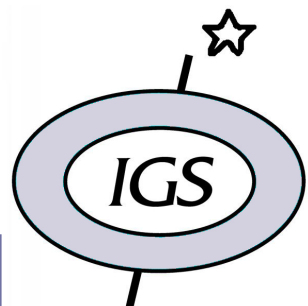


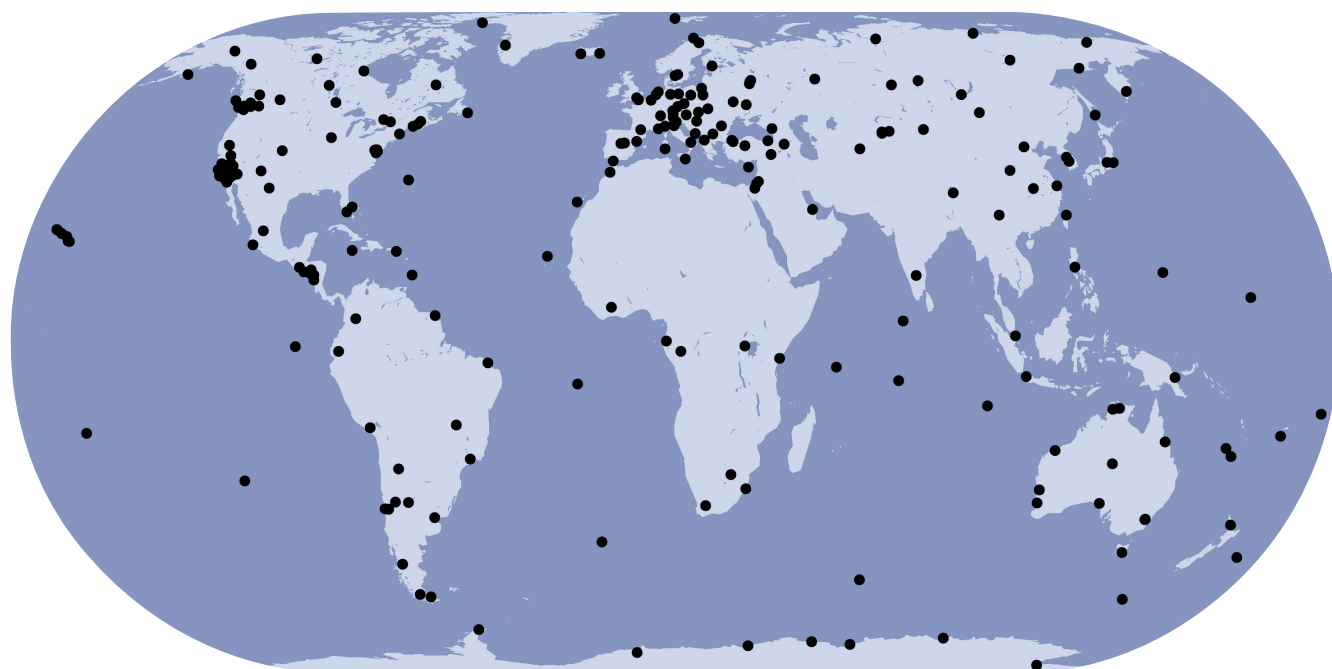
IGS



- ⊙ A *federation* of over 200 *worldwide* national agencies, universities, and research institutions in more than 80 countries
- ⊙ GPS satellite orbits to 5 cm — the *highest precision* in the world
- ⊙ *Precise positions* (5 mm) for 350 worldwide reference stations

⊙ All products mutually *consistent* in the IGS realization of the International Terrestrial Reference Frame

⊙ Continuous development of *new applications* and products in Working Groups and Pilot Projects



The foundation of the International GNSS* Service (IGS), formerly the International GPS Service, is a global network of over 350 permanent, continuously operating, geodetic-quality GPS and GLONASS tracking sites. The station data are archived at three Global Data Centers and six Regional Data Centers. Ten Analysis Centers regularly process the data and contribute products to the Analysis Center coordinator, who produces the official IGS combined products. The Central Bureau is responsible for day-to-day management of the IGS following policies set by the IGS International Governing Board.

*Global Navigation Satellite System

The IGS classic product set — satellite orbits, clocks, Earth rotation parameters, and station positions — is augmented by newer products borne from IGS Working Groups and Pilot Projects:

- Tropospheric path delay
- Ionospheric grid total electron content
- Real-time developments
- Precise Timing
- GLONASS classic products
- Low Earth orbiters
- Sea Level & Tide Gauges (TIGA)
- GNSS/Galileo initiative

The IGS reference frame coordinator determines tracking site coordinates and velocities in the International Terrestrial Reference Frame (ITRF), and organizes the IGS contribution to ITRF.

Central Bureau Information System <http://igs.cb.jpl.nasa.gov>
CDDIS Global Data Center <http://cddis.gsfc.nasa.gov>
IGN Global Data Center <http://igs.ensg.ign.fr>
SIO Global Data Center <http://sopac.ucsd.edu>

IGS Central Bureau
Jet Propulsion Laboratory MS 238-540
Pasadena, CA 91109 USA
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(GPS Broadcast Values Included for Comparison)

GPS SATELLITE EPHEMERIDES/ SATELLITE & STATION CLOCKS		ACCURACY	LATENCY	UPDATES	SAMPLE INTERVAL
Broadcast	Orbits	~160 cm	real time		daily
	Sat. clocks	~7 ns			
Ultra-Rapid (predicted half)	Orbits	~10 cm	real time	4x daily	15 min
	Sat. clocks	~5 ns			15 min
Ultra-Rapid (observed half)	Orbits	<5 cm	3 hours	4x daily	15 min
	Sat. clocks	~0.2 ns			15 min
Rapid	Orbits	<5 cm	17 hours	daily	15 min
	Sat. & Stn. clocks	0.1 ns			5 min
Final	Orbits	<5 cm	~13 days	weekly	15 min
	Sat. & Stn. clocks	<0.1 ns			5 min

Note 1: IGS accuracy limits, except for predicted orbits, based on comparisons with independent laser ranging results. The precision is better.

Note 2: The accuracy of all clocks is expressed relative to the IGS timescale, which is linearly aligned to GPS time in one-day segments.

GLONASS SATELLITE EPHEMERIDES

Final	15 cm	~2 weeks	weekly	15 min
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**GEOCENTRIC COORDINATES OF IGS
TRACKING STATIONS (>130 SITES)**

Final Positions	Horizontal	3 mm	12 days	weekly	weekly
	Vertical	6 mm			
Final Velocities	Horizontal	2 mm/yr	12 days	weekly	weekly
	Vertical	3 mm/yr			

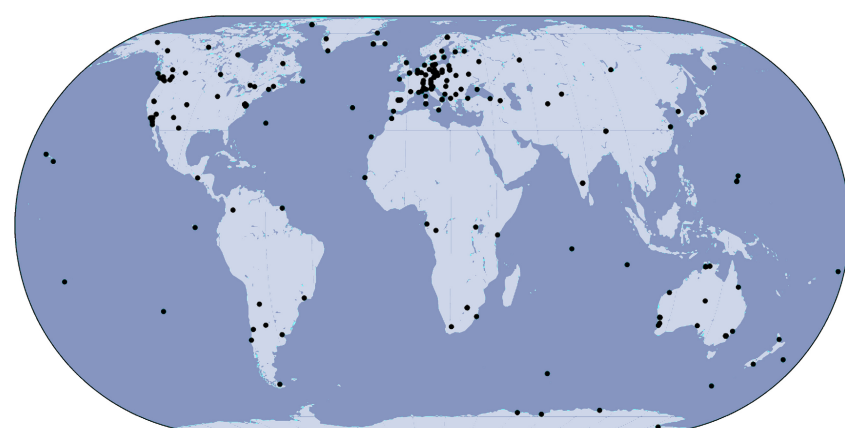
EARTH ROTATION PARAMETERS

Ultra-Rapid (predicted half)	Polar Motion	0.3 mas	real time	4x daily	4x daily
	Polar Motion Rate	0.5 mas/day			
	Length-of-day	0.06 ms			
Ultra-Rapid (observed half)	Polar Motion	0.1 mas	3 hours	twice daily	4x daily
	Polar Motion Rate	0.3 mas/day			
	Length-of-day	0.03 ms			
Rapid	Polar Motion	<0.1 mas	17 hours	daily	daily (12 UTC)
	Polar Motion Rate	<0.2 mas/day			
	Length-of-day	0.03 ms			
Final	Polar Motion	0.05 mas	~13 days	weekly	daily (12 UTC)
	Polar Motion Rate	<0.2 mas/day			
	Length-of-day	0.02 ms			

Note: The IGS uses VLBI results from IERS Bulletin A to calibrate for long-term LOD biases.

ATMOSPHERIC PARAMETERS

Final tropospheric zenith path delay	4 mm	<4 weeks	weekly	2 hours
Ultra-Rapid tropospheric zenith path delay	6 mm	2-3 hours	every 3 hours	1 hour
Ionospheric TEC grid	2-8 TECU	~11 days	weekly	2 hours; 5 deg (lon) x 2.5 deg (lat)
Rapid ionosphere TEC grid	2-9 TECU	<24 hours	daily	2 hours; 5 deg (lon) x 2.5 deg (lat)



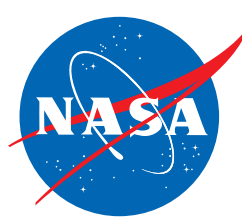
The subnetwork of IGS stations contributing hourly data



International
Association
of Geodesy



Council of
Astronomical &
Geophysical Data
Analysis Services



IGS coordination and outreach activities are organized by the Central Bureau, which is sponsored by the National Aeronautics and Space Administration (NASA) and managed for NASA by the Jet Propulsion Laboratory (JPL) of the California Institute of Technology.