

WAAS Technical Report
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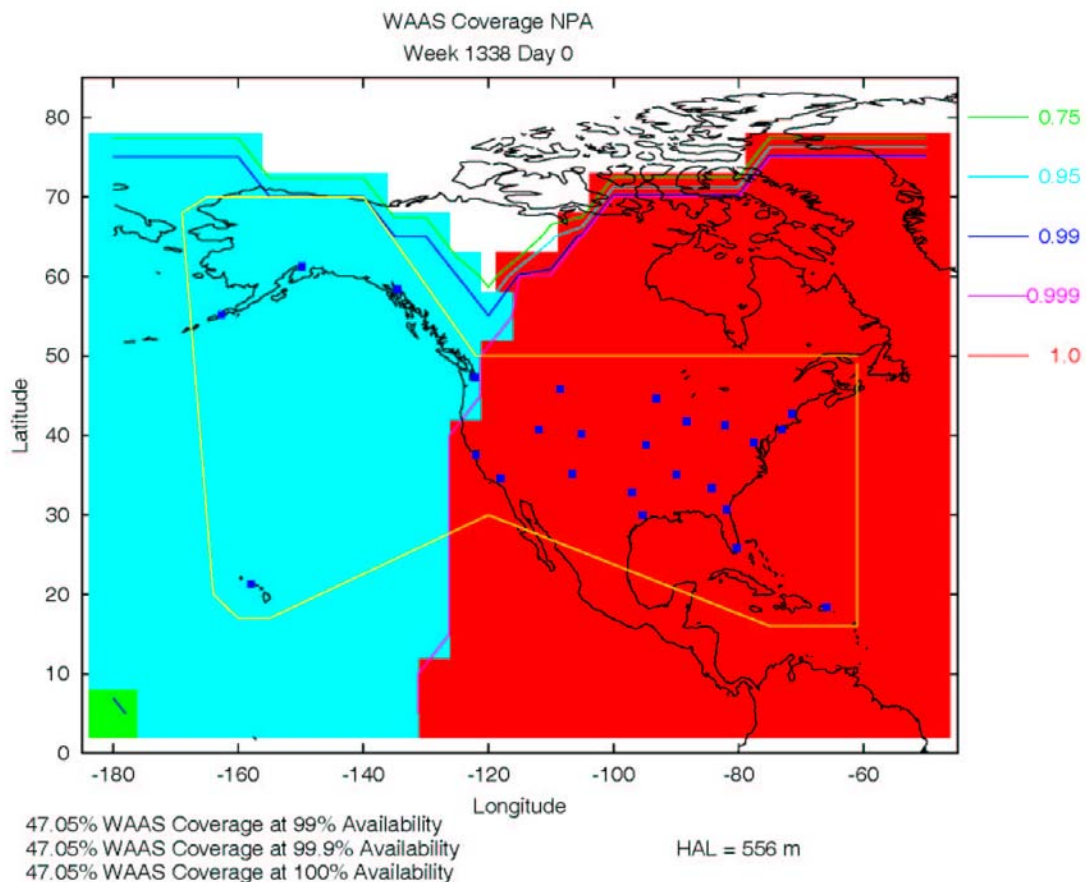
DR#16: Loss of WAAS NPA and LPV in POR service area after POR GEO GUS switch.

GPS Week/Day: Week 1338 Day0 (8/28/2005)

Discussion:

On week 1338 Day 0 (8/28/2005) POR GUS switch at 61281 (17:01:11 GMT) was followed by POR navigation message stream setting all satellites to not monitored state at GPS time 61367 (17:02:47 GMT). LPV and NPA service was lost for approximately 1 hour in the POR coverage area. Figure 1 shows the NPA service area affected and resulting availability.

Figure 1



Note that the coverage plot shown below does not take into account a WAAS user avionics receiver that has Fault Detection/Fault Detection Exclusion (FD/FDE) logic. FD/FDE allows a user to continue to have NPA navigation service. Figure 1 only shows the coverage for a user that uses WAAS exclusively (no FD/FDE).

A second POR GUS switch occurred at GPS time 63118 (17:31:58 GMT), which was again, followed by a satellite UDRE's being set to not monitored on the POR message stream. POR GEO started transmitting normal UDRE's at 64854 GPS time of week (18:00:54 GMT).

Normal WAAS navigation messages stopped being received at reference stations at 61282 GPS time (7:01:12 GMT). The newly installed G2 WAAS receiver started outputting WAAS messages that failed the CRC check at 61282 (7:01:12 GMT) for 4 to 10 seconds depending on receiver and during the second GUS switch at 63117 (17:31:57 GMT) again for 4 to 10 seconds.

Abnormal WAAS messages, or garbled messages, were transmitted on the POR GEO due to a GUS switchover. During a GUS switchover random messages are transmitted to the GEO and relayed to users. These messages fail a CRC so user avionics are required to discard the message, meaning safety for the user is not compromised.

The GUS switchover occurred due to the primary GUS losing lock on the satellite. This has happened previously and further investigation is required to determine the reason for the GUS to lose lock.

Conclusion:

A WAAS LPV and NPA service outage on the POR GEO occurred on August 18, 2005. The outage lasted 1 hour during which time two POR GUS switches occurred, followed by a satellite UDRE's being set to not monitored on the POR message stream.. The WAAS AORW navigation message stream transmitted normal URDE's for all satellites providing LPV service in the AROW service area during the time that this POR anomaly occurred.