

GPS submissions for ITRF2004

- **IGS** : 028/1996 to 036/2005 (9 years / 471 weeks)
- **SIO** : 020/1991 to 001/2005 (14 years / 728 weeks)
- **GFZ** : 007/1996 to 001/2005 (9 years / 309 weeks out of 469)
(TIGA reprocessing, some intervals not complete- every 4th week only)
- **JPL** : just announced ...

- Interval: 028/1996 to 036/2005 (9 years / 471 weeks)
- Input
 - ACs: COD EMR ESA GFZ JPL NGS SIO + MIT since 2003 (week 1204)
 - Except for a few isolated cases, all AC were included
 - Recent solutions (since ~1999) are generally of better quality
 - No re-analysis of original data
- Parameters
 - Daily LOD, X&Y pole & rates
 - Weekly station coordinates & apparent geocenter
 - Stations with very short time span (< 2 months) were not included
 - 460 distinct station (code+pt+soln) provided
 - Stations solution numbering is consistent with most recent version of the discontinuity tables:
<ftp:macs.geod.nrcan.gc.ca/pub/requests/sinex/discontinuities>
- Constraints
 - All AC's constraints were removed before the weekly combinations.
 - Inner constraints (origin, orientation, scale) were added.
Although the solutions are fairly close to ITRF, they have not been aligned to any existing frame, since transformations will be estimated during the ITRF2004 realization

● Details on parameters

0837 – 0998 (Jan96 - Mar99)	:	▪ ERPs and Geocenter removed. ▪ Products from before the combination pilot project. ▪ Many ACs were not contributing to the parameters.
0999 – 1012 (Mar99 - Jun99)	:	▪ ERPs removed. ▪ Some ACs were still not contributing to this parameters.
1013 – now (Jun99 - now)	:	▪ ERPs and Geocenter included. ▪ All ERPs are at noon. ▪ Only the combined geocenter is included.

- **Interval: 020/1991 to 001/2005 (14 years / 728 weeks)**
- **General**
 - **Physical models and conventions follow IERS standards 1992**
- **Estimated Parameters**
 - **3 site positions, 6 satellite positions and 9 radiation parameters**
 - **3 EOP and 3 EOP rates**
 - **Tropospheric zenith delays per hour per site (piecewise linear)**
 - **Tropospheric zenith delay gradients twice per day per site**
- **Constraints**
 - **Tightly constrained solutions for orbit generation.**
 - **After getting the tightly constrained solutions, the constraints are relaxed to obtain the unconstrained solutions.**
- **SINEX files**
 - **Weekly SINEX files are generated by combining 3 to 5 sub-networks (30-50 sites each)**

● Correction terms

- IGS relative antenna phase center
- Solid earth tide
- Ocean tide (Scherneck 11 terms)
- Pole tide

● Strategy

- Double difference data; 120 sec sampling
- Elevation mask 10 at degree
- Elevation dependent data weighting
- Neill's mapping function
- Ambiguities are resolved up to 1000 km

- **Interval: 007/1996 to 001/2005 (9 years / 309 weeks out of 469)**
- **General**
 - Physical models and conventions follow IERS standards 1996
 - From daily solutions re-analyzed for TIGA Pilot Project at GFZ IGS AC. Up to now, not all weeks during this period are available.
 - New estimated satellite-specific satellite phase center offset values are used to constrain the solutions. This is to avoid the anomalous scale change with respect to ITRF2000 detected in GFZ TIGA solutions, especially when new Block IIR-B satellites were deployed.
- **Estimated Parameters**
 - 3 site positions, 6 satellite positions and 6 radiation parameters
 - 3 EOP and 3 EOP rates
 - Tropospheric zenith delays in steps of 4 hours
 - Tropospheric zenith delay gradients twice per day per site
- **Constraints**
 - Free network solutions; loosely inner constraints and geocenter constraints (all constraints are given for removal)
- **SINEX files**
 - Weekly SINEX files are generated by combining 3 sub-networks (~80 sites each).

● Correction terms

- IGS relative antenna phase center
- Solid earth tide
- Ocean tide (FES95.2, 8 constituents, Pagiatakis' software)
- Pole tide

● Strategy

- Zero-difference data ; 300 sec sampling
- Elevation mask 7 at degree
- Elevation dependent data weighting
- Neill's mapping function
- Ambiguities are resolved up to 4000 km

- It is recommended to use the IGS Combination solutions for the ITRF2004. Although the re-analysis from GFZ and SIO are more consistent and for the older time interval of better quality than the original solutions, which entered into the IGS-Combination.
- The SIO/GFZ solutions should be used for quality check and feed-back.