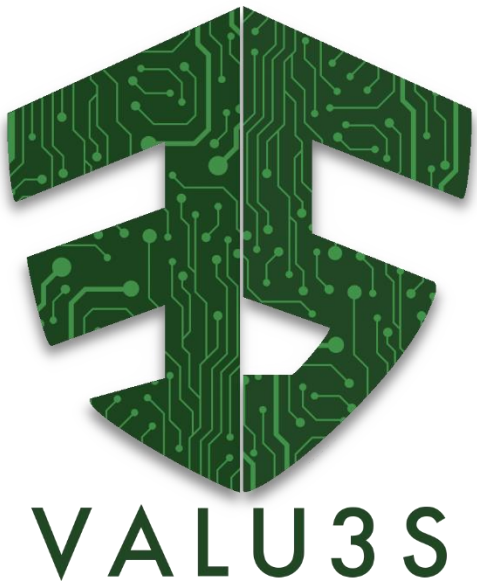

Verification and Validation of Automated Systems' Safety and Security

Initial Dissemination and Training Report

Document Type	Report
Document Number	D6.7
Primary Author(s)	David Pereira (ISEP)
Document Date	April 27, 2021
Document Version	6.1 (Final)
Dissemination Level	Public (PU)
Reference DoA	February 26, 2021
Project Coordinator	Behrooz Sangchoolie, behrooz.sangchoolie@ri.se, RISE Research Institutes of Sweden
Project Homepage	www.valu3s.eu
JU Grant Agreement	876852

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.

Disclaimer

The views expressed in this document are the sole responsibility of the authors and do not necessarily reflect the views or position of the European Commission. The authors, the VALU3S Consortium, and the ECSEL JU are not responsible for the use which might be made of the information contained in here.

Project Overview

Manufacturers of automated systems and the manufacturers of the components used in these systems have been allocating an enormous amount of time and effort in the past years developing and conducting research on automated systems. The effort spent has resulted in the availability of prototypes demonstrating new capabilities as well as the introduction of such systems to the market within different domains. Manufacturers of these systems need to make sure that the systems function in the intended way and according to specifications which is not a trivial task as system complexity rises dramatically the more integrated and interconnected these systems become with the addition of automated functionality and features to them.

With rising complexity, unknown emerging properties of the system may come to the surface making it necessary to conduct thorough verification and validation (V&V) of these systems. Through the V&V of automated systems, the manufacturers of these systems are able to ensure safe, secure and reliable systems for society to use since failures in highly automated systems can be catastrophic.

The high complexity of automated systems incurs an overhead on the V&V process making it time-consuming and costly. VALU3S aims to design, implement and evaluate state-of-the-art V&V methods and tools in order to reduce the time and cost needed to verify and validate automated systems with respect to safety, cybersecurity and privacy (SCP) requirements. This will ensure that European manufacturers of automated systems remain competitive and that they remain world leaders. To this end, a multi-domain framework is designed and evaluated with the aim to create a clear structure around the components and elements needed to conduct V&V process through identification and classification of evaluation methods, tools, environments and concepts that are needed to verify and validate automated systems with respect to SCP requirements.

In VALU3S, 12 use cases with specific safety, security and privacy requirements will be studied in detail. Several state-of-the-art V&V methods will be investigated and further enhanced in addition to implementing new methods aiming for reducing the time and cost needed to conduct V&V of automated systems. The V&V methods investigated are then used to design improved process workflows for V&V of automated systems. Several tools will be implemented supporting the improved processes which are evaluated by qualification and quantification of safety, security and privacy as well as other evaluation criteria using demonstrators. VALU3S will also influence the development of safety, security and privacy standards through an active participation in related standardisation groups. VALU3S will provide guidelines to the testing community including engineers and researchers on how the V&V of automated systems could be improved considering the cost, time and effort of conducting the tests.

VALU3S brings together a consortium with partners from 10 different countries, with a mix of *industrial partners* (24 partners) from automotive, agriculture, railway, healthcare, aerospace and industrial automation and robotics domains as well as leading *research institutes* (6 partners) and *universities* (10 partners) to reach the project goal.

Consortium

RISE RESEARCH INSTITUTES OF SWEDEN AB	RISE	Sweden
STAM SRL	STAM	Italy
FONDAZIONE BRUNO KESSLER	FBK	Italy
KNOWLEDGE CENTRIC SOLUTIONS SL - THE REUSE COMPANY	TRC	Spain
UNIVERSITA DEGLI STUDI DELL'AQUILA	UNIVAQ	Italy
INSTITUTO SUPERIOR DE ENGENHARIA DO PORTO	ISEP	Portugal
UNIVERSITA DEGLI STUDI DI GENOVA	UNIGE	Italy
CAMEA, spol. s r.o.	CAMEA	Czech
IKERLAN S. COOP	IKER	Spain
R G B MEDICAL DEVICES SA	RGB	Spain
UNIVERSIDADE DE COIMBRA	COIMBRA	Portugal
VYSOKE UCENI TECHNICKE V BRNE - BRNO UNIVERSITY OF TECHNOLOGY	BUT	Czech
ROBOAUTO S.R.O.	ROBO	Czech
ESKISEHIR OSMANGAZI UNIVERSITESI	ESOGU	Turkey
KUNGLIGA TEKNISKA HOEGSKOLAN	KTH	Sweden
STATENS VAG- OCH TRANSPORTFORSKNINGSINSTITUT	VTI	Sweden
UNIVERSIDAD DE CASTILLA - LA MANCHA	UCLM	Spain
FRAUNHOFER GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V.	FRAUNHOFER	Germany
SIEMENS AKTIENGESELLSCHAFT OESTERREICH	SIEMENS	Austria
RULEX INNOVATION LABS SRL	RULEX	Italy
NXP SEMICONDUCTORS GERMANY GMBH	NXP-DE	Germany
PUMACY TECHNOLOGIES AG	PUMACY	Germany
UNITED TECHNOLOGIES RESEARCH CENTRE IRELAND, LIMITED	UTRCI	Ireland
NATIONAL UNIVERSITY OF IRELAND MAYNOOTH	NUIM	Ireland
INOVASYON MUHENDISLIK TEKNOLOJI GELISTIRME DANISMANLIK SANAYI VE TICARET LIMITED SIRKETI	IMTGD	Turkey
ERGUNLER INSAAT PETROL URUNLERI OTOMOTIV TEKSTIL MADENCILIK SU URUNLER SANAYI VE TICARET LIMITED STI.	ERARGE	Turkey
OTOKAR OTOMOTIV VE SAVUNMA SANAYI AS - OTOKAR AS	OTOKAR	Turkey
TECHY BILISIM TEKNOLOJILERI DANISMANLIK SANAYI VE TICARET LIMITED SIRKETI - TECHY INFORMATION TECHNOLOGIESAND CONSULTANCY LIMITED COMPANY	TECHY	Turkey
ELECTROTECNICA ALAVESA SL	ALDAKIN	Spain
INTECS SOLUTIONS SPA	INTECS	Italy
LIEBERLIEBER SOFTWARE GMBH	LLSG	Austria
AIT AUSTRIAN INSTITUTE OF TECHNOLOGY GMBH	AIT	Austria
E.S.T.E. SRL	ESTE	Italy
NXP SEMICONDUCTORS FRANCE SAS	NXP-FR	France
BOMBARDIER TRANSPORTATION SWEDEN AB	BT	Sweden
QRTECH AKTIEBOLAG	QRTECH	Sweden
CAF SIGNALLING S.L	CAF	Spain
MONDRAGON GOI ESKOLA POLITEKNIKOA JOSE MARIA ARIZMENDIARRIETA S COOP	MGEP	Spain
INFOTIV AB	INFOTIV	Sweden
BERGE CONSULTING AB	BERGE	Sweden

Executive Summary

Both dissemination and training are important activities for the success of any project. Dissemination activities are one of main channels to ensure the outreach of the results of the project, while training can serve as a powerful tool to consolidate the interest that external stakeholders may have in adopting VALU3S results. The first plans for these two activities have been introduced and described in D6.3 – *"Initial Dissemination and Training Plans"* [1] and have been implemented during the first year of the project. The project has also defined a set of dissemination and training Key Performance Indicators (KPI) that is included in those plans. The results presented in this deliverable are evaluated with respect to those KPI, and the main conclusions are drawn and discussed.

In terms of dissemination, this deliverable starts by reporting on a set of activities that were performed that resulted in processes and tools that help monitoring and managing the projects dissemination activities. Then, both internal and external dissemination activities are reported. Internal dissemination summarizes the main channels for disseminating information within the project's internal activities. External dissemination activities describe the main activities performed for disseminating project's information to external audiences and includes information about project's partner websites advertising VALU3S, the role of public deliverables, content prepared to perform general dissemination of the project's objectives and organization, the publications produced by the project and project's dedicated webpage for announcing them in combination with their announcement in the project's social networks.

After reporting on dissemination, the focus of this deliverable turns to training activities. The planning of training activities is reported, alongside with the results of two surveys that served as basis for the defining the long terms plans related to training. Finally, the first training session organized by the project is reported, as well as activity defined with the goal of produce videos focused on V&V methods (and tools) to complement the contents that will be presented during future training sessions.

We conclude with a detailed analysis of each of the pre-defined KPIs and draw conclusions about the performance of the project during its first year which can be considered successful.

This deliverable relates to other deliverables of the project, namely D6.3 [1] where the initial plans for dissemination and training are defined, and the content reported here will be used to update those plans which will be defined until month 18 of the project when D6.12 – *"Final Dissemination and Training Plans"* is planned to be delivered. The training activities reported here, namely the information on surveys prepared for organizing the first training session (and others that will succeed in the remaining of the project), also relates this deliverable to D3.1 – *"V&V Methods for SCP Evaluation of Automated Systems"* [2] from which the categorization of V&V methods adopted in those deliverables has been used.

Contributors

David Pereira	ISEP	José Proença	ISEP
Giann Nandi	ISEP		

Reviewers

Fredrik Warg	RISE	2021-03-25, 2021-04-20
Ahmet Yazıcı	ESOGU	2021-03-28
Bohuslav Křena	BUT	2021-04-02
Behrooz Sangchoolie	RISE	2021-04-21, 2021-04-28, 2021-04-30

Revision History

Version	Date	Author (Affiliation)	Comment
1.0	2021-03-16	David Pereira (ISEP), José Proença (ISEP)	Initial Table of Contents
2.0	2021-03-22	David Pereira (ISEP)	Draft for first internal review round
3.0	2021-04-15	David Pereira (ISEP)	Update draft with the integration of comments from 1st round of internal reviews, and new content added in the KPIs section.
4.0	2021-04-27	David Pereira (ISEP)	Update draft with the integration of comments from 2nd round of internal reviews.
5.0	2021-04-28	David Pereira (ISEP), José Proença (ISEP), Giann Nandi (ISEP)	Integration of final comments and document consolidation.
5.1	2021-04-28	Behrooz Sangchoolie (RISE)	Review of the final draft while making minor formatting changes
6.0	2021-04-29	David Pereira (ISEP)	Final version considering minor formatting and inputs.
6.1	2021-04-30	Behrooz Sangchoolie (RISE)	Final version to be submitted.

Table of Contents

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Acronyms

D	Deliverable
DECT	Dissemination, Exploitation and Communication Team
DoA	Description of the Action
EC	European Commission
EU	European Union
ECSEL	Electronic Components and Systems for European Leadership
GA	Grant Agreement
JU	Joint Undertaking
KPI	Key Performance Indicator
MS	Microsoft
PC	Project Coordinator
PCA	Project Consortium Agreement
VALU3S	Verification & Validation of Automated Systems' Safety and Security
V&V	Verification & Validation
WP	Work package

Chapter 1 Introduction

Both dissemination and training are important activities for the success of any project. *Dissemination activities* ensure that the project's results reach the intended audiences, using the right channels, and conveying the appropriate message. *Training activities* provide a fundamental mechanism to ensure that partners and stakeholders have a suitable understanding of the scientific and technological results supporting the outcomes of the project in order to ease their adoption for their own activities and/or businesses. This deliverable reports on the results obtained during the first year of the project in terms of dissemination and training activities, which includes the standard projects outputs, such as publications, but also reports on the implementation of plans that were proposed and described in D6.3 – *"Initial dissemination and training plan"* [1].

The preliminary strategy was defined during VALU3S's proposal phase, and it is depicted in Figure 1.1. Following this strategy, the first year of the project was mainly focused on preparing the plans for dissemination and launch the corresponding actions. In parallel, the project also engaged on the planning and launching of activities related to training. The initial versions of these plans have been proposed in D6.3 whereas the final version of the plans will be described later in D6.12 – *"Final dissemination and training plan"*.

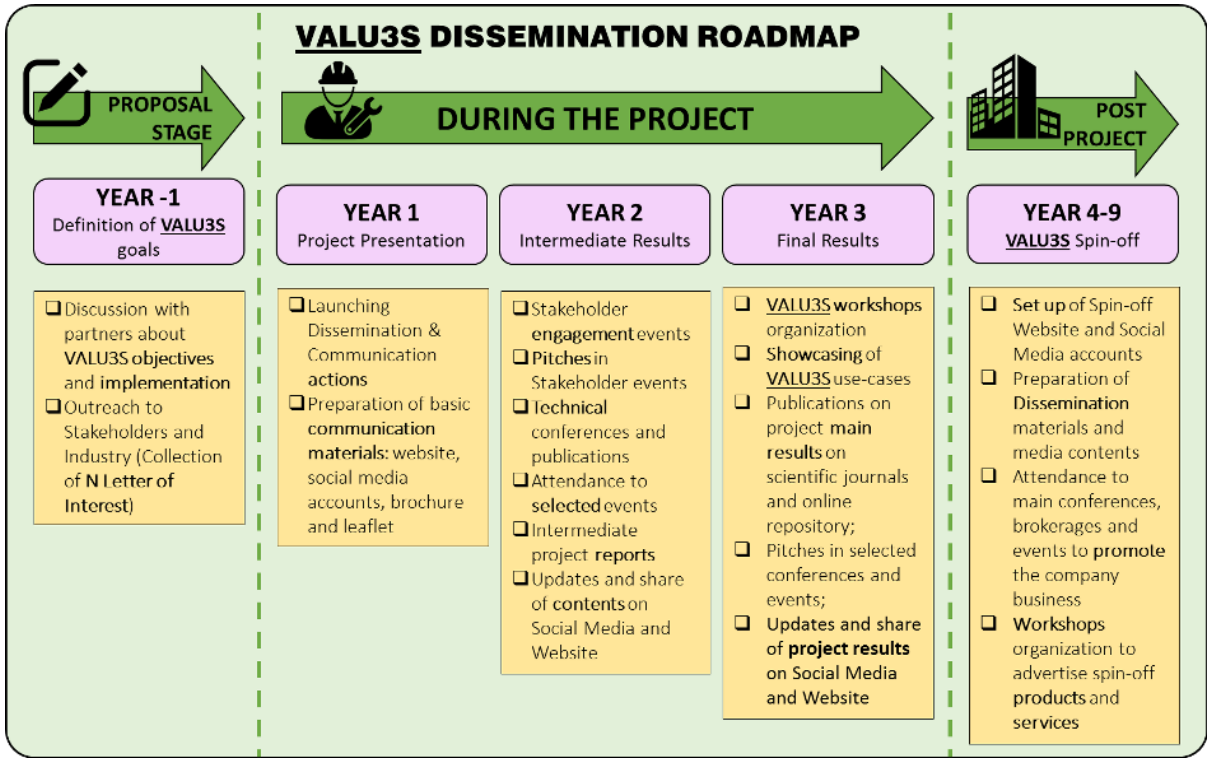


Figure 1.1: VALU3S dissemination roadmap.

1.1 Target Audiences for Dissemination and Training Activities

The identification of target audiences is a fundamental action to drive the dissemination and training activities in the sense that they will help developing tailormade contents that target each of the identified target audiences in the most effective manner, contributing to ensure that VALU3S has the desired far-reaching impact and, consequently, encourage interested stakeholders to adopt VALU3S' solutions for their own business and products.

An initial analysis of the VALU3S dissemination target audiences, and some of their most relevant stakeholders, is reported in Table 1.1. In what concerns training, the main stakeholders are the project's consortium, the industrial community, and the scientific community.

Table 1.1: Identified VALU3S' stakeholders.

VALU3S stakeholders	
Scientific Community	• Universities researching in Robotics and Automation • Research and technology organizations • National research centres • Attendants to trade exhibitions covering areas such as Robotics, Manufacturing, Automotive, Agriculture, Health, Aerospace and Railway
Industrial community	• Industrial robotics producers • Employers (owners of factories in which automated systems/vehicles are deployed) • ICT companies • Digital Innovation Hubs • Automotive, Agriculture, Health, Aerospace and Railway companies
Policy maker/lobbies/associations	• euRobotics AISBL (Association Internationale Sans But Lucratif) • European Robotics Platform (EUROP) • European Robotics Research Network (EURON) • European Design and Automation Association (EDAA) • European Factories of the Future Research Association (EFFRA) • European Association of Agricultural Economists (EAAE) • European Automobile Manufacturers' Association (ACEA) • AUTOSAR • European Public Health Association (EUPHA) • European Aviation Safety Agency (EASA) • European Union Agency for Railways (ERA)
Mass Media	• Social media • Newspapers • Websites

VALU3S stakeholders	
Investor, Public Body	• National bank • Business Angel • National institute for safety on the work • Standardization bodies

1.2 Relation with other Deliverables

This deliverable reports on the dissemination and training actions that were performed during the first year of the VALU3S project. Those actions refer not only of the typical outcomes in terms of dissemination (e.g., published papers), but also to the implementation of several internal processes and documentation to guide and manage the dissemination and training activities, whose plans are reported in D6.3 – *"Initial Dissemination and Training Plans"*[1] [1].

This deliverable is also related to D3.1 – *"V&V methods for SCP evaluation of automated systems"* [2], D6.4 – "Initial exploitation plan" [3], and D6.5 – *"Initial report on the results of the standardisation survey (methods, tools, concepts suggested by the standards)"* [4]. The information contained in those deliverables has served as input to prepare training activities as described in Chapter 3. Furthermore, this deliverable has also relation with D6.11 – *"Initial Communication Activity Report"* [5] in what concerns the announcements of publications and training activities in the project's social networks.

Finally, the results reported about dissemination and training during the first year of the project will contribute to the update of the plans that will be presented in D6.12 – *"Final dissemination and training plan"*, to be delivered in month 18 of the project.

1.3 Deliverable Organization

The remainder of this deliverable is organized as follows: Chapter 2 describes the initiatives and actions that were conducted during the first year to comply with what was initially planned and described in deliverable D6.3 in terms of internal and external dissemination, and also the result of several activities concerned with the implementation of processes and the setup of the infrastructure that supports the monitoring and management of dissemination activities. Chapter 3 reports on the actions taken to identify the key aspects of the planning and organization of training sessions, and reports on the details of the VALU3S 1st training sessions that took place in March and April of the current year. It also describes an ongoing activity focusing on the production of videos that will complement the content addressed in the training session that was organized and to be addressed in future training sessions that will be organized in the remaining of the project. In Chapter 4, the dissemination and training outcomes

[1] Whenever necessary, information belonging to D6.3 that is required to substant the contents reported in this deliverable, will be provided as shorter as possible and without compromising D6.3's confidentiality requirements.

are evaluated with respect to the established KPIs, and an overall analysis of this evaluation is presented. Finally, in Chapter 5 the main conclusions about the content reported in this deliverable are summarized.

Three appendices are also considered in this deliverable: in Appendix A the individual dissemination and training activities of the partners of the project are summarized; in Appendix B we present the results from the second survey that was prepared to help driving the planning and organization of internal and external training for the first and remaining years of the project; and in Appendix C the poster and leaflet templates of the project are presented.

Chapter 2 Dissemination

This main focus of this chapter is to report the results of activities that addressed both internal and external dissemination during the first year of the project.

We start by reporting on outcomes and processes that are necessary to support both types of dissemination, notably: 1) the document templates produced that ensure a uniformised image for project documentation, in particular, for project presentations and deliverables; 2) the process for publication preparation in the scope of the project and the infrastructure to monitor and manage publications.

Finally, we report the concrete activities in terms of internal and external dissemination. In what internal dissemination is concerned, the focus was on internal channels of dissemination that have been setup to help conveying dissemination outcomes within the project's internal activities. In terms of external dissemination, reporting on results refers to: partners websites dedicated to VALU3S; publications that partners have obtained, either as results of their individual R&D efforts or resulting from collaborative work with other member of the project; how those publications are further disseminated through VALU3S website and social networks; and general dissemination material such as posters and flyers, activities that have been conducted during the first year of the project.

2.1 Document Templates

All documents produced within the scope of VALU3S, notably project presentations and project deliverables, must respect the project's defined image. This means that partners shall always use, unless it is impossible, the templates produced by the management and communication governing bodies of the project. The templates are available to all partners in the *Templates* channel hosted in the VALU3S Teams and can be subject to updates during the project's lifetime. Notably, these templates include the necessary acknowledgments to the funding agencies of VALU3S, as well as all the necessary disclaimers, ensuring compliance with the project's legal requirements.

2.1.1 Presentation Template

The presentation template assumes the form of a Microsoft PowerPoint template. It is composed of three slide styles: a title slide, a content slide, and a closing slide, which are presented in Figure 2.1, Figure 2.2, and Figure 2.3, respectively. The title slide requires the user to introduce the title, type of event, authors and their organization, date, location where the presentation will take place, and the dissemination level (public (PU) or confidential (CO)).

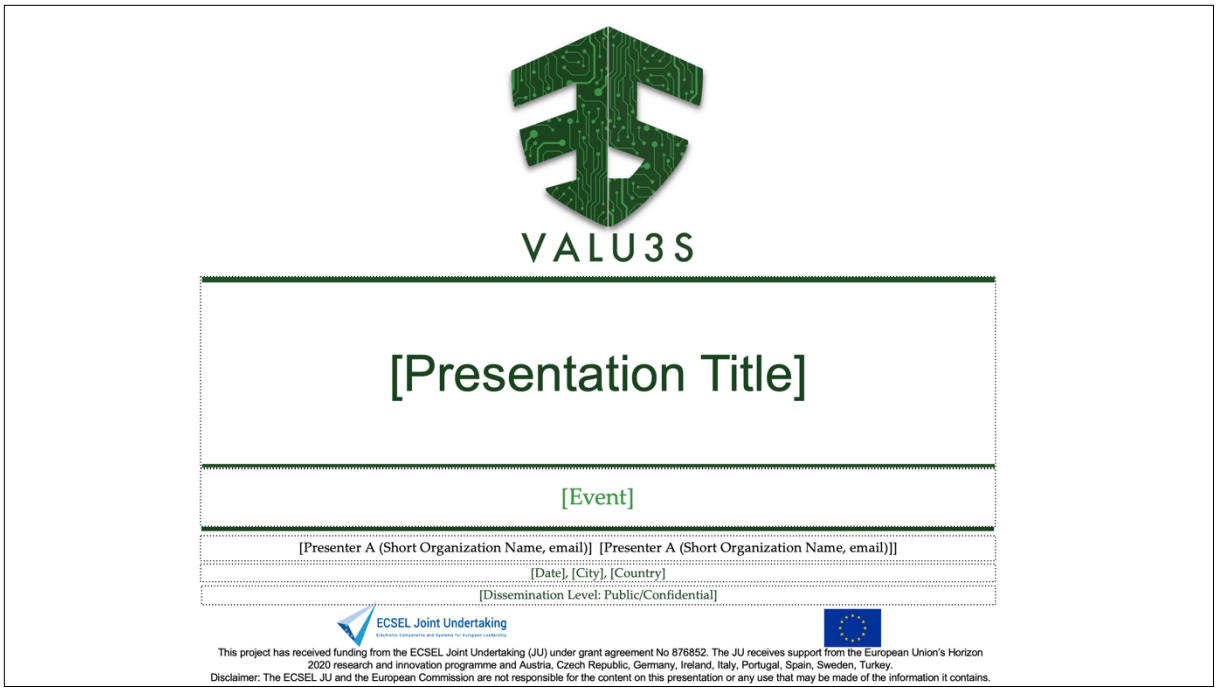


Figure 2.1: VALU3S presentation template - title slide.

The contents slide was designed to be flexible for partners to introduce information. It typically requires a title, but that can be removed if the partner understands it is better for conveying the information. The date of the presentation, its title, and the slide number are always presented in the footer. The logo of the project is also always presented in the bottom-right corner.

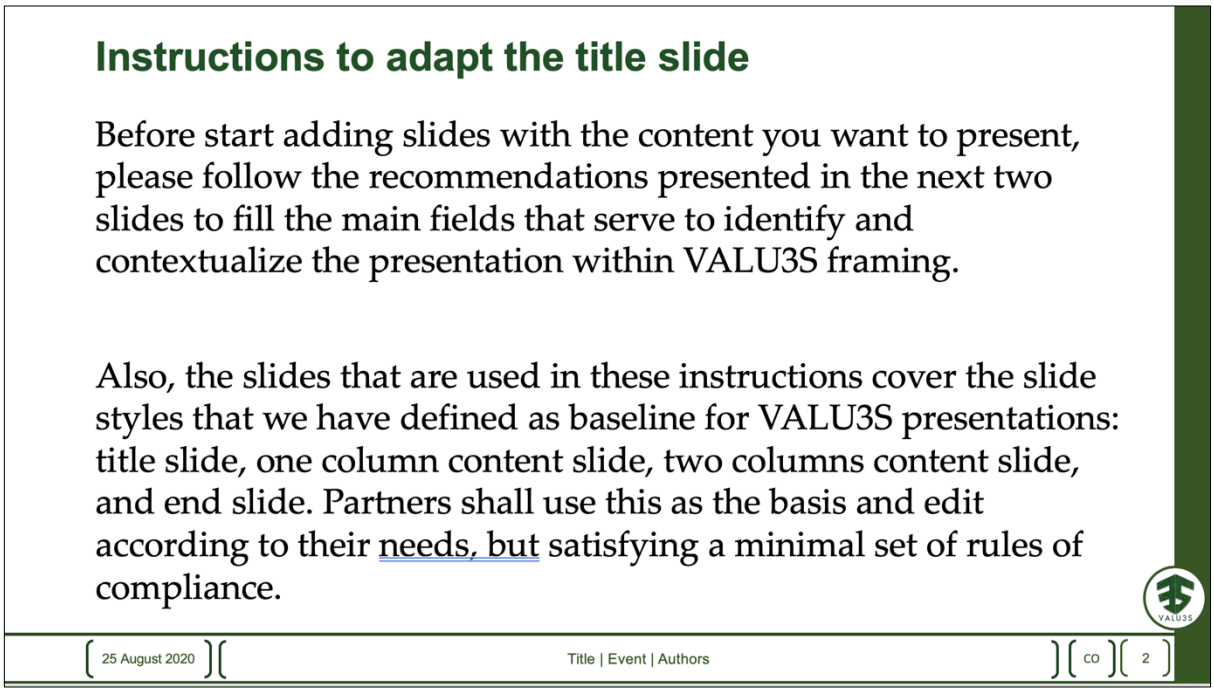


Figure 2.2: VALU3S presentation template - content slide.

The closing slide essentially consists of the reinforcement of the image of the project via its logo and title, and also presents the acknowledgment to the European Union and the ECSEL JU using the right text, as well as the necessary disclaimer.

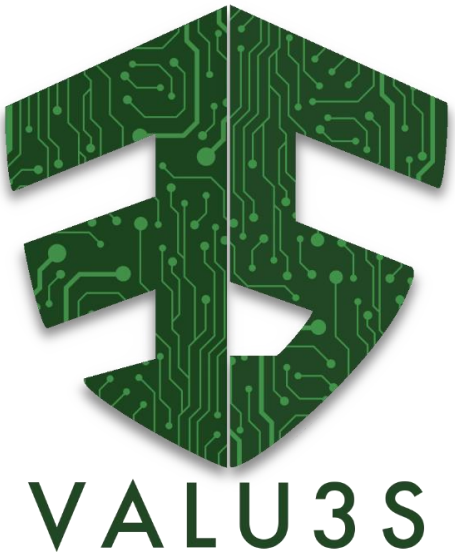
Figure 2.3: VALU3S presentation template - closing slide.

2.1.2 Deliverables Template

The templates for producing deliverables for VALU3S are available in both Microsoft Word and LaTex formats. They share a common structure, which is the following:

- a **title page**, including the deliverable number, the authors, the date, the version, the dissemination level (if it is public or confidential), and the reference for the DoA [6].
- a **disclaimer page**, stating that the contents of the deliverable are the authors own responsibility and do not necessarily reflect the views of the European Commission.
- a page including the **list of contributors** for this deliverable, a **list of reviewers**, and a **list of previous versions** of this deliverable.
- a **set of pages with the contents** of the deliverable.
- a **closing page**, reinforcing the image of the project via its logo and website, and including again the obligatory acknowledgment to the funding entities.

For exemplification purposes, the title and contributors' pages are presented in Figure 2.4 and Figure 2.5, respectively.



VALU3S

Verification and Validation of Automated Systems' Safety and Security

VALU3S Deliverable Template

Document Type	Deliverable
Document Number	DX.X
Primary Author(s)	Lead Beneficiary & Task Leader & WP Leader
Document Date	
Document Version	X.X (Draft / Final)
Dissemination Level	Public (PU) / Confidential (CO)
Reference DoA	Date of current DoA
Project Coordinator	Behrooz Sangchoolie, behrooz.sangchoolie@ri.se, RISE Research Institutes of Sweden
Project Homepage	www.valu3s.eu
JU Grant Agreement	876852

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.

Figure 2.4: Deliverable template - title page.

Contributors

<Name>	<Short Affiliation>	<Name>	<Short Affiliation>
<Name>	<Short Affiliation>	<Name>	<Short Affiliation>
<Name>	<Short Affiliation>	<Name>	<Short Affiliation>
<Name>	<Short Affiliation>	<Name>	<Short Affiliation>

Reviewers

<Name>	<Short Affiliation>	<Date>
<Name>	<Short Affiliation>	<Date>
<Name>	<Short Affiliation>	<Date>
<Name>	<Short Affiliation>	<Date>

Revision History

Version	Date	Author (Affiliation)	Comment
0.1	2020-05-12	Pierre Kleberger (RISE)	Initial Draft Template
0.2	2020-05-15	Pierre Kleberger (RISE)	Updates to layout of Title and page numbering. Added typesetting of lists. Fixed Appendix heading numbering.
0.3	2020-05-18	Pierre Kleberger (RISE)	Put the document title in header on the outer side of the page.
0.4	2020-05-19	Pierre Kleberger (RISE)	Corrected fonts in funding acknowledgement on first page and last page.
0.5	2020-05-26	Pierre Kleberger (RISE)	Updated logo
1.01	2020-07-01	Pierre Kleberger (RISE)	Updated format of Headings.
1.02	2020-08-05	Pierre Kleberger (RISE)	Typo and layout corrections of consortium list.

Figure 2.5: Deliverable template - contributors page.

2.2 Publication Monitoring and Management

2.2.1 Publication Workflow

Any new publication in the scope of VALU3S shall follow a specific workflow whenever possible, in order to respect the rules defined in the project's Grant Agreement (GA) [7] and Project Consortium Agreement (PCA) [8], and to ensure that the consortium members are continuously updated about publications resulting from activities being performed in the project. The workflow defined for VALU3S is depicted below in Figure 2.6.

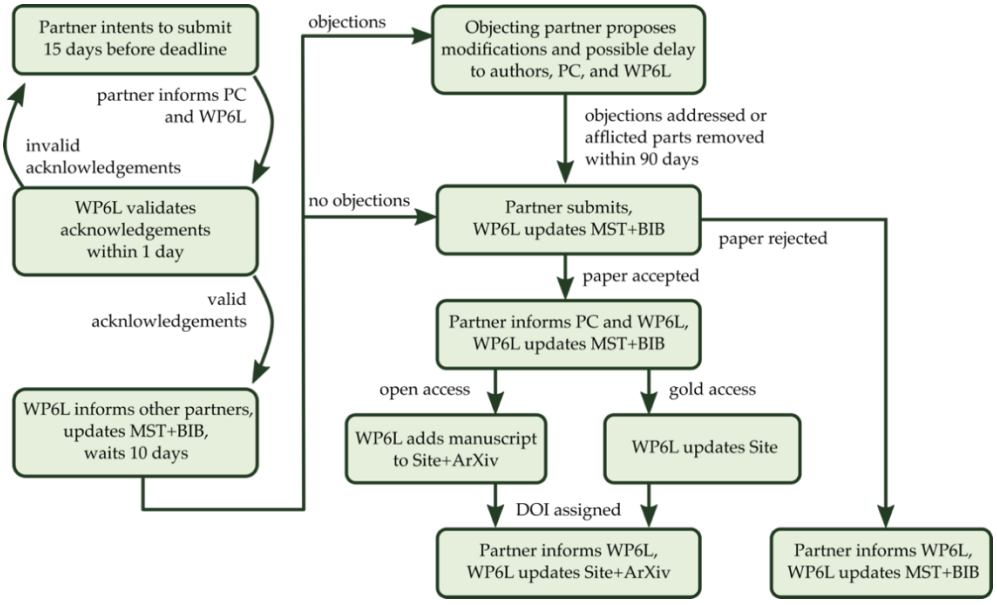


Figure 2.6: Workflow overview for publishing a manuscript within VALU3S.

A more detailed documentation of the several steps of this workflow has been made available in the internal *Publications* channel of the project about this workflow and about the guidelines to ensure open access to publications resulting from work performed in the project, and according to the rules specified by the several publishers, notably, IEEE, ACM, Elsevier, and IosPress.

2.2.2 Publication Database and Bibliography Management

In VALU3S, a publications and bibliography management framework has been put in place to help monitoring and managing publications.

A unique database containing entries of all the publications made in the scope of the project's activities has been created and is regularly updated with new publications and allows to register all moments of the publication process according to what has been defined in the publication workflow presented in Section 2.2.1. This database is complemented with a bibliography management system that allows to export, in standard formats, not only the referred publications, but also other legal and non-technical documents that are typically used in internal or external contents, such as deliverables, presentations,

etc. In the remaining of this section, we provide detailed information about how this publications and bibliography management framework is implemented.

Publications Database

The publications database consists of a simple Microsoft Excel spreadsheet that contains all the meta-data usually necessary for characterizing scientific publications. This database satisfies the requirements of the fields present in the ECAS portal page where publications in the scope of project must be inserted. This database is available in the VALU3S Teams *Publications* channel and is periodically updated, as well as it can be accessed by all partners at any time so it can be effectively used by them it in the preparation of any documentation in the scope of the project's activities.

Bibliography Management System

At the core of the bibliography management system lies the Zotero bibliography manager [9], which is a free, easy-to-use tool to help users collect, organize, cite, and share research. The choice of Zotero is justified by its versatility to cope with the type of dissemination material that is expected from a project with such a number and diversity of partners involved like VALU3S. Furthermore, Zotero also provides a Microsoft Word plugin and allows to export references in the BibLaTex format, thus supporting the two document formats that are targeted by VALU3S deliverables and scientific/industrial publications. A snapshot of the Zotero interface with a minimal database is presented in Figure 2.7.

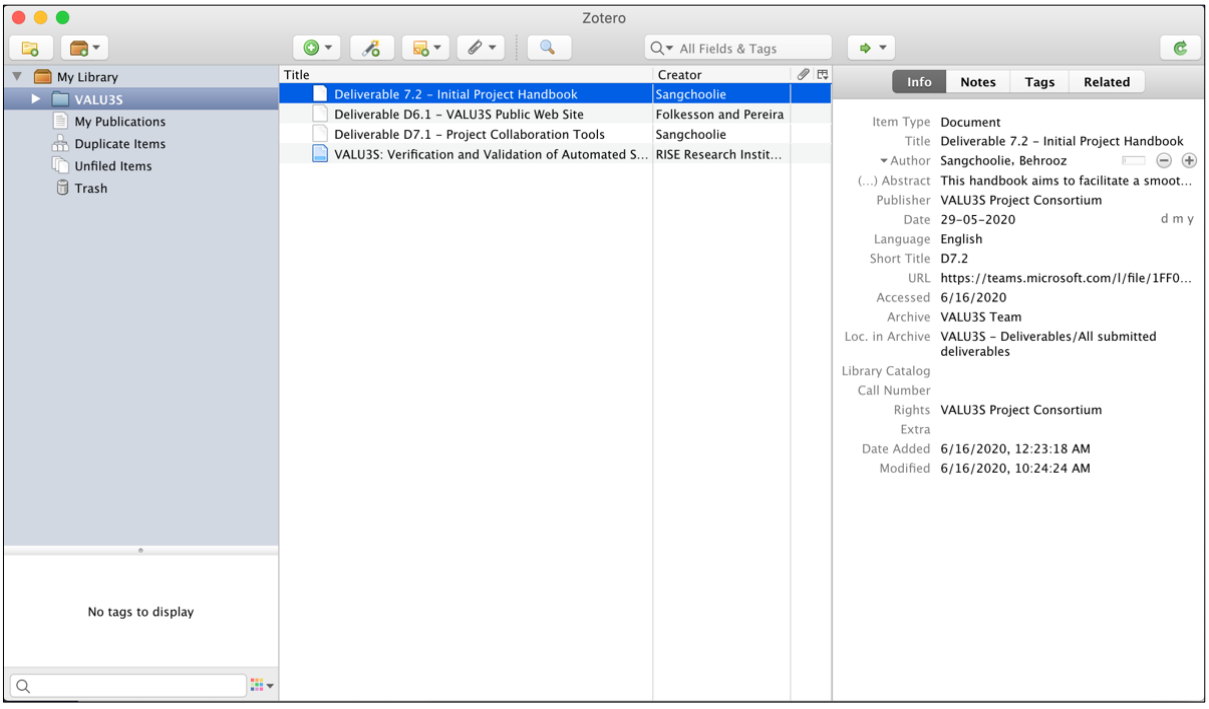


Figure 2.7: Zotero user interface.

For illustrative purposes, we present below in Figure 2.8 the form in Zotero that is associated to the creation of deliverable entry (in this case, the deliverable used as example is D7.2 – *"Initial Project Handbook"* [10]) where the Zotero's entry type *Document* is used.

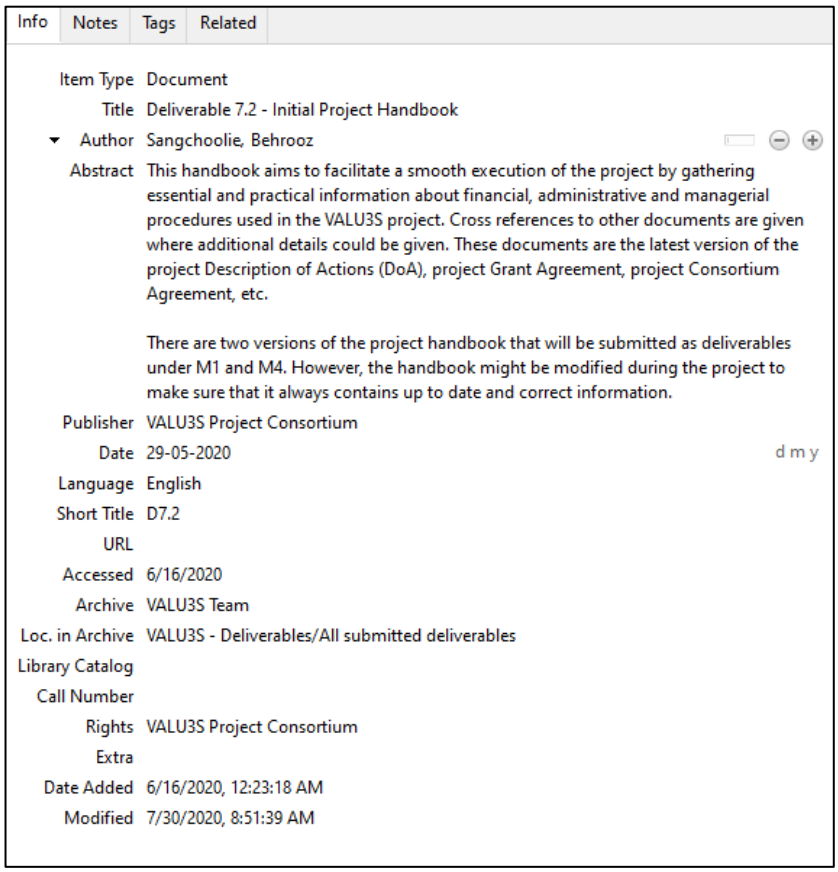


Figure 2.8: Zotero entry for deliverable D7.2 – Initial Project Handbook.

2.3 Internal Dissemination

In this section we report on the results of the implementation of the plans presented in D6.3 [1] that aim at setting up the mechanisms and infrastructure that enable a lean and effective process of internal dissemination.

2.3.1 Microsoft Teams Environment Support

VALU3S has adopted Microsoft Teams [11] as the platform to host and manage all information relevant to the execution of the project (described in the Project Handbook [10]). The VALU3S Team organized in channels out of which the channels identified below are particularly useful for internal dissemination:

- **Publications**: this channel hosts all the publications produced within VALU3S, along with publications database and bibliography management database previously introduced.
- **Templates**: this channel hosts the Microsoft Word and LaTeX templates for deliverables and the Microsoft PowerPoint templates for project presentations. Further templates, if introduced in the project in the future, will also be hosted in this channel.
- **Deliverables**: this channel hosts all deliverables prepared by the project and are available to all project partners, being a source of information for them to have increased awareness of the project results progress.

2.3.2 Mailing Lists for Internal Dissemination

In order to easily convey general or directed information to all members of the consortium, or to groups of the consortium such as members of work packages, members of tasks, as well as for the Steering Committee, the Technical Committee, and the Dissemination, Exploitation, and Communication Team (DECT), a distribution system based on mailing lists has been adopted. From the set of all mailing lists that have been put in place, the following are the most relevant for dissemination purposes:

- **Project's General Mailing List**: this distribution list is used for conveying information that affects all members of the consortium. In the case of dissemination related activities, this distribution list has been used to ask partners to fill in updated information about dissemination related data, for filling in surveys focused on monitoring publications and preparation of training activities, etc.
- **Dissemination, Exploitation, and Communication Work Package Mailing List**: This mailing list serves the purpose of conveying dissemination related information to all members of the four tasks that are part of the dissemination work package.
- **DECT Mailing List**: This mailing list is concerned with conveying information to the members of the DECT of the project, including dissemination related suggestions that should be taken up to the DECT's debate and decisions. This team is formed by the VALU3S Communication Manager, VALU3S Project Manager, and the leaders of WP6, Task 6.1, Task 6.2, and Task 6.4, the three tasks responsible for dissemination, exploitation, and communication activities, respectively.

2.3.3 Internal Meetings

Other channels for internal dissemination are the regular meetings taking place between VALU3S's partners, at all levels (work package level, task level, use case level, collaboration between partners, management, and steering bodies, etc). Each meeting produces its correspondent minutes, which are a source of information that participants in the meeting, or other partners of the project, can consult in order to keep track of the activities in which they are participating/interested.

2.3.4 Internal Deliverables

Internal deliverables are a very relevant source of information that VALU3S partners shall always consult in order to get acquainted with the progress of the project, and to get more details about the recent scientific and technologic results produced by the project.

2.3.5 Use Case Dissemination Managers

Being a use case driven project, VALU3S needs to put in place the necessary procedures that will ensure that use case related information that can be disseminated is accurately monitored and organised in order not to lose track of relevant progress that may have impact in the target audiences of the project.

With the specific purpose of implementing such efficient and timely monitoring mechanism, VALU3S proposes the concept of Use Case Dissemination Manager (UCDM), inspired by previous projects, notably ENABLE-S3 [12]. Each use case nominates a participant (person from one of the partners

involved in the use case) to register all relevant information that should be available for dissemination purposes.

Use case dissemination managers will be asked to provide, periodically, the following updated information about the progress of the use case:

- **Brief Summary of Progress:** short text (less than 15 sentences) that objectively describe the main achievements of the use case during the reporting period, the highlight activities, and the involved partners own opinion regarding what was more enjoyable activities they performed during the reporting period.
- **Media Communications:** a table whose entries refer to communications to the media performed by members of the use case.
- **Meetings, Workshops, and Conferences:** a table whose entries refer to the participation of use case members in technical meetings, workshops, and conferences.
- **Publications and other articles:** a table whose entries refer to publications and other articles that were produced and published and that are framed within the activities of the use case.
- **General public activities:** a table whose entries describe the activities conducted withing the scope of the use case and that targeted the general public.

Besides the aforementioned data, use case dissemination managers will be asked to also provide updated images that represent the progress of the use case, in high-quality, so that these can be used to produce communication material.

In Figure 2.9, we present a screenshot of the typical structure of a folder in MS Teams that holds the data about a specific reporting period for a use case. The way all reports regarding use cases is described below:

- A main folder named *"UC Dissemination Management"* holds a set of sub-folders, one per use case, located under the folder responsible for hosting all information of Task 6.1.
- Each use case folder is structured as a set of sub-folders, one per period of reporting
- Each folder of a reporting period contains:
    - a MS Word document that is the form for the information of the use case
    - a sub-folder for hosting images, named *"Images"*
    - a sub-folder for hosting videos, named *"Videos"*
    - a sub-folder for hosting other relevant information, named *"Other"*

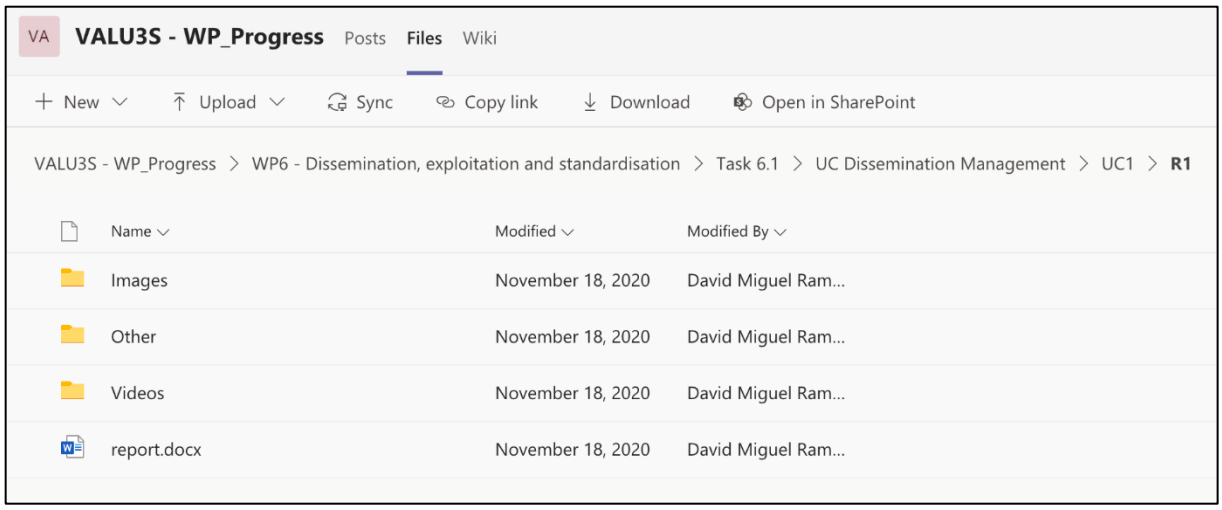


Figure 2.9: Structure of a periodic reporting folder for the selected use case.

During the first year of VALU3S, the plan was to define the role of UCDM, present it to the DECT for validation and then interact with the use case leaders to provide instructions on the steps of this initiative. The concept of UCDM is now in its last implementation step, which is to elect a UCDM for each use case. Dissemination and training activities in the scope of use cases are expected to increase in the second year and continue to grow until the end of the project. Hence, the reporting of UCDMs is only expected to start during the second year of the project.

2.4 External Dissemination

External dissemination targets parties that are not directly involved in the activities of VALU3S. External dissemination activities will promote the VALU3S framework to the different identified target groups and stakeholders (see Table 1.1) so that they are aware of the project outcomes and can leverage the maximum benefit from the research and innovation in VALU3S methods, techniques, and tools.

In the following subsections we describe the set of actions that were introduced in D6.3 as part of the initial plan for external dissemination and that were implement during this first year of the project. Complementary information about external dissemination resulting from the individual members of the consortium is presented in Appendix A.

2.4.1 Partners' Websites

All partners are encouraged to promote VALU3S project via their own web sites. In order to increase the potential of impact on public awareness, basic information about the project, as well as the project's web site, should always be included by partners when disseminating VALU3S' results in their web sites. As an example, we present in Figure 2.10 and Figure 2.11 the VALU3S entries on two consortium's partners institutional websites (in this case, COIMBRA and MGEP).

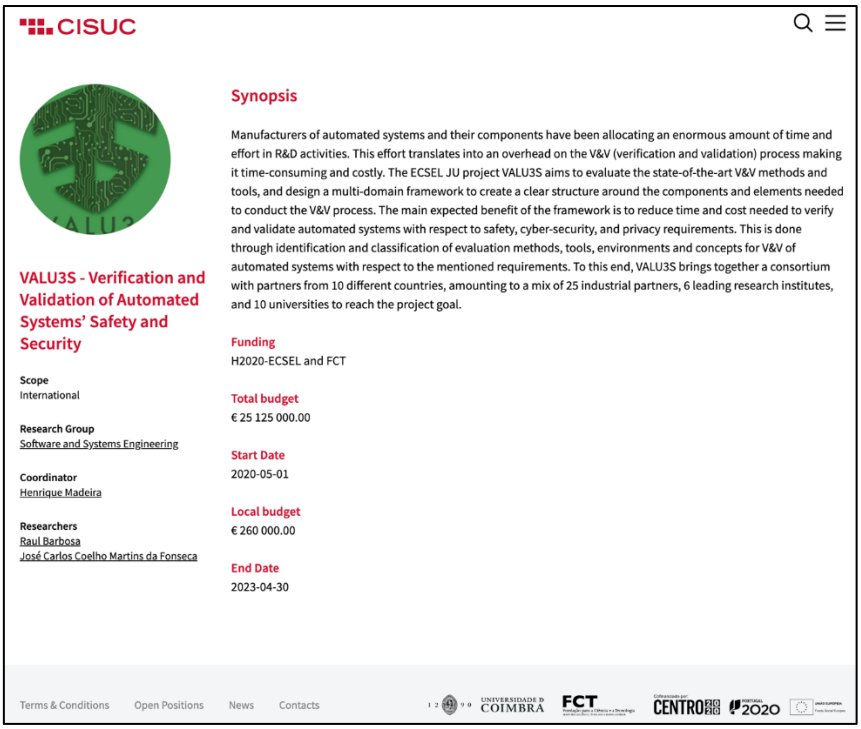


Figure 2.10: VALU3S entry in COIMBRA's website.

Figure 2.11: VALU3S entry in MGEP's website.

2.4.2 Public Deliverables

External dissemination will also be achieved via the set of VALU3S deliverables that are going to be produced during the project, which amounts to total of 23. All these public deliverables will be made available to external audiences through the project website. These public deliverables will allow to share the latest development outcomes of the project with the target audiences of the project, contributing to the dissemination knowledge as widely as possible. During this first year of the project, eight public deliverables identified in Table 2.1 have been prepared.

Table 2.1: First year VALU3S public deliverables (ordered by delivery month).

Number	Number wrt. WP	Title	Due Month
D39	D6.1	VALU3S public web page	1
D40	D6.2	Press Conference to launch VALU3S	4
D12	D3.1	V&V methods for SCP evaluation of automated systems	8
D14	D3.3	Identified gaps and limitations of the V&V methods listed in D3.1	12
D45	D6.7	Initial dissemination and training activity report	12
D46	D6.8	Initial exploitation activity report and short/long-term market analysis	12
D48	D6.10	Final report on the results of the standardization survey (methods, tools, concepts suggested by the standards)	12
D49	D6.11	Initial communication activity report	12

2.4.3 General External Dissemination Material

With the goal of building typical communication materials that are suited to events, two posters and two flyers were prepared containing the fundamental information necessary to effectively convey the importance of the research, innovation, and developments that are being targeted by VALU3S consortium, and how that can bring considerable impact to highly automated systems.

For the case of the posters, a roll-up and a typical A0 sized poster, the following information is present:

- **Identification:** name and acronym of the project.
- **Ambition:** identifies the overarching problem being addressed by the project, an provides a short text highlighting how the project will indeed address the problem.
- **Envisioned V&V framework:** an image identifying the dimensions and layers of the envisioned V&V framework, and their validation on use cases.
- **Application domains:** identification of the several application domains targeted by VALU3S use cases.
- **Consortium:** identification of the countries involved in the project, the logos of the members of the consortium, and a depiction of the geographical distribution along European territory.
- **Budget:** the budget defined for the project, split in the total cost and the total EU contribution.
- **Main project contact:** identification of the project coordinator and leading institution.
- **Acknowledgments:** the legal text acknowledging the project's funding entities

The standard version of the poster is presented in Appendix C.1 for illustrative purposes. Regarding the produced leaflet, the information present is the following:

- **Identification:** name and acronym of the project
- **Social Media Channels:** the links for the project's pages in the three social networks considered by the project, which are LinkedIn, Twitter, and YouTube
- **Project Website:** the link for the project's website.
- **Contacts:** the contact of the project coordinator and of the institution.
- **Ambition (about the project):** identifies the overarching problem being addressed by the project, an provides a diagram and short text highlighting how the project will indeed address the problem.
- **Envisioned V&V framework:** an image identifying the dimensions and layers of the envisioned V&V framework, and their validation on use cases.
- **Application domains:** identification of the several application domains targeted by VALU3S use cases.
- **Consortium:** identification of the countries involved in the project, the logos of the members of the consortium, and a depiction of the geographical distribution along European territory.
- **Budget:** the budget defined for the project, split in the total cost and the total EU contribution.
- **Acknowledgments:** the legal text acknowledging the project's funding entities

One of the leaflets is presented in Appendix C.2 (the "front" part) and in Appendix C.3 (the "back" part) for illustrative purposes.

The general dissemination material described here has already been used in relevant events, including the ECA2030 event [13] organized by the Mobility.E Lighthouse [14] and the EFECS 2020 annual event [15].

2.4.4 Publications

One of the main activities related with the dissemination of VALU3S's results to external audiences is that of producing scientific publications. Below is the list of publications resulting from the work of the partners in VALU3S during the first year.

- Barbosa, R., Basagiannis, S., Giantamidis, G., Becker, H., Ferrari, E., Jahic, J., Kanak, A., Labayen Esnaola, M., Orani, V., Pereira, D., Pomante, L., Schlick, R., Smrcka, A., A. Yazici, P. Folkesson, B. Sangchoolie: ***The VALU3S ECSEL Project: Verification and Validation of Automated Systems Safety and Security***, 23rd Euromicro Conference on Digital System Design (DSD), 26-28 Aug. 2020, Kranj, Slovenia; DOI: 10.1109/DSD51259.2020.00064
- Homoliak, I., Breitenbacher, D., Hujnak, O., Hartel, P., Binder, A., Szalachowski, P.: ***SmartOTPs: An Air-Gapped 2-Factor Authentication for Smart-Contract Wallets***, 2nd ACM Conference on Advances in Financial Technologies (AFT '20), online (organized from New York, USA), 2020; DOI: https://doi.org/10.1145/3419614.3423257
- de la Vara, J.L., Parra, E., Ruiz, A., Gallina, B.: ***The AMASS Tool Platform: An Innovative Solution for Assurance and Certification of Cyber-Physical Systems***, 26th International

Working Conference on Requirements Engineering: Foundation for Software Quality (REFSQ 2020), CEUR Workshop Proceedings, vol. 2584, Pisa, Italy, 2020

- de la Vara, J.L., Marin, B., Ayora, C., Giachetti, G.: ***An Empirical Evaluation of the Use of Models to Improve the Understanding of Safety Compliance Needs, Information and Software Technology***, vol. 126, 2020; DOI: https://doi.org/10.1016/j.infsof.2020.106351
- López, B., Álvarez-Rodríguez, J.M., Parra, E., de la Vara, J.L.: ***Ontology Configuration Management for Knowledge-Centric Systems Engineering in Industry***, 50th IEEE/IFIP International Conference on Dependable Systems and Networks (DSN 2020), Valencia, Spain, 2020; DOI: 10.1109/DSN-S50200.2020.00022
- de la Vara, J.L., Ruiz, A., Blondelle, G.: ***Assurance and Certification of Cyber-Physical Systems: The AMASS Open Source Ecosystem***, Journal of Systems and Software. Vol. 171, 2020; DOI: https://doi.org/10.1016/j.jss.2020.110812
- Roda-Sanchez, L., Olivares, T., Garrido-Hidalgo, C., de la Vara, J.L., Fernández-Caballero, A.: ***Human-Robot Interaction in Industry 4.0 based on an Internet of Thing Real-Time Gesture Control System***, Integrated Computer-Aided Engineering, vol. 28, no. 2, pp. 159-175, 2021; DOI: 10.3233/ICA-200637
- M. Belmonte, L., S. García, A., Morales, R., de la Vara, J.L., Fernández-Caballero, A.: ***Feeling of Safety and Comfort Towards a Socially***, Sensors 2021, 21(3), 908; DOI: https://doi.org/10.3390/s21030908
- Nandi, G., Pereira, D., Proença, J., Tovar, E.: ***Work-In-Progress: a DSL for the safe deployment of Runtime Monitors in Cyber-Physical Systems***, 41st IEEE Real-Time Systems Symposium, Huston, Texas, USA, 2020
- Cledou, G., Proença, J., Sputh, B., Verhulst, E.: ***Hubs for VirtuosoNext: Online Verification of Real-Time Coordinators***, Science of Computer Programming, Special Issue on Selected Tool Papers of the 21st International Conference on Coordination Models and Languages, COORDINATION 2019, vol. 203, 2020; DOI: https://doi.org/10.1016/j.scico.2020.102566
- 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
- B. Sangchoolie, K. Pattabiraman and J. Karlsson: ***An Empirical Study of the Impact of Single and Multiple Bit-Flip Errors in Programs***, IEEE Transactions on Dependable and Secure Computing, doi: 10.1109/TDSC.2020.3043023
- Smarra, F. and D'Innocenzo, A.: ***Learning Markov Jump Affine Systems via Regression Trees for MPC***, IFAC World Congress, 2020.
- Masti, D., Smarra, F., D'Innocenzo, A., and Bemporad, A.: ***Learning affine predictors for MPC of nonlinear systems via artificial neural networks***, IFAC World Congress, 2020.
- Kuhn, T., Antonino, P.O., Bachorek, A.: ***A Simulator Coupling Architecture for the Creation of Digital Twins***, ECSA Companion 2020: 326-339, 2020
- Jahic, J., Bauer, T., Kuhn, T., when, N., Antonino, P.O.: ***FERA: A Framework for Critical Assessment of Execution Monitoring Based Approaches for Finding Concurrency Bugs***, SAI (1) 2020: 54-74
- Treichel, T., Antonino, P.O., Santos, F.S., Rosa, L.S.: ***Simulation-as-a-Service: a simulation platform for cyber-physical systems***, ICSA 2021, WASA Workshop, 2021

- Borg, M., Abdessalem, R.B., Nejati, S., Jegeden, F-X. Shin, D.: ***Digital Twins Are Not Monolythic -- Cross-Replicating ADAS Testing in Two Industry-Grade Automotive Simulators***, To appear in the Proc. of the IEEE International Conference on Software Testing, Verification and Validation (ICST) 2021, 12-16 April 2021, Available online: https://arxiv.org/abs/2012.06822
- Borg, M., Bronson, J., Christensson, L., Olsson, F., Lennartsson, O., Sonnsjö, E., Ebabi, H., Karsberg, M.: ***Exploring the Assessment List for Trustworthy AI in the Context of Advanced Driver-Assistance Systems***, Accepted for publication in the Proc. of the 2nd Workshop on Ethics in Software Engineering Research and Practice, Available online: https://arxiv.org/abs/2103.09051
- Borg, M., Jabangwe, R., Åberg, S., Ekblom, A., Hedlund, L., Lidfeldt, A.: ***Test Automation with Grad-CAM Heatm–ps - A Future Standard Pipe Segment in MLOps for Vision AI***, Accepted for publication in the Proc. of the 1st International Workshop on DevOps Testing for Cyber-Physical Systems, Available Online: https://arxiv.org/abs/2103.01837
- Agirre J.A. et al., ***The VALU3S ECSEL Project: Verification and Validation of Automated Systems Safety and Security***, To Appear in Microprocessors and Microsystems.
- Mover, S., Cimatti, A., Griggio, A., Irfan, A., Tonetta, S.: ***Implicit Semi-Algebraic Abstraction for Polynomial Dynamical Systems***, Accepted for publication in Proc. of the 33rd International Conference on Computer-Aided Verification (CAV-21).
- Markwirth, T., Jancke, R., Sohrmann, C.: ***Dynamic Fault Injection Into Digital Twins of Safety-Critical Systems***, Design, Automation and Test in Europe Conference, DATE 2021, Virtual Conference and Exhibition, 1-5 February 2021. Available Online: http://publica.fraunhofer.de/documents/N-633371.html

Besides the aforementioned references, several partners of the project have publications already submitted and under evaluation and are now pending on the result of the final acceptance decisions, including publications resulting from collaborative work of partners in some of the project's tasks. This collaborative work can already be witnessed by the conference paper and its extension to a journal paper, both entitled, "***The VALU3S ECSEL Project: Verification and Validation of Automated Systems Safety and Security***", that is the results of such type of collaboration between 13 partners.

2.4.5 Publications Web Page and Social Networks Announcements

In order to make the publications resulting from VALU3S activities available, a new page has been added to the VALU3S website that presents the list of publications that were accepted in the respective forums during the first year of the project. The link for VALU3S publication webpage is https://valu3s.eu/publications/, and all publications listed in that page satisfy the open access requirements imposed by the legal documents of the project and include both Green Access[2] and Gold

[2] *Green open access:* this type of open access is also known as self-archiving, meaning that authors deposit a preprint, a potentially revised author version or, where possible, a final peer-reviewed publisher's version of their publication at an institutional or subject repository that allows public access.

Access[3] publications. In VALU3S, at least green open access is required. A screenshot of the publications page of the project is presented in Figure 2.12.

VALU3S has also engaged in the initiative of announcing their publications in their social networks in order to increase their outreach to the public audiences, notably in LinkedIn [16] and Twitter [17]. In Figure 2.13 and in Figure 2.14 we present an example of the typical format of such announcements for the corresponding social networks. This will be a continuous process during the project's lifetime, that works as follows:

1. When a new publication is accepted and communicated, the corresponding manuscript is inserted/updated in the internal publication management system.
2. Then a new entry in the Publications webpage that provides the bibliography information and provides a link to a pre-print to provide green open access or provides a link to the publisher in the case of gold open access.
3. Finally, a new post is released in both LinkedIn and Twitter accounts of the project.

[3] *Gold open access:* this type of open access is where an author publishes their article in an online open access journal and assumes the associated costs. It has the key advantage of making publications freely accessible right from the moment they are first published, which means they can be used immediately.

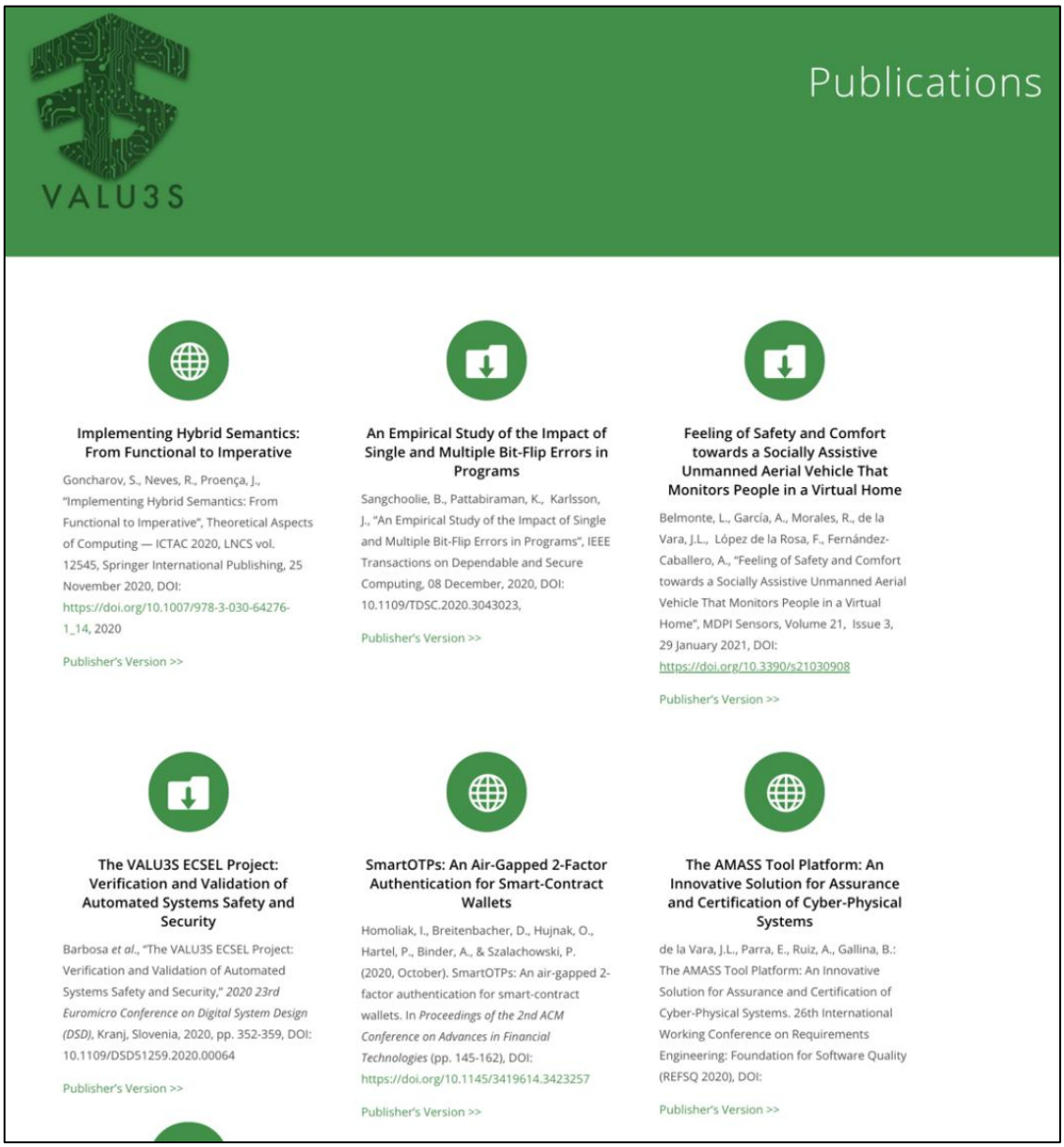


Figure 2.12: Screenshot of VALU3S publications webpage (part of VALU3S official website).

Figure 2.13: Example of a LinkedIn post about a new publication of VALU3S.

Figure 2.14: Example of a Twitter post about a new publication of VALU3S.

Chapter 3 Training

In this chapter we describe the training activities that have been conducted during the first year of the project. These include the preparation and distribution of two surveys to the partners of the consortium to gather information about the types of training they would expect from the project, as well as the report on the first training session of the project which was organized with the aim of creating an increased awareness of these methods and tools to all partners of the consortium. Finally, an activity that is focused on motivating partners to produce videos about their own V&V methods so that these videos are made available to the consortium (and also externally, via the project's YouTube channel) is also reported.

The goal of what is reported in this chapter is to increase the consortium awareness about the V&V methods that will be targeted by the project (via training sessions and the videos), and consequently to open new opportunities for collaboration and cross fertilization of technologies in R&D activities that may have not been foreseen while defining the technical activities of the project.

3.1 Training Planning

To have a clear understanding of the expectations of the consortium regarding training activities, two surveys have been prepared and distributed to the consortium. The first survey focused on the high-level types of training that are expected based on the various technical dimensions to be addressed in the project (e.g., methods & tools training, use case training, standards training, etc.). The second survey was more specialized, focusing particularly on specific topics that have been shown to have prevalence over others considering the results of the first survey.

3.1.1 First Survey

The first survey was structured in several sections, with each of the section focusing on the various dimensions of the project that could clearly benefit from training. In what follows, we summarize the goal of each of the sections and we finalize this section with the perceived outcomes.

Training Offerings

The first section of the survey was concerned with training offerings that VALU3S partners already have in the services they provide. The training offerings consider both those that can lead to a formal graduation degree, and those that, for instance, are technical courses or product directed training. Since VALU3S will produce both scientific and industry-oriented outcomes, it is fundamental to identify all means available in the project that enable further outreach of the project's results to the external stakeholders, during and after the project finishes.

This section consisted of three questions that are presented in Table 3.1. The first question asks if the partner has already training offers in place. In the case of a positive answer, then the partner is asked to indicate if they plan to introduce VALU3S results in those offerings, and when they consider doing that.

Table 3.1: Training survey: section on training offerings.

Question Number	Question Text
Q1	Does your institution offer any type of training offers?
Q2	Would you consider, or plan, to introduce results from VALU3S in any of the course offerings from your institution?
Q3	When are you considering including VALU3S results in your institution's training offerings?

Use Case Training

The second section of the survey was focused on the importance of use case training. Use case training sessions may be an important asset for a successful project's progress that is strongly driven by use cases. They can serve as small forums for sharing hands-on experience with methods and tools involved, for providing increased awareness to those participating in use cases (and other interested partners) about the technical objectives and expected impacts in the state-of-the-art, and also to foster cross domain fertilization of ideas and collaborations between different use cases.

This section consisted of four questions, presented in Table 3.2. The first question asked if a use case training session is relevant to the partner answering the survey. If the answer is positive, then the partner is questioned about the timing for such session, to whom the session should be open to and, finally, if he was willing to organize such a session.

Table 3.2: Training survey: section on use case training.

Question Number	Question Text
Q1	Do you think that training sessions should be organized for the use-cases where your organization is involved?
Q2	When do you think it is the best time to organize such use case training session(s)?
Q3	To whom this training sessions should open to?
Q4	Would you consider organizing such training session(s)?

Industry-Targeted Training

This section concerns with the organization of training sessions directed to industrial stakeholders. This is among the most important aspects of training, since it can serve as an enabler for the future adoption of VALU3S outcomes by external industrial stakeholders when these are exposed to more detailed clarifications about the advantages of the methods, tools, and their applicability, e.g., in the demonstrators for the use cases addressed in the project. Hence, this section consisted of three questions, presented in Table 3.3. The first asked if the partner was available for performing any training activity directed to industrial stakeholders. If answered positively, the partner was asked also about the preferred format for those sessions – directed towards a well identified set of companies, as part of an

externally organized (e.g., special session in a conference/workshop), as a project workshop open to the external audiences, or as a workshop just for the project participants. Finally, the partner was asked about the most suited timing to perform such training activities.

Table 3.3: Training survey: section on industrial training.

Question Number	Question Text
Q1	Does your institution plan to perform training activities directed towards industrial stakeholders?
Q2	What would be the format of such training activities?
Q3	When do you think it is the better time to organize training targeting industry stakeholders?

Project-Wide Workshops

Project-Wide Workshops refer to training activities that consist (on possibly a combination of) methods, tools, use cases and demonstrators, hackathons, etc., based on background bought into the project or results produced within the project. These training activities naturally target the complete consortium and might be very helpful for partners to become more aware of the totality of progress being done in the project and find new ways of collaborating with other partners.

This section consisted of five questions, presented in Table 3.4. The first questions ask for the availability of partners to organize such workshops. If answered positively, the partner is asked how many workshops they plan to organize, when to do it, and if the planned workshops are to be organized co-located with other external events or forums. In the case of answering positively to the latter, the partner is asked to indicate potential venues.

Table 3.4: Training survey: section on project wide workshops.

Question Number	Question Text
Q1	Do you plan to host or organize any VALU3S technical workshop?
Q2	How many?
Q3	When do you plan to do it?
Q5	Is your plan to organize such workshops co-located with other events?
Q6	Please identify possible targets.

Methods, Techniques, and Tools

The last section of the survey was concerned with internal training about methods and tools brought by partners as their background into the project. The goal was to gather a global view from the general interest of project members about learning and getting hands-on experience with such methods and tools. This section also serves as a complement to the previous ones, as the results can be used for the organization of VALU3S workshops focused on the aspects that are deemed as more relevant for the partners. Hence, this section was composed of six questions, presented in Table 3.5. The first and third questions asked the partner if they were interested in having tutorials organized focused on the methods and tools of the project. If answered positively, the partner was asked to select from the methods list (respectively, tools list) which ones were more relevant for him (multiple choices allowed). The last two

questions asked about the availability of the answering partner of organizing such tutorials and, if so, if they were willing to allow the recording of such tutorial so that it could be made available for outside audiences.

Table 3.5: Training survey: section on methods, techniques, and tools.

Question Number	Question Text
Q1	From the list of METHODS & TECHNIQUES to be explored in the project, would you like to have a tutorial explaining or providing hands-on experience with any of them?
Q2	Select for which METHODS & TECHNIQUES you would like to have a tutorial or a hands-on session.
Q3	From the list of TOOLS to be explored in the project, would you like to have a tutorial explaining or providing hands-on experience with any of them?
Q4	Select for which tools you would like to have a tutorial or a hands-on session.
Q5	Would you be willing to organize an internal training session for any of your methods, techniques, or tools, if a sufficient number of consortium members finds it relevant?
Q6	Would you allow any of these internal training sessions to be recorded and made publicly available by VALU3S dissemination channels?

Perceived Outcomes

From the results available, we highlight some aspects that are relevant to partners in terms of potential training actions, which we consider relevant to build the baseline for the training plan. One first aspect is the fact that partners that have training offers plan to introduce the results of the project in those offers, starting from year 3 of the project but mostly after the project terminates. Secondly, partners showed great interest in participating in training sessions that focuses on the methods, techniques, and tools adopted by VALU3S, which ended up being decided as the main target of the training session organized during the first year of the project. Training oriented towards use cases is also something that the consortium appreciates and believes that domain-oriented use case training sessions can be the best structure to pursue. Finally, many partners have shown interest in contributing for industrial training with the preferred target audience being selected groups of companies, but with the training session providing also the possibility of interested consortium members to participate.

3.1.2 Second Survey

The survey described in the previous section provided high-level information about what partners expect from training sessions organized by VALU3S. The next step was then to gather more specific information about V&V methods and tools that the consortium partners were more interested in, so that training session organizers could use that information along the project to fine-tune the contents to be presented. To get that information in the most precise manner, a second survey was prepared and distributed to partners. It focused on the various V&V methods and tools that were brought into the project and that can be conveyed to partners in training sessions.

The first questions that were considered, and for which inputs from the consortium was required, were focused on the period when the first training session should occur, and what should be the format of those sessions. The concrete questions are presented in Table 3.6 and Table 3.7.

Table 3.6: Question about the preferred schedule format of training sessions.

Question Number	Question Text
Question	What is your preferred schedule format for the training session?
Alternatives Provided	• One full day event • Two half-day events • One and half-day event

Table 3.7: Question about the preferred period in time for Y1 training session.

Question Number	Question Text
Question	When would you prefer to have the training session for the first year of VALU3S?
Possible Answers	• Second half of February 2021 • First half of March 2021 • Second half of March 2021 • First half of April 2021 • Second half of April 2021

Regarding the format, 60% of the partners showed preference for two half-day events whereas 33% would opt by one full day event and 7% a half-day event. In what concerns the period in the timeline of the project's first year to hold the training, the partners shown preference for the second half of March 2021 (23%) and during April (21% on the first half and 36% on the second half of the month). These answers were crucial for deciding the format and the point-in-time to have the first training session and also to have it split in two parts (thus satisfying the half-day session criteria inferred from the survey): a first part was scheduled to take place on the 25th of March, whereas the second part was scheduled to the 22nd of April. Both were successfully realized.

Before entering into details regarding the V&V methods and tools, the survey questioned the partners about their interest in having use-case dedicated sessions (which has already been shown as a point of interest for the consortium in the first survey distributed to the partners). The question posed to the participants is the one presented in Table 3.8.

Table 3.8: Question about the interest in dedicated use case training.

Question Number	Question Text
Question	Would you be interested in attending dedicated modules for use-cases training?
Possible Answers	• Yes • No

The reaction of the consortium to this question was in the direction that is more useful to the project, with 79% showing high interest in having use case training. However, as the project's first year is still heavily focused on the specification and detail of use cases, training sections focused on use cases seem to be better adequate to the 2nd and 3rd years of the project.

Still in the scope of use case training, project partners were also asked to provide their preferences regarding what particular use cases were more relevant for them. The main conclusion was that the use cases that were most selected by the partners do offer a great coverage of the several application domains addressed by the project, which is also one of the main objectives of having use case training, where methods, techniques, and tools considered for a particular use case of a given application domain may be very relevant to other use cases addressing that same domain.

The remaining of the questions posed in the survey were concerned with understanding what are the methods and tools that are more relevant for the consortium. For that, the questions focused on V&V methods and tools followed the categorization defined in D3.1 and, for each V&V method category that was identified in that deliverable, partners were asked about what of the specific V&V methods on each category more relevant, and also what specific tool(s) were associated with those specific methods were more relevant. For each question, the partners were able to select all the methods and tools that were more interesting to them within each category.

In Appendix B, the detailed results of the answers of the partners about each of the categories of V&V methods is provided. As an example of how these questions were structured, we present in Table 3.9, Table 3.10, and Table 3.11 the sequence of questions that focused on the V&V method categorized as Attack Injection.

Table 3.9: Question about the relevance of Attack Injection category in training.

Question Number	Question Text
Question	Are you interested in attending dedicated training sessions about Attack Injection
Possible Answers	• Yes • No

Table 3.10: Question about which V&V methods associated with Attack Injection are more relevant.

Question Number	Question Text
Question	The list below includes the methods on Attack Injection. Select the ones you would be more interested in attending a dedicated training session.
Possible Answers	• [AInj1] Model-Implemented Attack Injection • [AInj2] Simulation-Based Attack Injection at System-level • [AInj3] Vulnerability and Attack Injection

Table 3.11: Question about which tools associated with Attack Injection are more relevant.

Question Number	Question Text
Question	The following is a list of tools associated with Attack Injection. Select the ones you would be more interested in attending a dedicated training session.
Possible Answers	• [AInj1] MODIFI (https://www.ri.se/en/what-we-do/expertises/fault-injection-and-attack-injection) • [AInj2] SUMO (https://www.eclipse.org/sumo/) • [AInj2] CARLA (https://carla.org/) • [AInj3] VAIT Infection

Besides use case training and V&V methods and tools training, two other aspects were addressed in the survey: the relevance of training focused on standards, and also training focused on patents preparation. Both these aspects are crucial to the project, since the project proposes to follow and influence standards that focus on V&V of automated systems and also because it is expected that exploitation of results of the project is considerable, hence the relevance of standards and patent preparation training for the project.

Regarding standards, the questions showed in were present in the survey. The results of the survey indicate that 50% of the partners are interested in dedicated standards training, whereas the other half is not. From that half of the partners that have interest, the focus is mostly on ISO 26262 with 43% of the votes, followed by SOTIF with 36%, and by IEC 61508 with 29% of the votes. In Table 3.12 the question posed about the interest in having training specialized on training is provided and in Table 3.12 we show an excerpt of the 68 identified standards and associated V&V methods.

Table 3.12: Question about the interest on standards training.

Question Number	Question Text
Question	Would you be interested in attending dedicated training for standards?
Possible Answers	• Yes • No

Table 3.13: Example of association of standard with V&V methods.

Question Number	Question Text
Question	Which standards would be more relevant for you?

Question Number	Question Text
Possible Answers	We don't list all the options here, but essentially one option per standard identified in D3.1 as being associated with a particular V&V method. The list was consolidated with respect to the list of standards already identified as relevant to the project in D6.5. An example of an option is given below; It focuses on IEC 61508 and the reader can see that it has associated V&V methods (in this case Attack Injection focused on Simulation-Based Attack Injection at System-level which is identified as [AInj2], and other fault injection methods, identified [FInj1 – Finj6]). • *IEC 61508 [AIng2, FInj1, FInj2, FInj3, FInj4, FInj5, FInj6]*

Regarding training on preparation of patents, a single question was posed to the partners asking if they were interested in having training dedicated to the process of patent preparation. The conclusion was that patent training was not very relevant, with only 39% of the partners showing interest in such dedicated training.

Perceived Outcomes

The main focus of this survey was on identifying which V&V methods (and associated tools) are more interesting for the consortium during the first year of the project. The results obtained indicate that, from the V&V methods categories presented in D3.1 – *"V&V methods for SCP evaluation of automated systems"* [2], Injection-based methods (both attack and fault-injection approaches), Simulation-based methods, and Testing-based methods are the ones that are more relevant, whereas those V&V methods that are more related to formal methods deserve less interest from the partners. The concrete details about the results obtained can be consulted in Appendix B.

Other aspects such as standards training and patent preparation training were also a target of the survey and the results indicate that half of the consortium has interest in standards training, but less than half has interest in patent preparation training. Given the importance of these two topics for the objectives of the project, but also considering that the preferences regard V&V methods (and associated tools) may vary along the project as a result of the partners technical work, the consortium will be consulted in the future once again via similar survey to get an updated overview of the preferences of the project.

3.2 First Internal Training Session

A considerable effort was spent in making sure that training activities would start during the first year of the project. The motivation for this effort during this first year is for partners to increase their awareness about what other partners bring into the project and support them in finding valuable collaboration opportunities within the project. The training sessions were recorded and first be made available in the internal MS Teams infrastructure so that they are always available for partners to watch, thus allowing those partners of the project who were not available to participate to still have the chance to access the contents. After a careful review of the contents, the various training modules, each with a duration of approximately 35 minutes (including time for discussions) were made available also in the project's YouTube channel [18], thus serving the purpose of external dissemination and training to further increase the outreach of the project to its external stakeholders and audiences.

The first part of the First VALU3S Training Session took place online on the 25th of March 2021 using MS Teams as the hosting platform. In this first part, five training modules were presented that covered five different V&V methods that are part of the baseline of the project, and previously introduced in D3.1 [2]. The agenda for this first part was the following:

- ***Welcome & Introduction to the Video Training initiative***, David Pereira, ISEP
- ***Wireless Interface Network Security Assessment***, Fabio Patrone, UNIGE
  YouTube link: https://www.youtube.com/watch?v=0Gq2DzeicJo&t=1s
- ***Runtime Verification Based on Formal Specifications***, Giann Nandi, ISEP
  YouTube link: https://www.youtube.com/watch?v=cMripFJ-bB4
- ***Risk Analysis for Secure Automated Systems,*** Davide Ottonello, STAM
  YouTube link: https://www.youtube.com/watch?v=NVIrKQ4IxF4
- ***Introduction to Model Checking,*** José Proença, ISEP
  YouTube link: https://www.youtube.com/watch?v=tU_aOytuqLg
- ***Simulation-based fault and attack injection at system level***, Mateen Malik, RISE
  YouTube link: https://www.youtube.com/watch?v=OH6HeHP5j0U
- ***Closing***, David Pereira, ISEP

The second part of the First VALU3S Training session took place online on the 22nd of April 2021. In this second part, also five training modules were presented, covering six different V&V methods (and tools) that are part of the baseline of the project, and previously introduced in D3.1 [2]. The agenda for this first part was the following:

- ***Welcome***, David Pereira, ISEP
- ***Virtual Architecture Development and Simulated Evaluation of Software Components with FERAL,*** Thomas Bauer, FRAUNHOFER
  YouTube Link: https://www.youtube.com/watch?v=YMHFFRsnI3s
- ***Simulating Traffic Scenarios Using CARLA***, Hamid Ebadi, INFOTIV
  YouTube Link: https://www.youtube.com/watch?v=erbDz5Djk_c
- ***Model-Implemented Fault and Attack Injection***, Peter Folkesson, RISE
  YouTube Link: https://www.youtube.com/watch?v=HfTzYSVclXM
- ***Model-Based Assurance and Certification***, Jose Luis la Vara, UCLM
  YouTube Link: https://www.youtube.com/watch?v=Y90FbYz4NaM
- ***Model-Based Failure Logic Analysis***, Silvia Mazzini, INTECS
  YouTube Link: https://www.youtube.com/watch?v=RYOVpTL6dso
- ***An Introduction to Formal Specification and Verification***, Marie Farrel, NUIM
  YouTube Link: https://www.youtube.com/watch?v=FQGKbYCbxPY
- ***Closing***, David Pereira, ISEP

The presentations given in these two parts of the training sessions addressed the following categories of V&V methods, as established in D3.1 [2]:

- **Injection-based V&V** (3 presentations):
  - *Wireless Interface Network Security Assessment*

    - *Simulation-based fault and attack injection at system level*
    - *Model-Implemented Fault and Attack Injection*
- **Simulation** (2 presentations):
    - *Virtual Architecture Development and Simulated Evaluation of Software Components with FERAL*
    - *Simulating Traffic Scenarios Using CARLA*
- **Runtime Verification** (1 presentation):
    - *Runtime Verification Based on Formal Specifications*
- **Formal Verification** (3 presentations):
    - *Introduction to Model Checking*
    - *Model-Based Assurance and Certification*
    - *Formalising Verifiable Requirements*
- **Semi-Formal Analysis** (2 presentations):
    - *Risk Analysis for Secure Automated Systems*
    - *Model-Based Failure Logic Analysis*

Considering the above distribution of presentations per V&V method category, we can conclude that only Testing-based methods and System-Type-Focused V&V were not covered in the first training session. According to the results of the second survey that collected the preferences of the consortium members (see Section 3.1.2 and, for more details, Appendix B) with respect to training on V&V methods, Testing-based was the second category of methods with the highest interest (67% of the participants showed interest) whereas System-Type-Focused V&V was ranked fifth in the participants preferences (with 43% of preference).

We can also conclude that from the set of all presentations, 5 presentations were in the scope of two of the three most voted V&V methods categories (Injection-based V&V and Simulation) whereas 6 presentations were in the scope of V&V methods categories that had the lowest preferences of the members of the consortium (Formal Verification, particularly General Formal Verification, and Semi-Formal Analysis, and Runtime Verification).

Although the set of presentations does not completely follow along the results obtained in the already referred survey, that cannot be considered as a disadvantage: at the current stage of the project, what is considered more important is that partners are made aware of the various V&V methods (and tools) available in the project. This was also a good opportunity for partners to get more insight about the potential of these methods, their purposes, and possibly identify opportunities to combine their own plans of work in the project with methods that they were not yet considering. Nevertheless, for the preparation of future training sessions, the organizers will make efforts to ensure that V&V methods under the categories of Testing-based and System-Type-Focused V&V methods are targeted for presentation. Alternatively, and following the ideas presented in Section 3.3 about partners producing videos to complement the contents presented in training sessions, the organizers will identify partners working on these categories and motivate them to produce videos focusing on V&V methods within those categories.

3.2.1 Perceived Outcomes of the First Training Session

During this part of VALU3S First Training Session, in average 80 members of the project have been present during the complete event (having reached 85+ attendees at some points). In the case of the second part, the attendance was in average of 45 members (mostly due to the date of the presentation being in a very busy period of the project with many of the partners involved in contributing to the finalisation of the deliverables and also in the process of reviewing those deliverables).

In both of the parts of the VALU3S 1st Training Session, the interest of several partners in the contents presented was a high point. This interest was not solely based on aiming at understanding in more detail the contents presented, but also in understanding the possibility of applying some of the methods in use cases and also in combining them with other methods being addressed in the project. Further insight about the impact of this training session in the work being conducted by partners is expected to be obtained via the results of a survey that has been prepared and distributed among the partners after the second part of the training session took place. However, the results of that survey will not be available in time for the submission of this deliverable. Instead, they will be conveyed in the next General Assembly of the project and also during the first-year review session of the project.

At the time when this deliverable was written (roughly 1,5 months after they have been made available), there was a total of 173 visualisations. This is a clear contribution from VALU3S not only in what concerns offering training to external audiences about relevant V&V methods, but also a means to increase the dissemination of knowledge present in the consortium. We believe that training following along the lines of this first training session shall continue to increase its impact and will help increasing the external awareness of the importance of the project to its stakeholders.

3.3 Complementary Training Videos

Although training session are able to cover relevant parts of various technical activities being addressed by the project, they have limited reach in what considers, for instance, the total number of V&V methods that are considered in the project. In order to increase the training effort of the project, it was decided to start an activity that focuses on producing more videos about V&V methods and tools, even if those methods and tools will not be presented in the scope of a future training session of the project.

To support this activity, the WP6 leader introduced the idea in the last consortium meeting and made a formal presentation of it in the first part of the 1st VALU3S Training session. In this formal presentation of the initiative, partners were informed about content should be addressed on these videos, what is the expected duration, and how these training videos will be made available first in the internal MS Teams environment of the project and, afterwards, in the project's website (with corresponding announcements made in the other two social media considered in the project, LinkedIn and Twitter).

In order to facilitate the production of such videos, a set of guidelines have been provided to the partners via specialized documentations that is available in VALU3S MS Team infrastructure. That documentation includes not only a set of guidelines on how to use software to record and edit the videos, but also guidelines about the content (inspired on the presentations that have already given in

the VALU3S 1st training session). We summarise these guidelines in the list of topics that should be addressed when preparing a video about a V&V method:

- **High-level introduction to the V&V method under consideration:** the content of the video with respect to the details of the V&V method under consideration shall be kept at a high level. The objective is thus to convey to the consortium the main characteristics and to capture the attention of interested partners who should afterwards contact the author directly to get to know more about the method and tools.
- **Strengths and weaknesses:** at least a couple of slides shall be dedicated to conveying the main strengths and identified weaknesses of the method being presented. It might be a good idea to show a link to where the method is described in deliverable D3.1 and also to the identified gaps in D3.3 [2].
- **Possible combinations/marriage with other V&V methods:** as one of the main objectives of the project, the author should give some hints about her/his view about how the method can be combined with other methods considered in the project. Highlighting the improvements to the method, if applicable, are also welcome.
- **Associated tools:** at least a brief overview of what tools relate to the presented method should be provided (without forgetting the links to where the tools can be obtained, if that is applicable). If the author considers relevant, a very short demo of a selected tools should also be included (or delegated to a follow-up video if that is of interest to the author).
- **Perceived potential of exploitation (ideas, examples, experiences):** if applicable, it is always a good idea to show examples of applications of the presented method in terms of its potential for future exploitation, including industrial application or even potential for productization.
- **Examples/other projects where the V&V method and tools were used:** if possible, include a very short reference to other projects where the V&V method has already been explored.

Each video, similarly, to the presentations that already occurred during the two parts of the VALU3S 1st Training Session, should have a duration of about 20 to 25 minutes. Furthermore, the videos must use the PowerPoint templates that were prepared for presentations within the scope of the project and the author of the video should mark it as being public since the produced videos will be made available online in VALU3S YouTube channel [18] and also announced in the project's other two social media channels, notably LinkedIn [16] and Twitter [17].

Chapter 4 Key Performance Indicators

In this chapter, we report on the dissemination and training KPIs established for the project. An original set of KPIs was introduced during the DoA [6] preparation (as it was missing in the project's approved proposal), but that set included some KPIs that focused on communication activities. Also, explicit training KPIs were missing. The original set of KPIs is presented in Table 4.1.

Table 4.1: List of dissemination KPIs defined during DoA preparation.

KPI	Description	Value
Diss-KPI-1	Average number of journal papers, newspaper/magazine articles per year	≥ 5
Diss-KPI-2	Average number of conference and workshop papers per year	≥ 20
Diss-KPI-3	Total number of VALU3S workshops organized per year	≥ 2
Diss-KPI-4	Participation in fairs and exhibitions per year	≥ 3
Diss-KPI-5	Number of speeches in public events per year	≥ 3
Diss-KPI-6	Number of accesses to the VALU3S website per year	≥ 2000
Diss-KPI-7	Number of new followers in social media channels per year	≥ 500
Diss-KPI-8	Number of VALU3S results made available as Open Source projects (e.g. tools, tutorials, training materials)	≥ 5
Diss-KPI-9	Number of industrial publications	≥ 5
Diss-KPI-10	Average Number of new recipients of press-releases per year	≥ 100

In order to be more precise on what the KPIs would measure concerning dissemination and training activities, the KPIs focusing on communication have been dropped (and adopted in the communication KPIs addressed by Task 6.4) and a new estimation of the objectives for each of the remaining KPIs was updated taking into account the results of a specific survey that was distributed to the consortium with the purpose of obtaining the partners expectations about the values that should be associated with each of the KPIs. In that survey, partners were also asked to suggest new KPIs, which resulted on adding new KPIs that target the organization of summer schools, and therefore focused on training. The final list of KPIs (up to this moment of the project) is presented in Table 4.2.

Table 4.2: List of current KPIs and associated interval of values.

KPI	Description	Original Value	Updated Value
Diss-KPI-1	Average number of journal papers, newspaper/magazine articles per year	≥ 5	≥ 10
Diss-KPI-2	Average number of conference and workshop papers per year	≥ 20	≥ 25

KPI	Description	Original Value	Updated Value
Diss-KPI-3	Total number of VALU3S workshops organized per year	≥2	≥2
Diss-KPI-4	Participation in fairs and exhibitions per year	≥ 3	≥ 10
Diss-KPI-5	Number of speeches in public events per year	≥ 3	≥ 10
Diss-KPI-6	Number of VALU3S results made available as Open Source projects (e.g. tools, tutorials, training materials)	≥ 5	≥ 15
Diss-KPI-7	Number of industrial publications	≥ 5	≥ 10
Diss-KPI-8	Number of summer schools organized	N/A	≥ 1

As can be seen in Table 4.2, each KPI has an interval of values instead of a single value (except for the new Diss-KPI-8) as target. This interval's lower bound corresponds to the values initially proposed during the DoA preparation, and the upper bound the values inferred from the inputs of the partners based on their answers to the survey.

In the remaining of this chapter, we describe how each of the KPIs has been evaluated with respect to the established upper- and lower-bound target values and how successful the project was on achieving them. When applicable, a KPI evaluation report also point to possible actions to consider in order to update that KPI for better matching with the characteristics of the activities of the project.

4.1 Diss-KPI-1: Average Number of Journal Papers, Newspaper/Magazine Articles per Year

The target lower- and upper-bounds established for this KPI were 5 and 10, respectively. During the reporting period, the project managed to reach the number of 7 journal publications. The publications considered for evaluating Diss-KPI-1 were the following:

- de la Vara, J.L., Marin, B., Ayora, C., Giachetti, G.: ***An Empirical Evaluation of the Use of Models to Improve the Understanding of Safety Compliance Needs***, Information and Software Technology, vol. 126, 2020; DOI: https://doi.org/10.1016/j.infsof.2020.106351
- de la Vara, J.L., Ruiz, A., Blondelle, G.: ***Assurance and Certification of Cyber-Physical Systems: The AMASS Open Source Ecosystem***, Journal of Systems and Software. Vol. 171, 2020; DOI: https://doi.org/10.1016/j.jss.2020.110812
- Roda-Sanchez, L., Olivares, T., Garrido-Hidalgo, C., de la Vara, J.L., Fernández-Caballero, A.: ***Human-Robot Interaction in Industry 4.0 based on an Internet of Thing Real-Time Gesture Control System***, Integrated Computer-Aided Engineering, vol. 28, no. 2, pp. 159-175, 2021; DOI: 10.3233/ICA-200637
- M. Belmonte, L., S. García, A., Morales, R., de la Vara, J.L., Fernández-Caballero, A.: ***Feeling of Safety and Comfort Towards a Socially***, Sensors 2021, 21(3), 908; DOI: https://doi.org/10.3390/s21030908

- Cledou, G., Proença, J., Sputh, B., Verhulst, E.: ***Hubs for VirtuosoNext: Online Verification of Real-Time Coordinators***, Science of Computer Programming, Special Issue on Selected Tool Papers of the 21st International Conference on Coordination Models and Languages, COORDINATION 2019, vol. 203, 2020; DOI: https://doi.org/10.1016/j.scico.2020.102566
- B. Sangchoolie, K. Pattabiraman and J. Karlsson: ***An Empirical Study of the Impact of Single and Multiple Bit-Flip Errors in Programs***, IEEE Transactions on Dependable and Secure Computing, doi: 10.1109/TDSC.2020.3043023
- 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.

The number of accepted publications is higher than the target lower-bound established for this Diss-KPI-1 and so we consider that is has been successfully achieved. The value achieved remains below the upper-bound of at least 10 publications, but typically this type of publications requires longer preparation times and have long evaluation processes. Hence an increase is this type of publications, per year, is expected in the remaining of the project and also after the project finishes.

The reported journal publication includes results from individual activities of partners within the scope of their participation in VALU3S, but also includes the first project-wide journal publication, "*The VALU3S ECSEL Project: Verification and Validation of Automated Systems Safety and Security*", involving 17 authors from 13 partners of the VALU3S consortium, showing an excellent example of collaboration within the project.

4.2 Diss-KPI-2: Average Number of Conference and Workshop Papers per Year

The target lower- and upper-bounds established for this KPI were 20 and 25, respectively. During the reporting period, the project managed to reach the number of 17 conference and workshop publications.

During the first year, the number of conference and workshop publications was 17. The publications considered for measuring this KPI are the following:

- Barbosa, R., Basagiannis, S., Giantamidis, G., Becker, H., Ferrari, E., Jahic, J., Kanak, A., Labayen Esnaola, M., Orani, V., Pereira, D., Pomante, L., Schlick, R., Smrcka, A., A. Yazici, P. Folkesson, B. Sangchoolie: ***The VALU3S ECSEL Project: Verification and Validation of Automated Systems Safety and Security***, 23rd Euromicro Conference on Digital System Design (DSD), 26-28 Aug. 2020, Kranj, Slovenia; DOI: 10.1109/DSD51259.2020.00064
- Homoliak, I., Breitenbacher, D., Hujnak, O., Hartel, P., Binder, A., Szalachowski, P.: *SmartOTPs: **An Air-Gapped 2-Factor Authentication for Smart-Contract Wallets***, 2nd ACM Conference on Advances in Financial Technologies (AFT '20), online (organized from New York, USA), 2020; DOI: https://doi.org/10.1145/3419614.3423257
- de la Vara, J.L., Parra, E., Ruiz, A., Gallina, B.: ***The AMASS Tool Platform: An Innovative Solution for Assurance and Certification of Cyber-Physical Systems***, 26th International

Working Conference on Requirements Engineering: Foundation for Software Quality (REFSQ 2020), CEUR Workshop Proceedings, vol. 2584, Pisa, Italy, 2020

- López, B., Álvarez-Rodríguez, J.M., Parra, E., de la Vara, J.L.: ***Ontology Configuration Management for Knowledge-Centric Systems Engineering in Industry***, 50th IEEE/IFIP International Conference on Dependable Systems and Networks (DSN 2020), Valencia, Spain, 2020; DOI: 10.1109/DSN-S50200.2020.00022
- Nandi, G., Pereira, D., Proença, J., Tovar, E.: ***Work-In-Progress: a DSL for the safe deployment of Runtime Monitors in Cyber-Physical Systems***, 41st IEEE Real-Time Systems Symposium, Huston, Texas, USA, 2020
- 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
- Smarra, F. and D'Innocenzo, A.: ***Learning Markov Jump Affine Systems via Regression Trees for MPC***, IFAC World Congress, 2020
- Masti, D., Smarra, F., D'Innocenzo, A., and Bemporad, A.: ***Learning affine predictors for MPC of nonlinear systems via artificial neural networks***, IFAC World Congress, 2020
- Kuhn, T., Antonino, P.O., Bachorek, A.: ***A Simulator Coupling Architecture for the Creation of Digital Twins***, ECSA Companion 2020: 326-339, 2020
- Jahic, J., Bauer, T., Kuhn, T., Wehn, N., Antonino, P.O.: ***FERAL: A Framework for Critical Assessment of Execution Monitoring Based Approaches for Finding Concurrency Bugs***, SAI (1) 2020: 54-74
- De Angeli, S., Pasino, A., Clematis, A., Ottonello, D., Battista, U.: ***A review of single and multi hazard risk assessment approaches for critical infrastructures protection***, 2nd Scientific International Conference on CBRNe SICC Series, 10-12 December 2020.
- Treichel, T., Antonino, P.O., Santos, F.S., Rosa, L.S.: ***Simulation-as-a-Service: a simulation platform for cyber-physical systems***, ICSA 2021, WASA Workshop, 2021
- Borg, M., Abdessalem, R.B., Nejati, S., Jegeden, F-X. Shin, D.: ***Digital Twins Are Not Monozygotic -- Cross-Replicating ADAS Testing in Two Industry-Grade Automotive Simulators***, To appear in the Proc. of the IEEE International Conference on Software Testing, Verification and Validation (ICST) 2021, 12-16 April 2021, Available online: https://arxiv.org/abs/2012.06822
- Borg, M., Bronson, J., Christensson, L., Olsson, F., Lennartsson, O., Sonnsjö, E., Ebabi, H., Karsberg, M.: ***Exploring the Assessment List for Trustworthy AI in the Context of Advanced Driver-Assistance Systems***, Accepted for publication in the Proc. of the 2nd Workshop on Ethics in Software Engineering Research and Practice, Available online: https://arxiv.org/abs/2103.09051
- Borg, M., Jabangwe, R., Åberg, S., Ekblom, A., Hedlund, L., Lidfeldt, A.: ***Test Automation with Grad-CAM Heatmaps - A Future Standard Pipe Segment in MLOps for Vision AI***, Accepted for publication in the Proc. of the 1st International Workshop on DevOps Testing for Cyber-Physical Systems, Available Online: https://arxiv.org/abs/2103.01837
- Mover, S., Cimatti, A., Griggio, A., Irfan, A., Tonetta, S.: ***Implicit Semi-Algebraic Abstraction for Polynomial Dynamical Systems***, Accepted for publication in Proc. of the 33rd International Conference on Computer-Aided Verification (CAV-21).

- Markwirth, T., Jancke, R., Sohrmann, C.: ***Dynamic Fault Injection Into Digital Twins of Safety-Critical Systems***, Design, Automation and Test in Europe Conference, DATE 2021, Virtual Conference and Exhibition, 1-5 February 2021. Available Online: http://publica.fraunhofer.de/documents/N-633371.html

Besides the publications reported above, there are other publications already submitted for evaluation and also other publications are being prepared in the context of collaborative work being performed in various task of the project.

The total of 17 publications is not enough to match the target lower-bound established for this KPI during the reporting period. However, we consider the achieved number of publications a very good result, notably since these are related to the first year of the project and most activities are focused on aspects such as use case specification, validation scenarios and test case definition, gap analysis in V&V methods and establishing plans for improving or/and combining/marrying.

This KPI will be subject to internal analysis, and the partners of the consortium will be consulted so to update the value to meet their expectations for the 2nd year of the project.

4.3 Diss-KPI-3: Total Number of VALU3S Workshops Organized per Year

The target lower- and upper-bounds established for this KPI are both at least 2 workshops organized. During the first year, the project has organized two internal workshops dedicated to training of some of the V&V methods and tools being considered in the project. These two half-day workshops were the first part and the second part of the VALU3S First Training Session, presented in Section 3.2.

We consider Diss-KPI-3 successfully achieved but we intend to increase the number of workshops in the next two years of the project, and the final plans towards this will be presented in the final training plan of the project.

4.4 Diss-KPI-4: Participation in Fairs and Exhibitions per Year

The target lower- and upper-bounds established for this KPI were of at least 3 or 10 participations in fairs or exhibitions. During the first year, the project members have participated in 7 of those events.

The participations considered for the evaluation of Diss-KPI-4 were presentations of the project, by several members of the consortium in the following events:

- EFECS 2020 on-line event
- VÖSI Software Day 2020 (https://en.softwareday.at/)
- Graz Symposium 2020 (https://www.lieberlieber.com/en/development-of-a-domain-specific-language-for-modeling-component-versions-and-their-dependencies)
- Swissed20, the 7th annual symposium of the Swiss Society for System Technology (https://www.lieberlieber.com/modellierung-auf-der-grundlage-von-feature-branches-swissed-2020/)

- Embedded World 2021 (https://www.embedded-world.de/)
- ESE Kongress Dec 2020 (http://ese-kongress.de)
- ECA2030 - Electric, Connected and Automated Mobility for the 2030 customer (https://www.mobilitye.eu/news/eca2030-conference-announcement-2020)

The KPI was successfully achieved, as the results are closed to the higher threshold for the number of participations in fairs and exhibitions and is considerably higher than the established lower-bound.

4.5 Diss-KPI-5: Number of Speeches in Public Events Per Year

The target lower- and upper-bounds established for this KPI were of at least 3 or 10 participations in fairs or exhibitions, respectively. During the first year, the project members have contributed with 27 speeches:

- Project presentation in VALU3S official press conference
- Virtual booth in EFECS 2020
- Presentation of a Demonstrator Baseline from AQUAS at ARM Safety Summit 2020, by SIEMENS
- An online webinar by TRC about the improved method for knowledge-centric traceability management
- Presentation of overview of VALU3S project at the EWICS 21 winter meeting
- Presentation at the AUTOSEC + OWASP workshop, presenting the project and part the activities at RISE. The title of the presentation is: "Fault and Attack injection-based Verification of Automated systems with respect to safety and Cybersecurity".
- Public presentation at a SAFER bi-weekly seminar, presenting the project and part of the activities at RISE. The title of the presentation is: "On the use of fault and attack injection to evaluate system safety and cybersecurity".
- Presentation of work in the scope of VALUES at the conference STEW, Swedsoft's yearly conference, in January 2021. (https://www.swedsoft.se/en/stew/)
- Presentation of work in the scope of VALUES at the conference Science! by Infotiv 20210408, in April 2021. (https://www.infotiv.se/science-infotiv-20210408)
- The set of all 11 videos recorded during VALU3S First Training Session, announced to the followers of the project via the project's newsletter, and LinkedIn and Twitter networks
- The set of all presentations of the 17 conference and workshop publications already identified in Diss-KPI-2

This KPI was successfully achieved with 17 more contributions than the number previously established as the target upper-bound.

4.6 Diss-KPI-6: Number of VALU3S Results Made Available as Open Source Projects

This KPI aims at monitoring the total number of Open-Source projects, of different types, resulting from the activities of the project, and ensuring that in the best-case scenario 15 of such projects are successfully made available (or at least 5 in the worst case). During the first year of VALU3S there is nothing to report.

4.7 Diss-KPI-7: Number of Industrial Publications

This KPI aims at monitoring the total number of industrial publications obtained during the complete duration of the project. During the first year, only one such publication was reported, and refers to the book entitled "Traceability Studio User´s Guide" with ISBN-10: 1082350850 and independently published by TRC.

This KPI considers the complete duration of the project and not only the reporting period that is covered by this deliverable. It is expected that this number of publications increases already in the second year of the project as the efforts on the development and validation of the several demonstrators increases, and the same with respect to the development/improvement of the tools that implement the improved/combined/married V&V methods.

4.8 Diss-KPI-8: Number of Summer Schools Organized

This KPI aims at monitoring the number of summer schools organized during the project. At the current stage of the project, no Summer (or Winter) Schools have been planned. These are expected to be organized closer to the end of the project, and the results of their planning will be conveyed in the deliverable that will present the final training plan.

4.9 Analysis of Dissemination and Training KPIs Performance

Based on the information of the individual performances of each dissemination and training KPI, presented from Section 4.1 to Section 4.8, we can affirm that VALU3S had a very good performance during the first year, in particular in a year highly affected by the global pandemic of COVID-19 which had strong impact on the organization of both scientific and industrial events.

From the set of KPIs that focus on a yearly evaluation period, that is, DISS-KPI-1 to DISS-KPI-5, only DISS-KPI-2 has not reached the target lower-bound established, but for a very short margin of 3 publications. The remaining KPIs not only have successfully surpassed their established lower-bounds and reached values that are closer to the defined upper-bound and, in the case of DISS-KPI-5, clearly exceeds that upper-bound. It is expected that the consortium reaches even higher values for each of the KPIs already next year, result from collaborations that are now running in the project and also because

of the focus of the work that will increase in what concerns demonstrator development and validate, V&V method (and tools) improvement/combination/marriage, among others

In what concerns the three KPIs that consider the complete duration of the project, progress has only been reported in Diss-KPI-7 and consists of one industrial publication. It is expected that the number to be reported in the second year of the project will increase considerable due to the same reasons pointed in the previous paragraph. Diss-KPI-6 and Diss-KPI-8 have nothing to report as both KPIs focus on activities that are expected to be realized only closer to the end of VALU3S. However, planning the activities targeted by those two KPIs will start soon in order to be included in the final dissemination and training plan, to be finalized in month 18 of the project.

To finalize, we reinforce the understanding that VALU3S has had a very good performance overall during its first year. Nevertheless, these results will be further discussed with the remaining of the consortium and with the project's governance bodies to understand if there is any need to update the current objectives established for all the KPIs, which is a fundamental effort to ensure that the final dissemination and training plans propose the most suited targets for the project current status and expected progress.

Chapter 5 Conclusions

In this deliverable, we have reported the activities associated with dissemination and training that were performed during the first year of the project. All the reported activities, and their outcomes, are essential to promote the impact of the project towards external audiences and stakeholders and also to ensure high levels of awareness of results within the project's consortium. This deliverable therefore reports not only concrete dissemination and training outcomes, but also the results of the implementation of the plans already presented in D6.3 – *"Initial Dissemination and Training Plans"* [1].

Initial focus of this document is given to describing efforts that resulted in processes and tools that help enabling a smooth monitoring and managing of dissemination and training activities. This includes the results on the preparation of dissemination material such as project's templates, publication workflow to ensure that the process of preparing publications with the project ensures compliance with the project's legal documents and enforces awareness of the consortium about material being prepared to disseminate project's achievements.

The deliverable continues with the detailed description of internal and external dissemination reporting. Internal dissemination results include the main channels used for internal dissemination (inter MS Teams infrastructure support via dedicated channels for dissemination, database for registering and managing publications, bibliography management tool adopted, and the role of internal meetings, internal deliverables, and of Use Case Dissemination Managers as active actors in gathering and organizing dissemination data arising from use cases. Regarding external dissemination, the main channels adopted with the aim of increasing the outreach of VALU3S results to external audiences and include partners websites announcing the project, the role of public deliverables, general external dissemination material prepared for dissemination the high-level goals and approach of the project, and the project's publication dedicated webpage and associated process for announcing new publications to external audiences via social networks.

In terms of training reporting, this document focuses on describing two surveys distributed to the consortium with the aim of organizing the first training session, and to help driving the preparation of further internal and external training activities for the remaining of the project. The details of the first training session are also reported, including the presentations included in the session and on the V&V methods (and tools) addressed by the partners that contributed. Also, we describe a new activity that is being implemented in the project to motivate partners at producing videos about the V&V methods they bring into the project and to make these videos available both for the consortium members and to external audiences via their availability in VALU3S YouTube channel and their announcement via the remaining social media channels adopted by the project. The videos resulting from this activity have also the very important objective of complementing content that may not be considered in future training sessions.

Before concluding the report, eight KPIs defined for evaluating the performance of dissemination and training actions are addressed and the outcomes of the project are matched against what is defined for

each of those KPIs. We show that only one of KPIs that focus their evaluation on a yearly basis was not totally achieved: Diss-KPI-2, which is concerned with the number of conference and workshop publications, established as objective a minimum of at least 20 publications but the results of the first-year report 17 publications. Still, 17 is a value close enough for being considered a very good result, particularly considering that we are here reporting the results of the first year of the project which was more focused on planning and specification rather than in development. Implementation and validation activities which are the ones whose outcomes most contribute to the obtain mature results ready to be published in forums relevant for the project). Furthermore, the publication process is usually long (includes R&D work, writing, submission, evaluation, and the publication process itself) which is makes it a challenge for the consortium to having publications accepted and published during the first 12 months a project.

Regarding the KPIs that consider the complete duration of the project, two of them have no results to report – Diss-KPI-6 focused on open-source projects resulting from the project and Diss-KPI-8 focused on the organization of summer schools were not planned to be addressed during this reporting period as the related activities are typical from later phases of the project and after the project is finished. We note that Diss-KPI-7, which targets industrial publications, has had limited progress, but its numbers are expected to increase when development of demonstrator and technical work on the improvement/combination/marriage of V&V methods and tools become the central activities of the project, which is expected to be the case from the start of the second year of the project. In general, based on the reported data and evaluation at the light of the KPIs, one can conclude that the project has had a good performance with respect to dissemination and training activities during the reporting period.

References

[1] D. Pereira and J. Proença, "Deliverable D6.3 - Dissemination and Communication Plan." VALU3S Consortium, Aug. 30, 2020.

[2] J. L. de la Vara and S. Rupert, "Deliverable D3.1 - V&V methods for SCP evaluation of automated systems." VALU3S Consortium, Dec. 18, 2020.

[3] Í. Elguea, "Deliverable D6.4 - Initial exploitation plan." VALU3S Consortium, Aug. 30, 2020.

[4] C. Schmittner, "Deliverable D6.5 - Initial report on the results of the standardisation survey (methods, tools, concepts suggested by the standards)." VALU3S Consortium, Aug. 30, 2020.

[5] STAM, "Deliverable D.611 - Initial communication activity report." VALU3S Consortium, Apr. 27, 2021.

[6] VALU3S Consortium, "Description of the Action." Feb. 26, 2021, Accessed: Aug. 01, 2020. [Online].

[7] VALU3S Consortium, "Grant Agreement."

[8] VALU3S Consortium, "Project Consortium Agreement." .

[9] Corporation for Digital Scholarships, *Zotero - Your personal research assistant*. Corporation for Digital Scholarships, 2020.

[10] B. Sangchoolie, "Deliverable D7.2 - Initial Project Handbook." VALU3S Project Consortium, May 29, 2020, Accessed: Jun. 16, 2020. [Online].

[11] Microsoft, *Microsoft Teams*. Microsoft, 2017.

[12] ENABLE-S3 Consortium, "ENABLE-S3 - European Initiative to Enable Validation for Highly Automated Safe and Secure Systems." https://enable-s3.eu/.

[13] Mobility.E Consortium, "Virtual ECA2030 – Electric, Connected and Automated Mobility for the 2030 customer," *ECA2030 Conference 2020*, Oct. 27, 2020. https://www.mobilitye.eu/news/eca2030-conference-announcement-2020.

[14] Mobility.E Consortium, "Mobility.E Lighthouse Project," Aug. 01, 2020. https://www.mobilitye.eu/ (accessed Aug. 01, 2020).

[15] AENEAS, ARTEMIS-IA, EPoSS, ECSEL Joint Undertaking and the European Commission, "European Forum for Electronic Components and Systems 2020," *ABOUT EFECS 2020*, Nov. 25, 2020. https://efecs.eu/efecs2020.html.

[16] VALU3S Consortium, "VALU3S LinkedIn Page." https://www.linkedin.com/company/valu3s-project/ (accessed Aug. 01, 2020).

[17] VALU3S Consortium, "VALU3S Twitter Page," Aug. 01, 2020. https://twitter.com/valu3s_project (accessed Aug. 01, 2020).

[18] VALU3S Consortium, "VALU3S YouTube Channel," Aug. 01, 2020. https://www.youtube.com/channel/UCBvhaW8hkWgopiJWbFBrIFQ (accessed Aug. 01, 2020).

Appendix A Partners Dissemination Activities

We report in this appendix, namely in Table A.1, the dissemination activities performed by the individual partners of the consortium.

Table A.1: Individual Dissemination Actions

Partner	Individual Plan
RISE	Submission and publication of a journal paper "An Empirical Study of the Impact of Single and Multiple Bit-Flip Errors in Programs" in IEEE Transactions on Dependable and Secure Computing. Submission of a workshop article to SELSE2021 (Silicon Errors in Logic – System Effects), which is now accepted, with the title: "Simulation-based Fault Injection in Advanced Driver Assistance Systems Modeled in SUMO" Participation in EFECS2020 and presentation of the project at the event. Giving a public presentation at the AUTOSEC + OWASP workshop, presenting the project and part of our activities at RISE. The title of the presentation is: "Fault and Attack injection-based Verification of Automated systems with respect to safety and Cybersecurity". Presentation entitled "ODD and how it affects the V&V process" at the VALU3S Swedish cluster full-day meeting Workshop 1, 2021-02-25. Presentation entitled "Summary of the SOTIF standard" at the VALU3S Swedish cluster full-day meeting, Workshop 1, 2021-02-25. Presentation at the conference; STEW, Swedsoft's yearly conference, in January 2021. (https://www.swedsoft.se/en/stew/) Presentation at the conference; Science! by Infotiv 20210408, in April 2021. (https://www.infotiv.se/science-infotiv-20210408) Public presentation at a SAFER bi-weekly seminar, presenting the project and part of our activities at RISE. The title of the presentation is: ""On the use of fault and attack injection to evaluate system safety and cybersecurity"". (KPI-5) Contribution to the preparation and submission of a project-wide journal article to Microprocessors and microsystems (MICPRO). Submission of an article to EDCC2021 with the title: "SUFI: A Simulation-based Fault Injection Tool for Safety Evaluation of Advanced Driver Assistance Systems Modelled in SUMO".

Partner	Individual Plan
	Contribution to a conference article, along with many other project partners, with the title: "The VALU3S ECSEL Project: Verification and Validation of Automated Systems Safety and Security". Preparation and submission of three other publications that are currently under evaluation Presentation entitled "Simulation-based fault and attack injection at system-level" at the project's first training session. A video of this presentation will be available for public use at the project YouTube channel; Presentation entitled "Model-implemented fault and attack injection" at the project's second training session. A video of this presentation will be available for public use at the project YouTube channel. Presentation entitled "V&V of ML-based systems using Simulators" at the VALU3S Swedish cluster full-day meeting Workshop 1, 2021-02-25. Presentation of the accepted SELSE 2021 article "Simulation-based Fault Injection in Advanced Driver Assistance Systems Modelled in SUMO" at the SELSE workshop. Presentation entitled "Summary of the ISO/SAE DIS 21434 standard" at the VALU3S Swedish cluster full-day meeting Workshop 1, 2021-02-25.
STAM	Participation in EFECS2020 and organization of a virtual booth for it. Preparation and submission of paper entitled "A Review of Single and Multi-Hazard Risk Assessment Approaches for Critical Infrastructures Protection" has been submitted. Finally, STAM is leader of T6.4, so it must coordinate the external communication. In detail, it defines and implements the external communication plan and updates it according to feedbacks deriving from already implemented communication channels. STAM has created contents for social media channels and the website.
FBK	Presentation of overview of VALU3S project at the European Workshop on Industrial Computer Systems Reliability, Safety and Security (EWICS 21) winter meeting. Preparation and submission of scientific publications, with one of such publications being accepted in Computer Aided Verification 2021.
TRC	Contribution to publications in collaboration with UCLM. Paper "Ontology Configuration Management for Knowledge-Centric Systems Engineering in Industry" accepted in DSN 2020. Contributed with 3 courses/webinar with information about the improved method for knowledge-centric traceability management, and also with the inclusion of information about the improved method for knowledge-centric traceability management in an industrial book"

Partner	Individual Plan
UNIVAQ	UNIVAQ investigated the dissemination plan and contributed to the publication of a first conference paper to disseminate the project goals and organization: Barbosa R. et al., "The VALU3S ECSEL Project: Verification and Validation of Automated Systems Safety and Security", Euromicro Conference on Digital System Design, Slovenia, August 26-28, 2020. UNIVAQ led the organization of a journal paper publication with goals within the VALU3S scope: Agirre J.A. et al., "The VALU3S ECSEL Project: Verification and Validation of Automated Systems Safety and Security", Microprocessors and Microsystems. Submitted. UNIVAQ contributed with further two publications: • F. Smarra and A. D'Innocenzo, "Learning Markov Jump Affine Systems via Regression Trees for MPC", IFAC World Congress, 2020. • D. Masti, F. Smarra, A. D'Innocenzo and A. Bemporad, "Learning affine predictors for MPC of nonlinear systems via artificial neural networks", IFAC World Congress, 2020."
ISEP	ISEP is the partner responsible for WP6 and Task 6.1 and, henceforth, was the main responsible for defining and implementing dissemination and training plans and contributed to the preparation of dissemination material, notably the project's poster, flyers, and video introducing VALU3S that is available in the project's YouTube channel. During the first year, ISEP also contributed with two training presentations in the first VALU3S training session, notably with the presentations entitled "Runtime Verification Based on Formal Specifications" and "Introduction to Model Checking". Moreover, ISEP's members have contributed to the project wide paper "The VALU3S ECSEL Project: Verification and Validation of Automated Systems Safety and Security" (and to its extension to a journal article), contributed to the paper being prepared as the result of the work on Task 3.1 and D3.1, and also contributed with the following three publications: • Nandi, G., Pereira, D., Proença, J., Tovar, E.: Work-In-Progress: a DSL for the safe deployment of Runtime Monitors in Cyber-Physical Systems, 41st IEEE Real-Time Systems Symposium, Huston, Texas, USA, 2020 • Cledou, G., Proença, J., Sputh, B., Verhulst, E.: Hubs for VirtuosoNext: Online Verification of Real-Time Coordinators, Science of Computer Programming, Special Issue on Selected Tool Papers of the 21st International Conference on Coordination Models and Languages, COORDINATION 2019, vol. 203, 2020 • Goncharov, S., Neves, R., Proença, J.: Implementing Hybrid Semantics: From Functional to Imperative, Theoretical Aspects of Computing – ICTAC 2020, LNCS vol. 12545, 2020 Finally, ISEP has prepared several surveys to help structuring the training activities of the project and was the main organized of the two parts of VALU3S 1st training sessions that took place during March and April of 2021.
UNIGE	UNIGE contributed to writing the paper based on the contents of deliverable D3.1 which has been submitted to an internal conference. UNIGE also presented its proposed method "Wireless interface network security assessment" during the first part of VALU3S 1st training session.
CAMEA	Presented VALU3S project during company presentations related to CAMEA systems (for both traffic and industry).

Partner	Individual Plan
COIMBRA	COIMBRA has contributed with the creation of a web page for the VALU3S project in the Web portal of our research centre CISUC. COIMBRA also contributed to the publication "The VALU3S ECSEL Project: Verification and Validation of Automated Systems Safety and Security". Additionally, some preparation work has been done concerning the planning of papers to be submitted to top conferences in 2021, such as the IEEE/IFIP DSN.
BUT	BUT has contributed to this task by writing a scientific paper concerning computer security in ACM AFT conference.
ESOGU	ESOGU contribute to the preparation of two journal papers during this reporting period.
VTI	VTI contributed with the presentations "SUMO and Veins" at the workshop session of the "VALU3S Swedish cluster full-day meeting", 2020-10-15 and "ODD and how it affects the V&V process" at the workshop session of the "VALU3S Swedish cluster full-day meeting", 2021-02-25. VTI also contributed with a video demo and presentation of "Driving Simulator - "SIM IV" at the workshop session of the "VALU3S bi-weekly Swedish cluster meeting", 2021-04-15.
UCLM	Preparation of publications on VALU3S, e.g., the paper "Feeling of Safety and Comfort Towards a Socially Assistive Unmanned Aerial Vehicle That Monitors People in a Virtual Home", which has been accepted at the Sensors journal. Involvement in the organisation of training sessions. UCLM has also attended the meetings about dissemination aspects. Specific dissemination actions include publication preparation (for journals and for conferences) and attendance to conferences to introduce VALU3S ideas (REFSQ 2020, DSN 2020).
FRAUNHOFER IESE	Contribution to joint publication of VALU3S approach: The VALU3S ECSEL Project: Verification and Validation of Automated Systems Safety and Security (DSD journal); Contribution with three other publications related to virtual validation and the FERAL tool framework: 1) Thomas Kuhn, Pablo Oliveira Antonino, Adam Bachorek: A Simulator Coupling Architecture for the Creation of Digital Twins. ECSA Companion 2020: 326-339, 2020; 2) Jasmin Jahic, Thomas Bauer, Thomas Kuhn, Norbert Wehn, Pablo Oliveira Antonino: FERA: A Framework for Critical Assessment of Execution Monitoring Based Approaches for Finding Concurrency Bugs. SAI (1) 2020: 54-74; and 3) Tagline Treichel, Pablo O. Antonino, Filipe Silva Santos, Leonardo Silva Rosa, Simulation-as-a-Service: a simulation platform for cyber-physical systems, ICSA 2021, WASA Workshop, 2021"
SIEMENS	Presentation of Demonstrator Baseline from AQUAS at ARM Safety Summit 2020.
UTRCI	UTRCI contributed to the publication of a first conference paper to disseminate the project goals and organization: Barbosa R. et al., "The VALU3S ECSEL Project: Verification and Validation of Automated Systems Safety and Security", Euromicro Conference on Digital System Design, Slovenia, August 26-28, 2020. UTRCI also contributed to a journal paper publication with goals within the VALU3S scope: Agirre J.A. et al., "The VALU3S ECSEL Project: Verification and Validation of Automated Systems Safety and Security", Microprocessors and Microsystems. Submitted."
NUIM	NUIM contributed with a presentation on formal verification in the first training session organized withing VALU3S.
IMTGD	MTGD have contributed on dissemination activities with sharing project posts in social media accounts. IMTGD also have contributed preparation of two papers one in local consortium and task 3.1 partners.

Partner	Individual Plan
ERARGE	ERARGE contributed to the preparation of the VALU3S paper.
OTOKAR	OTOKAR has contributed to dissemination activities with the posts about VALU3S shared in social media accounts. OTOKAR also made a plan to attend conferences and fairs for the dissemination activities.
TECHY	Social media interactions were carried out. An ongoing article writing process has been conducted with the local partners participating. A green open access publication is to be selected to apply for the prepared manuscript.
INTECS	INTECS contributed with a presentation on the second part of VALU3S 1st Training Session, and also with an overview of the VALU3S project at the 5th Italian Workshop on Embedded Systems (IWES 21).
LLSG	LLSG created a professional flyer (pdf) "VALU3S-EU research project" which has been used in hardcopy and also on social media (itcluster.at, pressebox.de, software-journal.de, etc) and online conference (Graz Symposium, Swissed20, Vösi Software day)
AIT	We contributed to the publication "The VALU3S ECSEL Project: Verification and Validation of Automated Systems Safety and Security", which has been accepted for its publication in the DSD 2020 Proceedings as a regular paper.
ESTE	Creation/gathering of UC6-related dissemination media content.
QRTECH	Presentation material was created, and will be completed gradually during the project, to promote QRTECH's participation and achievements in VALU3S with focus on its potential benefits in different industry segments at internal meetings and conferences. Work is ongoing to publish the latest news and information from the research projects that QRTECH is currently involved in, including VALU3S, in the company's internal and external websites. Presentation material for initial dissemination and training activity is created, and will be completed gradually during the project, to promote QRTECH's participation and achievements in VALU3S with focus on its potential benefits in different industry segments at internal meetings and conferences.
CAF	CAF dissemination of results will be made through multiple schemes. Periodic dissemination actions will be done to all concerned parties to ensure high visibility of the project progress. Targets for dissemination will include the railway sector, mainly. Several dissemination levels are defined: public dissemination (press releases in specialised media and CAF Signalling social networks/webs), industrial dissemination (thought international conferences like Intelligent Rail Summit) and scientific dissemination (journal at IEEE International Conference on Intelligent Rail Transportation). Work carried out during the reporting period: • VALU3S project general Project paper preparation and submission to DSD2020. • First project public dissemination in social networks. • VALU3S project general Journal preparation and submission.

Partner	Individual Plan
MGEP	Work carried out Dissemination in social networks and participated in the preparation of the publication entitled "The VALU3S ECSEL Project: Verification and Validation of Automated Systems Safety and Security" and to its extension into a journal publication. Furthermore, MGEP has worked on publications targeting relevant forums for the VALU3S community, namely the Journal of Manufacturing Systems, the Journal of Intelligent Manufacturing, and Advances in Manufacturing.
INFOTIV	Working carried out during this period: • Collaboration in publication of a paper, "Exploring the Assessment List for Trustworthy AI in the Context of Advanced Driver-Assistance Systems" - Markus Borg, Joshua Bronson Humanized Autonomy RISE Research Institutes of Sweden and Linus Christensson, Fredrik Olsson Dept. of Computer Science Lund University • Workshop/demonstration of opensource tool chain for creating V&V model presented to the Swedish cluster and other partners • Presentation at VALU3S First Training Session on "Simulating Traffic Scenarios using CARLA" that will be available in the project's YouTube channel. • Two public popular science events ("Science by Infotiv") to advertise the VALU3S project and demonstrate the result of the research that is done within the project or with collaboration with other partners. • Presentation in full day Swedish cluster meeting on "Summary of SOTIF standard" • Presentation in Quest for Quality (Q4Q) conference on "Can we teach all testers new tricks"
BERGE	BERGE contributed with two videos created for VALU3S advertisement, with presentations of POC at Swedish cluster meeting and an in-house presentation of the project at Berge during Creative Lunch. BERGE also had a meeting with existing customers and potentially future customers, and with Nvidia regarding visual quality, database handling of big data, car simulations and testing of autonomous vehicles.

Appendix B Survey Results about V&V Methods and Tools

In this appendix, we provide a summary of the results obtained for all the categories of V&V methods that were identified in D3.1 [2] and that were included in the second survey developed and distributed to the consortium for the purpose of preparing the first VALU3S training session and to help guiding the elaboration of future training sessions to take place in the remaining years of the project.

B.1 Injection-based Methods & Tools

Injection-based methods and tools were divided into two sub-categories: Attack Injection and Fault Injection. Below, the results for each of these sub-categories is presented:

- ***Attack Injection:*** Based on the results of the survey, 57% of the participants showed interest in training focused on this V&V method. The most relevant Attack Injection methods for the participants were Simulation Based Attack Injection at System Level and Vulnerability and Attack Injection, both with 34% of the preferences. Regarding associated tools, 29% showed preference about the MODIFI tool, 28% about the SUMO tool (https://www.eclipse.org/sumo/), and 26% about CARLA (https://carla.org/).
- ***Fault Injection:*** Based on the results of the survey, 66% of the participants showed interest in training focused on this V&V method. The most relevant methods for the participants were Simulation-based Fault Injection at System Level with 50% of the preferences and Software-Implemented Fault Injection with 45% of the preferences. Regarding associated tools, 32% showed preference about the MODIFI tool, while the second most interesting option was, once again, SUMO and CARLA, both having 30% of the preferences.

B.2 Simulation-based Methods & Tools

Based on the results of the survey, 67% of the partners showed interest in having training dedicated to simulation-based methods. In this category, six different V&V methods were considered. From these, V&V of *Machine Learning-based Systems Using Simulators* was the one with a higher preference, obtaining 38% of the votes of the partners, followed by *Simulation-based Robot Verification* with 23% and *Simulation-based Testing for Human-Robot Collaboration* with 21% of the votes. In what concerns associated tools, the ones that are considered more relevant for the partners are the Robot Operating System (ROS) and Unreal Engine, both with 29% of the votes, and CARLA with 26% of the votes.

B.3 Testing-Based Methods & Tools

Based on the results of the survey, 66% of the partners showed interest in having training dedicated to testing-based methods. In this category, eight different V&V methods were considered. From these, V&V of *Machine Learning-based Model Validation* was the one with a higher preference, obtaining 38% of

the votes of the partners, followed by *Model-based Testing* with 32%, followed by *Assessment of Cybersecurity-Informed Safety* and *Model-Based Mutation Testing* with 21% of the votes each. In what concerns associated tools, the ones that are considered more relevant for the partners are the TensorFlow, CARLA, and Pytorch, with 30%, 27%, and 23% of the votes each, respectively.

B.4 Runtime Verification-based Methods & Tools

Based on the results of the survey, 41% of the partners showed interest in having training dedicated to Runtime Verification-based methods. In this category, three different V&V methods were considered, with *Runtime Verification Based on Formal Specifications* with 60% of the votes from the partners that showed interest in this category of methods. In what concerns associated tools, ANaConDa (http://www.fit.vutbr.cz/research/groups/verifit/tools/anaconda/) was the one with higher preference, with 26% of the votes, followed by LARVA (http://www.cs.um.edu.mt/svrg/Tools/LARVA/) with 21% of the votes.

B.5 Formal Source Code Verification Methods & Tools

Based on the results of the survey, 44% of the partners showed interest in having training dedicated to Formal Source Code Verification methods. In this category, two different V&V methods: *Deductive Verification*, which obtained 45% of the votes, and *Source Code Static Analysis* with 55% of the votes of those partners that showed interest in this category of methods. In what concerns associated tools, Verifast (https://github.com/verifast/verifast) and Klee (https://klee.github.io/) were the ones considered more relevant, with 22% of the votes.

B.6 General Formal Verification Methods & Tools

Based on the results of the survey, 36% of the partners showed interest in having training dedicated to Formal Source Code Verification methods. In this category, where six different methods were considered, the method of *Formal Requirements Validation* obtained 68% of the preferences, followed by *Model Checking* with 52%, and *Reachability-Analysis-Based Verification for Safety-Critical Hybrid Systems* with 48%. In what concerns associated tools, Uppaal (http://www.uppaal.org/), NuSMV (http://nusmv.fbk.eu/), an NuXmv (https://nuxmv.fbk.eu/) were the ones considered more relevant, with 36%, 32%, and 24% of the votes, respectively.

B.7 SCP-Focused Semi-Formal Verification Analysis

Based on the results of the survey, 36% of the partners showed interest in having training dedicated to SCP-focused Semi-Formal Verification Analysis methods. In this category, where eight different methods were considered, the method of *Model-Based Safety Analysis* obtained 65% of the preferences, followed by *Model-Based Threat Analysis* with 60%. In what concerns associated tools, CHESS and CHESS-FLA (https://www.eclipse.org/chess/index.html) and COMPASS (http://www.compass-

toolset.org/) were ones considered more relevant, both with 30% of the votes, followed by xSAP (https://xsap.fbk.eu/) with 25% of the preferences.

B.8 General Semi-Formal Source Analysis Methods & Tools

Based on the results of the survey, 27% of the partners showed interest in having training dedicated to General Semi-Formal Source Analysis methods. In this category, where six different methods were considered, the method of *Model-Based Design Verification* obtained 40% of the preferences, followed by *Traceability of Safety Software* with 33%, and Model-Based Assurance and Certification with 27% of the preferences of the partners that showed interest in having training in this category. In what concerns associated tools, Simulink was the preferred one with 40% of the votes, followed by OpenCert (https://www.eclipse.org/opencert/) with 27% of the preferences.

B.9 System Type-Focused Methods & Tools

Based on the results of the survey, 43% of the partners showed interest in having training dedicated to General Semi-Formal Source Analysis methods. In this category, where six different methods were considered, the method of *Model-Based Formal Specification and Verification of Robotic Systems* obtained 33% of the preferences, followed by *CPU Verification* and *HiL/SiL Test Bench for NMT* both with 33%, and Model-Based Assurance and Certification with 21% of the preferences of the partners that showed interest in having training in this category. In what concerns associated tools, OpenCert (https://www.eclipse.org/opencert/), Uppaal (https://www.uppaal.com/), and ROS (https://www.ros.org/) got the highest preferences, with 25% of the preferences each.

Appendix C VALU3S Poster and Leaflet

C.1 VALU3S Standard Poster

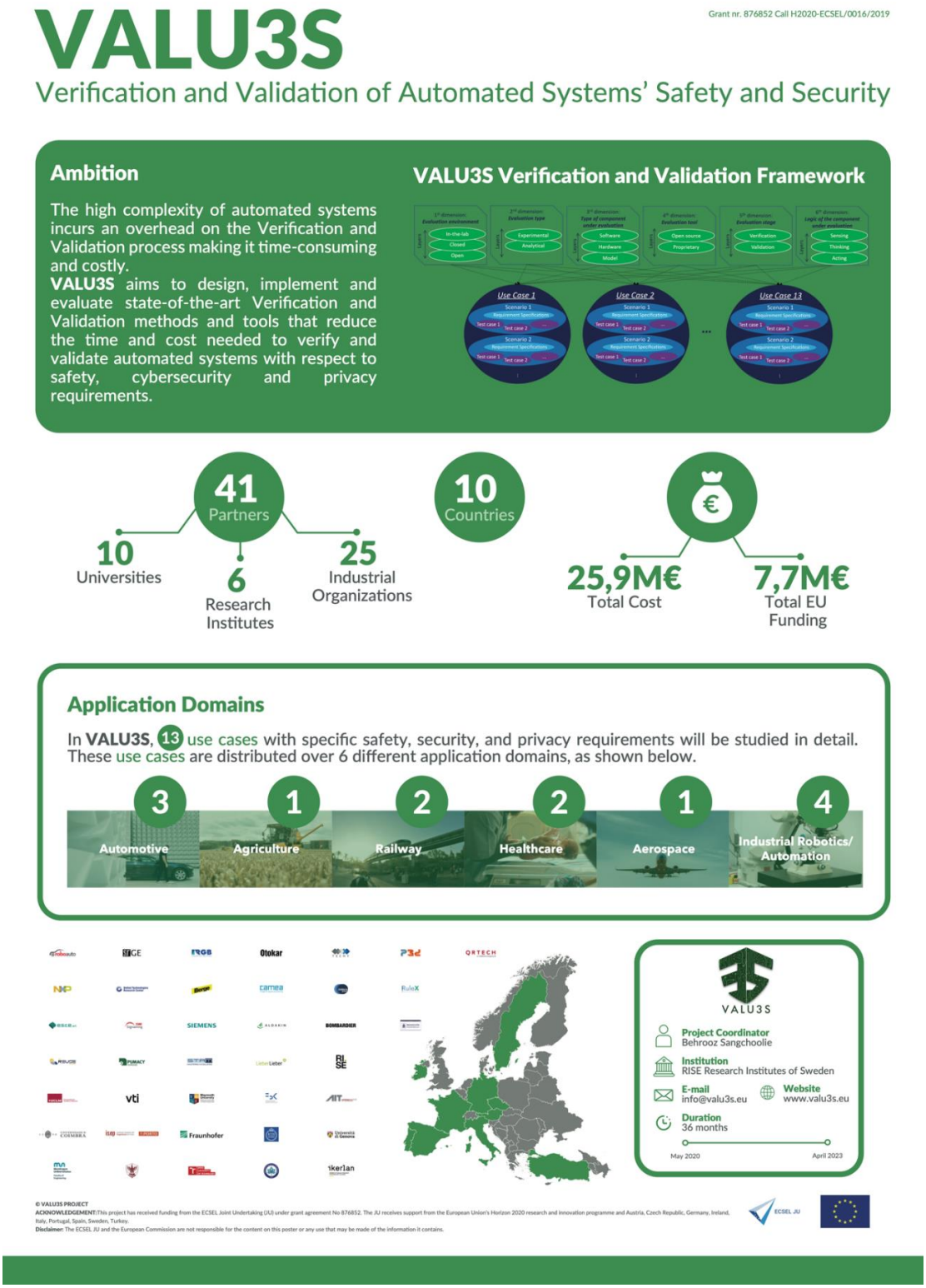


Figure C.1 VALU3S standard poster.

C.2 VALU3S Leaflet (Front)

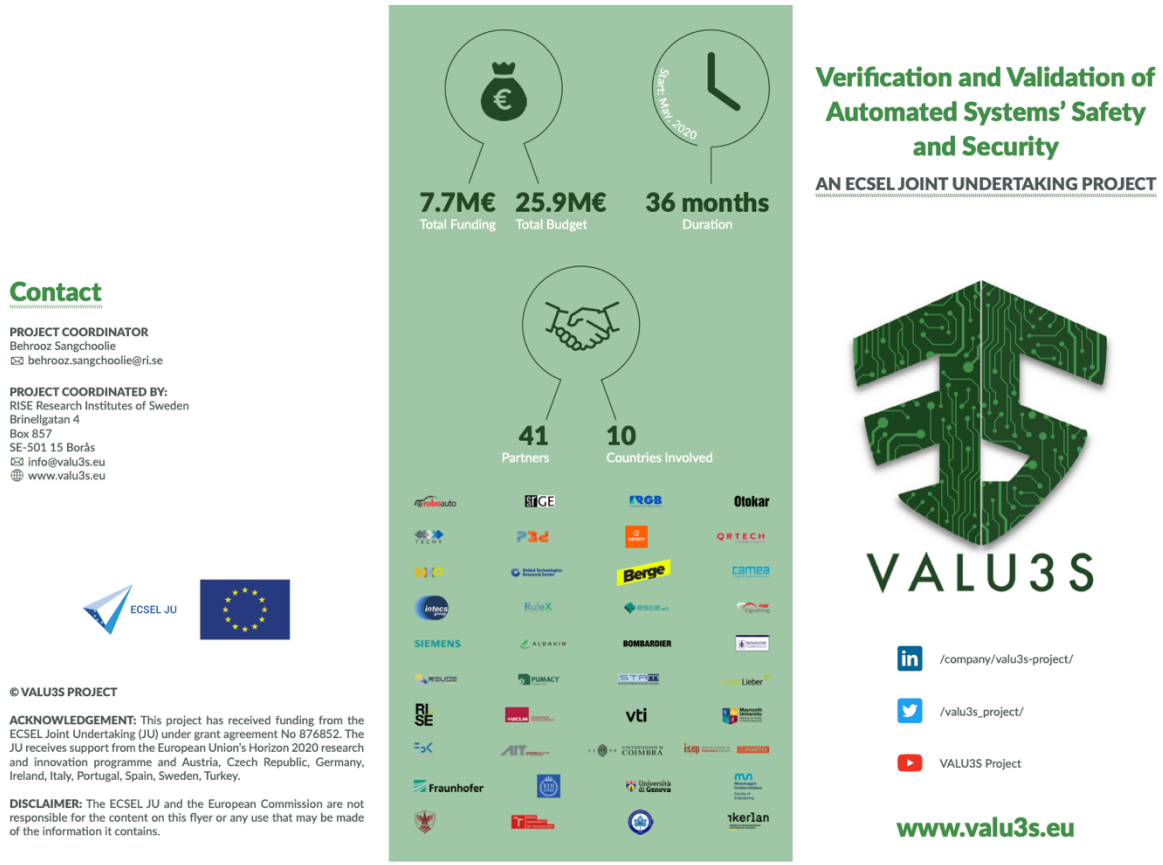


Figure C.2 VALU3S leaflet (front).

C.3 VALU3S Leaflet (Back)

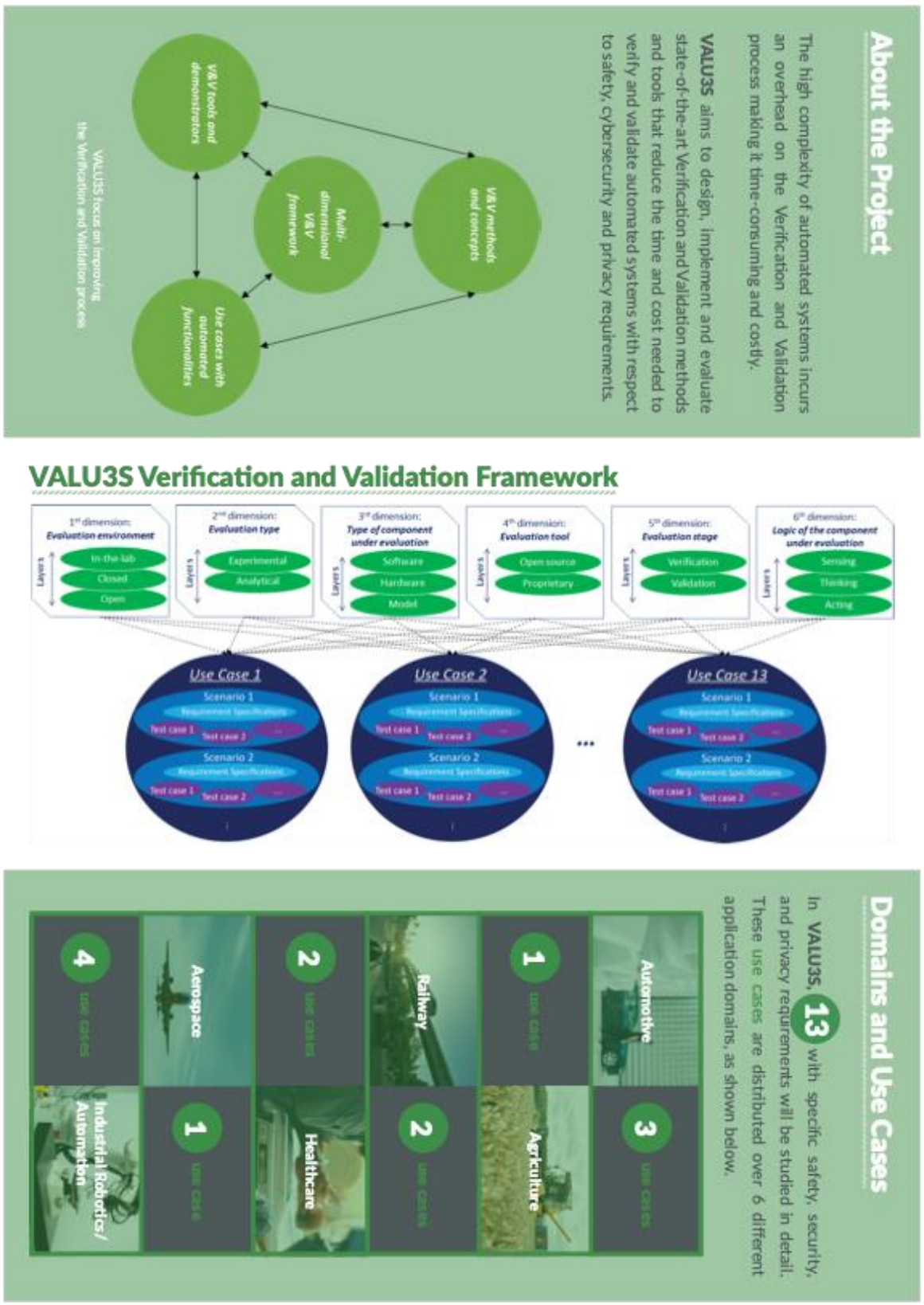
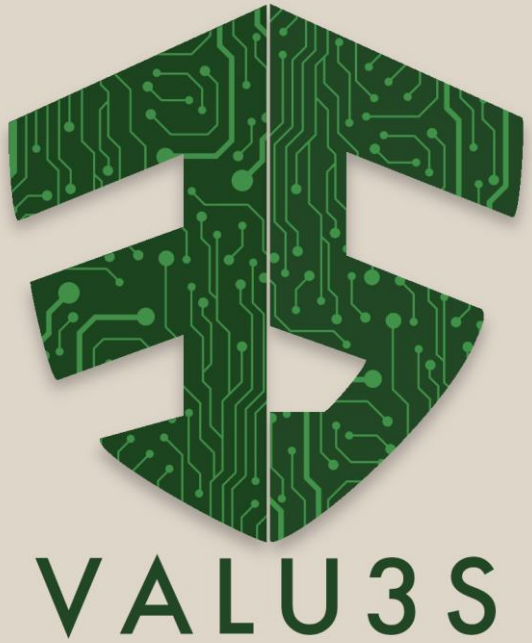


Figure A.3 VALU3S leaflet (back).



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.