



# supportBSS Project Overview

March 2021

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## EURAMET's European Metrology Networks

The vision of EURAMET and its members is to ensure Europe has a world-leading metrology capability, based on high-quality scientific research and an effective and inclusive infrastructure, that meets the rapidly advancing needs of end users. [EURAMET's European Metrology Networks](#) (EMNs) will help to realise this aim.

The EMNs will analyse the European and global metrology needs and address these needs in a coordinated manner. EMN members will then formulate common metrology strategies including aspects such as research, infrastructure, knowledge transfer and services. The members will be committed to contributing to the EMN, helping to establish sustainable structures that are strategically planned from the outset.

## EMPIR 19NET03 supportBSS: An introduction

In recent years to better protect European citizens, the EU's radiation protection regulations have become ever more complex due to stricter legal dose assessments, exposure limits and activity concentrations as well as new technological developments and emerging complex practices. A European Metrology Network (EMN) in this area could act as a single point of contact to cover all the metrological needs related to radiation protection and to maintain reliable quality assurance.

The aim of the project is to support the establishment of the potential EMN under consideration. This will be done by beginning to identify stakeholder's research needs, initiating the implementation of a long-term ongoing dialogue between the potential EMN and the metrology community and developing a web platform for radiation protection regulation. A Strategic Research Agenda (SRA) and two roadmaps will also be developed. Furthermore, the project and potential EMN will work together to support long-term knowledge-sharing and capacity building in Europe and develop a proposal for a sustainable European metrology infrastructure. This will significantly strengthen radiation protection in Europe.

Council Directive 2013/59/EURATOM lays down the basic safety standards for protection against the dangers arising from exposure to ionising radiation for workers, the public and the environment. The directive applies to any planned, existing or emergency exposure situation. It focuses on exposures which cannot be disregarded from a radiation protection point of view or with regards to the environment in view of protecting long-term human health. The updated directive also includes drastically reduced exposure limits, such as the dose limit for the eye lens or the radon activity concentration.

Furthermore, new radiation practices and new technological developments, such as pulsed fields in medical, industrial and technical applications have resulted in the use of radiation fields of growing complexity. Therefore, the metrology for radiation protection measurements and legal dose assessment is a highly complex task. It requires increased efforts in all



member states to build and maintain sustainable metrological competence. Increased digitalisation will lead to digital legal dosimetry over the next few years. Legal dose assessment and an associated dose registry is currently a national issue, but exposed workers are active internationally, therefore their personal dose values must be combined into a single value. This is only possible if dose assessment is performed in each country with the same level of reliability and that combining dose values is done based on harmonised data processing.

In the past, radiation protection regulations were often implemented without considering the metrological implications, leading to cost inefficiencies. In addition, implementation of limit values was hard to comply with in practice. Shared specialist facilities would allow the required protection to be achieved without driving up costs.

At the moment 16 project partners are working on this goal!



## History of radiation protection

Radiation protection legislation has been overhauled to better protect European citizens. Radiation protection measurement (dosimetry) will need to become more responsive to changing needs, by supporting new technologies more harmonised worker protection measures, and digitalisation trends. As there is no comprehensive facility capable of supporting all these requirements, a European Metrology Network for reliable radiation protection regulation is being considered, to help introduce a legally enforceable European quality assurance system. The project to support the establishment of the EMN started in June 2020 and will last for four years. It aims to develop a long-term ongoing dialogue between the metrology community and relevant stakeholders in the field of radiation protection regulation.

The need for this development in quality assessment capabilities to enable comprehensive radiation protection can be understood best by looking back to the history of radiation protection. This history begins at the turn of the 19<sup>th</sup> and 20<sup>th</sup> centuries with the observation that ionising radiation from natural and artificial sources can have a damaging effect on living organisms.

The discovery of X-rays by Wilhelm Conrad Röntgen in 1895 led to extensive experiments by scientists, physicians and inventors. Initially, the experiments were handled very carelessly. For a long time, the dangers of radioactivity and radiation were not recognised, see Figure 2.



Figure 1: Unprotected experiments in the USA in 1896 with an early X-ray tube (Crookes tube), when the dangers of radiation were still largely unknown. Source: William J. Morton and Edwin W. Hammer (1896): *The X-ray, or Photography of the Invisible and its value in Surgery*, American Technical Book Co., New York, fig. 54.

The history of radiation protection regulation in Europe was started by the EURATOM Treaty in 1957. The feedback process on the following legislation turned out to be the most challenging. Various regulations were implemented however the metrological implications were not considered in detail. The implementation was done without asking feedback from the metrology institutes due to a lack of any communication strategy. This proved costly in the field of radiation protection and increased social dissatisfaction with the implementation of hard-to-reach limit values.

This emphasises the need to implement ongoing stakeholder dialogue. This is the aim of this project and potential EMN. The project's "Publishable Summary" is available here, s. Figure 3.



Figure 2: Dosimeter and radiation warning sign, from the EURAMET website of [Support for a European Metrology Network on reliable radiation protection regulation](#).

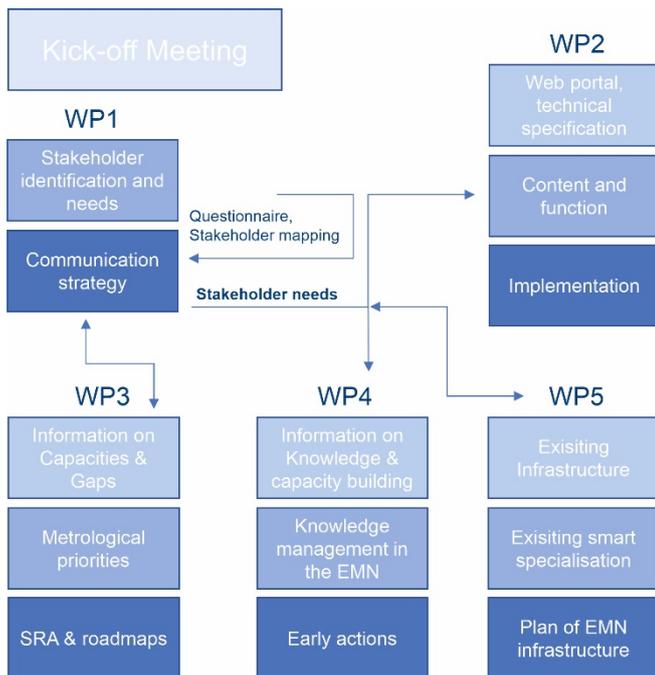


Figure 3: The objectives of supportBSS: Our route to an EMN. (WP = work package)

### Objective 1: Implementing a long-term dialogue

The aim is to establish regular, constructive dialogue and liaison between the project and stakeholders of radiation protection regulation. The stakeholder needs are central to the development of all objectives, see Figure 3.

An on-line questionnaire to identify existing metrological capabilities related to radiation protection, stakeholders and their needs was created and sent to the identified list of stakeholders. The stakeholders included standards development and regulatory organisations, national and international bodies, manufacturers of radiation protection devices, medical staff, etc. A stakeholder committee was formed as a result of discussions during and after kick-off meeting with the consortium and stakeholder groups. Also, the available information on SRAs and roadmaps has been collected and summarised for the stakeholders. The stakeholder database has been created and will be updated regularly throughout the project.

### Objective 2: Web portal for radiation protection regulation

The aim is - to design and implement a web portal serving as a contact point for the metrology community, stakeholders and customers in the area of radiation protection. The web portal will enable stakeholders' easy access to capabilities and the ability to interact and exchange information.

The majority of work planned for this objective is in 2021. This will rely on the stakeholder database and on the information gathered from them. Currently, an

overview of how the web portal will be presented to enable communication between the metrology community and the stakeholders / users has been created. In addition, a proposal of future web portal administration requirements addressing e.g. the accessibility of web portal, procedure of validation of published information is being prepared.

### Objective 3: Strategic Research Agenda (SRA) and Roadmaps

The aim is to develop a Strategic Research Agenda (SRA) and roadmaps for metrology services underpinning radiation protection regulation.

Initial work has concerned the study of the SRA and equivalent strategic documents produced by the RP Platforms e.g. Melodi, Eurados, Euramed, Neris, Alliance and Share, as well as relevant organisations such as the EURAMET TC-IR, IAEA, BIPM, HERCA, among other, looking for the identification of research needs and trying to establish a link to metrology issues. A workshop was held. The perspective of each platform and organisation in each specific field together with the fundamental or applied research character of the topic, its relative importance if identified by more than one, was noted. A draft document providing a summary of the main findings is currently being prepared for circulation among the project partners. This will also be shared with stakeholders for feedback.

### Objective 4: Knowledge-sharing and capacity building

The aim is to develop a knowledge-sharing programme that promotes the transfer of knowledge from NMI/DIs to stakeholders (primarily emerging NMIs/DIs, secondary calibration laboratories and radiation protection workers). It is envisaged that the knowledge-sharing and capacity building programme will include regularly hosted activities for a wide range of stakeholders, such as the exchange of scientific personnel between organisations, metrology workshops, training courses and interlaboratory comparisons.

An online literature review has been completed to assess the current availability of radiation protection training courses, capacity building activities and other knowledge-sharing activities. This information will feed into a future gap-analysis with the intention of identifying where knowledge transfer activities are required. One early example is that the consortium (and colleagues from EMPIR project Preparedness) have identified that 'citizen science' networks require guidance in making their own radiation measurements. Such networks, though not providing services to support radiation protection regulation, are playing an increasingly important role in environmental radiation protection.



### Objective 5: Joint and sustainable European metrology infrastructure

The aim is to develop a plan for a joint and sustainable European metrology infrastructure underpinning radiation protection regulation. The plan will be completed within the first 12 months of the project and will address how to (i) use coordination and smart specialisation of capabilities (ii) align with other running initiatives and projects, (iii) promote the development of emerging member states, and (iv) consider how to extend collaboration to third countries.

To date, the existing metrology infrastructure that underpins the radiation protection regulation has been identified and combined into a database. The available good practice guides and international standards (ISO, IEC) and IAEA guides related to radiation protection calibrations, type testing and emergency preparedness have been collected as well and have been combined in a second database. Using this data, a gap analysis will be performed to identify the fields of radiation protection where infrastructure, guides and standards are missing.

### Past Events

#### Kick-off meeting of supportBSS

##### Kick-off Meeting EMPIR 19NET03 supportBSS



Towards a proposal for an EMN on Radiation Protection

##### 23 June 2020 EMPIR 19NET03 supportBSS

08:00 - 08:30	Technical test of the Web Conference
08:30 - 09:00	<b>Registration</b>
09:00 - 09:15	<b>Welcome</b>
09:15 - 09:45	<b>Keynote talk:</b> Ellie Conolly (JNP Project Officer), <i>Introduction to JNPs</i>
09:45 - 10:00	<b>Open Questions</b>
10:00 - 11:00	<b>Initial Activities:</b> JNP Work Packages 1 & 2
11:00 - 11:15	<b>Break</b>
11:15 - 12:15	<b>Initial Activities:</b> JNP Work Packages 3 & 4
12:15 - 13:15	<b>Lunch</b>
13:15 - 14:15	<b>Initial Activities:</b> JNP Work Packages 5 & 6
14:15 - 15:30	<b>First outputs:</b> Publishable summary Data Management Plan
	<b>Open Discussion:</b> Stakeholder Committee, Logo, Newsletter and the next meeting
15:30 - 16:00	<b>Closing Remarks</b>



##### 24 June 2020 EMN based on 19NET03

08:00 - 08:30	Technical test of the Web Conference
08:30 - 08:45	<b>Registration</b>
08:45 - 09:00	<b>Welcome</b>
09:00 - 09:15	<b>Summary of Day one:</b> 19NET03 supportBSS
09:15 - 09:45	<b>Keynote Talk:</b> Jörn Stenger (EURAMET chair elect), <i>The strategic role of the EMNs</i>
09:45 - 10:30	<b>Keynote Talk:</b> Thomas Damitz (EURAMET Networks Officer), <i>Experience from existing EMNs</i>
10:30 - 10:45	<b>Break</b>
10:45 - 11:15	<b>Keynote Talk:</b> Annette Röttger (PTB), <i>Our route to the EMN for radiation protection</i>
11:15 - 12:15	<b>Open Discussion</b>
12:15 - 12:30	<b>Closing Remarks</b>

EURAMET e.V., Bundesallee 100, 38116 Braunschweig, Germany  
Phone: +49 531 592 1960 Email: secretariat@euramet.org www.euramet.org



Figure 4: Agenda from supportBSS kick-off meeting.

The kick-off meeting for the project 19NET03 supportBSS was held virtually on 23 – 24 June 2020, hosted by PTB. In this meeting a stakeholder committee was established.

### Gap Workshop

A virtual workshop on gaps in radiation protection metrology was held on 9 November 2020. It was organised by the consortium of supportBSS. The so-called gaps in radiation protection metrology and capacities either in the scope of the Council Directive 2013/59/EURATOM or in some aspects of the EURATOM treaty were discussed and summarised in 6 parallel sessions. The topics considered most important in terms of radiation protection metrology are summarized in six main topics:

- TOP 1: reference fields
- TOP 2: radiation protection quantities
- TOP 3: education and training needs
- TOP 4: measurement devices for radiation protection in medical or industry applications of ionising radiation or for environmental monitoring & handling and transmission of measurement data
- TOP 5: activity standards
- TOP 6: type testing: harmonisation and national requirements & radiation protection legislation, ISO standards, accreditation

A summary report on the workshop is in preparation and will be distributed to all participants soon.

### vCarm

The scope of the potential EMN and the projects first results were presented on the vCARM 2020 under the title “A presentation Metrology for radiation protection: Our route to a European Metrology Network”.

### CCRI webinar on “Metrology for Radiation Protection”

A CCRI webinar on “Metrology for Radiation Protection” was run on 5 October 2020 by the coordinator of supportBSS. This seminar summarised the technical issues that need to be tackled in the coming years, including opportunities to get involved in research. The second part of the seminar covered a EURAMET initiative to engage with stakeholders and to strengthen existing knowledge transfers. This webinar is available on YouTube:

<https://www.youtube.com/watch?v=V2B77LyY62I>

### EURADOS GA and EURADOS WG3.3

In the General Assembly of EURADOS e.V., EURADOS Chair Filip Vanhavere presented the potential EMN on radiation protection to an audience of 800 participants worldwide to inform the members about the cooperation between EURAMET and EURADOS.

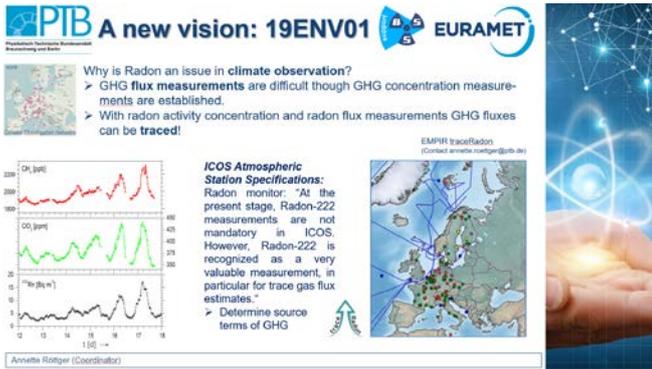


Figure 5: The environmental aspects play an important role in the developing EMN on radiation protection.

In the annual meeting of EURADOS e.V., the consortium presented first results in the WG 3.3 with a special focus on the environmental aspects following the EMPIR environmental call in 2019 and preparing for the Green Deal call in 2021 of the potential European Partnership on Metrology.

### EURAMET Stakeholder Engagement Workshop

The engagement with stakeholders is a key objective of EURAMET and its European Metrology Networks. In a recent workshop EURAMET introduced the concept and supported the consortium in defining priorities. The outcomes of the workshop, which was hosted by Thomas Damitz and Caroline Pritchard, will be used to create a communication strategy for a potential EMN on radiation protection regulation.

### Recent & Upcoming Events

The consortium is currently preparing for the following meetings, conferences and workshops:

10 February 21	TC IR Meeting
18 February 21	Joint Meeting BoD / TC Chairs / EMN Chairs/WG Convenors
19 – 30 April 21	EGU 2021
In planning:	
05 May 21	supportBSS M12 project meeting

### Update on the establishment of the potential EMN for Radiation Protection

Everyone in the world is exposed to environmental radiation and more than 23 million people around the world are exposed to ionising radiation in the workplace.

Due to new technological developments radiation exposure has been increasing for years. Thus, compliance with the corresponding legislation has become more complex due to stricter legal dose rate assessments, exposure limits and limits on activity concentrations.

An EMN for radiation protection regulation is needed as a central contact point to cover all metrological requirements in connection with radiation protection. Such an EMN under the umbrella of EURAMET is in under discussion and being prepared and supported by the EMPIR project 19NET03 supportBSS.

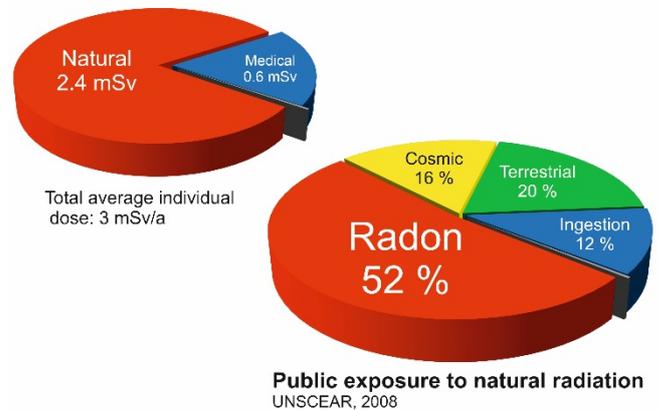


Figure 6: Public exposure published as published by UNSCEAR, 2008.

The partners of supportBSS, together with other organisations providing a service in the field of radiation protection, are preparing a proposal for the EURAMET General Assembly in 2021 to establish the EMN on radiation protection. The proposal and the Memorandum of Understanding (MoU) are nearly finished. The supporting Delegate from EURAMET is Jörn Stenger, the proposer is Annette Röttger. The final objective of the network project is to develop a plan for a harmonised, sustainable, coordinated and smartly specialised infrastructure to underpin the needs expressed in the European regulations for radiation protection.

### Acknowledgements

The consortium is grateful to have this powerful support from colleagues worldwide! Further collaboration interest is welcome.

This project (19NET03) has received funding from the EMPIR programme co-financed by the Participating States and from the European Union's Horizon 2020 research and innovation programme.