

Minutes of the 2014 Meeting of the APMP
Technical Committee for Time and Frequency
Daejeon Convention Centre, Daejeon, Rep. Korea

22–23 October, 2014

Minutes taken by M. Wouters

I. Participants

In total, XX individuals representing 14 institutes in 13 economies participated in the 2014 meeting of the TCTF. The meeting was held in room 108 of the Daejeon Convention Centre on October 22 (full day) and 23 (half day), 2014.



KRISs	Korea	D.H. Yu
		???
MUSSD	Sri Lanka	R.G.S.A. Perera
NICT	Japan	Yasuhiro Koyama
		Yuko Hanado
		Miho Fujieda
		Ryuichi Ichikawa

NIM	China	Aimin Zhang
NIMT	Thailand	Narat Rujirat
NMIA	Australia	Michael Wouters
NMIJ	Japan	Feng-Lei Hong
		Masaki Amemiya
		Takeshi Ikegami
		Kazumoto Hosaka
NMISA	South Africa	Adriaan van Brakel
NML-SIRIM	Malaysia	Ahmad Sahar Omar
NPLI	India	R.C. Budhani (day 2)
Puslit KIM-LIPI	Indonesia	Ahmad Mohamad Boynawan
TL	Chinese Taipei	Chia-Shu Liao
		Huang-Tien Lin
		Wen-Hung Tseng
VMI	Vietnam	Nguyen Bang

II. Day 1 0900-1030: Chair's Report (Chair: Dr H.T. Lin)

A. Opening and adoption of the Agenda (H.T. Lin)

The Agenda as circulated prior to the meeting was presented and additions and amendments were invited; none were proposed. Dr Lin proposed that Dr Koyama chair the first session of the Tuesday meeting and Dr Koyama accepted. The agenda was adopted.

B. Chair's report (H.T. Lin)

1. 2013 meeting of the TCTF

The Chair summarised the main decisions of the 2013 meeting of the TCTF:

1. The CCTF position paper on CCTF-K001.UTC was considered and the consensus was that Circular T in its current form is fit for purpose.
2. Regarding GNSS receiver calibration, it was decided to: determine what NMIs are planning to join UTC; nominate a number of NMIs as Group-1 laboratories to BIPM; and organize a limited receiver calibration campaign as a dry run.
3. The TCTF was asked to consider suitable projects, and the WG co-ordinators were asked to communicate with their members to develop proposals more efficiently.
4. The WG coordinators were asked to collect information to assist with drafting a strategy for the TCTF; the WGOFM was asked to cover microwave frequency development and the WGMRA to cover time dissemination.
5. Dr Michael Wouters (NMIA) was approved as the TCTF Vice-Chair.

2. Structure of the TCTF (since January 2012)

Chair: Dr Huang-Tien Lin

- WG on MRA (Mutual Recognition Arrangement)

- Coordinator: Dr Wen-Hung Tseng (TL)
- WG on GNSS (Global Navigation Satellite Systems)
 - Coordinator: Dr Michael Wouters (NMIA)
 - Sub Coordinator: Mr Jia-Lun Wang (TL)
- WG on TWSTFT (Two-Way Satellite Time and Frequency Transfer)
 - Coordinator: Dr Miho Fujieda (NICT)
 - Sub Coordinator: Mr Yi-Jiun Huang (TL)
 - Sub Coordinator: Dr Hideo Maeno (NICT)
- Joint TCL/TCTF WG on OFM (Optical Frequency Metrology)
 - Coordinator: Dr Feng-Lei Hong (NMIJ)

3. Activities: MRA

Table 1 Status of CMC reviews undertaken since November, 2013.

Code	NMI	Status	Date
SIM.TF.9.2013 (resubmission of SIM.TF.8.2013)	INDECOPI (Peru)	Inter-regional review	Posted May 13, 2014
SIM.TF.10.2014	INM (Colombia)	Inter-regional review	Posted August 9, 2014
SIM.TF.11.2014	ICE-LMVE (Costa Rica)	Inter-regional review	Posted September 4, 2014
	TL (Taiwan)	Intra-RMO review	

Table 2 Approvals of peer reviewers

Reviewer	
Dr Judah Levine (NIST, USA)	A*STAR, Singapore
Dr Takeshi Ikegami (NMIJ, Japan)	NIMT, Thailand
Dr Sergio Lopez (CENAM, Mexico)	NMIA, Australia

4. Activities: GNSS receiver calibration

Dr Lin summarised the current state of the new arrangements for calibration of GNSS receivers. Draft guidelines had been circulated just prior to the Taipei meeting and the TCTF participated in the subsequent discussion process. The TCTF proposed three NMIs (NIM, TL and NICT) as Group-1 laboratories and these were accepted by the BIPM. Revised guidelines were published on April 25, 2014.

5. Activities: Asia Pacific Workshop on Time and Frequency 2014

The 2014 IEEE FCS meeting was held in Taipei with the ATF 2014 as a technical co-sponsor. The ATF 2014 logo appeared on the Conference website. Members of the APMP, TCTF and regional NMIs were encouraged to submit abstracts. Dr Lin noted that many TCTF members are on the FCS Technical Program Committee for Group 5 (Timekeeping) and Group 6 (Optical Standards).

6. APMP Mid-year meeting

The mid-year meeting of the APMP was hosted by Puslit KIM-LIPI, 2-5 June, 2014. The 32nd Meeting of the JCRB was summarised and actions for the APMP were identified. The APMP MoU was

discussed and procedures around nomination and approval of TC Chairs had been highlighted. It was noted that there were currently no guidelines for the operation of the TCs. The preparation of a Strategic Plan for the APMP was a key issue for the meeting.

The Chair then summarised the Strategic Plan for the TCTF as presented at the Mid-Year Meeting and there was further discussion.

The Chair briefly mentioned the MEDEA-funded workshop being hosted by NIM as an example of the TCTF's support for its DEC members.

The Chair noted that only 2 proposals for TC Initiatives had been submitted this year.

Q. How much support for the DEC workshop was available from PTB and how is the money made available? Is funding available for other projects? (Koyama, NICT)

A. For the DEC workshop there was no fixed budget. PTB is paying travel and accommodation costs for each of the participants and two presenters. New projects can still be funded.

III. Day 1, 1100-1230: Institutional reports (Chair: Dr H.T. Lin)

Short reports from each institute participating in the meeting were presented and discussed. Individual presentations are available on the APMP website and are not summarised here.

A. KIM-LIPI (Boynawan)

Q. What was the process by which KIM-LIPI became the official time source for the Ministry of XXX (M. Wouters, NMIA)?

A. The Ministry was responding to regulations regarding the time stamping of electronic transactions. The question of who should be the source of the timestamps arose and KIM-LIPI was approached.

Q. How many participants were there in the June Laser Workshop? Was Egypt a participant (H.T. Lin, TL)?

A. There were 8 participating DECs. Associate APMP members were also invited to attend.

B. KRISS (D.H. Yu)

Q. How well-controlled are temperature and humidity controlled in the clock room in the new building? Are the masers in environmental chambers (A. Zhang, NIM)?

A. In the old building there was dedicated environmental control for the clock room. In the new building there is centralized control. Temperature is specified to be stable to 0.25° C and humidity to 5%. In the old building, the H-masers were in environmental chambers. In the new building, the space they are in is specified to be stable to 0.1° C.

Q. Why is KRISS building a system to distribute T&F via a LF signal (M. Wouters, NMIA)?

A. It is envisaged to be a backup to GPS. There are concerns about jamming. It is hoped to work with telecommunications providers to make the LFS a backup to GPS.

Q. It was noted that the new building (T&F has been largely relocated in the last year) is located next to a busy road. Is vibration a problem (C.S. Liao, TL)?

A. No, vibration is not a problem.

Q. What is the business model for the LFS service (H.T. Lin, TL)?

A. *Unsure of response here.* The frequency for the LFS service has not yet been allocated.

C. NICT (Y. Hanado)

Q. Is there any data yet on the performance of the VLBI system? Is it better than TWCP (D.H. Yu, KRISS)?

A. There is no data yet.

Q. What was the uncertainty of the portable Cs? How was it determined (W.H. Tseng, TL)?

A. It was determined from the round-trip measurements.

Q. Was the tuneable THz source developed by NICT (C.S. Liao, TL)?

A. Yes

Q. How do you know how many NTP clients the NTP servers have (A.S. Omar, KIM-LIPI)?

A. All we know is the number of accesses

Comment: Even if you record IP addresses, complications such as NAT make it difficult to estimate the number of unique clients (M. Wouters, NMIA).

Q. Do any other NMIs have information or experiences to relate (H.T. Lin, TL)?

A. NMIA restricts access to our NTP servers so we know exactly who our users are (M. Wouters, NMIA).

D. NIM (A. Zhang)

There were no questions.

E. NIMT (N. Rujirat)

Q. Does NIMT have any experience of speed measurement using GPS-based devices (M. Wouters, NMIA)?

A. No.

Comment: SIRIM's presentation discusses this topic (A.S. Omar, SIRIM).

F. NMIA (M. Wouters)

Q. How was the proficiency test that NMIA assisted with conducted (H.T. Lin, TL)?

A. A rubidium was circulated. Its frequency was measured and then it was sent to a lab, and returned within a week, and its frequency re-measured. We estimated the effect of power cycling of the rubidium by repeatedly cycling the power and measuring the frequency.

Comment: How many other labs have performed proficiency tests (H.T. Lin, TL)?

The response was that 4 labs had done this.

G. NMIJ (K. Hosaka)

Q. What were the "costs for running the remote calibration service" (M. Wouters, NMIA)?

A. These were the costs to NMIJ to set up the service and the annual running cost to maintain the service.

H. NMISA (A. van Braakel)

There were no questions.

I. NML-SIRIM (A.S. Omar)

Q. Were time interval and/or distance measurement verified for calibration of taxi-meters (W.H. Tseng, TL)?

A. This was only done for type approval, initial and subsequent verification. The calibrated simulator is used to calibrate/verify taxi-meters. MUSSD (R.G.S.A Perera)

Comment: Data to facilitate an informal inter-comparison was available on the BIPM website and from the websites of many NMIs. Alternatively, if MUSSD could make its data publically available, it would be very simple to process their data to inter-compare our clocks (M. Wouters, NMIA)?

J. TL (C.S. Liao)

Q. Why are there such a large number of calls to the Speaking Clock given that many people's mobile phones provide correct time (M. Wouters, NMIA)?

A. It has a very pleasant voice!

K. VMI (N. Bang)

There were no questions.

Dr Lin presented apologies from Ms Y-Y. Liu (A*STAR) and Dr A. Sen Gupta (NPLI), who were unable to attend the meeting. Their reports will be available on the APMP website.

IV. Day 1, 1330-1500: Reports from WGs (Chair: Dr H. T. Lin)

The presentations made by the WGs are available on the APMP website.

A. WG on the Mutual Recognition Agreement (W.H. Tseng)

Comment: The Chair thanked Dr Tseng for his work in co-ordinating the WGMRA over the past three years.

Comment: The list of potential CMC reviewers was not the same as the list of peer reviewers. Only one contact point in each NMI is needed for CMC reviewers – this contact can then nominate a suitable colleague (H-T. Lin, TL).

B. WG on Global Navigation Satellite Systems (M. Wouters)

Q. What plan for receiver calibration do you intend to send to the BIPM (H. T. Lin, TL)

A. It was unclear what information BIPM wanted and BIPM would have to be consulted.

Q. Why was the receiver that was used in the 2012 calibration exercise no longer available (Y. Koyama)

A. The receiver was in use as calibration equipment and thus shouldn't be used as a travelling system. In the preferred case, the travelling receiver could be any receiver.

C. WG on OFG (F-L. Hong)

Comment: It was requested that Dr Ito (NICT) join the WG.

Comment: Dr Lin thanked Dr Hong for his many years of work for the WG OFG.

Q. What were the sources of funding for the workshop (H-T. Lin, TL)?

A. Funding was from three sources: PTB-APMP-APLMF, NMIJ (for presenters) and DEC

Q. Was a report on the outcomes of the workshop required (H.T. Lin, TL)?

A. Yes.

D. WG on Two Way Time-Transfer (M. Fujieda)

Q. What is the transponder fee for the AM4 satellite (H.T. Lin, TL)?

A. It is cheaper than Eutelsat.

Comment: The Chair thanked NICT for their many contributions to TWSTT research.

Dr Tseng made a short presentation on the effects of tracking errors in TWSTFT, caused by the delay-locked loop. The preliminary result was that it was better to operate in an open-loop mode.

Comment: The data are very recent and results have not yet been presented publicly (H.T. Lin, TL).

The Chair thanked the WGs for all their work for the TCTF. He asked for comments on the current structure of the TCTF and its WGs and whether their current activities matched the members' needs. No changes were suggested.

V. Day 1, 1530-1700: Discussions (H.T. Lin)

A. Strategic Plan

The three elements of the TCTF's current strategic plan were discussed, focusing on the resources needed to implement them, and current activities in support of them.

The ATF Workshop was discussed in the context of the TCTF's strategic objective of facilitating the communication of advances in T&F. The formation of an organizing committee for the ATF was discussed. Dr Lin proposed Dr Koyama as the Chairman of the ATF Organizing Committee. This was approved by the TCTF and Dr Koyama accepted the nomination. Further discussion was deferred to the next days' session.

Dr Lin again encouraged the TCTF to continue to consider the Strategic Plan so that it could be kept current.

B. 2013 and 2014 ATF Workshops

Dr Lin described in a bit more detail his experiences in promoting the ATF over the past two years, first as a joint session with AP-RASC in 2013 and then as a technical co-sponsor of the IEEE FCS in 2014.

AP-RASC (Asia-Pacific Radio Science Conference) is a regional URSI conference. Commission A covers Electromagnetic Metrology and the ATF Workshop was held under this umbrella. Five sessions were convened, with a total of 60 papers being presented. Dr Lin thanked the session conveners and contributing authors for making the ATF 2013 a success. A meeting of the CCTF WG for TWSTFT was also held in conjunction with the conference.

Dr Lin initially approached the Chair of the local Organizing Committee to see how the ATF might participate in the FCS meeting. The FCS Standing Committee highlighted that they expected extra papers and paying registrants through the participation of the ATF. Dr Lin noted that there was some confusion about the relationship between the TCTF, APMP and ATF.

C. DEC Projects: UTC Workshop /MEDEA/ DEC

The motivation for the UTC Workshop and its aims were explained. The possibility for further MEDEA funding was reiterated.

At the mid-year APMP meeting, the proposed instrument bank was discussed. Mechanisms by which support could be offered to attend established metrology schools were being explored.

D. Technical Committee Initiatives

A TCI for 2014/2015 had been suggested and expressions of interest sought; however, after a reappraisal of resources available to support the project, it was decided to postpone the project. The TCTF members were invited to consider if their NMI could pilot the project.

E. CMC Issues

TCs have been requested to provide an estimate of the labour required to establish a CMC.

Dr Wouters asked for a clarification of what activities were to be considered in estimating the cost of preparing and maintaining a CMC. It was not certain what the intended scope of this calculation is.

Dr Lin drew attention to a change in the procedure for nomination of peer assessors. Previously, the NMI had proposed a peer assessor for approval by the TCTF Chair. Now, the NMI must propose the name of an NMI to the TCTF Chair, who will then select a reviewer from that NMI.

The current list of peer reviewers is:

KRISS	Taeg Yong Kwon
KRISS	Sang Eon Park
MSL	Tim Armstrong
NICT	Mizuhiko Hosokawa
NICT	Yasuhiro Koyama
NICT	Tsukasa Iwama
NICT	Hiroyuki Ito
NIM	Gao Xiaoxun
NIM	Zhang Aimin
NPLI	Amitava Sen Gupta
NMIA	Michael Wouters
NMIJ	Takeshi Ikegami
NMIJ	Masaki Amemiya
NMIJ	Tomonari Suzuyama
NMIJ	Michito Imae
TL	Chia-Shu Liao
TL	Huang-Tien Lin

Dr Koyama asked the TCTF to consider financial support and/or hosting the ATF. It was suggested that the next ATF be held adjacent to the upcoming APMP meeting in Beijing.

The Chair closed the afternoon session by handing over to the incoming Chair, Dr M. Wouters.

VI. Day 2, 0900-1030: Discussions (Chair: Y. Koyama)

A. Report on NTP servers (Y. Koyama)

Dr Koyama reported on a collaboration with KIM-LIPI. An FPGA-based NTP server developed by NICT was being installed for KIM-LIPI to evaluate. Dr Koyama invited other NMIs to consider co-operating with NICT in the same way.

Q. How can traceability of the NTP server be established (M. Wouters, NMIA)?

A. The server has a 1 pps input which can be used to discipline the internal rubidium clock. This can be the local UTC. The server can also be made traceable via GPSCV.

Q. Who are the users of the NTP server (R.C. Budhani, NPLI)?

A. The general public.

Q. Is your Cs fountain integrated with your time dissemination (R.C. Budhani, NPLI)?

A. Not yet. One is operating, the second is being commissioned. The uncertainty budget will then be evaluated.

Q. Is there some possibility of a comparison with the NPLI fountain (R.C. Budhani, NPLI)?

A. Yes, there may be a possibility via TWSTFT.

Q. Is there some possibility for the server to respond to other time protocols (W.H. Tseng, TL)?

A. Yes. It has a single board computer with an Ethernet connection in addition to the FPGA board which answers NTP requests. The hardware NTP server only responds to NTP requests and so is immune to cyber-attacks.

B. Report on URSI meeting (Y. Koyama)

On the issue of the future of leap seconds in UTC, currently being considered by the ITU, URSI Commission A has recommended that there be no more leap seconds inserted in UTC. Dr Koyama characterised this as a very strong statement. He suggested that URSI Commission A could be a very powerful forum for NMIs to put forward their opinions.

Q. In Australia, the local ITU representative is responsible for forming a consensus from stakeholders and then formulating a position to present to the ITU. This position may differ from the NMIs and what may be being represented through the URSI. Is there a conflict here (M. Wouters, NMIA)?

A. No, I don't think so.

C. Discussion of ATF Workshop (Y. Koyama)

Dr Koyama explained some of the history of the ATF. NICT had provided financial support for the ATF, including participant's expenses, for many years but this had ended due to budget limitations. In 2013 and 2014, the ATF had been held in conjunction with other conferences.

For 2015, there were no convenient conferences being held in the region and it was proposed and accepted to hold ATF 2015 in conjunction with the APMP meeting.

Comment: Dr Sen-Gupta, who was unable to attend the meeting, had sent an email saying that he would like to nominate for a position on the organizing committee.

Financial support for the ATF was necessary to ensure its future. NMIs were invited to nominate as sponsoring organisations. Three NMIs - NICT, TL and NPLI - offered tentative support.

There was some discussion about the forms that financial support could take. Prof. Budhani, suggested that it could for example, take the form of publication of the proceedings.

Nominations for the Organizing Committee were called for and the following members nominated:

Chair: Y Koyama (NICT)

HT Lin (TL)

K Hosaka (NMIJ)

Z Fang (NIM)

A Sen Gupta (NPLI)

A van Braakel/C. Matthee (NMISA)

F L Hong (NMIJ)

Q. What should be the frequency of the ATF Workshops (C.S. Liao, TL)?

A. It was desirable to have it every year.

Dr Koyama noted that the present format of the TCTF meeting only allowed for a relatively short presentation from each NMI and that in the past, the ATF had allowed for a more comprehensive report. This created a conflict between the TCTF and ATF however.

This led into a discussion of what the scope of the future ATF should be, in particular should research be mixed with institutional reports. The matter was left open.

Dr Hong commented that his preference was for ATF to be held every two years, in conjunction with the APMP meeting. Dr Koyama mostly agreed with this but thought that in the alternate years, it might be held in conjunction with another conference such as an URSI meeting.

Dr Lin suggested that each NMI be encouraged to submit a paper to the ATF.

VII. Day 2, 1100-1230: Discussions (Chair: M. Wouters)

A. Strategic Plan (M. Wouters)

Comments on the Strategic Plan were again invited; no changes were proposed.

The GNSS receiver calibration campaign was discussed again, to confirm our readiness to begin, and what actions needed to be taken immediately. The WG GNSS coordinator needed to contact BIPM regarding the state of the current calibration guidelines, and to survey the TCTF's current calibration needs so that a timetable could be drawn up.

Dr Wouters suggested that a new WG focused on the practical needs of its members, particularly its DEC members, might be valuable. The current WGs, with the exception of the WGMRA, had a strong research focus. The new WG could act as a single contact point for members seeking advice on issues such as calibration and as a collection point for related useful materials. Dr Lin nominated Mr Sahar as the Coordinator and Mr Sahar accepted. The name of this new WG is still to be determined.

Dr Wouters proposed that in order to facilitate communication and the WGMRA co-ordinator, that Mr Louis Marais (NMIA) become the new co-ordinator after a transition period. This was accepted. The present co-ordinator, Dr Tseng, was thanked by the Chair and the TCTF for his work for the WGMRA over the past three years.

B. Closing (M. Wouters)

The Chair summarised the principal outcomes of the TCTF meeting.

1. The TCTF Strategic Plan was finalised and accepted.
2. The next steps to begin calibration of GNSS receivers were decided.
3. A new WG focused on the practical needs of DEC members was formed.
4. The ATF 2015 Workshop will be held in conjunction with the 2015 APMP meeting. Dr Koyama was elected as the Chair and an Organizing Committee was formed.

The Chair thanked the outgoing Chair, Dr Lin, for his excellent work for the TCTF over the past three years.

Dr Zhang played a video presentation on the upcoming APMP 2015 meeting in Beijing.

The meeting closed at approximately 12 noon.