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FINANCIAL FRAMEWORK PARTNERSHIP AGREEMENT 2021/METROLOGY/01

European Partnership on Metrology ANNUAL REPORT
2023 – Part B
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Glossary

BoD	EURAMET Board of Directors
CBC	Capacity Building Coordination
CEN	European Committee for Standardization
CENELEC	European Committee for Electrotechnical Standardization
CIGRE	International Council on Large Electric Systems
CSA	Coordination and Support Action
CSP	Coordination and Support Project
DI	Designated Institute
DPIA	Data Protection Impact Assessment
EA	European Co-operation for Accreditation
EMN	European Metrology Network
EMPIR	European Metrology Programme for Innovation and Research
ETSI	European Telecommunications Standards Institute
EU	European Union
EUROLAB	European Federation of National Associations of Measurement, Testing and Analytical Laboratories
FFPA	Financial Framework Partnership Agreement
FO	Finance Officer
FUN	Fundamental
FWCI	Field-weighted Citation Impact
GRD	Green Deal
GS	General Secretary
HEU	Horizon Europe
HLT	Health
IAC	Internal Audit Committee
IAEA	International Atomic Energy Agency
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IEC	International Electrotechnical Commission
IEM	Integrated European Metrology
IND	Industry
IP	Intellectual Property
ISO	International Organization for Standardization
IT	Information Technology
JRP	Joint Research Project
KPI	Key Performance Indicator
MIM	Mutual Insurance Mechanism
MSU	Management Support Unit
NEN	Netherlands Standardization Institute
NMI	National Metrology Institute
NPL	National Physical Laboratory
NRM	Normative
PAD	Project Administrative Data
PRT	Potential Research Topic
RPT	Research Potential
SDG	United Nations Sustainable Development Goal
SDO	Standards Developing Organisation

SME	Small and Medium-Sized Enterprise
SRA	Strategic Research Agenda
SRT	Selected Research Topic
SSH	Social Sciences and Humanities
TC	EURAMET Technical Committee
TP	Targeted Programme
TRL	Technical Readiness Level
UK	United Kingdom
WHO	World Health Organization

1 Implementation of the annual work programme and the resulting activities

1.1 Definition of the area of the programme to be opened

The areas of the programme in broad terms (topics) to be opened in each year were decided by the Partnership Committee at the beginning of the programme, along with an indicative budget for each topic, and are included in Annex 1. While budget may be rebalanced between topics in any year it is not expected that the sequence of calls will be changed. Five topics were identified for the 2023 Call Target Programmes:

- Fundamental Metrology
- Metrology for Industry
- Metrology for Pre- and Co-normative Research
- Research Potential
- Capacity Building Coordination

The first four topics were Research and Innovation Actions implemented in two stages, while the last topic was a Coordination and Support Action implemented in one stage.

To encourage input from stakeholders, EURAMET consulted with the relevant European Metrology Networks (EMN) and relevant Technical Committees in order to identify needs related to the Target Programmes for Fundamental Metrology, Metrology for Industry, Metrology for Pre- and Co-normative Research, and Research Potential and to support the preparation of the 2023 call. This information, along with EURAMET's Strategic Research Agenda for Metrology in Europe was published with the Stage 1 call.

To encourage input from European Standardisation Organisations, EURAMET consulted with:

- CEN
- CENELEC
- IEC
- NEN

in order to collect standardisation research needs and support the preparation of the 2023 call. The results of this consultation identified 11 priority standardisation needs which were published with the Stage 1 call.

The Scope documents for the 2023 Calls are reproduced in Annex 2.

1.2 Call budget, national funding and Union contribution

The total budget for the 2023 calls was 51 M€ in EU contribution. In addition, the necessary budget of the participating states cash contribution for the administration of the programme can be associated with the call. The initial breakdown of the budget between the TPs was

- Fundamental Metrology – 19,5 M€
- Metrology for Industry – 23,5 M€
- Metrology for Pre- and Co-normative Research – 5 M€
- Research Potential – 2 M€
- Capacity Building Coordination CSA – 1 M€

In terms of EU Contribution.

1.3 Call announcement

1.3.1 Stage 1: Fundamental Metrology, Metrology for Industry, Metrology for Pre- and Co-normative Research, and Research Potential

The Stage 1 for the Target Programmes Fundamental Metrology, Metrology for Industry, Metrology for Pre- and Co-normative Research, and Research Potential was launched on 11th January 2023 and closed on 20th February 2023.

The announcements were made through the EURAMET website and through various other electronic media like social media as well as individual emails to NCPs and other known networks like:

- EURAMET community, including Partnership Committee members, EURAMET TC and EMN Chairs, EURAMET Contact Persons
- EURAMET Research Council members
- Stakeholder communities, such as:
    - EA (European Co-operation for Accreditation)
    - Eurachem
    - Eurolab

1.3.2 Stage 2: Fundamental Metrology, Metrology for Industry, Metrology for Pre- and Co-normative Research, and Research Potential

The Stage 2 call was launched on 23rd June 2023 and closed on 2nd October 2023, addressing 56 topics which had been distilled from the best of the ideas received in Stage 1. For each of the topics published a supporting document was provided identifying the need or opportunity, the scientific objectives and potential impact.

The announcements were made through the EURAMET website and EURAMET also announced the launch of the call to:

- EURAMET community, including Partnership Committee members, EURAMET TC and EMN Chairs, EURAMET Contact Persons
- EURAMET Research Council members
- Stakeholder communities, such as:
    - EA (European Co-operation for Accreditation)
    - Eurachem
    - Eurolab

1.3.3 One-stage call on Capacity Building Coordination CSA

This one-stage call was launched on 23rd June 2023 together with the Stage 2 Call for Joint Research Projects and closed on 2nd October 2023. A supporting document was provided identifying the need, objectives, and potential impact.

The announcement of the Call was made together with the Stage 2 Calls on Fundamental Metrology, Metrology for Industry, Metrology for Pre- and Co-normative Research, and Research Potential.

1.4 Call 2023 Stage 1 – Potential Research Topics (PRTs)

The topic areas Fundamental Metrology, Metrology for Industry, Metrology for Pre- and Co-normative Research, and Research Potential were implemented in two stages. EURAMET launched Stage 1 for PRTs requesting research ideas and needs, on 11th January 2023 and the call closed on 20th February 2023.

The aim of Stage 1 was to identify challenges and problems and provide ideas to help EURAMET best prioritise the most important topics to address and make best use of the resources available in the NMI and DI community. Stage 1 was open to any person or organisation from anywhere in the world. The process was web based and used a simple Word template to ensure ideas were expressed in an appropriate and consistent way. Proposers provided administrative information online and uploaded their PRT as a Word file. Submissions were automatically acknowledged by e-mail.

1.4.1 Stage 1 submissions received

In total 94 eligible Stage 1 submissions were received:

- Fundamental Metrology: 24
- Metrology for Industry: 49
- Pre- and Co-normative Research: 13
- Research Potential: 8

All were subject to a very simple but defined eligibility check, mainly to simply identify any repeat submissions or inadequate submissions, or submissions entirely out of scope. Altogether 126 Stage 1 PRT submissions were received, of which 32 were superseded with later versions by the submitters (those submitting before the deadline had the opportunity to make changes and resubmit up until the deadline, thus superseding their earlier submission) and no submissions failed to meet the eligibility criteria.

The online web page required proposers to identify the most appropriate classification against a list, with the option of “other” for cross cutting topics or topics which the proposers felt did not fall easily into one of the predefined classifications. The classification was only used to make it more likely that similar topics were reviewed together.

1.4.2 Stage 1 admissibility, eligibility and prioritisation

Having completed the admissibility and eligibility checks, EURAMET revisited the classification. A check was made to ensure that the proposers had allocated their proposal to the appropriate classification. The classifications were also revisited to ensure they best captured the actual submissions received. Excel workbooks were prepared for the Partnership sub-committees with instructions, statistical data and collated information on all of the submissions, and pre-programmed cells to enable initial views and comments to be captured.

The PRTs that passed the eligibility sift were forwarded to the Partnership sub-committees. The subcommittee members initially worked in pairs, each pair responsible for the initial review of PRTs within two or three classifications, thus sharing the workload. Each sub-committee member was provided with an individual Excel workbook to capture initial impressions and comments. These individual workbooks were then sent back to the MSU where the inputs were collated into a single consolidated Excel workbook for each Call topic.

The consolidated workbooks were then redistributed such that all members of the relevant Partnership sub-committees could see all initial PRT comments, i.e. their own and every other member’s comments in preparation for the sub-committee meetings. At this stage the review was widened with sub-committee members free to review all PRTs and prepare further comments. This whole process took place from late February to early April 2023, culminating in virtual meetings of the Sub-Committees. Sub-Committee Research had a meeting from Monday 3rd April to Wednesday 5th April to review the PRTs on Fundamental Metrology, Metrology for Industry, and Metrology for Pre- and Co-normative Research. The Sub-Committee Capacity Building had a virtual meeting on Thursday 6th April to review the Research Potential PRTs. The results from the meetings were a consensus view to publish a total of 56 Selected Research Topics (SRTs) at Stage 2; 15 for Fundamental Metrology, 24 for Metrology for Industry, 12 for Metrology for Pre- and Co-normative Research, and 5 for Research Potential.

The key criteria in the selection of the topics were alignment with the scope of the call, that the stakeholder need was clearly identified and supported, and knowledge that relevant expertise and facilities existed within EURAMET to address those needs.

Following the meeting, a list of the titles of the SRTs was released to the Partnership Committee to allow appropriate partnering meetings to be arranged following the launch of Stage 2. The first drafts of the "Supporting Documents" were prepared by the MSU, a short document for each topic to be published at Stage 2 describing the background, objectives and potential impact. The information and much of the text for the supporting documents was drawn from the relevant PRTs. These drafts were then reviewed by the Partnership sub-committee and iterated until deemed acceptable. The objectives outlined in each SRT were presented to the full Partnership Committee on 1st June. The Partnership Committee approved the SRT objectives and concluded this part of the process with a formal decision to support 56 SRTs and associated objectives.

The calls under the European Partnership on Metrology differ from those of Horizon Europe. In the annual Work Programme, only the general call topic is published initially. Detailed information on the Selected Research Topics is then released on the metpart.eu portal when the Call for Proposals is launched in Stage 2. Together, the annual Work Programme and the Selected Research Topics provide the comprehensive documentation necessary for proposal development. This process enables a swift response to stakeholder needs by gathering Potential Research Topics and using them to formulate the Selected Research Topics, which complement the Work Programme.

When considering the above process, it would be rather misleading to imagine the process as one of prioritising one PRT over another. Rather it was a case of reviewing all PRTs in a given area, establishing a list of all of the needs, scientific and technological objectives and potential impacts expressed, and then identifying which of those ideas could be addressed most effectively by the metrology research community. Thus, in each area all of the objectives from all relevant PRTs were assembled, and prioritised. The process is better thought of as a prioritisation of ideas rather than prioritisation of particular PRTs, although the genealogy of all Stage 2 topics was carefully captured ensuring the traceability of each of the Stage 2 topics to its "parent" contributing PRTs. This approach ensured efforts would be focused most appropriately but made the preparation of the supporting documents challenging (e.g. as it was not simply a case of choosing PRT X over PRT Y and then editing the text of PRT X). The topics were assembled not only to bring the best resources from EURAMET to bear on the identified needs, but also to promote closer working between different EURAMET members and across technical disciplines by combining objectives in single topics that could only be addressed through collaboration.

1.5 Call 2023 Stage 2 – Joint Research Projects (JRPs)

Stage 2, a dedicated call for JRPs was launched on 23rd June 2023 and was closed on 2nd October 2023. This call opened the 56 SRTs for Fundamental Metrology, Metrology for Industry, Metrology for Pre- and Co-normative Research, and Research Potential, each with a supporting document identifying the need or opportunity, the scientific objectives and likely impact.

The following detailed EURAMET documentation was produced or updated, approved and published with either the Stage 1 call and / or the Stage 2 call:

- Guide 1: Admissibility and Eligibility for the potential Partnership on Metrology Calls
- List 1a: List of EURAMET NMIs and DIs
- List 1b: Country Information
- Guide 2: Submitting a Potential Research Topic
- Template 2: PRT template
- Guide 4: Writing Joint Research Projects (JRPs)
- List 4: Checklist for Template 4
- Template 4: JRP protocol

- Guide 5: Submitting administrative data for Partnership projects
- Template 5: Project Administrative Data (PAD)
- List 5: Checklist for Template 5
- Guide 6: Evaluating Partnership Proposals
- Form 4a: Ethics Form

1.6 Call 2023 One-Stage Capacity Building Coordination (CSA)

This one-stage call was launched on 23rd June together with the Stage 2 Call for Joint Research Projects and closed on 2nd October. A supporting document was provided identifying the need, objectives, and potential impact, explaining that research and development activities were not eligible to be funded in the Capacity Building Coordination CSA, instead the projects needed to have a clear focus on building capacities through knowledge transfer activities.

In addition to the EURAMET documentation listed above, dedicated documents on writing Coordination and Support Projects (CSPs) were provided to the applicants.

- Guide 7: Writing Coordination and Support Projects (CSPs)
- Template 7: CSP protocol

1.7 Admissibility and eligibility of proposals

1.7.1 Fundamental Metrology

Following closure of Stage 2 a total of 15 JRP proposals for Fundamental Metrology were received. There was one proposal for each SRT topic published although more than one proposal per topic was possible. All JRP proposals underwent admissibility and eligibility checks by the MSU against a pre-defined checklist. All proposals submitted were deemed eligible.

1.7.2 Metrology for Industry

Following closure of Stage 2 a total of 23 JRP proposals for Metrology for Industry were received. There was one proposal for each SRT topic published except for 1 SRT in Metrology for Industry (i15) although more than one proposal per topic was possible. All JRP proposals underwent admissibility and eligibility checks by the MSU against a pre-defined checklist. All proposals submitted were deemed eligible.

1.7.3 Metrology for Pre- and co-normative research

Following closure of Stage 2 a total of 11 JRP proposals for Metrology for Pre- and co-normative research were received. There was one proposal for each SRT topic published except for 1 SRT in Metrology for Pre- and Co-normative Research (n06) although more than one proposal per topic was possible. All JRP proposals underwent admissibility and eligibility checks by the MSU against a pre-defined checklist. All proposals submitted were deemed eligible.

1.7.4 Metrology for Research Potential

Following closure of Stage 2 a total of 5 JRP proposals for Research Potential Metrology were received. There was one proposal for each SRT topic published although more than one proposal per topic was possible. All JRP proposals underwent admissibility and eligibility checks by the MSU against a pre-defined checklist. All proposals submitted were deemed eligible.

1.7.5 Capacity Building Coordination (CSA)

Following closure of the one-stage CSA call one proposal for Capacity Building Coordination was received although more than one proposal was possible. This proposal underwent admissibility and eligibility checks by the MSU against a pre-defined checklist. The submitted proposal was deemed eligible.

1.8 Referees

In parallel with the 2023 calls the MSU and the Partnership Deputy Chair and Chair established the list of independent referees. All referees were drawn from EURAMET's Referee Database which was established in 2014. The database contains 357 potential referees. The primary and overriding criteria for the selection of the referees were scientific and technical competence (and their independence from the proposers). Within that constraint the best balance of gender, nationality, background etc was sought. This process involved the establishment of a larger than needed initial pool of competent referees from which the MSU checked availability, and then provided there was choice, followed a defined set of criteria aimed at achieving the best balance.

It was assumed that many if not most NMIs and DIs in Europe would participate in the programme so even at this stage no referees were targeted from these organisations. For all referees a more detailed check for conflict of interest was made at each stage of the process to ensure that referees were not drawn from organisations involved in the submission of proposals. Those experts passing the sift were entered into the pool which eventually contained 273 referees. The experts in the pool were then contacted to establish their willingness to act as referees for EURAMET, their availability and their expectation of being independent from any proposal. The terms and conditions offered in terms of expenses etc closely followed those used by the Commission for Horizon Europe.

Furthermore, referees in the pool who had indicated they were available were provided with the relevant supporting documents and asked to "self-check" their suitability. They responded by e-mail indicating one of three possibilities for each SRT:

- Able to read a proposal likely to be received against the SRT as a specialist
- Able to read a proposal likely to be received against the SRT as a generalist
- Unable to read a proposal likely to be received against the SRT

After these replies the "pool of available" referees included 172. This allowed the establishment of the boundary conditions of available and competent referees with a very high degree of confidence that there would be "no surprises". The aim was for at least three referees allocated to each proposal and ideally a maximum of three proposals allocated to each referee.

In the event a total of 93 referees were used to evaluate all proposals: 19 referees for Normative, 29 referees for Fundamental, 5 referees for CBC, 39 referees for Industry and 10 referees for Research Potential, with some referees being used for more than one thematic area.

Some redundancy had been deliberately built in the process in case the MSU checks or the declaration by the referees identified real or potential conflicts of interest requiring them to drop out ahead of the evaluation. The final statistics for the referees who attended the review conferences are given below.

1.8.1 Overall statistics (referees):

Gender: 69 men (74.2 %), 24 women (25.8 %)

28 Nationalities, Austria (1), Belgium (3), Bosnia and Herzegovina (1), Bulgaria (1), Croatia (3), Czechia (1), Denmark (1), Finland (1), France (11), FYR Macedonia (1), Germany (6), Greece (3), Ireland (2), Israel (2), Italy (13), Lithuania (1), Netherlands (5), Other (3), Poland (5), Portugal (1), Romania (4), Serbia (4), Slovakia (1), Spain (8), Switzerland (2), Türkiye (2), United Kingdom (5).

Industry vs. academia: the categories of organisation defined include: Consultancy firms, Higher Education Establishments, Non-research Commercial sector including SMEs, Non-research International Organisations (Association of States), Non-research Public Sector, Private / Commercial Research Centres, Private Non-profit Research Centres, Public Research Centres, Other and No information given.

The attending referees came from:

- 1 Consultancy firms (1.1 %)

- 48 Higher Education Establishments (51.6 %)
- 11 Non-research Commercial sector including SMEs (11.6 %)
- 2 Non-research International Organisations (Association of States) (2.1 %)
- 8 Private / Commercial Research Centres (8.4 %)
- 2 Private Non-profit Research Centres (3.2 %)
- 17 Public Research Centres (17.9 %)
- 4 Other (4.2 %)

The list of referees was published on 11 January 2024 on www.euramet.org.

1.9 Evaluation of proposals

The following EURAMET documentation was provided to referees:

- Call 2023 Budget and Features
- Guide 4: Writing Joint Research Projects (JRPs)
- Guide 6: Evaluating Partnership Proposals
- Form 6a: Referee Code of Conduct and Declaration
- Form 6b: Payment to Referees
- Form 6c: JRP Evaluation
- Form 6d: CSP Evaluation
- Guide 7: Writing Coordination Support Projects (CSPs)

Referees were asked to confirm by email that they were able to agree to both the “Code of Conduct for Referees” and the “Declaration of Confidentiality and Any Conflict of Interest” which are parts of Form 6a and referenced in Guide 6. A signed copy of Form 6a was sent to the MSU by each referee prior to the evaluation of proposals as a prerequisite for the referee’s participation.

The Forms 6c & 6d followed the evaluation criteria in the Partnership work plan. The evaluation criteria were:

- Excellence.
- Impact
- Quality and efficiency of the implementation

Marking was against each evaluation criterion between 0 and 5. The threshold for individual evaluation criteria was 3 and the overall threshold, applying to the sum of the three individual scores was 10. If a proposal scored less than this, it was considered of insufficient quality to be funded.

The Partnership Committee had decided the weighting for the evaluation criteria for Call 2023. Table 1 shows the specific weightings for the evaluation criteria for the Call 2023.

Table 1: Weightings for the evaluation criteria for the 2023 calls

Call/Evaluation criteria weighting	Excellence	Impact	Implementation
Normative	1.25	1.75	1
Fundamental	1.75	1.25	1
Industry	1.25	1.75	1
Research Potential	1.25	1.5	1.25
Capacity Building Coordination	1	1.25	1.75

1.9.1 Review conferences

The Normative, Fundamental, Industry and Research Potential proposals were each evaluated at a review conference. For the review conference the process of evaluation involved the referees receiving the proposals assigned to them several weeks ahead of the review conference (although all of the remaining proposals within a TP were made available to them as the possibility existed of needing a debate in plenary session). The referees were requested to review and make their own preliminary informal marking. Referees were not required to submit these marks prior to the review conference as experience has shown that often the referees modify their views following the face-to-face discussions at the review conference.

The review conferences took place in Amsterdam on the dates below;

REVIEW CONFERENCE	DATES
NORMATIVE	Tuesday 7th (DAY 1) & Wednesday 8th (DAY 2) November
FUNDAMENTAL METROLOGY	Thursday 9th (DAY 1) & Friday 10th (DAY 2) November
INDUSTRY	Monday 13th (DAY 1) & Tuesday 14th (DAY 2) November
RESEARCH POTENTIAL	Wednesday 15th (DAY 1) & Thursday 16th (DAY 2) November

At each review conference the referees met a representative of the proposing consortia (normally the person who would become the coordinator should the proposal be successful), enabling referees to clarify their understanding of the proposed project and to test the various claims made prior to marking the JRP proposals.

Key elements of each review conference included:

- Separate guidance briefings for the referees and proposers,
- A poster session for the referees with the proposers,
- Discussion between the referees of their initial thoughts based on their individual remote prior reading and their views following the presentation session,
- Development of formal questions by the referees to be put to the proposers,

- Formal Q&A session with the proposers,
- Marking of the proposals,
- A final plenary session to address any issues arising and to finalise the ranked list.

The full agenda for the review conference is given in Annex 2.

The referees were split into pre-defined groups to allow efficient and effective discussion of the proposals. Each of the proposals in the group was marked within the group by consensus, however the bulk of the input into the discussions came from a minimum of three referees formally assigned to the proposal. Although the discussions amongst the referees involved robust debate, they were able to reach consensus in all cases without any specific difficulties. All referees within the group declared agreement to the final marking books and overall, there were no problems encountered with this process. Indeed, the approach allowed wide and effective debate on the relative merits of the proposals.

To ensure consistency between the scores from different groups of referees, the training of the EURAMET facilitators concentrated on leading their referees to consensus opinions based on the scoring guidance:

0	The proposal **fails** to address the criterion or cannot be assessed due to missing or incomplete information
1	**Poor:** the criterion is inadequately addressed or there are serious inherent weaknesses
2	**Fair:** the proposal broadly addresses the criterion but there are significant weaknesses
3	**Good:** the proposal addresses the criterion well but a number of shortcomings are present
4	**Very Good:** the proposal addresses the criterion very well but a small number of shortcomings are present
5	**Excellent:** the proposal successfully addresses all relevant aspects of the criterion. Any shortcomings are minor

As marks were agreed between the referees, the facilitators would keep referring to these definitions. To further promote consistency between the groups the Deputy Programme Manager wandered between the groups collecting scores as they developed and listening to the debates. Where a group appeared to be scoring out of line with other groups, questions were asked of the referees against this guidance – prompting them to defend their scores.

The final discussions, where referees from all groups came together to review and approve the single ranked list, demonstrated that scoring had been consistent across the groups.

1.9.2 Capacity Building Coordination Evaluation Meeting

The Capacity Building Coordination proposals (also termed Coordination Support Projects (CSP)) were evaluated at an evaluation meeting which took place in Amsterdam on Sunday 12th November.

The process of evaluation involved the referees receiving the proposals assigned to them several weeks ahead of the evaluation meeting. The referees were requested to review and make their own preliminary informal marking. Referees were not required to submit these marks prior to the evaluation meeting as experience has shown that often the referees modify their views following face-to-face discussions.

Key elements of the evaluation meeting included:

- Separate guidance briefings for the referees and proposers,

- A presentation session, followed by informal questions and answers, between the referees and the proposers,
- Marking of the proposals,
- A final plenary session to address any issues arising and to finalise the ranked list.

The full agenda for the evaluation meeting is given in Annex 2.

Each of the proposals was marked within the group by consensus. Although the discussions amongst the referees involved robust debate, they were able to reach consensus in all cases without any specific difficulties and all referees signed the final marking workbooks.

To ensure consistency between the scores from referees, the training of the EURAMET facilitators concentrated on leading their referees to consensus opinions based on the same scoring guidance as above.

As marks were agreed between the referees, the facilitator would keep referring to these definitions. The final discussions, where referees approved the final ranked list, then demonstrated that scoring had been consistent.

1.9.3 Independent observation of the evaluation process

The review conferences and consensus group meeting were attended by an independent observer Daria Julkowska, whose appointment had been agreed between EURAMET and the Commission. Daria had access to all documentation, all communications with the referees, and attended the review conferences and evaluation meeting with full access to all areas. She also had the freedom to interview proposers, referees and EURAMET staff. She was asked to provide a report in two parts; the first part to report on the correctness of the process as implemented and the second part to offer any suggestions for improvement for EURAMET. The approach was deliberate, allowing for the initial section to be promptly released alongside the Call results, while enabling more deliberate consideration for the second part. A positive evaluation report was received and is provided in Annex 2.

1.9.4 Partnership Committee Decision on projects to be funded

It should be noted that the Partnership Committee is the body within EURAMET charged with the overall responsibility for the Partnership. The Partnership Committee consists of one representative from each of the 23 participating countries, plus some standing invitees. Membership of the Partnership Committee is published on the EURAMET website. Voting within the Partnership Committee takes recognisance of the significantly varying levels of national commitment but uses a “square root” system to ensure the decision-making process is not dominated by the representatives from the countries with larger national contributions.

On Tuesday 21 November, immediately following the review conferences, the Partnership Committee met and formally endorsed the recommendations of the referees without change.

The referees deemed 13 of the 15 Fundamental Metrology proposals, 18 out of 23 Metrology for Industry proposals, 10 out of 11 Metrology for Pre- and Co-normative Research proposals, 3 out of 5 Research Potential proposals, and the Capacity Building Coordination proposal of suitable quality for support. Neither the referees nor proposers had identified any significant duplication of work between proposals likely to be funded, and so there were no changes to be made to the size of individual projects and the choice faced by the Partnership Committee was merely where to draw the line in each list.

The Committee took various votes on how to distribute the budget for the year between the Target Programmes and in the end decided to fund the top 8 of the Fundamental Metrology projects, top 14 of the Metrology for Industry projects, top 5 of the Metrology for Pre- and Co-normative Research projects, top 3 of the Research Potential projects and the Capacity Building Coordination CSA. These proposals were sent for ethics screening with a view to being funded.

The Ranked Lists are shown in Table 2 below.

Table 2: Ranked List of Call 2023 projects

NRM ranked list			
1	23NRM01	JRP-n10	SBS Uncert
2	23NRM02	JRP-n07	SMURFnano
3	23NRM03	JRP-n04	BioAirMet
4	23NRM04	JRP-n01	NoQTeS
5	23NRM05	JRP-n05	SensMonCT II
6		JRP-n02	MetroNoME
7		JRP-n03	MetLiEGas
8		JRP-n09	ValOnSi
9		JRP-n12	NConRIDe
10		JRP-n08	METROSENS
11		JRP-n11	FLASH-DOSE

RPT ranked list			
1	22RPT01	JRP-r01	WAC
2	22RPT02	JRP-r02	ETraceAbs
3	22RPT03	JRP-r05	GrainMet
4		JRP-r04	PreNIM DC
5		JRP-r03	dweservices

FUN ranked list			
1	23FUN01	JRP-f05	PhoQuS-T
1	23FUN02	JRP-f08	CoCoRICO
3	23FUN03	JRP-f01	HIOC
4	23FUN04	JRP-f04	COMOMET
5	23FUN05	JRP-f10	AQuanTEC
5	23FUN06	JRP-f11	ProMET
7	23FUN07	JRP-f02	QuAHMET
8	23FUN08	JRP-f07	MetSuperQ
9		JRP-f15	BioSITrace II
10		JRP-f03	EPIQ
11		JRP-f12	QMeaSHA
12		JRP-f13	ENORM
13		JRP-f09	UNIQUE
14		JRP-f06	SISAT
15		JRP-f14	ML4Met

CBC ranked list			
1	23CBC01	CSP-b01	CBC

IND ranked list			
1	23IND01	JRP-i21	ENSURE
1	23IND02	JRP-i19	COMET
1	23IND03	JRP-i06	RF 4 6G
4	23IND04	JRP-i11	MetroSuperCap
5	23IND05	JRP-i02	H2FlowTrace
6	23IND06	JRP-i03	Met4EVCS
7	23IND07	JRP-i20	RadonNET
7	23IND08	JRP-i09	DI-Vision
9	23IND09	JRP-i14	MaritimeMET
10	23IND10	JRP-i16	OnMicro
11	23IND11	JRP-i17	ThermoTRACE
12	23IND12	JRP-i05	ADAM
13	23IND13	JRP-i12	ScreenFood4Safety
14	23IND14	JRP-i10	xDDiff
15		JRP-i04	AMMI
16		JRP-i23	DECARB II
16		JRP-i07	MUSICA
18		JRP-i01	QKDNextGen
19		JRP-i08	DyRoTorque
20		JRP-i24	SmartWater
21		JRP-i18	EasyCal
22		JRP-i22	Nano4COPS
23		JRP-i13	METAPHOR

The total EU contribution allocated was 52 145 132 € of which 17 676 499 € was for non-NMI and DI participants (34 %). 1 301 946 € of the allocated funding was transferred from the previous years. These figures may be adjusted as the budgets are examined in Grant Preparation.

The full names of the selected projects from Call 2023 are shown in Table 3.

Table 3: Full names of selected projects from the 2023 Call

Fundamental:		
23FUN01	*PhoQuS-T*	*Photonic and quantum sensors for practical integrated primary thermometry*
23FUN02	*CoCoRICO*	*Controlled confinement to reduce the inaccuracy of clocks based on optical lattices*
23FUN03	*HIOC*	*High-accuracy ion-based optical clocks*
23FUN04	*COMOMET*	*Fundamental physical metrology with cold molecules*
23FUN05	*AQuanTEC*	*Advanced quantum technology for metrology of electrical currents*
23FUN06	*ProMET*	*Fundamental protein metrology to support the definition of measurands, analytical targets, and their associated measurement uncertainty*
23FUN07	*QuAHMET*	*Quantum anomalous Hall effect materials and devices for metrology*
23FUN08	*MetSuperQ*	*Metrology for superconducting qubits*
Industry:		
23IND01	*ENSURE*	*Electric energy and supply reliability*
23IND02	*COMET*	*Manufacturing of commutable calibrators and quality control materials for standardisation and post-market surveillance of IVD tests*
23IND03	*RF 4 6G*	*RF key quantities for 6G development*
23IND04	*MetroSuperCap*	*Metrology for static and dynamic characterisation of supercapacitors*
23IND05	*H2FlowTrace*	*Flow measurement traceability for hydrogen in gas networks*
23IND06	*Met4EVCS*	*Metrology for electric vehicle charging systems*

23IND07	*RadonNET*	*Radon metrology: Sensor networks for big buildings and future cities*
23IND08	*DI-Vision*	*Traceable machine vision systems for digital industrial applications*
23IND09	*MaritimeMET*	*Metrology for green maritime shipping: Emission control through traceable measurements and machine learning approaches*
23IND10	*OnMicro*	*On-wafer microwave metrology for future industrial applications*
23IND11	*ThermoTRACE*	*Thermometry with embedded SI traceability for industrial applications*
23IND12	*ADAM*	*Application of Digital-Metrological Twins for emerging measurement technology in advanced manufacturing*
23IND13	*ScreenFood4Safety*	*Metrology for food safety in the circular economy: targeted and screening methods for contaminants in food and recycled packaging*
23IND14	*xDDiff*	*Multidimensional optical diffusion for the measurement of appearance*
Normative:		
23NRM01	*SBS Uncert*	*Support for standardisation of sample-by-sample waveform uncertainty computation*
23NRM02	*SMURFnano*	*Standardised measurements of surface functionalities on nanoparticles*
23NRM03	*BioAirMet*	*Standardisation of bioaerosol monitoring for air quality and climate modelling*
23NRM04	*NoQTeS*	*Normating colour-centre-based quantum sensing technology towards industrial application and standards*
23NRM05	*SensMonCT II*	*Advanced detail sensitivity monitoring by new concepts to improve the reliability of safety relevant products using industrial computed tomography*
Research Potential:		
23RPT01	*WAC*	*Wideband AC quantum traceability*
23RPT02	*ETraceAbs*	*Establishing European traceability for medical measuring devices through liquid absorbance filters*
23RPT03	*GrainMet*	*Metrology for standardised moisture content measurements in plant-origin bulk materials in support of International and European food safety and trade*
Capacity Bilding Coordination:		
23CBC01	*CBC*	*Capacity building coordination*

1.9.5 Partnership Committee Decision on projects funded from the reserve ranked lists for Calls 2021 and 2022

When the Call 2021 and Call 2022 stage 2 call closed the UK had not yet associated to Horizon Europe, and participation of UK participants was addressed as per the transition arrangements. The proposals were evaluated, and budget funding lines were set in the expectation that the UK would associate before the preparation of the grant agreements was finalised. When it became clear in spring 2022 and then again in spring 2023 that the UK's association would not be in place in time, the UK participants were switched from external beneficiaries to associated partners, and the funds released were used by the Partnership Committee to fund additional projects from the reserve ranked lists for Call 2021 and Call 2022 respectively. This increased the number of Call 2021 projects funded from 13 to 16 (with the addition of one Green Deal project and 2 Normative projects), and the number of Call 2022 projects funded from 25 to 27 (with the addition of 1 Health project and 1 Integrated European Metrology project). The number of funded projects and the total funded costs

in this report therefore differ from the values reported in the 2021 and 2022 annual reports. A separate report will be prepared detailing full call statistics for 2021 and 2022.

The additional projects funded in 2022 from the 2021 call were:

v13 (21GRD 10)	'quantiAGREMI'	On farm quantification of ammonia and greenhouse gas emissions from livestock production
n07 (21NRM05)	'STASIS'	Standardisation for safe implant scanning in MRI
n10 (21NRM06)	'EMC-STD'	Metrology for emerging electromagnetic compatibility standards

The additional projects funded in 2023 from the 2022 call were:

h06 (22HLT07)	'NEuroBioStand'	Standardisation of measurements of neurodegenerative disease biomarkers
s13 (22IEM07)	'INFOTherm'	Integrated European research, calibration and testing infrastructure for fibre-optic thermometry

1.10 Announcement and Grant Agreement preparation

Formal announcement of the results and grant agreement preparation for the projects selected in 2023 will take place in the first few months of 2024. The Annual report 2024 will include detailed statistics on the selected grants of Call 2023.

2 Financial Management

EURAMET received EU funds for the Partnership in 2023 in accordance with the Contribution Agreement. 23,65 Mio € (net of MIM) was received on 13th June 2023 to cover the prefinancing payments for call 2022. 6,5 Mio € was received on15th September 2023 to cover 2nd prefinancing payments for call 2021.

These funds are held by EURAMET and then paid to the Grant Beneficiaries in accordance with the Grant Agreements. None of the funds are used for implementation activities which are all paid for by the National Cash contributions.

The administrative costs of the Partnership for 2023 are shown in Part C of this report.

2.1 Allocation of EU Contribution to recipients

The funds allocated by the EU to the selected projects were allocated to the recipients in accordance with the requirements of the Decision, the Contribution Agreement, the Work Programme and the model grant agreement, and according to their estimated costs in the budget.

The total EU funds allocated for the 2022 projects was 41 751 651.72 € compared with the maximum available of 43 053 598.02 € (43 000 000 € from the 2022 call plus 53 598.02 € carry over from the 2021 call). Details by project and recipient are shown in Annex 1.

The total EU funds allocated for the 2021 to 2022 projects combined was 67 698 053.70 € compared with the maximum available of 69.000.000 €.

2.2 Payments to recipients

At present EURAMET has paid all prefinancing to the beneficiaries. Before payments are made against financial statements EURAMET makes efforts to assure itself that the costs claimed by the beneficiaries are correct and represent eligible costs in accordance with the processes outlined in the model grant agreements.

The Annex 1 details payments made to each beneficiary in each project, including the planned EU contribution. Payments made in 2023 totalled €23,236,962,72, while payments to the end of 2023, including all previous payments, were €37,253,339.19.

2.3 Interest and recoveries

36 095 € interest was received in 2023 on EU Partnership funds held by EURAMET. No negative interest was charged on funds being held in the EU account.

3 Management of the Partnership by EURAMET

3.1 People

The organisation of the EURAMET Secretariat in December 2023 can be seen below in Figure 1 and the staff in post in 2023 are listed in Table 4. In their meeting in September 2023 the EURAMET Board of Directors decided to change the structure of EURAMET Braunschweig office by combining the General Secretary and Programme Manager roles, thus flattening the organisation by one management layer.

Figure 1: Organisation of the EURAMET Secretariat

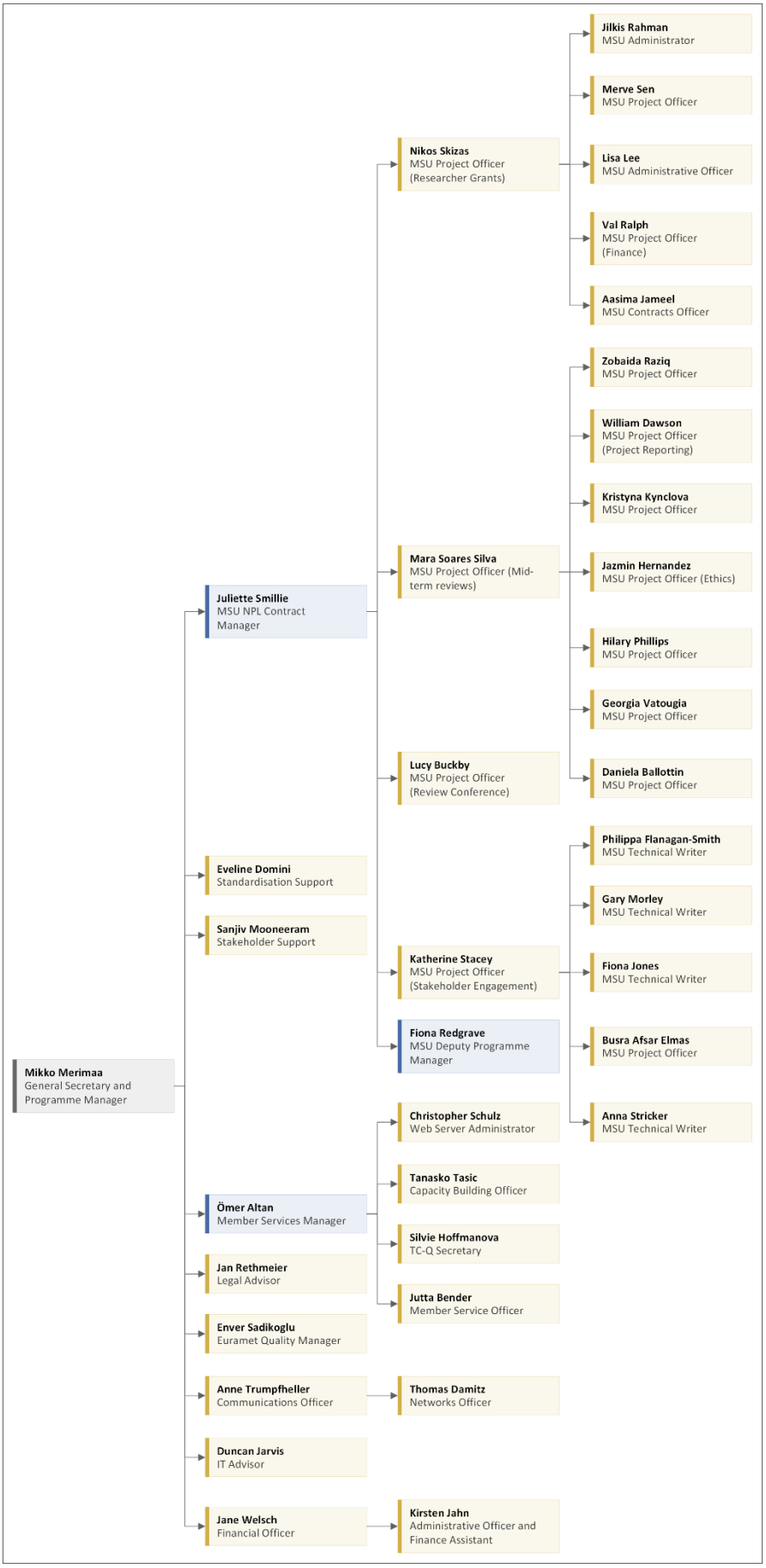


Table 4 EURAMET staff in 2023

Staff accounted for in Braunschweig	
General Secretary	Mikko Merimaa
Member Service Manager	Julien Vuillemin-Toledo (until November 31st), Ömer Altan (from February 2024)
Programme Manager	Dagmar Auerbach (until October 25th) Mikko Merimaa (from October 25th)
Communications Officer	Anne Trumpfheller
Quality Manager	Enver Sadikoglu
Legal Advisor	Jan Rethmeier
Head of General Management Unit	Jutta Bender
Administrative Officer	Brian Rambeka (until May)
TC-Quality Secretary	Silvie Hoffmanová
Capacity Building and Members´ Support Officer	Tanasko Tasić
Support for Standardisation	Eveline Domini
Financial Officer	Jane Welsch
Finance Assistant and Administrative Officer	Kirsten Jahn
Support for Networks	Thomas Damitz
IT Advisor	Duncan Jarvis
Staff accounted for in Teddington	
Project Officer (Deputy Programme Manager)	Fiona Redgrave
Project Officer (Researcher Grants)	Nikos Skizas
Project Officer (Project Reporting)	William Dawson
Project Officer (Review conference)	Lucy Buckby
Project Officer (Mid-Term Reviews)	Mara Soares Silva
Project Officer (Stakeholder Engagement)	Katherine Stacey
Project Officer (Project Finance)	Val Ralph
Project Officer (Ex-post Audits)	Ömer Altan (until 31 January 2024)
Project Officer	Georgia Vatougia
Project Officer	Zobaida Raziq
Project Officer	Busra Afsar Elmas
Project Officer (Data Control)	Tolga Alioglu
Project Officer (Group Leader)	Juliette Smillie
Project Officer	Kristyna Kynclova
Project Officer (Ethics)	Jazmin Hernandez
Project Officer	Daniela Ballottin
Project Officer	Merve Sen
Contracts Officer	Aasima Jameel
Project Officer	Hilary Phillips
Technical Writer	Anna Stricker
Technical Writer	Philippa Flanagan-Smith
Impact Officer	Gary Morley
Impact Officer	Fiona Jones
Administrative Officer	Jilkis Rahman (since April)
Administrative Officer	Lisa Lee

3.2 Processes

In 2023 the normal call processes were followed. Usual progressive updates to the call and reporting guides and procedures were implemented. In addition, a new guide, template and evaluation process were developed to address the CSA call.

The updated and new guides are available from the Partnership Participant portal at www.metpart.eu.

3.3 Promotion and Stakeholder engagement

3.3.1 Project pages on EURAMET website

Dedicated pages for the projects from the 2022 Partnership Call (including project summary and image) have been put on the EURAMET website.

3.3.2 Partnership specific events in 2023

Including the promotion of EPM

Workshop: Metrology for the hydrogen supply chain

Online, 20 September 2023

Metrology Partnership project Metrology for the hydrogen supply chain (Met4H2, 21GRD05) organised an online public stakeholder workshop.
Project partners representing European Metrology Institutes and the gas industry presented the current status of the project, focusing on issues such as:

- Health, safety and environment
- Flow measurement
- Hydrogen quality
- Measurement uncertainties for fiscal metering

This workshop aimed to foster discussion on the entire hydrogen supply chain and allow participants to provide their feedback or share their own measurement challenges.

Seminar: Metrology support for carbon capture, utilisation and storage

Online, 26 October 2023

This seminar was organised by the consortium of Metrology Partnership project Metrology Support for Carbon Capture Utilisation and Storage (MetCCUS, 21GRD06). It brought together experts from metrology and industry, to discuss and present their solutions for the measurement challenges that the carbon capture, utilisation and storage industry faces.

During the seminar, an overview of the MetCCUS project was presented, as well as the perspective from industry players. Over 10 invited speakers addressed key measurement challenges including those related to flow metering, emissions monitoring, chemical metrology, and the physical properties of CO2.

Workshop: The international standardisation roadmap for nanomedicine

Vanves, France, 13 November 2023

This workshop is co-sponsored by the Partnership project Metrology for innovative nanotherapeutics (22HLT04, MetrlNo).

Nanomedicine and nano-enabled medical device therapeutics (defined here as nanotherapeutics) are innovative solutions for tackling several health challenges, by delivering therapeutic agents to specific targeted sites in a controlled manner.

The international community is developing robust and validated analytical methods, fit for purpose reference materials and formally recognised consensus standards for the assessment of their quality and safety.

Objectives of the day
The intent of the workshop was to:

- share information on existing (pre)-standardisation initiatives ongoing at the European and international level (OITB, EURAMET, VAMAS, EDQM, ASTM E56, ISO/TC 229, CEN/TC 352)
- identify and prioritise specific measurement and standards needed to facilitate preclinical development and regulatory approval moving forward.

Full information including program

Workshop: New calibration standards and methods for radiometry and photometry
Online, Wednesday 22 November 2023
At this workshop the consortium of Metrology Partnership project New calibration standards and methods for radiometry and photometry after phaseout of incandescent lamps (22IEM05, NEWSTAND) gave news of project developments and gather stakeholder needs.

The project has two main goals:

- to deliver new transfer standards and dissemination methods to underpin the traceable measurement of spectral irradiance from natural and artificial sources of optical radiation
- to develop the metrological infrastructure required for these measurements

The workshop will be of interest to manufacturers of reference sources, spectroradiometers and filtered detectors, as well as those that perform calibrations of such instruments.

Preparatory workshop: 2024 Call for Research Potential Projects (RPT)
Online, 6-8 December 2023
The workshop

Research Potential projects (RPT) are a good tool for emerging NMIs to develop research measurement capabilities. Many significant impacts for both the EURAMET community and our stakeholders were realised thanks to these projects.

In 2024 there will be another RPT Call, this time related to all priorities from the **European Partnership on Metrology** (Green Deal, Digitalisation, Health, Integrated European Metrology, Industry, Normative or Fundamental).

The objective of the workshop is:

- to inform Potential Research Topics (PRT) authors about the scope, eligibility, rules and procedures related to the Call.
- to enable participants to promote their ideas for PRTs and find peers from other institutions interested in preparing a joint PRT and eventually joint project proposal in Stage 2

The workshop will have two sessions. The idea of splitting the workshop in two part is because we want to give participants some time after the first session to discuss ideas within their institutions and externally, and then come with clearer view for the second session.

Preliminary programme

- Scope, eligibility, rules, procedures (Fiona Redgrave, Tanasko Tasić)
- Good experiences from the past (Oliver Power, NSAI, coordinator of the projects 17RPOT04 VersICal (EMPIR) and 22RPOT02 True8DIGIT (EPM)
- Presentation of ideas (participants)
- Further discussion of ideas, networking (participants)

3.3.3 European Partnership on Metrology good news stories in 2023

Good news stories highlighting engagement with stakeholders included the following.

New joint research project on improving energy efficiency for railways

Date published: 22 February 2023

Providing increased confidence in the use of instrumentation to harvest waste energy in the transport system

DC railway and metro systems, supplied by unidirectional substations, show significant waste of energy for their inability to fully recover the energy produced by electric braking. Estimates show that an amount of 1 GWh per year, about the annual consumption of 365 families, can be wasted in one single commuter line. Bidirectional substations and/or storage systems are expected to significantly improve the energy efficiency but presently equipment and procedures lack to determine their real overall efficiency performance as well as the efficiency of their components like power transformers and converters.

Following needs expressed by IEC TC9, CLC SC9XC and CLC TC14, the new project **Metrology support for enhanced energy efficiency in DC transportation systems** (22NRM04, e-TRENY) will develop future methodologies for DC transport efficiency determination, that combine accurate on-site measurements with circuit models of the railway electric system.

The project is one of the first to start within the European Partnership on Metrology.

The activity is organised into four technical work packages:

- Configurations of non-conventional DC substations and on-site measurement setup development
- Infrastructure for on-site traceable measurement of energy efficiency
- Efficiency measurement of power converters used in DC transport systems
- Efficiency determination of whole DC supply system.

The project consortium is composed of well-established European National Metrology Institutes, industrial companies and universities, which provides a unique combination of specific experience and knowledge in the field of efficiency measurement of converters and machinery on the one side and of their operation and integration in a railway system on the other side.

The project consortium is composed of:

- 5 metrology institutes: INRIM (Italy), FFII (Spain), LNE (France), VSLB.V. (Netherlands), VTT (Finland) and
- 6 partners from industry and academia: Metro de Madrid, S.A. (Spain), Systra S.A. (France), Università degli studi della Campania Luigi Vanvitelli (Italy), Università degli Studi di Genova (Italy), Universiteit Twente, (Netherlands), Alstom Transport SA (France)

Project coordinator Domenico Giordano from INRIM said

'This is a great opportunity for the metrology community to foster the energy transition of the public electric transportation system'.

This project builds upon the work of previous EMPIR project Metrology for smart energy management in electric railway systems (16ENG04, MyRailS).

Improved instrument transformer measurement in new joint research project

Date published: 22 February 2023

Standardised methodologies, procedures and infrastructures for calibration, characterisation and testing of instrument transformers

Society is increasingly using switching devices such as inverters, bulky power electronic converters and active filters, both as loads as well as part of generators - especially for renewable energy sources. This has driven a consequent proliferation of disturbances on grid voltage and current, also at medium voltage level, up to hundreds of kilohertz, due to the harmonics of the components around the switching frequency.

The new project *Characterisation of AC and DC MV instrument transformers in extended frequency range up to 150 kHz* (22NRM06, ADMIT) will develop traceable measurement methods and procedures for the characterisation of instrument transformers used to measure disturbances up to 150 kHz in the medium voltage grid. The project partners will closely interact with IEC TC 38 to ensure the incorporation of the project outputs for revised and new written standards. The project results will benefit the metrology community, manufacturers of medium voltage systems and academics.

The project is one of the first to start within the European Partnership on Metrology.

The activity is organised into four technical Work Packages:

- Performance requirements, parameters and test procedures for accuracy evaluation
- Infrastructure for voltage generation and traceable measurement chain
- Infrastructure for current generation and traceable measurement chain
- Ensuring impact

The consortium brings together:

- seven leading European metrology institutes in the field of high voltage and high current metrology INRIM (Italy), FFII (Spain), LNE (France), RISE (Sweden), VTT (Finland), VSL (Netherlands) and METAS (Switzerland)
- five partners from industry and academia: RSE (Italy), Università degli studi della Campania Luigi Vanvitelli (Italy), Università degli studi di Bologna (Italy) Università degli Studi di Genova (Italy), ARTECHE (Spain), UNARETI (Italy)

Project coordinator Domenico Giordano from INRIM said

'*This project will foster the integration of renewable energy sources also in medium voltage distribution grids.'*

Metrology Partnership project is addressing the issue of microplastics in food and the environment

Date published: 19 May 2023

Creating a metrological infrastructure to measure small microplastics and nano-plastics

Plastic pollution is recognised as a severe anthropogenic issue globally, where complex physico-chemical transformation processes such as aging, degradation and fragmentation produce microplastics (MPs) and, subsequently, nanoplastics (NPs).

This occurs during production, consumer use and waste processing. The resulting plastic particles accumulate in the environment, including in the water and soil, and can cross biological barriers, accumulating within organisms. The EU Plastics Strategy has named reducing microplastic release as a key objective for fulfilling the European Union's circular economy action plan.

Several studies have reported the occurrence, analytical methods and toxicity of larger MPs in the environment and food matrices. However, small MPs (< 100 µm) and NPs (< 0.1 µm) in natural systems have been overlooked, primarily due to the significant methodological challenges associated with their micro- and nano-specific properties.

The recently started Metrology Partnership project Metrological traceability of measurement data from nano- to small-microplastics for a greener environment and food safety (21GRD07, PlasticTrace) will create methods for measuring and characterising small microplastics and nanoplastics. This will account for composition, size distribution and morphology, and will produce appropriate, realistic reference materials.

The project will also develop sample preparation methods and create a good practice guide for measuring and characterising SMP/NPs in food and the environment. This infrastructure will enable traceable monitoring of SMP/NPs, supporting decision-making and mitigation measures around plastic pollution. It will also support future technologies, such as biodegradable bioplastics, and improvements to the health impacts of industries such as food packaging and water management.

Project coordinator Andrea Mario Giovannozzi from INRIM said

"PlasticTrace is creating a solid and synergic networking with the main actors on the microplastics topic at both European and International level, including standardization bodies (ISOTC147/SC2/JWG1), pre-normative activities (VAMAST WA45) and European projects (EUROqCHARM, POLYRISK, PlasticsFatE, CUSP, Priority) for the harmonization of the methods and the development of reference materials, which constitute the fundamental base for an active contamination monitoring, future risk assessment and dietary exposure.

An active network of stakeholders which include environmental agencies, food producers, instrument makers has been already set for the proper involvement and dissemination of the PlasticTrace outputs. At the moment, candidate reference materials for both small-micro and nanoplastics are in preparation and will be promptly characterized in terms of homogeneity and stability with both thermoanalytical and spectroscopic methods. We expect to use them soon for the development of the methods in some selected matrices such as surface water and milk."

EURAMET project on passive radiative cooling technologies collaborates with SPACECOOL in Japan

Date published: 28 November 2023

Developing metrological frameworks to standardise new passive cooling materials and test them under real-world conditions

The Metrology Partnership project Metrological framework for passive radiative cooling technologies (21GRD03, PaRaMetriC) is working to develop a metrological framework to classify and compare Passive Radiative Cooling (PRC) materials. These materials provide an emerging technology that can cool to sub-ambient temperatures even in direct sunlight, and could be an efficient alternative to conventional systems, saving up to 80 % of cooling-related electricity.

The project will create protocols and best-practice guides for in-field testing and set up long-term tests across several sites to assess material performance under a variety of real-world conditions. This will help drive innovation in PRC technology, producing more energy-efficient cooling to meet rising needs. The standardised methods developed by the project will allow informed decisions to be made by both citizens and industry, and will overall reduce reliance on fossil fuels, in turn reducing the human impact on climate change.

The collaboration

SPACECOOL INC in Japan has developed a material known as SPACECOOL film that allows cooling without using traditional energy sources. This material makes it possible to lower the temperature below the outside temperature with zero energy input, by releasing heat into space even under direct sunlight.

The company will provide the material and will collaborate with the other members of the consortium towards the development of characterisation methods, demonstration tests and life cycle assessments for PRC materials. The goal is to contribute to the standardisation of reliable and reproducible PRC materials, in line with the objectives of the PaRaMetriC project.

Project Coordinator Lorenzo Pattelli from INRiM said 'The successful identification of widely available and highly reproducible materials exhibiting passive radiative cooling is paramount to promoting standardisation in this field, enabling the comparison of new materials against well characterised samples.

The PaRaMetriC consortium will collaborate with SPACECOOL to evaluate the cooling capacity of its cooling films using different testing prototypes, potentially up to surface areas of square meters due to the scalable fabrication of the SPACECOOL film.

Among several materials that are currently being studied in the project, large-scale and flexible films such as the one developed by SPACECOOL hold promise for several thermal management applications reaching beyond the residential sector, including for instance efficient heat shedding from electric vehicles, refrigeration in the transportation or electric power distribution fields, non-evaporative cooling and storage of water, or to enhance the efficiency of traditional cooling appliances, to name a few.

Representation at COP28 Climate Change Conference

For their leading role in the field of passive radiative cooling, SPACECOOL has been selected to exhibit at the COP28 Japan Pavilion as one of the companies supporting the realisation of Japan's long-term goal of becoming carbon neutral by 2050, and the worldwide efforts to mitigate and adapt to climate change. During the event, launching November 30th, the collaboration between SPACECOOL and PaRaMetriC will also be presented, to highlight our joint commitment towards the standardisation of passive radiative cooling technologies.

Partnership project makes progress towards protecting the Earth's fragile ozone shield

Date published: 19 December 2023

Developing the first metrological framework to assess the impact of cosmic rays and human activity on the ozone layer

One of the most significant − yet unexplored − ecological challenges facing EU member states and beyond is the impact on human and environmental health of the increasing atmospheric ionisation. This is caused by extra-terrestrial radiation, cosmic rays and solar UV radiation, boosted by anthropogenic emissions.

Metrology Partnership project Metrology for Earth Biosphere: Cosmic rays, ultraviolet radiation and fragility of ozone shield (21GRD02, BIOSPHERE) aims to develop the necessary tools, methodologies and measurement infrastructure needed to evaluate the mutual impact of cosmic rays and biologically active UV radiation on the Earth's biosphere. The work will support EU policy makers with scientific assessments and information that have the potential to substantially improve policies on climate, health and anthropogenic emission activities.

First measurements on ethanol

Combined theoretical and experimental studies on the elastic scattering of electrons on ethanol were **performed for the first time in the energy range of 30–800 eV**. Ethanol is of current interest in the field of climate physics because it is one of the most promising future sources of renewable energy that can be made from various plant materials. Owing to its lower global warming potential, this biofuel is increasingly replacing traditional fossil fuels.

The growing use of ethanol as an energy carrier, however, is causing a rise in the concentration of volatile organic compounds in the Earth's atmosphere. Electron-collision-induced dissociation processes of these compounds, initiated by primary as well as secondary cosmic rays, can lead to the production of reactive species which may impact the ozone balance in the upper atmosphere. For the quantitative description of these processes, comprehensive electron interaction cross sections of ethanol are needed – and are provided by the new measurements.

These project results have been published in the European Physics Journal in the paper Combined experimental and theoretical study on the elastic electron scattering cross sections of ethanol.

Project coordinator Faton Krasniqi from PTB said

'With a series of experiments already successfully conducted, the project is collecting data to quantify the effects of the combined cosmic and UV field on the fragmentation of atmospheric molecules and biological damages in human cells. These data will allow us to assess and expand the current knowledge of how these combined fields affect the ozone dynamics and the associated potential for acute and chronic health effects.

Implementation of electron scattering data into simulation codes for the propagation of space through the atmosphere leads to refined radical, ion and slow electron production rates, which would then make it possible to estimate how effective the cosmic ray model is compared to the photochemical model in depleting the ozone layer.'

4 Implementation of the action plan

In 2022 and 2023 a Pillars Assessment of EURAMET was carried out by the auditor PKF Littlejohn LLP, London, UK, as required by the European Commission. The objective of the assessment was to provide reasonable assurance to the European Commission as to whether the entity fulfils the requirements set out in points (a) to (f) of Article 154(4) of the Financial Regulation applicable to the General Budget of the European Commission and Article 29.1 of the Financial Regulation applicable to the European Development Fund with regard to the following pillars:

1 Internal control system

2 Accounting system

3 Independent external audit

4 Grants

7 Exclusion from access to funding

8 Publication of information on recipients

9 Protection of personal data

The conclusion of the auditor was that "Overall in our opinion, based on the work we have performed, the entity applies appropriate rules and procedures for ensuring protection of personal data in accordance with the criteria set by the European Commission."

The Pillars assessment final report was sent by the Audit Company to the Commission on 8th March 2023. The final report was accepted by the Commission and no supervisory measures were requested nor included in the FFPA. The full final report is provided in Annex 2. The findings, related recommendations, and status of their implementation is listed below in Table 5. All recommendations have been implemented.

Table 5: Pillars Assessment findings, related recommendations, and status of their implementation

PILLAR 1 — INTERNAL CONTROL SYSTEM	
Main findings / critical recommendations	
No	**Description of the finding/recommendation**
	No main findings / critical recommendations identified.
Other findings / other recommendations	
No	**Description of the finding/recommendation**
1	*Finding:* According to the Entity's procedures undertaken, risks are aligned with the Entity's strategic objectives, however we note that this is not clearly reflected in the risk assessment.
	Recommendation: We recommend, the inclusion, in the description of each risk, a clear reference to the Entity's strategic objectives related to each risk.
Status	Completed. Updated risks and the risk repository were approved by the EURAMET BoD in their autumn meeting.
2	*Finding:* The Quality Manager is one of the members of the Internal Audit Committee (IAC), however is under the supervision of the head of the Management Board of the Entity. This may compromise the independence of the IAC.
	Recommendation: The Entity should ensure the independence of the IAC with respect to the Management Board. Specific legal clauses may be included in the description of the role for the Quality Manager.
Status:	Completed. The revised procedure clarifying the role of the Quality Manager was approved by BoD in their spring meeting on 2023-04-26.
3	*Finding:* The monthly review undertaken to confirm that the information reflected in the Entity's bank statements reconciles with the data held in the accounting system is not formalised in an internal document signed by the Finance Officer (FO) and General Secretary (GS).
	Recommendation:

	We recommend that the General Secretary (GS) document his/her approval of the Finance Officer's bank reconciliations and follows up on any discrepancies arising from this review.
Status:	Completed: A new process is in place to approve the Finance Officer's bank reconciliations
4	*Finding:* During our assessment, we noted that certain individuals are authorised to make payments on their own. Due to the legal form of the Entity, they are not able to remove the capacity for these individuals making the payments on their own
	Recommendation: We recommend removing the possibility for these individuals to make payments on their own. Including, as part of the financial risk, a reference of the possibility of unauthorised bank transfers.
Status	Completed: EURAMET Byelaws were amended to remove the capacity for individuals to make payments on their own and banks were informed on the updated byelaws.
5	*Finding:* During our assessment, we noted that travel expenditure is usually reviewed by the FO, however this is not the case for travel expenses incurred by the FO, which are not subject to a second review.
	Recommendation: In those cases where a business trip is undertaken by the FO, and travel expenses incurred, the Entity should have a delegation of authority which assigns the responsibility to review the FO expenses to another staff member from the administration team.
Status	Completed: A new process is in place where the travel expenses of the FO are reviewed by the GS
6	*Finding:* We noted one procurement procedure where proposals were submitted to a dedicated email address for which the Entity's staff members (including those responsible for the evaluation) had access.
	Recommendation: We recommend that only one individual in the Entity, who is independent from the evaluation committee, has sole access to the dedicated email address for the receipt of proposals.
Status	Completed: A new process is in place where the legal adviser has sole access to the proposals

PILLAR 2 — ACCOUNTING SYSTEM	
Main findings / critical recommendations	
No	**Description of the finding/recommendation**
	No main findings / critical recommendations identified.
Other findings / other recommendations	
No	**Description of the finding/recommendation**
	No other findings / other recommendations identified.

PILLAR 3 — INDEPENDENT EXTERNAL AUDIT	
Main findings / critical recommendations	
No	**Description of the finding/recommendation**
	No main findings / critical recommendations identified.
Other findings / other recommendations	

No	Description of the finding/recommendation
	No other findings / other recommendations identified.

PILLAR 4 — GRANTS	
Main findings / critical recommendations	
No	**Description of the finding/recommendation**
	No main findings / critical recommendations identified.
Other findings / other recommendations	
No	**Description of the finding/recommendation**
7	*Finding:* The audit methodology put into place for evaluation of projects does not include: (1) the existence of an audit planning memorandum; and (2) a representative sample selection.
	Recommendation: We recommend putting into place a process to establish the risk related to the audit (based on a detailed audit planning memorandum) and based on the risks raised, a statistical approach to selecting a sample should be undertaken.
Status	Completed: We have changed our procedure to use or exceed the sample sizes indicated in the H2020 Indicative Audit Programme.

PILLAR 7 — EXCLUSION FROM ACCESS TO FUNDING	
Main findings / critical recommendations	
No	**Description of the finding/recommendation**
	No main findings / critical recommendations identified.
Other findings / other recommendations	
No	**Description of the finding/recommendation**
	No other findings / other recommendations identified.

PILLAR 8 — PUBLICATION OF INFORMATION ON RECIPIENTS	
Main findings / critical recommendations	
No	**Description of the finding/recommendation**
	No main findings / critical recommendations identified.
Other findings / other recommendations	
No	**Description of the finding/recommendation**
8	*Finding:* We noted two cases where not all the beneficiaries awarded with EU funds (according to the grant agreement) were listed in the Entity's website.
	Recommendation:

	We recommend reinforcing the internal procedure of the Entity to ensure that the names of all beneficiaries are included on the Entity's website for notification of the award.
Status	Completed: Our internal procedure was improved by adding an extra check on our checklist.

PILLAR 9 — PROTECTION OF PERSONAL DATA	
Main findings / critical recommendations	
No	**Description of the finding/recommendation**
	No main findings / critical recommendations identified.
Other findings / other recommendations	
No	**Description of the finding/recommendation**
9	*Finding:* We noted some missing references to the Entity's personal data protection policy in the inclusion of privacy notices, in different steps of the grant procedure.
	Recommendation: We recommend that the Entity includes privacy notes on stage 1 and stage 2 submission pages for call of proposals, as well as the referee registration.
Status	Completed: A privacy statement is included for Stage 1 and Stage 2 submissions, as well as referee submissions.
10	*Finding:* The Entity does not have a data protection impact assessment (DPIA) methodology in place, nor does it have a data subjects' rights requests procedure.
	Recommendation: We recommend putting into place both a DPIA methodology and a data subjects' rights requests procedure.
Status	Completed: We have revised our procedures and added both the DPIA methodology and a data subjects' rights requests procedure.

5 Achievement of KPIs

First achievements of KPIs based on projects started in 2021 are listed in Table 6 below.

Table 6: Achievements of KPIs

Objective	KPI Definition/ proposed target	KPI achievement
1. To develop, by 2030, new research capabilities which are built within the framework of new European metrology networks (EMN) and which perform in terms of calibration and measurement capabilities at least	**By mid of 2024**: 1.1 The EMN landscape will have been completed through strategic consideration of topics where the NMIs and DIs most benefit from coordination, complementarity, and joint research capabilities. At least 12	**Status end of 2023:** 1.1 Up to end 2023, 12 EMNs have been launched: 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 EMN for Clean Energy has been approved and is building up their website at the moment.

Objective	KPI Definition/ proposed target	KPI achievement
equally to the leading metrology institutes outside the Participating States	EMNs will have been launched. 1.2 Deliver a report on the number of EMNs and their joint research capabilities including staff effort and shared infrastructure. **By the end of 2030**: 1.3 At least 9 of the EMNs will demonstrate measurement capability at the top international level.	1.2 Each EMN's respective SRA has been published on their websites. A draft report has been delivered to the Commission for their review in September 2023. 1.3 The measurement capabilities are under development at the moment.
2. To support, by 2030, sales of new innovative products and services through the use and adoption of the new metrology capabilities in key emerging and enabling technologies	Every year: 2.1 The number of participants from industry and early adopters of the developed technologies in JRPs to be at least at the level of participation in the last EMPIR comparable Target Programmes (Industry, Health, Normative, Green Deal "Energy-Environment") The number of participants in JRPs as regards digital calls should be included in the report.	**Status end of 2023:** 2.1 The number of participants from industry and early adopters of the developed technologies in JRPs as of the end of 2023 is detailed below, and comparable figures for EMPR are given as reference. As the number of projects is different, the average number of participants per project is used to assess if the KPI is met.

Partnership	Number of projects	Number of industry and adopters per TP	Average number per project	EMPIR	Number of projects	Number of industry and adopters per TP	Average number per project	KPI on target?
DIT	2	23	11,5	n/a	0	0		N/A
GRD	10	113	11,3	ENV+ENG	37	307	8,3	Y
FUN	8	51	6,4	FUN	18	106	5,9	Y
HLT	7	65	9,3	HLT	19	129	6,8	Y
IEM	7	53	7,6	n/a				N/A
IND	14	153	10,9	IND	41	309	7,5	Y
NRM	18	102	5,7	NRM	37	166	4,5	Y
RPT	7	34	4,9	RPT	21	39	1,9	Y

2. To support, by 2030, sales of new innovative products and services through the use and adoption of the new metrology capabilities in key emerging and enabling technologies	By mid of 2024 2.2 Deliver a report on the trends in European turnover from new or significantly improved products and services that can be attributed to the research activities of the partnership and its predecessors by TP. 2.3 At least 40 % of the collaborators[1] in joint research projects should be profit-making entities. Every year from 2026 onwards: 2.4 An average of at least EUR 50 million of European turnover from new or significantly improved products and services should be demonstrated to result from the research activities of the Partnership. 2.5 At least 40 % of the collaborators in joint research projects should be profit-making entities.	**Status end of 2023:** 2.2 This report is in progress and will be delivered in time. There have been Partnership projects concluded within the timeframe, but analysis of the economic benefit of EMPIR projects is progressing as planned. 2.3 Collaborators can only be appointed after the project started, a first indication will come at their first periodic reporting which is at M18. For Call 2021 this is foreseen in Spring 2024. 2.4 This is not possible to give evidence now, as the interviews to gain those numbers will start a year after the conclusion of the projects. 2.5 see point 2.3, This KPI had been achieved so far.
3. To contribute to the creation and diffusion of high-quality new knowledge, competences and skills across the Union in the context of lifelong learning and with a view to achieving societal transformation, including through enhancing capability for innovation;	By mid of 2024 3.1 At least 18 seminars, and stakeholders events should have been organised by the EMNs. Every year from 2026 onwards: 3.2 The average number of peer reviewed scientific publications per project that completed in the previous year should be at least 6. 3.3 On average at least 4 seminars and courses are arranged towards stakeholder communities per concluded project. By the end of 2030:	**Status end of 2023:** 3.1 16 EMN related events had been held within 2022, and 16 events within 2023. Altogether 32 events have been arranged by the end of 2023. (see https://www.euramet.org/publications-media-centre/events/archived-events) 3.2 No Partnership projects have been completed yet. However, up until the end of 2023, 28 peer-reviewed scientific publications have been reported from Call 2021 projects in their first 18 months. For more details see section 6.3. 3.3 A first indication will come at their first periodic reporting which is at M18. For Call 2021 this is foreseen in Spring 2024. Seminars in general are coming when the first results have been achieved and can be taught to others.

[1] Collaborators are those organisations that have signed a Letter of Agreement (or equivalent) with the consortium.

<table>
<tr>
<td></td>
<td>3.4 The Field-Weighted Citation2 Index of peer reviewed publications produced by the Metrology Partnership is at least 1.

3.5 Funding distributed to non NMIs and DIs will have been 35 % of the total funding distributed in the areas supporting the EMNs.

3.6 At least 10 patent applications are produced for every 100 concluded projects.</td>
<td>3.4 Not applicable yet.

3.5 Not applicable yet.

3.6 Not applicable yet.</td>
</tr>
<tr>
<td>4. To contribute fully and effectively, by 2030, to the design and implementation of specific standards and regulations that underpin public policies addressing societal, economic and environmental challenges</td>
<td>Every year:

4.1 At least 10 % of activity in the selected joint research projects is dedicated to normative research & to support regulation.

Every year from 2026 onwards:

4.2 The number of contributions to standard committees that underpin policy or regulation that underpin public policies addressing societal, economic, and environmental challenges should be at least 400.

Overall:

4.3 At least 40 % of activity in the selected joint research projects is dedicated to the twin transition.</td>
<td>Status end of 2023:

4.1
<table>
<tr><th>Call year</th><th>Funded Value</th><th>Standardisation participation</th><th>Percentage of Standardisation /participation</th></tr>
<tr><td>2021</td><td>€ 25 946 402</td><td>€ 10 262 134</td><td>39,6%</td></tr>
<tr><td>2022</td><td>€ 41 751 652</td><td>€ 11 430 540</td><td>27,4%</td></tr>
<tr><td>2023</td><td>€ 52 145 132</td><td>€ 10 912 098</td><td>20,9%</td></tr>
<tr><td>2024</td><td>€ 0</td><td>€ 0</td><td>0,0%</td></tr>
<tr><td>2025</td><td>€ 0</td><td>€ 0</td><td>0,0%</td></tr>
<tr><td>2026</td><td>€ 0</td><td>€ 0</td><td>0,0%</td></tr>
<tr><td>2027</td><td>€ 0</td><td>€ 0</td><td>0,0%</td></tr>
<tr><td>TOTAL</td><td>€ 119 843 186</td><td>€ 32 604 772</td><td>27,2%</td></tr>
</table>

4.2 A first indication will come at their first periodic reporting which is at M18. For Call 2021 this is foreseen in Spring 2024.

4.3
<table>
<tr><th>Call year</th><th>Funded Value</th><th>Twin participation</th><th>Percentage of Twin /participation</th></tr>
<tr><td>2021</td><td>€ 25 946 402</td><td>€ 24 124 181</td><td>93,0%</td></tr>
<tr><td>2022</td><td>€ 41 751 652</td><td>€ 11 063 312</td><td>26,5%</td></tr>
<tr><td>2023</td><td>€ 52 145 132</td><td>€ 2 299 430</td><td>4,4%</td></tr>
<tr><td>2024</td><td>€ 0</td><td>€ 0</td><td>0,0%</td></tr>
<tr><td>2025</td><td>€ 0</td><td>€ 0</td><td>0,0%</td></tr>
<tr><td>2026</td><td>€ 0</td><td>€ 0</td><td>0,0%</td></tr>
<tr><td>2027</td><td>€ 0</td><td>€ 0</td><td>0,0%</td></tr>
<tr><td>TOTAL</td><td>€ 119 843 186</td><td>€ 37 486 922</td><td>31,3%</td></tr>
</table>
</td>
</tr>
</table>

[2] Field-weighted Citation Impact (FWCI) is an author-level metric introduced and applied by Scopus SciVal. FWCI equals to the total citations actually received divided by the total citations that would be expected based on the average of the considered field. FWCI of 1 means that the output performs just as expected for the global average. More than 1 means that the author outperforms the average, and less than 1 means that the author underperforms.

<table>
<tr>
<td>5. To unleash the potential of metrology among end-users, including SMEs and industrial stakeholders, as an instrument which contributes to the achievement of the Union goals for the digital and green transitions.</td>
<td>By the end of 2022 onwards:

5.1 The share of selected research topics where end-users including industrial stakeholders and early adopters of the proposed technologies, have contributed to the objectives should be at least 10 %.

By the end of 2026 onwards:

5.2 At least 0.75 % of projects can demonstrate an end-user engagement mechanism after the project.

5.3 On average 1.5 outreach events are arranged towards stakeholder communities per concluded project. Uptake of co-created scientific results and innovative solutions.

5.4 To provide examples that the joint research projects are addressing the identified Union policy priorities and global challenges (including SDGs)</td>
<td>Status end of 2023:

5.1
<table><tr><th>Year</th><th>Total No. SRTs published</th><th>No. SRTs with Early adopters</th><th>% Early Adopters (KPI 5.1)</th></tr><tr><td>2021</td><td>30</td><td>26</td><td>87 %</td></tr><tr><td>2022</td><td>55</td><td>50</td><td>91 %</td></tr><tr><td>2023</td><td>57</td><td>44</td><td>77 %</td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td>Totals</td><td>142</td><td>120</td><td>85 %</td></tr></table>
5.2 The first projects of the Call 2021 will finish in 2025, exact results will be obtained from that time onwards on.

5.3 A first indication will come at their first periodic reporting which is at M18. For Call 2021 this is foreseen in Spring 2024.

5.4 A first indication will come at their first periodic reporting which is at M18. For Call 2021 this is foreseen in Spring 2024.</td>
</tr>
</table>

As the annual report needs to be in line with the Art.50.1(b) of the Regulation (EU) 2021/695 the following table shows the achievements according to the regulation:

Information based on Art.50.1(b) of the Regulation (EU) 2021/695	**Status by end of 2023**
Information on the level of mainstreaming SSH (Social Sciences and Humanities)	The integration of SSH is not a main aspect of this Partnership, but is supported through the inclusion in projects, whenever appropriate.
The ratio between lower and higher TRLs in collaborative research	Lower TRL levels are reached in projects in the field of Fundamental Metrology. In the TPs of Metrology for Industry or the Metrology to support the Green Deal, the TRLs are mostly higher, as they include the potential industrial uptake community mainly in the consortium.
The progress on the participation of widening countries	With our approach to incorporate more EURAMET members in the Partnership and to raise awareness of the Partnership in the community, we are trying very hard to increase the number of participants.
The geographical composition of consortia in collaborative projects	All projects and their consortia are spread over Europe.
The evolution of researchers' salaries	As EURAMET is not responsible for the individual salaries, this is not applicable for us.
The use of a two-stage submission and evaluation procedure	We follow a two stage process with stage 1 our call for needs where we respond to the actual stakeholder needs and the stage two where we address these needs in project proposals. This always happens within one calendar year.
The measures aimed at facilitating collaborative links in European R&I	In all our JRPs we aim at collaborative research with the inclusion of participants from the whole life cycle. This includes at the beginning a wide range of European Research facilities and of course the potential end users on the other side.
The use of the evaluation review and the number and types of complaints	We follow the same evaluation criteria as the other HEU initiatives. See 1.8.1 of this report.
The level of climate mainstreaming and related expenditures	EURAMET only attends project meetings virtually and all other related issues are dealt with online as well. The Mid Term Evaluations for the projects will be held virtually and we do not require the projects to have only face to face meetings.
SME participation	In the Partnership we participate in the MIM and therefore all SMEs receive prefinancing. Our call scopes encourage SME participation.
Private sector participation	The Partnership is open for all entities who are allowed to receive funding under the HEU participation rules.
Gender participation in funded actions	All entities are obliged to have a gender equality plan unless they are in a category where they are exempt from the requirement to have one.
Evaluation panels	Our independent reviewers who evaluate the proposals are not linked to any NMI or DI within

Information based on Art.50.1(b) of the Regulation (EU) 2021/695	Status by end of 2023
	EURAMET and we have an independent observer appointed by the Commission to oversee our evaluation at each Review Conference.
Boards and advisory groups	The European Partnership on Metrology has a steering group, and the Partnership Committee oversees all necessary decisions related to the Partnership
The 'Seals of Excellence'	This is not applicable for us.
The European Partnerships as well as the co-funding rate	We have synergies with various other Partnerships, like MADE, Hydrogen and PIANOFORTE, we have signed various MoU and are involved in collaborative research projects. Cofunding Reporting can be seen in Part E and F of the report.
The complementary and cumulative funding from other Union programmes	EURAMET and its members are involved in various other Union programmes. One example is our EMN Quantum which is included in the Quantum flagship initiative.
Research infrastructures	Within every JRP we support common infrastructure in all related NMIs and DIs in Europe.
Time-to-grant	Time to grant can be seen from table 7 (Part B point 6.1)
The level of international cooperation	We are open to any international cooperation, the JRC can join any project, if they wish to do so, the CERN research centre is involved in some projects and for other international cooperations, related to SDOs we include them, whenever possible in our actions.
Engagement of citizens and civil society participation	Every action has an impact related objective in where the engagement with the broad public is encouraged and foreseen, if this is possible.

6 Data on the programme implementation and its impact

6.1 Call dates, timescales & overall statistics on proposals received

Table 7: Dates and timescales

Stage	Stage 1, PRT	Stage 2, JRP	Stage 1, CSA
Respective TPs	FUN, IND, NRM, RPT	FUN, IND, NRM, RPT	CBC
Call opened	11-Jan-23	23-Jun-23	23-Jun-23
Call closed	20-Feb-23	02-Oct-23	02-Oct-23
Selection decision made by the Partnership Committee	01-Jun-23	21-Nov-23	21-Nov-23
Announcement	09-Jan-23	23-Jun-23	23-Jun-23
Expected grant agreement signature	-	01-Jun-24	01-Jun-24
Days between call closure and announcement	40	99	99
Days between call closure and expected signature of the grant agreement		241	241

Table 8: Number of applications submitted, evaluated or prioritised and selected

Stage	Application type	Number of submissions*	Number eligible for evaluation	Number selected
Stage 1	PRT	94	94	56**
Stage 2	JRP	54	54	30
1 stage CSA	CSP	1	1	1

*(excluding superseded submissions)
**(Some SRTs include input from more than one PRT)

Table 9: Type of organisation submitting PRTs

Country	NMI/DI	Other	Total
Austria	1	0	1
Croatia	1	0	1
Czechia	1	0	1
Denmark	1	0	1
Estonia	1	0	1
Finland	3	0	3
France	8	1	9
Germany	26	1	27
Italy	11	2	13
Japan	0	1	1
Lithuania	0	2	2
Netherlands	5	1	6
Norway	3	0	3
Peru	0	1	1
Romania	1	0	1
Slovakia	2	1	3
Sweden	4	0	4
Switzerland	2	1	3
Türkiye	3	0	3
Ukraine	1	0	1
United Kingdom	9	0	9
Total	83	11	94

6.2 Detailed statistics from Stage 2

Table 10: Resource details for all submitted proposals

	JRP	CSP	Total
Total Value (including Associated Partners)	*118 268 513 €*	*1 000 000 €*	*119 268 513 €*
- Internal funding requested	*58 717 213 €*	*1 000 000 €*	*59 717 213 €*
-External funding requested	*44 036 708 €*	*0 €*	*44 036 708 €*
-Unfunded Annex 2 Costs	*3 953 929 €*	*0 €*	*3 953 929 €*
-Non eligible Associated Partner Costs	*11 560 663 €*	*0 €*	*11 560 663 €*
Total requested EU funding	*102 753 921 €*	1 000 000 €	103 753 921 €
Total available EU funding	*51 301 946 €*	1 000 000 €	52 301 946 €
Total person months efforts	12 365	27	12 392
- Person months efforts -internal funded	6 333	27	6 360
- Person months efforts -external funded	4 870	0	4 870
- Person months efforts - unfunded	284	0	284
- Person months efforts - Associted Partner			878
Number of proposals	54	1	55
Number of eligible proposals	54	1	55
Total number of Beneficiaries	771	1	772
Average Beneficiaries per proposal	14	1	14
Total number of Participants	834	1	835
Average Participants per proposal	15	1	15
Average total value per proposal	2 190 158 €	1 000 000 €	2 168 518,42 €
Average funding request per proposal	1 902 850,39 €	1 000 000,00 €	1 886 434,93 €

Figure 2: Value of submitted proposals by country and type

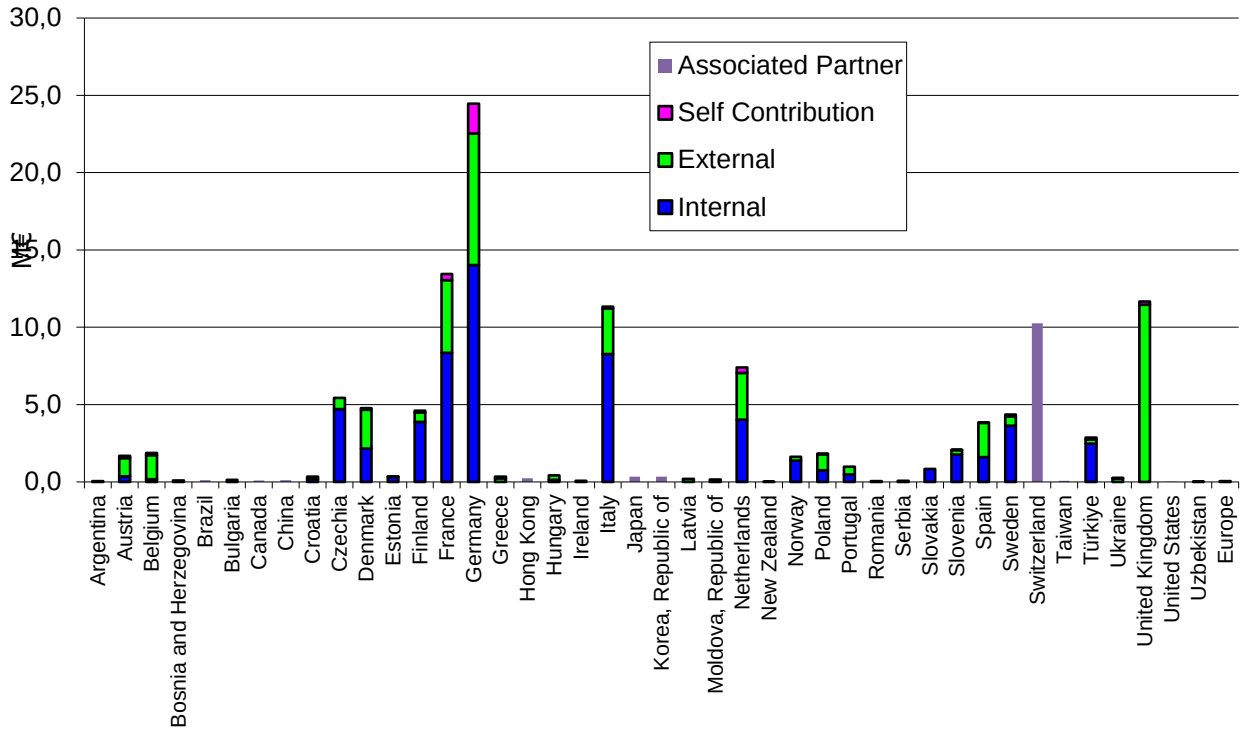


Table 11: Type of participant in submitted proposals by country

	Internal	External	Self Funded	Associated	Total
Argentina	0	2	0	0	2
Austria	6	7	3	0	16
Belgium	3	17	2	0	22
Bosnia and Herzegovina	3	0	0	0	3
Brazil	0	0	0	1	1
Bulgaria	0	2	0	0	2
Canada	0	0	0	2	2
China	0	0	0	1	1
Croatia	2	1	0	0	3
Czechia	39	6	0	0	45
Denmark	17	22	3	0	42
Estonia	5	1	0	0	6
Finland	27	5	3	0	35
France	41	39	7	0	87
Germany	49	63	26	0	138
Greece	0	2	1	0	3
Hong Kong	0	0	0	1	1
Hungary	3	4	0	0	7
Ireland	1	0	0	0	1
Italy	34	31	3	0	68
Japan	0	0	0	3	3
Korea, Republic of	0	0	0	2	2
Latvia	0	1	0	0	1
Moldova, Republic of	0	5	0	0	5
Netherlands	20	19	5	0	44
New Zealand	0	0	1	0	1
Norway	10	2	0	0	12
Poland	12	13	1	0	26
Portugal	6	7	0	0	13
Romania	0	1	0	0	1
Serbia	0	2	0	0	2
Slovakia	8	0	0	0	8
Slovenia	13	4	1	0	18
Spain	10	24	1	0	35
Sweden	21	4	1	0	26
Switzerland	0	0	0	44	44
Taiwan	0	0	0	1	1
Türkiye	24	1	2	0	27
Ukraine	0	5	1	0	6
United Kingdom	0	58	7	0	65
United States	0	0	0	1	1
Uzbekistan	0	0	1	0	1
Europe	0	0	1	0	1
Total	**354**	**348**	**70**	**56**	**828**

An organisation is counted each time it is included in a proposal, therefore 1 organisation may equate to a number of counts.

Figure 3: Nationality of coordinating organisation in the submitted proposals

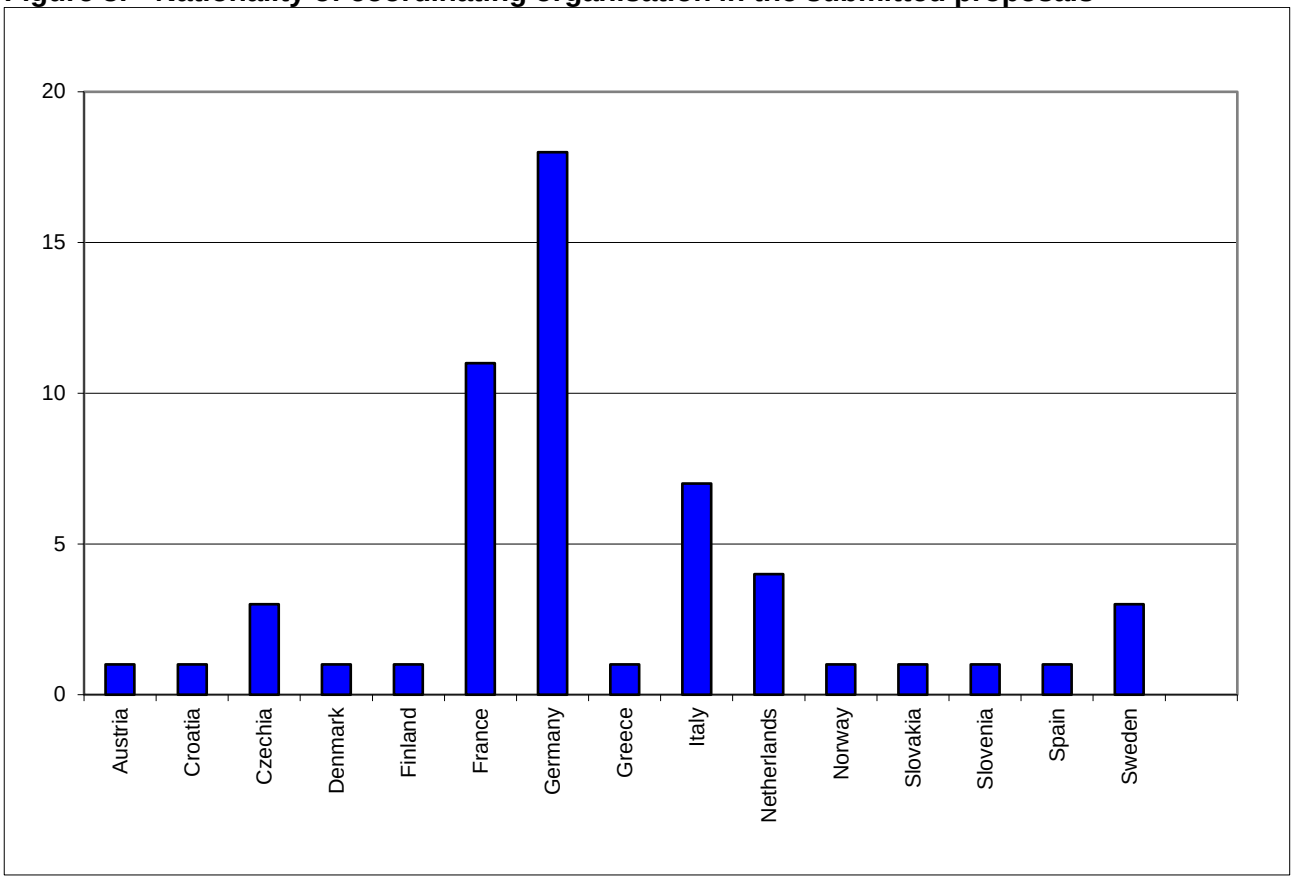


Table 12: Resource details for all selected proposals

	JRP	CSP	Total
Total Value (including Associated Partners)	*61 826 811 €*	1 000 000 €	*62 826 811 €*
- Intermal funding requested	*33 238 596 €*	*1 000 000 €*	*34 238 596 €*
-External funding requested	*17 906 546 €*	*0 €*	*17 906 546 €*
-Unfunded Annex 2 Costs	*3 121 747 €*	*0 €*	*3 121 747 €*
-Non eligible Associated Partner Costs	*7 559 922 €*	*0 €*	*7 559 922 €*
Total requested EU funding	*51 145 142 €*	1 000 000 €	*52 145 142 €*
Total available EU funding	*51 301 946 €*	1 000 000 €	*52 301 946 €*
Total person months efforts	7 137	27	7 164
- Person months efforts -internal funded	3 583	27	3 610
- Person months efforts -external funded	2 720	0	2 720
- Person months efforts - unfunded	240	0	240
- Person months efforts - Associted Partner	594	0	594
Number of projects selected	30	1	31
Total number of Beneficiaries	428	1	429
Average Beneficiaries per proposal	14	1	14
Total number of Participants	469	1	470
Average Participants per proposal	16	1	15
Average total value per proposal	2 060 893,70 €	1 000 000,00 €	2 026 671,32 €
Average funding request per selected project	1 704 838,07 €	1 000 000,00 €	1 682 101,35 €

Figure 4: Value of selected proposals by country and type

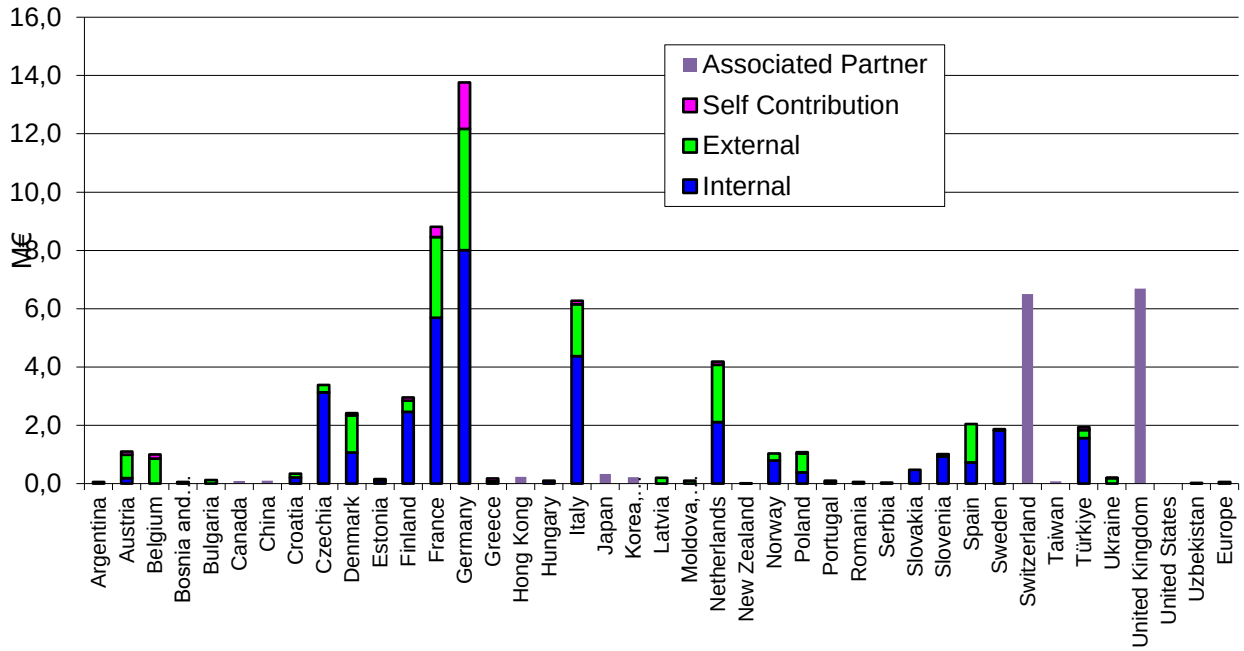
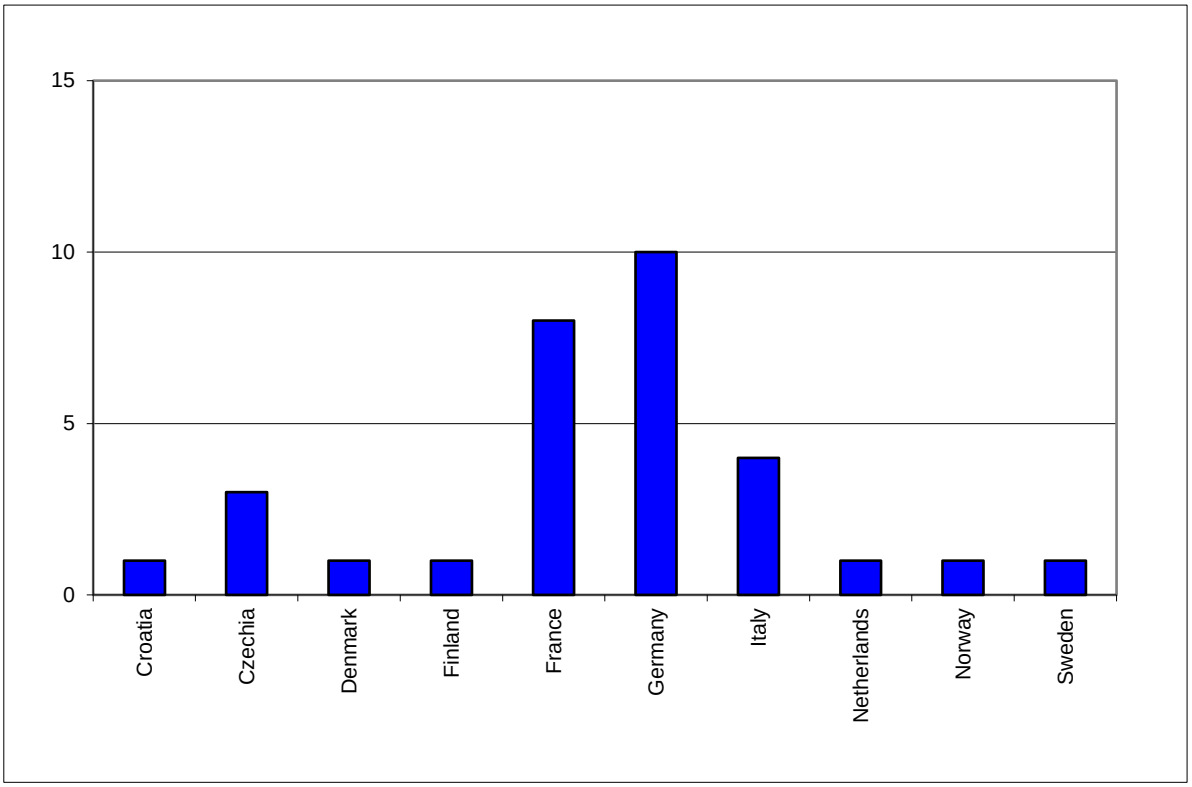


Table 13: Type of participant in selected proposals by country

	Internal	External	Unfunded	Associated	Total
Argentina	0	2	0	0	2
Austria	3	4	2	0	9
Belgium	0	9	2	0	11
Bosnia and Herzegovina	2	0	0	0	2
Brazil	0	0	0	0	0
Bulgaria	0	2	0	0	2
Canada	0	0	0	2	2
China	0	0	0	1	1
Croatia	2	1	0	0	3
Czechia	20	2	0	0	22
Denmark	8	12	2	0	22
Estonia	2	1	0	0	3
Finland	15	3	3	0	21
France	25	21	5	0	51
Germany	25	31	20	0	76
Greece	0	1	1	0	2
Hong Kong	0	0	0	1	1
Hungary	2	0	0	0	2
Ireland	0	0	0	0	0
Italy	19	18	3	0	40
Japan	0	0	0	3	3
Korea, Republic of	0	0	0	1	1
Latvia	0	1	0	0	1
Moldova, Republic of	0	3	0	0	3
Netherlands	10	11	2	0	23
New Zealand	0	0	1	0	1
Norway	5	2	0	0	7
Poland	6	8	1	0	15
Portugal	1	1	0	0	2
Romania	0	1	0	0	1
Serbia	0	1	0	0	1
Slovakia	4	0	0	0	4
Slovenia	7	2	1	0	10
Spain	5	14	0	0	19
Sweden	12	1	0	0	13
Switzerland	0	0	0	25	25
Taiwan	0	0	0	1	1
Türkiye	13	1	1	0	15
Ukraine	0	4	1	0	5
United Kingdom	0	33	6	0	39
United States	0	0	0	1	1
Uzbekistan	0	0	1	0	1
Europe	0	0	1	0	1
Total	**186**	**190**	**53**	**35**	**464**

Figure 5: Nationality of coordinating organisation in selected proposals



6.3 Outputs of all actions that ended in the reporting year

During 2023 several Impact and Output reports (first reporting) were collected from Partnership call from 2021. A reporting process is in place to collect and collate the data. In addition, a guidance on the use of the Input and Output data is available from the Metrology Partnership download page. The projects are required to complete these reports at each reporting period.

Table 14: Output data for Metrology Partnership projects

Output		Total no. of outputs
Presentations & other dissemination	Conference presentations /posters	125
	Other dissemination activities	93
Peer-reviewed publications	Peer-reviewed publications	28
Standards	Inputs to standards committees	79
Training	Training activities (internal)	16
	Training activities (external)	13
IP	Patent applications	0
	Total number of unique outputs	**354**

The output data reported has been collated from the data provided by JRP coordinators in the JRP Output and Impact Report. The data reported here was collated at the end of 2023.

Notes on the definitions used in the data collation

- The category 'peer-reviewed publications' includes articles that have been published in journals or accepted for publication. Submitted papers are not counted.
- The data for 'inputs to standards committees' do not include inputs to metrology committees (such as BIPM, EURAMET)
- Co-authored peer-reviewed publications have been identified as those publications with authors from at least two organisations (two NMI or one NMI and one DI from at least two different countries)
- Training is defined as 'internal' where the training is directed at consortium members and 'external' where training is directed at non-consortium members or a mixture of both consortium members and non-consortium members.

Summary of the data

- A total of 354 unique outputs have been reported to date.
- To date the most commonly reported outputs are conference presentations (incl. posters) (35 % of total outputs)
- A total of 28 peer-reviewed papers have been published to date, of which 64 % have been co-authored (i.e. with authors from at least two organisations).
- There have been 62 inputs to 44 unique standards developing committees.
- 29 training activities with roughly a third of these directed to people beyond the core consortia undertaking the projects.
- There have been no patent applications so far

The tables that follow provide more detail on the output figures.

Contributions to standards

Metrology Partnership JRP participants engage with a wide range of standards making and regulatory bodies (including metrology standards committees). This includes, for example, membership of technical committees and working groups of standards developing bodies (SDOs) such as ISO, IEC, CEN, CENELEC, ETSI and their national equivalents. JRP participants make presentations to these technical committees and their working groups and also to regulatory bodies (ministries, WHO, EC, etc.) and provide inputs to draft standardisation documents.

JRP participants have made 62 contributions or inputs to 44 unique committees of standards making bodies, predominantly at international level with ISO being the most frequent SDO engaged with.

Table 15: Contributions to standards

Type of standards body	No. of contributions
International standards development organisation (ISO, IEC)	27
European standards development organisation (CEN, CENELEC, ETSI)	10
National standards development organisation	14
Regulatory/regulation-making/policy-making bodies (Ministries, IAEA, ICNIRP etc.)	1
Industry associations (CIGRE, etc)	9
Other	1
TOTAL	62

Publications
A key output and dissemination tool for JRPs is publication of project outputs. To date there have been 25 publications in peer-reviewed journals.

The extent of co-publications, that is articles with authors from more than one organisation, provides an indicator of close collaboration between NMIs as well as between NMIs and a DI from another country. 64 % of all publications in peer reviewed journals are co-publications.

Please note, all publications must be open access and listed in our repository, otherwise they are not allowed to be counted as peer reviewed publications.

Table 16: Publications

Publications	
Articles in peer-reviewed journals	25
Proceedings	3
Good practice guides	0
Technical reports	0
Books	0
Theses	0
TOTAL	**28**

Published Open Access Peer reviewed Publications	
Published Open Access Peer reviewed Publications	28
Co-authored Published Open Access Peer reviewed Publications	18

Other dissemination
In addition to publications, conferences and contributions to standards committees, project partners have undertaken a wide range of other activities to disseminate project outputs including workshops, newsletters, articles in trade or popular press, websites, etc.

Table 17 Other dissemination

Dissemination activities	No.
Presentation to external audience	26
Website	15
Article published in the popular press	7
Article published in trade / professional press	0
Project event / workshop / seminar	4
Exhibition	0
Newsletter, flyer, leaflets	5
Media interview / media briefing /TV or radio clip	0
Video /film	1
Communication with the public / public report	0
email lists, social networking, etc.	16
Other	19
TOTAL	93

Annex 1

Payments to Partnership Projects→ Excel file

Annex 2 Previously published documents

This annex contains the following documents which were available during 2023 but are included again here for completeness. They are included in their original form and not reformatted to match the page numbering of the bulk of this report.

1. Scope documents for the 2023 Call
2. Review Conference Agendas 2023
3. Independent Observer's Report Call 2023
4. Final Pillars Assessment report
5. Summary of projects of call 2021 and 2022 and summary of selected projects of call 2023 which are still under negotiation
6. Publishable Summaries of all funded projects

Annex 3

Detailed statistics of projects funded from the 2021 and 2022 Calls → PDF file