation equipment:

- Decca navigator
- Loran-C navigator
- Syledis navigator
- Local position fixing systems

Radio navigation devices supplies continuous position but are not typically available world wide.

b) Satellite navigation systems:

- GPS navigator
- GPS navigator with a differential correction facility, DGPS

## Dead Reckoning equipment

a) Ship's heading measurement devices:

- Gyro compass
- Magnetic compass
- GPS gyro compass

b) Speed measuring devices:

- Single axis speed logs

- Dual axis speed logs
- Radio navigation equipment
- Satellite navigation equipment

## **Reference Targets**

Ship position calculation based on selected radar object called Reference Target. Selection of radar objects is carried out in chart planning phase.

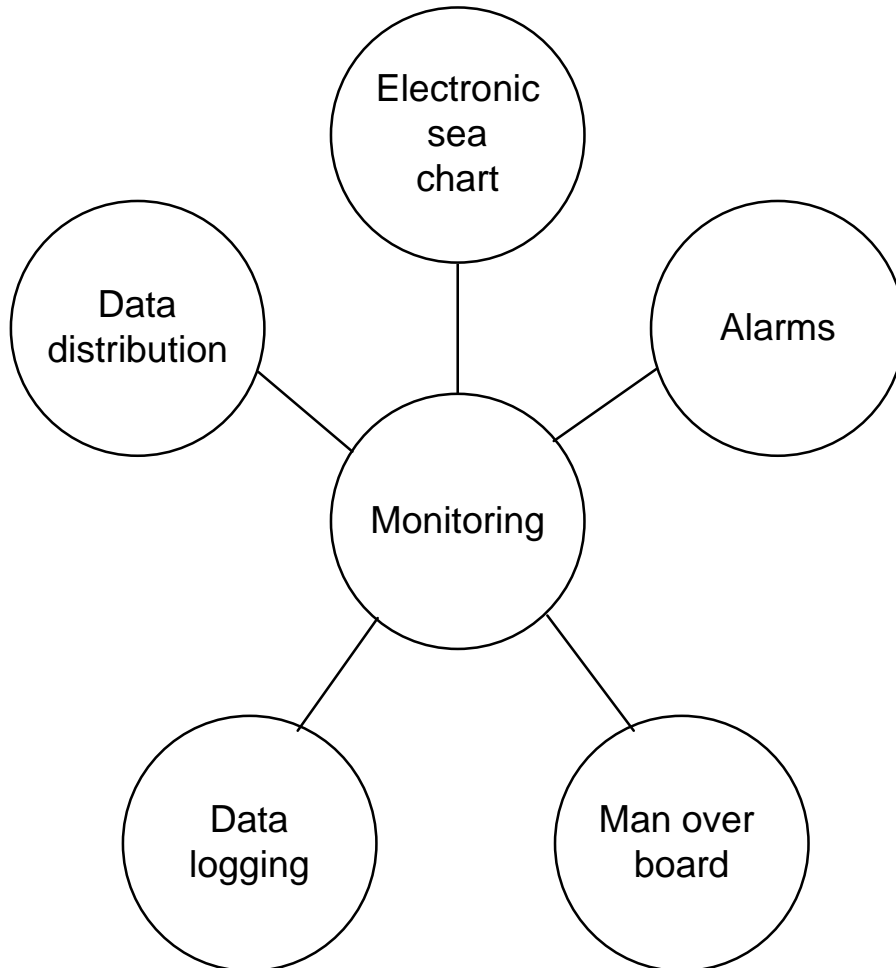
## **Manual Correction**

User activated position correction where radar echoes and information of synthetic chart are combined and verified by operator, and adjusted if necessary.

---

# Monitoring

Monitoring is a continuous check of navigation data, user actions and performance of the system.  
Part of the monitoring is also the display of electronic sea chart and conning information.



## Display of electronic sea chart

- Own ship position
- Planned track
- Planned safety lines
- Ship's predictor
- Chart alarms
- ARPA targets
- Chart information

## Alarms

- Route monitoring alarms
- Position calculation alarms
- Position monitoring alarms
- Waypoint approach alarms
- Alarms for sensor failure
- Alarms for system failure

- Alarms for incorrect operator action
- Alarm based on chart database

## **Man Over Board**

Built-in function for man over board.

## **Data Logging**

- Past track history
- Events
- Dangerous targets
- Voyage recording

## **Data Distribution**

- Connection to on board computer system

This page is intentionally left blank



# ECDIS Screen

## Overview

The screenshot shows the ECDIS interface with the following components and data:

- Upper status bar:** Mon.Route Osku1, Plan Route, Pilot Data, Depth metres, Height metres, North Up, TM, TrueVect, UserChart, Ref Target, ARPA 2, Radar, FEC1, Ship off screen.
- Information area (upper):**

59°48.506N	Gyro (corr)	204.6°	
024°47.028E	CMG (pos)	206.5°	
WGS 84	OFFSET	SMG 17.2 Kt	
Plan Speed	18.0 Kt	Next WP	14
Plan CTS	88.3°	Dist WOP	nm
Route	95.6°	ETA	
Ch limit	185m	Next CTS	88.3°
Off track	m	Turn rad	1.0 nm
		Turn rate	19°/min
- Chart legend / Dialog box area:** S57 chart legend
 

Cell name	AA5C1Q00
Navigational purpose	Harbour
Issue date	19990203
Edition number	2
Last displayed update	000
Update issue date	19990203
Last update appl. date	19990203
Projection	Mercator
Horizontal datum	WGS 84
Vertical datum	Higher high water large tide
Sounding datum	Lowest low water
Quality of data	
Magnetic var.	
- Information area (lower):**

Cursor		
From Own Ship:	3002.6 nm	206.6°
	15°03.524N	095°03.111W
- Lower status bar:** 04.07.2000 06:44 UTC, 04.07.2000 07:44 GMT Standard, 1:10 000, 02.02 02.02

Parts of the ECDIS display.

The ECDIS (Electronic Chart Display and Information Systems) screen includes several areas. There is statusbar at the top and the bottom of the screen, which are shown permanently. The upper and lower right hand corner is taken up by permanently shown in Information area. Between these areas there is a Dialog box area where user can fill or choose appropriate options. The left hand part of the ECDIS screen is the Electronic chart area. When the push button is pressed from the Control Panel appropriate menu opens up at the current cursor's location.

---

## Electronic chart area

The ECDIS can use the following types of charts:

- S57ed3 ENC charts (vector)
- CM-93 charts (vector)
- ARCS charts (raster)

There can also be displayed following information:

- cursor moved by trackball
- planned route
- EBL (Electronic Bearing Line) and VRM
- symbol of ownship with speed vector
- targets acquired by ARPA

## Electronic charts in ECDIS

The electronic navigational charts are displayed in Electronic chart area. There are two kinds of electronic navigational charts available to use in the ECDIS:

- S57ed3 ENC or CM-93 vector format
- ARCS raster format

S57ed3 ENC and ARCS electronic charts may substitute official paper charts. User should check the current situation from his flag country administration and if in doubt use the paper charts as primary source of navigational information.

ECDIS combines chart and navigational information. It should be noted that modern navigation systems (e.g., differential GPS) may offer a more accurate positioning than was available to position some of the surveys from which the electronic navigational chart was derived.

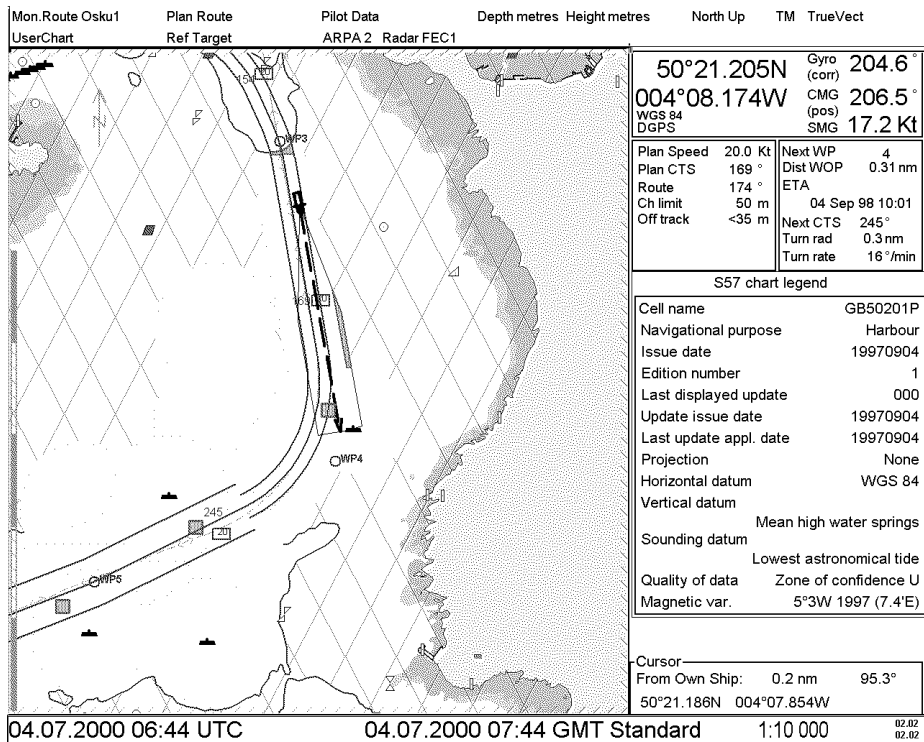
### **S57 vector format:**

ECDIS is compatible with S57 release 3 ENC format. From this format the ECDIS generates the “System ENC”, = SENC, which is used for actually for operations the ECDIS.

When opening a chart it is displayed with default scale called compilation scale. It is possible to modify details of chart displayed in Electronic chart area. You can change scale of chart by pressing ZOOM IN and ZOOM OUT pushbuttons. Scale range is 1:1 000 - 1:50 000 000.

### **CM-93:**

Compatibility with CM-93 format depends on commercial agreements. Some versions of this ECDIS are compatible and others are not. The compatibility is controlled by the security device called dongle. From CM-93 format the ECDIS generates SENC which is used for actual operations of the ECDIS. The difference between S57ed3 ENC charts and CM-93 charts is that the CM-93 charts are from a private source and they cannot be used as a substitute of paper chart under any condition. To highlight that part they are later called as NON-HO charts in this manual.

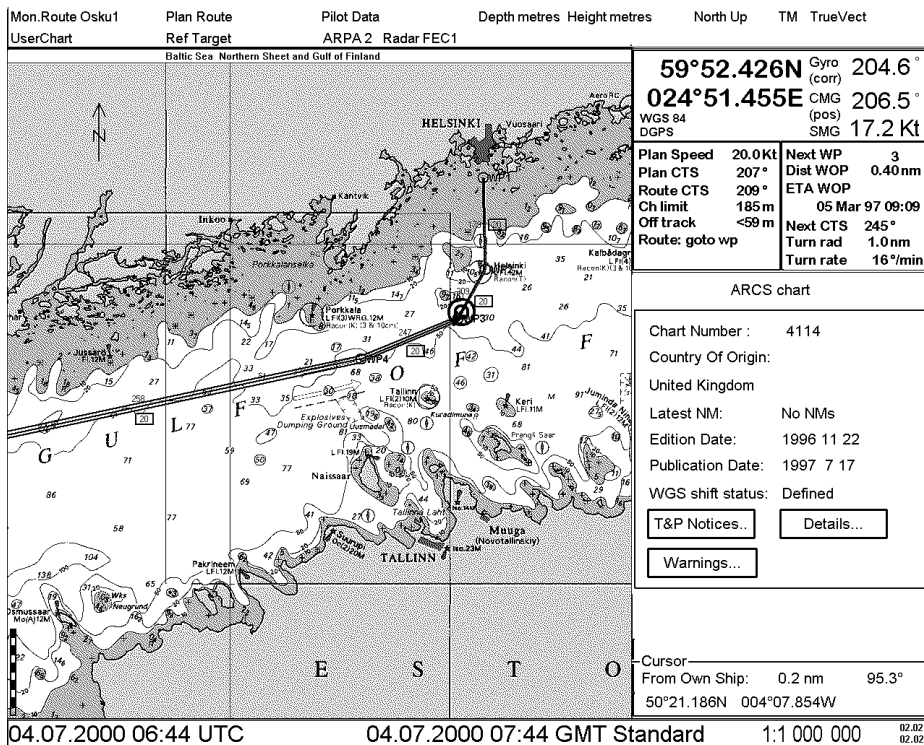


Display of S57 chart on ECDIS screen

**ARCS raster format:**

ARCS charts are digital reproductions of British Admiralty (BA) paper charts. They retain the same standards of accuracy, reliability and clarity as paper charts.

Zooming into the ARCS chart can be useful for magnifying complex detail, but decreases the density of data displayed, and can give a false impression of distance from danger. Therefore it is possible to zoom 2\*original paper chart's scale or 1/2\*original paper chart's scale.



Display of ARCS chart on ECDIS screen.

---

## Dialogbox area

Content of Dialogbox area is depending on status of ECDIS. This is the area where user can discuss with application. If user has pressed a pushbutton of Control panel and chooses desired menu command from the menu there will appear the corresponding dialog box in the Dialog box area.

---

## Upper statusbar

The data displayed in upper statusbar includes the following information in the first line listed from left to right:

Mon.Route Osku1	Plan Route STO-OUT	Pilot Data TYHJA	Depth metres	Height metres	North Up	TM	TrueVect	TrueTrail
UserChart MK_18	Ref Target MK_18	ARPA 1	Radar Sindel21					

### Mon. Route

The name of selected route for monitoring.

### Plan Route

The name of selected route for planning.

### Pilot data

The name of selected Pilot data.

### Depth

There is measurement unit of depth on the displayed chart in this field.

### Height

There is measurement unit of the displayed chart above sea level in this field.

### TM / RM

True Motion or Relative Motion indicates the mode of display stabilisation.

### TrueVect / RelVect

True Vector or Relative Vector indicates the mode of displayed vector of ARPA target.

### TrueTrail / RelTrail

True Trail or Relative Trail of displayed Radar video

Mon.Route Osku1	Plan Route STO-OUT	Pilot Data TYHJA	Depth metres	Height metres	North Up	TM	TrueVect	TrueTrail
UserChart MK_18	Ref Target MK_18	ARPA 1	Radar Sindel21					

There is in the second line from left to right following information (Displayed text is depending on status of ECDIS, scale of the displayed chart and position devices, which are connected to ECDIS):

### UserChart

There is name of User Chart in this field.

### Ref target

There is name of reference target's file in this field.

### ARPA X

There is number of ARPA radar which is the current source of target data.

### Overscale/Underscale

Indicates that scale of displayed chart is larger/smaller than the original scale of paper chart

### LARGER DATA EXISTS (S57 charts), Larger scale available (ARCS charts)

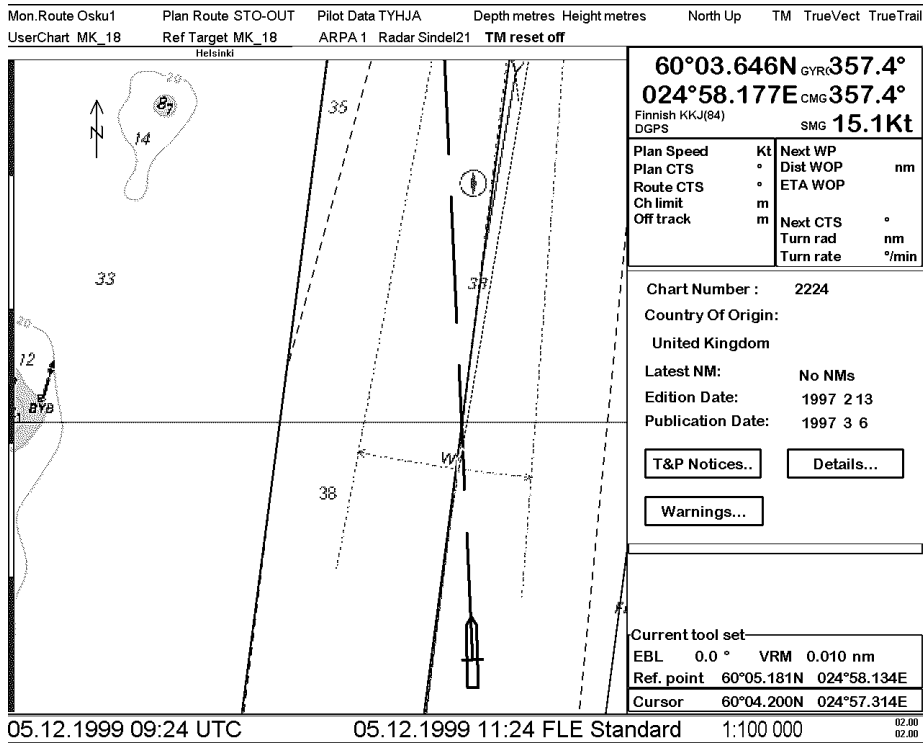
There is available chart, which scale is larger than displayed chart.

### SHIP OFF SCREEN (S57 charts), Ship out of dsp (ARCS charts)

This is indicating that ship is not in displayed area.

### TM RESET OFF

This is indicating that true motion or relative motion is not in use, although own ship is on display.



Note indication of TM RESET OFF.

## Lower statusbar

The data displayed in lower statusbar includes the following listed from left to right:

### UTC time

Co-ordinated Universal Time. The UTC time indicates time on Greenwich Meridian.

### Local time zone

User can select local time zone to be displayed in this field.

### Scale

Scale of displayed chart is shown in this field.

### Software release

Current software release is shown here. Upper value is software release of the ECDIS chart. Lower value is software release of the ECDIS navigation interface.

### Alarms:

Alarms generated by the system (replace UTC time) and by the steering (replace local time) is shown in lower status bar.

04.07.2000 06:44 UTC	04.07.2000 07:44 GMT Standard	1:10 000	02.02 02.02
----------------------	-------------------------------	----------	----------------

Lower status bar in normal operation.

2009 Position source change	04.07.2000 07:44 GMT Standard	1:10 000	02.02 02.02
-----------------------------	-------------------------------	----------	----------------

Lower status bar, when the system has generated an alarm.

04.07.2000 06:44 UTC	2486 Disabled: Steering off	1:10 000	02.02 02.02
----------------------	-----------------------------	----------	----------------

Lower status bar, when the steering has generated an alarm.

---

## Information Area

There is in the Information area where it is permanently displayed information about the position of own ship and the route monitoring (upper part of the area) and information of cursor's location on the chart (lower part of area).

60°00.537N	Gyro (corr)	352.8°
024°59.884E	CMG (pos)	352.9°
WGS 84	SMG	17.3Kt
GPS		

Plan Speed	19.0 Kt	Next WP	2
Plan CTS	2 °	Dist WOP	0.65 nm
Route	1 °	ETA	
Ch limit	185 m		05 Sep 99 12:16
Off track	<43 m	Next CTS	278°
		Turn rad	0.3 nm
Out from gate		Turn rate	57 °/min

Cursor		
From Own Ship:	5.044 nm	52.3°
59°45.276N	015°19.128E	

Information from the positioning sensors:

- Latitude and Longitude
- GYRO readings and source of it
- CMG (Course made good) and source of it
- SMG (Speed make good) and source of it
- Positioning source, which can be: Dead Reckoning, GPS, DGPS, LORAN, FILTER etc.

Information of used datum, which is shown above positioning source. (WGS 72, WGS 84, European 1950 etc.)

Information from Route monitoring:

- Plan Speed
- Plan CTS (Course to steer)
- Ch limit
- Next WP
- Turn radius
- Turn rate

Information, which has calculated from data of positioning sensors and from data of Route monitoring by the system:

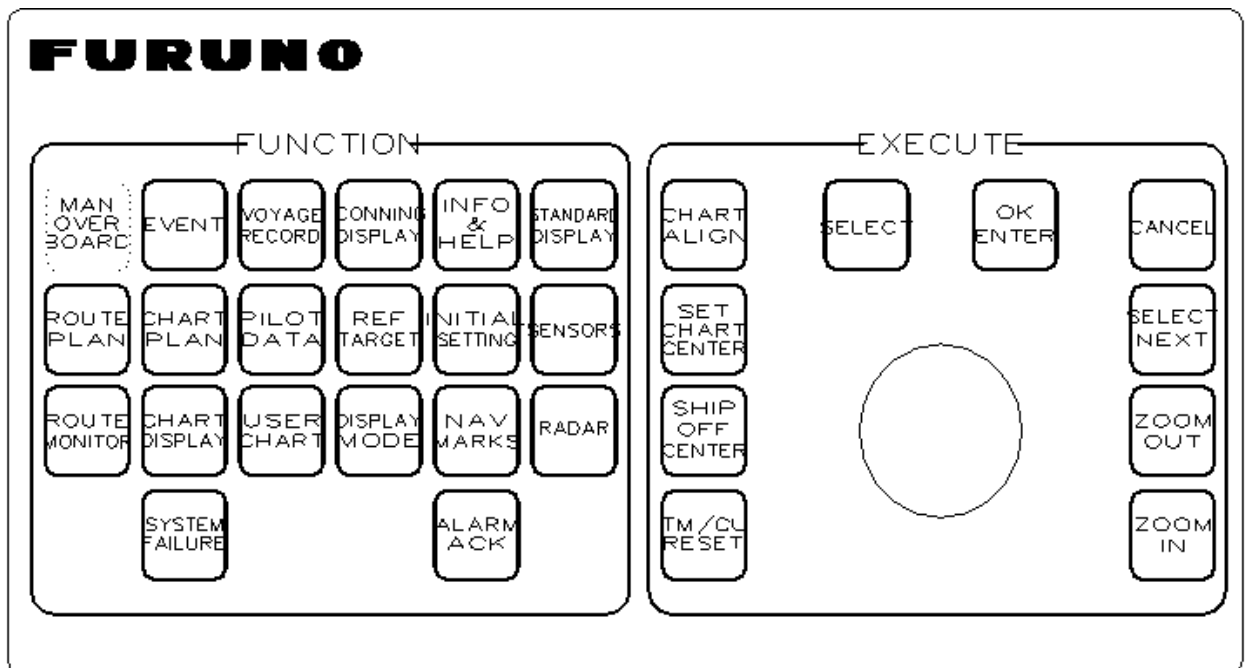
- Route CTS
- Off track
- Dist WOP (wheel over point)
- ETA (Estimated Time of Arrival) wop
- Next CTS

# Control Panel

---

## Overview

The user can control the ECDIS with the Control Panel. The Control Panel includes the pushbuttons and the trackball. The trackball is used as a mouse by rolling the ball and using the pushbuttons SELECT. The user can control the cursor's position on the display, select the menu items and alter values of various parameters. (See figure Layout of the Control Panel.)



*Layout of the Control Panel.*

---

## Operative push buttons



### SELECT

Used in window dialog to push soft keys, tick boxes etc. It is also used to insert WPs, User Chart objects etc. when corresponding sheet is open in a Dialog box area.



### OK/ENTER

It is used in window dialog to select OK or ENTER option.



### SELECT NEXT

If dialog box has two or more sheets, SELECT NEXT is used to open next sheet.



### CLOSE/CANCEL

It is used in window dialog to select CANCEL-option or to close window.

---

## Direct function push buttons



### STANDARD DISPLAY

It is used to make displayed object selection as defined by IMO performance standard.



### CHART ALIGN

User can move own ship and ARPA targets over chart to new position. It is used to align chart correctly if used position method does not give accurate position. Moves also waypoints etc. to a new position if corresponding window is open in dialog box area.



### ZOOM OUT

This is used to change the scale of displayed chart. The scales of chart have defined by system. Pushing once the zoom out pushbutton you get next smaller scale of chart on display (e.g. before ZOOM OUT scale was 1:10000 and after ZOOM OUT it is 1:20000). The scale of chart is indicated as fraction in lower statusbar.





#### ZOOM IN

This is used to change the scale of chart display. The scales of chart have defined by system. Pushing once the zoom in pushbutton user gets next greater scale of chart on display (e.g. before ZOOM IN scale was 1:20000 and after ZOOM IN it is 1:10000). The scale of chart is indicated as fraction in lower statusbar.



#### SET CHART CENTER

User can set the current cursor position as new chart center position by pushing SET CHART CENTER button. Automatic true motion reset is disabled, if user press SET CHART CENTER button, until user pushes either TM/CU RESET or SHIP OFF CENTER. It can be used to view ahead, route planning etc.



#### SHIP OFF CENTER

User can set the current cursor position as new position of ship on the display. This enables automatic true motion reset. If the cursor position was in true motion reset area then an automatic true motion reset happens.



#### TM/CU RESET

Pressing this button performs true motion reset and enables automatic true motion resets.



#### LOGBOOK M.O.B.

This button is used to record a predefined Man Over Board event to logbook. Position of this event is also displayed on chart as a red mark.

**Note**, it is displayed only if Events is selected to display in Chart display dialog box.



#### LOGBOOK EVENT

This button is used to record an event to logbook. You can also write a comment for this event.

**Note**, it is displayed only if Events is selected to display in Chart display dialog box.



#### ALARM ACK

Alarm is displayed in the lower status bar. Also a red lamp is activated for this pushbutton. High priority alarm has also an audible sound.



#### lamp SYSTEM FAILURE

This lamp is lit in case of internal failure which has serious effects for operation.


---

## Menu push buttons




CONNING  
DISPLAY

Conning display pushbutton is used to switch conning display between HARBOUR and NAVIGATE mode. User can also change palette for conning display.



ROUTE  
PLAN

Route plan push button is used to control route planning function. For more information, see Chapter "Route Planning".



ROUTE  
MONITOR

Route monitor push button is used to monitor route. For more information, see Chapter "Route Monitoring".



USER  
CHART

User chart push button is used to control user charts. For more information, see Chapter "User Chart Control"



SENSORS

Sensors push button is used to select sensors for the system. For more information, see Chapter "Navigation Sensors"



CHART  
PLAN

Chart plan push button is used to control both ARCS raster charts and S57 vector charts. For more information about ARCS charts, see Chapter "ARCS charts" and about S57 charts see chapter "S57 charts"



CHART  
DISPLAY

Chart display push button is used to control chart details of both ARCS raster charts and S57 vector charts.



DISPLAY  
MODE

Display mode push button is used to control selection between true and relative motion. For more information, see chapter "Display mode".



Ref target push button is used to control reference targets. For more information, see Chapter "Reference targets".



Pilot data push button is used to control pilot data. For more information, see Chapter "Pilot data".



Voyage record push button is used to control recording voyage related things. For more information, see Chapter "Recording functions".



Initial setting push button is used to control setup and configurations of the system. For more information, see Chapter "Parameters setup".



Radar push button is used to control ARPA target source and optional Radar Echo Overlay functionality.

---

## INFO & HELP pushbutton




INFO & HELP push button operates together with the cursor on display.

- If cursor is located in chart area over a target, then you will get the information of that target.
- If cursor is located over Pilot data, User Chart or Reference target object, then you get information of pointed object.
- If cursor is located in chart area, then you will get information from chart database about the pointed cartographic object.
- If cursor is located outside chart area, then it activates help function.

## ECDIS Control Panel used from software

The Control panel of ECDIS can be used also from software with a mouse and a keyboard without specific Control Panel. After starting the ECDIS program you can execute software Control Panel pressing F9 from keyboard. ASPO Systems ECDIS keyboard appears. You can select function from Control Panel by clicking left mouse button. There are a few exceptions to normal Control Panel. The followed push buttons are not directly operative from software Control Panel:

- **Alarm Ack**, press **F2** from keyboard.
- **TM Reset**, press **F3** from keyboard.
- **INFO Request**, move cursor over desired object and press **F8** from keyboard.
- **ECDIS Control Panel On/Off**, press **F9** from keyboard.
- **Ship off Center**, move cursor desired location and press **F10** from keyboard.
- **Set Chart Center**, move cursor desired location and press **F11** from keyboard.
- **Chart Align**, use right mouse button to make chart alignment.

ASPO Systems ECDIS					
MOB	Event	Voyage rec	Conning Dsp	Info/Help	Std disp
Route Plan	Chart Plan	Pilot data	Ref Target	Initial Set	Sensors
Route Monit	Chart Disp	User Chart	Disp Mode	Nav Marks	Radar
	Ok/ Enter	Cancel	ZoomOut	Zoom In	Select Next
F2 = Alarm Ack    F8 = Info/Help    F10 = Ship Offcenter    Mouse right = F3 = TM Reset    F9 = Panel On/Off    F11 = Set chart center    Chart Align					

To open/close software Control Panel press **F9** from keyboard.

# Set up before departure

---

## Update Chart material

Update your ARCS or S57 chart material before departure to a new voyage. To get more information about updating ARCS charts, see Chapter "Raster Charts" and about updating S57 charts, see chapter "S57 vector charts".

Note that if you have a dual installation with a back-up station, you can make a backup of your chart to back-up station in an easy way, see Chapter "Backup Operation".

---

## Display/Approve date for S57 charts and manual updates

**NOTE!** It is very important that you set Display/Approve date for S57 charts as current date.

There may be features which are Date dependent or periodical in S57 charts, therefore if you not have set Display and Approve dates as current date there is possibility that you may have wrong presentation or some feature may completely be absent. To get more information about to set Display/Approve date, see Chapter "Date dependent and periodical features of S57 chart"

---

## Set Chart Alarm calculation

Set Chart Alarms areas suitable for your coming voyage. For more information, see chapter "Chart Alarms"

---

## Create or update Route, User chart, Reference targets and Pilot data

If it is necessary, create a new route or modify existing one for a new voyage. To get more information about creating or updating a route, see Chapter "Route Planning".

If it is necessary, create a new User chart or modify existing one for a new voyage. To get more information about User chart, see Chapter "User Chart Control".

If it is necessary, create a new Reference targets file or modify existing one for a new voyage. To get more information about Reference targets, see Chapter "Reference targets".

If it is necessary, create a new Pilot data or modify existing one for a new voyage. To get more information about pilot data, see Chapter "Pilot data".

---

## Select User chart

Select a user chart for the next voyage. For more information how to select User chart, see Chapter "How to select User chart".

---

## Recalculate Route



*ROUTE PLAN button*

Select
Cancel
Create
Exchange with Monitored
Copy from Monitored
Backup and Restore
Report
Full WP Report
Passage Plan Report

First double click Route Plan pushbutton.

Then select desired route for planning using **Select** from above menu.

## Recalculate timetable and ETA values

Adjust the arrival times of a route to be correct for the departure time. Recalculation can be done using **Route Planning** and **Params**. Set at least ETD to correspond departure time and perform desired optimization.

*Set at least ETD to date and time edit box in ETD/UTC field to correspond departure time.*

The dialog box is titled "ROUTE PLANNING - TOKYO / 01.09.1999 13:49". It contains several sections: "WP" (1), "Params", "ChartAlarms", and "Prepare". The "Description" field contains "OUT OF TOKYO BAY". The "ETD/UTC+ 3" section shows "WP 1" and "01 Sep 99 19:16". The "ETA/UTC+ 3" section shows "WP 23" and "01 Sep 99 23:55". The "Total Length" is "81.6 nm". The "Speed limit" is "20.0 Kt" and "Max. power" is "100 %". The "Optimize" dropdown is set to "Time table" and "Income" is "0.000 x1000\$". A checkbox "Enable changes" is checked.

If you have optional VOS package for more detailed optimisation use it now. For more information VOS optimization, see Chapter "VOS operations".

## Check your route against Chart Alarms

Before you sail your route, you should always check your route again for Chart Alarms. This is important because your S57 charts and manual updates may contain any amount of date dependent information. Check of Chart Alarms can be done using **Route Planning** and **ChartAlarms**.

After check of Chart Alarms cancel selection of the Planned Route in order to enable the selection of it for route to be monitored. Use **Cancel** from above menu to do it.

---

## Route Monitoring menu



ROUTE MONITORING - TOKYO	
Next WP	<input type="text" value="9"/> Timetable
ETA WP	<input type="text"/> Time Distance nm
Final WP	<input type="text" value="23"/> Time 01 Sep 99 23:24 Distance 62.2 nm
Plan final	01 Sep 99 23:55
Off plan	30 min
Suggested speed	16.2 Kt
Trial speed	<input type="text" value="0.0"/> Kt
Speed profile	<input type="text" value="Plan"/>
Center line	<input checked="" type="checkbox"/> for ARPA
Channel borders	<input type="checkbox"/> radar

### Select Route

Select a route for the next voyage. For more information selection of route, see Chapter "How to select route to be monitored".

### Select Next Waypoint

This informs which is the next waypoint for route monitoring and possible automatic route steering. The system selects next waypoint automatically, check that it is correct one. Note that waypoint number 1 is not accepted. Use above menu to do it.

### Select Final Waypoint

This selection is used ONLY in case that the last waypoint should be different to that one defined last in your route. If needed use above menu to do it.

### Center line for ARPA radar

Select ON to display the center line of the route on the radar display. Displayed part of the route consists of one leg before next waypoint and four legs after that. Select OFF to disable display of the center line on the radar display.

### Channel borders for ARPA radar

Select ON to display the channel limit lines of the route on the radar display. Displayed part of the route consists of one leg before next waypoint and four legs after that. Select OFF to disable display of the channel limit lines on the radar display.

---

## Select Pilot Data

Select a Pilot Data for the next voyage. For more information selection of Pilot data, see Chapter "How to select Pilot data".

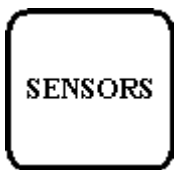
---

## Select Reference Targets

Select reference targets for the next voyage. For more information selection of reference targets, see Chapter "How to select Reference target".

---

## Verify configuration of navigation sensors



*SENSORS push button  
To select between  
Speed/Course and Position  
sheets to be opened either  
press button*



*or go by cursor above  
Speed/Course or Position text  
and press SELECT*

SELECT SENSORS			
Speed/Course	Pos	Other	Record
<input type="checkbox"/> Manual speed			<input type="text"/> Kt
<input checked="" type="checkbox"/> Log			16.9 Kt
<input checked="" type="checkbox"/> Dual log	> ^		0.0 Kt 16.9 Kt
<input type="checkbox"/> Radar			17.0 Kt 359.9 °
<input type="checkbox"/> Manual course			<input type="text"/> °
<input checked="" type="checkbox"/> Gyro 1			359.9 °
<input checked="" type="checkbox"/> Rate gyro	(calc.)		0.0 °/min

## Verify GYRO settings

Select **ON** GYRO1 or GYRO2. Note that in typical installation GYRO1 is connected to a traditional gyro compass, while GYRO2 either gyro value from Trackpilot or gyro value from a DGPS sensor capable of solving heading, pitch and roll.

Note that **MANUAL COURSE** should be used in only emergency state when no other heading reference is available. Rate gyro is always automatically selected.

## Verify SPEED settings

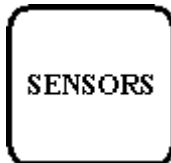
Select both **LOG** and **DUAL LOG ON**, if they are available. Or select one of them.

Note that **MANUAL SPEED** should be used in only emergency state when no other speed reference is available. Remember that position sensors are also available as speed reference sources.



## Verify RADAR settings

If direct GYRO1 and GYRO2 or LOG and DUAL LOG are not available, you can use radar as source for heading, speed and course.



*SENSORS push button  
To select between  
Speed/Course and Position  
sheets to be opened either  
press button*



*or go by cursor above  
Speed/Course or Position text  
and press SELECT*

SELECT SENSORS			
Speed/Course	Pos	Other	Record
<input type="checkbox"/> Alignment	Start		
<input type="checkbox"/> Enable chart align	Range 0.0 nm Bearing 0.0°		
<input type="checkbox"/> Dead reckoning	Lat 78°20.925N Lon 031°47.224E		
Kalman filter	On		
16.9 Kt 359.9°	Lat 78°20.925N Lon 031°47.223E		
DGPS PB	Primary		Diff
16.9 Kt 359.9°	Lat 78°20.925N Lon 031°47.223E		
SYLEDIS	Secondary		
16.9 Kt 359.9°	Lat 78°20.752N Lon 031°47.186E		
LSR85PB	Secondary		
16.9 Kt 359.9°	Lat 78°20.902N Lon 031°47.203E		

## Verify POSITION sensors

The data field of a position sensor contains a label (here DGPS PB, SYLEDIS or LSR85PB) which indicates the type of the sensor, **Primary-Secondary-OFF** status that indicates, if the sensor is included or not, position in local datum, speed and course. A DGPS position sensor has additional text **Diff**, if differential signal is in use.

Position sensors have priority, which is indicated using Primary and Secondary. Only one sensor can be primary while the others can be secondary or off position. After OFF-state a position sensor is changed to secondary-state. After secondary-state a position sensor is changed to primary-state and if there was already a position sensor with primary-state it will be changed automatically to secondary-state.

**SWITCH "Primary" THAT SENSOR WHICH IS CONSIDERED TO BE MOST RELIABLE.**

**SWITCH "Secondary" THOSE SENSORS WHICH ARE CONSIDERED TO BE RELIABLE.**

## Verify KALMAN FILTER

The Kalman filter is an automatic process that will calculate the most probable position based on all position sensors. The filter uses in its process all sensor that has not OFF as selection. For more information about Kalman Filter, see Chapter "Filter operation".

## Verify ALIGNMENT

The alignment is a correction given by the Chart Align function. Normally switch OFF in the start up procedure. For more information about alignment, see Chapter "How to use position alignment".

---

## Set Depth alarm limit

Press button

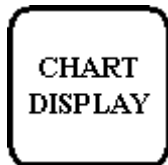


Chart display - ALL-ON			
ARCS details	Tracking	Mariner	Route
Chart	Standard	Other	
Echo alarm depth	<input type="text" value="5"/>	m	
Shallow contour	<input type="text" value="10"/>	m	
Safety depth	<input type="text" value="30"/>	m	
Safety contour	<input type="text" value="30"/>	m	
Deep contour	<input type="text" value="50"/>	m	

To change Depth alarm limit take cursor to Echo alarm depth edit box and press **SELECT** button.. **Note**, the system generates alarm based on received information from the Echo Sounder.

Use **Echo alarm depth** to set the Depth alarm limit.

---

## Start Reference target position calculation



Use this button to open Reference target menu.

Reference target ▶
Select
Cancel
Create
Backup and Restore
Report

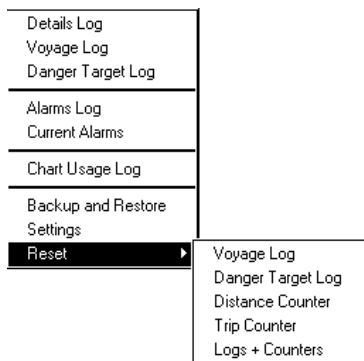
If you have defined reference targets for you voyage, use **Start** to activate this function. For more information, see chapter "Reference Targets".

---

## Reset distance counter and logs



Use this button to open Voyage record menu.



Press **Voyage Record** push button and select **Reset Logs + Counter** to reset them.

---

## Verify Datum

Datum is used to select between different models of the earth. It is essential that you use Datum in a consistent way.

If you use paper charts together with electronic chart material, it is recommended that you use the same Datum as your current paper chart to avoid misalignment between your electronic system and points taken or plotted on your current paper chart.

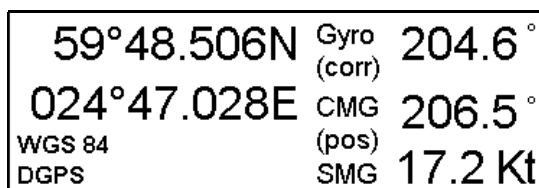
Once you have selected a datum, all numerical latitude-longitude position values are presented in your selected datum.

**Note:** If you use ARCS raster chart material the rasterized charts contain some rasterized position information. These positions like scales in the edges of ARCS charts are true only if you have selected native datum of that ARCS chart. Normally this is the natural situation, because you use ARCS together with equal official paper chart and because you have selected as datum the datum of your equal official paper chart.

To select datum proceed as follows:



1. Press **Initial setting** push button.
2. Select desired datum from a list box of **Datum**.
3. Selected datum is shown on the Upper information area.



Selected datum is shown on Upper information area (in this case WGS 84)

This page is intentionally left blank

# Conditions required to replace paper charts

---

## Introduction

Carriage requirement for adequate and up to date charts for intended voyage can be found from SOLAS Chapter V/20 of the 1974. In resolution A.817(19) IMO has specified how requirement of the V/20 of the 1974 can be fulfilled with a device called ECDIS. In resolution A.817(19), Appendix 7 (RCDS 1998) IMO has specified how requirement of the V/20 of the 1974 can be fulfilled when an ECDIS uses RCDS mode. The traditional alternative way to fulfil requirements of the SOLAS chapter V/20 of the 1974 has been the use of paper charts.

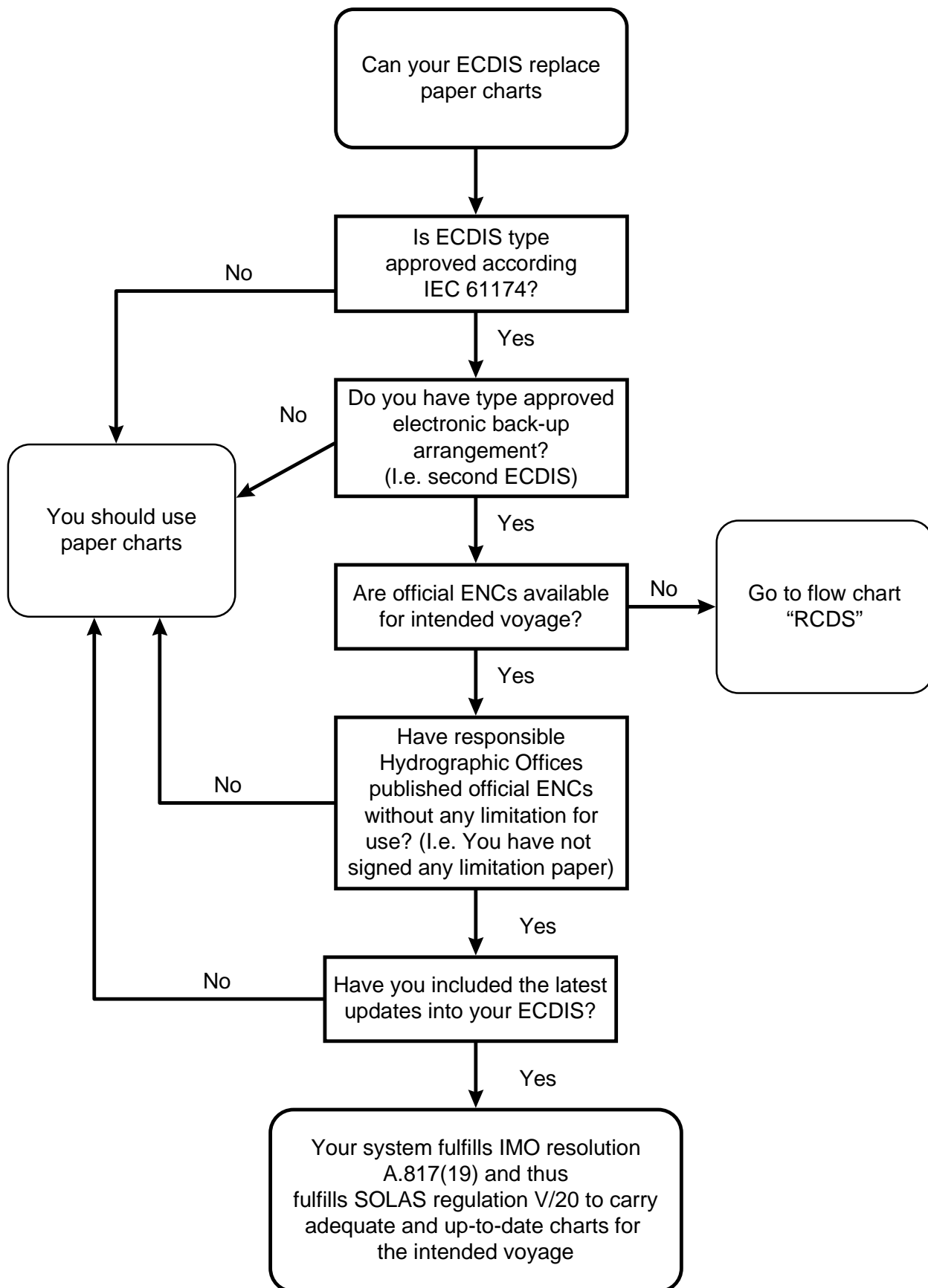
If you use type approved version of this ECDIS (BSH type approval certificate number 6579 / 080 138 / 99. If in doubt, contact your supplier of the ECDIS to check the status of your system) and if following conditions are met, then your system fulfils IMO A.817(19).

- own ship area is covered with updated ENC charts
- your selected display area is covered with updated ENC charts
- you have a backup system which fulfils IMO A.817 requirements. One example is a second ECDIS

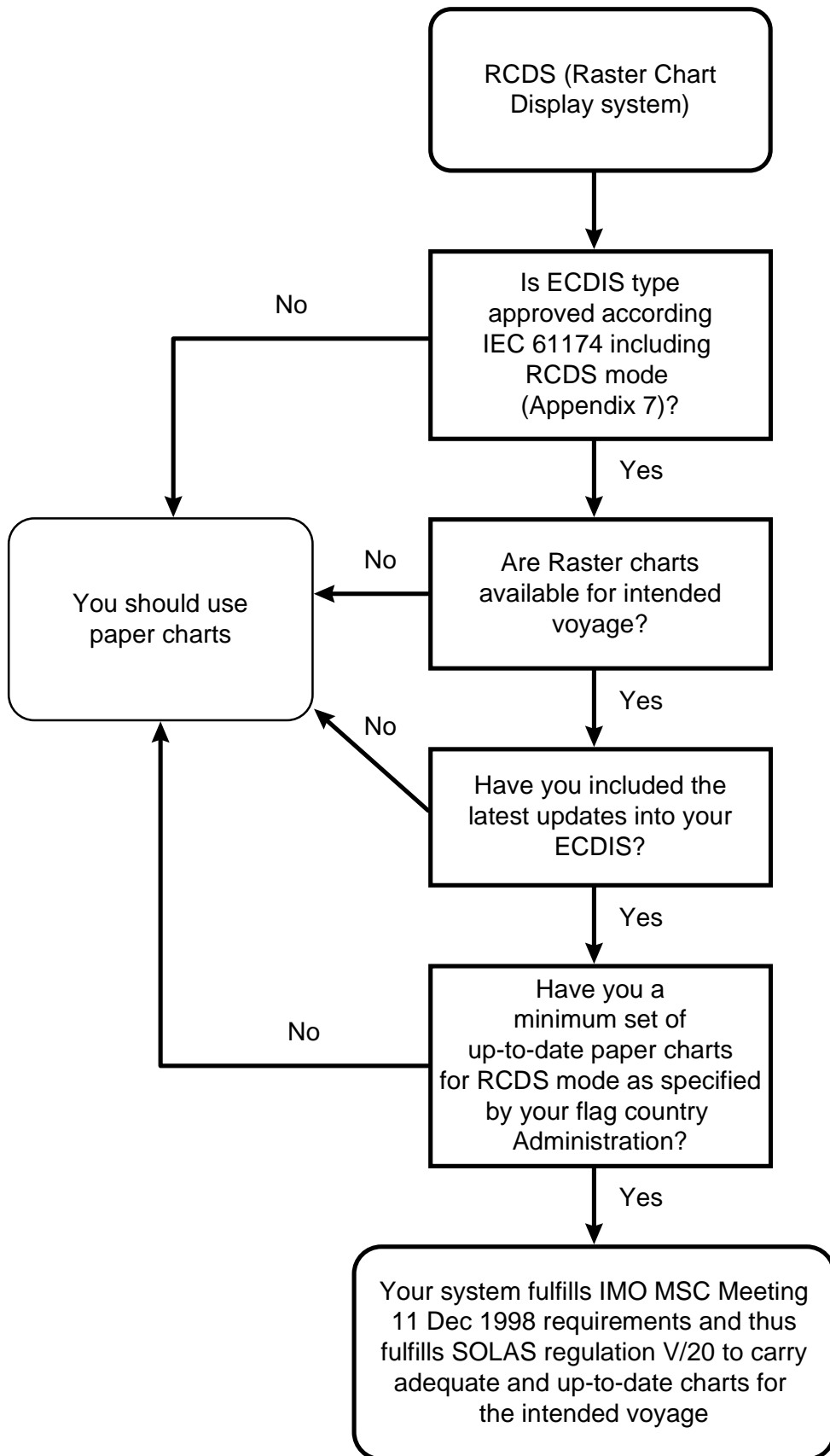
Note that ENC producers provide their conditions of use in the Publisher notes, which you should read always when loading new material into the ECDIS. See chapter "How to load S57 charts from " on page 56

In areas where ENCs are not available raster chart material called ARCS from UK HO can be used in the ARCS mode of this ECDIS, if following additional conditions are met:

- own ship area is covered with updated ARCS charts
- your selected display area is covered with updated ARCS charts
- appropriate folio of up-to-date paper chart is carried onboard and available, if required by your flag country administration



Data flow chart for replacing paper chart with ENC chart material



Data flow chart for replacing paper chart with Raster chart material

# How to detect ENC coverage in S57 Chart display

This Electronic Chart System has capability to show more than one S57 Chart cell at the same time. This feature is called multi cell display. If one S57 Chart cell does not cover the whole display the system will open more S57 Chart cells to be displayed, if they are available in displayed area. The Upper Status bar shows information about S57 Chart cells displayed on the Electronic chart display area. The information depends on position of cursor.

The list of possible indications:

Pilot Data	Depth Metres	Height Metres
ARPA 1 Radar	RCDS Mode	Ship off

RCDS mode: Raster chart material is displayed on electronic chart display area.

Pilot Data	Depth metres	Height metres
ARPA 1 Radar	Non ENC Data	Ship off

Non ENC Data: The S57 Chart at cursor location is not official ENC material.

Pilot Data	Depth metres	Height metres
ARPA 1 Radar		

No indication: The S57 Chart at cursor location is official ENC material

Areas which are covered by legal ENC data are indicated with ENC coverage symbol. See following examples.

Route	Plan route TOKIO	Pilot data CORUNA	Depth metres	Height metres	TRUE MOTION
Chart	Ref target V18	Radar 1	X3.8		

50°22'N  
153°22'W  
WGS 72  
DEADREC

Plan Speed  
Plan CTS  
Route  
Ch limit  
Off track

S57 chart legend

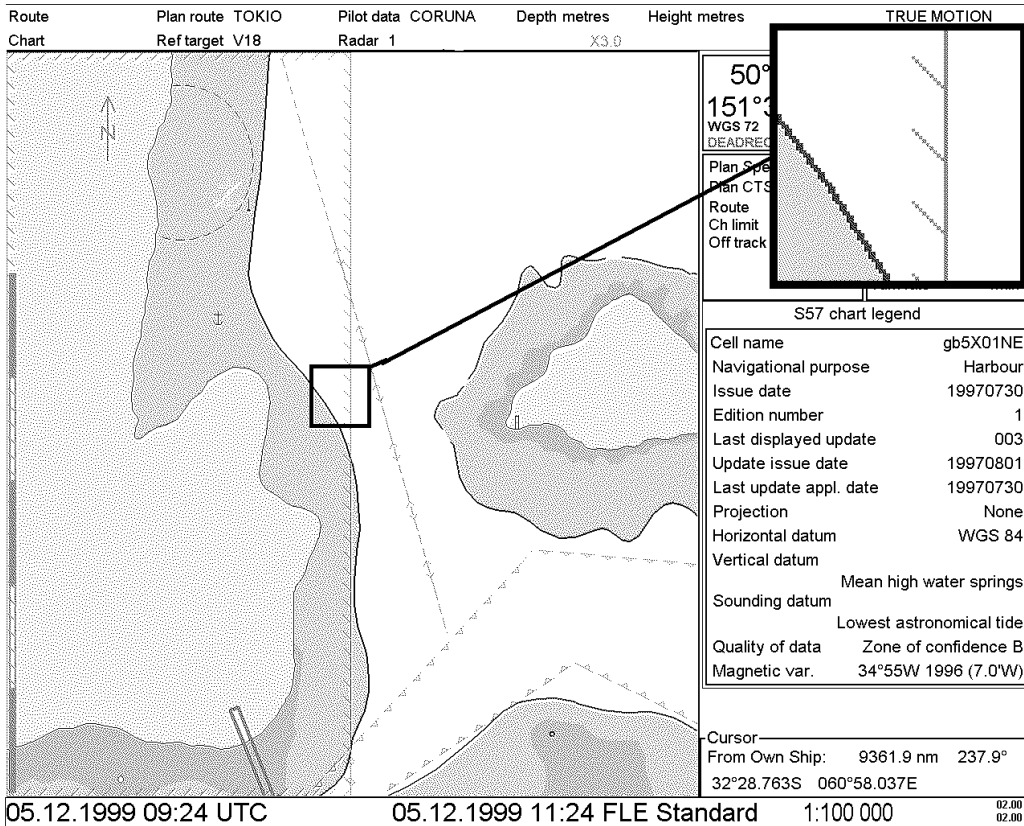
Cell name	GB400002
Navigational purpose	Approach
Issue date	19980218
Edition number	1
Last displayed update	000
Update issue date	19980218
Last update appl. date	19980218
Projection	None
Horizontal datum	WGS 84
Vertical datum	Lowest astronomical tide
Sounding datum	Mean higher high water
Quality of data	Zone of confidence U
Magnetic var.	1°53W 1998 (0.4'E)

Cursor  
From Own Ship: 4699.6 nm 248.9°  
22°14.200N 114°19.061E

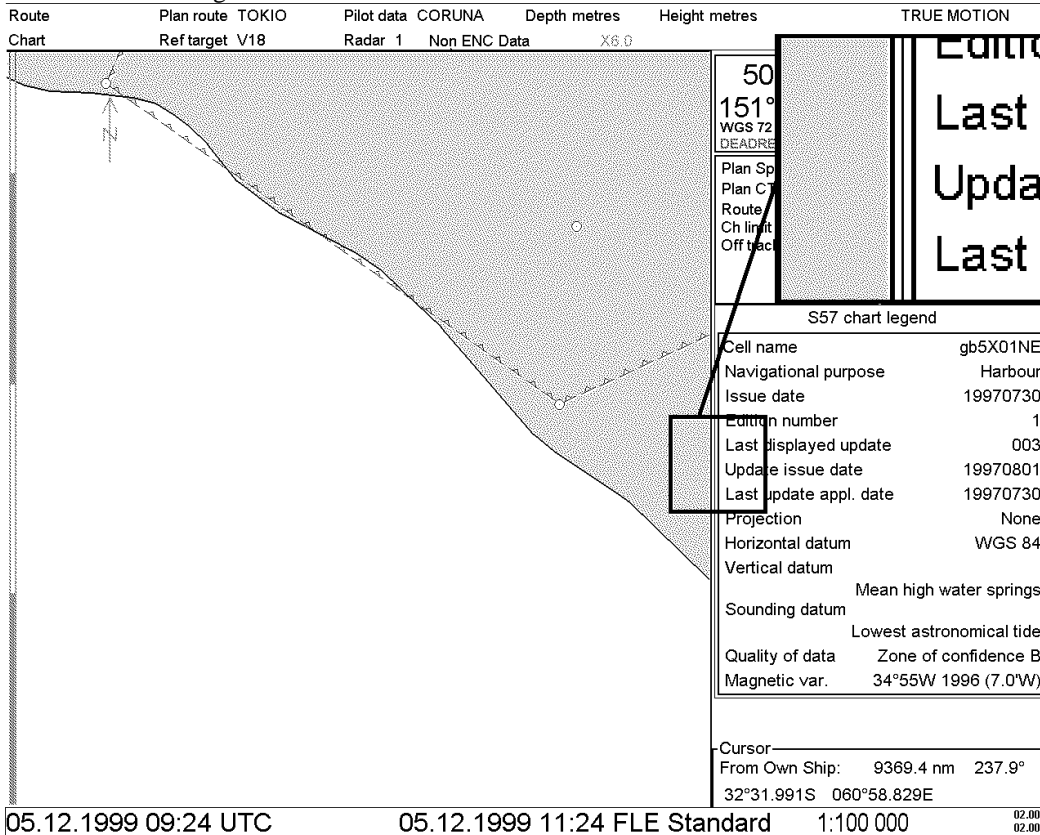
05.12.1999 09:24 UTC	05.12.1999 11:24 FLE Standard	1:100 000	02.00 02.00
----------------------	-------------------------------	-----------	----------------

Full ENC coverage.





Partial ENC coverage.



No ENC coverage.

# Vector Chart material

---

## Introduction

Theoretically a chart can be coded for computer as raster or vector chart. There is a special chapter for raster coded charts in this manual. Vector coded charts can be coded using different techniques. One technique is called S57ed3 and this technique has been selected by IMO as the only alternative for SOLAS compliant electronic charts. If a S57ed3 coded chart is published by government authorised Hydrographic Office, then it is called ENC. If a S57ed3 coded chart is published by private industry, then it is called as NON ENC. Another technique is known as CM-93/2. It is used by private company C-MAP to publish electronic charts. All CM-93/2 charts are NON ENC. There is a special chapter about C-MAP charts in this manual. You can read more about ENC and related legal issues in chapter "Conditions required to replace paper charts". Later in this manual all references to Vector Chart material are under name S57 Charts regardless of the source of them.

Sometimes you may wish to add manually Notices to mariners or Navtex warnings into your S57 charts. In this system this kind of things are called as Manual Updates. Manual updates are valid for both S57 and ARCS charts so that you need to define them only once. Also manual updates are valid for all scales so that you don't need to repeat them for charts published in different scales from the same area. See more details in chapter "Manual Updates".

---

## S57 Charts

### Introduction

This Electronic Chart System is compatible with official IHO S57 release 3 chart material produced by Hydrographic offices (HO). This material, when issued by government authorised Hydrographic Office, is called ENC (electronic navigational chart). Use, presentation and display of S57 charts are based on International Maritime Organisation (IMO), International Hydrographic Organisation (IHO) and International Electrotechnical Commission (IEC) regulations and rules (S52ed3.1). When this ECS (Electronic Charts System) uses ENC (S57 release 3 chart produced by a government authorised Hydrographic Office), it is an ECDIS as defined by IMO, IHO and IEC.

An ENC could be encrypted to prevent unauthorised use and then the user needs a permit to view the ENC. This permit could be entered manually from control panel, loaded from a floppy disk or loaded through telecommunication from a RENC.

Before any ENC can be used in the ECDIS, it is loaded into the hard disk and converted into the system's own internal format (SENC). Some parts of the charts may be date dependent i.e. they are visible after a set date or they are visible only for a limited period etc. In this Electronic Charts System you control all date dependent objects with Display Until and Approve Until dates. In paper chart world the Preliminary and Temporary Notices to Mariners represent the date dependency described above for S57 charts.

An important part of ENCs are the updates. Hydrographic Offices can issue two kinds of updates:

- incremental updates, which are small additions to original base cells
- reissues and new editions, which are complete replacements of previous base cells and their updates

All updates are date stamped and they may also contain date dependent parts. You control also usage of updates in this Electronic Charts System from Display Until and Approve Until dates. Using Display Until and Approve Until dates you can view your charts correctly drawn on any date in the past or in the future.

Chart material will be available stored in media such as CD-ROMs and floppies, electronically through telecommunication from RENCs or electronically from LAN (Local Area Network) in which it could have arrived from RENCs, CD-ROMs or floppies. Such material can contain only basic cells, cells and updates or only updates. This Electronic Chart System contains as standard delivery the software to access CD-ROMs, floppies and LAN. A telecommunication package to establish a connection to the RENC in Stavanger, which operates using marketing name PRIMAR, is available as an option.

Each S57 chart may contain beside the chart itself links to additional textual descriptions or pictures. Typically additional textual descriptions and pictures contain important sailing directions, tidal tables and other traditional paper chart features, which do not have any other method to be included into the S57 chart. This ECDIS copies these textual descriptions and pictures into its hard disk and allow you as user to cursor pick them for viewing purposes.

An appendix of this manual provides short introduction for interpretation of S57 ENC chart display.

### **Definitions of terms**

<b>Cell</b>	A cell is a geographical area containing ENC data. Each cell has separate unique name. Hydrographic Offices divide their responsibility area into the cells which they publish.
<b>S57 chart</b>	A database, standardized as to content, structure and format, issued for use with ECDIS without any authority of government authorized Hydrographic Office. The difference of S57 chart and ENC is that non-ENC charts require complete up-to-date paper charts to be used as primary aid of navigation.
<b>ENC</b>	A database, standardized as to content, structure and format, issued for use with ECDIS on the authority of government authorized Hydrographic Offices. The ENC contains all the chart information necessary for safe navigation and may contain supplementary information in addition to that contained in the paper chart (e.g. sailing directions) which may be considered necessary for safe navigation. The name of coding standard for ENC is S57ed3.
<b>SENC</b>	A database resulting from the transformation of the ENC by ECDIS for appropriate use, updates to the ENC by appropriate means, and other data added by the mariner. It is this database that is actually accessed by ECDIS for the display generation and other navigational functions, and is the equivalent to an up-to-date paper chart. The SENC may also contain information from other sources.
<b>RENC</b>	A service provider offering ENC delivery and update service as defined in IHO standard S52e3. Often a RENC provides both CD-ROM and telecommunication based service to ECDIS users. One example of a RENC is the RENC in Stavanger operating under marketing name PRIMAR.

## Chart legend of S57 chart

CHART LEGEND is not a pushbutton, but it is a front-page, which is displayed as a base. If you push CANCEL enough you will finally get CHART LEGEND.

This system is capable to show more than one S57 Chart at the same time. This feature is called multi chart display. If one S57 Chart does not cover the whole display, the system will open more S57 Chart to be displayed, if they are available in displayed area. The Chart Legend shows information about S57 Charts displayed on the Electronic chart display area. The information is available always from the current position of the cursor.

S57 chart legend	
Cell name	JP44OJBE
Navigational purpose	Approach
Issue date	19980325
Edition number	1
Last displayed update	000
Update issue date	19980325
Last update appl. date	19980313
Projection	Mercator
Horizontal datum	WGS 84
Vertical datum	Mean sea level
Sounding datum	Nearly lowest low water
Quality of data	Zone of confidence U
Magnetic var.	

### Cell name:

Name of chart.

### Navigational purpose:

S57 Charts are compiled for a variety of navigational purposes. The navigational purpose for which an individual S57 Chart has been compiled by a Hydrographic Office is indicated in this field. Alternatives are: Overview, General, Coastal, Approach, Harbour and Berthing

### Issue date:

Issue date of the base cell of the chart.

### Edition number:

Edition number of the chart.

### Last displayed update:

Number of last update, which is visible on the chart screen.

### Update issue date:

Issue date of last update, which is visible on the chart screen

### Last update appl. date:

Date to which the last update, which is visible on the chart screen, is effective.

### Projection:

Projection of the chart. The projection is always Mercator.

### Horizontal datum:

Horizontal datum of the chart data as published by the producer of it. By definition this must be WGS 84.

### Vertical datum:

Vertical datum of the chart.

### Sounding datum:

Datum used for soundings.

### Quality of data:

This is a quantitative estimate of the accuracy of chart features given by chart producer.

### Magnetic var.:

Amount of magnetic variation. A positive value indicates a change in an easterly direction and a negative value indicates a change in a westerly direction.

## Permanent warnings of S57 charts

Permanent warning help you to keep the S57 charts up-to-date. Only up-to-date S57 charts can be legal replacement of the paper charts. Permanent warnings indicate, if the system detects a condition which may cause your system to use not up-to-date charts.

NOTE! The system can powerfully assist you to keep your charts up-to-date for the charts which you have got from a RENC. For charts which has been loaded from other sources than a RENC, the system is unable to know the exact up-to-date situation.

See more details in chapter "Date dependent and periodical features of Vector chart".

You have loaded updates into the hard disk, but these updates are not included into the SENC. This kind of charts are drawn in orange colour in the Chart Plan - Catalogue.

Perform SENC conversion for these charts. See more details in chapter "How to use SENC convert window to initiate SENC conversion".

See more details in chapter "How to know up-to-date status of the RENC Product List".

You have loaded an update which contained cancel information for a chart. You selected not to remove the canceled chart. This permanent indication reminds you about your intended use of a canceled chart.

Consider removal of the chart. See more "How to remove S57 Charts from the system" on page 79.

### Permanent Warning

At least one of used charts has more than 1 week between "Approved Until" and/or "Displayed Until" and current system date. Use Chart Plan - Date Dependent to set dates

### Permanent Warning

At least one of used charts is not up-to-date. At least one update is loaded in harddisk, but not in SENC format. Use Chart Plan - Catalogue to check charts

### Permanent Warning

At least one of used charts is not up-to-date. Get or load latest edition and/or updates from your RENC service. Use Chart Plan - Date Dependent to check charts

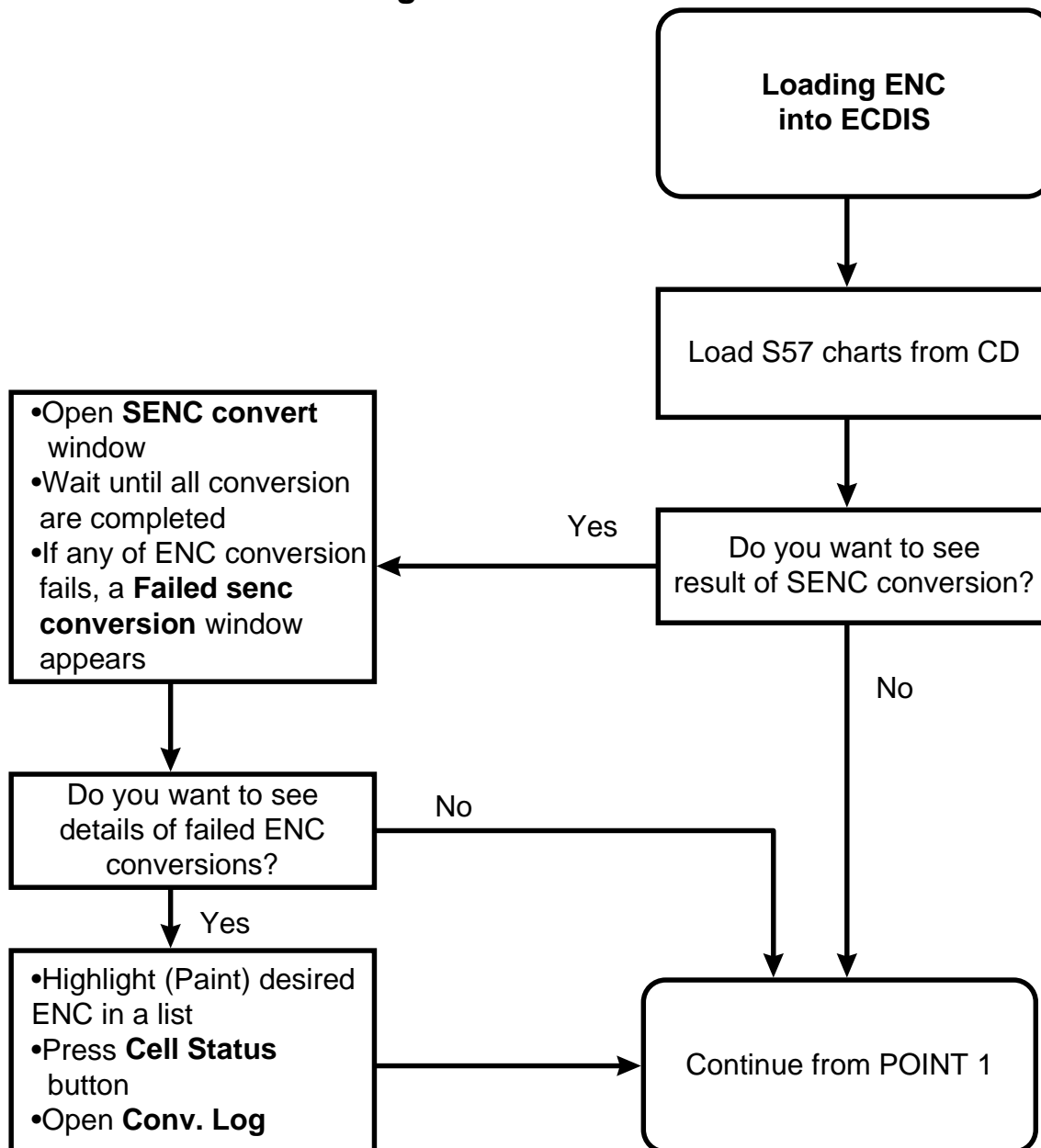
### Permanent Warning

At least one of used charts is canceled. Use Chart Plan - Catalogue to check charts. Use Chart Plan - Remove to remove canceled chart.

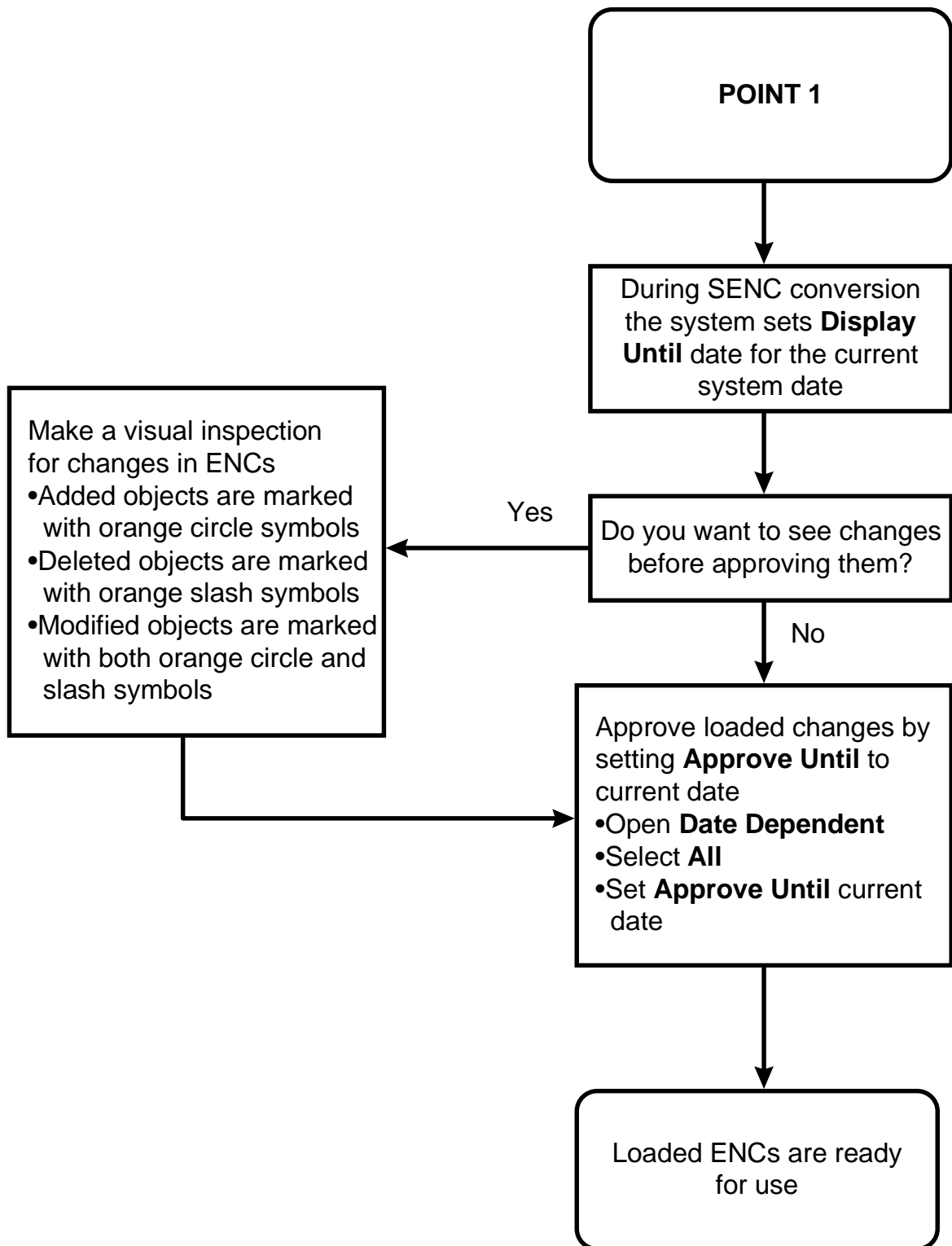
---

## How to load S57 charts

### Flow chart of the loading of S57 Charts into ECDIS



Data flow chart, How to load S57 charts into ECDIS.



Data flow chart continue, How to load S57 charts into ECDIS.

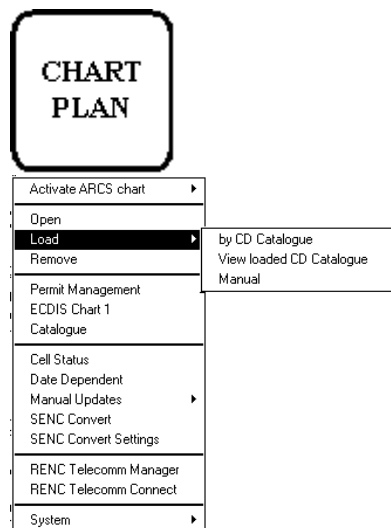
## How to load S57 charts from a CD-ROM, floppy or LAN

When you load S57 charts by CD Catalogue, the system first load a CD catalog, which stores certain information into the hard disk such as cells ID, their position, edition number, from your LAN (Local Area Network) connection, floppy or CD-ROM. After that the system asks which charts will be loaded from the selected media.

After building the CD catalogue you can view the contents of it using S57 catalogue command.

**Note:** All CD-ROMs, floppies or LAN (Local Area Network) connections from one single National Hydrographic Office have equal names although their contents could be totally different. You can use your own unique names to identify them separately and correctly later.

To load by CD catalogue proceed as follows:



1. Press CHART PLAN push button.
2. Select **Load** from the menu and **by CD Catalogue** from the sub menu. A S57 Load dialog box appears. The default load source is CD-ROM. Press **Load** and continue from step 5, if you use CD-ROM. If you want to load from a floppy disk or from another ECDIS using LAN, you have to change Load Dir. Press **Browse** to select a new Load Dir

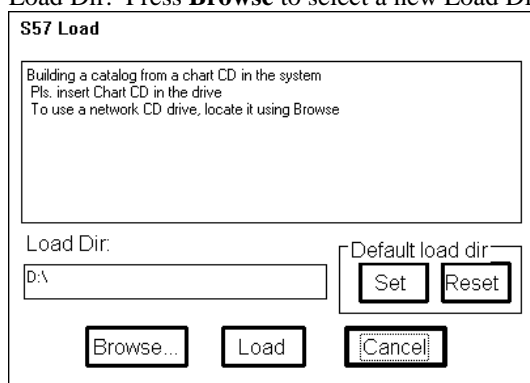
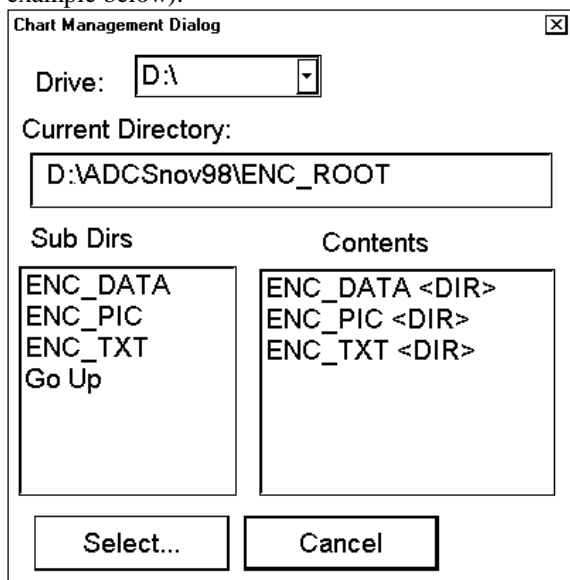


CHART PLAN push button

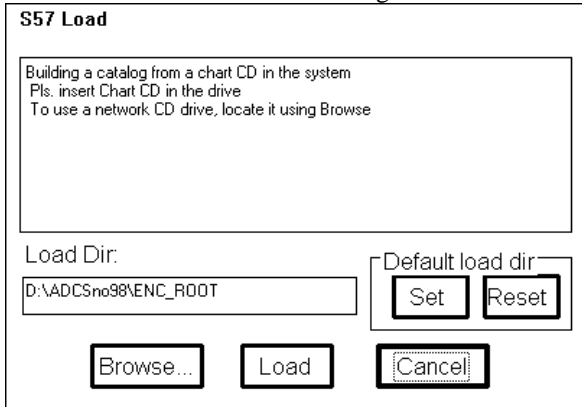
3. If you use a floppy disk, select **A:\** in **Drive:**. If you use another ECDIS using LAN, select suitable **Drive:** and **Sub Dir**. Note that a correct load source has "**\ENC\_ROOT**" in the end of the **Current Directory:** (see example below).



Press **Select** when you are ready.

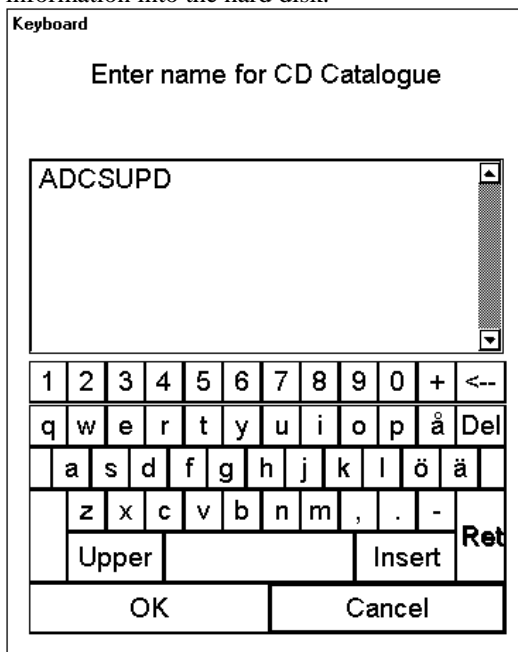


- You return back to S57 Load dialog. Press **Load**.

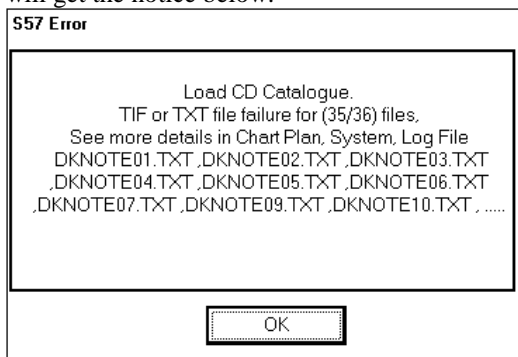


**Note**, if you are loading PRIMAR official ENC service Base CD or Update CD, the ECDIS will automatically give name "PRIMAR" or "PRIMARUPD" for CD Catalog and you can continue step 7.

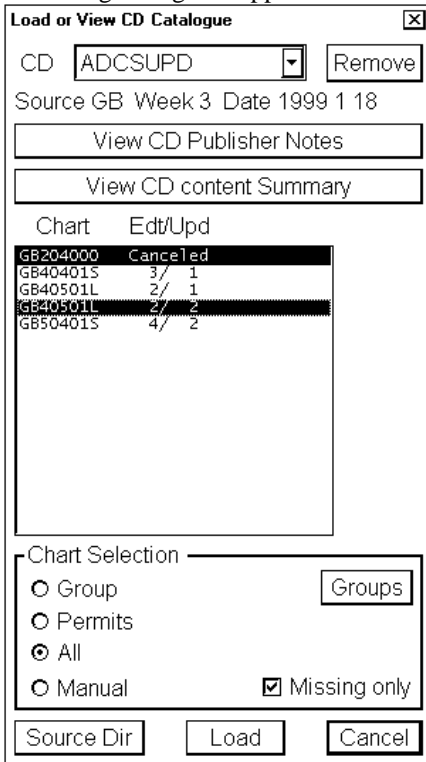
- A keyboard dialog box appears. Enter name for CD Catalog and press **OK**. System will load catalog information into the hard disk.



- The system automatically copies all Text and Pictures files associated with Charts from a CD Catalogue. The system keeps only the latest version of these. If your system had already in use newer Text and Picture files you will get the notice below.



7. Following dialog box appears



Select a named "CD" you want to load from CD -field. A list of charts appears into a list box which contains information about charts (edition and update number). In a **Chart Selection** you can choose, which charts are loaded from the CD-ROM. Selection "**Missing only**" loads only Charts and their updates which are not already loaded into the ECDIS.

**Note**, If you want to remove loaded CD Catalogue, select desired CD from the list box and press **Remove** button.

8. Press **Load** button to load selected charts.
9. If any of chart conversion fails, a **Failed SENC conversion** window appears, which has a list of failed conversions. Use this window to find out the reason for failure. For more information, see chapter "How to use Failed SENC conversion window" on page 65.
10. If you want to view the progress of SENC conversion, you can activate the **SENC convert** window. For more information, see chapter "How to view progress of SENC conversion" on page 64

**NOTE 1!** If you want to make chart selection by group, press **Group** button and select desired group. If in selected group and list of charts have common charts, they are highlighted in the list box.

**NOTE 2!** If your system has LAN (Local Area Network) and you want load your charts from another drive than your system CD-ROM drive, press **Source Dir** button. Then you can define drive and path from where you load your charts.

**NOTE 3!** The System can make conversion into the SENC and set the "Display Until" date automatically. This is the recommended way. More information to set them, see chapter "How to select automatic SENC conversion and Display Until date" on page 63.

**NOTE 4!** You should read the text file associated into each catalog. The text file typically contains **very important notices for the usage of the charts from the producing Hydrographic Office**.

1. Press **View CD Publisher Notes** button in the S57 Load dialog box.
2. A viewer shows you the Publisher Notes of the selected "CD".
3. If you want to make a hard copy of Publisher Notes, select **Print** in the **File** menu.
4. To close this program, select in **Exit** in the **File** menu.

**NOTE 5!** You can view the Summary of the content of the CD. It contains information about charts you are going to load.

1. Press **View CD content Summary** button in the S57 Load dialog box.
2. A viewer shows information about the selected "CD". Each row contain:
  - CellID            Name of the chart
  - Edition            Edition number of the chart
  - Base                Included update number and issue date of base cell of the chart
  - First Update      Update number and issue date of the first update included
  - Last Update      Update number and issue date of the last update included
3. If you want to make a hard copy of the Summary of Catalog, select **Print** in the **File** menu.
4. To close this program, select in **Exit** in the **File** menu.

CellID	Edition	Base	Source GB	Week 2	Date	First Update	Last Update
GB204000	4	2 / 1999	1	29	1999 1 15		
GB304010	3	0 / 1999	1	29			
GB40401S	3	0 / 1999	1	5			
GB40501L	2	0 / 1999	1	29			
GB50401S	4	1 / 1999	1	29			

The example above contain only base cells and reissues of the charts. Charts GB204000 and GB50401S are called as reissues, because they already include updates (GB204000 include updates 1 and 2. Gb50401S include update 1). Charts GB304010, GB40401S and GB40501L are called as base cells, because they do not contain any updates i.e. their update number is 0.

CellID	Edition	Base	Source GB	Week 2	Date	First Update	Last Update
GB204000	4	0 / 1999	1	15	1999 1 14	2 / 1999	1 22
GB50401S	4	0 / 1999	1	22		1 / 1999	1 22

The example above contain both base cells and all updates of the charts from issue of base cell up to the last update.

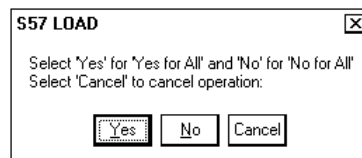
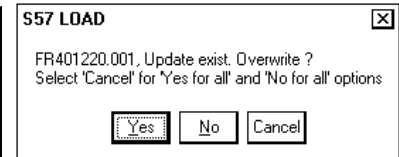
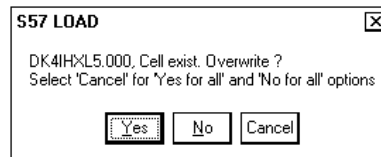
CellID	Edition	Base	Source GB	Week 3	Date	First Update	Last Update
GB204000	Canceled		3	1999	2 5	3 / 1999	2 5
GB40401S	3		1	1999	2 5	1 / 1999	2 5
GB40501L	2		1	1999	2 5	2 / 1999	2 5
GB50401S	4		2	1999	2 5	2 / 1999	2 5

The example above contain only updates. In example above update 3 is available for chart GB204000, update 1 is available for chart GB40401S, updates 1 and 2 are available for chart GB40501L and update 2 is available for chart GB50401S.

### Messages, which control reload

If you try to load charts with the same edition already loaded into your hard disk or if you try to load the same update already loaded into your hard disk, you get following messages after pressing **Load** button.

If you press **Cancel** button, you will get following dialog box:



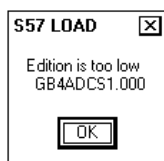
If you want to avoid very time consuming reload of charts which you already have, then you should select **No** ("No for all" option in above window).

However if you want to reload charts, then select **Yes** (= "Yes for all" option in above window).

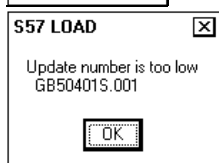
### **Messages, which contain only notice**

If you tried to load older chart data than you already have in your hard disk, you will get one of the following messages:

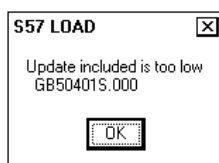
This indicates that you already use a newer edition of the chart.



This indicates that you already use a newer reissue of the chart, which includes this update



This indicates that you already use a newer reissue of the chart



This indicates that you already use these updates



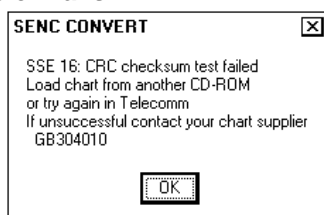
NOTE! You can not replace chart data, which is already in use unless you only replace the latest base cell or update. If you want to reload older data again, you must first remove the chart from your hard disk (See chapter "How to remove S57 chart cells from the system").

### **Messages, which require careful attention**

All messages in this chapter change the legal status of the charts in your system. Study these message extremely careful because you may need to use paper charts to fulfil SOLAS requirements

#### **Test before ENC to SENC conversion fails**

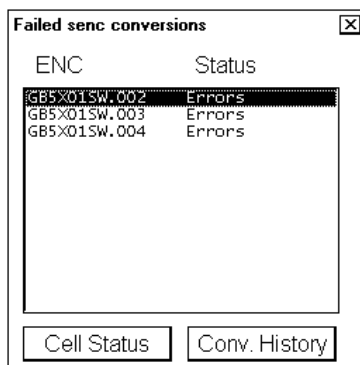
CRC checksum is tested before the SENC conversion and if it fails you get this message



#### **ENC to SENC conversion fails or detects errors**

If the SENC conversions detect anything abnormal you get following message window:

See more information in chapter "S57 SENC Conversion details" on page 63.



### A new edition of the chart has been published and you miss it

If you tried to load updates for a chart for which you do not have new enough base cell or reissue in your hard disk, you will get following message:



**The message above clearly indicate that this chart is not up-to-date and thus it does not fulfil SOLAS requirements.** Get immediately from the publisher of this chart the new edition of the chart.

### You do not have all the published updates

If you tried to load updates and you miss one or more updates between updates already loaded into your hard disk and updates that you are loading, then you get following message:

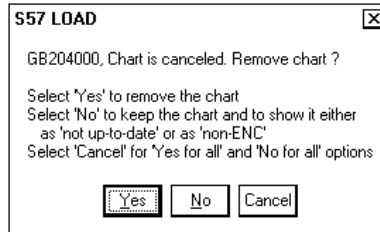


The message above indicates that you tried to load updates number 3, 4 and 5 when at least update 2 and possibly update 1 were not available in your hard disk. Check the content of your CD-ROMs to find the missing update/updates or contact your chart supplier.

**The message above clearly indicate that this chart is not up-to-date and thus it does not fulfil SOLAS requirements.** Get immediately from the publisher of this chart the missing updates of the chart.

### Unsafe Chart has been cancelled by the publisher

If you load an update, which contain cancellation of the chart instruction by the publisher of it, you get following message:



Normally you should accept the cancellation and you should press **Yes**. Then the system automatically removes the chart from the hard disk and from your chart screen.

You may insist to keep the chart although the publisher of it has told you that the content of the chart is so unsafe that they have cancelled it. The reason might be that you do not have anything better available. In this case you press **No**. Then the system automatically remove the ENC status from the chart, because the publisher has told so in his special cancellation update.

**Note that the cancellation message above clearly indicate that the publisher says that this chart is unsafe for navigation and thus it does not fulfil SOLAS requirements.** Get immediately from the publisher of this chart the new chart/charts, which replace the unsafe cancelled chart.

## How to load S57 charts, which are not fully compliant with the standards

The ECDIS could in some cases load S57 charts, which does not have full compliance with S57 standard coding for transfer media. Minimum requirement for loading manually is legally coded:

- XXXXXXXX.000 file, which includes a base cell
- XXXXXXXX.NNN file, in which NNN is a number from 001 to 999, and which includes an update

To load charts without building a named "CD Catalog" proceed as follows:

1. Press CHART PLAN push button, select **Load** from the menu and **Manual** from submenu.
2. You can select desired drive and charts.

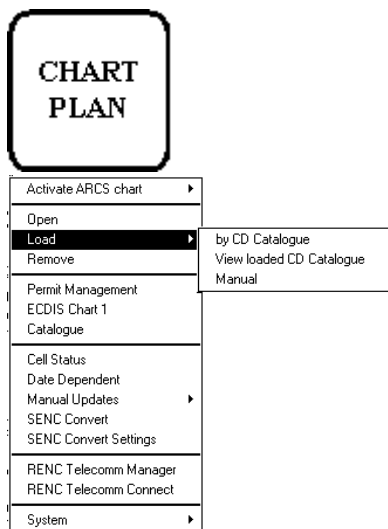
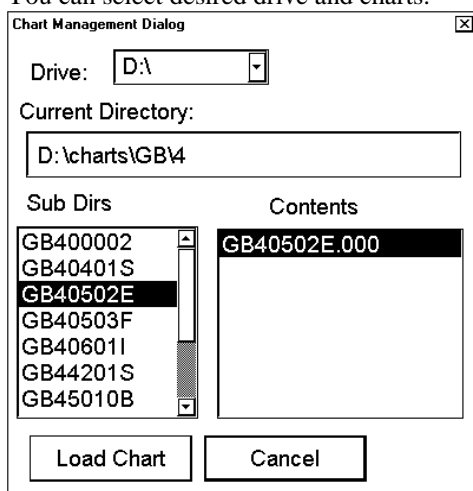


CHART PLAN push button



When ready to load charts, press **Load Chart** button.

3. The System may also make conversion into the SENC and setting of Display Until date automatically. This can take a few minutes.

---

## S57 SENC Conversion details

S57 charts from Hydrographic offices are called ENC. An ENC has to be converted into SENC format before it can be used in the ECDIS. The ECDIS can convert ENC into SENC format automatically. If the conversion is successful, the Failed SENC conversion window does not appear.

If the system fails to convert ENC into SENC or if the system detects a coding error in an ENC, a **Failed SENC conversion** window appears with a list of failed ENCs. In this window you can select any of the charts to see reason for failure in conversion.

Normally the conversion is initiated automatically from loading of the charts. Chapter "How to load S57 charts" on page 54 describes the loading process. Chapter "How to select automatic SENC conversion and Display Until date" on page 63 describes how you can select automatic conversion. You can also initiate conversion from a SENC convert window or from a Cell Status window.

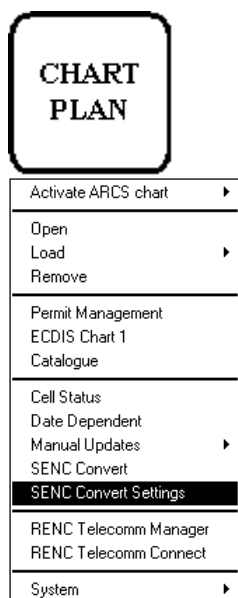
### How to make SENC conversion faster

The SENC conversion speed depends about how many other tasks the system has. The system can do SENC conversion as background process during any other possible operational use of the system, but you can greatly improve the speed of the SENC conversion, if you do following things:

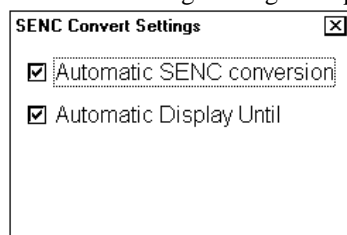
1. Disable Radar echo overlay. Select Radar overlay mode as **ECDIS ONLY**. Select control of visible navigation features as OFF for Radaroverlay (the Radaroverlay visibility control is located in "Tracking" sheet of "Chart details").
2. Select Display Mode as **TRUE MOTION**
3. Press **Set Chart Center** push button and allow the system to operate either in TM RESET OFF or SHIP OFF SCREEN state
4. Press **Zoom In** until you reach scale of 1:1 000

### How to select automatic SENC conversion and Display Until date

When you are loading new S57 charts base cells and/or their updates into hard disk, it is possible make automatic conversion to SENC format. It is also possible to set display dates as issue dates automatically. Proceed as follows to set these options:



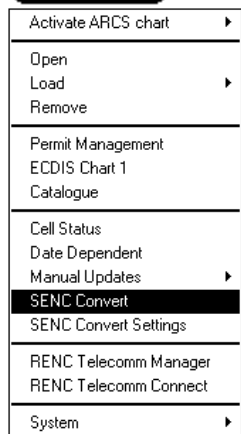
1. Press CHART PLAN button, select **SENC Convert Settings** from the menu.
2. A S57 Settings dialog box appears:



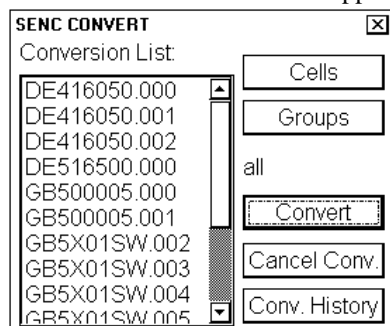
Select **Automatic SENC Conversion** and **Automatic Display Until** options.

## How to view progress of SENC conversion

If you want to view the progress of SENC conversion, you can activate SENC convert window. Proceed as follows:

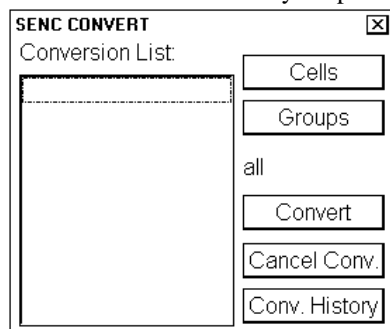


1. Press CHART PLAN button, select **SENC Convert** from the menu.
2. A SENC Convert window appears:



Example above shows a queue of unfinished SENC conversions.

Note!. You can at any moment remove charts from the conversion list. You paint with the cursor any amount of chart names in the Conversion List. And then you press **Cancel Conv.** to remove your painted charts from the SENC conversion queue.



Example above shows that all SENC conversions have been finished. conversions.

Note!. You can at any moment view the results of the finished SENC conversions. Press **Conv. History** and you get a Conversion log for viewing.



## How to use Failed SENC conversion window

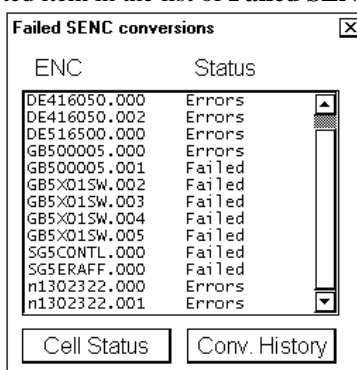
If the system is unable to convert ENC into SENC without any error or failure, a **Failed SENC conversion** window appears with a list of failed ENCs. Status of Failure means that the system completely failed to convert the ENC into the SENC and thus the ENC cannot be used.

Status of **Errors** means that the system detected minor or major errors in the conversion of the ENC into the SENC. Check carefully the content of Conv history and Cell status to see, if the error was minor or major. Major errors are indicated as NON ENC in Conv History. **Note that the status of Errors together with NON ENC in Conv History clearly indicate that this chart is not up-to-date and thus it does not fulfil SOLAS requirements.** Get immediately from the publisher of the chart the new edition of this chart.

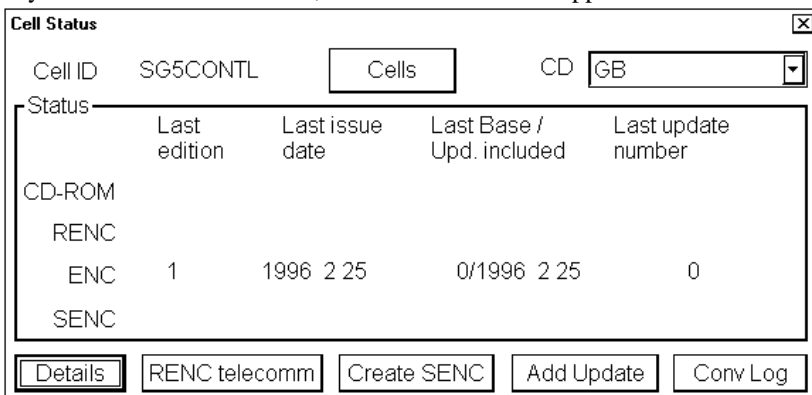
Status of **Failure** means that the system completely failed to convert the ENC into the SENC and thus the ENC cannot be used. **Note that the status of Failure clearly indicate that this chart is not up-to-date and thus it does not fulfil SOLAS requirements.** Get immediately from the publisher of the chart the new edition of this chart.

The **Failed SENC conversion** window contains two buttons. One to open conversion history log **Conv. History** and another to open **Cell Status** window of selected item in the list of **Failed SENC conversions** window.

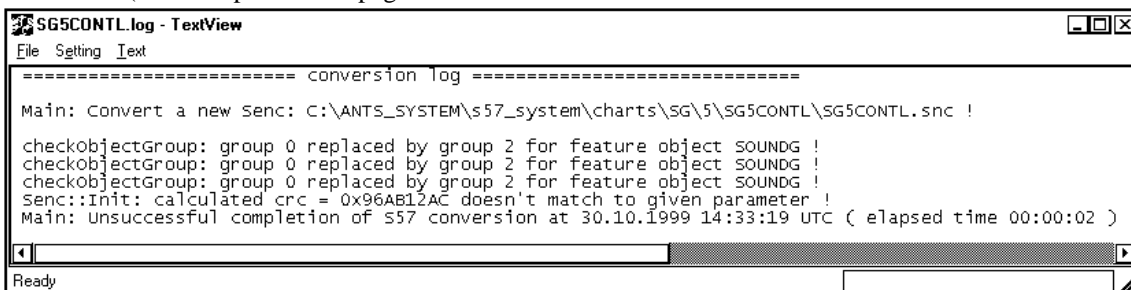
If you use **Conv. History** button, a Conversion Log appears. Conversion Log shows the status of converted ENCs. More information about the results of conversions, see chapter "How to use SENC Conversion history log" on page 66.



If you use **Cell Status** button, a Cell Status window appears.



Then you can push **Conv Log** button to open view detailed description of errors and failures detected during SENC conversion (see example on next page).

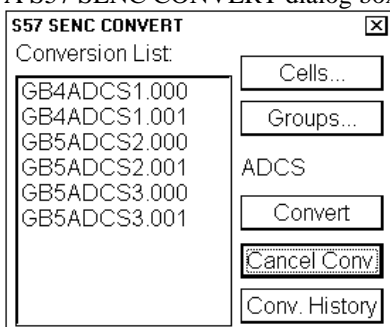


In the example above the reason of the SENC conversion failure is a miss match of checksum (calculated crc number differs from the expected).

## How to use SENC Conversion history log

The system automatically records the results of all conversion into the Conversion history log. You can at any moment view the content of this log. Proceed as followed:

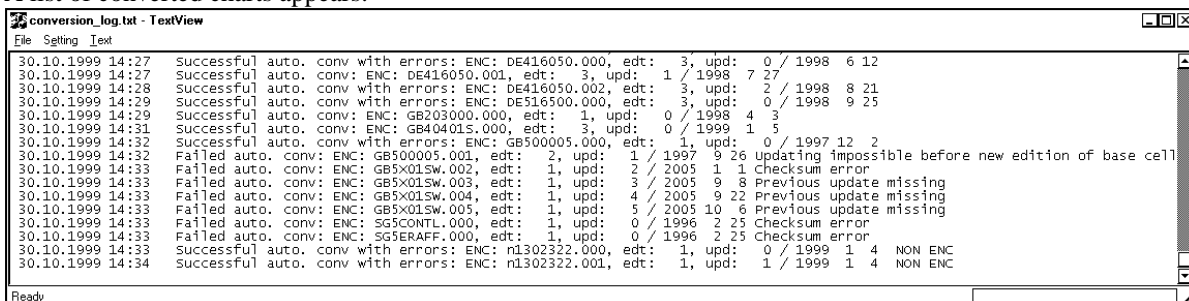
1. Press CHART PLAN button, select **SENC Convert** from the menu.
2. A S57 SENC CONVERT dialog box appears:



After conversion (Conversion list is empty), press **Conv. History** button.

**NOTE!** You can also activate the **Conv. History** from the "Failed SENC conversions" window.

3. A list of converted charts appears:



You can view here status of converted charts.

4. Close TextView program from **File** menu.  
Below are example of all possible results of conversion:

### **Perfect chart**

Successful auto. conv: ENC: GB203000.000, edt: 1, upd: 0 / 1999 4 3

### **Perfect Chart ,which is produced by a private chart producer (i.e. chart doesn't have ENC status)**

A private chart cannot fulfil SOLAS requirements and you must refer to a paper chart as legal primary aid of navigation, when you navigate in the area covered by this chart.

Successful auto. conv: ENC: AS31MATT.000, edt: 1, upd: 0 / 1999 4 8 NON ENC

### **Conversion errors, but the chart is partly usable**

Use Cell Status to check details of errors. Note that the chart is still ENC.

Successful auto. conv with errors: ENC: DE416050.000, edt: 3, upd: 0 / 1998 6 12

### **Conversion errors, but the chart is partly usable as NON ENC**

Use Cell Status to check details of errors. Note that the chart is not anymore ENC, if it was produced by an Hydrographic Office, and you must refer to a paper chart as legal primary aid of navigation, when you navigate in the area covered by this chart.

Successful auto. conv with errors: ENC: n1302322.000, edt: 1, upd: 0 / 1999 1 4 NON ENC

### **Failed conversion**

Chart is not usable and you cannot view the chart. You must refer to a paper chart as legal primary aid of navigation, when you navigate in the area covered by this chart.

Failed automatic conversion: ENC: DK3EIOXE.000, edt: 1, upd: 0 / 1999 2 17

### ***Failed conversion of an update***

Chart is partly usable, but it is not up-to-date and you need a "new edition" of the chart from the publisher of it. Note that the chart is still ENC, but it does not anymore fulfil the SOLAS requirement that you have included the latest update into your chart. You must refer to a paper chart as legal primary aid of navigation, when you navigate in the area covered by this chart.

Failed auto. conv: ENC: GB500005.001, edt: 2, upd: 1 / 1997 9 26 Updating impossible before new edition of base cell

### ***Failed conversion. Checksum is not correct***

Chart is not usable and you cannot view it. Try to reload the base cell or update from original media. And if that doesn't help order a new CD-ROM from your chart supplier. You must refer to a paper chart as legal primary aid of navigation, when you navigate in the area covered by this chart.

Failed automatic conversion: ENC: SG5CONTL.000, edt: 1, upd: 0 / 1996 2 25 CHECKSUM ERROR

### ***Failed conversion. Checksum of an update is not correct***

Chart is partly usable, but it is not up-to-date. Try to reload the update from original media. And if that doesn't help order a new CD-ROM from your chart supplier. Note that the chart is still ENC, but it does not anymore fulfil the SOLAS requirement that you have included the latest update into your chart. You must refer to a paper chart as legal primary aid of navigation, when you navigate in the area covered by this chart.

Failed automatic conversion: ENC: GB5X01SW.002, edt: 1, upd: 2 / 2005 1 1 CHECKSUM ERROR

### ***Failed conversion. At least one of the previous updates has failed in its SENC conversion***

The system cannot accept additional updates unless all previous updates have been successfully converted into the SENC. Chart is partly usable, but it is not up-to-date. Try to reload first the failed previous update from original media (in this example the failed previous update is GB5X01SW.002). And if that doesn't help order a new CD-ROM from your chart supplier. Note that the chart is still ENC, but it does not anymore fulfil the SOLAS requirement that you have included the latest update into your chart. You must refer to a paper chart as legal primary aid of navigation, when you navigate in the area covered by this chart.

Failed automatic conversion: ENC: GB5X01SW.003, edt: 1, upd: 3 / 2005 9 8 PREVIOUS UPDATE MISSING

### ***Failed conversion. The base cell has failed in its SENC conversion***

The system cannot accept updates unless the base cell has been successfully converted into the SENC. Chart is not usable and you cannot view it. Try to reload the base cell from original media (in this example the failed base cell is GB5X01SW.000). And if that doesn't help order a new CD-ROM from your chart supplier. You must refer to a paper chart as legal primary aid of navigation, when you navigate in the area covered by this chart.

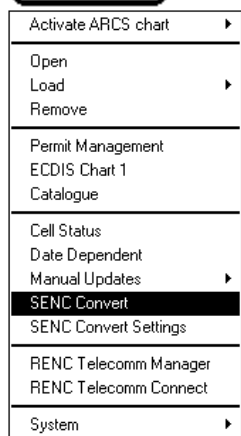
Failed automatic conversion: ENC: GB5X01SW.001, edt: 1, upd: 1 / 1998 9 8 PREVIOUS BASE CELL OR UPDATE MISSING

**NOTE! Always study both the "Failed SENC conversion" dialog and "Conversion history log" very carefully, because they contain important information about the legal status of the charts. Specially note that a chart may lose its legal status to fulfil SOLAS requirements and you may need to refer to a paper chart as legal primary aid of navigation.**

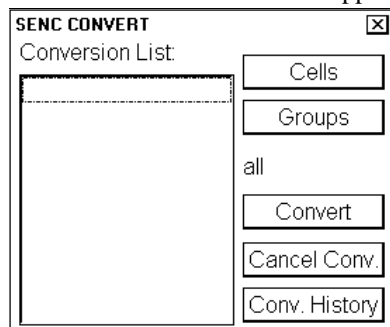
## How to use SENC convert window to initiate SENC conversion

Normally the "Automatic SENC conversion" is selected and there is no need to initiate SENC conversions from the SENC convert window. If you do not use the "Automatic SENC conversion" , you need to manually initiate SENC conversion. Another case in which you need to manually initiate SENC conversion is, if you upgraded or reloaded the ECDIS software from the ECDIS software CD-ROM.

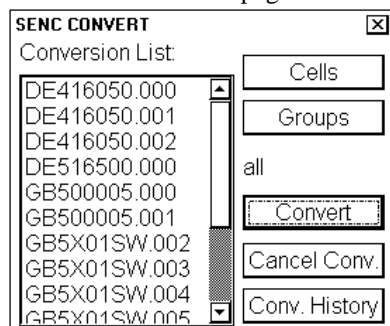
To initiate SENC conversions manually proceed as follows:



1. Press CHART PLAN button, select **SENC Convert** from the menu.
2. A SENC Convert window appears:



3. Use **Cells** to select an individual chart or use **Groups** to select a group of charts. Then press **Convert** to initiate the SENC conversion of the charts. Note that the **Convert** only do conversion of those charts, which are not currently converted into the SENC format. If your selected chart or all members of your selected group are already in the SENC format, the Conversion list remains empty. If all or some charts are not yet in the SENC format, they are added into the Conversion list (see example below). If you need for some reason to force SENC conversion of an already converted charts, you read instructions in chapter "Seldom used features of Vector charts" on page 144.



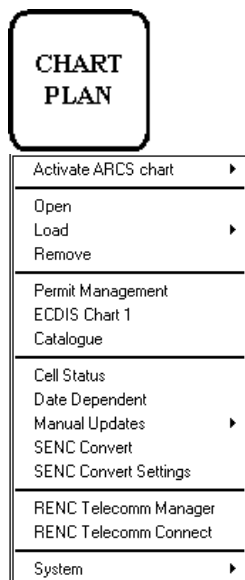
**Note 1!** You can at any moment remove charts from the conversion list. You paint with the cursor any amount of chart names in the Conversion List. And then you press **Cancel Conv.** to remove your painted charts from the SENC conversion queue.

**Note 2!** You can at any moment view the results of the finished SENC conversions. Press **Conv. History** and you get a Conversion log for viewing.

---

# Some features of Chart Plan menu

## Overview of Chart Plan menu



### Activate ARCS chart:

This function activates ARCS chart into the screen. You have two options to select the chart to be opened into the display: **Ignore scale** opens ARCS chart with a scale which was used last time when you used ARCS charts, **Sync scale** opens ARCS chart with a scale which is as close as possible to the scale which was used with S57 charts.

### Open:

You can open S57 chart by its number. See chapter "How to select charts for viewing" on page 118.

### Load:

You can load ENC's into the hard disk using CD-ROMs, floppies or LAN (Local Area Network); see chapter "How to load S57 charts" on page 54.

### Remove:

You can remove cells from your hard disk; see chapter "How to remove S57 Charts from the system" on page 79.

### Permit Management:

You can load permits for encrypted charts to enable their use in your ECDIS. Currently PRIMAR and CMAP uses encryption.

### ECDIS Chart 1:

This is used to open chart set "IHO ECDIS Chart 1". You can get familiar with symbology of chart used with ECDIS. See also Chapter "Symbology used in Vector charts" on page 135.

### Catalogue:

You can manage S57 charts using this; see chapter "Catalogue of S57 cells" on page 72.

### Cell Status:

You can view status of the cells (edition number and date, number of updates of the cell) stored into your hard disk, CD-ROMs or RENC. You can compare that you have the latest cell with latest update in use. For more information, see chapter "Seldom used features of Vector charts" on page 144.

### Date Dependent:

You can view date dependency of the cells (RENC status query date, number of updates available, Update Display dates, Update Approve Dates of the cells) in the SENC format; see chapter "Date dependent and periodical features of Vector chart" on page 128.

### Manual Update Planning

You can update your charts manually. For more information, see chapter Manual Updates.

### SENC Convert:

You can convert ENC's (base cells and/or updates) into the SENC by individual cell or group of cells basis; see chapter "How to use SENC convert window to initiate SENC conversion" on page 68.

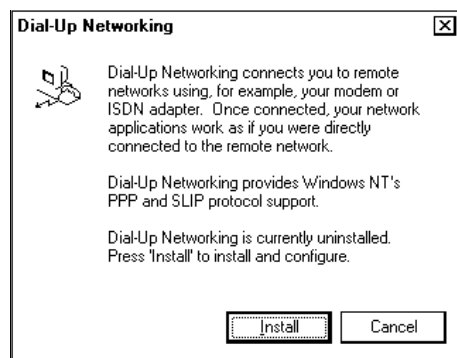
### SENC Convert Settings:

You can select automatic conversion from ENC format into the SENC format when you load charts into the hard disk. You can also select automatic set of Display until date to current date after the SENC conversion; see chapter "How to select automatic SENC conversion and Display Until date" on page 63.

## RENC Telecomm Manager:

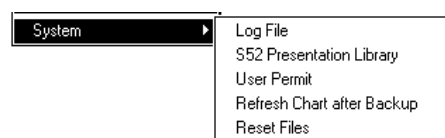
You can order a Product List, Permits, Charts and Updates from the RENC using telecommunications.

## RENC Telecomm Connection:



You can establish a telecommunication connection to the RENC. If following window appears, it is indication that the RENC connection has not been installed, press **Cancel** if you are not configuring connections to remote networks.

## System:

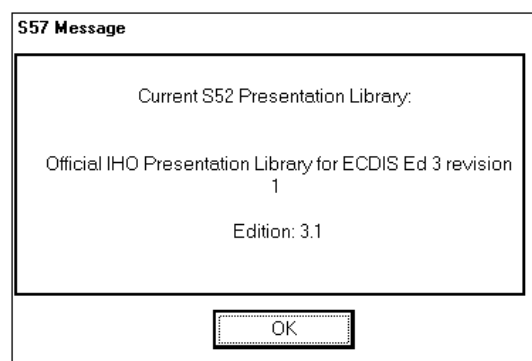


System has a set of further selections. They are described below:

### Log File

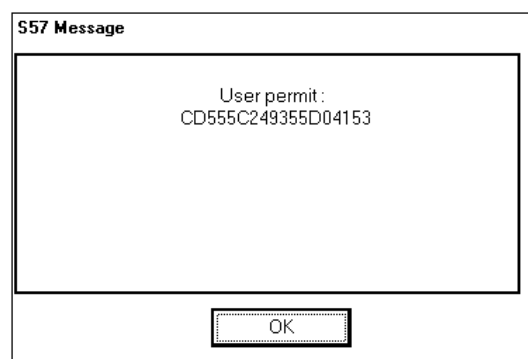
The log file contain various system events, which might be useful when your system supplier try to find reason of the unexpected behaviour of the system reported by you.

### S52 Presentation Library



You can check used presentation library for S57 charts. The current official Presentation library is shown in this example.

### User Permit



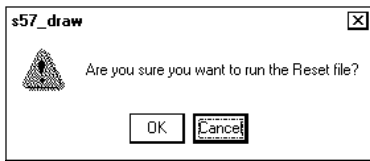
You can check your User Permit., which is used as your identifier in security systems such as PRIMAR and CMAP. See example below:

### Refresh Charts after Backup.

This used refresh available charts and updates after somebody made Backup of all charts and updates from another ECDIS to this ECDIS.

## Reset Files

This is only used for demonstrations. Reset Files run a script, which can be defined only by the factory experts, and which returns the content of the chart database into a such state that an demonstration of chart loading and updating could be demonstrated again.



If you by accident select this option, you get this question:

Select **Cancel** for any other case than rerunning of the demonstration.

## Catalogue of S57 cells

A S57 catalogue is used to view graphical coverage of the charts stored into the hard disk, available in a named "CD" or available from the RENC. Available charts are displayed using their limits of charts. Note that sometimes the real coverage of the charts may be considerably less than the declared limits of it. You can cursor pick any chart by going over its limit and then you can view the information of it

The screenshot shows a software interface with a map of Europe and a grid of S57 cells. A panel on the right displays navigation data and a 'View filters' dialog box. The dialog box has four sections circled in black and numbered 1 to 4. Section 1 is 'View filters', section 2 is 'Selected chart', section 3 is 'Group', and section 4 is 'Cursor'. The status bar at the bottom shows the date and time: 31.03.2000 08:08 UTC and 31.03.2000 11:08 FLE Standard.

### 1. View Filters

- **Name**, if selected displays also cell names in graphical coverage display
- **Permit**, if selected displays only charts for which you have permit
- **Navigation purpose**, displays charts from selected Navigation purposes
- **Group Charts**, displays charts, which are members of the active group
- **Catalogue Charts**, you have three option to select:
  - **RENC**, display charts available from the RENC
  - **SENC**, display charts stored into the hard disk in SENC format.
  - **CD**, display charts available in a named "CD"

### 2. Selected Chart

- **Cell ID**, name of the chart
  - **Permit**, existence of the permit
  - **SENC**, existence of SENC in your hard disk
- 3. Group.** See more in the chapter "Group of S57 cells"

The chart limit boxes are colour coded as follows:

**Green** The chart is available for use in SENC format. If the source of the chart is a RENC then the chart is also up-to-date. If the source of the chart is something else than a RENC then all loaded updates are included into the SENC.



- Orange**     The chart is available for use in SENC format but the chart is either not up-to-date or canceled. Either the SENC is from old edition, the SENC misses latest updates or the chart has been canceled..
- Red**         If the chart is permit free, you do not have it available for use in SENC format and thus you cannot use the chart currently.  
If the chart requires permit, you do not have the permit for the chart and you cannot use the chart currently..
- Blue**         The chart is available either in ENC format, in SENC format for another software version or in SENC format for another ECDIS. For example chart is blue during SENC conversion and if you loaded a chart into the ECDIS and the system could not convert the chart into SENC format.
- Magenta**     You have a permit to use the chart, but the chart is not available in SENC format and thus you cannot use the chart currently.

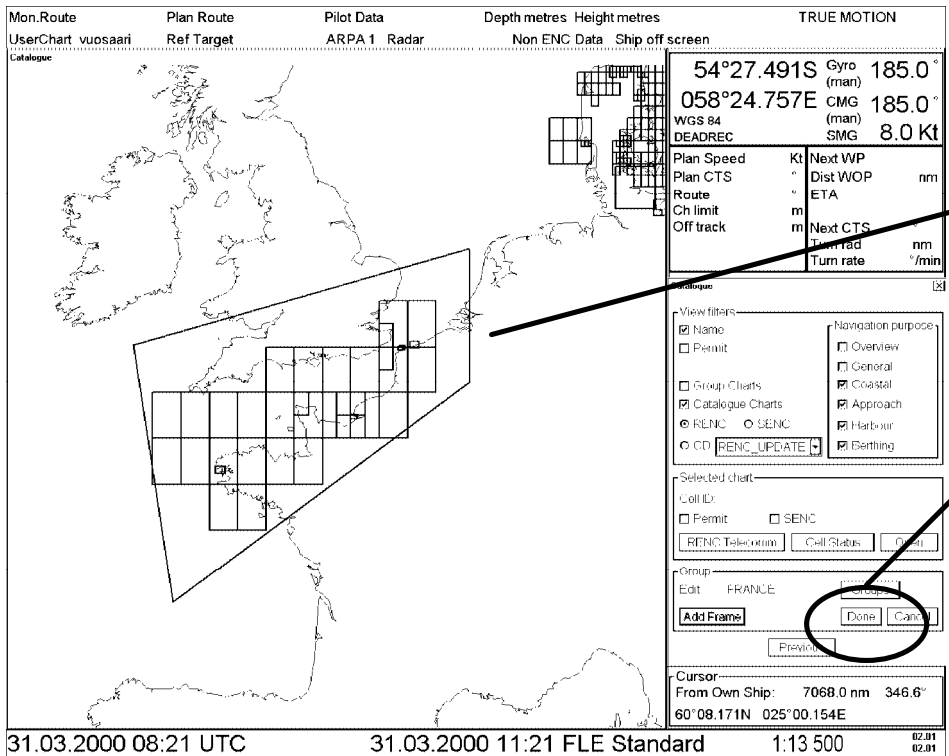
## Group of S57 Chart cells

In S57 catalogue you have possibility to define groups of S57 Charts. This means that you can collect charts together - for example all cells, which cover a route from Liverpool to New York or all cells available from one National Hydrographic Office. This makes easier to perform many SENC maintenance functions such as loading base cells and updates, setting Display Until and Approve Until dates etc. Below an example how to make a group and add Charts into it.

The screenshot shows the ECDIS interface with a map of the North Atlantic and a right-hand panel for chart management. The panel includes sections for 'Catalogue', 'View filter', 'Navigation purpose', 'Used chart', and 'Group'. Annotations with arrows point to specific actions:

- 1. Select Catalogue Charts as RENC, SENC or CD**: Points to the 'Catalogue' section where 'Group Charts', 'RENC', 'SENC', and 'CD' are selected.
- 2. Press Groups button**: Points to the 'Groups' button in the 'View filter' section.
- 3. Enter Name for new Group**: Points to the 'New Group Name' dialog box where 'france' is entered.
- 4. Press Add Frame button**: Points to the 'Add Frame' button in the 'Used chart' section.

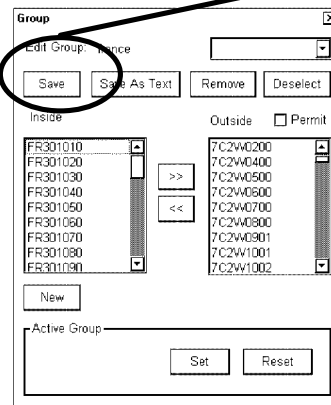
Below the main interface, two smaller screenshots show the 'Group' dialog box and the 'Keyboard' input screen for the group name.



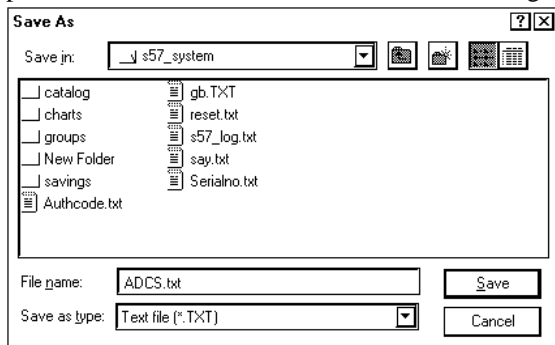
5. Use SELECT button to define frame for group

6. Press Done button

7. Press Save button



You can save your chart cells also into text file, if you like to have a list of chart cells in text format. To do this press **Save As Text...** button. A "Save As" dialog box appears.

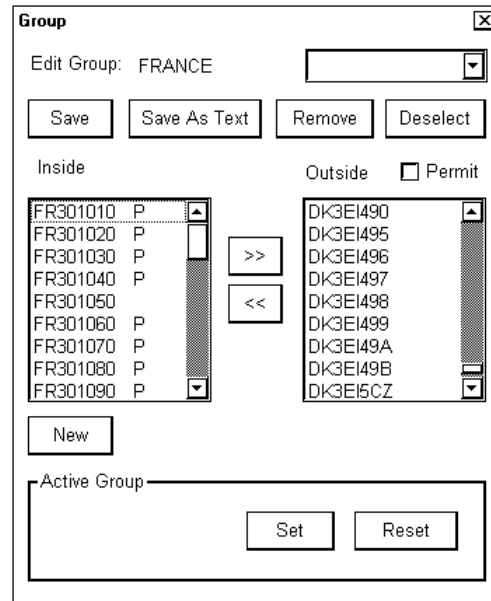


Select directory and drive to where you want save your group. You can use Windows NotePad application to view and to make a hard copy from the list of group.

### How to remove S57 Chart cells from a group

You can remove chart cells from a defined group. To remove proceed as followed:

1. Press CHART PLAN push button. Select **Catalog** from the menu.
2. Press **Groups...** button in S57 Catalog dialog box.
3. Select desired group from **Edit group** list box.
4. Select desired chart cell(s) from Inside list box.
5. Press >> button. Selected Chart cell is removed to Outside list box and it is no more member of defined group



### How to delete a group

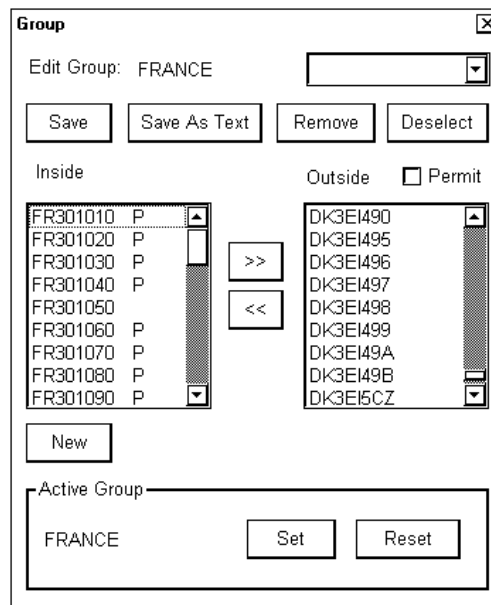
You can delete a defined group. To remove proceed as followed:

1. Press CHART PLAN push button. Select **Catalog** from the menu.
2. Press **Groups...** button in S57 Catalog dialog box. A Chart group dialog box appears.
3. Select desired group from **Edit group** list box.
4. Press **Remove** button. Confirm deleting a group, press **OK**.

### How to select active group for viewing with catalog

To select active group proceed as follows:

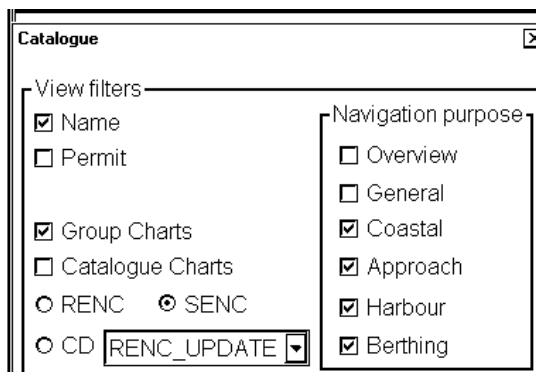
1. Press CHART PLAN push button. Select **Catalog** from the menu.
2. Press **Groups** button in S57 Catalog dialog box.
3. Select desired group from **Edit group** list box.
4. In **Active Group** -field press **Set** button. The name of active group appears to **Active Group** -field.



## How to view active group with catalogue

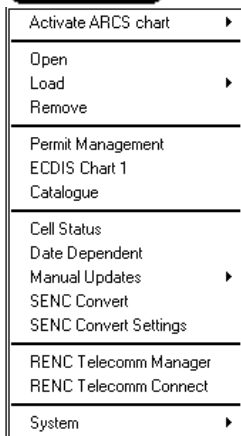
To view active group proceed as follows:

1. Press CHART PLAN push button. Select **Catalog** from the menu.
2. Select Group Chart in Catalogue dialog box. In Catalogue window it is shown charts which are member of active group.



## How to view status and date dependency of S57 Chart cells and their updates

When you load S57 Chart cell(s) and/or their updates the system sets **Display until** of S57 Chart cell(s) as current date of the System. To set **Approve until** as current date of the System you must open Date Dependent and perform Approve Until. You can view status and date dependency of S57 Chart cells and their updates. To view status and date dependency, proceed as followed:



1. Press CHART PLAN push button and select **Date Dependent** from the menu.
2. A Date Dependent dialog box appears.

Date Dependent						
Cell ID	RENC		SENC		Updates	
	edt/	upd	edt/	upd	Displayed until	Updates Approved until
FR501130	-/	-	1/	7	2000 2 9 ( 7)	2000 2 9 ( 7)
FR601021	-/	-	1/	0	2000 2 9 ( 0)	2000 2 9 ( 0)
GB100035	-/	-	15/	0	2000 2 8 ( 0)	1999 11 25 ( 0)
GB304010	2/	0	2/	0	2000 2 11 ( 0)	1999 1 5 ( 0)
GB404015	3/	0	3/	0	2000 2 11 ( 0)	1999 1 5 ( 0)
GB504015	4/	1	>>>	3/	2000 2 11 ( 1)	1999 1 5 ( 0)
n1300131	-/	-	Cancelled		2000 2 8 ( 6)	1998 9 21 ( 2)
N04D0610	-/	-	3/	0	2000 2 9 ( 0)	2000 2 9 ( 0)
N04D0611	-/	-	2/	0	2000 2 9 ( 0)	2000 2 9 ( 0)
N04D0612	-/	-	2/	0	2000 2 9 ( 0)	2000 2 9 ( 0)
N04D0613	-/	-	2/	2	2000 2 9 ( 2)	2000 2 9 ( 2)
N04D0710	-/	-	2/	0	2000 2 9 ( 0)	2000 2 9 ( 0)
N04D0712	-/	-	2/	0	2000 2 9 ( 0)	2000 2 9 ( 0)
N04D0721	-/	-	2/	0	2000 2 9 ( 0)	2000 2 9 ( 0)
N04D0722	-/	-	2/	0	2000 2 9 ( 0)	2000 2 9 ( 0)
N04D0812	-/	-	2/	1	2000 2 9 ( 1)	2000 2 9 ( 1)
N04D0813	-/	-	2/	0	2000 2 9 ( 0)	2000 2 9 ( 0)
N04D0820	-/	-	2/	1	2000 2 9 ( 1)	2000 2 9 ( 1)
N04D0910	-/	-	2/	0	2000 2 9 ( 0)	2000 2 9 ( 0)

Latest RENC	Oldest date	2000 2 8	1997 7 16
Product List	Newest date	2000 2 11	2000 2 9
2000 2 11	Manual Updates	---NVLD---	---NVLD---

Sync Manual Update Dates       

    All SENCs

Recommended settings in Date Dependent are:

- Sync Manual Update Dates as ON position
- All Cells ON position

**RENC edt / upd** : Column “RENC” contain edition/update status from Product List..

**SENC edt / upd** : Column “SENC” contain edition/update status from “SENC”, i.e. loaded and converted in the ECDIS.

**Updates displayed until:** View the date until updates is displayed. You can enter desired date by using **Display until** button. The number after date shows the number of updates involved to displayed cell (number of displayed updates / number of updates in SENC format).

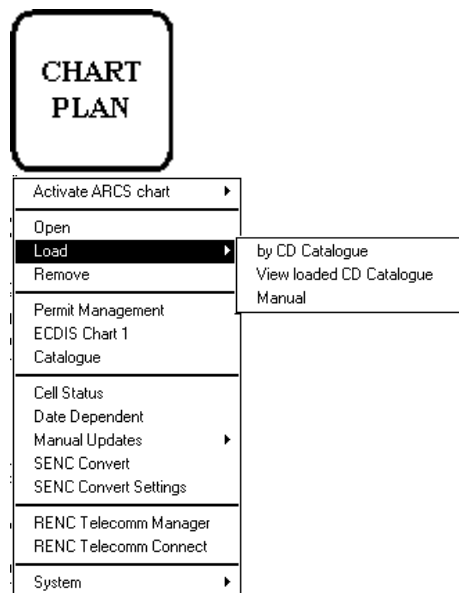
**Updates approved until:** View the date until updates is approved. You can enter desired date by using **Approve until** button (number of approved updates / number of updates in SENC format).

A Mark “>>>” is used to indicate that a chart is not up-to-date. Cancelled charts are indicated as “cancelled” instead of “edt/updn”. If SENC contain a cancelled chart then the indication “>>>” is replaced by “\*\*\*”.

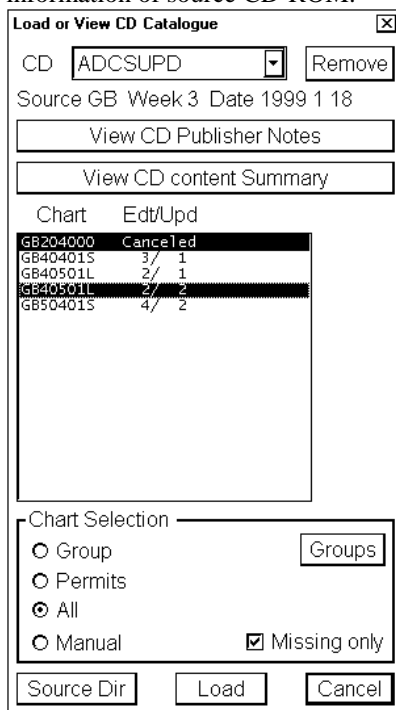
The issue date of the used Product list is displayed as “Latest RENC Product List”. If the ECDIS do not contain any Product List, then the date of the Product List is displayed as “—NVLD—”.

## How to later use CD Catalogue created during load of S57 charts

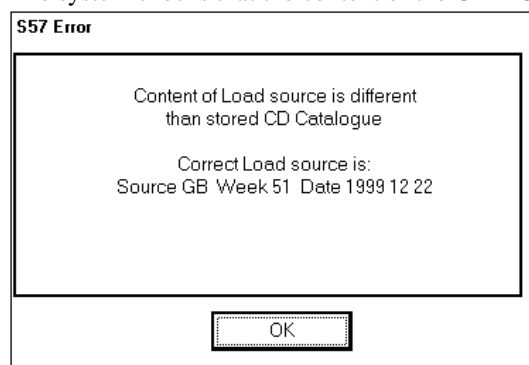
The CD Catalogue was created during loading of S57 charts. A CD Catalogue contains important information from the chart producer such as Publisher Notes and Summary of the charts. Sometimes you may need to load charts from the CD-ROM. These things can be done as shown below.



1. Press CHART PLAN push button, select **Load** from the menu and **View loaded CD Catalog** from submenu.
2. Select a named "CD Catalogue" you want to use in CD list box. The content of the catalog appears as a list of charts in the list box and information of source CD-ROM.



**Note!** If you also want to load chart, you must use the same "CD" as you used to make a named "CD Catalogue". The system checks that the content of the CD-ROM is equal and in case of miss match following message appears:



## How to view Publisher Notes and/or CD content Summary

You can view the Publisher notes as follows.

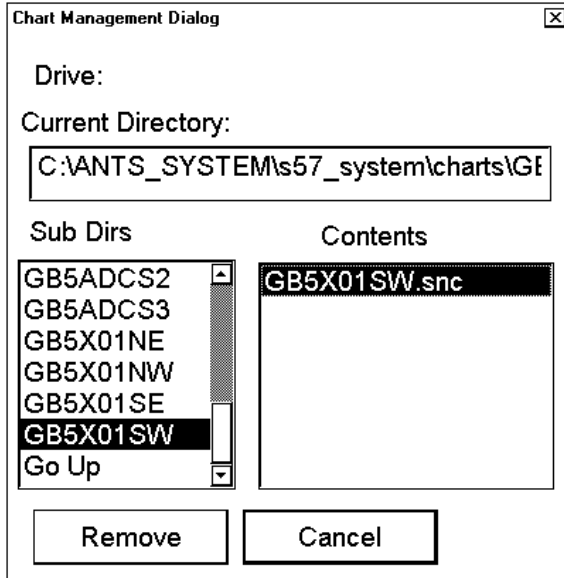
1. Press **View CD Publisher Notes** button in the S57 Load dialog box.
2. A viewer shows you the Publisher Notes of the selected "CD".
3. If you want to make a hard copy of Publisher Notes, select **Print** in the **File** menu.
4. To close this program, select in **Exit** in the **File** menu.

You can view the Summary of the content of the CD. See chapter "How to load S57 charts from a CD-ROM, floppy or LAN" on page 56."

## How to remove S57 Charts from the system

To remove S57 format vector chart cell from the system, proceed as follows:

1. From the Control panel press Chart Plan push button.
2. Select **Remove** from the menu. There will appear a chart list dialog.
3. Select desired chart cells to remove them from the system. You can remove base cell (000), updates (001...) and SENC format (snc).



4. Press **Remove** button. System will remove file(s) from the hard disk.

---

# Introduction to the S57 chart service from a RENC

## Introduction

Before you can use RENC service, you have to be authorized as Customer of RENC. To be authorized you have to contact official distributor (Chart Agent) of RENC. After that you have available following services:

- CD-Service
- Telecomm Service

You can use either CD-Service or On-line Service alone, or you can use some combination of services, like order of Product List, Permits, Updates by Telecomm Service and Base Charts by CD-Service.

## Permits

Permits are used to control the permission to use a chart. A permit in RENC security is connected to an edition.

Permits are issued as two different types

- Subscription Permit. These include updates for subsequent 12 months. It is assumed that a typical user is a SOLAS class vessel, which is required to use up-to-date charts.
- One-Off Permit. These include only updates up to the issue date of the Permit. It is assumed that a typical user is a non-SOLAS class vessel, which is not required to use up-to-date charts.

Each Permit includes also the expiry date.

The expiry date of a Permit controls the ENC to SENC conversion. If the issue date of a chart or update is older or equal to the Permit expiry date, then the system can convert an ENC into the SENC. There are no viewing time limits as used in some other security systems such as ARCS. The user has a right to view a chart forever and more over he has a right to convert a chart from its ENC format into the SENC forever.

A RENC can publish Permits in two different formats

- “\*.pmt” format. This format does not include the applicable chart edition and does not include applicable permit type.
- PERMIT.TXT format. This format does include the applicable chart edition and does include applicable permit type.

Both permit formats are fully operational, but the older “\*.pmt” format creates confusion, because it cannot support the user, when chart edition changes.

The system display warnings associated with expiry date. Examples are “will expire” warning 30 days before the expiry date and “have expired” after the expiry date. These warning are relevant only for Subscription Permits. Only the new PERMIT.TXT format support the system to suppress irrelevant warning associated with expiry date.

## Product List

A Product List is maintained by a RENC. You can retrieve the Product List by Telecomm from a RENC or you can load it from the CD-ROM of a RENC. This list contains an up-to-date list of available charts and their edition/update status in the RENC. When you load a CD-ROM or use Telecomm to receive Product List from a RENC, the ECDIS checks the issue date of the Product List. If the issue date indicates newer Product List, then it is copied into the ECDIS. If the issue date indicates older Product List, then ECDIS shows a notice to the user that newer already loaded.

## Authentication

Normally the authentication process is invisible for the user. Only if the Authentication fails, then the user gets appropriate notice. From user point of view the Authentication is similar to CRC checksum test. If CRC checksum test or Authentication fails then the chart is unusable.

Authentication uses private key and public key. A digital signature associated with each chart contains private key. Public key is stored in the ECDIS and it is really public. RENC may publish a new public key. This public key will be available as text by fax, by post, by front page of a newspaper etc. and as a text file called for example PRIMAR.PUB. The day, when a RENC publish a new public key, will be similar milestone than the change of millennium.



## Available service types

### Telecomm Service

Telecomm Service is using telecommunication lines to retrieve information from the RENC. Following information can be downloaded there:

- ENC Product List
  - Information, status and coverage of all available ENC products
- Cell Permit
  - Buy decryption permit to access the ENC information
- ENC Information
  - Download ENC base cells or updates

### CD-Service

If you are using CD-Service, you receive from the RENC following:

- Base CD contain all Base Cells that are available in the RENC database when CD was released.
- Update CD contain all updates to the Base CD, but it will also contain any new Base Cells and New Edition, Re-issues received from the contributing Hydrographic Offices. Update CD will be issued once a week.

If you want to enlarge your chart coverage, you have to contact your Distributor to order more permits for new charts.

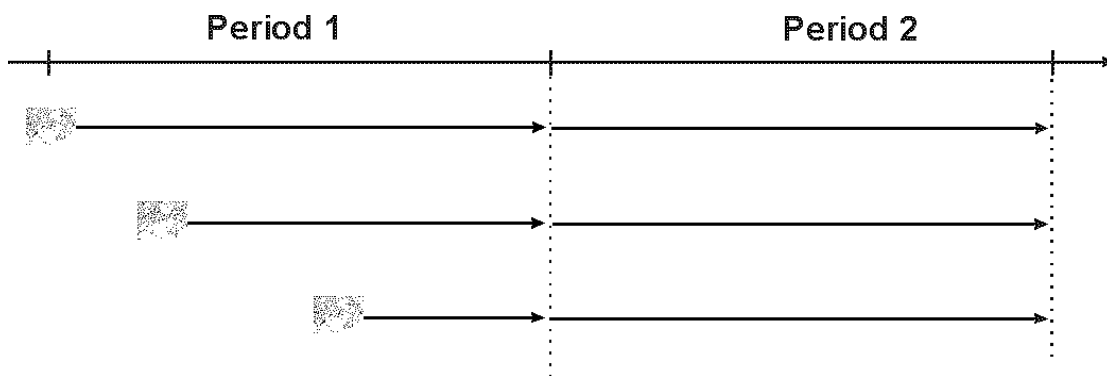
## Subscription types

Charts and their Updates stored in RENC are decrypted and you have to get key (Permit) to load chart into the ECDIS. There are two different kinds of Permit to choose suitable one for your purpose.

### Subscription

Subscription period is 12 months and it starts when you order first Permit(s) from the RENC.

- User subscribes to a updating service
- Updating service has a renewable expiration date
- ENC is still available after expiration, but can not apply any new information
- User will receive during the service period:
  - all updates issued to the ENC
  - any re-issues for the ENC
  - any new edition of the ENC



If you enlarge your chart coverage during your subscription period as shown above, will expire date of subscription for all charts be the same date.

### One-Off

If you use One-Off Permit, you order permit for chart and updates which are valid until date you order permit (i.e. Chart is up-to-date when you ordered it). No more information can be retrieved for this chart, which is published after order date.

**One-Off Current Edition;** permit for a chart, which is based on data on the hard disk of the ECDIS.

**One-Off the latest Edition;** permit for a chart, which is the latest available based on the Product List of a RENC.

# Service provided by a RENC

## How to view the Coverage of the RENC service

Whenever you like to see Product List in graphical presentation, use Catalog to view it. The Catalog of S57 Chart shows the situation when you last time ordered the Product List from the RENC or loaded the latest BASE or UPDATE CD-ROM into the ECDIS.

Note, the ECDIS keeps automatically the latest available Product List. Thus the ECDIS do not load the Product List if it is older than already loaded into the ECDIS.

The screenshot shows the ECDIS interface with a map of the North Atlantic. A grid of chart limit boxes is overlaid on the map. The 'Catalog' window is open, showing various parameters and a list of chart categories. The 'View filters' section is highlighted with a circle, and two arrows point from the text '1. Make selections: •Catalogue Charts •RENC' to the 'Catalogue Charts' and 'RENC' options in the window. Another arrow points from the text '2. Selection of Displayed Charts' to the 'View filters' section of the window.

1. Make selections:

- Catalogue Charts
- RENC

2. Selection of Displayed Charts

The chart limit boxes are colour coded as follows:

- Green** The chart is available for use in SENC format. If the source of the chart is a RENC then the chart is also up-to-date. If the source of the chart is something else than a RENC then all loaded updates are included into the SENC.
- Orange** The chart is available for use in SENC format but the chart is either not up-to-date or canceled. Either the SENC is from old edition, the SENC misses latest updates or the chart has been canceled..
- Red** If the chart is permit free, you do not have it available for use in SENC format and thus you cannot use the chart currently.  
If the chart requires permit, you do not have the permit for the chart and you cannot use the chart currently..
- Blue** The chart is available either in ENC format, in SENC format for another software version or in SENC format for another ECDIS. For example chart is blue during SENC conversion and if you loaded a chart into the ECDIS and the system could not convert the chart into SENC format.
- Magenta** You have a permit to use the chart, but the chart is not available in SENC format and thus you cannot use the chart currently.

## How to know up-to-date status of a chart from a RENC

To keep Charts up-to-date you have to check situation in a RENC about at weekly basis. The ECDIS compares used charts to Product List of RENC. If a **Permanent Warning** appears to Chart display of ECDIS, it is an indication that at least one of used charts is not up-to-date compared to the Product List, see below:

**Permanent Warning**

At least one of used charts is not up-to-date. Get or load latest edition and/or updates from your RENC service.  
Use Chart Plan - Date Dependent to check charts

The information of available charts and their up-to-date status is available both in Catalogue and in Date Dependent window.

**The easiest method to check up-to-date status is to view Catalogue and check that all required charts are indicated as green. Charts which are not up-to-date are indicated as orange. See more "How to view the Coverage of the RENC service" on page 82.**

You can also use Date Dependent window on demand when you have doubt that some charts are not up-to-date or you have the Permanent Warning shown above.

Cell ID	RENC edt/ upd	SENC edt/ upd	Updates Displayed until	Updates Approved until
FR501130	1/ 7	1/ 2	2000 2 9 ( 2)	2000 2 9 ( 2)
FR601021	1/ 0	1/ 0	2000 2 9 ( 0)	2000 2 9 ( 0)
GB100035	15/ 0	15/ 0	2000 2 9 ( 0)	2000 2 9 ( 0)
GB304010	2/ 0	2/ 0	2000 2 9 ( 0)	2000 2 9 ( 0)
GB404015	3/ 0	3/ 0	2000 2 9 ( 0)	2000 2 9 ( 0)
GB504015	4/ 1	3/ 1	2000 2 9 ( 1)	2000 2 9 ( 0)
n1300131	-	Canceled	2000 2 9 ( 6)	2000 2 9 ( 2)
N0400610	3/ 0	3/ 0	2000 2 9 ( 0)	2000 2 9 ( 0)
N0400611	2/ 0	2/ 0	2000 2 9 ( 0)	2000 2 9 ( 0)
N0400612	2/ 0	2/ 0	2000 2 9 ( 0)	2000 2 9 ( 0)
N0400613	2/ 2	2/ 2	2000 2 9 ( 2)	2000 2 9 ( 2)
N0400710	-	2/ 0	2000 2 9 ( 0)	2000 2 9 ( 0)
N0400712	2/ 0	2/ 0	2000 2 9 ( 0)	2000 2 9 ( 0)
N0400721	2/ 0	2/ 0	2000 2 9 ( 0)	2000 2 9 ( 0)
N0400722	2/ 0	2/ 0	2000 2 9 ( 0)	2000 2 9 ( 0)
N0400812	2/ 1	2/ 1	2000 2 9 ( 1)	2000 2 9 ( 1)
N0400813	2/ 0	-	---NVLD---	---NVLD---
N0400820	2/ 1	-	---NVLD---	---NVLD---
N0400910	2/ 0	2/ 0	2000 2 9 ( 0)	2000 2 9 ( 0)

Latest RENC      Oldest date      2000 2 9      2000 2 9  
 Product List      Newest date      2000 2 9      2000 2 9  
 2000 2 11      Manual Updates      ---NVLD---      ---NVLD---

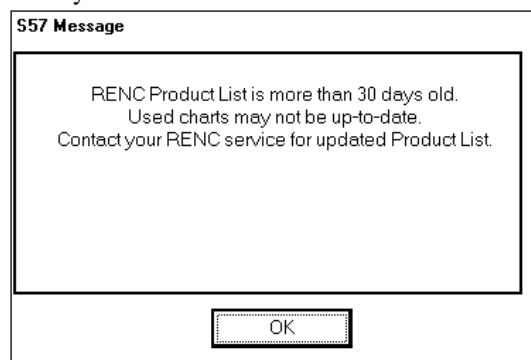
Sync Manual Update Dates              
       All SENCs

Interpret Date Dependent window as follows:

1. **RENC edt / upd**; in this field is displayed chart's edition and it's update in the RENC. The information is based on Product List you last time ordered.
2. **SENC edt / upd**; in this field is displayed chart's edition and it's update in the ECDIS.
3. Chart in the ECDIS is older than Chart in the RENC. In this case new edition of chart has been released.
4. Chart is not available in the RENC but it is in the ECDIS.
5. Chart in the ECDIS is newer than chart in the RENC. In this case in the ECDIS has chart included two updates and only one update available in the RENC.
6. Chart available in the RENC but not in the ECDIS.

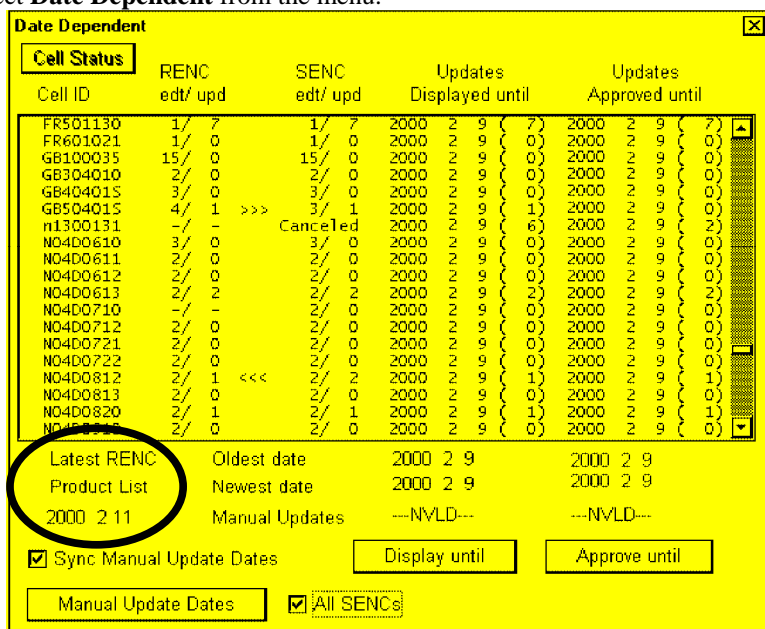
## How to know up-to-date status of the RENC Product List

The ECDIS checks time to time when you have last time ordered the Product List from the RENC. If period of time when you order the Product List is more than 30 days then the ECDIS gives a S57 Message as shown below:



To check the date when you have last time ordered Product List of RENC, proceed as follows:  
Press CHART PLAN push button.

Select **Date Dependent** from the menu.



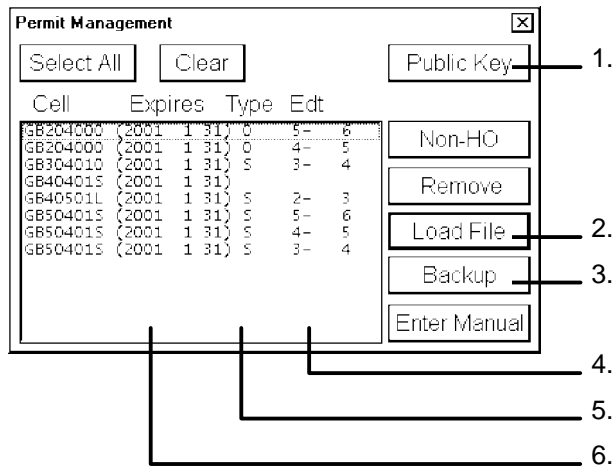
In lower left corner there is a date field indicating when you load last time a Product List from the RENC.

## How to manage Permits from a RENC

Permits are used control the right to use a chart in the ECDIS. A permit in RENC ENC Service is connected to an edition of chart. Permits are issued as two different types:

- Subscription Permit; This include updates for subsequent 12 months.
- One-Off Permit; This include only updates up to the issue date of the Permit.

The expiry date of the Permit controls loading base charts and it's updates to the ECDIS. The ECDIS will warn you when you are loading Charts or Updates which are issued less than 30 days before expire date of the Permit. If the Permit is expired it is impossible to load Chart or it's update issued after expire date of the Permit. The user has a right to view a chart forever, but it will not comply demands for up-to-date charts.

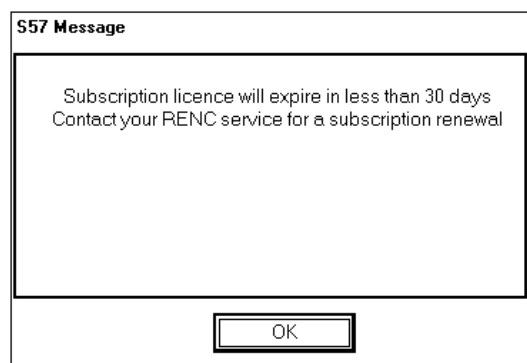


1. You can view Public Key or load a new one.
2. When you receive Permits from the RENC loading is done using Load File.
3. You can make a back-up copy of the Permits using **Backup**.
4. In a list of Permits this field indicates edition number of chart to which the Permit is valid. Note that when a new edition of Chart is issued also new Permit is needed. You can have Permit for different edition of the same Chart as shown above.
5. Type of Permit (Subscription or One-off).
6. Expiry date of permits. All Permits as subscription type will expire at the same date.

### Subscription warnings

If you have at least one Permit of Subscription type, the system will automatically warn you about the expire date of your subscription licence.

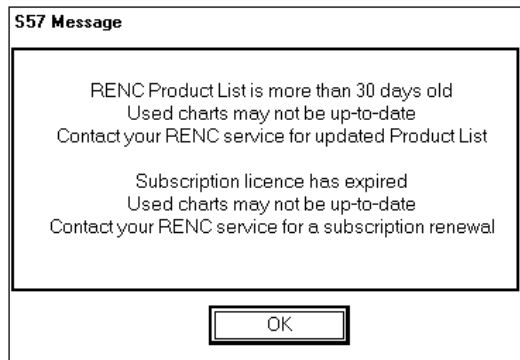
Warning about soon to be expired subscription is activated every 12 hour when it is less than 30 days for expire date.



Warning about expired subscription is activated every 12 hour after the subscription expired (see lower part of the example).

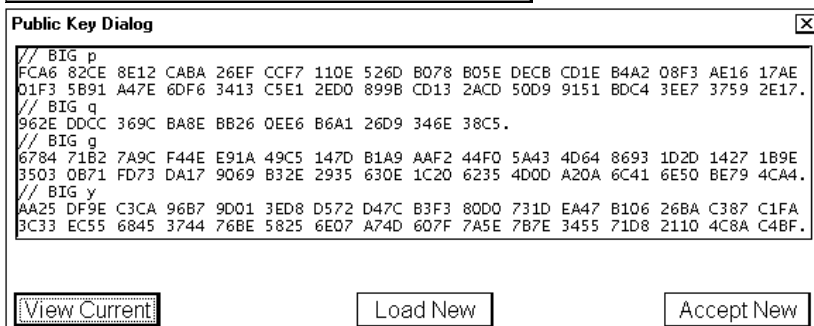
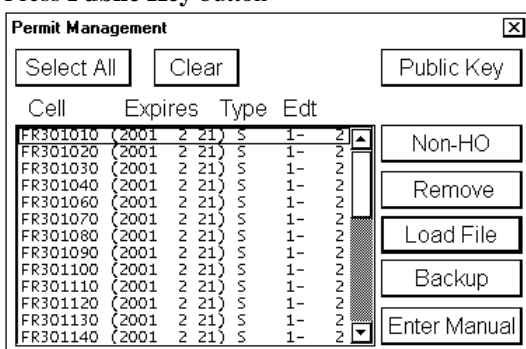
NOTE!

The upper part of the example contains also a warning that the Product List is too old.

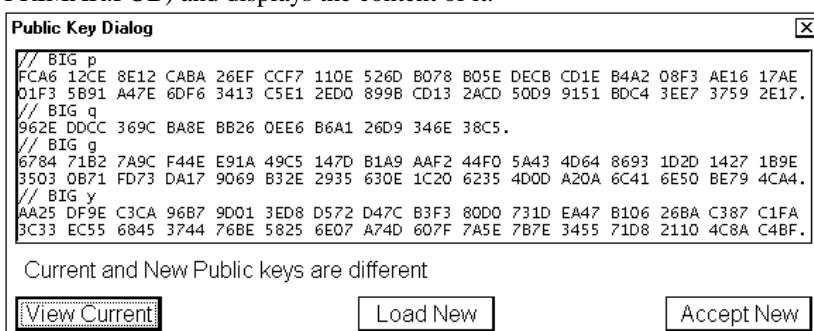


## How to manage Public key from a RENC

To view Public Key or to load Public Key into the ECDIS, access to Public Key is in **Permit Management** window. Press **Public Key** button



“View Current” display current Public Key. “Load New” loads a new Public Key from \*.PUB file (for example PRIMAR.PUB) and displays the content of it.

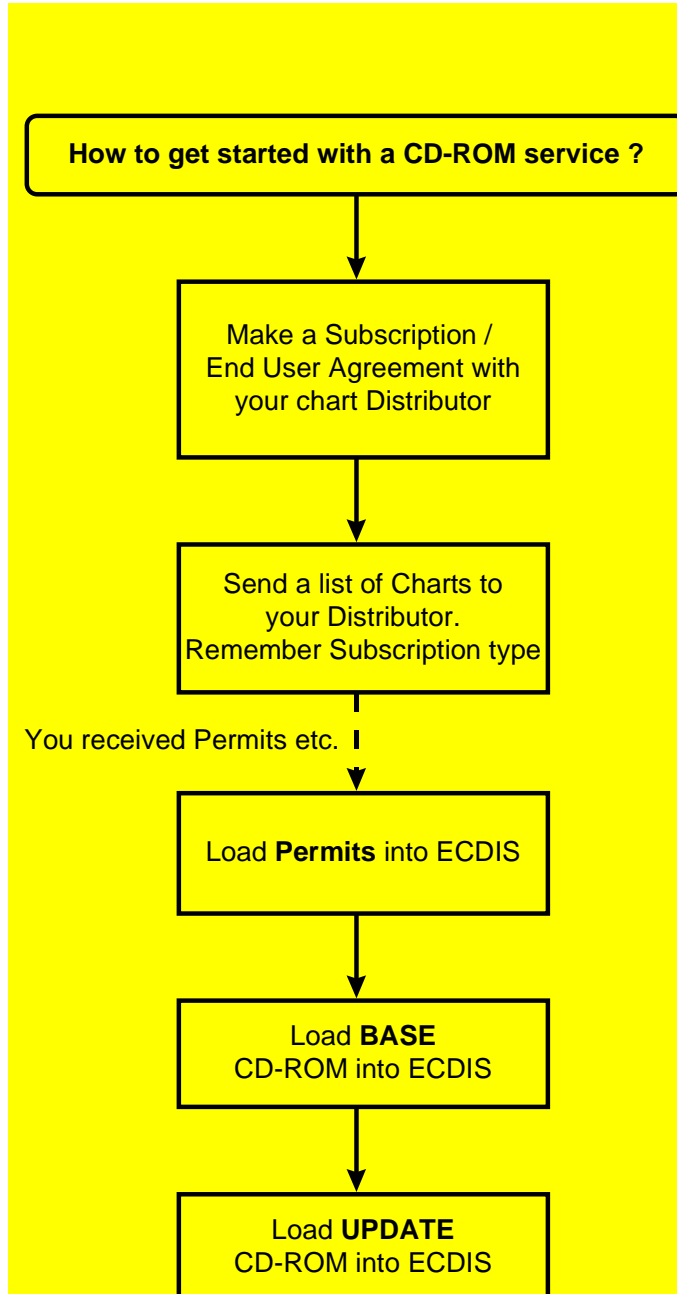


Compare the content of the loaded new Public Key to the known content of the Public Key of the RENC you use. If the content is ok, you can take the loaded new Public Key in use by "Accept New".

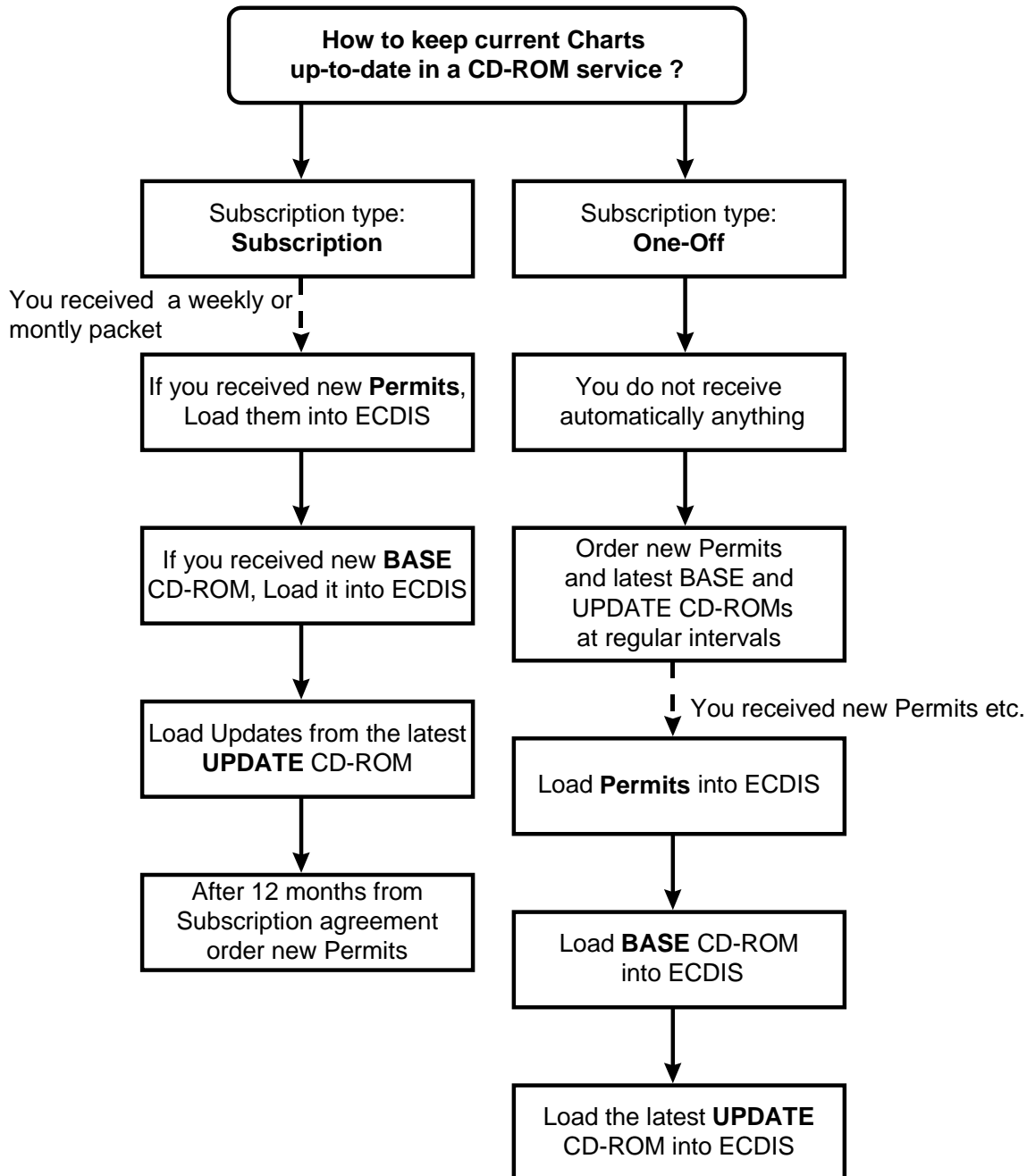
---

## CD-ROM service from a RENC

### How to get started with S57 charts using a RENC

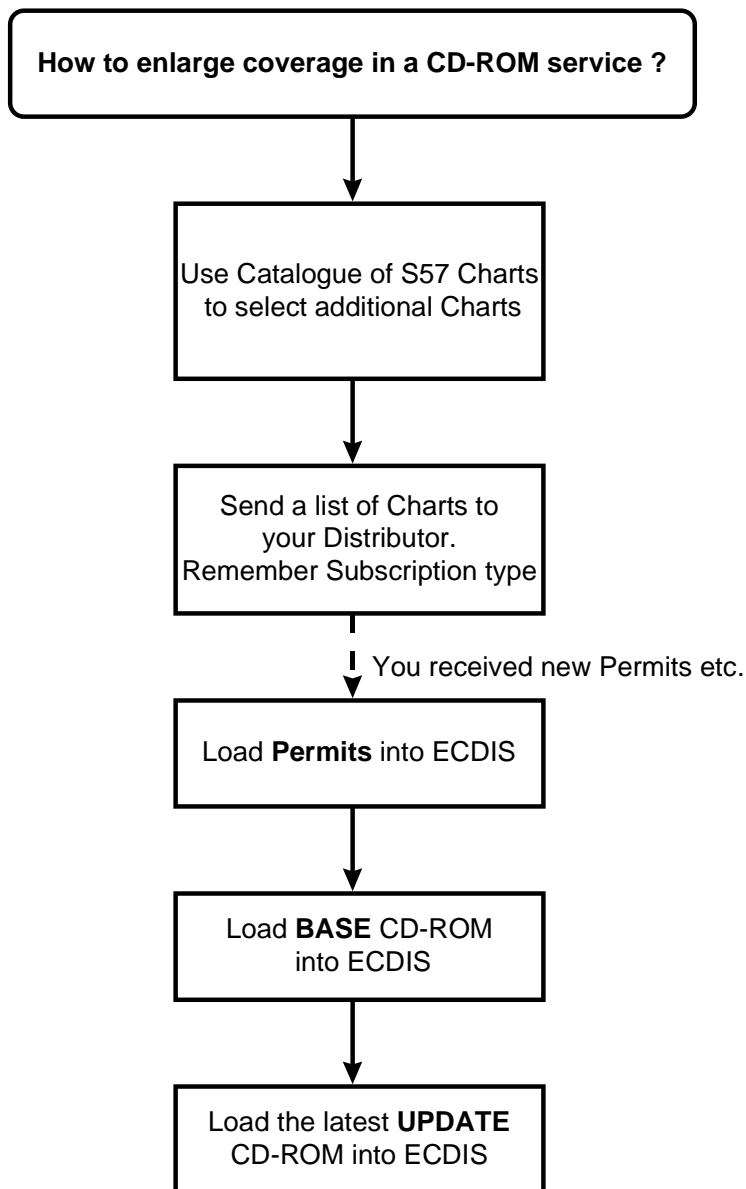


## How to keep S57 charts up to date using a RENC





## How to enlarge chart coverage using a RENC

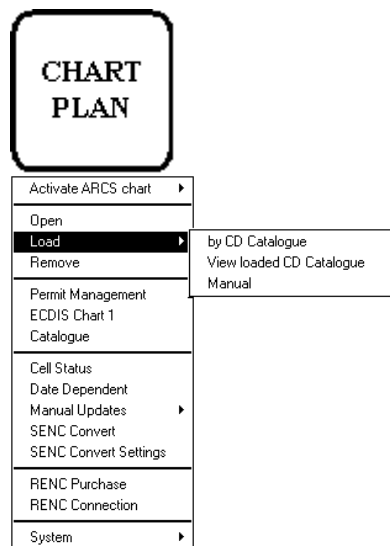


## A BASE CD-ROM from a RENC

A BASE CD-ROM from a RENC contains all the Charts stored in the RENC when it was issued. When you load Charts by **CD-Catalogue** also following information is loaded into the ECDIS hard disk:

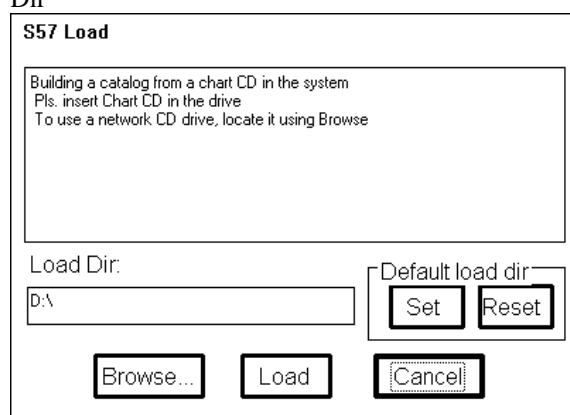
- The Content Summary of the BASE CD-ROM.
- Publisher Notes.
- The Product List.

When you receive a new BASE CD-ROM from the RENC, load Charts into the ECDIS as follows:



*CHART PLAN push button*

1. Press **CHART PLAN** push button.
2. Select **Load** from the menu and by **CD Catalogue** from the sub menu. The default load source is CD-ROM. Press **Load**, if you use CD-ROM. If you want to load from another ECDIS using LAN, you have to change Load Dir. Press **Browse** to select a new Load Dir



3. When you press **Load** button in S57 Load window, the ECDIS loads Content Summary, Publisher Notes and Product List from CD-ROM and opens **Load or View CD Catalogue** window.
4. In **Load or View CD Catalogue** window you select Charts which will be loaded into ECDIS and after selection press **Load** button to load Charts into the ECDIS. See also

If you had a newer Product List already in use, you get following notice.

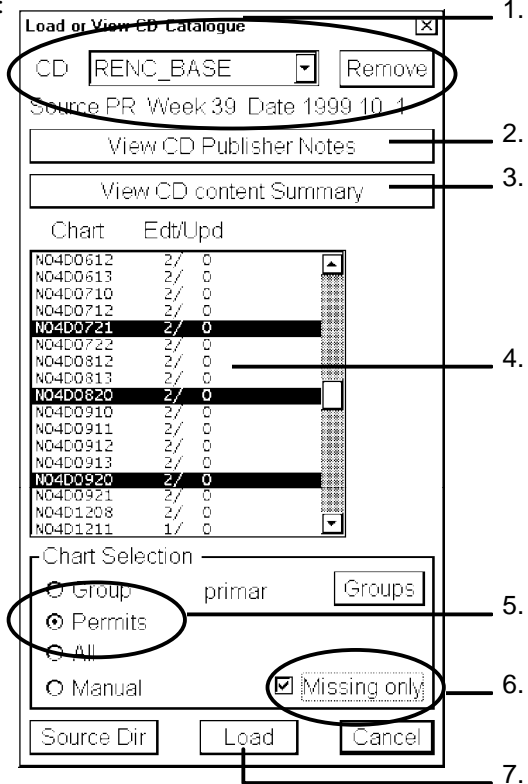
### NOTE

It is very typical that the Product List of a BASE CD-ROM is older than the Product List in use.



Interpretation of **Load or View CD Catalogue** window:

1. The source and edition date of CD is displayed here.
2. View CD Publisher Notes
3. View CD content Summary
4. List of Charts stored in CD-ROM and also information about Edition number of Chart and amount of updates included in the Chart.
5. In Chart Selection field you can select method how to pick desired Charts from the List:
  - **Group**; if you have predefined Group of Charts the ECDIS will highlight the Charts which are available in CD-ROM.
  - **Permits**; the ECDIS will highlight the Charts which are available in CD-ROM and you have Permits.
  - **All**; the ECDIS will highlight all the Charts which are available in CD-ROM.
  - **Manual**; you can highlight desired Charts from the List.
6. Selection "Missing only" loads only Charts and their updates which are not already loaded into the ECDIS.
7. When you press **Load** button highlighted Charts are loaded into the ECDIS.

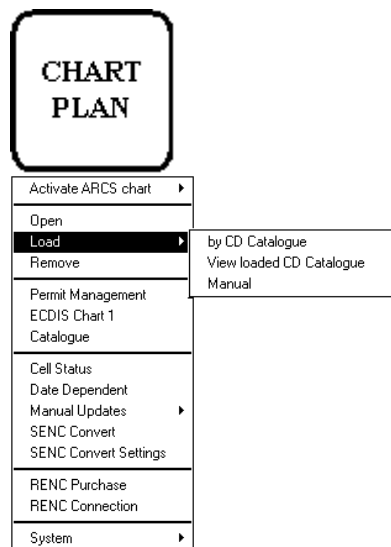


## An UPDATE CD-ROM from a RENC

An UPDATE CD-ROM from a RENC contains all the Updates included to Charts stored in the RENC when the latest BASE CD-ROM was issued. When you load Charts **by CD-Catalogue** also following information is loaded into the ECDIS hard disk:

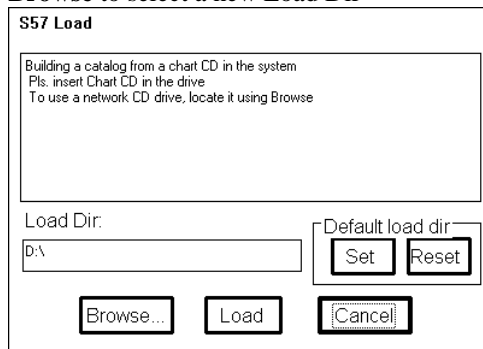
- The Content Summary of the BASE CD-ROM.
- Publisher Notes.
- The Product List.

When you receive a new BASE CD-ROM from the RENC, load Charts into the ECDIS as follows:



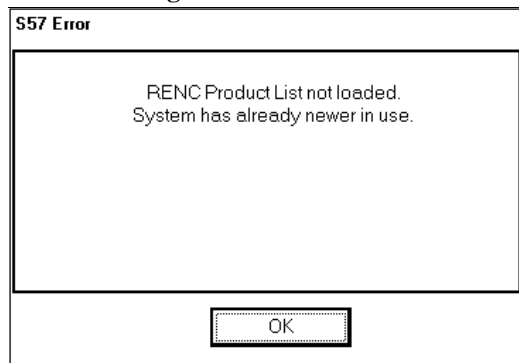
*CHART PLAN push button*

1. Press CHART PLAN push button.
2. Select **Load** from the menu and **by CD Catalogue** from the sub menu. A S57 Load dialog box appears. The default load source is CD-ROM. Press **Load** and continue from step 5, if you use CD-ROM. If you want to load from a floppy disk or from another ECDIS using LAN, you have to change Load Dir. Press **Browse** to select a new Load Dir



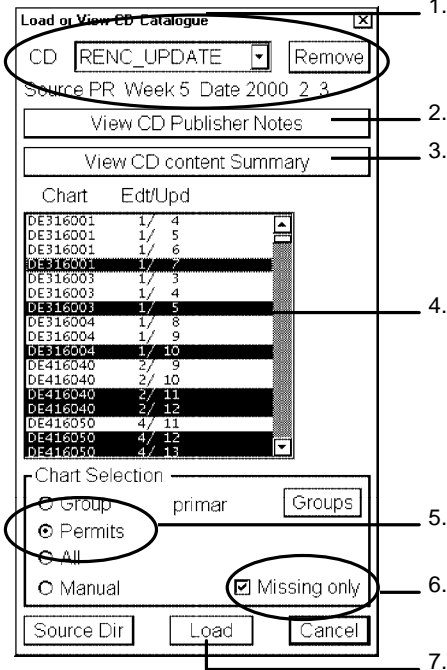
3. When you press **Load** button in S57 Load window, the ECDIS loads Content Summary, Publisher Notes and Product List from CD-ROM and opens **Load or View CD Catalogue** window

If you had a newer Product List already in use, you get following notice.

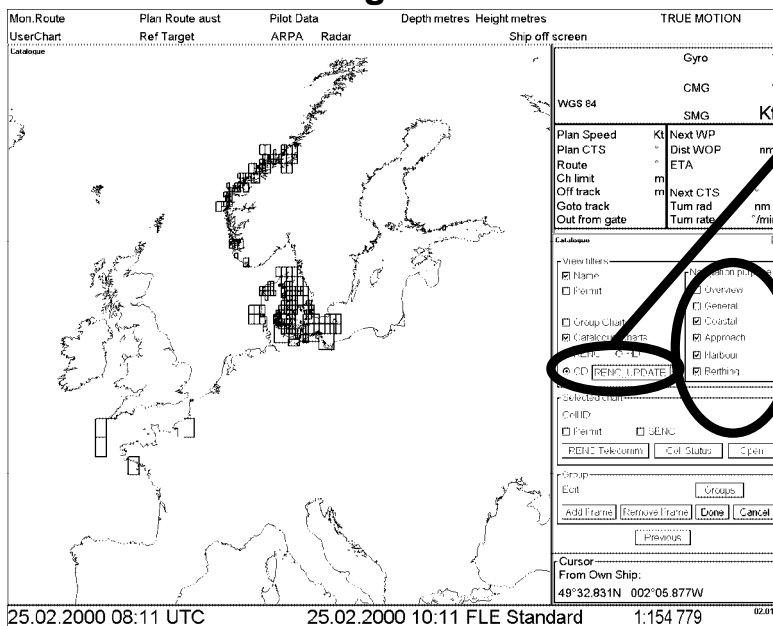


Interpretation of **Load or View CD Catalogue** window:

1. The source and edition date of CD is displayed here.
2. View CD Publisher Notes
3. View CD content Summary
4. List of Charts stored in CD-ROM and also information about Edition number of Chart and amount of updates included in the Chart.
5. In Chart Selection field you can select method how to pick desired Charts from the List:
  - **Group**; if you have predefined Group of Charts the ECDIS will highlight the Charts which are available in CD-ROM.
  - **Permits**; the ECDIS will highlight the Charts which are available in CD-ROM and you have Permits.
  - **All**; the ECDIS will highlight all the Charts which are available in CD-ROM.
  - **Manual**; you can highlight desired Charts from the List.
6. Selection "Missing only" loads only Charts and their updates which are not already loaded into the ECDIS.
7. When you press **Load** button highlighted Charts are loaded into the ECDIS.



## How to view Coverage of a BASE or UPDATE CD-ROM from a RENC



1. Make selections:
  - Catalogue Charts
  - CD
  - Select desired CD from a list box
2. Selection of Displayed Charts

Example, when the CD Catalogue is from an UPDATE CD-ROM from a RENC

## A Permit CD-ROM or floppy disk from the RENC

The RENC can deliver Permits either stored in CD-ROM or stored in floppy disk. When you received new permits from the RENC you have to load them into the ECDIS. The permit is a key which is used to decrypt the Chart you want to use in the ECDIS. To load Permits, proceed as follows:

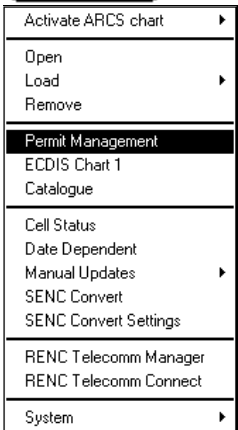
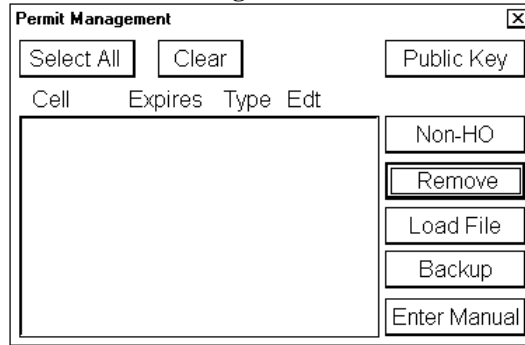


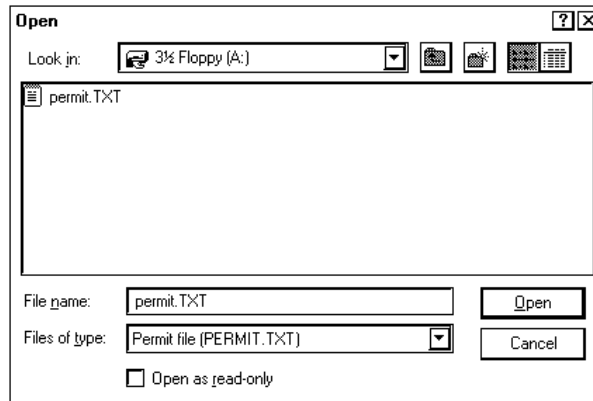
CHART PLAN push button

1. Press CHART PLAN push button.
2. Select **Permit Management** from the menu.



Press **Load File** in Permit Management window.

3. Select correct drive from **Look in** list box

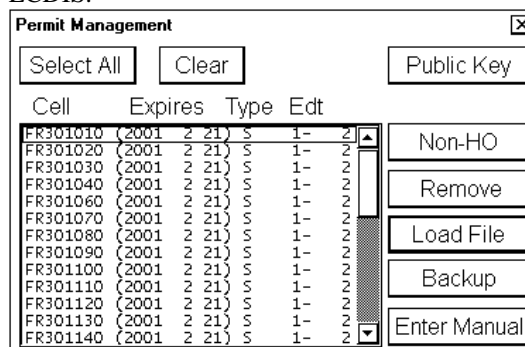


Permits can be available in two formats.

- **PERMIT.TXT** which contain Permits, their editions and subscription types. This is the preferred format.
- \*.PMT which as received from a RENC contain Permits, but no edition or subscription information. NOTE! \*.PMT format is used by the system for backup of Permits. As a backup it contain also subscription type and edition.

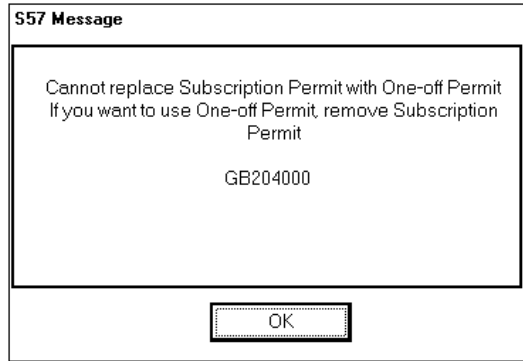
Select suitable permit file and press **Open** button to load Permits.

4. In Permit Management window displays Permits which are loaded into the ECDIS.

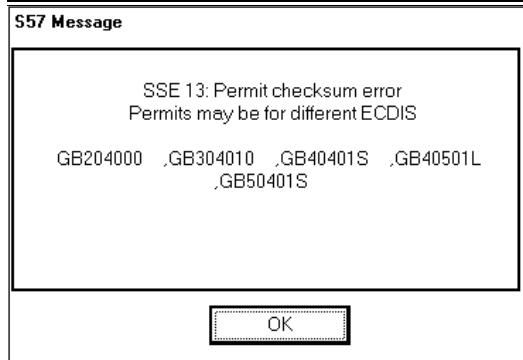


### **Messages in Permit load**

If you try to load One-off Permit for a Chart for which you already have a Subscription Permit, you get following message:



If you load Permits for different ECDIS, you get following message:



---

## RENC security system

### Standard messages in S57 Chart Load

During loading S57 Charts into the ECDIS you may get different kind of messages. For more information of standard messages in S57 Chart Load, see chapters "Messages, which contain only notice" and "Messages, which require careful attention" on page60.

### Additional messages in S57 Chart Load

#### *Issue control of BASE and UPDATE CD-ROM from RENC*

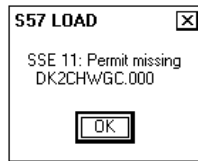
CD-ROMs from a RENC has issue control. If you later use CD Catalogue created during load of S57 charts, you get following messages for a wrong CD-ROM.

The image shows two screenshots of an S57 Error dialog box. The top dialog has the title "S57 Error" and the text "Please enter RENC base CD 4/2000 (2000 1 24)". Below the text is an "OK" button. The bottom dialog also has the title "S57 Error" and the text "Please enter RENC update CD 4/2000 (2000 1 24)". Below the text is an "OK" button.



## Messages, which contain only notice

If you tried to load charts for which you do not have permit, you will get one of the following messages:

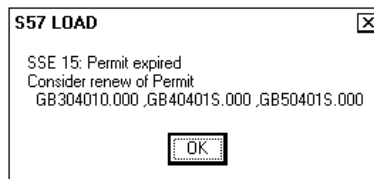


## Messages, which require careful attention

All messages in this chapter change the legal status of the charts in your system. Study these message extremely careful because you may need to use paper charts to fulfil SOLAS requirements

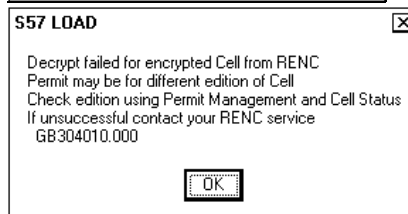
### You do not have a valid Permit

A Chart was not converted into SENC because the Permit has expired.



A Chart was not converted into SENC because a Permit with unknown edition was for different edition.

You can check edition of the Permit using Permit Management window and the edition of Chart using Cell Status window.

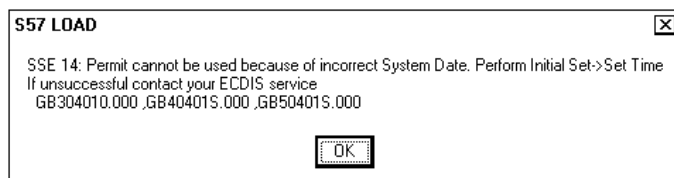


A Chart was not converted into SENC because your Permit was for different edition.

You can check edition of the Permit using Permit Management window and the edition of Chart using Cell Status window.

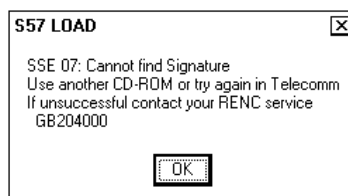


A Chart was not converted into SENC because the software, data and system time in the ECDIS indicates tampering.

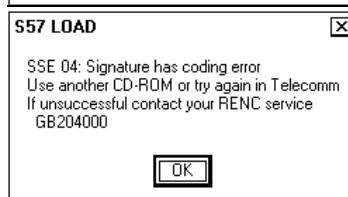


### Authentication of chart failed

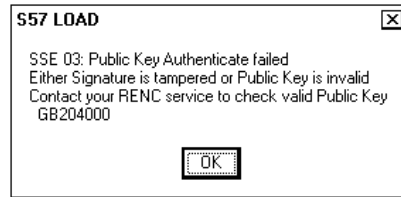
The Chart is not loaded because of missing Signature.



The Chart is not loaded because of coding error in Signature.



The Chart is not loaded because of tampered Signature or not valid Public Key



The Chart is not loaded because of invalid or tampered Signature



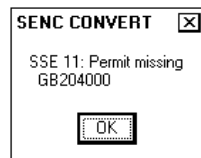
## Standard messages in S57 SENC conversion

When converting S57 Charts into the ECDIS you may get different kind of messages. For more information of standard messages in S57 SENC conversion, see chapters "Messages, which contain only notice" and "Messages, which require careful attention" on page60.

## Additional messages in S57 SENC conversion

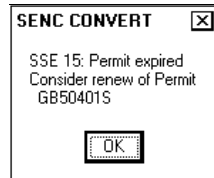
### *Messages, which contain only notice*

You do not have a Permit

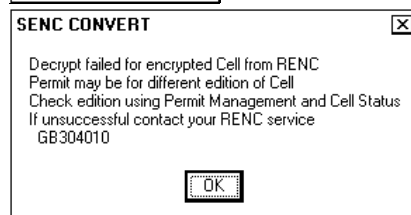


### *Messages, which require careful attention*

Your Permit has expired



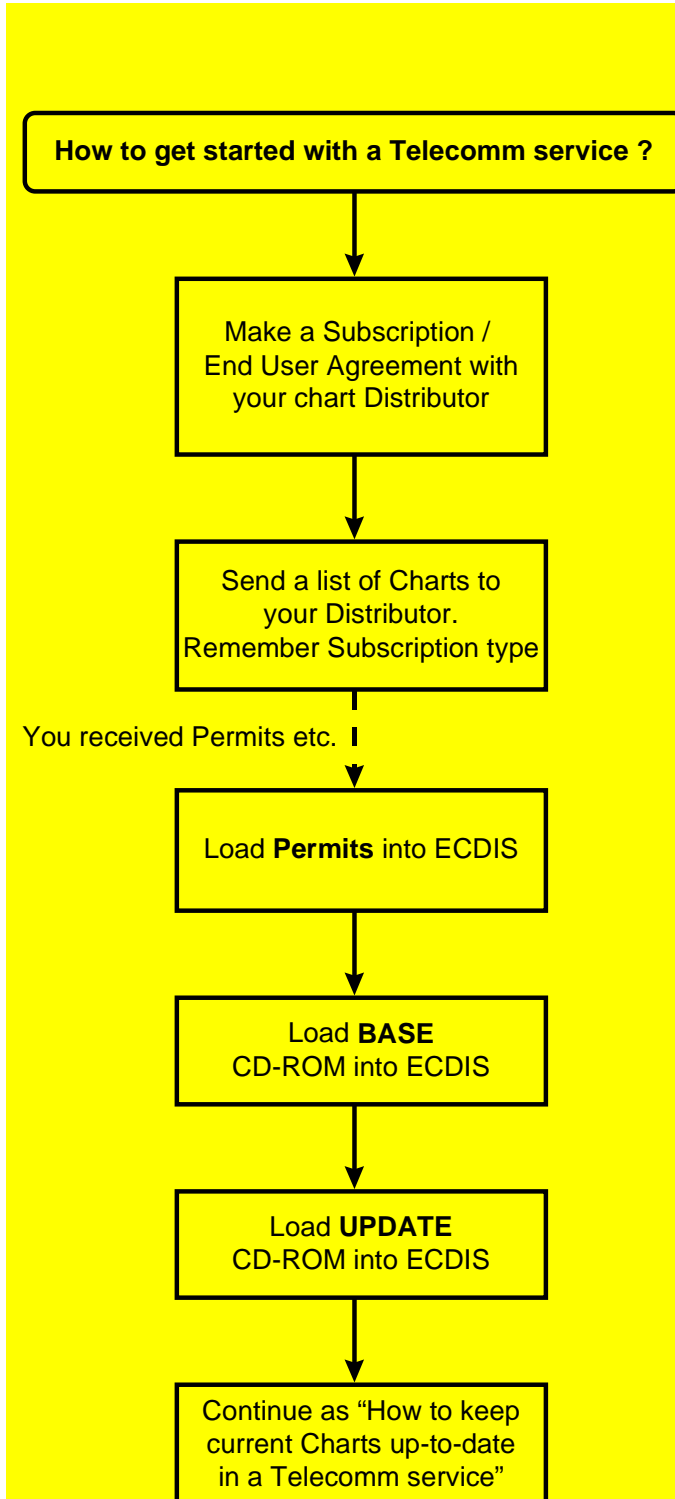
You have a Permit, but it is valid for another edition of the Cell.  
You can check edition of the Permit using Permit Management window and the edition of Chart using Cell Status window.



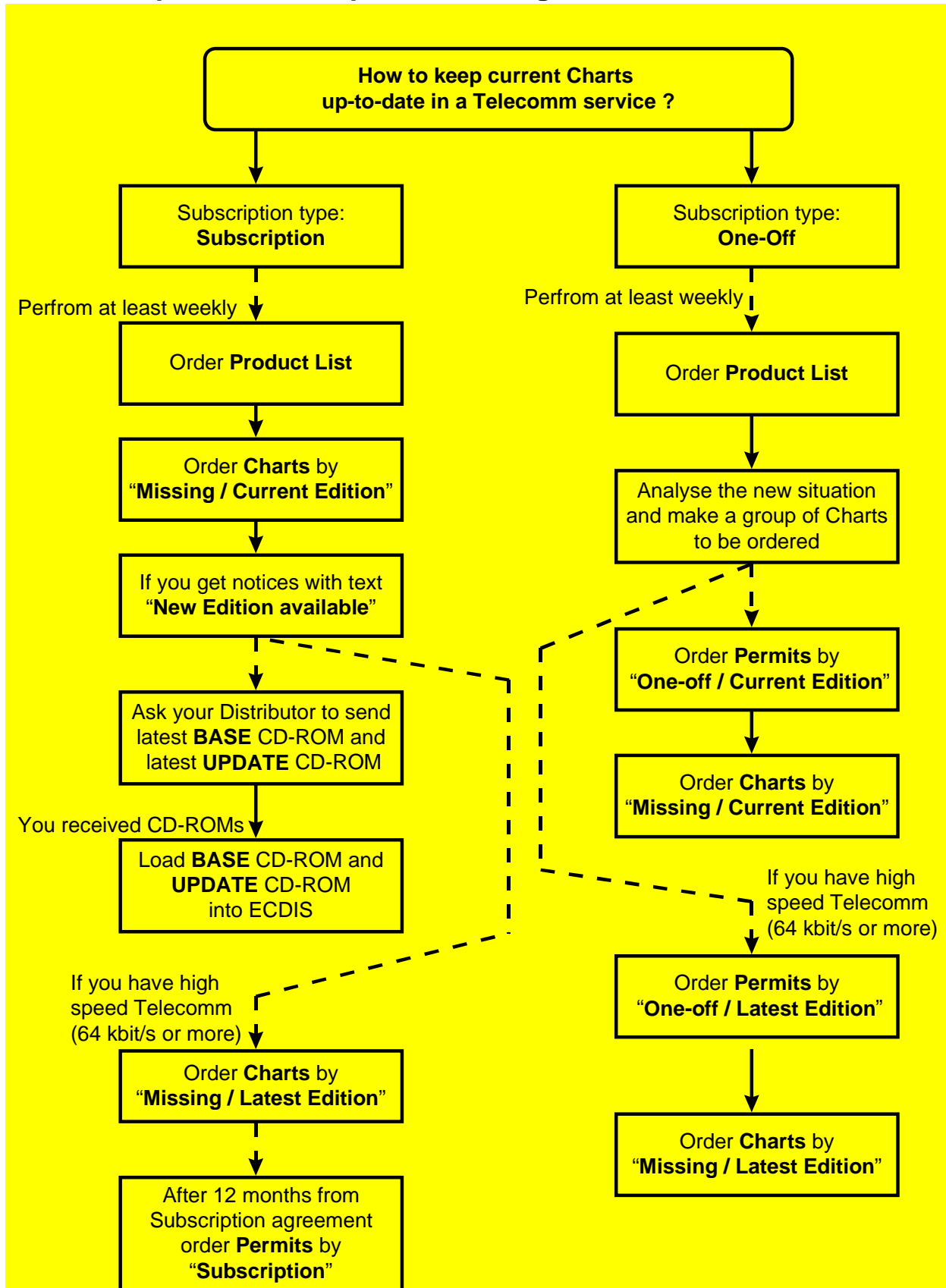
---

## Telecomm service from a RENC

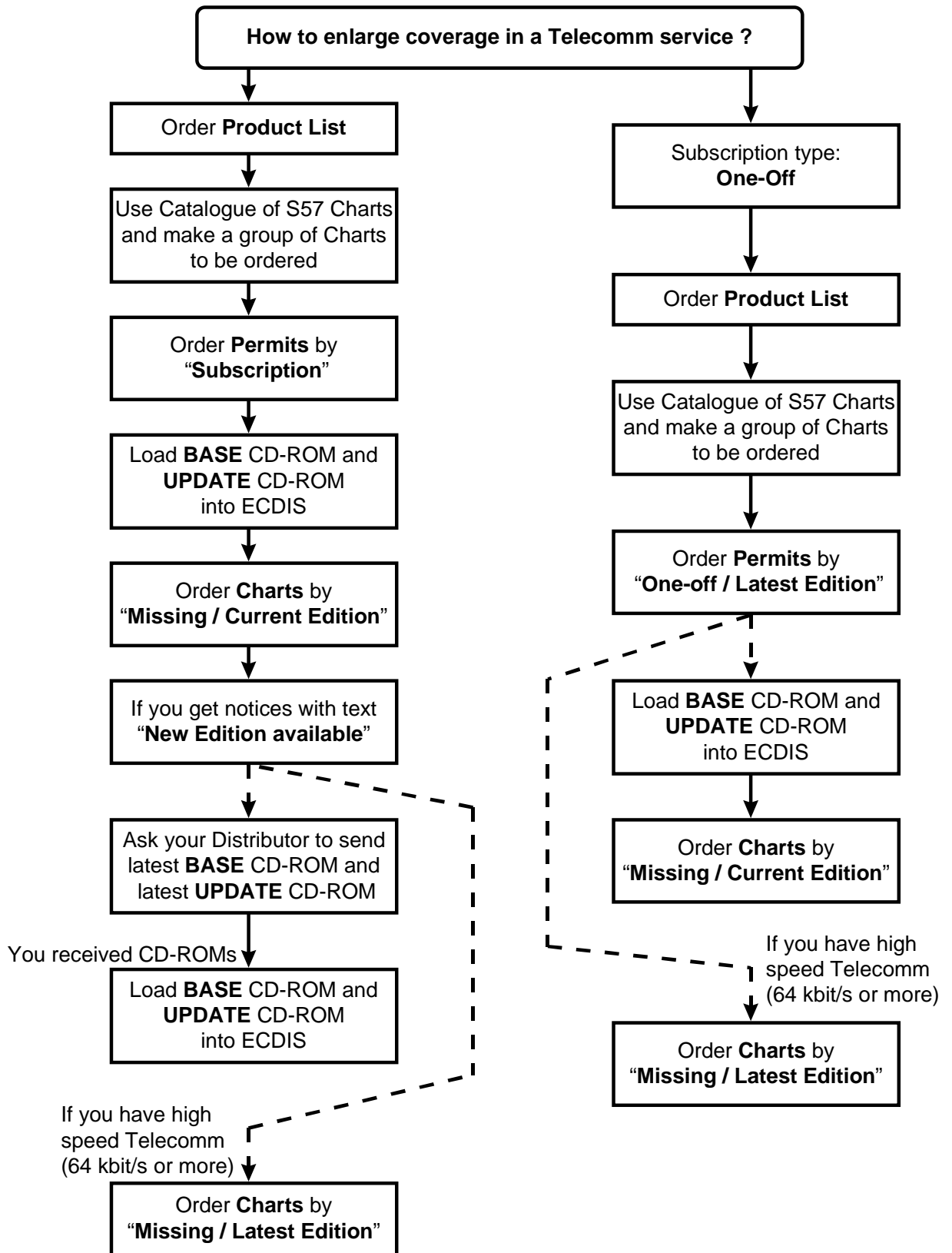
### How to get started with S57 charts using a RENC



# How to keep S57 charts up to date using a RENC



How to enlarge chart coverage using a RENC



## How to establish a Telecomm connection to a RENC

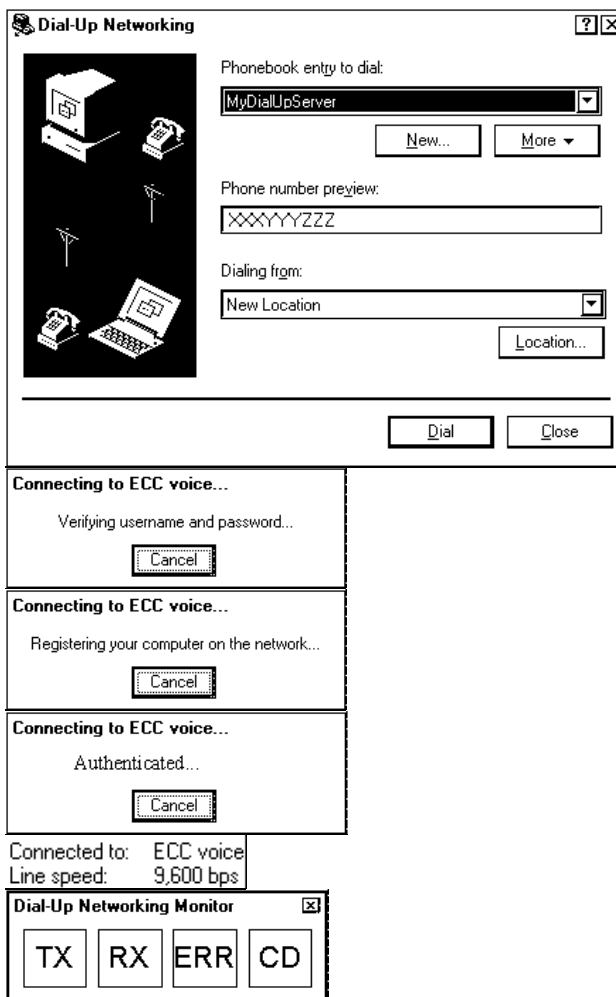
If you want order Product list, Permit, Cell or Update from a RENC, you have to establish connection to a RENC first. To do this, proceed as follows:

Press **CHART PLAN** push button.

Select **RENC Telecomm Connect** from the menu.

In **Dial-Up Networking** dialog box check you have correct phone number, then press **Dial** button to call a RENC though the Internet.

A Dial-Up Networking Monitor dialog box appears. During the connection establishment you will get a few dialog boxes on display, which is indicating progress of connection:



Verifying username and password of your Internet connection.

Registering your computer to the Internet

Authentication of your computer by the Internet

Confirmation of established connection.

Dial-Up Network Monitor window will remain permanently displayed on the screen.

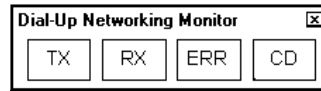
You can monitor from this box how connection is going.

1. CD, when this light turns on, the connection to the RENC has been established.
2. TX, when flashing the ECDIS is transmitting data to the RENC.
3. RX, when flashing the ECDIS is receiving data from the RENC.
4. ERR, when flashing there has been an error, when transmitting data between the ECDIS and the RENC.
5. When **CD** light is on, you are connected to the RENC and you able to purchase from the RENC.

## How to close the Telecomm connection to a RENC

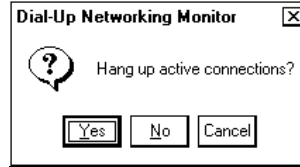
To close connection to the RENC, proceed as followed:

Press cross sign in upper right corner



Confirm disconnection by pressing **Yes**.

This will close your connection.



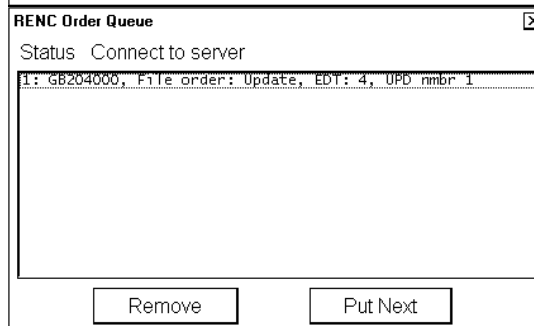
## Common Telecomm receive sequence

When you order something from a RENC, you can monitor the transaction using **RENC Order Queue** window. This window is activated in **RENC Telecomm Manager** window using **Show Order Queue**. Open RENC Order Queue window before you press Order button. Below is a common Telecomm receive sequence:

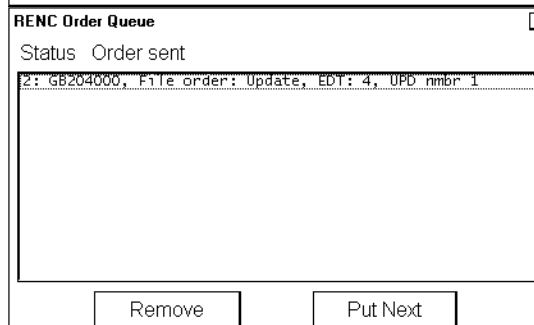
1. ECDIS is seeking web site from the Internet.



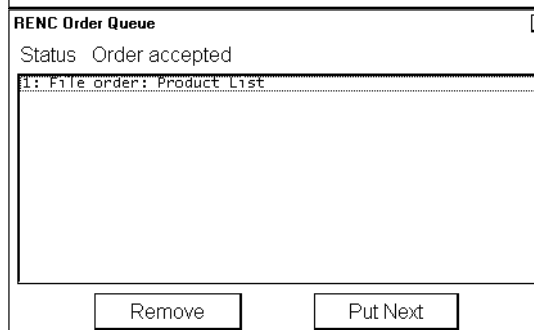
2. Web site was found, now the ECDIS is making connection to RENC server.



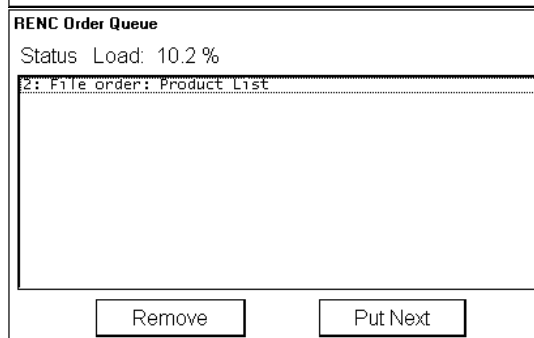
3. After connection, the ECDIS sends the request.



4. When the RENC server has received the request it sends order acceptance.

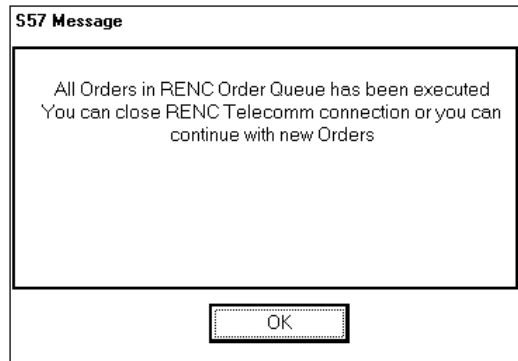


5. Now the ECDIS is downloading data from the RENC server.





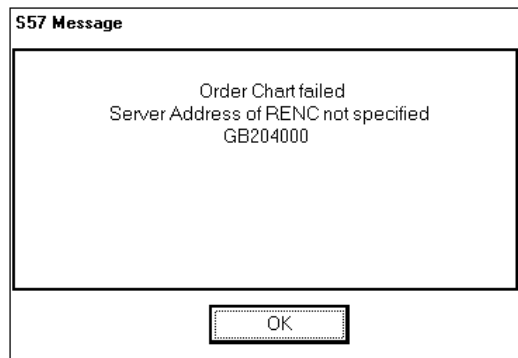
6. When the ECDIS has downloaded all the data which was requested, following window appears. You can now close the connection.



## Typical error messages of the Telecomm connection to a RENC

You have not set the server address of the RENC. Select a suitable one from the list of the RENC Telecomm manager.

If the list of the RENC Telecomm manager do not contain the suitable address, you can specify the server address in the Installation paramters. See separate Technical Manual.

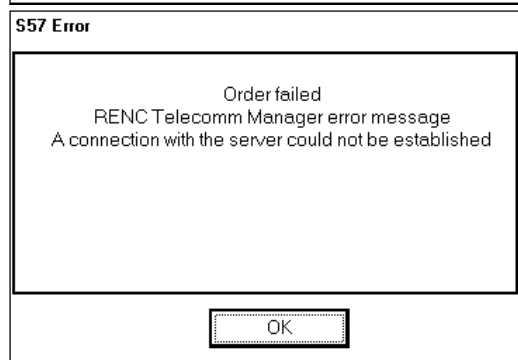


Telecomm connection was broken.  
Connect Telecomm again.

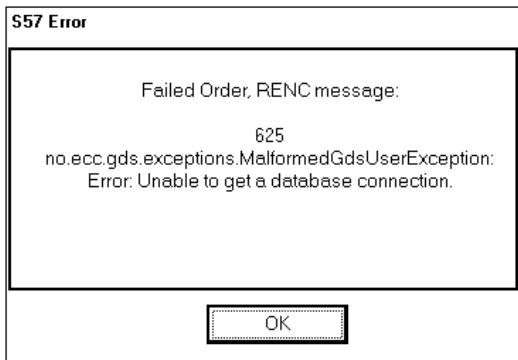


The system cannot get connection to the RENC server. Telecomm can be connected or not connected.

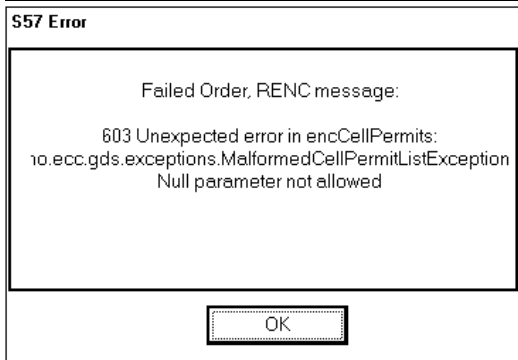
Close Telecomm connection. Then connect Telecomm and try again..



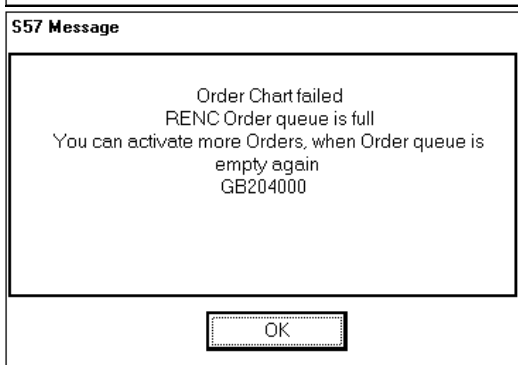
The system could not establish a connection with the database server at RENC. Close the connection and try again.



The system could not get ordered Permits. Either the Permit management at the RENC didn't operate properly or the list of the permits contained charts for which you as a user are not allowed to have access. Try again with the same group of charts or try with a small test group.



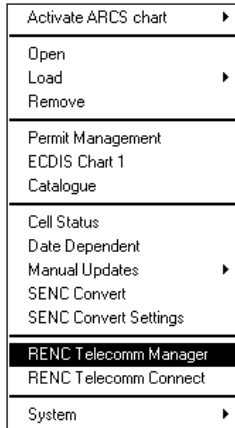
The order queue of the RENC Telecomm manager is limited. You have temporarily exceeded its limit. Wait until the order queue is empty again and then continue to add more orders. NOTE! The system do not lose any orders which he has put in the queue i.e. when you add an order again the system automatically continues from the point it was able to reach.



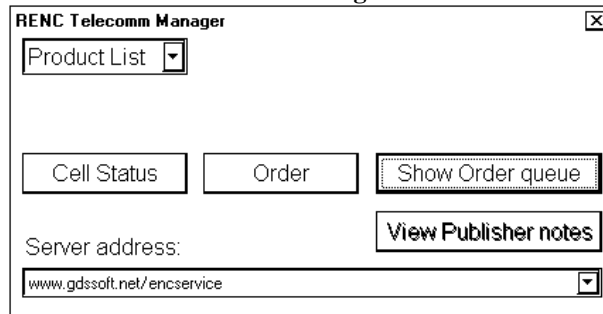
## How to order Product List from a RENC by Telecomm

The RENC is keeping a database of available ENC's and their updates. This list is called Product List. You shall order the Product List at least once in the beginning. . The Product List enables the ECDIS to know the coverage and up-to-date situation of a service from a RENC. Normally you should order the Product List at least once per week in order to know the latest up-to-date situation.

After you have establish a connection to the RENC to order Product list, proceed as follows:



1. Press CHART PLAN push button
2. Select **RENC Telecomm Manager** from the menu.



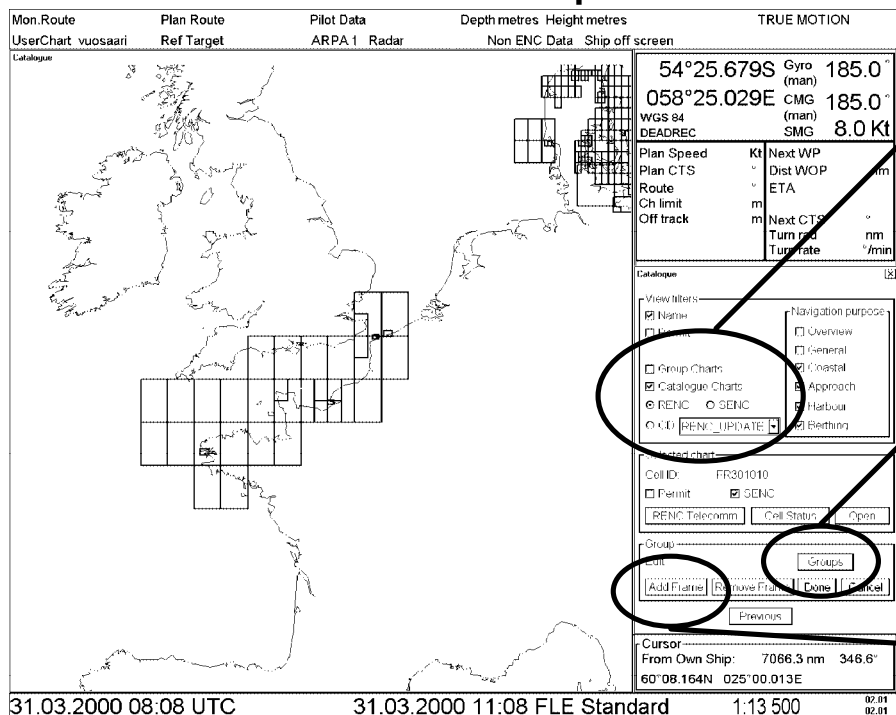
3. Select **Product list** from a list box in upper left corner. Press **Order** button. You will get the latest Product list which will be stored to hard disk.
4. To view Product List use Catalog of S57 charts and its selector RENC.

If you already had a newer Product List, you get following message.

NOTE! This should not happen with Telecomm unless there is some Date and Time miss match.



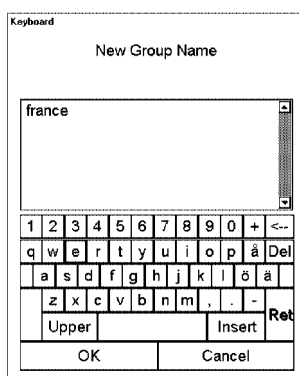
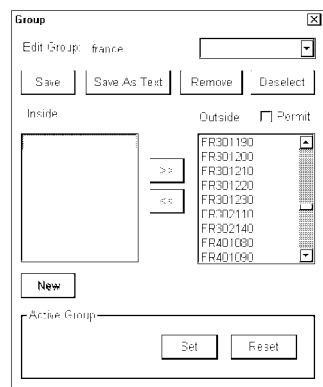
## How to make user defined Group for use with RENC Telecomm



1. Select Catalogue Charts as RENC

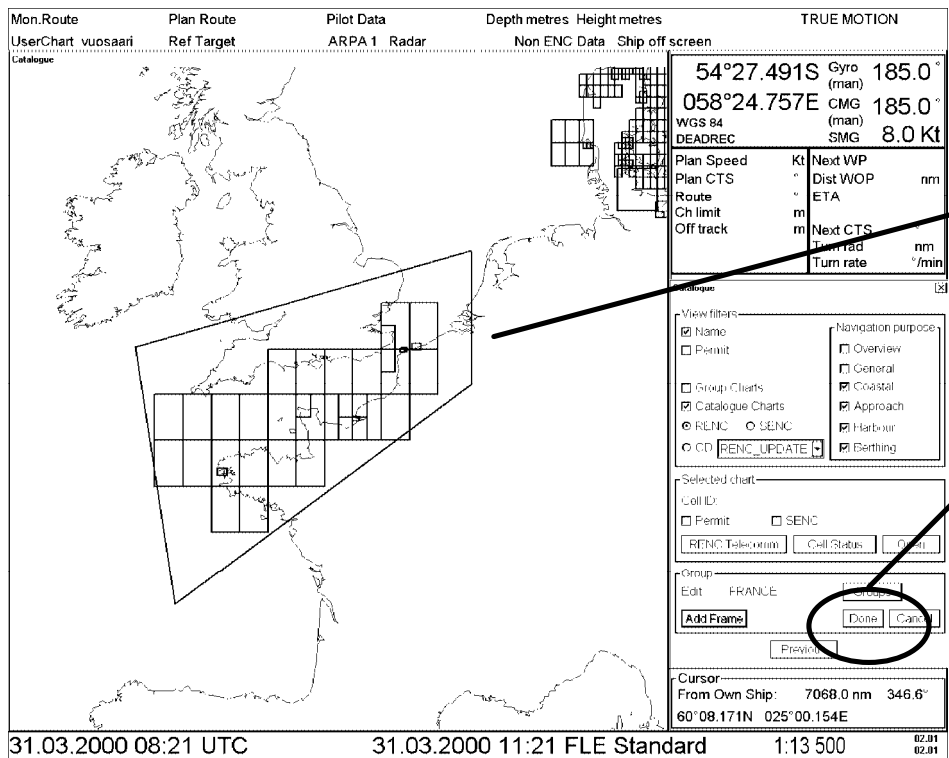
2. Press Groups button

4. Press Add Frame button



3. Enter Name for new Group

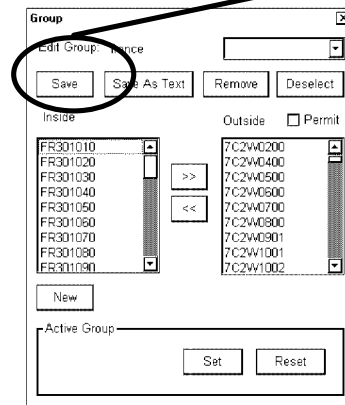
1. Open Catalogue of S57 charts. Make selection of displayed Catalogue.
2. To make user define group press **Groups** button.
3. Enter Name for a new Group.
4. Select charts which are selected into the Group using **Add Frame** button.



5. Use SELECT button to define frame for group

6. Press Done button

7. Press Save button

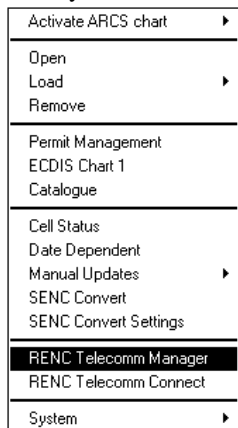


5. Use SELECT button of Control Panel to make frame in Catalogue window. The ECDIS selects all the charts which are inside or which are intersected by a frame.
6. When the frame is ready press **Done** button.
7. You can see the selected charts of your Group which are listed **Inside** list box of Group window,. You can use also >> or << buttons to add or remove charts in your group. Press **Save** button to save Group you created.

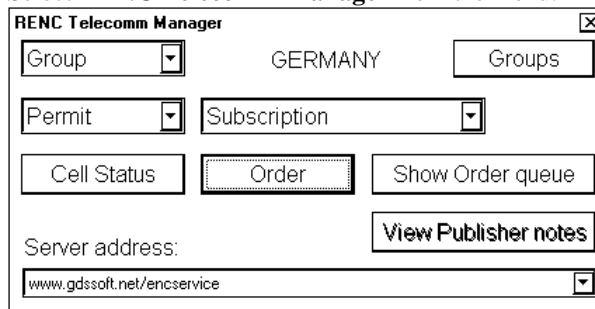
## How to order Permits from a RENC by Telecomm

Permits can be ordered for either individual Chart or user defined Group. If you are using Group for your order, you have to first define a Group containing desired Charts.

After you have establish a connection to the RENC to order Permits, proceed as follows:



1. Press CHART PLAN push button
2. Select **RENC Telecomm Manager** from the menu.



3. Select **Chart** or **Group** in a list box and then select desired Chart or Group using button in upper right corner (Text in Button depends your selection in list box).  
Select **Permit** from a list box . Select type of Permit "**Subscription**", "**One-Off / Current Edition**" or "**One-Off / Latest Edition**". Press **Order** button.

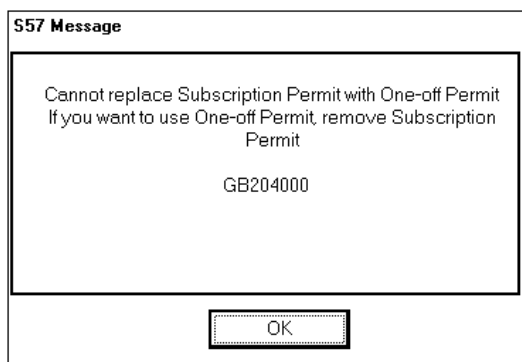
### Subscription Permits

If you have a valid subscription Permit for a chart an you order Charts by "Missing / Latest Edition", the system automatically order missing subscription Permits for new editions of the Charts.

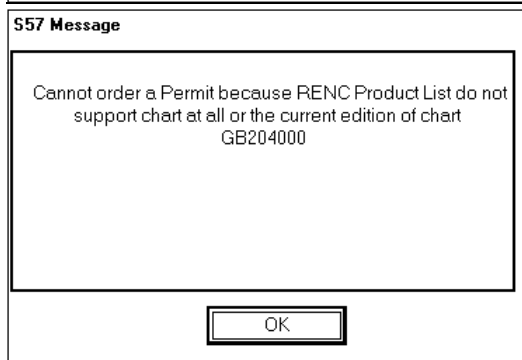
If you manually order subscription Permits they are always for the current edition of the chart in your hard disk.

### Messages in Permit load

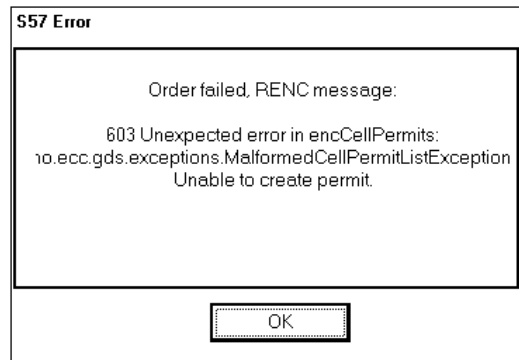
If you try to order One-off Permit for a Chart for which you already have a Subscription Permit, you get following message:



If you try to order Permit for a Chart which is not part of a service from a RENC, you get following message:



Temporarily the RENC could not create Permits for you order. Try to order again.

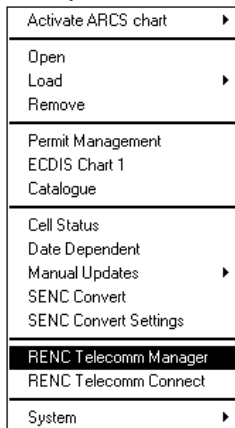


## How to order Charts from a RENC by Telecomm

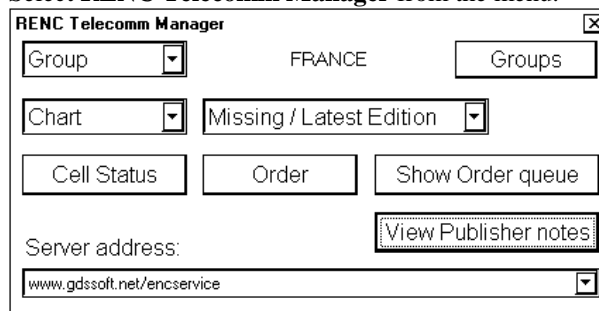
You have two basic alternatives to order Charts by Telecomm.

1. **Missing / Current Edition.** This orders only updates. Thus the required time is short and telecommunication cost is low. **NOTE!** If there a new edition of the charts available in the RENC, you cannot get your charts up-to-date by "Missing / Current Edition"
2. **Missing / Latest Edition..** This orders everything. Thus the required time is long and telecommunication cost is high"

After you have establish a connection to the RENC to order Chart(s), proceed as follows:



1. Press CHART PLAN push button
2. Select **RENC Telecomm Manager** from the menu.



3. Select **Chart** or **Group** in a list box and then select desired Chart or Group using button in upper right corner (Text in Button depends your selection in list box).  
Select **Chart** from a list box . Select "**Missing / Latest Edition**" or "**Missing / Current Edition**". Press **Order** button.

If you order chart(s) and their updates using RENC Telecomm Manager, you have to have permits for corresponding charts loaded into ECDIS.

If you have a valid subscription Permit for a chart an you order Charts by "Missing / Latest Edition", the system automatically order missing subscription Permits for new editions of the Charts.

## A complete example how to order a single Chart from a RENC by Telecomm

If you want to order Permit or Chart and Updates for a single Chart from a RENC.

Mon.Route Plan Route Pilot Data Depth metres Height metres TRUE MOTION  
 UserChart vuosaari Ref Target ARPA 1 Radar Non ENC Data Ship off screen  
 Catalogue

54°25.679S Gyro 185.0°  
 058°25.029E CMG 185.0°  
 WGS 84 (m) (m)  
 DECKREC SWS 8.0 Kt

Plan Speed Kt Next WP  
 Plan CTS Dist WOP nm  
 Route ETA  
 Ch limit m Next CTS °  
 Off track m Turn rad nm  
 Turn rate /min

Catalogue

View filters: Navigation purposes  
 Name  Permit  Overview  
 Group Charts  General  
 Catalogue Charts  Coastal  
 RENC  SENC  Harbour  
 RENC Update  Berthing

Selected chart  
 Cell ID: FR301010  
 Permit  SENC  
 RENC Telecomm  Cell Status  Order

Group  
 Edit Groups  
 Add Frame Remove Frame Done Cancel  
 Previous

Cursor  
 From Own Ship: 7066.3 nm 346.6°  
 60°08.164N 025°00.013E

31.03.2000 08:08 UTC 31.03.2000 11:08 FLE Standard 1:13 500 02.01 02.01

1. Open Catalogue of S57 Charts, select RENC to be displayed.
2. Move cursor over Chart border you are interested in and press SELECT button of Control Panel.
3. In Selected Chart field you can see the Chart number, press **Cell Status** button.
4. In Cell Status window you can see selected Chart edition and updates number in the RENC. If you want order Permit for this Chart, press **RENC Telecomm** button.
5. In **RENC Telecomm Manager** window select **Permit** and mode of Permit (Subscription or One-Off).
6. If you like to see how transaction is progressing, press **Show Order Queue** button.
7. To send your request press **Order** button.
8. When your request is sent to the RENC you can monitor the transaction in RENC Order Queue window (When the ECDIS is sending and receiving information).

Cell Status

Cell ID: FR301010 Cells CD: RENC\_BASE

Status	Last edition	Last issue date	Last Base / Upd. included	Last update number
CD-ROM				
RENC	1	2000 2 7	0/-NVLD...	3
ENC				
SENC				

Details Purchase Create SENC Add Update Conv Log

RENC Telecomm Manager

Cell: FR301010 Cells

Chart: Missing / Latest Edition

Cell Status Order Show Order queue

Server address: View Publisher notes  
 www.gdssoft.net/en/service

RENC Order Queue

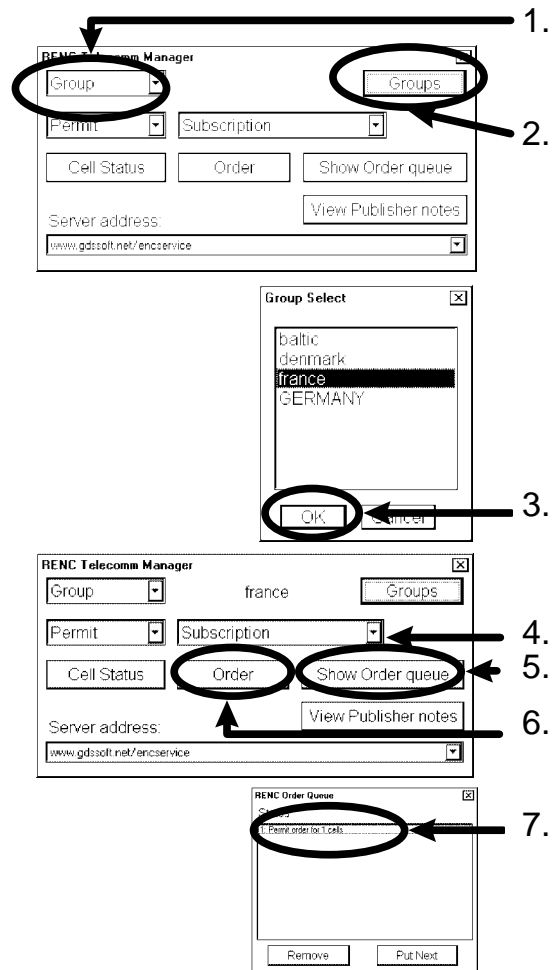
Status: Permit codes for 1 cells

Remove Put Next



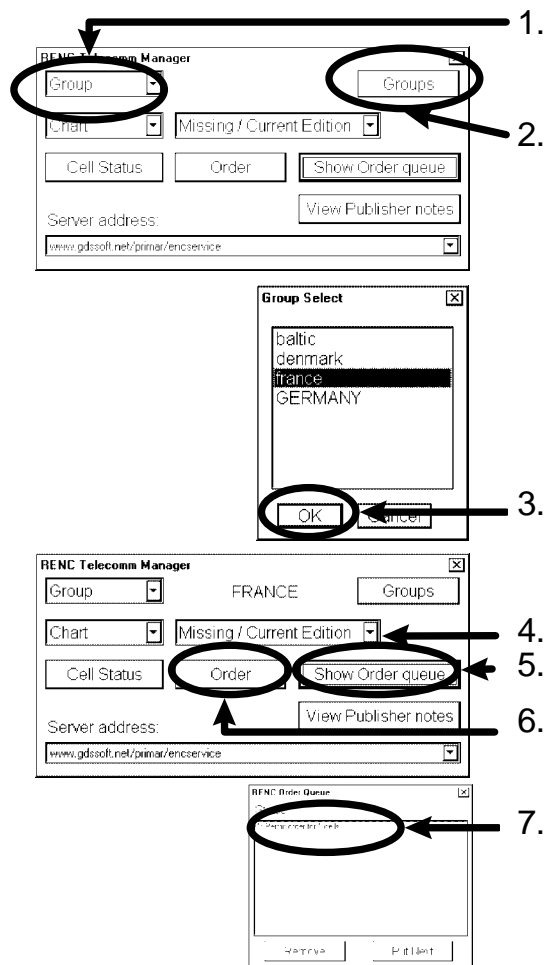
## A complete example how to order a group of Permits from a RENC by Telecomm

1. In **RENC Telecomm Manager** window select **Group** button.
2. Press **Groups** button.
3. In **Group Select** window highlight desired Group and press **OK** button.
4. In **RENC Telecomm Manager** window select **Permit** and mode of Permit (Subscription or One-Off).
5. If you like to see how transaction is progressing, press **Show Order Queue** button.
6. To send your request press **Order** button.
7. When your request is sent to the RENC you can monitor the transaction in RENC Order Queue window (When the ECDIS is sending and receiving information).



## A complete example how to update a group of charts from a RENC by Telecomm

1. In **RENC Telecomm Manager** window select **Group** button.
2. Press **Groups** button.
3. In **Group Select** window highlight desired Group and press **OK** button.
4. In **RENC Telecomm Manager** window select **Chart** and mode as **Missing / Current Edition**.
5. If you like to see how transaction is progressing, press **Show Order Queue** button.
6. To send your request press **Order** button.
7. When your request is sent to the RENC you can monitor the transaction in RENC Order Queue window (When the ECDIS is sending and receiving information).



### NOTE!

"Missing /Current Edition" loads only missing updates for the charts, which are currently in the ECDIS. The loading time and thus the Telecomm cost is lowest possible. Sometimes a RENC publish a new edition of a chart. "Missing / Current Edition" do not load these new editions. Use "Missing / Latest Edition" to load also new editions of the charts.

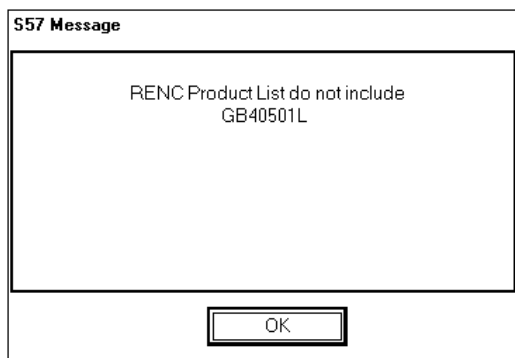
## Messages of Chart Load from a RENC by Telecomm

### **Standard checks before load**

When you load S57 Charts into the ECDIS you may get different kind of messages. For more information of standard messages in S57 Chart Load, see chapters "Messages, which contain only notice" on page 60 and "Messages, which require careful attention" on page 60.

### **Additional checks before load**

This message indicates that you have tried to load a chart from a RENC, which do not contain the chart in its service.



This message indicates that there is a newer edition available.

**The message clearly indicate that this chart is not up-to-date and thus it does not fulfil SOLAS requirements.** Get immediately the new edition of the chart from the RENC.

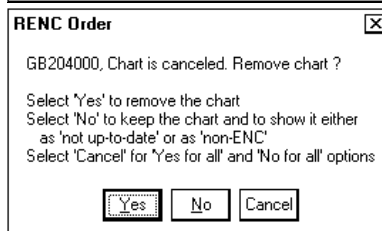


This message indicates that the Chart has been cancelled.

Normally you should accept the cancellation and you should press **Yes**. Then the system automatically removes the chart from the hard disk and from your chart screen.

You may insist to keep the chart although the publisher of it has told you that the content of the chart is so unsafe that they have cancelled it. The reason might be that you do not have anything better available. In this case you press **No**. Then the system automatically remove the ENC status from the chart, because the publisher has told so in his special cancellation update.

**Note that the cancellation message above clearly indicate that the publisher says that this chart is unsafe for navigation and thus it does not fulfil SOLAS requirements.** Get immediately from the publisher of this chart the new chart/charts, which replace the unsafe cancelled chart.



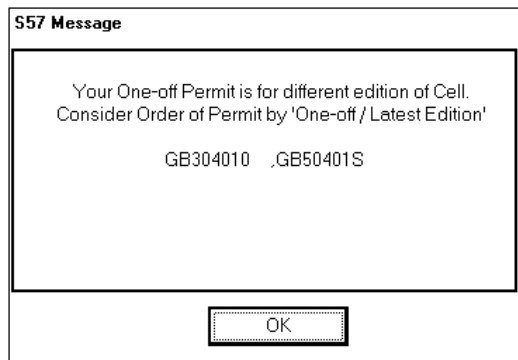
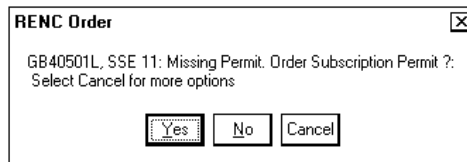
This message indicates that you do not have a Permit for ordered Chart. The system ask you to order a Subscription Permit.

If you accept order, select Yes.

If you do not accept, select No.

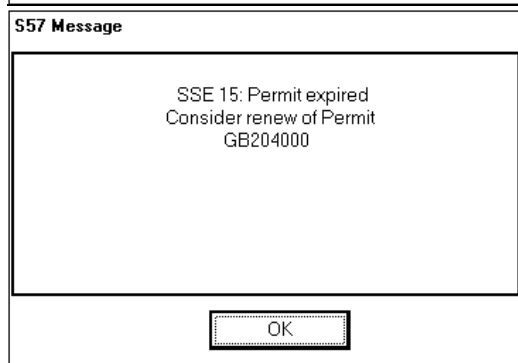
This message indicates that you have an One-off Permit for different edition of the Chart.

**The message clearly indicate that this chart is not up-to-date and thus it does not fulfil SOLAS requirements.** Renew immediately your Permits from the RENC.



This message indicates that there is more up-to-date chart data in the RENC but your Permit has expired.

**The message clearly indicate that this chart is not up-to-date and thus it does not fulfil SOLAS requirements.** Renew immediately your Permits from the RENC.



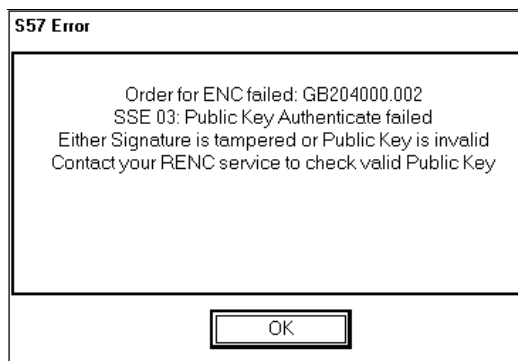
### **Standard notices after load**

When converting S57 Charts into the ECDIS you may get different kind of messages. For more information of standard messages in S57 SENC conversion, see chapters "Messages, which contain only notice" on page 60 and "Messages, which require careful attention" on page 60.

### **Additional notices after load**

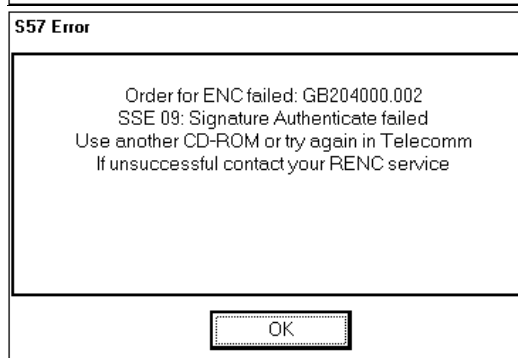
This message indicates that the Chart is not loaded because of tampered Signature or not valid Public Key

**The message clearly indicate that this chart is not up-to-date and thus it does not fulfil SOLAS requirements.** Get the chart immediately from the RENC.



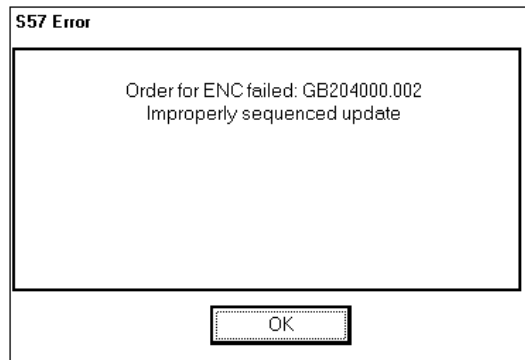
This message indicates that the Chart is not loaded because of invalid or tampered Signature.

**The message clearly indicate that this chart is not up-to-date and thus it does not fulfil SOLAS requirements.** Get the chart immediately from the RENC.



This message indicates that previous Update of the same order failed to download into ECDIS. Try to order again

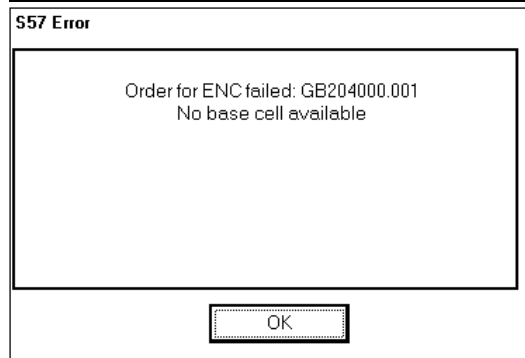
**The message clearly indicate that this chart is not up-to-date and thus it does not fulfil SOLAS requirements.** Get the chart immediately from the RENC.



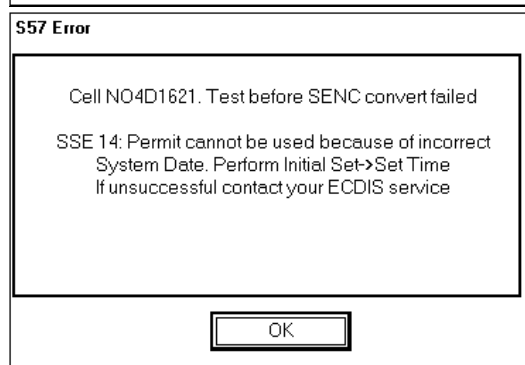
This message indicates that Base Chart of the same order failed to download into ECDIS.

Try to order again

**The message clearly indicate that this chart is not up-to-date and thus it does not fulfil SOLAS requirements.** Get the chart immediately from the RENC.



A Chart was not converted into SENC because the software, data and system time in the ECDIS indicates tampering.



---

# Vector chart display

## How to select Vector chart material in use

To select S57 chart material onto the display proceed as follow:

1. From Control Panel press **CHART PLAN** push button.
2. From menu check that there is a following text in first line: **Activate ARCS chart**. If it is, then go to step 4.
3. If there is text **Activate S57 chart** choose this command.
4. You have now selected S57 charts on display.

## How to select charts for viewing

### Select a chart from catalogue

To select a chart for viewing from **Catalogue**, proceed as follow:

1. From Control Panel press **CHART PLAN** push button.
2. Select **Catalogue** command from the menu.
3. From the catalogue window pick by cursor the desired chart. For more information, see chapter "Catalogue of S57 cells" on page 72.
4. Press button **Open**.

### Browsing around your charts

Viewing S57 charts from different positions and using different scales is very easy. Basic tools to browse around are push buttons **ZOOM IN**, **ZOOM OUT**, **SET CHART CENTER**, **SHIP OFF CENTER** and **TM/CU RESET**.

You can use **SET CHART CENTER** to look ahead any other position than your own ship position. Pressing it automatically deactivates true motion reset function. When true motion reset is deactivated you have on upper right hand part of the display either indication **Ship out of dsp** or **TM RESET OFF** depending of the view.

You can enter numerical values for center of the chart display. Press **DISPLAY MODE** push button and select **Set Center** from the menu, a Chart Center dialog box appears:

Display mode ▶  
Orientation ▶  
Set Center

Chart Center

Lat: 60°13.686N Lon: 024°57.897E

-- - + ++ -- - + ++

Set Center

Enter desired values for center of chart display.

If you want immediately back to your own ship position, push **TM/CU RESET**.

**ZOOM IN** and **ZOOM OUT** are used to change scale of the chart display. The system has a logical way to automatically select next larger or smaller scale. The system has an indication of **LARGER SCALE DATA EXISTS**, if there exist a chart with larger compilation scale available at your current viewing position.

## Look charts around your own ship

You can use either **TRUE MOTION** or **RELATIVE** motion. Refer to **DISPLAY MODE** chapter. In True motion your own ship moves until it reaches the true motion reset borderline. Then it will jump back to opposite position on screen based on its course. In relative motion your own ship stays in a fixed position, while the chart under it moves on screen.

If you use true motion and you press **TM/CU RESET**, your ship will immediately jump to true motion reset position.

If you use true motion and you press **SHIP OFF CENTER**, your ship will go to that position on screen and continue true motion movement from that position. When it reaches true motion reset borderline it will automatically jump to true motion reset position.

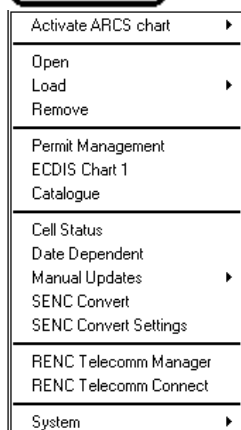
If you use relative motion and you press **TM/CU RESET**, your ship will immediately jump to true motion reset position and use that position as fixed position to stay on screen.

If you use relative motion, you can select a new fixed position to your ship by pressing **SHIP OFF CENTER** push button.

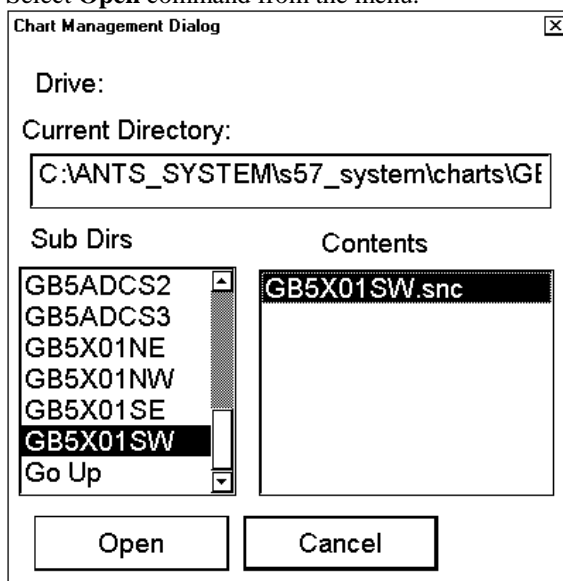
Use **ZOOM IN** and **ZOOM OUT** push buttons to select desired scale of the chart display.

## How to select a chart by its name on display

To select a specific S57 chart cell onto the display use **Open** menu command. Proceed as follows:



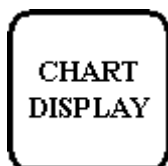
1. From Control Panel press Chart Plan pushbutton.
2. From menu check that there is a following text in first line: **Activate ARCS chart**. If it is, then go to step 4.
3. If there is text **Activate S57 chart** choose this command.
4. Select **Open** command from the menu.



5. Choose desired chart from chart list dialog and press **Open** button.
6. When you select a chart it will be displayed automatically in the Electronic chart area.

## Control of visible chart features

When you press **CHART DISPLAY** pushbutton, you get Chart details window, which have several sheets to control visible chart features.



*CHART DISPLAY*  
push button. Dialog box which appears after pressing chart display push button.

Chart display - ALL-OFF \*

Tracking	Mariner	Route
Chart	Standard	Other
Echo alarm	<input type="text" value="0"/> m	
Shallow contour	<input type="text" value="5"/> m	
Safety depth	<input type="text" value="8"/> m	
Safety contour	<input type="text" value="10"/> m	
Deep contour	<input type="text" value="20"/> m	
Speed Vectors	<input type="text" value="12"/> min	<input type="text" value="TRUE"/>
TM reset margin	<input type="text" value="80"/> %	
Scale	<input type="text" value="1:10000"/>	
Palette	<input type="text" value="DAY BRIGHT"/>	
Symbols	<input type="text" value="SIMPLIFIED"/>	
Depths	<input type="text" value="TWO COLOUR"/>	
Boundaries	<input type="text" value="PLAIN"/>	
Light sectors	<input type="text" value="LIMITED"/>	
Shallow pattern	<input type="text" value="NONE"/>	
Update highlight	<input type="text" value="DETAILED"/>	

"Chart"-sheet

### Echo alarm depth:

User can set alarm limit for echosounder. If depth of water below transducer of the Echosounder is below the limit, an alarm will be generated.

### Shallow contour:

User can set value of shallow water contour.

### Safety depth:

User can set the value of safety depth. Spot soundings below the Safety depth are displayed as highlighted.

### Safety contour:

User can set value of safety contour. Visible safety contour is equal to set value or if the contour of set value is not available then the visible safety contour is next deeper contour than safety contour,.

**Note**, the system uses Safety contour also for Chart Alarms.

### Deep contour:

User can set deep water contour.

### Speed Vectors:

User can set vector time and presentation type for speed vectors displayed on ECDIS screen. Selected presentation type for speed vectors is indicated Upper right hand corner of ECDIS screen.

True Vectors = TrueVect

Relative Vectors = RelVect

North Up	TM	TrueVect
en		



**TM reset margin:**

In True motion your own ship moves until it reaches the true motion reset borderline. Then it will jump back to opposite position on screen based on its course. User can set the limit for TM reset.

**Scale:**

This function determines the displayed scale of the electronic chart.

**Palette:**

Enable user to choose appropriate palette for display depending on brightness of the bridge.

**Symbols:**

Enable user to choose how to display symbols of the chart. The options are:

- **Simplified**, the shape of symbols is of modern design and the sea mark symbols use colour fill
- **Paper Chart**, the shape of symbols imitates traditional symbols used in paper charts

**Depth:**

User can set how to display different depth zones on the chart display. If user selects multicolour, the chart display uses 4 different colours:

- deeper than user-selected deep contour
- between deep contour and user-selected safety contour
- between safety contour and user-selected shallow water contour
- between shallow water contour and coastline.

If user selects two colours, the chart display uses only two colours:

- deeper than safety contour
- shallower than safety contour

**Boundaries:**

User can set how to display boundaries of some chart features. The options are:

- **Plain**, the used line styles are limited to plain solid and dashed lines.
- **Symbolized**, some of the used line styles use symbols to highlight the purpose of a line

**Light sector:**

User can set how to display light sectors. The options are:

- **Limited**, the length of light sector is fixed at 25 mm independently of the displayed scale.
- **Full**, the length of light sector represent its nominal range as defined by the chart producer.

**Shallow pattern:**

User can set how to display shallow water area. The options are:

- **None**
- **Diamond**, is provided to distinguish shallow water at night

**Update Highlight:**

User can set how the updates are highlighted on the screen before they are approved by the user. The options are

- **Detailed**, system try to highlight updates so that only those objects, which has visible changes, are highlighted. Use this option to see the practical change of an update.
- **All effects**, system highlights updates so that all the objects, which has something to do with updates, are highlighted although some of them has not been changed from practical point of view.

## CHART DISPLAY

Press **CHART DISPLAY** button to open Chart details dialog box. Standard display includes chart features shown here. The system will show these chart features, when button **STANDARD DISPLAY** is pressed.

Chart display - ALL-ON *		
Tracking	Mariner	Route
<input checked="" type="checkbox"/> Chart	<input checked="" type="checkbox"/> Standard	<input type="checkbox"/> Other
<input checked="" type="checkbox"/> Unknown object or presentation <input checked="" type="checkbox"/> Chart data coverage <input checked="" type="checkbox"/> Land features <input checked="" type="checkbox"/> Water and seabed features <input checked="" type="checkbox"/> Traffic routes <input type="checkbox"/> Cautionary areas <input checked="" type="checkbox"/> Information areas <input checked="" type="checkbox"/> Buoys and beacons <input checked="" type="checkbox"/> Lights <input checked="" type="checkbox"/> Fog signals <input checked="" type="checkbox"/> Radar <input checked="" type="checkbox"/> Services		

### “STANDARD”-sheet

Sheet STANDARD contains chart features as defined by IMO to form so called Standard Display. You can recall at any time the Standard Display by single operator action (by pressing STANDARD DISPLAY push button from Control Panel).

## CHART DISPLAY

Other includes chart features shown here. The system will not show these features, when button **STANDARD DISPLAY** is pressed.

Chart display - ALL-OFF *		
Tracking	Mariner	Route
<input type="checkbox"/> Chart	<input type="checkbox"/> Standard	<input type="checkbox"/> Other
<input type="checkbox"/> Information about chart data <input checked="" type="checkbox"/> Land features <input checked="" type="checkbox"/> Soundings <input type="checkbox"/> Depth contours, Currents, Magnetics <input type="checkbox"/> Seabed and Obstructions <input type="checkbox"/> Services and Small craft facilities <input type="checkbox"/> Special areas  <input checked="" type="checkbox"/> Additional information available  Important Text <input checked="" type="checkbox"/> Clearances, Bearings, Radio channels  Other Text <input checked="" type="checkbox"/> Names for position reporting <input checked="" type="checkbox"/> Light descriptions <input type="checkbox"/> Nature of Seabed <input type="checkbox"/> Geographic names, etc. <input type="checkbox"/> Swept depths, Magnetics <input type="checkbox"/> Berth and Anchorage numbers <input type="checkbox"/> National language, Land elevation		

### “OTHER”-sheet

Sheet OTHER contains chart features, for which you can control visibility and which are not part of IMO defined Standard Display.

**Note!** If you want to use Info request by cursor pick, you have to select desired chart features to be displayed from this sheet.

**Note!** Chart details window appears, when user press CHART DISPLAY push button. Use SELECT NEXT to open desired sheet in Chart details windows.

## Display Base

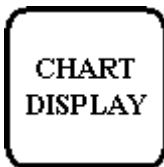
A subset of chart features is called as Display base. As required by IMO, these features cannot be made invisible under any user selection. The **Display Base** consist of following chart features:

- coastline (high water)
- own ship's safety contour, which is selected by the user
- indication of isolated underwater dangers of depths less than the safety contour, which lie within the safe waters defined by the safety contour
- indication of isolated dangers, which lie within the safe water defined by the safety contour such as bridges, overhead wires, etc., and including buoys and beacons whether or not these are being used as aids to navigation
- traffic routine systems
- scale, range, orientation and display mode
- units of depth and height

## Control of visible navigation features

Visibility control of the navigation features is divided into three sheets. Sheet Route controls Planned and monitored route. Sheet Tracking control past tracks and some other features. Sheet Mariner control Pilot data, User charts and Chart alarms. Press CHART DISPLAY button to open Chart details window. Use SELECT NEXT to open desired sheet in Chart details window.

User can define settings for chart details which are displayed over S57 charts. This means that user can select different layers to be **Off**, **Std** or **Other**. Selection of **Off** is self explanatory. Selection of **Std** is set as visible, if the STANDARD DISPLAY button is pressed. Selection of **Other** is set as invisible, if the STANDARD DISPLAY button is pressed



*Monitored and planned routes are non-chart information. All the selected items are shown on top of chart data*

Chart details - ALL-ON *		
Chart	Standard	Other
Tracking	Mariner	Route
-Monitored route-		
Off	Std	Other
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
-Planned route-		
Off	Std	Other
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

### "ROUTE" sheet

Sheet ROUTE contain selection of route related navigation features

**Monitored route**, user can select which part of monitored route is displayed.

**Planned route**, user can select which part of planned route is displayed.

## CHART DISPLAY

*Past tracks, Predictor ship, Events & Positions, ARPA targets, Reference targets and Radaroverlay are non-chart information. All the selected items are shown on top of chart data.*

Chart display - ALL-OFF \*

Chart	Standard	Other
Tracking	Mariner	Route

Past tracks

Off Std Other

Ship System

Ship Primary

Ship Secondary

Length  min    Labels  min

Off Std Other

ARPA targets

Length  min    Labels  min

Off Std Other

Predictor ship (30 sec)

Events and Positions

ARPA targets

Radar Overlay

Ship true symbol scale limit

“TRACKING” sheet

### Past Tracks

- **Ship System**, if selected as **Std** or **Other**, own ship past track is displayed based on the position used by the system
- **Ship Primary**, if selected as **Std** or **Other**, own ship past track is displayed based on the primary position sensor
- **Ship Secondary**, if selected as **Std** or **Other**, own ship past track is displayed based on the secondary position sensor.
- **ARPA targets**, if selected as **Std** or **Other**, ARPA target past tracks are displayed.

**Predictor ship**, if selected as **Std** or **Other**, predicted own ship position is displayed.

**Note:** The Predictor is visible only, if the own ship true scale symbol is also displayed.

**Events and Positions**, if selected as **Std** or **Other**, Events and Positions are displayed.

Note MOB event is always visible.

**ARPA targets**, if selected as **Std** or **Other**, ARPA targets are displayed.

**Radaroverlay**, if selected as **Std** or **Other**, Radar Echo Overlay is displayed.

Note! Radar overlay has its own mode control. Radar echo overlay can be visible only if the selected mode something else than ECDIS ONLY. For more information about radar echo overlay, see chapter "Radar Echo Overlay".

**Ship true symbol scale limit**, own ship is displayed as true scale symbol, if the displayed chart scale is larger than selected limit scale here and if the size of the true scale symbol is longer than 6 mm on the chart display.

## CHART DISPLAY

*Pilot data, User chart and Chart alarms are non-chart information. All the selected items are shown on top of chart data*

Chart display - ALL-OFF \* "MARINER" sheet

Chart	Standard	Other
Tracking	Mariner	Route

**Pilot data**

Off Std Other

Position

Range

Text

**User chart**

Off Std Other

Points

Lines

Symbols and Tiduals

Areas 50% Transparent

Display only radar part of Lines, Symbols and Areas

**Chart Alarm warning area**

Off Std Other

Highlight

**Reference target**

Off Std Other

Position

### Pilot data:

- **Position**, if selected as **Std** or **Other**, positions of Pilot Data records are displayed as a symbol on the chart.
- **Range**, if selected as **Std** or **Other**, range circles around Pilot Data records are displayed. Size of circle depends on value set in Pilot Data.
- **Text**, if selected as **Std** or **Other**, text of Pilot Data records are displayed on the chart.

### User chart

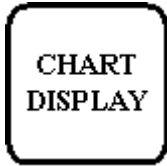
- **Points**, if selected as **Std** or **Other**, Points are displayed.
- **Lines**, if selected as **Std** or **Other**, Lines are displayed
- **Symbols and Tiduals**, if selected as **Std** or **Other**, Symbols and Tiduals are displayed.
- **Area**, if selected as **Std** or **Other**, Areas are displayed. Colour fill of the areas can be selected as transparent from 25 to 75% and as No colour fill. If No colour fill is selected, only the boundaries of the areas are visible.
- **Display only radar part of Lines, Symbols and Areas**, if selected as **Std** or **Other**, only those Lines, Symbols and Areas are displayed, which has user selection "on radar" activated for them in the User Chart. This selector is used to view only that part of the User Chart, which will be sent to the ARPA radar connected to the system.

**Chart Alarm warnings Area**, if selected as **Std** or **Other**, Chart Alarm warnings areas are displayed in red highlight colour.

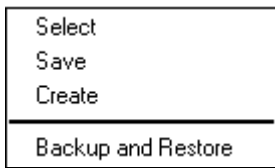
**Reference target**, if selected as **Std** or **Other**, reference targets are displayed.

## Store and recall of Chart Display Settings for visible chart and navigational features

You can define Chart Display Settings for chart details, which are displayed over S57 charts cells. You can save these Chart Display Settings into the hard disk and later recall them on demand.



Press twice *CHART DISPLAY* button.



If you press twice *CHART DISPLAY* pushbutton there will appear menu at cursor's position.

### Select:

You select from the saved Chart Display Settings one for recall.

### Save:

You save Chart Display Settings.

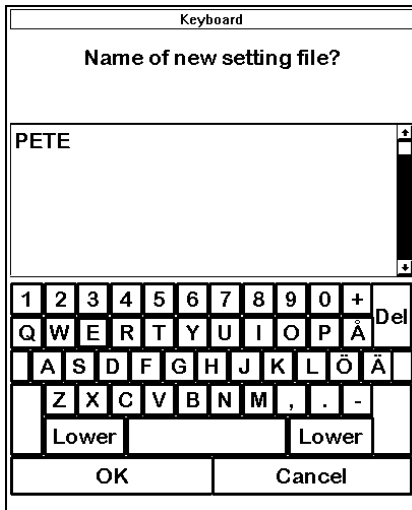
### Create:

You create a new Chart Display Settings.

### Backup and Restore:

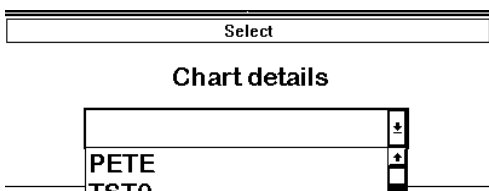
You can make backups of your Chart Display Settings into a floppy disk. Or you can restore backups of your Chart Display Settings from your floppy disk.

### How to create a new Chart Display Settings



1. Press *CHART DISPLAY* button twice.
2. Select **Create** from the menu.
3. Enter desired name for Chart Display Settings and press **OK** in dialog box.

### How to select Chart Display Settings



1. Press *CHART DISPLAY* button twice.
2. Choose **Select** from the menu.
3. Select desired Chart Display Settings from list box.

### How to save changes to Chart Display Settings

1. Press *CHART DISPLAY* button twice.
2. Choose **Save** from the menu.
3. Current Chart Display Settings are saved automatically.

---

## Sailing directions, Tidal tables etc. features of Vector charts

Vector charts contain Sailing directions, Tidal tables and other textual and picture information, which is not immediately visible on the chart. These information form an integral part of the legal ENC chart, which can fulfil SOLAS requirements and thus replace a paper chart. As a navigator you should check them as well as you check the visible chart when you do your planning and when you perform navigation.

Because these features are not permanently visible on the chart as they used to be in case of paper chart, the ECDIS has special symbols to highlight the locations from which you can cursor pick by Info request these kind of additional information. Below are example of these symbols. See also chapter "Request information about Vector chart objects" on page 136.



A grey box is used to show that Tidal information is available for Info request by cursor pick. **Note!** The visibility of the grey box symbol is controlled by the "Depth contours, currents, magnetics" selector of the "Other"-sheet of Chart Display window.



A magenta symbol is used to show that additional textual or picture information such as Sailing directions is available for Info request by cursor pick. **Note!** The visibility of the magenta symbol is controlled by the "Additional information available" selector of the "Other"-sheet of Chart Display window.

---

# Date dependent and periodical features of Vector chart

## Introduction

Vector charts contain date dependent features. Updating in general including reissues, new editions and updates creates date dependency. In addition to the obvious date dependency some features of S57 charts creates additional date dependency. These features include "Date Start", "Date End", "Periodical date start" and "Periodical date end". Hydrographic offices use these features to publish Temporary and Preliminary Notices to Mariners as their paper chart equivalent updates are called. The ARCS equivalent is called T&P Notices. "Periodical date start" and "Periodical date end" are used for seasonal chart features such as summer only sea marks, seasonal yacht race areas etc. See also chapter "A little learning about date dependency of S57 standard" on page 130.

You can efficiently use Date Dependency to use the real valid data for any given date applicable for your navigation or planning purposes. For example you can check existence of changes and restrictions weeks before they became valid. Date Dependency is a part of new electronic method to keep your chart up-to-date and valid for your intended use. Normally you should set **Display Until** and **Approve Until** once per week to keep your chart up-to-date.

**Note!** When you load charts and their updates into your system, the **Display Until** date is set as current date of the System. You must yourselves set **Approve Until** date. Make sure that you have set **Display Until** and **Approve Until** dates to the current date or to your planning date, whichever is applicable to your current usage of charts. For more information how to set Display/Approve date, see following chapter "How to approve and highlight Vector chart updates". If you use currently charts, which has Display Until and/or Approved Until set more than 1 week from current system date, you have a permanent reminder on your chart display.

### Permanent Warning

At least one of used charts has more than 1 week between "Approved Until" and/or "Displayed Until" and current system date. Use Chart Plan - Date Dependent to set dates

## How to approve and highlight Vector chart updates

Before you approve updates, you can display (highlight) updates, which are included into S57 Charts. Normally you have selected set "Automatic Display Until" after the SENC conversion. In this case after all the SENC conversions have been finished, all updates are automatically highlighted and you can view them and approve them after viewing. See chapter "How to set Approve Until date" on page 129.

If you - later after the initial approval of the updates - want to review updates, you can proceed as follows:

1. Use Approve Until to set the begin date for the update highlight. See chapter "How to set Approve Until date" on page 129.
2. Use Display Until to set the end date for the update highlight. See chapter "How to set Display Until date" on page 129.
3. Review the changes. Added features are highlighted with orange circles. Removed features are highlighted with orange slashes. Changed features are highlighted with both orange circles and slashes. See the picture left. See also for the presentation of highlighted updates chapter "An example of changes known to happen in the future." on page 131.
4. After review set Approve Until and Display Until back to the current system date.

### Insertion

### Deletion

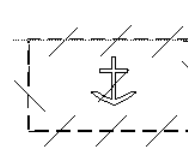
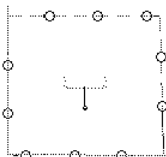
Point



Line



Area





## How to set Display Until date

1. Press CHART PLAN push button.
2. Select **Date Dependent** from the menu.
3. Date in **Updates Displayed until** field is shown as follows.

Date Dependent											
Cell Status											
Cell ID	RENC edt/ upd	SENC edt/ upd	Updates Displayed until			Updates Approved until					
7C1W0001	-/-	1/ 0	2000	2 18	( 0)	2000	2 18	( 0)			
7C1W0002	-/-	1/ 0	2000	2 18	( 0)	2000	2 18	( 0)			
7C1W0003	-/-	1/ 0	2000	2 18	( 0)	2000	2 18	( 0)			
7C1W0004	-/-	1/ 0	2000	2 18	( 0)	2000	2 18	( 0)			
7C2W0101	-/-	1/ 0	2000	2 18	( 0)	2000	2 18	( 0)			
7C2W0102	-/-	1/ 0	2000	2 18	( 0)	2000	2 18	( 0)			
7C2W0103	-/-	1/ 0	2000	2 18	( 0)	2000	2 18	( 0)			
7C2W0104	-/-	1/ 0	2000	2 18	( 0)	2000	2 18	( 0)			
7C2W0200	-/-	1/ 0	2000	2 18	( 0)	2000	2 18	( 0)			
7C2W0300	-/-	1/ 0	2000	2 18	( 0)	2000	2 18	( 0)			
7C2W0400	-/-	1/ 0	2000	2 18	( 0)	2000	2 18	( 0)			
7C2W0500	-/-	1/ 0	2000	2 18	( 0)	2000	2 18	( 0)			
7C2W0600	-/-	1/ 0	2000	2 18	( 0)	2000	2 18	( 0)			
7C2W0700	-/-	1/ 0	2000	2 18	( 0)	2000	2 18	( 0)			
7C2W0800	-/-	1/ 0	2000	2 18	( 0)	2000	2 18	( 0)			
7C2W0901	-/-	1/ 0	2000	2 18	( 0)	2000	2 18	( 0)			
7C2W0902	-/-	1/ 0	2000	2 18	( 0)	2000	2 18	( 0)			
7C2W1001	-/-	1/ 0	2000	2 18	( 0)	2000	2 18	( 0)			
7C2W1002	-/-	1/ 0	2000	2 18	( 0)	2000	2 18	( 0)			
Latest RENC			Oldest date			2000 2 18			1999 4 19		
Product List			Newest date			2000 2 18			2000 2 18		
2000 1 9			Manual Updates			---NVLD---			---NVLD---		
<input checked="" type="checkbox"/> Sync Manual Update Dates											
Manual Update Dates											
<input checked="" type="checkbox"/> All SENCs											
Display until											
Approve until											

Press **Display Until** button to define which updates are displayed. The system will display changes to S57 Chart cells before entered date.

Date to display until:	
Date	28.Feb.2000 Time
<input type="button" value="▲"/> <input type="button" value="▼"/>	<input type="button" value="▲"/> <input type="button" value="▼"/>
<input type="button" value="OK"/> <input type="button" value="Cancel"/>	

## How to set Approve Until date

1. Press CHART PLAN push button.
2. Select **Date Dependent** from the menu.
3. Date in **Updates Approved until** field is shown as follows

Date Dependent											
Cell Status											
Cell ID	RENC edt/ upd	SENC edt/ upd	Updates Displayed until			Updates Approved until					
7C1W0001	-/-	1/ 0	2000	2 28	( 0)	2000	2 18	( 0)			
7C1W0002	-/-	1/ 0	2000	2 28	( 0)	2000	2 18	( 0)			
7C1W0003	-/-	1/ 0	2000	2 28	( 0)	2000	2 18	( 0)			
7C1W0004	-/-	1/ 0	2000	2 28	( 0)	2000	2 18	( 0)			
7C2W0101	-/-	1/ 0	2000	2 28	( 0)	2000	2 18	( 0)			
7C2W0102	-/-	1/ 0	2000	2 28	( 0)	2000	2 18	( 0)			
7C2W0103	-/-	1/ 0	2000	2 28	( 0)	2000	2 18	( 0)			
7C2W0104	-/-	1/ 0	2000	2 28	( 0)	2000	2 18	( 0)			
7C2W0200	-/-	1/ 0	2000	2 28	( 0)	2000	2 18	( 0)			
7C2W0300	-/-	1/ 0	2000	2 28	( 0)	2000	2 18	( 0)			
7C2W0400	-/-	1/ 0	2000	2 28	( 0)	2000	2 18	( 0)			
7C2W0500	-/-	1/ 0	2000	2 28	( 0)	2000	2 18	( 0)			
7C2W0600	-/-	1/ 0	2000	2 28	( 0)	2000	2 18	( 0)			
7C2W0700	-/-	1/ 0	2000	2 28	( 0)	2000	2 18	( 0)			
7C2W0800	-/-	1/ 0	2000	2 28	( 0)	2000	2 18	( 0)			
7C2W0901	-/-	1/ 0	2000	2 28	( 0)	2000	2 18	( 0)			
7C2W0902	-/-	1/ 0	2000	2 28	( 0)	2000	2 18	( 0)			
7C2W1001	-/-	1/ 0	2000	2 28	( 0)	2000	2 18	( 0)			
7C2W1002	-/-	1/ 0	2000	2 28	( 0)	2000	2 18	( 0)			
Latest RENC			Oldest date			2000 2 28			1999 4 19		
Product List			Newest date			2000 2 28			2000 2 18		
2000 1 9			Manual Updates			---NVLD---			---NVLD---		
<input checked="" type="checkbox"/> Sync Manual Update Dates											
Manual Update Dates											
<input checked="" type="checkbox"/> All SENCs											
Display until											
Approve until											

Press **Approve Until** button to define which updates are approved. The system will approve changes to chart cells before entered date

Date to approve until:	
Date	28.Feb.2000 Time
<input type="button" value="▲"/> <input type="button" value="▼"/>	<input type="button" value="▲"/> <input type="button" value="▼"/>
<input type="button" value="OK"/> <input type="button" value="Cancel"/>	

## A little learning about date dependency of S57 standard

### *How the issue date of updates change the visibility of the changes*

Study the example below to understand the behaviour of updates relative to date

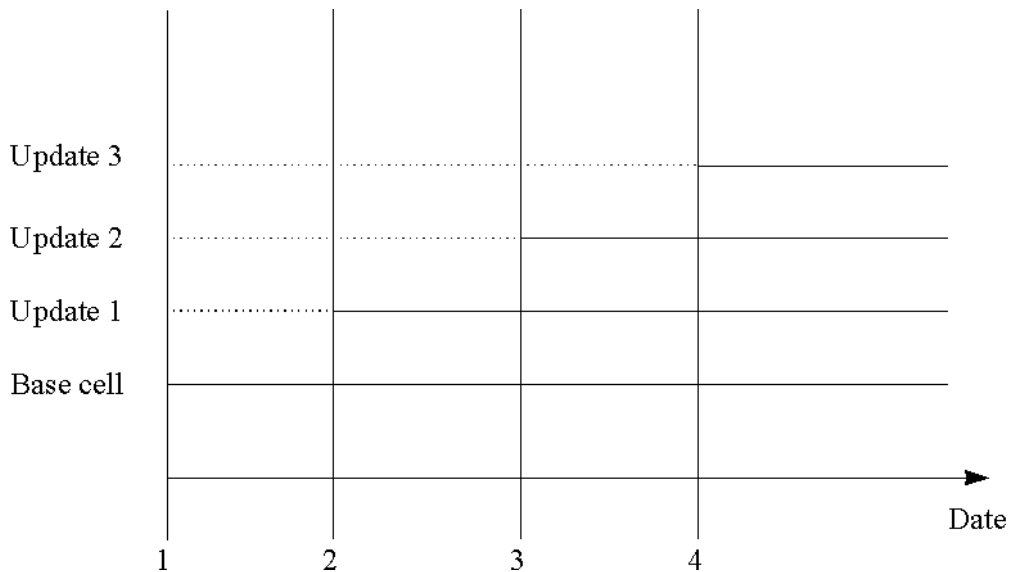


Figure above shows how updates are dependent on Display/Approve date set by user. Actions from 1 to 4 are follows:

1. Base cell including three updates is converted into SENC. Display date is set as current date of the System. Approve date has to set current date.
2. The date in which update 1 was issued. Display and Approve dates have to set to correct date in order to see the chart with Update 1.
3. The date in which update 2 was issued. Display and Approve dates have to set to correct date in order to see the chart with Update 1 and Update 2.
4. The date in which update 3 was issued. Display and Approve dates have to set to correct date in order to see the chart with Update 1, Update 2 and Update 3.

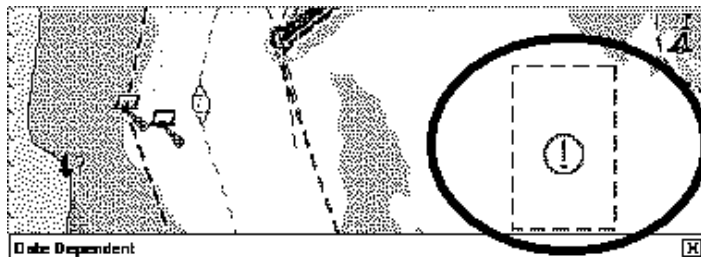
**NOTE!** In order to display charts with correct updated situation, use **always** current date during your voyage. If your voyage lasts more than one week set current date at least once per week during your voyage.

**NOTE!** In order to display charts with correct updated situation during route planning, use **always** planned date of each waypoint to check your plan.

### *How Temporary and Preliminary Notices to Mariners behave with Vector charts*

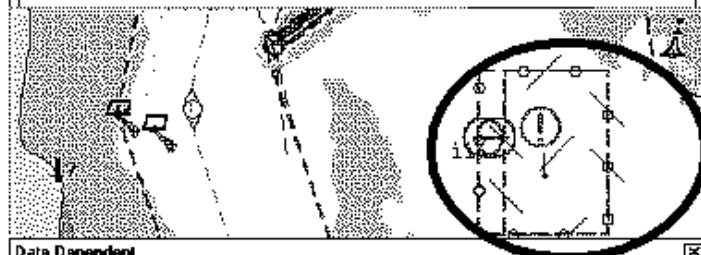
In some cases the producer of chart (Hydrographic Office) is aware of changes which happen in the future. The Hydrographic Office is able to include this kind of updates into the chart for later use. In paper chart world these changes are published in Preliminary and Temporary Notices to Mariners. In ARCS these are known as T&P Notices.

**An example of changes known to happen in the future.**



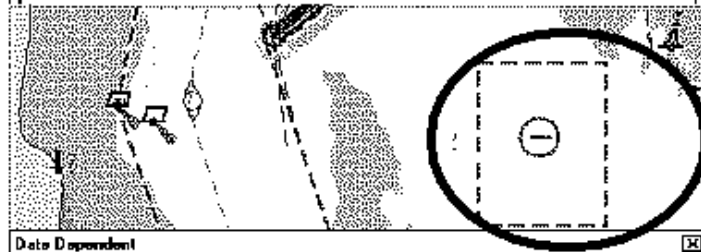
Display/Approve date is set to 2005-01-02. You can see a box shaped Caution Area displayed

Date Dependent			
Cell Status	Latest RENC	Updates Displayed	Updates Approved
Cell ID	status query	until	until
GB5X01SW	---NVL--- ( X )	2005 1 2 ( 2/ 5)	2005 1 2 ( 2/ 5)



Display date is set now 2005-09-08 and Approve date is 2005-08-09. You can see new area (Restricted Area) inserted together with existing area (Caution Area)

Date Dependent			
Cell Status	Latest RENC	Updates Displayed	Updates Approved
Cell ID	status query	until	until
GB5X01SW	---NVL--- ( X )	2005 9 8 ( 3/ 5)	2005 8 9 ( 2/ 5)



Display/Approve date is set to 2005-09-08. You can see only Restricted Area without any Caution Area.

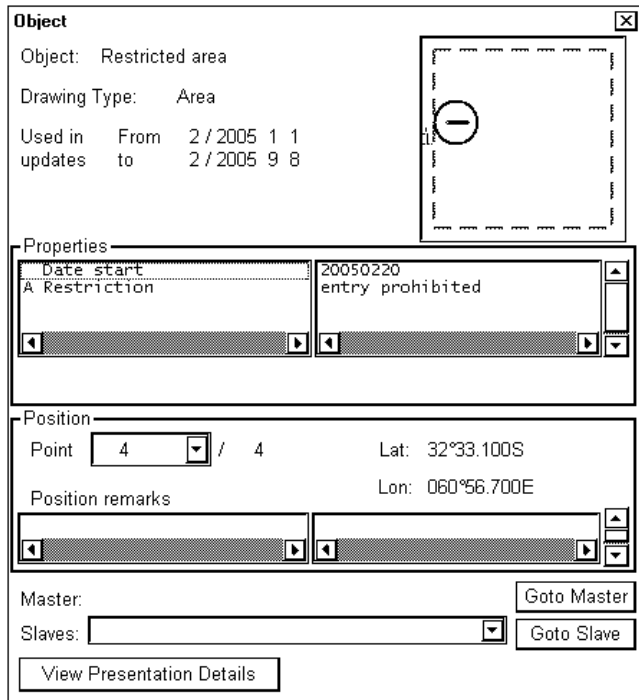
Date Dependent			
Cell Status	Latest RENC	Updates Displayed	Updates Approved
Cell ID	status query	until	until
GB5X01SW	---NVL--- ( X )	2005 9 8 ( 3/ 5)	2005 9 8 ( 3/ 5)
Oldest date	---NVL---	2005 9 8	2005 9 8
Newest date	---NVL---	2005 9 8	2005 9 8
Manual Updates		1999 5 21	1999 5 21
<input checked="" type="checkbox"/> Sync Manual Update Dates		Display until	Approve until
<input type="checkbox"/> Manual Update Dates		<input type="checkbox"/> All Cells	<input type="checkbox"/> Cells <input type="checkbox"/> Groups GB5X01SW

### How periodical features are coded in Vector charts

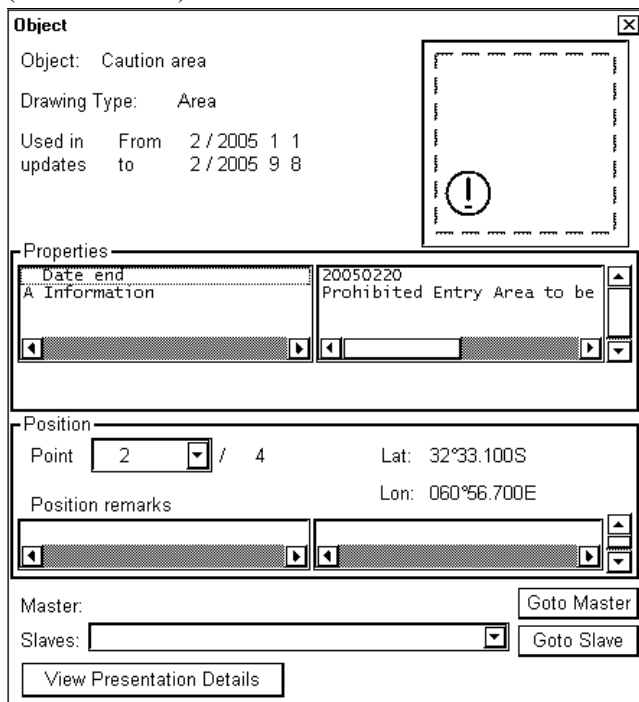
There are following alternatives, how the chart producer can define a chart feature to use periodical date start and end:

- YYMMDD (Full date for date start and date end)
- --MMDD (The same date every year)
- --MM (The same month every year)

An example below shows how user can find out using Info query (periodical) full date for starting date. (YYYYMMDD)



An example below shows how user can find out using Info query (periodical) full date for ending date. (YYYYMMDD)



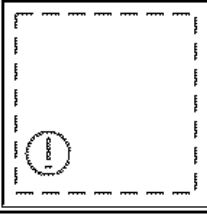
An example below shows how user can find out using Info query periodical starting and ending month and day in every year. (--MMDD)

**Feature Object** [X]

Object: Caution area

Geometric Type: Area

Used in From 0 / 1998 5 25  
updates to



Feature Attributes

A Information	YACHT RACE AREA
Periodic date end	--1115
Periodic date start	--0401
Scale minimum	139996

Position

Point 14 / 15 Lat: 55°59.595N  
Lon: 012°34.279E

Position Attributes

Master: [Goto Master]

Slaves: [Goto Slave]

[View Presentation Details]

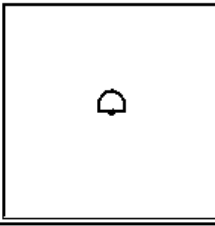
An example below shows how user can find out using Info query periodical starting and ending month in every year. (--MM)

**Feature Object** [X]

Object: Buoy, special purpose/general

Geometric Type: Point

Used in From 0 / 1998 2 25  
updates to



Feature Attributes

M Category of special purpos	yachting mark
M Colour	yellow
Periodic date end	--10
Periodic date start	--03

Position

Point 1 Isol / 1 Lat: 50°46.200N  
Lon: 001°17.595W

Position Attributes

Master: [Goto Master]

Slaves: Top mark [Goto Slave]

[View Presentation Details]

**An example of periodical chart feature.**

Next two figures show a Caution area which is valid from date 1<sup>st</sup> April to date 15<sup>th</sup> November.

**Date Dependent**

Cell Status	Latest RENC status query	Updates Displayed until	Updates Approved until
n1300131	---NVLD---	( X ) 1999 3 31 ( 6/ 6)	1999 3 31 ( 6/ 6)

Oldest date --NVLD-- 1999 3 31 1999 3 31  
 Newest date --NVLD-- 1999 3 31 1999 3 31  
 Manual Updates 1999 5 21 1999 5 21

Sync Manual Update Dates       

    All Cells     Cells     Groups    n1300131

Display/Approve date has been set to to 1999-3-31.  
 Caution Area is NOT displayed because the date is NOT valid for displaying it.

**Date Dependent**

Cell Status	Latest RENC status query	Updates Displayed until	Updates Approved until
n1300131	---NVLD---	( X ) 1999 4 1 ( 6/ 6)	1999 3 31 ( 6/ 6)

Oldest date --NVLD-- 1999 4 1 1999 3 31  
 Newest date --NVLD-- 1999 4 1 1999 3 31  
 Manual Updates 1999 5 21 1999 5 21

Sync Manual Update Dates       

    All Cells     Cells     Groups    n1300131

Display date has been set to to 1999-4-1.  
 Caution Area is displayed because the date is valid for displaying it.

Figure below show the content of the attributes of the Caution area in the example above as shown in the Info request window.

**Object**

Object: Caution area  
 Drawing Type: Area  
 Used in From 0 / updates to

**Properties**

A Information	
Periodic date end	--1115
Periodic date start	--0401
Scale minimum	139996

**Position**

Point 4 / 15    Lat: 56°00.145N  
 Lon: 012°35.230E

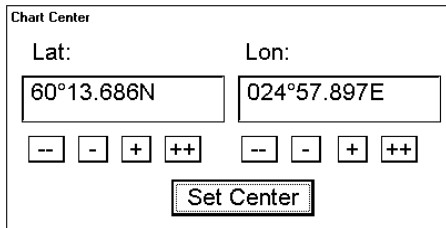
Position remarks

Master:   
 Slaves:

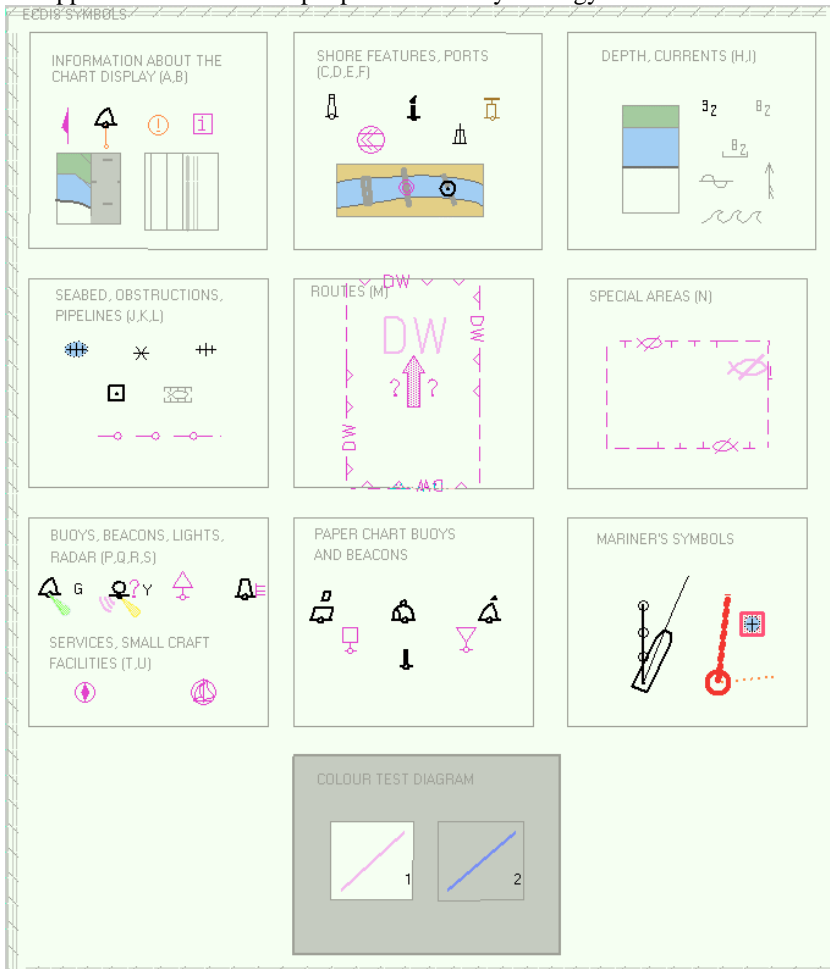
# Symbology used in Vector charts

As a user you can familiarise yourself with the used presentation by browsing IHO ECDIS Chart 1, which is included in this ECDIS. Note that it behaves as any S57 Chart and it follows your selections. See "Control of visible chart features" on page 120.

To use IHO ECDIS Chart 1 select **ECDIS Chart 1** from the Chart Plan-menu. When you open ECDIS Chart 1, the Chart Center window appears which allows easy return to the chart position before executing ECDIS Chart 1 by pressing **Set Center** button of the Chart Center window.



An appendix contains example plots of used symbology.



## How to change presentation library used for Vector chart features

An ECDIS uses official IHO presentation library to draw Vector charts. Used presentation library is replaceable, but this feature is only intended to be used by qualified service personal and type approval authorities.

When this manual was published the official presentation library was "pslb03\_1.dai" known as "Official IHO presentation library for ECDIS Ed 3 revision 1, Edition: 3.1".

---

## Request information about Vector chart objects

The ability to cursor-pick on an object for the additional information that lies behind the object is an important part of ECDIS capability. However, an unprocessed cursor pick, which does discriminate or interpret and merely dumps on the interface panel all the information available at that point on the display, will normally result in pages of unsorted and barely intelligible attribute information.

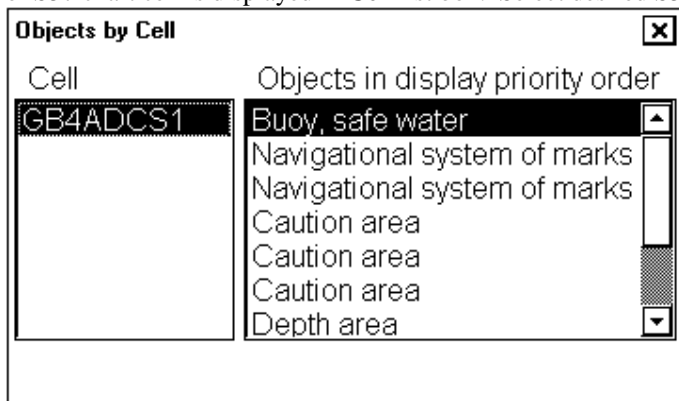
### How to set visible Vector chart features

The request information about S57 chart objects is given only objects which are set to displayed by user. How to set chart details to be displayed, see chapter "Control of visible " on page 120.

### How to select desired object from the list of found objects

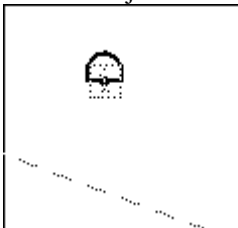
To select desired SENC and object for information request, proceed as follows:

1. Move cursor above desired object.
2. Press INFO & HELP push button. Two dialog boxes appear: **Object** and **Objects by Cell**
3. Use Object by Cell dialog box to select desired chart cell and desired object from which you need information. If there are different navigation purpose S57 charts over area you make an information request, you can select desired S57 chart cell in **Object by Cell** dialog box. A list of S57 chart cell is displayed in **Cell** list box. Select desired S57 chart cell from a list.



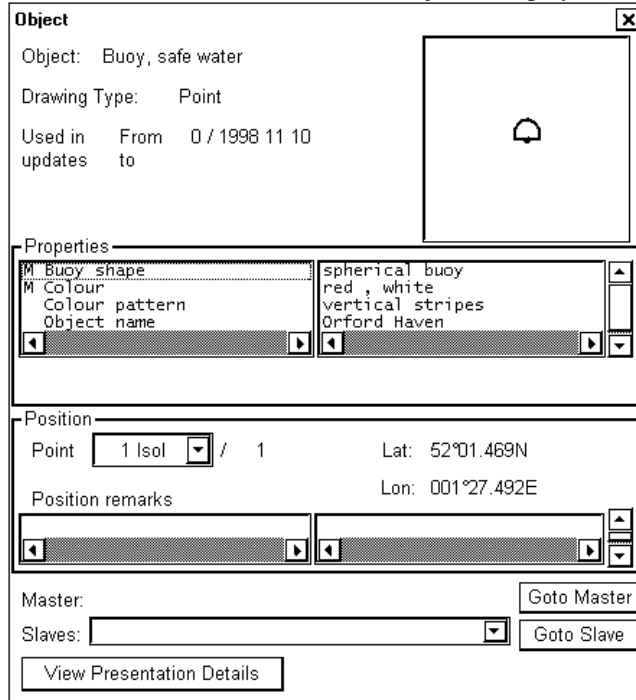
Select desired object from an **Object in display priority order** list box.

4. Selected object in the chart is displayed with mark of information.





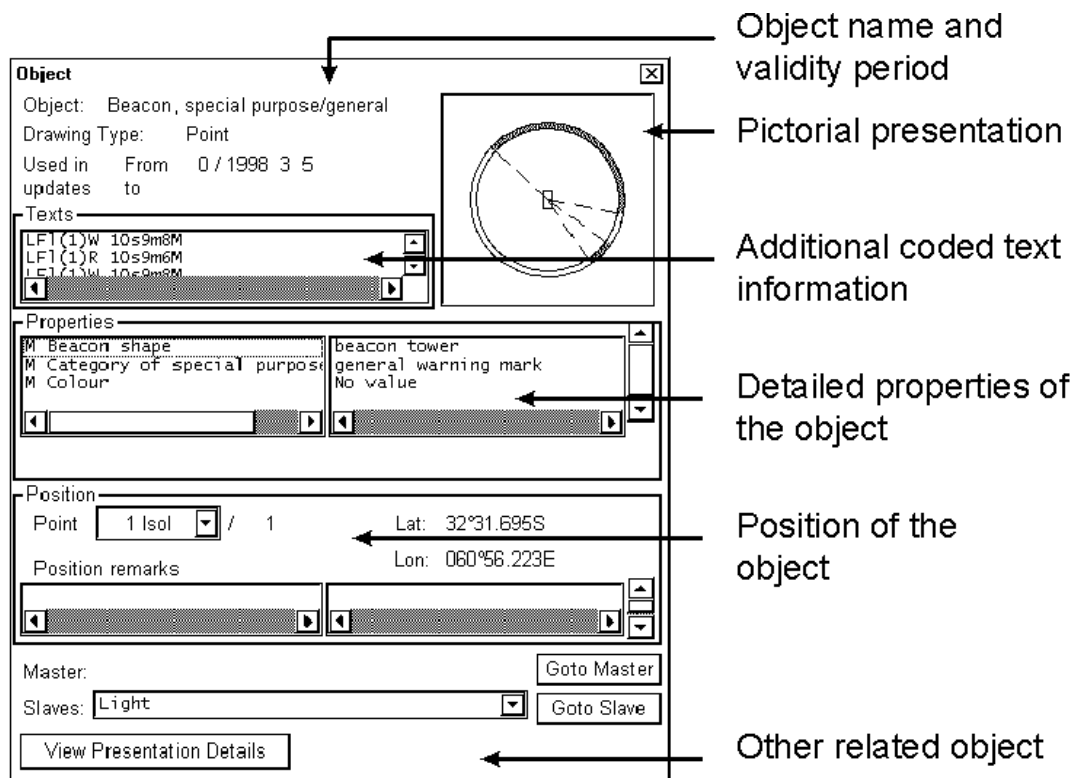
- The detailed information of selected object is displayed in an **Object** dialog box



- To close dialog boxes press CANCEL in Control Panel.

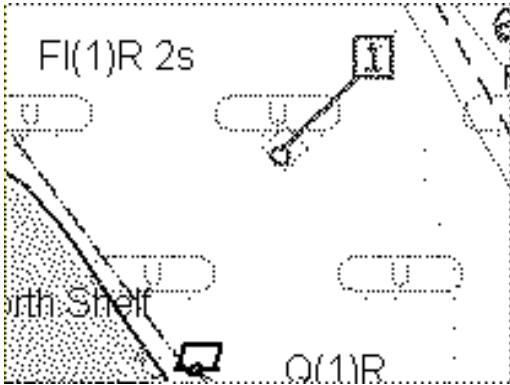
## How to view properties of a Vector chart object

After you have selected a Vector chart object, you can view detailed information of it in an **Object** dialog box:



## A little learning about Vector Chart coding

*Tidal information is available as a table*



**Object**

Object: Tidal stream panel data

Drawing Type: Point

Used in updates From 0 / 1998 11 10 to

Properties

Object name	H
Textual description	G80TG969.TXT
Tidal stream panel value	0131 , HARWICH , HW , 297 , 0.2 , 339

View content

Position

Point 1 Isol / 1 Lat: 51°57.904N

°16.802E

Untitled - TextView

File Setting Text

Tidal stream panel values:

Hour	Dir[°]	Rate[kt]
-6	297	0.2
-5	339	1.0
-4	335	1.0
-3	341	0.9
-2	339	1.2
-1	338	0.8
0	327	0.3
1	156	0.7
2	154	1.5
3	159	1.4
4	156	1.1
5	161	0.7
6	235	0.1

Goto Master

Goto Slave

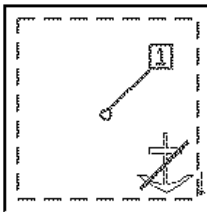
**More information is available as a text**

**Object**

Object: Restricted area

Drawing Type: Area

Used in From 0 / 1998 11 10  
updates to




---

**Properties**

A Restriction	anchoring prohibited
Textual description	GB0THSNU.TXT

[View content](#)

---

**Position**

Point 56 / 172      Lat: 51°56.683N  
Lon: 001°18.584E

Position remarks

---

**Gb0thsnu.txt - TextView**

File Setting Text

M: HARWICH CHANNELS ANCHORING PROHIBITED

SI Anchoring is prohibited in, and within 60 metres of the channels.

**More information is available as a picture**

**Object**

Object: Nautical publication information

Drawing Type: Area

Used in From 0 / 1999 3 25  
updates to

---

**Properties**

Information	BEACONS IN THE SUEZ CANAL
PI: Logical representation	GB0201500.TXT

[View content](#)

---

70      Lat: 30°34.687N  
Lon: 032°15.000E

[Goto Master](#)  
[Goto Slave](#)

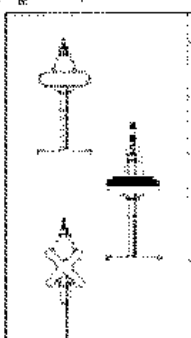
---

**PI: View**

**BEACONS IN THE SUEZ CANAL.**

The 5.5 metre depth contour throughout the canal is marked at sea by buoyant beacons. Details of their shape, topmarks and lights are diagram below

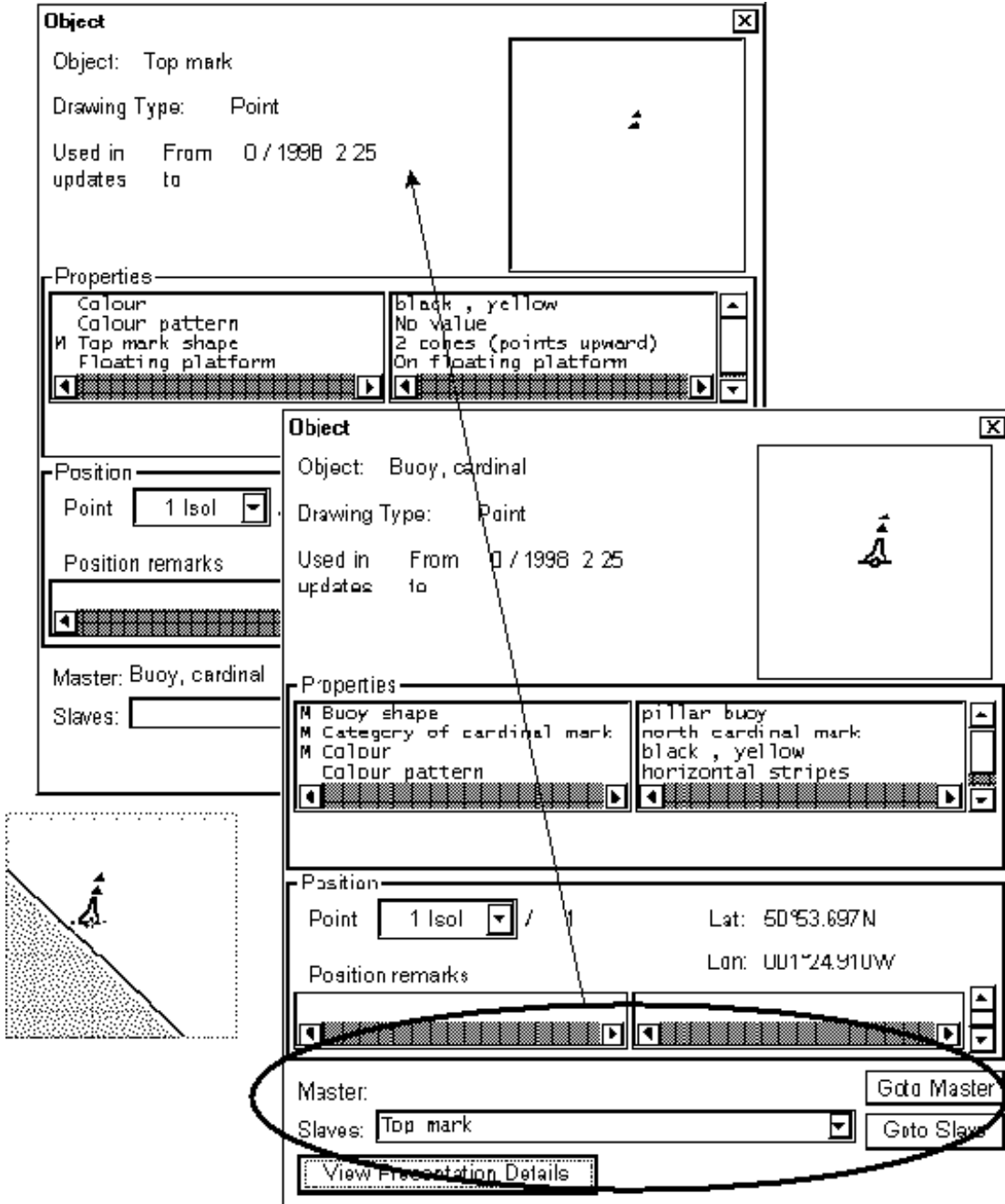
	Topmark	Light cha
East side	White with green secondary	Fixed (p
West side	White with red secondary	Fixed (p
Junction	Yellow and black horizontal bands	In anchor (4 X Red in port)
Canal buoy	Yellow (S)	Red (W)



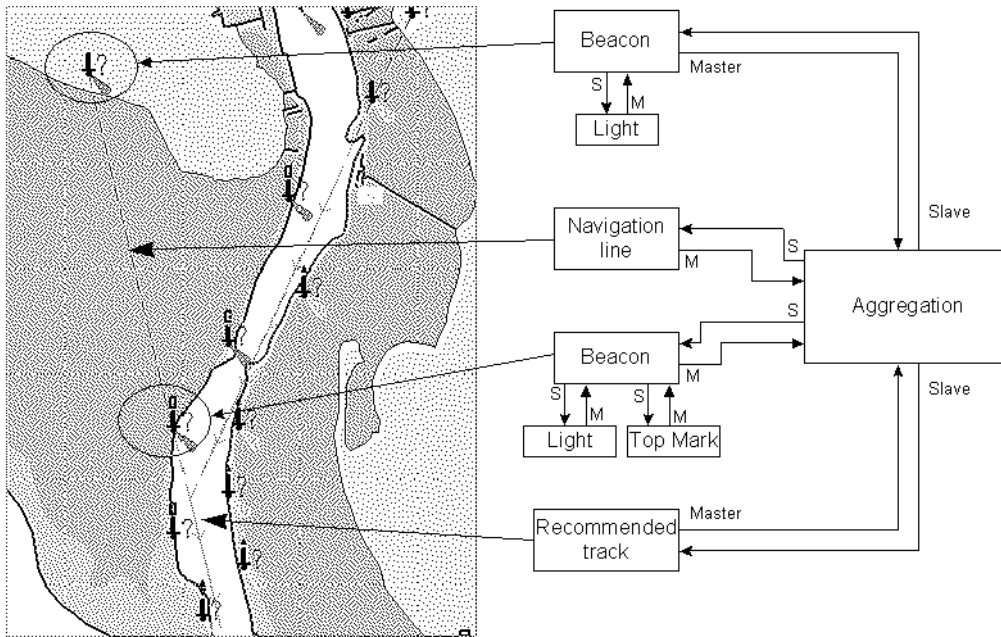
## Linked objects

Often a group of chart objects are linked together. Most common example is **beacon** or **buoy**, in which body and top mark are defined separately. One example is lights and **recommended track**. Another example is **measurement mile**. There are also other similar cases.

### Body and top hat of a beacon or buoy



## Recommended track defined by two beacons



**Object**  
Object: Recommended track  
Drawing Type: Line  
Used in From 0/1998 2 25 updates to

Properties  
M Category of recommended track based on a system of fixed marks  
M Orientation 345-50°  
M Traffic flow inbound

Position  
Point 1 Con / 3 Lat: 50°50.541N Lon: 001°18.792W

Position remarks

Master: Aggregation  
Slaves:

**Object**  
Object: Beacon, lateral  
Drawing Type: Point  
Used in From 0/1998 2 25 updates to

Properties  
M Beacon shape No value  
M Category of lateral mark port-hand lateral mark  
M Colour red  
Conspicuous, visually not visually conspicuous

Position  
Point 1 Isol / 1 Lat: 50°50.624N Lon: 001°18.826W

Position remarks

Master: Aggregation  
Slaves: Light, Top mark

**Object**  
Object: Aggregation  
Drawing Type:  
Used in From 0/1998 2 25 updates to

Properties

Position  
Point / 0 Lat: 50°50.541N Lon: 001°18.792W

Position remarks

Master: Aggregation  
Slaves: Navigation line, Recommended track, Beacon, special purpose/general

**Object**  
Object: Light  
Drawing Type: Point  
Used in From 0/1998 2 25 updates to

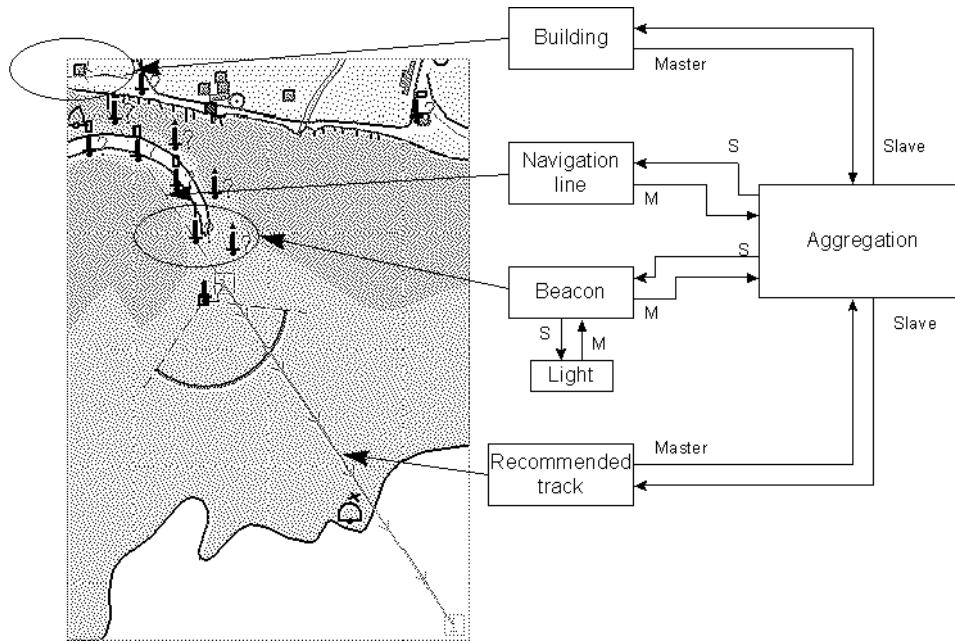
Properties  
A Category of light leading light, front light  
A Colour red  
A Light characteristic occulting  
Signal group (2)

Position  
Point 1 Isol / 1 Lat: 50°50.624N Lon: 001°18.826W

Position remarks

Master: Beacon, lateral  
Slaves:

## Recommended track defined by a building and a beacon



**Object**  
 Object: Recommended track  
 Drawing Type: Line  
 Used in From 0/1998 2.25 updates to

**Properties**  
 M Category of recommended track based on a system of fixed marks  
 M Orientation 324.00 °  
 M Traffic flow inbound

**Position**  
 Point 2 Con / 2 Lat: 50°46.457'N  
 Lon: 001°21.246'W

Master: Aggregation  
 Slaves: [Goto Master] [Goto Slave]

---

**Object**  
 Object: Aggregation  
 Drawing Type: [Empty]  
 Used in From 0/1998 2.25 updates to

**Position**  
 Point / 0 Lat: 50°46.992'N  
 Lon: 001°21.722'W

Master: [Goto Master]  
 Slaves: Building, single [Goto Slave]

**Object**  
 Object: Beacon, special purpose/general  
 Drawing Type: Point  
 Used in From 0/1998 2.25 updates to

**Properties**  
 M Colour Orange, red  
 M Colour pattern No value  
 M Conspicuous, visually conspicuous  
 M Information not visually conspicuous  
 M Part hand lateral mark Also Part hand lateral mark

**Position**  
 Point 1 Isol / 1 Lat: 50°46.934'N  
 Lon: 001°21.782'W

Master: Aggregation  
 Slaves: Top mark [Goto Master] [Goto Slave]

---

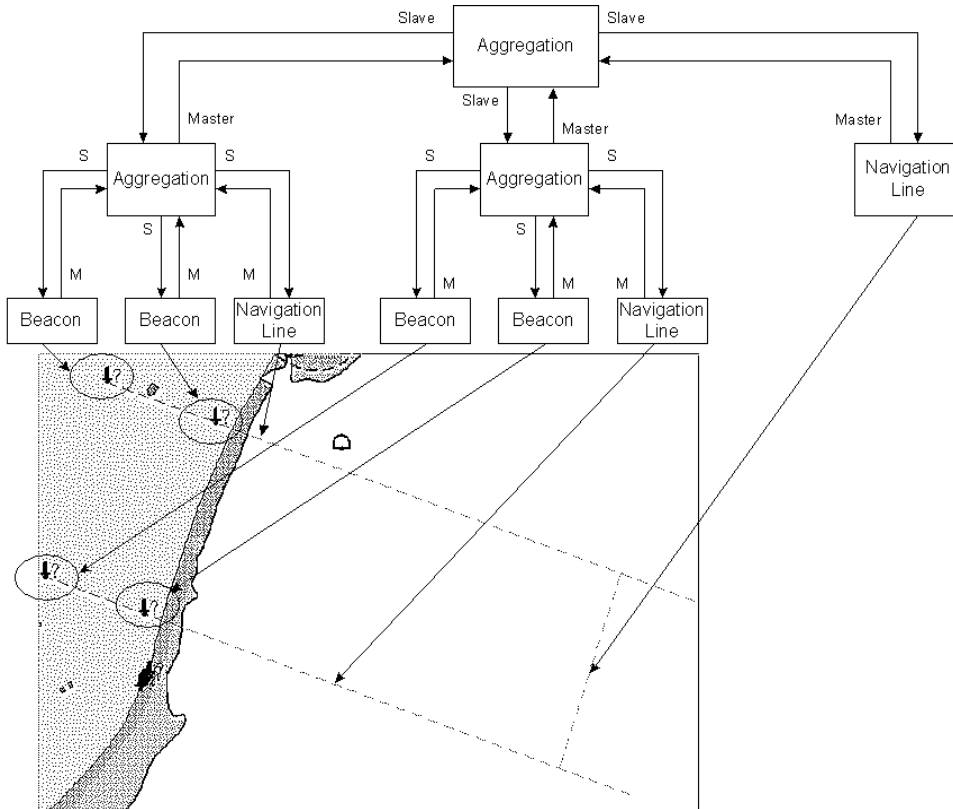
**Object**  
 Object: Top mark  
 Drawing Type: Point  
 Used in From 0/1998 2.25 updates to

**Properties**  
 M Information  
 M Top mark shape  
 M Pentagonal other shape (see INFORM)

**Position**  
 Point 1 Isal / 1 Lat: 50°46.934'N  
 Lon: 001°21.782'W

Master: Beacon, special purpose/general [Goto Master]  
 Slaves: [Goto Slave]

# Measurement mile



<p><b>Object</b></p> <p>Object: Navigation line</p> <p>Drawing Type: Line</p> <p>Used in From 0/1998 11 10 updates to</p> <p><b>Properties</b></p> <p>Category of navigation line: Transit line Orientation: No value</p> <p><b>Position</b></p> <p>Point: 2 Can / 3 Lat: 52°00.955N Lon: 001°29.507E</p> <p>Position remarks:</p> <p>Master: Aggregation Slaves: [Empty] [Goto Master] [Goto Slave]</p> <p>[View Presentation Details]</p>	<p><b>Object</b></p> <p>Object: Aggregation</p> <p>Drawing Type:</p> <p>Used in From 0/1998 11 10 updates to</p> <p><b>Properties</b></p> <p><b>Position</b></p> <p>Point: [Empty] / 0 Lat: 52°00.152N Lon: 001°29.070E</p> <p>Position remarks:</p> <p>Master: Aggregation Slaves: Beacon, special purpose/general Beacon, special purpose/general Navigation line [Goto Master] [Goto Slave]</p>
<p><b>Object</b></p> <p>Object: Aggregation</p> <p>Drawing Type:</p> <p>Used in From 0/1998 11 10 updates to</p> <p><b>Properties</b></p> <p><b>Position</b></p> <p>Point: [Empty] / 0 Lat: 52°00.152N Lon: 001°29.070E</p> <p>Position remarks:</p> <p>Master: [Empty] Slaves: Navigation line Navigation line Aggregation [Goto Master] [Goto Slave]</p>	<p><b>Object</b></p> <p>Object: Beacon, special purpose/general</p> <p>Drawing Type: Point</p> <p>Used in From 0/1998 11 10 updates to</p> <p><b>Properties</b></p> <p>Beacon shape: No value Category of special purpose: mark with unknown purpose Colour: No value</p> <p><b>Position</b></p> <p>Point: 1 Isol / 1 Lat: 52°01.576N Lon: 001°26.586E</p> <p>Position remarks:</p> <p>Master: Aggregation Slaves: [Empty] [Goto Master] [Goto Slave]</p>

---

## Seldom used features of Vector charts

There are some functions or features which are not used as daily or weekly basis, but sometimes there is a need to use them.

### Cell Status

Use Cell Status function to find out the status of individual cell in your system, in a CD-ROM or in a RENC.

**Status of CD-ROM** -field: This information is based on information in CD-Catalog you have loaded and selected here from CD list box.

**Status of RENC** -field: This information is based on information in the RENC. One example of a RENC is PRIMAR. You get Status of cells in RENC using telecommunication, if you have optional telecommunication installed in your system and you are a licensed user of the RENC.

**Status of ENC** -field: This information is based on information on hard disk of the system. The ENC is here S57ed3 delivery formatted chart. Before it can be displayed as a chart it has to be converted into System internal display format SENC.

**Status of SENC** -field: This information is based on information on hard disk of the system. A SENC is the System internal display format.

Status	Last edition	Last issue date	Last Base / Upd. included	Last update number
CD-ROM	1	1998 11 12		4
RENC				
ENC	1	1998 11 12	0/1998 11 2	4
SENC	1	1998 11 12	0/1998 11 2	4

Use **Conv Log** button to view detailed conversion log of S57 Chart cell.

### S57 Cell Details

You may need to check when an update has been added into your ECDIS. Also you may need to check what was shown in your chart display 3 weeks ago. There are also many other rare cases when you need to know what was known by your ECDIS.

If you press **Details** button in S57 Cell Status, you will get a S57 Cell Details window, where you can view updates by their numbers.

To check any situation in the past you can use **Displayed Update** and **Approved Update** -fields to specify directly number of Update.

Edition number	Update number	Issue date	Upd. appl. date
1	0	1998 11 2	1998 11 2
1	1	1998 11 3	
1	2	1998 11 11	
1	3	1998 11 11	
1	4	1998 11 12	



## How to use Cell Status window to initiate SENC conversion

Cell Status window can be used to force a new conversion into the SENC format for any chart cell, which is already in the SENC format. Normally you do not need this feature, but it could be useful if for example somebody try to analyse why an update cannot be converted etc.

Use **Create Senc** to initiate SENC conversion of the base cell.

Status	Last edition	Last issue date	Last Base / Upd. included	Last update number
CD-ROM				
RENC				
ENC	1	2005 10 6	0/1998 3 5	5
SENC	1	1998 3 5	0/1998 3 5	5

If the base cell is already converted in the SENC format then the system ask you this question. Select **OK** to overwrite the existing SENC.

Then the content of Cell Status window changes as in this example.

Note that the SENC row is now empty.

Status	Last edition	Last issue date	Last Base / Upd. included	Last update number
CD-ROM				
RENC				
ENC	1	2005 10 6	0/1998 3 5	5
SENC				0

After the SENC conversion is completed, the content of the Cell Status changes as in this example.

Note that the last update number for SENC row is now 0 to indicate that only the base cell is included into the SENC.

Now use **Add Update** to include an update in the SENC.

Status	Last edition	Last issue date	Last Base / Upd. included	Last update number
CD-ROM				
RENC				
ENC	1	2005 10 6	0/1998 3 5	5
SENC	1	1998 3 5	0/1998 3 5	0

After the SENC conversion for the added update is completed, the content of the Cell Status changes as in this example.

note that the last update number for SENC row is now 1 to indicate that also the first update is included into the SENC.

Now repeat **Add Update** to include the rest of the updates in the SENC. In this example you need to repeat it still 4 times more for updates 2, 3, 4 and 5.

Status	Last edition	Last issue date	Last Base / Upd. included	Last update number
CD-ROM				
RENC				
ENC	1	2005 10 6	0/1998 3 5	5
SENC	1	1998 3 5	0/1998 3 5	1

This page is intentionally left blank

# Raster Chart material

---

## ARCS Charts

Around 2700 ARCS charts are available on 11 Chart CD-ROMs, covering the world's major trading routes and ports. Regionally based Chart CD-ROMs RC1 to RC10 contain standard BA navigation charts, while RC11 contains ocean charts at scales of 1:3,500,000 and smaller. ARCS charts are facsimile copies of BA paper charts, and as such share a common numbering system. New Editions and New Charts for ARCS and BA paper charts are issued simultaneously. They are supplied on each weekly Update CD-ROM until incorporated into the Chart CD-ROMs at the next issue.

Occasionally, it is necessary to issue new charts in advance of their intended date of validity, for example a change in regulations commencing on a future date. In such cases the current chart will co-exist with the new chart until the date of implementation, the earlier chart being indicated with a suffix "X" after the chart number. The system will allow access to both charts for the period of overlap by issue of new chart permits.

Sometimes you may wish to add manually Notices to mariners or Navtex warnings into your ARCS charts. In this system this kind of things are called as Manual Updates. Manual updates are valid for both ARCS and S57 charts so that you need to define them only once. Also manual updates are valid for all scales so that you don't need to repeat them for charts published in different scales from the same area. See more details in chapter Manual Updates.

## Chart legend of ARCS chart

CHART LEGEND is not a push button, but it is the front-page that is displayed as a base. If you push CANCEL enough you will finally get CHART LEGEND. The chart legend gives information to the user about edition date and updates of the displayed chart

### Chart number:

Number of current chart is shown in this field.

### Country Of Origin:

The country which has produced original chart.

### Latest NM:

Date when the latest Notice to Mariners included to chart.

### Edition Date:

Date when the chart was issued.

### Publication Date:

Issue date of Update CD used to update the system.

### ARCS chart

Chart Number :	4114
Country Of Origin:	United Kingdom
Latest NM:	No NMs
Edition Date:	1996 11 22
Publication Date:	1997 7 17
WGS shift status:	Defined
<input type="button" value="T&amp;P Notices.."/>	<input type="button" value="Details.."/>
<input type="button" value="Warnings..."/>	

### WGS shift status:

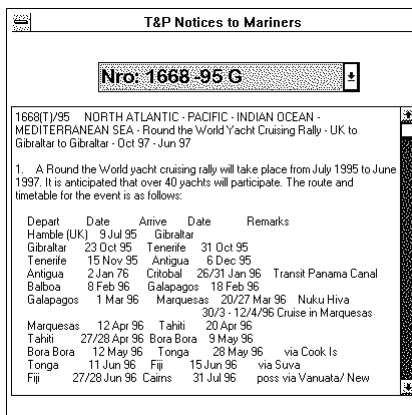
Datum shift between local Datum and WGS84 datum is known (=Defined), unknown or user defined (=Undefined) or shift is known only some parts of chart (=Partially defined).

## T&P Notices, Details and Warnings of ARCS

Access to view T&P Notices, Details or Warnings of ARCS is in a Legend of ARCS chart. In lower part of the Legend there are three buttons to activate corresponding window.

### T&P Notices...

T&P Notices are also known as Temporary and Preliminary Notices to Mariners. Press **T&P Notices** button to open text window, providing chart information that does not warrant permanent chart correction, can be viewed.



### Details...

Press **Details** button to open window where detailed information of chart is shown.

#### Projection:

Projection of current chart. By pressing projection button user gets more information of latitude of true scale and rotation angle.

#### Orig. Scale:

The scale of the origin paper chart is shown here.

#### Hor Datum:

Horizontal datum used with current chart.

#### Depth Unit:

Unit of depth used with current chart.

#### Depth Datum:

Vertical datum of depth used with current chart.

#### Height Unit:

Unit used for objects locating above sea

#### Height Datum:

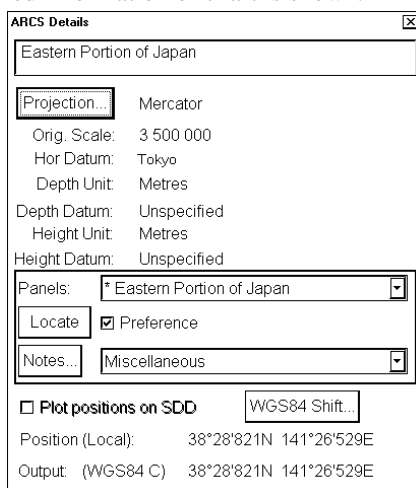
Vertical datum for objects locating above sea.

#### Panels:

This can be used to select desired inset (Panel) from the combo box. This function also co-operates with Locate, Preference and Notes.

#### Locate:

This function selects to display an inset, which is selected in **Panels** combo box.

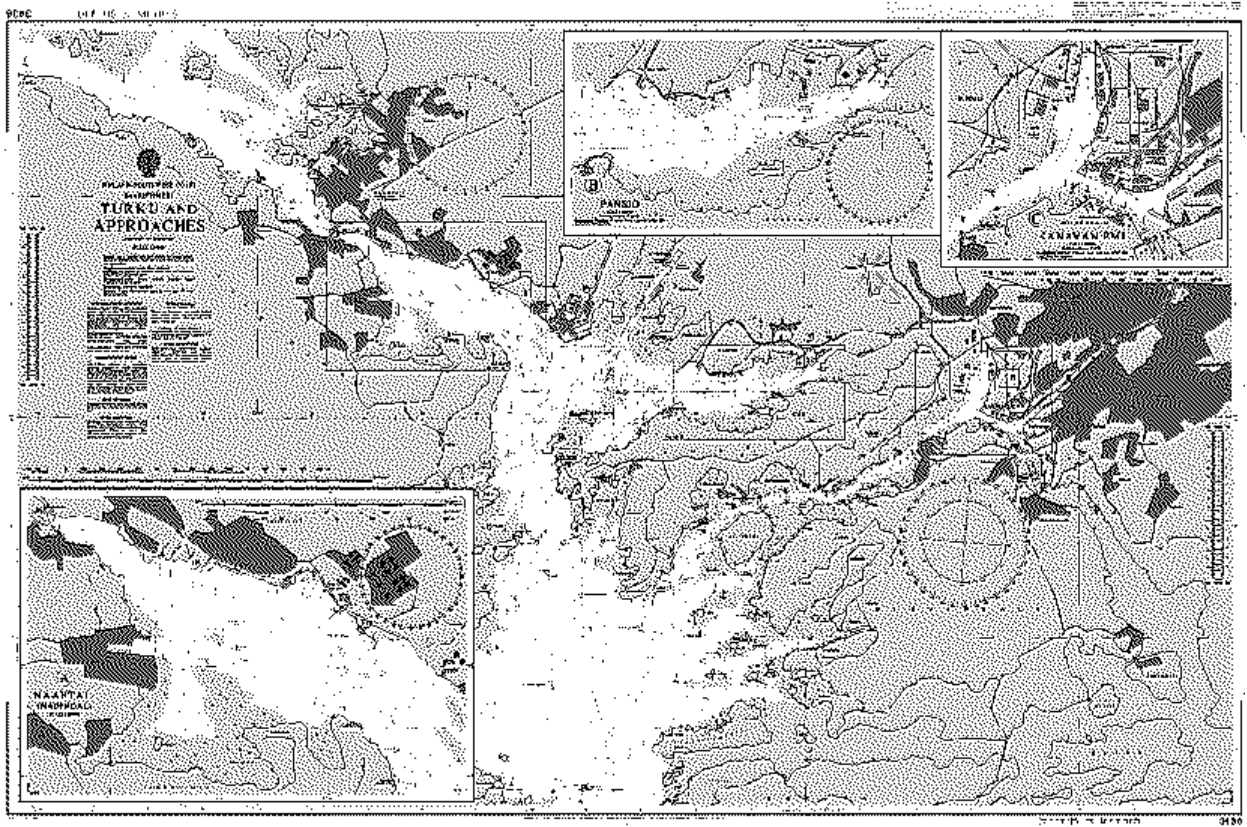


### Warnings of ARCS chart

There could be warnings of last minutes not included to Notices to Mariners.

### How to set Preference for Inset (Panel)

If there are in the same chart different insets with the same position, the user can select preferred inset, which displays own ship position.



The chart with three insets.

1. Select desired inset from **Panels** combo box
2. Select **Preference** check box as shown below

Panels:	* Eastern Portion of Japan
Locate	<input checked="" type="checkbox"/> Preference

### How to view Notes of ARCS chart

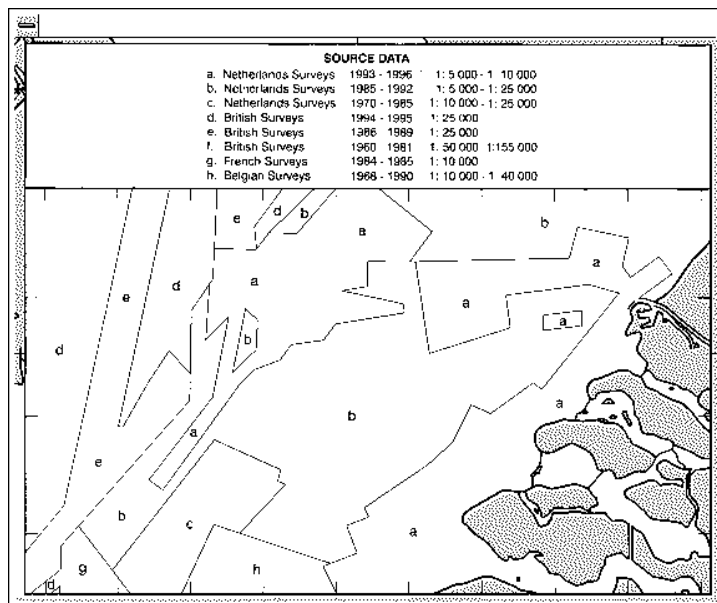
User can select from combo box desired item in order to view note. After selection in Panels press **Notes...** button and there will appear a text window. The window will be closed by pressing **CANCEL**.

<p><b>SATELLITE-DERIVED POSITIONS</b></p> <p>Positions obtained from satellite navigation systems, such as the Global Positioning System (GPS), are normally referred to the World Geodetic System 1984 Datum. Such positions must be adjusted by 0.01 minutes <b>SOUTHWARD</b> and 0.20 minutes <b>EASTWARD</b> before plotting on this chart.</p> <p><b>Example</b></p> <p>Satellite-Derived Position (WGS 84 Datum) 60°23'50N, 22°06'00E lat/long adjustments 0'01S 0'20E</p> <p>Adjusted Position 60°23'49N, 22°06'20E (compatible with chart datum)</p>	<p>Panels: Naantali (Nadendal)</p> <p>Locate <input type="checkbox"/> Preference</p> <p>Notes...</p>
	<p>WGS Shifts</p> <p>Vertical Datums</p> <p>IALA Region</p> <p>Sources</p> <p>WGS Shifts</p> <p>Recommended Tracks</p> <p>Nav aids</p> <p>Depths</p> <p>Vessel Traffic Services</p> <p>Miscellaneous</p> <p>Miscellaneous</p>
	<p>Position (L)</p> <p>Output: (W)</p>
	<p>Current to</p> <p>EBL</p>

### How to use Source Data Diagram

A Source Data Diagram (SDD) consists of two parts, a graphic showing the areas covered by each type of source material from which the chart was compiled, and a tabulation, keyed to graphic, giving details of source dates and scales. The layout of graphic corresponds to the layout of the chart, and the borders of the diagram equate to the

limits of the chart panels. If this option is selected it is possible to click by cursor ARCS chart to plot origin on SDD.  
If Plot positions on SDD is not active there is no SDD on the chart.



---

## Datum and ARCS Charts

### Difference between ARCS chart local datum and positions in WGS84 datum

The difference between ARCS chart local datum and WGS84 datum is known as WGS84 Shift. For most of the ARCS charts this is known and the system can do conversion automatically. For some ARCS chart this is unknown and the user is responsible to define it. For some ARCS charts this is partially known and the user is responsible to define it for the unknown areas of partially known ARCS charts. See chapter "How to define User WGS84 Shift" on page 155.

See also ARCS Navigator User Guide. It has a chapter "Use with GPS" about the datum question.

#### ***How the state of WGS Shift is indicated permanently***

Cursor window does not have any warning. The cursor position operates in user selected working datum (see chapter "How to select Datum").

Cursor
From Own Ship: 164.3 nm 8.0°
60°07.026N 024°54.986E

Cursor window does have warning **WGS undefi.** in red colour.

The system still operates in user selected working datum (see chapter "How to select Datum"). But the system is unable to correctly do the transformation between local paper chart datum and the user selected working datum.

Cursor
From Own Ship: 0.6 nm 294.7°
60°20.243N 022°03.234E WGS undefi.

Cursor window does have warning **WGS user** in red colour.

The system still operates in user selected working datum (see chapter "How to select Datum"). But the system use user defined WGS shift to perform the transformation between local paper chart datum and the user selected working datum.

Cursor
From Own Ship: 361.7 nm 112.3°
60°03.219N 029°20.841E WGS user

#### ***How to check WGS shift status of the used chart***

There is a WGS shift status -field in ARCS legend. Alternatives are as below:

WGS shift is defined for this chart. All latitude / longitude positions of cursor, Routes, User Charts, Pilot data etc. are correctly displayed on ARCS chart.

#### ARCS chart

Chart Number :	4001
Country Of Origin:	United Kingdom
Latest NM:	No NMs
Edition Date:	1994 8 12
Publication Date:	1997 10 23
WGS shift status:	Defined
<input type="button" value="T&amp;P Notices.."/>	<input type="button" value="Details.."/>
<input type="button" value="Warnings..."/>	

WGS shift is not defined for this chart. Latitude / longitude positions of cursor, Routes, User Charts, Pilot data etc. may not be correctly displayed on ARCS chart.. You can use User WGS shift to define correct transformation from WGS84 co-ordinates to local datum of the ARCS chart.

ARCS chart

Chart Number :	4508
Country Of Origin:	United Kingdom
Latest NM:	3259/1997
Edition Date:	1991 12 6
Publication Date:	1997 10 23
WGS shift status:	Not Defined
<input type="button" value="T&amp;P Notices.."/>	<input type="button" value="Details.."/>
<input type="button" value="Warnings.."/>	

WGS shift is partially defined for this chart. Some parts or panels of this chart do not have defined WGS shift. Latitude / longitude positions of cursor, Routes, User Charts, Pilot data etc. may not be correctly displayed on ARCS chart.. You can use User WGS shift to define correct transformation from WGS84 co-ordinates to local datum of the ARCS chart for the parts or panels of this chart, which do not have defined WGS shift.

ARCS chart

Chart Number :	1358
Country Of Origin:	United Kingdom
Latest NM:	3840/1997
Edition Date:	1983 1 7
Publication Date:	1997 10 23
WGS shift status:	Partially Defined
<input type="button" value="T&amp;P Notices.."/>	<input type="button" value="Details.."/>
<input type="button" value="Warnings.."/>	



## How to view cursor position in local datum of an ARCS chart

On demand you can view the cursor position in local datum of an ARCS chart. This is useful when you need to refer to the corresponding paper chart. You can access ARCS Details from **Details** button of the Chart legend of ARCS.

In this example the used ARCS chart has WGS84 shift defined.

**Cursor Position** panel show cursor position in local ARCS chart datum (indicated as **Local Datum**) and in WGS84 datum as defined in the used ARCS chart (indicated as **WGS84 Chart**).

NOTE ! The permanent **Cursor** panel below the ARCS Details window show cursor position always in user selected working datum (see chapter "How to select Datum").

✕
**ARCS Details**

Baltic Sea Northern Sheet and Gulf of Finland

Projection...	Mercator
Orig. Scale:	750 000
Hor Datum:	Undetermined
Depth Unit:	Metres
Depth Datum:	Approx Mean Sea Level
Height Unit:	Metres
Height Datum:	Mean Sea Level

Panels: \* Baltic Sea Northern Sheet and Gulf of Finland

Locate	<input checked="" type="checkbox"/> Preference
--------	--

Notes... Miscellaneous

Plot positions on SDD WGS84 Shift...

**Cursor Position**

Local Datum	60°04'159N 029°15'443E
WGS84 Chart	60°04'159N 029°15'243E

**Cursor**

From Own Ship:	358.2 nm 112.3°
60°04.159N 029°15.243E	

In this example the used ARCS chart has WGS84 shift not defined.

**Cursor Position** panel show cursor position only in local ARCS chart datum (indicated as **Local Datum**).

NOTE ! The permanent **Cursor** panel below the ARCS Details window has warning WGS undefi to highlight that the system is unable to do a correct transformation from local ARCS chart datum to the user selected working datum (see chapter "How to select Datum").

✕
**ARCS Details**

Gulf of Finland - Eastern Part

Projection...	Mercator
Orig. Scale:	200 000
Hor Datum:	Undetermined
Depth Unit:	Metres
Depth Datum:	Approx Mean Sea Level
Height Unit:	Metres
Height Datum:	Mean Sea Level

Panels: \* Gulf of Finland - Eastern Part

Locate	<input checked="" type="checkbox"/> Preference
--------	--

Notes... Miscellaneous

Plot positions on SDD WGS84 Shift...

**Cursor Position**

Local Datum	60°03'261N 029°22'862E
Local Datum	60°03'261N 029°22'862E

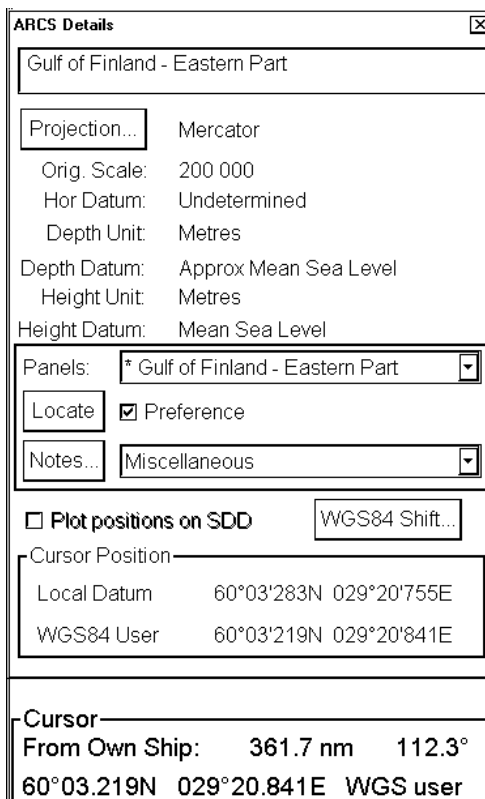
**Cursor**

From Own Ship:	362.8 nm 112.2°
60°03.261N 029°22.862E WGS undefi.	

In this example the used ARCS chart has WGS84 shift not defined.

**Cursor Position** panel show cursor position in local ARCS chart datum (indicated as **Local Datum**) and in WGS84 datum as defined by the User WGS shift (indicated as **WGS84 User**).

NOTE ! The permanent **Cursor** panel below the ARCS Details window has warning WGS undefi to highlight that the system uses user defined transformation from local ARCS chart datum to the user selected working datum (see chapter "How to select Datum").



### How to view value of WGS84 Shift

On demand you can view the value of WGS84 shift of an ARCS chart. You can access ARCS WGS84 shift from **WGS84 Shift** button of **ARCS Details** window.

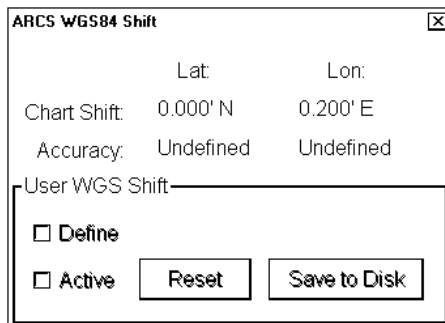
In this example the used ARCS chart has WGS84 shift defined.

#### Chart Shift:

The shifts between WGS84 datum and the local datum.

#### Accuracy:

This field contains accuracy as defined by the chart producer.



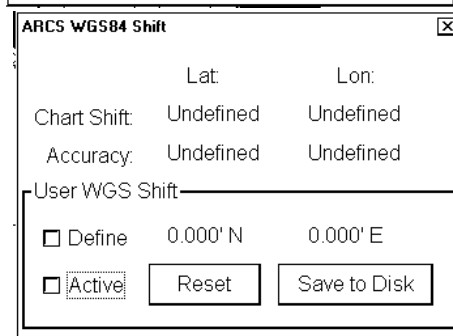
In this example the used ARCS chart has WGS84 shift not defined.

#### Chart Shift:

Undefined indicates that this ARCS chart do not have defined WGS84 shift

#### Accuracy:

This field contains accuracy as defined by the chart producer



In this example the used ARCS chart has WGS84 shift not defined.

**Chart Shift:**

Undefined indicates that this ARCS chart do not have defined WGS84 shift

**Accuracy:**

This field contains accuracy as defined by the chart producer.

**User WGS shift**

The shifts between WGS84 datum and the local datum as defined by user.

**Active**

Indicates that the user defined WGS84 shift is in use.

	Lat:	Lon:
Chart Shift:	Undefined	Undefined
Accuracy:	Undefined	Undefined
User WGS Shift		
<input type="checkbox"/> Define	0.064' N	0.086' W
<input checked="" type="checkbox"/> Active		
	<input type="button" value="Reset"/>	<input type="button" value="Save to Disk"/>

**How to define User WGS84 Shift**

You can define WGS84 shift for those ARCS charts, which do not include defined WGS84 shift. You cannot redefine WGS84 shift for any ARCS chart, which has defined WGS84 shift by the chart producer.

To define User WGS84 shift proceed as follows

1. select Define
2. press **Chart align** button and move the cursor. You can view the value of user WGS shift and when you have correct value depress the **Chart Align** button.

	Lat:	Lon:
Chart Shift:	Undefined	Undefined
Accuracy:	Undefined	Undefined
User WGS Shift		
<input checked="" type="checkbox"/> Define	0.000' N	0.000' E
<input type="checkbox"/> Active		
	<input type="button" value="Reset"/>	<input type="button" value="Save to Disk"/>

Use **Save to Disk** to save the user defined WGS84 shift for later use of the same ARCS chart.

Use **Reset** to reset the value of the user defined WGS84 shift.

Use **Active** to control use of user defined WGS84 shift.

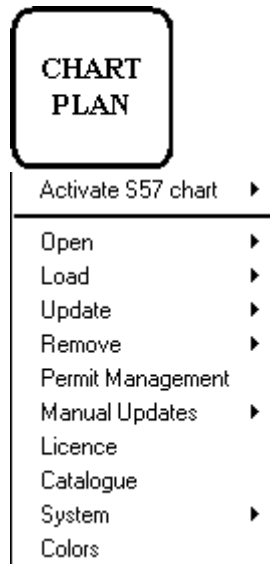
	Lat:	Lon:
Chart Shift:	Undefined	Undefined
Accuracy:	Undefined	Undefined
User WGS Shift		
<input type="checkbox"/> Define	0.064' N	0.086' W
<input checked="" type="checkbox"/> Active		
	<input type="button" value="Reset"/>	<input type="button" value="Save to Disk"/>

---

# ARCS chart managing

## Chart plan

CHART PLAN is used for managing chart database.



*CHART PLAN push button*

menu:

### **Activate S57 chart:**

The function activates S57 chart onto the display. You have two options to select chart to be opened onto display; **Ignore scale** opens S57 chart cell with scale that was used last time you use S57 charts. **Sync scale** opens S57 chart with scale that was used with ARCS charts.

### **Open:**

User can open appropriate ARCS chart on the display.

### **Load:**

User can load ARCS chart from CD-ROM to hard disk.

### **Update:**

User can update ARCS charts stored hard disk. Updates are delivered by British Admiralty in CD-ROM weekly.

### **Remove:**

User can remove charts from hard disk.

### **Permits:**

User can load from floppy disk the permit by this function.

### **Licence:**

User can view license information of using ARCS chart by this function.

### **Catalogue:**

User can manage ARCS charts. See "ARCS Catalog" on page 166.

### **System:**

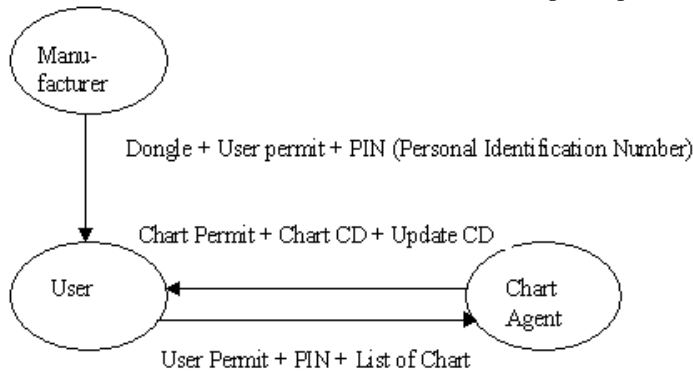
- ARCS Update Status: Displays information of ARCS Update CD which is loaded in the system.
- S52 Presentation Library; View information of used presentation library with manual updates.
- Verify system files: Compares loaded system files with files on Update CD.
- Refresh Charts after backup; Use this after backup from another ECDIS.
- Log File: User can view log file including ARCS depending functions.

### **Colors:**

This enables the user to see if the individual colours can be distinguished when viewing. See also chapter "Colour Calibration"

## ARCS licence information

Licence information, which is transferred between participants, is shown below:



If ARCS format is active, you can select ARCS Licence from the menu. There will appear Licence information dialog box into Dialog box area. This dialog box consists information about owner of licence, user permit and type of licence.

Licence Information	
Licensee:	XXXXXXXXXXXX
Vessel:	XXXXXX
Company:	ASPO Systems OY
	PO Box 11
	SF-02201
	Espoo
	Finland
Host System:	
User Permit:	XXXXXXXXXXXX
PIN:	XXXXX
Licence Type/Number:	Navigator XXXXXXX
<p>This licence is only valid if the chart permits on this system are licenced to the person or company named above. If you are not the named or do not represent the named company, you may be in breach of the licence conditions relating to the use of these charts. If in doubt please contact your nearest ARCS supplier.</p>	

*Licence information dialog box.*

## How to get started with ARCS charts

In order to get charts in the system and be displayed you have to go on a few steps:

1. Load Permit from the floppy disk by using **Permits** command. See "How to load chart permits" on page 158.
2. Load chart from ARCS RCnn CD-ROMs. To make sure how to load chart, see "How to load a new ARCS chart into the system" on page 160.
3. Load update from Weekly CD-ROM. To make sure how to update chart, see "How to update ARCS chart" on page 163.
4. Open desired chart by using **Open** command or by using **Catalogue** command.

If new update CD-ROM arrives continue from step 3.

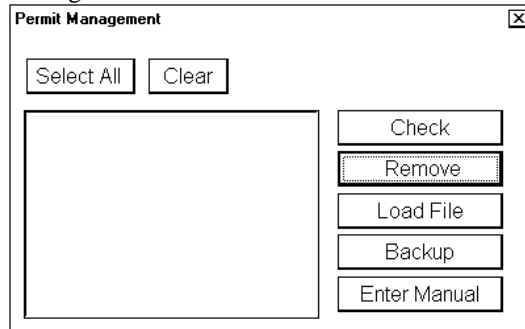
If you order more charts continue from step 1.

## How to load chart permits

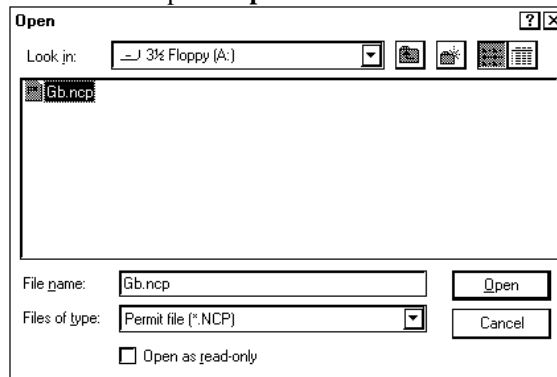
Permits are usually delivered in floppy disk. To load chart permit into the system, proceed as follows:



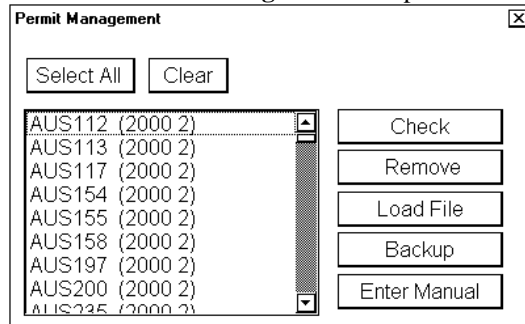
1. From the Control panel press Chart Plan push button.
2. From menu check that there is a following text in first line: **Activate S57 chart**. If it is, then go to step 4.
3. If there is text **Activate ARCS chart** choose this command.
4. Select Permits command from the menu. There will appear Permit Management Window.



5. Insert a permit floppy disk to floppy disk drive.
6. Press **Load file** button.
7. Select file and press **Open**.



8. Check in **Permit Management** that permits are displayed here



9. Close window, press CANCEL in ECDIS Control Panel

### Enter Manual button:

This function enables enter manually permit string which is delivered for example by telex. After typing the string user can accept it by pressing Add button or reject by Cancel button.

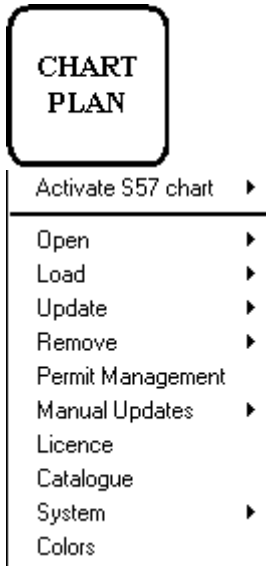
### Backup button:

This button opens "Save As" dialog. User is able to make backup copy from Chart Permit file.

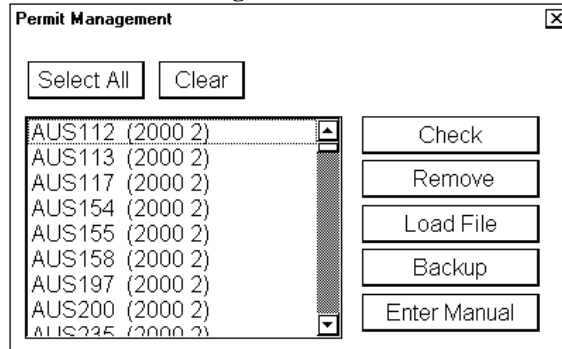
## How to remove chart permits

Normally you do not need to remove permits during normal operation. Sometimes however it may be necessary to remove chart permits from the system.

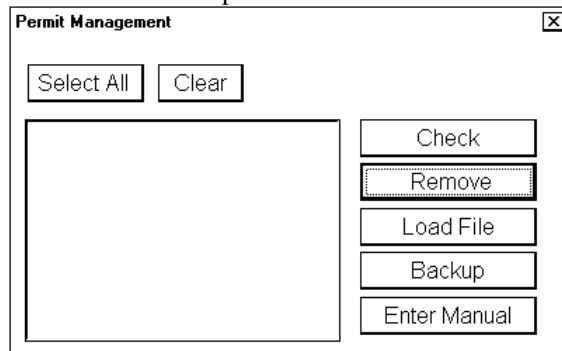
To remove chart permit, proceed as follows:



1. Select **Permit Management** command from the menu.



2. Press **Select All** button
3. Press **Remove** button.
4. Check that selected permits has been removed.



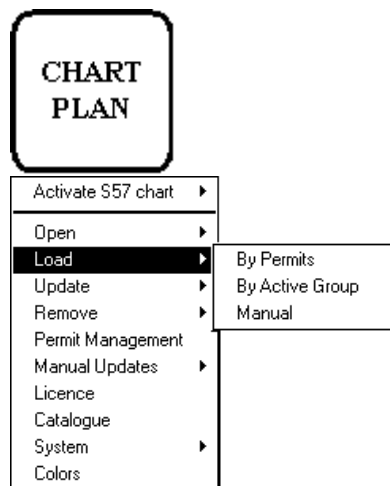
5. Close window, press CANCEL in ECDIS Control Panel

## How to load a new ARCS chart into the system

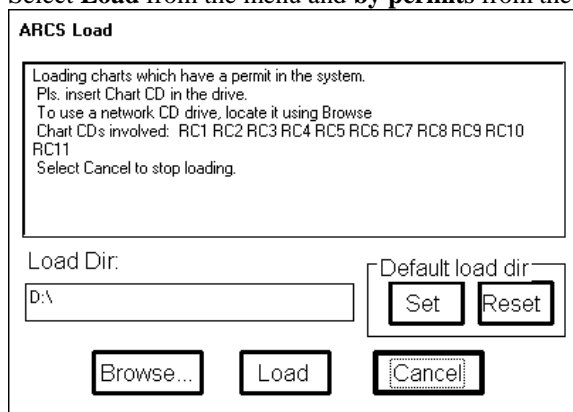
To load ARCS format raster chart into the system which ones you have a permit.

- **Load by permit.** You can load all the charts which are involved in your licence. The system will load them automatically.
- **Load by active group.** You can define a group of charts to be loaded into the system. It will be useful to define groups to make it easier to maintain your database.
- **Load manual.** You can select manually the charts, which will be loaded into the system.

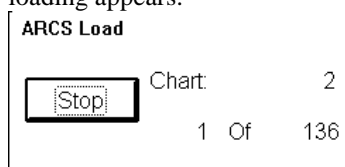
### Load by permits



1. Press CHART PLAN push button.
2. Select **Load** from the menu and **by permits** from the sub menu



3. Insert desired CD-ROM into drive and press **Load**. A progress indicator of loading appears.



This dialog box displays status of loading.

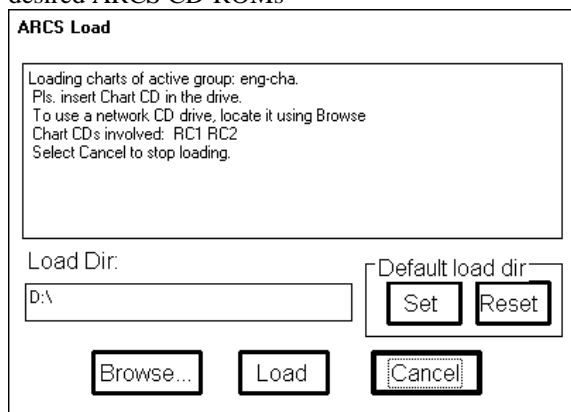
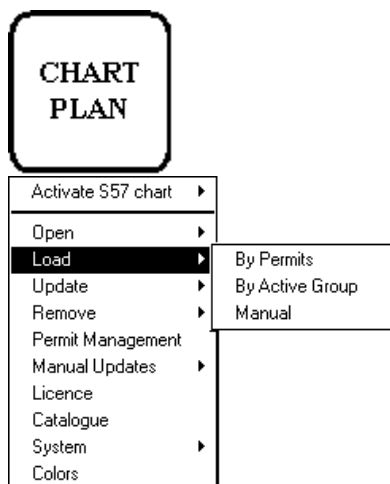
4. Repeat step 3 until you have loaded all the CD-ROMs involved your licence, after you have load all the CD-ROMs, press **Cancel** to close **ARCS Load** dialog box.



## Load by active group

Loading by active group is used when you want to load only ARCS charts which you have designed to include to defined group. This is very useful if your licence includes lot of charts all around the world and you are going to use only a part of charts to which you have permit. You just define a group from charts you need for voyage and load them into the system. To load by active group, proceed as followed:

1. Define a group, if does not exist. For more information, see chapter "Group of ARCS charts" on page 169.
2. Set group as an Active group. To set group as Active group, "How to select active group" on page 172.
3. Press CHART PLAN push button, select **Load** from the menu and **by Active group** from the sub menu.
4. An **ARCS Load** dialog box appears, which indicates active group and desired ARCS CD-ROMs

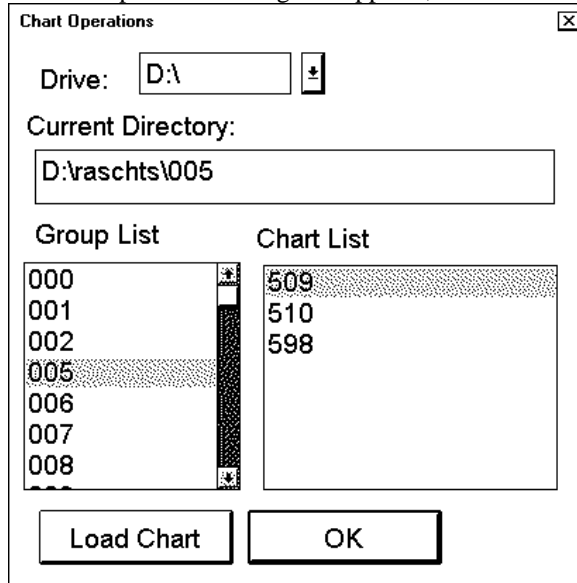
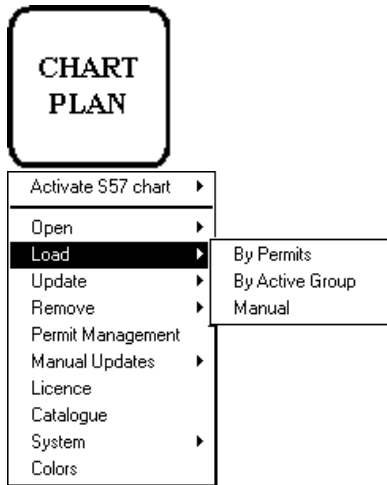


5. Insert desired CD-ROM to CD-ROM drive and press **Load**.
6. Repeat step 5 until you have loaded all the CD-ROMs involved the active group, after you have load all the CD-ROMs, press **Cancel** to close **ARCS Load** dialog box.

### Load manual

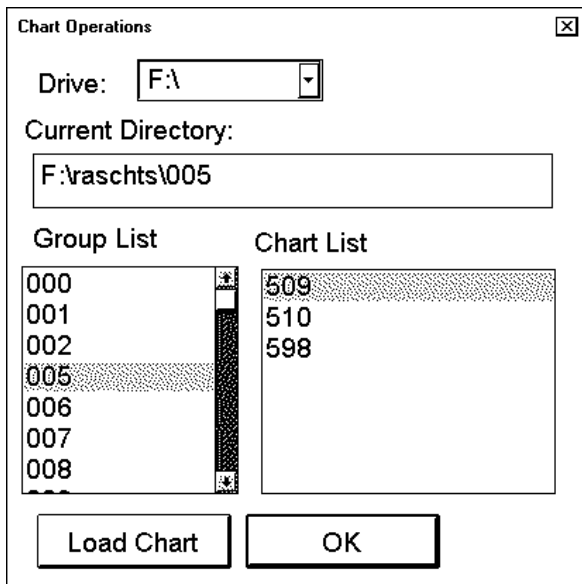
You can also load ARCS charts manual into the system, to load charts proceed as follows:

1. Insert desired ARCS CD-ROM into CD-ROM drive.
2. Press CHART PLAN push button, select **Load** from the menu and **manual** from the sub menu.
3. A Chart Operations dialog box appears, select desired chart from list box.



To load chart into the system press **Load Chart** button. To close this dialog box press **OK** button.

**Note!** If you want to use another CD-ROM drive connected in your network, use **Chart Operations** window to select another CD-ROM drive.



**D:** local CD-ROM drive.

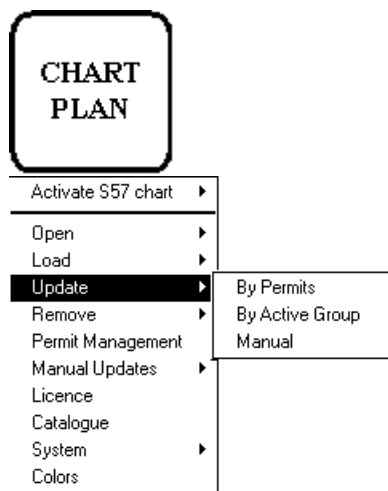
**F:** other station CD-ROM drive.

## How to update ARCS chart

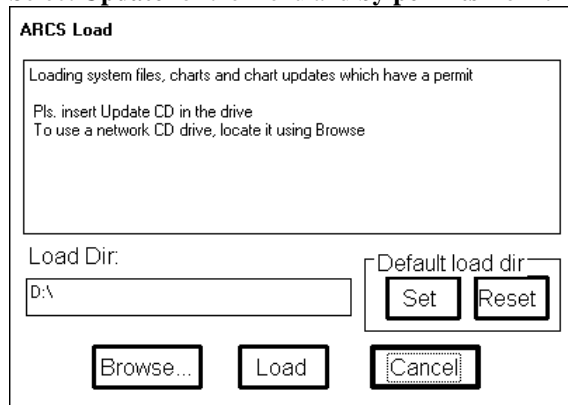
The updates are delivered separately in update CD-ROM. To update ARCS format raster chart into the system, you can use one of following procedures:

- **Update by permit.** You can update all the charts which are involved in your licence. The system will update them automatically.
- **Update by active group.** You can define a group of charts to be updated. It will be useful to define groups to make it easier to maintain your database.
- **Loading updates manual.** You can select manually the charts, which will be updated into the system.

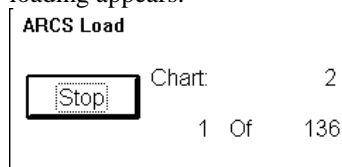
### Loading updates by permits



1. Press CHART PLAN push button.
2. Select **Update** for the menu and **by permits** from the sub menu.



3. Insert update CD-ROM to drive and press **Load**. A progress indicator of loading appears.

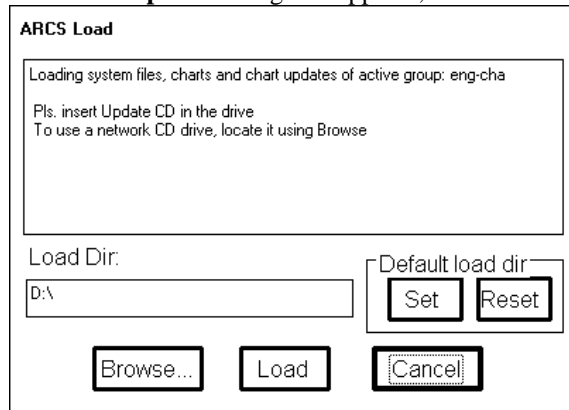
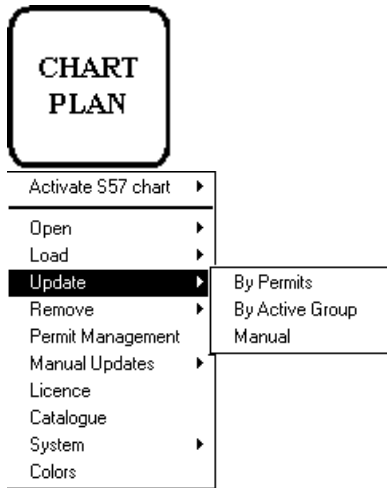


System will update automatically charts you have permit.

## Loading updates by Active group

Loading updates by active group is used when you want to update only ARCS charts which you have designed to include to defined group. This is very useful if your licence includes lot of charts all around a world and you are going to use only a part of charts to which you have permit. You just define a group from charts you need for voyage and update them into the system. To update by active group, proceed as followed:

1. Define a group, if does not exist. For more information, see chapter "Group of ARCS charts" on page 169.
2. Set group as an Active group. To set group as Active group, see "How to select active group" on page 172.
3. Press CHART PLAN push button, select **Update** from the menu and **by Active group** from the sub menu.
4. An **ARCS Update** dialog box appears, which indicates active group

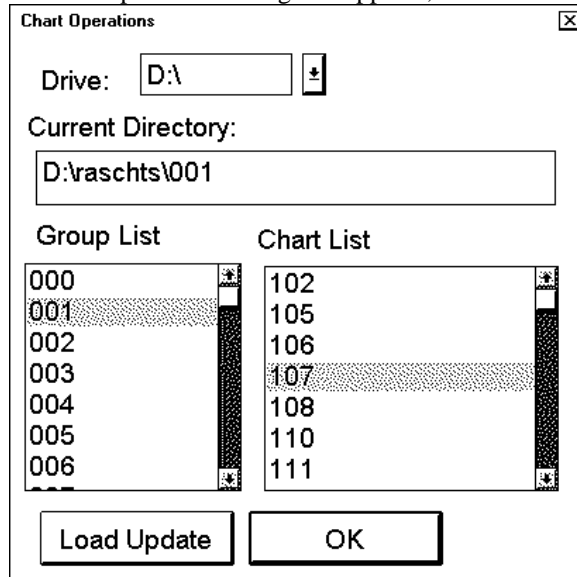
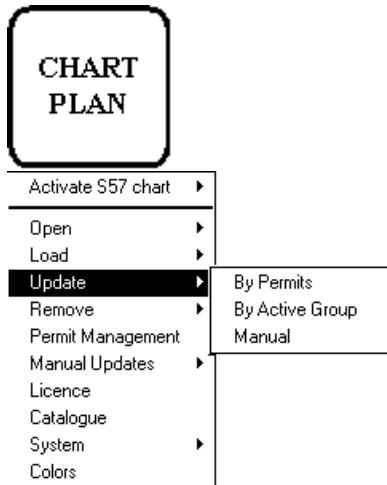


5. Insert Update CD-ROM to CD-ROM drive and press **Load**.

## Loading updates manual

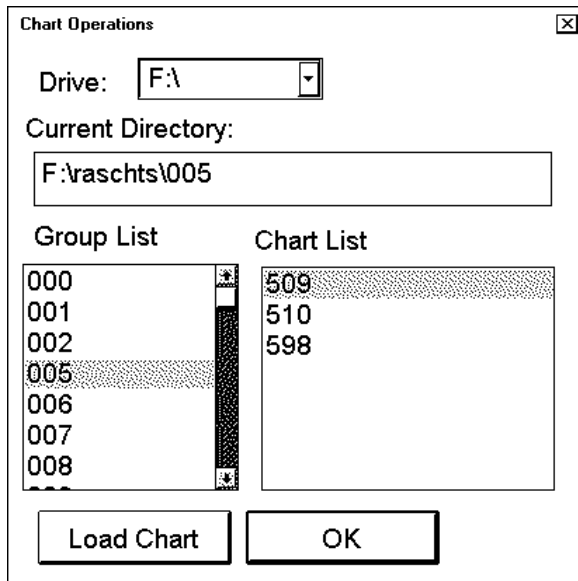
You can also load updates for ARCS charts manual. To load chart updates manual, proceed as follows:

1. Insert Update ARCS CD-ROM into CD-ROM drive.
2. Press CHART PLAN push button, select **Update** from the menu and **manual** from the sub menu.
3. A **Chart Operations** dialog box appears, select desired chart from list box.



To load updates into the system press **Load Update** button. To close this dialog box press **OK** button.

**Note!** If you want to use another CD-ROM drive connected in your network, use **Chart Operations** window to select another CD-ROM drive.



**D:** local CD-ROM drive.

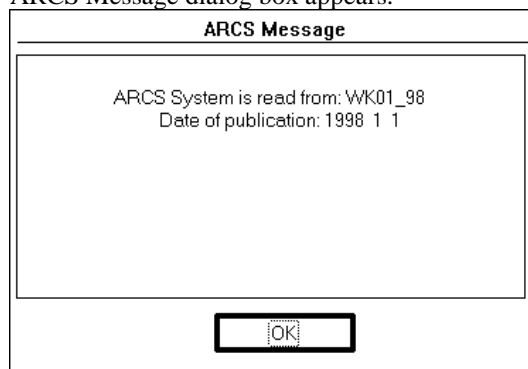
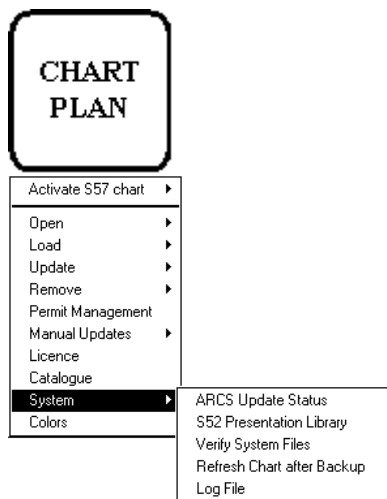
**F:** other station CD-ROM drive.

## How to view update status of your ARCS charts

You can easily check at any moment, which has been the latest Update CD introduced to your system.

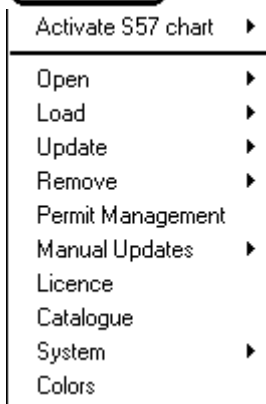
To view update status of ARCS charts, proceed as followed:

1. Press CHART PLAN push button and select **System** from the menu, select **ARCS Update Status** from the submenu
2. ARCS Message dialog box appears.

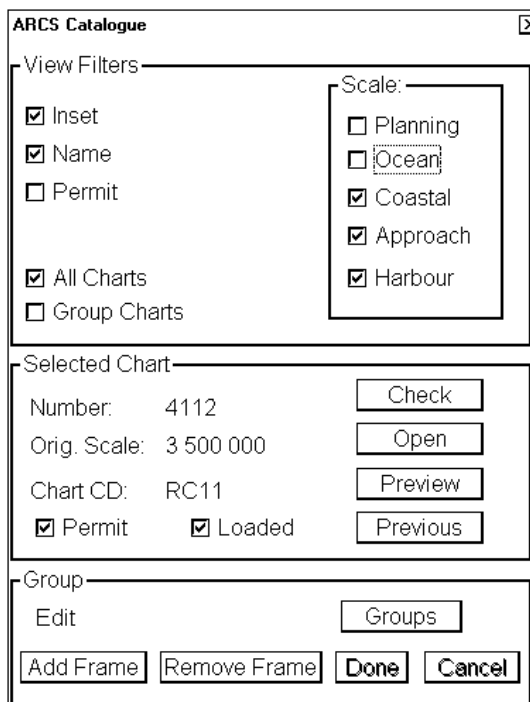


In this dialog is shown information of Latest Update CD, which is loaded into the system.





*CHART PLAN push button and ARCS Catalogue command*



**The list of colours:**

**Green:** chart is loaded to the ECDIS and user has permit for this chart.

**Magenta:** chart is **not** loaded to hard disk but user has permit for this chart. In order to load chart to hard disk, see "How to load a new ARCS chart into the system" on page 160.

**Red:** chart is **not** loaded to hard disk and user has **not** permit for this chart. In order to load permit to hard disk, see "How to load chart permits" on page 158 and to load chart, see "How to load a new ARCS chart into the system" on page 160.

After you have clicked the border of chart you get information of chart in **Selected Chart** field as follows:

- **Number;** Chart number as stated on the face of the paper chart.
- **Orig. Scale;** Scale of original paper chart.
- **Chart CD;** The number of area CD in which selected chart is stored.
- **Permit;** if selected there is permit in ECDIS.
- **Loaded;** if selected chart is loaded into ECDIS.

There are also a few buttons in this dialog. **Check** button is used to check selected chart if edition and updates of chart are valid.

**Preview** button is used to view selected chart as low resolution image. See an example below:

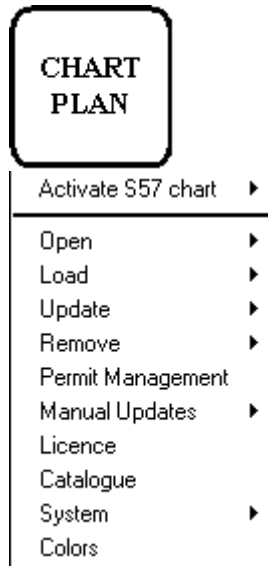




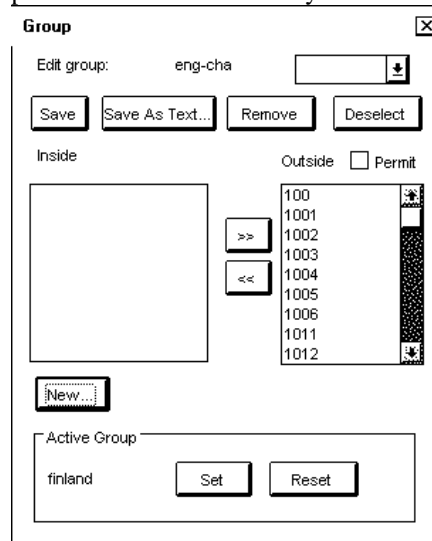
## Group of ARCS charts

### How to create a group

To create user defined group, proceed as follows:

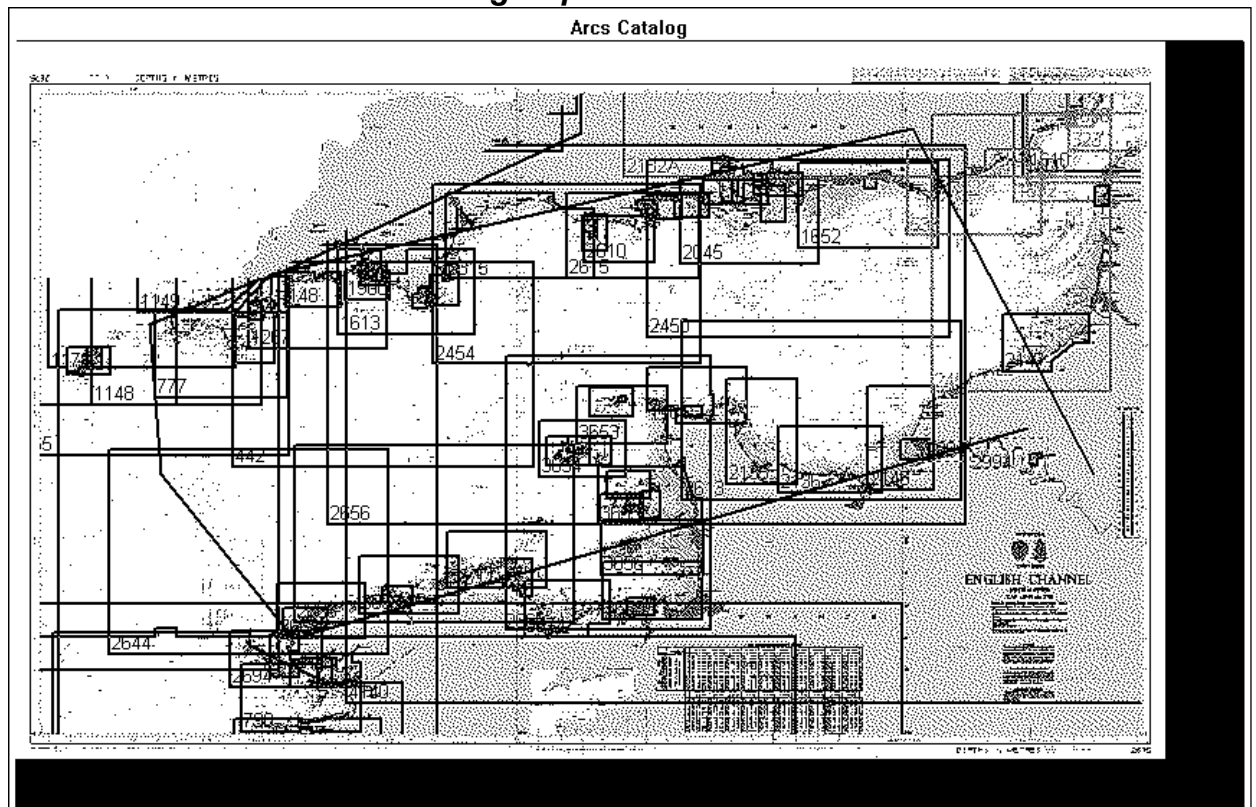


1. Press CHART PLAN push button.
2. Select **Catalogue** from the menu. ARCS Catalog dialog box appears.
3. Press **Groups** button in group -field. A Chart Group dialog box appears.
4. Press **New** button, define a name for new chart group using "type writer", press **OK** button when ready.

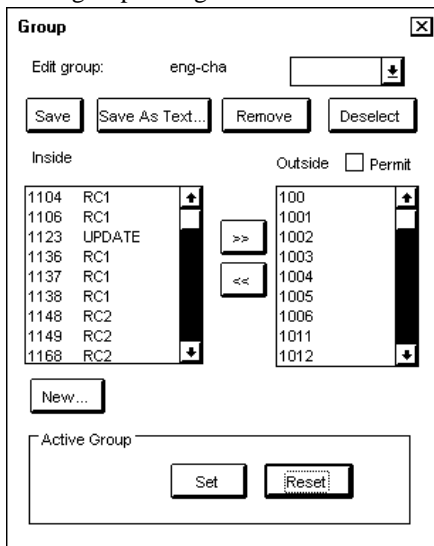


Entered group name appears to **Edit group** -field (eng-cha). Now you can define chart cells which are included this group.

### How to add ARCS charts into a group



After you have entered name for group, press **Add frame...** button in ARCS Catalog dialog box, you can make a frame in ARCS Catalog window moving cursor desired location and pressing **SELECT** push button. Charts that are inside a frame or intersect a frame limit are added into the group. When your frame is ready press **Done** button in ARCS Catalog dialog box. Chart cells which are selected into defined group are displayed in **Inside** list box in Chart group dialog box.

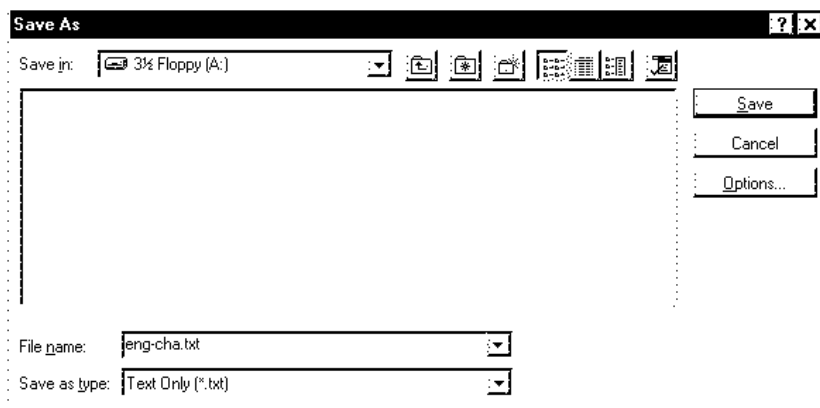


You can also add charts to your group by using << (add) button. To add a chart, select (highlight) chart ID in **Outside** list box and then press << button.

**Note!** If you select **Permit** check box, the system will display only chart cells you have permits.

When you are satisfied with selection you have done, press **Save** button to save defined group.

You can save your chart cells also into text file, if you like to have a list of chart cells in text format. To do this press **Save As Text...** button. A “Save As” dialog box appears.



Select directory and drive to where you want save your group. You can use Windows NotePad application to view and to make hard copy from the list of group.

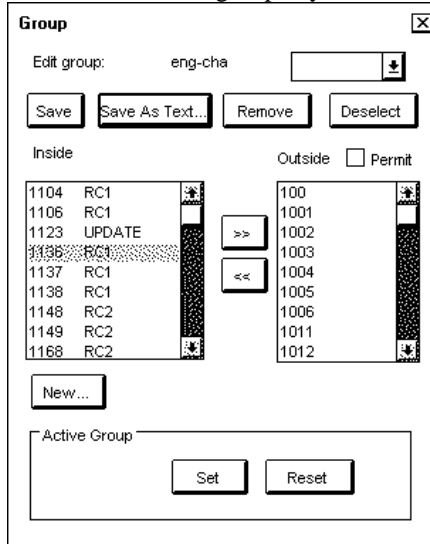
### ***How to remove ARCS charts from a group***

You can remove charts from a defined group. To remove proceed as followed:

# CHART PLAN

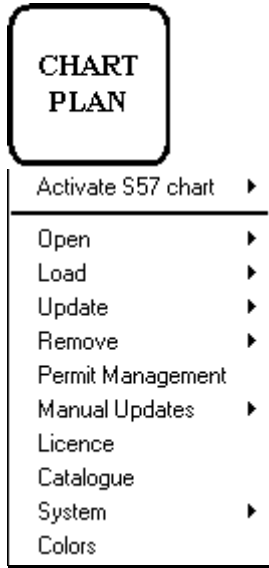
- Activate S57 chart ▶
- Open ▶
- Load ▶
- Update ▶
- Remove ▶
- Permit Management
- Manual Updates ▶
- Licence
- Catalogue
- System ▶
- Colors

1. Press CHART PLAN push button. Select **Catalogue** from the menu.
2. Press **Groups** button in ARCS Catalog dialog box. A Chart group dialog box appears.
3. Select desired group from **Edit group** list box.
4. Select desired chart(s) from Inside list box.
5. Press >> button. Selected chart is removed to Outside list box and it is not member of defined group anymore.

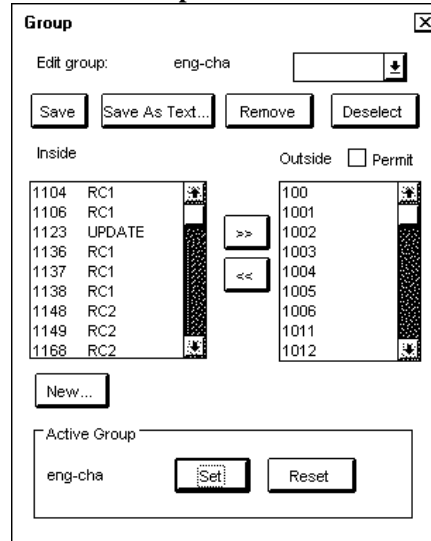


### How to select active group

You can select a group as an active group. To select, proceed as followed:



1. Press CHART PLAN push button. Select **Catalogue** from the menu.
2. Press **Groups...** button in an ARCS Catalog dialog box. A Chart group dialog box appears.
3. Select desired group from **Edit group** list box.
4. In **Active Group** -field press **Set** button. The name of active group appears to **Active Group** -field.



### How to delete a group

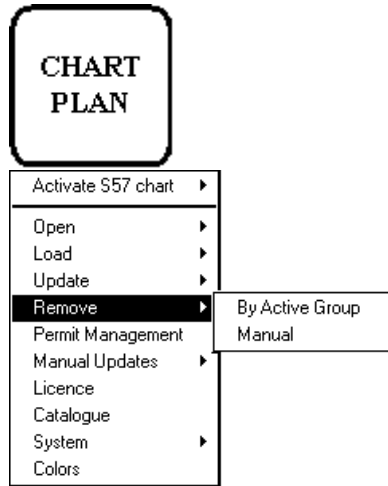
You can remove a defined group from a hard disk. To remove proceed as followed:

1. Press CHART PLAN push button. Select **Catalogue** from the menu.
2. Press **Groups** button in an ARCS Catalog dialog box. A Chart group dialog box appears.
3. Select desired group from **Edit group** list box.
4. Press **Remove** button. Confirm deleting a group, press **OK**.

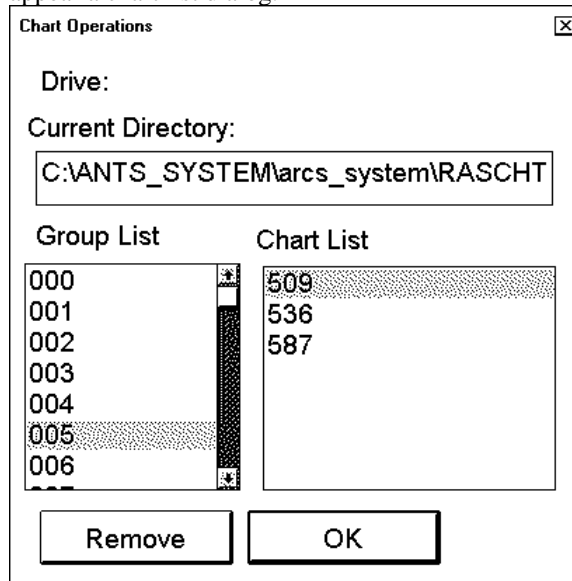
## How to remove ARCS chart from the system

You can remove ARCS charts from the system either **Manual** or **by Active group**.

### Manual remove of charts

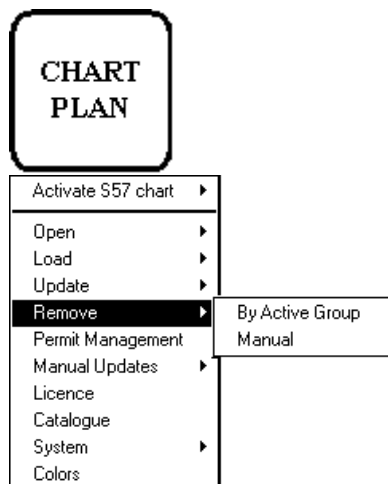


1. From the Control panel press CHART PLAN pushbutton.
2. From menu check that there is a following text in first line: **Activate S57 chart**. If it is, then go to step 4.
3. If there is text **Activate ARCS chart** choose this command.
4. Select **Remove** from the menu and **manual** from the sub menu. There will appear a chart list dialog.

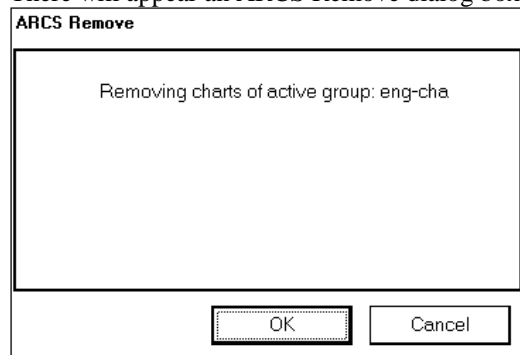


5. Select desired charts to remove them from the system.
6. Press **OK** button. System will remove charts from the hard disk.

### Remove charts using Active group



1. From the Control panel press CHART PLAN pushbutton.
2. From menu check that there is a following text in first line: **Activate S57 chart**. If it is, then go to step 4.
3. If there is text **Activate ARCS chart** choose this command.
4. Select **Remove** from the menu and **by Active Group** from the sub menu. There will appear an ARCS Remove dialog box.



Press **OK** button, the system will remove ARCS charts from hard disk which are involved in Active group.

---

## ARCS chart display

### How to select ARCS chart material on display

To select ARCS format raster chart material onto the display proceed as follows:

1. From Control Panel press **Chart Plan** pushbutton.
2. From menu check that there is a following text in first line: **Activate S57 chart**. If it is, then go to step 4.
3. If there is text **Activate ARCS chart** choose this command and select **Ignore** or **Sync Scale** from the sub menu.
4. You have now selected ARCS charts on display.

### How to select used Datum

Datum is used to select between different models of the earth. It is essential that you use Datum in a consistent way.

If you use paper charts together with electronic chart material, it is recommended that you use the same Datum as your current paper chart to avoid misalignment between your electronic system and points taken or plotted on your current paper chart.

Once you have selected a datum, all numerical latitude-longitude position values are presented in your selected datum.

**Note:** If you use ARCS raster chart material the rasterized charts contain some rasterized position information. These positions like scales in the edges of ARCS charts are true only if you have selected native datum of that ARCS chart. Normally this is the natural situation, because you use ARCS together with equal official paper chart and because you have selected as datum the datum of your equal official paper chart.

To find out native datum of ARCS chart, proceed as follows:

#### ARCS chart

Chart Number :	4114
Country Of Origin:	United Kingdom
Latest NM:	No NMs
Edition Date:	1996 11 22
Publication Date:	1997 7 17
WGS shift status:	Defined
<input type="button" value="T&amp;P Notices.."/>	<input type="button" value="Details..."/>
<input type="button" value="Warnings..."/>	

1. Press **Details...** button in Chart legend dialog box.

2. ARCS details dialog box appears. In **Hor Datum** field is indicated native datum of displayed ARCS chart. See Figure below.

**INITIAL  
SETTING**

To select datum which is used by the system, proceed as follows:

1. Press **Initial setting** push button.
2. Select desired datum from a list box of **Datum**.
3. Selected datum is shown on the Upper information area.

<b>59°52.426N<sub>GYR</sub> 210.8°</b>	
<b>024°51.455E<sub>CMG</sub> 210.8°</b>	
WGS 84	<b>SMG 17.2Kt</b>
DGPS	
Plan Speed 20.0Kt	Next WP 3
Plan CTS 207°	Dist WOP 0.40 nm
Route CTS 209°	ETA WOP
Ch limit 185 m	05 Mar 97 09:09
Off track <59 m	Next CTS 245°
Route: goto wp	Turn rad 1.0 nm
	Turn rate 16°/min

Selected datum is shown on Upper information area (in this case WGS 84).

## How to view different charts

### Select a chart from catalogue

To select ARCS format raster chart onto the display by using **ARCS catalogue**, proceed as follows:

1. From Control Panel press Chart Plan pushbutton.
2. Select **Catalogue** command from the menu.
3. From the catalogue window activate desired chart to open. For more information, see "ARCS Catalog" on page 166.
4. Press button **Open**.

### Browsing around your charts

Viewing ARCS charts from different places and using different scales is very easy. Basic tools to go around are push buttons **ZOOM IN**, **ZOOM OUT**, **SET CHART CENTER**, **SHIP OFF CENTER** and **TM/CU RESET**.

You can use **SET CHART CENTER** to look ahead any other place than your own ship position. Pressing it automatically deactivates true motion reset function. When true motion reset is deactivated you have on upper right hand part of the display either indication **Ship out of dsp** or **TM RESET OFF** depending of the view.

You can enter numerical values for center of chart to display. Press **DISPLAY MODE** push button and select **Center...** from the menu, a Chart Center dialog box appears:

Display mode ▶  
Orientation ▶  
Set Center

Chart Center

Lat: 60°13.686N Lon: 024°57.897E

-- - + ++ -- - + ++

Set Center

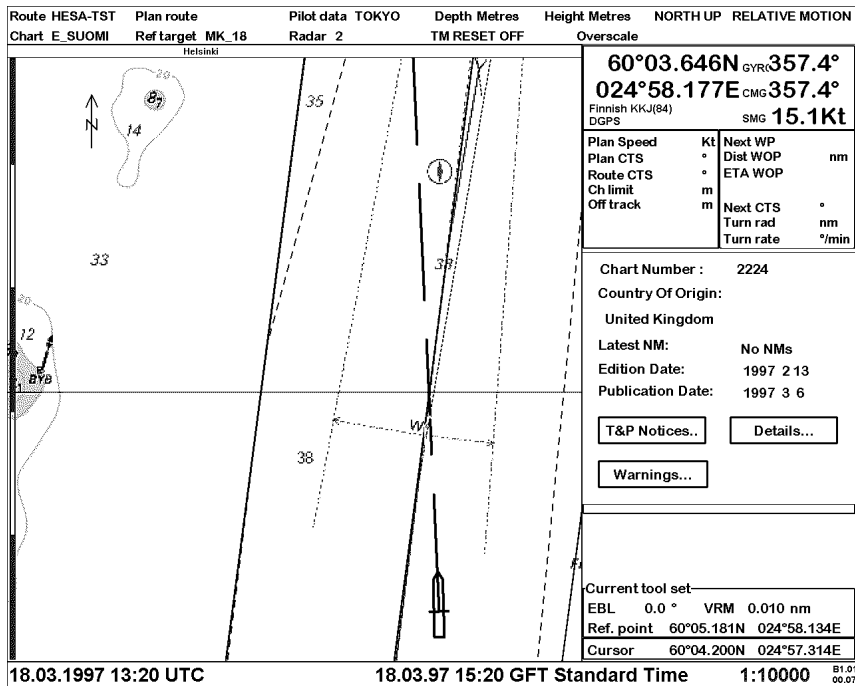
Enter desired values for center of chart to be displayed.

If you want immediately back to your own ship position, push **TM/CU RESET**.

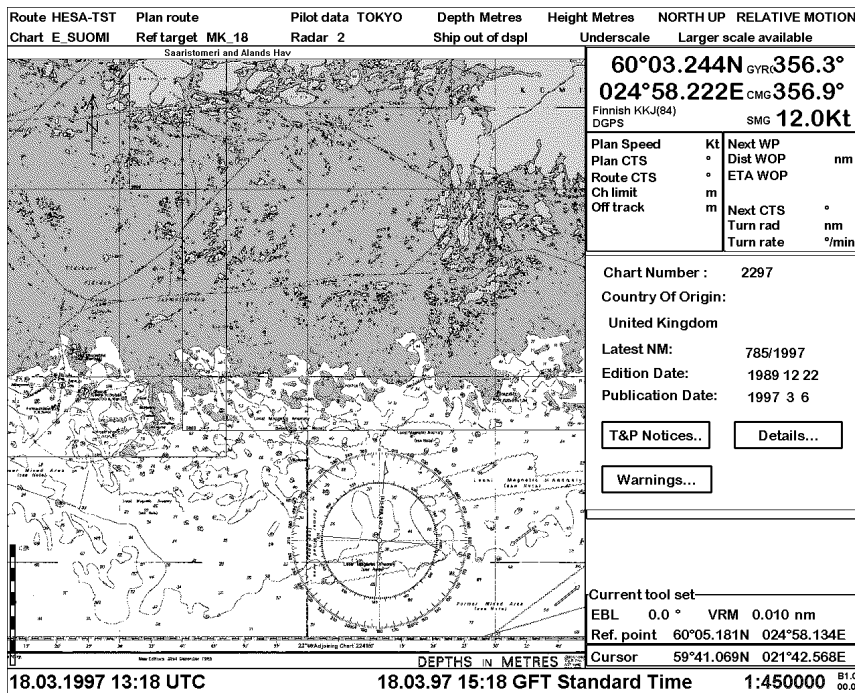
**ZOOM IN** and **ZOOM OUT** are used to change scale of chart. ARCS system allows 2\* overscaling and ½\* underscaling. The system has a logical way to automatically select next larger or smaller scale chart automatically. The system has an indication of **Larger scale available**, if there is larger scale chart available at your current viewing position. If the system uses natural scale of an ARCS chart, the scale indication is in black color like **1:100000**. If the system uses underscale or overscale image of an ARCS chart, the scale indication is in red colour like **1:20000**. The system has also indication **UNDERSCALE** or **OVERSCALE**.

The system has indication of **Same scale available**, if you have a chart with the same scale and overlapping with displayed ARCS chart. When you are reaching to edge of chart and you have indication **Same scale available** you can switch an other chart with the same scale to the display by pressing **SELECT NEXT** push button from the Control Panel. An overlapping chart with same scale will be opened.





This is possible view of ECDIS screen, note also upper status bar indications.



This is possible view of ECDIS screen, note also upper status bar indications.

### Look charts around your own ship

You can use either **TRUE MOTION** or **RELATIVE** motion. Refer to **DISPLAY MODE** chapter. In True motion your own ship moves until it reaches the true motion reset borderline. Then it will jump back to opposite position on screen based on its course. In relative motion your own ship stays in a fixed position while the chart under it moves on screen.

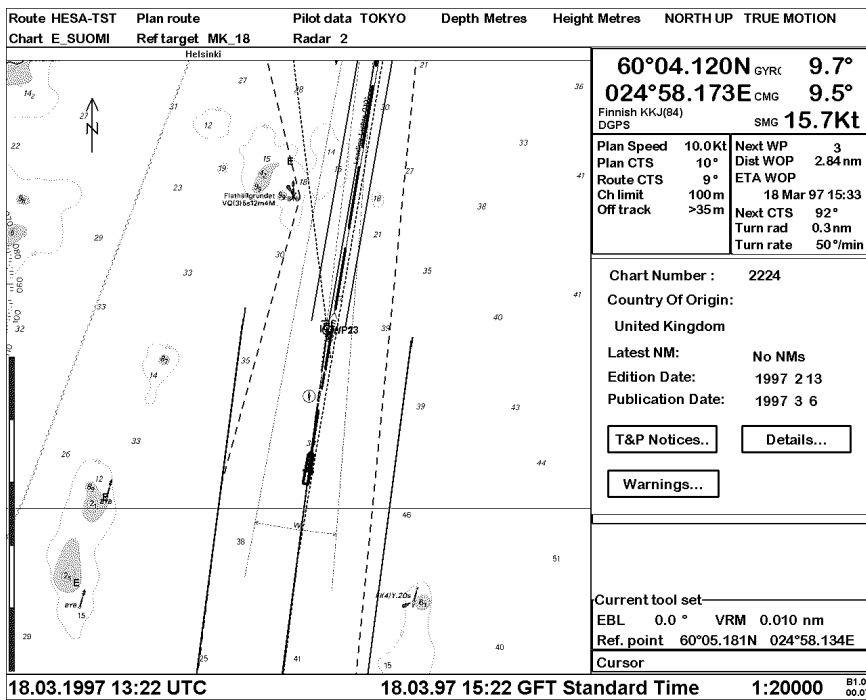
If you use true motion and you press **TM/CU RESET**, your ship will immediately jump to true motion reset position.

If you use true motion and you press **SHIP OFF CENTER**, your ship will go to that position on screen and continue true motion movement from that position. When it reaches true motion reset borderline it will automatically jump to true motion reset position.

If you use relative motion and you press **TM/CU RESET**, your ship will immediately jump to true motion reset position and use that position as fixed position to stay on screen.

If you use relative motion, you can select a new fixed position to your ship by pressing **SHIP OFF CENTER** push button.

Use **ZOOM IN** and **ZOOM OUT** push buttons to select desired scale of the chart.

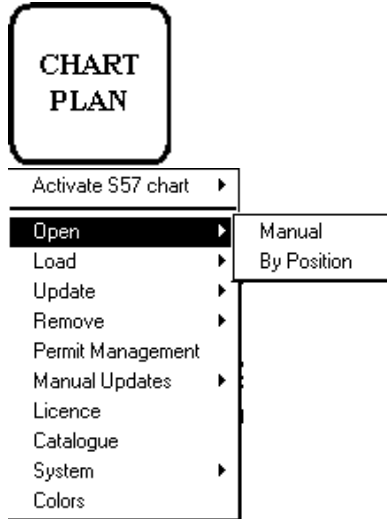


This is possible view of ECDIS screen, note also upper status bar indications and no TM RESET OFF.

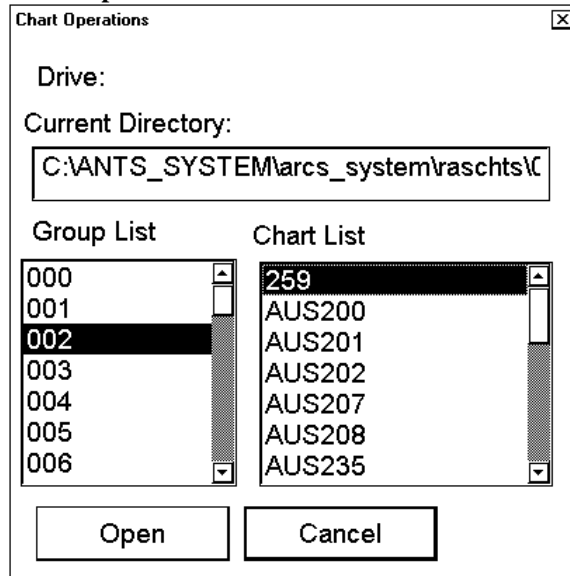
## How to select an ARCS chart by its number on display

### Open ARCS chart manual

To select a specific ARCS format raster chart onto the display use **Open** menu command. Proceed as follows:



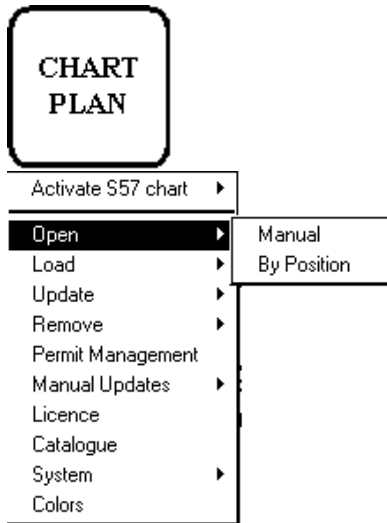
1. From Control Panel press CHART PLAN push button.
2. From menu check that there is a following text in first line: **Activate S57 chart**. If it is, then go to step 4.
3. If there is text **Activate ARCS chart** choose this command.
4. Select **Open** from the menu and **manual** from sub menu



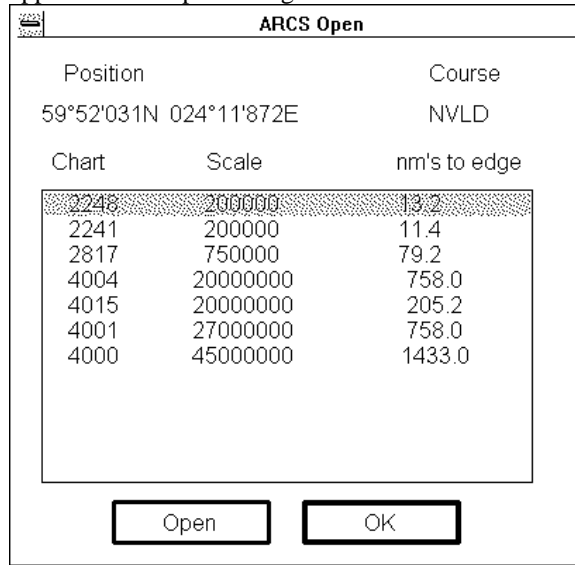
5. Choose desired chart from chart list dialog and press **Open**.
6. When you select a chart it will be displayed automatically in the Electronic chart area.

### Open ARCS chart by position

To open an ARCS chart by position of own ship or by chart center, if your display is in TM RESET OFF status, use **Open by position** command. Then you get a list of charts which cover current position. To open chart by position, proceed as followed:



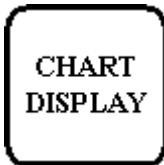
1. From Control Panel press CHART PLAN push button.
2. From menu check that there is a following text in first line: **Activate S57 chart**. If it is, then go to step 4.
3. If there is text **Activate ARCS chart** choose this command.
4. Select **Open** from the menu and **by Position** from sub menu. There will appear ARCS Open dialog box



Select desired chart from a list box and press **Open**.

## Control of visible chart features

When you press **CHART DISPLAY** pushbutton, you get Chart details window, which have several sheets to control visible chart features.



*CHART DISPLAY push button. Dialog box which appears after pressing chart display push button.*

Chart display - ALL-OFF *			
ARCS details	Tracking	Mariner	Route
Chart	Standard	Other	
Echo alarm	<input type="text" value="0"/>	m	
Shallow contour	<input type="text" value="5"/>	m	
Safety depth	<input type="text" value="8"/>	m	
Safety contour	<input type="text" value="10"/>	m	
Deep contour	<input type="text" value="20"/>	m	
Speed Vectors	<input type="text" value="12"/> min	<input type="text" value="TRUE"/>	
TM reset margin	<input type="text" value="80"/>	%	
Scale	<input type="text" value="1:10000"/>		
Palette	<input type="text" value="DAY BRIGHT"/>		
Symbols	<input type="text" value="SIMPLIFIED"/>		
Depths	<input type="text" value="TWO COLOUR"/>		
Boundaries	<input type="text" value="PLAIN"/>		
Light sectors	<input type="text" value="LIMITED"/>		
Shallow pattern	<input type="text" value="NONE"/>		
Update highlight	<input type="text" value="DETAILED"/>		

### Echo alarm depth:

User can set alarm limit for echosounder. If depth of water below transducer of the Echosounder is below the limit, an alarm will be generated.

### Speed Vectors:

User can set vector time and presentation type for speed vectors displayed on ECDIS screen. Selected presentation type for speed vectors is indicated Upper right hand corner of ECDIS screen.

True Vectors = TrueVect

Relative Vectors = RelVect

North Up	TM	TrueVect
en		

### TM reset margin:

In True motion your own ship moves until it reaches the true motion reset borderline. Then it will jump back to opposite position on screen based on its course. User can set the limit for TM reset.

### Scale:

This function determines the displayed scale of the electronic chart.

### Palette:

Enable user to choose appropriate palette for display depending on brightness of the bridge.

**Note!** Selections of Shallow contour, Safety depth, Safety contour, Deep Contour, Symbols, Depths, Boundaries, Light sectors, Shallow pattern and Update highlight in Chart sheet are used to control only visibility of manual updates **not** ARCS charts. Also STANDARD and OTHER sheets are used to control only visibility of manual updates of the charts **not** ARCS charts.

### Shallow contour: (valid only for manual updates - not for ARCS)

User can set value of shallow water contour.

### Safety depth: (valid only for manual updates- not for ARCS)

User can set the value of safety depth. Spot soundings below the Safety depth are displayed as highlighted.

**Safety contour: (valid only for manual updates- not for ARCS)**

User can set value of safety contour. Visible safety contour is equal to set value or if the contour of set value is not available then the visible safety contour is next deeper contour than safety contour,.

**Note**, the system uses Safety contour also for Chart Alarms.

**Deep contour: (valid only for manual updates- not for ARCS)**

User can set deep water contour.

**Symbols: (valid only for manual updates- not for ARCS)**

Enable user to choose how to display symbols of the chart. The options are:

- **Simplified**, the shape of symbols is of modern design and the sea mark symbols use colour fill
- **Paper Chart**, the shape of symbols imitates traditional symbols used in paper charts

**Depth: (valid only for manual updates- not for ARCS)**

User can set how to display different depth zones on the chart display. If user selects multicolour, the chart display uses 4 different colours:

- deeper than user-selected deep contour
- between deep contour and user-selected safety contour
- between safety contour and user-selected shallow water contour
- between shallow water contour and coastline.

If user selects two colours, the chart display uses only two colours:

- deeper than safety contour
- shallower than safety contour

**Boundaries: (valid only for manual updates- not for ARCS)**

User can set how to display boundaries of some chart features. The options are:

- **Plain**, the used line styles are limited to plain solid and dashed lines.
- **Symbolized**, some of the used line styles use symbols to highlight the purpose of a line

**Light sector: (valid only for manual updates- not for ARCS)**

User can set how to display light sectors. The options are:

- **Limited**, the length of light sector is fixed at 25 mm independently of the displayed scale.
- **Full**, the length of light sector represent its nominal range as defined by the chart producer.

**Shallow pattern: (valid only for manual updates- not for ARCS)**

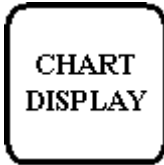
User can set how to display shallow water area. The options are:

- **None**
- **Diamond**, is provided to distinguish shallow water at night

**Update Highlight: (valid only for manual updates- not for ARCS)**

User can set how the updates are highlighted on the screen before they are approved by the user. The options are

- **Detailed**, system try to highlight updates so that only those objects, which has visible changes, are highlighted. Use this option to see the practical change of an update.
- **All effects**, system highlights updates so that all the objects, which has something to do with updates, are highlighted although some of them has not been changed from practical point of view.



Press **CHART DISPLAY** button to open Chart details dialog box. Standard display includes chart features shown here. The system will show these chart features, when button **STANDARD DISPLAY** is pressed.

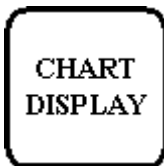
**“STANDARD”-sheet**

Sheet STANDARD contains chart features as defined by IMO to form so called Standard Display. You can recall at any time the Standard Display by single operator action (by pressing **STANDARD DISPLAY** push button from Control Panel)

**STANDARD** sheet control only visibility of manual updates of the charts **not** ARCS charts.

Chart display - ALL-ON \*

ARCS details	Tracking	Mariner	Route
Chart	Standard	Other	
<input checked="" type="checkbox"/> Unknown object or presentation <input checked="" type="checkbox"/> Chart data coverage <input checked="" type="checkbox"/> Land features <input checked="" type="checkbox"/> Water and seabed features <input checked="" type="checkbox"/> Traffic routes <input type="checkbox"/> Cautionary areas <input checked="" type="checkbox"/> Information areas <input checked="" type="checkbox"/> Buoys and beacons <input checked="" type="checkbox"/> Lights <input checked="" type="checkbox"/> Fog signals <input checked="" type="checkbox"/> Radar <input checked="" type="checkbox"/> Services			



Other includes chart features shown here. The system will not show these features, when button **STANDARD DISPLAY** is pressed.

**“Other”-sheet**

Sheet OTHER contains chart features, for which you can control visibility and which are not part of IMO defined Standard Display.

**OTHER** sheet control only visibility of manual updates of the charts **not** ARCS charts.

Chart display - ALL-OFF \*

ARCS details	Tracking	Mariner	Route
Chart	Standard	Other	
<input type="checkbox"/> Information about chart data <input checked="" type="checkbox"/> Land features <input checked="" type="checkbox"/> Soundings <input type="checkbox"/> Depth contours, Currents, Magnetics <input type="checkbox"/> Seabed and Obstructions <input type="checkbox"/> Services and Small craft facilities <input type="checkbox"/> Special areas  <input checked="" type="checkbox"/> Additional information available  Important Text <input checked="" type="checkbox"/> Clearances, Bearings, Radio channels  Other Text <input checked="" type="checkbox"/> Names for position reporting <input checked="" type="checkbox"/> Light descriptions <input type="checkbox"/> Nature of Seabed <input type="checkbox"/> Geographic names, etc. <input type="checkbox"/> Swept depths, Magnetics <input type="checkbox"/> Berth and Anchorage numbers <input type="checkbox"/> National language, Land elevation			

**Note!** If you want to use Info request by cursor pick for manual updates you have to select desired chart features to be displayed from this sheet.

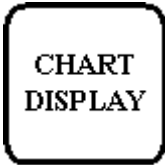


CHART DISPLAY  
push button

"ARCS details"-sheet

ARCS details dialog box appear when user press CHART DISPLAY push button. If you have this dialog box already open, you can change sheet **Select Next** push button.

Chart display - ALL-ON \*

Chart	Standard	Other	
ARCS details	Tracking	Mariner	Route
<input type="checkbox"/> View original <input type="checkbox"/> Mark updates			

**View original**, if selected displayed chart is shown without updates.

**Mark updates**, if selected updated parts of chart are surrounded by red rectangular.

Figures below show how you can find places with updates on a chart.

The ARCS chart that is displayed as for normal use.

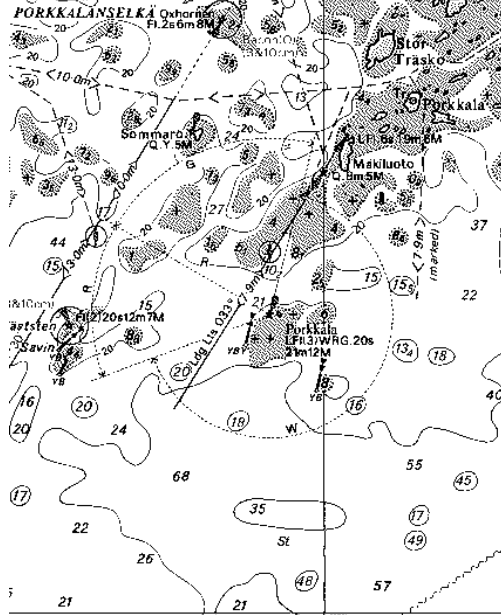


Chart display - ALL-ON \*

Chart	Standard	Other	
ARCS details	Tracking	Mariner	Route
<input type="checkbox"/> View original <input type="checkbox"/> Mark updates			

The ARCS chart that is displayed as original edition and places that cover updates are marked with red rectangular.

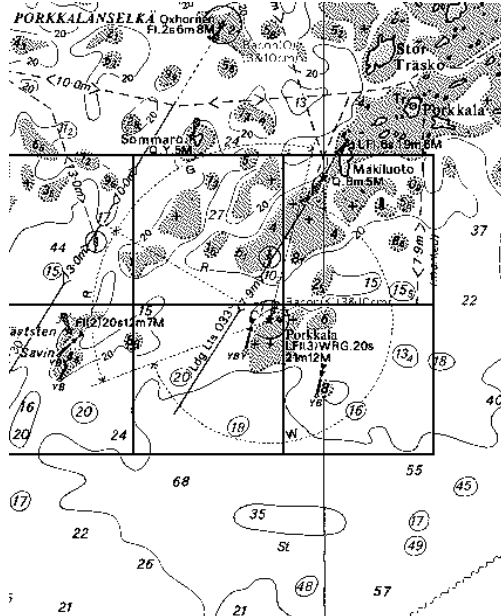


Chart display - ALL-ON \*

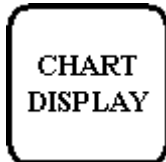
Chart	Standard	Other	
ARCS details	Tracking	Mariner	Route
<input checked="" type="checkbox"/> View original <input checked="" type="checkbox"/> Mark updates			



## Control of visible navigation features

Visibility control of the navigation features is divided into three sheets. Sheet Route controls Planned and monitored route. Sheet Tracking control past tracks and some other features. Sheet Mariner control Pilot data, User charts and Chart alarms. Press CHART DISPLAY button to open Chart details window. Use SELECT NEXT to open desired sheet in Chart details window.

User can define settings for chart details which are displayed over ARCS charts. This means that user can select different layers to be **Off**, **Std** or **Other**. Selection of **Off** is self explanatory. Selection of **Std** is set as visible, if the STANDARD DISPLAY button is pressed. Selection of **Other** is set as invisible, if the STANDARD DISPLAY button is pressed



*Monitored and planned routes are non-chart information. All the selected items are shown on top of chart data*

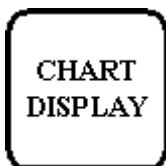
### "ROUTE" sheet

Sheet ROUTE contain selection of route related navigation features

Chart display - ALL-ON *			
Chart	Standard	Other	
ARCS details	Tracking	Mariner	Route
Monitored route			
Off	Std	Other	
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/> Center line	
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/> Channel borders	
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/> WP - mark	
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/> Leg mark	
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/> Wheel over line	
Planned route			
Off	Std	Other	
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/> Center line	
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/> Channel borders	
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/> WP - mark	
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/> Leg mark	

**Monitored route**, user can select which part of monitored route is displayed.

**Planned route**, user can select which part of planned route is displayed.



“Tracking” sheet

*Past tracks,  
Predictor ship,  
Events & Positions,  
ARPA targets,  
Reference targets  
and Radaroverlay  
are non-chart  
information. All the  
selected items are  
shown on top of  
chart data.*

Chart display - ALL-OFF \*

Chart	Standard	Other
ARCS details	Tracking	Mariner
	Route	

Past tracks

Off Std Other

Ship System

Ship Primary

Ship Secondary

Length  min Labels  min

Off Std Other

ARPA targets

Length  min Labels  min

Off Std Other

Predictor ship (30 sec)

Events and Positions

ARPA targets

Radar Overlay

Ship true symbol scale limit

**Past Tracks**

- **Ship Primary**, if selected as **Std** or **Other**, own ship past track is displayed based on the primary position sensor
- **Ship Secondary**, if selected as **Std** or **Other**, own ship past track is displayed based on the secondary position sensor.
- **ARPA targets**, if selected as **Std** or **Other**, ARPA target past tracks are displayed.

**Predictor ship**, if selected as **Std** or **Other**, predicted own ship position is displayed.

**Note: The Predictor** is visible only, if the own ship true scale symbol is also displayed.

**Events and Positions**, if selected as **Std** or **Other**, Events and Positions are displayed.

Note MOB event is always visible.

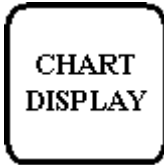
**ARPA targets**, if selected as **Std** or **Other**, ARPA targets are displayed.

**Reference target**, if selected as **Std** or **Other**, reference targets are displayed.

**Radaroverlay**, if selected as **Std** or **Other**, Radar Echo Overlay is displayed.

Note! Radar overlay has its own mode control. Radar echo overlay can be visible only if the selected mode something else than ECDIS ONLY,.

**Ship true symbol scale limit**, own ship is displayed as true scale symbol, if the displayed chart scale is larger than selected limit scale here and if the size of the true scale symbol is longer than 6 mm on the chart display.



*Pilot data, User chart and Chart alarms are non-chart information. All the selected items are shown on top of chart data*

### “Mariner” sheet

Chart display - ALL-OFF \*

Chart	Standard	Other
ARCS details	Tracking	Mariner
		Route

Pilot data

Off Std Other

Position

Range

Text

User chart

Off Std Other

Points

Lines

Symbols and Tiduals

Areas 50% Transparent

Display only radar part of Lines, Symbols and Areas

Chart Alarm warning area

Off Std Other

Highlight

Reference target

Off Std Other

Position

#### Pilot data:

- **Position**, if selected as **Std** or **Other**, positions of Pilot Data records are displayed as a symbol on the chart.
- **Range**, if selected as **Std** or **Other**, range circles around Pilot Data records are displayed. Size of circle depends on value set in Pilot Data.
- **Text**, if selected as **Std** or **Other**, text of Pilot Data records are displayed on the chart.

#### User chart

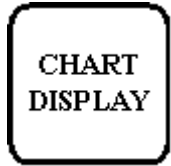
- **Points**, if selected as **Std** or **Other**, Points are displayed.
- **Lines**, if selected as **Std** or **Other**, Lines are displayed
- **Symbols and Tiduals**, if selected as **Std** or **Other**, Symbols and Tiduals are displayed.
- **Area**, if selected as **Std** or **Other**, Areas are displayed. Colour fill of the areas can be selected as transparent from 25 to 75% and as No colour fill. If No colour fill is selected, only the boundaries of the areas are visible.
- **Display only radar part of Lines, Symbols and Areas**, if selected as **Std** or **Other**, only those Lines, Symbols and Areas are displayed, which has user selection "on radar" activated for them in the User Chart. This selector is used to view only that part of the User Chart, which will be sent to the ARPA radar connected to the system.

**Chart Alarm warnings Area**, if selected as **Std** or **Other**, Chart Alarm warnings areas are displayed in red highlight colour.

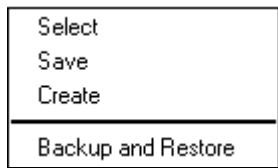
**Reference target**, if selected as **Std** or **Other**, reference targets are displayed.

## Store and recall of Chart Display Settings for visible chart and navigational features

You can define Chart Display Settings for chart details, which are displayed over S57 charts cells. You can save these Chart Display Settings into the hard disk and later recall them on demand.



Press twice *CHART DISPLAY* button.



If you press twice CHART DISPLAY pushbutton there will appear menu at cursor's position.

**Select:**

You select from the saved Chart Display Settings one for recall.

**Save:**

You save Chart Display Settings.

**Create:**

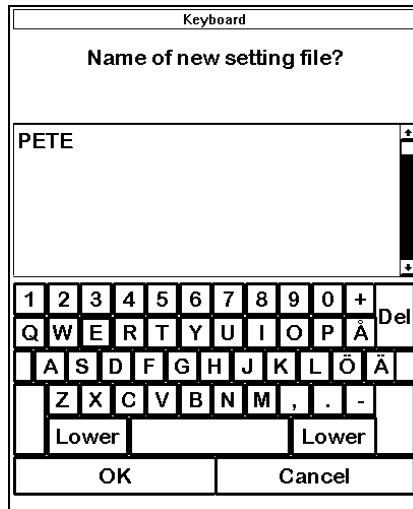
You create a new Chart Display Settings.

**Backup and Restore:**

You can make backups of your Chart Display Settings into a floppy disk. Or you can restore backups of your Chart Display Settings from your floppy disk.

### How to create a new Chart Display Settings

1. Press CHART DISPLAY button twice.
2. Select **Create** from the menu.
3. Enter desired name for Chart Display Settings and press **OK** in dialog box.



### How to select Chart Display Settings

1. Press CHART DISPLAY button twice.
2. Choose **Select** from the menu.
3. Select desired Chart Display Settings from list box.



### How to save changes to Chart Display Settings

1. Press CHART DISPLAY button twice.
2. Choose **Save** from the menu.
3. Current Chart Display Settings are saved automatically.

# Manual Updates

---

## Introduction

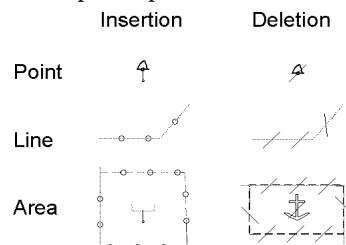
It is defined in SOLAS that mariner shall keep his charts up-to-date for intended voyage. Mariner receives chart corrections and other essential information for the area of his intended voyage for example as

- Notices to Mariners (by post, by email, by fax, etc.)
- Navtex warnings

Mariner shall keep his electronic chart in his ECDIS also up-to-date. Regardless of the chart material used mariner must know which of these chart corrections are applied into his ECDIS charts and which of them mariner needs to add as manual updates.

Manual update could be a deletion of an already existing object, modification of position or other characteristics of an already existing object or insertion of a new object. In this ECDIS manual updates are stored in a common database, which is used both with S57 and ARCS charts. For more information, see "How to check in details the creation and usage history of manual updates" on page 203.

Mariner cannot permanently remove from the chart display any of the official objects. If mariner needs to make obsolete any of the official objects he deletes them. Then in practice the deleted features are still visible, but they have special presentation for a deleted object.



However mariner can remove objects which he has inserted himself. He just says that a feature is deleted and it is removed from the display.

Note that the manual updates has no automatic connection to any automatic update received later for S57 or ARCS charts. If a manual update itself became obsolete, because the official chart has been updated to include the update defined as manual update, the mariner must himself deletes the obsolete manual update in question.

This ECDIS does record complete usage of manual updates. All deletions, modifications and insertions are recorded and time stamped. If mariner wish to see what kind of manual updates he had in past for example two weeks ago, he uses update history to specify the relevant date range. For more information to set Display and Approve date, see chapter "Date Dependent and Periodical Features of Vector Chart"

# Display of Manual Updates

## How to control visible chart objects from Manual Updates

Chart features added by Manual Updates behave exactly as any other chart feature. Their visibility follows common rules. For more information, see chapter "Control of visible chart features".

## Control of date dependency of Manual updates

### How to set current date for viewing

Manual updates operate like any other S57 Chart which contains updates and other date dependent features.

When you Accept manual updates as permanent the system sets **Display until** of Manual Updates as current date of the System. To set **Approve until** as current date of the System you must open Date Dependent and perform Approve Until. For more information to set current date, see chapter "Date Dependent and Periodical Features of Vector Charts". Recommended settings in Date Dependent are:

- Sync Manual Update Dates as ON position
- All Cells ON position

See example below where Updates Displayed and Approved until are set as the System current date.

**Date Dependent** ✕

**Cell Status**

Cell ID	RENC edt/ upd	SENC edt/ upd	Updates Displayed until			Updates Approved until		
7C1W0001	-/-	1/ 0	2000	2 28	( 0)	2000	2 18	( 0)
7C1W0002	-/-	1/ 0	2000	2 28	( 0)	2000	2 18	( 0)
7C1W0003	-/-	1/ 0	2000	2 28	( 0)	2000	2 18	( 0)
7C1W0004	-/-	1/ 0	2000	2 28	( 0)	2000	2 18	( 0)
7C2W0101	-/-	1/ 0	2000	2 28	( 0)	2000	2 18	( 0)
7C2W0102	-/-	1/ 0	2000	2 28	( 0)	2000	2 18	( 0)
7C2W0103	-/-	1/ 0	2000	2 28	( 0)	2000	2 18	( 0)
7C2W0104	-/-	1/ 0	2000	2 28	( 0)	2000	2 18	( 0)
7C2W0200	-/-	1/ 0	2000	2 28	( 0)	2000	2 18	( 0)
7C2W0300	-/-	1/ 0	2000	2 28	( 0)	2000	2 18	( 0)
7C2W0400	-/-	1/ 0	2000	2 28	( 0)	2000	2 18	( 0)
7C2W0500	-/-	1/ 0	2000	2 28	( 0)	2000	2 18	( 0)
7C2W0600	-/-	1/ 0	2000	2 28	( 0)	2000	2 18	( 0)
7C2W0700	-/-	1/ 0	2000	2 28	( 0)	2000	2 18	( 0)
7C2W0800	-/-	1/ 0	2000	2 28	( 0)	2000	2 18	( 0)
7C2W0901	-/-	1/ 0	2000	2 28	( 0)	2000	2 18	( 0)
7C2W0902	-/-	1/ 0	2000	2 28	( 0)	2000	2 18	( 0)
7C2W1001	-/-	1/ 0	2000	2 28	( 0)	2000	2 18	( 0)
7C2W1002	-/-	1/ 0	2000	2 28	( 0)	2000	2 18	( 0)

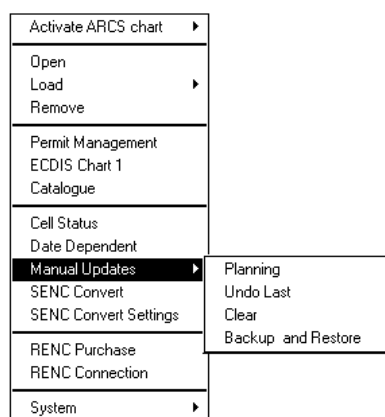
Latest RENC	Oldest date	2000 2 28	1999 4 19
Product List	Newest date	2000 2 28	2000 2 18
2000 1 9	Manual Updates	2000 2 28	2000 2 18

Sync Manual Update Dates     
      

    
  All SENCs

---

## Manual Update editor

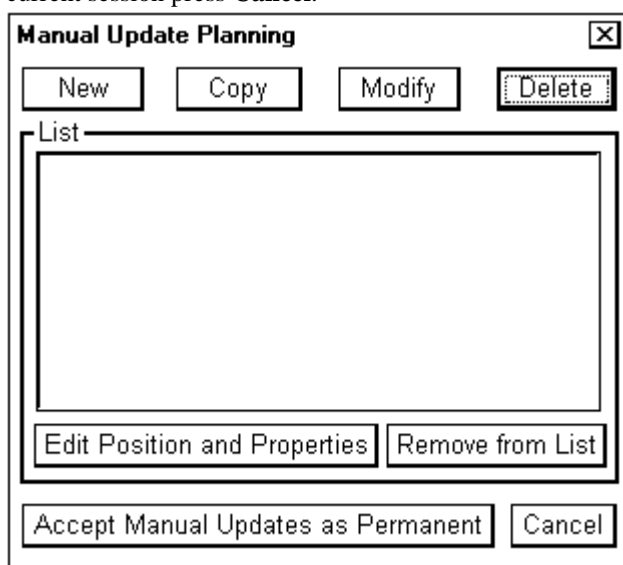


Manual update editor has following alternatives:

- **Planning** to operate with new manual updates.
- **Undo Last** to remove last accepted manual update planning session. By repeating Undo Last you can remove any amount of old manual update planning session.
- **Clear** to remove all manual update in a single operation
- **Backup and Restore** to make a backup or to recall already recorded backup
- with ARCS chart you have here also **Date Dependent** to set viewing date of manual updates. Note that with S57 charts Date Dependent is in main menu of Chart Plan.

## Manual Update Planning

Manual update editor operates in sessions. You create a session when you activate Manual Update Planning dialog. You can freely delete, modify, copy or create chart objects until you feel finished with your session. Then you terminate your session by pressing **Accept Manual Updates as Permanent** and the ECDIS stores permanently your manual updates. If you need to leave your manual update session and discard all modification made during the current session press **Cancel**.



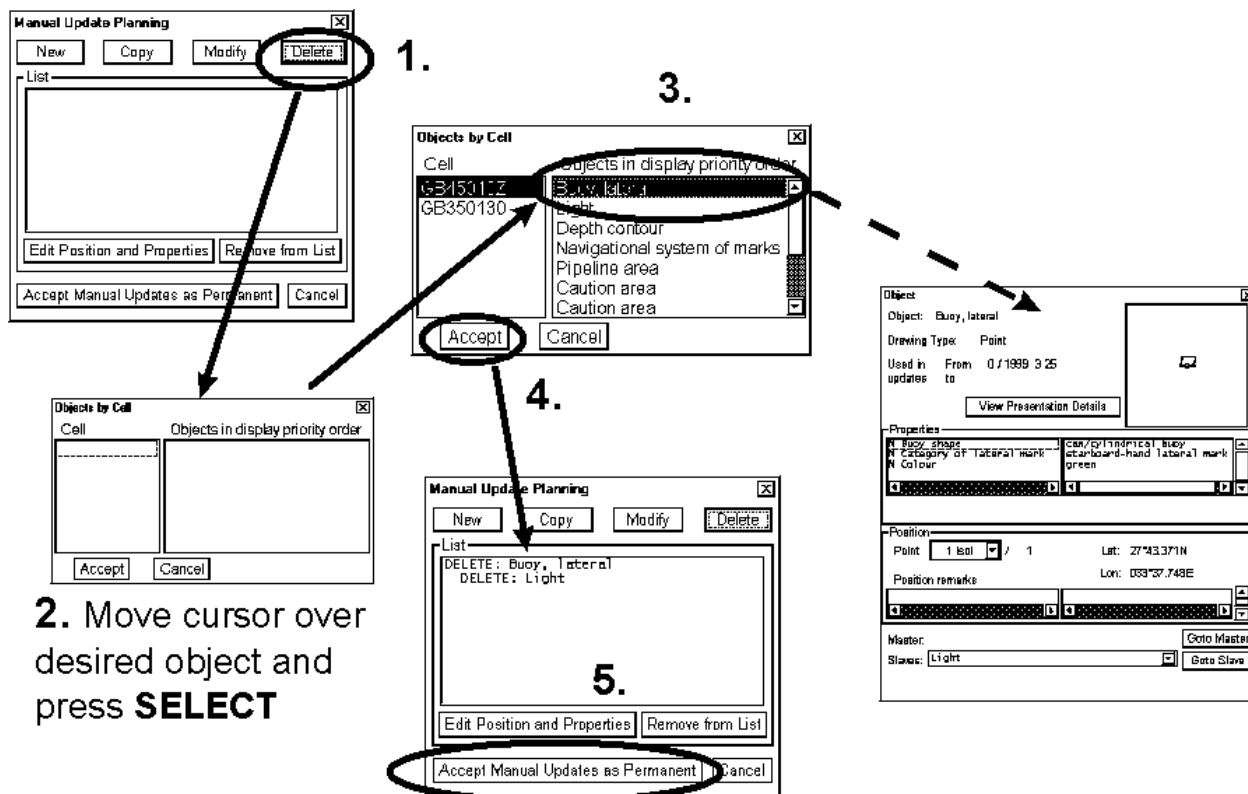
**New, Copy, Modify, Delete:** These buttons are used to collect chart objects into a list shown in a Manual Update Planning dialog for further editing during current session of Manual Update Planning. **New** creates an object from scratch. **Copy** creates an object using an existing objects as an example. **Modify** changes an existing object. **Delete** removes an existing object.

**Remove from List:** If you made a manual update by mistake, you can remove it if you haven't accepted it yet as permanent.. You can remove it by selecting (highlighting) chart object in the List and press button **Remove from List**.

**Edit Position and Properties:** You can edit position and/or properties of selected (highlighted) chart object by using button **Edit Position and Properties**.

## How to delete existing chart object

Mariner cannot permanently remove from the chart display any of the official chart objects. If mariner needs to remove any of the official chart objects he is allowed to mark them as deleted. In practice the deleted chart object is still visible, but it has on top of it a special presentation for a deleted object. To delete chart object, proceed as follows:



1. Press **Delete** button in a Manual Update Planning dialog.
  2. Move cursor over desired chart object and press **SELECT** push button in Control Panel.
  3. Select the object in Objects by Cell window. You can also view data of each object before making your selection.
  4. Press **Accept**
  5. Use **Accept Manual Updates as Permanent** to complete the deletion.
- Note:** If you deleted an official ENC chart object, a deletion mark is added over the original chart object which is still visible. If you delete Manual Update chart object, then it is removed from the chart display based on date of deletion. See more in chapter Control of date dependency of Manual updates



## How to modify existing chart object

Mariner cannot permanently remove from the chart display any of the official chart objects, but he can modify position and/or properties of chart objects. When mariner modifies chart object the ECDIS will mark original chart object as deleted and a copy of original chart object as inserted.

1. Press **Modify** button in a Manual Update Planning
2. Move cursor over desired object and press SELECT push button.
3. Select the object in Objects by Cell window. You can also view data of each object before making your selection.
4. Press **Accept**
5. Press **Edit Position and Properties**
6. If you want to modify the position of the object press **Edit Position**. Otherwise continue from point 10.
7. Move cursor over desired location on ECDIS screen. And press SELECT pushbutton.
8. Now you can use fast lane and press directly **Accept Manual Updates as Permanent**. If you want to modify also properties continue from point 9.
9. If you want to modify also properties press **Accept**,
10. If you want to modify the properties of the object press **Edit Properties list and values**. Otherwise continue from point 8.
11. Pick from the list properties you want to modify and give them new values. You can also add new properties or remove old.
12. Press **Accept List and values** to continue from point 6 or 10 again. Otherwise continue from point 8.

**1.**

**2.** Move cursor over desired object and press **SELECT**

**3.**

**4.**

**5.**

**Object**  
 Object: Beacon, cardinal  
 Drawing Type: Point  
 Used in: From 0/1998 2/24  
 updates: 10  
 View Presentation Details

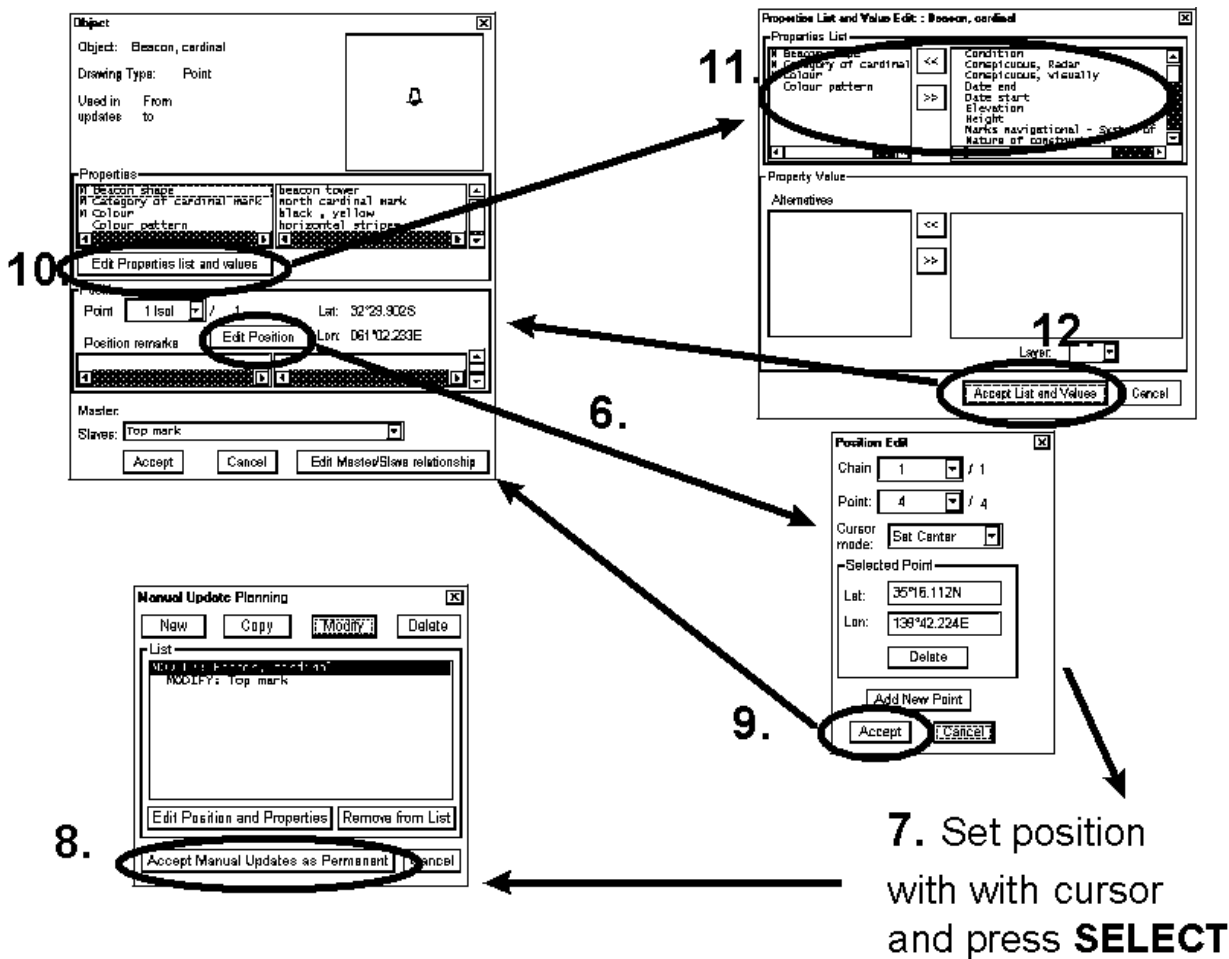
**Properties**

Beacon shape	beacon tower
Category of cardinal mark	north cardinal mark
R colour	black, yellow
Colour pattern	horizontal stripes

**Position**

Point: 1 lat 1  
 Lat: 32°29.902S  
 Position remarks: Long: 061°02.233E

**Master:** Goto Master  
**Slave:** Top mark Goto Slave



## How to insert a new chart object

Mariner can insert a new object either using Create or Copy. With Create he creates a new feature from scratch. With Copy he uses an already existing object as an example for the new inserted feature.

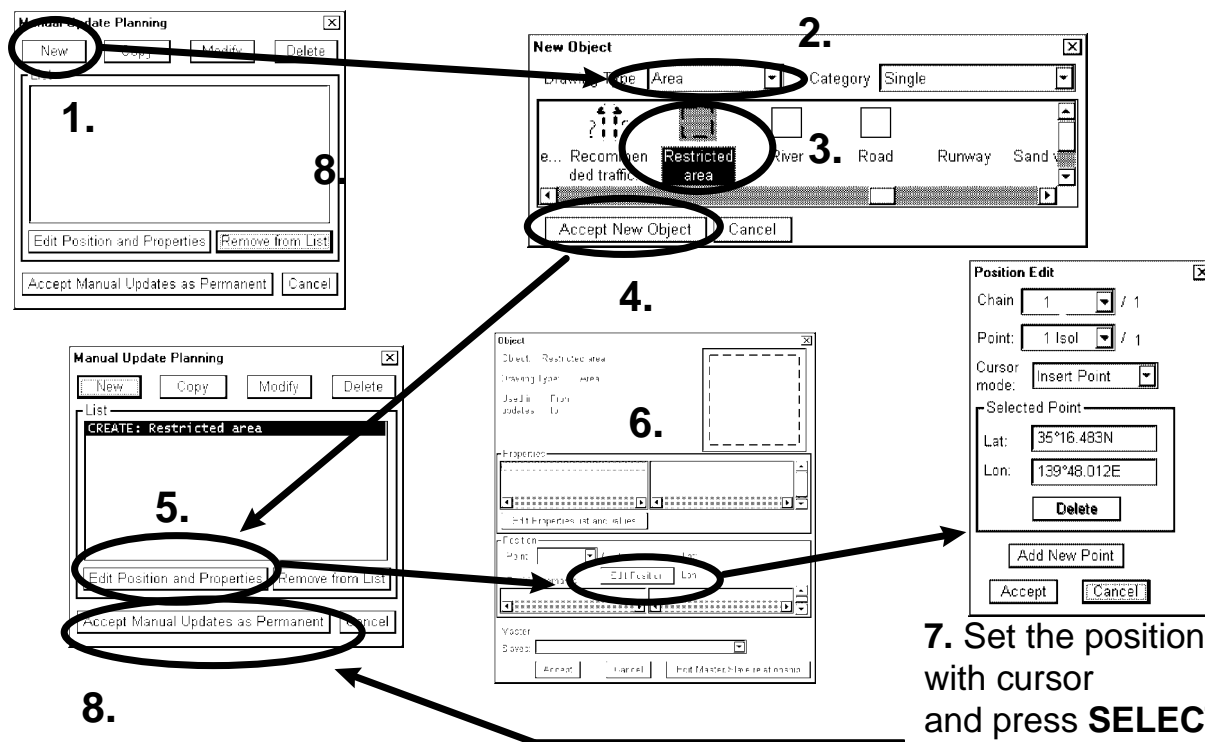
### Insert a new chart object using Create

When you want to create a new object from a scratch, you start creating by pressing **Create** in Manual Update Dialog. A S57 Object window appears. In this window you can select Geometric type of object (Point, Line or Area) and type of object:

- Single. All self understandable chart objects which can be created based on a single selected chart object. Examples are different kind of restricted and warning areas, light vessels, anchorage symbols etc.
- Nav Aid. Nav Aid is guided method to create navigational aids such as lights and buoys, because they consist of several objects put together with master and slave relationships
- Easy Lateral Sea Mark. Guided method to create Nav Aid easily for any lateral sea marks.
- Easy Cardinal Sea Mark. Guided method to create Nav Aid easily for any Cardinal sea marks.
- Easy Other Sea Mark. Guided method to create Nav Aid easily for any Other sea marks.
- Easy Light. Guided method to create Nav Aid easily for any simple lights.
- Easy Obstruction. Guided method to create Obstructions.

**An example of Restricted area**

1. Press **New** button in Manual Update Planning window.
2. Select desired Drawing Type as **Area**
3. Select by cursor desired icon in list of available chart objects.
4. Press **Accept New Object**.
5. New object is displayed in a List of Manual Update Planning window. Then press **Edit Position and Properties**.
6. Press **Edit Position**
7. Move cursor over desired locations on ECDIS screen. And press **SELECT** pushbutton. Repeat this until you have defined all corner points.
8. Press directly **Accept Manual Updates as Permanent**

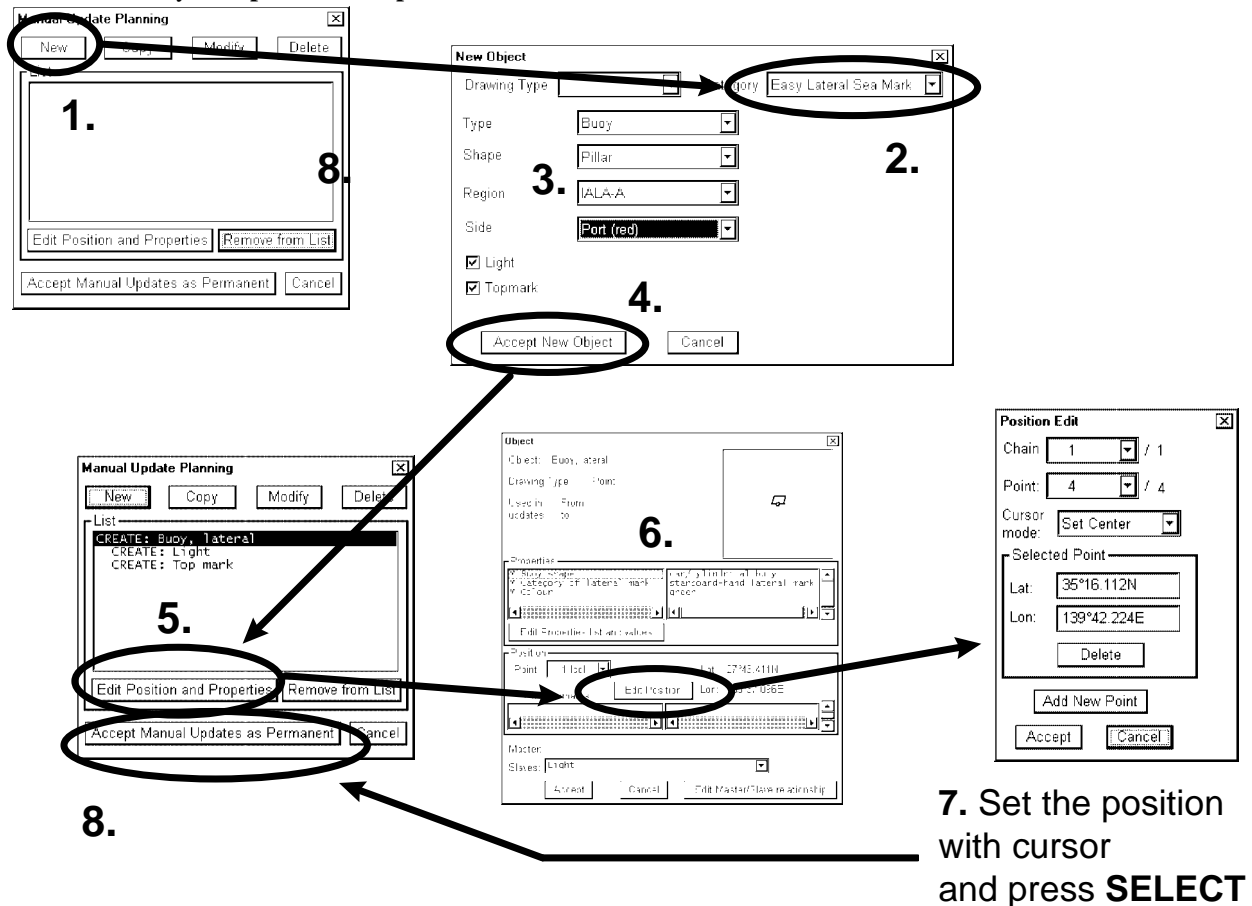


7. Set the positions with cursor and press **SELECT** for each corner point of your area

### An example of Easy Lateral sea Mark

The method is similar also for Easy Cardinal sea marks, Easy Other sea marks, Easy Lights and Easy Obstructions.

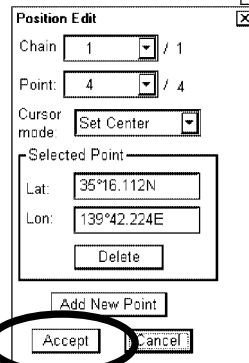
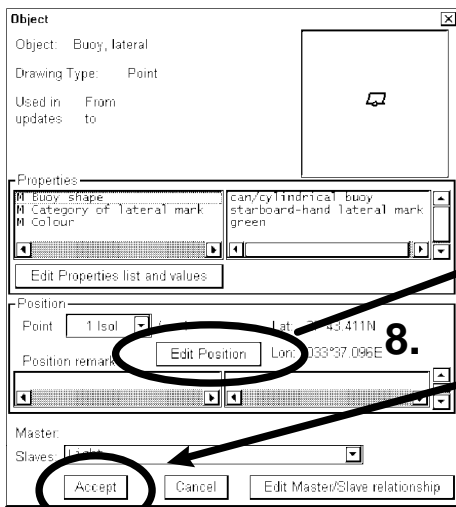
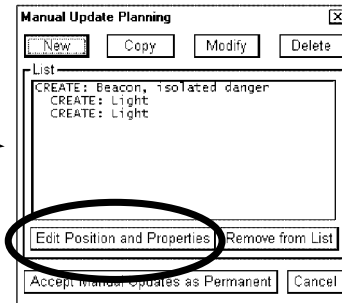
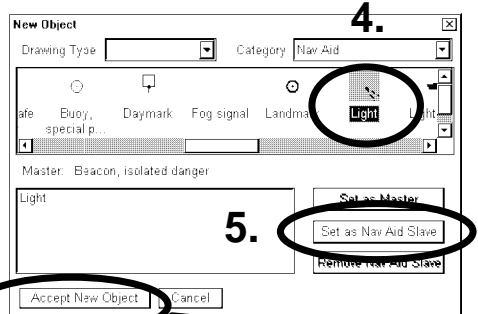
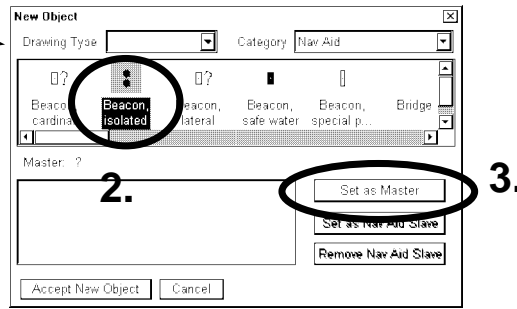
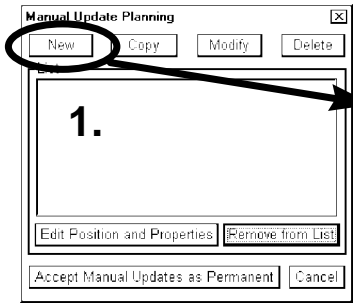
1. Press **New** button in Manual Update Planning window.
2. Select **Easy Lateral Sea Mark** in **Category** in list box of New Object window.
3. Then make selections.
4. Press **Accept New Object**.
5. New object is displayed in a List of Manual Update Planning window. Then press **Edit Position and Properties**.
6. Press **Edit Position**
7. Move cursor over desired location on ECDIS screen. And press **SELECT** pushbutton.
8. Press directly **Accept Manual Updates as Permanent**



### An example of Nav Aid

A light is only a light - it requires also a support which could be a pile or buoy etc. Body and top mark of a buoy are separated to enable a vast number of possible combinations.

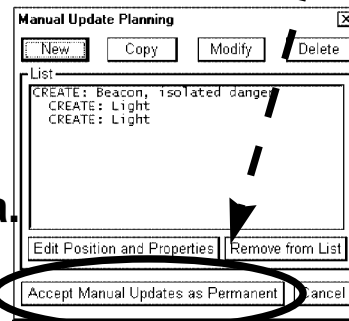
1. Press **New** button in Manual Update Planning window.
2. Select **Point** as Drawing Type; Select **Nav Aid** as Category. Then select by cursor desired icon of the master object.
3. Press **Set as Master**.
4. When you have set Master object , you can define Nav Aid slaves for it. Select by cursor desired icon of a slave object.
5. Press **Set as Nav Aid Slave**. If you need more than one slave object continue from step 4. Otherwise continue from step 6.
6. When you are ready with Master and it's slave objects, press **Accept New Object** button.
7. New object with slaves (two lights) are displayed in a List of Manual Update Planning window. Then you set the position of your master and slave object. Press **Edit Position and Properties**
8. Press **Edit Position**
9. Move cursor over desired location on ECDIS screen. And press SELECT pushbutton.
10. Now you can use fast lane and press directly **Accept Manual Updates as Permanent** (10b. in the example) or you can use slower path by pressing **Accept**, which gives other possibilities not handled in details here (10a.)in the example)
11. If you used slower path then press **Accept**.
12. If you used slower path then press **Accept Manual Updates as Permanent**.



9. Set the position with cursor and press **SELECT**

11a.

12a.



Alternative way is to press **Accept Manual Updates as Permanent** after the position is set

## Insert a new chart object using Copy

You can make new object by copying existing one. Then you pick up a object and make a copy of it with all related properties. After copying you can modify position and properties of copied object suitable for your purposes.

**1.** Press **Copy** button in a Manual Update Planning

**2.** Move cursor over desired object and press **SELECT**

**3.** Select object in Object by Cell window. There could be more than one objects in the area.

**4.** Press **Accept**

**5.** New object is displayed in a List of Manual Update Planning window. Then press **Edit Position and Properties**.

**6.** Press **Edit Position**

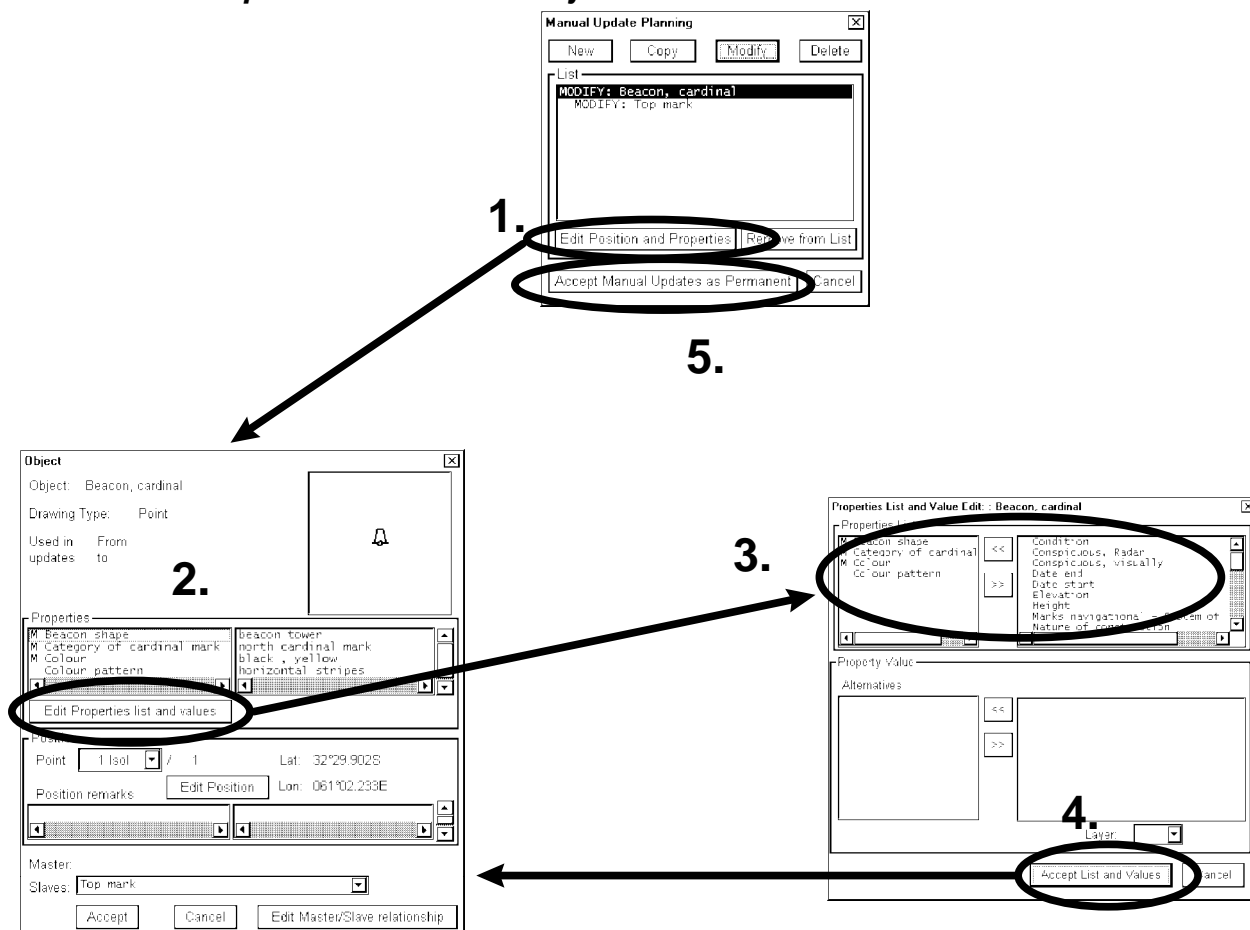
**7.** Set position with with cursor and press **SELECT**

**8.** Press directly **Accept Manual Updates as Permanent**.

1. Press **Copy** button in a Manual Update Planning
2. Move cursor over desired object and press **SELECT** push button in Control Panel.
3. Select object in Object by Cell window. There could be more than one objects in the area.
4. Press **Accept**
5. New object is displayed in a List of Manual Update Planning window. Then press **Edit Position and Properties**.
6. Press **Edit Position**
7. Move cursor over desired location on ECDIS screen. And press **SELECT** pushbutton.
8. Press directly **Accept Manual Updates as Permanent**.

# How to edit properties of a manual update chart object

## How to edit Properties of an chart object



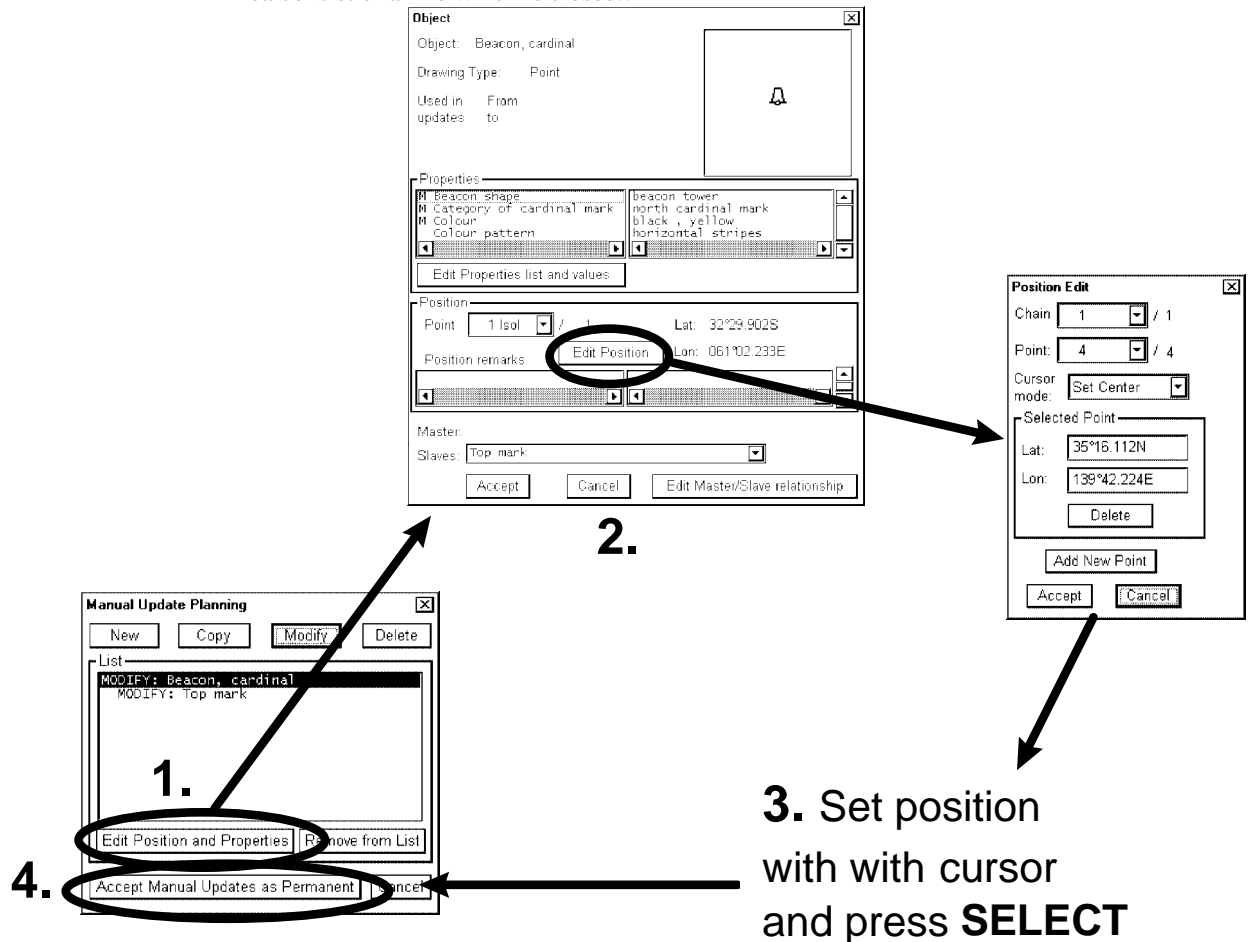
1. In Manual Update Planning window press **Edit Position and Properties** button.
2. An **Object** window appears. Press **Edit Properties List and Values** button.
3. An **Properties List and Values edit** window appears. Add or remove features in Properties List using >> and << buttons. To edit property value highlight desired value in **Properties List**, then you can edit in Property Value field using Alternatives field or enter Numeric or Textual value. If the Object has linked object you can also edit those values. Press **Edit Master/Slaves relationship** button to edit them. Make desired modifications in **Properties List and Values edit** window. After you have edit all the values of the linked objects press **Accept** button.
4. After you have edit all the values of the object you press **Accept List and Values**, if you want continue from point 2 with the object. Otherwise continue from point 5.
5. Press directly **Accept Manual Updates as Permanent**



## How to edit position of a chart object

An object can be type of point, line or area.

- Point has only one point in its presentation.
- Line can consist of one or more chains. A chain consist of two or more points.
- Area consist of a line which is closed..



1. In Manual Update Planning window press **Edit Position and Properties** button.
2. An **Object** window appears. Press **Edit Position** button
3. An **Position edit** window. appears
4. When **Edit Position** window is open, you can edit the position of the selected chart feature, see flow charts below (How to modify an existing position of a Chart Feature, How to define position of a new Chart Feature and how to define a new center point for an existing Chart Feature).
5. Press directly **Accept Manual Updates as Permanent**

An example below how to modify an existing position of a Chart Feature.

1) Activate Position Edit      2) Move cursor over a point

3) Use CHART ALIGN pushbutton pressed down to modify position of a point

An example below how to define position of a new Chart Feature. The method is also applicable to insert or append new points for existing Chart Features.

1) Activate Position Edit

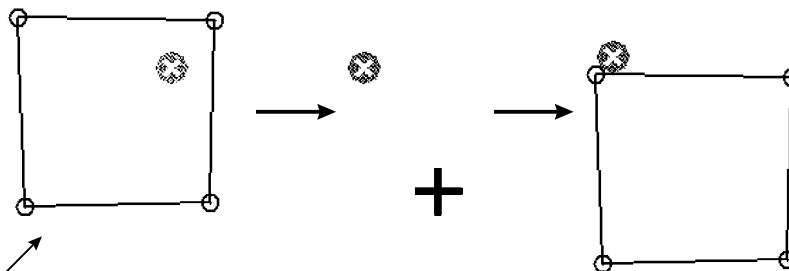
2) Select "Insert Point"

3) Insert a point with SELECT pushbutton

4) If required, you can change co-ordinates

An example below how to define a new center point for an existing Chart Feature.

1) Activate Position Edit



3) Move cursor over the new required center point and press SELECT pushbutton

2) Select "Set Center"

## Seldom used features of Manual updates

### How to check in details the creation and usage history of manual updates

You may need to check when an manual update has been added into your ECDIS. Also you may need to check what was shown in your chart display 3 weeks ago. There are also many other rare cases when you need to know what was known by your ECDIS.

To check any situation in the past you can use either Display Until and Approve Until to specify exact date of interest. Alternatively you can specify directly the number of Manual Update Planning Session. See below.

Update	Upd
0 1999 5 20	
1 1999 5 20	
2 1999 5 21	

Display Until: 1999 5 21      Upd:

Approve Until: 1999 5 20      Upd:

This page is intentionally left blank

# Chart Alarms

---

## General

The ECDIS is defined to increase safety with capability of detecting areas where depth is less than Safety contour or where specified conditions exist. If you plan a route or if prediction of own ship movement goes across safety contour or an area where selected specified condition exist, the system will give an indication or alarm for danger area. In this operation the ECDIS utilises chart database (S57 charts) stored on hard disk in SENC format. Note that ECDIS calculates dangerous areas using the largest scale chart available which may not be the visualised chart.

You can select objects which are included for calculation of danger area (For example restricted areas). There is a list of various areas which can cause indication of danger.

You can also define your own safe area by creating a User Chart Area. The system can utilise these areas when calculating chart alarms. This is very useful with raster chart material such as ARCS.

The ECDIS can check for you

- predicted movement area of the own ship
- planned route with an easy to use locator function to find dangerous areas

The ECDIS will highlight for you on the chart area

- dangerous areas inside predicted movement area of the own ship
- dangerous areas inside your monitored route
- dangerous areas inside your planned route

# Chart alarms

Official S57 chart material consists depth contours which can be used calculation of chart alarms. A chart database also includes different types of objects which user can include in chart alarms. Proceed following steps:

1. Select suitable **safety contour** for your own ship. See chapter "How to select safety contour" on page 206.
2. Check that "Chart Alarms" is set to be displayed. See chapter "How to highlight Chart Alarm" on page 209.
3. If you want include Chart alarms some other objects or areas, select them for indication or alarm. See chapter "How to select objects used in Chart Alarm" on page 207.
4. In route planning mode define a new route or select existing one. Make an Chart Alarm calculation of route if there are indications of danger areas. For more information, see chapter "Route planning" on page 213. Modify your route if necessary and make the Chart Alarm calculation again.
5. Select route as monitored route.
6. Set watch sector for your own ship. See chapter "How to activate own ship check" on page 211.

The system is ready for Chart Alarm calculation of monitored route and estimated own ship position.

## How to select safety contour

User has to select safety depth suitable for the own ship. To select proceed as followed:

1. Press CHART DISPLAY button. Select **Chart** sheet open.
2. Enter desired depth into **Safety contour** -field.

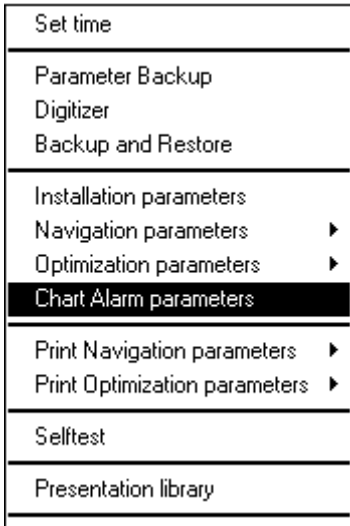
**Note**, if the chart does not consist selected depth contour, the system will automatically select next deeper contour.

Chart display - ALL-OFF *		
Tracking	Mariner	Route
Chart	Standard	Other
Echo alarm	<input type="text" value="0"/> m	
Shallow contour	<input type="text" value="5"/> m	
Safety depth	<input type="text" value="8"/> m	
Safety contour	<input type="text" value="10"/> m	
Deep contour	<input type="text" value="20"/> m	
Speed Vectors	<input type="text" value="12"/> min	<input type="text" value="TRUE"/>
TM reset margin	<input type="text" value="80"/> %	
Scale	<input type="text" value="1:10000"/>	
Palette	<input type="text" value="DAY BRIGHT"/>	
Symbols	<input type="text" value="SIMPLIFIED"/>	
Depths	<input type="text" value="TWO COLOUR"/>	
Boundaries	<input type="text" value="PLAIN"/>	
Light sectors	<input type="text" value="LIMITED"/>	
Shallow pattern	<input type="text" value="NONE"/>	
Update highlight	<input type="text" value="DETAILED"/>	

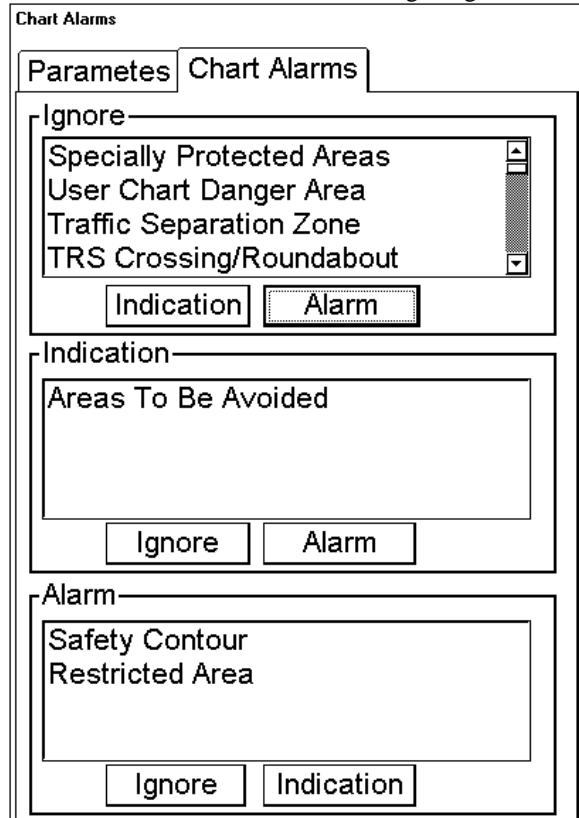
Here in this example safe water depth is set as 10 m. Use **Safety Contour** -field to set depth limit for Chart Alarms.

## How to select objects used in Chart Alarms

You can include for calculation also areas which have to be noted when sailing (for example restricted areas). To include these areas for chart alarms, proceed as followed:



1. Press INITIAL SETTING button, select **Chart Alarm parameters** from the menu.
2. Following dialog box appears. Open **Chart Alarms** sheet. Highlight desired object in **Ignore** list box to be included safe water calculation. After highlighting press either **Indication** or **Alarm** whether you want only indication or also alarm when crossing danger area.



In this example the system gives indication when crossing **Areas To Be Avoided** and alarm when crossing **Safety contour** and **Restricted Area**.

## List of areas

There are the areas which ECDIS detects and provides an alarm or indication if estimated own ship position or planned or monitored route across the area. You can select following areas in Chart Alarms sheet.

Fairway	Cargo Transshipment Area
Restricted Area	User Chart Danger
Caution Area	Traffic Separation Zone
Offshore Production Area	TRS Crossing/Roundabout
Military Practise Area	TRS Precautionary Area
Seaplane Landing Area	Two Way Traffic Route
Submare Transit Lane	Deep Water Route
Fishing Ground	Recommended Traffic Line
Pipeline Area	Inshore Traffic Zone
Cable Area	Ice Area
Anchorage Area	Channel
Anchorage Prohibited	Fishing Prohibited
Dumping Ground	Spoil Ground
Incineration Area	Dredged Area

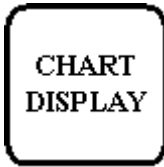
**Note! Areas To Be Avoided and Specially Protected Areas** are collections of certain type of areas. If you select either of them, a group of areas will cause alarm or indication. A table below shows which areas are selected if Areas To Be Avoided or Special Protected Areas is selected.

Areas To Be Avoided	Specially Protected Areas
Fairway	Fishing Ground
Restricted Area	Pipeline Area
Caution Area	Cable Area
Offshore Production Area	Anchorage Area
Military Practise Area	Anchorage Prohibited
Seaplane Landing Area	Dumping Ground
Submare Transit Lane	Incineration Area
	Cargo Transshipment Area



## How to highlight Chart Alarm

User has possibility to select level of transparency of Chart Alarm highlight. To select, proceed as followed:



1. Press CHART DISPLAY button, select **Mariner** sheet open.
2. Select in **Chart Alarm Warning area** field Highlight as **Std** or **Other** position.

Chart display - ALL-OFF \*

Chart	Standard	Other
Tracking	Mariner	Route

Pilot data

Off Std Other

Position

Range

Text

User chart

Off Std Other

Points

Lines

Symbols and Tidal

Areas

Display only radar part of Lines, Symbols and Areas

Chart Alarm warning area

Off Std Other

Highlight

Reference target

Off Std Other

Position

## How to include User Chart Symbols, Lines and Areas in Chart Alarm

### Symbols

For User Chart Symbols use option **Danger Symbol** in Symbol sheet. Without this selection Symbol of User Chart is not used for Chart Alarm. The dangerous symbol is drawn red instead of dark yellow.

*In Symbol sheet of User Chart you can select which Symbols are included Chart Alarm by selecting **Danger Symbol** check box.*

USER CHART - URAGA-TO / 03.09.1999 09:43

Point	Line	Area	Symbol	Tidal
Current <input type="text" value="1"/>		Total 87		
Name <input type="text" value="DAISAN-K"/>		Position		
		Lat <input type="text" value="35°17.087N"/>		
		Lor <input type="text" value="139°44.459E"/>		
Symbol <input checked="" type="checkbox"/>				
<input checked="" type="checkbox"/> Dsp on radar				
<input checked="" type="checkbox"/> <b>Danger Symbol</b>				

## Lines

For User Chart Line use option **Danger Line** in Line sheet. Without this selection Line of User Chart is not used for Chart Alarm. The dangerous line is drawn red instead of dark yellow.

In Line sheet of User Chart you can select which lines are included Chart Alarm by selecting Danger Line check box.

USER CHART - URAGA-TO / 03.09.1999 09:43

Point Line Area Symbol Tidal

Current 12 Total 14

Name: URAGA

Element type: Navigation lin

Danger Line

On Radar

Start position: End position:

## Areas

For User Chart Areas use option **Danger Area** in Area sheet. Without this selection Area of User Chart is not used for Chart Alarm. The boundary of dangerous area is drawn red instead of dark yellow.

In Area sheet of User Chart you can select which areas are included Chart Alarm by selecting Danger Area check box.

USER CHART - URAGA-TO / 17.08.1999 14:54

Point Line Area Symbol Tidal

Area Object

Current 1 Total 4

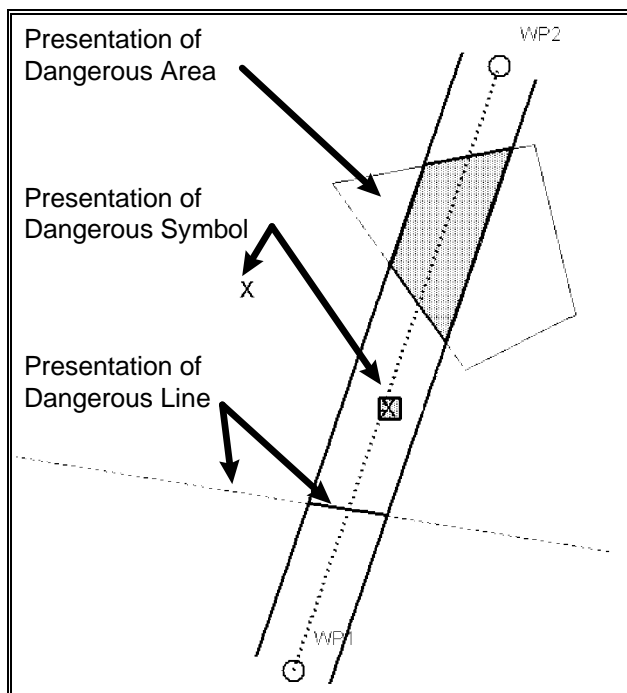
Name: wreck

On Radar  Danger Area

First << >> Last

Add Import... Delete

See figure below for behaviour of dangerous Symbol, Line and Area in Chart Alarm check.



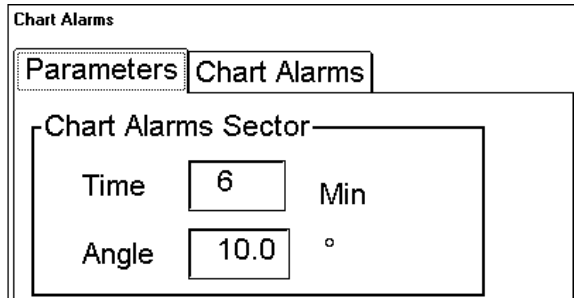
# How to activate own ship check

Calculation of own ship predicted movement area is done using watch sector from own ship position. Sector size is time and angle. To set them proceed as follows:



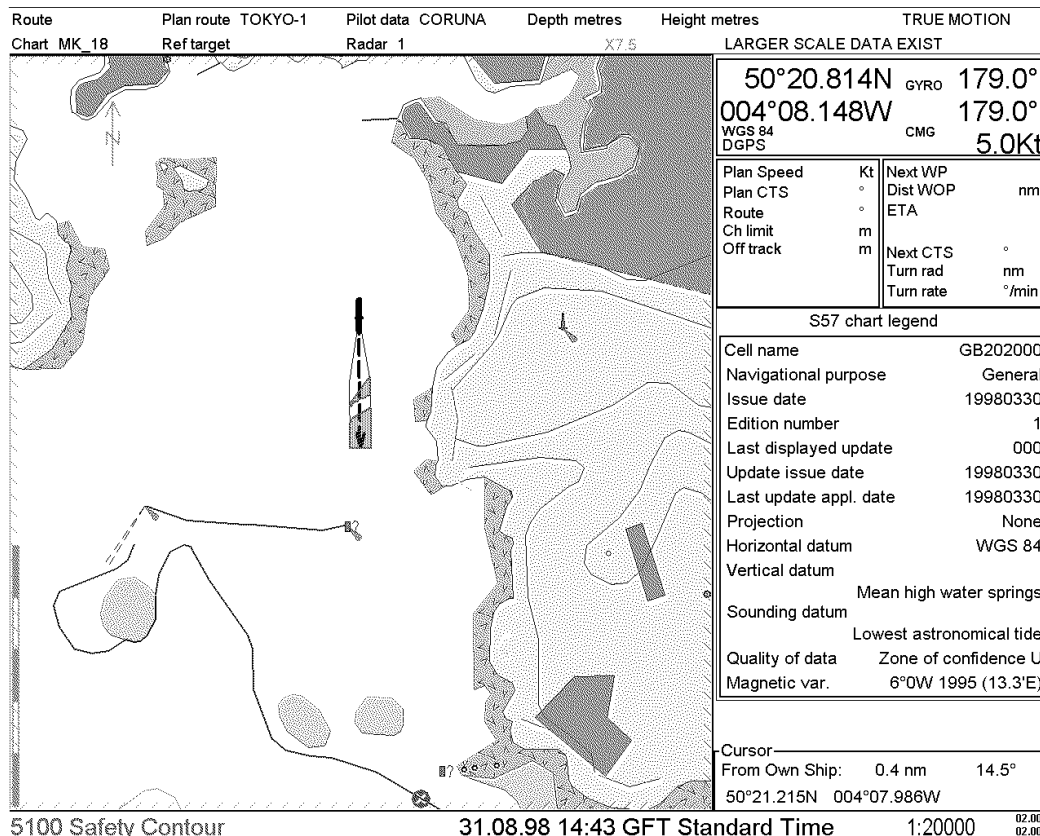
1. Press INITIAL SETTING button, select **Chart Alarm parameters** from the menu.
2. Following dialog box appears. Open **Parameters** sheet. Enter desired values to define size of sector.

Set time
Parameter Backup
Digitizer
Backup and Restore
Installation parameters
Navigation parameters ▶
Optimization parameters ▶
<b>Chart Alarm parameters</b>
Print Navigation parameters ▶
Print Optimization parameters ▶
Selftest
Presentation library



Time for sector is set to be 6 minutes and angle is 10 degrees.

Figures below show how watch sector is displayed on ECDIS screen.





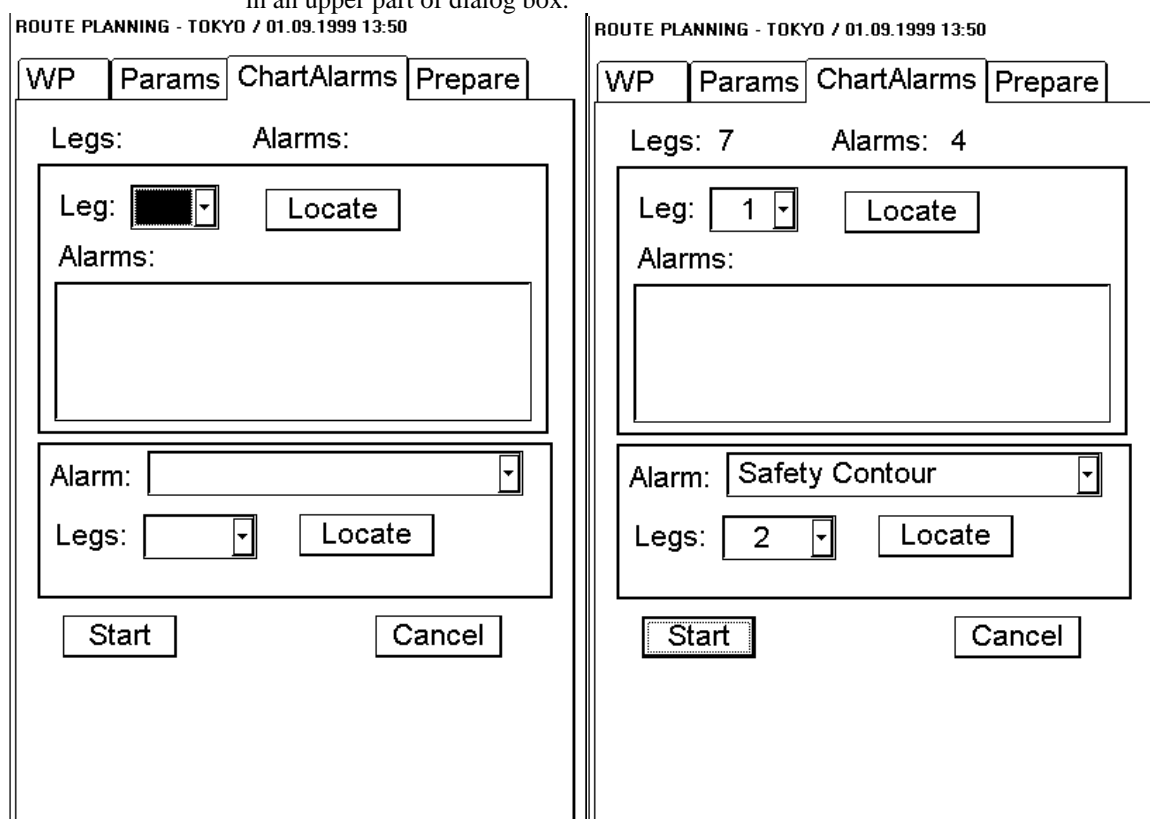
## Route planning

The system will calculate Chart Alarms using user defined channel limit for route. Dangerous areas are shown highlighted if safety contour or user selected Chart Alarm areas are crossed by the planned route. For more information of route planning, see chapter "Route planning".

**Note!** If your voyage is going to take a long time or you are planning it much earlier than it is taking place, use display and approve dates corresponding dates you are going to sail. For more information, see chapter "Time dependent and periodical features of S57 chart"

You can generate a list of Chart Alarms which are across by the planned route. Proceed as follows:

1. Enter **Safety Contour** you want to use.
2. Select dangerous objects used in Chart Alarm calculation.
3. Plan a route, define waypoints and other necessary information.
4. After that open **ChartAlarms** sheet To generate a list of alarms press **Start** button. The system will check a route leg by leg and when finish you will see number of **Legs** and **Alarms** in an upper part of dialog box.



Figures above show before and after Chart Alarm calculation in Route Planning mode.

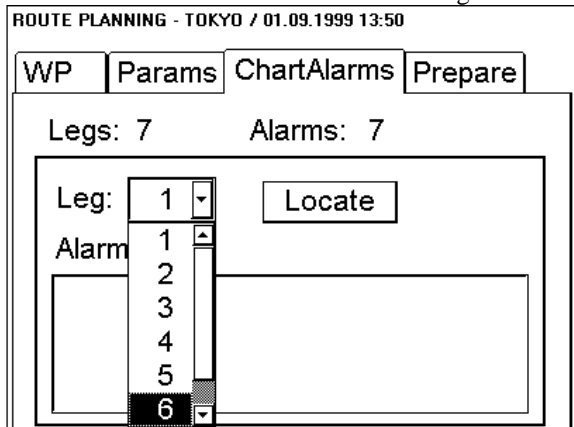
If there are alarms included to planned route, you have two alternatives to check them.

1. Check alarms leg by leg
2. Check alarms by using category of alarm

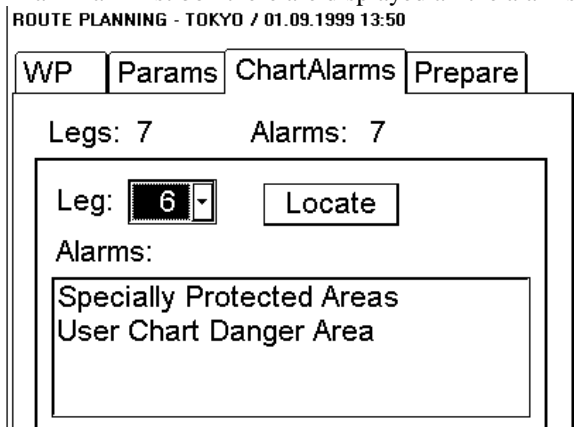
### How to find Chart Alarms leg by leg

After you have done Chart Alarm calculation, the system is able to show you legs where dangerous areas are located. All the alarms for each leg where alarms occur are shown in a list box of **Alarms**. The list of alarms is based on selections in Chart Alarm parameters. To find Chart Alarms for route, proceed as follow:

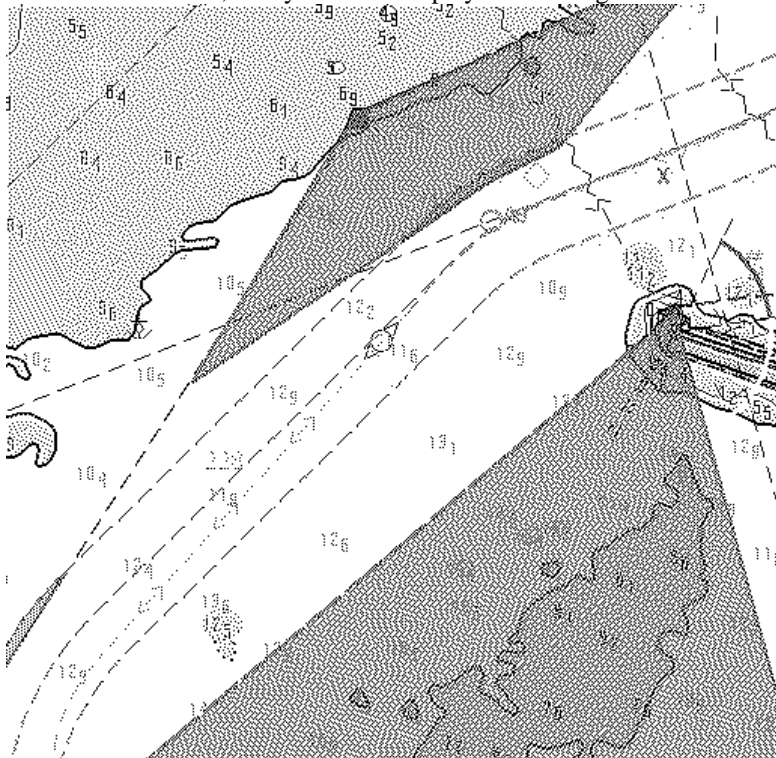
1. In ChartAlarms sheet select in list box a leg.



2. In an Alarm list box there are displayed all the alarms in this leg.



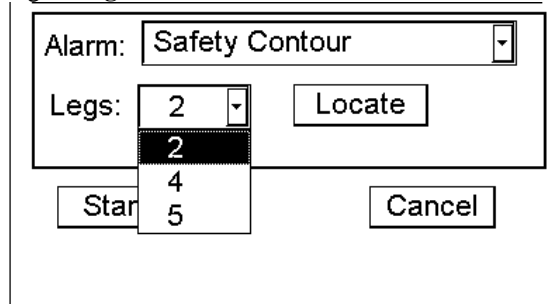
Press **Locate** button, the system will display selected leg on Electronic Chart Area.



## How to find Chart Alarms by their category

After you have done Chart Alarm calculation, the system is able to show you legs where the Chart Alarms are locating. The system can show alarms by their category. In order to do it, proceed as follow:

1. In ChartAlarms sheet select first desired alarm in **Alarm** list box and after that you can select leg in **Legs** list box.

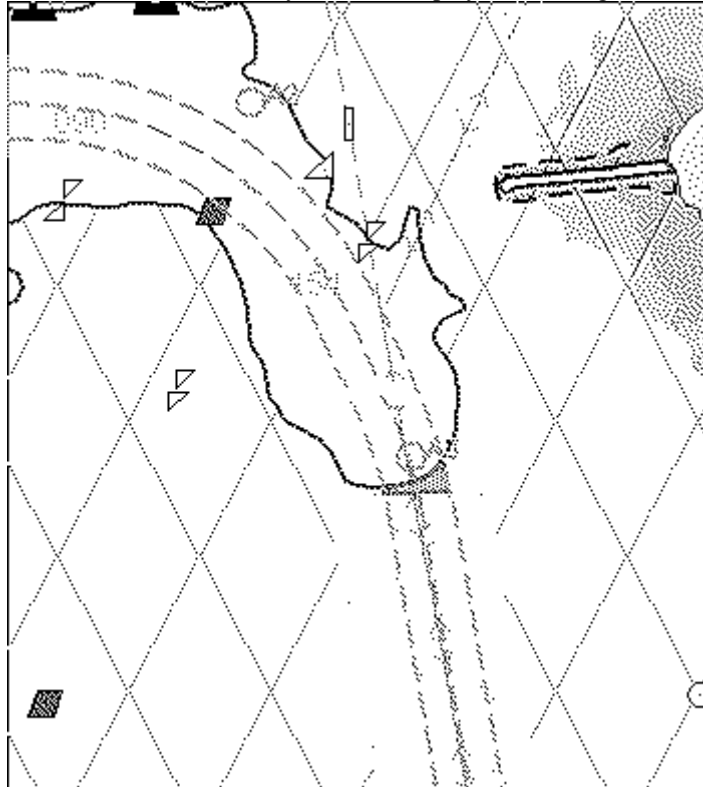


Alarm: Safety Contour

Legs: 2 (selected), 4, 5

Buttons: Locate, Star, Cancel

2. Press **Locate** button, the system will display selected leg on Electronic Chart Area.



# Route monitoring

Route monitoring can be divided to two separate parts; own ship estimated position and monitored route. See also chapter "Route Monitoring".

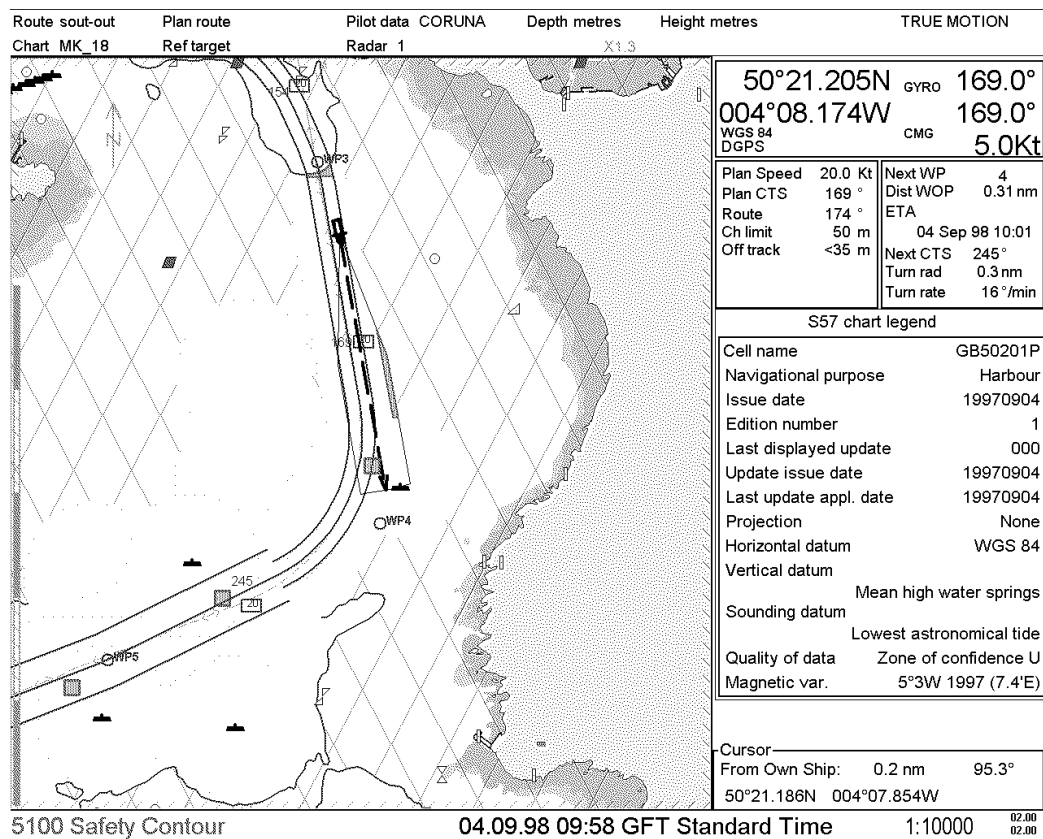


Figure above shows how in route monitoring mode the system highlights Chart Alarms inside channel limits of monitored route and inside predicted movement area of own ship.



## Chart Alarm using ARCS charts

In case of using ARCS charts, you can yourself define dangerous areas by using User Chart. The system can utilise User Chart symbols, lines and areas and calculate Chart Alarm from this material. See also chapter "User Chart Control".

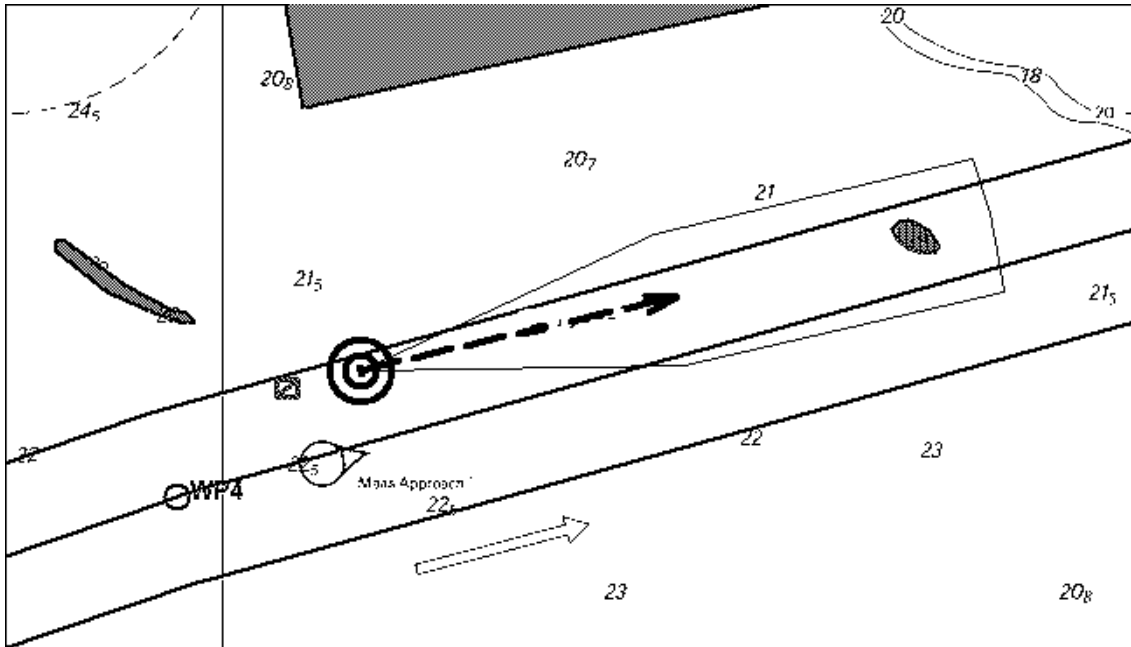


Chart Alarm used with ARCS chart. The calculation is done with route and predicted movement area of own ship. Proceed following steps, when you start planning of next voyage:

1. Create a new User Chart or select existing one which has been defined symbols, lines and/or areas for Chart Alarms. See "How to include User Chart Symbols, Lines and Areas in Chart Alarm" on page 209.
2. Check that "Chart Alarm Warning Area" is set to be displayed. See chapter "How to highlight Chart Alarm" on page 209.
3. Select User Chart danger area indication or alarm position. See "How to select objects used in Chart Alarm" on page 207.
4. In route planning mode define a new route or select existing one. Make Chart Alarm of route if there are indications of danger areas. Modify your route if necessary. See chapter Route planning.
5. Select route as monitored route.
6. Set watch sector for your own ship. See chapter "How to activate own ship check" on page 211.

The system is ready for Chart Alarms based on User Chart for monitored route, planned route and own ship.

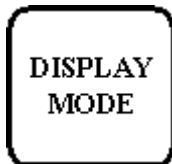
This page is intentionally left blank

# Navigation tools

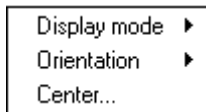
---

## Display mode

DISPLAY MODE push button is used to select between true motion and relative motion display modes. In true motion mode ECDIS shows own ship's position, and other movable data such as radar targets, moving on the earth-fixed chart background. In relative motion mode ECDIS shows the chart information, and radar targets, moving relative to own ship position fixed on the screen.



*DISPLAY MODE* button



menu:

**Display mode:**

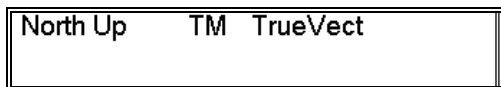
User can select between true motion and relative motion.

**Orientation:**

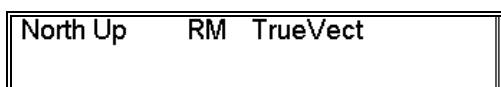
Only North up is available.

**Center:**

User can set center of the chart screen.



On upper status bar, see TRUE MOTION indication. Press DISPLAY MODE button, select **Display mode** and from the submenu **True motion**.



On upper status bar, see RELATIVE MOTION indication. Press DISPLAY MODE button, select **Display mode** and from the submenu **Relative motion**.

---

# Navigation marks

Navigation marks consist of two independent sets of tools. Both tools have REFERENCE POINT, EBL, VRM, PARALLEL INDEX and RANGE RINGS which are displayed in the Electronic Chart Area.



NAV MARKS pushbutton

**NAVIGATION MARKS**

Tool set 1 Tool set 2

Centered reference point Reset

**Move Display**

Reference point

VRM

EBL

Parallel index

Range rings     1 nm

Info

**Data**

EBL	224.7	°	VRM	2.175	nm
	34°56.507N		129°10.415E		
Ref.	34°58.053N		129°12.273E		

sheet: "TOOL SET 1"

**Centered reference point:**

Use this to select tool set to centre of own ship.

**Reset:**

By pressing this button you can reset Reference point, VRM and EBL to center of chart display.

**Display Reference point:**

Use this option to display reference point on the electronic chart.

**Display VRM:**

Use this option to select VRM (Variable Range Marker) to be displayed around the reference point.

**Display EBL:**

Use this option to select EBL (Electronic Bearing Line) to be displayed from the reference point.

**Display parallel index:**

Use this option to select parallel lines with EBL to be displayed. The range of parallel index is controlled by changing VRM's size.

**Display range rings:**

Use this option to select range rings to be displayed around the reference point. The range of those rings is depending on scale of displayed chart.

**Display Info:**

Use this option to select information about VRM, EBL and Reference point to be displayed on Electronic chart area in numeric mode.

**Move Reference point:**

Use this option to set preference of move to Reference point.

**Move VRM:**

Use this option to set preference of move to VRM and EBL.

### Move EBL/parallel index:

Use this option to move EBL/parallel index. To change direction of EBL use CHART ALIGN push button. Move cursor to end of EBL, drag and drop it to desired location by using CHART ALIGN push button.

sheet: "TOOL SET 2"

There is a possibility to set another tool. It is used same way as **TOOL SET 1**.

### How to move EBL

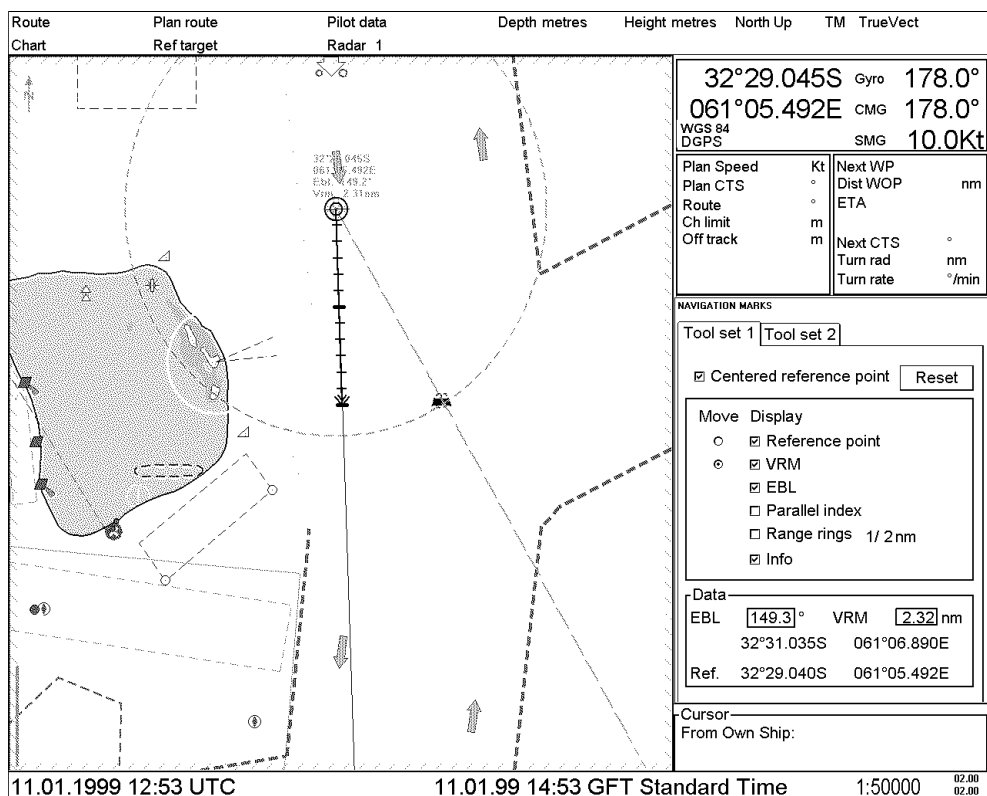
You have two methods available: you can directly enter a new numeric value of EBL or you can locate cursor over the EBL line and use CHART ALIGN to move it. If you locate cursor over crossing of VRM and EBL then you can use CHART ALIGN to move both. If reference point and EBL coexist in a same location then you can set preference to move EBL with "Move VRM" option.

### How to move VRM

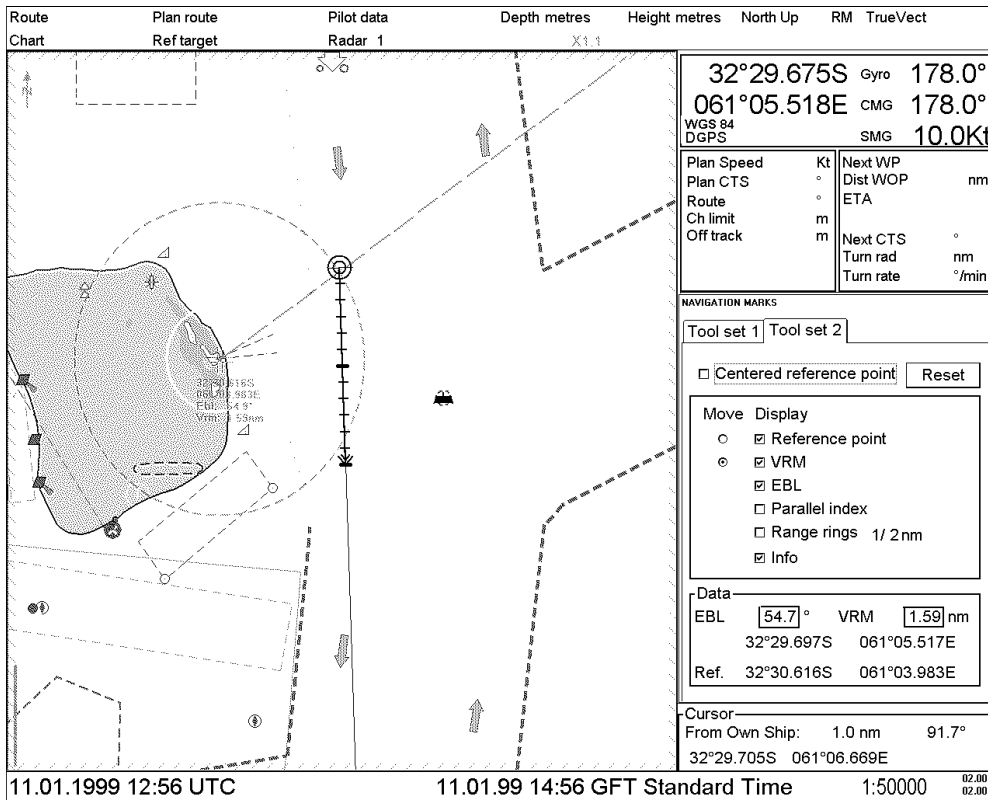
You have two methods available: you can directly enter a new numeric value of VRM or you can locate cursor over the VRM ring and use CHART ALIGN to move it. If you locate cursor over crossing of VRM and EBL then you can use CHART ALIGN to move both. If reference point and VRM coexist in a same location then you can set preference to move VRM with "Move VRM" option.

### How to move Reference point

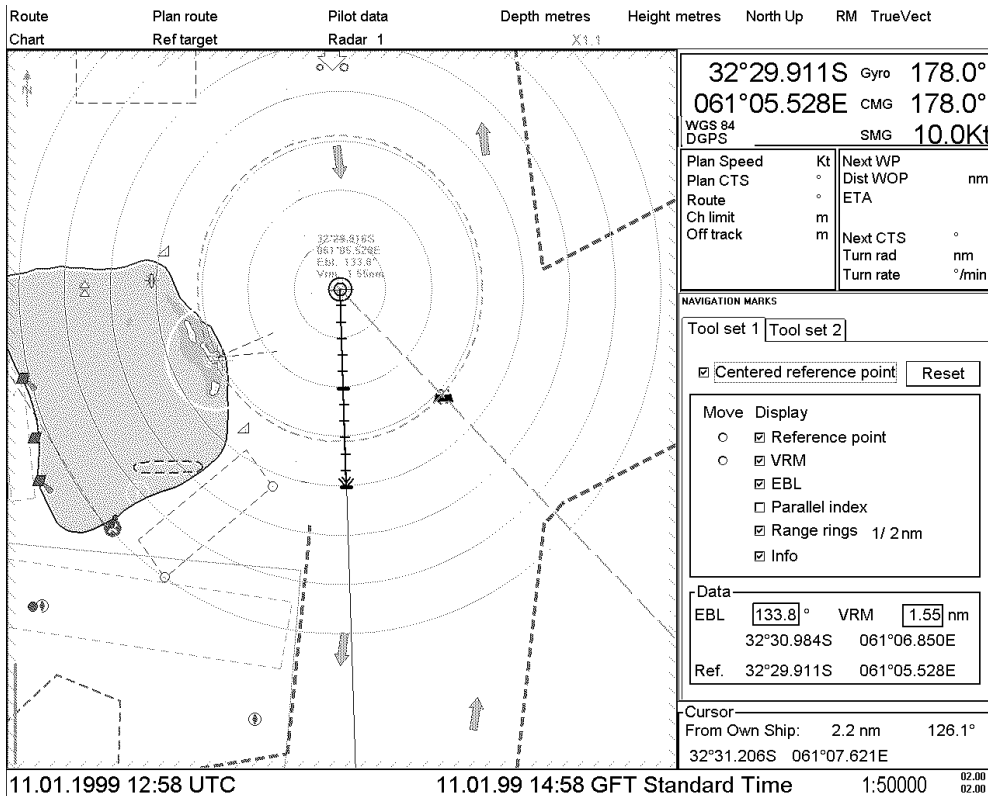
To move reference point, move cursor above reference point and use CHART ALIGN push button to drag and drop reference point desired location. If reference point, EBL and VRM coexist in a same location then you can set preference to move Reference point with "Move Reference point" option



Centered reference point with Variable Range Mark (VRM), Electronic Bearing Line (EBL) and numeric info on chart display.



Reference point not centered own ship position with Variable Range Mark (VRM) and Electronic Bearing Line (EBL).



Centered reference point with Range rings.

# Route planning

---

## Introduction

A route plan is complete navigation plan from starting point to the final destination. The plan includes:

- Route name
- Name, Lat and Lon of each waypoint
- Radius of turn circle at each waypoint
- Safe channel limits
- Chart Alarm calculation based on channel limits and chart database
- Deadband width
- Minimum and maximum speed for each leg
- The navigation method (rhumb line, great circle)
- Fuel saving
- ETD for the first waypoint
- ETA for the last waypoint
- Ship and environmental condition affecting the ship speed calculation

The system calculates using this data; speed, course and length for each leg, ETAs for each waypoint, fuel consumption and WOP for the trackpilot and also calculates safe water areas based on user defined channel limits. The calculated data is displayed in a tabular form which can be printed as a documented route plan and also stored in a file for later use. The route files thus formed contains the trackpilot commands for each waypoint.

Main functions of this Route Planning are:

- Define waypoints
- Define turnings for each waypoint
- Define channel limits for each leg (leg is the line connecting two waypoints together). The channel limits are used to detect Chart Alarms when you are planning or monitoring your route. See also chapter "Chart Alarm calculation"
- Define the speed for each leg
- Enable a calculation for ETD and ETA
- Enable a calculation for most economical sailing

---

## Route planning main menu

Main parameters for the Route Planning are:

- Latitude and longitude of the waypoint
- Channel limits to the waypoint
- Turning radius of the waypoint
- Maximum and minimum speed limits for a leg

There are two push buttons to control a route. The other push button is used for planning the routes and the other one is used to select and control a route for monitoring.

To complete Route planning, proceed as follow:

1. Create a new route or select existing one for route planning. See chapter "How to create a new route" on page 226.
2. Modify your route if necessary. See chapter "How to modify already existing route" on page 232.
3. Make Chart Alarm (Safe water) calculation. See chapter "Chart Alarms sheet" on page 230.
4. Optimize your route. See "Optimization" on page 236.

Operation of Route planning push button is following:

1. When you press ROUTE PLAN push button, ROUTE PLANNING dialog box will appear to Dialog box area.
2. If you already have ROUTE PLANNING dialog box on display and you press ROUTE PLAN push button, you will get Route planning menu on display.



ROUTE PLAN button

Select
Cancel
Create
Exchange with Monitored
Copy from Monitored
Backup and Restore
Report
Full WP Report
Passage Plan Report

menu:

**Select:**

You can select already existing route to be edited. Choose **Select** from the menu, there will appear a list box in Dialog box area. Choose appropriate route in list box of routes.

**Cancel:**

You can remove selected ROUTE PLAN file from display.

**Create:**

Choose Create from menu, if you want to make a new route, there will appear typewriter in the Dialog box area. Give name to route max. 8 letters. See also "How to create a new route" on page 226.

**Exchange:**

This function is used to exchange planned and monitored routes. Planned route is used both as alternative route and as editable route.

**Copy from monitored:**

This makes copy from monitored route for edited one. You can give name for a new route to plan which is copied from monitored route.

**Backup and Restore:**

You can make a backup to floppy disk or restore a route from floppy disk. See also "Backup Operations" on page 291.

**Report:**

Use this to generate report of planned route.

**Full wp report:**

Use this to generate detailed report of planned route.

**Passage plan:**

Use this to generate a combined report from active Planned Route and active Pilot Data.

**Note**

To get planned route to be displayed, make sure that desired options of the planned route (Center Line, Channel Borders, Wp-marks and Leg marks) are selected either **Std** or **Other** on the ROUTE -sheet.



**CHART  
DISPLAY**

*Chart details dialog box appear when user press CHART DISPLAY push button. To select between different sheets to be opened either press button*

**SELECT  
NEXT**

*or go by cursor above desired sheet's text and press SELECT*

Chart details - ALL-ON		
Chart	Standard	Other
Tracking	Mariner	Route
<p>Monitored route</p> <p>Off Std Other</p> <p><input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> Center line</p> <p><input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> Channel borders</p> <p><input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> WP - mark</p> <p><input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> Leg mark</p> <p><input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> Wheel over line</p>		
<p>Planned route</p> <p>Off Std Other</p> <p><input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> Center line</p> <p><input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> Channel borders</p> <p><input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> WP - mark</p> <p><input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> Leg mark</p>		

Wp-marks enables display of WP's number on the Electronic chart area.

Leg marks enable display of planned speed and Course to Steer, which were defined during route planning, on the Electronic chart area.

## Select datum

Selection of datum is very important, if you manually enter latitude-longitude positions from the control panel or keyboard or if you use digitizer. If you only operate with cursor to add and to modify waypoint locations, then you could use any datum, although it is recommended to use native datum of the chart. For more information to select datum, see chapter "Datum".

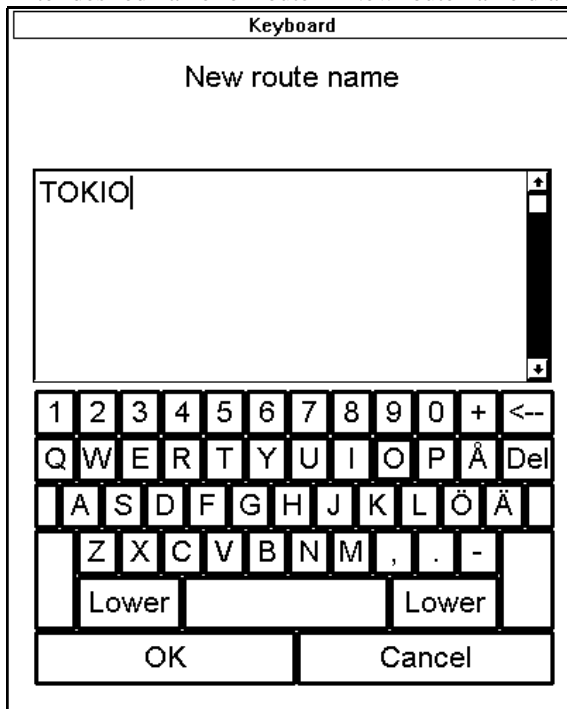
---

## How to create a new route

### Create a new route

If you want create a new route, proceed as follows:

1. Press **Route Plan** push button.
2. Select **Create** from the menu.
3. Enter desired name for route in New route name dialog box.



"Typewriter" which appears after create has selected.

4. Press **OK**, when you are satisfied with name.

## Waypoint sheet

To select between Params, AntiGround, Prepare and WPs sheets to be opened either press button



or go by cursor above WP, Params, ChartAlarms or Parameters text and press SELECT

ROUTE PLANNING - TOKYO / 02.09.1999 15:58			
WP	Params	ChartAlarms	Prepare
Waypoint			
16	Total	19	7.5 nm
Name		Steering mode	
<input type="text"/>		Rhumb line	
Radius		Channel limit	
0.5 nm		200 m	
Position		Speed	
Lat	35°07.117N	Min	0 Kt
Lon	139°40.014E	Max	20 Kt
First	<<	>>	Last
Insert...	Add...	Delete	
Import...		Reverse	
<input checked="" type="checkbox"/> Enable changes			Displayed

### Enable changes:

You have to select this in order to enable editing.

### Waypoint:

Each waypoint has a number. This shows the current waypoint number. Total indicates first the total number of waypoints in the current file and then total length of the planned route from first waypoint to the last waypoint.

### Name:

You can give name to each waypoints.

### Steering mode:

You can define steering mode each leg whether it is rhumb line or great circle.

### Radius:

You can define turning radius for each waypoints.

### Channel limit:

You can define channel limit for each leg.

### Position:

In these fields you can enter LAT/LON position of waypoint.

### Speed:

You can set speed limit for minimum and maximum speed.

### First:

Pushing this control user gets to first waypoint of the file.

### Last:

Pushing this control user gets to last waypoint of the file.

### >>:

This changes current waypoint to the next waypoint.

### <<:

This changes current waypoint to the previous waypoint.

### Insert:

This insert a new waypoint after the current waypoint.

### Add:

This function adds a new waypoint to the end of the route.

### Delete:

This function deletes current waypoint.

**Import:**

You can import new waypoints from already existing routes into your current route.

**Reverse:**

Use this function to reverse sailing order of the whole route.

**Add waypoints**

To define a waypoint, you have following alternatives:

- Move cursor to the desired location on the Electronic chart area and press **Select** button in Control Panel.
- Use **Add** button in Waypoints sheet.

To add a waypoint by **Select** button, proceed as follow:

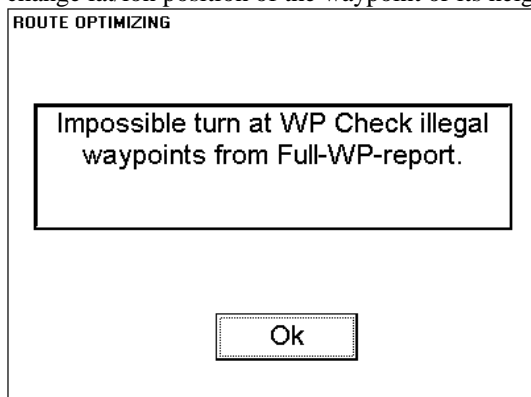
1. Open Waypoints sheet.
2. Take cursor to the Electronic chart area to desired position and press **Select** button.
3. Modify data of added waypoint. For more information to modify WPs data, see "Change other waypoint data" on page 234.

To add a new waypoint by **Add** button, proceed as follow:

1. Open Waypoints sheet.
2. Press **Add** button in Waypoints sheet. This adds a new waypoint into the route. This is copy of current waypoint.
3. Modify position of waypoint. For more information to modify WP's position, see "Change waypoint position" on page 233.
4. Modify other data of waypoint. For more information to modify WP's other data, see "Change other waypoint data" on page 234.

When you added a new waypoint, you might got a message shown below. It indicates that the geometry of your current route is Impossible to sail for a vessel. Typically it is enough if you:

1. decrease the radius of turn of the waypoint or its neighbours
2. change lat/lon position of the waypoint or its neighbours



## Fill in the Parameter sheet



Press *SELECT NEXT* button to open parameters sheet.

ROUTE PLANNING - TOKYO / 02.09.1999 15:58			
WP	Params	ChartAlarms	Prepare
Description			
OUT OF TOKYO BAY			
ETD/UTC+ 3			
WP	1	01 Sep 99 19:16	
ETA/UTC+ 3			
WP	19	01 Sep 99 23:55	
		01 Sep 99 23:55	
Total Length:		60.2 nm	
Speed limit		Max. power	
20.0	Kt	100	%
Optimize		Income	
[Dropdown]		0.000 x1000\$	
<input checked="" type="checkbox"/> Enable changes			

### Enable changes:

You have to select this in order to enable editing.

### Description:

You can enter a note for the route.

### ETD wp:

Planned estimated time of departure from a defined waypoint. (0 is automatic first waypoint)

### ETA wp:

First part is planned estimated time of arrival to last waypoint. (0 is automatic last waypoint). ETA can be calculated between two defined waypoints.

Second part is calculated ETA which may differ from planned ETA, if it is impossible to meet using selected optimisation. Also total length of the route is displayed.

### Speed limit:

You can set speed limit for a route.

### Max. power:

You can set maximum power of engines which is used for VOS optimization. VOS is an optional software used in optimization of route.

### Income:

This indicates the budget given for this voyage. (Income \* 1000\$)

### Optimize type:

Optimize types are Max speed, Timetable, Max Profit and Min cost.

## Optimize your route

After all waypoints are inserted and you have made safe water calculation, you can optimize your route. If not selected then optimisation will be done automatically with Max. Speed. If you want do optimization with specific strategy for more information, see "Available Optimization strategies" on page 236.

## Chart Alarms sheet

In this sheet you can make Safe water calculation for your route. For more information see chapter "Chart Alarm calculation."



Press *SELECT NEXT* button to open *AntiGround* sheet

ROUTE PLANNING - TOKYO / 01.09.1999 13:50

WP Params ChartAlarms Prepare

Legs: 15 Alarms: 4

Leg: 1 Locate

Alarms:

Alarm: Safety Contour

Legs: 2 Locate

Start Cancel

**NOTE!** In order to display charts with correct updated situation, use **always** current date during your voyage. If your voyage lasts more than one week set current date at least once per week during your voyage.

**NOTE!** In order to display charts with correct updated situation during route planning, use **always** planned date of each waypoint to check your plan.

## Prepare sheet

In this sheet you can prepare planned route for exchange to be the monitored route. Use this sheet if you are going to use **Exchange** function to select planned route as monitored route. You can select next WP and Final WP for steering already in planning mode.



*Press SELECT NEXT button to open Prepare sheet.*

ROUTE PLANNING - TOKIO / 05.10.1998 10:14			
WP	Params	ChartAlarms	Prepare
Prepare for exchange			
Next WP	<input type="text" value="2"/>	Max speed	
ETA WP	<input type="text" value="5"/>	05 Oct 98 12:18	
Final WP	<input type="text" value="16"/>	05 Oct 98 14:26	

# How to modify already existing route

Route	Plan route ISOHESA	Pilot data	Depth metres	Height metres	TRUE MOTION
Chart	Ref target	Radar 1	Ship off screen	X11.6	

32°44.758S Gyro 178.0°	
061°06.141E CMG 178.0°	
WGS 84	SMG 10.0Kt
DEADREC	

Plan Speed	Kt	Next WVP	
Plan CTS	°	Dist WOP	nm
Route		ETA	
Ch limit	m	Next CTS	°
Off track	m	Turn rad	nm
		Turn rate	°/min

ROUTE PLANNING - ISOHESA / 12.01.1999 10:32

WP	Params	ChartAlarms	Prepare
----	--------	-------------	---------

Waypoint

37	Total	40	52.6 nm
----	-------	----	---------

Name:  Steering mode:

Radius:  nm Channel limit:  m

Position: Lat  Lon

Speed: Min  Kt Max  Kt

First << >> Last

Insert... Add... Delete

Import... Reverse

Enable changes

Cursor: From Own Ship: 5858.8 nm 341.9°  
60°04.255N 025°14.258E

12.01.1999 08:33 UTC 12.01.99 10:33 GFT Standard Time 1:10000 02.00 02.00

Modifying of a new route.

## Parameters

Main parameters for the Route Planning are:

- Latitude and longitude of the waypoint
- Channel limits to the waypoint
- Turning radius of the waypoint
- Maximum and minimum speed limits for a leg

## How to select waypoint to be modified

To select route to be modified open waypoint sheet. In a Record field waypoint's number indicates waypoint which is currently to be modified. You have three alternatives to select desired waypoint of route:

- Enter desired number of waypoint in Record field to Waypoint edit box. To modify Waypoint's number take cursor to Waypoint edit box and press **Select** button. Enter desired number and press **OK**.

WP	Params	ChartAlarms	Prepare
----	--------	-------------	---------

Waypoint

16	Total	19	7.5 nm
----	-------	----	--------

- Use **First**, **<<**, **>>**, **Last** buttons to find appropriate waypoint.
- |       |    |    |      |
|-------|----|----|------|
| First | << | >> | Last |
|-------|----|----|------|
- Use **CHART ALIGN** push button to select waypoint. Take cursor into the Electronic chart area above desired waypoint and press **CHART ALIGN** push button.



## Change waypoint position

To change position of waypoint you have following alternatives to do it:

- Enter latitude and longitude to Position field.
- Drag and drop waypoint with CHART ALIGN push button.

### Enter latitude and longitude to Position field:

1. Select Waypoints sheet open.
2. Select desired Waypoint.
3. Enter co-ordinates of latitude and longitude to Position field. To modify co-ordinate of Latitude take cursor to **Lat** edit box and press **Select** button. Enter co-ordinate and press **OK**. To the same way to modify co-ordinate of longitude.

Position	
Lat	35°08.321N
Lon	139°44.794E

### Drag and drop waypoint to new position:



CHART ALIGN pushbutton

1. Select Waypoints sheet open.
2. Take cursor into the Electronic chart area above desired waypoint.
3. Press CHART ALIGN push button and move cursor to desired position. Keep CHART ALIGN button pressed down while you move cursor and release it when cursor is in right position.

Route	Plan route	ISOHESA	Pilot data	Depth metres	Height metres	TRUE MOTION																											
Chart	Ref target		Radar 1 Ship off screen																														
<table border="1"> <tr> <td colspan="2">32°44.261S Gyro</td> <td>178.0°</td> </tr> <tr> <td colspan="2">061°06.120E CMG</td> <td>178.0°</td> </tr> <tr> <td colspan="2">WGS 84 DEADREC</td> <td>SMG 10.0Kt</td> </tr> <tr> <td>Plan Speed</td> <td>Kt</td> <td>Next W/P</td> </tr> <tr> <td>Plan CTS</td> <td>°</td> <td>Dist WOP</td> </tr> <tr> <td>Route</td> <td>m</td> <td>ETA</td> </tr> <tr> <td>Ch limit</td> <td>m</td> <td>Next CTS</td> </tr> <tr> <td>Off track</td> <td>m</td> <td>Turn rad</td> </tr> <tr> <td></td> <td></td> <td>Turn rate</td> </tr> </table>							32°44.261S Gyro		178.0°	061°06.120E CMG		178.0°	WGS 84 DEADREC		SMG 10.0Kt	Plan Speed	Kt	Next W/P	Plan CTS	°	Dist WOP	Route	m	ETA	Ch limit	m	Next CTS	Off track	m	Turn rad			Turn rate
32°44.261S Gyro		178.0°																															
061°06.120E CMG		178.0°																															
WGS 84 DEADREC		SMG 10.0Kt																															
Plan Speed	Kt	Next W/P																															
Plan CTS	°	Dist WOP																															
Route	m	ETA																															
Ch limit	m	Next CTS																															
Off track	m	Turn rad																															
		Turn rate																															
<p>ROUTE PLANNING - ISOHESA / 12.01.1999 10:28</p> <p>WP Params ChartAlarms Prepare</p> <p>Waypoint</p> <p>39 Total 40 0.5 nm</p> <p>Name <input type="text"/> Steering mode Rhumb line</p> <p>Radius 0.2 nm Channel limit 50 m</p> <p>Position</p> <p>Lat 60°03.815N Min 0 Kt</p> <p>Lon 025°13.552E Max 20 Kt</p> <p>First &lt;&lt; &gt;&gt; Last</p> <p>Insert... Add... Delete</p> <p>Import... Reverse</p> <p><input checked="" type="checkbox"/> Enable changes</p> <p>Cursor</p> <p>From Own Ship: 5858.3 nm 341.9°</p> <p>60°03.862N 025°13.310E</p>																																	
12.01.1999 08:30 UTC		12.01.99 10:30 GFT Standard Time			1:10000																												

Drag and drop waypoint to new position. In this case it is waypoint number 39 to take to new position.

## Change other waypoint data

To change other data of waypoint, such as name, steering mode, turning radius, min/max speed, proceed as follow:

1. Select desired waypoint. For more information to select waypoint, see "How to select waypoint to be modified" on page 232.
2. Take cursor to desired edit box and press **Select** button. Modify field's value and press **OK**.

## Add a new waypoint in the end of a route

To add a new waypoint in the end of a route you have following alternatives:

- Use cursor and **Select** button define position of waypoint.
- Use **Add** button in Waypoints sheet.

To add a new waypoint by **Select** button, proceed as follow:

1. Open Waypoints sheet.
2. Take cursor to the Electronic chart area to desired position and press **Select** button. New waypoint appears to the end of route.
3. Modify data of added waypoint. For more information to modify WPs data, see "Change other waypoint data" on page 234.

To add a new waypoint by **Add** button, proceed as follow:

1. Open Waypoints sheet.
2. Press **Add** button in Waypoints sheet. This adds a new waypoint to the end of route. This is copy of current waypoint.
3. Modify position of waypoint. For more information to modify WP's position, see "Change waypoint position" on page 233.
4. Modify other data of waypoint. For more information to modify WP's other data, see "Change other waypoint data" on page 234.

## Delete a waypoint

To delete a waypoint, proceed as follow:

1. Open Waypoints sheet.
2. Select desired waypoint to delete. For more information to select WP to modified, see "How to select waypoint to be modified" on page 232.
3. Press **Delete** button in Waypoints sheet.

## Insert a waypoint

If you want insert waypoint between two waypoints use **Insert** button. This inserts waypoint next to current waypoint. For example, you want insert a new waypoint between waypoints 6 and 7. Select WP 6 so that it is shown in Record field and after that push **Insert** button. The whole procedure to insert waypoint is followed:

1. Open Waypoints sheet.
2. Select waypoint so that next waypoint of the route will be inserted one. For more information to select WP to modified, see "How to select waypoint to be modified" on page 232.
3. Press **Insert** button in Waypoints sheet.
4. Modify position of waypoint. For more information to modify WP's position, see "Change waypoint position" on page 233.
5. Modify other data of waypoint. For more information to modify WP's other data, see "Change other waypoint data" on page 234.

## Import waypoint from other routes

You are able to select waypoints from other route to import them to current route. To import waypoints proceed as follow:

1. Open Waypoints sheet.
2. Press **Import** button. The following dialog box appears

**WP IMPORT**

**Copy from**

Route   Wp total 19

First wp to copy

Number of wp's to copy

---

**Copy to**

Route   Wp total 13

Copy before wp

Copy after wp

Copying order

3. WP import dialog box.
4. Select the route from where waypoints are copied.
5. Enter first waypoint to copy.
6. Enter number of copied waypoints to **Number of WP's to copy** edit box.
7. Enter to **Copy before wp** field WP's number before which imported WPs will be added.
8. Select copying order. The copying order can be direct or reverse.
9. Press **Copy** button.
10. Selected waypoints are imported to the current route.

## Reverse sailing order of a route

It is possible to reverse the whole route using button **Reverse** in Waypoint sheet.

---

# Optimization

## Available Optimization strategies

After all waypoints are inserted the optimization is done in Parameters sheet. Optimization calculates all parameters for route steering (like: course and distance between two waypoints, manoeuvring start point, WOP etc.). There are four possibilities for optimization:

### Max Speed:

Calculation uses the maximum speed defined in the ship parameters and multiplied by all reduction factors (weather, ICE, fouling etc.) together with speed limits given for each waypoint and gives a result of ETA.

### Time Table:

Calculates the speed required in order to arrive in destination at required ETA. Maximum speed is never exceeded.

### Max. Profit:

This calculation takes in account the fuel cost and the fixed cost of the ship and calculates the most profitable speed (highest profit per time unit).

### Min. Cost:

This calculation takes in account the fuel cost and the fixed cost of the ship and calculates the speed which gives the minimum total cost.

### Note:

VOS is an optional route optimization software from DMI (Danish Maritime Institute). If available it operates fully integrated with the ECDIS. For more information, see "VOS operations" on page 240.

## How to optimize

In a Parameters sheet you can define Estimated Time of Departure (ETD) and desired number of waypoint for ETA. This ETA time is depending on optimization strategies.

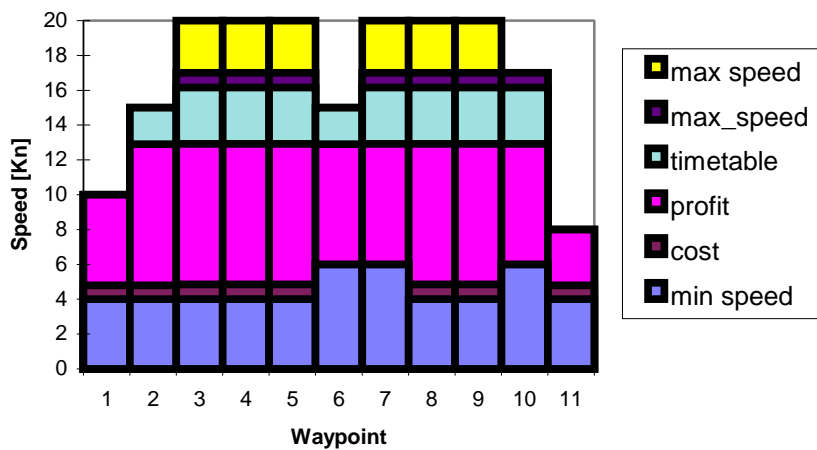
1. Open parameters sheet.
2. Select desired optimization strategies from combo box in the **Optimize** field.

## How to plan a speed profile

A speed profile is defined by general max. speed and optimize types. These values are given while planning a route. You can give Speed limit and optimize type in Parameters sheet and in waypoint sheet you can give min. and max. speed for each leg. The picture shown below demonstrates what influences have different optimize types and speed limits for a speed profile.

max speed (general)						17
wp	min speed	cost	profit	time table	max _speed	max speed
1	4	4,8	10,0	10,0	10	10
2	4	4,8	12,9	15,0	15	15
3	4	4,8	12,9	16,2	17	20
4	4	4,8	12,9	16,2	17	20
4	4	4,8	12,9	16,2	17	20
5	6	6,0	12,9	15,0	15	15
6	6	6,0	12,9	16,2	17	20
7	4	4,8	12,9	16,2	17	20
8	4	4,8	12,9	16,2	17	20
9	6	6,0	12,9	16,2	17	17
10	4	4,8	8,0	8,0	8	8

An Exsample of speed profile



---

## Backup to floppy

This procedure can be used to make backups of routes or to carry routes to other planning or navigation station. For more information, see "Backup to floppy" on page 293.

---

## Restore from floppy

This procedure can be used to read backup copies of any route if some data is lost during Route Planning operations. The other usage is to read routes originating from other planning or navigation station. For more information, see "Restore from floppy" on page 293.

---

## Move to planning or navigation station

For more information, see "Move to planning or navigation station" on page 293.

---

## Read from planning or navigation station

For more information, see "Read from planning or navigation station" on page 294.

---

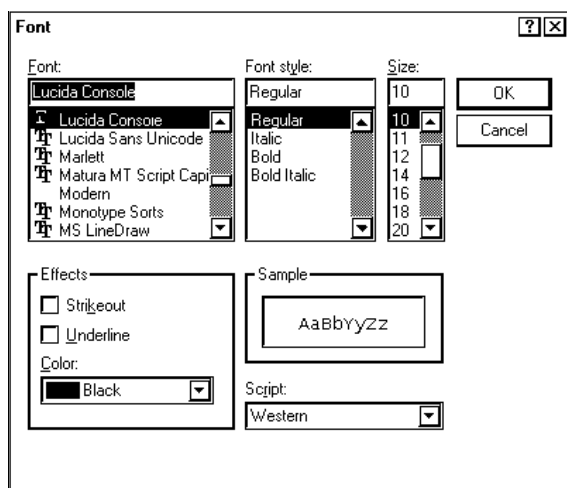
## WP table report

This report is generated when you select **Report...** from the menu and system opens Windows Notepad application automatically to view generated report. It is possible to print the report as follow:

1. From File menu select Print.
2. Report will automatically to be printed to default printer.

If printed area is too wide for page layout, you can change size and/or type of font:

1. From **Edit** menu select **Set font...**
2. Font dialog appears. Select desired options and press **OK**. (Recommended font is Fixedsys and size of font is 9).



To close Notepad select Exit from File menu.

WP report consists information of:

- position of waypoints
- planned speeds
- planned courses
- distances between waypoints
- total distance of route

- estimated times of arrival (ETA)
- planned fuel consumption

Report.txt - TextView

File Setting Text

PLAN SUMMARY ALY-ANR 23.03.2000 13:07 Datum: WGS 84

WP	LAT	LON	SPD	CRS	M	LEG	REMAIN	ETA (UTC+ 2)	HFO	DO
21	48°26.937N	005°19.080W	21.0	28.5	R	5.3	404.3	24.Dec.1992 02:00	0	0
	"QUESSA S"									
22	48°31.587N	005°15.280W	21.0	50.1	R	5.5	399.0	24.Dec.1992 02:15	0	0
	"QUESSA C"									
23	48°35.137N	005°08.880W	21.0	49.8	R	117.2	393.5	24.Dec.1992 02:31	0	0
	"QUESSA N"									
24	49°50.776N	002°52.126W	21.0	75.2	R	19.5	276.3	24.Dec.1992 08:06	0	0
	"TSSCASQW"									
25	49°55.773N	002°22.920W	21.0	74.7	R	96.1	256.7	24.Dec.1992 09:02	0	0
	"TSSCASQE"									
26	50°21.145N	000°01.335E						24.Dec.1992 13:37	0	0

Ready

## Full WP report

This report is generated to view with Windows Notepad application. For more information to print, to change size of font and to close Full WP report, see "WP table report" on page 238. This report consists following information (This sample is only part of report):

Report.txt - TextView

File Setting Text

ROUTE PLAN ALY-ANR 23.03.2000 13:12 Datum: WGS 84

BASIC ROUTE PARAMETERS:

Maximum power output 5 %  
 weather factor 1.0 % Ice factor 1.0 % Fouling 1.0 %  
 Maximum attainable speed 22.000 Kt  
 Cost: Hour: 1500 \$/h Heavy fuel oil: 120 \$/ton Diesel oil: 160 \$/ton  
 ETD from waypoint 21 (UTC+ 2) 24.Dec.1992 02:00 QUESSA S  
 ETA to waypoint 45 (UTC+ 2) 24.Dec.1992 21:24 FLUSHING

ROUTE PLAN:

Waypoint 21 "QUESSA S" Position: 48°26.937N 005°19.080W  
 Radius: 2.00 nm R.O.T: 10.0 °/min  
 Channel limit: 1000 +/-m Dead band: 333 +/-m  
 Speed: 20.00 Kt Limits: max 21 Kt min 1 Kt  
 Course: 29.5° Leg: 354.69 nm Steering mode: Rhumb line  
 ETA: (UTC+ 2) 24.Dec.1992 02:00 Time used: 0 min  
 Hfo: 0.00 ton/h 0 ton Do: 0.00 ton/h 0 ton

Waypoint 22 "QUESSA C" Position: 48°31.587N 005°15.280W  
 Radius: 2.00 nm R.O.T: 10.0 °/min  
 Channel limit: 250 +/-m Dead band: 83 +/-m

Ready

---

## VOS operations

VOS (Voyage Optimization System) is an optional route optimization software from DMI (Danish Maritime Institute). If available it operates fully integrated with the ECDIS.

VOS operations are selected from Route planning in Parameters sheet. They are selectable in **Optimize type** combo box, when selected Operation System goes to optimization part of the VOS software. VOS itself has its own operator's manual.

For more information, how to make optimization, see "How to optimize" on page 236.

## How to test ECDIS and VOS together

This chapter gives instructions to test integration of VOS and ECDIS. This should be done always when ECDIS or VOS program has been reloaded or updated into the ECDIS.

1. Select a short route (from 5 to 10 waypoint is suitable).
2. Check that **ETD** and **ETA** in Parameters sheet have legal values.
3. Check with **backup** and **WP Summary report**, that route is OK.
4. Select Optimize type, **VOS Max Spd.**
5. Now control should change to VOS.
6. Select **Edit Data in Memory.**
7. Select **Way Points info (NOT Editable)** and check that route is OK.

```
+-----+
| Edition of Wp's | | Delete WP: DEL | Move: Cursor keys | Exit: ESC |
+-----+
```

```
+-----+
| WP | | Latitude | | Longitude | | Time sp. | | Text |
| no | | | | | at WP | | |
| | | -ddd:mm.cc | | -ddd:mm.cc | | hhh:mm | |
+-----+
```

WP no	Latitude	Longitude	Time sp.	Text
1	051:26.11	003:36.05	0.00	PILOTFLU
2	051:26.02	003:34.52	0.00	RADAR ST
3	051:25.66	003:33.92	0.00	FAIRWAY
4	051:25.28	003:31.28	0.00	WIELINGE
5	051:24.49	003:24.13	0.00	W4 - W5
6	051:24.34	003:19.64	0.00	SCH 12
7	051:24.58	003:15.02	0.00	SCH9 -10
8	051:23.93	003:06.93	0.00	SCHEUR-Z
9	051:23.91	003:05.95	0.00	SCH5- 6
10	051:25.23	003:00.06	0.00	BR & W
11	051:27.73	003:00.04	0.00	AKKAE NE



8. Select **Data for the Sections of the Route I** and check that all legs have their **depth of wtr.** more than 50 meters.

```

+-----+
| Section Data I  || Repeat prev. Sect.: F1  Move: Cursor keys  Exit: ESC |
+-----+
1. Way point      TG17 JW1
2. - -            PILOTBRH
+-----+
| 1. 2. cour  || wind  || wind  || wave  || wave  || set of || velocity || depth | | |
| WP: WP: -se || di rect. || vel octy: || height || period || current || of curr || of wtr. |
|   || (l/o) || (deg) || (m/s) || (m) || (s) || (deg) || (knots) || (m) |
+-----+
| 11 12 | | 0 0.0 0.0 0.0 0 0.0 50 |
| 12 13 | | 0 0.0 0.0 0.0 0 0.0 50 |
| 13 14 | | 0 0.0 0.0 0.0 0 0.0 50 |
| 14 15 | | 0 0.0 0.0 0.0 0 0.0 50 |
| 15 16 | | 0 0.0 0.0 0.0 0 0.0 50 |
| 16 17 | | 0 0.0 0.0 0.0 0 0.0 50 |
| 17 18 | | 0 0.0 0.0 0.0 0 0.0 50 |
| 18 19 | | 0 0.0 0.0 0.0 0 0.0 50 |
| 19 20 | | 0 0.0 0.0 0.0 0 0.0 50 |
| 20 21 | | 0 0.0 0.0 0.0 0 0.0 50 |
| 21 22 | | 0 0.0 0.0 0.0 0 0.0 50 |
+-----+

```

9. Select **Data for the Sections of the Route II** and check that all legs have their **max speed** more than 15 knots, **min speed** at least 1 knot, **max power** 100 % and **min power** 0 %.

```

+-----+
| Section Data II || Repeat prev. Sect.: F1  Move: Cursor keys  Exit: ESC |
+-----+
1. Way point      PILOTFLU
2. - -            RADAR ST
+-----+
| 1. 2. swel l  || swel l  || swel l  || max  || mi n  || max  || mi n  | | |
| WP: WP: di rect. || height || period || speed || speed || power || power |
|   || (deg.) || (m) || (s) || (knots) || (knots) || (% MCR) || (% MCR) |
+-----+
| 1 2 | | 0 0.0 0.0 20.0 1.0 100 40 |
| 2 3 | | 0 0.0 0.0 20.0 1.0 100 40 |
| 3 4 | | 0 0.0 0.0 20.0 1.0 100 40 |
| 4 5 | | 0 0.0 0.0 20.0 1.0 100 40 |
| 5 6 | | 0 0.0 0.0 20.0 1.0 100 40 |
| 6 7 | | 0 0.0 0.0 20.0 1.0 100 40 |
| 7 8 | | 0 0.0 0.0 20.0 1.0 100 40 |
| 8 9 | | 0 0.0 0.0 20.0 1.0 100 40 |
| 9 10 | | 0 0.0 0.0 20.0 1.0 100 40 |
| 10 11 | | 0 0.0 0.0 20.0 1.0 100 40 |
| 11 12 | | 0 0.0 0.0 20.0 1.0 100 40 |
+-----+

```

10. Select **General data** and check that **GREEN SEA & SLAMMING** is 1 or 2 and **at last speed trial** speed is legal.

General Data			Move: ??	Exit: ESC
LOADING CONDITION	Mean Draught	8.00	m	
SEA WATER TEMPERATURE	Average for Voyage	12.0	°C	
GREEN SEA & SLAMMING	1: Respected 2: Ignore	2		
SHIPS PERFORMANCE	Speed ratio	1.00		
-at last speed trial	Speed	17.0	knots	
	Draught at speed trial	8.00	m	

11. Select **Prime mover data** and check that **Specific gravity of F.O.** is around 950, **Heating value** is around 41240 and **shaft generator loading** is around 500.

Prime Mover Data			Move: ??	Exit: ESC
Specific gravity of F.O.		950	(kg/ m <sup>3</sup> ) at 15 °C	
Heating value of F.O.		41000	(kJ/kg)	
Expected average of shaft generator loading		0	(kW)	

12. Press **Esc** to get back in **Main menu**  
 13. Select **OPTIMIZE Voyage**  
 14. Check that optimization results are OK.  
 15. Press **Esc** until you get back to ECDIS program.  
 16. Check with **backup** and **WP Summary report**, that route has all its waypoints and the data is OK.

# Route monitoring

---

## Introduction

The ROUTE MONITOR push button provides access to the functions for monitoring routes. Use of the ROUTE MONITOR is a means for permanent monitoring of the vessel's behaviour relative to the monitored route. The Information area displays the data on the vessel's position relative to the monitored route. The monitored route consists of following information in the electronic chart area:

- The route is displayed as red dots
- The limits of channels of each leg are displayed as red lines. These limits are used to detect Chart Alarms when you are monitoring the route. See also chapter "Chart Alarm calculation".
- Each leg has information about planned speed shown in rectangular
- Each leg has information about planned course to steer

**NOTE!** In order to display charts with correctly updated situation, use **always** current date as Approve Until and Display Until during your voyage. If your voyage lasts more than one week set current date at least once per week during your voyage.

For more information, see chapter "Date dependent and periodical features of S57 chart".

Operation of Route monitor push button is following:

1. When you press ROUTE MONITOR push button, **ROUTE MONITORING** dialog box will appear to Dialog box area.
2. If you already have **ROUTE MONITORING** dialog box on display and you press ROUTE MONITOR push button, you will get Route monitor menu on display.



**.Select:**

You can select already existing route to be monitoring.

**Cancel:**

You can close route file, which was selected to be monitored route.

ROUTE MONITORING - TOKYO

Next  
 WP  Max speed

ETA  
 WP  Time  
 Distance nm

Final  
 WP  Time 03 Sep 99 11:02  
 Distance 40.9 nm

Suggested speed min  
 Kt

Trial speed  Kt

Speed profile

Center line  for ARPA

Channel borders  radar

Route Monitor window when connected ARPA radar is Selesmar or Furuno. Note, that control of visibility of monitored route is in this window.

ROUTE MONITORING - TOKYO

Next  
 WP  Max speed

ETA  
 WP  Time  
 Distance nm

Final  
 WP  Time 03 Sep 99 11:02  
 Distance 40.9 nm

Suggested speed min  
 Kt

Trial speed  Kt

Speed profile

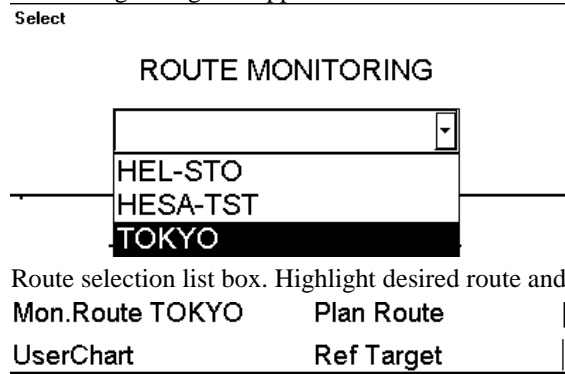
Route Monitor window when connected ARPA radar which communicate using IEC 61162-1 standard.

---

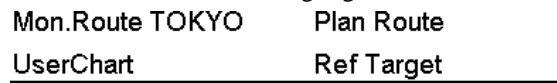
## How to select route to be monitored

To select route to be monitored, proceed as follows:

1. Press **Route monitor** push button and choose **Select** command from the menu. Select Route monitoring dialog box appears.



2. Route selection list box. Highlight desired route and press **Select** to make selection.



Route field looks as this when route TOKYO has been selected as monitored route.

---

## How to select next waypoint

When you have selected a route to be monitored the system selects next waypoint automatically. Check that next waypoint is desired one. The ECDIS will automatically advance next waypoint when you pass it.

The ECDIS automatically set last waypoint of your monitored route as final waypoint.

To select next waypoint, proceed as follows:

1. Press **Route monitor** push button to get Route monitor window.
2. Move cursor over the Next WP box and press **Select** push button. Now you get a numeric keypad to enter the number of the next waypoint.
3. Define a suitable waypoint and press OK.

---

## How to select final waypoint

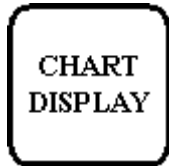
Normally you use as final waypoint the last waypoint of your monitored route and the ECDIS automatically did this selection when you selected the monitored route. However sometime you may prefer to use as final waypoint some other waypoint than the last waypoint of the monitored route.

To select final waypoint, proceed as follows:

1. Press **Route monitor** push button to get Route monitor window.
2. Move cursor over the Final WP box and press **Select** push button. Now you get a numeric keypad to enter the number of the next waypoint.
3. Define a suitable waypoint and press OK.

## Display of the route on the electronic chart screen

To get monitored route to be displayed, make sure that desired options of the monitored route (Center Line, Channel Borders, Wp-marks, Leg marks and Wheel over line) are selected on the ROUTE -sheet.



Press CHART DISPLAY push button. To select ROUTE sheet to be opened either press button



or go by cursor above ROUTE text and press SELECT.

Chart details - ALL-ON		
Chart	Standard	Other
Tracking	Mariner	Route
Monitored route		
Off	Std	Other
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Center line		
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Channel borders		
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
WP - mark		
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Leg mark		
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Wheel over line		

Wp-marks enables display of waypoint's number in a route.

Leg marks enable display of planned speed and planned Course to Steer in a route.

Wheel over line enables display of line, which turn start line for a waypoint. This line appears when "WP approach" has given and disappears when turning has started.

## Display of the route on the ARPA radar screen

ECDIS can control visibility of the monitored route on the ARPA radar screen in some selected ARPA radars such as Selesmar and Furuno. Some ARPA radars such as Furuno have this kind of controls also in the ARPA radar operators panel.

Note that generic ARPA radars of IEC 61162-1 type of interface cannot display monitored route on their screen. Then these controls are not available on the ECDIS screen.

### Center Line:

You can switch on/off center line to be displayed on the radar screens.

### Channel Borders:

You can switch on/off channel borders to be displayed on the radar screens.

ROUTE MONITORING - TOKYO	
Next WP	9 Max speed
ETA WP	Time Distance nm
Final WP	19 Time 03 Sep 99 11:02 Distance 40.9 nm
Suggested speed	min Kt
Trial speed	<input type="text"/> Kt
Speed profile	Plan <input type="button" value="v"/>
Center line	On <input type="button" value="v"/> for ARPA
Channel borders	Off <input type="button" value="v"/> radar

---

## How to monitor route

You can monitor the route from the ECDIS screen. There are two boxes in the upper information area.

<b>Plan Speed</b>	<b>20.0 Kt</b>
<b>Plan CTS</b>	<b>207 °</b>
<b>Route CTS</b>	<b>209 °</b>
<b>Ch limit</b>	<b>185 m</b>
<b>Off track</b>	<b>&lt;59 m</b>
<b>Route: goto wp</b>	

Left window

**Plan Speed:**

The speed which was defined while the route was planned.

**Plan CTS:**

Course to Steer (CTS) calculated during route planning. If gyro correction is enabled then the value of Plan CTS is also compensated.

**Route CTS:**

Calculated course to steer to follow the route including off track, drift and gyro error compensation. Note: drift compensation and gyro error compensation are enabled in Ship Parameters. For more information of Ship Parameters, see chapter "Parameters".

**Ch limit:**

Channel limit for current leg of route defined while route was planned

**Off track:**

Distance from center line of leg.

**Route:**

This indication appears, if Steering mode is either Goto WP (Route: goto wp) or Goto track (Route: goto track).

<b>Next WP</b>	<b>3</b>
<b>Dist WOP</b>	<b>0.40 nm</b>
<b>ETA WOP</b>	<b>05 Mar 97 09:09</b>
<b>Next CTS</b>	<b>245 °</b>
<b>Turn rad</b>	<b>1.0 nm</b>
<b>Turn rate</b>	<b>16 °/min</b>

Right window

**Next WP:**

Next waypoint to approach.

**Dist WOP:**

Distance to wheel over point (WOP).

**ETA WOP:**

Estimated Time of Arrival (ETA) to WOP.

**Next CTS:**

Indicates next CTS after turning. If gyro correction is enabled then the value of Plan CTS is also compensated.

**Turn rad:**

Turning radius of the next turn as defined in route planning.

**Turn rate:**

Turning rate of the next turn with current speed.

---

## How to ask ETA

Estimated time of arriving to a waypoint is calculated by the ECDIS. In Route Monitor dialog box user can select waypoint number and speed profile for calculation.

### ETA WP:

Indicates number of special ETA waypoint and estimated time and distance to it.

### Final WP:

Indicates number of Final waypoint and estimated time and distance to it.

*Monitored route is optimized to Max Speed.*

ROUTE MONITORING - TOKYO	
Next WP	<input type="text" value="2"/> Max speed
ETA WP	<input type="text" value="4"/> Time 15 Dec 97 07:34 Distance 7.9 nm
Final WP	<input type="text" value="12"/> Time 15 Dec 97 09:18 Distance 40.9 nm
Suggested speed	<input type="text"/> min Kt
Trial speed	<input type="text"/> Kt
Speed profile	<input type="text" value="Plan"/>
Center line	<input type="text" value="On"/> for ARPA
Channel borders	<input type="text" value="Off"/> radar

### Speed profile:

There are 3 calculation strategies:

- **Plan;** if selected, the system calculates with optimization made in Route Planning mode.
- **Trial;** if selected, you can enter speed to test ETAs with different speeds.
- **Current;** if selected, system calculates ETAs using average speed of last five minutes. **Note,** if Speed Profile is selected as Current, own ship average speed is displayed in Trial speed box. (i.e. speed which is used "Current" Speed profile calculation.)

### Trial speed:

You can enter desired speed for calculation of ETA to waypoint.

*Speed profile is changed to Trial speed. You can enter Trial speed and system will calculate ETAs.*

ROUTE MONITORING - TOKYO	
Next WP	<input type="text" value="2"/> Max speed
ETA WP	<input type="text" value="5"/> Time 14 Jan 98 15:06 Distance 9.7 nm
Final WP	<input type="text" value="12"/> Time 14 Jan 98 17:04 Distance 40.9 nm
Suggested speed	<input type="text"/> min Kt
Trial speed	<input type="text" value="12.0"/> Kt
Speed profile	<input type="text" value="Trial"/>
Center line	<input type="text" value="On"/> for ARPA
Channel borders	<input type="text" value="Off"/> radar



*Time table optimization displayed in Route monitoring.*

ROUTE MONITORING - TOKYO	
Next WP	2 Timetable
ETA WP	5 Time 14 Jan 98 07:22 Distance 9.7 nm
Final WP	12 Time 14 Jan 98 08:57 Distance 28.4 nm
Plan final	14 Jan 98 09:20
Off plan	24 min
Suggested speed	8.3 Kt
Trial speed	12.0 Kt
Speed profile	Trial
Center line	On for ARPA
Channel borders	Off radar

**Plan final:**

It is displayed ETA final WP. This value has been given in route planning mode in Parameters sheet.

**Off Plan:**

Indicates time difference between planned ETA and calculated ETA to final WP.

**Suggested speed:**

The system calculates suggested speed so that ETA final WP would be same as planned ETA if type of optimization was Time table.

Table below shows how the system calculates ETAs:

Type of selected speed profile / optimization on Route Monitor Window	Used speed from current point to the next wp	Used speed from the next wp to the final wp
Speed profile: Plan MAX SPEED	current average speed	planned leg speed
Speed profile: Plan TIMETABLE	current average speed	planned leg speed
Speed profile: Plan ECO: COST	current average speed	planned leg speed
Speed profile: Plan ECO: PROFIT	current average speed	planned leg speed
Speed profile: Trial	current trial speed	current trial speed
Speed profile: Current	current average speed	current average speed

---

## Route monitoring related alarms

Following alarms are related to route monitoring:

**2052 Route: Illegal ETA WP**, which will appear when the system cannot use the selected ETA waypoint. The reason might be corrupted or missing route file.

**2053 Route: Illegal next WP**, which will appear when the system cannot use the selected next waypoint. The reason might be corrupted or missing route file.

**2054 Route: Illegal final WP**, which will appear when the system cannot use the selected final waypoint. The reason might be corrupted or missing route file.

**2060 Route: WP change disabled**, which will appear when the you try to change next or final waypoint while the system is in automatic Route Steering. Leave automatic Route Steering and change then the waypoint.

**2063 Route: Select disabled**, which will appear when the you try to select a new route for Route Monitoring while the system is in automatic Route Steering. Leave automatic Route Steering and select then a new route.

**2064 Route: Cancel disabled**, which will appear when the you try to cancel current Monitored Route while the system is in automatic Route Steering. Leave automatic Route Steering and cancel then the current route.

**2454 Route: End reached**, which will appear when the own ship passes the last waypoint. The system cancel current Route Monitoring. Normally this alarm appears only, if alarm 2458 is left unacknowledged.

**2457 Route: Outside chl limits alarm**, which will appear if the own ship is outside the monitored channel. This alarm is repeated every minute, if the condition continues.

Following alarms are related to route monitoring when automatic Route Steering is not used:

**2451 Route: WP approach alarm**, which will appear when the own ship arrives within selectable time to wheel over point of the next waypoint

**2458 Route: Last WP approach alarm**, which will appear when the own ship arrives within selectable time to the final waypoint Acknowledgement of this alarm cancels current Route Monitoring.

# User chart control

---

## Introduction

User charts are simple overlay charts which the user has made for his own purposes. They can be displayed on both radar screen and electronic chart on ECDIS display. These charts are intended for highlighting safety related things like position of important navigation marks, safe area for the ship etc. User Charts areas can be used to activate alarms and indications based on user defined danger symbols, lines and areas. When route or own ship estimated position is going to across User Chart symbol, line or area which is defined as a dangerous one, an alarm or indication is generated by the system. See chapter "Chart Alarm calculation".

A user chart consists of points, lines and letter/number symbols etc. A user chart contains max. 2000 lines and 1000 symbols (letters and numbers). The user chart is displayed on the radar display and its position and shape is based on the vessels actual position. When own ship is moving in the area covered by the user chart the elements of the user chart are superimposed on the radar picture with max 80 nearest elements displayed. The user charts can also be shown on ECDIS display. In this way the radar display can be kept as "clean" as possible for radar target detection.

Different symbols and segments:

- **Line;** You can define four different type of lines. Lines can be use to Chart Alarm calculation and/or display on radar:
  - **Navigation lines:** Displayed on both displays (radar + ECDIS). Navigation lines are reference lines for coast line.
  - **Coast line:** Displayed on ECDIS screen only. Coastal line is usually well defined (by chart digitizer) multisegment line showing the coast line. User is able to create this type of line in case of there is no suitable chart available over desired area in ARCS format or in S57 format.
  - **Depth contour:** Displayed on ECDIS screen only. Depth line shows the selected depth levels. User is able to create this type of line in case of there is no suitable chart available over desired area in ARCS format or in S57 format.
  - **Route line:** Displayed on both displays (radar + ECDIS). Route lines are zones for anchoring and traffic separation lines etc.
- **Area:** User can define closed areas, which the system can use to detect safe water areas. If route or estimated ship position is going to across the area, system is able to give warning to user. These areas can be used to specify safe areas as defined by the master or by the policy of the shipowner. They are always available regardless of the S57 or ARCS chart material used.
- **Symbols:** User selectable, symbols can be displayed on both displays or on ECDIS display only. Symbols are used to indicate buoys, light houses, fixed targets, wrecks etc. Symbols can be use to Chart Alarm calculation.
- **Tidals:** Displayed on ECDIS screen only. Tidals can be used to make own notes about tide at user defined points.
- **Points:** It doesn't itself have any symbol on radar screen, but it is a very important element of a User chart See chapter "What is a User Chart Point and for which purpose it is used ?" on page 253.

Operation of User Chart push button is following:

1. When you press USER CHART push button, **USER CHART** dialog box will appear to Dialog box area.
2. If you already have **USER CHART** dialog box on display and you press USER CHART push button, you will get User chart menu on display.



Select
Cancel
Create
Backup and Restore
Combine
Point report
Line report
Area report
Symbols report
Full report
Report for radar

**Select:**

User can select User chart file to display on the radar screen and on Electronic chart or select to edit it.

**Cancel:**

Cancels User chart file.

**Create:**

User can create new User chart file by naming it by this function.

**Backup and Restore:**

User can make backup copy from User chart file or restore User Chart file from backup device.

**Combine:**

User can join User Charts together.

**Point report:**

This function generates report from Points of User chart.

**Line report:**

This function generates report from lines of User chart.

**Area Objects report:**

This function generates report from area objects of User chart.

**Symbols report:**

This function generates report from symbols of User chart.

**Full report:**

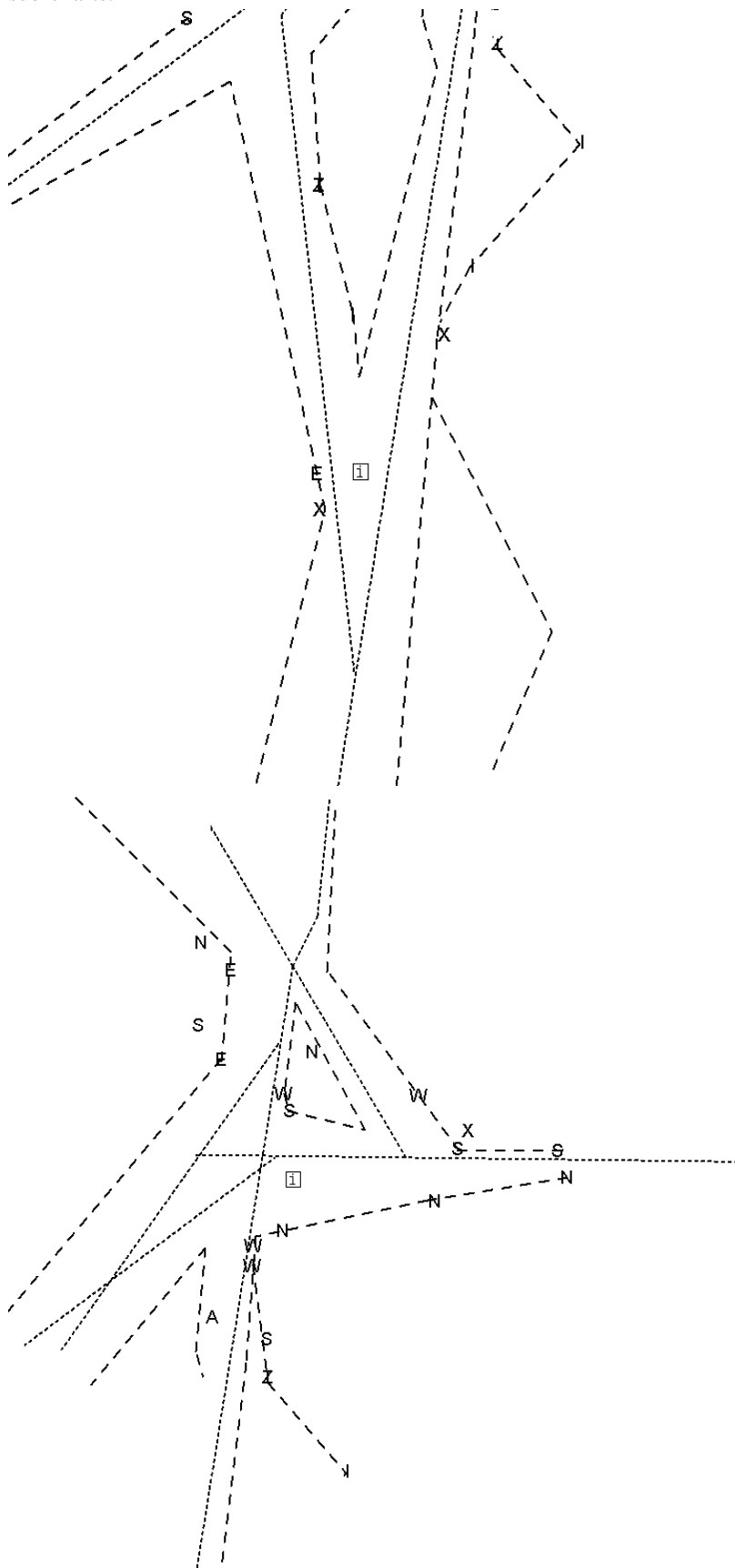
This function generates report from all the objects of User chart.

**Report for radar:**

This function generates report from all the objects of User chart, which are displayed on radar screen.



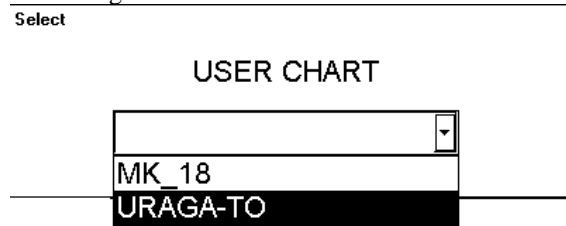
Below are some examples of sub-charts from the above example. Note the position used for points to collect the sub-charts.



---

## How to select User Chart

1. Press **User Chart** push button and select from menu **Select**. The following list box appears to the Dialog box area:



2. User chart list box appears to the dialog box area. Highlight desired User chart to select it.
3. Select desired User chart from a list box.
4. User chart will be loaded to ECDIS processor and it is displayed on the Electronic chart area. For more information about control User chart display, see Chapter "Details of chart display".

Mon.Route TOKYO      Plan Route  
UserChart URAGA-TO Ref Target

Chart field looks as this when URAGA-TO has been selected as user chart.

---

## Select datum

Selection of datum is very important, if you manually enter latitude-longitude positions from the control panel or keyboard or if you use digitizer. If you only operate with cursor to add and to modify waypoint locations, then you could use any datum, although it is recommended to use native datum of the chart. For more information to select datum, see chapter "Datum".

---

## How to create User Chart

1. Press **User Chart** push button from Control Panel.
2. Select **Create** from the menu.
3. Typewriter appears to the Dialog box area. Give the name to User Chart and press OK.
4. Now you have User Chart dialog box with five sheets in the Dialog box area.

There are following introduction of User Chart sheets

### Note:

If you want User chart to be displayed on the electronic chart make sure, that **Points, Symbols & Tiduals, Lines and Areas of User chart** are selected in **Mariner** sheet.

## Point sheet

To select between Point, Symbol, Line,, Area and Tidal sheets to be opened either press button



or go by cursor above Point, Symbol, Line, Area or Tidal text and press SELECT

USER CHART - URAGA-TO / 03.09.1999 09:40

Point	Line	Area	Symbol	Tidal
-------	------	------	--------	-------

Current	<input type="text" value="3"/>	Total	<input type="text" value="6"/>
---------	--------------------------------	-------	--------------------------------

Name	<input type="text" value="NO 1"/>	Position	
		Lat	<input type="text" value="35°29.566N"/>
		Lon	<input type="text" value="139°52.481E"/>

First	<<	>>	Last
-------	----	----	------

Add	Import. . .	Delete
-----	-------------	--------

Enable changes                      Displayed

### Enable changes:

User has to select this in order to modify User Chart. When user select Enable changes, User Chart is removed from the radar(s). When you stop modifying User Chart remove selection Enable changes (or close User chart window), the system automatically reload the User chart to radar(s)

### Current:

It is indicated number of current Point in this field. They are collection points for sub charts. User can select Point by editing desired number to edit box or create new one.

### Total:

Total indicates total number of Points.

### Name:

User can give name to current point.

### Lat:

User is able to enter to edit box latitude of Point.

### Lon:

User is able to enter to edit box longitude of Point.

### Add:

This function adds new record next to current record. User can either edit position by entering new co-ordinates or by showing new location with the trackball and select pushbutton inside the Electronic chart area.

### Delete:

This function deletes current record of Point.

### Import:

User is able to select from the list a file to import into current Point file.

### First:

Pushing this control user gets first point of the file.

### Last:

Pushing this control user gets last point of the file.

### >>:

Pushing this control user gets next point of the file.

### <<:

Pushing this control user gets previous point of the file.



## Symbol sheet

To select between Point, Symbol, Line, Area and Tidal sheets to be opened either press button



or go by cursor above Point, Symbol, Line, Area or Tidal text and press SELECT

USER CHART - URAGA-TO / 03.09.1999 09:43

Point	Line	Area	Symbol	Tidal
-------	------	------	--------	-------

Current	1	Total	87
Name	DAISAN-K	Position	
		Lat	35°17.087N
		Lor	139°44.459E
Symbol	X		
<input checked="" type="checkbox"/> Dsp on radar			
<input checked="" type="checkbox"/> Danger Symbol			

First	<<	>>	Last
Add	Import	Delete	

Enable changes      Displayed

### Enable changes:

User has to select this in order to modify User Chart. When user select Enable changes, User Chart is removed from the radar(s). When you stop modifying User Chart remove selection Enable changes (or close User chart window), the system automatically reload the User chart to radar(s)

### Current:

It is indicated number of current Symbol in this field. User can select number of symbol by editing desired number to edit box or create new one.

### Total:

Total indicates total number of symbols.

### Name:

User can give name to current symbol.

### Lat:

User is able to enter to edit box latitude of symbol.

### Lon:

User is able to enter to edit box longitude of symbol.

### Symbol:

User can choose desired symbol. If you left this field blank, in chart area is displayed text entered Name field.

### Dsp on radar:

If selected, symbols are displayed also on radar screen.

### Danger Symbol:

User can select if the symbol is part of Chart Alarm calculation.

### Add:

This function adds new record next to current record. User can either edit position by entering new co-ordinates or by showing new location with the trackball and select pushbutton.

### Delete:

This function deletes current record of symbol.

### Import:

User is able to select from the list a file to import to current symbol file.

### First:

Pushing this control user gets first symbol of the file.

**Last:**

Pushing this control user gets last symbol of the file.

>>:

Pushing this control user gets next symbol of the file.

<<:

Pushing this control user gets previous symbol of the file.

## Line sheet

To select between Point, Symbol, Line, Area and Tidal sheets to be opened either press button



or go by cursor above Point, Symbol, Line, Area or Tidal text and press SELECT

USER CHART - URAGA-TO / 03.09.1999 09:43

Point Line Area Symbol Tidal

Current 12 Total 14

Name: URAGA Element type: Navigation lin

Danger Line On Radar

Start position: Lat 35°29.866N Lon 139°51.406E End position: Lat 35°28.319N Lon 139°49.857E

Line start takes cursor position

First << >> Last

Add Import Delete

Enable changes Displayed

**Enable changes:**

User has to select this in order to modify User Chart. When user select Enable changes, User Chart is removed from the radar(s). When you stop modifying User Chart remove selection Enable changes (or close User chart window), the system automatically reload the User chart to radar(s)

**Current:**

It is indicated number of current line in this field. User can select line by editing desired number to edit box or create new one.

**Total:**

Total indicates total number of lines.

**Name:**

User can give name to current line.

**Element type:**

User can choose appropriate line type from combo box. Available types are:

- Navigation line
- Route line
- Depth contour
- Coast line

Navigation and Route lines are part of lines displayable also on ARPA radar screen. Depth contours and Coast lines are visible only on ECDIS screen.

**Danger Line:**

User can select if the line is part of Chart Alarm calculation.

**Start lat:**

User is able to enter to edit box latitude of line's starting point.

**Start lon:**

User is able to enter to edit box longitude of line's starting point.

**End lat:**

User is able to enter to edit box latitude of line's ending point.

**End lon:**

User is able to enter to edit box longitude of line's ending point.

**Line start takes cursor position:**

If selected, user can draw a new line so that he can select position of line's starting point freely. If it is not selected line will be connected to previous line.

**Add:**

This function adds new record next to current record. User can either edit position by entering new co-ordinates or by showing new location with the trackball and select pushbutton.

**Import:**

User is able to select from the list a file to import to current line file.

**Delete:**

This function deletes current record of line.

**First:**

Pushing this control user gets first line of the file.

**Last:**

Pushing this control user gets last line of the file.

**>>:**

Pushing this control user gets next line of the file.

**<<:**

Pushing this control user gets previous line of the file.

## Tidal sheet

To select between Point, Symbol, Line, Area or Tidal sheets to be opened either press button



or go by cursor above Point, Symbol, Line, Area or Tidal text and press SELECT

USER CHART - URAGA-TO / 03.09.1999 09:40

Point	Line	Area	Symbol	Tidal
-------	------	------	--------	-------

Current  Total

Name

Position

Lat	<input style="width: 100%;" type="text" value="35°22.479N"/>
Lon	<input style="width: 100%;" type="text" value="139°44.707E"/>

Type

Orientation  ° Time:

UTC +3

Strength  Kt

First	<<	>>	Last
-------	----	----	------

Add	Import. . .	Delete
-----	-------------	--------

Enable changes Displayed

### Enable changes:

User has to select this in order to modify User Chart. When user select Enable changes, User Chart is removed from the radar(s). When you stop modifying User Chart remove selection Enable changes (or close User chart window), the system automatically reload the User chart to radar(s)

### Current:

It is indicated number of current Tidal in this field.

### Total:

Total indicates total number of Tidal in User Chart.

### Name:

User can give name to current Tidal.

### Lat:

User is able to enter to edit box latitude of tidal.

### Lon:

User is able to enter to edit box longitude of tidal.

### Type:

user can select type of tidal

### Orientation, Strength and Time:

User can enter speed, course and time for tidal. Note that time of the tidal is always in local time.

### Add:

This function adds new record next to current record.

### Delete:

This function deletes current record of tidal.

### Import:

User is able to select from the list a file to import to current tidal file.

### First:

Pushing this control user gets first tidal of the file.

### Last:

Pushing this control user gets last tidal of the file.

>>:

Pushing this control user gets next tidal of the file.

<<:

Pushing this control user gets previous tidal of the file.

## Area Sheet

To select between Point, Symbol, Line, Area or Tidal sheets to be opened either press button



or go by cursor above Point, Symbol, Line, Area or Tidal text and press SELECT

USER CHART - htest / 06.09.1999 15:41

Point	Line	Area	Symbol	Tidal
-------	------	------	--------	-------

Area

Current  Total

Name:

On Radar  Danger Area

First	<<	>>	Last
-------	----	----	------

Add	Import	Delete
-----	--------	--------

Corner Points of Area

Current  Total

Mode:

<input type="text" value="60°10.658N"/>	<input type="text" value="025°02.059E"/>
---	--

First	<<	>>	Last
-------	----	----	------

Add	Delete
-----	--------

Enable changes      Not Displayed

### Enable changes:

User has to select this in order to modify User Chart. When user select Enable changes, User Chart is removed from the radar(s). When you stop modifying User Chart remove selection Enable changes (or close User chart window), the system automatically reload the User chart to radar(s)

### Area Object:

When user define an area for User Chart first he adds an area object and then gives a name and selects if it is displayed on radar and/or if it is used for safe water calculation (Danger Area).

### Current:

It is indicated number of current area in this field. User can select area by editing desired number in edit box or create new one.

### Total:

Total indicates total number of areas.

### Name:

User can give name to current area

### On Radar:

User can select if the boundary line of the area is also displayed on ARPA radar display.

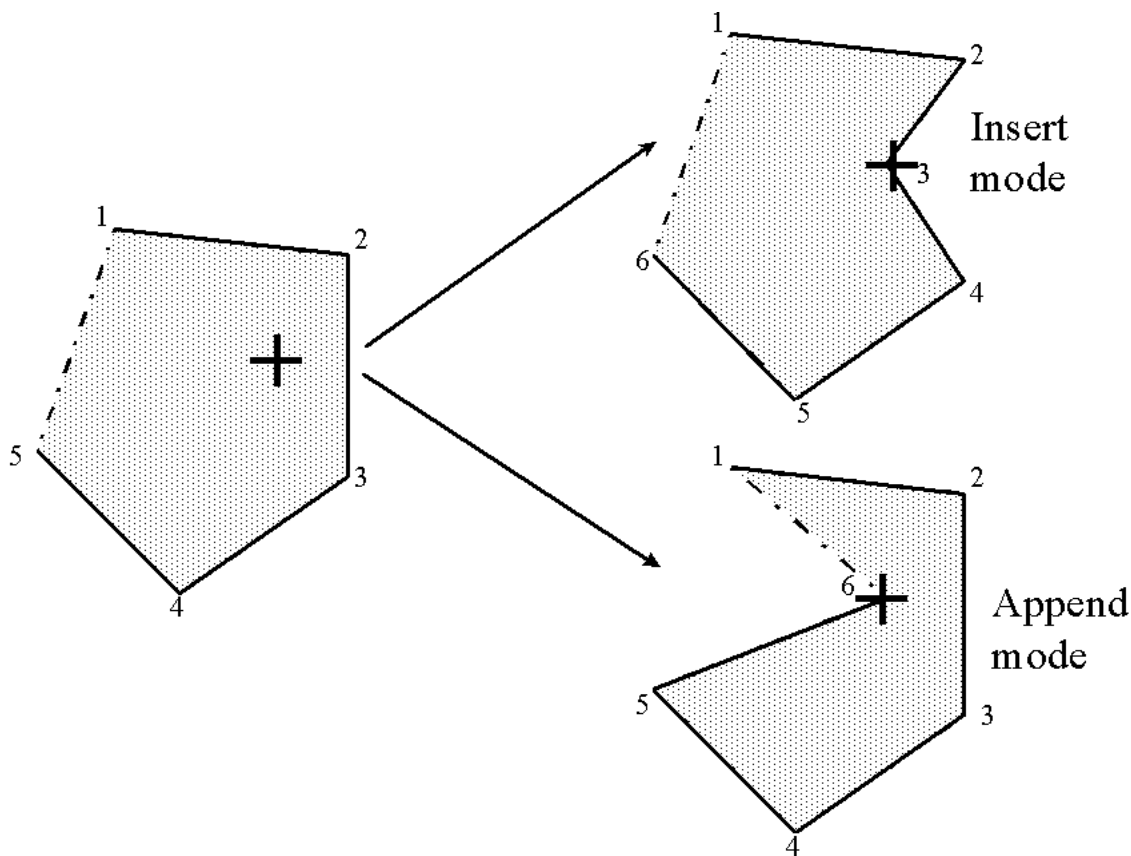
### Danger Area:

User can select if the area is part of Chart Alarm checks.

### Corner Points of Area:

After you have defined an Area Object, you can define corner points of the Area object.. Default mode for a new area without any corner points is Insert, which allow immediate entry of corner points. Other available modes are:

- **Select**, you can pick up existing corner point for viewing information of it.
- **Insert**, you can add a new corner point to most close edge of area. See figure below.
- **Append**, you can add a new corner point to latest edge of area. The latest edge is shown as dashed line. See figure below.



Difference between Insert and Append modes. There is an original area in left side and upper area is after adding a corner point using Insert mode and lower area is after adding a corner point using Append mode.

The **Insert mode** adds a corner point to the closest edge of area. The **Append mode** adds a corner point after last corner point.

### ***How to add a new Area of User Chart***

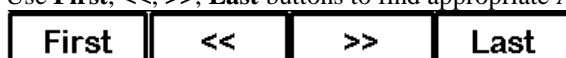
An Area of User Chart can be used for example to define safe water area displaying on the ARPA radar. To add a new User Chart Area proceed as follows:

1. Open Area sheet. Select tick box **Enable changes**.
2. Press **Add** button in **Area object** field.
3. Give a name for area and select tick boxes if it used to Danger Area calculation and/or displaying on radar.
4. In **Corner points** field select desired mode for adding corner points. (Insert or Append mode).
5. Define corner points on the electronic chart area using cursor and **SELECT** button.
6. To define more areas continue from step 2.

### ***How to select an Area of User Chart to be modified***

In **Area object** field **Current** indicates which Area of User Chart is selected to be modified. If you want another area to be modified, you have three alternatives to do it:

- Enter desired Area number of User chart object in Record field to **Current** edit box. To modify number take cursor to **Current** edit box and press **Select** button. Enter desired number and press **OK**.
- Use **First**, **<<**, **>>**, **Last** buttons to find appropriate Area of User chart.



- Use **INFO/HELP** push button to select Area of User chart. Take cursor into the Electronic chart area above desired Area one of its corner point and press **INFO/HELP** push button.

### ***How to change position of corner point***

The easiest way to move corner point is drag and drop it to desired position. To do it, proceed as follow:

1. Select display of electronic chart area so you can see desired Area of User Chart on display.
2. Take cursor above a corner point you want to move to new position.
3. Press CHART ALING push button and move cursor to desired position. Keep CHART ALIGN button pressed down while you move cursor and release it when cursor is in right position.

### ***How to delete an Area of User Chart***

To delete complete Area of User Chart, select desired Area object to be displayed in Area Object field and press **Delete** button.

## How to import Areas of User Chart

You can copy Areas of User Chart from another User Chart file to active User Chart file.

1. Create or open existing User chart file. Open Areas sheet.
2. Press **Import** button in Area Object field.
3. An User Chart Import dialog box appears

USER CHART IMPORT

Copy from

Chart **EURO-OUT**

Element category Area Object

Total record count 4

First record to copy 1

Number of records 3

Copy to

Chart EURO-IN

Element category Area Object

Copy

Select **Chart** from which you want to copy Areas

4. **Total record count** shows number of areas stored in selected User Chart. Enter into **First record to copy** field Area number from which you want to start copying.
5. Enter **Number of records** field how many areas you want copy into active User Chart file.
6. Press **Copy** button to copy selected areas. If you do not want copy exit this dialog box by pressing CANCEL in Control Panel.

## Add a new Point, Symbol, Line or Tidal to User chart

Here in this text the User chart object is a common name for **Point, Symbol, Line** and **Tidal**. The idea to modify **Point, Symbol, Line** and **Tidal** are the same all User chart objects. To select User chart to be modified open User chart object sheet. In a Record field Current number indicates User chart object which is currently to be modified. **NOTE**, you have to be corresponding sheet open in the Dialog box area. (i.e. If you are editing symbols you have to have symbols sheet opened).

To modify User Chart Areas, see chapter "Area Sheet" on page 261.

You have three alternatives to select desired User chart object:

To add a new User chart object you have following alternatives to do it:

- Press **Select** button.
- Press **Add** button in desired sheet.

To add a new User chart object by **Select** button, proceed as follows:

1. Open desired User chart object sheet.
2. Take cursor to the Electronic chart area to desired position and press **Select** button. New User chart object appears.
3. Modify data of added User chart object. For more information to modify Point, Symbol, Line and Tidal data, see "Change other data of Point, Symbol, Line" on page 266.

To add a new User chart object by **Add** button, proceed as follows:

1. Open desired User chart object sheet.

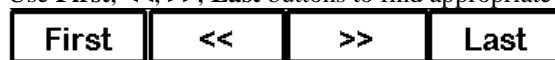


2. Press **Add** button in desired User chart object sheet. This adds a new User chart object to the end of file, which is copy of current User chart object.
3. Modify position of User chart record. For more information to modify position, see "Change position of Point, Symbol, Line or Tidal" on page 265
4. Modify other data of User chart object. For more information to modify other data, see "Change other data of Point, Symbol, Line" on page 266.

## How to select Point, Symbol, Line or Tidal to be modified

Here the User chart object is a common name for **points**, **symbols**, **line** and **tidal**. The idea to modify **points**, **symbols**, **line** and **tidal** are the same all User chart objects. To select User chart to be modified open User chart object sheet. In a Record field Current number indicates User chart object which is currently to be modified.

- Enter desired number of User chart object in Record field to **Current** edit box. To modify number take cursor to **Current** edit box and press **Select** button. Enter desired number and press **OK**.
- Use **First**, **<<**, **>>**, **Last** buttons to find appropriate User chart object.



- Use **INFO/HELP** push button to select User chart object. Take cursor into the Electronic chart area above desired User chart object and press **INFO/HELP** push button.

## Change position of Point, Symbol, Line or Tidal

To change position of User chart object you have two alternatives to do it:

- Enter latitude and longitude to Position field.
- Drag and drop User chart object with **CHART ALIGN** push button.

### **Enter latitude and longitude to Position field:**

1. Select desired User chart object sheet open.
2. Select desired User chart object.
3. Enter co-ordinates of latitude and longitude to Position field. To modify co-ordinate of Latitude take cursor to **Lat** edit box and press **Select** button. Enter co-ordinate and press **OK**. To the same way to modify co-ordinate of longitude. **Note:** Lines have start and end point position fields.

Position	
Lat	35°08.321N
Lon	139°44.794E

### **Drag and drop User chart object to new position:**



*CHART ALIGN pushbutton*

1. Select desired User chart object sheet open.
2. Take cursor into the Electronic chart area above desired User chart object.
3. Press **CHART ALING** push button and move cursor to desired position. Keep **CHART ALIGN** button pressed down while you move cursor and release it when cursor is in right position.

## Change other data of Point, Symbol, Line or Tidal

To change other data of **User chart object**, such as name, symbol, element type, proceed as follows:

1. Select desired **User chart object**. For more information to select User chart object, see "How to select Point, Symbol, Line or Tidal to be modified" on page 265.
2. Take cursor to desired edit box and press **Select** button. Modify field's value and press **OK**.

## Delete a Point, Symbol, Line or Tidal

To delete a User chart object, proceed as follows:

1. Open desired User chart object sheet.
2. Select desired User chart object to delete. For more information to select User chart object to modified, see "How to select Point, Symbol, Line or Tidal to be modified" on page 265.
3. Press **Delete** button in desired User chart object sheet.

## Import Points, Symbols, Lines or Tidal from other User chart

User is able to select User chart objects from other user chart to import them to current User chart. To import User chart object proceed as follows:

1. Open desired User chart object sheet.
2. Press **Import** button. The following dialog box appears.

The dialog box is titled "USER CHART IMPORT". It contains two main sections: "Copy from" and "Copy to".

**Copy from section:**

- Chart: U18
- Element category: Symbol
- Total record count: 77
- First record to copy: 5
- Number of records: 66

**Copy to section:**

- Chart: v1s
- Element category: Symbol

At the bottom of the dialog is a "Copy" button.

Import elements dialog box.

3. Select the chart from where User chart objects are copied.
4. Element category shows category from which User chart object's category elements are copied.
5. Enter first record to copy edit box.
6. Enter number of records to edit box.
7. Press **Copy** button.

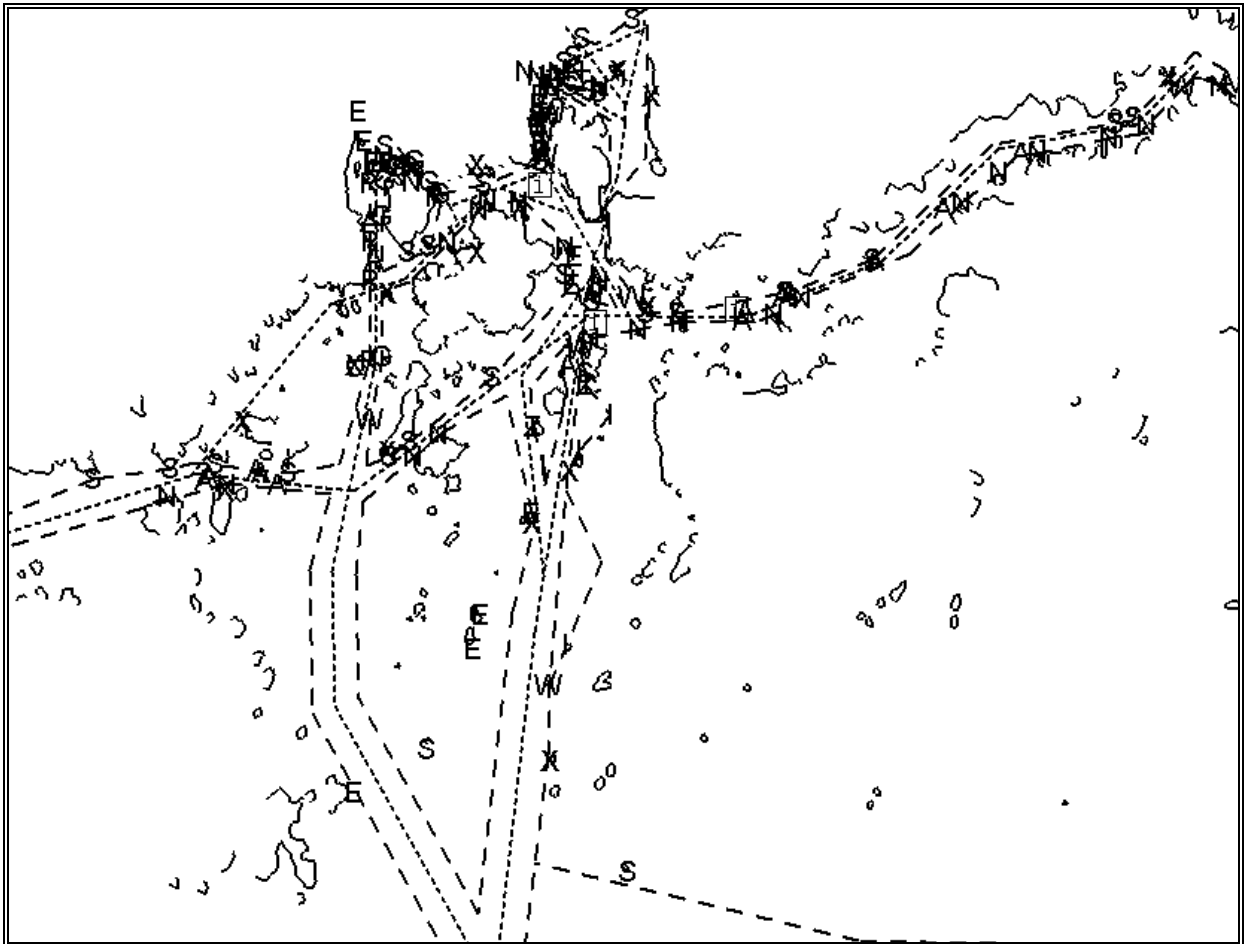
## Display on ECDIS screen

User Charts can be displayed on the ECDIS screen. They have many options available to select visible objects at any time. Their visibility is controlled from the Mariner sheet of Chart Display.

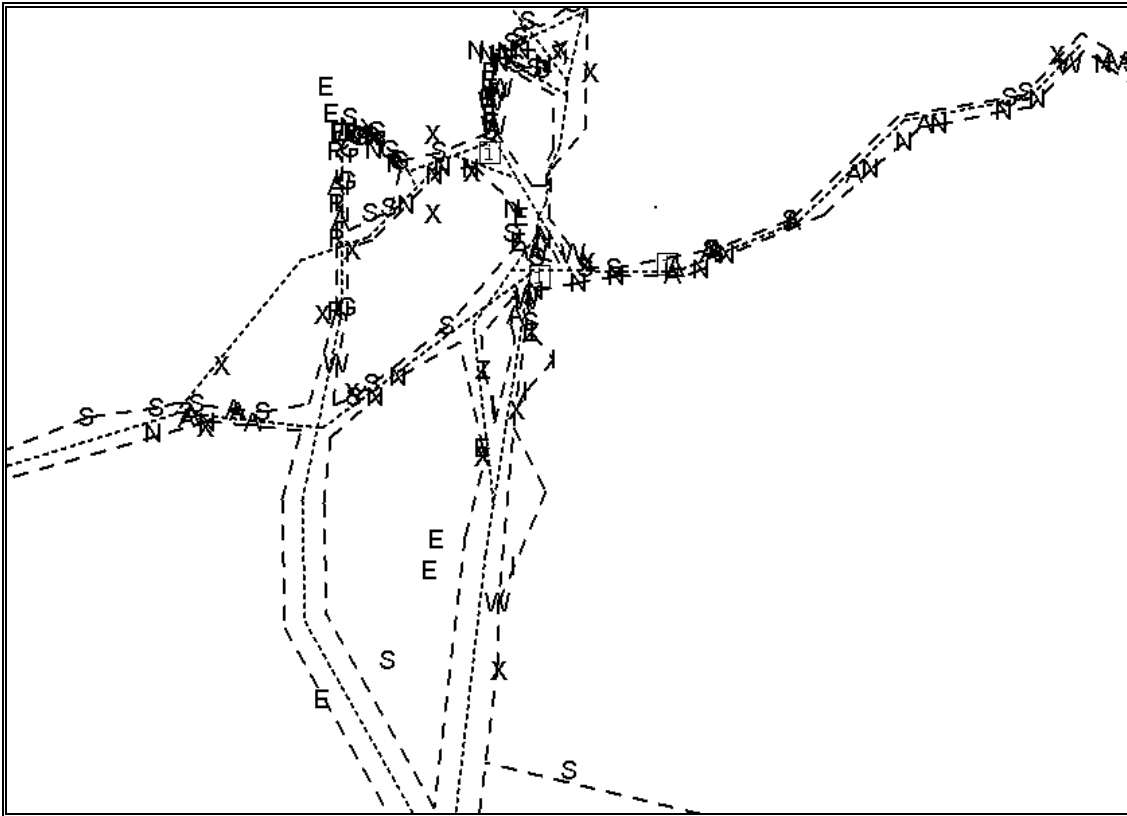
User chart

Off	Std	Other	
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Points
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Lines
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Symbols and Tidals
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Areas <input type="text" value="50% Transparent"/>
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Display only radar part of Lines, Symbols and Areas

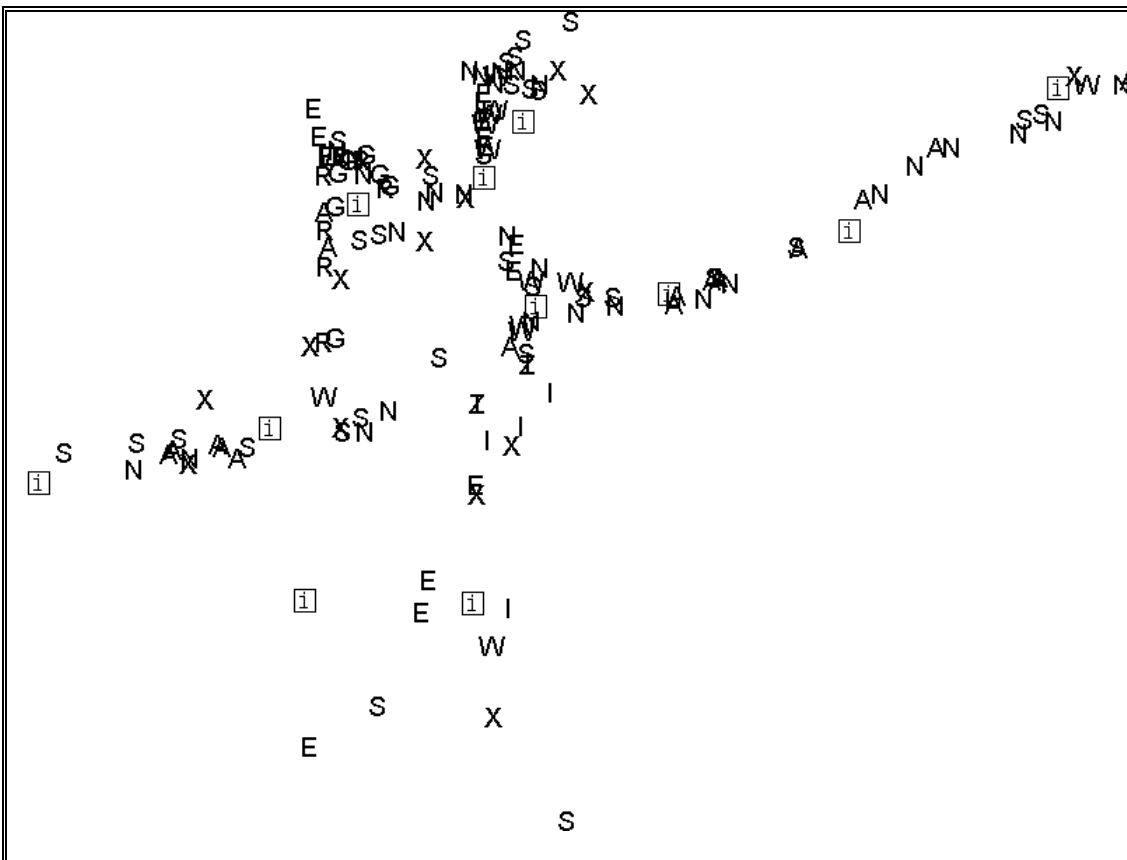
Below are some examples from the same User Chart with different selections.



An example with all User Chart objects visible.



An example with only radar part of Lines, Symbols and Areas displayed.



An example with only Symbols and Points displayed. **NOTE!** Above is also a very good example how many and where the Points should be defined.



An example with no Symbols displayed.

---

## **Backup to floppy**

This procedure can be used to make backups of User charts or to carry User charts to other planning or navigation station. For more information, see "Backup to floppy" on page 293.

---

## **Restore from floppy**

This procedure can be used to read backup copies of any User Chart file if some data is lost during Pilot data modifying. The other usage is to read User Chart files originating from other planning or navigation station. For more information, see "Restore from floppy" on page 293.

---

## **Move to planning or navigation station**

For more information, see "Move to planning or navigation station" on page 293.

---

## **Read from planning or navigation station**

For more information, see "Read from planning or navigation station" on page 294.

---

## **How to load User Chart in the old Vector system format**

For more information, see "How to load chart and route files in the old Vector system format" on page 294.

---

## **How to save User Chart in the old Vector system format**

For more information, see "How to save chart and route files in the old Vector system format" on page 294.

## Point report

Points are shown as symbol and they are very important element of a user chart. Point is a center point for subchart inside an user chart. Subcharts are small enough to be sent for radar screen.

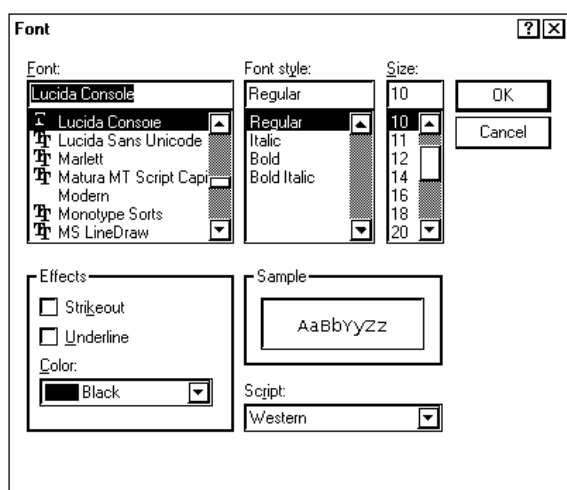
User chart's Point report is generated by the system. This report appears on display, when user press **User Chart** pushbutton and select **Point report** command from the menu.

In order to print this report do follow:

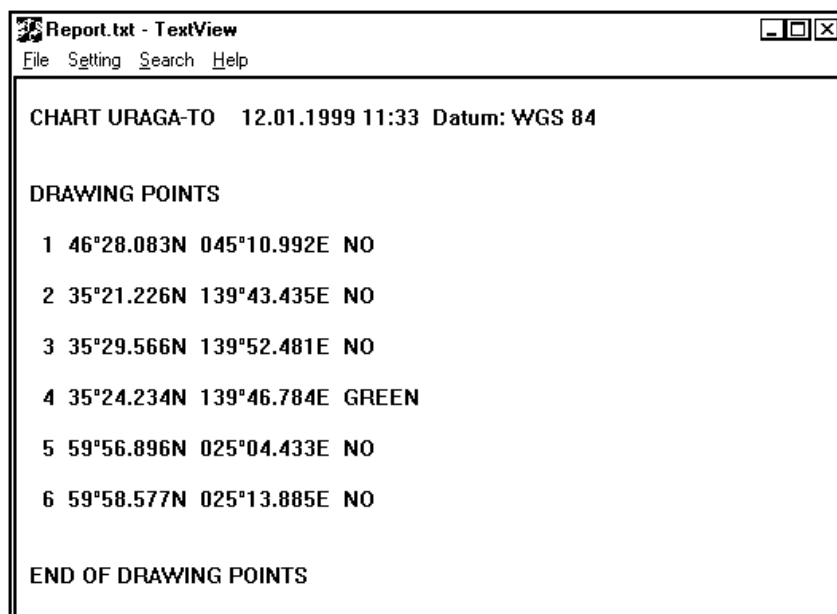
1. From File menu select Print.
2. Report is now print automatically to default printer.

If printed area is too wide for page layout, you can change size and/or type of font:

1. From **Edit** menu select **Set font...**
2. Font dialog appears. Select desired options and press **OK**. (Recommended font is Fixedsys and size of font is 9).



To close this report select from File menu Exit. Notepad will be closed.

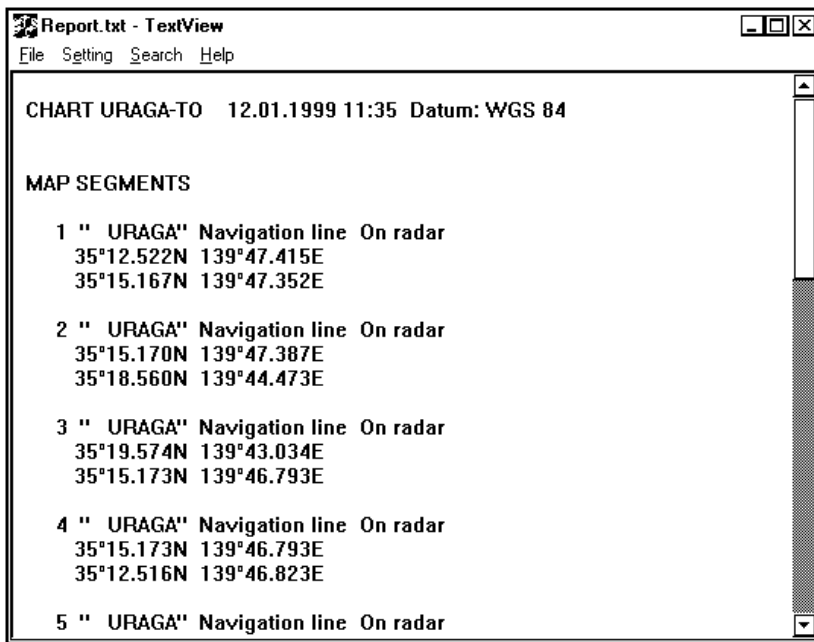


---

## Line report

User chart's Line report is generated by the system. This report appears on display, when user press **User Chart** pushbutton and select **Line report** command from the menu.

To print, to change size of font and to exit this report, "Point report" on page 271.

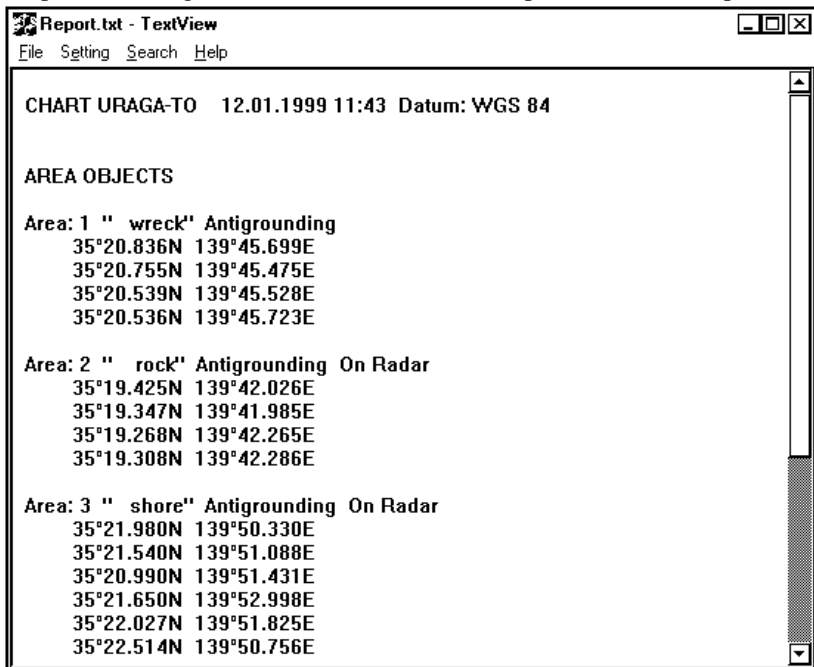


---

## Area Object report

User chart's Area object report is generated by the system. This report appears on display, when user presses **User Chart** pushbutton and selects **Area Object report** command from the menu.

To print, to change size of font and to exit this report, see "Point report" on page 271.



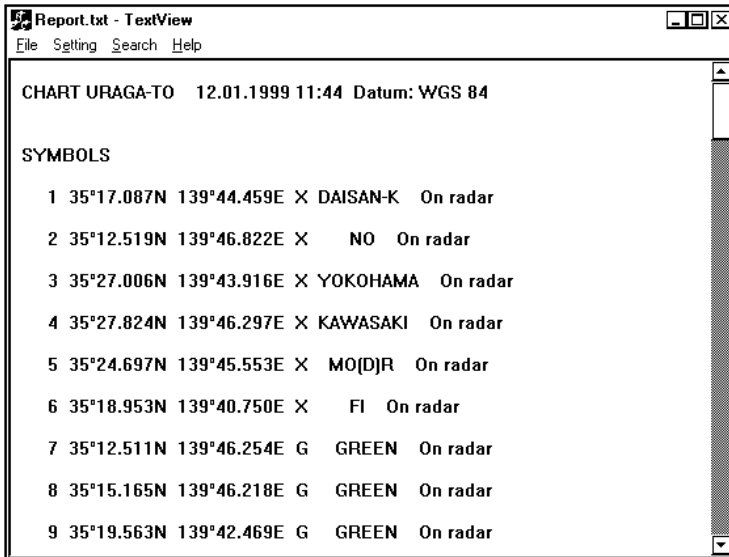


---

## Symbols report

User chart's Symbols report is generated by the system. This report appears on display, when user presses **User Chart** pushbutton and selects **Symbols report** command from the menu.

To print, to change size of font and to exit this report, see "Point report" on page 271.



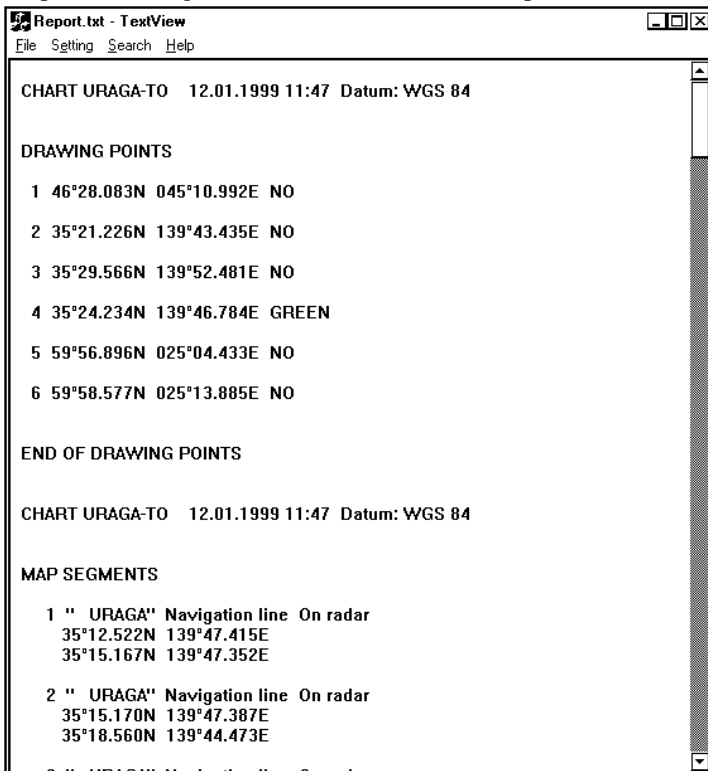
---

## Full report

This report includes information about Points, Symbols, Lines, Areas and Tidal.

User chart's Full report is generated by the system. This report appears on display, when user presses **User Chart** pushbutton and selects **full report** command from the menu.

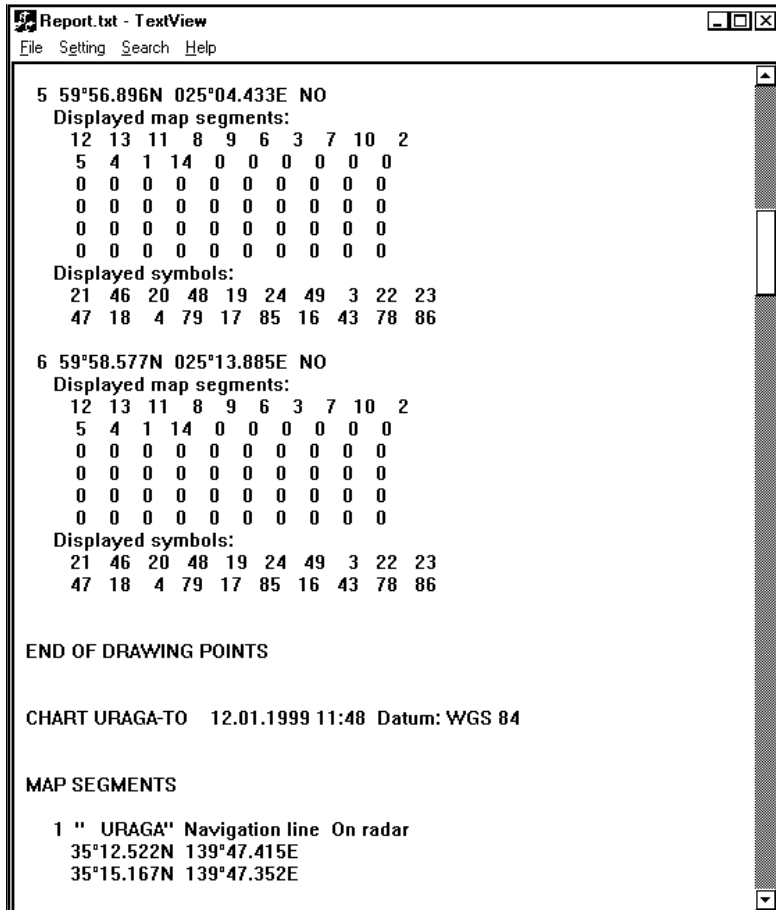
To print, to change size of font and to exit this report, see "Point report" on page 271.



# Report for Radar

User chart's Report for radar report is generated by the system. This report appears on display, when user presses **User Chart** pushbutton and selects **Report for radar** command from the menu.

To print, to change size of font and to exit this report, see "Point report" on page 271.



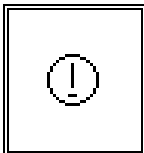
# Reference targets

---

## Introduction

The system has a built in position calculating device that is based on tracking radar targets.

In the narrow water navigation, the radar is one of the best position sensors. The Reference Target is specially developed to use the radar as a position sensor. It is required that co-ordinates of all Reference targets which can be used for above, are included in the reference target.

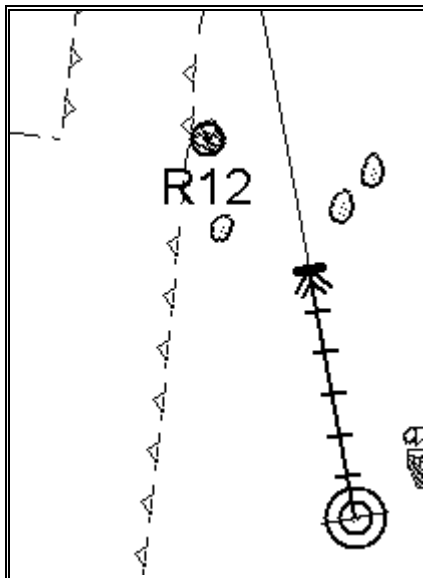


Reference target symbol when it is displayed on chart display.

The chart containing Reference targets must have at least 8 Reference targets inserted. The radar must acquire simultaneously at least 2 fixed targets before the position is taken into the calculation. For more information, how to use reference target for position calculation, see chapter "Using ARPA targets for position calculation"

Reference targets are also used in Gyro error compensation.

For more information to use Reference targets in Gyro error compensation, see chapter "Gyro error correction" on page 312



Reference target presentation on chart display when Reference target function is activated and ECDIS receives target information from the radar (target number with letter R).

Operation of Ref target push button is following:

1. When you press REF TARGET push button, **REFERENCE TARGET** dialog box will appear to Dialog box area.
2. If you already have **REFERENCE TARGET** dialog box on display and you press REF TARGET push button, you will get Reference target menu on display.



pop-up menu:

**Reference target:**

It is possible to start or stop reference targets monitoring.

**Select:**

User can select from list box reference target file.

**Cancel:**

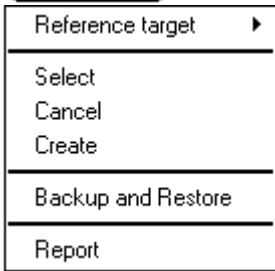
Cancels selected reference target file.

**Create:**

User can give name for reference target.

**Backup and Restore:**

User can make backup copy from reference target file or restore from backup media.

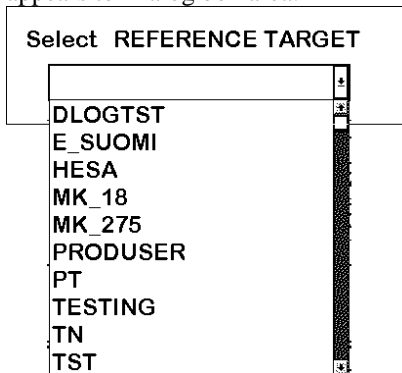


**Report:**

User can take tabulated reference target report.

## How to select Reference targets

1. Press **Reference target** push button and select from menu **Select**. The following list box appears to Dialog box area:



Reference target list box appears to the dialog box area. Highlight desired Reference target to select it.

2. Select desired Reference target from list box.
3. Reference target will be loaded to ECDIS processor. For more information to control Reference target, see Chapter "Details of chart display".

Plan Route	Pilot Data
Ref Target MK_18	ARPA 1

---

## Select datum

Selection of datum is very important, if you manually enter latitude-longitude positions from the control panel or keyboard or if you use digitizer. If you only operate with cursor to add and to modify waypoint locations, then you could use any datum, although it is recommended to use native datum of the chart. For more information to select datum, see chapter "Datum".

---

## How to create Reference target

1. Press **Ref target** push button from Control Panel.
2. Select **Create** from the menu.
3. Typewriter appears to the Dialog box area. Give the name to Reference target and press OK.
4. Now you have dialog box with Target sheet in the Dialog box area.

Sheet: "TARGET"

REFERENCE TARGET - MK\_18 / 21.06.1999 11:36

Target

Current 4 Total 19

Name LINTUPAA Element type Normal

Position Lat 60°06.680N Lon 024°53.840E

Seek Min 0.0 nm Max 24.0 nm

First << >> Last

Add Import Delete

Enable changes Displayed

### Enable changes:

User has to select this in order to do modifying.

### Current:

Indicates number of current reference target. User can change target by editing desired number to edit box or create new one.

### Total:

Indicates total number of reference targets.

### Name:

User can give name to current ref. target.

### Element type:

User can choose appropriate type from combo box.

### Lat:

User is able to enter to edit box latitude of target data record.

### Lon:

User is able to enter to edit box longitude of target data record.

**Min. and Max.**

User can define range for current ref. target within system seeks it.

**Add:**

This function adds new target next to current target. User can edit position by entering new co-ordinates or by showing new location with the trackball and select pushbutton.

**Delete:**

This function deletes record of current target.

**Import:**

User is able to select from the file list a Reference Target files to import to current file.

**First:**

Pushing this control user gets first target of the file.

**Last:**

Pushing this control user gets last target of the file.

**>>:**

Pushing this control user gets next target of the file.

**<<:**

Pushing this control user gets previous target of the file.

**Note:**

If you want reference targets to be displayed on the charts make sure, that **Reference target** is selected in **Mariner** sheet.

## Add a new Reference target record

To add a new Reference target record you have following alternatives to do it:

- Press **Select** button.
- Press **Add** button in Current record sheet.

To add a new Reference target record by **Select** button, proceed as follows:

1. Open Current target sheet.
2. Take cursor to the Electronic chart area to desired position and press **Select** button. New Reference target appears at the cursor's position.
3. Modify data of added Reference target. For more information to modify Reference target data, see "Change other data of Reference target" on page 280.

To add a new Reference target by **Add** button, proceed as follows:

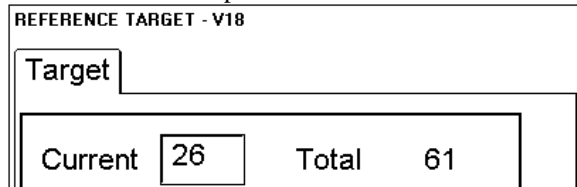
1. Open Current target sheet.
2. Press **Add** button in Current target sheet. This adds a new Reference target record to the end of Reference target. This is copy of previous Reference target record.
3. Select last record of Reference target to be modified. For more information to select Reference target to modified, see "How to select Reference target to be modified" on page 279.
4. Modify position of Reference target record. For more information to modify position of Reference target record, see "Change Reference target position" on page 279.
5. Modify other data of Reference target record. For more information to modify other data of Reference target record, see "Change other data of Reference target" on page 280.

---

## How to select Reference target to be modified

In a Record field number of current indicates reference target record which is currently to be modified. You have three alternatives to select desired reference target record:

- Enter desired number of Reference target record in Record field to Waypoint edit box. To modify Waypoint's number take cursor to Waypoint edit box and press **Select** button. Enter desired number and press **OK**.



REFERENCE TARGET - V18

Target

Current 26 Total 61

- Use **First**, **<<**, **>>**, **Last** buttons to find desired Reference target record.
- Use **INFO/HELP** push button to select Reference target record. Take cursor into the Electronic chart area above desired symbol of Reference target and press **INFO/HELP** push button.



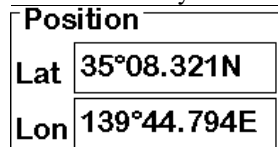
## Change Reference target position

To change position of Reference target you have two alternatives to do it:

- Enter latitude and longitude to Position field.
- Drag and drop symbol of reference point with **CHART ALIGN** push button.

### ***Enter latitude and longitude to Position field:***

1. Select desired Reference target record.
2. Enter co-ordinates of latitude and longitude to Position field. To modify co-ordinate of Latitude take cursor to **Lat** edit box and press **Select** button. Enter co-ordinate and press **OK**. To the same way to modify co-ordinate of longitude.



Position

Lat 35°08.321N

Lon 139°44.794E

### ***Drag and drop symbol of Reference target to new position:***



*CHART ALIGN pushbutton*

1. Take cursor into the Electronic chart area above desired symbol of Reference target.
2. Press **CHART ALING** push button and move cursor to desired position. Keep **CHART ALIGN** button pressed down while you move cursor and release it when cursor is in right position.

## Change other data of Reference target

To change other data of Reference target, such as name, element type and seeking range, proceed as follows:

1. Select desired Reference target record. For more information to select Reference target record, see "How to select Reference target to be modified" on page 279.
2. Take cursor to desired edit box and press **Select** button. Modify field's value and press **OK**.

## Delete a Reference target record

To delete a Reference target record, proceed as follows:

1. Select desired record to delete. For more information to select record to be modified, see "How to select Reference target to be modified" on page 279.
2. Press **Delete** button in Current target sheet.

## Import record of Reference target from other chart

User is able to select records of Reference target from other charts to import them to current one. To import records proceed as follows:

1. Press **Import** button. The following dialog box appears.

The dialog box is titled "USER CHART IMPORT". It contains two main sections: "Copy from" and "Copy to".

**Copy from section:**

- Chart: MK\_18
- Element category: Reference target
- Total record count: 21
- First record to copy: 1
- Number of records: 18

**Copy to section:**

- Chart: DUVER
- Element category: Reference target

At the bottom of the dialog is a button labeled "Copy".

Import Reference target dialog box.

2. Select the chart from where Reference targets are copied.
3. Enter first record to copy.
4. Enter count of copied records to **Number of records** edit box.
5. Press **Copy** button.



---

## Associated alarms

Reference Targets have following associated alarms:

"**1102 RefTgt: Less than 8 Targ**", if you try to start Reference targets with a file with less than 8 targets.

"**1101 RefTgt: No file selected**", if you try to start Reference targets without any selected file

"**2351 RefTgt: Forced to cancel**", if you select a new Reference target file without cancel the current file. The system cancel then automatically the current file.

"**2352 RefTgt: Lost positions**", you have selected Reference targets as positions source and the Reference target system is unable to solve own ship positions.

"**2352 RefTgt: Lost gyro corr**", you have selected Reference targets as gyro correction source and the Reference target system is unable to solve gyro correction.

"**2352 RefTgt: Tracking full**", if you try to select Reference targets in use and there are less than 8 tracking channels available.

---

## Backup to floppy

This procedure can be used to make backups of Reference Targets file or to carry Reference Targets file to other planning or navigation station. For more information, see "Backup to floppy" on page 293.

---

## Restore from floppy

This procedure can be used to read backup copies of any Reference Target file if some data is lost during Reference Target modifying. The other usage is to read Pilot data files originating from other planning or navigation station. For more information, see "Restore from floppy" on page 293.

---

## Move to planning or navigation station

For more information, see "Move to planning or navigation station" on page 293.

---

## Read from planning or navigation station

For more information, see "Read from planning or navigation station" on page 294.

---

## How to load Reference Targets in the old Vector system format

For more information, see "How to load chart and route files in the old Vector system format" on page 294.

---

## How to save Reference Targets in the old Vector system format

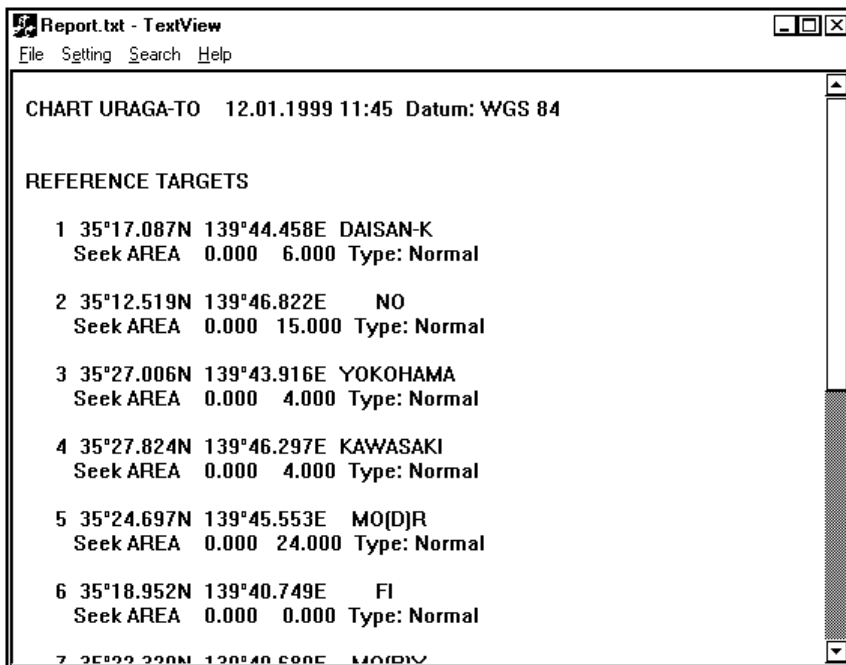
For more information, see "How to save chart and route files in the old Vector system format" on page 294.

---

## Reference target report

Reference targets are used to enable Reference target positioning using a radar. The radar is used to find these targets and ECDIS calculates the ship position based on the radar data acquired from the Reference targets.

To print, to change size of font and to exit this report, see "Point report" on page 271.



# Pilot data

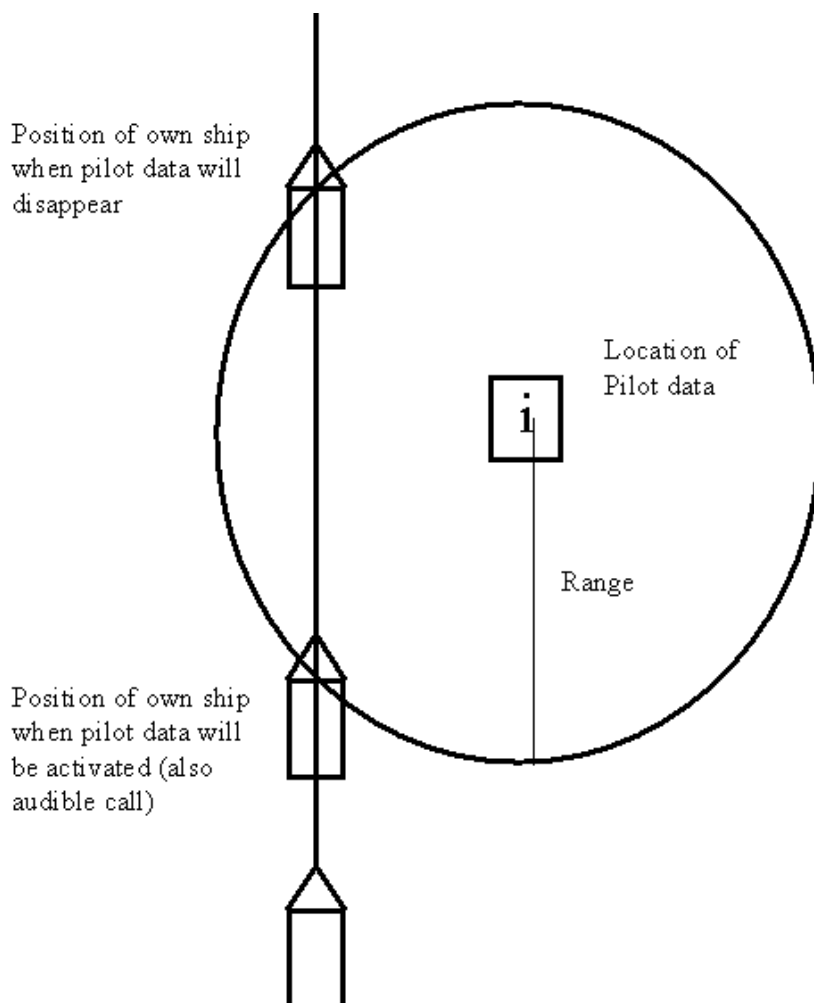
---

## Introduction

Navigation related Notebook is called PILOT DATA. Notebook pages are displayed also on radar screen. Pilot data is a notebook data file which gives messages for operator relative to a specific ship position. This will happen so that user defines Range for each Pilot Data record and ECDIS will make a comparison against own ship position and when it is required the Pilot Data will appear on the screen. (See figure below.)

There is also a possibility to associate to each waypoint a clear brief message that shall appear on the radar display together with the notice of the proximity of the relevant point.

While the ship sails, notebook pages (= records) in the selected pilot data file are compared with own ship position once per each minute to select displayed page. Also when the ship has passed a waypoint the system will make a comparison against own ship position. If the system finds that you have arrived within a new Pilot Data notebook page, it generates alarm "5001 New Pilot Data".



Mon.Route HESA-TST Plan Route Pilot Data **HABG-HKI** Depth metres Height metres TRUE MOTION  
 UserChart URAGA-TO Ref Target MK\_18 ARPA 1

<b>59°43.700N</b> GYRC <b>78.5°</b>	
<b>024°18.800E</b> CMG <b>78.5°</b>	
Finnish KKJ(84) DGPS SMG <b>17.2Kt</b>	
Plan Speed 20.0Kt	Next WP 11
Plan CTS 75°	Dist WOP 9.13nm
Route CTS 79°	ETA WOP
Ch limit 500m	25 Mar 97 15:57
Off track <320m	Next CTS 47°
Route: goto wp	Turn rad 1.0nm
	Turn rate 16°/min

PILOT DATA - HABG-HKI

Current record Edit record

Record

Current  Total 3

Position

Lat  Range  nm

Lon

CALL TO COASTING PILOT

Cursor

05.12.1999 09:24 UTC 05.12.1999 11:24 FLE Standard 1:100 000 02.00 02.00

Pilot data appears both ECDIS and radar screen.

## How to use normally

Operation of Pilot data push button is following:

1. When you press PILOT DATA push button, **PILOT DATA** dialog box will appear to Dialog box area.
2. If you already have **PILOT DATA** dialog box on display and you press PILOT DATA push button, you will get Pilot data menu on display.



Select
Cancel
Create
Backup and Restore
Report

**Select:**

Selects pilot data file to edit.

**Cancel:**

Cancels selected pilot data file.

**Create:**

Creates new pilot data file. User can give name max. 8 characters.

**Backup and Restore:**

User can make backup copy from reference target file or restore from backup media

**Pilot report:**

Generates tabulated report from selected pilot data file.

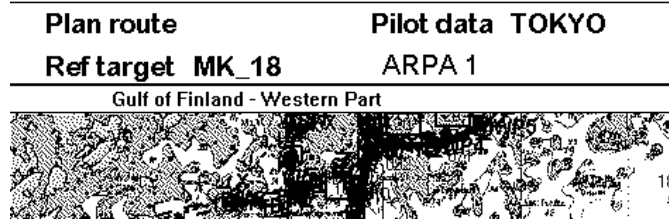
## How to select pilot data

1. Press **Pilot data** push button and select from menu **Select**. The following list box appears to Dialog box area:

### Select PILOT DATA



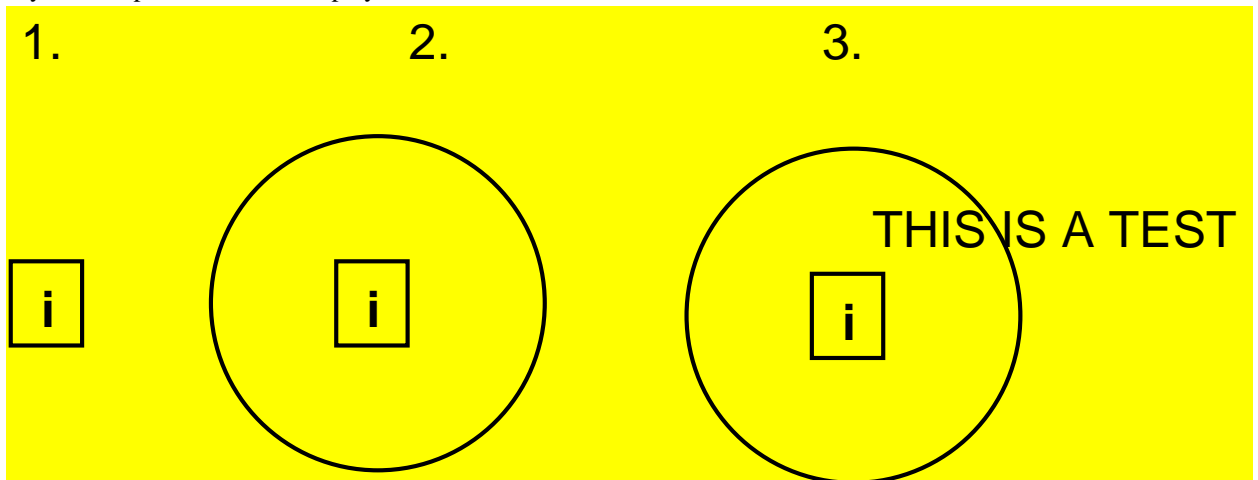
2. Select desired Pilot data from list box.
3. If selection succeeds, name of Pilot data appears to upper status bar in Pilot data field.



After pilot data has been selected it is possible to view and/or edit current pilot data file in the Dialog box area. There will open up dialog box with two sheets named as Current and Edit. The sheet "Current" allows user to view pilot data record which is activated to display on radar and the sheet "Edit" allows user to edit selected Pilot data file.

### Note:

If you want pilot data to be displayed on the electronic chart make sure, that **Pilot data** is selected in **Mariner** sheet.



Three different variation as examples to present how pilot Data is displayed over chart area:

1. Only Position mark is displayed
2. Position and Range marks are displayed
3. Also Pilot Data text is displayed over chart.

## Current record sheet

To select between Current and Edit sheets to be opened either press button



or go by cursor above Current or Edit text and press SELECT

PILOT DATA - CORUNA / 05.06.1997 14:15

Current Edit

Record

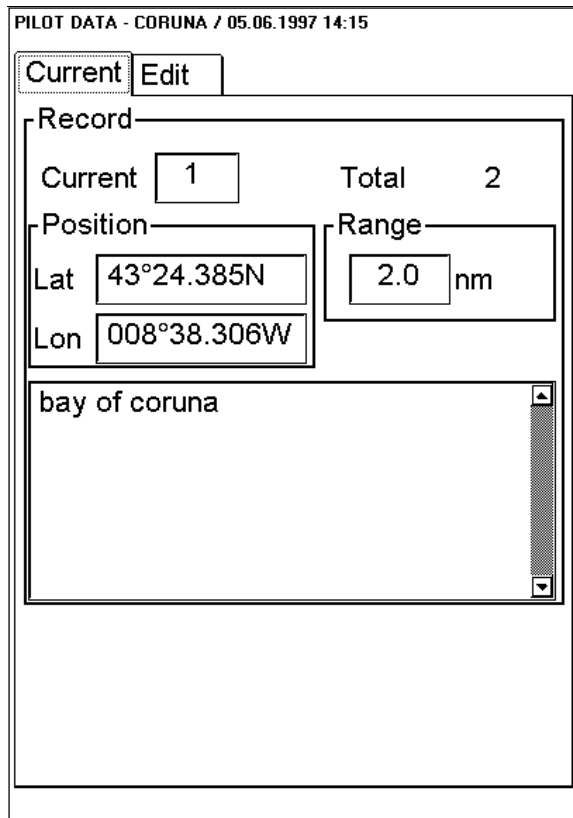
Current 1 Total 2

Position

Lat 43°24.385N Range 2.0 nm

Lon 008°38.306W

bay of coruna



### Current:

This indicates current number of record which is activated.

### Total:

This indicates amount of records in current file.

### Position:

This indicates position of current record (LAT, LON).

### Range:

Control range for the system to activate current record of Pilot data.

The lower part of the dialog box shows text entered to the current record.

## Edit record sheet

To select between Current and Edit sheets to be opened either press button



or go by cursor above Current or Edit text and press SELECT

PILOT DATA - TOKYO-1 / 01.09.1999 10:44

Current Edit

Record

Current 1 Total 4

Position

Lat 35°08.271N Range 0.5 nm

Lon 139°47.292E

USE CH 72

First << >> Last

Add Import Delete

Enable changes Partly Displayed

### Enable changes:

User has to select this in order to do modifying.

### Current:

Indicates current number of record to edit.

### Total:

Indicates amount of records in current file.

### Position:

Indicates position of current record (LAT, LON). User can edit position by entering new co-ordinates or by moving cursor with the trackball and when desired location found by pressing select pushbutton.

### Lat:

User is able to enter to edit box latitude of Pilot data record.

### Lon:

User is able to enter to edit box longitude of Pilot data record.

### Range:

User is able to enter Range of Pilot data record for a comparison against own ship position. (See Fig. How the Ecdis activates pilot data onto the display.)

### TEXT:

User is able to edit message of Pilot data record, which appears to the screen, when the ship has passed the calculated point. To edit the text move cursor inside the text edit box and push Select from Control Panel. The typewriter will appear to Dialog box area.

### First:

Pushing this control user gets first record of the file.

### Last:

Pushing this control user gets last record of the file.

### >>:

Pushing this control user gets next record of the file.

<<:

Pushing this control user gets previous record of the file.

**Add:**

This function adds new record next to current record. User can edit position by entering new co-ordinates or by showing new location with the trackball and select pushbutton.

**Delete:**

This function deletes current record of Pilot data.

**Import:**

User is able to select from the list box an existing file to import the whole file or part of file to current Pilot data file.

---

## How to create a new Pilot data

If you want to create a new pilot data, proceed as follows:

1. Press **Pilot data** push button.
2. Select **Create** from the menu.
3. Give the name for Pilot data, max. 8 letters.
4. Press **OK**.

**NOTE:**

It is recommended to use TRUE MOTION display mode while editing.

### Add new Pilot data record

To add a new **Pilot data** record following alternatives to do it:

- Press **Select** button.
- Press **Add** button in Edit record sheet.

To add a new Pilot data record by **Select** button, proceed as follows:

1. Open Edit sheet.
2. Take cursor to the Electronic chart area to desired position and press **Select** button. New Pilot data record appears to the end of file.
3. Modify data of added Pilot data record. For more information to modify Pilot data record, see "Change other data of Pilot data record" on page 289.

To add a new Pilot data record by **Add** button, proceed as follows:

1. Open Edit sheet.
2. Press **Add** button in Edit sheet. This adds a new Pilot data record to the end of route, which is copy of current Pilot data record.
3. Modify position of Pilot data record. For more information to modify Pilot data record position, see "Change Pilot data record position" on page 289.
4. Modify other data of Pilot data record. For more information to modify Pilot data record other data, see "Change other data of Pilot data record" on page 289.



## How to select Pilot data record to be modified

To select Pilot data to be modified open Edit sheet. In a Record field Current indicates Pilot data which is currently to be modified. You have three alternatives to select desired Pilot data of route:

- Enter desired number of Pilot data in Record field to Current edit box. To modify Current's number take cursor to edit box and press **Select** button. Enter desired number and press **OK**.
- Use **First**, **<<**, **>>**, **Last** buttons to find desired Pilot data.



- Use INFO/HELP push button to select Pilot data. Take cursor into the Electronic chart area above desired Pilot data and press **INFO/HELP** push button.

## Change Pilot data record position

To change position of Pilot data you have three alternatives to do it:

- Enter latitude and longitude to Position field.
- Drag and drop Pilot data with CHART ALIGN push button.

### ***Enter latitude and longitude to Position field:***

1. Select Edit sheet open.
2. Select desired Pilot data.
3. Enter co-ordinates of latitude and longitude to Position field. To modify co-ordinate of Latitude take cursor to **Lat** edit box and press **Select** button. Enter co-ordinate and press **OK**. To the same way to modify co-ordinate of longitude.

### ***Drag and drop Pilot data to new position:***



*CHART ALIGN pushbutton*

1. Select Edit sheet open.
2. Take cursor into the Electronic chart area above desired **Pilot data**.
3. Press CHART ALIGN push button and move cursor to desired position. Keep CHART ALIGN button pressed down while you move cursor and release it when cursor is in right position.

## Change other data of Pilot data record

To change other data of Pilot data, such as range and text, proceed as follows:

1. Select desired **Pilot data** record. For more information to select Pilot data, see "How to select Pilot data record to be modified" on page 289.
2. Take cursor to desired edit box and press **Select** button. Modify field's value and press **OK**.

## Delete a Pilot data record

To delete a Pilot data record, proceed as follows:

1. Open Edit sheet.
2. Select desired Pilot data record to delete. For more information to select Pilot data record to modified, see "How to select Pilot data record to be modified" on page 289.
3. Press **Delete** button in Edit record sheet.

## Import Pilot data from other routes

User is able to select Pilot data records from other Pilot data to import them to current pilot data. To import Pilot data records proceed as follows:

1. In Edit sheet, press **Import** button. The following dialog box appears.

PILOT DATA IMPORT

Copy from

Pilot data

Total page count 3

First page to copy

Number of pages to copy

Copy to

Pilot data

First page copied as page

2. Select the Pilot data from where Pilot data records are copied.
3. Enter first Pilot data record to copy and enter number of copied Pilot data records to **Number of pages to copy** edit box.
4. **Copy to Pilot data** indicates file to be copied. **First page is copied as page** indicates record's to where first record is imported..
5. Press **Copy selected pages** button.

---

## Backup to floppy

This is used to make backups of Pilot data file. For more information, see "Backup to floppy" on page 293.

---

## Restore from floppy

This is used to read backup copies of Pilot data file. For more information, see "Restore from floppy" on page 293.

---

## Move to planning or navigation station

For more information, see "Move to planning or navigation station" on page 293.

---

## Read from planning or navigation station

For more information, see "Read from planning or navigation station" on page 294.

---

## Pilot data report

Use **Report** function in the PILOT DATA menu.






To print, to change size of font and to exit this report, see "Point report" on page 271.

# Backup Operations

---

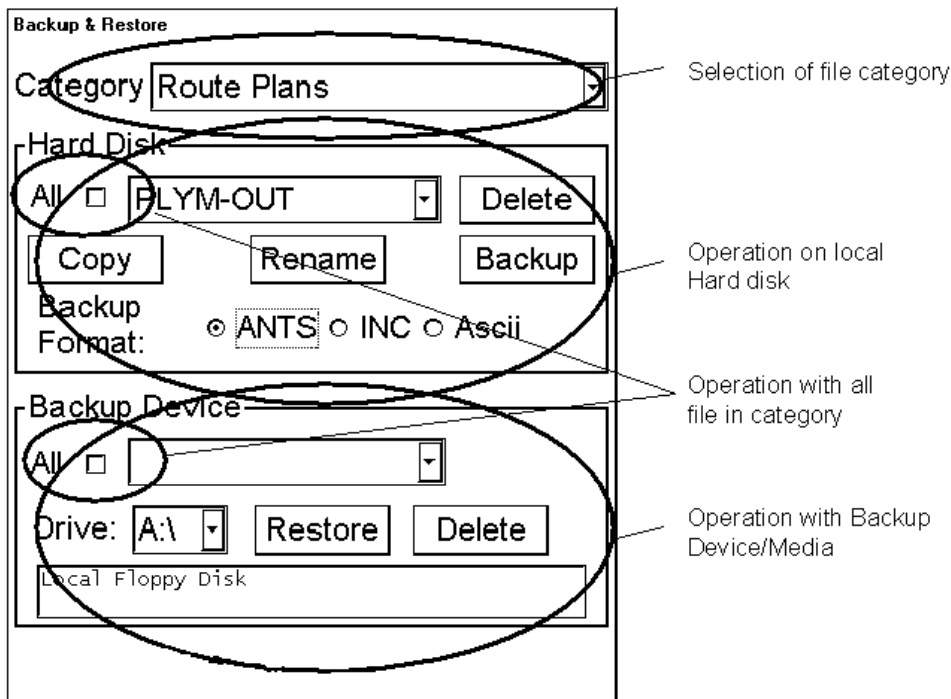
## Introduction

There are several push buttons and menus, which call maintenance function. Via this function user can make operation on hard disk such as **backup, copy, rename** or **delete**. User can make backup copy to backup device or restore from backup device to hard disk. There are listed below push buttons and menu commands, which are used to maintenance system's database:

	<b>Menu commands:</b>
	<b>Backup and Restore</b>
	<b>Backup and Restore</b>
	<b>Backup and Restore</b>
	<b>Backup and Restore</b> <b>Parameter backup...</b>
	

**Note,** Use only IBM PC formatted floppy disks.

When user selects one of pushbutton and menu command listed above File Maintenance dialog box appears in the dialog box area.



## How to find out right file category

System automatically selects corresponding file depending on your selection. (E.g. Route Plan pushbutton selects Route Plan files as default.) The categories consist of following files:

- **Route Plans**
- **User Charts**
- **Pilot datas**
- **Installation Parameters**
- **Chart Display Settings**
- **Paper Chart Setup**
- **Presentation Libraries**
- **Logs**
- **Manual Updates**
- **All Charts and Updates**

When you have Backup & Restore dialog box open, you can select desired category from **File category** combo box.. When category is selected the system shows all the possible functions you are allowed to do with selected category.

## How to make a copy of file

You can make a copy from original file using **Copy** function in Backup & Restore. To make a copy of file, proceed as follows:

1. Select desired file category.
2. Select desired file in Hard Disk -field.
3. Press **Copy** button.
4. Enter new name for selected file and press **OK**.

---

## How to copy a file to an other name

You can change name of file using **Rename** function in Backup & Restore. To copy a file to another name, proceed as follows:

1. Select desired file category.
2. Select desired file in Hard Disk -field.
3. Press **Rename** button.
4. Enter new name for selected file and press **OK**.

---

## Backup to floppy

You can make a backup from original file to floppy disk in Backup & Restore. To make a backup of file to floppy disk, proceed as follows:

1. Select desired file category.
2. Select desired file in Hard Disk -field.
3. Select desired **Drive** in Backup Device -field.
4. Press **Backup** button in Hard Disk -field.

---

## Restore from floppy

You can restore file from floppy disk in Backup & Restore. To restore file from floppy disk, proceed as follows:

1. Select desired file category.
2. Select desired **Drive** in Backup Device -field.
3. Select desired file in Backup Device -field.
4. Press **Restore** button in Backup Device -field.

---

## How to delete file

You can delete file using **Delete** function in Backup & Restore. To delete a file, proceed as follows:

1. Select desired file category.
2. Select desired file in Hard Disk -field.
3. Press **Delete** button.

---

## Move to planning or navigation station

If there is separate planning station connected to system, it is possible to move files from planning station to navigation station and vice versa.

1. From Control Panel select desired pushbutton.
2. From menu select **Backup and Restore** command.
3. In the Hard disk -field select desired file.
4. Select backup drive in **Backup device** -field. Press **Backup** button in Hard Disk -field. If **Overwrite existing files** is selected the file with the same name in another ECDIS is replaced with moved file.

---

## Read from planning or navigation station

If there is separate planning station connected to system, it is possible to read files from planning station to navigation station and vice versa.

1. From Control Panel select desired pushbutton.
2. From menu select **Backup and Restore** command.
3. Select backup drive in **Backup device** -field.
4. In the Backup Device -field select desired file.
5. Press **Restore** button in Backup Device -field. If **Overwrite existing files** is selected the file with the same name in the ECDIS is replaced with restored file.

---

## How to load chart and route files in the old Vector system format

The Route and User Chart files can read in Vector System format (Inc). When loading files in Inc format the ECDIS converts file to format used with the ECDIS. To do it, proceed as follows

1. From Control Panel select desired pushbutton.
2. From menu select **Backup and Restore** command.
3. Select backup drive in **Backup device** -field.
4. In the Backup Device -field select desired file.
5. Press **Restore** button in Backup Device -field.

---

## How to save chart and route files in the old Vector system format

The Route and User Chart files can write in Vector System format (Inc). When moving files from the ECDIS to Backup Device the ECDIS converts file to Inc format. To do it, proceed as follows

1. From Control Panel select desired pushbutton.
2. From menu select **Backup and Restore** command. There will appear Backup & Restore dialog box in the Dialog box area.
3. In the Hard disk -field select desired file and select **Backup file format** as Inc.
4. Select backup drive in **Backup device** -field. Press **Backup** button in Hard Disk -field.

## Backup of chart material

The ECDIS provides a possibility to keep chart data base identical both in the hard disk of the ECDIS and the hard disk of the backup ECDIS. If you want make a backup of chart material to backup ECDIS, open Backup & Restore dialog box and proceed as follows:

1. Select File category.
2. Select **Drive** of backup ECDIS.
3. Press **Backup** button.

The screenshot shows the 'Backup & Restore' dialog box. It is divided into three main sections. The top section, labeled 'Category', contains a dropdown menu currently set to 'All Charts and Updates', which is circled in black and labeled with a '1' to its right. Below this is the 'Hard Disk' section, which is currently empty and labeled with a '3' to its right. A 'Backup' button is located in the bottom right of this section, also circled in black. The bottom section, labeled 'Backup Device', contains a 'Drive:' label followed by a dropdown menu set to 'G:\', which is circled in black and labeled with a '2' to its right. Next to the dropdown is a 'Restore' button. Below the drive selection is a text field containing the path '\\EC1000\_002\ANTIS\_SYSTEM'. At the bottom of the dialog, there are two checked checkboxes: 'ARCS' and 'S57'.

NOTE!

After the backup has been completed the hard disk content of the backup ECDIS is identical. However the backup ECDIS doesn't automatically start to use possible new material. Press CHART PLAN and select **System>Refresh Charts after backup** from the menu.

---

## Restore of chart material

The ECDIS provides a possibility to keep chart data base identical both in the hard disk of the ECDIS and the hard disk of backup the ECDIS. If you want restore a backup of chart material from the backup ECDIS, open Backup & Restore dialog box and proceed as follows:

1. Select File category.
2. Select **Drive** of backup ECDIS. Then press **Restore** button.

Backup & Restore

Category All Charts and Updates

Hard Disk

Backup

Backup Device

Drive: G:\ Restore

\\EC1000\_002\ANTS\_SYSTEM

ARCS  S57

### NOTE!

After the restore has been completed the hard disk content of the ECDIS is identical with backup ECDIS. However your ECDIS doesn't automatically start to use possible new material. Press CHART PLAN and select **System>Refresh Charts after backup** from the menu.



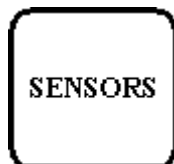
# Navigation Sensors

## How to select Navigation sensors

User can select navigation sensors used in navigation and view their current values.

Checkbox status shows whether to use the sensor for integrated navigation or not. If there is no value with sensor it indicates that sensor is not valid. Note, that content of these sheets is depending on sensors which are in use on the ship.

Sheet: "SPEED/COURSE"



*SENSORS pushbutton*

*To select between Speed/Course, Position or Other sheets to be opened either press button*



*or go by cursor above*

*Speed/Course, Position or Other text and press SELECT*

SELECT SENSORS			
Speed/Course	Pos	Other	Record
<input type="checkbox"/> Manual speed			<input type="text"/> Kt
<input type="checkbox"/> Log (no pulse)			Kt
<input checked="" type="checkbox"/> Dual log (bottom)	< ^		2.3 Kt 12.7 Kt
<input type="checkbox"/> ARPA			13.2 Kt 60.8 °
<input type="checkbox"/> Manual course			<input type="text"/> °
<input checked="" type="checkbox"/> Gyro 1			61.0 °
<input type="checkbox"/> Gyro 2			61.0 °
<input checked="" type="checkbox"/> Rate gyro			

### Manual speed:

If selected, user can enter value (Kt) for Speed.

Note: This is used only if there are no other Speed or SMG sensors selected.

### Log:

If selected, sensor is used as water speed source. **(no pulse)** is used to indicate that a log device with closed contact relay interface using 200 pulses/nm does not give any pulses and thus the speed might be wrong. If Log is selected and "no pulse" condition is detected, then system generates alarm **"2005 Log data unreliable"**.

Note: If you have a dual log, which can measure both water and bottom track, then installation parameters could be set to receive water track of the dual log as log device.

**Dual log:**

If selected, sensor is used as speed and course source. **(bottom)** is used to indicate that the dual log device says that its speed is based on bottom track.

**ARPA:**

If selected, sensor is used as speed and course source. Radar might tell its source of speed and course. Following alternatives are available: **(bottom)** if source is a log operating in bottom track, **(water)** if source is a log operating in water track, **(posit.)** if source is a position receiver such as GPS, **(manual)** if source is a manual entry, **(reftgt)** if source is a tracked target.

**Manual course:**

If selected, user can enter Course.

**Note:** This is used only if there are no other Course sensors selected.

**Gyro1:**

If selected, sensor is used as course source. **(mag)** is used to indicate value from a magnetic heading source. True heading source has no indication. If the source of Gyro1 is a gyro with synchro or stepper interface, then indication **(require set)** is used highlight that you need to set a new initial value for the gyro.

**Gyro2:**

If selected, sensor is used as course source. **(mag)** is used to indicate value from a magnetic heading source. True heading source has no indication.

If you have both gyro1 and gyro2 selected and if they value differs more than 5° then system generates alarm "**2004 Gyro data unreliable**".

**Rate gyro:**

Sensor is used as Rate of Turn source. **(calc.)** is used to indicated Rate of Turn calculated from Gyro movement.

**Note:** This release of program always selects Rate gyro.

**How to set initial value of a Gyro1**

You Gyro1 could be interfaced based on serial data and thus you don't need to set the initial gyro value. However it is very common that your Gyro1 is interfaced based on synchro or stepper interface. Then you need to set the initial value of the Gyro1. If your Gyro1 requires initial value, then there is an indication **(require set)**; see below.

<input checked="" type="checkbox"/> Gyro 1 (require set) °
--

To set initial value use Initial Settings; see below.

INITIAL SETTINGS	
Datum	<input type="text" value="WGS 84"/>
Gyro	<input type="text" value="348.6°"/>
Position discrepancy limit	<input type="text" value="0.00"/> nm

## Sheet "POSITION"

To select between Speed/Course, Position or Other sheets to be opened either press button



or go by cursor above Speed/Course, Position or Other text and press SELECT

SELECT SENSORS	
Speed/Course	Pos Other Record
<input type="checkbox"/> Alignment	Start
<input type="checkbox"/> Enable chart align	
Range	0.0 nm Bearing 0.0°
<input type="checkbox"/> Dead reckoning	
Lat	60°25.191N Lon 024°59.897E
Kalman filter	Off
	12.7 Kt 59.6°
Lat	60°25.192N Lon 024°59.897E
DGPS	Primary Diff
	12.7 Kt 59.6°
Lat	60°25.188N Lon 024°59.885E
GLL+ZDA	Secondary
	12.7 Kt 59.6°
Lat	60°25.196N Lon 024°59.908E

The field of a position sensor contains a label (here DGPS, GLL+ZDA) which indicates the name of the sensor; a status (primary/secondary/off) which indicates, if the sensor is included or not; position in conning position and local datum; speed and course which has (mag) if the course is referenced to magnetic north. A DGPS position sensor has additional text Diff, if differential signal is in use. If the position is displayed in red colour, then Kalman filter has excluded that sensor from its estimated position.

Position sensors have priority, which is indicated using sensors as primary and as secondary positioning source. Only one sensor can be primary while the others can be secondary or off. After **off**-state a position sensor is changed to **secondary**-state. After **secondary**-state a position sensor is changed to **primary**-state and if there was already a position sensor with **primary**-state it will be changed automatically to **secondary**-state. When the position source is changed based on priorities and signal validity to another position source, then you get alarm "**2009 Position source change**". Note that alarm 2009 is active only without Kalman Filter because the filter has his own process to calculate estimated position and in that process priority given by primary and secondary is not used.

If a DGPS selected as **primary** or **secondary**, changes its status from "no Diff" to "Diff" or from "Diff" to "no Diff" the system generates alarm "**4027 DGPS pos. Source change**" (alarm numbers are from 4027..4032 depending of position receiver).

**Pri no alarm** and **Sec no alarm** can be used with DGPS if you want disable alarm "**4027 DGPS pos. source change**". These selection are intended for area where the differential coverage is fading. One example is if you sail along coastline but so far away that the differential signal changes its status very often.

### Enable chart align:

If selected, user is able to do a chart alignment by using CHART ALIGN button.

### Alignment:

Alignment is selected automatically if user has defined position offset by CHART ALIGN push button. The offset values are given in Nautical Miles and degrees. If position alignment is used then user is reminded of it every 30 minutes by Alarm "**2011 ChartAlign: over 30 min**".

### Dead reckoning:

The system select automatically Dead reckoning, if there are no valid and selected position sources and if there are valid and selected speed and course sources. If system has selected Dead reckoning, then the user can enter a new position for the ship in the LAT. and LON fields.

### Kalman filter:

If selected, Kalman filter calculates the estimate of position using simultaneously all valid and selected position, speed and course sensors. To read more information about Kalman Filter, see "Filter Operation" on page 306.

**Sheet "Other"**

To select between Speed/Course, Position or Other sheets to be opened either press button



or go by cursor above Speed/Course, Position or Other text and press SELECT

SELECT SENSORS

Speed/Course | 
 Pos | 
 Other | 
 Record

True Wind

9.9 Kt      346 °

Set and Drift

(posit.) Angle -1.0 ° Manual

Crs 330.8 °      Spd 0.4 Kt

Pitch and Roll

Pitch            °      Roll            °

Depth below transducer      114.5 m

Gyro correction                    °

Distance counter                    0.7 nm

Trip counter                          0.7 nm

**True wind:**

In this field True Wind speed (Kt or m/s) and course are displayed. Note: true wind is wind relative to own ship heading. For more information, see chapter "Wind sensor" on page 316.

**Set and Drift:**

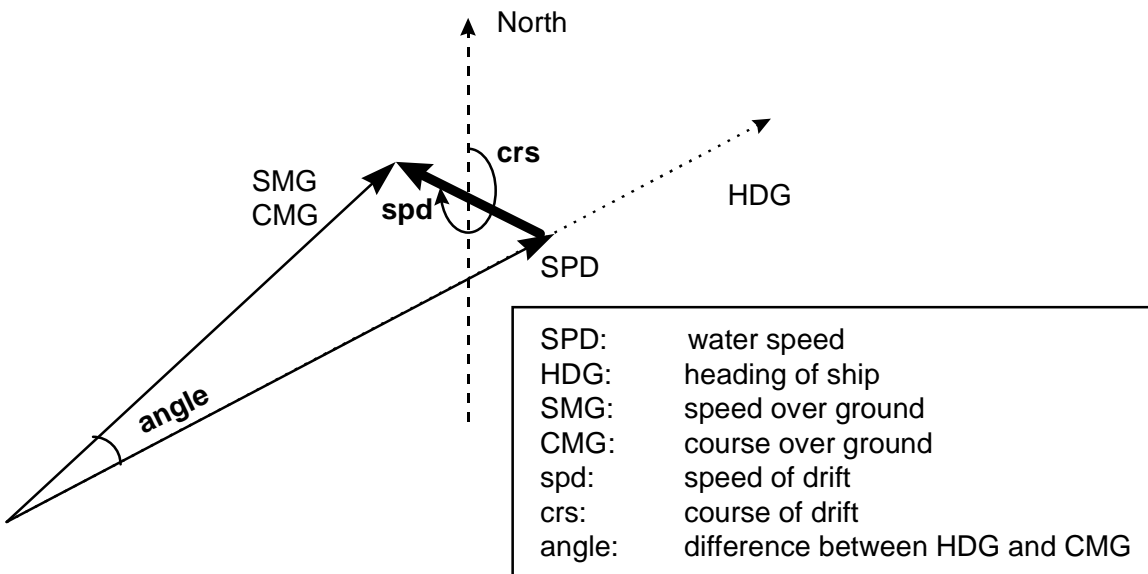
If user selects Manual tick box, this enables user to set manually speed and course of drift. Note: You can select manual drift only if there are no automatic sources of SMG and CMG. (i.e. You neither have a dual axis log nor any position receiver available.)

Angle = difference between heading and CMG

Spd = speed component of the drift vector

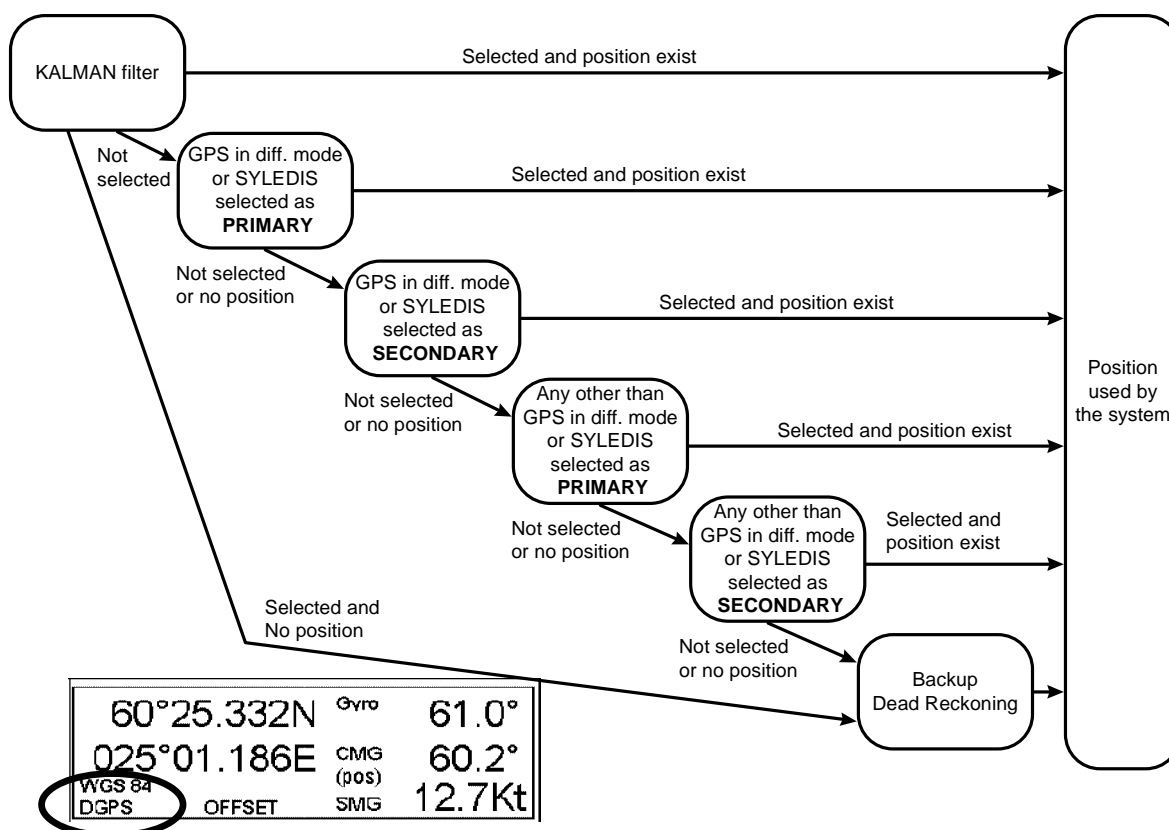
Crs = course component of the drift vector

Vector defined by (SMG and CMG) is equal to vector sum of vectors defined by (SPD and HDG) and (set and drift).



## Source of position

Use Figure below to find source of position. Kalman filter uses all position sensors, which have either **primary** or **secondary**, as input for its calculation. GPS in differential operation mode and SYLEDIS position sensors (high precision position sensors) are considered better than other position sensors.



Position used by the System is shown in right hand upper corner of ECDIS display (the example above shows DGPS). Following alternatives are available:

- **NO POSIT**, in red colour, if even no dead reckoning sensors are selected and valid.
- **DEAD REC**, in red colour, if position source is dead reckoning
- **DGPS, GPS, LORAN, DECCA** or **SYLEDIS** if position source is a receiver operating in indicated mode
- **LOST DGPS**, in red colour, if the user selection includes a DGPS device, which doesn't operate in differential mode.
- **FIL LOST DGPS**, in red colour, if the Kalman filter is in use and it includes a DGPS device, which doesn't operate in differential mode.
- **REFTARG**, if position source is tracked ARPA targets controlled by the system
- **FILTER HIGH**, if position source is the Kalman filter with high precision position sensor.
- **FILTER**, if position source is the Kalman filter without high precision position sensors
- **BAD FILTER**, in red colour, if position source is the Kalman filter and the filter has excluded at least one of the selected sensors because of bad behaviour

If the system changes the source of position based on lost sensor data or change of differential mode of a DGPS sensor, then the system generates alarm "**2009 Position source change**". If the Kalman filter is used then the system generates alarm "**2010 Filter: Pos source change**"

If a selected DGPS sensor changes its operation mode and if the user has used selection **Primary** or **Secondary**, then the system generates alarm "**4027 DGPS pos. source change**" (4027 for first sensor, 4028 for second etc.).

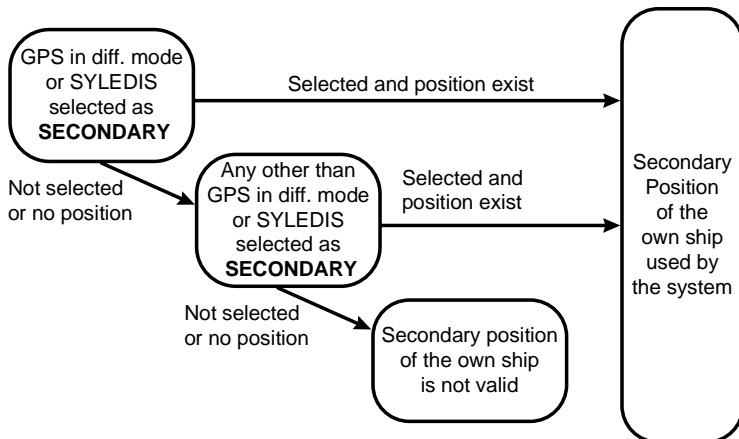
## Primary and Secondary position of own ship

The system has three different positions for own ship: System position, Primary position and Secondary position:

- System position, which is used for navigation and steering. See chapter "Source of position" on page 301.
- Primary position, is the position of sensor which is selected as a primary position source.
- Secondary position, is the position of sensor which is selected as a secondary position source.

The source of Primary position of the own ship is position sensor, which has been selected either as **Primary** or as **Pri no alarm**.

The source of Secondary position of the own ship are position sensors, which have been selected either as **Secondary** or as **Sec no alarm** (see figure below). Secondary position of the own ship is not available as latitude/longitude value for the user.



System, Primary and Secondary position of the own ship are available as past tracks on ECDIS screen. You can control their visibility from Tracking sheet of Chart Details (see example below where "Ship System" has been selected to be displayed).

Chart	Standard	Other
Tracking	Mariner	Route
Past tracks		
Off Std Other		
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
	Ship System	
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Ship Primary	
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Ship Secondary	
Length	<input type="text" value="20"/> min	Labels <input type="text" value="5"/> min

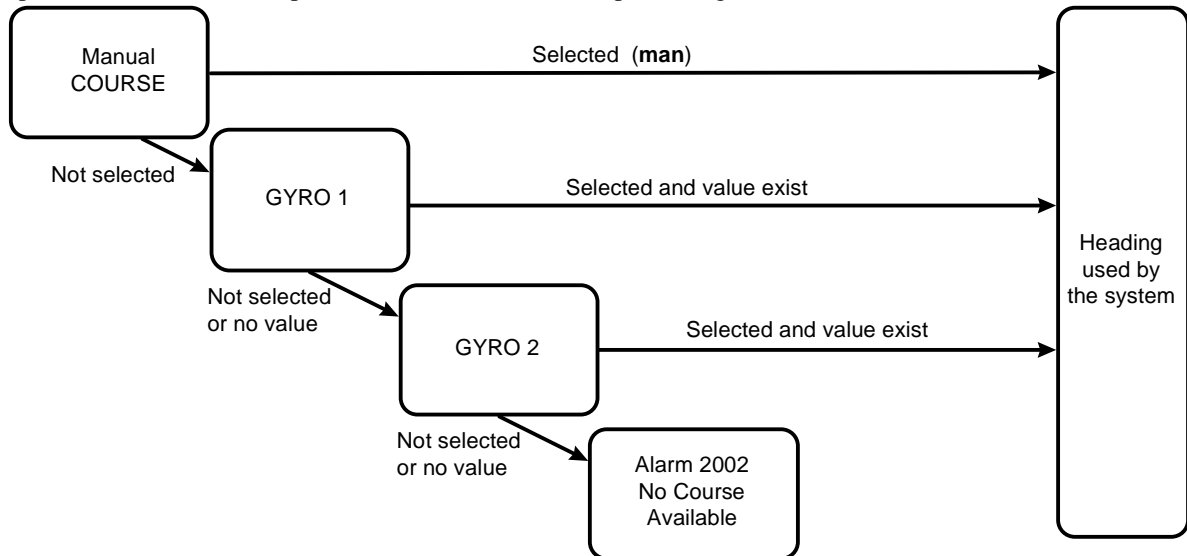
## Position discrepancy alarm

Based on Primary and Secondary positions of the own ship you can activate alarm "2007 Position discrepancy". The alarm is active only if both Primary and Secondary positions of the own ship are valid and if the limit value is non zero. You can set the limit for alarm from Initial Settings (see below).

INITIAL SETTINGS	
Datum	<input type="text" value="WGS 84"/>
Gyro	<input type="text" value="348.6°"/>
Position discrepancy limit	<input type="text" value="0.00"/> nm

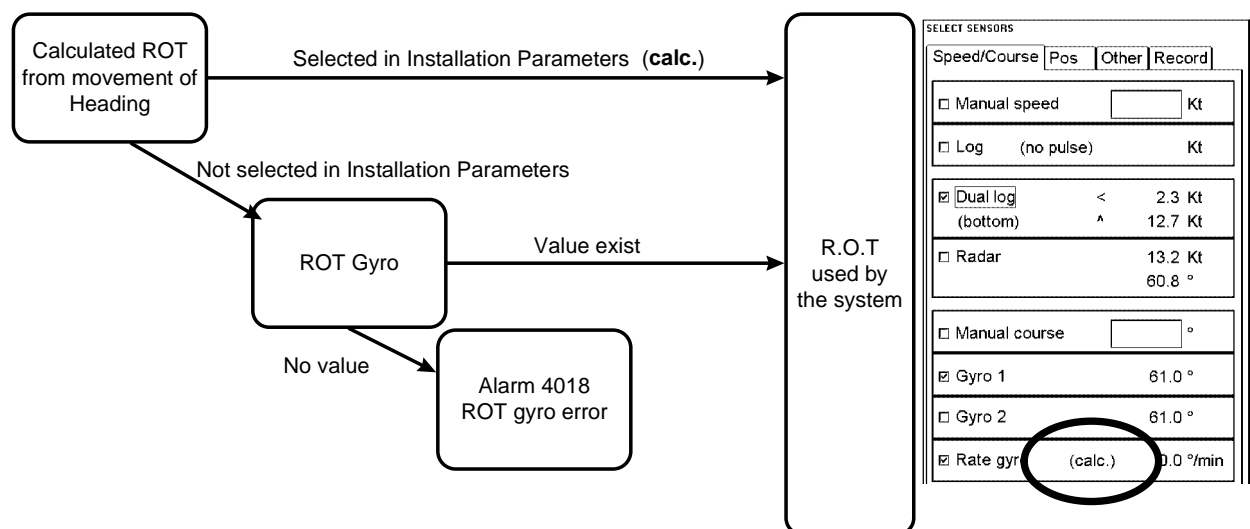
# Source of smg, cmg, speed, heading, rot, drift and docking speed components

Use figures below to find source of various navigation data. SMG, CMG is speed and course over ground. Speed is speed over water, Drift is difference between speed over water and ground. Docking speed components are: bow speed (transversal), stern speed (transversal) and center speed (longitudinal).



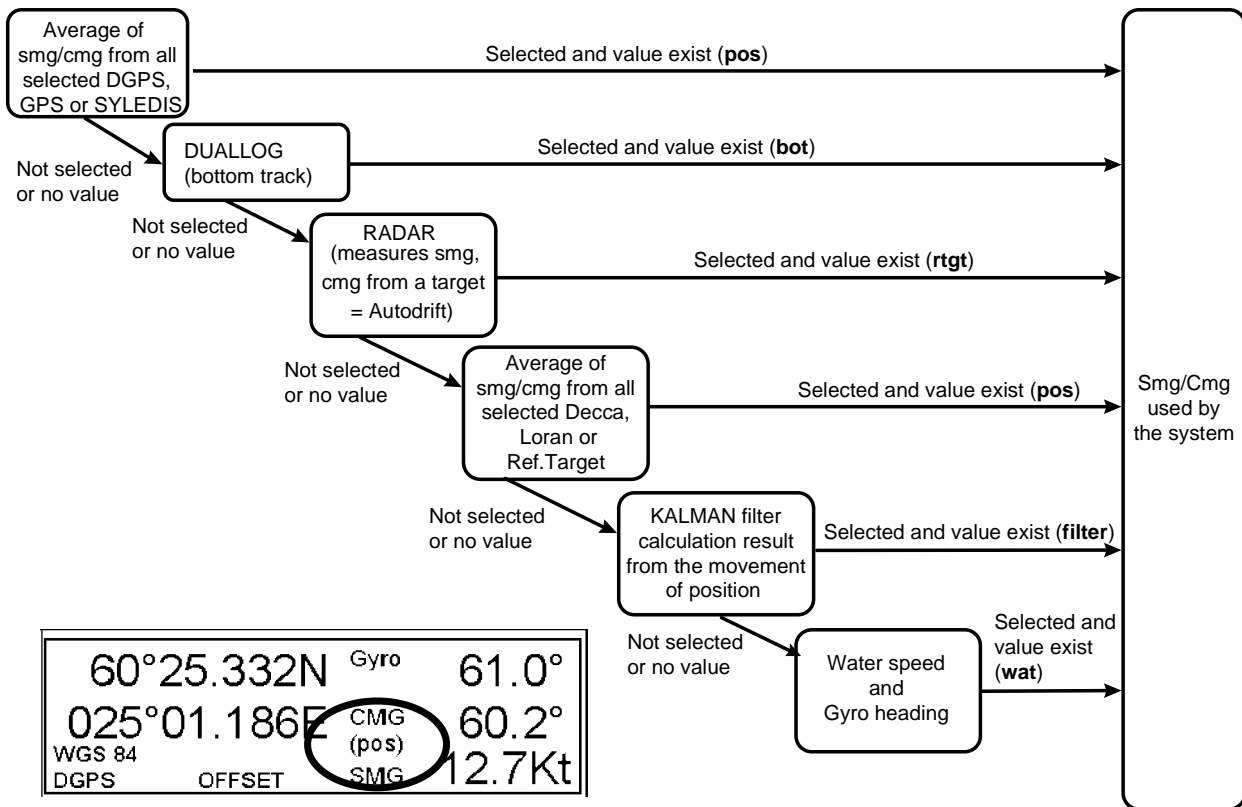
60°25.332M	Gyro	61.0°
025°01.186E	CMG (pos)	60.2°
WGS 84	SMG	12.7Kt
DGPS	OFFSET	

Heading used by the System is shown in right hand upper corner of ECDIS display. In this case heading is received from Gyro and it is shown without specific indication (see the example above). Following alternatives are available: **without specific indication**, if value is referenced to true north; **(mag)** if value is referenced to magnetic north, **(man)** if value is based on manual entry; **(corr)** if value includes gyro correction. Note that **(corr)** is displayed in red colour.

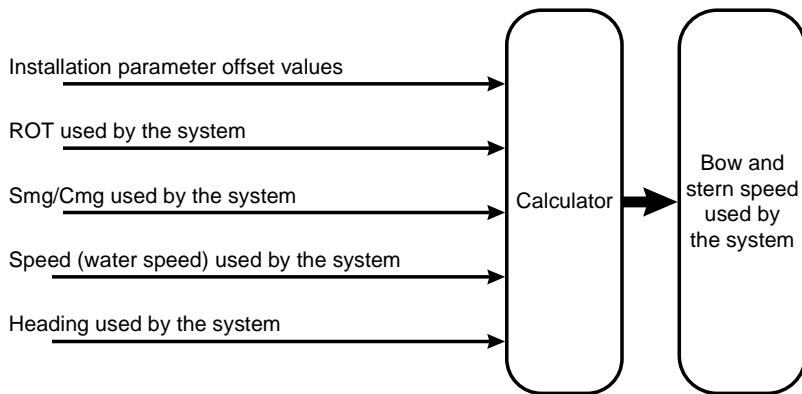


SELECT SENSORS		
Speed/Course	Pos	Other   Record
<input type="checkbox"/> Manual speed		Kt
<input type="checkbox"/> Log (no pulse)		Kt
<input checked="" type="checkbox"/> Dual log (bottom)	< ^	2.3 Kt 12.7 Kt
<input type="checkbox"/> Radar		13.2 Kt 60.8 °
<input type="checkbox"/> Manual course		°
<input checked="" type="checkbox"/> Gyro 1		61.0 °
<input type="checkbox"/> Gyro 2		61.0 °
<input checked="" type="checkbox"/> Rate gyr	(calc.)	0.0 °/min

ROT used by the System is shown in SENSOR Speed/Course sheet.. In Rate Gyro field, if there is a text **(calc)** the system calculates ROT from movement of heading and, if there is no text value is received from ROT gyro.

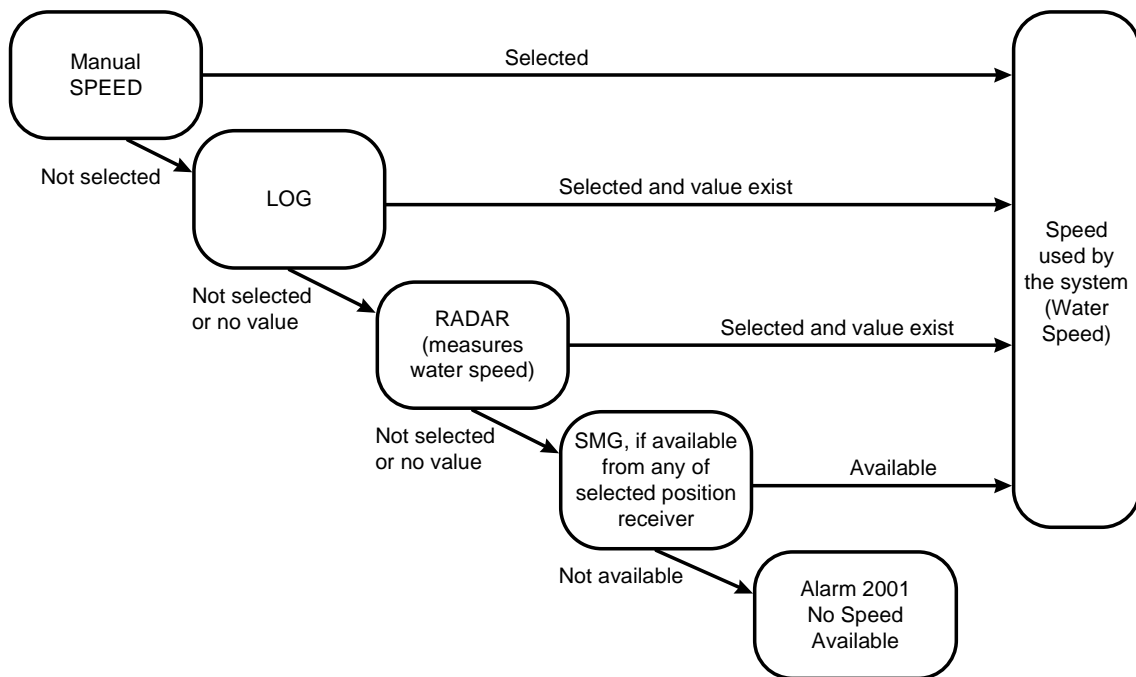


SMG/CMG used by the System is shown in right hand upper corner of ECDIS display. In this case CMG and SMG are from selected position sensors and it is shown as **(pos)**. Following alternatives are available: **(bot)** if value is based on bottom tracking dual axis log; **(wat)** if the value is based on water tracking log, **(rtgt)** if the value is based on target tracking in the connected ARPA radar, **(arpa)** if the value is based on mixed sources of CMG and SMG in the connected ARPA radar, **(pos)** if value is based on average of selected position sensors; **(filter)** if value based on Kalman Filter; **(man)** if value is based on manual entry. Note that (pos), (bot), (wat) and (man) could come from direct interfaces of the system or from the connected ARPA radar.

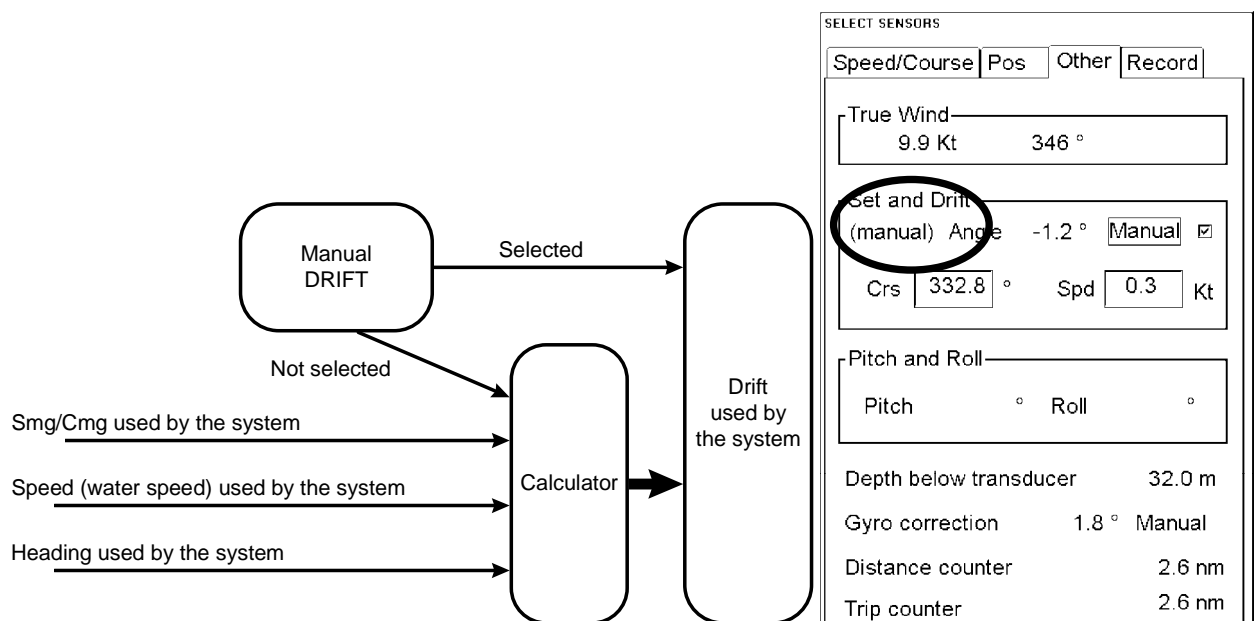


The figure above show the source of docking speed components used for predictor.





The figure above shows the source of water speed used for drift calculation.



Drift used by the System is shown SENSOR Other Sheet. In this case it is from manual drift). Following alternatives are available: **(log)** if value is based on log or dual axis log; **(posit)** if value is based on position sensor; **(filter)** if value based on Kalman Filter; **(man)** if value is based on manual entry.

## No speed or course available

It is possible that user has not selected any speed or course sensors, or that the selected sensors doesn't have any valid values. This kind of a situation is critical for the system, because it cannot perform even dead reckoning. When no speed source is available the system generates alarm "2001 No speed available". When no course source is available the system generates alarm " 2002 No course available".

---

## Filter Operation

The ECDIS includes an automatic multisensor Kalman filter for position. The filter can calculate the estimate of position using simultaneously all operative position sensors.

Position sensors are shown by pressing **SENSORS** pushbutton.

Operator can manually include or exclude different sensors. Remaining sensors (= sensors with any other selection than OFF) are included in the filter processing. The purpose of this filter is to continuously monitor the position given by each individual sensor and define if the sensor is reliable or not. Also selected Gyro and Log sensor are included into this analysis. The filter knows the different behaviour between different type of sensor. (Loran, Decca, GPS, DGPS etc.). The result of the filter is a smooth position which is used to as final position of the ship. Filter eliminates all jumps in the final position even if there is a position jumps in a sensor. (Decca line change, loss of differential signal with DGPS etc.).

The filter can be selected or deselected by switching ON or OFF the status of the filter. If the filter is NOT selected, the new start position of the estimated position is then the average value of the enabled sensors (sensors with any other selection than OFF). If filter is selected, it operates from the alarm system point of view like a position source - alarms are generated if the system do not have a valid position available. No alarms are generated for jumps or validity of the position sensors selected to be used with filter as long as the filter is able to estimate a reliable position based on selected position sensors.

Filter requires at least one position sensor and one course sensor (i.e. gyro) selected and valid in order to operate. The filter has one main alarm "**2000 Filter: Pos unreliable**". This means that the filter is not able to calculate the position from the connected sensors. This can happen, if there is only one position sensor connected and the position of that one becomes unreliable or if there are more position sensors but they are deviating too much among them. Alarm can appear also if the speed/ course sensor is found to be not reliable (Log or Gyro). Note that filter indicate unreliable position sensors by changing the colour of their position into red.

If the filter is used without automatic Route Steering, then in case of alarm 2000 only filter itself is set in OFF state. After the alarm 2000 the system will use its normal method to select position source from available sensor. Normally this cause a jump in the position of the system. After the alarm 2000, the user should evaluate which sensor caused the problem. Disable the bad sensor and then you can select the filter ON again.

Kalman filter is build to support automatic Route Steering and thus its model of the ship including navigational sensors require that you have some speed. If the speed is less than 4 knots, the system generates alarm "**2008 Filter: Speed below 4 kn**". If you don't use automatic Route Steering the system also selects the filter as OFF after the alarm 2008. With automatic Route Steering the system keeps the filter selected, but repeats alarm 2008.

If there is a change in the availability of the sensor selected with Kalman Filter, the system generates alarm "**2010 Filter: Pos source change**". This change of available sensor may or may not affect the operation of the Filter. However the user is always informed about a change.

## Filter and automatic Route Steering

The filter can operate based on only one position sensor and one gyro. However this minimum selection is not suitable for automatic Route Steering or program track turn, which both require an independent speed source. With automatic Route Steering the minimum selection is for GOTO WAYPOINT:

- one position sensors, gyro and log or
- two position sensors and gyro

And for GOTO TRACK:

- one high precision position sensors, gyro and log or
- one high precision position sensor, second position sensors and gyro

Source of position indicates what kind of sensors the Filter is using for position calculation. The permanent indication is available in upper right hand corner:

- FILTER, there is no high precision position sensor selected and available for Filter.
- FILTER HIGH, there is high precision position sensor selected and available for Filter. It is possible to use track steering modes which requires accurate position (Goto Track, Program Track Turn).

If you try to enable automatic Route Steering without Kalman filter positioning, the system generates alarm "**2470 Disabled: Needs filter on**". If you try to enable automatic Route Steering without independent speed source, the system generates alarm "**2490 Disabled: Needs log sensor**". If you try to enable automatic Route Steering for GOTO TRACK mode without high precision position sensor available, the system generates alarm "**2491 Disabled: Needs diff pos.**".

If you loose during automatic Route Steering the Kalman Filter position, the system generates alarm "**2475 Route: Needs Filter ON**". .If you loose during automatic Route Steering a log device and your remaining selection doesn't meet the minimum, the system generates alarm "**2476 Route: Needs log sensor**". .If you loose during automatic Route Steering GOTO TRACK mode a high precision position sensor and your remaining selection doesn't meet the minimum, the system generates alarm "**2492 Route: Needs diff pos.**".

If you loose during Program Track Turn the Kalman Filter position, the system generates alarm "**2493 ProgTurn: Needs Filter ON**". .If you loose during Program Track Turn a log device and your remaining selection doesn't meet the minimum, the system generates alarm "**2495 ProgTurn: Needs log sensor**". .If you loose during Program Track Turn a high precision position sensor and your remaining selection doesn't meet the minimum, the system generates alarm "**2494 ProgTurn: Needs diff pos.**".

If the filter is used with automatic Route Steering, then in case of alarm "**2000 Filter: Pos unreliable**" all position sensors and filter itself are changed to OFF state and the system continues with backup dead reckoning based on selected speed / course sensors. It is recommended that you leave then automatic Route Steering and continue using more traditional steering mode during the period you solve the reason for alarm 2000. If you don't leave automatic Route Steering, then the system will repeat alarm "**2475 Route: Needs filter ON**" every 15 seconds. Also after alarm 2000 the system generates alarm "**2006 Route: CRS jump possible**" to remind you that if you now continue automatic Route Steering and just select one of the position sensors, then most probably your ship will perform a turn as a consequence of new position. As summary after the alarm 2000, the user should leave automatic Route Steering and evaluate which sensor caused the problem. If the ship position from the a position sensor is acceptable, switch it on. Don't select any sensor which causes jumping. Then you can select the filter ON again and continue automatic Route Steering.

## How to use position alignment

The position alignment function is in order to final adjust the ship position by using Radar echo overlay, Reference target, radar echo target and ECDIS chart material.

If position alignment is in use, the ECDIS will generate following alarm every 30 minutes to remain user for alignment: "2352 ChartAlign: over 30 min".

### Position alignment by means of the ECDIS

If the radar echo targets and the Reference target's symbols are not exactly overlapping there is either position error or gyro error or some combination of these errors.

It is possible to do position alignment on the ECDIS display by moving own ship position or by moving ARPA radar target position. Moving is done by dragging and dropping own ship symbol or ARPA radar target to desired location. Before you are able to drag and drop, you have to select **Enable chart align** in Sensor/Position sheet. Drag and drop means that you take cursor above desired object and press **Chart align** button. Keep button down and move own ship symbol or ARPA radar target to the desired position by track ball.

Note, if Radar Echo Overlay is on the ECDIS display when position alignment is done, then

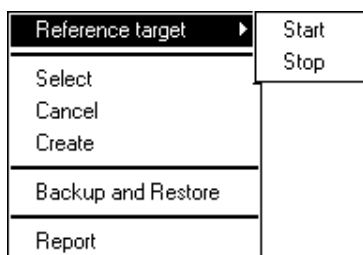
- Mode of Radar Echo Overlay is temporarily changed to "Radar over Chart"
- ECDIS uses temporarily Radar Echo Overlay color also for own ship and ARPA targets symbols

To make position alignment, proceed as follow:

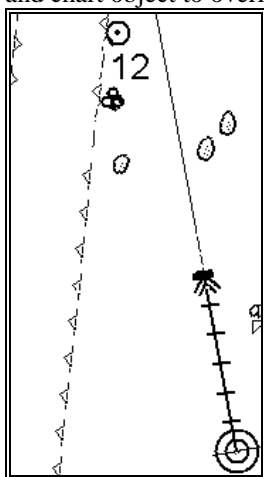
1. Select desired chart material (ARCS or S57).
2. Select suitable radar target manually for tracking or use suitable Reference target file for automatic tracking. To start monitoring of Reference target use:



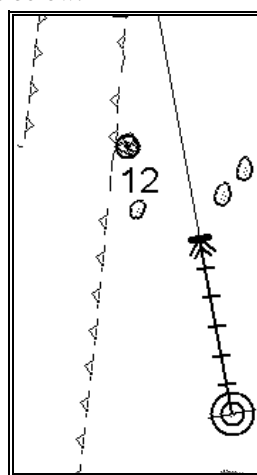
Use this button to open Reference target menu



3. Select **Enable chart align** in Sensor/Position sheet.
4. Use the track ball of Control Panel to **drag and drop** principle to overlap a reference target and a symbol or suitable chart detail. (Drag and drop own ship position to get reference target and chart object to overlap). See figures below.



Before position alignment



After position alignment

- If the position source is Dead Reckoning, then chart align was used to set a new start position to the Dead Reckoning. In this case there is no offset and no indication test OFFSET. If the position source is something else than Dead Reckoning, then the indication of **OFFSET** is displayed on Upper information area. Also the Range and Bearing of the **OFFSET** are shown in Sensor position sheet. See figures below.

You can see Range and Bearing of **OFFSET** in Position sheet.

SELECT SENSORS	
Speed/Course	Pos Other Record
<input checked="" type="checkbox"/> Alignment	Start
<input checked="" type="checkbox"/> Enable chart align	
Range 0.3 nm	Bearing 84.7°
<input type="checkbox"/> Dead reckoning	
Lat 59°30.304N	Lon 014°42.580E

Indication of **OFFSET** is displayed on the ECDIS screen.

60°06.341N	GYRC	1.0°
024°58.459E	CMG	1.0°
Finnish KKJ(84)		
DGPS	OFFSET	SMG 17.2Kt

## How to reset position alignment

To reset position alignment, proceed as followed:

- Press **Sensors** button and select Position sheet open.
- Remove selection from **Alignment** tick box.

SELECT SENSORS	
Speed/Course	Pos Other Record
<input type="checkbox"/> Alignment	Start
<input type="checkbox"/> Enable chart align	
Range 0.0 nm	Bearing 0.0°
<input type="checkbox"/> Dead reckoning	
Lat 59°30.330N	Lon 014°43.175E

Alignment field after Alignment selection has removed.

- Check that indication of **OFFSET** disappears on the Upper information area.

59°59.960N	GYRO	93.0°
025°06.913E	CMG	92.7°
WGS 84		
DGPS		SMG 17.1Kt

The Upper information area after Alignment selection has removed. There is no **OFFSET** indication.

## Position alignment by means of the ARPA radar

User chart, showing coast line, buoys, etc., can be used as a position reference once the ARPA radar is able to see these objects. If the ARPA radar targets and the User Chart are not exactly overlapping there is either position error or gyro error or some combination of these errors. Some selected ARPA radar modes which can display User Charts can perform position alignment.

### ARPA Radar with CHART ALIGN push-button

1. User chart must be available on the radar.
2. Press CHART ALIGN push-button on the ARPA radar display once. Then use ARPA radar display track ball and move the User Chart so that it overlaps correct radar echoes. Press CHART ALIGN push button again once. Then the amount of alignment is transferred to the ECDIS.
3. If the position source is Dead Reckoning, then CHART ALIGN set a new start position to the Dead Reckoning. In this case there is no offset and no indication text OFFSET. If the position source is something else than Dead Reckoning, then the indication of **OFFSET** is displayed on Upper information area. See Figure below.

: Metres NORTH UP TRUE MOTION  
 Inderscale Larger scale available

60°06.341N	GYRO	1.0°
024°58.459E	CMG	1.0°
Finnish KKJ(84)		
DGPS OFFSET	SMG	17.2Kt
Plan Speed 8.1 Kt	Next WP	3

Upper information area on ECDIS screen.

### ARPA radar without CHART ALIGN push-button

1. User chart must be available on the ARPA radar. (ARPA radar must be connected to the ECDIS and STORED VIDEO MAP pushbutton of the ARPA radar must be pressed). Press **Sensors** button and select Position sheet open.

Press **Start** button to alignment with radar.

SELECT SENSORS

Speed/Course Pos Other Record

Alignment

Enable chart align

Range 0.0 nm Bearing 0.0°

Dead reckoning

Lat 59°29.781N Lon 014°30.891E

2. On the ARPA radar screen, locate a clear reference radar echoes and suitable User Chart lines or symbols.
3. Press **Start** button in Position sheet. If there was no User Chart lines on the ARPA radar display, then system is unable to continue and generate alarm "**2072 ChartAlign: No line avail**". If there was User Chart lines on the ARPA radar the system can continue and as a reminder of the ongoing process it generate and maintain alarm "**2061 Chart Align: Executing**" during the whole process.
4. Use the track ball of the ARPA radar and move the User Chart so that it overlaps radar echoes.

Press **Stop** button when you have defined alignment.

SELECT SENSORS			
Speed/Course	Pos	Other	Record
<input checked="" type="checkbox"/> Alignment	<b>Stop</b>	<b>Cancel</b>	
<input type="checkbox"/> Enable chart align			
Range	0.8 nm	Bearing	198.4°
<input type="checkbox"/> Dead reckoning			
Lat	59°29.423N	Lon	014°39.351E

5. Press **Stop** button in Position sheet. The alarm "**2061 Chart Align: Executing**" disappears automatically and the amount of alignment is transferred to the ECDIS and range and bearing of it is display in this field. If you want to cancel the alignment process then press **Cancel button** and the process is terminated without any new alignment.
6. If the position source is Dead Reckoning, then the system sets a new start position to the Dead Reckoning. In this case there is no offset and no indication text **OFFSET**. If the position source is something else than Dead Reckoning, then the indication of **OFFSET** is displayed on Upper information area. See Figure below.

: <b>Metres</b> <b>NORTH UP</b> <b>TRUE MOTION</b>			
<b>Inderscale</b> <b>Larger scale available</b>			
<b>60°06.341N</b> <small>GYRC</small>		<b>1.0°</b>	
<b>024°58.459E</b> <small>CMG</small>		<b>1.0°</b>	
<small>Finnish KKJ(84)</small>		<b>SMG 17.2Kt</b>	
<small>DGPS</small>	<small>OFFSET</small>		
<b>Plan Speed</b>	<b>8.1 Kt</b>	<b>Next WP</b>	<b>3</b>

Upper information area on ECDIS screen.

## Gyro error correction

Typical gyro error sources are: installation offset, speed/latitude error and dynamic settling error. Typically you detect gyro error on a User chart superimposed on the ARPA picture, on ARPA targets drawn on the Ecdis screen or on radar overlay drawn on the ECDIS screen.

**Gyro error correction** is used to remove the difference between the Chart North and the Gyro North.

Gyro error can be corrected totally or partially already in the gyro compass system itself. Many gyro compass systems have automatic speed/latitude corrector, which may use automatic or manual input for speed and latitude. Some gyro compass systems include also correction for dynamic settling error.

Automatic Gyro error compensation based on the Reference targets can be used with all kind of Gyro compass systems to remove any error left.

Automatic Gyro error correction based on tabled speed/latitude correction can be used, if the gyro compass itself does not make any corresponding correction.

Gyro error compensation can be used to:

- correct User chart on ARPA Radar screen.
- correct ARPA target positions on ECDIS screen
- correct radar overlay drawn on ECDIOS screen
- compensate courses used in Route Monitoring and automatic Route Steering.

If you have enabled **Gyro error correction** and if this correction has modified the value of the own ship heading, then this condition is always visible in Information Area (upper). See example below. Red coloured (**corr**) indicates that the value of Gyro has been corrected.

60°00.929N	Gyro (corr)	348.6°
024°59.628E	CMG (pos)	348.1°
WGS 84	SMG	15.0Kt
GPS		

If you have enabled both **Gyro error correction** from Ship Parameters and **Gyro error compensation** from Route Parameters then **Plan CTS** and **Next CTS** in Information Area (upper) display compensated values. (see below). Also course to steer used by automatic Route Steering is compensated in this case.

Plan Speed	10.0 Kt	Next WP	2
Plan CTS	2°	Dist WOP	0.65 nm
Route	1°	ETA	
Ch limit	185 m	05 Sep 99 12:16	
Off track	<43 m	Next CTS	278°
		Turn rad	0.3 nm
Out from gate		Turn rate	57°/min



**SENSORS**

*SENSORS pushbutton  
To select between  
Speed/Course, Position or  
Other sheets to be opened  
either press button*

**SELECT  
NEXT**

*or go by cursor above  
Speed/Course, Position or  
Other text and press SELECT*

**SELECT SENSORS**

Speed/Course | Pos | **Other** | Record

True Wind—  
10.1 Kt      57 °

Set and Drift—  
(posit.) Angle -0.5 ° Manual

Crs  °      Spd  Kt

Pitch and Roll—  
Pitch      °      Roll      °

Depth below transducer      55.0 m

**Gyro correction      -1.9 ° Table**

Distance counter      56.4 nm

Trip counter      56.4 nm

The current value of Gyro correction and its method is displayed in Sensors, Other sheet. See example above. **Table** indicated speed/latitude table as source, **Manual** indicates manual entry and **RefTarg** indicates tracked reference targets as source.

## How to enable Gyro error correction

To operate Gyro error correction effective for radar, ECDIS and route steering, proceed as follow:

1. From Control Panel press **Initial Settings**
2. From menu select **Navigation parameters**
3. From submenu select **Ship and Route parameters**.
4. Select **Auto** in Gyro error correction field to enable Automatic Gyro error correction.

## INITIAL SETTING

Set time
Parameter Backup
Digitizer
Backup and Restore
Installation parameters
Navigation parameters ▶
Optimization parameters ▶
Chart Alarm parameters
Print Navigation parameters ▶
Print Optimization parameters ▶
Selftest
Presentation library

SHIP and ROUTE PARAMETERS	
<b>Ship parameters</b>	
Ship max. speed	23.0 Kt
Ship max. height	34.0 m
Ship draught	10.0 m
Gyro error correction	Auto ▾
Gyro spd/lat error	On ▾
Max gyro error correction	3.0 °
Manual gyro correction	0.2 ▲ ▾
<b>Route parameters</b>	
Max rate of turn	200 °/min
Turn end tolerance	2 °
WP approach alarm time	60 s
WP prewarn alarm time	120 s
Route start limit angle	20 °
Default line radius	0.3 nm
Drift compensation	On ▾
Gyro error compensation	Off ▾

**Ship parameters field:**

**Gyro error correction:**

**Off:** This selection disables any gyro error correction.

**Auto:** This selection enables the automatic Gyro error correction based on Reference targets. This selection is also a requirement to enable correction based on tabled speed/latitude.

**Manual:** This selection enables the manual Gyro error correction in **Manual gyro correction** - field.

**Gyro spd/lat error:**

This selects the automatic Gyro error compensation based on tabled speed/latitude correction. A requirement for this selection is that **Gyro error correction**. has been selected **Auto**.

**Max gyro error correction:**

This is the limit for the maximum correction allowed. Typical value is 3 degrees.

**Manual gyro correction:**

This is used to adjust gyro error manually. Note, that to enable this function you have to switch **Gyro error correction** to **Manual** position.

**Route parameters field:**

**Gyro error compensation:**

Used to select, if set courses in Route steering are corrected for gyro error.

## Use Reference targets for automatic Gyro error correction

Gyro error correction can be calculated in real-time using Reference Target function of the system.

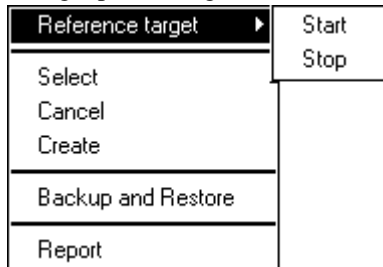
The file containing Reference Targets must have at least 8 Reference Targets inserted. The ARPA radar must find simultaneously at least 2 reliable tracked Reference Targets before the position and gyro error can be calculated.

When you start Reference target positioning, Reference target field appears to Sensors Position sheet.

1. Start Reference target positioning.



Use this button to open Reference target menu



2. Press **Sensors** button and open Position sheet.
3. Select Reference target as source of positioning. For more information, see "Source of position" on page 301.

SELECT SENSORS			
Speed/Course	Pos	Other	Record
<input type="checkbox"/> Alignment	<input type="button" value="Start"/>		
Range	0.0 nm	Bearing	0.0 °
<input type="checkbox"/> Dead reckoning			
Lat	60°00.791N	Lon	024°56.325E
Kalman filter	Off		
	16.1 Kt	353.5 °	
Lat	60°00.808N	Lon	024°56.307E
Reference target	Off		
	16.1 Kt	350.4 °	
Lat	60°00.783N	Lon	024°56.325E

4. When you have in Position sheet **Reference target** field, which shows speed, position and course values, the system has been able to calculate also a value for Gyro error compensation.

**NOTE!** The system use gyro error from reference targets, if you have selected **Gyro error correction** in **Auto** position and **Gyro spd/lat error** in **Off** position. Reference Target based gyro error correction doesn't require that you also use Reference Targets as position finding method. This feature is very useful when you operate with high accuracy position sensors such as DGPS because both your position is still based on high accurate DGPS and the system can automatically correct the gyro error for you.

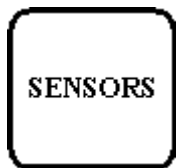
Gyro correction related alarms:

"**2352 RefTgt: Lost gyro corr**", you have selected Reference Targets as gyro correction source and the Reference target system is unable to solve gyro correction.

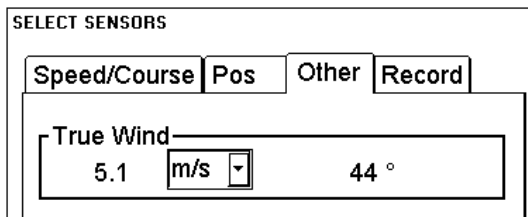
"**2352 RefTgt: Tracking full**", if you try to start reference targets and there are less than 8 tracking channels available.

# Wind sensor

Connected Wind sensor is available in Sensors Other sheet.



*SENSORS pushbutton*



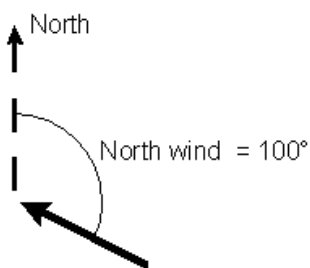
The system displays wind as True Wind, which is the wind relative to north displayed relative to own ship heading (see picture below).

Unit of wind can be selected either **m/s** or **Kt**.



## North Wind

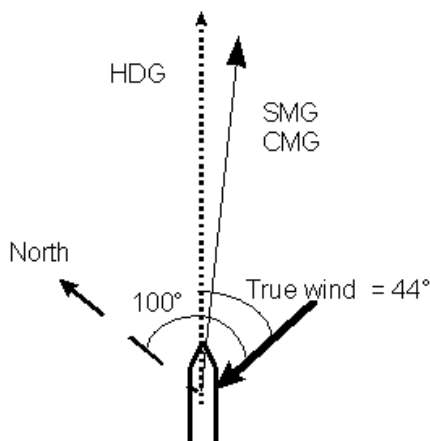
Wind relative to North



HDG	heading of ship
SMG	speed over ground
CMG	course over ground
True Wind	wind relative to own ship heading

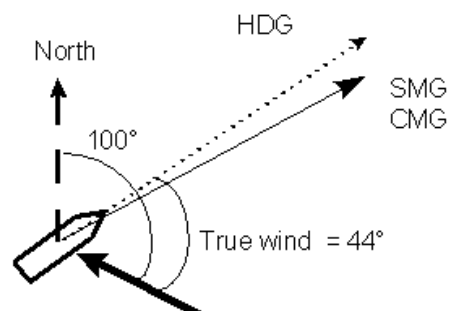
## True Wind

Head up presentation



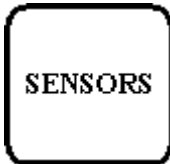
## True Wind

North up presentation



# Depth sensor

Connected Depth sensor i.e. Echosounder is available in Sensors Other sheet.



*SENSORS pushbutton  
To select between  
Speed/Course, Position or  
Other sheets to be opened  
either press button*



*or go by cursor above  
Speed/Course, Position or  
Other text and press SELECT*

SELECT SENSORS			
Speed/Course	Pos	Other	Record
True Wind		10.1 Kt	57 °
Set and Drift		(posit.) Angle -0.5 °	Manual <input type="checkbox"/>
Crs	243.7 °	Spd	0.2 Kt
Pitch and Roll		Pitch °	Roll °
Depth below transducer		55.0 m	
Gyro correction		-1.9 °	Table
Distance counter		56.4 nm	
Trip counter		56.4 nm	

The system displays depth value as depth below transducer. If you need you can activate an alarm based on the depth below transducer. This alarm is available from

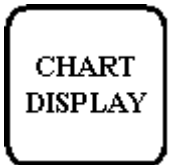


Chart display - ALL-ON			
ARCS details	Tracking	Mariner	Route
Chart	Standard	Other	
Echo alarm depth	5	m	
Shallow contour	10	m	
Safety depth	30	m	
Safety contour	30	m	
Deep contour	50	m	

If the measured depth goes from deeper value to a value which is less than the set Echo alarm depth, the system generates alarm "1200 Depth below limit".

---

## Sensor related alarms

Following alarms, which are not described elsewhere, are related to different sensors:

**"2055 ARPA Radar Comm. Error"**, if the system has lost connection to an connected ARPA radar. As a consequence the system loses tracked ARPA targets and speed/course available from ARPA.

**"2071 Source ARPA Radar changed"**, The system has lost connection to the ARPA radar which used to be the source of tracked ARPA targets and speed/course information. Then if there are available other connected ARPA radars the system selects one of them as a new source of tracked ARPA targets and speed/course information and the system generates alarm 2071.

**"4001 B-Adapter Error"**, if the system has lost connection to B-Adapter which is an interface to various navigation sensors. See more in separate Technical manual.

**"4002 Engine Control Comm Error"**, if the system has lost connection to Engine Control which could be an interface to various navigation sensors. See more in separate Technical manual.

**"4005 Gyro Error"**, if the system has lost connection to Gyro1 sensor.

**"4006 Gyro Error"**, if the system has lost connection to Gyro2 sensor.

**"4008 Log Error"**, if the system has lost connection to Log sensor.

**"4009 Dual Axis Log Error"**, if the system has lost connection to Dual Axis Log sensor.

**"4010 Echo Sounder Error"**, if the system has lost connection to Echo Sounder sensor.

**"4011 Wind Sensor Error"**, if the system has lost connection to Wind sensor.

**"4012 Position Eq Error"**, if the system has lost connection to Position sensor number 1

**"4013 Position Eq Error"**, if the system has lost connection to Position sensor number 2

**"4014 Position Eq Error"**, if the system has lost connection to Position sensor number 3

**"4015 Position Eq Error"**, if the system has lost connection to Position sensor number 4

**"4016 Position Eq Error"**, if the system has lost connection to Position sensor number 5

**"4018 ROT gyro error"**, if the system has lost connection to ROT gyro sensor.

**"4019 Pitch+Roll sensor error"**, if the system has lost connection to Pitch and Roll sensor.

**"4021 ARPA Radar System Error"**, if ARPA radar number 1 reports about internal failure

**"4022 ARPA Radar System Error"**, if ARPA radar number 2 reports about internal failure

**"4023 ARPA Radar System Error"**, if ARPA radar number 3 reports about internal failure

**"4024 ARPA Radar System Error"**, if ARPA radar number 4 reports about internal failure

**"4201 Ext. navigation eq. error"**, if external navigation equipment number 1 reports about internal failure

**"4202 Ext. navigation eq. error"**, if external navigation equipment number 2 reports about internal failure

**"4203 Ext. navigation eq. error"**, if external navigation equipment number 3 reports about internal failure

**"4204 Ext. navigation eq. error"**, if external navigation equipment number 4 reports about internal failure

**"4205 Ext. navigation eq. error"**, if external navigation equipment number 5 reports about internal failure

**"4206 Ext. navigation eq. error"**, if external navigation equipment number 6 reports about internal failure

**"4207 Ext. navigation eq. error"**, if external navigation equipment number 7 reports about internal failure

**"4208 Ext. navigation eq. error"**, if external navigation equipment number 8 reports about internal failure

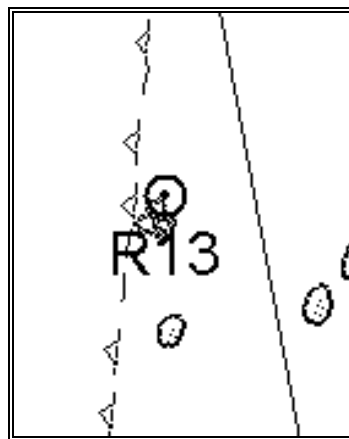
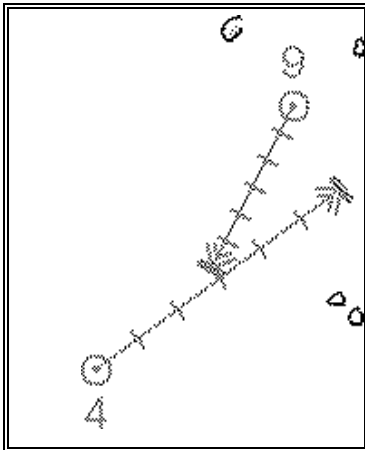
# Target functions

---

## Display of ARPA radar targets

Targets which are tracked by ARPA radar, can also be displayed on ECDIS screen. Select ARPA targets Std or Other position on **Tracking** sheet of Chart Display dialog box. There are two kind of targets displayed on electronic chart area:

- normal targets
- Reference targets



*Targets from the radar can also be displayed on the Electronic chart area. NOTE that reference target has letter "R" in its label.*

## Display of dangerous ARPA radar targets

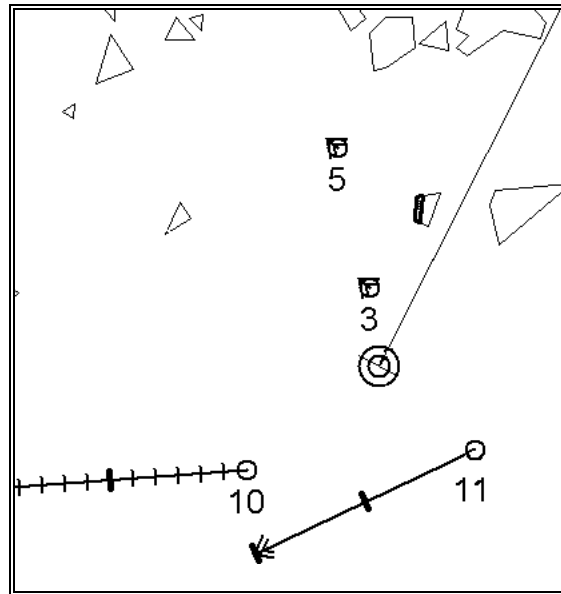
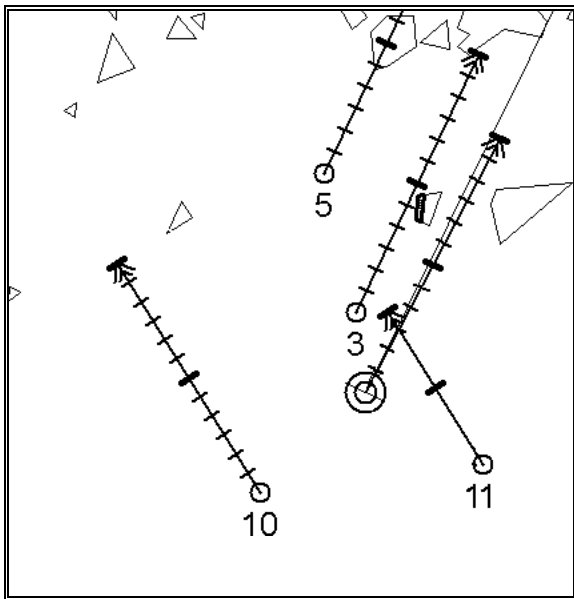
A dangerous ARPA radar target is displayed as a blinking target symbols between colours green and red. The ECDIS has its own definition for dangerous target limits. Thus ARPA radar may show a target as dangerous while ECDIS shows it as safe and vice versa. You can set CPA and TCPA limits used by the ECDIS in Danger Targets sheet of Voyage Recording. For more information, see chapter "How to set conditions of viewing and logging Danger Targets" on page 342.

## Display of lost ARPA radar targets

A Lost ARPA radar target is displayed as a blinking target symbols between colours green and dark yellow.

## Display of True or Relative speed vectors

Targets vector can be displayed relative to own ship's heading (**RelVect**) or with reference to the North (**TrueVect**). Both presentation modes can be used with relative motion (**RM**) or true motion (**TM**) of own ship display mode.



Presentation of True Vectors (TrueVect)

Presentation of Relative Vectors (RelVect)

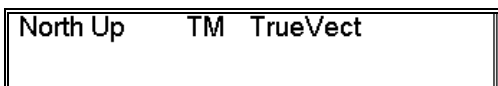
Vector time (or the length of vectors) and presentation mode can be set in Chart page of Chart Display

1. Press Chart Display button, open Chart page.
2. Enter in Speed Vectors field desired time in unit of minute.
3. Select desired presentation mode for speed vectors (TRUE = True Vectors, RELATIVE = Relative Vectors)

Chart display - ALL-OFF \*

Tracking	Mariner	Route
Chart	Standard	Other
Echo alarm	<input type="text" value="0"/> m	
Shallow contour	<input type="text" value="5"/> m	
Safety depth	<input type="text" value="8"/> m	
Safety contour	<input type="text" value="10"/> m	
Deep contour	<input type="text" value="20"/> m	
Speed Vectors	<input type="text" value="12"/> min	<input type="text" value="TRUE"/>

Permanent indication of vectors' presentation mode is displayed upper right hand corner of ECDIS screen.



**Note**, that permanent indication changes it's colour between black and red depending on selected display mode of own ship:

If display mode of own ship is True motion (TM): Indication of TrueVect is displayed as black text, indication of RelVect is displayed as orange text.

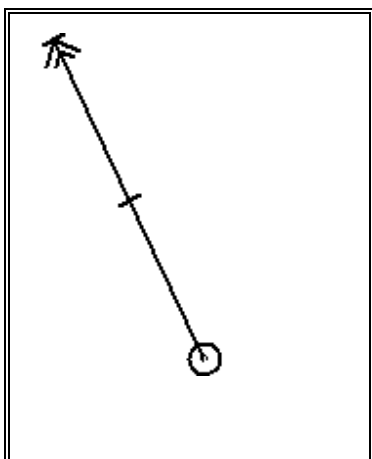
If display mode of own ship is Relative motion (RM): Indication of TrueVect is displayed as orange text, indication of RelVect is displayed as black text.



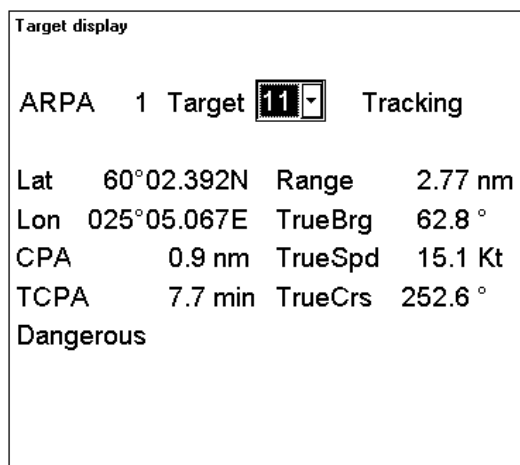
# Display of ARPA target data

## How to view ARPA target tracking data of normal targets

On the ECDIS display move cursor above desired ARPA radar target and press **INFO/HELP** push button. Following Target display dialog box appears.



ARPA Radar target on ECDIS screen

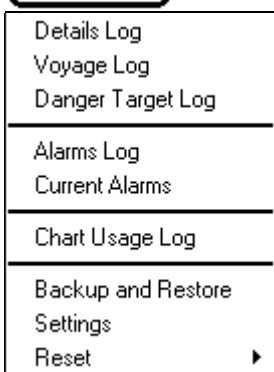


ARPA Target display dialog box.

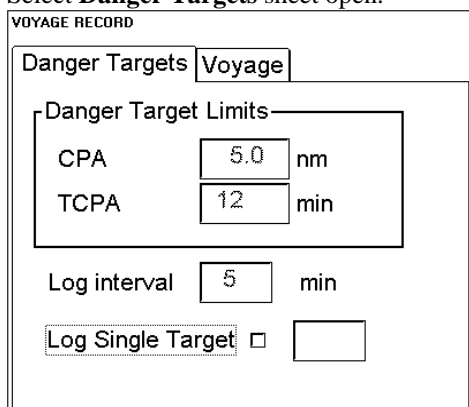
Target display dialog for ARPA radar target consists following information:

- Targets number and its status
  - Status can be **Query**, **Tracking** or **Lost**. State Query indicates a new target which do not yet have long enough tracking history to have target speed, course, CPA and TCPA available.
- Position
- CPA and TCPA
- Distance and true bearing from own ship
- True speed and true course of the target

User can set Closest Point of Arrival (CPA), and Time for CPA (TCPA) to define dangerous ARPA targets. CPA and TCPA limits are common for ECDIS display and Danger target log function. On ECDIS display, a dangerous ARPA target is blinking between green and red colour.



1. Press VOYAGE RECORD button.
2. Select **Settings** from the menu
3. Select **Danger Targets** sheet open.



Set desired limits for CPA and TCPA. Note, these limits are only for ECDIS. ARPA radar has its own setting for dangerous targets and thus a target which is dangerous at ARPA display can be safe on ECDIS or vice versa. If an ARPA target is inside CPA and TCPA, it is shown as dangerous ARPA target on ECDIS display. Log interval defines time period for logging.

**Note!** If TCPA has a negative value it means that you have already passed the closest point and the ARPA target is going away from your own ship. See example below:

Target display			
ARPA	1	Target <input type="text" value="12"/>	Tracking
Lat	60°03.830N	Range	2.66 nm
Lon	025°03.057E	TrueBrg	33.3 °
CPA	2.5 nm	TrueSpd	13.9 Kt
TCPA	-5.1 min	TrueCrs	56.2 °

## How to view ARPA target tracking data of reference targets

On the ECDIS display move cursor above desired ARPA radar target with letter "R" in its number and press **INFO/HELP** push button. Following Target display dialog box appears.

Target display			
ARPA	1	Target <input type="text" value="1"/>	Tracking
Lat	60°05.336N	Range	4.55 nm
Lon	024°58.277E	TrueBrg	348.2 °
CPA	0.7 nm	RefNum	1
TCPA	38.1 min	LifeTime	0.0 min

Target display dialog for Reference Target consists following information:

- Targets number and its status
  - Status can be **Query**, **Tracking** or **Lost**.
- Position
- CPA and TCPA
- Distance and true bearing from own ship
- RefNum, which is the number of reference target in the current reference target file
- LifeTime, which shows how long the target has been used as reference target without a break in tracking. A long life time indicates a good reference target.

## Source of ARPA radar targets

Source of ARPA radar targets is permanently shown on upper bar (see example below).

Mon.Route	Plan Route	Pilot Data TA	Depth metres	Height metres	F
UserChart	Ref Target	ARPA 1	Radar Mast X	X11.9	

You can select another source of ARPA radar targets from Radar window. Press RADAR button and use **ARPA target source** selection.

RADAR OVERLAY SETTINGS

Radar Overlay source      Sindel21

Gain      60 %

Sea clutter filter      0 %

Rain clutter filter      0 %

Echo trail time      0 min

Echo trails      TRUE

Interference reject      OFF

Echo stretch      OFF

Noise display      OFF

Mode      ECDIS only

Transparency      Opaque

ARPA target source      1

## Source of ARPA radar targets related alarms

Alarm "2055 ARPA Radar comm error" reports about a failure to receive data from connected ARPA radars.

Alarm "2071 Source ARPA Radar changed" informs that the system has automatically changed the source of ARPA radar targets from current source to a new source. The reason for automatic change is that the communication with current source is in failure state.

## Display ARPA target past positions

To display ARPA target past tracks, proceed as followed:

1. Press **Chart display** button.
2. Select **Tracking** sheet open. Select **ARPA targets** either **Std** or **Other** position.

Chart display - ALL-OFF \*

Chart	Standard	Other
Tracking	Mariner	Route

Past tracks

Off Std Other

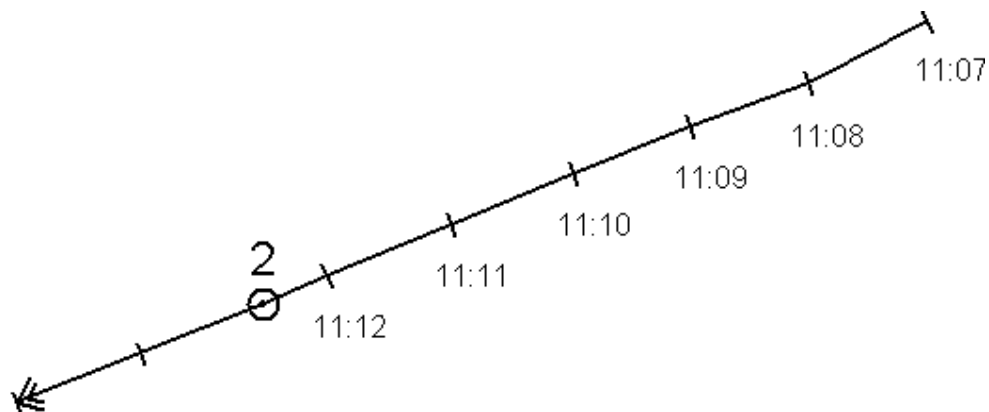
Ship System

Ship Primary

Ship Secondary

Length  min Labels  min

3. ARPA Target past track will appear. The distance of track depends on selected value (i.e. in the Figure above the distance of displayed track is last 20 min labelled every five minutes).



Display of ARPA target past track using 1 minute labels

---

## ARPA Target recording functions

Target recording is used to record ARPA targets information to danger targets log. For more information recording of danger target, "Danger targets log" on page 342.

---

## Using ARPA targets for chart align

Targets can be used to chart alignment. For more information, see chapter "How to use position alignment".

---

## Using ARPA targets for position calculation

In the narrow water navigation, the radar is one of the best position sensors. The function Reference Target is specially developed to use the radar as a position sensor.

The file containing Reference Targets must have at least 8 Reference targets inserted. The ARPA radar must be able to track reliable simultaneously at least 2 Reference Targets before the position can be calculated.

When you start Reference Target positioning, Reference target field appears to Sensors Position sheet.

The image shows a software interface. On the left is a menu titled "Reference target" with options: Start, Stop, Select, Cancel, Create, Backup and Restore, and Report. On the right is a dialog box titled "SELECT SENSORS" with tabs: Speed/Course, Pos, Other, Record. The "Pos" tab is active. It contains several sections: "Alignment" with a "Start" button; "Range 0.0 nm Bearing 0.0 °"; "Dead reckoning" with a checkbox; "Kalman filter" with a dropdown menu set to "Off" and values "16.1 Kt 353.5 °"; "Reference target" with a dropdown menu set to "Off" and values "16.1 Kt 350.4 °". Latitude and longitude fields are present for each section.

1. Start Reference target positioning.
2. Press **Sensors** button and open Position sheet.
3. Select Reference target as source of positioning

For position calculation select as primary or secondary source.

---

## Using ARPA targets for gyro error correction

Reference Targets can be used for gyro error correction. For more information, see "Navigation parameters setting" on page 353.

NOTE! The system is able to use Gyro error compensation value even if you have in Position sheet of Sensors dialog box the Reference Targets in Off -position. The requirement for the Gyro error correction value is that you have started the reference targets and the system has been able to calculate position and speed based on tracked reference targets.

---

This page is intentionally left blank

# Radar Echo Overlay

---

## Introduction

This ECDIS can have an optional Radar Echo Overlay. This means that the radar echo image can be transferred from the radar unit into the ECDIS chart display.

This ECDIS has many features to support exact match in scale and orientation of the chart and radar echo image. Exact match of the radar echo image and chart is an essential security feature. If the radar echo image and the chart display match, then the mariner can rely on what he sees and the mariner also gets a very good confirmation that his navigation sensors such as gyro and position receivers operate properly and accurately. However if the mariner is unable to achieve exact match then that is a very strong indication that something is wrong and he should not rely on what he sees.

This ECDIS can use radar echo image in several user selectable modes. "ECDIS only" mode operates without radar echo image. "ECDIS and radar" mode operates using rules for the type approved ECDIS to visualise radar echo image. "Radar over chart" mode draws radar echo image in top of the chart. This mode should be used temporarily because legally the equipment is not an ECDIS which can legally replace paper chart when operating with "Radar over chart". Fourth mode available is "Radar video only" which again should be used only temporarily to check pure radar echo presentation, because the equipment is not an ECDIS which can legally replace paper chart when operating with "Radar video only".

The radar echo image is transferred directly from radar transceiver so the range used in a connected ARPA radar display does not change scale in the ECDIS. This ECDIS is nearly independent of the ARPA radar display settings. The only ARPA radar display setting which has effect for the radar echo image of this ECDIS is the used pulse length of the radar transceiver. ARPA radar display controls the radar transmitted and thus selects the used pulse length. This ECDIS listens the radar receiver without any possibility to control radar transmitter. All other controls such as Gain, STC, FTC, interference reject, echo stretch, echo trails are independently controlled in this ECDIS.

Selected scale of displayed chart defines also scale of radar echo overlay. When you change scale of chart also scale of radar echo overlay is changed automatically. The maximum range of radar echo overlay is 24 nautical miles. Radar echo overlay can be displayed even if the own ship is not located in displayed chart area if the range is less than 24 NM.

The thumb rule for range of displayed area:

- Chart scale 1:10 000 is about equal to traditional radar range of 0.75 NM
- Chart scale 1:20 000 is about equal to traditional radar range of 1.50 NM

# How to activate radar echo overlay on the ECDIS

Radar echo overlay can be transferred into the ECDIS display. Like the other details of vector charts radar echo overlay can add or remove from chart display. In a Tracking sheet of Chart Details there is a control for Radar overlay. You have to also select mode how to display radar echo overlay in chart display and adjust it's visual image. To activate radar echo overlay, proceed as follows:

1. Press CHART DISPLAY button, select **Tracking** sheet open, check that radar overlay is set to be displayed. (Selected as **Std** or **other**).
2. Press RADAR button, Radar overlay dialog box open.

Chart display - ALL-OFF \*

Chart	Standard	Other
Tracking	Mariner	Route

Past tracks

Off Std Other

Ship System

Ship Primary

Ship Secondary

Length  min Labels  min

---

Off Std Other

ARPA targets

Length  min Labels  min

---

Off Std Other

Predictor ship (30 sec)

Events and Positions

ARPA targets

Radar Overlay

Ship true symbol scale limit

RADAR OVERLAY SETTINGS

Radar Overlay source Sindel21

Gain  %

Sea clutter filter  %

Rain clutter filter  %

Echo trail time  min

Echo trails

Interference reject

Echo stretch

Noise display

Mode

Transparency

ARPA target source

3. Select desired display mode for Radar echo overlay in Radaroverlay setting dialog box.
4. Adjust radar echo overlay visual image.

## Source of radar echo overlay

Source of radar echo overlay is permanently shown on upper bar (see example below).

Mon.Route Osku1	Plan Route	Pilot Data	Depth metres	Height metres	North Up	TM	TrueVect	TrueTrail
UserChart	Ref Target	ARPA 1 <span style="border: 2px solid black; border-radius: 50%; padding: 2px;">Radar FEC1</span>						



## Display modes of radar echo overlay

You can select following presentation modes of Radar image:

### **ECDIS only:**

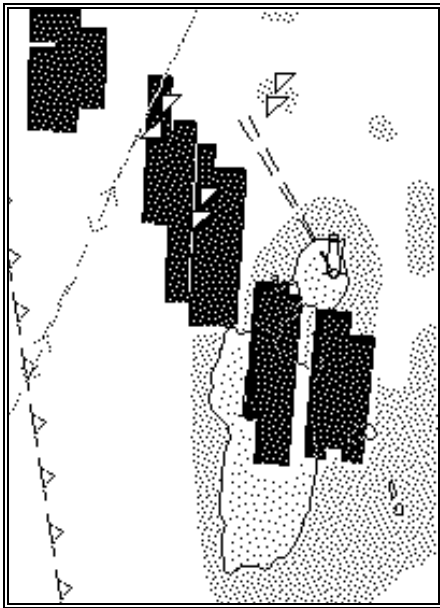
Only chart is displayed in the ECDIS.

### **ECDIS and Radar:**

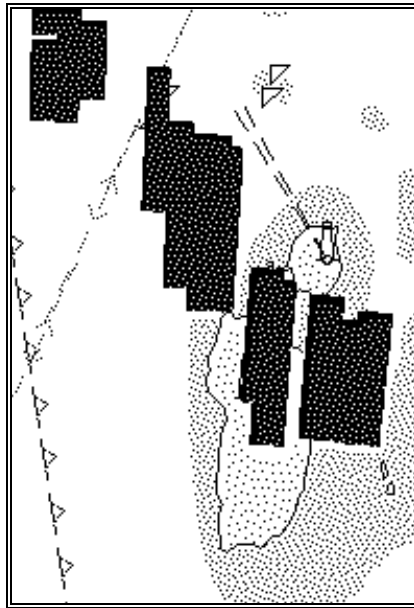
With S57 Chart material radar echo image is mixed into chart so that some chart features are underlying radar image and some are above it. This presentation follows the drawing rules of the Standard S52ed3.1 of IHO. If you use the ARCS Chart material radar image is drawn on top of the Chart.

### **Radar over Chart:**

Radar echo image is drawn on top of the Chart.



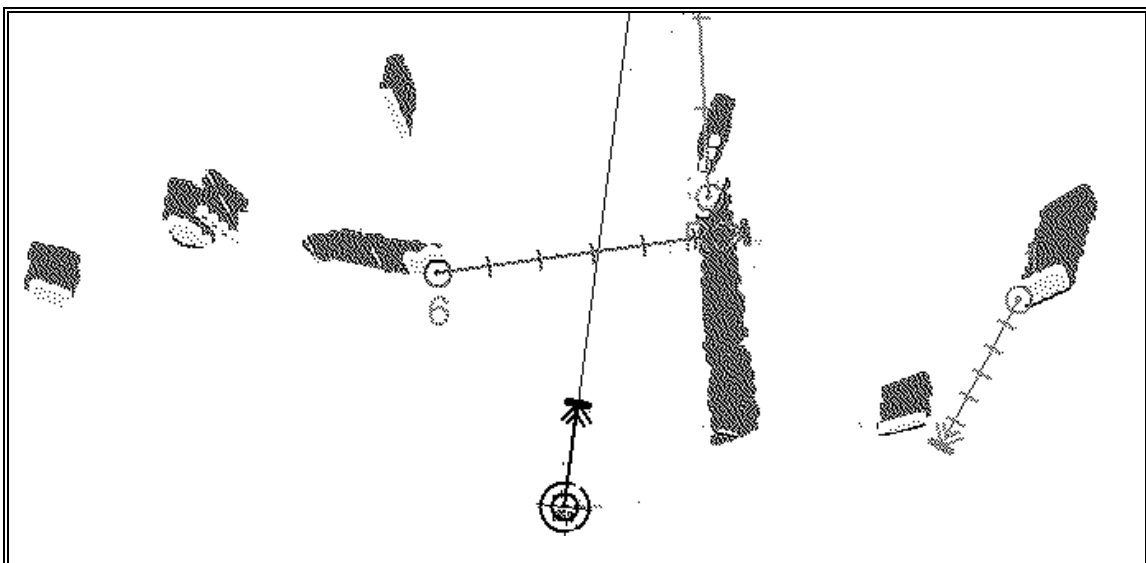
*ECDIS and Radar presentation*



*Radar over Chart presentation*

### **Radar video only:**

Only Radar echo image is drawn in the ECDIS display.



## How to adjust radar echo overlay visual image

There are several switches in Radar Overlay Settings to adjust radar echo overlay visual image (Gain, Sea clutter, Rain clutter, Echo trail, Interference reject, Echo stretch, Noise display).

**Note**, The controls of Gain, Sea Clutter Filter and Rain Clutter Filter are independent from the controls at any radar display. Therefore their relative position for the best picture may differ a lot of set values in a radar display.

RADAROVERLAY SETTINGS	
Radar overlay source	SINDEL
Gain	100 %
Sea clutter filter	0 %
Rain clutter filter	0 %
Echo trail time	1 min
Interference reject	LOW
Echo stretch	OFF
Noise display	OFF
Mode	ECDIS and Radar
Transparency	Opaque
ARPA target source	1

RADAROVERLAY SETTINGS	
Radar overlay source	SINDEL No Headline
Gain	100 %
Sea clutter filter	0 %
Rain clutter filter	0 %
Echo trail time	1 min
Interference reject	LOW
Echo stretch	OFF
Noise display	OFF
Mode	ECDIS and Radar
Transparency	Opaque
ARPA target source	1

**Note**, if the ECDIS fails to receive headline, trigger or azimuth from the radar transceiver, it is indicated in Radaroverlay settings dialog. box (See example above, headline information is missing).

### Radar overlay source

Indicates source of current radar echo overlay.

### Gain

Gain control is used to set sensitivity of radar echo image.

**Note**, If you change the value of Gain you have to check and if necessary re-adjust the value of Sea clutter filter because these two controls effect each other.

When you adjust Gain, Noise Display -mode is automatically switch to ON to show also lower level radar echo image.

### Sea clutter filter

Sea clutter filter control is used to control amount of sea clutter in radar echo image.

**Note**, If you change the value of Sea clutter filter you have to check and if necessary re-adjust the value of Gain because these two controls effect each other.

When you adjust Sea clutter filter, Noise Display -mode is automatically switch to ON to show also lower level radar echo image.

## Rain clutter filter

Rain clutter filter control is used as countermeasure against rain in radar echo image.

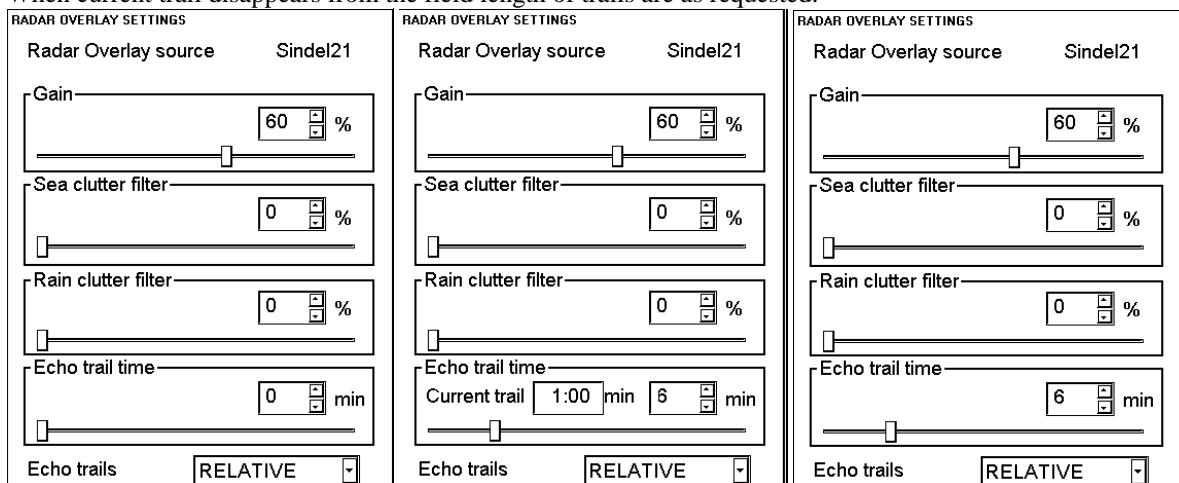
When you adjust Rain clutter filter, Noise Display mode is automatically switch to ON to show also lower level radar echo image.

## Echo trail time and trail presentation mode

Echo trails are artificial afterglow of radar echo image on the ECDIS display, created by maintaining the echo intensity once it has been seen, and then removing it after the set time has passed. Target Echoes represent their movements relative to own ship (Relative trails) or true movements with respect to land (True trails). Echo Trails are visible in dark green colour, if Noise Display has been selected OFF.

To select echo trail time and to select True or Relative echo trail presentation mode, proceed as follows:

1. Press RADAR button in Control Panel.
2. Select **TRUE** or **RELATIVE** presentation mode for trails in Echo trails list box.
3. Set desired time for echo trail time in Echo trail time field. If set time for trails is more than available in the ECDIS that moment, length of current trail is displayed in the field indicating that trail is shorter than requested. When current trail disappears from the field length of trails are as requested.



Permanent indication of selected presentation mode of trails is displayed upper right corner of the ECDIS screen.

True trail = TrueTrail

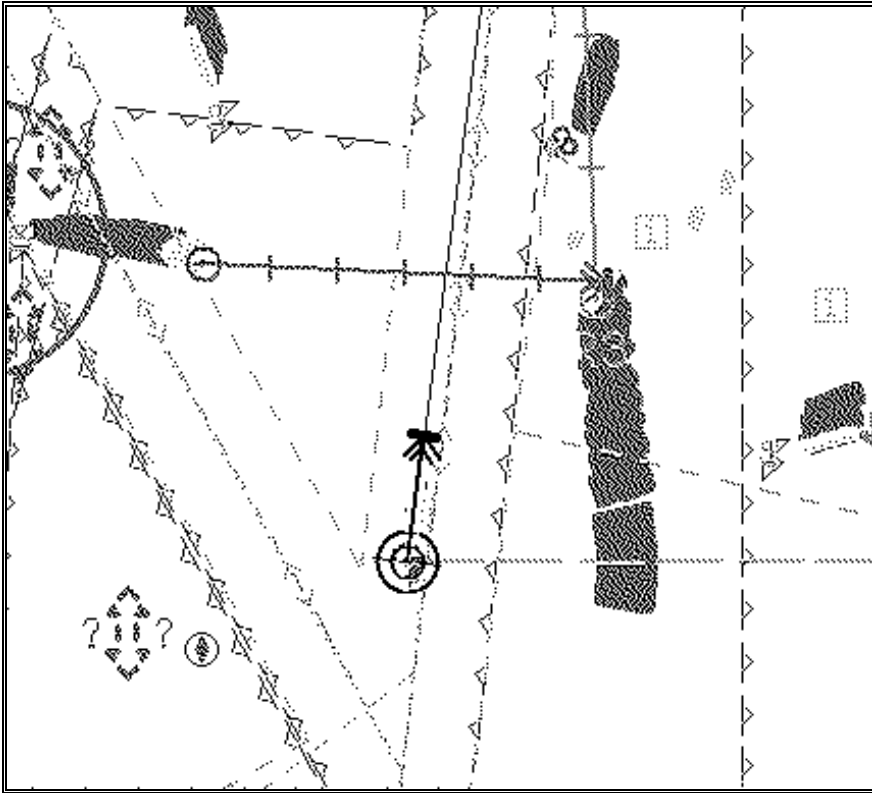
Relative trail = RelTrail

Mon.Route Osku1	Plan Route	Pilot Data	Depth metres	Height metres	North Up	TM	TrueVect	<b>TrueTrail</b>
UserChart	Ref Target	ARPA 1	Radar	FEC1				

**Note**, that permanent indication changes it's colour between black and red depending on selected display mode of own ship:

If display mode of own ship is True motion (TM): Indication of TrueTrail is displayed as black text, indication of RelTrail is displayed as orange text.

If display mode of own ship is Relative motion (RM): Indication of TrueTrail is displayed as orange text, indication of RelTrail is displayed as black text.



Relative trail presentation mode.

## Interference reject

Interference reject has three alternatives: OFF, LOW and HIGH. Select suitable to reduce interference of other radar and to suppress also amount of noise. Recommended positions are HIGH and LOW.

## Noise display

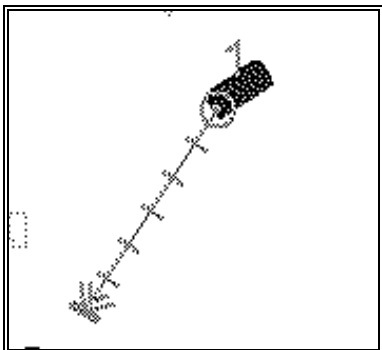
Radar echoes can be displayed with dark and bright green colour. If Noise display is selected ON, then dark green colour is used to display low echo level i.e. noise. If Noise display is selected OFF, then dark green colour is used to display Echo Trails.

## Transparency

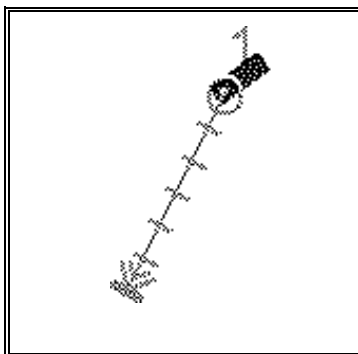
Transparency control "see through" behaviour of the radar echo overlay. Alternative OPAQUE overlaps chart objects: with ARCS totally and with S57 partly. Alternatives 25%, 50% and 75% allow you to see the chart details under the radar echoes.

## Echo Stretch

Echo stretch is used to emphasise radar echo to increase detectability of targets. Position **LOW** emphasise both noise and target level echoes while position **HIGH** emphasise only target level echoes.



Echo stretch **HIGH**.



Echo stretch **OFF**.

## Echo Overload situation

Mon.Route	Plan Route	Pilot Data	Depth metres	Height metres	North Up	TM	TrueVect	RelTrail
UserChart	Ref Target	ARPA 1 Radar Sindel21						

60°07.070N	Gyro (true)	355.1°
024°59.123E	CMG (pos)	354.5°
WGS 84	SMG	5.0Kt
GPS		

RADAROVERLAY SETTINGS	
Radar overlay source	FURUNO
<b>Overload Gain</b>	75 %
Sea clutter filter	0 %
Rain clutter filter	44 %
Echo trail time	5 min
Echo trails	RELATIVE
Interference reject	OFF
Echo stretch	OFF
Noise display	OFF
Mode	ECDIS and Radar
Transparency	Opaque
ARPA target source	1

Cursor	From Own Ship:	0.090 nm	147.4°
		60°06.994N	024°59.220E

07.09.1999 07:46 UTC	07.09.1999 10:46 FLE Standard	1:10 000	B1.17 B1.17
----------------------	-------------------------------	----------	----------------

Improperly set radar **Gain**, **Sea clutter filter** or **Interference reject** could lead to an overload situation, in which you see visual distortion such as above in your screen. Then check, if you have red text **Overload**, and adjust gain or sea clutter filter and set Interference reject in High position.

---

# How to adjust radar echo overlay to match positions of chart features

## Error sources of radar echo image and chart display miss match

Mariner should be aware that there are several reasons why the radar echo image and chart display do not match exactly. One should also be aware that normally the miss match is a combination of several reasons and adjusting only one feature doesn't solve the miss match all around. There is a fundamental difference between radar echo image and corresponding chart feature. Radar echo is a reflection from the real life target and the actual position of the real life target is front edge of the radar echo. Thus radar echo should start from the chart feature and extent as far as the used radar pulse length goes.

Bearing error sources

1. Gyro
2. Inaccurate chart
3. Improper installation parameters (radar echo overlay bearing offset)

Position error sources

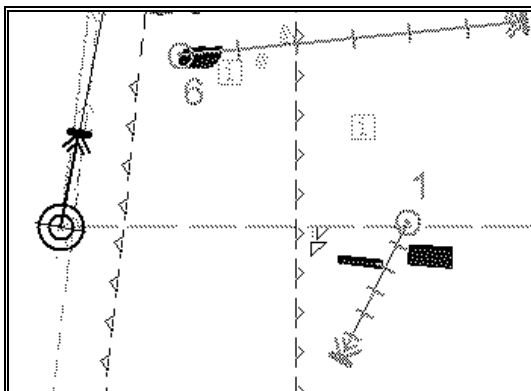
1. Inaccurate position
2. Position offset
3. Inaccurate chart
4. Wrong datum
5. Datum offset with ARCS material
6. Improper installation parameters (conning position offset, position receiver antenna offset, radar echo overlay range offset, datum selected for position receiver)

## Error sources of radar echo image and display of ARPA target miss match

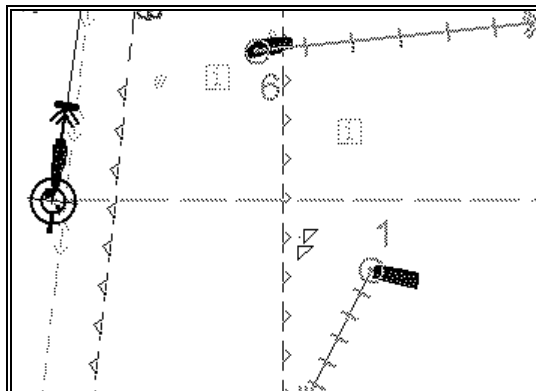
Mariner should be aware that there are several reasons why the radar echo image and display of ARPA target symbols do not match exactly.

1. different gyro value at ARPA radar display and at ECDIS
2. improper installation parameters (radar echo overlay bearing offset, radar echo overlay range offset, conning position offset)

See example below, how different gyro value set at ARPA radar display and at ECDIS effects the display of the ECDIS.



Different gyro value at ARPA and ECDIS



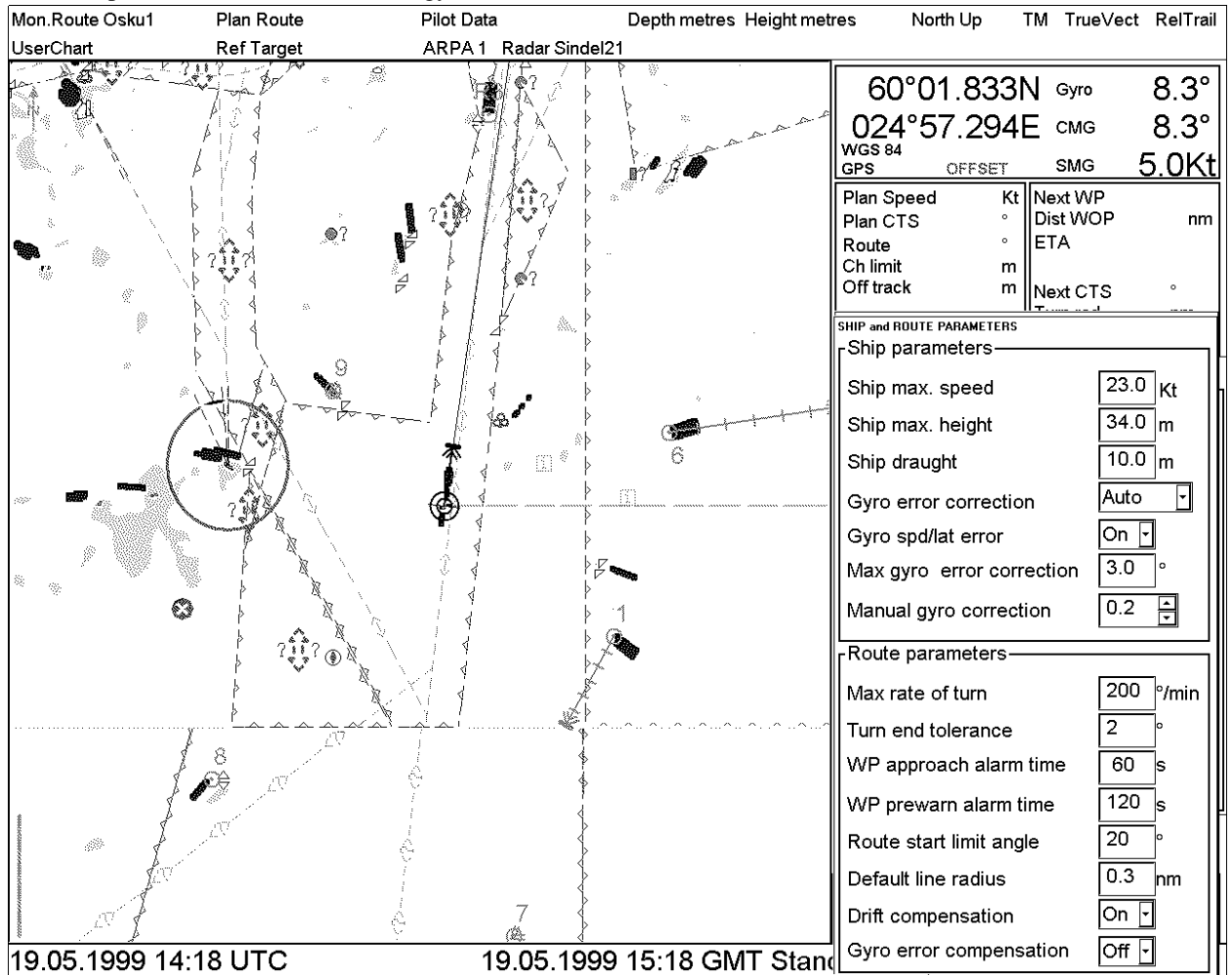
Equal gyro value at ARPA and ECDIS

## How to adjust bearing error

To adjust bearing error which is caused by gyro, you have three different alternatives:

1. Manual
  - Adjust value of manual gyro correction.
2. Table based gyro speed/latitude correction (Note! The build in correction inside the ECDIS doesn't correct dynamic error: settling time after course change etc.)
  - Switch selection Gyro speed/latitude correction to ON position.
3. Use Reference targets to make gyro correction (automatic).

See example below, how to use manual gyro correction.

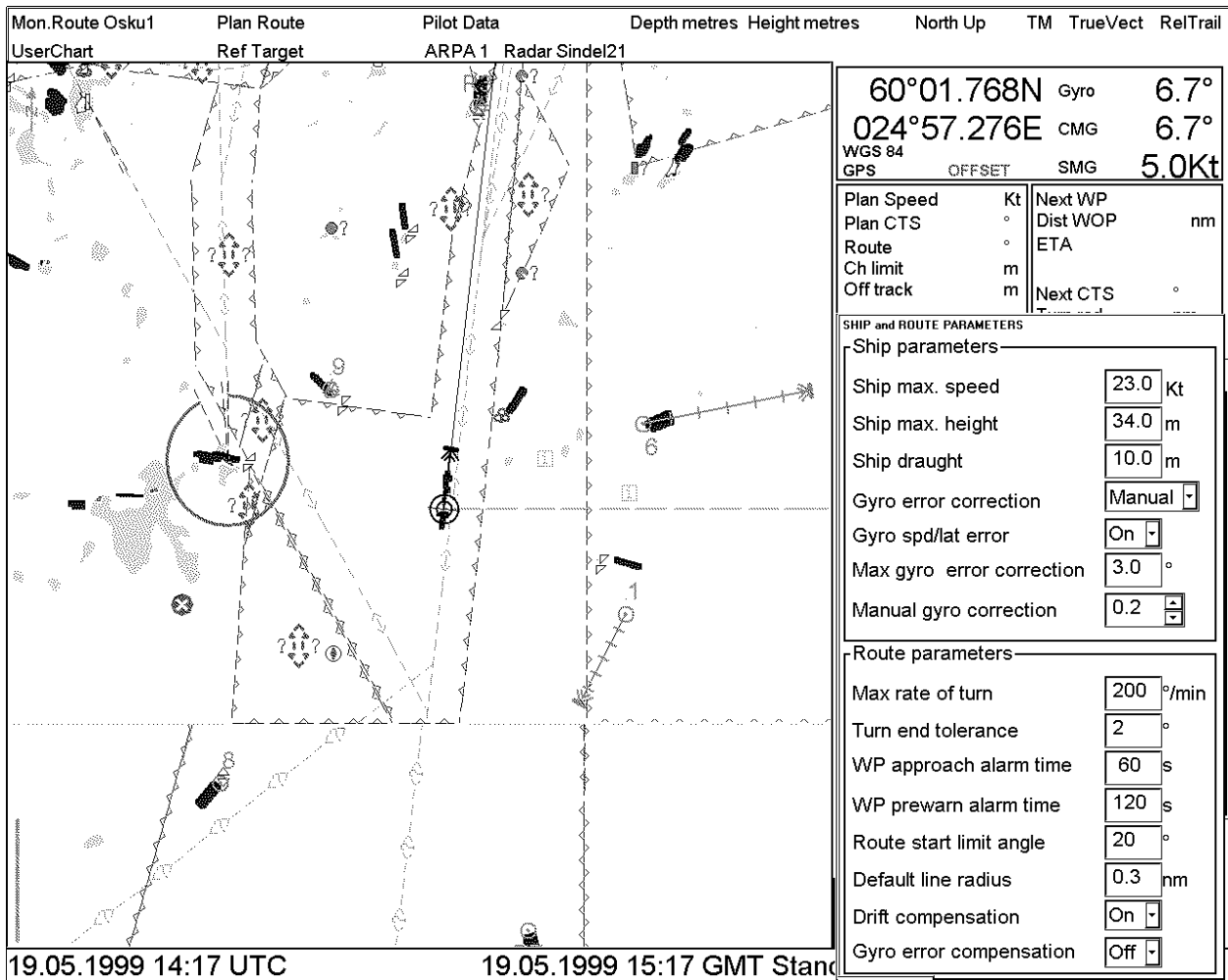


No manual gyro correction.

Note!

ARPA targets and radar echo overlay match perfectly.

Chart features and radar echo overlay have some miss match.



Manual gyro correction in use

Note!

ARPA targets and radar echo overlay match perfectly.

Chart features and radar echo overlay match perfectly.

## How to adjust position error

### *How to verify position and align it if required*

See chapter "Position alignment by means of ECDIS".

### *How to verify correct datum used in positioning*

It is very important that output co-ordinates of position device is the same as the ECDIS expects to receive, otherwise there is a risk that you have incorrect position in the ECDIS. Verify in position device configurations that output of co-ordinates is WGS84 and also in installation parameters in the ECDIS is set to receive position in WGS84 datum.



# Recording functions

---

## Introduction

An ECDIS EC1000 has capability to record various voyage related things like movement and position of own ship and dangerous targets based on ARPA radar.

The Voyage log is used to record entire voyage i.e. a sailing of a route from first point to the last.

The Details log is used to record position, speed and course once every minute.

Danger Targets log is used to record ARPA targets information.

Chart Usage log is used to record information of used charts in display.

All recording related things are here. User can print a report that includes own ship data and ARPA radar targets.

---

## Events and Man Over Board functions



*MOB button*

function LOGBOOK M.O.B

Records a predefined Man Over Board event to logbook. Position of this event is also displayed on chart as a red mark



*EVENT button*

function LOGBOOK EVENT

Records an event to logbook. You can also write a comment for this event.

**Note**, it is displayed only in the Electronic chart area if Events is selected to display in Chart display dialog box.

The ECDIS can display Events and MAN OVER BOARD. These events are also recorded into the Voyage log.



M.O.B

# Voyage recording

## Details log

Details log contains information of last 12 hours. Various information is recorded in Details log once per minute:

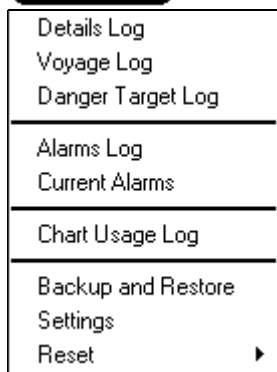
- Date and time
- Position of own ship which is based on selection of position sensors. For more information, see chapter "Source of position".
- Value of alignment (range, bearing), if it is used.
- Speed and Course. For more information, see chapter "Source of smg, cmg, speed, heading, rot, drift and docking speed components"
- Heading. For more information, see chapter "Source of smg, cmg, speed, heading, rot, drift and docking speed components".
- Value of gyro correction, if it is used.

## How to view Details log

To open Details log, proceed as followed:



1. Press VOYAGE RECORD button.
2. Select **Details log** from the menu
3. The system will start viewing program of log.
4. User is able to make a backup copy, print or print desired part of details log for later use.



**Details log - ANTS Event viewer**

File View Help

Date	Time	Type	Lat	Lon	Align [nm]	Align [°]	Spd [kn]	Crs [°]	Hdg [°]	Corr. [°]
05.07.2000	11:43:00	Auto	60°01.107N	025°00.265E	0.0	0.0	16.4	106.5	107.1	0.6
05.07.2000	11:42:00	Auto	60°01.184N	024°59.744E	0.0	0.0	16.3	106.8	107.4	0.6
05.07.2000	11:41:00	Auto	60°01.265N	024°59.219E	0.0	0.0	16.4	107.5	108.0	0.6
05.07.2000	11:40:00	Auto	60°01.354N	024°58.709E	0.0	0.0	16.2	110.7	111.6	0.8
05.07.2000	11:39:00	Auto	60°01.442N	024°58.187E	0.0	0.0	16.1	112.5	110.5	0.7
05.07.2000	11:38:00	Auto	60°01.600N	024°57.767E	0.0	0.0	16.1	141.3	140.5	1.6
05.07.2000	11:37:00	Auto	60°01.845N	024°57.565E	0.0	0.0	16.5	176.0	175.2	2.1
05.07.2000	11:36:00	Auto	60°02.117N	024°57.600E	0.0	0.0	16.6	185.4	187.4	2.1
05.07.2000	11:35:00	Auto	60°02.396N	024°57.651E	0.0	0.0	16.6	185.4	187.5	2.1
05.07.2000	11:34:00	Auto	60°02.671N	024°57.705E	0.0	0.0	16.5	186.1	188.0	2.1
05.07.2000	11:33:00	Auto	60°02.940N	024°57.766E	0.0	0.0	16.5	184.8	187.2	2.1
05.07.2000	11:32:00	Auto	60°03.219N	024°57.825E	0.0	0.0	16.6	181.9	189.4	2.1

Ready | Details log | Time: UTC | Datum: WGS 84

## Voyage log

This log consists information from the entire voyage. Recorded events are:

- Changes of course and speed are recorded. User can define limits for course change and speed change of own ship to be recorded. (Type:Ship)
- User is able to define time period, how often there is a recording regardless of course or speed changes. (For example, once per 4 hours). (Type:Auto)
- Man Over Board event (Type:MOB)
- Standard event (Type:User)
- Alarms generated by the system. User is able to select alarms, which are recorded into Voyage log. (Type:Alarm)
- Positions (type Posdev)

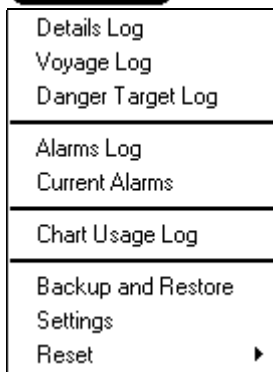
Each record consists information of wind speed and direction, depth information and distance counter value.

### How to view Voyage log

To open Voyage log, proceed as followed:



1. Press VOYAGE RECORD button.
2. Select **Voyage log** from the menu
3. The system will start viewing program of log.
4. User is able to make a backup copy, print a complete log or print desired part of Voyage log for later use.



Total voyage log - ANTS Event viewer

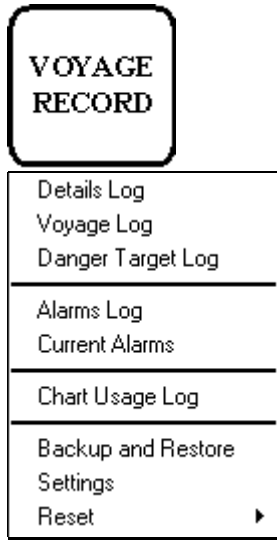
File View Help

Date	Time	Type	Lat	Lon	Spd [kn]	Crs [°]	Hdg [°]	Corr. [°]	Wind [kn]	Wind [°]	Dist Cntr [nm]	Depth [m]	Description
05.07.2000	11:39:00	Ship	60°01.442N	024°58.187E	16.1	112.5	110.5	0.7	0.0	0.0	674.9	NVLD	
05.07.2000	11:38:00	Ship	60°01.600N	024°57.767E	16.1	141.3	140.5	1.6	0.0	0.0	674.6	NVLD	
05.07.2000	11:37:00	Ship	60°01.845N	024°57.565E	16.5	176.0	175.2	2.1	0.0	0.0	674.4	NVLD	
05.07.2000	11:33:00	Ship	60°02.940N	024°57.766E	16.5	184.8	187.2	2.1	0.0	0.0	673.3	NVLD	
05.07.2000	11:32:00	Ship	60°03.219N	024°57.825E	16.6	191.9	192.4	2.1	0.0	0.0	673.0	NVLD	
05.07.2000	11:25:00	Ship	60°04.952N	024°59.542E	16.4	208.2	211.0	1.8	0.0	0.0	671.0	NVLD	
05.07.2000	11:21:00	Ship	60°06.028N	025°00.032E	16.5	191.0	193.2	2.0	0.0	0.0	669.9	NVLD	
05.07.2000	11:20:00	Ship	60°06.299N	025°00.106E	16.5	182.6	184.7	2.1	0.0	0.0	669.7	NVLD	
05.07.2000	11:19:00	Ship	60°06.571N	025°00.195E	16.6	198.3	198.8	2.0	0.0	0.0	669.4	NVLD	
05.07.2000	11:18:00	Ship	60°06.822N	025°00.445E	16.7	214.8	215.0	1.7	0.0	0.0	669.1	NVLD	
05.07.2000	11:17:00	Ship	60°07.023N	025°00.818E	16.6	230.7	230.7	1.3	0.0	0.0	668.8	NVLD	
05.07.2000	11:16:00	Ship	60°07.167N	025°01.280E	16.5	245.4	245.0	0.9	0.0	0.0	668.6	NVLD	

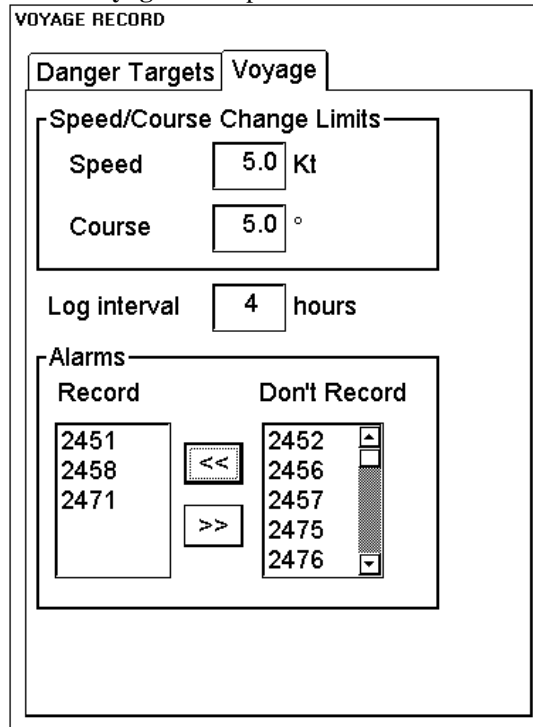
Ready | Entire voyage log | Time: UTC | Datum: WGS 84

## How to set conditions of logging

User can define limits for course change and speed change of own ship to be recorded and also time period for automatic logging. To set them, proceed as followed:



1. Press VOYAGE RECORD button.
2. Select **Settings** from the menu
3. Select **Voyage** sheet open.



Set desired limits for speed and course and also logging interval.

4. Select desired alarms to **Record** list box, which are recorded when alarm is generated. Alarms are shown here as number. For more information, see Chapter "Alarms".
5. Close dialog box pressing CANCEL push button in Control Panel.

## How to reset Voyage log for next voyage

When you think that there is suitable moment to make your voyage log empty (see "How to reset Voyage and Danger Targets logs" on page 345). You should do this at least twice a year. Note that you can make a backup of your voyage log before resetting it (see "How to make backup copy from Details, Voyage or Danger Targets log" on page 345.)



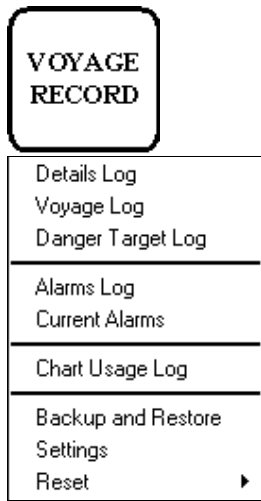
## Danger targets log

Information of dangerous targets is recorded into Danger Target log. Only ARPA targets which are dangerous based on user selected CPA and TCPA limits are recorded. Recorder data includes:

- CPA and TCPA of ARPA target
- Position, speed and course of ARPA target.

### How to view Danger targets log

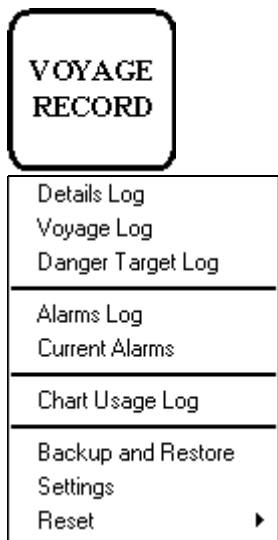
To open Danger targets log, proceed as follows:



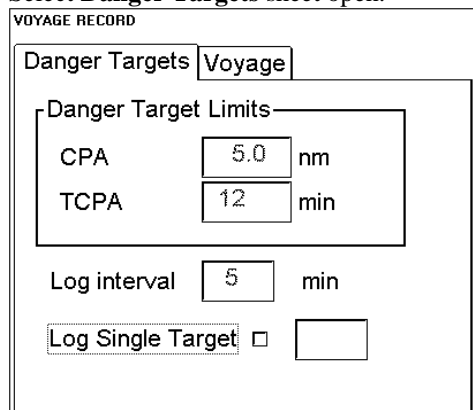
1. Press VOYAGE RECORD button.
2. Select **Danger targets log** from the menu
3. The system will start viewing program of log.
4. User is able to make a backup copy, print or print desired part of Danger targets log for later use.

### How to set conditions of viewing and logging Danger Targets

User can set Closest Point of Arrival (CPA), Time for CPA (TCPA) and Log interval for viewing dangerous ARPA targets on ECDIS display, a dangerous ARPA target is blinking between green and red colour. User is also alternatively to dangerous ARPA target logging to log only information of a single selected ARPA target



1. Press VOYAGE RECORD button.
2. Select **Settings** from the menu
3. Select **Danger Targets** sheet open.



Set desired limits for CPA and TCPA. Note, these limits are only for ECDIS. ARPA radar has its own setting for dangerous targets and thus a target which is dangerous at ARPA display can be safe on ECDIS or vice versa. If an ARPA target is inside CPA and TCPA, it is shown as dangerous ARPA target on ECDIS display. Log interval defines time period for logging..

**NOTE!** User is able to select logging of the track of a single ARPA target, if he selects **Log Single Target** and enters desired number of ARPA target. If this option is selected only information of this target is recorded

## How to save past track of a selected ARPA target

To save past track of selected target, proceed as followed:

1. Check number of ARPA targets. In order to get it move cursor above target and press INFO & HELP button.
2. Press Voyage Record button and select Settings from the menu. A Settings dialog box appears, select **Danger Target** sheet open.
3. Select Single Target Log tick box and enter ARPA target's number in edit box. See also "Danger targets log" on page 342.

**Note!** If you have selected Single Target Log only selected target's information is recorded. If you want record information of all danger targets, just remove selection of Single Target Log.

## Chart usage log

In Chart usage log is used to store information of charts which were displayed in the ECDIS chart display area or which were used for Chart Alarms. The following information is recorded by the system:

- Chart ID.
- Chart edition.
- The latest update included to chart.
- Displayed Updates Until
- Approved Updates Until
- center position of display (Lat, Lon).
- Scale of chart display.
- Details of chart selected to be displayed.

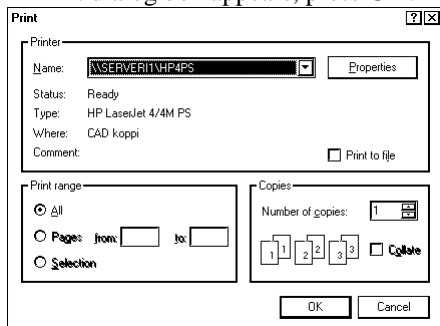
```

chart_usage.txt - TextView
File Setting Text
06.09.1999 20:09 f13e1iqr/ 1 0/1998 1 14 0/1998 1 14/1999 9 6 0/1998 1 14/1999 9 6
----- || -----
Scale: 50000 Center position: 60°02'459N 024°57'880E Details: 00220AA283001FFF
CellID/Edt Base Displayed Upd/Until Approved Upd/Until
N1200902/ 1 0/1999 1 20 0/1999 1 20/1999 9 6 0/1999 1 20/1999 9 6
Se3e33ao/ 1 0/1998 2 8 0/1998 2 8/1999 9 6 0/1998 2 8/1999 9 6
f13e1iqr/ 1 0/1998 1 14 0/1998 1 14/1999 9 6 0/1998 1 14/1999 9 6
06.09.1999 20:10
----- || -----
Scale: 50000 Center position: 60°02'459N 024°57'880E Details: 00220AA283001FFF
CellID/Edt Base Displayed Upd/Until Approved Upd/Until
N1200902/ 1 0/1999 1 20 0/1999 1 20/1999 9 6 0/1999 1 20/1999 9 6
Se3e33ao/ 1 0/1998 2 8 0/1998 2 8/1999 9 6 0/1998 2 8/1999 9 6
f13e1iqr/ 1 0/1998 1 14 0/1998 1 14/1999 9 6 0/1998 1 14/1999 9 6
06.09.1999 20:11
----- || -----
Scale: 52000 Center position: 32°28'635S 061°02'774E Details: 00220AA283001FFF
CellID/Edt Base Displayed Upd/Until Approved Upd/Until
GB4x0000/ 1 0/1998 2 24 0/1998 2 24/1999 9 6 0/1998 2 24/1999 9 6
06.09.1999 20:12
----- || -----
Scale: 52000 Center position: 32°28'635S 061°02'774E Details: 00220AA283001FFF
CellID/Edt Base Displayed Upd/Until Approved Upd/Until
GB4x0000/ 1 0/1998 2 24 0/1998 2 24/1999 9 6 0/1998 2 24/1999 9 6
06.09.1999 20:13
----- || -----
Scale: 52000 Center position: 32°28'635S 061°02'774E Details: 00220AA283001FFF
CellID/Edt Base Displayed Upd/Until Approved Upd/Until
GB4x0000/ 1 0/1998 2 24 0/1998 2 24/1999 9 6 0/1998 2 24/1999 9 6
06.09.1999 20:14
----- || -----
Scale: 52000 Center position: 32°28'635S 061°02'774E Details: 00220AA283001FFF
CellID/Edt Base Displayed Upd/Until Approved Upd/Until
GB4x0000/ 1 0/1998 2 24 0/1998 2 24/1999 9 6 0/1998 2 24/1999 9 6
Ready Time: UTC
  
```

## How to print Details, Voyage or Danger Targets log

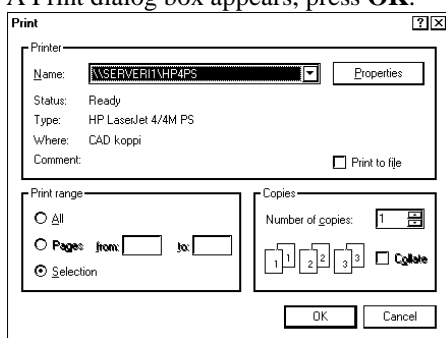
This procedure is equal if you make User Chart from Details, Voyage or Danger Targets log.

1. Open desired log
2. Select **Print** in **File** menu.
3. A Print dialog box appears, press **OK**. The Entire log will be printed.



If you are interested in only part of log, it is possible to print selected part of log.

1. Open desired log
2. Choose **Selection** in the **File** menu and **Start** in submenu.
3. Move cursor to location in log where you want to start printing and press **SELECT** in Control Panel.
4. Move cursor to location where you want to stop printing and press **SELECT** button in Control Panel.
5. Select **Print** in **File** menu.
6. A Print dialog box appears, press **OK**.



7. Selected rows are printed.

Date	Time	Type	Lat	Lon	Align [nm]	Align [°]	Spd [kn]	Crs [°]	Hdg [°]	Corr. [°]
05.07.2000	11:57:00	Auto	60°00.651N	025°07.493E	0.0	0.0	16.4	42.7	40.5	-1.6
05.07.2000	11:56:00	Auto	60°00.475N	025°07.083E	0.0	0.0	16.4	57.0	54.6	-1.2
05.07.2000	11:55:00	Auto	60°00.359N	025°06.596E	0.0	0.0	16.3	72.4	70.3	-0.7
05.07.2000	11:54:00	Auto	60°00.310N	025°06.053E	0.0	0.0	16.4	86.7	85.2	-0.2
05.07.2000	11:53:00	Auto	60°00.335N	025°05.514E	0.0	0.0	16.4	104.7	104.4	0.5
05.07.2000	11:52:00	Auto	60°00.413N	025°04.981E	0.0	0.0	16.3	106.5	107.1	0.6
05.07.2000	11:51:00	Auto	60°00.489N	025°04.476E	0.0	0.0	16.3	106.4	107.1	0.6
05.07.2000	11:50:00	Auto	60°00.566N	025°03.951E	0.0	0.0	16.4	106.4	107.0	0.6
05.07.2000	11:49:00	Auto	60°00.642N	025°03.432E	0.0	0.0	16.3	106.4	107.0	0.6
05.07.2000	11:48:00	Auto	60°00.720N	025°02.903E	0.0	0.0	16.5	106.5	107.1	0.6
05.07.2000	11:47:00	Auto	60°00.799N	025°02.367E	0.0	0.0	16.7	106.3	107.0	0.6
05.07.2000	11:46:00	Auto	60°00.876N	025°01.837E	0.0	0.0	16.4	106.3	106.9	0.6
05.07.2000	11:45:00	Auto	60°00.954N	025°01.307E	0.0	0.0	16.4	106.3	106.9	0.6
05.07.2000	11:44:00	Auto	60°01.029N	025°00.790E	0.0	0.0	16.4	106.3	106.9	0.6
05.07.2000	11:43:00	Auto	60°01.107N	025°00.265E	0.0	0.0	16.4	106.5	107.1	0.6
05.07.2000	11:42:00	Auto	60°01.184N	024°59.744E	0.0	0.0	16.3	106.8	107.4	0.6
05.07.2000	11:41:00	Auto	60°01.265N	024°59.219E	0.0	0.0	16.4	107.5	108.0	0.6

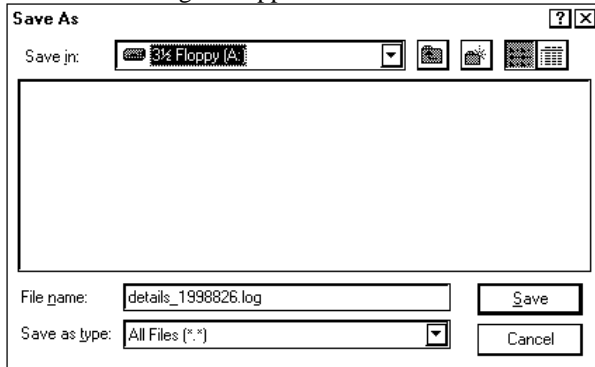
Selected part of log before print. Highlighted part of log will be printed by print command.



## How to make backup copy from Details, Voyage or Danger Targets log

This procedure is equal if you make User Chart from Details, Voyage or Danger Targets log.

1. Open desired log
2. Select **Save log** in **File** menu.
3. A Save As dialog box appears



Select desired bath for backup and press **Save**.

## How to reset distance counter

It is useful to reset distance counter when you are starting a new voyage. To reset distance counter, proceed as followed:

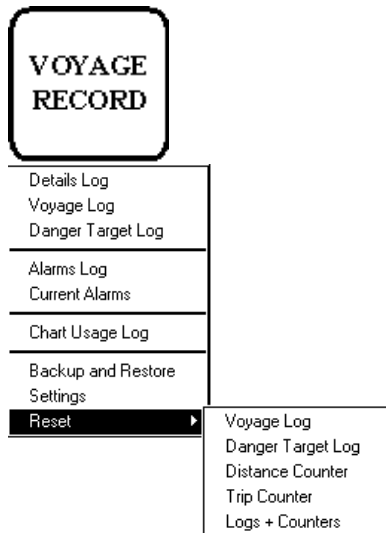
1. Press VOYAGE RECORD button.
2. Select **Reset** from the menu and Distance counter from the submenu.

The system will ask you if you are sure to reset Distance Counter. Press **OK** and the system resets it

## How to reset Voyage and Danger Targets logs

It is useful to reset Voyage and Danger Targets Logs when you are starting a new voyage. If necessary make a backup copy before resetting. To reset, proceed as followed:

1. Press VOYAGE RECORD button.
2. Select **Reset** from the menu and desired log from the submenu.
3. The system will ask you if you are sure to reset log. Press **OK** and the system resets the log.



## How to make an User chart from the log (Past track)

This procedure is equal if you make User Chart from Details or Voyage log.

1. Press **Voyage Record** pushbutton.
2. Select **log** you want make an User Chart from the menu. It will take a few seconds until a log viewer appears.
3. Select from A Log viewer's File menu **Save as User Chart** command.

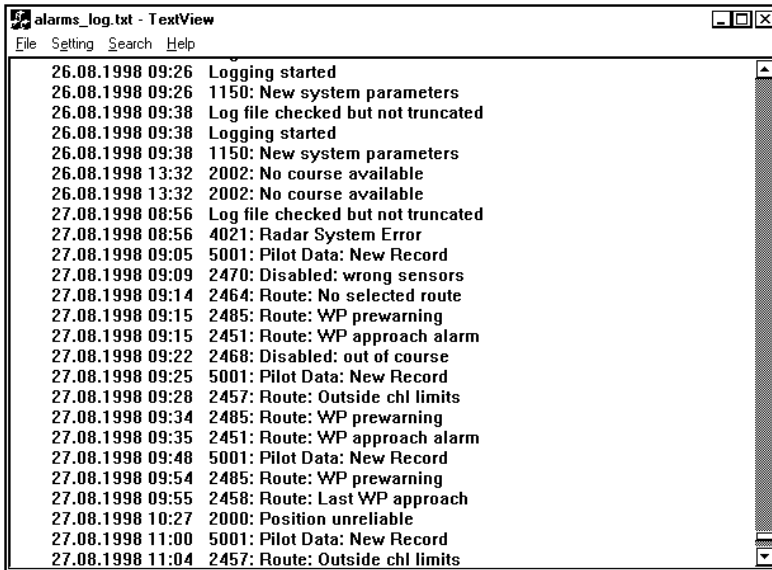
Date	Time	Lat	Lon
13.01.1997	14:13:00	59°59.765N	026°09.500E
13.01.1997	14:12:00	59°59.849N	026°09.033E
13.01.1997	14:11:00	59°59.938N	026°08.571E
13.01.1997	14:10:00	60°00.031N	026°08.131E
13.01.1997	14:09:00	60°00.091N	026°07.653E
13.01.1997	14:08:00	60°00.096N	026°07.168E
13.01.1997	14:07:00	60°00.051N	026°06.699E
13.01.1997	14:06:00	59°59.947N	026°06.252E
13.01.1997	14:05:00	59°59.824N	026°05.839E
13.01.1997	14:04:00	59°59.698N	026°05.411E
13.01.1997	14:03:00	59°59.576N	026°04.997E
13.01.1997	14:02:00	59°59.451N	026°04.567E
13.01.1997	14:01:00	59°59.325N	026°04.136E
13.01.1997	14:00:00	59°59.210N	026°03.725E
13.01.1997	13:59:00	59°59.079N	026°03.307E
13.01.1997	13:58:00	59°58.971N	026°02.864E
13.01.1997	13:57:00	59°58.920N	026°02.394E
13.01.1997	13:56:00	59°58.877N	026°01.905E
13.01.1997	13:55:00	59°58.832N	026°01.433E
13.01.1997	13:54:00	59°58.788N	026°00.944E
13.01.1997	13:53:00	59°58.748N	026°00.477E
13.01.1997	13:52:00	59°58.707N	025°59.988E
13.01.1997	13:51:00	59°58.665N	025°59.501E
13.01.1997	13:50:00	59°58.624N	025°59.028E
13.01.1997	13:49:00	59°58.582N	025°58.539E
13.01.1997	13:48:00	59°58.542N	025°58.067E
13.01.1997	13:47:00	59°58.500N	025°57.578E
13.01.1997	13:46:00	59°58.461N	025°57.113E
13.01.1997	13:45:00	59°58.424N	025°56.622E
13.01.1997	13:44:00	59°58.386N	025°56.128E
13.01.1997	13:43:00	59°58.354N	025°55.651E
13.01.1997	13:42:00	59°58.329N	025°55.158E

4. User chart conversion dialog box appears. In this dialog box there are following fields:
  - **User chart name**; in this field enter name for log which is saved as User chart.
  - **Elements will be displayed on radar**; if this is selected, chart will be displayed also on radar screen.
  - **Filter**; if selected, system filters log so that minimum distance between points in the User chart is 0,3 NM.
5. **Select log rows for user chart conversion**; in this window is shown the contents of log. User can select the entire log or part of it. For the selection of conversion points use **SELECT** pushbutton to select first point for the User chart, then roll TRACK BALL and hold down **SELECT** button until you have select last point for the User chart.
6. Function of the pushbuttons in the dialog box;
  - **OK**; converts selected points to User chart and closes dialog box.
  - **Cancel**; closes dialog box without doing anything.
  - **Select all**; selects all the points.
  - **Unselect all**; removes selection.
  - **Save in file**; saves selection to the file named in User chart name -field and keep this dialog box open for further selection to the same file. (It makes possible to save in the same file separate part of log.).

NOTE! If your selected range for conversion from log to User chart contains periods of not valid own ship position, then the User chart has a gap in the line for these periods.

## Alarms log

An Alarm's log is used to collect and record alarms generated by the system. User is able to view list of generated alarms using alarm log viewing program.

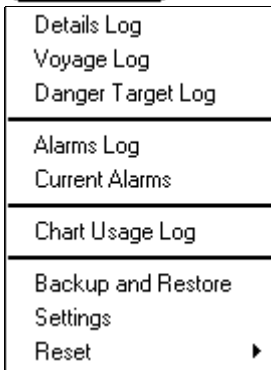


Possible view of latest alarm. A time and date, number of alarm and explanation are listed in Latest alarm log.

To open log, proceed as followed:



1. Press VOYAGE RECORD button.
2. Select **Alarms Log** from the menu
3. The system will start viewing program of log.
4. User is able to print log.



### How to print Latest Alarm

1. Press VOYAGE RECORD button.
2. Select **Alarms Log** from the menu
3. The system will start viewing program of log.
4. Select **Print** From the File menu. A print dialog box appears, press **OK**.

This page is intentionally left blank

# Datum

---

## General

Datum is a mathematical model of the earth, based on which the sea chart has been made. Datum connects together the positioning and the sea chart. If the Datum of position sensor and the sea chart are different, a transformation has to be made somewhere in the system. Not doing so can result errors of several sea miles. Generally, it can be assumed that the error is at least of the magnitude of a cable (0.1 NM). The difference between two Datums is never constant, but depends on position. This means that the difference term of WGS 84 and local Datum, generally used in paper charts, is not generally valid with electronic sea charts.

---

## Paper charts

Datums used in paper charts has been traditionally national Datums for historical reasons. Many paper charts do not have a marked Datum, compatibility with electronic charts may be complicated. In some paper charts, the correction terms instead of Datum are printed, for correction of the WGS 84 system satellite locations. The correction terms are usable but only with the paper chart in question.

---

## Electronic sea charts

Until now, electronic sea charts have generally been based on rasterizing or vectorizing of paper charts, resulting in the respective transfer of the local Datum.

Exceptions:

- The ARCS (raster) material includes polynomials for each chart, making it possible for the ECS system to solve the difference between the WGS 84 Datum and the local Datum with an accuracy sufficient for authority responsibility. In some charts, the mentioned difference is not known with sufficient accuracy, resulting in displaying a permanent warning window when displayed in ARCS compatible systems.

Cursor
From Own Ship:    0.6 nm       294.7°
60°20.243N 022°03.234E WGS undefi.

- ENC vector material, which according to S57 standard has to be produced by National Hydrographic Office in the WGS-84 Datum.

---

## Positioning devices and Datum

In early days of the electronic positioning devices, no attention was generally paid to Datums because the commonly used systems utilised special charts (like Decca charts). Later on, a data output was added to these systems, but still no attention was paid to Datums and the errors were considered as inaccuracy of the system. The spread of the GPS has made Datum better known. There is no value of an accurate position, if co-ordinates are in a wrong Datum. GPS satellites in the scope utilise the WGS-84 Datum. However the WGS-84 Datum is not a general solution for all positioning systems, due to differences between electronic sea chart system and the chart material displayed.

---

## **ECDIS and Datum**

The real ECDIS uses ENC material, produced to standards using WGS-84 Datum. Positioning devices connected to ECDIS must work in the WGS-84 Datum. The IMO resolution requires that the ECDIS must give an alarm, if the datum of positioning device is not the WGS-84. In practice this is impossible, because the standard used by positioning devices (IEC-1162, previously NMEA-183) does not include a Datum message. Consequently, the classification societies only approve positioning device in which Datum cannot be changed (i.e. is always WGS-84) to be interfaced to the ECDIS.

---

## **ECDIS and user selectable local Datum**

The ECDIS provides for user a possibility to change viewed datum. See chapter "How to select Datum" on page 352. This selection of the datum does not change anything inside the ECDIS for navigation calculation processes or for electronic sea chart display processes. But it changes the numerical values of positions displayed on the ECDIS screen into the user selected Datum. This is very useful, if you like to plot positions from the ECDIS on traditional paper chart.

# Parameters setup

## Parameters

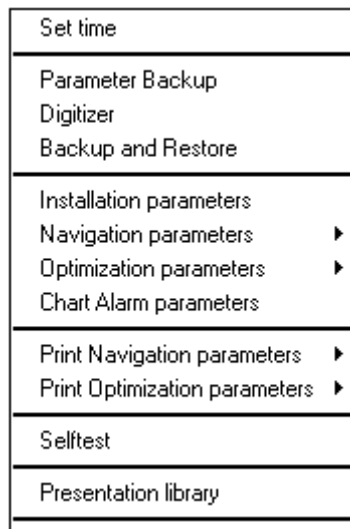
There are in the INITIAL SETTING menu **Installation parameters**, **Navigation parameters** and **Optimization parameters** commands, which define the configuration of ECDIS and operative parameters which are either used to control steering and navigation calculation or used during route planning.

Functionality of Initial setting push button is following:

1. When you press INITIAL SETTING push button, **INITIAL SETTING** dialog box will appear to Dialog box area.
2. If you already have **INITIAL SETTING** dialog box on display and you press INITIAL SETTING push button, you will get Initial setting menu on display.

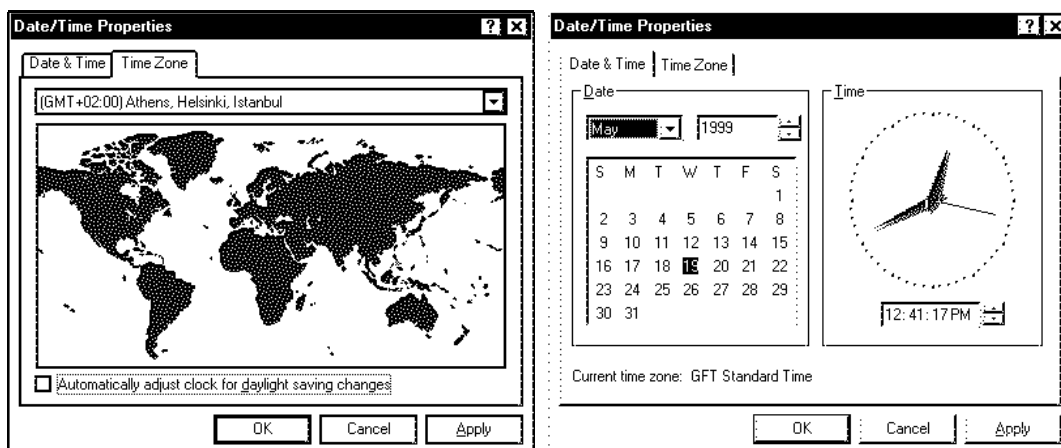


*INITIAL SETTING* button



### Set time:

User can set date, local time and time zone.



### Parameter backup:

User can take backup copy from parameters. See chapter "Backup operation".

### Installation parameters:

The ECDIS system parameters are set by installation parameters. **Note!** To access Installation parameters, you will need a key disc, which was delivered by the manufacturer. See Technical Manual for details.

### Navigation parameters:

This function is used to define parameters for a ship and a route. For more information about setting Navigation parameters, see "Ship and route parameters" on page 353.

### Optimization parameters:

This function is used to define parameters for speed and fuel consumption. For more information setting Optimization parameters, see "Optimization parameters setting" on page 356.

### Print navigation parameters:

Prints navigation parameters to default printer.

### Print optimization parameters:

Prints optimization parameters to default printer.

## How to access to installation parameters

Installation parameters command is used to set installation parameters for the system. All these parameters have something to do with hardware configurations and setup. It is necessary to modify them **only** during installation and later changes of sensor configuration. While this function is not part of normal operation, it is fully described in the technical manual.

## How to select Datum

Datum is used to select between different models of the earth. It is essential that you use Datum in a consistent way. See also chapter "ECDIS and Datum" on page 350.

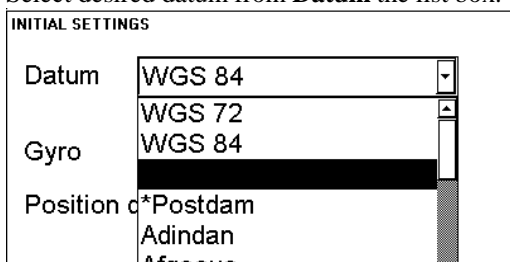
If you use paper charts together with electronic chart material, it is recommended that you use the same Datum as your current paper chart to avoid misalignment between your electronic system and points taken or plotted on your current paper chart.

Once you have selected a datum, all numerical latitude-longitude position values are presented in your selected datum.

**Note:** If you use ARCS raster chart material the rasterized charts contain some rasterized position information. These positions like scales in the edges of ARCS charts are true only if you have selected native datum of that ARCS chart. Normally this is the natural situation, because you use ARCS together with equal official paper chart and because you have selected as datum the datum of your equal official paper chart.

To select datum proceed as follows:

1. Press **Initial setting** push button and select **Datum** from the list box.
2. Select desired datum from **Datum** the list box.





- Selected datum is shown on the Upper information area.

60°12.396N	Gyro (corr)	161.5 °
025°29.101E	CMG (pos)	155.3 °
Finnish KKJ(84)	OFFSET SMG	15.7 Kt
FILTER HIGH		

Selected datum is shown on Upper information area (in this case Finish KKJ(84)).

## Navigation parameters setting

### Ship and route parameters

The purpose of Navigation parameters is set the basic parameters for the ship. These parameters are relative to ship steering and they are very important for a correct function of the integrated navigation system. Parameters must be maintained carefully. Necessary modification must be carried out with a good knowledge of the parameters importance.

In order to get edit Ship and Route parameters, proceed as follow:

- From Control Panel press INITIAL SETTING.
- From menu select **Navigation parameters**.
- From submenu select **Ship and Route parameters**.

SHIP and ROUTE PARAMETERS	
<b>Ship parameters</b>	
Ship max. speed	23.0 Kt
Ship max. height	34.0 m
Ship draught	10.0 m
Gyro error correction	Manual ▾
Gyro spd/lat error	On ▾
Max gyro error correction	3.0 °
Manual gyro correction	0.2 ▴ ▾
<b>Route parameters</b>	
Max rate of turn	200 °/min
Turn end tolerance	2 °
WP approach alarm time	60 s
WP prewarn alarm time	120 s
Route start limit angle	20 °
Default line radius	0.3 nm
Drift compensation	On ▾
Gyro error compensation	Off ▾

### **Ship parameters:**

#### **Ship max. speed:**

Maximum speed the ship can perform.

#### **Ship max. height:**

Max. height of ship for generating alarms for objects which are hanging above sea level.

#### **Ship draught:**

Max. draught of ship for generating alarms for objects which are below sea level.

#### **Gyro error correction:**

Used to select method of gyro error correction.

#### **Gyro spd/lat error:**

Used to select speeds/latitude correction method of gyro error correction.

#### **Max gyro error correction:**

This is the limit for the maximum correction allowed. Typical value 3 degrees.

#### **Manual gyro correction:**

Used to adjust gyro correction manually.

### **Route parameters:**

#### **Max Rate of Turn:**

Indicates the maximum rate of turn of the ship.

#### **Turn end tolerance:**

This defines the window for the detection of the end of turn. Typical values are between 2 to 4 degrees.

#### **WP approach alarm time:**

Used to set the alarm time before approaching the wheel over point.

#### **WP prewarn alarm time:**

Used to set the alarm time well before approaching the wheel over point.

#### **Route start limit angle:**

Used to set the maximum approach angle against planned course in order to accept start of automatic Route Steering.

#### **Default line radius:**

Used to define the default value of radius between waypoints during automatic Route Steering.

#### **Drift compensation:**

Enables/disables the drift compensation during automatic Route Steering.

#### **Gyro error compensation:**

Enables/disables the gyro error compensation of set course during automatic Route Steering.

### ***Forwarding distance***

The forwarding distance is the distance the ship travels straight after the steering command is given to the autopilot. This distance may vary with a different required radius of turn. The logic to verify the correct distance is to perform a manoeuvre of 90 degrees (Port and Starboard), with a SMALL RADIUS (0.3 NM), and verify from the radar, using curved EBL, if the turn goes "long" or is too "sharp". The parameter should also be verified with different radius. (Most important radius values are between 0.3 to 1.0 NM).

In order to get edit Forwarding distances parameters, proceed as follow:

1. From Control Panel press INITIAL SETTING
2. From menu select **Navigation parameters**

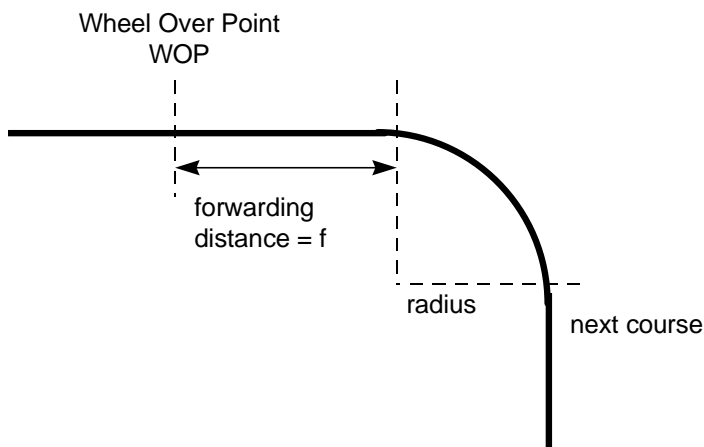
3. From submenu select **Forwarding distances**.

FORWARDING DISTANCES			
Port			
Radius /nm	Speed		
	20%	50%	100%
0.3	0.045	0.060	0.060
0.7	0.050	0.060	0.060
1.5	0.065	0.090	0.110

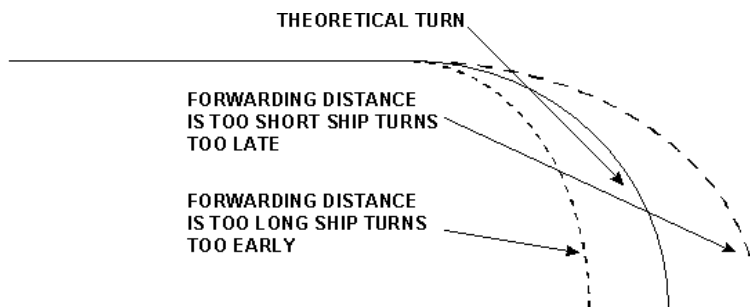
  

Starboard			
Radius /nm	Speed		
	20%	50%	100%
0.3	0.045	0.060	0.060
0.7	0.050	0.060	0.060
1.5	0.065	0.090	0.110

Normally these parameters are entered during sea trial but can also be modified later on. See figures below:



This Figure shows how Forwarding distance is defined.



Influence of forwarding distance to ship's turn.

## Optimization parameters setting

The optimization parameters are used in optimization calculation. Therefore it must be defined these parameters before calculation.

In order to get modify Optimization parameters, proceed as follow:

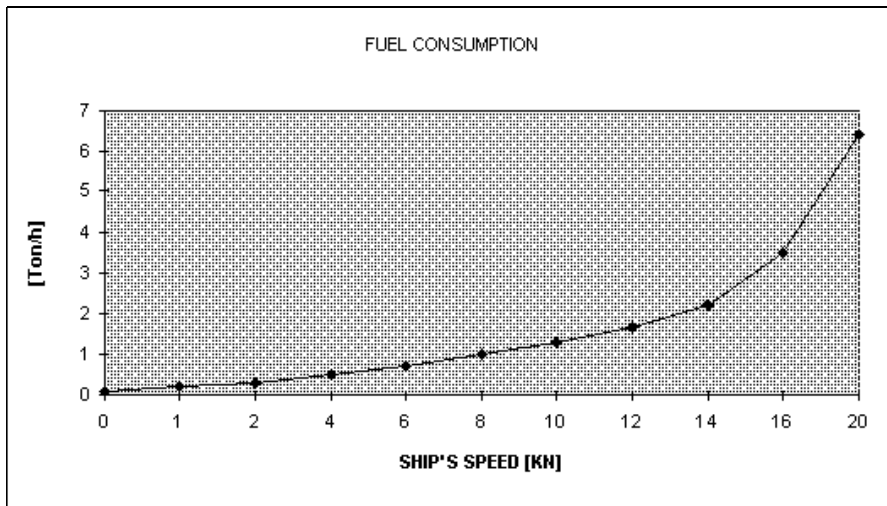
1. From Control Panel press INITIAL SETTING
2. From menu select **Optimization parameters**
3. Modify Optimization parameters by moving cursor to desired edit box and pressing select. This allows user to modify value.

PLANNING OPTIMIZATION PARAMETERS		
Cost		
Hour \$/h	HFO \$/ton	DO \$/ton
1200	150	200
Speed Kt	HFO ton/h	DO ton/h
0.0	0.000	0.000
2.0	0.200	0.100
4.0	0.400	0.100
6.0	0.800	0.100
8.0	1.400	0.100
10.0	1.600	0.100
12.0	1.800	0.100
14.0	2.200	0.100
16.0	2.700	0.100
18.0	3.300	0.100
20.0	4.000	0.100

**Note:** HFO: Heavy fuel oil

DO: Diesel oil

This is very important data table, which contains ship's fuel consumption with the different speeds. There are 11 different speeds used to indicate fuel consumption on that specific speed. Prior to entering data to the form prepare following graphic in order to find those 11 points.



Set 11 points on the graphics as explained above. Transfer those 11 points to the table. Use more points where the curve bends more.

Example: 3,5 KN = 0,72 Ton / Hour HFO

Use the second graphic for Diesel Oil, if the Diesel Oil consumption is relative to the speed.

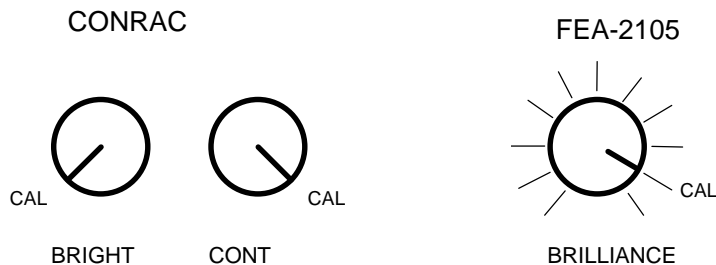
# Colour Calibration

---

## Settings of colour calibration

NOTE! Use of the brilliance control (with FEA-2105 monitor) and brightness and/or contrast control (with Conrac monitor) may adversely affect the visibility of information on the night display.

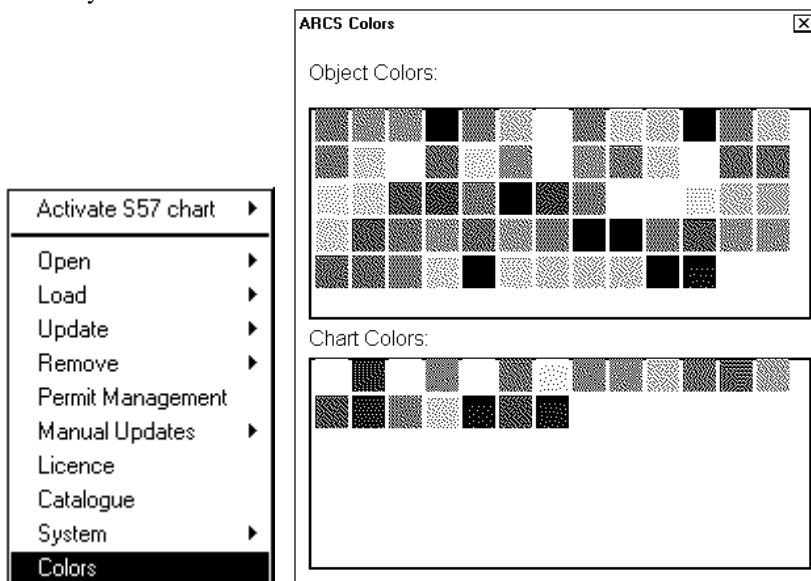
Brilliance, (FEA-2105 monitor) and Brightness and Contrast, (CONRAC monitor), are adjusted in initial factory calibration so that when the controls are in "CAL" position the ECDIS display fulfils the colour calibration for colour purity and colour differentiation. The calibrated positions are marked as below:



## Colour test for ARCS charts

It is a known thing that the colours in a monitor change when the monitor ages. Also you may want to use other setting of the Brilliance, (FEA-2105 monitor) and Brightness and Contrast, (CONRAC monitor), than the "CAL" position. For both cases you have a tool to check that you can clearly see all details of the charts. For ARCS chart this tool is Colors.

Press CHART PLAN and select Color from the menu. In ARCS Colours window you can see if the individual colours can be distinguished when viewing. This is to enable you to be aware of how light levels may affect the visibility of the chart.



# Colour Differentiation test for S57 charts

It is a known thing that the colours in a monitor change when the monitor ages. Also you may want to use other setting of the Brilliance, (FEA-2105 monitor) and Brightness and Contrast, (CONRAC monitor), than the "CAL" position. For both cases you have a tool to check that you can clearly see all details of the charts. For S57 charts this tool is Colour Differentiation Test diagram.

The Colour Differentiation Test Diagram is a part of ECDIS chart 1 and you can use it as follows:

CHART PLAN

1) Press CHART PLAN button

Activate ARCS chart  
 Open  
 Load  
 Remove  
 Permit Management  
**ECDIS Chart 1**  
 Catalogue  
 Cell Status  
 Date Dependent  
 Manual Updates  
 SENC Convert  
 SENC Convert Settings  
 RENC Purchase  
 RENC Connection  
 System

2) Select ECDIS Chart 1 from the menu

SET CHART CENTER

3) Move cursor over chart AA5C1WOO as shown here

ZOOM IN

4) Press SET CHART CENTER button

5) Press ZOOM IN button twice

6) Check with all palettes that you can discriminate the lines from background colour of the boxes

358 • Colour Calibration

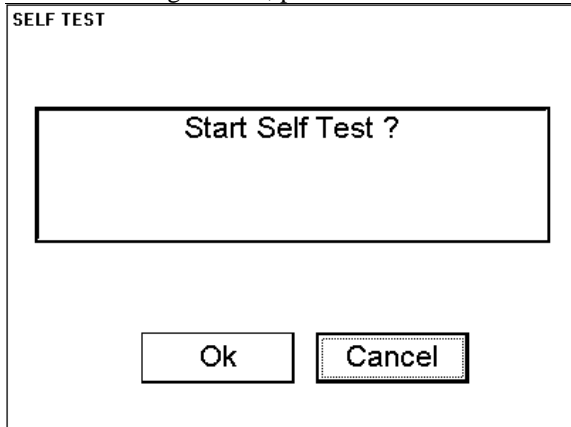
## Grey Scale test

Set **Brilliance** and **Contrast** to **calibrated positions**. Use **Grey Scale** to visually inspect neutral shades of grey.

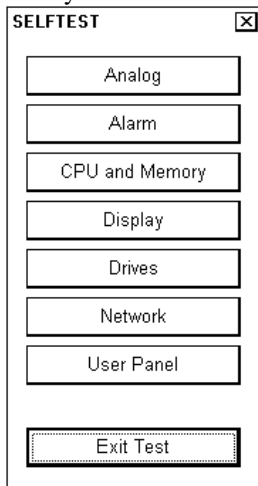
**Note**, during Selftest the ECDIS is unable to do any navigation related things and as an indication the System Failure is activated in the Control Panel.

To activate grey scale test proceed as follows:

1. Press INITIAL SETTING button and select **Selftest** from the menu.
2. Confirm starting Selftest, press **OK**.

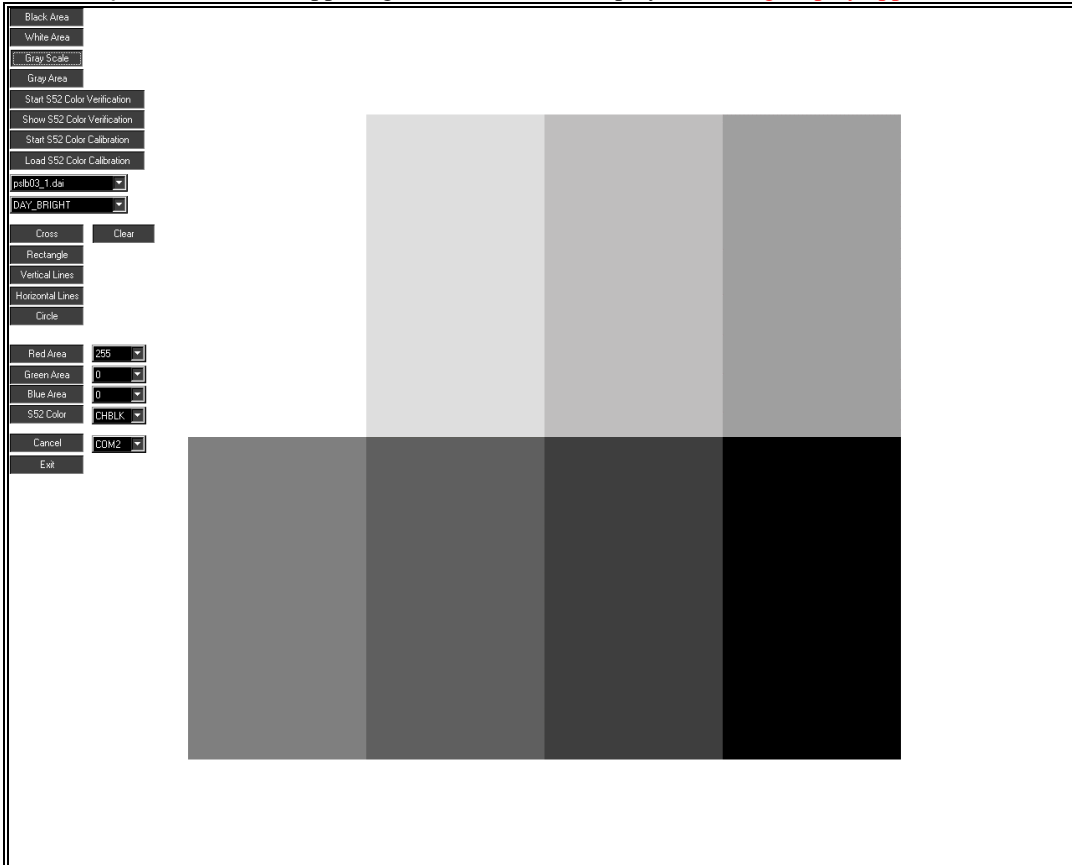


3. The system will end normal operating and start a Selftest module.



4. Execute **Display** of Selftest pressing soft key button.

5. Press **Grey Scale** button in upper right hand corner of display, following display appears:



Make visual inspection neutral shades of grey.

6. Close Display test by pressing **Exit** button in the display.
7. Stop Selftest pressing **End Test**, The system will start now normal operation.



# Steering with EMRI Trackpilot

---

## Introduction

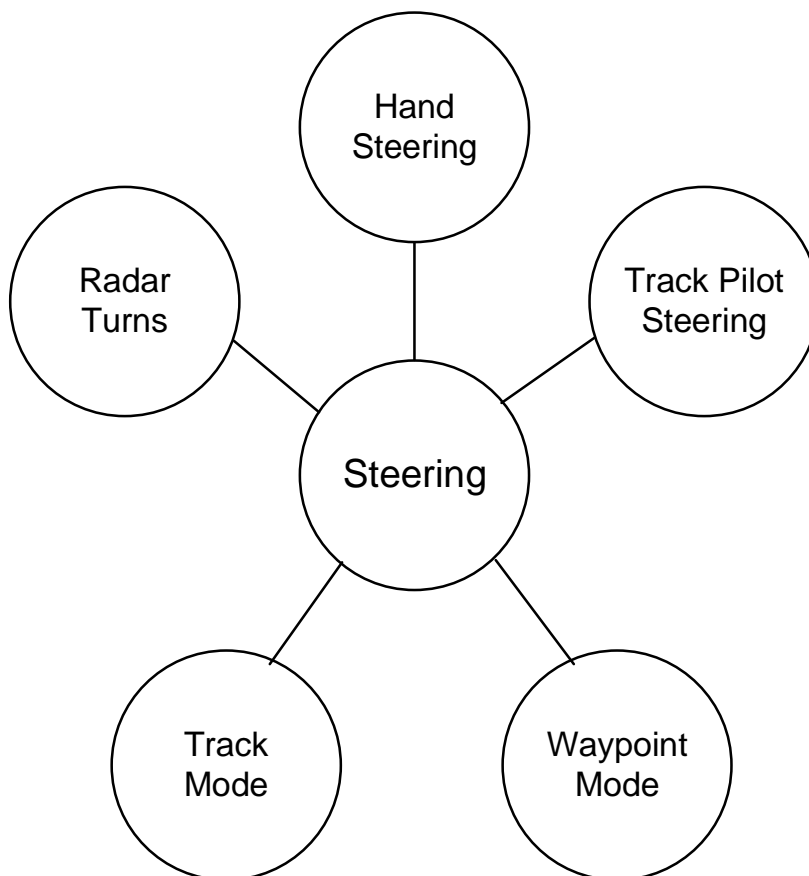
This chapter describes steering functions available with an optional EMRI Track Pilot.

The ECDIS system could be connected also to a simple Autopilot. See appendixes for steering with simple Autopilots.

---

## Steering modes of the system

Note that all steering related functions are available only if the ECDIS system is also connected to an optional EMRI Track Pilot processor.



*Steering modes of the ECDIS together with the trackpilot .*

## Hand steering

Hand steering modes are:

- Steering wheel
- Wing steering control
- Override tiller

While in hand steering mode the ECDIS system is displaying the rudder angle and indication of hand steering mode.

## Trackpilot steering

- Operator sets the required heading of the vessel
- Turning radius is also set by operator (or in course control mode the rudder limit)
- Turn is initiated by operator

ECDIS system displays required heading, radius, rate of turn and predicted turn. (also Curved EBL could be displayed, but not in course control mode)

## Waypoint mode

The ECDIS system will follow the planned track to next waypoint but with a moderate accuracy in order to have more economic sailing (sailing in ocean areas).

When approaching the next waypoint the ECDIS system is pre alerting operator well before the turn and just before the turn a second acknowledge is required.

The ECDIS system performs turns using planned radius.

## Track mode

In track mode the planned track is followed at the maximum accuracy between the waypoints and also in the turn (position controlled turn).

Approaching the waypoint in track mode is like in waypoint mode.

## Radar assisted turns

Radar assisted track turns are defined from the radar with a help of curved EBL.

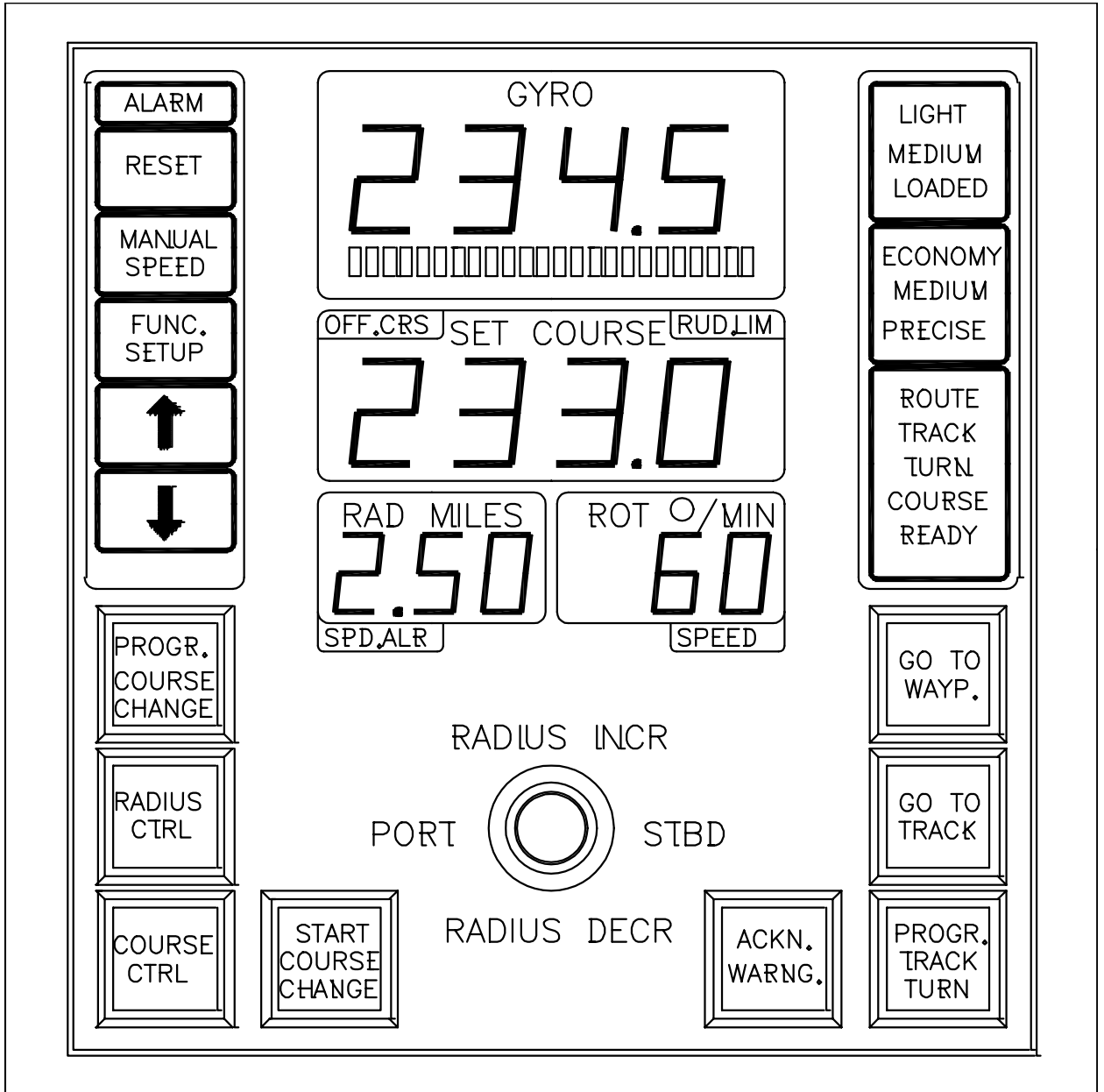
Turns are defined and started "ON-LINE" and performed with a constant radius. Turns can either be locked to the geographical co-ordinates or relative to water.

All steering modes can be interrupted with the override tiller. The system is displaying the future ship position in all steering modes. Whenever a constant radius turn is initiated, curved EBL is displayed.

Some radar models can be used also to set radius and to start course change. For more information, see "

Radar Steering" on page 366.

# Track Pilot Control Panel



## How to operate steering functions

All steering functions are possible to operate from integrated track pilot panel, which has:  
 NUMERICAL DISPLAY

- gyro
- set course
- set radius
- rate of turn based on speed and set radius

STATE DISPLAY

- control strategy: ECONOMY/MEDIUM/STRAIGHT
- load condition: LIGTH/MEDIUM/LOADED
- track pilot in operation: READY

- track pilot control mode: COURSE/TRACK
- track pilot automatic route steering: ROUTE
- track pilot track controlled turn: TURN

#### TILLER FUNCTION DISPLAY

- lamps **PORT** and **STBD** show when tiller can be used to set course
- lamps **RADIUS INCR.** and **RADIUS DECR.** Show when tiller can be used to set radius

#### TILLER

- used to set course and radius. See also "tiller function display" above

#### MODE SELECTION

- **COURSE CONTROL** for immediate course controlled course change using set radius
- **PROGRAM COURSE CHANGE** for programmed course controlled course change using set radius
- **PROGRAM TRACK TURN** for programmed track controlled course change using set radius and for Radar steering with selected ARPA radar models.
- **GOTO WAYPOINT** for course controlled automatic route steering
- **GOTO TRACK** for track controlled automatic route steering

#### ALARMS

- **OFF COURSE** lamp for displaying of track pilot off course alarm
- **RUD. LIMIT** lamp for displaying of track pilot rudder limit condition
- **SPEED AL.** lamp for displaying of track pilot too low speed alarm
- **ALARM** lamp for other track pilot related alarms and errors
- **RESET** pushbutton for acknowledging other track pilot related alarms and errors
- **ACKN. WARNING** lamp and pushbutton for integrated operation related alarms

---

# Manual steering operations

## Course control

Course Control steering mode can be used always, doesn't require any position source

- mode selection COURSE CONTROL
- lamps COURSE CONTROL and COURSE on
- immediate course change when tiller is used to set course
- course change is course controlled with rudder angle limit

## Radius control

Radius Control steering mode can be used always, doesn't require any position source

- mode selection RADIUS CONTROL
- lamps RADIUS CONTROL and COURSE on
- immediate course change when tiller is used to set course
- course change is only radius controlled with set radius
- if wind, current etc. effects the ship, the ship will drift away (inside or outside) from planned designed turn which is displayed on radar screen

## Program course change

Program Course Change steering mode can be used always, doesn't require any position source

- mode selection PROGRAM COURSE CHANGE
- lamps PROGRAM COURSE CHANGE and COURSE on
- tiller is first used to set new course and radius, which are also displayed on the radar screen
- START COURSE CHANGES flashes, if new set course is different from currently used set course
- course change is activated by pushing START COURSE CHANGE
- after activation the mode is automatically going back to RADIUS CONTROL
- course change is only course controlled with set radius
- if wind, current etc. effects the ship, the ship will drift away (inside or outside) from planned designed turn which is displayed on radar screen

## Program track turn

Program Track Turn steering mode can be used with Kalman filter and a high precision sensor such as DGPS:

- mode selection PROGRAM TRACK TURN
- lamps PROGRAM TRACK TURN, TRACK and TURN on
- tiller is first used to set new course and radius, which are also displayed on the radar screen
- START COURSE CHANGES flashes, if new set course is different from currently used set course
- course change is activated by pushing START COURSE CHANGE
- after activation the mode will remain PROGRAM TRACK TURN
- course change is track controlled with set radius
- if wind, current etc. effects the ship, the system tries to prevent the ship from drifting away (inside or outside) from planned designed turn which is displayed on radar screen

Following reasons will lead to alarms with use of Program Track Turn :

- Alarm "**2493 ProgTurn: Needs Filter ON**", any use of Program Track Turn without Kalman filter.
- Alarm "**2495 ProgTurn: Needs Log sens.**", any use of Program Track Turn with Kalman filter but without including an independent speed source (separate log sensor or two position sensors).
- Alarm "**2494 ProgTurn: Needs diff Pos.**", any use of Program Track Turn with Kalman filter but without a high precision sensor (an example is DGPS).

## Radar Steering

Radar steering mode can be used always, doesn't require any position source

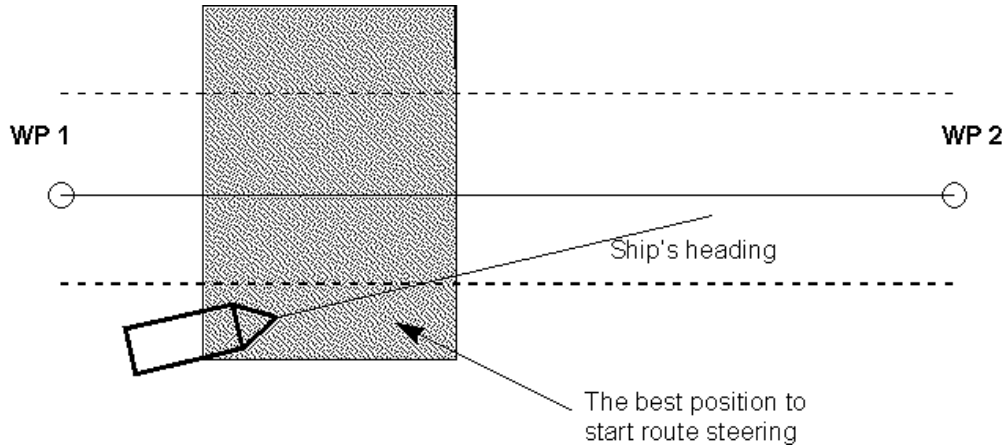
- this mode is available in some selected radar models
- mode selection PROGRAM TRACK TURN
- lamps PROGRAM TRACK TURN, TRACK and TURN on
- radar RADIUS INCREASE and RADIUS DECREASE are first used to set new radius. Radar EBL is first used to set new course. Radius and course are also displayed on the radar screen
- course change is activated by pushing radar ENTER NEW COURSE
- after activation the mode will remain PROGRAM TRACK TURN
- course change is only radius controlled with set radius
- if wind, current etc. effects the ship, the ship will drift away (inside or outside) from planned designed turn which is displayed on radar screen

## Summary of Manual steering modes

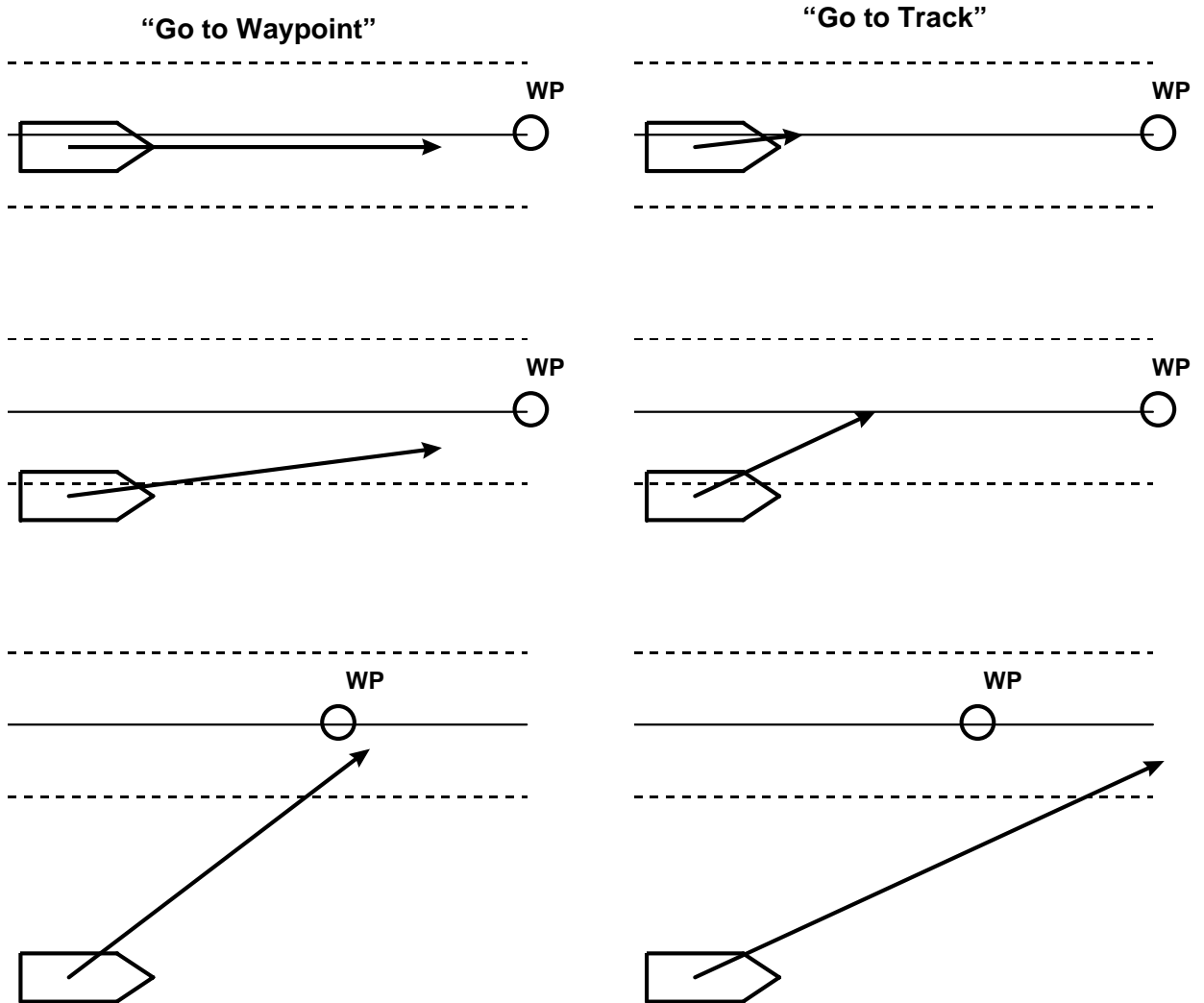
	COURSE CONTROL	RADIUS CONTROL	PROGRAM COURSE CHANGE	PROGRAM TRACK TURN	RADAR STEERING
Set course	yes	yes	yes	yes	yes
Set radius	no	yes	yes	yes	yes
Radius control	no	yes	yes	yes	yes
Design before execution	no	no	yes	yes	yes
Full curved EBL on radar screen	no	no	yes	yes	yes
Wind, current etc. compensation	no	no	no	yes	no
Needs gyro	yes	yes	yes	yes	yes
Needs log	no	yes	yes	yes	yes
Needs high precision position	no	no	no	yes	no

# Automatic Route steering

In automatic route steering you can use either **Go to Waypoint** mode or **Go to Track** mode. See figures below to find the best position to activate automatic route steering and differences between Go to waypoint and Go to track modes.



*The position of own ship when activating automatic route steering*



*Pictures above demonstrate how "Go to waypoint" differs from "Go to track". NOTE For an off track error of more than 100 metres the "Go to Track" saturates and cannot increase the approach angle towards the center line of the route.*

## Mode Goto Waypoint

- mode selection GO TO WAYPOINT. Lamps GO TO WAYPOINT and ROUTE are on
- tiller can be used to set radius, but not course which is set automatically
- steering is course controlled with set radius
- between waypoints, if wind, current etc. effects the ship, the system tries to prevent the ship from drifting away from planned route. The system has three means to prevent drifting away from the planned route. They are most effective when used together. If cross track error is used alone, then the own ship stabilises typically in a constant off track position. The means are:
  - measured cross track error from the center line, which is always active
  - Drift compensation available from Route Parameters
  - Gyro error compensation available from Route Parameters
- during turns, if wind, current etc. effects the ship, the ship will drift away (inside or outside) from planned designed turn which is displayed on radar screen
- can be used when the ship has good position source available

## Mode Goto Track

- mode selection GO TO TRACK. Lamps GO TO TRACK and ROUTE are on
- tiller can be used to set radius, but not course which is set automatically
- steering is track controlled with set radius
- when wind, current etc. effects the ship, the system tries to prevent the ship from drifting away from planned route. The system has three means to prevent drifting away from the planned route. They are most effective when used together although the cross track error alone is also very efficient. The means are:
  - measured cross track error from the center line, which is always active
  - Drift compensation available from Route Parameters
  - Gyro error compensation available from Route Parameters
- can be used when the ship has high precision position source available

## Summary of Route Steering modes

	GO TO WAYPOINT	GO TO TRACK
Set course	automatic	automatic
Set radius	automatic / manual	automatic / manual
Radius control	yes	yes
Dynamic waypoint position	yes	yes
Design before execution	yes	yes
Full curved EBL on radar screen	yes	yes
Wind, current etc. compensation in linear parts between wp.	low gain	high gain
Wind, current etc. compensation in turns	no	yes
Needs gyro	yes	yes
Needs log	yes	yes
Precision of position equipment	good <sup>1</sup>	high <sup>2</sup>

<sup>1</sup> Precision of position is good with LORAN and GPS.

<sup>2</sup> Precision of position is high with DGPS and SYLEDIS



## Preconditions for Route steering

### General preconditions

Route steering requires that the position filter is used. See more in chapter Filter Operations. If you try to activate any of the route steering modes without the filter, you get alarm **"2470 Disabled: Needs filter on"**. If you try to activate any of the route steering modes without independent speed source, you get alarm **"2490 Disabled: Needs log sensor"**.

### Goto Track mode preconditions

Route steering with Goto Track mode requires that you have at least one high precision position receiver available and in use (Permanent indication **FILTER HIGH** in upper right hand corner of ECDIS screen). DGPS and Syledis are accepted as high precision position receivers. Note that a standard GPS or a DGPS without differential position available are not accepted as high precision position receivers. Route steering with Goto Track mode requires also that you have at least either one log and position receiver or two position receivers available and in use. If one of the conditions described above is lost during Goto Track mode then the system automatically changes to Goto Waypoint mode and you get alarm **"2489 Route: Changed to Goto WP"**.

## How to activate Route steering

Route steering can be activated by pressing GOTO WAYPOINT or GOTO TRACK pushbutton in the trackpilot panel. The lamp of the pressed pushbutton will start to flash and if the ECDIS accepts the requested route steering mode, then the lamp will be turned permanently ON to indicate the used route steering mode.

If Go to waypoint is activated, indication **"Route: goto wp"** appears in Route Monitor window of ECDIS display.

Plan Speed	10.0 Kt	Next WP	9
Plan CTS	122 °	Dist WOP	0.47 nm
Route	120 °	ETA	
Ch limit	100 m		08 Apr 00 11:58
Off track	>9 m	Next CTS	182 °
Route: goto wp		Turn rad	1.0 nm
		Turn rate	12 °/min

If Go to track is activated, indication **"Route: goto track"** appears in Route Monitor window of ECDIS display.

Plan Speed	10.0 Kt	Next WP	9
Plan CTS	122 °	Dist WOP	0.40 nm
Route	121 °	ETA	
Ch limit	100 m		08 Apr 00 11:58
Off track	>4 m	Next CTS	182 °
Route: goto track		Turn rad	1.0 nm
		Turn rate	12 °/min

When route steering is not used or if the ECDIS did not accept the requested route steering mode, then there is an empty indication in Route Monitor window of the ECDIS Display

Plan Speed	10.0 Kt	Next WP	9
Plan CTS	122 °	Dist WOP	0.16 nm
Route	121 °	ETA	
Ch limit	100 m		08 Apr 00 11:58
Off track	<4 m	Next CTS	182 °
		Turn rad	1.0 nm
		Turn rate	12 °/min

There are several reasons why the requested route steering mode cannot be accepted:

Alarm **"2467 Disabled: Steering off"**, which tells that the ECDIS didn't have steering controlling permission at the time of request. Check that you have properly enabled Trackpilot for steering.

Alarm **"2470 Disabled: Needs filter on"**, which tells that you didn't have the Kalman filter operative and selected in ON position at the time of request. Route steering requires that you use Kalman filter, because the filter eliminates sudden jumps of the position and thus prevents unpredictable manoeuvres of the own ship. Check your selection of the sensors. See more information at Filter Operation

Alarm **"2490 Disabled: Needs log sensor"**, which tells that the Kalman filter did not have an independent speed source. You need either a log, a dual axis log or two position receivers. Check your selection of the sensors. See more information at Filter Operation

Alarm **"2491 Disabled: Needs diff Pos"**, which tells that the Filter did not have high precision position sensor for "Goto track" steering mode. Selected sensors must include at least one high precision sensors.

Alarm **"2468 Disabled: Out of course"**, which tells that the current heading of the own ship and the required set course to start the route steering has more difference than set by the user in the **Route start limit angle** of Route Parameters.

Alarm **"2464 Route: No selected route"**, which tells that there is no route selected for Route Monitoring.

Alarm **"2465 Route: Illegal WP"**, which tells that there is a route selected for Route Monitoring, but the selection of the next or final waypoint is missing or illegal.

## Arrival to a Waypoint

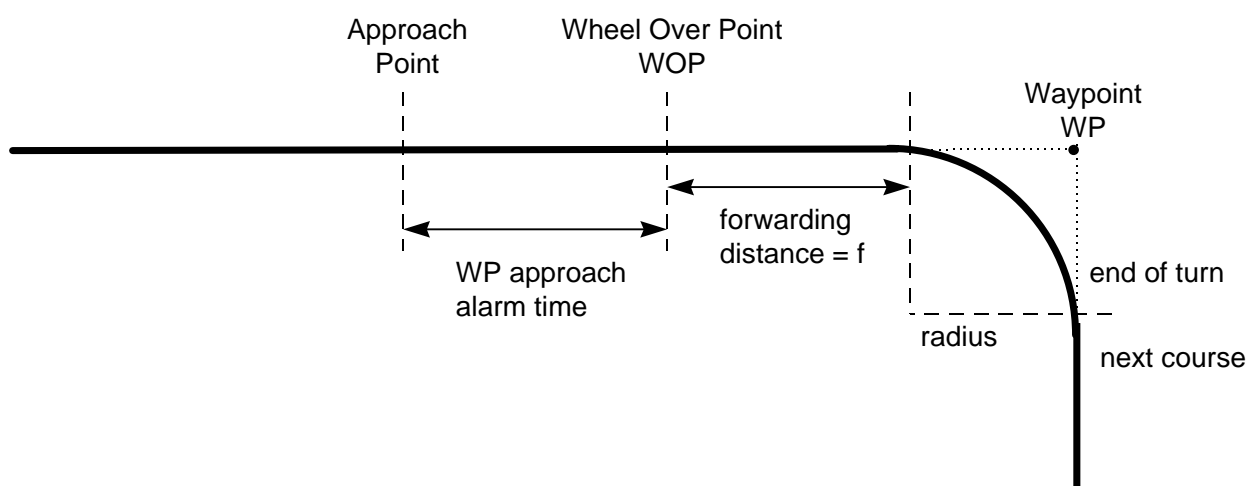
There are different rules how the system handles arriving to a waypoint. The rule is selectable through installation parameters.

### A single waypoint approach alarm

This rule is used by BSH and Lloyds Register.

Automatic route steering navigation tries to keep the ship always inside the channel limits and going to next waypoint. At the moment the next waypoint is about to be reached, there will be an alarm **"2451 Route: WP approach alarm"**.

Note that this alarm is programmable (the time before turn) and it is relative to the starting point of the manoeuvre. See Figure below:



TURN IS ENABLED ONLY WITH OPERATOR'S ACKNOWLEDGEMENT. This is: the own ship will continue without any turn following the last set course used before arrival to wheel over point and the system generates alarm **"2452 Route: Turning disabled"**.

As soon as the waypoint approach alarm appears, verify that the manoeuvre is safe and there are no dangerous targets. If the manoeuvre can be performed press ACKN. WARNING pushbutton.

If the turn is enabled by pressing ACKN WARNING button in Track Pilot Control Panel, the text **"Route: turn enabled"** appears in Route Monitor window of ECDIS display.

Plan Speed	10.0 Kt	Next WP	9
Plan CTS	122 °	Dist WOP	0.16 nm
Route	121 °	ETA	
Ch limit	100 m		08 Apr 00 11:58
Off track	<4 m	Next CTS	182 °
Route: turn enabled		Turn rad	1.0 nm
		Turn rate	12 °/min

As soon as the ship arrives to the wheel over point ECDIS sends a new course command to the trackpilot and the manoeuvre is started. During a manoeuvre the radar display and ECDIS display shows the CURVED EBL indicating the planned radius for manoeuvre.

During the turn the text "**Route: turning**" appears in Route Monitor window of ECDIS display.

Plan Speed	10.0 Kt	Next WP	9
Plan CTS	182 °	Dist WOP	nm
Route	182 °	ETA	
Ch limit	100 m		
Off track	<2 m	Next CTS	182 °
Route: turning		Turn rad	1.0 nm
		Turn rate	12 °/min

If the manoeuvre is not permitted and the ACKN. WARNING pushbutton is not pressed the ECDIS system goes automatically to the Radius Control mode and the old course is kept valid. In order to reset the alarm press ACKN. WARNING pushbutton. At this moment the future manoeuvring decisions are taken by operator.

If the turn is not enabled by pressing ACKN WARNING button in Track Pilot Control Panel, the text "**Route: goto wp**" or "**Route: goto track**" disappears from Route Monitor window of ECDIS display and the ECDIS generates alarm "**2452 Route: Turning disabled**".

Plan Speed	10.0 Kt	Next WP	9
Plan CTS	122 °	Dist WOP	0.16 nm
Route	121 °	ETA	
Ch limit	100 m		08 Apr 00 11:58
Off track	<4 m	Next CTS	182 °
		Turn rad	1.0 nm
		Turn rate	12 °/min

**NOTE:**

Approaching the last waypoint will give an alarm "**2458 Route: Last WP approach**" and the route steering is automatically terminated and the trackpilot goes to RADIUS CONTROL mode.

## Waypoint prewarning alarm and waypoint approach alarm

This rule is used by DNV.

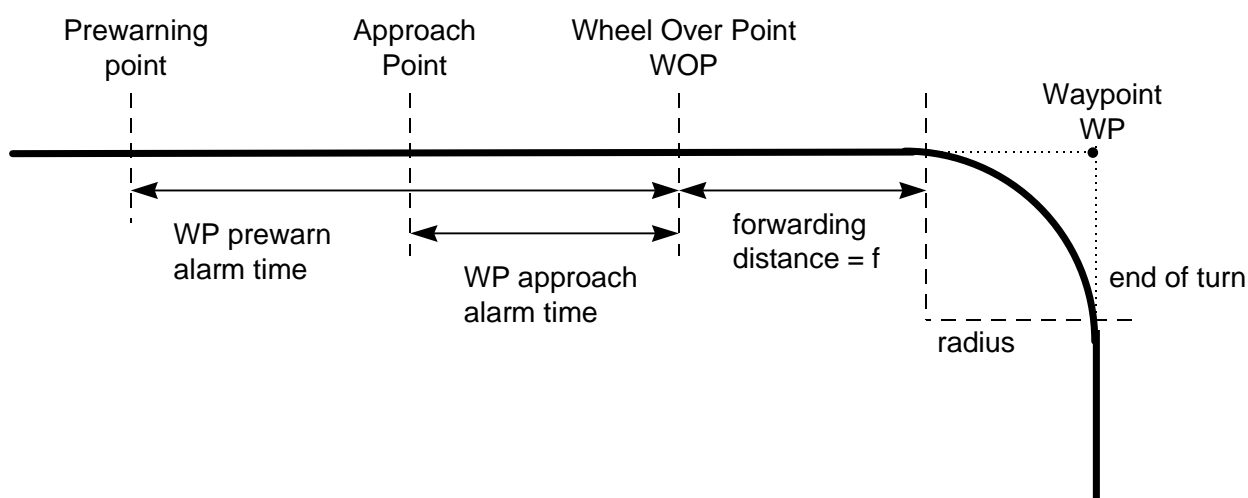
Automatic route steering navigation tries to keep the ship always inside the channel limits and going to next waypoint. Well before the next waypoint, there will be an alarm **2485 ROUTE WP PREWARNING**. As soon as the alarm appears verify that the manoeuvre is safe and there are no dangerous targets. If the manoeuvre can be performed press ACKN. WARNING pushbutton. If the manoeuvre is impossible you can leave the automatic route steering by selecting another steering mode.

TURN IS ALWAYS ENABLED. THE ONLY WAY TO DISABLE THE AUTOMATIC TURN IS TO SELECT ANOTHER STEERING MODE

Note that this alarm is programmable (the time before turn) and it is relative to the starting point of the manoeuvre. See Figure.

At the moment the next waypoint is about to be reached, there will be a second alarm "**2451 Route: WP approach alarm**".

Note that also this alarm is programmable (the time before turn) and it is relative to the starting point of the manoeuvre. See Figure below:



As soon as the ship arrives to the wheel over point the ECDIS sends a new course command to the trackpilot and the manoeuvre is started. During a manoeuvre the radar display and ECDIS display shows the CURVED EBL indicating the planned radius for manoeuvre.

After the waypoint approach alarm the text "**Route: turn enabled**" appears in Route Monitor window of ECDIS display.

Plan Speed	10.0 Kt	Next WP	9
Plan CTS	122 °	Dist WOP	0.16 nm
Route	121 °	ETA	
Ch limit	100 m		08 Apr 00 11:58
Off track	<4 m	Next CTS	182 °
Route: turn enabled		Turn rad	1.0 nm
		Turn rate	12 °/min

During the turn the text "**Route: turning**" appears in Route Monitor window of ECDIS display.

Plan Speed	10.0 Kt	Next WP	9
Plan CTS	182 °	Dist WOP	nm
Route	182 °	ETA	
Ch limit	100 m		
Off track	<2 m	Next CTS	182 °
Route: turning		Turn rad	1.0 nm
		Turn rate	12 °/min

### NOTE:

Approaching the last waypoint will give an alarm **2458 Route: Last WP approach** and the route steering is automatically terminated and trackpilot goes to the RADIUS CONTROL mode.

## Route Steering Alarms

The alarms relevant to the Steering are of two types (permanent and intermittent).

Permanent alarms are available regardless of the used steering mode:

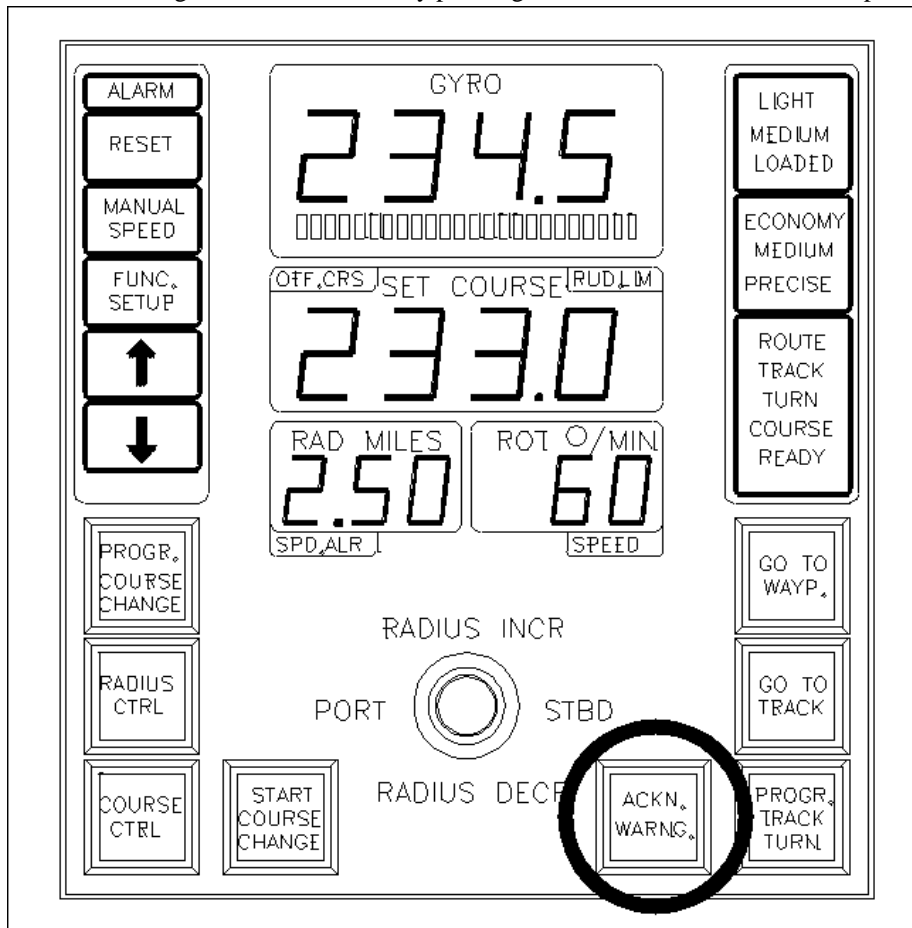
- OUT FROM CHANNEL is indicated by red colour of the "Off track" value and by orange text
- OUT FROM GATE is indicated by orange text. Out of gate indicates that, if the vessel continues using the current course, then the vessel will be outside of the channel at wheel over point.

Plan Speed	13.1 Kt	Next WP	2
Plan CTS	7 °	Dist WOP	1.60 nm
Route	4 °	ETA	
Ch limit	100 m	09 Apr 00 22:39	
Off track	<167 m	Next CTS	11 °
Route: goto wp		Turn rad	1.0 nm
Out from gate		Turn rate	19 °/min

Intermittent audio/visual alarms appear as follows:

- alarm number and text is visible on the bottom bar of the ECDIS screen (see example below)
- visual alarm is on ACKN. WARNG. Pushbutton of the Trackpilot control panel (see example below).
- buzzer is operating in Trackpilot panel

You acknowledge intermittent alarm by pressing ACKN. WARNG. of the Trackpilot panel.



19.03.1997 13:25 UTC

2451 Route: WP approach alarm

1:110 000

Typical intermittent alarms not described in other chapters are:

Alarm "**2010 Filter: Pos source change**", which appears if differential GPS used in filter positioning has changed its operation mode either from differential mode to normal mode or normal mode to differential mode. If used steering mode is "Goto Track" also alarm "2492 Route: Needs diff Pos" appears, if DGPS has changed its mode to normal mode.

alarm "**2457 Route: Outside chl limits**", which appears when the own ship is goes outside the planned channel.

Alarm "**2455 Route: off course**", which appears, if the system needs more than a set limit (the limit is available in Installation parameters) to keep the track. This alarm is repeated every 5 minutes, if the condition continues.

Alarm "**2456 Route: WP approach error**", which appears, if because of for example decreasing speed the own ship is more than waypoint approach alarm time + 100 seconds away from the wheel over point after the user have already acknowledged alarm "2451 Route: WP approach alarm" to enable the next automatic turn. After the alarm 2456 the next turn is not enabled and the system will generate a new alarm "2451 Route: Wp approach alarm" when appropriate.

Alarm "**2460 Pilot: ROT will be exceed**", which appears, if the set radius value in the Trackpilot panel together with the current speed of the ship request rate of turn which is over the limit set in Route Parameter **Max. rate of turn**.

Alarm "**2461 Route: ROT will be exceed**", which appears, if the planned radius for next waypoint together with the current speed of the ship request rate of turn which is over the limit set in Route Parameter **Max. rate of turn**. This alarm is activated if the own ship is within value **WP approach alarm time** set in Route Parameters from the wheel over point,

alarm "**2469 Trackpilot: off course**", which appears, if the trackpilot needs more than a set limit (the limit is available in Installation parameters for Go To Waypoint mode. Go To Track mode uses fixed value of 30 degrees) to keep the track. This alarm is repeated every 5 minutes, if the condition continues.

Alarm "**2475 Route: Needs filter on**", which appears, if the position from the Kalman filter is not available. This alarm is repeated every 15 seconds, if the condition continues. **NOTE:** If you used Goto Track mode, then the system changes automatically to Goto Waypoint mode and generates alarm "**2489 Route: Changed to Goto WP**".

Alarm "**2476 Route: Needs log sensor**", which appears, if the position from the Kalman filter cannot be compared against an independently operating log. This alarm is repeated every 15 seconds, if the condition continues. **NOTE:** If you used Goto Track mode, then the system changes automatically to Goto Waypoint mode and generates alarm "**2489 Route: Changed to Goto WP**".

Alarm "**2492 Route: Needs diff Pos**", which appears if the Filter did not have high precision position sensor for track steering. Selected sensors must include at least one high precision sensors. If you used Goto Track mode, then the system changes automatically to Goto Waypoint mode and generates alarm "**2489 Route: Changed to Goto WP**".

## Collision avoidance manoeuvre during automatic route steering

Often the route steering is interrupted by a collision avoidance manoeuvre, but there are also several other reasons to interrupt the route steering.

There are several possibilities to set the collision avoidance or any other manoeuvre:

- Use override tiller, direct rudder pump operation push-buttons or non follow up rudder control.
- Use follow up rudder control
- Use Track pilot COURSE CONTROL
- Use Track pilot RADIUS CONTROL
- Use Track pilot Program Track Turn
- Use a radar (available with some selected radar display models)

To use any of above trackpilot modes push the desired mode and follow normal instructions. See "Manual steering operations" on page 365.

Now the route steering is disabled until the GO TO WAYPOINT or GO TO TRACK pushbutton is pressed again. Note that for going back to route steering the ship heading must point to the next waypoint, otherwise an alarm is given.

Some selected radar models have three different possibilities of manoeuvre:

- Using an EBL and defining a new course
- Using a trial manoeuvre in manual trial mode
- Using a trial manoeuvre in automatic trial mode

### ***EBL mode***

- Select **Program Track Turn** from the Track pilot panel.
- Press CURVED EBL ON/OFF pushbutton of the radar. (If curved ebl is not displayed)
- Verify the correct turning radius and if necessary set the new value by means of RADIUS INCR. Or RADIUS DECR. Push-button of the radar.
- Move the EBL of the radar on the new intended course.
- Press ENTER NEW COURSE pushbutton of the radar.
- the systems performs the turn.
- In order to go back to route steering, steer the ship pointing to the next waypoint and press GO TO WAYPOINT or GO TO TRACK pushbutton of the Track pilot panel.

### ***Trial manoeuvre in manual mode***

This mode is used whenever the calculation of dangerous targets are required for finding a new safe course. This can be used before acknowledgement of a new course in route steering.

- Verify correct CPA/TCA setting of the radar.
- Set desired new course on the TRIAL COURSE thumb wheel of the radar.
- Set MANUAL/ AUTOMATIC trial of the radar in MANUAL mode.
- Select **Program Track Turn** from the Track pilot panel.
- Press TRIAL EXECUTE pushbutton of the radar.
- If the new course is safe, keep TRIAL EXECUTE of the radar pressed and press simultaneously ENTER NEW COURSE pushbutton of the radar.
- the system performs the turn.
- In order to go back to route steering use the same logic as on EBL steering.

### ***Trial manoeuvre in automatic trial mode***

This is used only in the collision avoidance mode. This is useful only if there are some targets to be detected as a dangerous target. (Below CPA / TCA limits)

- Set MANUAL / AUTOMATIC trial of the radar in AUTOMATIC mode.
- Select PORT or STARBOARD manoeuvre of the radar.
- Select **Program Track Turn** from the Track pilot panel.

- Press TRIAL EXECUTE of the radar and verify which is the new course indicated by the trial. Verify that the new course is safe and realistic.
- If safe, keep TRIAL EXECUTE of the radar pressed and press simultaneously ENTER NEW COURSE pushbutton of the radar.
- the system performs the turn.
- In order to go back to route steering use the same logic as on EBL steering.

## How to stop or modify already enabled route turn

There are two cases that the automatic route turn must be stopped or modified.

- because the turn cannot be performed up to the final value.
- because the turn which ship perform goes outside of the planned turn. ( Too fast or too slow).

You can also during turns use all methods described in "Collision avoidance manoeuvre during automatic route steering" on page 375.

However if you want you can interrupt your automatic route steering turn and continue it in manual mode.

### ***Interrupted turn***

- If the turn has already started then the set course display of the Track pilot shows the new course value.
- Press **Radius Control** pushbutton of the Track pilot control panel.
- Now the manual steering is enabled and your turn continues with old set values of course and radius.
- Using the tiller set the new intended course.
- Example:
  - Actual course = 45, new course = 120, route turn was enabled.
  - At the moment the ship heading is 60, the turn is desired to be interrupted to 90. The set course shows already 120. Press **Radius Control** pushbutton of the Track pilot control panel and use tiller to set the new course to be 90. The turn will be finished to that value.

### ***Too fast or too slow turn***

This is used in case the ship is not performing the planned radius and the radius must be modified.

- If the actual turning is too fast, use tiller of the Trackpilot control panel to increase radius
- with some selected radar models you can also press RADIUS INCR. Pushbutton of the radar once.
- New situation is shown on the radar screen.

The same logic applies for a too slow turning.



## Radar steering available from selected ARPA radar models

Selected ARPA radar models has "Enter New Course", "Radius Up" and "Radius Down" pushbutton. New set course is set by using the EBL of the ARPA radar or trial manoeuvre of the ARPA radar.

Radar steering is possible when you have selected **Program Track Turn** mode from the Trackpilot panel.

Intermittent alarms which are related with Radar Steering available with some selected ARPA radar models.

Alarm "**2450 Set radius limit exceeded**", which appears as when the system has got a request to set radius up or down and the value of the radius is already at highest or lowest value.

Alarm "**2462 Trial: ROT will be exceed**", which appears, if the set radius value in the ARPA radar for trail manoeuvre together with the current speed of the ship request rate of turn which is over the limit set in Route Parameter **Max. rate of turn**.

Alarm "**2473 Radar set course executed**", which appears as confirmation when the system has accepted a new turn from the ARPA radar. This alarm gives only a short beep and disappear automatically.

Alarm "**2479 Radar set radius executed**", which appears as confirmation when the system has accepted a new radius from the ARPA radar. This alarm gives only a short beep and disappear automatically.

Alarm "**2474 Disabled: Steering off**", which appears, if a radar steering related set course or set radius request form the ARPA radar has not been accepted by the system because the request did not come from Master ARPA radar.

Alarm "**2486 Disabled: Steering off**", which appears, if a radar steering related set course or set radius request form the ARPA radar has not been accepted by the system because the radar steering was not enabled from the Trackpilot panel. You enable radar steering from trackpilot panel by selecting Program Track Turn mode.

## Notes

### *When Track pilot is not used for steering*

Outside the track pilot there is steering selector with at least "HAND" and "TRACK PILOT" selections. "HAND" can be override tiller, direct rudder pump operation push-buttons, non follow up rudder control or follow up rudder control. While in "HAND" mode the track pilot sets always his set course equal to gyro course.

User can change to "HAND" mode from any track pilot modes.

### *Steady as she goes*

If the user wants that the ship should go "steady as she goes" while in the middle of any track pilot operation, he switch from any Track pilot mode to "HAND" mode (and back again if he likes to continue with track pilot control).

### *About mode changes when using Track pilot for steering*

The user can change from any mode to any other mode. It is possible to leave automatic route steering and resume back to automatic route steering during both linear parts and turns.

The new mode continues from the previous displayed course in set course numerical display. The only exceptions are pending program modes (PROGRAM COURSE CHANGE and PROGRAM TRACK TURN) when the new mode continues from currently used set course value. These pending modes are indicated by flashing light in START COURSE CHANGE push-button.

However PROGRAMMED TRACK TURN differ from other course changes in a following way:

- it is possible to design a PROGRAMMED TRACK TURN on top of an ongoing automatic route steering. This is to have the designed course change displayed on the radar screen. The course change (and mode change) is however activated only, if the user pushes START COURSE CHANGE. While designing a course change on top of route steering the tiller can off course used to set design course.
- it is also possible to design a similar course change on top of an ongoing turn (route or normal course change). In this case the difference to previous case is that radar designed course change display (= curved ebl) is already used to display ongoing turn. The course change (and mode change) is however activated only, if the user pushes START COURSE CHANGE. While designing a course change on top of route steering the tiller can off course used to set design course.
- lamps PROGRAM TRACK TURN, TRACK and TURN are on besides the lamps for the ongoing mode.

## ***Accuracy of Route Steering***

Accurate route steering is defined as small cross track error when automatically following the route. Two of the Route Parameters - Drift compensation and Gyro error compensation - have a significant effect for accuracy of route steering. If you need most accurate route steering, then both of these parameters should be enabled. Before activating the Gyro error compensation read chapter **Gyro error correction** to understand the possible methods for gyro error compensation.

---

## Other possible operations with EMRI Track Pilot

### Speed used by Track Pilot

- it is selected during installation if the track pilot uses the speed from his own log input interface or from serial line coming from integrated computer. This speed is called internal speed reference.
- user can select if he likes to use internal speed reference or manual speed which is selected by MANUAL SPEED pushbutton.

### Control strategy used by Track Pilot

- user can select between: ECONOMY/MEDIUM/PRECISE by using FUNC. SETUP and ARROW keys.
- control strategy select course keeping accuracy.

### Load condition used by Track Pilot

- user can select between: LIGTH/MEDIUM/LOADED by using FUNC. SETUP and ARROW keys.
- load condition selects rudder gain.

---

## Description of alarms with EMRI Track Pilot

### Alarms

#### *Track Pilot operation related alarms*

- ALARM lamp of the Track pilot control panel goes on
- alarm is displayed on the Track pilot control panel either as OFF COURSE/SPEED WARNING or as alarm number type AL:NN where NN is the number of alarm
- alarm is acknowledged by pushing RESET of the Track pilot control panel.
- list of typical alarms:

OFF COURSE	The ship doesn't follow set course
SPEED WARNING	The speed below 20% or above 120% of MCR speed (max. cruising speed). See also EMRI's AUTOPILOT INSTRUCTION MANUAL, page 14.
ON LIMIT	Track pilot uses rudder up to its set limit value. Normally this is only an indication, but if it continues for long period and the heading of the ship doesn't turn, it is an indication of failure of the steering system. See also EMRI's AUTOPILOT INSTRUCTION MANUAL, page 6.
AL 04	Rudder servo: Leak detected or no movement when valve on
AL 05	Navigation computer has cancelled a remote mode
AL 06	24VDC alarm system supply failure
AL 07	Navigation computer didn't accept a request to go for a remote mode
AL 10	Missing working gyro.
AL 11	Compass comparison alarm or reference gyro missing
AL 12	Messages from the navigation computer were missing while track pilot was in remote mode

### ***Integrated operation related alarms***

- ACKN. WARNING lamp of the Track pilot control panel goes flashing
- type of alarm is displayed on the display ECDIS screen as number and text
- alarm is acknowledged by pushing ACKN. WARNING of the Track pilot control panel.
- list of typical alarms:

2451	Route: WP approach alarm
2452	Route: Turning disabled
2455	Route: Off course
2456	Route: WP approach error
2458	Route: Last WP approach
2460	Pilot: ROT will be exceed
2461	Route: ROT will be exceed
2467	Disabled - steering off
2468	Disabled - out of course
2469	Trackpilot: Off course
2470	Disabled - Needs filter ON
2475	Route: Needs filter ON
2476	Route: Needs log sensor
2485	Route: WP prewarning
2489	Route: Changed to Goto WP
2490	Disabled: Needs log sensor
2491	Disabled: Needs diff pos
2492	Route: Needs diff pos
2493	ProgTurn: Needs Filter ON
2494	ProgTurn: Needs diff pos.
2495	ProgTurn: Needs log sens

## Errors

Errors should not happen during normal operation. They are related to internal problems.

### ***Track Pilot operation related errors***

- ALARM lamp of the Track pilot control panel goes on
- error is displayed on the Track pilot control panel as error number type ERR NN, where NN is the number of error
- error is acknowledged by pushing RESET of the Track pilot control panel.
- list of typical errors:

ERR 12                                      Trackpilot processor failure

### ***Integrated operation related errors***

- the ECDIS control panel ALARM ACK lamp goes on
- type of alarm is displayed on the display ECDIS screen as number and text
- alarm is acknowledged by pushing the ECDIS control panel ALARM
- list of typical alarms:

2480                                      Track pilot receive error

---

## How to use the Curved EBL

Curved EBL is a design and control tool to start a turn at correct position and to monitor behaviour of the own ship during turn. The Curved EBL is available on ECDIS screen and on some selected ARPA radar displays.

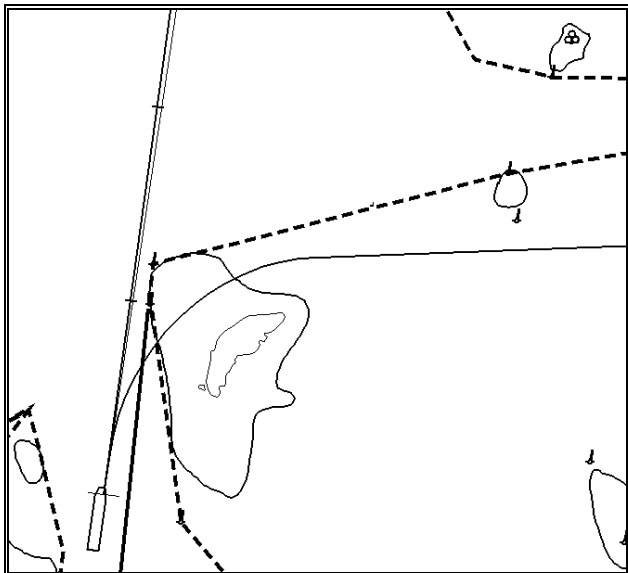
Before turn you can use the Curved EBL to select best position to initiate intended turn. In this so called design phase the own ship pushes Curved EBL in front of the ship. This design phase is available in:

- Program Track Turn of the Trackpilot
- Program Course Change of the Trackpilot
- Radar steering (available only with selected ARPA radar models)

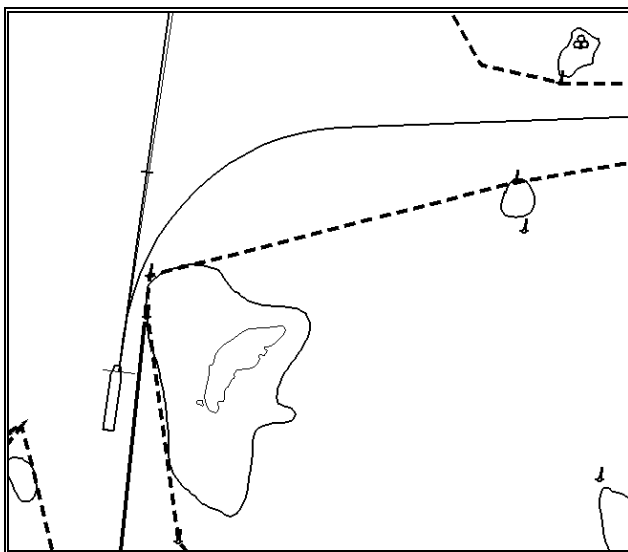
The Curved EBL is locked to its position when the own ship start a turn initiated by

- Automatic Route Steering: Goto WP or Goto Track
- Program Track Turn of the Trackpilot
- Program Course Change of the Trackpilot
- Radar steering: New set course from ARPA radar (available only with selected models)

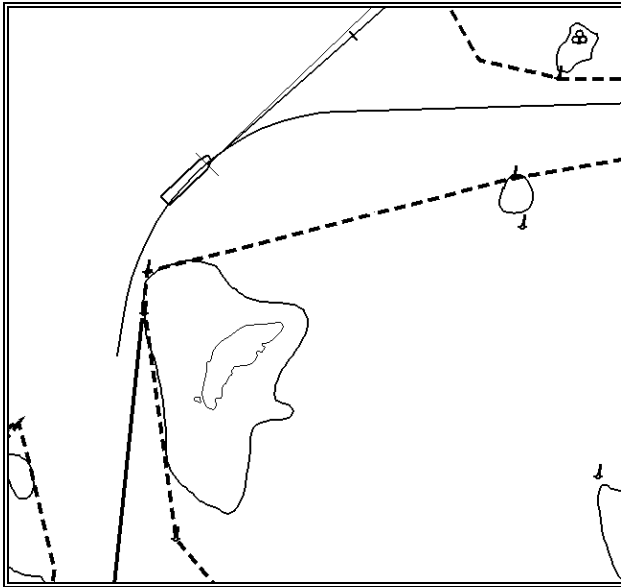
During the turn you can monitor how your ship performs the intended manoeuvre against the plan by comparing the Curved EBL position and your current own ship position.



Design Curved EBL before the wheel over point.



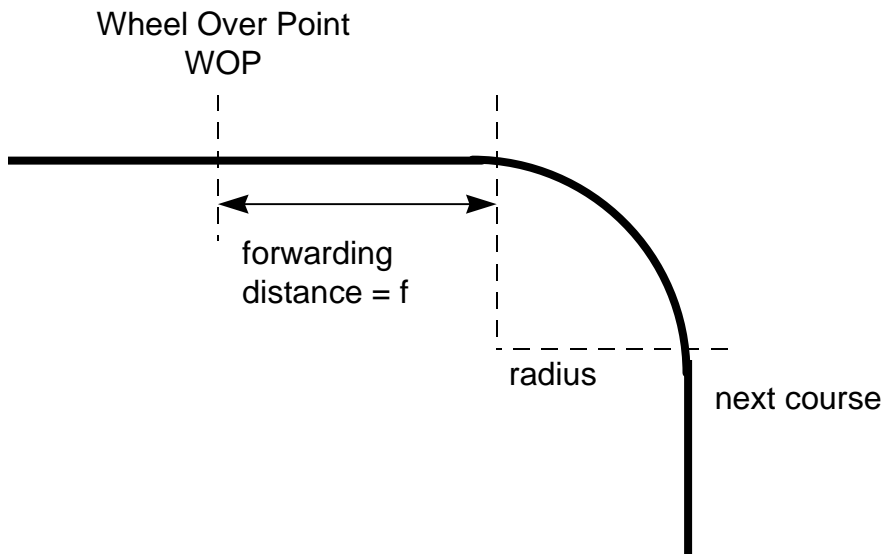
Curved EBL at the wheel over point.



Locked Curved EBL during turn.

### Structure of the Curved EBL

Curved EBL consist of a straight part in the beginning called "forwarding distance". Then an arc with selected radius and finally an EBL in the direction of the new requested set course. See figure below.



You can yourself adjust forwarding distances to suits your vessel characteristics. See chapter about Parameters Setup for more details.

---

## How to use the Predictor

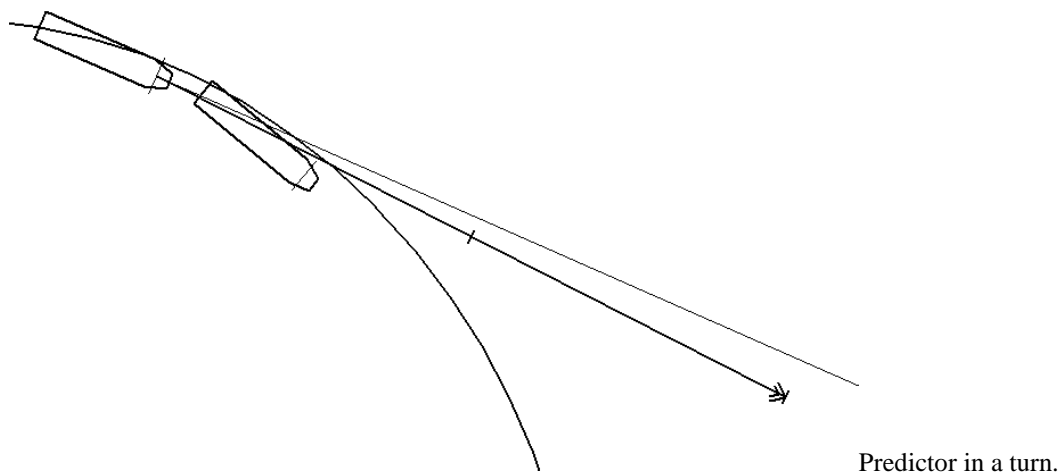
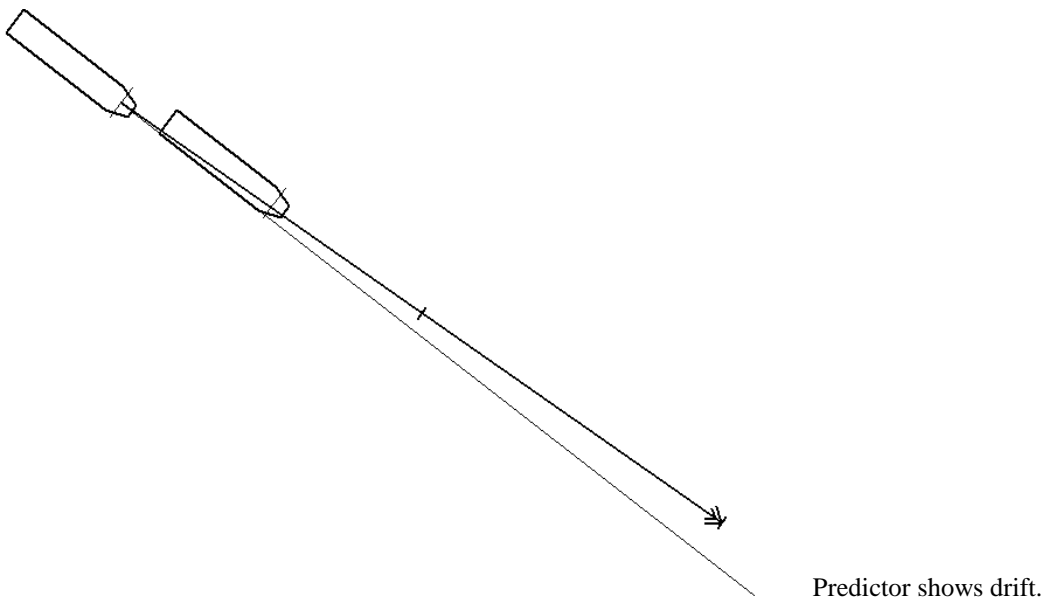
Predictor is a tool to estimate own ship future positions and behaviour. It is available on CHART DISPLAY. It consists of 1 piece of own ships drawn in true scale to successive future positions. The time between future own ship position is 30 seconds.

The predictor is calculated using current:

- docking speed components:
  - transversal bow speed
  - transversal stern speed
  - longitudinal center speed
- rate of turn

These components are assumed to be stable during prediction period.

The predictor can be used in every steering-state, even when steering without Trackpilot.





# Steering with Yokogawa Autopilot

---

## Steering modes of the system

Note that all steering related functions are available only if the ECDIS system is also connected to an optional Yokogawa autopilot processor. With Yokogawa autopilot following steering modes are available:

- Hand steering
- Autopilot steering
- Waypoint mode automatic Route steering

### Hand steering

Hand steering modes are:

1. Steering wheel
2. Wing steering control
3. Override tiller

While in hand steering mode the ECDIS system displays the rudder angle and indication of steering mode.

### Autopilot steering

- Operator sets the required heading of the vessel
- Control of the turning radius is not available. Turns are controlled by the rudder limit
- Turn is initiated by operator

While in Autopilot steering mode the ECDIS system displays the rudder angle and indication of steering mode. The Curved EBL is not available because the use of it requires radius controlled turns.

### Waypoint mode automatic Route Steering

The ECDIS system will follow the planned track to next waypoint but with a moderate accuracy in order to have more economic sailing (sailing in ocean areas).

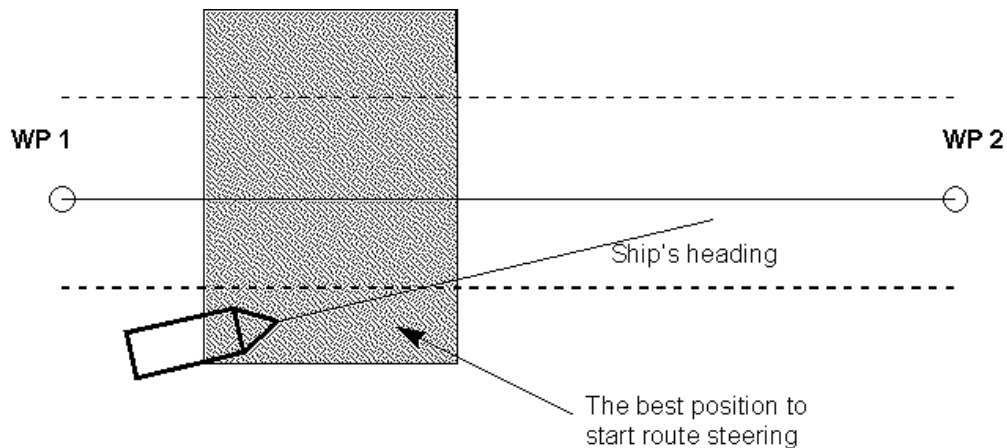
When approaching the next waypoint the system is pre alerting operator well before the turn and just before the turn a second acknowledge is required.

The ECDIS system performs turns using planned radius.

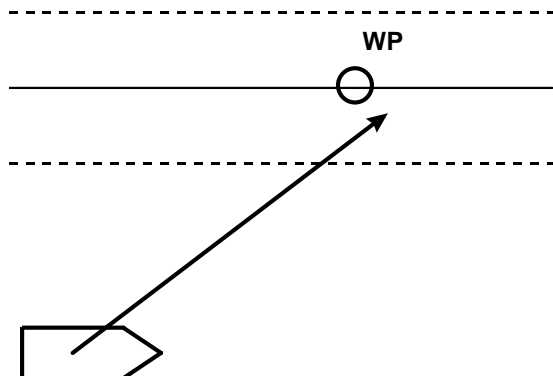
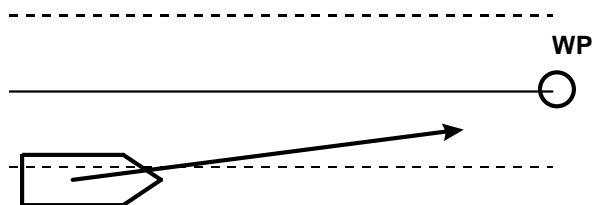
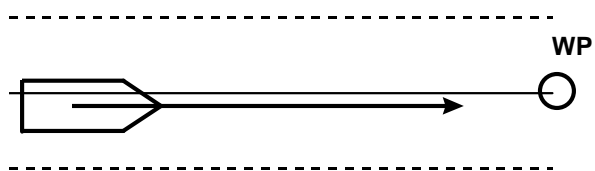
---

## Automatic route steering

See figures below to find the best position to activate automatic route steering and to understand performance of the automatic route steering.



*The position of own ship when activating automatic route steering*



*Pictures above demonstrate performance of the automatic route steering.*

## Characteristics of automatic route steering

- steering is course controlled with set radius
- between waypoints, if wind, current etc. effects the ship, the system tries to prevent the ship from drifting away from planned route. The system has three means to prevent drifting away from the planned route. They are most effective when used together. If cross track error is used alone, then the own ship stabilises typically in a constant off track position. The means are:
  - measured cross track error from the center line, which is always active
  - Drift compensation available from Route Parameters
  - Gyro error compensation available from Route Parameters
- during turns, if wind, current etc. effects the ship, the ship will drift away (inside or outside) from planned designed turn which is displayed on radar screen

## Summary of Route Steering

	GO TO WAYPOINT
Set course	automatic
Set radius	automatic
Radius control	yes
Dynamic waypoint position	yes
Design before execution	yes
Full curved EBL on radar screen	yes
Wind, current etc. compensation in linear parts between wp.	low gain
Wind, current etc. compensation in turns	no
Needs gyro	yes
Needs log	yes
Precision of position equipment	good <sup>3</sup>

## Preconditions for Route steering

Route steering requires that the position filter is used. See more in chapter Filter Operations. If you try to activate any of the route steering modes without the filter, you get alarm "**2470 Disabled: Needs filter on**". If you loose the filter position while you perform automatic route steering, you get alarm "**2475 Route: Needs filter on**",.

## How to activate route steering

Route steering can be activated by pressing REMOTE pushbutton in the Yokogawa autopilot panel.

If REMOTE is activated, indication "**Route: goto wp**" appears in Route Monitor window of ECDIS display.

Plan Speed	10.0 Kt	Next WP	9
Plan CTS	122 °	Dist WOP	0.47 nm
Route	120 °	ETA	
Ch limit	100 m	08 Apr 00 11:58	
Off track	>9 m	Next CTS	182 °
Route: goto wp		Turn rad	1.0 nm
		Turn rate	12 °/min

If the ECDIS did not accept the requested route steering mode, then there is an "**Autopilot Conflict**" indication in Route Monitor window of the ECDIS Display

Plan Speed	13.1 Kt	Next WP	2
Plan CTS	7 °	Dist WOP	3.37 nm
Route	4 °	ETA	
Ch limit	100 m	09 Apr 00 22:17	
Off track	>50 m	Next CTS	11 °
Autopilot Conflict		Turn rad	1.0 nm
		Turn rate	19 °/min

<sup>3</sup> Precision of position is good with LORAN and GPS.

When route steering is not used, there is an empty indication in Route Monitor window of the ECDIS Display

Plan Speed	10.0 Kt	Next WP	9
Plan CTS	122 °	Dist WOP	0.16 nm
Route	121 °	ETA	
Ch limit	100 m		08 Apr 00 11:58
Off track	<4 m	Next CTS	182 °
		Turn rad	1.0 nm
		Turn rate	12 °/min

There are several reasons why the requested route steering mode cannot be accepted:

Alarm "**2470 Disabled: Needs filter on**", which tells that you didn't have the Kalman filter operative and selected in ON position at the time of request. Route steering requires that you use Kalman filter, because the filter eliminates sudden jumps of the position and thus prevents unpredictable manoeuvres of the own ship. Check your selection of the sensors. See more information at Filter Operation

Alarm "**2490 Disabled: Needs log sensor**", which tells that the Kalman filter did not have an independent speed source. You need either a log, a dual axis log or two position receivers. Check your selection of the sensors. See more information at Filter Operation

Alarm "**2468 Disabled: Out of course**", which tells that the current heading of the own ship and the required set course to start the route steering has more difference than set by the user in the **Route start limit angle** of Route Parameters.

Alarm "**2464 Route: No selected route**", which tells that there is no route selected for Route Monitoring.

Alarm "**2465 Route: Illegal WP**", which tells that there is a route selected for Route Monitoring, but the selection of the next or final waypoint is missing or illegal.

## Arrival to a Waypoint

The ECDIS system uses with Yokogawa autopilot a rule known as DNV. NOTE The autopilot interface do not fulfil all DNV requirements.

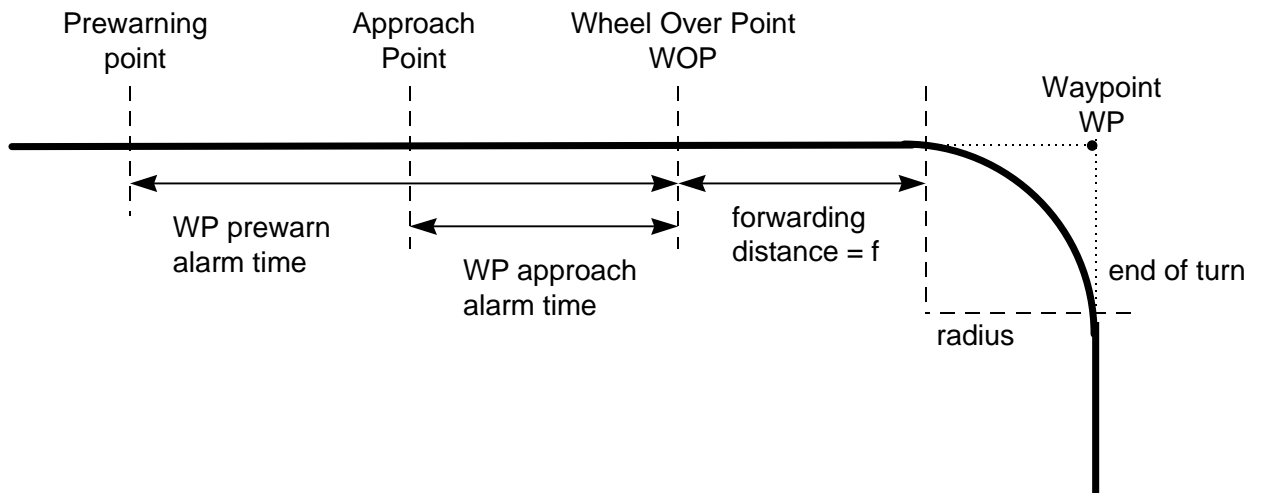
Automatic route steering navigation tries to keep the ship always inside the channel limits and going to next waypoint. Well before the next waypoint, there will be an alarm **2485 ROUTE WP PREWARNING**. As soon as the alarm appears verify that the manoeuvre is safe and there are no dangerous targets. If the manoeuvre can be performed press ACKN. WARNING pushbutton. If the manoeuvre is impossible you can leave the automatic route steering by leaving REMOTE mode of the Yokogawa autopilot.

TURN IS ALWAYS ENABLED. THE ONLY WAY TO DISABLE THE AUTOMATIC TURN IS TO SELECT ANOTHER STEERING MODE FROM YOKOGAWA AUTOPILOT

Note that alarm 2485 is programmable (the time before turn) and it is relative to the starting point of the manoeuvre. See Figure.

At the moment the next waypoint is about to be reached, there will be a second alarm "**2451 Route: WP approach alarm**".

Note that also alarm 2451 is programmable (the time before turn) and it is relative to the starting point of the manoeuvre. See Figure below:



As soon as the ship arrives to the wheel over point the ECDIS sends a new course command to the autopilot and the manoeuvre is started. During a manoeuvre the radar display and ECDIS display shows the CURVED EBL indicating the planned radius for manoeuvre.

After the waypoint approach alarm the text "**Route: turn enabled**" appears in Route Monitor window of ECDIS display.

Plan Speed	10.0 Kt	Next WP	9
Plan CTS	122 °	Dist WOP	0.16 nm
Route	121 °	ETA	
Ch limit	100 m	08 Apr 00 11:58	
Off track	<4 m	Next CTS	182 °
Route: turn enabled		Turn rad	1.0 nm
		Turn rate	12 °/min

During the turn the text "**Route: turning**" appears in Route Monitor window of ECDIS display.

Plan Speed	10.0 Kt	Next WP	9
Plan CTS	182 °	Dist WOP	nm
Route	182 °	ETA	
Ch limit	100 m	Next CTS	182 °
Off track	<2 m	Turn rad	1.0 nm
Route: turning		Turn rate	12 °/min

**NOTE:**

Approaching the last waypoint will give an alarm "**2458 Route: Last WP approach**". With Yokogawa autopilot one should leave REMOTE mode of the Yokogawa autopilot before performing acknowledge of the alarm **2458**. This will terminate the route correctly. If one acknowledge alarm **2458**, when Yokogawa autopilot is still in REMOTE mode, then the route steering is automatically terminated and system generates alarm "**2471 Autopilot mode conflict**".

## Route Steering Alarms

The alarms relevant to the Steering are of two types (permanent and intermittent).

Permanent alarms below are available regardless of the used steering mode:

- OUT FROM CHANNEL is indicated by red colour of the "Off track" value and by orange text
- OUT FROM GATE is indicated by orange text. Out of gate indicates that, if the vessel continues using the current course, then the vessel will be outside of the channel at wheel over point.

Plan Speed	13.1 Kt	Next WP	2
Plan CTS	12°	Dist WOP	1.57 nm
Route	352°	ETA	
Ch limit	100 m		11 Apr 00 21:11
Off track	>926 m	Next CTS	16°
Route: goto wp		Turn rad	1.0 nm
Out from channel		Turn rate	47°/min

Plan Speed	13.1 Kt	Next WP	2
Plan CTS	7°	Dist WOP	1.60 nm
Route	4°	ETA	
Ch limit	100 m		09 Apr 00 22:39
Off track	<167 m	Next CTS	11°
Route: goto wp		Turn rad	1.0 nm
Out from gate		Turn rate	19°/min

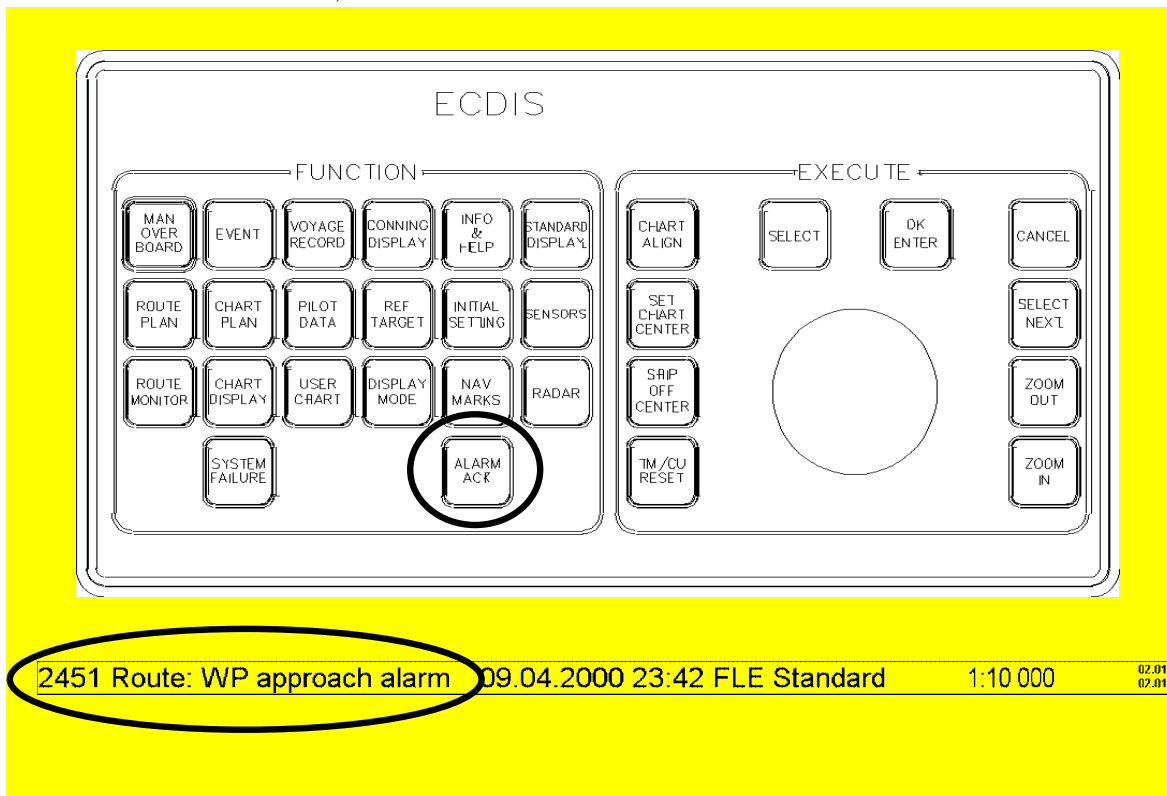
Permanent alarm below is available only during route steering mode:

- RATE LIMIT is indicated by orange text

Plan Speed	10.0 Kt	Next WP	3
Plan CTS	96°	Dist WOP	nm
Route	96°	ETA	
Ch limit	59 m		
Off track	<70 m	Next CTS	96°
Route: turning		Turn rad	0.3 nm
Rate of turn limit		Turn rate	105°/min

Intermittent audio/visual alarms appear as follows:

- visual alarm and buzzer is located in ECDIS control panel (see example below).
- alarm number and text is visible on the bottom bar of the ECDIS screen (see example below)



Typical intermittent alarms not described in other chapters are:

alarm **"2457 Route: Outside chl limits"**, which appears if the own ship is outside the planned channel. This alarm is repeated every minute, if the condition continues.

alarm **"2455 Route: off course"**, which appears, if the system needs more than a set limit (the limit is available in Installation parameters) to keep the track. This alarm is repeated every 5 minutes, if the condition continues.

alarm **"2456 Route: WP approach error"**, which appears, if because of for example decreasing speed the own ship is more than waypoint approach alarm time + 100 seconds away from the wheel over point after the user have already acknowledged alarm "2451 Route: WP approach alarm" to enable the next automatic turn. After the alarm 2456 the next turn is not enabled and the system will generate a new alarm "2451 Route: Wp approach alarm" when appropriate.

alarm **"2460 Pilot: ROT will be exceed"**, which appears, if the set radius value together with the current speed of the ship request rate of turn which is over the limit set in Route Parameter **Max. rate of turn**.

alarm **"2461 Route: ROT will be exceed"**, which appears, if the planned radius for next waypoint together with the current speed of the ship request rate of turn which is over the limit set in Route Parameter **Max. rate of turn**. This alarm is activated if the own ship is within value **WP approach alarm time** set in Route Parameters from the wheel over point,

alarm **"2469 Autopilot: off course"**, which appears, if the autopilot needs more than a set limit (the limit is available in Installation parameters for Go To Waypoint mode. This alarm is repeated every 5 minutes, if the condition continues.

alarm **"2471 Autopilot mode conflict"**, which appears, if the end of route has been reached and Yokogawa autopilot remains is REMOTE mode. Leave REMOTE mode of the Yokogawa as soon as possible.

alarm **"2475 Route: Needs filter on"**, which appears, if the position from the Kalman filter is not available. This alarm is repeated every 15 seconds, if the condition continues.

alarm **"2476 Route: Needs log sensor"**, which appears, if the position from the Kalman filter cannot be compared against an independently operating log. This alarm is repeated every 15 seconds, if the condition continues.

alarm **"2488 Integrated Steering lost"**, which appears, if the connection to the autopilot is lost during automatic Route Steering and the used integrated steering mode cannot be continued. **NOTE:** Normally you get first alarm **"2480 Autopilot Receive error"**

## Collision avoidance manoeuvre during automatic route steering

Often the route steering is interrupted by a collision avoidance manoeuvre, but there are also several other reasons to interrupt the route steering.

There are several possibilities to set the collision avoidance or any other manoeuvre:

- Use override tiller, direct rudder pump operation push-buttons or non follow up rudder control.
- Use follow up rudder control
- Leave Autopilot mode REMOTE and use the Autopilot

Now the route steering is disabled until the REMOTE pushbutton in the Yokogawa Autopilot panel is pressed again. Note that for going back to route steering the ship heading must point to the next waypoint, otherwise an alarm is given.

## How to stop or modify already enabled route turn

There are two cases that the automatic route turn must be stopped or modified.

- because the turn cannot be performed up to the final value.
- because the turn which ship perform goes outside of the planned turn. ( Too fast or too slow).

You can use also during turns all methods described "Collision avoidance manoeuvre during automatic route steering" on page 375.

## Notes

### ***Accuracy of Route Steering***

Accurate route steering is defined as small cross track error when automatically following the route. Two of the Route Parameters - Drift compensation and Gyro error compensation - have a significant effect for accuracy of route steering. If you need most accurate route steering, then both of these parameters should be enabled. Before activating the Gyro error compensation read chapter **Gyro error correction** to understand the possible methods for gyro error compensation.

---

## Description of alarms with Yokogawa Autopilot

### Alarms

- the ECDIS control panel ALARM ACK lamp goes on
- type of alarm is displayed on the display ECDIS screen as number and text
- alarm is acknowledged by pushing the ECDIS control panel ALARM
- list of typical alarms:

2451	Route: WP approach alarm
2452	Route: Turning disabled
2455	Route: Off course
2456	Route: WP approach error
2458	Route: Last WP approach
2460	Pilot: ROT will be exceed
2461	Route: ROT will be exceed
2468	Disabled - out of course
2469	Autopilot: Off course
2470	Disabled: Needs filter ON
2471	Autopilot mode conflict
2475	Route: Needs filter ON
2476	Route: Needs log sensor
2485	Route: WP prewarning

### Errors

Errors should not happen during normal operation. They are related to internal problems.

#### ***Integrated operation related alarms***

- the ECDIS control panel ALARM ACK lamp goes on
- type of alarm is displayed on the display ECDIS screen as number and text
- alarm is acknowledged by pushing the ECDIS control panel ALARM
- list of typical alarms:

2480	Auto pilot receive error
2488	Integrated steering lost



---

## How to use the Curved EBL with Yokogawa Autopilot

Curved EBL is a design and control tool to start a turn at correct position and to monitor behaviour of the own ship during turn. The Curved EBL is available on ECDIS screen and on some selected ARPA radar displays.

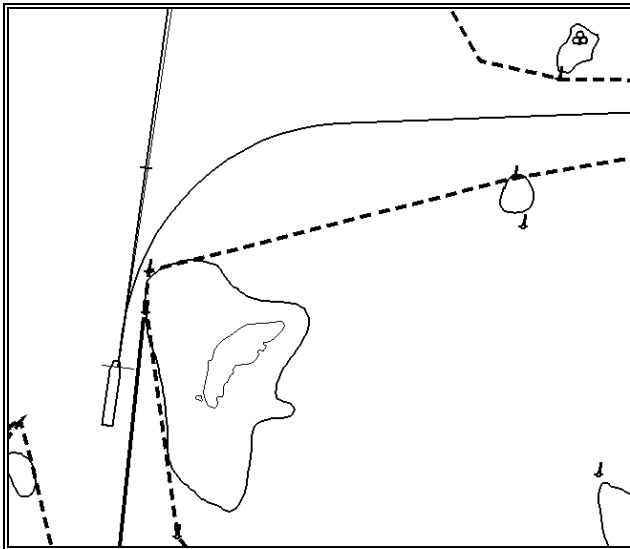
Before turn you can use the Curved EBL to select best position to initiate intended turn. In this so called design phase the own ship pushes Curved EBL in front of the ship. This design phase is available in:

- Not available with Yokogawa Autopilot

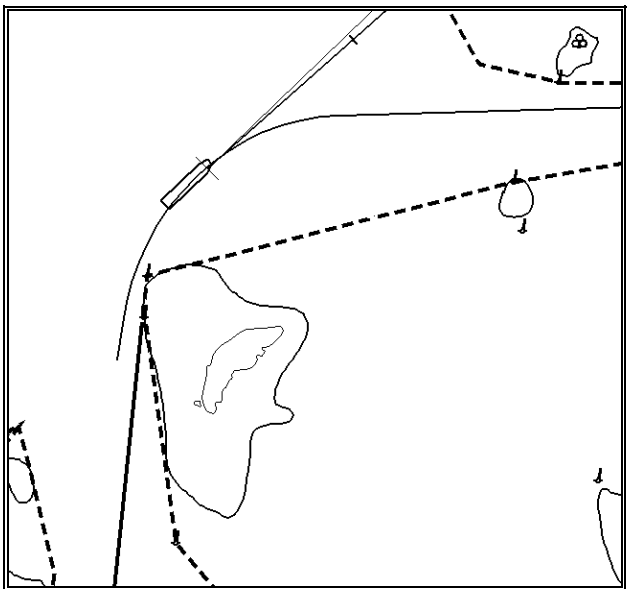
The Curved EBL is locked to its position when the own ship start a turn initiated by

- Automatic Route Steering

During the turn you can monitor how your ship performs the intended manoeuvre against the plan by comparing the Curved EBL position and your current own ship position.



Curved EBL at the wheel over point.



Locked Curved EBL during turn.

This page is intentionally left blank

# Alarms

---

## Overview

There are three kind of alarms generated by ECDIS or Track Pilot processors. To see list of alarms, see "List of alarms" on page 397.

---

## Alarms generated by Navigation Calculation

Navigation Calculation generates following alarms:

- Error detected in any sensor
- Radar communication error
- Software alarms, etc.

The alarms are displayed on the ECDIS screen left corner of lower status bar. Press Alarm Ack pushbutton from the Control Panel to reset the alarm on the screen.

Lower status bar, when an alarm is generated by Navigation Calculation.

2009 Position source change	03.11.1999 10:49	FLE Standard	1:50 000	02.00 02.00
-----------------------------	------------------	--------------	----------	----------------

---

## Alarms generated by Chart Calculation

Chart Calculation generates following alarms:

- new pilot data notebook page available
- Chart Alarms based on S57 charts
- Chart Alarms based on User Chart dangerous Symbols, Lines and Areas

The alarms are displayed on the ECDIS screen left corner of lower status bar. Press Alarm Ack pushbutton from the Control Panel to reset the alarm on the screen.

Lower status bar, when an alarm is generated by Chart Calculation.

5100 Safety Contour	03.11.1999 10:54	FLE Standard	1:50 000	02.00 02.00
---------------------	------------------	--------------	----------	----------------

---

## Alarms generated by Steering Calculation

Note that all steering related functions are available only if the ECDIS processor is also connected to an optional Track Pilot processor. Some of the alarms such as Outside Channel limit is also available without the optional Track Pilot processor. Without optional Track Pilot processor all alarms generated by Steering Calculation appear in the same alarm queue as alarms Generated by Navigation Calculation. See also chapter Steering modes, Alarms.

Lower status bar, when an alarm is generated by Steering Calculation.

03.11.1999 09:04 UTC	2486 Disabled: Steering off		1:50 000	02.00 02.00
----------------------	-----------------------------	--	----------	----------------

# Description of the alarm priority system

The permanently visible alarm in lower status bar is the top most i.e. latest most urgent alarm in any moment. Alarms has priority from 1 to 10 to control urgency. Priority 1 is highest. The list of alarms chapters show these priorities for each alarm with following syntax: "/1" in the end first row means priority = 1, "/1/8" in the end of first row means that priority is = 1, if unacknowledged and priority = 8, if acknowledged but the state of alarm still exist.

You have a possibility to view the alarms, which are in the queue. Move the cursor over the red alarm text in lower status bar and press INFO/HELP. This open Alarm queue window. See example below.

Mon.Route	Plan Route	Pilot Data	Depth metres	Height metres	TRUE MOTION																			
UserChart MK_18	Ref Target	ARPA 1 Radar	Non ENC Data	TM RESET OFF	X2.3																			
					60°01.994N Gyro 0.0 ° 024°59.852E CMG 357.5 ° WGS 84 (pos) DGPS SMG 20.0 Kt																			
					<table border="1"> <tr> <td>Plan Speed</td> <td>Kt</td> <td>Next WP</td> <td></td> </tr> <tr> <td>Plan CTS</td> <td>°</td> <td>Dist WOP</td> <td>nm</td> </tr> <tr> <td>Route</td> <td></td> <td>ETA</td> <td></td> </tr> <tr> <td>Ch limit</td> <td>m</td> <td>Next CTS</td> <td>°</td> </tr> <tr> <td>Off track</td> <td>m</td> <td>Turn rad</td> <td>nm</td> </tr> <tr> <td></td> <td></td> <td>Turn rate</td> <td>°/min</td> </tr> </table>	Plan Speed	Kt	Next WP		Plan CTS	°	Dist WOP	nm	Route		ETA		Ch limit	m	Next CTS	°	Off track	m	Turn rad
Plan Speed	Kt	Next WP																						
Plan CTS	°	Dist WOP	nm																					
Route		ETA																						
Ch limit	m	Next CTS	°																					
Off track	m	Turn rad	nm																					
		Turn rate	°/min																					
					<b>Alarm Queue</b> 1 2001 No speed available 1 2009 Position source change 2 5100 Safety Contour 2 5103 User Chart Danger Area																			
					Projection Mercator Horizontal datum WGS 84 Vertical datum Approximate mean sea level Sounding datum Mean lower low water springs Quality of data Zone of confidence U Magnetic var.																			
					<b>Cursor</b> From Own Ship: 1.064 nm 200.8° 60°01.000N 024°59.098E																			
<b>2001 No speed available</b>					03.11.1999 10:52 FLE Standard 1:50 000 02.00 02.00																			

How to read alarm queue (first row as an example):

- first number "2" indicates alarm priority
- second number "5100" indicates alarm number
- text indicates reason of alarm "Safety contour"

First example show how alarm 2001 changes its priority from 1 to 8 after acknowledge. Then lower priority alarm 5100 is the most urgent out of the remaining alarms.

Second example show how alarm 5100 changes its priority to 10 after acknowledge. Then alarm 5103 is the most urgent out of the remaining alarms.

Alarm Queue
<b>2 5100 Safety Contour</b> <b>2 5103 User Chart Danger Area</b> <b>8 2001 No speed available</b>
Alarm Queue
<b>2 5103 User Chart Danger Area</b> <b>10 5100 Safety Contour</b>

---

## List of alarms

### List of Navigation alarms

Alarm number	1101:	REFTGT: NO FILE SELECTED /7 ----- USE 'REFERENCE TARGET' BUTTON TO SELECT VALID REFERENCE TARGET FILE
Alarm number	1102:	REFTGT: NEED 8 TARGETS /7 ----- FILE MUST CONTAIN AT LEAST 8 TARGETS IN ORDER TO UTILIZE REFERENCE TARGETS USE 'REFERENCE TARGET' BUTTON TO SELECT ANOTHER REF. TARGET
Alarm number	1200:	DEPTH BELOW LIMIT /5 ----- ECHO SOUNDER INDICATES WATER DEPTH BELOW TRANSDUCER TO EXCEED SPECIFIED SAFE LIMIT.
Alarm number	2000:	FILTER: POSITION UNRELIABLE /1 ----- ECDIS IS NOT ABLE TO ESTIMATE A RELIABLE POSITION. VERIFY AND SELECT SPEED AND POSITION SENSORS THROUGH 'SENSORS' FUNCTION
Alarm number	2001:	NO SPEED AVAILABLE /1/8 ----- NO VALID SPEED SENSOR HAS BEEN FOUND. VERIFY AND SELECT SPEED SEN- SORS IN 'SENSORS' BUTTON
Alarm number	2002:	NO COURSE AVAILABLE /1/8 ----- NO VALID COURSE SENSOR HAS BEEN FOUND. VERIFY AND SELECT COURSE SENSORS IN 'SENSORS' FUNCTION.
Alarm number	2004:	GYRO DATA UNRELIABLE /1/8 ----- GYRO COMPASSES HAVE TOO BIG DIFFERENCE  VERIFY AND SELECT HEADING SEN- SORS IN 'SENSORS' FUNCT.
Alarm number	2005:	LOG DATA UNRELIABLE /1 ----- LOG GIVES 0 KN SPEED, WHICH DOES NOT CORRESPOND WITH OTHER SPEED SENSORS. VERIFY AND SELECT SPEED SEN- SORS IN 'SENSORS' FUNCTION.

Al arm number 2006: ROUTE: COURSE JUMP POSSIBLE /1  
-----  
SYSTEM HAS AUTOMATICALLY CHANGED TO DEAD RECKONING. IF YOU NOW SELECT "ON" A POSITION SENSOR YOU MAY GET A JUMP FOR COURSE. CHANGE FROM ROUTE STEERING TO MANUAL STEERING OR CHECK POSITION VERY CAREFULLY BEFORE SELECTING "ON".

Al arm number 2007: POSITION DISCREPANCY /1  
-----  
SYSTEM HAS DETECTED MORE DIFFERENCE THAN SET LIMIT BETWEEN OWN SHIP PRIMARY AND SECONDARY POSITIONS CHECK POSITION SENSORS

Al arm number 2008: FILTER: SPEED BELOW 4KN /1  
-----  
KALMAN FILTER REQUIRED THAT THE SPEED OF THE OWN SHIP IS MORE THAN 4 KN. IF ROUTE STEERING WAS NOT USED, THEN KALMAN FILTER HAS BEEN SET AUTOMATICALLY OFF BY THE SYSTEM.

Al arm number 2009: POSITION SOURCE CHANGED /1  
-----  
POSITION SOURCE OF OWN SHIP PRIMARY POSITION HAS BEEN CHANGED AUTOMATICALLY TO ANOTHER SOURCE THAN BEFORE.  
  
VERIFY NEW SOURCE

Al arm number 2010: FILTER: POS SOURCE CHANGE /1  
-----  
DGPS POSITION SENSOR USED IN FILTER POSITIONING HAS CHANGED ITS OPERATION MODE FROM NORMAL TO DIFFERENTIAL OR FROM DIFFERENTIAL TO NORMAL

Al arm number 2011: CHARTALING: OVER 30 MINUTES /1  
-----  
IF POSITION ALIGNMENT IS USED THEN USER IS REMINDED OF IT EVERY 30 MINUTES.

Al arm number 2052: ROUTE: ILLEGAL ETA WAYPOINT /7  
-----  
ETA WAYPOINT DOESN'T EXIST IN ROUTE FILE OR ETA WAYPOINT IS NOT BETWEEN NEXT AND FINAL WAYPOINT.  
VERIFY IN 'ROUTE MONITOR' THAT A VALID ROUTE IS SELECTED.

Al arm number 2053: ROUTE: ILLEGAL NEXT WAYPOINT /7  
-----  
NEXT WAYPOINT DOES NOT EXIST IN ROUTE FILE.  
  
VERIFY IN 'ROUTE MONITOR' THAT A VALID ROUTE IS SELECTED.

Alarm number 2054:                   ROUTE: I L L E G A L F I N A L W A Y P O I N T / 7  
 -----  
 F I N A L W A Y P O I N T D O E S N O T E X I S T  
 I N R O U T E F I L E.  
 V E R I F Y I N ' R O U T E M O N I T O R ' T H A T  
 A V A L I D R O U T E I S S E L E C T E D.

Alarm number 2055:                   ARPA RADAR COMMUNICATION ERROR/1  
 -----  
 E C D I S C A N N O T C O M M U N I C A T E W I T H  
 O N E O F T H E A R P A R A D A R S.  
 V E R I F Y T H A T ' A U T O T R A C K I N G O N '  
 A N D ' I N C O N ' A R E D E P R E S S E D O N  
 T H E A R A P A R A D A R S.

Alarm number 2060:                   ROUTE: W P C H A N G E D I S A B L E D     /7  
 -----  
 N E X T W A Y P O I N T C A N N O T B E  
 C H A N G E D D U R I N G R O U T E S T E E R I N G.  
 U S E ' A U T O P I L O T ' - M O D E  
 T O O V E R R I D E R O U T E S T E E R I N G B E -  
 F O R E S E L E C T I N G A N E W N E X T  
 W A Y P O I N T.

Alarm number 2061:                   CHART ALIGN: EXECUTING             /7  
 -----  
 I F C H A R T A L I G N M E N T I S D O N E B Y  
 M E A N S O F S E L E S M A R A R P A R A D A R,  
 T H E N T H I S A L A R M I S D I S P L A Y E D  
 A S L O N G A S Y O U D E F I N E  
 A L I G N M E N T

Alarm number 2063:                   ROUTE: S E L E C T D I S A B L E D         /7  
 -----  
 A N E W R O U T E C A N N O T B E S E L E C T E D  
 D U R I N G R O U T E S T E E R I N G.  
 U S E ' R A D I U S C O N T R O L '  
 T O O V E R R I D E R O U T E S T E E R I N G  
 B E F O R E S E L E C T I N G A N E W R O U T E.

Alarm number 2064:                   ROUTE: C A N C E L D I S A B L E D         /7  
 -----  
 A R O U T E C A N N O T B E C A N C E L E D  
 D U R I N G R O U T E S T E E R I N G.  
 U S E ' R A D I U S C O N T R O L '  
 T O O V E R R I D E R O U T E S T E E R I N G  
 B E F O R E C A N C E L I N G T H E R O U T E.

Alarm number 2067:                   MANUAL D R I F T D I S A B L E D         /7  
 -----  
 M A N U A L D R I F T V A L U E C A N O N L Y B E  
 I N S E R T E D W H E N N O S E N S O R S P R O -  
 V I D E S P E E D O V E R G R O U N D D A T A.  
 U S E ' S E N S O R S ' B U T T O N T O  
 V E R I F Y A N D S E L E C T S E N S O R S T O  
 B E U S E D.

Alarm number 2071:                   SOURCE ARPA RADAR CHANGED     /1  
 -----  
 M A S T E R R A D A R F O R E C D I S H A S  
 B E E N C H A N G E D.  
  
 V E R I F Y N E W S O U R C E O R T R A C K E D  
 A R P A T A R G E T S

Al arm number 2072: CHARTALIGN: NO LINE AVAIL /1  
-----  
IN ORDER TO PERFORM CHART  
ALIGN WITH AN ARPA RADAR  
THERE MUST BE TRANSFERRED USER  
CHART LINES IN THE ARPA RADAR  
CHECK THAT YOUR CURRENT USER  
HAS LINES AND THAT THEY ARE  
VISIBLE ON ARPA RADAR DISPLAY

Al arm number 2101: USER CHART: NEED POINTS /7  
-----  
USER CHART HAS MORE THAN 60  
LINES OR 20 SYMBOLS AND IT  
DOES NOT CONTAIN ANY POINTS.  
USE 'USER CHART' MENU TO  
SELECT A VALID USER CHART OR  
ADD POINTS TO CURRENT USER  
CHART

Al arm number 2351: REFTGT: FORCED TO CANCEL /1  
-----  
YOU HAVE SELECTED NEW  
REFERENCE TARGETS WITHOUT  
FIRST CANCEL OF CURRENT.  
THE USE OF CURRENT REFERENCE  
TARGETS HAS BEEN AUTOMATICALLY  
CANCELLED

Al arm number 2352: REFTGT: LOST POSITION /1  
-----  
YOU HAVE SELECTED REFERENCE  
TARGETS AS A POSITION SOURCE  
AND THE SYSTEM IS UNABLE TO  
SOLVE OWN SHIP POSITION BASED  
ON REFERENCE TARGETS  
CHECK YOUR REFERENCE TARGET  
POSITIONS AND THEIR TRACKING

Al arm number 2353: REFTGT: LOST GYRO CORR. /1  
-----  
LOST OF GYRO ERROR CORRECTION  
VALUE WHICH IS BASED ON  
REFERENCE TARGETS TRACKING

Al arm number 2354: REFTGT: TRACKING FULL /1  
-----  
IF CONNECTED ARPA RADAR HAS  
LESS THAN 8 FREE TRACKING  
CHANNELS AVAILABLE

Al arm number 2454: ROUTE: END REACHED /1  
-----  
YOU HAVE PASSED THE FINAL  
WAYPOINT OF YOUR MONITORED  
ROUTE.  
CURRENT MONITORED ROUTE HAS  
AUTOMATICALLY CANCELLED

Al arm number 2457: ROUTE: OUTSIDE CHANNEL LIMITS /2  
-----  
SHIP IS OUTSIDE CHANNEL LIMITS  
SPECIFIED FOR CURRENT LEG OF  
THE MONITORED ROUTE.  
CHECK OWN SHIP POSITION AND  
MONITORED ROUTE



Al arm number	2459:	STEERING PARAMETER ERROR /7 ----- TRACKPILOT PARAMETER HAS AN ERROR IN ITS CONTENTS. CHECK AGAIN INSTALLATION PARA- METERS OF ECDIS.
Al arm number	2480:	TRACK PILOT RECEIVE ERROR /1 ----- ECDIS CANNOT RECEIVE ANY DATA FROM TRACKPILOT. TO QUIT ALARM CHANGE "MAIN STEERING" -SELEC- TOR TO ANY OTHER POSITION THAN AUTOP. CHECK AND VERIFY TRACK PILOT OPERATION BEFORE NEW TRY
Al arm number	2488:	INTEGRATED STEERING LOST /2 ----- CONNECTION TO THE TRACKPILOT HAS BEEN LOST WHILE THE SYSTEM PERFORMED ONE OF THE INTEGRATED STEERING MODES: - GOTO TRACK - GOTO WAYPOINT - PROGRAM TRACK TURN CURRENT STEERING MODE CANNOT CONTINUE CHECK NEW STEERING SITUATION
Al arm number	3000:	PARAM CHANGE DISABLED /3 ----- INSTALLATION PARAMETERS CAN BE CHANGED ONLY IF THE ROUTE STEERING IS NOT ON AND THE KALMAN FILTER IS NOT USED. CHECK THE SITUATION AND TRY AGAIN.
Al arm number	4000:	NO SENSOR PARAMETERS /2 ----- SENSOR PARAMETER FILES ARE MISSING. LOAD INSTALLATION PARAMETERS OF ECDIS. IF REQUIRED USE BACKUP COPY OF PARAMETERS.
Al arm number	4001:	B-ADAPTER ERROR /1/8 ----- B-ADAPTER DOES NOT OPERATE DUE TO A SYSTEM FAULT. SWITCH OFF MAIN CIRCUIT BREA- KER AND THEN ON AGAIN. CALL SERVICE IF FAILURE STILL EXISTS.
Al arm number	4005:	GYRO ERROR /3 ----- GYRO1 DATA IS NOT RECEIVED CORRECTLY. USE 'INITIAL SETTINGS' MENU TO SET GYRO AGAIN. IF FAILURE STILL EXISTS, USE 'SENSORS' SPEED/POSITION PAGE TO SELECT VALID SENSORS.

Al arm number 4006: GYRO ERROR /3  
 -----  
 GYRO2 DATA IS NOT RECEIVED  
 CORRECTLY.  
 USE 'SENSORS' SPEED/POSITION  
 PAGE TO SELECT VALID SENSORS.

Al arm number 4008: LOG ERROR /3  
 -----  
 LOG DATA IS NOT RECEIVED  
 CORRECTLY.  
 USE 'SENSORS' SPEED/COURSE  
 TO SELECT VALID SPEED SENSORS.

Al arm number 4009: DUAL AXIS LOG ERROR /3  
 -----  
 DUAL AXIS LOG DATA IS NOT RE-  
 CEIVED CORRECTLY.  
 USE 'SENSORS' SPEED/COURSE  
 TO SELECT VALID SPEED SENSORS.

Al arm number 4010: ECHO SOUNDER ERROR /3  
 -----  
 ECHO SOUNDER DATA IS NOT RE-  
 CEIVED CORRECTLY.  
 VERIFY ECHO SOUNDER OPERATION.

Al arm number 4011: WIND SENSOR ERROR /3  
 -----  
 WIND SENSOR DATA IS NOT RE-  
 CEIVED CORRECTLY.  
 VERIFY WIND SENSOR OPERATION.

Al arm number 4012: POSITION EQUIPMENT ERROR /1  
 -----  
 POSITION EQUIPMENT 1 DATA IS  
 NOT RECEIVED CORRECTLY.  
 USE 'SENSORS' POSITION  
 TO SELECT VALID POSITION  
 SENSORS.

Al arm number 4013: POSITION EQUIPMENT ERROR /1  
 -----  
 POSITION EQUIPMENT 2 DATA IS  
 NOT RECEIVED CORRECTLY.  
 USE 'SENSORS' POSITION TO  
 SELECT VALID POSITION SENSORS

Al arm number 4014: POSITION EQUIPMENT ERROR /1  
 -----  
 POSITION EQUIPMENT 3 DATA IS  
 NOT RECEIVED CORRECTLY.  
 USE 'SENSORS' POSITION  
 TO SELECT VALID POSITION  
 SENSORS.

Al arm number 4015: POSITION EQUIPMENT ERROR /1  
 -----  
 POSITION EQUIPMENT 4 DATA IS  
 NOT RECEIVED CORRECTLY.  
 USE 'SENSORS' POSITION  
 TO SELECT VALID POSITION  
 SENSORS.

Al arm number	4016:	POSITION EQUIPMENT ERROR /1 ----- POSITION EQUIPMENT 5 DATA IS NOT RECEIVED CORRECTLY. USE 'SENSORS' POSITION TO SELECT VALID POSITION SENSORS.
Al arm number	4018:	ROT GYRO ERROR /3 ----- ROT GYRO DATA IS NOT RECEIVED CORRECTLY. VERIFY ROT GYRO DEVICE.
Al arm number	4019:	PITCH&ROLL SENSOR ERROR /3 ----- PITCH&ROLL DATA IS NOT RECEIVED CORRECTLY. VERIFY SENSOR FOR PITCH&ROLL DATA.
Al arm number	4021:	ARPA RADAR SYSTEM ERROR /1 ----- RADAR FROM CHANNEL 1 REPORT RADAR SYSTEM FAILURE OR ECDIS CANNOT COMMUNICATE WITH THE RADAR. VERIFY THAT 'AUTOTRACKING ON' AND 'INC ON' ARE DEPRESSED ON THE RADAR.
Al arm number	4022:	ARPA RADAR SYSTEM ERROR /1 ----- RADAR FROM CHANNEL 2 REPORT RADAR SYSTEM FAILURE OR ECDIS CANNOT COMMUNICATE WITH THE RADAR. VERIFY THAT 'AUTOTRACKING ON' AND 'INC ON' ARE DEPRESSED ON THE RADAR.
Al arm number	4023:	ARPA RADAR SYSTEM ERROR /1 ----- RADAR FROM CHANNEL 3 REPORT RADAR SYSTEM FAILURE OR ECDIS CANNOT COMMUNICATE WITH THE RADAR. VERIFY THAT 'AUTOTRACKING ON' AND 'INC ON' ARE DEPRESSED ON THE RADAR.
Al arm number	4024:	ARPA RADAR SYSTEM ERROR /1 ----- RADAR FROM CHANNEL 4 REPORT RADAR SYSTEM FAILURE OR ECDIS CANNOT COMMUNICATE WITH THE RADAR. VERIFY THAT 'AUTOTRACKING ON' AND 'INC ON' ARE DEPRESSED ON THE RADAR.
Al arm number	4027:	DGPS POS. SOURCE CHANGE /1/7 ----- DGPS POSITION SENSOR IN CHANNEL NUMBER 1 HAS CHANGED ITS OPERATION MODE FROM NORMAL TO DIFFERENTIAL OR FROM DIFFERENTIAL TO NORMAL CHECK SENSORS AND IF REQUIRED SELECT MORE SUITABLE POSITION SENSOR

Al arm number 4028: DGPS POS. SOURCE CHANGE /1/7  
-----  
DGPS POSITION SENSOR IN  
CHANNEL NUMBER 2 HAS CHANGED  
ITS OPERATION MODE FROM  
NORMAL TO DIFFERENTIAL OR FROM  
DIFFERENTIAL TO NORMAL  
SELECT MORE SUITABLE POSITION  
SENSOR

Al arm number 4029: DGPS POS. SOURCE CHANGE /1/7  
-----  
DGPS POSITION SENSOR IN  
CHANNEL NUMBER 3 HAS CHANGED  
ITS OPERATION MODE FROM  
NORMAL TO DIFFERENTIAL OR FROM  
DIFFERENTIAL TO NORMAL  
SELECT MORE SUITABLE POSITION  
SENSOR

Al arm number 4030: DGPS POS. SOURCE CHANGE /1/7  
-----  
DGPS POSITION SENSOR IN  
CHANNEL NUMBER 4 HAS CHANGED  
ITS OPERATION MODE FROM  
NORMAL TO DIFFERENTIAL OR FROM  
DIFFERENTIAL TO NORMAL CHECK  
SENSORS AND IF REQUIRED SELECT  
MORE SUITABLE POSITION SENSOR

Al arm number 4031: DGPS POS. SOURCE CHANGE /1/7  
-----  
DGPS POSITION SENSOR IN  
CHANNEL NUMBER 5 HAS CHANGED  
ITS OPERATION MODE FROM  
NORMAL TO DIFFERENTIAL OR FROM  
DIFFERENTIAL TO NORMAL  
CHECK SENSORS AND IF REQUIRED  
SELECT MORE SUITABLE POSITION  
SENSOR

Al arm number 4033: ARPA RADAR SPD/CRS ERROR /6  
-----  
ARPA RADAR SELECTED AS SPD AND  
CRS SOURCE IS NOT RECEIVED  
CORRECTLY  
USE 'SENSORS' SPEED/COURSE TO  
SELECT VALID SPD/CRS SENSORS

Al arm number 4201: EXT. NAVIGATION EQ. ERROR /6  
-----  
NAVIGATION EQUIPMENT  
CONNECTED IN ALARM INPUT 1  
REPORTS ABOUT INTERNAL FAILURE

Al arm number 4202: EXT. NAVIGATION EQ. ERROR /6  
-----  
NAVIGATION EQUIPMENT  
CONNECTED IN ALARM INPUT 1  
REPORTS ABOUT INTERNAL FAILURE

Al arm number 4203: EXT. NAVIGATION EQ. ERROR /6  
-----  
NAVIGATION EQUIPMENT  
CONNECTED IN ALARM INPUT 1  
REPORTS ABOUT INTERNAL FAILURE

Alarm number 4204: EXT. NAVIGATION EQ. ERROR /6  
-----  
NAVIGATION EQUIPMENT  
CONNECTED IN ALARM INPUT 1  
REPORTS ABOUT INTERNAL FAILURE

Alarm number 4205: EXT. NAVIGATION EQ. ERROR /6  
-----  
NAVIGATION EQUIPMENT  
CONNECTED IN ALARM INPUT 1  
REPORTS ABOUT INTERNAL FAILURE

Alarm number 4206: EXT. NAVIGATION EQ. ERROR /6  
-----  
NAVIGATION EQUIPMENT  
CONNECTED IN ALARM INPUT 1  
REPORTS ABOUT INTERNAL FAILURE

Alarm number 4207: EXT. NAVIGATION EQ. ERROR /6  
-----  
NAVIGATION EQUIPMENT  
CONNECTED IN ALARM INPUT 1  
REPORTS ABOUT INTERNAL FAILURE

Alarm number 4208: EXT. NAVIGATION EQ. ERROR /6  
-----  
NAVIGATION EQUIPMENT  
CONNECTED IN ALARM INPUT 1  
REPORTS ABOUT INTERNAL FAILURE

## List of Chart alarms

Al arm number	5001:	NEW PILOT DATA	/2/10
Al arm number	5100:	SAFETY CONTOUR	/2/10
Al arm number	5101:	AREAS TO BE AVOIDED	/2/10
Al arm number	5102:	SPECIALLY PROTECTED AREAS	/2/10
Al arm number	5103:	USER CHART DANGER AREA	/2/10
Al arm number	5104:	TRAFFIC SEPARATION ZONE	/2/10
Al arm number	5105:	TRS CROSSING/ROUNDBOUT	/2/10
Al arm number	5106:	TRS PRECAUTIONARY AREA	/2/10
Al arm number	5107:	TWO WAY TRAFFIC ROUTE	/2/10
Al arm number	5108:	DEEP WATER ROUTE	/2/10
Al arm number	5109:	RECOMMEND TRAFFIC LANE	/2/10
Al arm number	5110:	INSHORE TRAFFIC ZONE	/2/10
Al arm number	5111:	FAIRWAY	/2/10
Al arm number	5112:	RESTRICTED AREA	/2/10
Al arm number	5113:	CAUTION AREA	/2/10
Al arm number	5114:	OFFSHORE PRODUCTION AREA	/2/10
Al arm number	5115:	MILITARY PRACTICE AREA	/2/10
Al arm number	5116:	SEAPLANE LANDING AREA	/2/10
Al arm number	5117:	SUBMARINE TRANSIT LANE	/2/10
Al arm number	5118:	ICE AREA	/2/10
Al arm number	5119:	CHANNEL	/2/10
Al arm number	5120:	FISHING GROUND	/2/10
Al arm number	5121:	FISHING PROHIBITED	/2/10
Al arm number	5122:	PIPELINE AREA	/2/10
Al arm number	5123:	CABLE AREA	/2/10
Al arm number	5124:	ANCHORAGE AREA	/2/10
Al arm number	5125:	ANCHORAGE PROHIBITED	/2/10
Al arm number	5126:	DUMPING GROUND	/2/10
Al arm number	5127:	SPOIL GROUND	/2/10
Al arm number	5128:	DREDGED AREA	/2/10
Al arm number	5129:	CARGO TRANSSHIPMENT AREA	/2/10
Al arm number	5130:	INCINERATION AREA	/2/10

## List of Steering alarms with EMRI Trackpilot

Al arm number 2450: SET RADIUS LIMIT EXCEEDED /7  
 -----  
 RADIUS WAS TRIED TO BE SET  
 OUTSIDE ALLOWED LIMITS.  
 MINIMUM RADIUS IS SET BY INS-  
 TALLATION PARAMETERS, AND  
 MAXIMUM IS FIXED AT 2 NM.

Al arm number 2451: ROUTE: WP APPROACH ALARM /1  
 -----  
 WAYPOINT IS NOW BEING  
 APPROACHED.  
 PRESS 'ACKN. WARNING' TO  
 ACCEPT THE TURN.

Al arm number 2452: ROUTE: TURNING DISABLED /1  
 -----  
 WHEELOVER POINT HAS BEEN PAS-  
 SED WITHOUT 'ACKN. WARNING\*'  
 'RADIUS CONTROL' MODE HAS THEN  
 AUTOMATICALLY BEEN INITIATED

Al arm number 2455: ROUTE: OFF COURSE /4  
 -----  
 REQUIRED 'SET COURSE' FOR NEXT  
 WAYPOINT EXCEEDS THE 'LOWER  
 OFFCOURSE' OR 'HIGHER OFF-  
 COURSE' LIMIT OF PLANNED  
 COURSE.  
 ACCEPT THE SITUATION BY PRES-  
 SING 'ACKN. WARNING'

Al arm number 2456: ROUTE: WP APPROACH ERROR /1  
 -----  
 'TIME TO WOP' HAS CHANGED  
 SINCE 'WP APPROACH' ALARM WAS  
 ACKNOWLEDGED, POSSIBLY DUE TO  
 A POSITION JUMP.  
 VERIFY POSITION AND SPEED SEN-  
 SORS IN 'SENSORS'

Al arm number 2458: ROUTE: LAST WP APPROACH /1  
 -----  
 FINAL WAYPOINT OF THE ROUTE  
 IS REACHED.  
 AUTOMATICALLY INITIATE  
 'RADIUS CONTROL' MODE, AND  
 CANCEL THE ROUTE.

Al arm number 2460: PILOT: ROT WILL BE EXCEEDED /4  
 -----  
 THE RADIUS SENT TO AUTOPILOT  
 IS EXCEEDING THE MAXIMUM  
 LIMIT FOR TURNRATE.  
 INCREASE THE RADIUS, OR  
 REDUCE SPEED.

Al arm number 2461: ROUTE: ROT WILL BE EXCEEDED /4/7  
 -----  
 WAYPOINT IS BEING APPROACHED  
 WITH TOO HIGH SPEED FOR THE  
 PLANNED RADIUS, CAUSING MAX.  
 TURNRATE TO BE EXCEEDED.  
 REDUCE THE SPEED OR INCREASE  
 RADIUS BY OVERDRIVING WITH  
 'MAN. SET COURSE'.

Al arm number 2462: TRIAL: ROT WILL BE EXCEEDED /7

```

-----
TRIAL MANOEUVRE RADIUS IS TOO
SMALL, AND MAX. TURNRATE WILL
BE EXCEEDED.
INCREASE TRIAL MANOEUVRE
RADIUS, OR REDUCE SPEED.

Al arm number 2464:      ROUTE: NO SELECTED ROUTE      /7
-----
NO ROUTE HAS BEEN SELECTED,
AND ROUTE STEERING CANNOT BE
INITIATED.
SELECT A ROUTE AND NEXT WAY-
POINT THROUGH 'ROUTE MONITOR'
PUSHBUTTON.

Al arm number 2465:      ROUTE: ILLEGAL WAYPOINT      /7
-----
ROUTE STEERING CANNOT START
FROM WAYPOINT NO. 1.
USE 'ROUTE MONITOR'
PUSHBUTTON TO SELECT
NEXT WAYPOINT TO BE
NO. 2 OR HIGHER.

Al arm number 2467:      DISABLED: STEERING OFF      /1
-----
TRACK PILOT IS IN 'STEERING
OFF' MODE, AND STEERING
COMMANDS CANNOT BE EXECUTED.
STEERING MUST BE ENABLED
AT THE MAIN STEERING SELECTOR

Al arm number 2468:      DISABLED: OUT OF COURSE      /7
-----
ROUTE STEERING CAN ONLY BE
INITIATED WHEN SHIPS COURSE IS
WITHIN THE 'GOTO WP LIMIT' FOR
'GOTO WP' OR WITHIN THE 'GOTO
TRACK LIMIT' FOR 'GOTO TRACK' .
USE 'RADIUS CONTROL' MODE TO
STEER WITHIN THE LIMITS.

Al arm number 2469:      TRACKPILOT: OFF COURSE      /4
-----
TRACK PILOT DOES NOT STEER
WITHIN LIMITS OF 'COURSE TO
STEER' COMMAND' .
VERIFY TRACK PILOT FUNCTIONS.

Al arm number 2470:      DISABLED: NEEDS FILTER ON    /1
-----
'ROUTE STEERING' MODE CAN BE
UTILIZED ONLY WHEN 'FILTER' IS
ON AND THERE ARE ENOUGH SPEED,
HEADING AND POSITION SENSORS.
VERIFY AND SELECT POSITION
SENSORS IN 'SENSORS'

Al arm number 2473:      RADAR SET COURSE EXECUTED    /7
-----
'SET COURSE' VALUE HAVE BEEN
CHANGED BY RADAR 'ENTER NEW
COURSE' COMMAND.

Al arm number 2474:      DISABLED: STEERING OFF      /1

```



```

-----
STEERING COMMAND HAS BEEN
RECEIVED FROM TRACK PILOT, BUT
CANNOT BE EXECUTED IN
'STEERING OFF' MODE.
STEERING MUST BE ENABLED AT
THE STEERING SELECTOR.

Alarm number 2475: ROUTE: NEEDS FILTER ON /2
-----
THIS IS A WARNING THAT YOU ARE
USING ROUTE STEERING WITHOUT
FILTERED POSITION AVAILABLE.
VERIFY AND SELECT POSITION
SENSORS 'SENSORS'

Alarm number 2476: ROUTE: NEEDS LOG SENSOR /2
-----
THIS IS A WARNING THAT YOU ARE
USING ROUTE STEERING WITH ONLY
ONE POSITION DEVICE AND
WITHOUT ANY LOG DEVICE.
VERIFY AND SELECT SENSORS
IN 'SENSORS'

Alarm number 2479: RADAR SET RADIUS EXECUTED /7
-----
'SET RADIUS' VALUE HAS BEEN
CHANGED BY RADAR 'RADIUS
INCREASE' OR 'RADIUS DECREASE'
COMMAND.

Alarm number 2485: ROUTE: WP PREWARNING ALARM /1
-----
WAYPOINT IS NOW SOON BEING
APPROACHED.

Alarm number 2486: DISABLED: STEERING OFF /1
-----
A SET COURSE REQUEST HAS BEEN
RECEIVED FROM MASTER RADAR
BUT IT CANNOT BE EXECUTED.
VERIFY THAT TRACKPILOT IS IN
PROGRAM TRACK TURN MODE

Alarm number 2489: ROUTE: CHANGED TO GOTO WP /3
-----
SYSTEM CANNOT CONTINUE GOTO
TRACK MODE BECAUSE KALMAN
FILTER POSITION IS LOST OR
NO LOG SENSOR IS AVAILABLE
KALMAN FILTER

Alarm number 2490: DISABLED: NEEDS LOG SENSOR /1
-----
'ROUTE STEERING' MODE CAN BE
UTILIZED ONLY WHEN THERE IS AN
INDEPENDENT SPEED SOURCE.
ALTERNATIVES ARE A LOG OR TWO
POSITION RECEIVERS

```

Al arm number 2491:                   DI SABLED: NEEDS DI FF POS.       /1  
 -----  
   ' GOTO TRACK' MODE CAN BE  
   USED ONLY WHEN THERE IS A  
   HIGH PRECI SION POSI TION SENSOR  
   IN USE WITH KALMAN FILTER.

Al arm number 2492:                   ROUTE: NEEDS DI FF POS.       /1  
 -----  
   ' GOTO TRACK' MODE CANNOT  
   CONTINUE WI THOUT A HIGH  
   PRECI SION POSI TION SENSOR.  
   STEERING MODE IS AUTOMATI CALLY  
   CHANGED "GOTO WP" WITH ALARM  
   2489: ROUTE: CHANGED TO GOTO WP

Al arm number 2493:                   PROGTURN: NEEDS FILTER ON   /2  
 -----  
   THI S IS A WARNING THAT YOU ARE  
   USING PROGRAM TRACK TURN WI TH-  
   OUT FI LTERED POSI TION  
   AVAI LABLE.

Al arm number 2494:                   PROGTURN: NEEDS LOG SENS.   /2  
 -----  
   THI S IS A WARNING THAT YOU ARE  
   USING PROGRAM TRACK TURN WI TH-  
   OUT A LOG SENSOR OR WI THOUT  
   TWO POSI TION SENSORS

Al arm number 2493:                   PROGTURN: NEEDS DI FF POS.   /2  
 -----  
   THI S IS A WARNING THAT YOU ARE  
   USING PROGRAM TRACK TURN WI TH-  
   OUT A HI GH PRECI SION POSI TION  
   SENSOR

## List of Steering alarms with Yokogawa Autopilot

Al arm number	2451:	ROUTE: WP APPROACH ALARM /1 ----- WAYPOINT IS NOW BEING APPROACHED. PRESS 'ACKN. WARNING' TO ACCEPT THE TURN.
Al arm number	2452:	ROUTE: TURNING DISABLED /1 ----- WHEELOVER POINT HAS BEEN PAS- SED WITHOUT 'ACKN. WARNING*' 'RADIUS CONTROL' MODE HAS THEN AUTOMATICALLY BEEN INITIATED
Al arm number	2455:	ROUTE: OFF COURSE /4 ----- REQUIRED 'SET COURSE' FOR NEXT WAYPOINT EXCEEDS THE 'LOWER OFFCOURSE' OR 'HIGHER OFF- COURSE' LIMIT OF PLANNED COURSE. ACCEPT THE SITUATION BY PRES- SING 'ACKN. WARNING'
Al arm number	2456:	ROUTE: WP APPROACH ERROR /1 ----- 'TIME TO WOP' HAS CHANGED SINCE 'WP APPROACH' ALARM WAS ACKNOWLEDGED, POSSIBLY DUE TO A POSITION JUMP. VERIFY POSITION AND SPEED SEN- SORS IN 'SENSORS'
Al arm number	2458:	ROUTE: LAST WP APPROACH /1 ----- FINAL WAYPOINT OF THE ROUTE IS REACHED. AUTOMATICALLY INITIATE 'RADIUS CONTROL' MODE, AND CANCEL THE ROUTE.
Al arm number	2460:	PILOT: ROT WILL BE EXCEEDED /4 ----- THE RADIUS SENT TO AUTOPILOT IS EXCEEDING THE MAXIMUM LIMIT FOR TURNRATE. INCREASE THE RADIUS, OR REDUCE SPEED.
Al arm number	2461:	ROUTE: ROT WILL BE EXCEEDED /4/7 ----- WAYPOINT IS BEING APPROACHED WITH TOO HIGH SPEED FOR THE PLANNED RADIUS, CAUSING MAX. TURNRATE TO BE EXCEEDED. REDUCE THE SPEED OR INCREASE RADIUS BY OVERDRIVING WITH 'MAN. SET COURSE'.
Al arm number	2464:	ROUTE: NO SELECTED ROUTE /7 ----- NO ROUTE HAS BEEN SELECTED, AND ROUTE STEERING CANNOT BE INITIATED. SELECT A ROUTE AND NEXT WAY-

POINT THROUGH 'ROUTE MONITOR'  
PUSHBUTTON.

Alarm number 2465: ROUTE: ILLEGAL WAYPOINT /7  
-----  
ROUTE STEERING CANNOT START  
FROM WAYPOINT NO. 1.  
USE 'ROUTE MONITOR'  
PUSHBUTTON TO SELECT  
NEXT WAYPOINT TO BE  
NO. 2 OR HIGHER.

Alarm number 2468: DISABLED: OUT OF COURSE /7  
-----  
ROUTE STEERING CAN ONLY BE  
INITIATED WHEN SHIPS COURSE IS  
WITHIN THE 'GOTO WP LIMIT'.  
USE AUTOPILOT TO STEER WITHIN  
THE LIMITS.

Alarm number 2469: AUTOPILOT: OFF COURSE /4  
-----  
AUTOPILOT DOES NOT STEER  
WITHIN LIMITS OF 'COURSE TO  
STEER' COMMAND'.  
VERIFY AUTOPILOT FUNCTIONS.

Alarm number 2470: DISABLED: NEEDS FILTER ON /1  
-----  
'ROUTE STEERING' MODE CAN BE  
UTILIZED ONLY WHEN 'FILTER' IS  
ON AND THERE ARE ENOUGH SPEED,  
HEADING AND POSITION SENSORS.  
VERIFY AND SELECT POSITION  
SENSORS IN 'SENSORS'

Alarm number 2471: AUTOPILOT MODE CONFLICT /2  
-----  
YOU HAVE TRIED TO ACTIVATE  
ROUTE STEERING OR YOU HAVE  
REACHED THE END OF THE ROUTE,  
BUT YOU HAVE NOT LEFT 'ROUTE  
STEERING' MODE  
CHANGE IMMEDIATELY TO  
'AUTOPILOT ONLY' STEERING MODE

Alarm number 2475: ROUTE: NEEDS FILTER ON /2  
-----  
THIS IS A WARNING THAT YOU ARE  
USING ROUTE STEERING WITHOUT  
FILTERED POSITION AVAILBLE.  
VERIFY AND SELECT POSITION  
SENSORS 'SENSORS'

Alarm number 2476: ROUTE: NEEDS LOG SENSOR /2  
-----  
THIS IS A WARNING THAT YOU ARE  
USING ROUTE STEERING WITH ONLY  
ONE POSITION DEVICE AND  
WITHOUT ANY LOG DEVICE.  
VERIFY AND SELECT SENSORS  
IN 'SENSORS'

Alarm number 2485: ROUTE: WP PREWARNING ALARM /1  
-----  
WAYPOINT IS NOW SOON BEING  
APPROACHED.

Alarm number 2488: INTEGRATED STEERING LOST /2  
-----  
ROUTE STEERING WAS TERMINATED  
IN AN ABNORMAL SEQUENCE

Alarm number 2490: DISABLED: NEEDS LOG SENSOR /1  
-----  
'ROUTE STEERING' MODE CAN BE  
UTILIZED ONLY WHEN THERE IS AN  
INDEPENDENT SPEED SOURCE.  
ALTERNATIVES ARE A LOG OR TWO  
POSITION RECEIVERS

This page is intentionally left blank

# Definition of Terms

---

## List of terms

### APPROACHING POINT (AP)

A user selected point where a turning alarm is initiated.

### AUTOMATIC RADAR PLOTTING AID (ARPA)

A system wherein radar targets are automatically acquired, tracked and collision situations computer assessed and warning given.

### CHANNEL LIMIT (CHL)

During route planning a channel limit is defined for each leg. This limit can also be the border line of the chart shown on the radar display. "For more information, see "Figure 1" on page 418.

### COURSE

The compass course = true course.

### COURSE MADE GOOD (CMG)

The true filtered course which is calculated in the system. In case the course is taken from a magnetic compass the value shown includes compensation and user stated deviation. "For more information, see "Figure 1" on page 418.

### COURSE TO STEER (CTS)

Is the course to steer calculated by the system. "For more information, see "Figure 1" on page 418.

### CLOSEST POINT OF APPROACH (CPA)

A user can set CPA limit.

### DEADBAND WIDTH (DBW)

The dead band is an area within the channel where the system gives a zero cross track error value to the trackpilot. "For more information, see "Figure 2" on page 418.

### DATUM

A set of parameters specifying the reference surface or the reference co-ordinate systems used for geodetic control in the calculation of co-ordinates of points on the earth. Commonly datum is defined as horizontal and vertical datum separately. For the practical use of the datum it is necessary to have one or more well monument points with co-ordinates given in that datum.

### ELECTRONIC CHART DISPLAY AND INFORMATION SYSTEM (ECDIS)

The navigation information system which is considered equivalent to the nautical paper chart, displaying selected information from the chart data base (see ENC) integrated with data from positional and, optionally other sensors. By displaying chart contents and optionally other chart related and navigational information, ECDIS assists the mariner in route planning and, with on-line position indication, in route monitoring.

#### ELECTRONIC NAVIGATIONAL CHART (ENC)

The database held on the ship for use with ECDIS. The ENC is equivalent to new editions of paper charts, and may contain additional supplementary nautical information additional to that contained in the paper chart.

#### FORWARDING DISTANCE (F)

The distance which the vessel moves straight after a rudder command. "For more information, see "Figure 3" on page 418.

#### GREAT CIRCLE

The intersection of the surface of a sphere and a plane through its center.

#### MAGNETIC VARIATION

The angle between the magnetic and geographic meridians at any place, expressed in degrees and minutes east or west to indicate the direction of magnetic north from true north.

#### MENU

A list of commands and/or options. The user selects the desired command by moving the cursor to the respective position on the menu.

#### OFF TRACK

Cross track error (XTE) distance from intended track. "For more information, see "Figure 1" on page 418.

#### POSITION

On the display is indicated which instruments are giving information for the position calculation.

#### RENC

Regional Electronic Nautical Chart center. RENC is defined by IMO and IHO as the source of SOLAS compliant Electronic Nautical Charts (ENC), which use S57ed3 coding. An example of such a RENC is the PRIMAR in Stavanger Norway.

#### RANGE RING

A range ring is a circle with a defined radius located with its centre at the position of the own ship.

#### RHUMB LINE

A line on the surface of the earth making the same oblique angle with all meridians. A rhumb line is a straight line on a rhumb (or Mercator) projection.

#### SYSTEM ENC (SENC)

The manufacturer's own storage formats or data structure for the database.

#### SET COURSE

"For more information, see "Figure 1" on page 418.

#### SPEED

The speed shown by the log.

#### SPEED MADE GOOD (SMG)

The true speed over ground which is calculated in the system.

#### VARIABLE RANGE MARKER (VRM)

The VRM is a range ring, the radius of which is continuously adjustable.

#### WAYPOINT (WP)

The crossing point between two legs.



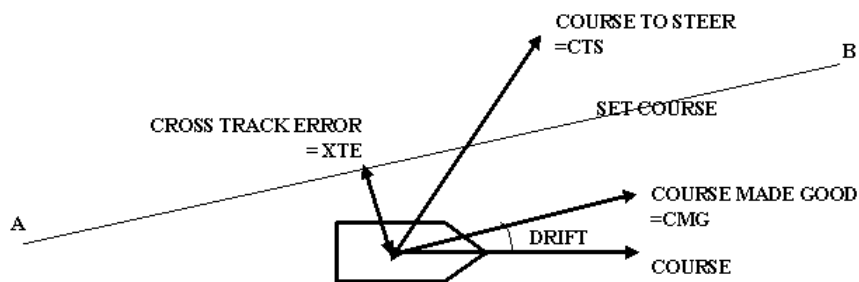
#### WHEEL OVER POINT (WOP)

The point where the rudder command is given. "For more information, see "Figure 3" on page 418.

#### WORLD GEODETIC SYSTEM (WGS)

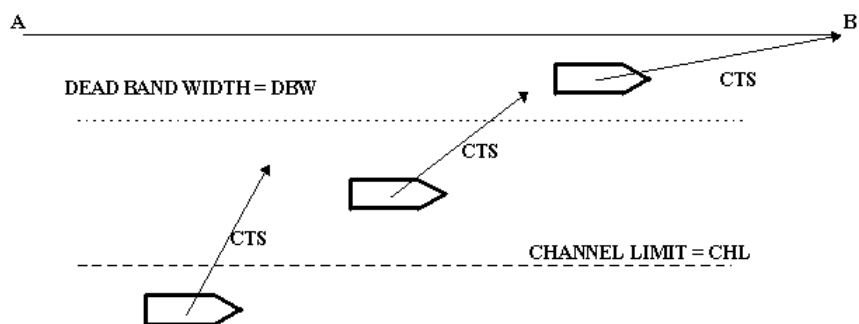
A consistent set of parameters describing the size and shape of the earth, the positions of a network of points with respect to the center of mass of the Earth, transformations from major geodetic datum's, and the potential of the Earth.

**Figure 1**



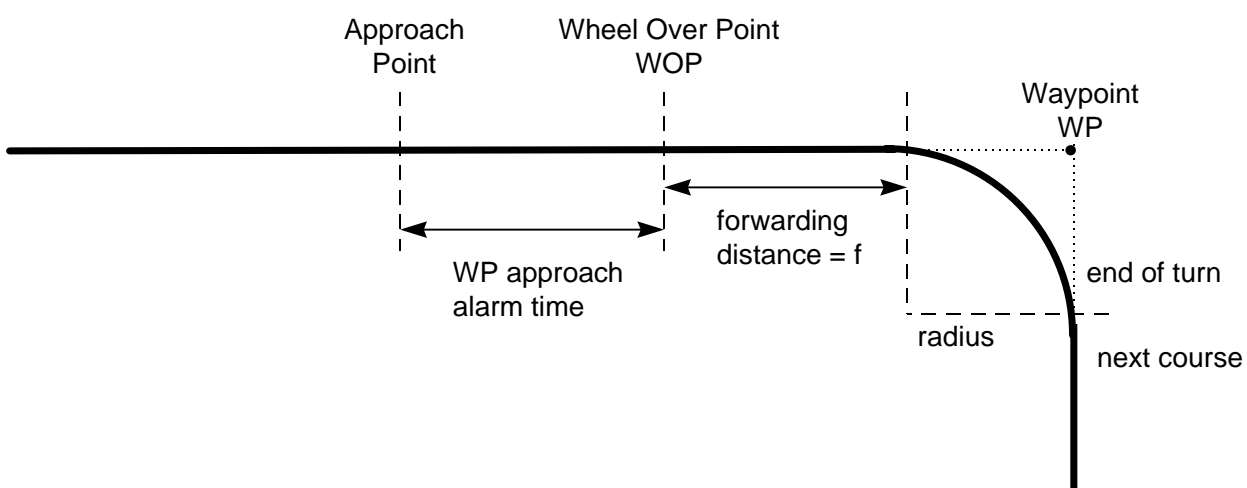
*Figure 1*

**Figure 2**



*Figure 2*

**Figure 3**



*Figure 3*

# Appendix 1

---

## IHO ECDIS chart 1

International Hydrographic Organization (IHO) has published a set of charts, where you can find examples of used symbology in S57. You can study them with "Info/Help" and by changing different layer ON and OFF in "Chart Display". Everything is visible if you select all layers from "Standard" and "Other" sheets ON.

To open IHO ECDIS Chart 1 on display, press CHART PLAN button and select **IHO ECDIS Chart 1**.

Note that chart AA5C1WOO is intended to help you to select suitable monitor brightness and contrast for current lightning condition.

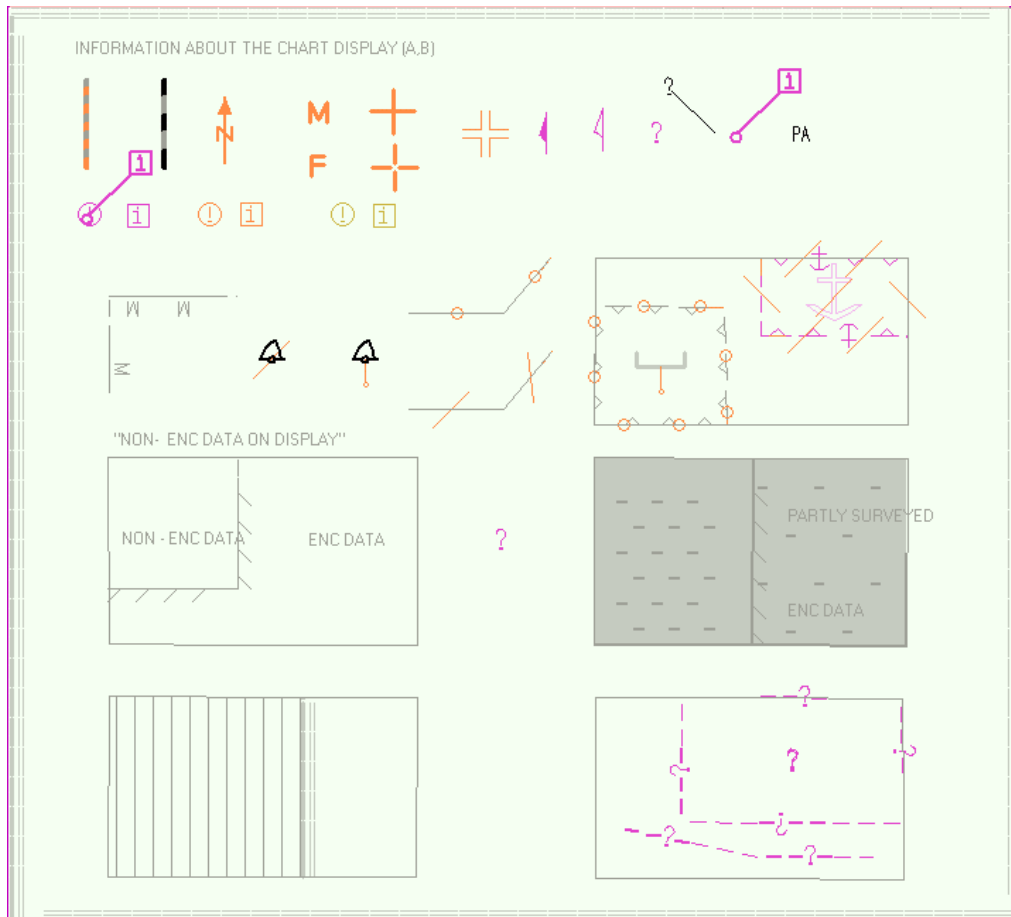


Chart AA5C1ABO

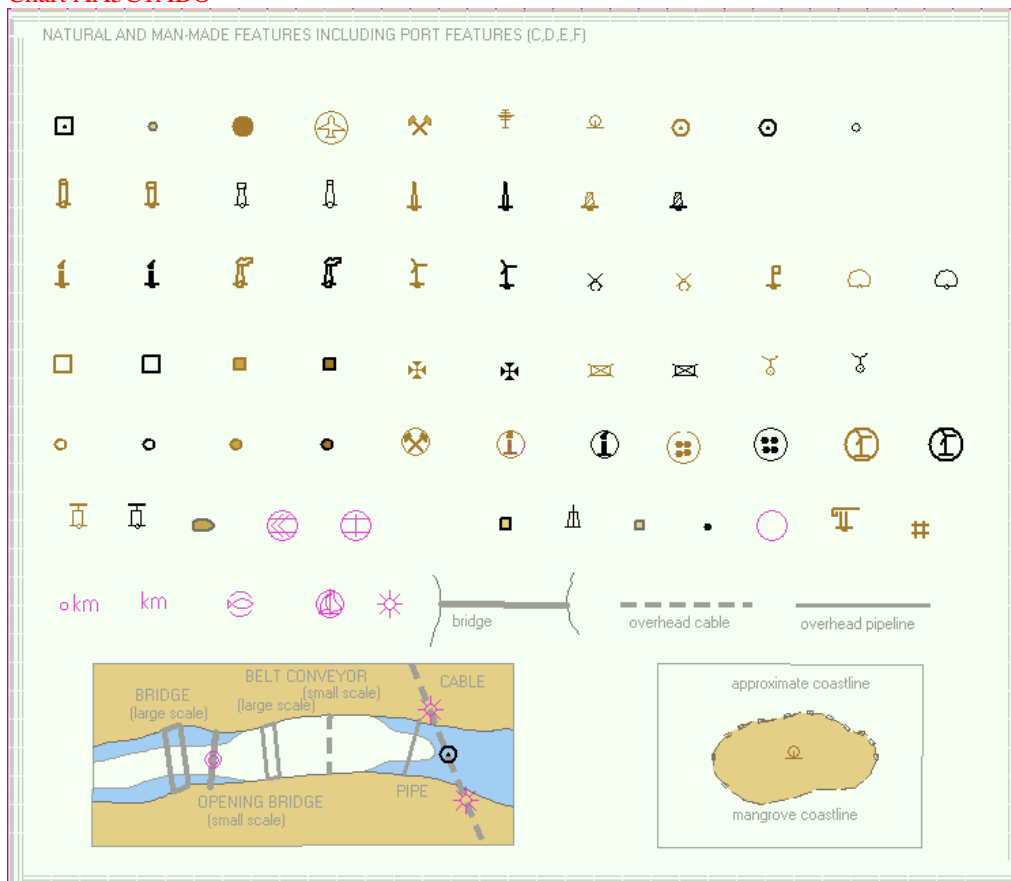


Chart AA5C1CDE



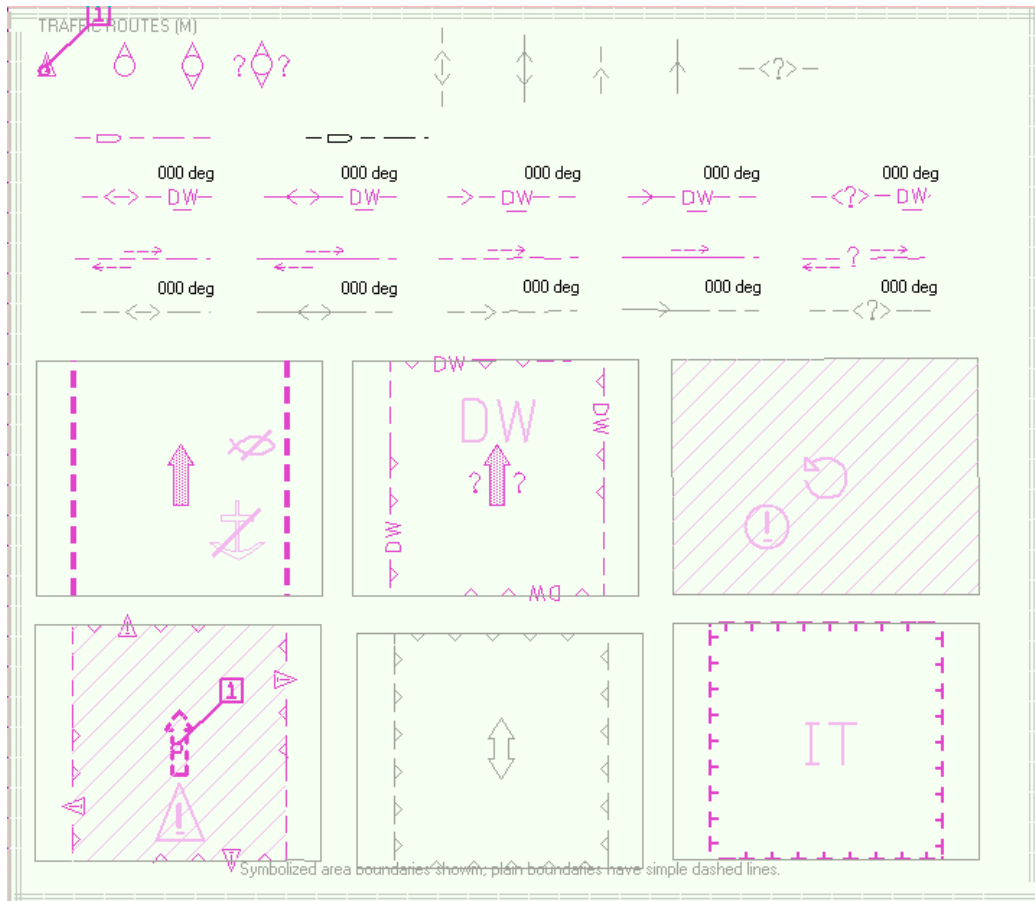


Chart AA5C1MOO

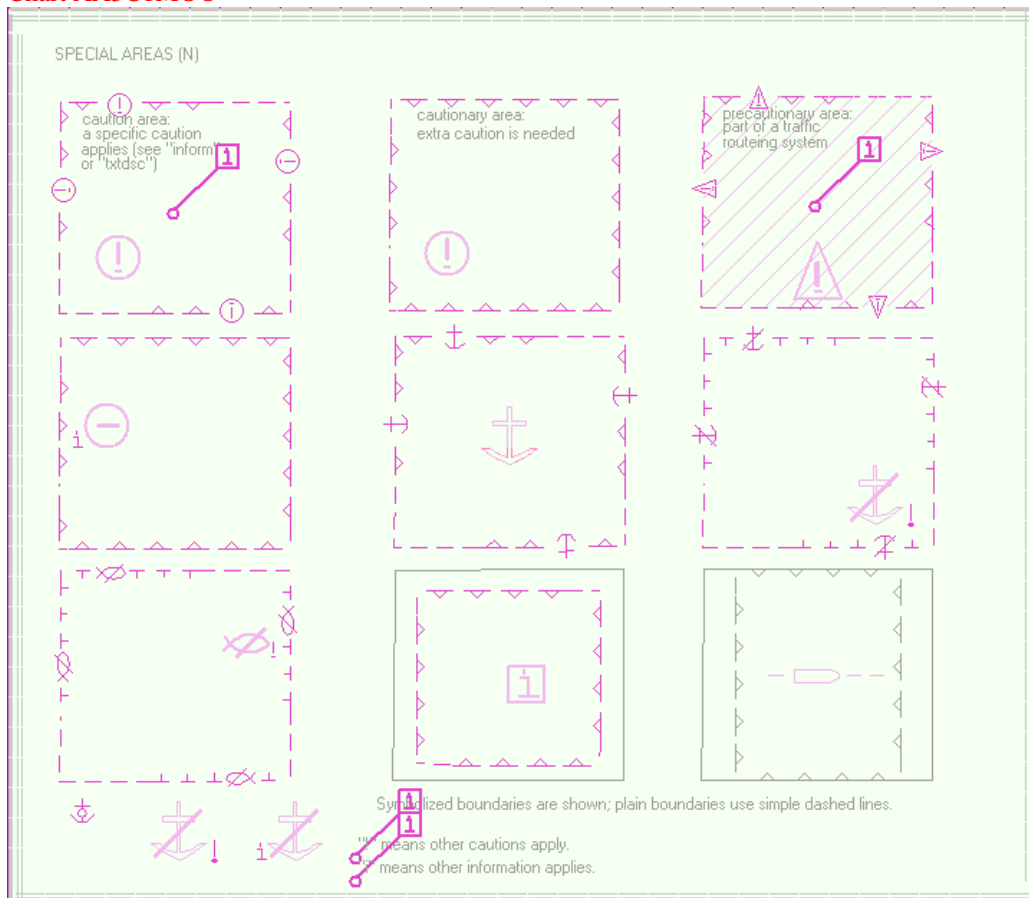


Chart AA5C1NOO

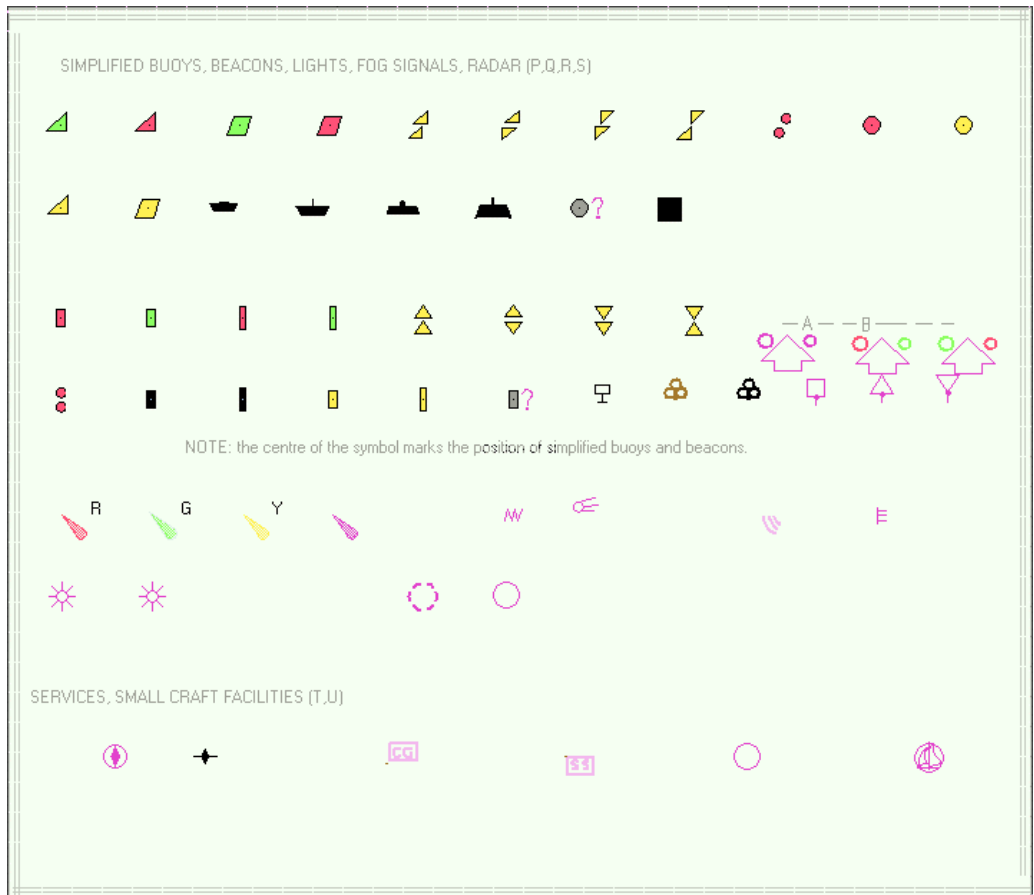


Chart AA5C1PQR

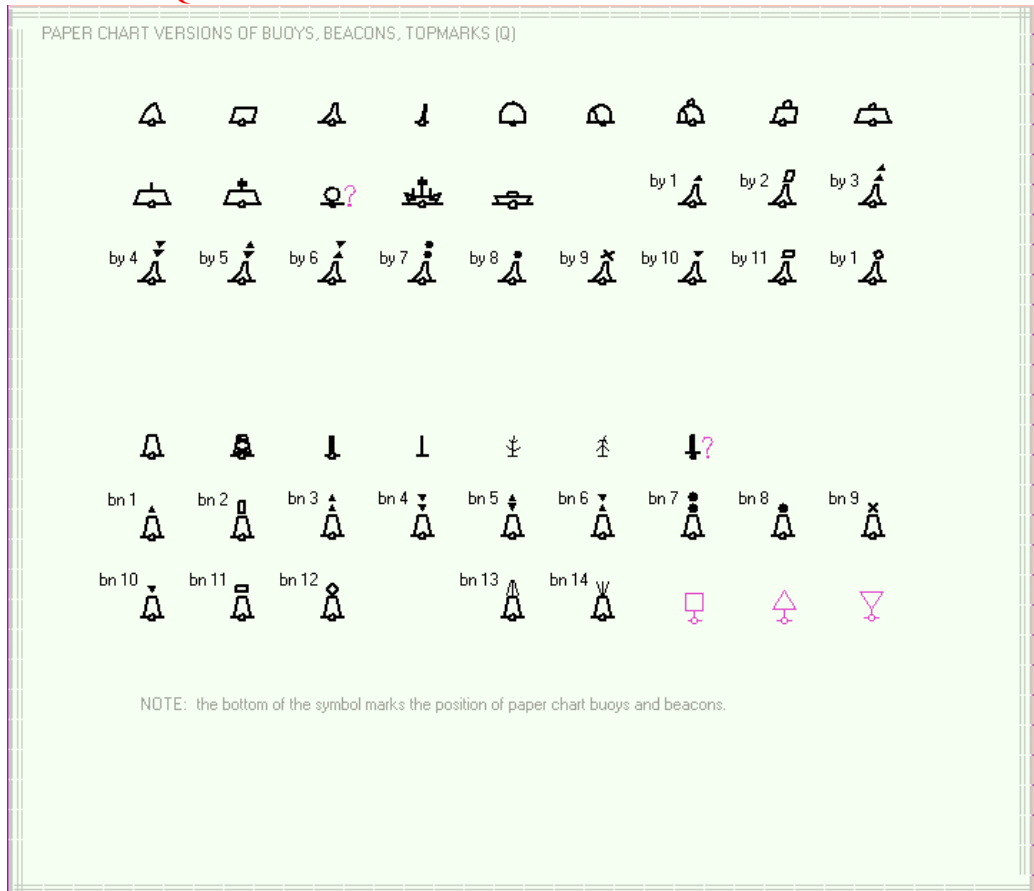


Chart AA5C1QOO

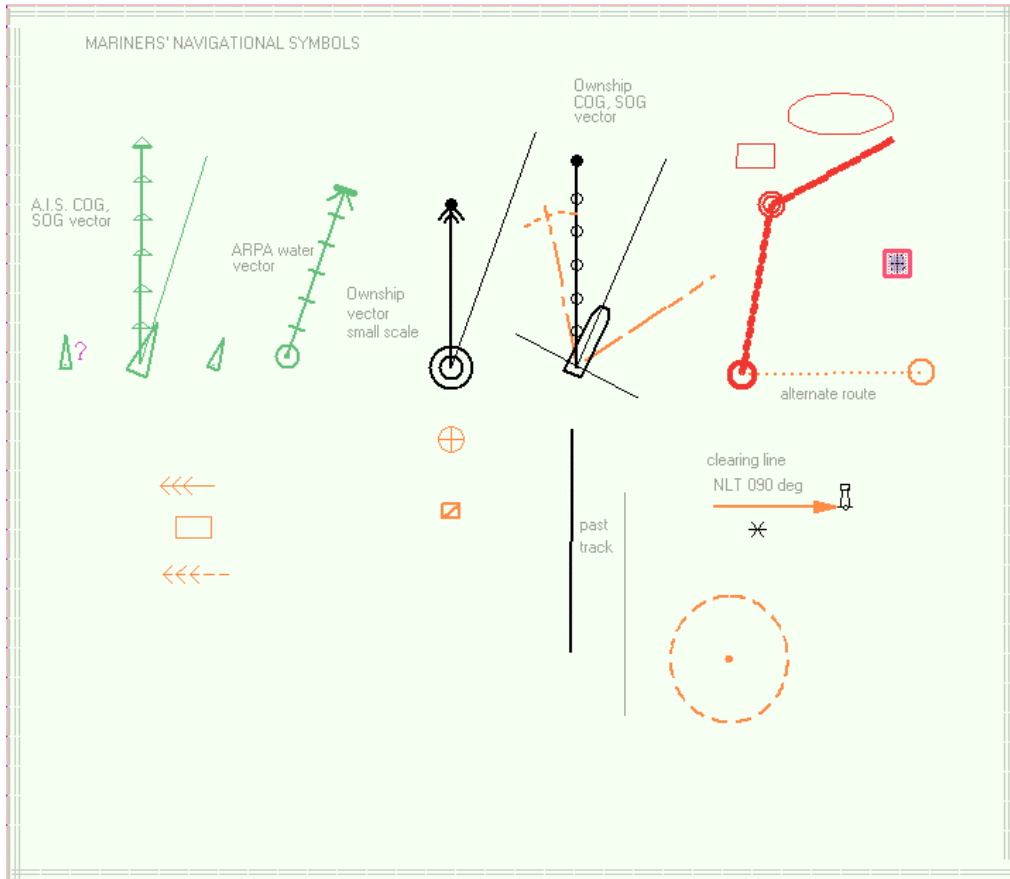


Chart AA5C1V00

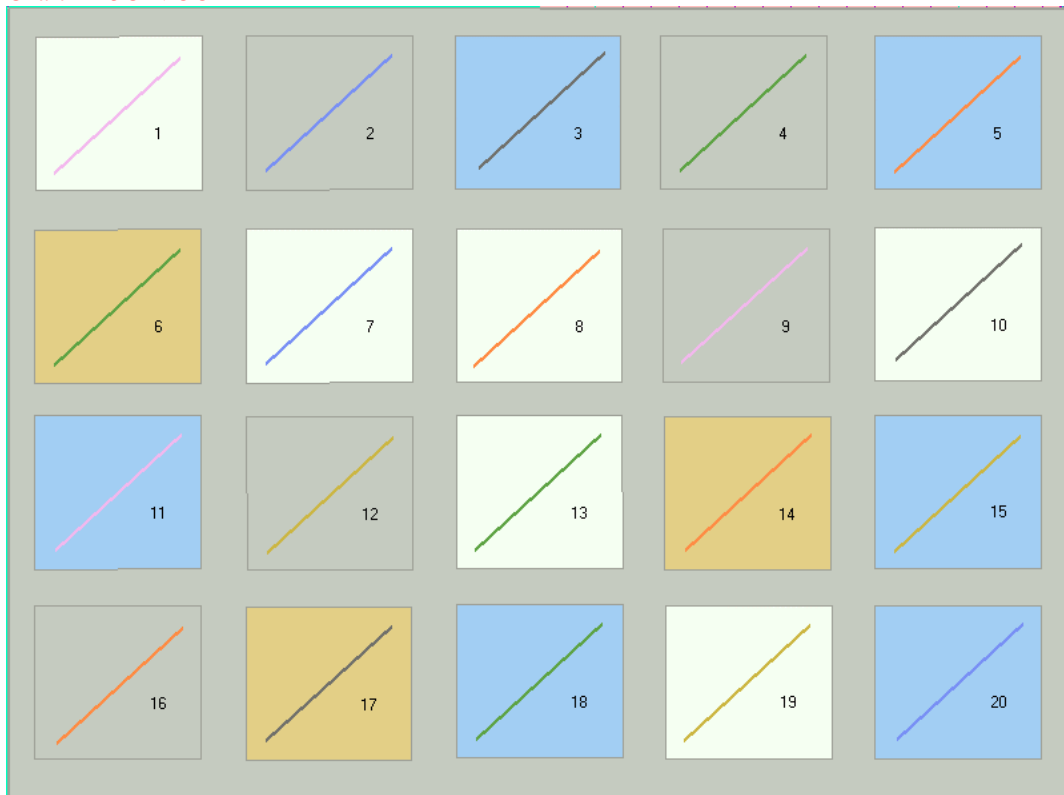


Chart AA5C1W00



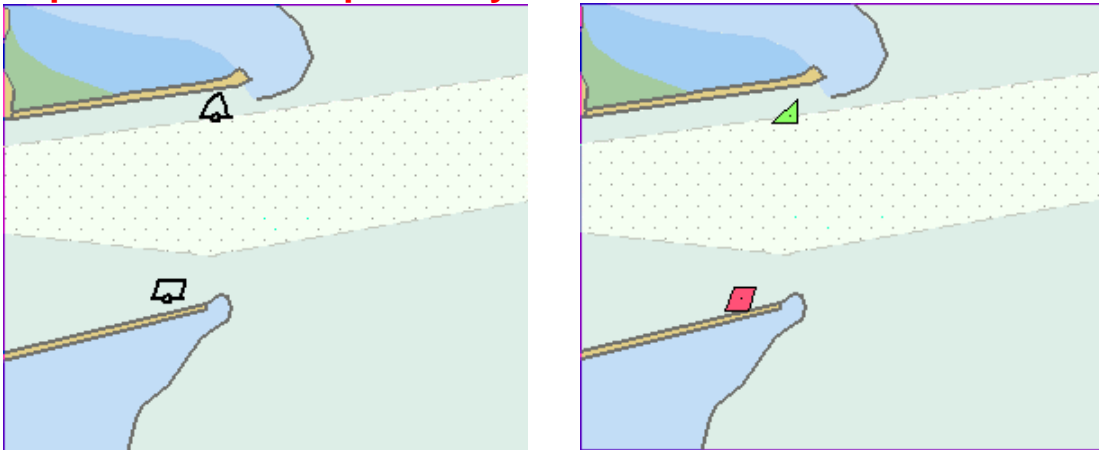
# Appendix 2

---

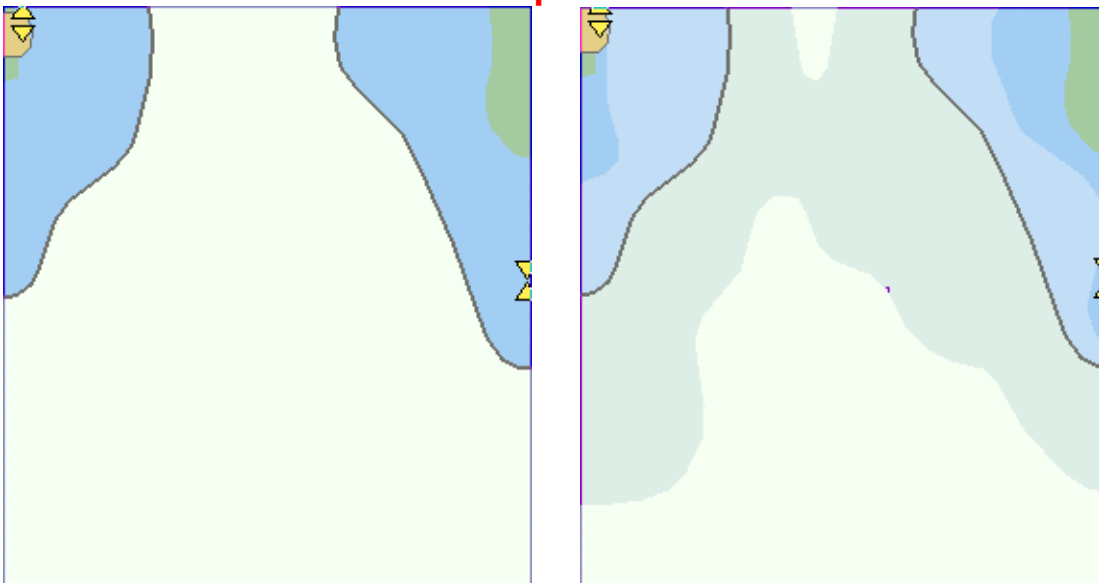
## Short introduction to interpret display of S57 charts

Following examples gives you a short introduction to features of S57 charts which may not be obvious without some basic knowledge.

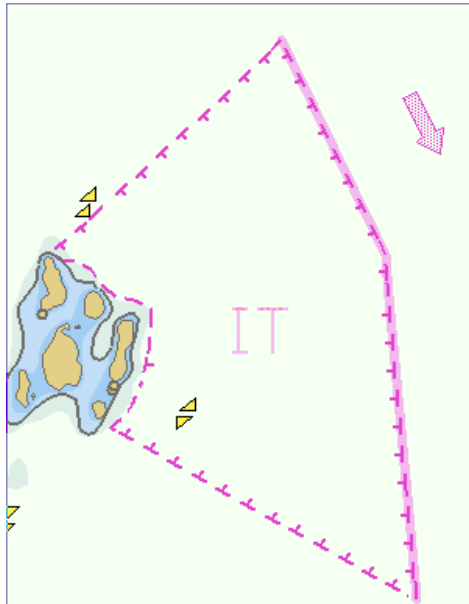
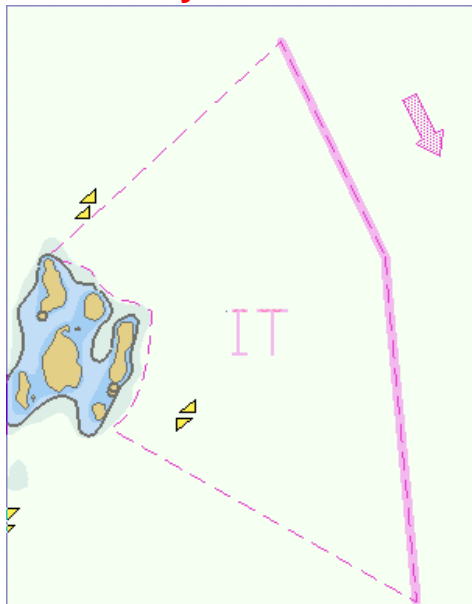
### Paper Chart or Simplified Symbols



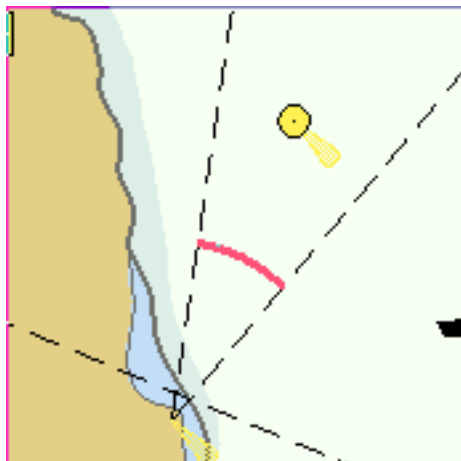
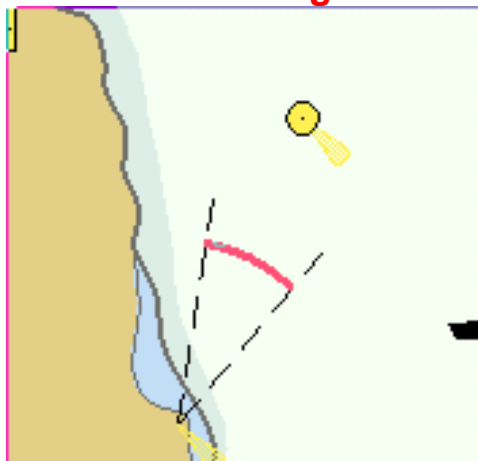
### Two colour or Multi colour Depth



## Plain or Symbolised Boundaries

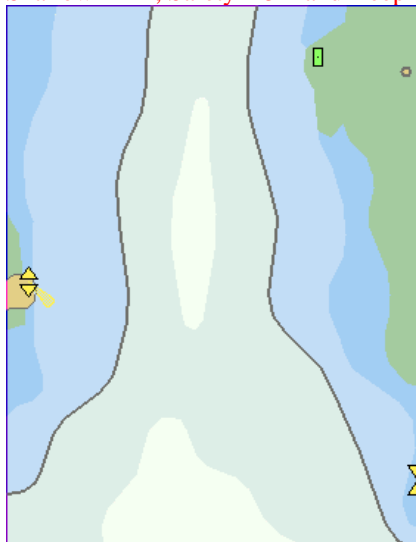


## Limited or Full Light sectors

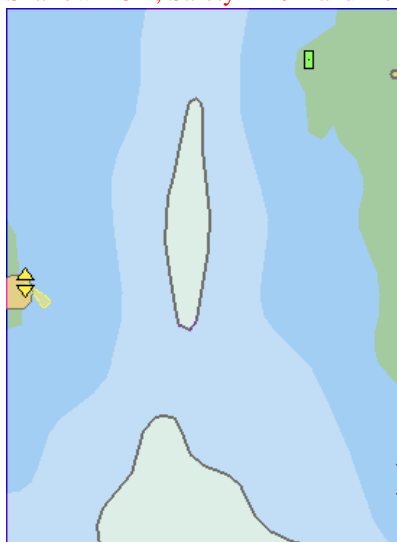


## Shallow, Safety and Deep Contours

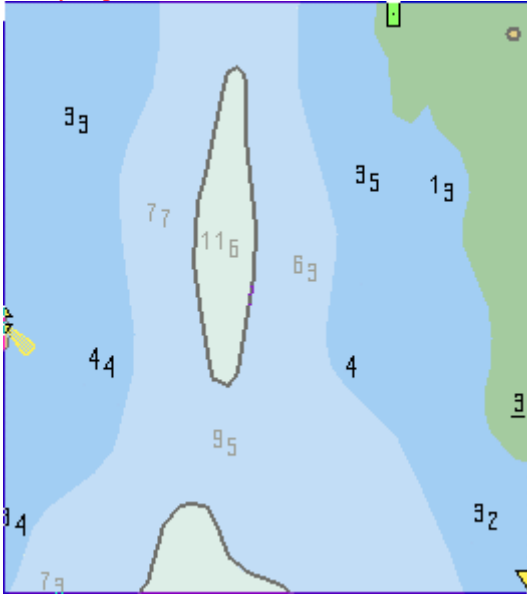
Shallow = 2m, Safety = 5m and Deep = 10m.



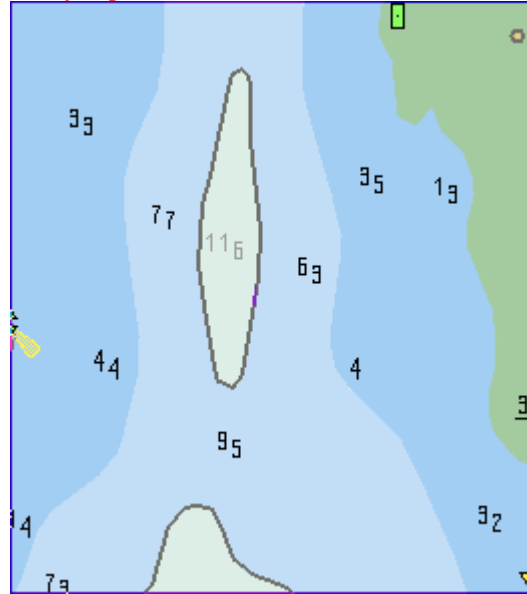
Shallow = 5m, Safety = 10m and Deep = 20m.



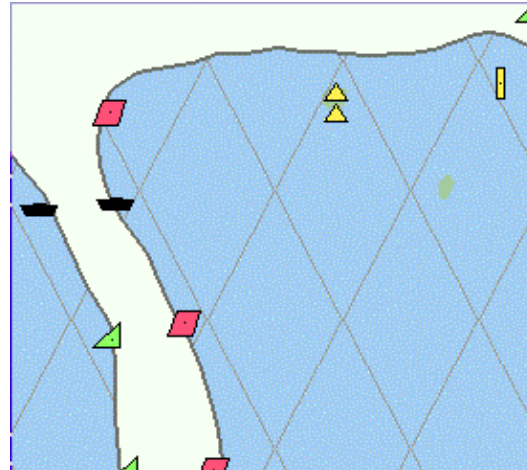
Safety depth = 6m.



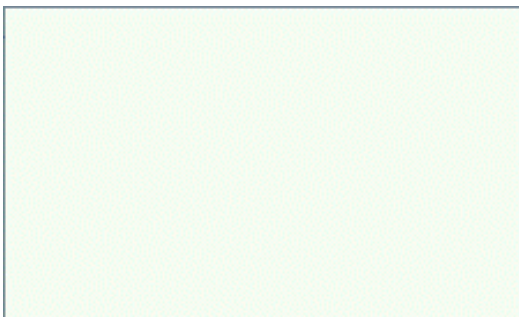
Safety depth = 10m.



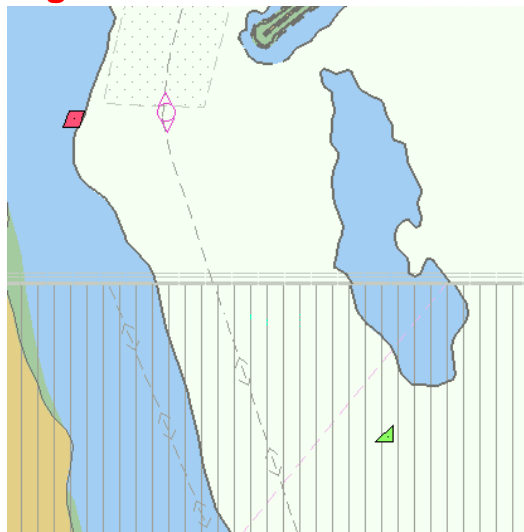
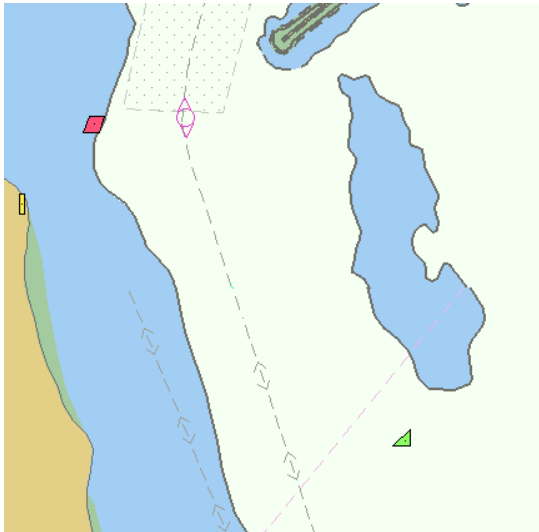
Shallow pattern



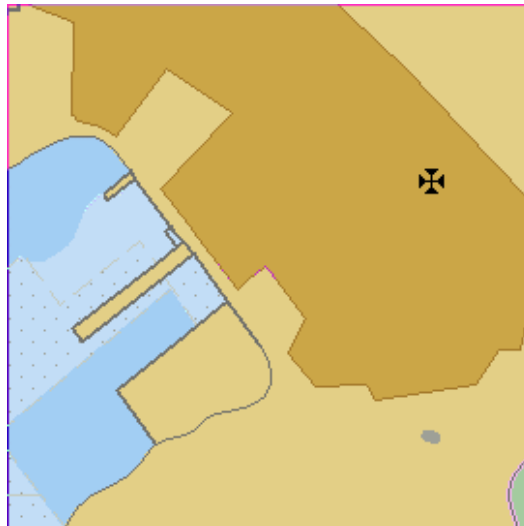
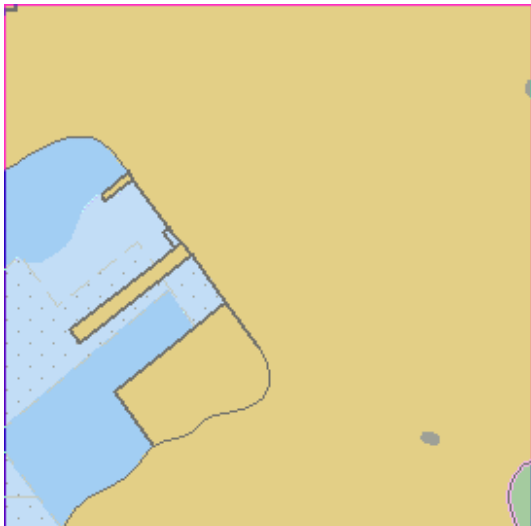
Sheet Standard: Unknown object or Presentation



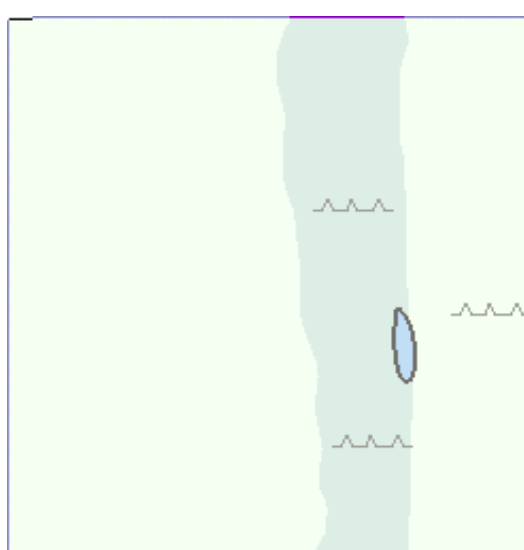
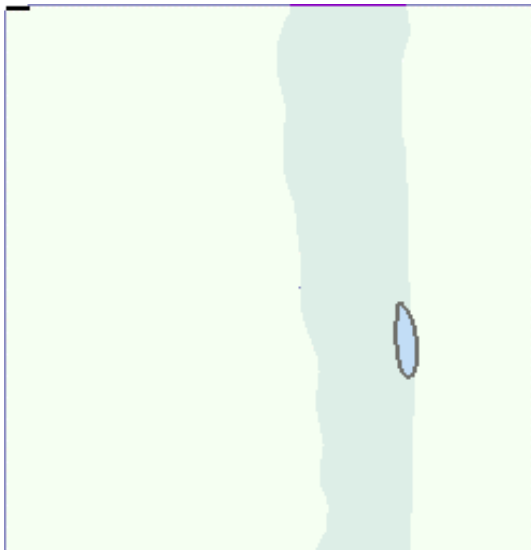
### Sheet Standard: Chart data coverage



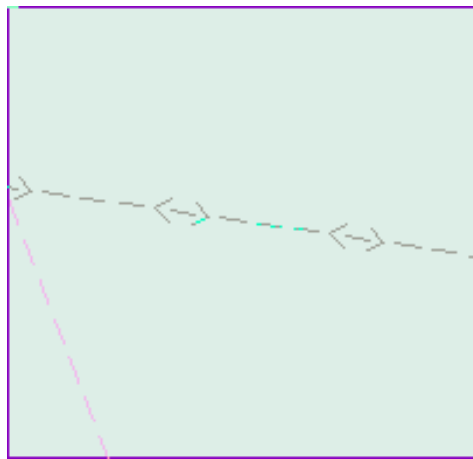
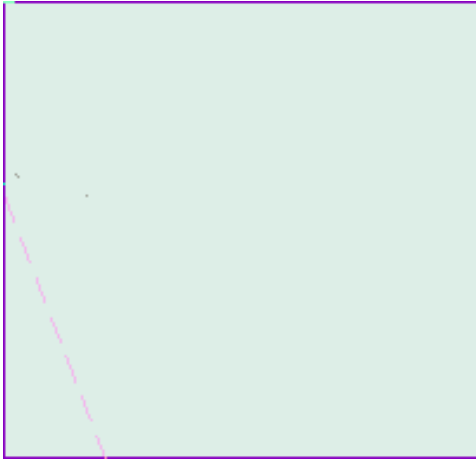
### Sheet Standard: Land features



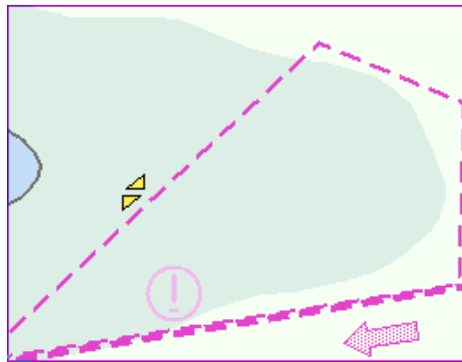
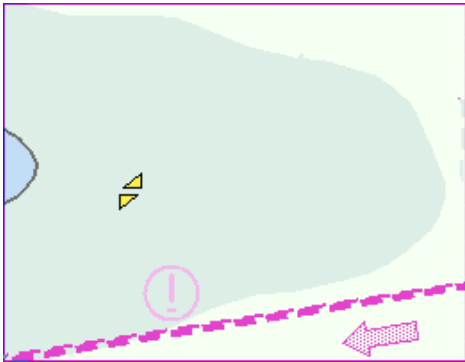
### Sheet Standard: Water and seabed features



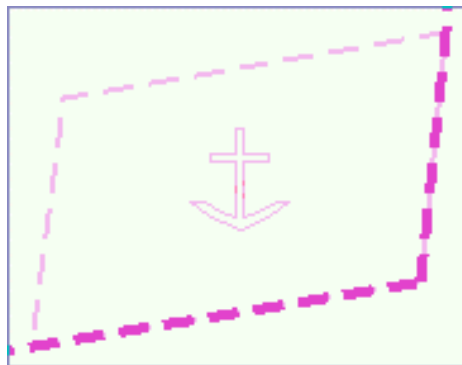
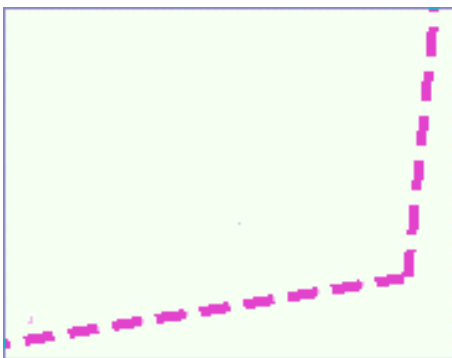
**Sheet Standard: Traffic routes**



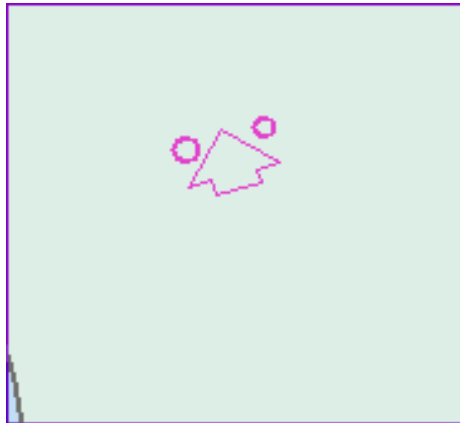
**Sheet Standard: Cautionary areas**



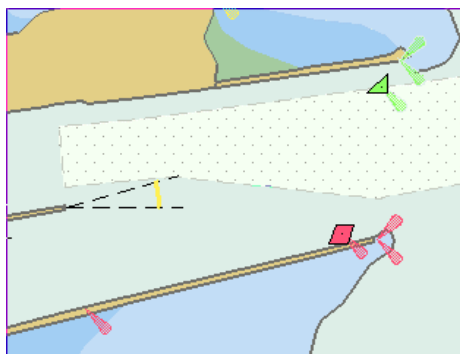
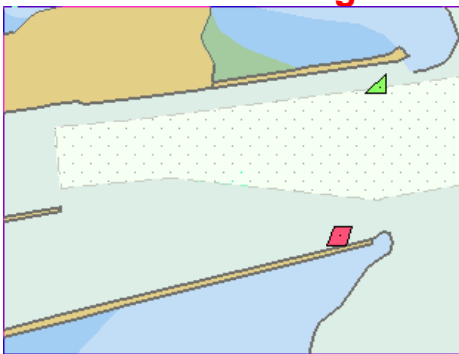
**Sheet Standard: Information areas**



### Sheet Standard: Buoys and beacons



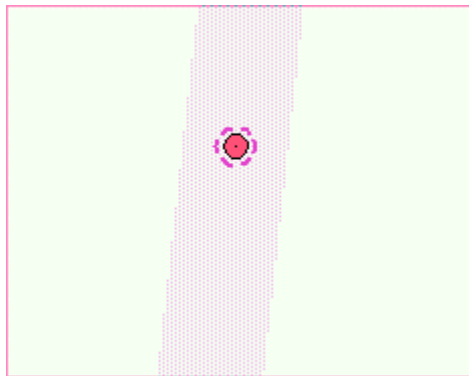
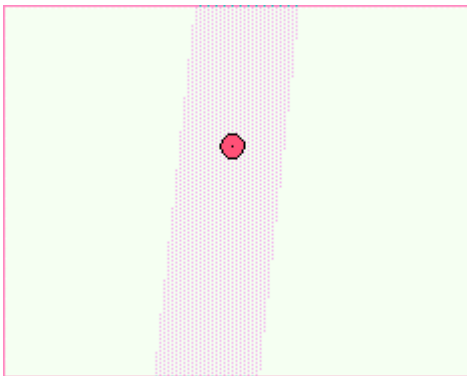
### Sheet Standard: Lights



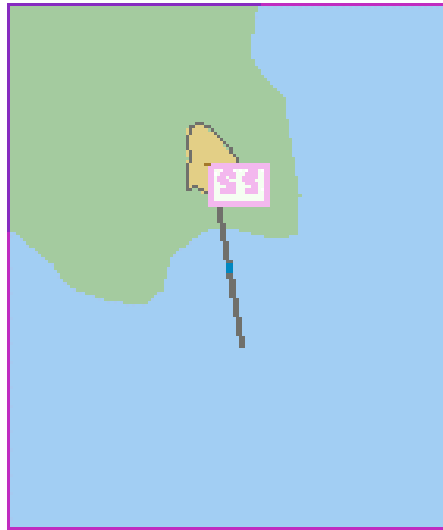
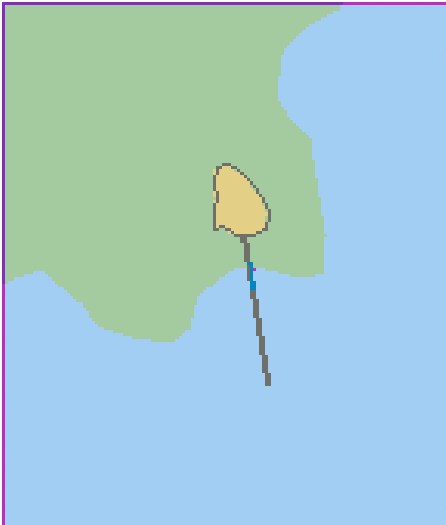
### Sheet Standard: Fog signals



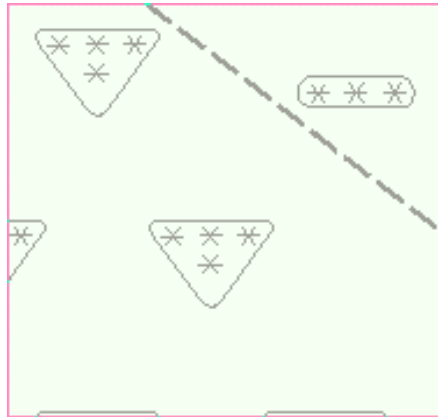
### Sheet Standard: Radars



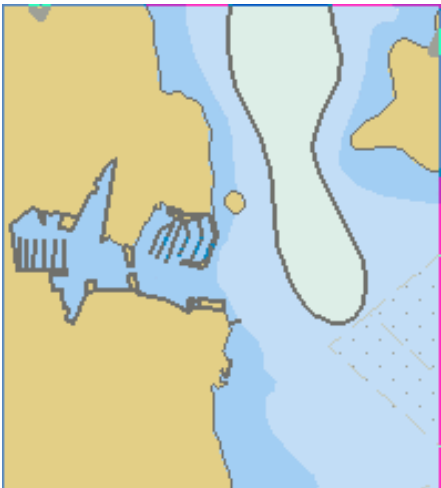
**Sheet Standard: Services**



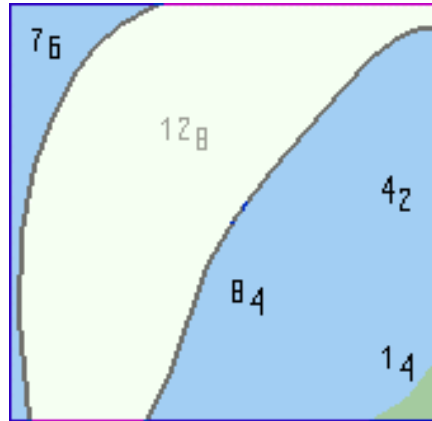
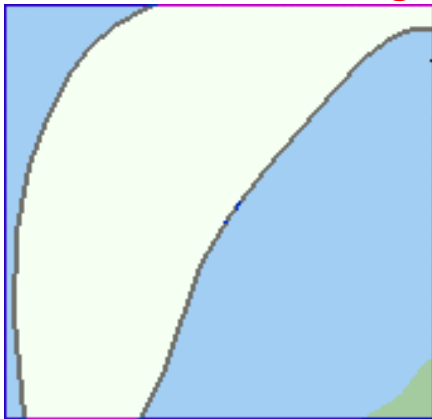
**Sheet Other: Information about chart data**



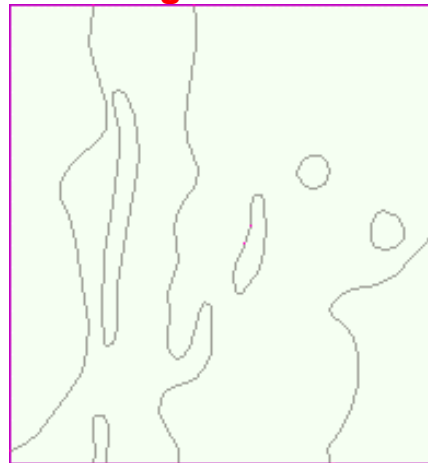
**Sheet Other: Land features**



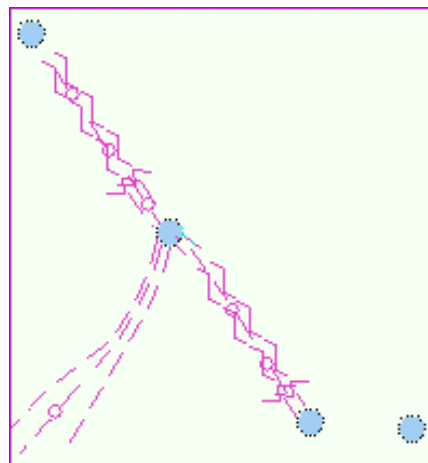
**Sheet Other: Soundings**



**Sheet Other: Depth contours, current magnetic**

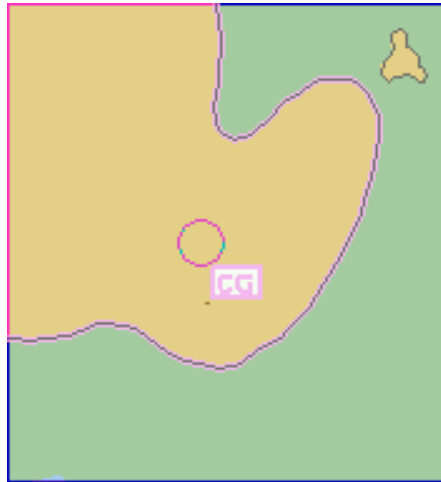
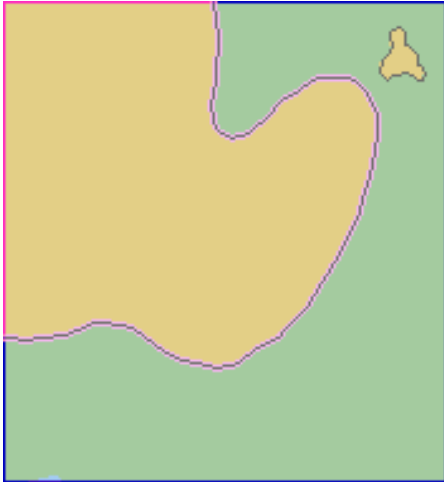


**Sheet Other: Seabed and Obstructions**

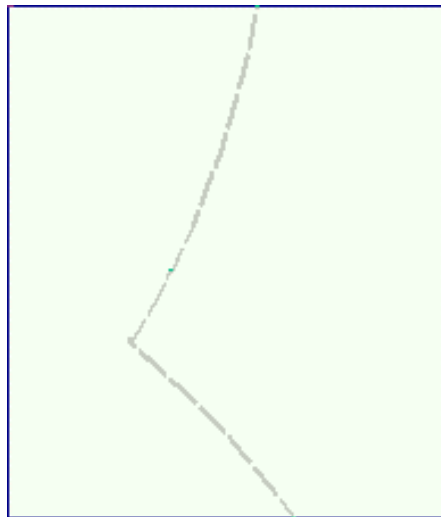
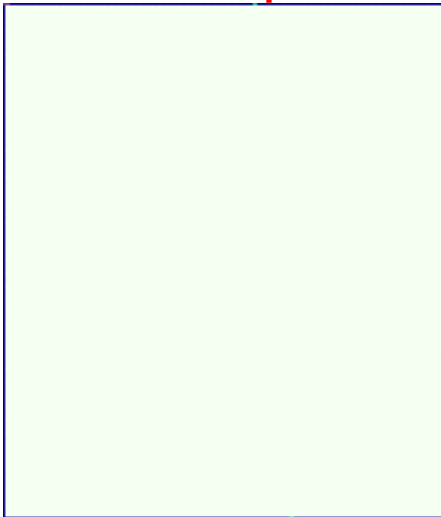




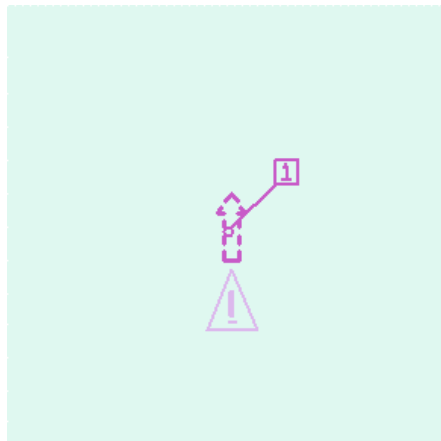
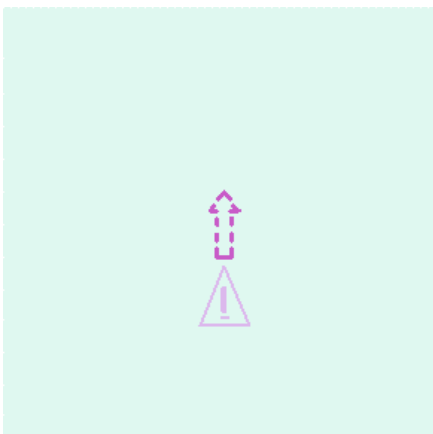
**Sheet Other: Services and small craft facilities**



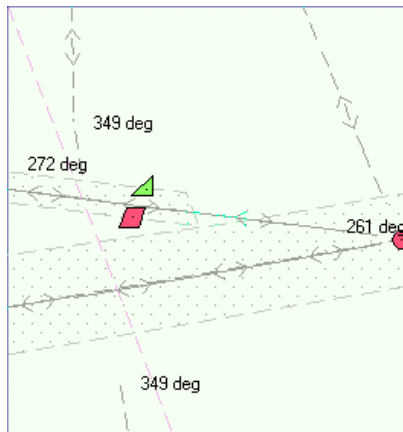
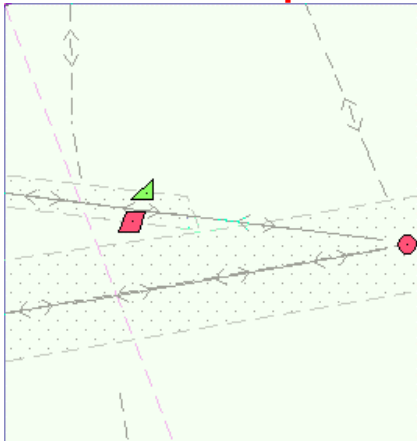
**Sheet Other: Special areas**



**Sheet Other: Additional information available**

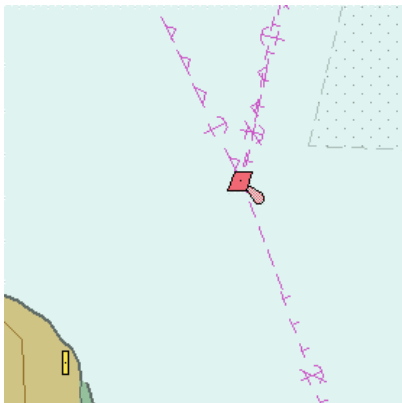


**Sheet Other: Important text**

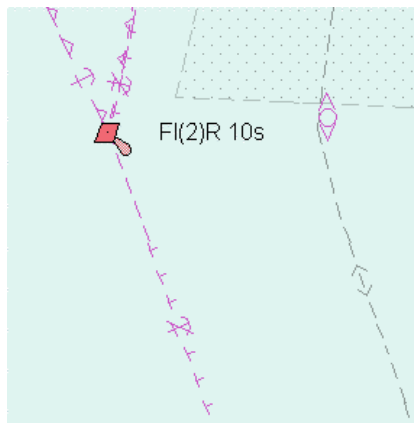
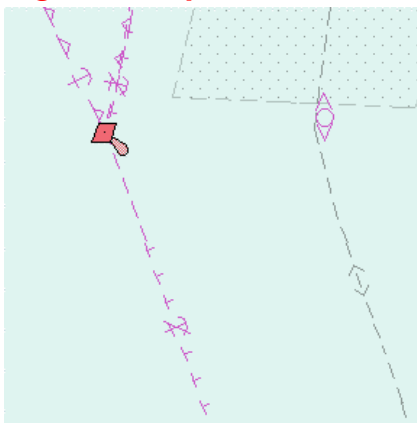


**Sheet Other: Other text**

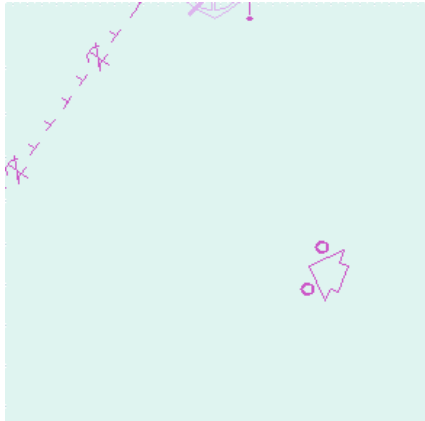
**Names for position reporting**



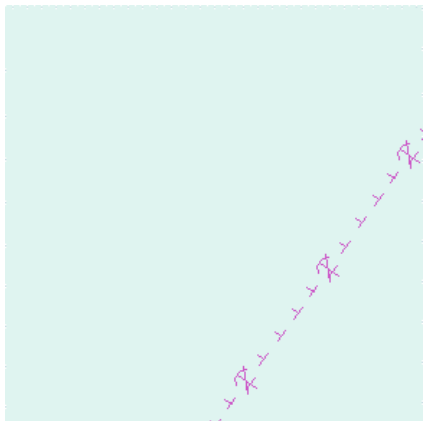
**Light descriptions**



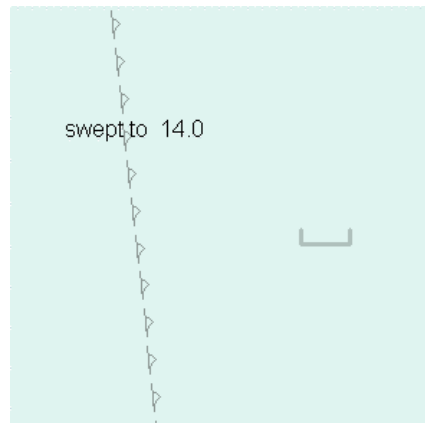
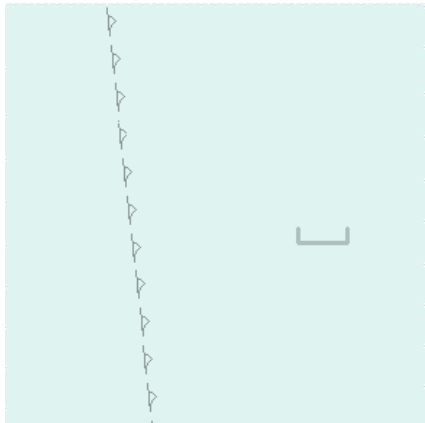
**Nature of Seabed**



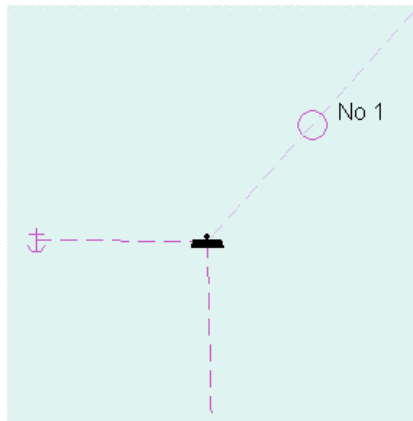
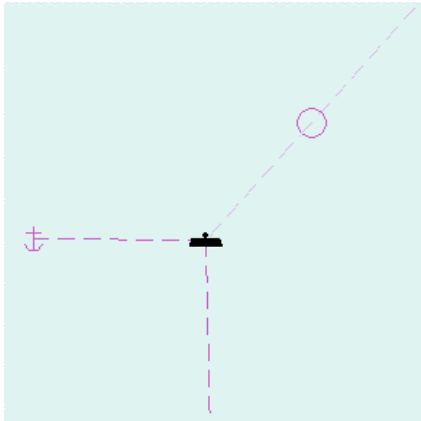
**Geographic names, etc.**



**Swept depths, Magnetics**



**Bert and Anchorage numbers**



# Appendix 3

---

## C-MAP Charts

### Introduction

This Electronic Chart System is also compatible with C-MAP private industry Vector Chart format CM-93 available from C-MAP Norway A/S. This material is used like Hydrographic Offices S57ed3 charts, but it doesn't have ENC status as defined by IMO, IHO and IEC and it cannot be used to replace paper charts.

CM-93 format is encrypted for preventing unauthorised use and then the user needs an Authorisation Code to view the CM-93. This Authorisation Code is entered manually from control panel.

Before any CM-93 charts can be used in the ECDIS, it is loaded into the hard disk and converted into the system's own internal format (SENC). CM-93 charts can be updated only by loading newer complete set of CM-93 charts. CM-93 chart material is stored into two CD-ROMs.

For any other detail of CM-93 charts use the Vector Chart Material Chapter of this manual.

### S57 Chart Legend with C-MAP charts

S57 chart legend	
Cell name	02700720
Navigational purpose	Overview
Issue date	19960104
Edition number	1
Last displayed update	000
Update issue date	19960104
Last update appl. date	
Projection	None
Horizontal datum	WGS 84
Vertical datum	
Sounding datum	
Quality of data	
Magnetic var.	

*An example of Chart Legend with C-MAP chart.*

---

## S57 chart managing with C-MAP charts

### Licence system used by the C-MAP

The licence system with C-MAP is based on serial numbered CD-ROMs and Authorisation Codes received from C-MAP Norway A/S. You select either required C-MAP Areas or Zones and your Electronic Chart System generates an User Code based on your selection, the serial number of the serial numbered C-MAP CD-ROM and the Hardware Identifier of your Electronic Chart System. You send the User Code to C-MAP Norway A/S and they send to you an Authorisation Code. You enter the received authorisation code into the system and then you can load and convert the CM-93 charts into your system.

### How to get started with C-MAP charts

1. Select automatic conversion into the SENC and setting of Display and Approve Update dates automatically. See "How to make conversion into SENC and set display date automatically with C-MAP charts" on page 453.
2. Define your subscription of C-MAP charts. See "How to define subscription of C-MAP charts" on page 439.
3. Load C-MAP charts by CD catalog. See "How to load C-MAP charts from a CD into the system" on page 444.

### How to keep up to date your C-MAP charts

At regular intervals C-MAP will reissue its charts to keep them up-to-date. There are neither edition number nor update number in C-MAP charts, so the system recognises changed charts using issue date of the chart.

The procedure of loading the reissue is the same as loading of the C-MAP charts first time. If loaded chart is already in the hard disk with older issue date, the system loads selected newer chart automatically. Other possible messages when loading C-MAP charts are explained in the end of the chapter "How to load C-MAP charts from a CD into the system" on page 444.

If you get a new release of a C-MAP CD-ROM, proceed as follow:

1. Select automatic conversion into the SENC and setting of Display and Approve Update dates automatically. See "How to make conversion into SENC and set display date automatically with C-MAP charts" on page 453.
2. Load C-MAP charts by CD catalog. See "How to load C-MAP charts from a CD into the system" on page 444.

## How to define subscription of C-MAP charts

Before you can be as authorized user of C-MAP charts you have to following things:

1. Purchase CD-ROM(s) of C-MAP from your Chart Agent.
2. Load Serial Number of C-MAP into the ECDIS
3. Select charts you like to use in the ECDIS by using Zones or Areas.
4. Generate User Code. This code is used to identify your chart folio for producer of C-MAP.
5. Send User Code to your Chart Agent.

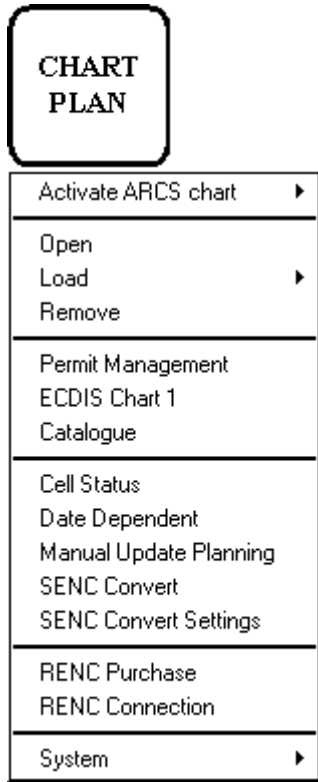
Based on User Code information producer of C-MAP charts is able to generate permission for the charts your have selected. You will receive Authorization code from the producer of C-MAP charts.

After receiving Authorization Code, proceed as follows:

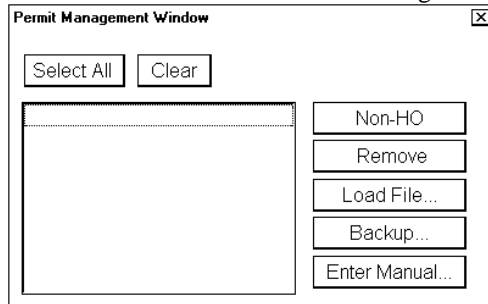
1. Enter Authorization Code into the ECDIS.
2. Use command **Load by CD-Catalogue** until you have to select which chart to load.
3. Build a group of required C-MAP charts.
4. Load C-MAP charts using command **View loaded CD-Catalog**.

## How to load Serial Number of CD-ROM

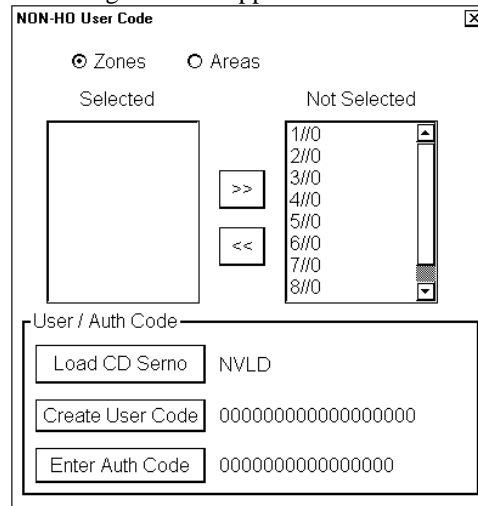
Each CD-ROM has individual Serial Number which is used to identify user of C-MAP charts. In order to load Serial Number into the ECDIS, proceed as follows:



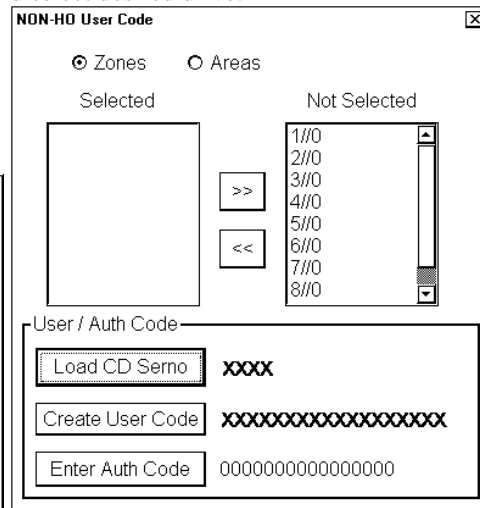
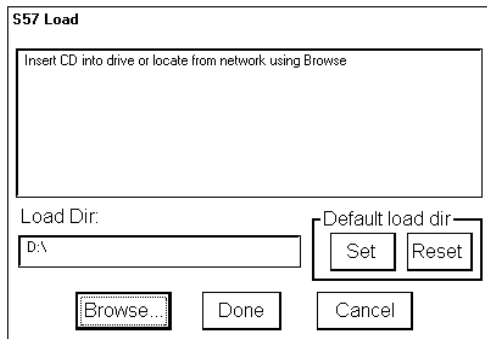
1. Press CHART PLAN push button
2. Select **Permit Management** from the menu.
3. Press Non-Ho button in Permits dialog box.



Following windows appear:



4. In NON-HO User Code dialog box, press **Load CD SerNo** button.
5. Insert your C-MAP CD-ROM to CD-drive and select desired drive.



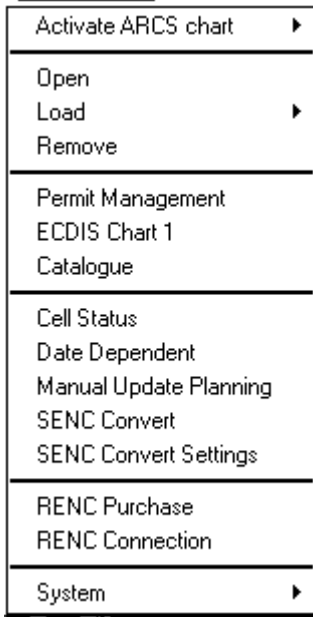
6. The CD serial Number is shown in SerNo field.



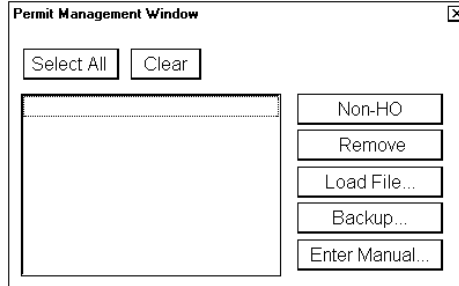
## How to define subscription by zones

The content of CD-ROM is divided into nine zones (1/0 - 9/0) and each zone has been divided in various number of Areas (1/1 - 1/16...9/1 - 9/2). A various number of charts are included into each Area. You can define charts you like to have in your chart folio either by Zones or by Areas.

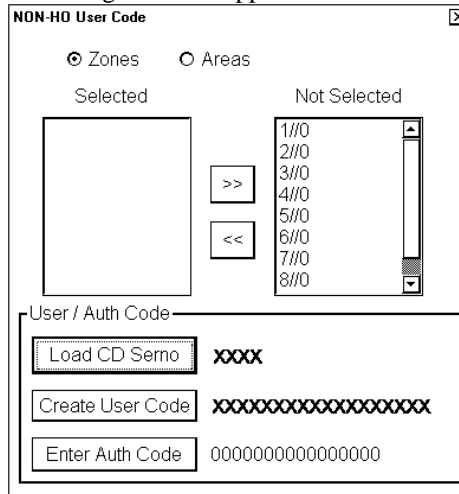
To define subscription by zones, proceed as follows:



1. Press CHART PLAN push button
2. Select **Permit Management** from the menu.
3. Press Non-Ho button in Permits dialog box.

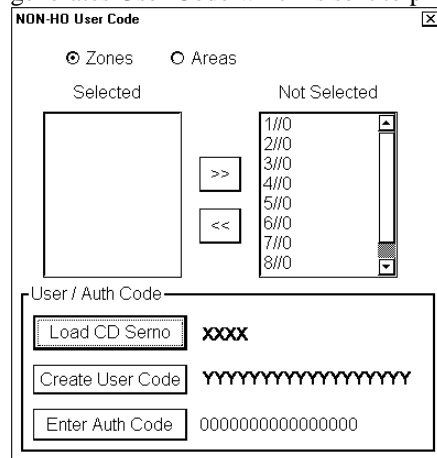


Following windows appear:



Select **Zones** tick box.

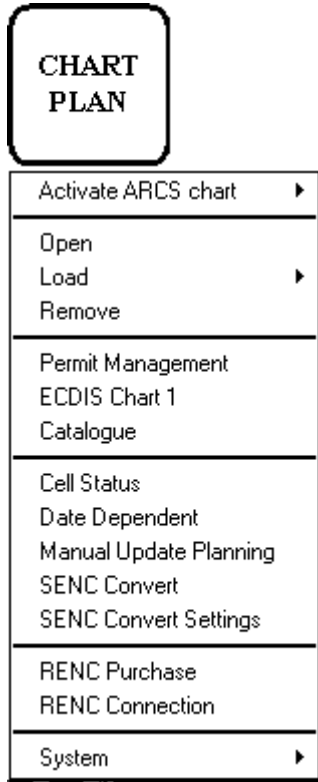
4. Highlight desired Zones in a **Not Selected** list box and press << button to move them into a **Selected** list box.
5. To create User Code for selected Zones, press **Create User Code** button. The ECDIS generates User Code which is sent to producer of C-MAP charts.



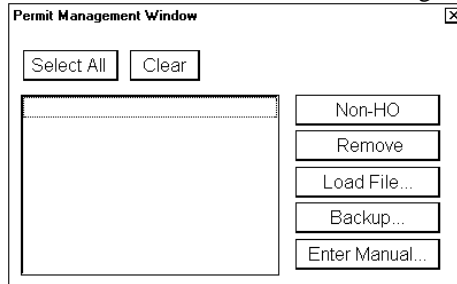
## How to define subscription by areas

The content of CD-ROM is divided into nine zones (1/0 - 9/0) and each zones has divided various number of Areas (1/1 - 1/16 ... 9/1 - 9/2). The various number of charts are included to Area. You can define chart you like to have in your chart folio either by Zones or by Areas.

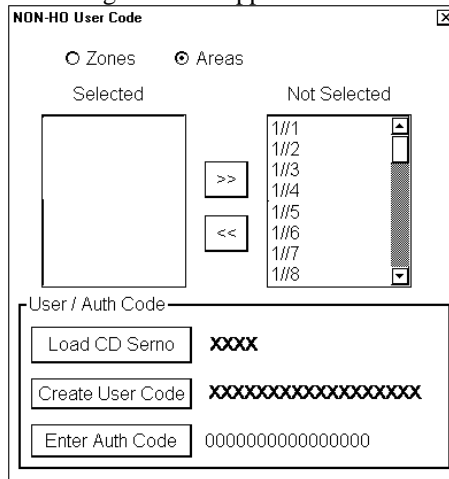
To define subscription by zones, proceed as follows:



1. Press CHART PLAN push button
2. Select **Permit Management** from the menu.
3. Press Non-Ho button in Permits dialog box.

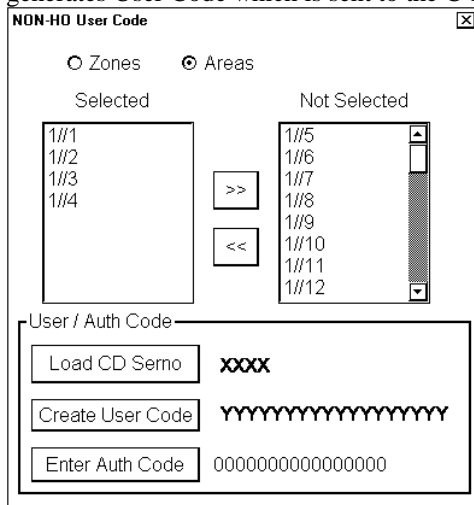


Following windows appear:



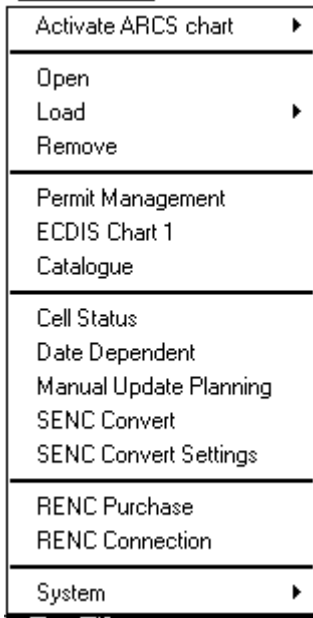
Select **Areas** tick box.

4. Highlight desired Areas in a **Not Selected** list box and press << button to move them into a **Selected** list box.
5. To create User Code for selected Areas, press **Create User Code** button. The ECDIS generates User Code which is sent to the C-MAP.

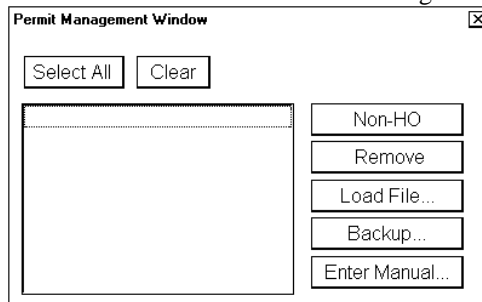


## How to enter Authorisation Code

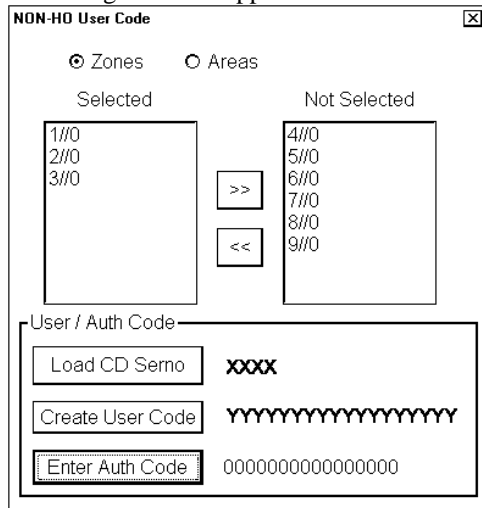
An Authorisation Code allows you to define your subscription to C-MAP. Based on your User Code you receive Authorisation Code from the C-MAP. You have to enter this string into the ECDIS. In order to do it, proceed as follows:



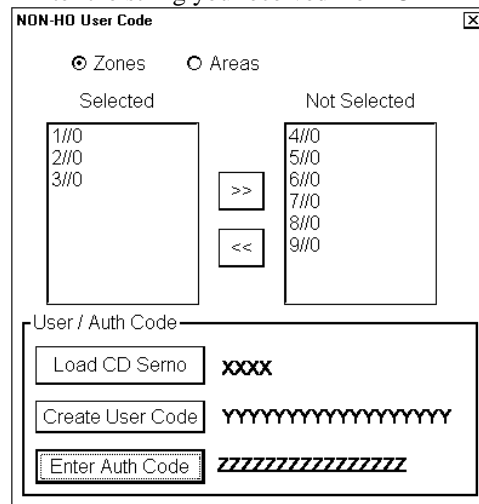
1. Press CHART PLAN push button
2. Select **Permit Management** from the menu.
3. Press Non-Ho button in Permits dialog box.



Following windows appear:



4. Press **Enter Auth Code** button.
5. Enter the string you received from C-MAP.



6. After entering Authorisation Code you are ready to load and view desired charts into the ECDIS.

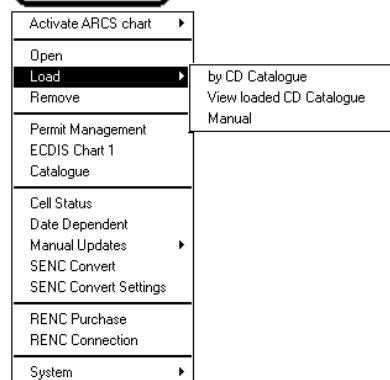
## How to load C-MAP charts from a CD into the system

When you load C-MAP charts by CD Catalogue, the system first load a CD catalog, which stores certain information into the hard disk such as cells ID, their position, edition number, from your LAN (Local Area Network) connection, floppy or CD-ROM. After that the system asks which charts will be loaded from the CD-ROM.

After building the CD catalogue you can view the contents of it using S57 catalogue command.

### Note:

All CD-ROMs, floppies or LAN (Local Area Network) connections from one National Hydrographic Office have equal names although their contents could be totally different. You must give them unique names to identify them separately and correctly later.



1. Press CHART PLAN push button
2. Insert desired CD-ROM to CD-ROM drive.
3. Select **Load** from the menu and **by CD Catalogue** from the sub menu. A S57 build CD catalogue dialog box appears. If you have incorrect Directory, press **Browse** to change directory else press **Load** in this dialog box.

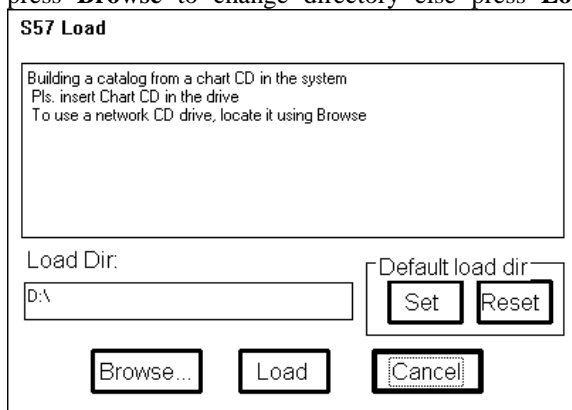
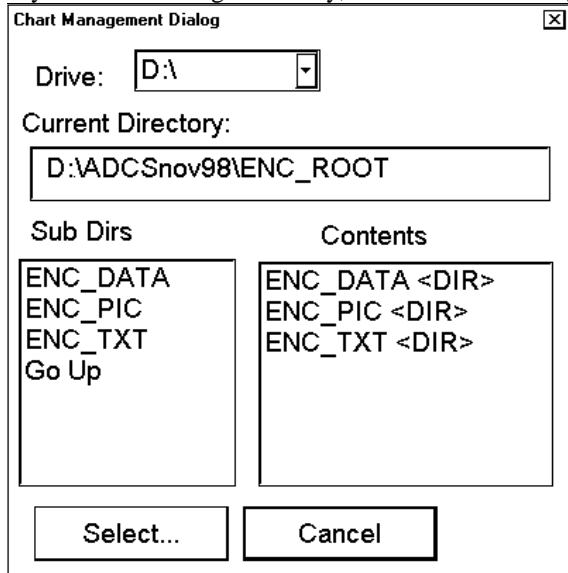


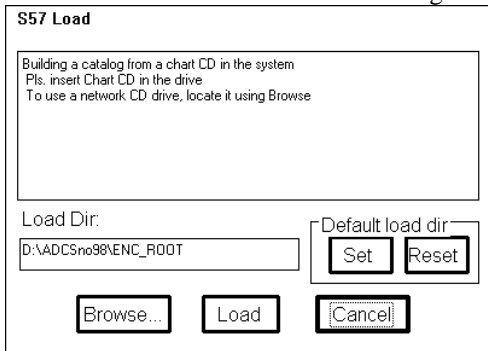
CHART PLAN push button

4. If you have to change directory, select it in this dialog box

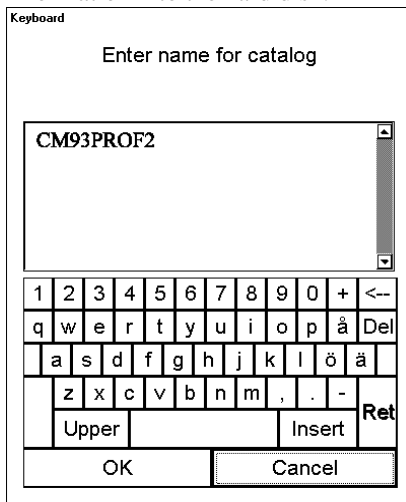


and press **Select**.

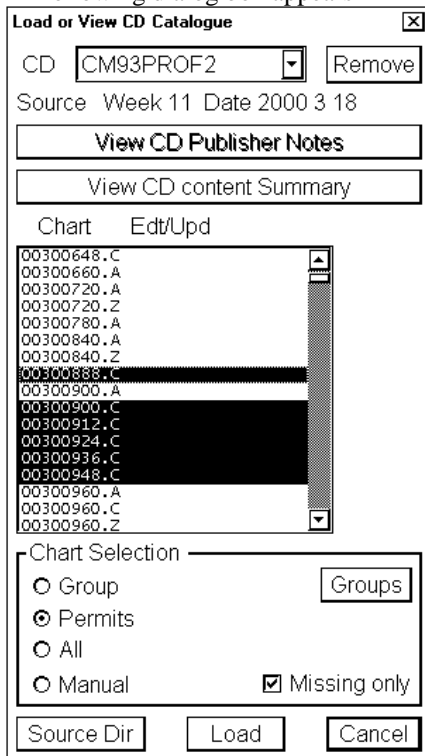
5. Press **Load** button in a S57 Load dialog box.



6. A keyboard dialog box appears. Enter name for CD Catalog and press **OK**. The system will load catalogue information into the hard disk.



7. A following dialog box appears



Select a named "CD" you want to use from CD -field. A list of charts appears into a list box. In a **Chart Selection** you can choose which charts are loaded from the CD-ROM. Use "Missing only" to select charts not already loaded into the ECDIS.

8. Press **Load** button to load charts.

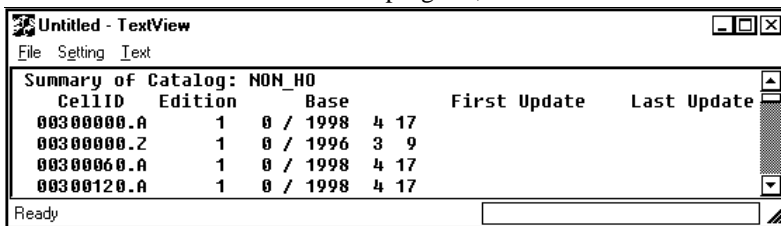
**NOTE!** If you want to make chart selection by group, press **Group** button and select desired group. If the selected group and charts available from CD have common members, they are highlighted in the list box.

If you want to load your charts from another drive than your computer CD-ROM drive (for example from Local Area Network, LAN), press **Source Dir** button. Then you can define drive and path from where you load your charts.

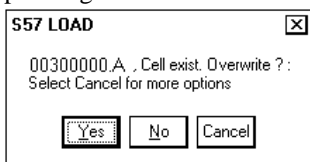
The System can make conversion into the SENC and setting of Display Until date automatically. It takes some time to convert charts into SENC.

**NOTE!** You can get Summary information about charts you are going to load.

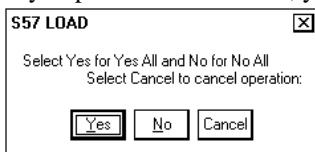
1. Press **View CD content Summary** button in the S57 Load dialog box.
2. A text processing program shows text information about selected named "CD Catalog" . For C-Map chart you can view issue date. For C-MAP charts the edition is always 1.
3. If you want to make a hard copy of Catalogue Summary, select **Print** in the **File** menu.
4. To close this program, select in **Exit** in the **File** menu.



If you already have charts with the same issued date loaded into your hard disk, you get following message after pressing **Load** button:



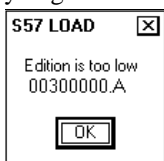
If you press **Cancel** button, you will get following dialog box:



If you want to avoid very time consuming reload of C-MAP charts, you should select No (= "No for all" option in above window).

However if you want to reload C-MAP charts, then select Yes in above window.

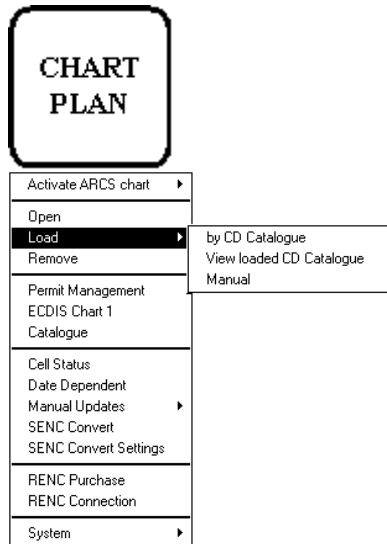
If you try to load C-MAP charts, which have older issue date than you already have loaded into your hard disk, then you get following message:



You can not replace a newer C-MAP chart with older C-MAP chart unless you first remove the newer C-MAP chart from your hard disk (See chapter "How to remove S57 chart cells from the system").

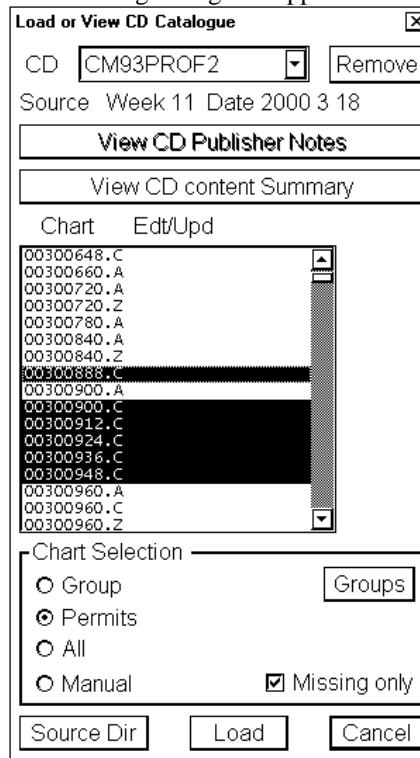
## Use of CD Catalogue

For C-MAP charts the CD Catalogue contains Summary of the charts (note that CD Publisher Notes are not available for C-MAP). Sometimes it is necessary to reload charts from the CD-ROM. These things can be done as shown below.



*CHART PLAN push button*

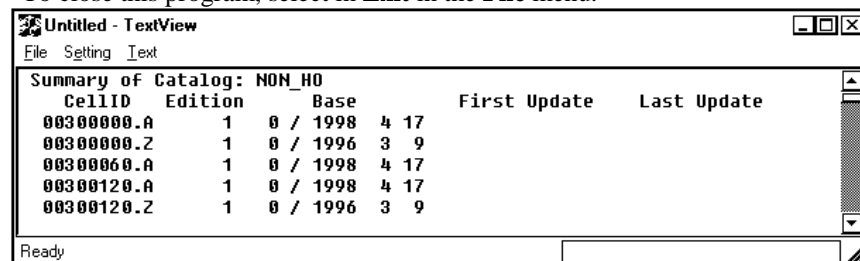
1. Press CHART PLAN push button, select **Load** from the menu and **View loaded CD Catalog...** from submenu.
2. A following dialog box appears



Select a named "CD" you want to use from CD -field. A list of charts appears into a list box.. If you want to load charts make selection here.

**NOTE!** You can get Summary information about charts you are going to load.

1. Press **View CD content Summary** button in the S57 Load dialog box.
2. A text processing program shows text information about selected named "CD Catalog" . You can get Edition number, issue date of base cells and updates in this window.
3. If you want to make a hard copy of Catalog Summary, select **Print** in the **File** menu.
4. To close this program, select in **Exit** in the **File** menu.



## Catalogue of S57 cells with C-MAP charts

A S57 catalogue is used to view your cells stored into the hard disk or named "CD catalogues". You view limits of cells in S57 Catalog window. It is possible to pick any cell by going over its limit using the cursor and then see the information (cell ID, update's number) of it.

Mon.Route	Plan Route	Pilot Data	Depth metres	Height metres	NORTH UP	TRUE MOTION
UserChart vuosaari	Ref Target	ARPA 1 Radar	Non ENC Data	Ship off screen		

Catalogue

51°46.629S Gyro (man) 185.0°	
058°48.159E CMG (man) 185.0°	
WGS 84	SMG 8.0 Kt
DEADREC	
Plan Speed Kt	Next WP
Plan CTS °	Dist WOP nm
Route °	ETA
Ch limit m	Next CTS °
Off track m	Turn rad nm
	Turn rate °/min

Catalogue

View filters

<input checked="" type="checkbox"/> Name	<input type="checkbox"/> Overview
<input type="checkbox"/> Permit	<input type="checkbox"/> General
<input type="checkbox"/> Group Charts	<input checked="" type="checkbox"/> Coastal
<input checked="" type="checkbox"/> Catalogue Charts	<input checked="" type="checkbox"/> Approach
<input type="radio"/> RENC	<input type="radio"/> HD
<input checked="" type="radio"/> CD	<input type="checkbox"/> Harbour
	<input type="checkbox"/> Berthing

Selected chart

Cell ID:

Permit  SENC

RENC Telecomm Cell Status Open

Group

Edit

Add Frame Remove Frame Done Cancel

Previous

Cursor

From Own Ship: 6919.6 nm 346.0°

60°08.254N 025°00.493E

23.03.2000 09:54 UTC 23.03.2000 11:54 FLE Standard 1:13 500 02.01 02.01

### View Filters -field

These fields are used to select displayed cells in S57 Catalog window. This is useful if the number of the cell has increased so much that you can not see the individual cells properly. Use filters to avoid confusion. Categories useful with C-MAP charts are follow:

- Name, if selected you see also cell names. Normally don't select with C-MAP charts.
- Permit, displays only cells for which you have permits
- Group Charts, displays only cells which are members of the active group.
- Catalog Charts, you have three option to select:
  - use CD, to view cells from a named "CD" (typically with name "NON-HO") which you have read from C-MAP CD-ROM.
- Navigation purpose, display only cells from selected navigation purposes. Categories are follow:
  - Overview
  - General
  - Coastal
  - Approach
  - Harbour
  - Berthing



**Selected Chart** -field

This field show information about selected cell.

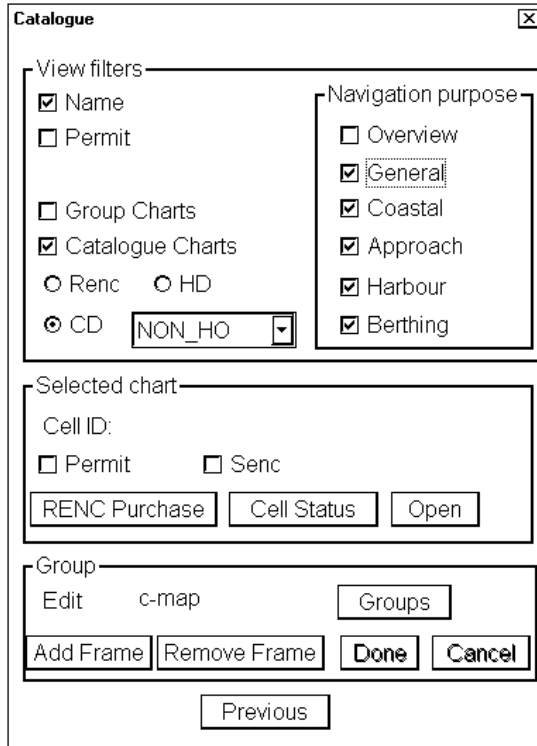
- Cell ID, Cell name
- Permit, existence of a permit
- SENC, existence of SENC in your hard disk
- Ordered, if cell has been ordered but not yet received into the system.

**Group** -field

In S57 catalogue dialog box you have possibility to define groups of cells. This means that you can collect cells together - for example all cells, which cover a route from Liverpool to New York or all cells available from one National Hydrographic Office. This makes easier to perform many SENC maintenance functions such as loading cells and updates, setting Display and Approve dates etc.

## Group of S57 cells with C-MAP charts

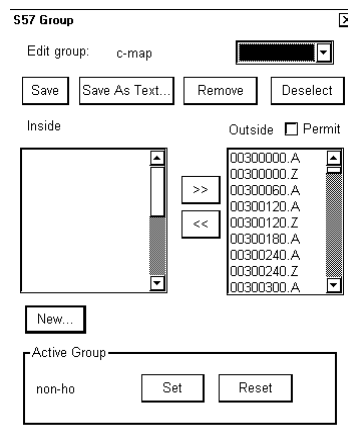
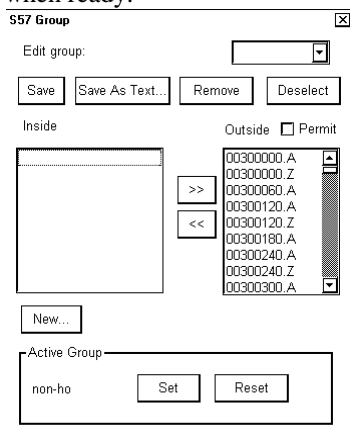
You can create groups of your own. This means that you define a group, which consists only those cells you are interested in. This makes easier to maintain cells, which are loaded into the system or which will be loaded into the system.



### How to create a group

To create user defined group, proceed as follows:

1. Press CHART PLAN push button.
2. Select **Catalog** from the menu. S57 Catalog dialog box appears.
3. Press **Groups...** button in group -field. A Chart Group dialog box appears.
4. Press **New...** button, define a name for new chart group using "type writer", press **OK** button when ready.



Entered group name appears to **Edit group** -field. Now you can define chart cells which are included to this group.

## How to add new cells into a group

You can add new cells into your group by framing desired area.

Mon.Route	Plan Route	Pilot Data rtm	Depth metres	Height metres	NORTH UP	TRUE MOTION
UserChart	Ref Target	ARPA 1	Non ENC Data	TM RESET OFF		

Catalogue							<b>34°58.053N</b> Gyro (man) <b>180.0°</b> <b>129°12.273E</b> CMG (pos) <b>0.0°</b> WGS 84 DEADREC SMG <b>0.0 Kt</b>	
04291077.D	04291079.E	04290000.B	04290001.E	04290002.E	04290003.B	04290004.E	Plan Speed Kt Plan CTS ° Route ° Ch limit m Off track m	Next WP Dist WOP nm ETA Next CTS ° Turn rad nm Turn rate °/min
	04261079.E	04260000.E	04260001.E	04260002.E	04260003.E	04260004.E		
		04270000.E			04270004.E	04270000.E		
04261077.D		04260000.D		04260003.B	04260004.E	04260000.E		
			04250002.E	04250003.E	04250004.E	04250000.E		

View filters	
<input checked="" type="checkbox"/> Name <input type="checkbox"/> Permit <input type="checkbox"/> Group Charts <input checked="" type="checkbox"/> Catalogue Charts <input type="radio"/> Renc <input type="radio"/> HD <input checked="" type="radio"/> CD <input type="text" value="NON_HO"/>	Navigation purpose <input type="checkbox"/> Overview <input type="checkbox"/> General <input checked="" type="checkbox"/> Coastal <input checked="" type="checkbox"/> Approach <input checked="" type="checkbox"/> Harbour <input checked="" type="checkbox"/> Berthing
Selected chart	
Cell ID: <input type="checkbox"/> Permit <input type="checkbox"/> Senc <input type="button" value="RENC Purchase"/> <input type="button" value="Cell Status"/> <input type="button" value="Open"/>	
Group Edit c-map <input type="button" value="Groups"/> <input type="button" value="Add Frame"/> <input type="button" value="Done"/> <input type="button" value="Cancel"/>	
<input type="button" value="Previous"/>	
Cursor From Own Ship: 2.647 nm 45.6° 34°59.907N 129°14.570E	

22.10.1999 06:53 UTC	22.10.1999 09:53 GTB Standard	1:50 600	02.00 02.00
----------------------	-------------------------------	----------	----------------

After you have entered name for group, press **Add frame...** button in S57 catalog dialog box. After that you can make a frame in S57 window moving cursor desired location and pressing **SELECT** push button. Cells which are inside a frame or intersect a frame limit are added into the group. When your frame is ready press **Done** button in S57 dialog box. Chart cells which are selected into defined group are displayed in **Inside** list box in Chart group dialog box.

S57 Group	
Edit group: c-map <input type="text" value=""/>	
<input type="button" value="Save"/> <input type="button" value="Save As Text..."/> <input type="button" value="Remove"/> <input type="button" value="Deselect"/>	
Inside	Outside <input type="checkbox"/> Permit
02700720.Z P 02700840.Z P 03300780.A P 03300810.B P 03300840.A P 03300840.B P 03600810.B P 03600840.B P 03600870.B P	00300000.A 00300000.Z 00300060.A 00300120.A 00300120.Z 00300180.A 00300240.A 00300240.Z 00300300.A
<input type="button" value="New..."/>	
Active Group	
non-ho <input type="button" value="Set"/> <input type="button" value="Reset"/>	

You can also add chart cell to your group by using << (add) button. To add cell, select (highlight) cell ID in **Outside** list box and then press << button.

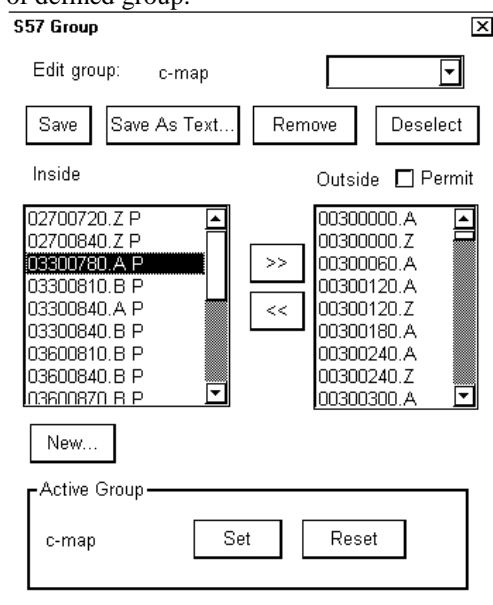
**Note!** If you select **Permit** check box, the system will display only chart cells for which you have permits. When you are satisfied with selection you have done, press **Save** button to save defined group. You can save your chart cells also into text file, if you like to have a list of chart cells in text format. To do this press **Save As Text...** button. A “Save As” dialog box appears. Select directory and drive to where you want save your group. You can use Windows NotePad application to view and to make a hard copy from the list of group.

**NOTE.** It is strongly recommended that you do not use **Overview** and **General scale** charts from **C-MAP** unless you have good reason because the **ECDIS** includes an **optimised world wide coverage of small scale charts** for these navigation purposes. If you load all **Overview** and **General scale** charts from **C-MAP** then the **ECDIS** will use a lot of time for chart drawing and other things.

### How to remove cells from a group

You can remove chart cells from a defined group. To remove proceed as followed:

1. Press **CHART PLAN** push button. Select **Catalog** from the menu.
2. Press **Groups...** button in **S57 Catalog** dialog box. A **Chart group** dialog box appears.
3. Select desired group from **Edit group** list box.
4. Select desired chart cell(s) from **Inside** list box.
5. Press **>>** button. Selected **Chart cell** is removed to **Outside** list box and it is no more member of defined group.



### How to delete a group

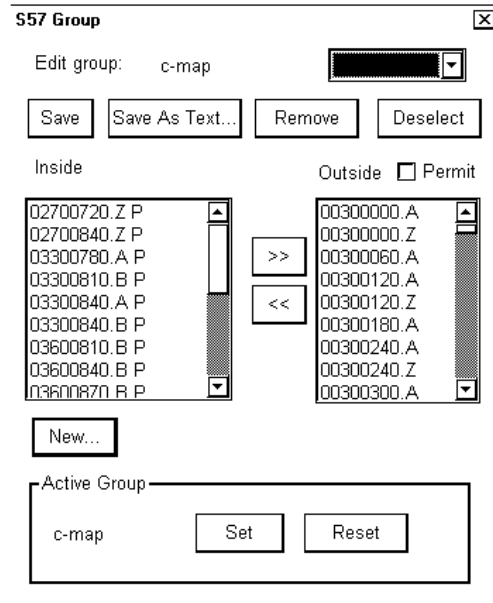
You can delete a defined group. To remove proceed as followed:

1. Press **CHART PLAN** push button. Select **Catalog** from the menu.
2. Press **Groups...** button in **S57 Catalog** dialog box. A **Chart group** dialog box appears.
3. Select desired group from **Edit group** list box.
4. Press **Remove** button. Confirm deleting a group, press **OK**.

## How to select active group for viewing with catalog

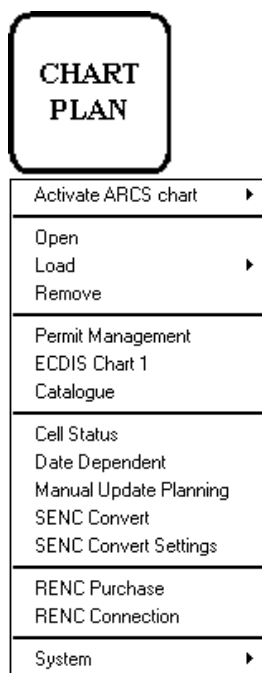
To select active group proceed as follows:

1. Press CHART PLAN push button. Select **Catalog** from the menu.
2. Press **Groups...** button in S57 Catalog dialog box. A Chart group dialog box appears.
3. Select desired group from **Edit group** list box.
4. In **Active Group** -field press **Set** button. The name of active group appears to **Active Group** -field.

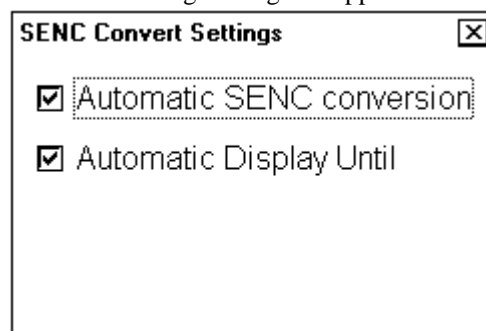


## How to make conversion into SENC and set display date automatically with C-MAP charts

When you are loading new C-MAP charts into hard disk, it is possible make automatic conversion into the SENC format. It is also possible to set display date as system's current date automatically. Proceed as follows to set these options:



1. Press CHART PLAN button, select **SENC Convert Settings** from the menu.
2. A S57 Settings dialog box appears:

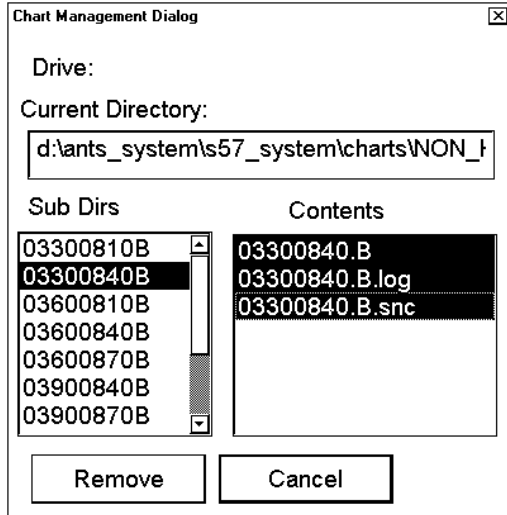


Select on **Automatic SENC Conversion** and **Automatic Display Until** options.

## How to remove C-MAP charts from the system

To remove C-MAP charts from the system, proceed as follows:

1. From the Control panel press Chart Plan push button.
2. Select **Remove** command from the menu. There will appear a chart list dialog.
3. Select desired chart cells to remove them from the system. You can remove native data (A, B, C, D; E, F or Z) or SENC format (snc).

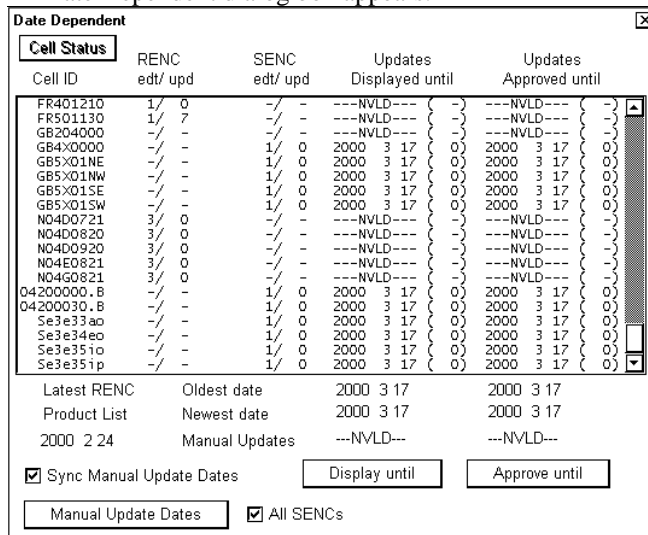
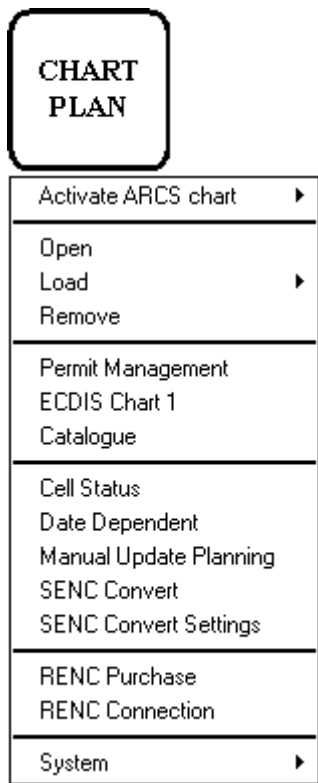


4. Press **Remove** button. System will remove files from the hard disk.

## How to view status and history of C-MAP charts by a group

You can view status and history of C-MAP charts. To view status and history, proceed as followed:

1. Press CHART PLAN push button and select **Date Dependent** from the menu.
2. A Date Dependent dialog box appears.



**Latest RENC Product List:** Not in use with C-MAP.

**Updates displayed until:** View the date until updates is displayed. You can enter desired date by using **Display until...** button. The number after date shows the number of updates involved to displayed.

**Updates approved until:** View the date until updates is approved. You can enter desired date by using **Approve until** button.