



# ACTION PLAN FOR THE FUTURE OF MOBILITY IN EUROPE 2030

EU COORDINATION AND SUPPORT ACTION H2020  
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*In this booklet:*

**EXECUTIVE SUMMARY / INTRODUCTION TO THE ACTION PLAN / LOW-ZERO EMISSION MOBILITY / AUTOMATION AND CONNECTED DRIVING / SAFETY AND (CYBER-) SECURITY IN TRANSPORT / MOBILITY PLANNING / CROSS-MODAL CROSS-BORDER TRANSPORT AND INTEGRATION OF NOVEL MOBILITY SERVICES IN PUBLIC TRANSPORT / INCLUSION - PUTTING THE USER IN THE CENTRE**

THE ACTION PLAN FOR TRANSPORT IN EUROPE IN 2030 DETAILS MEASURES THAT ADDRESS TECHNICAL TOPICS ESPECIALLY REFERRING TO SOCIETAL ASPECTS AND ISSUES FOR MULTI-STAKEHOLDER INTERACTION, AS E.G. POLICY, USER ACCEPTANCE, STANDARDIZATION, COLLABORATION AND THE INTEGRATION OF THE USER PERSPECTIVE INTO THE R&D&I PROCESS.

Multiple existing strategies and published roadmaps address these issues in its entirety or for individual modes or freight only. These initiatives are driven by the research community, the industry or policy, but only rarely from a user perspective. The Action Plan produced by Mobility4EU intends to fill this gap and provide recommendations for R&D, deployment, policy and regulatory framework and other implementation-related issues from a user-centered and cross-modal perspective.

Thus, the Action Plan adds to initiatives by providing recommendations on mainstreaming of universal design and user-centric design processes, synergies and collaboration potential between modes and the combination of transport of passengers and freight. The Mobility4EU Action Plan is structured within six main action areas:

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#### LOW-/ZERO EMISSION MOBILITY

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#### AUTOMATION AND CONNECTED DRIVING

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#### SAFETY AND (CYBER) SECURITY IN TRANSPORT

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#### MOBILITY PLANNING

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#### CROSS-MODAL/ CROSS-BORDER TRANSPORT

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#### INCLUSION: PUTTING THE USER IN THE CENTRE

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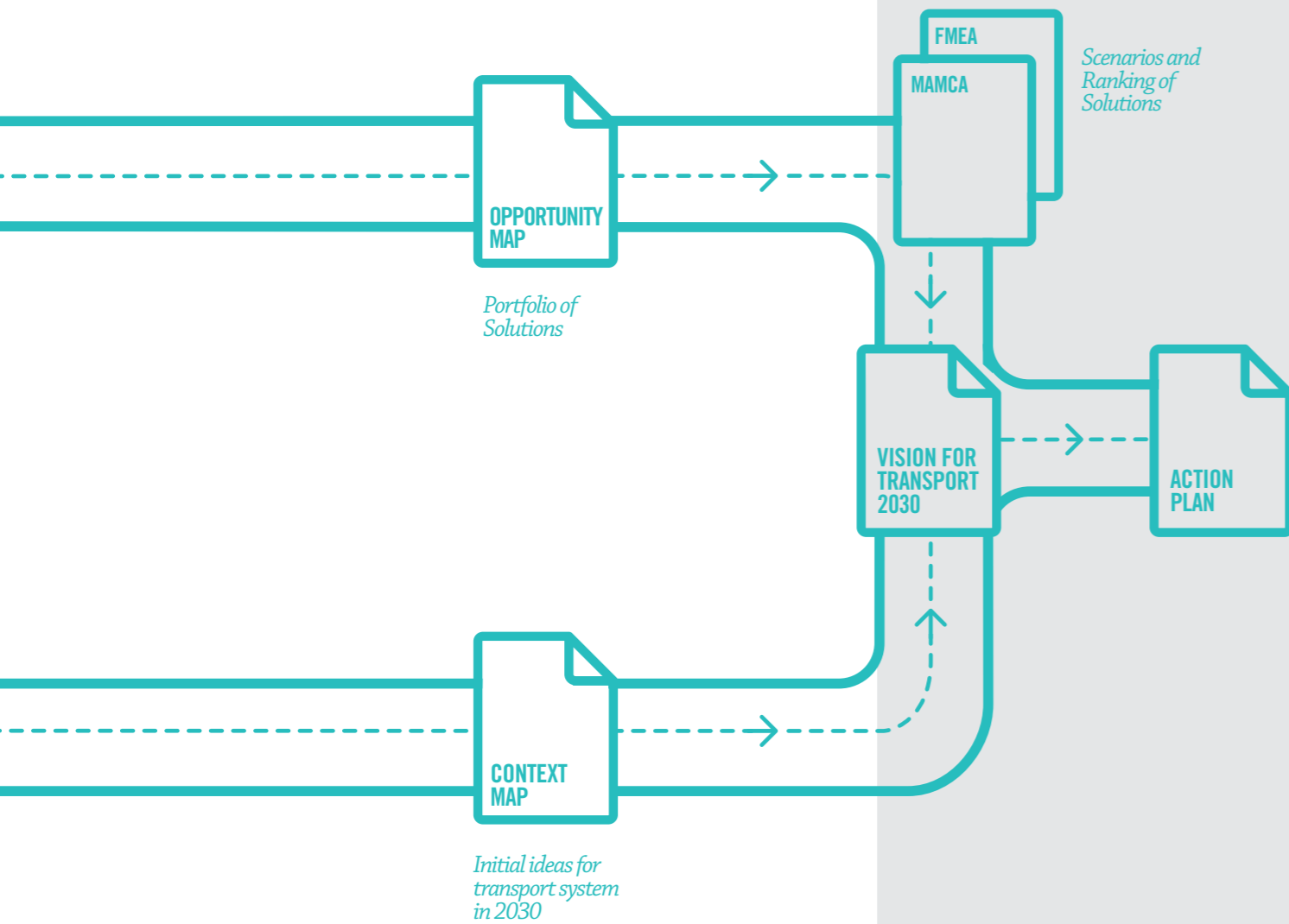
For each, an individual roadmap has been compiled that details recommendations for research, innovation, and implementation in transport both in technical and non-technical domains for achieving the future transport system envisioned. Proposed actions were categorized into action fields depending on whether they had a technical or societal/user-centric focus or if they principally targeted an improved collaboration of stakeholders from different domains. Actions in the roadmap have been further compiled along the following timeline: immediate (2020), short-term (2025) and mid-term (2030). Also, the stakeholder groups responsible for the implementation are listed.

This Action Plan is currently in consultation with stakeholders. A final version will be published at the end of 2018. The present document is a short version of the Action Plan: a document containing more details can be found at [www.mobility4eu.eu/resources](http://www.mobility4eu.eu/resources).

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## THE ACTION PLAN FOR TRANSPORT IN EUROPE IN 2030 DETAILS MEASURES TO ACHIEVE A USER-CENTRED AND INTEGRATED TRANSPORT SYSTEM FOR PASSENGERS AND FREIGHT.

### DERIVING THE VISION AND ACTION PLAN

The Action Plan for the future of transport in Europe in 2030 is based on the identification and assessment of societal challenges that will influence future transport demand and supply presented in the previously published Context Map.

A portfolio of 93 promising and innovative transport solutions across all modes answering the resulting demands has been published within the Opportunity Map. Based on these results, and by adopting a Multi-Actor Multi-Criteria Analysis (MAMCA), 4 scenarios for the development of future transport in Europe were built and ranked by stakeholders. A further prioritisation of solutions has been carried out through an adapted Extended Failure Mode and Effects Analysis (FMEA). Two scenarios emerged moving towards personalisation and digitalisation with a rather strict regulation on carbon emissions in all mobility aspects. The results have been taken within a creative process of vision building together with all stakeholders. The Vision for transport in Europe in 2030 summarises all results and presents the goal for the Action Plan.

The Action Plan has again been compiled in a participative process and has been put into a broad stakeholder consultation.

**THE MOBILITY4EU ACTION PLAN IS STRUCTURED WITHIN SIX MAIN ACTION AREAS. FOR EACH AREA, A ROADMAP DETAILS RECOMMENDATIONS FOR RESEARCH, INNOVATION, AND IMPLEMENTATION IN TRANSPORT BOTH IN TECHNICAL AND NON-TECHNICAL DOMAINS FOR ACHIEVING THE FUTURE TRANSPORT SYSTEM ENVISIONED.**

Proposed actions were categorized into action fields depending on whether they had a technical or societal/user-centric focus or if they principally targeted an improved collaboration of stakeholders from different domains. Actions in the roadmap have been compiled along the following timeline: immediate (2020), short-term (2025) and mid-term (2030). Furthermore, the responsible stakeholder groups for the implementation are listed. The structure of the action plan is outlined in the Table below.

MAIN ACTION AREAS				
STAKEHOLDERS	ACTION FIELDS	ACTION ITEMS		
		IMMEDIATE (2020)	SHORT-TERM (2025)	MID-TERM (2030)

In order to structure the complex topic of integrated and user-centred transport for passengers and freight, six action areas have been defined. They can be derived as prevalent or decisive themes within the Vision. The six action areas are:

**LOW-ZERO EMISSION MOBILITY**

**AUTOMATION AND CONNECTED DRIVING**

**SAFETY AND (CYBER) SECURITY IN TRANSPORT**

**MOBILITY PLANNING**

**CROSS-MODAL/ CROSS-BORDER TRANSPORT AND INTEGRATION OF NOVEL MOBILITY SERVICES IN PUBLIC TRANSPORT**

**PUBLIC TRANSPORT**

**INCLUSION: PUTTING THE USER IN THE CENTRE**

**THE FOLLOWING STAKEHOLDER GROUPS HAVE BEEN ADDRESSED REFERRING TO THE MAIN LEVEL MENTIONED:**

**INDUSTRY**

Terminal infrastructure for freight and passengers (construction).

Network infrastructure for freight and passengers

Private and commercial vehicle manufacturers (cars, trucks, boats) (including suppliers of parts, electronics, etc.).

Public transport vehicle manufacturers (bus, railway, metro, aircraft etc.).

IT/ITS solutions developers (including data collection and management services, traffic management).

**SHIPPERS OF GOODS**

Retailers, Wholesalers, Goods manufacturers.

**OPERATORS**

Passenger service operators (public transport and car sharing operators, all transport modes).

Terminal infrastructure for freight and passengers (management, operation of ports, airports, logistics centres).

Network infrastructure for freight and passengers (management, operation of roads, railways, waterways).



**USER REPRESENTATIVES**

Representative of disabled and/or elderly transport users.

Representative of travellers in general (car drivers, public transport passengers).

Representative of pedestrians and/or cyclists.

**POLICY MAKERS**

Local policy makers, municipality or transport authority (city or metropolitan area).

Regional or national policy makers, municipality or transport authority (larger regions and central government).

European Commission.

**R&D COMMUNITY**

Universities, Research institutes, Research departments of industry.

**FREIGHT SERVICE OPERATORS**

Logistics company, freight forwarder, road, rail, maritime, inland waterways, air.

**ENERGY NETWORK OPERATORS**

Energy providers

**STANDARDISATION BODIES**


**EUROPEAN TRANSPORT AND MOBILITY FORUM**

**NGOs**



MAIN ACTION AREA #1

# LOW-ZERO EMISSION MOBILITY

#1 ACTION FIELD TECHNICAL AND OPERATIONAL LAYERS OF MOBILITY	RESPONSIBLE STAKEHOLDERS			
 <p>SUB-FIELD 1.1 <b>VEHICLES</b></p>	<p>Policy makers Industry R&amp;D community Operators</p>	<p>Create policy framework supporting innovation.</p> <p>Develop cost-efficient, high-capacity, reliable and safe lithium-free batteries.</p> <p>Set-up battery cell production in Europe.</p>	<p>Initiate large-scale technology demonstrators for electrified heavy-duty road vehicles and vehicles in air and waterborne transport as well as alternative low-emission fuels in applicable cases.</p> <p>Approach infrastructure for respective fuels and electricity in a synergetic manner for all modes.</p> <p>Integrate low environmental impact/low energy consumption autonomous air transport concepts into segregated airspace.</p>	<p>Widely introduce electrified heavy duty road vehicles and vehicles in air and waterborne transport.</p> <p>Deploy electric or hybrid ferries and port vessels powered by wind and sun.</p> <p>Enhance electrification rate in rail targeting more than 80%.</p> <p>Employ drones and shared public transport services for logistics.</p>
	<p>Policy makers Industry R&amp;D community</p>	<p>Reduce transport noise emissions (e.g. for freight trains).</p>		
 <p>SUB-FIELD 1.2 <b>INFRASTRUCTURES</b></p>	<p>Policy makers Industry Operators</p>	<p>Increase investment in sustainable renewable fuels technologies and infrastructure.</p> <p>Assess needs for (urban) charging infrastructure (conductive and inductive) for all modes.</p> <p>Maximize share of renewable energies in the grid.</p>	<p>Sustain advancements by continuous support for successful investment mechanisms.</p>	
	<p>Policy makers Operators Freight service operators R&amp;D Industry</p>	<p>Initiate pilots and test sites for infrastructure options for electric trucks and develop comprehensive cost-benefit analysis.</p>	<p>Standardize on-road charging infrastructure for electrified trucks and develop feasible business models.</p>	
	<p>Policy makers Industry R&amp;D community Operators</p>	<p>Enhance energy efficiency in rail transport.</p>		
	<p>Industry R&amp;D community</p>	<p>Develop and introduce smart recycling infrastructure for batteries and vehicle components.</p>		
 <p>SUB-FIELD 1.3 <b>TRANSPORT OFFERS</b></p>	<p>Policy Makers Operators R&amp;D community</p>	<p>Establish urban purely electric car sharing offers integrated in public transport system.</p> <p>Implement and monitor short-term (non-permanent) benefits for early-adopters of electric vehicles.</p> <p>Research benefits of electric urban air mobility.</p>	<p>Establish rural purely electric car sharing offers integrated in multimodal public transport.</p>	
	<p>Operators Policy Makers</p>		<p>Move commuters to water transport using electrified high-speed ferries.</p>	<p>Foster the integration of waterways by providing seamless interfaces to other modes.</p>

IMMEDIATE  
**ACTIONS 2020**

SHORT-TERM  
**ACTIONS 2025**

MID-TERM  
**ACTIONS 2030**

MAIN ACTION AREA #1

# LOW-ZERO EMISSION MOBILITY

#2 ACTION FIELD SOCIETAL ASPECTS	RESPONSIBLE STAKEHOLDERS		
<p>SUB-FIELD 2.1 <b>POLICY AND REGULATORY FRAMEWORK</b></p>	<p>Policy makers Industry NGOs Operators Shippers of goods Freight service operators</p>	<p>Develop directive and strict program ensuring transport sector contribution to achievement of 1.5-2 degree target of the Paris agreement.</p> <p>Enact policy measures to effectively reduce harmful emissions in transport.</p> <p>Establish a regular control and adaptation process of emissions standards and respective executing institution.</p> <p>Monitor environmental footprint of transport solutions and propose strategies for an emission-based incentives scheme and feasible emission-free corridors.</p> <p>Fund collaborative decarbonization of transport in all modes.</p>	<p>Support member states in implementation of regular control, discussion and adaption process of emission standards.</p> <p>Establish the emission-based incentives system and implement emission-free corridors.</p> <p>Enable the determination of carbon footprint in logistics and freight transport.</p> <p>Balance the mode share according to the real costs and sustainability aspects.</p>
	<p>Policy makers Operators Industry</p>	<p>Set-up a broad stakeholder group to plan for full electrification of rail infrastructure and support member states to derive national plans.</p>	<p>Implement electrification of rail infrastructure according to the plan agreed on national and EU level and promote standardized concepts.</p>
	<p>Policy makers Industry R&amp;D community</p>	<p>Reinforce development of sustainable business models for standardized charging and alternative fuels infrastructure in all modes.</p> <p>Support member states in implementing the Alternative fuels directive and cities in deploying infrastructure and incentivize especially electric bus fleets.</p> <p>Develop innovative (electrified buses) procurement processes and instruments and build competencies on local and national levels.</p>	<p>Explore synergies for electric and alternative fuels infrastructure with all modes and with energy networks for other sectors than transport.</p> <p>Identify feasible financing for charging infrastructure for buses and ensure energy supply for electric bus fleets. Connect infrastructure to urban smart grids.</p> <p>Support wide implementation of alternative fuels infrastructure according to demand in all modes.</p>
	<p>Policy makers Industry R&amp;D community</p>	<p>Introduce strict environmental regulations in shipping and ports.</p> <p>Analyze the potential of incentives for renewable fuels in air transport together with stakeholders.</p>	<p>Apply the best practice findings of the analysis on potential incentives.</p>
	<p>Policy Industry R&amp;D community NGOs</p>	<p>Install a global institution equipped with all necessary execution rights which is in charge for the balanced allocation of free carbon allowances to entities and traded certificates</p> <p>Develop tools for monitoring the development of market price of emissions and number of free carbon allowances.</p> <p>Implement global emissions trading and offsetting measures.</p>	<p>Enact the obligation to monitor and report detailed data on carbon emissions</p> <p>Control the allocation of carbon allowances through global standards for all emission producing entities.</p>
	<p>Policy makers Industry R&amp;D community Operators</p>	<p>Propose common regulatory framework for decarbonizing logistics.</p> <p>Promote best practices to connect transport of people and goods.</p> <p>Agree on European wide tax scheme for road and rail for freight.</p>	

IMMEDIATE  
ACTIONS 2020

SHORT-TERM  
ACTIONS 2025

MID-TERM  
ACTIONS 2030

MAIN ACTION AREA #1



# LOW-ZERO EMISSION MOBILITY

<p>#2 ACTION FIELD <b>SOCIETAL ASPECTS</b></p>	<p>RESPONSIBLE <b>STAKEHOLDERS</b></p>			
<p>👁️ SUB-FIELD 2.2 <b>USER PERSPECTIVE</b></p>	<p>Operators Policy European Transport and Mobility Forum</p>	<p>Campaign the benefits of electric road vehicles and enable users participation in the transition process through EV use in public transport and sharing services etc.</p>		
	<p>Policy R&amp;D community User representatives</p>	<p>Design a low-/zero emission transport system tailored to user needs by exploring user needs and expectations and then defining user profiles and mobility patterns.</p> <p>Enable users to control their personal carbon footprint and incentivizing its reduction.</p> <p>Support bottom-up approaches to low/zero emission mobility solutions.</p>	<p>Explore opportunities to adapt transport offers to user needs and mobility patterns.</p> <p>Make personal carbon footprint a mandatory parameter when developing new solutions.</p>	
		<p>IMMEDIATE <b>ACTIONS 2020</b></p>	<p>SHORT-TERM <b>ACTIONS 2025</b></p>	
		<p>MID-TERM <b>ACTIONS 2030</b></p>		



MAIN ACTION AREA #1




# LOW-ZERO EMISSION MOBILITY

#3 ACTION FIELD MULTI-STAKEHOLDER INTERACTIONS AND PROCESSES	RESPONSIBLE STAKEHOLDERS			
 <p>SUB-FIELD 3.1 <b>COLLABORATION OF STAKEHOLDERS</b></p>	<p>Policy makers Operators Energy network operators- energy providers Industry R&amp;D community</p>	<p>Foster information exchange between cross-modal stakeholders.  Adapt push/pull measures in close cooperation of policy makers and industry.</p>	<p>Harmonize planning of energy and transport networks by joined working groups of energy and transport sector and of member states and regions.</p>	
	<p>European Transport and Mobility Forum Operators Industry Policy makers R&amp;D Community</p>	<p>Facilitate knowledge and technology transfer between stakeholders working on electrification, alternative fuels or automation of all modes in workshops, conferences and comprehensive projects. Stimulate cross-ETP task forces and other platforms and expert groups.</p>	<p>Bring stakeholders from different sectors together to promote sector coupling, connecting infrastructures and common utilization.</p>	
 <p>SUB-FIELD 3.2 <b>STANDARDIZATION</b></p>	<p>Policy makers Standardization bodies Industry R&amp;D community</p>	<p>Standardise on-road charging for electrified trucks and wireless charging infrastructure for pan-European use for.</p>	<p>Deploy standardised wireless and conductive charging infrastructure.</p>	
	<p>Policy makers Standardization bodies R&amp;D community</p>	<p>Initiate a multi-stakeholder dialogue about EU-wide standard for dynamic urban road user charging.</p>		
	<p>Industry R&amp;D community Shippers of goods Freight service operators</p>		<p>Standardize modular containers and protocols and interfaces to enable physical internet.</p>	
		<p>IMMEDIATE <b>ACTIONS 2020</b></p>	<p>SHORT-TERM <b>ACTIONS 2025</b></p>	<p>MID-TERM <b>ACTIONS 2030</b></p>



MAIN ACTION AREA #2

# AUTOMATION AND CONNECTED DRIVING

#1 ACTION FIELD TECHNICAL AND OPERATIONAL LAYERS OF MOBILITY	RESPONSIBLE STAKEHOLDERS		
 <p>SUB-FIELD 1.1 <b>VEHICLES</b></p>	<p>Industry R&amp;D community Policy makers</p>	<p>Enable mobility everywhere for everyone through technology development of, e.g. sensors, artificial intelligence, machine learning, predictive maintenance, safe and secure vehicle software and electronics.</p> <p>Allow adequate testing and learning phases under real driving conditions.</p> <p>R&amp;D to compensate drivers' inattentiveness.</p>	<p>Support innovation and testing of vehicles and infrastructure.</p> <p>Enable pilots creating policy framework including security and safety aspects for automated vehicles in public areas.</p> <p>Extensively test self-learning systems for automated and connected transport in terms of ethical compliance of its decisions.</p> <p>Provide training in automated driving for transportation providers, administrators, etc.</p>
	<p>Industry R&amp;D community User representatives Policy makers</p>	<p>Reduce transport noise emissions (e.g. for freight trains).</p>	<p>Foster inclusive use of automated and connected vehicles by performing a comprehensive design-to-needs analysis.</p> <p>Prioritize research on how automation can support ageing population and implement results.</p>
	<p>Policy makers Industry R&amp;D community Shippers of goods Freight operators</p>	<p>Enhance efficiency and capacity in rail projects for automated maintenance and transfer of goods between modes.</p>	<p>Develop automated trains for freight and passengers based.</p> <p>Implement pilots for automated transfer of goods between modes.</p>
	<p>Industry Operators R&amp;D community</p>		<p>Increase degree of automation flight operations incrementally.</p>
 <p>SUB-FIELD 1.2 <b>INFRASTRUCTURES</b></p>	<p>Policy makers R&amp;D community Industry Operators</p>	<p>Increase projects and pilot regions for testing, e.g. of infrastructure-supported automated driving and of rail tracks for autonomous trains.</p> <p>R&amp;D on infrastructure for urban automated air mobility.</p>	<p>Intensify development and use of automated trains and road vehicles by investment and funding programs and exploit possibilities for conversion of existing into smart infrastructure.</p> <p>Evaluate pilot regions (road, rail) and provide a comprehensive cost analysis for certain user scenarios.</p> <p>Implement demonstrators for urban automated air mobility.</p>
 <p>SUB-FIELD 1.3 <b>TRANSPORT OFFERS</b></p>	<p>Industry Mobility providers R&amp;D community</p>		<p>Research and demonstrate last-mile transport by autonomous vehicles.</p> <p>Improve door-to-door transport services by integrating automated vehicles in multi-modal seamless transport.</p>
	<p>Industry R&amp;D community Operators</p>	<p>Develop smart strategies for exploitation of Big Data solutions to forecast and take into account user needs.</p> <p>Optimize transport system through proactive traffic management and re-routing.</p>	<p>Create intelligent decision support systems for passengers and transport operators enabling smart travel demand management.</p>


IMMEDIATE  
**ACTIONS 2020**

SHORT-TERM  
**ACTIONS 2025**

MID-TERM  
**ACTIONS 2030**

MAIN ACTION AREA #2

# AUTOMATION AND CONNECTED DRIVING

#2 ACTION FIELD <b>SOCIETAL ASPECTS</b>	RESPONSIBLE <b>STAKEHOLDERS</b>		
 <p>SUB-FIELD 2.1 <b>POLICY AND REGULATORY FRAMEWORK</b></p>	<p>Policy makers Industry R&amp;D community</p>	<p>Assess needs for regulatory framework to accommodate automated and mixed (urban) transport.</p> <p>Initiate discussion of ethical board/commission focussing on controversial situations as, e.g. product liability, data ownership etc.</p> <p>Create pilots on full automation to prepare basis for later adaptation of legal frameworks.</p>	<p>Develop legal and regulatory framework harmonized between member states for the safe use of automated vehicles on public roads and in mixed traffic and ensuring exploitation for inclusive transport.</p> <p>Adapt and optimize the legal and regulatory framework for automated and connected driving according to experiences in pilots.</p>
	<p>Industry R&amp;D community User representatives Policy</p>	<p>Support coordination of activities in member states to implement efficient standardized 5G mobile communications network and the “5G For Europe” Action Plan. Support existing activities for legal clarification of 5G roll-out.</p>	
	<p>Policy makers</p>	<p>Support the implementation of autonomous vehicles by enforcing car-free city centers.</p>	<p>Introduce dedicated roadways for automated vehicles in particular in urban areas.</p>
 <p>SUB-FIELD 2.2 <b>USER PERSPECTIVE</b></p>	<p>User representatives Operators</p>	<p>Explore conditions for users acceptance and adoption of automated vehicles and new mobility services also perspectives in terms of regulatory changes and new legal framework.</p> <p>Raise awareness for benefits and inform about developments especially regarding safety, security and ethical concerns.</p> <p>Enable experiencing automated services in public transport and sharing concepts.</p> <p>Provide trainings for drivers of automated vehicles.</p> <p>Explore impact jobs.</p>	<p>Support users to understand the impact of automation on sustainability and seamless transport by including automated transport in planning tools.</p> <p>Using automation as an incentive for public transport and shared mobility.</p> <p>Developing convenient sharing concepts through automated maintenance of vehicles and defining ways for implementation.</p>



IMMEDIATE  
**ACTIONS 2020**

SHORT-TERM  
**ACTIONS 2025**

MID-TERM  
**ACTIONS 2030**

MAIN ACTION AREA #2

# AUTOMATION AND CONNECTED DRIVING

#3 ACTION FIELD MULTI-STAKEHOLDER INTERACTIONS AND PROCESSES	RESPONSIBLE STAKEHOLDERS		
 <p>SUB-FIELD 3.1 <b>COLLABORATION OF STAKEHOLDERS</b></p>	<p>Industry R&amp;D community Operators Policy makers User representatives</p>	<p>Initiate dialogue between stakeholders and municipalities on the potentials and preconditions of automated driving in urban areas.</p> <p>Discuss issues of safety and possible social consequences of CAD with relevant stakeholder groups, municipalities and users.</p> <p>Create ethical board for CAD representing the entire society.</p>	<p>Sustaining dialogue through continuously monitoring developing issues to be discussed with broad stakeholder base.</p>
	<p>Policy makers Operators Freight service operators R&amp;D community</p>	<p>Initiate strategy meetings between manufacturers and cities for planning implementation and financing of automated maintenance solutions.</p> <p>Define roles of hubs and warehouses in automated transport.</p>	<p>Implement means to secure data and research improved quality of data monitoring tools.</p> <p>Agree on EU wide database with data on infrastructure components.</p> <p>Share data, techniques and methods with responsible stakeholders</p>
 <p>SUB-FIELD 3.2 <b>STANDARDIZATION</b></p>	<p>User representatives Operators</p>	<p>Promote the deployment of automated transport systems by the definition of standards, e.g. harmonised standards for rail vehicles and infrastructure.</p>	<p>Standardize and homologate automated systems in all modes (vehicles, infrastructure, other systems as e.g. for maintenance).</p>
	<p>Industry R&amp;D community Policy User representatives Standardization bodies</p>	<p>Support standardization activities for V2X Day-2 applications bringing in user perspectives</p> <p>Discuss with stakeholders from all modes potential for standardized interfaces for data transfer and communication</p>	

IMMEDIATE  
**ACTIONS 2020**

SHORT-TERM  
**ACTIONS 2025**

MID-TERM  
**ACTIONS 2030**

# SAFETY AND (CYBER-) SECURITY IN TRANSPORT

ACTION AREA DESCRIPTION




**Protection of transport users**, especially vulnerable road users is considered in this action area. It includes technology means, design of infrastructure and urban design. **Enhanced safety** is in this context also seen as a mean to motivate walking, cycling and use of public transport. (Cyber-) Security in the novel transport system is an important topic especially in terms of automated and connected driving and the increasing deployment of digital technologies such as **artificial intelligence, big data and IoT** in transport. Policy measures to ensure data security and privacy, referring to the entire transport supply chain, and on raising users' awareness.

SCRIBBLE AND NOTE

A large grid area for scribbles and notes, consisting of a grid of small squares.

MAIN ACTION AREA #3

# SAFETY AND (CYBER-) SECURITY IN TRANSPORT

#1	ACTION FIELD TECHNICAL AND OPERATIONAL LAYERS OF MOBILITY	RESPONSIBLE STAKEHOLDERS			
 SUB-FIELD 1.1 VEHICLES		Industry R&D community Policy makers	Reinforce the development and deployment of driver assistance systems protecting vulnerable road users on short term especially for trucks in cities.	Promote automated functions within an initial phase especially for buses, trucks and high-end cars and C-ITS applications especially for heavy vehicles.	Address issues of mixed traffic of road users with and without assistance systems.
		Freight service operators Industry R&D community	Enhance safety and security in logistics by interoperable tracking of containers/boxes.	Develop a framework for cyber-security in logistics and ensure IT connectivity which allows plug and play data sharing.	
 SUB-FIELD 1.2 INFRASTRUCTURES		Policy makers R&D community Industry Operators	Promoting research on impact of different types of infrastructure in different scenarios, e.g. use of segregated lanes.	Promote benefits of urban design of secure, safe and resilient infrastructure.  Implement C-ITS infrastructure for safety applications.	
		Industry R&D community	Research self-monitoring and self-healing infrastructure (smart materials, systems, operations).	Pilot self-monitoring and self-healing infrastructure. Identify business and financing models.	Deploy and continuously advance self-monitoring and self-healing infrastructure.
 SUB-FIELD 1.3 TRANSPORT OFFERS		Industry R&D community Operators Freight operators	Develop assessment methods of safety and security performance of seamless journeys and digital technologies.		
		Industry R&D community Operators Policy makers	Enhance safety of vulnerable road users by considering urban design/infrastructure status in routing for seamless journeys.  Make vulnerable road users “digitally visible” through IoT-enabled safety devices.	Renew technical standards and conducts of co-development of different service interfaces.  Increase privacy protection of applications with more detailed and universal user data specifications and standardization.	Make Mobility as a service (MaaS) safe and secure.
		Industry R&D community Operators Freight service operators		Increase data security and privacy in authentication and payment processes for mobility services e.g. by concept of Trustee Roles, blockchain etc and support activities of respective initiatives.	



IMMEDIATE  
ACTIONS 2020

SHORT-TERM  
ACTIONS 2025

MID-TERM  
ACTIONS 2030

MAIN ACTION AREA #3

# SAFETY AND (CYBER-) SECURITY IN TRANSPORT

#2 ACTION FIELD SOCIETAL ASPECTS	RESPONSIBLE STAKEHOLDERS		
 <p>SUB-FIELD 2.1 <b>POLICY AND REGULATORY FRAMEWORK</b></p>	<p>Policy makers Operators Industry NGOs</p>	<p>Empower EU wide harmonized security and privacy regulations for the collection, use and processing of data in transport related issues</p> <p>Ensure impact of new General Data Protection Regulation (GDPR) on all issues of data security.</p> <p>Support member states to implement the European Network and Information Security Directive.</p>	<p>Provide a clear legal framework for usage of users data and EU-level institution monitoring compliance</p> <p>Support policy makers in the implementation of policies and regulation.</p> <p>Develop and enact a new General Data Protection Regulation (GDPR) for freight, defining data ownership and access rights to collected information.</p>
 <p>SUB-FIELD 2.2 <b>USER PERSPECTIVE</b></p>	<p>Policy makers Industry NGOs Operators User representatives European Transport and Mobility Forum</p>	<p>Raise user awareness of the importance of data security and privacy in transport related applications by facilitating a PR campaign and education programmes.</p>	<p>Promote transparency and proper information on data collection, ownership, processing and use and making the conformity of these issues mandatory throughout the EU.</p> <p>Develop common intra-EU privacy and safety statements providing a predefined set of needs with options to be shared between user and operator before travel start.</p>

IMMEDIATE  
**ACTIONS 2020**



SHORT-TERM  
**ACTIONS 2025**

MID-TERM  
**ACTIONS 2030**



MAIN ACTION AREA #3

# SAFETY AND (CYBER-) SECURITY IN TRANSPORT

#3	ACTION FIELD MULTI-STAKEHOLDER INTERACTIONS AND PROCESSES	RESPONSIBLE STAKEHOLDERS			
 SUB-FIELD 3.1 <b>COLLABORATION OF STAKEHOLDERS</b>		Policy makers Operators R&D community	Educate mobility providers about data security, open data and application of new General Data Protection Regulation (GDPR) and share best practices.	Provide new training schemes and education curricula for the future transport workforce (i.e. automated transport drivers).	
		Policy makers Industry R&D community	Improve data/cyber security in transport by supporting cooperation with experts from other application fields.		
		Operators R&D community	Improve safety and resilience capacity in public transport by smart management of public transport staff preventing risks and in emergency cases.		
	 SUB-FIELD 3.2 <b>STANDARDIZATION</b>	Industry R&D community Standardization bodies	Establish stable, standardised communication protocols for C-ITS in all application areas		
Policy makers R&D community Operators		Increase interoperability and compatibility by harmonising or developing national standards. Achieve compliance to "The Network and Information Security Directive" (NIS Directive)			

IMMEDIATE  
**ACTIONS 2020**

SHORT-TERM  
**ACTIONS 2025**

MID-TERM  
**ACTIONS 2030**

# MOBILITY PLANNING

ACTION AREA DESCRIPTION




Actions on the planning of **active modes, hubs and smart city applications**, identified in the stakeholder consultation process, have been prioritized in the roadmap as they emerge as horizontal actions from other Mobility4EU topics (interoperability, energy efficiency, health, etc). Another issue is the participation of citizens in the design of a new transport system and the establishment of **participatory forms of governance**.

SCRIBBLE AND NOTE

Grid area for scribbles and notes, consisting of a large grid of small squares.

MAIN ACTION AREA #4

# MOBILITY PLANNING

#1 ACTION FIELD TECHNICAL AND OPERATIONAL LAYERS OF MOBILITY	RESPONSIBLE STAKEHOLDERS		
 SUB-FIELD 1.1 <b>VEHICLES</b>			
 SUB-FIELD 1.2 <b>INFRASTRUCTURES</b>	Policy makers R&D community Operators	Identify changing urban infrastructure needs due to novel mobility behavior and needs of specific user groups.  Create possibilities for a dynamic use of physical infrastructure as e.g. summer bike parking /winter car (sharing) parking.	Define infrastructure needs of novel personal mobility devices including potential to share existing paths.  Promote flexible solutions for lanes configuration allowing shared use of transport network according to changing mobility needs in short and longer term.
	Industry R&D community Operators User representatives European Transport and Mobility Forum	Support municipalities to plan mixed-land use and high-dense urban areas in compact cities, discouraging urban sprawl.  Define main corridors to connect hubs and requirements to make them smart and sustainable.  Explore the organization of hubs for accommodating automation in seamless travels.	Integrate cross-modal hubs and interfaces into the urban structure and connect them by harmonised infrastructure to smart sustainable corridors.  Regenerate suburbs and ensure multiple land-use through integrated urban and regional planning.  Integrate cross-modal working groups and user representatives in the whole planning and implementation process.  Identify stakeholders responsible for implementation and maintenance of infrastructure.
	Policy makers Operators Industry R&D community	Develop plans for cities and regions to deploy smart communication infrastructure also clarifying financing.	
 SUB-FIELD 1.3 <b>TRANSPORT OFFERS</b>	Policy makers Operators Industry R&D community	Design new mobility concepts focusing on feasibility and financing and implement by redefining urban planning and mobility schemes  Enable co-creation of novel mobility services through crowdsourcing information from users.  Develop tools and methods to integrate shared mobility as a new mode in planning and modeling	Develop feasible business models for user-centric mobility solutions in the European transport system and incentivize investments in novel mobility solutions  Adapt public transport services and required infrastructure continuously to meet rising demand.  Estimate the impact of new mobility solutions on the use of other modes and urban space  Verify the effectiveness of planned cross-modal transport offers through user feedback.



IMMEDIATE  
**ACTIONS 2020**

SHORT-TERM  
**ACTIONS 2025**

MID-TERM  
**ACTIONS 2030**

MAIN ACTION AREA #4

# MOBILITY PLANNING

#2 ACTION FIELD SOCIETAL ASPECTS	RESPONSIBLE STAKEHOLDERS		
 SUB-FIELD 2.1 <b>POLICY AND REGULATORY FRAMEWORK</b>	R&D community	Support municipalities in integrating sustainable mobility strategies in urban planning as key aspect.  Update Sustainable Urban Mobility Plans (SUMP) based on novel forms of mobility.	Empower local governments to regulate new mobility services in terms of public policy goals and social equity.  Clearly regulate coexistence of personal mobility devices and other modes in the transport system.
	Policy makers Freight service operators	Support user-centric smart city applications by creating the legal basis for harmonization of data security and privacy laws.	Develop concepts for a successful harmonisation of legal measures for freight transport within regions and countries.
	User representatives Policy makers Operators	Strengthen dialogue between advocates for active mobility and municipalities.  Allocate more resources for active modes infrastructure and widened “Copenhagenise” concepts and foster active mobility-related activities.  Provide incentives and bonus-malus system to discourage car ownership and encourage active modes and public transport use.	
	Policy makers European Transport and Mobility Forum User representatives Operators	Discuss opportunities and barriers of co-creation of (urban) mobility solutions with relevant stakeholders, municipalities, and users.	Support regional and local governments in implementing participatory forms of governance for transport-related issues.
 SUB-FIELD 3.1 <b>USER PERSPECTIVE</b>	Policy makers User representatives	Create awareness of residents for benefits of active modes address in particular cultural frames and potential conflicts of interests in view of limited spaces in urban areas.	

IMMEDIATE  
**ACTIONS 2020**

SHORT-TERM  
**ACTIONS 2025**

MID-TERM  
**ACTIONS 2030**

MAIN ACTION AREA #4



# MOBILITY PLANNING

<p>#3 ACTION FIELD MULTI-STAKEHOLDER INTERACTIONS AND PROCESSES</p>	<p>RESPONSIBLE STAKEHOLDERS</p>	
<p>SUB-FIELD 3.1 <b>COLLABORATION OF STAKEHOLDERS</b></p>	<p>Policy makers Industry R&amp;D community</p>	<p>Support planning processes by fostering discussion of benefits, risks and opportunities of new (urban) mobility solutions and requirements of cross-modal transport hubs and interfaces.</p>
	<p>Industry R&amp;D community Operators User representatives European Transport and Mobility Forum Policy makers</p>	<p>Build working groups representing each mode and users to discuss requirements for cross-modal hubs and interfaces and to support municipalities in planning these hubs. Develop concepts for a successful harmonisation of legal measures for freight transport within regions and countries.</p>
	<p>Policy makers</p>	<p>Improve communication between the residential construction department and transport planning department in cities/regions.</p>
		<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>IMMEDIATE <b>ACTIONS 2020</b></p> </div> <div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>SHORT-TERM <b>ACTIONS 2025</b></p> </div> <div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>MID-TERM <b>ACTIONS 2030</b></p> </div> </div>



MAIN ACTION AREA #5

# CROSS-MODAL/ CROSS-BORDER TRANSPORT AND INTEGRATION OF NOVEL MOBILITY SERVICES IN PUBLIC TRANSPORT

#1 ACTION FIELD TECHNICAL AND OPERATIONAL LAYERS OF MOBILITY	RESPONSIBLE STAKEHOLDERS			
 <b>SUB-FIELD 1.1 VEHICLES</b>	Industry R&D community Operators	Develop modular public transport vehicles easily adaptable to demand and equipped to provide necessary information and billing possibilities.		
	Industry R&D community Operators		Promote developing train sharing concepts by R&D on autonomous rail vehicles for individual group routes.	
 <b>SUB-FIELD 1.2 INFRASTRUCTURES</b>	Policy makers Operators Industry	Renew Connecting Europe Facility (CEF) for transport or set-up new funding instrument.  Promote creation of holistic European concept for long distance public transport infrastructure.	Enforce implementation of EU long-distance public transport infrastructure concept also by subsidies.  Define harmonized infrastructure requirements for smart and sustainable corridors within the EU and coordinated with neighboring countries to enable cross-border transport.	Provide for update and maintenance of infrastructure enabling accommodation of autonomous vehicles.
	Policy makers Operators Freight service operators	Explore concepts combining transport of passengers and freight.  Develop concept and management system for sharing of (public) transport infrastructure and fleets by different operators/providers and across borders with a focus on rail.	Implement promising use cases of combining transport of passengers and freight  Incentivize shared use of infrastructure and fleets.  Exploit benefits of deploying autonomous vehicles in seamless journeys to enhance capacity.	
 <b>SUB-FIELD 1.3 TRANSPORT OFFERS</b>	Policy makers Industry Operators	Support dialogue between relevant stakeholders for developing a common agenda and vision for Maas including its integration in public transport.  Agree on roles of public and private stakeholders ensuring service levels and managing subsidies at all levels and create data analytics and exchange framework enabling Mobility as a Service.	Provide open application programming interfaces (API) and user data and statistics for all modes and providers.  Support initiatives on the use of open data/ interfaces in public transport and communication of their results.  Monitor (cost) efficiency and carbon footprint of different transport solutions.	Investigate the possibilities of an EU-wide MaaS standard/service.
	Policy makers European Transport and Mobility Forum Operators R&D community User representatives	Provide concept for integrated data platform to aggregate demand and supply data for mobility services including means to regulate access.	Develop and demonstrate integrated platform in a suitable pilot scenario.	Support the Pan-European roll-out of this integrated data platform in public transport.



IMMEDIATE  
ACTIONS 2020

SHORT-TERM  
ACTIONS 2025

MID-TERM  
ACTIONS 2030

MAIN ACTION AREA #5

# CROSS-MODAL/ CROSS-BORDER TRANSPORT AND INTEGRATION OF NOVEL MOBILITY SERVICES IN PUBLIC TRANSPORT

#2	ACTION FIELD TECHNICAL AND OPERATIONAL LAYERS OF MOBILITY	RESPONSIBLE STAKEHOLDERS			
 SUB-FIELD 2.1 <b>POLICY AND REGULATORY FRAMEWORK</b>		Industry R&D community Operators	Discuss possible regulatory changes and incentives for a shift to public transport and active mobility options.	Promote implementation of incentives addressing member states and organizations supporting cities.	
		Industry R&D community Operators	Promote regulation of sensitive fields such as liability or competition and support policy makers in this regard.	Develop a uniform compendium of liabilities and responsibilities of each transport mode.	
 SUB-FIELD 2.2 <b>USER PERSPECTIVE</b>		Policy makers R&D community Operators	Ensure equity through e.g. more frequent/ more affordable public transport offers or integrated mobility services.  Raising public acceptance of shared concepts.	Harmonise terms of service of transport and single ticketing solutions across EU including collective liability of operators.  Introduce EU-wide harmonized airport access and processes.  Enable users to take informed decisions through real-time journey planners and rerouting system for different cities/countries within single information system.  Including and prioritizing active modes in travel information systems.	Sustain and incentivize operators to shift towards shared business models to reduce the economic risk.  Enable and optimise activities of freight integrators.
		Policy makers Operators			Introduce key figures for the resilience of the transport system, minimize risks and offer alternative transport options in case of disruption

IMMEDIATE  
ACTIONS 2020




SHORT-TERM  
ACTIONS 2025

MID-TERM  
ACTIONS 2030



MAIN ACTION AREA #5

# CROSS-MODAL/ CROSS-BORDER TRANSPORT AND INTEGRATION OF NOVEL MOBILITY SERVICES IN PUBLIC TRANSPORT

 <b>ACTION FIELD</b> <b>TECHNICAL AND OPERATIONAL LAYERS OF MOBILITY</b>	<b>RESPONSIBLE STAKEHOLDERS</b>			
 <b>SUB-FIELD 3.1</b> <b>COLLABORATION OF STAKEHOLDERS</b>	Industry Operators	Develop common approach to interoperability in a cross-modal task force of stakeholders.		
 <b>SUB-FIELD 3.2</b> <b>STANDARDIZATION</b>	Industry R&D community Operators	Improve usability of transport infrastructure for different modes and operators by ensuring interoperability of systems, data and interfaces through standardization and/or common specifications.	Promote the wide use of open data and develop standards.	
		<b>IMMEDIATE ACTIONS 2020</b>	<b>SHORT-TERM ACTIONS 2025</b>	<b>MID-TERM ACTIONS 2030</b>

# INCLUSION - PUTTING THE USER IN THE CENTRE

ACTION AREA DESCRIPTION


Within this action area **inclusion** refers to **accessible** and **usable transport** for all users. The mainstreaming of **universal design** principles to vehicles and infrastructure facilitates the physical accessibility of transport for people with reduced mobility (disabled or older people, but also people with pushchairs or heavy luggage). Furthermore, **transport equity** and **spatial accessibility** of transport in order to enable access to essential services, employment, shopping opportunities and healthcare to everyone by taking into account e.g. the geographical spread of public transport stations and other mobility services as well as affordability of transport offers are considered.

SCRIBBLE AND NOTE

A large grid area for scribbles and notes, with a blue arrow pointing to it from the left side label.



MAIN ACTION AREA #6

# INCLUSION - PUTTING THE USER IN THE CENTRE




#1	ACTION FIELD TECHNICAL AND OPERATIONAL LAYERS OF MOBILITY	RESPONSIBLE STAKEHOLDERS			
	SUB-FIELD 1.1 <b>VEHICLES</b>	Policy makers Users' representatives European Transport and Mobility Forum Industry Operators R&D community	<p>Create legal basis for national regulations making universal design precondition for future vehicle design in all modes.</p> <p>Advertise widely visible good practices on the application of universal design to transport.</p> <p>Announce a prize for good practices of applying universal design in transport.</p> <p>Foster cross-fertilization of best practices among modes.</p>	<p>Put cases of good practices into wider demonstration.</p> <p>Incentivize the development of best practices and minimum requirements regarding accessibility by all mobility operators.</p> <p>Organize annual/biannual prize award ceremony on successful universally designed transport applications.</p>	<p>Evaluate demonstrations and provide guidelines for universally designed vehicles in all modes based on good practices.</p>
	SUB-FIELD 1.2 <b>INFRASTRUCTURES</b>	Policy makers Users' representa-tives European Transport and Mobility Forum Industry Operators R&D community	<p>Create awareness with policy makers on accessibility needs to transport and communication infrastructure.</p> <p>Provide a toolkit on accessibility to infrastructure providers and operators.</p> <p>Publish the Inventory of Assets, a database of accessibility at hubs</p>	<p>Improve accessibility at public transport stations based on Inventory of Assets database.</p>	<p>Provide for update and maintenance of infrastructure enabling accommodation of autonomous vehicles.</p>
		Policy makers		<p>Support stakeholders in achieving EU target for full internet access across the EU.</p>	
	SUB-FIELD 1.3 <b>TRANSPORT OFFERS</b>	Policy makers Users' representatives European Transport and Mobility Forum Industry Operators R&D community	<p>Investigate accessibility requirements of shared concepts/services.</p> <p>Create awareness of opportunities to operators.</p> <p>Incentivize inclusion of highly accessible routes into journey planners.</p> <p>Develop applications with accessible and user-friendly interfaces.</p> <p>Offer support to use required devices and services.</p> <p>Provide training in universal design to all stakeholders and foster application.</p>	<p>Ensure accessibility of sharing services and incentivize shared fleets of personal mobility devices at hubs to facilitate mode change for persons with reduced mobility.</p> <p>Support all users to find ways and connection points to other modes by developing cross-modal seamless internal navigation systems, e.g. in hubs, which can be used in all countries in the EU.</p> <p>Target full coverage of accessible multimodal transport offers.</p>	<p>Target full coverage of fully accessible sharing services and vehicles developed according to universal design principles.</p>
			IMMEDIATE <b>ACTIONS 2020</b>	SHORT-TERM <b>ACTIONS 2025</b>	MID-TERM <b>ACTIONS 2030</b>

MAIN ACTION AREA #6

# INCLUSION - PUTTING THE USER IN THE CENTRE

#2	ACTION FIELD TECHNICAL AND OPERATIONAL LAYERS OF MOBILITY	RESPONSIBLE STAKEHOLDERS			
	SUB-FIELD 2.1 <b>POLICY AND REGULATORY FRAMEWORK</b>	Policy makers Users' representatives European Transport and Mobility Forum Industry Operators R&D community	<p>Promote definition of specific targets on accessibility for the different transport modes.</p> <p>Develop funding strand aiming at supporting accessibility.</p> <p>Monitor negotiations and legislative progress of the European Accessibility Act</p> <p>Declare universal design in transport R&amp;D&amp;I as a precondition of financial support</p>	<p>Ensure a coherent approach to transport accessibility across all modes throughout the EU.</p> <p>Consult EC on setup of EU agency on (physical) accessibility for transport.</p> <p>Reduce regulatory fragmentation in terms of accessibility through the European Accessibility Act.</p>	<p>Introduce evaluation and monitoring mechanism of the European Accessibility Act.</p>
		Policy makers Users' representatives European Transport and Mobility Forum Operators R&D community	<p>Investigate equity impact of novel mobility services.</p> <p>Advise regulatory bodies on how to support transport equity for novel mobility services.</p> <p>Organise wide stakeholder consultation on opportunities for making transport more affordable for all.</p>	<p>Develop appraisal methods for transport equity in transport projects.</p> <p>Support governments and municipalities to find strategy, parameters and ways for financing of measures raising equity.</p> <p>Develop tools allowing flexible pricing making use of user mobility patterns.</p>	
	SUB-FIELD 2.2 <b>USER PERSPECTIVE</b>	Policy makers Operators User representatives European Transport and Mobility Forum	<p>Keeping human contacts in transport hotlines or at public transport stations.</p> <p>Motivate all transport providers to sign European Commissions Passenger Rights Campaign.</p> <p>Provide possibilities for human contact for support in transport.</p> <p>Consider changing population and requirements for learning processes for transport use.</p>	<p>Develop concepts ensuring usability of novel mobility services by all.</p>	<p>Monitor learning programs and keep them constantly updated.</p>
			<b>IMMEDIATE ACTIONS 2020</b>	<b>SHORT-TERM ACTIONS 2025</b>	<b>MID-TERM ACTIONS 2030</b>

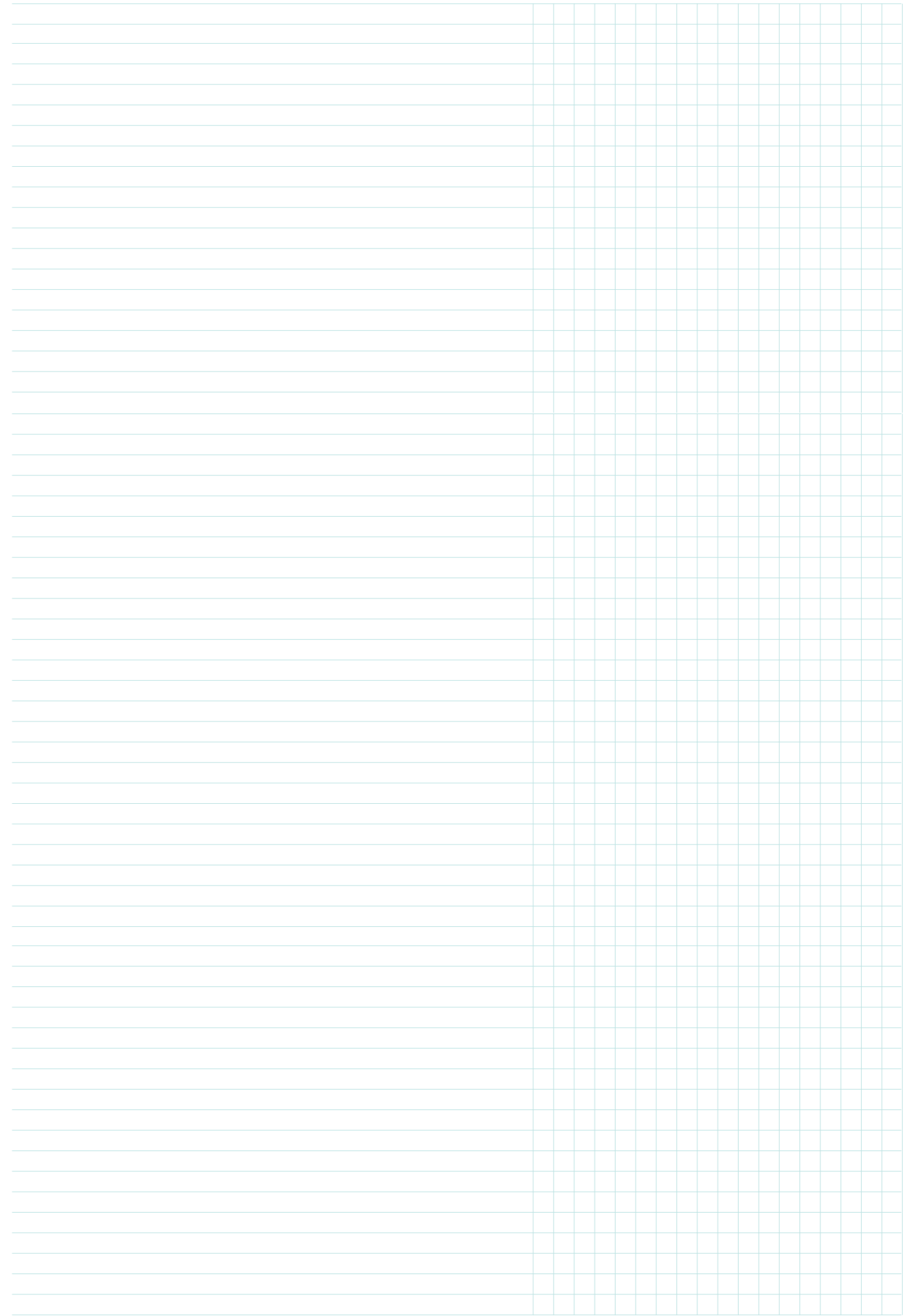
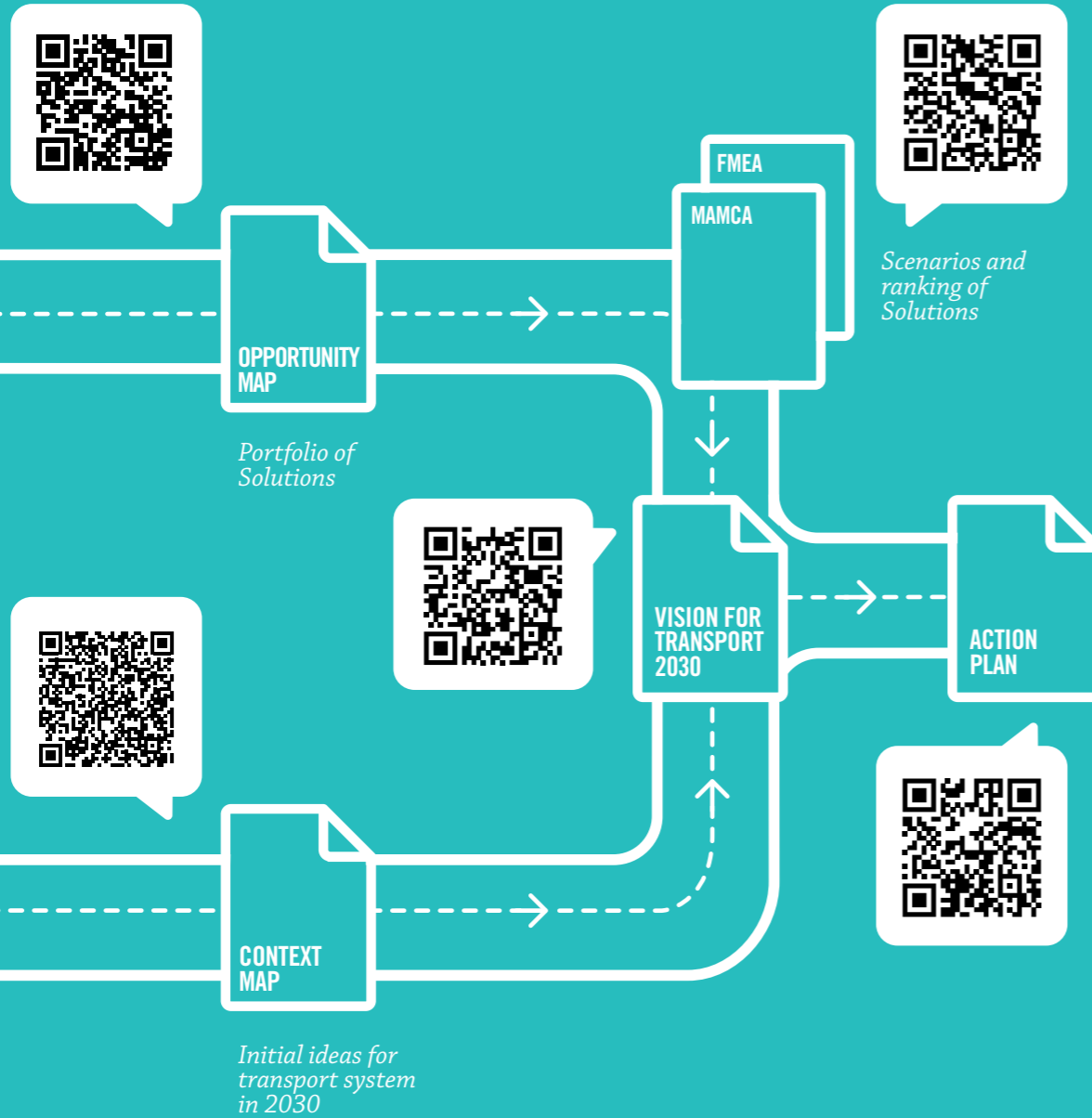
# INCLUSION - PUTTING THE USER IN THE CENTRE

 <b>ACTION FIELD</b> <b>MULTI-STAKEHOLDER INTERACTION AND PROCESSES</b>	<b>RESPONSIBLE</b> <b>STAKEHOLDERS</b>			
 <b>SUB-FIELD 2.1</b> <b>COLLABORATION OF STAKEHOLDERS</b>	Industry Operators R&D community User representatives European Transport and Mobility Forum	Support activities to co-design and co-develop mobility services together with future users.  Support bottom-up approaches towards reducing the personal carbon footprint.	Support the development of digital tools and platforms that allow for bottom-up co-creation of mobility services.  Promote living labs in which these novel transport solutions can be experienced.	
 <b>SUB-FIELD 2.2</b> <b>STANDARDIZATION</b>	Policy makers R&D community Industry Standardization bodies	Promote accessibility and universal design in (public) transport vehicles in all modes by the introduction of standards.	Include universal design standards in European and national regulations to make them binding.  Facilitate information campaign on standards on universal design.	
		<b>IMMEDIATE</b> <b>ACTIONS 2020</b>	<b>SHORT-TERM</b> <b>ACTIONS 2025</b>	<b>MID-TERM</b> <b>ACTIONS 2030</b>

VISUALIZATION-BASED STORY-MAPPING PROCESS IS A CORNERSTONE OF THE PROJECT. GRAPHICAL VISUALIZATIONS RESULTING FROM DISCUSSIONS HELD DURING PARTICIPATORY WORKSHOPS ARE LINKED BELOW.

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