Call for research proposals (Form 2 and project description)

Project No	**MB4_20_00D**
Title	**Roadmap to Pioneering a Testing Lab for AV Capabilities**
Publication date	05.04.2024
Submission date	**17.05.2024** at the latest
Funding request	CHF 200'000.- (incl. VAT)
Underlying documents	• Handbook – Research on Roads • Instructions for completing Form 2 These documents are available in German, French and Italian on the FEDRO website at guides, forms, factsheets.
Related projects	• MB4_20_02C_01: Cyber Threat Intelligence Framework and Recommendations for C-ITS • MB4_20_02G_01: Roadmap for Swiss C-ITS Security Operation Center • MB4_20_02E_01: Minimum requirements for an authorization to remotely drive automated vehicles in Switzerland
Questions	Questions in relation to this call for proposals must be formulated in writing in one of Switzerland's national languages or in English. The answers will be made available to all interested parties on the FEDRO website at current calls for proposals. • Deadline for submitting written questions: 19.04.2024. Questions received after this date will not be answered. • Questions should be submitted to: Office of the Working Group Mobility 4.0 (MB4@bss-basel.ch) • Questions submitted before the deadline will be answered no later than: 01.05.2024
Submission	Interested research teams are invited to submit their research proposal to the office of the Working Group Mobility 4.0 (WG MB4*)* at MB4@bss-basel.ch with the reference 'Forschungsgesuch XYZ_20_00A'. The proposal should contain: • The completed Form 2 (as an Excel file): 'MB4_20_00D (Form 2) Roadmap to Pioneering a Testing Lab for AV Capabilities.xlsx'. This form must be downloaded from the FEDRO website at Current calls for proposals; • The project description (as a PDF and Word file). Proposals received after the deadline will not be considered. For instructions on completing Form 2 and preparing the project description, please see the Instructions for completing Form 2. Language: Form 2 and the project description must be submitted in one of Switzerland's national languages or in English.

Correspondence	All correspondence in relation to this call for proposals should be sent by email to the office of the Working Group MB4 (MB4@bss-basel.ch).
Composition of the Advisory Committee	Applicants are expected to propose the members of the Advisory Committee (cf. Form 2). Regarding the composition of the Advisory Committee, the rules set out by FEDRO must be observed. In submitting a research proposal to the Working Group MB4 , applicants confirm that they have the consent of the proposed individuals for their participation on the Advisory Committee.
Evaluation of research proposals	**Formal check:** The office of the Working Group MB4 will check compliance with the following formal requirements: • Form 2 is completed correctly and in full. • The project description contains all sections with the required content. • The project description does not contain more than the maximum number of words permitted. Proposals not meeting the formal requirements will be excluded from the rest of the procedure, with appropriate justification. **Content evaluation and weighting:** The Working Group MB4 will evaluate the research proposals submitted on the basis of the following criteria and their weighting: • Amount of the funding request: 25% • Form 2: 25% • Project description: 50% The **amount of the funding request** is evaluated using the following formula (this creates a symmetrical treatment of the percentage difference): $Z_i = 3 + 4 * \text{Sign}(Y - X_i) * [\text{Abs}(Y - X_i) / Y]$ where: $Z_{i,Max} = 5$ $Z_{i,Min} = 1$ with: Z_i= Evaluation of the amount of the funding request in proposal *i* Y = Average funding request of all proposals X_i= Amount of the funding request in proposal *i* The **other criteria** are assessed on a scale from 0 to 5: 0 Cannot be assessed; no data available 1 Very poorly addresses the criterion; insufficient, incomplete information 2 Poorly addresses the criterion; does not adequately refer to the project 3 Addresses the criterion; broadly meets the requirements of the call for proposals 4 Addresses the criterion well; good quality 5 Addresses the criterion very well; excellent quality

Selection of the research proposal	The research proposal that optimally fulfils the specified criteria will be forwarded by the Working Group MB4 to FEDRO for further processing/evaluation by the Commission for Research on Roads. Based on the recommendation of the Commission for Research on Roads, FEDRO will make the final decision on how to proceed with the selected research proposal. In both the Working Group MB4 and the Commission for Research on Roads, recusal rules apply to members who work in the same company or institution as the applicant.
Reservation	Both the Working Group MB4 and FEDRO may decide not to award a research contract if they consider all the research proposals to be unsatisfactory. The decision on the funding of research is taken exclusively by FEDRO in the form of a ruling.

Information on the research project

1 Background

The ongoing development of vehicles with automation systems makes it necessary to develop appropriate test environments to test the regulatory requirements placed on these vehicles and systems. The technical challenges are manifold and encompass various aspects of vehicle technology. A test center for vehicles with automation systems plays an important role in the evaluation and validation of these technologies.

It is still unclear which use cases are relevant for a test center in Switzerland and what technical and methodological requirements will be placed on it. From today's perspective, it appears unlikely that there will be sufficient demand for a test center in Switzerland that would allow a full homologation and (market) approval. It is more likely that specific use cases such as testing of prototype vehicles for research purposes, the periodic testing of vehicles with automation systems (periodic motor vehicle inspection) or the investigation of vehicles with automation systems following accidents will be relevant.

Relevant research work that has been or is being carried out as part of road research at FEDRO is listed under "Related projects". A complete overview of completed and ongoing research projects initiated by the Mobility 4.0 working group can be found in the ARAMIS database.

2 Research needs and objectives

Firstly, this research project aims to identify the use cases for a test center for vehicles with automation systems in Switzerland. The Swiss context must be considered with its existing or planned regulation for automated driving and its political structure. Based on this, the research project should, secondly, identify and formulate the necessary technical and methodological requirements for a test center.

The definition of requirements for initial vehicle homologation is not the subject of the research mandate. These will be defined at international level and - insofar as they already exist today and are relevant to the research project - will be considered as part of the research project.

The key findings from the research project are to be formulated in recommendations to experts within the administration.

3 Expected content and deliverables

The following content and deliverables are expected as part of the research work:

- Identification of probable use cases: The identification of probable use cases for a test center for vehicles with automation systems in Switzerland is important to understand the requirements for such a test center. As already briefly described in the initial situation, from today's perspective there is unlikely to be sufficient demand for a test center in Switzerland for the full homologation and (market) approval of (at least standard) vehicles with automation systems. The following use cases are more likely (these are examples, not an exhaustive list): a) Testing of Switzerland-specific requirements for vehicles with automation systems, b) Testing of prototype vehicles (operation exclusively for testing and research purposes), c) Periodic (re-)testing of vehicles with automation systems as part of motor vehicle inspections, d) Investigation of vehicles with automation systems following accidents. The selection of the probable use cases must be justified and forms the basis for the following analyses.
- Investigation of international regulations for vehicle testing: An in-depth investigation of international regulations for vehicle testing is expected. This includes the collection of information from vehicle manufacturers (OEMs) and technical services in the field of certification and homologation, including

reference to existing regulations of the United Nations Economic Commission for Europe (UNECE) and the European Commission (e.g. the Joint Research Center JRC).

- Development of test scenarios: Relevant test scenarios (with a focus on the identified use cases) are to be developed based on international standards. Standardized scenario databases are being developed at international level. The findings from this work should be incorporated into the study as far as possible and appropriate. The scenarios should serve as a basis for defining the requirements for a test center in Switzerland
- Derivation of technical and methodological requirements for a test center: Derivation and presentation of the requirements for setting up a test center, considering the automated vehicle capabilities to be tested, the sensors to be evaluated and the methodology for carrying out the tests.

The research work should observe and consider the existing international regulations for the approval of vehicles with automation systems (UNECE, EU). The Swiss context must be considered.

Expected project start: January 2025

Expected project duration: 15 months