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Update on EURAMET's European Metrology Network for Advanced Manufacturing

Harald Bosse¹, Luca Boarino², Fernando A. Castro³, Alessandro Balsamo², Alex Evans⁴, Petr Klapetek⁵, Walter Knulst⁶, Virpi Korpelainen⁷, Antti Lassila⁷, Daniel O'Connor³, Dishy Phillips⁸, and Anita Przyklenk¹

¹ Physikalisch-Technische Bundesanstalt (PTB), Braunschweig, Germany

² Istituto Nazionale di Ricerca Metrologica (INRIM), Torino, Italy

³ National Physical Laboratory (NPL), Teddington, United Kingdom

⁴ Bundesanstalt für Materialforschung und -prüfung (BAM), Berlin, Germany

⁵ Czech Metrology Institute (CMI), Brno, Czech Republic

⁶ VSL National Metrology Institute (VSL), Delft, Netherlands

⁷ VTT Technical Research Centre of Finland Ltd, Centre for Metrology MIKES (MIKES), Espoo, Finland

⁸ European Society for Precision Engineering and Nanotechnology (euspen), Cranfield, UK

harald.bosse@ptb.de

Abstract

Advanced Manufacturing has been identified by the European Commission as one of six so-called Key Enabling Technologies (KET). This is one of the reasons why EURAMET, the European Association of National Metrology Institutes and Regional Metrology Organization of Europe, has established one of its twelve European Metrology Networks (EMN) on the topic of Advanced Manufacturing in September 2021. The EMNs were initiated in areas of high strategic relevance for the further development of Europe in alignment with the UN Sustainable Development Goals (SDG). The EMN for Advanced Manufacturing is structured in three sections along a generic manufacturing chain: 1) Advanced Materials, 2) Smart Manufacturing Systems, 3) Manufactured Components and Products. One of the key objectives was to develop a Strategic Research Area (SRA) of metrology needs, which is to be regularly updated to take into account current and future needs of the various stakeholders. Following the draft publication of the SRA of the EMN for Advanced Manufacturing in October 2024 we introduce here the first formal release of the SRA and provide an update on the recent, ongoing, and planned activities of the EMN.

advanced manufacturing, metrology, European Metrology Network (EMN), Strategic Research Agenda (SRA), stakeholder engagement

1. Who we are

The EMN for Advanced Manufacturing has been established in September 2022. Currently, 12 EMNs focus on topics of strategic importance for Europe and form an integral part of EURAMET, the European Association of National Metrology Institutes (NMI). EMNs are tasked to

- develop a **high-level coordination of the metrology community in Europe in a close dialogue with the respective stakeholders**
- develop and regularly update a **Strategic Research Agenda (SRA)** within their thematic areas
- provide input for the **European Partnership on Metrology** research programme

Our EMN membership, see figure 1, consists of contacts and experts from 18 Metrology Institutes and Designated Institutes, 6 International associations/organisations. It is supported in the steering of its activities by a stakeholder council that consists of 13 representatives mainly from industry, which advises the EMN for Advanced Manufacturing on its activities and contributes to the identification of the latest and most relevant topics.

1.1. Our Vision and Mission

The EMN's vision is to establish a self-sustainable interactive network of experts and an infrastructure to support metrology for advanced manufacturing in Europe. The EMN strives to be the primary contact point for metrology challenges faced in the advanced manufacturing industry.

The EMN has the mission of supporting competitiveness and innovation of the European advanced manufacturing industry by further developing a metrology infrastructure in cooperation with stakeholders, providing access to metrology research, services, and knowledge transfer. The realisation approach of these actions is described in detail in Przyklenk et al., 2021 [1].

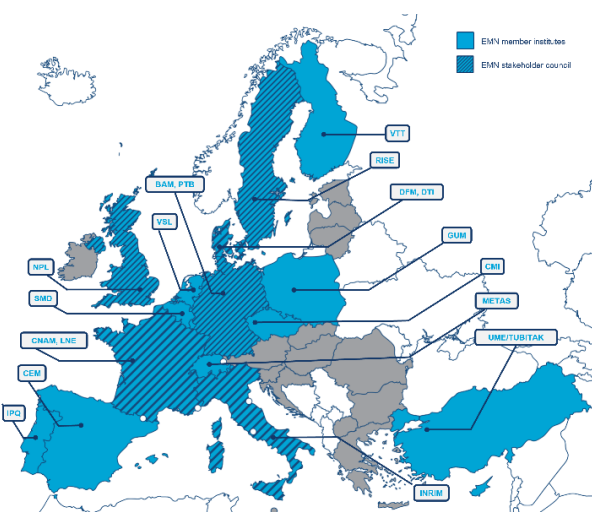


Figure 1 Mapping member institutes and stakeholder council of the EMN for Advanced Manufacturing.

1.2. Our Objectives

The EMN has identified the following main areas to support advanced manufacturing technologies by:

- continued stakeholder dialogue supported by the EMN stakeholder council targeting future metrology needs to be addressed in joint research projects,
- regular interaction with European Partnerships and other international organisations to identify future needs for metrology-related input for research programmes,
- developing and providing specific metrology knowledge transfer to Europe's advanced manufacturing industry,
- representing European interests in relevant standardisation and regulation committees, and
- coordinating the development and maintenance of European metrology infrastructure, calibration and measurement capabilities, and metrology services to support the competitiveness of European industry.

2. Our Strategic Research Agenda (SRA)

Advanced manufacturing requires new and enhanced metrology methods to assure the quality of manufacturing processes and the resulting products. The purpose of the SRA is to collate and highlight the key measurement challenges and opportunities for metrology in the field of advanced manufacturing. The SRA is intended to facilitate coordination and prioritisation of advanced manufacturing metrology research and development activity in Europe and acts as a reference document for the wider metrology and advanced manufacturing community. The SRA is now available as both a document and a summary presentation on the EMN website [2].

The analysis of the stakeholder needs is structured along eight cross-cutting topics (CCT) with inputs from 13 key industry sectors (KIS), which were identified to be where metrology is expected to have a larger impact for their further development [1]. In addition, the identified needs have been structured along short- and long-term timelines.

3. New task groups to drive and deliver EMN activity

The EMN has recently established three task groups to deliver against the objectives of the EMN. The first task group is concerned with establishing effective communications and supporting the efficient operation of the EMN.

- Creating the **EMN communications concept** in line with **EURAMET's 2030 strategy** and communications strategy and in collaboration with the EURAMET Secretariat.
- Establishment and maintenance of the **EMN website** and the development of **communications material to promote metrology** to the stakeholder community.

The second task group is focused on delivering useful stakeholder engagement for the EMN.

- **EMN representation** at stakeholder events and meetings.
- Preparing regular updates to the **stakeholder analysis**.
- Delivering **regular updates to the SRA**.

The third task group is tasked with ensuring impact & value:

- **Interacting with other European partnerships** to extend the impact of the EMN.
- Ensuring the **sustainability of the EMN** by **creating value** and benefits for EMN members and partners through e.g. facilitation of collaborative R&D projects.

4. Outlook – Stakeholder engagement

The EMN has established a strong stakeholder council with high-level representatives from European companies and institutes, which provides strategic advice on the future development directions and tasks of the EMN. Moreover, the

EMN is now in regular contact with other European partnerships related to the topic of Advanced Manufacturing, such as Made in Europe [3], Chips JU [4] and the upcoming partnership on Advanced Materials [5]. In addition to the EMN members from European NMIs and DIs, the European Society for Precision Engineering and Nanotechnology (euspen) is partner of the EMN. The EMN has also fostered a Memorandum of Understanding (MoU) between VAMAS and EURAMET [6].

For discussion and further development of the draft SRA the EMN has organized several events such as stakeholder workshops at international conferences, open consultations, and a Capacity Building Workshop. One example of an EMN event has been the open consultation on Metrology for Semiconductor Technologies held in July 2022.

To further increase engagement it is planned to supplement the EMN's regular workshops by a long-term stakeholder survey to capture stakeholder metrology needs in the EMN's key industry sectors and dynamically rank these with continuous input from the wider metrology and manufacturing community. The EMN is planning to release this survey with results periodically updated and shared via its new website in 2025.

An **update of the SRA** is planned to adequately take into account **competitiveness** aspects that have been raised in recent EU policy papers such as the Draghi report [7], EC competitiveness compass [8], and the Clean Industrial Deal [9].

Following the high priority topic of "Advanced Materials for Industrial Leadership", and the emergence of a new European Partnership on Advanced Materials the EMN is preparing an **open consultation event on metrology for advanced materials**, which is planned to take place online in autumn 2025. This will bring together representatives from research, industry and policy to identify the most promising trends and the corresponding metrology requirements [5].

The EMN is well connected but we still seek wider engagement to ensure that the collective benefits promised by advanced manufacturing and enabled by metrology can be realised.

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