MÄLARDALEN UNIVERSITY
SWEDEN

AMASS

Assurance and Certification of Cyber-Physical Systems within the AMASS platform

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(Architecture-driven, Multi-concern, Seamless Assurance and Certification of Cyber-Physical Systems)

77th Meeting IFIP-WG 10.4, Reggio Calabria, Italy, 29th January 2020

Workshop on Security-Oriented Situational Awareness for Safety-Critical Infrastructures

Talk outline

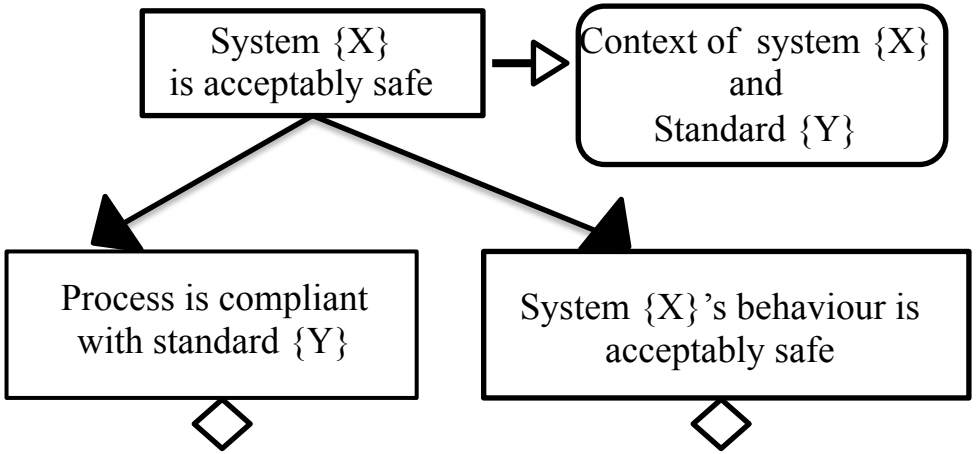
- My research/education focus
- Assurance & Certification
- AMASS project overview
- AMASS platform core
- AMASS platform and ecosystem
- AMASS platform in action
- AMASS platform future development

Research/education focus

- Research
  - Systematic reuse of (Relaxed) ACID-based transactional artifacts
  - Dependability modelling and analysis of high integrity (socio-technical) systems
  - ISO 26262-compliant safety case building
  - Systematic reuse of product-related certification artifacts
  - Systematic reuse of process-related certification artifacts
  - Compliance management
- Education
  - DVA437-Safety-critical systems engineering
  - DVA433-Functional safety, PROMPT initiative
  - DVA467- Quality assurance - Certification of safety-critical (software) systems, PROMPT initiative
  - Contribution to the discussion related to the Manifesto on Software Process Education, Training and Professionalism
    - Constructive Alignment extension for safety critical systems

Assurance and certification

"Safety certification **assures society** at large that deployment of a given system does not pose an unacceptable risk of harm. There are several ways of organizing and conducting certification, but all are conceptually based on scrutiny of an argument that certain claims about safety are justified by evidence about the system. " Taken from J. Rushby, Substantially revised version; original appears in Proceedings of the Ninth ACM International Conference On Embedded Software (EMSOFT), pp. 211–218, Taipei, Taiwan, October 2011.



AMASS project overview -Goals

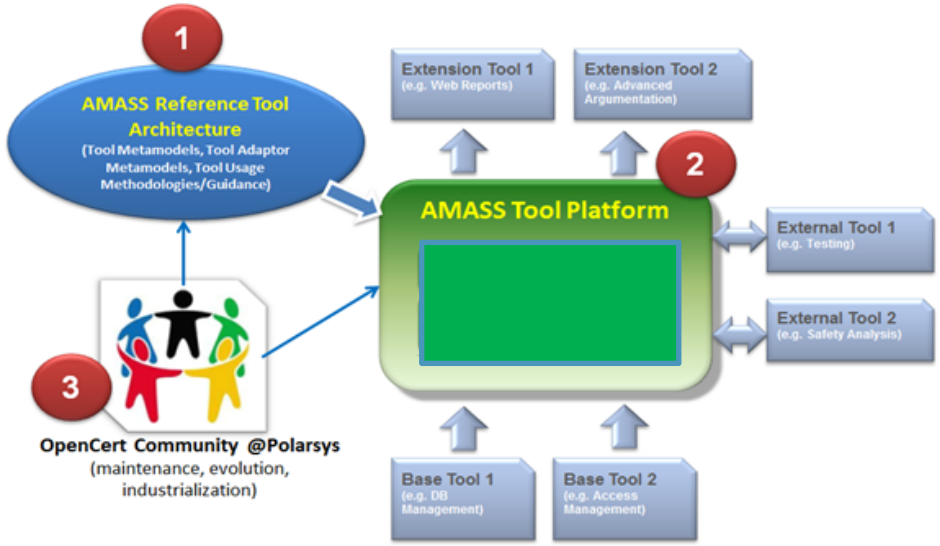
Project Goals

Develop an holistic approach and tool support for

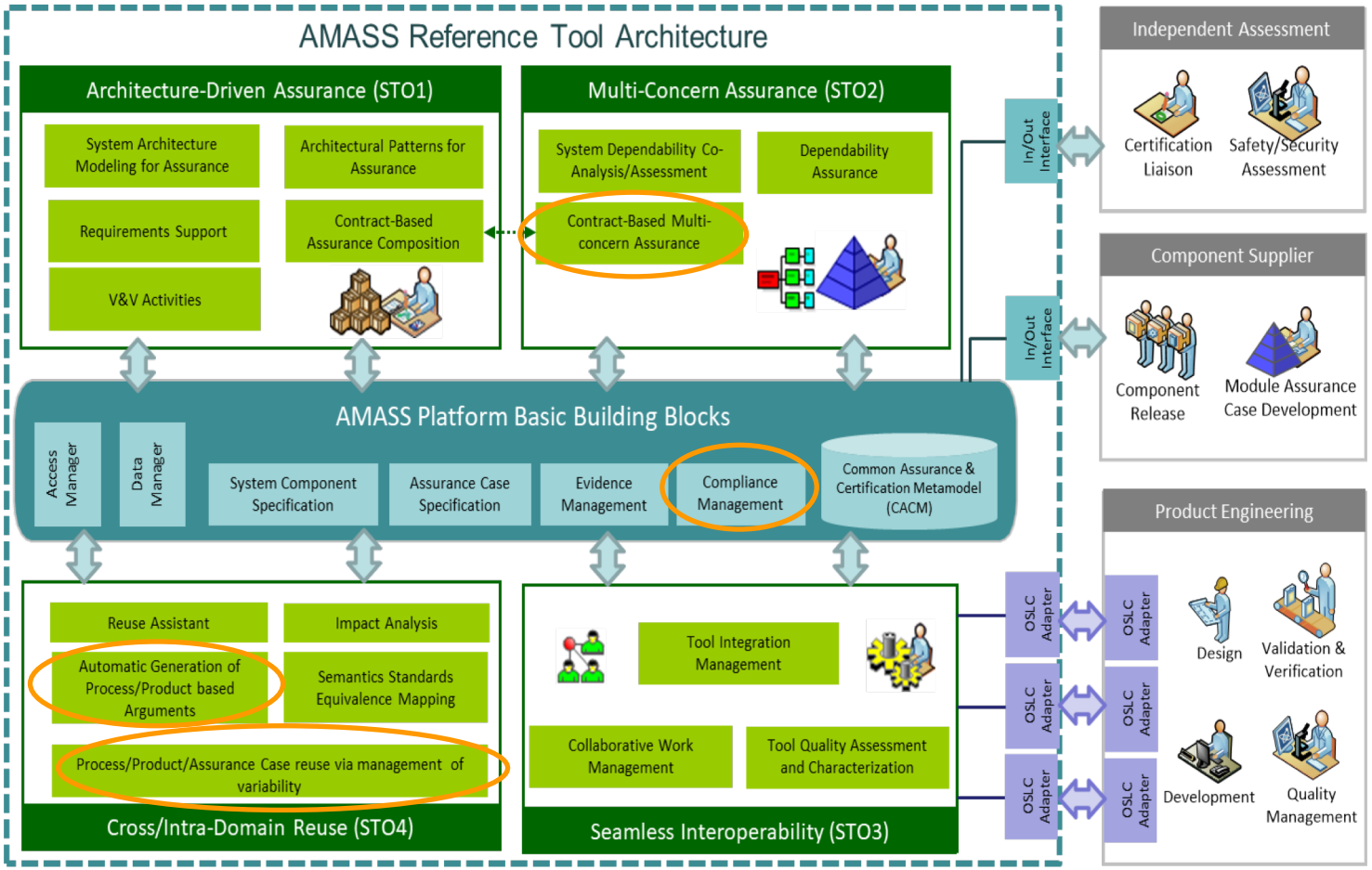
Architecture-driven, Multi-concern, Seamless, Reuse-Oriented Assurance & Certification

G1: Gain for Design Efficiency
G2: Reuse of assurance artefacts
G3: Raise of technology innovation
G4: Increase harmonisation and interoperability

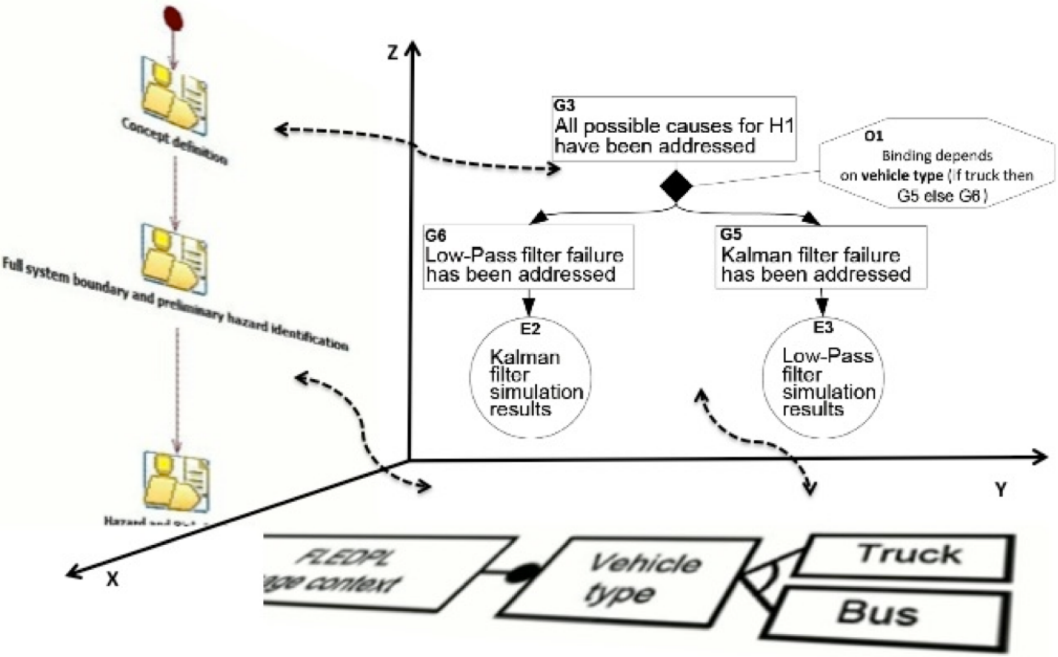
Tangible Results



AMASS project overview
-Scientific Objectives-

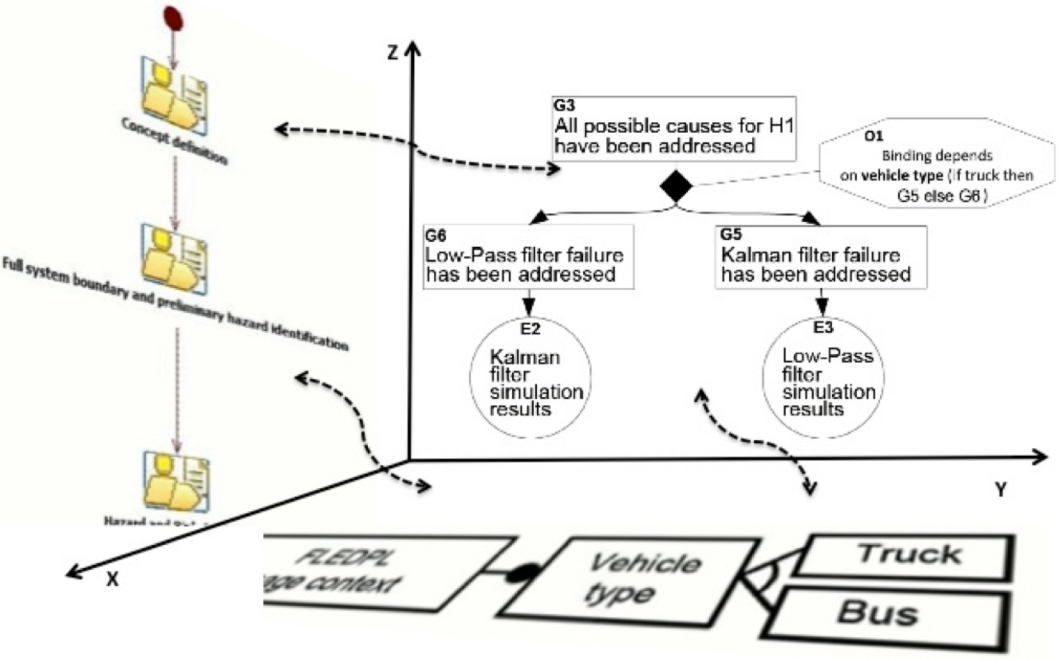


AMASS platform core



[Gallina, 2015]

AMASS platform core



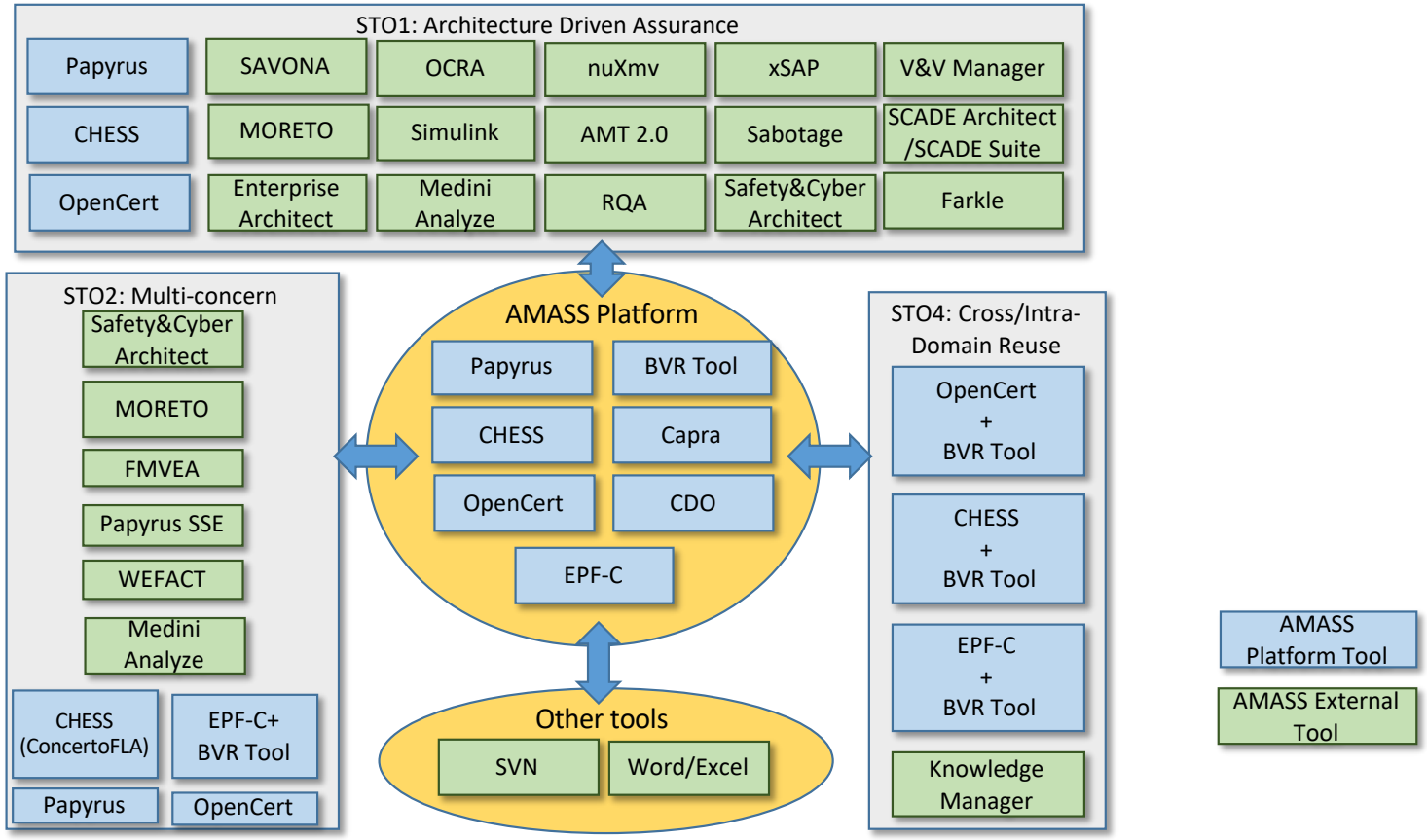
- OpenCert
- PolarSys CHESS
- eclipse PROCESS FRAMEWORK

+ BVR Tool

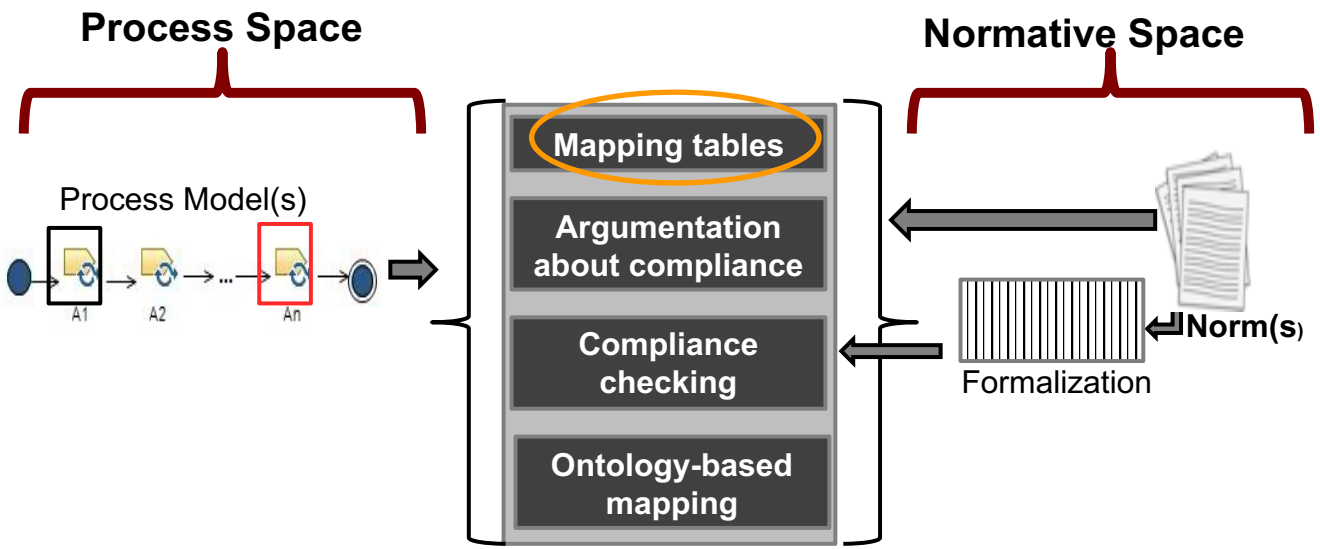
[Gallina, 2015]

https://www.polarsys.org/opencert/

AMASS platform and ecosystem

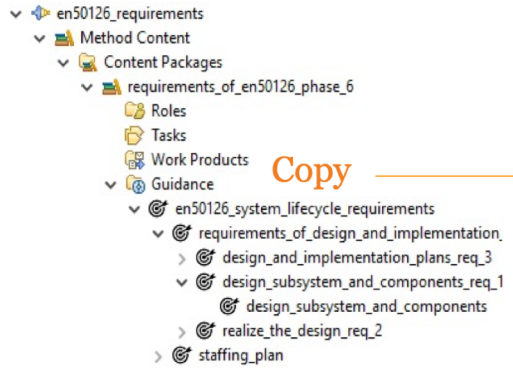


AMASS platform in action



AMASS platform in action

Standard Requirements plugin



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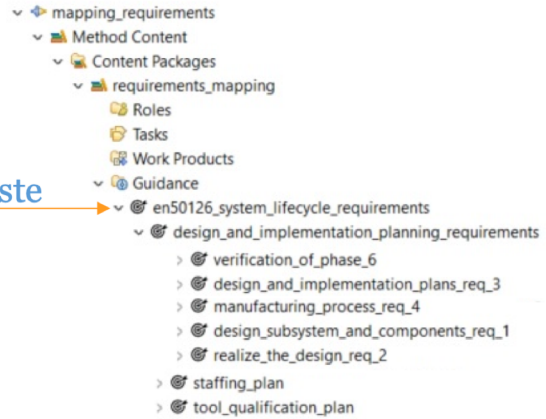
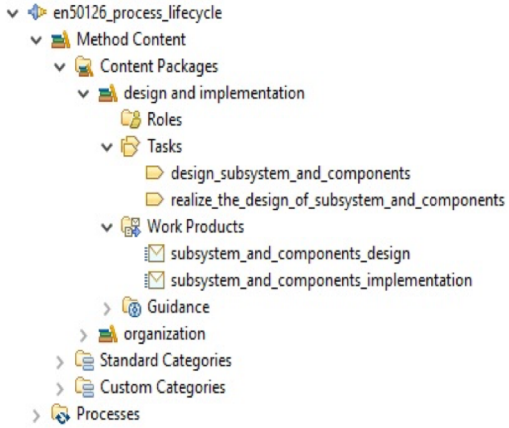
Mapping Requirements plugin

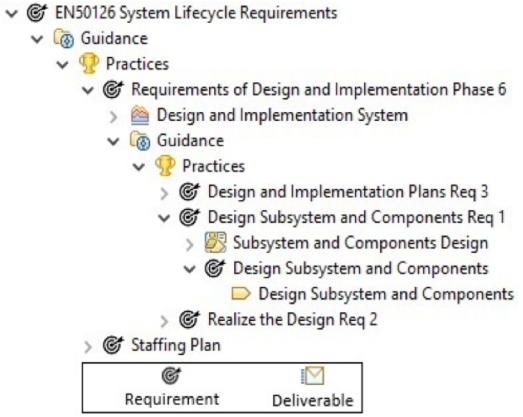


Process Lifecycle plugin

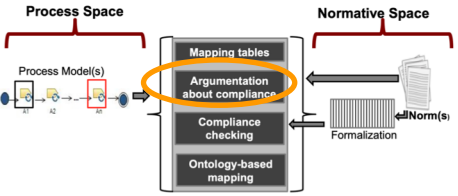


The links between process elements to each "standard requirement" have been established through "references" tab

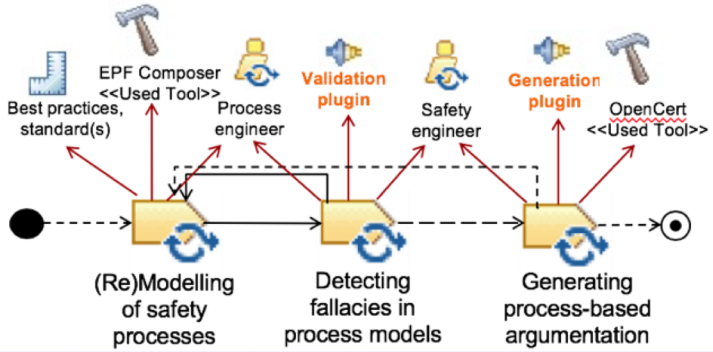
Mapped requirements in Browsing perspective

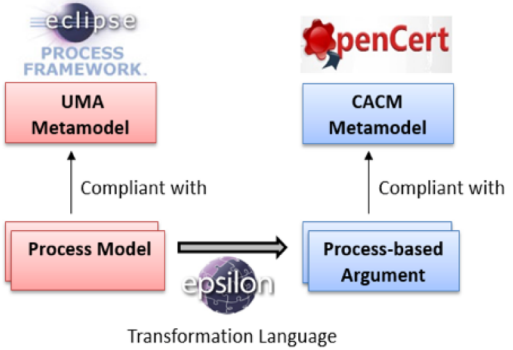


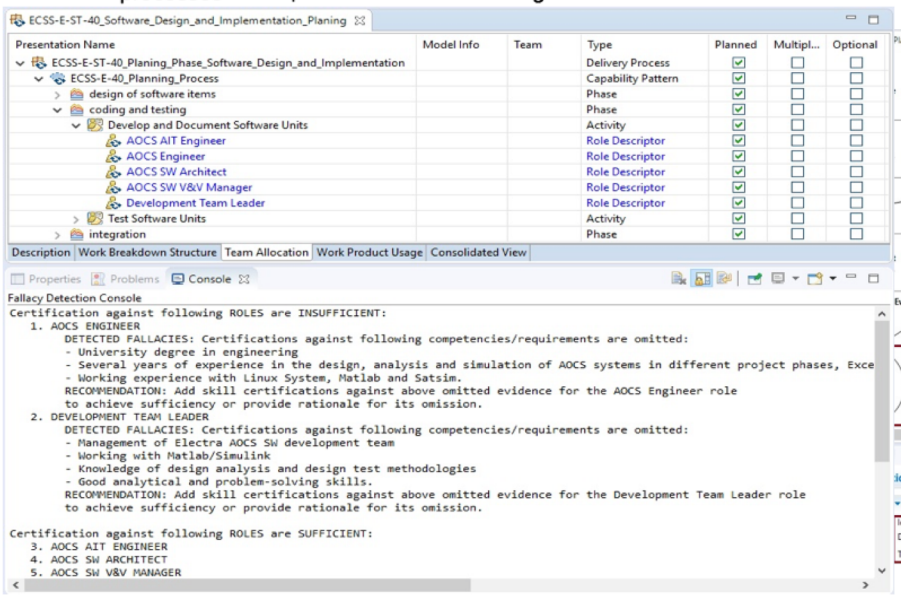
[Ul Muram et al. 2019]

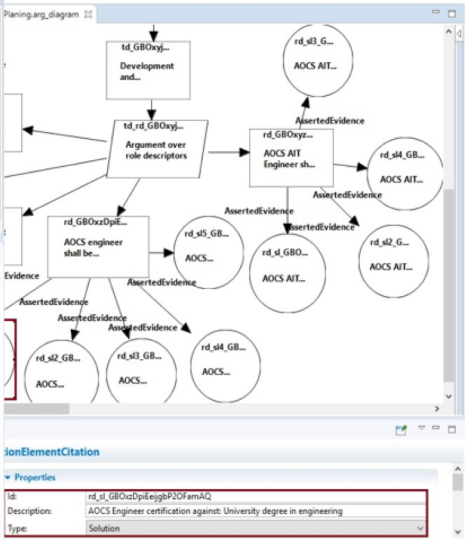


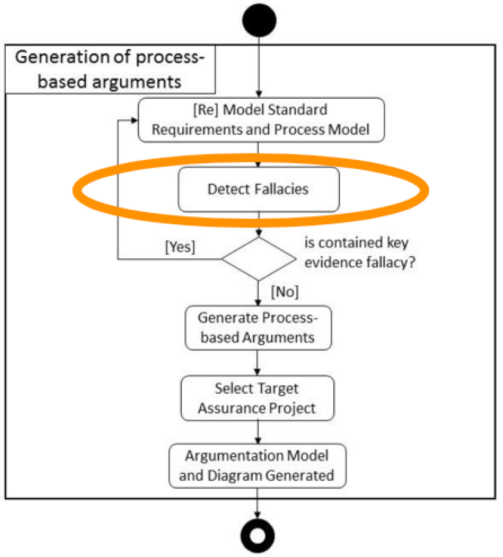
AMASS platform in action





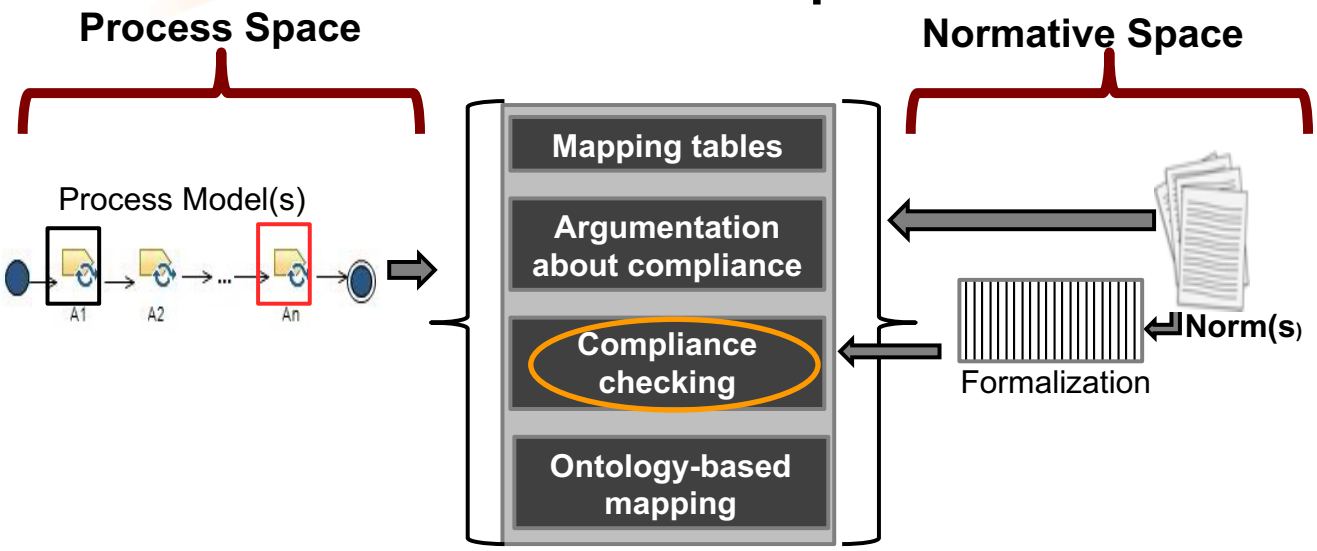




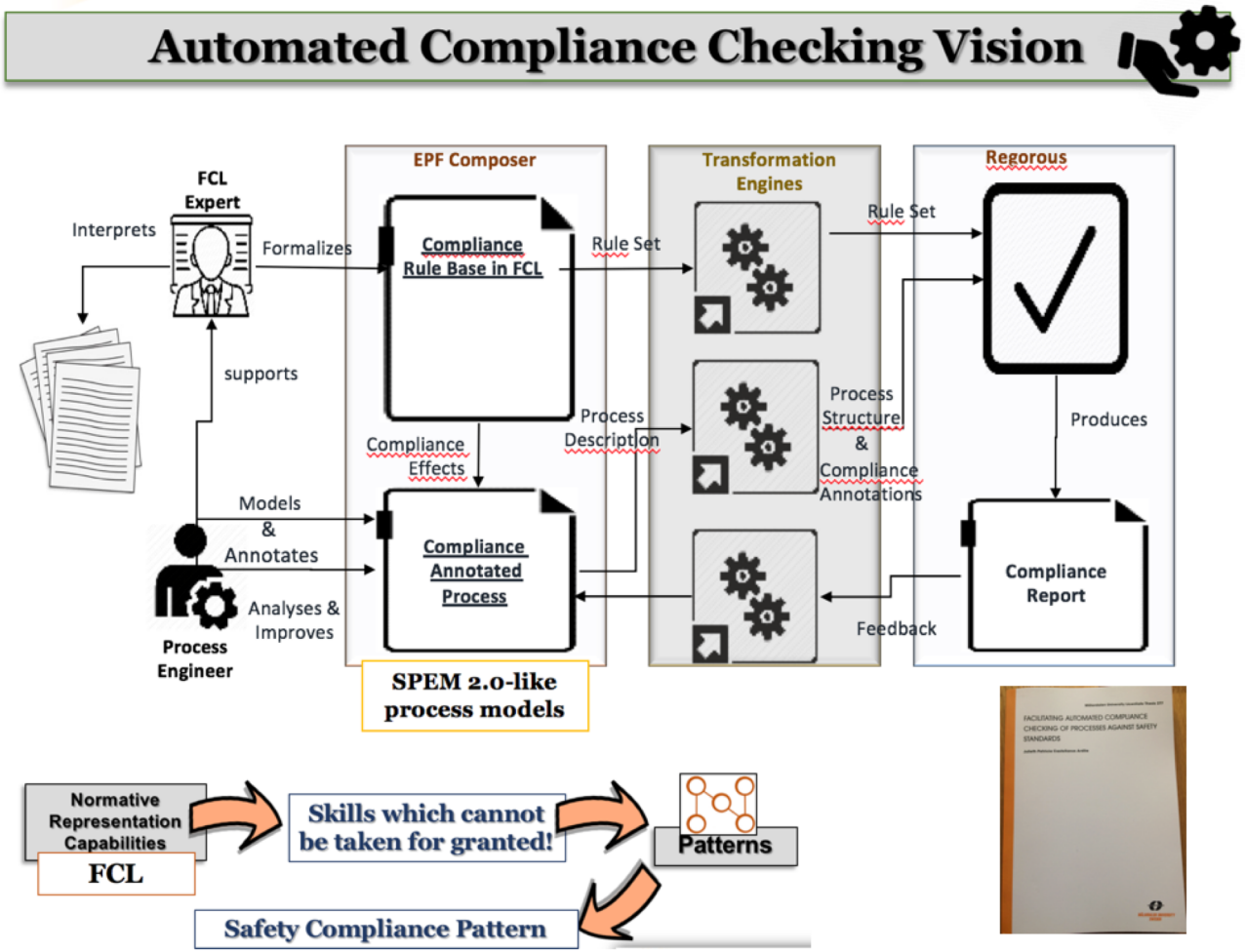


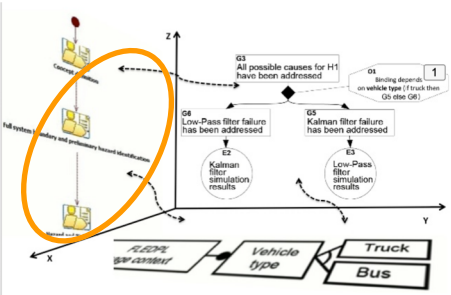
[Ul Muram, 2018]

AMASS platform in action



AMASS platform in action





AMASS platform in action

A software process modelled in EPF Composer

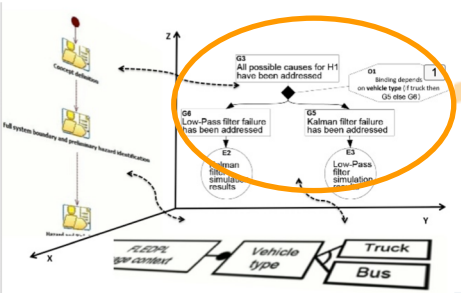
The achievement of error free models

Backward propagation of configured models

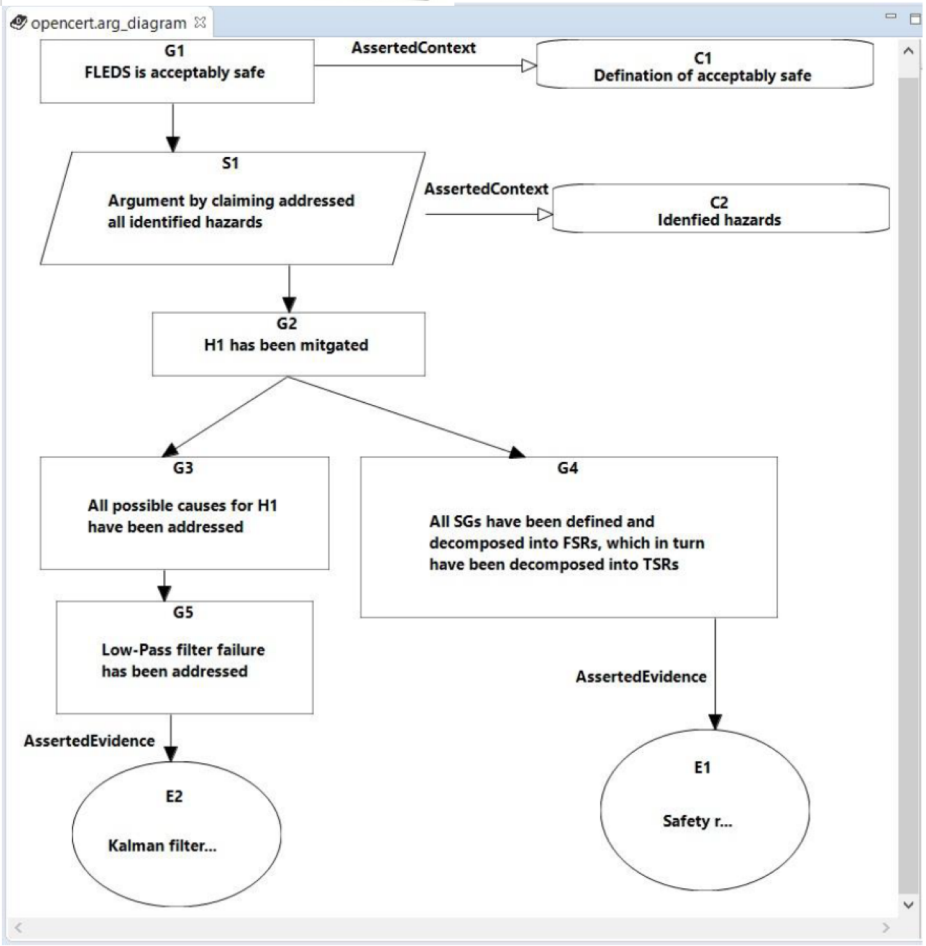
BVR Resolution editor

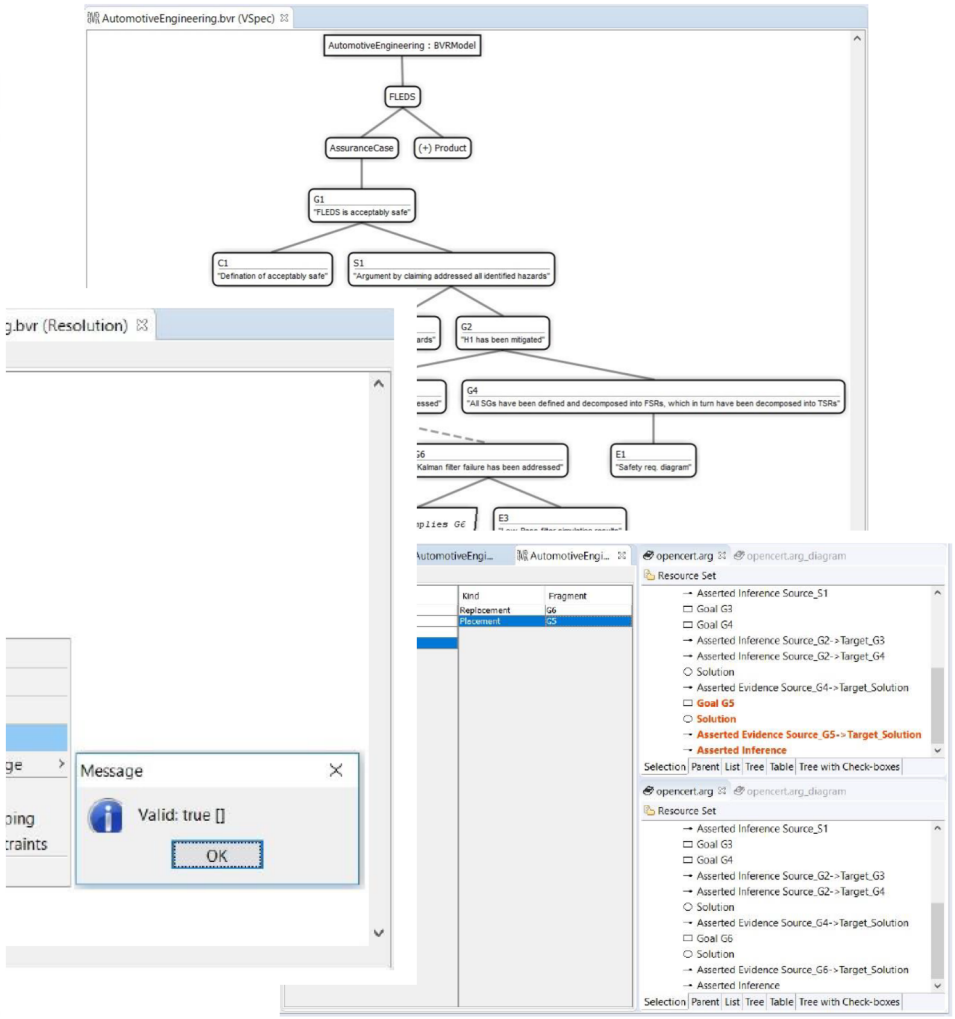
BVR VSpec editor

BVR Realization editor

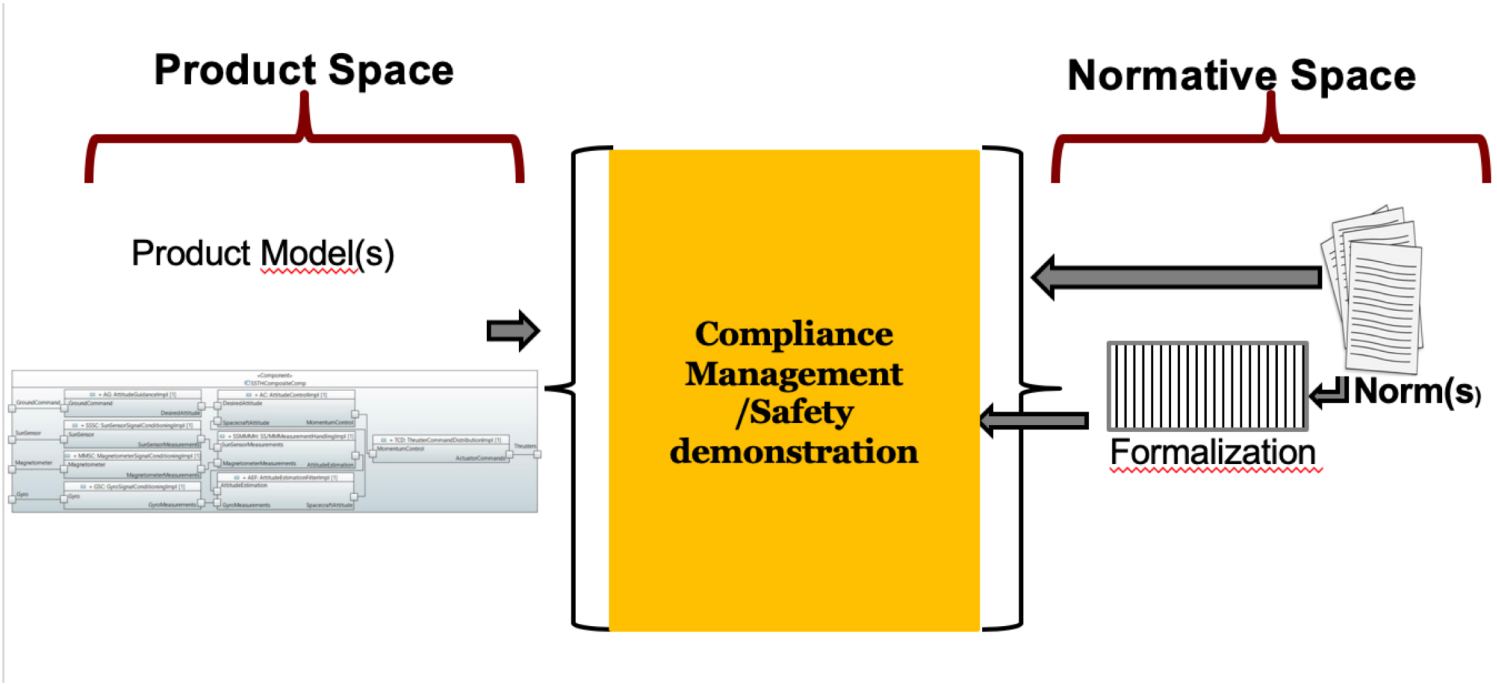


AMASS platform in action

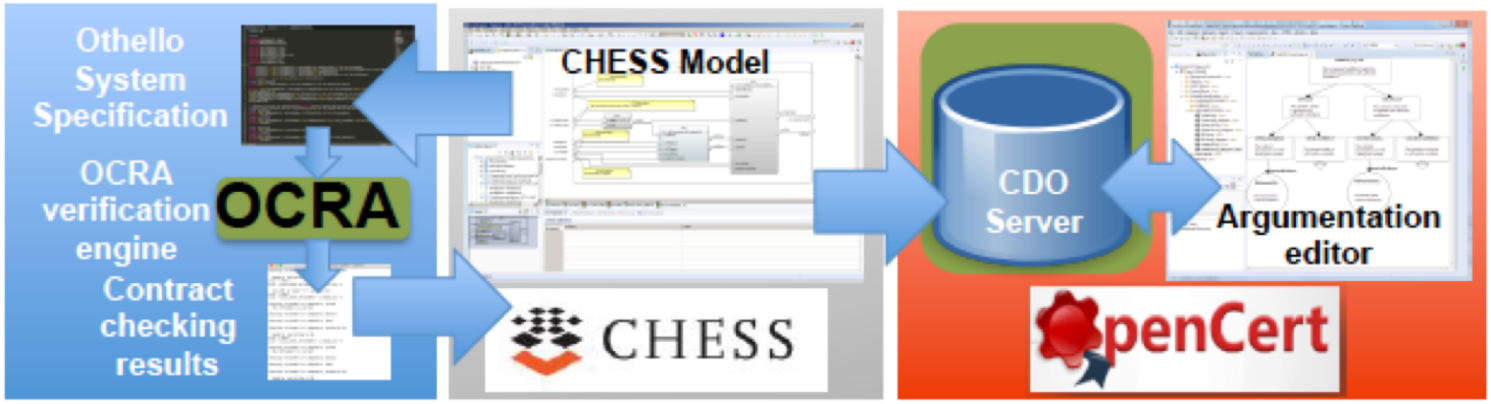




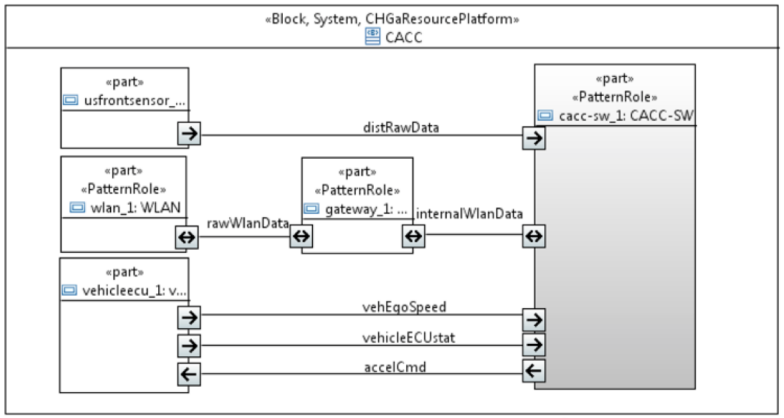
AMASS platform in action



AMASS platform in action



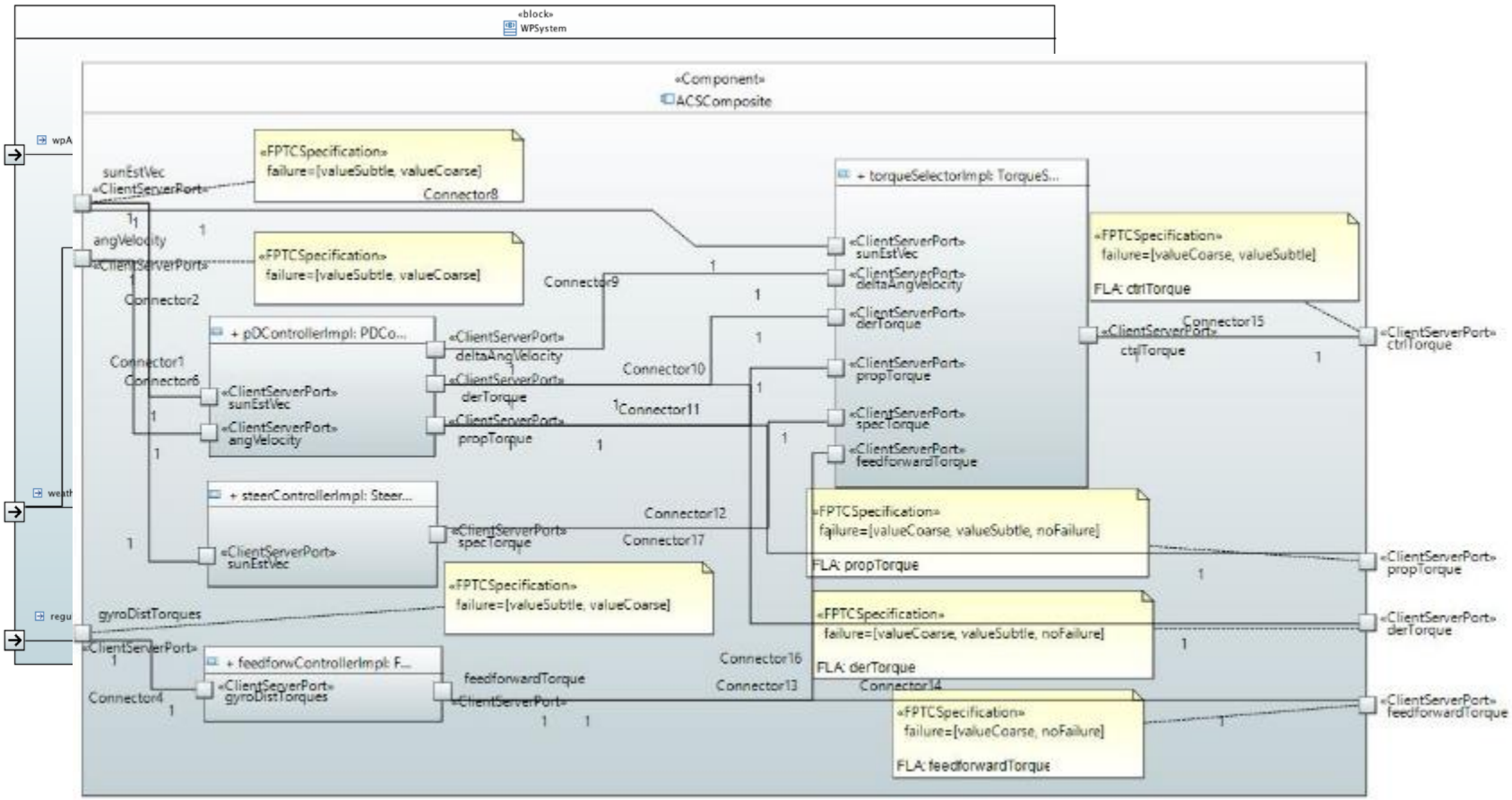
[Sljivo, 2018]



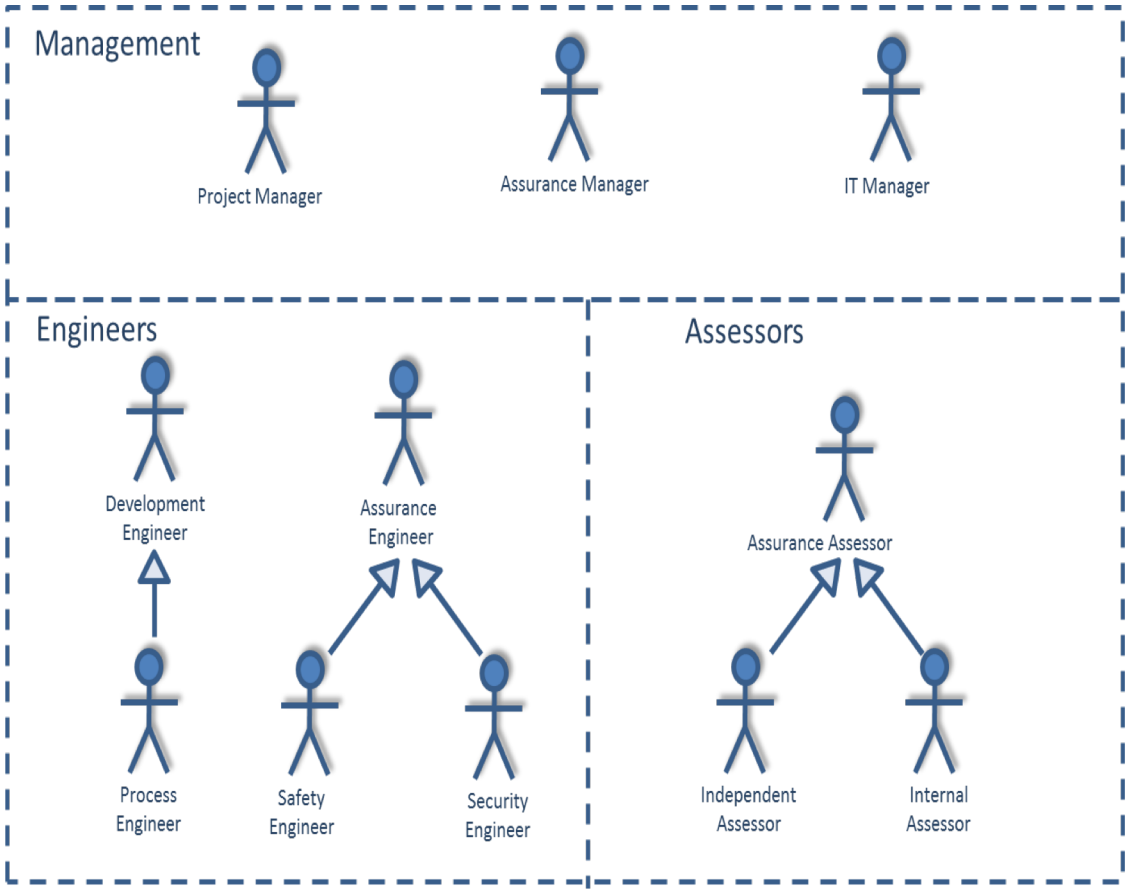
[Pattern-based architectural specification: CS3, Security Gateway Pattern]

[Pattern-based argumentation generation]

AMASS platform in action

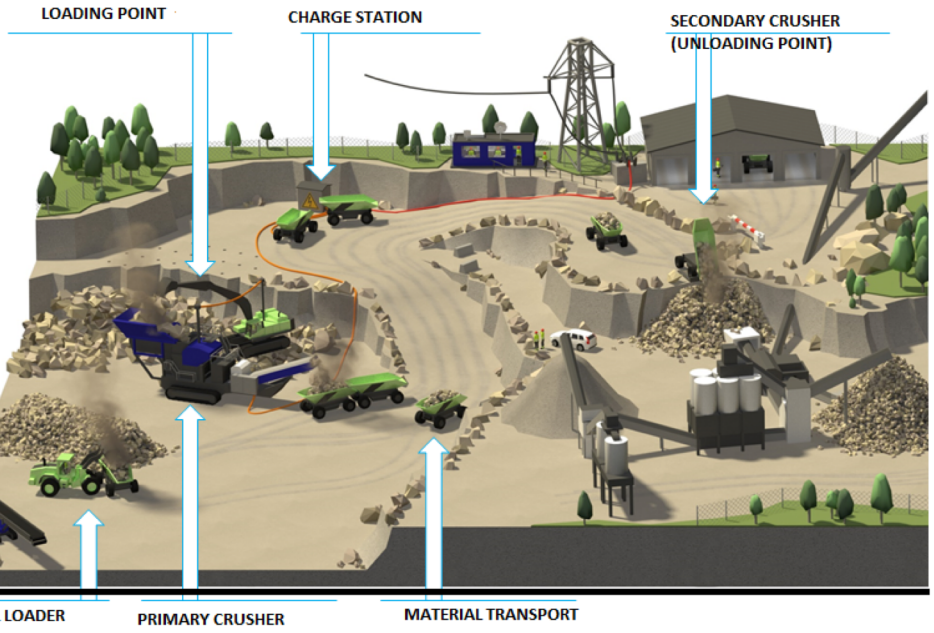


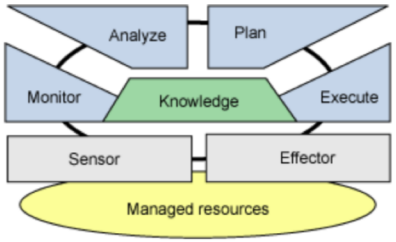
AMASS platform future development
Call for Users and Contributors



AMASS platform future development

in the context of SACSys- Safe and Secure Adaptive Collaborative Systems





Perception
Comprehension
Projection

Situation awareness
Decision making
Action

Source: https://www.volvoce.com/global/en/news-and-events/press-releases/2018/testing-begins-at-worlds-first-emission-free-quarry/

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Thank you for your attention!

Discussion time…