



# MULTI RADAR DISPLAY

## USER MANUAL

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## DOCUMENT CHANGE RECORD

Edition	Date	Reason for Change	Sections Pages Affected
1.0	03/04/07	New document	All
2.0	21/03/07	Full update from TMD3 manual to MRD manual	All
2.1	02/05/07	Document updated to MRD version 3.2.0.	All
2.2	29/05/07	Chapter 3 RASS-R toolbox added	Chapter 3
2.3	11/06/07	Chapter 5 Map editor completed	Chapter 5
2.4	28/06/07	Spelling errors corrected	All
2.5	30/04/08	Updated to MRD version 3.6.1	All
2.6	01/09/08	Updated to MRD version 3.7.0; several print screens updated; Multiple RBL (section 4.3.1 and 5.1.3); Map layers window (section 0); User interface added to change zoom-buttons (section 0); DHM Discover function added (Data Sources Options 0); G- and S-filter tab (section 5.2.4.2/2); ICAO runway ID used (section 0); MRD is available in 2 versions depending on license key: "MRD with 6 layers" and "MRD Lite with 1 layer"; Recording & Playback described (section <b>Error! Reference source not found.</b> )	All
9	19/11/09	Updated to MRD version 3.7.1 City Map Plugin (section 0) Date and Time feature (section 4.3.4) Target List (section 0) 3D Height Label (section 5.2.1.1) Long/Lat is format independent	All
10	04/11/10	Updated to MRD version 3.7.2; Paragraph 4.3.1, RBL locking only works on targets with a track number; rotation of labels of RBL and selected target can be changed by the scroll wheel of the mouse; target with SPI bit and RA field; Paragraph 0 MRD About window - licenses added;	All



		Paragraph 5.2.1.2 updated with more information about labels;	
11	28/6/11	Logo updated	All
12	16/5/12	Updated to MRD version 3.8.0; Typing errors corrected on several pages; Figure 3-3 updated; XMLRPC connection information added; Figure 5-58 updated with extra explanation on page 45; rephrasing of data integrity on page 46/56/59/62; Figure 5-93 updated and consistent explanation; ISA removed from the explanation on the DTED Screening (0); solution of problem with ADS-B targets updated in section 0 Edited by BSA - JDV	14, 35, 45, 46, 56, 59, 62, 65, 72, 87
13	10/9/12	Updated to MRD version 3.11.0; Included custom plug-ins under extra menu; M5 data labels;	19, 44-45
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## GLOSSARY OF TERMS

Abbreviation	Expansion
ACC	Air traffic Control Centre
ACP	Azimuth Change Pulse
ADS-B	Automatic Dependent Surveillance, Broadcast
ARP	Azimuth Reference Pulse
A-SMGCS	Advanced-Surface Movement Guidance and Control Systems
ASTERIX	All Purpose Structured EUROCONTROL Radar Information Exchange
ATC	Air Traffic Control
CAT001	Monoradar Data Target Reports, from a Radar Surveillance System to an SDPS (plots and tracks from PSRs, SSRs, MSSRs, excluding Mode S and ground surveillance)
CAT002	Monoradar Service Messages (status, North marker, sector crossing messages)
CAT034	Monoradar Service Messages, next version of CAT002
CAT048	Monoradar Data Target Reports, next version of CAT001
COTS	Commercial Off The Shelf
D6	Intersoft Electronics internal Radar data format, plot or track based.
DHM	Data Handling Module
EDR	Intersoft Electronics internal data format for record based data. Also stands for Extended Data Recorder, a device for generating and capturing serial data.
EDR V2	Second version of the EDR format.
Ethernet	A network specification developed by DEC, Intel, and Xerox which provides anywhere from 10 megabits to 1000 megabits per second transmission speeds.
GPS	Global Positioning System
IE	Intersoft Electronics
IP	Internet Protocol
LAN	Local Area Network
MB	Megabytes of memory.



MLAT	Multilateration
Monopulse	Radar-receiving processing technique used to provide a precise bearing measurement
MSSR	Monopulse Secondary Surveillance Radar
NM	Nautical Mile, unit of distance
Path	A path can be described as a file's address on your file system, describing where the file lives: An absolute path gives the complete path, starting at the root directory, or the very top of the file system; A relative path looks for a file from the directory you are currently in down.
PSR	Primary Surveillance Radar
Radar	Radio Detection And Ranging
RASS-R	Radar Analysis Support Systems – Real-time measurements
RASS-S	Radar Analysis Support Systems – Site measurements
RCS	Radar Analysis Support Systems – Site measurements
Record	A collection of data forming a complete message.
Resolution	Capability of a sensor system to distinguish two aircrafts in close proximity and to produce target reports for both.
RF	Radio Frequency
SAC	System Area Code
SIC	System Identification Code
SLS	Side Lobe Suppression, a technique to avoid eliciting transponder replies in response to interrogations transmitted via antenna sidelobes
SSR	Secondary Surveillance Radar
TCP	Transmission Control Protocol
TMD	Technical Maintenance Display
Transponder	Airborne unit of the SSR system, detects an interrogator's transmission and responds with a coded reply stating either the aircraft's identity or its flight level
UAP	User Application Profile, used in ASTERIX data for assigning Data Items to Data Fields.
UDP	User Datagram Protocol. A connectionless, unreliable Internet protocol.
UTC	Coordinated Universal Time



# 1. INTRODUCTION

The MRD is to be used as a dedicated display to enable maintenance and commissioning engineers to assess the operational performance and serviceability of ATC Radar systems. The MRD is designed to take the maximum advantage of the latest technologies; it uses the PC graphics card extensively and can be displayed on any screen resolution supported by the graphics card.

The MRD is used in combination with the RASS-R Data Handling Module (DHM), where the DHM is used to pre-process the radar data and make it available to the MRD for displaying. This setup allows for virtually any configuration of radar data sources with different capturing hardware and protocols to be serviced.

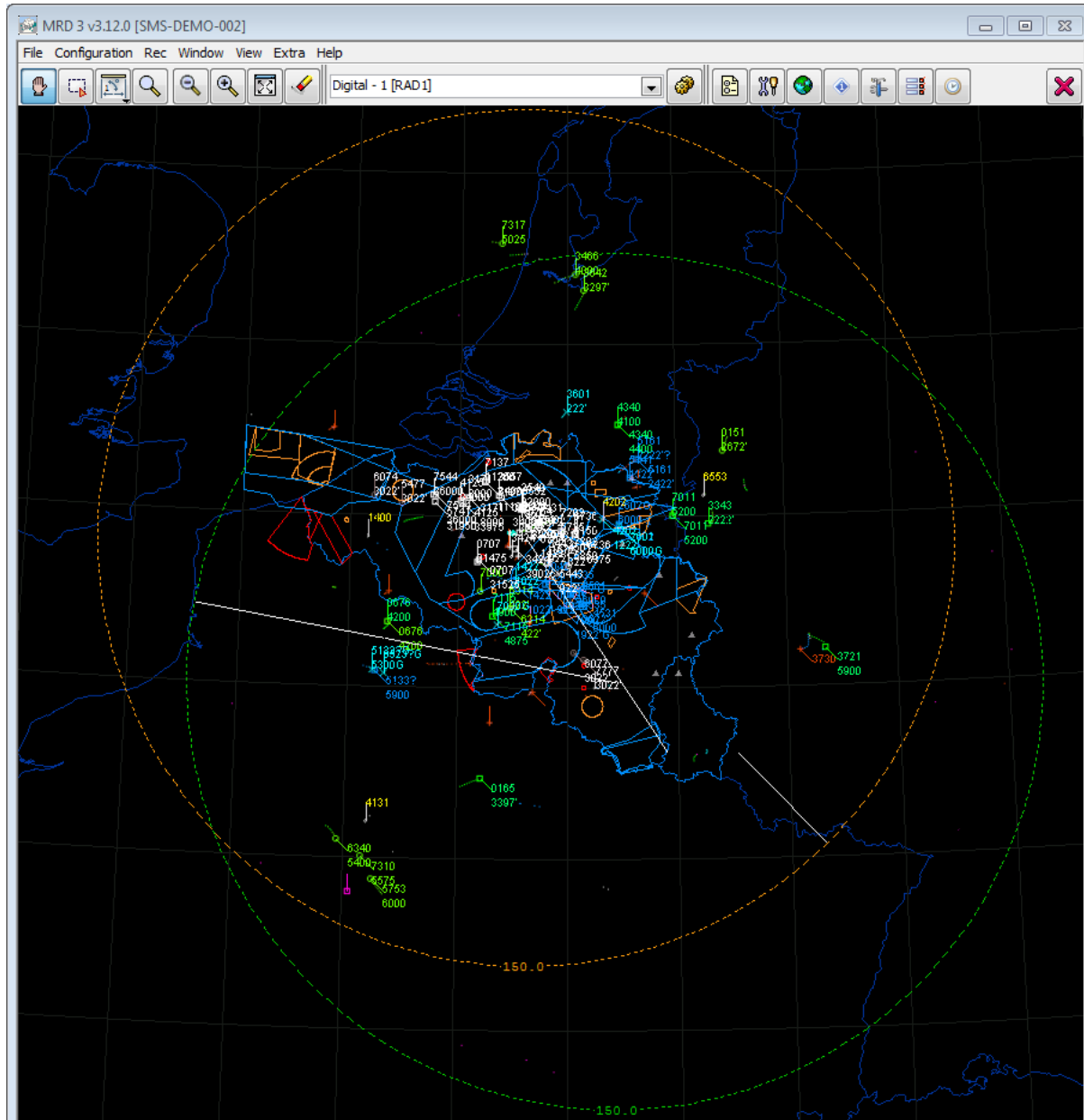


Figure 1-1: Multi Radar Display



The MRD can represent multiple and different types of data. The figure above shows a few of the different data types supported. All layers can be shown simultaneously in overlay.

*Table 1-1: supported data types*

<b>Data type</b>	<b>Available Layers</b>
Digital (Plot/Track)	6
Video	6
Vector (Weather)	6
Status (Radar service Messages)	6

## 1.1. Benefits and possibilities of the system

- Verify and validate; quickly compare a radar data source against other data sources. Examine detailed target reports for the same target from different radars.
- Interface via DHM allows for expansion to user specific data-types.
- MRD and DHM can be run on separate computers allowing the display system to run remote from the actual radar data source.
- Represent the same data simultaneously with different display and/or filter settings.
- Scalable main window allows best representation on any available monitor.
- Client specific demands are easily integrated.
- Even digitized video data can be sent over LAN.



## 2. GENERAL OVERVIEW

### 2.1. MRD as part of RASS-R

The MRD software has to be run in combination with the DHM for live capturing or replaying of DHM recorded data. Figure 2-1 is a schematic representation of a generic MRD setup. The MRD software is either run on the same computer as the DHM or the MRD is connected to the DHM (one or more) via LAN.

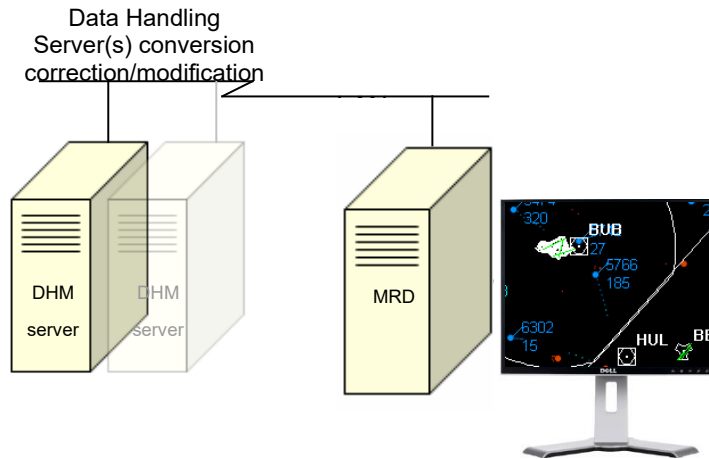


Figure 2-2: MRD as part of the RASS-R structure

The data that is converted/corrected/modified by the Data Handler Module is redirected to the MRD application where it is displayed as target data, weather data or status messages.

### 2.2. MRD General Overview

The MRD must be run on a standard Windows XP PC with a “decent” graphics card (see system requirements for detail). The MRD can display different types of data; i.e. Digital data (plot or track), Video, Vector data (mostly used for weather) and Status information. The MRD can display multiple data types of the same or different kind, for example 4 radar data streams with digital data and 2 weather outputs. Each of these data types is fully configurable to the user’s demand.

### 2.3. Network operation

The MRD uses several TCP and UDP ports for different purposes, it is important that these ports are free for use on the target system. Table 2-1 shows an overview of the ports used by the MRD.


Table 2-2: MRD network ports

Port Number	Used by	Usage
5770	RASS-R applications	Inter-application communication with other RASS-R applications
5773	Telnet server	Administrator commands, API for 3rd party programs.





### 3. RASS-R TOOLBOX

The RASS-R toolbox is installed on your pc and has a shortcut on the desktop. It can also be accessed using the Windows Start-menu. The toolbox is displayed in the figure below. The current version of the RASS-R toolbox is displayed in the right upper corner. The MRD is part of this RASS-R toolbox and can be opened using the appropriate icon .

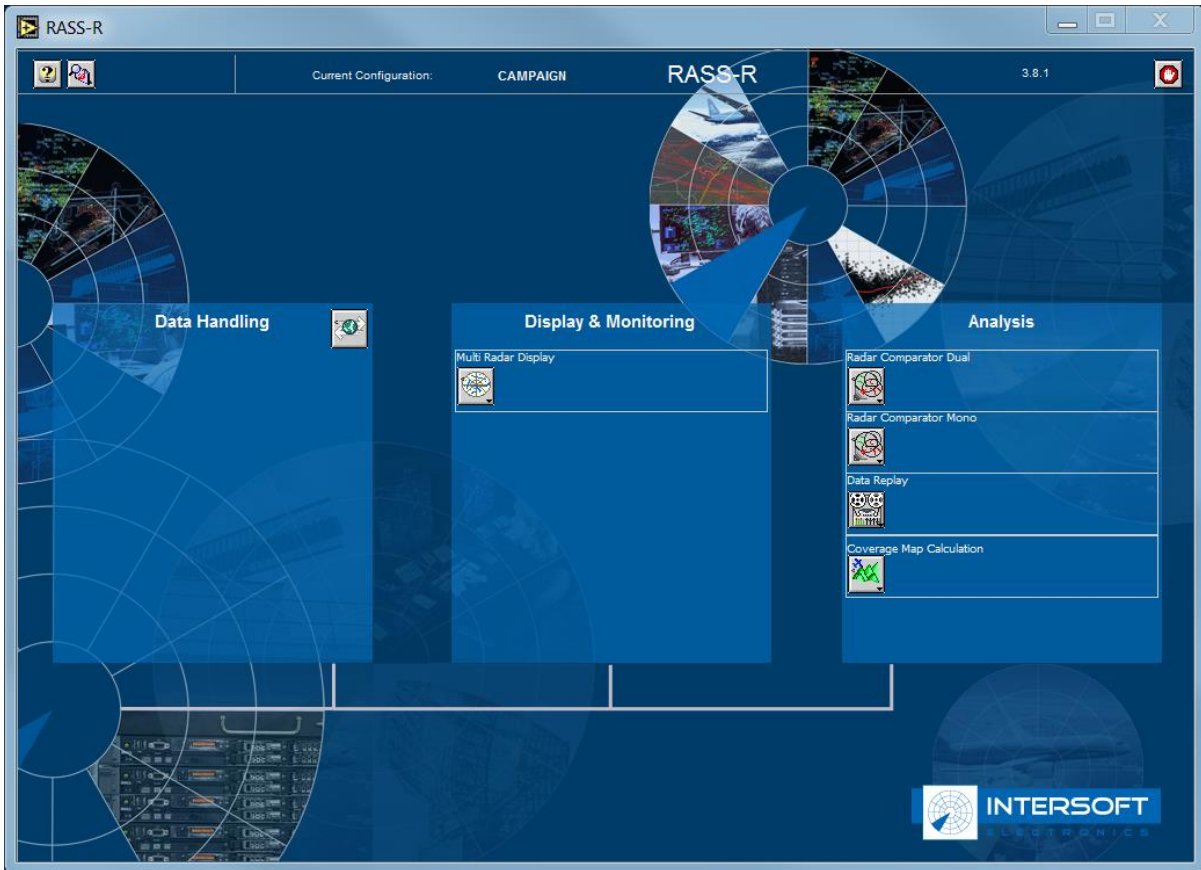






Figure 3-3: RASS-R toolbox

The menu bar contains the following items:

Table 3-3: RASS-R menu bar

Button	Usage
 Help window	When this button is clicked, the Help window will appear and show help information whenever you point over a button.
 Campaign change	Click this to make an appropriate campaign structure (see further)
 Exit	Quit the application

When you click the  button, it will ask you where you want to create your RASS-R campaign folder. Select the correct path. Upon completion, you should have the following directory structure created as in the figure below.

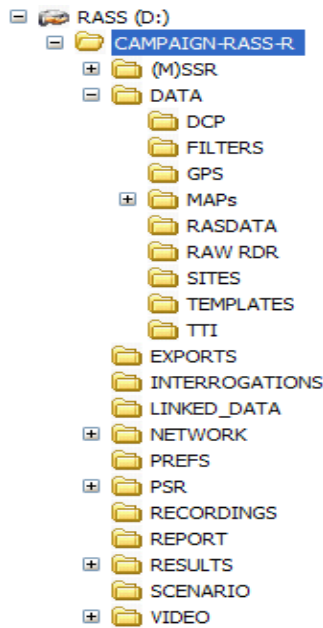


Figure 3-4: Campaign directory structure

**Note:** When you make a campaign folder with the RASS-R toolbox, it is preferred to make it on a separate drive than the drive where your operation system is on. For example, as in the figure above, a structure named "CAMPAIGN-RASS-R" is created on the D-drive.



## 4. MRD DISPLAY

After starting the MRD software the main MRD window appears (Figure 4-1). With a new installation the factory default configuration is loaded. Later you may select another configuration to be loaded at start-up.

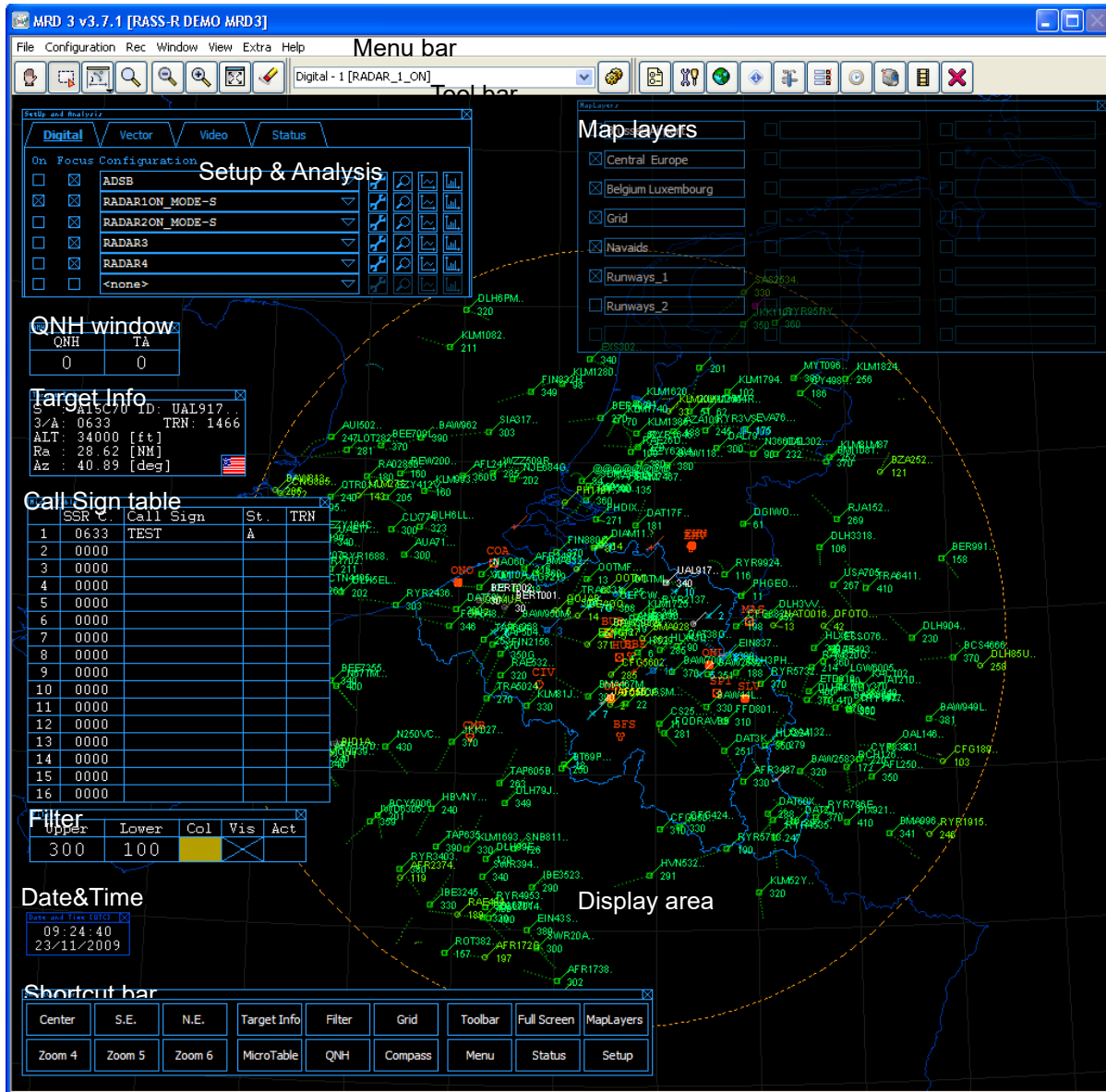


Figure 4-5: MRD main window

The main MRD window consists of 3 main parts:

- **Menu bar:** used to operate and configure the software.
- **Toolbar:** for quick access to the MRDs main features
- **Display Area:** graphical representation of the radar data in PPI style, with different windows in overlay: Target Info, Micro Table, QNH window, Filter, Shortcut Bar, Map layers, Setup & Analysis, all configurable in transparency.



## 4.1. Menu bar

The menu bar allows the user to access configuration dialogs, to save and load configurations. An overview of all the available menu items is given in table 4-1.

Table 4-4: Menu bar overview

Menu (shortcuts bold)	Usage
<b>File</b>	Main menu to access application related functions
↳ Exit <b>Ctrl+Q</b>	To quit the application
<b>Configuration</b>	Main configuration to access all configuration related menus
↳ Options...	Opens the Options window
↳ Setup and Analysis...	Opens the Setup and Analysis window
↳ Coastline Map Editor...	Opens the Map editor
↳ Save Configuration	Submenu to access other save options
↳ As Current	Will save the configuration under the currently loaded configuration name
↳ As Custom ... <b>Ctrl+S</b>	Opens a dialog which allows you to choose a configuration name for saving
↳ Load Configuration	Opens a dialog which allows you to choose a configuration for loading
<b>Window</b>	To access all open window
↳ TargetInfo <b>Ctrl+Shift+I</b>	Prompts the target info table
↳ ShortCutBar <b>Ctrl+Shift+B</b>	Prompts the shortcut bar on the display
↳ MapLayers <b>Ctrl+Shift+L</b>	Prompts the Map layers shortcut bar on the display
↳ Date&Time <b>Ctrl+Shift+D</b>	Prompts the Date & Time bar on the display
↳ MRD vx.x.x	If this window is hidden, click this to let it popup.
↳ Main Toolbar	If this window is hidden, click this to let it popup.
↳ Setup	If this window is hidden, click this to let it popup.
↳ Zoom/Select	If this window is hidden, click this to let it popup.
	<b>Note:</b> every time a window is opened (e.g. Target Info or Micro table) this list will be filled up with these windows.
<b>View</b>	Main view menu to access viewing options
↳ Full Screen <b>Ctrl+Shift+F</b>	Will resize the main window to occupy the full screen
↳ PPI	Show the data in PPI mode (currently disabled)
↳ Vertical	Show the data in vertical mode (not yet implemented)
↳ Visible	Submenu to access visibility options
↳ Toolbar <b>Ctrl+Shift+T</b>	Toggle the visibility of the toolbar
↳ Menu <b>Ctrl+Shift+M</b>	Toggle the visibility of the menu bar
↳ Status <b>Ctrl+Shift+S</b>	Toggle the visibility of the status bar
↳ Map	Toggle the visibility of the background map
↳ Compass	Displays the compass
↳ Toolbars	Submenu to access toolbar options
↳ Main Toolbar	Submenu to access main toolbar options
↳ Open	Open the main toolbar in a separate window
↳ Dock	Dock the main toolbar in the toolbar
↳ Zoom/Select	Submenu to access Zoom/Select toolbar options
↳ Open	Open the Zoom/Select toolbar in a separate window
↳ Dock	Dock the Zoom/Select toolbar in the toolbar
↳ Setup	Submenu to access Setup toolbar options
↳ Open	Open the Setup toolbar in a separate window
↳ Dock	Dock the Setup toolbar in the toolbar



<b>Extra</b>	
<input type="checkbox"/> Filter <b>Ctrl+F9</b>	Prompts the filter settings window
<input type="checkbox"/> MicroTable <b>Ctrl+F7</b>	Prompts the micro table
<input type="checkbox"/> QNH <b>Ctrl+F8</b>	Prompts the QNH window
<input type="checkbox"/> Custom	<i>Optional tools might be listed here. Separate manuals are provided for these custom plug-ins.</i>
<b>Help</b>	Main help menu to access all help items
<input type="checkbox"/> About MRD...	Application Summary dialog

## 4.2. Toolbar

The toolbar allows the user to quickly access functionalities that are often used.

### 4.2.1. Main toolbar

The main toolbar contains functions to configure the MRD. The Main toolbar can be displayed in “Open” view or “Dock” view, upon selection in the Menu bar.



Figure 4-6: Main toolbar (Open vs. Dock view)

Table 4-2 shows an overview of the Main toolbar’s functionality

Table 4-5: Main toolbar overview

Button	Usage
Options	Open the options window (see paragraph 5.1)
Setup and Analysis	Open the Setup and Analysis window (see paragraph 5.2)
Coastline Map editor	Open the Coastline Map editor (see paragraph 0)
Target Info	Open Target Info window (see paragraph 0)
Shortcut bar	Open Shortcut bar (see paragraph 0)
Map layers	Open the Map layers window (see paragraph 0)
Date & Time	Open the Date & Time window (see paragraph 4.3.4)
Exit	Quit the application



### 4.2.2. Zoom/Select toolbar

The Zoom/Select toolbar contains functions to manipulate the display area. The Zoom/Select toolbar can be displayed in “Open” view or “Dock” view, upon selection in the Menu bar.



Figure 4-7: Zoom/Select toolbar (Open vs. Dock view)

Table 4-3 shows an overview of the Zoom/Select toolbar’s functionality. Detailed explanation can be found in paragraph 4.3.1)

Table 4-6: Zoom/Select toolbar overview

Button	Usage
Pan	Switch the display to pan mode, use the cursor to move the display area around
Select	Switch the display to select mode, use the cursor to select targets
RBL	Enables the Range Bearing Line on the display and select one out of 5 Range Bearing Lines (if enabled).
Zoom	Switch the display to Zoom mode, use the cursor to zoom into areas of interest
Zoom out	Zoom out progressively until maximum viewing area is visible
Zoom in	Zoom in progressively until maximum zoom (highest level of detail) is reached
Home	Switch back to default zoom (-500) and centre (or press the home button)
Erase all	Clear all display data

### 4.2.3. Setup toolbar

The Setup toolbar allows the user to reach the setup window of a display’s current data source quickly. The Setup toolbar can be displayed in “Open” view or “Dock” view, upon selection in the Menu bar.

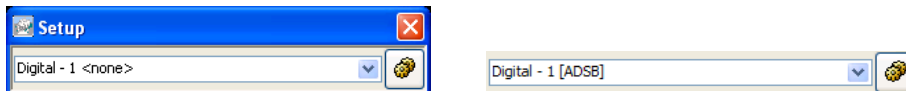


Figure 4-8: Setup toolbar (Open vs. Dock view)

Select a Display via the pop down menu and then press the “Setup” button to open the Display’s data source configuration window. The configuration window is specific per Data Type and is discussed in section 0.



### 4.3. Display area

#### 4.3.1. Main display

The display area is the main area of interest; this is where the radar data is graphically represented.

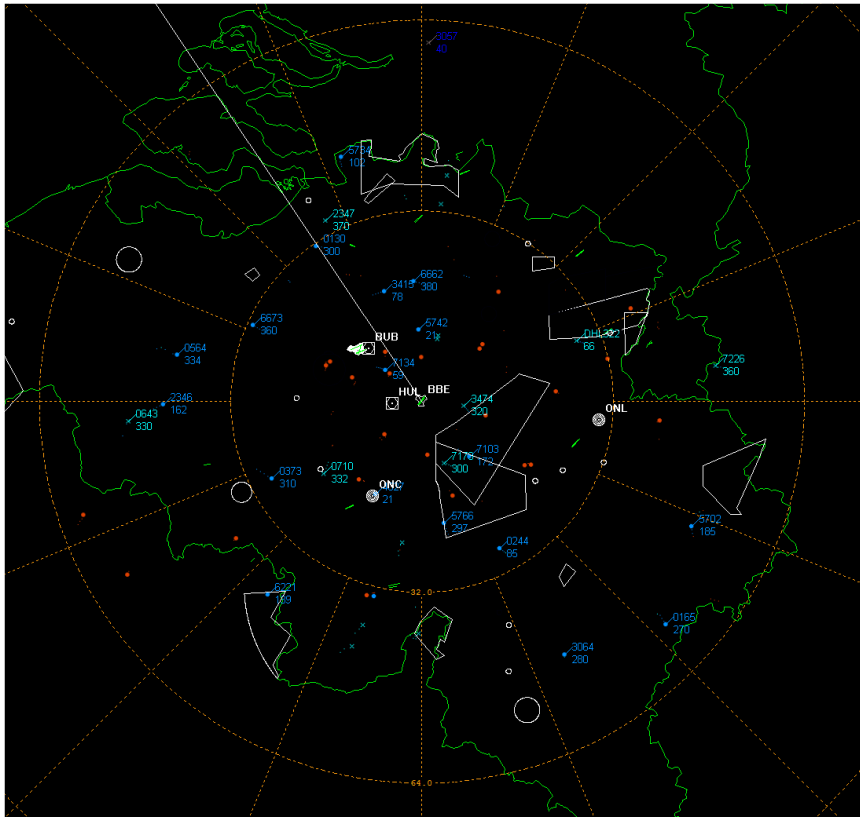


Figure 4-9: Main display

Use the “Zoom/Select” toolbar to switch the display in a specific mode and then manipulate the display by using the mouse. Instead of using the “Zoom / Select” toolbar, you can also right click on the display, then the following menu appears:

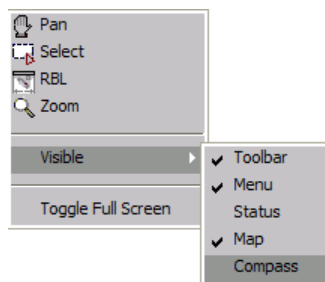


Figure 4-10: Display right click






This menu gives extra possibilities as well:

- Make the Toolbar/Menu bar/Status bar/Map/Compass visible or not
- Toggle to Full Screen mode

The following actions can be performed on the display:

- **Pan:** When in pan mode the mouse cursor shows a “Hand”  icon. Click and drag the screen content to re-centre the display. Panning the window may also be done by using the cursor keys “up, down, left, right” regardless of which mode the display is in.
- **Select:** When in select mode the mouse cursor shows a “Crosshair” + icon. Click individual targets or click and drag the mouse to select a rectangle of targets. Selected targets will colour white. Once selected, using the scroll wheel of the mouse can change the rotation of the target labels. Targets that have the Special Purpose Indicator (SPR) bit (I001/020 or I048/020) or the Resolution Advisory (RA) field (I048/260) on, colour red and start blinking.

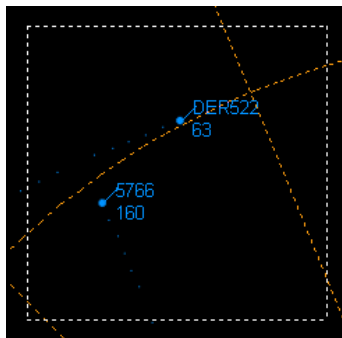



Figure 4-11: Multiple target selection

- **RBL (Range Bearing Line):** When you are in RBL mode, you can draw a RBL line.

In the Appearances option (paragraph 5.1.3), you can enable 1 till 5 different RBL-lines with each an appropriate colour.

Before you start drawing the RBL line, first pick out the number of line you want to draw by clicking the

bottom arrow in the RBL icon: . The next dropdown list appears: .

Using the left mouse button, you can change the start position of the RBL.

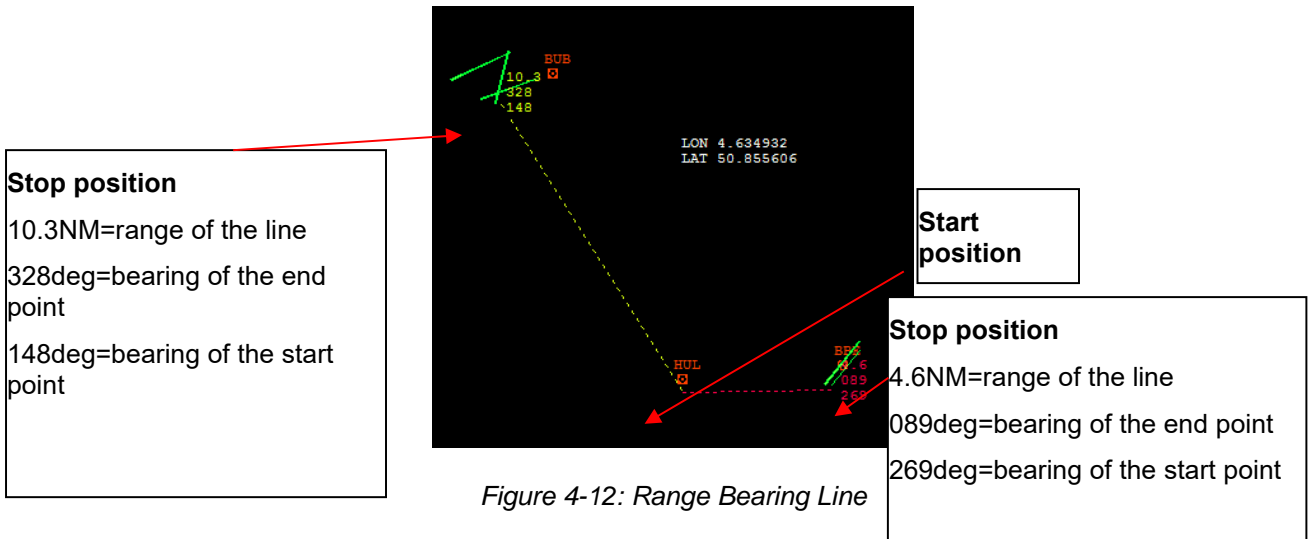
Using the left mouse button while pressing the Shift key, you can determine the end position of the RBL.

The end position can be chosen anywhere in the display area. But as soon as you point over a target with the mouse while pressing the Shift key, a modified + sign will appear. This means that the RBL can be locked on a target now (on the condition that the target has a track number). When locked, the RBL will follow the target and update its information automatically as long as the target exists. A RBL can also be locked between 2 targets (again, on the condition that both targets have a track number). Using the scroll wheel of the mouse can change the rotation of the RBL labels.


To turn off the RBL, you simply click the mouse to use another mode, for example Pan, Select or Zoom. Zooming or panning by means of the keyboard will not turn off the RBL! The example below will explain the displayed information of the RBL.







When you also enabled to view the Lon/Lat position when being in RBL-mode, wherever you drag on the PPI, you will see the current Longitude and Latitude of that position.

- **Zoom:** When in zoom mode the mouse cursor shows a “magnifying glass”  icon. Click and drag to zoom in on the selected rectangle. Using the keys “Page up, Page down, Home” regardless of which mode the display is in may also zoom the display.



### 4.3.2. Compass view

The compass view can be opened in the following way:

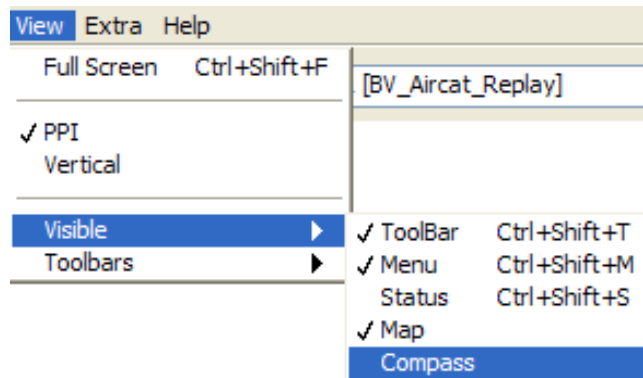


Figure 4-13: Select compass view

The compass view puts a compass layer on the screen. It can be helpful for when determining the correct heading of a target. The middle line of the grid also displays two bearings where the grid is pointing.

**When you press F6, the compass grids are enabled. By pressing the left or right key, you can turn the grid in order to project the targets on the compass degrees.**

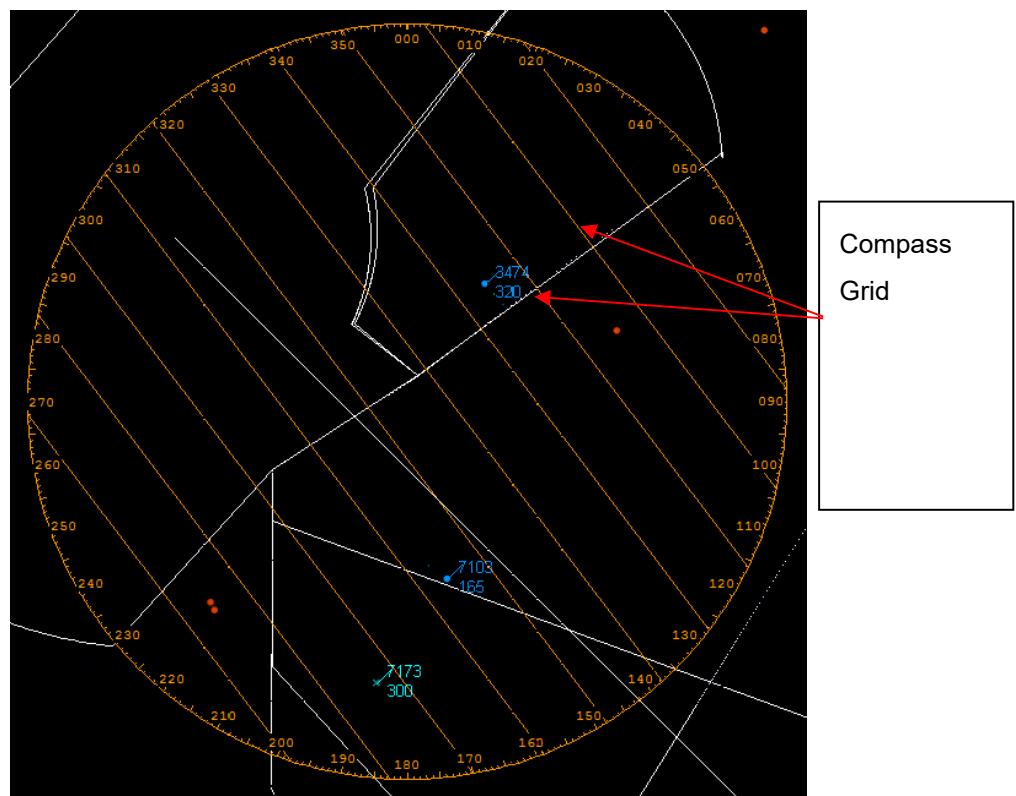


Figure 4-14: Compass view



### 4.3.3. Target info window

To display the Target Info, click Window in the Menu, then select "Target Info" or just press Ctrl+Shift+I or press the appropriate icon in the toolbar.

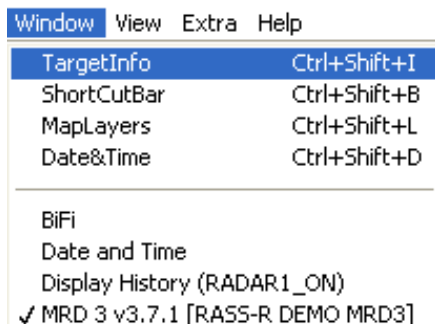



Figure 4-15: Select Target Info

The "Target Info" window will appear. Now, you can select a target in 2 different ways: click the select button  or do a right click and choose "select" as in Figure 4-10.

Upon selection, the "Target Info" window is updated with information belonging to the selected target. As you can see in the figure below, the selected target is highlighted (white) and the "Target Info" window contains the following information fields:

- Mode-S address: 48415E
- Aircraft ID: KLM44M
- Mode 3/A code: 3443
- TRN: track number 0070
- ALT: altitude 20350ft
- R: Range 120.23NM
- Az: Azimuth 331.30deg
- Country and flag: Netherlands
- REG: Registration number: PH-BXE
- TYP: Airplane type: 737-800

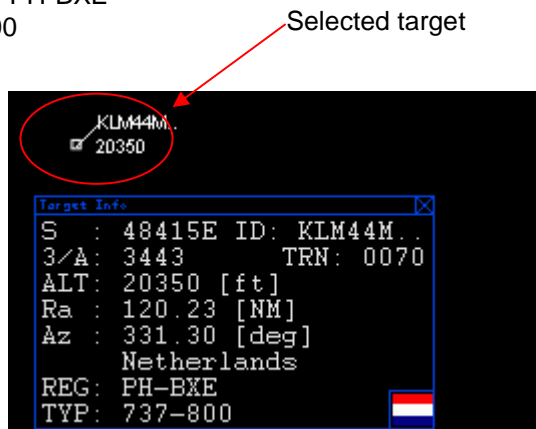


Figure 4-16: Target info window

The last 3 lines are look-up based on the mode-S address. Airplanes registered after the release of the MRD will not have a reference in the internal Database. The first time that you start up, it can be that the colour/opacity-settings of the Target Info window have default values that make it invisible for you. In the Appearances setup you can change this. (See paragraph 5.1.3)

**Note: The info will only be updated according to the target when the target contains a track number!**



### 4.3.4. Date & Time

To display the Date & Time, click Window in the Menu, then select “Date & Time” or just press Ctrl+Shift+D or press the appropriate icon in the toolbar.

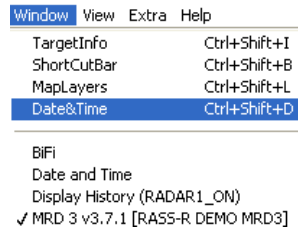


Figure 4-17: Select Date & Time

Current UTC time, based on the system time of the display computer, and Date is displayed in the Date and Time window

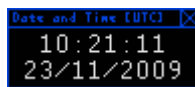


Figure 4-18: Date & Time window

### 4.3.5. Filter

To display the Filter, click “Extra” in the Menu, then select “Filter” or just press Ctrl+F9.

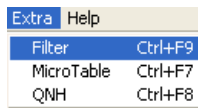


Figure 4-19: Select Filter

The filter can be used to filter targets between a lower and upper flight level (Unit is FL, maximum 1000). The filter can be turned on or off by clicking the Active button (“Act”). If you select the Visible button (“Vis”), then all targets between the lower and upper flight level will be coloured according the colour set in the Col-field.

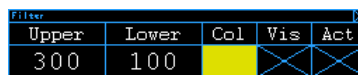


Figure 4-20: Filter window



### 4.3.6. Micro Table

To display the Micro Table, click “Extra” in the Menu, then select “Micro Table” or just press Ctrl+F7.

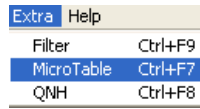


Figure 4-21: Select Micro Table

One can use the Micro Table to manually assign a Call Sign to a specific target. You simply type in the SSR code, the Call Sign and the appropriate Track number (TRN) of the target. Of course, the “Target Info” window can help you to obtain those values. Once this is filled in, it automatically gets an appropriate status in the St-column (Status). This status is updated automatically at each scan.

Different status values are possible:

- **A - Active:** when the target is still in the range of the Radar
- **L - Lost:** when the target is out of range or when the target is missing.
- **M - Multiple:** when there are multiple targets having the same SSR-code.
- **Empty field:** when you made an entry in the table with an unknown SSR-code, then the status will be empty. When the target appears at a next scan, it will get the status Active. Suppose it disappears again, it will get the status Lost (and not empty anymore)

As you can see in the picture below, the table has 16 rows. By setting the correct opacity (see further), you can simply drag it and put it on top of your radar display.

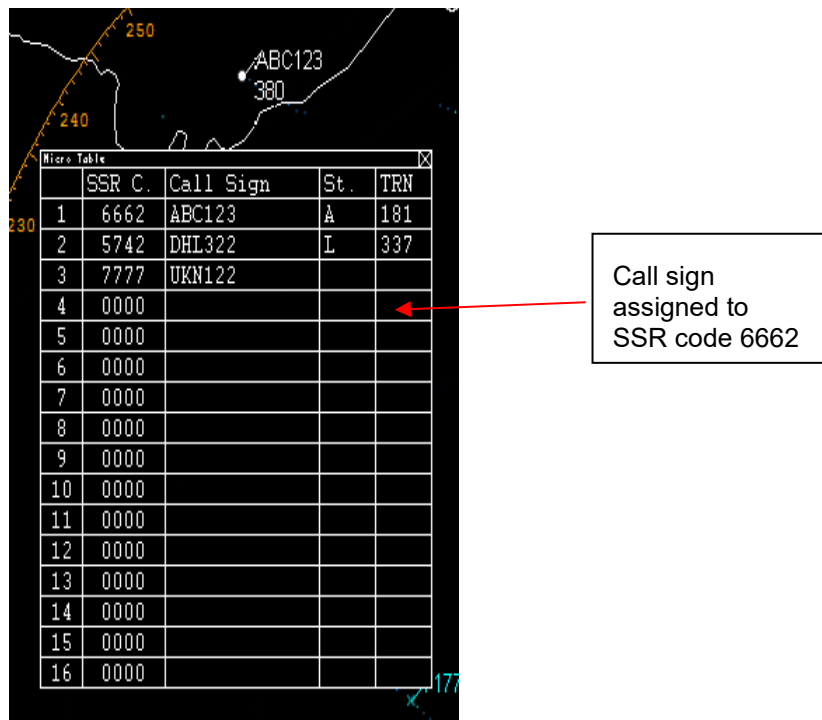


Figure 4-22: Micro Table



### 4.3.7. QNH correction

To display the QNH window, click “Extra” in the Menu, then select “QNH” or just press Ctrl+F8.

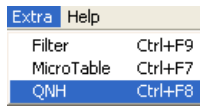


Figure 4-23: Select QNH

Atmospheric Pressure (Q) at Nautical Height correction can be set in the QNH window. The corrected height of a target will be displayed with a ` on the condition that the digital label is Mode-C in [ft] or [100ft] as in Figure 5-57. The QNH is expressed in millibar where every +/- 1mbar increases/decreases the Mode-C with 30ft for all targets with an altitude below the transition level (TL). The minimum TL is 1000ft. Setting the QNH to 0 mbar disables the QNH correction again.

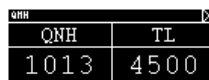


Figure 4-24: QNH window



### 4.3.8. Map layers window

To display the Map layers window, click “Window” in the Menu, then select “Map layers” or just press Ctrl+Shift+L or press the appropriate icon in the toolbar.

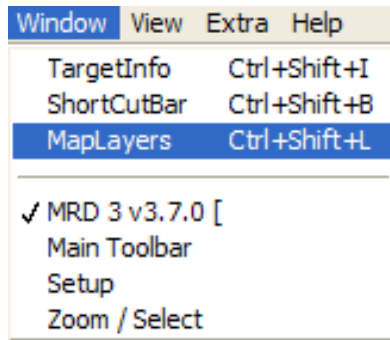


Figure 4-25: Select Map layers window

The Map layers window shows all layers that are enabled in the coastline map editor (see 0). You can simply turn each layer on or off separately by clicking the tick box.



Figure 4-26: Maplayers window



### 4.3.9. Shortcut bar

To display the Shortcut bar, click “Window” in the Menu, then select “Shortcut Bar” or just press Ctrl+Shift+B or press the appropriate icon in the toolbar.

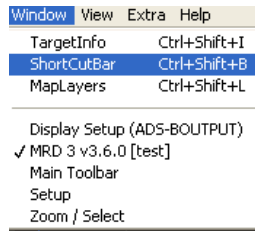


Figure 4-27: Select Shortcut Bar



Figure 4-28: Shortcut bar

The shortcut bar contains the different shortcuts as displayed above. The left block (red) are zoom options and configurable in the MRD.ini file. The other buttons are not configurable. In this shortcut bar, “Grid” enables or disables the grid of the compass view as explained in paragraph 0.

In Figure 4-28: Shortcut bar, 6 zoom positions are default configured:

- Centre
- S.E. (South-East)
- N.E. (North East)
- Zoom 4
- Zoom 5
- Zoom 6

These zoom positions can be configured in the following way:

Right click on a zoom-button and you will have the following possibility to “Rename” and to “Link to current zoom”.

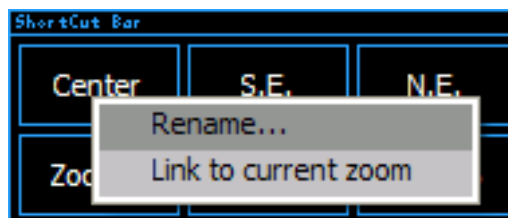


Figure 4-29: Change zoom settings





When rename is chosen, you simply can type a new name for that button. (limited to 7 characters)

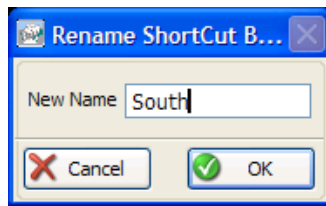


Figure 4-30: Rename the zoom button

When you then click to "link to current zoom", the current position and zoom settings of the display will be saved to that zoom-button, resulting in the following shortcut bar:



Figure 4-31: Zoom button "South"



#### 4.3.10. MRD About window - licenses

To display the MRD About window, click “Help” in the Menu, then select “MRD About”. A dialog as in Figure 4-33 will open.



Figure 4-32 MRD About window

The MRD can be licensed in 2 ways:

- **Software:**
  - **MRD Lite:** only 1 digital, 1 video, 1 vector and 1 status layer can be displayed. As soon as a second layer is created (See 5.1.1), a message as in Figure 4-34 will be displayed.
  - **MRD:** the full 6 layers can be used for each data type (digital/video/vector/status)
- **Support:** The warranty license indicates until which date the customer has a maintenance contract. This date also implicates until what date free support and software updates will be delivered. This expiration data doesn't have any influence in MRD operation.

Figure 4-33: MRD v3.7.2 registered to name "radar" and customer "Intersoft Electronics"

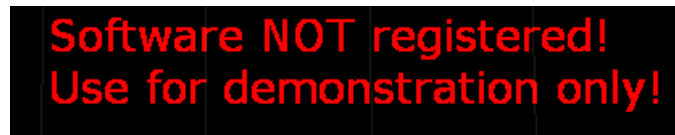



Figure 4-34: Software not registered message



## 5. MRD CONFIGURATION

### 5.1. Options

To configure the MRD software select “Options...” from the Configuration menu or press the “Options”  button from the application toolbar.

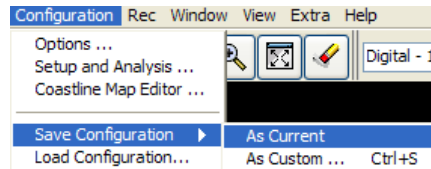


Figure 5-35: Select the options menu

The options dialog appears. It has 3 sections: “General”, “Data Sources” and “Appearances”.

All settings made can be saved in a configuration file. There are 2 possibilities to save:

- **Save Configuration as current:** to save as the current active configuration file
- **Save Configuration as custom:** (Ctrl+S) to save as another configuration file

When you save the configuration with another name, the following window will prompt:

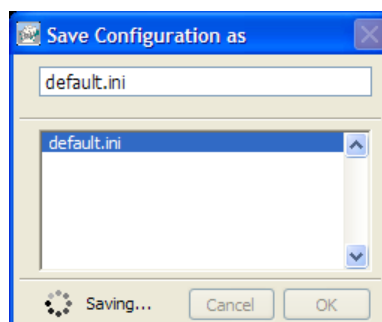


Figure 5-36: Save configuration as

To load a configuration, click the “Load configuration” option. The following window will prompt:

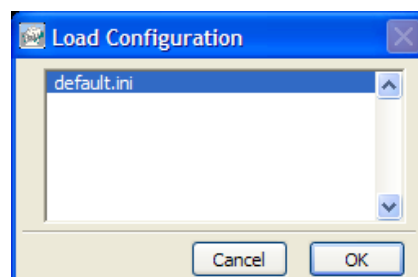


Figure 5-37: Load configuration



### 5.1.1. General options



To enter the general section of the Options dialog press the “General” button on the top left side of the dialog window.

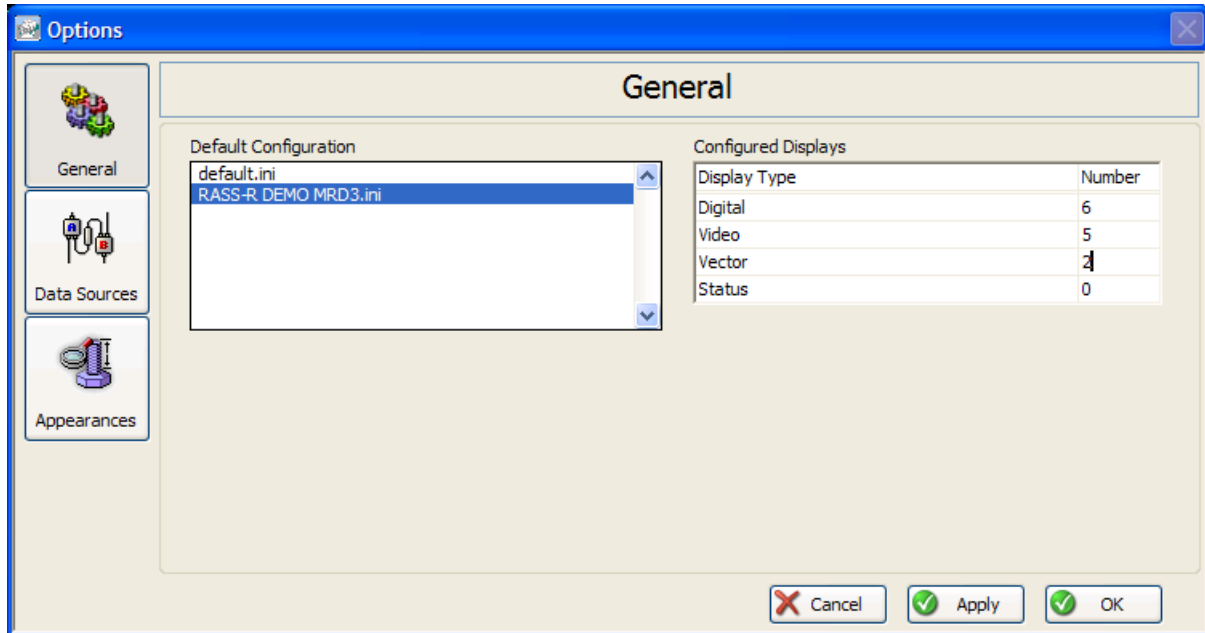


Figure 5-38: Options dialog “General” section

In the “General” section the following items are available for configuration:

- Default Configuration:** This is the configuration that is loaded at start-up, a list is shown with all available configurations. You may select a configuration simply by clicking the desired configuration’s name in the selection list. The configuration files are located in C : \INTERSOFT\MRD\UserPrefs .



- **Configured Displays:** The MRD is a multi radar display. This means it can display different data sources from different data types.

There are 4 different data types:

- **Digital** stands for Target data, Track data or Plot data.
- **Video** is digitized video data from radar
- **Vector** is used for all kinds of vector drawing; this is mainly used for displaying weather data.
- **Status** is used for radar service messages. These messages are displayed in a separate window.

To each data type (Digital/Video/Vector/Status) you can assign a number of layers. Though, the MRD can only display 6 data sources per data type **simultaneously**.

In the example below, 6 digital layers are created for the data source "Digital", 5 layers for a Video type and 2 layers for Vector type.

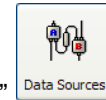
Configured Displays	
Display Type	Number
Digital	6
Video	5
Vector	2
Status	0

Figure 5-39: Configure display layers

**Note: It is recommended not to create more layers than necessary because of memory and performance considerations.**



### 5.1.2. Data Sources options



To enter the data sources section of the Options dialog press the “Data Sources” button on the left side of the dialog window.

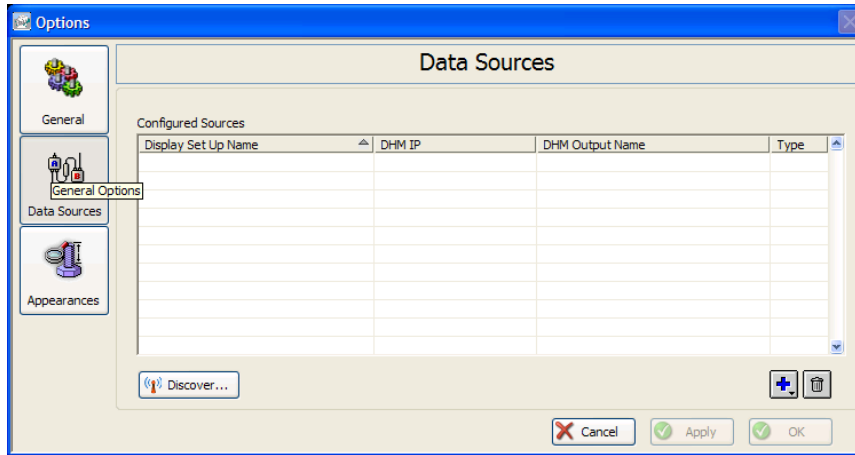
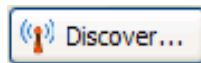


Figure 5-40: Options dialog “Data Sources” section

Once we have created a number of layers per data type in the “Data Sources” dialog (see previous paragraph), we now have to configure the data sources themselves!


Connecting to a DHM server that is outputting data in D6 format will do this.



#### Usage of the Discover button :

The “Discover” function is exactly the same as the “DHM Discover” function in the DHM. (Available from DHM v.2.8.0, see user manual “IE-DHM-UM-v15.doc” or higher, paragraph “4.2.8.3. DHM Discover”)

The MRD requires discover settings to determine on which Ethernet ports it must scan for available DHM Background Servers with output modules for a MRD.

First we click the “Add” button . We have to select the type of data source we want to configure. Suppose we select Digital.

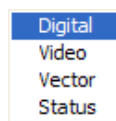


Figure 5-41: Selecting to Add a (digital) data source



Now we get a dialog to connect to a DHM server.

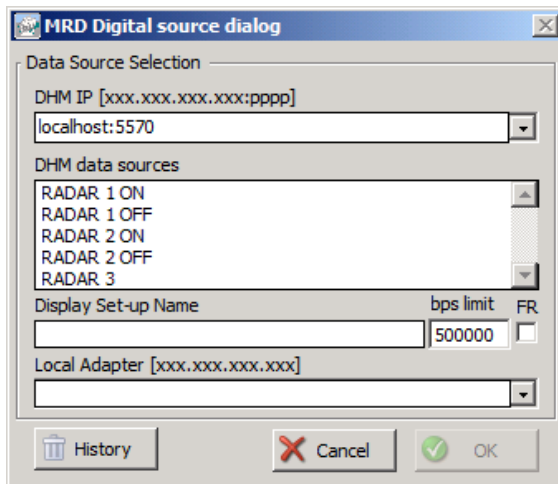


Figure 5-42: MRD data source dialog

**Note:** When you are connecting to a remote DHM server, type the IP address instead of localhost.

**Note:** When you are making a connection by using XMLRPC-protocol, type “xmlrpc://xxx.xxx.xxx.xxx:5005” where xxx.xxx.xxx.xxx is the IP address of the remote DHM server.

Clicking in the dropdown list on the “DHM IP” field, will show the following list or similar:

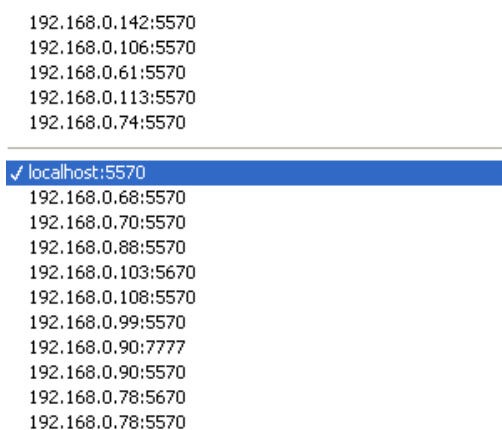


Figure 5-43: DHM server selection

There are 2 sections:

- **Above the horizontal line:**  
The list represents all active DHM servers on the network. (As a result of the DHM Discover function)
- **Below the horizontal line:**  
This list represents all DHM servers that were active in the past. (So not a result of the DHM Discover function)



Then, select the appropriate DHM server where to take data from.

Once the selection of the DHM server is made, the dialog will show all available digital data sources of the selected type (digital).

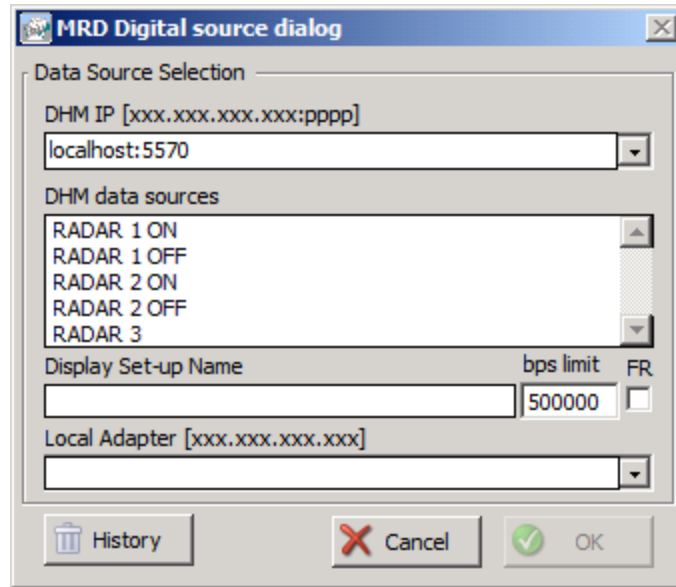


Figure 5-44: Available digital data source selection

In the figure above, on the local DHM server an “RADAR1 ON” is available.

By double clicking “RADAR1 ON”, the source will be selected and its name will be put in the “Display Set-Up Name”-field. However, you will have the possibility to type your own name.

The bps (bytes per second) limit is an overload protection parameter that protects the MRD for overload crash. The standard value of 500000bps is a good default value.

The FR (Force Reconnect on timeout) flag forces that MRD to reconnect to its DHM server for re-opening the data stream connection on reception of the timeout message.

The local adapter binds the digital data to the corresponding physical network adapter.

**Note: Be aware that all spaces must be replaced by an underscore; otherwise an error dialog will prompt! (ADS-B\_OUTPUT it is)**

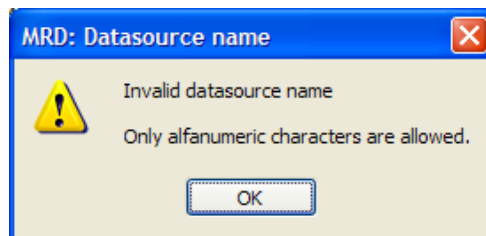
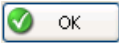


Figure 5-45: Underscores instead of spaces!





Finally, press  to confirm your selection.

Repeat these steps for every data source you want to select.

**Another example:** select a video source on a DHM server that is running on another pc with IP address 192.168.0.106 on port 5570:

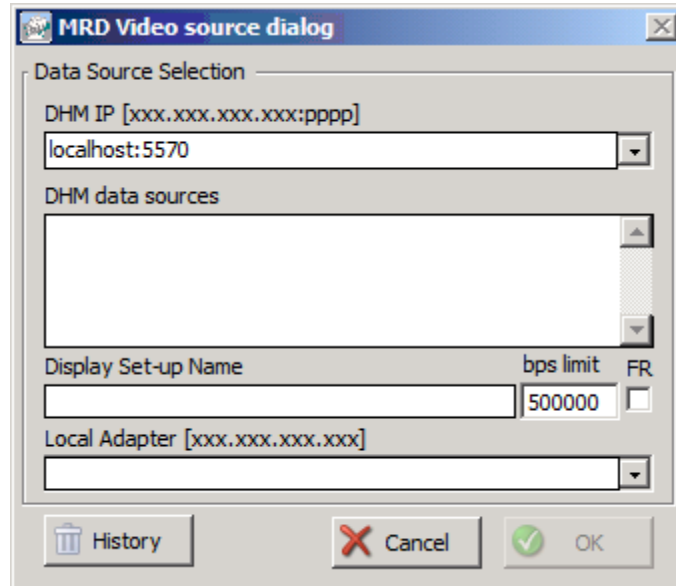


Figure 5-46: Video source selection

Finally, the Data Sources dialog can be as follows:

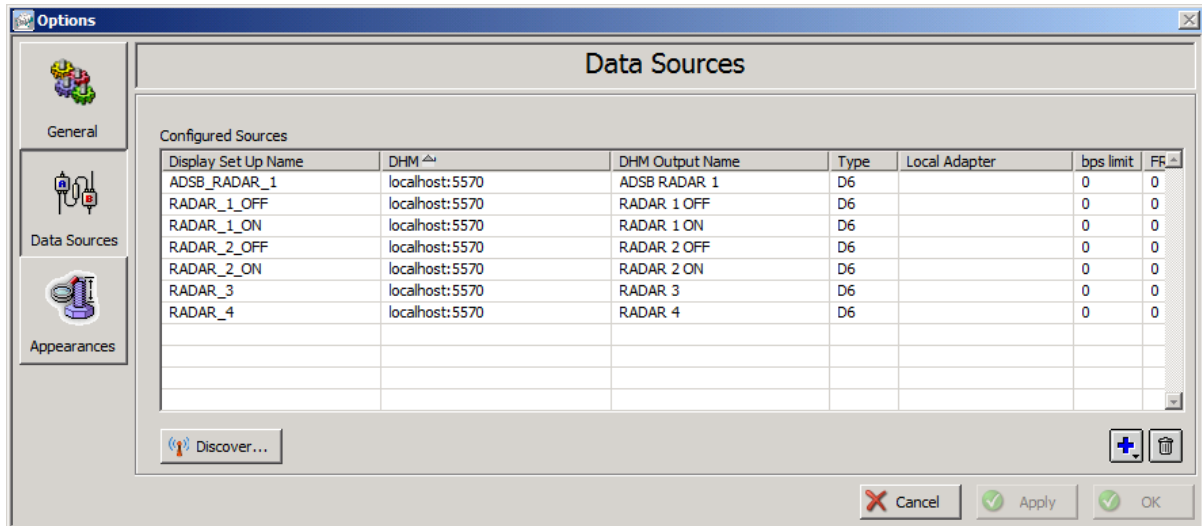


Figure 5-47: Options dialog with 6 digital sources configured

You may sort the data sources list by clicking in the column headers. The list used to assign data sources in the MRD “setup and analysis” window is ordered in the same way as selected here.



### 5.1.3. Appearances options



To enter the Appearances dialog press the “Appearances” button on the left side of the dialog window. Here we can configure the appearances of the Compass, Information windows and the Screen. Those adjustments are described below.

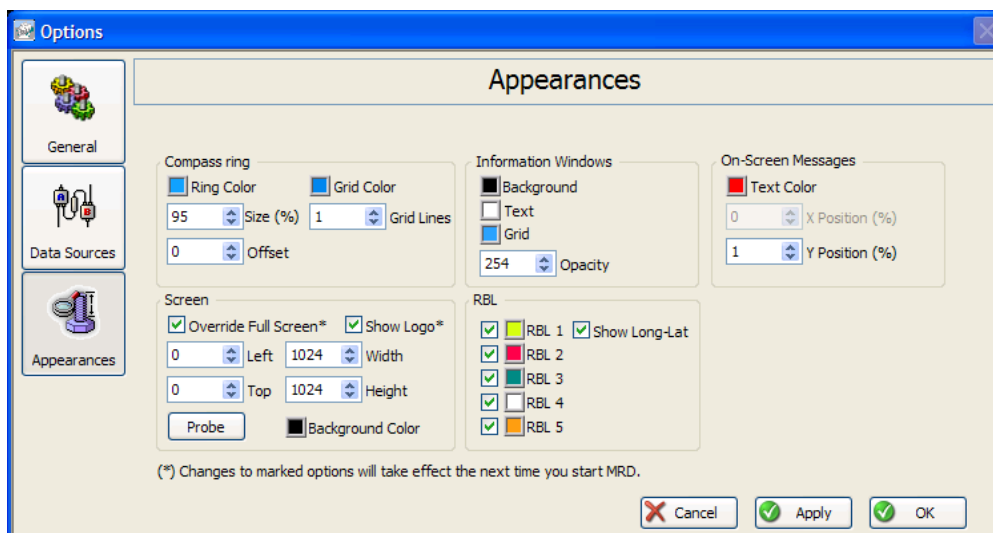


Figure 5-48: Options dialog “Appearances” section

**Compass Ring** has the following settings:

- **Ring Colour:** to define the colour of the compass
- **Grid Colour:** to define the colour of the grid (Grid can be enabled by pressing F6 as explained above)
- **Size:** this defines how much percent, beginning from the centre of the display area the compass will cover. (Min. value is 50%)
- **Grid Lines:** here one can set the number of grid lines that will be shown when F6 is pressed.
- **Offset [Degrees]:** determines the zero degree position of the compass. An offset of 10 means that the compass 0deg point is at 10 deg.

**Information window:** those settings apply on the different information windows that can be put on top of the PPI. You can choose the following settings:

- **Background** colour
- **Text** colour
- **Grid** colour
- **Opacity:** this determines the general level of opacity. By setting this to for example 100, you can easily lay the Target Info Table or Micro Table over the current radar display. The maximum value is 254. For every information window on the PPI screen, you can also change the opacity by pressing the +/- keys.





Figure 5-49: Opacity of 150

**On-screen messages:** to be applied on the text messages that appear on the screen. (for example: Radar Data Source time out [Digital - 5])

- Text Colour
- X-position (%)
- Y-position (%)

**Screen:** When Toggle Full Screen is pressed, you can choose whether to expand the display to the full resolution of the screen, or just to expand it to a predefined full screen resolution. (This is to fit easily all different kind of monitors).

- **Override Full Screen:** check the button to enable this feature
- **Left:** is the left position of the MRD
- **Right:** is the right position of the MRD
- **Width:** the MRD's width
- **Height:** the MRD's preferred height
- **Probe**: When you first use the mouse to resize and replace the MRD window, you can read out that actual position by clicking Probe. Then the Left/Right/Width/Height values will correspond to the actual window setting.
- **Background colour:** change the background colour of the PPI
- **Show logo:** show or hide the logo in the PPI (see also explanation below)

**The screen settings will only take effect when the MRD is restarted!**

**RBL (Range Bearing Line):** Enable or disable one out of 5 possible Range Bearing Lines. Assign an appropriate colour to it. Enable or disable the "Show Long-Lat" position when the cursor is in RBL mode.

### 5.1.3.1. How to show a logo in the MRD?


**Note : Configuring a logo is an expert setting!**

The logo must be a \*.jpg file in the C:\INTERSOFT\MRD\Logos directory and the MDR.ini file needs following code:

```
[Logo]
List.<size(s)>=1
List 0.Name="*.JPG"
List 0.XPos=0
List 0.YPos=99
List 0.Anchor=leftbottom
List 0.Opacity=20
```



## 5.2. Setup and analysis

The “Setup and Analysis” window allows the user to assign the configured data sources to the available displays and to configure the specific data sources parameters. The “Setup and Analysis” window also provides analysis windows to inspect the data from the specific data sources. To open the “Setup and Analysis” window select “Setup and Analysis...” from the Configuration menu or press the “Setup and Analysis”  button from the application toolbar.

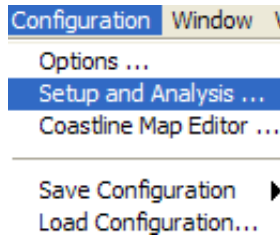


Figure 5-50: Selecting the “Setup and Analysis...” menu

The “Setup and Analysis” window has 4 tabs, each representing a display type i.e. Digital, Vector, Video and Status.

When no layers are configured, the following window will appear:



Figure 5-51: Setup and analysis window



### 5.2.1. Setup and analysis: digital

The digital section of the window allows the user to assign digital data sources to the available digital displays. The number of available digital displays is configured in the options window. (Maximum 6)



Figure 5-52: Setup and Analysis - digital

Table 5-1 shows an overview of the digital display options.

Table 5-7: Digital display options

Item	Usage
<input checked="" type="checkbox"/> On	The digital display is On (visible/checked) or Off (invisible/unchecked)
<input checked="" type="checkbox"/> Focus	Select between the Focus settings and normal settings.
<input type="text" value="RADAR_1_ON"/>	Select the data source to display or select <none>.
Display setup	Open the configuration window for the current data source.
Selection Info	Open a selection information window to display the actual data message belonging to a target.
History	Opens a history window for analysis
Histogram	Opens a histogram window for analysis
Display list	Opens a list of all current targets displayed for this data source

To assign a data source to a display simply click on the Configuration dropdown menu and select the data source you want to display.

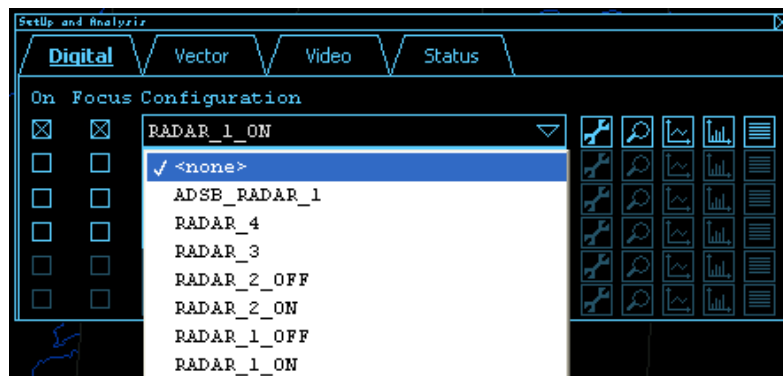


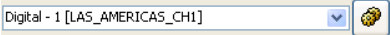


Figure 5-53: Assigning a digital data source



### 5.2.1.1. Display setup

There are 2 ways to open the “Display setup”-window:

- By clicking the “Display setup”-button  or
- By clicking the  button for the layer of interest in the setup toolbar 

The result is both the same:

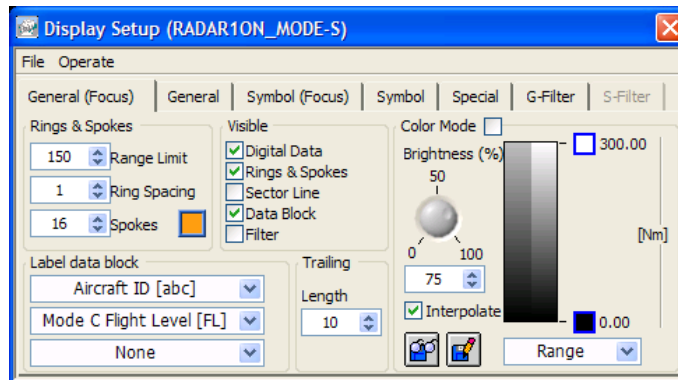


Figure 5-54: Display setup window

The digital “Data Setup”-window has a menu bar which allows the user to save and load digital data source configurations and to revert the settings back to factory defaults (see figure below). These settings are similar for the vector, video and status window setup.

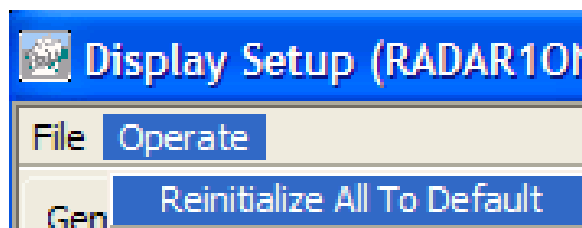


Figure 5-55: Factory Defaults



Further on there are 5 different tabs:

Table 5-8: Digital data source configuration overview

Tab	Usage
General (Focus)	Specify digital data source items their visibility and dimension; specify the data labels per target report. These settings are active when the “Focus” checkbox <input checked="" type="checkbox"/> is checked on the Setup and Analysis window.
General	Same functionality as “General” but these settings are used when the “Focus” checkbox <input type="checkbox"/> is unchecked.
Symbol (Focus)	Determine the symbol and colour per target type. These settings are active when the “Focus” checkbox <input checked="" type="checkbox"/> is checked on the Setup and Analysis window.
Symbol	Same functionality as “Symbol” but these settings are used when the “Focus” checkbox <input type="checkbox"/> is unchecked.
Special	Specify timing source, coordinates, label font and size.
Filter	Specify filter options

5.2.1.2. General tab

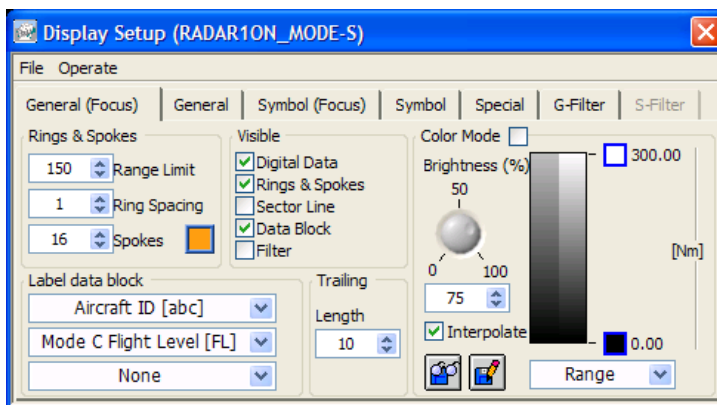


Figure 5-56: General tab

The general tab has several configurable items for the digital data source.

- **Rings & Spokes:** Determine the size and look of the range rings, within a certain Range Limit.
- **Visible:** turn on or off the Digital Data, Rings & Spokes, Sector Line, Data Block or Filter tab. The sector line is automatically clipped after some zooming factor.
- **Label data block:** Each target report has 3 labels that may be assigned to it, determine here which data items you wish to see, out of the following list:



None  
 Range [Nm]  
 Azimuth [deg]  
 Mode A Code [oct]  
 Mode 1 Code [oct]  
 Mode A & 1 Code [Oct]  
 Mode 2 Code [oct]  
 Mode S Address [hex]  
 Mode C Flight Level [FL]  
 Mode C Altitude [ft]  
 Mode C Altitude [100ft]  
 3D Height [ft]  
 Aircraft ID [abc]  
 Transponder Level [#]  
 Flight Status [#]  
 Power [dBm]  
 Heading [deg]  
 Ground Speed [kt]  
 UTC [h:m:s]  
 Delay [s]  
 Track Number [#]  
 ✓ Mode5 PIN NO  
 Mode5 PIN  
 Mode5 NO

Figure 5-57: Label information

- **Mode C Flight Level [FL]:** from data field ASTERIX I001/090, I048/090, I011/093
- **Mode C Altitude [ft] or [100ft]:** from data field ASTERIX I001/090, I048/090, I011/093
- **3D Height:** 3D PSR height from ASTERIX I048/110 or Geometric altitude from ASTERIX I021/140
- **UTC [h:m:s]:** is the Time Of Detection (TOD) from the data
- **Delay [s]:** is the difference between TOD and Time Of Recording (TOR).

In case a file (edr/D6/S4) is replayed, the original TOR from the recording will be used to calculate  $TOD - TOR = Delay$ .

In case the data is output and input again, for example on UDP or with a UDR600, the TOR is time stamped according to the current pc-time, which will correspond to the actual delay of the replay.

***It is important to have the RASS-R pc, where the recordings are made, time synchronized with the radar. (For example by NTP) In this case, the delay will show the accurate value. In case of a discrepancy between the pc-time and UTC time, high or even negative delays can be displayed.***

- **Mode5 PIN NO; Mode5 PIN; Mode5 NO;** from ASTERIX CAT48 SP data field. Military M5 custom content is manufacturer dependent and set by the SP type field in DHM CAT34/48 Convert module. See DHM UM for further details.

- **Trailing:** set the size of the trailing history dots.
- **Colour Mode:** not yet implemented.

***Note: Whether the settings from General (Focus) or General are applied, only depends on the Focus checkbox!***





### 5.2.1.3. Symbol tab

The target types are determined by the DHM during the radar data conversion. The list is thus dependent on the type of the originating data and is dynamically fetched from the DHM.

Use the Symbol box to select a symbol for the accompanying target type.

The S colour determines the symbol colour and the D colour determines the colour of the labels.

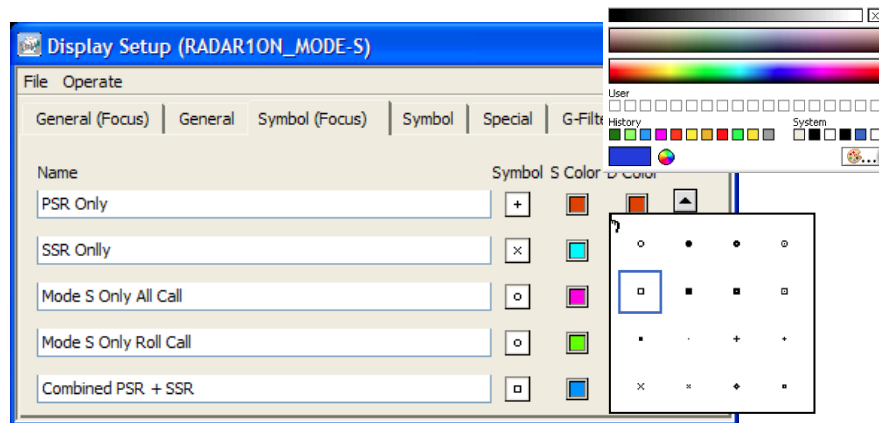


Figure 5-58: Digital data source symbols

A complete list of targets can be found below:

- PSR Only
- SSR Only
- Mode S Only All Call
- Mode S Only Roll Call
- Combined PSR + SSR
- Combined PSR + Mode S All Call
- Combined PSR + Mode S Roll Call
- PSR Only Test Target
- SSR Only Test Target
- Mode S Only All Call Test Target
- Mode S Only Roll Call Test Target
- Combined PSR + SSR Test Target
- Combined PSR + Mode S All Call Test Target
- Combined PSR + Mode S Roll Call Test Target
- SSR Only SPI
- Mode S Only All Call SPI
- Mode S Only Roll Call SPI
- Combined PSR + SSR SPI
- Combined PSR + Mode S All Call SPI
- Combined PSR + Mode S Roll Call SPI
- SSR Only Emergency
- Mode S Only All Call Emergency
- Mode S Only Roll Call Emergency
- Combined PSR + SSR Emergency
- Combined PSR + Mode S All Call Emergency
- Combined PSR + Mode S Roll Call Emergency
- Coasts
- PSR Only Reflection
- SSR Only Reflection

**Note: Whether the settings from Symbol (Focus) or Symbol are applied, only depends on the Focus checkbox!**



### 5.2.2. Special tab

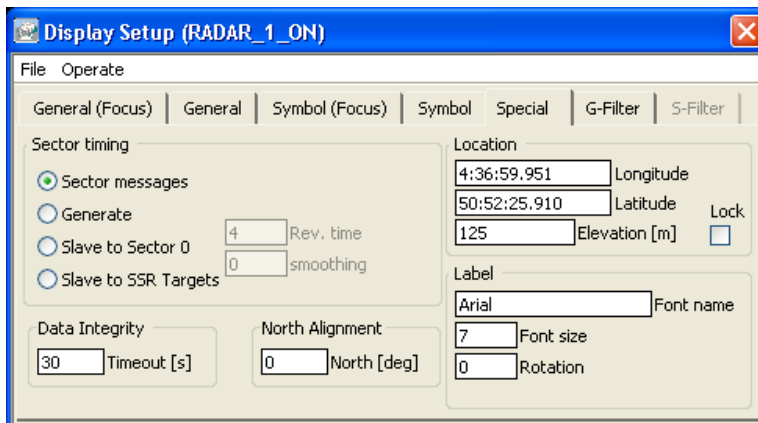


Figure 5-59: Digital data source special items

The special tab contains the following items:

- **Sector timing:** determines the display’s update rate. Either the display is updated via sector messages received in the radar data stream or internally generated, then the radar rotation is simulated and dummy sector messages are generated which cause the display to refresh its screen and draw the targets. There are 2 more options (slave to...) which are currently under development and not yet functional.
- **Location:** specifies the geographic coordinates of the radar centre (WGS-84 and 1mdeg resolution). When coordinates are typed as decimal degrees they will automatically be converted into degrees, minutes and seconds.
- **Lock:** when Lock is checked, and on the condition that the ASTERIX CAT034(120)3D Position of Source Data is available, the digital layer center point can be locked to the coordinates provided in CAT034(120).
- **Label:** allows the user to change the look and rotation of the target labels. (for example Arial, Helvetica).

**Note:** The rotation of a label can be individually changed by selecting a target and rotate it using the scroll wheel of your mouse.

- **North Alignment:** changes the north alignment of the targets. This is only possible for X/Y data and not for longitude/latitude data (for example MODE-S or ADS-B) Resolution is 1mdeg.
- **Data Integrity [s]:** specifies a timeout in seconds. Upon expiration, a service message is displayed if no data was received for a particular digital source.

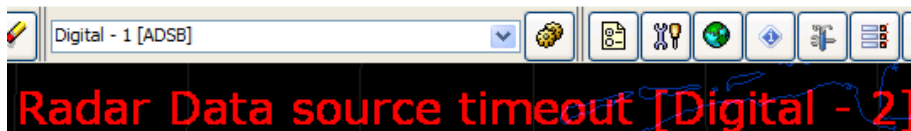


Figure 5-60: Data source timeout

### 5.2.2.1. G-Filter tab

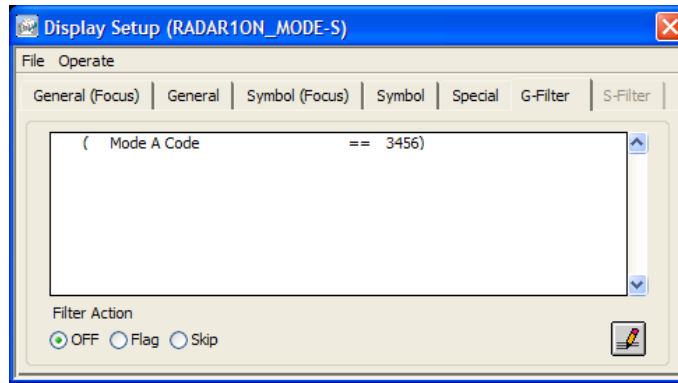



Figure 5-61: G-Filter tab

The G-filter or General-filter can be used to filter on the D6 data fields. It is only possible of course to filter on an item that is available in the D6 data. When you click the pencil button , the filter editor opens:

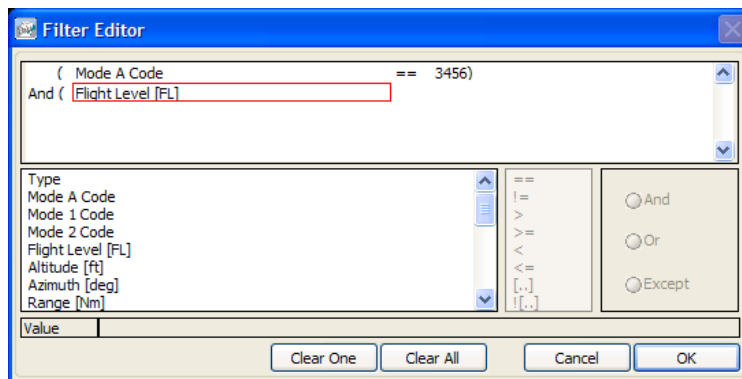


Figure 5-62: G-Filter editor

The filter editor is self-explanatory: select a type to filter on, a proper condition and a logical relation between types. Finally, after pressing OK, you will see the result appearing in the filter pane.



Different filter actions can be chosen:

- Off: Filtered is turned off
- Flag: data that meets the filter condition(s) is greyed out
- Skip: data that meets the filter condition(s) is not displayed

### 5.2.2.2. S-filter tab

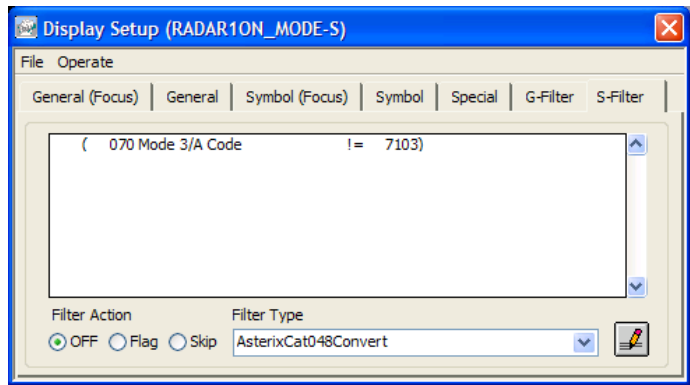


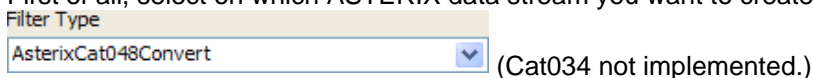
Figure 5-63: S-Filter tab


The S-filter or Specialized-filter can be used to filter on every data item according to the ASTERIX UAP. At this moment, the S-filter is only available (selectable) for ASTERIX CAT001 and CAT048.

The difference with the G-filter is that you can filter on more fields than there are available in the D6 data, for example: “Show only targets that have Enhanced Surveillance Function enabled”, or “only targets that contain BDS40 information”.

**Note:** *The S-filter is the same as the filter in the AsterixCat001Convert and AsterixCat048Convert in the DHM. Therefore, it is important that on the pc where you run the MRD on, you also need to install the DHM, because the MRD takes the filter engine from the DHM!*

First of all, select on which ASTERIX data stream you want to create a filter on, by using the dropdown list:



When you then click in the filter field or on the pencil button , the filter editor opens:

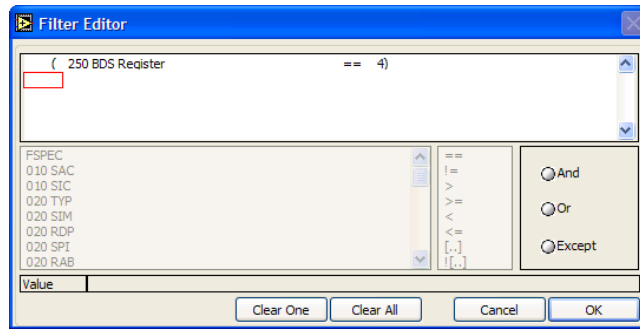


Figure 5-64: S-Filter editor

The filter editor is self-explanatory: select a type to filter on, a proper condition and a logical relation between types. Finally, after pressing OK, you will see the result appearing in the filter pane.



### 5.2.2.2.1. Some useful examples in the MRD

Display only targets with an Azimuth  $\geq 180$ :

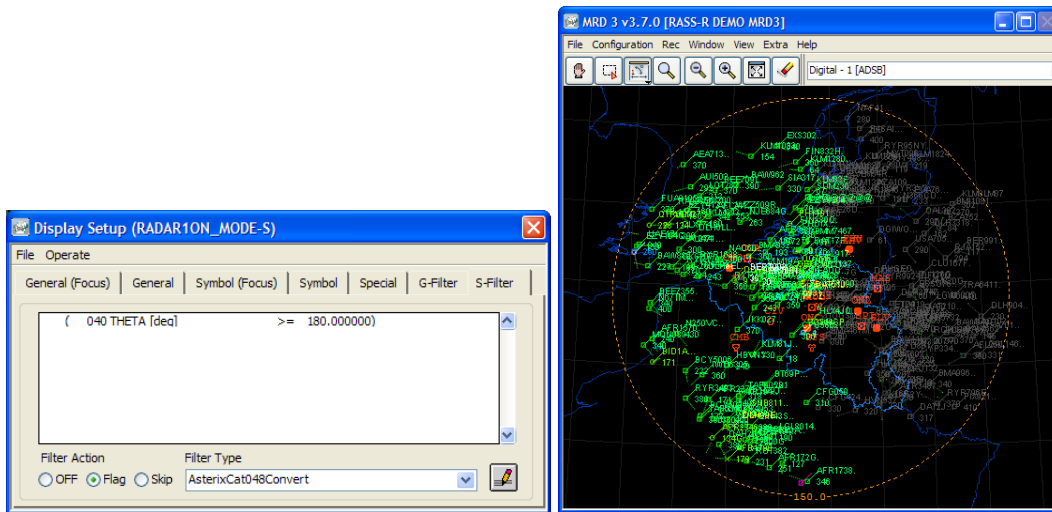


Figure 5-65: S-filter, condition and result 1

Search for Aircraft ID that contains [EXS]:

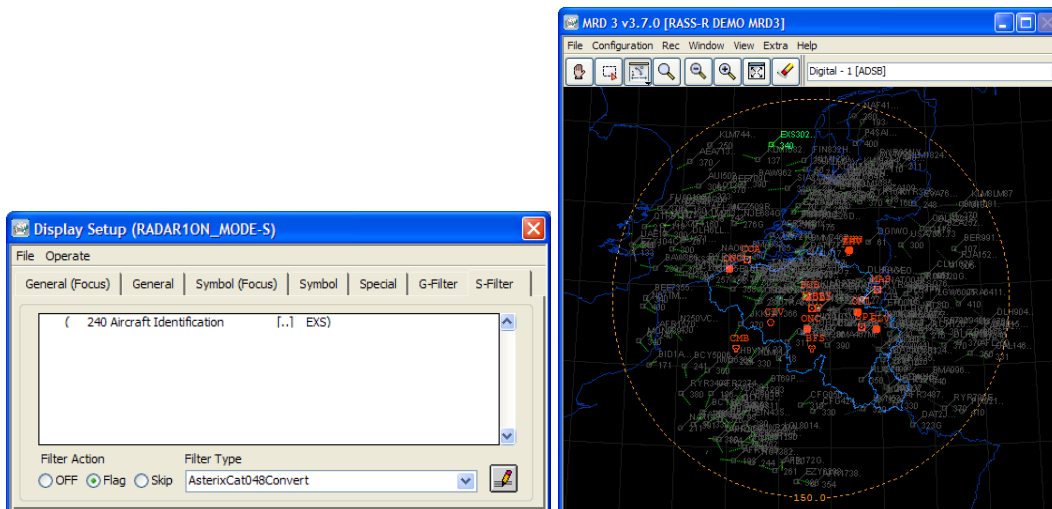


Figure 5-66: S-filter, condition and result 2



### 5.2.2.3. Selection Info

Suppose we use the selection tool to select the following (ADS-B) target:

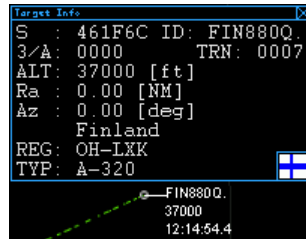



Figure 5-67: Select a target to Display Info

The data of this target can also be viewed in the “Display Info” window that can be opened by clicking on the “Selection Info”  button. In this window you will see the data in text or HEX format. The origin of data will depend on the data type.

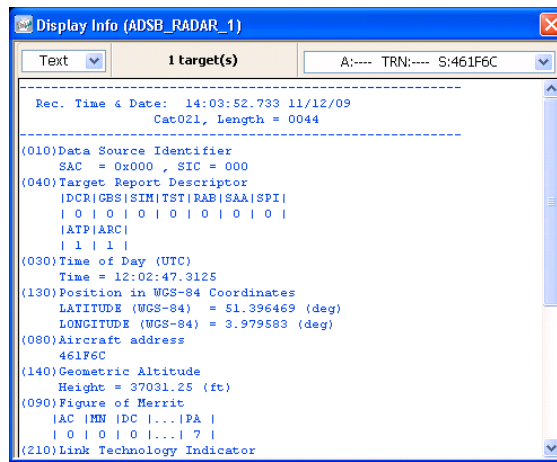


Figure 5-68: Example of ADS-B data (ASTERIX Cat021)

When multiple targets (maximum 50 for every layer) where selected, use the drop down list.

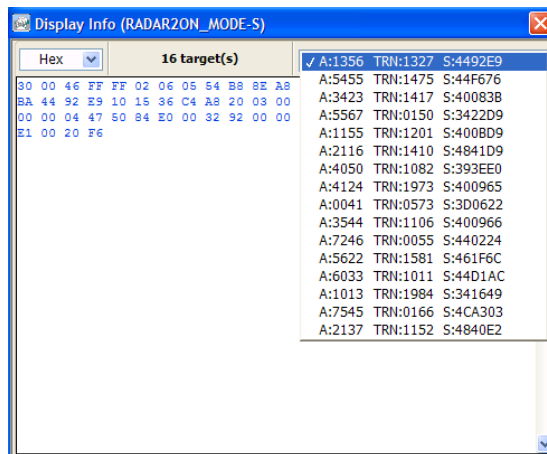


Figure 5-69: Selected targets



### 5.2.2.4. History Info

Open the “Display History” window by clicking the  button. The window in the figure below will be shown. The following parameters can be set:

- **History length:** the number of scan to represent the history for (default 20)
- **Type of history:** select what history you want to see based per scan
- **The graph type:** history window (per scan), histogram window or both

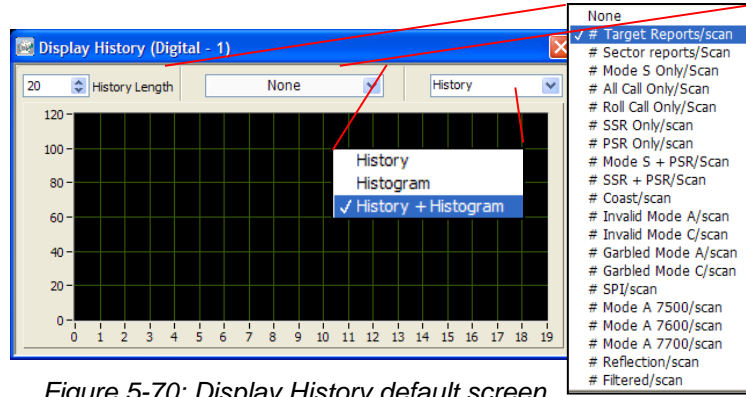


Figure 5-70: Display History default screen

Suppose we want to see the Display History for “Target Reports/scan” in a combined window, then the next graph will be displayed as soon as the MRD displays targets:

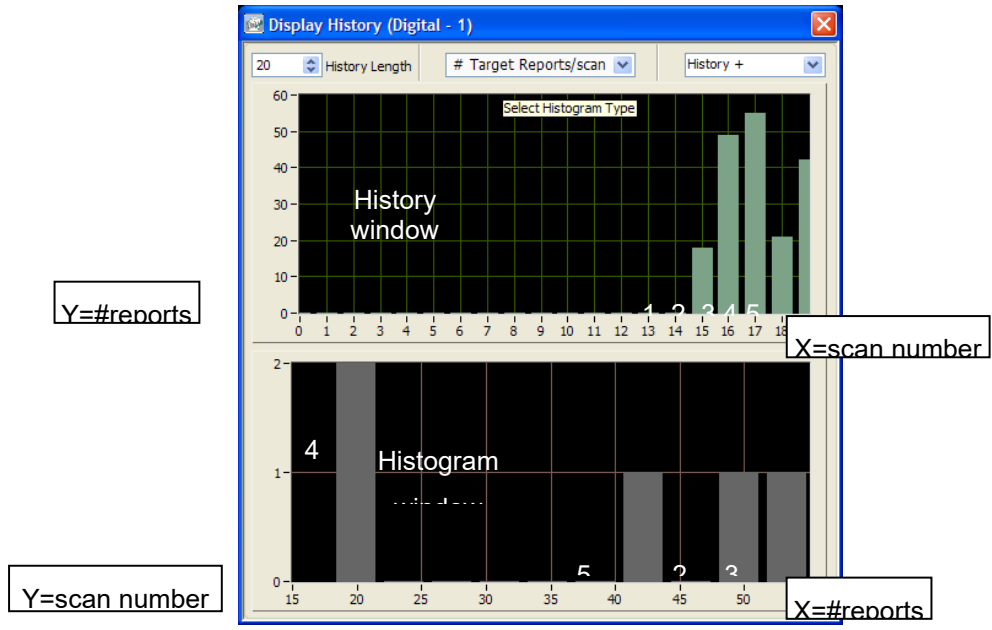


Figure 5-71: Display History "Target Reports/Scan"





The following number of bars in the “History Window” corresponds to the bars in the “Histogram Window”:

Table 5-9: History-Histogram explanation

Bar number	History Window	Histogram Window
1	15 <sup>th</sup> scan +/- 20 targets	Around 20 targets were measured a first time
2	16 <sup>th</sup> scan +/- 50 targets	Around 50 targets were measured a first time
3	17 <sup>th</sup> scan +/- 55 targets	Around 55 targets were measured a first time
4	18 <sup>th</sup> scan +/- 20 targets	Around 20 targets were measured a second time
5	19 <sup>th</sup> scan +/- 41 targets	Around 41 targets were measured a first time

### 5.2.2.5. Histogram info

Open the “Display History” window by clicking the  button. The following parameters can be set:

- **Data Source:** different data sources are possible
- **Bin size:** number of bars on the X-axis in which the information is divided (between 5-100)
- **History Length:** number of scans
- **Scale:**
  - **Absolute:** measured against the Y-axis scale in number of scans
  - **Relative:** measured against the Y-axis scale in percentage of scans (see further for example)
  - **Cumulative:** new measurements are added to the previous value (see further for example)  
Cumulative is only meaningful when relative is selected.
- **X-axis scale:** depends on the Data Source selected

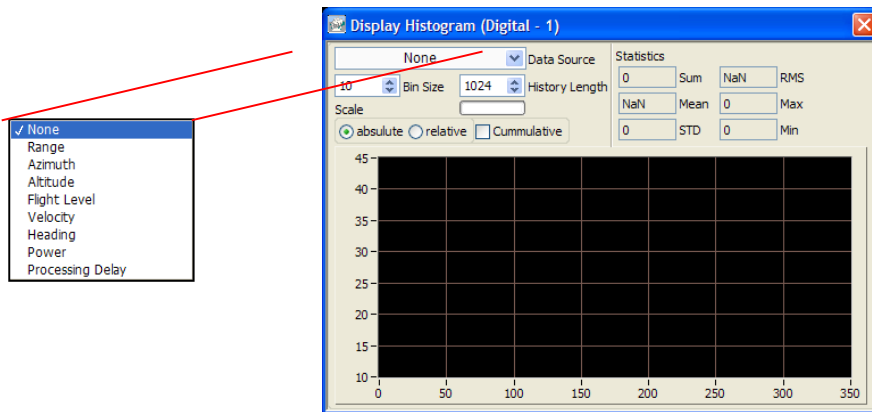


Figure 5-72: Display Histogram default screen



Suppose we want to see a histogram of the velocity. As soon as the MRD displays targets, the graph will be filled up. Note that the X-axis scale changed to 700knots maximum since we selected Velocity as the data source.

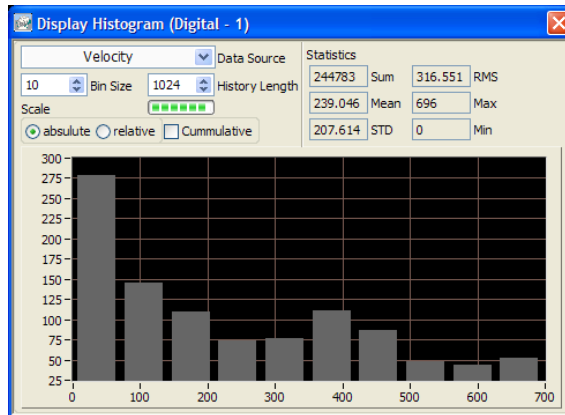


Figure 5-73: Display Histogram "Velocity"

What is the relation between the relative view and the relative-cumulative view?

Consider the figure below. Let us compare both views but only the first 3 bars (figures are approximations):

In the left window, you see 6% at 2500ft, 8% just below 5000ft and 7% just above 5000ft.

In the middle window, you see that the first bar at 2500ft corresponds to 6%, the second bar just below 5000ft corresponds 14% (cumulative: 6+8), the third bar corresponds just above 5000ft corresponds to 21% (cumulative: 14+7) and so on.

In the right window, we can interpret the graph: 50% of the planes fly below 25000ft.

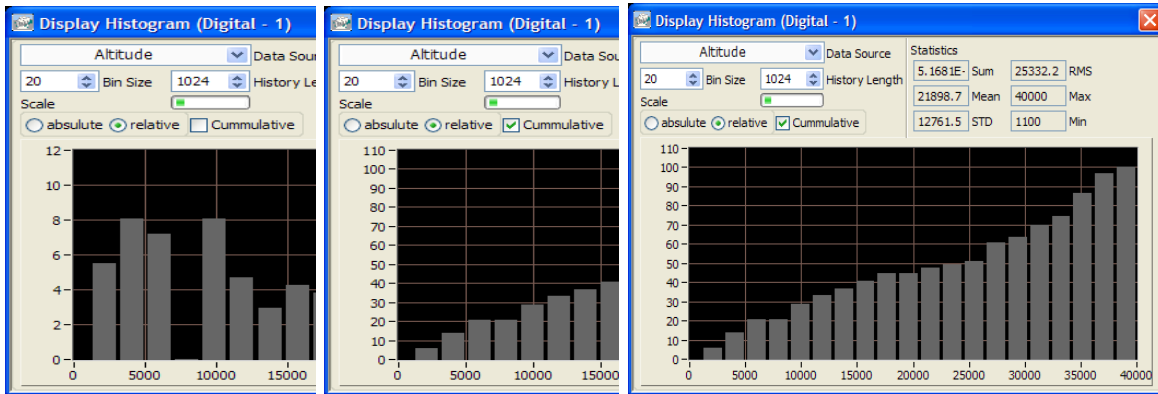


Figure 5-74: Cumulative – Relative



### 5.2.2.6. Display List

When you open the Display list by clicking the  button, a window listing all targets currently displayed, filtering conditions excluded (see 5.2.2.1), will pop-up.

Nb.	Trk. Nb.	Mode A	Mode S	AC ID	Alt. [ft]	Ra. [NM]	Az. [deg]	TOD [UTC]
1	20	7216	400942	BAW697..	34025	104.344	109.677	12:28:47.219
2	22	1373	40080F	BEE7309.	27750	134.992	52.982	12:28:45.398
3	36	5751	3CD075	RUS8136.	40000	107.348	257.629	12:28:52.070
4	39	4111	400561	BAW2583.	28150	85.906	290.841	12:28:53.180
5	47	5233	400980	BEE7265.	37000	94.461	0.478	12:28:43.617
6	56	5645	020058	RAM785..	7175	66.762	248.868	12:28:51.789
7	70	3443	48415E	KLM44M..	4050	96.012	4.114	12:28:43.758
8	74	0252	4492E5	DAT81Y..	25375	133.875	122.657	12:28:47.680
9	85	3547	400936	BAW949L.	34050	49.770	304.277	12:28:53.609
10	91	0616	3C64E9	DLH492..	30275	79.574	38.639	12:28:44.867
11	98	2141	ABCA08	NWA33...	3350	81.937	0.192	12:28:43.648
12	101	3125	461F6A	FIN875P.	38000	80.219	98.833	12:28:46.852
13	103	5763	4008BF	BEE7114.	33975	121.234	222.682	12:28:50.930
14	136	7546	40007D	VPCFD...	35725	86.566	143.663	12:28:48.328
15	139	7340	4841B8	KLM45J..	25325	122.547	344.383	12:28:54.922
16	146	5704	40110A	FQDRAVBB	28000	68.801	291.627	12:28:53.195
17	169	0742	4CA4EB	RYP2145.	36000	102.637	5.059	12:28:43.766
18	175	4117	01002F	MSR725..	24550	96.090	123.261	12:28:47.656
19	177	2354	342641	FUA9105.	37000	141.000	21.918	12:28:44.359
20	190	6360	449D82	OGLB...	2300	75.789	281.332	12:28:52.859
21	202	0615	3C6563	DLH426..	19000	126.457	116.477	12:28:47.430
22	205	6623	40048E	..BAW855	40000	83.695	99.893	12:28:46.891
23	213	3066	AE10C1	*****	43050	98.492	221.353	12:28:50.875
24	214	0101	4C01A3	JAT272..	29025	79.633	113.225	12:28:47.320
25	221	5226	4CA1F6	RYP2436.	37000	121.395	106.128	12:28:47.094

Figure 5-75: Display List window

This list can be sorted on each column, by clicking on its header cell



### 5.2.3. Setup and analysis: Vector

The vector section of the window allows the user to assign vector data sources to the available vector displays. The number of available vector displays is configured in the options window. (Maximum 6)

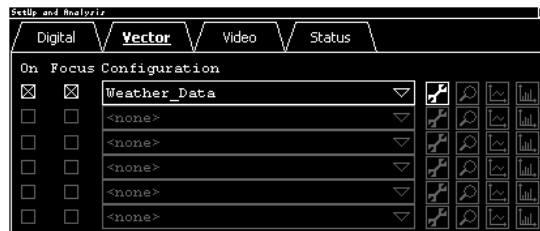


Figure 5-76: Setup and Analysis - vector

Table 5-4 shows an overview of the vector display options.

Table 5-10: Vector display options

Item	Usage
<input checked="" type="checkbox"/> On	The vector display is On (visible/checked) or Off (invisible/unchecked)
<input checked="" type="checkbox"/> Focus	Select between the Focus settings and normal settings
Weather_Data	Select the data source to display or select <none>.
Display setup	Open the configuration window for the current data source.

To assign a vector source to a display simply click on the Configuration dropdown menu and select the data source you want to display.

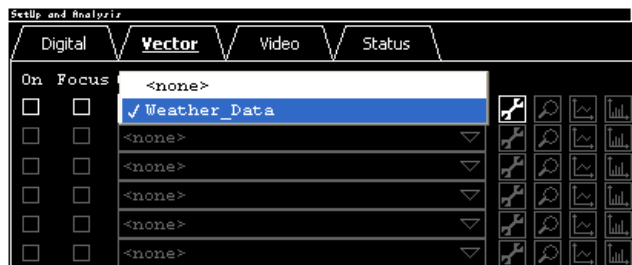


Figure 5-77: Assigning a vector data source

#### 5.2.3.1. Display setup

The display setup window for vector data is similar to digital data.



### 5.2.3.2. General tab

The general tab has several configurable items for the vector data source.

- **Colour palette:** assign different colours to the different intensity levels that are available in the data. For example: if an ASTERIX CAT008 data stream contains 8 intensity levels, they can be configured according the settings below. Maximum 256 levels can be configured.
- **Visible:** make weather data visible or not
- **Fill:** fill the contours in case contour weather data is displayed.

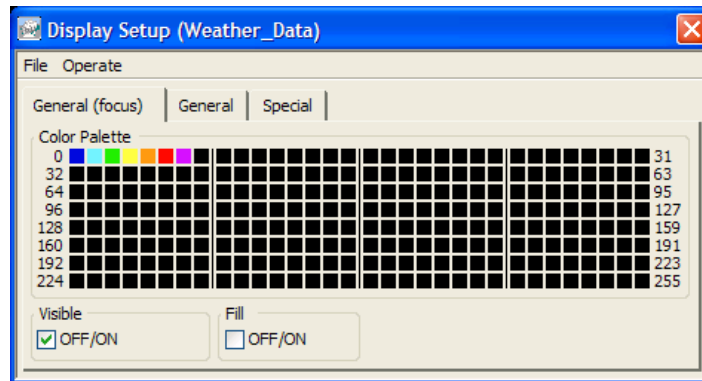


Figure 5-78: General tab vector

**Note: Whether the settings from General (Focus) or General are applied, only depends on the Focus checkbox!**

### 5.2.3.3. Special tab

The special tab has several configurable items for the vector data source.

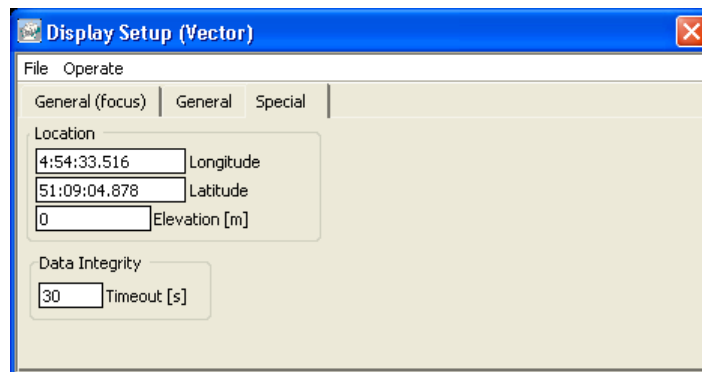


Figure 5-79: Special tab vector



- **Location:** specifies the geographic coordinates of the radar centre (WGS-84 and 1mdeg resolution). When coordinates are typed as decimal degrees they will automatically be converted into degrees, minutes and seconds.
- **Data Integrity [s]:** specifies a timeout in seconds. Upon expiration, a service message is displayed if no data was received for a particular vector source.



Figure 5-80: Vector data timeout



### 5.2.4. Setup and analysis Video

The video section of the window allows the user to assign video data sources to the available vector displays. The number of available video displays is configured in the options window. (Maximum 6)

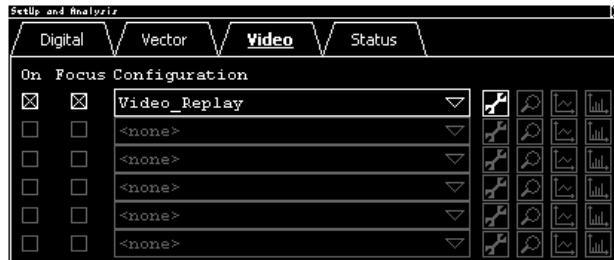


Figure 5-81: Setup and Analysis - video

Table 5-5 shows an overview of the vector display options.

Table 5-11: Video display options

Item	Usage
<input checked="" type="checkbox"/> On	The video display is On (visible/checked) or Off (invisible/unchecked)
<input checked="" type="checkbox"/> Focus	Select between the Focus settings and normal settings
Video_Replay	Select the data source to display or select <none>.
Display setup	Open the configuration window for the current data source.

To assign a video source to a display simply click on the Configuration dropdown menu and select the data source you want to display.

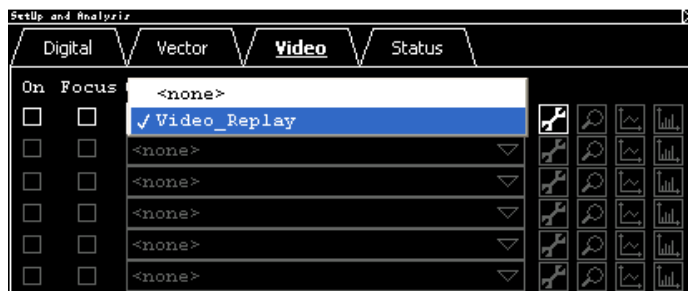


Figure 5-82: Assigning a video data source

**Note: Video is automatically clipped (i.e. not displayed anymore) after a certain zooming factor.**



### 5.2.4.1. Display setup

The display setup window for video data is similar to digital data.

### 5.2.4.2. General tab

Most of the settings are similar to the tabs discussed for the Digital Data Source. Only the differences are described in this section.

- **Fading:** means how many percent of the previous drawn line must fade out when a new line will be drawn. A low percentage will have a kind of eraser effect on the screen. A high value will have a kind of after-glowing effect.
- **Range (NM):** define the range of video data to be displayed.
- **Colour:**
  - **Brightness:** defines the brightness of the video data
  - **Interpolate:** must be turned on
  - **Colour setting upper:** actual video data
  - **Colour setting lower:** reference colour

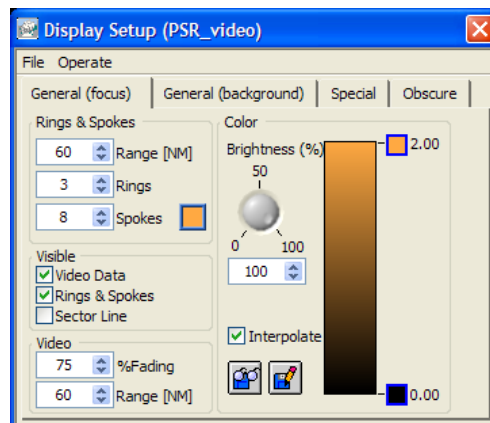


Figure 5-83: Configuring a Video Data Source

**Note: Whether the settings from General (Focus) or General are applied, only depends on the Focus checkbox!**





### 5.2.4.3. Special tab

The special tab has several configurable items for the video data source.

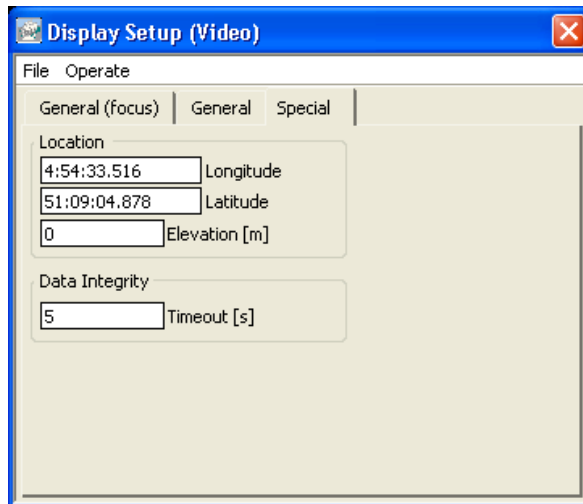


Figure 5-84: Video special tab

- **Location:** specifies the geographic coordinates of the radar centre (WGS-84 and 1mdeg resolution). When coordinates are typed as decimal degrees they will automatically be converted into degrees, minutes and seconds.
- **Data Integrity [s]:** specifies a timeout in seconds. Upon expiration, a service message is displayed if no data was received for a particular video source.



Figure 5-85: Video data timeout



### 5.2.5. Setup and analysis: Status

The Status section of the window allows the user to assign Status data sources to the available status displays. The number of available status displays is configured in the options window. (Maximum 6)



Figure 5-86: Setup and Analysis - status

Table 5-6 shows an overview of the status display options.

Table 5-12: Status display options

Item	Usage
<input checked="" type="checkbox"/> On	The status display is On (visible/checked) or Off (invisible/unchecked)
<input checked="" type="checkbox"/> Focus	Select between the Focus settings and normal settings
BERTEM	Select the data source to display or select <none>.
Display setup	Open the configuration window for the current data source.

To assign a status source to a display simply click on the Configuration dropdown menu and select the data source you want to display.

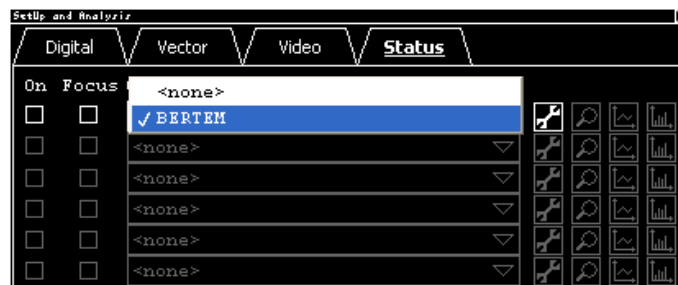


Figure 5-87: Assigning a status data source



Status data will be visible in the MRD in the following window:

```

Status Display (BERTEM_STATUS_OUTPUT)
-----
Rec. Time & Date: 11:00:32.905 25/01/08
Cat034, Length = 0020
-----
(010)Data Source Identifier
SAC = 0x006 , SIC = 003
(000)Message Type
Type = 2, Sector crossing message
(030)Time of Day
Time = 12:00:32.5312
(020)Sector Number
Nb = 072 (9)
(050)System Configuration and Status
Primary Subfield
|COM| 0 | 0 |PSR|SSR|MDS| 0 |FX |
| 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
COM Subfield
|NOGO|RDPC|RDPR|OVL RDP|OVL XMT|MSC|TSV| 0 |
| 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
PSR subfield
|ANT|CH-A/B|OVL|MSC| 0 | 0 | 0 |
| 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
Mode S subfield
|ANT|CH-A/B|OVL SUR|MSC|SCF|DLF|OVL SCF| | |
| 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
|OVL DLF| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
(060)System Processing Mode
Primary Subfield
|COM| 0 | 0 |PSR|SSR|MDS| 0 |FX |
| 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
COM Subfield
| 0 |RED-RDP|RED-XMT| 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 |
PSR subfield
|POL|RED-RAD|STC| 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 |
Mode S subfield
|RED-RAD|CLU| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
    
```

Figure 5-88: Status data

Different status messages (for example from an ASTERIX CAT002 or 034 data stream) will be displayed in a text window.



### 5.2.5.1. Display setup

The display setup window for status data is similar to digital data.

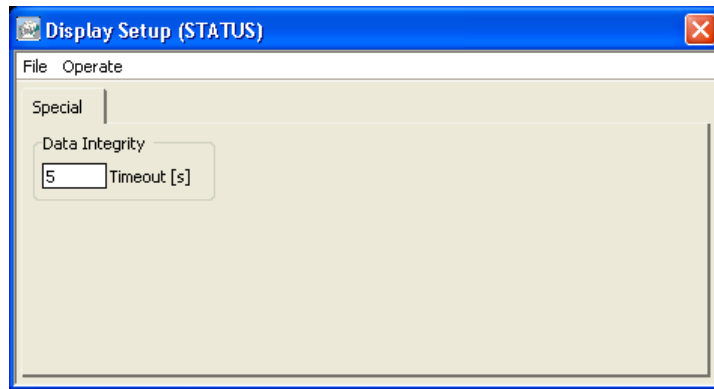


Figure 5-89: Status display setup

- **Data Integrity [s]:** specifies a timeout in seconds. Upon expiration, a service message is displayed if no data was received for a particular status source.

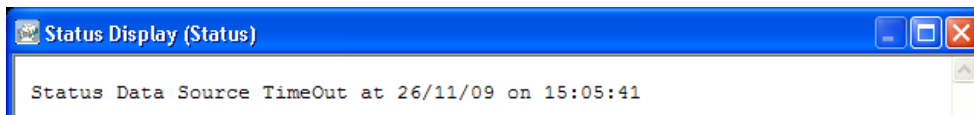



Figure 5-90: Status data timeout

### 5.3. Map Editor

The map editor allows the user to define a custom map to his preference. A map is constructed out of different layers and each layer can be customized. The defined layers can then easily be switched on and off by the user in the MRD main window.

Open the Map Editor by clicking  in the toolbar or by selecting “configuration->coastline map editor” from the menu bar.

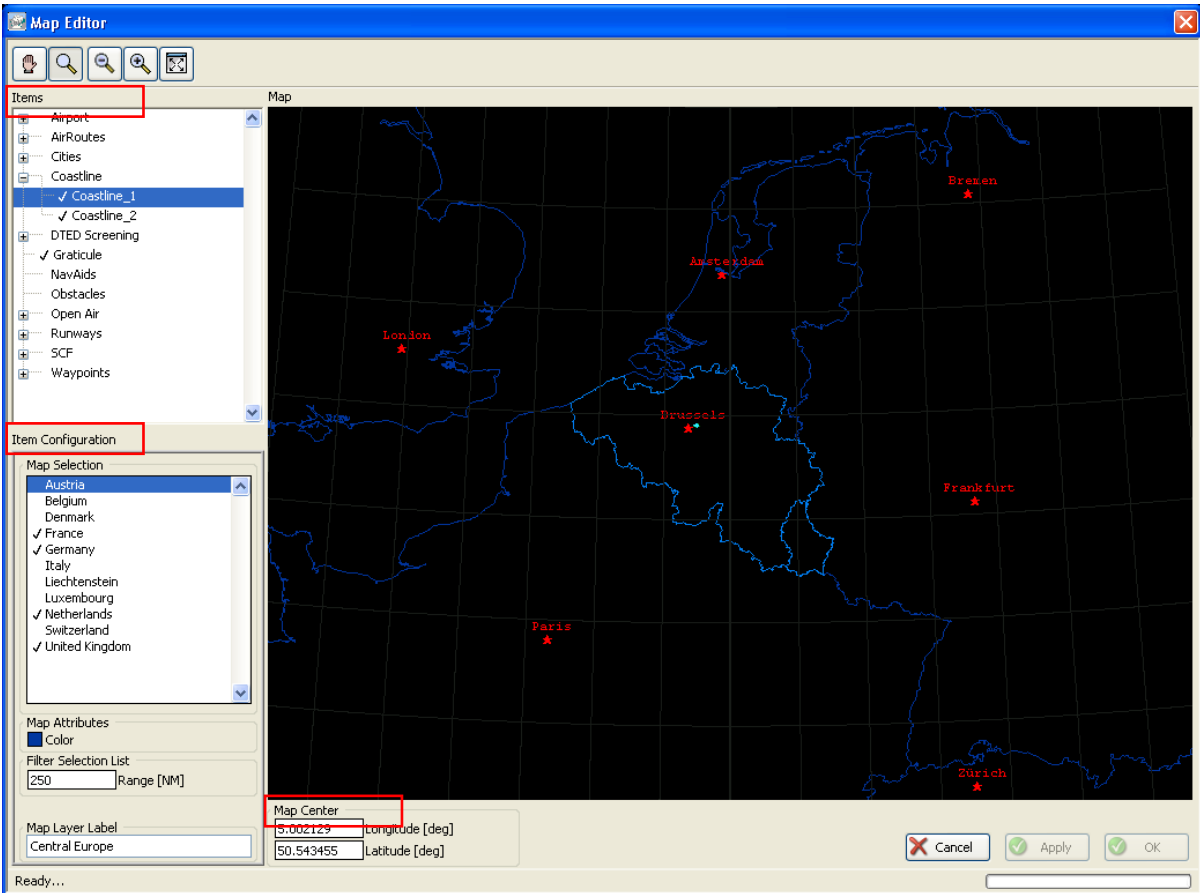


Figure 5-91: Map Editor - general overview

There 3 main fields visible to use for editing the map (Marked red on the figure above).



### 5.3.1. Zoom toolbar

The Zoom toolbar contains functions to manipulate the display area.

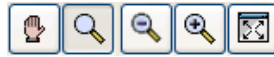







Figure 5-92: Zoom toolbar

The table below shows an overview of the Zoom/Select toolbar's functionality

Table 5-13: Zoom toolbar overview

Button	Usage
 Pan	Switch the display to pan mode, use the cursor to move the display area around
 Zoom	Switch the display to Zoom mode, use the cursor to zoom into areas of interest
 Zoom out	Zoom out progressively until maximum viewing area is visible
 Zoom in	Zoom in progressively until maximum zoom (highest level of detail) is reached
 Home	Switch back to default zoom (-500) and centre

### 5.3.2. Map Centre

**Note: First set the map centre, this will affect all other configuration items which all refer to the map centre.**

There are two fields to configure the map centre position i.e. Longitude and Latitude. The MRD accepts 2 WGS-84 coordinate formats with resolution of 1mdeg: decimal degrees and degrees, minutes and seconds values.

In order to minimize the distortion of radar map circles due to the projection method used, take the map center as much as possible in the center of the complete map. This becomes important when you are displaying for example large areas > 1000NM.



### 5.3.3. Items

This tree view shows a number of configurable map layers, use this field to enable or disable map layers. Only map layers that have been enabled here can later be switched on/off in the main window. If an item shows a [+ ] sign click on it to extend the list, this means you can configure more than one layer with this specific item.

A map can be constructed out of the following items:

Table 5-14: Map Editor Items

Name	#Layers (default)	Description
Airports	3	Detailed airport maps (runways, taxiways, buildings)
Air routes	6	Upper and lower air routes
Coastlines	2	Country border lines
Cities	3	City centres
DTED screening	6	Digital Terrain Elevation Data
Graticule	1	Long-Lat grid
Nav aids	1	Navigation Aids (VOR-DME, NDB, ...)
Open Air	3	Airspace description files
Runways	1	Runway and runway centrelines
SCF	6	Surveillance coordination function
Waypoints	6	Upper and lower airway-waypoints

To enable a map layer item in the Item window, double click it so that the ✓-icon appears in front of it.

The number of layers that are available for a single item is configurable in the ini-file of the specific map item. These can be found in the following directory:

C:\INTERSOFT\MRD\Map PlugIns

To change for example the number of Airport layers from 3 to 6, open the Airport.ini file in Notepad and change the number of layers to 6 in [Object Config]. Then save the file and reload the Airport tree in map editor. Do a similar action for the other map editor items.

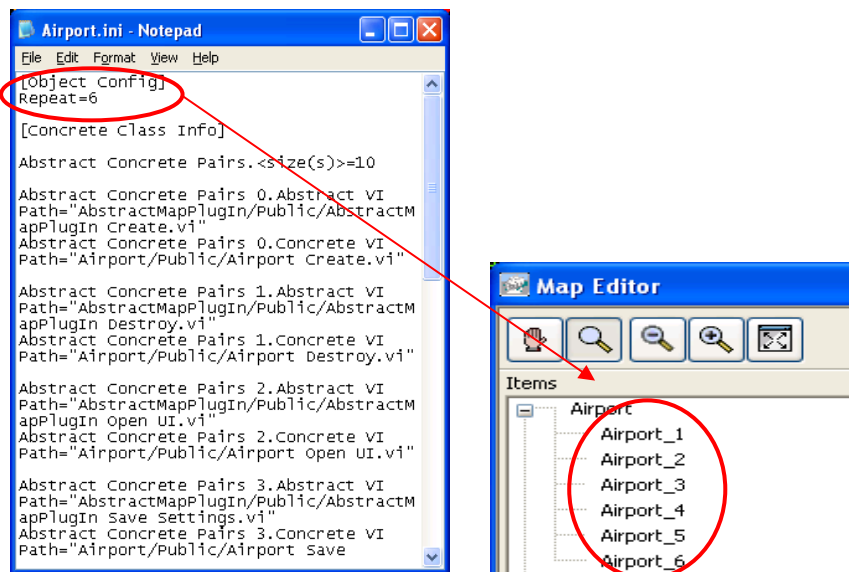


Figure 5-93: Airport.ini file and result



### 5.3.4. Item Configuration

When you select an item, the item's configuration window will be shown. Here, you can configure that specific Item. To enable a map layer for the specific item, double click it so that the ✓-icon appears in front of it. The enabled map layers can then later be switched on/off in the main MRD window. You may choose to give the map layer a custom name by editing the "Map Layer Label" field in the bottom of the item configuration area.

After making changes to the different items the buttons "Apply" and "OK" become high lighted. Pressing the "Apply" button will transfer the map settings to the main MRD window and leave the map editor open. Pressing the "OK" button will transfer the map settings to the main MRD window and close the map editor.

Pressing the "Cancel" button will close the map editor without transferring the changes.

**Note: After map changes are transferred to the main MRD window you will have to save the current configuration in order to make them permanent.**

In the next paragraphs, the different map layer items are explained.

### 5.3.5. Airports Item

The airports item allows the user to show detailed drawings of airfields and their surroundings. Custom airport drawings can be distilled from airport CAD drawings (please contact Intersoft Electronics for details about this procedure).

By default there are 3 airport layers defined in the map editor. This value may be edited in the airport.ini file located in the <c:\INTERSOFT\MRD\map\_plugins> directory. Change the value for "repeat" under the section [Object Config] to the desired number of layers.

The figure below shows the map editor with a detailed map of Zaventem (Brussels Airport, Belgium). in this example 3 airport layers are used each with a different colour for each sub-map of the airport.





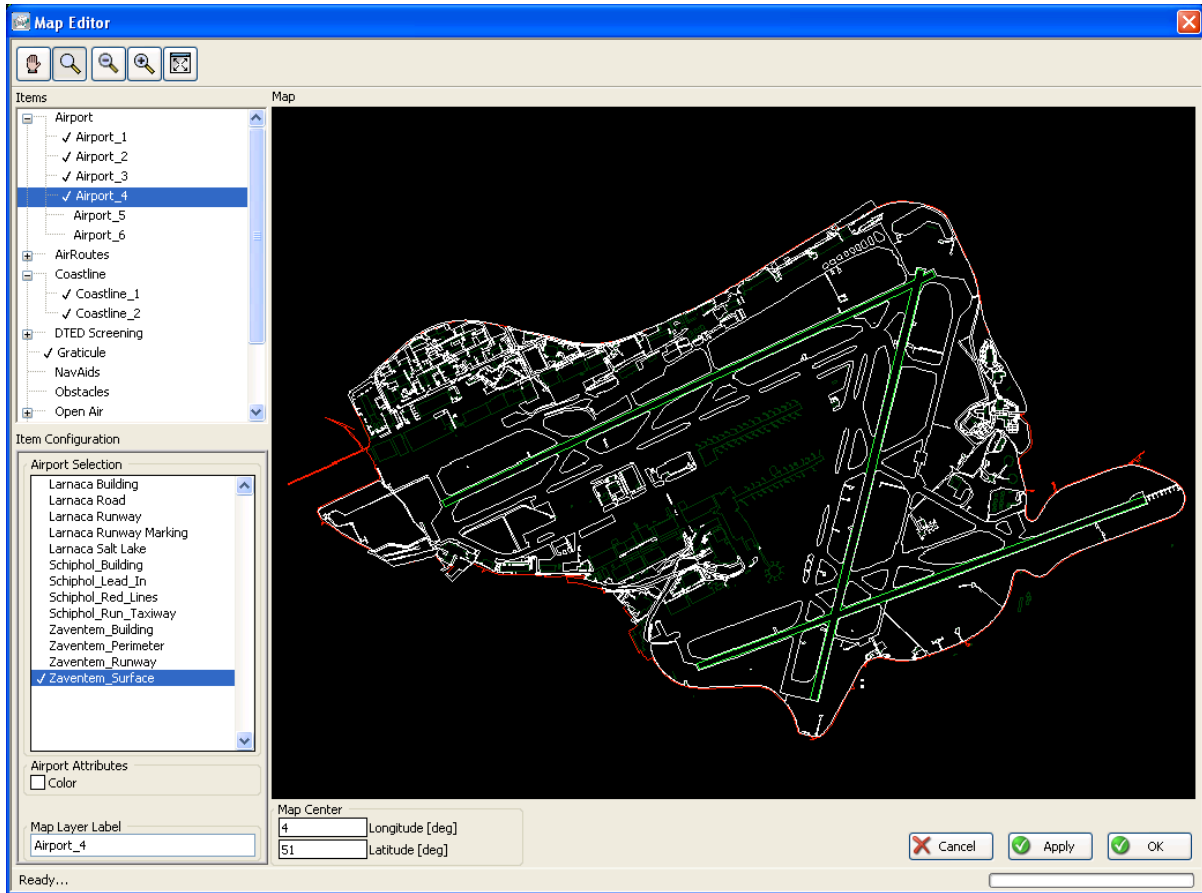


Figure 5-94: Map Editor - airports

To select an airport detail map, simply double click on the map name in the “Airport Selection” list, the ✓-icon indicates a selected (sub) map.



### 5.3.6. Airroutes Item

The Air routes item allows the user to show upper- and lower air routes. The air route files are divided per country. If your country is not listed in the file selection list please contact Intersoft Electronics.

By default there are 6 air route layers defined in the map editor this value may be edited in the airroutes.ini file located in the <c:\INTERSOFT\MRD\map\_plugins> directory. Change the value for “repeat” under the section [Object Config] to the desired number of layers.

The figure below shows the map editor with a map of Belgium and all upper air routes for Belgium and their label.

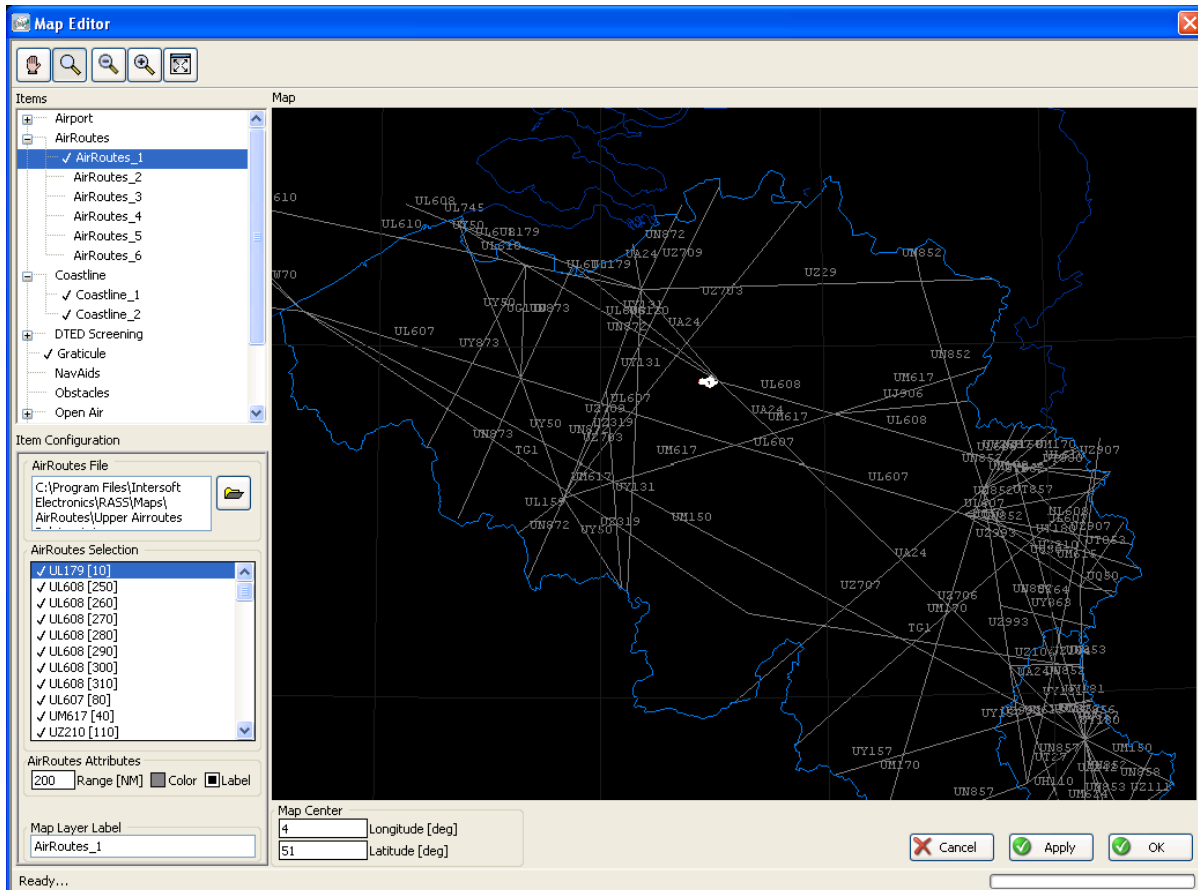


Figure 5-95: Map Editor – airroutes

To select a specific air route file click on the “browse” button in the “AirRoute File” section, a standard file dialog box will appear. Navigate to the <c:\INTERSOFT \maps\airroutes> directory and select the file you would like to use. The files are organized per country in upper and lower air routes.

After you have selected an air route file you can select the air routes that you would like to display. First enter a range (calculated from the map centre) in the “Air routes Attributes” section and then select/deselect the air routes of interest in the “Air routes Selection” section.



### 5.3.7. Cities

The Cities item allows the user to show city centres on the display. By default there are 3 city layers defined in the map editor. This value may be edited in the "Cities.ini" file located in the < c : \INTERSOFT \MRD\Map PlugIns > directory. Change the value for "repeat" under the section [Object Config] to the desired number of layers.

Figure Figure 5-96 shows the map editor with all cities in a range of 250NM around the map centre displayed in red.

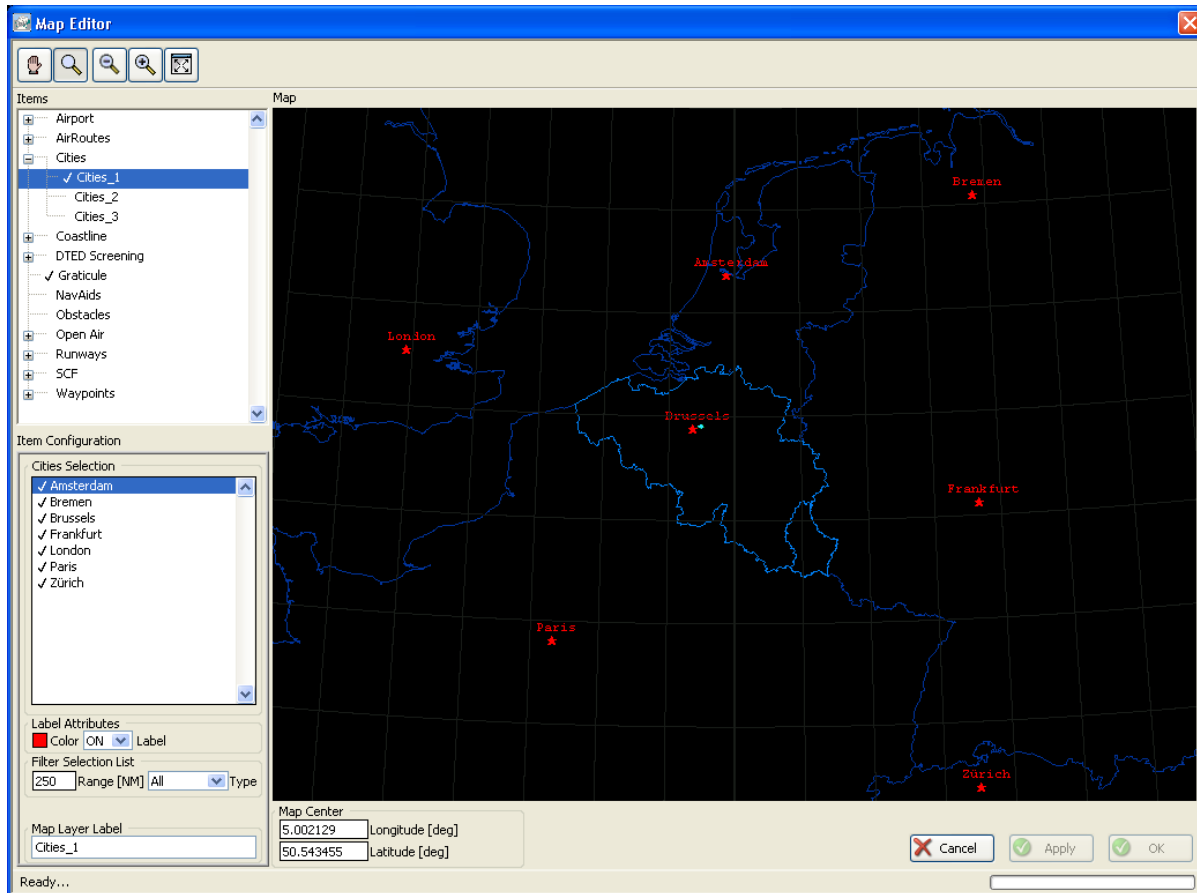


Figure 5-96: Map Editor - Cities

First enter the desired range and type of cities to select from. The Cities Selection list is loaded based on these settings. By default all cities within range will be selected. Deselect the cities that you don't want to display, by double clicking them. Finally choose a color and whether you want to show the city name.

MRD comes installed with a predefined list. You can update this list by editing "Cities.txt" in the < C : \INTERSOFT\Maps\arpts-rwys > folder.



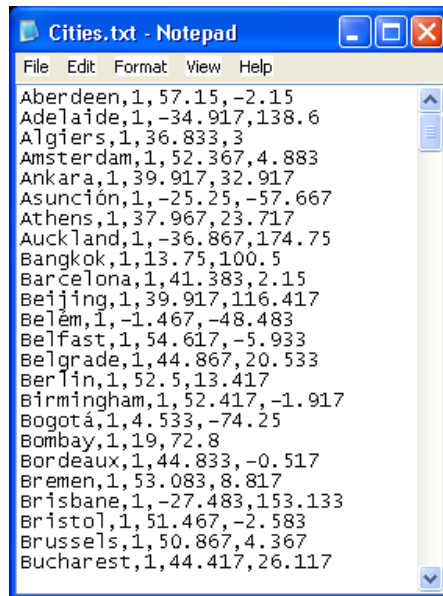


Figure 5-97: Cities.txt

Each line in the file represents one city structured by “[label],[type],[Latitude],[Longitude]”.

[Label] for the City Name

[Type] with 1 = Capitals, 2 = Major Cities, 3 = Cities, 4 = Towns, 5 = Villages

[Latitude],[Longitude] in decimal degrees



### 5.3.8. Coastline Item

The coastline item allows the user to select country borders. By default there are 2 coastline layers defined in the map editor, this value may be edited in the coastline.ini file located in the < C : \INTERSOFT\MRD\Map PlugIns > directory. Change the value for “repeat” under the section [Object Config] to the desired number of layers.

Figure 5-98 shows the map editor with the country borders of Belgium and surrounding countries. The borders from Belgium and Luxembourg are highlighted. This is established by defining Map layer coastline\_2 to show only Belgium and Luxembourg in a brighter colour than the settings in Map layer coastline\_1 where the surrounding countries are selected.

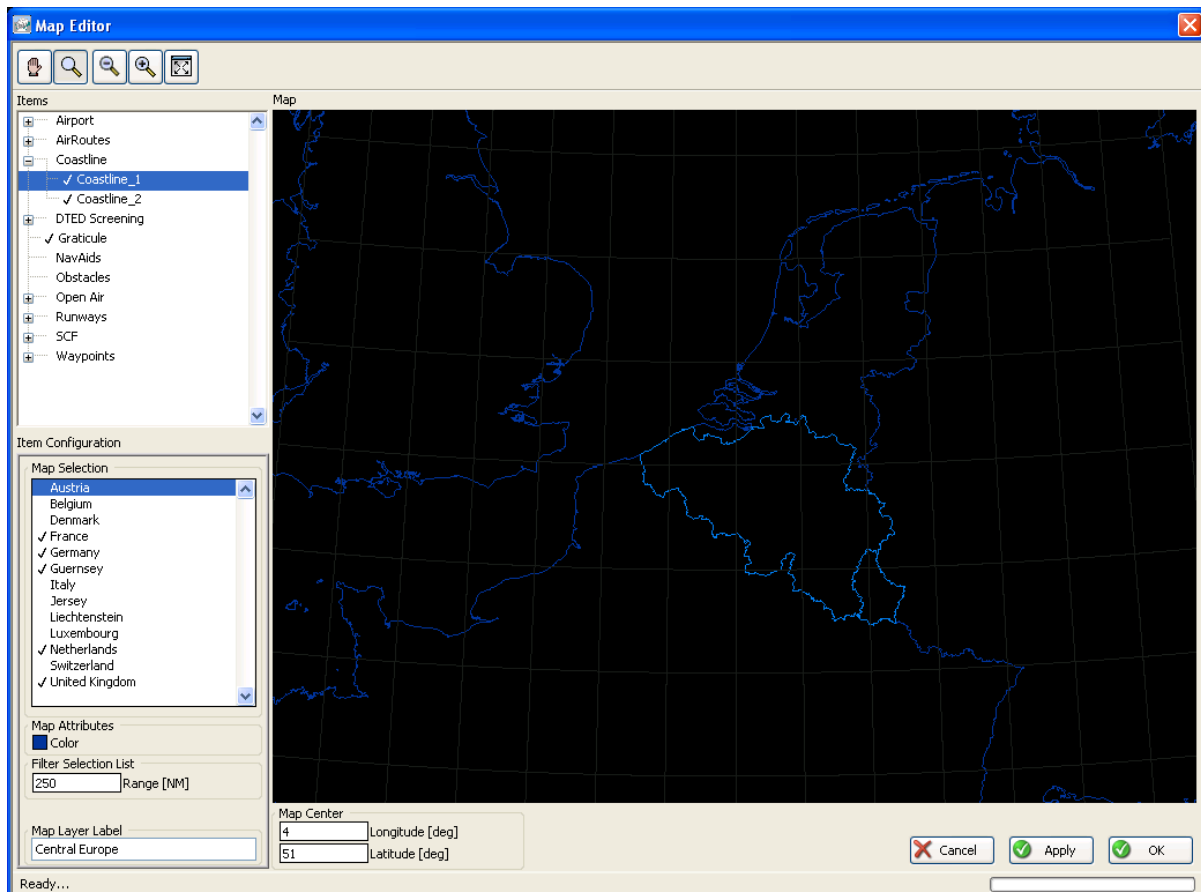


Figure 5-98: Map Editor - Coastline

First enter an appropriate range in the “Range” field in the “Filter Selection List” section, to show the names of the countries in a range from the map centre. Then select the countries from the “Map Selection” section and define the colour for the borders.



### 5.3.9. DTED Screening

The Digital Terrain Elevation Data (DTED) item allows the user to select screening files containing the line of sight for different altitudes for specific radar. The DTED screening files can be obtained from Intersoft Electronics or generated with the RASS-R Coverage Map Calculator.

The screening files take into account the antenna elevation, radio wave bending and earth radius (4/3 model). They however don't take into account the power budget of the radar and the actual atmospheric conditions.

Figure 5-99 shows the map editor with a screening up to FL250 for the Saint Hubert radar, Belgium.

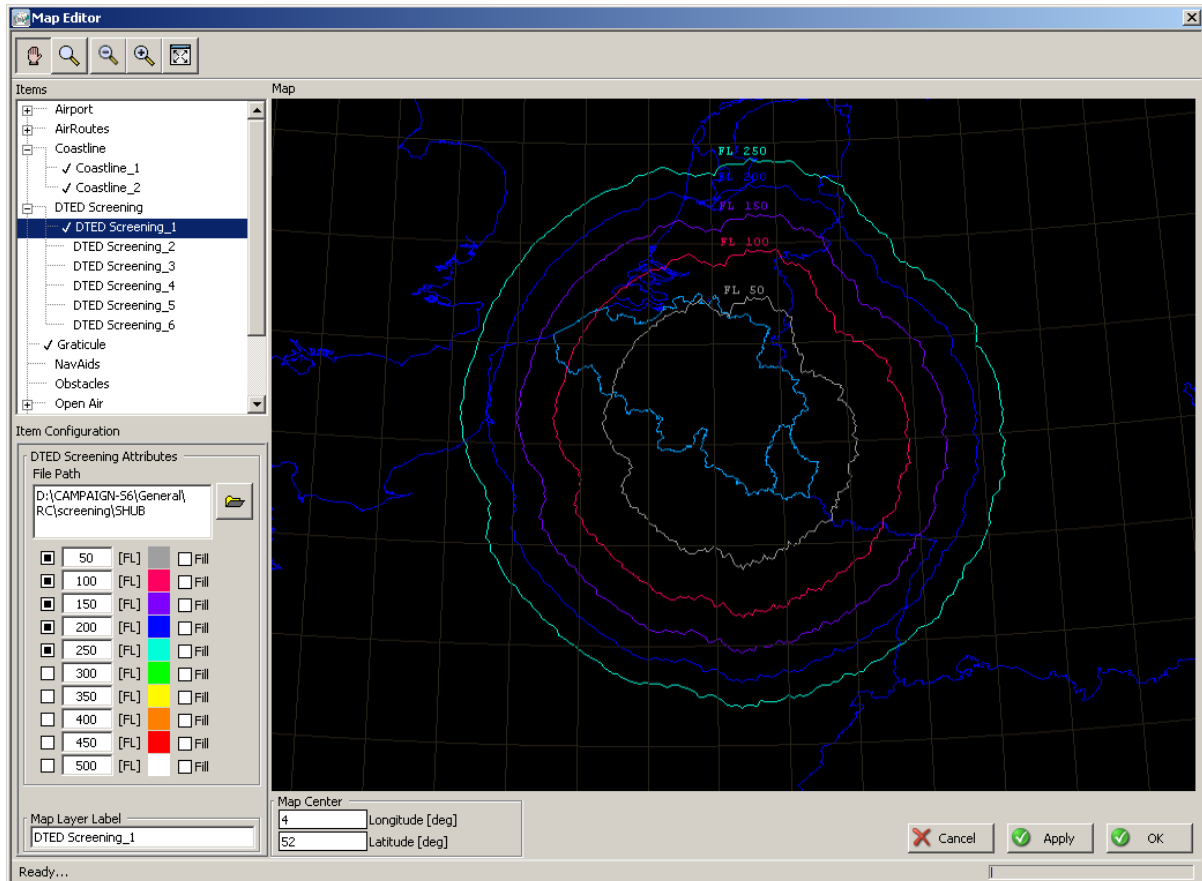


Figure 5-99: Map Editor – DTED Screening

Select the screening file directory with the screening files of interest by pressing the “browse” button in the “DTED Screening Attributes” section. After the directory has been selected click on the buttons next to the Flight Levels in the same section to draw the line of sight for this specific Flight Level. Select a custom colour if necessary.



**Remark the following:**

When you want to select a screening file, it is necessary to select the directory that contains both .hrscr and .par files instead of selecting an individual file. The reason is that the MRD Coastline Map Editor needs to read the .par file to know the correct position of the screening file. Second remark is that this directory should have the same name as the files in it!

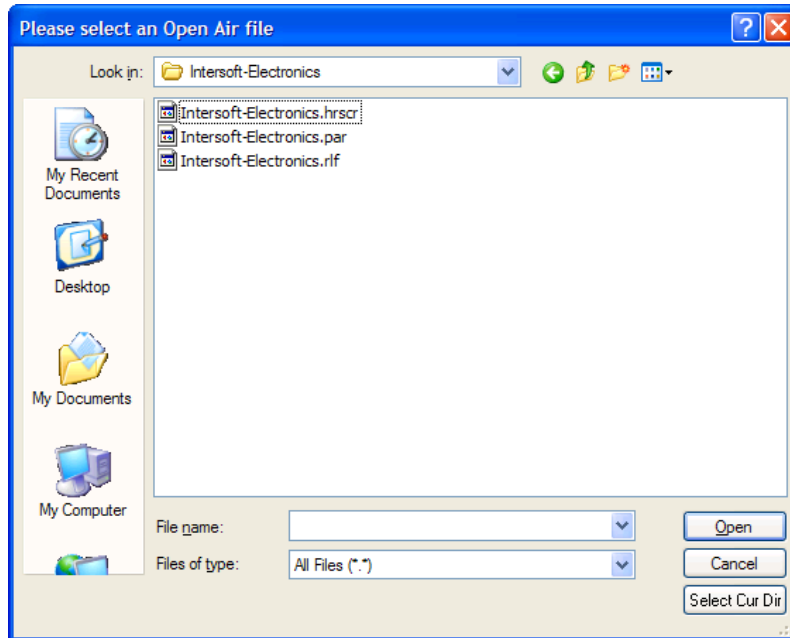


Figure 5-100: Folder selection DTED



### 5.3.10. Graticule Item

The graticule item allows the user to draw a longitude and latitude grid on the current map.

The figure below shows the map editor with a map of central Europe and a graticule grid with a range of 250NM from the map centre.

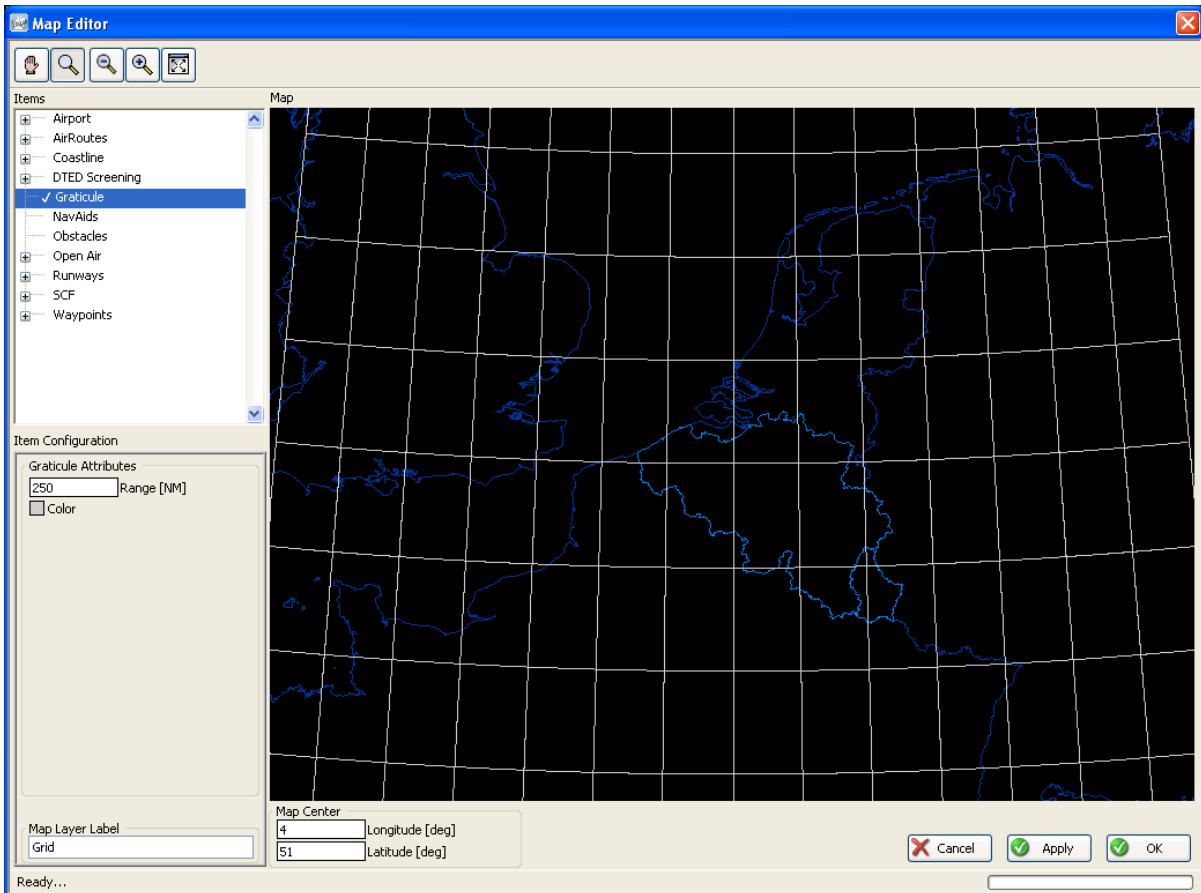


Figure 5-101: Map Editor - Graticule

Select the desired range (in nautical miles) by entering the range in the “Range” field in the “Graticule attributes” section. Select the colour for the graticule with the “colour” select box.





### 5.3.11. Nav aids Item

The Nav aids item allows the user to select navigation aids, such as NDB, VOR, DME etc. to be drawn in the map with their specific symbol. By default there is only one Nav aids map layer defined, this value may be edited in the nav aids.ini file located in the <c : \INTERSOFT\MRD\map plugins> directory. Add a [Object Config] section and add a field "repeat=N" where N is the desired number of layers.

This feature can be useful if you wish to depict different nav aids in different colours.

Or if you want to have two layers one with labels and one without so that you can easily switch labels on and of in the MRD main window.

The figure below shows the map editor most navigation aids of Belgium selected.

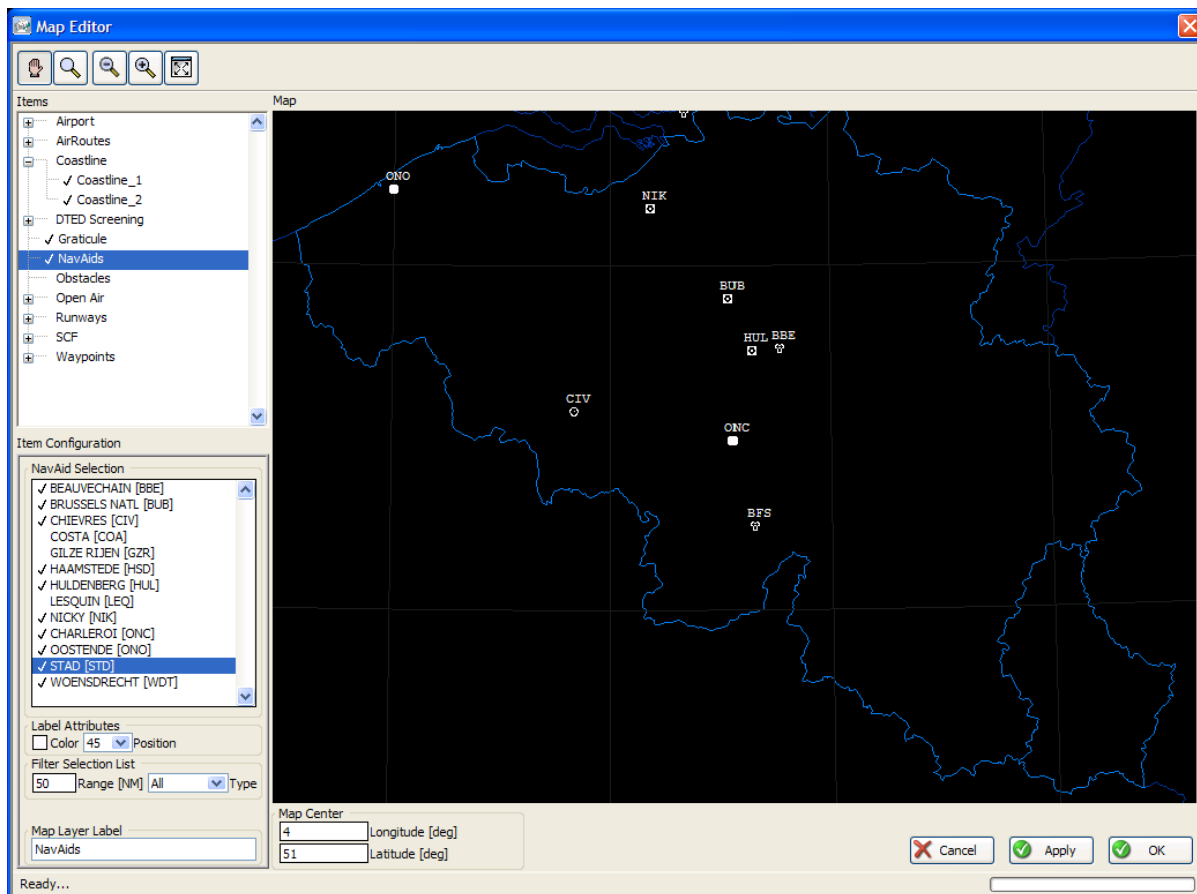


Figure 5-102: Map Editor - Nav aids

First enter an appropriate range in the "Range" field in the "Filter Selection List" section, to show only those navigation aids within a certain range from the map centre. You may also wish to filter the list on a certain navigation aid type, do this by selecting the desired type in the "Type" field in the "Filter Selection List" section. Now select the navigation aids of interest, select drawing colour and a label position. The label shown is the international abbreviation of the selected navigation aid.



### 5.3.12. Obstacles

The Obstacles item allows the user to select obstacles to be displayed, such as Pylon, Chimney and Windmill. By default there is only one Obstacles map layer defined, this value may be edited in the obstacles.ini file located in the <c:\INTERSOFT\MRD\map plugins> directory. Add a [Object Config] section and add a field "repeat=N" where N is the desired number of layers.

This feature can be useful if you wish to depict different obstacles in different colours.

Or if you want to have two layers, one with height labels and one without, this way you can easily switch height labels ON and OFF in the MRD main window.

The figure below shows the map editor with a map of Belgium and some fictional obstacles.

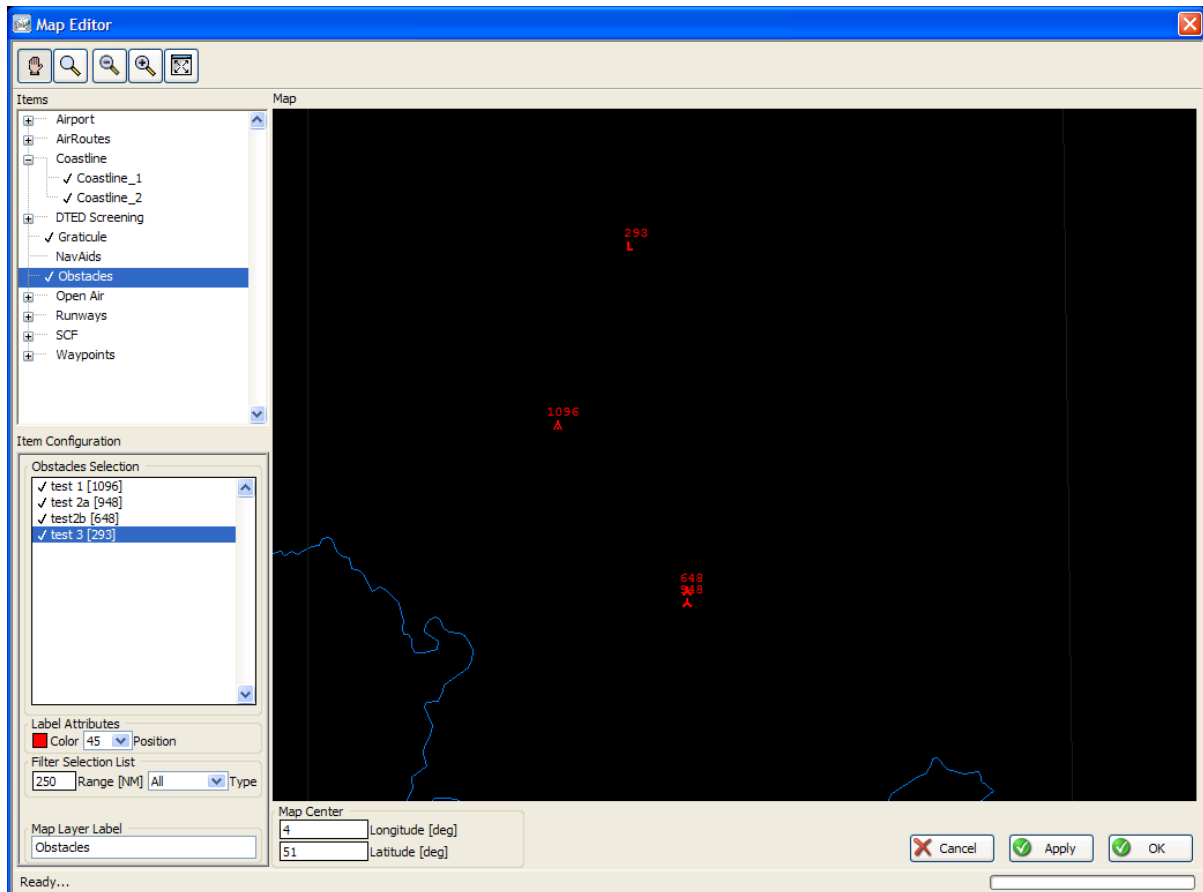


Figure 5-103: Map Editor - Obstacles



The obstacles definition file (OBSTACLES.TXT) is located in the <c : \INTERSOFT\maps\arpts-rwys> directory.

This is a tab-delimited file with the following structure:

*Table 5-15: Obstacles definition file structure*

Altitude (msl)	TYPE	WGS_DLAT	WGS_DLONG	NAME
1096	1	50.45	4.33	test 1
948	2	50.3	4.5	test 2a
648	2	50.31	4.5	test2b
293	3	50.6	4.43	test 3

For each obstacle enter an altitude in feet above mean sea level, the type : 1) pylon, 2) windmill and 3) chimney followed by the latitude and longitude in decimal degrees and finally a name for the obstacle.

The obstacles be selected in the "Obstacles Selection" section; First enter an appropriate range in the "Range" field in the "Filter Selection List" section, to show only those obstacles within a certain range from the map centre. You may also wish to filter the list on a certain obstacle type, do this by selecting the desired type in the "Type" field in the "Filter Selection List" section. Now select the obstacle of interest, select a drawing colour and a label position. The label shown is the height information above mean sea level from the obstacle.



### 5.3.13. Open Air Item

The Open Air item allows the user to select different airspaces to be displayed. You may also depict custom polygons and labels in a variety of colours. By default there are 3 open Air layers defined in the map editor, this value may be edited in the OpenAir.ini file located in the <c:\INTERSOFT\MRD\map\_plugins> directory. Change the value of “repeat” under the section [Object Config] to the desired number of layers.

The figure below shows the map editor with detail airspace of the Belgian coast.

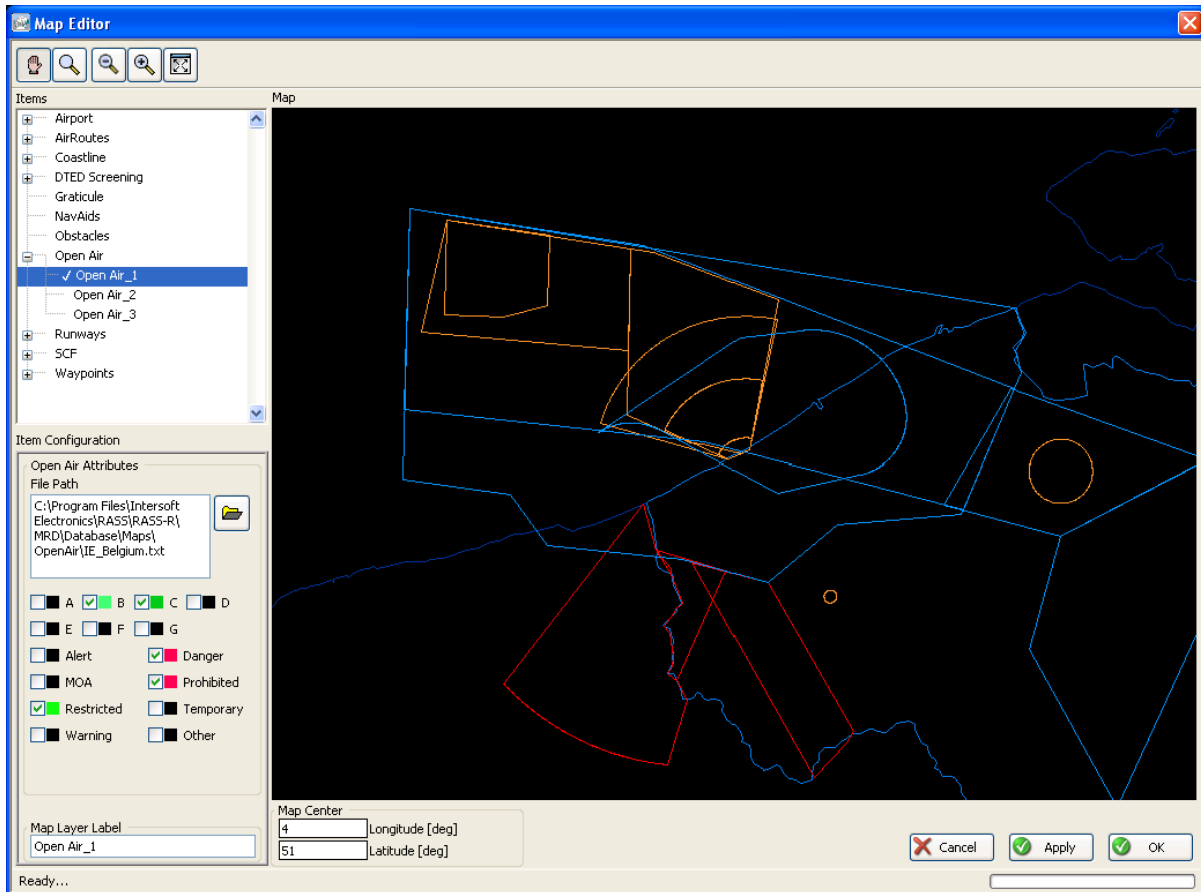


Figure 5-104: Map Editor - Open Air Item

Open Air is a terrain and airspace description language; the user can add or modify the data themselves, therefore having full control over what is being displayed. A description can be found on the Internet (<http://www.winpilot.com/UsersGuide/UserAirspace.asp>).

First you have to choose the appropriate file path and select the correct “Open Air” map; browse to the directory <c:\INTERSOFT\maps\openair> and select the desired file, for example IE\_Belgium.txt. Select the airspaces to be displayed and their colour.

**Note:** Take care that the colours selected here are not overridden by the “SB” (set brush) definition in the airspace definition file.



### 5.3.14. Runways Item

The Runways item allows the user to show runway drawings and runway centrelines on the map. By default there are 2 runway layers defined in the map editor this value may be edited in the runway.ini file located in the <c:\INTERSOFT\MRD\map\_plugins> directory. Change the value for “repeat” under the section [Object Config] to the desired number of layers.

The figure below shows the map editor zoomed in on the military field of Beauvechain (Belgium) 2 runways are depicted and the main runway has a runway centreline. This is established by defining runway layer runways\_2 to show only the main runway with runway centreline and defining runway layer runways\_1 to show both runways without a centreline. This allows the user to easily switch the extended runway centreline on/off in the MRD main window.

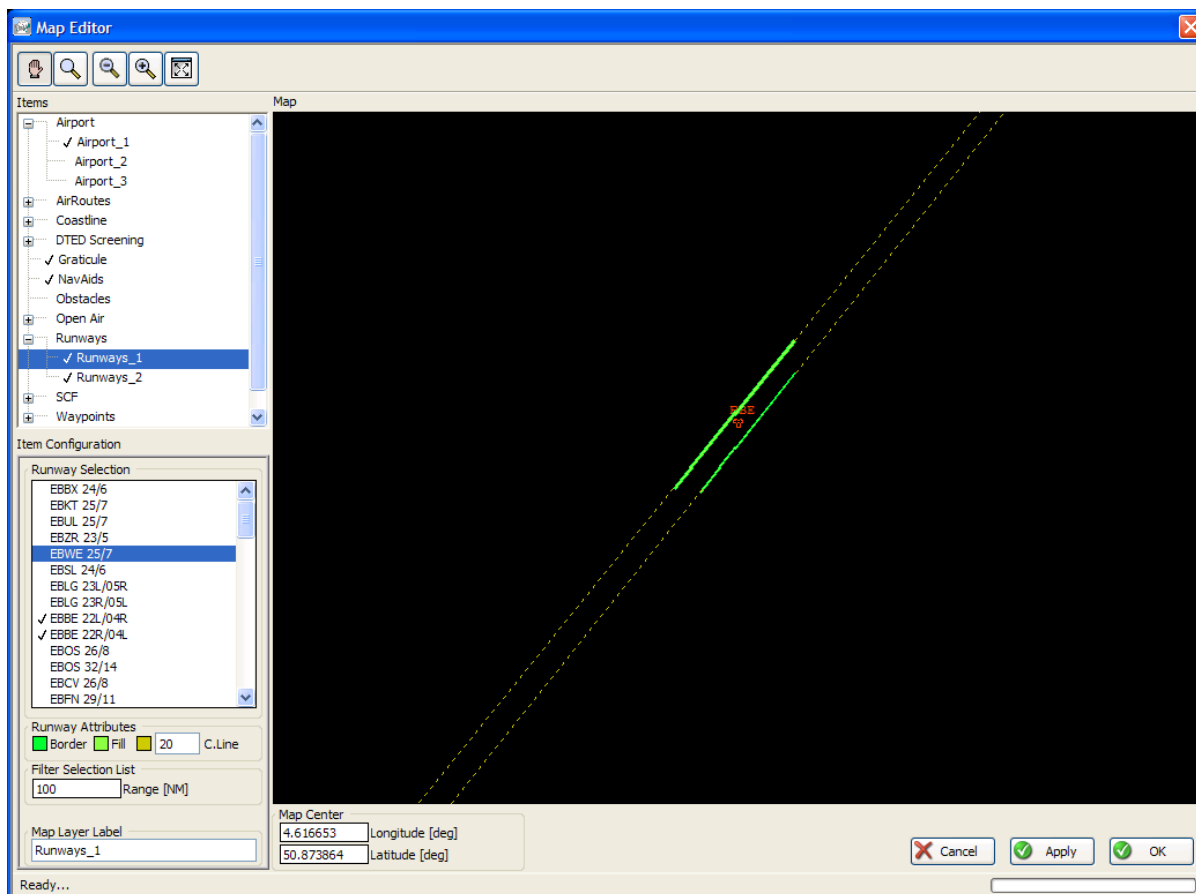


Figure 5-105: Map Editor - Runways

First enter an appropriate range in the “Range” field in the “Filter Selection List” section, to show the runways in a range from the map centre. Then select the runways from the “Runway Selection” section and define the colour for the runway borders and fill. You may select to draw runway centrelines by selecting a colour other than “T” (transparent) from the colour selection box and by defining a centreline length.



### 5.3.14.1. How to find your runway description?

A runway description consists of 2 strings:

- The ICAO airport identification name, for example: EBBE
- and the runway identification, for example: 24/6

The ICAO airport identification can be found in the following file:

`C:\INTERSOFT\Maps\arpts-rwys\ARPT.txt` (use Microsoft Excel to open the file).

You can also find it back in the runway file:

`C:\INTERSOFT\Maps\arpts-rwys\RUNWAY.txt` (use Microsoft Excel to open the file).

If there are wrong settings for a runway, or a new runway is implemented, you can easily change it in these .txt files.



### 5.3.15. SCF

The SCF map displays surveillance maps. By default there are 6 SCF Map layers defined in the map editor. This value may be edited in the scf.ini file located in the <c:\INTERSOFT\MRD\map plugins> directory. Change the value for “repeat” under the section [Object Config] to the desired number of layers.

The figure below shows the map editor with surveillance maps for Dusseldorf, Gatwick and Orly.

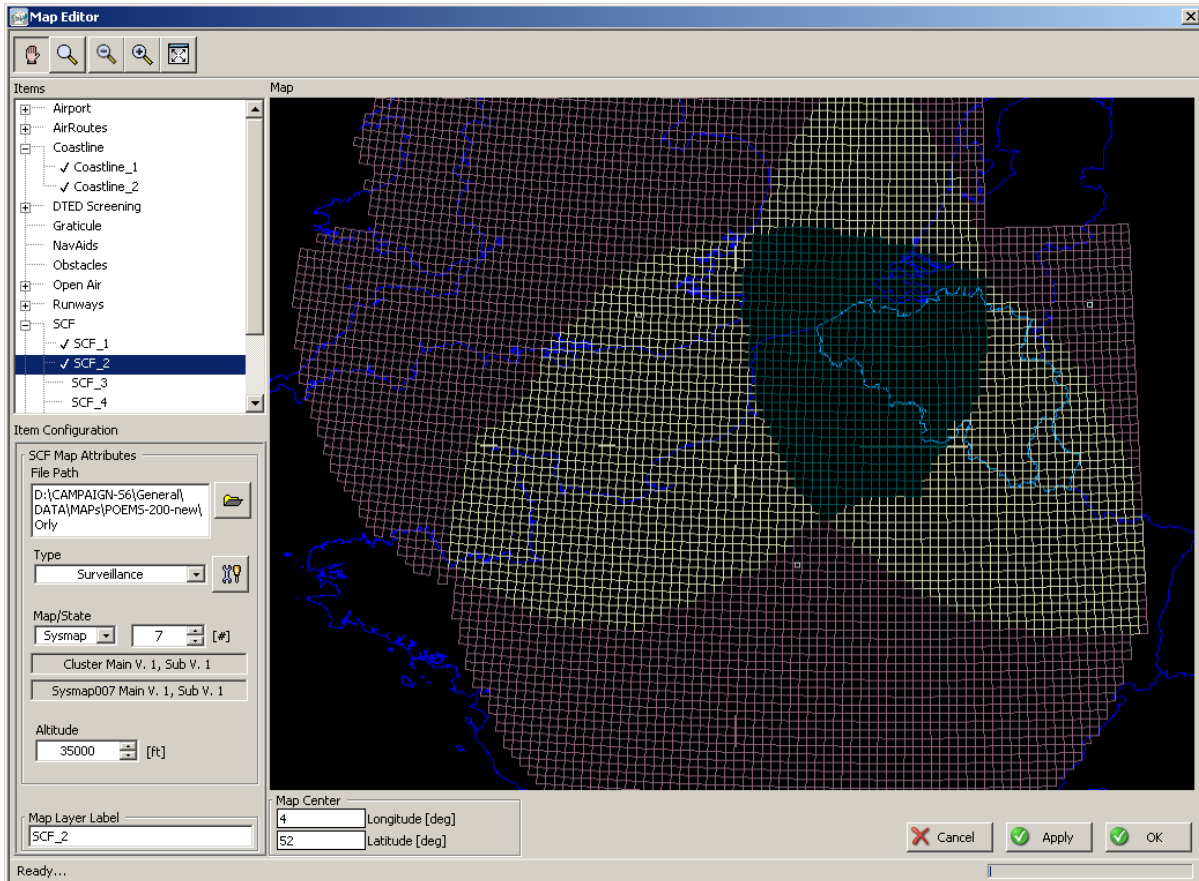


Figure 5-106: Map Editor - SCF

First select a SCF map directory by clicking on the “Browse” button in the “SCF Map Attributes” section.

The SCF maps must be on in a directory accessible by the computer running the MRD. They are NOT automatically retrieved from the radar. The SCF Map file type is described in detail in the POEMS ICD for SCF maps, the SCF map directory must contain the original cluster.dat and sysmatpxxx.dat files. The version and subversion of the sysmapxxx.dat file are displayed after selection.



### 5.3.15.1. SCF Map Type

The SCF map can be one of the four predefined SCF map types; Surveillance Maps, Data Link Maps, Lockout Maps or Intermittent Lockout Maps. Select the map type by clicking the “Type” drop down box.

### 5.3.15.2. SCF Map altitude and type

SCF maps can be different for every “altitude band” of 200ft. The user can set the altitude for the displayed maps in the “Altitude” field. SCF maps also differ per SCF state, the state is the binary number representing a particular station’s participation in the cluster. Either selects the sysmap number or the state number by selecting “Sysmap” or “State” from the dropdown menu “Map/State” and then enter a number next to the field indicating either the sysmap number or the state.

### 5.3.15.3. SCF Setup

To configure the SCF maps to be displayed and to set the display colours open the SCF setup window by pressing the “setup” button next to the “Type” selector.

The figure below shows the SCF setup colour dialog window.

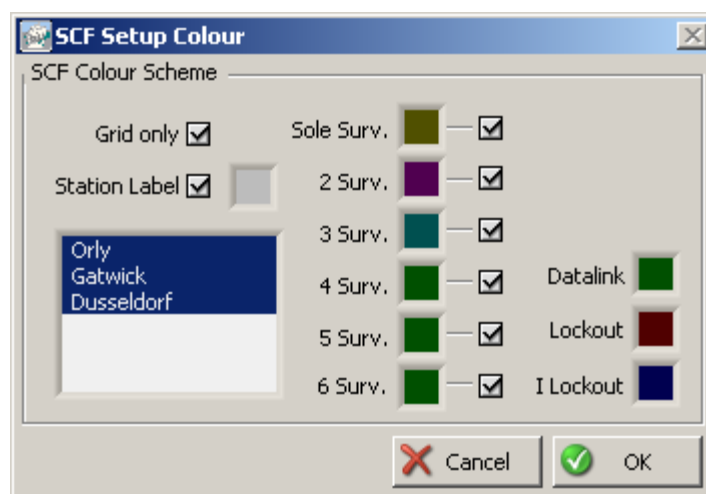


Figure 5-107: Map Editor – SCF – SCF Setup Colour

The “Grid Only” checkbox switches between solid coloured SCF map and a SCF grid map. Select the nodes to be displayed by shift-clicking their names in the “Node selection” list. This controls the topology of the map that is drawn. Only the nodes that are selected are included in the map. Typically the SCF map provides information about which station has coverage for a specific cell (one element of the SCF grid). A cell can have multiple station coverage (up to 6). The cell colour depends on the level of coverage. If the station has no coverage, the cell is black (not visible). If a cell has single coverage the colour of the “Sole Surv.” colour box is used for 2 radar coverage the “2 Surv.” colour box is used etc.





### 5.3.16. Waypoints Item

The waypoints item allows the user to show upper- and lower waypoints. The waypoint files are divided per country. If your country is not listed in the file selection list please contact Intersoft Electronics.

By default there are 6 waypoint layers defined in the map editor this value may be edited in the waypoint.ini file located in the <c:\INTERSOFT\MRD\map\_plugins> directory. Change the value for “repeat” under the section [Object Config] to the desired number of layers.

The figure below shows the map editor with a map of Belgium and all lower waypoint for Belgium and their label.

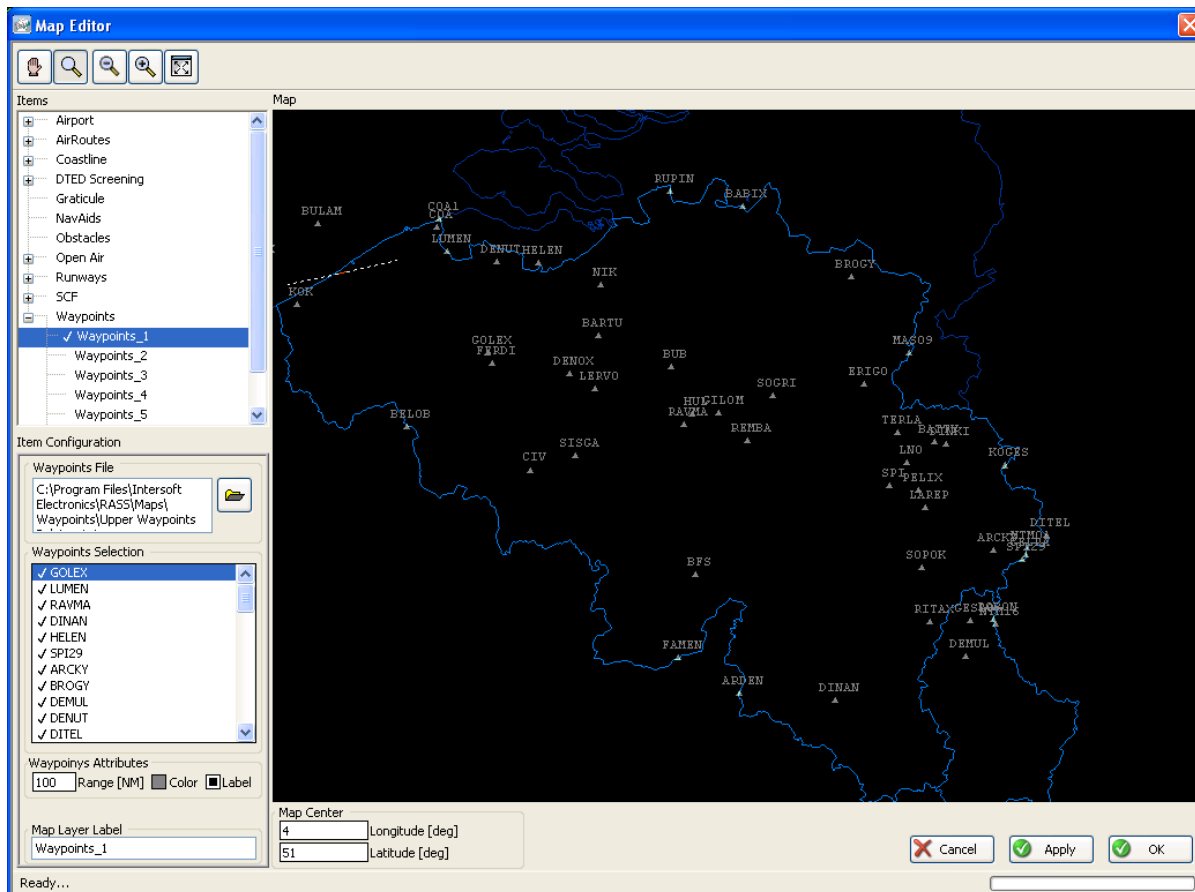


Figure 5-108: Map Editor – waypoints

To select a specific waypoint file click on the “browse” button in the “Waypoints File” section, a standard file dialog box will appear. Navigate to the <c:\INTERSOFT\maps\airroutes> directory and select the file you would like to use. The files are organized per country in upper and lower waypoints.

After you have selected an waypoint file you can select the waypoints which you would like to display. First enter a range (calculated from the map centre) in the “Waypoints Attributes” section and then select/deselect the waypoints of interest in the “Waypoints Selection” section.



## TROUBLESHOOTING/Q&A

**Problem:**

I cannot see my digital targets on the display.

**Solution:**

Is the map centre setup correctly? (See 0



Map Editor)

Does the data source setup have the correct coordinates? (See 5.2.2 Special tab)

Make sure the data is sent to the MRD using a proper DHM configuration! You can always use a sniffer to verify. (e.g. Wireshark, download free on <http://www.wireshark.org/>)

**Problem :**

The MRD.ini file is messed up after changing something.

**Solution:**

You can repair the MRD.ini file using the repair option of the MRD installer:

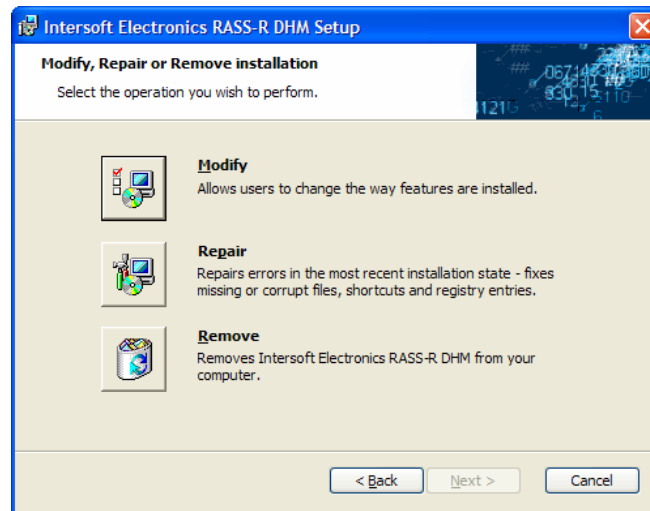


Figure 0-109: Repairing the MRD

**Problem :**

The default.ini file is messed up after changing something.

**Solution:**

First delete the default.ini configuration file from disk in the following path:

`C:\INTERSOFT\MRD\UserPrefs\default.ini`

When choosing “repair the MRD” by means of the installer, it will restore the default.ini file.



**Problem:**

I cannot see my ADS-B targets?

**Solution:**

Since the ADS-B targets do not contain sector messages, the MRD has to generate its sector timing as explained in paragraph "5.2.2 Special tab". For example, fill in a 4 or 10 seconds as revolution time.

It is also not necessary to fill in the centre position of the ADS-B targets, since the MRD uses the long/lat position of the targets to display. In other words, the MRD cannot change the position of the ADS-B targets.

**Problem:**

I do an ADS-B extraction with a RIM782, but I cannot see the ADS-B messages as text in the "Selection Info Window".

**Solution:**

This is because you send the ADS-B messages to the MRD without converting them to AsterixCAT021 first. Put an AsterixCat021Convert in between!

**Question:**

Do my own created preference files (i.e. MRD configuration) remain on disk after an uninstall of the MRD?

**Answer:**

Yes, an uninstall of the MRD deletes the MRD.ini file and the default.ini file (in the folder `C:\INTERSOFT\MRD\UserPrefs`)

Your own UserPrefs files remain in this folder.

**Question:**

I created a map using the Map Editor but I still see contours of Central Europe and Belgium on the MRD.

**Answer:**

As work-around, load the default coordinates in the MRD Map Editor again. (For example 4 degrees longitude and 52 degrees latitude) Now, disable all maps selected under item Coastline\_1 and Coastline\_2. Press Apply.

Then, reload the center point of the map again to the desired coordinates. Configure the proper coastlines again and press Apply. After leaving the Map Editor, the map should be compiled with the proper contours now.

**Problem:**

Loading another configuration in the MRD results in a LabVIEW error.

**Answer:**

This is a known issue. Use the following work-around:

- Go to Options>General.
- In the General-tab, select the configuration you want to load as Default Configuration and press Apply.
- Close the dialog and shut down the MRD.
- Restart the MRD. It will now restart with the desired configuration.



## APPENDIX: SHORTCUTS

Function	Shortcut
Exit:	Ctrl+Q
Save configuration	
<input type="checkbox"/> as custom	Ctrl+S
Targetinfo	Ctrl+Shift+I
Shortcut bar	Ctrl+Shift+B
Maplayers bar	Ctrl_Shift+L
Fullscreen	Ctrl+Shift+F
Visible	
<input type="checkbox"/> Toolbar	Ctrl+Shift+T
<input type="checkbox"/> Menu	Ctrl+Shift+M
<input type="checkbox"/> Status	Ctrl+Shift+S
Pan	Left/Right/Up/Down key
Filter	Ctrl+F9
MicroTable	Ctrl+F7
QNH	Ctrl+F8
CompassGrid	F6
Turn left	Left key
Turn Right	Right key
Zoom out	Page Up
Zoom In	Page Down
Window centre	Home button
Decrease the opacity of windows	- button
Increase the opacity of windows	+ button

**Note:** The left and right keys are different when the compass grid is enabled using F6.

