

The PST Project

RESEARCH CONTEXT

PURPOSE

SCOPE

OBJECTIVE

IMPROVE

Lancement : juillet 2016

Durée : 3 ans

Site : Saclay

- .
- Private / public project
- Carried out in the Institute Research in Technology SystemX (IRT SystemX)

Industrial partners

ALSTOM

APSYS
ICONIC PLACES

ANSYS

ESTEREL
Technologies

KRONO-SAFE
Safe design in real-time

SAFE RIVER
Safety & Security Forge

SAFRAN

Academic partners

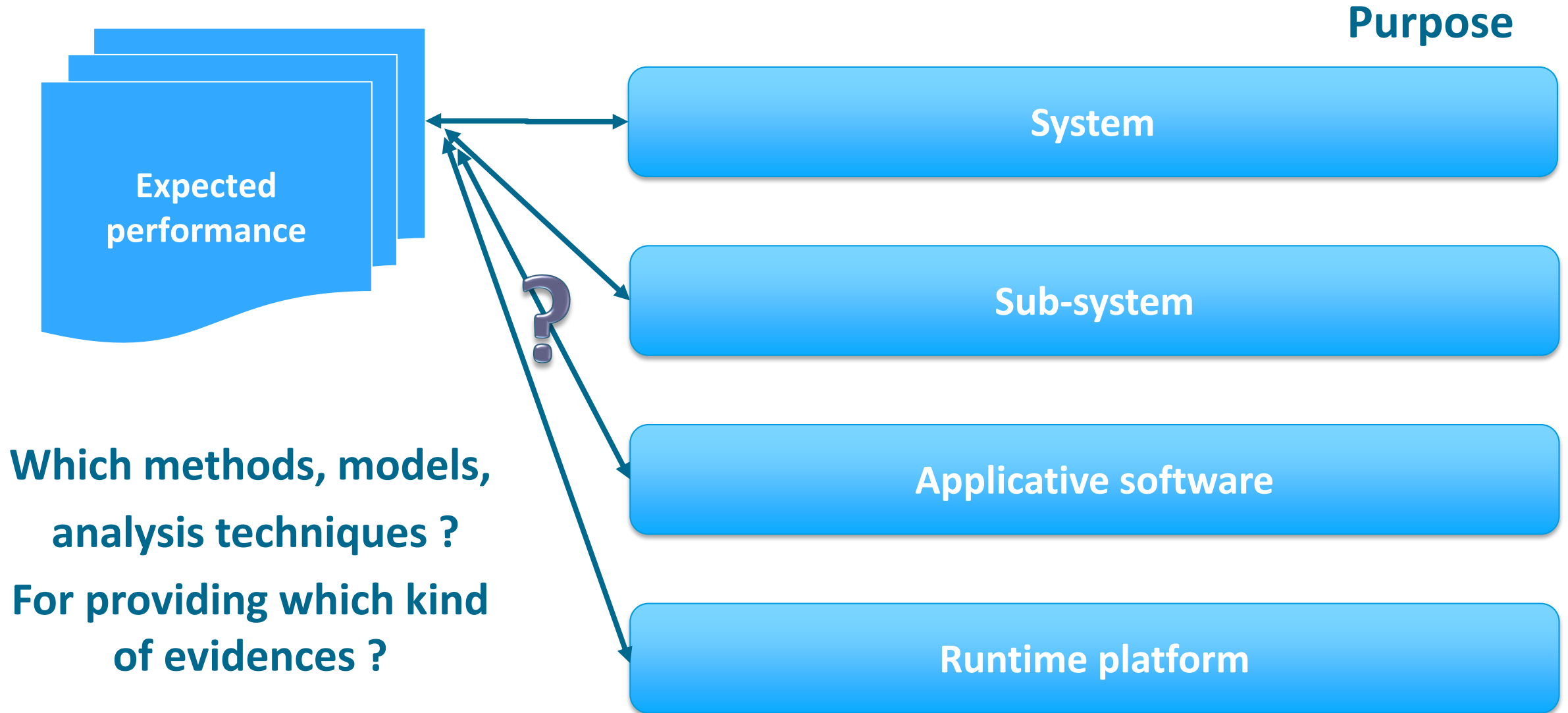
TELECOM
ParisTech

UNIVERSITÉ
PARIS
SUD
Comprendre le monde,
construire l'avenir
université
PARIS-SACLAY

Research Institute

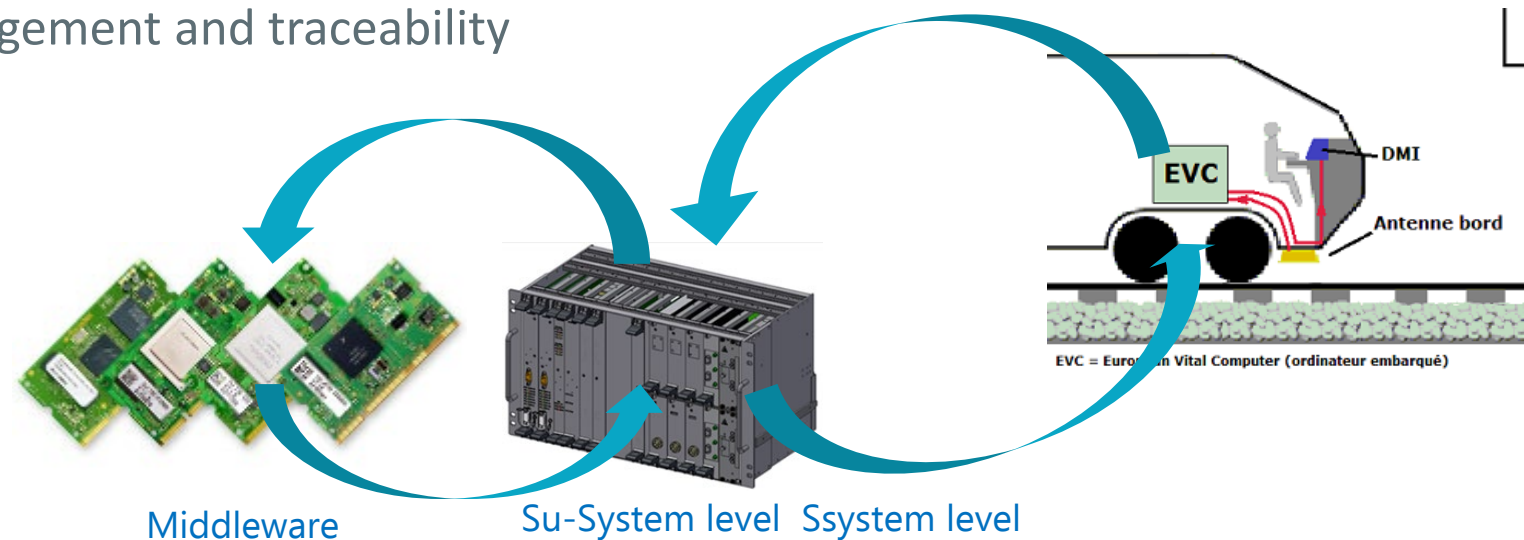
Systemx
INSTITUT DE RECHERCHE
TECHNOLOGIQUE

The PST project : Performances of Transportation Systems



■ How can models support and enhance the design process ?

- Seamless tool-assisted process.
- Architecture analysis for tradeoffs
- Optimization of HW & SW resources.
- Requirements management and traceability



Objectives

- **Design of a seamless model-based process harnessing :**
 - Model Based Systems Engineering (MBSE) practices for the system level ;
 - Model Driven Architecture (MDA) practices for the software and platform levels ;
 - Tradeoff practices woven with the System and Software development processes ;
- **Establishment of a traceability model for impact analysis ;**
- **Build of an open source demonstration :**
 - Mock-up that can be implemented in industrial tools like DOORS, PTC/integrity, DS/Enovia....

Objectives

■ Implementation of analysis

- by leveraging the Architecture and Analysis Design Language (AADL) and the Open Source AADL Tool Environment (OSATE) environment
 - System level : end-to-end latency analysis
 - Platform level : scheduling analysis
 - Build of assurance plans to verify requirement compliance.

Objectives

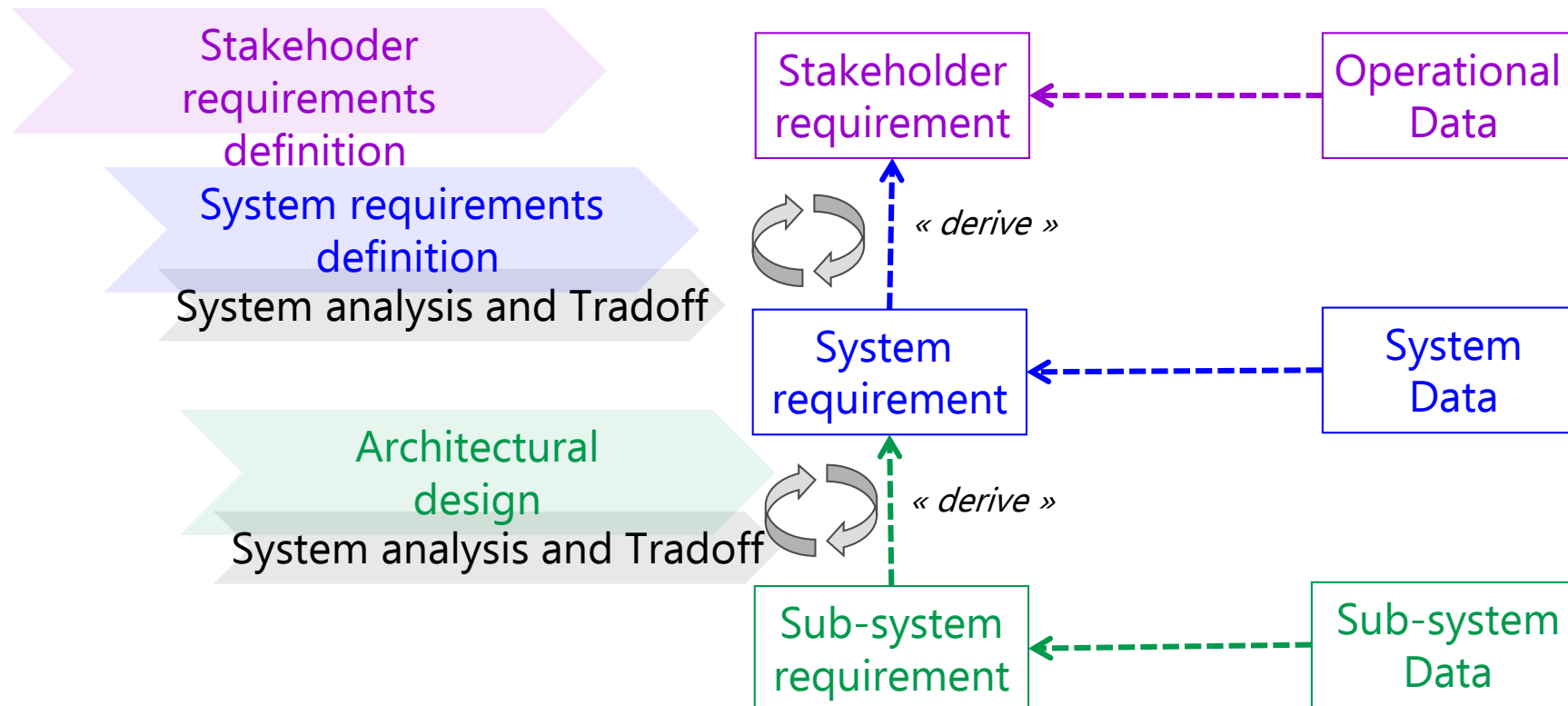
- **Build of an open source tooling solution**
 - Mock-up of principles for possible implementation in industrial contexts using tools of the ALP/PLM market (DOORS, PTC/integrity, DS/Enovia....)

- **Demonstration of an architecture based on a 2003 processor**
 - Compliant with ERA baseline 3 response time and safety requirements, selected in the scope of the PST Use Case.

The PST seamless process

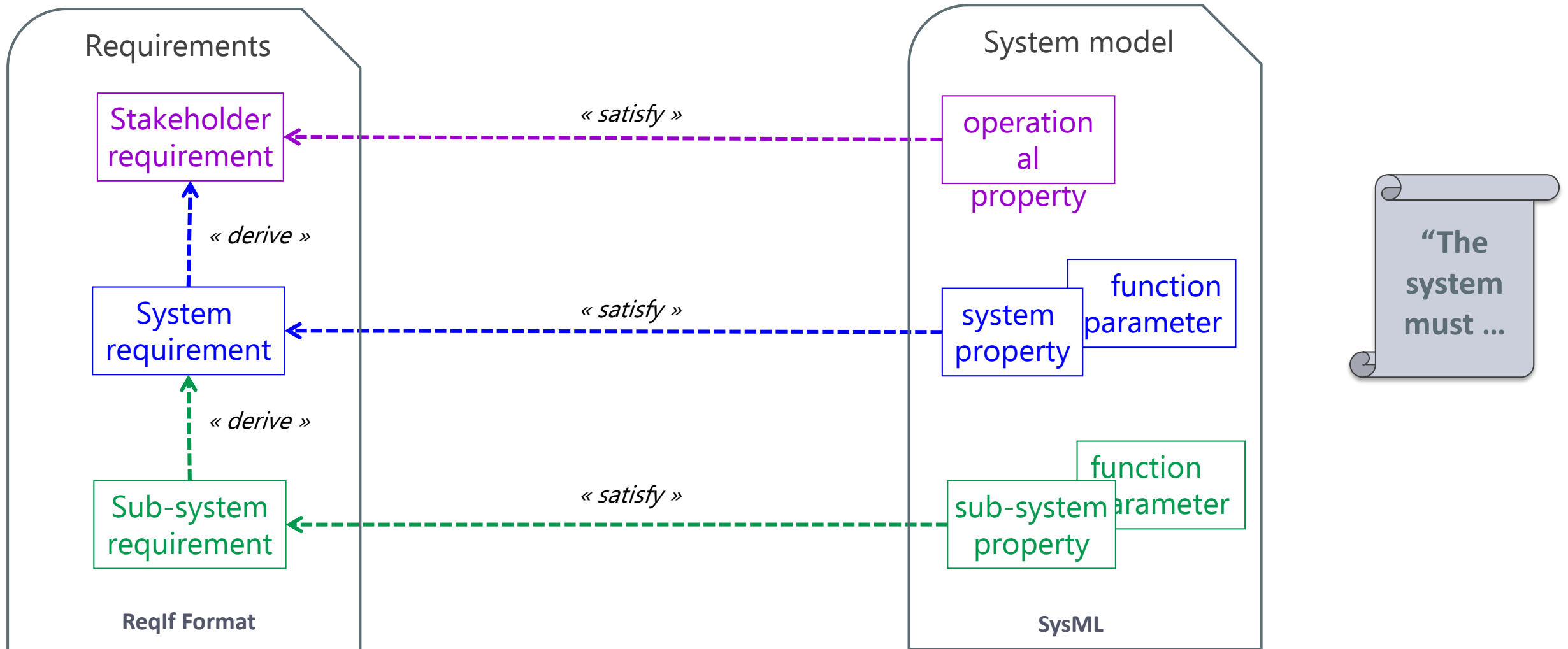
**SYSTEM LEVEL
SW/HW LEVEL**

System definition processes of the norm ISO/IEEE 15288



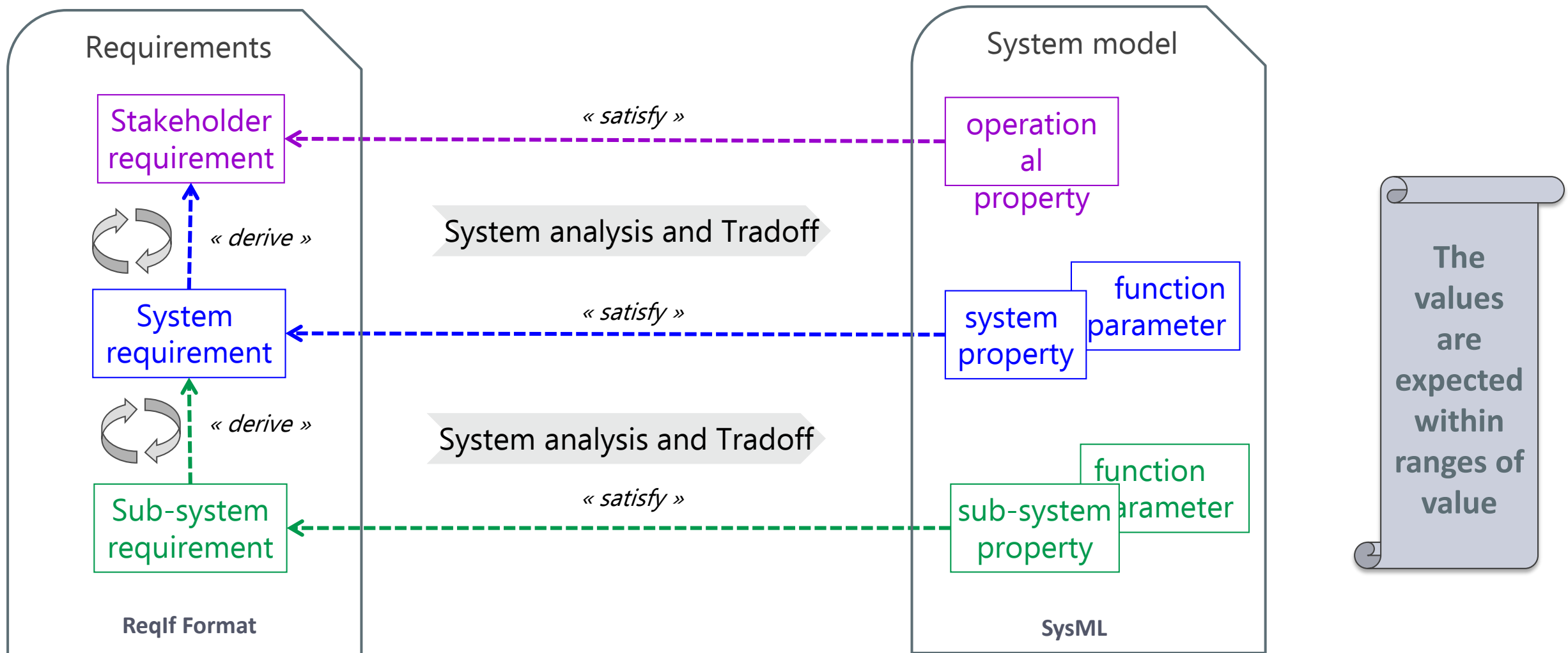
The PST seamless process - System level Qualitative requirements

Implementation of traditional “ALM” MBSE practices



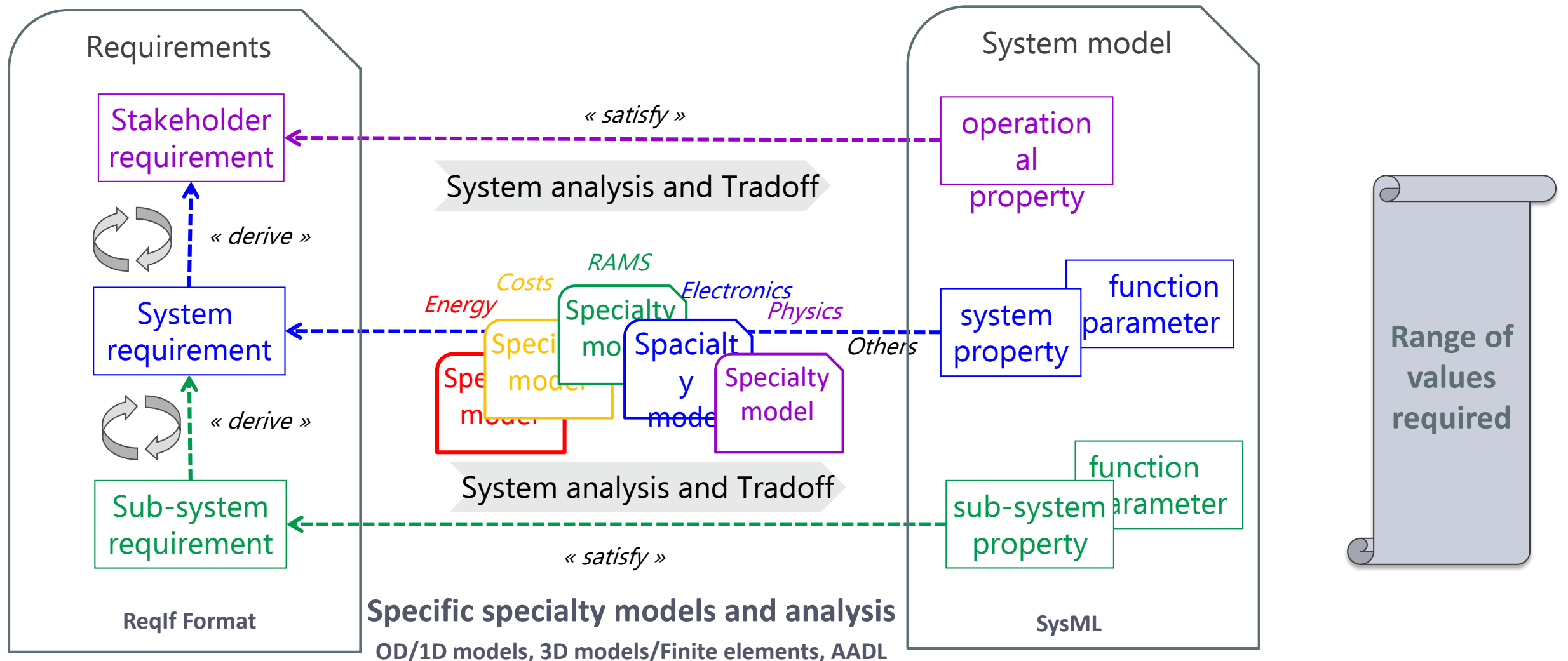
The PST seamless process - System level Quantitative requirements

Woven MBSE and tradeoff practices according to the “MIMEe” process



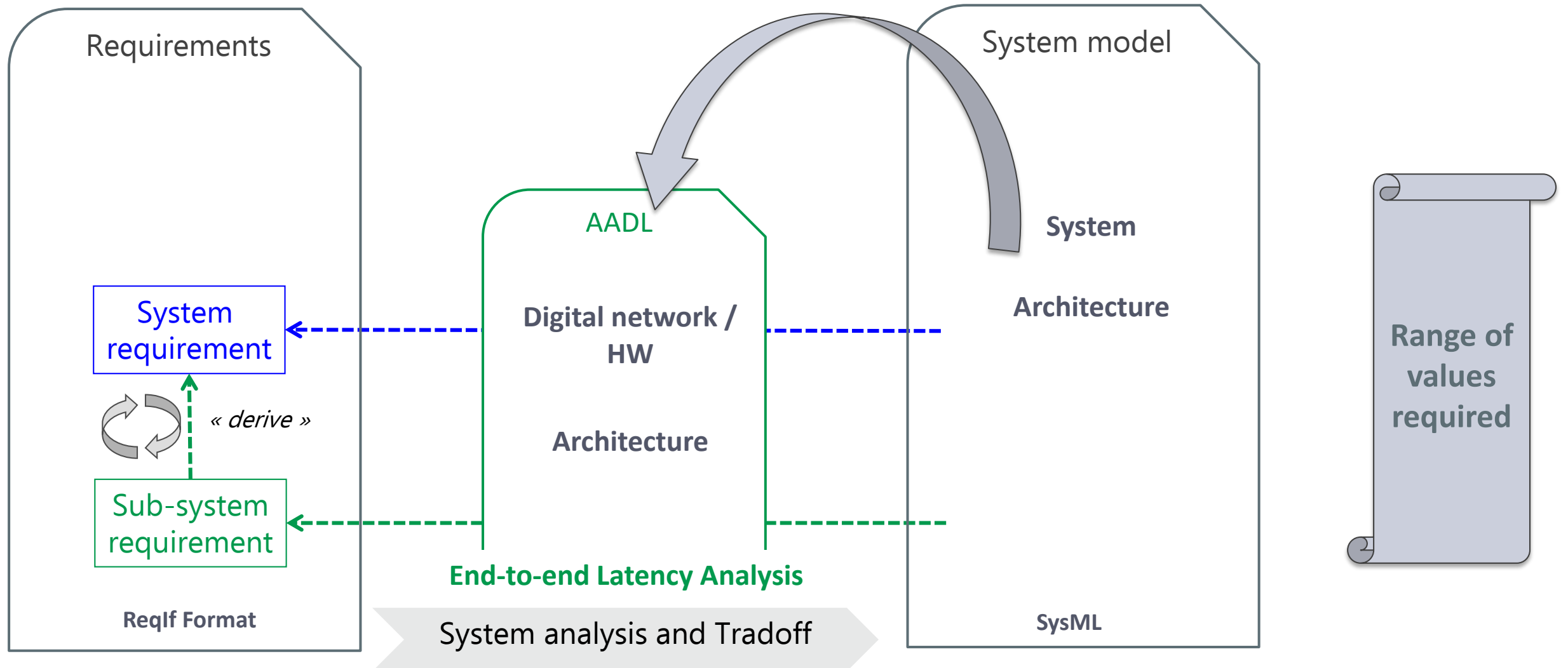
The PST seamless process - System level Quantitative requirements

Adoption of the MBSE and tradeoff practices of the “MIMEe” process



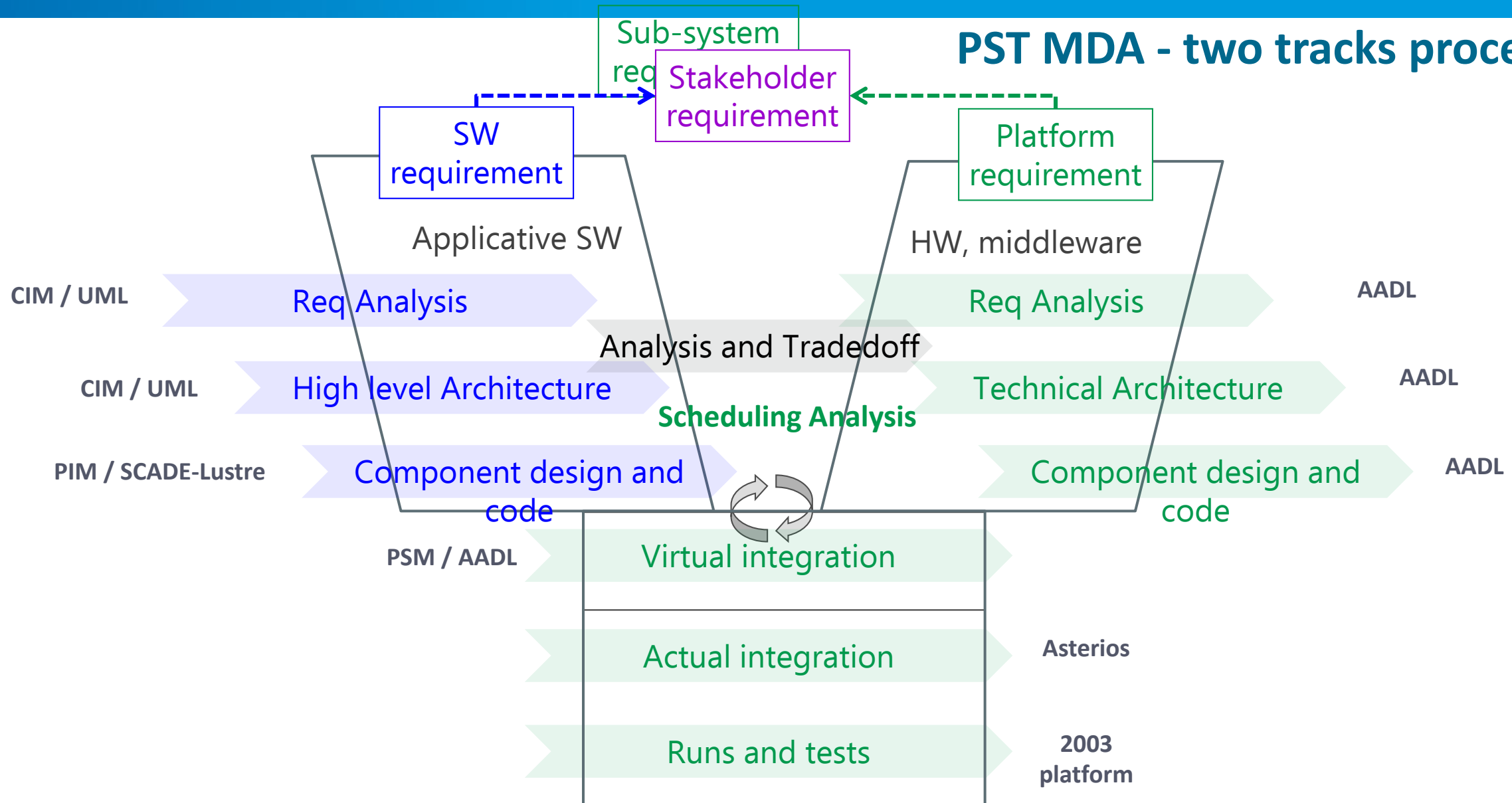
The PST seamless process - System level Quantitative requirements

And customization to the PST needs



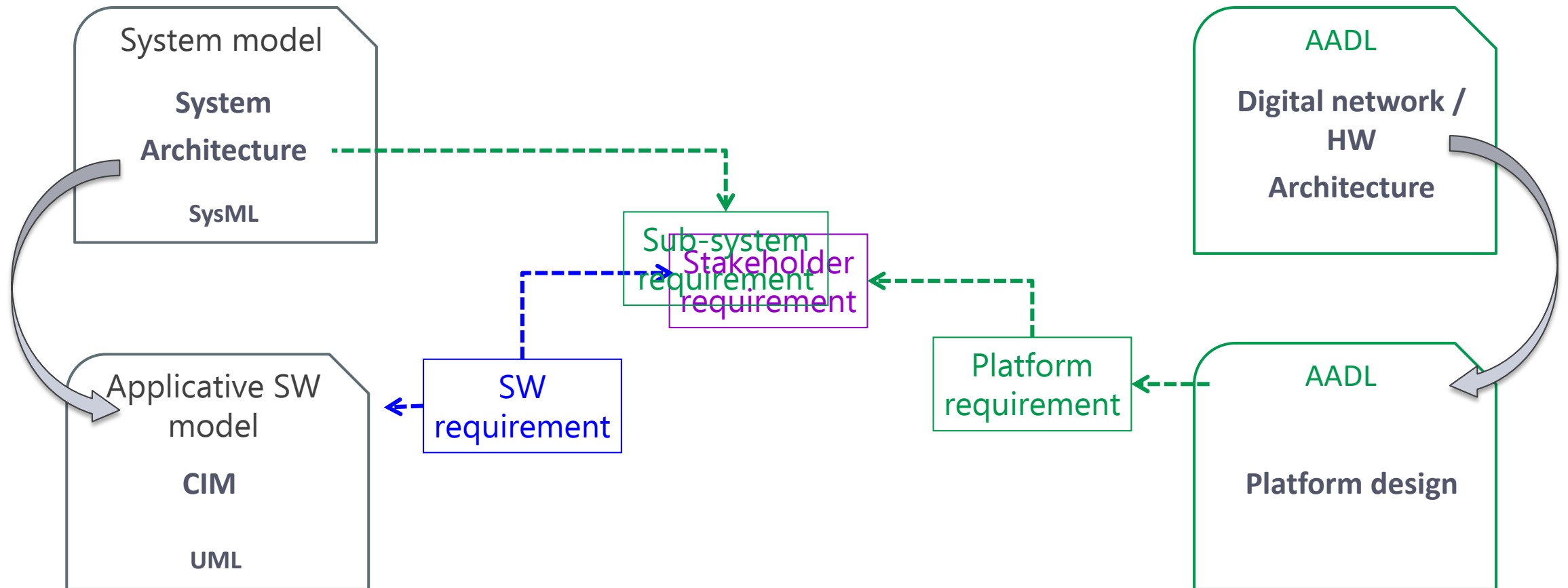
The PST seamless process - Software and platform level

PST MDA - two tracks process (Y)



The PST seamless process - Software and platform level

Transition between levels

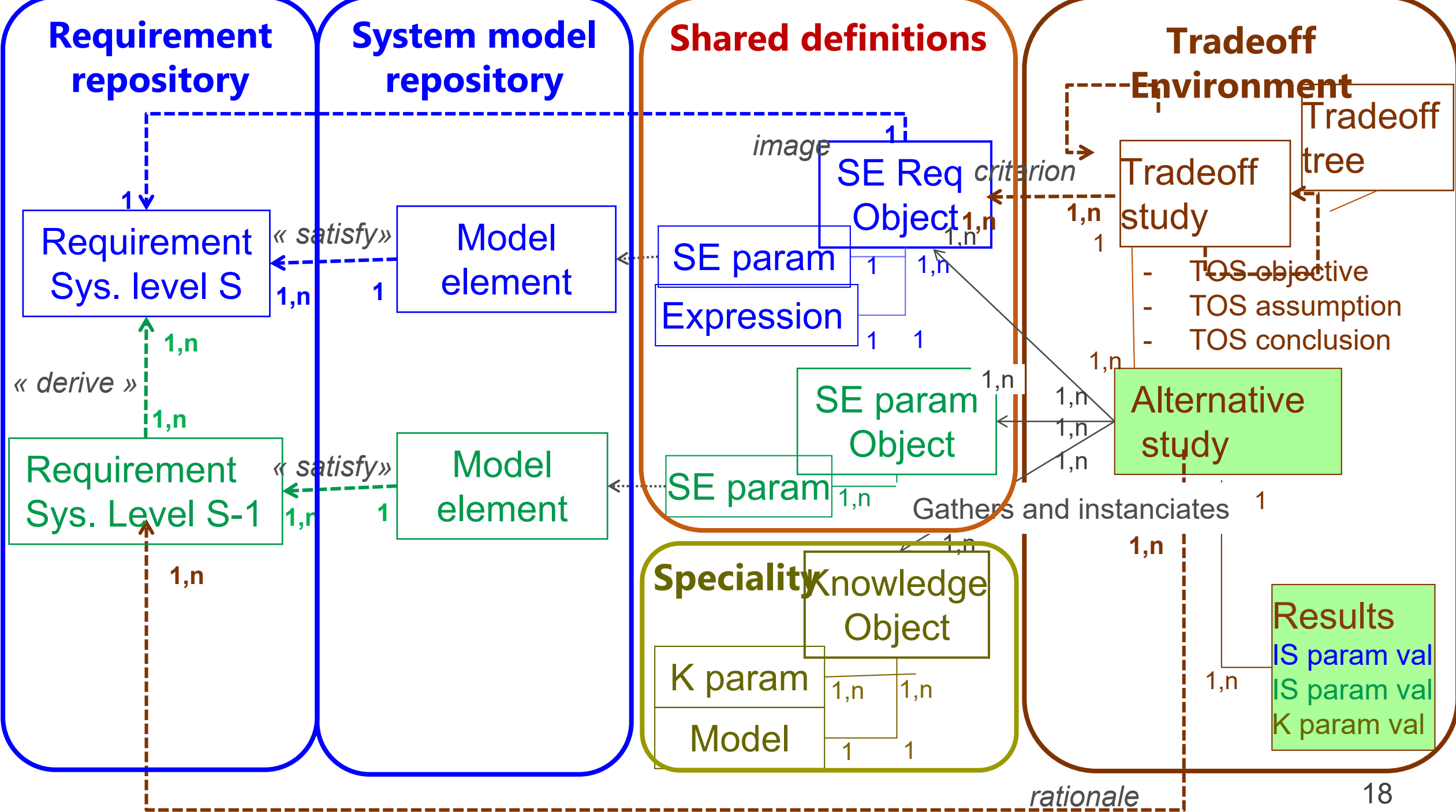


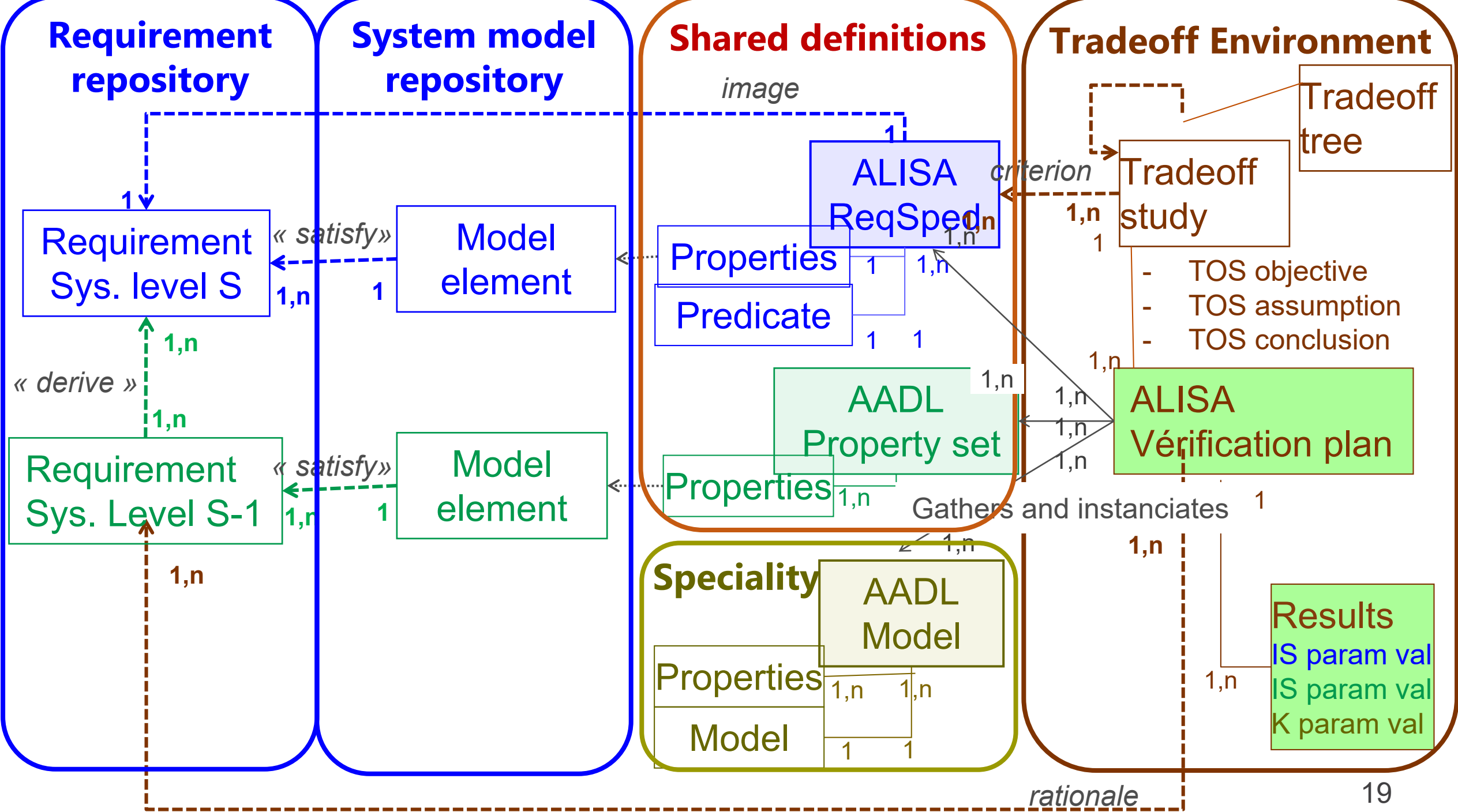
Traceability

TRACEABILITY MODEL IMPLEMENTATION

Traceability

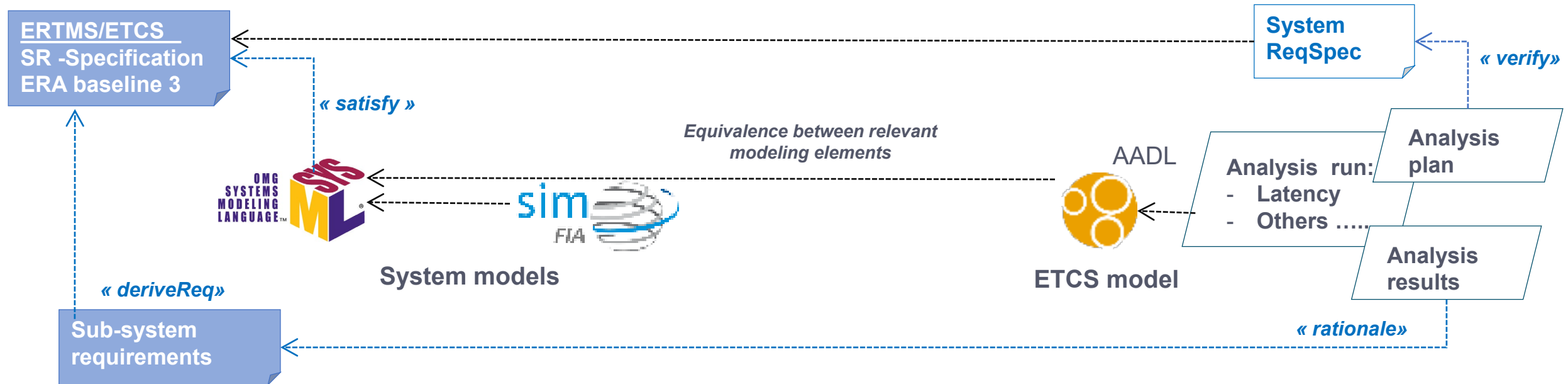
- **Adoption of the MIMe metamodel**
- **Customization with AADL and ALISA objets**





Summary

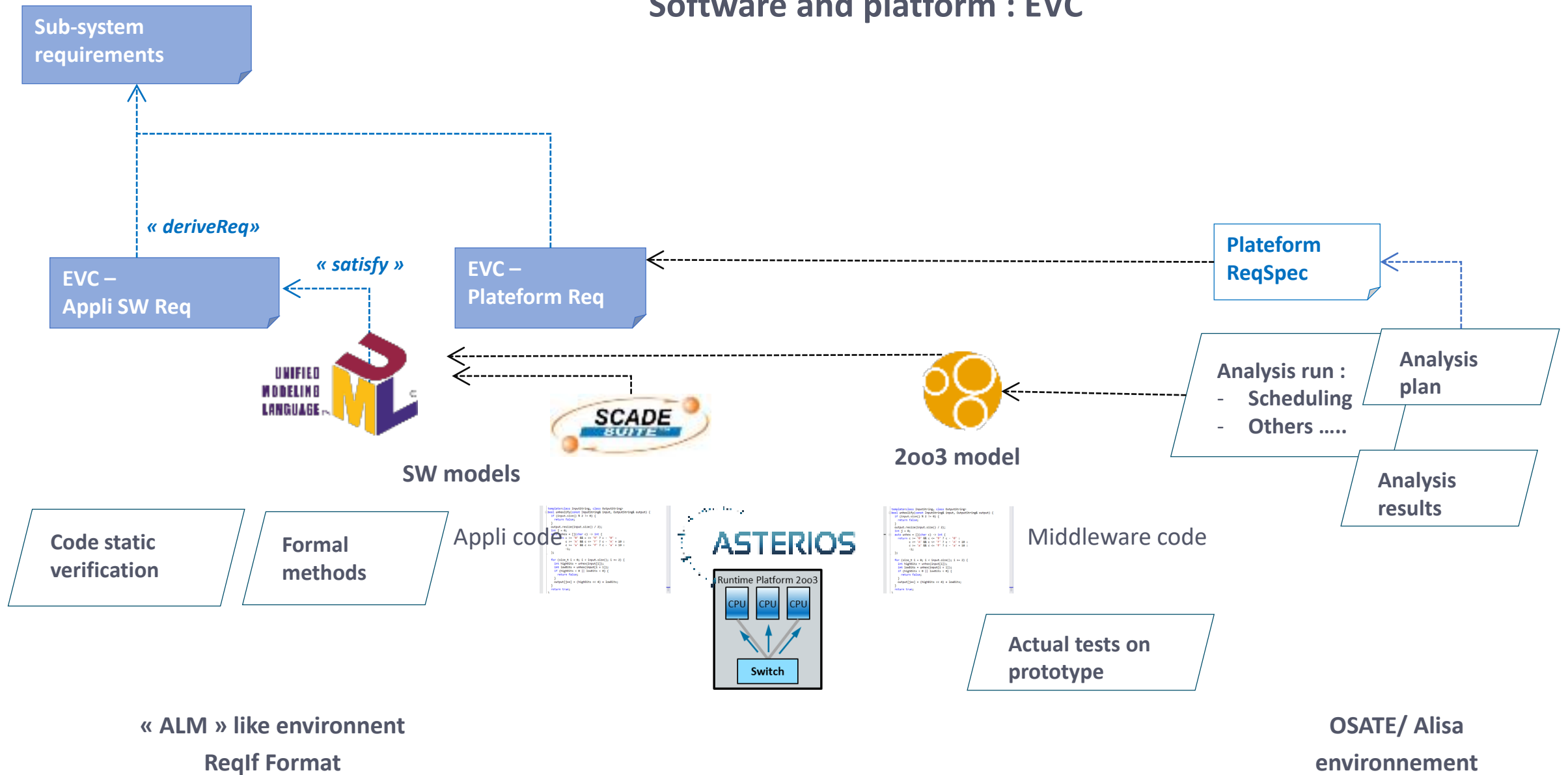
System level : ETCS Bord



« ALM » like environnement
ReqIf Format

OSATE/ Alisa
environnement

Software and platform : EVC



To go farther in this approach

- **Continue further reflexion on RAMS requirements**
 - Leveraging the PST process
 - Taking into account mutual dependencies between :
 - RAMS requirements :
 - Non RAMS and non RAMS requirements ;
 - ISABELLE capabilities for
 - analysis
 - certification
- **Implement realistic examples of safety studies**

