

1. General Aspects

One general finding is the increasing workload mainly caused by the growing numbers of new EURAMET members and high demands for the MRA work. Moreover many members of TC-L had to be very active regarding the EMRP Targeted Programme 3 (Length). So it was good luck that the transition from EUROMET to EURAMET went smoothly and quiet for TC-L.

2. Projects

Some statistics: In the period under review there were a total of 27 active projects (11 comparisons, 2 consultation, 9 cooperation, 5 traceability) in TC-Length. 5 of them are running already under EURAMET with project number 1000 upwards.

3. Comparisons

The current status of key and supplementary comparisons in length is shown in the following compilation.

The first and only round of CCL comparisons is now virtually completed. For the next round the CCL had to consider the CIPM concerns regarding the former decision to stop running traditional CCL comparison (and substitute them by CCL-RMO key comparison, see item 8.2). At its last meeting (September 2007) the CCL has reconsidered the key comparison portfolio which now looks like this:

- K1 Gauge blocks up to 500 mm (including also former CCL-K2)
- K3 Angle standards (polygons and angle blocks)
- K4 Cylindrical diameter standards
- K5 Step gauge
- K7 Line scales
- K8 Surface texture standards
- K11 National standards of length (optical frequency/wavelength standards, former BIPM.L-K11)

K7 and K8 were recognized as being principal techniques relevant for customer services, while CCL-K11 will continue the work of BIPM.L-K11 which has stopped because of closing the BIPM length section. Out of the 5 so called node laboratories running CCL-K11, 3 are members of EURAMET (MIKES, NPL and BEV [being the pilot]).

EURAMET has either completed or is to complete a range of RMO key comparisons, aligned with the CCL-KC. K1 and K2 are fully completed and reported, Measurements of K4, K5 and K6 (2D-CMM) are completed, and K7 is still running. K4, K5 and K7 are all RMO key comparisons (run by EURAMET) with participation from other RMOs NMIs.

Designation	Subject	Project no.	Report/status
EUROMET.L-K1	Gauge blocks	471	Final report Executive Report
EUROMET.L-K1.1	Gauge blocks	643	Final report
EUROMET.L-K2	Long gauge blocks/length bars	602	Metrologia paper Executive Report
EUROMET.L-K3.2006	Angle	---	Waiting on CCL and other RMOs
EUROMET.L-K4.2005	Diameter	812	Awaiting Draft A
EUROMET.L-K5.2004	1D CMM artefacts	777	Awaiting Draft A
EUROMET.L-K6	2D CMM artefacts	743	Awaiting Draft A
EUROMET.L-K7.2006	Linescales (up to 100 mm)	882	Running

EURAMET supplementary comparisons (EURAMET.L-Sx): In the following table one can find details on previous and new comparisons organized and reviewed by TC-L as being suitable for supporting the MRA. EURAMET.L-S15a is the most recent comparison and started in April 2008.

Designation	Subject	Project no.	Report/status
EUROMET.L-S1	Linescales	252	BNM/LNE, 1995
EUROMET.L-S2	Thermal expansion of gauge blocks	275	Metrologia paper Final report
EUROMET.L-S3	Depth setting standards	301	Metrologia paper
EUROMET.L-S4	Wires (diameter)	308	Metrologia paper
EUROMET.L-S5a	Roundness	BCR	Metrologia paper
EUROMET.L-S5b	Roundness	361	Metrologia paper
EUROMET.L-S6	Thermal expansion of long gauge blocks	390	PTB Report
EUROMET.L-S7	Surface plates	BCR	EUR 14059 EN, 1992
EUROMET.L-S8	Nd YAG lasers	Bilateral	Metrologia paper
EUROMET.L-S9	Grid plates	BCR 3442	3442/1/0/189/91/7
EUROMET.L-S10	Squares	570	Metrologia paper Executive Report
EUROMET.L-S11	Surface texture	600	Metrologia paper Final report
EUROMET.L-S12	Gauge blocks by comparison	601	Draft - B in preparation
EUROMET.L-S13	Cylindrical artefacts	369	Final Report (PTB)
EUROMET.L-S14	Steel tapes	677	Final report Executive Report
EURAMET.L-S15a	Step height standards	925	in progress
EUROMET.L-S15	Step heights by SPM	707	Final report
EUROMET.L-S16	Gauge blocks by comparison	797	Draft A in preparation
EUROMET.L-S17	Steel tape, trilateral (link to S14)	875	Final report
EUROMET.L-S18	Granite square, bilateral (link to S10)	905	In progress
EUROMET.L-S19	Steel cylindrical square, bilateral (link to S10)	910	In progress

4. CMCs

The sixth set of length and angle CMCs, EUROMET.L.5.2007 was approved and entered the KCDB in May 2007. Data collection for the next set of CMCs, EURAMET.L.6, was started immediately after.

Designation	Comment	EURAMET review date	Status
EUROMET.L.1.2000	Initial top level service submission from most of EUROMET NMIs.	2000	Complete - on KCDB, 2001
EUROMET.L.1.2001	Full submission, almost all services, most EUROMET NMIs, update on .L.1.2000 .	2001	Complete - on KCDB, 2001-10-30
EUROMET.L.2.2002	Minor updates/submissions from GB and FI.	Jun 02	Complete - on KCDB, 2003-01-09
EUROMET.L.3.2004	Submissions from AT, CH, CZ, DE, HU, IT, NO. Also first submission from BG, LT, LV, RO, SI, YU.	Jul 03 - Jun 04	Complete - on KCDB, 2005-03-23
EUROMET.L.4.2006	24 minor updates and 35 new submissions.	May 05 - Jan 06	Complete - on KCDB, 2006-05-10
EUROMET.L.5.2007	19 updated or new CMCs from 7 NMIs	Aug 06 - Mar 07	Complete - on KCDB, 2007-05-21
EURAMET.L.6	Being collected and collated now	Aug 07 – Jun 08	Being prepared for subm.

From other RMOs, three sets of CMC were added (SIM.L.3.2007, APMP.L.5.2008, APMP.L.6.2008), one has already undergone the inter-RMO review and is now on the KCDB.

Designation	Comment	EURAMET review date	Status
SADCMET.L.1.2001	First main submission from SADCMET.	N/A	Abandoned
COOMET.L.1.2002	First main submission from COOMET. Re-examined in early 2004.	Oct 02 - Dec 03 and Jan-Mar 04	Complete - on KCDB, 2004-04-06
APMP.L.1.2003	MY, TW submissions. Reviewed by EUROMET TCL Chairman.	Nov 03 - Dec 03	Complete - on KCDB, 2004-02-19
SIM.L.1.2003	Major submission from NIST. Reviewed by EUROMET TCL Chairman.	Sep 03 - Nov 03	Complete - on KCDB, 2004-01-15
SIM.L.2.2003	Submissions from BR, MX, USA.	Dec 03 - Feb 04	Complete - on KCDB, 2004-06-15
COOMET.L.2.2004	Second main submission from COOMET. Ukraine. (Belarus temporarily removed).	Jan 04 - Apr 04	Complete - on KCDB, 2005-01-10
APMP.L.2.2004	Major submission from JP. Review by EUROMET TCL Chairman.	May 04 and Mar 05	Complete - on KCDB, 2005-05-25
COOMET.L.3.2005	Next main submission from COOMET. Belarus (was part of COOMET.L.2.2004).	Mar 05	Complete - on KCDB, 2005-06-17
APMP.L.3.2006	23 new CMCs from NPL-India	Feb 06	Complete - on KCDB, 2007-01-08
APMP.L.4.2006	3 new CMCs from Indonesia	Aug 06	Complete - on KCDB, 2008-05-16
APMP.L.5.2008	CMCs from CMS – Chinese Taipei	Aug 06	Undergoing inter-RMO review
APMP.L.6.2008	CMCs from SCL – Hong Kong	Apr 08	Undergoing inter-RMO review
SIM.L.3.2007	Changes to INMS (CA) CMCs	Jun 07	Complete - on KCDB, 2007-08-08

The CMC lists are subject to ongoing review, based on the results from key and supplementary comparisons. Whenever there is a discrepant result in a comparison, this is highlighted in the final report. The pilot discusses corrective actions with the participant and reviews progress on the corrective actions when the pilot prepares the executive report on the comparison, approximately 6 months after the final report is prepared. Any items not resolved at the time of publication of the executive report are entered into the CMC actions list, which is visible to EURAMET TC-L contact persons and guests. At the time of this report one entry is in this list with the problem already resolved.

It was agreed by EURAMET and the JCRB that CMC claims of NIS (Egypt) will be handled by EURAMET since NIS is not member of any RMO. In the field of length, NIS has submitted CMC regarding *mise en pratique* laser radiation. An on site peer visit (and review) took place at Cairo end of January 2008. The CMCs have been positively reviewed and will be included in EURAMET.L.6. Similar procedure will be adopted to the CMC entries of INLP (Israel) for the next round EURAMET.L.7

5. Activities of the Sub-Committees

There are no sub-committees in TC-L.

6. Participation in iMERA-Plus

Obviously TC-L is responsible for the targeted programme in length (TP3). TP3-Guardian is J. Carneiro (DFM) and R. Thalmann (METAS) the TP3-Coordinator. At the first TP3-experts meeting at DFM, totally 8 joint research projects (JRP) were identified out of the submitted expressions of interest. Recently the European Commission formally approved the list of funded JRPs and the outcome for length is as follows:

JRP	JRP Short name	JRP Title
J1.1	Nanoparticles	Traceable characterization of nanoparticles
J1.4	NANOTRACE	New Traceability Routes for Nanometrology
J3.1	Long distance	Absolute long distance measurement in air
J2.2	NIMTech	Metrology for New Industrial Measurement Technologies

The kick off meetings and first workshops were held already early this year (see item 7).

7. Meetings

Previous meetings

- 2007 TC-L CP Meeting, 29-30 October 2007, MSA, San Anton, Malta (1st EURAMET / 19th EUROMET)
- 2007 TC-L CP Workshop on Joint Research Projects in Length, 30 October 2007, MSA, San Anton, Malta
- 12th Meeting of the CCL-WGDM: 10-11 September 2007, BIPM, Sèvres, France
- 12th Meeting of the CCL-WGMeP: 10-11 September 2007, BIPM, Sèvres, France
- 13th Meeting of the CCL: 13-14 September 2007, BIPM, Sèvres, France
- iMERA Plus Expert meeting on TP3: 18 July 2007, DFM, Lyngby, Denmark
- Kick-off meeting JRP 1.1 "Nanoparticles" 2008
- Kick-off meeting JRP 1.4 "NanoTrace", 14-15 April 2008, INRIM, Torino, Italy
- Kick-off meeting JRP 2.2 "NIMTech", 13-14 March 2008, PTB, Braunschweig, Germany
- Kick-off meeting + Workshop JRP 3.1 "LongRange", 18-19 May 2008, CEM, Madrid, Spain

upcoming meetings

- 2008 TC-L CP meeting, 6-8 October 2008, MIKES, Espoo, Finland
- 13th Meeting of the CCL-WGDM: 24-25 September 2008, INRIM, Torino, Italy (after NANOSCALE conference)
- 2nd Meeting of JRP 3.1, 24. October 2008, BEV, Vienna, Austria
- 2nd Meeting of JRP 1.4, September 2008, INRIM, Torino, Italy
- 2nd Meeting of JRP 2.2, 4. November 2008, INRIM, Torino, Italy

8. Issues / Strategic planning / Outlook for 2008/2009

8.1 DimVIM

The DimVIM (CCL Length Services Classification) used as a CMC classification scheme is now available in 12 languages on the EURAMET Length web site. Because of its importance it is directly linked from the BIPM site also. In the near future there will be an update by the WGDM regarding CMC for fs comb calibrations.

8.2 CIPM concerns on CCL-RMO KC

The concerns raised by the CIPM at its 2006 meeting with respect to the way, how CCL is operating and linking its comparisons came as a surprise to CCL. WGDM recognized the importance of the issues raised and has immediately taken appropriate action.

- The working group has prepared a document which comments all the questions raised by the CIPM. It was forwarded to the president of the CCL and the director of the BIPM who have agreed to ensure that CIPM is aware of the document.
- By working out a document on the CCL comparison scheme together with the BIPM and the JCRB.

Because of the great number of NMIs which are members of both, EURAMET and CCL, the outcome will be of vital importance for EURAMET TC-L.

8.3 Long time storage on comparison data

TC-L has concerns about the long term storage of key comparison data in the raw, original format. At the moment only the pilots have the original data available and in the case that the pilot left the NMI or was no longer contactable, the data would be difficult to obtain without major effort amongst the participants. Moreover It can be foreseen that EA would make requirements on those who conduct comparisons (like safe

storage of protocol, raw results, etc.) At the 2007 TC-L meeting the minimum set of data to be archived was concluded to consist of:

- Protocol
- Folder with individual laboratory results (*optional*)
- Spreadsheet with all results and analysis (*optional*)
- Draft A report
- Final Report
- Executive report (*optional*)

For the time being the data will be housed on the TC-L webpage (restricted access). If it proves useful, a more seamless integration in the EURAMET web page is considered.

The call to the former pilots was sent out and first data has been received. This brought certainty, that some information (on older comparisons) is lost already.

8.4 Issues related to CCL-K11

Since 3 out of 5 node laboratories are members of EURAMET, it is quite important for TC-L to provide a sound basis on running this key comparison. One step is how to share responsibilities between CCL and CCTF. The CCL-CCTF joint working group on frequency standards will take responsibility for CCL-K11 while WGDM specifically will coordinate CMC review for comb based frequency calibrations. Right now the technical protocol for CCL-K11 is being updated particularly with regard to a clear definition of the key comparison reference value (and even the measurand).

The very first measurements in this campaign have been performed and reported already (MIKES and GUM)

9. Any other business

The current chairman likes to express his gratitude to the former chairman, Dr. Andrew Lewis, for his help and his open ear for all problem regarding managing TC-L. In fact many data in this very report are just copied from the TC-L website which is perfectly maintained by Andrew.

Michael Matus

TC-Length Chairman, 26 May 2008