



EMN for Advanced Manufacturing Open Stakeholder Meeting - Welcome and introduction -

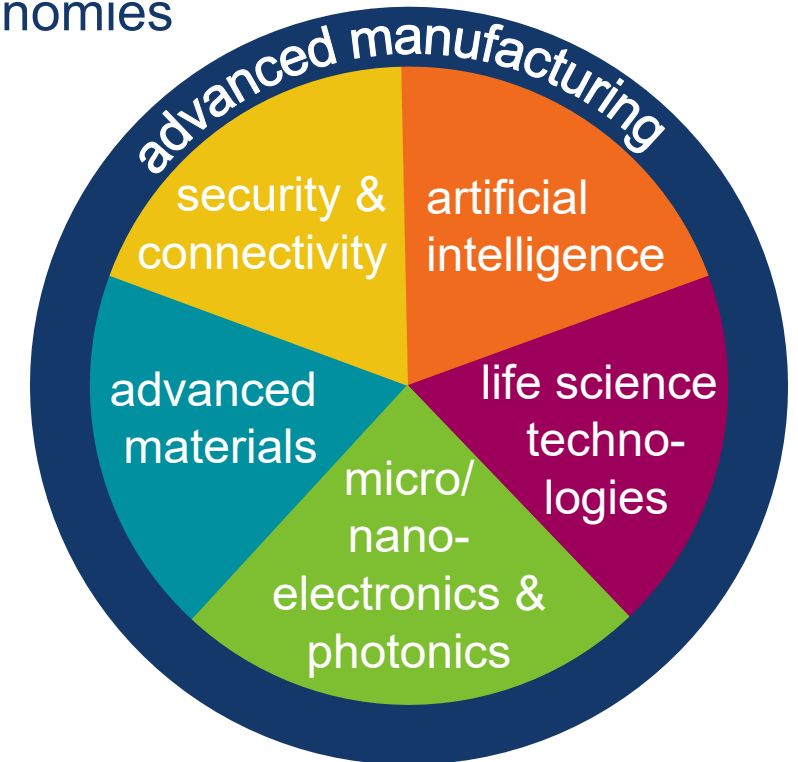


**ADVANCED
MANUFACTURING**

EMN 3rd Annual General meeting (AGM),
Hybrid meeting, hosted by INRIM, Torino, IT
24. October 2023, 14:00 – 18:00 local time (CEST)
H. Bosse (PTB), EMN chair

Advanced manufacturing (EC): one of six Key Enabling Technologies (KETs)

- Applications in multiple industries
 - full exploitation of KETs: creating advanced & sustainable economies
- European Technology Platform [MANUFuture](#):
 - Vision 2030 strategy document (HLG, 12/2018):
- **Manufacturing: backbone of European economy**
- 2014: 2.1 million enterprises, 30 million people, 1 710 B€. However: European manufacturing has been losing ground
- In 2030, European manufacturing will be competitive at global level due to its high-performance and technological level, targeting **zero-defect, zero-delay, zero-surprise and zero-waste production processes**



prioritised [KETs](#) in the Horizon Europe programme 2021-2027 (EC)

**NO mentioning of Metrology nor Measurement, but Quality
=> Awareness and „Translation“ needed!**

Report on recent EMN activities: Strategic cooperations: VAMAS, AMI 2030, other European partnerships



EURAMET'S EUROPEAN METROLOGY NETWORKS

Close collaboration in measurement science with a new sustainable structure

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) help realising this aim.

Currently there are eleven EMNs: **Advanced Manufacturing**, Climate and Ocean Observation, Energy Gases, Mathematics and Statistics, Pollution Monitoring, Quantum Technologies, Radiation Protection, Safe and Sustainable Food, Smart Electricity Grids, Smart Specialisation in Northern Europe, and Traceability in Laboratory Medicine.

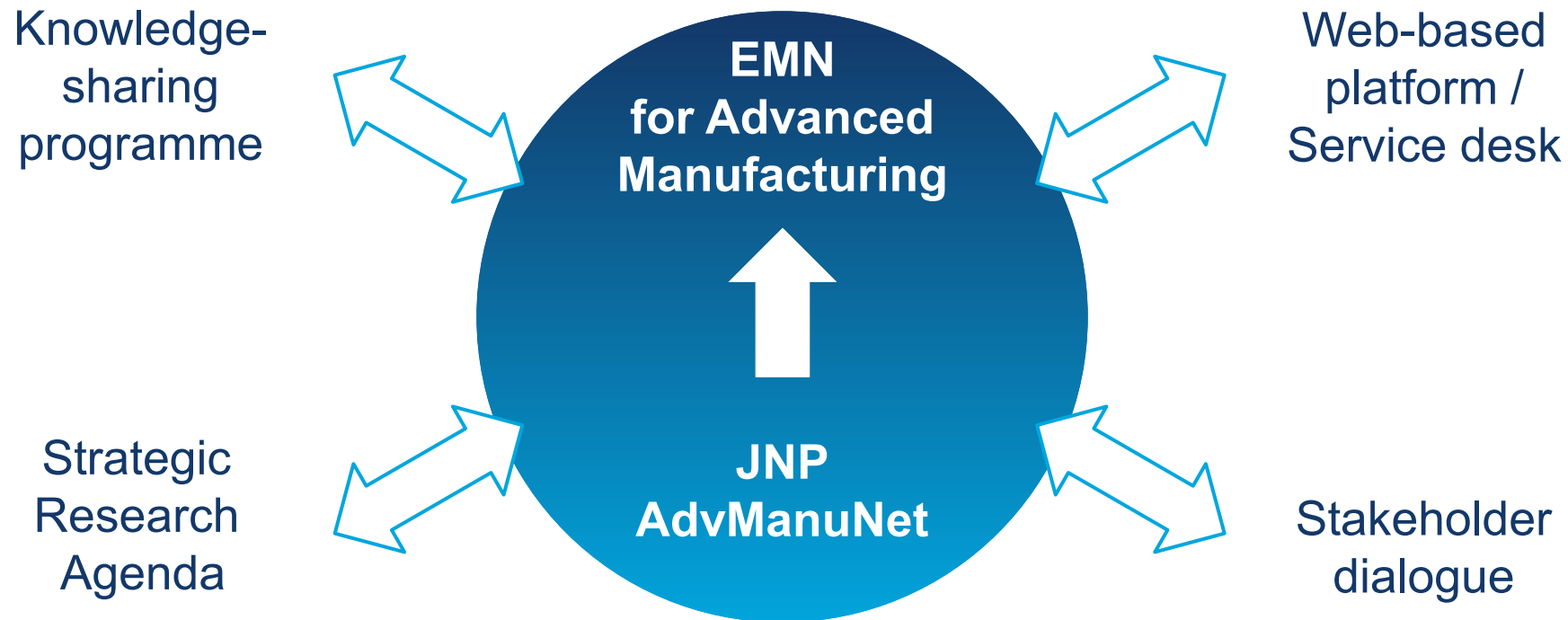
The EMNs will analyse the European and global metrology needs and address these needs in a coordinated manner. EMN members will then formulate common metrology strategies including aspects such as research, infrastructure, knowledge transfer and services. The members will be committed to contributing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

By providing a single point of contact for information, underpinning regulation and standardisation, promoting best practice and establishing a comprehensive, longer-term infrastructure, the EMNs aim to create and disseminate knowledge, gain international leadership and recognition, and build collaboration across the measurement science community. ... including strategic cooperations with other partnerships!



Objectives

JNP: Funded project within EMPIR to accelerate process of establishing EMN



EMN: Sustainable network operated by national metrology institutes

EMN for Advanced Manufacturing

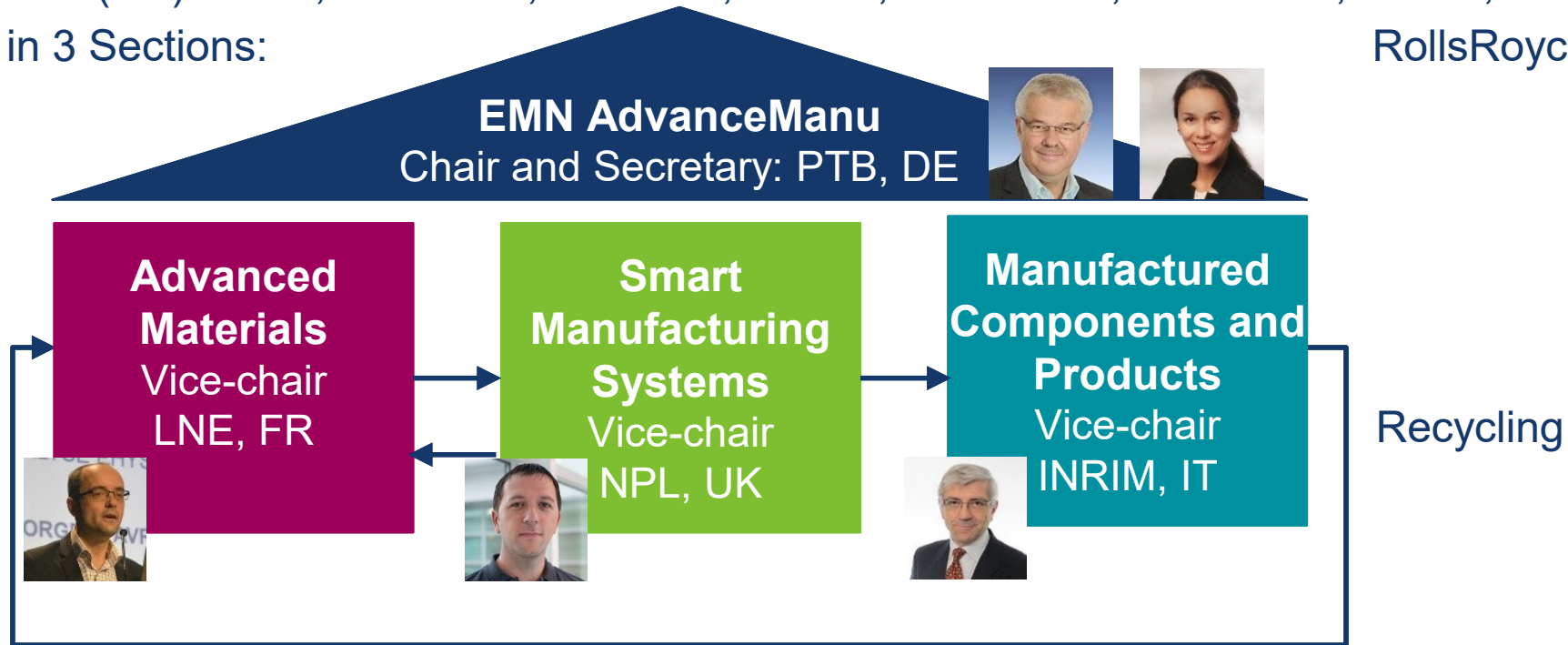


- [EMN for Advanced Manufacturing](#) formally established in Oct. 2021 (18 NMIs/DIs)
- [EMN Partner-Organisations](#): euspen
- EMN established regular contacts: ETP ManuFuture, EFFRA/Made in Europe, NanoFabNet, KDT, AMI 2030
- Stakeholder Council (SC): Zeiss, Renishaw, Siemens, Vestas, STMicroel., DTU/CIRP, CERN, BfR, BASF, RollsRoyce, Hexagon
- EMN organized in 3 Sections:

SC convenor:
Dr. Imkamp, Zeiss



Design for
manufacture and
recyclability



- Stakeholder-Dialogue: Larger companies & SME, Industry org., Networks, Univ., R&D-Institutes)
- Strategic Research Agenda (SRA) for Metrology for AdvanceManu ⇒ [1st SRA Draft](#) by end of 2022
- EMN organised several [events](#) ⇒ 1/2023: Launch of [EPM](#) call on Metrology for Industry

[1st SRA Draft](#) published on EMN website by end of 2022: slide decks

EMN ADVANCED MANUFACTURING: STRATEGIC RESEARCH AGENDA

The European Metrology Network (EMN) for Advanced Manufacturing is developing a Strategic Research Agenda (SRA) to identify priorities for research by Europe's National Metrology Institutes and Designated Institutes and to identify collaboration partners for such research.

The first step was to perform a review of stakeholder needs, involving the EMN's stakeholder council which represents 13 key industry sectors in advanced manufacturing, stakeholder workshops, an open consultation event and a review of the literature.

An overview of the complete approach is given in the following presentation:

- [Download draft introduction Strategic Research Agenda \(version 2022\)](#)

Identified metrology needs are summarised in two presentations.

The first provides an overview of needs in cross cutting scientific topics. These are broadly applicable and relevant to many key industry sectors.

- [Download draft SRA Cross Cutting topics \(version 2022\)](#)

The second summarises needs regarding the EMN's key industry sectors.

- [Download draft SRA Key Industry Sectors \(version 2022\)](#)

The content of these preliminary versions may change due to ongoing consideration of stakeholder feedback.

We welcome feedback and comments on requirements that we did not identify during that review. [Please contact us >>](#)

MENU

[Events](#)

[Advanced Manufacturing Member Institutes](#)

[Advanced Manufacturing Contacts](#)

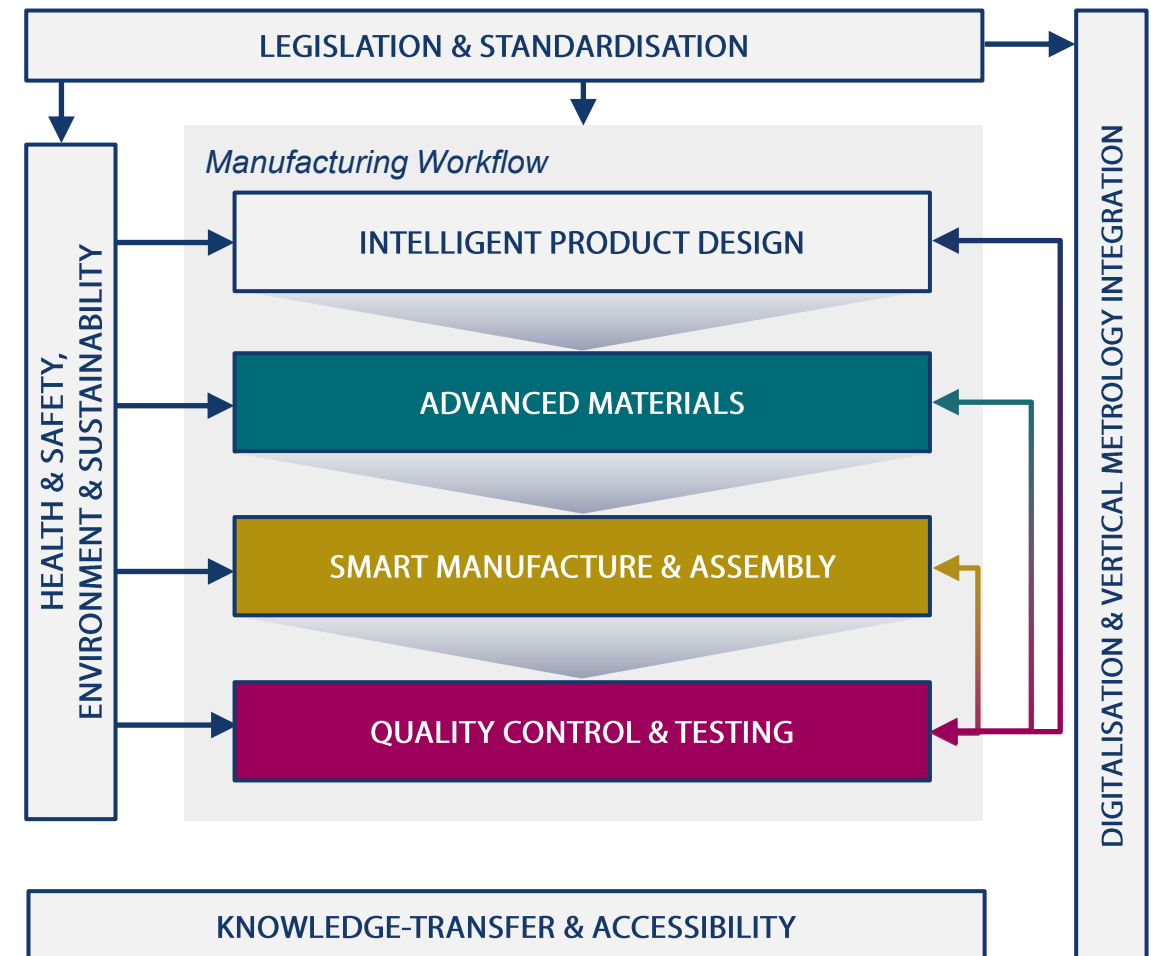
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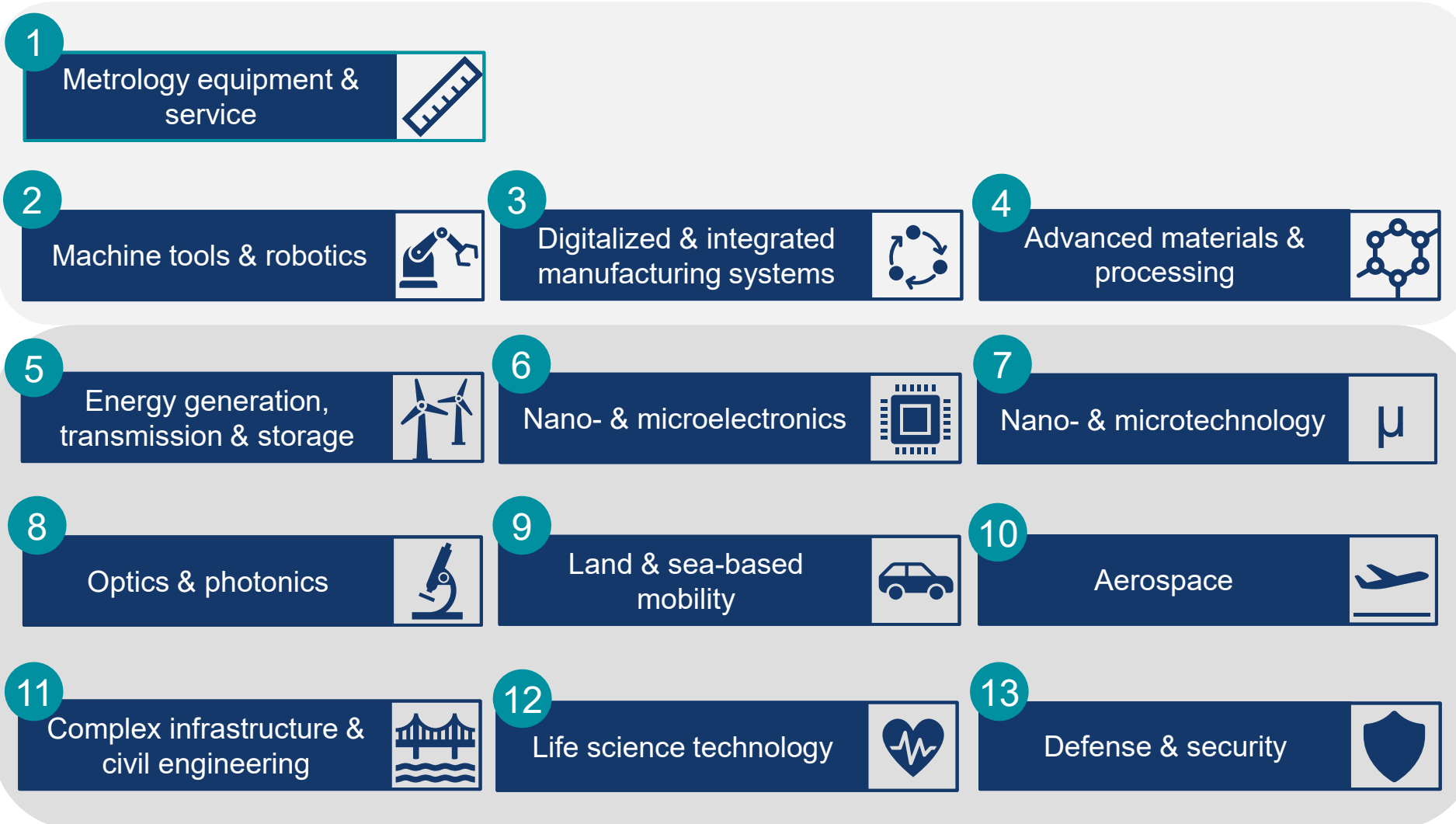
[Strategic Research Agenda](#)

Cross Cutting Topics (CCT) - Overview

- These cross cutting topics broadly cover the key steps in manufacturing
- The content of cross cutting topics is broadly applicable and relevant to many Key Industry Sectors (KIS)



Key Industry Sectors (KIS) – Overview



overarching KIS relevant for the other KISs

KIS primarily related to manufactured products

Current structure of the draft SRA document

Scene setting

Acronyms and Abbreviations.....	6
1 Executive Summary.....	9
2 The European Metrology Network for Advanced Manufacturing.....	10
3 Purpose of this document.....	10
4 Metrology for Advanced Manufacturing.....	11
4.1 Advanced Manufacturing Trends, Policies, and Strategies.....	13
4.2 Key industrial sectors.....	15
4.3 A vision for advanced manufacturing enabled by metrology.....	17

Stakeholder engagement

6 Stakeholder Engagement.....	63
6.1 Stakeholder Council.....	63
6.2 Questionnaires.....	63
6.3 Open workshops.....	63
6.4 Open consultations.....	64

Cross cutting content

5 Cross cutting challenges and opportunities for metrology.....	22
5.1 Intelligent Product Design.....	22
5.2 Advanced Materials.....	28
5.3 Smart Manufacture & Assembly.....	34
5.4 Quality Control & Testing.....	38
5.5 Digitalisation & Vertical Integration of Metrology.....	44
5.6 Legislation & Standardisation.....	48
5.7 Health & Safety, Environment & Sustainability.....	53
5.8 Knowledge-transfer & accessibility.....	58

Conclusion, Summary tables, and References

7 Conclusion.....	66
8 Appendices.....	67
8.1 Useful links.....	67
8.2 Key strategies and roadmaps.....	68
8.3 Summary of the metrology opportunities in advanced manufacturing.....	73
8.4 Detailed Key Industry Sector content.....	75

Draft SRA:
recently submitted to EURAMET and
SC members for comments and feedback

EMN for Advanced Manufacturing

example: CCT Advanced Materials

Draft SRA



Challenge	Capability	Short term (<3years)	Medium/Long term (>3years)
Measurements under realistic conditions		- Extend the range of simulated measurement conditions to access real world performance and develop accelerated testing methods (e.g. temperature, frequency, mechanical stress...)	- Development of methods and data analysis tools for measurements under complex combination of simulated conditions for more realistic assessment of performance and reliability - Methods to measure materials properties in complex media
In situ and operando measurements		- Materials measurements under complex conditions - Advances in big-data analysis to enable implementation of real time measurement	- Robust metrology solutions to access materials quality in-line - Advanced sampling strategies for representativity or full inspection methods
Hybrid metrology		- Measurements of the same properties using different techniques to reduce measurement uncertainty - Advances in correlative metrology, combining multiple techniques measuring different properties on the same object or in the same local area	- Robust and validated measurements and data analysis methods for multi-scale multi-method measurement approaches - Robust methods to validate in silico modelling, virtual testing and predictions of materials performance and reliability during the life cycle
High quality materials data		- Reproducible measurement protocols for measurements of materials properties - Accurate measurements of materials properties under different conditions to support digitalisation and virtual testing	- Robust and unbiased approach for determination of materials data quality when measurement standards are not yet available (e.g. emerging technologies) - Interoperability of materials properties databases to facilitate smart and interconnected measurements

	Advanced Materials - Key industry sector related metrology needs
01 - Metrology equipment & service	New and improved measuring techniques (including metrological traceability) to evaluate specific properties of manufacturing processes for advanced materials (e.g. holistic surface recording and porosity detection for additive manufacturing) Novel measurement methods for improved defect inspection High quality materials data to enable digital metrology services
02 - Machine tools & robotics	Harmonisation of metadata structure to support digital manufacturing Metrology for next generation robotics, including for materials that enable ultraprecise positioning and handling, such as multifunctional soft electronics.
03 - Digitalized & integrated manufacturing systems	High quality materials data measured under real conditions of operation Harmonisation of metadata structure to support digital manufacturing Validated multiscale materials modelling to enable digital testing
04 - Advanced materials & processing	Improved and new metrology methods needed to characterise different types of advanced materials such as: active materials, composites, multi-functional materials, nanomaterials, and biobased-materials
05 - Energy generation, transmission & storage	Methods for evaluation of device performance and of device reliability, including accelerated test methods and durability at cryogenic temperatures. Methods for measurements of materials properties and performance under realistic operational conditions Metrology for heat transfer fluids (e.g. nanofluid, ionic melts), porous and high energy density materials

Table lists specific challenges and opportunities against the identified 13 key industry sectors (only shown KIS 1 ... 5 here)

Key identified metrology challenges and metrology capabilities that are required to be developed

ADVANCED MANUFACTURING EVENTS

EMN Advanced Manufacturing Annual General Meeting 2023

2023-10-24 to 2023-10-25

Workshop: The Future of Metrology for Advanced Manufacturing

2023-06-12 to 2023-06-12

EMN Advanced Manufacturing Capacity Building Workshop

2023-05-16 to 2023-05-17

3DMC 2022 - The future of 3D metrology for advanced manufacturing

2022-11-15 to 2022-11-17

EMN Advanced Manufacturing Annual General Meeting 2022

2022-10-10 to 2022-10-11

Open consultation on Metrology for Semiconductor Technologies

2022-07-08 to 2022-07-08

Open Consultation on Metrology for Semiconductor Technologies

Online stakeholder session for EURAMET &
the EMN for Advanced Manufacturing

Friday 8 July 2022 | 10:00 - 12:30 CEST

EUROPEAN
METROLOGY
NETWORKS



EURAMET



Open Consultation on Metrology for Digital Transformation

2021-11-09 to 2021-11-09

EMN Advanced Manufacturing Annual General Meeting 2021

2021-10-12 to 2021-10-12

EMN Advanced Manufacturing Stakeholder Meeting 2021

2021-10-11 to 2021-10-11

Metrology for Digital Transformation

2021-09-23 to 2021-09-30

Introductory Meeting of EMN Advanced Manufacturing

2021-06-23 to 2021-06-23

EMN for Advanced Manufacturing: 3rd AGM @ INRIM, Torino, IT: 24./25. Oct., 2023



EMN Advanced Manufacturing Open Stakeholder Meeting Agenda

24 October 2023

Free hybrid event hosted by INRIM, IT and online via
Google Meet, draft v6



Time	14:00 – 18:00 local time (CEST)
Place	INRIM, Strada delle Cacce, 91, 10135 Torino, Italy
Registration	Online/in person registration: https://docs.google.com/forms/SHM
Responsibility	INRIM & the European Metrology Network for Advanced Manufacturing
Participants	EMN members and officials, EURAMET representatives, Stakeholders, Public
Invitees	Stakeholder Council Members, Stakeholders, EMN members

24. Oct:

Closed Stakeholder Council Meeting, 09:00-11:00

Open Stakeholder Meeting, 14:00-18:00 →

25. Oct:

Closed Annual General Meeting, 09:15-12:45

Open Stakeholder Workshop, 14:00-15:30

Time	Min	Item	Speaker
13h00	60	Lunch Break	
14h00	15	Welcome and introduction	Harald Bosse, PTB, DE EMN Chair
14h15	15	News from EURAMET	Jörn Stenger, PTB, DE EURAMET Chair
14h30	15	Update on EFFRA and the Made in Europe Partnership	Željko Pazin, EFFRA Executive Director, BE
14h45	25+5	Keynote 1 on topic: Development of the Chips JU partnership	Yves Gigase, Executive Director KDT Partnership
15h15	25+5	Keynote 2: Deterministic doping: each atom counts!	Michele Perego Research Director at CNR-IMM, MDM Laboratories ST Microelectronics, IT
15h45	30	Coffee Break	
16h15	25+5	Keynote 3 on topic: Batteries in the automobile industry	Nello Li Pira Global R&I Materials Manager - Head of Materials for EEs & ePWT, CRF spa Stellantis, IT
16h45	25+5	Keynote 4 on topic: Friction Stir Welding of Space Habitable Modules: challenges of controlling and monitoring parameters	Federico Nada FSW Tools & Methods Engineer, CCIS-I Methods, Tooling and Tests, Thales Alenia Space, IT
17h15	25+5	Keynote 5 on topic: Beyond Moore's Law @ Politecnico of Torino	Luciano Scaltrito Full Professor at the Department of Applied Science and Technology (DISAT), PoliTO, IT
17h45	10+5	Open discussion on metrology needs for advanced manufacturing	Moderation: EMN officials
18h00		End of the meeting	

Acknowledgement



Thanks to all colleagues who provided input for this presentation,
in particular those from JNP AdvManuNet and EMN for Advanced Manufacturing

=> <https://www.euramet.org/european-metrology-networks/advanced-manufacturing/>

=> advancemanu@euramet.org

Thank you for your attention!

Mock-up of EMN website



**ADVANCED
MANUFACTURING**

The project [JNP 19NET01 AdvManuNet](#) 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.



The EMPIR initiative is co-funded by the European Union's Horizon 2020 research and innovation programme and the EMPIR Participating States