

REPORT OF THE IAU DIVISION 1 WORKING GROUP ON “NOMENCLATURE FOR FUNDAMENTAL ASTRONOMY” (NFA)

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ABSTRACT. A Division 1 Working Group on “Nomenclature for Fundamental Astronomy” (NFA) was formed at the 25th IAU GA in 2003 in order to provide proposals for new nomenclature associated with the implementation of the IAU 2000 Resolutions. This WG is also intended to make related educational efforts for addressing the issue to the large community of scientists. Five Newsletters were issued from October 2003 to July 2004 and posted on the NFA webpage (<http://syrte.obspm.fr/iauWGnfa/>). One important step has been the preparation of a questionnaire including a part on ‘terminology choices’ and a part for the Almanac Offices and related organizations. The summary of the responses and comments to this questionnaire and further questions have led to draft WG recommendations and guidelines on terminology together with a Resolution proposal to the IAU 2006 GA which are supported by explanatory documents. This paper reports on the WG activities, draft recommendations and future actions.

1. INTRODUCTION

The IAU Working Group on “Nomenclature for Fundamental Astronomy” (NFA) was created by Division I at the 25th IAU General Assembly in July 2003 and officially installed by the IAU in November 2003. The general task of this WG is to provide proposals for new nomenclature associated with the implementation of the IAU 2000 Resolutions and to make related educational efforts for addressing the issue to the large community of scientists.

2. BACKGROUND ON IAU RESOLUTIONS ON THE REFERENCE SYSTEMS

At its 23rd General Assembly in 1997, the IAU adopted the International Celestial Reference System (ICRS) as specified by IAU Resolution A4, 1991 and the International Celestial Reference Frame (ICRF) (Ma et al. 1998) that realizes the ICRS. At the 24th IAU GA in 2000, a number of resolutions were passed that concern the definitions of astronomical reference systems and transformations between them:

- Resolution B1.3 specifies that the systems of space-time coordinates as defined by IAU Resolution A4 (1991) for the solar system and the Earth within the framework of General Relativity are named the Barycentric Celestial Reference System (BCRS) and the Geocentric Celestial Reference System (GCRS), respectively. It also pro-

This resolution also recommends that the IERS continue to provide users with data and algorithms for the classical transformations (i.e. referred to the equinox).

- Resolution B1.9 provides the conventional linear relation between TT and TCG.

The IAU 2000 Resolutions have been implemented in IERS 2003 Conventions that include expressions, tables and routines based on either the classical or the new transformation.

3. ACTIVITIES OF THE NFA WORKING GROUP

The implementation of the IAU 2000 Resolutions (especially B1.3, B1.7 and B1.8) for various astronomical applications requires that a consistent and well defined terminology be recognized and adopted by the astronomical community for all the quantities based on the new concepts. The terminology issue began to be discussed within the ICRS Working Group in 2003 and in recent papers (Seidelmann and Kovalevsky 2002, Capitaine et al. 2003 a, b) and was identified during the 2003 IAU General Assembly as being an important and urgent issue. The Division 1 Working Group on “Nomenclature for Fundamental Astronomy” (NFA) was established by the 2003 IAU GA with the task of preparing a consistent and well defined terminology for fundamental astronomy.

Starting from October 2003, the activities of the NFA WG has consisted of newsletters, questionnaires, e-mail discussion and the preparation of WG recommendations and guidelines as well as a draft resolution to be submitted to the IAU 2006 GA. They have also included the preparation of explanatory documents that are intended to support the NFA recommendations. All the NFA material has been made available on the NFA web site.

The NFA WG Newsletters

Five newsletters were issued by the NFA WG from October 2003 to July 2004 to discuss the different steps to be followed by the WG in order to select the proposed terminology. One important step has been the preparation of a NFA questionnaire, a preliminary version of which was submitted to the WG (November 2003) with Newsletter 2. Suggestions of the WG were incorporated including splitting the Questionnaire into two parts; Questionnaire NFA/A on ‘terminology choices’ which was at first intended for the astronomical community, and Questionnaire NFA/B, for the Almanac Offices and related organizations. All the WG members responded to QA and the main Almanac Offices responded to QA and QB (issued on 13 January 2004). Newsletter 4 (15 March 2004) included a short summary of the questionnaire responses together with some further questions to the WG. The documents collecting the responses and comments to both questionnaires have been the basis for the preparation of WG recommendations and explanatory documents. These documents are more appropriate to be submitted for comments to the astronomical community instead of the questionnaire itself. Newsletter 5 (16 July 2004) included draft1 WG Recommendations and Resolution proposal.

The NFA WG web site

All the documents regarding the WG discussion and the Newsletters are posted on the webpage of the NFA WG at: <http://syrtel.obspm.fr/iauWGnfa/>; the page also includes links to sites of interest for the WG activities. The NFA webpage contains, at the time of the Journées 2004, the following items: Membership, Working Group objectives and methods, Newsletters 1 to 5 with the NFA Questionnaire, NFA explanatory documents, Related documents, Questionnaire responses, Educational documents, IAU Resolutions and Links (to IAU, Div 1, IERS, IERS Conventions 2003, IERS FAQs, IVS, IAU Resolutions, Division 1 Working Groups).

The NFA WG e-mail discussion

There has been active WG e-mail discussion about the following points:

- the naming of the old and new paradigms (e.g. “equinoctial” and “orthogenic”, respectively, or “equinox based” and “CIO based”, respectively),

- the naming of the system defined by the CIP equator and the CIO (e.g. “intermediate”),
- the naming and order of certain steps in the transformation from ICRS to observer (e.g. ‘apparent intermediate places’),
- the naming of the distance between the equinox and the CIO along the equator,
- whether to use capitals for names for origins, poles and systems,
- whether to improve the consistency of the nomenclature in using the designation “intermediate” to refer both to the pole and the origin of the new systems linked to the CIP and the CIO or TIO,
- whether to refer to catalogue coordinates as ICRF or ICRS coordinates,
- whether to use “system” or “frame” for the “intermediate frame/system”,
- whether “right ascension” could legitimately be used in an extended way,
- the meaning of the term and concept of the ICRS (including orientation),
- the meaning of the term and concept of TCB/TDB,
- the relationship between the spatial axes of the BCRS and the ICRS,
- the need for a new name for the GCRS having its axes aligned to those of the ICRS.

The agreement reached by the WG on some of the above points has been reflected into the draft WG Recommendations; in contrast, there are still some weak points (e.g. the use of capitals) and some issues to be further discussed (e.g. the spatial axes of the BCRS/GCRS).

The NFA WG explanatory documents

This includes:

NFA/A documents providing the basis for the IAU Resolutions and their implementation,

NFA/B documents providing detailed implementation of the proposed terminology:

- B1: Chart from transformation from ICRS to observed places (20 July 2004),
- B2: Summary of terms and definitions (20 July 2004),
- B3: Terminology list (20 July 2004)

The educational activities

A special page of the NFA web site makes available documents (pdf files) with educational purpose relevant to the NFA issue; this includes:

(i) presentations at different meetings on the IAU Recommendations on Reference Systems and their applications (e.g. at Journées 2001, 2004, IVS Meeting 2004, AAS Meeting 2004, etc.),

(ii) one example transformation (from P. Wallace) which is an application of the IAU 2000 resolutions concerning Earth orientation and rotation in order to predict the topocentric apparent direction of a star.

4. NFA WG RECOMMENDATIONS AND GUIDELINES ON TERMINOLOGY

The summary of the responses and comments to the NFA questionnaire provided in the NFA Newsletter 4 and the responses to the questions of this Newsletter have led to draft Working Group recommendations and guidelines on terminology circulated to the WG with Newsletter 5. These guidelines have been discussed in July and August 2004 by the WG and they now need to be discussed by a larger community before being submitted to the IAU together with a Resolution proposal to the IAU 2006 GA (See the Annex of the NFA discussion, this Volume). The explanatory documents are updated according to the discussion.

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