



D7.1 PRELIMINARY VERSION OF CPSOSAWARE DISSEMINATION PLAN & MATERIAL

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Work Package WP7 – Industry Driven Trial and Evaluation

Abstract

This report constitutes an output of the Task 7.1 “Dissemination planning and activities” and represents the D7.1 “Preliminary version of CPSoSaware Dissemination Plan & Material”. Therefore, this document provides detailed information regarding the activities and initiatives carried on in the first half of the project and outlines the channels through which results and key messages will be communicated to the stakeholders and audiences that have been identified to benefit from the CPSoSaware project. The basic aim of dissemination and communication is to effectively transmit information of the CPSOSAWARE project activities and its outcomes to multiple stakeholders and audiences, in order to support and maximize the impact of the CPSoSaware current and future outputs. The overall outreach that will be succeeded through this task will help towards the overall sustainability of the project results.



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Website www.CPSoSaware.eu

Control Sheet

VERSION	DATE	SUMMARY OF CHANGES	AUTHOR
0.1	15/3/2021	Initial ToC defined and circulated to the consortium for approval	Neofytos Gerosavva
0.2	25/04/2021	Initial Draft circulated to the Consortium	Neofytos Gerosavva, Ioannis Giannoulakis, Michalis Tzifas (8BELLS)
0.3	15/05/2021	ISI, CATALINK, UPAT, UoP, CRF, TAU, ATOS	UoP team Beatriz Gallego- Nicasio Crespo (ATOS), Gerasimos Arvanitis (UPAT) Alessandro Cacciatore (CRF), Alessandro Zanella (CRF) Pekka Jaaskelainen (TAU), Adam Dąbrowski (RTC), Wojciech Jaworski (RTC), Valia Leivaditou (CTL), Christos Anagnostopoulos (ISI), Stavros Nousias(ISI), Evangelos Chaleplidis(ISI), Vassilis Pikoulis(ISI), Panagiotis Tsakanikas(ISI), Francesco Regazzoni (USI) Evgeny Shindin (IBM)

Preliminary Version of CPSoSaware Dissemination Plan & Material

0.4	25/05/2021	EIGHT BELLS drafted next version incorporating partners input	Neofytos Gerosavva (8BELLS)
0.5	01/06/2021	Pre-final version released	Neofytos Gerosavva, (8BELLS)
0.6	22/06/2021	Review by PASEU, USI	Petros Kapsalas(PASEU), Francesco Regazzoni (USI)
0.7	23/06/2021	Review comments addressed; new version produced	Neofytos Gerosavva, (8BELLS)
1.0	30/06/2021	Final version - Document ready for submission to the European Commission	Apostolos Fournaris, Aris Lalos (ISI)

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Executive Summary

According to the CPSoSaware Description of Action (DoA) [1] within the scope of this task, we will widely disseminate and adequately present the CPSoSaware project contributions and outputs to the scientific and technical communities. More specifically, the CPSoSaware consortium partners within the scope of the T7.1 will specify our targeted stakeholders and audience, the channels with which they can be reached, and the specific activities through which the consortium will trigger widespread awareness. So, within this context the current document “Preliminary version of CPSoSaware Dissemination Plan and Material” describes the dissemination activities performed by the CPSoSaware consortium throughout the first 18 months of the project lifecycle. More specifically, we will present all the dissemination material produced so far, the project website statistics, the created social media channels and additionally a variety of papers, acknowledging the project, that they were presented in various important scientific events (conferences, symposiums, workshops etc) or published in well-known journals as well as some additional events that were attended from consortium partners and some initial clustering activities with other projects. Furthermore, a dissemination plan for the second half of the project is being provided as well.

1 Introduction

Within the CPSoSaware project, WP7 is dedicated to dissemination, exploitation, standardization, and concertation activities and IPR management in addition. The CPSoSaware consortium within this WP context and, through the participation in various types of dissemination activities, is committed to achieving strong communication of the project results to the public and key stakeholders through social media (Facebook, LinkedIn, Twitter) posts, and other announcements in the website and other news channels.

This deliverable lies within the scope of Task T7.1 “Dissemination planning and activities” as described in the DoA [1] has as a main objective to organize the transfer of knowledge and of project results, both within the consortium and to the outside world. Therefore, it ensures that all organizations involved are kept informed and promote project results and outcomes through a variety of channels. The present deliverable will describe in detail all related activities and the specific channels such as the project website, social media, newsletters, brochures etc, which were designed to disseminate the results of CPSoSaware project.

Additionally, these channels could refer to scientific publications, journal articles, posters, presentation at workshops and conferences, webinars, training courses, events participation etc.

The specific aims of the CPSoSaware dissemination and communication activities are the following:

- To promote through communication and dissemination the CPSoSaware outputs -scientific results and relevant technologies.
- To contribute to the widespread use and awareness, raised by the developed technologies in order to increase the potential of market outreach
- To identify the main stakeholder types/categories and use appropriate dissemination tools and channels.
- To catch the attention and attract potential stakeholders for the CPSoSaware technologies (in combination with the T7.2 activities)

The execution of the dissemination plan is being evaluated through quantitative and qualitative measures for the sake of accountability and improvement of the project.

2 Dissemination Activities

2.1 Document Structure

This deliverable “Preliminary version of CPSoSaware Dissemination Plan and Material” consists of various subsections such as social media and website, dissemination material produced, activities and events, papers, journal articles and clustering activities that are under the document’s (current) main section “Dissemination activities”. In each subsection we try to describe in a clear way the specific dissemination activity along with the related screenshots that refer to the specific activity. Furthermore, in the subsection 2.9 we present our dissemination KPIs and current performance, whereas at section 3 we provide a plan of activities for the second half of the project.

2.2 Summary on dissemination activities

Within this deliverable we aim to provide a detailed account of all dissemination and communication efforts carried out by the CPSoSaware project partners during the first half of the project as well as those that are planned for next few months. Therefore, we will present all dissemination material produced during these months such as: the two first newsletters, project leaflets and brochures, events attended by project partners, accepted scientific papers, social media and the project website. In addition, this document also includes a list of KPIs, and the performance of the project with respect to those KPIs.

According to the DoA it is planned to split the dissemination work into the following communication processes:

- Creation of the CPSoSaware public web portal that is going to operate as a forefront of the CPSoSaware ecosystem. Apart from the CPSoSaware ecosystem support, the portal will act as a dynamic database centralizing the scientific results, standard documents, market information relative to the context of the CPSoSaware project.
CURRENT STATUS: WEBSITE CREATION DONE ✓
- To support online and offline dissemination, a leaflet, a poster, and presentation slides will be created and updated upon major developments in the course of the project including project deliverables, dissemination materials and other project-related material. Project branding will provide a uniform graphic layout.
CURRENT STATUS: LEAFLET, BROCHURE, FIRST PROJECT VIDEO CREATED ✓
- Creation of a social media strategy (including Twitter, Facebook, LinkedIn, and the likes) to be used to broadcast announcements of the project participation in public events, key achievements, publications, etc.
CURRENT STATUS: SOCIAL MEDIA - FACEBOOK, TWITTER, LINKEDIN, INSTAGRAM CREATED ✓
- Publication of CPSoSaware newsletter. Such news will be distributed taking into account the identified needs.
CURRENT STATUS: TWO NEWSLETTERS ALREADY PUBLISHED ✓
- Publications in major international peer-reviewed scientific conferences, specialized journals and magazines in project related areas.

CURRENT STATUS: SEVERAL PUBLICATIONS (26 IN NUMBER) IN INTERNATIONAL CONFERENCES AND WELL-KNOWN JOURNALS HAVE ALREADY DONE ✓

- Workshop organization. CPSoSaware will organize two (ISI, UPAT) workshops or co-locate our workshops with international events (e.g EU meeting, conferences, industrial events).
CURRENT STATUS: THIS IS EXPECTED TO BE DONE DURING THE SECOND HALF OF THE PROJECT
- Training organization. CPSoSaware will organize three (CAT) training seminars
CURRENT STATUS: WILL BE DONE WHEN THE TECHNOLOGY WILL REACH A HIGHER LEVEL OF MATURITY

Table 1: Dissemination activities' status presents a brief summary of activities per category during the first half of the project :

Type	Description	First 18 months status
Publication in Conferences	Participation to or organization of scientific events, conferences and workshops as well as participation to industry interest groups, venues, associations and standards' bodies events.	PARTICIPATION: 20 accepted publications for various type of conferences and symposiums-presented below
Publication in Journals	Publication of papers in journals and magazines.	<ul style="list-style-type: none"> • Journals: 6 accepted journal publications -presented below • Another two are pending
Survey papers and whitepapers	Whitepapers available on social media platforms and the project's website.	<p>Whitepaper #1 to be released on M20-M22</p> <p>Survey paper based on D1.1 to be submitted on M18</p>
Workshop organization	The project consortium will be organized 2 workshops	Some workshops were already organized by consortium members but of course the project will organize 2 dedicated CPSoSaware workshops
Participation in events	Participation in various project related events	Events participated by project partners are listed below. Currently we have participated in 15 events of various types
Marketing Material	Leaflets, Posters. Brochures, Press Releases, Videos	AVAILABLE: Leaflet, Brochure, first video
Project Website	Raising awareness of CPSoSaware	WEBSITE AVAILABLE

Social Media	Facebook, Twitter and LinkedIn with relevant project news.	AVAILABLE: Facebook, LinkedIn, Twitter, Youtube
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Table 1: Dissemination activities' status

2.3 Project Logo

As one of the first tasks within the WP7 and WP8 context was the creation of a logo to create a project identity and help to grab attention from potential stakeholders because logos can demonstrate the project's core values with a simple image. The selected logo tries to capture the concept behind the CPSoSaware project and its intended pilot use cases & results and provides a concrete identity to the project. The logo has been created by the project coordinator, ISI, since the beginning of the project and all project templates are based on it (deliverables, poster, presentation, and internal reports). Of course, the logo will be used for any dissemination activity and created content.

Once the brand identity was created it has been used consistently among all the content creation.



Figure 1: Project Logo

2.4 Social Media and Website

In the following sections we present the project website along with some statistics and additionally all the project's social media (LinkedIn, Facebook, Twitter) with the respective analytics for the corresponding period of time (M1-M18).

2.4.1 Website

The initial months of the project lifecycle worked as an introductory -preparatory phase in order to create and start implementing a realistic and comprehensive strategy that aims at the successful spreading of CPSoSaware’s outcomes. This initial phase consisted of the planning of all related activities, such as the deployment and maintenance of an official website that contains specific information about the CPSoSaware project. The project website (Figure 2) is accessible under the domain <https://CPSoSaware.eu> and was created during the first three months of the project. The website represents the basic channel for disseminating the project objectives, activities, and results. The website is divided into a public area, further subdivided in various thematic sections, and the private area accessible only to project partners. The website includes dedicated sections for: latest news, project concept and approach, main objectives, uses cases, members of the consortium and brief descriptions, as well as all the created media, “friend” projects and published works. The visitor can download any project related material such as the two first newsletters, the A4 leaflet and the trifold brochure. The website is designed to be simple, functional, and intuitive for the project stakeholders’ and different types of audience. This website is hosted by EIGHT BELLS the dissemination leader and in collaboration with all partners who also contribute to different sections of the website, such as publications, events and news will be dynamically updated and enriched through the project duration according to progress and activities.

The website structure and layout are interrelated with the main goals of WP7 in order to be able to disseminate the project results to the general public, experts in the field and to engage key stakeholders. The project website is very flexible and operates dynamically; it is enriched with information, and as the work evolves it provides updates on project information, and news such as upcoming meetings, participation in events, dissemination actions, conferences, publications, newsletters, photos, etc.

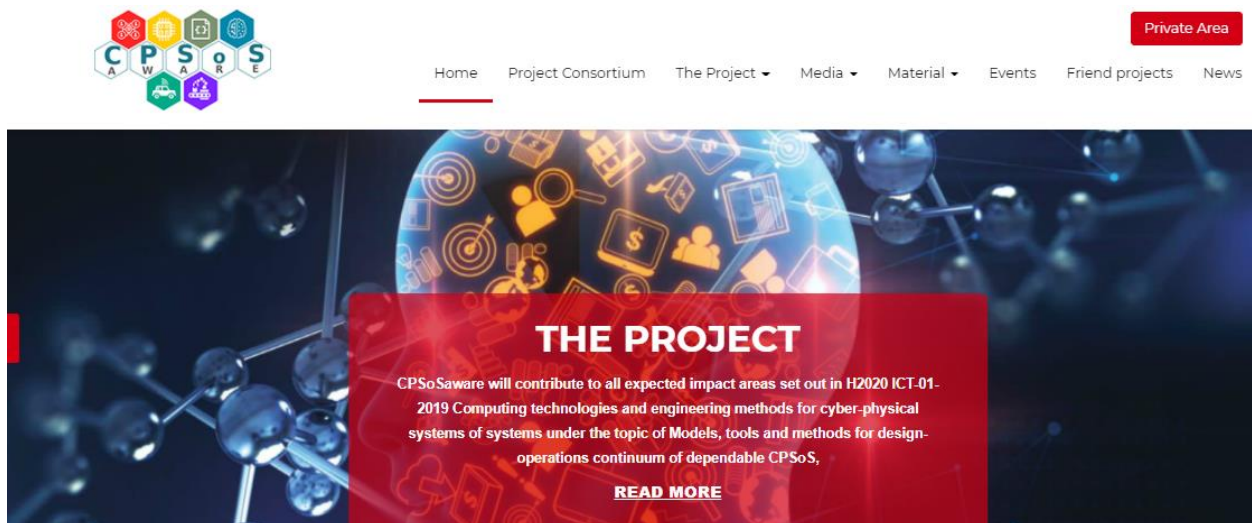


Figure 2: Website homepage

2.4.1.1 Website statistics

The CPSoSaware website is being monitored through various statistics and KPIs. As it can be observed during the last 18 months, we have at the moment 2105 unique website visitors and 6572 visits. Figure 3 below presents website statistics (visitors and visits) from June 2020 – June 2021 (left side of the image)

while the right side of the picture presents visitors and visits during June 2021. Figure 4 displays visits per website section

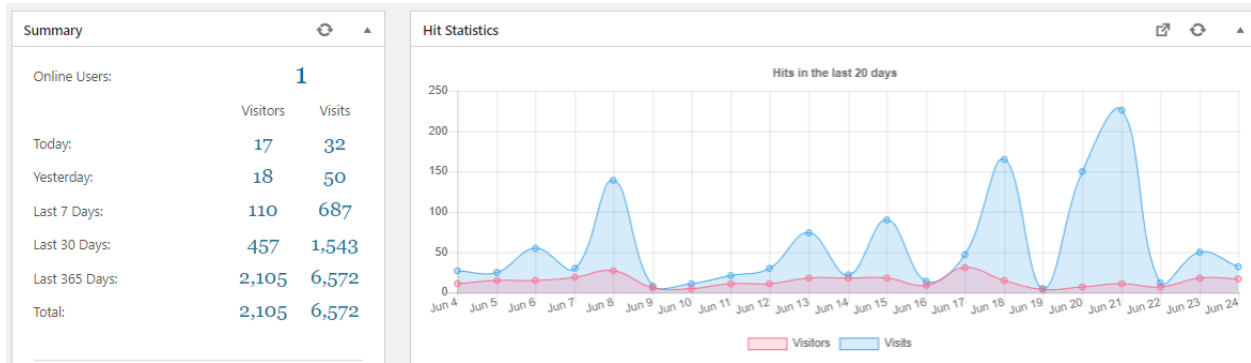


Figure 3: Website statistics

ID	Title	Link	Visits
1	Home Page	/	2,673
2	Project Consortium	/project-consortium/	223
3	The Project	/the-project/	137
4	Concept	/concept/	114
5	Use Cases	/use-cases/	110
6	News	/news/	92
7	Overview	/overview/	90
8	Events	/event/	90
9	Publications	/publications/	89
10	Newsletter issue #1	/2020/10/20/newsletter-issue-1/	85

Figure 4: Visits per website page

2.4.2 Social media

Besides the project website and as part of the WP7’s activities, several social media channels were created in order to establish a link between the possible stakeholders and the latest news about the project. In this way, the project’s online presence will be complemented via a strong social media presence.

As mentioned a Facebook page, a Twitter account and a LinkedIn page have been created to promote the project to the general audience and to reach potential key stakeholders such as software suppliers, technology suppliers, Tiers and OEMs in value chain for automotive (use case connected and automated vehicles) and industrial manufacturing (use case manufacturing processes).

Nowadays, social media networks are perhaps the most popular and efficient channels to promote a project and enhance its visibility. Through the use of social networks, channels and media it is possible to increase the visibility of the project and create a strong network among the different stakeholders involved in this knowledge sharing process. The project's online presence is being complemented via a consisted and strong social media presence. Already a Facebook page, a Twitter account and a LinkedIn page have been created to communicate project achievements and outputs to the wider audience. Updates are being published at regular time intervals. Additionally, all consortium members involved are committed to use their own organization and individual social networks for promoting the project results to increase impact and to achieve a broad exploitation of project outputs. Social media channels, such as Twitter, can be effective in communicating brief live project announcements using the well-known approach based on the usage of hashtags (in order to target specific audiences as well). Twitter as a channel is more appropriate towards posting short updates, connecting with other projects that maybe involving in related objectives with those of CPSoSaware, sharing project news that can instantaneously reach a large audience and re-tweeting relevant contents from EU bodies, friend projects, conferences etc. On the other hand, LinkedIn and Facebook can be more effective in promoting discussion, posting relevant announcements, and generating awareness of the project and its associated activities. Facebook is more appropriate for providing informal information and writing more extended text, while LinkedIn is more appropriate for establishing professional connections and liaisons with other networks and follow updates about specific thematic areas that can be related with the project such as cyber physical systems, cyber-security, autonomous driving, robotics, manufacturing, artificial intelligence etc

- The Facebook page channel is set up to spread information to the general public. Facebook page was created under the link <https://www.facebook.com/CPSoSaware>. This social media is appropriate and will be used for public project communication in the form of text, pictures and videos from project meetings as well as disseminations activities such as participation and presentation in conferences, attendance in forums etc. **The page has currently 62 followers**
- The Twitter page will be used for communication with related stakeholders and actors through networking, brief tweets and announcement of upcoming or completed activities. A Twitter account (<https://twitter.com/CPSoSaware>) has been created in order to share with the large twitter community all the news related to the project. All "tweets" are being posted by the dissemination leader and already the appropriated functionality was implemented in order to be visible in the website in real time. **The page has currently 415 followers**
- The LinkedIn page is appropriate for providing updates for the project progress targeting mainly the professional networks and communities of LinkedIn. The project LinkedIn page is accessible at <https://www.linkedin.com/company/CPSoSaware-eu-funded-project/> **The page has currently 50 followers**

The social media allowed us to reach a variety of professionals interested on the topics addressed by the project. It can be said that the use of such online communication tools, has facilitated an effective and fast communication means to spread the latest news, helping us to reach an audience around the world.

A brief presentation of each created social media -channels follows:

❖ **FACEBOOK**

The Facebook page (<https://www.facebook.com/CPSoSaware>) has currently 62 followers as of 26/5/2021. Facebook provides an analytics functionality that gives a deeper insight of user activities and the impact that posts have to followers. Figure 5 present the Facebook page while Figure 6 provides an overview of Facebook statistics, since the project started. More specifically Figure 6 displays the number of people we managed to reach (Reach column) per specific post we made on Facebook. This social media is appropriate and will be used for public project communication in the form of text, pictures, and videos from project meetings as well as disseminations activities such as participation and presentation in conferences, attendance in scientific forums etc.

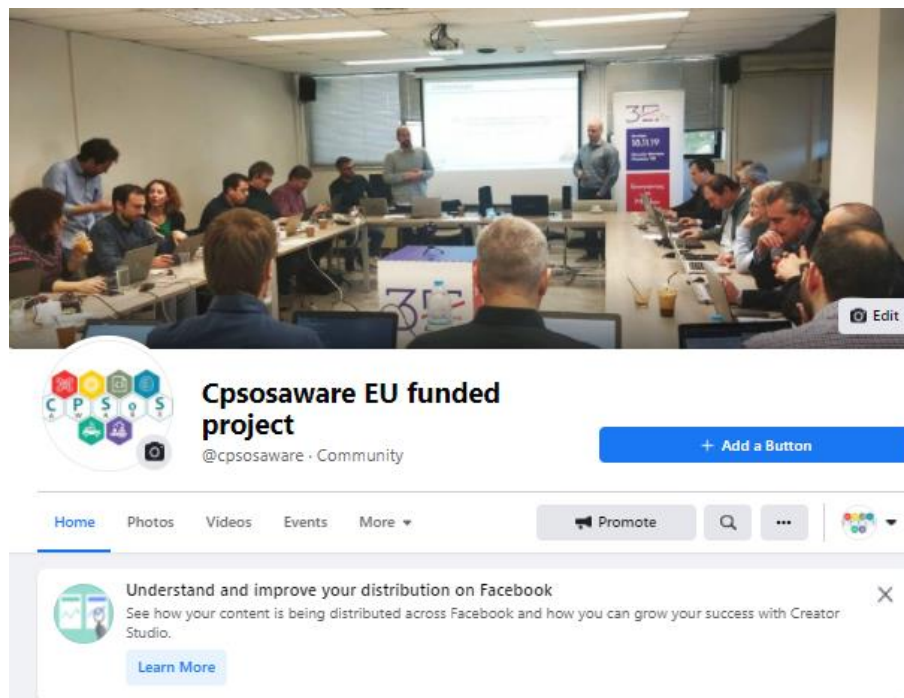


Figure 5: CPSoSaware Facebook page

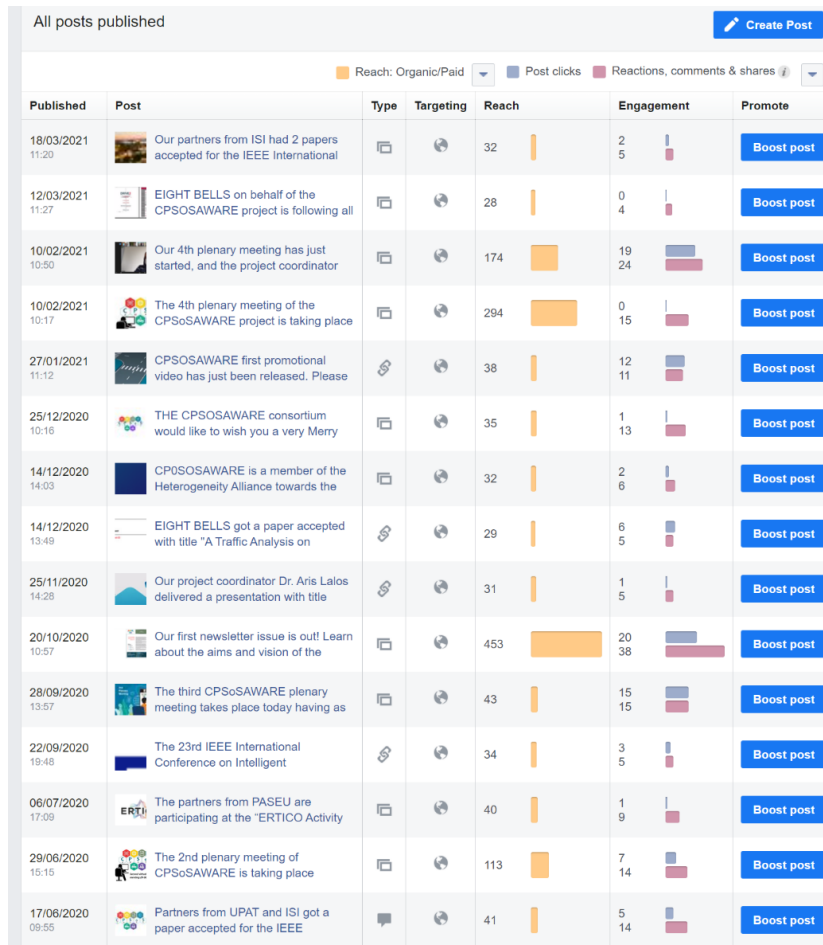


Figure 6: Facebook statistics

TWITTER

The Twitter page is being used for communication with related stakeholders and actors through networking, short updates on project news (tweets) and announcement of upcoming or completed activities. A Twitter account (<https://twitter.com/CPSoSaware>) has been created in order to share with the large twitter community all the news related to the project. The CPSoSaware Twitter account has currently 415 followers. Figures 7-8-9 display the CPSoSaware Twitter page and related statistics. For instance, we can observe that during the period of February an overall number of 1314 twitter impressions were counted while for March 2021 we had 1193 twitter impressions. When we speak for twitter impressions, we refer to a total tally of all the times the Tweet has been seen. This includes the times it appears in a one of the account followers' timelines and the times it has appeared in search or as a result of someone liking the Tweet. To date, the Twitter feed has been used to inform the community of the main events and activities that relate to the project and raise awareness of the project results. We could state that is by far the most popular social channel of the project.

All "tweets" are being posted by the dissemination leader and already the appropriated functionality was implemented in order to be visible on the website in real time.



Figure 7: CPSoSaware Twitter account

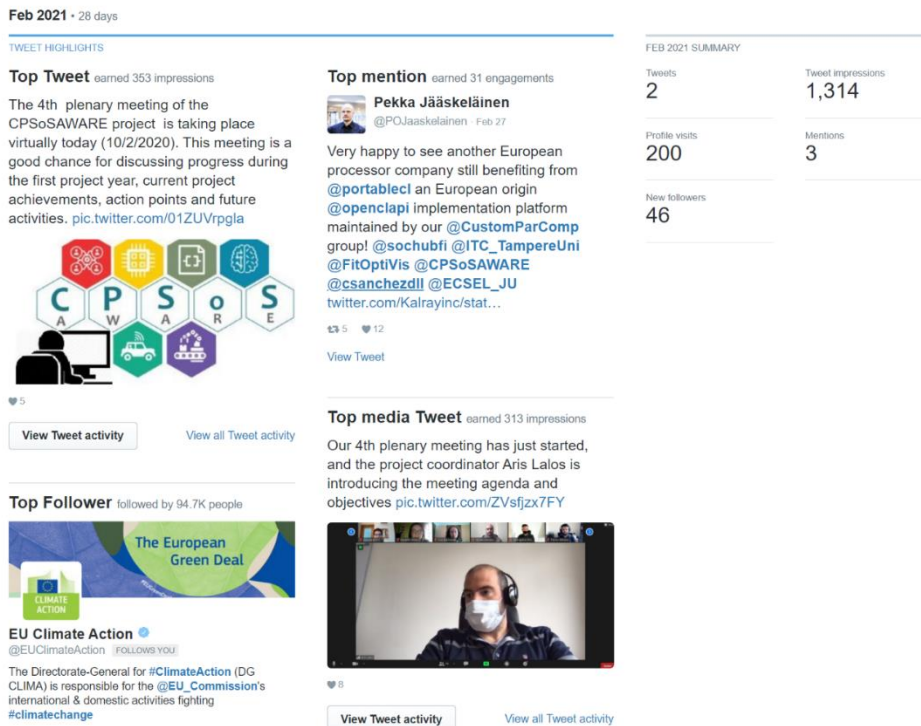


Figure 8: Twitter February 2021 statistics

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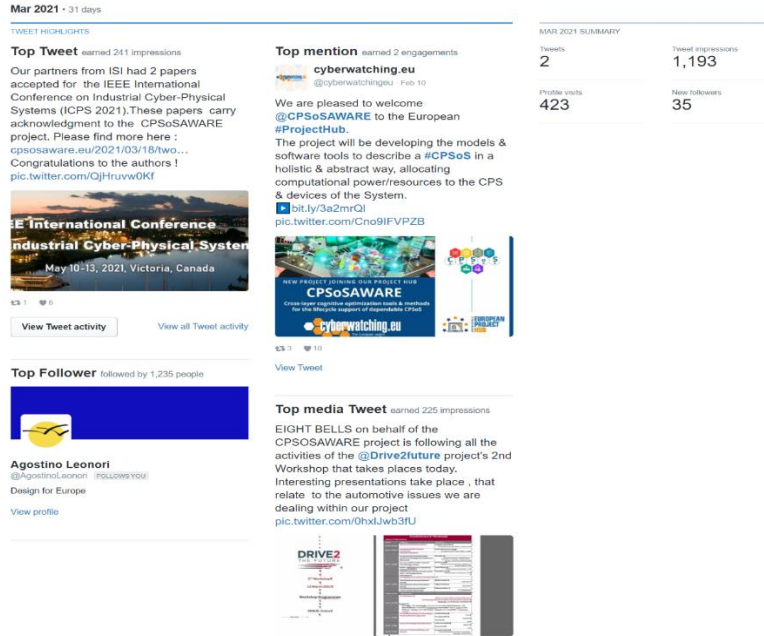


Figure 9: Twitter March 2021 statistics

LINKEDIN

The LinkedIn page is appropriate for providing updates on the project progress targeting mainly the professional networks and communities of LinkedIn. The LinkedIn project page is accessible at <https://www.linkedin.com/company/CPSoSaware-eu-funded-project> and is currently being followed by 50 persons as of 26/5/ 2021. LinkedIn provides statistics and analytics functionality that gives a deeper insight of this social media account posts impact. Figure 10 presents the LinkedIn page while **Error! Reference source not found.** provides an overview of April statistics.

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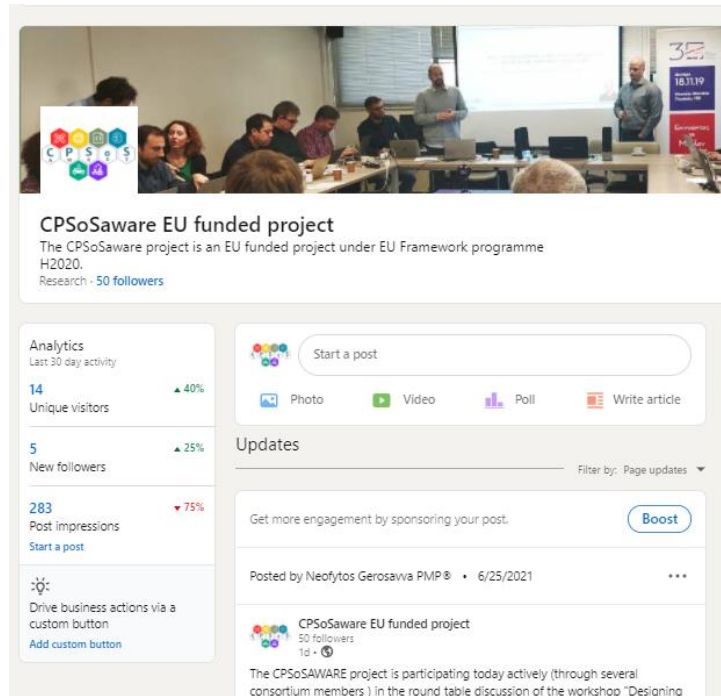


Figure 10: CPSoSaware LinkedIn account

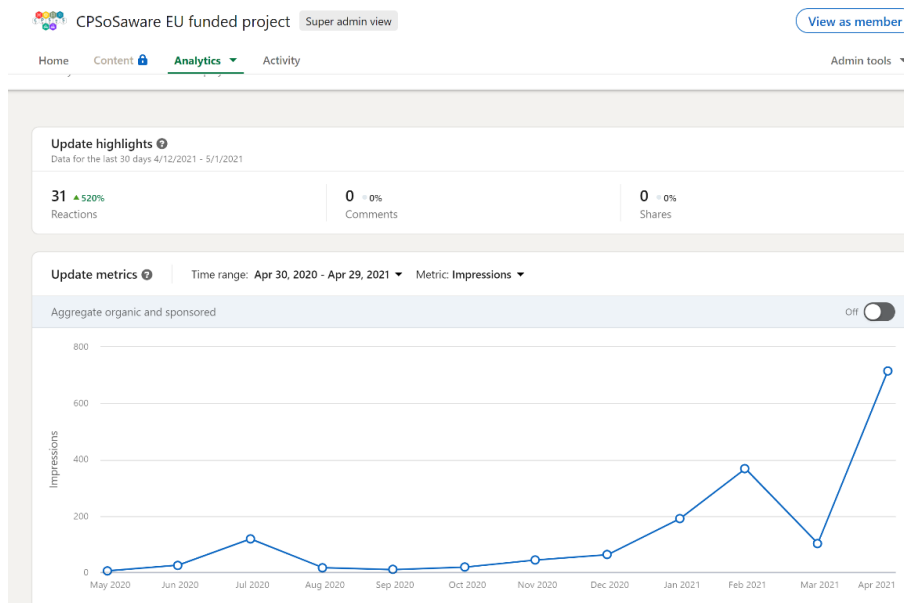


Figure 11: CPSoSaware LinkedIn April 2021 statistics

2.5 Material Produced

Towards the introduction of the project concept, approach, objectives, pilot use cases, pillars etc the following material was produced by the dissemination leader along with the collaboration of the rest project partners during the first year of the project:

- Project leaflet -one page
<https://CPSoSaware.eu/2020/10/20/a4-leaflet/>
- Project brochure- six pages
<https://CPSoSaware.eu/2020/10/20/brochure/>
- Project newsletter #1 -six pages
<https://CPSoSaware.eu/2020/10/20/newsletter-issue-1/>
- Project newsletter #2 – seven pages
<https://CPSoSaware.eu/2021/05/20/newsletter-issue-2/>

This material was produced to communicate to the readers the project vision, objectives, approach, actors and use cases. Leaflet, brochure and newsletters are designed with the projects colours and include also the project logo, the project’s social media and website links, and of and the appropriated EU acknowledgment and disclaimer, according to the Grant Agreement. The content that has been included in these documents targets users that are not “yet familiar” with the project, but they are interested in the potential results and solutions.

The leaflet, brochure and the two newsletters are being presented in the following sub-sections

2.5.1 Leaflet

During the first months of the project an informative leaflet (Figure 12) was produced to provide brief information about the project and its objectives. As an official project material, it includes the appropriate EU funding logos and acknowledgements, and a barcode for accessing the project website, social media icons, partners’ logos etc. This leaflet was circulated to all the consortium partners for disseminating it during events participation, etc.



Figure 12: CPSoSaware Leaflet

2.5.2 Brochure

Along with the project leaflet, a brochure (Figures 13-14) was produced. The brochure is two pages long, including detailed information about the project concept and vision, objectives, pillars, use cases and can be used as a printed trifold.

Below we present this brochure:



Figure 13: CPSoSaware Brochure (FRONT VIEW)

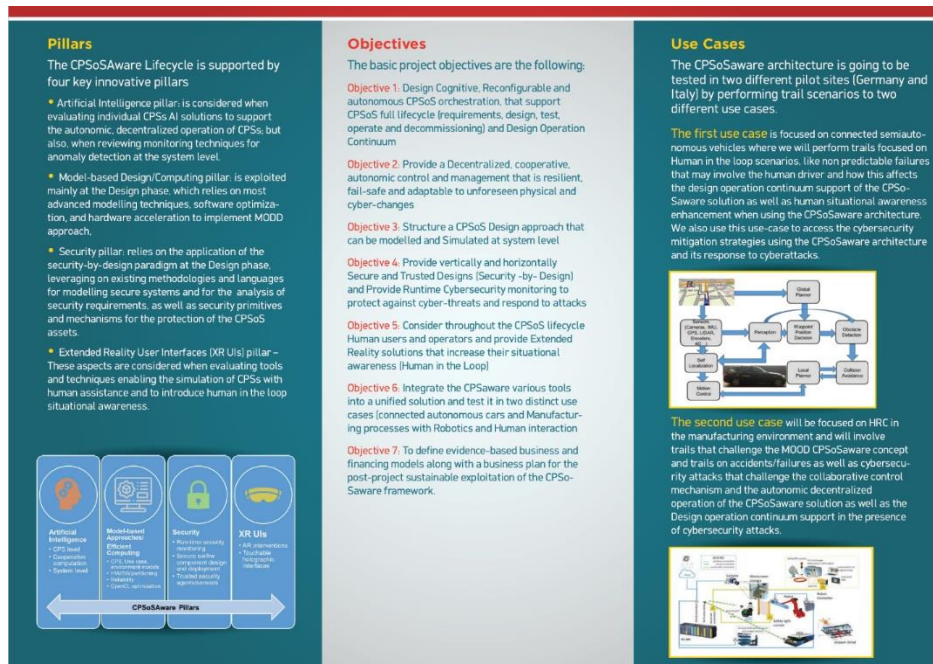


Figure 14: CPSoSaware Brochure (BACK VIEW)

2.5.3 First Newsletter

The first newsletter (Figure 15) was released on M9 and consists of 6 pages. It includes news about the project, the consortium, the basic pilot use cases, the accepted papers acknowledging the project, activities performed during the first 8 months, attended meetings etc. The newsletter uses the project's colour palette and the front page includes the project logo, a small summary, and an acknowledgment of the European Union funding, along with the proper disclaimer. The second page provides to the reader a brief description of the project objectives; the third one describes the pilot use cases, while the pages 4 and 5 of the document, list some events attended by consortium members during the respective time-period along with accepted papers. The last page provides the map with the consortium distribution, a photo of the consortium and web-links to the project social media. The plan is to release this newsletter at regular intervals providing updates on project progress and results as well as information on important deliverables, interviews, events attended, etc. In order to be easily accessible, the project newsletter was made available for reading and downloading through the project website, the project social media and through the individual partners social media through reposts /resharing (respecting and complying with the EU rules applying for GDPR).

The CPSOSAWARE first newsletter can be found here:
<https://CPSoSaware.eu/2020/10/20/newsletter-issue-1/>



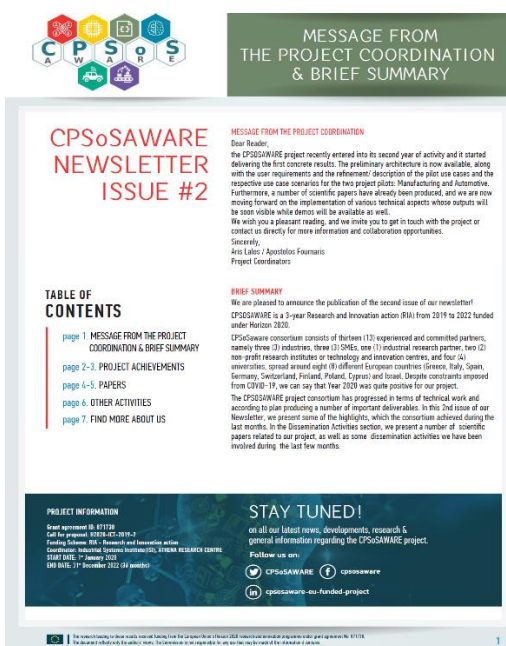


Figure 15: The first CPSoSaware Newsletter issue 1

2.5.4 Second Newsletter

The second project newsletter (Figure 16) was released on M16 and provides an update on the current project achievements per work package, a list of accepted papers that acknowledge the project as well

some dissemination events etc. The second newsletter can be downloaded from here: <https://CPSoSaware.eu/2021/05/20/newsletter-issue-2/> and is being presented below:



MESSAGE FROM THE PROJECT COORDINATION & BRIEF SUMMARY

CPSoSWARE NEWSLETTER ISSUE #2

MESSAGE FROM THE PROJECT COORDINATION

Dear Reader,
 The CPSoSWARE project recently entered into its second year of activity and it started delivering the first concrete results. The preliminary architecture is now available, along with the user requirements and the reference description of the pilot use cases and the respective use case scenarios for the two project pilots: Manufacturing and Automotive. Furthermore, a number of scientific papers have already been produced, and we are now moving forward on the implementation of various technical aspects, whose outputs will be soon visible while demo will be available as well. We wish you a pleasant reading, and we invite you to get in touch with the project or contact us directly for more information and collaboration opportunities.
 Sincerely,
 Ana-Laura J. Apostolou-Fournaris
 Project Coordinator

BRIEF SUMMARY

We are pleased to announce the publication of the second issue of our newsletter! CPSoSWARE is a 3-year Research and Innovation action (RIA) from 2019 to 2022 funded under Horizon 2020.

CPSoSaware consortium consists of thirteen (13) experienced and committed partners, namely three (3) industries, three (3) SMEs, one (1) educational research partner, two (2) non-profit research institutes on technology and innovation centres, and four (4) academic research centres from eight (8) different European countries (Greece, Italy, Spain, Germany, Switzerland, Finland, Poland, Cyprus) and Israel. Despite constraints imposed from COVID-19, we can say that Year 2020 was quite positive for our project.

The CPSoSWARE project consortium has progressed in terms of technical work and according to plan producing a number of important deliverables. In this 2nd issue of our Newsletter, we present some of the highlights, which the consortium achieved during the last months. In the Dissemination Activities section, we present a number of scientific papers related to our project, as well as some dissemination activities we have been involved during the last few months.

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- page 7. FIND MORE ABOUT US

PROJECT INFORMATION

Acronym: CPSoSWARE
 Call for proposal: H2020-ICT-019124
 Funding scheme: ERC - Research and Innovation action
 Coordinating Institution: ISTEC, ISTEC RESEARCH CENTRE
 START DATE: 1st January 2019
 END DATE: 31st December 2022 (36 months)

STAY TUNED!

On all our latest news, developments, research & general information regarding the CPSoSWARE project.

Follow us on:

- Twitter: @CPSoSWARE
- Facebook: cpsosaware
- LinkedIn: cpsosaware-er-funded-project

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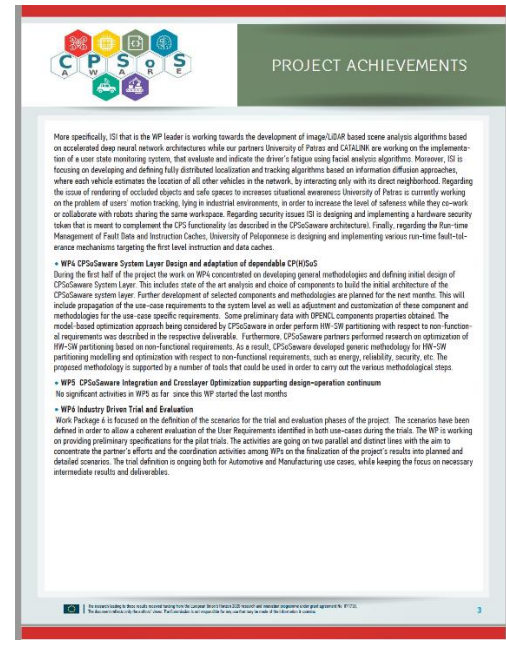
PROJECT ACHIEVEMENTS

This issue covers a period of 8 months from October 2020 – May 2021 (M9–M17). During this period of time significant progress has been done in several work packages of the project.

Below we provide a summary per workpackage:

- WP1 CPSoS Requirements, Use Cases, Specifications and Architecture**
 Work package 1 released the first version of the CPSoSaware architecture, documented in deliverable D1.3 in December 2020. The second main outcome of this workpackage in the period of the recent release of the end-user requirements and use cases for the two project pilots: Manufacturing and Automotive, documented in deliverable D1.2 in April 2021.
 D1.3 Preliminary Version of CPSoSaware System Architecture elaborated on the reference architecture of CPSoSWARE and the architectural components. The focus was on the technical specifications of the system components, including functional and non-functional requirements. The D1.2 document provided the description of the reference Use Cases and extracted the user requirements of interest. The document provides the methodology defined and used for deriving the describing Use Cases, where applicable, as well as the User Requirements. The definition of the User Requirements is made upon considerations coming from the main stakeholders of the applications in the Use Cases. The D1.1 'Supportive, motivating and persuasive approaches, tools & metrics' provided a review of the state-of-the-art methodologies and best practices, techniques and mechanisms, technologies and solutions for capturing requirements, developing and maintaining Dependable Cyber-Physical System of Systems (CPSoS).
- WP2 Virtual User/Physical Environment Models, CPS Models and orchestration support tools**
 The work within the WP2 concerned with a variety of issues during this period of time. A component meta data library collection work has progressed with data received for various components used in the pilots and also for those that are not yet used, but which are provided as a toolbox for later application cases and for teaching cost estimation modelling work. In addition, design and implementation of Jsim4F-v1, a FaaS (PaaS) component wrapper to integrate FaaS executors easily to the PaaS-based OpenCL platform, has progressed with multiple international collaboration calls organized. On the network modelling side, there was focus on identifying the open-source simulation models and their extension needs for intra and inter communication. The deliverable D1.1 'Human Factors and Metrics analysis' was submitted recently. This deliverable moved into two directions: On the one hand we tried to collect and describe all the information coming from existing literature review and bibliography regarding related human factors concerning the automotive and manufacturing pillars respectively (and these findings are being presented in the first part of this document), whereas, on the other hand we designed and performed surveys (and the second part of this deliverable we describe the results obtained from these surveys). Some useful trends and conclusions regarding user behaviour and association between human factors and metrics were extracted and presented.
- WP3 Model based CPSiKS Layer Design and Development supporting Distributed Assisted, Augmented and Autonomous Intelligence**
 The main progress during year 1, towards the WP3 objectives related to:
 - i) the establishment of methodologies and tools for processing multimedial data for user state and environment monitoring
 - ii) the development of the mathematical models that will be used within the CPSoSaware automotive and manufacturing pillar,
 - iii) the selection of algorithms that will be used in order to solve the problems related to localization and path planning in C2iS and human robot collaboration basis
 - iv) the implementation of AI logic/hybrid interfaces for improving Human in the loop behaviour
 - v) the implementation of security mechanisms for the individual CPSiKS and finally the vi) Run-time Management of Fault Data and Instruction Caches that can be deployed at the individual CPSiKS.

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PROJECT ACHIEVEMENTS

More specifically, ISI that is the WP leader is working towards the development of image/3DAR based scene analysis algorithms based on accelerated deep neural network architectures while our partner University of Patras and CATALINK are working on the implementation of a user state monitoring system, that evaluates and indicates the driver's fatigue using facial analysis algorithms. Moreover, ISI is focusing on developing and defining fully distributed localization and tracking algorithms based on information diffusion approaches, where each vehicle estimates the location of all other vehicles in the network, by interacting only with its direct neighborhood. Regarding the issue of rendering of occluded objects and safe spaces to increase situational awareness University of Patras is currently working on the problem of users' motion tracking, lying in industrial environments, in order to increase the level of awareness while they co-work or collaborate with robots sharing the same workspace. Regarding security issues ISI is designing and implementing a hardware security token that is meant to complement the CPS functionality (as described in the CPSoSaware architecture). Finally, regarding the Run-time Management of Fault Data and Instruction Caches, University of Patras is designing and implementing various run-time fault-tolerance mechanisms targeting the first level instruction and data caches.

- WP4 CPSoSaware System Layer Design and adaptation of dependable CPSiKS**
 During the first half of the project the work on WPs concentrated on developing general methodologies and defining initial design of CPSoSaware System Layer. This includes state-of-the-art analysis and choice of components to build the initial architecture of the CPSoSaware system layer. Further development of selected components and methodologies are planned for the next months. This will include propagation of the use-case requirements to the system level as well as adjustment and customization of these component and methodologies for the use-case specific requirements. Some preliminary data with OPENCL components properties obtained. The model-based optimization approach being considered by CPSoSaware in order perform HW-SW partitioning with respect to non-functional requirements was described in the respective deliverable. Furthermore, CPSoSaware partners performed research on optimization of HW-SW partitioning based on non-functional requirements. As a result, CPSoSaware developed generic methodologies for HW-SW partitioning modelling and optimization with respect to non-functional requirements, such as energy, reliability, security, etc. The proposed methodology is supported by a number of tools that could be used in order to carry out the various methodological steps.
- WP5 CPSoSaware Integration and Crosslayer Optimization supporting design-operation continuum**
 No significant activities as WPs are on, since the WP started the last months.
- WP6 Industry Driven Trial and Evaluation**
 Work Package 6 is focused on the definition of the scenarios for the trial and evaluation phases of the project. The scenarios have been defined in order to allow a coherent evaluation of the User Requirements identified in both use-cases during the trials. The WP is working on providing preliminary specifications for the pilot trials. The activities are going on two parallel and distinct lines with the aim to concentrate the partner's efforts and the coordination activities among WPs on the finalization of the project's results into planned and detailed scenarios. The trial definition is ongoing both for Automotive and Manufacturing use cases, while keeping the focus on necessary intermediate results and deliverables.

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PAPERS

We list below an updated list of papers submitted and accepted during the first 16 months of the project lifecycle that carry acknowledgement on the CPSoSaware project:

Accepted

1. G. Arvanitis, A. S. Lalos and K. Moustakas, "Robot and Fact-3-Delivery Mapping for Industrial Modeling Applications," in IEEE Transactions on Industrial Informatics, vol. 17, no. 2, pp. 1307-1317, Feb. 2021.
2. N. Pappalardo, A. S. Lalos, K. Berberidis and C. Angelopoulos, "Cooperative Multi-Modal Localization in Connected and Autonomous Vehicles," 2020 IEEE 9th Connected and Autonomous Vehicles Symposium (CAVS), 2020, pp. 1-5.
3. N. Pappalardo, A. S. Lalos and K. Berberidis, "Graph-based Cooperative Localization for Connected and Semi-Autonomous Vehicles," 2020 IEEE 58th International Workshop on Computer Aided Modeling and Design of Communication Links and Networks (CAMLD), 2020, pp. 1-6.
4. A. P. Fournaris, A. Lalos, P. Kapsalopoulos and C. Angelopoulos, "Decentralized, Secure and Cognitive Architecture for Autonomous CyberPhysical System of Systems," 2020 19th Mediterranean Conference on Embedded Computing (MECO), Bukara, Montenegro, 2020, pp. 1-5.
5. Georgios Karamidas, Christos P. Antonopoulos, Nikolaos Vassilakis, Panagiotis Jaskakalakis, Maria-Catalina Ciol, Evangelos I. Zednerakis, Apostolos P. Fournaris, Ana-Laura J. Apostolou, "Cross-layer Cognitive Optimization Tools & Methods for the Lifecycle-Support of Dependable CPSoS," IEEE Annual Symposium on IST/SIS, July 6th - 8th, Limassol, Cyprus, 2020.
6. A. P. Fournaris, D. Dimitrakopoulos, C. Langelopoulos, K. Koufopoulou, G. Anemone, "Anomaly Detection Trusted Hardware Sensors for Critical Infrastructure Legacy Devices," Sensors, 2020, 20, 3097.
7. Apostolos Fournaris, Charis Dimitrakopoulos, and Olympos Koufopoulou, "Creating Trusted Security Sensors for Anomaly Detection Systems using Hardware Components," THUS/IEEE 2020 Workshop on Trustworthy Manufacturing and Utilization of Secure Devices, Design, Automation and Test in Europe Conference (DATE 2020) Conference, 21 April - 21 May 2020, Grenoble, France.
8. Apostolos P. Fournaris, Charis Dimitrakopoulos, and Olympos Koufopoulou, "Profiling Diffusion Digital Signature Traces for Correlation Differential Side Channel Attacks," SAMOS 2020, International Conference on Embedded Computer Systems, Modeling and Simulation, Virtual Event, July 6 - September 20, 2020.
9. E. Yastikis Pkaidis, C. Mavroufakidis and A. S. Lalos, "A New Clustering-Based Technique for the Acceleration of Deep Convolutional Networks," 2020 19th IEEE International Conference on Machine Learning and Applications (ICMLA), 2020, pp. 1625-1629.
10. Muller, L.; Christyane, C.; Pirogakis, N.; Bessley, P. A Traffic Analysis on Serverless Computing Based on the Example of a File Upload Stream on AWS Lambda. Big Data Cogn. Comput. 2020, 4, 38.
11. N. Mikhlin, A. P. Fournaris, I. M. Khan, C. Dimitrakopoulos and F. Wang, "Improved Hybrid Approach for Side-Channel Analysis Using Efficient Convolutional Neural Networks and Dimensionality Reduction," in IEEE Access, vol. 8, pp. 184299-184311, 2020.
12. Nicosias, E. V. Pkaidis, C. Mavroufakidis, and A. S. Lalos, "Accelerating deep neural networks for efficient scene understanding in autonomous cyber-physical systems," in IEEE International Conference on Industrial Cyber-Physical Systems, 2021.
13. Nikos Pappalardo, Ana S. Lalos, and Kostas Berberidis, "Graph Laplacian Enhanced Kalman Filter for Connected and Automated Vehicle Localization," IEEE International Conference on Industrial Cyber-Physical Systems (ICPS), 18-19 May, Victoria, Canada, 2021.
14. Jan Salami, Michel Babay, Julius Skala, Yusuf Karam, Mahamed Yehiaoui, Panagiotis Jaskakalakis, "PaaS-E: A Scalable Low Latency Distributed OpenCL Runtime" (Accepted to) SAMOS '20, Seneca, Greece for virtual July 6-9, 2021).
15. Jakob Zadnik, Marko Mikulotic, Jozsef Ito, Panagiotis Jaskakalakis, "Performance of Texture Compression Algorithms in Low-Latency Computer Vision Task," 9th European Workshop on Visual Information Processing (EUVIP), Paris, France (Virtual), June 23-25, 2021).
16. Charalampos Dimitrakopoulos, Konstantinos Konstantinos, "Minkowski: A Fast Algorithm to Find the Center of an n-dimensional Convex Polytope," International Joint Conference on Computer Vision, Imaging and Computer Graphics Theory and Applications - SPRINGER, 229-236, 2021.
17. S. Nicosias, E. Arvanitis, A. S. Lalos and K. Moustakas, "Mesh Salience Detection Using Convolutional Neural Networks," 2020 IEEE International Conference on Multimedia and Expo (ICME), 2020, pp. 1-6.

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Figure 16: The CPSoSaware Newsletter issue II

2.5.5 Promotional video

A first CPSoSaware promotional video was released on M13, created by the dissemination leader (EIGHT BELLS). The video provides information on the project, innovative pillars, objectives, pilot use cases along with information such as consortium partners etc. The video currently has around 160 views.

The video can be watched here: <https://www.youtube.com/watch?v=OO2cMvu7DYc&t=1s>



Figure 17: CPSoSaware promotional video

2.6 Activities and Events

As part of the relevant activities for the dissemination of the project, the CPSoSaware partners participated in or even co-organized some events related to the project research objectives.

Below we list these events:

23rd Development Forum Network 2020

Our project coordinator Dr. Aris Lalos delivered a presentation with title “Robustifying automated driving and smart manufacturing systems using Decentralized Secure and Cognitive CyberPhysical System of Systems” on the Development Forum Network 2020 that took place on 23/11/2020. You can find this presentation in Greek here (at the 42:00) <https://www.youtube.com/watch?v=M2s7uKrFzJs>

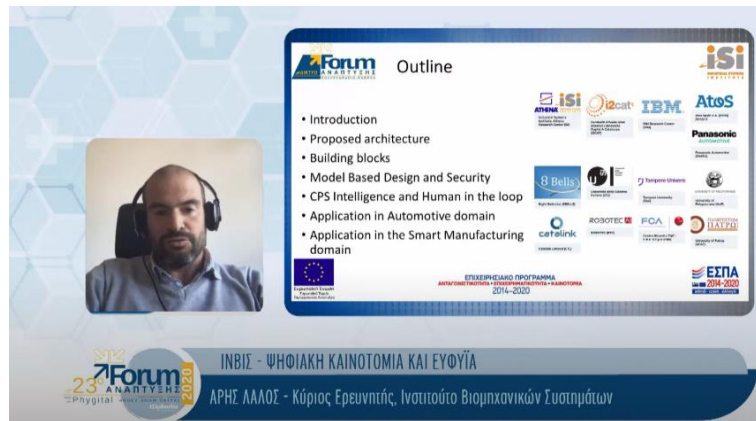


Figure 18: Development Forum Network 2020 participation

-Special Issue “Secure, Efficient Cyber-physical Systems and Wireless Sensors”

The Special Issue “Secure, Efficient Cyber-physical Systems and Wireless Sensors” was supported by our project https://www.mdpi.com/journal/jsan/special_issues/Cyber_physical_Sensors.

More specifically, our colleagues from ISI Dr. Apostolos Fournaris and Dr. Aris Lalos along with our colleague from USI Dr. Francesco Regazzoni were editors of the special issue “Secure, Efficient Cyber-physical Systems and Wireless Sensors” for the Journal of Sensor and Actuator Networks. The aim of this Special Issue was to bring together researchers and practitioners from diverse fields of science and engineering working on achieving efficiency and/or security in the cyberphysical system domain and the industrial wireless sensors network domain. The overall purpose of this special issue was to present emerging technologies related to autonomic solutions capable of guaranteeing the overall reliability, efficiency and security of CPSs, even when the components or subsystems are not fully reliable and unforeseen conditions emerge during the course of operation.

Topics of interest for the Special Issue included:

- Distributed, cooperative signal processing and machine learning for dependable CPSs.
- Augmented reality tools for increasing situational awareness in CPHSs.
- The design and implementation of smart dynamic network structures for dependable CPSs.
- Run time security monitoring solutions for CPSoS.
- CPS and wireless sensor network Security vulnerabilities and countermeasures.
- CPS hardware/software partitioning for efficiency and reliability.
- CPS hardware and software design for efficiency and/or security.
- CPS and wireless sensor modeling for real world applications.
- Deep multi-modal learning accelerators for the real time monitoring of physical processes.
- Real-world CPS deployments; pilots of intelligent distributed sensing methods utilizing edge-computing.
- Efficient wireless sensor designs and realizations
- Cybersecurity aspects on CPSs and wireless sensor networks

The proper communication to spread the workshop was conducted on our project’s social media channels and website.



Figure 19 : Special issue “Secure, Efficient Cyber-physical Systems and Wireless Sensors” of JSAN journal

DRIVE2 THE FUTURE second workshop

EIGHT BELLS on behalf of the CPSoSaware project followed all the activities of the Drive2future (<https://www.drive2thefuture.eu/>) project’s 2nd Workshop that took place on 12 of March 2021. Interesting presentations take place, that relate to the automotive issues we are dealing within our project.

Time	Subject	Presenter
09:30—09:35a	Welcome and Workshop outline	Evangelos Galanidis
09:35—09:45a	Introduction by the European Commission	Pedro Alfonso Perez-Lopez
09:45—10:30a	Connected and Automated Vehicle: Workplace and Engagement in the new Management	Gina Rossi
09:45—10:30a	Overview of V77 regulations related to Drive2thefuture project	Zac Dierckx
09:45—10:30a	BRACE – BRinging users on Adaptive of automated Vehicles	Ignacio Rodriguez
09:45—10:30a	“NOW” stage scale demonstration of AVs: First insights of user-experience”	Henriette Carver
10:30—11:00a	Investigating AV acceptance and expectations	Melina Louka
10:30—11:00a	Drive2thefuture-Value of Customers’ Survey	Filippo Fasella
10:30—11:00a	Drive2thefuture-Drivers’ Acceptance-Survey	Rebecca Ashton
11:00—11:30a	Panel Discussion	
11:00—11:30a	Ethical, security, safety and legal dilemmas - Are they impacting the acceptance of autonomous vehicles?	Moderator: Luc Mendeux, HUMANITY
11:30—12:15p	Panelists: Rana Elabbasi - TU, Abdel Feghal - University of Science & Technology, Nels Kristensen - TU, Simon Parkinson - University of Cambridge, Kishor Mahale - Intel, Gerry de Amorim - TU, David Brown - University of Cambridge	
12:15—12:40p	From skills identification to AV training	Fabrizio Orfanou
12:15—12:40p	The Drive2thefuture-approach	Zac Dierckx
12:40—1:30p	Demos and testing to Drive2thefuture	Carlo Giuffrè
12:40—1:30p		Lesley Ann Mathis
12:40—1:30p		Anne Anundi
1:30p—1:30p	Summary of Workshop findings and closure	Evangelos Galanidis

Figure 20: DRIVE2 THE FUTURE event agenda

IEEE 5G Summit for Connected & Automated Mobility (CAM)

EIGHT BELLS on behalf of the CPSoSaware project followed all the activities of the "IEEE 5G Summit for Connected & Automated Mobility (CAM)" that took place on May 11 and 12 2021. For more info about this event please visit: <http://5gsummit.org/CAM/index.html>. This first 5G for CAM conference brought together a variety of EU-funded projects in the area of CAM, to share their experiences and present results with a view towards deployment. As Horizon 2020 is open to international participation, the event also provided an opportunity to address a broader global perspective.



Figure 21: "IEEE 5G Summit for Connected & Automated Mobility (CAM)" event

CPS & IoT'2021 Summer School on Cyber-Physical Systems and Internet-of-Things.

Our partners from ISI delivered a presentation with title "Secure and Efficient Industrial IoT: Architectures and Technologies" during the CPS & IoT'2021 Summer School on Cyber-Physical Systems and Internet-of-Things. The schedule of this event can be found here <http://embeddedcomputing.meconet.me/wp-content/uploads/2021/06/CPSandIoT2021-Summer-School-Schedule.pdf> and the specific presentation took place during day 3 (Wednesday 9 June 15:45-17:15) and was delivered by our project coordinator Aris Lalos and our colleagues Christos Koulamas and Dimitris Serpanos. An explicit reference on the CPSoSWARE project and its objectives was made. For more information please visit: <https://embeddedcomputing.meconet.me/ss-cpsiot2021/>

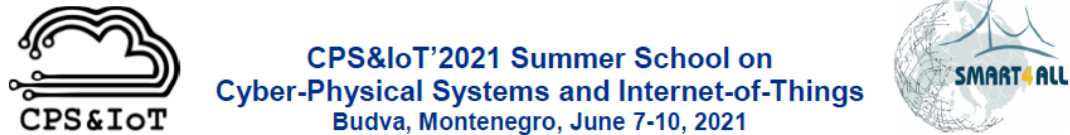


Figure 22 : CPS & IoT 2021 Summer School on Cyber- Physical Systems and Internet of Things

Special Sessions organization and presentations:

Our partner USI was an organizer of these events:

- Special Session Organization "Security, Reliability and Test Aspects of the RISC-V Ecosystem" at the IEEE European Test Symposium (ETS) 2021, 24-28 May 2021.



Figure 23 : IEEE European Test Symposium (ETS) 2021

- Panel Organization "The ethic of things - The role of ethics in IoT security research" at MAL-IoT 2021 (co-located with ACM Computing Frontiers), May 11 - 13, 2021 <http://mal-iot2021.alari.ch/>

18th ACM International Conference on Computing Frontiers (CF'21)

May 11-13, 2021 - Virtual Conference



Figure 24 : ACM International Conference of Computing Frontiers

Also, our partner USI has participated actively to the following conferences:

- 2020 Hardware-Oriented Security and Trust (HOST): 7 – 11 December 2020
- Real World Crypto 2021: January 11-14 2021
- Great Lakes Symposium on VLSI 2020 (GLSVLSI), 8-11 September, 2020
- The Design Automation Conference 2020 (DAC): June 20-24, 2020
- ACM Computing Frontiers and to the MAL-IoT 2021 (co-located): May 11 - 13, 2021

CARMEL OEM Partners Workshop

EIGHT BELLS on behalf of the CPSoSaware consortium attended the friend project's CARMEL first "OEM partners workshop" that took place on May 27, 2021.

The four pillars of the CARMEL project were presented to the attendants and OEMS.

- Autonomous mobility
- Connected mobility
- Electromobility
- Remote control vehicle



Figure 25 : CAMEL workshop

SMART4ALL 1st Joint Workshop on 9th June 2021

EIGHT BELLS on behalf of the CPSoSaware consortium attended the first joint SMART4ALL workshop. SMART4ALL project organized the 1st Joint Workshop with other DIHs and SAE Initiatives on MECO'2021 Conference that took place on 9th of June 2021. The event brought together the latest achievements from one of the world's leading IT companies and representatives from European Commission, SAE Initiative and several active H2020 projects and European DIHs and EDIHs candidates presented their activities in shaping Europe's digital future. This Special Session was wrapped up with presentations of selected research papers from project partners.



Figure 26: SMART4ALL 1st Joint Workshop

Participation at the ERTICO Activity Development days workshop

The partners from PASEU participated at the “ERTICO Activity Development days workshop”, an event that took place from 7-8 July 2020. The purpose of the ERTICO Activity Development workshop was to inform the participants about opportunities within the H2020 Work Programme and to present initial ideas for proposals for the next round of Calls, per focus area (Connected and Automated Driving; Green Deal; Urban Mobility; Transport and Logistics).

Workshop "Designing a Novel Adaptive #CyberSecurity Solution for #IoV"

This workshop took place on 25/6/2021 and was organized by our friend H2020 project nIoVE. <https://www.niove.eu/>

The aim of the workshop (Figure 27) was to demonstrate and discuss the requirements to be considered in a complex cybersecurity system, respecting the need of original equipment manufacturers, designers of post-market CAVs components, cybersecurity experts and response teams, public transportation authorities, smart city administrators, and passengers and pedestrians. The workshop aim to aid in understanding a novel cybersecurity solution from the end-users perspective, the critical aspects in designing such solutions, the trends, and barriers in the domain.

The workshop was organized based on the outcomes of nIoVe – A Novel Adaptive Cybersecurity Framework for the Internet-of-Vehicles – project. nIoVe is a 3-year Innovation action European project co-founded by the European Union’s Horizon 2020. The project brings together European excellence to build innovative cybersecurity of Connected and Autonomous Vehicles (CAVs) within the Internet-of-Vehicles (IoV) ecosystem to support automotive manufacturers and transport providers.

The event was actively participated from our coordinators Dr Aris Lalos(ISI) and Dr Apostolos Fournaris (ISI) as external experts -members of the panel and the round table discussion whereas other CPSOSAWARE consortium members such as Mrs Beatriz Nicasio Crespo (ATOS) and Dr Petros Kapsalas (PASEU) (See Figure 28).

Agenda & Timeline:

- Presentation of the nIoVe project – 20 min
- Presentation of stakeholders’ requirements – 20 min
- Round table discussion with stakeholders’ representatives, researchers from projects in the same domain, and external experts in the field of cybersecurity, automotive industry, and AI – 60 min
- Q&A session – 20 min

For more information about this event :

- <https://www.aiai2021.eu/niove/>
- <http://www.aiai2021.eu/program/>

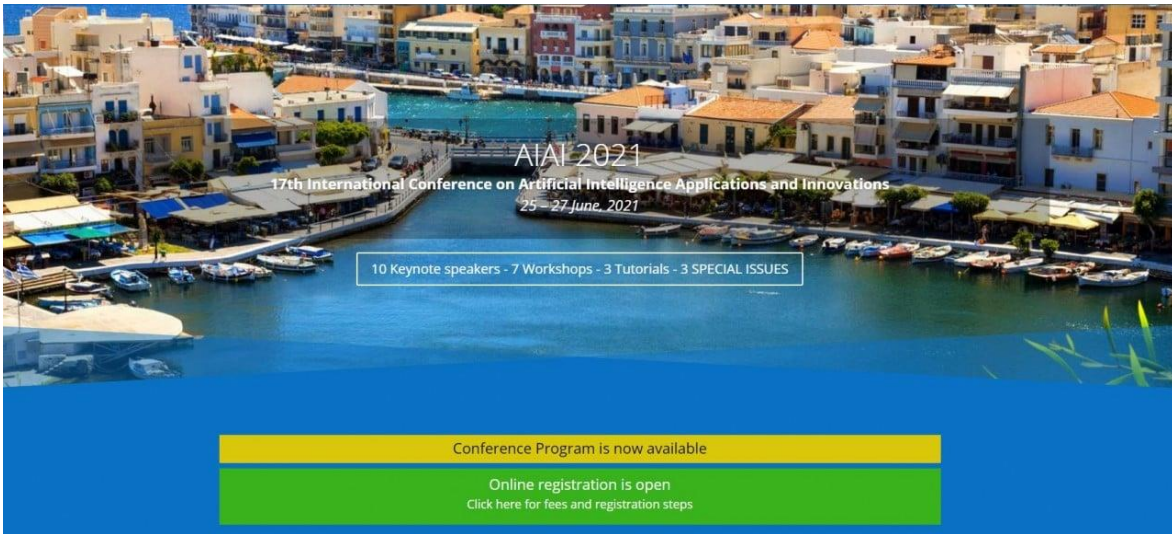


Figure 27: Workshop "Designing a Novel Adaptive #CyberSecurity Solution for #IoV"

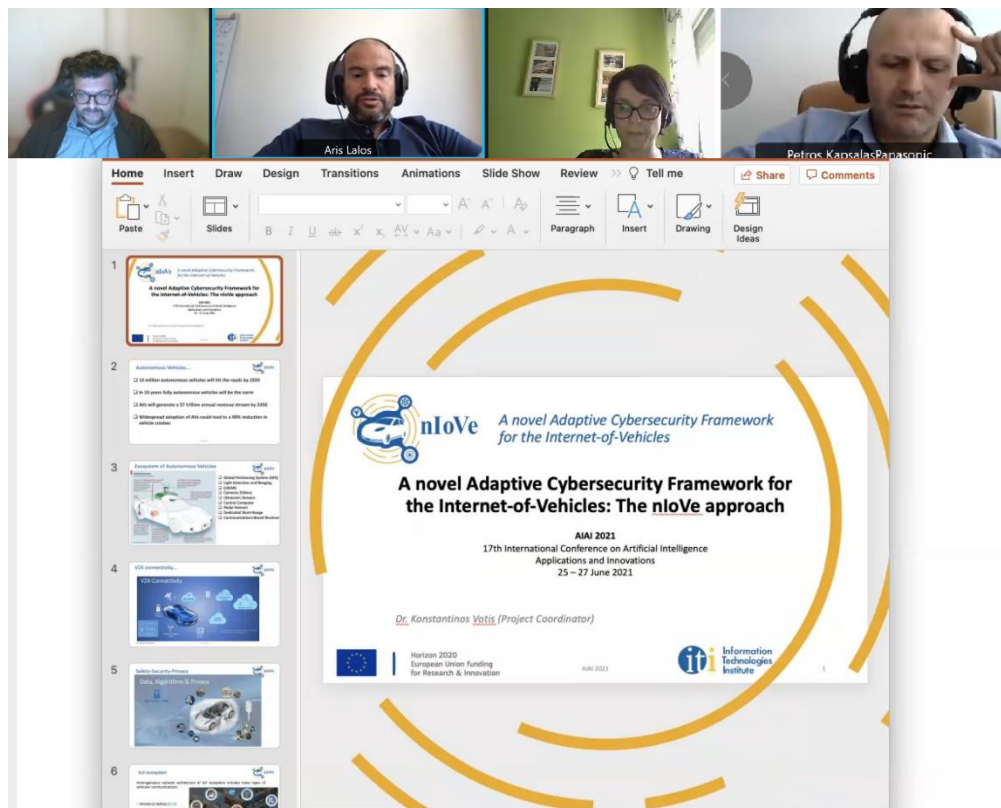


Figure 28: CPSoSWARE partners (ISI, ATOS, PASEU) participating as panel experts in the nIoVe project workshop

SEMANTiCS 2021 conference (upcoming activity)

Our partner Catalink is planning to submit a presentation to the SEMANTiCS 2021 conference’s Industry & Use Case track, where they plan to present their CASPAR tool for semantic data fusion in the context of the CPSOSWARE task T4.5. More specifically, CATALINK aims to present how the CASPAR tool merges diverse data from their Android-based DMS (driver's yawning, blinking, & biometrics) into a uniform semantic model, offering holistic insights and alerts about the driver's state. This is the 16th edition of the SEMANTiCS conference, which is a meeting place for technology professionals, industry experts, researchers and decision makers working on the fields of Linked Data and Semantic AI. Submissions to the Industry & Use Case track have a strong focus on real world applications beyond the prototypical status and demonstrate the power of semantic systems! We, thus, believe that it is a very suitable venue for promoting our prototypes.



Figure 29: SEMANTiCS 2021 event

2.7 Papers, Journal Articles and Posters

The scientific papers accepted for conferences and journals that acknowledge the CPSoSaware project are presented at the table below along with all the related information. Overall, we have 26 accepted papers divided in this way: 20 conference papers and an additional 6 journal publications

	AUTHORS	PAPER INFORMATION AND TITLE	PUBLICATION DETAILS	DOI	PARTNER
1	Lisa Muller Christos Chrysoulas Nikolaos Pitropakis Peter J. Barclay	Journal paper “A Traffic Analysis on Serverless Computing Based on the Example of a File Upload Stream on AWS Lambda”	Big Data Cogn. Comput. 2020, 4(4), 38 ing and Applications, 2020.	https://zenodo.org/record/4659957	EIGHT BELLS

Preliminary Version of CPSoSaware Dissemination Plan & Material

2	Gerasimos Arvanitis, Aris S. Lalos, Konstantinos Moustakas	Journal paper "Robust and Fast 3D Saliency Mapping for Industrial Modeling Applications"	IEEE Transactions on Industrial Informatics journal	10.1109/TII.2020.3003455	UPAT, ISI
3	Nikos Piperigkos, Aris S. Lalos, Kostas Berberidis, and Christos Anagnostopoulos	Symposium paper "Cooperative Multi-Modal Localization in Connected and Autonomous Vehicles"	IEEE Connected and Automated Vehicles Symposium (CAVS), 4-5 October, Victoria, Canada, 2020	10.1109/CAVS51000.2020.9334558	ISI
4	Nikos Piperigkos, Aris S. Lalos, and Kostas Berberidis,	Conference paper "Graph based Cooperative Localization for Connected and Semi-Autonomous Vehicles"	IEEE International Workshop on Computer Aided Modeling and Design of Communication Links and Networks (CAMAD), 14-16 September, Virtual Conference, 2020.	10.1109/CAMAD50429.2020.9209312	ISI
5	A. P. Fournaris, A. Lalos, P. Kapsalas and C. Koulamas	Conference paper "Decentralized, Secure and Cognitive Architecture for Automotive CyberPhysical System of Systems"	2020 9th Mediterranean Conference on Embedded Computing (MECO), Budva, Montenegro, 2020, pp. 1-5,	10.1109/MECO49872.2020.9134336.	ISI, PASEU
6	Georgios Keramidas, Christos P. Antonopoulos, Nikolaos Voros, Pekka Jääskeläinen, Marisa	Symposium paper "CPSoSaware: Cross-layer Cognitive Optimization Tools & Methods for the Lifecycle Support of Dependable CPSoS"	IEEE Annual Symposium on ISVLSI, July 6th – 8th, Limassol, Cyprus, 2020	https://doi.org/10.1109/ISVLSI49217.2020.00-12	UoP, TAU, I2CAT, UPAT

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	Catalán Cid, Evangelia I. Zacharaki, Apostolos P. Fournaris, Aris Lalos				
7	A. P. Fournaris; Dimopoulos, C.; Lampropoulou s, K.; Koufopavlou O	Journal paper “Anomaly Detection Trusted Hardware Sensors for Critical Infrastructure Legacy Devices”	Sensors 2020, 20, 3092. https://www.mdpi.com/1424-8220/20/11/3092/htm	10.3390/s20113092	ISI
8	Apostolos Fournaris, Charis Dimopoulos, and Odysseas Koufopavlou	Conference paper “Creating Trusted Security Sensors for Anomaly Detection Systems using Hardware components”	TRUDEVICE 2020: Workshop on Trustworthy Manufacturing and Utilization of Secure Devices, Design, Automation and Test in Europe Conference (DATE 2020) Conference, 21 April – 31 May 2020, Grenoble, France	N/A	ISI
9	Apostolos P. Fournaris, Charis Dimopoulos, and Odysseas Koufopavlou	Conference paper “Profiling Dilithium Digital Signature Traces for Correlation Differential Side Channel Attacks”	International Conference on Embedded Computer Systems: Architectures, Modeling and Simulation, Virtual Event, July 6 - September 30, 2020	10.1007/978-3-030-60939-9_19	ISI
10	V. Pikoulis, C. Mavrokefalidis, A. S. Lalos	Conference paper “A New Clustering-Based Technique for the Acceleration of	IEEE International Conference on Machine Learning MDPI and ACS	10.1109/ICMLA51294.2020.00222	ISI

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		Deep Convolutional Networks”	Style		
11	Mukhtar, Naila, Apostolos P. Fournaris, Tariq M. Khan, Charis Dimopoulos, and Yinan Kong	Journal paper "Improved Hybrid Approach for Side-Channel Analysis Using Efficient Convolutional Neural Network and Dimensionality Reduction."	IEEE Access 8 (2020): 184298-184311	10.1109/ACCESS.2020.3029206	ISI
12	Nousias, E. V. Pikoulis, C. Mavrokefalidis, and A. S. Lalos	Conference paper "Accelerating deep neural networks for efficient scene understanding in automotive cyber-physical systems"	IEEE International Conference on Industrial Cyber-Physical Systems, 2021.	N/A	ISI
13	Nikos Piperigkos, Aris S. Lalos, Kostas Berberidis	Conference paper " Graph Laplacian Extended Kalman Filter for Connected and Automated Vehicles Localization"	IEEE International Conference on Industrial Cyber-Physical Systems (ICPS), 10-13 May, Victoria, Canada, 2021.	N/A	ISI
14	Jan Solanti, Michal Babej, Julius Ikkala, Vinod Kumar, Mala mal Vadakital, Pekka Jääskeläinen	Conference paper "PoCL-R: A Scalable Low Latency Distributed OpenCL Runtime"	SAMOS XXI, Samos, Greece (or virtual) (July 4-8, 2021).		TAU
15	Jakub Zadnik, Markku Mäkitalo, Jussi Iho, Pekka	Conference paper "Performance of Texture Compression Algorithms in Low-Latency Computer Vision Tasks"	9th European Workshop on Visual Information Processing (EUVIP), Paris, France (virtual),		TAU

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	Jääskeläinen		(June 23-25, 2021).		
16	Chamzas Dimitrios, Chamzas Constantinos Moustakas Konstantinos	Conference paper “cMinMax: A Fast Algorithm to Find the Corners of an N-dimensional Convex Polytope”	Proceedings of the 16th International Joint Conference on Computer Vision, Imaging and Computer Graphics Theory and Applications - GRAPP, 229-236, 2021	10.5220/0010259002290236	UPAT
17	M. Mavropoulos, G. Keramidas et al	Symposium paper “Run Time Management of Faulty Data Caches”	Proc. of IEEE European Test Symposium, 2021		UoP
18	Panagiotis Mousouliotis, Stavros Zogas, Panagiotis Christakos, Georgios Keramidas, Nikos Petrellis, Christos Antonopoulos and Nikolaos Voros	Conference paper “Exploiting Vitis Framework for Accelerating Sobel Algorithm”	Accepted for Publication in the Proc. of the Mediterranean Conference on Embedded Computing (MECO 2021), 2021		UoP
19	Efstratios Tiganourias, Michail Mavropoulos, Georgios Keramidas, Vasilios Kelefouras, Christos Antonopoulos and Nikolaos Voros	Conference paper “A Hierarchical Profiler of Intermediate Representation Code based on LLVM”	Accepted for Publication in the Proc. of the Mediterranean Conference on Embedded Computing (MECO 2021), 2021		UoP

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20	S. Nousias, G. Arvanitis, A. S. Lalos and K. Moustakas	Conference paper "Mesh Saliency Detection Using Convolutional Neural Networks"	2020 IEEE International Conference on Multimedia and Expo (ICME), 2020, pp. 1-6,.	doi: 10.1109/ICME46284.2020.9102796	ISI, UPAT
21	A. S. Lalos, E. Vlachos, K. Berberidis, A. P. Fournaris and C. Koulamas	Journal paper "Privacy Preservation in Industrial IoT via Fast Adaptive Correlation Matrix Completion"	IEEE Transactions on Industrial Informatics, vol. 16, no. 12, pp. 7765-7773, Dec. 2020	doi: 10.1109/TII.2019.2960275.	ISI
22	Francesco Regazzoni, Paolo Palmieri, Fethulah Smailbegovic, Rosario, Cammarota, Ilia Polian,	Journal paper "Protecting artificial intelligence IPs: a survey of watermarking and fingerprinting for machine learning"	CAAI Transactions on Intelligence Technology 6 (2), 180-191.	https://doi.org/10.1049/cit2.12029	USI
23	Ognjen Glamocanin, Dina G. Mahmoud, Francesco Regazzoni and Mirjana Stojilovic	Conference paper "Shared FPGAs and the Holy Grail: Protections against Side-Channel and Fault Attacks"	Design Automation and Test in Europe (DATE) 2021, 1-5 February 2021		USI
24	Andrea Caforio, Fatih Balli, Subhadeep Banik, Francesco Regazzoni	Conference paper "A Deeper Look at the Energy Consumption of Lightweight Block Ciphers"	Design Automation and Test in Europe (DATE) 2021, 1-5 February 2021		USI
25	Francesco Regazzoni, Shivam Bhasin, Amir Alipour, Ihab Alshaer, Furkan, Aydin, Aydin Aysu, Vincent	Conference paper "Machine Learning and Hardware security: Challenges and Opportunities -Invited Talk-"	Proceedings of 39th International Conference on Computer-Aided Design, ICCAD 2020, San Diego, California, USA, 2-5 November		USI

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	Beroulle, Giorgio Di Natale, Paul Franzon, David Heil, Naofumi Homma, Akira Ito, Dirmanto Jap, Priyank Kashyap, lia Polian, Seetal Potluri, Rei Ueno, Elena Ioana Vatajelu, and Ville Yli-Mäkelä		2020.		
26	Jaume Abella, Sergi Alcaide, Jens Anders, Francisco Bas, Steffen Becker, Elke De Mulder, Nourhan Elhamawy, Frank K. Gurkaynak, Helena Handschuh, Carles Hernandez, Mike Hutter, Leonidas Kosmidis, Iliia Polian, Matthias Sauer, Stefan Wagner, Francesco Regazzoni,	Symposium paper "Security, Reliability and Test Aspects of the RISC-V Ecosystem"	IEEE European Test Symposium (ETS) 2021, 24-28 May 2021.		USI

Table 2: CPSoSaware publications

Below an image (Figure 30) presenting the logos of some events where papers acknowledging the CPSoSaware project were submitted and accepted:



Figure 30: All events where CPSoSaware publications accepted

Journal papers pending:

We are also waiting evaluation for the following two journal papers that acknowledge our project-submitted from our partners from TAU

- Petrus Kivi, Markku Mäkitalo, Jakub Zadnik, Julius Ikkala, Vinodkumar Malamal Vadakital, Pekka Jääskeläinen:
"Real-Time Photorealistic Rendering of Live Captured Point Clouds: A Survey" (Submitted to) IEEE ACCESS.
- Joonas Multanen, Kari Hepola, Asif Ali Khan, Jeronimo Castrillon, Pekka Jääskeläinen:

"Energy-Efficient Instruction Delivery in Embedded Systems with Domain Wall Memory"
(Submitted to) IEEE Transactions on Computers.

Survey paper "Empowering systems under cyber physical systems of systems of intelligence" under preparation:

ISI and UPAT are preparing a survey paper based on the M9 review report and the specific comment from the reviewers on considering publishing the outputs of D1.1 "Supportive, motivating and persuasive approaches, tools & metrics". More specifically the specific recommendation was that ***"The publication of the outputs of D1.1 in the form of a survey journal paper on the state of the art on "approaches, tools and metrics of CPSoS" can be very useful for people interested in "jumping" into this work. It might not have high Impact Index (since it is not novel but a recapitulation, analysis and comparison) but can have a strong impact and citations and will be a useful resource for many other researchers/engineers that would like to approach this topic"***.

Towards this direction this survey paper aims to provide a comprehensive review of current best practices in connected cyber-physical systems. The basis of our investigation is a dual-layer architecture encompassing a perception layer and a behavioural layer. Perception algorithms concerning scene understanding (object detection and tracking, pose estimation), localization mapping and path planning are thoroughly investigated. The behavioural part focuses on decision making and human in the loop control while the security aspect of cyber-physical and systems of cyber-physical systems will also be extensively analysed. Furthermore, applications of cyber-physical systems of systems will be presented, mainly from the automotive and manufacturing aspects. The survey paper is expected to be submitted to an IEEE conference.

Empowering systems of cyber-physical systems of systems with intelligence

Stavros Nousias, Nikos Piperigkos, Gerasimos Arvanitis, Apostolos Fournaris, Aris S Lalos

Abstract—The abstract goes here.

Index Terms—IEEE, IEEEtran, journal, \LaTeX , paper, template.

I. INTRODUCTION

This survey will provide a comprehensive review on current best practices in connected cyberphysical systems. The basis of our investigation is a dual layer architecture encompassing a perception layer and a behavioral layer. Perception algorithms with respect to scene understanding (object detection and tracking, pose estimation), localization mapping and path planning are thoroughly investigated. Behavioural part focuses on decision making and human in the loop control while the security aspect of cyberphysical and systems of cyberphysical systems will also be extensively analyse. Furthermore applications of cyberphysical systems of systems will be presented, mainly from the automotive and manufacturing aspects.

[1]

II. CPSS AND CONNECTED CPSS ARCHITECTURE OVERVIEW (AL)

III. PERCEPTION LAYER

A. Sensor fusion (SN,NPGA)

B. Object detection, tracking and scene analysis

1) *Object detection datasets*: The “Caltech 101” Dataset (Fei-Fei et al. 2006) contains images of 101 categories of object, and is relatively widely used within the community for evaluating object recognition. Each image contains only a single object. A principal aim of the Caltech datasets is to evaluate multi-category object recognition, as a function of the (relatively small) number of training images

annotation interface, encouraging casual and professional users alike to contribute and share annotation. Many object categories are labelled, with annotation consisting of a bounding polygon and category, with some objects additionally being labelled with pose and object parts.

The Lotus Hill Dataset (Yao et al. 2007) is a large, recently produced dataset, a small part of which is made freely available to researchers. It contains 8 data subsets with a range of annotation. Particularly we highlight (a) annotations providing a hierarchical decomposition of individual objects e.g. vehicles (9 classes, 209 images), other man-made objects (75 classes, 750 images) and animals (40 classes, 400 images); and (b) segmentation labelling of scenes to a pixel level (444 images). As this dataset has only recently been released there has not yet been a lot of work reported on it. The datasets look to have a useful level of annotation (especially with regard to hierarchical decompositions which have not been attempted elsewhere), but are somewhat limited by the number of images that are freely available.

The PASCAL Visual Object Classes (VOC) challenge is a benchmark in visual object category recognition and detection, providing the vision and machine learning communities with a standard dataset of images and annotation, and standard evaluation procedures. Organised annually from 2005 to present, the challenge and its associated dataset has become accepted as the benchmark for object detection.

The KITTI dataset has been recorded from a moving platform (Fig. 1) while driving in and around Karlsruhe, Germany (Fig. 2). It includes camera images, laser scans, high-precision GPS measurements and IMU accelerations from a combined GPS/IMU system. The main purpose of this dataset is to push forward the development of computer vision and robotic algorithms targeted to autonomous driving [1]–[7]. While our

Figure 31 : Survey paper on D1.1 outputs screenshot

Master's thesis (TAMPERE UNIVERSITY):

Two master theses from PHD students of Tampere University are also related with the university's activities as regards the project:

- Jan Solanti:

"Distributed Low Latency Computing with OpenCL - A Scalable Multi-Access Edge Computing Framework"

January 2021 <https://trepo.tuni.fi/handle/10024/124202>

- Topi Leppänen: "Scalability Optimizations for Multicore Soft Processors" February 2021

Open source releases (TAMPERE UNIVERSITY) :

- OpenASIP v1.22 (December 2020)
<http://openasip.org/download.html>
- OpenASIP v1.21 (March 2020)
<http://openasip.org/download-1.21.html>
- Portable Computing Language (PoCL) v1.6 (December 2020)
<http://portablecl.org/pocl-1.6.html>

2.8 Clustering and liaison activities

As part of the efforts made to further promote project results, engage and collaborate with other projects, CPSoSaware became a member of the CYBERWATCHING.eu platform on February 2020. CYBERWATCHING.eu is the European observatory of research and innovation in the field of cybersecurity and privacy and we consider it essential that we joined this network of projects that can help us disseminate better the project outputs. The CPSoSaware's profile can be found under the link <https://cyberwatching.eu/projects/2635/CPSoSaware>



Figure 32: CPSoSaware inclusion on the CYBERWATCHING platform

Heterogeneity Alliance

CPSoSaware is a member of the Heterogeneity Alliance towards the joint effort of enhancing current technologies and tools for heterogeneity included under the Alliance. For more info about the alliance please visit <http://heterogeneityalliance.eu>



Figure 33 : Heterogeneity Alliance logo

Collaboration with other projects – Clustering activities

Towards the effort of connecting with other related projects we are already in discussions with other projects for possible collaborations and performing joint activities with them. For instance, we could refer to the H2020 funder projects nloVe <https://niove.eu/> , XANDAR <https://xandar-project.eu/> , and CARMEL <https://www.h2020caramel.eu/>. We are already in discussions with nloVe project for organizing a joint webinar /workshop with them while we have participated already in a CARMEL workshop as well as in a nloVe workshop -mentioned previously on the document (<https://www.aiai2021.eu/niove/>).

Efforts to engage other projects as well will be continuous through the project lifecycle



Figure 34: XANDAR project logo



Figure 35: CARMEL project logo



Figure 36: nIoVe project logo

2.9 Dissemination KPIs

The monitoring of dissemination and communication activities is an essential process to evaluate the success and efficiency of the plan. A set of Key Performance Indicators (KPIs) that are relevant for the activities pertaining WP7 were defined in the DoA that help us to monitor the progress and impact of the dissemination and communication activities and act as guidance in order to help the consortium to take corrective measures when is needed.

The next figure presents the KPIs that were introduced in DoA (Figure 37) whereas Table 3 provides an update on the current achieved status. We have also added 2 KPIs measuring the number of newsletters, and the number of leaflets and brochures produced for the project.

The table is being organized as follows:

- First column is dedicated to the specific activity/ channel,
- Second column is referring to the specific target set on the DoA/ KPI,
- Third column refers to the audience that we are targeting through the specific activity,
- Fourth column displays the current status/ performance at the M18
- Fifth column "ACTION" provides the exact action needed according to the status of the previous column.

Metric	KPI
CPSoSaware website	2000+ unique visitors
Peer-reviewed journal publications	20+ (10+ as make Open Access)
Active participation in conferences and other events	20+
Organization of workshops/tutorials	2+
On-site demonstrations	3+
Professional videos, infographics and webinars	7+
Co-operation with other initiatives	3+
Number of posts to the social media pages	100+
Number of followers to the social media pages	100+

Figure 37 : KPIs defined in the CPSoSaware DoA

The status of each KPI can be categorized as following:

Within the target
Target Succeeded
Needs improvement
To be monitored

ACTIVITY /CHANNEL	KPI	AUDIENCE	Values at M18	ACTION
CPSoSWARE WEBSITE	Number of distinct Visitors >=2000 (throughout project lifetime)	Industry, general public, scientific & research community, public sector	2105 unique visitors and 5385 visits.	Target succeeded
NUMBER OF FOLLOWERS SOCIAL MEDIA -TWITTER	Twitter followers >= 150	Industry, general public, scientific & research community, public sector	415 FOLLOWERS	Target succeeded
NUMBER OF FOLLOWERS SOCIAL MEDIA -FACEBOOK	Facebook followers >= 100	Industry, general public, scientific & research community, public sector	62 FOLLOWERS	Within the target set but needs further improvement
NUMBER OF FOLLOWERS SOCIAL MEDIA -LINKEDIN	LinkedIn Group Members >=100	Industry, general public, scientific & research community, public sector	50 FOLLOWERS	Needs improvement
VIDEOS INFOGRAPHICS WEBINARS	Videos, infographics, webinars >7	Industry, general public, scientific & research community, public sector	1	Needs improvement
Brochures and leaflets	Number of brochures or leaflets produced	Industry, general public, scientific & research	1 leaflet produced	Target completed, of course we will continue producing

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	>=2	community, public sector	1 brochure produced	related material
Number of newsletters	Number of newsletters produced >=4	Industry, general public, scientific & research community, public sector	2	Within the target set
On site demonstrations	On site demonstrations > 3	Industry and research	0	To be monitored. This will happen during the second half of the project
Active participation in conferences and other events	Number of conferences and events >20	All CPSoSWARE partners will participate in European and international conferences. Academic partners will organise special sessions and workshops in EU and Int. conferences	PAPERS ACCEPTED IN CONFERENCES: 20 EVENTS attended by consortium members as far : 15	KPI can be considered as successful but of course more publications and participation in events is essential
Peer reviewed journal publications	Number of peer reviewed journal publications ≥ 20 Number of Open Access publications ≥ 10	Articles on magazines, technology roadmaps, and industry-led journals. The scientific publications will facilitate the efforts of professionals and researchers.	PAPER accepted for journals: 6 Pending journal papers: 2	Within target set
Organization of workshops /tutorials	Organisation of workshops/ tutorials ≥ 2	Organisation of industry focused events (i.e., workshops, symposiums, demonstrations, trainings, etc.) to disseminate project outcomes.	2	To be monitored. : CPSoSWARE partners have already involved on organizing some events but of course this KPI to be considered successful industry focused events eg demonstrations technical workshops should be organized when we will be more technologically mature
Co-operation with	Number of collaborations		<ul style="list-style-type: none"> • XANDAR • CARMEL 	We have started the communication with

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other initiatives	with other projects and initiatives ≥ 3		<ul style="list-style-type: none"> • nloVe • Cyber-watching • Heterogeneity Alliance 	the 3 projects mentioned and joint activities are going to schedule in the following months – Within the target set
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Table 3: Dissemination KPIs

3 Plan for the upcoming months

During the second half of the project our dissemination plan will be to organize workshops dedicated to the project meaning trainings, webinars, technical workshops, hands-on activities, etc. Moreover, as the CPSoSaware platform will be technologically mature we will aim for attending various type of exhibitions, fairs etc where we will present our demos. Additionally to this, within our plans is the organization of common events with other projects with which we have already established some communication.

Moreover, it is within the plan to publish infographics and upload them to the project website and social media. Those posters will be more informative on technical project outputs and will illustrate in more detail the various CPSoSaware platform components and the specific use cases scenarios that the consortium will implement and were described in other deliverables. Also, the CPSoSaware consortium plans to enhance the media content of its YouTube channel by uploading videos that demonstrate some components of the platform, demonstration videos, use cases scenarios, simulations etc. Online webinars that will be organized will be also accessible from the project website. Furthermore, in order to share the project progress with the scientific community, the consortium will continue drafting articles and other contributions for the technical literature and dedicated journals. Such contributions will be written by academic and technology partners, through peer-reviewed journals and magazines and also through papers presented at conferences and other events. Finally, when the project results allow, it is within our priorities to participate and present in demonstration events.

Some action points will be the following:

- Grow number of social media followers
- Succeed KPIs that we still lack behind
- Publication of white papers, articles on magazines, technology roadmaps, and industry-led journals
- Attend technical forums and demonstration exhibitions
- Produce more videos on the project either technically oriented or business related
- Participate physically in European and international conferences
- Organisation of industry focused events (i.e., workshops, symposiums, demonstrations, trainings, etc.) to disseminate project outcomes.
- Liaison activities. The CPSoSaware consortium will collaborate as much as possible with other ongoing projects accepted in the call to exploit opportunities for knowledge exchange and for improving dissemination among the target audience

4 Conclusions

This document is the first report of the Dissemination Exploitation and Standardization activities carried out within the CPSoSaware project, in the first half of the project. We have presented any material produced (leaflet, brochure, video, two newsletters) with a list of events that were participated by project partners, a list of 26 accepted publications for journals and conferences, other related activities such as clustering with other projects, our social media and website etc. The dissemination KPIs status was presented as well. We believe that the KPIs demonstrate a satisfactory activity as far but more improvement is needed in the area of attending events and organizing our own workshops, events and gaining more social media followers. The current document will be updated yearly during the whole project duration and its final version will be delivered on M36.

References

[1] Grant Agreement NUMBER: 871738 - CPSOSAWARE PROJECT