Model Based Standardization of a procedural language: Conceptualization of the ECSS-E-70-32.

VITROCISET Belgium

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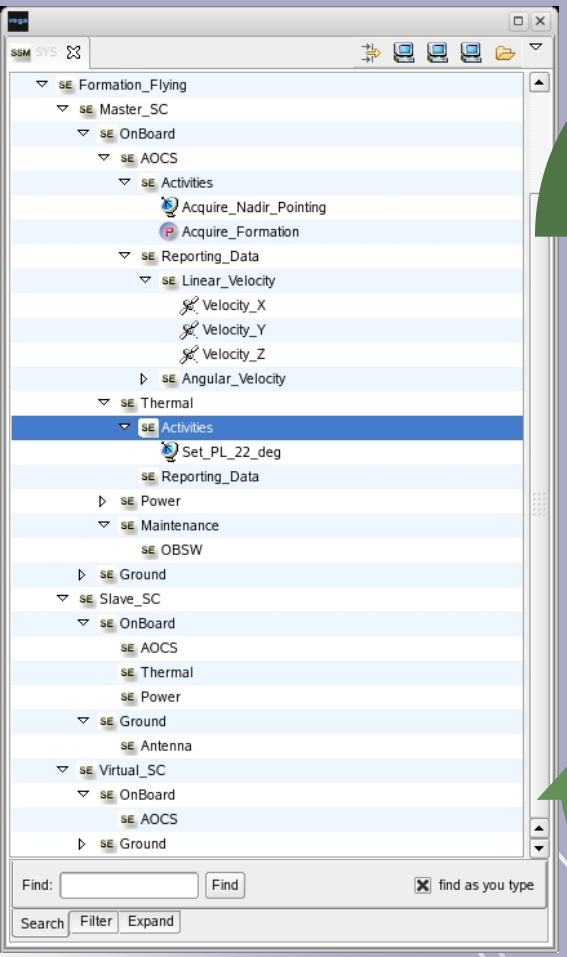
ECSS-E-70-32 Summary



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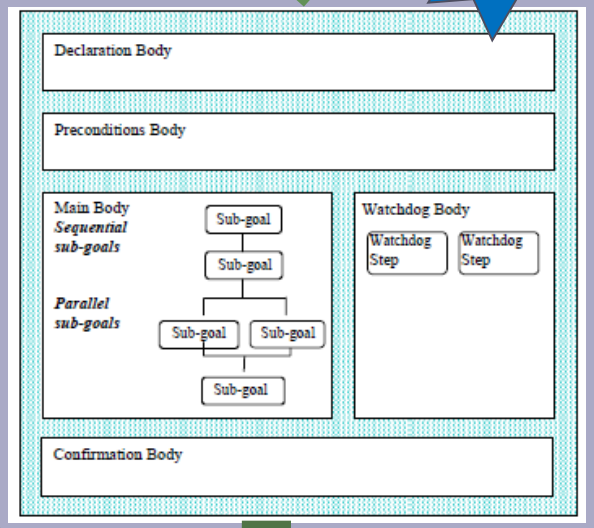

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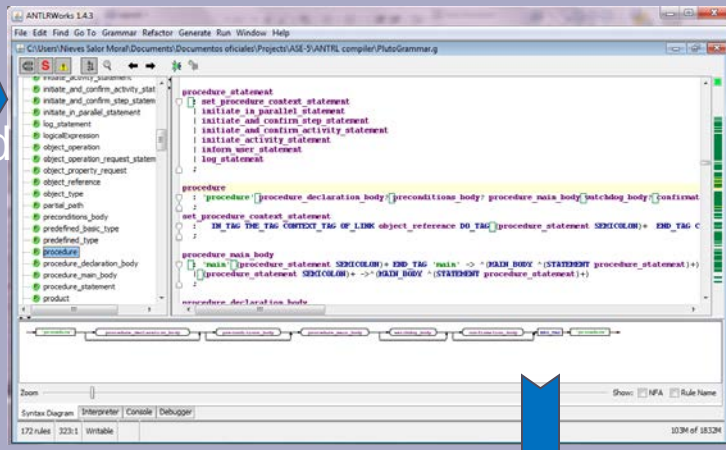

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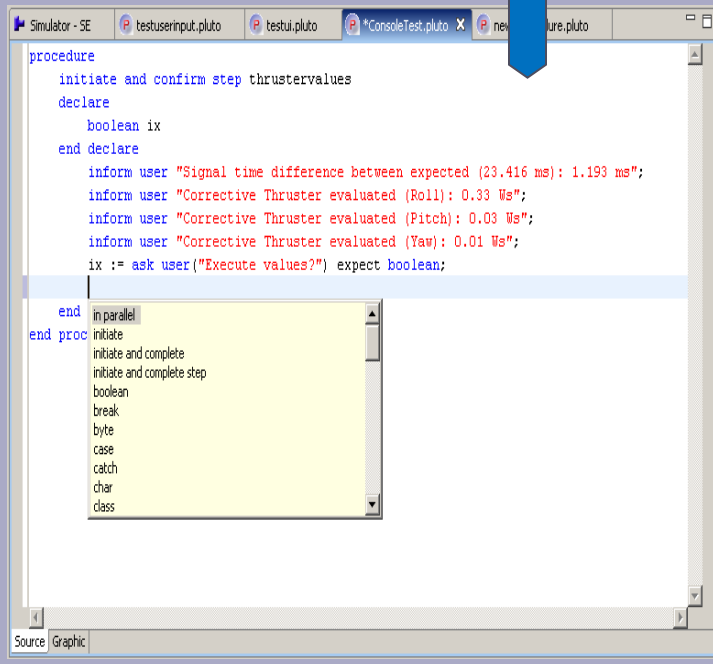


ECSS-E-70-32 Status

- Ambiguity problems
- Use of relative referencing
- Grammar based implementations **PLUTO**
- Increasing demand for extensions to the standard
  - New standard functions
  - Use of global variables
  - Allow several parallel watchdog instances for the event

Goals of the conceptualization

- Provide an **standardized** and verified **data model for procedures** without implementation constraints.
- Provide an **ICD** for procedures.
- **Allow extensions** to the standard to be done in a qualified and verified model.
- Discover and **remove inconsistencies and ambiguities** of the standard.

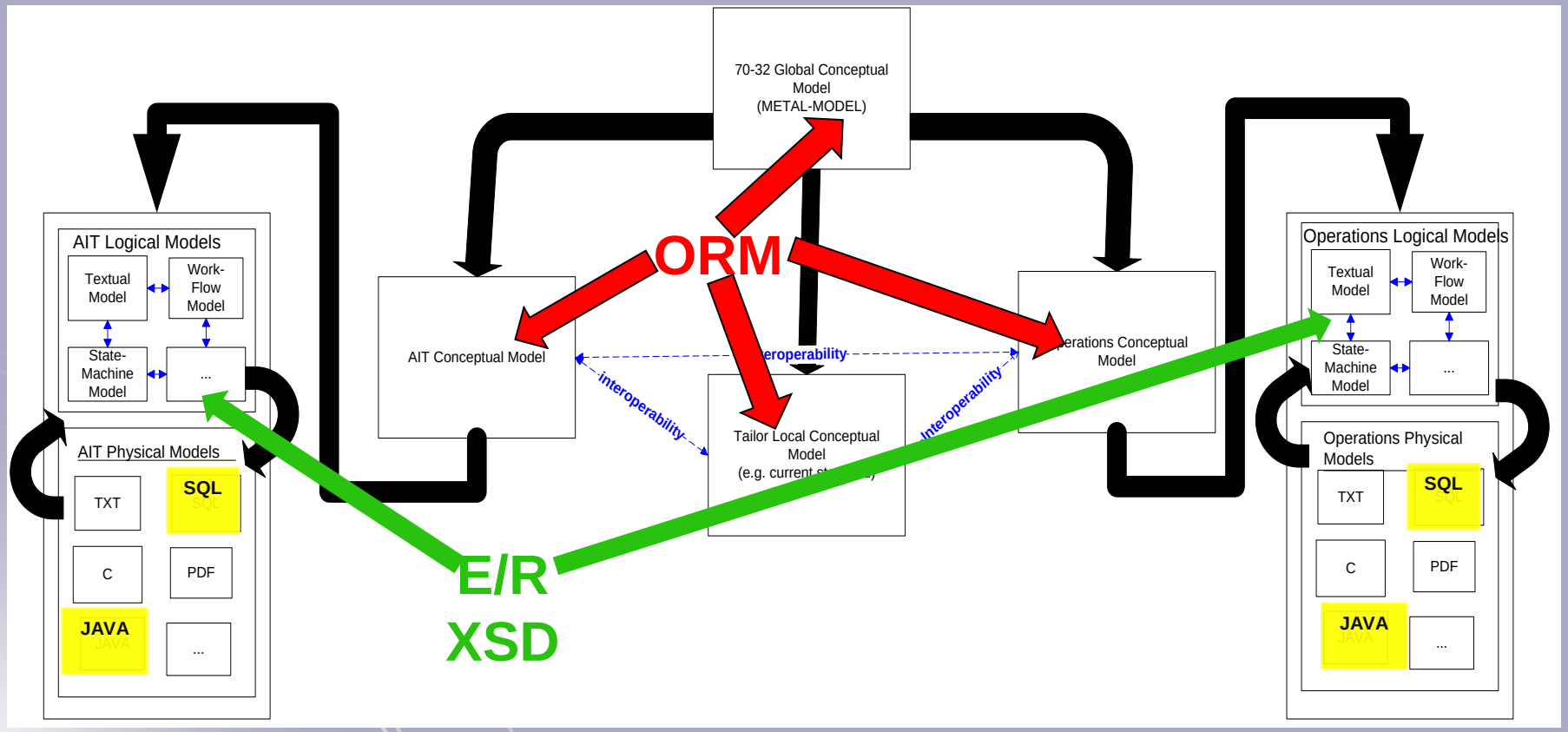
Compliance → **SEMANTIC** ✓ GRAMMAR ✗

Conceptualization Approach

- Layers of conceptualization
  - **Data**
    - Model the information and structures contained in the standard.

Conceptualization Approach

Data formalization

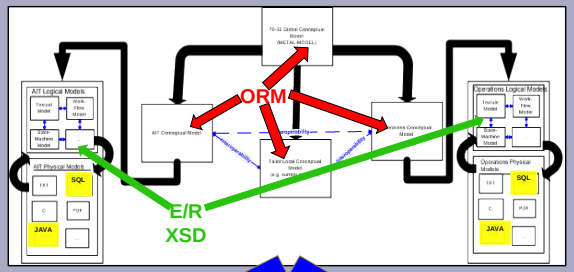


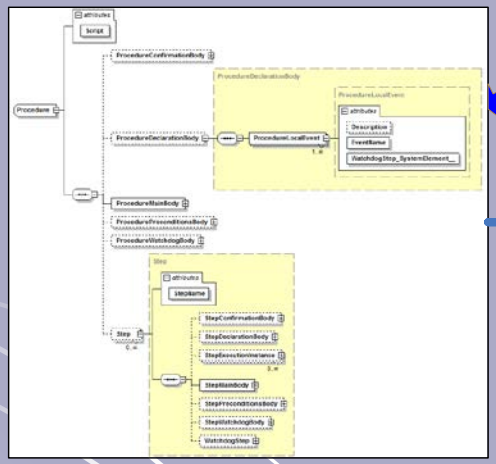
Conceptualization Approach

- Layers of conceptualization
  - **Data**
    - Model the information and structures contained in the standard.
  - **Grammar**
    - Define the syntax of the procedures according to the formal data.

Conceptualization Approach

Grammar formalization





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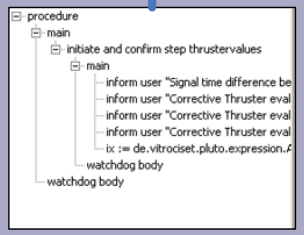
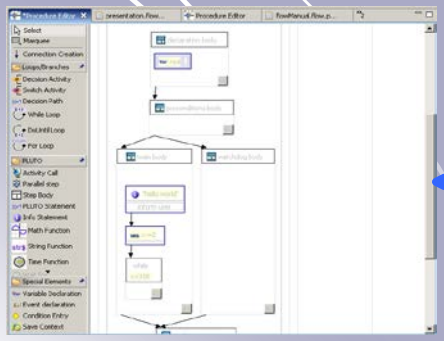
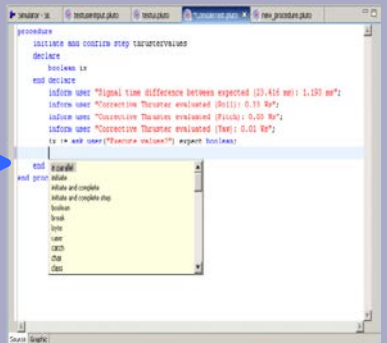






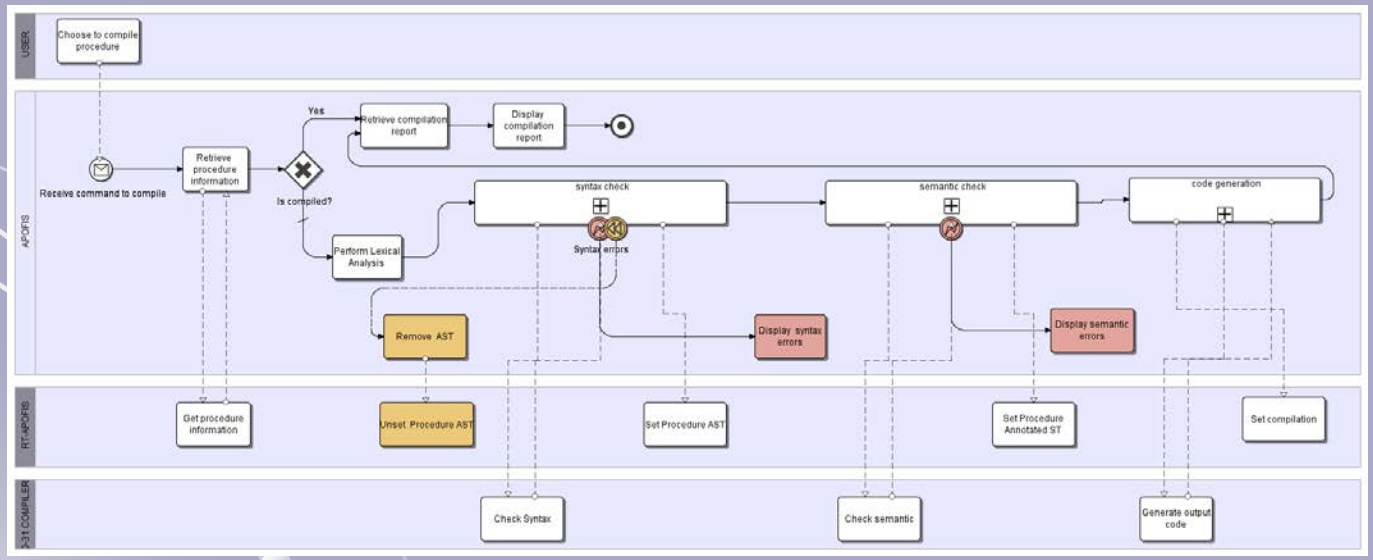
Conceptualization Approach

- Layers of conceptualization
  - **Data**
    - Model the information and structures contained in the standard.
  - **Grammar**
    - Define the syntax of the procedures according to the formal data.
  - **Business**
    - Model the data flow and behavior of the procedures.

Conceptualization Approach

Business formalization

- Specification in a formal way
  - **Data flows** between processes.
  - **Collaboration** between information repositories
  - User **interactions** with the information system



- Use of the standard **BPM** to model processes.

On-going working case

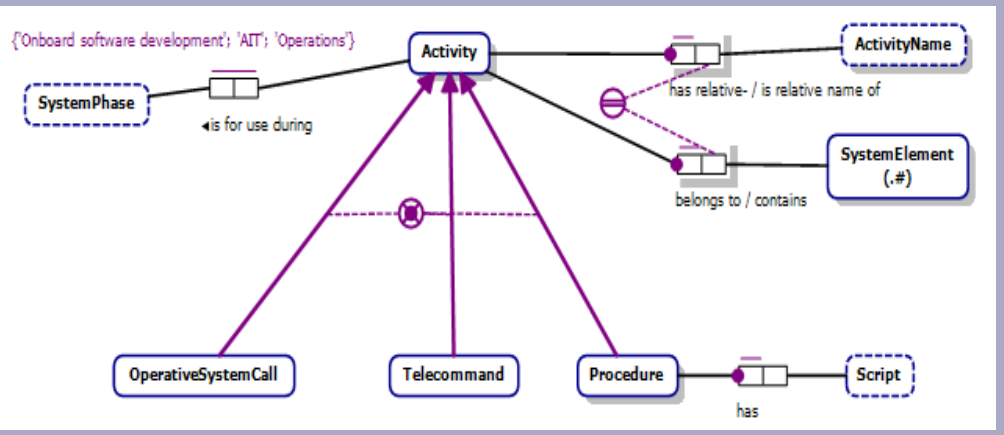
- ASE-5 Project
  - Goals:
    - **FORMAL** METHODS
    - VALIDATION & **VERIFICATION**
    - COMPLIANT WITH **ECSS-E-ST-70-32**
    - **QUALITY** SYSTEM FOR ACTIVITY PREPARATION/EXECUTION ENVIRONMENT
    - **SCALABILITY** TO OTHER MARKETS
  - Require
    - CREATE PROCEDURES CONCEPTUAL MODEL
    - USE SSM CONCEPTUAL MODEL

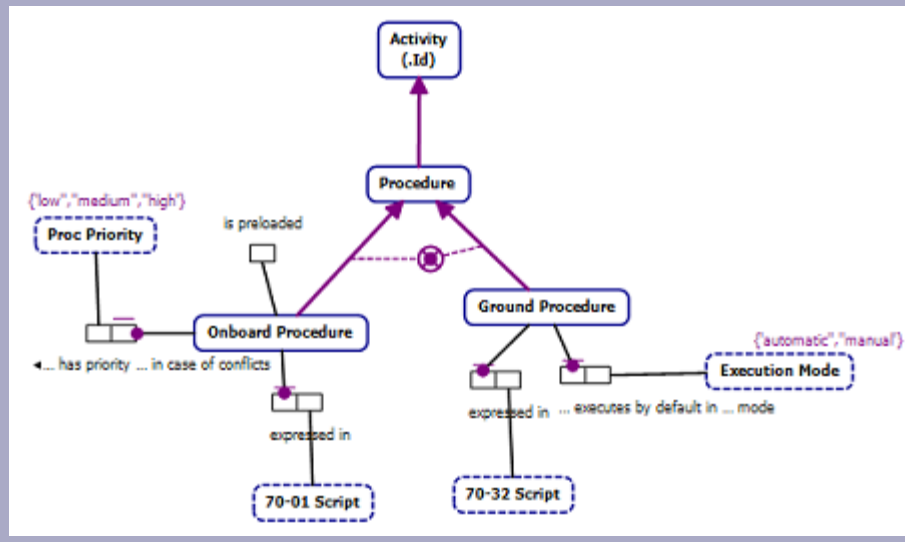
On-going working case

- Steps for the conceptualization:
  - Model the **semantics** of the standard.
    - **NOT** only static data → also dynamic.
  - Discover **common concepts** between parties and harmonize definitions.
  - **Validate** the **completeness** and **correctness** with stakeholders.

On-going working case

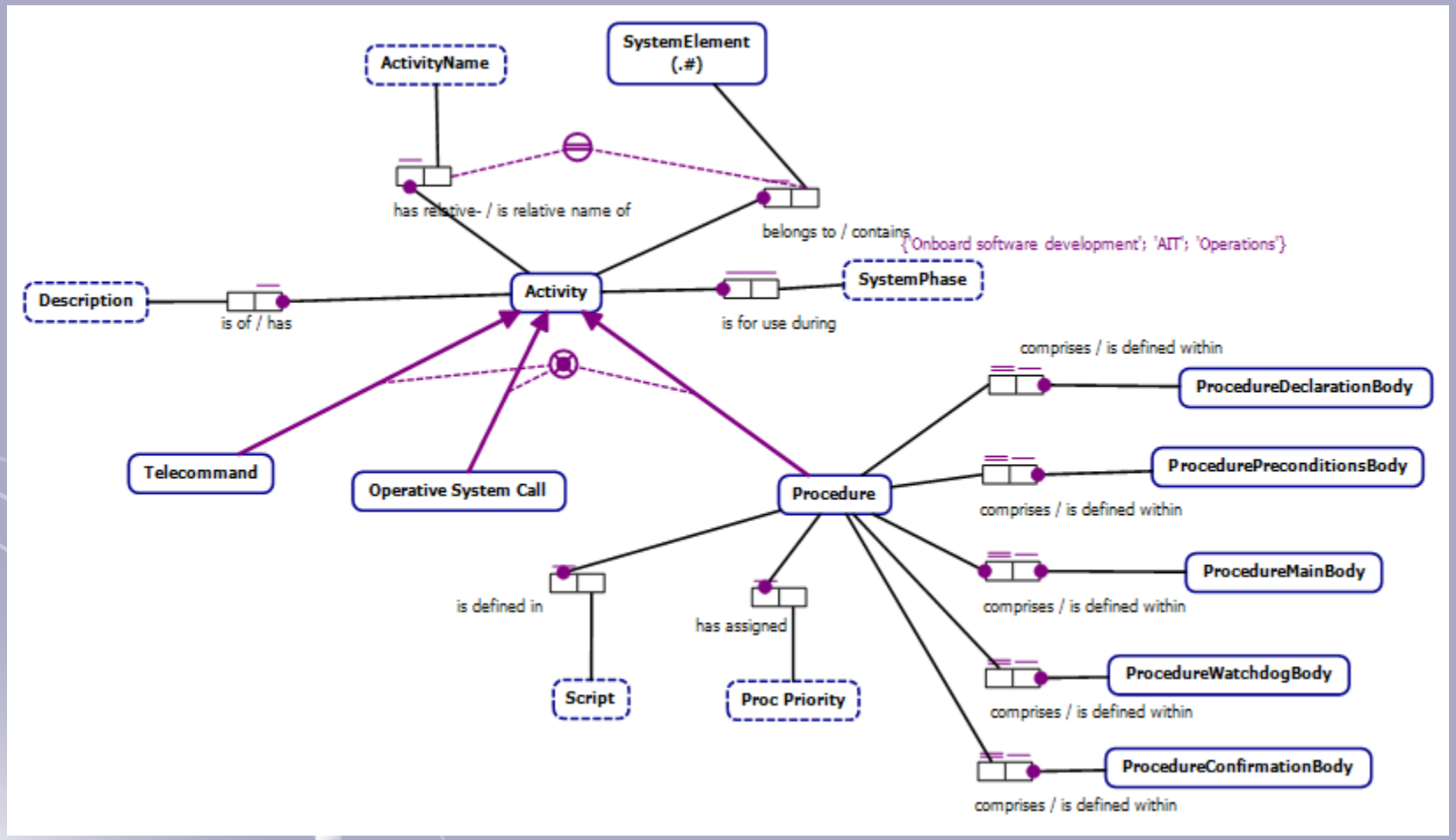
- Integration between parties





On-going working case

- Integration between parties

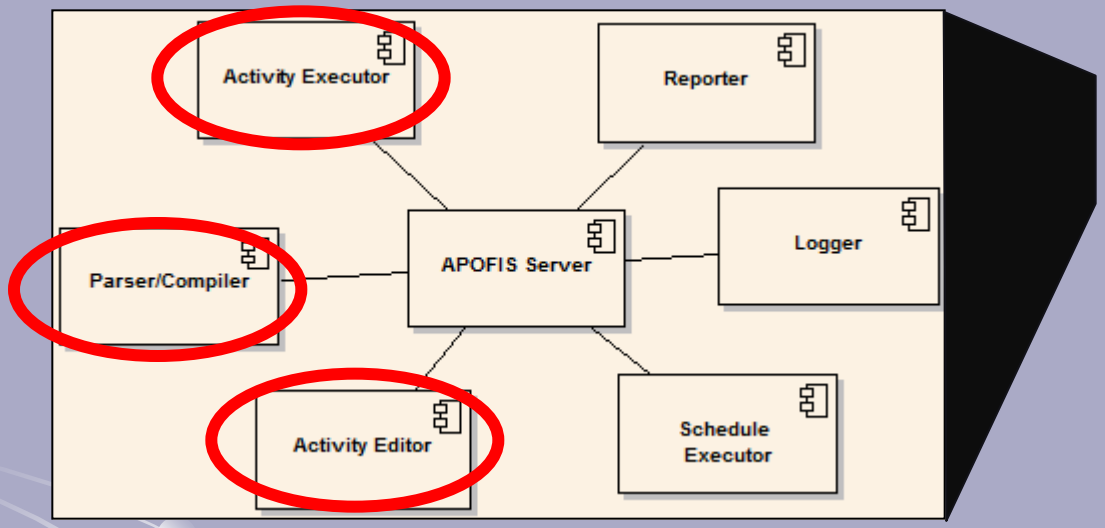


On-going working case

- Application in the ASE-5 project

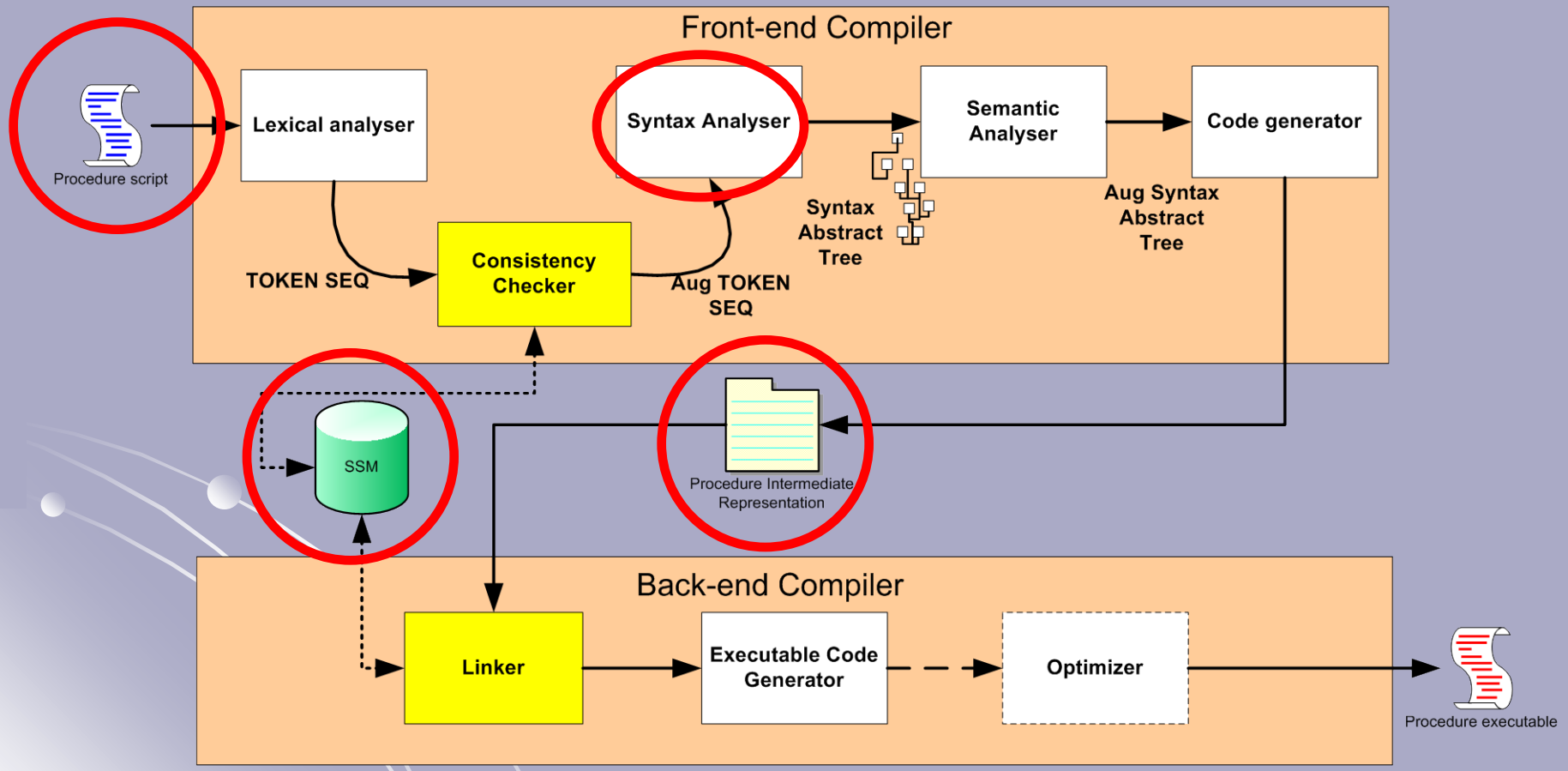
On-going working case

- Application in the ASE-5 project



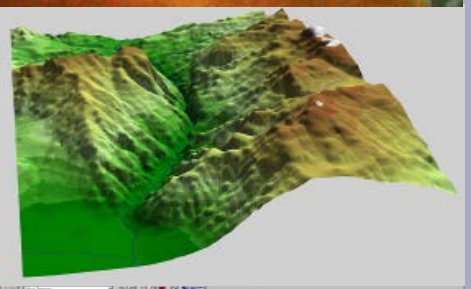
On-going working case

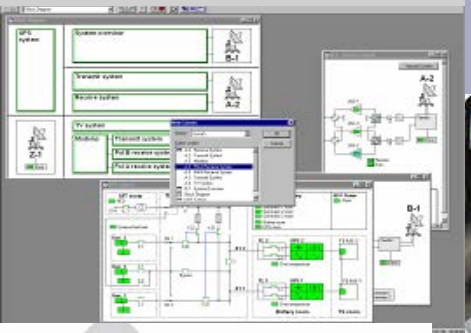
- Application in the ASE-5 project



Conclusions

- Output of the process
  - Conceptual models
    - Static and dynamic data in ORM
    - Business process in BPM
  - Logical models
    - XML Schema of the standard acting as ICD.
    - E/R models
    - Grammars for writing procedures.
  - Physical models
    - SQL scripts/JAVA classes
    - BPEL processes
  - Compiler of the grammars





Thank you for your attention

Vitrociset Belgium
Rue Devant les Hêtres 2
B-6890 Transinne. Belgium
Tel: +32(0)61 230 001
Fax: +32(0)61 230 269

Vitrociset Germany
Lise Meitner strasse, 10
64293 Darmstadt - Germany
Tel.: +49 (0)6151 95734-12
Fax: +49 (0)6151 95734-26

Vitrociset Netherlands
's Gravendijckseweg 53
2201 CZ Noordwijk - The Netherlands
Tel.: +31 (0)71 3649770
Fax: +31 (0)71 3648960