ECSEL Research and Innovation actions (RIA)

AMASS

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

Dissemination and Training Progress (c)
D8.8

Work Package:	WP8: Exploitation, Dissemination and Standardization
Dissemination level:	PU = Public
Status:	Final
Date:	7th April 2019
Responsible partner:	Jose Luis de la Vara (Universidad Carlos III de Madrid)
Contact information:	jvara@inf.uc3m.es
Document reference:	AMASS_D8.8_WP8_UC3_V1.0

This deliverable is part of a project that has received funding from the ECSEL JU under grant agreement No 692474. This Joint Undertaking receives support from the European Union's Horizon 2020 research and innovation programme and from Spain, Czech Republic, Germany, Sweden, Italy, United Kingdom and France.

Contributors

Names	Organisation
Jose Luis de la Vara, Juan Llorens, Anabel Fraga, Eugenio Parra	Universidad Carlos III de Madrid (UC3)
Luis M. Alonso, Jose M. Fuentes	The REUSE Company (TRC)
Cristina Martínez, Alejandra Ruiz	Tecnalia Research & Innovation (TEC)

Reviewers

Names	Organisation
Borja López (Peer reviewer)	The REUSE Company (TRC)
Gaël Blondelle (Peer reviewer)	Eclipse Foundation Europe (ECL)
Cristina Martínez (Quality Manager)	Tecnalia Research & Innovation (TEC)
Barbara Gallina (TC Review)	Barbara Gallina (TC Review)

TABLE OF CONTENTS

Abbreviations and Definitions **5**
Executive Summary **6**
1. Introduction **7**
2. Dissemination Progress **8**
2.1 Internal Dissemination 8
2.1.1 Project Collaboration Platform 8
2.2 External Dissemination 11
2.2.1 AMASS Website 11
2.2.2 Dissemination Material 20
2.2.3 Social Media Activity 29
2.2.4 YouTube Channel 30
2.2.5 Event Organization 31
2.2.6 Event Participation 35
2.2.7 Publications 39
2.3 Communication Activities 42
3. Training Progress **43**
3.1 Internal Training 43
3.1.1 Training at the 6th Plenary Meeting in Bilbao 43
3.1.2 General Training on the AMASS Prototype P2 44
3.1.3 Partner-to-Partner Specific Training Sessions 45
3.1.4 Internal Training Sessions 45
3.2 External Training 46
3.2.1 Research Training 46
3.2.2 Other external training activities 46
4. Conclusion **48**
References **49**
Appendix A. Progress of the Dissemination Plan until m36 ..... **50**
Appendix B. Progress of the Training Plan until m36 ..... **51**

List of Figures

Figure 1. ARTEMIS open innovation model 7
Figure 2. AMASS wiki 8
Figure 3. AMASS ticket system 10
Figure 4. AMASS SVN repository 11
Figure 5. AMASS website 13
Figure 6. First EAB Workshop page 14
Figure 7. Second EAB Workshop page 14
Figure 8. AMASS Open Industrial Workshop page 15
Figure 9. Pager Template 16
Figure 10. Statistics for the AMASS website 18
Figure 11. View of the access to the pages of the AMASS website 19
Figure 12. View of the access to the website from the AMASS social media channels 19
Figure 13. Example of slides in the AMASS presentations 20
Figure 14. AMASS Triptych (1) 21
Figure 15. AMASS Triptych (2) 22
Figure 16. Official AMASS leaflet and poster 23
Figure 17. Front of the project leaflet prepared by the AMASS consortium 24
Figure 18. Back of the project leaflet prepared by the AMASS consortium 25
Figure 19. Project poster prepared by the AMASS consortium 26
Figure 20. Project poster for EclipseCon 2018 27
Figure 21. Project poster for EFECS 2018 28
Figure 22. AMASS Twitter account 29
Figure 23. LinkedIn group managed by AMASS 29
Figure 24. AMASS YouTube channel 30
Figure 25. Presentation at the AMASS Open Industrial Workshop 31
Figure 26. Presentation at SASSUR 2018 32
Figure 27. Presentation at SAFECOMP 2018 34
Figure 28. Presentation at medini analyze User Conference 35

List of Tables

Table 1. General dissemination tools and channels 9
Table 2. Communication activities 42
Table 3. Planned dissemination activities 50
Table 4. Planned internal training events that have been held 51
Table 5. Planned external training events that been held 51

Abbreviations and Definitions

ACM	Association for Computing Machinery
AI	Artificial Intelligence
ARTEMIS	ARTEMIS Industry Association is the association for actors in Embedded Intelligent Systems within Europe
BSc	Bachelor of Science
CA	Consortium Agreement
CPS	Cyber-Physical Systems
CS	Case Study
DNG	DOORS Next Generation
EAB	External Advisory Board
EC	European Commission
ECSEL	Electronic Components and Systems for European Leadership
EPF	Eclipse Process Framework
ESA	European Space Agency
ETCS	European Train Control System
EWICS	European Workshop on Industrial Computer Systems
FCL	Formal Contract Logic
FMEA	Failure Mode and Effects Analysis
FMEDA	Failure Modes, Effects and Diagnostic Analysis
FMVEA	Failure Modes, Vulnerabilities and Effect Analysis
FTA	Fault Tree Analysis
GA	Grant Agreement
IEEE	Institute of Electrical and Electronics Engineers
INCOSE	International Council on Systems Engineering
IoT	Internet of Things
ISO	International Organization for Standardization
JU	Joint Undertaking
KM	Knowledge Manager
MASP	Multi Annual Strategic Plan
MSc	Master of Science
OCRA	Othello Contracts Refinement Analysis
OEM	Original Equipment Manufacturer
OSLC	Open Services for Lifecycle Collaboration
PhD	Doctor of Philosophy
R&D	Research & Development
R&I	Research & Innovation
SAE	Society of Automotive Engineers
SME	Small and Medium-sized Enterprise
SOTIF	Safety of The Intended Functionality
STO	Scientific and Technical Objective
SVN	Subversion
SysML	System Modelling Language
WP	Work Package

Executive Summary

This document (D8.8) is the third and final progress report on dissemination and training activities for the AMASS project. These activities, which are essential for the success of the project, allow different stakeholders to gain awareness of the achievements of the project and of how to use its results. D8.8 presents the activities performed from m25 (April 2018) to m36 (March 2019) in AMASS.

The progress on dissemination can be divided into internal and external activities. The internal activities performed correspond to those resulting from the usage of the project's wiki, SVN repositories, and mailing lists. For external dissemination, AMASS has a website with a wide range of content, including public deliverables and blog posts about project news. The partners have contributed to maintaining and increasing the amount of project presentations, leaflets, and poster as dissemination material. They have also been active in social media through LinkedIn and Twitter, in event organisation (six main events; AMASS Open Industrial Workshop, medini analyze User Conference, SAFECOMP, DECSoS, SASSUR, and WAISE), and in event participation (other 60 events). In addition, 38 scientific publications have been accepted at different journals, conferences, and workshops. Communication activities have also been performed, such as blog posts, project newsletters, and the advertisement of AMASS on the partners' websites. Through the YouTube channel, new videos about AMASS results have been shared with wide audiences.

Regarding training, a training activity about the new version of the AMASS tools has been arranged. The resulting videos have been publicly published. Progress has also been made on research training related to BSc, MSc, and PhD students, and to the presentation of the project solutions for CPS assurance and certification at universities and other organizations.

D8.8 relates to the following AMASS deliverables:

- D8.1 (AMASS Website and Project Collaboration Platform) [5] provides details about the e-infrastructure of the project for communication and information exchange among AMASS partners, including the internal reporting of dissemination and training actions and results.
- D8.5 (Dissemination and Training Plan) [6] identifies needs and presents a plan regarding activities for the dissemination of project results and training.
- D8.6 (Dissemination and Training Progress (a)) [7] and D8.7 (Dissemination and Training Progress (b)) [8] reported on the dissemination and training activities performed in the first and second year of the project, respectively.
- D9.1 (Project Management Plan and Handbook) [10] presents guidelines and rules about external communications and about how to use the project collaboration platform (e.g. file naming conventions and recommendations on the use of the project's mailing lists).

1. Introduction

AMASS has created and consolidated a de-facto Europe-wide assurance and certification open tool platform, ecosystem, and self-sustainable community spanning the largest CPS vertical markets. The ultimate aim of the project is to lower certification costs in the face of rapidly changing product features and market needs. This has been achieved by establishing a novel holistic and reuse-oriented approach for architecture-driven assurance, multi-concern assurance, and for seamless interoperability between assurance and engineering activities along with third-party activities (e.g. external assessments) [3].

This document is deliverable D8.8 (Dissemination and Training Progress (c)), released by the AMASS WP8 (Exploitation, Dissemination and Standardization). The document describes the dissemination and training performed on the AMASS project between April 2018 and March 2019. More concretely, D8.8 presents the actions taken by the AMASS consortium to:

- Ensure the dissemination of knowledge gained during the project execution.
- Encourage new research and development in European industry that is intended to exploit results from AMASS.
- Provide training material and courses on AMASS technology and methods to industrial and other users.
- Set up a framework of bidirectional channels for input and recommendations to and from multiple industrial domains and wider research communities.

Dissemination and training play major roles in ARTEMIS and ECSEL. In ARTEMIS, the open innovation model (Figure 1; [12]) deals with aspects such as external relations, collaborative innovation, and education. The Strategic Research Agenda 2016 [13] emphasises the need to develop and exchange best practices in training and education for CPS, and includes an Education & Training Working Group [14]. The Multi-Annual Strategic Plans [15] in ECSEL explicitly refer to activities such as planning and organisation of dissemination events, the provision of education and training, and university education in close collaboration with the industry as key aspects for delivering the expected programme impact.

This document is organized as follows. Section 2 presents the dissemination progress and Section 3 the training progress. Section 4 presents our main conclusions. Finally, Appendix A and Appendix B summarise the progress of the dissemination and training plans, respectively.

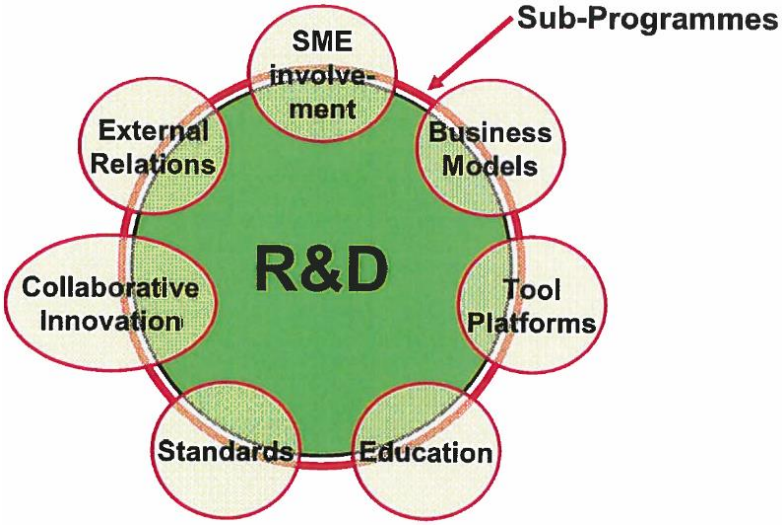


Figure 1. ARTEMIS open innovation model

2. Dissemination Progress

The dissemination activities performed in AMASS are divided into internal and external categories. In addition, communication activities have been performed. This section reports on the progress made in these three categories and presents an updated plan for general dissemination.

Table 1 presents the general objectives defined for dissemination in D8.5 [6] and their result. As can be observed, the results for most metrics are higher or very close to the objectives for the whole project.

2.1 Internal Dissemination

AMASS has used different methods to share information among the project partners to effectively collaborate and reach the project goals. The main methods have been:

- Wiki
- SVN repository
- Mailing lists

These methods have been implemented using a project collaboration platform, which is described in the next section.

2.1.1 Project Collaboration Platform

The AMASS **wiki** (Figure 2) has continued to be used to provide a space where the project partners can easily find and share information fast. The partners have used it, for example, to organise the topics to discuss in the general meetings. In addition, the ticket system in the wiki is being used to report on improvements to the AMASS Tool Platform (Figure 3). For example, this system has been used during the validation and evaluation phase of the Platform and also during the case study development as a way of communicating errors and failures to developers.

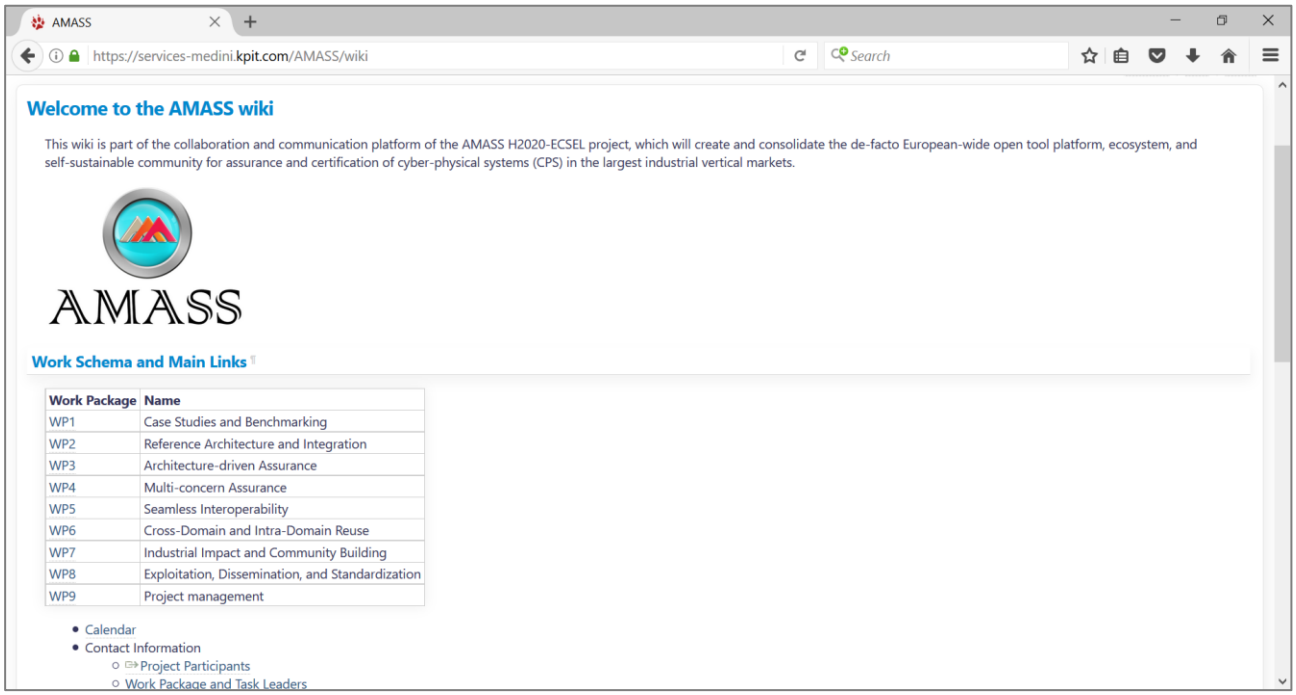


Figure 2. AMASS wiki

Table 1. General dissemination tools and channels

Dissemination tool/channel	How to measure	Objective for the whole project	Result until March 2019
Website	Monthly visits	100	14,700+ in total in 36 months (3,500+ between m01 and m12, 8000+ until m24)
	Duration of visits	2 min on average	2:33 min on average
	Downloads per year	35 for posters, flyers and newsletters; 50 for public reports	• 3,505 downloads in total in 36 months (~250 between m01 and m12; 1,600+ until m24); • 95 for the leaflet and 129 for the newsletters (26 and 10 between m01 and m12, and 60 and 59 until m24, respectively)
	References from external web pages	15 (excluding partners)	The search "*amass*" "*architecture-driven*" on Google returns around 3,000 entries (2,000 at m24), and "*www.amass-ecsel.eu*" around 900 (700 at m24)
Publications	Scientific papers at workshops	8	21 (7 between m01 and m12; 14 until m24)
	Scientific papers at conferences	8	49 (7 between m01 and m12; 24 until m24)
	Scientific articles	8	9 (2 between m01 and m12; 3 until m24)
	Articles in industry magazines or stakeholder journals	8	4 (1 between m01 and m12; 1 until m24)
Attendance to events	Posters presented at conferences	10	12 (3 between m01 and m12; 8 until m24)
	Oral communications at conferences / events	20	60+ (15 between m01 and m12; 41 until m24)
	Flyers distributed	400	450+ (150 between m01 and m12; 270 until m24)
	Attended fairs	4	5 (1 between m01 and m12; 3 until m24)
Organization of events	Workshops organized	3	14 (8 between m01 and m12; 10 until m24)
	Registered people at workshops	>30	30+ on average
	Organized conferences	2	6 (0 between m01 and m12; 2 until m 24)
	Registered people at the conferences	100-150	Approx. 150 on average
	Flyers distributed	450	450+ (150 between m01 and m12; 270 until m24)

The **SVN repository** (https://services.medini.eu/svn/AMASS_collab/) is the main tool that the AMASS partners use to share files. Figure 4 shows the repository structure. It contains over 2,700 folders and 24,000 files as of March 2019. Between m25 and m36, over 3,500 revisions have been committed. Another repository was initially used for the AMASS Tool Platform source code, but the code and its management have been moved to a public Git repository as a part of the AMASS open source solutions management.

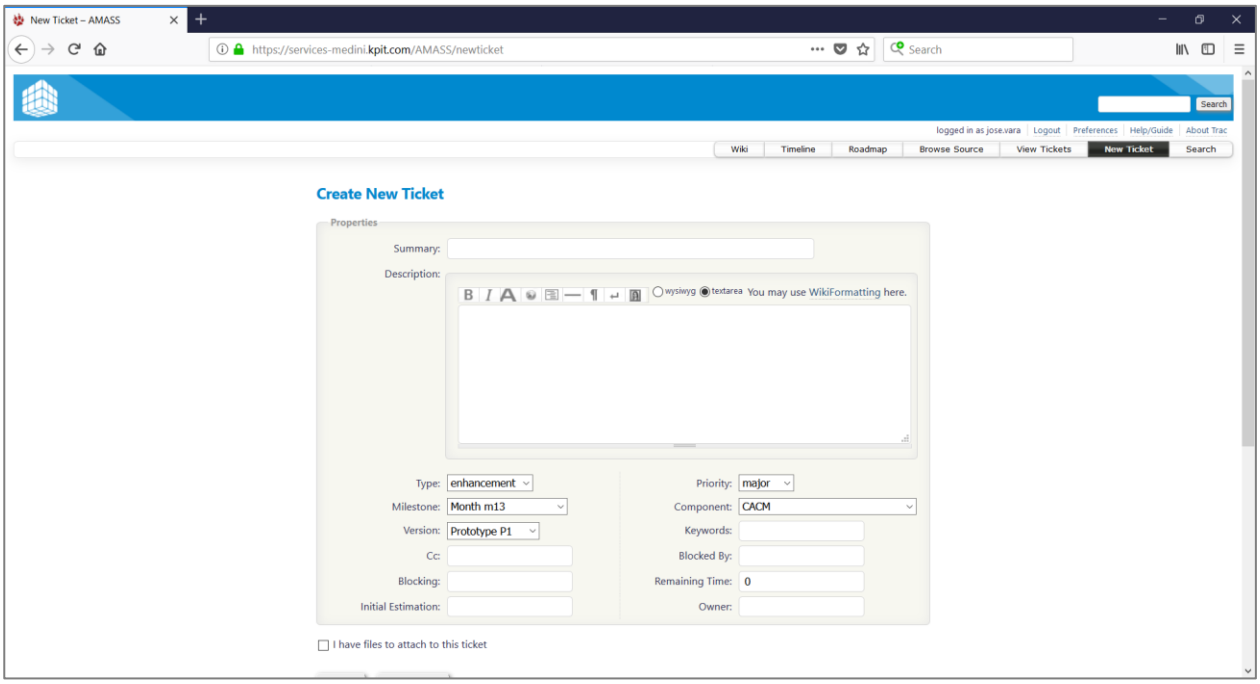


Figure 3. AMASS ticket system

The consortium uses 14 **mailing lists**. These are the main method used for internal communication. There is a general mailing list that all participants are subscribed to. This list aims to communicate project-wide information e.g. the organisation of Plenary meetings. The other 13 mailing lists target specific topics e.g. specific WPs or AMASS bodies (Technical Committee, EAB, etc.). D8.1 [5] provides details about the lists. As of March 31, 2019, the AMASS consortium has exchanged over 6,000 emails through the lists.

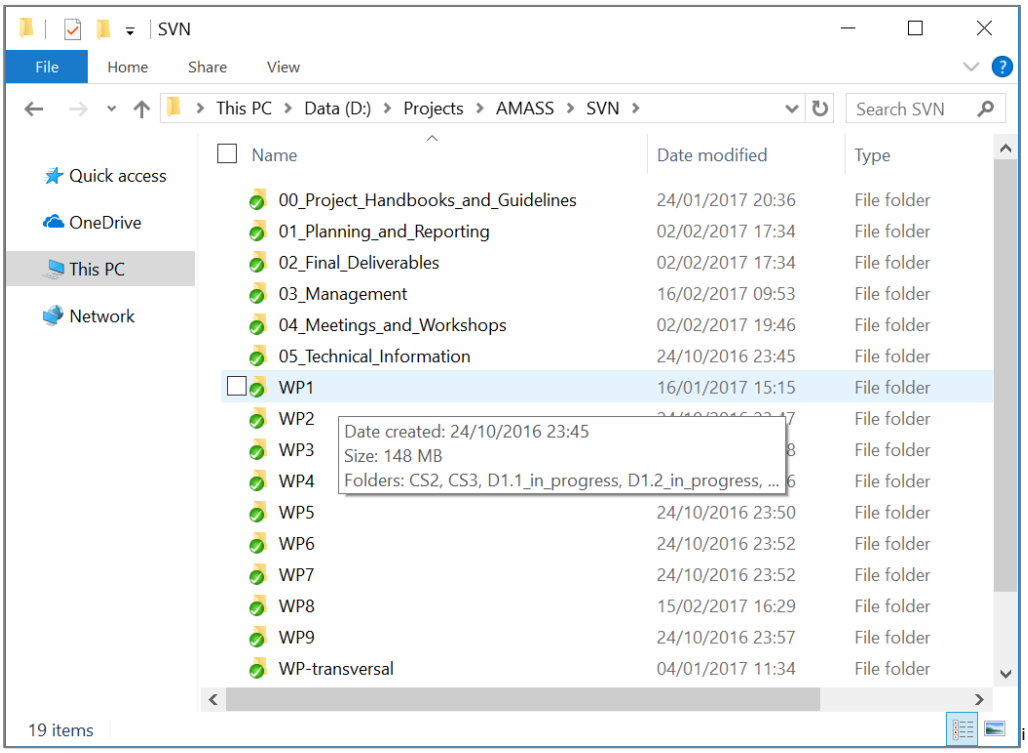


Figure 4. AMASS SVN repository

2.2 External Dissemination

External dissemination corresponds to those activities that aim to reach specific third-party audiences, e.g. the research communities related to AMASS. The different methods used for external dissemination are presented in the following subsections. They include the preparation of materials for different dissemination channels (e.g. publications) as well as the participation in and organisation of events.

2.2.1 AMASS Website

The AMASS website (https://amass-ecsel.eu/) was created during the first year of the project including project presentations, publicly downloadable documents (project reports and dissemination papers), links to related projects, demonstration material, a blog section, an EAB section, etc. The website was designed to be a channel for dissemination, training, and discussion. The AMASS logo and website graphics promote the project in a unified graphical layout.

During the third year of AMASS, the project website has been updated by modifying existing sections and creating new ones. The “Partners” section has been updated to reflect changes in some organizations. The images of the carrousel at the Home page have been changed, showing the last version of the ARTA, the new AMASS leaflet and the image promoting the AMASS Open Industrial Workshop.

New content has been added to the “Events”, “Blog”, “Deliverables”, “Dissemination”, “Publications” and “Demos” sections:

- A total of 46 events related to the project between April 2018 and March 2019 (8 internal and 38 external) have been added to the project calendar in the “Events” section.
- At the moment of writing this report, 8 events that have been planned after April 1st, 2019 (1 internal and 7 external) have been added to the project calendar in the “Events” section.
- A total of 19 blog posts have been created in the “Blog” section.
- 21 public deliverables, aside from this document, have been added to the “Deliverables” section.

- 3 Newsletters (April 2018, October 2018 and April 2019) have been published in the “Dissemination” section.
- A new project leaflet summarizing the AMASS usage scenarios has also been published in the “Dissemination” section. This leaflet has been used for dissemination in the EFECS 2018 Conference.
- Links to 2018 and 2019 publications have been inserted in the "Publications” section.
- 4 videos demonstrating the AMASS Prototype P1 features and 2 videos showing the application of the Prototype P1 in the Industrial Case Studies have been published in the “Demos” Section.
- 37 short videos about the AMASS Prototype P2 features have been published in the “Training” Section.

Three new pages have been designed in the website to hold the following information:

- **First EAB workshop** (Figure 6): this section shows information about the first meeting with the AMASS EAB (attendees, agenda, presentations and report of conclusions).
- **Second EAB workshop** (Figure 7): this section shows information about the second meeting with the AMASS EAB (attendees, agenda, presentations and report of conclusions).
- **AMASS Open Industrial Workshop** (Figure 8): this section gathers information about the final project event and provides a link to the registration page.

The homepage of the AMASS website is shown in the Figure 5. The actual website comprises the following sections:

- Home
- Objectives
- Organization:
  - External Advisory Board
    - First EAB Workshop
    - Second EAB Workshop
- Partners
- Library:
  - Deliverables
  - Dissemination
  - Publications
  - Training
  - Demos
- Blog
- Events
  - AMASS Open Industrial Workshop
- Contact Us

Another section is going to be completed in the next weeks with summaries of the main tool features developed during AMASS (pagers of the features; https://amass-ecsel.eu/content/amass-platform-funcionalities). The template to describe the features is shown in Figure 9.

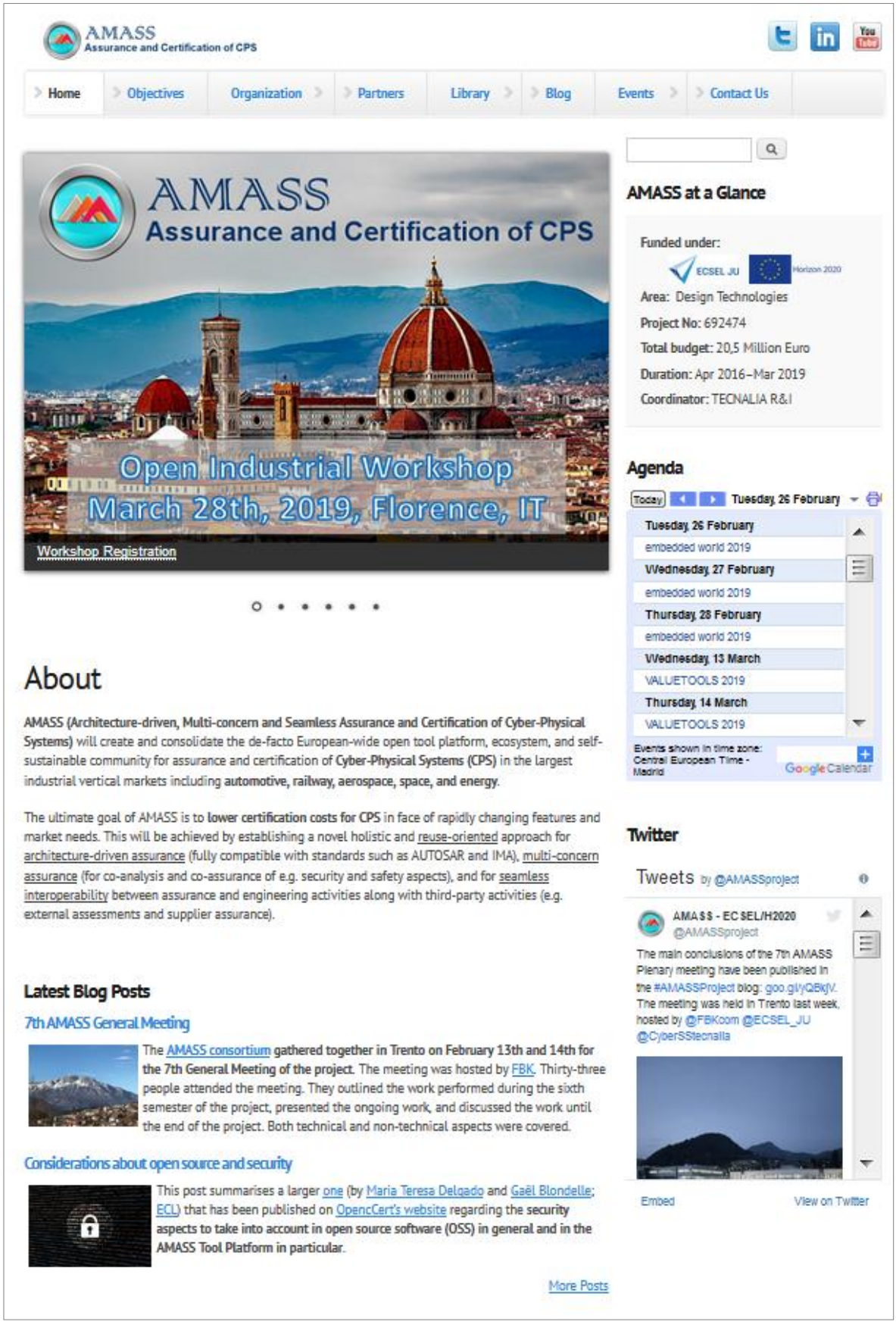
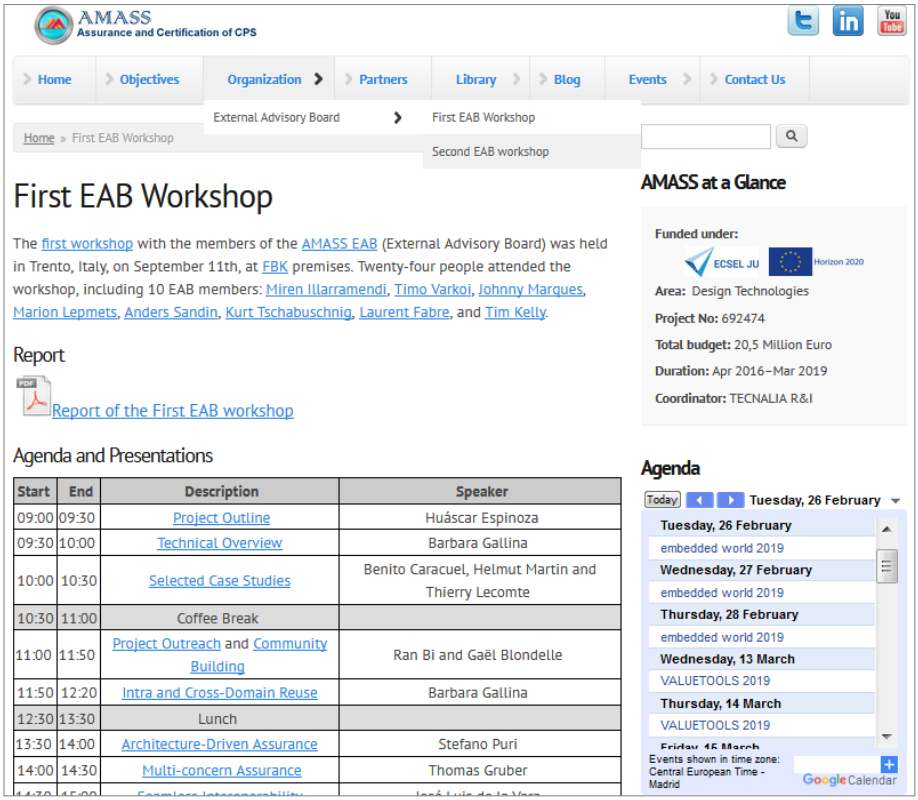


Figure 5. AMASS website



AMASS Assurance and Certification of CPS

Home | Objectives | Organization | Partners | Library | Blog | Events | Contact Us

External Advisory Board | First EAB Workshop | Second EAB workshop

Home » First EAB Workshop

First EAB Workshop

The first workshop with the members of the AMASS EAB (External Advisory Board) was held in Trento, Italy, on September 11th, at FBK premises. Twenty-four people attended the workshop, including 10 EAB members: Miren Illarramendi, Timo Varkoi, Johnny Marques, Marion Lepmets, Anders Sandin, Kurt Tschabuschnig, Laurent Fabre, and Tim Kelly.

Report

Report of the First EAB workshop

Agenda and Presentations

Start	End	Description	Speaker
09:00	09:30	Project Outline	Huáscar Espinoza
09:30	10:00	Technical Overview	Barbara Gallina
10:00	10:30	Selected Case Studies	Benito Caracuel, Helmut Martin and Thierry Lecomte
10:30	11:00	Coffee Break	
11:00	11:50	Project Outreach and Community Building	Ran Bi and Gaël Blondelle
11:50	12:20	Intra and Cross-Domain Reuse	Barbara Gallina
12:30	13:30	Lunch	
13:30	14:00	Architecture-Driven Assurance	Stefano Puri
14:00	14:30	Multi-concern Assurance	Thomas Gruber

AMASS at a Glance

Funded under: ECSEL JU Horizon 2020

Area: Design Technologies

Project No: 692474

Total budget: 20,5 Million Euro

Duration: Apr 2016–Mar 2019

Coordinator: TECNALIA R&I

Agenda

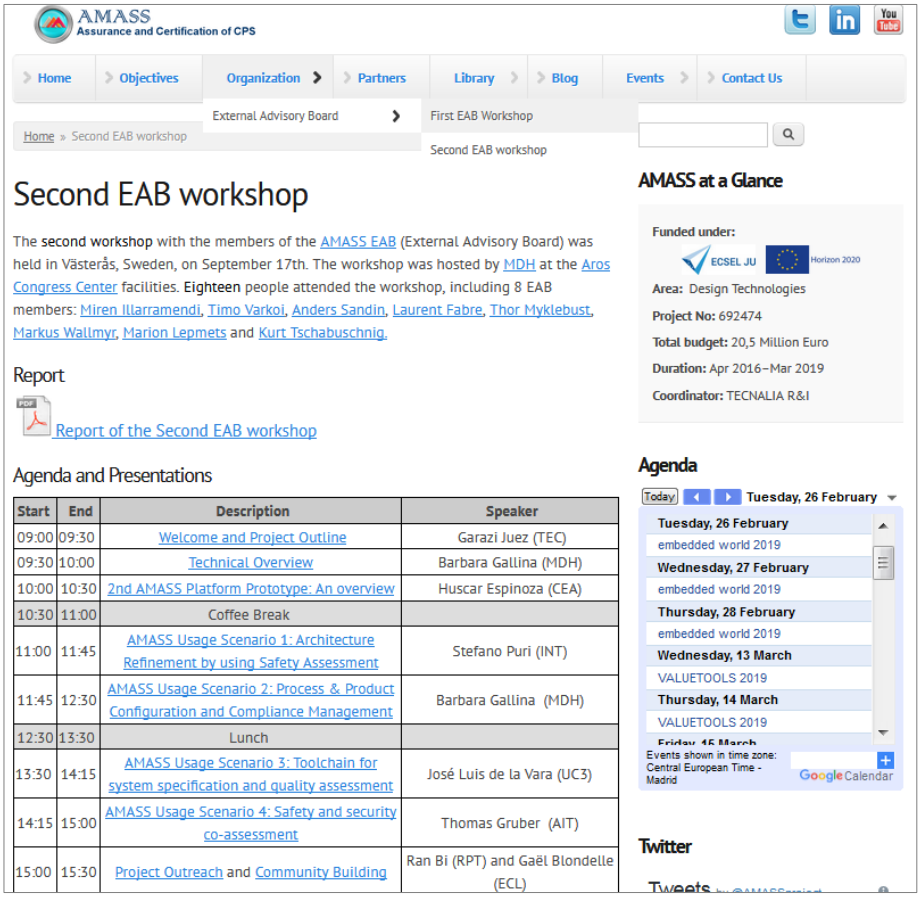
Today | Tuesday, 26 February

Tuesday, 26 February
embedded world 2019
Wednesday, 27 February
embedded world 2019
Thursday, 28 February
embedded world 2019
Wednesday, 13 March
VALUETOOLS 2019
Thursday, 14 March
VALUETOOLS 2019

Events shown in time zone: Central European Time - Madrid

Google Calendar

Figure 6. First EAB Workshop page



AMASS Assurance and Certification of CPS

Home | Objectives | Organization | Partners | Library | Blog | Events | Contact Us

External Advisory Board | First EAB Workshop | Second EAB workshop

Home » Second EAB workshop

Second EAB workshop

The second workshop with the members of the AMASS EAB (External Advisory Board) was held in Västerås, Sweden, on September 17th. The workshop was hosted by MDH at the Aros Congress Center facilities. Eighteen people attended the workshop, including 8 EAB members: Miren Illarramendi, Timo Varkoi, Anders Sandin, Laurent Fabre, Thor Myklebust, Markus Wallmyr, Marion Lepmets and Kurt Tschabuschnig.

Report

Report of the Second EAB workshop

Agenda and Presentations

Start	End	Description	Speaker
09:00	09:30	Welcome and Project Outline	Garazi Juez (TEC)
09:30	10:00	Technical Overview	Barbara Gallina (MDH)
10:00	10:30	2nd AMASS Platform Prototype: An overview	Huscar Espinoza (CEA)
10:30	11:00	Coffee Break	
11:00	11:45	AMASS Usage Scenario 1: Architecture Refinement by using Safety Assessment	Stefano Puri (INT)
11:45	12:30	AMASS Usage Scenario 2: Process & Product Configuration and Compliance Management	Barbara Gallina (MDH)
12:30	13:30	Lunch	
13:30	14:15	AMASS Usage Scenario 3: Toolchain for system specification and quality assessment	José Luis de la Vara (UC3)
14:15	15:00	AMASS Usage Scenario 4: Safety and security co-assessment	Thomas Gruber (AIT)
15:00	15:30	Project Outreach and Community Building	Ran Bi (RPT) and Gaël Blondelle (ECL)

AMASS at a Glance

Funded under: ECSEL JU Horizon 2020

Area: Design Technologies

Project No: 692474

Total budget: 20,5 Million Euro

Duration: Apr 2016–Mar 2019

Coordinator: TECNALIA R&I

Agenda

Today | Tuesday, 26 February

Tuesday, 26 February
embedded world 2019
Wednesday, 27 February
embedded world 2019
Thursday, 28 February
embedded world 2019
Wednesday, 13 March
VALUETOOLS 2019
Thursday, 14 March
VALUETOOLS 2019

Events shown in time zone: Central European Time - Madrid

Google Calendar

Twitter

Tweets

Figure 7. Second EAB Workshop page

AMASS
Assurance and Certification of CPS

Home | Objectives | Organization | Partners | Library | Blog | Events | Contact Us

Home » AMASS Open Industrial Workshop

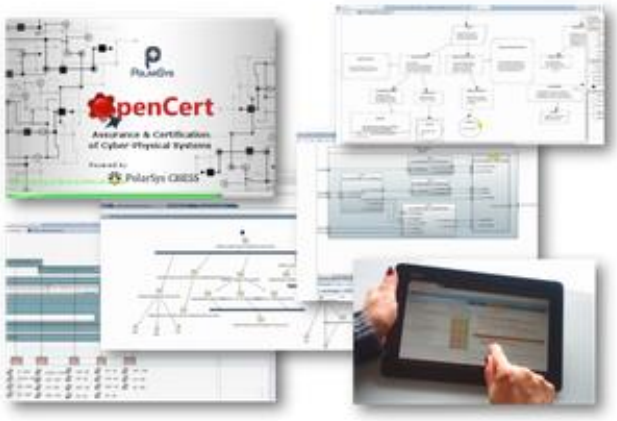
AMASS Open Industrial Workshop

The AMASS Open Industrial Workshop will be held on **March 28th, 2019, from 8:30 to 12:30, in Florence, Italy**. The event is co-located with the DATE 2019 conference (Design, Automation and Test in Europe; https://www.date-conference.com/).

The workshop is targeted at both practitioners and researchers aiming to gain awareness of the **latest advances on cost-effective assurance and certification of safety-critical systems**, and of how the corresponding solutions work. We will present practical aspects and concrete application examples of the main AMASS results in two main sessions: Introduction to the AMASS concepts and methodology, and Application of the AMASS approach, including demos and hands-on activities. Further information will be added in this webpage in the next weeks.

Attendance is **free of charge**. Nonetheless, we need you to register to keep track of the attendees: https://goo.gl/forms/aPJYmedtd7xTG4Yi1. The early registration deadline is March 1st, 2019. After this date, we cannot guarantee space for further attendees. In addition, you need to register for the DATE conference to enter the venue: https://www.date-conference.com/registration. A registration as exhibition visitor would be sufficient, which does not involve any costs.

Do not hesitate to contact us if you have any questions (main contact: Jose Luis de la Vara; jvara_AT_inf_DOT_uc3m_DOT_es)



AMASS at a Glance

Funded under: ECSEL JU, Horizon 2020
Area: Design Technologies
Project No: 692474
Total budget: 20,5 Million Euro
Duration: Apr 2016–Mar 2019
Coordinator: TECNALIA R&I

Agenda

Today | Tuesday, 26 February

Tuesday, 26 February
embedded world 2019
Wednesday, 27 February
embedded world 2019
Thursday, 28 February
embedded world 2019
Wednesday, 13 March
VALUETOOLS 2019
Thursday, 14 March
VALUETOOLS 2019

Events shown in time zone: Central European Time - Madrid
Google Calendar

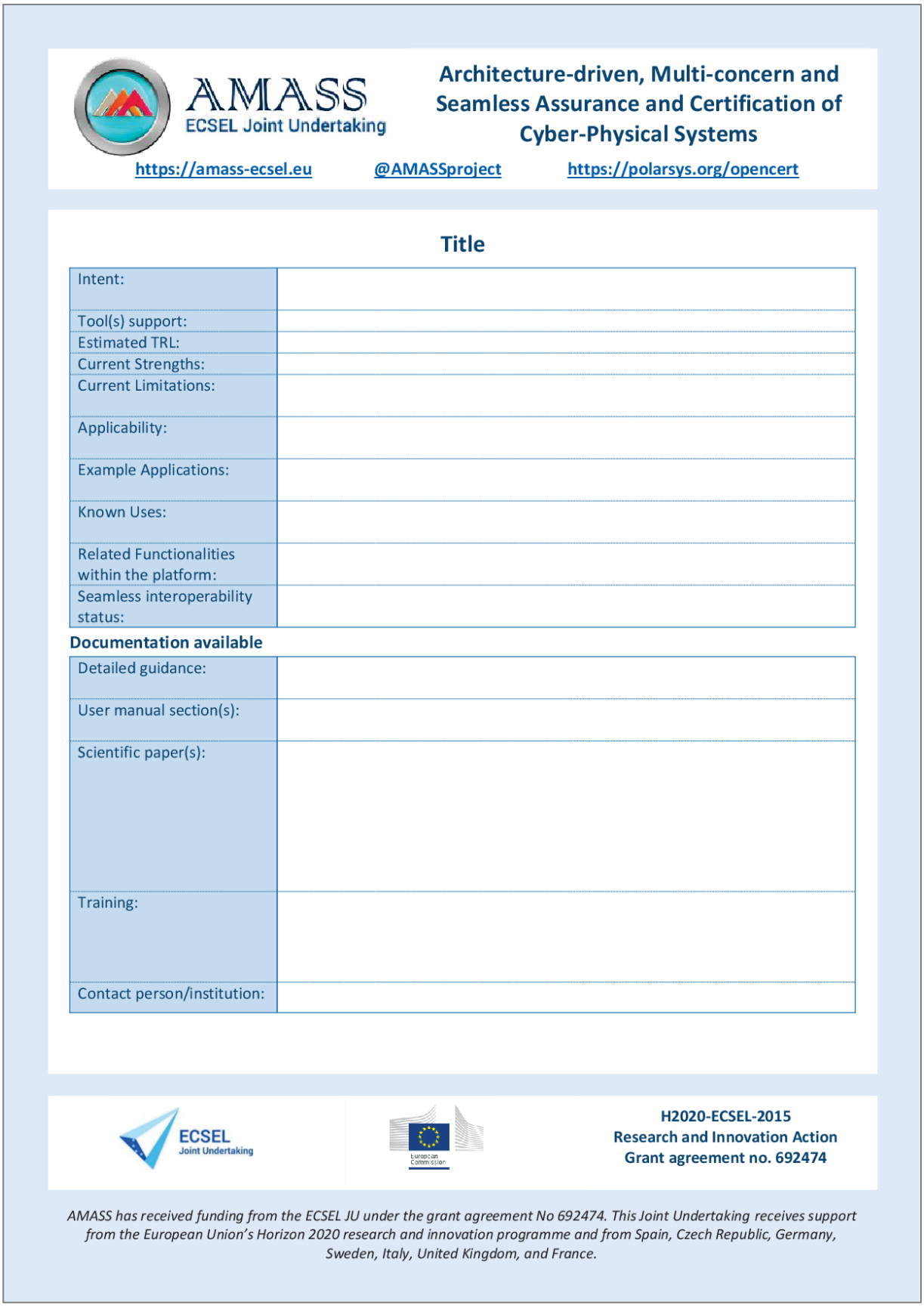
Twitter

Tweets by @AMASSproject

AMASS - ECSEL/H2020
@AMASSproject
The main conclusions of the 7th AMASS Plenary meeting have been published in the #AMASSProject blog: goo.gl/yQBkJV. The meeting was held in Trento last week, hosted by @FBKcom @ECSEL_JU @CyberSStecnalia

Embed View on Twitter

Figure 8. AMASS Open Industrial Workshop page



AMASS
ECSEL Joint Undertaking

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

https://amass-ecsel.eu @AMASSproject https://polarsys.org/opencert

Title

Intent:	
Tool(s) support:	
Estimated TRL:	
Current Strengths:	
Current Limitations:	
Applicability:	
Example Applications:	
Known Uses:	
Related Functionalities within the platform:	
Seamless interoperability status:	

Documentation available

Detailed guidance:	
User manual section(s):	
Scientific paper(s):	
Training:	
Contact person/institution:	

ECSEL Joint Undertaking

European Commission

H2020-ECSEL-2015
Research and Innovation Action
Grant agreement no. 692474

AMASS has received funding from the ECSEL JU under the grant agreement No 692474. This Joint Undertaking receives support from the European Union's Horizon 2020 research and innovation programme and from Spain, Czech Republic, Germany, Sweden, Italy, United Kingdom, and France.

Figure 9. Pager Template

Nineteen blog posts have been published during the third year of the project [1]. Each of them has been also disseminated through the AMASS Twitter account and other means:

- "BVR tool in AMASS", submitted on 2018, May 8
- "Safety Architect and Cyber Architect Tools in AMASS", submitted on 2018, May 18
- "Fourth semester of AMASS (and new newsletter)", submitted on 2018, June 6
- "AMASS results have been evaluated as remarkable in the second project review!", submitted on 2018, June 12
- "Collaboration between Rapita and OHB for code coverage analysis", submitted on 2018, July 6
- "Article about AMASS in Eclipse newsletter", submitted on 2018, July 27
- "SACM 2.0, the new version of the standard for structured assurance cases", submitted on 2018, August 24
- "Best paper award at QUATIC 2018!", submitted on 2018, September 11
- "Second workshop with EAB members", submitted on 2018, September 21
- "The SASSUR 2018 workshop has been successfully held!", submitted on 2018, September 28
- "AMASS presence at SAFECOMP 2018", submitted on 2018, October 5
- "medini analyze User Conference", submitted on 2018, October 10
- "6th AMASS General Meeting", submitted on 2018, October 24
- "Fifth semester of AMASS (and new newsletter)", submitted on 2018, November 16
- "AMASS Open Industrial Workshop", submitted on 2019, January 14
- "Considerations about open source and security", submitted on 2019, February 8
- "7th AMASS General Meeting", submitted on 2019, February 15
- "TRC results in AMASS", submitted on 2019, March 1
- "The AMASS Open Industrial Workshop has been successfully held!", to be submitted on 2019, April 4

21 public deliverables have been published [2] aside from this document:

- D4.3 Design of the AMASS tools and methods for multiconcern assurance (b)
- D2.4 AMASS reference architecture (c)
- D5.3 Design of the AMASS tools and methods for seamless interoperability (b)
- D6.3 Design of the AMASS tools and methods for cross/intra-domain reuse (b)
- D3.6 Prototype for architecture-driven assurance (c)
- D4.6 Prototype for multiconcern assurance (c)
- D5.6 Prototype for seamless interoperability (c)
- D3.8 Methodological guide for architecture-driven assurance (b)
- D4.8 Methodological guide for multiconcern assurance (b)
- D5.8 Methodological guide for seamless interoperability
- D2.5 AMASS user guidance and methodological framework
- D6.6 Prototype for cross/intra-domain reuse (c)
- D6.8 Methodological guide for cross/intra-domain reuse (b)
- D2.8 Integrated AMASS platform (c)
- D7.7 AMASS open source platform provisioning and website (c)
- D8.4 Exploitation Results and Final Market Megatrends Analysis
- D1.6 AMASS demonstrators (c)
- D2.9 AMASS platform validation

- D7.2 External advisory board and industrial adoption program report
- D1.7 AMASS solution benchmarking
- D8.11 Standardization Roadmap and Report
- D8.8 Dissemination and Training Progress (c)

The AMASS website is an efficient tool used to report progress made during the project. The number of visits to the AMASS website during the full duration of the project (from April 1, 2016 to March 31, 2019) was 14,732. Further statistics are shown in Figure 10.

After the homepage, the most frequently accessed page of the AMASS website has been the one with the deliverables (Figure 11). The AMASS social media channel with the highest number of accesses to the AMASS website has been Twitter (Figure 12).

In addition to the main AMASS website, the partners maintain the web of the open source community built around project results in the scope of the OpenCert open source project (https://www.polarsys.org/opencert/). More information about this web can found in the deliverables that present the AMASSS open source platform (e.g. D7.7 [4]).

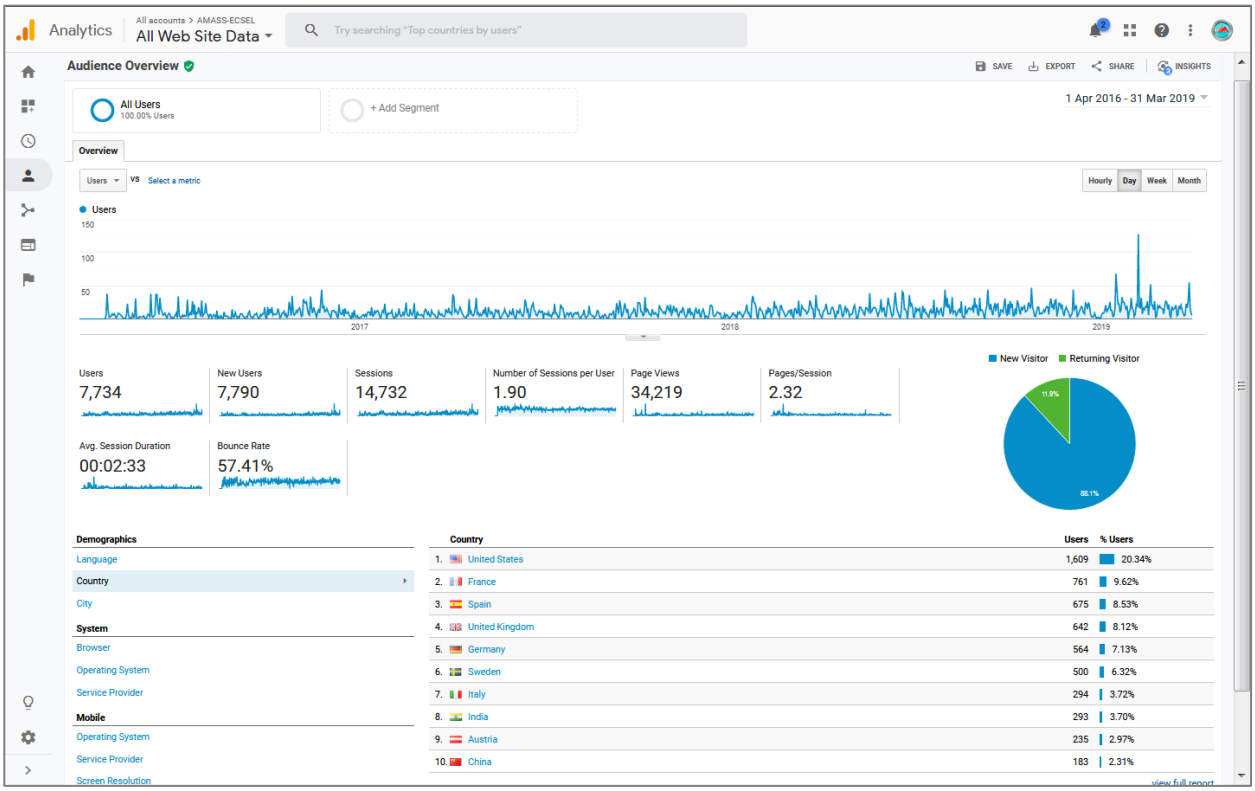


Figure 10. Statistics for the AMASS website

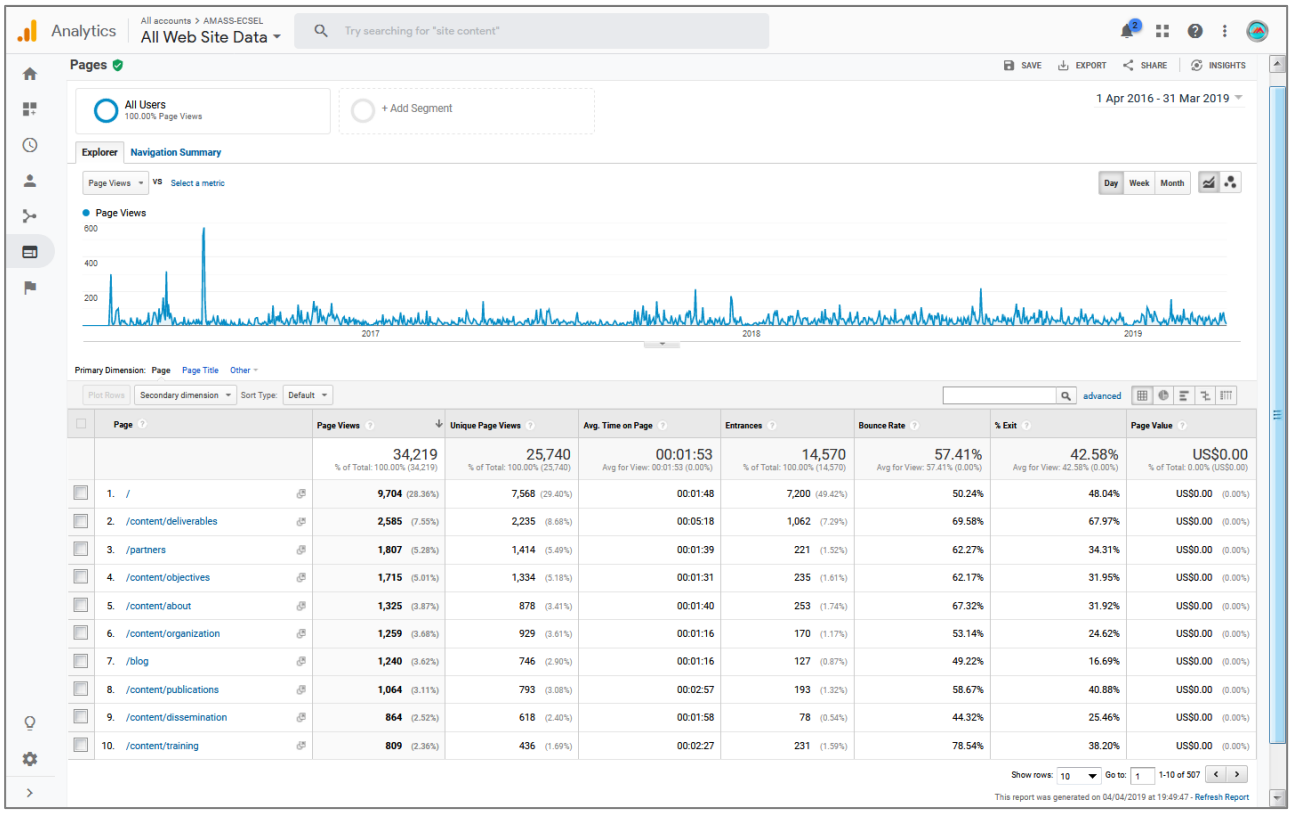


Figure 11. View of the access to the pages of the AMASS website

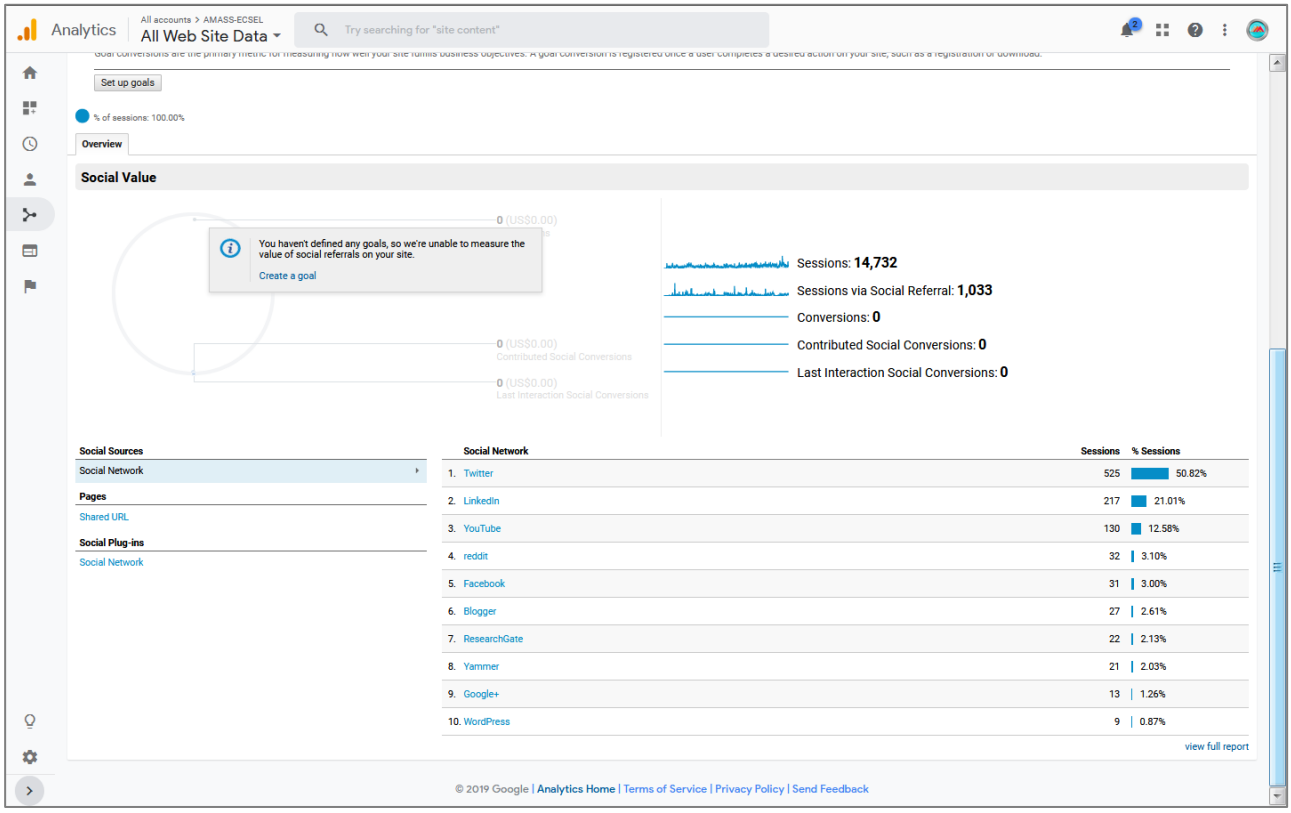


Figure 12. View of the access to the website from the AMASS social media channels

2.2.2 Dissemination Material

During the third year of the project, the AMASS consortium has maintained its dissemination materials. The main materials are:

- Project logo (see document front page)
- Project newsletters (see Section 2.3 for more details)
- Project presentations (Figure 13), a short (10-15 min.) and long version (around 30 min.)

In addition, a new leaflet in the form of a triptych has been prepared (Figure 14 and Figure 15), which focuses on usage scenarios of the AMASS results.

In previous years, ECSEL prepared the official leaflet and poster of the project (Figure 16), in collaboration with the AMASS partners. Later on, the AMASS consortium also prepared a leaflet (Figure 17 and Figure 18) and a poster (Figure 19) that have been used as a complement to the official ones.

The dissemination material has been used at the events that the AMASS partners have organized (see 2.2.5) and have attended (see Section 2.2.6). New posters have also been prepared for specific events; more concretely for EclipseCon 2018 (by the AMASS partners; Figure 20) and for EFECS 2018 (by ECSEL; Figure 21).

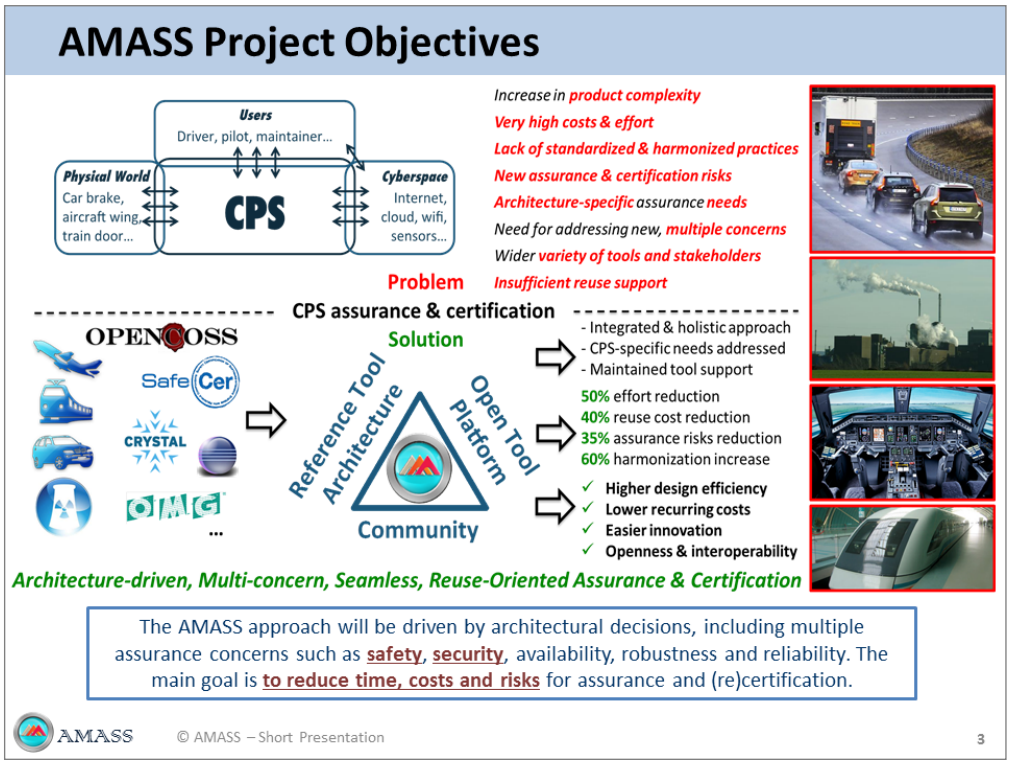


Figure 13. Example of slides in the AMASS presentations

Figure 14. AMASS Triptych (1)

Figure 15. AMASS Triptych (2)

AMASS

ECSEL JU

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

Objectives

AMASS will create and consolidate the de-facto European-wide open tool platform, ecosystem, and self-sustainable community for assurance and certification of Cyber-Physical Systems (CPS). The ultimate goal of AMASS is to lower certification costs for CPS in face of rapidly changing features and market needs. The following main technical objectives have been defined:

- Define a holistic approach for architecture-driven assurance that directly and explicitly addresses current technologies and product architecture needs.
- Define a multi-concern assurance approach to ensure not only safety and security, but also other dependability aspects such as availability, robustness and reliability.
- Consolidate a cross-domain and intra-domain assurance reuse approach to improve mutual recognition agreement of compliance approvals.
- Develop a fully-fledged open tool platform that will allow developers and other stakeholders to guarantee seamless interoperability of the platform with other tools used in CPS development.

Relevance and Impact

The AMASS consortium consists of partners with wide experience in critical system assurance and certification, covering its whole value chain:

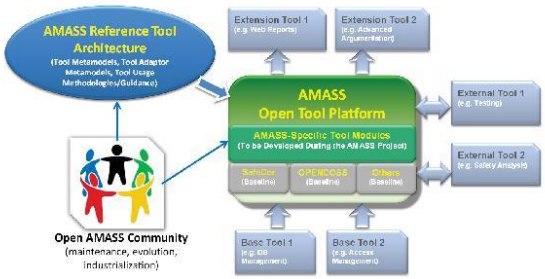
- OEMs (including system integrators) and Component suppliers will use AMASS results to increase CPS design cost-effectiveness, ease innovation, and reduce the costs and risks of assurance.
- Assessors and Certification authorities will be able to provide CPS-specific services.
- Tool vendors will extend their products with new features and integrate them with the AMASS Platform.
- Research partners will be able to reach a leading position in research on CPS assurance and certification by contributing to top-notched, flagship solutions.

In addition, European society will benefit from the use of CPS with a higher confidence in their dependability, for a wide range of applications in transport, manufacturing, healthcare, energy, defence, and communications.

Technical Innovation

The main tangible results of the projects will be:

- AMASS Reference Tool Architecture, which will extend prior conceptual and methodological frameworks for architecture-driven and multi-concern assurance, as well as for reuse and seamless interoperability.
- AMASS Open Tool Platform, which will correspond to an open collaborative tool environment that supports CPS assurance and certification. It is a concrete implementation of the Reference Tool Architecture.
- Open AMASS Community, which will manage the project outcomes, for maintenance, evolution and industrialization. The Open Community will be supported by a governance board, rules, policies, and quality models.



The results will ultimately allow AMASS to demonstrate:

- Gain for design efficiency of complex CPS by reducing their assurance and certification effort.
- Reuse of assurance results, leading to cost reductions for (re)certification.
- Raise of technology innovation led by reduction of assurance and certification risks of CPS products.
- Sustainable impact in CPS industry by increasing the harmonization and interoperability of assurance and certification support technologies.

AMASS

Project Coordinator
Huascar Espinoza

Institution
TECNALIA Research & Innovation

Email
huascar.espinoza@tecnalia.com

Website
www.amass-ecsel.eu

Start 1-4-2016
Duration 36

Total investment
€M 20.5

Participating organisations
29

Number of countries
8

Austria
AIT AUSTRIAN INSTITUTE OF TECHNOLOGY GMBH
KOMPETENZZENTRUM – DAS VIRTUELLE FAHRZEUG FORSCHUNGSGESELLSCHAFT MBH

Czech Republic
HONEYWELL
MASARYK UNIVERSITY

Germany
KPIT MEDINI TECHNOLOGIES AG
ECLIPSE FOUNDATION EUROPE
INFINEON
BERNER & MATTNER
LANGE AVIATION

France
ALLIANCE POUR LES TECHNOLOGIES DE L'INFORMATIQUE
ALSTOM TRANSPORT S.A.
COMMISARIAT A LENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES
CLEARSY SAS

Italy
FONDAZIONE BRUNO KESSLER
INTECS
RINA
THALES ITALIA SPA

Sweden
MÄLARDALEN UNIVERSITY
OHB SWEDEN AB
ALTEN SVERIGE AKTIEBOLAG
SP SVERIGES TEKNISKA FORSKNINGSINSTITUT
COMENTOR AB

United Kingdom
RAPITA SYSTEMS

Spain
TECNALIA RESEARCH & INNOVATION
GMV AEROSPACE AND DEFENCE, S.A.U.
THALES ALENIA SPACE
UNIVERSIDAD CARLOS III DE MADRID
THE REUSE COMPANY
SCHNEIDER ELECTRIC ESPAÑA S.A

Figure 16. Official AMASS leaflet and poster

AMASS

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

AMASS has created and consolidated the **de-facto European-wide open tool platform, ecosystem, and self-sustainable community for assurance and certification of Cyber-Physical Systems** (CPS) in the largest industrial vertical markets including automotive, railway, aerospace, space, and energy.

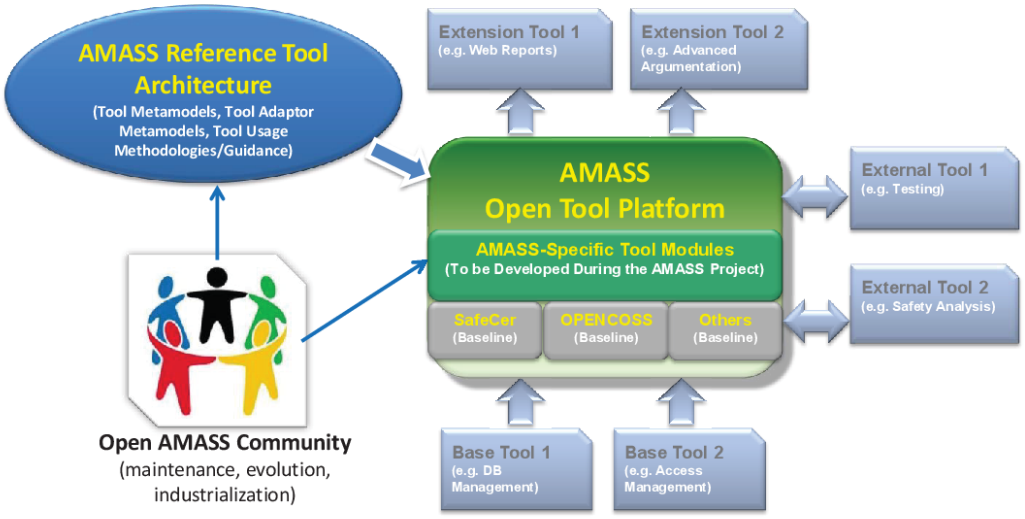
The ultimate goal of AMASS is to **lower certification costs** for CPS in face of rapidly changing features and market needs. This has been achieved by establishing **a novel holistic and reuse-oriented approach for architecture-driven assurance** (fully compatible with standards such as SysML), **multi-concern assurance** (for co-analysis and co-assurance of e.g. security and safety aspects), **and seamless interoperability** between assurance and engineering activities along with third-party activities (e.g. external assessments and supplier assurance).

AMASS work has built on the **results from previous successful EU projects** such as OPENCOSS, SafeCer, CRYSTAL, CHESS, and SESAMO.

Key data
Apr 2016 - Mar 2019
29 partners from 8 countries
EUR 20.5M budget
EUR 6.2M EU funding
EUR 4.2M national funding
Approx. 2500 persons/month

Web: http://amass-ecsel.eu/
Twitter: @AMASSproject

Coordination
Tecnalia Research & Innovation
Dr. Alejandra Ruiz
Alejandra.Ruiz@tecnalia.com



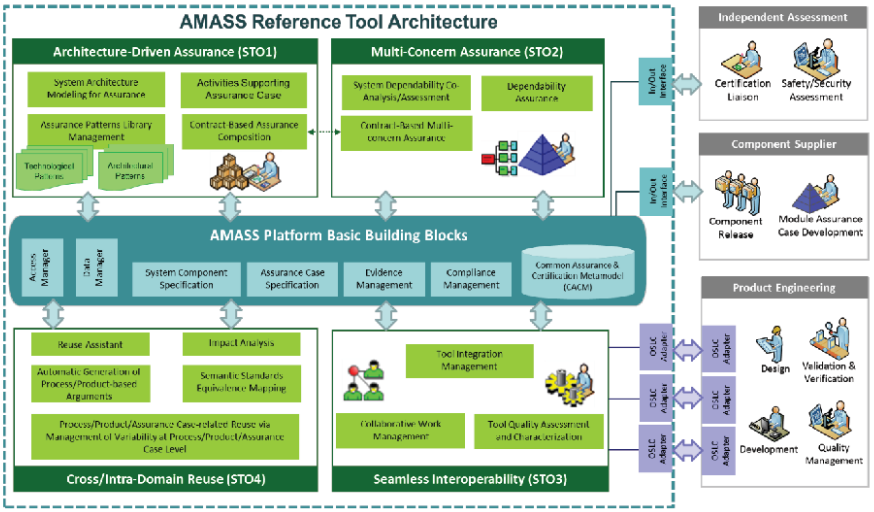
ECSEL Joint Undertaking

European Commission

H2020-ECSEL-2015
Research and Innovation Action
Grant agreement no. 692474

Figure 17. Front of the project leaflet prepared by the AMASS consortium

Overview of the Technological Solution



Goals

1. A potential gain for **design efficiency** of complex CPS by reducing their assurance and certification/qualification effort by 50%;
2. A potential reuse of assurance results (qualified or certified before), leading to 40% of **cost reductions** for component/product (re)certification/qualification activities;
3. A potential raise of **technology innovation** led by 35% reduction of assurance and certification risks of new CPS products, and;
4. A potential sustainable impact in CPS industry by increasing the **harmonization and interoperability** of assurance and certification/qualification tool technologies by 60%.

AMASS results have been validated and their benefits have been evaluated in 11 case studies from aerospace, automotive, avionics, industrial automation, and railway.

Impact

- **OEMs** (including system integrators) **and Component suppliers** will use AMASS results in order to increase CPS design cost-effectiveness, ease innovation, and reduce the costs and risks of CPS assurance and certification
- **Assessors and Certification authorities** will be able to provide services that better fit CPS-specific needs
- **Tool vendors** will extend their products with new features and integrate them with the AMASS Open Tool Platform, further benefiting from the openness and interoperability that AMASS will enable
- **European society** will benefit from the use of CPS with a higher confidence in their dependability, for a wide range of applications in transport, manufacturing, healthcare, energy, defence, and communications.

Project partners

Tecnalia R&I (ES)
Honeywell (CZ)
Schneider Electric (ES)
ANSYS medini Technologies (DE)
Mälardalen University (SE)
Eclipse Foundation Europe (DE)
Infineon (DE)
Austrian Inst. of Technology (AT)
Fondazione Bruno Kessler (IT)
Intecs (IT)
Assystem (DE)
GMV Aerospace & Defence (ES)
RINA (IT)
Thales Alenia Space (ES)
Univ. Carlos III de Madrid (ES)
Rapita Systems (UK)
The REUSE company (ES)
OHB (SE)
Masaryk University (CZ)
Alstom Transport (FR)
Virtual Vehicle (AT)
ALL4TEC (FR)
CEA List (FR)
ClearSy (FR)
Alten (SE)
Lange Research Aircraft (DE)
Thales (IT)
Research Insts. of Sweden (SE)
Comentor (SE)

Figure 18. Back of the project leaflet prepared by the AMASS consortium

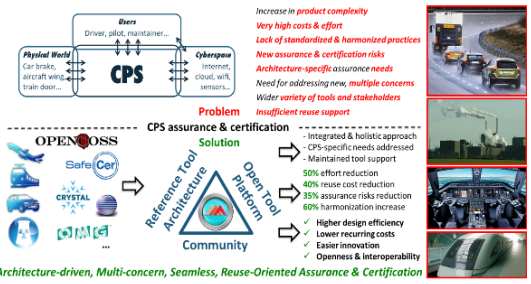
AMASS

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

1 Project Objectives

AMASS will create and consolidate the European-wide **open tool platform, ecosystem, and self-sustainable community for assurance and certification of Cyber-Physical Systems** (CPS). The ultimate goal of AMASS is to lower certification costs for CPS in face of rapidly changing features and market needs. The project will:

- Define a holistic approach for **architecture-driven assurance** that addresses current technologies and product architecture needs.
- Define a **multi-concern assurance** approach to ensure not only safety and security, but also other dependability aspects.
- Consolidate a **cross-domain and intra-domain assurance reuse** approach to improve mutual recognition of compliance approvals.
- Develop a fully-fledged open tool platform that will allow developers and other stakeholders to guarantee **seamless interoperability** of the platform with other tools used in CPS development.



2 Technical Innovation

The main tangible results of the projects will be:

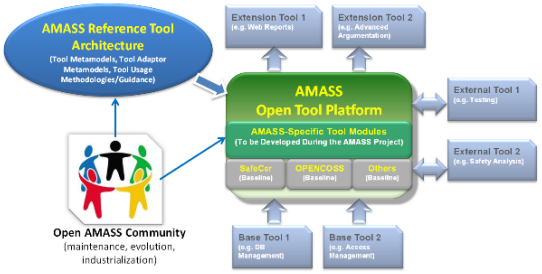
1. AMASS Reference Tool Architecture, which will extend prior conceptual and methodological frameworks for architecture-driven and multi-concern assurance, as well as for reuse and seamless interoperability.

2.AMASS Open Tool Platform, which will correspond to an open collaborative tool environment that supports CPS assurance and certification. It is a concrete implementation of the Reference Tool Architecture.

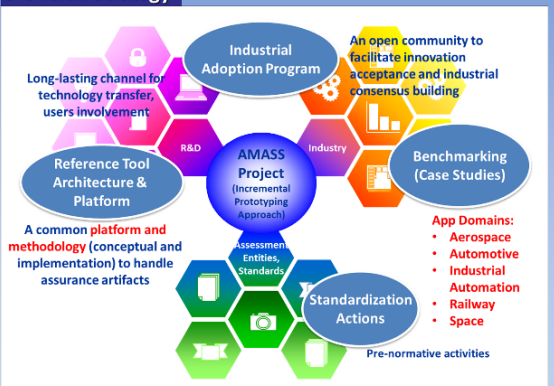
3.Open AMASS Community, which will manage the project outcomes, for maintenance, evolution, and industrialization. The Open Community will be supported by a governance board, rules, policies, and quality models.

The results will ultimately allow AMASS to demonstrate:

- Gain for **design efficiency** of complex CPS by reducing their assurance and certification effort.
- Reuse of assurance results, leading to **cost reductions** for (re)certification.
- Raise of technology innovation led by **reduction of assurance and certification risks** of CPS products.
- Sustainable impact in CPS industry by increasing the **harmonization and interoperability** of assurance and certification support technologies.

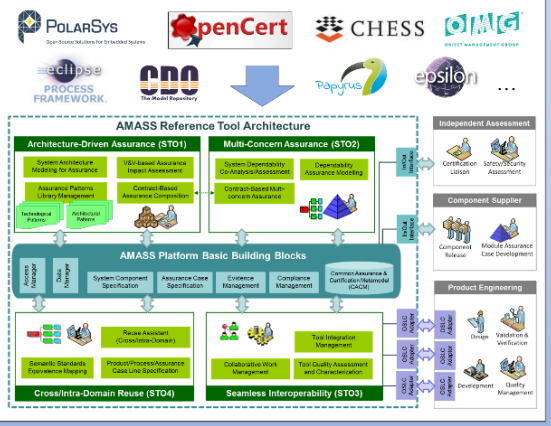


3 Overall Strategy



4 Technological Solution

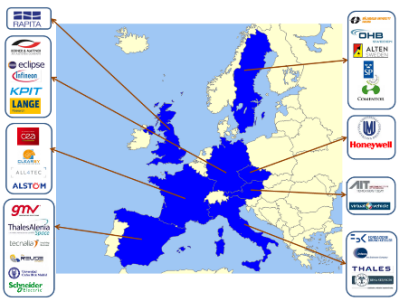
A **model-based approach and tool support** for CPS assurance and certification in the largest industrial vertical markets, including automotive, railway, aerospace, space, and energy domains



AMASS in a Nutshell

H2020-ECSEL-2015 Research & Innov. Action - Grant agreement no. 692474

Apr 16 - Mar 19
29 partners
8 countries
20.7M€ budget
~2500 pm effort



http://amass-ecsel.eu/ @AMASSproject

Figure 19. Project poster prepared by the AMASS consortium

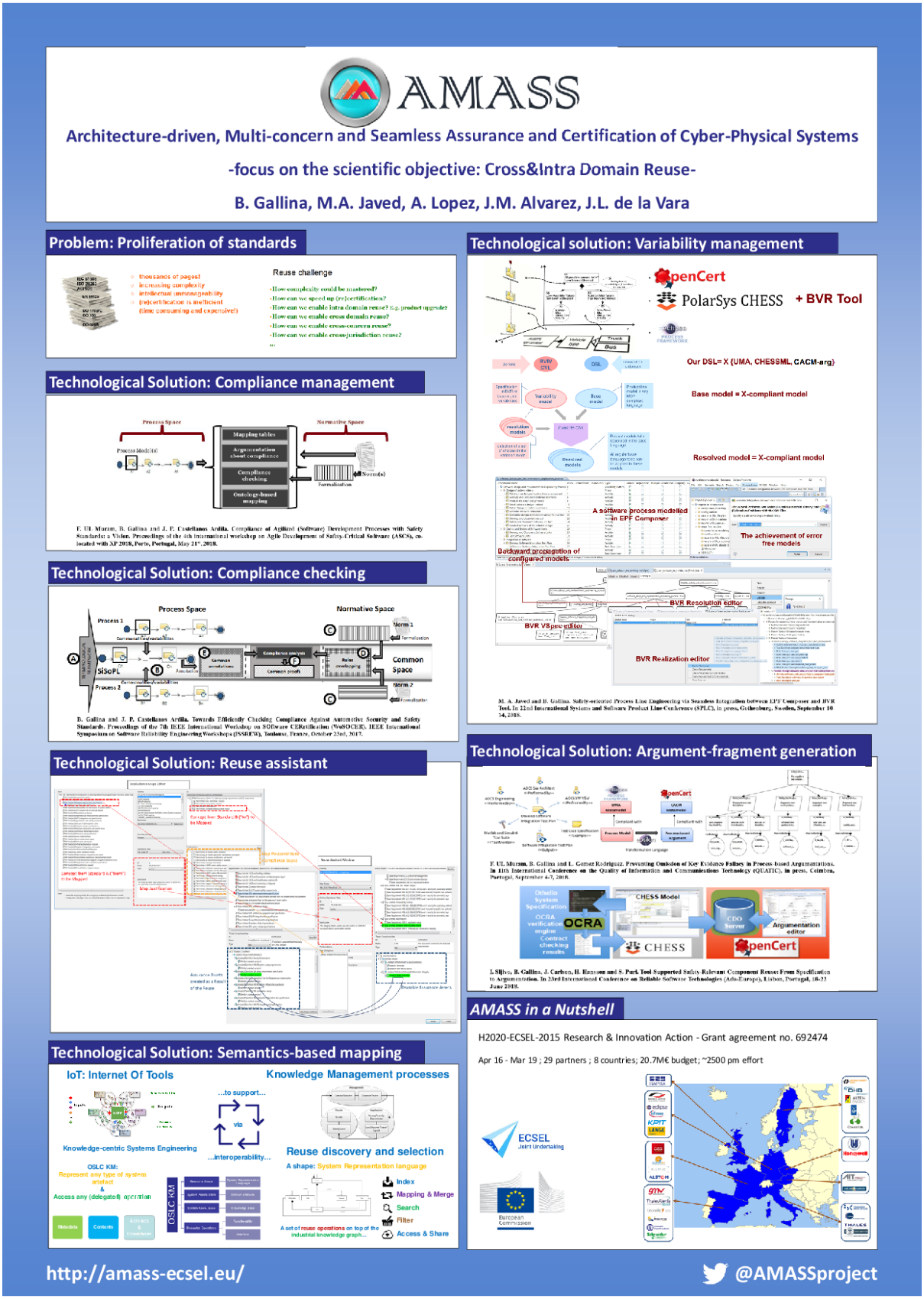


Figure 20. Project poster for EclipseCon 2018

AMASS

ECSEL JU

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

Objectives

AMASS is creating and consolidating the **de-facto European-wide open tool platform, ecosystem, and self-sustainable community for assurance and certification of Cyber-Physical Systems** (CPS).

The ultimate goal of AMASS is to **lower certification costs for CPS** in face of rapidly changing features and market needs. This will be achieved by establishing a novel holistic and reuse-oriented approach for architecture-driven assurance (fully compatible with standards such as SysML), multi-concern assurance (for co-analysis and co-assurance of e.g. security and safety aspects), and seamless interoperability between assurance and engineering activities along with third-party activities (e.g. external assessments).

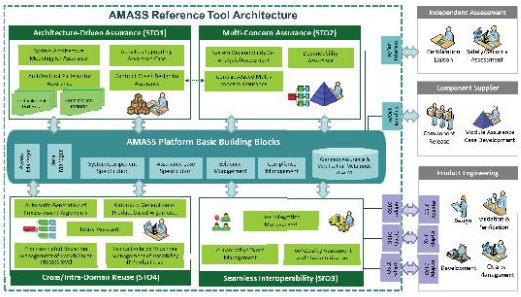
Technical Innovation

The main tangible results of the projects will be:

- **AMASS Reference Tool Architecture**, which will extend prior frameworks.
- **AMASS Open Tool Platform** for CPS assurance and certification by implementing the Reference Tool Architecture.
- **Open AMASS Community** to manage outcome maintenance and industrialization.

The results will ultimately allow AMASS to demonstrate:

- **Gain for design efficiency** of complex CPS by reducing their assurance effort.
- **Reuse of assurance results**, leading to cost reductions for (re)certification.
- **Raise of technology innovation** led by reduction of assurance and certification risks.
- **Sustainable impact in industry** through technology harmonization and interoperability.



Austria
AIT AUSTRIAN INSTITUTE OF TECHNOLOGY GMBH
KOMPETENZZENTRUM – DAS VIRTUELLE FAHRZEUG FORSCHUNGS-GESELLSCHAFT MBH

Czech Republic
HONEYWELL
MASARYK UNIVERSITY

Germany
KRIT MEDINI TECHNOLOGIES AG
ECLIPSE FOUNDATION EUROPE
INFINEON
BERNER & MATTNER
LANGE AVIATION

France
ALLIANCE POUR LES TECHNOLOGIES DE L' INFORMATIQUE
ALSTOM TRANSPORT S.A.
COMMISARIAT A LENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES
CLEARSY SAS

Italy
FONDAZIONE BRUNO KESSLER
INTECS
RINA
THALES ITALIA SPA

Sweden
MÄLARDALEN UNIVERSITY
OHB SWEDEN AB
ALTEN SVERIGE AKTIEBOLAG
SP SVERIGES TEKNISKA FORSKNINGSINSTITUT
COMENTOR AB

United Kingdom
RAPITA SYSTEMS

Spain
TECNALIA RESEARCH & INNOVATION
GMV AEROSPACE AND DEFENCE, S.A.U.
THALES ALENIA SPACE
UNIVERSIDAD CARLOS III DE MADRID
THE REUSE COMPANY
SCHNEIDER ELECTRIC ESPAÑA S.A

AMASS

Project Coordinator
Alejandra Ruiz

Institution
TECNALIA Research & Innovation

Email
alejandra.ruiz@tecnalia.com

Website
www.amass-ecsel.eu

Start 1-4-2016
Duration 36

Total investment
€M 20.5

Participating organisations
29

Number of countries
8

Figure 21. Project poster for EFECS 2018

2.2.3 Social Media Activity

AMASS has been active on two social media platforms:

- Twitter (Figure 22; https://twitter.com/AMASSproject) and
- LinkedIn (Figure 23; https://www.linkedin.com/groups/3807241)

As of March 31, 2019, the Twitter account has 161 followers and the LinkedIn group has 278 members. During the third project year, AMASS has published 54 project-specific tweets and started 14 discussions on the LinkedIn group.

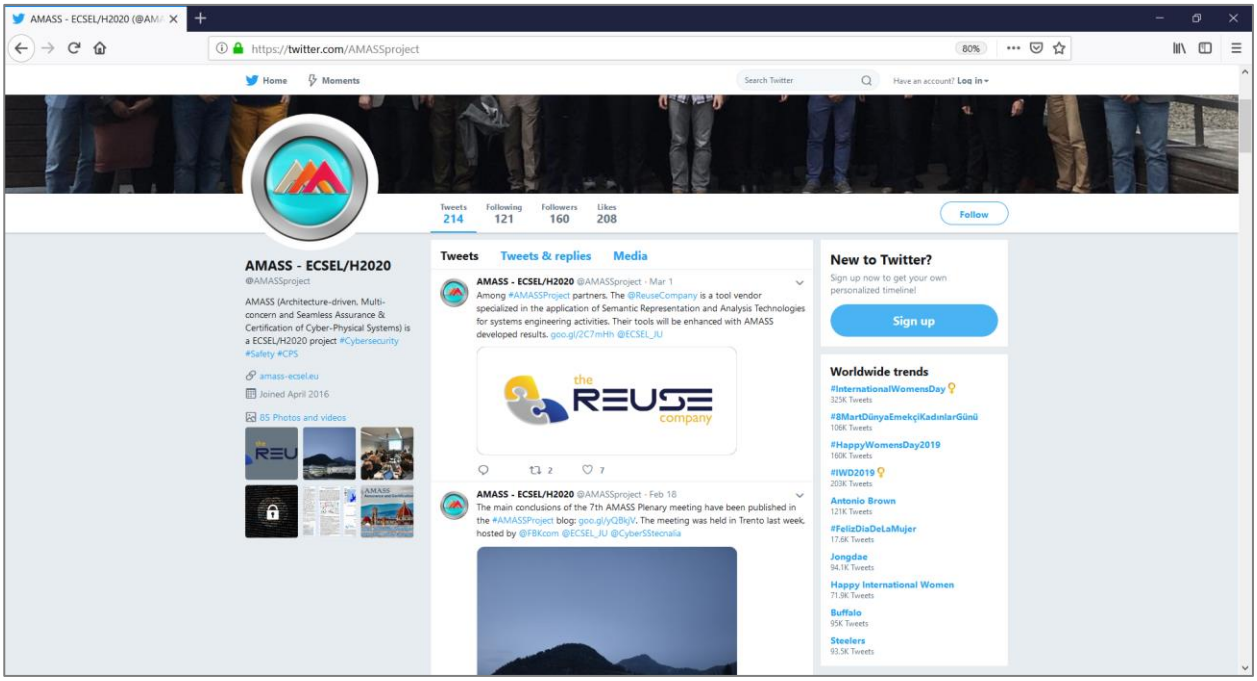


Figure 22. AMASS Twitter account

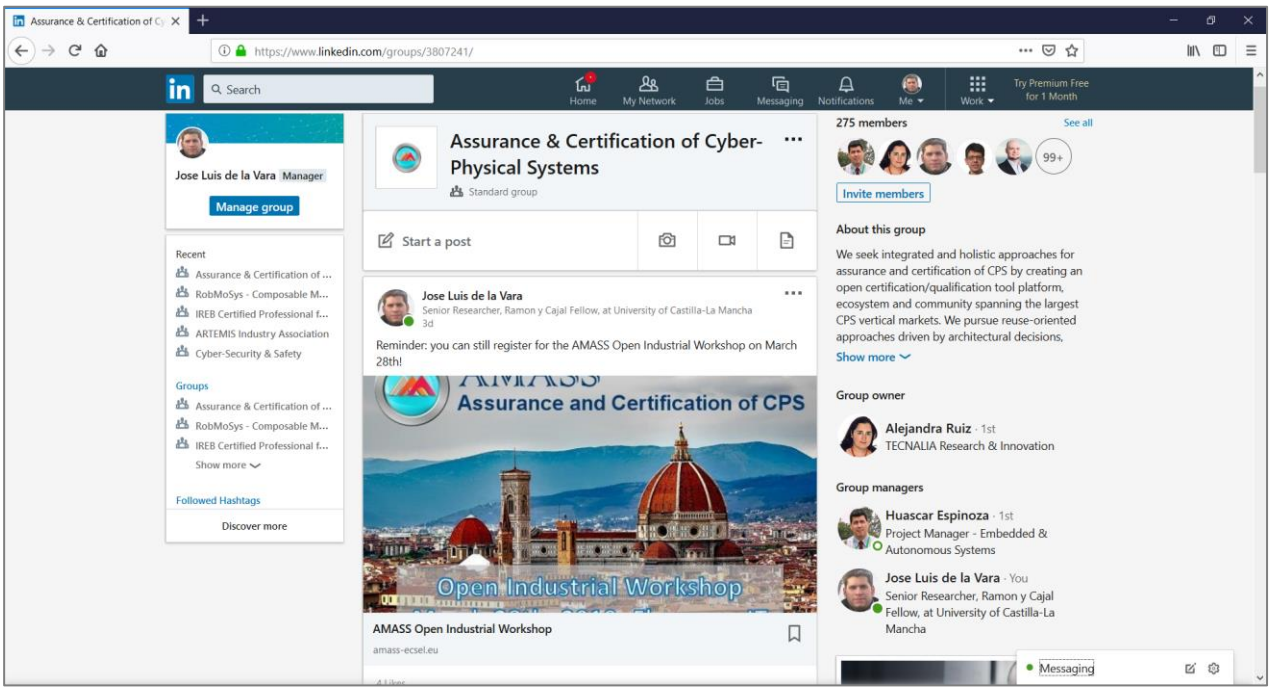


Figure 23. LinkedIn group managed by AMASS

2.2.4 YouTube Channel

The YouTube channel (Figure 24) with videos about the results of AMASS and about the technologies used for their development was created in December 2017:

https://www.youtube.com/channel/UCw_D0l5sDgysEphi6tzzDyw

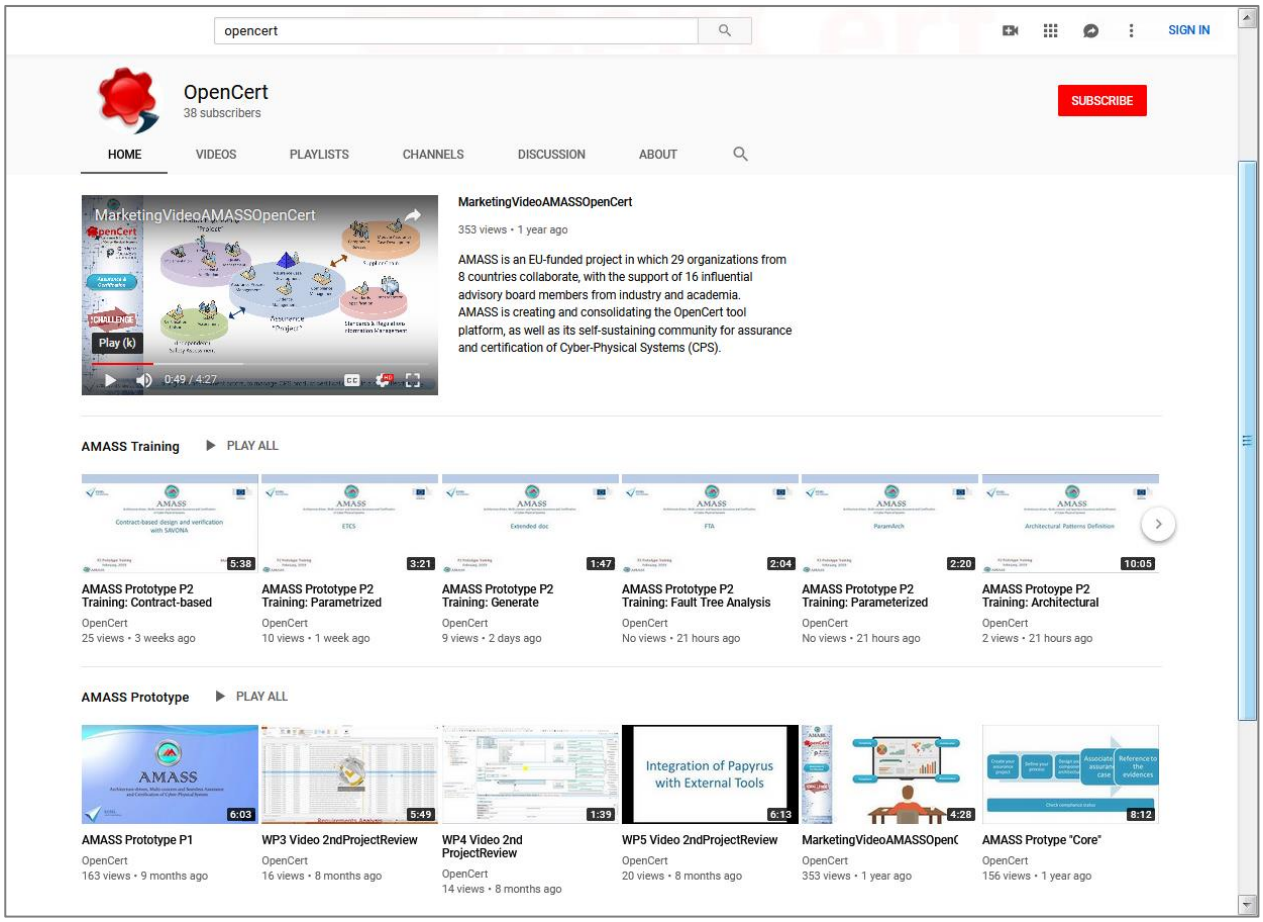


Figure 24. AMASS YouTube channel

An icon with a link to the YouTube channel appears at the header section of the website (Figure 5), close to the Twitter and LinkedIn icons. The channel currently includes 56 videos, including a marketing one, demos of the Core Prototype, P1 Prototype and P2 Prototype, and videos of the training sessions for the three AMASS Prototypes.

The titles of the videos uploaded from m25 (April 2018) to m36 (March 2019) related the AMASS Prototype P1 are:

- AMASS Prototype P1
- WP3 Video - 2nd Project Review
- WP4 Video - 2nd Project Review
- WP5 Video - 2nd Project Review
- CS7 Video - 2nd Project Review
- CS10 Video - 2nd Project Review

The titles of the videos uploaded from m25 (April 2018) to m36 (March 2019) related to the AMASS Prototype P2 are detailed in Section 3.1.2.

Links to the videos are also available on the AMASS website in the "Training section (https://amass-ecsel.eu/content/training) and "Demos section (https://amass-ecsel.eu/content/demos).

As of March 31, 2019, the channel has 38 subscriptions. The most popular video is the Marketing one, with 351 views.

2.2.5 Event Organization

The AMASS consortium has been very active in the organisation of events related to the assurance and certification of CPS. The main events are described in the subsections below.

2.2.5.1 AMASS Open Industrial Workshop

The AMASS Open Industrial Workshop (Figure 8) was held on March 28th, 2019, in Florence, Italy. The event was co-located with the DATE 2019 conference (Design, Automation and Test in Europe; https://www.date-conference.com/).

Figure 25. Presentation at the AMASS Open Industrial Workshop

The workshop was targeted at both practitioners and researchers aiming to gain awareness of the latest advances on cost-effective assurance and certification of safety-critical systems, and of how the corresponding solutions work. AMASS partners presented practical aspects and concrete application examples of the main AMASS results in two overall sessions: Introduction to the AMASS concepts and methodology, and Application of the AMASS approach, including demos and hands-on activities.

Twelve people registered for the workshop, including both researchers and practitioners. The speakers from the AMASS consortium were Alejandra Ruiz (TEC), Alberto Debiasi (FBK), and Stefano Puri (INT). The event agenda included the following topics:

- AMASS Introduction
  - Architecture-driven assurance
  - Architecture-driven assurance workflow and functionalities
  - Compliance and reuse
  - Toolchain connectivity
  - OSLC
  - Co-engineering
- Demos
  - AMASS Prototype functionalities

- Design and safety assessment of on-board software applications in Space Systems, developed by GMV in CS4
- ETCS Linking, developed by RINA in CS9

- Exercise
  - Argument fragments generation
  - Concerto FLA multi-concerns dependability analysis
  - SenseSpacecraftRate (with contracts, state machines and error models; and with parameterized architecture)
  - Sabotage
  - OpenCert (modelling of standards and of evidence, and compliance management)

The overall feedback on the AMASS results was positive. The attendees had downloaded some of the AMASS resources before the Workshop and were really committed. Some questions were asked about installing dedicated servers, how the development will continue after the project, and the role of the community in this future.

2.2.5.2 SASSUR 2018

SASSUR 2018 (http://www.es.mdh.se/safecomp2018/workshops/SASSUR2018-Prorgamme-V2.pdf; Figure 26), the 7th International Workshop on Next Generation of System Assurance Approaches for Safety-Critical Systems, was held on September 18, 2018, in Västerås, Sweden, as a SAFECOMP 2018 workshop. SASSUR is one of the key events for scientific dissemination in AMASS, and the project supported the organisation of the workshop.

Over 30 people attended the workshop, including people from academia and from industry. Among the AMASS partners, Alejandra Ruiz, Garazi Juez (TEC) and Jose Luis de la Vara (UC3) participated in the workshop as co-organisers, and Martin Skoglund (SPS) presented a paper.

Figure 26. Presentation at SASSUR 2018

The keynote speaker was Thor Myklebust, Researcher and Certification Manager at SINTEF, Norway. With the title “Evolutionary development and frequent releases of safety systems”, Thor presented their recent

work on the application of agile methods for the development and assurance of software-intensive critical systems. This work includes SafeScrum and the so-called agile safety case.

SASSUR papers were divided into three sessions for paper presentation. As a novelty for this edition, each paper had an assigned discussant (another paper's presenter) and the time for questions & answers and discussion was extended. The main topics of the accepted papers are the comparison of safety analysis techniques, the comparison of safety analysis techniques and security analysis ones, risk estimation for automated vehicles, analysis of generic-component integration in automated driving vehicles, synergies between safety assurance practices and cybersecurity assurance ones, and challenges for assuring complex and large safety-critical systems.

A panel on trends and needs for future assurance of safety-critical systems was also organised. Laurent Fabre, Thor Myklebust, and Timo Varkoi were the panellists. They discussed with the audience recent worrying issues, the main aspects to consider for future assurance, the extent to which existing system analysis techniques (for safety, security, etc.) will be valid for the next generation of systems, whether regulations are ready for future assurance, the necessary means for future assurance of safety-critical systems, and how future assurance can take advantage of advanced technologies such as e.g. artificial intelligence and blockchain.

It is expected that a new edition of SASSUR will be held next year at SAFECOMP 2019 in Turku, Finland.

2.2.5.3 SAFECOMP 2018

In addition to SASSUR 2018, AMASS partners organised and participated in other SAFECOMP 2018 events (http://www.es.mdh.se/safecomp2018/; Figure 27).

SAFECOMP 2018 was organized by Barbara Gallina (MDH). Many other AMASS partners participated in the conference, including AIT, ALT, SPS, CEA, and TEC. The conference was co-located with five workshops, including SASSUR, DecSOS (organized by AIT; co-chair Erwin Schoitsch), and WAISE (organized by CEA; co-chair Huascar Espinoza).

The International Workshop on Artificial Intelligence Safety Engineering (WAISE) was dedicated to explore new ideas on AI safety, ethically aligned design, regulations, and standards for AI-based systems. WAISE brought together experts, researchers, and practitioners from diverse communities, such as AI, safety engineering, ethics, standardization, certification, robotics, cyber-physical systems, safety-critical systems, and application domain communities. AMASS members from INT, AMT and CEA participated as PC members for WAISE 2018.

Erwin Schoitsch (AIT) was the chair of the Multi-concern assurance session at the main conference, which hosted interesting discussions on safety and security concerns in the automotive domain. The conference featured three keynotes around the conference main theme, which was cross- and intra- domain reuse of engineering and certification artefacts: challenges and opportunities. A panel discussion on the main theme was also held. This gave the opportunity to brainstorm around challenges which are shared by AMASS-STO4 (Cross- and Intra- Domain Reuse).

AMASS work on STO4-related results was also presented at the exhibition by MDH-team members (Irfan Sljivo, Zulqarnain Haider, Faiz Ul Muram, Muhammad Atif Javed, Julieth Patricia Castellanos Ardila). SPS presented a fast abstract.

In summary, SAFECOMP 2018 has been a great opportunity to present the progress of AMASS in front of an international audience with more than 180 participants coming from 21 different countries. AMASS partners are looking forward to SAFECOMP 2019 to repeat the large and successful participation.

Figure 27. Presentation at SAFECOMP 2018

2.2.5.4 medini analyze User Conference

The 4th International annual medini analyze User Conference (Figure 28) was held on September 27th, 2018, in Berlin, Germany. The event is a key event for safety engineers but also safety managers to get together and discuss on the newest and hottest topics of state of the art on functional safety, reliability and quality engineering, and tooling. A second day (28th) was used for workshops with different topics such as SOTIF, system model-based safety, and collaborative editing and safety engineering.

Over 50 people from 33 companies attended the event, from OEM, tier 1, and tier 2 organisations, but also semiconductors and consulting companies. All in all, the event was a very good place to discuss and disseminate essential AMASS key topics and objectives with specialists and safety experts. Among the AMASS partners, Jan Mauersberger, Marc Born and Michael Soden (all AMT) participated in both days. Michael presented our approach to exchange FMEDA results along the supply chain. Jan presented recent activities and results on collaborative editing.

The first day was filled with interesting presentations on how tools like medini analyze are used in practice. Rüdiger Diefenbach from Daimler AG for example explained how medini is (1) used by a large number of users to perform Hazard Analysis and Risk Assessments across multiple business units, and (2) shared between “normal users” and reviewers. He also outlined recent plans to a more tool-guided safety management to better manage complex safety cases due to combination of series, systems, and versions in the future. Several tier suppliers showed their application of tools and norms with respect to autonomous driving and electrification, as well as challenges coming up due to ISO 26262 2nd edition. There was a very interesting presentation from the Aviation domain, explaining that quick learning and adaptation of users to new tools is a key factor in decisions on tool landscape.

The second workshop day was fully packed with sessions on “safety case handover”, especially from Semiconductor to tier suppliers. Different viewpoints, limitations, and tool breaches due to historical reasons and “animosities” between suppliers were discussed. Future trends such as collaborative real-time editing and full traceability were discussed in detail. Safety and security as co-located activities were tackled shortly.

In October 2018, a similar event was held in Troy, MI, USA. This event was also used to share results of AMASS with a large community of safety experts.

Figure 28. Presentation at medini analyze User Conference

2.2.5.5 DeCPS 2019

DeCPS 2019 (https://ae2019.edc.pl/workshops.html); Workshop on Challenges and new Approaches for Dependable and Cyber-Physical Systems Engineering will be held at Warsaw, Poland, 14 June 2019. The workshop is co-located with the Ada-Europe 24th International Conference on Reliable Software Technologies. Faiz Ul Muram and Barbara Gallina (MDH) are taking part in the organization of DeCPS 2019. The Workshop is dedicated to explore new ideas in order to fill the gap between the physical world and the cyber one. This workshop aims to provide a platform to industrial practitioners, researchers and engineers in academia to exchange of their ideas, research results, experiences in the field of dependable and cyber physical systems (CPS) engineering. The topics of interest includes safety and security, industrial experiments and case studies, impact of artificial intelligence in CP and vehicle of the future. The workshop will also include some contributions from the AMASS project.

2.2.6 Event Participation

In addition to those organised by the partners, the AMASS consortium has participated (or will participate) in the following **60 events**:

- **Ada-Europe 2018** - 23rd International Conference on Reliable Software Technologies. Lisbon, Portugal. June 18-22, 2018.

  Feedback: The presentation received positive comments. In particular, the needs for automatic methods for multi-concern co-analysis and assurance was acknowledged
- **Ada-Europe 2019** – 24th International Conference on Reliable Software Technologies. Warsaw, Poland. June 11-14, 2019.
- **Annual meeting of the French Chapter of INCOSE**. Nancy, France. December 2018.

  Feedback: Discussion sessions with PhD students, researchers and, industrials about the new challenges of autonomous systems. Informal presentation of AMASS approach that raise the question about how the platform can deal with autonomous systems challenges.
- **ASCS 2018** - 4th International Workshop on Agile Development of Safety-Critical Software. Porto, Portugal. May 21, 2018.

  Feedback: The presentation received positive comments from the audience. The presenter (Faiz UL Muram) explained the vision regarding the potential role of existing and complementary compliance means in the hybrid/agilized context.

- **ATVA 2018** - 16th International Symposium on Automated Technology for Verification and Analysis. Los Angeles, USA. October 7-10, 2018.
- **CEN and CENELEC Industry Stakeholder Engagement Workshop on Urban Autonomous Mobility**. Brussels, Belgium. November 21, 2018.

  Feedback: Some industrials were very interesting about the standards formalization/modelling approach. Further discussions have been pursued after the event to explore potential collaborations.
- **Conferencia del Programa Marco de Investigación e Innovación de la Unión Europea en España**. Toledo, Spain. November 20, 2018.
- **CSD&M 2018** – 9th Complex Systems Design & Management conference. Paris, France. December 18-19, 2018.

  Feedback: Interest is the new solutions by TRC for assurance-targeted model-based systems engineering.
- **DATE 2019** – Design, Automation and Test in Europe. Florence, Italy. March 25-29, 2019.

  Feedback: See Section 2.2.5.1
- **DeCPS 2018** - Workshop on Challenges and new Approaches for Dependable and Cyber-Physical Systems Engineering. Lisbon, Portugal. June 22, 2018.
- **DeCPS 2019** - Workshop on Challenges and new Approaches for Dependable and Cyber-Physical Systems Engineering. Warsaw, Poland. June 14, 2019.
- **DECSoS 2018** - 13th International ERCIM/EWICS/ARTEMIS Workshop on "Dependable Smart Embedded and Cyber-physical Systems and Systems-of-Systems". Västerås, Sweden. September 18, 2018.
- **EclipseCon 2018**. Toulouse, France. June 13, 2018.

  Feedback: The presenter (Atif Javed) explained the work done with the context of WP6 of AMASS project. The proposed reuse approaches are perceived as very useful by the attendees. He also presented the evolution of EPF Composer. This work is seen as a way forward and re-gaining the interest of the community in EPF Composer.
- **EclipseCon Europe 2018**. Ludwigsburg, Germany. October 23-25, 2018.
- **ECSA 2018** - European Conference on Software Architecture. Madrid, Spain. September 24-28, 2018.
- **ECSEL Symposium 2018**. Brussels, Belgium. June 19-20, 2018.

  Feedback: Staffan Skogby (Alten) was responsible of the AMASS project booth. There were a good number of visitors to the booth from different industries. There were some discussions about the AMASS potential to generate business benefits and the cost of assurance and certification in CPS domains.
- **EFECS 2018** - European Forum for Electronic Components and Systems. Lisbon, Portugal. November 20-22, 2018.

  Feedback: Alejandra Ruiz (Tecnalia) presented the objectives and main features of the AMASS proejct. The audience showed interest in the application of AMASS results in contexts and situations other than those from the industrial case studies; e.g. for terminology alignment and agreement for cybersecurity in industrial automation.
- **embedded world 2019**. Nürnberg, Germany. February 25-27, 2019.

  Feedback: The presenter (Gaël Blondelle) explained the main process and the main features to use the AMASS Tool Platform. The audience showed interest and positive comments on the overall AMASS process for CPS assurance & certification, although it would need to be tailored to specific practices and domains.

- **ERF2019** - European Robotics Forum. Bucharest, Romania. March 20-22, 2019.

  Garazi Juez from Tecnalia participated together with Fabio Martinelli (CNR- ECSO), Ulrich Seldeslachts (LSEC, workshop organiser), Bernhard (Joaneum Research), Endika Gil Uriarte/David Mayoral (Alias Robotics) as contributors of the Cybersecurity for robotics workshop at ERF2019.

  Feedback: The contributors and the audience were very interesting on how AMASS safety-security co-engineering and co-assessment solutions, such as the extended version of Sabotage for fault/attack injection simulations, could be applied in the robotics field.

- **EUROMICRO-SEAA 2018** - Euromicro Conference on Software Engineering and Advanced Applications. Prague, Czech Republic. August 29-31, 2018.

  Feedback: The presenter (Julieth Castellanos) presented a paper in which it is proposed a tool-supported methodology for compliance checking in the context of safety-critical systems. The presentation got positive comments. In particular, it raised interests for future cooperation, within the area of process design.

- **EuroSPI 2018** – European Systems, Software & Service Process Improvement & Innovation. Bilbao, Spain. September 5-7, 2018.

  Feedback: The presentation raised a limited interest among the audience, due to the heterogeneity of the attendees' expertise. The presenter (Barbara Gallina) explained the novel measurement framework proposed in the context of AMASS-WP6. A couple of attendees expressed interest and the discussion continued later on. A follow-up is expected.

- **HASE 2019** – International Symposium on High-Assurance Systems Engineering. Hangzhou, China. January 3-5, 2019.

  Feedback: The audience (particularly from German institutions) raised interest around co-engineering safety/security analyses tool support with regard to ISO26262.

- **Honeywell Engineers Week**. Brno, Czech Republic. February 18-22, 2019.

  Feedback: The participants indicated that HON results in AMASS should also concentrate on requirement-based coverage and that the company extend its exploitation activities.

- **ICECCS 2018** - International Conference on Engineering of Complex Computer Systems. Melbourne, Australia. December 12-14, 2018.

  Feedback: Talk about the AMASS compliance management approach. Little interest from audience that was more from the formal methods community.

- **ICSE 2018** - 40th International Conference on Software Engineering. Gothenburg, Sweden. May 27-June 3, 2018.

  Feedback: Great interest in the architecture-driven assurance results for requirements quality analysis, including quality evolution analysis.

- **ICSOFT 2018** - 13th International Conference on Software Technologies. Porto, Portugal. July 26-28, 2018.

- **ICSR 2018** - 17th International Conference on Software Reuse. Madrid, Spain. May 21-23, 2018.

  Feedback: The presenter (Atif Javed) explained the work with the context of traceability maintenance. This work got positive feedback from the audience.

- **IDIMT 2019** - Interdisciplinary Information Management Talks. Kutnà Hora, Czech Republic. September 5-7, 2019.

- **INCOSE Symposium 2018** - 28th Annual INCOSE International Symposium. Washington DC, US. July 7-12, 2018.

  Feedback: Positive feedback on the TRC technologies for assurance and certification in the scope of model-based systems engineering.

- **INCOSE Symposium 2019** - 29th Annual INCOSE International Symposium. Orlando, US. July 20-25, 2019.

- **INCOSE IW 2019** – INCOSE International Workshop. Torrance, US. January 26-29, 2019.
  Feedback: Positive feedback towards the standardisation of AMASS results by TRC and UC3 for assurance-driven requirements engineering and ontology management.
- **INCOSE UK - ASEC 2018** - Annual Systems Engineering Conference. Bedford, UK. November 20-21, 2018.
- **ISSA 2018** - International Workshop on Interplay of Security, Safety and System/Software Architecture. Barcelona, Spain. September 3-7, 2018.
- **ISSA 2019** - International Workshop on Interplay of Security, Safety and System/Software Architecture. Luxembourg. September 23-27. 2019.
- **IWES 2018** – 3rd Italian Workshop on Embedded Systems. Siena, Italy. September 13-14, 2018.
- **MESS 2018** Micro-electronics Systems Symposium. Vienna, April 12-13, 2018.
- **Models 2018 –** IEEE/ACM 22nd International Conference on Model-driven Engineering Languages and System. Copenhagen**,** October 2018.
- **NOSE 2018** - Nordic Systems Engineering Tour. Stockholm, Sweden. April 24, 2018.
- **OSLC Fest**. Stockholm, Sweden. November 5-6, 2018.
  Feedback: Valuable discussions about the OSLC KM approach. Interest in adopting it and in contributing to it.
- **QUATIC 2018**- 11th International Conference on the Quality of Information and Communications Technology. Coimbra, Portugal. September 4-7, 2018.
- **QUATIC 2019** - 12th International Conference on the Quality of Information and Communications Technology. Ciudad Real, Spain. September 11-13, 2019.
- **RE 2018** - 26th IEEE international Requirements Engineering Conference. Banff, Canada. August 20-24, 2018
  Feedback: Conference participants were especially interested in the solutions for requirements authoring and for requirements quality analysis.
- **REFSQ 2019** – 25th International Working Conference on Requirements Engineering: Foundation for Software Quality. Essen. Germany. March 18-21, 2019
  Feedback: Discussions around the usage and issues of safety cases and of how the assessment of their quality could prevent past incidents (e.g. Boeing 737 MAX).
- **RSSR 2019** - Third International Conference Reliability, Safety and Security of Railway Systems: Modelling, Analysis, Verification and Certification. Lille, France. June 4-6, 2019
- **SAFECOMP 2018** - 37th International Conference on Computer Safety, Reliability and Security. Västerås, Sweden. September 18-21, 2018.
  Feedback: See Section 2.2.5.3.
- **SAFECOMP 2019** - 38th International Conference on Computer Safety, Reliability and Security. Turku, Finland. September 10-13, 2019.
- **SASSUR 2018** - 7th International Workshop on Next Generation of System Assurance Approaches for Safety-Critical Systems. Västerås, Sweden. September 18, 2018.
  Feedback: See Section 2.2.5.2.
- **SASSUR 2019** - 8th International Workshop on Next Generation of System Assurance Approaches for Safety-Critical Systems. Turku, Finland. September 10, 2019.
- **SCSSS 2018** - 6th Scandinavian Conference on SYSTEM & SOFTWARE SAFETY. Stockholm, Sweden. May 21-22, 2018.
  Feedback: Proposed tool-supported methodology for compliance checking presented. The proposal got positive comments. One comment was the following: "the approach can be very

helpful for checking generic processes in the light of different standards, facilitating the understanding of the process improvements required for specific projects".

- **SCSSS 2019** - 7th Scandinavian Conference on SYSTEM & SOFTWARE SAFETY. Stockholm, Sweden. October 22-23, 2019.
- **SEFM 2018** - 16th International Conference on Software Engineering and Formal Methods. Toulouse, France. June 27-29, 2018.
- **SESE 2018** - South European Systems Engineering Tour. Firenze, Italy, Toulouse, France, and Barcelona, Spain. May 21-23, 2018.
- **SPICE 2018** - 18th International SPICE Conference. Thessaloniki, Greece. October 9-10, 2018.
  Feedback: The audience was interested in details about the logic used to perform compliance checking, namely FCL.
- **SPLC 2018** - 22nd International Systems and Software Product Line Conference. Gothenburg, Sweden. September 10-14, 2018.
  Feedback: The presenter (Muhammad Atif Javed) explained the developed tool within the context of AMASS project. The audience perceived the solution as cost-effective compared to the literature.
- **TeReCom 2018 -** 2nd Workshop on Technologies for Regulatory Compliance. Groningen, The Netherlands. December 12, 2018.
  Feedback: The audience was very involved in the discussion of the paper "Lessons Learned while formalizing ISO 26262 for Compliance Checking". Specifically, there were comments regarding validation of the result sets resulting from our formalization job, which we consider very pertinent. In particular, our job is still at initial phases and we are considering gaining more knowledge before we face final users.
- **TRC User Group Summit**. Madrid, Spain. March 27-28, 2019.
  Feedback: Benefits acknowledged for the solutions developed by TRC in AMASS that are planned to be included in TRC products and services.
- **Workshop at LAAS/CNRS**. Toulouse, France. May 3, 2018
  Feedback: The presentation raised a general interest among the audience, which was mainly composed of dependability experts. The presenter (Barbara Gallina) explained the AMASS vision. An attendee was wondering if solution presented was going to be robust to face the changes, which are being implemented in ISO 26262, version 2018. The presenter replied affirmatively.
- **Workshop at Lorentz Center**. Leiden, The Netherlands. April 11, 2018.
  Feedback: High level of interest for collaboration from relevant professors (e.g. Joost-Pieter Katoen, Marielle Stoelinga, and Alessandro Cimatti).
- **Workshop at NASA Ames research center**. Moffet Field, USA. November 2018.

2.2.7 Publications

During the last 12 months of AMASS, the project has resulted in the following **38 scientific publications**. Among them, the paper entitled "*Preventing Omission of Key Evidence Fallacy in Process-based Argumentations*", by Faiz UL Muram, Barbara Gallina, and Laura Gómez Rodríguez (MDH), received the best paper award at the 11th International Conference on the Quality of Information and Communications Technology (QUATIC 2018). Three further journal publications on AMASS results are currently under review.

2019

- Haider, Z., Gallina, B., Carlsson, A., Mazzini, S., Puri, S.: ConcertoFLA-based Multi-concern Assurance for Space Systems. Ada User Journal 40(1)

- Sljivo, I., Juez, G., Puri, S., Gallina, B.: Guiding Assurance of Architectural Design Patterns for Critical Applications. Ada User Journal (accepted paper)
- Adedjouma, M., Yakymets, N.: A Framework for Model-based Dependability Analysis of Cyber-Physical Systems. 19th IEEE International Symposium on High Assurance Systems Engineering (HASE 2019)
- Bendík, J., Černá, I.: Evaluation of Domain Agnostic Approaches for Enumeration of Minimal Unsatisfiable Subsets. 22nd International Conference on Logic for Programming, Artificial Intelligence and Reasoning (LPAR-22)
- de la Vara, J.L., Jimenez, G., Mendieta, R., Parra, E.: Assessment of the Quality of Safety Cases: A Research Preview. 25th International Working Conference on Requirements Engineering: Foundation for Software Quality (REFSQ 2019)
- de la Vara, J.L., Ruiz, A., Gallina, B., Blondelle, G., Alaña, E., Herrero, J., Warg, F., Skoglung, M., Bramberger, R.: The AMASS Approach for Assurance and Certification of Critical Systems. embedded world Conference 2019
- Gallina, B., Javed, M.A., Martin, H., Bramberger, R.: Co-engineering of security and safety life-cycles for engineering security-informed safety-critical automotive systems in compliance with SAE J3061 and ISO 26262. 24th International Conference on Reliable Software Technologies (Ada-Europe 2019)
- Javed, M. A., Gallina, B.: Towards Variant Management and Change Impact Analysis in Safety-oriented Process-Product Lines. 34th ACM/SIGAPP Symposium on Applied Computing (SAC 2019)
- Nešic D., Nyberg, M., Gallina, B.: Constructing Product-Line Safety Cases from Contract-Based Specifications. 34th ACM/SIGAPP Symposium on Applied Computing (SAC 2019)
- Ul Muram, F., Gallina, B., Kanwal, S.: A Tool-supported Model-based Method for Facilitating the EN50129-compliant Safety Approval Process. 3rd International Conference Reliability, Safety and Security of Railway Systems: Modelling, Analysis, Verification and Certification (RSS-Rail 2019)

2018

- Álvarez-Rodríguez, J.M., Mendieta, R., de la Vara, J.L., Fraga, A., Llorens, J.: Enabling system artefact exchange and selection through a Linked Data layer. Journal of Universal Computer Science 24(11): 1536-1560
- Adedjouma, M., Pedroza, G., Smaoui, A., Kien Dang, T.: Facilitating the Adoption of Standards through Model-based Representation. 23rd International Conference on Engineering of Complex Computer Systems (ICECCS 2018)
- Alaña, E., Herrero. J.: Design and Safety assessment of on-board software applications using the AMASS platform. EUROSPACE - DASIA 2018
- Alaña, E., Herrero, J., Urueña, S., Macioszek, K., Silveira, D.: A Reference Architecture for Space Systems. 12th European Conference on Software Architecture (ECSA 2018)
- Bendík, J., Beneš, N., Černá, I.: Finding Regressions in Projects under Version Control Systems. 13th International Conference on Software Technologies (ICSOFT 2018)
- Bendík, J., Ghassabani, E., Whalen, M.W., Černá, I.: Online Enumeration of All Minimal Inductive Validity Cores. 16th International Conference Software Engineering and Formal Methods (SEFM 2018)
- Bendík, J., Černá, I., Beneš, N.: Recursive Online Enumeration of All Minimal Unsatisfiable Subsets. 16th International Symposium Automated Technology for Verification and Analysis (ATVA 2018)
- Castellanos Ardila, J. P., Gallina, B., Ul Muram, F.: Enabling Compliance Checking against Safety Standards from SPEM 2.0 Process Models. 44 Euromicro Conference on Software Engineering and Advanced Applications (SEAA 2018)
- Castellanos Ardila, J.P., Gallina, B., Ul Muram, F.: Transforming SPEM 2.0-compatible Process Models into Models Checkable for Compliance. 18th International SPICE Conference (SPICE 2018)

- Castellanos Ardila, J.P.: Enabling Automated Compliance Checking of Processes against Safety Standards. 8th International Symposium On Leveraging Applications of Formal Methods, Verification and Validation (ISoLA 2018)
- de Oliveira, A. L., Paiva Bressan, L., Montecchi, L., Gallina, B.: A Systematic Process for Applying the CHESS Methodology in the Creation of Certifiable Evidence. 14th European Dependable Computing Conference (EDCC 2018)
- Gallina, B., Iyer, S.: Towards Quantitative Evaluation of Reuse within Safety-oriented Process Lines. 25th European & Asian Systems, Software & Service Process Improvement & Innovation (EuroSPI&Asia2-2018)
- Grabowski, M.: Systematic Refinement of CPS Requirements using SysML, Template Language and Contracts. Modellierung 2018
- Griggio, A., Roveri, M., Tonetta, S.: Certifying Proofs for LTL Model Checking. 18th International Conference on Formal Methods in Computer-Aided Design (FMCAD 2018)
- Haider, Z., Gallina, B., Zornoza Moreno, E.: FLA2FT: Automatic Generation of Fault Tree from ConcertoFLA Results. 3rd International Conference on System Reliability and Safety (ICSRS 2018)
- Javed, M. A., Gallina, B.: Safety-oriented Process Line Engineering via Seamless Integration between EPF Composer and BVR Tool. 22nd International Systems and Software Product Line Conference (SPLC 2018)
- Javed, M. A., Ul Muram, F., Zdun, U.: On-Demand Automated Traceability Maintenance and Evolution. 17th International Conference on Software Reuse (ICSR 2018)
- Kaiser, B., Schneider, D., Adler, R., Domis, D., Möhrle, F., Berres, A., Zeller, M., Höfig, K., Rothfelder, M.: Advances in Component Fault Trees. 28th European Safety and Reliability Conference (ESREL 2018)
- Ul Muram, F., Gallina, B., Gomez Rodriguez, L.: Preventing Omission of Key Evidence Fallacy in Process-based Argumentations. 11th International Conference on the Quality of Information and Communications Technology (QUATIC)
- Adedjouma, M., Smaoui, A.: Model-Based Computer-Aided Monitoring for ISO26262 Compliant Systems. 8th IEEE International Workshop on Software Certification (WoSoCer 2018)
- Gallina, B., Ul Muram, F., Castellanos Ardila, J. P.: Compliance of Agilized (Software) Development Processes with Safety Standards: a Vision. 4th International Workshop on Agile Development of Safety-Critical Software (ASCS 2018)
- Gannous, A., Andrews, A., Gallina, B.: Toward a Systematic and Safety Evidence Productive Verification Approach for Safety-Critical Systems. 8th IEEE International Workshop on Software Certification (WoSoCer 2018)
- Castellanos Ardila, J.P., Gallina, B., Governatori, G.: Lessons Learned while Formalizing ISO 26262 for Compliance Checking. 2nd Workshop on Technologies for Regulatory Compliance (TeReCom 2018)
- Gonzalez, L., Marti E., Calvo, I., Ruiz, A., Perez, J.: Towards Risk Estimation in Automated Vehicles using a Fuzzy System. 7th International Workshop on Next Generation of System Assurance Approaches for Safety-Critical Systems (SASSUR 2018)
- Skoglund, M., Warg, F., Sangchoolie, B.: In Search of Synergies in a Multi-Concern Development Lifecycle: Safety and Cybersecurity. 7th International Workshop on Next Generation of System Assurance Approaches for Safety-Critical Systems (SASSUR 2018)
- Verma, S., Gruber, T., Puschner, P., Schmittner, C., Schoitsch, E.: A Quantitative Approach for the Likelihood of Exploits of System Vulnerabilities. 13th International ERCIM/EWICS /ARTEMIS Workshop on “Dependable Smart Embedded and Cyber-Physical Systems and Systems-of-Systems (DECSoS 2018)
- Espinoza, H., de la Vara, J.L., Juez, G., Martinez, C., Gallina, B., Puri, S., Mazzini, S., Blondelle, G.: Meet the new Eclipse-based tools for Assurance and Certification of Cyber-Physical Systems. Eclipse Newsletter July 2018

- Skogby. S.: Samarbete för att stärka europeisk elektronikindustri. Elektronik Tidningen October 2018

Almost all the publications above are open access, in accordance to the recommendations provided in D8.5 (e.g. through repositories whose information is retrieved by OpenAIRE [11]).

In addition to the public deliverables listed in Section 2.2.1, the following one has been released: D9.4 - Third intermediate annual progress report, October 2018

2.3 Communication Activities

The purpose of AMASS communication activities has been to inform general audiences (e.g. overall groups of practitioners and the general population) of the project and its results. The ultimate goal is to raise awareness of the project. All AMASS partners has made every effort to communicate information concerning the project and its progress to as wide an audience as possible.

The communication activities undertaken between m25 and m36 are listed in Table 2.

Table 2. Communication activities

Event	Date	Resp.	Description
Advertisements of AMASS results	Apr 2018 – Mar 2019	All	Inclusion of news and events related to AMASS in the partners' websites and through social networks.
Fourth newsletter	Apr 2018	UC3	Vision and main achievements of the project in m19-m24, and upcoming work.
Eclipse newsletter	July 2018	CEA TEC UC3 INT ECL	An article introducing the AMASS approach and the AMASS open platform to the >250k subscribers of the Eclipse newsletter.
Interview at EclipseCon 2018	Jun 2018	MDH	Outline of AMASS open source results
Fifth newsletter	Oct 2018	UC3	Vision and main achievements of the project in m25-m30, and upcoming work.
Conf. Programa Marco de Investigación e Innovación de la Unión Europea en España	Nov 2018	TEC	Presentation of EU projects coordinated by Spanish organisations.
embedded world 2019	Feb 2019	ECL, TEC & UC3	Presentation of the AMASS approach for assurance & certification of critical systems
Sixth newsletter	Apr 2019	UC3	Summary of the main achievements of the project and of the work in m31-m36. This activity will be completed upon project finalisation.

3. Training Progress

The training activities performed in AMASS between April 2018 and March 2019 are divided into internal and external training. Most of the work has focused on internal training.

3.1 Internal Training

This section includes all the events that have been arranged for internal training in AMASS.

3.1.1 Training at the 6th Plenary Meeting in Bilbao

The technical sessions held during the 6th Plenary meeting at Bilbao (16th-18th October 2018) focused on demonstrating the available tools and their functionalities for the AMASS Prototype P2, thus providing case study owners the opportunity to contact directly with the developers. The demonstrations were organized by work packages from WP3 to WP6.

The following demos of features were presented by the WP3 partners:

- P2 enhancements (auto layout, extended reports, extended state machines, ...) (FBK)
- Model based FTA/FMEA (FBK)
- Parametrized architecture support (FBK)
- ETCS Linking system (RIN, FBK)
- Sabotage - Simulation-Based Fault Injection Framework (TEC)
- Metrics (TRC)
- Architectural patterns, Traceability with Capra (INT)
- Contract-based design with SAVONA (B&M)

The following demos of features were presented by the WP4 partners:

- FMVEA tool demo (AIT)
- MORETO tool (AIT)
- Trade-off analysis with ANP (AIT)
- CHESS (FBK)
- Concerto-FLA (MDH)

The following demos of features were presented by WP5 partners:

- Access & data management (TEC)
- Collaborative work support in OpenCert (TEC)
- Collaborative modelling and Data mining (AMT)
- V&V tool integration (FBK).
- OSLC-KM-based tool integration in OpenCert and Seamless Interoperability in the Systems Engineering Suite (TRC). The functionalities that were presented were:
    - Importing more OSLC-KM types in AMASS platform
    - From VERIFICATION Studio to AMASS platform
    - OSLC-KM Connector
    - Ad-hoc integrations: Rhapsody, ReqIF, DOORS Next Generation
    - Automatic transformations
    - TRACEABILITY Studio
- OSLC Interoperability with Farkle in CS3 (ALT)

The following demos of features were presented by WP6 partners:

- Compliance management via OpenCert (TEC).
- Compliance management via EPF Composer (MDH):
    - Basic mapping
    - Generation of process-based arguments from process models describing plans
    - Compliance checking
- Reuse assistant (+ Reuse Discovery, including Elastic Search) (TEC, UC3, KMT)
- Variability management at process/product/argumentation level (MDH).
- Scenario concerning cross-concern variability and Safety & Security co-engineering (VIF)

3.1.2 General Training on the AMASS Prototype P2

After the plenary meeting held in Bilbao in October 16th-18th, the AMASS Implementation team has recorded some short training videos, designed for the Case Study owners to know and understand all the latest developments on the AMASS Platform.

There are 10 different partners that have created the following training videos:

- AIT:
    - FMVEA tool
    - MORETO (Model-based Security Requirement Management tool)
- ALT:
    - Farkle tool
- B&M:
    - Contract-based design and verifications with SAVONA tool
- FBK:
    - Parametrized architectures: ETCS model
    - Generate documentation starting from a CHESS model
    - FTA (Fault Tree Analysis) tool
    - OSLC communication with external tools in CHESS
    - Parameterized models in OCRA
    - Contract-based trade off analysis
- INT:
    - Architectural Patterns Definition
    - Architectural patterns Instantiation
    - Traceability with Capra
- KMT:
    - Indexing with elasticsearch
- MDH:
    - Product-based Multi-Concern Argument Fragment Generation
    - Automate Compliance Checking
    - Basic Compliance in EPF
    - Fallacy Free Process-based Argumentation
    - System Dependability functionality via concerto FLA
    - Variability Management at Assurance Case Level

  - Variability Management at Process Level
  - Variability Management at Product Level
- TEC:
  - Collaborative Work support
  - Compliance Monitoring
  - Reuse Assistant
  - Sabotage tool
  - Security Manager
- TRC:
  - Assessing quality and quality evolution
  - Importing more OSLC-KM types from AMASS to AMASS
  - From Verification Studio to AMASS
  - OSLC-KM Connector
  - Ad hoc integration of Rhapsody
  - Ad hoc integration of ReqIF
  - Ad hoc integration of DNG
  - Automatic transformations
  - Traceability Studio tool
- ViF:
  - Variability Co-engineering

After the videos were produced, they were uploaded to the AMASS subversion repository to make them available to all other partners, especially to the Case Study owners.

3.1.3 Partner-to-Partner Specific Training Sessions

Beside the previous activities, some “Training-on-demand” sessions have been organized in November and December 2018 to address the specific needs of the Case Study owners. For example, some specific training was provided by:

- TRC to TAS about TRC tools usage
- MDH for supporting CS11 and CS7 developments
- TEC has also made some trainings on demand (e.g. to LAN and TLV).

3.1.4 Internal Training Sessions

Finally, as internal trainings, some partners have identified the need to train some of their engineers to use the AMASS platform or its results for some internal purpose. So, they have created internal training courses, such as:

- CLS, training course on modelling systems with Papyrus / OCRA on January 2019
- GMV, internal training of the AMASS platform for elaborating CS4
- RIN, internal training related to assessment and certification of internal procedures
- A4T, Internal training of the AMASS prototype for ALL4TEC's developers
- ALT, several training sessions have been run about results from the AMASS outcomes (e.g. RPT tools)

3.2 External Training

External training is training targeted at parties not directly involved in AMASS. Most of the external training activities provided during the third year of AMASS was research training, as explained in the next section.

3.2.1 Research Training

Research training has addressed the transfer of knowledge based on AMASS to the research and academic communities.

Among these activities, the training videos generated for the Prototype P2 training have been published in the AMASS YouTube channel (Section 2.2.4), taking into account the restrictions stated by the presenters regarding the confidentiality of the content used in the training. When allowance was obtained, the full video was published in the channel and if not, the confidential parts were omitted. The AMASS Prototype P2 training videos are also available on the AMASS website (https://amass-ecsel.eu/content/training).

MDH has organized a new course related to AMASS results to be offered at MDH as part of the PROMPT initiative. More information can be found in these pages:

- http://www.mdh.se/utbildning/kurser/kursplaner-1.35552?benamning=&kurskod=DVA467&niva= &huvudomrade=&fordjupning=&akademi=&search=Search#
- http://www.promptedu.se

Another research training activity carried out by MDH has been the presentation of AMASS challenges and results at courses on safety-critical systems engineering
(e.g. https://www.mdh.se/utbildning/kurser?kod=DVA467&l=en_UK).

UC3 has also been involved in research training activities at university courses by presenting AMASS challenges and results at a course on Software Project Management that includes system quality assurance aspects, both at Universidad Carlos III de Madrid (UC3), and at University of Castilla-La Mancha, Spain.

Finally, students that have been or are working on theses on AMASS-related topics include:

- Irfan Sljivo, MDH. Assurance Aware Contract-Based Design for Safety-Critical Systems. PhD thesis.
- Julieth Patricia Castellanos Ardila, MDH. Facilitating Automated Compliance Checking of Processes against Safety Standards. Licentiate thesis (intermediate PhD activity in Sweden).
- Roy Mendieta, UC3. Methodology for knowledge management based on a universal information representation model. PhD thesis.
- Enrique Zornoza Moreno, MDH. Model-based approach for automatic generation of IEC-61025 standard compliant fault trees. MSc thesis.
- Laura Gómez Rodríguez, MDH. A tool-supported method for fallacies detection in process-based argumentation. MSc thesis.
- Rafael Ontoria, UC3. Analysis and application of model-based systems engineering. BSc thesis.

3.2.2 Other external training activities

Regarding other external training activities, AMASS partners participated in a training session organized by the ECSEL SafeCOP project (http://www.safecop.eu) in Stockholm, 29-30/08/2018. Training materials and courses on AMASS technology and methods were provided to industrial and other interested users.

AIT participated in Standardization Tutorials at two SafeCOP Standardization Meetings (Lisbon, 11th April 2018 and Stockholm, 30th January 2019), providing training on collaborative CPS, safety & security co-engineering, generic (basic) and domain specific standards.

TEC made an online training about AMASS Assurance Cases and Standard Modelling to the PDP4E project partners (https://www.pdp4e-project.eu). The AMASS approach was considered interesting and will be followed together with the OpenCert tool in the PDP4E project. A training targeting Sabotage for fault injection simulations was also given by TEC to the eITUS project partners (https://robmosys.eu/e-itus).

The AMASS Open Industrial Workshop (see 2.2.5.1) could also be regarded as an external training activity, as the attendees learnt about the AMASS conceptual aspects and how to use the AMASS Tool Platform. The presentation at embedded world 2019 entitled “The AMASS Approach for Assurance and Certification of Critical Systems” also partially aimed training purposes.

More information about the progress on research and external training is presented in the Table 5.

4. Conclusion

This document has presented the methods used and activities performed for dissemination and training of AMASS results during the third year of the project (April 2018 - March 2019). Both dissemination and training are essential to increase the impact of the AMASS project. The entire consortium has engaged in collaborative and coordinated actions to make third parties aware of AMASS results and know how to exploit them.

Dissemination activities have aimed to promote project results, communicate achievements in the project, and raise interest in the solutions developed. The preparation and deployment of means such as the AMASS website, project presentations, leaflets, and social media accounts have greatly contributed to these activities. Event organisation and participation, and publications have also played major roles in informing others about AMASS.

Regarding training, AMASS partners have provided industrial and research stakeholders with new knowledge and upgraded skills regarding CPS assurance and certification, and have collaborated to overcome the potential gaps between AMASS results and their application. Internal training has been essential to ensure a common, shared understanding of CPS assurance and certification, how to tackle these activities, and how to improve them. Several internal training events have been run on the new version of the AMASS Tool Platform, as well as external training actions for research purposes and for practitioners.

The progress made in dissemination and training during the third project year is aligned with the plans presented in D8.5 [6], D8.6 [7], and D8.7 [8]. In addition, the AMASS partners have taken care of addressing some recommendations included in the Second Review Report such as:

- Considering some project leaflet (5~6 pages maximum) for external audiences.
- Preparing articles and papers for industry-targeted venues and for specific stakeholders, including journals; e.g. IEEE Software, embedded world, the Eclipse newsletter, and the industry track of conferences.
- Submitting of joint academic/industrial papers; e.g. the publications at the above venues, among others.
- Doing more training and trials with the new improvements to make the partners capable of providing more interesting results and benchmarking.
- Gathering feedback from regulators, standards bodies and security agencies; e.g. by inviting Thor Myklebust, who is involved in these kinds of activities, to join the EAB, as well as by different standardisation-targeted activities reported in D8.11 [9].

References

[1] AMASS project: Blog. 2019. https://amass-ecsel.eu/blog

[2] AMASS project: Deliverables. 2019. https://amass-ecsel.eu/content/deliverables

[3] AMASS project: D2.4 - AMASS reference architecture (c). 2018. https://www.amass-ecsel.eu/sites/amass.drupal.pulsartecnalia.com/files/documents/D2.4_AMASS-reference-architecture-%28c%29_AMASS_Final.pdf

[4] AMASS project: D7.7 - AMASS open source platform provisioning and website (c). 2018. https://www.amass-ecsel.eu/sites/amass.drupal.pulsartecnalia.com/files/documents/D7.7_AMASS-open-source-platform-provisioning-and-website%28c%29_AMASS_Final.pdf

[5] AMASS project: D8.1 - AMASS Website and Project Collaboration Platform. 2016.

[6] AMASS project: D8.5 - Dissemination and Training Plan. 2016. https://www.amass-ecsel.eu/sites/amass.drupal.pulsartecnalia.com/files/documents/D8.5_Dissemination-and-Training-Plan_AMASS_Final.pdf

[7] AMASS project: D8.6 - Dissemination and Training Progress (a). 2017. https://www.amass-ecsel.eu/sites/amass.drupal.pulsartecnalia.com/files/documents/D8.6_Dissemination-and-Training-Progress-%28a%29_AMASS_Final.pdf

[8] AMASS project: D8.7 - Dissemination and Training Progress (b). 2018. https://www.amass-ecsel.eu/sites/amass.drupal.pulsartecnalia.com/files/documents/D8.7_Dissemination-and-Training-Progress-%28b%29_AMASS_Final.pdf

[9] AMASS project: D8.11 - Standardization Roadmap and Report. 2019

[10] AMASS project: D9.1 - Project Management Plan and Handbook. 2016.

[11] OpenAIRE: Architecture-driven, Multi-concern and Seamless Assurance and Certification of Cyber-Physical Systems (692474). 2019. https://explore.openaire.eu/search/project?projectId=corda__h2020::f1463df57feedfea84a5950aca41c4cf https://www.openaire.eu/search/project?projectId=corda__h2020::f1463df57feedfea84a5950aca41c4cf

[12] ARTEMIS: DECISION OF THE GOVERNING BOARD OF THE ARTEMIS JOINT UNDERTAKING APPROVING THE MULTIANNUAL STRATEGIC PLAN AND RESEARCH AGENDA FOR 2012. 2011. https://ec.europa.eu/research/participants/portal/doc/call/fp7/artemis-2012-1/32195-artemis-gb-2011-d.33_signed_en.pdf

[13] ARTEMIS: Strategic Research Agenda 2016. 2016. https://artemis-ia.eu/publication/download/sra2016.pdf

[14] ARTEMIS: WG Education & Training. 2017. https://artemis-ia.eu/working-group/wg-education-training.html

[15] ECSEL: MASP and Work Plans. 2018. https://www.ecsel.eu/sites/default/files/2017-12/ECSEL%20GB%202017.94%20-MASP%202018_0.pdf

[16] OPENCOSS project. 2017. http://www.opencoss-project.eu/

[17] SafeCer project. 2016. https://artemis-ia.eu/project/30-psafecer.html

[18] CHESS project. http://www.chess-project.org/

Appendix A. Progress of the Dissemination Plan until m36

All the general activities planned for dissemination, from April 2018 to March 2019, presented in D8.5 [6] and D8.6 [7] have been performed. These activities are listed in Table 3.

Table 3. Planned dissemination activities

Activity	Date	Resp.	Description
SCSSS conference	May 2018	MDH	6th Scandinavian Conference System and Software Safety/Workshop 1- Frontiers in Safety.
ICSR conference	May 2018	MDH	The International Conference on Software Reuse (ICSR) is the premier event in the field of software reuse research and technology. The main goal of ICSR is to present the most recent advances and breakthroughs in the area of software reuse and to promote an intensive and continuous exchange among researchers and practitioners.
DASIA conference	May 2018	GMV	Data Systems in Aerospace embraces technical and managerial aspects of development, operations and maintenance of data-handling related components and systems.
ICSE conference	May 2018	UC3	The International Conference on Software Engineering is the premier software engineering conference, providing a forum for researchers, practitioners and educators to present and discuss the most recent innovations, research, experiences, trends and concerns in the field of Software engineering.
DeCPS workshop	Jun 2018	INT	International Workshop on Challenges and new Approaches for Dependable and Cyber-Physical Systems Engineering, in conjunction with Ada-Europe.
ECSEL JU Symposium	Jun 2018	ALT, TEC & UC3	Event focused on deep technological presentations, both about project achievements and about state-of-the-art technology, consisting of four thematic one-day workshops: Smart Cities, Smart Energy, Interoperability in CPS and IoT, and Future CPS industrial research challenges.
QUATIC conference	Sep 2018	UC3	The International Conference on the Quality of Information and Communications Technology serves as a forum for disseminating advanced methods, techniques and tools for supporting quality approaches to ICT engineering and management.
SASSUR workshop	Sep 2018	TEC & UC3	International Workshop on Next Generation of System Assurance Approaches for Safety-Critical Systems collocated with SAFECOMP.
DECSoS workshop	Sep 2018	AIT	International workshop on Dependable Embedded and Cyber-Physical Systems and Systems-of-Systems, collocated with SAFECOMP.
WAISE workshop	Sep 2018	CEA	First International Workshop on Artificial Intelligence Safety Engineering, collocated with SAFECOMP.
SAFECOMP conference	Sep 2018	MDH	Annual event covering the state-of-the-art, experience and new trends in the areas of safety, security and reliability of critical computer application.

Appendix B. Progress of the Training Plan until m36

All the general activities planned for internal training, from April 2018 to March 2019, presented in D8.5 [6] and D8.6 [7] have been performed. These activities are listed in Table 4. External training activities are listed in Table 5.

Table 4. Planned internal training events that have been held

Event	Date	Resp.	Description
Third Training for AMASS Demonstrators	Nov 2018 – Feb 2019	TRC	Training on AMASS P2 Prototype, around two months before their release.

Table 5. Planned external training events that been held

Event	Date	Resp.	Description
Quality assurance - Certification of safety-critical (software) systems	Mar 2018	MDH	New course related to AMASS results to be offered at MDH as part of the PROMPT initiative. http://www.mdh.se/utbildning/kurser/kursplaner-1.35552?benamning=&kurskod=DVA467&niva=&huvudomrade=&fordjupning=&akademi=&search=Search# http://www.promptedu.se
Software project management course	May 2018	UC3	Presentation of AMASS challenges and results at a course on software project management of UC3, which includes system quality assurance aspects.
SafeCop training meeting	Aug 2018	INT	Presentation of the AMASS open source platform
Safety Critical Systems Engineering	Nov 2018	MDH	Presentation of AMASS challenges and results at a course on safety-critical systems engineering. Introduced a specific research-oriented lecture.
Modelling systems with Papyrus / OCRA	Jan 2019	CLS	Internal training (engineers)
Training on Assurance Cases	Feb 2019	TEC	External training on Assurance cases and AMASS approach to the PDP4E project
Videos about Prototype P2 training	Mar 2019	TRC	Publication of the videos from Third Training for AMASS Demonstrators in the AMASS website and the YouTube channel