4th plenary meeting of the Subcommittee on Geodesy

NASA Update

Stephen Merkowitz
NASA Goddard Space Flight Center

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Geodetic Infrastructure is the Foundation for Enabling Many Scientific Applications

- Sea level change
- Water cycle
- Geological hazards
- Weather/climate
- Ecosystems
- Geodynamics

- Land and ice deformation and change
- Sea surface height
- Atmospheric parameters
- Land and vegetation topography
- Mass change
- Surface and ground water
- and soil moisture

- Time variable gravity
- Altimetry
- InSAR and SAR
- Radio occultation
- GNSS reflections from space
- Optical change detection

- Precise positions
- Orbit determination
- Earth rotation
- Gravity field
- Reflection and signal-to-noise ratio
- Total electron content and tropospheric delay

- Station coordinates as function of time
- Origin (Earth system center of mass)
- Scale
- Orientation

- Geodetic techniques (SLR, VLBI, GNSS, DORIS)
- Software
- Experts
- Archives

National Academies: Evolving the Geodetic Infrastructure to Meet New Scientific Needs

https://doi.org/10.17226/25579

3/20/2024

http://space-geodesy.nasa.gov
NASA Plans Significant New Investments in Geodesy

Earth Science Budget Highlights

- Extension of Terra/Aqua/Aura to end of life, all missions in extended operations through 2026, senior review wedge in 2027 bounds future cost growth
- Supports critical research, applications, data and technology for mission schedules
- Consolidation of some mission science teams and discipline research areas for greater synergies across fields
- Responsive Science Initiatives Program realigns elements of research, tech, applied, and data programs and will focus on areas of national importance to work with interagency partners and provide products, information, and research with significant societal value
- Includes a sustained budget increase for Interagency Satellite Observation Needs (formerly SNWG)

- Doubles the investment in Geodesy infrastructure, supporting NASA, civil space and national security needs for accurate Earth positioning
- New content in Earth Science Technology to begin developing the first space-borne quantum gravity gradiometer (QGG).

https://science.nasa.gov/
NASA Space Geodesy Program

NASA Space Geodesy Network

NASA Global GNSS Network
Next-Generation Station Deployment

Ny-Ålesund, Svalbard

Fortaleza, Brazil

Maryland, USA

Texas, USA

http://space-geodesy.nasa.gov
VGOS Continues to Grow

VGOS Network expanded to 12 stations with more on the way.

Hawaii-Germany 1-hour VGOS sessions producing rapid dUT1 predictions used by many operational systems including GNSS.

Correlators cut turnaround time for 24-hour sessions by more than half to ~30 days while cadence increased from 2 to 3 per month.

Evaluations of alternative intensive baselines such as Texas-Germany drive towards a more robust network.

Hawaii

Goddard

Texas
CDDIS - Total number of files downloaded by Country 2023

https://cddis.nasa.gov
Laser Ranging to GPS Coming Soon

First GPS III vehicles with NASA provided laser retroreflectors available for launch in 2025

Fight unit under optical testing
Observations of a common space-based reference has the potential for reducing the uncertainty in the local-ties to the mm level thus improving the ITRF combination.

NASA GRITSS Demonstration Mission targeting launch in Fall 2025.
Outreach and Training the Next Generation

Liceu High School visitation - Brazil

VLBI School - Brazil

NASA STEM Enhancement in Earth Sciences – Texas, USA

Open House at TLRS-3 - Peru

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