BIPM Capacity Building & Knowledge Transfer Programme

EFFECTIVE PARTICIPATION IN COORDINATED UNIVERSAL TIME (UTC)

Programme

Course dates: 13 to 14 February 2018
Location: BIPM, Sèvres, France

Day 1 [Feb. 13]

Registration of the participants [8:30-9:00]

Opening address [9:00-9:10]

D1.1 – [09:10 – 10:00] The role of the BIPM and the international metrology coordination

- General role (R. Guliyeva)
- Role of the BIPM in time and frequency metrology (P. Tavella)
- National and international impact of maintaining a realization of UTC (P. Tavella)

D1.2 – [10:00 – 10:30] Fundamentals of the computation of UTC

- UTC and associated products: main components of Circular T (G. Petit)
- Minimum requirements for participation in UTC (G. Petit)

D1.3 – [10:30 – 11:00] Participating to time scales computation (UTC, rapid UTC)

- Data reporting protocols (A. Harmegnies)
- Data consistency requirements for UTC and Rapid UTC (G. Panfilo)

Coffee – [11:00 – 11:30]

D1.4 – [11:30 – 12:15] Time transfer techniques

- GNSS time transfer (L.-G. Bernier)
- TWSTFT (A. Bauch)
- Optical fibres (A. Bauch)

D1.5 – [12: 15 – 13:00] Services provided by the BIPM Time Department and the RMOs

- ftp server: Clock characterization and time link comparisons (G. Panfilo)
- BIPM Time Department Data Base (A. Harmegnies)
- Calibrations for Group 1 and Group 2 laboratories
  - Time Department web page of calibrations (G. Petit)
  - RMOs (A. Bauch; RMO rep)

Lunch – [13:00 – 14:00]

D1.6 – [14:00 – 15:30] Organization and operation of a time laboratory providing a realization of UTC (at time laboratory, A. Bauch, L.-G. Bernier)

- Laboratory environment
- Operation of equipment
- Staff skill levels
- Security of operation and data
- Laboratory evolution

Coffee – [15:30 – 16:00]

D1.7 – [16:00 – 17:30] Uncertainties of [UTC-UTC(k)] – How to improve them?

- Understanding how uncertainty is calculated (G. Panfilo)
  - Contribution of time transfer to the uncertainty
- Historic evolution to current uncertainty levels (G. Panfilo)
- Actions to improve laboratory uncertainty (A. Bauch, L.-G. Bernier)

Day 2 [Feb. 14]

D2.1 – [09:00 – 10:30] Calibration of GNSS equipment for time transfer (Part I)

- BIPM Guidelines for GNSS equipment calibration (G. Petit)
- Description of calibration methods & calibration parameters, implementation of calibration parameters in data files (A. Bauch)

Coffee – [10:30 – 11:00]

D2.2 – [11:00 – 13:00] Calibration of GNSS equipment for time transfer (Part II)

- Types of receivers, technical description (P. Nogas, A. Kuna, J.-M. Sleewaegen)
  - Time receivers (including different manufacturers characteristics)
  - Geodetic type receivers used for time comparisons
  - Factory calibration and calibration certificates

Lunch – [13:00 – 14:00]

D2.3 – [14:00 – 17:00] Calibration of GNSS equipment for time transfer (Part III)

(with a coffee break 15:30 – 16:00)

- Hands-on in laboratory experience (P. Nogas, A. Kuna, J.-M. Sleewaegen, A. Bauch, L. Tisserand)
  - Equipment set up (including points to take care)
  - Executing calibration measurements
  - Checking results
  - Reporting results

D2.4 – [17:30 – 18:00] Closure and distribution of attendance certificates