

# **Projet de recherche sur l'Interopérabilité en Ingénierie Système basée sur les modèles**

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- MBSE is emerging as the means to master complex systems/products/services and the associated life-cycles.
- MBSE work products need to be shared between customers, OEMs and partners (e.g. sub-contractors) involved in life-cycle activities.
- Today the sharing of MBSE work products is limited due to the lack of standard exchange practices, and collaboration requires generally the use of the same tool and same tool version by all partners, leading to constraints and reduced operational performance.
- The business need is now to interconnect MBSE processes between customers, OEMs and partners, and to exchange MBSE work products in a seamless way, while enabling each stakeholder to operate its preferred tools.
- This need is supported by the data interoperability strategy and roadmaps developed by several industry sectors (e.g. ASD SSG for Aerospace & Defence).
- NB1: a “MBSE work product” can be defined as a set (or package) of data feeding one or several views of the considered system architecture.
- NB2: Architectures are considered in this project either as result of the Architecting phase or Design phase. Architecture Frameworks like UAF and NAF will be considered..

- **SE interoperability:** see Chapter 6 “Previous and on-going works” of AFIS-AFNeT Framing Document
  - SEDRES project
  - OMG SE conceptual model
  - OMG Model Interchange Working Group
  - AFIS work on SE with regards to PLM and PM
  - AP233 and DoDAF mapping study
  - SystemX I(SC)2
  - DoD Digital Engineering Information Exchange Model (DEIXM)
- **Data standards for interoperability**
  - STEP Enhanced Architecture, lead by AFNeT
  - New STEP Application Protocols currently in development: AP242 ed2, AP239 ed3, MoSSEC, implementing the above architecture.
  - Future version of AP233 to be investigated
- **System modelling languages or technologies**
  - SysML, Archimate, BPMN, IDEF
  - Arcadia/Capella, Cameo, Enterprise Architect, HOPEX, Rhapsody, RFLP

## Aim of the MBSE interoperability project

- Ensure that French industry contributes to and masters the future MBSE interoperability standards and processes.
- Increase the knowledge of French academic community on MBSE and data interoperability.
- Align stakeholders strategy on MBSE interoperability (agreed roadmap)
- Identify and deliver short-term benefits

# Objectives of the MBSE interoperability project

- To define a set of use cases addressing interoperability between organization and platforms
- To propose an interoperability strategy for based on a layered approach and an update of AP233.
- To influence related associations (INCOSE, OMG, PDES)
- To prototype and demonstrate the envisioned interoperability mechanisms

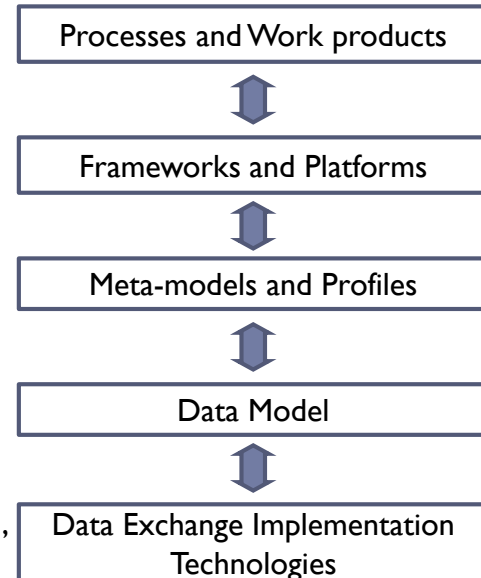
See. ISO/IEC/IEEE  
42020 and 15288

See. UAF and NAF

See UAF and NAF  
meta-models; sysML  
and other languages

See ISO 10303 (STEP)

See XML (file exchange),  
OSLC (transactional)



List of scientific issues that could lead to PhD subjects within the project:

- ❑ How to relate heterogeneous ontologies in a single environment, with different levels of semantics?
- ❑ What systematic approach should be used to link work products (document-like), digital artefacts (model-based) and data?
- ❑ How to trace the decision process through models and layers?

- ❑ A group of AFIS and AFNeT members will develop the project proposal
  - ❖ AFIS: MBSE and 3S-AI Technical Committees
  - ❖ AFNeT: PLM Task Force
- ❑ IRT SystemX and Saint Exupéry are candidate frameworks (TBC)
- ❑ Potential project partners to be identified ASAP.
- ❑ Targeted planning:
  - ❖ Project proposal could be issued by September 2019
  - ❖ Research partnering could be finalized by end of 2019
  - ❖ Projects could start by beginning of 2020..



