

# Title: Support for a European Metrology Network on environmental monitoring

## Abstract

Environmental monitoring embraces a number of fields including; air, water, noise, light, and thermal measurement. However, interaction between disciplines is often minimal or even non-existent. There are limited multidisciplinary networks on environmental monitoring at European level with a specific metrological focus. Recent European initiatives, such as the One Health European Joint Programme (OHEJP), highlight the need for robust metrology references for multifactor research and for greater cooperation between individual themes. Consequently, there is a need for an integrated European Metrology Network to establish a long-term dialogue between the metrology community and stakeholders on environmental monitoring to support innovation, competitiveness and regulatory decision-making in this area.

## Keywords

Air quality, water quality, noise, light, thermal pollution, emissions, integrated approach, interdisciplinary study, metrological tools.

## Background

There is currently no global vision of the services offered by the NMIs and DIs on environmental monitoring for stakeholders. There is an urgent need for an initiative to develop a multidisciplinary metrological infrastructure for delivering standards and related services in the areas of: air quality (including emissions), water quality (including thermal pollution), light pollution and noise pollution. Other fields of research (such as soil pollution) could also be considered.

Current activities operate in field-specific silos, with minimal interaction between disciplines. Regarding **Air Quality**, there is a broad range of activities at NMIs/DIs including reference materials for calibration of gas and particle pollutants and applied metrology for measurements in the field. There is some involvement in international networks e.g. WMO-GAW (World Meteorological Organization Global Atmosphere Watch), AQUILA (the European network of National Air Quality Reference Laboratories), NORMAN (the network of reference laboratories, research centres and related organisations for monitoring of emerging environmental substances). However, these networks are limited to specific areas (regulated compounds, emerging substances, equivalence methods, inter-laboratory comparisons, etc.) or to specific matrices (water, air, soil) and do not fully investigate interfaces between environmental compartments (air/water, soil/air, etc.). There is currently no multidisciplinary network for data with metrological rigour, making it difficult to support policy-makers and industry and to develop reference measurement methods and specifications.

There are limited structures for **water pollution** at European level beyond the Technical Committee for Metrology in Chemistry and the NORMAN network. NMI/DIs activities need to link directly into these existing networks and foster interdisciplinary collaborations e.g. air/water pollution, air/ soil pollution.

Currently there is no real European multidisciplinary and metrological network addressing the measurement of **noise and light pollution**. Current coordination between NMIs/DIs regarding noise pollution takes place via the annual meetings of the Technical Committee for Acoustics, Ultrasound and Vibration (TC-AUV). Noise pollution is included in the specific roadmaps for acoustics and potential participation in EMPIR projects is regularly discussed. However again, coordination is linked to a specific community and does not include participation on wider multidisciplinary projects associated with pollution monitoring. The Council of Europe has issued two Recommendations 1776 (2010) and 1947 (2010), on noise and light pollution however there is no coordination at national level and in some areas national regulations are superseded by regional laws. Light pollution is strictly related to environmental conditions and needs a diffuse approach among scientists and stakeholders. There are some networks (of varying quality) at international level specific to light pollution such

as the Dark Sky Association, as well as two Horizon 2020 projects which aim to increase the cross-fertilisation of skills. A draft EMPIR project for the Environmental Call 2019 has been proposed to improve measurement uncertainty of sky glow and to build a metrology network of European stakeholders.

How and where NMIs should focus limited resources to obtain maximum impact for society urgently requires a strategic plan and significant coordination both at European and global levels. No single NMI has the expertise or resource to tackle all or even a significant fraction of the most critical priorities without collaboration. Without coordination, there is a strong likelihood of unnecessary duplication, with NMIs (nationally and/or regionally) potentially independently choosing to focus efforts on the same challenge with consequential neglect of others. EURAMET is considering establishing a European Metrology Network to coordinate the European NMI response, to establish close links to the stakeholder community, to develop and implement a strategic agenda and establish a knowledge, technology transfer and promotion plan, to ensure an effective response is put in place. This SNT is intended to elaborate how a network could support EURAMET and to support that network in its initial tasks.

## Objectives

Proposers should address the objectives stated below, which are mainly based on the PNT 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 / legal / regulatory / market constraints, but the reasons for this should be clearly stated in the protocol.

The JNP shall focus on developing a long term ongoing dialogue between the metrology community and relevant stakeholders. This dialogue should support the take-up of research outputs from the metrology community and the collection of needs from stakeholders to inform future research.

The specific objectives are:

1. To identify and establish regular dialogue between the project and all stakeholders in the fields of environmental monitoring, including: air quality, water quality, light pollution and noise pollution. This should encompass existing networks e.g. AQUILA, NORMAN and the EURAMET Technical Committee for Acoustics, Ultrasound and Vibration (TC-AUV), as well as standards development organisations. The project should identify stakeholder needs and facilitate new and existing interdisciplinary collaborations.
2. Using the needs of stakeholders identified in Objective 1, to develop a Strategic Research Agenda (SRA) and roadmaps for environmental monitoring that combine an integrated, multidisciplinary approach with traceable metrology solutions (e.g. certified reference materials). This should take into account the metrological needs of stakeholders and include measures to support innovation, assist competitiveness, ensure comparability and prioritise future research.
3. Using feedback on the needs of stakeholders identified in Objective 1, to develop a web-based platform for stakeholders in the fields of environmental monitoring that provides a single point of contact for their metrological needs. The platform should provide easy access to European metrology capabilities, relevant metrological tools and environmental regulation requirements in order to support decision-making and identify gaps in current NMI/DI measurement services. It should be developed in a manner that allows it to be maintained by a future EMN.
4. Using the feedback from stakeholders in Objective 1, set up a knowledge-sharing programme for environmental monitoring metrology, to promote the dissemination and uptake of information, particularly with existing networks e.g. AQUILA, NORMAN and EURAMET TC-AUV. This should include a range of activities regularly organised by the project, such as the exchange of researchers between organisations, metrology workshops, interdisciplinary studies and training courses.
5. To develop a plan for a multidisciplinary and sustainable European Metrology Network for environmental monitoring. The plan should be completed within 12 months of the start of the project and should: (i) identify the scope of the EMN, with respect to the remits of other EMNs, (ii) use coordination and smart specialisation of capabilities, (iii) align with other running initiatives and projects, (iv) promote the development of emerging member states, and (v) consider how to extend collaboration to third countries.

The proposed activities shall be justified by clear reference to the measurement needs within strategic documents published by the relevant stakeholders. Proposers should establish the current state of the coordination in this area and explain how their proposed project goes beyond this.

The proposed activities should not include those essential for the establishment and operation of the EMN. EMNs will be established and operated by the EURAMET members using their own national resources

regardless of whether specific EMPIR proposals are funded. EMPIR funding is for specific tasks aimed at ensuring a proposed EMN will progress quickly towards its establishment and implementation and contribution to the objectives of the programme.

EURAMET expects the average EU Contribution for the selected JNPs in this TP to be 0.4 M€, and has defined an upper limit of 0.5 M€ for this project.

## **Potential Impact**

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

You should detail how your JNP results are going to:

- Address the SNT objectives and deliver solutions to the documented needs,
- Provide a lasting improvement to coordination in the European metrological community and communication with their stakeholders beyond the lifetime of the project,

You should detail other impacts of your proposed JNP.

You should also detail how your approach to realising the objectives will further the aim of EMPIR 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

## **Time-scale**

The project should be of up to 4 years duration.