Action-based approach

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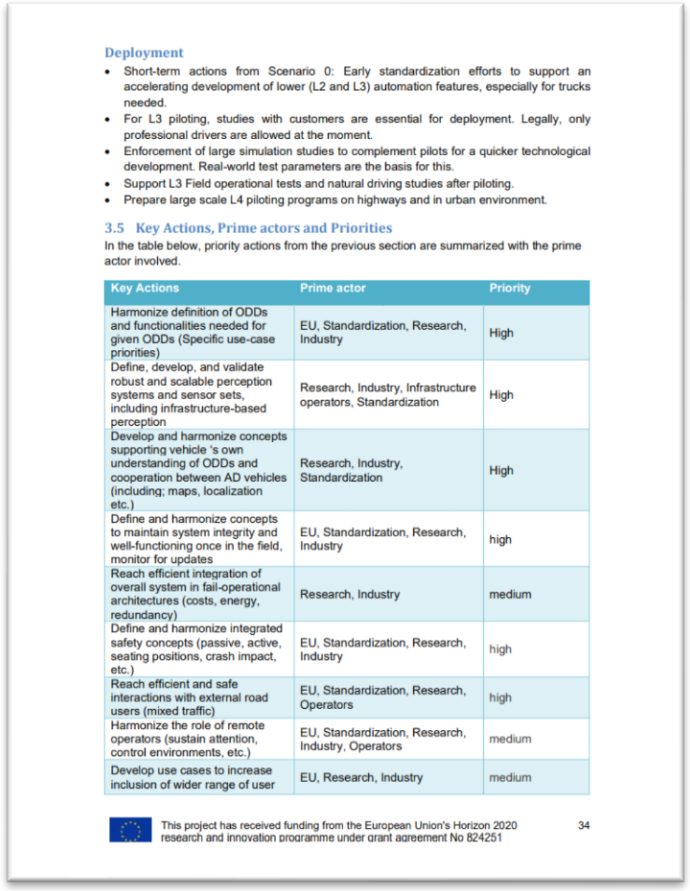
In D2.1 a matrix was created that shows the key priorities per TA.

Consolidated Key Priorities per Use-Case vs Thematic area

Development Paths / Use Cases		D3.7 Society Challenges & Scenarios				D3.4 Systems and Services Challenges & Scenarios			D3.1 Technical Challenges & Scenarios			
		User awareness, users and societal acceptance and ethics, driver training	Safety validation and roadworthiness testing	Policy and regulatory needs, European harmonisation	Socio-economic assessment and sustainability	New mobility services, shared economy and business models	Big data, artificial intelligence and their applications	Digital and physical infrastructure	Human Factors	Connectivity	Deployment	In -vehicle technology enablers
	Generic	Societal Needs Analysis from user and society perspectives	Alignment of vehicle regulation (and type approval) and corresponding assessment tools & procedures	Working for flexible AD regulation, enabling different solutions, within the boundaries of safety.	Impact assessment needs both pilots (low TRL) and FOTs (high TRL)	Foster the development of new ecosystems, new types of partnerships, new business models in the fields of services	Develop 'standard' model for sharing data that ensure data privacy and security	Define common EU standards for the interaction of PDI and AVs (e.g. ISAD, ODD)	Integrated Safety (passive, active, seating positions, crash impact, etc)	Definition of connectivity requirements for AD functions (performance, QoS, resilience, etc.)	Living labs to support tests and demonstration by including end users earlier	Harmonize definition of ODDs and functionalities needed for given ODDs
		Positive Risk analysis	Determine proper combinations of virtual testing, closed test track and open road testing of AVs	Learn from adaptation of regulation, work towards common approach	Development of EU-level databases to allow more reliable scaling up (data on accidents, mileage, etc. including ODD aspects, with sufficient details and granularity)	Pilots and FOTs to validate business case, operational models and specifications	Harmonisation, alignment needed for development and validation of AI functionalities for AV	Define Classifications of PDI	Interaction with external road users (mixed traffic)	Specification of Day 2 and Day 3 C-ITS services	L4 Pilots including cross-border applications	Define, develop, and validate robust and scalable perception systems and sensor sets
		Ethics evaluation based on technology understanding	Share and harmonise driving/traffic scenarios and best practices	Build common CAD framework	Development of commonly available (validated) AV simulation and other evaluation tools	Define the involvement of public authorities in the early stage of deployment to create trust among stakeholders	Standards and solutions (HW/SW) for data management and data quality (e.g. L3Pilot)	AV-ready road planning and self- explaining roads. (e.g traffic signs and lane marking for Avs)	New role of remote operators (sustain attention, control environments, etc)	Standardisation and further deployment of V2X technologies	L3 FOT including cross-border applications	Develop technologies supporting vehicle's own understanding of ODDs and cooperation between AD vehicles. (incl. maps, localization,..)
		Impact on driver/users and operator training	Consensus building with respect to validation of methodologies, including Data-labeling standards	Make cross-border testing easy	Commitment to use common impact assessment methodologies (like FESTA, Trilateral framework)	Integration of new services with existing services (e.g. public transport) from start	Develop new AI-concepts for cyber-physical road traffic systems	Investigate the use of common definitions (e.g. ISAD). Create Living lab with PDI	Behavioral change. Social inclusion	(Cyber)secure and safe communications respecting privacy and various levels of trust	Promote deployment through simulations of scenarios, road transport & traffic management	Maintain system integrity and well-functioning once in the field, monitor for updates
		Secure privacy for mobility users	Develop procedures to manage validation of vehicle updates monitoring during the whole lifecycle of the vehicle	Harmonisation of the interpretation of traffic rules, digitalization of traffic sign information	Research on the long-term indirect impacts of automation, equity etc.	Further develop urban delivery AD solutions	Harmonisation of AI investments development	Define the involvement of public authorities in the early stage of deployment to create trust among stakeholders	Learning, education	Interoperability of communication technologies / Hybrid connectivity solutions	Customer pilots with non-homologated vehicles	Reach efficient integration of overall system in fail-operational architectures (costs, energy, redundancy)
	Passenger Cars	(no specific)	Homologation framework and simulations, self-certification	(no specific)	Impacts on safety and travel behaviour	Peer-to-peer sharing	New robust AI-passenger-car solutions	(no specific)	(no specific)	(no specific)	(no specific)	(no specific)
	Freight Vehicles	New fleet operation schemes for AV	Homologation framework Hub-to-hub, semi-confined ODDs	Business case for platooning need to be clarified depending on regulation scenario	Impacts on transport network efficiency and environment	Logistics services Business need for AD (TCO)	New AI freight and logistics solutions	Hub-to-hub corridors Freight traffic management. Truck parking safe-zones for AD trucks	The role of professional truck drivers	Correctness and latency for multi-brand configuration	Commercial operational pilots	Superstructure, e.g. trailer)
	Urban Mobility Vehicles	City authority Perspectives	VRU scenarios for unmanned buses and shuttles	Support early introduction through exemptions	Impacts on transport mode choice and social inclusion	New infrastructure business models and financing tools	New AI urban mobility solutions	Traffic management complementing public transport	The role of professional bus drivers	Specific requirements for remote operation "control-tower"	Identify needs.	Low-speed, low-tech AVs

The key priorities represent the most important actions from three deliverables of the ARCADE tasks.



Deployment

- Short-term actions from Scenario 0: Early standardization efforts to support an accelerating development of lower (L2 and L3) automation features, especially for trucks needed.
- For L3 piloting, studies with customers are essential for deployment. Legally, only professional drivers are allowed at the moment.
- Enforcement of large simulation studies to complement pilots for a quicker technological development. Real-world test parameters are the basis for this.
- Support L3 Field operational tests and natural driving studies after piloting.
- Prepare large scale L4 piloting programs on highways and in urban environment.

3.5 Key Actions, Prime actors and Priorities

In the table below, priority actions from the previous section are summarized with the prime actor involved.

Key Actions	Prime actor	Priority
Harmonize definition of ODDs and functionalities needed for given ODDs (Specific use-case priorities)	EU, Standardization, Research, Industry	High
Define, develop, and validate robust and scalable perception systems and sensor sets, including infrastructure-based perception	Research, Industry, Infrastructure operators, Standardization	High
Develop and harmonize concepts supporting vehicle 's own understanding of ODDs and cooperation between AD vehicles (including; maps, localization etc.)	Research, Industry, Standardization	High
Define and harmonize concepts to maintain system integrity and well-functioning once in the field, monitor for updates	EU, Standardization, Research, Industry	high
Reach efficient integration of overall system in fail-operational architectures (costs, energy, redundancy)	Research, Industry	medium
Define and harmonize integrated safety concepts (passive, active, seating positions, crash impact, etc.)	EU, Standardization, Research, Industry	high
Reach efficient and safe interactions with external road users (mixed traffic)	EU, Standardization, Research, Operators	high
Harmonize the role of remote operators (sustain attention, control environments, etc.)	EU, Standardization, Research, Industry, Operators	medium
Develop use cases to increase inclusion of wider range of user	EU, Research, Industry	medium

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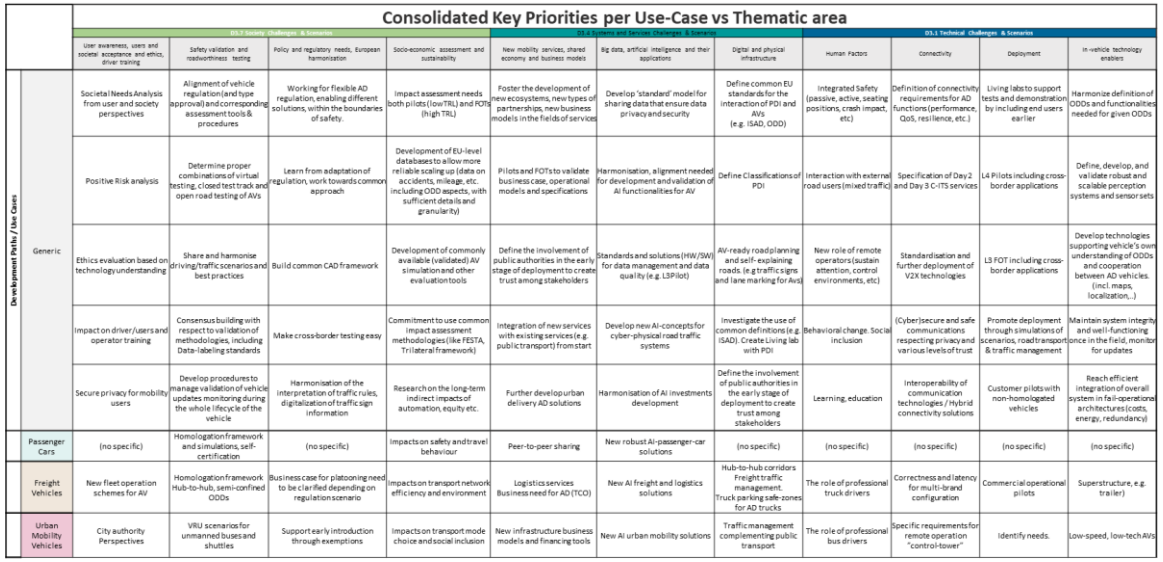
Year 1 Deliverables 3.1, 3.4 & 3.7



Consolidated Key Priorities per Use-Case vs Thematic area

Development Paths / Use Cases		User awareness, users and societal acceptance and ethics, driver training	Safety validation and roadworthiness testing	Policy and regulatory needs, European harmonization	Socio-economic assessment and sustainability	New mobility services, shared economy and business models	Big data, artificial intelligence and their applications	Digital and physical infrastructure	Human Factors	Connectivity	Deployment	In-vehicle technology enablers
Generic		Societal Needs Analysis from user and society perspectives	Alignment of vehicle regulation (and type approval) and corresponding assessment tools & procedures	Working for flexible AD regulation, enabling different solutions, within the boundaries of safety.	Impact assessment needs both pilots (low TRL) and FOTs (high TRL)	Foster the development of new ecosystems, new types of partnerships, new business models in the fields of services	Develop 'standard' model for sharing data that ensure data privacy and security	Define common EU standards for the interaction of PDI and AVs (e.g. ISAD, ODD)	Integrated Safety (passive, active, seating positions, crash impact, etc)	Definition of connectivity requirements for AD functions (performance, QoS, resilience, etc.)	Living labs to support tests and demonstration by including end users earlier	Harmonize definition of ODDs and functionalities needed for given ODDs
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		Impact on driver/users and operator training	Consensus building with respect to validation of methodologies, including Data-labeling standards	Make cross-border testing easy	Commitment to use common impact assessment methodologies (like FESTA, Trilateral framework)	Integration of new services with existing services (e.g. public transport) from start	Develop new AI-concepts for cyber-physical road traffic systems	Investigate the use of common definitions (e.g. ISAD). Create Living lab with PDI	Behavioral change. Social inclusion	(Cyber)secure and safe communications respecting privacy and various levels of trust	Promote deployment through simulations of scenarios, road transport & traffic management	Maintain system integrity and well-functioning once in the field, monitor for updates
		Secure privacy for mobility users	Develop procedures to manage validation of vehicle updates monitoring during the whole lifecycle of the vehicle	Harmonisation of the interpretation of traffic rules, digitalization of traffic sign information	Research on the long-term indirect impacts of automation, equity etc.	Further develop urban delivery AD solutions	Harmonisation of AI investments development	Define the involvement of public authorities in the early stage of deployment to create trust among stakeholders	Learning, education	Interoperability of communication technologies / Hybrid connectivity solutions	Customer pilots with non-homologated vehicles	Reach efficient integration of overall system in fail-operational architectures (costs, energy, redundancy)
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Year 1 Deliverable 2.1 - Key priority matrix

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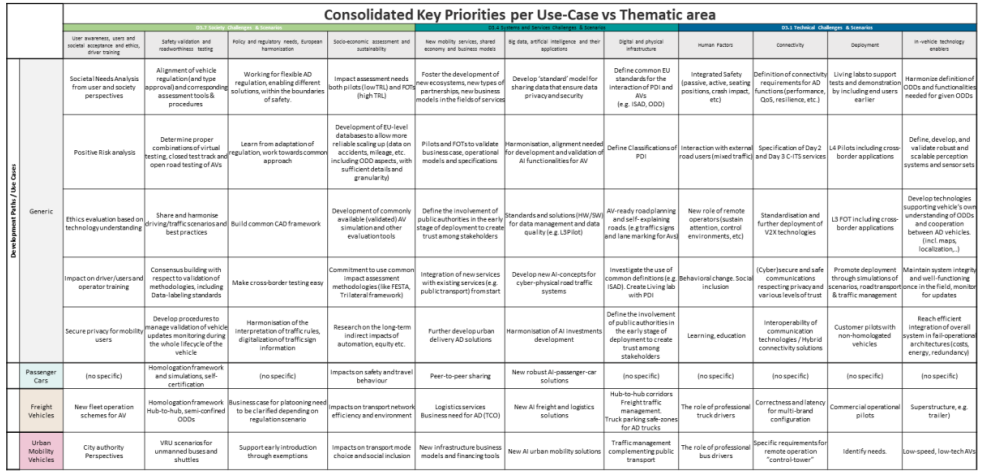
8 actions were derived from the key priorities, which are discussed in more detail today.



Consolidated Key Priorities per Use-Case vs Thematic area

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Year 1 Deliverable 2.1 - Key priority matrix

- Tech: Harmonize definition of ODDs and functionalities needed for given ODDs (Specific use-case priorities) (Bosch-Julien) + Armin
- Services: Foster the development of new ecosystems, new types of partnerships, new business models in the fields of services (Vedecom-Nadege) + Fieke
- Services: Develop common procedures for training and of AI-based vehicle control systems (TNO-Hala)) + Michaela
- Society: Develop a common EU testing and validation methodology (Headstart-Alvaro) + Marcel
- Tech: Reach efficient and safe interactions with external road users (mixed traffic) (Volvo-Emma) + Michaela
- Services: Develop user-oriented mobility concepts supporting society inclusion and enhancing mobility of elderly, disabled and children through real-world studies, field operational trials and naturalistic studies (VTT-Satu/Sami) + Fieke
- Services: Define the involvement of public authorities in the early stage of deployment to create trust among stakeholders (Rijkswaterstaat -Maarten) + Marcel
- Society: Organize both large-scale pilots (low level TRL) and FOTs (high level TRL) to assess the implications of the new technology and related services in different environments (UniLeeds-Yvonne) + Armin

8 actions to be discussed in the Stakeholder-WS (13th of February 2020)

There are two rounds in which the action posters are discussed.

Round 1: 35 min

- Tech: Harmonize definition of ODDs and functionalities needed for given ODDs (Specific use-case priorities)
- Services: Foster the development of new ecosystems, new types of partnerships, new business models in the fields of services
- Services: Develop common procedures for training and of AI-based vehicle control systems
- Society: Develop a common EU testing and validation methodology

Round 2: 35 min

- Tech: Designing Cooperative Interaction of Automated Vehicles with Other Road Users in Mixed Traffic Environment: Development of HMI solutions and evaluation criteria
- Services: Develop user-oriented mobility concepts supporting society inclusion and enhancing mobility of elderly, disabled and children through real-world studies, field operational trials and naturalistic studies
- Services: Define the involvement of public authorities in the early stage of deployment to create trust among stakeholders
- Society: Organize both large-scale pilots (low level TRL) and FOTs (high level TRL) to assess the implications of the new technology and related services in different environments

The format aims to collect input and feedback on the actions.

Action Name

tbd.

Related Task/s

Why is this action important?	Key uncertainties	Action description	Possible impacts
▪ [Reasons] ***Further arguments?***	▪ [Key uncertainties] ***Further key uncertainties?*** ***Specific key uncertainties for truck or urban?***	[Description] ***Questions/ Feedback?***	▪ [Impacts] ***Further possible impacts?***

Cause-effect or working mechanism

- **Cause:** tbd.
- **Effect:** tbd.
- **Working mechanism:** tbd.

Questions/ Feedback?

Stakeholders

Actor	Task	Role

Further stakeholders?

Evaluation criteria

- [Evaluation criteria]

Further evaluation criteria?

Key references

- [Key references]

Further key references?

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