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NASA's Next Generation Space Geodesy Program

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Requirements for the ITRF have increased dramatically since the 1980s. The most stringent requirement comes from critical sea level monitoring programs: a global accuracy of 1.0 mm, and 0.1mm/yr stability, a factor of 10 to 20 beyond current capability. Other requirements for the ITRF coming from ice mass change, ground motion, and mass transport studies are similar. Current and future satellite missions will have ever-increasing measurement capability and will lead to increasingly sophisticated models of these and other changes in the Earth system.

Ground space geodesy networks with enhanced measurement capability will be essential to meeting the ITRF requirements and properly interpreting the satellite data. These networks must be globally distributed and built for longevity, to provide the robust data necessary to generate improved models for proper interpretation of the observed geophysical signals.

NASA has embarked on a Space Geodesy Program with a long-range goal to build, deploy and operate a next generation NASA Space Geodetic Network (SGN). The plan is to build integrated, multi-technique next-generation space geodetic observing systems as the core contribution to a global network designed to produce the higher quality data required to maintain the Terrestrial Reference Frame and provide information essential for fully realizing the measurement potential of the current and coming generation of Earth Observing spacecraft.

Phase 1 of this project has been funded to (1) Establish and demonstrate a next-generation prototype integrated Space Geodetic Station at Goddard's Geophysical and Astronomical Observatory (GGAO), including next-generation SLR and VLBI systems along with modern GNSS and DORIS; (2) Complete ongoing Network Design Studies that describe the appropriate number and distribution of next-generation Space Geodetic Stations for an improved global network; (3) Upgrade analysis capability to handle the next-generation data; (4) Implement a modern survey system to measure inter-technique vectors for co-location; and (5) Develop an Implementation Plan to build, deploy and operate a next-generation integrated NASA SGN that will serve as NASA's contribution to the international global geodetic network.

An envisioned Phase 2 (which is not currently funded) would include the replication of up to ten such stations to be deployed either as integrated units or as a complement to already in-place components provided by other organizations.

This talk will give an update on the activities underway and the plans for completion.