

Les outils CNES

The « BEST » WORKBENCH

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OVERVIEW

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Brief history

Process and tools based on standards

- 2 CCSDS standards :
 - ◆ The EAST language for the syntax of data (Enhanced Ada SubseT)
 - ◆ The DEDSL (Data Entity Specification Language) for the semantics of data
- OASIS (“Outil d’Aide à la Structuration des Informations Spatiales“)
 - ◆ Impossible to impose to users to learn and master 2 languages
 - ◆ Need of friendly tools to hide the languages
 - ◆ Description through a GUI dedicated to data description
 - ◆ Production of the standard compliant description by a simple click
- BEST
 - ◆ Joint ESA CNES effort
 - ◆ Leads to the BEST workbench that enhances OASIS thanks to several other tools

CNES recommended process

Whatever the kind of data, CNES recommends the use of editors, checker and document producers:

- A specific editor to help the user in describing the data without any specific knowledge of the required syntax. The result consists in a formal ICD (in a formal language).
- A document producer that translates the formal definition in a more informal description (HTML, Word, PDF or Excel document). The result consists in a readable ICD.
- A data checker that controls the data compliance with the formal ICD. The data checker is used by the software that produces the data and by the software that consumes the data.
 - ◆ A formal language combined with a data checker enable easy software integration.
 - ◆ Ensures a valid OAIS representation information

Tools & Utilities

- The editor/modeller : OASIS
 - ◆ The key tool of the workbench
 - ◆ It produces formal data description for any kind of data (binary or ascii)
 - ◆ Internal format in XML (XIF is a CNES standard)
 - ◆ Many export formats (EAST, DEDSL, XTCE, XML Schema)
- The document producer : SCRIBE
 - ◆ A generic tool
 - ◆ Two kinds of users: **designers** that are able to define templates and **users** that are able to apply the previously defined templates to the formal description
 - ◆ Templates may address different purposes: e.g. a general documentation for review people, a detailed documentation for software programmers
- The data checker
 - ◆ A tool that validates data according to its formal description (syntax check only)

Additional Tools & Utilities (1)

- The OASIS plug-ins (to extend the capabilities of the tool)
 - ◆ The Monitoring & Control plug-in : a specific editor to design TM, TC, Monitoring functions, Calibrators... also dedicated to the import/export of descriptions to XTCE standard
 - ◆ XML Schema plug-in : a specific editor for the description of XML data
- The DPE to simulate data compliant to the formal description
 - ◆ Full random
 - ◆ In or out the legal ranges
 - ◆ Using simple directives
 - ◆ Using external code (for complex cases)
- Aladin
 - ◆ A tool that compares and merges 2 versions of a formal description

Additional Tools & Utilities (2)

- ASCII Dump
 - ◆ Prints binary data in a readable text format
 - ◆ Export formats : XML or 'Label = Value'
- A library to manipulate data
 - ◆ It eases the writing of INPUT/OUTPUT software as soon as the formal description of data is available (e.g. it allows to read or write data without dealing with its physical format)
 - ◆ It eases the production of conversion programs (to transform data from a format into another one)
 - ◆ The API is available for (C, FORTRAN, Ada, Java)

BEST Workbench



OASIS : a graphical editor

The screenshot displays the OASIS Modeller application window. The main area shows a hierarchical tree diagram of a message structure. The root node is 'DEMO', which branches into 'HEADER' and 'DATA'. 'HEADER' further branches into 'PKT_ID', 'PKT_SEQ', 'PKT_TM_PKT_LEN', 'GPS', and 'PHY'. 'PKT_ID' branches into 'PKT_TM_VER_NO', 'PKT_TM_TYPE_IND', 'PKT_TM_SECHDRFLG', and 'PKT_TM_APID'. 'PKT_SEQ' branches into 'PKT_TM_GRP_FLAGS' and 'PKT_TM_SRC_CTR'. The 'PKT_TM_APID' field is highlighted in blue, indicating it is selected. The bottom panel shows the 'demo_v2' project and the 'Syntax' tab. The path is 'DEMO/HEADER/PKT_ID/PKT_TM_APID'. The field details are as follows:

Selection	Type information :	ENUMERATION	Size & DefaultValue:	Physical value
Field	Name : TIFIANT_DE_TYPE_DE_PAQUET	RESERVED TMGPS TMPHY TMLRX	Definition : Forced Value : 11 Default value : NONE Value : RESERVED	Encoding : BINARY Representation : DECIMAL Value :
Type	Base type : ENUMERATION			

OASIS : Syntax editor

The screenshot shows the 'Modify field syntactic & semantic information' dialog box in the OASIS software. The dialog has a title bar with the OASIS logo and a close button. Below the title bar are tabs for 'Syntax', 'Pragma', 'Semantic', 'Encoding', and 'Messages', with 'Syntax' selected. A 'Path' field contains 'VIKING_V4/E5_RECORD/HEADER/HEADER_1/ORBIT_NUMBER' and a 'Parent' button. The main area is divided into several sections: 'Selection' with 'Field' and 'Type' buttons; 'Type information' with 'Name' (AN_ORBIT_NUMBER) and 'Base type' (INTEGER) fields; 'Range' with 'Mode' (Begin + End), 'Begin' (37), 'End' (1653), and 'Size' (1617) fields; 'Size & Encoding' with 'Mode' (BINARY), 'Computation mode' (Default), 'Size (in bits)' (16), and 'Platform' (Not specified) fields; and 'Value and Format' with 'Format' (checkbox), 'Default value' (None), and 'Value' fields. At the bottom right are 'Finish' and 'Cancel' buttons.

Section	Field	Value
Path	Path	VIKING_V4/E5_RECORD/HEADER/HEADER_1/ORBIT_NUMBER
Selection	Field	AN_ORBIT_NUMBER
Type information	Name	AN_ORBIT_NUMBER
Type information	Base type	INTEGER
Range	Mode	Begin + End
Range	Begin	37
Range	End	1653
Range	Size	1617
Size & Encoding	Mode	BINARY
Size & Encoding	Computation mode	Default
Size & Encoding	Size (in bits)	16
Size & Encoding	Platform	Not specified
Value and Format	Format	<input type="checkbox"/>
Value and Format	Default value	None
Value and Format	Value	

OASIS : Semantic Editor

Modify field syntactic & semantic information

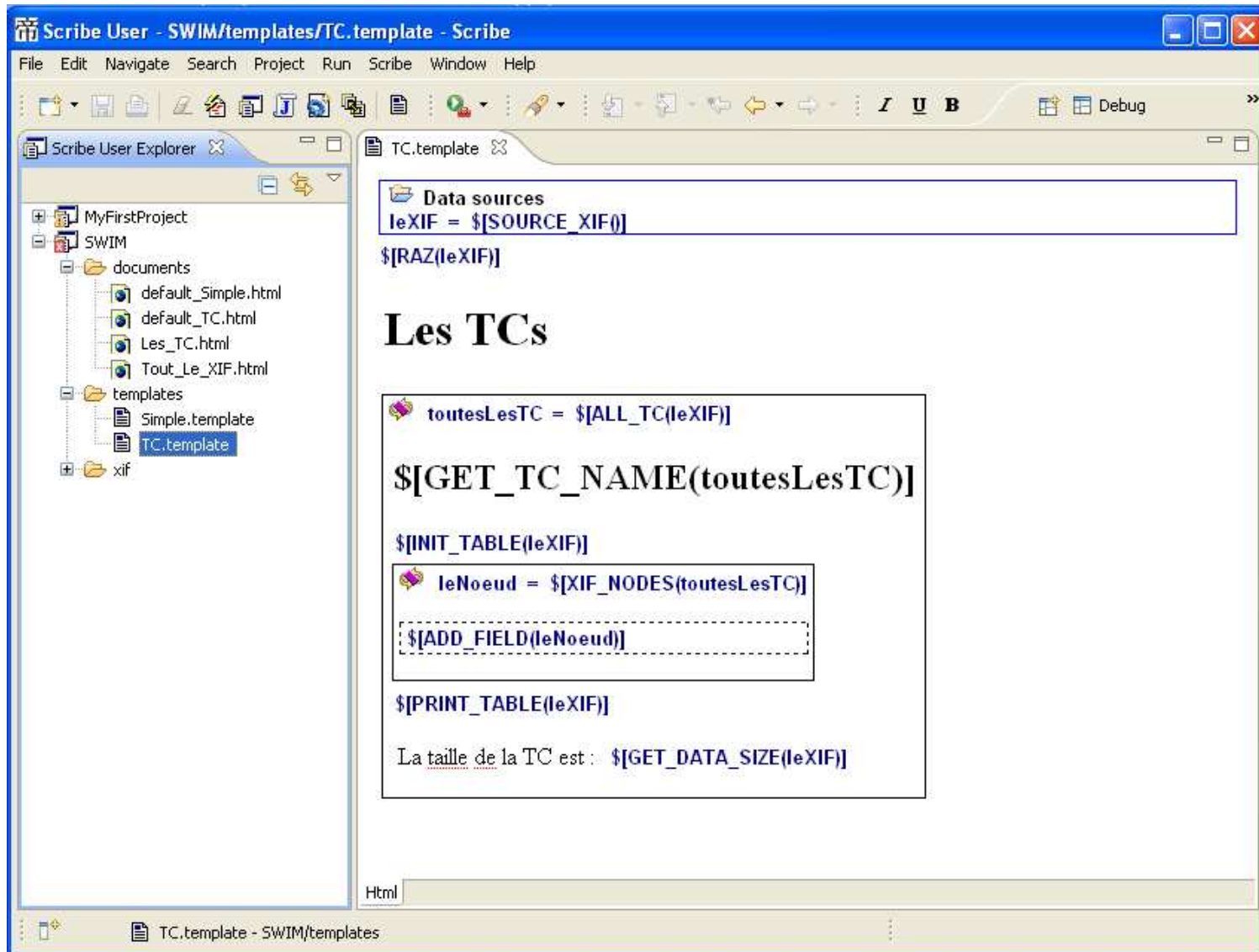
Syntax Pragma Semantic Encoding Messages

Configuration

Attributes	Value	Context
DOCUMENT_TITLE	VIKING V4	
ILLUSTRATION		
LOGO_LEFT	./images/CNES_Triangulairebleu.JPG	
LOGO_CENTER	./images/logo_CDPP.JPG	
LOGO_RIGHT	./images/viking.JPG	
PROJECT_NAME	VIKING	
DOCUMENT_TITLE_PDF	VIKING V4 data description	
DOCUMENT_IDENTIFICATI...	PLAS-DED-VIKIN_V4-00060-CN	
COMPANY_NAME	CNES	
DOCUMENT_SUMMARY	VIKING V4 description : E et B Waves and Plasma Density (V4LV4H)	
DOCUMENT_KEYWORDS	Data description, VIKING, ICD, Waves and plasma density, High resolution data	
REFERENCE_DOCUMENT	VIKING Low Frequency Wave Experiment (V4L), Data Processing, PLAS-EXP-VIKING_V4-00119-IRF	
APPLICABLE_DOCUMENT		
INTERNAL_DISTRIBUTION	HEULET Dominique;DCT/PS/TVI	
EXTERNAL_DISTRIBUTION		
AUTHOR	AUBRON Rémy	CNES
APPROVED_BY	BESSION Bruno	CNES
FOR_APPLICATION	N/A	
CHANGE_DATE	08/11/2011	
ISSUE_DATE	08/11/2011	
DOCUMENT_CHANGE	01	
DOCUMENT_ISSUE	00	
SOUS_DIRECTION	Mission OPERATIONS	
SERVICE	Earth Observation	
REV_DATE_HISTORY	01.00;08/11/2011	Creation
ACRONYM		
CONTRACT	N/A	

Finish Cancel

SCRIBE



SCRIBE

Some outputs

- CDPP : [Viking \(PDF\)](#) & [Viking \(HTML\)](#)
- H2 : [Pseudo Arcs Fins \(HTML\)](#)
- Jason : [OSDR \(Excel\)](#)
- Nosyca : [TM \(Excel\)](#)
- Pléiades : [CCC - Stations \(HTML\)](#)
- SSALTO : [Altimetry Level 1 \(HTML\)](#)
- SVOM : [Satellite Data Base Export \(HTML\)](#)
- SWIM : [Instrument Commands \(HTML\)](#)

The benefits of a formal description

- The formal definition is the contractual agreement
 - ◆ An unambiguous description to avoid endless discussion
 - ◆ Time saving during software integration
- The formal definition allows data simulation very early in the project life cycle
 - ◆ Effort saving during software unit testing
- This formal definition describes data without any assumption on the underlying operating system and the way the data are encoded
 - ◆ Long term preservation is reinforced
- Documentation is deduced from the formal definition
 - ◆ Documentation is always up to date

The benefits for long term preservation

- The formal definition ensures a precise and unambiguous representation information
 - ◆ ICD in XIF format preserved with data
 - ◆ ICD in PDF and HTML format accessible by users
- The formal definition allows validation of data transferred to the archive
 - ◆ Theoretically → it is not so simple
 - ◆ Performance problems for large amounts of data
 - ◆ Validation failures when data record are not complete
- Formal definition not adapted for data in standard formats : PDF, FITS, ...

Contact

- Download : <http://logiciels.cnes.fr>
- Help Desk : east@cnes.fr
- Training request at east@cnes.fr
- User manuals available at <http://logiciels.cnes.fr>
- Industrial contract for maintenance (change request & anomaly report)
- An action is in progress to distribute Best & Scribe under open source license