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Networking and Requirements Workshop

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CONTENT

1. OBJECTIVES OF THE WORKSHOP	3
2. TARGET GROUPS AND PARTICIPANTS	3
3. FLOW OF THE WORKSHOP.....	3
3.1. Morning Session.....	3
3.2. Afternoon Session.....	4
3.3. OPINA Architecture and Requirements Workshop	6
4. CONCLUSION AND THE NEXT STEPS	8





1. OBJECTIVES OF THE WORKSHOP

The main purpose of the workshop was to share the stages and results achieved so far in the OPINA project with the stakeholders and to proceed in the works by taking their opinions into account. Specific objectives were;

- Give information related to OPINA Project and the OPINA clustering approach,
- Understand and analyse the expectations of the OPINA target groups,
- Networking and establishing collaboration,
- Provide coordination between participants and initiatives, share knowledge and experiences, promote, and support the development of OPINA cluster.

During the project period, at least two workshops will be held each year, and this has been the first workshop. We are sure that the future workshops will be more effective with feedback from participants.

2. TARGET GROUPS AND PARTICIPANTS

Target groups of the workshops were determined as SMEs, automotive manufacturers, original part producers, software companies, automobile sub-industry manufacturers and electronic parts manufacturers. Thus, the opinions of all parties on a wide range of autonomous vehicles were tried to be obtained.

In total; 72 participants were registered, and 109 participants attended the workshop.

3. FLOW OF THE WORKSHOP

3.1. Morning Session

OPINA, Networking and Requirements workshop started with the welcoming speeches of the OPINA Project Representatives. Welcoming speeches started with the beneficiary institution representative Prof. Semih Bilgen from İstanbul Okan University, continued with the speeches of Dr. Faruk Cengiz Tekindağ from WYG Türkiye, the Contractor of the project, Mr. Özgür Öcal from European Union Delegation to Turkey, and Mr. Ali Eser from Ministry of Industry and Technology, the Contracting Authority of the project, presented their speeches and remarked the importance of the project in their welcoming remarks.

After the welcoming speeches, workshop presentations started with the OPINA Introduction, presented by Prof. Semih Bilgen. Prof. Ing. Peter Urban from RWTH Aachen University attended to the workshop with "Cooperative, Connected and Automated Mobility (CCAM) Strategic Research and Innovation Agenda Studies". Prof. Orhan Alankuş, from İstanbul Okan University continued the program with his presentation "National Connected and Autonomous Vehicle Technology Road Map Workshops Results". Mr. Uwe Pfeil, European Cluster Manager 2020, R-Tech-Germany attended the workshop with his presentation regarding with his lessons learnt from the past 10 years.

İrfan Aloğlu the Project Team Leader continued the program with his presentation "OPINA Architecture, Clustering and Requirements Analysis". The morning session was finalized with the OPINA's Marketing Positioning presentation carried out by Asst. Prof. İsmail Bayezit from OPINA Project.





3.2. Afternoon Session

The afternoon session continued with workshop sessions, 1st Round of Workshop on Clustering and Portal Requirements held with the moderation of the Tom Weber, the international cluster expert for OPINA. The 2nd Round of Workshop on OPINA Architecture and Requirements had two different parallel sessions on two different subjects Autonomous Vehicle Software Development and Autonomous Vehicle Simulation, Verification and Validation, the participants were divided into two groups according to their preferences. This session was moderated by the experts of the Technical Assistance Team. The workshop ended with the presentations of the session moderators summarizing the day's proceedings.

Clustering and Requirements Analysis Workshop

The audience was asked several questions on development barriers of enterprises and whether companies are already working within networks and service requirements from a cluster. Results are briefed as below;

OPINA is the new portal for CCAM (cooperative, connected automated mobility). It is open for cooperation to anyone and consists of two main elements:

- OPINA **cluster** is the networking hub for people from all technical disciplines that are interested in this fascinating topic. In the OPINA cluster, people can openly discuss ideas, acquire latest information about technical trends and developments, present their entities and/or ideas and also get to know the specialists and exchange views with them.
- OPINA **platform** is the cooperation ecosystem. This where people find technical support for their developments, benchmarking and performance evaluation, software tool chains, compliance checks against automotive standards or even pre-certification conformance testing.

The OPINA Cluster is the arena for the cross-industry exchange of skills in. The networking of technological and organizational know-how creates innovations for the future. In order to do so, the OPINA Cluster will provide a number of dedicated services.

One of the vital issues of the Workshop on 4 December 2020, was to mirror the results of the Cluster Benchmark Study and the list of services derived from it against the demands of the Workshop audience and to eventually complement it with services required, but not yet identified.

Therefore, the audience was asked several questions and basic points were;

- Lacking expertise is a problem
- Needs for mentoring support
- Needs to have some (shared) verification infrastructure, at least at the beginning
- Support on the commercialization process of developments
- Business model is important
- Trusting each other is another issue
- Some projects on autonomous systems for logistic applications are almost ready for deployment and are looking for partners to boost development
- Closer contact with OEMs is important as they are crucial for the development of specifications and concepts



- OEMs have their own (safety) requirements – technical issue, starting projects without OEMs involves higher risks
- Co-working has a lot to do with trust
- Start small, don't forget the overall picture, care about the standards, try to influence their development and build something that is applicable everywhere
- Problems on SAE Level 3 (detecting whether the driver is capable of taking over) -therefore skip and move from Level2/Level 2+ directly to Level 4
- In order to determine the physical and physiological condition of the driver for SAE L3 autonomy, numerous sensors are need -> expensive
- Autonomous driving in highways is just being made available. Autonomous driving in cities is a different story
- The cluster is the entity to keep an eye on marketing aspects – both for its members and for technology
- Potential members expect services that are worth the money
- Basic expectations from a cluster are;
 - Being able to create the right consortia for national/international funding and technology development
 - Access to the latest standards and specifications for development and testing
 - Training and education
 - Close the technological gap
 - Bring all people together, not only engineers, but also the (potential) customers
 - Finding international support for standardization
 - Collaboration on a European level with outer networks
 - Collaboration with other test areas



3.3. OPINA Architecture and Requirements Workshop:

In order to stimulate the technical perspective of the workshop participants during second round of the afternoon session, we split the workshop on OPINA Architecture and Requirements into two sub-sections with the following titles:

1. First Breakout Room focused on connected or Autonomous car Architecture and Software Development
2. Second Breakout Room focused on Simulation, testing and Field Testing

The attendance for the brainstorming sessions in the second round were as follows:

- ~12 participants in 1st Breakout room
- ~45 participants in 2nd Breakout room

The outcomes of the technical session breakout rooms were as follows:

- Participants do not have much experience on collaborative development environment directly, but they interacted with colleagues and vendors in a collaborative manner.
- GitHub has been used for collaborative development apart from regular direct interaction through meetings and conferences (e-mails/telephone/video).
- Participants expressed AUTOSAR, ISO26262 and Cybersecurity standards are being highly considered for steering, ADAS and infotainment architectures.
- Participants expressed high power and high-speed computing units must be considered for high data processing applications like CAEV kind of applications, especially where many sensors are involved for capturing the real time data.
- Open source AUTOSAR stack was used for their POC by one of the participants and which is based on ArcCore platform. CAN and Ethernet hardware physical layers were interfaced and was supported by KOSGEB.
- Participants expressed that model-based development tools and HIL based tools were being used in their current working automotive/avionics projects, but these projects were not related to either Connected Car or Autonomous development applications.
- VT system with Vector tools has been bench testing environment for HIL (Hardware in the Loop) testing for one of the participants ECU testing.
- Prof. Orhan Alankuş mentioned world level Model Based Design and Development (V-Cycle based) Environment of OPINA Platform.
- One of the participants from European Automotive Service Provider company mentioned usage of GAZEBO and CARLA so far in their autonomous vehicle development projects.
- GAZEBO is flexible and well-integrated with ROS which is an advantage for autonomous algorithm development and validation in SIL environment.
- One of the participants mentioned his experience on GAZEBO tool in his previous company. He suggested employment of GAZEBO in OPINA architecture. However, he expressed concerns regarding ISO26262 compliance of open-source tools.
- Nowadays, more and more students acquire GAZEBO and ROS know-how, which is another advantage.
- GAZEBO is more robotics oriented and modelling of the vehicle is not detailed or easy.



- CARLA is much more realistic and represents vehicle characteristics better. Graphics and scenes are better as well. Hence, vehicle dynamics are static and are not much changeable. This is one of the main drawbacks of CARLA simulation, which is preventing us to model complex vehicles, such as bus and truck.
- Application Life Cycle tools were discussed and mentioned widely usage within OPINA project/platform
- Did not get response from participants about SIL and DIL environments and developments.
- One of participants mentioned that they are automating test cases related to RTE (real time environment) interface – internal communication tests, external communication tests (CAN/Ethernet/Fleaxray), persistency tests and custom platform tests (Logging, Tracing, Diagnostics). These tests are generated by TEG (Test Environment Generator) which is participants company's IP.
- One of the participants stated that they were working on Autonomous functions to achieve L3 and that their computing unit was capable to achieve Level 3 autonomous only. They implemented software functions Built in self-tests (BIST), Time services, Error Handler, Host Supervision, persistency, Logging & Tracing, Memory mapping, Calibration services, communication stack and many other functions.
- In order to realize MIL simulation, one of the European SME mentioned using Dyna4 virtual test-driving simulation for the testing of ADAS systems. This provides high fidelity environment for sensor models and vehicle dynamics.
- Participants mentioned product/project based HIL set-ups are being used in their respective projects. To illustrate, one of their HIL set-up is based on CARLA and uses Nvidia and Vector tools. The other is based on GAZEBO and uses Nvidia platform as basis.
- A participant stated that their test case generation is manual rather automated. The system engineering team decides on tests. They record them on SysML.
- For the automation, they have developed the necessary toolchain to integrate with MATLAB, Dyna4 and SysML. another product xMOD, which provides co-simulation environment in order to speed up the simulation times, using different software platforms in one environment, and also for easy data collection.
- For SoP (Series of Production) projects, they have to rely on classical control units. But for development and/or prototyping, mostly Nvidia platforms are used.
- One of the participants suggested TÜV certifications preparations to be done on OPINA platform.
- One of the participants suggested ISO2626, Aspice, system design, safety software development, Agile/SAFe etc. trainings could be useful by OPINA platform.
- One of the participants from FZI, Deutschland stated his interest on stereo cameras, setup of the vehicle and localization sensors as GNSS or ins (imu)/gps. He said they were using Differential GPS methods to reach below 1m accuracy; however, their aim was going cm-precision as done in military-grade systems, not available for public use.
- OPINA team further asked about GSM Posts sourced use as Assisted GPS from V2X sensors in 4G and 5G band. A participant replied that even this technology only enables until 30cm precision.
- The same participant also mentioned identification of vehicle integration troubles as software to hardware interface problems.
- Participants also expressed their curiosity on verification capabilities of OPINA in cluster session. Additionally, they mention ISO2626, Aspice, system design, safety software development, Agile/SAFe etc. trainings could be useful for OPINA collaborators.
- Importance of certified testers and test operators have been mentioned during this workshop by one of the participants.
- Participants mentioned: Retrofitted autonomous test vehicle would be useful.



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4. CONCLUSION AND THE NEXT STEPS

Thanks to the participation of the esteemed members of our first workshop, the OPINA team is able to elaborate the requirements and future directions of OPINA projects in order to develop an open innovation and development platform for autonomous and connected car technologies.

The following bullets have been observed during the management of OPINA Workshop-I and can be considered for the organization of the upcoming workshops:

- Overall OPINA WS-1 can be considered satisfactory to achieve workshop objectives as to determine the main requirements for OPINA Cluster and OPINA Connected and Autonomous Vehicle Development Architecture requirements.
- Perfect event duration was maintained, and multi-language sessions services were successful.
- The level of interest was promising for the future events and corresponding further actions to be put in place to maximise the potential SMEs and start-ups interest in OPINA.
- More interactivity with European companies and clusters will be good to create an ecosystem on AV in the region with a much faster grow-up.

