

ECSEL Research and Innovation Actions (RIA)



AMASS

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

**External Advisory Board and Industrial
Adoption Program Roadmap
D7.1**

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Executive Summary

The focus of AMASS is to propose an open tool platform for assurance and certification of Cyber-Physical Systems (CPS) for different vertical markets. The AMASS consortium will use its links to worldwide companies, standardization initiatives, large industrial companies, technology suppliers and research institutions to present the AMASS concept and propose the adoption of the open platform.

One key instrument to this purpose is the AMASS External Advisory Board (EAB), which consists of a group of influential and prominent people from relevant industrial companies, research institutions, and open source communities that have a special interest in AMASS outcomes.

Another instrument is a program for an early adoption of the AMASS approach by the industry. This program will provide recommendations for the promotion of AMASS results, their future development, and the creation of future initiatives for training and research in this field.

This deliverable presents the roadmaps for these two instruments. It covers two different AMASS project tasks:

- Task T7.1 (Networking and Coordination of the External Advisory Board) (see Section 2).
- Task T7.2 (Industrial Adoption Program) (see Section 3).

The proposed plan includes:

- the identification of the most relevant projects and initiatives on which the AMASS networking activities will focus. This also involves the way of working for networking,
- a list of leading experts in the area of assurance and certification of cyber-physical systems having accepted to become AMASS EAB members,
- a description of the EAB goals, scope and its management procedures, to make sure that the incremental results of the project are properly driven by the needs of industry and that they meet regulatory constraints,
- the identification of the community of AMASS stakeholders and the identification of AMASS results and research areas that may impact such community,
- a structured roadmap during and after the project that will help increase the project impact and visibility within the relevant communities of practice. This also includes a global AMASS plan to grow adoption of the AMASS methods and tools by the industry and to collaborate with other project works packages to execute this plan.

1. Introduction

AMASS will **create and consolidate a European-wide assurance and certification open tool platform, ecosystem and self-sustainable community** spanning the largest CPS vertical markets. The ultimate aim is to lower certification costs in face of rapidly changing product features and market needs. This will be achieved by establishing a novel holistic and reuse-oriented approach for **architecture-driven assurance, multi-concern assurance** (compliance demonstration, impact analyses, and compositional assurance of **security** and **safety** aspects), and for **seamless interoperability** between assurance/certification and engineering activities along with third-party activities (external assessments, supplier assurance).

AMASS will perform a variety of activities in order to ensure impact of its results and gain interest from third parties. These activities will be applied at various stages of the project, from the beginning to the end. In addition, the large number of industrial organizations in the project, among them big worldwide and European players and market leaders, and the strong plans of all the partners guarantee an outstanding exploitation of project results. These activities will be also reinforced by the interaction with an **External Advisory Board (EAB)**, composed by relevant professionals in different domains who will provide their advice to help AMASS achieve project goals.

Further **Networking** activities will extend dissemination activities, especially by co-operating with other EU funded projects and other organisations, groups and professionals already working in the domain. The efforts will be aligned accordingly. The objective is to join efforts, minimize duplications and maximise the AMASS potential. In particular, the project intends to establish strong links to other projects, and support the creation of appropriate ecosystems around technologies for CPS development. Furthermore, the AMASS consortium will focus on informing the professional networking community through dissemination of information materials and active attendance to selected events, allowing personal discussions and exchange of experience. Note that these activities are not pure dissemination activities but technical and strategic coordination activities.

Task 7.1 (Networking and Coordination of External Advisory Board) will provide the necessary tools to plan, coordinate, and manage the EAB activities. Task 7.1 will also provide a forum where the EAB, and other international experts, can exchange ideas and advice. AMASS will utilize a mailing list/forum to discuss issues directly related to AMASS, such as technical approaches, platform architecture, technology, regulatory frames, etc. Finally, Task 7.1 will establish the means of sustainability and continuation of the AMASS initiative after the completion of the project. Section 2 of this document presents the plan for this task.

In addition, to ensure the adoption of final AMASS results and improve the effectiveness on assurance and certification costs of industrial CPS's, the project will provide an **adoption outreach program** (D7.4 AMASS open source platform marketing and outreach plan), which defines the strategy to be executed by project partners.

Task 7.2 (Industrial Adoption Program) is dedicated to defining a roadmap for an early adoption of the AMASS approach by a user community. This will combine both operational and research-led activities for the design of a strategic roadmap for adoption of AMASS. The roadmap will use outputs from the different technical WPs (WP3-WP6), as well as the main expected results from AMASS to create a systematic adoption program. This program will provide recommendations for the promotion of AMASS results, their future development, and the creation of future initiatives for training and research in this field. Finally, the program will execute some of these recommendations to promote the early adoption of AMASS by different companies and initiatives. Section 3 of this document presents the plan for this task.

2. Networking and External Advisory Board Management

2.1 Introduction

This section describes two types of activities of task T7.1:

- Networking with other European projects and communities.
- Coordination of work with EAB.

Networking activities will include technical and strategic promotion of the AMASS platform and collaboration with the Eclipse PolarSys initiative¹ for a common framework for embedded system engineering, and other relevant communities, where AMASS has been appointed as a strategic project. This task will also look for co-operation with other EU funded projects as well as organisations, groups and professionals already working in the domain. The objectives are to join efforts, minimize duplications and maximise the potential. Note that these activities are not pure dissemination activities (which are actually performed in WP8 Exploitation, Dissemination and Standardization) but technical and strategic coordination activities. The emphasis will be laid on the unique AMASS features and functionalities, which are expected to extend and enrich the existing knowledge in the domain.

The External Advisory Board (EAB) consists of relevant and influential professionals from the aerospace, space, nuclear, medical, industrial automation and automotive domains, including also experts from regulatory authorities in these domains. They have agreed to give meaningful advice to AMASS on a regular basis in many different areas, including regulation, technological development, European policies, and outreach. EAB also advises the AMASS Technical Committee in its strategic technical decision-making process.

The External Advisory Board Coordinator (EABC) coordinates the EAB activities. For further information on the EAB coordination role, see Section 2.5.

2.2 Networking with related R&D Projects

Networking activities will extend **dissemination activities in the area of CPS assurance and certification**, especially by co-operation with other EU funded projects plus organisations, groups and professionals already working in the domain such as working groups related to tool development for CPS. AMASS will set up **relationships with other ECSEL projects**. In particular, the project intends to establish strong links to other ECSEL tool platform initiatives and support the creation of appropriate ecosystems around technologies for CPS development. Furthermore, the AMASS consortium will focus on **informing the professional networking community** through dissemination of information materials and active attendance to selected events allowing face-to-face discussions and exchange of experience.

Table 1 provides a short **list of on-going research initiatives and projects** that will be the target of collaboration activities. Please note that this is a list of projects identified by AMASS experts for which we expect extended impact in case of a collaboration. The lead contact partner will coordinate collaboration activities.

¹ www.polarsys.org

Table 1. Most relevant projects for AMASS

Project	Lead contact (partner)	Description
SafeCOP	Detlef Scholle (ALT)	SafeCOP (Safe Cooperating Cyber-Physical Systems using Wireless Communication) will establish a safety assurance approach, a platform architecture, and tools for cost-efficient and practical certification of cooperating CPS. The SafeCOP project is relevant because it will also work on producing safety assurance evidence, in this case needed to certify cooperative functions. Both projects, SafeCOP and AMASS, share the goal to lower certification costs.
EMC2	Thomas Gruber (AIT)	EMC2 (Embedded Multi-Core systems for Mixed Criticality applications in dynamic and changeable real-time environments) works on enabling multi-core and mixed-criticality systems in multiple domains, e.g. automotive and avionics. EMC2 focuses more on the design phase and only partially on assurance. AMASS can use the identified challenges and approaches to the design of mixed-criticality systems.
OMG System Assurance Task Force	Jose Luis de la Vara (UC3)	This task force at OMG works on: (1) the adaptation and extension of OMG technologies that apply across domains to enhance System Assurance (e.g. Reliability, Safety, Security, and Compliance); (2) the definition of a common framework for analysis and exchange of information related to system assurance and trustworthiness, and; (3) the promotion of System, Software and Information Assurance in OMG product interoperability mechanisms. Its specific activities include the development of the SACM specification for assurance case modelling.
CP-SETIS	Erwin Schoitsch (AIT)	CP-SETIS (Towards Cyber-Physical Systems Engineering Tools Interoperability Standardization) is a support-action type IA of Horizon 2020 driven by key partners of several ARTEMIS/ECSEL projects of the High-Rel Cluster of projects, aiming at harmonizing and creating a sustainable infrastructure for maintaining the IOS (Interoperability Specification) set of standards and guidelines, which all ARTEMIS/ECSEL projects could follow in establishing interoperable tools, tool chains and environments.
Semi40	Christoph Schmittner (AIT)	Semi40 (Power Semiconductor and Electronics Manufacturing 4.0) focuses on smart manufacturing in the semiconductor domain. For the semiconductor domain, availability and reliability are already huge concerns. The increased connectivity and interaction add security as a new concern.
ESPRESSO and Gen&ReuseSafetyCases	Barbara Gallina (MDH)	The ESPRESSO project and its continuation, the Gen&ReuseSafetyCases project, are Swedish projects aimed at increasing readiness to comply with ISO-26262. The ESPRESSO project and the Gen&ReuseSafetyCases cross-fertilized each other ² .
CITADEL	Stefano Tonetta (FBK)	The CITADEL project (Critical Infrastructure Protection using adaptive MILS) builds on the MILS technology and performs the research and development necessary to create adaptive MILS systems. It focuses on the construction and verification of adaptive systems with advanced mechanisms for monitoring safety and security aspects and supporting the recovery from faults/attacks. It applies adaptive MILS in new and evolving adaptive systems contexts such as Critical Infrastructures, where adaptability is a crucial ingredient for the safety and security of future systems.

AMASS will analyse, extend, and integrate results from existing projects that are working with similar technology. Project participants will also take part in clustering and synchronization meetings organised by commission services. Specifically, the **cooperation program** will be organized through:

² <http://stratresearch.se/en/research/ongoing-research/strategic-mobility-2014/project/6788/>

- **Awareness of AMASS goals and activities.** Research results and open activities will be communicated to other projects.
- **Physical meetings** in workshops or other related events.
- **Specific joint workshops** between AMASS partners and other project's partners. We will put special focus on the projects listed above.
- **Continuous update of the state of the art** within the different WPs, mainly by AMASS partners that participate in those projects. This update will be organized by the lead contact partner when results from the projects are available and/or of interest by the other project.

The objective is to **participate at least in two events** targeted at networking with related R&D initiatives **per project year**.

2.3 External Advisory Board Scope

The main task of the External Advisory Board (EAB) is to **provide strategic guidance and support** to the consortium to ensure that the AMASS results meet the project's objectives and industry needs. The EAB members will advise the AMASS Technical Committee in its **strategic technical decision-making process** and the **standardization & community building** activities in order to leverage the results toward the community.

Another important task of the EAB is to support **AMASS networking** with standardization committees and industry communities, and to provide opportunities for research collaborations.

The EAB is established for the **whole AMASS project duration** period (April 2016 to March 2019) and may be consulted at any time during the project. A dedicated communication channel has been appointed through the EAB Mailing list (see section 2.6.1) and they will be invited to AMASS events and workshops (see Section 2.6.2).

The **EAB members are influent and prominent professionals** from industry, regulation agencies, research institutions, and open source communities, **not only from Europe but worldwide**, that have a special interest in AMASS outcomes.

The **responsibilities and duties** of the EAB members shall be the following:

- **Review** the project outcomes and identify its strong/weak points with respect to the objectives of the project and the application of its results.
- **Provide unbiased insights and feedback** from a third party point-of-view, because they are not involved in the project execution and the day-to-day business in the project.
- **Comment and guide** on the consortium's skills and the relevance of their proposals and actions.
- **Promote** the exposure of AMASS activities in industry.

To achieve the above tasks, the EAB will **undertake the following activities**:

- Attending the **EAB meetings, planned at least once a year** and aligned with the main milestones of the project, to give feedback on the results achieved in the previous year, and to establish plans for the next 12 months and for any other issues where feedback is needed.
- **Providing feedback** about and linking AMASS to international research, reports, conferences, etc. on the initiative of the EAB members.
- **Providing ad-hoc feedback** when requested by the EAB Coordinator (Huascar Espinoza, TECNALIA), or the AMASS Technical Manager (Barbara Gallina, MDH) on various issues.

Each EAB member will **experience the following benefits** from being part of AMASS:

- Access to **innovative solutions and results** developed during AMASS.
- Be part of a **worldwide community** for CPS dependability (e.g., safety, security ...).
- Be a member of the AMASS community, which enables **information and know-how exchange**.

2.4 Presentation of the EAB Members

As part of the work in task T7.1 (Networking and EAB Coordination), we have collected suggestions of potential EAB members from the AMASS partners.

Table 2 summarises the list of experts that have accepted to become EAB members. This list aims to balance the different industrial sectors, academia, and kind of stakeholders in the area of assurance and certification of cyber-physical systems.

Table 2. List of EAB Members

Partner	Country	Contact	Email	Role
Verocel	US	George Romanski	romanski@verocel.com	Certification/Verification assessors
Renault	FR	Javier Ibañez-Guzman	javier.ibanez-guzman@renault.com	Car manufacturer
Mondragon Goi Eskola Polit. J.M.A. S.COOP	ES	Miren Illarramendi	millarramendi@eps.mondragon.eu	University (Miren is expert on safety-critical embedded systems)
University of York	UK	Tim Kelly	tim.kelly@york.ac.uk	University (Tim is expert on Assurance Cases)
Embraer	BR	Johnny Marques	johnny.marques@embraer.com.br	Airborne manufacturer
Spinnet	FI	Timo Varkoi	timo.varkoi@spinnet.fi	Nuclear domain expertise/assessor
Ultra Electronics CONTROLS	UK	Antonio Priore	Antonio.Priore@ultrapcs.com	Multi-industry consultancy for engineering, technology, project innovation and strategy
LFV	SE	Anders Sandin	anders.sandin@lfv.nuac.eu	Air control traffic services
Cross Control ABC_CONTROL	SE	Markus Wallmyr	markus.wallmyr@crosscontrol.com	CPS engineering services and products
SoftComply	EE	Marion Lepmets	marion@lepmets.com	Medical domain
Scania	SE	Mattias Nyberg	mattias.nyberg@scania.com	Truck/bus manufacturer

Partner	Country	Contact	Email	Role
Critical System Labs (CSL)	CA	Laurent Fabre	laurent.fabre@cslabs.com	Engineering consultancy/management of safety risk and security vulnerabilities associated with complex software-intensive systems
NASA	US	Ganesh Pai	ganesh.pai@nasa.gov	Robust Software Engineering (RSE) technical area, of the Intelligent Systems Division (Code TI).
MAGNA STEYR Engineering AG & Co KG	AT	Kurt Tschabuschnig	kurt.tschabuschnig@magna.com	Automotive Tier 1 - Engineering Services, Complete Vehicle Engineering and Production
AIRBUS Helicopters	GE	Stephan Thesing	stephan.thesing@airbus.com	Rotorcraft manufacturer

2.5 EAB Coordinator Role

A special role is given to the **EAB Coordinator** (EABC). The EABC is in charge of EAB communication management and the EAB information control. In particular, the EABC is responsible for:

- The **involvement of EAB members** (by updating frequently the progress of work, keeping alive ongoing discussion, structuring the debates, collecting Questions & Answers).
- The **organization of the EAB events** (meetings, workshops, forums, etc.), including logistics of the event (room reservation, hotel, social events, etc.).
- The collection of **advice, comments and recommendations** from the EAB members.
- The **dissemination of information to EAB members**, including the management of credentials and information control.
- The **reporting of the EAB discussions** (summary and recommendation from the EAB).

The EABC role is given to Huáscar Espinoza (TEC) and performed conjointly by Gaël Blondelle (ECL).

The EABC coordinates the EAB activities, and reports to the AMASS Technical Committee (TC).

2.6 EAB Communication Management

2.6.1 EAB Mailing List

The communication to the EAB is organized via an e-mail list (eab-amass@ikv.de). This e-mail list is hosted and managed by the partner KMT, as the other mailing lists of the AMASS project, and will contain the following members:

- EAB members
- AMASS Exploitation manager (EM)
- AMASS Project Coordinator (PC)
- AMASS Steering Committee (SC)
- AMASS Technical Committee (TC)

The mailing list functionalities are described in deliverable D8.1 (AMASS Website and Project Collaboration Platform) [1], Section 3.2.

The mailing list will accept only mails from the members of the list and selected AMASS participants. The authorizations and list member registration are requested via the PC.

2.6.2 EAB Workshops

During the AMASS project, we will organise meetings dedicated to the EAB communication. A minimum of **three one-day workshops** (once a year) shall be performed. These EAB workshops will be accomplished in order to present to the EAB members the progress of work of the AMASS project and to start an information exchange and discussion between the AMASS consortium and the AMASS EAB members. The three mandatory workshops shall be performed with regard to three critical milestones of the AMASS project plan:

Table 3. EAB Workshops

EAB Workshop	Date	Related milestone (date)
Workshop n°1	June 2017	M2 First Prototype: Core AMASS Platform Validated in Laboratory (April 2017)
Workshop n°2	June 2018	M3 Second Prototype: Full AMASS Platform Validated in Laboratory (March 2018)
Workshop n°3	April 2019	M4 Final Prototype: Full AMASS Platform Validated in Relevant Environment (March 2019)

2.6.2.1 EAB Workshop n°1: The AMASS vision

This workshop shall be performed at m15 (June 2017). At this time, the following work will be available for the First AMASS prototype:

- Requirement specification and analysis of the AMASS platform
- Use Cases formalizations
- Case study implementation and benchmarking.

The progress of work will allow the EAB members to advise the project on the user needs and on the definition of the approaches for architecture-driven assurance, multi-concern assurance, seamless

interoperability, and cross- and intra-domain reuse. At this point, the EAB members may be invited to analyse the direction taken by the project and give their opinion.

To this end, we will organize the structure of the workshop in four conference sessions (for each session, a debriefing will be accomplished):

- Overall scenarios of AMASS: this session will present user needs as a story board, i.e. how the AMASS platform will change the way of working when performing certification of CPS's. The AMASS project members will present these scenarios from an end-user point of view. No technical considerations shall be presented, the AMASS platform shall be viewed as an operating "black box" facility. We must focus on concrete AMASS case studies.
- AMASS partners will summarise each of the AMASS scientific and technical objectives (STO) and the achievements at that date.
- AMASS partners will present their plans and actions already done to promote the adoption of the AMASS outcomes in industry and academia. This includes slots for community building and for industrial impact and exploitation.
- Round table & promotion: in this session, the EAB members will be invited to comment the previous sessions and to give advice/recommendations on the work achieved. We will discuss the promotion strategy with EAB members to define relevant actions.

2.6.2.2 EAB Workshop n°2: Story boards applied to the Case Studies

This workshop shall be performed at m27 (June 2018). At this time, the following work will be available:

- Second AMASS Prototype
- Case Study workbench for the second prototype.

The progress of work will enable the EAB members to evaluate the second prototype of the AMASS platform, which includes most of the expected functionality. The vision presented in the first workshop will now be illustrated with the industrial case studies running in the second prototype.

For this purpose, the same structure of sessions that the EAB Workshop n°1 may be used but illustrated by running the prototypes.

2.6.2.3 EAB Workshop n°3: Proposals for AMASS follow-up in industry and academia

This workshop will be performed at the end of the project (April 2019). The final AMASS platform will be available including its benchmarking on full industrial case studies. The AMASS platform will be available as well as the report assessing the benchmark by means of the project measures of success. The sessions may be structured as follows:

- Demonstration session: Demonstration of the tool running the industrial case studies (all WPs shall be involved).
- Benchmark results session: Overall debriefing of the project (main results, success stories, difficulties, etc.).
- Proposals for AMASS community roadmap and follow-up.
- Proposal for standardization: This session will allow the AMASS members and the EAB members to debate on the opportunities to promote the AMASS results to standardization. For this purpose, the AMASS members will present their proposals.

2.7 Information Contents & Policy

Costs Reimbursement Policy defines the quantity of the costs (incurred by EAB members) that can be reimbursed and which of them are suitable of being in this category. These are the **costs associated to attendance to EAB meetings, covering all trip costs such as travel, lodging and meals needed** by the EAB member staff. The payment will be done after receipt of a formal request to the EAB Coordinator³ subject to approval of the Technical report⁴ and cost claim by the Project Coordinator. The original associated invoices must be attached to the cost claim. The reimbursement costs must not exceed the 65% of the total costs.

Deliverables and relevant information will be sent to the EAB members before each EAB workshop. Specific confidential information will require a **Non-Disclosure-Agreement (NDA)** to be signed between the related organisations. See Appendix A for the NDA model. Those EAB members that have not signed the AMASS NDA cannot access any confidential materials from the AMASS project. EAB members can receive public information directly, i.e. without any closure.

³ EAB Coordinator - See Section 2.5

⁴ Technical report: It will contain a reference to the place, date and objective of the meeting and a description of the costs incurred.

3. Plan for Industrial Adoption Program

3.1 Roadmap Objective

The main objective of the Roadmap is the early adoption of the AMASS approach by the user community. In this sense, the Roadmap defines the strategy to be carried out by the AMASS consortium, creating an industrial adoption program that increases the impact and the visibility of the project within the relevant communities. This industrial adoption program provides recommendations for the promotion of AMASS, its future development, and the creation of future initiatives for training and research in this field.

The first step in the Roadmap definition process is to identify the future user community of AMASS and its expectations regarding usage of the AMASS approach. This information is listed in section 3.2 “User Community for AMASS Adoption and their Expectations”.

After that, it is important to select which AMASS results could be promoted, analyzing if these results would fulfill the user expectations previously identified. This information is described in section 3.3 “AMASS Concepts and Results to Be Promoted”.

For the promotion of the AMASS results, it is needed to have a set of means. In section 3.4 “Means for the AMASS promotion” the necessary means are identified.

Finally, section 3.5 “Industrial Adoption Program” describes the program for the AMASS adoption. This program includes for every group of users, the objectives, means and workflow.

3.2 User Community for AMASS Adoption and their Expectations

The AMASS user community has been identified and described previously in the deliverable D8.5 “Dissemination and Training Plan” [2]. Table 4 recalls the identified AMASS community:

Table 4. Target groups identified in D8.5

Target Group	Examples of stakeholders
Industry: avionics and space, automotive, railway, air traffic management, automation and other possible domains that AMASS could have an impact.	OEMs, component suppliers, integrators of safety-critical platforms, tool vendors, consulting and service providers, certification organizations, standardization groups and industrial forums.
Policy makers	Consultancy providers, assessor companies, standardization and regulation bodies.
Research community	Universities, research institutes.
Scientific communities	Safety-critical development, reliability, and dependability communities.
Open-source communities	Developers of open-source tools for embedded systems engineering.
SMEs	SMEs constitute a special interest group for AMASS, as they generally have very limited access to basic or applied research to develop new products. Yet, the economic viability of many SMEs depends on the cost of certification.

Also, Table 5 describes the user expectations (extracted from deliverable D8.5 [2]).

Table 5. Expectations identified

Users	Interested in:
Original Equipment Manufacturers (OEMs)	<ul style="list-style-type: none"> • Complying with the assurance and certification process for safety-critical items. • Enabling an efficient tool supported development process which suites the needs for safety analysis, documentation and certification in an optimal way. • Organizing the suppliers work related to the safety work products to achieve efficient supplier coordination.
Component Suppliers (Manufacturers)	<ul style="list-style-type: none"> • Specification of assurance case modules, which can be integrated into the overarching assurance case. • Transferring certification artefacts (e.g. assurance case modules) across certification for multi-domains. • Preserving the integrity of the evidence that they provide to platform integrators. • Ensuring the integrity of the evidence both up- and down-stream of the supply chain. • Application of tool support for the provision of evidence and the management of evidence so that safety cases can be created with lower effort.
Integrators of Safety-critical Platforms	<ul style="list-style-type: none"> • AMASS results concerning the composition of the assurance safety case based on individual modules, and that ensure the integrity of the evidence passed through the supply chain. • Tools that support these processes.
Consulting and Service Providers	<ul style="list-style-type: none"> • AMASS results that ensure the integrity of the evidence passed through the supply chain.
Certification Organizations	<ul style="list-style-type: none"> • AMASS results concerning intra/cross-domain and multi-concern assurance.
Tool Vendors	<ul style="list-style-type: none"> • Interoperability. The adaptation of the existing tools to the AMASS architecture and working philosophy. • Information access. Ensure that all the information relevant for the tool development is available.
Policy Makers and Standardisation Groups	<ul style="list-style-type: none"> • Assurance and certification process.
Scientific and Research Communities	<ul style="list-style-type: none"> • Outcomes of the project. • Advance of the state of the art.
Open Source Communities	<ul style="list-style-type: none"> • An open tool platform developed by collaboration and with free redistribution and access to an end product design and implementation details.

3.3 AMASS Concepts and Results to Be Promoted

The AMASS Tangible Results shall be:

- AMASS Reference Tool Architecture**, which will extend the OPENCOS and SafeCer conceptual, modelling and methodological frameworks for architecture-driven and multi-concern assurance, as well as for further cross-domain and intra-domain reuse capabilities and seamless interoperability mechanisms (based on OSLC specifications).
- AMASS Open Tool Platform**, which will correspond to a collaborative tool environment that supports CPS assurance and certification. The AMASS Tool Platform is a concrete implementation of the AMASS Reference Tool Architecture, with a capability for evolution and adaptation, which will be released as an open technological solution by the AMASS project. AMASS openness is based on both standard OSLC APIs with external tools (e.g., engineering tools including V&V tools) and on open-source release of the AMASS building blocks.
- Open AMASS Community**, which will manage the project outcomes, for maintenance, evolution and industrialization. The Open Community will be supported by governance board, rules, policies, and quality models. This includes support for AMASS base tools (tool infrastructure for database and access management, among others) and extension tools (enriching AMASS functionality). As Eclipse Foundation is part of the AMASS consortium, the PolarSys/Eclipse community⁵ is a strong candidate to host AMASS (D7.3 “AMASS open source platform project proposal” [4]).

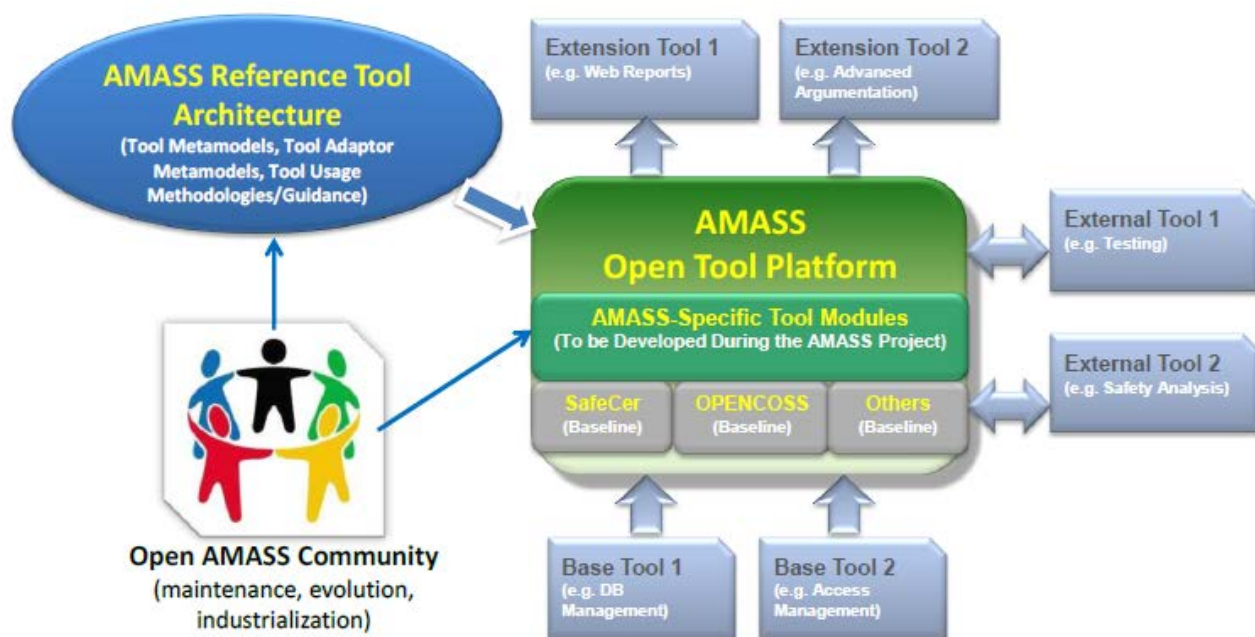


Figure 1. AMASS tangible outcomes

These AMASS results have to be promoted to the users' community, demonstrating their benefits to the stakeholder's business, with respect to:

- A potential gain for design efficiency of complex CPS by reducing their assurance and certification/qualification effort by 50%.

⁵ www.polarsys.org

- A potential reuse of assurance results (qualified or certified before), leading to 40% of cost reductions for component/product (re)certification/qualification activities.
- A potential raise of technology innovation led by 35% reduction of assurance and certification/qualification risks of new CPS products.
- A potential sustainable impact in CPS industry by increasing the harmonization and interoperability of assurance and certification/qualification tool technologies by 60%.

Table 6 lists the key exploitable results of AMASS related to their potential users and the expected impact to them.

Table 6. Key exploitable results

Key exploitable results	Potential users	Impact: Benefits for users
Industrial use case demonstrators in key industry domains (WP1)	Industry companies who provide respective products and tool vendors supporting the development/analysis of these products	The demonstrators are a perfect starting point to introduce AMASS framework for development, certification and validation into a whole related product line. Benefit will be cost and time savings of future product developments. New aspects of the tool chains can be demonstrated.
Quality metrics for certification and development of applications/products (WP1)	Industry companies who apply the AMASS framework	Instrument to measure and continuously improve their development and certification activities.
	Technology providers	Usage as argumentation for the introduction of their particular technology.
Business models for the AMASS framework (WP2)	Technology providers	Application of these business models to market their technology.
Integrated AMASS Tool platform (WP2-6)	Industry companies who provide respective products	Cost and time savings as provided (and validated) by the AMASS technology, especially for certification of the products with multi-concerns, re-use across domains and seamless integration with other development tools used by the user.
Methodology and tool support for architecture driven assurance (WP3)	Industry companies who develop products based on standard platforms (IMA, AUTOSAR,...) that require assurance or certification. Companies interested in integration of systems out of components that are assembled together with safety analysis information.	Cost and time savings as provided (and validated) by the AMASS technology.
Methodology and tool support for multi-concern	Industry companies who develop products that have to fulfil	Cost and time savings as provided (and validated) by the AMASS

assurance (WP4)	multiple non-functional requirements like safety, security, reliability, performance, and that need to be certified.	technology.
Approach and tool support for seamless interoperability of tools for modelling, analysis, design... of CPS (WP5)	Industry companies who develop CPS.	Cost and time savings by better integration among their various tools and avoidance of errors due to manual transfer of data.
	Tool provider for CPS.	Reduction of market barriers that exist for CPS because of poor interoperability between existing tools and those that are entering the market. Acquisition of new users' tools as the acceptance of tools will be increased due to higher end-user value.
Methodology and tool support for re-use of components even across domain or within intra domain boundaries (WP6 in cooperation with the other WPs)	Industry companies that want to sell their products in different domains or in the same domain governed by different regulations	Tremendous cost and time savings as the effort for re-certification will be reduced.
Open Source Platform for AMASS tooling (WP7)	Tool providers	The tool providers can base their technology on AMASS open source framework and benefit from the community. Non-differentiating effort can be shared. New tool providers can enter and enhance the community.
AMASS Reference Tool Architecture, supported by a common assurance and certification metamodel (CACM) (WP2), achieved by integrating CACM-fragments developed within WP3-WP6	Tool providers for CPS design	Having a common data scheme for exchanging tool information facilitates acceptance of tools by their clients.
	Industrial companies	A shared approach to manage assurance and certification assets to reduce vendor-locking, innovation barriers, and exchange of information between supply chain actors.

3.4 Means for the AMASS Promotion

This section describes the means that could be used for the promotion of AMASS project. These means have been identified previously in the deliverable D8.5 "Dissemination and Training Plan"[2]. Table 7 lists these means:

Table 7. Means identified in the Dissemination and Training Plan (D8.5)

Means	Description
AMASS website and logo ⁶	It will contain project presentations, public downloadable documents (project reports and dissemination papers), links to related projects, demonstration material, news sections, etc. The website will have tools for dissemination purposes, training material, discussion forums, blogs, and posts.
AMASS brochure and poster ⁷	The brochure and poster will be used at events and conferences. They will be produced at the initial phase of the project, in collaboration with ECSEL, and updated at regular intervals as necessary. Simultaneously to this brochure, we will create data sheets that describe how the framework supports development of certified systems. This information will be distributed among partners' customers and during trade shows and seminars.
Project presentations	Slides for two different project presentations, one short ⁸ (5-10 min.) and another long ⁹ (20-30 min.), will be prepared. Their preparation will be coordinated by the responsible partners for coordinating and monitoring dissemination activities.
AMASS news channels	An electronic newsletter ¹⁰ , published twice a year on the website, will present updated information about project progress, as well as news about the latest results and enhancements achieved in the project. The newsletter will be complemented with a blog ¹¹ , which will publish pieces of news on AMASS biweekly. In addition, we will use popular channels such as Twitter ¹² and LinkedIn ¹³ in order to inform interested subscribers more rapidly and directly.
Scientific papers and publications ¹⁴	The academic partners of the project will, individually and in collaboration, publish and present scientific advances at relevant conferences and workshops, as well as in journals and magazines. We plan to have at least 25 publications at the end of the project. The conferences include International Conference on Systems Engineering (INCOSE), International Conference on Computer Safety, Reliability and Security (SAFECOMP), European Safety and Reliability Conference (ESREL), High Assurance Systems Engineering (HASE), Dependable Systems and Networks (DSN) and Embedded Real Time Software and System (ERTS).
Promotion through industry	Project presentations will be made at exhibitions, conferences, and

⁶ <http://www.amass-ecsel.eu>

⁷ http://www.amass-ecsel.eu/sites/amass.drupal.pulsartecnalia.com/files/documents/AMASS-Leaflet_1.0.pdf

⁸ http://www.amass-ecsel.eu/sites/amass.drupal.pulsartecnalia.com/files/documents/AMASS_Presentation_Short.pdf

⁹ http://www.amass-ecsel.eu/sites/amass.drupal.pulsartecnalia.com/files/documents/AMASS_Presentation_Long.pdf

¹⁰ Newsletter #1 - October 2016:

http://www.amass-ecsel.eu/sites/amass.drupal.pulsartecnalia.com/files/documents/Newsletter_1_Final.pdf

¹¹ <http://www.amass-ecsel.eu/blog>

¹² <https://twitter.com/AMASSproject>

¹³ <https://www.linkedin.com/groups/3807241>

¹⁴ <http://www.amass-ecsel.eu/content/publications>

Means	Description
events	seminars targeting relevant industry stakeholders and decision makers.
Organisation of international AMASS workshops	The goal of these workshops will be to disseminate both the techniques developed during the project and the preliminary results of the project to the targeted beneficiaries of the AMASS project, occasionally co-located or co-organized with some conference (satellite events).
Industry partner community	Each project partner will aim to disseminate the AMASS results and goals through its network (e.g. enterprise events, expert community forum, and supplier's network).
Training and Tutorial	<p>The training activities will encourage the adoption of AMASS results in academia (researchers, students, etc.) and in industry (standardization and certification bodies, CPS developers, tool vendors, as well as long-life learners employees who decide to upgrade themselves¹⁵, etc.). By the end of the project, AMASS aims to:</p> <ul style="list-style-type: none"> • Have held at least six internal training events. • Have held at least five external training events, three of them to practitioners. • Provide training-related material for each case study, including some video. <p>Industrial training will pay special attention to knowledge transfer via demonstrations, and more concretely via demonstrations of AMASS results usage and benefits through the industrial case studies.</p>

Other additional means that could be used for the promotion of AMASS results are:

- Demonstrators: industrial use case demonstrators in key industry domains to show the AMASS results.
- Web-Portal for industrial adoption: a specific web area to promote the AMASS content.
- Tool support kit: user manual and installation guide.
- Tool demonstrators as web services: instead of downloading and installing a tool, some functionality can be explored directly via the web in the cloud.

3.5 Industrial Adoption Program - Roadmap

The industrial adoption program has the objective of promoting the results of AMASS to the user community using the available means. In the previous sections, we have summarised the information that we have to consider for the definition of the program. There are several user groups, with different users and expectations that we should cover with the AMASS results. The following subsections define the adoption program (audience, objective, means and workflow) for each user group.

¹⁵ <http://www.promptedu.se>

3.5.1 User Group: Industry

Industry is one of the main target groups for AMASS. Stakeholders in this group are composed of manufacturers, providers, integrators, consultants and certification organizations that have different expectations respect to safety integration, dependability/safety assurance and certification process, dependability/safety assessment and compliance management, multi-concern assurance, etc. (see Table 5).

It is a fact that from industry perspective, systems engineering is an essential prerequisite for developing complex safety-critical systems. Complex Cyber Physical Systems are becoming a reality and a critical failure related to such a critical system could lead to human, environmental or technological risks. Consequently, an enhancement in the effectiveness of those practices is always gladly accepted by the industry and will be the eventual outcome of AMASS. In fact, a novel holistic and reuse-oriented approach for architecture-driven and multi-concern assurance will be provided. Furthermore, a seamless interoperability between engineering and assurance/certification and activities along with third-party activities will be addressed.

In this direction, one of the main issues every company would like to overcome is the lack of re-use and high costs of certification. To do so, AMASS Tool platform reduces the execution time of assurance and certification/qualification activities by partly automating them and facilitating the re-use of assurance results.

Since industrial community is quite heterogeneous, they should be targeted in an individual manner as well. This means that implications related to their particular role in the supply chain and certification of the products together with the challenges faced by each type of industrial domain need to be considered. In order to aim at the widest possible coverage of safety-critical domains, partners from different sectors are represented in AMASS. More specifically, AMASS is composed of industrial partners involved in industrial automation, automotive, avionics, air traffic management, space and railway domains.

Even if other domains are not directly tackled in the project, some other industrial communities might be addressed by means of their contact networks and the External Advisory Board. Some remarkable examples are medical devices, process industries and maritime domains.

It is worth stressing that industry represents the key target group of the project. As industrial stakeholders will be some of the potential users of the AMASS platform, their feedback will be essential in order to build it up as efficiently as possible. The different views from different domains will be properly integrated according to a global view and will be taken into account for a further deployment of the AMASS platform features.

Along with these “vertical markets”, “horizontal” groups of industrial stakeholders arise which comprise Original Equipment Manufacturers (OEMs), Component Suppliers (Manufacturers), Integrators of Safety critical. For further information of each group, please refer to the deliverable D8.5 **[iError! Marcador no definido.]**.

Based on the information collected in the previous sections, the following table summarizes:

- Users identified that could adopt AMASS
- AMASS results to promote
- Means to use for the promotion

Table 8. Adoption program for the Industry user group

Intended Audience	Content to promote	Means
<ul style="list-style-type: none"> • Original Equipment Manufacturers (OEMs) • Component Suppliers (Manufacturers) • Integrators of Safety-Critical Platforms • Consulting and Service Providers • Certification Organizations • Tool Vendors • Standardization groups • Industrial forums 	<ul style="list-style-type: none"> • AMASS Reference Tool Architecture • AMASS Open Tool Platform • Open AMASS Community 	<ul style="list-style-type: none"> • AMASS website • Promotion through industry events • Organisation of international AMASS workshops • Industry partner community • Training • Demonstrations • Web Portal for industrial adoption • Tools support kit • Product data sheets • Web based tool demonstrator provision (tools in the cloud)

Workflow

The following workflow shows the actions planned for the adoption program:

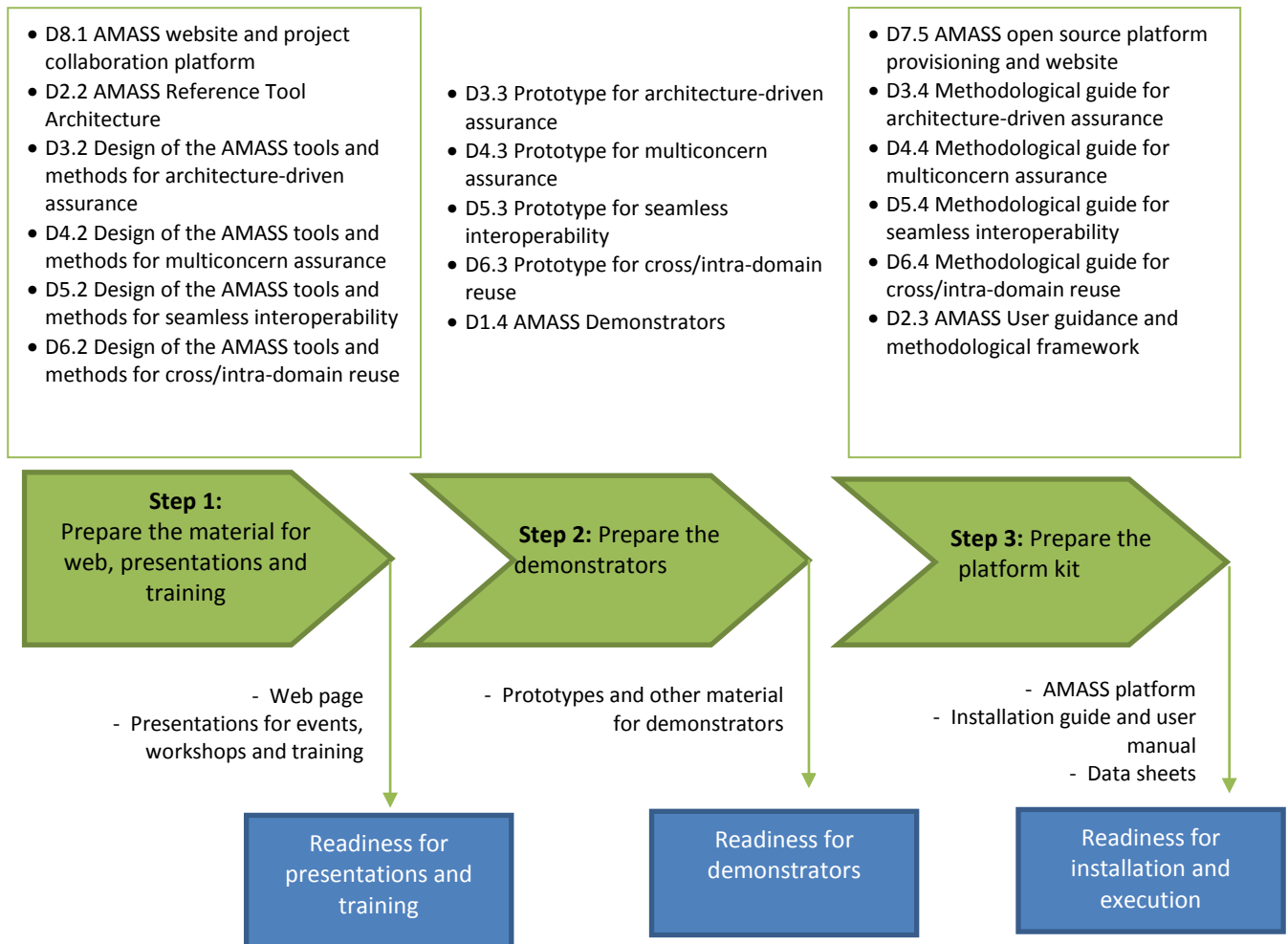


Figure 2. Workflow for the Industry user group

3.5.2 User Group: Policy Makers

The analysis, development and assurance of safety-critical CPS is highly standardised and regulated. Policy Makers are responsible for industrial development to adapt national and regional policies and standards. As stated in Table 4 consultancy providers, assessor companies and standardization and regulation bodies are the intended audience within this user group. A remarkable example is the European Aviation Safety Agency (EASA)¹⁶, an agency of the European Union (EU) with regulatory and executive tasks in the field of civilian aviation safety.

The content to promote, the means and the corresponding workflow are the same that applies to the Industry user group (Table 8 and Figure 2).

3.5.3 User Group: Research and Scientific Communities

Another key user group is the one representing research and scientific communities. Since AMASS will work on implementing a common metamodel called Common Assurance and Certification Metamodel

¹⁶ <https://www.easa.europa.eu/>

(CACM), this knowledge database will be introduced within these communities. By doing so, these theoretical concepts are formalized through a metamodel and transmitted to the community in order to work on those concepts and suggest possible extensions to the AMASS platform.

Table 9. Adoption program for the Research and Scientific Communities user group

Intended Audience	Content to promote	Means
<ul style="list-style-type: none"> Universities Research institutes 	CACM Metamodel	Theoretical presentation and training

Workflow

The following workflow shows the actions planned for the adoption program:

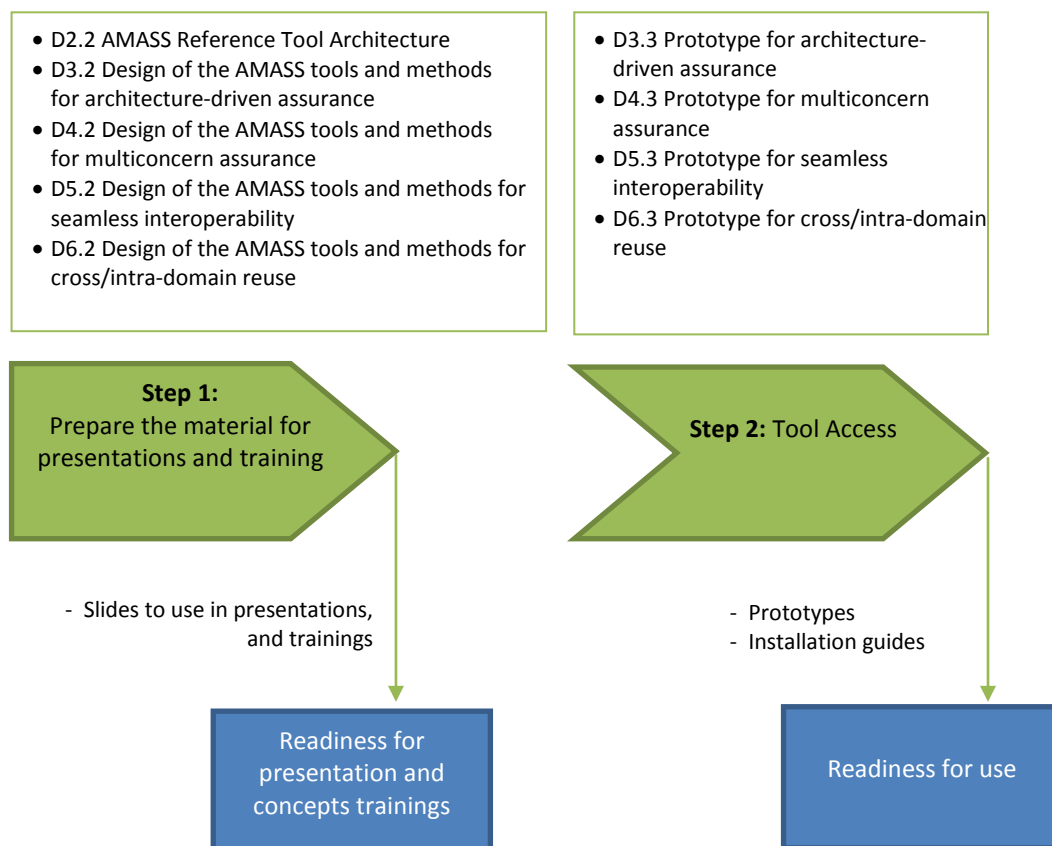


Figure 3. Workflow for the Research and Scientific user group

3.5.4 User Group: Open Source Communities

As described in D8.2 Exploitation Plans and Initial Market Megatrends Analysis [3], a specific number of open source communities is relevant for AMASS and can be seen as special stakeholders: Eclipse, PolarSys, and Open Service for Lifecycle Collaboration (OSLC). They play a vital role as a way of maintaining and further deploying the AMASS results.

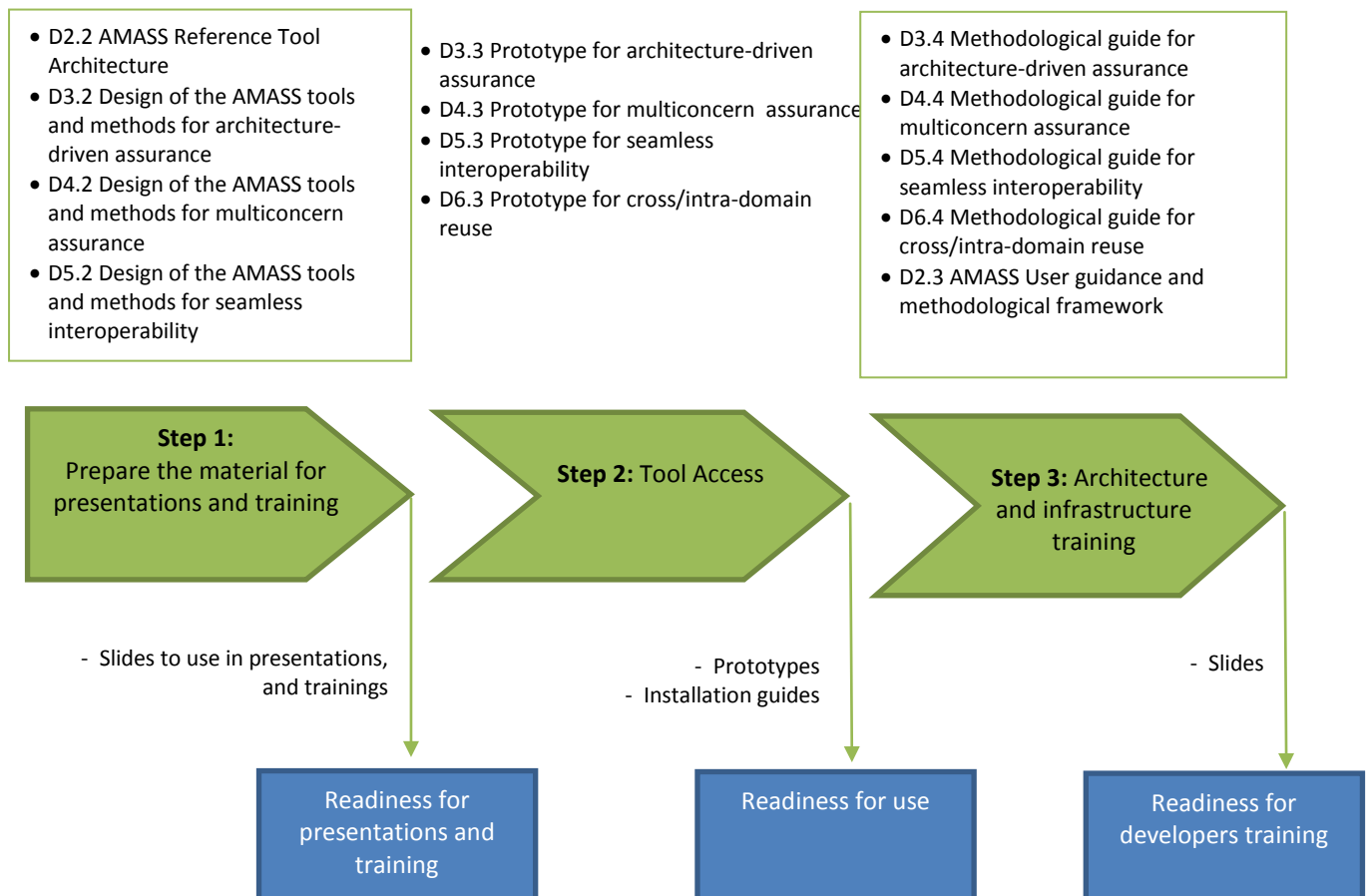
Table 10 depicts the program for Open Source Communities whereas the workflow is illustrated in Figure 4.

Table 10. Adoption program for the Open Source Communities user group

Intended Audience	Content to promote	Means
Open-source communities: Developers of open-source tools for embedded systems engineering	Common Assurance and Certification Metamodel (CACM)	<ul style="list-style-type: none"> • Training • Tool Kits

Workflow

The following workflow shows the actions planned for the adoption program:


Figure 4. Workflow for the Open Source Community user group

References

- [1] D8.1 AMASS Website and Project Collaboration Platform, 31 August 2016
- [2] [D8.5 Dissemination and Training Plan](#), 28 July 2016
- [3] [D8.2 Exploitation Plans and Initial Market Megatrends Analysis \(a\)](#), 30 November 2016
- [4] [D7.3 AMASS open source platform project proposal](#), 31 January 2017

Abbreviations and Definitions

API	Application Programming Interface
ARTEMIS	ARTEMIS Industry Association is the association for actors in Embedded Intelligent Systems within Europe
AUTOSAR	AUTomotive Open System ARchitecture
CA	Consortium Agreement
CACM	Common Certification and Assurance Metamodel
CO-CPS	Cooperating Cyber-Physical Systems
CPS	Cyber-Physical Systems
EAB	External Advisory Board
EABC	Advisory Board Coordinator
EASA	European Aviation Safety Agency
EC	European Commission
ECSEL	Electronic Components and Systems for European Leadership
ESA	European Space Agency
EU	European Union
GA	Grant Agreement
IMA	Integrated Modular Avionics
IA	Innovation Action
IOS	Interoperability Specification
JU	Joint Undertaking
MILS	Multiple Independent Levels of Security
NDA	Non-Disclosure-Agreement
OEM	Original Equipment Manufacturer
OMG	Object Management Group
OSLC	Open Services for Lifecycle Collaboration
PM	Project Manager
QM	Quality Manager
R&D	Research and Development
RSE	Robust Software Engineering
SACM	Structured Assurance Case Metamodel
SME	Small and Medium-sized Enterprise
STO	Scientific and Technical Objectives
V&V	Verification and Validation
WG	Working Group
WP	Work Package

Appendix A. Model of NDA for EAB Members

Third Party User Confidentiality Undertaking

THIRD PARTY CONFIDENTIALITY UNDERTAKING

WITNESSETH

Within the framework of the AMASS "Architecture-driven, Multi-concern and Seamless Assurance and Certification of Cyber-Physical Systems" European project, part of seventh framework programme of the European Community (hereinafter "the Project"), it may become desirable or necessary for the members of the Consortium Agreement involved in the Project and listed in Appendix MBR (hereinafter individually referred to as "the Member" and collectively referred to as "the Members") to disclose to external experts (hereinafter individually referred to as "the User") forming the user group (hereinafter referred to as "the User Group") certain technical or business information of a proprietary and confidential nature.

The User designated below agrees to use and protect such information, in accordance with the following rules:

Company name a xx company registered xxx under n° xxx, whose head office is located xxx, represented by xxx acting as xxx

1. As used in this document the term "Confidential Information" shall mean any information, software or data disclosed by any of the Members to the User, within the framework of the Project, either in writing or orally, subject to the conditions set forth hereafter, and including without limitation any written or printed documents, electronic data or information, samples, models, or any means of disclosing such Confidential Information.

2. Any information or data in whatever form disclosed and which is designated as proprietary or confidential by an appropriate stamp, legend or any other notice in writing, or when disclosed orally, has been identified as proprietary or confidential at the time of disclosure and has been promptly (thirty (30) days at the latest) confirmed and designated in writing as Confidential Information, shall be subject to the relevant terms and conditions of this "Non Disclosure Commitment".

3. The User hereby covenants that, for a period of ten (10) years from the date of disclosure of any Confidential Information, the Confidential Information received shall:

(a) be protected and kept in strict confidence by the User, that must use the same degree of precaution as it/he uses to protect its/his own Confidential Information and safeguards utilised in treating its/his confidential information of like importance, but in no case any less than reasonable care;

(b) not be used in whole or in part for any purpose other than the discussions relating to the Project within the framework of the meetings of the User Group without the prior written consent of the disclosing Member;

(c) neither be disclosed nor caused to be disclosed, whether directly or indirectly, to any third party or persons other than User and Members listed in Appendix MBR within the framework of the meetings of the User Group for the Project.

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Third Party User Confidentiality Undertaking

(d) neither be copied nor otherwise reproduced nor duplicated in whole or in part where such copying, reproduction or duplication have not been specifically authorised in writing by the disclosing Member, other than for use for the Purpose

4. It is expressly understood and agreed by the User that the disclosure and provision of Confidential Information under this "Non Disclosure Commitment" shall not be construed as granting to the User any rights whether express or implied by licence or otherwise. Any such Confidential Information and copies thereof shall remain the property of the disclosing Member, subject to third parties rights, and shall be returned by the User immediately upon request.

5. The User shall have no obligations or restrictions with respect to any Confidential Information, which the User can prove:

(a) it has come into the public domain prior to or after the disclosure thereof and in such case through no wrongful act of the User; or

(b) it is already known to the User as evidenced by appropriate written documentation; or

(c) it has been lawfully received from a third party without restrictions or breach of this "Non Disclosure Commitment"; or

(d) it has been or is published without violation of this "Non Disclosure Commitment"; or

(e) it is independently developed in good faith by employees of the User who did not have access to the Confidential Information; or

(f) it is approved for release or use by written authorisation of the disclosing Member; or

(g) it is not properly designated or confirmed as proprietary or confidential under paragraph 2 above.

6. This "Non Disclosure Commitment" shall come into force upon its signature by the User and shall expire 5 (five) years thereafter.

7. The expiry of this "Non Disclosure Commitment" shall not relieve the User of complying with the obligations imposed by paragraph 3 thereof with respect to the use and protection of the Confidential Information received prior to the date of the expiry of this "Non Disclosure Commitment".

8. No warranties of any kind are made by either Member under this Non Disclosure Commitment. Any Confidential Information exchanged under this Non Disclosure Commitment is provided "as is"

9. This "Non Disclosure Commitment" shall be governed by and shall be interpreted in accordance with the laws of Belgium.

10 In the event of any dispute, controversy or claim arising out or in connection with the present Agreement, the User agrees that the matter shall be submitted for settlement proceedings under the International Chamber of Commerce ADR Rules. If the dispute, controversy or claim has

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Third Party User Confidentiality Undertaking

not been settled within a period of two months following the filing of a request for ADR pursuant to the said Rules, such dispute, controversy or claim shall be finally settled under the Rules of Arbitration of the International Chamber of Commerce by one or more arbitrators appointed in accordance with the said rules. The place of arbitration shall be Brussels (Belgium). The language to be used in the arbitral proceedings shall be English.

11. This document shall become effective on the date of its signature.

Date:	
Signature :	



Third Party User Confidentiality Undertaking

APPENDIX MBR

List of the signatory members of the Consortium Agreement involved in the Project:

TO BE COMPLETED

CONFIDENTIAL

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