3.5.3 Conventions Centre

The Conventions Center is provided jointly by the Bureau International des Poids et Mesures (BIPM) and the U.S. Naval Observatory (USNO).

The Conventions Center provides updated versions of the Conventions in electronic form, after approval of the IERS Directing Board. In the mean time, work on interim versions is also available electronically. In addition to the electronic releases, printed versions of the Conventions will be provided at less frequent intervals or when major changes are introduced.

In 2007, the work accomplished or in progress is the following.

1. Technical topics

The background work of keeping track of corrections, typos and small changes that improve the readability of the documents continued in 2007. More technical or complex issues are first discussed, *e.g*. through the Advisory Board or on the discussion forum (<http://tai.bipm.org/iers/forum>), where topics are identified as needing investigation and possible developments for future versions of the Conventions. Several such topics concern contributions to the difference between the instantaneous position of a site and its adopted position, such as the effects of geocenter motion or atmospheric loading. It is expected that all effects (such as station displacement) that are periodic and have a consistent and accurate *a priori* model, expressed in closed form, should be included in the IERS Conventions. Models for long-term or non-periodic effects, which have an impact on the definition of reference frames, are also to be studied, although their inclusion as conventional effects will need to be discussed.

Work on the following major topics was started, on-going or completed in 2007:

1.1 Terrestrial reference frame

A general revision of the chapter has begun with the primary goal of incorporating the ITRF 2005 into the chapter. Principal contributors to this effort are C. Boucher, Z. Altamimi, J. Ries, and U. Hugentobler.

1.2 Free Core Nutation

The free core nutation (FCN) is a free motion with variable excitation that causes the amplitude and phase of the motion to be unpredictable at some level. Because of this, the FCN was not included in the IAU 2000A nutation model, and therefore has been accommodated separately. The FCN model of S. Lambert was selected as the conventional model on 23 October 2007. Principal contributors to this effort are S. Lambert, Z. Malkin, and B. Luzum.

1.3 Terminology and models for Transformations

Modifications were made to Chapter 5 to make the chapter's terminology more consistent with current IAU recommendations. In addition, the references for the planetary fundamental arguments were

revised to make them clearer. Work has begun on incorporating the IAU 2006 Precession model into the Conventions. Principal contributors to this effort are N. Capitaine, P. Wallace, and B. Luzum.

1.4 Atmospheric tidal loading

The diurnal heating of the atmosphere induces surface pressure oscillations at mostly diurnal S1 and semidiurnal S2 harmonics, which produce station displacement due to loading. These can have an amplitude of 1.5 mm. Using the Ray and Ponte (Annales Geophysicae 21, 2003) tidal representation, a model is proposed to compute the station displacement as grid values and an interpolation program. These can be found at <http://www.ecgs.lu/atm>. Implementation in Chapter 7 „Displacement of reference points“ is not yet complete. Principal contributors to this effort are T. van Dam and R. Ray.

1.5 Lunisolar station displacements

The subroutine dehanttideinel.f, which computes the tidal corrections of station displacements caused by lunisolar gravitational attraction, has been updated by H. Manche and G. Petit. These updates include replacing subroutines DUTC and FJLDY with the SOFA subroutines iau_CAL2JD and iau_DAT and modifying the time arguments of subroutine STEP2DIU.

1.6 Tidal variations in Earth rotation

Currently, there is no conventional subroutine to compute the tidal variations in Earth rotation for the Defraigne and Smits model. A routine has been written utilizing the new software template. The subroutine is currently under external review. Principal contributors to this effort are B. Luzum and B. Stetzler.

1.7 Tropospheric mapping function

A completely revised version of the chapter was released on 28 June 2007. For optical techniques, it describes a new model for zenith delay (Mendes and Pavlis, *Geophys. Res. Lett.* 31, 2004) and a new mapping function, both adopted by the ILRS as of 1 January 2007. For radio techniques, since the recommended mapping functions cited in the Conventions (2003), have now been shown to have deficiencies, an expert panel was assembled to review the current recommendations. The VMF1 (Boehm et al., *J. Geophys. Res.* 111, 2006) is now the recommended mapping function, which requires input coefficients determined from numeric weather model. For users not needing the highest accuracy, the GMF (Boehm et al., *Geophys. Res. Lett.* 33, 2006), which uses standard input coefficients, is provided. Principal contributors to this effort are J. Boehm, G. Hulley, A. Niell, E. Pavlis and J. Ray.

1.8 Ionospheric models for radio techniques

A new section regarding ionospheric models for radio techniques, including higher order terms, is under way. Principal contributors to this effort are M. Pajares and A. Krankowski.

2. Conventions Workshop

The IERS Conventions Workshop was held in anticipation of the upcoming new registered edition of the IERS Conventions. The workshop was organized to discuss relevant models for inclusion in the Conventions, to determine milestones for achieving the next registered edition, and to discuss long-term technical and institutional issues. The major results of the workshop include:

- the definition of classes of models and criteria for choosing models,
- how to deal with non-tidal loading effects and displacements,
- atmospheric loading,
- tropospheric model,
- model for ocean tide effects on geopotential,
- model for diurnal and semidiurnal EOP variations, and
- considerations for technique-dependent effects.

It was decided to tentatively schedule the next registered edition for 2009. For an executive summary of the IERS Workshop, see <http://www.bipm.org/utils/en/events/iers/workshop_summary.pdf>.

3. Procedural Topics

In an effort to make the IERS Conventions more efficient to maintain and more user-friendly, a series of procedural changes have been initiated. Below are a list of the procedural changes that were started, on-going or completed in 2007:

3.1 Conventions Update web page updated

The Conventions Update page has been modified to not only include information and links to past updates, but to also provide information and links to planned and possible changes. This provides users insight into the directions that Conventions may be taking in the near future, allowing users to plan better regarding implementation of standardized models. This improvement was made in February 2008.

3.2 Software Standardization

A topic discussed at the Conventions Workshop was the benefit of providing standardized software. In an effort to work toward that goal, a software template was designed based on the IAU Standards of Fundamental Astronomy (SOFA) software template. This template will encourage a structure that will provide consistent information for software users that should improve the utility of the subroutines.

3.3 Plan of Action

A draft plan of action has been created to define the expectations for each chapter in preparation for the next registered edition. It also clearly assigns responsibility for each chapter to a member of the Conventions Center.

4. Dissemination of information

The Conventions web site (<http://tai.bipm.org/iers/>), including the discussion forum (<http://tai.bipm.org/iers/forum>), has been maintained. The web pages for the Conventions updates (<http://tai.bipm.org/iers/convupdt/convupdt.html>) are continuously modified, as required by changes in the texts, routines or data files.

List of updates

The list of updates as of 6 March 2008 to the Conventions since the last IERS Conventions Annual Report follows (an updated list is available online at <http://tai.bipm.org/iers/convupdt/listupdt.html>):

Chapter 5: Transformation Between the Celestial and Terrestrial Systems

- 16 February 2007: Changes (provided by P. Wallace and N. Capitaine) with respect to the previous version of the chapter: Revised section 5.8.3 to make the references for the planetary fundamental arguments clear.

Chapter 7: Displacements of reference points

- 20 June 2007:
  - The subroutine dehanttideinel.f has been updated. It remains under review for some other possible corrections (these effects should be < 0.05 mm).
  - The dutc subroutine has been corrected (from H. Manche). The effect is < 0.05 mm.
  - The step2diu subroutine has been corrected (from V. Tesmer). The effect may exceed 0.1 mm.

Chapter 9: Tropospheric Model

- 28 June 2007: Chapter 9 has been completely rewritten. The main contributors to the new writing of the chapter are J. Boehm, G. Hulley, A. Niell, E. Pavlis.

5. Conventions Center Staff

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