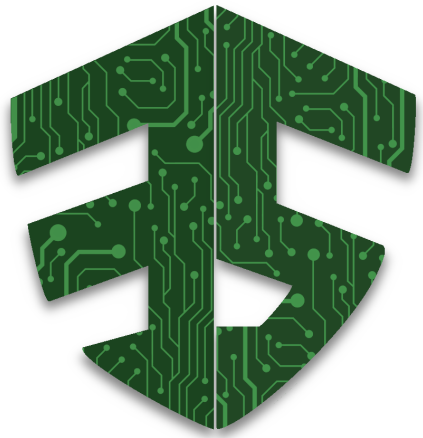


VALU3S

Verification and Validation of Automated Systems' Safety and Security

SAFER Research and Project Day

Behrooz Sangchoolie (RISE Research Institutes of Sweden, behrooz.sangchoolie@ri.se)

11 March 2022, Online meeting

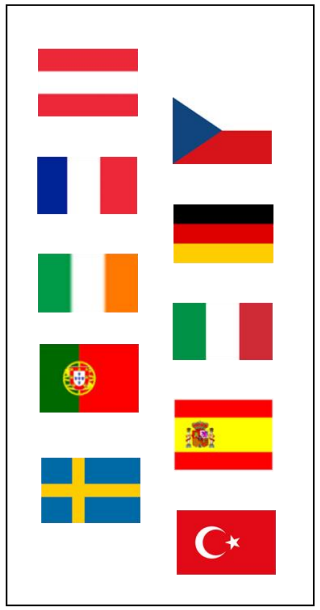
Dissemination Level: Public

This project has received funding from the ECSEL Joint Undertaking (JU) under grant agreement No 876852. The JU receives support from the European Union's Horizon 2020 research and innovation programme and Austria, Czech Republic, Germany, Ireland, Italy, Portugal, Spain, Sweden, Turkey.

Project Overview

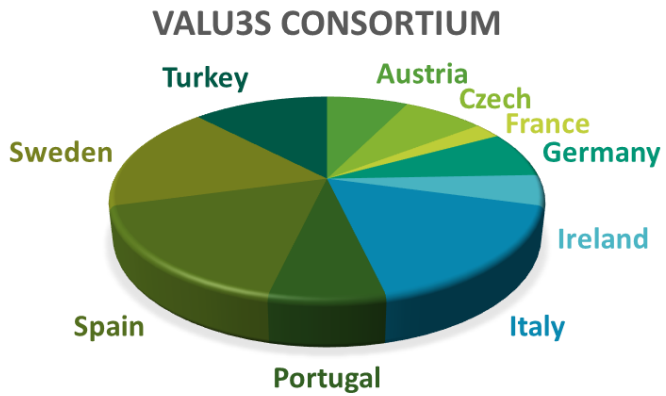
- VALU3S is funded by **ECSEL JU** under Horizon 2020 Work Programme
- Start date: **01/05/2020** Ending date: **30/04/2023** Duration: **36 months**
- The consortium consists of **41 partners** from **10 countries**
- The total VALU3S project cost is **25 857 454 €**

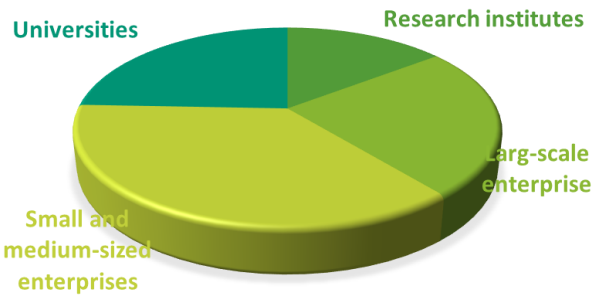
Countries



Industry

Academia

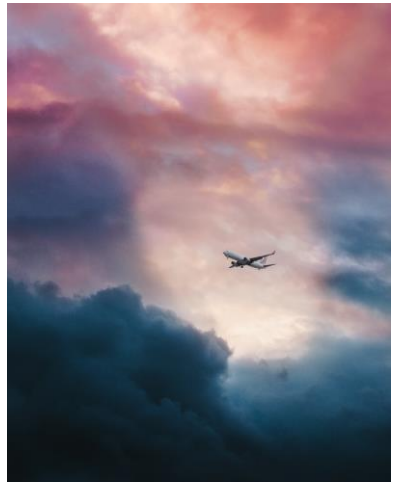


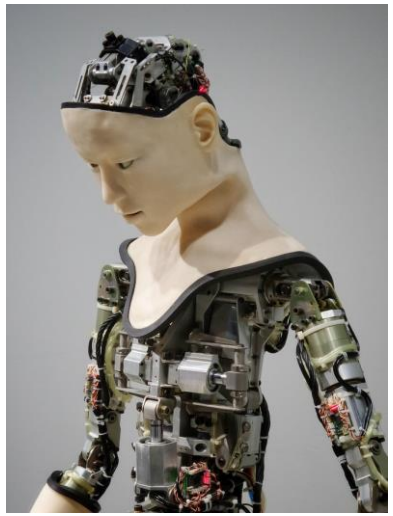


Motivation

Automation is heavily used in **safety-critical** systems, while **functionality** has been in the centre of attention.



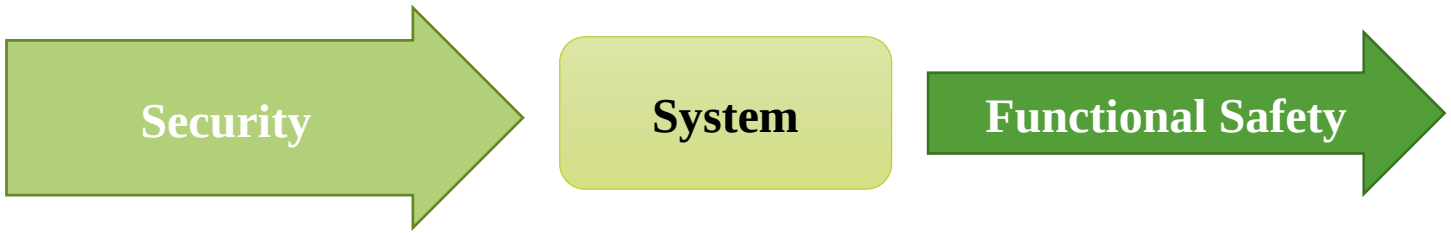






Motivation

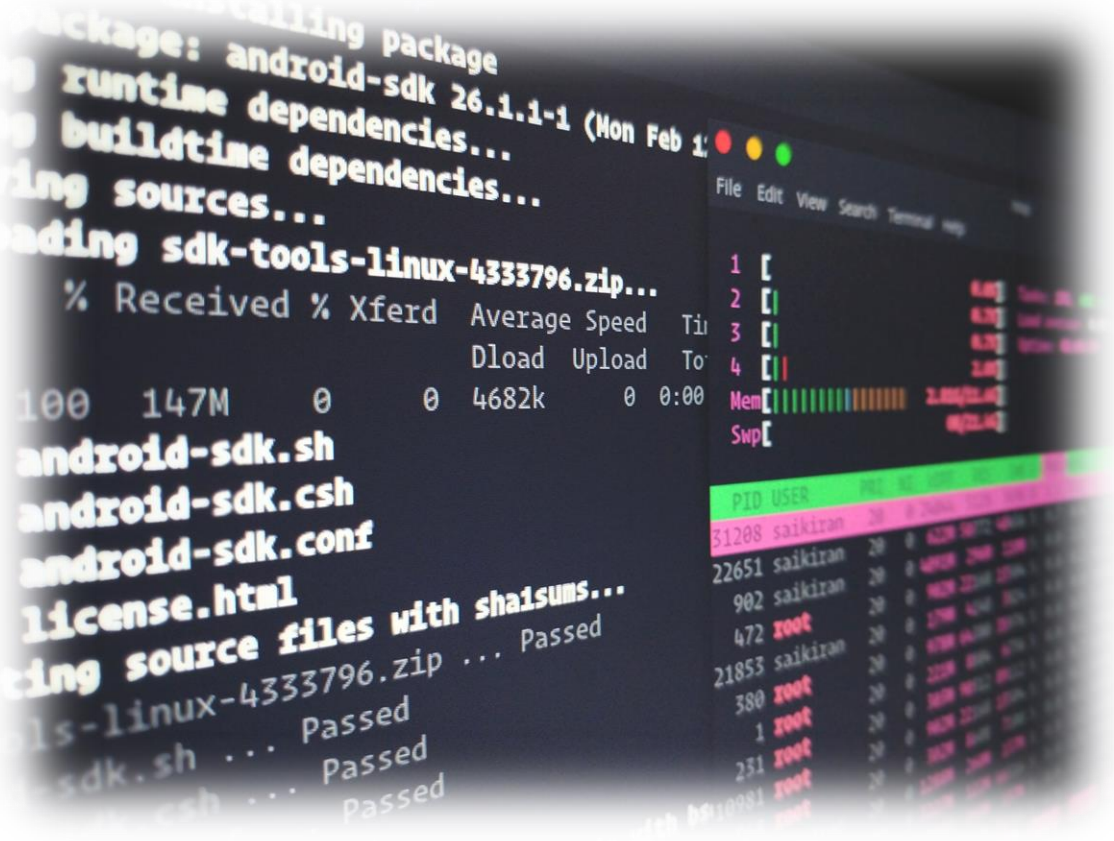
- With rising complexity, unknown emerging properties of the system may come to the surface making it necessary to conduct thorough **verification** and **validation** of these systems.

- To be introduced to the market, automated systems need to also be **Safe and Secure**



- The high complexity of automated systems incurs an overhead on the verification and validation making it **time-consuming** and **costly**.

High-level Objective



Design, implement and **evaluate** state-of-the-art **methods** and **tools** that reduce the **time** and **cost** needed to verify and validate automated systems with respect to **Safety** and **Security** requirements

Project use-cases

VALU3S aims to demonstrate, verify and validate the usefulness and wider acceptance of the proposed framework by **13 realistic pilots**

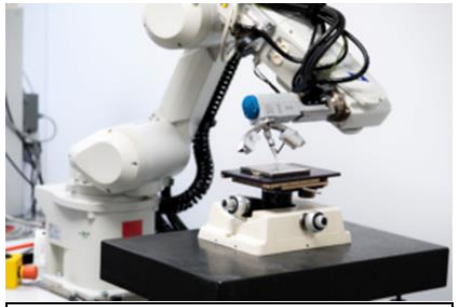
Automotive (3 UC)

Railway (2 UC)

Aerospace (1 UC)

Agriculture (1 UC)

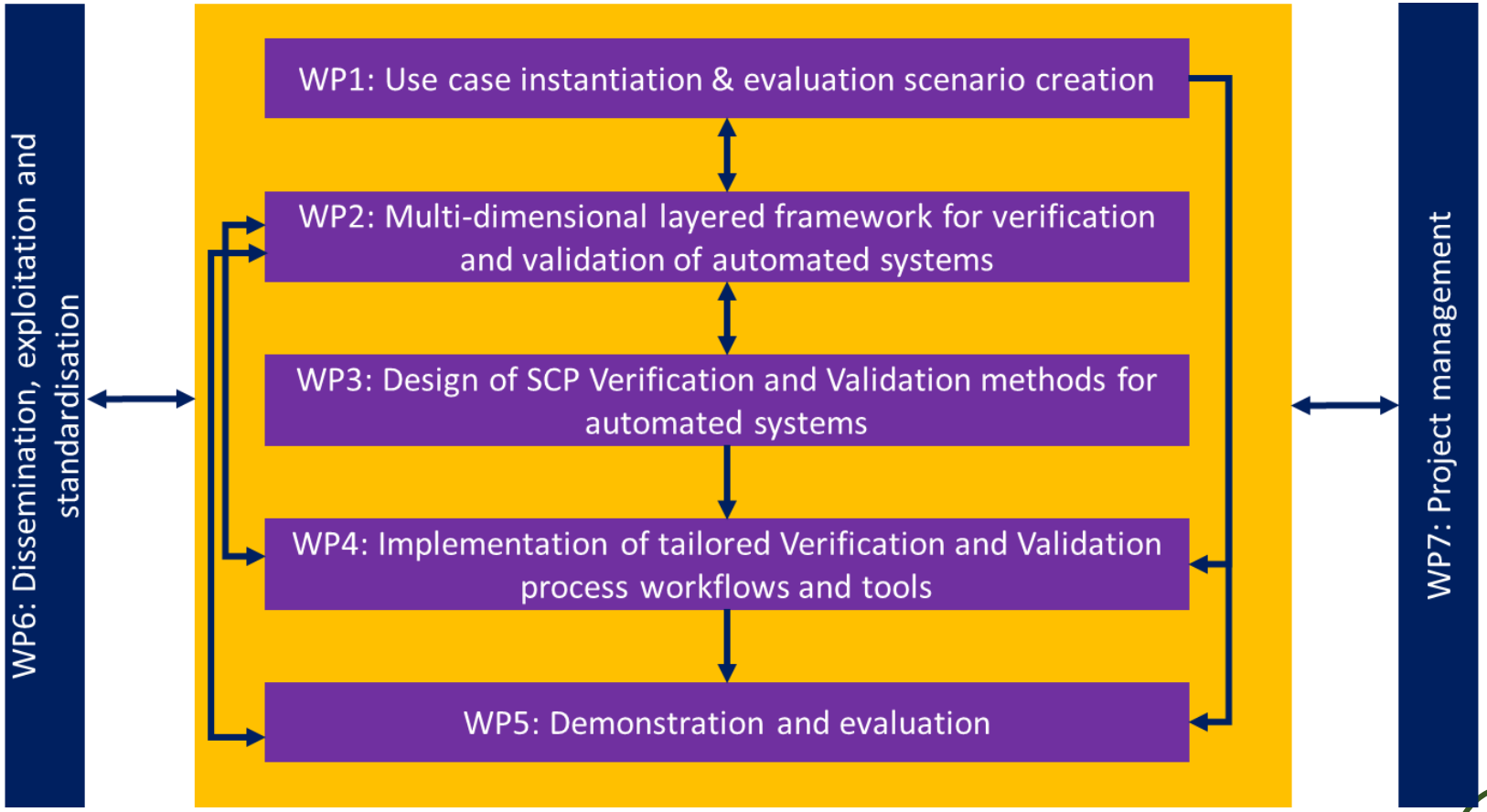
Health (2 UC)



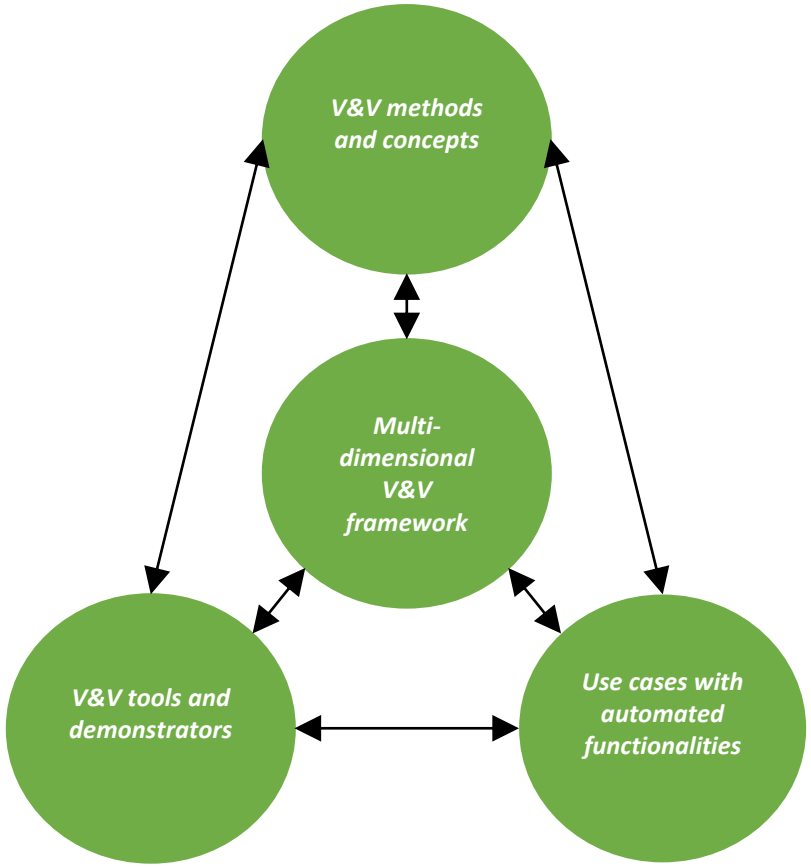
Industrial robotics (4 UC)

Overall status of the project and overview of the progress made

- Achieved the objectives of 5 of the project milestones.
- Submitted 47 of the project deliverables.



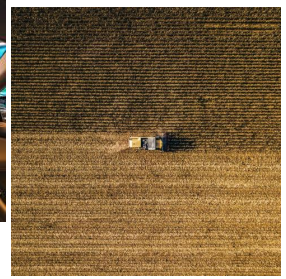
Project highlights and achievements (1/7)

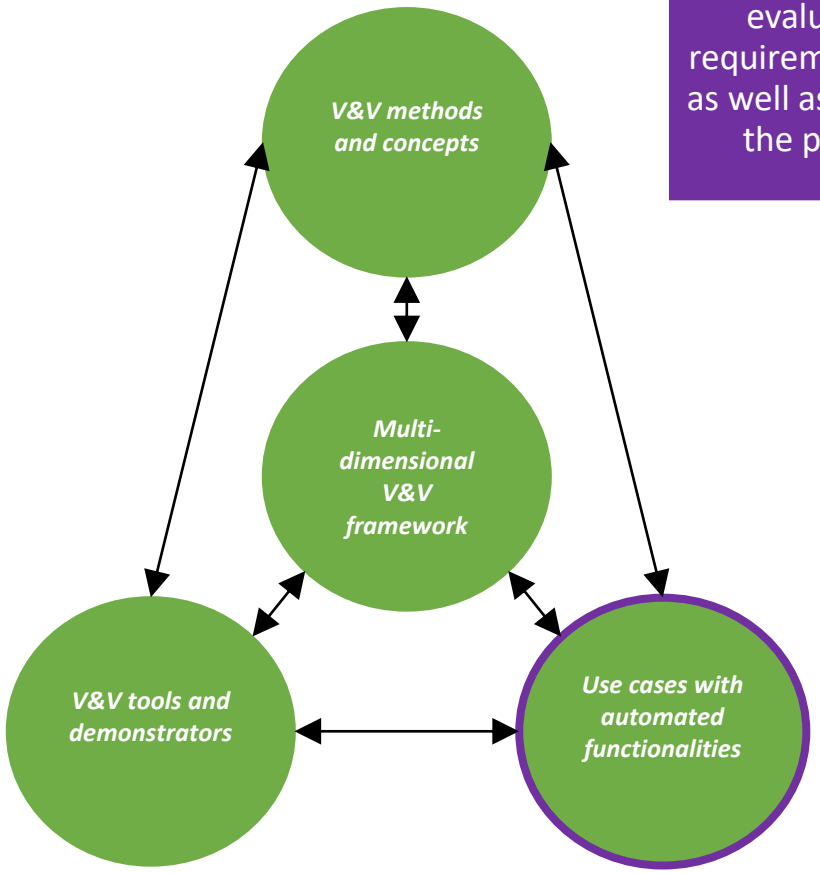


Project highlights and achievements (2/7)







Identification and detailing of evaluation scenarios, requirements, and test cases as well as further detailing of the project use cases.

Initial mapping of the test cases, requirements and scenarios to the V&V framework.

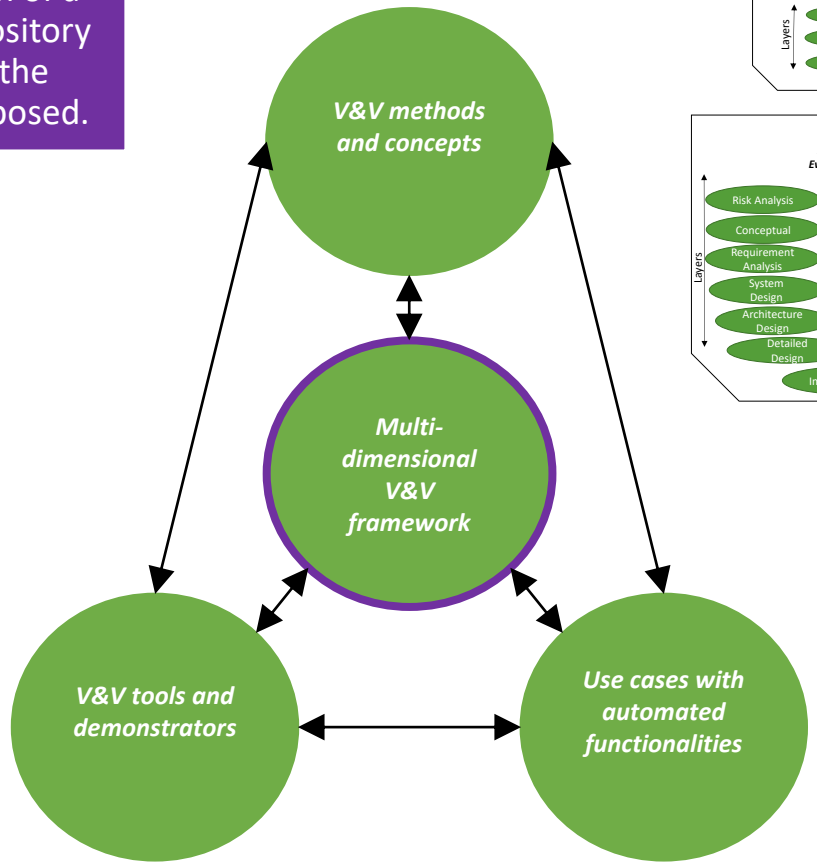
Conducting a commonality evaluation for the use cases and the associated scenarios, test cases and requirements.

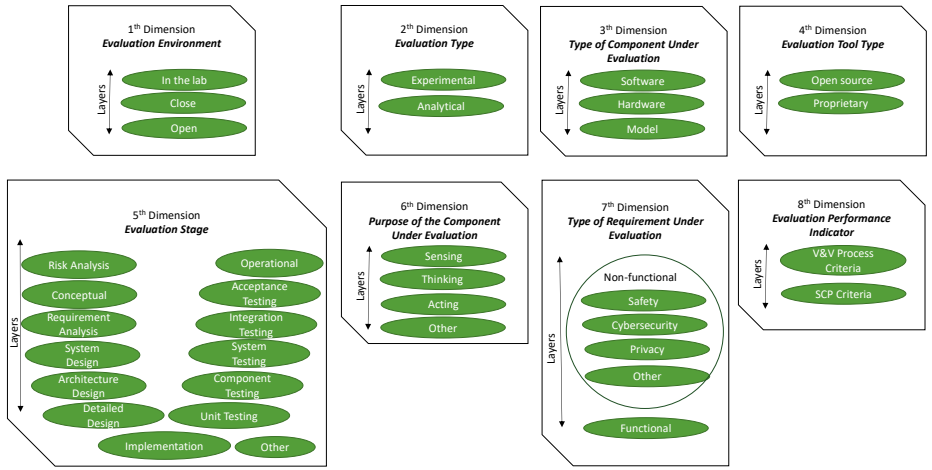
Project highlights and achievements (3/7)

Creation of an 8-dimensional framework for classifying elements of V&V processes.

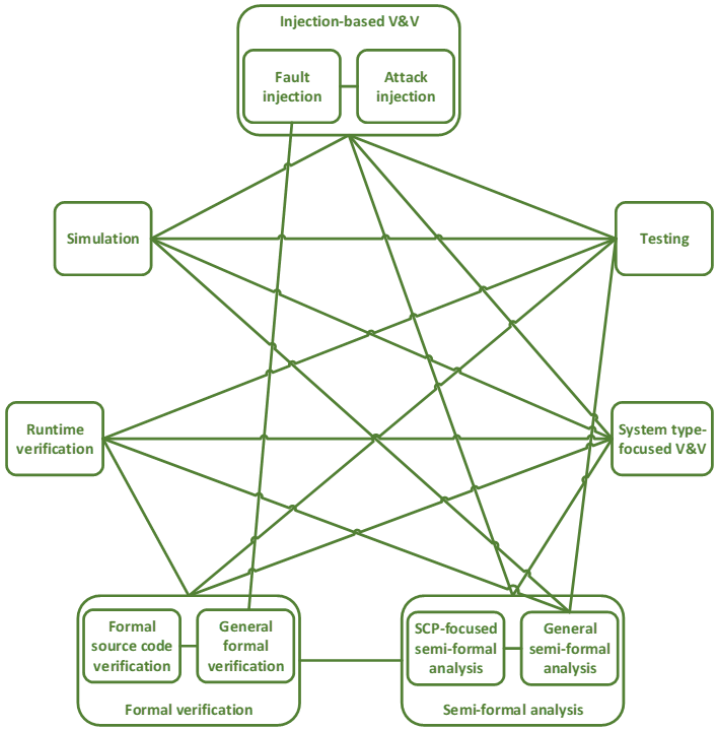
Design and implementation of a web-based repository according to the framework proposed.

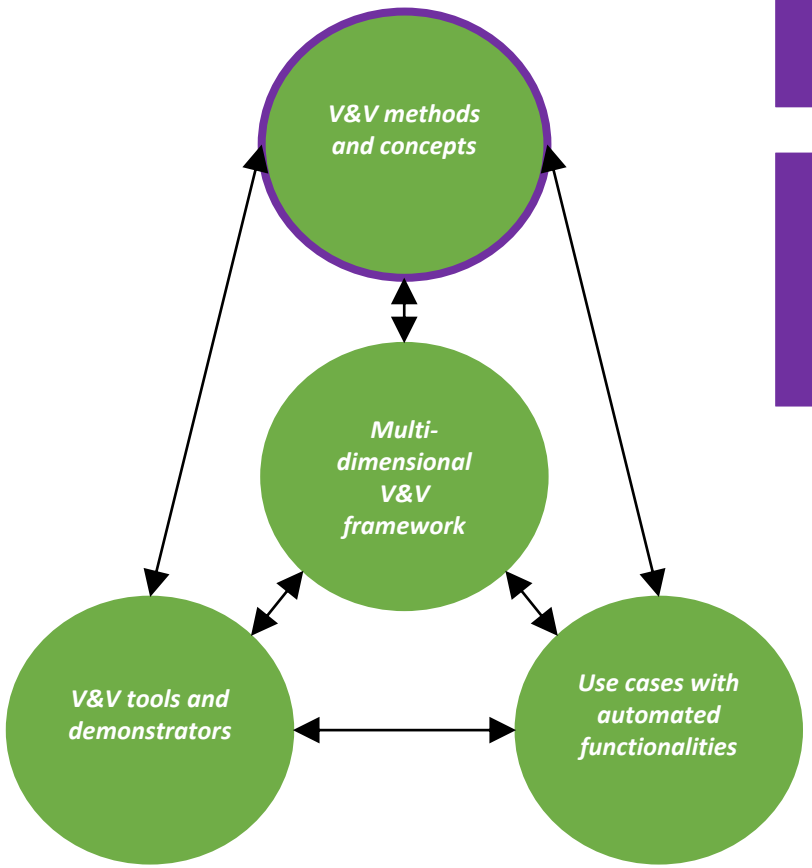
Population of the web-based repository with details about the project methods, tools, use cases, etc.





Project highlights and achievements (4/7)





Identification and detailing of 53 base V&V methods.

Identification and implementation of several distinct improvements for V&V base methods.

Population of the web-based repository with details about the V&V methods identified.

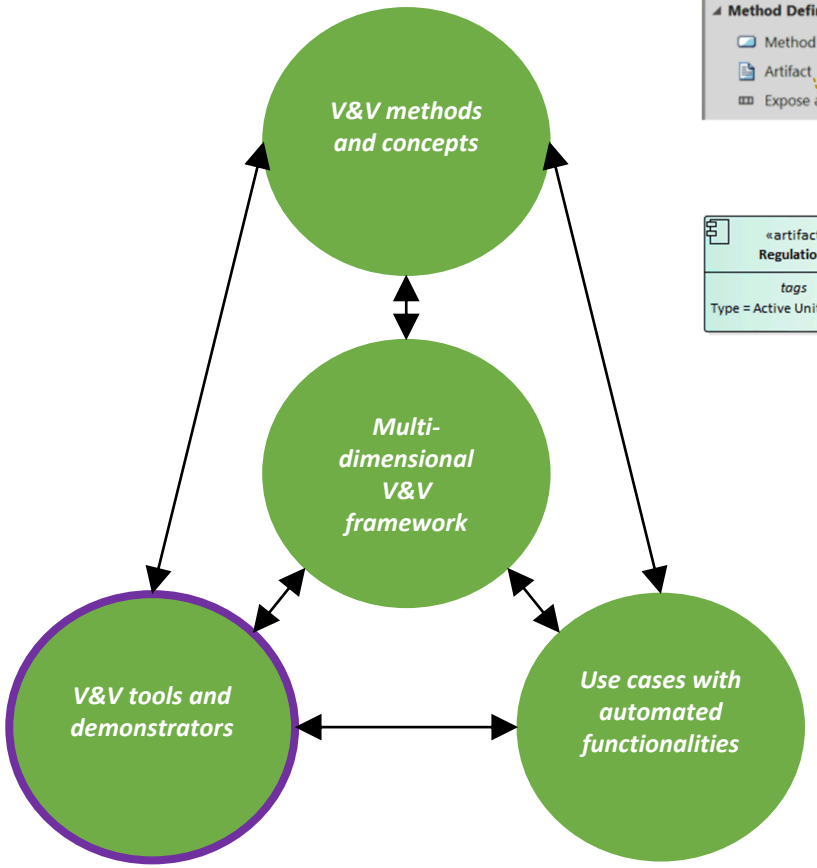
Identification of over 400 gaps and limitations in the V&V methods.

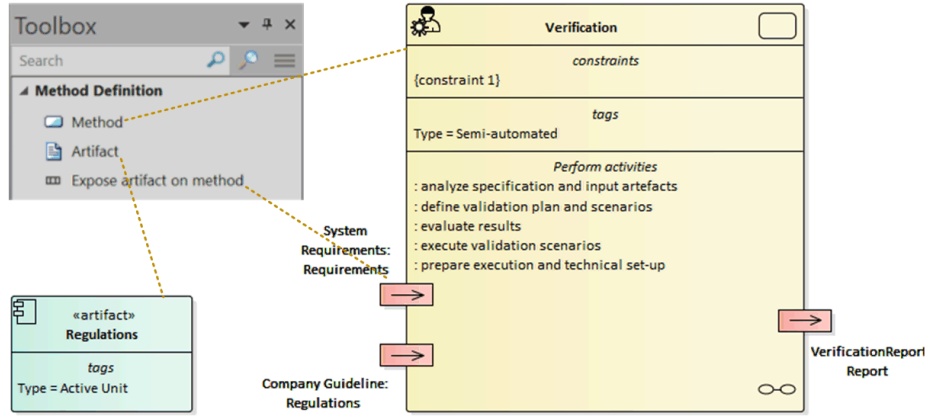
Identification and implementation of several combined V&V methods.

Project highlights and achievements (5/7)

Preparation of V&V workflow design activities and appropriate initial tool-support for modelling and documentation of all V&V workflows.

Continuous development and enhancement of tools to be used for conducting V&V activities.



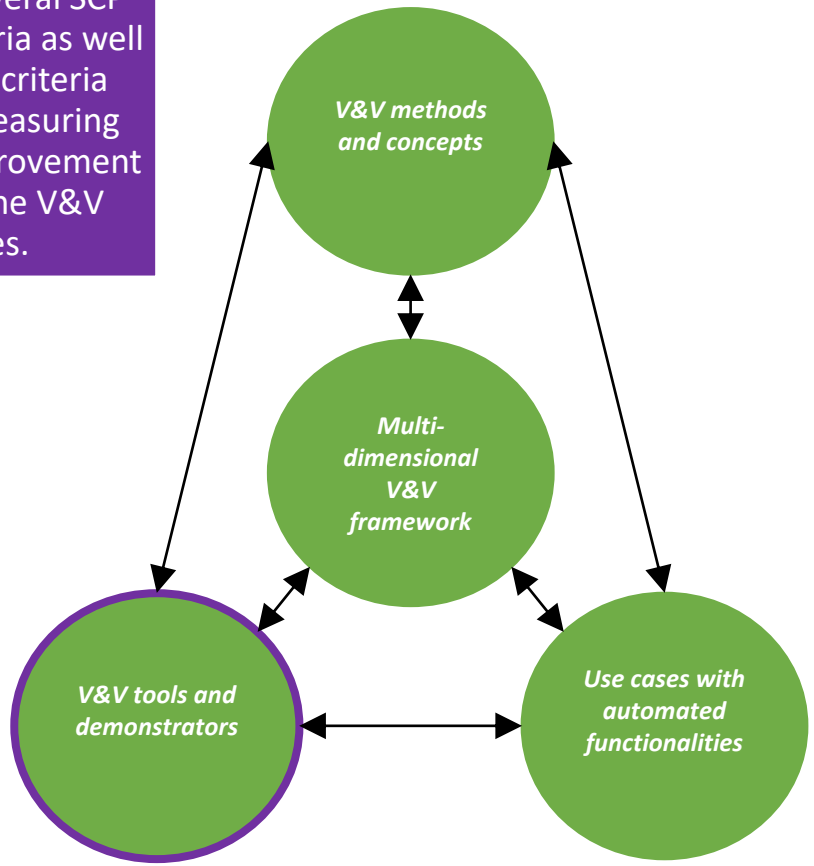


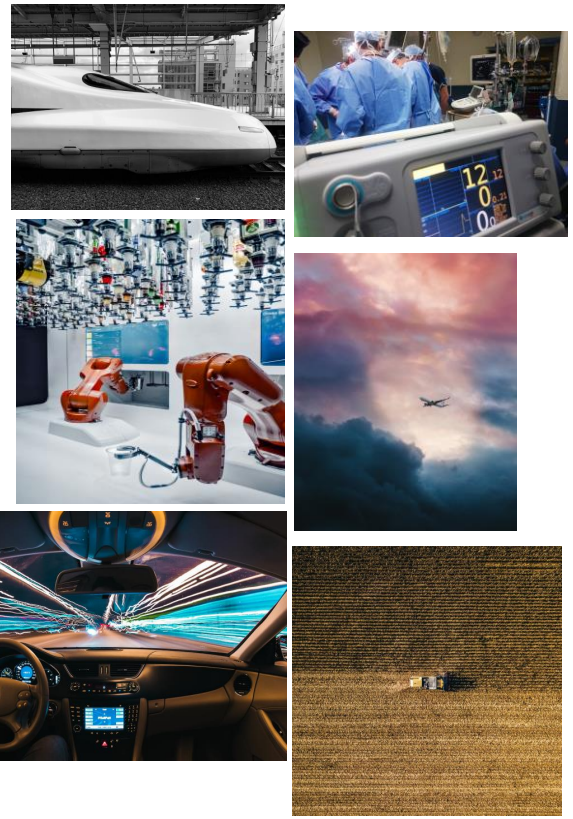
Project highlights and achievements (6/7)

Collection of V&V state-of-practice for the project use cases. This enables the measurement of the improvements achieved by the end of the project.

Identification and detailing of several SCP evaluation criteria as well as evaluation criteria suitable for measuring the level of improvement obtained in the V&V processes.

Continuous implementation of project demonstrators.





Project highlights and achievements (7/7)

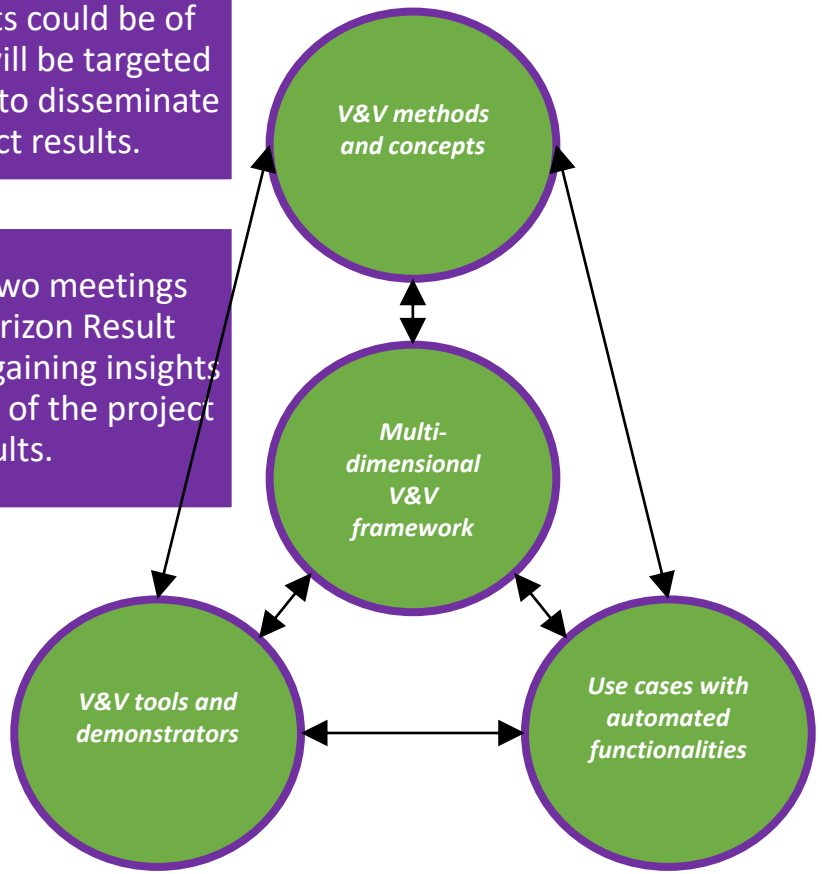
Creation of the project's final communication, exploitation, and dissemination plans as well as an initial rounds of reports connected to these activities.

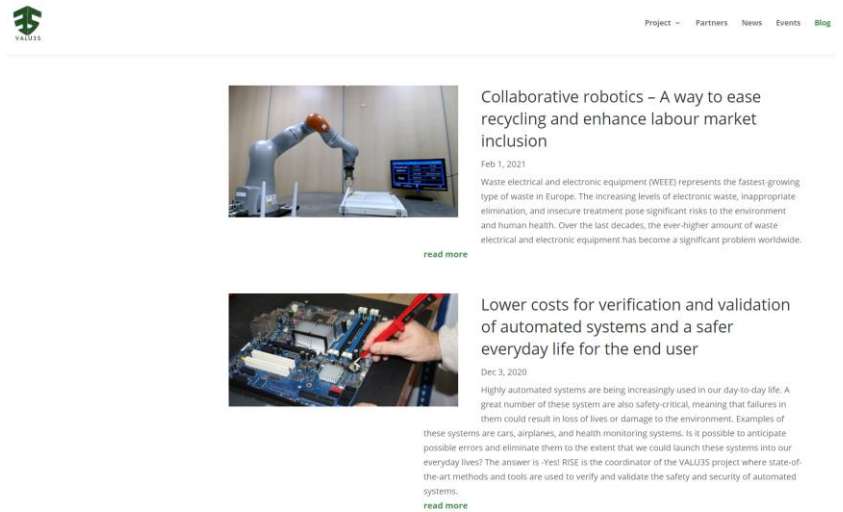
Identification of several standards as to where the project results could be of interest and will be targeted by the project to disseminate the project results.

Organization of multiple internal training sessions and publications of multiple scientific articles.

Scheduling two meetings with the Horizon Result Booster team gaining insights in exploitation of the project results.

Active involvement in communication activities, especially of those that contribute to the dissemination of project results.





The VALU3S ECSEL Project: Verification and Validation of Automated Systems Safety and Security

Agirre J.A. et al., "The VALU3S ECSEL Project: Verification and Validation of Automated Systems Safety and Security", Accepted for publication in Microprocessors and Microsystems, Elsevier.

Publisher's Version >>

Implementing Hybrid Semantics: From Functional to Imperative, Theoretical Aspects of Computing

Goncharov, S., Neves, R., Proença, J.: Implementing Hybrid Semantics: From Functional to Imperative, Theoretical Aspects of Computing — ICTAC 2020, LNCS vol. 12545, 2020; DOI: https://doi.org/10.1007/978-3-030-64276-1_14

Publisher's Version >>

Overview of some upcoming activities

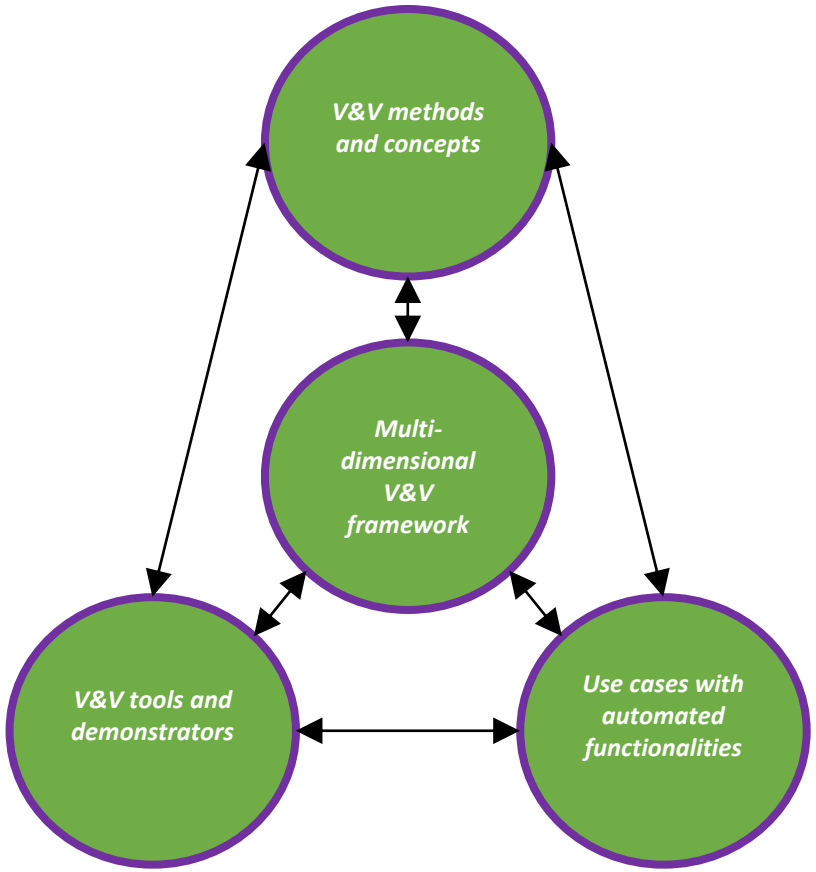
Continuous dissemination of the project results as well as active communication with other relevant projects and initiatives.

Finalization of the improved V&V methods to be used by project demonstrators.

Continuous development and finalization of V&V tools to be used by project demonstrators.

Finalization of project demonstrators, while showing the time/cost reduction introduced as a result of using technologies developed within the project.

Public release of the project's web-based repository containing the data collected within the project.



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VALU3S

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www.valu3s.eu

ECSEL Joint Undertaking
Electronic Components and Systems for European Leadership

This project has received funding from the ECSEL Joint Undertaking (JU) under grant agreement No 876852. The JU receives support from the European Union's Horizon 2020 research and innovation programme and Austria, Czech Republic, Germany, Ireland, Italy, Portugal, Spain, Sweden, Turkey.