PROJECT FINAL REPORT

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Project acronym: VRA

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4.1 Final publishable summary report

4.1.1. Executive Summary

The improvement of sensors, power train control as well as communication, make possible the automation of vehicle driving. Vehicle prototypes are currently capable of driving automatically, in road and urban environment. The automation is provided by systems in the vehicle and/or deployed on the road infrastructure, so that the process is named Vehicle and Road Automation. Partial or full automation of vehicles will improve traffic safety by reducing the number of incidents due to human errors, driver's distraction or reduced vigilance. Furthermore, Vehicle and Road Automation is likely to improve the traffic efficiency by smoothening the flow of vehicles as well as reducing congestions due to accidents. The resulting reduction of vehicle emissions and fuel consumption will have a positive impact on the environment.

VRA, as a Support Action project for networking and international cooperation on Vehicle and Road Automation, addressed in particular the deployment needs and the common issues in order to agree on solutions enabling good market conditions for a seamless and fast deployment.

VRA created a network of several stakeholders in the different Member States and at international level addressing the following objectives:

- Maintain an active European network of Vehicle and Road Automation experts and stakeholders
- Contribute to EU-US-JPN international collaboration on Vehicle and Road Automation
- Identify deployment needs for the different domains of Vehicle and Road Automation
- Promote the European Research on Vehicle and Road Automation through an innovative set of dissemination tools.

The VRA partnership concentrated its efforts on the research activities on European projects and initiatives developed in US and Japan, which have increased in the past years.

VRA ensured the sharing of the expertise on the field, and the exchanging of information between the key actors so that common views on Vehicle Road Automation could be reached.

VRA objectives were successfully achieved through networking and promotion activities organized with the support of the international collaboration.

The deployment needs for Vehicle and Road Automation were identified (including issues related to regulation, standardisation, connectivity, human factors, decision and control algorithms, evaluation of benefits) and discussed by experts and stakeholders during more than 100 events where VRA participated.

The VRA partnership took advantage to promote the European research though many different dissemination tools, such as the wiki on VRA, which gives an extended view of the projects on Automation done in Europe, Japan and US. A website was set-up (www.vra-net.eu) and a wiki also gave more information on the scenarios and the test corridors, as well as on the legal and regulatory needs of the European Member States.

The VRA partnership actively collaborated to the iMobility Forum Automation WG to build an open network to support the deployment of Vehicle and Road Automation in Europe and beyond.

As a prove of successful accomplishment, project CARTRE (http://connectedautomateddriving.eu) is being launched, with the aim of following the steps on VRA and go even further on the achievements of a European networking and into the exchange of information between US, EU and Japan.

4.1.2. The Objectives of VRA

The VRA project has been developed to support four main objectives.

Objective 1: Maintain an active European network of Vehicle and Road Automation experts and stakeholders.

This objective was mainly addressed by the activity of WP2 (WP2.2 and WP2.3). VRA WP2.2 supported the European Concertation, bringing the active European actors around the table to initiate synergies and reach common positions.

The European concertation has been initiated and supported by inviting projects and parties from European funded projects to common meetings. This task has been developed in close collaboration with the activities of the iMobility Forum Automation Working Group and it involved several European Project and other relevant national activities.

The outcome of the discussion was used for updating the deliverables of WP3 on deployment paths, regulation and legal issues and standardisation and certification.

The activity of WP2.2, as planned, was focused on the following point:

1) Extend the role of the Automation WG to become a concertation group for Automation in Europe.

2) Plan relevant discussions and organise regular Automation WG meetings. Several initiatives has been organised in particular in the framework of the ITS European congresses.

3) Maintain a road map for Vehicle and Road Automation: this has been achieved by consolidating the results of the discussion in D3.1.3 “Deployment paths for Vehicle and Road Automation (Final)” and in the other deliverables of WP3.

WP2.2 acted to bring people together on agreed positions and increase their willingness to solve problems together in a collaborative way. Each meeting has been documented on the VRA Website by reporting the minutes and all the presentations.

WP2.3 activities were focused on consolidating the interaction with the VRA Network and identification of any relevant activity worldwide for Vehicle and Road Automation and invite them to participate to the VRA network. As planned, the WP2.3 worked on the following tasks:

- Identify relevant VRA activities worldwide. This was achieved by the support of VRA partners and by the international contacts mainly by presentations during the planned meetings on the status of the current activities. The results were used to enrich the content of the VRA Wiki (several projects and additional sessions have been included in the Wiki)

- Request information and contribute to the inventory of relevant activities and contact lists on the online information exchange tool (Wiki)

- Webinars in order to present the current relevant activities. Nine Webinars been organised on the topic of the impact of connected and automated vehicles in the future.

VRA supported during its initiatives in the liaison and collaboration on different European projects on the topic on Vehicle and Road automation (in particular of those supported by the call FP7-ICT-2013-10). Additional projects have been monitored in the framework of the following calls: FP7-ICT-

2011-8, FP7-ICT-2013-10, FP7-PEOPLE-2013-ITN, FP7-SST-2008-RTD-1, FP7-SST-2012-RTD-1, H2020-ART-2016-2017, H2020-ICT-2014-1, H2020-ICT-2015, H2020- MG-2014-2015, ERC-2012-ADG-20120216 and by the CEDR Transnational Road Research Programme for Mobility & ITS.

Objective 2: Contribute to EU-US-JPN international collaboration on Vehicle and Road Automation.

VRA contributed to the achievement of this objective with the activity of WP2.1. In particular, VRA was involved in the participation to the trilateral EU-US-JP Automation in Road Transportation Working Group established to support the cooperation between Europe, United States and Japan on the topic of Automation.

The trilateral Working Group focuses on automated operation involving all road users, within a connected environment, for broad information sharing and focused collaboration across the regions. The working group exchanges and discuss views and perspectives on relevant topics in the area of vehicle and road transport automation that apply to the role of public authorities with all stakeholders, to disseminate the state-of-the art and to define needs for harmonization and standardization in order to support international developments and deployment.

The activity of the Trilateral Working Groups was mainly oriented on the following areas of cooperation:

- Connectivity: to identity additional requirements on C-ITS
- Digital infrastructure: to identify the role of digital maps for automation
- Human factors: to identify solutions for driver and other road user interactions
- Roadworthiness Testing: to define the necessary or appropriate tests required to allow the safe and reliable operation of automated vehicles on public roads
- Impact assessment: to establish a unified list of potential direct and indirect socio economic impacts ,and jointly try to quantify them
- Reliability and Cybersecurity: to clarify the reliability concerns and make recommendations

In addition, the international collaboration was supported by the participation to the International Events:

1) ITS World Congresses
2) ITFVHA. The ITFVHA overviews the relevant programmes for transportation, including the ongoing deployment on first generation systems and key topics are presented by experts. In this last meeting, a total of 22 countries participated with 97 people attending.
3) TRB initiatives and Automation Symposium (USA)
4) SIP-adus (Japan). This is a series of Workshops organised in Japan by SIP-Adus (Cross-Ministerial Strategic Innovation Program, Innovation of Automated Driving for Universal Services) on Connected and Automated Driving Systems.

Objective 3: Identify deployment needs for the different domains of Vehicle and Road Automation.

The activities related to OBJ-3 have been organised in several different tasks:

1) Deployment paths (WP3.1)
2) Regulatory needs (WP3.2)
3) Standardisation and certification needs (WP3.3)
4) Connectivity (WP3.4)
5) Human Factors (WP3.5)
6) Digital Infrastructure (WP3.6)
7) Impact Assessment (WP3.7)
8) Decision and Control Algorithms (WP3.8)

Objective 4: Promote the European Research on Vehicle and Road Automation through an innovative set of dissemination tools.

This objective was mainly addressed by WP4 considering the following goals:

- provide news and information on relevant content and results on VRA activities and make them available to interested parties;
- create awareness of all stakeholders requested to collaborate;
- promote the project achievements to a wide audience, optimise their potential impact and encourage the exploitation of these results;
- ensure that the knowledge accumulated in this project is properly presented and is in line with other international initiatives;
- provide a platform for information exchange about the standardisation progress and technical advances in this specific research area.

A wide range of topics have been considered in the dissemination activity, mainly related to the current activities for the deployment of Vehicle and Road Automation. They specifically focused on relevant areas of investigation such as:

- Connectivity for vehicle-to-infrastructure and vehicle-to-vehicle communications;
- Digital infrastructure describing the static and/or dynamic digital representation of the physical world with which the automated vehicle interact in order to operate;
- Human factors challenges of vehicle automation such as trust and acceptance, loss of situation awareness, etc.;
- Roadworthiness Testing studies on necessary or appropriate tests required to allow the safe and reliable operation of automated vehicles on different kind of road environments;
- Evaluation of benefits illustrating the direct and indirect socio-economic impacts of vehicle automation.

4.1.3. Main outcomes/ Results achieved

The main outcomes and results achieved are proposed below taking into the activities developed in WP2 (Networking Platform), WP3 (Deployment Needs) and WP4 (Dissemination).

WP2 (Networking Platform)

The VRA activities provided support to two well established cooperation initiatives:

- iMobility Forum Automation WG at European level: VRA gathered past and current activities to feed the needs of the iMobility Forum Automation WG which provided input for future research needs and recommendations for the EC
- Trilateral WG on Automation in Road Transport at international level: VRA supported the European Commission with expert inputs for the discussions with the US Department of Transport and Japan Ministry of Land, Infrastructure and Transport.

The coordination of the VRA network and of the VRA networking activities in VRA was managed in WP2 and led by ERTICO-ITS EUROPE (see Figure 1).

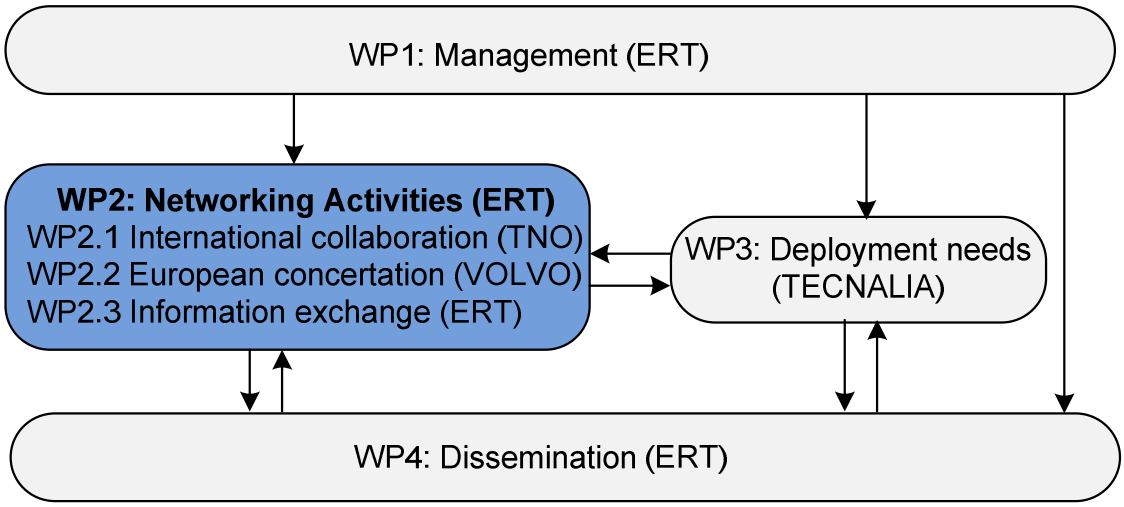

Figure 1: Outline of the work packages of the VRA project

The discussions and initiatives of WP2 were used to feed the activities in WP3 and vice versa the needs and discussion in WP3 were considered in the planning for the activities in WP2.

One of the main missions of WP2 was to involve stakeholders and foster collaboration between projects and activities by:

- Identifying relevant activities
- Identifying common partners
- Proposing collaboration
    - What: topics, gaps
    - How: Level of collaboration
    - When: Timeline
- Making simple bilateral agreements

WP2.1 - International Cooperation

The international collaboration, addressed in WP2.1, contributed to the creation of the International network through the following tasks:

1) Establish a dialogue with main international actors (EC, US DoT, MLIT)
2) Engage with other regions (US, JPN, China, Australia, others) to co-organise international meetings
3) Agree on common issues to be addressed at international level
4) Maintain a regular exchange of information informing on each other's progress about common issues
5) Participate to main international activities in the framework of the EU-US-JPN collaboration on automation

The following activities were performed:

1) The establishment of contacts with the main international actors guaranteed by the supported by the task Leader VOLVO and the other partners relying on previous on the links of the Trilateral Automation Working Group.

   Reference persons have been identified for the US DoT and MLIT. The dialogue with the EC commission has been focused to different DG involved in activity concerning automation (DG RTD, DG CNECT, DG MOVE, DG GROW) promoted by:

   a. direct invitation for participating to event;
   b. periodic updates and meetings.
2) International meetings have been organised supporting the activities of the Trilateral Working Group in collaboration with representatives of other regions
3) VRA supported the discussion on specific topics and common issues to be addressed at international level: in particular during the Trilateral Automation Working Groups specific activities been proposed to reach this objective (e.g. working sessions on the topic of Impact Assessment).
4) The exchange of information has been supported during the meetings by planning presentations to describe the current running activities.
5) VRA in this third period of activity supported initiatives in the framework of the Trilateral EU-US-JPN Working Group on Automation.

Moreover, round table discussions on common issues have been organised during the meetings in order to feed the WP3 discussions.

WP2.1 relied on the outcome of WP2.2's European concertation meetings since issues brought at international level have been discussed in smaller groups in Europe from which agreed positions emerge.

WP2.2 – European Concertation

VRA WP2.2 supported the European Concertation, bringing the active European actors around the table to initiate synergies and reach common positions.

The European concertation has been initiated and supported by inviting projects and parties from European funded projects to common meetings. This task has been developed in close collaboration with the activities of the Automation Working Group and it involved several European Project and other relevant national Activities.

The outcome of the discussion was used to consolidate the working documents and the deliverables of WP3 on deployment paths, regulation and legal issues and standardisation and certification. Specific breakout sessions for the different identified sub-working groups have been proposed (e.g. Human Factors, Standardisation and Certification, Connectivity, etc.).

The activity of WP2.2, as planned, was focused on the following point:

1) Extend the role of the Automation WG to become a concertation group for Automation in Europe.
2) Plan relevant discussions and organise regular Automation WG.
3) Consult stakeholders and identify eventual barriers to deployment
4) Maintain a road map for Vehicle and Road Automation: this has been achieved by consolidating the results of the discussion in D3.1.3 “Deployment paths for Vehicle and Road Automation (Final)”.

WP2.2 acted to bring people together on agreed positions and increase their willingness to solve problems together in a collaborative way. The discussions promoted by WP2.2 served as input for the Deliverables of WP3.

Each meeting has been documented on the VRA Website by reporting the minutes and all the presentations.

The VRA network was based on the interaction with:

- EU funded projects on Vehicle and Road Automation, mainly funded by the calls FP7-ICT-2013-10 , FP7-ICT-2011-8, FP7-ICT-2013-10, FP7-PEOPLE-2013-ITN, FP7-SST-2008-RTD-1, FP7-SST-2012-RTD-1, H2020-ART-2016-2017, H2020-ICT-2014-1, H2020-ICT-2015, H2020-MG-2014-2015, ERC-2012-ADG-20120216 and by the CEDR Transnational Road Research Programme for Mobility & ITS (see Figure 2).

- The already established network and activity of: the iMobility Forum Automation Working Group, which objective is to act as a forum for understanding the current state-of-art in ART; ERTRAC, the European Road Transport Research Advisory Council; GEAR2030 a high level group to address the challenges faced by the European automotive industry; C-ITS Platform to address the main barriers an enablers identified for the deployment of C-ITS in the EU; Oettinger Round Table, which is a cross-sectorial dialogue between automotive and telecommunication IT industry to coordinate communication systems and increasing levels of automated driving; STRIA, which is an strategic transport research & innovation agenda.

WP2.3 - Information Exchange

WP2.3 activities were focused on search and identify any relevant activity worldwide for Vehicle and Road Automation and invite them to participate to the VRA network.

As planned, the WP2.3 was addressed by the following tasks:

- Identify relevant VRA activities worldwide. This was achieved by the support of VRA partners and by the international contacts mainly by presentations during the planned meetings on the status of the current activities. The results were used to enrich the content of the VRA Wiki (http://vra-net.eu/wiki)
- Request information and contribute to the inventory of relevant activities and contact lists on the online information exchange tool (wiki)
- Nine webinars were organised in order to present the current relevant activities

WP2.3 also monitored multiple sources of information streams such as the annual ITFVHA meetings, AUSVI efforts, TRB joint committee on Road Vehicle Automation (LinkedIn) and many blogs (http://smartdrivingcar.com/, http://www.cybercars.fr/, etc…). Moreover VRA project followed some automation newsletters, https://www.technologyreview.com/c/robotics/ or http://spectrum.ieee.org/transportation between others.

VRA Projects partners have been requested to contribute to the collection of information on relevant past and current activity, considering the projects in which they are or they have been involved. Doing this, all the new information of the projects, national or European, will be up to date by the own project consortium.

Overview of the VRA partnership

The VRA Consortium ensured a balanced participation of different sectors that willing to play a supportive role to create an international network around vehicle and road automation. The VRA consortium relied on the numerous other contributors to the iMobility Automation WG who represented the major stakeholders and expert dealing with automation in Europe.

The VRA Consortium ensured the key sector representation

Table 1: key sector representation

Sector	Name
Associations	ERTICO (100 stakeholders in deployment of ITS)
Vehicle manufacturers	AB VOLVO (commercial vehicles and Volvo Technology)
Tier1 suppliers	DENSO (DE) Michelin (FR)
Research Centres and test facilities	ICCS (GR) IDIADA (SP) IFSTTAR (FR) Tecnalia (SP) TNO (NL) DEUTSCHES ZENTRUM FUER LUFT - UND RAUMFAHRT EV (DLR) TRL LIMITED (TRL)
Universities	Uni LEEDS (UK) Uni Roma (IT) RHEINISCH-WESTFAELISCHE TECHNISCHE HOCHSCHULE AACHEN (IKA)

VRA partners include the beneficiaries and the associated partners. Indeed, the participation of different stakeholders to the activities of the projects as Associated Partners was promoted by the

project and around 40 partners have joined the Consortium. The main roles of the associated partners were the following:

- To maintain an active network of experts and stakeholders
- To contribute to international collaboration
- To identify deployment needs
- To promote the research on vehicle and road automation

The following companies have signed a Letter of Intent to become associated partners: Abertis Autopistas, ADAS, Ajuntament de Barcelona, Austriatech, BRSI, CERTH, Chalmers, CTAG, Drive, Sweden, EARPA, Here, Iccor, Imtec, Inria, International Transport Forum, Jaguar Land Rover, Key Research, Lehrstuhl fur Ergonomie, Mouchel, Okan University, RACC, Renault, Traman21, Transport for London, TU Delft, TU E, Universita degli Studi Firenze, Universitat passau, Universitat Wurzburg, Vedecom, Vialis, Vislab

WP2 - conclusion

VRA established a fruitful dialogue with the main international actors (EC, US DoT and MLIT) and helped to coordinate the European efforts in the framework of activities related to Vehicle and Road Automation. Several initiatives were organised in the framework of large events such as the ITS European and international Congresses (e.g. Special Interest Sessions).

At European level, VRA relied also on planned external events (e.g. COMPANION or Autonet2030 events). VRA also attended other events to contact other main actors of the field of automation.

These efforts offered to the participants the possibility of discussing issues together in a collaborative way.

Considering results, the structure of the WP2 “Networking Activities” has shown its effectiveness in the involvement of the partners and in supporting international collaboration and European concertation.

WP3 (Deployment Needs)

WP3.1- Deployment paths

Vehicle and Road Automation will have a great impact on many aspects of the society from safety to productivity passing by the environment impact; the same way it had a huge impact on production, finance, telecom and other Information Technologies. The transition between today and tomorrow's situation happen gradually. Different step by step deployment scenarios will be investigated. For each of them the expected evolution on vehicles, infrastructure and management centres should be described. Based on these trends, the role and responsibilities of the different stakeholders involved into the value chain will be impacted: the vehicle manufacturers, the road operators and the fleet owners/mobility service providers. The value chain and related business models behind the deployment paths will be described.

The WP3.1 has gathered the main experts and stakeholder to describe possible deployment paths for the different types of vehicle and road automation mentioned.

In the first period of the project, the focus of VRA WP3.1 was on interaction with stakeholders in the iMobility Forum and EUCAR in order to build a solid base for future discussions. For the second period, the focus has been to interact with a larger group of stakeholders through ERTRAC. In the third period, there has been a specific focus on business models and infrastructure.

The result from the first period of the VRA activities (2013 – 2014) in terms of deployment paths has been well received and minor changes on the timeline on some function have been added in the following periods. In Europe today there is a common agreement on the different path and which order a certain application will be deployed. The views on the importance of different paths differ between different stakeholders.

More detailed results are available in the deliverable D3.1.3 "Deployment paths (Final)".

WP3.2- Regulatory Needs

The WP3.2 activities consisted of the following tasks:

- Convene specific meetings, and lead and contribute to the discussions on:
    - regulatory needs for deployment of automation and automated vehicles in Europe,
    - legal and liability issues linking with regulatory measures
- Contribute to reach common positions and write a white or position paper on the topic and present it to key stakeholders (such as UNECE WP29),

WP3.2 outcome have been consolidated at the end of each period of the VRA contract in the deliverable series D3.2.*x* on "Regulatory needs and solutions for deployment of Vehicle and Road Automation." due at M15, M27, M41. The present document is the final issue of the deliverable.

Through the various meetings of VRA and iMobility meetings as well as the ITS congresses and the TRB meetings, the WP3.2 has succeeded in establishing a list of relevant contact points in different active EU members states and beyond.

The final report (D3.2.3 – Regulatory Needs Final) is the results of the investigation work of VRA over the 42 months of activity: Identify the active contact points, Clarify current initiatives of EU Members States, Identify the inputs from EU and national -funded projects, Network internationally

especially with US and Japan to identify their regulatory initiatives, and Provide first recommendations for EU level coordination.

During the second period (Oct 2014 – Sept 2015) of VRA, WP3.2 has initiated concrete interaction with identified contact points, Requested feedback on the present draft report and extend its scope, work on Chapter 5 to list current regulatory concerns and which actions are needed, and Update report with status of initiatives and project results, add any new ones if identified.

During the third period (Oct 2015 – Dec 2016) of VRA, WP3.2 has actively contributed to GEAR2030 WP2-PT1 on “regulatory issues” as chair of the group. In total, the PT1 has met 6 times and worked on topics relevant for 2020 automated driving systems.

WP3.3- Standardisation and certification needs

WP3.3 supported the definition of a common European approach towards standardisation and certification for Vehicle and Road Automation.

Discussion group meetings and workshops were used to agree on the approach and reach and European position on standardisation and certification. The discussions were carried out at International level in order to reach global position concerning standardisation and to foster harmonisation for certification. Several panels regarding standardisation and certification were organised to promote discussion and consensus building among stakeholders.

For standardisation the following needs have been identified: gap identification on current standard; generic architecture standard for vehicle – road interaction; vehicle E/E architecture standard;V2X communications; cybersecurity; roadworthiness testing standardization; functional safety; human factors; standardization efforts in the infrastructure side. For Certification, the following aspects have been considered: basic technology certification; communications; interoperability and interaction between automated vehicles; road certification; type approval scheme, completeness of the certification process and new certification related topics (human factors, cybersecurity, digital maps, over-the-air-updates, etc.).

Recommendations on the necessary efforts towards standardization have also been identified: identification of SDOs relevant to the standardization activities; foster interoperability; link with H2020; foster field tests; follow up international certification and legislative activities and foster international harmonization.

The final period of the activities has been very productive in terms of advancing the discussion at the tri-lateral EU-US-JPN level, with a consolidated group of experts involved. The tri-lateral group is in a very interesting moment as finally the 3 regions have some legislation or guidelines in place supporting the testing of automation in public roads.

An increased interest in these topics has been identified from both road authorities and industry, leveraged by the creation of new legal frameworks in different countries. This interest has been obvious in 2016 with more countries defining license exemption procedures and more automated vehicle functions ready to be tested in real world scenarios. Standardization and certification needs for road automation is called to be a very important building block for its safe, efficient deployment. However there are many challenges that need to be addressed through a balanced union of R&D actions and policy making.

Standardization for automated driving is in its early stages right now, which also acts as a barrier for different certification organization and methodology definition. However, previous development e.g. in ADAS systems, can be seen as a potential reference for future standards and certification on

automation. Once the Vienna convention was amended, allowing for higher automation levels on public roads, a legal framework can be established enabling standardization initiatives to begin. However, the current status in Europe shows a high fragmentation between the different Member States and initiatives to harmonize them should be considered.

Testing, both for development and roadworthiness assessment is a topic prone to lead the standardization of the technology. Following the V-model for development, in most of its phases is possible to identify different issues that could benefit from standards. Several companies and projects are already introducing new tools and methodologies that would be able to reduce costs with a standardized approach. It is also important to evaluate how roadworthiness testing will need to adapt to cope with the (increasingly complex) requirements of these technologies in terms of development and validation.

During the first year of activity, the fundaments of the networking activities to be performed during the follow periods was defined and set through the use of different tools based on meetings between stakeholders as well as workshops at different forums and congresses of strategic interest. The second period followed a similar approach in terms of methodologies and tools and has been very productive in terms of advancing the discussion at the tri-lateral level, with a consolidated group of experts involved. Support to the AWG has ended with the development of a white paper in which standardisation and roadworthiness testing have a relevant role. The third period was slightly different in terms of networking activities due to the end of the iMobility Forum, and consequently the Automation Working Group which acted as host of the meetings with stakeholders. The VRA activities on Standardisation and Certification steered its activities and focused in the organisation and promotion of dedicated sessions in several working groups, forums, congresses and R&D project final events as a way to encourage discussion and support stakeholder interaction.

The final final version of this deliverable (D3.3.3) includes needs and recommendations associated to standardization and certification of road automation.

WP3.4 - Connectivity

WP3.4 focused on challenges and needs of connectivity with regard to road transport automation. The main challenges are to ensure interoperable, resilient, reliable and ubiquitous connectivity, to develop or adapt communication protocols for connected and automated driving, to investigate security and privacy aspects.

For the fast deployment of connectivity and especially in combination with automation in road transport there are several conditions that need to be satisfied, such as demonstration in real-life conditions (incl. high crowed areas with possible interferences, network overload, etc.) of different applications and functions that assess the feasibility and the readiness level of the technology, standardization and interoperability of connectivity devices and agreement on the message sets needed for automated driving applications, liability and compatibility with existing legislation.

WP3.4 collected information, performed activities and lessons learned from the relevant EC projects, such as AutoNet2030, AdaptIVe and iGAME, as well as VRA and iMobility forum physical and virtual meetings.

D3.4.2 includes the consolidation of the discussion on connectivity and its role in automated driving. Although there are different opinions the prevailing one is that convergence of connectivity and automation will maximize the benefits in terms of safety, efficiency, comfort and environmental impact.

D3.4.2 includes the result of all discussions that took place within the framework of the VRA project regarding Connectivity needs and recommendations for deployment of vehicle and road automation. This is mainly the outcome of the relevant EU projects (AutoNet2030, iGAME, AdaptIVe), as well as the relevant initiatives in connected automated road transport mainly in EU (C-ITS platform, Automotive-Telecom Alliance, Trilateral EU-US-Japan, etc.).

The work so far on connectivity was quite important and the main conclusion was that there is a need for convergence of connectivity and automation. This has become even more evident with all the initiatives launched the last couple of years, proving that connected automation is considered as the main driver for enhancing safety, efficiency and comfort in road transportation.

New communication technologies (e.g. 5G) and initiatives such as the Automotive-Telecom Alliance and H2020 calls, such as ART-01, highlight the importance and the need for continuation of this work.

More interesting results will arise within the next few years and within the framework of the successor of VRA, namely the CARTRE project, where the follow-up group on Connectivity has already started its activity.

WP3.5 – Human Factors

Current and further deployment of automation in vehicles on European roads may lead to paradigm shifts in the way we live and use mobility. Vehicle and Road Automation will have an impact on many aspects of our mobility, from the effects on society to individuals, from safety to efficiency, from productivity to quality of life and sustainability of our environment. Transition towards this new situation with respect to the automation in our vehicles and on our roads happens gradually. Different migration scenarios will be investigated and deployed, resulting in mixed traffic scenarios. For each of them, the expected evolution of vehicles, road infrastructure, policy guidelines and management should be investigated.

Based on these trends, new automation technologies are promoting changes in the role, authority and responsibilities of human drivers, pedestrians, cyclists, traffic managers, vehicle manufacturers, road operators and mobility service providers. All these groups can be involved in the same value chain, as well as the same global automated traffic system. Therefore, all these groups are likely to experience human factors related issues of automation, such as fears, trust, human error, workload, stress etc., but also likely achieve the benefits associated with the new opportunities created by automation. The related human factors challenges that must be understood to allow the successful deployment of vehicle and road automation are outlined in this document.

In the second period of the project, the focus of WP3.5 was on an interaction with stakeholders in the iMobility Forum, and also as part of smaller local networking activities with members outside this forum, in order to build a solid base of participants for future discussions.

During the third period, the focus was on the interacting with a larger group of stakeholders on an international level, as part of trilateral meetings with US and Japanese colleagues, as well as using the already implemented network to discuss the most important human factors issues we will be facing while deploying vehicle and road automation.

The results of these discussions, including the short-term recommendations to the European Commission (EC), are consolidated in D3.5.2 (Human Factors). These include an overview of how to study road user behaviour in the context of a heterogeneous, mixed traffic setting, and

investigating behaviour during automated vehicle mode transitions,. Some of the results were well received by the EC, and considered in the 2016-17 work program of Horizon 2020.

In the third and final year of the project, WP3.5 continued to expand the network of human factors experts and other stakeholders across Europe and beyond, engaging further in trilateral activities between EU-US-Japan. The already elaborated results have been further consolidated and placed in an appropriate anticipated roadmap. The further work towards network stabilization, consolidated results as well as the roadmap is presented in this document and used in parallel to discuss and to develop further short- and mid-term recommendations to the EC, to assist with the smooth and successful deployment of vehicle and road automation.

The VRA project was a good platform for building a network for groups discussing HF-related implications of AVS. The HF-subgroup consisted of a 'core group' of five HF-professionals, and another 5-7 'floating sub-group members' were involved in the discussion of HF-related issues within the VRA project. In addition:

1. HF-professionals from all around Europe and the world worked together. VRA helped to homogenise understanding of the current issues in the HF-domain in respect to AVS-context, developing possible solutions for these issues, as well as growing the professional network of stakeholders dealing with similar issues in a similar context. This optimized the information acquisition and knowledge generation on an international level and helps to provide focus on the most important HF-related issues associated with the deployment of AVS.
2. VRA also brings together professionals from different domains, which helped to share knowledge on all relevant HF-challenges and activities. Open discussions and group activities in the iMobility Forum Automation subgroup on HF showed that professionals outside the HF-domain were able to comprehend the importance of HF-related contributions, relevant to the development and deployment of AVS. These members actively participated in the discussions and provided additional, fruitful and constructive advice to the debate.

WP3.5 focussed on research and development sub-topics important for the future deployment of AVS from the HF-perspective. Most of the discussions conducted so far have focussed on collecting the most important categories and sub-categories in this area.

WP3.6 – Digital Infrastructure

WP3.6 supported the discussion on the topic of Digital Infrastructure.

The motivations of Digital Infrastructure are mainly related to:

- The need of a digital representation of the road infrastructure along with the investment needed on the physical road infrastructure
- The need of cooperation from the vehicles and the infrastructure operators to collect, update and correct eventual changes made on the physical infrastructure

The following main challenges have been identified during the activities:

- HD maps: Accurate data/position, update frequency, diverse situations, cost; Need for more precise data with complete accuracy/accurate positions; Different driving situations; Levels of automated driving; Collaboration between public and private sector; Separation of static and dynamic data
- How to best realize data integration: Sensor data and maps; One stop interface

- Question of reliability and levels of automated driving
- Liability: Roles of carmakers, map makers, and governments; Roles of static and dynamic data; Different conditions and scenarios; Sensor data at under 300 meters; Speed of updating types of data (dynamic, quasi dynamic, quasi static, static); Infrastructure and coordinates for positions of pedestrians, etc. and liability; Separating dynamic data and maps, and different uses
- Privacy: Question of how to send information; Updating software
- Security and risk of terrorism attacks

VRA WP3.6 networking activities supported the discussion on Digital Infrastructures contributing to several meetings in the second and the third period of VRA project. They include meetings and Workshops in conjunction with the iMobility Forum and in the framework of the EU US JPN Automation in Road Transportation Working Group.

The discussions on digital infrastructure and its role in automated driving are at their peak both in Europe and worldwide. There is a debate on the role of digital infrastructure in road transport automation.

WP3.7 – Evaluation of benefits

Differently from the activity performed in WP3.1 which identified the most probable deployment scenarios, in WP3.7 the modifications that different technologies will cause to the mobility systems were investigated and placed on a time-scale; such consequences will depend on a number of factors and choices and a wide range of effects is possible.

The activity of WP3.7, consolidated in D3.7, tried to set the basis to define a comprehensive modelling framework and the different bits of modelling work which will be necessary to assess such consequences in a more quantitative and reliable way so to take important policy decisions based on such modelling outcomes.

D3.7.2 (Evaluation for Vehicle and Road Automation: needs and recommendations - Final) mainly highlights the aspects listed below.

On-going R&D activities and state of the art:

- US-DOT work on evaluation of Schott Smith;
- CityMobil2 WP27 on long term impacts of road automation;
- ADAPTIVE work on safety, comfort and more of car automation;
- euroFOT on level 1&2 automation (ADAS)
- PEGASUS (German national project)

Need for further research:

- Define a (ore more than one) methodology to evaluate the benefits to “make crystal ball reading reliable”
- Evaluation of driver and other users behavior from objective data collected from sensors in the vehicles data logs so to learn to assess benefits “low cost” and keep benefit assessment up to date

- Evaluating effects on future drivers, trained on lever 3 cars, when driving lower automation level vehicles
- What is the baseline for the evaluation of vehicle automation?
- What is the human driver capable today? How good is good enough?
- Currently little data collection possible due to minimal-existence of level 3 (or higher) automation in public traffic. How to validate evaluation methods?

Conclusion and recommendations:

- Technical evaluation of vehicle performances can be achieved in an “almost objective” way once the key technical indicators to measure are selected. One possible approach can be to extend the CONVERGE evaluation guidelines defined by the homonym EC project of the late nineties on evaluation ICT for mobility.
- In ongoing research project different evaluation frameworks have been or are currently drafted. The interactive project [http://www.interactive-ip.eu] provided a next generation ADAS evaluation framework based on the PreVENT PreVAL project results. Based on the interactive evaluation framework the AdaptIVe project is currently working on an evaluation framework for automated vehicles [https://www.adaptive-ip.eu].
- In the future additional research project will provide more dedicated evaluation methods for specific areas for automated and connected vehicles.On the other hand transport, energy-environment, safety-security, societal and economic evaluation is strictly dependent on the application scenarios studied. The MAESTRO methodology, from the homonym EC DGVII funded research project to establish guidelines to evaluate pilot and demonstration transport projects, can be adopted here on simulations and field-trials of a number of scenarios for the application of automated vehicle technology to urban and interurban mobility.

WP3.8 – Decision and control algorithms

WP3.8 was active on the topic of decision and control algorithms for intelligent road transport systems

The technology required to deliver automation is progressing rapidly. Work is also required to address the legal and liability issues that provide an appropriate regulatory environment for the operation of automated road transport. However, Decision & Control Algorithms are frequently recognised as *the* enabling factor in the deployment of automated road transport systems, to deliver safe and competitive mobility. This is especially important for highly and fully automated vehicles, which could be the backbone of a new mobility sector, with huge societal and economic impact in the decades to come.

The Decision & Control Algorithms group within the VRA project has promoted discussion and considered opinions from experts mostly across the continent. The discussions have been summarised in this document, which also outlines relevant research questions needed to support the deployment of automated road transport systems across Europe. It is anticipated, that this report can guide investment decisions in research, so that the development of the emerging automated transport sector can be influenced in a direction, which is most beneficial for our society.

The activities performed in the field of decision and control algorithms, using as a basis key projects and experts in the area in Europe and beyond, were consolidated in D3.8.2 (Final) and provided recommendations and a common approach for the next levels of vehicle automation.

Decision and control algorithms have the highest potential to beneficially influence the aspects safety and efficiency of automated driving and road traffic in general.

In the final deliverable of WP3.8 the main deployment needs are highlighted considering the following main aspects:

- Adaptability and Decisional Autonomy
- Dependability
- Cognitive interaction with human traffic participants
- V2V and V2I interactions

4.1.4. The impact of VRA/ The achievements of VRA

There was a high participation of partners in all VRA activities, organizing a great number of workshops, and sessions in both Europe and world congresses, as well as attending the meetings organized. The planned schedule for the submission of the deliverables was successfully achieved, and the Milestones for the P3 were also achieved. The VRA partnership had a very good buy-in and collaboration with the associated partners of the consortium, some of which like DLR, IKA and TNO even became partners.

The international recognition was achieved, especially with US and Japan, with the trilateral meetings on exchanging information being held every 2-3 months, but also with Canada, Korea, Australia and China, due to their attendance to the ITS congresses, and to different events organized by partners from VRA. In fact ITS Australia hosted the last ITS world Congress in Melbourne, and collaborated organising the special sessions.

The partnership had a high visibility at important events with numerous contributions, such as the ITS Congress in Bordeaux or The European Congress in Glasgow, where VRA organized Special interest sessions, demonstrations and stakeholder workshops.

An overview of the communication tools developed for the VRA project is illustrated in Table 2.

Table 2: Overview of the communication developed for the VRA project

Tool	Description	Targeted Audience
Standard presentation	A general presentation about VRA. It can be used as a standalone presentation or have part of its slides imported to other presentations. It is provided to the partners on Projectplace.	ITS / mobility experts
VRA News	Project news will be posted on the website	All
VRA Leaflet	The 6 pages leaflet provides an overview of the VRA objectives and involved partners, promoting the available dissemination tools.	ITS / mobility experts Wider user comm.
VRA Roll-up poster	A roll-up poster has been designed for VRA events.. The poster will be stored at ERTICO, but the template will be shared to any interested partner for printing. ERTICO's poster can also be borrowed.	ITS / mobility experts Wider user comm.

VRA Website	The main communication channel to reach a reasonable number of people among all target groups. It was regularly updated.	All
VRA Wiki	This tool supported the collection of relevant information on different activities on Vehicle and Road Automation.	All
VRA Newsletters	The Newsletters collected relevant news and updates regarding the projects and activities in Vehicle and Road Automation.	All
Coverage in the specialised press	Publications on specialised press focus on specific topics and are promoted in collaboration with experts involved in VRA.	ITS / mobility experts
Partners' dissemination channels	Information and dissemination materials were distributed by using the channels offered by the collaboration with other projects (such as CityMobil2, Auto2030, iGames, Adaptive and Companion)	All

The dissemination activity played a very important rule in the VRA project to share expertise and cooperate at European and International level.

A wide range of topics were considered in the dissemination activity, mainly related to the current activities for the deployment of Vehicle and Road Automation: they involved aspects related to deployment paths and scenarios (WP3.1), legal and regulatory issue (WP3.2) and standardisation, testing and certification. In addition, they specifically focused on the following relevant areas of investigation, considering the results and achievements of WP3 tasks:

- Roadworthiness Testing studies (WP3.3) on necessary or appropriate tests required to allow the safe and reliable operation of automated vehicles on different kind of road environments;
- Connectivity (WP3.4) for vehicle-to-infrastructure and vehicle-to-vehicle communications;
- Human factors (WP3.5) challenges of vehicle automation such as trust and acceptance, loss of situation awareness, etc.;
- Digital infrastructure (WP3.6) describing the static and/or dynamic digital representation of the physical world with which the automated vehicle interact in order to operate;
- Evaluation of benefits (WP3.7) illustrating the direct and indirect socio-economic impacts of vehicle automation;
- Decision and Control Algorithms (WP3.8) influencing the aspects safety and efficiency of automated driving and road traffic in general.

The dissemination activity scope established synergies with other VRA projects such as:

- CityMobil2[2] which develops implementation studies and demonstration of automated road transport system (ARTS) at five European sites by targeting relevant legal, technical, and socioeconomic issues;
- AutoNet2030[3] which develops and test a co-operative automated driving technology, based on a decentralised decision-making strategy which is enabled by mutual information sharing among nearby vehicles;
- iGAME[4] which aims at speeding-up real-life implementation and interoperability of wireless communication based automated driving;
- AdaptIVe[5] which develops and tests new functionalities for cars and trucks, offering both partially automated and highly automated driving on motorways, in urban scenarios, and for close-distance manoeuvres. It addresses topic such as liability issues, human-vehicle integration, and evaluation methodology and tool;
- Companion[6] which aims to develop and validate off-board and on-board systems for coordinated platooning, research potential legal solutions and standards to advance platooning adoption, and demonstrate of platooning operations on European roads.

Additional synergies were established with national activities with the support of the VRA partners. For instance, IFSTTAR contributes to make the link with the activities of the French competitive cluster and TNO provides information on relevant national initiatives (e.g. DAVI[7], HF Auto[8]) or DLR and IKA (e.g. Pegasus[9]).

The targeted audience includes a wide range of stakeholders:

- Research networks: researchers and engineers involved in VRA development, testing, and deployment;
- Car manufacturers and suppliers to the car industry;
- ICT/ITS professionals in the public and private sectors, including road operators and road authorities;
- ITS organisations: ERTICO-ITS Europe, national ITS associations, ITS America, ITS Japan;
- Engineering and automotive associations;
- Consultants: major consultancies that operate nationally or e.g. are advising cities on ITS;
- Standardization and certification bodies;
- General public, such as drivers or road users

4.1.5. Conclusion

The VRA partnership concentrated all the efforts to create an active European network of experts and stakeholders involved in Automation in Road Transport and contribute to the EU-US-Japan international collaboration. During the project, the results achieved the networking activities along with the international collaboration meetings and the different workshop organised VRA successfully

[2] CityMobil2 official website: http://www.citymobil2.eu/en/
[3] AutoNet2030 official website: http://www.autonet2030.eu/
[4] iGAME official website: http://www.gcdc.net/i-game
[5] AdaptIVe official website: http://www.adaptive-ip.eu/
[6] Companion official website: http://www.companion-project.eu/
[7] DAVI official website: http://davi.connekt.nl/
[8] HF Auto: http://hf-auto.eu/
[9] Pegasus: http://www.pegasus-projekt.info/en/

fostered the international collaboration. By supporting the participations of several partners in international meetings, the project made great advance in the international collaboration. It stablished a close relationship and collaboration with some of the main international actors such as European Commission, US Department of Transport or the Ministry of Land, Infrastructure and Tourism of the Japanese government. At the same time, VRA helped to coordinate European efforts in the international activities, organizing and supporting initiatives.

The international collaboration was supported in European concertation by organising activities, by partners leading some workshops and initiatives, several meetings and workshops in related projects such as COMPANION, AdaptIVe, CityMobil2 were organized during the project. European initiatives, like EC funded projects or national initiatives were involved in most of the meetings, and VRA was invited to actively participate in the events and workshop organized by this national initiatives. These EC funded projects and national initiatives were invited to participate in the meetings and in the common relevant topics of discussion that were addressed by specific working groups.

The partnership proved its effectiveness by organizing more meetings and workshops than the ones scheduled, and improving in the information exchange and collaboration with the international actors, especially in the trilateral meetings, which take place every three months. The following activities would be highlighted:

- ITS World Congress in Melbourne 2016, ITS World Congress in Bordeaux 2015, ITS World Congress in Detroit 2014, ITS World Congress in Tokyo 2013.
- ITS European Congress in Helsinki, ITS European Congress in Glasgow 2016
- iMobility Forum Automation WG meetings
- Trilateral Automation EU-US-Japan Working Group on Automation in Road Transportation meetings
- SIP-Adus Workshop 2014, 2015 and 2016
- TRB Transportation research board
- Automated Vehicles Symposium (2014, 2015, 2016)

In addition, webinars, and dissemination material such as papers and publications were prepared. A wiki with the information collected on the different projects and initiatives on automated vehicles was created and periodically updated.

Information collected on the Member States, with their collaboration, about the regulatory process and the standardisation was also published, and analysed, with the idea of generating a common roadmap towards the implementation of automated vehicles in Road Transportation.

4.2 Use and dissemination of foreground

Conferences and workshops were great networking opportunities for experts to share knowledge.

Though not publishing original technical work, VRA participates in thematic sessions at European and international conferences & events to promote its objectives and work progress.

Presentations or papers at specialised meetings and congresses were more often used to present interim results and to collect feedback from experts. Materials have been usually made available afterwards either through websites or as proceedings.

Website

VRA website (www.vra-net.eu) was considered the main dissemination tool for all news concerning the VRA project and it is directly managed by the WP4 Leader (ERTICO – ITS Europe).

The website was launched in December 2013. The main functions of VRA website were:

- To provide access, by means of direct links, to all identified VRA studies at National, European and Global levels;
- To disseminate the latest VRA-related news on campaigns, achievements, meetings and events;
- To share presentations, reports and any other material to report on the discussion which took place in the VRA Network activities: Stakeholders workshop, International Workshops and Seminars;
- To disseminate good practice examples and success stories;
- To Store electronic versions of the VRA communication printed material such as brochure and newsletter;
- To give a central information contact point: vra.info@mail.ertico.com.

The VRA website was updated at least weekly with information and news. The website design follows the VRA brand identity. During the project life cycle, the content of different sessions of the website has been updated considering the progress in the project. In particular:

- The list of partners and associated partners has been updated considering the companies that have joined the VRA project (http://vra-net.eu/about-the-vra-network/partners/);
- The structure and the description of the discussion group (http://vra-net.eu/network/discussion-groups/) have been updated considering the organisation of the working groups in WP3.

The purpose of the VRA Wiki is to offer a catalogue of all national, European and international activities concerning vehicle and road automation providing in-depth information and contact details in order to keep the stakeholders informed of the past, current and future initiatives and experiences.

The wiki-based catalogue is an online, open, free encyclopaedia with key information on activities related to Vehicle and Road Automation. It can be accessed and modified freely by any professional involved or interested in the topic at the following link: http://vra-net.eu/wiki. Visitors need only register to create a user access with a username and password to start editing the Wiki.

The decision to have a VRA Wiki has been taken as it offers several benefits in comparison to a static offline deliverable. Building the catalogue in the form of a Wiki makes it a collaborative effort, easily accessible by the FOT community, and ensures the possibility to gather a large number of information. Further it ensures that the catalogue is dynamic and can be constantly updated when information become available (as opposed to a static offline deliverable that becomes rapidly outdated).

The Wiki is updated mainly considering the information collected with the activity in WP2.3.

A VRA YouTube channel (http://www.youtube.com/user/vrainfo) has been created to gather videos on Vehicle and Road Automation which can be of interest for the VRA stakeholders. Videos of the Webinars have been uploaded on the YouTube channel and a link to them is provided on the Website.

Webinar

During the project life cycle, the videos of the following Webinars were added:

- VRA Webinar 1 - "Long Term Socio-Economic Effects of Mobility Automation in Cities"
- VRA Webinar 2 - "Driver Assisted Truck Platooning"
- VRA Webinar 3 – "Automation @ ITS European Congress: main feedback and highlights"
- VRA Webinar 4 – "Human Factors in vehicle automation: activities in the European project adaptive"
- VRA Webinar 5 - "From Advanced Active Safety Systems to Automated Systems: From interactIVe to AdaptIVe and beyond"
- VRA Webinar 6 - "Cooperative Automation: Activities in the European Project i-GAME"
- VRA Webinar 7 - "Vehicle Automation: Challenges and Opportunities for Cities"
- VRA Webinar 8 - "Traffic Management in the Era of Vehicle Automation and Communication Systems (VACS)"
- VRA Webinar 9 – "Impact assessments for Automated Road Systems: results from the project CityMobil2"

Presentations and videos are available in the library of the VRA website: http://vra-net.eu/library/

Pubblications

During the project life cycle the following publications were finalised:

- The "**emergence of truck platooning**" – Baltic Transport – issue 3/2016 - - mainly addressing the following points: "The role of automation and their impact on consumers is not always as direct as seems. The impact automated systems can have on commercial road transport benefit the everyday lived of millions by making freight transport safer, greener and more efficient. Truck platooning proves a solution to numerous challenges Europe's roads face today but there is still many aspects awaiting international discussions and agreement before we can experience the proven benefits". The article is available on the VRA website: http://vra-net.eu/the-emergence-of-truck-platooning/

- **Automation to solve "last mile problem"** – on Passengers transport (September 2016) - www.passengertransport.co.uk – were the issue of the impact that self-driving vehicles could have on cities and passenger transport have been addressed. The article is available on the VRA website: http://vra-net.eu/news/automation-to-solve-last-mile-problem/

- "**From ambition to meaning**" – on the Thinking Highways (October 2016) - .thinkinghighways.com where the initiatives on Automation at the European ITS Congress of Glasgow were highlighted; the article is available on the VRA website: http://vra-net.eu/from-ambition-to-meaning-what-we-learned-about-automation-at-the-11th-its-european-congress/

Publications at Technical and Scientific Congresses:

- "**Autonomous vehicle: the concept of high quality of service highway**" by Jacques Ehrlich, Dominique Gruyer, Olivier Orfila, Nicolas Hautière (IFSTTAR, LIVIC Lab, France) published at FISITA 2016 (www.fisita2016.com/) World Automotive Congress, 26-30 September 2016.

  Additional information on the paper available on the VRA Website at the following address: http://vra-net.eu/physical-and-digital-infrastructure-presentation-at-fisita-2016/

- **Current activities in Vehicle and Road Automation: a European and international overview** by Davide Brizzolara (Paper number ITS - EU-TP0349) presented at the ITS European Congress in Glasgow, providing an overview of the most important European and International Initiatives on Automation.

VRA also interacted with the EC to support the preparation of articles on the Horizon 2020 Magazine that should be finalised in March 2017.

Section A (public)

TEMPLATE A1: LIST OF SCIENTIFIC (PEER REVIEWED) PUBLICATIONS, STARTING WITH THE MOST IMPORTANT ONES

NO.	Title	Main author	Title of the periodical or the series	Number, date or frequency	Publisher	Place of publication	Year of publication	Relevant pages	Permanent identifiers[10] (if available)	Is/Will open access[11] provided to this publication?
1	*Autonomous vehicle: the concept of high quality of service highway*	*Jacques Ehrlich, Dominique Gruyer, Olivier Orfila, Nicolas Hautière (IFSTTAR, LIVIC Lab, France)*	*World Automotive Congress – FISITA 2016*	*Annual*	*FISITA 2016*	*Busan, Korea*	*2016*	-	-	yes
2	*Current activities in Vehicle and Road Automation: a European and international overview*	*Davide Brizzolara*	*ITS European Congress in Glasgow*	*Annual*	*ITS European Congress in Glasgow proceedings*	*Brussels*	*2016*	-	-	*yes*

[10] A permanent identifier should be a persistent link to the published version full text if open access or abstract if article is pay per view) or to the final manuscript accepted for publication (link to article in repository).
[11] Open Access is defined as free of charge access for anyone via Internet. Please answer "yes" if the open access to the publication is already established and also if the embargo period for open access is not yet over but you intend to establish open access afterwards.

TEMPLATE A2: LIST OF DISSEMINATION ACTIVITIES								
NO.	Type of activities[12]	Main leader	Title	Date/Period	Place	Type of audience[13]	Size of audience	Countries addressed
1	*Conference*		*Special Session SAE On-Road Automated Vehicle Standards Committee*	*15 July 2013*	*Standford, USA*	*Scientific community, policy makers*	*60*	Europe
2	*Workshop*		*TRB road vehicle workshop*	*16-19 July 2013*	*Standford, USA*		*300*	*International*
3	*Conference*		*Trilateral WG on Automation for Road transport*	*19 July 2013*	*Standford, USA*	*Scientific Community, Industry, Policy*		*International*

[12] A drop down list allows choosing the dissemination activity: publications, conferences, workshops, web, press releases, flyers, articles published in the popular press, videos, media briefings, presentations, exhibitions, thesis, interviews, films, TV clips, posters, Other.

[13] A drop down list allows choosing the type of public: Scientific Community (higher education, Research), Industry, Civil Society, Policy makers, Medias, Other ('multiple choices' is possible).

						Makers		
4	*Partnership meeting*	*ERTICO*	*Admin Kick-off meeting*	*03 September 2013*	*Telco*			Europe
5	*Conference*		*iMobility Steering Group Meeting*	*23 September 2013*	*Brussels, Belgium*			Europe
6	*Conference*		*Trilateral WG on automation for road transport*	*27 September 2013*	*Telco*			*International*
7	*Partnership meeting*	*ERTICO*	*Kick-off meeting*	*30 September 2013*	*Brussels, Belgium*			Europe
8	*Conference*		*Concertation meeting*	*01 October 2013*	*Brussels, Belgium*		*40*	Europe
9	*Conference*		*Automation WG meeting*	*02 October 2013*	*Brussels, Belgium*	*Scientific Community, Industry, Policy makers*	*30*	*Europe*
10	*Conference*		*ITFVHA*	*13 October 2013*	*Tokyo, Japan*	*Scientific Community, Industry, Policy makers*	*40*	*Europe*
11	*Congress*		*ITS World Congress*	*14-18 October 2013*	*Tokyo, Japan*	*Scientific Community, Industry, Civil Society, Policy makers*	*10000*	*Europe*
12	*Conference*		*Trilateral WG on Automation for Road Transport*	*18 October 2013*	*Tokyo, Japan*	*Scientific community, Industry, Policy makers*		*International*
13	*Conference*		*Trilateral WG on Automation for Road Transport*	*04 December 2013*	*Brussels, Belgium*	*Scientific Community, Industry,*		*International*

						Policy makers		
14	*Conference*		*Automation WG meeting*	*05 December 2013*	*Telco*	*Scientific Community, Industry, Policy makers*		*Europe*
15	*Conference*		*Trilateral WG on Automation for Road Transport, during the Transportation Research Board*	*16 January 2014*	*Washington, USA*	*Scientific Community, Industry, Policy makers*		*International*
16	*Partnership meeting*		*VRA meeting*	*23 January 2014*	*Brussels, Belgium*			*Europe*
17	*Conference*		*Automation WG meeting*	*24 January 2014*	*Brussels, Belgium*	*Scientific Community, Industry, Policy makers*		*Europe*
18	*Presentation*		*AdaptIVe KoM / RESPONSE4 KoM*	*30-31 January 2014*	*Wolfsburg, Germany*			*Europe*
19	*Conference*		*MGMT Meeting*	*04 April 2014*	*Conference call*			*Europe*
20	*Conference*		*TRA Transport Research Arena*	*14-17 April 2014*	*Paris, France*	*Scientific Community, Industry, Civil Society, Policy makers*		*International*
21	*Conference*		*MGMT Meeting*	*18 April 2014*	*Conference call*			*Europe*
22	*Conference*		*iMobility Forum*	*29 April 2014*	*Brussels, Belgium*	*Scientific Community, Industry,*		*Europe*

						Policy makers		
23	*Conference*		*CM2 Ministerial Meeting*	*05 May 2014*	*Athens, Greece*	*Scientific Community, Policy makers, Civil Society*		*Europe*
24	*Partnership meeting*	*ERTICO*	*VRA Consortium Meeting*	*07 May 2014*	*Antwerp, Belgium*			*Europe*
25	*Conference*	*ERTICO*	*Automation WG*	*08 May 2014*	*Antwerp, Belgium*	*Scientific Community, Industry, Policy makers*		*Europe*
26	*Conference*		*Trilateral WG on Automation on Road Transport*	*08 May 2014*	*Antwerp, Belgium*	*Scientific Community, Industry, Policy makers*		*International*
27	*Conference*		*MGMT meeting*	*16 May 2014*	*Conference call*			*Europe*
28	*Conference*	*ERTICO*	*Meeting with SAFER*	*19 May 2014*	*Gothenburg, Sweden*			*Europe*
29	*Conference*	*ERTICO*	*Meeting with VCC DRIVE ME*	*19 May 2014*	*Gothenburg, Sweden*			*Europe*
30	*Workshop*		*Swedish Workshop on Automation*	*20 May 2014*	*Gothenburg, Sweden*	*Scientific Community, Industry, Policy makers*		*Europe*
31	*Conference*		*Meeting with Chinese delegation*	*02 June 2014*	*Brussels, Belgium*			*Europe*
32	*Conference*		*MGMT Meeting*	*06 June 2014*	*Conference call*			*Europe*

33	*Conference*		*Auto HF KOM: Human Factors of Highly automated Driving*	*11 June 2014*	*Delft, Netherlands*	*Scientific Community, Industry, Policy makers*		*Europe*
34	*Congress*	*ERTICO*	*ITS European Congress*	*16-19 June 2014*	*Helsinki, Finland*	*Scientific Community, Industry, Policy makers*		*International*
35	*Conference*		*MGMT Meeting*	*27 June 2014*	*Conference call*			*Europe*
36	*Conference*		*ADASIS General Assembly*	*30 June 2014*	*Amsterdam, The Netherlands*			*Europe*
37	*Conference*		*ERTRAC Task Force on Automation*	*09 July 2014*	*Brussels, Belgium*	*Scientific Community, Industry, Policy makers*		*Europe*
38	*Workshop*		*TRB Transportation Research Board Workshop*	*18 July 2014*	*San Francisco, USA*	*Scientific Community, Industry, Policy makers*		*Europe*
39	*Conference*		*Trilateral Automation WG*	*18 July 2014*	*San Francisco, USA*	*Scientific Community, Industry, Policy makers*		*Europe*
40	*Conference*		*International Task Force Vehicle Highway Automation (ITFVHA)*	*06 September 2014*	*Detroit, USA*	*Scientific Community, Industry, Policy makers*		*Europe*
41	*Congress*		*ITS World Congress*	*07-11 September*	*Detroit, USA*	*Scientific Community,*		*Europe*

				2014		*Industry, Policy makers*		
42	*Conference*		*Automation WG meeting (EC Recommendation for H2020)*	*17 September 2014*	*Brussels, Belgium*	*Scientific Community, Industry, Policy makers*		*Europe*
43	*Conference*		*Road Traffic Information and Control Conference (RTIC 2014)*	*07 October 2014*	*London, UK*	*Scientific Community, Industry, Policy makers*		*Europe*
44	*Conference*		*ERTRAC Task Force on Connectivity and Automated Driving*	*08 October 2014*	*Brussels, Belgium*	*Scientific Community, Industry, Policy makers*		*Europe*
45	*Workshop*	*ERTICO*	*VRA Workshop*	*06 November 2014*	*Brussels, Belgium*			*Europe*
46	*Workshop*		*Workshop on Connected and Automated Driving Systems Tokyo*	*17-18 November 2014*	*Tokyo, Japan*	*Scientific Community, Industry, Policy makers*		*Europe*
47	*Conference*		*Trilateral Automation WG*	*19 November 2014*	*Tokyo, Japan*	*Scientific Community, Industry, Policy makers*		*Europe*
48	*Conference*		*CityMobil Reference Group Meeting*	*01-02 December 2014*	*Lausanne, Switzerland*	*Scientific Community, Industry, Policy makers*		*Europe*
49	*Conference*		*Automation WG meeting*	*02 December 2014*	*Lausanne, Switzerland*	*Scientific Community,*		*Europe*

						Industry, Policy makers		
50	*Conference*		*TRB Transport Research Board (94th Annual meeting)*	*12-15 December 2014*	*Washington, USA*	*Scientific Community, Industry, Policy makers*		*Europe*
51	*Conference*		*Trilateral Automation Working Group*	*11 December 2015*	*Washington, USA*	*Scientific Community, Industry, Policy makers*		*Europe*
52	*Workshop*		*ERTRAC Automated Driving Workshop*	*26 January 2015*	*Brussels, Belgium*	*Scientific Community, Industry, Policy makers*		*Europe*
53	*Conference*		*iMF Automation sub-WG Leaders Conference Call*	*06 February 2015*	*Conference call*	*Scientific Community, Industry, Policy makers*		*Europe*
54	*Conference*		*ERTRAC Conference*	*02-03 February 2015*	*Brussels, Belgium*	*Scientific Community, Industry, Policy makers*		*Europe*
55	*Conference*	*ERTICO*	*HERE-ERTICO digital infrastructure meeting*	*12 March 2015*	*Berlin, Germany*			*Europe*
56	*Conference*		*iMobility Forum meeting on Regulatory Needs for Vehicle and*	*23 March 2015*	*Brussels, Belgium*	*Scientific Community, Industry, Policy makers*		*Europe*

			Road Automation					
57	*Conference*		*iMobility Forum Legal Issues*	*24 March 2015*	*Brussels, Belgium*	*Scientific Community, Industry, Policy makers*		*Europe*
58	*Conference*		*IMF SG meeting*	*26 March 2015*	*Brussels, Belgium*	*Scientific Community, Industry, Policy makers*		*Europe*
59	*Workshop*		*Workshop on Socio-Economic Impact of Road Transport Automation and CityMobil2 Demonstration*	*30-31 March 2015*	*La Rochelle, France*	*Scientific Community, Industry, Policy makers*		*Europe*
60	*Conference*		*Trilateral Automation WG*	*31 March- 01 April 2015*	*La Rochelle, France*	*Scientific Community, Industry, Policy makers*		*Europe*
61	*Conference*		*3rd EU-US Symposium on "road Vehicle Automation"*	*14-15 April 2015*	*Washington, USA*	*Scientific Community, Industry, Policy makers, Civil Society*		*Europe*
62	*Conference*		*EC ITS Conference*	*24 April 2015*	*Brussels, Belgium*	*Scientific Community, Industry, Policy makers, Civil Society*		*Europe*

63	*Conference*		*iMobility Forum Automation Working Group meeting*	*28 April 2015*	*Brussels, Belgium*	*Scientific Community, Industry, Policy makers*		*Europe*
64	*Conference*		*ADASIS General Assembly*	*10-11 June 2015*				*Europe*
65	*Conference*		*HERE Directions Conference*	*26 June 2015*	*Brussels, Belgium*			*Europe*
66	*Conference*		*iMobility Forum Automation Working Group meeting*	*30 June-01 July 2015*	*Brussels, Belgium*			*Europe*
67	*Conference*		*iMobility Forum WG Meeting*	*01 July 2015*	*Brussels, Belgium*	*Scientific Community, Industry, Policy makers*		*Europe*
68	*Conference*		*Automated Vehicle Symposium*	*21 July 2015*	*Ann Arbor, USA*	*Scientific Community, Industry, Policy makers*		*International*
69	*Conference*		*Trilateral Automation Working Group in Road Transportation meeting*	*23-24 July 2015*	*Ann Arbor, USA*	*Scientific Community, Industry, Policy makers*		*International*
70	*Workshop*		*AdaptIVe Workshop*	*17 September 2015*	*Paris, France*			*Europe*
71	*Conference*		*iMobility Forum WG Meeting*	*23 September 2015*	*Brussels, Belgium*			*Europe*
72	*Partnership meeting*	*ERTICO*	*VRA Consortium meeting*	*24 September 2015*	*Brussels, Belgium*			*Europe*
73	*Conference*		*International Task Force on*	*04 October 2015*	*Bordeaux, France*	*Scientific Community,*		*International*

			Vehicle and Highway Automation (ITFVHA)			*Industry, Policy makers*		
74	*Congress*	*ERTICO*	*ITS World Congress*	*05-09 October 2015*	*Bordeaux, France*	*Scientific Community, Industry, Policy makers*		*International*
75	*Workshop*		*AdaptIVe workshop on legal aspect*	*18 September 2015*	*Paris, France*			Europe
76	*Workshop*		*SIP-Adus Workshop*	*27-29 October 2015*	*Tokyo, Japan*	*Scientific Community, Industry, Policy makers*		*International*
77	*Conference*		*Trilateral Automation Road Transport WG*	*30-31 October 2015*	*Tokyo, Japan*	*Scientific Community, Industry, Policy makers*		*International*
78	*Conference*		*Driverless Technology Conference and Exhibition (DTCE 15)*	*23 November 2015*	*London, UK*			
79	*Conference*		*TRB Transport Research Board meeting*	*10-14 January 2016*	*Washington, USA*	*Scientific Community, Industry, Policy makers*		*International*
80	*Conference*		*Trilateral ART WG*	*14 January 2016*	*Washington, USA*	*Scientific Community, Industry, Policy makers*		

81	*Conference*		*European Automotive Forum 2016 "Driving connected cars into the future"*	*14 January 2016*	*Brussels, Belgium*			
82	*Conference*		*iMobility Forum WG meeting*	*29 January 2016*	*Brussels, Belgium*			
83	*Conference*	*ERTICO*	*FOT-Net Data Workshop: A common methodology for automation FOTs pilots*	*03-04 February 2016*	*Devonshire, UK*			*Europe*
84	*Workshop*		*ERTRAC Security Workshop*	*19 February 2016*	*Brussels, Belgium*			*Europe*
85	*Conference*		*EU Truck Platooning Challenge*	*07 April 2016*	*Amsterdam, The Netherlands*			*Europe*
86	*Conference*		*iMobility Forum Automation Workshop*	*07 April 2016*	*Brussels, Belgium*			*Europe*
87	*Conference*		*Trilateral Automation WG*	*17 April 2016*	*Warsaw, Poland*			*International*
88	*Workshop*		*Technical workshop of AdaptIVe*	*22 April 2016*	*Athens, Greece*			*Europe*
89	*Conference*		*Connected cars Forum*	*17 May 2016*	*Brussels, Belgium*			*Europe*
90	*Conference*		*Grand Cooperative Driving Challenge*	*28-29 May 2016*	*Helmond, The Netherlands*			*Europe*
91	*Conference*		*CityMobil2 final conference*	*1-2 June 2016*	*San Sebastian, Spain*			*Europe*

92	*Congress*	*ERTICO*	*ITS European Congress*	*6-9 June 2016*	*Glasgow, UK*			*International*
93	*Conference*		*Insurance Europe Meeting*	*15 June 2016*	*Vienna, Austria*			*Europe*
94	*Conference*		*Automated Vehicle Symposium*	*19-21 July 2016*	*San Francisco, USA*			*International*
95	*Conference*		*Trilateral Probe Data WG meeting*	*21 July 2016*	*San Francisco, USA*			*International*
96	*Conference*		*Trilateral ART WG meeting*	*22 July 2016*	*San Francisco, USA*			*Europe*
97	*Conference*		*International Conference on Traffic and Transport Psychology 2016*	*02-05 August 2016*	*Brisbane, Australia*			*Europe*
98	*Conference*		*COMPANION Final Conference Event*	*14-15 September 2016*	*Tarragona, Spain*			*Europe*
99	*Workshop*		*EU EIP 4.2 workshop on Automated Driving and ITS*	*21-22 September 2016*	*Madrid, Spain*			*Europe*
100	*Conference*		*FISITA world Automotive Congress*	*26-30 September 2016*	*Busan, South Korea*			*International*
101	*Conference*		*ITS World Congress Melbourne*	*10-14 October 2016*	*Melbourne, Australia*			*International*
102	*Conference*		*AutoNet2030 Final Event Conference*	*27 October 2016*	*Sandhult, Sweden*			*Europe*
103	*Workshop*		*SIP-Adus Workshop*	*15-17 November 2016*	*Tokyo, Japan*			*International*

104	*Conference*		*Trilateral EU-US-Japan meeting on Automation WG*	*17 November 2016*	*Tokyo, Japan*			*International*