

Publishable Summary for 19NET03 supportBSS Support for a European Metrology Network on reliable radiation protection regulation

Overview

In recent years, 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) is needed as a single point of contact to cover all the metrological needs related to radiation protection and to maintain reliable quality assurance. This project will support the future EMN by identifying stakeholder research needs, implementing a long-term ongoing dialogue between them and the metrology community and installing a web platform for radiation protection regulation. A Strategic Research Agenda (SRA) and two roadmaps will also be developed. Furthermore, long-term knowledge-sharing and capacity building in Europe will be supported and a proposal for a sustainable European metrology infrastructure will be developed. This will significantly strengthen radiation protection in Europe.

Need

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 up 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, regulations were often implemented without consideration of the metrological implications. This led to cost inefficiencies in complying with radiation protection rules and the implementation of limit values that were hard to comply with in practice. With the introduction of shared specialist facilities, it will become possible to secure the protection goal without driving up costs.

Objectives

The overall aim of this project is to develop a long-term ongoing dialogue between the metrology community and relevant stakeholders in the field of radiation protection regulation. This dialogue will support the collection of needs from stakeholders to inform future research and the take-up of research outputs from the metrology community.

The specific objectives are:

1. To establish regular, constructive dialogue and liaison between the project and stakeholders of radiation protection regulation. This will include (i) standards development and regulatory organisations related to Council Directive 2013/59/EURATOM, (ii) national and international bodies e.g. Heads of the European Radiological Protection Competent Authorities (HERCA), International

Atomic Energy Agency (IAEA), the European Radiation Dosimetry Group (EURADOS), (iii) manufacturers of radiation protection devices and (iv) medical staff.

2. To develop a web-based platform for radiation protection regulation stakeholders, taking into account feedback from stakeholders in Objective 1. The platform will include easy access to European metrology capabilities and regulatory requirements, i.e. for the Council Directive 2013/59/EURATOM, as well as a service desk to answer stakeholder's questions. The platform will also be developed in a manner that allows it to be maintained by a future EMN.
3. To develop a Strategic Research Agenda (SRA) and roadmaps for metrology services underpinning radiation protection regulation, in particular with respect to (i) safety, (ii) technical application and (iii) environmental factors, taking into account feedback from key stakeholders in Objective 1. The SRA and roadmaps will take into account existing national priority lists and on-going initiatives and networks such as the IAEA/WHO Secondary Standards Dosimetry Laboratory (SSDL) network, EURADOS and EURAMET TC-IR. The SRA shall address the measurement of ionising radiation in the workplace and environment as required by the EURATOM TREATY articles 31, 33, 35 and 36 where it is appropriate.
4. To set up and promote a knowledge-sharing programme for stakeholders in order to support the dissemination and uptake of results, including those from previous, relevant EU research, taking into account feedback from stakeholders in Objective 1. This will include a range of regularly hosted activities for a wide range of stakeholders, such as the exchange of researchers between organisations, metrology workshops, training courses and interlaboratory comparisons.
5. To develop a plan for a joint and sustainable European metrology infrastructure underpinning radiation protection regulation. The plan will be completed within 12 months of the start of the project and address how to (i) develop coordination and smart specialisation of capabilities, (ii) integrate existing Quality Assurance infrastructure and type testing laboratories into the joint infrastructure, (iii) align with other running initiatives and with TC-IR, (iv) promote the development of emerging member states, and (v) consider an extension of the collaboration to third countries.

Results

Objective 1 - Establish regular dialogue and liaison with key stakeholders interested in radiation protection regulation

Stakeholders will be identified, grouped, addressed and sorted according to their interests. The project will implement a databank which will include at least the following groups: standards development and regulatory organisations, national and international organisations and bodies, e.g. HERCA, EURADOS, IAEA, ICRU, ICRP, manufacturers of radiation measurement devices and medical staff organisations. The data collected in the project will provide information on needs, capacity, interests and activities of organisations developing or applying radiation protection requirements, rules and regulations.

From the new databank, a stakeholder map will be drawn up to inform the communication strategy and support stakeholders efficiently. This will include information such as stakeholders' interests, potential risks and misunderstandings, mechanisms to positively influence stakeholders, key organisations to be informed about the network project during the execution phase and in the EMN in foundation phase. Based on this, a code of practice for the communication strategy will be established, giving details on how to establish and maintain comprehensive stakeholder engagement.

Objective 2 - Development of a web-based platform

The project will establish a comprehensive web platform for radiation protection regulation. The web platform will be designed and implemented to serve as a contact point for the metrology community, stakeholders and other end users of radiation protection and enable easy interaction and exchange of information. The project will test the web platform and ensure it functions effectively and can be maintained by the future EMN.

Objective 3 - Development of the SRA and roadmaps

The SRA and roadmaps developed in this project will provide comprehensive information on all metrology services relevant to radiation protection regulation across Europe. This will make it possible to prioritise the future metrology services needed to underpin radiation protection regulation and to perform gap analysis of existing services to take account of existing and upcoming technological developments. This process will serve the development of a joint service infrastructure within the future EMN and be used as a tool to optimise the services of its members.

Objective 4 - Set up and promotion of a knowledge-sharing programme

Based on a preliminary gap analysis, the project will conduct inter-comparisons, involving the exchange of scientific staff, training courses and workshops. This will provide the evidence of how knowledge-sharing can be efficiently implemented in the future EMN while addressing the needs of its members and stakeholders. Once this has been achieved, the project will then implement a knowledge-sharing and capacity building programme that promotes the transfer of knowledge from NMI/DIs to stakeholders. In the field of radiation protection, the technological development rapidly creates new challenges.

It is therefore necessary to provide access to identified problems and solutions at a European level. The experience and expertise of the project partners will be shared with emerging laboratories to accelerate their development and optimise the use of resources. It is envisaged that the knowledge-sharing 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.

Objective 5 - Plan for a sustainable European metrology infrastructure to underpin radiation protection regulation

The project will promote the early uptake of project outputs by end users, to be taken forward by the future EMN, through appropriate dissemination of the project results to international bodies and standardization organisations. The results and outputs will be actively communicated to the wider metrological community, stakeholders and end-users, including NMIs/DIs not participating in the project.

A Stakeholder Committee of at least 20 members including CENELEC, ISO, IEC and members from industry either producing devices to measure ionising radiation, making use of ionising radiation in their production process or producing devices emitting ionising radiation for technical or medical applications will be setup. Based on results of the project, the Stakeholder Committee will generate proposals for contributions to new or improved international standards and introduce these to the appropriate standardisation bodies.

The project will develop a plan for a joint and sustainable European metrology infrastructure underpinning radiation protection regulation. The plan will be re-evaluated according to feedback from stakeholders in order to identify existing, missing, unique and redundant capabilities. This will result in the development of a new metrology infrastructure in Europe for radiation protection, including the mechanism to provide Quality Assurance services to stakeholders.

Impact

The main impact of the project will be to identify, analyse and activate different stakeholder groups to inform the targets, structure and activities of the future European Metrology Network on reliable radiation protection regulation under Directive 2013/59/EURATOM. The project will support the legal and organisational basis of the future EMN and in this way a more targeted, efficient and swift set-up of the EMN will be achieved.

The future EMN will support a quality-assured metrological infrastructure for radiation protection and legal dose assessment as required by Directive 2013/59/EURATOM and the EURATOM Treaty. It will aim to create coherent procedures in calibration and type testing according to international standards such as those of IEC and ISO. This will support the development of all types of equipment (sources, detectors, dosimeters) in a rapidly growing harmonised European market in radiation protection and address the needs of users in complying with the requirements of the regulation. Thus, this project and future EMN will make important contributions to ensure the long-term economic competitiveness of predominantly small and medium-sized equipment manufacturers as well as numerous industrial and other end users.

This project and future EMN will extend the capabilities and capacities in Europe towards non-NMIs or non-DIs. This includes groups dealing directly with the EURATOM Treaty in regard to environmental monitoring in Europe, passing their data on to the Joint Research Centre to be used in EURDEP (European Radiological Data Exchange Platform) and EARN (European Atlas of Natural Radiation) as well as groups underpinning Directive 2013/59/EURATOM in calibration, service and knowledge sharing of radiation protection organised under EURADOS (European Radiation Dosimetry Group). In addition, emerging laboratories will benefit from the experience and expertise of project partners to accelerate their development and optimise the use of their resources.

The development of a European metrology network for radiation protection regulation and in particular the web-based platform will benefit international organisations and standardisation bodies, such as ISO TC85, IEC TC45 and CENELEC. These organisations currently give guidance in the field of radiation risks, dose assessment, technical and metrological state of the art but do not link the metrology directly to the needs expressed in regulation.



The roadmaps for the metrology needs of i) Directive 2013/59/EURATOM and ii) the EURATOM Treaty will be communicated to CCR (Consultative Committee for Standards of Ionizing Radiation) and used by BIPM (International Bureau of Weights and Measures). The direct involvement of CCRI and BIPM will have high-level impact on the work of the international organisations mentioned above, combining efforts world-wide.

A harmonised metrological infrastructure for radiation protection will provide support to deal with the European challenge of digitalisation, for example a digital quality-assured dose register. This will promote free trade and travel in Europe.

A long-term collaboration of all relevant partners in the field will provide a valuable basis to steer joint developments at European level. Fostering this mutual exchange of expert knowledge will not only identify routes for innovative metrology but may also provide input for legal processes, feedback to legislation, standardisation and common research activities directly responding to European legal requirements. It will also ensure the optimal use of resources across Europe.

This EMN will provide the basis upon which to implement and to guarantee metrological quality in radiation protection for all European citizens by harmonising procedures and combining the capabilities in service and research (i.e. calibration, type testing and reference fields). This requires a coordinated approach to ensure that the required metrological quality in the dissemination of the radiation protection quantities is reached for all dose assessments performed under 2013/59/EURATOM.

Finally, the future EMN will provide metrological based quality assessment (QA) for all radiation protection issues. Thus, the final goal of radiation protection will be achieved: The “ALARA” (“As Low As Reasonably Achievable”) principle is reached for every citizen of the European Union alike.

List of publications

n/a

Project start date and duration:		01 June 2020, 48 months
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		Unfunded Partners: 16. STUK, Finland