

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

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 23rd 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://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: Metrology for standardised, innovative, alternative and validated measuring tools for water quality monitoring

Abstract

Traditional water quality monitoring programmes have limitations, for example, they may not take the temporal variability of water chemistry and pollution into account. To address this, low-cost innovative and alternative measuring tools can be used on-site and online for real-time water quality monitoring with the aim of meeting higher water quality standards and reducing environmental impact. However, these tools are not widely used because they are often not validated, or they are perceived to be less reliable or more difficult to use. Therefore, a standardised metrological infrastructure needs to be developed to certify the validity and quality of the data obtained using these tools in order to support their acceptance, to promote their use and to make their application sustainable.

Keywords

Equivalence of results, harmonised validation, innovative and alternative water quality monitoring tools, measurement uncertainty, quality assurance

Background to the Metrological Challenges

Surface and ground waters need to be monitored because their quality can be greatly influenced by anthropogenic sources (e.g. urban, industrial and agricultural) and natural processes (e.g. precipitation inputs, erosion and chemical weathering). Therefore, representative and reliable water quality monitoring programmes are required to determine whether costly measures need to be implemented to improve water quality in order to achieve good ecological status as per the Water Framework Directive. Most of these programmes are currently based on the collection of spot samples, at a stated frequency, followed by laboratory analysis. However, this approach may fail to take into account the temporal variability of water chemistry and pollution.

Affordable and reliable screening tools and methodologies (e.g. biomonitoring, online monitoring systems, biological early warning systems, field test kits for specific pollutants, portable analytical assay equipment, sensors, direct toxicological assays, passive samplers) need to be used to improve water quality monitoring programmes. These include (i) laboratory-based methods, (ii) test kits (e.g. immunoassays such as enzyme-linked immunosorbent assay (ELISA) and lateral-flow assays), (iii) portable devices, (iv) continuous measuring devices and (v) continuous or unattended sampling techniques. These tools can be used to monitor and measure the physico-chemical parameters (e.g. nutrients, organic matter, absorbance, inorganic and organic compounds), the microbiological parameters (e.g. the presence of bacteria/viruses) and the toxicity and ecotoxicity of water.

Some of the water quality parameters that need to be monitored can be defined by their method, meaning that any significant change in the method will engender a different measurand. An example is the biochemical oxygen demand, which is an indirect measure of the biodegradable organic carbon content of the water. In this example, the use of alternative biochemical oxygen demand test kits, with a two day response time, rather than the standard method that takes five days, can greatly improve the management of wastewater treatment plants leading to higher quality effluents, at reduced costs, with an improved environmental footprint that meets regulatory requirements.

Innovative and alternative water quality monitoring tools clearly have advantages over traditional methods, such as their low cost, their suitability for use on site and online, and their fast response, which allows real-time monitoring. This makes it possible to be alerted upstream about any contamination and to carry out more complete analyses before taking the necessary protective measures. However, these innovative and alternative water quality monitoring tools are not widely used at the moment because they are often not validated, are perceived to be less reliable, or they lack instructions on how to use them and/or on how to interpret the results. Consequently, they are not yet suitable for use in reporting to regulatory requirements and there is a strong need to build up a metrological infrastructure to certify the validity and quality of the data obtained using these tools. Once in place, this is expected to improve their acceptance and use within the legislative framework.

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 water quality monitoring.

The specific objectives are

1. To assess the metrological performance of innovative and alternative measuring tools operated online and in the laboratory for water quality monitoring. The performance assessment should focus on estimating the measurement uncertainty and i) on the comparability to a standardised/accepted reference method for parameters defined by their method or ii) on the traceability to the SI for the other parameters.
2. To organise and conduct comparisons in order to demonstrate the competence of the organisations that are responsible for laboratory-based, and on-site, water quality monitoring measurements. The focus should be on the selection and preparation of representative real, or synthetic, water samples.
3. To compare a set of innovative, alternative and validated water quality measuring tools, from objective 1, with a reference method in order to demonstrate the equivalence of results. This should include the selection of sufficient representative water samples, the selection of the statistical tests to be implemented and the selection of the assessment criteria.
4. To collaborate with the technical committees CEN/TC 230 “Water analysis” and ISO/TC 147 “Water quality”, and the users of the standards they develop to ensure that the outputs of the project are aligned with their needs. This will include the provision of a report on innovative, alternative and validated measuring tools for water quality monitoring and recommendations for incorporation of this information into future standards at the earliest opportunity.

The proposed research shall be justified by clear reference to the measurement needs within strategic documents published by the relevant Regulatory body or Standards Developing Organisation or by a letter signed by the convenor of the respective TC/WG. EURAMET encourages proposals that include representatives from industry, regulators and standardisation bodies actively participating in the projects. The proposal must name a “Chief Stakeholder”, not a member of the consortium, but a representative of the user community that will benefit from the proposed work. The “Chief Stakeholder” should write a letter of support explaining how their organisation will make use of the outcomes from the research, be consulted regularly by the consortium during the project to ensure that the planned outcomes are still relevant, and be prepared to report to EURAMET on the benefits they have gained from the project.

Proposers should establish the current state of the art, and explain how their proposed research goes beyond this. In particular, proposers should outline the achievements of the EMRP project ENV08 WFD and the EMPIR project 18NRM01 EDC-WFD and how their proposal will build on those.

EURAMET expects the average EU Contribution for the selected JRPs in this TP to be 0.8 M€, and has defined an upper limit of 1.0 M€ for this project.

EURAMET also expects the EU Contribution to the external funded partners to not exceed 30 % of the total EU Contribution across all selected projects in this TP.

Any industrial partners that will receive significant benefit from the results of the proposed project are expected to be unfunded partners.

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 water quality monitoring 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.