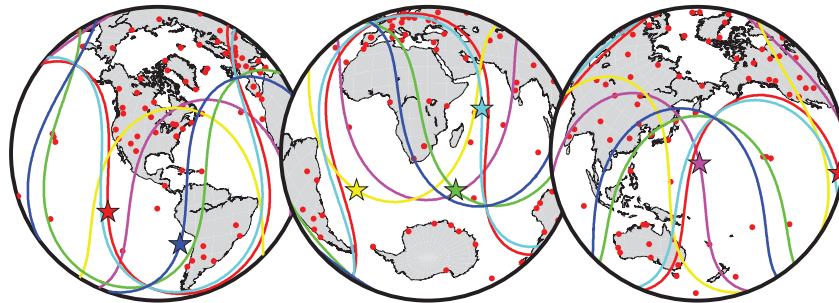# Products and Services of the IGS Analysis Center at NGS

GPS satellite orbit planes projected on Earth (arcs)

Locations of the Reference Frame stations (dots)

Locations of six satellites at UTC midnight (stars)

GPS Products and Services

The **Global Positioning System (GPS)** consists of a constellation of a minimum of 24 operational satellites that transmit radio signals on two or more frequencies. Each signal consists of three components—carrier phase, ranging codes, and navigation messages—derived from an atomic frequency standard (or clock) onboard the satellite. Ground-based stations use antennas and receivers to detect and extract the three components from the signal, providing data that can be processed for satellite and station positions, ionospheric and tropospheric delays, Earth orientation, synchronization of world clocks (i.e., time transfer), and other applications.

NOAA's National Geodetic Survey (NGS) is one of several **Analysis Centers (AC) of the International Global Navigation Satellite Systems Service (IGS),** and in this role, NGS uses data collected at U.S. **Continuously Operating Reference Stations (CORS)** and IGS stations to determine GPS satellite orbits, station positions, and Earth orientation.

NGS generates two orbit products: rapid and final. The rapid orbits are available daily within 17 hours after Universal Coordinated Time (UTC) midnight and are aligned to the IGS Reference Frame. The final orbit products are available within 12 days and are also aligned to the IGS Reference Frame, but in a way that accounts for transient motions of the Earth's center of mass. NGS provides station positions only for the final orbit products. More technical details about the data reduction process are available at the **IGS Central Bureau website: igscb.jpl. nasa.gov/igscb/center/analysis/noaa.acn**

Available on the NGS website, arranged by GPS Week, are the NGS rapid and final orbit products in SP3 format and NGS' weekly estimates of station position and Earth orientation in SINEX format.

- **NGS website:**
  geodesy.noaa.gov/orbits

- **SP3 format:**
  geodesy.noaa.gov/orbits/sp3_docu.txt

- **SINEX format:**
  www.iers.org/documents/ac/sinex/sinex_ v210_proposal.pdf

- **For more information, email:**
  ngs.cors@noaa.gov