

Report of the
IAU WORKING GROUP
*"Nomenclature for
Fundamental Astronomy" (NFA)*

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IAU WG "Nomenclature for Fundamental Astronomy" (NFA)

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IAU WG "Nomenclature for Fundamental Astronomy" (NFA)

*Created by Division 1 at the 24th IAU General Assembly
(July 2003)*

*Membership approved by the Division 1 OC and the IAU EC
on November 2003*

General task of the Working group on NFA:

*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
a large community of scientists.*

Resolutions of the 2000 IAU GA on the celestial reference systems

- IAU Resolution B1.3

Definition of BCRS and GCRS

Aim: coordinate systems in the framework of GR

- IAU Resolution B1.6

IAU 2000 Precession-Nutation Model

Aim: submilliarcsecond accuracy

- IAU Resolution B1.7

Definition of Celestial Intermediate Pole

Aim: realization of the pole in the high frequency domain

- IAU Resolution B1.8

Definition and use of CEO and TEO

Aim: accurate estimation of parameters : UT1, Precession-nutation separately

IAU 2000 Resolution B1.3

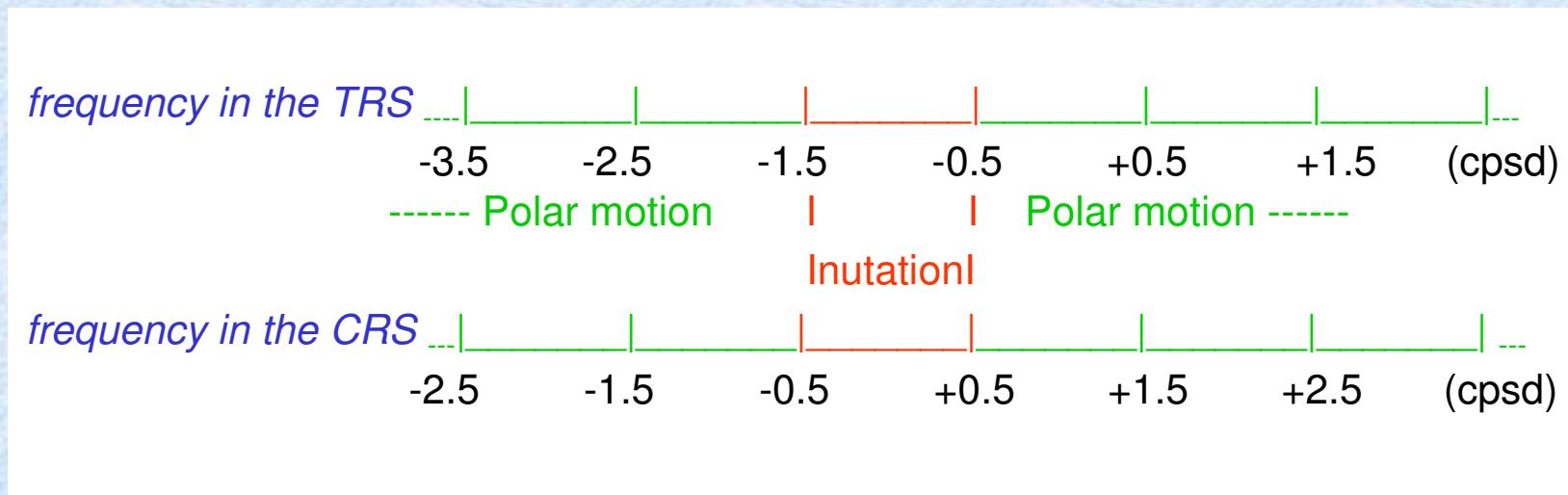
Clarification of IAU's 1991 definition of the coordinate systems in the framework of GR : *distinction between the celestial systems*

- a) for Solar System (BCRS) which can be considered to be a *global coordinate system* that contain all the 'far away regions'
- b) for the Earth (GCRS) which can only be considered as a *local coordinate system*

Definition of the Celestial Intermediate Pole (IAU Resolution B1.7)

Definition of the CIP for high frequency variations

- Celestial motion is the IAU 2000 precession-nutation for periods > two days + offsets
- Nutations with periods < two days included in the model for motion in the TRS



Implementation of Resolutions B1.6

- *Nutation*

IAU2000A : ~ 650 luni-solar terms and ~ 650 planetary terms at 1 μ as
IAU 2000 B (its shorter version): ~80 terms for 1 mas level

- *Precession*

IAU 2000 : IAU 1976 + (VLBI) corrections to precession rates

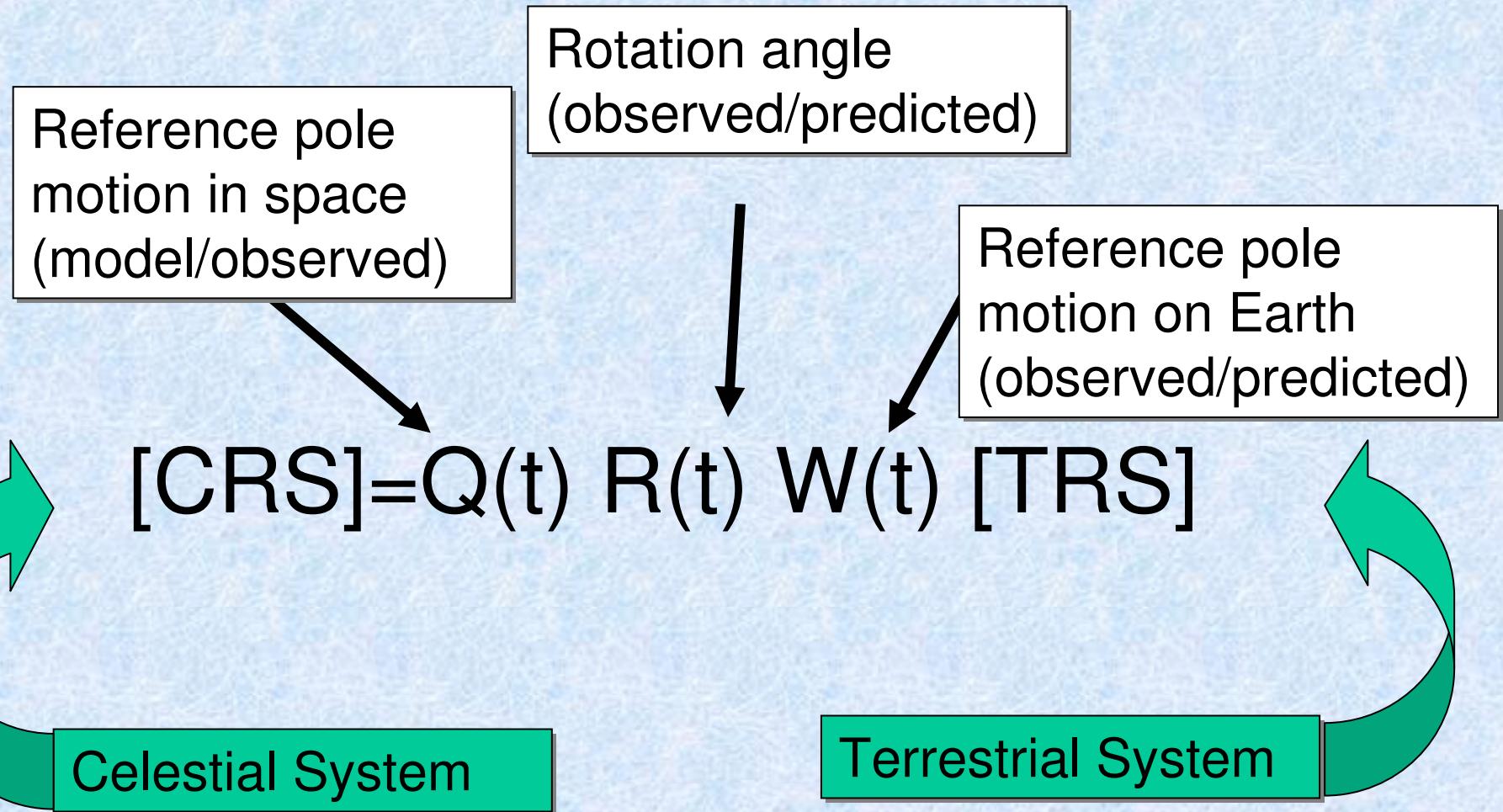
$$d\psi_A \text{ (IAU 2000)} = -0''.29965/\text{cy} ; d\omega_A \text{ (IAU 2000)} = -0''.02524 / \text{cy}$$

- *Celestial pole offsets at J2000*

IAU 2000 frame biases (VLBI estimates)

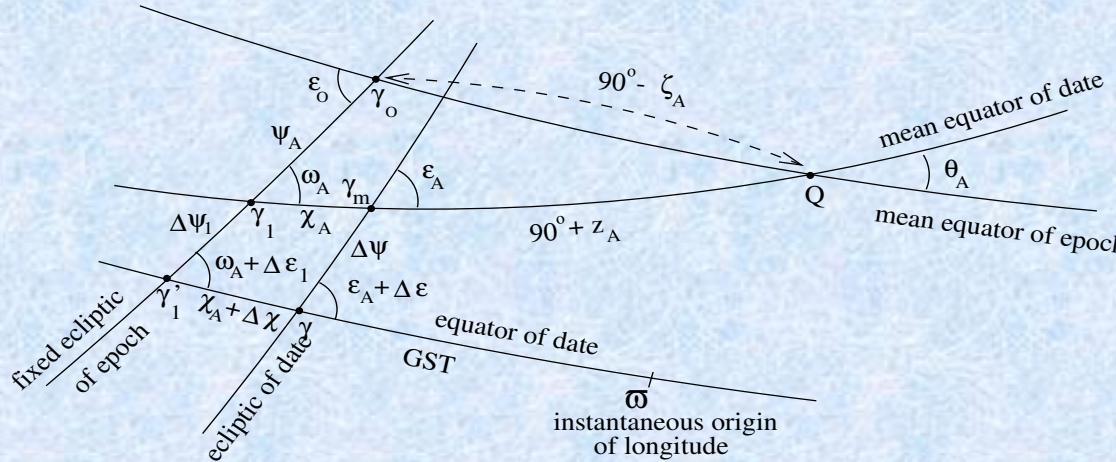
$$\xi_0 \text{ (IAU 2000)} = -16.6 \text{ mas} ; \eta_0 \text{ (IAU 2000)} = -6.8 \text{ mas}$$

Transforming Coordinates

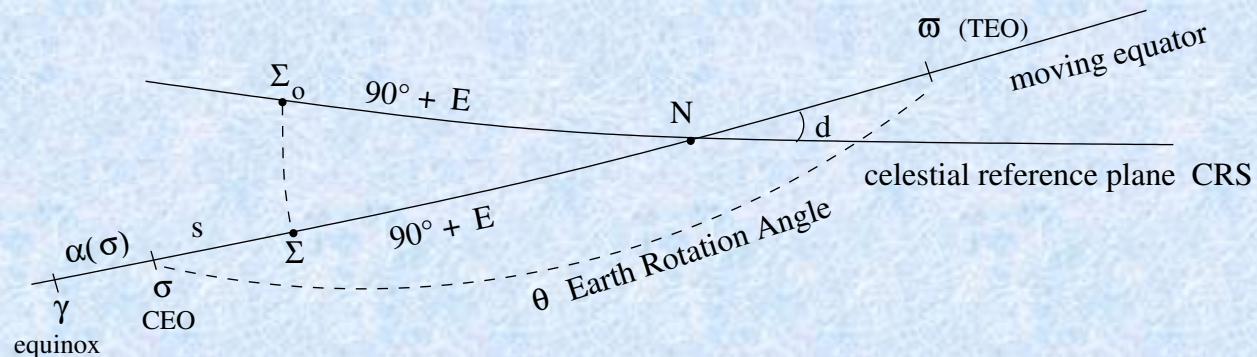


Implementation of Resolutions B1.8

Classical transformation: equinox-based



Recommended new transformation: CEO based



IAU WG "Nomenclature for Fundamental Astronomy" (NFA)

<http://danof.obspm.fr/iauWGnfa>

- Membership
- Working Group objectives and methods
- Newsletters 1 to 5 + NFA Questionnaire
- NFA explanatory documents
- Related documents
- Questionnaire responses
- Educational documents
- IAU Resolutions
- Links : *to IAU, Div 1, IERS, IERS Conventions 2003, IERS FAQs, IVS, IAU Resolutions, Div1 WGs*

IAU WG "Nomenclature for Fundamental Astronomy" (NFA)

Working Group objectives and methods

- 1. Background on IAU Resolutions on reference systems*
- 2. Terminology for Implementing the IAU Resolutions*

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 is recognized and adopted by the astronomical community for all the quantities based on the new concepts.

- 3. The Working Group ``Nomenclature for Fundamental Astronomy" (NFA)*
- 4. The NFA Questionnaire*
- 5. NFA Working group recommendations and guidelines on terminology*
- 6. References*

-> Explanatory document A

IAU WG "Nomenclature for Fundamental Astronomy" (NFA)

NFA Newsletters

- [Newsletter 1](#) (20 October 2003) + 6 Annexes
- [Newsletter 2](#) (19 November 2003) + 2 Annexes
- [Newsletter 3](#) (13 January 2004) + 1 Annex
- [NFA Questionnaire](#) (13 January 2004)
- [Newsletter 4](#) (15 March 2004) *including a short summary of the Questionnaire responses and questions to the WG*
- [Newsletter 5](#) (16 July 2004) *including draft_1 WG Recommandations and Resolution proposal*

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NFA explanatory documents

- Transformation Chart (20 July 2004), *pdf file*
- Terminology Table (20 July 2004), *pdf file*
- Terminology List (20 July 2004), *pdf file*

IAU WG "Nomenclature for Fundamental Astronomy" (NFA)

Educational documents relevant to the NFA issue

1) Presentations (pdf files)

- *Precession-nutation in the framework of the IAU 2000 Resolutions* (NC)
- *The IAU Recommendations on Reference Systems and their applications* (NC & DMC)
- *Recent International Recommendations on reference Systems* (DMC)
- *SOFA software support for IAU 2000* (PW)
- *Développements récents des concepts et des modèles en Astronomie fondamentale* (NC)
- *VLBI contribution to precession (present and future)* (NC&PW)
- *Effect of the VLBI procedure on the estimated quantites for precession, nutation and UT1* (NC)

2) Examples (pdf files)

- *An example transformation* (PW): *Application of the IAU 2000 resolutions concerning Earth orientation and rotation. The objective is to predict the topocentric apparent direction of a star*

IAU WG "Nomenclature for Fundamental Astronomy" (NFA)

Result of the work of the WG (october 2003 - august 2004)

→ Draft documents for the IAU 2006 GA

- *NFA WG Recommendations and guidelines (26 August 2004)*
- *Draft Resolution to be submitted to the IAU 2006 GA*
- *Explanatory documents for supporting NFA recommendations*
 - *NFA/A : reports on the basis for the IAU Resolutions and their implementation*
 - *NFA/B: detailed implementation of the proposed terminology:*
 - *B1: Chart from transformation from ICRS to observed places*
 - *B2: Summary of terms and definitions*
 - *B3: Terminology list*