



Report on the activities of the IAU/IAG Joint Working Group on Theory of Earth Rotation

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Introduction: purpose of the IAU/IAG JWG_ThER

- *The International Association of Geodesy (IAG) and the International Astronomical Union (IAU) set up a new Joint Working Group on Theory of Earth Rotation in April 2013.*
- *The **purpose** of this **JWG** is:*
To promote the development of theories of Earth rotation that are fully consistent and that agree with observations and provide predictions of the ERP (Earth Rotation Parameters) with the accuracy required to meet the needs of the near future as recommended by, e.g., GGOS, the Global Geodetic Observing System of the IAG.
- **Let us recall that GGOS accuracy goals are 1 mm in position and 0.1 mm/yr in velocity on global scales** for the ITRF. The accuracy in position corresponds roughly to **30 μ as** and **3 μ as/yr** - *angles measured from the Earth's centre.*

Desired Outcomes of the JWG

- 1. Contribute to improving the accuracy of precession-nutation and ERP theoretical models** by proposing both new models and additional corrections to existing models.
- 2. Clarify the issue of consistency** among **conventional ERP**, their **definitions** in various **theoretical approaches**, and their **practical determination**.
- 3. Establish guidelines or requirements for future theoretical developments** with improved accuracy.

The overall goals of the WG cannot be achieved within only 2 years.

The first term should be used to develop a solid concept of how to reach its aims.

Reports must be presented at the next General Assemblies of both IAU and IAG, in 2015.

Structure of the JWG

The **structure** of this JWG follows the **characteristics of the current set of EOP** (Earth Orientation Parameters) as well as the fields of specialization of researchers.

People in charge:

- **Chair:** Jose M. Ferrándiz (IAU)
- **Vice-Chair:** Richard Gross (IAG)

The WG is structured in three Sub-Working Groups (SWG):

1. **Precession/Nutation** (Chair: Juan Getino)
2. **Polar Motion and UT1** (Chair: Aleksander Brzezinski)
3. **Numerical Solutions and Validation** (Chair: Robert Heinkelmann)

SWG 3 will be dedicated to numerical theories and solutions, relativity and new concepts and validation by comparisons among theories and observational series.

General organization of activities

- *Each SWG is entrusted with its own tasks and goals.*
- **The three SWG should work in parallel** for the sake of efficiency **and** they should be coordinated and **linked together** as closely **as the needs of consistency demand.**
- **The JWG is intended on an open basis and the cooperation of non-members is welcome. All people interested in Earth rotation is invited to contribute**
- **If you do not know how to contribute, please contact any of the chair persons or visit our website**
<http://web.ua.es/en/wgther>

Initial activities and previous meetings

- Related JWG meetings, most of them open to attendants, were held on occasion of different conferences:
 - *IAG 2013 Scientific Assembly, in Potsdam*
 - *Journées 2013, in Paris*
 - *8th IVS General Meeting 2014, in Shanghai*
 - *EGU 2014, in Vienna*
- Most of the presentations there and other documents – memos, ToRs, member list, etc. are available at the JWG web site, hosted by the Institution of the Chair – University of Alicante, Spain

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- **Consistency** has been one of the main concerns in the discussions, according to the JWG Terms of Reference and other IAG initiatives - e.g. the GGOS Bureau for Standards and Conventions (BSC)