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SoHO

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GUIDE TO THE CDS SCIENCE TELEMETRY MONITOR (STM)

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1 Prerequisites

The program STM is provided to allow monitoring of the CDS science stream data either in realtime or replay mode. It can be run (by typing the command STM) from any IDL session which has access to either the current or past telemetry files.

One environment variable should be defined before STM is run viz.

CDS_TM_DATA - The directory which holds the telemetry files.

Note that in realtime mode, STM accesses the telemetry by reading the telemetry file that is being written simultaneously by the EGSE software. The variable CDS_TM_DATA should therefore always point to the directory where that file resides since this is not resettable within STM. It need not be the same directory as that storing older telemetry files, since the path to those can be redefined within the routine which selects replay files.

Project staff running STM will also require two other environment variables to be defined viz.

CDS_GIS_RAW - A directory to which any 'raw' GIS data files are written.

CDS_STM_DUMP - A directory to which special packets containing the contents of the CDHS deferred command store, and raster, series, data extraction and VDS hardware tables are written.

Other users are free to define these variables but they should point to private directories to which they have write access.

2 The operating mode

The initial screen displays the basic options for running STM. The second row of buttons should be considered first. This row has two buttons labelled at startup as 'REALTIME' and 'COMMAND DRIVEN'.

2.1 REALTIME

This is a button which toggles between realtime and replay mode. If it is the first button you press, there will be some delay while various routines are compiled so do not assume nothing is happening and go clicking wildly on other items! If you press this button when 'Realtime' is displayed, the button label will change to 'Replay' and other widgets, appropriate only to replay mode, will appear.

In replay mode three additional widgets appear.

- **Select TM file:** when pressed will display a widget which allows the use to select the telemetry files to be read. Multiple files may be selected but they should be consecutive in time.

- **Current file:** for information only, this widget displays the current telemetry file being read.

- **Start packet:** enter a value here to allow the reading to begin at a specified packet within the first file of those chosen. This is useful when attempting to extract a particular observation late within a file.

2.2 COMMAND DRIVEN

This is also a toggle button which changes between two modes of operation of STM. The mode may either be 'Command driven' or 'Data driven'. In 'Command driven', the telemetry is received but nothing is displayed unless that option has been explicitly requested by the user by selecting something from the 'Display Options' menu.

In 'Data driven' mode, whenever a packet is received in the telemetry which corresponds to anything that can be displayed, the windows for that display is automatically created and the data displayed. The screen can quickly be overwhelmed if, for instance, many different types of special packets are being received. In an attempt to avoid too much crowding, only pages from one instrument at a time are allowed (ie if VDS pages are displayed and GIS data are received, the VDS pages are deleted before displaying the GIS data).

2.3 SPECIAL PACKETS

Note that regardless of the operating mode chosen by the user, special packets in the telemetry will ALWAYS be displayed.

3 Control of STM

Once the selection of operating modes has been made, further control of STM is via the buttons and menu on the top line of the main STM display.

- **EXIT** click this button to exit from STM.

- **START** start ingestion of telemetry in either realtime or replay mode.

- **STOP** stop ingestion of telemetry in either replay or realtime mode. This command is ignored if ingestion has not previously been started. If this command is issued after the receipt of a raster header and before the last data packet is received, the program will attempt to reconstruct the data from the information it already has. This should be safe (in terms of crashing the whole thing) but is not recommended. Note that the same thing happens if an ABORT packet is received - but ingestion of telemetry continues after an ABORT is detected.

- **PAUSE** temporarily pause the intake of telemetry. The button label changes to 'Restart' when the telemetry is paused, and the telemetry must be restarted before any further start/stop actions are allowed.

4 Display Options

Several items from the telemetry may be displayed and monitored within STM. Their selection is made from within the pull-down menu 'Display Options'.

The possible items are:

- **REVIEW** Creates a table which displays the total number of telemetry packets of each kind received since the start of intake of telemetry or since the 'Reset' button was pressed. This option only works in 'Command Driven' mode.

- **HEADER INFO** Creates a table to display the information contained in either a VDS or a GIS raster header packet.

- **VIEW SPECIALS** Creates tables of the appropriate format to display the contents of the particular special packet requested.

- **RAW DATA** Creates a window which allows control of the dumping of GIS raw data. The equivalent for VDS raw data is in fact a memory dump. The raw GIS data is used for calculation of data extraction LUT spirals etc.

The GIS data can be tabulated within the created widget although beware that this is slow and can create a bottleneck within the telemetry reading. It is best to switch this OFF once it has been confirmed that data are being received OK. The user can also opt to have the raw GIS data dumped to disk file - see 'Dump To File' menu within this widget. The file name is chosen automatically and is pretty well guaranteed to be unique since it uses the system time (to the nearest minute). The data are simply written with an unformatted write. Data dumping to the disk file is terminated when this widget is quit using the 'Done' button (even if the 'Dump OFF' option in the 'Dump to file' pull-down menu is not used prior to exiting).

- **MONITOR** Displays either the total count versus exposure number, for the VDS/GIS options, or the location of various mechanisms involved in a raster. The former acts as a simple rate meter with self-scaling plots. It can handle a maximum of 1000 samples (exposures).

- **DISPLAY VDS/GIS** Plots or displays the science data from the chosen instrument. Some rudimentary assessment of the data is provided. See the next section for further details.

5 Display of VDS data.

Pressing the 'VIEW VDS' button in the main STM screen will create a new display with its own options. Two images can be displayed. By default, any images received are displayed in the upper

(A) window. The user may choose which image in displayed in the lower (B) window by using the 'VIEW' menu.

The options in this screen are:

- **DONE** button to exit this mode
- **HARDCOPY** menu to create hardcopy of current display. Sends image to postscript printer defined with env. var. PRINTER.
- **ANALYSE** pull-down menu to provide some simple analysis possibilities viz:
  - **Zoom A/B** Creates a window in which a zoomed version of image A or B is displayed. Uses the standard IDL zoom utility. Instructions are given in the message window but note that the zoom centre is determined by the cursor location within the original window not the zoomed one and that no zoomed window (not even a blank one) appears before you click within the original image.
  - **Profile** Creates a window in which to display a profile plot of some section of either image. The size of the profile is set with the sliders and the orientation with the buttons. Note that when you switch from horizontal to vertical and vv. the range of the allowable profile length changes. Once a profile has been displayed those data may be fitted by a gaussian profile (use the 'Fit profile' pull-down menu). There are various options on the fitted profile to allow different definitions of the background to be fitted with the gaussian. The results of the fit are given in the message window.
- **CUSTOMIZE** pull-down menu to allow changes to the display LUT. The only options implemented are to use the standard IDL xloadct routine to adjust the display or to reload the default LUT.
- **VIEW** pull-down menu allows user to select which data are displayed. Options are:
  - **Select A/B** allows selection of which exposures are displayed in the A and B windows. A smaller widget will appear in the left hand corner of the screen and if more than one exposure has been received and a slider will allow the selection of the exposure to be displayed. Note that on the slider the exposures are numbered from 0 to n-1.

- ◦ **Full VDS** The exposure to be displayed can be selected as above, but this time the display is in a special window which displays the full 1024x1024 VDS image and also a scrollable full resolution version. This is the only way of inspecting data outside of the 1024x256 window normally used, for example the 'background' windows.

- **STATISTICS** a pull-down menu to allow some simple statistical analyses of the images displayed in A or B. It has 2 options for each window:

  - ◦ **Box cursor** displays a box cursor which may be manipulated (instructions in the message window). To move the box cursor, place the mouse cursor within the box and drag the box while holding mouse button 1 (Left) down. To resize the box do a similar thing with the middle mouse button and to get the statistics press the right hand mouse button. The calculated statistics are displayed in the widgets just below the command buttons.

  - ◦ **All image A/B** As the name suggests this option will display the statistics of the complete image displayed in either window A or B.

Note that while the above two options need to be selected each time some statistics are required, it is possible at any time to get the details of a single datum just by clicking the mouse button on the desired pixel in either image.

6 Display of GIS data.

Pressing the 'VIEW GIS' button in the main STM screen will create a new display with its own options. Two spectra can be plotted. By default, any data received are plotted in the upper (A) window. The user may choose which data are plotted in the lower (B) window by using the 'VIEW' menu.

The options in this screen are:

- **DONE** button to exit this mode

- **HARDCOPY** menu to create hardcopy of current display in either window A or B. The plot is sent to the default postscript printer.

- **ANALYSE** pull-down menu to provide some simple analysis possibilities viz:

  - ◦ **Subtract A-B** not yet implemented

- **Enlarge A/B** requires that data from only one GIS band are displayed (use the selection buttons) and then use two cursor clicks on the displayed spectrum to define the limits for the enlargement.

- **Fit profile in A/B** requires that data from only one GIS band are displayed (use the selection buttons) and then use the pull-down menu to select the fitting option (ie choice of background definition). Requires two cursor clicks to define the range of data to be fitted.

- **VIEW** pull-down menu to allow choice of data displayed in windows A/B. Options are:

  - **Select A/B** will display a widget to allow choice of exposure to plot in windows A/B. Details of the chosen exposure will be written to the information widgets.

- **PLOT AXES** pull-down menu to allow the definition of the plot axes. The choices are:

  - **By pixel** use pixel or datum number as the abscissa variable.

  - **By wavelength** use wavelength as the abscissa variable.

  - **Linear counts** plot the counts on a linear axis.

  - **Logarithmic counts** plot the counts on a log axis.