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NORTHROP GRUMMAN
Electronic Systems

SSMIS GPS Early-Orbit/State-Of-Health Software (EOSOH) Software Users Manual

Software Bond (#DDP-060-005-04-00) EOSOH v. 2.4

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1. SCOPE

1.1 Identification

This EOSOH Software User's Manual (SUM) provides detailed instructions for executing the Special Sensor Microwave Imager/Sounder (SSMIS) Computer Software Configuration Item (CSCI) No. D93000Y for the Defense Meteorological Satellite Program (DMSP). This SUM covers operation of the Early Orbit / State of Health (EOSOH) program.

Operation of the Sensor Data Records Processor (SDRP), Environmental Data Records Processor (EDRP), Verification Processor (VERP), and the Update Processor (UPDP) are documented separately.

1.2 System Overview

Figure 1 shows the SSMIS scan geometry. The system scans at a constant 45-degree angle from nadir and intersects the Earth's surface at a constant incidence angle of 53.1 degrees. Radiometric data from the 24 channels is collected along an active scan angle of 144 degrees across track producing a swath width on the ground of 1707 kilometers. The sensor collects data to the aft of nadir for a morning ascending node spacecraft orbit and collects data forward of nadir for a morning descending node spacecraft orbit

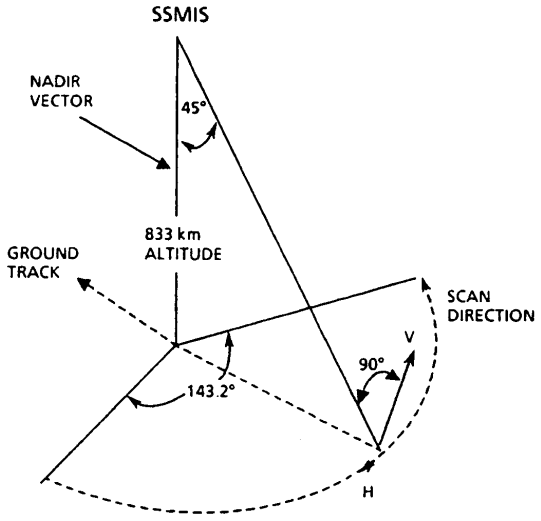

Figure 1 SSMIS Scan Geometry

Figure 2 shows a simplified block diagram of the SSMIS system. The SSMIS collects microwave energy from the Earth's surface and atmosphere with a rotating 24-inch parabolic reflector. This reflector focuses the energy on a feedhorn assembly consisting of six feedhorns that provide the initial frequency multiplexing for the 24 channels. The reflector and the six feedhorns rotate with the entire sensor canister. Rotation is accomplished by the scan drive subsystem consisting of the scan drive assembly (part of the sensor) and the Scan Drive Electronics located separately from the sensor. Located at the top of the canister are a cold calibration reflector and a warm calibration source, which do not rotate with the canister. Each

revolution of the sensor, the feedhorns view these calibration sources. The ground processing software uses this calibration data to convert the sensor output to absolute radiometric brightness temperatures.

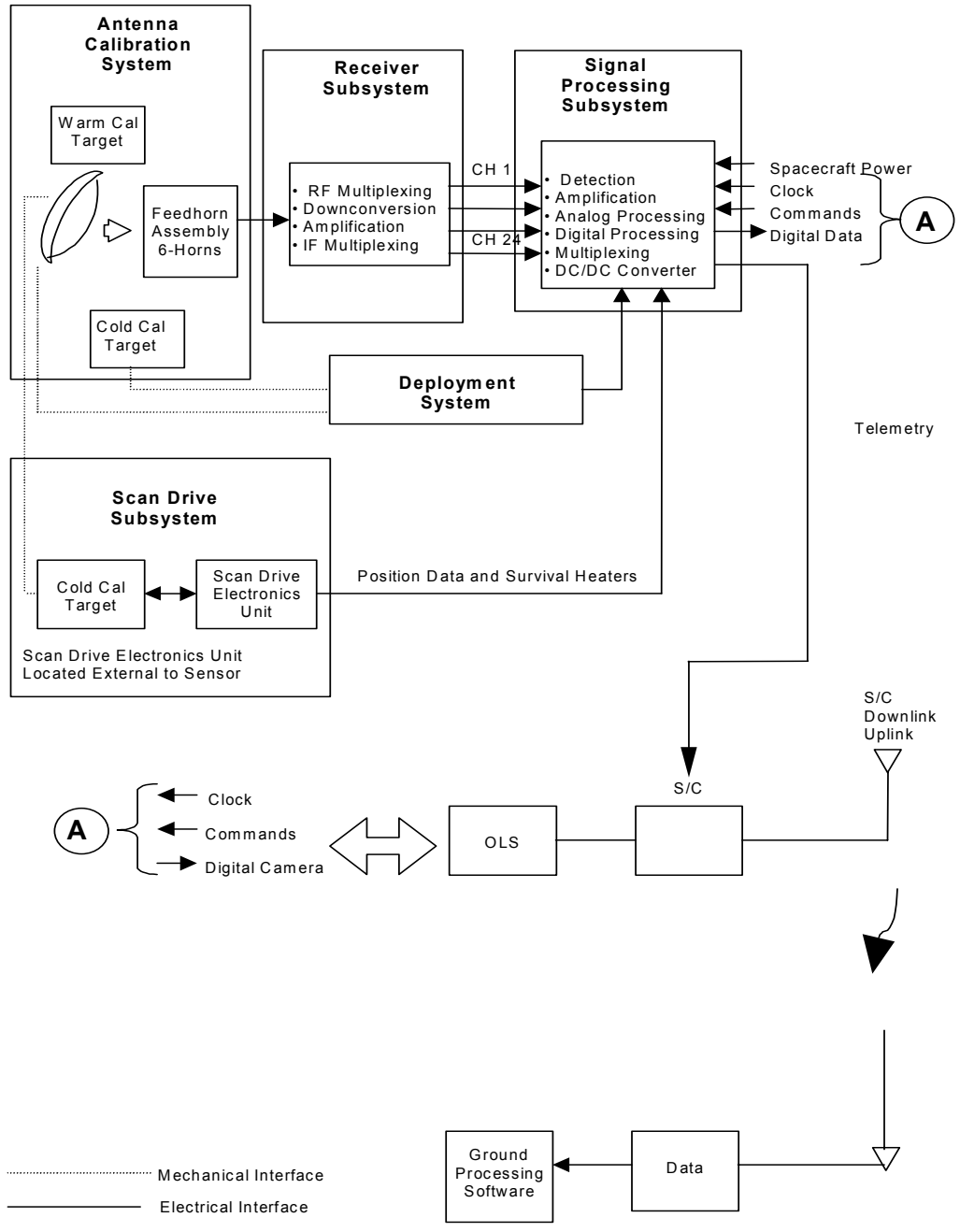

Figure 2 SSMIS Simplified Block Diagram

The outputs of the feedhorns are input to the receiver subsystem where additional frequency multiplexing occurs to produce 24 channels of information, each corresponding to a specific frequency. The outputs of the receiver are converted to the video spectrum, digitized and formatted, and sent to the OLS under control of the sensor signal processor and the flight software. The SSMIS data is transmitted to the ground split between the L and T channels.

The ground software processes the sensor data into calibrated and Earth-located Sensor Data Records (SDRs) and finally into a variety of environmental data, Environmental Data Records (EDRs). The EOSOH Computer Software Component (CSC) of the ground software plots the raw sensor data and generates statistics for analysis of the performance of the sensor.

1.3 Revision History

Revision	Report Date	Comments
Original	29 Jun 2001	Documented for GPS Rev 3, bonding#s: EOSOH: DDP-060-005-03-01
RE-12068A	29 Jul 2002	Documented for GPS Rev 4, bonding#s: EOSOH: DDP-060-005-04-00

1.4 REFERENCED DOCUMENTS

1.4.1 Government Documents

The following documents are referenced or relevant to this document to the extent specified herein. If no issue data is listed, the latest version is applicable.

SPECIFICATIONS

SS-DMSP-875A 24 Oct 2000	System Specification for the DMSP Block 5D-3 Special Sensor Microwave Imager/Sounder (SSMIS)
S-DMSP-876A 24 Oct 2000	Prime Item Development Specification, Sensor System Hardware Configuration Item (HWCI) for the DMSP Block 5D-3 Special Sensor Microwave Imager/Sounder (SSMIS)
S-DMSP-881	Software Requirements Specification for the Ground Processing Software of Special Sensor Microwave Imager/Sounder (SSMIS)
S-DMSP-884	Interface Requirements Specification for the Ground Processing Software of Special Sensor Microwave Imager/Sounder (SSMIS)

1.5 Non-Government Documents

The following documents are referenced or relevant to this document to the extent specified herein. If no issue data is listed, the latest version is applicable.

1.5.1 Northrop Grumman Documents

Report 11846B 29 Jul 2002	Software Design Document for the Special Sensor Microwave Imager/Sounder (SSMIS) Ground Processing Software (GPS)
AE 26775B 29 Jul 2002	Interface Design Document for the Special Sensor Microwave Imager/Sounder (SSMIS) Ground Processing Software (GPS)
Report 11796B 29 Jul 2002	Software User's Manual For the Ground Processing Software of Special Sensor Microwave Imager/Sounder (SSMIS)

(Copies of Northrop Grumman documents may be obtained from Northrop Grumman, CAGE 70143, P.O. Box 296, Azusa, California 91702-0296.)

2. Getting Started

2.1 Minimum Requirements

The SSMIS Early Orbit/State Of Health (EOSOH) software is written in IDL (the Interactive Data Language). In order to run EOSOH, the user must first have IDL 5.2 installed and properly licensed on the target machine. See http://www.rsinc.com/ for more information. Because EOSOH relies on IDL features that were introduced with version 5.2, earlier versions may not run EOSOH properly. Newer versions of IDL will likely work but are not supported, as they have not been tested.

EOSOH was written to run on a variety of different platforms that are supported by IDL. It has been tested on Sun Solaris 7 (SPARC), SGI IRIX 6.5 (MIPS), and Microsoft Windows NT 4.0 or 2000 (Intel PC). Other platforms running IDL are likely to work but cannot be guaranteed without testing.

Table 1 summarizes the minimum and recommended specifications for a computer system running EOSOH.

Table 1: Minimum and Recommended Computer System Requirements

	Minimum Required	Recommended
CPU	Sun SPARC, MIPS R4000, Intel Pentium	Sun UltraSPARC, MIPS R10000, Intel Pentium III or higher
Memory (total physical ram + swap space)	80 MB per orbit	128 MB per orbit
Free disk space	1 MB	4 GB or more
Video display size	800x600 pixels	1280x1024 or larger
IDL version	5.2 or later	5.2

2.2 Running EOSOH

2.2.1 UNIX Platforms

A simple shell script is provided to invoke EOSOH from the UNIX command prompt. If the shell script does not have executable permission, the UNIX "chmod" command may be used to give it proper permissions (e.g., `chmod 755 eosoh`).

2.2.1.1 Interactive Mode

To start EOSOH in its interactive mode using this script, simply change to the directory in which EOSOH is installed and type `./eosoh`. Be aware that when EOSOH is invoked in this way, the

entire IDL session will terminate when the first EOSOH window is closed, regardless of how many other windows may be open simultaneously. Run EOSOH from the IDL command prompt to avoid this limitation.

2.2.1.2 Automatic Mode

The Automatic Mode of EOSOH may be started using this shell script by typing `./eosoh auto`. This supplied shell script offers a simple example of how EOSOH may be run in Automatic Mode without any user intervention. The script will periodically check an **`Input`** directory for new files to process. When it finds one or more files in that directory (ie, the files have been copied there by some external process), it will run EOSOH in Automatic Mode to process each file. After EOSOH finishes, the script will then move any successfully processed input file to a **`Processed`** directory. Any generated output will appear in an **`Output`** directory. At this point, the script will loop back to the start, waiting for more data files to appear in the **`Input`** directory. It will run forever or until it is killed by the UNIX `kill` command.

The default directories in the supplied script are:

- **`Input`**: /usr/local/eosoh/input
- **`Output:`** /usr/local/eosoh/output
- **`Processed:`** /usr/local/eosoh/processed

These may be changed by simply editing the script to fit the file system layout at your site.

2.2.2 All Platforms

EOSOH may also be invoked on all platforms from within IDL. To do so, start IDL in the directory where EOSOH is installed.

2.2.2.1 Interactive Mode

At the IDL prompt, type `eosoh` to start the software in interactive mode.

2.2.2.2 Automatic Mode

From the IDL prompt, the Automatic Mode of EOSOH may only be invoked to process one file at a time. To do so, first determine the name of the input data file you wish to process. Then type the following at the IDL prompt, replacing `filename.dat` with the actual name of your file:

```
eosoh, auto='filename.dat'
```

2.2.2.3 Windows notes

On Windows platforms, the easiest way to start IDL from the directory in which EOSOH is installed is to double-click one of the source ("`.pro`") files in the EOSOH directory (e.g.,

eosoh.pro). Depending on how your preferences are set, IDL may or may not automatically change to the proper directory with this action. To ensure that it does so, follow these steps:

- Select the File menu in the main IDL window
- Select the Preferences… option
- On the General tab of the Preferences dialog, make sure the Change Directory on Open option is checked.
- Click the OK button of the Preferences dialog. If the Change Directory on Open option was previously unchecked, you will need to exit IDL and restart it as described above.

3. The EOSOH Window

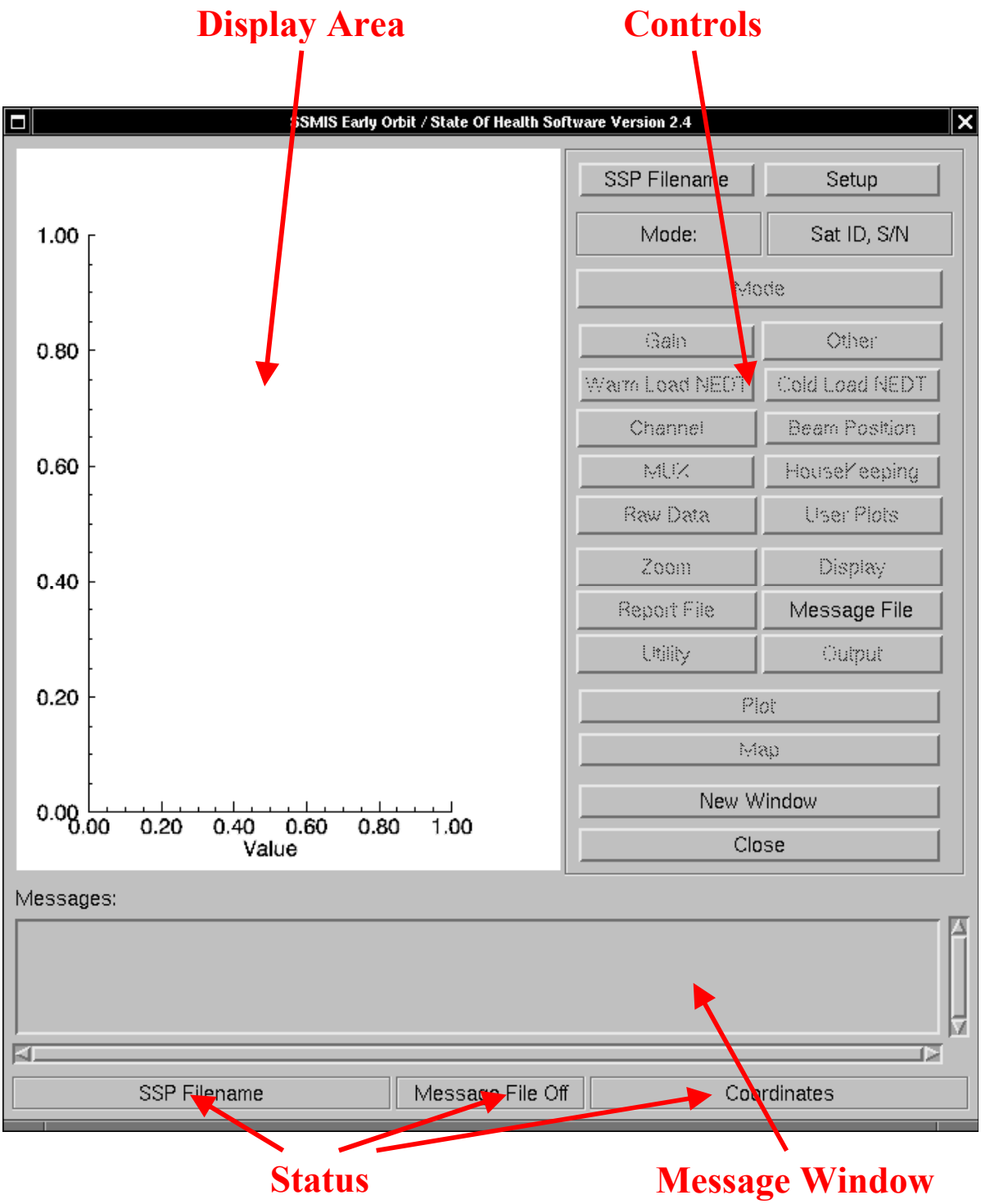

Figure 3: The EOSOH Window

There are four main parts to the interactive EOSOH window. The **`Display`** area shows data in graphical form, either as a series of X-Y line plots or as a map of radiometric data located on the earth; or in tabular form. The **`Controls`** area contains all of the controls and widgets necessary to control the software. The Message Window displays any diagnostic and informational messages that the software produces. The **`Status`** area displays status information including the currently loaded input filename, whether messages are being saved to a file, and coordinates of any data points under the mouse pointer in the **`Plot Area`**.

The majority of an interactive EOSOH session will consist of the user controlling the software through buttons and menus in the **`Controls`** area to display data in the **`Display`** area.

4. Using EOSOH

EOSOH was designed to be straightforward and intuitive to use by only making available the commands that make sense at each point during operation. For example, when the software first starts up, all data selection and plotting buttons are unavailable because it doesn't make sense to select data or create plots before a data file has been loaded. This section of the User's Guide will walk the user through a typical EOSOH session, illustrating how various program options become available only at certain points when they make sense.

4.1 Opening a Data File

When EOSOH first starts up in interactive mode, the most useful of the four available buttons is the `SSP Filename` button (**`SSP`** stands for "Special Sensor Packet"). Click on this button to display a dialog that will allow you to select an input data file, typically in RSDR format, to load into the software. The dialog you see will be the standard File/Open dialog for the platform on which you are running the software.

Once you have selected an input file using the Open dialog, EOSOH will read that file into memory and automatically begin processing it. Depending on the file's contents, a number of things may happen:

- Diagnostic messages will appear in the **`Messages`** pane of the EOSOH window, indicating some characteristics of the input file and the SSMIS data contained within, and whether the read operation was ultimately successful.
- The **`Satellite ID/Serial Number`** area of the EOSOH window will display the satellite ID found in the input file along with the corresponding SSMIS serial number.
- An ASCII report file summarizing statistics of the file's data will be generated.
- The **`Mode`** button will become available.

4.2 Selecting the SSMIS Mode

EOSOH processes SSMIS data according to the mode in which the sensor was operating. You may only view and analyze data from one sensor mode at a time. Thus before continuing, you must select which mode you wish to work with. To do so, click the Mode button and select the mode you wish to analyze from the pull-down menu.

You will notice that only the sensor modes for which data was present in the file are available. After you have selected the mode you wish to work with, a number of things will happen:

- The **`Mode:`** pane of the EOSOH window (above the **`Mode`** button) will display the sensor mode you have selected.

- The **Utility** and a number of data selection buttons will become available, depending on which mode is currently selected.
- The **Messages** pane will indicate which mode you have selected.

4.3 Selecting Data to Plot

The primary use of the interactive mode of EOSOH is to create graphical plots of SSMIS data. The next step in doing so is to select which data parameters you wish to plot.

Depending on the selected sensor mode, some combination of the Gain, MUX, HouseKeeping, Warm Load NEDT, Cold Load NEDT, Channel, and Beam Position buttons will be available. To select a data parameter for plotting, first click the button corresponding to its category. If that button is unavailable, then the data is not available in the currently selected sensor mode.

When a data selection button is clicked, a dialog showing all of the available parameters of its type will appear. For example, if the MUX button is clicked, a dialog showing 28 MUX parameters and 3 Warm Load PRTs will appear. In each of these dialogs, data parameters will appear as checkboxes that may be toggled on or off. To select a particular parameter for plotting, simply toggle its checkbox to the "selected" or "checked" state. When satisfied with your selections, click the OK button in the dialog. The following things will then happen:

- The dialog window will disappear.
- All checked data parameters will be recorded as being selected for plotting. Note that this does not happen until you click OK in the dialog window!
- If one or more valid parameters has been selected for plotting, the Plot button will become available.

4.4 Plotting Data

Once the above steps have been successfully executed, click the Plot button to plot the selected data parameters in the Plot Area. Each selected data parameter will be plotted as a line depicting data value versus time.

At this point, the options for how to proceed are numerous. These may include, but are not limited to:

- Zoom the Plot Area to examine a particular region of data in more detail
- Change the properties of plot lines
- Add text annotations to the plot
- Save the plot to an image file on disk
- Save data in the plot window to a file readable by other IDL programs
- Print the plot to a printer connected to the computer system
- Select other data parameters to plot

- Load a new data file into the software

These options and more are explained fully in the EOSOH Component Reference.

4.5 Creating a Map

A map of radiometric data located on the earth may be created for sensor modes Normal, Early Orbit 1, Early Orbit 2b, and Early Orbit 2c. To create a map, select one channel in either the Antenna Temperatures, Brightness Temperatures, or Counts dialog. Then click the Map button to create and display the map of that channel's radiometric data on the earth.

As with a plot, the user can then zoom the map, add text annotations, save it to an image file, and send it to a printer, among other options. In particular, note the sections on Regenerate Map and Zoom to Lat/Lon for information on how to increase the map resolution after zooming.

4.6 Verifying Memory Dump

The Memory Dump mode of the SSMIS allows the user to verify the contents of the sensor's onboard memory against the program and data that were last uploaded to it. EOSOH can handle and select Memory Dump mode, just as described in Section 4.2, but operation of the software is significantly different from what is described above. Instead of the Plot Area, the **`Display`** area shows the following panel for Memory Dump verification:

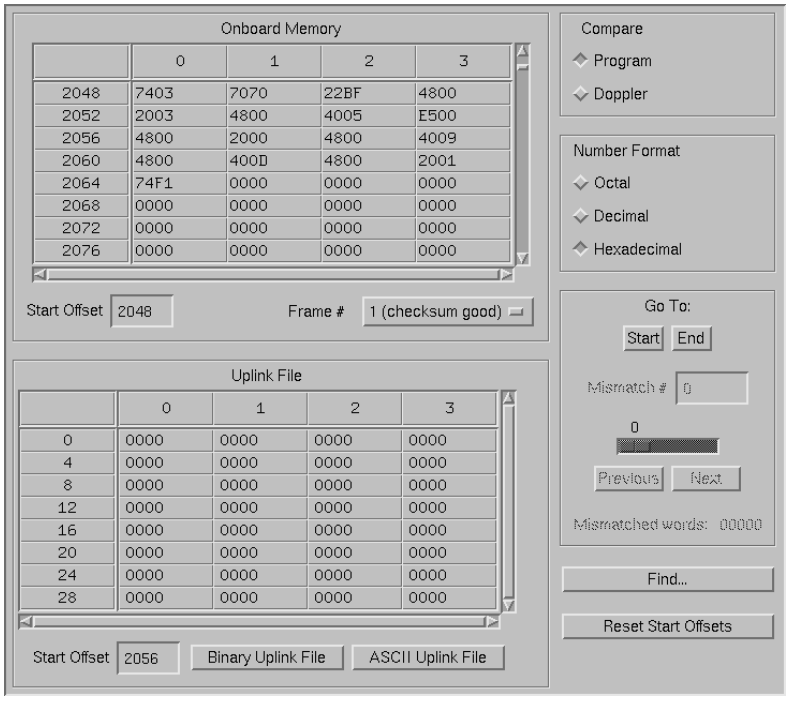

Figure 4: The Memory Dump Panel

The following steps are necessary to compare onboard memory with uplinked data:

- Select Program or Doppler, depending on which area of memory you will verify.
- In the Onboard Memory pane, select a frame whose checksum is marked "good." Comparison against any frame with a bad checksum cannot be trusted.
- Open the uplink file: choose either binary or ASCII depending on which format you have. EOSOH will then automatically compare each memory word in the uplink file with the corresponding word found in the onboard memory.
- A message will appear in the Message Window telling how many words did not match. No mismatched words are expected if the data is good.

If there are mismatched memory words, options for proceeding may include showing those mismatches and searching for particular memory word values.

For more information, see the section on Memory Dump.

4.7 Viewing Raw RSDR Data

EOSOH can display Raw RSDR data packets when the Keep Raw RSDR Packets option is set before loading an RSDR file. This mode shows a panel in the **Display** area that is similar to the Memory Dump panel. The panel displays one second at a time of raw sensor data from the RSDR file, along with the corresponding ephemeris from the RSDR document data. Controls are available to change which second of data is displayed, and to search for specific values within the data.

This mode is particularly useful for examining the raw RSDR data when results are very unexpected. For example, if some SSMIS frame sync words are garbled in the downlink, they will not be recognized by EOSOH and therefore will not be processed. This mode may be used to investigate the problem and possibly find additional data that could be corrected with an external program.

For more information, see the section on Raw Data Packets.

4.8 Automatic Mode

EOSOH can run in Automatic Mode to produce a report file and any number of plot files for a given input data file. This occurs without any user intervention, allowing it to be run from a wide variety of system processing scripts under UNIX. See Section 2.2.1.2 for more information on how to start the Automatic Mode of EOSOH.

As in the interactive mode, the report file is always generated for each input data file. However, which plots, if any, that EOSOH generates in Automatic Mode are completely up to the user. Plots to be generated in Automatic Mode are specified in the file `auto.dat`. The format of this

file is exactly the same as that of the User Plots Data File. If `auto.dat` cannot be found or is invalid, EOSOH will issue a warning and try to fall back on the file `plots.dat`. If this file cannot be loaded either, then no plots will be generated in Automatic Mode.

The size and format of image files generated from the Automatic Mode plots are controlled by the Setup parameters Default Image Size and Default Image Type. Naming of the report and plot files is determined by Default File Naming Convention. Multiple plot files are numbered, adding **_NN** to the file name, where **NN** is the plot number. For example, an input data file of SSMIS serial number 1 and orbit 308 may generate the following output file names:

- **ssmis_7550_1_308.rpt**
- **ssmis_7550_1_308_00.bmp**
- **ssmis_7550_1_308_01.bmp**
- **ssmis_7550_1_308_02.bmp**

5. EOSOH Component Reference

This section provides a detailed, alphabetical list of all EOSOH commands, actions and window components. Each entry contains a quick reference table with the following entries:

Where	References the EOSOH component that contains this component.
Path	Shows the sequence of components that must be clicked or selected to reach this component from the main EOSOH window.
Modes	Lists the SSMIS sensor modes for which this component is valid.
Conditions	Describes other program conditions that may affect the component's availability.

56 GHz Oscillator

Where	Raw Data
Path	Raw Data → 56 GHz Oscillator
Modes	Normal, Early Orbit 1, 2a, 2b, 2c, Idle
Conditions	Data file loaded, Valid mode selected

`56 GHz Oscillator` is a Data Selection Toggle. When turned on, it causes the redundancy mode (primary or backup) of the 56 GHz Oscillator to be plotted as a Redundancy Plot in any time history plots.

See also Redundancy Plot, Selection Toggles.

91 GHz Oscillator

Where	Raw Data
Path	Raw Data → 91 GHz Oscillator
Modes	Normal, Early Orbit 1, 2a, 2b, 2c, Idle
Conditions	Data file loaded, Valid mode selected

`91 GHz Oscillator` is a Data Selection Toggle. When turned on, it causes the redundancy mode (primary or backup) of the 91 GHz Oscillator to be plotted as a Redundancy Plot in any time history plots.

See also Redundancy Plot, Selection Toggles.

Access Data Structures

Where	Utility
Path	Utility → Access Data Structures
Modes	All
Conditions	Data file loaded, Valid mode selected, Raw data packets saved

`Access Data Structures` allows advanced users of EOSOH to gain access to internal data structures at the IDL command prompt. From there, possibilities include manually checking data values or sending data to a custom IDL procedure for further analysis. Only raw data and product data for the currently selected SSMIS mode will be available. To access data for another mode, you must select that mode first.

While data is available at the IDL prompt, all EOSOH windows in the current IDL session will be stopped. To return to the main program, you must type `.continue` when you are finished.

Some combination of the following variables will be made available at the prompt, depending on sensor mode and Setup options:

Table 2: Variables for Data Access

nframes	number of SSMIS frames
time	nframes array of SSMIS frame times
nrad	number of radiometric frames (same as nframes except in Early Orbit 2a)
radtime	nrad array of radiometric frame times (Early Orbit 2a)
lat	nframes array of spacecraft latitudes (degrees)
lon	nframes array of spacecraft longitudes (degrees east)
alt	nframes array of spacecraft altitudes (nautical miles)
status	nframes array of SSMIS status words
sfid	nframes array of SSMIS subframe Ids
osc56	nframes array of 56 GHz Oscillator modes (1 = primary, 0 = backup)
osc91	nframes array of 91 GHz Oscillator modes
oven	nframes array of PLO Oven Power modes
receiver_heater	nframes array of Receiver Heater modes
warmload_heater	nframes array of Warm Load Heater modes
receiver	nframes array of Receiver modes (1 = on, 0 = off)
memory	nframes × 57345 array of onboard memory words (Memory Dump)
mux1 – mux28	arrays of computed mux values
wl1, wl2, wl3	arrays of computed warm load values
rawmux	nframes × 4 array of raw mux values
rawwl	nframes × 4 array of raw warm load values
counts1 – counts24	nframes × beam position array of raw radiometric counts, per channel
hk1 – hk28	arrays of computed housekeeping values (Early Orbit 2b, 2c)
hkwl1 – hkwl3	arrays of computed housekeeping warm load values (EO 2b, 2c)

rawhk	3 × nframes × 30 array of raw housekeeping values (EO 2b, 2c)
gain1 – gain24	nframes array of gain values, per channel (Normal, Early Orbit 1)
clnedt1 – clnedt24	nframes array of cold NEΔT values, per channel (Norm, EO 1)
wlnedt1 – wlnedt24	nframes array of warm NEΔT values, per channel (Norm, EO 1)
csigma1 – csigma24	nframes array of cold sigma values, per channel (Norm, EO 1)
wsigma1 – wsigma24	nframes array of warm sigma values, per channel (Norm, EO 1)
warmcal1 – warmcal24	nframes array of warm calibration counts, per channel (Norm, EO 1)
coldcal1 – coldcal24	nframes array of cold calibration counts, per channel (Norm, EO 1)
beamlat30, beamlat60, beamlat90, beamlat180	nframes × nbeam array of beam located latitudes for channels with 30,60,90,180 beam positions (Normal)
beamlon30, beamlon60, beamlon90, beamlon180	nframes × nbeam array of beam located longitudes for channels with 30,60,90,180 beam positions (Normal)
beamlat	nframes × 180 array of beam located latitudes (other modes)
beamlon	nframes × 180 array of beam located longitudes (other modes)
scantime	nframes array of raw scan time values from the SSMIS data stream
times	nframes array of time start scan values from the SSMIS data stream
computed_checksum	nframes array of checksums computed by EOSOH
checksum	nframes array of checksums from the SSMIS data stream
memtest	nframes array of memory test words (Idle)
ones	nframes × 5 array of words that should all have value 1 (Idle)
datapkts	3 × 395 × nseconds array of raw RSDR one-second data packets

All Messages

Where	Message File
Path	Message File → All Messages
Modes	n/a
Conditions	n/a

The **`All Messages`** button allows you to save messages in the Message Window to a text file for later perusal. **`All Messages`** causes the software to save any messages currently in the **`Message Window`**, followed by any subsequent messages that are printed in the **`Message Window`** until the software window is closed or the Messages Off button is selected.

See also Messages Off, Message Window, Subsequent Messages.

Annotate

Where	Display
Path	Display → Annotate
Modes	Normal, Early Orbit 1, 2a, 2b, 2c, Idle
Conditions	Data file loaded, Valid mode selected, Data plotted or mapped

This button allows you to add custom text annotations to the plot or map. To do so, follow these steps:

- Click `Display → Annotate`. The cursor over the Plot Area becomes an "I-beam" for text entry.
- Click the exact spot in the Plot Area where you would like to place the annotation. Note that you cannot perform any other mouse operations in the Plot Area until this has been completed.
- A new Text Properties dialog will appear, allowing you to type in the text of the annotation and specify its properties. To cancel the annotation, enter no text and click `Cancel`. Otherwise click `Ok` when you are satisfied.

Text annotations are drawn "on the glass" rather than in data space. That is, they stay in the same place on the screen regardless of whether the plot or map is zoomed or panned later on. Therefore be sure to perform any zoom or pan operations before adding annotations.

There is no way to directly move an annotation to a new spot on the screen. You must delete the old one and create a new one in the desired position. To delete an annotation, simply double-click it and edit its text to have no value.

See also Plot Area, Text Properties.

Antenna Temperatures

Where	Channel
Path	Channel → Antenna Temperatures
Modes	Normal, Early Orbit 1
Conditions	Data file loaded, Valid mode selected

The **`Antenna Temperatures`** button is a data parameter selection button. Clicking it produces a Data Selection Dialog allowing the user to select a number of channels whose antenna temperatures are to be plotted in the time history plot. This button is only available when there is enough valid data to compute antenna temperatures for Normal mode or Early Orbit 1.

See also Brightness Temperatures, Channel, Counts, Data Selection Dialogs.

ASCII Uplink File

Where	Memory Dump Panel
Path	Memory Dump Panel → Uplink File → ASCII Uplink File
Modes	Memory Dump
Conditions	Data file loaded, Memory Dump mode selected

Use this button to load an ASCII-formatted uplink file for comparison with onboard memory. When the selected file is successfully loaded, EOSOH will compute a new comparison of memory based on the new uplink file. Look for the results of this comparison in the Message Window.

ASCII uplink files typically have an extension of `.upl`.

See also Binary Uplink File, Memory Dump.

Beam Position

Where	Main Window
Path	Beam Position
Modes	Normal, Early Orbit 1, 2a, 2b, 2c
Conditions	Data file loaded, Valid mode selected

The **`Beam Position`** button is a data parameter selection button. Clicking it produces a Data Selection Dialog allowing the user to select a number of beam positions whose raw radiometric counts are to be plotted in the time history plot. The number of beam positions available for selection varies depending on the current sensor mode:

Table 3: Beam Positions Available per Mode

Mode	Beam Positions
Normal	180 + cold & warm calibration
Early Orbit 1	30 + cold & warm calibration
Early Orbit 2a	450
Early Orbit 2b	450
Early Orbit 2c	450
Idle	1 (one radiometric data point per frame)

Selected beam positions alone do not qualify as valid data to create a time history plot. In order to activate the **`Plot`** button, the user must select at least one beam position and at least one channel (see Channel). This is because in a time history plot, beam position alone does not uniquely identify a data parameter to be plotted. Each beam position may be associated with up to 24 channels, depending on the sensor mode and beam position number. Thus only a valid beam position / channel pair qualifies as a unique data parameter that may be plotted.

For each selected beam position, a data parameter will be selected for plotting for each selected channel that is associated with that beam position. For example, consider a case in which Early Orbit 1 is the selected mode, beam positions 1 and 13 are selected, and channels 5, 6, and 18 are selected. In this case, the following data parameters will be selected for plotting, each corresponding to a valid beam position / channel pair:

- Beam position 1, channel 5
- Beam position 13, channel 5
- Beam position 1, channel 6
- Beam position 13, channel 6
- Beam position 1, channel 18
- Beam position 13, channel 18

See also Channel, Data Selection Dialogs, Plot By Beam Position.

Beam Position Offset

Where	Misc
Path	Setup → Misc → Beam Position Offset
Modes	Early Orbit 2b, 2c
Conditions	n/a

`Beam Position Offset` allows you to specify the physical beam position number that represents logical beam position 1. The SSMIS has a total of 450 physical beam positions, but only 180 of those are earth-looking positions. While sensor modes Early Orbit 1 and Normal contain only the earth-looking beam positions, or a subset thereof, modes Early Orbit 2b and Early Orbit 2c contain all 450 beam positions, giving EOSOH the choice of overriding the default earth-looking beam positions.

The default beam position offset of 49 specifies that maps of modes Early Orbit 2b and Early Orbit 2c will display radiometric data for physical beam positions 49 through (and including) 228, representing logical beam positions 1 through 180.

See also Map, Setup.

Binary Uplink File

Where	Memory Dump Panel
Path	Memory Dump Panel → Uplink File → Binary Uplink File
Modes	Memory Dump
Conditions	Data file loaded, Memory Dump mode selected

Use this button to load a binary-formatted uplink file for comparison with onboard memory. When the selected file is successfully loaded, EOSOH will compute a new comparison of memory based on the new uplink file. Look for the results of this comparison in the Message Window.

Binary uplink files typically have an extension of `.bn`.

See also ASCII Uplink File, Memory Dump.

Brightness Temperatures

Where	Channel
Path	Channel → Brightness Temperatures
Modes	Normal, Early Orbit 1
Conditions	Data file loaded, Valid mode selected

The **`Brightness Temperatures`** button is a data parameter selection button. Clicking it produces a Data Selection Dialog allowing the user to select a number of channels whose brightness temperatures are to be plotted in the time history plot. This button is only available when there is enough valid data to compute brightness temperatures for Normal mode or Early Orbit 1.

See also Antenna Temperatures, Channel, Counts, Data Selection Dialogs.

Channel

Where	Main Window
Path	Channel
Modes	Normal, Early Orbit 1, 2a, 2b, 2c, Idle
Conditions	Data file loaded, Valid mode selected

The **`Channel`** button provides up to three data parameter selection buttons, depending on the current sensor mode: Counts, Antenna Temperatures, and Brightness Temperatures. The channels and types of channel data available for selection vary depending on the current sensor mode:

Table 4: Channel Data Available per Mode

Mode	Channels	Data Types
Normal	1-24	Counts, Antenna and Brightness Temperatures
Early Orbit 1	1-24	Counts, Antenna and Brightness Temperatures
Early Orbit 2a	1-24	Counts
Early Orbit 2b	1, 6, 8	Counts
Early Orbit 2c	12, 15, 18	Counts
Idle	1	Counts

Selected channels alone do not qualify as valid data to create a time history plot. In order to activate the **`Plot`** button, the user must select at least one beam position (see Beam Position) and at least one channel. This is because in a time history plot, channel alone does not uniquely identify a data parameter to be plotted. Each channel may be associated with up to 24 beam

positions, depending on the sensor mode and channel number. Thus only a valid beam position / channel pair qualifies as a unique data parameter that may be plotted.

In Normal mode, different channels have different numbers of corresponding beam positions. The following table summarizes the number of beam positions each channel has:

Table 5: Beam Positions Available per Normal Channel

Number of beam positions	Channels
30	19-23
60	1-7, 24
90	12-16
180	8-11, 17, 18

Note that in Normal mode, certain beam position / channel pairs are not valid according to this table, and thus will not cause the **`Plot`** button to become active. For example, beam position 50/channel 20 is not a valid pair because channel 20 only has 30 beam positions.

Idle mode has only one radiometric data point per frame. Thus when the Idle mode channel is selected, the one beam position / channel pair is inferred.

See also Antenna Temperatures, Beam Position, Brightness Temperatures, Counts, Data Selection Dialogs.

Clear Screen

Where	Utility
Path	Utility → Clear Screen
Modes	Normal, Early Orbit 1, 2a, 2b, 2c, Idle
Conditions	Data file loaded, Valid mode selected

The **`Clear Screen`** button causes the software to clear the Plot Area, restoring it to the default visual state with no plot lines. It is never necessary to use this button during normal operation of the software (you do not need to clear the screen before creating a new plot). It is merely provided as a convenience.

Close

Where	Main Window
Path	Close
Modes	n/a
Conditions	n/a

Clicking the **`Close`** button causes the current interactive window to be closed. Any data loaded into the current window will be unloaded if no other windows point to it. If this is the original EOSOH window and EOSOH was invoked from the UNIX command prompt, the software will exit completely. Otherwise, IDL will continue to run and any other open EOSOH windows will remain unaffected.

Cold Load NEDT

Where	Main Window
Path	Cold Load NEDT
Modes	Normal, Early Orbit 1
Conditions	Data file loaded, Valid mode selected

The **`Cold Load NEDT`** button is a data parameter selection button. Clicking it produces a Data Selection Dialog allowing the user to select a number of channel NEΔTs (Noise Equivalent Delta Temperatures) to be plotted in the time history plot. This dialog is only valid in Normal and Early Orbit 1 sensor modes because the data required to calculate NEΔTs are only available in these modes.

See also Data Selection Dialogs, Warm Load NEDT.

Cone Angle Offset

Where	Misc
Path	Setup → Misc → Cone Angle Offset
Modes	Normal, Early Orbit 1, 2b, 2c
Conditions	n/a

`Cone Angle Offset` allows you to specify the sensor's Cone Angle offset in degrees from 0. This setting affects the geolocation of radiometric data on the earth. This can be used to fine-tune geolocation by viewing a map of a surface channel (e.g., Channel 1) and adjusting the Roll, Pitch, Yaw and Cone Angle offsets until coastline features line up with continental boundaries displayed on the map.

See also Pitch Offset, Roll Offset, Yaw Offset, Setup.

Counts

Where	Channel
Path	Channel → Counts
Modes	Normal, Early Orbit 1, 2a, 2b, 2c, Idle
Conditions	Data file loaded, Valid mode selected

The **`Counts`** button is a data parameter selection button. Clicking it produces a Data Selection Dialog allowing the user to select a number of channels whose raw radiometric counts are to be plotted in the time history plot.

See also Antenna Temperatures, Brightness Temperatures, Channel, Data Selection Dialogs.

Data File

Where	Output
Path	Output → Data File
Modes	Normal, Early Orbit 1, 2a, 2b, 2c, Idle
Conditions	Data file loaded, Valid mode selected, Time history plot of data displayed in the **`Plot Area`**

This button allows you to save data in the current time history plot to a data file. That data file can then be loaded into IDL and analyzed using your own IDL code. If a map or a plot that is not time history is displayed, that data will not be saved to the data file.

Only currently visible data will be saved to the data file: any data that is not visible in the Plot Area will not be saved. This is useful if you only want to analyze a particular region of data: simply zoom the plot to the region of interest and then save it to a data file.

Details of the data file format will be discussed in Section 6.3.

Data Selection Dialogs

There are 10 Data Selection Dialogs in EOSOH:

- Antenna Temperatures
- Beam Position
- Brightness Temperatures
- Cold Load NEDT
- Counts
- Gain
- HouseKeeping
- MUX

- Plot By Beam Position
- Warm Load NEDT

Each dialog is used to select data parameters of a particular type for plotting. This entry describes common elements shared by all Data Selection Dialogs.

A Data Selection Dialog has two main areas: the parameter area at the top and the control area at the bottom.

The parameter area is visually enclosed by a frame and contains individual checkboxes for all data parameters that may be selected. It may also contain other controls, as described in each Data Selection Dialog's Component Reference entry. An individual data parameter is selected for plotting when its checkbox is toggled to the "selected" or "checked" state.

The control area always contains 4 buttons: **`Clear All`**, **`Select All`**, **`Cancel`**, and **`OK`**.

- **`Clear All`** resets all checkboxes in the parameter area to the "unchecked" state.
- **`Select All`** sets all checkboxes in the parameter area to the "checked" state.
- **`Cancel`** closes the Data Selection Dialog without applying any changes made in the parameter area. The next time the Data Selection Dialog is displayed, the parameter area will reflect the settings that were made the last time they were applied.
- **`OK`** applies the current settings in the parameter area and closes the dialog. You must always click the **`OK`** button if you wish to apply your current selections for the next plot.

Decimal

Where	Memory Dump Panel, Raw Data Panel
Path	Memory Dump / Raw Data Panel → Number Format → Decimal
Modes	Memory Dump, Raw Data Packets
Conditions	Data file loaded, Valid mode selected

The Memory Dump and Raw Data panels can display numbers in three different representations. Select this button to display numbers as decimal.

See also Hexadecimal, Octal, Memory Dump, Raw Data Packets.

Default Input File Location

Where	Defaults
Path	Setup → Defaults → Default Input File Location
Modes	n/a
Conditions	n/a

`Default Input File Location` specifies the directory in which the software will first look for input data files when the SSP Filename button is pressed. The default directory is the current directory. Note that even when this is set, the user may navigate to a different directory using the standard File/Open dialog box controls.

See also Default File/Open Spec, Default Output File Location, Setup.

Default File Naming Convention

Where	Defaults
Path	Setup → Defaults → Default File Naming Convention
Modes	n/a
Conditions	n/a

`Default File Naming Convention` specifies whether EOSOH's built-in file naming convention will be used to name generated report files. If set to **`Automatic`**, the file name convention used will be **`ssmis_xxxx_y_zzzzz.rpt`**, where:

- **`xxxx`** is the satellite id
- **`y`** is the sensor serial number
- **`zzzzz`** is the orbit number

If set to **`Bypass`**, the report file name will have the same prefix as the input data file, adding a **`.rpt`** suffix. For example, if the input file is named **`f15_rt_04428_rsdr.dat`**, the generated report file will be named **`f15_rt_04428_rsdr.rpt`** in this case.

See also Default Output File Location, Setup.

Default File/Open Spec

Where	Defaults
Path	Setup → Defaults → Default File/Open Spec
Modes	n/a
Conditions	n/a

`Default File/Open Spec` specifies the filename filter to be used in the File/Open dialog box that appears when SSP Filename is clicked. The default value of **`*.dat`** instructs the File/Open dialog box to only show files with a **`.dat`** extension. A null value or a value of **`*`** will show all files.

Under Windows, multiple file specifications may be combined by separating them with a semi-colon (`;`). For example, the default value under Windows is **`*.dat;*.mis;*.rdr`**, which instructs the File/Open dialog to display all files ending with **`.dat`**, **`.mis`**, and **`.rdr`**.

See also Default Input File Location, Setup.

Default Image Size

Where	Defaults
Path	Setup → Defaults → Default Image Size
Modes	n/a
Conditions	n/a

This specifies the default image size of any plot files generated in the Automatic Mode of EOSOH. Because this does not apply to the interactive mode, you must be careful to save the setup parameters to `setup.dat` before running EOSOH in the Automatic Mode. Otherwise the program default of 1024x1024 will be used.

See also Automatic Mode, Default Image Type, Save Setup Info To …, Setup, Setup File.

Default Image Type

Where	Defaults
Path	Setup → Defaults → Default Image Size
Modes	n/a
Conditions	n/a

This specifies the default image file format for any plot files generated in the Automatic Mode of EOSOH. Because this does not apply to the interactive mode, you must be careful to save the setup parameters to `setup.dat` before running EOSOH in the Automatic Mode. Otherwise the program default of BMP will be used.

Note that GIF file output is not supported in IDL version 5.4. You will still be permitted to select the GIF file type, but image file creation will fail, giving a failure message in the during Automatic Mode processing. You must select another image file type if you are using IDL 5.4.

See also Automatic Mode, Default Image Size, Save Setup Info To …, Setup, Setup File.

Default Output File Location

Where	Defaults
Path	Setup → Defaults → Default Output File Location
Modes	n/a
Conditions	n/a

`Default Output File Location` specifies the directory in which generated report files will be saved. The default directory is the current directory.

See also Default Input File Location, Default File Naming Convention, Setup.

Default Warning Command

Where	Defaults
Path	Setup → Defaults → Default Warning Command
Modes	n/a
Conditions	n/a

`Default Warning Command` specifies an external operating system command that will be run whenever the software finds data that is outside preset limits. This check occurs every time a report file is generated. The external command is only executed if at least one data element is found to be outside of limits. This feature is only supported under UNIX.

The external command may be a script or program that you write to take specific action based on what data is out of limits. Presently, the software only checks and warns for NEΔT values. The type of data and percent outside limits is passed to the external command through the standard input file descriptor. Messages are passed one per line, having the following form:

```
SSP file: FFFFFFFF
XXXX out of limits: yy.yy%
```

where **`FFFFFFFF`** is the name of the input data file, **`XXXX`** is the name of the parameter and **`yy.yy`** is the percentage of data points that are out of limits. The system date and time is pre-pended to the above output on a separate line.

One simple example of an external command that may be used is **`sendmail user@host`** where **`user@host`** is the email address of someone who can receive these messages and act upon them.

See also Limits, Setup.

Doppler

Where	Memory Dump Panel
Path	Memory Dump Panel → Compare → Doppler
Modes	Memory Dump
Conditions	Data file loaded, Memory Dump mode selected

Two types of data can be uplinked to the SSMIS and subsequently verified when the sensor sends down its memory contents in the Memory Dump mode: program data and the Doppler

table. This button selects the Doppler coefficient table for verification. Select it when verifying the sensor's Doppler table against a previously uplinked table.

See also Memory Dump, Program, Verifying Memory Dump.

End

Where	Memory Dump Panel
Path	Memory Dump Panel → Go To → End
Modes	Memory Dump
Conditions	Data file loaded, Memory Dump mode selected

Clicking this button will reposition the **`Onboard Memory`** table, and the **`Uplink File`** table if loaded, to the very end of data that has been or will be compared. When comparing either program or Doppler memory, only a small portion of the total onboard memory is applicable to the comparison. This control allows the user to easily jump to the end of the compared memory to examine the contents there.

See also Memory Dump.

Find…

Where	Memory Dump Panel, Raw Data Panel
Path	Memory Dump / Raw Data Panel → Find…
Modes	Memory Dump, Raw Data Packets
Conditions	Data file loaded, Valid mode selected

Use this button to search for specific data word values in either Memory Dump mode or the Raw Data Packets mode. Clicking it displays a new dialog box with a text entry field for entering search values. To search for a particular value, enter that value in the text box and press Enter or click the `Find` button. If found, the data table(s) will be repositioned to display the next occurrence of the search value entered. To display the following occurrence, press Enter or click `Find` again. Searches always begin from the currently displayed data.

The **`Find`** dialog includes controls to select the representation (**`Decimal`**, **`Hexadecimal`**, or **`Octal`**) of the data value entered into the text box. This need not be the same representation displayed in the Memory Dump or Raw Data panel, but be sure it matches whatever you type into the text box.

In Memory Dump mode, the dialog also includes controls to select either Onboard Memory or Uplink data for searching. The **`Find`** dialog will only search through the selected dataset.

The search value itself may contain up to five adjacent 12-bit words in Raw Data Packets mode or four 16-bit words in Memory Dump mode. When searching for multiple adjacent words, it is easiest to use **Hexadecimal** representation because each word is always a whole number of digits (4 bits per digit). Leave no spaces in between adjacent search words.

For example in the Raw Data Packets mode, the SSMIS frame sync word is 0F0F0F in hexadecimal representation. This comprises two adjacent 12-bit words (0F0 and F0F) but would be entered as above, with no spaces, into the text box of the **Find** dialog. This could be easily extended to search for only frames with a subframe ID of 3 by concatenating the frame sync word with a hexadecimal value "003:" 0F0F0F003.

See also Memory Dump, Raw Data Packets.

Flight Direction

Where	Misc
Path	Setup → Misc → Flight Direction
Modes	n/a
Conditions	n/a

Normally, EOSOH will automatically determine the satellite flight direction (forward or backward) for a particular input data file based on headers in that file. This information is important to correctly geolocate radiometric data on the earth. **Flight Direction** allows you to force the flight direction to a particular direction if you are sure of the satellite's flight direction and you think the software is incorrectly identifying it. Under normal operation, however, the default setting of **Automatic** is recommended.

Note that forcing the SSMIS serial number to a particular value using SSMIS Serial Number does not alter flight direction since flight direction is dependent on the satellite, not the SSMIS serial number.

See also Setup, SSMIS Serial Number.

Frame

Where	Memory Dump Panel
Path	Memory Dump Panel → Onboard Memory → Frame #
Modes	Memory Dump
Conditions	Data file loaded, Memory Dump mode selected

When multiple frames of Memory Dump mode are available from the input data file, use this control to select which frame should be used in comparison with the uplink file. This control displays whether the checksum of each frame was verified as good or bad. It is important to

select a frame whose checksum is good; otherwise the comparison with the uplink file cannot be trusted.

If an uplink file is already loaded when this control is used to switch frames, the comparison against the new frame will automatically occur. Look for the results of the new comparison in the Message Window.

See also Memory Dump.

Gain

Where	Main Window
Path	Gain
Modes	Normal, Early Orbit 1
Conditions	Data file loaded, Valid mode selected

The **`Gain`** button is a data parameter selection button. Clicking it produces a Data Selection Dialog allowing the user to select a number of channel Gains to be plotted in the time history plot. This dialog is only valid in Normal and Early Orbit 1 sensor modes because the data required to calculate Gains are only available in these modes.

See also Data Selection Dialogs.

Generate Report

Where	Report File
Path	Report File → Generate Report
Modes	All
Conditions	Data file loaded

Mainly available as a convenience to the EOSOH developers, this button causes the software to regenerate the report file. Note that a report file is always generated automatically when a new data file is loaded into the software. This button is only useful if you wish to force generation of the report file again (if, for example, it was deleted during your session and you don't want to load the entire input data file again).

See also Report File, Show Report.

Hexadecimal

Where	Memory Dump Panel, Raw Data Panel
Path	Memory Dump / Raw Data Panel → Number Format → Decimal
Modes	Memory Dump, Raw Data Packets
Conditions	Data file loaded, Valid mode selected

The Memory Dump and Raw Data panels can display numbers in three different representations. Select this button to display numbers as hexadecimal.

See also Decimal, Octal, Memory Dump, Raw Data Packets.

HouseKeeping

Where	Main Window
Path	HouseKeeping
Modes	Early Orbit 2b, 2c
Conditions	Data file loaded, Valid mode selected

The **`HouseKeeping`** button is a data parameter selection button. Clicking it produces a Data Selection Dialog allowing the user to select a number of HouseKeeping parameters to be plotted in the time history plot.

HouseKeeping parameters are closely related to MUX parameters. They are, in fact, the same as MUX parameters of the same ID numbers with the following exceptions:

- HouseKeeping parameter data values occur 3 times per scan in the SSMIS data streams of modes Early Orbit 2b and Early Orbit 2c. This is in contrast to once every 8 scans for most MUX values and once every scan for Warm Load PRT MUX values.
- There are no HouseKeeping ID numbers 26 and 27.

Aside from these differences, HouseKeeping parameters are treated the same as MUX parameters in EOSOH, although it is important to note that they are always treated separately within the software.

See also Data Selection Dialogs, MUX.

Image File

Where	Output
Path	Output → Image File
Modes	Normal, Early Orbit 1, 2a, 2b, 2c, Idle
Conditions	Data file loaded, Valid mode selected, Data displayed in the **`Plot Area`**

This button allows you to save the current plot or map to an image file. The image will be saved exactly as it is shown in the Plot Area, except that you may choose a different pixel resolution for the saved file.

Note that GIF file output is not supported in IDL version 5.4. You will still be permitted to select the GIF file type, but image file creation will fail, giving a failure message in the Message Window. You must select another image file type if you are using IDL 5.4.

Keep Raw RSDR Packets

Where	Defaults
Path	Setup → Defaults → Keep Raw RSDR Packets
Modes	n/a
Conditions	n/a

`Keep Raw RSDR Packets` determines whether EOSOH will retain the raw, unprocessed RSDR data in memory. The default setting is **`Never`**, meaning that raw RSDR data packets will be discarded after they have been processed. In this case, the Raw Data Packets mode will not be available. If set to **`Always`**, EOSOH will keep that data, making the Raw Data Packets mode available. If set to **`Ask`**, EOSOH will ask the user whether to keep raw data each time a new file is loaded.

The extra memory required to keep raw data packets is typically about the same as the size of RSDR file itself. If changing this setting from **`Never`** to **`Always`**, you must reload the current data file in order to see raw data from the current file.

See also Raw Data Packets, Setup, SSP Filename.

Latitude (deg)

Where	Raw Data
Path	Raw Data → Latitude (deg)
Modes	Normal, Early Orbit 1, 2a, 2b, 2c, Idle
Conditions	Data file loaded, Valid mode selected

`Latitude (deg)` is a Data Selection Toggle. When turned on, it causes spacecraft latitude in degrees to be plotted in any time history plots.

See also Selection Toggles.

Limits

Where	Setup
Path	Setup → Limits
Modes	n/a
Conditions	n/a

The **Limits** section of the Setup dialog allows the user to specify low and high limits for various raw input and computed product data parameters. These limits are used to check data values and issue a warning when they are out of limits (see Default Warning Command), as well as display limits directly on plots of data (see Plot Limits). Limits may be specified for:

- 24 channels of NEΔT
- 24 channels of Gain
- 3 Current MUX parameters
- 5 Voltage MUX parameters
- 22 Temperature MUX parameters

See also Default Warning Command, Plot Limits, Setup.

Line Color

Where	Plot Line Properties
Path	Plot Area → Double-click Plot Line → Plot Line Properties → Line Color
Modes	Normal, Early Orbit 1, 2a, 2b, 2c, Idle
Conditions	Data file loaded, Valid mode selected, Data plotted, Plot line selected

The **Line Color** control is part of the Plot Line Properties dialog. It allows the user to change a plot line's color in two different ways:

- By selecting a predefined color from the provided pull-down list. When a color is selected from the pull-down list, the corresponding RGB values are displayed in the **R**, **G** and **B** boxes to the right.
- By entering the Red (**R**), Green (**G**) and Blue (**B**) values of the desired color as an RGB triplet. All three values must be in the range 0-255.

The user must click **OK** or **Apply** for any changes to take effect.

See also Plot Line Properties.

Line Style

Where	Plot Line Properties
Path	Plot Area → Double-click Plot Line → Plot Line Properties → Line Style
Modes	Normal, Early Orbit 1, 2a, 2b, 2c, Idle
Conditions	Data file loaded, Valid mode selected, Data plotted, Plot line selected

The **`Line Style`** control is part of the Plot Line Properties dialog. It allows the user to change a plot line's style to one of seven predefined styles, available through a pull-down list. Note that if the style **`None`** is selected, the plot line will be invisible unless a symbol other than **`None`** is also selected.

The user must click **`OK`** or **`Apply`** for any changes to take effect.

See also Plot Line Properties, Symbol.

Load Setup Info From ...

Where	Defaults
Path	Setup → Defaults → Load Setup Info From ...
Modes	n/a
Conditions	n/a

`Load Setup Info From ...` allows you to load setup parameters (everything that can be set via the Setup dialog) from a file. The **`Setup`** dialog will update to reflect the new settings loaded from the file, but those settings will not be applied to the program until you click **`Apply`** or **`OK`**.

See also Save Setup Info To …, Setup.

Longitude (deg East)

Where	Raw Data
Path	Raw Data → Longitude (deg East)
Modes	Normal, Early Orbit 1, 2a, 2b, 2c, Idle
Conditions	Data file loaded, Valid mode selected

`Longitude (deg East)` is a Data Selection Toggle. When turned on, it causes spacecraft longitude in degrees East to be plotted in any time history plots.

See also Selection Toggles.

Map

Where	Main Window
Path	Map
Modes	Normal, Early Orbit 1, 2b, 2c
Conditions	One channel selected

Create and display a map of radiometric data for the selected channel located on the earth. If more than one channel is selected, only data for the first (lowest numbered) channel will be used.

See also Map Color Scale, Map Color Table, Map Continents, Map Grid Factor, Map Grid Lines, Map Image Size, Map Interpolation, Map Line Thickness, Map Printing, Map Squash, Plot Area, Save Color Table.

Map Color Scale

Where	Display
Path	Display → Map Color Scale
Modes	Normal, Early Orbit 1, 2b, 2c
Conditions	Data file loaded, Valid mode selected, Data mapped

This button produces a dialog box that allows the user to change the range of data values represented by the map color scale. When a new map is generated, this range is always set to the full range of data shown on the map. If truncated to a partial subset of the full range, any data points outside the new range will be displayed as the color at the corresponding end of the new range. Note that the values themselves will not be truncated and will be shown properly as coordinates when moving the mouse over them.

Use this to filter out unwanted data points and improve the contrast of colors within the data range of interest. This is especially effective as a filter when using a color table with black on one or both ends.

See also Map, Map Color Table, Plot Area.

Map Color Table

Where	Display
Path	Display → Map Color Table
Modes	Normal, Early Orbit 1, 2b, 2c
Conditions	Data file loaded, Valid mode selected, Data mapped

Click this button to change the colors displayed in the map. It will display a standard IDL dialog for changing and manipulating color tables. Use this dialog to find or create a suitable color table. For more information on this dialog, refer to the IDL documentation for **`XloadCT`**.

See also Map, Map Color Scale, Save Color Table.

Map Continents

Where	Plot/Map
Path	Setup → Plot/Map → Map Continents
Modes	n/a
Conditions	n/a

This option turns on or off the display of continent boundaries on a map.

See also Map Grid Lines, Map Line Thickness, Setup.

Map Grid Factor

Where	Plot/Map
Path	Setup → Plot/Map → Map Grid Factor
Modes	n/a
Conditions	n/a

This option allows you to control the detail with which EOSOH generates maps of geo-located SSMIS data plotted on the earth. One degree of latitude and longitude is divided by the **`Map Grid Factor`** to get the resolution of the grid used to generate a map image. For example, a **`Map Grid Factor`** of 1 means a 1-degree resolution grid will be used, while the default **`Map Grid Factor`** of 3 means that a 1/3 degree resolution grid will be used. Higher numbers will cause longer processing times, scaling approximately with the square of the **`Map Grid Factor`**.

See also Map, Setup.

Map Grid Lines

Where	Plot/Map
Path	Setup → Plot/Map → Map Grid Factor
Modes	n/a
Conditions	n/a

This option turns on or off the display of latitude and longitude grid lines on the map. These lines are for display purposes only, and are not to be confused with Map Grid Factor.

See also Map Continents, Map Line Thickness, Setup.

Map Image Size

Where	Plot/Map
Path	Setup → Plot/Map → Map Image Size
Modes	n/a
Conditions	n/a

When creating a map of radiometric data, EOSOH first fills in a latitude-longitude grid (see Map Grid Factor) with data values (radiometric scene counts). It then projects this grid, using a standard Mercator map projection, onto an image, whose size in pixels is specified by the **`Map Image Size`** option. That image is finally displayed in the Plot Area, scaled and zoomed according to the current zoom coordinates of the map.

Larger image sizes will produce higher resolution output, but will take longer to compute. Computation time scales approximately with the product of the **`X`** and **`Y`** resolutions. For best performance, **`X`** and **`Y`** should be equal integer powers of 2.

Also note that an extremely high Map Image Size is relatively useless unless the Map Grid Factor is scaled accordingly.

See also Map, Map Grid Factor, Setup.

Map Interpolation

Where	Plot/Map
Path	Setup → Plot/Map → Map Interpolation
Modes	n/a
Conditions	n/a

The default behavior when generating a map of radiometric data is to fill in one pixel of data on the map for each beam location in the sensor's swath. This may leave some empty pixels or "holes" within the swath, depending on a number of factors such as the number of beam positions per scan, the Map Grid Factor, and the latitude of a particular scan of data. Turning this option on causes any empty pixels within the swath to be filled in with data values that are interpolated based on their nearest neighbors. Map generation typically takes significantly longer with interpolation turned on.

See also Map, Map Grid Factor, Setup.

Map Line Thickness

Where	Plot/Map
Path	Setup → Plot/Map → Map Grid Factor
Modes	n/a
Conditions	n/a

This option specifies the thickness of Map Continent lines and Map Grid Lines, in absolute pixels relative to the Map Image Size. If set to 0, EOSOH will automatically adjust the line thickness to one pixel per every 512 pixels in the Map Image Size.

See also Map, Map Continents, Map Grid Lines, Map Image Size, Setup.

Map Printing

Where	Plot/Map
Path	Setup → Plot/Map → Map Printing
Modes	n/a
Conditions	n/a

The software displays radiometric maps using a black background with white text and continents. Because this is generally undesirable when printing, the software automatically inverts black and white for the printer, causing it to print black text and continents on a white background. Colors of radiometric data remain unaffected.

Set this parameter to `Invert black & white` for the default behavior, or `As is` to print maps exactly as they appear on the screen.

See also Map, Setup.

Map Squash

Where	Plot/Map
Path	Setup → Plot/Map → Map Squash
Modes	n/a
Conditions	n/a

When generating a map of radiometric data, the software compresses the range of data values in an attempt to filter out errant high and low data values, thereby showing a greater dynamic range of colors in the region of interest. This is accomplished by forcing all data values above and below a certain range to fall on the boundaries of that range. The **`Map Squash`** parameter specifies the number of standard deviations away from the mean that define this range.

Therefore the default value of 1 defines the range as one standard deviation above and below the mean. Set **`Map Squash`** to `0` to disable this behavior and use all data values unaltered.

See also Map, Setup.

Maximize Display

Where	Display
Path	Display → Maximize Display
Modes	Normal, Early Orbit 1, 2a, 2b, 2c, Idle
Conditions	Data file loaded, Valid mode selected, Window in normal layout

Clicking **`Maximize Display`** causes the Plot Area to enlarge, filling the entire software window except for the **`Status`** area (see The EOSOH Window). The software **`Controls`** area will become its own separate window to give more room for the **`Plot Area`**. Note that in this view, the Message Window is not visible. To restore the software's default layout, use the Normal Window button.

See also Normal Window.

Memory Block Size

Where	Memory Dump
Path	Setup → Memory Dump → Memory Block Size
Modes	Memory Dump
Conditions	n/a

Most standard uplink files contain bytes of data past what is loaded into the sensor's memory. This extra data must be ignored when comparing the onboard memory dump with an uplink file, or a good memory dump may be erroneously marked as bad. Data in the uplink file is therefore truncated to an integer multiple of the **`Memory Block Size`**. This value is nominally 512 bytes and is not expected to change. It is provided as a Setup parameter just in case the user needs to verify an uplink file that does not comply with the 512 byte block size.

See also Memory Dump, Setup.

Memory Dump

Where	Mode
Path	Mode → Memory Dump
Modes	Memory Dump
Conditions	Data file loaded with Memory Dump mode data

The **Memory Dump** button selects the Memory Dump mode of the sensor, which is handled and displayed differently than all other sensor modes. Like Raw Data Packets, data is shown in tabular form inside the **Display** area. The primary purpose of this mode is to verify program and Doppler memory from the sensor against what was previously uploaded.

See also ASCII Uplink File, Binary Uplink File, Decimal, Doppler, Find…, Hexadecimal, Frame #, Memory Block Size, Memory/Uplink Offset, Mismatch #, Mode, Next, Octal, Previous, Program, Verifying Memory Dump.

Memory/Uplink Offset

Where	Memory Dump
Path	Setup → Memory Dump → Memory/Uplink Offset (various)
Modes	Memory Dump
Conditions	n/a

When comparing the sensor's onboard memory dump with uplinked data, it is necessary to know where to begin comparison in both sets of data. Any data found before these offsets is expected to change and therefore should not be included in the comparison. **Memory Offsets** are specified as the number of 16-bit words past the beginning of onboard memory where comparison should start. **Uplink Offsets** are specified as the number of 16-bit words past the beginning of the uplink file.

There are a total of six different offsets, representing the combination of **Program** and **Doppler** memory for both onboard and uplinked data; as well as binary or ASCII formatted uplink files. The default offsets are not expected to change, but are provided as Setup parameters for the case of unusual or changing data formats:

Table 6: Default Memory Dump Offsets

Memory Offset (Doppler)	52000
Memory Offset (Program)	2048
Uplink Offset (Doppler, ASCII)	4
Uplink Offset (Doppler, Binary)	8
Uplink Offset (Program, ASCII)	2052
Uplink Offset (Program, Binary)	2056

See also Memory Dump, Reset Start Offsets, Setup, Start Offset.

Memory Offset (Doppler)

Where	Memory Dump
Path	Setup → Memory Dump → Memory Offset (Doppler)
Modes	Memory Dump
Conditions	n/a

See Memory/Uplink Offset.

Memory Offset (Program)

Where	Memory Dump
Path	Setup → Memory Dump → Memory Offset (Program)
Modes	Memory Dump
Conditions	n/a

See Memory/Uplink Offset.

Messages Off

Where	Message File
Path	Message File → Messages Off
Modes	n/a
Conditions	n/a

The **`Messages Off`** button closes the current message file (specified by either All Messages or Subsequent Messages) and stops saving messages to that file. Messages will continue to be printed to the Message Window until the software window is closed.

See also All Messages, Message Window, Subsequent Messages.

Message Window

Where	Main Window
Path	Messages:
Modes	n/a
Conditions	n/a

The **`Message Window`** is a text area at the bottom of the main interactive software window. Informational and diagnostic messages are printed to the **`Message Window`** at various points

during the operation of the software. Messages displayed in the **Message Window** may optionally be saved to a text file using either the All Messages or Subsequent Messages buttons.

See also All Messages, Messages Off, Subsequent Messages.

Mismatch

Where	Memory Dump Panel
Path	Memory Dump Panel → Go To → Mismatch #
Modes	Memory Dump
Conditions	Data file loaded, Memory Dump mode selected

This control is only available when an uplink file has been loaded and the comparison with onboard memory has revealed mismatched words. Use the slider control or the text box to specify the numbered mismatch you wish to display. When used, the **Onboard Memory** and **Uplink File** tables will jump to the specified mismatch number and highlight it.

See also Memory Dump, Next, Previous.

Mode

Where	Main Window
Path	Mode
Modes	All
Conditions	Data file loaded

The **Mode** button allows you to select which SSMIS mode of data you wish to work with. After opening a valid input SSP file, you must select a sensor mode before viewing any of the data. Only modes for which valid data exists in the opened input file will be available for selection. Taking note of this fact is an easy way to determine which modes are present in the input file.

To select a mode, click on the **Mode** button, then click on the desired mode name from the resulting pull-down menu. If the sensor mode you want is not available to be clicked (it is "greyed" out), no valid data for that mode was found in the current SSP file. You may select any valid mode that exists in the file, or open a new SSP file.

After selecting a mode, a number of things will happen. These are detailed in the section Selecting the SSMIS Mode.

See also Selecting the SSMIS Mode, Memory Dump, Raw Data Packets.

MUX

Where	Main Window
Path	MUX
Modes	Normal, Early Orbit 1, 2a, 2b, 2c, Idle
Conditions	Data file loaded, Valid mode selected

The **MUX** button is a data parameter selection button. Clicking it produces a Data Selection Dialog allowing the user to select a number of MUX (Multiplexed) housekeeping parameters to be plotted in the time history plot.

There are 4 types of MUX data: temperature, current, voltage, and raw counts. 28 MUX parameters and 3 warm load PRTs are available for selection. The following table summarizes the data types of all 31 parameters:

Table 7: MUX Data Types

Type	MUX ID #s
Temperature	1-18, 28, Warm Load PRTs 1-3
Current	19-21
Voltage	22-26
Raw counts	27

In the SSMIS data stream, MUX parameters 1-28 are multiplexed across 8 scans, with 4 MUX data values per scan. Thus there will generally be only one MUX data value for every 8 scans of data. Warm Load PRT values are not multiplexed and occur in every scan.

Note that if MUX parameters of different data types are selected for plotting, their values will be plotted against the same scale on the Y axis, regardless of units. In most cases, this will probably not be the desired effect.

See also Data Selection Dialogs, HouseKeeping.

New Window

Where	Main Window
Path	New Window
Modes	n/a
Conditions	n/a

Click this button to create a new, independent instance of the EOSOH interactive window. The new window will allow you to simultaneously analyze data from another file (or even the same file) while keeping the current data loaded in the current window.

If data is already loaded into the current window, the new window will point to that same data without wasting memory by making a new copy of it. Additionally, if a sensor mode is already selected in the current window, the new window will automatically select that mode as well. If you wish to load a different file or view a different sensor mode in the new window, do so normally. The original EOSOH window will remain unaffected by any changes in the new window.

There is no limit to how many EOSOH windows can point to the same set of data. Use this capability to simultaneously view different types of data from the same file. When no windows point to a particular set of SSMIS data anymore, the associated memory will be freed.

Each window, while it may be pointing to the same data set, will have its own independent set of Setup parameters, initialized based on the `setup.dat` file or program defaults. **`Memory Dump`**, **`Limits`**, **`Plot/Map`**, and **`Defaults`** parameters are unique to each EOSOH window and can be changed without affecting others. **`Misc`** parameters (serial number, flight direction, pointing offsets) are specific to the data set and therefore affect all EOSOH windows pointing to the same data. Therefore in the specific case that you wish to view the same data with different **`Misc`** parameters, you must reload the same data file in each new window to ensure that the parameters are separate and unique.

See also Setup.

Next

Where	Memory Dump Panel, Raw Data Panel
Path	Memory Dump / Raw Data Panel → Go To → Next
Modes	Memory Dump, Raw Data Packets
Conditions	Data file loaded, Valid mode selected

In Memory Dump mode, this button is only available when an uplink file has been loaded and the comparison with onboard memory has revealed mismatched words. Use it to highlight and jump to the next word that does not match between onboard memory and the uplink file.

In Raw Data Packets mode, use this button to display the next full second of raw sensor data from the RSDR file.

In both cases, the position will wrap around to the first mismatch or second when the last one is currently displayed.

See also Memory Dump, Previous, Raw Data Packets.

Normal Window

Where	Display
Path	Display → Normal Window
Modes	Normal, Early Orbit 1, 2a, 2b, 2c, Idle
Conditions	Data file loaded, Valid mode selected, Window in maximized layout

Clicking **`Normal Window`** causes the software window to return to its default layout (see The EOSOH Window) after having been maximized with the Maximize Display button.

See also Maximize Display.

Octal

Where	Memory Dump Panel, Raw Data Panel
Path	Memory Dump / Raw Data Panel → Number Format → Decimal
Modes	Memory Dump, Raw Data Packets
Conditions	Data file loaded, Valid mode selected

The Memory Dump and Raw Data panels can display numbers in three different representations. Select this button to display numbers as decimal.

See also Decimal, Hexadecimal, Memory Dump, Raw Data Packets.

Pitch Offset

Where	Misc
Path	Setup → Misc → Pitch Offset
Modes	Normal, Early Orbit 1, 2b, 2c
Conditions	n/a

`Pitch Offset` allows you to specify the satellite's Pitch offset in degrees from 0. This setting affects the geolocation of radiometric data on the earth. This can be used to fine-tune geolocation by viewing a map of a surface channel (e.g., Channel 1) and adjusting the Roll, Pitch, Yaw and Cone Angle offsets until coastline features line up with continental boundaries displayed on the map.

See also Cone Angle Offset, Roll Offset, Setup, Yaw Offset.

PLO Oven Power

Where	Raw Data
Path	Raw Data → PLO Oven Power
Modes	Normal, Early Orbit 1, 2a, 2b, 2c, Idle
Conditions	Data file loaded, Valid mode selected

`PLO Oven Power` is a Data Selection Toggle. When turned on, it causes the redundancy mode (primary or backup) of the PLO Oven Power to be plotted as a Redundancy Plot in any time history plots.

See also Redundancy Plot, Selection Toggles.

Plot

Where	Main Window
Path	Plot
Modes	Normal, Early Orbit 1, 2a, 2b, 2c, Idle
Conditions	Valid combination of plot parameters selected

Create and display a line plot of the current data parameters that are selected. Selection of data parameters that you wish to plot may be done through the various Data Selection Dialogs. Plots will generally be time history plots with data values on the Y axis and time on the X axis, except as noted below. A maximum of 30 data parameters may be plotted at one time.

If Plot By Beam Position is selected along with at least one valid Beam Position/Channel pair, all selected radiometric data will be plotted as a function of beam position rather than time. Selected data parameters that are not dependent on beam position (such as Gain or MUX) will not be plotted. Similarly, selection of Plot Channel Image along with a valid channel will produce an image of only the selected channel rather than the default time history type plot.

Plot Area

Where	Main Window
Path	Plot Area
Modes	Normal, Early Orbit 1, 2a, 2b, 2c, Idle
Conditions	Data file loaded, Valid mode selected

The **`Plot Area`** displays SSMIS data in graphical form. It has two modes, depending on the type of plot or graphics requested by the user: **`Plot Mode`** and **`Map Mode`**. In both modes, the following user input events are valid in the **`Plot Area`**:

- `Drag with the Left Mouse Button`

This action allows you to zoom the plot or map. The software displays a wire frame box on top of the plot or map, depicting the area over which the mouse has been dragged. When you release the left mouse button, the software will zoom the plot or map to display only the area enclosed by the wire frame box.

Over the **ColorBar** in **Map Mode**, this operation will update the color scale include only those data values within the range selected. Any data points outside of this range will be displayed in the nearest color at the corresponding edge of the data range.

While still holding down the left mouse button, you may click the right mouse button to cancel the zoom operation. The wire frame box will disappear and you may release the left mouse button without performing the zoom.

- Drag with the Right Mouse Button
  This action allows you to pan the plot or map. Without changing the scale, the plot or map will move with the mouse pointer, allowing you to fine-tune its positioning within the **Plot Area**. Release the right mouse button to complete the operation.

- Mouse Over Data
  When the mouse pointer is positioned directly over a plot line, the name of the data parameter and the X-Y coordinates of that point are displayed in the **Coordinates** box of the **Status** area (see The EOSOH Window).

  In **Map Mode**, the latitude and longitude at the mouse pointer are displayed. If any data point is present at the mouse pointer, its value is also displayed. Mousing over the **ColorBar** in the map also displays the data value of the particular color under the mouse pointer.

- Double-click an Axis or Text (left mouse button)
  This action selects the text or axis and displays a Text Properties dialog box, allowing the user to change the text and its appearance. The dialog will allow you to edit the text, as well as specify its color and font size. When an axis is selected, you are editing its title text. All existing text in a plot or map, including the title, may be edited in this way.

In **Plot Mode**, multiple X-Y line plots are displayed in the **Plot Area** on a white background. The following user input events also apply in **Plot Mode**:

- Double-click a Plot Line (left mouse button)
  This action selects the plot line and displays a Plot Line Properties dialog box, allowing the user to change that line's appearance. This is particularly useful if you can't quite tell which data parameter a particular plot line represents: simply double-click it and change its appearance until it stands out enough to identify in the plot legend.

In **Map Mode**, a map of beam-located channel data is displayed along with a **ColorBar** showing the mapping between colors and data values. The following user input events also apply in **Map Mode**:

- `Double-click the ColorBar` (left mouse button)
  This action produces the same effect as Map Color Scale, allowing you to change the color scale of data in the map.

Plot By Beam Position

Where	Other
Path	Other → Plot By Beam Position
Modes	Normal, Early Orbit 1, 2a, 2b, 2c
Conditions	Data file loaded, Valid mode selected

The **`Plot By Beam Position`** button is a data parameter selection button. Clicking it produces a Data Selection Dialog allowing the user to select an option to plot raw radiometric counts by beam position (as opposed to plotting beam position / channel pairs by time). You must select the `Plot channels by beam position` checkbox in order for this option to take effect.

In order to plot channels of radiometric counts by beam position rather than time, each beam position / channel pair must be time-averaged to produce a single data point. In other words, data will be averaged over a range of scans to produce the plot by beam position. The **`Low`** and **`High`** text entry boxes allow the user to select a range of scans, numbered starting with 1, over which to average radiometric data for the purposes of this plot.

The **`Scale 30/60/90/180 (Normal mode)`** checkbox specifies that all beam position data in Normal mode will be stretched to fit a maximum of 180 beam positions. This option has no effect in the other modes. This is useful because different channels have different numbers of beam positions in the Normal mode, but in all cases the beam positions in the data stream span the same physical range of viewing angles of the sensor. For example, channel 7 has 60 beam positions in Normal mode while channel 8 has 180. Channel 7's beam position 10 is physically looking at the same spot as channel 8's beam position 30, and so forth. When this option is selected, the beam position axis in the plot effectively represents physical beam position rather than logical beam position number.

Note that to restore the default behavior of creating time history plots, you must deselect (uncheck) the **`Plot channels by beam position`** checkbox.

See also Beam Position, Channel, Data Selection Dialogs, Plot.

Plot By Scan

Where	Other
Path	Other → Plot By Scan
Modes	Normal, Early Orbit 1, 2a, 2b, 2c, Idle
Conditions	Data file loaded, Valid mode selected

`Plot By Scan` is a Plot Option Selection Toggle. When this option is turned on, data will be plotted by scan number rather than by time in normal time history plots. Note that this effectively only changes the scale of the X axis because scan number is linearly related to time.

See also Plot, Selection Toggles.

Plot Channel Image

Where	Other
Path	Other → Plot Channel Image
Modes	Normal, Early Orbit 1, 2a, 2b, 2c
Conditions	Data file loaded, Valid mode selected

`Plot Channel Image` is a Plot Option Selection Toggle. When this option is selected along with at least one valid channel, that channel's radiometric data will be plotted as a two-dimensional rectangular image. The resulting image's Y axis represents the SSMIS scan number while its X axis represents beam position number. This is a quick and easy way to view all of a channel's radiometric data without generating a map.

If more than one channel is selected, only data for the first (lowest numbered) channel will be used.

See also Map, Plot, Selection Toggles.

Plot Limits

Where	Other
Path	Other → Plot Limits
Modes	Normal, Early Orbit 1, 2a, 2b, 2c, Idle
Conditions	Data file loaded, Valid mode selected

`Plot Limits` is a Plot Option Selection Toggle. When this option is turned on, each line in a standard time history plot is accompanied by another pair of lines indicating that data parameter's minimum and maximum acceptable limits. For each plot line, the corresponding pair of "limit" lines is drawn in the same color, thickness and style.

See also Limits, Plot.

Plot Line Properties

Where	n/a
Path	Plot Area → Double-click Plot Line
Modes	Normal, Early Orbit 1, 2a, 2b, 2c, Idle
Conditions	Data file loaded, Valid mode selected, Data plotted in **`Plot Area`**

`Plot Line Properties` is a dialog box that allows the user to change the appearance of a particular data plot line in the Plot Area. In particular, it allows modification of the line's:

- Color
- Style
- Thickness
- Symbol
- Symbol Size

The **`Plot Line Properties`** dialog provides three buttons to control its actions:

- **`OK`** applies the currently selected properties to the plot line and closes the dialog.
- **`Apply`** applies the currently selected properties to the plot line and keeps the dialog open.
- **`Cancel`** closes the dialog without applying the currently selected properties. Note, however, that any properties previously applied using the **`Apply`** button will remain in effect.

See also Line Color, Line Style, Symbol, Symbol Size, Thickness.

Plot Lines Vary

Where	Plot/Map
Path	Setup → Plot/Map → Plot Lines Vary
Modes	Normal, Early Orbit 1, 2a, 2b, 2c, Idle
Conditions	n/a

When EOSOH creates a plot of multiple parameters, plot lines of different parameters are distinguished by drawing them in different colors, line thicknesses, and line styles (solid, dashed, dotted, etc). The default setting, **`Colors`**, causes EOSOH to vary plot line colors before varying line styles or thicknesses. Select the **`Line Types`** setting to cause EOSOH to vary line styles, or types, before varying thicknesses or colors. This option is most useful for printing plots on black and white printers.

See also Setup.

Plot/Map Title

Where	Plot/Map
Path	Setup → Plot/Map → Plot/Map Title
Modes	Normal, Early Orbit 1, 2a, 2b, 2c, Idle
Conditions	n/a

This specifies the default title for all plots and maps created by EOSOH. You may use any text for this, as well as a number of special tokens that will be replaced at runtime by text specific to the current data set:

Table 8: Plot/Map Title Tokens

`%s`	SSMIS serial number
`%r`	Revolution/orbit number
`%f`	RSDR file name, without any directory component
`%c`	Channel (map only)

For example, the default format, `SSMIS S/N %s Rev %r %c (%f)`, might produce a plot title of **`SSMIS S/N 1 Rev 308 (eo1.dat)`** or a map title of **`SSMIS S/N 1 Rev 308 Channel 18 (eo1.dat)`**.

Previous

Where	Memory Dump Panel, Raw Data Panel
Path	Memory Dump / Raw Data Panel → Go To → Previous
Modes	Memory Dump, Raw Data Packets
Conditions	Data file loaded, Valid mode selected

In Memory Dump mode, this button is only available when an uplink file has been loaded and the comparison with onboard memory has revealed mismatched words. Use it to highlight and jump to the previous word that does not match between onboard memory and the uplink file.

In Raw Data Packets mode, use this button to display the previous full second of raw sensor data from the RSDR file.

In both cases, the position will wrap around to the last mismatch or second when the first one is currently displayed.

See also Memory Dump, Next, Raw Data Packets.

Printer

Where	Output
Path	Output → Printer
Modes	Normal, Early Orbit 1, 2a, 2b, 2c, Idle
Conditions	Data file loaded, Valid mode selected, Data displayed in the **`Plot Area`**

This button allows you to print the current plot or map to a printer. The image will be printed exactly as it is shown in the Plot Area, except that it will be printed at a higher resolution, more suitable for a printer. If the **`Plot Area`** is currently displaying a map, the setting of the Map Printing option will apply.

See also Image File, Map Printing.

Program

Where	Memory Dump Panel
Path	Memory Dump Panel → Compare → Program
Modes	Memory Dump
Conditions	Data file loaded, Memory Dump mode selected

Two types of data can be uplinked to the SSMIS and subsequently verified when the sensor sends down its memory contents in the Memory Dump mode: program data and the Doppler table. This button selects the Doppler coefficient table for verification. Select it when verifying the sensor's Doppler table against a previously uplinked table.

See also Doppler, Memory Dump, Verifying Memory Dump.

Raw Data Packets

Where	Mode
Path	Mode → Raw Data Packets
Modes	N/A
Conditions	Data file loaded, Raw RSDR packets kept

Clicking **`Raw Data Packets`** will show raw data from the current RSDR file in the **`Display`** area. The Plot Area will disappear, replaced by a set of data tables and controls. Raw sensor data is shown one second (395 36-bit words, or 1185 12-bit words) at a time, along with the corresponding ephemeris information from the RSDR's document data. This mode can be used to examine the raw data before any processing has been done, to determine whether there may be data errors preventing EOSOH from utilizing the full set of data.

This mode is normally unavailable due to the extra memory required to retain the raw, unprocessed data for display. To enable it, you must enable the Keep Raw RSDR Packets option in the Setup dialog before loading the data file. If you enable this option after loading a data file, you must reload that data file in order to see the raw data packets.

Note that raw SSMIS data in the RSDR file is generally "word swapped:" the three 12-bit words of each 36-bit triplet are in reverse order. EOSOH corrects this swap before storing raw data for display, so you should expect to always see raw data in the "correct" order. This mode may also be useful to determine whether anything has gone unexpectedly wrong with the word swap process.

See also Decimal, Find…, Hexadecimal, Keep Raw RSDR Packets, Mode, Next, Octal, Previous, Second #, Setup, Viewing Raw RSDR Data.

Receiver

Where	Raw Data
Path	Raw Data → Receiver
Modes	Normal, Early Orbit 1, 2a, 2b, 2c, Idle
Conditions	Data file loaded, Valid mode selected

`Receiver` is a Data Selection Toggle. When turned on, it causes the redundancy mode (primary or backup) of the Receiver to be plotted as a Redundancy Plot in any time history plots.

See also Redundancy Plot, Selection Toggles.

Receiver Heater

Where	Raw Data
Path	Raw Data → Receiver Heater
Modes	Normal, Early Orbit 1, 2a, 2b, 2c, Idle
Conditions	Data file loaded, Valid mode selected

`Receiver Heater` is a Data Selection Toggle. When turned on, it causes the redundancy mode (primary or backup) of the Receiver Heater to be plotted as a Redundancy Plot in any time history plots.

See also Redundancy Plot, Selection Toggles.

Recenter

Where	Zoom
Path	Zoom → Recenter
Modes	Normal, Early Orbit 1, 2b, Early Orbit 2c
Conditions	Data file loaded, Valid mode selected, Channel data mapped

Clicking this button will zoom out, or "recenter" the current map to display the full mapped image. This is not the same as Zoom Out because the image itself may only cover a part of the world, as specified either by Regenerate Map or Zoom to Lat/Lon.

For example, consider a map that has been generated to cover only North America, using the Regenerate Map button. If you zoom in further using the mouse, the software will efficiently scale that image to the new zoom area, just as it has always done. Clicking on **`Recenter`** at this point will show the full image of North America, as it was last generated by Regenerate Map.

See also Map Image Size, Plot Area, Regenerate Map, Zoom Out, Zoom to Lat/Lon.

Recompute

Where	Utility
Path	Utility → Recompute
Modes	All
Conditions	Data file loaded

Mainly available as a convenience to the EOSOH developers, this button causes the software to compute product data from raw data. Note that data products are always computed automatically when a new data file is loaded into the software, and at other times whenever appropriate (when Roll, Pitch and Yaw offsets are changed in Setup, for example). This button is only useful if you wish to force computation of product data again.

Redundancy Plot

A **`Redundancy Plot`** is a special type of time history plot depicting the redundancy mode (primary or backup) of a particular sensor component. Because it can only have two possible values, a **`Redundancy Plot`** is displayed differently than a normal time history plot. For each **`Redundancy Plot`** currently displayed, the software draws the outline of a horizontal bar that spans the full range of time in the X axis. The bar's vertical position and thickness has no meaning. Multiple **`Redundancy Plot`** bars are stacked vertically so that they all fit into the Plot Area at all times.

At any given time value on the X axis, the **Redundancy Plot's** state is depicted as follows: if the sensor component is in the primary mode, the bar is shaded with its given color; otherwise (if in backup mode), the bar is not shaded (white).

The following are the possible **Redundancy Plots**:

- 56 GHz Oscillator
- 91 GHz Oscillator
- PLO Oven Power
- Receiver
- Receiver Heater
- Warm Load Heater

Regenerate Map

Where	Zoom
Path	Zoom → Regenerate Map
Modes	Normal, Early Orbit 1, 2b, 2c
Conditions	Data file loaded, Valid mode selected, Channel data mapped

Normally, when a map is first generated and displayed, the resulting image covers the entire world. Any subsequent zoom or pan operations on that map are done very efficiently by scaling that same image without increasing its resolution. This is fine for quick operations, but when the area of interest is sufficiently small, the zoomed map does not take advantage of the full resolution of the map image.

Regenerate Map will cause EOSOH to generate the map image again, using the current area in view to fill the entire resolution of the image. Anything outside of the current view is discarded until Zoom Out is used. This results in a more accurate image, at the cost of the time it takes to regenerate the map. Use this button to increase image quality after you have zoomed to the desired region using the mouse.

See also Map Image Size, Plot Area, Recenter, Zoom Out, Zoom to Lat/Lon.

Reset Parameters

Where	Utility
Path	Utility → Reset Parameters
Modes	Normal, Early Orbit 1, 2a, 2b, 2c, Idle
Conditions	Any data parameters selected to be plotted

If you select new data parameters for plotting without deselecting the currently plotted parameters, both the current and the new parameters will be plotted the next time you click Plot.

The **`Reset Parameters`** button resets all data parameters to the deselected state. This is a convenient way to clear the currently selected parameters before selecting other parameters for the next plot. Thus, the typical sequence of events will be something like this:

- Select data parameters to plot
- Plot selected data parameters
- Analyze the plot and optionally save or print data
- Reset parameters
- Repeat for the next set of data parameters

See also Clear Screen.

Reset Start Offsets

Where	Memory Dump Panel
Path	Memory Dump Panel → Reset Start Offsets
Modes	Memory Dump
Conditions	Data file loaded, Memory Dump mode selected

Click this button to reset the onboard memory and uplink file Start Offsets to the values found in Setup. If the offsets change, EOSOH will compute a new comparison of memory based on the new offset. Look for the results of the new comparison in the Message Window.

See also Memory Dump, Memory/Uplink Offset, Setup, Start Offset.

Roll Offset

Where	Misc
Path	Setup → Misc → Roll Offset
Modes	Normal, Early Orbit 1, 2b, 2c
Conditions	n/a

`Roll Offset` allows you to specify the satellite's Roll offset in degrees from 0. This setting affects the geolocation of radiometric data on the earth. This can be used to fine-tune geolocation by viewing a map of a surface channel (e.g., Channel 1) and adjusting the Roll, Pitch, Yaw and Cone Angle offsets until coastline features line up with continental boundaries displayed on the map.

See also Cone Angle Offset, Pitch Offset, Yaw Offset, Setup.

Save Color Table

Where	Display
Path	Display → Save Color Table
Modes	Normal, Early Orbit 1, 2b, 2c
Conditions	Data file loaded, Valid mode selected, Data mapped

If you have created your own modified color table using Map Color Table, you can save it for future use by clicking on this button. It will produce a dialog prompting you for the color table name and an index. The name may be whatever you wish to call your color table: it should be something unique. The index can be from 0 to 255, and specifies the slot in the color table file where the current color table will be saved. The dialog will normally come up with the first unused index filled in; you may use a lower index to overwrite an existing color table if you are sure you don't want to keep it (start at the top and count from 0 in the dialog provided by Map Color Table to figure out a particular table's index).

When saved, the current color table will be added to the file `eosoh.tbl`. Copy this file anywhere else you will be running EOSOH in order to have access to your custom color table.

If you wish to make your color table the default, save it with name "EOSOH" and index 0 to overwrite the default EOSOH color table. To keep a backup copy of the EOSOH color table before overwriting it, simply load it and save it to another index and name (e.g., "EOSOH Backup") before creating and saving your own color table.

See also Map, Map Color Table.

Save Setup Info To …

Where	Defaults
Path	Setup → Defaults → Save Setup Info To …
Modes	n/a
Conditions	n/a

`Save Setup Info To ...` allows you to save all currently selected setup parameters (everything that can be set via the Setup dialog) to a file. Note that this saves the current values selected in the **`Setup`** dialog, which are not necessarily the same as what is currently applied in the software if you haven't clicked on **`Apply`** yet. This file may be loaded into the software at a later time to restore all of the saved settings.

Note that when starting up, the software reads the file `setup.dat` to initialize all setup parameters. Thus, if you wish to apply your current settings to all future EOSOH sessions, you should save them to the file named `setup.dat`.

See also Load Setup Info From ..., Setup, Setup File.

Second

Where	Raw Data Panel
Path	Raw Data Panel → Go To → Second #
Modes	Raw Data Packets
Conditions	Data file loaded, Raw Data Packets selected

Use the slider or the text box in this control to specify the numbered one-second record of raw sensor data you wish to display. When used, the **`Raw Data Packets`** and **`Ephemeris`** tables will display data from the specified record number.

See also Next, Previous, Raw Data Packets.

Selection Toggles

A **`Selection Toggle`** is a menu item that controls the state of a program setting or parameter. Its two possible states, on and off, are indicated by the presence or absence of an asterisk (**`*`**) at the end of its name, respectively. Using the mouse to click on the **`Selection Toggle`** menu item causes it to change from its current state to the other.

There are two types of **`Selection Toggles`** in EOSOH: **`Data Selection Toggles`** and **`Plot Option Selection Toggles`**. A **`Data Selection Toggle`** is used to select a particular data parameter for plotting. This is equivalent to a checkbox in a Data Selection Dialog. The "on" state indicates that the data parameter is selected for plotting, while the "off" state indicates that it is not. A **`Plot Option Selection Toggle`** is used to configure a program option that affects the plotting of data.

The **`Data Selection Toggles`** in EOSOH are:

- 56 GHz Oscillator
- 91 GHz Oscillator
- Latitude (deg)
- Longitude (deg East)
- PLO Oven Power
- Receiver
- Receiver Heater
- Warm Load Heater

The **`Plot Option Selection Toggles`** in EOSOH are:

- Plot By Scan
- Plot Channel Image

- Plot Limits

Setup

Where	Main Window
Path	Setup
Modes	n/a
Conditions	n/a

Clicking the **`Setup`** button produces a dialog allowing the user to set various options that control the behavior of EOSOH. In addition to widgets for setting the various parameter values, the **`Setup`** dialog provides the following buttons to control how it applies setup parameters to the software:

- **`OK`**: apply the currently selected values and close the **`Setup`** dialog.
- **`Apply`**: apply the currently selected values and keep the **`Setup`** dialog open.
- **`Cancel`**: close the **`Setup`** dialog without applying the currently selected values.

See also Beam Position Offset, Cone Angle Offset, Default Input File Location, Default File Naming Convention, Default File/Open Spec, Default Image Size, Default Image Type, Default Output File Location, Default Warning Command, Flight Direction, Keep Raw RSDR Packets, Limits, Load Setup Info From ..., Map Continents, Map Grid Factor, Map Grid Lines, Map Image Size, Map Interpolation, Map Line Thickness, Map Printing, Map Squash, Memory Block Size, Memory/Uplink Offset, Pitch Offset, Plot Lines Vary, Plot/Map Title, Roll Offset, Save Setup Info To …, SSMIS Serial Number, Yaw Offset.

Show Report

Where	Report File
Path	Report File → Show Report
Modes	All
Conditions	Data file loaded

The **`Show Report`** button is provided as a convenience to the user. It causes the software to call an external program to display the current report file in a new window. This saves the user the trouble of finding the report file in the computer's filesystem and opening it directly.

See also Generate Report, Report File.

SSMIS Serial Number

Where	Misc
Path	Setup → Misc → SSMIS Serial Number
Modes	n/a
Conditions	n/a

Normally, EOSOH will automatically determine the SSMIS Serial Number for a particular input data file based on headers in that file. This information is then used to read the appropriate constants that are used to compute data products. **`SSMIS Serial Number`** allows you to force the serial number to a particular value if you are sure of the sensor unit that produced a particular data set and you think the software is incorrectly identifying it. Under normal operation, however, the default setting of **`Automatic`** is recommended.

Note that forcing the SSMIS serial number to a particular value does not alter flight direction since flight direction is dependent on the satellite, not the SSMIS serial number.

See also Flight Direction, Setup.

SSP Filename

Where	Main Window
Path	SSP Filename
Modes	n/a
Conditions	n/a

Clicking the **`SSP Filename`** button produces a File/Open dialog allowing the user to select an input data file to read into EOSOH. In most cases, this data file will be in RSDR format, but EOSOH also has the capability to read data files produced by NOAA/NESDIS at Suitland, Maryland. Clicking this button is the only way to load data into the software.

Start

Where	Memory Dump Panel
Path	Memory Dump Panel → Go To → Start
Modes	Memory Dump
Conditions	Data file loaded, Memory Dump mode selected

Clicking this button will reposition the **`Onboard Memory`** table, and the **`Uplink File`** table if loaded, to the very beginning of data that has been or will be compared. When comparing either program or Doppler memory, only a small portion of the total onboard memory is applicable to the comparison. This control allows the user to easily jump to the end of the compared memory to examine the contents there.

Note that the start position for each table is that specified by Start Offset.

See also End, Memory Dump, Start Offset.

Start Offset

Where	Memory Dump Panel
Path	Memory Dump Panel → Onboard Memory / Uplink File → Start Offset
Modes	Memory Dump
Conditions	Data file loaded, Memory Dump mode selected

For both the onboard memory and the uplink file, this specifies the 16-bit word number where comparison of memory should begin. Default values are used from Setup, but they may be adjusted using this text entry field. Simply enter the new desired offset and hit enter. EOSOH will automatically perform a new comparison of memory based on the new offset. Look for the results of the new comparison in the Message Window.

If you find that an offset other than the default is required for proper comparison, you may wish to update the default values in the Setup and save those to the file `setup.dat`. However, these are not expected to change.

Note that unlike the **`Onboard Memory`** and **`Uplink File`** tables, this field is always a decimal number.

See also Memory Dump, Memory/Uplink Offset, Reset Start Offsets, Setup, Start.

Subsequent Messages

Where	Message File
Path	Message File → Subsequent Messages
Modes	n/a
Conditions	n/a

The **`Subsequent Messages`** button allows you to save messages in the Message Window to a text file of your choice for later perusal. **`Subsequent Messages`** causes the software to save any future messages that are printed in the **`Message Window`** until the software window is closed or the Messages Off button is selected. Messages currently displayed in the **`Message Window`** will not be saved to the text file.

See also All Messages, Messages Off, Message Window.

Symbol

Where	Plot Line Properties
Path	Plot Area → Double-click Plot Line → Plot Line Properties → Symbol
Modes	Normal, Early Orbit 1, 2a, 2b, 2c, Idle
Conditions	Data file loaded, Valid mode selected, Data plotted, Plot line selected

The **`Symbol`** control is part of the Plot Line Properties dialog. It allows the user to change a plot line's symbol to one of eight predefined symbols, available through a pull-down list. If a symbol other than **`None`** is selected, each data point on the selected plot line will be displayed using the selected symbol.

The user must click **`OK`** or **`Apply`** for any changes to take effect.

See also Plot Line Properties, Symbol Size.

Symbol Size

Where	Plot Line Properties
Path	Plot Area → Double-click Plot Line → Plot Line Properties → Symbol Size
Modes	Normal, Early Orbit 1, 2a, 2b, 2c, Idle
Conditions	Data file loaded, Valid mode selected, Data plotted, Plot line selected

The **`Symbol Size`** control is part of the Plot Line Properties dialog. It allows the user to change a plot line's symbol size to a value between 1 and 10, available through a slider widget. Note that if a symbol of **`None`** is selected, this option has no effect.

The user must click **`OK`** or **`Apply`** for any changes to take effect.

See also Plot Line Properties, Symbol.

Text

Where	n/a
Path	Plot Area → Double-click Text → Text Properties → Text
Modes	Normal, Early Orbit 1, 2a, 2b, 2c, Idle
Conditions	Data file loaded, Valid mode selected, Data plotted, Text object selected

The **`Text Color`** control is part of the Text Properties dialog. It allows the user to change the string value of a text object.

The user must click **`OK`** or **`Apply`** for any changes to take effect.

See also Text Color, Text Properties, Text Size.

Text Color

Where	n/a
Path	Plot Area → Double-click Text → Text Properties → Text Color
Modes	Normal, Early Orbit 1, 2a, 2b, 2c, Idle
Conditions	Data file loaded, Valid mode selected, Data plotted, Text object selected

The **`Text Color`** control is part of the Text Properties dialog. It allows the user to change a text object's color in two different ways:

- By selecting a predefined color from the provided pull-down list. When a color is selected from the pull-down list, the corresponding RGB values are displayed in the **`R`**, **`G`** and **`B`** boxes to the right.
- By entering the Red (**`R`**), Green (**`G`**) and Blue (**`B`**) values of the desired color as an RGB triplet. All three values must be in the range 0-255.

The user must click **`OK`** or **`Apply`** for any changes to take effect.

See also Text, Text Properties, Text Size.

Text Properties

Where	n/a
Path	Plot Area → Double-click Text
Modes	Normal, Early Orbit 1, 2a, 2b, 2c, Idle
Conditions	Data file loaded, Valid mode selected, Data plotted in **`Plot Area`**

`Text Properties` is a dialog box that allows the user to change the value, color, and size of a particular text object in the Plot Area. This includes all titles, axis titles, and annotations added by the user. If the text value is set to null (no text), the text object will be deleted from the plot area.

The **`Text Properties`** dialog provides three buttons to control its actions:

- **`OK`** applies the currently selected properties to the plot line and closes the dialog.
- **`Apply`** applies the currently selected properties to the plot line and keeps the dialog open.
- **`Cancel`** closes the dialog without applying the currently selected properties. Note, however, that any properties previously applied using the **`Apply`** button will remain in effect.

See also Annotate, Plot Area, Text, Text Color, Text Size.

Text Size

Where	n/a
Path	Plot Area → Double-click Text → Text Properties → Text Size
Modes	Normal, Early Orbit 1, 2a, 2b, 2c, Idle
Conditions	Data file loaded, Valid mode selected, Data plotted, Text object selected

The **`Text Size`** control is part of the Text Properties dialog. It allows the user to change a text object's font size to a value between 6 and 32, available through a slider widget.

The user must click **`OK`** or **`Apply`** for any changes to take effect.

See also Text, Text Color, Text Properties.

Thickness

Where	Plot Line Properties
Path	Plot Area → Double-click Plot Line → Plot Line Properties → Thickness
Modes	Normal, Early Orbit 1, 2a, 2b, 2c, Idle
Conditions	Data file loaded, Valid mode selected, Data plotted, Plot line selected

The **`Thickness`** control is part of the Plot Line Properties dialog. It allows the user to change a plot line's thickness to a value from 1 to 10, available through a slider widget. Note that if a line style of **`None`** is selected, this option will have no effect.

The user must click **`OK`** or **`Apply`** for any changes to take effect.

See also Line Style, Plot Line Properties.

Uplink Offset (Doppler, ASCII)

Where	Memory Dump
Path	Setup → Memory Dump → Uplink Offset (Doppler, ASCII)
Modes	Memory Dump
Conditions	n/a

See Memory/Uplink Offset.

Uplink Offset (Doppler, Binary)

Where	Memory Dump
Path	Setup → Memory Dump → Uplink Offset (Doppler, Binary)
Modes	Memory Dump
Conditions	n/a

See Memory/Uplink Offset.

Uplink Offset (Program, ASCII)

Where	Memory Dump
Path	Setup → Memory Dump → Uplink Offset (Program, ASCII)
Modes	Memory Dump
Conditions	n/a

See Memory/Uplink Offset.

Uplink Offset (Doppler, Binary)

Where	Memory Dump
Path	Setup → Memory Dump → Uplink Offset (Program, Binary)
Modes	Memory Dump
Conditions	n/a

See Memory/Uplink Offset.

User Plots

Where	Main Window
Path	User Plots
Modes	Normal, Early Orbit 1, 2a, 2b, 2c, Idle
Conditions	Data file loaded, Valid mode selected

The **`User Plots`** button provides a pull-down menu, generated at run-time, allowing the user to quickly select data parameters for commonly created plots. Each button in the pull-down menu will automatically select all data parameters for that plot while deselecting all other data parameters. This provides the user with a flexible and convenient way of selecting parameters for common plots without using the various Data Selection Dialogs to select each parameter individually.

For example, one common plot may be to display all voltage MUX parameters. This plot would display MUX ids 22, 23, 24, 25 and 26. If a **`User Plot`** called "Voltage" were defined with these parameters, the user would simply need to click `User Plots` → `Voltage`, then `Plot` in order to display that plot. The equivalent action using the normal controls would be as follows:

- Click `Utility` → `Reset Parameters`
- Click `MUX`
- Click checkboxes for MUX ids `22`, `23`, `24`, `25` and `26`
- Click `OK`
- Click `Plot`

`User Plots` are defined in the file `plots.dat`. If that file exists and contains valid **`User Plot`** definitions, they will be added to the **`User Plots`** pull-down menu when the software starts.

See also User Plots Data File.

Warm Load Heater

Where	Raw Data
Path	Raw Data → Warm Load Heater
Modes	Normal, Early Orbit 1, 2a, 2b, 2c, Idle
Conditions	Data file loaded, Valid mode selected

`Warm Load Heater` is a Data Selection Toggle. When turned on, it causes the redundancy mode (primary or backup) of the Warm Load Heater to be plotted as a Redundancy Plot in any time history plots.

See also Redundancy Plot, Selection Toggles.

Warm Load NEDT

Where	Main Window
Path	Cold Load NEDT
Modes	Normal, Early Orbit 1
Conditions	Data file loaded, Valid mode selected

The **`Warm Load NEDT`** button is a data parameter selection button. Clicking it produces a Data Selection Dialog allowing the user to select a number of channel NEΔTs (Noise Equivalent Delta Temperatures) to be plotted in the time history plot. This dialog is only valid in Normal and Early Orbit 1 sensor modes because the data required to calculate NEΔTs are only available in these modes.

See also Cold Load NEDT, Data Selection Dialogs.

Yaw Offset

Where	Misc
Path	Setup → Misc → Yaw Offset
Modes	Normal, Early Orbit 1, 2b, 2c
Conditions	n/a

`Yaw Offset` allows you to specify the satellite's Yaw offset in degrees from 0. This setting affects the geolocation of radiometric data on the earth. This can be used to fine-tune geolocation by viewing a map of a surface channel (e.g., Channel 1) and adjusting the Roll, Pitch, Yaw and Cone Angle offsets until coastline features line up with continental boundaries displayed on the map.

See also Cone Angle Offset, Pitch Offset, Roll Offset, Setup.

Zoom Out

Where	Zoom
Path	Zoom → Zoom Out
Modes	Normal, Early Orbit 1, 2a, 2b, 2c, Idle
Conditions	Data file loaded, Valid mode selected

Clicking **`Zoom Out`** will restore the Plot Area to the default view, showing all data in the current plot or map. In map mode, this will zoom out to show the entire world, regardless of whether the map had previously been generated to show a partial view.

See also Plot Area, Recenter, Regenerate Map, Zoom to Lat/Lon.

Zoom to Lat/Lon

Where	Zoom
Path	Zoom → Zoom Out
Modes	Normal, Early Orbit 1, 2a, 2b, 2c, Idle
Conditions	Data file loaded, Valid mode selected

Clicking **`Zoom to Lat/Lon`** will produce a dialog box with text entry fields to describe a latitude/longitude box on the world. Use this to zoom to a specific area when you want precise control or reproducible results. When using this zoom, the map image is regenerated to cover only the coordinates specified, just as with Regenerate Map.

When you zoom to a specific latitude/longitude range, EOSOH will save those coordinates to a data file called `sohzoom.dat`. For your convenience, the next time you wish to zoom to the

same coordinates, the dialog fields will be populated with the values saved in this file. Only the last zoom coordinates used will be saved for future use.

See also Map Image Size, Plot Area, Recenter, Regenerate Map, Zoom Out.

6. Files and Formats

6.1 Setup File

Each time a new EOSOH window is created, it looks for a file named `setup.dat`. If the file exists, any Setup parameters found in it will be loaded, overriding the program defaults. Use this file to store your site-specific defaults that will be used each time you run EOSOH. Simply save setup parameters to `setup.dat` and copy that file to any directory from which you will run EOSOH.

6.2 Report File

The format of the report filename is **`ssmis_xxxx_y_zzzzz.rpt`** where **`xxxx`** is the satellite ID, **`y`** is the SSMIS serial number, and **`zzzzz`** is the readout revolution number of the data file. This format may be overridden by setting the Default File Naming Convention to **`Bypass`**, in which case the report filename will be the same as the corresponding input data filename with a **`.rpt`** extension.

The report file is produced as a text file, with all data items clearly labeled. It is impossible to predict the exact format of any particular report file because the data items displayed depend on the types of data available in the input data file.

6.3 Output Data File

When the user saves currently displayed data using the Data File button, an IDL-readable savefile is produced. The savefile defines an IDL data structure called **`datastruct`** with three main elements:

- **`n`** (long integer): the number of unique data parameters saved in the file
- **`names`** (array of **`n`** strings): names of each of the **`n`** data parameters saved in the file
- **`data`** (array of **`n`** pointers): pointers **`n`** two-dimensional arrays of X-Y data

Each data array is packed as follows. The first dimension always contains two elements, representing X (data time) and Y (data value). X is index 0 and Y is index 1. The second dimension contains as many elements as there are data points in the array, representing the X and Y values.

The entire data structure may be read into IDL using IDL's built-in **`restore`** procedure.

Below is a simple example IDL program to read in such a savefile and plot each data parameter in a separate window. Of course, this is hardly necessary when EOSOH provides better plotting facilities, but it shows the mechanics of reading and using the savefile.

```
pro plot_savefile, savefile
      restore, savefile
      for i = 0, datastruct.n – 1 do begin
            window, i, retain=2
            plot, (*datastruct.data[i])[0,*], $
                  (*datastruct.data[i])[1,*], xtitle='Time', $
                  ytitle=datastruct.names[i]
      endfor
end
```

6.4 User Plots Data File

The User Plots feature is enabled by reading a file called `plots.dat` and populating the **`User Plots`** pull-down menu with valid plot definitions from that file. Additionally, the Automatic Mode of EOSOH reads plot definitions from the file `auto.dat`, which uses the same format. This section defines the format of that file so that you may edit or create it to specify your own custom plot types.

The `plots.dat` file is a simple text file, with one plot definition per line. Each line contains a comma-separated list of elements. The first is the name of the data parameter used for this custom plot. Valid data parameter names are:

- **`mux`**: MUX data parameters
- **`hk`**: HouseKeeping data parameters
- **`wlnedt`**: Warm Load NEDT
- **`clnedt`**: Cold Load NEDT
- **`gain`**: Gain
- **`beampos`**: Beam Position
- **`bybp:`** Plot By Beam Position
- **`counts`**:
- **`tb:`** Brightness Temperatures
- **`tb0:`** Antenna Temperatures
- **`device:`** Redundancy Plots

The second element is the custom plot name that you wish to give it. This can be anything you like. The plot will have this name under the **`User Plots`** pull-down menu.

The remaining elements in each plot definition are the data parameter numbers to select for plotting. Each of the above data parameter names may have the following valid data parameter numbers:

- **mux**: 1 through 31, representing MUX ids 1 through 28 and Warm Load PRTs 1 through 3.
- **hk**: 1 through 31, representing MUX ids 1 through 28 and Warm Load PRTs 1 through 3. Note that numbers 26 and 27 are not valid for HouseKeeping.
- **wlnedt**: 1 through 24, representing warm load NEΔTs for channels 1 through 24.
- **clnedt**: 1 through 24, representing cold load NEΔTs for channels 1 through 24.
- **gain**: 1 through 24, representing gains for channels 1 through 24.
- **beampos**: 1 through 452, representing beam positions 1 through 450, plus cold and warm calibration beam positions.
- **bybp**: should contain three or four parameters. First parameter should be 1 to turn on plot by beam position, 0 to turn it off. Second and third parameters should be low and high scan numbers over which each beam position will be averaged. Set this to 0 and a very high number to ensure that all scans will be included. Fourth parameter should be 1 if Normal mode beam positions should be scaled to physical positions (30/60/90/180 all on the same scale), 0 or unspecified for no scaling.
- **counts**: 1 through 24, representing counts for channels 1 through 24.
- **tb**: 1 through 24, representing brightness temperatures for channels 1 through 24.
- **tb0**: 1 through 24, representing antenna temperatures for channels 1 through 24.
- **device**: 0 through 5, corresponding to the following devices in order: 91 GHz Oscillator, 56 GHz Oscillator, Receiver, PLO Oven Power, Receiver Heater, Warm Load Heater.

For example, a line describing a plot of all voltage MUX parameters with a custom plot name of "Voltage" would be the following:

```
mux,Voltage,22,23,24,25,26
```

7. NOTES

7.1 Acronyms and abbreviations

The following acronyms and abbreviations are used in this document.

ASCII	American Standard Code for Information Interchange
CAGE	Commercial and Government Entity
CSC	Computer Software Component
CSCI	Computer Software Configuration Item
DMSP	Defense Meteorological Satellite Program
EDR	Environmental Data Records
EDRP	Environmental Data Records Processor
EOSOH	Early Orbit / State of Health Processor
GB	Gigabytes
GHz	Gigahertz
GPS	Ground Processing Software
ID	Identification
IDL	Interactive Data Language
MB	Megabytes
NEDT	Noise Equivalent Delta Temperature
NESDIS	National Environmental Satellite, Data, & Information Service
NOAA	National Oceanic and Atmospheric Administration
OLS	Operational Linescan System
PLO	Phase Locked Oscillator
RSDR	Raw Sensor Data Record
SDR	Sensor Data Records
SDRP	Sensor Data Records Processor
SSMIS	Special Sensor Microwave Imager/Sounder
SSP	Special Sensor Packet
SUM	Software User's Manual
UPDP	Update Processor
VERP	Verification Processor