



## Capacity Building – Projects (Call 2017)

An overview of the funded projects from the Targeted Programme Research Potential.

The aim of these projects is to build capacity for research in less developed NMIs and DIs.

The projects underpin the coherent, efficient, sustainable and integrated development of a European metrology capacity landscape.

# Human and environmental exposure to ionising radiation

## Improving Europe's calibration facilities for radiation monitoring equipment

Radiation protection dosimeters are used to assess human exposure and environmental contamination due to ionizing radiation in a variety of settings, including hospitals and industry. To meet regulatory requirements, technical services across Europe need to be established or improved for the calibration of radiation monitoring equipment. By having facilities with trained staff, emerging National Measurement Institutes (NMIs) could deliver the traceable measurements needed and participate in research activity.

This project will develop and validate, through international intercomparisons, calibration capabilities for radiation protection dosimeters; the targeted dose measurement accuracy is 5 % or less. The emerging NMIs of participating countries will develop their technical capacity in ionizing radiation dosimetry in order to provide better measurement accuracy for end-users. Project results will also support the further development of international standards, thereby benefitting the wider scientific and industrial community.



### Project 17RPT01

Research capabilities for radiation protection dosimeters

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# Liquid density measurements for manufacturers

## Improving calibration facilities for liquid density measurement

For a range of sectors that includes food and pharmaceuticals, liquid products are often quantified by mass or volume; since liquid density is directly related to those two quantities, it is itself a key parameter. The availability of more accurate density measurement would facilitate manufacturers' compliance with EU Directives and national laws, as well as making their products more competitive. Across Europe, however, there is insufficient technical capability at emerging National Measurement Institutes (NMIs) to deliver the high-level calibration work needed.

This project will build the technical capacity of participants in order to deliver high accuracy measurement of liquid density for industrial users. The emerging NMIs will upgrade or develop new systems, with an investigation of parameters known to affect density measurement. Production of validated density reference materials will further increase the range of technical services offered by participating laboratories. Project results will also support the revision of international standards, while users will benefit from the good practice guides developed.



### Project 17RPT02

Establishing traceability for liquid density measurements

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# Digitising AC measurements

## Facilitating digital measurements of AC voltage and current

Digital technologies are at the heart of a wide range of industries, from healthcare to advanced manufacturing. A vital part of ensuring Europe's continuing success in these sectors is the implementation of a robust digital infrastructure. However, there are still a number of barriers to overcome in order to guarantee that industrial instruments are accurate and aligned to international standards. One challenge is facilitating the transition from analogue to digital measurements of AC voltage and current, and particularly so for dynamic conditions – as measurements performed at National Measurement Institutes (NMIs) still typically use static frameworks.

This project will advance the European capability for digital evaluation of dynamic AC voltage and current by utilising quantum standards and developing publicly available measurement systems. Since electrical analysis supports up to 70 % of NMI measurement and calibration activities, this project will help many areas of industry to obtain the accurate and dynamic device calibrations that are invaluable to the digitally-based operations, products, and services of the future.



### Project 17RPT03

A digital traceability chain for AC voltage and current

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## Measuring electrical impedance

### Developing expertise for the practical use of digital impedance bridges

Electrical impedance is one of the most widely measured electrical quantities, important for studying areas including supercapacitors, solar materials, and biological tissues. This means that increasingly accurate impedance analysers are required, which must be calibrated to international standards. Calibration services rely on 'impedance bridges', which are complex and labour intensive measuring systems beyond the means of most measurement laboratories. Digital impedance bridges offer an ideal solution as they are versatile, use inexpensive and readily available components, and do not require a high level of operator skill. As such, there is a need to show that they can be adapted for industry use.

This project will design, construct, and validate a single reference impedance bridge, develop a good practice guide for the application of digital impedance bridges, and create a virtual training lab. In doing so, the project will facilitate the training and dissemination of expertise in a practical way, supporting industries in the adoption of digital techniques for accurate impedance measurements.



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#### Project 17RPT04

A versatile electrical impedance calibration laboratory based on digital impedance bridges

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## Europe's National Measurement Institutes working together

**The majority of European countries have a National Measurement Institute (NMI) that ensures national measurement standards are consistent and comparable to international standards. They also investigate new and improved ways to measure, in response to the changing demands of the world. It makes sense for these NMIs to collaborate with one another, and the European Association of National Metrology Institutes (EURAMET) is the body that coordinates collaborative activities in Europe.**

The European Metrology Programme for Innovation and Research (EMPIR) follows on from the successful European Metrology Research Programme (EMRP), both implemented by EURAMET. The programmes are jointly funded by the participating countries and the European Union and have a joint budget of over 1000 M€ for calls between 2009 and 2020. The programmes facilitate the formation of joint research projects between different NMIs and other organisations, including businesses, industry and universities. This accelerates innovation in areas where shared resources and decision-making processes are desirable because of economic factors and the distribution of expertise across countries or industrial sectors.

EURAMET wants to involve European industry and universities at all stages of the programme, from proposing Potential Research Topics to hosting researchers funded by grants to accelerate the adoption of the outputs of the projects.

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