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Eidgenössisches Departement für Umwelt, Verkehr,
Energie und Kommunikation UVEK

Bundesamt für Strassen ASTRA
Working Group Mobility 4.0

ML, 4 December 2023

Invitation to submit research ideas for the research program 2025-2026

Objective

Within FEDRO's research framework (“Forschung im Strassenwesen”), the working group Mobility 4.0 (WG MB4) focuses on specifying and implementing the need for research on the topics of automation and digitalisation in road traffic. Research ideas for the upcoming FEDRO research program 2025-2026 can be submitted to the WG MB4.

A research idea outlines a possible research endeavor (research needs, methods, resources), however, is not yet a research proposal. Submitted research ideas allow the WG MB4 to identify research needs for FEDRO’s research program 2025-2026. A research idea needs to refer to one of following four research focus areas of the WG MB4:

1. Develop basic information as a basis for regulation

A technologically driven development is taking place in the mobility sector. At the same time, new potential emerges for the transport of people and goods as well as traffic management. New risks are also foreseeable. The nature of these new developments as well as their effects need to be researched as a basis for any adjustments to transport policy, their financing and any necessary regulation.

Examples of possible research ideas:

- Simulations and analyses of the effects and interactions of
  - new forms of mobility,
  - automated driving on pedestrian and bicycle traffic,
  - new (digital) business models in the area of transport services and of
  - Swiss social developments (demographics) on road traffic, including slow-moving traffic, and on the mobility system.
- Development of alternatives and options.

2. Determine and develop the prerequisites for highly automated driving

FEDRO assumes that, in the medium term, SAE level 3 and 4 vehicles will be travelling in mixed traffic in Switzerland. In addition to the development of corresponding legal bases, this requires clarification of the physical and digital infrastructure requirements, their financing and the procedural, technical and organisational prerequisites.

Examples of possible research ideas:

- Requirements (including infrastructural and digital) for the state to be able to accompany the introduction and management of highly automated driving in mixed traffic;
- Funding requirements for the creation of the prerequisites for highly automated driving;
- Identification and official approval procedures for routes with traffic of highly automated vehicles;
- Identification and preparation of the authorities’ contribution (e.g. creation of a machine-readable regulation) in ensuring compliance with (country-specific) traffic regulations by highly automated vehicles;
- Identification and management of Switzerland-specific characteristics in road traffic as a basis for international negotiations on standards and for Swiss system adaptations in automated driving;
- Management and control of road traffic and forms of mobility under the conditions of mixed traffic with automated vehicles of various levels and with non-motorised road users.

3. Regulatory roles, governance issues and necessary future competences

The role of the authorities responsible for road transport, in particular FEDRO, is likely to change significantly as a result of the expected dynamic developments in the mobility system. In addition to its current tasks, FEDRO is likely to become increasingly active as a digital road operator in the future. Digitalisation in the transport sector and in management of road transport facilities therefore represents an expansion of the current role of FEDRO and it places new demands on the organisation of FEDRO and on the working methods and qualifications of its employees. As cross-border transport plays an important role for Switzerland, international coordination is also required in the area of digital infrastructures. International cooperation should also be intensified in mobility research.

Examples of possible research ideas:

- Analysing the role(s) of the authority (FEDRO) and cooperation between authorities for the management of the future mobility system across all federal levels;
- Future requirements regarding competences and training needs associated with these requirements;
- Governance models for stakeholders in the future mobility system;
- State framework for mobility data governance and for the official handling of artificial intelligence.

4. Strengthening the resilience of the future mobility system

A digitally interconnected mobility system is particularly vulnerable to disruptions and attacks. Cooperative intelligent transport systems (C-ITS) are particularly vulnerable to malicious attacks, which can lead to the loss of human life. It is therefore necessary to systematically assess the risks, to prevent and combat system failures and, in the event of system failures, prepare for a rapid restart of the mobility system. Further research is required to ensure the functionality of Switzerland's future mobility system by strengthening its resilience.

Examples of possible research ideas:

- Ongoing systematic identification of potential threats to (transport) security in new forms of mobility/business models (cyber security, data quality, reliability of technical components such as sensors, data transmission, inadequate human-automated vehicle communication, etc.);
- Approaches, responsibilities and organisational forms for problem solving in the interconnected mobility system;
- Organisational forms for remedying mobility system malfunctions and restoring the (automation) system;
- Further approaches for strengthening the resilience of the mobility system.

Remark: The titles and explanations of the research focus areas were translated by the secretariat of the WG MB4. The original text can be found in the German version of the invitation. In case of ambiguities, the text in the German version takes precedence.

General conditions

A research idea needs to be handed in on time (**see submission date below**) with Form 1 (> *Formulare* > *Formular 1D (German version*) / Form 1E (English version) / Formulaire 1F (French version)) to the secretariat of the WG MB4 (MB4@bss-basel.ch).

Form 1 describes which contents must be covered. When formulating the research idea, please take into account in particular that you clearly delimit the research object, state the targeted level of abstraction and outline the expected results also from the perspective of the authorities.

In addition to Form 1, a separate document with 2-3 specific research questions – derived from the research idea – must be submitted. Please be aware, that the research idea needs to be comprehended by informed non-experts. The working language within the WG MB4 is English. For this reason, we welcome submissions in English. However, submissions can also be made in German or French.

Provided the submitted research idea satisfies the formal requirements[1], the WG MB4 will assess it. The research idea can either be recognized as a research need, handed back to the authors for revision or rejected. The secretariat of the WG MB4 will set a date for submission of revised ideas.

All research ideas that are recognized as research needs by the WG MB4 will be forwarded to FEDRO for assessment. In consultation with the *Kommission für Forschung im Strassenwesen* (FOKO), the FEDRO will decide which research ideas should be pursued.

[1] The current Form 1 is completely filled out and handed in on time.

Research ideas that are to be pursued will generally be subject to a public call to tender.

Submission Date

- 26 January 2024

Further Information

For further information the secretariat of the WG MB4 is at your disposal (MB4@bss-basel.ch).

The secretariat of the WG MB4 informs interested institutions about current calls to tender for research endeavors and invitations to submit research ideas. For this purpose the secretariat maintains a mailing list. Should you want to receive information via this channel, please contact the secretariat (MB4@bss-basel.ch).

The following documents are only available in German or French. The following links will take you to the German versions. The French versions are available via the French version of FEDRO's website.

- **Handbook** «Forschung im Strassenwesen»
- **Detailed requirements for submitting research applications to FEDRO**

In the following tables you will find information on completed and ongoing research projects initiated by the WG MB4 and on research ideas that have been approved for implementation by FEDRO.

Completed and ongoing research projects

Research project ID	Title	ARAMIS	Status and link to report (if completed)
MB4_20_00A_01	Spatially-differentiated effects of automated driving (Räumlich-differenzierte Auswirkungen des automatisierten Fahrens)	Link	completed
MB4_20_01A_01	Pooling and its behavioural foundations (Verhaltensbezogene Grundlagen und Potenzial von Ride Pooling mit autonomen Fahrzeugen in der Schweiz)	Link	active
MB4_20_01B_01	Data Integrity and Ownership for Smart Mobility ("DAGSAM" (Data Governance für intelligente Mobilität))	Link	completed
MB4_20_01D_01	Automated Driving in future mobility systems: user preferences and modelled transport development (Präferenzen und Verkehrsentwicklung mit automatisierten Fahrzeugen)	Link	active
MB4_20_02B_01	Disruption potential of smart mobility: opportunities and risks from an ethical, sociological and economic perspective (Disruptionspotenzial der intelligenten Mobilität: Chancen und Risiken aus ethischer, soziologischer und ökonomischer Sicht)	Link	active
MB4_20_02C_01	Cyber Threat Intelligence Framework and Recommendations for C-ITS (Cyber-Threat Intelligence Framework und Empfehlungen für C-ITS)	Link	completed
MB4_20_02E_01	Minimum requirements for an authorization to remotely drive automated vehicles in Switzerland (Mindestanforderungen für eine Genehmigung der Fernlenkung von automatisierten Fahrzeugen in der Schweiz)	Link	active
MB4_20_02G_01	Roadmap for Swiss C-ITS Security Operation Center (Roadmap für ein Swiss C-ITS Security Operation Center)	Link	active

[2] See Handbook (chapter 4.3.2) and Detailed requirements for submitting research applications to FEDRO (chapter 4). A direct award is only possible if there is a special interest of the applicant worthy of protection that is recognised by FEDRO.

[3] Form 2: > Formulare > Formular 2D (German version) / Form 2E (English version) / Formulaire 2F (French version)

Research project ID	Title	ARAMIS	Status and link to report (if completed)
MB4_20_05B_01	Transition zones between mixed traffic and fully automated traffic operations (Übergänge zwischen Bereichen mit Mischverkehr und ausschliesslich automatisiertem Verkehr)	Link	active

Research ideas approved by FEDRO for implementation

Research idea ID	Title
MB4_20_05E	Minimum infrastructure requirements for conditionally and highly automated vehicles (Mindestanforderungen an die Infrastruktur für vernetzte bedingt- und hochautomatisierte Fahrzeuge)
MB4_20_03B	Digitalized and decarbonized mobility in Switzerland – economic potential of possible 2050 scenarios (Digitalisierte und dekarboniserte Mobilität in der Schweiz - volkswirtschaftliche Potentiale möglicher Szenarien 2050)
MB4_20_04A	Integration of slow-moving traffic into the digitalised transport system (Integration des Fuss- und Veloverkehrs (inkl. Mikromobilität) ins digitalisierte Verkehrssystem)