

**Opportunity Title:** Understanding the estimated scale differences between different space geodetic techniques.

**Opportunity Reference Code:** IC-16-15

**Organization** Office of the Director of National Intelligence (ODNI)

**Reference Code** IC-16-15

**How to Apply** **Create and release your Profile on Zintellect** – Postdoctoral applicants must create an account and complete a profile in the on-line application system. **Please note: your resume/CV may not exceed 2 pages.**

**Complete your application** – Enter the rest of the information required for the IC Postdoc Program Research Opportunity. The application itself contains detailed instructions for each one of these components: availability, citizenship, transcripts, dissertation abstract, publication and presentation plan, and information about your Research Advisor co-applicant.

**Application Deadline** 4/15/2016 6:00:00 PM Eastern Time Zone

**Description** The Terrestrial Reference Frame (TRF) is the basis that defines the earth's coordinate system, i.e. latitude, longitude, and elevation. The accuracy and stability of this TRF is tied to a number of parameters, but currently the limiting factors are the frame's realization of center of mass and scale. Currently, the world's best TRF is the International Earth Rotation and Reference System Service's International TRF 2008 (IERS' ITRF08). The ITRF08 is considered to have a level of accuracy at the level of 1.2 ppb (parts per billion), that is 8 mm at the equator.

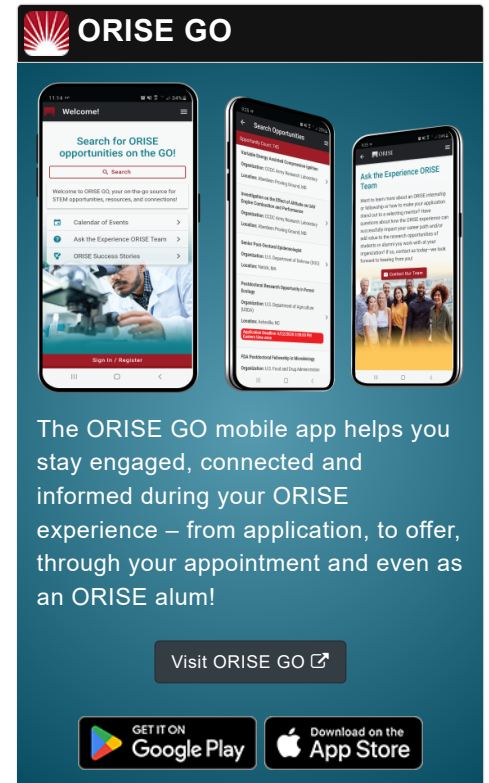
The ITRF08 is realized through the combination of geodetic data from the four space geodetic techniques: Satellite Laser Ranging (SLR), Very Long Baseline Interferometry (VLBI), Global Navigation Satellite Systems (GNSS), and Doppler Orbitography Radiopositioning Integrated by Satellite (DORIS). One of the larger sources of error to this frame is believed to be the differences between the SLR and VLBI scales estimated at 1.05 +/- 0.13 ppb and 0.049 +/- 0.010 ppb/year at epoch 2005. Future improvements in TRF accuracies reside in improving the consistency of local ties in co-location sites, site characterization, and space geodesy estimates.

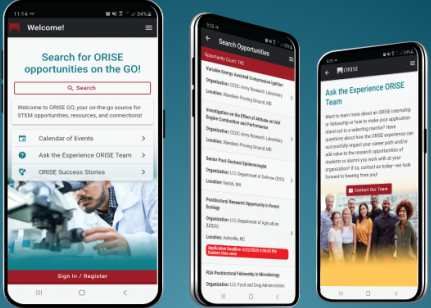
In a recent study by Haines et al. (JGR, 2015), they estimate a Global Positioning System (GPS) based TRF frame. Their frame's scale differs from ITRF by 1.1 ppb (about 7 mm at the equator). With this advancement future terrestrial reference frames may use SLR, VLBI, and GNSS techniques to estimate scale.

#### Example Approaches

The aim of this research is to investigate the different space









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geodetic techniques: SLR, VLBI, and GNSS focusing on the different sources of errors that will affect the realization of TRF scale and how these errors can be reduced to improve TRF scale estimates. This includes the potential contributions of local ties in co-location and knowledge of site characterization and how changes in these site characterizations introduce errors into scale.

**Eligibility  
Requirements**

- **Citizenship:** U.S. Citizen Only
- **Degree:** Doctoral Degree.
- **Discipline(s):**
  - **Business** (11 )
  - **Chemistry and Materials Sciences** (12 )
  - **Communications and Graphics Design** (6 )
  - **Computer, Information, and Data Sciences** (16 )
  - **Earth and Geosciences** (21 )
  - **Engineering** (27 )
  - **Environmental and Marine Sciences** (14 )
  - **Life Health and Medical Sciences** (45 )
  - **Mathematics and Statistics** (10 )
  - **Other Non-Science & Engineering** (13 )
  - **Physics** (16 )
  - **Science & Engineering-related** (1 )
  - **Social and Behavioral Sciences** (28 )