A   Recommendations on terminology by the 2003-2006 IAU NFA Working Group (August 2006)

The final recommendations on terminology associated with the IAU 2000/2006 resolutions of the IAU Working Group on "Nomenclature for fundamental astronomy" (NFA) are the following (see Capitaine *et al.*, 2007):

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 "CIO based" for referring to the classical and new paradigms, respectively.*

   Comment: the "Celestial/Terrestrial Intermediate Origin" with the acronym CIO/TIO is proposed here as the updated terminology to replace the IAU 2000 "Celestial/Terrestrial Ephemeris Origin" with the acronym CEO/TEO (see below items 3 and 4 and the proposed resolution).

3. *Using "intermediate" to describe (i) the moving geocentric celestial reference system defined in the IAU 2000 resolutions (i.e. containing the CIP and the CIO), and (ii) the moving terrestrial reference system containing the CIP and the TIO.*

   Comment the term "intermediate" has been chosen to specify that these systems are intermediary systems between the geocentric celestial reference system and the terrestrial reference system, which are realized by using the models, constants and procedures that are conventionally accepted; it conventionally separates the instantaneous celestial orientation of the Earth into components we label polar motion (in the terrestrial reference system) and precession-nutation (in the celestial reference system).

4. *Harmonizing the name of the pole and the origin to "intermediate" and therefore changing CEO/TEO to CIO/TIO.*

5. *Using "system" in a broad sense rather than "frame" in this context of the intermediary system/frame.*

6. *Using special designations for particular realizations of the intermediate celestial reference system.*

   Comment: this applies for example to "the IAU 2000A system" to designate the system which is realized by transforming the geocentric celestial reference system GCRS to the intermediate system using the IAU 2000A precession-nutation and associated frame biases at J2000.0 (the GCRS being transformed from the BCRS by using the coordinate transformation specified in the IAU 2000 Resolution B1.3).

7. *Keeping the classical terminology for "true equator and equinox" (or "true equinox based") for the classical equatorial system.*

8. *Choosing "equinox right ascension" (or "RA with respect to the equinox") and "intermediate right ascension" (or "CIO right ascension", or "RA with respect to the CIO"), for the azimuthal coordinate along the equator in the classical and new paradigms, respectively. (Note that right ascensions and declinations with respect to the ICRS are usually designated by α_{ICRS}, δ_{ICRS}).*

   Comment: this is to be specified only once in the presentation of a paper if there is some risk of misunderstanding. Afterwards, "right ascension" alone is sufficient.

9. *Giving the name "equation of the origins" to the distance between the CIO and the equinox along the intermediate equator, the sign of this quantity being such that it represents the CIO right ascension of the equinox, or equivalently, the difference between the Earth Rotation Angle and Greenwich apparent sidereal time.*

10. *Retaining "apparent places" and "mean places" in the equinox based system.*

11. *Not introducing "apparent intermediate places" in the CIO based system, but introducing instead "intermediate places".*

12. *Using "ITRF zero-meridian" to designate the plane passing through the geocenter, ITRF pole and ITRF x-origin and using, if necessary, "TIO meridian" to designate the moving plane passing through the geocenter, the CIP and the TIO.*

13. *Fixing the default orientation of the BCRS so that for all practical applications, unless otherwise stated, the BCRS is assumed to be oriented according to the ICRS axes.*

   <u>Comment</u>: Once the BCRS is spatially oriented according to the ICRS, the spatial GCRS coordinates get an "ICRS-induced" orientation.

14. *Re-defining Barycentric Dynamical Time (TDB) as a fixed linear function of TCB*:

   $$\text{TDB} = \text{TCB} - \text{L}_\text{B} \times (\text{JD}_\text{TCB} - \text{T}_0) \times 86400 + \text{TDB}_0,$$

   where $\text{T}_0 = 2443144.5003725$,

   and $\text{L}_\text{B} = 1.550519768 \times 10^{-8}$ and $\text{TDB}_0 = -6.55 \times 10^{-5}$ s are defining constants.
   <u>Additional points</u>

- *Considering a terminology associated with other types of apparent places, although it may be required for specific use, has not been considered as being essential for common astronomical use and is therefore not part of the NFA WG terminology recommendations.*

- *No WG consensus having been reached for having strict rules for using or not using capitals for names for origins, poles and systems, no recommendation on this issue is proposed by the WG. The policy adopted throughout the NFA document is to capitalize those terms that are defined in IAU or IUGG resolutions.*