



Auto-test based on OBCP

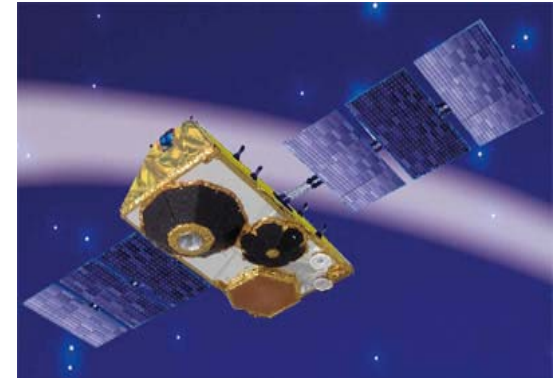
Globalstar 2 case

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- 1 - Globalstar 2 project**
- 2 - Auto-test principles**
- 3 - OPISS product**
- 4 - Conclusions**

Globalstar 2 project :

- 48 satellites to be built by Thales Alenia Space
 - Very strong programmatic constraints
 - Very high AIT production rate
 - 6 satellites batch for each launch
- Distributed/pipelined AIT
 - Toulouse, Cannes and Roma
 - Production pipe with several s/c in parallel
- Avionics qualification principles :
 - Full qualification campaign on PFM
 - Reduced tests on others FM (X-Checks, ...)



Avionics AIT needs

- Reduce the validation planning
 - Automatic test sanction (pass/fail) with diagnosis on failure
 - Send more commands than through the ground/board interface per seconds
 - Reduce the time spent in telemetry interface waits (HK periods, TC acceptance, ...)

- Provide a affordable and repeatable solution for mass production
 - No need for avionics engineers to execute and analyze the test
 - Less ground support
 - Very repeatable tests on different premises

Let the avionics AIT engineers implement the test :

- Flexibility in the test procedure
- No SW modification on procedure update
- Independence of the different functional chains

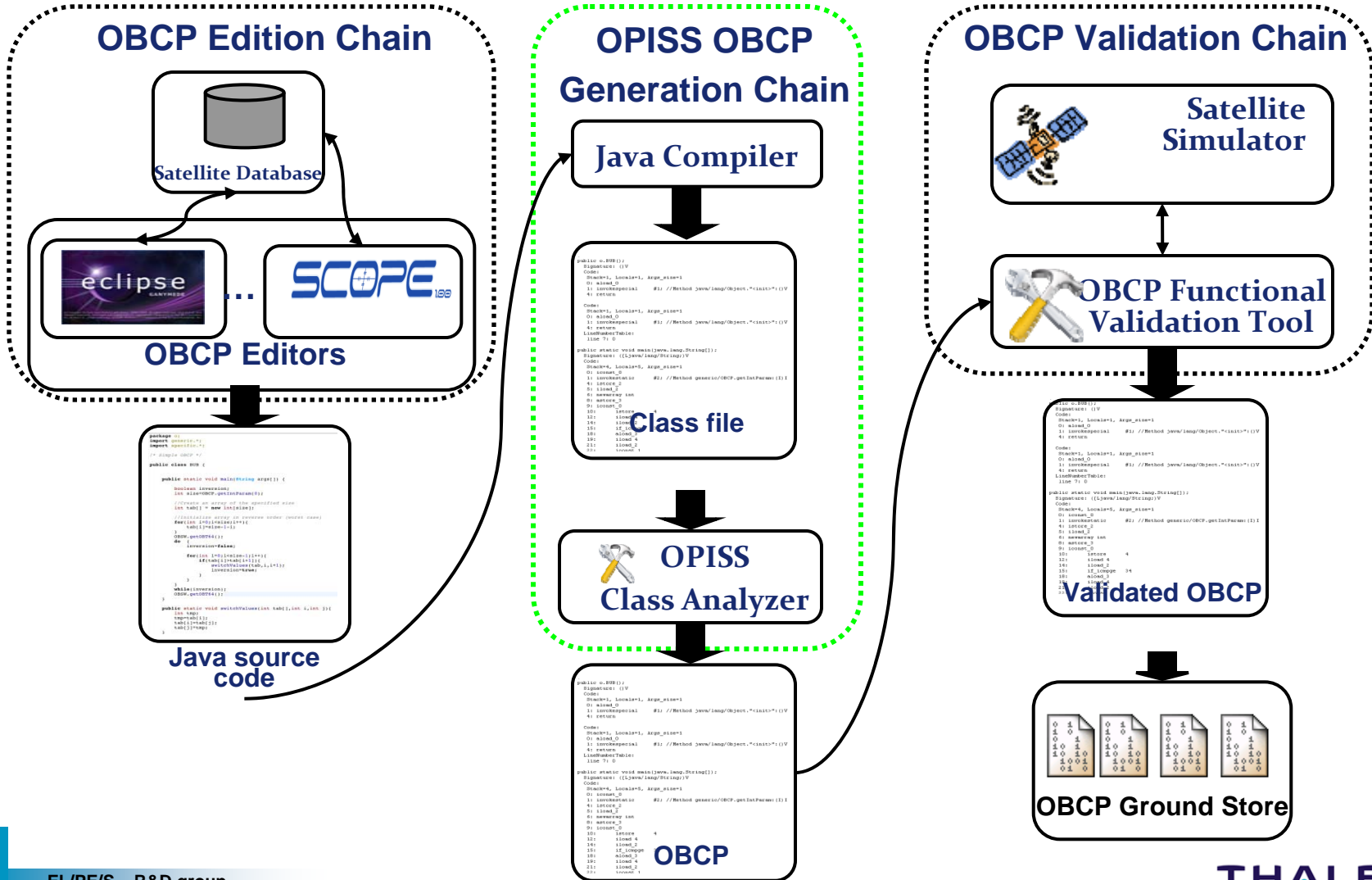
OPISS = **O**n-**B**oard **P**rocedure **I**nterpreter for **S**pace **S**ystems

OPISS is a multi-purpose on-board procedure interpreter based on Java and designed for space systems

OPISS in a nutshell:

- Offers powerful features for OBCP
 - Dynamic loading/unloading
 - Interface with OBSW
 - Compliant of ECSS-E-ST-70-01
- Is compatible with space software constraints
 - Memory & CPU
 - Criticality & real-time compatibility
- Provides a strong isolation between OBCP and OBSW
- Developed in collaboration with CNES

OBCP Production Chain

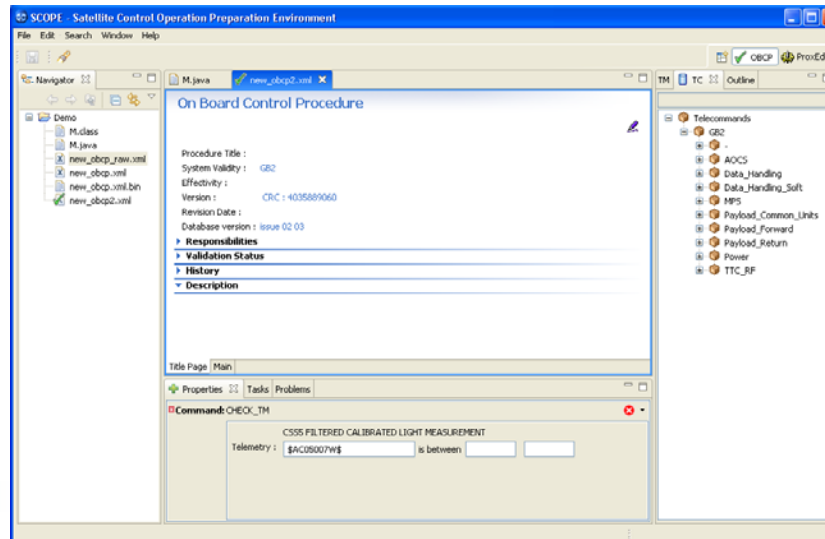


SCOPE is the Thales Alenia Space editor for :

- Flight control procedures
- OBCP (and action sequences)

A specific editor with dedicated high level instructions has been developed for autotest

- Tailored for avionics validation needs
- Specific instructions for test reporting, test sanction, ...



Procedures has been written autonomously by avionics engineers

- Fully developed with SCOPE
- Validated on the avionics test bench
- Several procedures per functional chain

Procedure are executed several time during AIT sequence :

- Initially to check the correct assembly of the equipments
- During and after the different environmental tests

No need for expert or complex setup to run the tests ;

- Send a TC to the spacecraft
- Wait the TM producing the result
- Reduced operators work load

Constellation projects require new approaches and new solutions

In the context of GlobalStar 2, auto-testing of spacecrafts based on OBCP is efficient :

- Effective reduction of the test phase
- Very simple and efficient solution
- Currently used daily by AIT in Roma

Baseline for next constellations : O3B and Iridium

- With an enhanced version and powerful test scenarios
- Possible use for telecommunication satellites family

Concerning OPISS :

- Flight qualification is in progress
- Thales Alenia Space baseline for OBCP

Thanks for your attention



OPISS

ON-BOARD PROCEDURES INTERPRETER FOR SPACE SYSTEMS

ThalesAlenia
Space

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