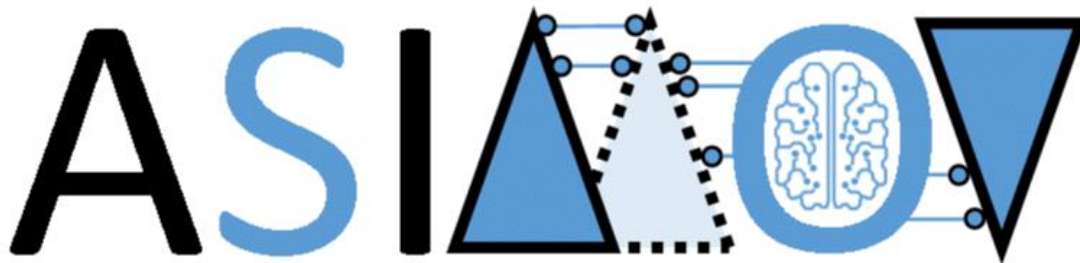# Dissemination Plan and Report

[WP5; T5.3; Deliverable: D5.3 version 1.1]

Non-Confidential

AI training using Simulated Instruments for Machine Optimization and Verification

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Formal Reviewers

Version	Date	Reviewer
1.0	2022.02.10	Tabea Henning (DLR); Niklas Braun (AVL)
1.1	2022.08.19	Jan van Doremalen (CQM); Hans Vanrompay (TFS)

Change History

Version	Date	Reason for Change
1.0	2022.02.10	First version, based on the plans and reports of the Dutch and German partners, with some contributions from Finnish partners (pending the funding decision in Finland)
1.1	2022.06.22	M12 update to results and consortium (removal of Finland)

Abstract

The ASIMOV-project develops technologies to combine Digital Twinning and Machine-Learning (e.g., Reinforcement Learning) to automate the calibration, optimization of Cyber Physical Systems. The project is centred around industry use cases to ensure that the technology developed in the project will meet actual industry needs. To enhance the value of the ASIMOV-project, initiatives will be taken to disseminate these.

This document provides an overview of the dissemination plans of the ASIMOV-consortium as well as report on the actual status.

This document will be updated every 6 months. Version 1.1 reflects the status per July 2022 (month 12 in the project).

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1   Introduction

High-tech cyber-physical systems (CPSs) play increasingly important roles in our society. They are ubiquitous, and companies, organizations and societies depend on their correct functioning. CPSs need to have high up-times, be user-friendly, and economically to use. CPS suppliers must assure that their systems reliably deliver optimal quality in customers' environments, without bothering their customers with complex system optimisation tasks that require highly skilled staff. Systems need to be optimally tuned before delivery and at installation and re-adjusted during use. Such optimization can easily require many hours/days and this total time increases rapidly due to growing project diversity and complexity. To address this major problem, it is ASIMOV's vision that CPSs must be increasingly autonomous and self-optimising, which leads to the following central question:

How to build complex high-tech systems that select their optimal settings autonomously within minimal time and with minimal external expertise?

To answer this question, the ASIMOV project will develop innovative technologies to create self-optimising CPSs by combining AI and Digital Twinning. The consortium, consisting of large industrial parties, SME's with strong AI-expertise, and leading universities and research institutes, will deliver the following innovations:
- creating digital twins of systems to simulate realistic system behaviour;
- training an Optimisation-AI based on the digital twin to find optimal system settings;
- verifying the validity of the digital twin for training the AI;
- using the trained AI to perform the tuning and calibration tasks on actual machine configurations.

This will lead to AI-based software that autonomously performs system optimisation tasks during manufacturing, installation, and system usage. Proof of concepts will be provided in two different industrial system domains (electron microscopes and automated driving) for which optimisation is crucial for system performance.

The key objectives of the dissemination are to create public awareness of the ASIMOV methods, tools and results, showing the industrial feasibility and applicability, knowledge sharing and exchange and actively transfer ASIMOV results to specific industrial and academic target groups. All project partners, especially the applied research partners, will present findings at international conferences and workshops, feed insights into special interest groups, as well as publish research results in peer-reviewed journals and conference proceedings. Industrial partners will complement dissemination of results through the realization of proof-of-concepts, field tests and in-product-demonstrations showcasing achievements at professional exhibitions. Public dissemination: promote and support (white) papers, articles, conference contributions, innovation markets, invited talks, industrial exhibitions, etc. Use widely available platforms to make the public reports and papers available, e.g., a public ASIMOV website, an ASIMOV page on Wikipedia, an ASIMOV project entry on ResearchGate, an ASIMOV page on LinkedIn etc.

This document gives an overview of the plans to disseminate the ASIMOV results to create awareness by creating industrial and social added value. In addition to the plan, the document also provides a report of the current exploitation status.

2 Consortium Overview

Company Name (Project coordinator first)	**Country**	**Role *)**	**Type of organisation **)**				
			I	**S**	**U**	**R**	**O**
FEI Electron BV (TFS)	The Netherlands	C	x				
Netherlands organization for applied scientific research (TNO)	The Netherlands	M				x	
Eindhoven University of Technology (TUE)	The Netherlands	P			x		
CQM B.V. (CQM)	The Netherlands	P		x			
OFFIS e. V. (OFFIS) **until December 31, 21**	Germany	M				x	
Deutsches Zentrum für Luft- und Raumfahrt (DLR) **per January 1, 2022**	Germany	M				x	
AVL Deutschland GmbH (AVL)	Germany	P	x				
NorCom Information Technology GmbH & Co. KGaA (NORCOM)	Germany	P		x			
LiangDao GmbH (LIANGDAO)	Germany	P		x			
RA Consulting GmbH (RAC)	Germany	P		x			
TrianGraphics GmbH (TG)	Germany	P		x			

Table 1 - Consortium Overview

*)   C = Coordinator; M = country's Main participant contact; P = Participant
**)   Type of organisation: I=Industry; S=SME; U=University, R=Research Institutes, O=Other

NOTE:

The German consortium has changed since submission of the FPP. The table above reflects the current composition of the consortium, i.e. OFFIS is converted to DLR. A CR will be submitted to ITEA to reflect the change. It is in progress for submission in September 2022.

NOTE:

All Finland participation is removed in version 1.1. of this document and their withdrawal from the consortium will be reflected in the CR.

3 Dissemination Plan

3.1 Industrial Partners

Dissemination Description	Planned date
AVL	
Presentation of the project in social media channels of AVL	M8
Presentation of project content and intermediate results in internal workshops at AVL	M12, M24
Presentation of final results in internal workshops at AVL	M36
Presentation of project results at international conferences, e.g., Symposium on Development Methodology in 11/2024	M30 - M36
Symposium presentation: Schyr, C.; Braun, N.; Oberpeilsteiner, S.: *AI-based Optimization of Digital Twins of Unmanned Commercial Vehicles.* 7th International Commercial Vehicle Technology Symposium (Kaiserslautern, September 2022)	M15
Schyr, C.; Braun, N.; Hartwecker, A.; Müller, S.; Oberpeilsteiner, S.: *Efficient Use of Multibody Simulation on the Vehicle-in-the-Loop Test Bench.* AVEC 2022 (Kanagawa, Japan 2022)	M15
CQM	
Transfer knowledge within customer projects from CQM to customer	ongoing
Transfer knowledge to our (potential) customer base and market by means of blogs, workshops, white papers, seminars.	ongoing
LIANGDAO	
Presentation of LiangDao's contribution at ASIMOV and results at conferences	From 2023 on
Presentation of project content and intermediate results in internal workshops at LiangDao	Q3 2022
Roadshow at customer in case of requirements regarding lidar simulation	Q3 2022
NORCOM	
Presentation of the ASIMOV project to customers	M8 - M36
Presentation of project intermediate results in internal workshops	M8 - M36
RAC	
Yearly multiple roadshows at customer sites	from 2023 on
Once per year presentation on the RA User Day	from 2023 on
Yearly multiple conference and show participations	from 2023 on
Continuously evaluation of possible standardisation activities	from 2023 on
TFS	
Presentation of the ASIMOV project and technical results during Thermo Fisher Scientific Technology Conferences	M36
1-2 publications at International Conferences and in peer-reviewed Journals	M18-M36
TG	
Presentation of results as papers and presentations at international conferences (DSC,….)	M24
Announcement of upcoming new features at exhibitions (I/ITSEC, DSC, Autosense,…)	M36
Social media marketing activities	M24

Table 2 - Dissemination Plans of Industrial Partners

3.2 Academic and Research Partners

Dissemination Description	Planned date
DLR	
1-2 academic publications + presentations on national conferences (e.g., DATE)	M8 – M19
5-6 academic publications + presentations on international conferences (e.g., SAFECOMP, CPS-WEEK)	M20 – M36
Participation and scientific-technical exchange on 2 (national/international) conferences like the BMBF/BMWK conference "Research and technology for automated and connected driving" and "International Workshop on Digital Twin Architecture" (TwinArch) co-located with European Conference on Software Architecture (ECSA)	M16 – M36
Introduction of ASIMOV results w.r.t. AI application, resulting challenges and needs w.r.t. standardization into the amendment of the DIN standardization roadmap AI "Künstliche Intelligenz" within the focal topic "Mobility", in particular safe automated mobility; the goal of the	M10-M36

Dissemination Description	Planned date
roadmap is to describe the status quo and to develop recommendations for activities for politics, science, industry, and standardization bodies.	
TNO	
Article about ASIMOV in ESI – 20 years book	M17
ASIMOV demonstration at ESI Symposium 2022 – 27th September 2022	M17
ASIMOV presentation at ESI Symposium 2022 – 27th September 2022	M17
ASIMOV presentation at ESI Symposium 2022 – April 2024	M35
2 or 3 publications (conferences, journals, TNO reports etc.)	M18 – M36
TUE	
2-3 academic publications of the PhD students Jilles van Hulst and Roy van Zuijlen in leading control and CPS conferences such as ECC, ACC, IFAC World Congress, CPS week, IEEE CCTA and smaller dedicated workshops	M18 – M36
Journal publication in leading journals such as IEEE Transactions on Control Systems Technology, IFAC Control Engineering Practice, etc. (due to duration of review process for journals, several journal publications are expected after M36)	M25
2 PhD theses on ASIMOV research perspective	> M36

Table 3 - Dissemination Plans of Academic and Research Partners

3.3   Joint Dissemination Plans

Partners	Dissemination Description	Planned date
TFS, TNO, CQM, TUE	Industry reference group: workshops with 6 (at this moment) industries outside the ASIMOV-consortium to align on potential industry value and to share ASIMOV results. [Canon Production Printing, Lely, Philips, Smart Robotics, Ultimaker, Thales]	M12, M24, M30, M36
All	ASIMOV **public website** – www.ASIMOV-project.eu (action: AVL)	M6 shifted to M9
All	ASIMOV **Wikipedia** Page (action: TNO) Draft ASIMOV Wikipedia page submitted for review by Wikipedia) https://en.Wikipedia.org/wiki/Draft:ITEA4_ASIMOV_Project Publish future links to public ASIMOV papers and reports on this page.	M9
All	ASIMOV LinkedIn Page	M9
DLR, AVL, TFS, TNO, TrianGraphics	Article "Architecture for DT-based RL Optimization of Cyber-Physical Systems" (led by DLR, written by DLR and Working Group members) submission to 1st International Workshop on Digital Twin Architecture (TwinArch 2022) https://www.iese.fraunhofer.de/en/twinarch.html#1 co-located with the 16th European Conference on Software Architecture (ECSA) in Prague, Czech Republic	M14
TFS, TNO, CQM, TUE	Article about ASIMOV on Bits&Chips: https://bits-chips.nl/	M18
All	Publish public papers and reports via **ResearchGate**. Project has been created on ResearchGate: https://www.researchgate.net/project/ASIMOV-ITEA	M12
All	Publish public papers and reports via **LinkedIn**. Create a project on LinkedIn	M9

Table 4 - Joint Dissemination Plans

Regarding the ASIMOV public website: hosting was delayed as a Finnish part volunteered to host (TietoEvry). AVL has volunteered and is able to host www.ASIMOV-project.eu.

Regarding the ASIMOV Wikipedia Page: a draft page is available and has been submitted to Wikipedia for review. The duration of the review process is unpredictable, but this is likely to take months.

Regarding the ASIMOV ResearchGate project, DLR has created a project after the withdrawal of Finland.

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version 1.1	public	2022.06.22		10/14

4 Dissemination Results

4.1 Industrial Partners

Dissemination Description	Date
AVL	
Paper accepted Schyr, C.; Braun, N.; Oberpeilsteiner, S.: *AI-based Optimization of Digital Twins of Unmanned Commercial Vehicles.* 7th International Commercial Vehicle Technology Symposium (Kaiserslautern, September 2022)	M11
Schyr, C.; Braun, N.; Hartwecker, A.; Müller, S.; Oberpeilsteiner, S.: *Efficient Use of Multibody Simulation on the Vehicle-in-the-Loop Test Bench.* AVEC 2022 (Kanagawa, Japan 2022)	M11
CQM	
LIANGDAO	
NORCOM	
Presentation of the Asimov project to international business client in the automotive sector	Oct-2021
RAC	
TFS	
Remco Schoenmakers was interviewed at the Dutch/German Artificial Intelligence Expert Day (organized by Ministry of Economic Affairs) (March 24, 2021). He discussed the proposal for the ASIMOV-project and the potential and challenges of the technology.	Mar-2021
Presentation of Remco Schoenmakers at the Machine Learning conference of Bits&Chips	M1
Interview of Brainport Eindhoven with Remco Schoenmakers about AI, referring to ASIMOV: https://brainporteindhoven.com/nl/ontdek/de-kracht-van-brainport/cases/ai-is-vak-apart-dat-nog-volwassen-moet-worden (in Dutch)	
TG	

Table 5 - Dissemination Results of Industrial Partners

4.2 Academic and Research Partners

Dissemination Description	Date
DLR/OFFIS	
Article about ASIMOV in OFFIS in-house public magazine article "Datawork No. 73", available under https://www.offis.de/en/offis/downloads-and-tools/datawork-offis-journals.html)	M7
In the course of the amendment of the DIN standardization roadmap AI "Künstliche Intelligenz", results from ASIMOV with regard to AI application, the resulting challenges and needs with regard to standardization within the focal topic "Mobility", in particular safe automated mobility, have been introduced. The goal of the roadmap is to describe the status quo and to develop recommendations for activities for politics, science, industry, and standardization bodies.	M10-M12
TNO	

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version 1.1	public	2022.06.22		11/14

Dissemination Description	Date
TUE	

Table 6 - Dissemination Results of Academic and Research Partners

4.3 Joint Dissemination Results

Partners	Dissemination Description	Date
TNO	Draft Wikipedia page has been created (in review by Wikipedia).	Jan-2022
DLR	Project has been created on ResearchGate: https://www.researchgate.net/project/ASIMOV-ITEA	July 2022
AVL	ASIMOV public website launched: www.ASIMOV-project.eu	May 2022

Table 7 - Joint Dissemination Results

In the table above, items are in grey as they are not the final results, but intermediate results.

4.4 Number of External Publications (KPI in PPR – target: 30)

M6	6
M12	3
M18	
M24	
M30	
M36	

Table 8 - Number of External Publications
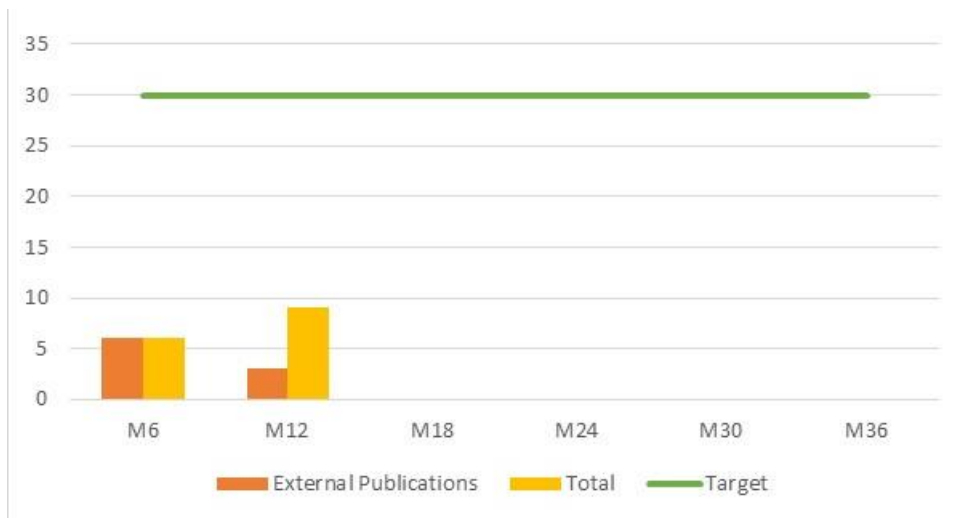
Figure 1 - #External Publications Chart

5 Terms, Abbreviations and Definitions

Table 9 - Terms, Abbreviations and Definitions

AI	Artificial Intelligence
ASIMOV	AI training using Simulated Instruments for Machine Optimization and Verification
DT	Digital Twin
ML	Machine Learning
RL	Reinforcement Learning
WP	Work Package

6 Bibliography

[1] ASIMOV-consortium, *ASIMOV - Full Project Proposal,* 2020.