

IAU Division I Working Group
“Nomenclature for Fundamental Astronomy” (NFA)

Newsletter 5

Nicole Capitaine, 16 July 2004

Introduction

The purpose of this Newsletter is to provide draft documents to be discussed within the IAU Working Group “Nomenclature for Fundamental Astronomy” in order they can be transformed into the NFA WG Report to the IAU with terminology recommendations. The present NFA documents are composed of (i) draft WG recommendations and guidelines on terminology and (ii) a separate NFA explanatory document.

The draft recommendations and guidelines on terminology, which are submitted to the NFA Working Group in the next section of this Newsletter, result from the work of the WG from October 2003 to April 2004 (cf. NFA Newsletters 1 to 4, NFA Questionnaires A and B and WG answers to the questions of Newsletter 4) and are supposed to reflect the opinion of the majority. The WG recommendations, once agreed, should be submitted for comments to a larger astronomical community before being transmitted in a final form to the IAU. One of these recommendations, if it is supported, will require that a proposal for a specific IAU Resolution be submitted to the 2006 IAU General Assembly. A draft Resolution is proposed in this Newsletter, based on earlier discussion that took place before the latest IAU GA [NFA4] as well as on more recent ones within the NFA WG ([NFA7], [NFA12]).

The NFA explanatory document contains an introduction summarizing the WG objectives and methods, and two parts. Its content relies on previous documents circulated within the WG (i.e. Annexes to the previous Newsletters and Questionnaires) and on e-mail discussions within the WG. Part A, which is provided here only as a preliminary scheme with a few Figures, is intended to provide a general presentation and discussion of the scientific issue explaining the basis for the IAU Resolutions and their implementation.

Part B, which provides information for application of the proposed terminology associated with the introduction of the new paradigm and comparison with the classical one. It has been prepared by Catherine Hohenkerk and myself based on preliminary documents and on the conclusions of the Questionnaires responses. It is composed of Part B1 giving a chart for transformation from ICRS to observed place, Part B2 which provides a terminology table and Part B3 a terminology list.

The list of references to the papers that are the basis of this document (or have been consulted) is given at the end of this Newsletter.

The aim of such an explanatory document is to help astronomers in the understanding of the IAU 2000 Resolutions and their implementation and to make clear the proposed nomenclature associated with this implementation.

1 Draft NFA Working group recommendations and guidelines on terminology

1.1 Preliminary discussion

According to the Questionnaire responses, some points are already agreed by the majority and some others still need some further discussion. The points that still need further discussion are the following:

- (i) replace CEO/TEO by CIO/TIO: it seems to me that a majority has recommended harmonization and I have therefore taken this option as a draft recommendation, followed in the documents,
- (ii) use “system” or “frame” for the “intermediate” system/frame: the option chosen in these documents is to use “system”.

1.2 Proposed WG recommendations

The following draft NFA WG recommendations and guidelines have been deduced from the summary provided in NFA Newsletter 4 and the WG responses to the questions of this Newsletter.

1. *Using existing terms (e.g. right ascension) in extended ways for the terminology associated with the new paradigm with a clear specification, rather than introducing new names,*
2. *Using 'equinox-based' and 'CEO (CIO)-based' for referring to the classical and new paradigms, respectively,*

Comment: Note that 'equinoctial' versus 'orthogenetic' have also been strongly supported by a few WG members.

3. *Giving names to the systems containing the CIP and the CEO (CIO), and containing the CIP and the TEO (TIO),*
4. *Using special designation for particular realization of the system (as for example IAU 2000A),*
5. *Using 'intermediate' to describe (i) the celestial system containing the CIP and the CEO (CIO), and (ii) the terrestrial system containing the CIP and the TEO (TIO),*

Comment: The term “intermediate” has been chosen to specify that the “Celestial Intermediate Pole” (CIP) (defined by IAU Resolution B1.7) is such that by convention it divides the instantaneous orientation of the Earth into components we label polar motion (in the terrestrial system) and precession-nutation (in the celestial system).

6. *Keeping the classical terminology for 'true equator and equinox' (or 'true equinox-based') for the classical equatorial system,*
7. *Harmonizing the name of the pole and the origin to 'intermediate' and therefore changing CEO/TEO to CIO/TIO,*
8. *Choosing 'equinox-right ascension' and 'CEO (CIO)-right ascension', respectively (or 'RA with respect to the equinox/or CEO (CIO)'), for the azimuthal coordinate along the equator in the classical and new paradigms, respectively,*

9. *Using ITRF meridian through the ITRF origin (meanwhile keeping Greenwich meridian for non precise use) and if necessary TEO/TIO meridian for the meridian through the TEO (TIO),*
10. *Giving the name "equation of the origins" to the distance between the equinox and the CEO along the equator,*
11. *Retaining 'apparent places' and 'mean places' in the equinox-based system,*
12. *Not introducing 'apparent intermediate places' in the CEO (CIO)-based system,*
13. *introducing 'intermediate places' in the CEO (CIO)-based system.*
14. *Using "system" rather than "frame in this context of the intermediary system/frame,*
 Comment: the choice of "system" or "frame" for the intermediate system has been one important point of discussion within the WG (See Sect. 1.1.)

The additional following points have also been agreed:

- *Not considering other types of apparent places as essential for common astronomical use, but only for very specific use.*
- *Not having strict rules for using or not using capitals for names for origins, poles and systems,*
- *retaining a name for the 'ephemeris meridian'.*

2 Draft Resolution to be submitted to the IAU GA 2006

Recommendation from the Division I IAU Working Group "Nomenclature for Fundamental Astronomy" (NFA)

Complementary terminology associated with the IAU 2000 Resolutions

The XXVIth General Assembly of the IAU

NOTING

- 1) the adoption of resolutions IAU B1.1 through B1.9 by the IAU General Assembly of 2000, and
- 2) that the International Earth Rotation and Reference Systems Service (IERS) and the Standards for Fundamental Astronomy (SOFA) have made available the models, procedures, data and software to implement these resolutions operationally,

RECOGNISING

- 1) that the harmonizing use of "intermediate" for designating both the pole and the origin of the new systems linked to the Celestial Intermediate Pole and Celestial or Terrestrial Ephemeris origins, defined in Resolution B1.7 and B1.8, respectively would improve the consistency,
- 2) that the potential ambiguity of the acronym CIO with that used in the past for designating the Conventional International Origin for the pole of the International Latitude Service (ILS) does not exist any more,

RECOMMENDS

1. that the designation “intermediate” be used uniformly to describe the key elements of the moving new reference system, and
2. that the terminology “Celestial Intermediate Origin” (CIO) and “Terrestrial Intermediate Origin” (TIO) be used in place of the previously introduced “Celestial Ephemeris Origin” (CEO) and “Terrestrial Ephemeris Origin” (TEO)

3 References

The NFA documents provided with this Newsletter are based on the following documents:

McCarthy D.D. and Capitaine N., 2002 “Compatibility with past observations” in the Proceedings of the IERS Workshop on the “Implementation of the New IAU Resolutions”, Capitaine, N. et al. (eds), (IERS Technical Note ; 29) Frankfurt am Main: Verlag des Bundesamts fr Kartographie und Geodsie, 2002, p 87.

Seidelmann, P.K. and Kovalevsky, J. 2002, “Application of the new concepts and definitions (ICRS, CIP, and CEO) in fundamental astronomy”, A&A, 392, 341-351.

Wallace, P., 2002 “Software for implementing the IAU 2000 Resolutions”, in the Proceedings of the IERS Workshop on the “Implementation of the New IAU Resolutions”, Capitaine, N. et al. (eds), (IERS Technical Note ; 29) Frankfurt am Main: Verlag des Bundesamts fr Kartographie und Geodsie, 2002, p 87.

[NFA1] Annex 1 of NFA Newsletter 1: “The new reference Systems: some answers” (K. Seidelmann et al.), March 2003.

[NFA2] Annex 2 of NFA Newsletter 1: Suggestions for improving the previous document (M. Soffel and S. Klioner), April 2003.

[NFA3] Annex 3 of NFA Newsletter 1: “Implementation of the IAU 2000 precession-nutation and Universal Time using the new paradigm. Summary for the Division 1 ICRS Working Group and Commission 19 Precession-Nutation Working Group” (N. Capitaine, P. Wallace, D.D. McCarthy, J. Chapront), February 2003.

[NFA4] Annex 4 of NFA Newsletter 1: Project of an IAU resolution, WG ICRS, April 2003.

[NFA5] Annex 5 of NFA Newsletter 1: Report of Division I meetings at the XXV IAU GA (N. Capitaine), October 2003.

[NFA6] Annex 6 of NFA Newsletter 1: Draft of Nomenclature and Terminology for the IAU WG (C. Hohenkerk), October 2003.

[NFA7] Annex 1 of NFA Newsletter 2: “Terrestrial Polar Origin” (B. Guinot), 2 November 2003.

[NFA8] Annex 2 of NFA Newsletter 2: “Nomenclature scheme for the ‘telescope pointing’ chain of transformations” (P. Wallace), 26 October 2003.

[NFA9] Annex 3 of NFA Newsletter 2: “Some Different Ideas for Nomenclature” (G. Kaplan), 10 December 2003.

[NFA10] “Presentation of the NFA Questionnaires” (N. Capitaine), 13 January 2004.

[NFA11] “Annex to the NFA Questionnaire A”, 13 January 2004.

[NGFA12] “NFA Documents collecting the Questionnaire responses” March 2004.

Capitaine N. and McCarthy D.D. and 2004 “The IAU Recommendations on Reference Systems and their Applications”, AAS 204th Meeting, Special Session “The Reference System Resolutions of the IAU”, 31 May 2004.

Kovalevsky, J., Seidelmann K., 2004, “Fundamentals of Astrometry”, Cambridge University Press.