SESP 2010

Session:	Session: SRDB (22)
Type:	Concurrent Session
Date:	Thursday, September 30, 2010
Time:	12:00 - 13:00
Room:	Einstein
Chair:	
Co-chair:	
Remarks:	

Seq	Time	Title	Abs No
1	12:00	SRDB Translator: A Tool to Transfer Data from S2K to ECHO Databases	

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Context
The first version of SRDB Translator has been developed by TAS-I and
Intecs in the frame of Galileo GSTB V2 project, with the objective to
allow an easy import of the Satellite Reference Database into the EGSE
system.
The GSTB-V2 project was based on SCOS2000 database, tailored
according to the specific mission requirements, delivered to all
database users as a single MS Access 2000 file.
The database has been validated during satellite AIV/T by TAS-I central
checkout system, using ECHO legacy system and its native database.
The existence of two different databases led to the development of a
tool allowing maintaining consistency of the test database at EGSE side
whenever a new Master GSTB SRDB release was delivered.

A new enhanced version of the tool has been recently released for use
in the frame of Sentinel-1 project, as part of the EGSE Central
Checkout System which shall support the integration and the test
activities of the satellite.
Case studies are in progress to apply the tool also to other S2K
databases of different projects, such as BEPI COLOMBO. The main goal
is to design a SW version of the tool that can be customized to follow
the evolutions of the SCOS standard ICD independently from the
specific project using it.

SRDB Translator
The Translator tool has been developed as a utility of ECHO Database
Editor (MTGP) and uses MS SQL Server RDBMS.
All SCOS2K tables are scanned and the data is transferred to
corresponding fields into ECHO tables, applying the proper
transformation.
Other standard ECHO MTGP functionalities are available to the operator
to review imported data, to define local EGSE contributions and to
perform consistency check among local and imported data. (The
imported SRDB is assumed to be already consistent).

No partial imports are foreseen, so each time a new SRDB is received
by EGSE team, its content shall overwrite any previous copy of SRDB
data already available.

Current SRDB Translator SW version is compliant with SCOS2000 ICD Issue 6.1

Main features
The SRDB translator must be firstly connected to the two databases involved by the translation process, the input SRDB and the destination ECHO DB.
Once connected, SRDB Translator acquires input data and transfer it to the destination database. The acquisition process follows these steps:
● load SRDB data from source database into its internal tables. All data of involved tables is loaded, without transformation, to speed-up the process.
● Analyze each loaded table, performing required checks and transformations, and organizing data into ECHO format
● Copy transformed data into ECHO database

At the end of the acquisition process, a log is produced, listing for all loaded data objects the positive or negative result of the transformation.
The content of each original loaded SRDB table is also available, to help operators in case of error detections.

Technical problems on data transfer
Before starting with tool development, a detailed comparison of the structure of the two involved databases has been performed, to identify the commonalities and the differences between them.
This analysis has outlined the following main problems:

● Main satellite database data, as telemetry, telecommand and parameters are managed in both databases, but with different rules and implementation details
● On-line SW implementation rules often affect data representation in the database.

Furthermore, frequent releases of S2K database enhanced versions and their customization to meet mission specific data requirements add complexity to the data exchange process and force work ingwith different input database structure in each new project.

Future enhancements
The experience and the knowledge acquired during the development and maintenance phase of SRDB Translator tool outline the great benefits that can be given by the design of a standard database interface, at least for the data concerning the satellite database.
This standard interface would allow an easier data exchange among different EGSE systems, reducing program costs both in SW development and AIT training and improving harmonization.

For example, even the only definition of an ad-hoc markup language based on XML could lead to the development of legacy import/export procedures, without needs to know details of other systems and totally independent from their evolution.
The markup language would reduce also the checks on data consistency, allowing defining detailed validation rules and constraints.

2   12:30   SRDB Next Generation
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Background:
The project's Satellite Reference DataBase (SRDB) hosts all data that needs to be shared in order to define and test the avionics and the operations. It includes various kinds of data used by various spacecraft domains like e.g. :
- TM/TC and operations data (including ground segments)
- Data for the production of the central software
- Electrical information at functional level
- System and environment data for the configuration of the simulation facilities

SRDB provides a reliable data source repository with strict configuration control processes. Beyond the classic SRDB use case over the last decade the use cases evolved along with the trend of model-based systems engineering, where increasingly more and more data is moved from documents to databases. The systems evolved that also the concurrent nature of the activities are taken into account.

Current Limitations:
One of the most critical problems is the non-compatibility of the different meta models in use. Typically each of the different tools involved in the process do have its unique internal data representations. Interfaces had to be developed to convert data from one representation into another. Often enough it turned out that this conversion was a complex operation as not all of the data was represented in an in-compatible representation (explicitly stored data vs derived data). A further problem in this is the fact that quite some data model definitions are highly implementation technology dependent. This makes the data conversion even more complex. As the current tools are 10+ years old, the used technologies and applied development processes might not be sufficient to answer the future needs.

Way forward
Astrium Satellites is currently preparing for the replacement of currently applied tools for SRDB. In this process currently a user requirements definition is on its way. In this process the following elements are fully considered:
● Lessons learnt from past and current projects
● State of the art technologies for implementation and deployment
● State of the art development processes
● Intermediate result of the ECSS working group on engineering database E-TM-10-23
● Results and validations of the ESA TRP activities like SSRM and VSD

The propose paper will focus on the following:

● Summarize status and outline rational to replace current systems
● Outline key (user-) requirements
● Identify risks and critical issues