INTI

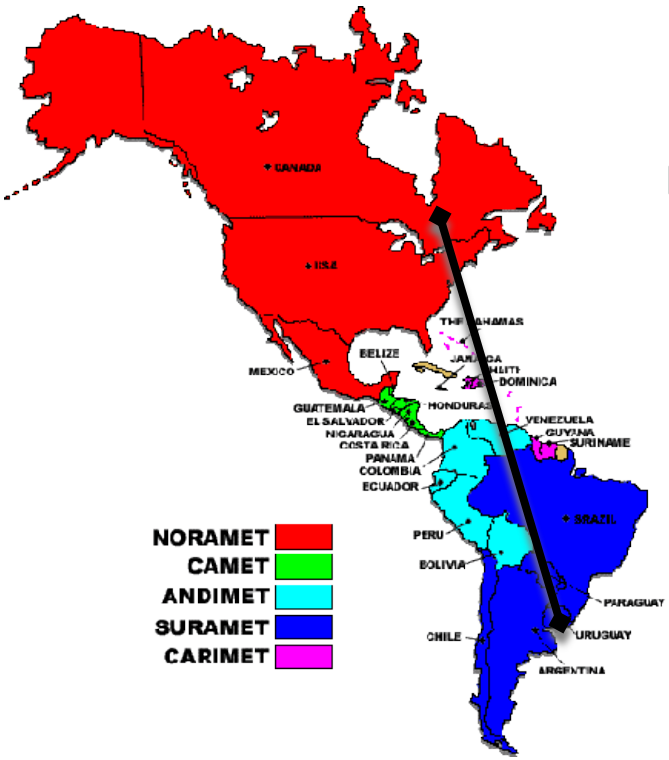
SIM – MWG7

Mass and Related Quantities

Report to CCM

Ministerio de Industria
Presidencia de la Nación

SIM –Sistema Interamericano de Metrología



A very extended RMO

Distance NRC (Ottawa) – LATU (Montevideo)

> 9100 km

Some conparisons have to be organized by subregions

SIM WG 7. Mass and Related quantities
Internal structure

Chair (since 2014)		Fernando Kornblit	INTI (Argentina)	ferk@inti.gob.ar
Co-chairs	Density	Luis Omar Becerra	CENAM (Mexico)	becerra@cenam.mx
	Force	Alejandro Savarin	INTI (Argentina)	asavarin@inti.gob.ar
	Pressure	Juan Forastieri	INTI (Argentina)	jaforast@inti.gob.ar
	Mass	Luis Manuel Peña	CENAM (Mexico)	lpena@cenam.mx
	Hardness	Sérgio P. de Oliveira	INMETRO (Brazil)	spoliveira@inmetro.gov.br

The MWG7 has 93 contacts from 30/34 SIM countries

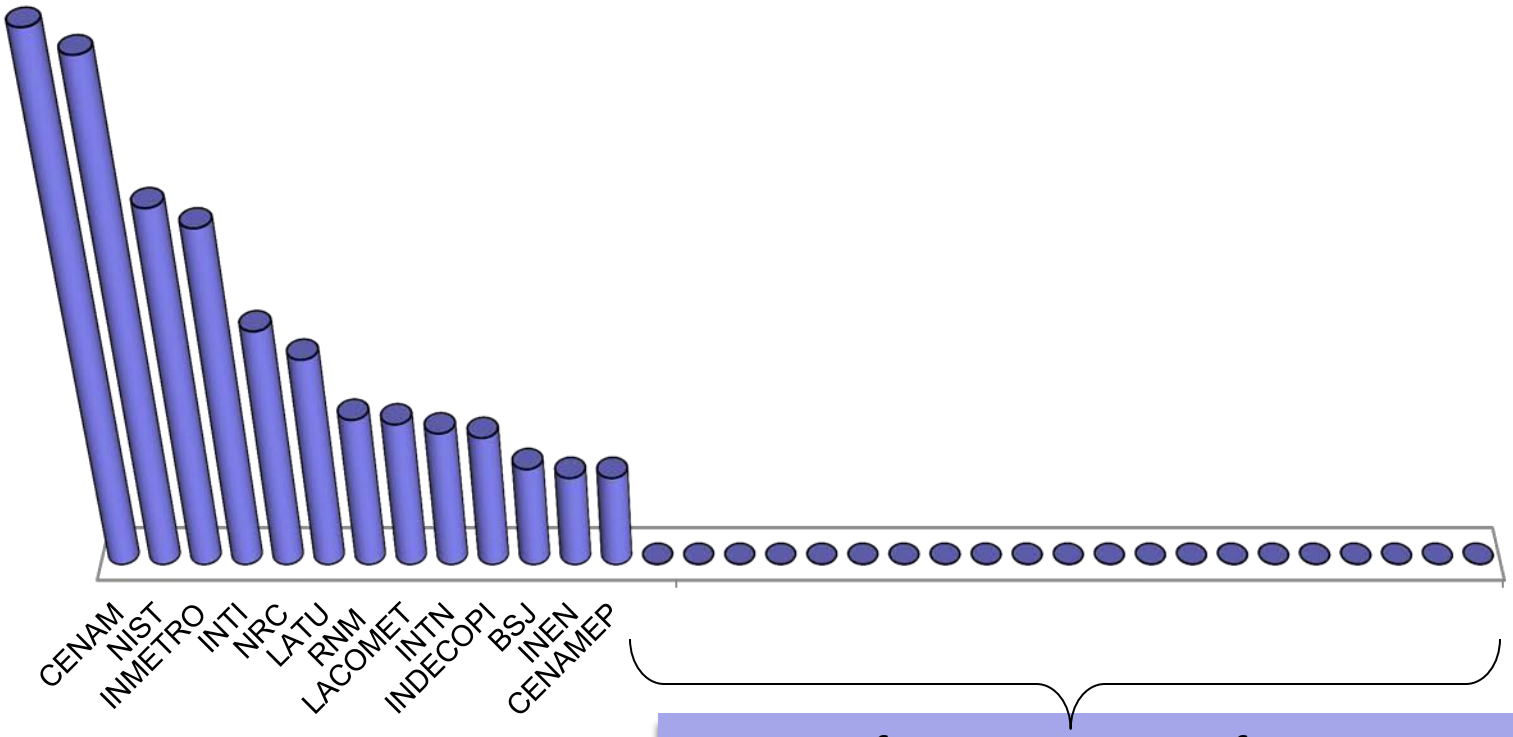
Some contacts participate in more than one sub-group.

Etiquetas de fila	Density	Force and Torque	Hardness	Mass	Pressure	Total general
ANDIMET	**4**	**8**		**6**	**6**	**24**
Colombia	1	3		1	2	7
Bolivia	1	2		1	2	6
Ecuador	1	2		2	1	6
Perú	1	1		2	1	5
CAMET	**4**	**3**		**11**	**4**	**22**
Costa Rica	1	2		4	1	8
Panamá	3	1		3	1	8
El Salvador				1	1	2
Nicaragua				1	1	2
Guatemala				1		1
Honduras				1		1
CARIMET	**2**	**1**		**16**	**1**	**20**
Jamaica	2	1		2	1	6
Belize				2		2
St. Vincent & Grenadines				2		2
Trinidad & Tobago				2		2
Antigua & Barbuda				1		1
Bahamas				1		1
Barbados				1		1
Dominica				1		1
Grenada				1		1
Guyana				1		1
Haiti				1		1
St. Lucia				1		1
NORAMET	**4**	**4**	**2**	**5**	**5**	**20**
México	2	2	1	2	3	10
USA	1	2	1	1	1	6
Canada	1			2	1	4
SURAMET	**9**	**9**	**2**	**13**	**9**	**42**
Chile	5	1		7	1	14
Argentina	1	2		1	4	8
BRASIL	1	3	2	1	1	8
Paraguay	1	1		3	2	7
Uruguay	1	2		1	1	5
Total general	**23**	**25**	**4**	**51**	**25**	**128**

Published CMCs

Country	NMI		M	D	P	F	T	V	H	FF	Total
Argentina	INTI		29	16	13	11				4	73
Brazil	INMETRO		27	4	14	5	1	22		4	77
Canada	NRC		32	8	9					3	52
Chile	RNM		24			9					33
Cost Rica	LACOMET		24							8	32
Ecuador	INEN		20								20
Jamaica	BSJ		22								22
Mexico	CENAM		28	20	18	15	4	11		15	111
Panama	CENAMEP		20								20
Paraguay	INTN		23							7	30
Peru	INDECOPI		19	1						9	29
USA	NIST		38	7	22	18			17	4	106
Uruguay	LATU		35	11							46
Other 21 countries (3 MRA signatories)											0
Total			341	67	76	58	5	33	17	54	651

Mass and related quantites - CMCs declared by SIM countries



Aim: To increase the number of NMIs with published CMCs

Key and Supplementary comparisons in Mass

SIM.M.M-K1	Comparison of mass standards 1 kg	Draft B	7 NMIs
SIM.M.M-K5	Comparison of mass standards Mass: 200 mg, 1 g, 50 g, 200 g and 2 kg	Draft B	7 NMIs
SIM.M.M-S6	Comparison of mass standards Mass: 10 kg, 2 kg, 1 kg, 200 g, 50 g, 1 g, 200 mg Bilateral	Draft B in progress,	bilateral
SIM.M.M-S7	Comparison of mass standards Mass: 2 kg, 1 kg, 200 g, 50 g, 1 g, 200 mg	Approved and published in 2013	7 CARIMET NMIs
SIM.M.M-S11	Determination of mass and volume of weights Mass: 2 kg, 1 kg, 200 g, 50 g, 1 g, and 200 mg Volume of weights of 2 kg, 1 kg, 200 g, and 1 g	In progress,	7 NMIs
SIM.M.M-S9	Determination of the susceptibility and magnetic polarization of weights by means of the susceptometer method	Draft B	BIPM +8 SIM NMIs
SIM.M.M-S12	Comparison of mass standards 50 kg	In progress	4 NMIs
SIM.M.M-S13	Comparison of mass standards Mass: 10 kg and 2 kg	Draft B in progress	Bilateral
SIM.M.M-S14	Comparison of mass standards Mass: 200 mg, 1 g, 50 g, 200 g, 1 kg and 2 kg	Approved and published in 2014	CEM + 6 CAMET NMIs

Key and Supplementary comparisons in Density

SIM.M.D-K3	Volume of solid weights	draft B sent	7 NMIs
SIM.M.D-S4	Comparison of calibrations of hydrometers for liquid density determination	Protocol complete	8 NMIs
SIM.M.D.S5	Volume of weights of 2 kg, 1 kg, 200 g, and 1 g	In progress,	7 NMIs

Key and Supplementary comparisons in Force

SIM.M.F-S1	Calibration of force testing machines in compression : 10 kN to 100 kN	Approved and published in 2014	5 NMIs
SIM.M.F-S2	Calibration of a force testing machine in compression Force: 10 000 N to 100 000 N	Planned	7 NMIs
SIM.M.F-S3	Comparison of instrumented Charpy tests	Report in progress, Draft B	3 NMIs
SIM.M.F-S4	Calibration of a force transducer in compression	Protocol complete	bilateral
SIM.M.F-S5	Comparison of a force testing machine	Report in progress	bilateral

Key and Supplementary comparisons in Pressure

SIM.M.P-K1	Pneumatic pressure. Piston-cylinder unit 600 kPa to 7 Mpa	Draft A in progress	11 NMIs
SIM.M.P-K1.c	Pneumatic pressure Digital manometer 600 kPa to 7 Mpa	Stopped by a failure in the transfer artifact. It will be restarted when possible	16 NMIs
SIM.M.P-K6	Pneumatic pressure Effective area of a piston-cylinder unit10 kPa - 120kPA	Draft A in progress	11 NMIs
SIM.M.P-K6.1	Pneumatic pressure 10 kPa - 120kPA Digital manometer	Stopped by a failure in the transfer artifact. It will be restarted when possible	11 NMIs
SIM.M.P-K2	Absolute pressure 10 kPa to 120 kPa	Stopped by a failure in the transfer artifact. It will be restarted when possible	14 NMIs
SIM.M.P-K7	Pressure in liquid	Finished and published	7 NMIs
SIM-EUROMET.M.P-BK3	Absolute pressure in gas	Approved for equivalence	PTB-CENAM
SIM-EUROMET.M.P-BK4	Pressure in liquid	Approved and published	PTB-CENAM

Key and Supplementary comparisons in Pressure (cont)

SIM.M.P-S5	Negative gauge mode 10 kPa to 100 kPa	Stopped by a failure in the transfer artifact. It will be restarted when possible	11 NMIs
SIM.M.P-S7	Hydraulic gauge pressure 7 MPa to 70 Mpa	Approved and published in 2013	7 NMIs
SIM.M.P-S8	Hydraulic gauge pressure 0 MPa to 70 Mpa	Planned	Bilateral
SIM.M.P-S9	Pneumatic pressure range: 0 MPa to 2 MPa	Planned	Bilateral
SIM.M.P-S10	Pressure 700 kPa to 7000 kPa	Planned	6 NMIs
SIM.M.P-S2	Pressure measurements (gauge mode)	In progress	3 NMIs
SIM.M.P-S3	Pressure measurements (gauge mode)	Protocol complete	2 NMIs

Activities carried out in the last period

- Meeting of the whole SIMWG7. Querétaro, Oct 2013.
  - Follow-up of pending comparisons
  - Plan of future comparisons
  - Activities 2014-2015
  - Election of the chair and co-chairs

Activities carried out in the last period

- Workshop on "*The Bayesian approach in the uncertainty evaluation for Mass and Related Quantities*" Querétaro, México, Oct 2013
  - Inconsistencies in the GUM
  - Bayesian approach
  - Prior assignments and Maximum Entropy
  - Available software for bayesian analysis
  - Monte Carlo cases

Activities carried out in the last period

- Dec 2013, Bogotá: ANDIMET Schooll on Density:

  Workshop on hydrometers and oscillation type density meter.

  Development of guides (both in progress)

  - **SIM Guidelines on the Calibration of Oscillation Type Density Meters**
  - **SIM Guidelines on the Calibration of Hydrometers**

Activities carried out in the last period

Oct 2014, Brazil: Workshop on Force and Torque (about 10 NMIs)

- Uncertainty in force measurements according *EURAMET cg-4.*
- Drifts and intermediate verifications of primary and secondary standards
- Torque wrench calibration according ISO 6789-03.
- Proposal for a SIM guide on calibration of torqmeters

Proposed acitivities 2015-2016

1. **MASS:** Workshop to be organized commonly with the SIM - Legal Metrology MWG
   - High scale balances verification
   - Type approval of weighing instruments by modulus
   - To be held in Panama, April 2015.

   Instructors from CENAMEP/CENAM/INTI

2. **MASS:** Workshop on weights calibrations (comparation and subdivision)

   For new staff of several NMIS (INEN, CESMEC, INTN, INM, INDECOPI, IBMETRO, LACOMET, RECOPE, LATU, among others)

   Planned to be held in June 2015, in Quito (INEN)

   Instructors from CENAM/INTI

Proposed acitivities 2015-2016

3. **PRESSURE**. Workshop on Vacuum Metrology at NIST. For about 5 NMIs. Planned for 2nd half of 2015.

4. **DENSITY** Workshop to present the final versions of the guidelines developed in the 2013 activity. Planned for the 2nd half of 2015

Proposed acitivities 2015-2016

5. Two activities planned for 2016 (for the whole group)

5.1 Workshops on CMCs in Mass and Related Quantities

- Towards the new MRA
- CCM requirements on KC / CMC declarations
- CMCs declarations. Information needed (guidelines for NMis)
- CMCs review (intra and interregional) How/Who must review CMCs within the group
- Relationship between IC results and stated CMCs
- Technical information to the QSTF

Proposed acitivities 2015-2016

5.2. Workshop on the new SI

- The new kilogram
- Status of the roadmap
- Mise en pratique
- Impact to SIM NMIs

5.3.MWG7 meeting


INTI
That´s all
thank you!