SAVOIR-FAIRE status and perspective

Jean-Loup TERRAILLON

TEC-SWE

Status

Phase 1 of Savoir-Faire completed.

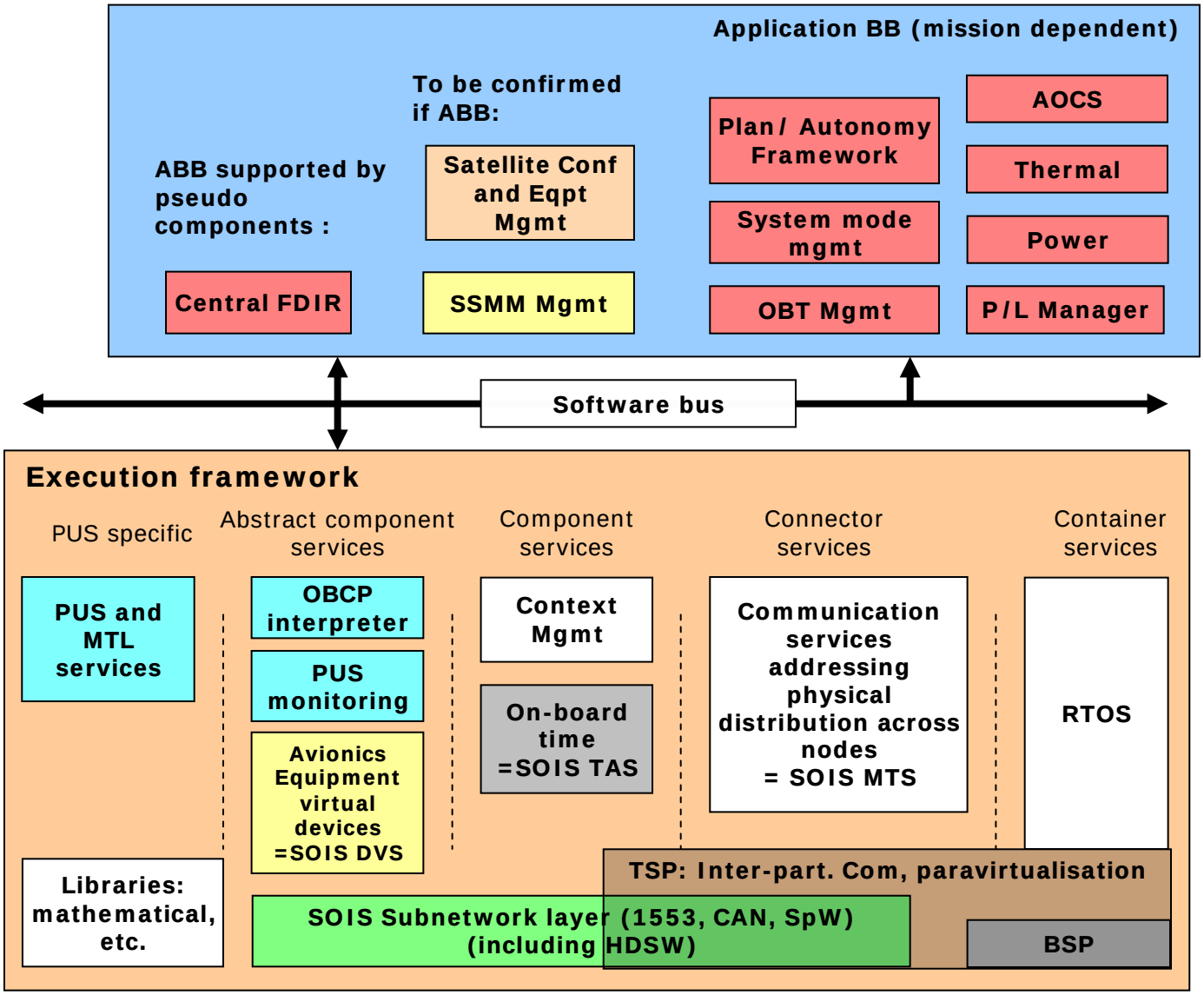
We get a document which has been sent under review in each Savoir-Faire organisation

- Architectural principle (component model for application running on an execution platform)
- Functional chains mapped on the architectural principles
- Reusability by domain engineering

- CORDET-2 started
- GSTP on functional chain under ITT

- SAVOIR-SAFI ToR drafted [Sensor/Actuator Functional Interface]

The software reference architecture



The On-board Control Procedures execution engine building block

On-board Control Procedures (OBCP)

- Flight control procedures used to increase the degree of autonomy ("operator on board")
  - Reduced spacecraft visibility
  - Deep space missions with long signal propagation delays
  - Reaction to unforeseen circumstances
- Isolated from the rest of the flight software
- Can be uploaded/modified in flight
- ECSS-E-ST-70-01C (April 2010)

OBCP execution engine identified as a Flight Software Reference Architecture Building Block

- OBCPs themselves are components (in different execution mode)

OBCP Challenges

- **Interface of the OBCP engine**
  - Provided interface (to the flight software, to the Ground)
  - Required interface (to flight software services (e.g. PUS services), to system resources (memory, CPU scheduler, I/O))
- **On-board Operations Procedures (OBOPs) vs. On-board Application Procedure (OBAPs)**
  - Different verification approaches
  - Different capabilities, different resource usage profiles (scheduling, memory utilisation), different interfaces?
- **Failure isolation implementation**
  - OBCP = Dynamic update in flight + isolated execution (no errors from the OBCP engine propagate to the flight software)
  - In the TSP environment the latter features comes for free!
- **Source language**
  - Domain specific language, scripting language, Java?
  - To be standardised? To be generated from different languages or MDE diagrams?
- **Execution mode i.e. what is the target language**
  - Interpretation (i.e. source language = target language)
  - Intermediate language (e.g. Java bytecode)
  - Native code (Ahead-of-Time compilation, Just-in-Time compilation?)

Savoir-Faire next steps

Next meeting 4/5 November:

- Disposition of the comments on the Savoir-Faire document
- Investigate the interface within the Execution Platform
  - SOIS sub network layer ?
  - Single C API or not?
  - Priority on the Software Bus API?
- Data modelling language: separate or part of the component model?
- Link OBSW architecture vs ATB/SVF/RTB architecture

Start the SAVOIR-SAFI from the input given by the Control community

Conclusions

A roadmap for standardisation of Avionics has been consolidated through the SAVOIR initiative and is now reflected in the AES RM

Immediate support activities have started towards

- Refinement of the reference architecture (functional level)
- Notion of reference specification
- OBC, RTU, ground, payload interfaces
- Modeling for verification

CORDET2 works on the software component model and execution platform

The GSTP works on the functional chains

Sensor Actuator interface working group