WAAS Technical Report
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Pomona, New Jersey
3/6/2006

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DR# 22: POR Message Gaps caused TTA Monitor Trip and loss of PA & NPA Service

GPS Week/Day: Week 1351 Day 6 (12/3/2005)

Discussion:

On week 1351 day 6 (12/3/2005), beginning at GPS time of week 521013 (00:43:33 GMT), there were several short POR GEO broadcast gaps, and two Type 6 Alerts (broadcast on POR only), which preceded a POR GUS switchover, and Source Select Switches to ZLA C&V for all four GUSes. WAAS PA POR-primary sites (Oakland, Los Angeles, and Seattle) all dropped to SPS mode for 3 seconds coincident with the first Type 6 Alert. They also dropped to NPA mode for three seconds in the middle of the 15-second POR gap. In both cases they switched to using the AOR-W GEO for 20-30 seconds. The sequence of events is detailed below, and listed in Table 1.

The first anomaly was a 2-second POR broadcast gap at GPS time of week 521013. A Type 24 alert occurred 6 seconds later, setting POR to Not Monitored. Nearly three hundred seconds later, POR had another 2-second gap, during which a Type 62 message should have been sent. Five seconds after that, there was a TTA (Time To Alarm) monitor trip on POR, immediately followed by a Type 6 Alert beginning at GPS time 521315 (which was broadcast on POR only), setting all satellites to Not Monitored. All POR-only sites dropped to SPS mode for 18 seconds. Oakland, LA, and Seattle are POR-primary dual-GEO sites; they dropped to SPS mode for 3 seconds, then went back to PA mode using AOR-W.

Over about the next 5500 seconds, there were 12 more 2-second POR gaps, a 3-second gap, and a 15-second gap at time 526632, where Types 62, 24, 3 and 2 messages should have been broadcast. Four seconds later, there was another TTA monitor trip on POR, again followed immediately by a Type 6 Alert at time 526651, setting all satellites to Not Monitored. All POR Non-dual sites dropped to SPS mode for 17 seconds upon receipt of the first Type 6 message.

Within thirty seconds after the Type 6 alert, POR had another 12-second gap, initiating a POR switchover from the Santa Paula B to the Brewster GUS. POR Non-dual sites dropped to SPS Mode for 71-78 seconds, except Anchorage and Cold Bay, which did so for 100 seconds.

Within three minutes after the POR switchover, all four GUSs had a source select switch from ZDC to the ZLA C&V.

Conclusion:

The POR GEO had a series of short broadcast gaps, and sent out Type 6 alerts towards the beginning and at the end of this series. Shortly after the second Type 6 Alert, a POR GUS switchover to Brewster occurred, and all four GUSes changed their selected C&V source from ZDC to ZLA. Brief losses of PA & NPA service availability occurred at WAAS sites that use POR as their primary GEO coincided with the Type 6 alerts. They also dropped to SPS mode for 70-100 seconds as a result of the switchover.

Table 1—WAAS POR Events, 1351 Day 6

Start	Stop	Duration	Event	Details
518400				Beginning of day—Santa Paula B is primary GUS for POR
521013	521014	2s	POR gap	
521020	521023	4s	T24 Alert	POR UDREi 13→14 (not monitored)
521308	521309	2s	POR gap	missing T62 message
521314			TTA Trip	POR Time to Alarm monitor trip
521315	521318	4s	T6 Alert—POR only	All 16 monitored SVs set to UDREi 14 (not monitored)
521570	521571	2s	POR gap	
521616	521617	2s	POR gap	
521684	521685	2s	POR gap	
522099	522100	2s	POR gap	
523046	523047	2s	POR gap	
523779	523780	2s	POR gap	
523789	523790	2s	POR gap	
524888	524889	2s	POR gap	
525261	525262	2s	POR gap	
525340	525341	2s	POR gap	
526104	526105	2s	POR gap	
526117	526118	2s	POR gap	
526512	526514	3s	POR gap	
526632	526646	15s	POR gap	missing T62, T24, T3, T2 messages
526650			TTA Trip	POR Time to Alarm monitor trip
526651	526654	4s	T6 Alert—POR only	All 16 monitored SVs set to UDREi 14 (not monitored)
526688	526703	12s	POR gap	
526704	526711	8s	Eight T0 Messages	POR switchover to Brewster GUS
526827			Source Select Switch	Brewster GUS begins using ZLA C&V
526828			Source Select Switch	Santa Paula B GUS begins using ZLA C&V
526864			Source Select Switch	Santa Paula A GUS begins using ZLA C&V
526865			Source Select Switch	Clarksburg GUS begins using ZLA C&V