

## Important information about these documents

This call is being held ahead of any agreement from the Commission that the relevant funding will be available. At present the relevant legislation is still under discussion in both Council and Parliament, and there is no certainty on the detailed arrangements for funding selected projects. The funding of any selected project, and the terms and conditions of participation in the projects, are dependent on completion of the legislative process and the subsequent contractual processes between the European Commission and EURAMET. Proposers submit to this call at their own risk.

### Background

Last year, EURAMET submitted a draft proposal to the EC for a further research programme to be established under article 185 of the Treaty on the Functioning of the European Union (TFEU) to follow on from EMRP and EMPIR. This was published by the EC at [https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/european-partnerships-horizon-europe/candidates-digital-industry-and-space\\_en](https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/european-partnerships-horizon-europe/candidates-digital-industry-and-space_en)

The initiative would be called the European Partnership on Metrology and would aim to create, by 2030, a sustainable and effective system for metrology at European level that ensures Europe has a world-class metrology system that:

- Provides metrology solutions, fundamental metrological reference data and methods, offering fit-for-purpose solutions supporting and stimulating European innovation and responding to societal challenges.
- Supports and enables effective design and implementation of regulation and standards that underpin public policies that address societal challenges.

The Commission commissioned an impact assessment into this proposal and 11 others in similar priority areas, and, based on those findings, published their own proposal for the Partnership, their response to the impact assessment and a draft of the Decision on 23<sup>rd</sup> February 2021. See:

<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2021:89:FIN>

[https://ec.europa.eu/commission/presscorner/detail/en/ip\\_21\\_702](https://ec.europa.eu/commission/presscorner/detail/en/ip_21_702)

<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021SC0035&qid=1614677899327>

That draft Decision is currently under discussion in the European Council and the European Parliament.

Under the assumption that the Council and Parliament pass the basic act which would form the legal basis for this research programme, and that the participating countries named in the Draft Decision submit the required commitment letters, EURAMET is publishing these potential Selected Research Topics and draft guidance notes. These documents are not approved by the Commission nor will they lead to a binding decision by EURAMET e.V. for any further negotiation or funding. All published guides and templates are subject to amendment by the EC and EURAMET e.V. as further information becomes known.

# Title: Trustworthy and sustainable smart mobility

## Abstract

Digitisation and automation are indispensable drivers for Sustainable and Smart Mobility (SSM). A common metrological framework is required to provide reliable sensing systems and trustworthy data. Proposals submitted against this SRT should lay the foundations of a Metrology of Trustworthiness for the automotive and transport industry, as a necessary condition for the development of SSM based on automated systems. This will ensure that the EU maintains its leading role in the international technical harmonisation of automated vehicles.

## Keywords

Connected Cooperative, and automated mobility (CCAM), Autonomous Vehicle (AV), Advanced Driver Assistance System (ADAS), Sustainable and Smart Mobility (SSM), Sensor Networks, Sensors Degradation, Uncertainty, Reliability, Traceability, Trustworthiness, Deep Learning, Artificial intelligence (AI)

## Background to the Metrological Challenges

The European Commission, through the European Green Deal, and specifically by one of its flagships measures, the Sustainable and Smart Mobility (SSM), aims for the European Union to be the world's first "*climate-neutral bloc*" by 2050. However, the trustworthiness of data, provided by sensors and devices used in Connected Cooperative and Automated Mobility (CCAM), Advanced Driver Assistance System (ADAS) and Autonomous Vehicles (AVs) is not reliable and traceable. For example, most sensors and sensing systems (such as Lidar, Radar, cameras, inertial measurement units etc.) are not sufficiently reliable to quantify the physical environmental phenomena. They lack metrological traceability, proper sensitivity parameters, associated uncertainties and reference performance standards. A trustworthy automation system will be based on the inherent reliability of its components, elements, and interconnected sensors, and on the quality of data acquired, transferred, processed, stored, and distributed. The knowledge of metrological attributes, such as accuracy, precision, and traceability of sensors interfacing with the physical world and environment will improve the quality of provided data.

## Objectives

Proposers should address the objectives stated below, which are based on the PRT submissions. Proposers may identify amendments to the objectives or choose to address a subset of them in order to maximise the overall impact, or address budgetary or scientific / technical constraints, but the reasons for this should be clearly stated in the protocol.

The JRP shall focus on metrology research necessary to support standardisation in Sustainable and Smart Mobility (SSM) based on the trustworthiness of data provided by sensors and devices.

The specific objectives are

1. To develop calibration procedures and metrological characterisation of the individual sensors used in transport system industries for Advanced Driver Assistance System (ADAS) and Autonomous Vehicles (AVs), ensuring accuracy, precision, sensitivity, repeatability, and establishing traceability to SI.
2. To establish new methods for checking the reliability, malfunctioning and long-term functionality of sensors in working conditions (e.g. aging and weather) including approaches towards predictive maintenance.
3. To characterise the fusion of sensor data and manage the trustworthiness of data flows by establishing uncertainties and accuracy of evaluation algorithms and by extending the trustworthiness of Artificial Intelligence
4. To establish calibration services, within participating NMIs, for the sensors and fused sensor systems, introduce methodologies for statistical approach in large-scale calibration and lay the foundation for a European Common Mobility Data Space as defined in COM (2020) 789. To publish a best practice guide on these calibration services.
5. To facilitate the take up of the technology and measurement infrastructure developed in the project by the measurement supply chain (accreditation laboratories), the European Metrology Network for

Mathematics and Statistics (EMN MATHMET), standards developing organisations (IEEE P2020, ETSI, UNECE) and end users (automotive and transport industry).

These objectives will require large-scale approaches that are beyond the capabilities of single National Metrology Institutes and Designated Institutes. To enhance the impact of the research, the involvement of the appropriate user community such as industry, standardisation and regulatory bodies is strongly recommended, both prior to and during methodology development.

Proposers should establish the current state of the art and explain how their proposed project goes beyond this. In particular, proposers should outline the achievements of the EMPIR 17IND12 “Metrology for the Factory of the Future” (Met4FoF), EMPIR 17IND06 “Metrology for the next-generation digital substation instrumentation” (FutureGrid II), and EMPIR 17IND02 “Communication and validation of smart data in IoT-networks” (SmartCom) and how their proposal will build on those.

EURAMET expects the average EU Contribution for the selected JRPs in this TP to be 2.2 M€ and has defined an upper limit of 2.7 M€ for this project.

EURAMET also expects the EU Contribution to the external funded partners to not exceed 35 % of the total EU Contribution across all selected projects in this TP.

## Potential Impact

Proposals must demonstrate adequate and appropriate participation/links to the “end user” community, describing how the project partners will engage with relevant communities during the project to facilitate knowledge transfer and accelerate the uptake of project outputs. Evidence of support from the “end user” community (e.g. letters of support) is also encouraged.

You should detail how your JRP results are going to:

- Address the SRT objectives and deliver solutions to the documented needs,
- Feed into the development of urgent documentary standards through appropriate standards bodies,
- Transfer knowledge to the automotive and transport sector.

You should detail other impacts of your proposed JRP as specified in the document “Guide 4: Writing Joint Research Projects (JRPs)”

You should also detail how your approach to realising the objectives will further the aim of the potential European Partnership on Metrology to develop a coherent approach at the European level in the field of metrology and include the best available contributions from across the metrology community. Specifically, the opportunities for:

- improvement of the efficiency of use of available resources to better meet metrological needs and to assure the traceability of national standards
- the metrology capacity of EURAMET Member States whose metrology programmes are at an early stage of development to be increased
- organisations other than NMIs and DIs to be involved in the work.

## Time-scale

The project should be of up to 3 years duration.