CCAM platform WG1 & CCAM partnership

State of play and link with other WGs of the CCAM platform

4 May 2020

AGENDA, 7th meeting, 4 May 2020

- Welcome and introduction
- Adoption of the minutes of the previous meeting and of the agenda
- Overview of workflow (WG1, SRIA, Partnership)
- European Partnership on CCAM – State of Play
- Preparation of the Strategic Research & Innovation Agenda (SRIA)
- Conclusions and Next Steps
- AOB

Links between WG1 and CCAM partnership

- **Plenary December 2019: D1** – vision, objectives, R&I areas

- **13 March 2020**: draft Partnership proposal

- **13 April 2020**: final Partnership proposal

- **Plenary June 2020: D2** – 7 cluster documents incl. R&I actions

- **Q2 2020**: Strategic Research Innovation Agenda (SRIA)

- **Q3/4 2020**: Signature of the Memorandum of Understanding

European Partnership on CCAM – Proposal

Huge progress has been made in terms of:

- Commitments from stakeholder groups
- Definition of 7 Clusters and potential R&I actions
- Links with other European partnerships
- Description of process to prepare the SRIA

May 2020 - Partnership proposal published

European Commission

Strategic Research & Innovation Agenda

What is it?

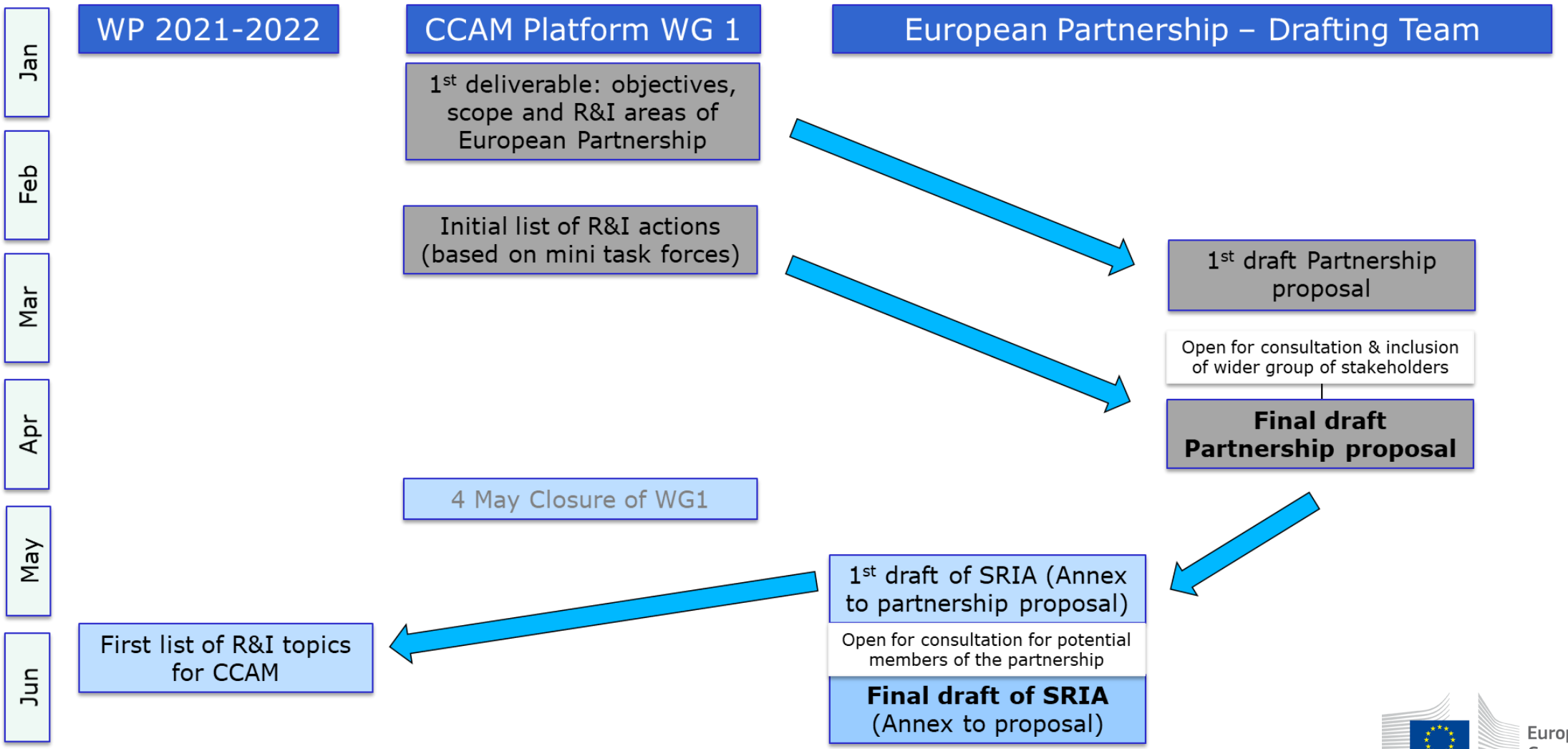
- Strategy document, which identifies the foreseen portfolio of activities of the partnership, measurable expected outcomes, deliverables and milestones within specific timeframes
- Precondition to launch a European Partnership
- SRIA needs to be agreed with the EC
- Has to be sufficiently detailed to build the basis for the drafting of workprogrammes

Strategic Research & Innovation Agenda

Milestones to prepare the SRIA

- First draft of cluster documents – mid May
- First draft of SRIA – 2nd half of May 2020
- Agreed list of R&I topics for Workprogramme 2021/22 – end May
- Final draft of SRIA – end June 2020

Workflow to prepare the SRIA for CCAM



European Commission

European Partnership under Horizon Europe

Connected, Cooperative and Automated Mobility (CCAM)

European leadership in safe and sustainable road transport through automation

Outline

- Background
- Stakeholder community
- Consultation results
- Developing the CCAM Partnership Proposal
- CCAM vision and expected Impacts for Society
- Sectors and stakeholder in the CCAM Partnership
- SRIA Strategic Research & Innovation Agenda

Background

- 24 January: at CCAM Platform meeting, EC called for the preparation of a Partnership Proposal
- 17 February: public workshop to gather stakeholders interests
- 13-23 March: stakeholders consultation on draft Proposal
- End March - beginning April: stakeholders feedback was analysed and used to further strengthen the proposal. + integrating the CCAM Cluster approach
- 13 April: submission of the final Partnership Proposal to the EC
- May/June: draft the SRIA and build the stakeholder community

Stakeholder Community (status 13 April)

CCAM stakeholders supporting the Partnership development	
Research providers	AVL, AIT, CEA, Cerema, DLR, Eurecat, Everis, FEV, fka, Fraunhofer, ICCS, ICOOR, IDIADA, IFPEN, Lero, Ricardo, RISE, SAFER, SINTEF, TNO, VTI, VTT
Universities	Aachen, Budapest, Chalmers, DTU, Eindhoven, Florence, Galway, Istanbul, Leeds, Leuven, Milano, Modena, Mondragon, Paris, Warsaw, Zilina
Automotive	Akka, BMW Group, Bosch, Continental, DAF Trucks, Faurecia, FCA, Irizar, JLR, Renault, Valeo, Volkswagen, Volvo Group
ITS	Bestmile, Dinniq, HERE, TomTom, PTV, Swarco, Ubiwhere, TTS Italia
Telecom/IT	ELMOS, Ericsson, EVERIS, Huawei, NXP, Vicomtech
Infrastructure	Asfinag, Sanef, Vinci
Freight & Logistics Services and Users	ALICE, Colruyt Group, Gebruder Weiss, IDIT, Procter & Gamble
Member States	Austria, Belgium, Czech Republic, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Norway, Spain, Sweden, UK
Regions, cities and public transport operators	Flanders, Gothenburg, Helmond, Paris/Ile-de-France, Madrid, Stuttgart, Vienna
Representative bodies	ALICE, AMICE, ANEC, CEDR, CLEPA, CONEBI, EARPA, ECTRI, EPoSS, ERF, ERTICO, ETNO, ETRMA, EUCAR, Eurocities, EuroRap, FEMA, FIA, GSMA, IRU, POLIS, UITP, 5GAA
Cluster and test centres	AIPSS, Aurora Snowbox, Austriatech, CARA, Catapult, Drive Sweden, Moveo, PTCarrereta, Tempere, Vedecom, Zalazone

Consultation results (1/3)

- Contributions from 94 companies, associations, public authorities, universities and experts
- Feedback was analysed and used to further strengthen the proposal
- Large confirmation of interests in the CCAM Partnership
- In general agreement with the proposal with some interesting key take-aways

Consultation results (2/3)

Key take-aways

- **Safety**: transition phase, VRU, ODD, risks of CCAM
- **Scope and roles:** societal aspects and sustainability as a priority, citizens' involvement; responsibilities of local/regional/national authorities; the policy development must go hand in hand with the technological; follow a human-centric approach
- **Transport efficiency:** traffic management and travel times; measures and services to stimulate transport efficiency for personal and freight transport

Consultation results (3/3)

Key take-aways

- **Business/deployment:** go-to-market strategies; stepwise approach; rolling out CCAM; value chain; level-playing field
- **Urban dimension:** CCAM for last mile solutions, urban planning topics, mass transit, risks of CCAM
- **Governance and membership:** membership needs clarification; commitment of partners and in-kind resources; involvement of MS

Developing the CCAM Partnership Proposal

- Combining **connectivity, cooperative systems and automation** will enable automated and fully orchestrated manoeuvres, bringing us closer to **Vision Zero**.
- The goal is to create more **user-centred, all-inclusive mobility**, while increasing **safety, reducing congestion** and contributing to **decarbonisation**.
- CCAM will also enable the provision of **new mobility services for passengers and goods**, fostering benefits for users and for the mobility system as a whole.

European leadership in safe and sustainable road transport through automation

CCAM Vision and Expected Impacts for Society

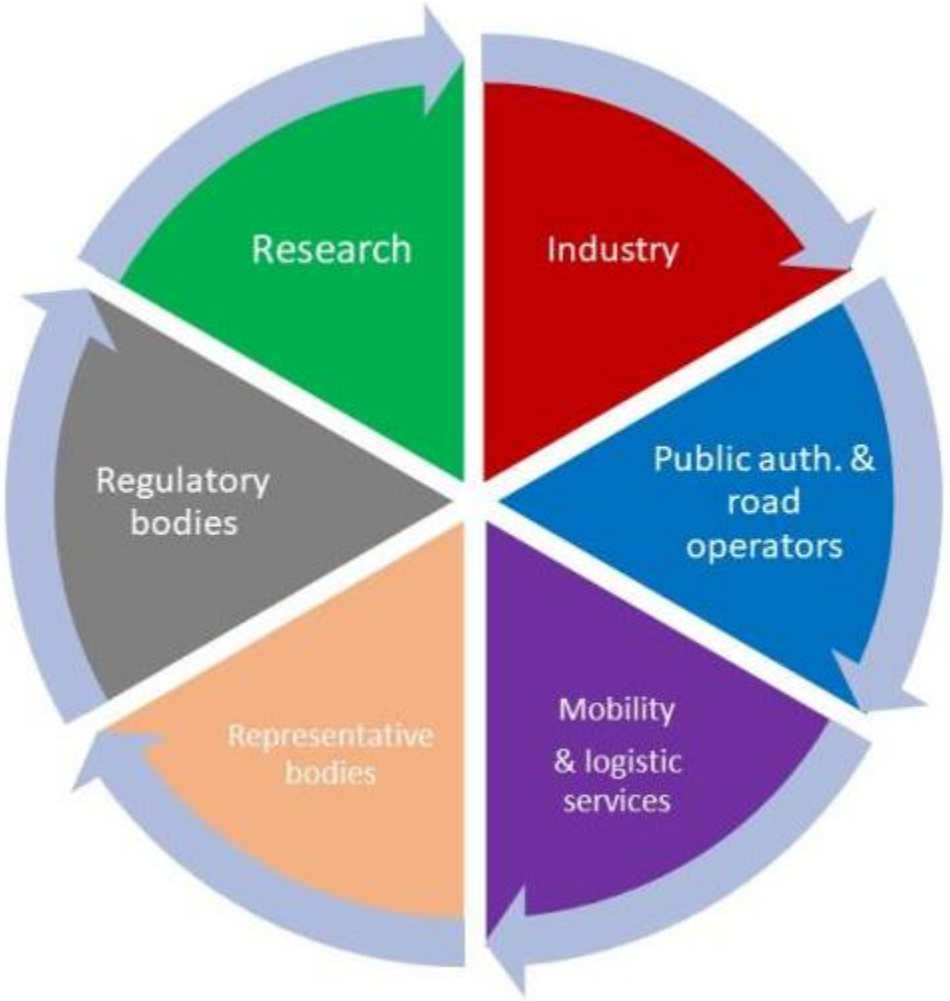
The development of CCAM shall provide benefits to **all citizens**. With full integration of CCAM in the transport system, the **expected positive impacts** for society will be:

- **Safety**: Reducing the number of road fatalities and accidents caused by human error;
- **Environment**: Reducing transport emissions and congestion by optimising capacity, smoothening traffic flow and avoiding unnecessary trips;
- **Inclusiveness**: Ensuring inclusive mobility and goods access for all; and
- **Competitiveness**: Strengthen competitiveness of European industries by technological leadership, ensuring long-term growth and jobs.

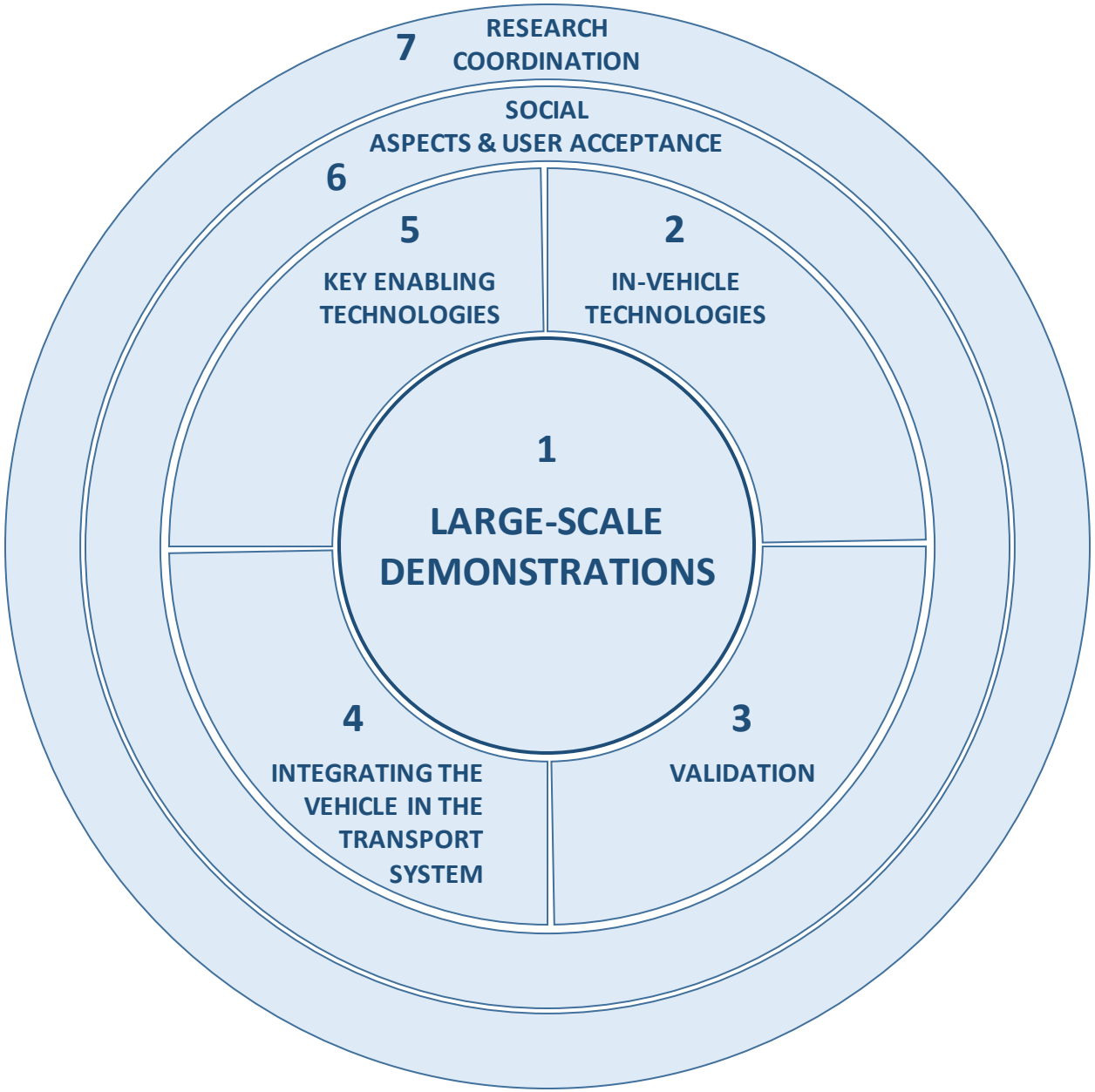
CCAM Vision and Expected Impacts for Society

Expected Impact	General objectives (GO)
Improving safety and security of the transport system drastically	• (GO1) Reduced number of fatalities and injuries in road transport • (GO2) Safe and efficient co-existence between automated and non-automated "conventional" traffic for a long transition period of mixed traffic
Meeting societal needs for mobility while reducing environmental impacts and strengthening our economy	• (GO3) High public acceptance and adoption of CCAM with clear understanding of its benefits and limits • (GO4) Increased efficiency of transport flows (people and goods) leading to better use of infrastructure capacity and preservation of public space • (GO5) Reduced transport emissions and congestion
Maintain and extend industrial leadership for new jobs and economic growth all over Europe	• (GO6) Making Europe a world leader in the deployment of connected and automated mobility for people and goods • (GO7) More focused and long-term investments in R&I, development and pre-deployment of CCAM.
Strengthen leadership in all technological and societal aspects of CCAM through targeted knowledge and capacity building	• (GO8) Support the creation, dissemination and capitalisation of knowledge to accelerate the development and improvement of CCAM enabled solutions

CCAM Partnership Sectors and Stakeholder

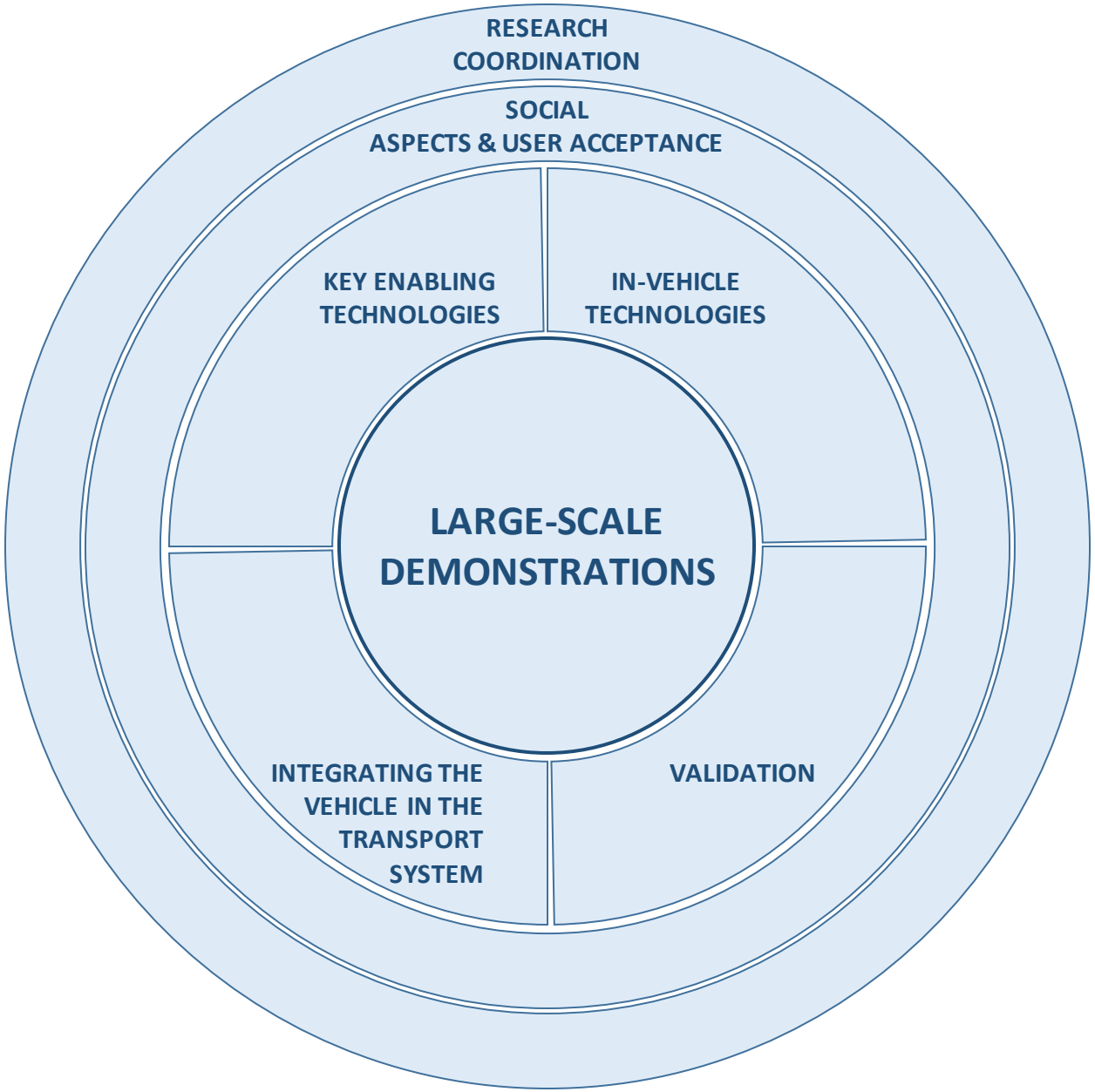


Industry	- Automotive industry, including supply chain - ITS solutions, telecom providers, connectivity - Data handling and storage industry, ...
Public authorities & road operators	- Cities and regions - Transport authorities, road authorities and operators - Member States
Mobility & logistic services	- Public transport providers - Mobility and logistics service providers - Insurance, maintenance, ...
Representative bodies	- Road users - Stakeholder associations - Road safety, society, the environment, ...
Regulatory bodies	- National, European and international
Research	- Universities - Public research institutes - Private research institutes



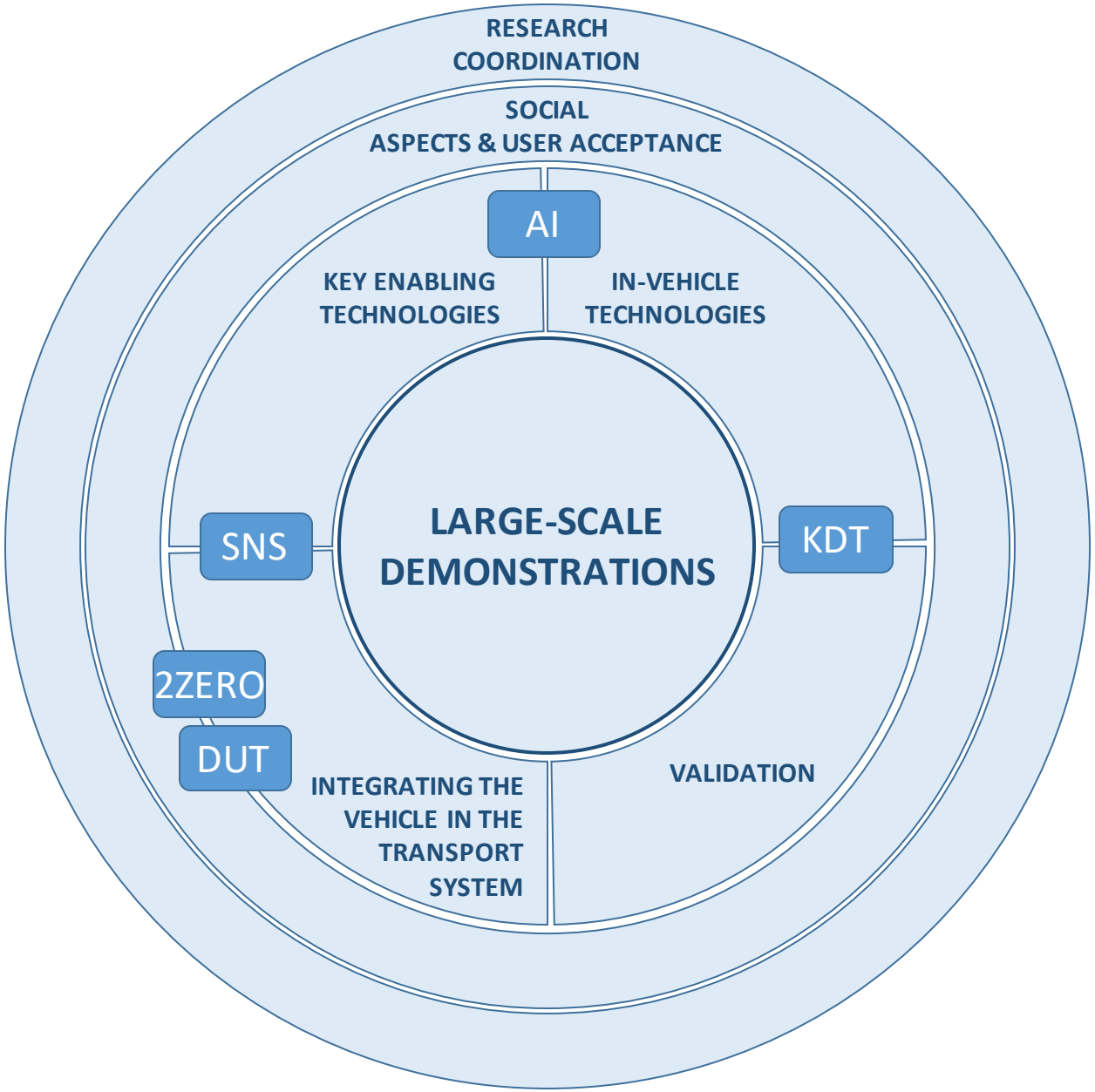
CCAM - 7 Clusters

1	Shared automated mobility solutions (11) Highly automated passenger vehicles (13) Automated commercial/freight vehicles (14)
2	Environment perception (1) Passive & active safety (3) On-board decision making (4) Human Factors requirements (6.1)
3	Validation of CCAM systems (5) Validation of Human Factors (6.2)
4	Remote operation and surveillance (7) Physical and digital infrastructure (8) Connectivity / Cooperative Systems (9) Fleet and (mixed) traffic management (12)
5	Cyber-secure electronics (2) Artificial Intelligence (10) Data Storage and sharing (21)
6	Societal needs analysis (15) Socio-economic and environmental impact analysis (16) Workforce development (22)
7	European framework for testing on public roads (17) Data exchange platform (18) EU-wide knowledge base (19) Common evaluation framework (20)



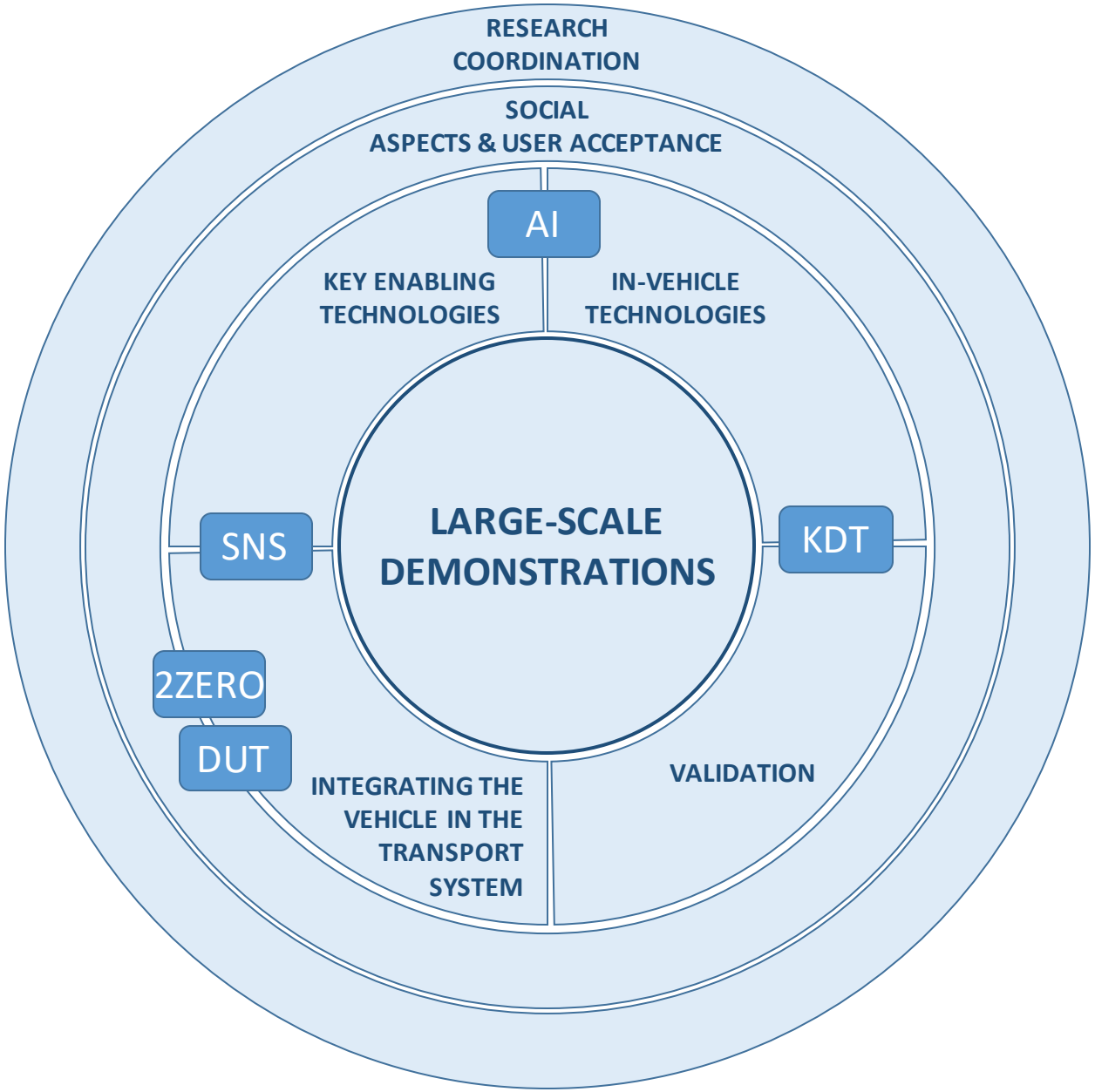
CCAM - 7 Clusters

- Partnership under Horizon Europe ⇒ Research & Innovation only, but
- R&I will feed input to policy, regulatory needs and European harmonization activities
- R&I will feed input to technical standardization (ISO, ETSI, etc.)
- R&I activities will link with pre-deployment (e.g. CEF)



Other partnerships

- 2ZERO – towards zero emissions
- DUT – driving urban transition
- KDT – key digital technologies
- SNS – smart network services
- AI – artificial intelligence, data & robotics
- … Collaborative calls



All CCAM WGs

- Are invited to participate in detailing the cluster documents for CCAM
- Can propose new R&I actions (the cluster documents do not try to cover all relevant partnerships)
- Integration of input into other partnership SRIAs will not be handled by WG1 or CCAM partnership

Relation Clusters – CCAM platform WGs

Cluster	WG2	WG3	WG4	WG5	WG6
1. Large scale demonstrations	✓				
2. In-vehicle technologies			✓		
3. Validation			✓		
4. Integrating the vehicle in the transport system		✓			✓
5. Key enabling technologies				✓	✓
6. Social aspects and user acceptance			✓		
7. Research coordination	✓				

All CCAM WGs and CCAM Members are invited to contribute to the SRIA development

SRIA Strategic Research & Innovation Agenda

Objectives

- Detail the R&I actions listed in the chapter 3.1 of the CCAM Proposal: develop topics, explain “what, why, how”.
- Level of details: further detailed compared to the Proposal text but not developed up to the level of a call for projects. (Writing full topics recommendations for the annual Work Programmes are another task.)
- Confirm the type of action (IA, RIA, CSA)
- Indicate a range of TRL level
- Set the agenda => develop a roadmap mapping the topics according to beginning / middle / end of the Partnership lifetime.

SRIA Strategic Research & Innovation Agenda

Drafting process

- Start on the basis of the CCAM Proposal document.
- Continue to use the input from the WG1 Mini Task Forces.
- Members of WG1 and of the Mini Task Forces should now contribute to the 7 clusters and SRIA development.
- Members of the other CCAM Platform WGs are invited as well. But work is on R&I, in the scope of the Partnership, not on policy/regulatory aspects!
- All stakeholders who expressed interest during the public consultation will be also invited to contribute.

SRIA Strategic Research & Innovation Agenda

Timeline

First stakeholders meeting 18-19-20 May

- Schedule of 7 meetings for each cluster, avoiding overlaps to allow people to participate to several clusters (similar approach than CCAM Platform).
- Will start the work of detailing the topics. And need also already to ask about the timing: allocate the topics to beginning / middle / end of the Partnership lifetime.
- The priorities identified for the beginning of the Partnership will be recommended to the EC as the topics for the first Work Programme 2021-2022.

SRIA Strategic Research & Innovation Agenda

Timeline

First stakeholders meeting 18-19-20 May

- 18/05 10:00-12:00 cluster 1 (leader: Armin Graeter, Mats Rosenquist)
- 18/05 13:30-15:30 cluster 2 (leader: David Storer)
- 18/05 16:00-18:00 cluster 3 (leader: Peter Urban)
- 19/05 10:00-12:00 cluster 4 (leader: Torsten Geissler)
- 19/05 13:30-15:30 cluster 5 (leader: Margriet Van Schijndel)
- 19/05 16:00-18:00 cluster 6 (leader: Ingrid Skogsmo)
- 20/05 10:00-12:00 cluster 7 (leader: Stephane Dreher)

Register by email to info@ertrac.org

Limit: 1 or 2 clusters per person!

SRIA Strategic Research & Innovation Agenda

Timeline

Next steps

- End of May: cluster leaders to work on consistency between clusters and develop the overall picture of the agenda (topics over Partnership lifetime).
- First week of June: Member States Board preparation meeting. Will invite the MS representatives. Objectives: clarify the governance of the MS Board; present the stage of preparation of the SRIA; get feedback on draft agenda.
- Mid-June: second stakeholders meetings on the 7 clusters. Discussing the final topic list. Presenting and discussing the overall agenda of all topics, and which topics go as priorities for the first Work Programme 2021-2022.
- Objective of SRIA finalisation end of June.

Cluster Presentations

- Cluster 1: Large-scale demonstration
- Armin Graeter

CCAM Cluster 1: Large-scale demonstration

Specific Objectives

- (SO4) Demonstrate inclusive, user-oriented and well-integrated mobility concepts enabled by CCAM with a reduced carbon footprint
- (SO5) Demonstrate new freight and logistics concepts and services enabled by CCAM with a reduced CO2 emission per tonne-km

Link to Standardisation, Regulation, Policy

- Applying the European framework for testing
- Providing input to common test data

Develop and demonstrate shared and integrated automated mobility solutions (IA)

- Provide appropriate living-labs to analyse public acceptance of CCAM in real-world conditions while offering stakeholders with the opportunity to innovate, propose, test, and improve innovative mobility and logistics services.
- Conduct large-scale demonstrations to increase the scalability of demonstrations of advanced shared automated mobility and logistics solutions, including automated door-to-door goods delivery solutions, to pre-deployment in more complex ODDs in urban, peri-urban and rural environments.
- Demonstrate efficient ways to integrate shared mobility solutions using CCAM vehicles into the transport system.
- Facilitate the uptake of new business and operational models which positive societal impacts by demonstrating inclusive shared automated mobility solutions that complement mass transit, in particular for users with special needs (such as disabled, elderly) and for Mobility White Spots, where other public transport is not economically viable.

Large-scale demonstration of highly automated passenger vehicles (IA)

- Conduct large-scale pilots and field operational trials (FOT) which ensure safety, providing valuable insights into the capacity of automated driving systems (ADS) and their current limitations.
- Perform large-scale pilots with prototype vehicles in order to provide data for verifying and validating ADS ensuring safety and reliability before market introduction.
- Conduct demonstrations with small series production passenger vehicles (i.e. FOTs) to raise user awareness, help assess the impact on society and accelerate implementation. For these FOTs, “Living Labs” provide the infrastructure (including connectivity), mixed dynamic traffic environments and user communities. The coordination of Living Labs for ADS is important to foster harmonization and interoperability and support cross-border functionality all over Europe.

Large-scale demonstration pilots of automated commercial / freight vehicles (IA)

- Deliver evidence for quantifiable freight transport objectives via large-scale demonstration pilots and pre-deployment such as increased freight transport efficiency, improved road infrastructure utilization, reduced energy consumption, increased safety, and improved working environment.
- Involve early the different freight logistics stakeholders such as; road haulage operators, shippers, port, terminal, road infrastructure authorities, forwarders, truck OEMs, trailer and load-carrier manufacturers will identify opportunities and obstacles.
- Develop, test and evaluate new operational and business-models through logistics operational pilots in a “European logistics living lab” for integration into a global logistics context and to strengthen European competitiveness to pave the way for innovative concepts and new products and services. and to strengthen European competitiveness to pave the way for innovative concepts and new products and services.

Cluster Presentations

- Cluster 2: In-Vehicle Technologies
- David Storer

CCAM Cluster 2: In-Vehicle Technologies

Specific Objectives

- (SO2) Agreed safety standards for highly automated driving systems to operate and function on public roads
- (SO1) Secure and trustworthy interaction between road users, vehicles, infrastructure and services

Link to Standardisation, Regulation, Policy

- Recommendations for performance standards for environment perception for CCAM
- Recommendations for harmonized validation methods for passive and active safety
- Inputs to UNECE WGs on vehicle safety
- Inputs to EuroNCAP
- Recommendations for harmonized validation methods for on board decision making systems
- Recommendations for industry standard for CAD control architectures
- Inputs to international standardisation activities on HMI design guidelines

Environment Perception (RIA)

- Increase performance, accuracy and reliability of perception systems based on enhanced sensing, localization and cognition also using machine learning
- Develop more powerful embedded in-vehicle systems
- Improve integration with infrastructure-based perception systems to complete data fusion where internal systems are out of range
- Reduce false detections for improved driver comfort and enhance trust from other vehicles and road users of CCAM, expanding the ODD (rainfall, fog, snow, complex urban environments).
- Develop self-assessment methods for environment perception systems
- Define performance standards

Passive & active safety (RIA)

- Develop advanced safety systems to protect passengers in new, unconventional seating positions and body postures, taking into account the situations and conditions for the use of such systems (e.g. public shared automated vehicles)
- Develop consistent methods and assessment tools to fully understand the safety impact of automated vehicles in mixed traffic and derive safety requirements.
- Define requirements and potential needs for the adaptation of traffic rules
- Improve reliability levels of in-vehicle systems and components as an element of accident avoidance

On-board decision making (RIA)

- Develop on-board safe, unambiguous, real-time decision-making for CCAM using complex in-vehicle systems-of-systems with advanced sensors, extensive computational power, reliable, dynamic high-definition digital maps.
- Implement harsh and complex conditions where advanced capabilities such as pattern recognition, big-data analysis and self-learning require high performance computing on- and off-board.
- Define and harmonise, at the EU-level, Operational Domains to ensure real-time decision-making for safe and secure CCAM for all types of traffic situations and roads.
- Develop tamper-proof electronic controls architecture of connected and automated vehicles

Human-Machine interaction and interface design (Requirements, RIA)

- Perform research and international standardization activities on design strategies for in-vehicle input, in-vehicle interface with driver, output devices and actuators as well as on how to interact with surrounding road users (VRU, people in adjacent vehicles, police, etc).
- Develop different design strategies depending on road type, ODD, vehicle type etc.
- Ensure inclusiveness for a wider range of user groups (e.g. children, elderly, disabled) especially when designing for mobility services.
- Perform continued research and proof of concepts (PoC) on driver state assessment methods and technologies.
- Develop solutions to address situations where human drivers are unfit to resume control.
- Develop training and information campaigns for users and general public which complement intuitive vehicle designs.
- Address the optimisation of the on-board experience of vehicle occupants with respect to new automated modes of transport

Cluster Presentations

- Cluster 3: Validation
- Peter Urban

CCAM Cluster 3: Validation

Specific Objectives

- (SO1) Secure and trustworthy interaction between road users, vehicles, infrastructure and services
- (SO2) Agreed safety standards for highly automated driving systems to operate and function on public roads
- (SO3) Validated functional safety for CCAM use cases

Link to Standardisation, Regulation, Policy

- Deliver recommendations for European and global harmonisation and standardisation of validation methods for a type approval and compliance testing framework of automated vehicles (input to relevant and competent bodies at EC and UN-ECE).
- Deliver HMI design guidelines and recommendations for an update version of the European 'Statement of Principles' (SoP) on internal and external HMI of automated vehicles;
- Deliver the evidence basis of a common understanding of the required safety, reliability and security of CCAM to policy makers

Validation of CCAM systems (RIA)

- Ensure the safety of higher levels of automation, particularly in mixed traffic situations which require scenario-based validation and verification of the vehicle and its operation in the intended ODD. Moreover, functional safety, reliability and security need to be evaluated. Within this context virtual, physical and hybrid approaches are needed allowing a cost-effective, reproducible and interchangeable validation of individual components and software as well as of the vehicle automation functions, including the underlying safety concept.
- Develop common methodologies and tools to define the validation and verification requirements as well as the orchestration of the required tests including the derivation of representative scenarios and tests. This includes the development of a standardised, virtual simulation environment, dedicated hardware and physical infrastructure for testing.
- Address the validation of self-learning systems, as their properties are principally dynamic and will change with time and with increasing experience on the road.
- Elaborate recommendations for a common framework for harmonisation, standardisation and homologation.

Validation of human factors and human-machine interaction (RIA)

- Develop a reference model of human driving performance as a basis of a common understanding of the required safety and reliability level of CCAM
- Develop HMI testing procedures, methods and tools for higher levels of automation which include both strict experimental set-ups as well as more naturalistic ones
- Derive design guidelines for novel HMI concepts that fulfil upcoming requirements with respect to safe human interaction and intuitive usability
- Elaborate recommendations for a European Statement of Principles (ESoP) on automated vehicles, including HMI and their communication with vulnerable road users

Cluster Presentations

- Cluster 4: Integrating the vehicle in the transport system,
- Torsten Geissler

CCAM Cluster 4: Integrating the vehicle in the transport system

Specific Objectives

- (SO1) Secure and trustworthy interaction between road users, vehicles, infrastructure and services
- (SO2) Agreed safety standards for highly automated driving systems to operate and function on public roads
- (SO8) Improved synergies between public and private investment plans to advance vehicle and infrastructure technologies

CCAM Cluster 4: Integrating the vehicle in the transport system

Link to Standardisation, Regulation, Policy

- Secure and trustworthy interaction of vehicles, infrastructure and third-party services in cross-border dimension through infrastructure support level (ISAD) specification with clarified roles and responsibilities business and operating models in PDI.
- Harmonisation for cross-border communication supporting CCAM (e.g. in ITS Directive Working Programme Activity 3.4.).
- Input to T-PEG and DATEX II standardisation.
- Input to the revision of the ITS Directive 2010/40/EU, and the two Commission Delegated Regulations stemming from it: a) Delegated Regulation 886/2013 of 15 May 2013 with regard to data and procedures for the provision, where possible, of road safety-related minimum universal traffic information free of charge to users and Delegated Regulation on Safety Related Traffic Information and b) Delegated Regulation 2015/962 of 18 December 2014 with regard to the provision of EU-wide real-time traffic information services.

Physical and digital infrastructure (PDI, RIA)

- Enable the transition in the most efficient and cost-effective manner for physical infrastructure (markings, road signs, layout, road condition, etc.) and digital infrastructure (digitised spatial network and regulations, etc.).
- Define a cost-effective transition for the operational challenges (traffic management of the mobility network, fleet orchestrator, etc.)
- Conduct research on business and financing models, infrastructure classification schemes, policy options and ways to increase competencies and resources for road authorities (and/or operators) to ensure the physical, digital and operational infrastructure remains fit for purpose.
- Achieve a common understanding of the role of PDI for CCAM and specifications of required infrastructure.

Connectivity / cooperative systems (RIA)

- Secure effective connectivity for the needs of CCAM.
- Ensure robustness and redundancy, availability of communication channels (network coverage) and a minimum quality of service (QoS) especially for higher levels of automation. For safety critical applications of CCAM, the performance and resilience of connectivity is essential.
- Create trust among the different entities exchanging information.
- Assess the performance from an end-to-end perspective in real-world driving conditions and in hybrid communication environments, safeguard fail-safe operation, appropriate degradation, privacy protection and end-to-end security.
- Ensure interoperability of systems and services provided by the different actors (vehicles, infrastructure, road users, road/fleet operators, public authorities, etc.), develop standardised C-ITS messages and message sets (e.g. for manoeuvres) and test EU-wide interoperability and compatibility.

Fleet and (mixed) Traffic Management

- Integrate (shared) automated vehicle systems in existing traffic, with conventional vehicles and on existing roads.
- Integrate (shared) automated services in fleet and traffic management systems. This requires reaching agreements on targets and roles within the mobility system among multiple stakeholders, as well as research on a multitude of aspects, e.g. simulation and big data analysis, impacts on operations and users, total system effects, infrastructure savings and needs, etc.
- Develop the concept of fleet orchestration for the monitoring and management of shared fleets, and its integration with the other relevant systems and services like shared vehicles, smart infrastructure, Public Transport or Goods delivery back-end systems.
- Test new options and governance models to operate shared automated mobility systems as part of real-life fleet and traffic management systems. Guidance for authorities (e.g. local, regional, national, port, EU-wide) to prepare and plan for CCAM services.

Cluster Presentations

- Cluster 5: Key Enabling Technologies
- Margriet Van Schijndel

CCAM Cluster 5: Key Enabling Technologies

Specific Objectives

- (SO1) Secure and trustworthy interaction between road users, vehicles, infrastructure and services
- (SO10) Inclusion of new and emerging knowledge fields addressing user needs and wide industrial application CCAM solutions

Link to Standardisation, Regulation, Policy

- (Functional) Safety Standards, harmonisation and standardisation of cyber safe interfaces, as well as an EU cybersecurity label to be developed with other European initiatives and Partnerships
- AI for automotive applications, in line with the European AI framework building on European fundamental rights and values, as composed in the Partnership on AI, big data and robotics
- Data exchange framework, data ownership, GDPR

Cyber-security

- Assess the robustness and resilience of vehicles function related to different types of attacks (over the air, in physical proximity, different magnitudes of attacks…); system analysis for cybersecure functions
- Address the detection and prevention of malicious activities; automated consistency and plausibility checks as part of the inherent security concept along the entire lifetime and value chain, from production to operation to maintenance or repair.
- Ensure secure electronics components and interfaces, operating systems of devices, firmware, communication, application software. The security value chain has to be considered at each level of the value chain and ensuring the protection of users' privacy and integrity.
- Tailor vehicle specific cypher algorithms (solutions based on zero trust policy) to protect in-vehicle communication and quantum resistance to protect CCAM vehicles against brute force attacks from quantum computers
- Ensure safety of the CCAM system in case of failure in subsystems or components, enhanced via advanced redundancy measures. Redundancy spans from the typical additional components and functions to unlocking the potential for multi-purpose use of (sensor) data and calculations or data transmission.

Artificial Intelligence (AI)

- Develop explainable concepts, techniques and models of Artificial Intelligence (AI) for CCAM. Huge amounts of in-vehicle and infrastructure-based sensor data together with other data sources will be used to ‘train’ AI algorithms. This development process is accelerated and supported through harmonization, availability, quality assurance, interoperability and exploitation of relevant data.
- Industrialisation, requirement-based development, continuous improvement of trained modules for application in safety critical domains and the verification and certification of AI for automated driving functions.
- Develop AI for situational awareness: estimate and predict the system state, human state and traffic state, the three parts that together determine the safety of a situation. This should then be taken a step further, from situational awareness towards cooperative, reactive, adaptive and predictive perception, decision making and actions.

Data storage and sharing

- Develop a harmonised approach for data sharing based on open and interoperable programming interfaces (APIs) and access control by defined user rights.
- Focus on the data value chains, data storage and formats, standards and related infrastructure.
- Provide a complete and secure system architecture that complies with privacy, data security and cybersecurity requirements while allowing access to in-vehicle real-time data and resources, on-board and remotely, as needed.
- Foster cross-industry interoperability, choice by and portability of services for the user, price affordability, and competitiveness

Cluster Presentations

- Cluster 6: Social aspects and user acceptance
- Ingrid Skogsmo

CCAM Cluster 6: Social aspects and user acceptance

Specific Objectives

- (SO1) Secure and trustworthy interaction between road users, vehicles, infrastructure and services
- (SO6) Societal impacts (e.g. safety, efficiency, environment) and wider economic impacts are sufficiently assessed and accepted

Link to Standardisation, Regulation, Policy

- Recommendations on how to address societal needs and support societal actors to development of CCAM.
- Recommendations on the interaction and coexistence of AI, ethical decisions with users.
- Investigating barriers and benefits for the sector and different stakeholder groups.
- Recommendations on the socio-economic and environmental impact generated by CCAM.

Societal needs analysis (RIA)

- Analyse user requirements, expectations and concerns related to the use of connected, cooperative and automated driving technologies and systems in their broadest sense.
- Perform ethics evaluation as the understanding of CCAM will evolve.
- Perform positive risk analyses to identify, assess and manage the potentially beneficial outcomes of CCAM for users and society.

Societal needs analysis (CSA)

- Assess the impact of the implementation of CCAM by organising targeted debates, workshops and knowledge sharing sessions amongst different stakeholders, users and society at large.
- Conduct targeted campaigns aimed at increasing user awareness, obtaining trust in CCAM, the results of which will be analysed.
- Perform demonstrations with real users to receive valuable day-to-day feedback and insights.

Socio-economic and environmental impact analysis (RIA)

- Assess the short, medium- and long-term impacts, benefits and costs of CCAM (in all areas)
- Conduct comprehensive cost / benefit analyses and projections of the overall investment requirements, vehicle equipment costs, operating costs, infrastructure costs and environmental costs
- Identify and develop specific use cases with a positive socio-economic impact, defining the policy framework and specific use cases and roll-out plans.
- Define policy and planning measures that can mitigate any potential negative CCAM outcome.

Workforce development (RIA)

- Assess the impacts of higher degrees of automation and digitalisation in road transport on existing and future workforce (including job location, working environment, working times, needs for new skills, education and driver training).
- Analyse requirements and training needs for new workforce by focusing on relevant legislation
- Define policies for labour market incentives and ways to adapt workforce development and value chains to new and fast changing framework conditions and technological evolutions of CCAM.
- Identification of necessary incentives for investment in human capital, financial mechanisms for retraining, supporting labour market dynamism and flexibility, adaptation of workplace and workflow by industry and SMEs.
- Develop tools and methods to help road and transport authorities and operators plan for and transition towards an increasingly automated transport system.

Cluster Presentations

- Cluster 7: Coordination
- Stephan Dreher

CCAM Cluster 7: Coordination

Specific Objectives

- (SO7) Long-term coordination framework for R&I and large-scale testing activities, involving all relevant public and private stakeholders from European, national and regional levels
- (SO8) Improved synergies between public and private investment plans to advance vehicle and infrastructure technologies
- (SO9) Common evaluation framework for R&I results to foster exchange and reuse of results from CCAM projects in Europe
- (SO11) Expand and disseminate the knowledge base on CCAM solutions, stakeholders, R&I programmes and projects, and testing activities.

CCAM Cluster 7: Coordination

Link to Standardisation, Regulation, Policy

- Information exchange with regulatory bodies for CCAM testing on public roads (national, European level and beyond); and with standardisation bodies for harmonised testing activities.
- Support for the development of harmonized policies and regulations
- Recommendations for standardization of evaluation methodologies, KPIs, Life-Cycle Assessment, common quality assessment metrics,
- Recommendations and input for data formats, standardized structured annotation model;
- Recommendations and input for public road testing processes. Support for the development of common data formats for safety related events, vehicles and services monitoring.
- Harmonization of national and local processes for testing conditions and requirements

EU-wide knowledge base, including common scenario database (CSA)

- Consolidate and maintain the existing web-based Knowledge Base centralising information about stakeholders, R&I programmes and projects and testing activities in the field of CCAM in Europe and worldwide.
- Create a common baseline for CCAM Knowledge in Europe and define the governance structure for the Knowledge base with a strong focus on facilitating the contribution stakeholders from all sectors and in particular exchanges with Member States.
- Extend the Knowledge Base by providing more information about national, international CCAM activities, standards, testing methodologies, common scenario database, lessons learned.

Common evaluation framework (CSA)

- Develop a common evaluation framework for large-scale demonstration pilots in Europe. Identify tools for assessment and align views on missing and needed methodologies.
- Prepare scaling up, creating an ODD database including all events and detailed characterization with a link to statistics on incidents, etc…
- Perform classification of the networks: what is the network on which automated vehicles can actually drive? Describe the physical layouts of the cities
- Define system levels parameters to adequately assess system level and societal target effects of various deployment options.
- Provide life-cycle assessment KPIs for commercial product, process and service

Common evaluation framework (IA)

- Create the tools and methodologies to assess future scenarios for deployment

Test Data exchange framework (CSA)

- Establish a data exchange framework to improve cooperation and make better use of the results of all testing activities in Europe.
- Ensure provision of high quality and well-documented datasets, co-operate on a technical reference platform with other data sharing initiatives, encourage data re-use, establish win-win situations, and keep the balance between privacy / IPR and availability.

Test Data exchange framework (IA)

- Identification of the required data, of their specifications, formats, etc. in order to define the framework for the data labelling and formats

European framework for testing on public roads (CSA)

- Propose and promote a legislation harmonizing conditions for obtaining permission for testing on public roads across European member states.
- Elaborate harmonised data needs and specifications for specific use cases and scenarios, define data sharing principles and create a unified European shared, publicly available database on incidents and other events related to safety of automated vehicles
- Define minimal conditions for entities interested in testing on public roads to meet before receiving permission for tests. Develop flexible functional scheme for “safe testing”, based on vehicle capabilities in conjunction with infrastructure support, context and traffic situation as well as driver/operator maturity, including “safe systems” approach.
- Develop and define a common edge (use) case approach
- Analyse and elaborate user experience/behavioural aspects in relation and addition to test/validate technical components and systems.

European framework for testing on public roads (IA)

- Define and develop tools for assessment of testing on public roads in order to have clearly defined measures for evaluation of how entities stick to the framework, develop common test and validation methodologies in RDI projects/initiatives, including the foundation of common quality assessment metrics.

Strategic European agenda for R&I and large-scale testing (CSA)

- Develop and continuously update a clear long-term European agenda for research & innovation and large-scale testing activities, making sure that investments at European, national and local levels, both of public and private nature, are complementing each other towards systemic and interoperable solutions for a fully integrated European mobility system
- Ensure European contribution in the Trilateral ART Working group and foster the exchange of knowledge with the international CCAM community for the identification of strategic alignment and cooperation areas.
- Support the organisation of CCAM expert networking events and workshops for the alignment on R&I and testing challenges and priorities.

CCAM platform – plenary June 2020

- **Major milestone for WG1**: finalize D2 (contribution to SRIA - the 7 cluster documents, based on 22 mini task forces), end of WG1 in its current scope
- Presentation of the **CCAM Strategic Research and Innovation Agenda** by the future partners of the CCAM partnership
- Presentation of results and **planned deliverables** of all WGs
- **Evaluate the working of the CCAM platform**, asses the scope and working of all existing working groups and define their deliverables

CCAM platform – plenary December 2020

- **Major milestone for WG2-6**: all WGs produce a final deliverable, based on their respective scoping papers, reflecting the work done since June 2019 and collecting all recommendations from the WG (can include annexes)
- **Recommendations** should focus on **R&I and pre-deployment activities**, but can cover all activities related to CCAM and are not limited to the new CCAM partnership or the related cluster documents
- **Evaluate the working of the CCAM platform**, close or re-asses the scope of existing working groups, need to cover new topics in new working groups, etc.

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