INTRODUCTION

This document is intended to define the standard reference system to be used by the International Earth Rotation Service (IERS). It is based on the Project MERIT Standards (Melbourne *et al.*, 1983) and the IERS Standards (McCarthy, 1989; McCarthy, 1992) with revisions being made to reflect improvements in models or constants since the IERS Standards were published. If contributors to IERS do not fully comply with these guidelines, they will carefully identify the exceptions. In these cases, the institution is obliged to provide an assessment of the effects of the departures from the conventions so that its results can be referred to the IERS Reference System. Contributors may use models equivalent to those specified herein. Different observing methods have varying sensitivity to the adopted standards and reference systems. No attempt has been made in this document to assess the sensitivity of each technique to the adopted reference systems and standards.

The recommended system of astronomical constants corresponds closely to those of the previous IERS Standards with the exception of the changes listed below. The units of length, mass, and time are in the International System of Units (SI) (*Le Système International d'Unités (SI)*, 1991) as expressed by the meter (m), kilogram (kg) and second (s). The astronomical unit of time is the day containing 86400 SI seconds. The Julian century contains 36525 days.

Differences Between This Document and IERS Technical Note 13

Most chapters of IERS Technical Note 13 have been revised, and known typographical errors contained in that work have been corrected in this edition. There are some major differences between the current work and the past IERS Standards. The following is a brief list of the major modifications by chapter.

CHAPTER 2 IERS Dynamical Reference Frame

The JPL DE 403 ephemeris (Standish *et al.*, 1995) replaces the DE 200 model of IERS Technical Note 13.

CHAPTER 3 IERS Terrestrial Reference System

The NUVEL NNR-1A Model (DeMets *et al.*, 1994) for plate motion has replaced the Nuvel NNR-1 Model of IERS Technical Note 13.

CHAPTER 4 Numerical Standards

Numerical values are now given only for the most fundamental constants along with their uncertainties and references. Constants which have been changed include the astronomical unit in seconds and meters, precession, obliquity, equatorial radius, flattening factor and dynamical form factor of the Earth, constant of gravitation, geocentric and heliocentric gravitational constant.

CHAPTER 5 Transformation Between Celestial and Terrestrial Reference Systems

An empirical model to be used to predict the difference in the celestial pole coordinates between those published by the IERS and those given by the IAU model is added.

CHAPTER 6 Geopotential

The JGM3 model replaces the GEM-T3. Love Numbers are revised.

CHAPTER 7 Local Site Displacements

The printed table of the components of site displacement due to ocean loading is no longer included. References to machine- readable files are given. Love Numbers are revised. Atmospheric loading and postglacial rebound are included.

CHAPTER 8 Tidal Variations in UT1

The subdaily and daily tidal variations in Earth orientation due to the effect of ocean tides has been added.

CHAPTER 12 General Relativistic Models for Propagation

The formulation has been modified to be consistent with IAU/IUGG resolutions.

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Errata from Technical Note 13

p. 9: GPS Block II $dz = 0.9519m$ vice $1.0229m$.
p. 18: Table 3.1, first line, last value should be -0.0070 vice 0.0070.
p. 83: Hobart Q1 EW tangential phase should be 160.4 vice -160.4.
p. 89: Malibu M2 EW tangential phase should be -142.4 vice 142.4.
p. 98: Pearblossum M2 radial phase should be -24.14 vice 24.1.
p. 137: paragraph 3, read ...of the International **Astronomical** Union.
p. 137: the formula reads

$$ds^2 = -c^2 d\tau^2$$

$$= -\left(1 - \frac{2U}{c^2}\right)(dx^0)^2 + \left(1 + \frac{2U}{c^2}\right)[(dx^1)^2 + (dx^2)^2 + (dx^3)^2)].$$

(the minus sign was omitted in the second line)

p. 140, note 2: the formulae giving TCB-TCG read

$$TCB - TCG = c^{-2}[\int_{t_0}^{t}(v_e^2/2 + U_{ext}(x_e)dt + v_e.(x - x_e)].$$

$$TCB - TCG = L_C \times (JD - 2443144.5) \times 86400 + c^{-2}v_e.(x - x_e) + P.$$

(the "." in the vector product $v_e.(x - x_e)$ was omitted)

References

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Standish, E. M., Newhall, X X, Williams, J. G., and Folkner, W. F., 1995, "JPL Planetary and Lunar Ephemerides, DE 403/LE 403," JPL IOM 314.10-127, to be submitted to *Astron. Astrophys.*