



Space Geodesy Networks to Improve the ITRF

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Ground-based networks of co-located space geodetic techniques (VLBI, SLR, GNSS, DORIS) are the basis for the development and maintenance of the International Terrestrial Reference Frame (ITRF), which is our metric of reference for measurements of global change. The Global Geodetic Observing System (GGOS) of the International Association of Geodesy (IAG) has established a task to develop a strategy to design, integrate and maintain the fundamental geodetic network and supporting infrastructure in a sustainable way to satisfy the long-term requirements for the reference frame. The GGOS goal is an origin definition at 1 mm or better and a temporal stability on the order of 0.1 mm/y, with similar numbers for the scale and orientation components. These goals are based on scientific requirements to address sea level rise with confidence, but other applications are not far behind. Recent studies including one by the US National Research Council has strongly stated the need and the urgency for the fundamental space geodesy network. Simulations are underway to examining accuracies for origin, scale and orientation of the resulting ITRF based on various network designs and system performance to determine the optimal global network to achieve this goal. To date these simulations indicate that 24 – 32 co-located stations are adequate to define the reference frame and a more dense GNSS and DORIS network will be required to distribute the reference frame to users anywhere on Earth. Stations in the new global network will require geologically stable sites with good weather, established infrastructure, and local support and personnel. GGOS will seek groups that are interested in participation. GGOS intends to issues a Call for Participation of groups that would like to contribute in the network implementation and operation. Some examples of integrated stations currently in operation or under development will be presented. We will examine necessary conditions and challenges in designing a co-location station.