GULF ASSOCIATION FOR METROLOGY

Regional Metrology Organization(RMO)

Introduction of GULFMET TC IR and its capabilities

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Introduction

GULFMET TC IR has newly established in Feb 2021 and its role to:

- Provide forum for GULFMET NMI experts.
- Discuss issues related to Ionizing Radiation
- Join associate members (Turkey, South Korea , Bosian and Herzegovina, and Egypt)
- Provide support in technical capabilities (transfer knowledge and trainings)
- Provide inter-comparisons as technical evidence for their competencies
- Support the members in establishing their Calibration Measurement Capabilities (CMCs)
- Inter-RMO review of CMCs of other RMOs.

GULFMET TC IR Members

UAE
FANR SSDL (DI)

KSA
1. SASO (NMI)
2. KACST
3. KFSHRC

Kuwait
Ministry of Health - SSDL

Bahrain
Waiting for nomination

Qatar
Ministry of Municipality and Environment

Oman
1. Ministry of Health
2. Ministry of Commerce and Industry and Investment Promotion

GULFMET TC IR Associate Members

Bosnia and Herzegovina
Institute of Metrology of Bosnia and Herzegovina (NMI)

Egypt
Ionizing Radiation Metrology Lab (NMI)

South Korea
KRISS (NMI)

Turkey
TENMAK (DI)

GULFMET TC IR Observers

- Only guest in the meetings
- No right to Vote
- Allowed to participate TC IR activities (trainings and comparisons) as per IAEA – GULFMET Cooperation.

Jordan
JAEC

Uzbekistan
Uzbek National Institute of Metrology

Iraq
Ministry of Science and Technology (MOST)

Lebanon
Lebanese Atomic Energy Commission (CNRS)

Syria
Atomic Energy Commission of Syria (AECS)

Yemen
National Atomic Energy Commission (NATEC)

Metrological structure UAE

Traceability

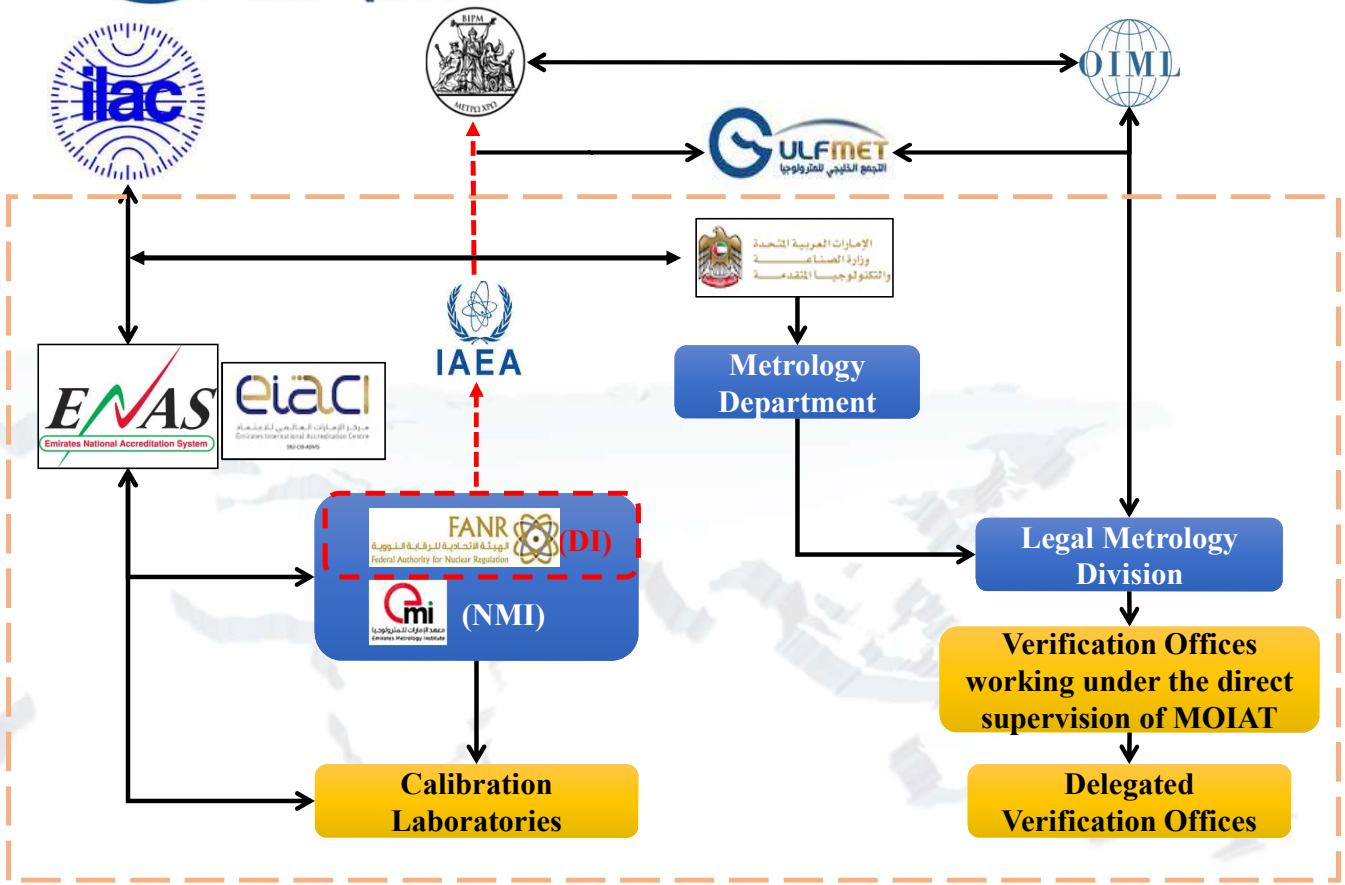
Emirate Metrology Institute

FANR SSDL

Accreditation Body

Accreditation Body

Ministry of Industrial and Advanced Technology



Metrological structure Saudi Arabia

Traceability

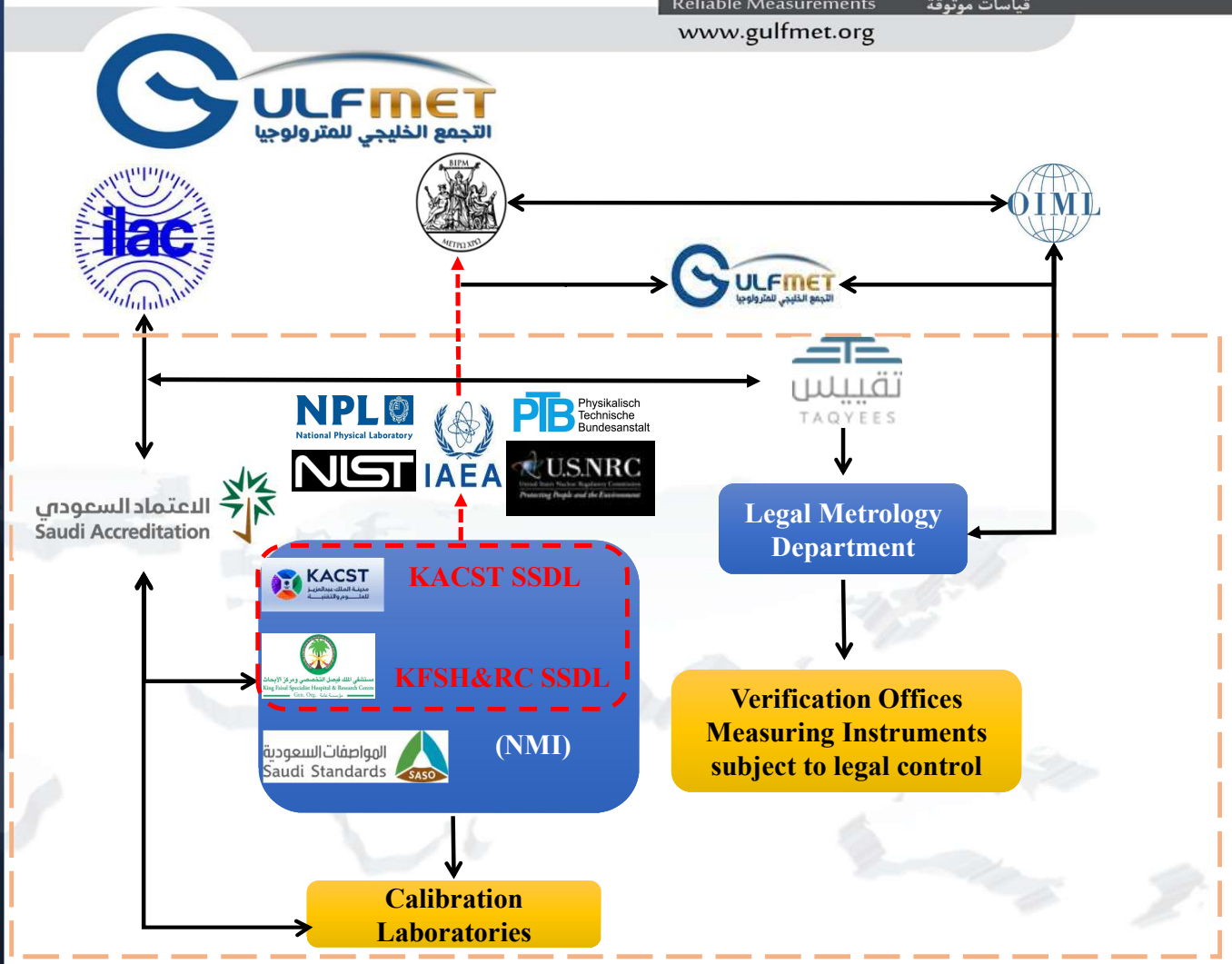
Saudi legal Metrology Authority

KACST SSDL

KFSH&RC SSDL

Saudi Accreditation Body

National Metrology Institute (SASO)



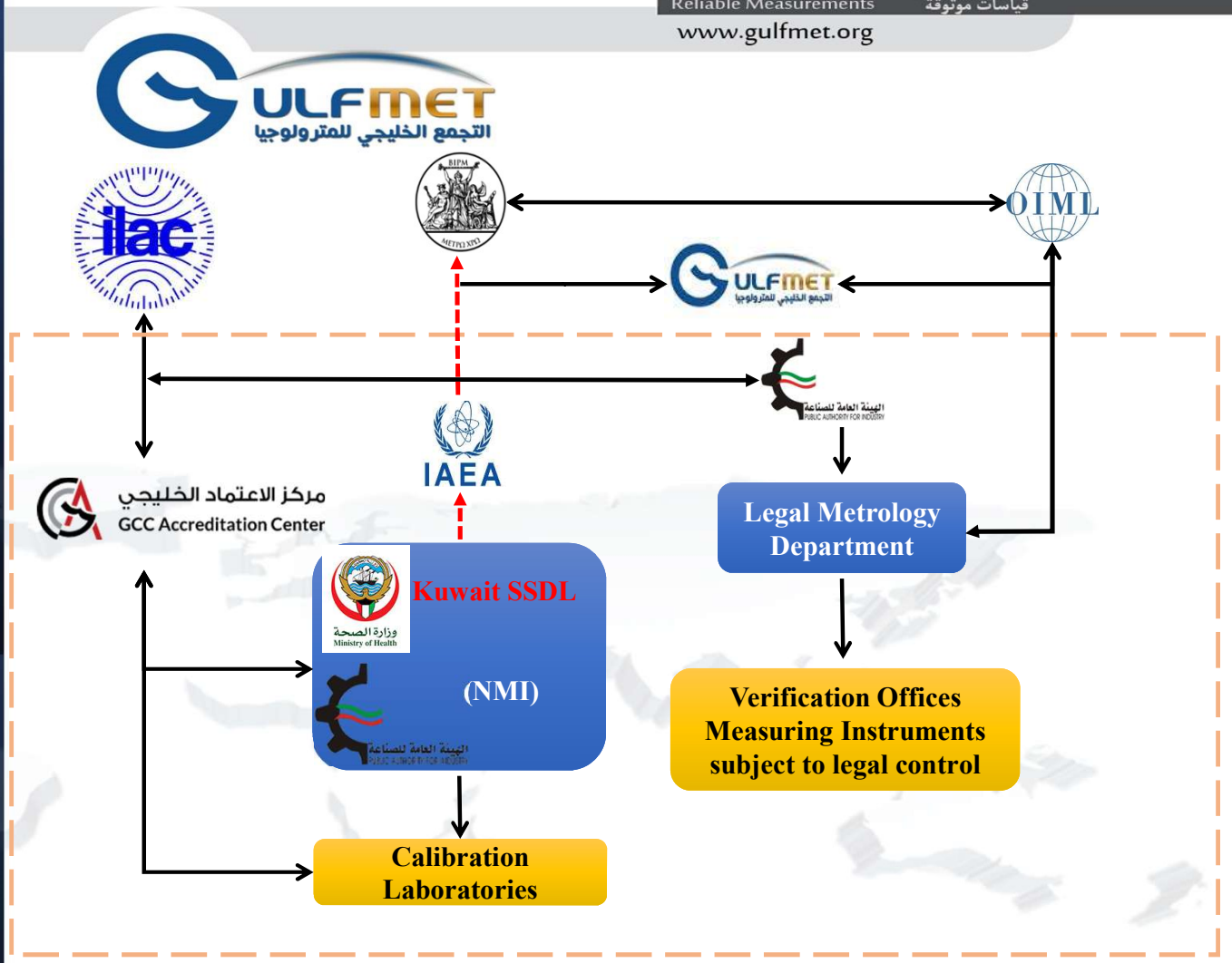
Metrological structure Kuwait

Traceability

Public Authority For Industry

Ministry of Health – Kuwait SSDL

Gulf Accreditation Body



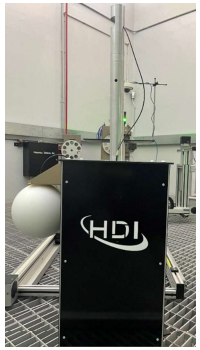
Technical Capabilities

Tech. Capability	UAE FANR SSDL	KSA KFSHRC SSDL	KSA KACST SSDL	Kuwait MOH SSDL
Calibration in Radiation Protection field (Gamma) ISO 4037	✓	✓	✓	✓
Calibration in Radiation Protection field (X-ray Ns) ISO 4037	✓	✓	✓	✓
Calibration in Neutron measurement field	In progress	✓	In progress	-
Calibration of contamination meters (Alpha and Beta)	-	✓	-	-
Calibration in Diagnostic Radiology (RQR and RQA)	✓	✓	✓	In progress
Calibration in Diagnostic Radiology (RQT and RQR-M)	-	✓	-	-
Calibration in Radiotherapy (W_D in Co-60)	-	✓	-	-
Calibration in HDR Brachytherapy	-	✓	-	-
Calibration in Contact-Therapy k_{air} X-ray (CCRI T1 to T4 and T1 beam qualities)	-	✓	-	-
Reference irradiation in term of K_{air}, H*(10), Hp(10), Hp(0.07) and Hp(3)	✓	✓	✓	✓

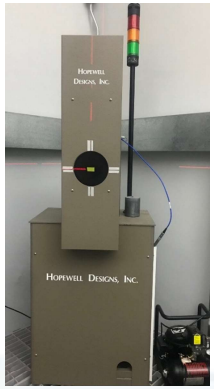
Technical Capabilities UAE

FANR
الهيئة الاتحادية للرقابة النووية
Federal Authority for Nuclear Regulation

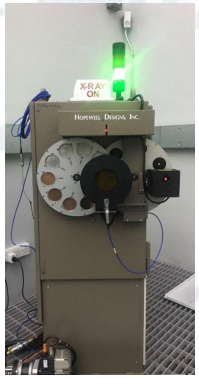
One irradiation room (9x8x8m) equipped with



Neutron Irradiator
241_{Am-Be}, 185 GBq



Gamma Beam Irradiator
137_{Cs}, 820 GBq



X-ray irradiator X80-320 A Model (N-series, RQR, RQA)

Panoramic Irradiator
137_{Cs}, 470 MBq

Technical Capabilities Saudi Arabia

GULFMET التجمع الخليجي للمترولوجيا

Gamma irradiators with 06 ^{137}Cs and 01 ^{60}Co sources (two reference chambers)

Therapy unit with 5 kCi ^{60}Co source (03 ref. chambers and 04 electrom.

Contamination (07 α & β Reference sources)

Neutron irradiator with a 3 Ci AmBe source (2 reference detectors)

Brachytherapy unit ^{192}Ir source (01 ref. chambers and 01 electrom.

Dual X-Ray System (RP, DR & RTH) (05 reference standards)

Technical Capabilities Saudi Arabia

GULFMET التجمع الخليجي للمترولوجيا

Gamma radiation unit

320 kV X-rays Unit

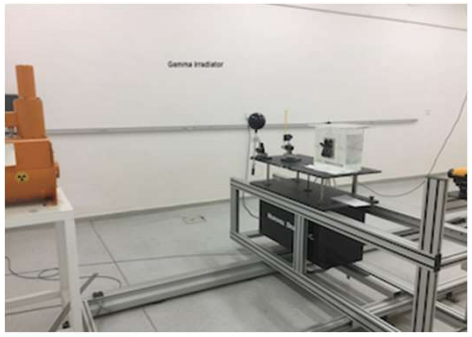
Control room

Neutrons Unit

Control room

Technical Capabilities Kuwait

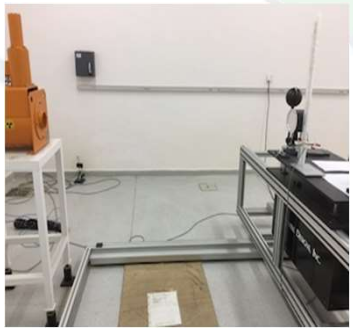
GULFMET التجمع الخليجي للمترولوجيا



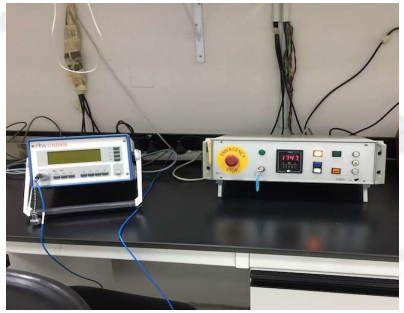
Gamma Irradiator Cs137 (740 GBq)/ 20 Ci , 2003 installation, Model OB 6, STS-GmbH manufacture + Reference Standard chamber LS01/ PTW 32002, water slap phantom for personal dosimeters irradiation

X-ray Irradiator (Narrow Beam), (40 – 225 kV) ,

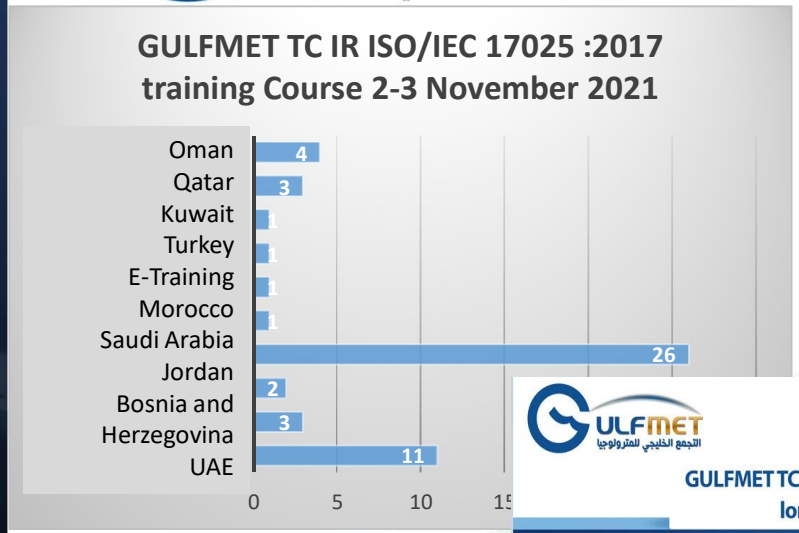
Control room of X-ray Irradiator (Narrow Beam)



Reference & working, NE2575 chambers, Calibrated according the Reference Standard

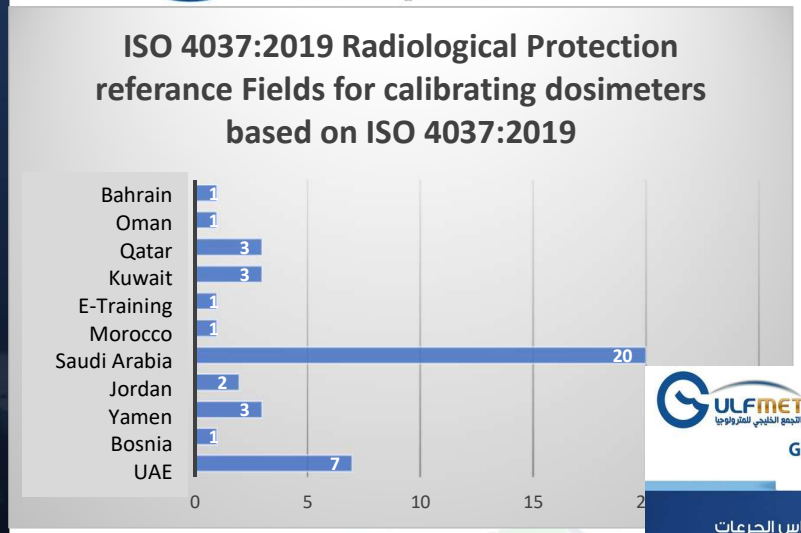


GULFMET TC IR Activities: Trainings 2021



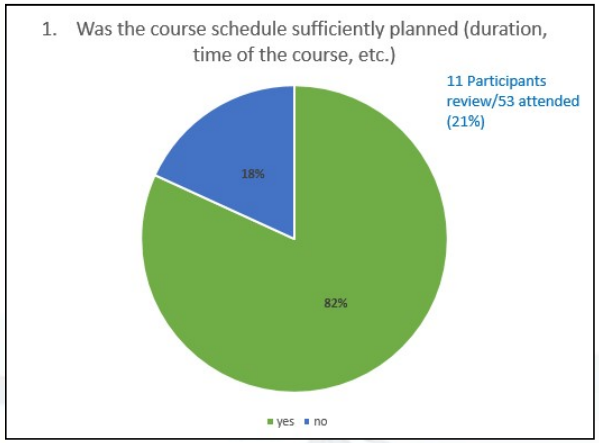
- 53 participants joined the course
- BIPM E-Learning platform

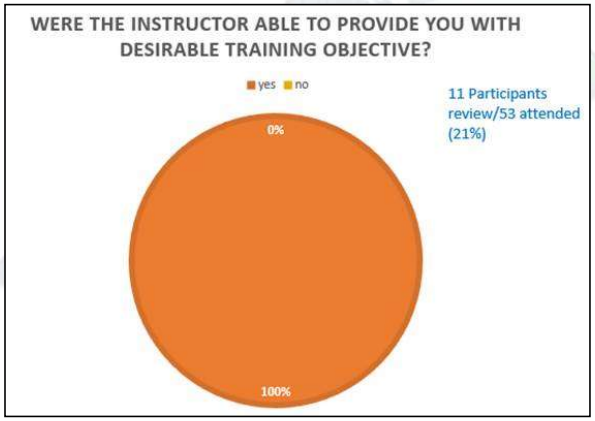
GULFMET TC IR Activities: Trainings 2021

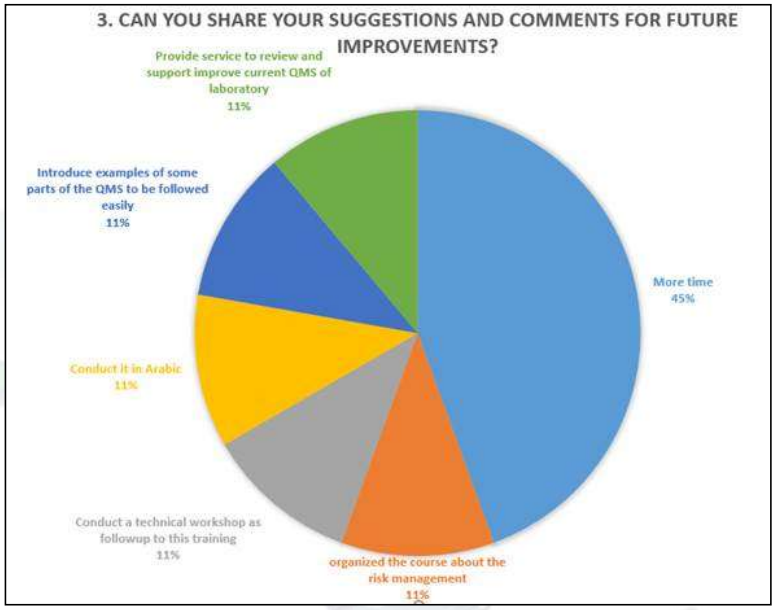


- 43 participants joined the course
- BIPM E-Learning platform

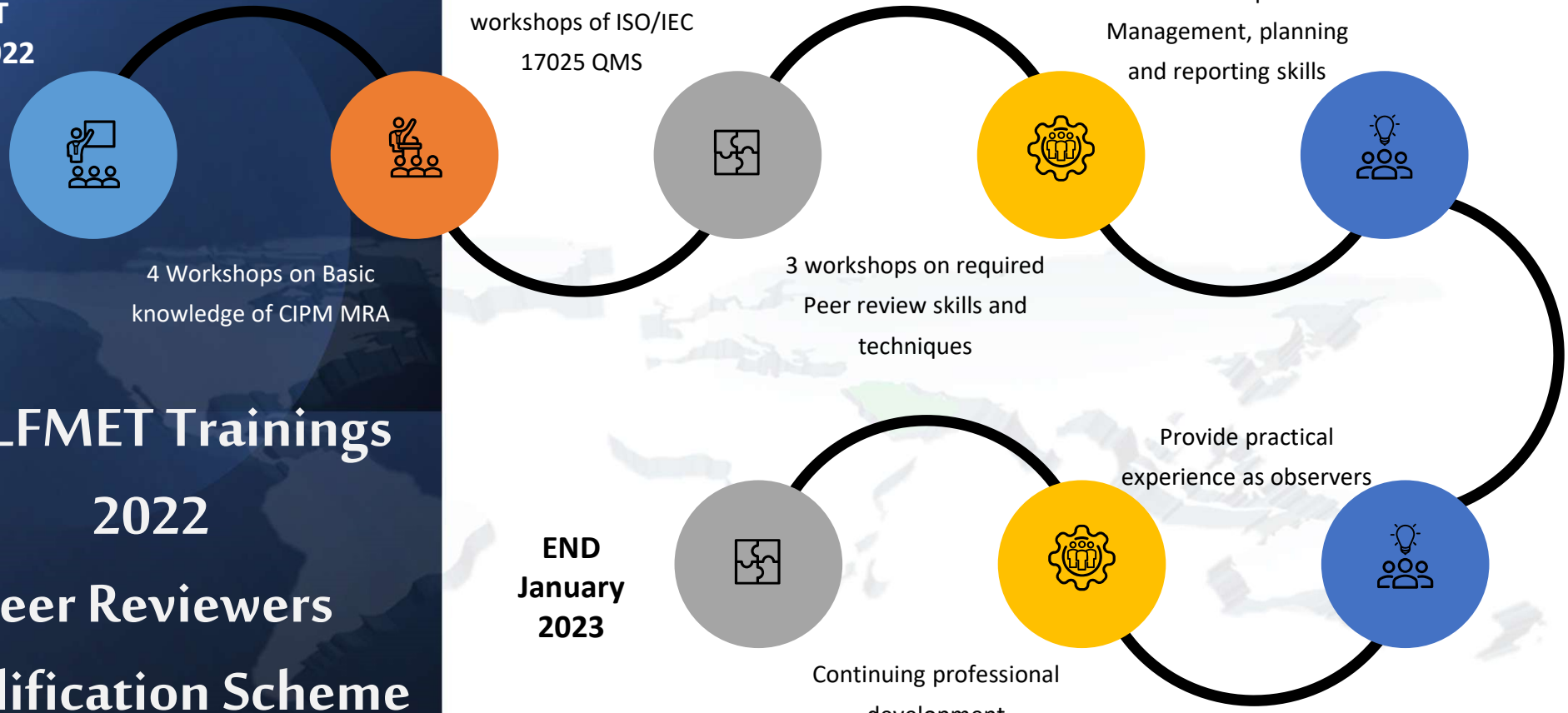
GULFMET TC IR Activities: Trainings Feedback







GULFMET Trainings 2022 Peer Reviewers Qualification Scheme



GULFMET TC IR Activities: Trainings 2023

- **Speakers** from Academic Institutes and Universities in Taiwan.

GULFMET TC IR Ongoing Inter-Laboratory Comparisons

- Two Inter-Laboratory comparisons scheduled in 2022

1. **GULFMET.RI(I)-K5**: Ongoing – Measurement Phase
   - Key Comparison For Radiation Protection Calibration Field in Air Kerma For Cs-137 Gamma Reference field
   - Eight laboratories participating (KSA, UAE, Jordon, PTB, Turkey, Republic of Uzbekistan, Bosnia and Herzegovina, and Kuwait)
   - Pilot Lab is KFSHRC in KSA and Link Lab is PTB
   - KSA, FANR, JAEC, PTB and Turkey completed the measurement.

2. **GULFMET.RI(I)-S1:** Ongoing – Measurement Phase
   - Supplementary Comparison For Radiation Protection Calibration Field in Air Kerma For X-Ray ISO 4037:2019 N-Series Qualities
   - Eight laboratories participating (KSA, UAE, Jordon, PTB, Turkey, Republic of Uzbekistan, Bosnia and Herzegovina, and Kuwait)
   - Pilot Lab is KFSHRC in KSA and Link Lab is PTB.
   - KSA, FANR, JAEC, PTB and Turkey completed the measurement.

Delay in artifact shipment by 3 months due to changing the shipment company. And Customs clearance. Will be shipped to Next participant by Next week.

GULFMET TC IR Planned Inter-Laboratory Comparisons

- One Inter-Laboratory comparisons Planned in 2023

1. **GULFMET.RI(I)-S2**: protocol successfully registered in KCDB
   - Supplementary Comparison For Diagnostic Radiology in Air Kerma For X-Ray RQR and RQA and RQT Beam Qualities
   - Eight laboratories participating (KSA, UAE, Kuwait, Turkey, Republic of Uzbekistan, Bosnia and Herzegovina, Jordon and PTB)
   - Pilot Lab is KFSHRC in KSA and Link Lab is PTB
   - Measurement phase started in May 2023 with KSA as per the plan
   - Planned to be done in 2022, but postponed to 2023 as participants are not yet ready

GULFMET TC IR Designated Institutes

- FANR in UAE is the Only DI for IR in GULFMET so far.
- Two Labs from KSA are requesting to be nominated as DI for Radiation Protection (KACST) and Medical (KFSHRC).
- KSA KFSHRC got the ISO 9001 certification in 2023 and ongoing for ISO 17025.
- KACST ongoing ISO17025 accreditation.
- Members and observers of GULFMET are members of the IAEA/WHO Network

GULFMET TC IR CMCs

- No CMCs has been established until now from GULFMET TC IR in BIPM KCDB.
- UAE SSDL and KSA KFSHRC have achieved successfully the bilateral comparison with IAEA to support claiming CMCs.
- UAE SSDL has finalized the External Audit from Accreditation body and successfully achieved the approval from GULFMET TC QS. The QMS certificate will be released soon.
- Next step would be claiming CMCs in Dosimetry for UAE FANR SSDL.

GULFMET TC IR Roadmap

- **2022:**
  - Register TC IR members as NMI or DI in BIPM (UAE SSDL).
  - Agreement with IAEA to support GUFLEMT TC IR Action plan (Done).
- **2023:**
  - Approved QMS through peer review or accreditation body (UAE).
  - Successful completion of GULFMET TC IR inter-comparisons as technical evidence.
  - Submit CMCs in IR Dosimetry (Radiation Protection and Diagnostic Field) (in process).
  - Establish Neutron measurement calibration by 2023.
- **2024:**
  - Propose GULFMET Supplementary comparison in Neutron H*(10).
  - Participate in on-going CCRI(III)-S2 supplementary comparison, on neutron Hp(10) (if available).
  - Extend QMS scope to include Neutron measurements.
  - Establish the calibration service of Surface Contamination.
- **2025-2026:**
  - Establish Radiotherapy Field.
  - Propose/participate inter-comparison in Radiotherapy field.
  - Propose/participate inter-comparison in Surface Contamination.

THANK YOU FOR ATTENTION

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