



SURVEY ON METROLOGY SYSTEM OF MOLDOVA



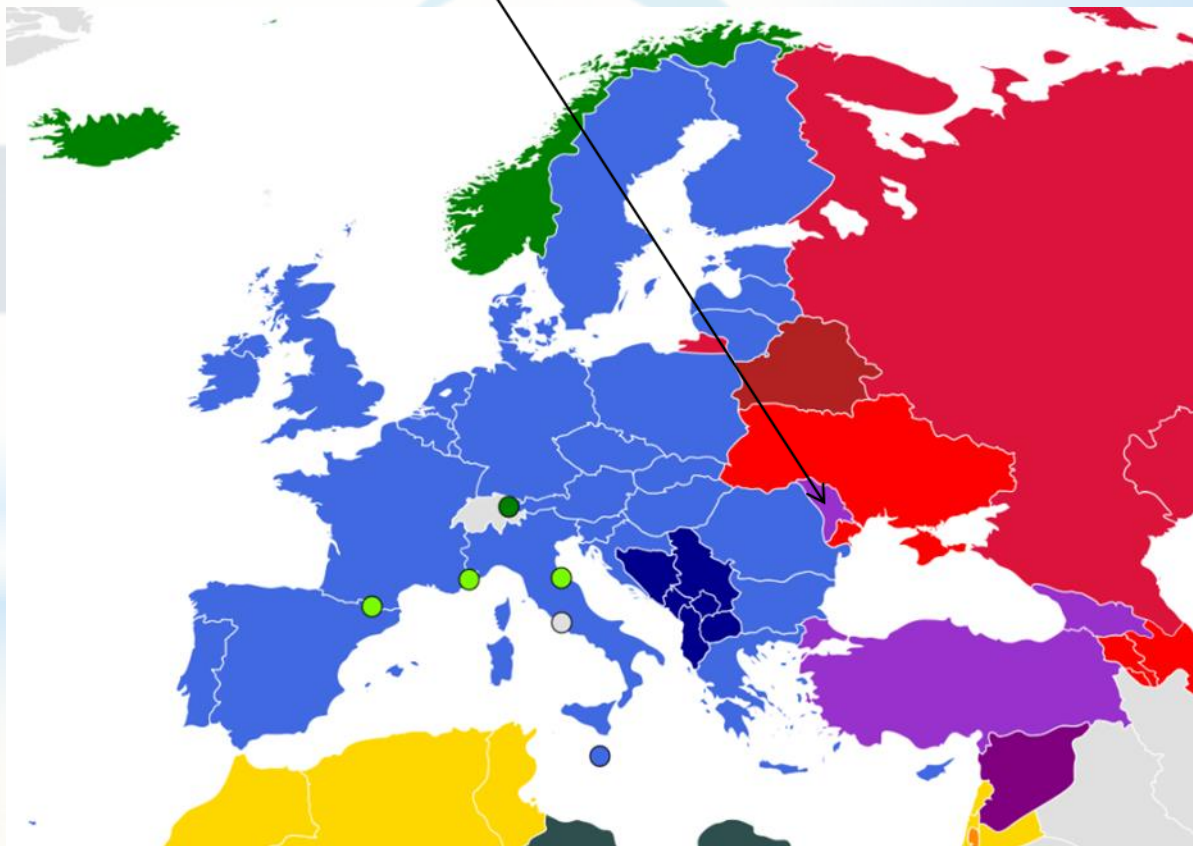


REPUBLIC OF MOLDOVA

Area 33,846 km²

Population 2,998,000

EU



NATIONAL METROLOGY INSTITUTE OF MOLDOVA



INM is NMI of Moldova whose founder is the **Ministry of Economy**.

INM is funded from the **state budget** and revenues from **providing services**.

The budget is approved every year by the Ministry of Economy.

Currently, INM has a complex structure composed of **seven laboratories** that constitute basic ability of the INM, along with other departments necessary for organizing, implementing programs of research, maintaining and developing of national standards base and ensuring traceability in the country.

De jure – young institution

De facto – more than 60 years of experience in the metrology area of the Republic of Moldova



SHORT HISTORY OF MOLDOVA'S METROLOGY SYSTEM

1955 – Creation of the National lab of the Republic of Moldova for state surveillance.

1977 – Creation of the Center of Standardization and Metrology of Moldova.

1992 – Registration of the state enterprise "Center of Standardization and Metrology of Moldova", founded by State Department of Standards and Metrology of the Republic of Moldova.

1998 – Changing the name into "National Center for Standardization, Metrology and Certification" (CNSMC).

2002 – Reorganization of the CNSMC into "National Institute of Standardization and Metrology" (INSM)

2012 - Reorganization of the National Institute of Standardization and Metrology (INSM).

2013 – Foundation of the National Institute of Metrology (INM), as a public institution, with competences in the field of legal metrology and administration of the Base of National Standards.



STRUCTURE OF METROLOGY SYSTEM

National Metrology system comprise of:

- Central Metrology authority – the central field of public administration in the Government, responsible for a quality infrastructure (Standardization and Metrology Service)
- National Metrology Institute (INM)
- System of national measurements standards
- National Committee on Metrology
- Metrological services of corporate bodies
- Consumer Protection Agency

INM has 3 divisions: legal, applied metrology and administration.

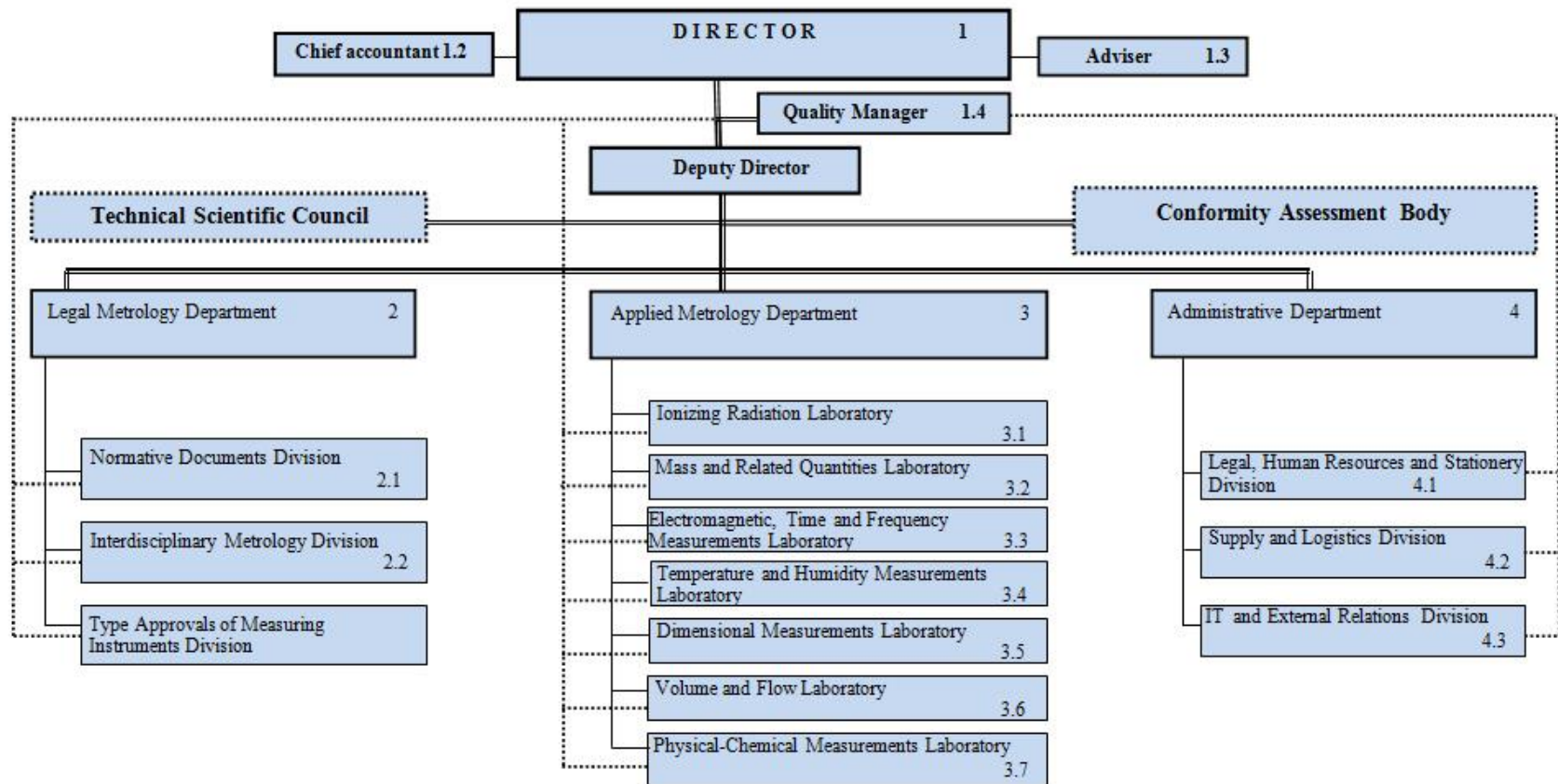
At the moment there are no DI's in metrology system.

INM have 59 employs and the average age is 37.

On 15/10/2016 came into force a new law on metrology developed according to OIML D1: 2012

STRUCTURE OF METROLOGY SYSTEM

Organizational Structure of National Metrology Institute (INM)

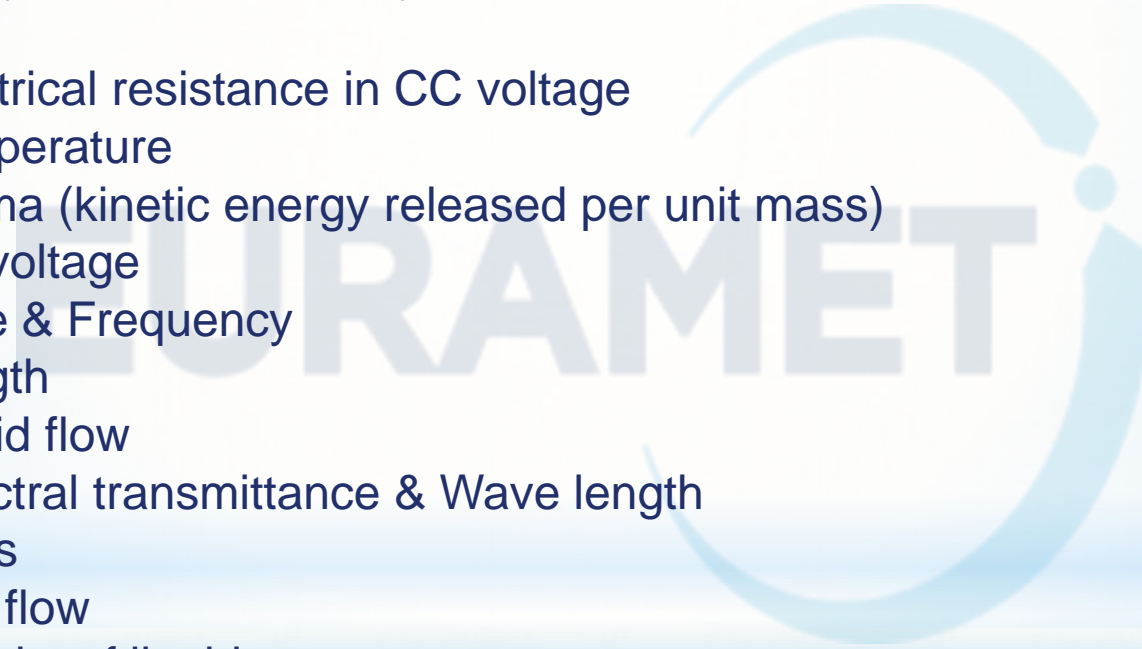




NATIONAL MEASUREMENT STANDARDS

At the moment 11 national standards are approved by central metrology authority and are owned by INM:

- Electrical resistance in CC voltage
- Temperature
- Kerma (kinetic energy released per unit mass)
- CC voltage
- Time & Frequency
- Length
- Liquid flow
- Spectral transmittance & Wave length
- Mass
- Gas flow
- Density of liquid





QUALITY MANAGEMENT SYSTEM



All the metrology fields from INM are covered by QMS in accordance with EN ISO/IEC 17025:

- Laboratory mass and related quantities
- Laboratory of electromagnetic quantities, frequency and time
- Laboratory of thermal quantities and humidity
- Laboratory of dimensional quantities
- Laboratory flow and volumes
- Laboratory of physic-chemical quantities
- Laboratory of ionizing radiation

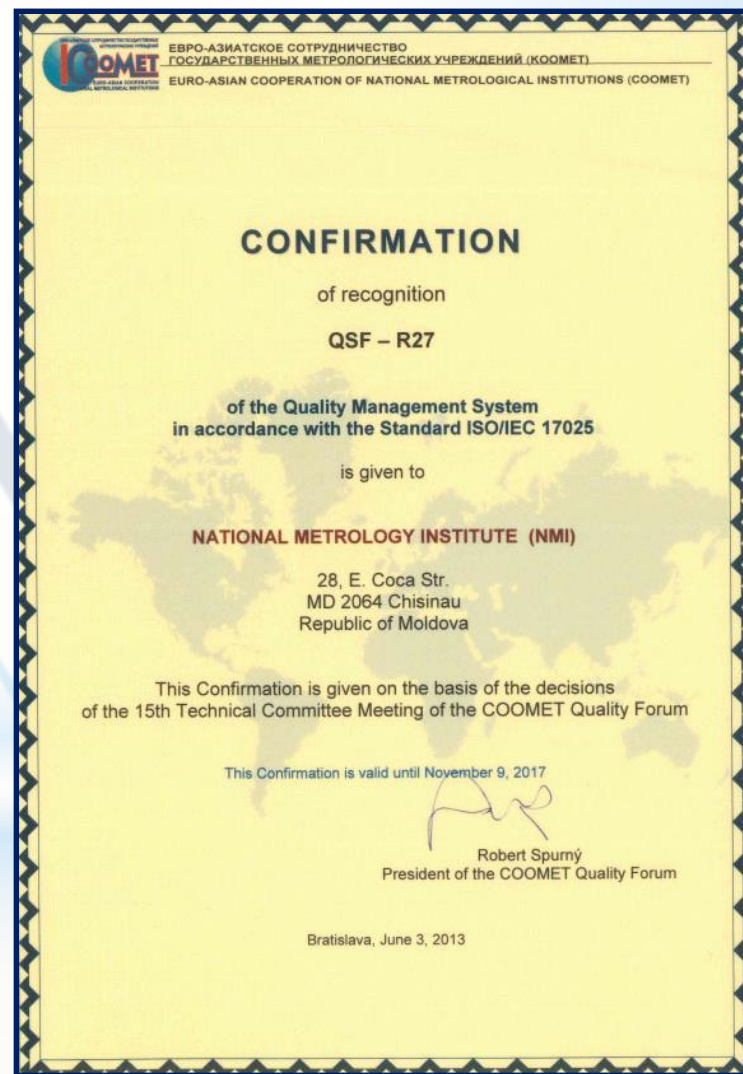
2015 – 2017

In the EU-RM Association Agreement framework, including the creation of a *Deep and Comprehensive Free Trade Agreement (DCFTA)*, the INM laboratories were equipped with modern equipment, which improved significantly the range and quality of measurement capabilities

QUALITY MANAGEMENT SYSTEM



- In November 2012, QMS has been evaluated by a group of experts from the COOMET. Assessed are the fields thermal quantities, ionizing radiation
- and gas flow. Next Peer Review will be in September 2017 performed by the same organization. Technical experts of NMI are used by COOMET as peers in the field of temperature.
- INM staffs are involved as technical experts by Moldova's accreditation body in accreditation of calibration and testing laboratories, most often in the field of mass, electricity, length and flow.





PUBLISHED CMCs AND CALIBRATION SERVICES

Institute of Metrology of Moldova has published CMC's in the field of temperature and ionizing radiation

Number of calibrations performed in 2016:

- Mass and related quantities – 866
- Electromagnetic quantities, frequency and time - 287
- Thermal quantities and humidity - 985
- Dimensional quantities -195
- Flow and volumes -177
- Physic-chemical quantities - 91
- Ionizing radiation -11

Customers are usually metrological verification and testing laboratories, industrial construction companies, medical and other.

➤ At the moment INM is able to provide traceability for needs of the country



PUBLISHED CMCs AND CALIBRATION SERVICES

- Laboratories of INM are accredited for the fields of humidity, mass, length, volume, force, pressure, density of liquid, gas flow, liquid flow, spectral transmittance, AC and DC voltage, resistance and frequency and time.
- Accreditation is done by National Accreditation Body, which is not recognized yet at the international level but it has passed an EA assessment in February 2017 to become EA MLA signatory.
- INM has additionally submitted CMCs for mass, electricity and length and they expect to have them published till end of this year.
- During last 2 years INM has benefited from a twinning program and with the support of the German PTB and the Romanian NMI they participated in 3 intercomparisons, being already at the stage of analyzing the results of the measurements.



TRACEABILITY ROUTS



- For the purpose of assuring the metrological traceability of measurements, INM follows the existing international practices of regional metrology organizations, and especially COOMET, to which INM participates as affiliate member, offering activities of dissemination of measurement units through calibrations performed under a Management System implemented according to SM SR ISO/CEI 17025:2006.
- External calibrations are performed only with National Metrology Institutes with recognized CIPM MRA capabilities in the fields of interest.
- The calibration certificate formats issued by these institutes meet the requirements of ISO/IEC 17025.
- The traceability of INM standards is assured from the Czech Republic (CMI), Romania (INM Ro), Germany (PTB), Switzerland (METAS) and Belarus (BelGim).



PARTICIPATION IN ILCs

<u>COOMET.EM- S20</u>	DC Voltage 2016
Comparison type, Field Status	Supplementary comparison in Electricity and Magnetism, DC Voltage and Current In progress
<u>COOMET.EM- S19</u>	Comparison of electric resistance standards 2015 - 2017
Comparison type, Field Parameter(s) Status	Supplementary comparison in Electricity and Magnetism, Resistance 100 ohm and 100kohm DC Protocol complete
<u>COOMET.L- S20</u>	Calibration of gauge blocks 2016
Comparison type, Field Status	Supplementary comparison in Length, Dimensional Metrology In progress
<u>COOMET.M.D- S1</u>	Density of liquids 2012 - 2015
Comparison type, Field Parameter(s) Status	Supplementary comparison in Mass, Density Temperature range: 15 °C to 30 °C Protocol complete
<u>COOMET.M.FF- S1</u>	Comparisons of gas meters 2006
Comparison type, Field Parameter(s) Status	Supplementary comparison in Mass, Fluid Flow Measurement of air flow rate Pressure: close to the atmospheric pressure Temperature: 19 °C to 24 °C Approved and published



PARTICIPATION IN ILCs

<u>COOMET.M.FF- S5</u>	Comparison of critical nozzles for gas flow 2013 - 2014
Comparison type, Field	Supplementary comparison in Mass, Fluid Flow
Parameter(s)	Comparison in air, from 15 °C to 25 °C Relative humidity: 45 % to 90 % and pressure: 86 kPa to 106 kPa
Status	Planned
<u>COOMET.M.FF- S6</u>	Comparison of the determination of static volume of reference metallic tanks 2014
Comparison type, Field	Supplementary comparison in Mass, Fluid Flow
Status	Volume of liquid: 1 L, 2 L, 5 L, 10 L, 20 L and 50 L Planned
<u>COOMET.M.M- S2</u>	Supplementary bilateral comparison in the field of mass measurements 2015 - 2016
Comparison type, Field	Supplementary comparison in Mass, Mass Standards
Status	Planned
<u>COOMET.M.P- S1</u>	Comparison of standards of gauge pressure 2014 - 2015
Comparison type, Field	Supplementary comparison in Mass, Pressure
Parameter(s)	Gauge pressure: 1 MPa to 10 MPa Pressure measurements in liquid (gauge mode)
Status	Protocol complete
<u>COOMET.PR- S10</u>	Tristimulus values Y, x, y and L*a*b* of transparent color glasses 2016 - 2017
Comparison type, Field	Supplementary comparison in Photometry and Radiometry, Colorimetry
Parameter(s)	Geometry 0° / 0°, illuminant CIE D65, standard CIE observer 10°
Status	Protocol complete



PARTICIPATION IN ILCs

<u>COOMET.RI(I)- S1</u>	Comparison of air kerma standards from radiation protection level Cs-137 gamma ray beams 2011 - 2013
Comparison type, Field Status	Supplementary comparison in Ionizing Radiation, Section I (x and gamma rays, electrons) Approved and published
<u>COOMET.RI(I)- S3</u>	Comparison of the national standards of air kerma for x-radiation qualities used for radiation protection and diagnostic radiology 2016-2017
Comparison type, Field Status	Supplementary comparison in Ionizing Radiation, Section I (x and gamma rays, electrons) N-40, N-60, N-80, N-100, N-120, N-150, N-200, N-250, N-300; RQR2, RQR3, RQR5, RQR7, RQR9, RQR10 In progress
<u>COOMET.T- K3.2</u>	Realizations of the ITS-90 from 302.9 K to 692.7 K 2010 - 2012
Comparison type, Field Status	Key comparison in Thermometry, Standard Platinum Resistance Thermometers Approved for equivalence, Results available
<u>COOMET.T- K7</u>	Comparison of water triple point cells 2008 - 2011
Comparison type, Field Status	Key comparison in Thermometry, Fixed Point Cells Temperature: 273.16 K Approved for equivalence, Results available

14 intercomparisons published in KCDB of BIPM



INTERNATIONAL COOPERATION

NMI of Moldova is currently associate member of:

- General Conference on Weights and Measures (CGPM) of the international Organization of Metrology „Meter Convention“ since 2006
- International Organization of Legal Metrology (OIML) since 1995
- The Republic of Moldova is a member of the Euro-Asian Interstate Council on Standardization, Metrology and Certification (EASC) since its foundation in 1992.
- INM is a member of the regional metrology organization COOMET.
- and in May, 2017 NMI became Associate member of WELMEC and EURAMET.

ASSOCIATION AGREEMENT

between the European Union and the European Atomic Energy Community and their Member States, of the one part, and the Republic of Moldova, of the other part was signed on 27th June 2014 and on 1st of July 2016, the Association Agreement (AA) came into force

[http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:22014A0830\(01\)&from=hr](http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:22014A0830(01)&from=hr)



BILATERAL COOPERATION

NMI of Moldova has signed Memorandum of Understandings with:

- Belarusian State Institute of Metrology (BelGIM) signed in 2014
- Romanian Bureau of Legal Metrology (BRML) signed in 2014
- National Metrology Institute (INM) Romania signed in 2015
- Czech Metrology Institute (CMI) signed on October 2016
- Central Office of Measures (GUM) Poland - in the process of signing
- Technical and Scientific Council from Turkey (TUBITAK)



***THANK YOU FOR YOUR
ATTENTION***