S2G Data Viewer

User Manual

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	Name	Function	Signature
Prepared by	Ivo Carvalho	Project Manager	
Reviewed by			
Approved by			
Signatures and approvals on original			

DEIMOS Engenharia S.A.
Av. Columbano Bordalo Pinheiro, N. 75, Piso 9 A1
1070-061 Lisboa, Portugal
Tel.: +351 21 893 3010 / Fax: +351 21 896 9099
E-mail: deimos@deimos.com.pt

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1.A	First issue of the document.	29/03/2012	All
1.B	Updated the contents of the document to cover the new features developed under CCN1, namely:	21/06/2013	All
	- Quality Report		§ 5.9
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	- On-demand quality check		
	- Find data unit		
	- Execution of external scripts		
	- Propagate errors from ISPs and TFs to upper levels		
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	- Limit Display;		
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	- set error colour;		
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	- How to install S2G in Mac		§ 3.2
	- New output error		§ 4.1.4
	- New labels in “Highlight Data Unit Error” (Preferences)		§ 4.1.7
	- Different display help page for linux		§ 4.1.8
	- Progress bar when loading files		§ 5.6

1.H	- Add Time Code Field' as UTC Time Code	24/06/2019	§ 4.1.4
	- Add time displayed as UTC time string		§ 4.1.5
	- Add command line arguments section		§ 6
1.I	Content removed and referenced to section 3.3 of [RD.3]	20/04/2020	§ 5.13
1.J	Updated screenshots	05/09/2022	
1.K	Updated the contents of the document to cover the new features developed under contract No. 4000141470/23/NL/CT, namely:	22/08/2024	
	- CCSDS 727.0-B-4 reference document [RD.4]		§ 2.2
	- new section for CFDP Extension nesting levels		§ 3.1.1
	- new section for CFDP Extension in Data Unit List view		§ 4.1.4.1
	- new section for CFDP Extension in mission schemas		§ 4.2.3
	- new section for CFDP Extension, new transformation		§ 5.11.1
	- Menu Contents with new Concatenate feature and updated respective [Figure 6]		§ 4.1.2.1
	Annotated ISP to ISP and Annotated CADU to CADU was not described		§ 5.11
	Replaced "Error! Reference source not found" in previous versions of this document with correct reference		§ 5.15
	Removed duplicated Menu Details [Figure 6] and misplaced from last UM update		§ 4.1.2.1
	Minimum System Requirements, Disk Space updated		§ Table 4

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1. INTRODUCTION

The Space to Ground Data Viewer (S2G) [AD.1, AD.2, AD.3, AD.4, AD.5, AD.6, AD.7] is an extensible utility tool to support ground systems engineers during the test campaigns to inspect the contents of the communication channels between the signal-in-space and the ground systems apparatus.

This manual provides detailed information on how to use S2G to inspect files storing CADUs, TFs and ISPs. Apart from describing the several components of the S2G application itself, this manual provides also information about nominal operations and procedures to extend S2G to support other missions (i.e. data formats).

The following sections of this document are organized as follows:

- Section 2 lists applicable and reference documents
- Section 3 provides instructions to install and launch the application.
- Section 4 presents the several components of S2G.
- Section 5 provided a detailed description of the S2G operations and related customization procedures.
- Section 6 shows some troubleshooting procedures.

1.1. Acronyms and Abbreviations

The acronyms and abbreviations used in this document are the following ones:

Acronym	Description
CADU	Channel Access Data Unit
DME	DEIMOS Engenharia
GUI	Graphical User Interface
ISP	Instrument Source Packet
S2G	Space to Ground
SoW	Statement of Work
TF	Transfer Frame

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2. RELATED DOCUMENTS

2.1. Applicable Documents

The following table specifies the applicable documents that shall be complied with during project development.

Table 1: Applicable documents

Reference	Code	Title	Issue
[AD.1]	S2G-DME-TEC-TNO005	S2G Data Viewer Technical Note: Technical Specification	1.A
[AD.2]	S2G-DME-RCR-ECP032	S2G Data Viewer: Proposal for CCN1 Activities	1.B
[AD.3]	S2G-DME-RCR-ECP056	S2G Data Viewer: Proposal for CCN2 Activities	1.C
[AD.4]	S2G-DME-RCR-ECP075	S2G Data Viewer: Proposal for CCN3 Activities	1.B
[AD.5]	S2G-DME-RCR-ECP094	S2G Data Viewer: Proposal for CCN5 Activities	1.B
[AD.6]	S2G-DME-RCR-ECP111	S2G Data Viewer: Proposal for CCN7 Activities	1.A
[AD.7]	S2G-DME-RCR-ECP117	S2G Data Viewer: Proposal for CCN8 Activities	1.A

2.2. Reference Documents

The following table specifies the reference documents that shall be taken into account during project development.

Table 2: Reference documents

Reference	Code	Title	Issue
[RD.1]	S2G-DME-TEC-TNO014	Technical Note: DFDL for S2G	1.F
[RD.2]	ECSS E-70-41	Ground systems and operations - Telemetry & telecommand packet utilisation	
[RD.3]	S2G-DME-TEC-SUM092	Mission Specification Schemas Developer's Manual	1.C
[RD.4]	CCSDS 727.0-B-4	CCSDS File Delivery Protocol (CFDP) https://public.ccsds.org/Pubs/727x0b5.pdf	

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3. GETTING STARTED

3.1. Introduction

Satellite house-keeping telemetry or science instruments data is transmitted to the ground sensor stations in a packets hierarchy (see Figure 1) that is defined according to a standard format, e.g. [RD.2]. Based on that standard format, each mission customizes the packets hierarchy to according to its specific needs and instruments.

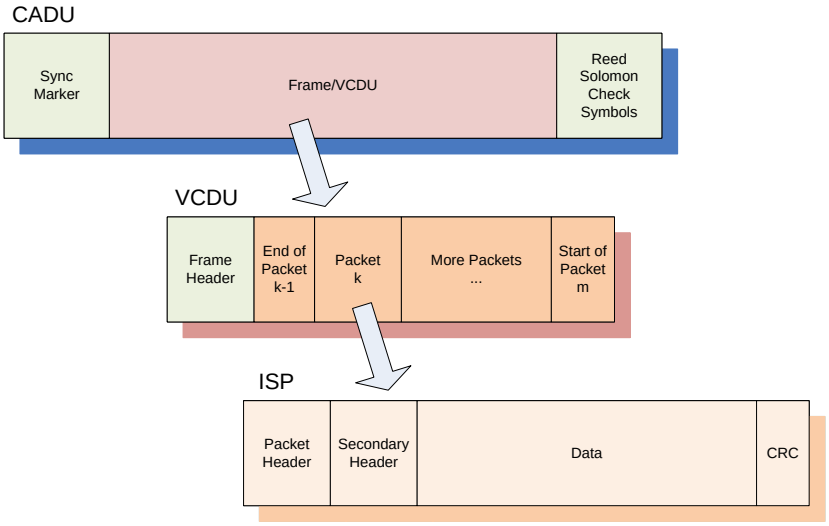


Figure 1: Hierarchy of Data received by the Ground Sensor Stations

The Space to Ground Data Viewer (S2G) displays the contents of the communication channels between the signal-in-space and the ground systems apparatus. It interprets files containing concatenated CADUs, TFs or ISPs, and lists of available data units and displays the fields and associated values inside each data unit. The tool also provides a hexadecimal viewer to allow low-level data inspection.

This document uses the designation of *data unit* when the type of the data item (CADUs, TFs or ISPs) is not relevant for the context.

3.1.1. CFDP Extension

The CCSDS File Delivery Protocol (CFDP) operates at the Application Layer of the ISO protocol stack and provides a file based service that transfers data to Ground. CFDP generates a sequence of Protocol Data Units (PDUs) containing File Metadata, a sequence of data PDUs (containing file segments) followed by and End-of-File PDU.

See [RD.4] for further information.

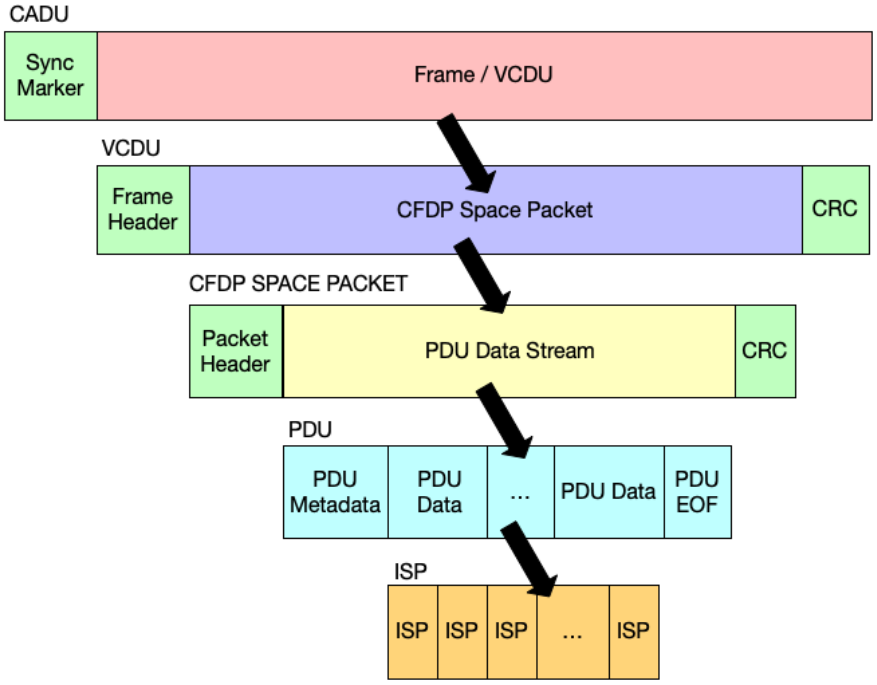


Figure 2: Hierarchy of Data received by the Ground Sensor Stations (CFDP Extension)

3.2. Installation

To install S2G proceed as follows:

Linux & Windows

1. Unzip the distribution archive (list of available archives Table 3) into the installation directory.

Mac OS

1. Open dmg and drag the s2g folder from the dmg window into Application folder.

To start the application, follow the instructions in Section 3.3 (How to Start S2G).

S2G is available for several platforms. Please use the version supporting your platform (according to Table 3). The installation should consider the minimum requirements presented in Table 4. The platforms presented have been used to support testing activities.

Table 3: Installation Archives

Archive	Supported Platform
s2g-linux.gtk.x86_64.zip	Linux (64 bit)
s2g-macosx.cocoa.x86_64.dmg	Mac OS (64 bit)
s2g-win32.win32.x86_64.zip	Windows (64 bit)

Table 4: Minimum System Requirements

Platform	Requirements	
Linux (64 bit)	RAM: Disk Space: Dependencies:	2 GB 258 MB Java 11
Mac OS (64 bit)	RAM: Disk Space: Dependencies:	2 GB 248 MB Java 11
Windows (64 bit)	RAM: Disk Space: Dependencies:	1 GB 243 MB Java 11

3.3. How to Start S2G

S2G supports multiple platforms, namely Windows, Linux and Mac OS. Following are instructions to start using the tool in each of these platforms, considering that the S2G has been previously installed (see section 5.1 for details on how to perform the installation). After launch, the S2G application window shall be presented as displayed in Figure 3.

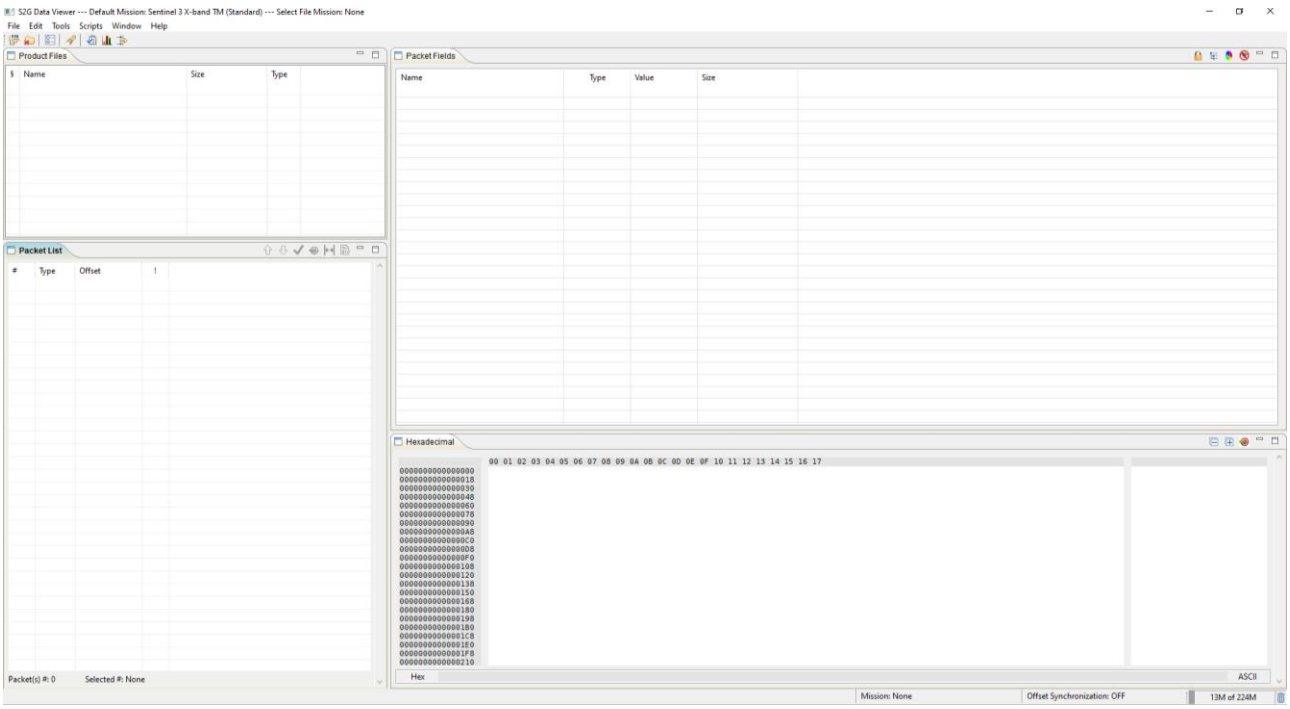


Figure 3: S2G Data Viewer Application Window[1]

[1] The Eclipse RCP framework used to develop S2G shall render graphical widgets differently in order to integrate the current operating system look-and-feel. The figures shown in this manual have been rendered using the Linux platform.

3.3.1. Windows

To start S2G on Windows, follow these steps

1. In the Windows Explorer, navigate into the installation directory
2. Double click the ”s2g.exe” application to start S2G

3.3.2. Linux

To start S2G on Linux, follow these steps

1. In the System Explorer (e.g. Nautilus), navigate into the installation directory
2. Double click the ”s2g” application to start S2G

3.3.3. Mac OS

To start S2G on Mac OS, follow these steps

1. In the Finder, navigate to the installation directory
2. Double click the ”s2g” application to start S2G

3.4. Inspection of Data Unit Files

The S2G Main Window provides all the functionalities supporting the inspection of files storing CADUs, TFs and ISPs. Follow through to the section 4 for a detailed presentation of the interface components. For information about configuring and operating S2G refer to section 5.

4. S2G DATA VIEWER

S2G is composed of a window GUI that contains several views, each presenting different details of the data stored in the binary data files – details of this GUI are presented in section 4.1.

The mission configuration files are described in section 4.2. The configuration file is an XML file that provides information required by the GUI to display the data. The definition of the mission binary data, namely the data fields for CADU, TF and ISPs, is defined using DFDL [RD.1].

4.1. S2G GUI

4.1.1. Application Window

The S2G graphical user interface is composed of a main application window that contains several views used to display specific information about data files. The application main window also provides the application menu and a tool bar with shortcuts to most common actions.

Figure 4 highlights the following components of the main application window:

1. Menu
2. Tool bar
3. Product Files View
4. Data Unit List View
5. Data Unit Details View
6. Hexadecimal View
7. Status Bar
8. Memory Indicator

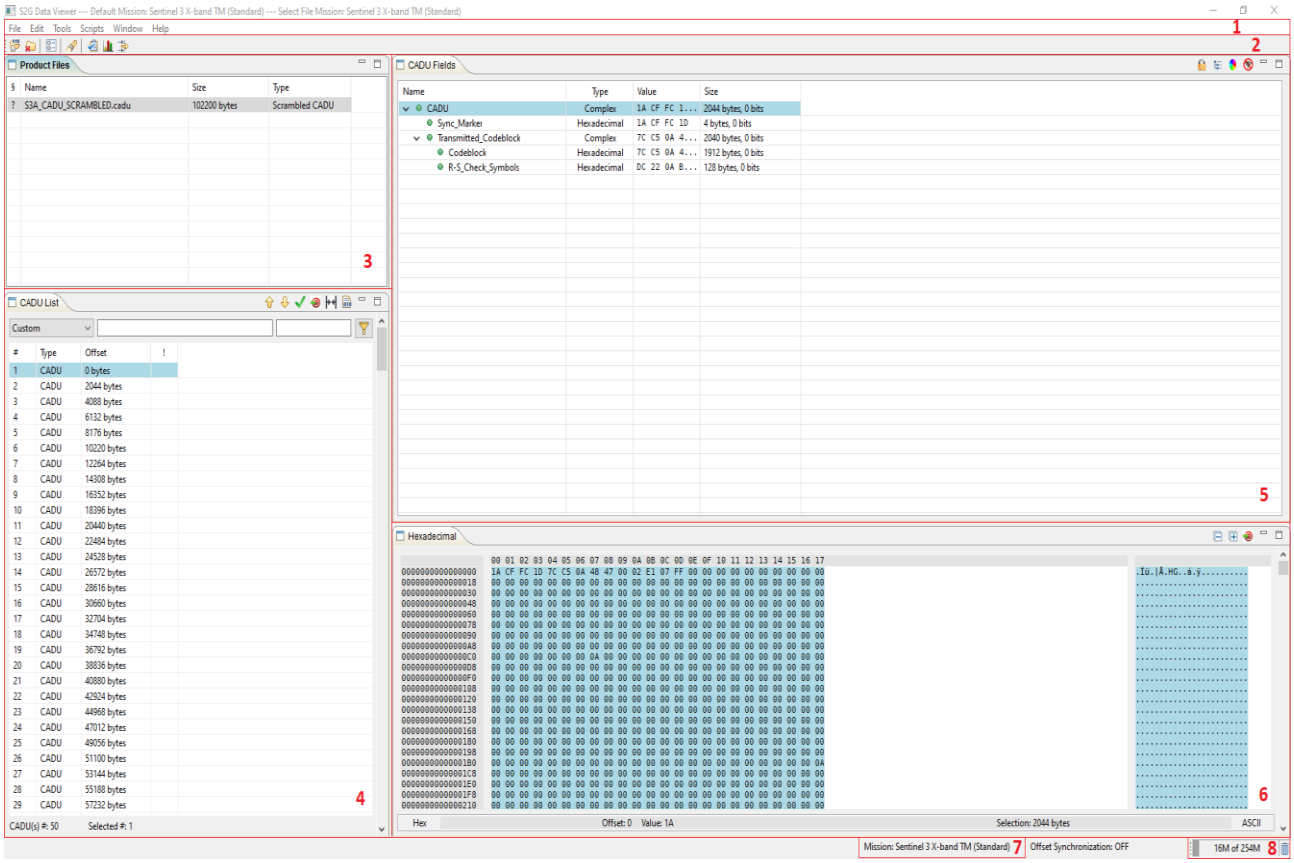


Figure 4: Components of the Application Window

S2G has been developed using the Eclipse RCP framework which renders graphical widgets differently depending on the underlying operating system. As such, the operating system configurations, namely the windows style and font selection, are expected to change the application's look-and-feel.

4.1.2. Menu and Toolbar

The menu and toolbar shown in Figure 5 enable the user to operate the tool. They provide actionable menu items and buttons that allow operations such as open and close product files, or configure the active mission.

Figure 5: Menu and Toolbar

4.1.2.1. Menu Contents

The main menu provides six sub-menus each containing specific operations – as presented in Figure 6. The menu is organized as follows:

- Main Menu, contains sub-menus:
  - *File*, with operations
    - *Open File*, opens a selection dialog enabling the user to choose the file to open – see section 5.6 for details on how to open a file.
    - *Close File*, closes the currently selected file – see section 0 for details on how to close a file.
    - *Export, outputs to file the data units currently limited in the Data Unit List.*
    - *Exit*, closes the application.
  - *Edit*
    - *Preferences…*, opens the preferences dialog to edit the tool configuration
    - *Mission Configuration…*, opens the configuration dialog to manage mission configuration files.
  - *Tools*
    - *Transform*, opens the transformation dialog to transform the currently selected file
    - *Transform File…*, opens the transformation dialog to transform the file to be selected by the user
    - *Concatenate*, concatenates the currently selected files into a single data file
    - *Show Report*, starts the analysis of the selected file to produce a data quality report
    - *Batch Report*, produces a data quality report for a selected set of files or folders containing a given data type files.
    - *Show Plot*, starts the analysis of the selected file to produce 2D data plot
    - *Mask Editor*, launches the support tool to help define the synchronization masks.
  - *Scripts*
    - *Execute Script*, shows the list of scripts available for execution on S2G. The selected script shall be executed over the selected product file.
  - *Window*
    - *Reset Views*, allows the user to reset the default location of the several views.
    - *Toggle Find Bar*, shows/hides the find bars associated with field details and hexadecimal views.
  - *Help*
    - *Open Help*, displays the S2G help page
    - *Documentation*, links to support documentation for S2G/DFDL.
    - *About S2G*, displays the S2G development credits dialog.

- *Check for updates*, connects to S2G server to check for an updated version of the software or the mission configuration files.

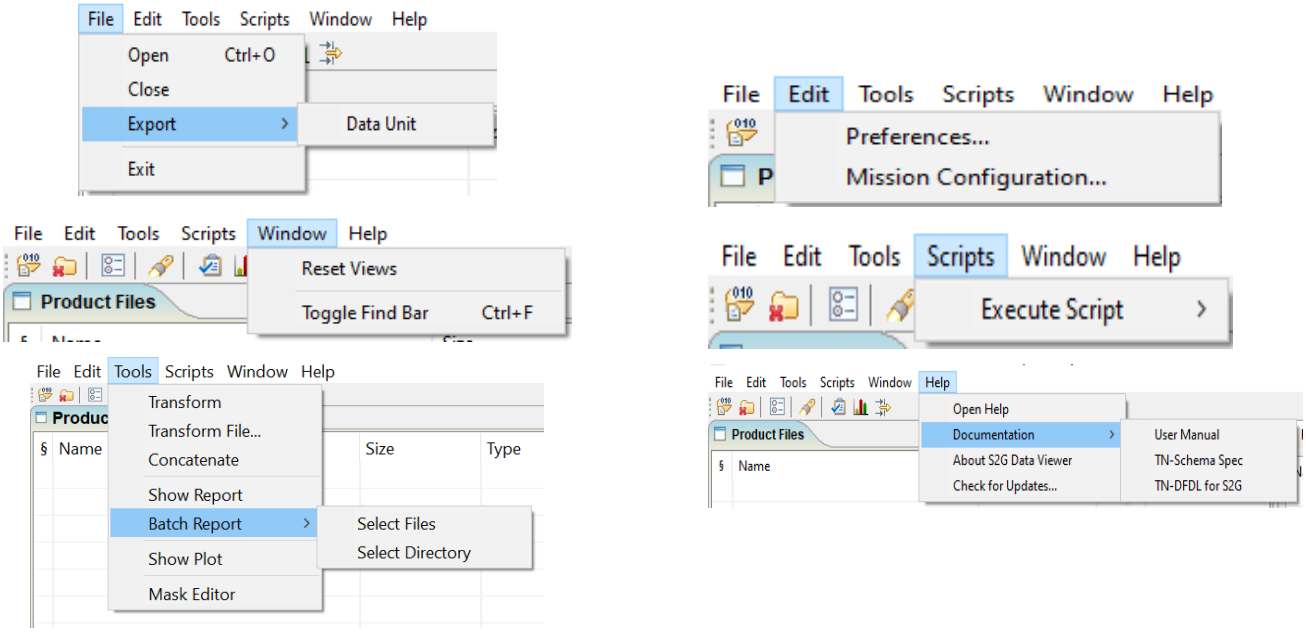


Figure 6: Menu Details

4.1.2.2. Toolbar Contents

The toolbar provides easy access to usual operations. As observed in Figure 7, the following operations are available (in sequence):

- *Open File*
- *Close File*
- *Edit Preferences*
- *Toggle Find Bars*
- *Show Report*
- *Show Plot*
- *Transform*

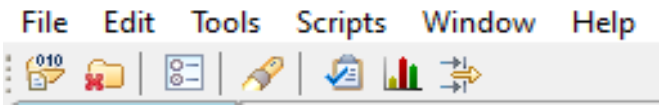


Figure 7: Toolbar Details

4.1.3. Product Files view

The Product Files view (presented in Figure 8) displays the list of open files in a tabular form. The view provides information about file size and, when hovering the mouse pointer over the file name, shows a tooltip with the complete file path. Additionally the view contains a visual clue on whether the file has already been checked for errors by producing the Quality Report (refer to section 5.9) – 'V' for checked, '?' for not yet checked.

Apart from displaying the list of open product files, this view is used to select the files to inspect. Using the mouse (or the cursor keys, if the view is in focus), the user can select a particular file. Selecting a file will result in the automatic update of all other views.

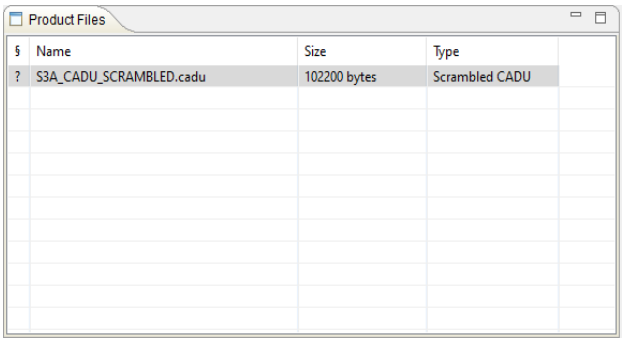


Figure 8: Product View

4.1.4. Data Units List view

The list of data units stored in the currently selected product file is provided by the view shown in Figure 9. As can be observed in the figure, the overall structure of the view is the same for all types of data units, consisting of a tabular display of the content items.

The display provides default columns for all types of contents: data unit order inside the file; type of data, offset from the beginning of the file and lower level error indicator (active when the "Show internal code block structure" toggle button is enabled – refer to section 4.1.5). The mission configuration allows adding additional columns to the displayed data (refer to section 5.13 for customization details). For the default missions, the values of the following fields are added to the list:

- For TF, display Virtual Channel Id and Virtual Channel Frame Count
- For ISP, display Source Sequence Counter, APID and Time Code Field

For ISP, assume the value for the column 'Time Code Field' as UTC Time Code.

In order to help the user to identify related items, S2G provides a colour coding scheme. The colour coding scheme uses the value of one of the additional columns, as defined by the user in the configuration. Packets with the same value are painted in the same colour. The examples in Figure 9 show the colour coding applied to TFs and ISPs.

Further details on how to define additional columns and specify colour coding are provided in section 5.13.

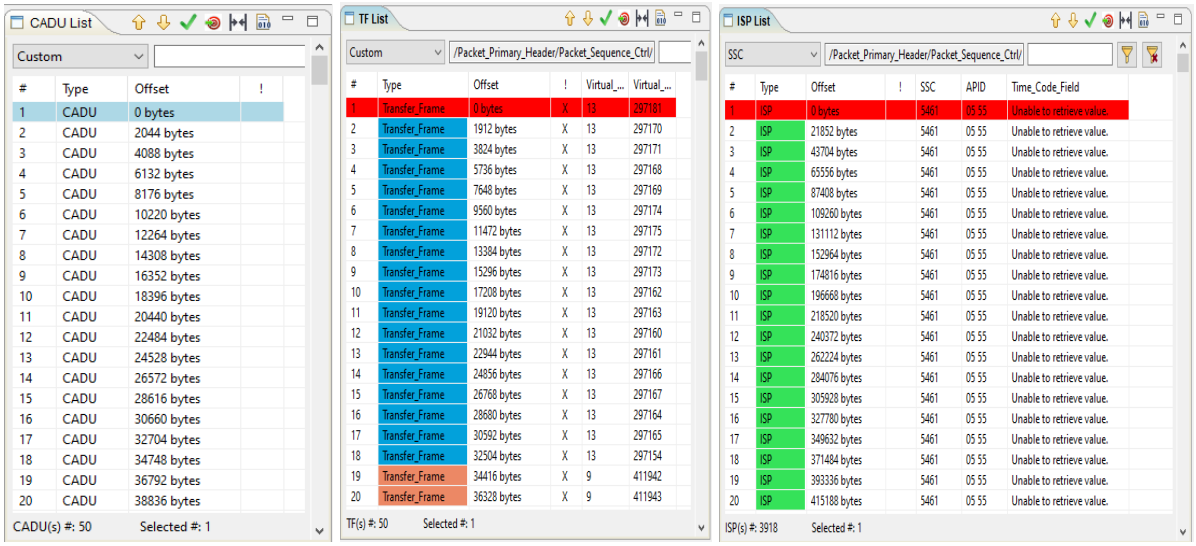


Figure 9: Data Units List View

The Data Units List enables the user to select a data unit by: clicking over the data unit with the mouse; through cursor keys (when the view is in focus); or pressing next/previous buttons – see Figure 11. Upon selection of a unit, the data unit details view and hexadecimal view are automatically synchronized with the newly selected item: the data unit details view displays the internal structure of the item; and the hexadecimal view auto-scrolls the show the beginning of the item.

After selecting a specific field in the Content Details view, the user can re-focus the selection on the content item by double-clicking on the item – this action clears any existing field selection.

This view enables four functionality buttons:

- *On demand quality check* (signalled by a check mark): apply the Reed-Solomon check (at CADU level) or the CRC check (TF level) for the selected data unit. Upon executing the quality check the status of the RS and CRC fields in the Data Unit details view changes depending on the result of the check (refer to section 4.1.5). The check applies only for the data level of the open file, i.e., if a CADU file is open displaying also the CRC fields of the underlying TF, then the quality check shall only apply to the RS at CADU level;
- *Find data unit* (signalled by the bull's-eye mark): allows jumping to a given data unit given its order number inside the file. When this function is activated the indication "Jump to data unit:" is displayed in a dialog box allowing the user to enter the intended unit number. When a number (between the possible range) is given, it shows the selected item. If the number provided is not in the possible range, it shows a warning saying "Data unit out of range". A warning is also showed when the index is not valid. The action can be cancelled with the "Esc" key.

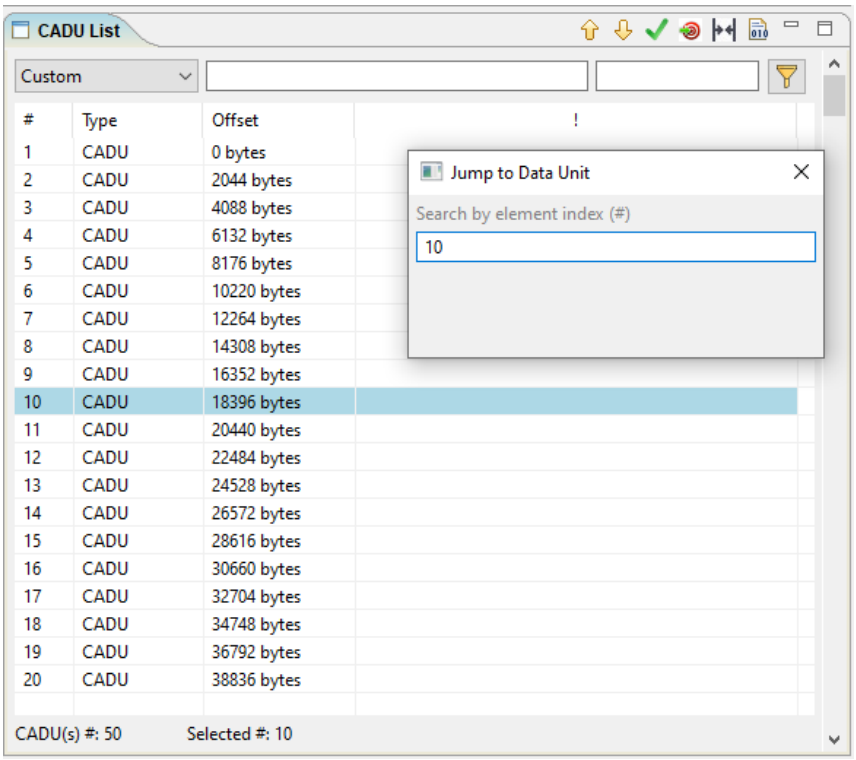
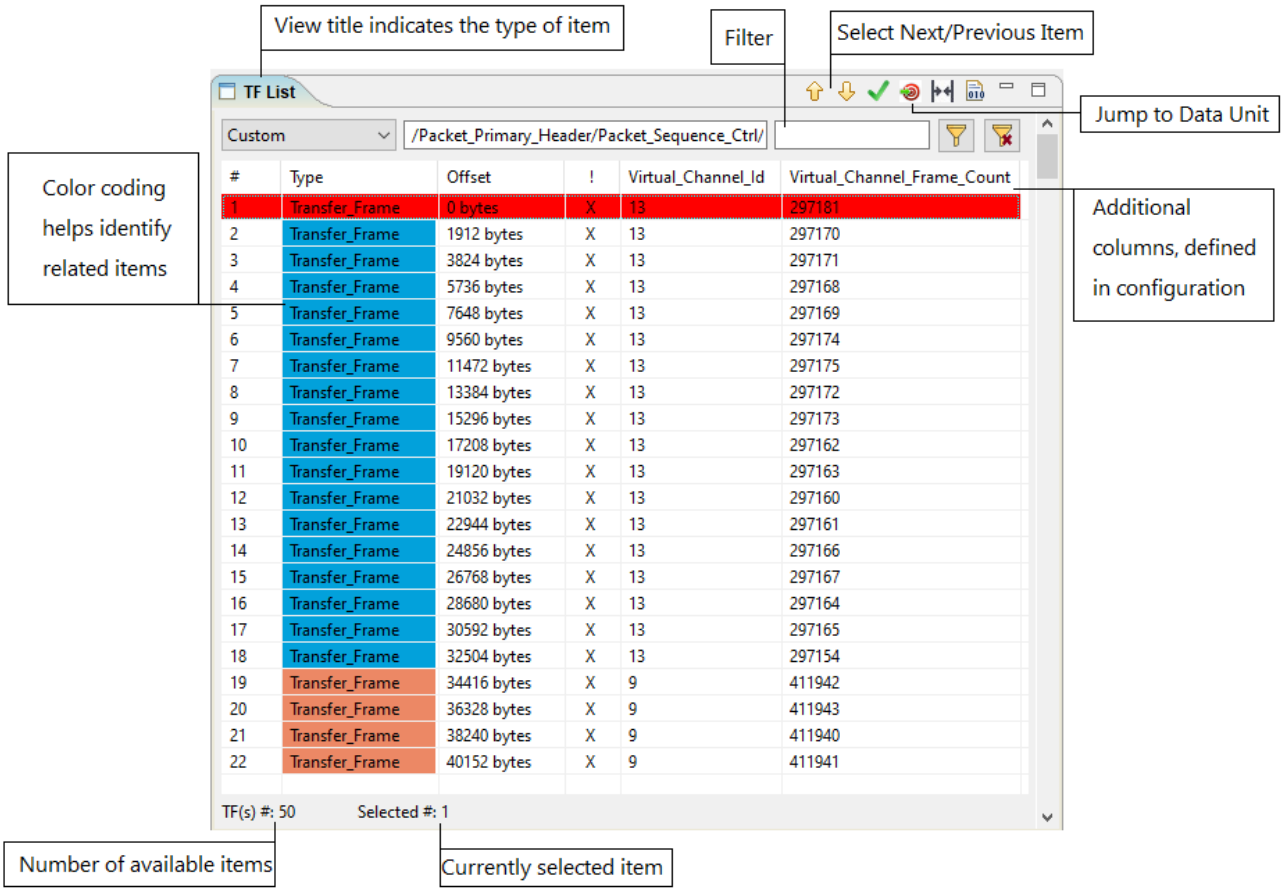


Figure 10: Jump to Data Unit

- *Limit Range* (signalled by the narrowing icon): allows limiting the display of data to a given time window. The user is requested an interval of data unit numbers and the Data Unit List shall display only the data units within that interval. This limitation can then be switched on/off.
- *Export Range (signalled by the file icon):* outputs to file the data units currently limited in the Data Unit List (as per the *Limit Range* capability).

The Filter area allows writing on a text box for searching any data on the file depending on the available field selected from the combo box that follows the mission configuration or by selecting Custom for a customized search criteria.

This view provides an information bar in the lower part of the window, were the number of available units is displayed. The information bar also displays the order index of the currently selected unit. The latter is a helpful indication to the user as the unit selection is not affected when the unit goes out of view.



#	Type	Offset	!	Virtual_Channel_Id	Virtual_Channel_Frame_Count
1	Transfer_Frame	0 bytes	X	13	297181
2	Transfer_Frame	1912 bytes	X	13	297170
3	Transfer_Frame	3824 bytes	X	13	297171
4	Transfer_Frame	5736 bytes	X	13	297168
5	Transfer_Frame	7648 bytes	X	13	297169
6	Transfer_Frame	9560 bytes	X	13	297174
7	Transfer_Frame	11472 bytes	X	13	297175
8	Transfer_Frame	13384 bytes	X	13	297172
9	Transfer_Frame	15296 bytes	X	13	297173
10	Transfer_Frame	17208 bytes	X	13	297162
11	Transfer_Frame	19120 bytes	X	13	297163
12	Transfer_Frame	21032 bytes	X	13	297160
13	Transfer_Frame	22944 bytes	X	13	297161
14	Transfer_Frame	24856 bytes	X	13	297166
15	Transfer_Frame	26768 bytes	X	13	297167
16	Transfer_Frame	28680 bytes	X	13	297164
17	Transfer_Frame	30592 bytes	X	13	297165
18	Transfer_Frame	32504 bytes	X	13	297154
19	Transfer_Frame	34416 bytes	X	9	411942
20	Transfer_Frame	36328 bytes	X	9	411943
21	Transfer_Frame	38240 bytes	X	9	411940
22	Transfer_Frame	40152 bytes	X	9	411941

Figure 11: Details of the Data Unit List View

When S2G detects problems or inconsistencies in a data unit, it is highlighted in the view as follows:

- data units with problems in data stream synchronization, are highlighted by the entire background of the row in red - Figure 12 (this colour can be consulted in the Preferences, refer to section 4.1.7).
- data units with schema syntactic errors (such as expressions malformed or element paths not found), are highlighted by the entire background of the row in orange - Figure 13 (this colour can be consulted in the Preferences, refer to section 4.1.7).
- data units with minor inconsistencies (such as having fields with unexpected values), are highlighted using a red font - Figure 14 (this colour can be configured in the Preferences, refer to section 4.1.7).

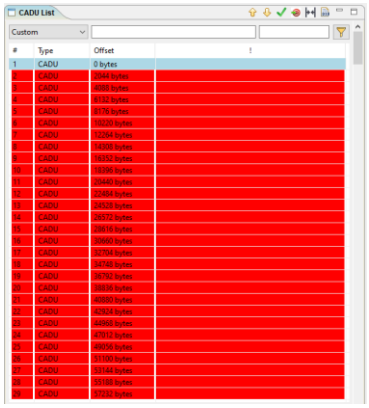


Figure 12: Data stream synchronization error highlighting (red background) in the Data Unit List View.

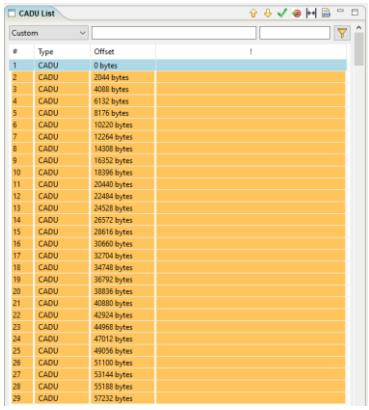


Figure 13: Schema syntactic error highlighting (orange background) in the Data Unit List View.

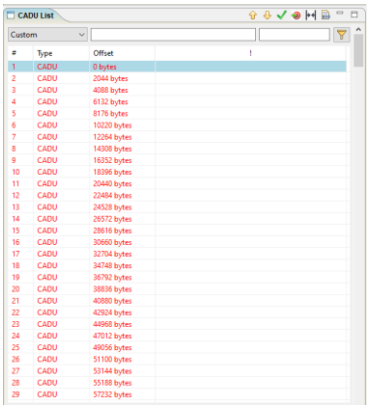


Figure 14: Minor inconsistencies error highlighting (red font) in the Data Unit List View.

S2G identifies idle data units highlighting them in the list with an italic grey font.

4.1.4.1. CFDP Extension

Two additional data unit types (CFDP Space Packet and CFDP PDU) are available.

For CFDP PDU data unit types an additional functionality button is available in the Data Unit List view:

- Transition Id List (signaled by icon): allows to jump to Transaction ID List tab. The tab shows the list of transaction IDs available in the PDU stream, the filename and file status (COMPLETE=file complete, INCOMPLETE=data gaps present in file).

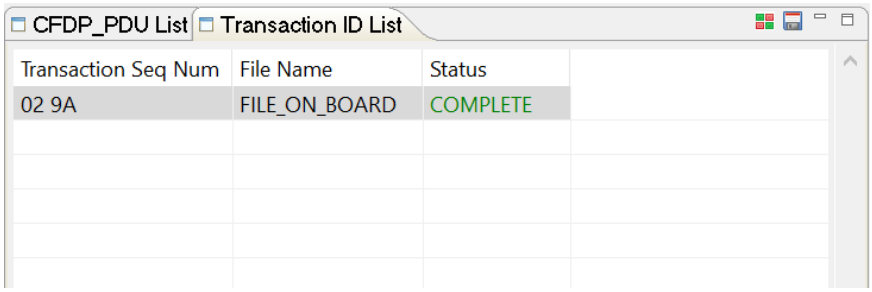


Figure 15: Transition Id List

This tab enables 2 functionality buttons:

- Completion Map: The completion map (signaled by icon) displays whether the File Data PDUs are complete or present gaps (at byte level). The information to check the presence of gaps is retrieved from relevant size fields in Metadata/EOF PDUs and Segment offset field in File data PDUs.

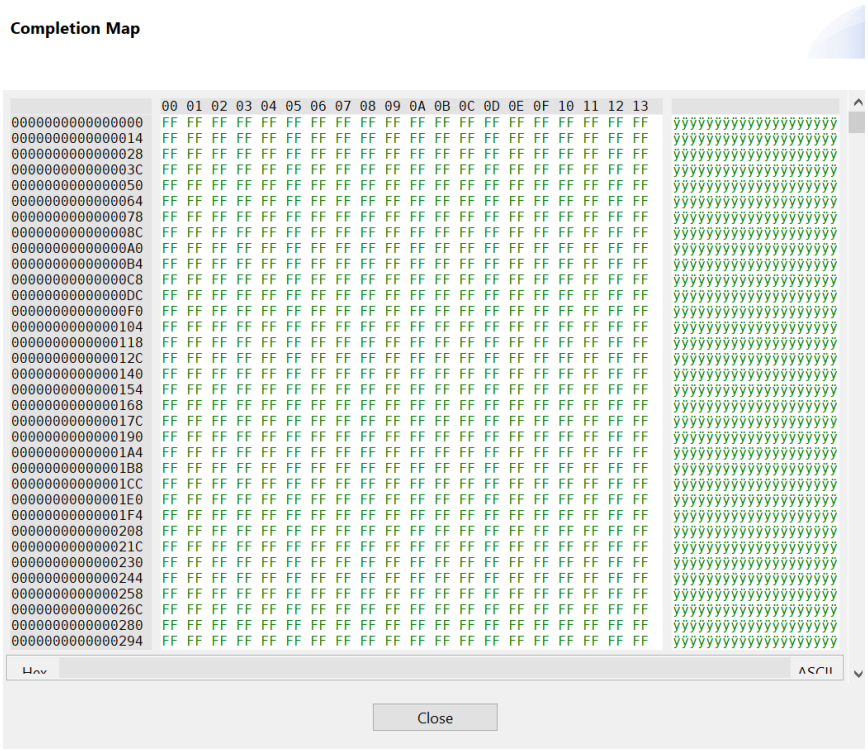


Figure 16: Completion map

- Save File Data (signaled by a save-to-disk icon): Outputs to a file the contents of the File Data PDUs units (thus excluding File Directive PDUs, e.g. Metadata and EOF PDUs).

4.1.5. Data Unit Details view

Each data unit inside a file is defined in the mission data schema through a hierarchical structure, in which leafs are the actual fields of the item. These fields are then grouped into sequences of fields, or with other groups. The hierarchical structure of each item is displayed in the Contents Details view – Figure 17 shows the content of an ISP.

The hierarchy of nodes can be expanded to display details of field organization and values. Each element of the hierarchy is represented in a tabular way, with the following attributes:

- The name
- The type of the representation (this type is defined by the user, and defines how the value is represented in the value column.
- The value, according to the type of representation
- The size of the element (the actual size of the element if a field; otherwise the sum of the size of child elements).

The values are represented according to default representation types specified in [RD.1]. To enhance data inspection, the tool displays a tooltip (as shown in Figure 17) that shows alternative representations of the field values in *Binary*, *Hexadecimal* and *Unsigned Integer*.

When representation type is of 'Time' type, time is displayed as UTC time string (as shown in Figure 17).

In the *Binary* representation the octets assigned to the field are fully represented, replacing the irrelevant bits with a '.'. For both *Hexadecimal* and *Unsigned Integer* representations the underlying octets is cleaned of the irrelevant bits and then right shifted before displayed in the tooltip.

Each element representing a field or a group of fields can be selected using the mouse or the cursor keys (when view is in focus). When an element is selected, the bytes in which it is stored are highlighted in the Hexadecimal view.

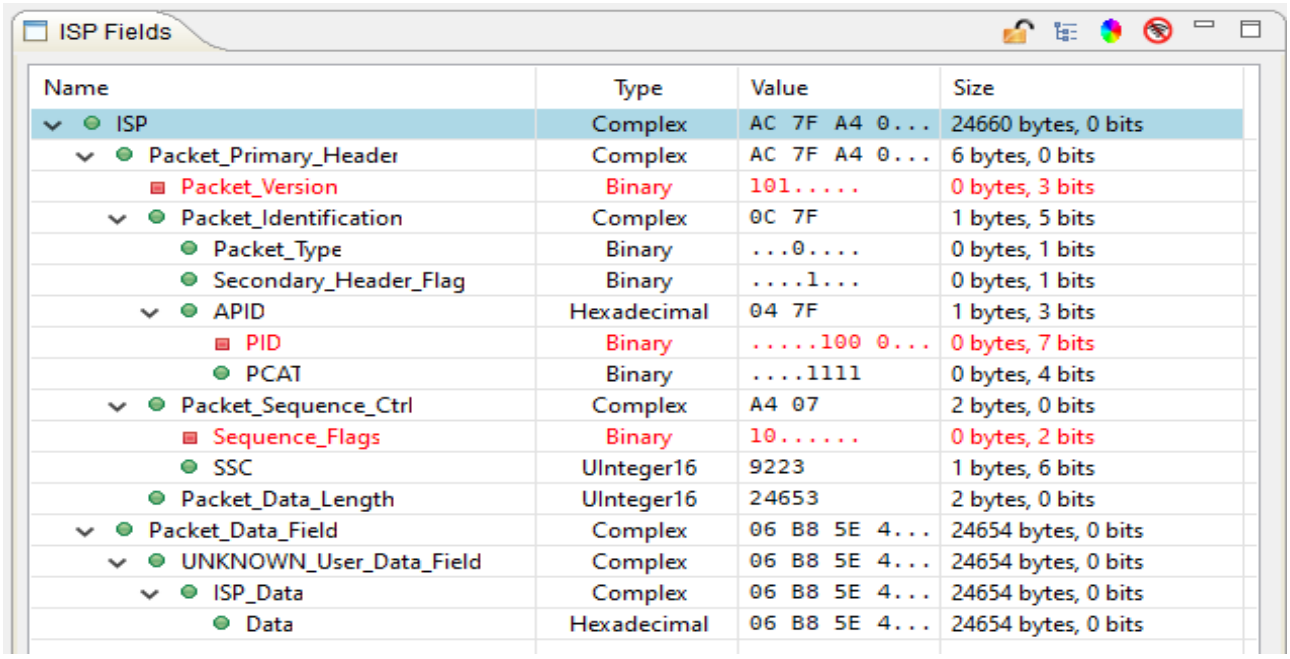


Figure 17: Contents Details View (ISP Example)

When S2G detects inconsistencies in a data unit field, the field is highlighted by being show in red (as shown in Figure 17).

Error detection fields like Reed-Solomon field in CADUs or CRC field in TF are highlighted by being shown in blue. This colour means the quality check hasn't been performed for that particular data unit. Upon performing the quality check either by generating a report or by using the on-demand quality check functionality (see section 4.1.4) the colour shall change to red in case of failed check or green in it passed.

The underlying tree structure that supports the contents details can be expanded or collapsed using the tree button on the top right corner. The lock button enables/disables showing internal block code structure (e.g. in a TF showing the contained ISPs).

The view enables four functionality buttons:

- *Show internal code block structure* (signalled by a lock icon): show/hide the underlying structure of data levels contained in the current file data level (e.g. ISPs inside a TF);
- *Expand/Collapse the entire tree structure* (signalled by the hierarchy icon);

- *Show Packet Details Colouring* (signalled by the colour palette icon): Colours the tree structure highlighting the predefined sections of the shown packet;
- *Visually propagate lower level errors* (signalled by the beacon icon): highlight in error indication dolour the whole path from the lower level field containing an error up to the tree structure top.

4.1.6. Hexadecimal view

The Hexadecimal view, shown in Figure 18, displays the bytes of the files in two areas, indexed by the offset from the beginning of the file:

- On the left, a table with the bytes/octets (displayed in hexadecimal)
- On the right, a table with the text representation of the file contents.

In order to assist inspection of the file contents it is important to map the structure of the file contents (i.e. CADUs, TFs, and ISPs) to the actual raw data. The Hexadecimal view provides this mapping mechanism. This view provides the following highlights.

- The bytes related to the selected item in the Contents List View are highlighted – the fields directly below the parent node of the hierarchy are highlighted with different colours. Figure 18 shows these fields (usually representative of *standard packet sections*) in green, yellow and blue.
- The bytes related to the selected element in the Content Details View are highlighted. This selection is represented in pink on Figure 18.

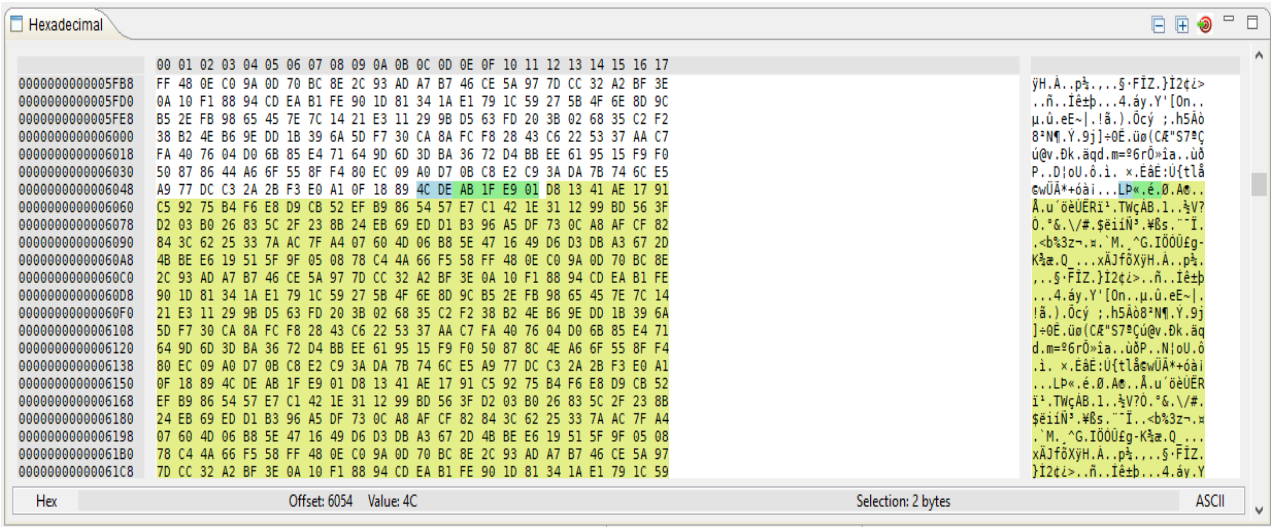


Figure 18: Hexadecimal View with Standard Sections

Additionally to the automatic highlight provided by S2G, the user can also select a group of bytes using mouse gestures (i.e. click-and-drag selection). When performing mouse selection, the selected area is highlight in grey.

Besides selection, the tool allows a *jump to* functionality in which the user can jump to the item related to a specific byte. This functionality is activated by double-clicking on a previously mouse selected area. This action results in automatic selection of the item in the Content List View and auto-scroll of the

Hexadecimal view to the beginning of the selected item. Any field selection in Content Details view is cleared by this action.

The hexadecimal view provides an information bar with information about the current selection. Notice that the provided information (*Offset*, *Value* and *Selection*) is related to: in first place, the mouse selection if any; otherwise the information represents the selection related to the field in Content Details view.

The values of the offsets on the left of the octet table and, on the information bar, the offset and value of current selection can be displayed in either decimal or hexadecimal. To toggle between these two modes, the user has just to double click over the Representation label – "Hex" on the bottom left of Figure 18. The value of the label is either "Hex" or "Dec" according to selected representation (Hexadecimal or Decimal, respectively).

The Hexadecimal view also provides functionality to *Find Position* (signalled by the bull's-eye mark in Figure 20): allowing jumping to a given data unit given its offset. When this function is activated the indication "Jump to data unit:" is displayed in a dialog box allowing the user to enter the intended offset either in Hexadecimal or Decimal format, depending on the selected display mode. When a number (between the possible range) is given, it shows the selected item. If the number provided is not in the possible range, it shows a warning saying "Data unit out of range". A warning is also showed when the index is not valid. The action can be cancelled with the "Esc" key.

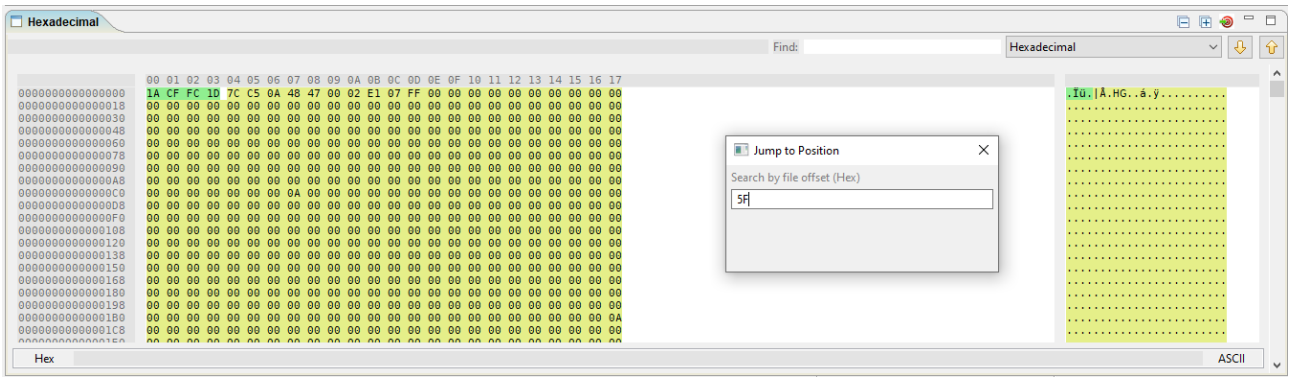


Figure 19: Jump to Position

The user can modify the number of columns visible, by clicking on the plus/minus buttons on the top right of the view.

For the specific case of Transfer Frames, the Hexadecimal View highlights the first byte of the instrument source packet that begins in the frame data. This byte is highlighted by placing a red box at the octet corresponding location (see near mouse pointer in Figure 20)

Figure 20: Hexadecimal View with First Packet in TF

4.1.7. Preferences

The preferences or configuration parameters of the tool can be updated by activating the menu item "Edit" → "Preferences" to display the preferences page. The dialog to select the active mission is shown in Figure 21. More details on how to select active mission on section 5.4.

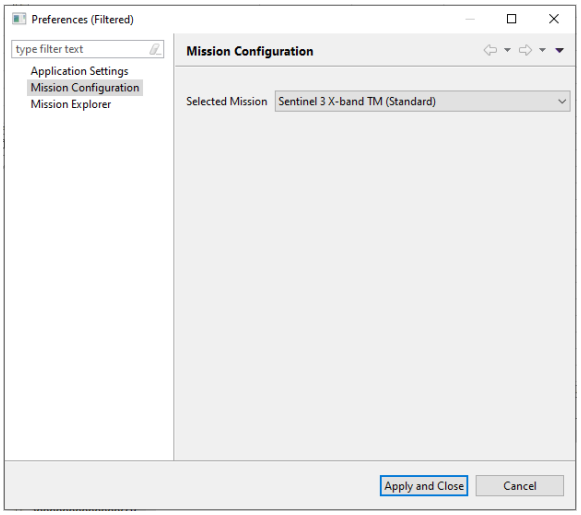


Figure 21: Preferences (Mission Configuration)

S2G provides a Mission Explorer interface as part of the preferences page – see Figure 22. This allows the user to check some details of the configuration without having to open the xml files with the mission data configuration.

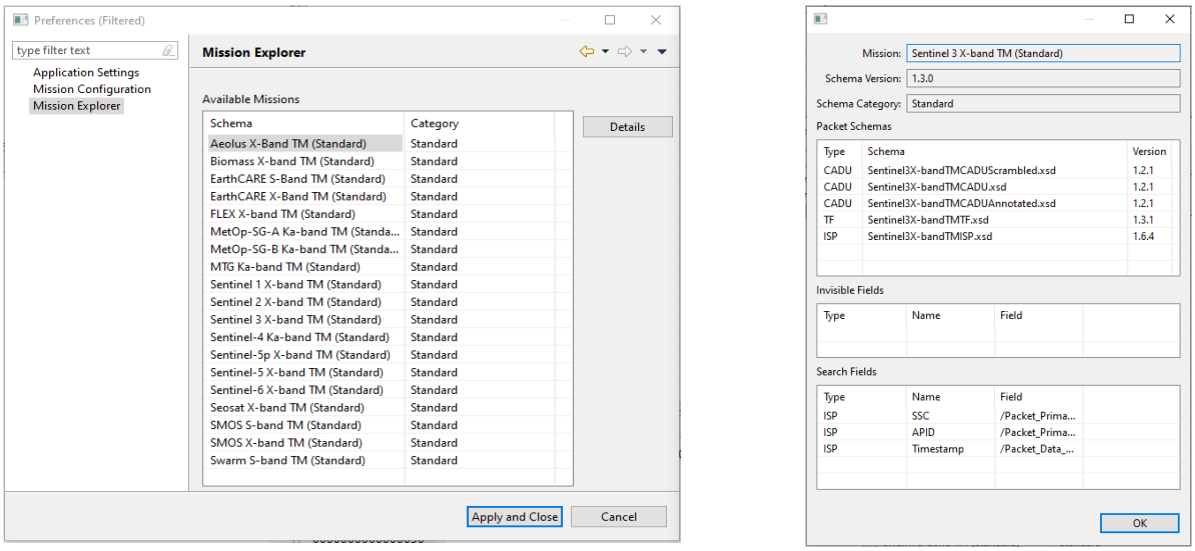


Figure 22: Preferences (Mission Explorer)

S2G provides general Application Settings as part of the preferences page – see *Figure 23*. This allows the user change basic behaviour of the tools, namely: data unit offset synchronization, enable/disable the update check at startup, disable/enable the generation of debug information; configure the number of events to be stored in the quality report, manage the parameters the configure the offset file cache (set maximum cached files and reset the cache), enable/reset ambiguous data definition selection and also select the colour used to highlight severe errors in the Data Unit List.

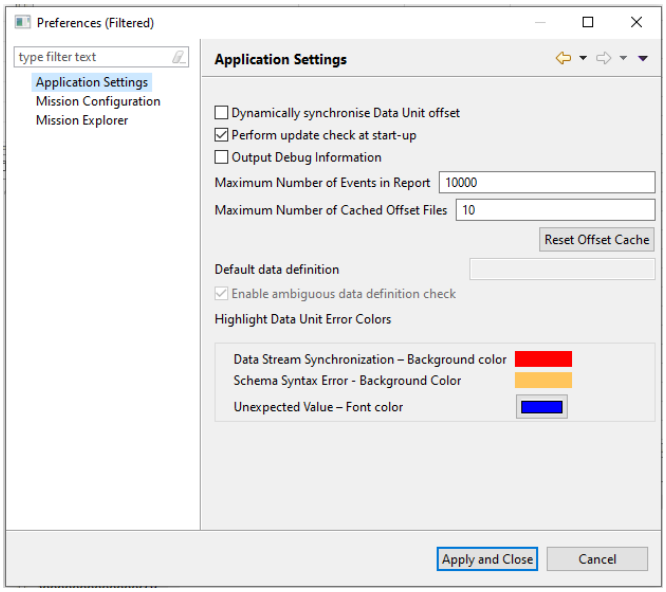


Figure 23: Preferences (Application Settings)

4.1.7.1. Mission Configuration

The mission specification available in the tool can be configured by activating the menu item “Edit” → “Mission Configuration” to display the configuration page. This functionality enables the user to extend

S2G to support custom missions. How to configure new missions is described on section 5.5 (customization of mission data is covered in section 5.13).

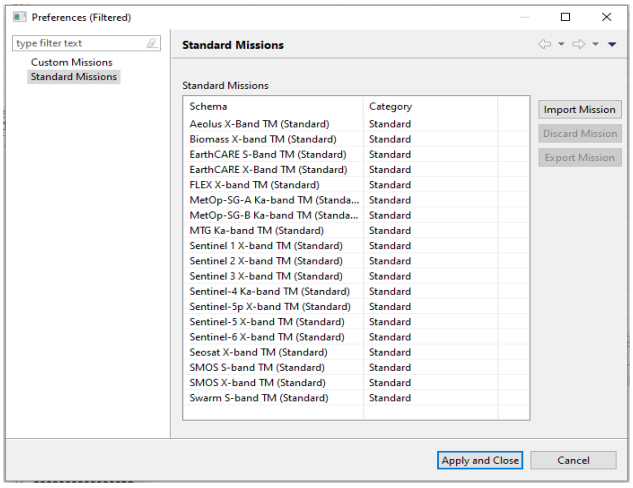


Figure 24: Mission Configuration

4.1.8. Help and About

The help can be displayed through the menu item “Help” -> “Open Help”. How the help is displayed depends on the Platform/OS. In Windows a window with the help is displayed, while in Mac and Linux OS the help information is accessed through the pre-defined web browser. Since help is provided through a built-in webpage client, firewall access must be granted to the tool for correct usage. Figure 25 provides an example of the Help interface in Linux.

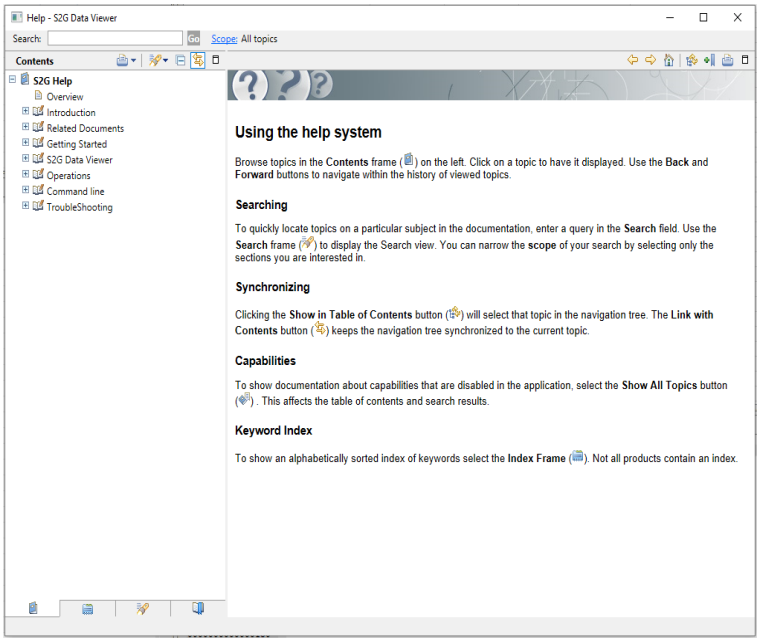


Figure 25: Help Dialog (in Linux platform)

The about dialog is accessible through the menu item “Help” -> “About”. Figure 26 provides the about dialog.

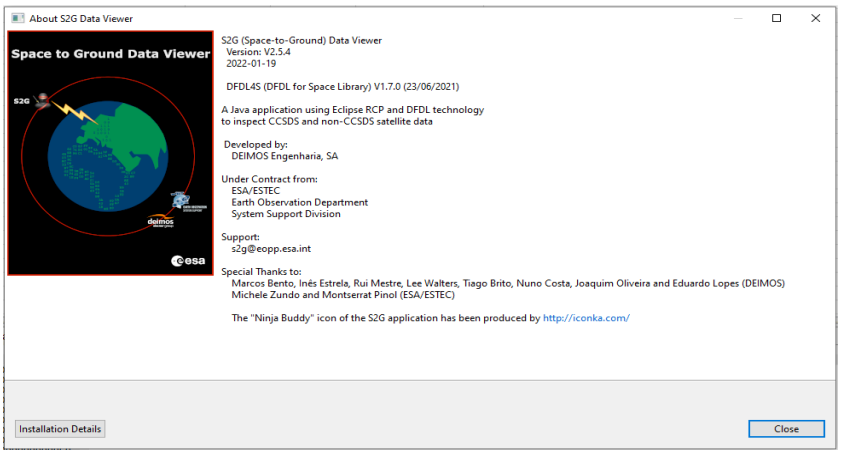


Figure 26: About Dialog

4.2. Mission Configuration

S2G takes a set of mission configurations as inputs, composed of several separate files. The tool provides a set of default mission configurations, that the user can expand by following the procedure described in section 5.5.

The default mission configuration files are available inside the workspace location, which is a folder containing auxiliary data, created during the first execution of the application. The location of the workspace depends on the installation platform, as follows:

- For Windows and Linux, the workspace location is created inside the installation directory
- For Mac OS, the workspace location is created inside the app directory related to S2G.

Inside the workspace, each mission configuration is stored in a separate directory available through $WORKSPACE/resources/data.

The files composing the Mission Configuration (Figure 27) provide a wide range of configuration parameters used by the application, and can be divided in two groups:

- the Mission Definition file is an xml file that contains the mission definition parameters used by the GUI (such as mission name, the list of searchable or hidden fields); this file also contains the reference to the schemas defining the structure of the binary data.
- the Mission Data Definition schema files are a set of schemas that define the binary contents of the several levels of packages (CADU, TF and ISP) based on the DFDL [RD.1].

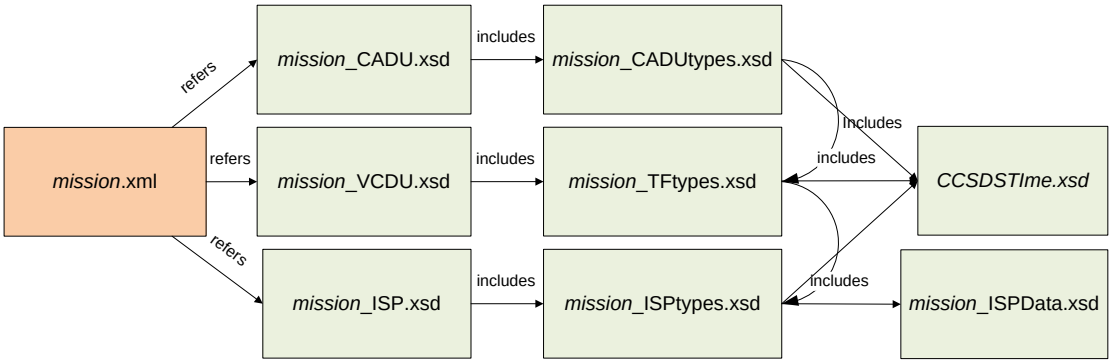


Figure 27: Mission Configuration files structure

The following sections present details of the two types of configuration files.

4.2.1. Mission Definition File

The Mission Definition file is an xml file (see Figure 28 for an example) that specifies list of schemas used to interpret the binary data. The file stores the mission *name*, and it also provides for each type of file, additional information used by the GUI.

Each *schema* element in the file defines:

- The *file*, which is the actual file containing the schema definition
- The *search* element, that stores the list of fields that should appear as option in the find bar
- The *invisible* element that stores the list of fields that should be hidden from the hierarchical representation in the Content Details view.
- The *packet_list_columns* element that stores the list of fields to be displayed as extra columns in the Contents List view.
- The *masks* element specifies the mask(s) used for synchronization detection.
- The *plots* element defines the charts applicable to the data.
- The *transformation* element specifies the data transformation applicable to the data.

A *field* is defined by a name attribute, with the path of the field as value. The path of the field is defined by the concatenation of the several item names in the hierarchical structure defining the binary data.

Only a *field*, defined under the *packet_list_columns*, can have an attribute *indicator* (with value colour). The presence of this indicator is used to select the value during colour coding of the packets.

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<mission_definition xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:noNamespaceSchemaLocation="../Mission.xsd">
    <name>Sentinel 1 X-band TM</name>
    <version>1.1</version>
        <schema type="CADU" name="ScrambledCADU"

            [...snip...]

        </schema>
        <schema type="CADU" name="CADU"

            [...snip...]

        </schema>
        <schema type="TF" name="TF"

            [...snip...]

            <transformations>
                <transformation transformationName="TF to ISP" transformationType="TF2ISP"/>
            </transformations>
        </schema>
        <schema type="ISP" name="ISP"
                idle="{false}"
                locationAPID="/Packet_Primary_Header/Packet_Identification/APID"
                locationSSC="/Packet_Primary_Header/Packet_Sequence_Ctrl/SSC"
                locationTimeStamp="/Packet_Data_Field/(.*)Packet_Secondary_Header/Time_Code_Field/Time_Code">
            <file>Sentinel1X-bandTMISP.xsd</file>
            <search>
                <field name="SSC">/Packet_Primary_Header/Packet_Sequence_Ctrl/SSC</field>
                <field name="APID">/Packet_Primary_Header/Packet_Identification/APID</field>
                <field name="Timestamp">/Packet_Data_Field/(.*)Packet_Secondary_Header/Time_Code_Field/Time_Code</field>
            </search>
            <invisible/>
            <packet_list_columns>
                <field name="SSC">/Packet_Primary_Header/Packet_Sequence_Ctrl/SSC</field>
                <field name="APID" indicator="color">/Packet_Primary_Header/Packet_Identification/APID</field>
                <field name="Time_Code_Field">/Packet_Data_Field/(.*)Packet_Secondary_Header/Time_Code_Field/Time_Code</field>
            </packet_list_columns>
            <masks>
                <mask referenceValue="0800C0000000" maskValue="F800C0000000"/>
            </masks>
            <plots>
                <plot_path xxName="Packet #" xxPath="" xxType="Number"
                           yyName="SCC" yyPath="./Packet_Primary_Header/Packet_Sequence_Ctrl/SSC" yyType="Number"/>
                <plot_path xxName="Packet #" xxPath="" xxType="Number"
                           yyName="APID" yyPath="./Packet_Primary_Header/Packet_Identification/APID" yyType="String"/>
                <plot_path xxName="Timestamp" xxPath="./Packet_Data_Field/(.*)Packet_Secondary_Header/Time_Code_Field/Time_Code" xxType="Timestamp"
                           yyName="APID" yyPath="./Packet_Primary_Header/Packet_Identification/APID" yyType="String"/>
                <plot_path xxName="Packet #" xxPath="" xxType="Number"
                           yyName="Timestamp" yyPath="./Packet_Data_Field/(.*)Packet_Secondary_Header/Time_Code_Field/Time_Code" yyType="Timestamp"/>
            </plots>
        </schema>
    </schemas>
</mission_definition>
```

Figure 28: Example of Mission Definition file

4.2.2. Mission Data Definition Schemas

The Mission Data Definition schemas are XSD schemas adapted (according to [RD.1]) to describe the structure of the binary items inside the data files. Although each schema file could have been defined independently, considering that they can share schema types, the structure shown in Figure 27 has been used for the default missions provided with S2G. Section 5.13 provides some guidelines on how the user can customize an existing mission configuration.

4.2.3. CFDP Extension

Additional Mission Data schema files are needed to define the binary contents of the CFDP dedicated levels (CFDP Space Packets and CFDP PDUs):

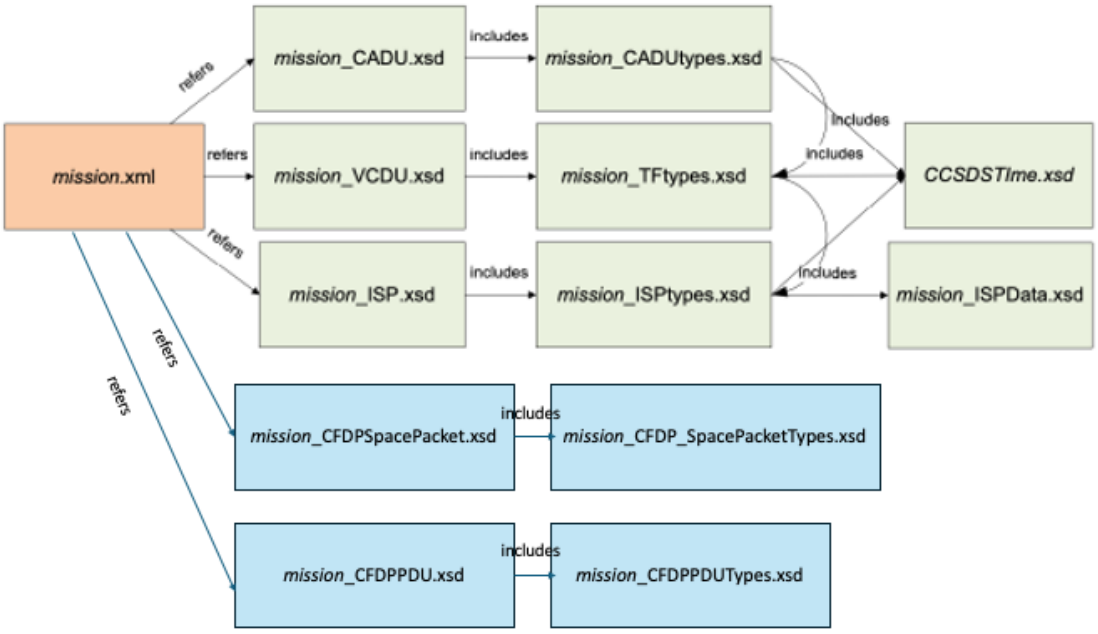


Figure 29: Mission Configuration files structure (CFDP Extension)

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5. OPERATIONS

5.1. Installation Procedure

See section 3 (Getting Started).

5.2. Launch S2G

See section 3 (Getting Started).

5.3. Exit S2G

To close S2G proceed as follow:

1. Select menu “File” → “Exit”.

5.4. Select Active Mission

The file types available when opening a data file is related to the currently active mission. To change the active mission, proceed as follow:

1. Open the preferences pages (“Edit” → “Preferences”).
2. Inside the “S2G Data Viewer”, select the “Mission Configuration” page.
3. Select the new active mission using the combo box “Selected Mission” shown in Figure 30.
4. Press OK to finish configuration setup.

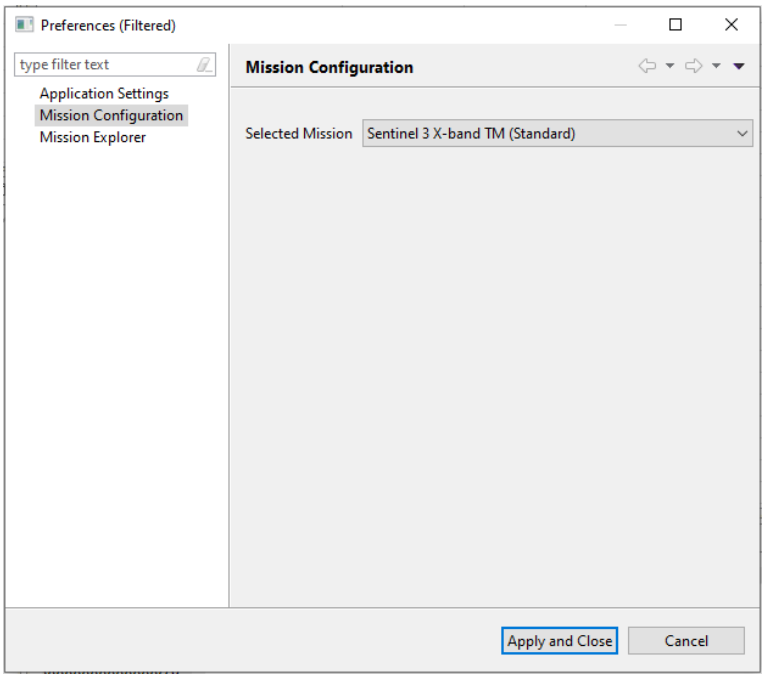


Figure 30: Active Mission Configuration

5.5. Mission Configuration Management

S2G enables the use of customized missions, loading their data at startup. This functionality is available by activating the menu item "Edit" → "Mission Configuration" (shown in Figure 31). The user is able to: export an existing mission (to have access to the defining files); import a new mission; and discard an existing mission. From the point of view of S2G there are two categories of mission definitions: the standard missions and the custom missions.

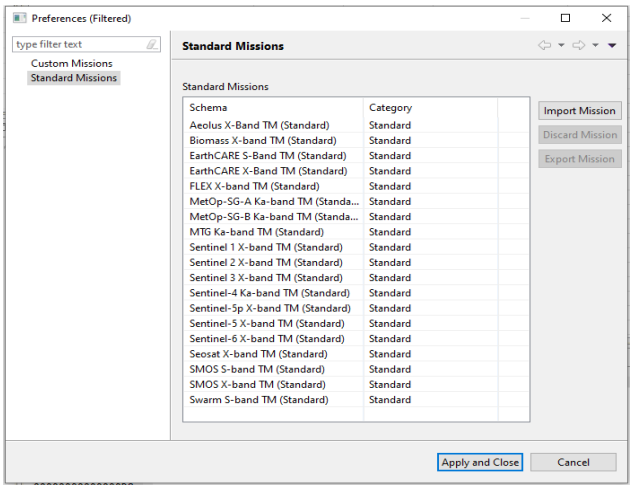


Figure 31: Mission Configuration

5.5.1. Export Mission

To export existing mission files proceed as follow:

1. Launch the Mission Configuration dialog through menu “Edit” → “Mission Configuration” (Figure 31)
2. Select the mission category to manage (custom or standard) in the left hand side of the dialog;
3. Select the mission file to be exported in the missions list;
4. Press button “Export Mission” and select the directory where to save the file, finishing with OK. After this step, the mission jar file shall be available in the chosen location.

5.5.2. Discard Mission

To discard existing mission files proceed as follow:

1. Launch the Mission Configuration dialog through menu “Edit” → “Mission Configuration” (Figure 31)
2. Select the mission category to manage (custom or standard) in the left hand side of the dialog;
3. Select the mission file to be discarded in the missions list;
4. Press button “Discard Mission” confirming with OK the deletion message that is shown. After this step, the mission is no longer available in the application.

5.5.3. Import Mission

To import a new mission file proceed as follow:

1. Launch the Mission Configuration dialog through menu “Edit” → “Mission Configuration” (Figure 31)
2. Select the mission category to manage (custom or standard) in the left hand side of the dialog;
3. Press button “Import Mission”;
4. Select the file to import from the file open dialog and finish with OK. After this step the new mission shall be available in the application.

5.6. Open File

To open a data file proceed as follow:

1. Launch the Open file dialog through menu “File” → “Open” (Figure 32)

   Note: this step can also be performed thought the “Open File” button in the toolbar; or using the keyboard shortcut (Ctrl-O).

2. Select the type of file to be open, in the file type combo box.
3. Select the file to open, and finish with OK. After this step, a progress dialog is shown while loading the file (Figure 33), and the file will appear listed in the Product Files view (Figure 34).

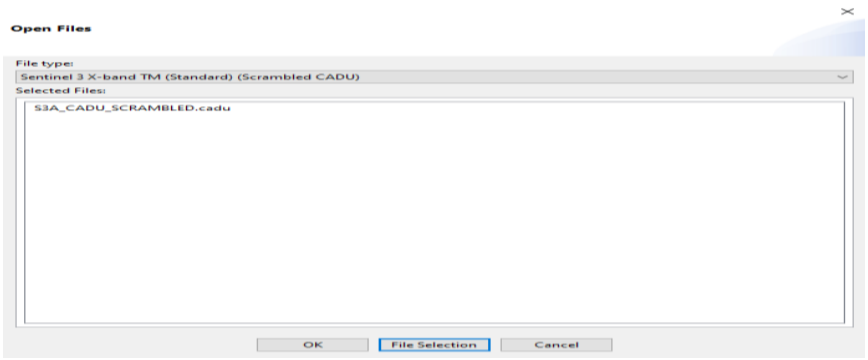


Figure 32: Open file dialog (with types of files)

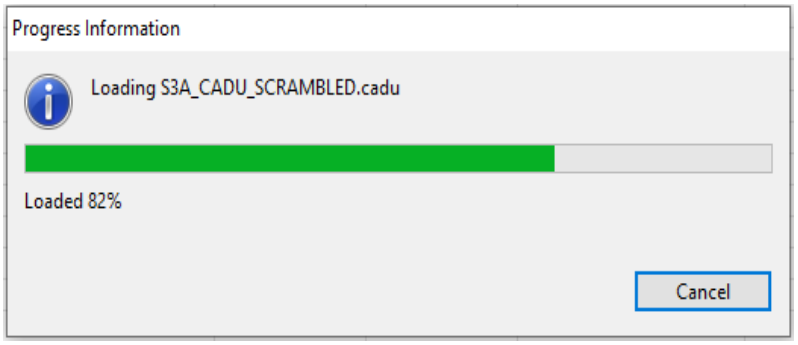


Figure 33: Progress bar when loading file

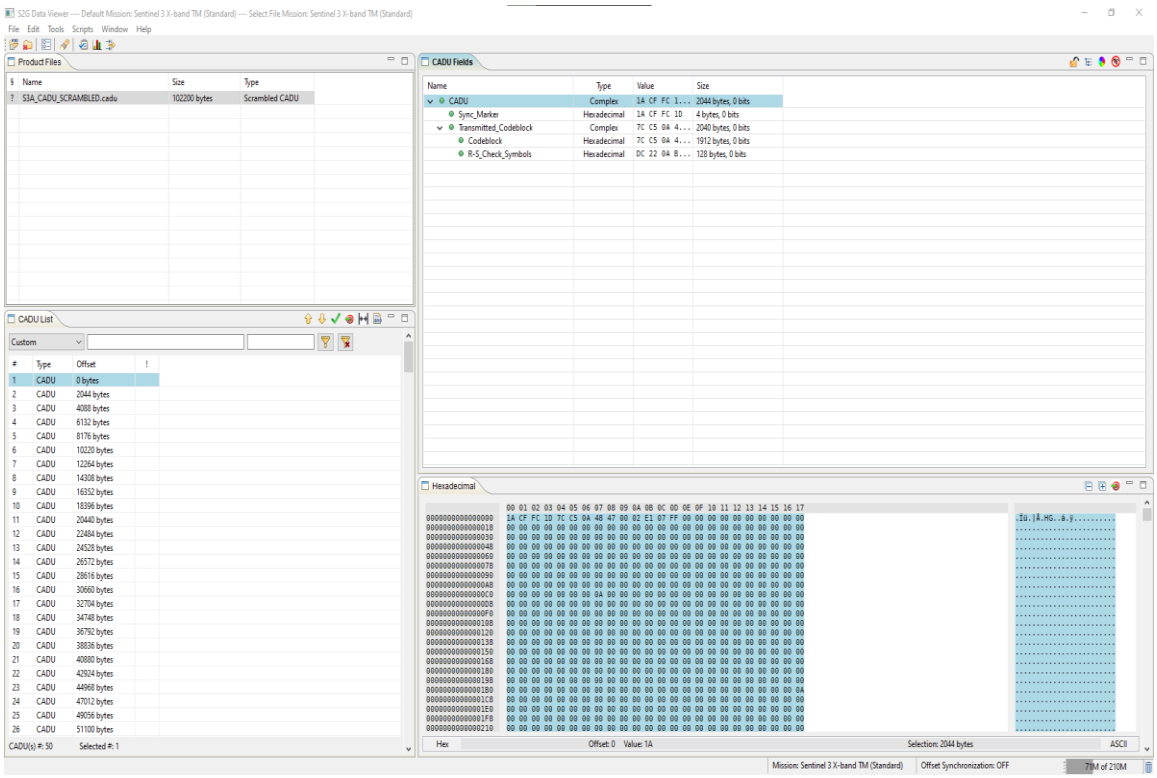


Figure 34: S2G Main Window displaying file contents

While opening a file, S2G may try (if data unit offset synchronisation is enabled in the Preferences) to match the bit patterns (if any) defined by the mission definition file (see section 4.2.1 for details) in order to check for data units synchronization. When synchronization errors are detected S2G will issue a warning to the user, as seen in Figure 35. The user can then generate the full quality report to access detailed information about synchronization errors. Note that the current offset synchronisation status (on/off) is indicated in the status bar at the bottom of the main screen.

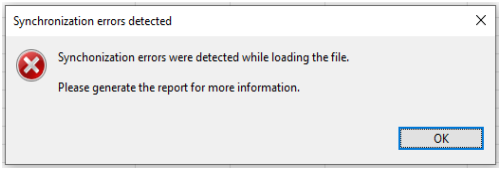


Figure 35: Warning dialog when Synchronization Errors are detected

5.7. Data Unit Inspection

To inspect the content of a file in the Product Files list view, consider the following operations.

5.7.1. Inspect a Data Unit

To inspect the contents of a file, proceed as follow:

1. In the Data Unit list view, scroll to the packet to inspect.
2. Select by clicking over the row of the desired data unit

Note: This selection can also be performed with the cursor keys; and the packet selection is highlighted in a shade of pink.

After step 2), the selected item is represented in the Data Unit Details view in a hierarchical structure, and the Hexadecimal view is automatically scrolled to show the beginning of the packet in the file.

5.7.2. Inspect Data Unit fields

To inspect the field of a content item, proceed as follow:

1. In the Data Unit Details view, expand the nodes of the item structure to display the field to inspect.

Note: The content item structure is shown only if a file and data unit is selected.

2. Select by clicking over the desired item field. Passing the mouse over the field value displays alternate representations of the field value in a tooltip.

Note: the data unit field selection is highlighted in a shade of pink.

After step 2), the byte storing the selected item field is highlighted with a pink shade in the hexadecimal view.

5.7.3. Clear Data Unit field selection

To clear the selection of Data Unit field, proceed as follow:

1. In the Data Unit List view, scroll the currently selected item into view
2. Double click on the currently selected data unit.

5.8. Search

5.8.1. Hexadecimal Value

S2G enables the search by hexadecimal and text file content. To search for a raw file content proceed as follows:

1. Display the find bar (by activating the menu item "Window" → "Toggle Find Bar" or through the keyboard shortcut Ctrl + "F") – the find bar is shown on top of the Hexadecimal view as in Figure 36.
2. Select the search mode from the combo box listing: *Hexadecimal* to search for hexadecimal values (contents on the left side of the view); *Text* to search for text (contents on the right side of the view).
3. Enter the value to search in the text box labeled "Find:"

Note 1: Hexadecimal values cannot contain spaces (e.g. search for AE3B to find the two next bytes "AE 3B" in the file.

Note 2: Non-printable characters are represented by the dot ('.') character. As such, the dot character cannot be used for matching during search.

4. Press enter to activate the forward search. Forward and backward search can also be activated using down and up arrow, respectively.

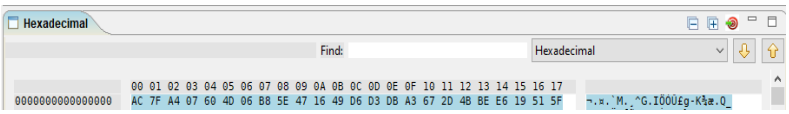


Figure 36: Find Bar for Hexadecimal Search

5.9. Quality Report

To generate a quality report proceed as follows:

1. Select the file in the Product View.
2. Select menu "Tools" → "Show Report" (or click the "Show Report" button in the toolbar). After this step, while the report is being generated the user can evaluate the progress in a progress dialog.

3. When the report is finished, a dialog is shown (Figure 37) to the user that enables opening the report in an external browser from a default location, or save it in a user specified location.

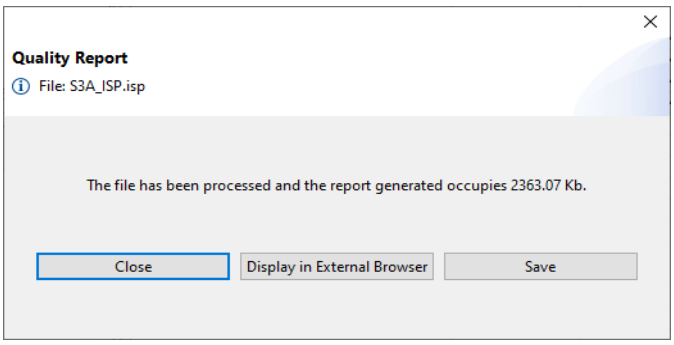


Figure 37: Finished Quality report dialog

In order to avoid a consumption of a large amount of memory, S2G limits the number of events in the report (this number can be configured in the Application Settings preferences). The information about the size of the report is provided in the dialog, in order to help the user evaluate if displaying the report in a web browser is feasible.

The report is stored in XML format, which when rendered by a Web Browser with the style sheet provided by S2G is displayed as shown in Figure 38.

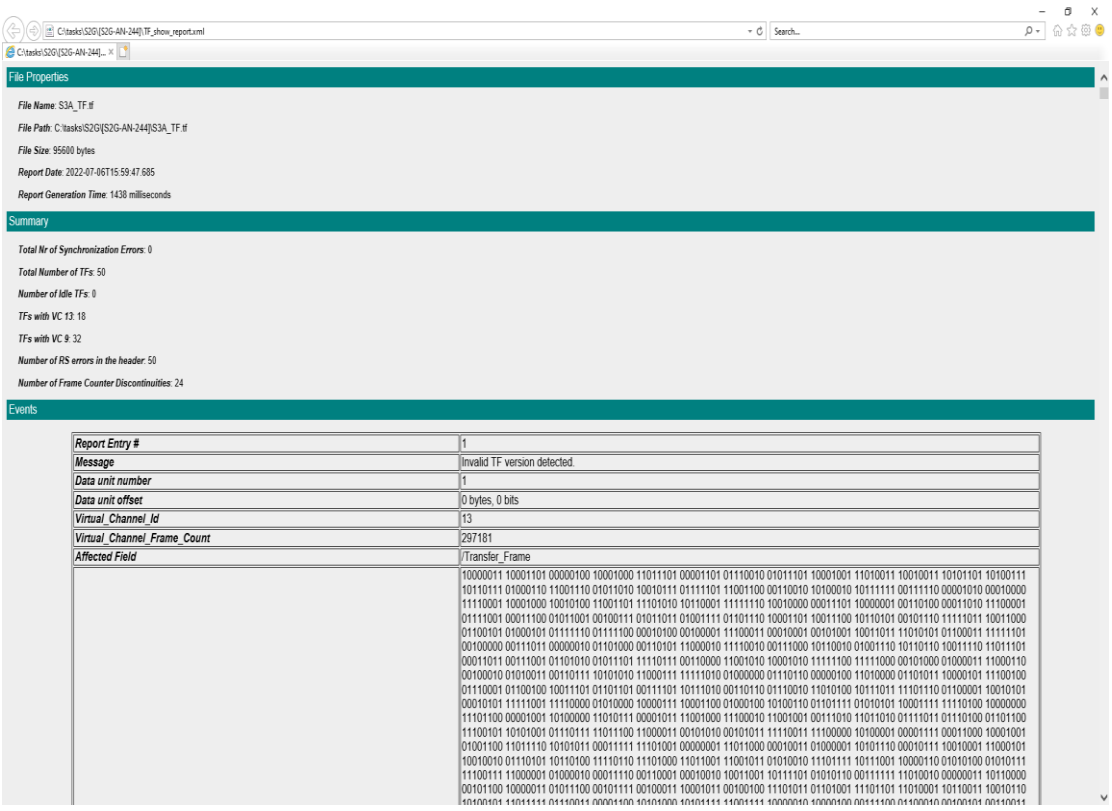


Figure 38: Quality report displayed in external Web Browser

5.9.1. Description of the Quality Report contents

The Quality Report is divided in 3 sections:

- *File Properties*, containing information about the file selected for quality check;
- *Summary*, presenting a list of items summarizing the result of the quality check;
- *Events*, containing a list of detailed information items for each event detected during the quality check.

The content of each section is detailed in the next sections of this document. Please note that the checks performed by the quality report are done over uncorrected data. Also, Reed-Solomon and CRC fields are not checked on-the-fly (errors reported in the quality report, are not highlighted in the data unit fields view). These checks are only performed in the scope of the quality report.

5.9.1.1. File Properties

This section is equal for all file types and contains the items in Table 5.

Table 5: File Properties in the Quality Report

File Properties	Scrambled CADU	Unscrambled CADU	TF	ISP
File Name	x	x	x	x
File Path	x	x	x	x
File Size	x	x	x	x
Report Date	x	x	x	x
Report Generation Time	x	x	x	x

5.9.1.2. Summary

The items listed in the Summary section of the quality report depend on the type of the input product. Table 6 presents a description of the listed items for each type.

Table 6: Summary information in the Quality Report

Item	Scrambled CADU	Unscrambled CADU	TF	ISP
Total Nr of Synchronization Errors	x	x	x	x
Number of CADUs	x	x		

Number of RS errors in the header		x	x	
Total Number of TFs			x	
Number of Idle TFs			x	
Number of Frame Counter Discontinuities			x	
Total Number of ISPs				x
Number of Idle ISPs				x
First Timestamp				x
Last Timestamp				x
Number of SSC gaps				x
Number of Duplicated ISPs				x
Number of ISPs Timestamp Discontinuities				x
Number of CRC errors				x

5.9.1.3. Events

This section contains the detailed information of detected events. If no event is detected, the section is empty. The events that can be detected and displayed depend on the type of the input product.

Each event is presented in the form of a table, containing always (among other relevant fields specific of the event):

- Report entry number;
- The event message;
- Data unit number (i.e., number of the CADU, TF or ISP within the file);
- Data unit offset (i.e., the offset in bytes from the CADU, TF or ISP file origin);

Table 7 shows the description of the main events detected by S2G according to the product type.

Table 7: Events in the Quality Report

Event Message	Description	Scrambled CADU	Unscrambled CADU	TF	ISP
Stream Synchronization	The synchronization was lost at some point. The *lost offset* where the sync was lost is detailed in the event, as well as the *re-sync offset*.	x	x	x	x

Event Message	Description	Scrambled CADU	Unscrambled CADU	TF	ISP
Reed Solomon uncorrectable errors detected (during quality check)	Reed-Solomon errors that cannot be corrected were detected in the data unit (due to the large amount of the incorrect bits, the RS algorithm is unable to recover all errors).		x		
Reed Solomon errors detected (during quality check)	Correctable Reed-Solomon errors were detected in the data unit. The *interleaving level*, *symbol offset*, *expected value* and *found value* are provided for each correctable error detected in the data unit.		x		
CRC error detected	The calculation of the CRC over the data unit fields does not match the CRC value provided. *SSC*, *APID* and *Time Code Field* values are provided in the event details.			x	x
Frame Counter discontinuity	A jump from the previous transfer frame number and the current one was detected, indicating a discontinuity. Information about the previous TF and the current one is provided in the event details.			x	
Unknown APID detection	An invalid APID value was detected.				x
Invalid SSC Gap detected	A jump in the SSC between the previous ISP and the current one was detected. Information about the previous ISP and the current one is provided in the event details.				x
Timestamp discontinuity	A jump between the previous Time Code Field and the current one was detected, indicating a discontinuity. The timestamp is expected to be continuously increasing. Information about the previous ISP and the current one is provided in the event details.				x
Duplicated ISP	An ISP with the same SSC, APID and Time Code Field values as a previously analyzed ISP is detected. Information about the original ISP and the current one is provided in the event details.				x

5.9.2. Batch Quality Report Generation

The user can also generate quality reports in batch mode for a: (a) set of selected files or (b) all files in a set of selected folders. When choosing to generate the report for a set of folder the user may choose to

iterate recursively into existing sub-folders. In either mode the user is prompted to select of given file type and the report generation proceeds assuming all selected files correspond to that data type. The quality report file is stored in the same location of the source data file, with the same name and extension 'xml'.

5.10. Data Plotting

To generate a plot of the data proceed as follows:

1. Select the file in the Product View.
2. Select menu "Tools" → "Show Plot" (or click the "Show Plot" button in the toolbar). After this step, while the plot is being generated the user can evaluate the progress in a progress dialog.
3. When finished, the plot is shown in dialog (Figure 39). The user can display the several plot types, by selecting them in the top combo box. The user can also select between the available chart types: XY Chart and Pie Chart.
4. The user can store the plot data (stored in XML format similar to the quality report), or save the plot image using the button at the bottom of the dialog.

Note: the user can zoom in/out using the popup menu activated by a left click in the plot area.

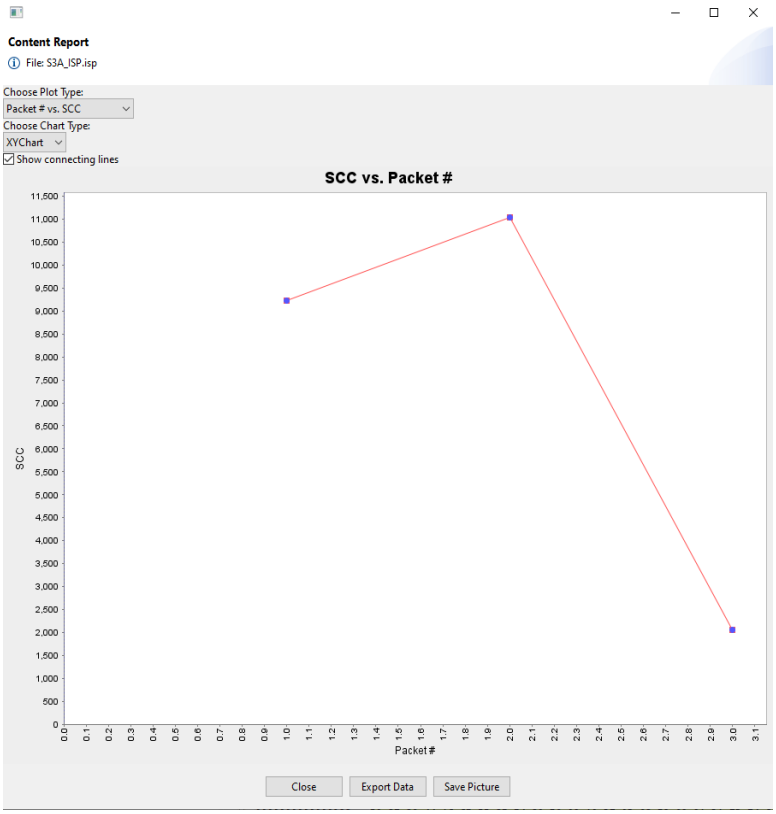


Figure 39: Data plotting dialog - XY Chart

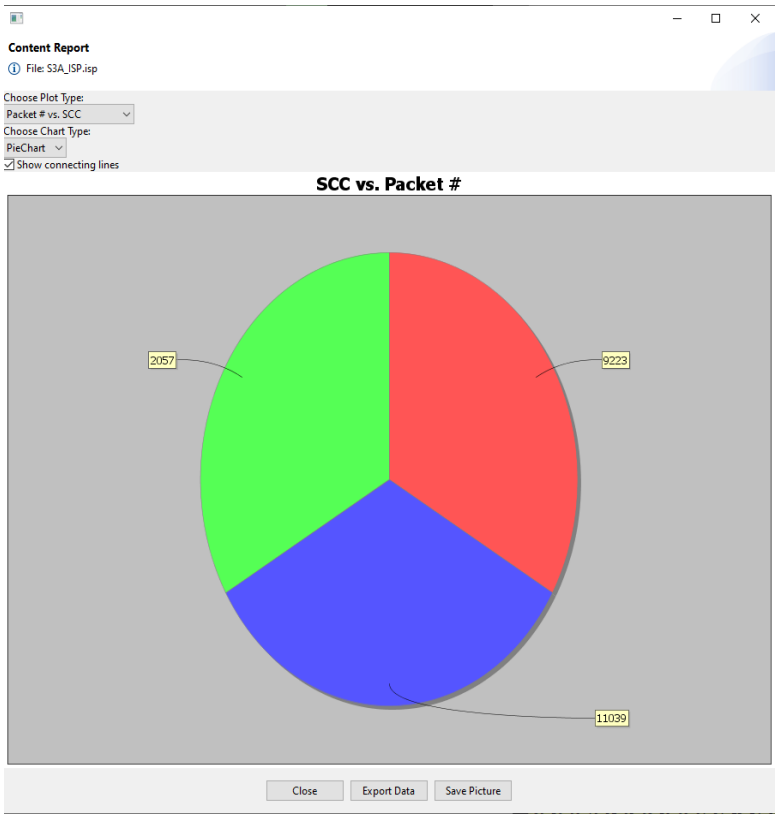


Figure 40: Data plotting dialog - Pie Chart

5.11. Data Transformation

To perform a data transformation operation proceed as follows:

1. Select the file in the Product View.
2. Select menu "Tools" → "Transform" (or click the "Transform" button in the toolbar), to show the transformation dialog (Figure 41). Depending on the type of file selected as source of transformation the dialog will request different transformation parameters.
    a. Scrambled CADU to Descrambled CADU
        i. "Polynomial" is the descrambling polynomial to be used
        ii. "Apply RS correction" activates RS correction; otherwise data is not checked after descrambling
        iii. "Generate report" to generate a report containing all inconsistencies of the source file plus all issues detected during the actual transformation
    b. CADU to TF
        i. "Cutoff file" activates a cutoff of the size of the file; this cutoff is based on the values of "Cutoff size (Mb)" and "Cutoff # data units". Cutoff value of 0 means that no cutoff is to be applied. S2G with consider both cutoffs at the same time.
        ii. "Discard idle frames" allows filtering idle frames

iii. "Split output files by SCID" allows to generate separate files containing data units related to a single Spacecraft ID

iv. "Split output files by VCID" allows to generate separate files containing data units related to a single Virtual Channel ID

v. "Generate report" to generate a report containing all inconsistencies of the source file plus all issues detected during the actual transformation

c. TF to ISP

i. "Cutoff file" activates a cutoff of the size of the file; This cutoff is based on the values of "Cutoff size (Mb)" and "Cutoff # data units". Cutoff value of 0 means that no cutoff is to be applied. S2G with consider both cutoffs at the same time.

ii. "Split output files by APID" allows to generate separate files containing data units related to a single APID

iii. "Discard idle packets" allows filtering idle ISPs

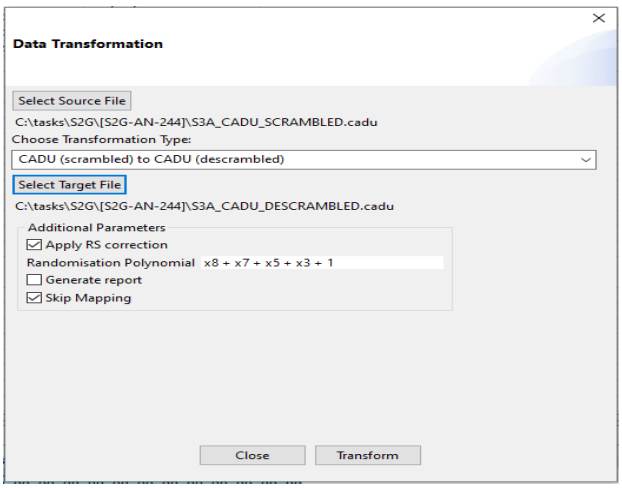
iv. "Generate report" to generate a report containing all inconsistencies of the source file plus all issues detected during the actual transformation

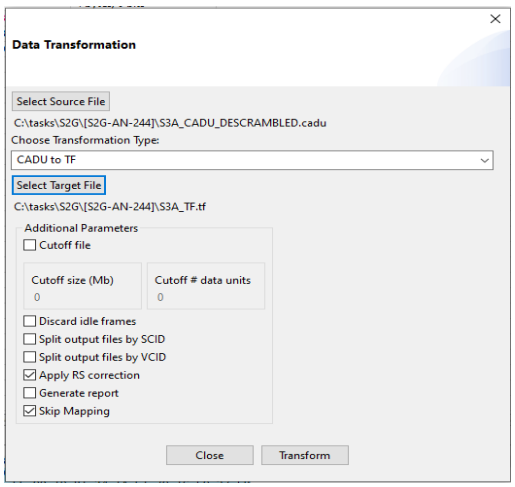
d. Annotated CADU to CADU (available if Annotated CADU type defined)

e. Annotated ISP to ISP (available if Annotated ISP type defined)

3. Once the transformation is properly configured (including the target file), click the "Transform" button, and confirm the parameters in the confirmation dialog. After this step, while the transformation is being performed the user can evaluate the progress in a progress dialog.

4. When the transformation is finished, if the report generation was activated, a dialog is shown to the user that enables opening the report in an external browser from a default location, or save it in a user specified location.





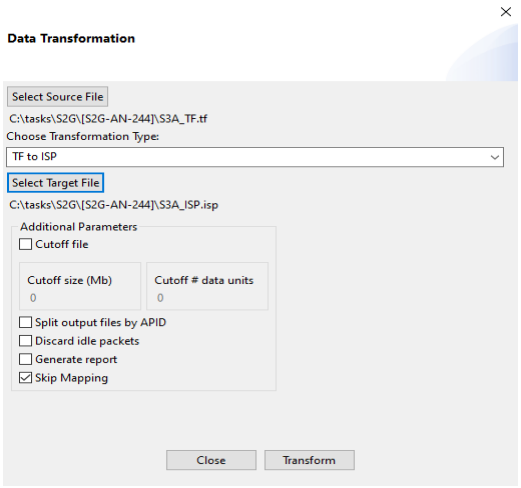


Figure 41: Transformation Dialogs

5.11.1. CFDP Extension

The following additional transformation operations are available for CFDP data units:

- CFDP Space Packet to PDU

i. "Cutoff file" activates a cutoff of the size of the file; this cutoff is based on the values of "Cutoff size (Mb)" and "Cutoff # data units". Cutoff value of 0 means that no cutoff is to be applied. S2G with consider both cutoffs at the same time.

ii. "Generate report" to generate a report containing all inconsistencies of the source file plus all issues detected during the actual transformation

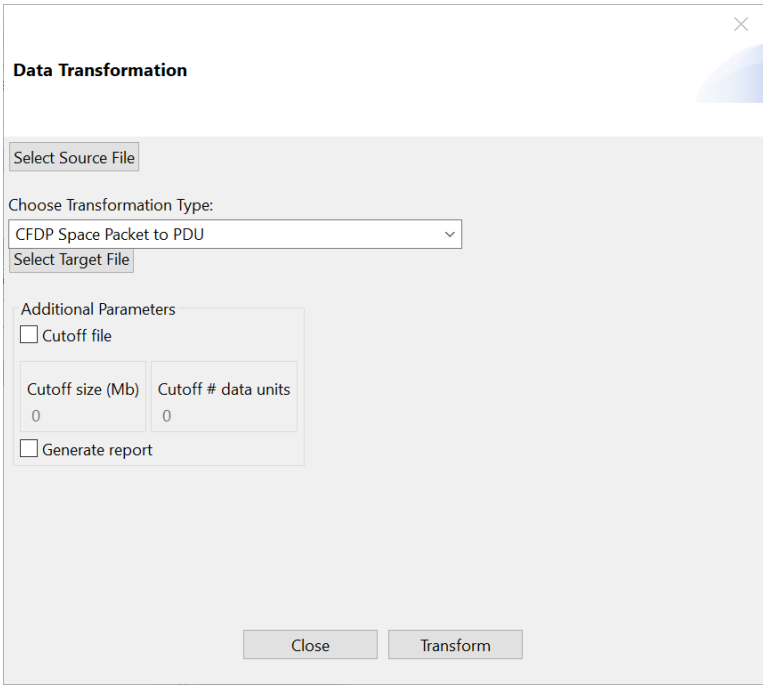


Figure 42: CFDP Space Packet to PDU transformation dialog

5.12. Close File

To close a data file proceed as follows:

1. Select the file in the Product View.
2. Select menu “File” → “Close”. After this step, the file will disappear from the list in the Product Files view.

Note: this step can also be performed thought the “Close File” button in the toolbar.

5.13. Customize Mission Data Specification

The information is provided in section 3.3 of [**RD.3**].

5.14. Add a script to S2G

The scripts accessible through menu “Scripts” → “Execute Script” are located in a specific directory in S2G workspace $WORKSPACE/resources/scripts. To ease the access to the specific directory a symbolic link is available directly in S2G installation directory. In order to add a script to S2G the user needs to copy the script into the scripts directory. To be identified as a script the file needs to be set with execution privileges. Once copied the script shall be immediately available in S2G the next time menu “Scripts” → “Execute Script” is activated with no need to restart the application.

5.15. Mask Editor

S2G has available a mechanism to dynamically synchronize the data units offsets when parsing data. This option can be enable thru the preferences dialog as indicated in section 4.1.7. The masks used in the synchronization are supplied in the mission specification schemas as described in section 5.13. To aid the user in defined the adequate value of the hexadecimal mask S2G provides a mask editor through menu “Tools” → “Mask Editor” (see Figure 43).

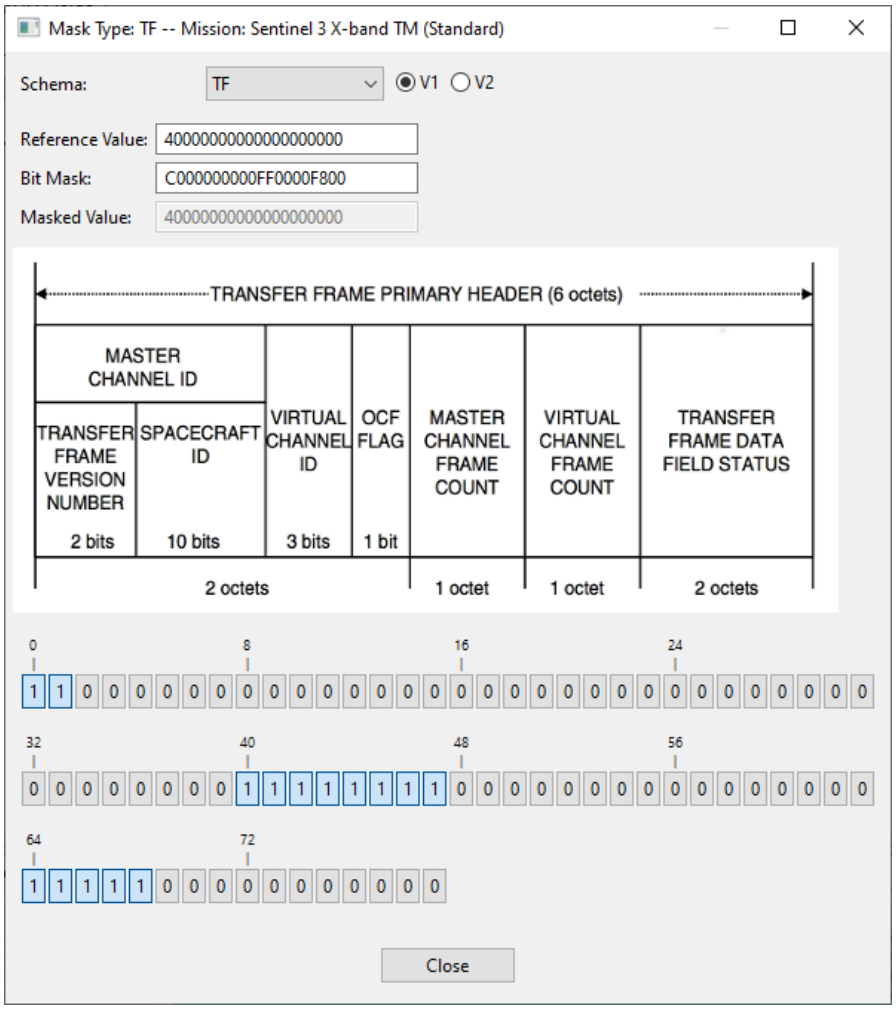


Figure 43: Mask Editor - TF V1 screen

The Mask Editor is composed of the following elements:

- A Schema Type selection (CADU, TF, ISP). For TF selection the user can also select among V1 and V2 format;
- A 'Reference Value' hexadecimal field, which the user can edit to represent a typical value of the data to be synchronized;
- A 'Bit Mask' hexadecimal field, which corresponds to the mask to apply to the data;
- A 'Masked Value' field, showing the application of the mask to the reference value;
- A figure summarizing the structure of the selected schema type header;
- A set of bit buttons, which the user can toggle to edit the bit mask on a bit by bit level.

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6. COMMAND LINE

6.1. How to run from command line:

S2G can be called with command line arguments to easy the opening of the S2G window GUI with a product file loaded.

Those commands line arguments will set the mission schema, the schema type and the product file to be loaded.

To call S2G with arguments use:

s2g -cli -schema_type “type” -mission_file “path/to/file” -product_file “path/to/file/”

Where:

1. “-cli” flag indicates whether to use command line arguments or not
2. “-schema-type” can have one of five values: Scrambled_CADU, CADU, TF, ISP, Annotated_ISP
3. “-mission_file” is the path to the mission schemas
4. “-product_file” is the path to the product file

6.2. Where is the "s2g" command in the different target environments:

The "s2g" command is handled differently, depending of the target environment. Check where to find the "s2g" command for your case:

- Mac: ./s2g.app/Contents/MacOS/s2g
- Linux: ./s2g
- Windows: ./s2g.exe

Due to behavior of Windows Command Line, when executing an ‘.exe’ the command line will not wait to finish its execution. Due to this behavior, messages sent to standard output (like validation of command line arguments), will not be shown. It is recommended to add “| more” at the end of the command. Example command: “s2g.exe -cli -schema_type "type" -mission_file "path/to/file" -product_file "path/to/file | more"

7. TROUBLESHOOTING

7.1. Problem: Unable to find CADU sync marker

The first step performed when opening a CADU file is to find the sync marker to calculate the offset of the beginning of the first CADU stored in the file. The error dialog in Figure 44 is displayed if the tool is unable to find the sync marker.

To correct this issue, consider:

- verifying that the selected file does in fact contain CADU packets
- verifying that the value for the sync marker is correctly specified in the mission data schemas (refer to section 5.13 for details on how to customize mission data schemas)

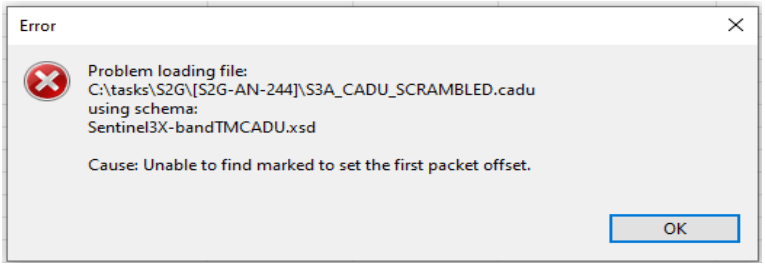

Figure 44: Error dialog (Unable to find CADU Sync Marker).

7.2. Problem: Unable to load mission definition schema

When a data file is open, the tool interprets the file contents according to the mission data schema. If a syntax problem is found while loading the schema, an error dialog is shown indicating the problem's cause – see example in Figure 45.

This issue can be corrected by editing the XSD schema file indicated in the error dialog.

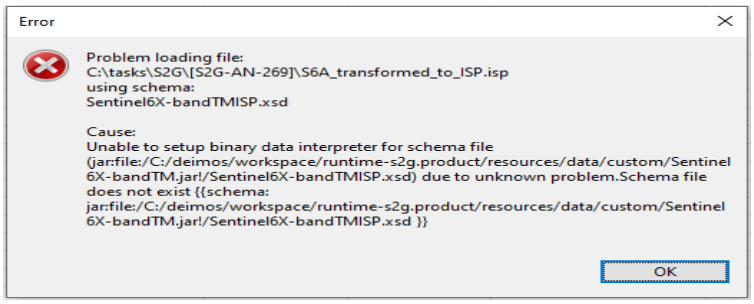

Figure 45: Error dialog (Unable to load mission definition schema).

7.3. Problem: Corrupted workspace

The contents of the workspace created automatically when S2G is launched for the first time are not expected to be edited by the user. However, if the workspace content becomes corrupted by some external reason, the user can revert to the default by proceeding as follows:

1. Delete the workspace directory.
2. Restart the application.

Note: Upon restart, S2G rebuilds the workspace contents with default values.

7.4. Problem: Synchronization related issues

While opening a file, S2G may try (if data unit offset synchronisation is enabled in the Preferences) to match the bit patterns (if any) defined by the mission definition file (see section 4.2.1 for details) in order to check for data units synchronization. To optimize the loading operation the synchronization result is stored in a cache for future use when re-loading the same file.

In case the cached data becomes inadequate for the originally loaded data the application may show some misbehaviour: the quality report signals errors while looking at the data there is no underlying problem or even several executions of the quality report result in different set of errors.

This issue can be corrected by clearing the synchronization offset cache (refer to section 4.1.7, Figure 23)

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