Motivation

- Accuracy of measurements higher than that of reference frame realizations
- Geodetic/geophysical interpretation and navigational requirements have pushed accuracy requirements
- A consistent framework for all space techniques is missing
- Further progress only possible through a consistent realization and consistent link of all reference systems

Goals defined in Whitebook (Nothnagel et al. 2010)

G1 Consistency of reference systems
G2 Definition of high-precision reference systems
G3 Improvement of physical background models
G4 Integration of all space-geodetic and astrometric observations
G5 Realization of next generation reference systems
G6 Near-real-time determination and availability of reference frames

Tasks defined to reach the goals above

T1 Refinement of definitions and conventions
T2 Homogenization of models for data reduction and parameterisation
T3 Improvement in the realization of geocentric, selenocentric and planetocentric reference frames
T4 Control and improvement of solar system ephemerides
T5 Realisation of the geodetic datum
T6 Investigations in relativistic effects in the context of next generation reference frames
T7 Refinement of co-location of sensors on Earth and in space
T8 Development of refined combination strategies
T9 Realisations of links between reference frames
T10 Investigations in quality and long-term stability of reference frames
T11 Establishment of real-time reference frames

Structure of the Research Unit

Space-Time Reference Systems for Monitoring Global Change and for Precise Navigation in Space


DFG Research Unit (Second Phase in Preparation)

Research areas

Fig. 1: Reference frames are central for kinematics, rotation and gravity field. This applies to the Earth, the Moon and the planets.

Fig. 2: The world of objects, reference systems and observations covered in this Research Unit.

Fig. 3: Projects of the Research Unit

Goals and tasks

- Advances in methodology
- Application of geodetic methodologies to Moon and planets
- Stronger cooperations between disciplines

Promotion of young scientists

- Integration in a profound network of scientists
- Introduction into global science community
- Dedicated female courses on project management and conflict handling

Impact on Earth-, Moon-, Planetary -System Sciences

- IAG Global Geodetic Observing System (GGOS)
- IAU/IAG Working Group on Planetary Coordinates + Rotational Elements
- IAU Working Group on ICRF-3
- Other IAG/IAU/ERS Working Groups
- Space probe missions (Chang’E-3, Lunar Reconnaissance Orbiter, Venus Express …)

Additional benefits of the Research Unit

- Additional key achievements
- Promotion of young scientists

Additional key achievements

- IAG Global Geodetic Observing System (GGOS)
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