

# TECHNICAL NOTES ON GOES-7

## Spacecraft System Characteristics

Launch Date: 02/87  
Launch Vehicle: Delta 3914  
Orbit: Geostationary  
Longitude: -175°W +/- 3°  
Inclination: 7.78°  
Primary Uplink Frequency: S-Band  
Primary Downlink Frequency: L-Band  
Transponder Bandwidth: 8.2MHz  
Redundant On-board Spacecraft Electronic Systems  
Primary Power Source: Solar

## Spacecraft Station Keeping

GOES-7 circles the earth in a geosynchronous orbit, which means it orbits the equatorial plane of the earth at a speed matching the earth's rotation. This allows it to hover continuously over one general position on the surface. The geosynchronous plane is about 35,800 km (22,300 miles) above the earth. At this altitude, a wide communication footprint area can be obtained.

The spacecraft is maintained at -175°W +/- 3°. East/West command maneuvers are issued twice a year to GOES-7 by NASA KPGO. This window provides a full coverage area to the PEACESAT Network of sites in the Pacific Basin.

## Eclipse Episodes

GOES-7 uses the sun's solar rays as its primary power source. There are solar panels that convert solar energy to electrical energy. Eclipse episodes happen when the moon comes in between the sun's solar rays and GOES-7's solar panels. This will cause a temporary shut down of systems that varies from 5min to an hour. After the improper shutdown of GOES-7's systems, the spacecraft comes up in a failed state. With the Navigational Engineering support by NOAA, there is a joint responsibility of NASA at the Kokee Park Geophysical Observatory & PEACESAT Headquarters to properly initialize GOES-7.

Eclipse episodes occur twice a year for duration of about one and a half months. PEACESAT Operations at this time are cut down to 12 hour days. Most PEACESAT sites do not get affected by this due to the 12 hour window being during the normal business hours.

## Tracking of Spacecraft

PEACESAT uses three means of reference in tracking GOES-7

- STSPlus Tracking Software using NORAD Two-Line Elements (TLE)
  - o Free Tracking Software Download: <http://www.dransom.com/stsplus.html>
  - o Current NORAD TLE's: <http://celestrak.com/NORAD/elements/goes.txt>
  - o Provides navigational information in GOES-7
- NASA Tracking Data
  - o Distributed to PEACESAT Headquarters by NASA KPGO monthly
  - o Used for Engineering purposes by PEACESAT Headquarters

GOES-7

DATE TIME SUBPOINT

YYMMDD HHMMSS LATS LONGS

30506 0 1.39S 178.95W	30506 80000 7.28N 178.89W	30506 160000 5.94S 179.34W
30506 3000 0.39S 179.02W	30506 83000 6.87N 178.85W	30506 163000 6.54S 179.31W
30506 10000 0.63N 179.08W	30506 90000 6.34N 178.82W	30506 170000 7.03S 179.27W
30506 13000 1.63N 179.14W	30506 93000 5.70N 178.81W	30506 173000 7.40S 179.21W
30506 20000 2.60N 179.20W	30506 100000 4.97N 178.82W	30506 180000 7.63S 179.14W
30506 23000 3.53N 179.25W	30506 103000 4.15N 178.85W	30506 183000 7.74S 179.07W
30506 30000 4.40N 179.28W	30506 110000 3.26N 178.89W	30506 190000 7.71S 178.99W
30506 33000 5.20N 179.29W	30506 113000 2.32N 178.94W	30506 193000 7.55S 178.92W
30506 40000 5.90N 179.29W	30506 120000 1.33N 179.00W	30506 200000 7.25S 178.86W
30506 43000 6.51N 179.27W	30506 123000 0.33N 179.07W	30506 203000 6.83S 178.81W
30506 50000 7.00N 179.24W	30506 130000 0.69S 179.14W	30506 210000 6.30S 178.77W
30506 53000 7.37N 179.19W	30506 133000 1.69S 179.20W	30506 213000 5.65S 178.75W
30506 60000 7.62N 179.14W	30506 140000 2.66S 179.26W	30506 220000 4.91S 178.75W

30506 63000 7.73N 179.07W 30506 143000 3.59S 179.30W 30506 223000 4.09S 178.76W  
30506 70000 7.71N 179.01W 30506 150000 4.45S 179.33W 30506 230000 3.19S 178.80W  
30506 73000 7.56N 178.95W 30506 153000 5.24S 179.34W 30506 233000 2.24S 178.84W

- PEACESAT Pointing Data
  - o Distributed to all PEACESAT sites by PEACESAT Headquarters monthly
  - o Shows Alignments Times for PEACESAT Sites
  - o [Click for a PDF of the current PEACESAT Pointing Data](#)
  - o [Click for a JPEG of the current PEACESAT Pointing Data](#)