

APMP NEWSLETTER

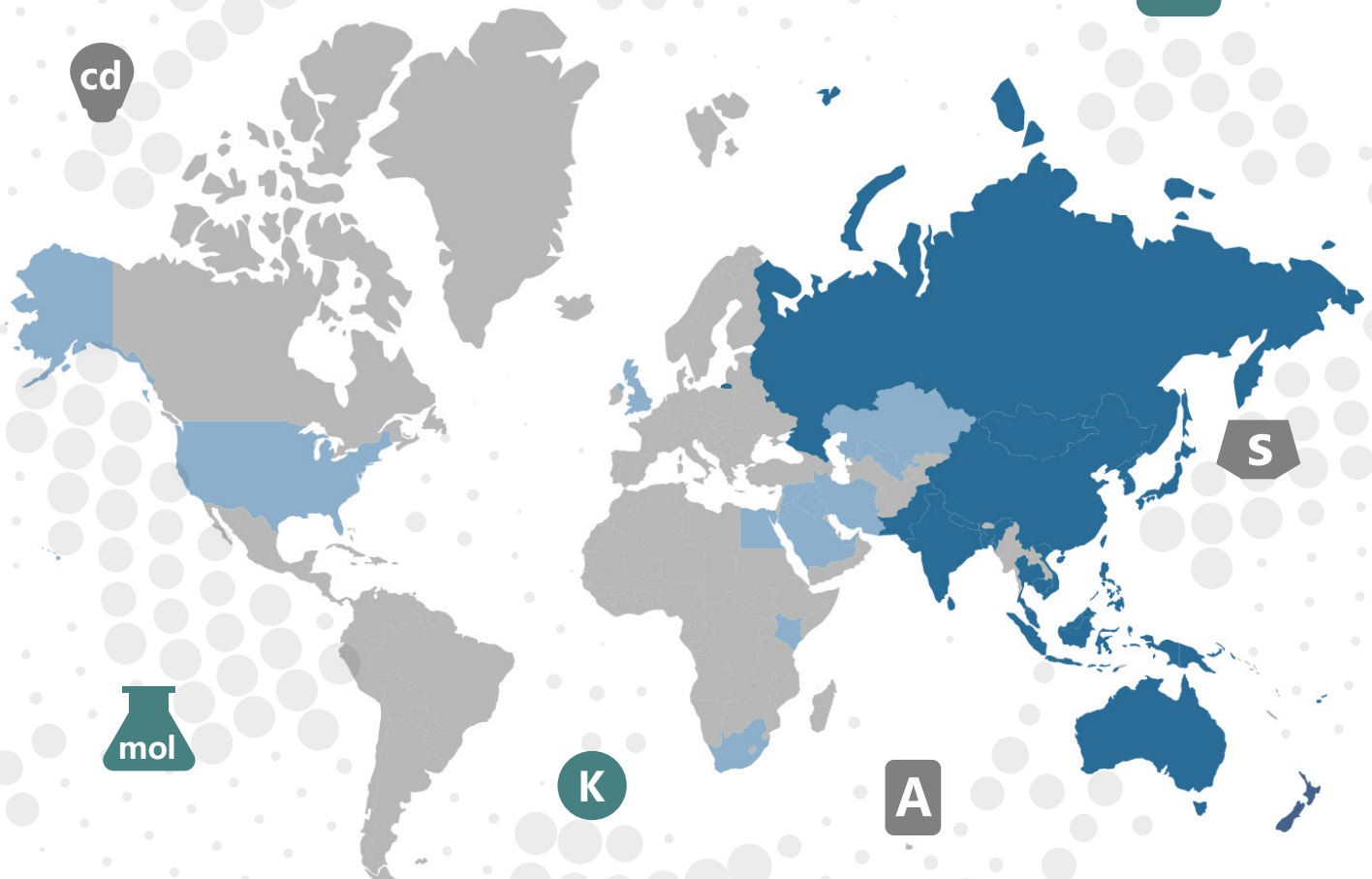
Asia Pacific Metrology Programme

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Issue 46
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Greetings from APMP Chairperson

Dear APMP colleagues and friends,

Here comes the spring of the new year. Let me first extend my best regards and new year greetings to all of you. The world today is still in the grip of the COVID-19 pandemic. Fortunately, we have seen the vaccination working effectively, and hopefully we will be able to see each other face to face in the near future.

As for APMP, in 2021, our fight against the pandemic made important progress. The APMP COVID-19 Response Programme has been running for more than one year. Till now, 5 projects have been supported with about USD 100 000 in total. Interested members are welcome to join this programme.

In 2021, APMP recognised the importance of digital transformation and prepared itself to embrace the trend. At the 37th APMP General Assembly, we were glad to announce the establishment of the Focus Group on Digital Transformation in Metrology (DXFG). Looking forward to the journey ahead, we are excited to embrace digital transformation, which is part of promoting research excellence in emerging areas, identified as the work priority of 2022.

All these achievements would not have been possible without the generous support and cooperation of our colleagues and friends. Here, I would like to extend my heartfelt gratitude to EC members, all Committee Chairs and the Secretariat. I also feel deep gratitude to APMP members and partner organisations around the world.

This February, China has celebrated the advent of spring and embraced the Year of the Tiger. In the Chinese culture, tigers symbolise bravery and strength. With the joint efforts of us all, I hope that the world will have an early victory against the pandemic, and I wish everyone a healthy and auspicious new year!



FANG Xiang

APMP General Assembly & Related Activities, 2021

The 2021 APMP General Assembly (GA) and Related Activities (APMP 2021) were held as a series of online meetings from 1 to 26 November 2021. This month-long meeting season is comprising of a record-setting 44 video conference sessions, including annual meetings of the Executive Committee (EC), the Technical Committee Chairs Forum (TCCF), 12 Technical Committees (TCs), the Developing Economies' Committee (DEC), 6 Focus Groups (FGs) and one Working Group (WG), and has involved more than 230 participants from about 30 economies in total.

The APMP 2021 has witnessed new developments in a series of initiatives that reflected the work priorities of the year: regional collaboration in digital transformation, continued response to the COVID-19 pandemic, maintaining sustainability of projects at the time of COVID-19, etc.

The most important theme of the year was digital transformation. Following the decision made by the EC at their Midyear Meeting in June 2021 to establish a new APMP Focus Group on Digital Transformation in Metrology (DXFG) and a series of preparatory work carried out in the second half of the year, the new Focus Group was formally estab-

lished at the 37th APMP General Assembly held on 26 November. It will serve as the central organ of APMP to coordinate and promote regional collaborations in digital transformation and to conduct the associated international liaison.

Elections took place virtually in a closed session in the GA. Two EC members, Dr. Jan Herrmann (NMIA, Australia) and Dr. Yon-Kyu Park (KRISS, Korea) completed their four-year's term as EC members. Ms. Ajchara Charoensook was approved to extend her office term as EC member for one more year until GA 2022. Dr. Hyun Min Park, President of KRISS, was elected as the next Chairperson of APMP for a term of three years commencing from GA 2022. Six TC Chairs started their first term at the GA. Three other TCs and the DEC have elected their new chairs whose term will start from the next GA.

At the GA, among the total 12 recipients of the annual awards, the 2021 APMP Award was presented to Dr. Thomas Liew, CIPM member and former Director of NMC, A*STAR, Singapore for his remarkable contributions to regional metrology activities.



A subset of participants at the 37th APMP GA

APMP Focus Group on Digital Transformation in Metrology (DXFG) Established

At the APMP Midyear Meeting in June, the APMP Executive Committee (EC) decided to establish a new Focus Group on Digital Transformation in Metrology (DXFG).

A Survey on Digital Transformation was conducted among all members of APMP in order to understand the scene of APMP members in digital transformation and to provide a basis for developing future work plans. See summary report of the survey at http://www.apmpweb.org/main/newsview.php?b_index=64.

Among other key conclusions from the survey, members have widely agreed that to establish a focus group to work dedicatedly on DX would be a very meaningful step. Members have expectations on it to figure out what digital transformation really means to metrology and what suitable activities are that really fit for APMP members' needs.

A series of preparatory work were carried out in the second half of the year. The Secretariat has received 30 nominations for FG members from 14 member economies, Dr. Blair Hall (MSL, New Zealand), a member of IMEKO TC6 (Digitalization), of the CIPM Expert Group on the Digital SI, and of the NSCLI 141 (Metrology Information Infrastructure and Automation) was elected as the new Focus Group Chair. A preliminary work plan of the FG was also developed by the chair and members. The new DXFG was formally approved by the 37th APMP General Assembly held on November 26. It will serve as the hub to coordinate regional collaborations in digital transformation and to conduct the associated international liaison.

2021 APMP NMI Directors' Workshop

Foster Asia-Pacific Metrology Collaboration in a Digital World

The 12th APMP NMI Directors' Workshop was held on the theme "Foster Asia-Pacific Metrology Collaboration in a Digital World" for ideas sharing and discussions to develop a holistic understanding of metrology digitalisation and to review the preliminary work plan of the APMP Focus Group on Digital Transformation in Metrology (DXFG). The Workshop connected APMP NMI directors and invited participants virtually for a forward-oriented dialogue driven by digitalisation on 23 November 2021.



Workshop Chair: Dr. Morioka Takehiro
APMP Executive Committee Member

Topics that featured prominently on the agenda are:

Topic 1: How is digital transformation changing NMIs?

Topic 2: Key areas of digital transformation for APMP

Topic 3: Regional collaboration in metrology for digital transformation



Dr. Takashi USUDA
Director General, NMIJ /
CIPM Secretary



Mr. FANG Xiang
Director, NIM, China /
APMP Chairperson



Dr. Hyun-Min Park
President,
KRISS



Ms. Ajchara Charoensook
Director,
NIMT



Dr. Cui Shan
Scientist III,
NMC, A*STAR



Dr. Blair Hall
Principal Research Scientist,
MSL



Mr. Mark Kuster
Chair,
NSCLI 141 Measurement
Information Infrastructure &
Automation Committee
(MII&AC)



Dr. Sascha Eichstädt
Convener, EURAMET TC-IM Working Group
'Metrology for Digital Transformation' (WG M4D) /
Head of Dept. Metrology for
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Chair of IMEKO TC6 "Digitalization"



Dr. Héctor Laiz
Research Director of
Metrology, INTI,
Argentina /
CIPM Member



Ms. Chang Kwei Fern
APAC Chair /
Director, SAC,
Enterprise Singapore

Discussions at the Workshop centred around the above topics, with each one dedicated to particular perspectives on high-level strategic insights from APMP NMI directors focused on NMIs' conscious attempts and efforts, technological frontiers that NMIs were preparing for digital transformation from technical experts, and observations, experience and knowledge from invited RMOs and SRBs. The reports are accessible on the APMP website.

Digital transformation is changing NMIs. This Workshop, in particular, aimed to discuss the work plan of the APMP DXFG, which regarded engaging with stakeholders to identify and prioritise the challenges posed by digital transformation, initiating capability development and establishing suitable digital infrastructure as its initial plans. Since the DXFG was officially approved by the 37th APMP GA, APMP has committed itself to bring its members onto the new journey towards digital metrology, to "leave no one behind", and to let members engage in, benefit from, and contribute to the exciting digital revolution.

APMP COVID-19 Response Programme Continued

The APMP COVID-19 Response Programme launched in June 2020 marks APMP's dedicated efforts to fight against the pandemic. This Programme aims to encourage and support all scientific, technical, knowledge transfer or capacity building activities that will directly improve members' measurement capabilities needed to fight against the COVID-19 pandemic.

In addition to the USD 250 000 budget allocated for FY 2020 and FY 2021, USD 100 000 was allocated for FY 2022 to provide consistent support to the programme. Calls for proposals are constantly open and evaluation of projects is conducted every three months.

The table below lists the projects approved so far.

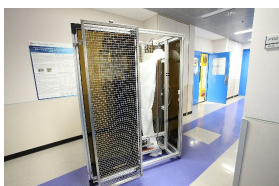
Projects approved

(2020) Possible Metrological Supports for COVID-19 Crisis Management
(2020) Comparison Measurement and Training Courses on the Ventilator Tester
(2021) Investigation of the Human Speech/Cough Droplet Size Measurement and Comparison for COVID-19 Infection Control
(2021) Accurate Measurement of SARS-CoV-2 and Development of Nucleic Acids Reference Material
(2021) Establish and Validate National Capabilities to Support the Growth in Use of Thermal Imagers for Public Thermal Screening

Possible Metrological Supports for COVID-19 Crisis Management

In the effort to fight against the COVID-19 pandemic, it is also very important to protect the medical personnel, nurses and hospital staff who are at high stake of infection caused by medical treatment of patients.

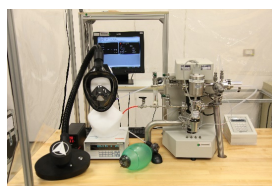
The project titled "Possible metrological supports for COVID-19 crisis management" overseen by NIMT (Thailand) was designed to improve measurement capabilities for PPE suit and PARP in response to the pandemic among APMP member economies, meeting the needs of stakeholders in hospitals and raising their awareness of metrology in combating the pandemic, and sharing knowledge to support APMP member economies in the pandemic control.



Non-destructive testing for medical PPE suit to verify its readiness



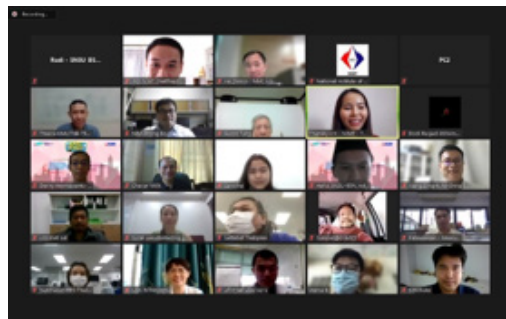
Prototype of Open Source DIY Positive Pressure Powered Air-Purifying Respirator and Its traceability in pressure testing



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Comparison Measurement and Training Courses on the Ventilator Tester

The COVID-19 can impair patients' lung function and lead to severe respiratory symptoms, to which ventilator is a crucial medical device used in hospital. The project titled "Comparison measurement and training courses on the ventilator tester" led by APMP Medical Metrology Focus Group (MMFG) is designed to build up developing economies' measurement capability in ventilator tester within the region. With about 12 participating APMP member institutes, this project is composed of comparison measurement to verify existing methods for calibrating the ventilator tester, drafting of a guideline for calibration, and calibration training to APMP developing member institutes.



A subset of participants of MMFG meeting

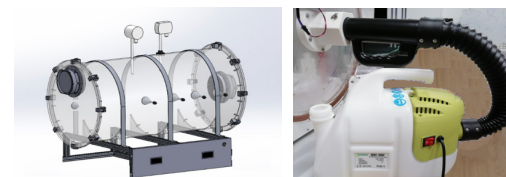
In July 2021, NIMT (Thailand), NIM (China), MHESI (Ministry of Higher Education, Science, Research and Innovation, Thailand), MMFG and DEC held *Webinar on the Technical Transfer of Medical Metrology for the Public Health Service System*, which focused on ventilator and ventilator tester, diagnostic ultrasound machines and tympanometer and otoacoustic emissions equipment. It benefited 120 participants from 8 NMIs and 40 Thai domestic stakeholders in hospitals, manufacturers and universities, etc. The webinar exemplified how to support, influence and connect with stakeholders related to medical metrology.

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Investigation of the Human Speech/Cough Droplet Size Measurement and Comparison for COVID-19 Infection Control

COVID-19 virus has been reported to be possibly spread in part by infectious droplets and aerosols produced when infected individuals cough, sneeze or speak. It is important to study the droplet size distribution around a person after he/she coughs, sneezes or speaks loudly.



Droplet test chamber

Droplet generator

The project entitled "Investigation of the human speech/cough droplet size measurement and comparison for COVID-19 infection control" is overseen by NMC, A*STAR (Singapore), with five participating APMP member institutes. The project aims at conducting droplet size measurement with traceability, developing standardized methodology for droplet size measurement, investigating uncertainty in droplet size measurement via metrology standards, and conducting the world-first inter-NMI comparison on droplet size measurement. Currently the comparison protocol and the test chamber with a droplet generator have been developed, with the comparison ongoing.

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Accurate Measurement of SARS-CoV-2 and Development of Nucleic Acids Reference Material

As for combating the COVID-19 pandemic, the earlier the rapid and accurate detection is put in place the more effectively the transmission will be cut off, to which the SARS-CoV-2 nucleic acid plays a crucial role. However, many APMP developing member institutes are facing challenges developing reference materials for the traceable accurate measurement of the virus.

The project titled "Accurate measurement of SARS-CoV-2 and development of nucleic acids reference materials" was overseen by NIM (China), with five participating institutes. It was designed to build up the capabilities of APMP DEC member institutes in providing traceable measurement of SARS-CoV-2 to fight against the COVID-19 pandemic and prepare for future potential

pandemics. Under the project, in July 2021 NIM and HSA jointly hosted the webinar on *Accurate Measurement of SARS-CoV-2 and Development of Nucleic Acids Reference Materials*, where LGC, NIST, KRISS and NIM experts delivered reports on topics, including principles and international standardization guidelines for PCR testing, development of SARS-CoV-2 nucleic acid reference materials, etc. The webinar has benefited 118 participants from various APMP developing member institutes. Currently, there is an ongoing post-workshop learning exercise, in which APMP DEC member institutes can apply the methods learnt from the Webinar to measure the reference sample distributed by NIM and compare their results.



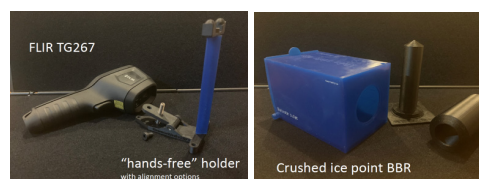
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Poster of Workshop

Establish and Validate National Capabilities to Support the Growth in Use of Thermal Imagers for Public Thermal Screening

Thermal screening has been widely adopted across the world as an important control measure for controlling pandemics, both for the current COVID-19 pandemic, and previous pandemics such as SARs, MERS and ZIKA. It was also identified as a priority in the recent FGMM and MEDEA surveys.

The project titled “Establish and validate national capabilities to support the growth in use of thermal imagers for public thermal screening”, with NMIA (Australia) and NMC,A*STAR as the project overseers and 15 participating economies, was designed to deliver two objectives. One is to provide participants with familiarity and expertise with thermal imaging screening standards to engage meaningfully with their local medical stakeholders. And the other is to help build up the capabilities of NMIs from the developing economies in evaluation of thermal imagers for body temperature screening. It is worth noting that this project brought up a new concept, that is, creating optimal remote access and knowledge exchange (ORAKLE) in radiation thermometry using 3D printing.



ORAKLE-action pack items

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For more details of the above projects please refer to the reports at <http://www.apmpweb.org/ga/document.php> – GA 2021 online – COVID-19 project progress reports.

Enhancing Sustainability of TCI/FGI Projects

COVID-19 has substantially affected the TCI and FGI Programmes, bringing a halt to almost all projects in progress and a curb to potential proposals. A few recommendations were made at the EC and Committee Chairs’ Meeting to enhance the sustainability of the TCI/FGI Programmes.

Increasing opportunities for better communications through online meetings or workshops by:

- adding an agenda item to TC/FG meetings for discussion of new proposals,
- naming Champions to lead the discussion for initiating TC/FG projects during the TC/FG regular meetings, and
- collecting and surveying regularly ideas/topics through members, where the survey results will be provided to TCs and FGs to initiate TCI/FGI proposals accordingly;

Ensuring TCI and FGI projects transparency by:

- making past project outcomes available to members, and
- selecting successful TCI/FGI projects as examples for circulation and promotion;

Enhancing flexibility of executing TCI and FGI projects under pandemic impacts by:

- holding online workshops/trainings as the preferred format if the pandemic is still a concern for member economies, and
- allowing more flexible ways to use the budget during the time when travel is not possible.

Guidelines on Financial Support for Equipment Leasing by DEC Members

At the 37th APMP General Assembly, a document was approved to provide guidelines for APMP member institutes in developing economies who require financial support for leasing of equipment.

Many less developed NMIs in the Asia Pacific region lack laboratory instruments and consequently cannot participate in APMP's capability activities. As a generic rule, APMP budget does not support capital investments of an individual member institute. In this case, equipment leasing may serve as an interim measure to assist institutes in acquiring an equipment expeditiously, in order to thrust the institute's capability building to meet urgent needs for metrological services due to a widespread threat or crisis such as the COVID-19 pandemic.

At the 66th meeting of the APMP Executive Committee (EC) in June 2021, the EC endorsed in-principle that APMP would support developing member economies' leasing of instruments that are necessary for them to participate in APMP-funded projects. The guidelines provide for lease period, coverage of contract, payment, considerations for financial support, and annual budget. An upper limit of USD 50 000 was set as the amount available to support one or more leased items per year, and USD 10 000 can be granted to one institute for annual leasing fees.

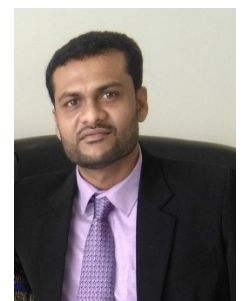
In the light of the COVID-19 pandemic, this action will help APMP member institutes in developing economies to acquire equipment for projects that allow capability building to improve their domestic laboratories' capacity to tackle the crisis or meet their domestic stakeholders' needs.

DEC Highlights

Progress on work programs of the DEC over 2021 was inevitably affected by the continuing impact of the pandemic on all of APMP members. Nonetheless achievements over the year included:

- Joint organisation of planning workshops under MEDEA focusing on the UN Sustainable Development Goals: Health; Water; and Economic Growth/Industry, Innovation and Infrastructure;
- A series of webinars on "SI units: Practical realization and how to assure measurement traceability", covering the kelvin, kilogram and metre, organised by Dr. Jariya Buajarern, the DEC Future Proofing Task Force Lead and supported by APMP's technical experts/TC Chairs;
- the first Workshop of the DEC CMC Task Force in December, aimed at member institutes without CMCs and strongly supported by APMP's Lead TC Chair and APMP experts; and
- the soft launch of the [MEDEA APMP-APLMF Web Portal](#) – the website aimed at external stakeholders using case studies and success stories to highlight the importance of metrology.

A key outcome from the annual DEC meetings in November 2021 was the election of the next DEC Chair. Mr. S D I Dias, Deputy Director of the Measurement Units, Standards and Services Department (MUSSD), Sri Lanka, was elected and will take up his term as DEC Chair during the 2022 APMP meetings.



In addition, Ms. Thanakporn Nontachart from NIMT, Thailand, has taken on the leadership of the CMC Task Force; and Dr. Achaya Teppitaksak from NIMT and Mr. Zainal bin Hj Mustapa from NMIM, Malaysia have taken over from Dr. Angela Samuel as APMP and APLMF Co-Convenors of the MEDEA Web Portal Working Group.

Over 2022, the DEC will continue to deliver on the work programs of the Task Forces, working with the EC, Lead TC Chair, TC and FG Chairs, as well as contribute to implementation of MEDEA activities. The DEC Chair (Angela), with the DEC Coordination Committee (Mrs. Gao Wei, NIM, China, Mrs. Ajchara Charoensook, NIMT, Thailand, and Dr. Ghufron Zaid, SNSU-BSN, Indonesia) and the APMP Treasurer (Dr. Teo Tang Lin) will also be engaging with APMP members through consultations to seek views on the proposed revisions to APMP’s membership fees and classification structure.



A subset of participants in the 2021 DEC meetings

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Progress of MEDEA 3.0

The MEDEA 3.0 project funded by the German Government started in May 2021. Since then, three virtual planning workshops with APMP as well as APLMF members took place, having the overarching topics health, water and economic growth, industry, innovation and infrastructure.

Following a kick-off workshop, developing economies of both networks have been asked to apply the World Bank Group and PTB’s Rapid Diagnostic Toolkit on Metrology and Legal Metrology for the first time. The self-assessment instrument’s results will allow the participating economies and the project to monitor changes in metrology systems considering the economies’ service delivery and technical competency as well as external relations and recognition. Another two applications of the self-assessment are scheduled for the next two years.

In addition, a programme to promote the skills of DEC task force leaders within APMP is ongoing. Participants receive training on their role, virtual collaboration tools and individual coaching for their tasks as well as peer counselling.

A webinar series on “How to write metrology case studies” was conducted and resulted in 6 case studies that are published on the joint APMP and APLMF metrology portal (<https://metrologyasiapacific.com/>).

In the coming months, the project will further support the work of the DEC Task Forces, the development of policy briefs on metrology in the areas of health, water and industry, the development of technical trainings and ELearning material.

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21st NMI Directors and Member State Representatives Meeting

The 21st NMI Directors and Member State Representatives meeting was held online from 11:00 to 13:00 (UTC) on 20 and 21 October 2021. The meeting was successfully hosted by KRISS, NIM and NMIJ on behalf of APMP. It was composed of the following three sessions:

- Reporting from the CIPM, BIPM and State Representatives Working Group (SR-WG)
- SI redefinition, Now and Future
- COVID-19

At the beginning of the session “Reporting from the CIPM, BIPM and SR-WG”, Dr. Takashi Usuda, CIPM Secretary, gave an introduction to the meeting. Then reports from the CIPM by Dr. Wynand Louw, CIPM President, and from the BIPM by Dr. Martin Milton, BIPM Director, were given. Dr. Robert Gunn and Dr. Daniela Arruda Benjamin, SR-WG Chairs, reported the feedback from SR-WG.

At the session of “SI redefinition, Now and Future”, three invited speakers made presentations. A lecture on progress in the realization of the new definition of the kilogram was given by Dr. Michael Stock of BIPM. Dr. Barbara Goldstein of NIST talked about quantum-based standards and trends including the NIST on Chip program. Dr. Noël Dimarcq, CCTF President, made presentation on study towards a new definition of the second.

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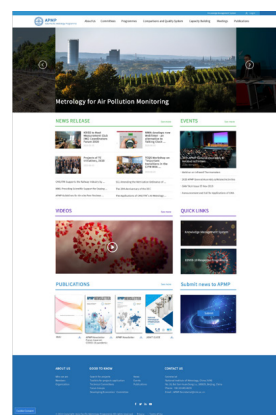
The topic of the third session was COVID-19. The result of the survey on the pandemic impact on NMI activities was reported. The survey was conducted online or via email in the period between 5 August and 10 September 2021 in advance of the meeting, targeting NMIs and related institutes of the Member States to the Metre Convention and Associate States and Economies of the CGPM. The questionnaire survey results which summarized answers from 47 institutes including 11 APMP institutes showed that most of the institutes were affected by the pandemic. It was found that NMIs had taken measures not to stop the supply of standards and traceability even under the pandemic, which they consider as the most important and essential role. Then activities and experiences during the pandemic, for example, online peer review, accreditation, and utilization of metrology for economic recovery, were introduced.



Dr. Park (KRISS), Dr. Yang (NIM) and Dr. Akoshima(NMIJ) hosted the meeting

APMP New Website on the Way

Since APMP secretariat launched the APMP website renovation, substantial progress has been made. A demo of the new website was developed and presented to the 37th General Assembly. The brand new website is designed to serve as a user-friendly, interactive and informative platform for smooth information and knowledge sharing among APMP members and to demonstrate APMP’s work as a regional metrology organisation to its stakeholders. The demo has been circulated among APMP member institutes and is expected to be updated and finalized by March. It is planned that the new website will be finished with respect to technical construction by May and be officially launched in July.



Homepage of new website (demo)

Greetings from Chairperson-elect and New TC Chairs



Chairperson-elect
Dr. Hyun-Min Park
KRISS, Korea

Greetings from Korea!

I wish everyone a happy and healthy New Year.

It is my great honor and pleasure to be elected the next APMP Chairperson. Taking this opportunity, I would like to thank APMP colleagues for the trust and support you have placed in me.

Standing on the starting line of the New Year and the new position as Chairperson-elect, I feel expectations and pressure at the same time. Numerous challenges and changes, such as COVID-19 pandemic or Digital Transformation, emerge at both the regional and global levels. The roles and responsibilities of NMIs are getting more important than ever before in order to overcome the era of great upheavals.

We may represent different countries, but we are aimed at one common mission, which I would like to remind you and myself at this point, 'To promote and support a measurement infrastructure in the Asia-Pacific region'. I will stand by side-by-side with all APMP friends as we move forward to achieve our common mission.

Again, I am delighted to be part of this amazing journey with APMP colleagues. I greatly look forward to working with you and hope to see everyone in person soon.



TCAUV
Dr. Yong Tae Kim
KRISS, Korea

Greetings to members.

The past two years have been a difficult time for the global village to hold their breath due to COVID-19, but TCAUV has made continuous efforts to develop. I would like to thank the former Chair Dr. Ryuzo Horiuchi, the group leaders, and all members for their great efforts.

In pursuit of advanced metrology in the fields of acoustics, ultrasound and vibration, I will endeavor to encourage and support the new challenges of our members.

In the near future, I hope that we will overcome the hardships of Covid-19 and bring health and happiness to our members' homes and workplaces.



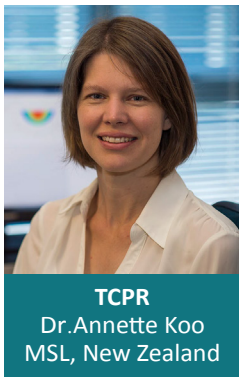
TCEM
Dr. MENG Yusong
NMC, A*STAR, Singapore

It is a great honour for me to be elected as TCEM chair, and also my pleasure to serve this warm and friendly big family with a lot of friends, peers and seniors, whom I have known from my first experience with APMP activities in 2013 as a junior researcher. Thanks to the great efforts of former Chairs and all the members, TCEM has made significant achievement in synergizing on-site peer review and intra-RMO review which shortens the CMC review process to help the members. As the new chair, I would like to take this great opportunity to work with all the members to promote not only the cooperation among TCEM members for new initiatives and comparisons, but also between TCEM and other TCs/FGs/DEC.

Finally, I sincerely wish you and your family a New Year filled with health, happiness and love. I am really looking forward to meeting you all in the future meetings after COVID-19.



It gives me immense pleasure to greet you all, the APMP community, as I, S.S.K.Titus, resume to the responsibility of TCM Chair for the next term. I would like to express my heartfelt gratitude to my parent organization National Physical Laboratory, India for nominating me to this position and would also like to express my sincere thanks to all the members who have placed their trust in me and electing me to serve the APMP fraternity in this capacity. I would also like to thank my predecessor, Dr. S.J.Chen, for his excellent leadership, particularly in promoting the inter-comparisons and introducing me to the various functions of this responsibility. I am honoured to have this opportunity and looking forward to learn much more from the APMP fraternity as we move forward in our mission of promoting and supporting the measurement infrastructures in the Asia-Pacific region which would ultimately enhance the quality of life and the environment. In this mammoth task, I am sure that I would get all the cooperation and support from the members to fulfill all the tasks associated with it to accomplish our vision. NPLI celebrated its Platinum Jubilee on the 4th January 2022, organizing a webinar on “Recent Trends in Metrology” in which Dr. K.Ogushi also delivered a talk and several others were present. I would like to thank you, on behalf of NPLI, for your participation and encouragement in that event.



Kia ora koutou | Greetings to you all. The photometry and radiometry community in our region is working hard to improve health and enable sustainable energy options while supporting industry and innovation, and I am proud to be a part of it. We face challenging times in which metrology can contribute to better outcomes for all the member economies of the APMP TCPR.

We have all been reminded in recent times of how much our individual well-being depends on our collective ability to respond in a unified way to issues as they arise. The measurement quality infrastructure is a critical component of our region's capacity to do this effectively. Over the next three years as chair of the APMP TCPR, I look forward to facilitating ongoing cooperation between all our members to grow our capabilities and improve our readiness to face future challenges.



It is my great honor to serve you all as the chair of the TCQM for the next three years. The TCQM has worked for the implementation and maintenance of the CIPM MRA with respect to chemical and biological measurement through carrying out regional comparison programs. The TCQM also has been acting as a forum for exchanging knowledge and information among members. In that way, the TCQM has helped the NMIs and DIs of developing economies to strengthen their measurement capabilities and their metrology service. Now the TCQM is one of the most active TCs in APMP. As the TCQM activities are getting stronger and the number of comparisons is increasing, I will do my best to strategically organize the TCQM activities. I would like to ask your collaborations.



I'm Hisashi Abe, NMIJ, have been working on humidity standards and measurement techniques for trace moisture using laser spectroscopy. I'm truly humbled and honored to be elected as the new TCT chair. I understand that a main goal of our activities is to get approval for CMCs and publish them in the KCDB. For this goal, we have comparisons, review protocols, review tasks, and so on. I'd like to give it my best shot to help every TCT member smoothly achieve this goal. I'm looking forward to working with you.

2021 APMP Awards

Due to cancellation of the in person GA 2021, APMP awards of 2021 cannot be presented in the traditional APMP Award Ceremony but are presented locally by the recipients' institutes. We release the photos and the acceptance speech here as a way to congratulate the award recipients of 2021.

APMP Award

Dr. Thomas Liew, NMC, A*STAR, Singapore

I am greatly humbled and honored to receive the APMP Award. Thank you for the privilege and opportunity to serve and to work with APMP colleagues on the many interesting programs over the years. Your warm, generous, and collaborative spirit makes APMP a great and attractive environment to support each other in developing metrology capabilities in a region of growing world trade and manufacturing. It is great to see initiative like the Focus Groups grow and evolve into a useful collaborative platform to address regional grand challenges.

Special thanks too to my ASEAN colleagues, especially Professor Prayoon Shiowattana and Dr. Sivinee Sawatdiaree, my partners in crime in establishing the ASEAN Expert Group on Metrology. We had a lot of fun figuring out how to progress metrology to support the ASEAN Economic Community vision.

Last but not least, this award is possible due to the unwavering support of colleagues at ASTAR NMC and the HSA.



APMP Young Metrologist Prize

Dr. Xiang Ding, NIM, China

Thank APMP for awarding me as the 2021 APMP Young Metrologist and it is my great honor to receive this award. I would like to give my sincere gratitude to Mr FANG Xiang, director of NIM and Ms LIU Wenli, director of Center for Medical Metrology of NIM for offering opportunities and supporting young scientists like me. Since I joined NIM in 2009 and joined the big family of APMP in 2014, I have received continuous help and support from many colleagues and friends. I would also like to give my appreciation to them all and share with them the pleasure and honor of receiving this award. We have been experiencing a tough time since early 2020 but we are staying together closely to fight against COVID-19. I am inspired and happy to contribute my effort to such a great organization in this fight and support each other with all APMP members. Let's fight together and we will defeat it!



Ms. Pui Sze Cheow, HSA, Singapore

Thank you for granting me the Young Metrologist Award. I would like to express my utmost gratitude to the APMP Executive Committee and the APMP Award Advisory Committee. I am truly honoured and humbled to have been selected for this distinguished award.

I am particularly indebted to the HSA Senior Management for the nomination. Although I am receiving this honour, the award truly belongs to my former and current bosses, and the excellent teams that I have worked with at various phases of my career. I would also like to express sincere thanks to colleagues from our counterpart metrology institutes for their kind support and opportunities.

Receiving this award will bolster my confidence and efforts as a Metrologist to contribute even more to the metrology community, as well as our local and regional stakeholders.

Thank you APMP again for this recognition.



APMP Award for Developing Economies

Dr. Sutthinun Taebunpakul, NIMT, Thailand

I feel deeply honored to receive the 2021 APMP Award for Developing Economies, and to work in collaboration with colleagues from the Asia-Pacific region. I do have many people to thank who have made it possible for me to receive this; most of whom have been colleagues at one time or another, all of whom have made important contribution to life.

Life is like a mirror. When you knit your brows, the mirror looks unpleasant. If you keep smiling, it reflects nicely in return. As long as you wish to see smiling in mirror rather than being stressful and you desire to develop yourself, it will empower your mind to achieve your dream as your imagination. Likewise, as metrologists, when we are happy to build and share measurement capabilities, we all have high hopes in common of ultimate goal for the benefit of mankind.



APMP Technical Activity Award

Dr. Jan Herrmann, EC member (2017 GA - 2021 GA), NMIA, Australia

I feel very privileged to have had the opportunity to contribute to the important work of the APMP Executive Committee, and I have greatly benefited from the experience and the collective wisdom that my APMP colleagues have shared so generously. I have thoroughly enjoyed working with such a great group of colleagues at our many meetings, in person and online, and also sharing some wonderful times at social occasions in a number of beautiful places across our region. I am very grateful for that experience and learnt much from it. It will be great to see APMP continue to strengthen its engagement with stakeholders in industry and the community and to support its member institutes and their economies, be it in current areas of focus such as supporting the pandemic response and recovery, and in pursuit of new opportunities such as in digital transformation. I wish APMP much success in that important work, and I hope to be able to continue contributing in some way.



Dr. Yon-Kyu Park, EC member (2017 GA - 2021 GA), KRISS, Korea

My first APMP attendance was in 2002 to win the APMP young metrologist prize, at that time lizuka prize. The winning the prize influenced me so much in terms of measurement standards and international cooperation.

My career can be developed together with the APMP, therefore I always thank to APMP.

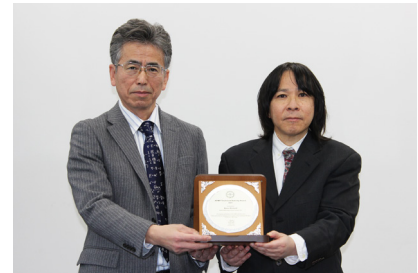
My role in the EC was the liaison between the EC and TC as well as the FG for climate change and clean air. I was so happy to support the TCs' and FGs' activities, mainly by operating the TCI and FGI program. I'd like to thank to TC chairs and FG chairs for their contribution to APMP.

With the closing my 4 years' term as an EC member, APMP granted me an APMP Technical Activity Award. I'd like to express by sincere gratitude to all APMP members for giving me an opportunity to work for APMP and giving me the valuable award.



Dr. Ryuzo Horiuchi, TCAUV Chair (2018 GA - 2021 GA), NMIJ/AIST, Japan

I am indeed honored to serve as TCAUV Chair for three years and receive an APMP Technical Activity Award. I appreciate TCAUV members, TC Chairs, Lead TC Chairs, EC members, APMP Chairs and Secretariats, and hosting NMIs for their kind supports during my term. It was very fortune that I could talk with friendly APMP colleagues. I would like to thank TCAUV colleagues, especially pilot NMIs of key-comparisons, overseers of TCI projects, and members of WG on CMC review for their great efforts. TCAUV is relatively small community, and it is not unusual that the same person takes several roles. I also would like to thank Dr. Kang, Dr. Samuel, and Ms. Weigelt for supporting realization of the sound level meter project. I hope I can continue to work with APMP colleagues for further development of APMP. Best wishes to APMP.



Dr. Hyung-Kew Lee, TCEM Chair (2018 GA - 2021 GA), KRISS, Korea

First, I would like to thank the APMP Chairperson and all the EC members for this award. I also would like to appreciate the help from APMP secretariat. It has been great honor for me to contribute to APMP as a TCEM chair for the last three years. The transition to KCDB2.0 and management of peer reviews in the middle of pandemic have not been easy. Despite these difficulties, TCEM managed to complete six CMC reviews with the help from review board members. I really feel grateful to them for their support. Finally, I would like to congratulate Dr. Meng Yusong on being the next chair. I am sure that he will do his job better than me. I hope that next year will be better for all of us.



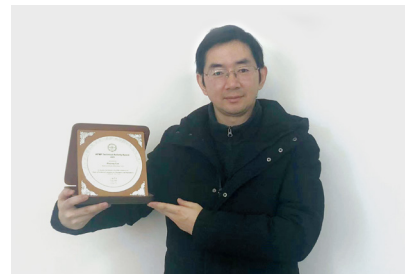
Dr. Sheng-Jui CHEN, TCM Chair (2018 GA - 2021 GA), CMS/ITRI, Chinese Taipei

I am so honored that I had this opportunity to serve as the TCM chair, and return my tiny efforts to the TCM, such a big family. I am very grateful to my institute CMS/ITRI for all the support during my term. I'd also like to thank APMP Chair, Secretariat, EC members, TC Chairs, Lead TC Chair and DEC chair for your guidance and support. I feel very fortunate to be able to work with so many of you talented people, I can always learn something from you during every meeting, tea break chat and most importantly the Karaoke GA dinner. Finally, I want to congratulate Dr. Titus from CSIR-NPL India the new TCM chair, I trust that you are our right choice and I feel confident (and happy) to pass all the chair's burden to you now. All the best to APMP and TCM.



Dr. Haiyong Gan, TCPR Chair (2018 GA - 2021 GA), NIM, China

Serving as the chair of the technical committee of photometry and radiometry is a wonderful experience in my career. It's such an honorable and serious mission to lead the work of promoting the knowledge sharing, the comparisons, the strategic planning, as well as the harmonic friendship with regional experts in the field of optical measurement and beyond. Thanks to all my colleagues who maintained their professionalism and enthusiasm so that everything works out smoothly and successfully in spite of the COVID-19 pandemic. It's amazing that over one hundred CMCs submitted from many NMIs have been approved for JCRB review. I'll only regret that I couldn't go to Sydney due to injury so I've missed the chances to meet my colleagues in person for all past three years! However, we will finally meet again when the COVID-19 virus is beaten. And before that happens, I'll always be virtually with all my dear friends in APMP.



Dr. Kazumi Inagaki, TCQM Chair (2018 GA - 2021 GA), NMIJ/AIST, Japan

TCQM became one of the biggest TCs in APMP, and still be in grow-up for covering large chemical and biological metrology. We have a wonderful culture for sharing knowledge and experiences to build up our metrological capabilities, and I was very happy to contribute for the culture as the chair. Unfortunately, we have not had a face-to-face meeting due to COVID-19 pandemic, but I do believe that we will meet in real soon with happy smiles.



Dr. Inseok Yang, TCT Chair (2018 GA - 2021 GA), KRISS, Korea

It has been my privilege and honor to work as the APMP TCT chair for the past three years. I thank all members of the TCT and the leadership of the APMP for working with me during my term. During my term as the TCT chair, KCDB 2.0 was launched, and we needed to adapt to this new system. Also, there has been the global pandemic that changed the way we meet. These have been challenging tasks, but I am very glad and grateful that, with the help from all of you, I was able to hand over the chair of the TCT to the good hands of our next chair, Dr. Hisashi Abe of NMIJ/AIST.



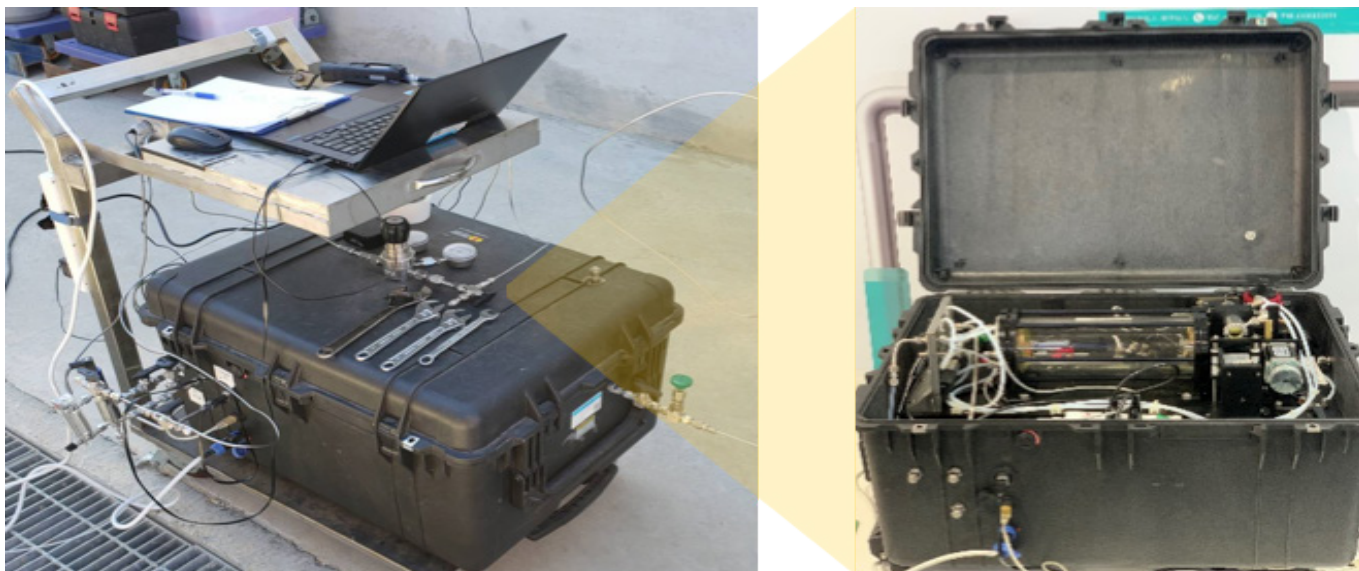
News from Members

CMS/ITRI's Innovations to Support Advanced Process of Semiconductor Manufacturing

To support the demands from advanced process of semiconductor manufacturing, Center for Measurement Standards (CMS) / Industrial Technology Research Institute (ITRI) has developed novel techniques to solve the technical challenges and increase the yield rate in manufacturing processes. The innovations include “Purity Analysis of Gases” and “EUV optical radiation measurement technology”. Those outcomes have been demonstrated in “SEMICON Taiwan 2021”.

Purity Analysis of Gases

The purity analysis of gases can be applied for trace-moisture measurement, FTIR (Fourier-transform infrared spectroscopy) analysis, and mass spectrum analysis. For trace-moisture measurement, the optical cavity ring-down spectrometer (CRDS) traces to the trace-moisture primary standard which is at ppb level; for FTIR analysis, characteristics of gas molecules absorbing different specific infrared light wavelengths are applied to identify the impurity; for mass spectrum analysis, unknown impurities can be identified by specific mass-to-charge ratio (m/z) ions through electron impact.



The mobile system of Gases Purity Analysis which can provide on-site service

EUV Radiometry Measurement Technology

In order to cope with local semiconductor industry in developing advanced lithography techniques, CMS/ITRI initiated to establish EUV radiometry-related measurement and calibration capabilities, starting with spectral responsivity calibration for EUV detectors. The technology can be applied for developing the key module of advanced semiconductor and EUV lithography. Also, it can be applied for evaluating the EUV photoresist and developing the advanced semiconductor materials.

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Calibrated Phasor Measurement Unit as a Metrological Tool for Real Time Monitoring of Indian Smart Grid

Around the world, the smart grid concept has gained momentum to tackle the current scenario as it helps control, monitor and analyse the power requirements, which in turn increases overall efficiency and stability. Today's smart grid relies on phasor measurement units (PMUs) to deliver real-time critical data on the voltage, current, frequency, and phase, mainly within the power grid. To ensure reliability and accuracy of the acquired data, PMUs must be calibrated from a traceable PMU calibrator system. The recently installed CSIR-NPL Phasor Measurement Unit Calibration System (PMU-CAL) as shown in Fig.1 can provide perfect solutions for PMU users, manufacturers, electrical power utilities, and organizations associated with electrical power transmission.



Fig.1: CSIR-NPLI Phasor Measurement Unit Calibration System (PMU-CAL)

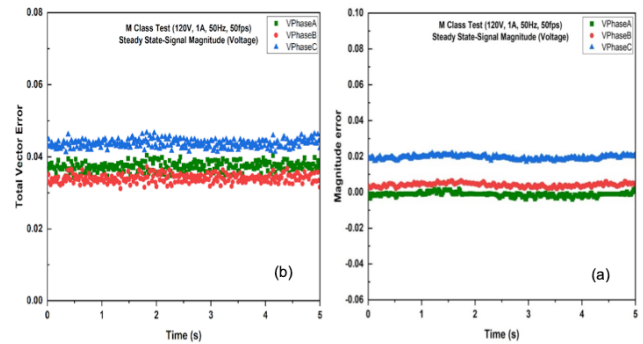


Fig.2: (a) Total Vector Error and (b) Magnitude Error of M class Test

The PMU-Cal system can produce multiple complex signals, including harmonics and inter-harmonics. Using this system, one can generate precise voltage and current stimulus up to six digits with accuracy better than 50 ppm. This feature gives us the flexibility to calibrate PMUs by different manufacturers. Fig.2 shows the total vector error (TVE) and magnitude error of measurement class signal magnitude tests run at 50 frame rates per second at 50Hz frequency. Calibrated PMUs will be an essential and reliable tool to provide more intelligent monitoring, control and protection for the smart grid. The PMU-CAL system installed at CSIR-NPL is traceable against the respective national standards. The time taken to calibrate a PMU has been reduced to a few hours, in contrast to the traditional technique that takes more than a week with skilled manpower. The CSIR-NPL PMU calibration system has an uncertainty of $\pm 0.005\%$ to $\pm 0.010\%$. The automated PMU-CAL system fully complies with the IEC/IEEE 60255-118-1:2018 standard. Calibrated PMUs will provide intelligent monitoring, control and protection for the smart grid. This will increase efficiency, improve reliability and enhance the quality of the power grid.

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A Growing Number of Optical Clocks Steer International Atomic Time

The International Bureau of Weights and Measures collects data from more than 450 microwave atomic clocks worldwide to secure the stability and reliability of the *International Atomic Time* (TAI). Ensuring that its scale interval matches the SI second as accurately as technically possible relies on calibrations by a much smaller number of *primary* and *secondary frequency standards*. Primary standards directly probe the defining cesium transition and have played the dominant role since this definition went into effect in 1967, while secondary standards use different transitions.

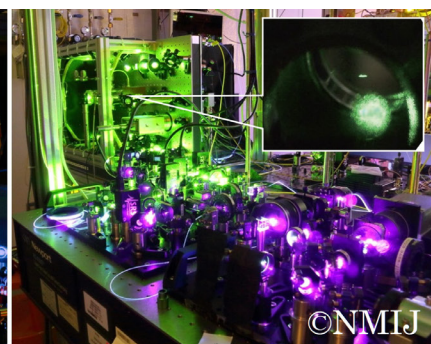
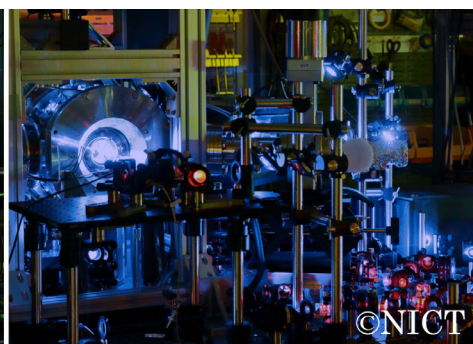
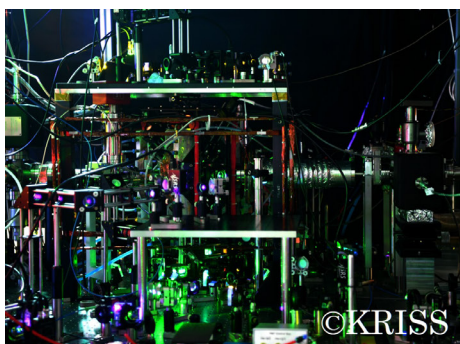
Optical frequency standards, implemented as optical lattice clocks or trapped-ion clocks, have progressed to reach uncertainties close to 10^{-18} [1, 2], surpassing the primary standards by two orders of magnitude. Consequently, CIPM has tasked its *Consultative Committee for Time and Frequency* (CCTF) to explore a redefinition of the SI second. A roadmap to this redefinition lists several mandatory criteria [3], including regular contributions of optical standards to TAI, with a goal of three contributing clocks per month and measurement uncertainties no larger than 2×10^{-16} .

So far, three strontium optical lattice clocks and four ytterbium optical lattice clocks have been recognized as optical secondary standards for contribution to TAI (Table 1). The APMP laboratories KRISS, NICT and NMIJ play leading roles: The large uptimes reported by KRISS and NMIJ demonstrate the reliability of optical standards, with NMIJ repeatedly reporting more than 90% availability. In December of 2021, NICT first reported an uncertainty below the 2×10^{-16} goal of the roadmap. All three institutes contributed simultaneously in November and December, where the number of calibrations reached an all-time high [4].

The growing number and diversity of reports make the steering of TAI more accurate and reliable, and the good agreement of results (Fig. 3) supports the CCTF’s latest plans for a redefinition of the SI second in 2030 [4].

Table 1: Optical clocks contributing to TAI

Institute	Country	Secondary standard	First TAI contribution
SYRTE	France	SYRTE-Sr2, SYRTE-SrB	2017
NICT	Japan	NICT-Sr1	2018
NIST	USA	NIST-Yb1	2019
INRiM	Italy	IT-Yb1	2019
NMIJ	Japan	NMIJ-Yb1	2020
KRISS	Korea	KRISS-Yb1	2021



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- [2] M. Samuel *et al.*, Phys. Rev. Lett **123**, 033201 (2019)
- [3] N. Dimarcq, “Task Force on the Road map for the redefinition of second”,
at www.bipm.org/en/committees/cc/cctf/22-1-2020 (2020)
- [4] BIPM, “Record number of frequency standards contribute to International Atomic Time”,
at www.bipm.org/en/-/2021-12-21-record-tai (2021)
- [5] BIPM data available at <https://www.bipm.org/en/time-ftp/circular-t>
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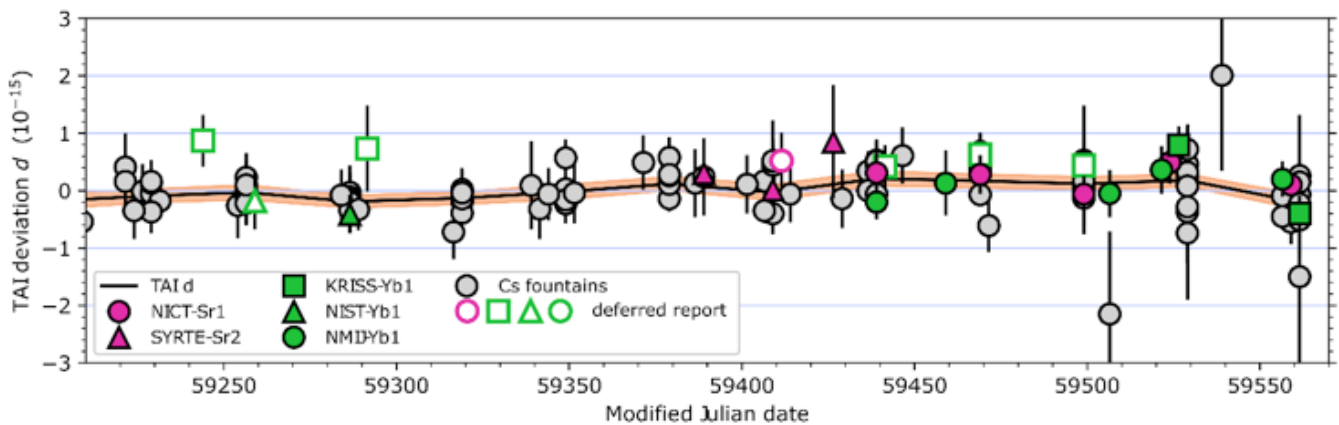


Fig. 3: The TAI scale interval in relation to the SI second in 2021, evaluated by the optical secondary standards KRISS-Yb1, NICT-Sr1, NMIJ-Yb1, NIST-Yb1 and SYRTE-Sr2, and by the contributing cesium fountains [5]. For optical standards, full symbols (colored for atomic species) show on-time evaluations, directly used for steering TAI. An open symbol is a deferred report, submitted with delay and thus with less weight in steering. Error bars do not include the uncertainties assigned to secondary representations of the second [6]

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Philippines Opens its First Metrology in Chemistry (MiC) Laboratory



Photo credits: ABRLazo, DRCruz, CBBembenuto, ARCVeranga

The Philippines' first and state-of-the-art Metrology in Chemistry (MiC) Laboratory was inaugurated last November 9, 2021. The inauguration ceremony was led by Department of Science and Technology (DOST) Secretary Fortunato T. de la Peña with Department of Trade and Industry (DTI) Secretary Ramon M. Lopez as guest of honor and keynote speaker.

The MiC Laboratory was established through a 5-year General Appropriations Act and Grants-in-Aid Program of DOST in 2017 entitled Enhancing the Capabilities of the National Metrology Laboratory (NML) of the Philippines with the Industrial Technology Development Institute (ITDI) as the implementing agency. Housed in a newly constructed 4-story building, the MiC Laboratory aims to provide local chemical testing laboratories easy access to reference materials (RMs) and accuracy-based proficiency testing (PT) schemes that are locally produced and conducted, respectively. The MiC Laboratory now boasts of producing several matrix RMs for contaminants and toxic elements in food

and water whose values have been obtained through higher-order methods using state-of-the-art equipment acquired through the said projects and are now publicly available for sale. The MiC Laboratory now also conducts accuracy-based proficiency testing schemes using test samples whose values are similarly obtained using higher-order methods.

The MiC Laboratory was established through the efforts of Dr. Benilda S. Ebarvia which later won her the 2019 APMP DEN Award for this pioneering work in the Philippines. Assisting her in this endeavor are chemists who have been trained at advanced NMLs of the APMP.

Through the establishment of this new facility, the MiC Laboratory is expected to cater to metrologically traceable chemical measurements, quality control and assurance needs of local chemical testing laboratories, manufacturing and export sectors, and regulators who enforce regulations on food safety and drinking water.

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National Metrology Center (NMC), A*STAR

Our Awards in 2021

Firefly Awards

The National Metrology Centre (NMC) of Singapore has achieved various awards under the Gold category of the Firefly Awards given by the Ministry of Trade and Industry (MTI) of Singapore in recognising the teams and individuals for the exemplified strengths in the respective areas as follows:

Dr. Ashhar Karalikkadan, Dr. Ng Wee Hoe and Dr. Shilpa Manandhar were presented the **Borderless Award** for their efforts of going above and beyond their duties by volunteering in the *Stronghold Diagnostic Lab (SDL)* project to setup a centralised testing facility to support nation efforts to ramp up COVID-19 testing capacity.

Dr. Kai Fuu Ming, Mr. Patrick Ng and Mr. Justin Sim Chek Kwang were presented the **Innovative Policy/Project Award** for their efforts of collaborating with organisations in the *Diagnostics Lab Automation for COVID-19 Testing (BRAVE/RAVE)* project to develop, build and deploy BRAVE/RAVE automation systems within a highly compressed timeline.

APMP Award Winner 2021

It is with our great honour for Dr. Thomas Liew, former Executive Director of the National Metrology Centre (NMC) of Singapore, to bag the APMP Award in 2021.

Dr. Liew began his active participation in APMP since 2011 GA, as Treasurer in the Executive Committee and Liaison to APEC, DEC, and TCMM.

His significant contributions include establishing cross-disciplinary FG initiative with significant budget to address regional metrology challenges, improve meeting effectiveness with poster presentations and resolve difficult banking matters.

As the founding chair/co-chair of the ASEAN EGM for 7 years, elected CIPM member in 2014 and a member of the Board of Directors of Metrologia, Dr. Liew involved actively to link the interest of APMP to the ASEAN and international metrology communities. He also worked with APMP to chair the 2021 SI in FAIR Digital Data Workshop.



Dr. Thomas Liew



Prof. Gregory Goh, Executive Director of NMC presented the award plaque to Dr. Liew

World Metrology Day 2021 Celebration in Singapore

Singapore commemorated the 2021 World Metrology Day on 20 May themed “Measurement for Health” with a Webinar to remember the importance of measurement roles in everyday life such as in health, and in the wellbeing of everyone.

The Webinar was co-organised by the National Metrology Centre (NMC) and Health Sciences Authority (HSA) of Singapore. We were very pleased to have Dr. Srinath Rajagopal of National Physical Laboratory, UK, to talk about metrology in medical ultrasound; and Professor Jim Huggett of National Measurement Laboratory at LGC, UK to discuss reference measurements for SARS-CoV-2 diagnosis. We were also grateful to Mr. Lim Seng Hoo from Cairnhill Metrology and Dr. Liu Qinde from HSA, to share about measurements for health and in clinical laboratories, and Dr. Wang Li from NMC to speak on non-contact body temperature screening. The event attracted about 300 world-wide participants and was very successful as judged from the many appreciations we received.

NPL Pre-Flight Satellite Calibration Facility for Underpinning Climate Missions

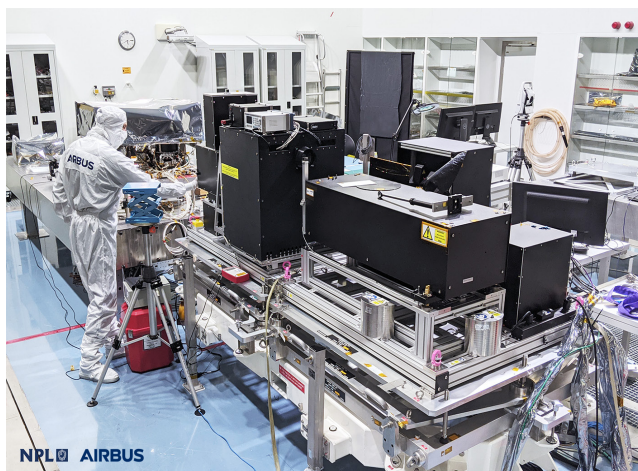
NPL has developed its STAR facility to aid UK and global Earth Observation missions, providing calibrated and characterised climate quality measurements. STAR-cc-OGSE, which stands for Spectroscopically Tuneable Absolute Radiometric, calibration and characterisation, Optical Ground Support Equipment, is a vital piece to the climate monitoring puzzle, conceived at NPL, to provide innovative solutions to the pre-flight calibration of satellite instruments.

The facility provides a state-of-the-art solution to instrument calibration and characterisation, ensuring the needed performance is achieved while also minimising the time and effort involved in the pre-launch vacuum test environment. In essence the facility combines together in a single transportable package, the contents of NPL radiometric calibration capabilities which normally occupy three laboratories at the Teddington site.

The STAR-cc-OGSE is fully traceable to NPL's primary radiometric standard, the cryogenic radiometer, and can provide unprecedented uncertainties well below 0.5% across a wide spectral region. The first mission that will utilise the STAR-cc-OGSE is the CNES/UK microsatellite – MicroCarb, a

mission designed to measure greenhouse gases.

If you'd like to know more about the MicroCarb mission, and NPL's contribution, a short video was made by the UK Space Agency & Space 4 Climate for COP26 <https://youtu.be/jYyoPjfw8to>. The STAR facility is the result of a partnership between the Scottish laser company M-squared lasers and NPL.



Future Meetings

APMP Midyear Meetings of 2022 will be held as virtual meetings in June.

The 38th GA and Related Activities in 2022 was prepared by NMIJ and may take the form of hybrid meetings. The final decision will be announced to members by April 2022.

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