

Geodesy: The hidden infrastructure behind crucial infrastructure

Precise observations reveal how our planet moves, deforms, and changes over time.

Where is it? How is it moving? How is the Earth changing?

These fundamental questions are answered by *geodesy*, the science of measuring and understanding the Earth's shape, gravity field, rotation, and motion.

Why Geodesy Matters



Positioning and Navigation

Accurate geodetic reference frames underpin GNSS, surveying, mapping, navigation, and the operation of modern transport and communication systems.



Infrastructure Monitoring

Bridges, dams, railways, pipelines, buildings, and other critical infrastructure can be monitored for deformation and ground movement with millimetre-level precision.



Hazard and Climate Monitoring

Geodetic observations detect land subsidence, landslides, sea-level change, earthquake-induced deformation, and other processes that can threaten infrastructure and communities.



Resilience and Emergency Response

During disasters, reliable positioning and a common spatial reference are essential for coordinating observations, assessing damage, and supporting emergency response and recovery.

A National Strategic Asset

Geodetic infrastructure is *critical infrastructure itself*. Continuously operating reference stations, satellite observations, gravity networks, tide gauges, and other geodetic systems provide the stable spatial and temporal foundation needed to connect data across agencies, technologies, and generations. Without reliable geodesy, critical infrastructure cannot be consistently positioned, monitored, or connected. Investing in geodesy means investing in

Safe Infrastructure · Resilient Services · Disaster Preparedness · National Security · Informed Decision making.

Geodesy is the invisible infrastructure that makes critical infrastructure work.

Through the *International Association of Geodesy (IAG)* and its *Global Geodetic Observing System (GGOS)*, the global geodetic community works together to provide the measurements, reference systems, services, products and essential geodetic variables that help science and society understand our changing Earth and build a safer, more resilient world.



<https://geodesy.science/ggos/>