



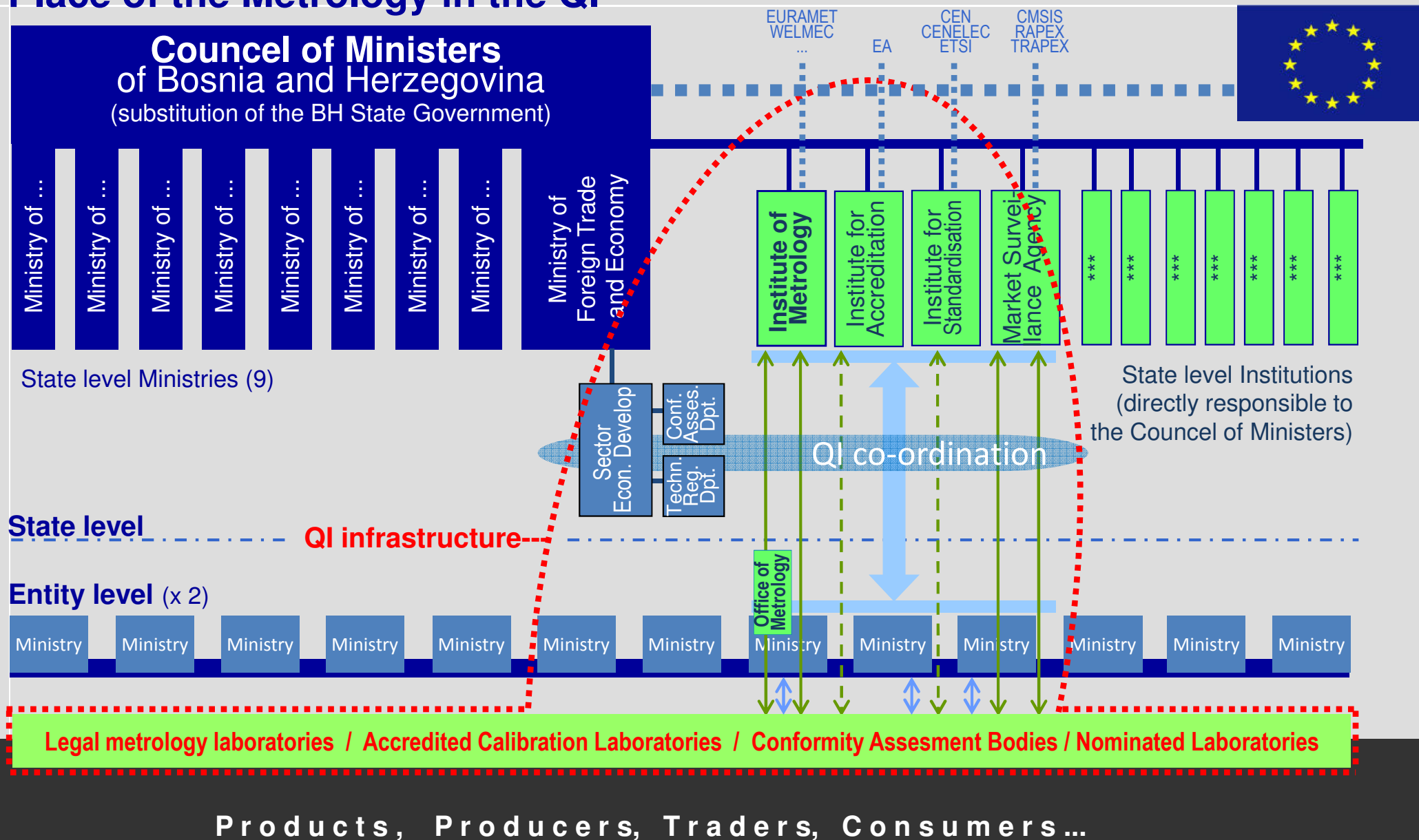
Institute of Metrology of Bosnia and Herzegovina

- on its way of development...



QUALITY INFRASTRUCTURE IN BOSNIA AND HERZEGOVINA

Place of the Metrology in the QI





THE LAW ON METROLOGY OF BOSNIA AND HERZEGOVINA

(BIH OFFICIAL GAZETTE, No. 19/2001)

ROLE OF THE IMBIH

Scientific Metrology

Provides reference values of SI measurement units at highest technical level in the state (national and reference measurement standards) and their dissemination to lower ranking standards.

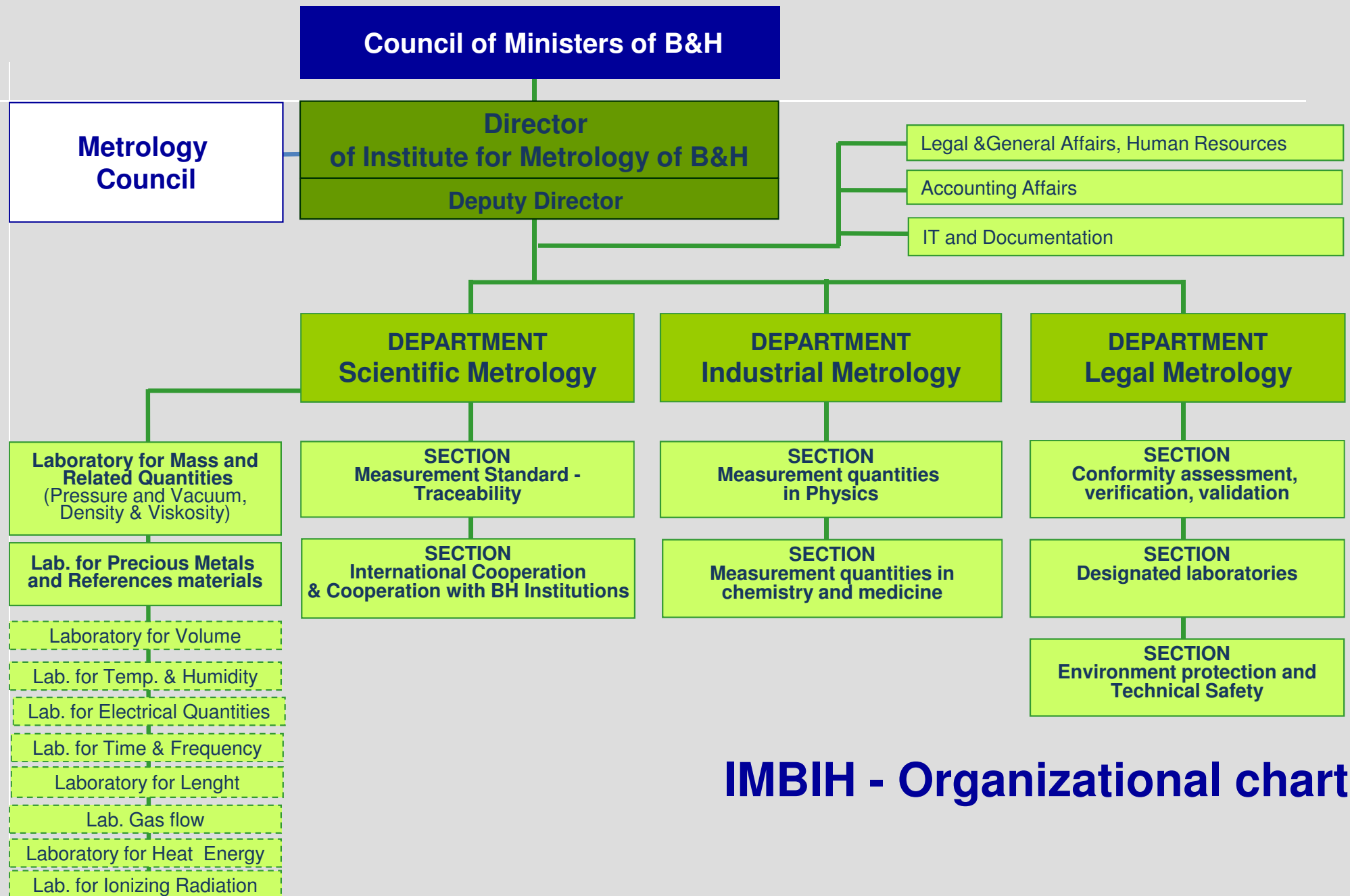
Industrial Metrology

Traceability of measuring instruments in industrial and other environments to support quality system requirements. Technical competence is based on accreditation.

Legal Metrology

Accurate and reliable measurements to support quality of life (health care, environment protection, general technical safety....

“The Institute **realizes the base of standards** in Bosnia and Herzegovina, develops, creates, declares and **maintains national standards** of legal units of measurement, **provides traceability** of the national standards against international standards, **prescribes metrological requirements** for standards, reference materials and measuring instruments, **makes decisions on recognition** of standards as national standards, **performs the conformity assessment** including the **pattern evaluation and pattern approvals** of measuring instruments.”



IMBIH - Organizational chart



CURRENT RESOURCES OF IMBIH

- 56 employees out of 72 planned



- **Laboratories of IMBIH:**
 - Laboratory for Mass
 - Laboratory for Pressure and Vacuum
 - Laboratory for Precious Metals
 - Laboratory for Length
 - Laboratory for Density And Viscosity
 - Laboratory for Temperature and Humidity
 - Laboratory for Heat Energy (Heat Meters)
 - Laboratory for Volume
 - Laboratory for Gas Flow (Volume Meters)
 - Laboratory for Electrical Quantities
 - Laboratory for Time And Frequency
 - Laboratory for Ionizing Radiation
- **Two Centers for Verification:**
- **Metrology Council**, appointed on July 10, 2008 by Council of Ministers of BIH.



< The laboratories of IMBIH (except mass and precious metals) have been equipped by IPA 2007 & 2008 funds and donation of Slovenian Government.

[illegible]

Every single piece of the equipment is covered by appropriate certificate >



PARTICIPATION IN INTERCOMPARISONS IN FRAME OF EURAMET

- **EUROMET project No. 592** “Inter-comparison in mass” (coordinator: NPL), realized in February 1998
 - **EUROMET project No. 593** “Inter-comparison in length” (coordinator BNM-LNE), realized in January 1998
 - **EUROMET project No. 594** “Inter-comparison in electrical quantities” (coordinator: NMI), realized in March 1998
 - **EURAMET project No. 1046** “Inter-comparison of electromagnetic flow-meters” (coordinator: CMI, Czech Republic), realized in 2009.
 - **EURAMET Project no. 1079** “Volumetric and gravimetric calibration of a 20 L proving tank” (coordinator: INRIM, Italy), realized in 2009.
 - **EURAMET Project no. 1041** “Comparison up to 200 kPa in absolute and gauge pressure” (coordinator: METAS, Switzerland) – planned for april 2011.
 - **EURAMET Project no. 1096** “SEE exercise comparison of mass standards of 1 kg and submultiples of the kilogram” (coordinator: EIM, Greece), realized in 2008.
 - **EURAMET Project no. 1040** “Comparison from 100 μ Pa up to 1 Pa using a SRG as a transfer standard” (coordinator: METAS, Switzerland), realized in 2009.
 - **EURAMET Project no. 1120** “Comparison of Mass Standards for SEE” (coordinator: BEV Austria) realized in 2009, realized in 2009.
 - **EURAMET project No. 1125** “Evaluation of cross-float measurements with pressure balances – 1st loop“ & „Evaluation of cross-float measurements with pressure balances – 2nd loop“ realized in 2010.
- ... not all listed



IMBIH has published first CMCs in KCDB BIPM



LABORATORY FOR MASS AND RELATED QUANTITIES has published its CMCs

- On **8th June 2012**, Laboratory for Mass has confirmed and got international recognition of its competences by publishment of its calibration and measurement capabilities in KCDB BIPM (International Bureau of Measures and Weights in Paris). It has got approval to use CIPM MRA logo on its certificates of calibration.
- *Important steps*
- **EURAMET Project no. 1120**, pilot BEV, KCDB comparison linked to EUROMET.M.M-K4 and EUROMET.M.M-K2 via BEV (Austria) and EIM (Greece). (weights of 1 kg, 500 g, 20 g, 2 g, 100 mg), realised in 2009, Final Report in 2012
- **Peer Review in mass**, by external assessor from BEV in February 2011
- Laboratory for Mass and Related Quantities of IMBIH has documented procedures and instructions according to standard BAS EN ISO/ IEC 17025 and got approval of **EURAMET TC Q** in March 2011



CMCs of LABORATORY FOR MASS AND RELATED QUANTITIES



Calibration and Measurement Capabilities

Mass and Related Quantities, Bosnia and Herzegovina, IMBIH (Institute of Metrology of Bosnia and Herzegovina)



Calibration or Measurement Service			Measurand Level or Range			Measurement Conditions/Independent Variable		Expanded Uncertainty					Comments
Class	Instrument or Artifact	Instrument Type or Method	Minimum value	Maximum value	Units	Parameter	Specifications	Value	Units	Coverage Factor	Level of Confidence	Is the expanded uncertainty a relative one?	
Mass	Mass standards	Comparison in air	1	100	mg			0.7 to 2	µg	2	95%	No	Uncertainty scales with measurand level. The volume of the mass standards is known. Approved on 08 June 2012
Mass	Mass standards	Comparison in air	0.1	1	g			2 to 3	µg	2	95%	No	Uncertainty scales with measurand level. The volume of the mass standards is known. Approved on 08 June 2012
Mass	Mass standards	Comparison in air	1	10	g			3 to 8	µg	2	95%	No	Uncertainty scales with measurand level. The volume of the mass standards is known. Approved on 08 June 2012
Mass	Mass standards	Comparison in air	10	100	g			8 to 20	µg	2	95%	No	Uncertainty scales with measurand level. The volume of the mass standards is known. Approved on 08 June 2012
Mass	Mass standards	Comparison in air	0.1	1	kg			20 to 220	µg	2	95%	No	Uncertainty scales with measurand level. The volume of the mass standards is known. Approved on 08 June 2012
Mass	Mass standards	Comparison in air	1	5	kg			0.22 to 1.1	mg	2	95%	No	Uncertainty scales with measurand level. The volume of the mass standards is known. Approved on 08 June 2012
Mass	Mass standards	Comparison in air	5	10	kg			1.1 to 2.1	mg	2	95%	No	Uncertainty scales with measurand level. The volume of the mass standards is known. Approved on 08 June 2012



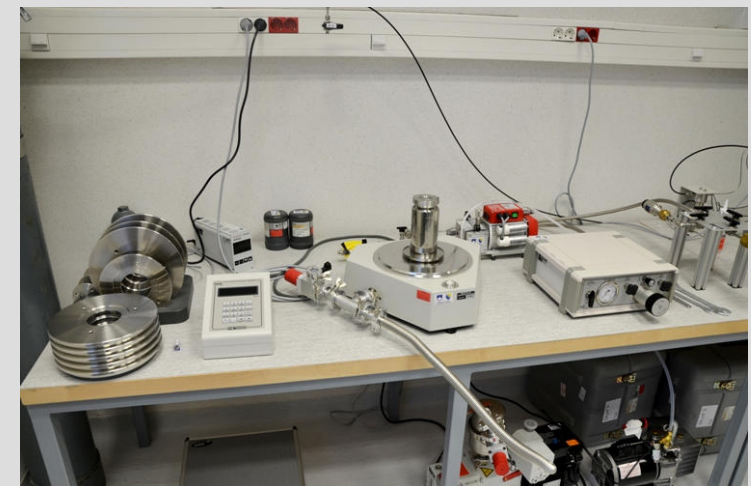


IMBIH confirmed first national measurement standard LABORATORY FOR MASS AND RELATED QUANTITIES holds first recognized national standard

- On **12th September 2013** IMBIH recognized the first national standard in the field of mass (**issued legal act**) , which is the highest standard of quality measurement in Bosnia and Herzegovina , and serves for dissemination of the measurement unit of mass (kg) on all other standards and measurements.

Further improvements

- Presentation of Quality system of Laboratory for Mass and Related Quantities (**extended on field of pressure**) was approved on TC Q Meeting in March 2012
- Peer Review in pressure**, by external assessor from CMI was in February 2013





QUALITY SYSTEM



Since year 2010, IMBIH is certified by Bureau Veritas in accordance with the requirements of International standard ISO 9001.

- Management Quality System according to standard BAS EN ISO/ IEC 17025 is fully implemented and documented by the Laboratory for Mass and Related Quantities (self declared confirmed at EURAMET TC Q) and Laboratory for Precious Metals and References Materials , while the other laboratories are in the process.
- Laboratory for Precious Metals and References Materials applied for accreditation to Institute of accreditation of BIH (BATA) for activities related to precious metals and is waiting for audit at the end of 2013.
- Quality System of IMBIH was presented and confirmed by EURAMET Technical Committee for Quality at the annual meeting in 2011 and IMBIH is now ready to submit its calibration and measurement capabilities of BIH national standards to the international key comparisons data base KCDB at BIPM (International Bureau of Measures and Weights in Paris).



HARMONISATION OF THE NATIONAL LEGISLATIVE WITH EC NEW APPROACH DIRECTIVES

RESPONSIBILITY OF IMBIH

Ministry of Foreign Trade and Economic Relationship of B&H (MOFTER) is in charge for **transposition** of Directives of **New Approach** and **Global Approach** according to the Law on technical requirements for products and conformity assessment (“Official Gazzete of B&H”, no. 45/04)

IMBIH is in charge for implementation:

- **Directive on Measuring Instruments (MID) 2004/22/EC**
 - in process of transposition
- **Directive on Non-Automatic Weighing Instruments (NAWI directive) 90/384/EEC and 93/68/EEC (CE Marking)**
 - new code 2009/23/EC, transposed in the Ordinance on Non-Automatic Weighing Instruments (“Official Gazzete of B&H”, no. 47/11)



THE LAW ON METROLOGY OF BOSNIA AND HERZEGOVINA

(BIH OFFICIAL GAZETTE, No. 19/2001)

ROLE OF METROLOGY INSTITUTIONS AT THE ENTITY LEVEL

ENTITY OFFICES FOR METROLOGY - REPUBLIC OF SRPSKA & FEDERATION BiH

“Verification of legal measuring instruments and its metrological supervision”

Law of Metrology of B&H, Article 27, Paragraf 2:

“Verification of the measuring instruments is performed, in accordance with the applicable technical requirements, by the Institutions for Metrology of the Entities in the Federation of Bosnia and Herzegovina and the Republic of Srpska, or the **nominated legal persons**, which have previously undergone the accreditation procedure or the procedure of an equal value to the accreditation procedure.”



CURRENT MEMBERSHIP IN INTERNATIONAL ORGANIZATIONS

OIML (*International Organization of Legal Metrology*)

- Corresponding Member since March 1997

EURAMET (*European Association of National Metrology Institutes*)

- Member since 2009

WELMEC (*European cooperation in legal metrology*)

- Associate member since 2009

IAAO (*International Association Assay Office*)

- Observer since 2010

BIPM / CGPM (*International Bureau of Weights and Measures / General Conference for Measures and Weights*)

- Associate Member since 2011

WELMEC (*European cooperation in legal metrology*)

- Associate member since 2013

COOMET (*Euro-Asian Cooperation of national metrological institutions*)

- Associate member since 2013

IMBIH signed CIPM MRA on June 15th 2011



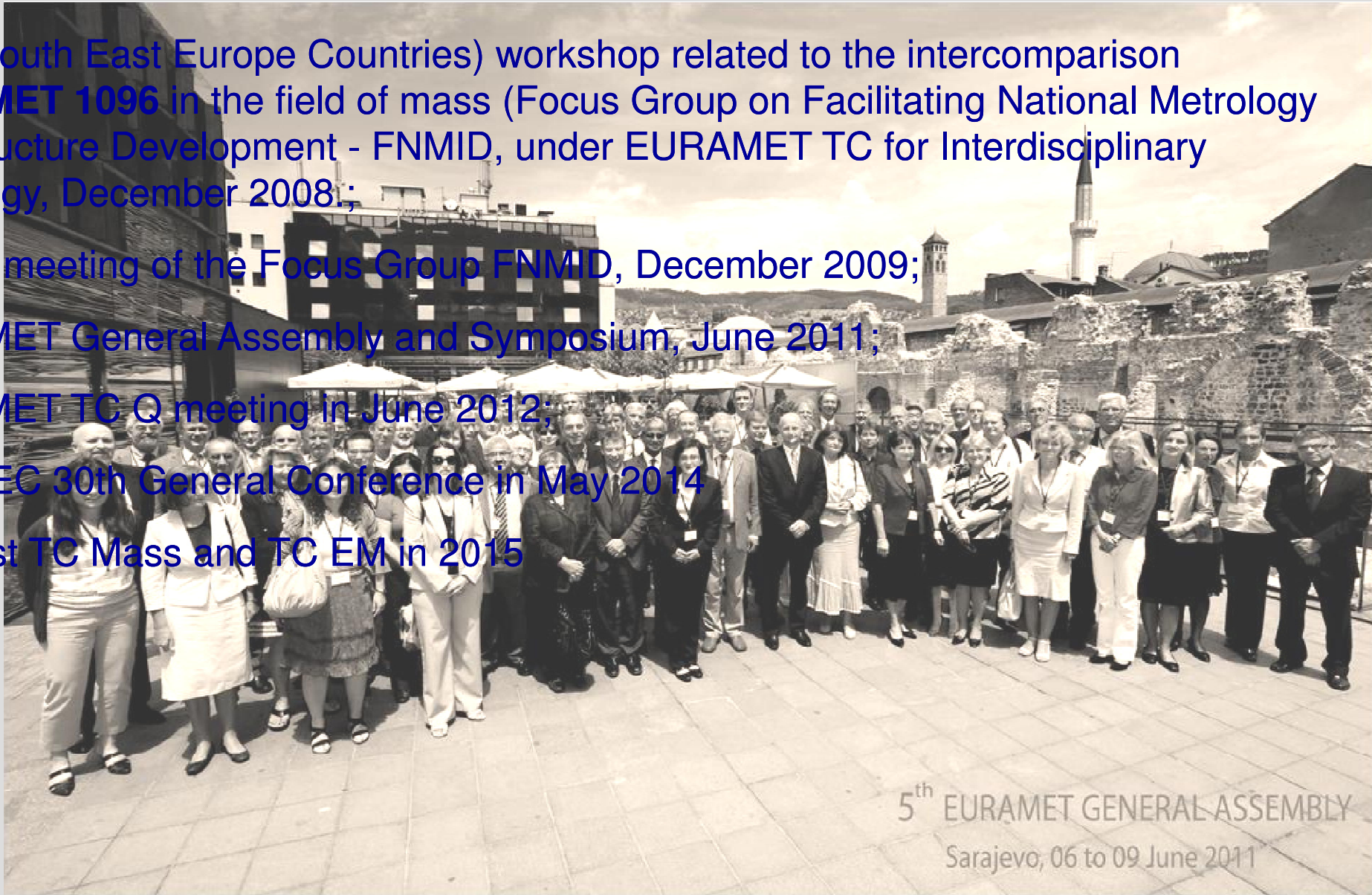
PARTICIPATION IN EURAMET AND WELMEC

- **10 persons from IMBIH** have been registered in several **Technical Committees in EURAMET** (quality, flow, interdisciplinary metrology, chemistry, time and frequency, electricity and magnetism, mass and related quantities, temperature, IR, length).
- **8 persons from IMBIH**, plus 2 persons from ORAO Bijeljina, participate in several **Working Groups of WELMEC** (Directive implementation, General aspects of legal metrology, Metrological supervision, Pre-packages, Software in Metrology, Measuring instrument directive, Measuring equipment for liquids other than water, Utility meters).
- **Director of IMBIH is member of the EURAMET Board of Directors and WELMEC Chairperson Group;**
- **Activities in EURAMET TC Interdisciplinary Metrology Focus Group - Facilitating National Metrology Infrastructure Development**
- **12 engineers of IMBIH (out of 37) were certified as technical assessors by EA accredited bodies;**



IMBIH as a host of International events :

- SEE (South East Europe Countries) workshop related to the intercomparison **EURAMET 1096** in the field of mass (Focus Group on Facilitating National Metrology Infrastructure Development - FNMID, under EURAMET TC for Interdisciplinary Metrology, December 2008);
- Annual meeting of the Focus Group FNMID, December 2009;
- EURAMET General Assembly and Symposium, June 2011;
- EURAMET TC Q meeting in June 2012;
- WELMEC 30th General Conference in May 2014
- Will host TC Mass and TC EM in 2015



5th EURAMET GENERAL ASSEMBLY
Sarajevo, 06 to 09 June 2011



EU ASSISTANCE / SUPPORT

Past:

- **PHARE PRAQ III Program in 1990s** (trainings and international comparisons)
- **CARDS 2002 & 2006** Regional Quality Infrastructure Programme
- **IPA 2008 & 2011** Regional Quality Infrastructure Programme
- **IPA 2007** - “Pre-Accession Instrument” –EC assistance, realized in 2009 & 2010 (TA & Supply)
- **IPA 2008** - “Pre-Accession Instrument” –EC assistance, realized in 2010 (Supply, last delivery of equipment in 2013)
- **EU TAIEX** programs of education

Present:

- EURAMET Focus Group on Facilitating National Metrology Infrastructure Development (supported by PTB) from 2007- present
- **Cooperation with Government of Slovenia** (implemented by IMT), from 2008- present
- Active bilateral cooperation with BEV, VSL, R Slovenia, PTB, NPL, CMI, UME, DMDM, INRIM, NIST



Bilateral Cooperation agreements with NMIs :

- **Bilateral Cooperation with UME (Turkey)**, signed in 2008
- **Bilateral Cooperation with MIRS (Slovenia)**, signed in 2008
- **Bilateral Cooperation with PTB (Germany)**, signed in 2009
- **Bilateral Cooperation with BEV (Austria)**, signed in 2009
- **Bilateral Cooperation with DMDM (Serbia)**, signed in 2011
- **Bilateral Cooperation with IMT (Slovenia)**, signed in 2011
- **Bilateral Cooperation with VSL (Netherland)**, signed in 2012
- **Bilateral Cooperation with DZM (Croatia)**, signed in 2013
- **Bilateral Cooperation with ČMI (Chezh)**, signed in 2014

...



EUROPEAN METROLOGY RESEARCH PROGRAMMES IN RETROSPECTIVE





EUROPEAN METROLOGY RESEARCH PROGRAMMES IN RETROSPECTIVE

- Bosnia and Herzegovina became 23rd EMRP member state in March 2013. Becoming a member state implies the commitment to participate and support scientific development of metrological society through fostering national strategic interest.
- This commitment includes financial participation in project funding, only part of it given in cash, and the rest of the amount is vindicated by different types of services that NMI provides during participation in the project.
- IMBIH became a part of the consortium in four different SRT (Selected Research Topics) that will run for becoming funded JRPs.



IMBIH as a part of EMRP JRPs consortiums

SRT title	Coordinator
JRP-v03 MeteoMet Metrology for pressure, temperature, humidity and airspeed in the atmosphere	Andrea Merlone, INRIM
JRP-g06 Metrology for Biogas	Adriaan van der Veen, VSL
JRP-g08 Sensor development and calibration method for inline detection of viscosity and solids content of non-Newtonian fluids	Inge (I.)van Andel, VSL
JRP-g18 Measurement Tools for Smart Grid Stability and Quality	Paul Wright, NPL



**Our resources are getting bigger and better
significantly in the last five years,
in both ways...**

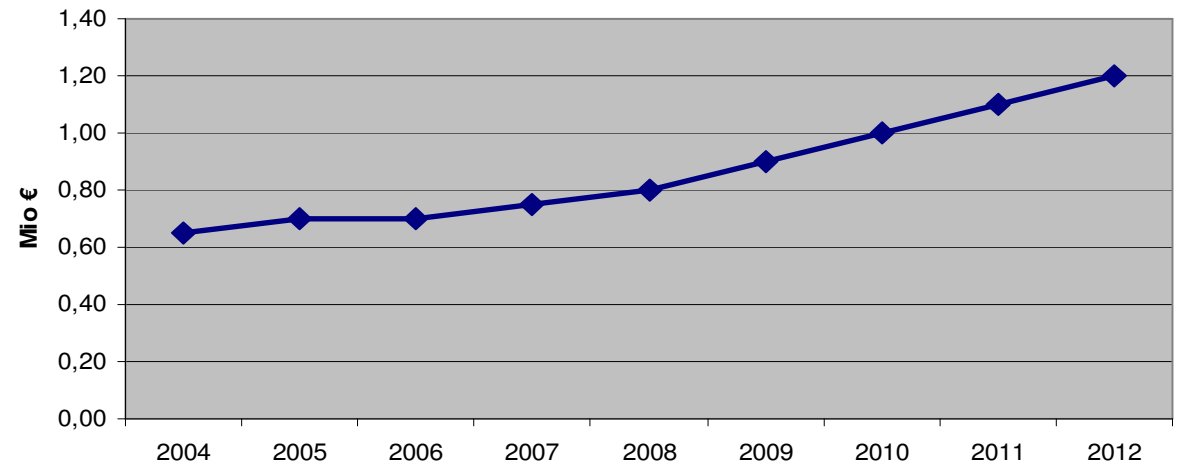


...our hardware...

Laboratories of IMBIH:

- Laboratory for Mass
- Laboratory for Pressure and Vacuum
- Laboratory for Precious Metals
- Laboratory for Length
- Laboratory for Density And Viscosity
- Laboratory for Temperature and Humidity
- Laboratory for Heat Meters
- Laboratory for Volume
- Laboratory for Gas Flow and Volume Meters
- Laboratory for Electrical Quantities
- Laboratory for Time And Frequency
- Laboratory for Ionizing Radiation

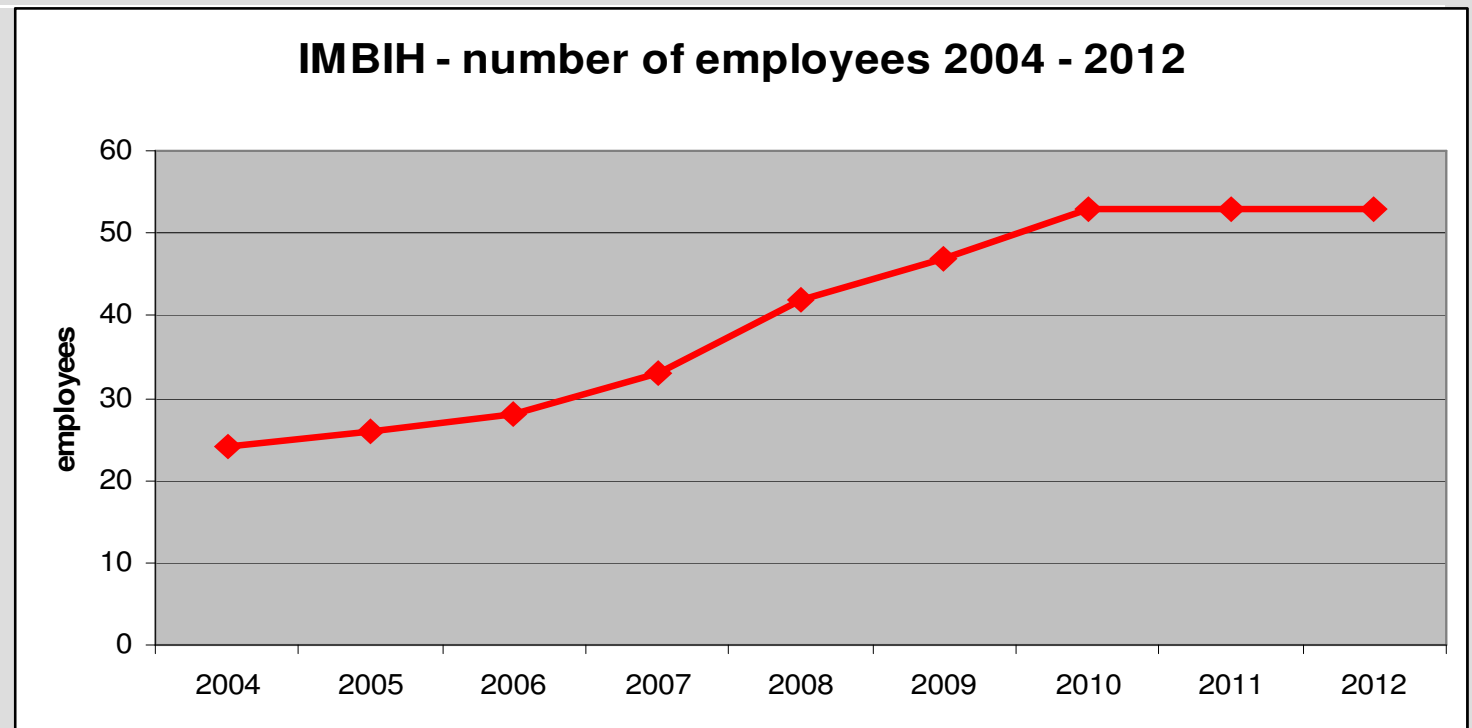
IMBIH - Total annual spent budget 2004 - 2012



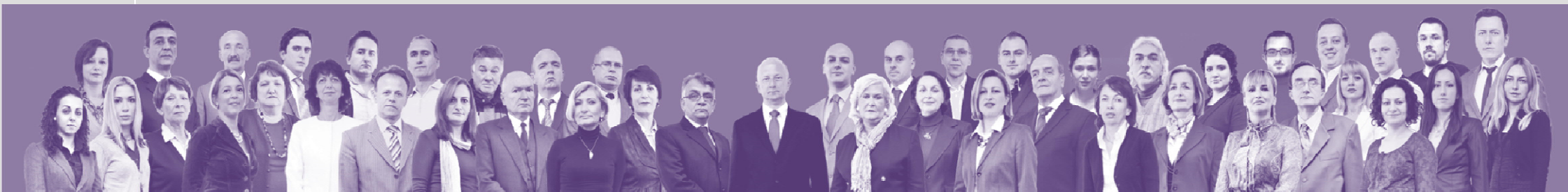
LABORATORIJE IMBIH	LABORATORIES OF IMBIH
LABORATORIJA ZA MASU I GUSTOĆU	LABORATORY FOR MASS AND DENSITY
LABORATORIJA ZA DUŽINU	LABORATORY FOR LENGTH
LABORATORIJA ZA PRITISAK I VAKUUM	PRESSURE AND VACUUM LABORATORY
LABORATORIJA ZA GUSTINU I VISKOZNOST	LABORATORY FOR DENSITY AND VISCOSITY
LABORATORIJA ZA TEMPERATURU I VLAŽNOST	TEMPERATURE AND HUMIDITY LABORATORY
LABORATORIJA ZA MJERILA TOPLOTNE ENERGIJE	CALORIMETERS LABORATORY
LABORATORIJA ZA PLEMENITE METALE	LABORATORY FOR PRECIOUS METALS
LABORATORIJA ZA VOLUMEN	VOLUME LABORATORY
LABORATORIJA ZA MJERILA PROTOKA I ZAPREME GASA	LABORATORY FOR GAS FLOW AND VOLUME METERS
LABORATORIJA ZA ELEKTRIČNE VELIČINE	LABORATORY FOR ELECTRICAL QUANTITIES
LABORATORIJA ZA VRIJEME I FREKVENCIJU	LABORATORY FOR TIME AND FREQUENCY



...and software.



Number of employees was doubled in just six years (2004-2010) !





And we wan't stop !

B&H, 23rd member of EMRP

- Bosnia-Herzegovina became a member country of the European Metrology Research Programme (EMRP) this March.
- This membership is a milestone for IMBiH. It allows us active participation in the latest *state-of-the-art* research projects.
- IMBiH's young scientists took part in seven JRP projects as ESRG and RMG staying for 46 months in developed NMIs
- We plan to continue this very fruitful way of knowledge transfer and professional training





NEXT STEPS (DEVELOPMENT PLAN) - general

- **Development of distributed metrology system** according to the best models & practice in the EU, and specific BH internal structure, fulfilling strong demands of the internationally recognized quality of metrology services, within the overall Quality Infrastructure;
- Further **recognition of national measurement standards**;
- Continuous development & publishing of the national **Metrological Regulations**;
- Enforcement of the faster completion of the **accreditation** of all IMBIH laboratories.
- Raising awareness of the importance of **professionalism** in a specific field of activities, **continuous education** of the personnel, follow-up **trainings**, trainings for assessors for implantation of EN ISO/IEC 17025, training for assessors in conformity assessment, etc.;
- Stronger and **direct assistance** to the BH economy in the area of metrology (recently signed General Co-operation Agreements with strongest energy companies in BiH ie. RNB and EPBIH).



NEXT STEPS (DEVELOPMENT PLAN) - more concretely

- Activities **to publish CMCs** as more as possible;
- Activities to continue **to participate in EMPIR** projects also in next calls;
- **Recognition of national measurement standards** towards their **international** recognition (BIPM or EURAMET comparisons);
- Development of **geografically distributed system** of metrology according to the strong demands for internationally recognized requirements;
- IMBIH shall encourage private and public sector to participate in the metrology infrastructure in order to **expand distributed system of metrology**;
- Activities **to achieve full membership in OIML**;
- Activities to **join EUROLAB**;
- Activities to **join the Convention on the Control and Marking of Articles of Precious Metal**;
- Activities to **join the Convention** on the Control and Marking of Articles of **Precious Metal**;
- Additional **development of metrology regulatory framework** in country.

More about IMBIH at:
www.met.gov.ba

