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Joint Discussion 16
Nomenclature, precession and new models in fundamental astronomy
Applications and scientific contribution to astronomy

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Preface

The IAU Joint Discussion 16 was held at the IAU XXVI General Assembly in Prague, in August 2006. The title of the meeting was *Nomenclature, Precession and new models in Fundamental Astronomy. Applications and scientific contribution to astronomy.* It was organized by IAU Division I (*Fundamental Astronomy*) and Commission 19 (*Earth Rotation*), with the participation of IAU Division X (*Radio Astronomy*) and all the Division I Commissions, as well as with the support of the International Association of Geodesy (IAG). The Scientific Organizing Committee was made up of the three organizers and the representatives of these scientific bodies.

This JD 16 was of 1.5-day duration and was composed of the six following sessions:

1. State of the art of the implementation of the *IAU Resolutions* and the ICRS
2. Precession and the ecliptic
3. High accuracy models for reducing astronomical observations
4. New terminology in fundamental astronomy, time and relativity
5. Scientific applications of high-accuracy astronomy
6. General discussion and educational efforts

Each session consisted of two invited talks, one to four oral presentations and a number of posters.

Presentations covered both completed works and prospects for the future. The meeting was also an opportunity to present to a large audience the proposals for new IAU *resolutions* related to the topic of the meeting, which were submitted to be voted on during the second session of the 26th IAU GA.

The main purpose of JD 16 was to discuss recent and future IAU *resolutions* on reference systems. The International Celestial Reference System (ICRS) and its realization the International Celestial Reference Frame (ICRF) were adopted by the IAU XXIII General Assembly in 1997. At the IAU XXIV General Assembly in 2000, a number of additional *resolutions* were passed concerning the definition of the celestial and terrestrial reference systems and transformations between them. These *resolutions* contain several new concepts. Implementation of these resolutions requires a consistent and well defined terminology that is recognized and adopted by the astronomical community. The

Working Group on *Nomenclature for Fundamental Astronomy* was to make related educational efforts for addressing the issue to the larger community of scientists. Two *resolutions* on new terminology and an improved definition of Barycentric Dynamical Time (*Resolutions 2 and 3*) submitted to the IAU XXVI General Assembly in 2006 were discussed.

Discussion of the IAU 2000A precession-nutation at the IAU XXV GA in 2003, revealed a requirement for a new precession model that was consistent with both dynamical theories and the IAU 2000A nutation model; it also revealed the need for an improved definition for the ecliptic. The Division I Working Group on *Precession and the Ecliptic* was created to address these requirements. This WG has selected a new, high-accuracy precession model to replace the IAU 2000 precession. A proposal to adopt this precession model has been submitted to the IAU 2006 GA (*Resolution 1*). This *resolution* has been presented and discussed along with proposals for next generation models.

The adopted reference systems and the high-accuracy models which have been recently developed make possible various scientific applications in a number of fields of astronomy. Another objective of JD 16 was the presentation of scientific applications of high accuracy astrometric observations, models and accurate realizations of reference systems for ephemerides, celestial mechanics, astrometry, Earth rotation, time and radio-astronomy.

Improvements in astrometric models and catalogues were discussed. Effects such as Earth rotation, nutation, light deflection, and relativistic transformations, with potential for various scientific applications were presented, emphazing the recent progress in models and observations (Earth dynamics, spacecraft observations and planetary ephemerides, time synchronization and navigation in deep space). Presentations about future space astrometric missions, like *Gaia* and *SIM*, were also discussed. The final discussion emphasized the necessary educational effort to be done in order that a sufficient number of students all over the world be educated with the knowledge and skills in astrometry in order to support existing and future projects.

The scientific programme of the meeting included 12 invited papers, 20 oral and 45 poster presentations, 90 % of which have been provided for the proceedings. The proceedings are divided into six parts corresponding to the sessions of the meeting, each one including one-page, one-half page and one-fourth page abstracts corresponding to the invited papers, the oral papers and the posters, respectively.

We express our thanks to the Scientific Organizing Committee for its valuable help in preparing the scientific programme and chairing the sessions, and to all the authors of presentations for their very interesting contributions. We thank the Local Organizing Committee for the very efficient help during the meeting, especially the Chair of the SOC, Cyril Ron.

Scientific Organizing Committee

Aleksander Brzezinski (Polska), Mark R. Calabretta (Australia), Nicole Capitaine (France, co-chair), Veronique Dehant (Belgique), Toshio Fukushima (Japan), James L. Hilton (USA, co-chair), Kenneth J. Johnston (USA), Irina I. Kumkova (Russia), Andrea Milani (Italia), Robert A. Nelson (USA), Kenneth P. Seidelmann (USA), Michael Soffel (Germany), and Jan Vondrák (Czech Republic, co-chair).

Nicole Capitaine, James Hilton, Jan Vondrák, co-chairs of the JD 16 SOC,
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