

Report to the EURAMET GA on TC-IR activities

Ulrike Ankerhold (PTB)
 TC-IR Chair

1. General Aspects

This report summarizes the activities of the EURAMET Technical Committee for Ionizing Radiation. The TC-IR currently has contact persons from 28 EURAMET members, including JRC-IRMM of the European Commission. IAEA and BIPM as liaison organization are observers. The TC-IR has close links with the IAEA in several research areas and István Csete from the IAEA has taken a leading role in reviewing TC-IR CMCs for many years. The EURAMET TC-IR does not have any subcommittees but instead has organized three working groups to focus on CMCs and work related to the roadmaps. The TC-IR Contact Person annual meeting was organized by PTB in Berlin in January 2016. During the meeting it was decided that the next TC-IR CP meeting will be held at METAS, Switzerland, in January 2017. The TC-IR CP meetings were extended to 2.5 days having at least one day for discussion and presentation of project proposals for current EMPIR calls.

2. Projects

There are 14 EURAMET-TC-IR projects on-going and one project was completed in 2015.

ID	Starting Date	Title	Coordinating institute	Collaboration type
608	2001-10-01	International Inter-comparison Test Program of instrument calibrations for neutron dosimetry	LNE-IRSN	Comparison
628	2003-10-14	Direct comparison of primary standards of air kerma for medium energy (300 kV) X-rays	NPL	Comparison
936	2007-07-01	Comparison of long counter measurements of monoenergetic neutron fluences	NPL	Comparison
1104	2009-07-01	Comparison of the neutron spectra of reference neutron sources for the improvement of the ISO 8529 Standard series	NPL	Research
1132	2013-01-17	Comparison of the ambient dose equivalent rate for photon radiation	PTB	Comparison
1243	2013-03-01	The interlaboratory comparison of the radionuclide calibrators	FTMC	Traceability
1284	2013-10-01	Survey of European countries' legal regulations and practices in ionising radiation calibrations	NRPA	Consultation
1285	2013-03-01	Comparison of air kerma and dose to water standards for Co-60 radiation beams for radiotherapy	METAS	Comparison

1383	2015-09-01	Bilateral Comparison on I-131 standardisation	POLATOM	Comparison
1326	2014-09-01	Comparison of the air kerma standards for ¹³⁷ Cs and ⁶⁰ Co gamma-ray beams for radiation protection measurements	IST/ITN	Comparison
1362	2015-05-18	Comparison of air kerma measurements for Tungsten anode based mammographic X-ray beam quantities	IAEA	Comparison
1387	2016-02-01	Supplementary comparisons of the calibration of low energy x-ray air kerma standards	NRPA	Comparison
1388	2016-02-01	Supplementary comparisons of the calibration of protection level x-ray air kerma standards	NRPA	Comparison
1386	2016-02-01	Supplementary comparisons of the calibration of medium energy x-ray air kerma standards	NRPA	Comparison
1389	2016-02-01	Bilateral comparison of air kerma and absorbed dose to water measurements for Co-60 and Cs-137	BEV	Comparison
1398	2017-01-01	Comparison of personal dose equivalent at 0.07 mm and 3 mm depth, Hp(0.07) and Hp(3), for beta radiation	PTB	Comparison

Project completed in 2015

ID	Date	Title	Coordinating institute	Collaboration type
1331	2014-07-01	Comparison of primary absorbed dose to water standards in the medium-energy x-ray range	PTB	Comparison

3. CMCs and comparisons

A separate working group has been organised for CMCs and comparison led by Bruno Chauvenet, LNHB, France and István Csete, IAEA. At the last TC-IR meeting in January 2016 the CMC review process was discussed and the following experts for contributing to the CMC review process were found:

1. Dosimetry CMCs: István Csete (IAEA), Hans Bjerke (NRPA, Norway), Jean-Marc Bordy (LNE-LNHB, France), Costas Hourdakis (IRCL/GAEC-EIM, Greece), Jacco de Pooter (VSL, The Netherlands), Maja Vojnić Kortmiš (IRB, Croatia)
2. Radioactivity CMCs: Bruno Chauvenet (LNE-LNHB, France), Franz-Josef Maringer (BEV, Austria), Dirk Arnold (PTB, Germany) and Laszlo Szűcs (MKEH, Hungary)
3. Neutron CMCs: David Thomas (NPL, UK), Miloslav Kralik (CMI, Czech Republic).

CMC review completed and published in the reporting period (2015-2016)

Subfield	JCRB file name	NMI/country	Claims/date
Radioactivity	EURAMET.RI.19.2014	MIRS/IJS, Slovenia	5, (30/11/2015)
	EURAMET.RI.23.2015	CIEMAT, Spain	106, (22/04/2016)
Dosimetry	EURAMET.RI.22.2015	NPL, UK	22, (20/07/2015)
	EURAMET.RI.21.2015	Riso, Denmark	9, (20/04/2015)
	EURAMET.RI.19.2014	MIRS/IJS, Slovenia	9, (30/11/2015)
	EURAMET.RI.24.2015	IAEA, Int. Org.	27, (31/03/2015)
Neutron	----	----	----

Overview of the ionizing radiation CMCs

	Country/lab	Dosimetry	date of publ.	review pending IRTC	review pending RMOs	Activity	date of publ.	review pending IRTC	review pending RMOs	Neutron	date of publ.	review pending IRTC	published total
1	Austria/BEV	50	31/01/2012			100	15/09/2003						150
2	Bulgaria/BIV NCM	7	14/02/2007		8	16	04/06/2013						23
3	Czech Republic/CMI	7	11/03/2005	7		104	15/09/2003			12	19/05/2005		123
4	Finland/STUK	30	31/01/2012										30
5	France/LNE-LNHB	82	10-04-2013			166	15/09/2003		139	15	19/05/2005		263
6	Germany/PTB	90	07/10/2014			158	20/01/2010			20	19/05/2005	20	268
7	Greece/GAEC	35	12/10/2009										35
8	Hungary/MKEH	26	31/01/2012			74	04/06/2013						100
9	IAEA	23	09-09-2013										23
10	IRMV					110	15/09/2003						110
11	Italy/ENEA	76	11/03/2005	76		13	15/09/2003			9	19/05/2005		98
12	Netherlands/VSL	21	31/01/2012			57	15/09/2003						78
13	Norway/NRPA	22	31/01/2012										22
14	Poland/GUM	4	31/01/2012			68	15/09/2003						72
15	Portugal/ITN	43	11/03/2005		38								43
16	Romania/IFIN					36	10/05/2013						36
17	Slovakia/SMU	30	15/05/2008			37	15/05/2008			9	15/05/2008		76
18	Spain/CIEMAT	52	15/05/2008	48		106	22/04/2016						158
19	Sweden/SSM	26	31/01/2012										26
20	Switzerland/METAS	3	31/01/2012			21	15/09/2003						24
21	United Kingdom/NPL	27	20/07/2015			116	15/09/2003	115		42	19/05/2005		185
22	Slovenia/MIRS-IJF-F2	9	30/11/2015										9
23	Turkey/TAEK					3	26/08/2014						3
24	Denmark/Riso	9	20/04/2015										9
	Total EURAMET	672		131	46	1185		115	139	107		20	1964
	All IR CMCs	1001				2841				207			4049

The yellow coloured claims are older than 5 years and have to be revised.

5. Activities of the TC-IR Working Groups

In TC-IR three working groups are established since 2012. At the TC-IR meeting in 2016 the convenors of the working groups presented an overview about the status of the roadmap, new challenges and developments, stakeholders and current research projects.

1.) **TC-IR WG CMCs and Comparisons: Convenor István Csete (IAEA) and Bruno Chauvenet (LNE-LNHB):**

This working group has CMC reviewing as its main task. The work is under the supervision of the CIPM MRA. In the reviewing technical competence is needed in the measurement application and methods, and in the technical rules set up by the JCRB. There are strict deadlines and a large metrology network to coordinate. The group will follow the results from comparison projects and update the EURAMET project data base.

2.) The two other working groups are related to the TC-IR strategy and will first focus on the roadmaps to ensure that they are up-to-date. Another important task is to observe the developments in ionizing radiation in order to identify new metrological challenges for developing the TC-IR strategy. The WGs establish connections with stakeholders and standard bodies in order to be able to realize the roadmaps in project proposals for EMPIR and other funding bodies. Other important aspects of the WGs are to maintain a European view of current capability in IR and to support the capacity building in their fields.

TC-IR WG Health Care and New Dose Quantities: Convenor Jean-Marc Bordy (LNE-LNHB, France)

This working group will focus on topics given in the roadmaps 1 and 3; Dosimetry and radionuclides in health care and Novel dosimetry concepts for IR. Neutron measurements are included.

TC-IR WG Radionuclides and Dosimetry in Energy, Industry and Environment (nuclear and non-nuclear): Convenor Franz-Josef Maringer (BEV, Austria).

This working group will focus on topics given in roadmap 2; Anthropogenic and natural radionuclides in environment and industry.

6. Participation in EMRP/ EMPIR

I. New EMPIR JRPs in progress (start in 2016):

Health Call 2015:

PerfusImaging, Metrology for Multi-Modality Imaging of Impaired Tissue Perfusion, Tobias Schäffter (PTB, Germany)

MRTDosimetry, Dosimetry for molecular radiotherapy, Vere Smyth (NPL, UK)

MRgRT, Metrology for MR guided RadioTherapy, Jacco de Pooter (VSL, The Netherlands)

SIB Call 2015:

MetroBeta, Radionuclide beta spectra metrology, Mark Kellett (LNE-LNHB, France)

II. Current EMRP projects:

MetroDECOM, Metrology for Decommissioning of Nuclear Plants, Jiri Suran (CMI) Czech Republic, 14 partners

MetroEWR, Metrology for Early Warning Networks, Stefan Neumaier, (PTB) Germany, 13 partners

III. EMRP JRPs that have ended by May 2015:

MetroFission, Metrology for New Generation Nuclear Power Plants, coordinator Lena Johansson (NPL), UK, 12 partners

MetroMRT, Metrology for Molecular Radiotherapy, Vere Smyth (NPL) UK, 14 partners

BioQuaRT, Biologically weighted quantities in radiotherapy, Hans Rabus (PTB) Germany, 7 partners

MetroMetal, Measuring radiation in scrap metals, coordinator Eduardo Garcia-Toraño (CIEMAT), Spain, 14 partners

MetroRWM, Metrology for radioactive waste management, coordinator Petr Kovar (CMI), Czech Republic, 13 partners

MRI safety, Metrology for new generation safety standards and equipment in MRI, Bernd Ittermann (PTB), Germany, 3 partners

MetrExtRT, Metrology for radiotherapy using complex radiation fields, Jean-Marc Bordy (LNE-LNHB), France, 10 partners

IV. SIP (Support for Impact) projects

The JRP ENG08 MetroFission has won a SIP project to write an IEC standard for the digital data format of nuclear instrumentation. SIP07 started in June 2015.

7. Capacity Building: Activities of the last year and future needs

TC-IR currently has 28 registered contact persons, 16 from NMIs and 12 from DIs. 6 contact persons come from so-called "new" EU member states with an emerging metrological infrastructure, 4 institutes haven't any CMC claims. A young scientist from Croatia spent a training visit at PTB to learn the calibration of therapy and diagnostic dosimeters and general aspects in dosimetry for therapy. At the last TC-IR meeting several young scientists have asked for such training visits, especially in dosimetry.

Future needs in capacity building of great importance are practical training courses in the calibration of dosimeters or standard instruments and training in organization and coordination of comparisons. The TC-IR will support these requests. Maybe a coaching programme could be helpful.

8. Meetings

TC-IR Contact Person meeting in 2016

The TC-IR Contact Person annual meeting was organized by PTB in Berlin in January 2016. The meeting was extended to 2.5 days and was combined with a brainstorming meeting (one day) to discuss project proposals for the EMPIR calls 2016 Environment, Energy and PreNormative.

Collaboration with OPERRA

EURAMET TC-IR was invited to a meeting with the European project OPERRA that was held in Munich on 11th November 2015. Possible collaborations within the framework of the topic “radiation protection” were discussed.

Collaboration with EURADOS

EURAMET TC-IR has been invited to the 1st EURADOS Stakeholder Meeting for European Research in Dosimetry. The focus of the meeting will lay on the new strategic research agenda of EURADOS and will be held on 30 June 2016 in Munich.

9. Issues

Comparisons:

There is a problem with supporting key comparisons for the CMCs. Some key comparison exercises have not yet been reported even ten years or more after initiated. This creates a significant problem with CMCs, especially in radioactivity and neutron measurements. The WG will communicate with CCRI regarding this issue.

At the last TC-IR contact person meeting all pending TC-IR comparisons (see EURAMET-TC-IR website) were discussed. Several projects have not been completed since more than five years. The status of these comparisons will be clarified soon and a decision made on how they will be completed or ended without a report.

10. Strategic Planning

Work will continue to strengthen links with stakeholders, standard bodies and international organizations. Efforts will be focussed on interdisciplinary work, especially to find and initiate interdisciplinary projects within the Grand Challenges. The new EMPIR projects (calls 2015) are all interdisciplinary. Especially the recent developments in the field Health require interdisciplinary metrological research.

11. Outlook for 2017/2018

1. EMPIR calls in 2017 and 2018
2. CMC review is ongoing.
3. The next contact person meeting will be organized by METAS in Bern, Switzerland in January 2017. This meeting will again be 2.5 days and combined with a brainstorming meeting for the EMPIR calls 2017.
4. EURAMAET TC-IR will continue to work on goals set up in the CCRI strategic plan up to 2020.
5. Possible collaborations with other European projects / programmes in the field of ionizing radiation shall be identified and intensified.
6. The interdisciplinary cooperation shall be strengthened for example the new interdisciplinary EMPIR projects (see section 6).

