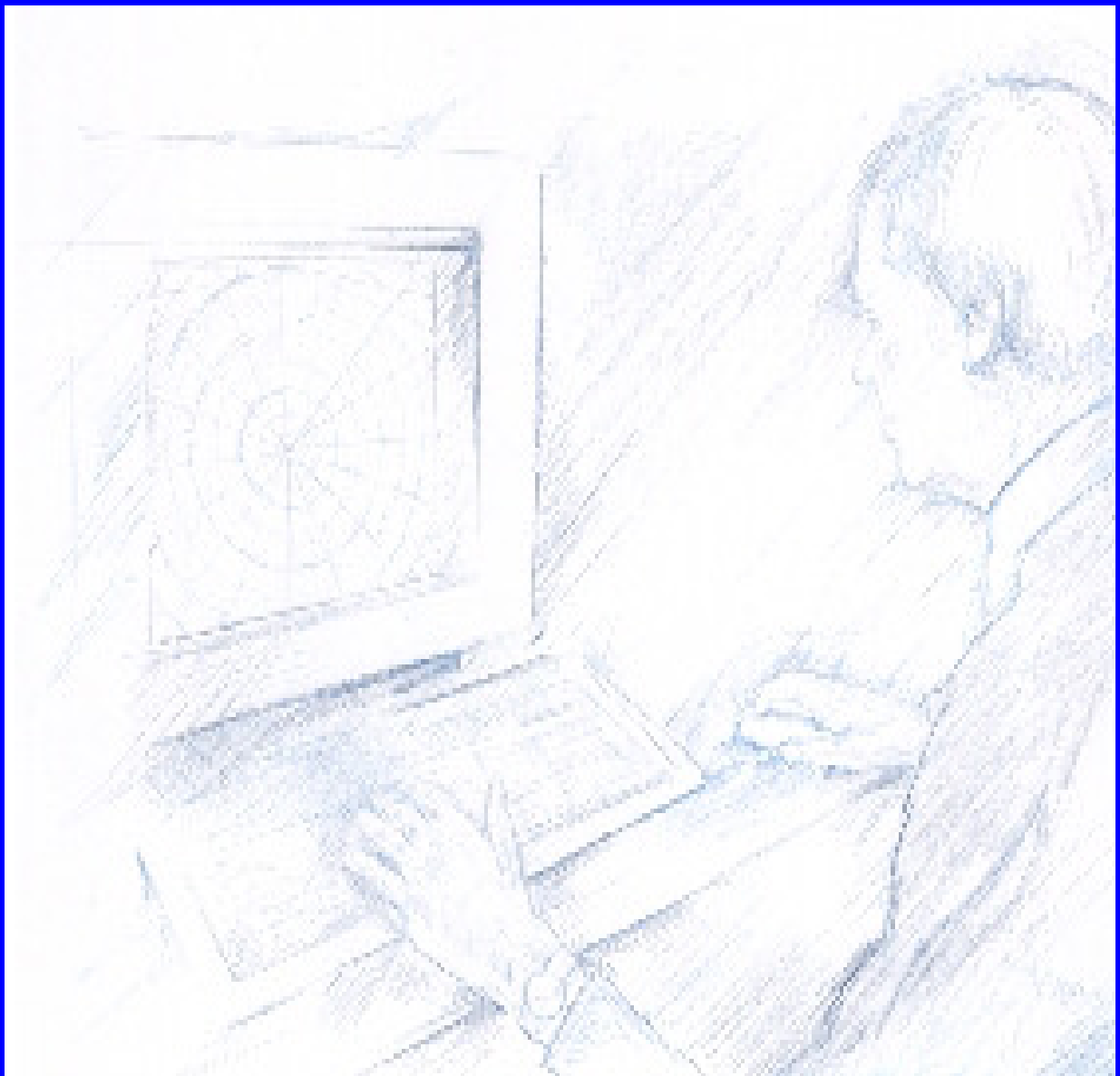


RASS-R - Technical Maintenance Display 3



User Manual

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Abstract

The TMD3 is an extremely powerful and radar manufacturer independent display system for use in daily radar monitoring and maintenance activities. The TMD3 allows you to perform an on-the-spot real-time check-up of the radar's performance, displaying radar data and video. The recorded data and video can also be analyzed off-line in a replay mode. The TMD3 is equipped with a very user-friendly graphical Human Machine Interface, reducing keyboard input to the strict minimum. The system can even be operated from a high-end laptop system.

Keywords

TMD3	Video display	Data display	PPI
Record	Play back		

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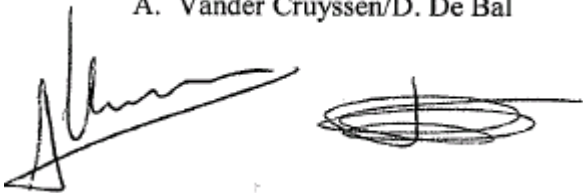
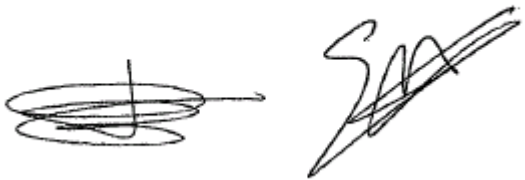
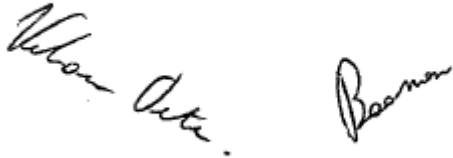


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CONVENTIONS USED IN THIS MANUAL

The following conventions are used in this manual:



Note: This icon to the left of bold italicized text denotes a note, which alerts you to important information.



Caution: This icon to the left of bold italicized text denotes a caution, which alerts you to the possibility of data loss or a system crash.



Warning: This icon to the left of bold italicized text denotes a warning, which alerts you to the possibility of damage to you or your equipment

1. Introduction

The TMD3 is used as a dedicated local display to enable maintenance and commissioning engineers to assess the operational performance and the serviceability of the Mode-S system. The TMD3 is designed to take the maximum advantage of the latest technologies. It uses a 1600x1200pixels or higher LCD screen for displaying and a high performance PC for processing. The image below represents the TMD3 user interface.

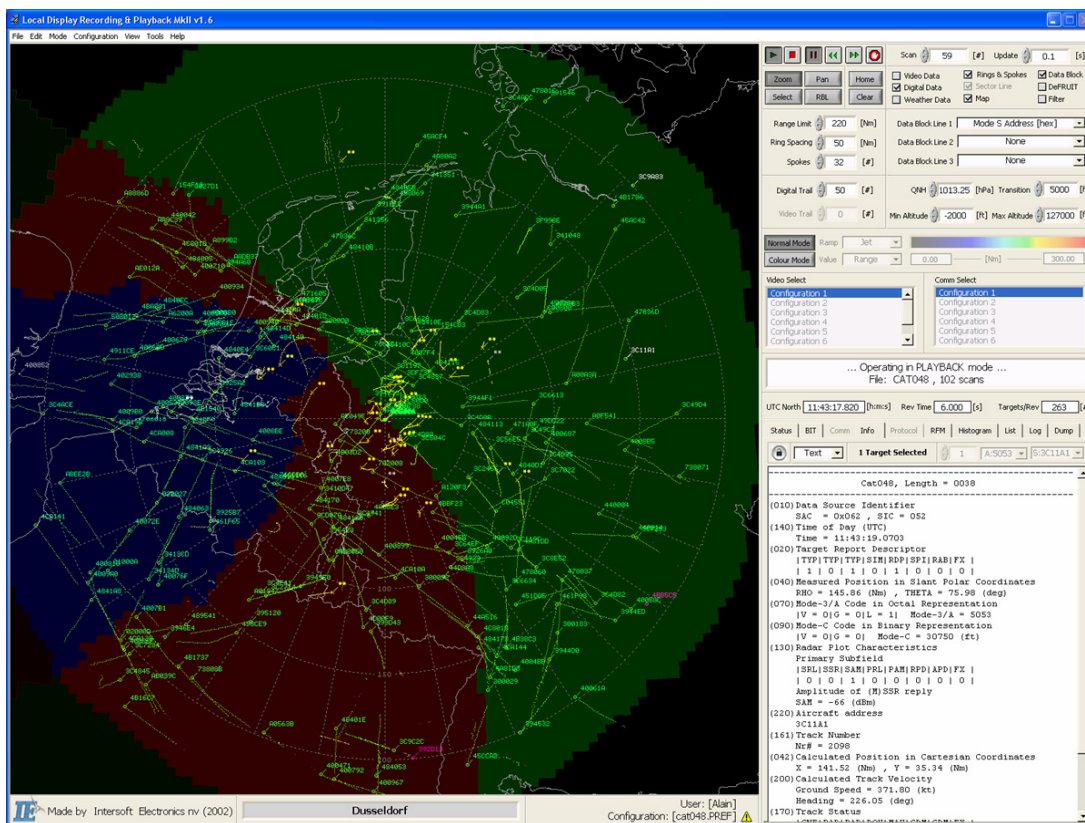


Figure 1-1: TMD3 User interface

For real-time displaying and processing of the data (video and digital), the TMD3 uses a COTS PC with high performance graphics card. The PC has sufficient internal storage media to contain the software and manage the storage of video and radar data. The software runs as a stand alone application built using National Instruments® LabVIEW.

The TMD3 uses dedicated separate hardware for the acquisition of analogue video signals and digital radar data signals, for example Intersoft Electronics' Radar Interface Module (RIM782).

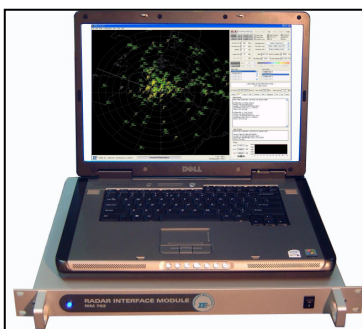


Figure 1-2: TMD3 on a laptop connected to a RIM

2. Operating System

2.1. General

The TMD3 comes with a pre-installed Windows XP Professional operating system. The operating system is pre-configured with one account: the administrator account. This account allows the adding of other accounts in Windows XP when more than one user is required. The TMD3 inherits these accounts (login names) from the Windows XP operating system. Some TMD3 configuration settings can only be done by the administrator. For this, the user has to be logged in as the administrator (login name = administrator) in Windows XP. Other users (login name \neq administrator) will not be able to change TMD3 administrator-only settings, even if they have administrator privileges for Windows XP.



Do NOT change any Windows XP settings (except for creating new users). Any change in the pre-configured Windows XP settings can have severe impact on the performance of the TMD3 system.



Do NOT install additional software on the TMD3 platform. Installing additional software on the TMD3 platform can have severe impact on the performance of the TMD3 system.

2.2. System restore

In the unlikely event of an operating system crash or non-physical hard disk failure, the system recovery CD allows the user to quickly recover the original setup (as delivered) of the system. The system recovery CD contains an image file of the operating system and the pre-installed applications. This image file serves as a quick and easy recovery solution in the event of a system crash or hard disk failure.



The data gathered throughout the use of the TMD3 is NOT recovered by this system restore CD! Therefore always back up your TMD3 data folder when important data is present. (See also paragraph Software Usage/Directory Structure)

To execute a system restore, put the system restore CD in the CD drive, restart the PC and hit the F12 key during the boot sequence. The instructions on the screen will guide the user through the restore procedure.

BEWARE: All information present on the hard disk will be lost after the system recovery procedure. Make backups of valuable information before executing a system restore procedure. After a system recovery is necessary to re-install the latest available version of the TMD3 software.

3. Software installation

The TMD3 is part of the RASS-R toolbox (see next paragraph). Normally, the TMD3 comes with pre-installed software. If, for any reason, you want to re-install the TMD3 software or install a new version of the software, use the appropriate CD and insert it into the CD drive. The set-up installation tool will guide you through the procedure.

The installer will install the TMD3 in a folder named "TMD3", part of the directory structure of the RASS-R installation.

Optionally, the TMD3 can be set as "Auto-start-up", such that it will start immediately after power on of the PC. For more details about auto start-up, please consult the Windows XP user manual.

The TMD3 is installed in the C : \ INTERSOFT \ TMD3-directory.

4. 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 Figure 4-1: RASS-R toolbox. The current version of the RASS-R toolbox is displayed in the right upper corner. The TMD3 is part of this RASS-R toolbox and can be opened using the appropriate icon .




Figure 4-1: RASS-R toolbox

The menu bar contains the following items:

Table 4-1: 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 Figure 4-2: Campaign directory structure.

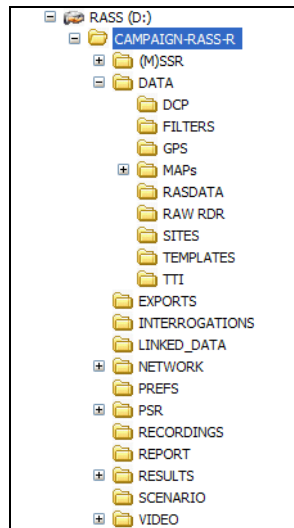


Figure 4-2: Campaign directory structure



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.

The following directories can be used in combination with the TMD3 to store the following information:

- **DATA:**
Maps: holds the compiled (for specific site coordinates) maps as defined by the user and the cluster maps for the SCF
- **EXPORTS:** contains stored log files
- **PREFS:** contains stored configuration files
- **RECORDINGS:** holds the temporary (internal use only) recordings files
- **REPORT:** contains the .csv files created by the different export functions of the TMD3
- **RESULTS:** contains the recorded TMD3 files
- **SCENARIO:** the scenarios for the user defined maps

5. Software usage

5.1. Short tour

After starting the TMD3, the following window will appear. (See figure on next page) The user will be asked to select a configuration.



Some parameters can not be changed if you are not logged in as an administrator!

The Factory Default Configuration (hard coded in the software) will get you started, but you should set up the parameters according to your needs.

The TMD3 window consists out of the following three items:

- Menu Bar for accessing configurations, tools, files, etc...
- Display (Both video and digital data)
- Graphical User Interface (GUI)

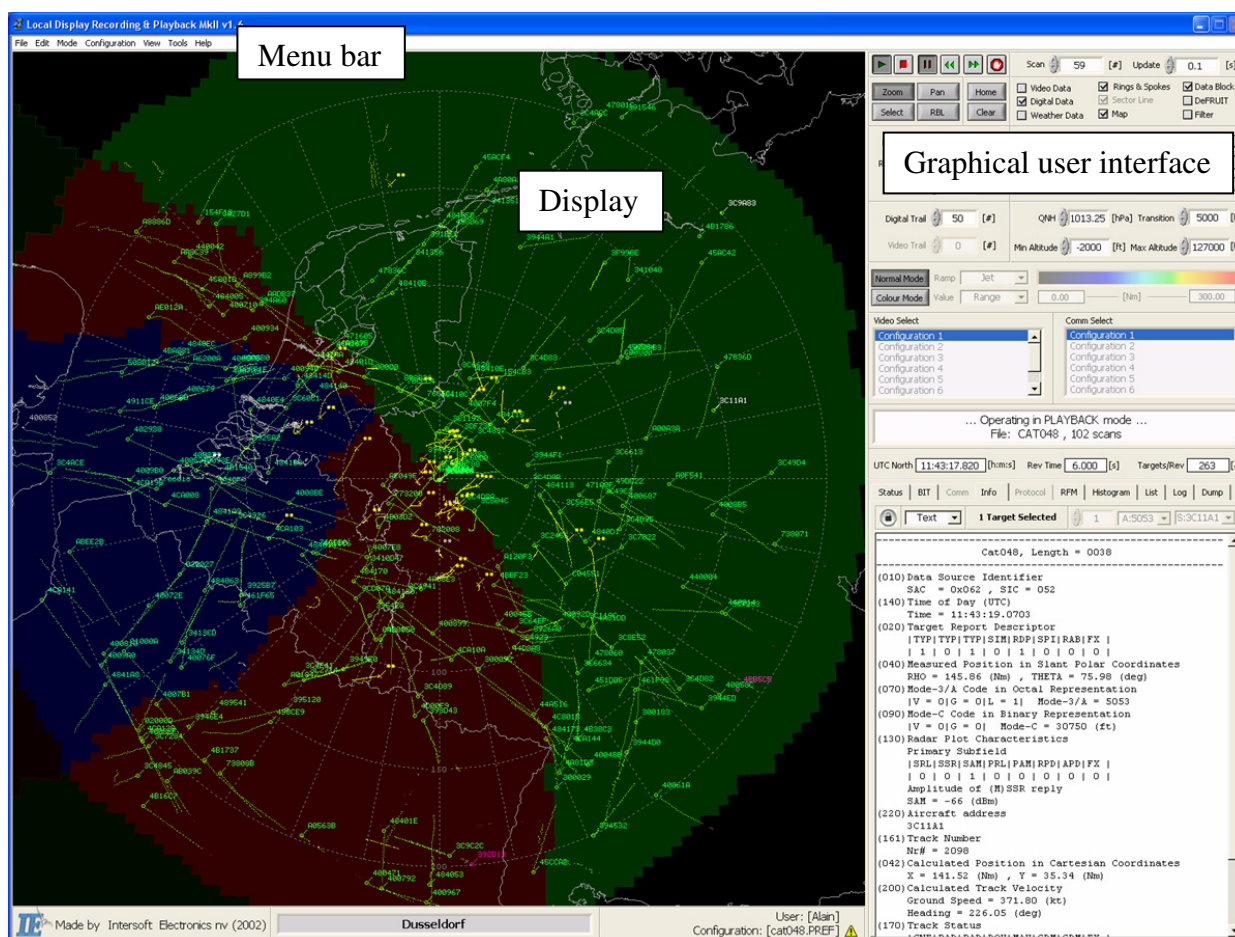


Figure 5-1: TMD3

When we take a closer look to the user interface, we can distinct the following items:

The screenshot shows the TMD3 v3.0.0 user interface. On the left is a radar display area labeled "Video and Data display". At the top left is a "Menu bar". The main interface is divided into several control panels:

- Record and playback control:** Includes buttons for "Aut", "Save Mode", "Scans", and "Size".
- Display contents control:** A grid of checkboxes for "Video Data", "Digital Data", "Weather Data", "Rings & Spokes", "Sector Line", "Map", "Data Block", "DeFRUIT", and "Filter".
- Cursor control panel:** Includes "Zoom", "Pan", "Home", "Select", "RBL", and "Clear" buttons.
- Data block contents control:** Three dropdown menus for "Data Block Line 1", "Data Block Line 2", and "Data Block Line 3".
- Range/Rings control:** Sliders for "Range Limit", "Ring Spacing", and "Spokes".
- Trail control:** Sliders for "Digital Trail" and "Video Trail".
- QNH control:** A slider for "QNH" (1013.25 [hPa]).
- Altitude filter:** Sliders for "Transition", "Min Altitude", and "Max Altitude".
- Point colour control:** A color ramp slider and a "Colour Mode" section with "Value" and "Range" sliders.
- Video/Data selection:** Two list boxes for "Video Select" and "Comm Select".
- Operation mode indicator:** A status bar showing "... Operating in RECORDING Mode ..." and "SCF Map: None".
- Information shield selection:** A row of tabs including "Status", "BIT", "Comm", "Info", "Protocol", "RFM", "Histogram", "List", "Log", and "Dump".
- Information field:** A large text area displaying target data, including "Cat001, Length = 0016" and various radar parameters like "Target Report Descriptor", "Measured Position in Polar Coordinates", and "Radar Plot Characteristics".

Figure 5-2: TMD3 User interface

5.2. Video and Data Display

This area is the main area of interest and allows the visualization of data items (plots/tracks in ASTERIX/RDIF) and the corresponding analogue video simultaneously and in real time. The display can also contain other items, such as:

- Range Rings
- Spokes
- Sector line
- Maps (coastline and/or screening file)
- Data Blocks
- Symbols
- Air-routes
- Zones (polygons)
- Runways
- Latitude-longitude grid

You can zoom and pan, query on data by selecting targets, visualize video signals (PSR clutter and targets, SSR targets, Mode-S all call video) and digital information (ASTERIX or RDIF). The actual content of the display is managed through the “Video and Communication”-configuration window.

On some occasions warning messages are displayed on the screen. They will remain there until they are no longer valid or manually removed by the user. Zooming and panning does not move the position of the warning messages on the display. Warnings can be removed manually by hitting the “end” key on the keyboard. When more than one warning is issued simultaneously, they will alternate on the screen. Notice that hitting the “end” key only removes the warning that is displayed at that moment.



Figure 5-3: Warning message

Issuing and removing warning messages is automatically logged in the log files. Notice that manually removing a warning by clicking the end button only removes the warning/error message from the display. The warning remains valid until it is cleared by the appropriate channels. A warning message can only re-appear on the screen if it is cleared not when it is manually removed.

The following ASTERIX I034 items can trigger a warning/error message on the screen:

I034/050 (System Configuration and Status)

Table 5-1: Warning/error messages I034/050

COM	RDPR	Bit 6 = 1 : Reset of RDPC
	OVL RDP	Bit 5 = 1 : Overload of RDP
	OVL XMT	Bit 4 = 1 : Overload in transmission subsystem
	MSC	Bit 3 = 1 : Monitoring System Disconnected
	TSV	Bit 2 = 1 : Invalid Time Source
PSR	OVL	Bit 5 = 1 : Overload
	MSC	Bit 4 = 1 : Monitoring System Disconnected
SSR	OVL	Bit 5 = 1 : Overload
	MSC	Bit 4 = 1 : Monitoring System Disconnected
MDS	OVL SUR	Bit 13 = 1 : Overload
	MSC	Bit 12 = 1 : Monitoring System Disconnected
	OVL SCF	Bit 9 = 1 : Overload
	OVL DLF	Bit 8 = 1 : Overload

034/060 (System Processing Mode)

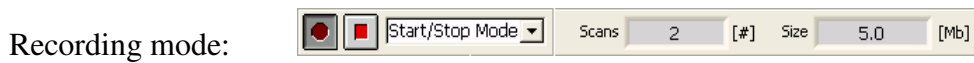
Table 5-2: Warning/error messages I034/060

COM	RED-RDP	Bits 5..7 : 001 .. 111 : Reduction Active
	RED-XMT	Bits 2..4 : 001 .. 111 : Reduction Active
PSR	RED-RAD	Bits 5..7 : 001 .. 111 : Reduction Active
SSR	RED-RAD	Bits 6..8 : 001 .. 111 : Reduction Active
MDS	RED-RAD	Bits 6..8 : 001 .. 111 : Reduction Active

5.3. Graphical user interface

5.3.1. Record and playback control panel

The TMD3-tool allows the user to record and later playback all information seen in the display, along with the parameters, maps and settings used at the moment of recording. Both analogue video and digital data is recorded. The user can store the recorded data in a predefined folder. Depending on the mode of operation, (recording or playback), the control panel looks different:



The Mode of Operation can be selected using the menu bar. Click Mode ↪ Recording Mode/Playback Mode.

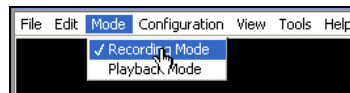


Figure 5-4: Recording/Playback mode

5.3.2. Cursor Mode Panel

The display cursor can be used in several modes:

- **Zoom** allows the user to zoom a particular selection of the display using a rectangular zoom in PPI display mode and an arbitrary zoom in vertical display mode.
- **Pan** allows the user to pan the screen. Panning is possible over the full range of the radar. (display can be panned 2x Max range)
- **Home** this centralizes the display to the full range
- **+** step by step zooming in of the display
- **Select** allows the user to select a target and query information about the target. Multiple targets can be selected by clicking and dragging. The selected targets are displayed in white. The select mode is a single shot mode.
- **RBL** allows the user to create a Range-Bearing Locator. This is a line with attached Data Block, showing range and heading at any position.
- **Clear** erase all targets/data from the display
- **-** step by step zooming out of the display

5.3.3. Display contents panel

This panel allows the user to switch on/off a number of items in the display:

- Video Data
- Digital Data
- Weather Data (ASTERIX Cat008)
- Rings & Spokes
- Sector line
- Map (coastline map and screening file map)
- Data Block
- DeFRUIT (applied on display only, not on recording)
- Filter

The selection pannel looks as follows:

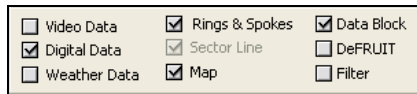


Figure 5-5: Display contents panel

5.3.4. Rings and spokes Panel

These controls set the appearance of the "Rings and Spokes" item in the display:

- Range limit (Nm)
- Ring Spacing (Nm)
- Spokes (#=number)

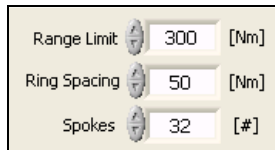


Figure 5-6: Rings and spokes panel

5.3.5. Data block panel

These controls select the contents of the Data Block in the display. Up to 3 lines of data can be displayed. The content of each data block line is selectable. The label “UTC” is the TOD as in the data.

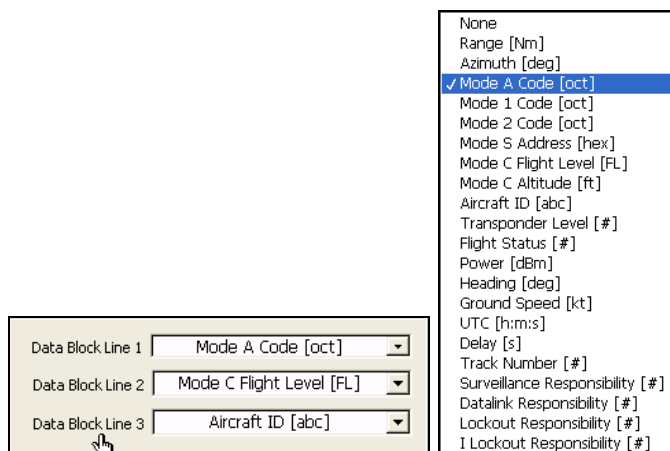


Figure 5-7: Data block panel



Whenever the selected data block is not available for a target, “*” is displayed along the target.**

5.3.6. Trail Panel

The user can set individually the length of each of the two trails: Video trail length is limited to 5. Digital trail length is limited to 100, if the history has to be kept in memory. If the Digital Trail or Video Trail length is set to inf (type the letters “i” “n” “f”), an infinite length trail is built up, but this trail is cut back to the respective maximum trail length upon zooming, panning or other actions that require an update of the display.

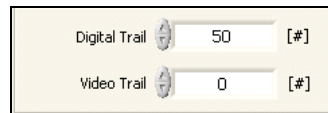


Figure 5-8: Trail panel

5.3.7. QNH Panel

The QNH correction parameters (correcting the altitude below the transition level due to barometric differences) can be entered in this control field. Only the altitude value (not the flight level) shown in the data block is recalculated using the QNH parameters.

This field also allows the user to select a minimum and maximum altitude for displaying data blocks. Aircraft data blocks are suppressed for any target above the maximum or below the minimum limit set by the altitude filter.



Figure 5-9: QNH panel

5.3.8. Dot Colour panel

The digital Data (plots/tracks) shown in the TMD3 display can be coloured in two ways:

- **Normal:** In this mode the plot colour is derived from the type of plot (e.g. Combined plot, SSR only plot, Mode-S plot). The list of options is set in the "Display Configuration Window". (See 6.2.1

Display Configuration Setup)

- **Colour Mode:** In this case the user can select a field (e.g. Altitude, Power, Azimuth) and use the value of this field as the colour of the plot symbol. In this case, it is required to select a "Ramp" (colour scale) and select a minimum and maximum boundary.

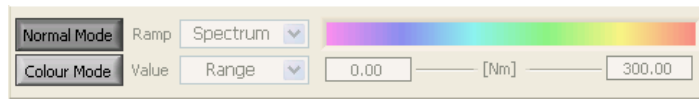


Figure 5-10: Normal mode

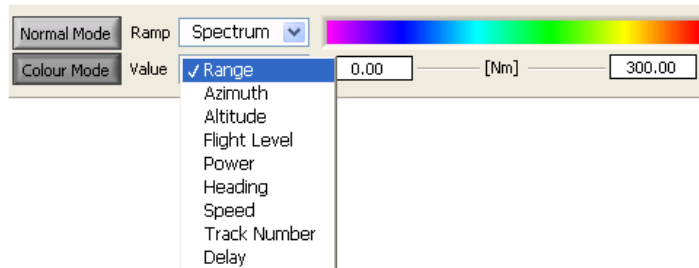


Figure 5-11: Colour mode

5.3.9. Video/Comm configuration panel

The user can define up to 8 different Video configurations and up to 6 different Comm configurations in one parameter set, and can switch instantaneously between these configurations using the “Video Select” and “Comm Select”-selection lists as in the figure below. (See 6.2.2 and 6.2.3 for detailed configuration).

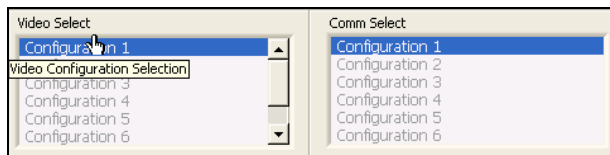


Figure 5-12: Video-Communication select

5.3.10. Mode of Operating panel

This field shows the mode of operation of the TMD3. (See 5.3.1) This can be either playback or recording. In recording mode it shows information about the selected SCF-map.

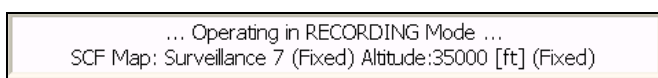


Figure 5-13: Recording mode

In playback mode it shows information of the selected file.



Figure 5-14: Playback mode

5.3.11. Site Name, User Name and Configuration File

Below the PPI, the site name is displayed along with the name of the current user and the selected configuration file.



Figure 5-15: Configuration file

5.3.12. Information selection tab

The TMD3 allows you to display a wide variety of information. Generally the following is explained:

- UTC North: is the Time Of Detection (TOD) of the North message in the ASTERIX or RDIF data
- Revolution Time: is calculated by subtracting the TOD of the current North message with the TOD of the previous North message.
- Reports/Scan: number of digital plots/tracks per scan

A selection can be made using the following tabs:

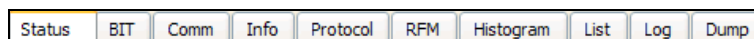


Figure 5-16: Information selection tab

5.3.12.1. Status tab

The status tab shows the status of the radar as transmitted through ASTERIX Cat002/034 data items 50, 60 and 70.

The upper field shows the System Configuration and Status (items 50 and 60), the middle field shows the Target Count values (item 70). In the lower field, you can observe the Radar Service messages. Use the popup menu to select between “North message”, “Sector message” or “Sector Zero message”.

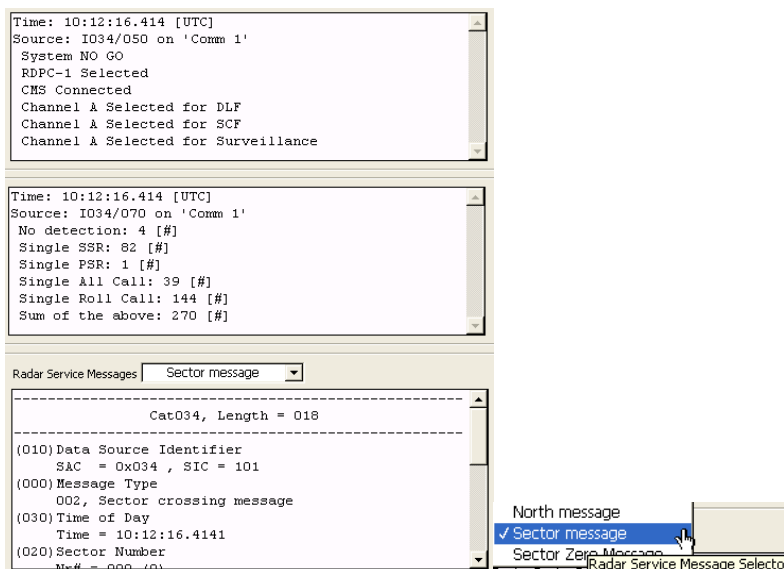


Figure 5-17: Status tab

5.3.12.2. BIT tab

The BIT (Build In Test) function of the TMD3 allows the user to verify all digital and video threads that are active. The TMD3 software presents the user with an updated BIT of these threads each time the BIT tab is selected. That is why there is a "Time of BIT execution" time and date present in the BIT tab. To refresh the BIT information, the BIT tab needs to be selected again by clicking in another tab and then changing back to the BIT tab. The information is self explanatory.

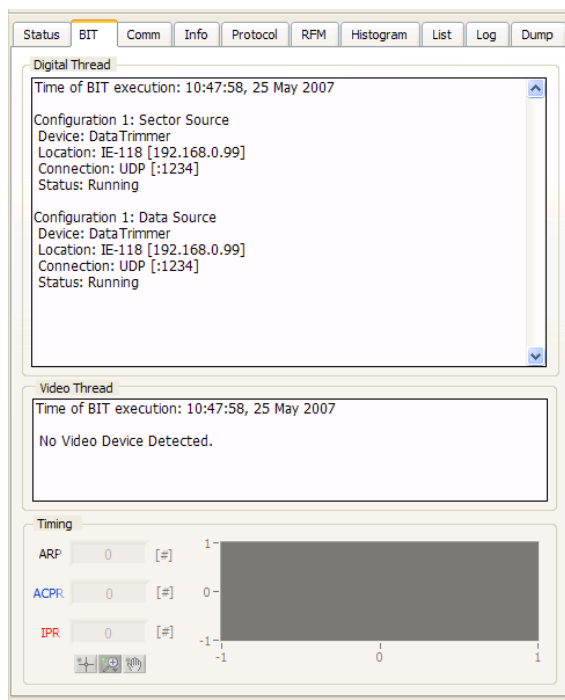


Figure 5-18: BIT tab

The lower graph displays the current value and the history of the timing signals that are connected to the TMD3. ARP = north pulse counter, ACPR = # ACP per revolution, IPR = # interrogations (trigger) per revolution. Notice that this information is only available in recording mode.

5.3.12.3. Comm tab

The Comm (communication) tab shows the status of the six communication channels that can be configured. Depending on the selected configuration, (ASTERIX, RDIF, etc..), different information can be shown in the text field underneath. Six LED indicators show the status of the six lines. Green indicates running status, Red means failure, Grey means the line is not used.

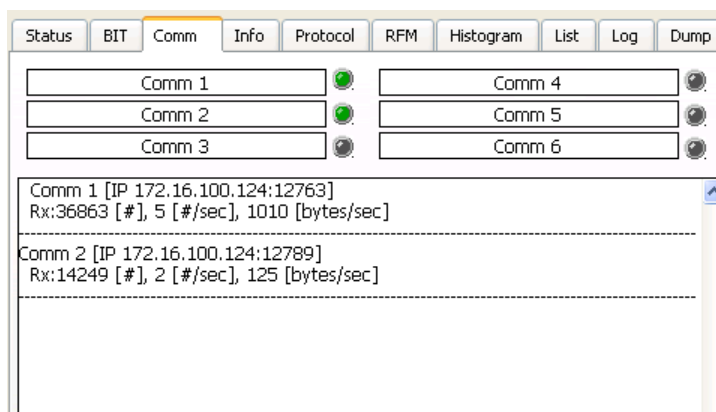


Figure 5-19: Comm tab

5.3.12.4. Info tab

The selected target(s) can be queried and their corresponding information - decoded (HEX or TEXT) ASTERIX or RDIF data fields - is shown in the info section. A target can be selected using the cursor in select mode and by clicking on the target. When multiple targets are selected you can scroll through the targets using the selection counter, A-code or S-address.

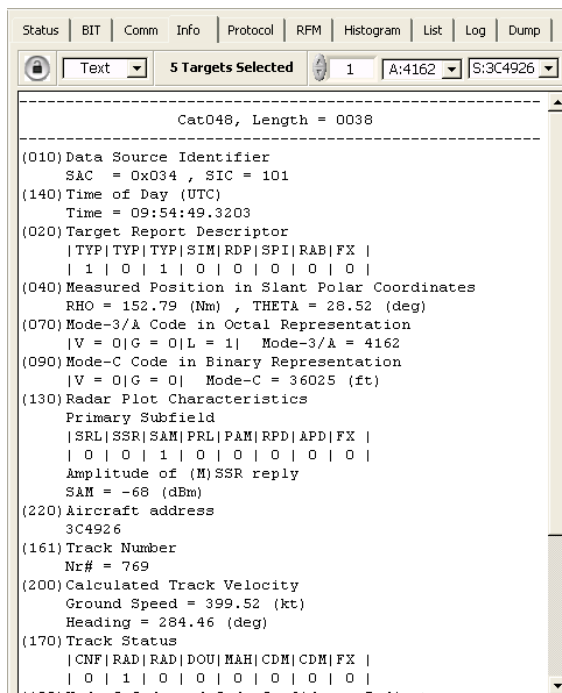



Figure 5-20: Info tab

5.3.12.5. Protocol tab

The protocol tab allows the user to verify the contents of the LAP-B/HDLC layers, and counts the contents of the individual ASTERIX messages per category. When you click , it will clear the protocol statistics.

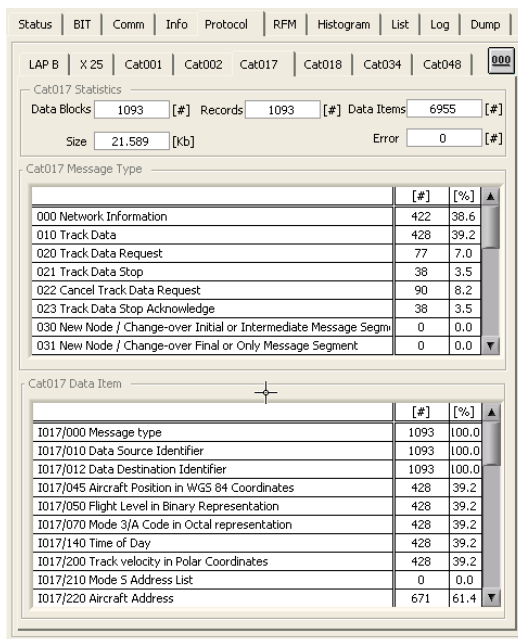


Figure 5-21: Protocol tab

5.3.12.6. RFM tab

The RFM monitoring function allows an automatic monitoring of the position, code etc. for a stationary target. The user can set a window (Range-Azimuth) and enter the presumed A code and/or flight level of the RFM. Statistics on range and azimuth are presented to the user. Once the RFM statistics window size is reached, it will act as a sliding window. All numbers are calculated using the data contained in the statistics window at that particular moment in time. Notice that the Scans number is incremented at the beginning of the scan and that the Hits number is incremented at the actual position of detection. This means that the Pd number is only valid upon completion of the scan.

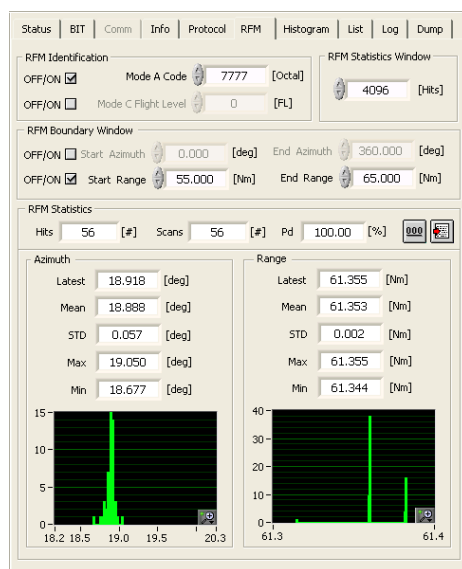




Figure 5-22: RFM tab

Use the  button to clear the RFM statistics. Use the  button to export the RFM statistics to a .csv file.

5.3.12.7. Histogram tab

The Histogram function allows the user to select a parameter of interest and monitor this for consecutive scans. The result is shown in a histogram.

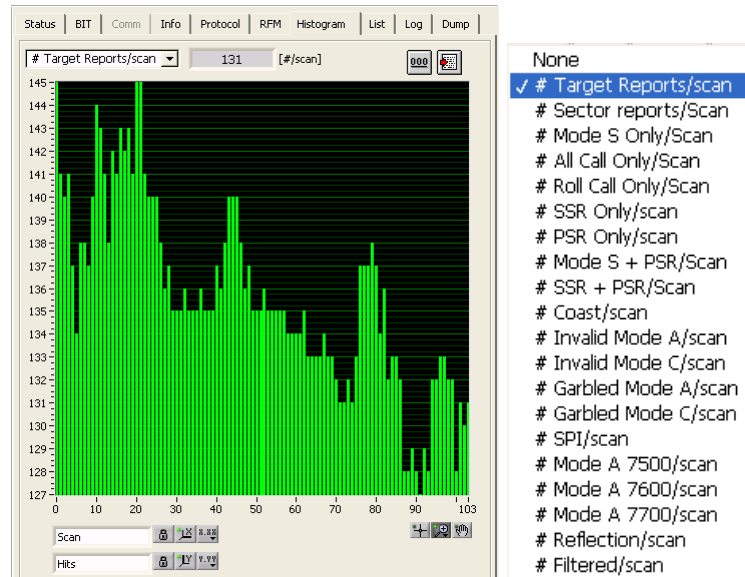




Figure 5-23: Histogram tab

Use the  button to clear the histogram. Use the  button to export the histogram values to a .csv file. Notice that changing the histogram selection will clear the histogram contents.

5.3.12.8. List tab

The TMD3 is mainly designed to operate with a Mode-S station, which will use Mode-S to interrogate the targets. Mode-S presents a number of additional features, such as data-link, Surveillance Coordination Function and Enhanced Surveillance. The display deals with these new types of technologies in representing the data provided by the Mode-S radar in a correct and user friendly way. Typically, enhanced surveillance data (MB data, Resolution Advisories, etc.) can be viewed in the “Target info” field (see above). The data associated to DLF and SCF functions is presented in the main display area (e.g. Cat 17 Track Data) or is represented in a special “Synoptic Display” area. (See later). This synoptic display operates in conjunction with a list, which limits the number of targets of interest to maximum 32. The user can create this list manually, from a selected number of targets in the main display, or dynamically from a predefined filter (e.g. only those targets with MB present, with a RA present etc.).

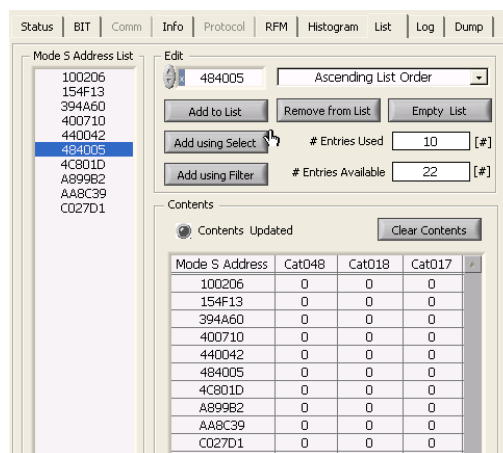


Figure 5-24: List tab

The Mode-S address list is to be used in cooperation with the Synoptic window. There is no link between the Mode-S list and the Dump window.

5.3.12.9. Log tab

Each action that the user undertakes is logged to a log-file, and can be seen in the "log" tab. This list can be used to verify all actions undertaken since start-up of the TMD3. The data contained in this log is automatically stored on disk on shut down of the TMD3. The last 10 log-files are retained on disk. These log-files can be recalled using the "Log-file" menu.

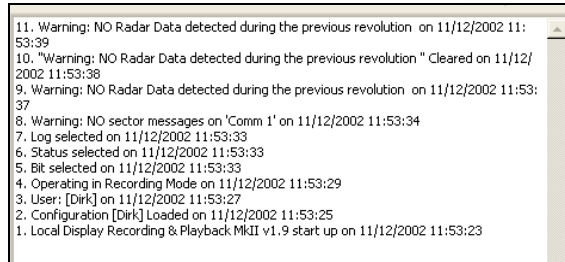


Figure 5-25: Log tab

5.3.12.10. Dump tab

A final feature available under the Tab list is the "Dump" function. This allows you to dump all or a limited set (using the filter function) of ASTERIX/RDIF messages into a predefined table and/or into a .csv file.

The user can select the data to be dumped (ASTERIX cat 1,2,17,18,34,48 or RDIF) and a dedicated filter (All, Mode-S only, Only the targets with Target ID, MB data or Resolution Advisory data present).

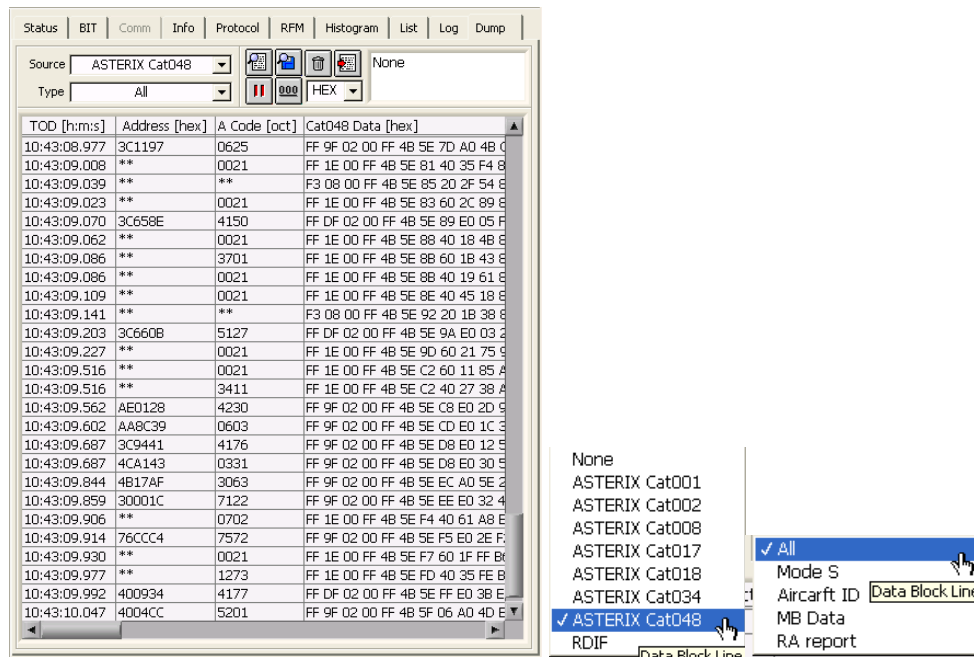


Figure 5-26: Dump tab

The following buttons are used:

Table 5-3: Menu buttons dump tab

Button	Usage
	Look at the dump detail
	Click this button to select where to save the dumped data
	Click this button to delete the dumped data
	Click this button to dump the data into the selected file
	This button can pause the dump
	Use this button to clear the list

6. TMD3 Configuration

6.1. Start up

6.1.1. First time start up

The very first time you open the TMD3, the following alert will prompt:

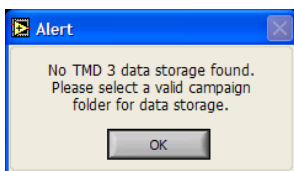


Figure 6-1: TMD alert

You have to select a correct path for the TMD3 data storage. This path should correspond to standard RASS-S campaign folder. When you click OK, the following window appears:

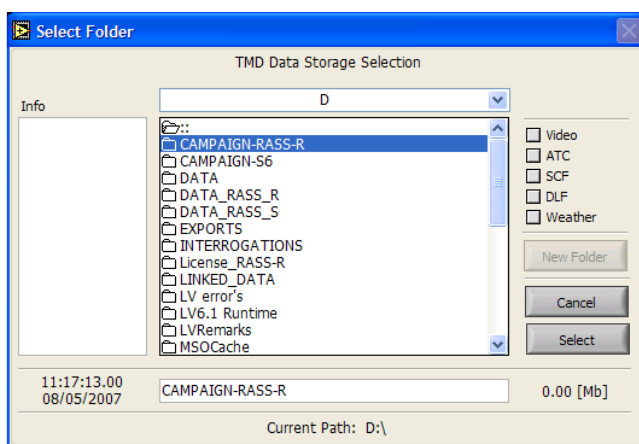


Figure 6-2: Storage folder selection

You can select an appropriate folder where to store the data in. When you made a campaign structure using the RASS-R toolbox, you can easily browse to for example D:\CAMPAIGN-RASS-R. (Refer to 4 RASS-R toolbox)

Upon completion, the TMD3 will start up normally the next time you open it.



The path you selected will be saved in the TMD.ini file that is in the following folder: C:\INTERSOFT\TMD3. The TMD3 will not ask anymore for this path, until the data storage path from the ini-file no longer corresponds with the actual path on your harddisk.

Example: The ini-file contains the following path:

[Data Storage] Path="/D/CAMPAIGN-S6/CAMPAIGN-RASS-R"

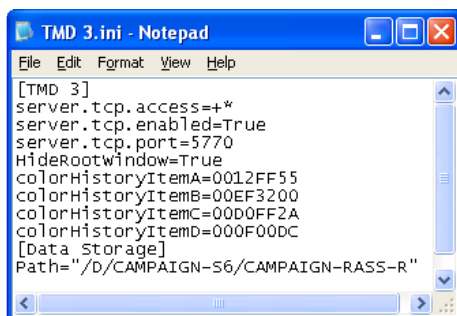


Figure 6-3: TMD3.ini file

When you would change the campaign folder name on your haddisk, into “D:\CAMPAIGN-S6\CAMPAIGN-DEMO”

both paths do not correspond anymore and the alert will prompt every time you open the TMD3.

This can be solved in two ways:

Change the campaign folder name to “D:\CAMPAIGN-S6\CAMPAIGN-RASS-R” again.

Or erase the [Data Storage] path from the ini-file. Then the TMD3 will prompt the alert again and you can select the new data storage path.

6.1.2. Normal start up

In a normal start up of the TMD3, a dialog appears that allows you to select a predefined configuration:

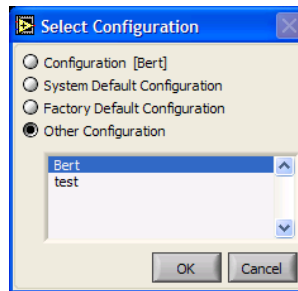


Figure 6-4: Select configuration

A **configuration** is a combination of all the setup parameters used by the TMD3 (e.g. Video Sources, ACP/ARP sources, Comm setup, line selection, colour selection for plots, etc..). This way the TMD3 can be configured to individual needs and individual configurations can be restored automatically during the login process. The TMD3 configuration files are saved in the “\PREFS\” folder in the campaign folder that you selected at first start up of the TMD3. (See previous paragraph)

There are **4 types of configuration**:

- **Configuration for [Username]:** This is the most common (Username is the Windows login name). At the end of each TMD3 session, the user will be prompted to save the current configuration. The next session can then be started using this saved configuration. Notice that at any time a configuration can be saved for future use using the “Save Configuration ...” menu item.
- **System Default Configuration:** This allows a user to start up the TMD3 using the system defaults. These system defaults can only be set by the system administrator (= Windows Administrator) and can NOT be modified by any other user. The System Default Configuration can be considered as a default configuration for a specific organization.
- **Factory Defaults Configuration:** The third option can be used if the user wants to revert to the Factory Defaults Configuration. This configuration is hard-coded in the software. This configuration can only be changed by Intersoft Electronics. The Factory Default configuration should get you always started.
- **Other Configuration:** The last option allows you to load any configuration saved by any other user. All available configurations are listed. Select any configuration by clicking on the appropriate name.

When you have selected a configuration, the device discovery process will start. Since all data is streamed using the RASS-R Data Handling Module –server (DHM-server), the TMD3 scans on the network which DHM-servers are active (See also 8.1 Configuration of DHM). For those that are active, it will show the available Video Inputs or Digital Inputs. When both digital and video input is detected, the TMD3 will immediately start up in recording mode. If not, the “Discovery Devices”-window will pop-up.

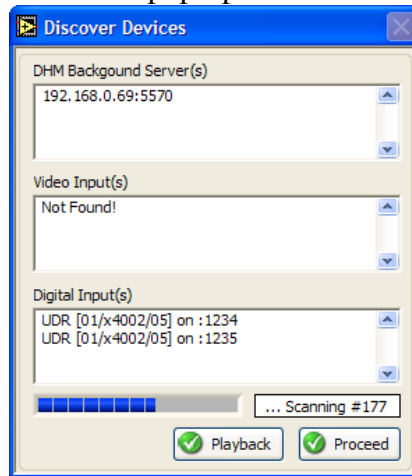
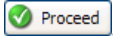
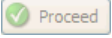



Figure 6-5: Discover devices

This window is dynamically updated as long as the scanning goes on. When you click  Proceed, you start up the TMD3 in Recording mode. When no Digital input nor Video input is available,  Proceed will become inactive and you are supposed to enter the Playback mode by clicking .



Upon the unlikely event that the TMD3 has failed (crashed), the next start-up sequence will use the auto login feature and restore the previous selected configuration. This means that the select configuration window will select the previous selected configuration and automatically close without any intervention of the user.

6.2. Configuration change

Most of the configuration parameters can be set from the "Configuration" menu in the menu bar. The most important configuration screens can also be recalled using the function keys.

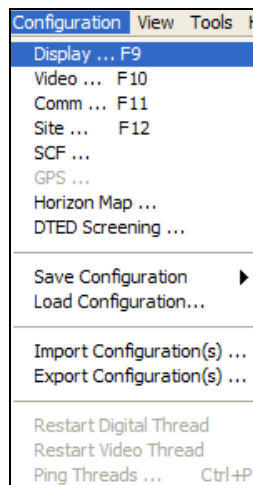


Figure 6-6: Configuration menu

6.2.1. Display Configuration Setup

Open the "Display Configuration"-window as in the figure above or click F9. The display configuration has five "Tabs" in the window.

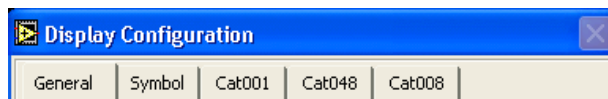


Figure 6-7: Display configuration tabs

Start by selecting the "General" Tab. Modify the proper controls according to your needs.

Whenever a configuration has been changed **Apply** is enabled and blinks. Click this button to apply the modified parameters without leaving the configuration window. This way the user can see, evaluate and if necessary change configuration parameters on the spot. Upon clicking **OK** all modifications are applied and the configuration window is closed. Clicking **Cancel** will ignore all changes and close the configuration window.

6.2.1.1. General Tab

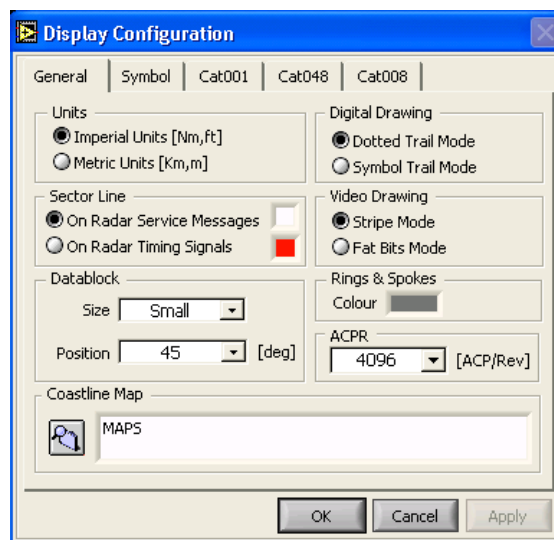


Figure 6-8: General tab

- **Units:** Imperial or Metric Units: allows the user to select either Nautical Miles and Feet or Kilometers and meters.
- **Digital Drawing:** Selection between "Dotted Trail Mode" or "Symbol trail Mode". In the first mode, the Digital Trail (History) is shown as a single pixel dot. In the second mode, the Digital Trail has the same symbol as the original (updated) plot.
- **Sector Line:** On Radar Service Messages or On Radar Timing Signals. This selection allows the user to select whether the Rotating Sector Line is taken from the Radar service message Sector information (included in ASTERIX Cat 002/034) or from the Encoder (ACP/ARP). This selection is also used to define the scan boundary in recording mode. When "On Radar Service Messages" is selected, the scan boundary is the sector zero message. In this mode no ARP/ACP pulses are required to make a digital thread recording. When "On Radar Timing" is selected, the scan boundary is the ARP pulse. In this mode ARP/ACP pulses are required to make a digital thread recording. **A video thread recording always requires ARP/ACP signals.**

When the TMD3 rotates on Radar Service Messages, it expects **32 sector messages at regular intervals**. If a sector message does not come on time (for example due to a buffer problem), the TMD3 will wait until it is received. Upon receiving, the TMD3 continues drawing the sector line, which may result in a faster rotating sector line for a short while in

order to cover the gap in time between the two successive sector messages. If the rotation of the TMD3 sector line is faster than expected or at irregular intervals, timing errors in the North and/or sector messages might cause this behavior. Then, further analysis of the sector messages is necessary. (for example by recording the sector messages)

Remark: there is no option to generate sector timing as in the Multi Radar Display MRD3.

- **Sector Lines Colours:** The sector line colours (both types) can be selected separately by clicking on the colour selection box next to the text fields.
- **Video Drawing:** Stripe Mode or Fat Bits mode. The difference between the two drawing modes has been made clear hereunder. The Stripe mode is typically used for representation of Mode-S all Call data or SSR data, where the Fat Bit mode is better for showing PSR clutter data. (But can be used for SSR too).

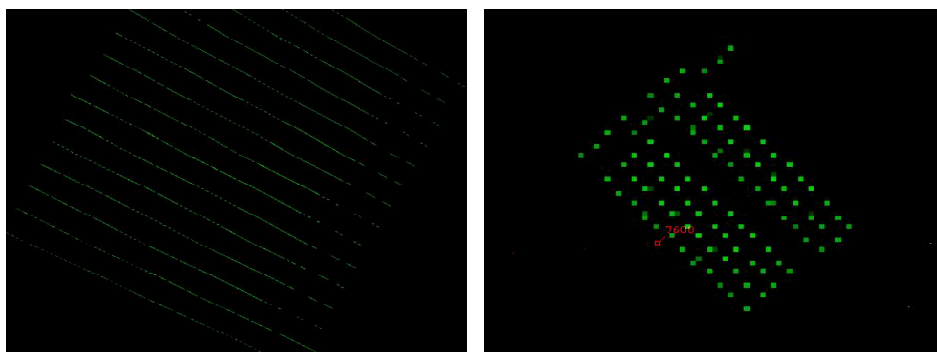


Figure 6-9: Video drawing

- **Data Block Size:** The data block font can be drawn in four sizes: Small, Medium, Large and Extra Large.

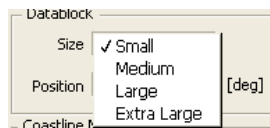


Figure 6-10: Data block size

- **Data Block Rotation:** The data block can be positioned at 45, 135, 225 or 315 degrees relative to the plot position.

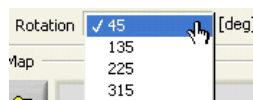


Figure 6-11: Data block rotation

- **Rings and Spokes Colour:** This control lets you set the colour of the rings and spokes in the display.
- **ACPR:** This control menu selects the number of ACP pulses that is expected per revolution. (4096 = 12 bit encoder, 16384 = 14 bit encoder; 65536 = 16 bit encoder). A change in ACPR selection requires a restart of the TMD3 software.

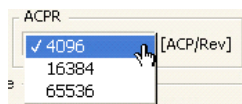


Figure 6-12: ACPR

- **Coastline Map:** Use this function to select a Map that has been saved previously to disk (See Map editor) To select a Map, Click on the map select button and select a Map file in the dialog that follows.

6.2.1.2. Symbol and Colour Tab

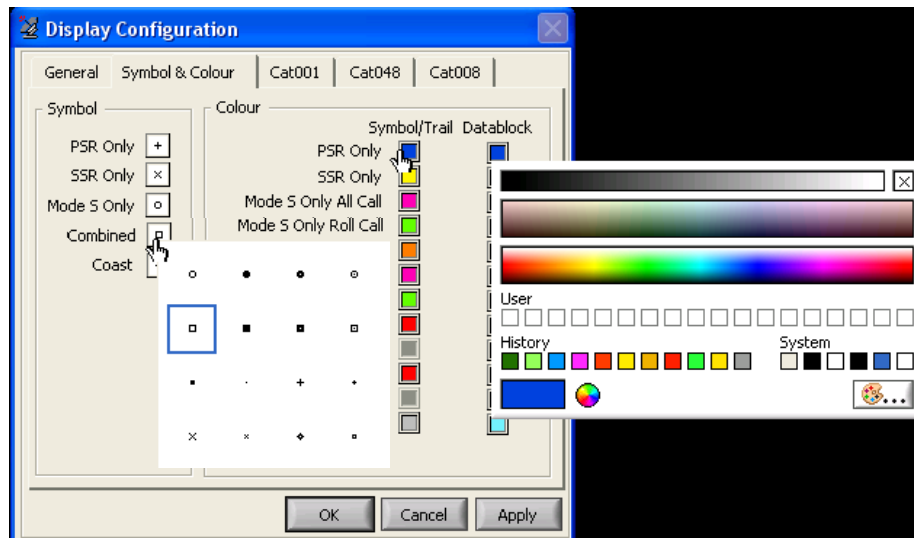


Figure 6-13: Symbol & colour tab

Here you can define the symbol colour, data block colour and symbol shape to identify specific types of targets. Use the colour picker pop-up window that appears when you click on one of the colour boxes. Individual symbol shapes can be selected for:

- PSR Only targets
- SSR Only targets
- Mode-S only
- Combined targets (PSR + SSR, PSR + Mode-S)
- Coasts (missed targets)

Select one of the symbols available from the menu of the pop-up menu. (Click on the symbol to get the menu) furthermore, you can set the colour for specific combinations. The colour of the symbol/trail and the colour of data block can be set separately.

Typically, the symbol/trail colour and data block colour can be modified for:

- PSR Only targets
- SSR Only targets
- Mode-S Only All Call targets
- Mode-S Only Roll Call targets
- Combined Mode-S All Call + PSR targets
- Combined Mode-S Roll Call + PSR targets
- Emergency Codes
- SPI
- Reflections
- Test Targets
- Coasted Targets

6.2.1.3. ASTERIX Cat001 and Cat048 setup

The ASTERIX setup tabs allow you to customize the list of fields that are shown in the target info field when querying targets (see further). This can be used to remove unwanted information from the display. Each field can be switched on or off by clicking on the button after the field name. When clicking on the “Display” word above, all fields switch from on to off or vice versa.

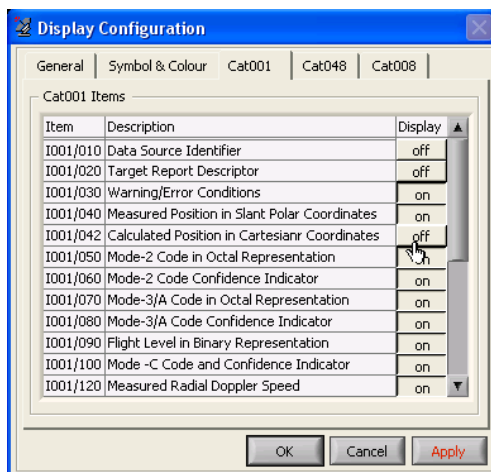


Figure 6-14: Asterix setup

6.2.1.4. ASTERIX Cat008 colour definition

The TMD3 is capable of displaying ASTERIX Cat008 weather pictures. The user has to define the colour of the different levels 0-7 (ASTERIX I008/020). Remember to switch on the weather checkbox in the GUI.

6.2.2. Video Configuration Setup

Open the “Video”-window in the following way or click F10.

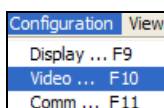


Figure 6-15: Configuration Menu

The Video Configuration of Figure 6-16 appears. The TMD3 allows for 8 different Video configurations. These configurations are hot-swappable, allowing for example a fast switch between Analogue Video (Where colour or intensity means Video amplitude or voltage) and Quantised (PSV) video. Click on the corresponding tab to configure each configuration.

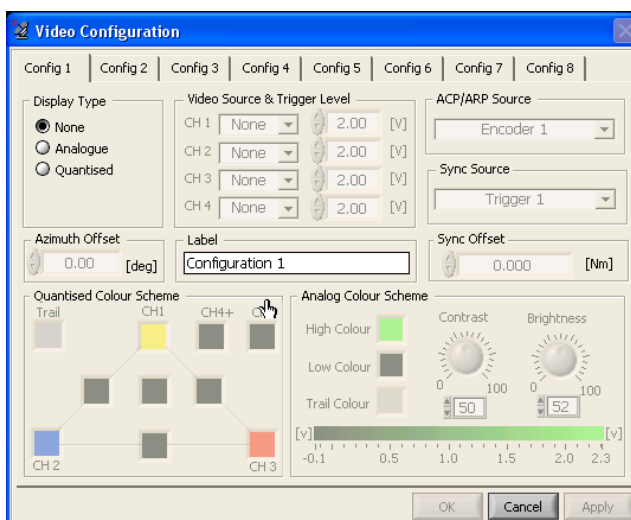


Figure 6-16: Video Configuration

Following parameters can be set:

- (Video) Display Type:** None, Analogue or Quantised. This allows the user to select either an analogue video display or a quantised video display. Analogue means that the intensity/colour is derived from the sampled voltage of the video pulse. The scheme according to which the colour is taken can be defined in the "Analogue Colour Scheme" control. This way, users can verify the video amplitude of targets in great detail. Quantised means that the incoming video is passed through a threshold comparator prior to being displayed. If video is above a certain limit, (set as a voltage between 0 and 2 V), a pixel or line will be drawn on the screen.

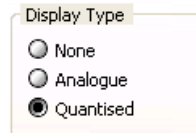


Figure 6-17: Display Type

- Video Source:** In case analogue Display type is selected, the user can only select one input channel out of 4 possible inputs. In case Quantised Video is selected, up to four inputs can be combined into one video bit. Notice that the four inputs for the quantised mode do not have to correspond with the hardware inputs on the MDI or RIM. The colour of the bit is determined from the colour triangle defined in the "Quantised Video Colour Scheme" control.

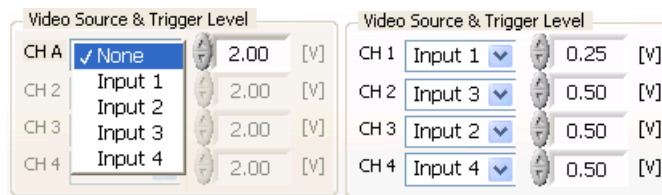


Figure 6-18: Video Source select (left: Analogue mode; Right: Quantised Mode)

- Video Trigger level:** The trigger level determines the threshold value below which no video is sampled (in volts).
- Azimuth Offset:** The azimuth offset (in +/-degrees) is applied to offset the video data with respect to the north pulse.

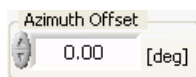


Figure 6-19: Azimuth Offset

- Quantised Video Colour Scheme:** In case multiple Video inputs are combined (e.g. PSR and SSR video, All Call and SSR), each of the separate Video sources (which must be quantised first) has an individual colour. Furthermore, combinational colours can be defined. (E.g. Red = PSR, Blue = SSR, Yellow = Mode-S; PSR and SSR overlaid will show as purple, PSR and Mode-S overlaid will show up as orange.)

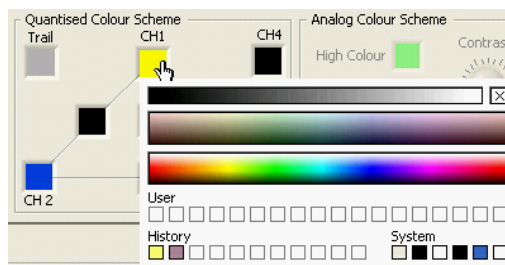


Figure 6-20: Quantised video colour scheme

- Analogue Colour Scheme:** The Analogue video is always sampled between -0.1 and 2.3 Volts. This range can be "rescaled" using the Colour scheme. First of all, you can select a High and Low colour. The video will be interpolated between these two colours. Next, select the trail colour. This is the colour for the video history. (maximum 5 trails or infinite) Now select the "Brightness" and "Contrast". These two controls influence the boundary between the low and high colours.

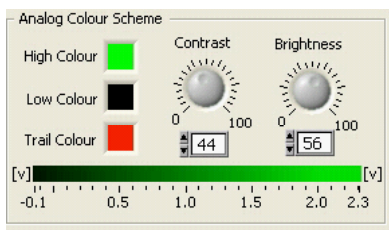


Figure 6-21: Analog colour scheme

- ACP/ARP Source:** This control selects between encoder input 1 or 2

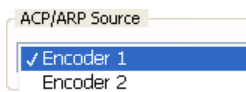


Figure 6-22: ACP/ARP Source

- Sync Source:** This control selects the source of the trigger pulses. This control selects the trigger (zero range) between trigger input 1, trigger input 2, composite video on video input 7 or composite video input 8 (on MDI¹ front panel).

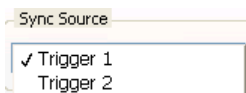


Figure 6-23: Sync Source

- Sync offset:** This control sets the zero range of the display (in +/- Nm). This should be adjusted if the trigger pulse supplied to the tool is not aligned with the interrogation of the radar.

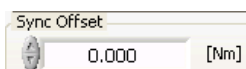


Figure 6-24: Sync Offset

Label: each of the configurations can be given a label, which shows up in the Configuration list on the TMD 3GUI. Configurations that are not defined (Video Display Type set to "None") can't be selected in the TMD3GUI.



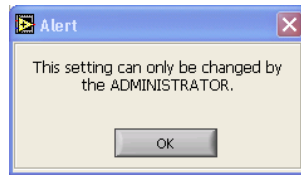
Figure 6-25: Video Label

After setting the parameters the "Apply" button is enabled. Click this button to apply the modified parameters without leaving the video configuration window. Notice that some controls (such as Trigger level and colour schemes) react instantaneously without the need to apply them. This way, you can see the effect immediately and fine tune the video configuration set up.



Some settings can only be changed by the System Administrator. The following alert will be shown in this case.

¹ In case the MDI56x is used in combination with a Radar Video Recorder. Not when a RIM782 is used.



6.2.3. Communication Configuration Setup

Open the “Comm Configuration” window in the following way or click F11.

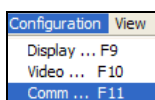


Figure 6-26: Configuration Menu

The next window will appear:

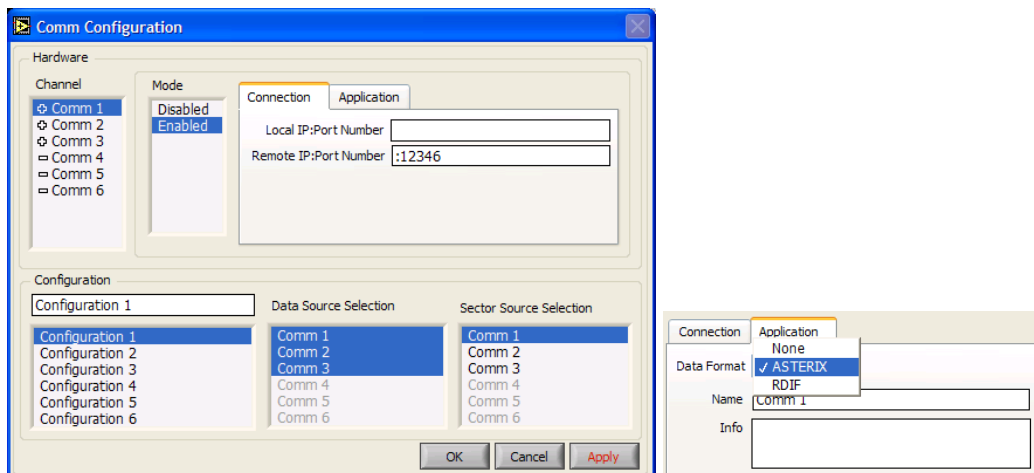


Figure 6-27: Comm configuration

The first item on left hand side of the window is the Hardware channel list. You will see a list of 6 available channels (Comm 1-6). Select one of the 6 Comm-lines to define it.

There are 3 Tabs to configure:

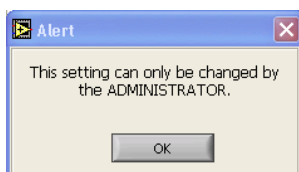
- **Mode:** to enable or disable a Comm-channel. In the Channel list, ☒ means enabled, ☐ means disabled.
- **Connection:** fill in the IP address and TCP port where the DHM outputs the data.
 - Local IP: this is only required when more than one network adapter is installed on the computer
 - Remote IP: IP address of the DHM server. In case the DHM is running on the same pc as the TMD3, you can simply fill in “:port number”.
- **Application:** you can choose between ASTERIX or RDIF, then give it an appropriate name and fill in some info.
- **Configuration combination:** Finally, combine the configured channels in a Configuration and give it an appropriate name.



A configuration can have multiple Data Sources but only 1 Sector Source! In the TMD3 GUI, you can easily switch between those configurations.



Some settings can only be changed by the System Administrator. The following alert will be shown in this case.



6.2.4. Site Configuration Setup

Open the Site-window in the following way or click F12.

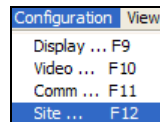


Figure 6-28: Configuration Menu

Following window will appear:

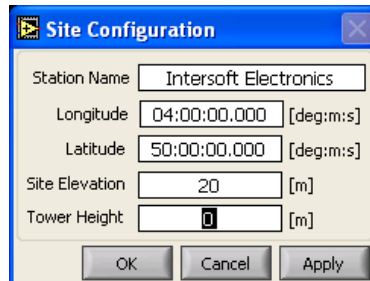


Figure 6-29: Site configuration

It is necessary to align the Radar Data correctly with respect to the coastline map.

You can enter the site coordinates and its name. Use the longitude and latitude controls to enter position in the format deg:m:s , where deg represents the degrees [-180...+180] , m are the minutes [0..59] and s are the seconds [0.000..59.999].

Site Elevation is altitude of the tower base above mean sea level in meters. Tower height should also be entered in meters.



Notice that the site coordinates are stored with the configuration, not with the map definition file. This means that you can change the site coordinates and still use the same map definition file. The same object will appear but at a different position with respect the new site coordinates.

Click the Apply button to apply the new position to the TMD3 display. (It will move the radar data over the preloaded maps.)



When SCF maps are available (see later), the site information contained in these maps is automatically transferred to the TMD3 site information window.

6.2.5. SCF Configuration Setup

Open the SCF-window in the following way.

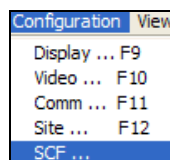


Figure 6-30: Configuration Menu

This window allows you to set a number of SCF map and ASTERIX Cat017² related parameters.

² CAT17=Mode-S Surveillance Co-ordination Function messages

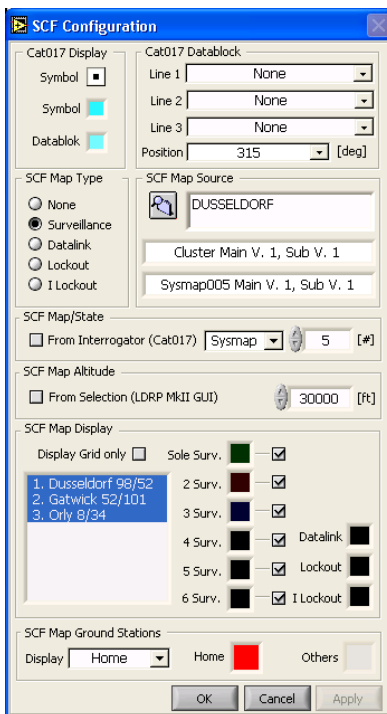


Figure 6-31: SCF configuration

6.2.5.1. Cat 17 Display and Data block

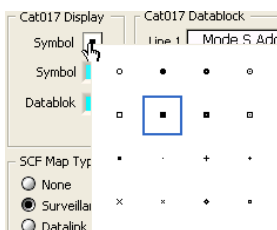


Figure 6-32: CAT017 display

This set of controls allows the user to set the symbol, symbol colour and data block colour for the Cat017 Track Data messages displayed in the TMD3. The position is taken from the longitude/latitude information present in the Cat017 track data message and then recalculated to fit the PPI/vertical display. Notice that the Cat017 track data messages originating from other nodes are asynchronous to the radar’s rotation. This means that they will popup and are not synchronized with the rotating sector line.

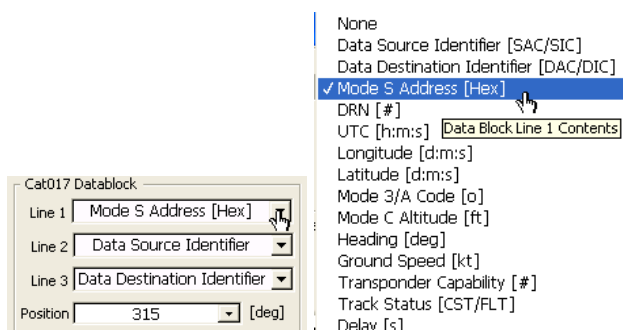


Figure 6-33: CAT017 data block

The Cat017 data block control allows the user to define the contents of the data block for Cat017 Track Data messages. The position of the data block with respect to the symbol can be modified (typically, when the position is different from Cat048 data block position, they will be more noticeable). Notice that the Cat017 data block contents is solely taken from the Cat017 Track Data messages. Whenever the selected data block is not available, “***” is displayed. There is one exception: Delay [s] is calculated as the difference between the time stamp inside the Cat017 track data message and the time of arrival of the Cat017 track data message in the TMD3. For track data messages originating from neighboring nodes, this value includes the SCF network delay.

Remark: under normal circumstances every series of track data exchange is properly ended with a cancel track data message. This will trigger the removal of the data block and symbol of the last received track data message. However, when no cancel track data message is received within 2 scans of the last received track data message, the data block and symbol of the last received track data message are removed anyway.

6.2.5.2. SCF Map Type and source

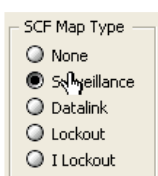


Figure 6-34: SCP Map Type

The SCF map can be one of the four predefined SCF map types: Surveillance map, Data Link Map, Lockout Map or Intermittent Lockout Map. The user can easily switch between these maps, allowing him to verify the maps loaded in the system. Remember that the Map checkbox has to be set in the TMD3 GUI in order to display the SCF Map.

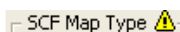


Figure 6-35: SCP Map Type Warning

Beware: the SCF maps are to be loaded in the TMD3 (see further). They are NOT automatically retrieved from the radar. Preferably put the SCF maps in the D:\CAMPAIGN-RASS-R\DATA\MAP-folder.

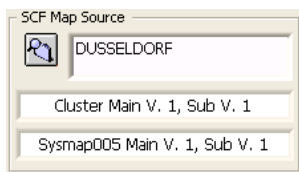


Figure 6-36: SCF Map Source

The SCF Map file type is described in detail in the POEMS ICD for SCF maps (The SCF map folder must contain the original cluster.dat and sysmapxxx.dat files). The name of the selected SCF map source folder is displayed. The next line contains the version and subversion number taken from the cluster.dat file. The last line contains the version and subversion number of the selected sysmapxxx.dat file (manual mode only, see later).

6.2.5.3. SCF Map altitude and type

SCF maps can be different for every “altitude band” of 200 ft. That is why the user can set the altitude for the displayed maps fixed or use the altitude of the target that is selected in the TMD3 GUI. This last option makes sure that the displayed SCF map always corresponds with the altitude of the selected target.

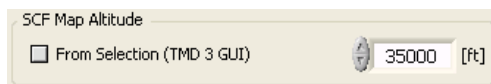


Figure 6-37: SCF Map altitude

SCF maps also differ per SCF state. (The state is the binary number representing whether a particular station participates in the cluster or not). The state can be entered manually (e.g. to verify all the maps in the file) or can be taken from the interrogator. In this case, a special SCF command (Move Node to new State, with SIC/SAC and DIC/DAC both set to the same code) needs to be present in the Cat017 data stream. The SCF map is then automatically updated whenever the state (Move Node message) is changed.

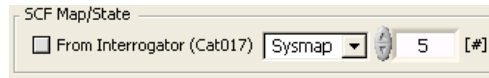


Figure 6-38: SCF Map/State

When entered manually, the user can chose to enter the state number or the required sysmap number. Whenever a state number is entered, the corresponding sysmap is taken from the solution table in the cluster.dat file.

6.2.5.4. SCF Map Display

This set of controls defines the SCF map appearance on the screen.

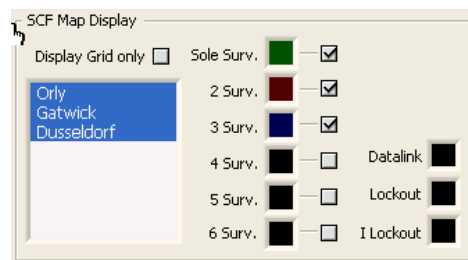


Figure 6-39: SCF map display

Display Grid Only: This control switches between a solid coloured SCF map and a grid SCF map (the displayed grid corresponds to the grid as defined in the SCF map)

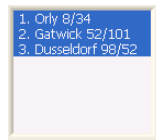


Figure 6-40: Node Selection

Node selection: This controls the topology of the map that is drawn in the display. Only the nodes that are selected are included in the map. A node is identified by its node number, its name and the SAC/SIC code (shift click to select multiple nodes). This information is taken from the cluster.dat file.

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 a single coverage, the cell is coloured according to its Colour box setting. Use the checkboxes next to the colour boxes to switch on/off zones with a specific coverage level. Regions that are covered by neighboring nodes only but are still included in the SCF map are drawn shaded.

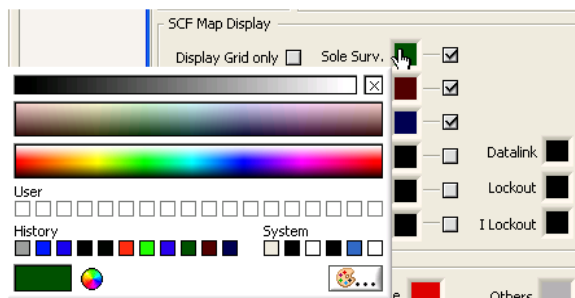



Figure 6-41: SCF map colour settings

Tip: use dark colours for the map, in order not to obstruct video and digital displays. These dark colours can be created the best from using the “colour palette” menu. To evoke this, use the “palette”  button.

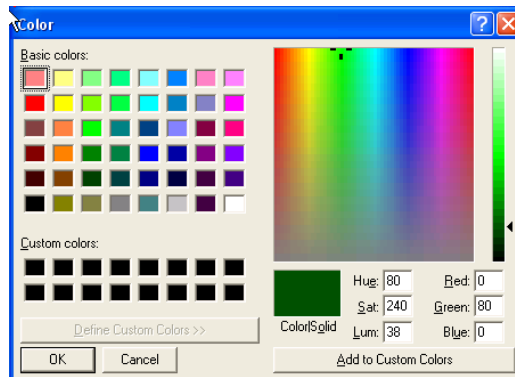


Figure 6-42: SCF map colour panel

This way, you can create colours by typing in the values for green, blue and red saturation.

6.2.5.5. SCF Ground Stations

By using the SCF ground stations panel, you can add or remove the ground station labels (e.g. Gatwick). You can also determine the colour of these labels. The colour of the home station and of the other stations in the cluster can be modified separately.



Figure 6-43: SCF ground stations

6.2.6. Horizon Screening Map Setup

Open the “Horizon Map”-window in the following way.

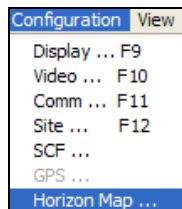


Figure 6-44: Configuration menu

The following window will appear:

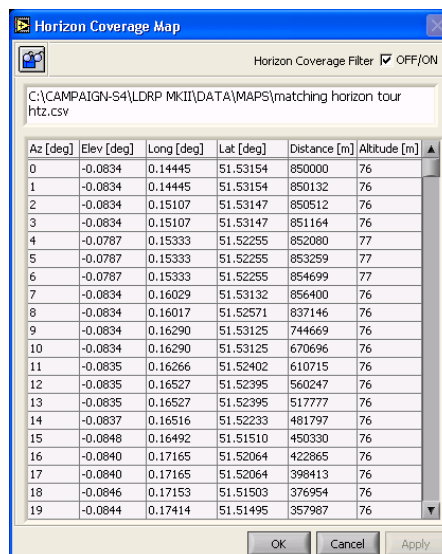



Figure 6-45: Horizon Coverage Map

Click the  button to browse for a Horizon screening file. This is a .csv format file containing an entry for each azimuth (1-360). Each entry consists of an azimuth, a minimum elevation for that azimuth, Longitude and latitude of the horizon screening point, distance and altitude of the horizon screening point.

The horizon screening map is NOT part of the TMD3 software. The default path for the horizon screening map is D:\CAMPAIGN-RASS-R\DATA\MAPS. The horizon screening file cannot be edited using the TMD3 software.

Click the Horizon Coverage Filter OFF/ON checkbox to enable/disable the Horizon Coverage Filter function. This function uses the horizon screening file to decide whether a target is visible or not. The elevation of the target is calculated using the range and altitude values. The azimuth value is used to find the corresponding entry in the horizon screen file. Whenever the altitude of a target is unknown or not validated, it is always considered as being visible.

Targets that should not be visible according to the horizon screen file are displayed in grey on the screen in PPI as well as in Vertical display mode. Note that the GUI filter checkbox Filter has to be checked in order for the horizon filter to be applied.

6.2.7.DTED screening

Open the “DTED Screening”-window in the following way.

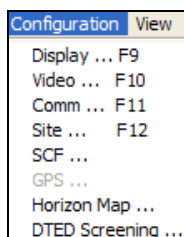


Figure 6-46: Configuration menu

When you click DTED screening, the following window will appear:

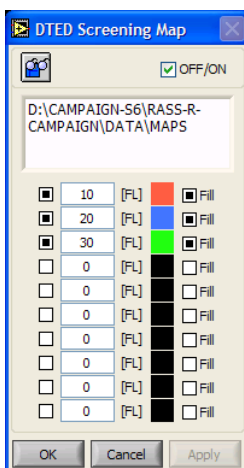



Figure 6-47: DTED screening window

Digital Terrain Elevation Maps can be converted to screening files with the RASS-R module Coverage Map Calculation. You can display them in the TMD3. Therefore, click  to select the correct *.hrscr file. Tick the OFF/ON button to display the screening or not.

The lines of equipotential flight level can be defined as follows:

- Enable or disable them by clicking
- Fill in a positive or negative flightlevel value
- Select a colour
- Select to fill the region between two lines of equipotential flightlevel

As a result of the settings above, you will see the following figure:

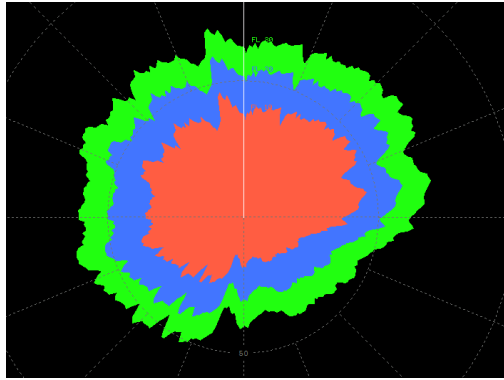


Figure 6-48: Screening file

6.2.8. Saving and Loading Configuration

Save [CTRL+S] or load a configuration in the following menu:

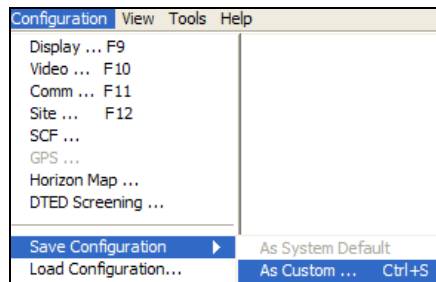


Figure 6-49: Configuration menu

Only a system administrator can save a configuration as “System Default”. For all other user this option is disabled. Notice that an administrator can have his own configuration called “administrator”.

When clicking Save Configuration > As Custom, following dialog appears:

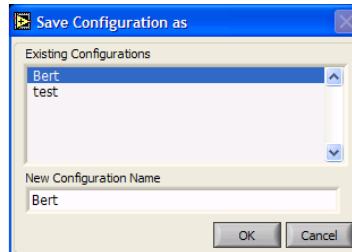


Figure 6-50: Save Configuration as (after menu or CTRL+S)

Enter a new configuration name or select an existing name (will be overwritten) from the list. When loading, following dialog appears:

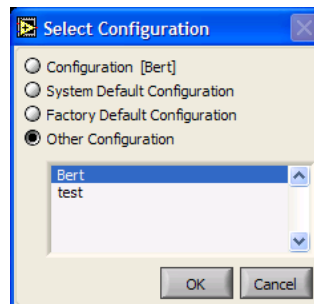


Figure 6-51: Select Configuration

Notice that this window is the same as for the login procedure (See also 6.1.2 Normal start up). Select a configuration of your choice and click OK. Whenever a configuration is loaded that is not the user's default configuration (other configuration name than the login name), an on screen warning is presented to the user by placing ⚠ next to the current login and configuration name.

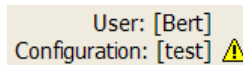


Figure 6-52: configuration warning

This warning sign does not mean that the configuration has changed but that you are not using your default configuration!



When you want to load a new configuration or quit the TMD3 (CTRL+Q), while the actual configuration has been changed without saving it first, the next window appears:

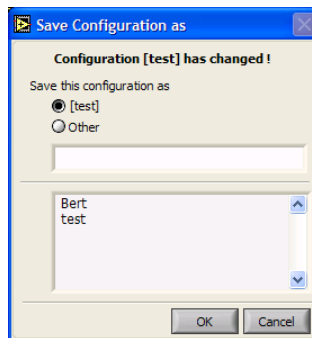


Figure 6-53: Save Configuration as

The dialog above suggests first to save the configuration as the Windows login name.

6.2.9.Importing/Exporting Configurations

Import or export configurations in the following way:

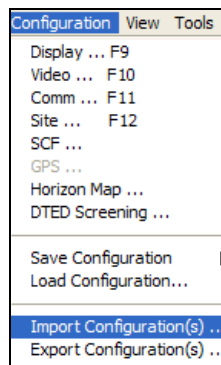


Figure 6-54: Configuration menu

The following dialog will appear:

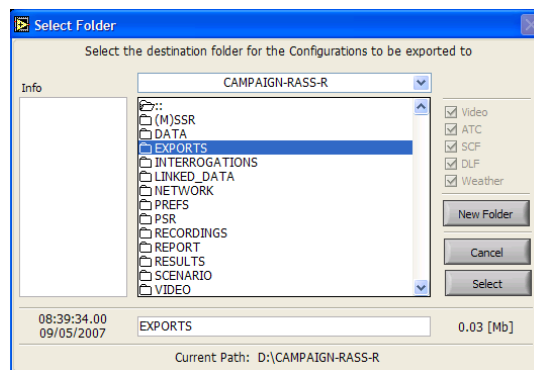


Figure 6-55: Export configuration

Select a folder (preferably as in the figure above) and export all configurations present in the TMD3 to this folder.

To import, a similar window will prompt. The format of such files is specific to the TMD3 and can NOT be read by alternative tools (such as Excel). The imported configurations will automatically be placed in the appropriate places and are ready to be used.

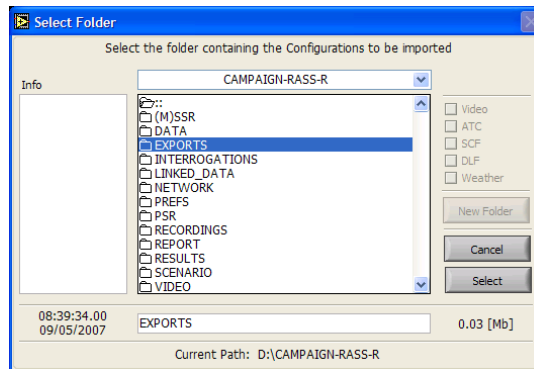


Figure 6-56: Import configurations

6.2.10. Threads

There are two main threads running in the TMD3: a video (analogue) thread and a digital thread. The video thread takes care of getting the video signals streamed by the DHM and putting them on the display, while the digital thread does the same for digital plots.

The response time of both threads can be visualized using the Configuration → Ping Threads menu item. The following window will appear:

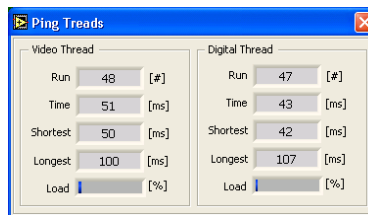


Figure 6-57: Ping threads window

Both run counters should be increasing (not necessarily in equal amounts). The load indicators at the bottom of the window give the user an idea of the processing load of both threads. These load indicators should display low values.

The TMD3 continuously checks both threads upon execution time as a watchdog. If a thread does not respond in 5 seconds, the TMD3 shows an alert of the thread that is not responding. (For example when too much video is input so that RIM782 cannot process it anymore, or when the computer CPU does not give enough processing time to a video or digital thread). The alerts are not shown if no video or data is received. Even if the threads respond again, the alerts will remain present on the TMD3.

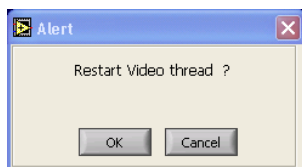


Figure 6-58: Restart Video Alert



Figure 6-59: Restart Digital Alert

By pressing OK, the user can restart the thread again. All thread occurrences are also logged in the TMD3 log-function.

6.2.11. Help function

Whenever the mouse pointer is kept above a control or an indicator for a short time, a tip strip will occur. This tip strip will give a comprehensive description of the selected control or indicator.



Figure 6-60: Tip strip example

The tip strip can be switch on/off in the Help menu. The On-line help function of the TMD3 can also be enabled in the Help menu. This will launch the PDF version of the user manual in a separate window.

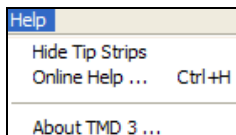


Figure 6-61: Help menu

6.3. Change mode

The TMD3 has two main operation modes:

- Recording mode
- Playback mode

When starting up the TMD3, the “Discover Devices”-window allows you to switch between the 2 modes (See 6.1 Start up). When started up, the user can at any time switch between recording and playback mode. Notice that in recording mode it is not mandatory to make recordings. This mode is also used for viewing real time data.

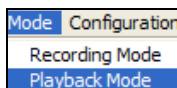


Figure 6-62: Mode menu

The "recording and Playback Control panel" changes appearance depending on the selected mode.

6.3.1. Recording Mode

In recording mode, the panel looks as follows:



Figure 6-63: Recording panel

There are two recording modes available. A particular mode can be selected with the control next to the stop button.

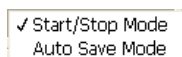





Figure 6-64: Recording modes

Remember that there are two possibilities to define the scan boundary in recording mode: Sector zero (sector line on service messages) or ARP (sector line on timing signals). The first selection allows the recording of the digital thread information without the presence of the ARP/ACP signals (ATC centre). For the recording of the video thread information, ARP/ACP signals are always required (on site).

6.3.1.1. Start/Stop Save Mode

The first mode is called Start/Stop Save Mode. In this mode the Start  and Stop  buttons are simply be used to start and stop a recording at any time. To start a TMD3 recording session, click . The "Scans" and "Size" indicator will increment showing that data is being recorded.

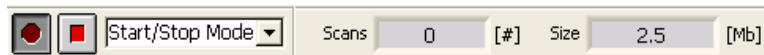



Figure 6-65: Recording panel

Click  to halt the recording at any time and save the data onto the PC's hard-disk. After clicking the stop button, a dialog box appears. This dialog allows to select an existing folder or to create a new one to save the data in. Data is saved in multiple D6-files, so a complete folder is saved. In case that one of the individual files is not needed, uncheck the corresponding checkbox. This will lower the size of the data to be saved.

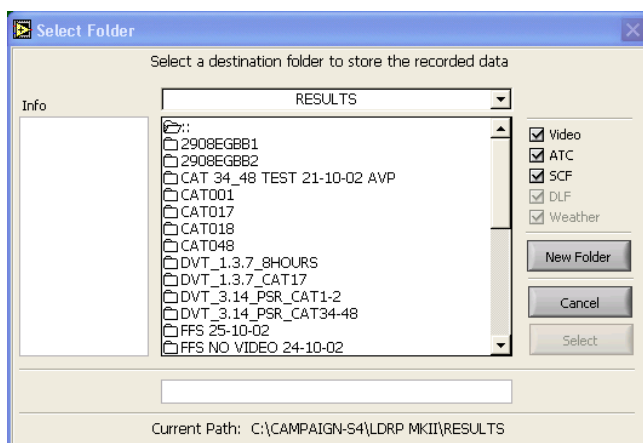


Figure 6-66: Record -folder selection

Use the Info box to add any comment regarding the recorded data. This information is available when loading the recorded data for playback.

The size of a recording is limited by the maximum number of scans (32500) or by the maximum size of one of the individual files (1Gb). When this happens in Start/Stop mode, the recording will stop automatically and the Save dialog box will appear in order to save the recorded data.

6.3.1.2. Auto Save Mode

The second recording mode is called Auto Save Mode.

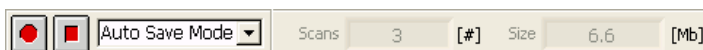


Figure 6-67: Recording control panel

When selecting the auto save mode, an auto save configuration window will appear. This window allows the user to configure the auto save function. The same window can also be evoked using the menu TOOLS > Auto Save ... selection.

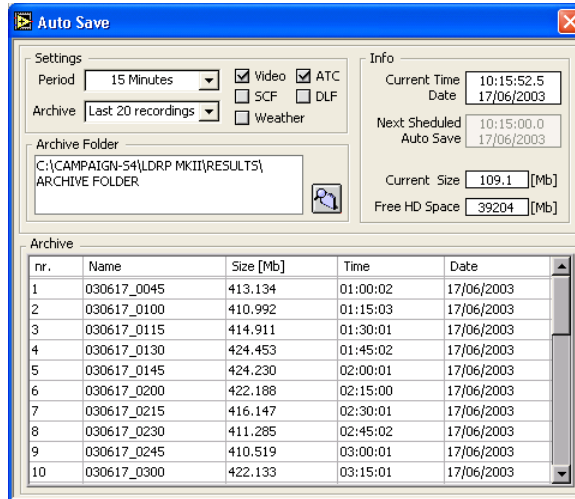


Figure 6-68: Autosave window

The auto save function can be considered an endless loop TMD3 recording with a user defined (limited) archive. First define the length of the recordings by selecting a period. The user can selected between the following values:

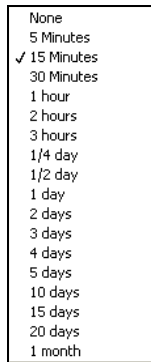


Figure 6-69: Period

Next define the length of the archive:

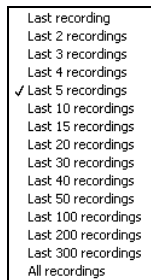


Figure 6-70: Archive

For example, with the selections made above an archive of 5 recordings of 15 minutes each will be stored in the archive folder. The oldest recording will be removed whenever a new recording became available. Browse for an archive folder using . The content of the archive is listed in the table below.

nr.	Name	Size [Mb]	Time	Date
1	030617_0045	413.134	01:00:02	17/06/2003
2	030617_0100	410.992	01:15:03	17/06/2003
3	030617_0115	414.911	01:30:01	17/06/2003
4	030617_0130	424.453	01:45:02	17/06/2003
5	030617_0145	424.230	02:00:01	17/06/2003
6	030617_0200	422.188	02:15:00	17/06/2003
7	030617_0215	416.147	02:30:01	17/06/2003
8	030617_0230	411.285	02:45:02	17/06/2003
9	030617_0245	410.519	03:00:01	17/06/2003
10	030617_0300	422.133	03:15:01	17/06/2003

Figure 6-71: Files archive

The automatic naming of the files inside the archive is similar to the naming of the Log files of the TMD3: YYMMDD_HHMM. The recorded data is saved in multiple files, so a complete folder is saved. In case that one of the individual files is not needed, uncheck the corresponding checkbox. This will lower the size of the data to be saved.



Figure 6-72: Recording selection

The info panel at the right hand side displays the current date and time, the time of the next scheduled auto save, the size of the current recording and the free space left on the PC hard disk

The file that is **currently being recorded** is a **temporary file** (temporarily saved in the RECORDING folder of the TMD3 data storage path, as selected at first start up of the TMD3, see paragraph 6.1.1 and chapter 4) The temporary file is written to disk after the recording period expired at the moment of the next scheduled auto save. Only at that moment, the free HD Space is updated.



In the unlikely event of a system crash, the temporary file is lost and overwritten upon restart of the TMD3, because nothing guarantees that the temporary file was a valid recording at the moment of the system crash.

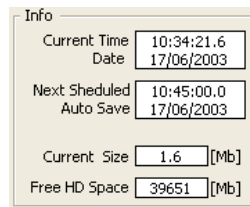




Figure 6-73: Recording Info

Notice that the Auto Save configuration window does not need to be kept open all the time during the recording. Once the auto save function is configured, the window can be closed. Do not forget to click the Start  button to activate the auto save function once it is configured.

Use the Stop  button to end the auto save recording function. The Auto Save configuration is stored together with the other configuration settings. The user can switch between the Start/Stop mode and Auto Save mode at any time. Between each two consecutive recordings **one scan of data is not recorded** due to re-synchronization at the first scan boundary.

The size of an individual recording is limited by the maximum number of scans (32500) or by the maximum size of one of the individual files (1Gb). When this happens in auto save mode, the recording will be saved automatically using the appropriate file naming and the auto save function will continue to run normally.

6.3.2. Playback Mode

After making a recording, the user can replay this recording using the Playback Mode.

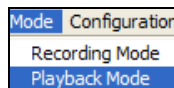


Figure 6-74: Mode menu

The playback control panel together with a load dialog box appears:

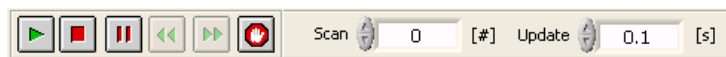


Figure 6-75: Playback control panel

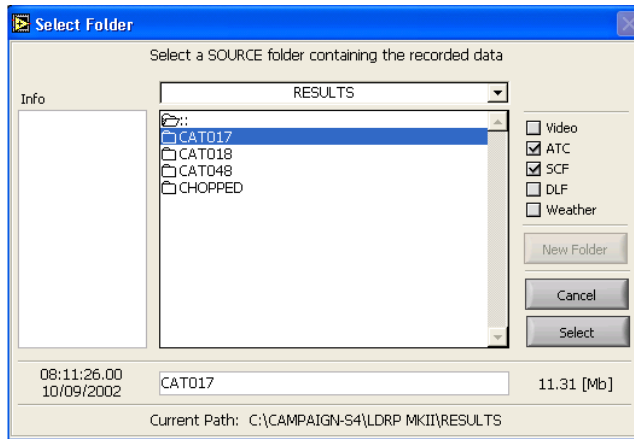


Figure 6-76: Playback folder selection

Click the select button to load the data. The following dialog will appear:

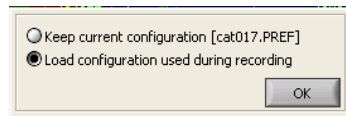







Figure 6-77: Replay settings select

The user can choose to keep the current selected configuration or use the configuration as it was during the recording.

Use the "Play"  button to start replay. This will initiate a step by step replay with a fixed speed. This speed (defined as time per revolution) can be entered in the "Speed" control. Once the end of the file is reached, the replay will automatically restart at the beginning of the file (endless loop replay).

Use the "Pause"  button to freeze the replay. In this mode, the replay can be done in a sector per sector Mode-Step mode. A sector is always 11.25 degrees. For this, while the pause button is pressed, use the "Backward"  or "Forward"  buttons to page through the file sector by sector. The scan indicator displays the scan number of currently displayed scan. Use this control to jump to any scan in the file. Use the up/down arrows of the scan control for paging one scan forward or backward.

Arm the  button to trigger the display to freeze on playback, on the first occurrence of a target that complies with a predefined filter. Remember that the Search function can be used in the replay mode (see paragraph on Special tools (search function)).

There are two different mechanisms of sector step replay: Radar Timing based and Radar Service Messages based. For recordings made before version 1.10.0, the sector step replay is always Radar Timing (=ACP/ARP) based. This means that the sector boundaries are always taken from the ACP values in steps of 11.25 degrees. For recordings made with version 1.10.0 (and above), the replay is based on the sector line source selection made during the recording (see Display configuration setup) and can not be changed afterwards during the replay. Recordings made with Radar Timing signals (ACP/ARP) as the sector line source can only be replayed with ACP based sector steps (see above). Recordings made with Radar Service Messages as sector line source can only be replayed with Radar Service Messages based sector steps. This means that the sector boundaries are taken from the Radar Service Messages (11.25 degrees).

Both methods can be distinguished by the colour of the sector line during the replay. The colour corresponds to the ones selected in the Display Configuration window. Note that the colour of the sector line can be changed during the replay.

6.4. Change view

The TMD3display has two types of "View" to select from:

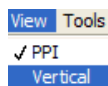


Figure 6-78: View menu

The **PPI** display is the default View and shows the data in a Plan Position Indicator type of display. (Not slant range corrected)

The **"Vertical"** view allows the data to be shown as Altitude versus Range display, using a "curved Earth" view. (The altitude bands are not horizontal but bended.) The 4/3 earth model is used to draw this type of display. The latitude value from the Site Configuration is used to calculate the earth radius at the radar site. Targets without altitude information (e.g. PSR only) are drawn on the zero altitude curve. All the functionalities available in PPI view except for video/map/weather display can be used in vertical view.

6.5. Special Tools in TMD3

The "Tools" Menu allows the user to select an extra tool, embedded in the software:

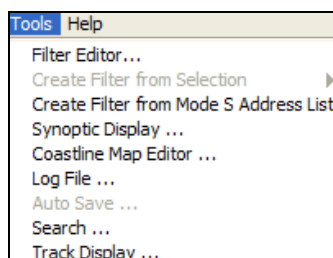


Figure 6-79: Tools menu

- The **Filter editor**: allows editing/creation of filter criteria for the display.
- **Create filter from Selection**: This tool automatically creates a filter criteria from the selected section (XY) of the display.
- **Create filter from Mode-S Address list**: This tool automatically creates a filter criteria from the selected S address list.
- **Synoptic Display**: The synoptic display is used to represent the cat 17, 18 and 48 messages in a time line.
- **Coast line Map editor**: allowing the user to edit and add objects to geographical Coast Line Maps. This allows the user to add polygons, Lines, Airways, etc... to the display.
- **Log file**: allows the user to consult log files that keep all actions performed by the TMD3 software.
- **Auto Save**: allows the user to configure the auto save function.
- **Search**: allows the user to do a quick search in a recorded file.
- **Track Display**: Track based Pd calculation tool.

6.5.1. Filter Editor

Use the Tools → Filter Editor menu to open the filter function. Use the filter option to filter out targets in the display. Those targets that match the filter criteria are normally displayed. Those targets that do NOT match the criteria are grayed out or not drawn, depending on the configuration setting.

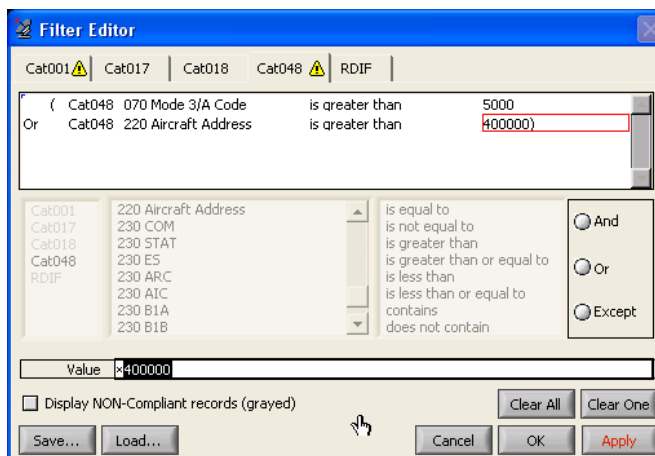


Figure 6-80: Filter editor

To create a filter, first select the data category that you wish to filter: ASTERIX Cat 001, 017, 018, 048 or RDIF. Each of these five categories can have a separate filter. The respective filter can be selected using the tab selector in the upper region of the filter window.

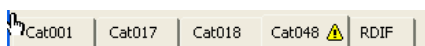


Figure 6-81: Filter editor tab select

Once the correct category is selected, start each line with a selection of the name of the category (E.g.Cat048). Do this by clicking in the first selection menu:



Figure 6-82: Filter category select

Next select a specific field of that category: e.g. 070 Mode 3/A Code. The fields are arranged according to the ASTERIX specification. The number in front corresponds with the ASTERIX item number, the name corresponds with the ASTERIX item name.

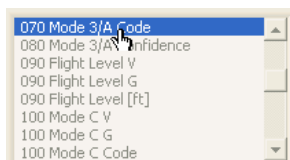


Figure 6-83: Filter item select



When filtering on an item that is not present in all targets, these targets will not pass the filter.

Next, select a logical operator. Depending on the selected item some possibilities can be grayed out.

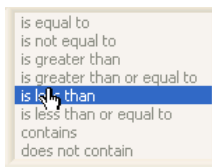


Figure 6-84: Logic operator select

Finally, the user can select a value. This can be a numerical vale, a Boolean value, an alphanumerical string or a menu item. The numerical value can be decimal, octal, and hexadecimal.

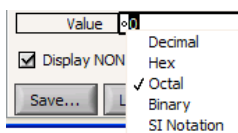


Figure 6-85: Filter value

Combine multiple elementary filters using the AND, OR and EXCEPT operators.

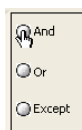




Figure 6-86; Filter combination operator

In this case, repeat the previous step until multiple elementary filter criteria's are created. Example: "070 Mode 3/A Code" "is greater than" "7000" AND "090 Flight Level [ft]" is less than "5000".

The user can create separate filters for each of the five categories, and all filters are executed before displaying. The user can also decide whether the target reports that don't pass the filter criteria are shown in grey or simply removed completely from the display.



Figure 6-87: Display NON-compliant records

The GUI also allows the user to save and recall filter criteria in separate filter files. Click Save  to save a filter, and Load  to recall. The following dialog will appear:

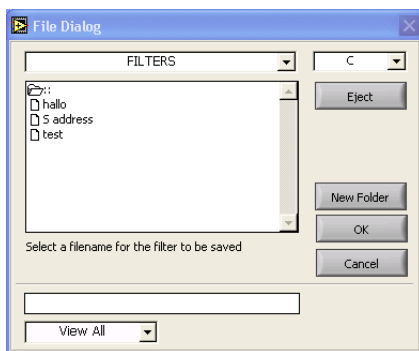


Figure 6-88: Load filter

Enter a filename and click the OK button.

Don't forget to activate the filter in the main screen using the "filter" checkbox. A warning icon appears next to the filter checkbox to indicate that a filter is active.

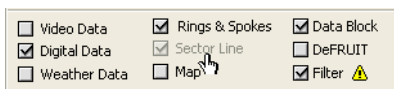


Figure 6-89; Filter warning icon

This will limit the data shown in the display or grey out some part.

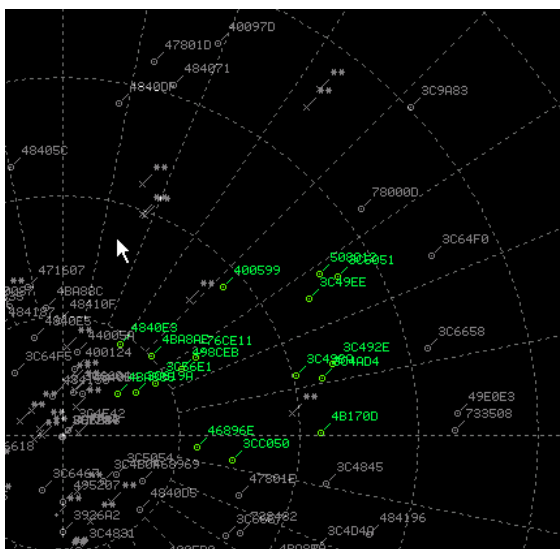


Figure 6-90: Filtered PPI view

The use of the Cat018 filter is somewhat special because Cat018 information is not displayed directly on the screen. The result of the Cat018 filter is linked to the display using the Mode-S Address as the common identification. All Cat018 messages that pass the Cat018 filter and contain a Mode-S Address will be linked to the corresponding target (Mode-S Address) displayed on the screen. This link is valid during one scan. In fact, it looks like the Cat018 filter is logically added to the Cat048 filter with a “logical or”. This way for example, the user can visualize for which targets there is Cat018 activity. The same principle also applies to the Cat017 filter.

6.5.2. Other Methods to Create Filters

Another method to create a filter is by selecting a number of targets on the display and then choosing the option “Create Filter from selection”. The function has a number of sub-functions allowing different selection criteria. This can be Mode-S address, Mode A code or Track number.

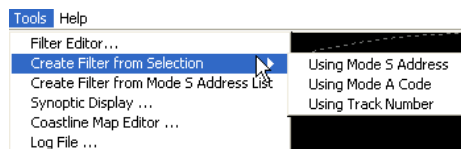


Figure 6-91: Tools menu

The created filter can always be viewed or edited using the normal filter editor.

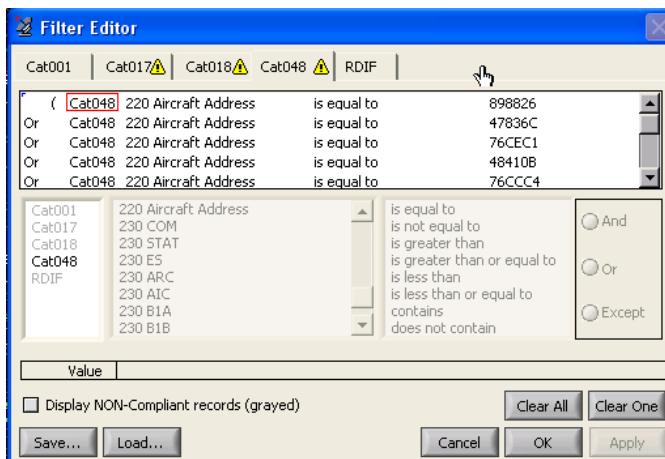


Figure 6-92: Filter editor

In case the Mode-S address is used as criteria, a filter is created on Cat 17, cat 18 and cat 48 categories.

In case Mode A code is used, a filter is created for cat 001,017,018,048 and RDIF.

In case Track number is used, a filter is created for cat 001 and 048.

Another method to add a filter is by using the Mode-S address list. This list can be seen using the “List” tab.

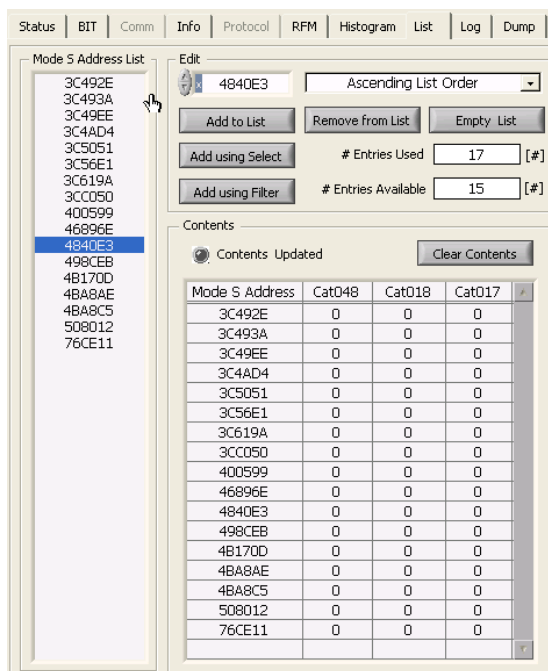


Figure 6-93: List tab

Next, select the “Create Filter from Mode-S address list” menu. This will create a filter on Cat 17, cat 18 and cat 48 categories using the Mode-S address as filter criteria.

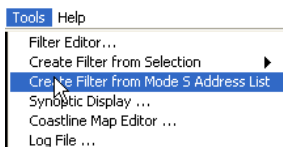


Figure 6-94: Tools menu

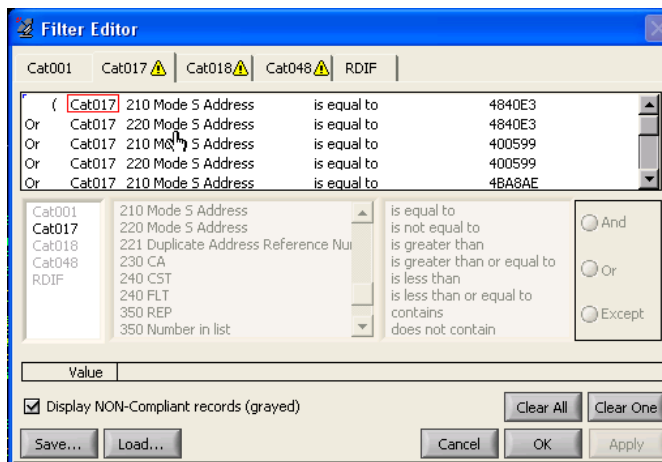


Figure 6-95: Filter editor

6.5.3. Tips & tricks when using filters

To pick out targets containing specific data items, use the FSPEC as a filter criterion. The FSPEC defines the ASTERIX contents for each message. If you for example want to visualise all target reports containing Mode-S MB data define the following filter criterion:
 “Cat048” “FSPEC” “contains” “I028/250 Mode-S MB Data”

To visualise all targets with any kind of Cat018 activity define the following filter criterion:
 “Cat018” “FSPEC” “contains” “I018/000 Message Type”.

This will link any Cat018 message (since they all have to contain item I018/000) containing a Mode-S Address to the corresponding Cat048 target report.

Filters also apply to the dump function. They can be used to further narrow the selection to be dumped in the dump window. This way a single target can be picked out (using Mode-S Address or Mode A code) and dump during flight trials.

Special interest has to be given for filtering targets due north. To filter out targets between 359 degrees and 1 degree, the OR operator has to be used instead of the AND operator. This is because the absolute upper limit of the azimuth value is 360 and the absolute lower limit of the azimuth value is 0.

“Cat048” “040 THETA [deg]” “is greater than” “359”
 “OR”
 Cat048” “040 THETA [deg]” “is less than” “1”

6.5.4. Synoptic Display

The synoptic display is an alternative way of looking at radar data, especially when dealing with ASTERIX cat017 and 018 data. This display shows a time-line and represents the ASTERIX messages as arrows between the different levels. The Source of most data is the SSR to which the TMD3 is connected. This is represented by a horizontal line. The radar can send data to the ATC centre (or the LDRP MKII) using ASTERIX cat048 messages. These are represented by red arrows between the Station and the ATC level (a second horizontal line). The station can also send data or requests to the SCF network. This is represented by green (sending data) or purple (receiving data) arrows between the SCF level and the Station line. Finally, the Station can send data to the DLF function. This is represented by blue arrows between the station and the DFL level.

Call the Synoptic window from the “Tools ↪ Synoptic Display” menu.

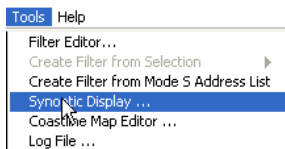


Figure 6-96: Tools menu

Next, determine the position of the window. This can be done by using this control menu:

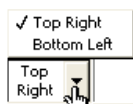


Figure 6-97: Synoptic display position select

The window has two default positions and sizes: Wide and low or High and narrow. The positioning of the window also depends on its size. By default this is the lower left corner (partly covering the main display) or the upper right corner (partly covering the TMD3GUI). Basically you can position the window anywhere you wish by dragging it.

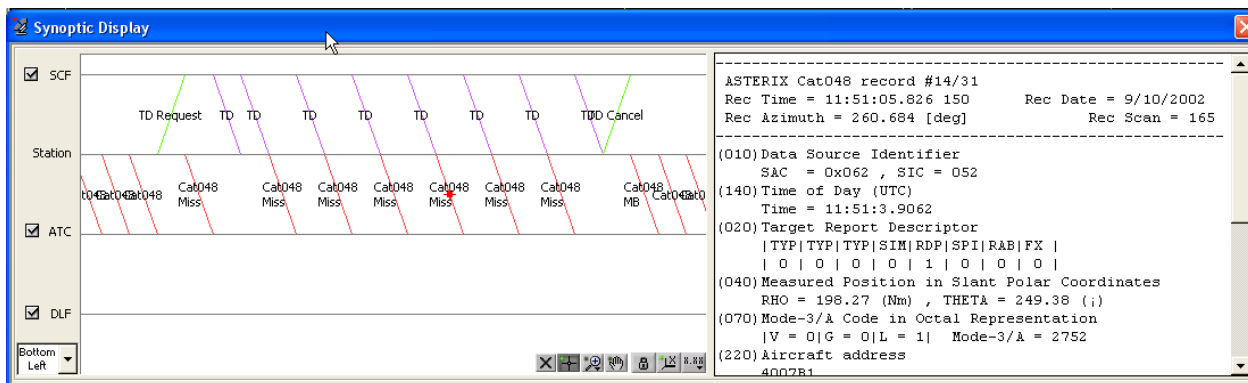


Figure 6-98: Synoptic display in bottom left position

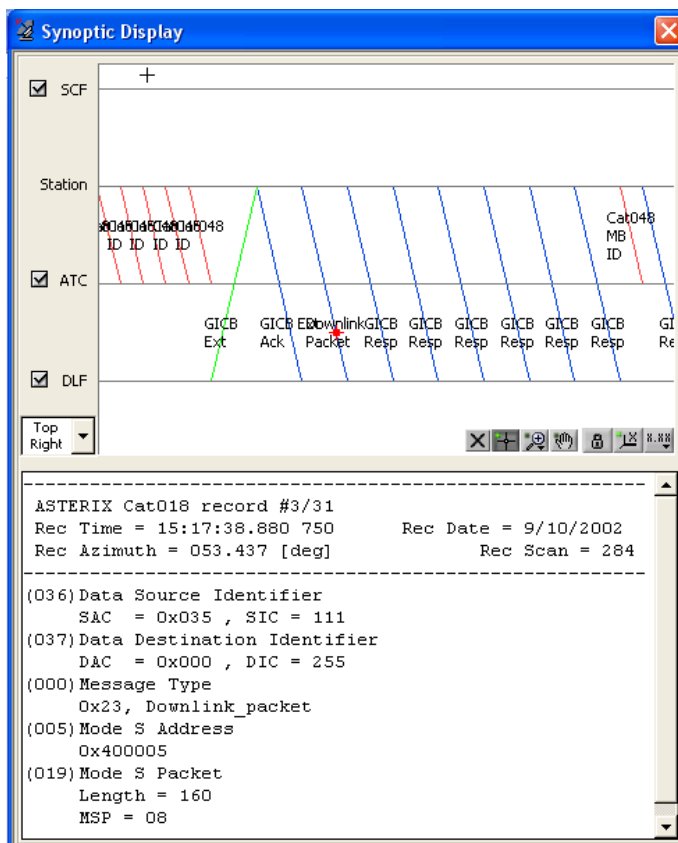





Figure 6-99: Synoptic display in top right position

To use the display, you first need to build a Mode-S list. For this, select the “List” Tab and add the target(s) of interest to the list.

This can be done in three ways:

- Enter an S address in the Edit field and click the “Add to List” button 
- Select a number of targets and click the “Add using Select” button 
- Create a filter and click the “Add using Filter” option. In the later case, the list is dynamically updated when the entries change. 

Beware: The list can contain a maximum of 32 entries. The Synoptic display only retains data for these 32 entries.

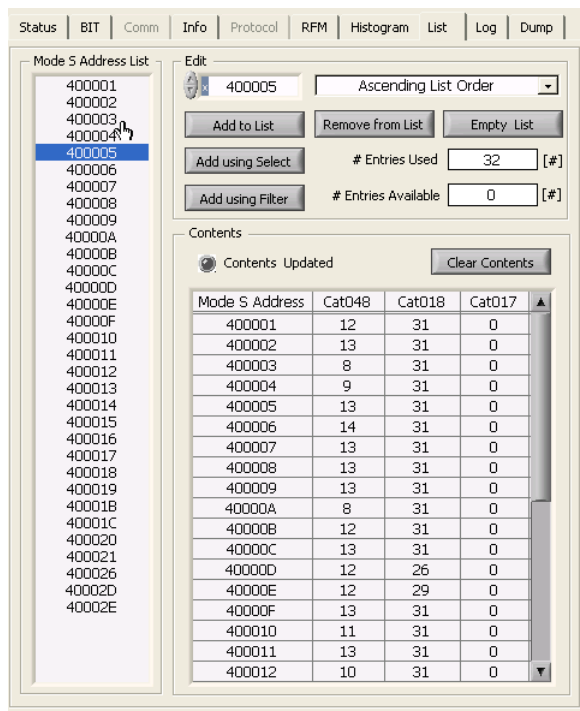


Figure 6-100: Mode-S address list

Next, select one of the targets (Mode-S addresses) shown in the Mode-S address List. The Synoptic display will be updated from the moment the targets are put in the Mode-S list. This means that upon switching between targets, the synoptic display will also switch appearance and shown the history of the different targets.

The synoptic display itself has several functions. The most important one is the query function. To use the query function, select one of the arrows by “dragging” the red cursor over such an arrow. The text info field to the right or under the graph will show the textual translation of the ASTERIX messages depicted by the arrow. Notice that the same settings are valid as for the Info tab in the TMD3 GUI.

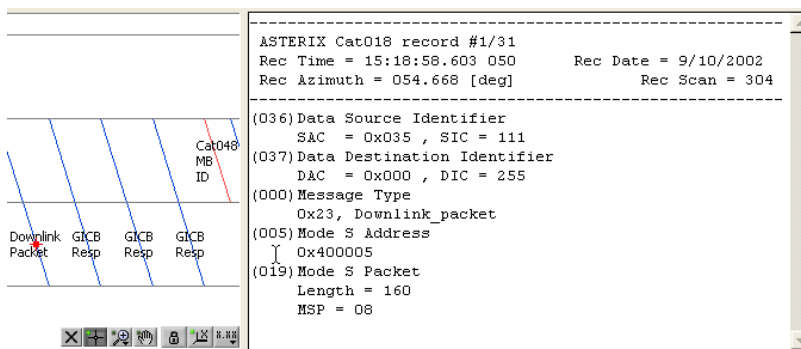


Figure 6-101: Synoptic display text info field

Use the two grey cursor lines to measure the time difference between two arbitrary messages. This time difference is calculated using the time of recording of the messages

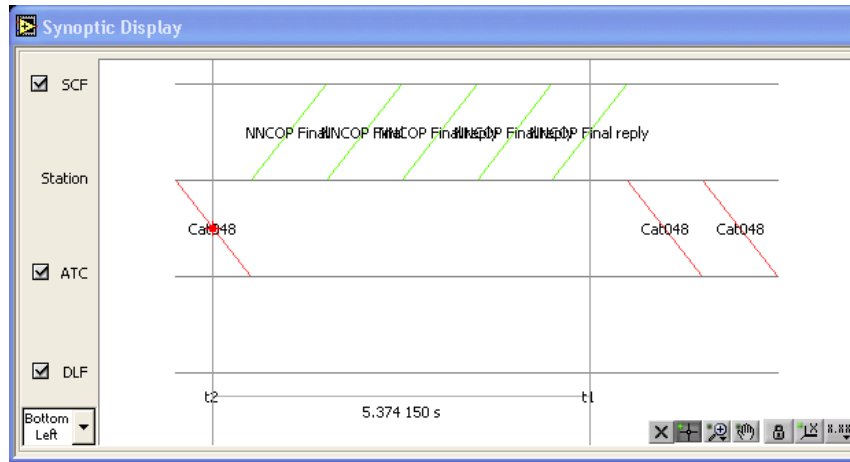


Figure 6-102: Synoptic display




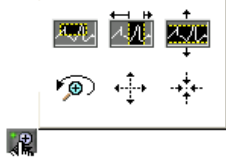



The graph containing the arrows has an operation palette.  This palette modifies the functionality of the mouse pointer into three possible operational methods: select, zoom and pan. Furthermore, the palette allows you to re-centre the time cursors and to lock or unlock the auto-scale function.

Table 6-1: Synoptic display button usage

Button	Usage
	This button centres the cursor in the middle of the graph
	This button puts the mouse pointer in “Cursor drag” mode, allowing the user to drag the cursor to a certain position
	The zoom palette allows you to zoom the graph in several ways (Selection zoom, Horizontal zoom, Vertical zoom, Undo zoom, Centred zoom out and centred zoom in.)
	This button activates the “Pan” function, allowing you to pan the graph in all directions
	This button locks the X scale. If the buttons look like this, the X scale is in “Loose-fit” mode and the display time scale is fixed. An update will not scroll or modify the appearance of the display, and a zoomed position will be retained. By clicking the button in case the scale is locked, the button changes to:  In this mode the X scale is in “Auto-Scale”, which implies that the scale automatically zooms to show all data that is drawn. If you zoom in this mode, the display will jump back to maximum scale each time an update is performed

6.5.5. Map editor

Use the Tools → Map editor menu to load the Map Editor.

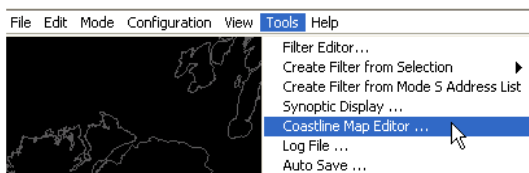


Figure 6-103: Tools menu

6.5.5.1. General description

The Map editor allows you to create a background map that includes a number of items:

- A Coast lines and border line geographical Map
- A graticule with longitude-latitude division per degree
- A layer with Runways (rectangular filled polygons, defined with one position and a heading)
- A layer with symbols (DME, Airports, Beacons, etc...)
- A layer with random polygons
- A layer with Airways (rectangular filled polygons, defined by a start and end position)

Each of these items can be modified using the Map editor. The editor needs you to select an element in the element list. After that, you can modify the parameters for each element. The map can be saved as a group of these elements. When a Map is applied to the display, it is compiled and the elements defined are vectorised.

The following (or similar) window will appear after calling the Map editor.

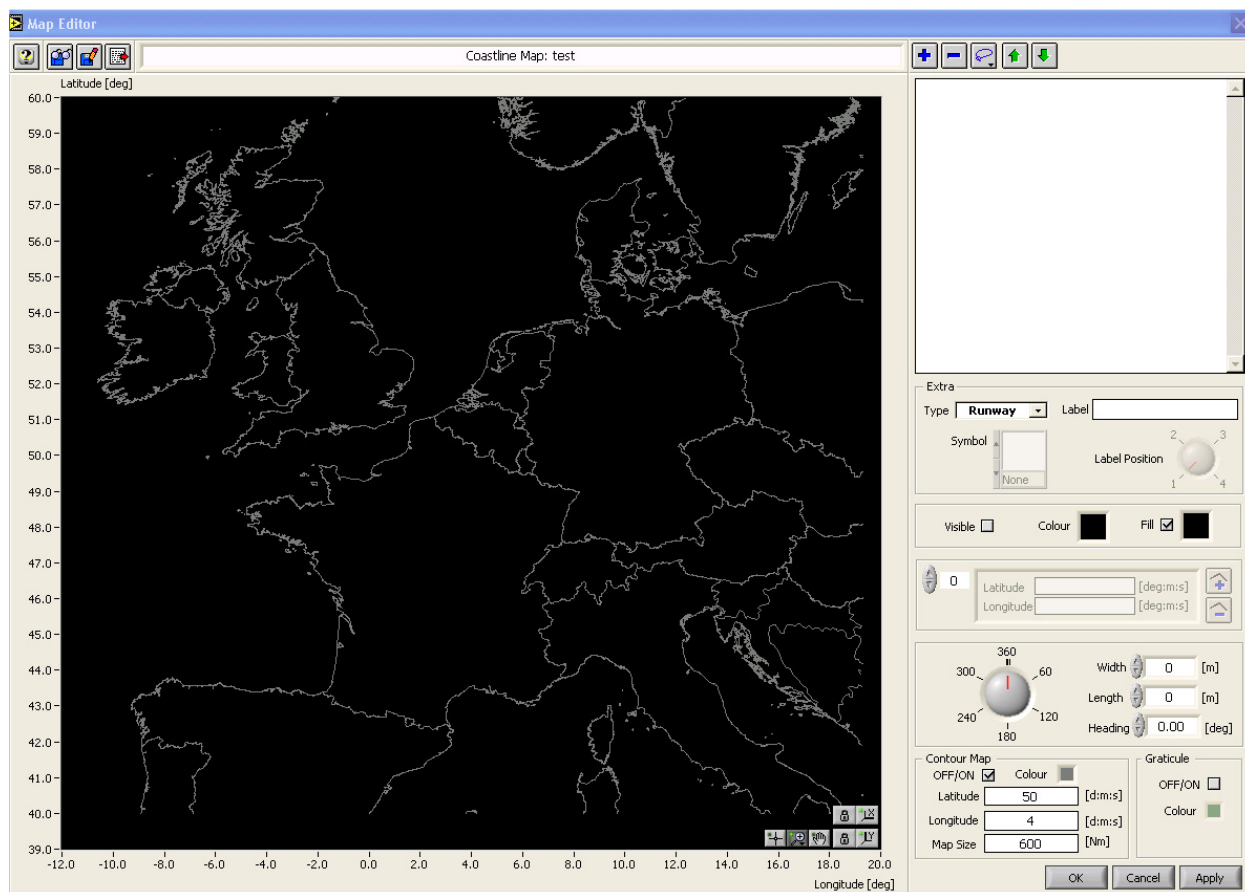


Figure 6-104: Map editor

The following functions are available in the map editor:

Table 6-2: Map editor buttons

Button	Usage
	Online help function
	Load a Map definition file
	Save a Map definition file
	Import from aeronautical database
	Add a map element
	Remove the selected element(s)
	Select specific set of elements
	Move a Map element Up
	Move a Map element Down

Applies the defined map to the display (and vectorises the elements)



Figure 6-105: The list of Map elements

For every type of element, a separate set of controls is available.

6.5.5.2. Importing the aeronautical database

A world wide aeronautical database is available in the map editor. The database contains airports, runways, nav aids, waypoints, airways and boundaries. By clicking the button, the import window is opened.

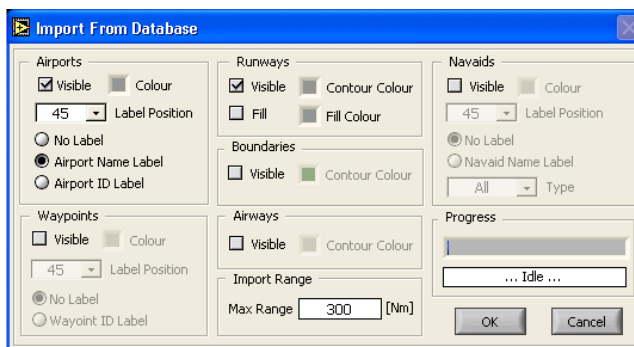


Figure 6-106: Import from database

Each kind of element can be switched on and off using the corresponding checkbox.

Beware that the import function is incremental. Elements already imported will be imported again when selected.

The import is limited by the Max range value. Elements located further away than the max range value will not be imported. Boundaries will be imported for twice the max range. Boundaries and airways that exceed the max range will be imported and displayed completely in the map editor. They will be clipped to the map size value when compiled into the TMD3 display. Imported elements can be edited individually or in group using the map editor HMI by selecting the element(s) of interest and changing the required values.

6.5.5.3. Runways

A runway is drawn as a rectangular polygon that can be optionally filled with a colour. It is defined by a source position (in longitude latitude) and a heading.

Next items can be changed:

- **Source position:** using the red cursor in the Map editor display or type over the longitude-latitude input control
- **Heading:** by altering the heading dial or typing in the heading
- **Length and width:** by typing in the values.
- **Colour:** also the fill colour can be changed (Click will evoke a colour menu)
- **Airway name:** Modify the airway name by typing it in the Label control. Notice that the Runway label is not put on the compiled map. It is only a name to identify it in the list.
- **Symbol:** use the Symbol type to add one or more labels to a run way. Select none for symbol if you only want to add a label and position it according to your requirements.

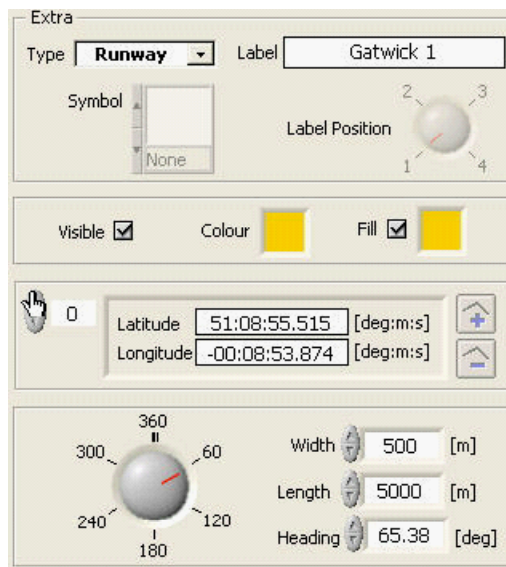


Figure 6-107: Runway change

Typically, runways are very small compared to the other items in the map, so it might be handy to zoom in on the map. The zoom can be performed using the zoom palette.

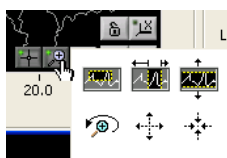


Figure 6-108: Zoom palette

To go back to moving the runway, select the cursor again (next to the zoom palette)



6.5.5.4. Air ways

An airway is drawn as a rectangular polygon that can be optionally filled with a colour. It is defined by a start position (in longitude latitude) and an end position (in longitude latitude). Optionally the user can modify the air way width (in meters).

Other things can be changed:

- **Start/End position:** modify the start and end positions using the 2 red cursors in the Map editor display or type over the longitude-latitude input control fields. The selected cursor (start or end) will switch between the two inputs in this control
- **Width:** Modify the airway width by typing in the values.
- **Colour:** Modify the airway colour and optionally its fill colour using the colour controls. (Click will evoke a colour menu)
- **Name:** Modify the airway name by typing it in the Label control. Notice that the Airway label is not put on the compiled map. It is only a name to identify it in the list. Use the Symbol type to add one or more labels to a run way. Select none for symbol if you only want to add a label and position it according to your requirements.

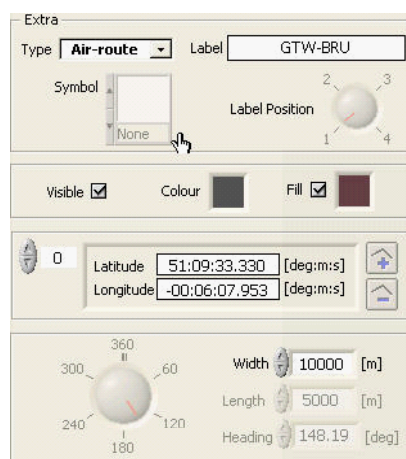


Figure 6-109: Airways change

6.5.5.5. Polygons (open or closed)

A polygon is drawn as a line polygon that can be optionally filled with a colour. It is defined by a set of positions (in longitude latitude).

Modify the positions using the N red cursors in the Map editor display or type over the longitude-latitude input control fields. The selected cursor will switch between the multiple points of the polygon.

Add polygon points using the “Add” or “remove” buttons or by Control-dragging the selected cursor.

Next things can be changed:

- **Colour:** Modify the polygon colour and optionally its fill colour using the colour controls. (Click will evoke a colour menu)
- **Name:** Modify the polygon name by typing it in the Label control. Notice that the polygon label is not put on the compiled map. It is only a name to identify it in the list. Use the Symbol type to add one or more labels to a run way. Select none for symbol if you only want to add a label and position it according to your requirements.

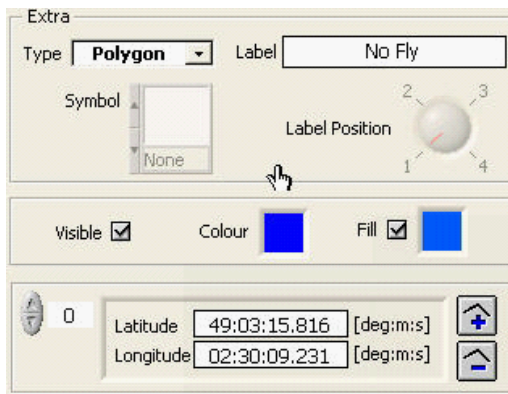


Figure 6-110: Polygon change

6.5.5.6. Symbols

A symbol is drawn at a fixed point in the display and has a fixed resolution. It can not be zoomed. It is defined by a position (in longitude latitude) and a symbol selection. A symbol is the only item that has a string (label) attached to it. If the user needs only labels at certain places, use the “None” symbol. The following changes can be made:

- **Symbol:** Modify the symbol appearance using the pop-up menu.
- **Position:** Modify the position using the red cursor in the Map editor display or type over the longitude-latitude input control field.
- **Colour:** Modify the symbol colour and using the colour controls. (Click will evoke a colour menu)
- **Name:** Modify the symbol name by typing it in the Label control. Use the “none” symbol to add labels to all other object in the map.

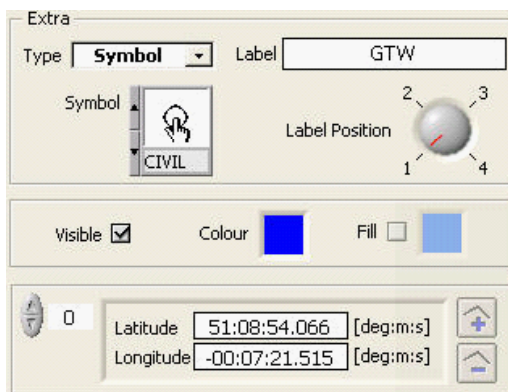


Figure 6-111: Symbol change

6.5.5.7. Contour Map and Graticule

The geographical “Contour “Coast line map can be enabled or disabled using the on/off switch in the site position control. Beware that the Contour map is always centred round the Site position. A world wide coast line map is available in the map editor.

The “Graticule” (grid at 1 degree latitude and longitude intervals) can be switched on or off and its colour can be modified.

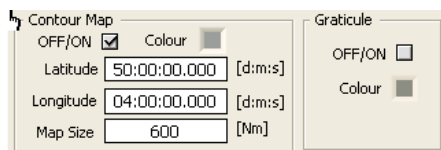



Figure 6-112: Contour map

6.5.5.8. Applying the Map

The map can be applied (compiled and automatically saved as part of a configuration) by clicking the “Apply” or “Ok” button, “ok” will also close the editor. Beware, the map definition (individual objects) is not saved as part of the configuration and must be saved separately (for later editing or station re-location), the compiled map is automatically saved with the configuration.

Use the  button to save the map definition for later editing and/or site re-location. Closing the map editor (by “OK”) will automatically update the map in use on the screen, but will NOT save the map definition file.

6.5.6. Log File

Use the Tools → Log File menu to load the Log File.

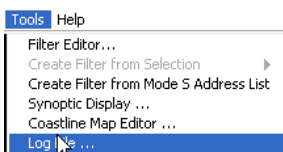


Figure 6-113: Tools menu

Following window will appear. The small menu in the menu bar of this window allows the user to load a log file.

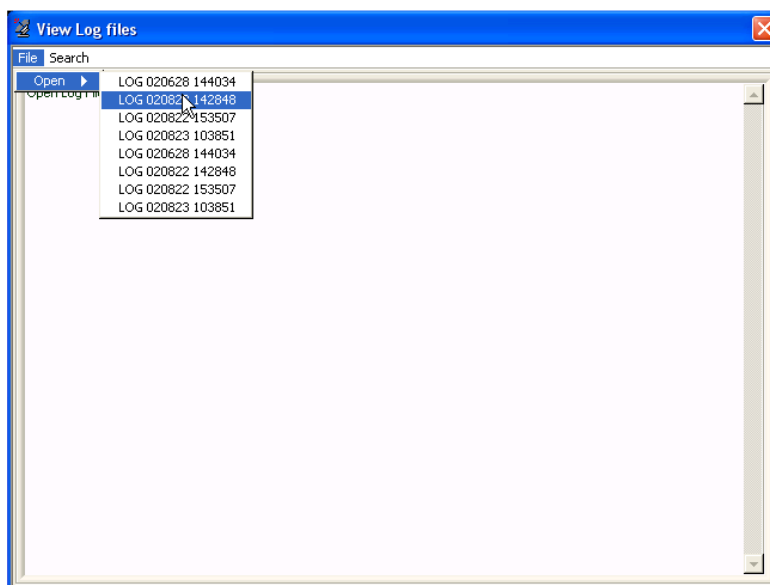


Figure 6-114: View log files

Select a log file from the list. Each TMD3 session creates a new log file. At all times the last 10 log files are available for viewing. The naming of the log files is as follows:

YYMMDD_HHMMSS where YearMonthDay_HourMinuteSecond is the moment of starting an TMD3 session. The logfiles are saved in the EXPORT-folder of the campaign currently being selected as TMD3 data storage folder at first time setup. (See paragraph 6.1.1 and chapter 4). The contents of the selected log file will appear in the window.

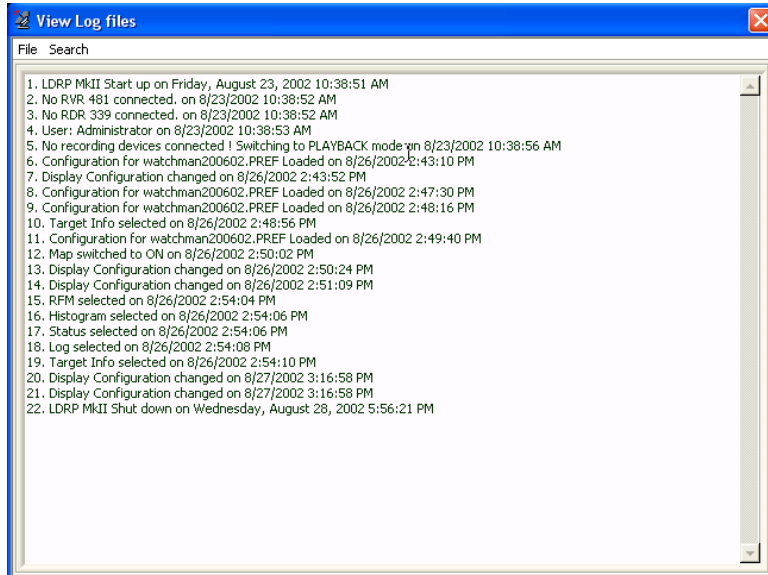


Figure 6-115: Log files window

The “Search” Menu allows you to search for matching strings in the log file. Search words are case sensitive!

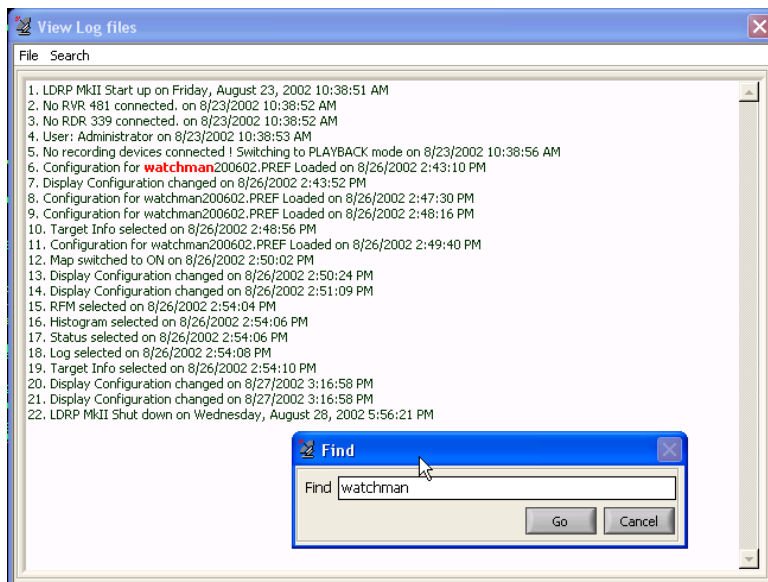


Figure 6-116: Search in log files

The log files can also be loaded by any COTS text viewing tool.

6.5.7. Auto save

For more details about the Auto Save function, please consult 6.3.1.2 Auto Save Mode.

6.5.8. Search

Use the Tools \hookrightarrow Search menu to load the Search window.

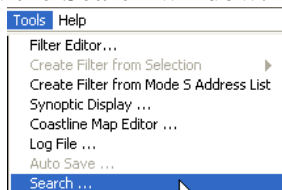


Figure 6-117: Tools menu



The fast search function is only available in replay mode.

The following window will appear:

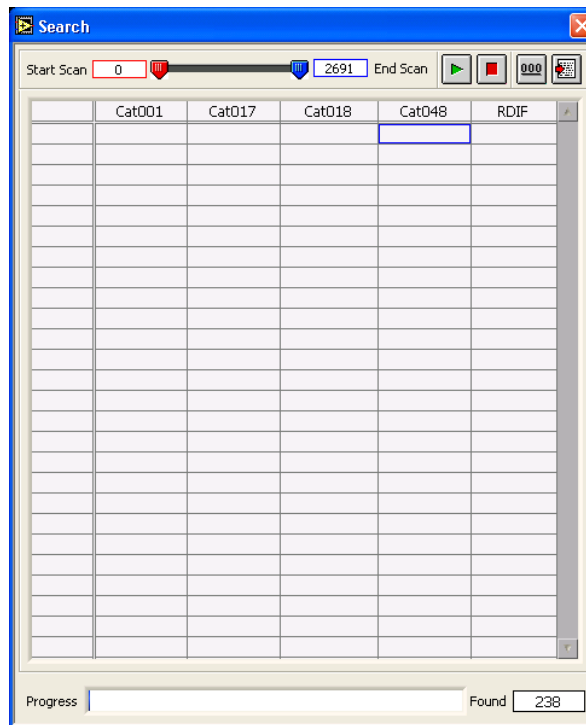


Figure 6-118: Search window

The search function operates on the selected file and uses the selected filter(s) as search criteria. For more details on how to use the filters, please consult the paragraph on filtering. Use the Start/End slider to limit the search to a particular part of the file.



Figure 6-119: Start/End slider



Click the  button to start the search. A search can be interrupted at all times by clicking the  button. All occurrences found up to that moment will be listed in the table. The progress of the search command can be monitored at the bottom of the window. The number of occurrences found is continuously updated during the search function.



Figure 6-120: Search progress

Up on completion of the search, all found occurrences are listed in the table. Notice that the table is limited to 500 first occurrences. The following dialog box warns the user of this limitation.

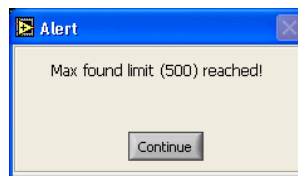


Figure 6-121: Search alert

Use the start/end slider find occurrences further in the file when the limit is reached. Because there are five types of filters (cat001, Cat017, Cat018, Cat048 and RDIF) available in the TMD3, the table contains five columns, one for each type of filter. Each column holds the scan number of a particular occurrence that matched the filter criteria for that specific filter. By simply clicking a cell in the table the TMD3 jumps automatically to that particular scan number. The selected cell is highlighted in blue. When used in combination with the filter editor settings, the occurrence can be shown in colour while all the rest is displayed in grey.

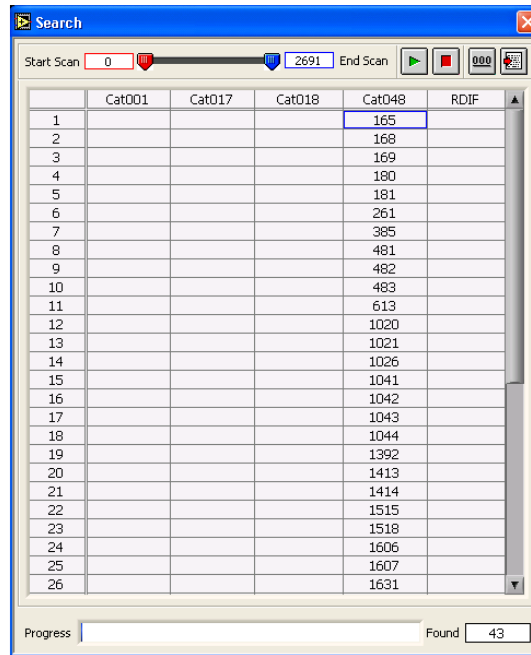


Figure 6-122: Search result

Use the button to clear the table. Use the button to export the table to a .CSV file. The user can close the search window at all times by clicking the button. When the search window is reopened, the content of the table is still valid. This remains until a new file is selected or the filter criteria are changed. At that moment the table is automatically cleared.

6.5.9. Track Display

Use the Tools Track Display menu to load the Track Display window.

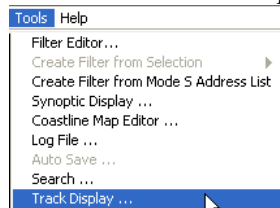


Figure 6-123: Tools menu

The Track Display tool is available in both recording and playback mode. It can handle ASTERIX Cat001 and Cat048 target reports. The presence of I001/141 and I001/161 or I048/140 and I048/161 is absolutely required for the Track Display tool to function properly. The following window will appear at the bottom of the GUI:

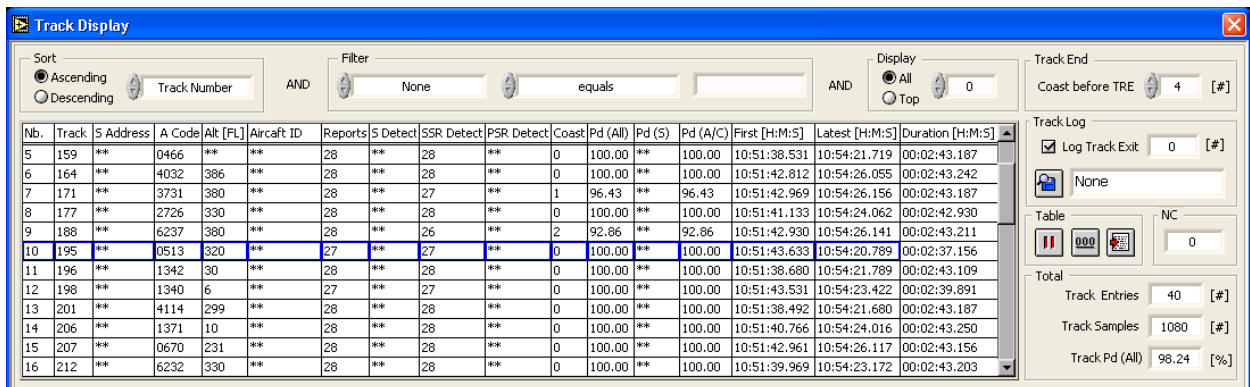


Figure 6-124: Track display

The main item in the Track Display window is the table containing the track information gathered through the target reports. Above there are three types of controls to sort, filter and display the table according to the user's needs. At the right of the window there are controls to make log files and export or clear the table content.

The information in the table is gathered from the target reports streamed to the TMD3 display. All information is sorted according to the track number attributed by the interrogator. No object correlation is done by the TMD3 software! Target reports that do not have a track number are not used and are counted in the NC indicator. The following items are sorted and stored in the table:

- **Nb.** = sequencing number attributed by Track Display tool
- **Track** = I048/161 or I001/161
- **S Address** = I048/220 (from the latest target reports)
- **A Code** = I048/070 or I001/070 (from the latest target reports)
- **Alt [FL]** = I048/090 or I001/090 (from the latest target reports)
- **Aircraft ID** = I048/240 (from the latest target reports)
- **Reports** = # target reports with specific track number (including coasted reports)
- **S Detect** = count of I048/20 with Mode-S flag on
- **SSR Detect** = count of I048/20 or I001/020 with SSR flag on
- **PSR Detect** = count of I048/20 or I001/020 with PSR ONLY flag on
- **Coast** = count of I048/20 or I001/020 with No Detect flag on
- **Pd (All)** = ((S Detect + SSR Detect + PSR only)/Reports)*100
- **Pd (S)** = (S Detect/Reports)*100
- **Pd (A/C)** = (SSR Detect/Reports)*100
- **First [H:M:S]** = I0048/140 or I001/141 from the first target report
- **Latest [H:M:S]** = I0048/140 or I001/141 from the latest target report
- **Duration [H:M:S]** = Latest [H:M:S] – First[H:M:S]

Notice that although there is no column for Pd (PSR), PSR only detects are added to the total number of reports. When an item is not available from the target reports, it is represented by ** in the table.

Whenever for a specific track number an End of Track (TRE) message is received, the track entry is automatically removed from the table and the number of coasted reports that are present before the TRE message is subtracted from the total. This value can be set by the Coasts before TRE parameter. This setting is automatically stored with the user configuration.



Figure 6-125: Coast before TRE

Track entries that are not update anymore and for which no End of Track messages is issued, are also automatically removed from the table. The number of misses before such a track entry is automatically removed is always equal to “Coast before TRE” value +2. Notice that no coasts are subtracted if no TRE message is received.

Track entries that are removed from the table can be logged automatically to a .csv formatted file by checking the “Log Track Exit” checkbox. The number of track exits that are currently in the log file is also displayed. The maximum number of track exit loggings per file is limited to 65536.

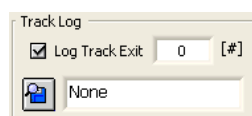






Figure 6-126: Track log

Click the  button to browse for a .csv destination file.

Click the  button to pause the table updating. The table is updated automatically every 0.5 seconds with the newest information. While the table updating is paused, the processing and logging continues.

Click the  button to clear the table content. Beware, all track information already gathered is cleared.

Click the  button to export the current content of the table to a .csv format file.

At the lower right side of the window an overview of the complete table is given.

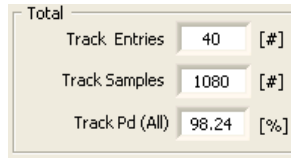


Figure 6-127: Track display total

Track entries = # individual tracks in the table

Track Samples = # target reports used in the entire table

Track Pd (all) = Overall Probability of detection

The content of the table can be customized according to the user’s needs. The table can be sorted according to every column in descending or ascending order.

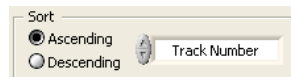


Figure 6-128: Track display sort

The content can be filtered according to every column.

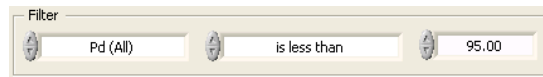


Figure 6-129: Track display filter

The number of rows in the table can be limited to any number.

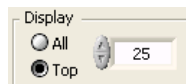



Figure 6-130: Track display limit

The Track Display window can be closed at all times by clicking the  button. The tool will keep on processing and logging all information streamed to the TMD3. When the Track Display window is opened again, the latest update of the table is displayed automatically.



When the Track Display tool is used in replay mode, any stepping backward or jumping forward will clear the table automatically.

7. Recordings

7.1. Making a Recording

First make sure the display is in recording mode. Do this using the Mode ↪ Recording Mode menu.

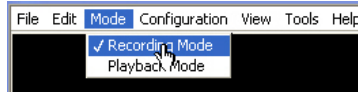


Figure 7-1: Mode menu

While in this mode, select the recording mode: Start/Stop or Auto Save. When selecting the auto save mode, configure the auto save set up parameters.

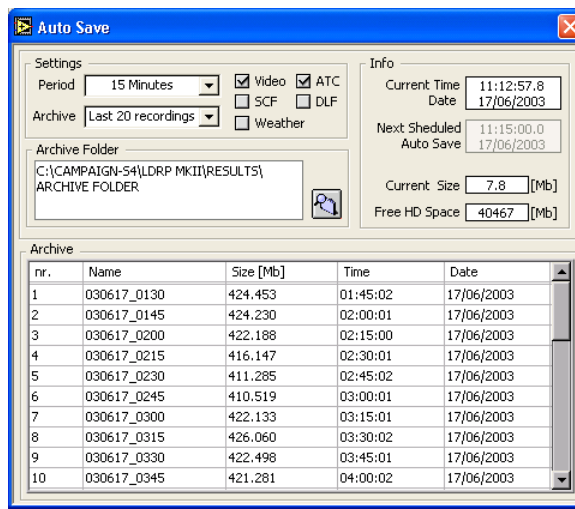


Figure 7-2: Auto save window

Click the start button to launch the recording (Start/Stop or Auto Save)

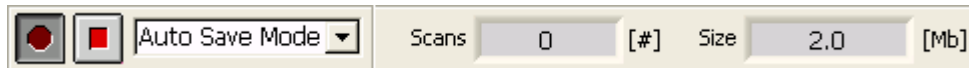



Figure 7-3: Record panel

While recording, the “Scans” and “Size” indicators will increment.

When in Start/Stop Mode, at the end of the recording session, click the Stop button. . This will evoke the following dialog box:

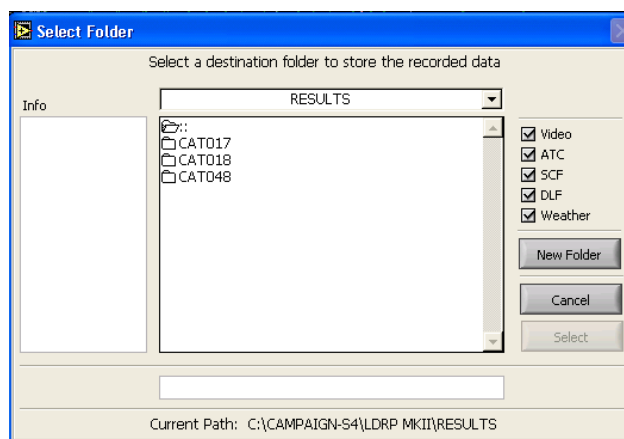


Figure 7-4: Save recording window

Here, you can decide what you wish to save. Typically, the tool will save the Video data, the ATC data (cat 001,048 or RDIF), the SCF data (Cat 17), the DLF data (Cat 18) and the Weather data (cat 008) in separate files. You can switch on or off any of these data-types to limit the size of the recording.

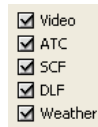


Figure 7-5: Recording select

After deciding what to save, select an existing or new folder to store the recording files. This can be done by means of the “New Folder” button.

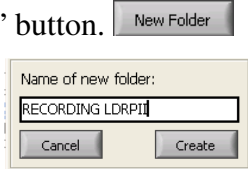


Figure 7-6: Recording name

Click “Create” to create the folder. Next, select it by clicking the “Select” button in the “Select Folder” dialog window.

Optionally, add comments to the folder using the “info” field.

7.2. Loading a Recording

After a recording has been made, you can transfer it to another system or re-load it in the same system to perform analysis. To do this, put the system in playback mode.

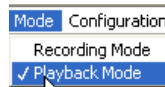


Figure 7-7: Mode menu

Select a file using the “Open” menu.

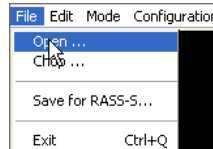


Figure 7-8: File menu

Next, select a file in the following dialog:

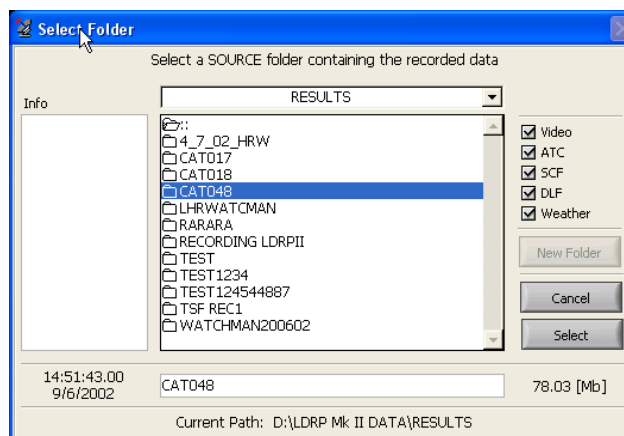


Figure 7-9: Reload recording window

Use the select button to confirm your selection.

Next, decide on the configuration file to be used. Each save operation automatically saves the active configuration. You can retrieve this configuration by using the following dialog:

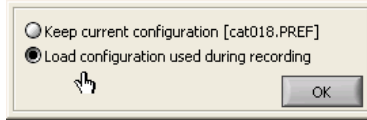


Figure 7-10: Load configuration select

The following buttons can be used:



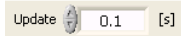
Figure 7-11: Replay panel

Table 7-1: Loading and recording

Button	Usage
	To start playback, click the play button
	To stop replay, click the stop button. This resets the scan counter of the replay
	To halt replay momentarily, click the Pause button
	To go back one scan in the recording, click the backward button. This is only available if the pause button is also depressed
	To go forward one scan in, click the Forward button
	Trigger to pause upon compliance with the filter

Alternatively, use the Scan control to select a playback scan manually.

In continuous playback (Non-paused) mode, you can determine the playback delay between two scans using the “Update” control.



7.3. Chopping

Large recordings can be “chopped” into smaller sections for distribution or storage at any given moment. For this purpose, the source file does not need to be loaded in memory.

Perform the chopping using the “Chop” function in the “File” menu.

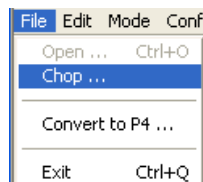


Figure 7-12: File menu

Next, enter a source and destination folder using the following dialog:

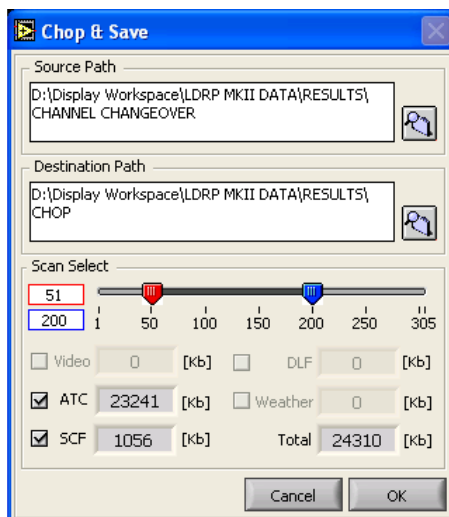


Figure 7-13: Chop & Save window

Click the two “Folder Select” buttons to select the source and destination folders. These buttons will each evoke a new folder dialog:

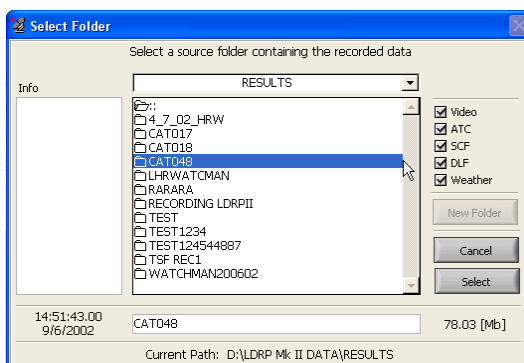


Figure 7-14: Select folder to chop

The Source selection dialog box will display the available files for each of the recordings when selected. After selecting a Destination folder, use the checkboxes next to the files sizes of the available files (in the Chop files window) to select which of the five files in the recording (Video data, the ATC data (cat 001,048 or RDIF) , SCF data (Cat 17), DLF data (Cat 18) and Weather data (cat 008) you want to retain in the chopped recording. Only the checkboxes for the available files will be enabled.

Furthermore, you can select a number of scans using the Scan select slider. The window also provides you with information on the file-size of the five sub-recordings and the total file size. Click OK to start the chopping function.

Notice that you can NOT chop a recording that is being replayed or is selected for replay. The following warning will appear.



Figure 7-15: Alert

7.4. Convert to P4 format

This tool converts ASTERIX Cat034/048 into PTE P4.cat file format.

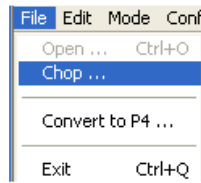


Figure 7-16: File menu

The following window will appear:

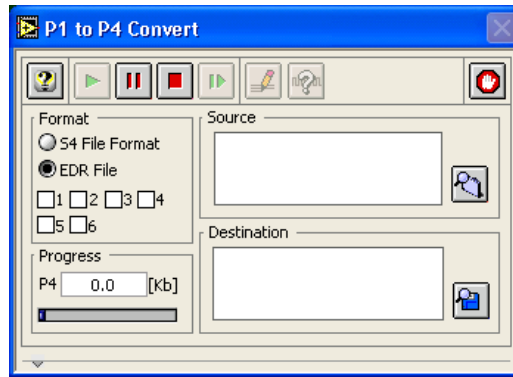



Figure 7-17: P1 to P4 convert

First thing to do is to select the EDR file format (default value) and browse for a recording folder. Normally these are stored in the /DATA/RAW RDR folder from the campaign structure. Click the  button to browse for a source folder.

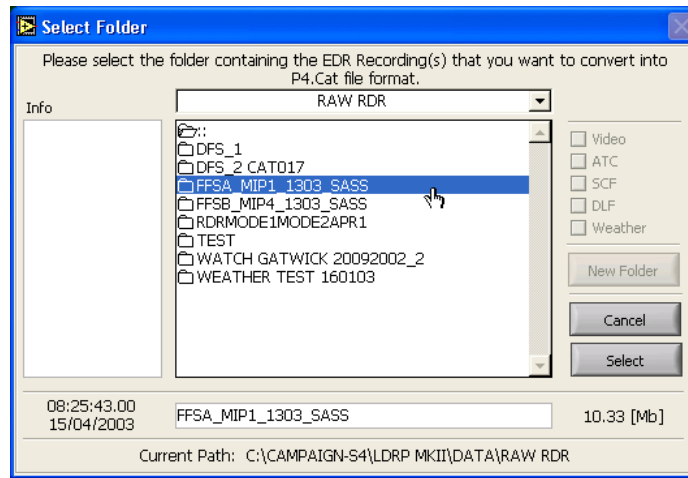


Figure 7-18: Select folder for P1 to P4 convert

Once a source folder is selected, the following window will appear:

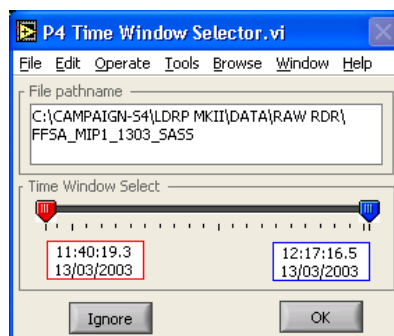


Figure 7-19: P4 Time window selector

Again it is possible to select a specific part of the recorded file based on start and end time. Use the red and blue sliders to select the period of interest out the entire recording. Click the “OK” button to proceed. Click the “Ignore” button to skip the selection procedure. Select the lines of interest using the appropriate checkboxes (1 to 6).

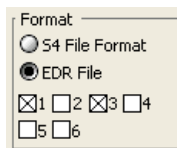



Figure 7-20: Format select

Next browse for a destination file to store the PTE P4.cat format by clicking the  button. Notice that the .cat extension is required.

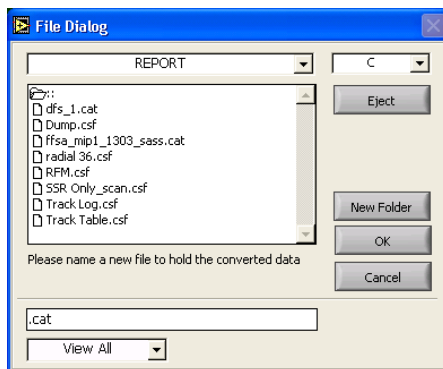


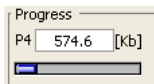





Figure 7-21: P4 file destination folder

The tool is now ready to convert the ASTERIX Cat034/048 messages contained in the recording file into the PTE P4.cat format. Proceed by clicking the  button. Use the  button to stop the conversion process at any time. The data already converted is stored in the destination file and can be used. A progress indicator displays the size of the converted P4.cat file



By clicking the  button, the converted messages are displayed in text format. Use the  button to pause the convert and the  button to step through the convert process message per message. This way each individual converted message can be seen.

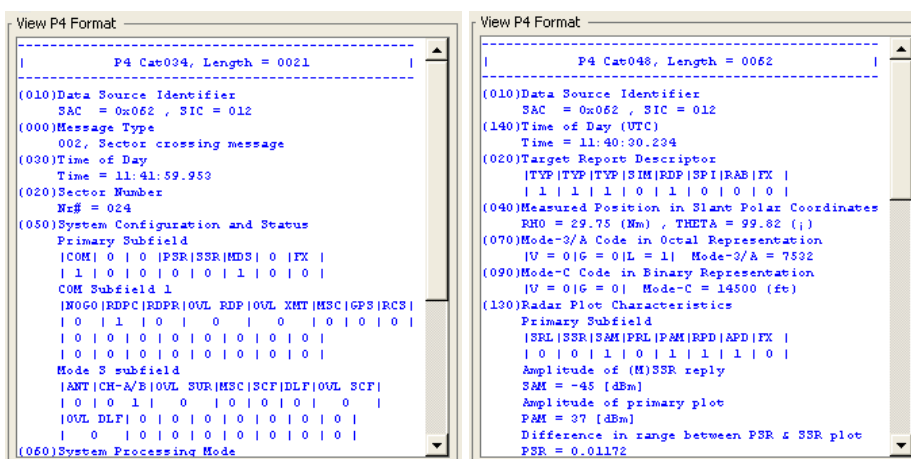



Figure 7-22: View P4 format

Using the display feature will slow down the conversion process.

Upon completion of the P1 to P4 convert the following window will appear:



Figure 7-23: P4 export alert

Click the  button to close the P1 to P4 conversion tool and return to the TMD3GUI.

7.5. Undo-redo Zoom/Pan

To undo your last zoom-pan action, use the Undo function. This can be found under the "Edit" menu.

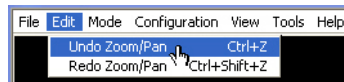


Figure 7-24: Edit menu

To redo your last Undo - action use the Redo function. This can be found under the "Edit" menu.

8. Tutorial

8.1. Configuration of DHM sessions

As already explained above, the TMD3 receives both digital and video data from DHM sessions. This paragraph explains how to configure the DHM sessions. Therefore, also consult the user manual of the DHM. (IE-UM-00025-xxx DHM.pdf)

8.1.1. Digital data on serial channel from RIM782 or UDR600

When the digital data (plots/tracks) is received on a serial channel, it is connected to a USB Data Recorder (UDR) inside a RIM782. Configure a session as follows:

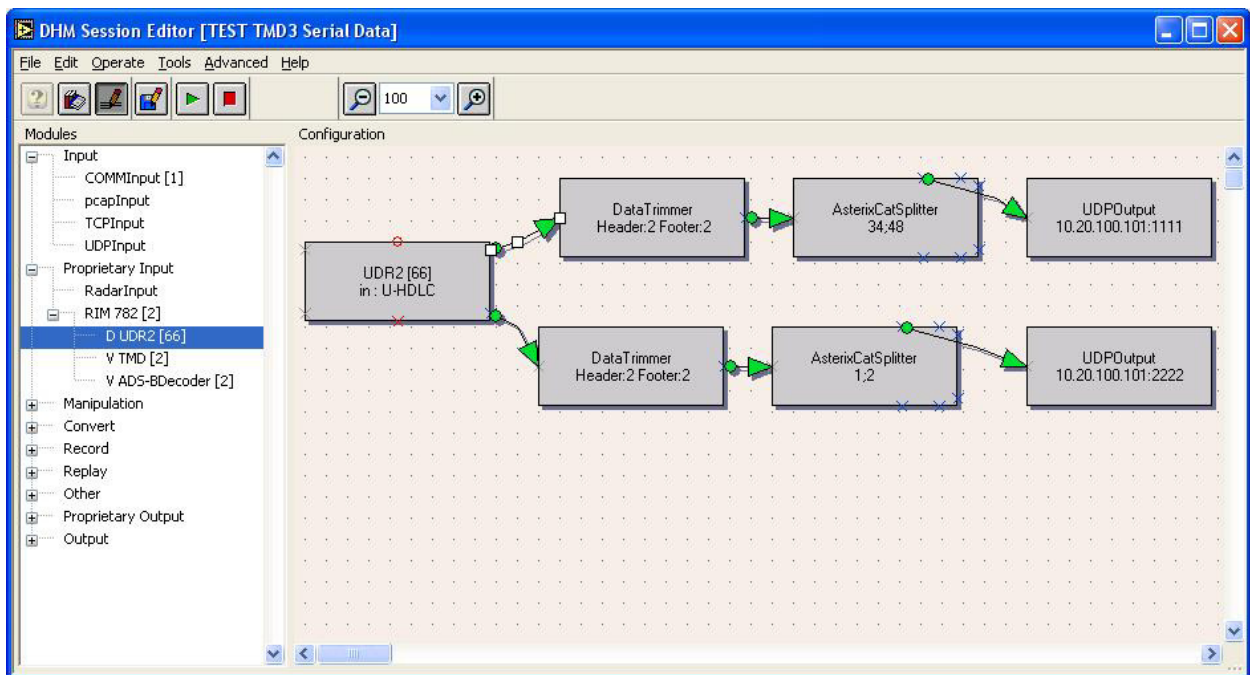


Figure 8-1: DHM Session Digital setup

- Module: UDR2[66]:** this module corresponds a UDR inside the RIM782[2]. Configure the appropriate transport layer (U-HDLC for ASTERIX or RDIF) and the correct serial interface (RS232 or RS422). If you are using multiple RIM782's and/or UDR600's, the number between [] is its serial number.

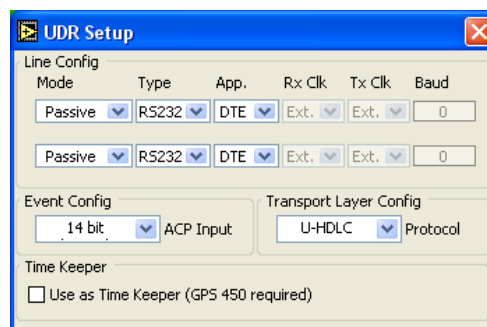


Figure 8-2: DHM: UDR Setup

- Time Keeper

Use as Time Keeper (GPS 450 required)

In case the GPS450 is connected to the UDR600 or RIM782, tick this box in order to use the GPS450 as time keeper. The pc-time will now be synchronized according to the UTC time, received from the GPS.
- Module: U-HDLC:** The TMD3 needs “clean” ASTERIX or RDIF messages. This module strips the U-HDLC headers and footers from the data first.

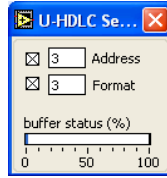


Figure 8-3DHM: U-HDLC setup

- Module: AsterixCatSplitter:** Unless you are sure that each protocol frame (U-HDLC, TCP, UDP) contains only one category of ASTERIX, it is recommended to use an AsterixCatSplitter for the reasons explained in the DHM user manual. Fill in the correct categories to split.

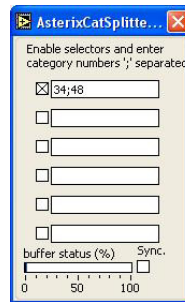


Figure 8-4DHM: AsterixCatSplitter

- Module: UDPOutput:** this module sends the data in “EDR incl. header”-frames (Intersoft protocol) over UDP to the TMD3. It is this UDP port number that becomes visible in the TMD3 “discover devices”-dialog and the BIT tab. (see Figure 6-5: Discover devices and Figure 5-18: BIT tab)

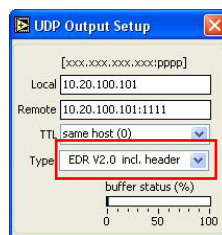


Figure 8-5: DHM: UDPOutput

Upon completion, you can run the session and inspect the configuration using the different probes and status windows.

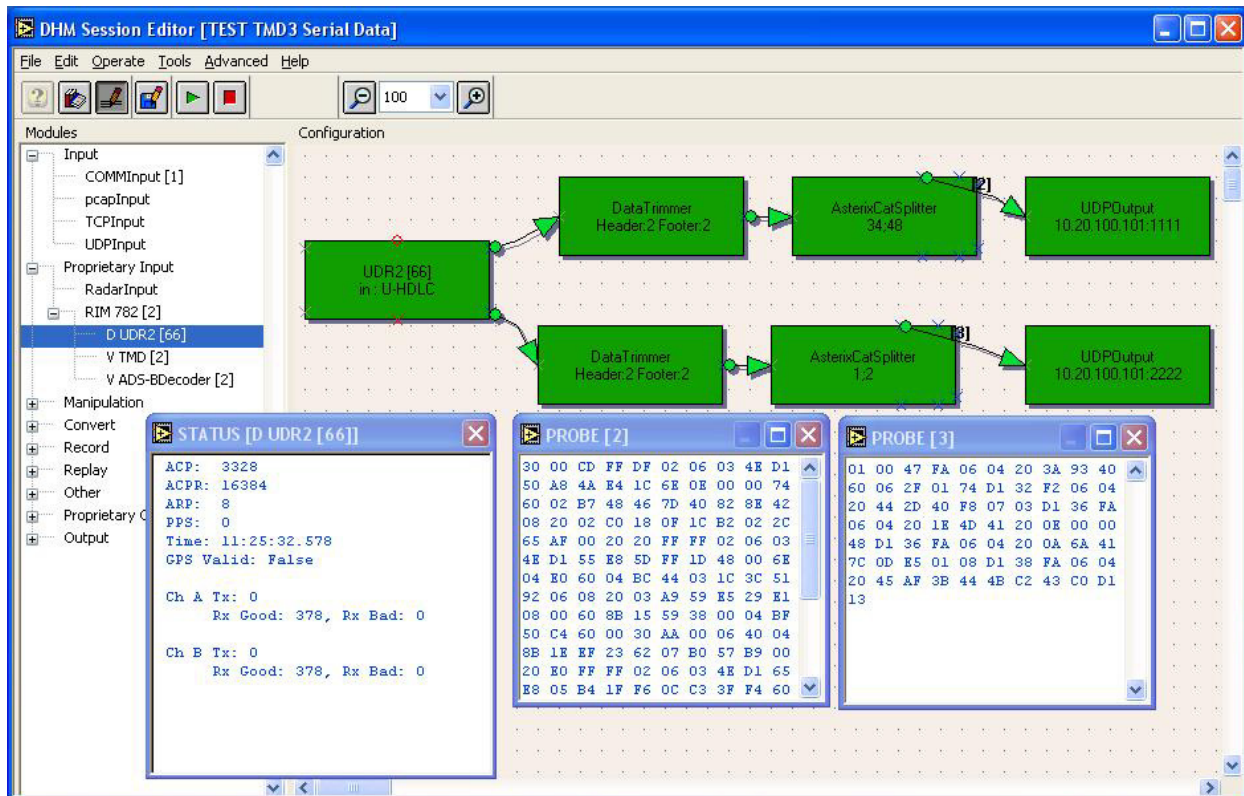


Figure 8-6: Running session

Remarks:

- Multiple streams of plots/tracks can be sent to the TMD3 (but only one can be displayed at the same time). Upon correct configuration in the TMD3, you can easily switch between different data streams. In the example above: CAT034/048 on UDP port 1111 and CAT001/002 on UDP port 2222. (See also 6.2.3 Communication Configuration Setup)
- Digital data in the TMD3 can be displayed, either **on sector messages or timing signals**. (ACP/ARP). If you want that the digital data is displayed according the ACP/ARP (input to the RIM782 or UDR600), you need to connect the timing signals as well to the UDP output. (red circle below)

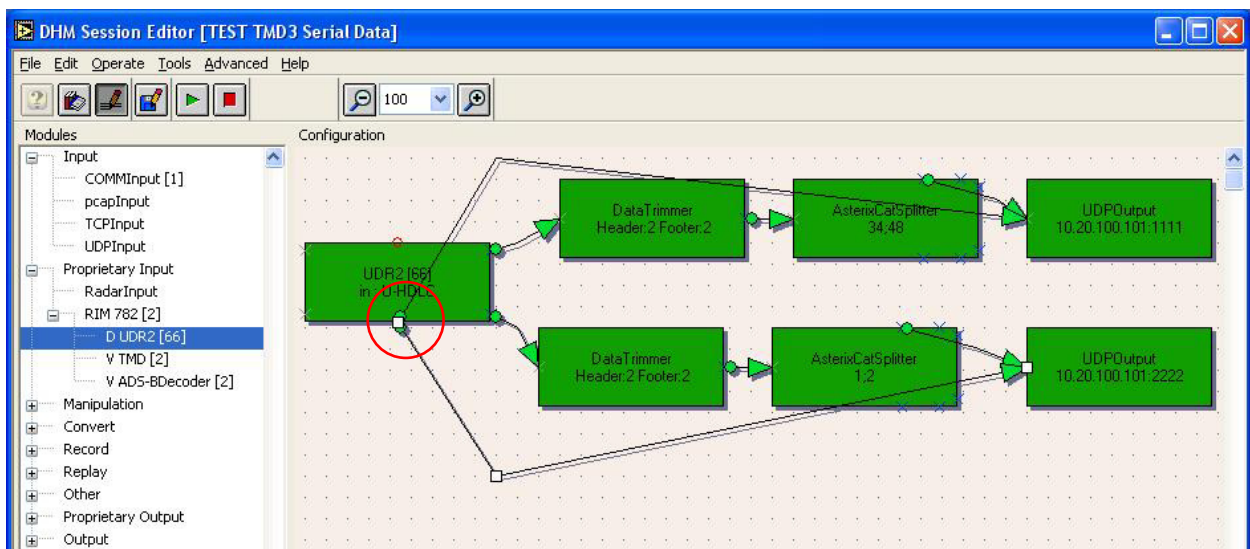


Figure 8-7: Digital data slaved on ACP/ARP

Next step is to make the appropriate selection of “sector line” in the TMD3. (See 6.2.1.1 General Tab)



On the contrary to digital data, video can only be slaved on ACP/ARP’s!

- Only when the DHM session is correctly configured from UDR to UDPOutput, the UDP port number becomes visible as digital input in the discover devices dialog (See Figure 6-5: Discover devices)
- In case no GPS450 is available, you can use the time keeper function in an AsterixCat002 or AsterixCat034Convert module, on the condition that ARP and TOD in a North message is available. Connect both ARP and ASTERIX CAT034 messages to the AsterixCat034Convert module (“dummy” module) as in the example below, and enable the time keeper function in it. (See also user manual DHM). After a couple of scans, the computer time will be updated.

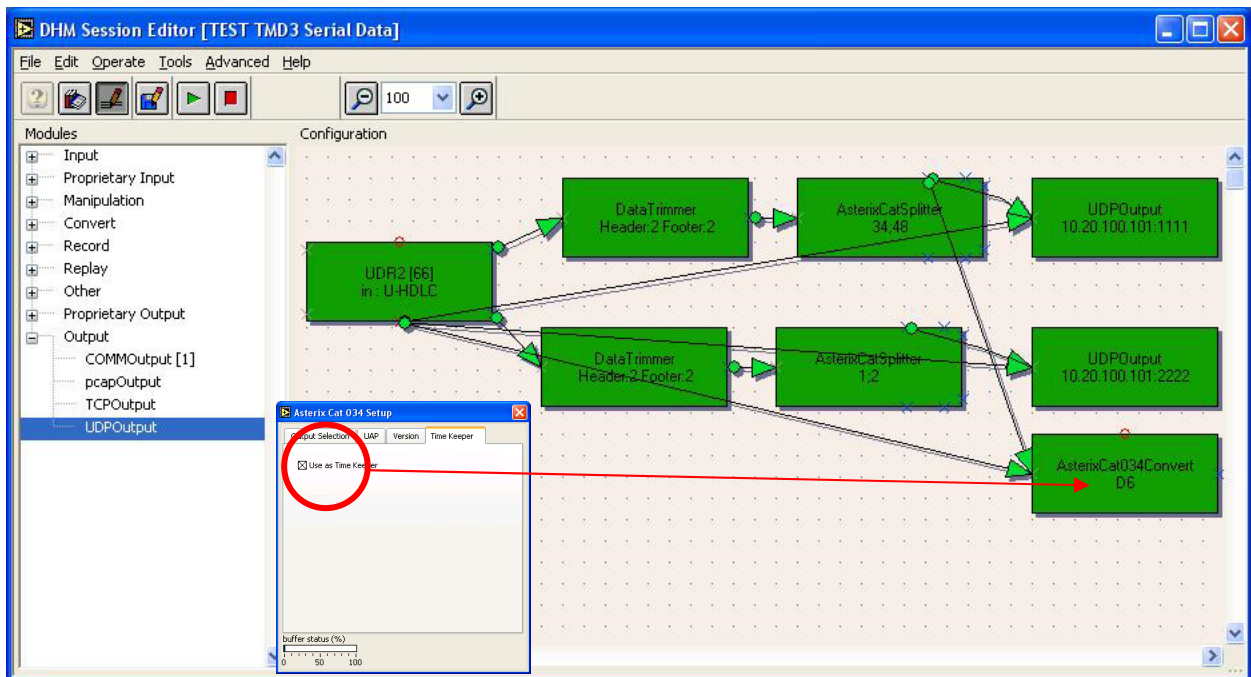


Figure 8-8: ARP and North message used as time keeper

8.1.2. Digital data coming from Ethernet

When the digital data (plots/tracks) is received on Ethernet, it is received on the Network Interface Card of the computer. Configure the following modules:

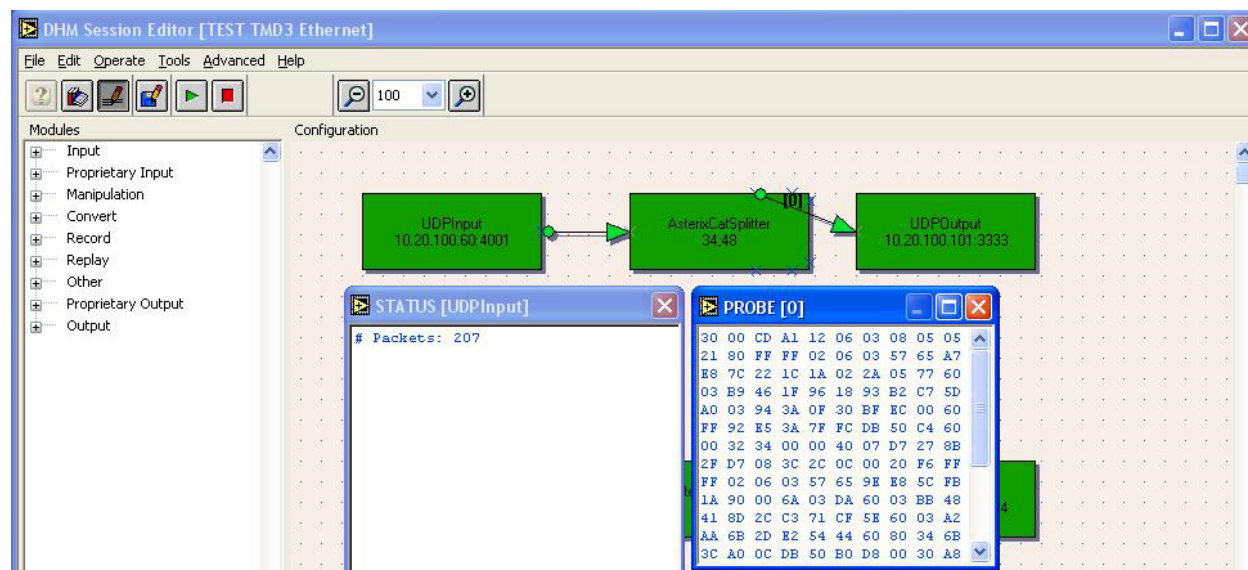


Figure 8-9: Digital data over Ethernet

- **Module: UDPIInput:** configure the right IP address and UDP portnumber where the digital data is received on.
- **Module: AsterixCatSplitter:** Unless you are sure that each protocol frame (U-HDLC, TCP, UDP) contains only one category of Asterix, it is recommended to use an AsterixCatSplitter for the reasons explained in the DHM user manual. Fill in the correct categories to split.
- **Module: UDPOOutput:** this module sends the data in .EDR incl header frames (Intersoft protocol) over UDP to the TMD3. It is this UDP port number that becomes visible in the TMD3 discover devices dialog. (see Figure 6-5: Discover devices)

Remarks:

- Multiple streams of plots/tracks can be sent to the TMD3 (but only one can be displayed at the same time). Upon correct configuration in the TMD3, you can easily switch between different data streams. In the example above: CAT034/048 on UDP port 3333 and CAT001/002 on UDP port 4444. (See also 6.2.3 Communication Configuration Setup)
- Only when the DHM session is correctly configured from UDR to UDPOOutput, the UDP port number becomes visible as digital input in the discover devices dialog (See Figure 6-5: Discover devices)
- Only when the DHM session is correctly configured from UDR to UDPOOutput, the UDP port number becomes visible as digital input in the discover devices dialog (See Figure 6-5: Discover devices)

8.1.3.Video configuration

When video is received by the RIM782, configure the following modules:

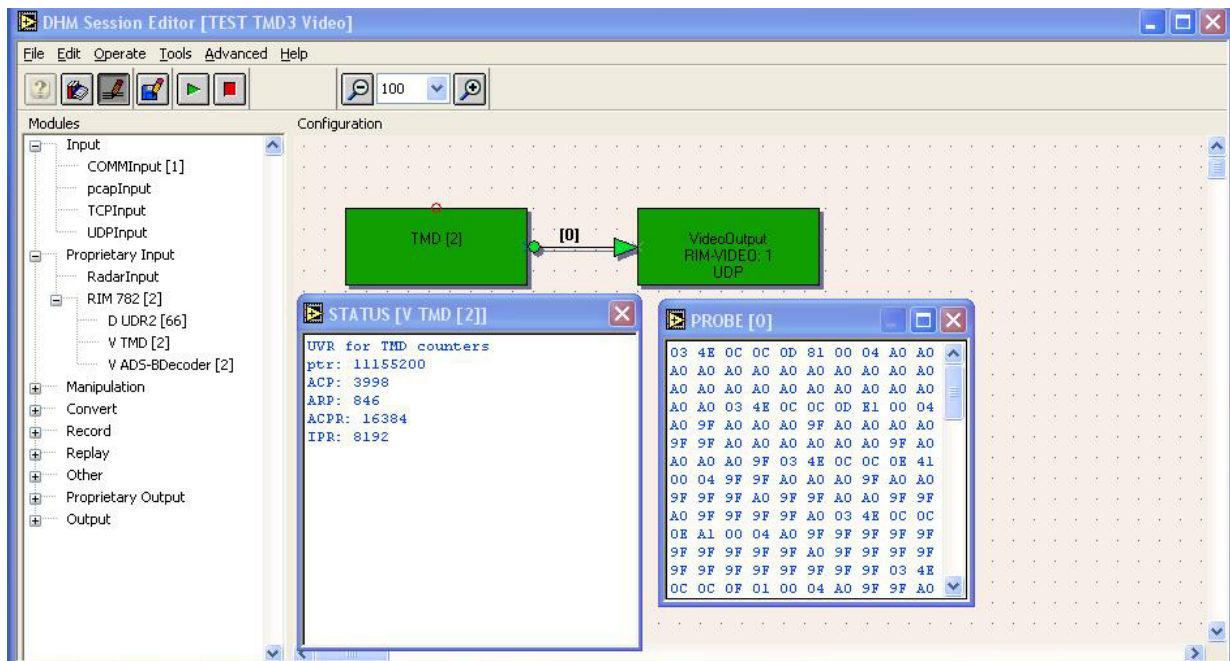


Figure 8-10: Video session

- Module TMD:** the RIM782 is configured here as “TMD”. The setup dialog gives exactly the same setup parameters as in the TMD3. (See 6.2.2 Video Configuration Setup) Therefore, it is recommended to set the correct configuration in the TMD3 and not in the DHM Session Editor.

- **Module: VideoOutput:** Configure as follows, with the correct name, local and remote IP-address:

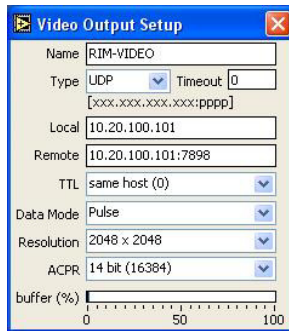


Figure 8-11: Video output setup

Remarks:

- A video thread recording always requires ARP/ACP signals.
- The TMD3 can only communicate with one RIM782 at the same time. In case you are using more than one RIM782 (for example for redundancy reasons), you need to click the



Recording Mode selection again in order to evoke the Select Video Source dialog. Now select the appropriate RIM782 where you want to display the video from.

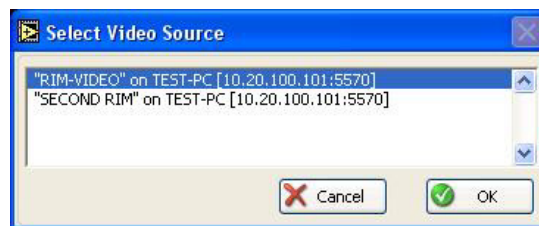


Figure 8-12: Select Video Source dialog

8.1.4.DHM recordings

Although the TMD3 offers advanced capabilities for recordings of both digital data and video data, one can always decide to make data recordings in the DHM using the EDRRecorder. Consult the DHM user manual for more information.

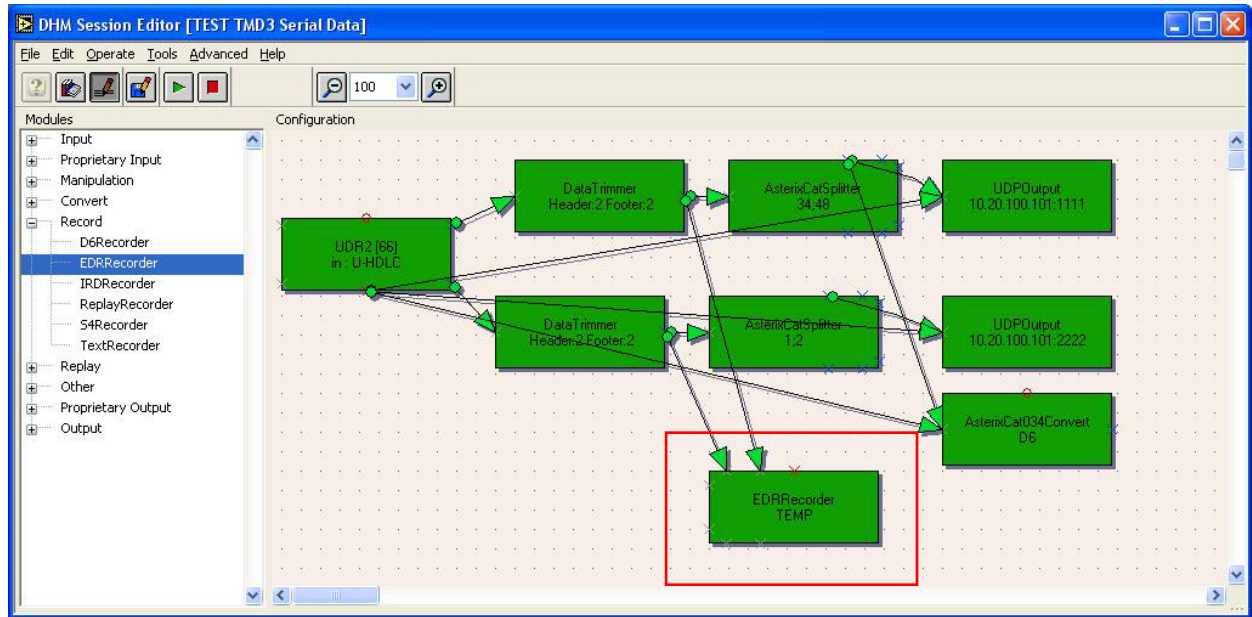


Figure 8-13: EDR Recordings outside TMD3

8.2. Zooming the display

Use the cursor control panel to set the cursor in "Zoom" mode. By default, the display will always switch back to the zoom mode. Notice that zoom mode can be used in both "PPI" and in "Vertical" view. When switching between PPI and Vertical mode, the previous selected zoom is remembered.



Figure 8-14: Cursor control panel

Next, drag a selection box in the display. The tool will zoom the data in the selection box. In PPI View, only square zooming is allowed. In vertical view rectangular zooming is available. Use the +/- button to zoom in/out 10%.

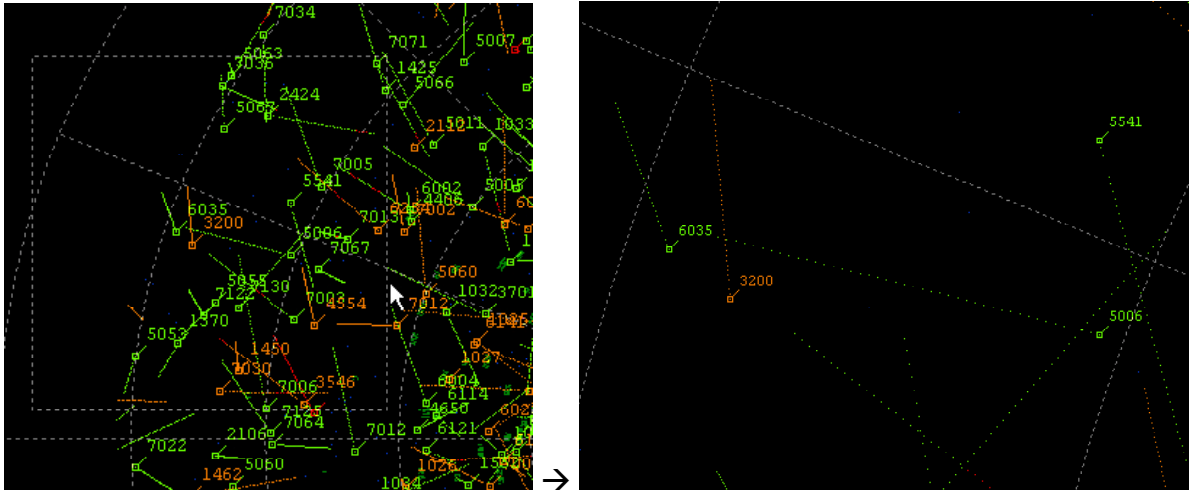


Figure 8-15: Zooming

You can also use the "Page Up" (zoom –in) and "Page Down" (zoom –out) keys of your keyboard to zoom.

8.3. Panning the display

Use the cursor control panel to set the cursor in "Pan" mode. Notice that pan mode can be used in both "PPI" and in "Vertical" view.



Figure 8-16: Cursor control panel

Now put the mouse in the display area and click a point. You can drag this point to another location. The radar Sector rings will move along with your mouse pointer to indicate the newly selected position. After releasing, the display will be updated according to the new position. You can also pan the display using the "Up" "down" "Left" and "Right" arrow keys on your keyboard.

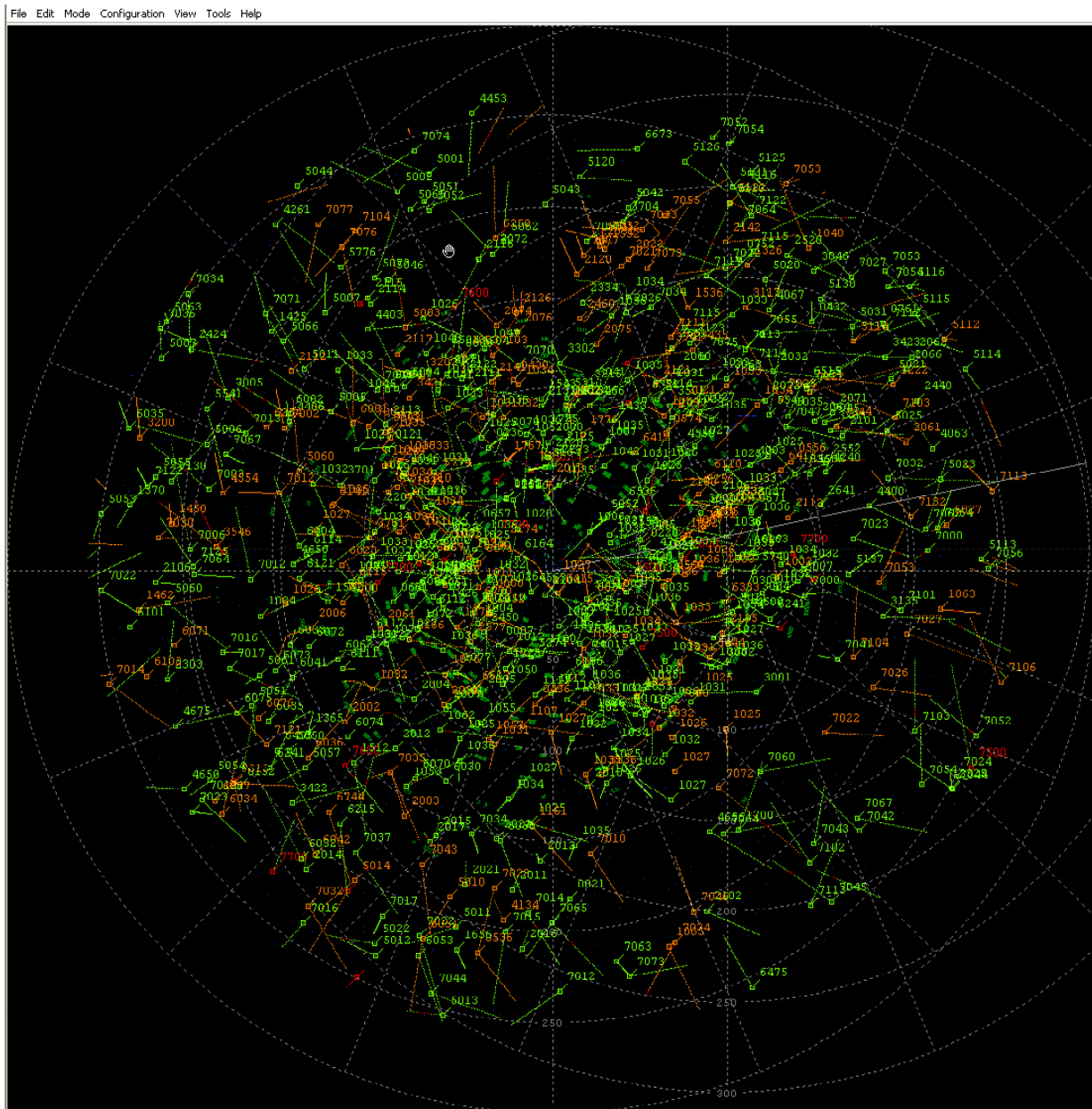


Figure 8-17: Pan display

8.4. Selecting targets in the display

Use the cursor control panel to set the cursor in "select" mode. Notice that Select mode can be used in both "PPI" and in "Vertical" view. When switching between PPI and Vertical mode, selected targets stay selected.

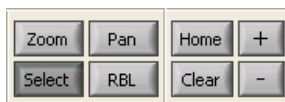


Figure 8-18: Cursor control panel

Point out the targets you want to select. You can either drag a square around a large selection, or hold the Ctrl key while selecting multiple targets. A single click selects one target. A target can be deselected by clicking it again. Beware: the tool automatically switches back to zoom mode after each selection. It is required to reselect this "select" mode each time a selection has been made.

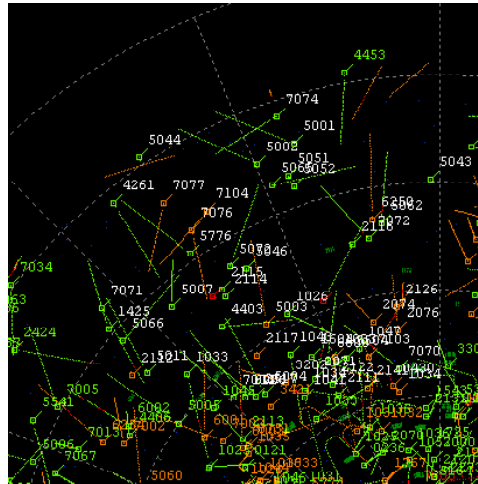


Figure 8-19: Select targets

All the selected targets appear in white.

The target information (ASTERIX/RDIF contents) is shown in the target info window. You can sub-select from the list of selected targets in the display using the menus in the info selection

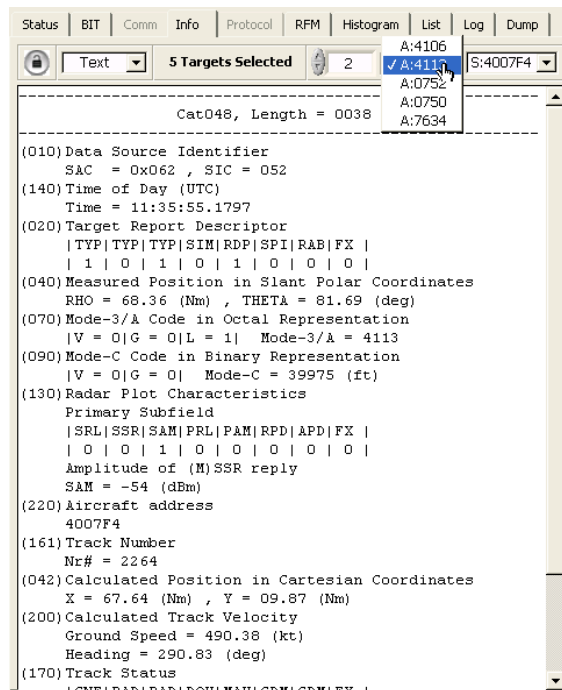


Figure 8-20: Target information

The data in the info can either be shown in hex or in decoded ASTERIX/RDIF:



Figure 8-21: Info format select

When multiple targets are selected in the display, pick out a target using the A code or S address.

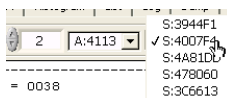


Figure 8-22: Target select

Use the “Lock” function to track a certain target and maintain it in the middle of the display. This is handy for following one particular target.



Figure 8-23: Lock

8.5. Using the RBL

Use the cursor control panel to set the cursor in "RBL" mode. Notice that RBL mode can be used in both "PPI" and in "Vertical" view.

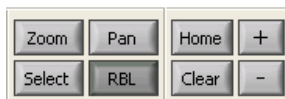


Figure 8-24: Cursor control panel

Now move the cursor in the display area. A Range and Bearing Locator (RBL) line will appear and one end will follow the mouse pointer. The other end is by default fixed to the origin. The RBL location can be read from its data-block. The content of the data block depends on the selected view (PPI/vertical) and Units (Metric/Imperial) The data block can be rotated by turning the mouse wheel.

Move the RBL origin by moving the mouse over the current origin. The cursor shape will change into a hand. This allows you to drag the origin to a new location. Alternatively just right click to relocate the RBL origin. Double click the RBL origin to restore it to its default position.

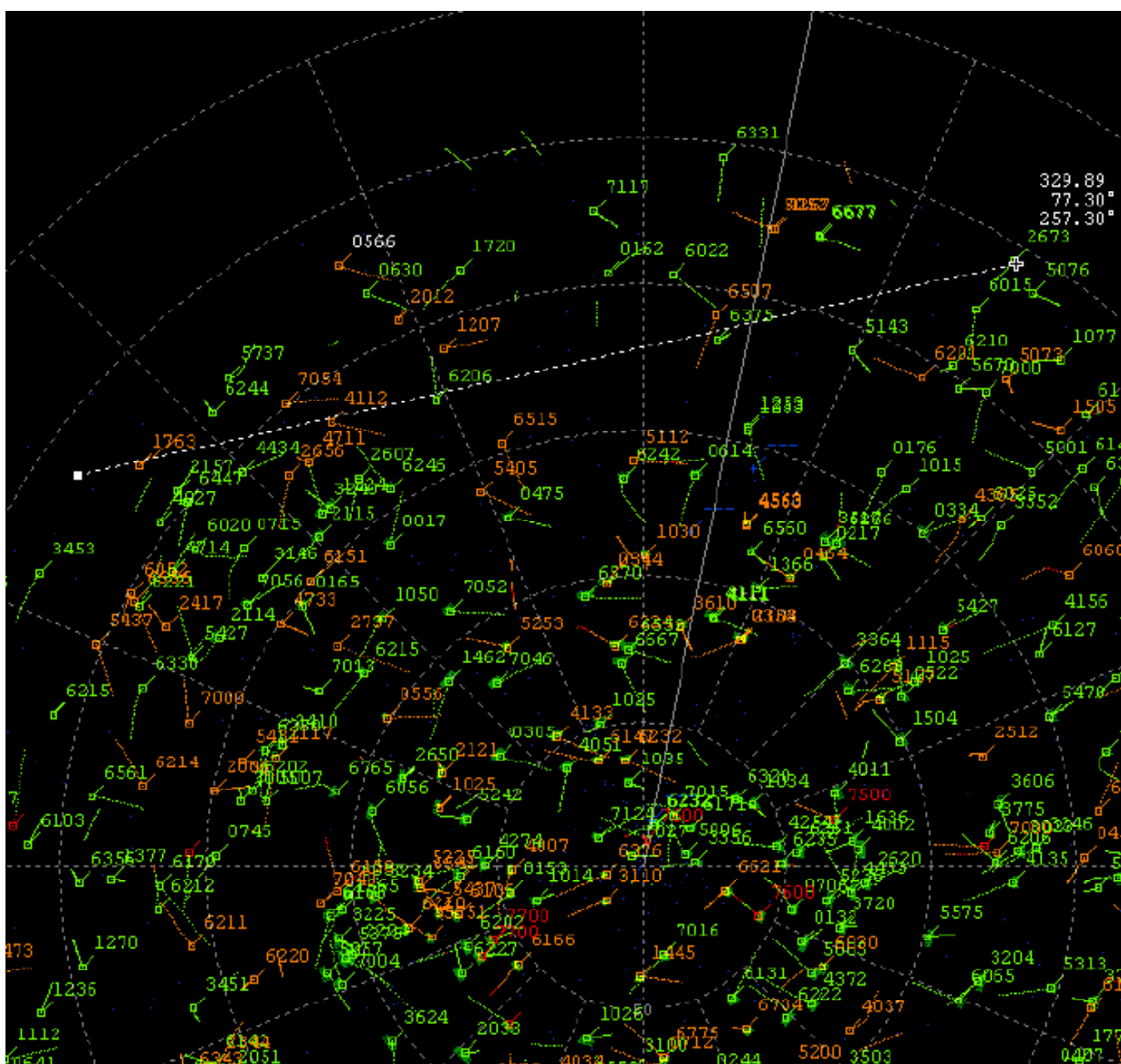


Figure 8-25: Range Bearing Line

The end point of the RBL can be locked to a target just by clicking it. The RBL cursor will now follow the target and the data block is updated on each update of the tracked target.

8.6. Using the Dump function

The Dump function can be accessed by clicking the Dump tab in the TMD3GUI. The dump function allows the user to dump specific information in a table to be viewed. The content of the information that is dumped is specified using two controls: Source and Type. Notice that the content and layout of the table depends on the selected combination of Source and Type. First select a source. The user can choose between the following sources:

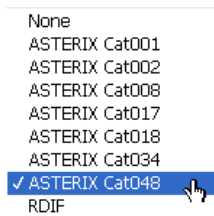


Figure 8-26: Dump source

For each of the source different Types are available. For example for ASTERIX Cat048 the following types are available:

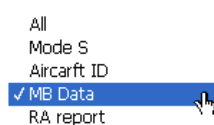








Figure 8-27: Dump type

“All” means that all Cat048 messages are dumped to the table regardless of the content. If Aircraft ID is selected, only Cat048 messages that contain Aircraft ID information are dumped to the table. In recording mode the table is updated as soon as the information is available. New information is added at the end of the table. Once the table is full, the oldest information scrolls off at the top as new information is added at the bottom. Filters are also applied to the dump function. This means that using a filter can narrow down the amount of data being dumped to the table. It also allows to single out one aircraft, for example for flight trials. Use the  button to pause the updating of the table. Use the  button to clear the table. Switching the Source or Type will automatically clear the table.

It is also possible to dump the table content to a .csv file. Click the  button to select an existing or create a new .csv file. The default location for the .csv file is the *REPORT* folder. This is located in *TMD3data\REPORT*. The default name is *Name.csv*. Any other name and any other location can be selected by the user. Click the  button to delete the current selected .csv file.

In replay mode, each scan the dump table is updated and the newly available information is added at the bottom of the table. In replay mode, at any time the last 4096 entries can be viewed using the scrollbar at the right. The oldest information scrolls off at the top of the table when the 4096 entries are used. Switching the Source or Type will automatically clear the table. Activate the  button to actually dump the table content to the .csv file. As long as the  button is activated, the .csv file is appended each time new information is added to the dump table. The content of the table can be dumped to the .csv file as it is displayed on the screen (HEX) or for some Source/Type combinations it can be dumped as individual text formatted fields.

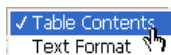


Figure 8-28: Dump format select

8.7. Exit

To exit the TMD3, use the "File → Exit" menu or type [CTRL+Q].

Exiting the tool can not be done while recording. To quit in this mode, first stop the recording.

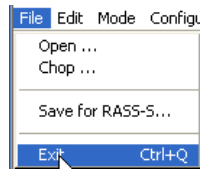


Figure 8-29: File menu

Whenever the configuration is changed during the session, the user will be prompted with the following dialog when quitting the TMD3:

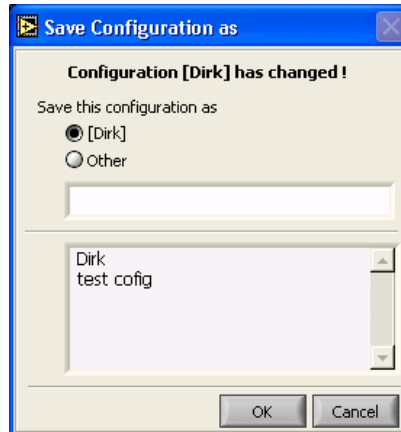


Figure 8-30: Save configuration as when exiting

This allows saving any changes made to the configuration before quitting the tool. Additionally, the current configuration can be saved under another name for future use.

9. Annex A: Safety Instructions

Use the following safety guidelines to help protect your equipment from potential damage and to ensure your own personal safety when using your equipment.

As you use your equipment observe the following safe-handling guidelines.

General



WARNING: Do not operate your equipment with any cover(s) (including equipment covers, bezels, filler brackets, front-panel inserts, and so on) removed.

* Your equipment is equipped with one of the following:

- A fixed-voltage power supply - Equipments with a fixed-voltage power supply do not have a voltage selection switch on the back panel and operate at only one voltage (see the regulatory label on the outside of the equipment for its operating voltage).
- An auto-sensing voltage circuit - Equipments with an auto-sensing voltage circuit do not have a voltage selection switch on the back panel and automatically detect the correct operating voltage.
- A manual voltage selection switch : Equipments with a voltage selection switch on the back panel must be manually set to operate at the correct operating voltage. To help avoid damaging a equipment with a manual voltage selection switch, ensure that the voltage selection switch is set to match the AC

Power available at your location:

- 115 V/60 Hz in most of North and South America and some Far Eastern countries such as South Korea and Taiwan
- 100 V/50 Hz in eastern Japan and 100 V/60 Hz in western Japan



NOTE: The voltage selection switch must be set to the 115-V position even though the AC power available in Japan is 100 V.

- 230 V/50 Hz in some regions in the Caribbean and South America and most of Europe, the Middle East, and the Far East

Also, ensure that your monitor and attached devices are electrically rated to operate with the AC power available in your location.

Before working inside the equipment unplug the equipment to help prevent electric shock or system board damage. Certain system board components continue to receive power any time the equipment is connected to AC power.

To help prevent electric shock, plug the equipment and device power cables into properly grounded electrical outlets. These cables are equipped with 3-prong plugs to help ensure proper grounding. Do not use adapter plugs or remove the grounding prong from a cable. If you must use an extension cable, use a 3-wire cable with properly grounded plugs.

To help protect your equipment from sudden, transient increases and decreases in electrical power use a surge suppressor line conditioner or uninterruptible power supply (UPS).

Be sure nothing rests on your equipment's cables and that the cables are not located where they can be stepped on or tripped over.

- Do not spill food or liquids on your equipment. If the equipment gets wet, contact Intersoft Electronics.
- Do not push any objects into the openings of your equipment. Doing so can cause fire or electric shock by shorting out interior components.
- Keep your equipment away from radiators and heat sources. Also, do not block cooling vents. Avoid placing loose papers underneath your equipment; do not place your equipment in a closed-in wall unit or on a bed, sofa, or rug.

CAUTION: Do not attempt to service the equipment yourself, except as explained in your documentation or otherwise provided to you. Always follow installation and service instructions closely.

In addition, take note of these safety guidelines when appropriate:

- When you disconnect a cable, pull on its connector or on its strain-relief loop, not on the cable itself. Some cables have a connector with locking tabs; if you are disconnecting this type of cable, press in on the locking tabs before disconnecting the cable. As you pull connectors apart, keep them evenly aligned to avoid bending any connector pins. Also, before you connect a cable, ensure that both connectors are correctly oriented and aligned.
- Handle components and cards with care. Do not touch the components or contacts on a card. Hold a card by its edges or by its metal mounting bracket. Hold a component such as a microprocessor chip by its edges, not by its pins.



WARNING: There is a danger of a new battery exploding if it is incorrectly installed. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

Protecting Against Electrostatic Discharge

Static electricity can harm delicate components inside your equipment. To prevent static damage, discharge static electricity from your body before you touch any of your equipment's electronic components, such as the microprocessor. You can do so by touching an unpainted metal surface on the equipment chassis.

As you continue to work inside the equipment periodically touch an unpainted metal surface to remove any static charge your body may have accumulated. You can also take the following steps to prevent damage from electrostatic discharge (ESD):

- Do not remove components from their antistatic packing material until you are ready to install the component in your equipment. Just before unwrapping the antistatic packaging, discharge static electricity from your body
- When transporting an electrostatic sensitive component, first place it in an antistatic container or packaging.
- Handle all electrostatic sensitive components in a static-safe area. If possible, use antistatic floor pads and workbench pads. The following notice may appear throughout this document to remind you of these precautions:



NOTE: See "Protecting against Electrostatic Discharge" in the safety instructions at the end of this guide.

Ergonomic Computing Habits



WARNING: *Improper or prolonged keyboard use may result in injury.*



WARNING: *Viewing the monitor screen for extended periods of time may result in eye strain.*

Battery Disposal:

Do not dispose the battery along with household waste. Contact your local waste disposal agency for the address of the nearest battery deposit site.

For the computer and Display use the safety instructions delivered with that equipment.

10. Reference Documents

10.1. Standard Documents

- STD. 1. ITU-T Recommendation on X25 (03/93)
- STD. 2. Radar Data Interchange Format (RDIF) CAA Paper 87002 Second Edition November 1991.

10.2. EC documents

- EC. 1. EATCHIP. Pre-Operational European Mode-S Functional Specification. Eurocontrol SUR-ET2-ST03.3110-SPC-01-00. Edition 2.0.
- EC. 2. EATCHIP. Intersite Co-ordination ICD for POEMS Eurocontrol SUR-ET2-ST03.3110-SPC-02-00 Edition 1.9 dated 3 June 98.
- EC. 3. POEMS Document for ASTERIX Category 017 Transmission of Mode-S Surveillance Co-ordination Function Messages Ref. SUR.ET2.ST03.3111-SPC-02-00 Ed 0.5 February 1999 Proposed Issue.
- EC. 4. POEMS Document for ASTERIX Category 018 (Part 6) Transmission of Mode-S Data link Function Messages Ref. SUR.ET2.ST03.3112-SPC-02-00 Ed 1.5 March 1999 Proposed Issue.
- EC. 5. POEMS Document for Radar Data Exchange Part 2b Transmission of Mono-radar Service Messages Ref. SUR.ET2.ST03.3116-SPC-02b-01 Ed 1.3 16 March 1999 Proposed Issue.
- EC. 6. POEMS Document for Radar Data Exchange Part 4 Transmission of Mono-radar Target Reports Ref. SUR.ET2.ST03.3115-SPC-04-01 Ed 1.3 12 March 1999 Proposed Issue.
- EC. 7. EC. 8. PTE-P1/P2 User Manuals :

10.3. ICAO documents

- IC. 1. ICAO Annex 10, Aeronautical Communications. Volume IV, First Edition July 1995 and including up to Amendment 73.
- IC. 2. ICAO Annex 10, Aeronautical Communications. Volume III, First Edition July 1995 and including up to Amendment 73.
- IC. 3. Manual on Mode-S Specific Services ICAO document 9688-AN/952 First edition, 1997.

10.4. Abbreviations and acronyms

ACP	Azimuth Change Pulses
ARP	Azimuth Reference Pulse\
ASTERIX	All purpose Structured Eurocontrol Radar Information exchange
CAA	Civil Aviation Authority
COTS	Commercial Off The Shelf
EDR	Extended Data Recorder
LDRP	Local Display for Recording and Playback
PC	Personal Computer
PSR	Primary Surveillance Radar
PSV	Processed Sum Video
RDIF	Radar Data Interchange Format
RVI	Radar Video Interface
RVR	Radar Video Recorder
SSR	Secondary Surveillance Radar
MDI	Maintenance Display Interface
VGA	Video Graphics Adapter