MEDEA: Metrology − Enabling Developing Economies in Asia

BIPM-APMP CBKT Training on Timescale and Algorithms ("TTA2020")

1-3 July 2020 at Grand Sukhumvit Hotel Bangkok, Bangkok, Thailand

Registration by 20 March 2020

Introduction:

Realizing a national standard time is one of the most important tasks of NMIs. This training aims to support institutes to improve their national standard time, their national services in Time and Frequency metrology, and their contributions to Coordinated Universal Time (UTC) through participation in BIPM Circular T / Key Comparison CCTF-K001.UTC.

This is a joint APMP and BIPM Capacity Building and Knowledge Transfer (CBKT) initiative. It will be organized under the banner of the BIPM-RMO CBKT framework. The content and the training material are prepared in collaboration with the BIPM.

Objective:

This training is focused on upgrading the basic skill of NMIs in time scale realization.
- Basic knowledge for time scale generation, comparison, and algorithms for performance evaluation
- Better insight on some practical tasks in measurements, data analysis and evaluations
- Better relationship with the BIPM Time Dept and the other RMO time labs helping further interactions and common projects.

The program will cover the practical aspects that enable participants to get a basic knowledge about time scale generation, GNSS time comparison, properly measurement and evaluation of the data, and steering national time scale to synchronize with UTC.
The lectures will be followed by practical exercise to maximize the knowledge transfer. Each exercise is based on the development or use of open source software code that will be made available to the participants. Details can be seen in the timetable (last part in this document).

Expected participants

This training expects participants who are/will be in charge of operating national standard time and participating UTC, or already contributing but have encountered difficulties with data quality. Expected conditions for participants are as follows.

    a) Technical knowledge: participants should have basic knowledge of physics, mathematics, electro-magnetic engineering, and some experiences of measurement devices. They should have the sufficient knowledge to be able to generate a time
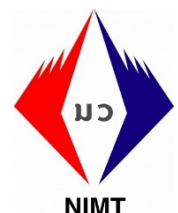
scale and participate to UTC through submission of the data to the BIPM. This training requires the attendees to bring personal PC. It also includes exercises by using Python code and "Stable32" software. Phyton (and necessary packages) and Stable32 should be already installed and working on each student PC.

b) Position held: Participants are/will be in charge of operating national standard time and participating UTC.

c) Level of English: Participants should understand a lecture and write a report in English.

If too many applications come, priority will be given to the laboratories that have never benefitted yet of a CBKT course, and those already submitting but facing data quality challenges.

Organizers*:*

1. Physikalisch-Technische Bundesanstalt *(*PTB*)*
2. Technical Committee of Time and Frequency (TCTF) of Asia Pacific Metrology Programme (APMP)
3. National Institute of Metrology (Thailand) (NIMT), Thailand

Supporting Organizations*:*

1. Bureau international des poids et mesures (BIPM)
2. LNE-SYRTE, Observatoire de Paris, Université PSL, CNRS, Sorbonne Université

Trainers and speakers:

1. Dr. Aimin Zhang, NIM, China
2. Dr. Dai-hyuk Yu, KRISS, Korea
3. Dr. Daniele G. Rovera, LYNE, France
4. Dr. Patrizia Tavella, Director of Time Department, BIPM,
5. Dr. Piyaphat Phoonthong, NIMT, Thailand
6. Dr. Shin-Yan Lin, TL, Taiwan
7. Dr. Yuko Hanado, NICT, Japan

PTB Support:

Up to one overseas participant from each developing economy in Asia can receive an economy return flight ticket, free accommodation and free airport transfer. Funded participants will receive breakfast, lunch and one welcome dinner as well as coffee breaks during the workshop. Participants from economies classified as developing countries under the OECD Development Co-operation Directorate (ODCD-DAC)[1] are eligible. Economies are required to consider contributing (if they can do so) to their expenses.

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[1] see http://www.oecd.org/dac/stats/daclist.htm. Eligible economies in Asia: Bangladesh, Bhutan, Cambodia, China, Fiji, India, Indonesia, Kyrgyzstan, Laos, Malaysia, Mongolia, Myanmar, Nepal, Pakistan, Papua New Guinea; Philippines, Sri Lanka, Thailand, Uzbekistan, Vietnam

Flight tickets will be booked directly by PTB on acceptance of your nomination form (please contact Anne Höpfner). The hotel will be paid directly by PTB.

Registration:

Please complete the attached **Nomination Form** and send it to the TTA2020 Secretariat and the Project Assistant anne.hoepfner@ptb.de at PTB by **20 March 2020**.

Venue and Accommodation:

- Training will take place at Grand Sukhumvit Hotel Bangkok in Bangkok, within walking distance to Nana BTS sky train station. Accommodation for participants will be booked by NIMT. To access the venue, you can take the airport limousine, sky train or other public transports to the hotel.

- If you need a visa to enter Thailand, fill in the attached "**Visa Assistance Form**" and send it to the **host in Thailand** by **March 20, 2020**.

- For more information please visit website: https://www.grandsukhumvithotel.com/index.html
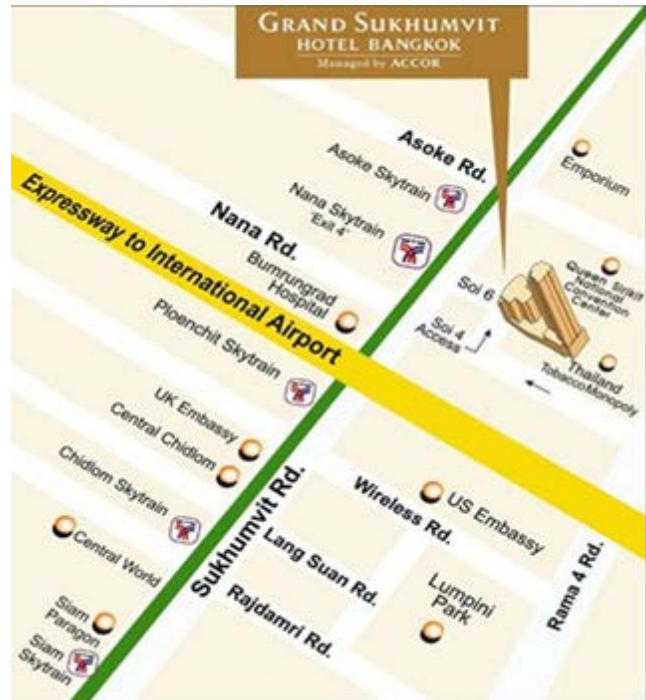
Location of the hotel

Currency and Credit Cards:

The local currency is Baht. Major credit cards (Visa, Master Card, etc.) are accepted in Hotels and big department stores. The exchange rate for 1 USD is about 31 Baht.

Climate:

Bangkok in July is monsoon season, which brings frequent but usually short bouts of intense rain. The average temperature is about 24°C - 33°C.

Electricity Supply:

Voltage of power supply is 220 volts AC with 50 Hz. The power plugs used in Thailand are A, B and C.

Plug and socket of Type A, B and C

Local Time:

UTC +7 without summer time

Contact Persons:

TTA2020 Secretariat

Dr. Yuko Hanado (Coordinator)
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PTB ⁄ MEDEA project (Registration, Flights, Hotel Reservations)

MEDEA Project Assistant PTB
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Host in Thailand (Visa assistance, Venue and access information)

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Program Draft (* plan of 12 February 2020)

	08:30 - 09:00		Registration
	09:00 - 09:15		Opening addresses
			Basic knowledge to realize a timescale
	09:15 - 10:30	L1	Generation of UTC timescale
	10:30 - 11:00		Coffee break
	11:00 - 11:30	L2	Realization of UTC(k)
	11:30 - 12:00	L3	How to design actual system
	12:00 - 13:00	L4	Example of actual UTC(k) systems
Day 1 Wednesday 1 July	13:00 - 14:00		Lunch
			Clock data analysis
	14:00 - 15:00	L5	Clock behaviour and model
	15:00 - 15:30	E1	Exercise 1: - Checking typical noise, training of Allan deviation estimation tool
	15:30 - 16:00		Coffee break
	16:00 - 17:30	E1	Exercise 1: - Checking typical noise, training of Allan deviation estimation tool
			Welcome dinner
			Time comparison of timescale
Day 2 Thursday 2 July	09:30 - 10:30	L6	Time comparison by GNSS
	10:30 - 11:00		Coffee break
			Measurement and data acquisition
	11:00 - 12:30	L7	Careful points in measurements, Errors, Calibration

	12:30 - 13:00	E2	Exercise 2: - Checking measurement data data retrieval, plotting, selecting, filtering, best fit
	13:00 - 14:00		Lunch
	14:00 - 15:00	E2	Exercise 2: - Checking measurement data data retrieval, plotting, selecting, filtering, best fit
	15:00 - 15:30	E3	Exercise 3: - Anomaly detection (outlier removal, jump in frequency)
	15:30 - 16:00		Coffee break
	16:00 - 17:30	E3	Exercise 3: - Anomaly detection (outlier removal, jump in frequency)
Day 3 Friday 3 July			Simulation of an ensemble timescale
	09:30 - 10:30	L8	Calculation process of averaged atomic timescale
	10:30 - 11:00		Coffee break
	11:00 - 13:00	E4	Exercise 4: - Computing an average timescale (simulation)
	13:00 - 14:00		Lunch
	14:00 - 15:30	E5	Exercise 5: - Supplementary training (grouping as different subject)
	15:30 - 16:00		Coffee break
			General framework
	16:00 - 16:30	L9	Regional framework
	16:30 - 17:00	L10	International framework
	17:00 -17:30		Closing address