WAAS Technical Report
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### 8/18/2005

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DR# 15:Loss of LPV service after AOR-W GEO GUS switch.
GPS Week/Day: Week 1336 Day 0 (8/14/2005)

Discussion:
On week 1336 day 0 (8/14/2005) AOR-W GUS switch at GPS time 51609 (14:20:09 GMT) was followed by AOR-W navigation message stream setting all satellites to not monitored state at GPS time 51802 (14:23:22 GMT). LPV service was lost for more than 3 hours in the AORW coverage area. Figure 1 shows the LPV service area affected and resulting availability. AOR-W GEO started transmitting normal UDREI's at GPS time 64150 (17:49:10 GMT).

Figure 1
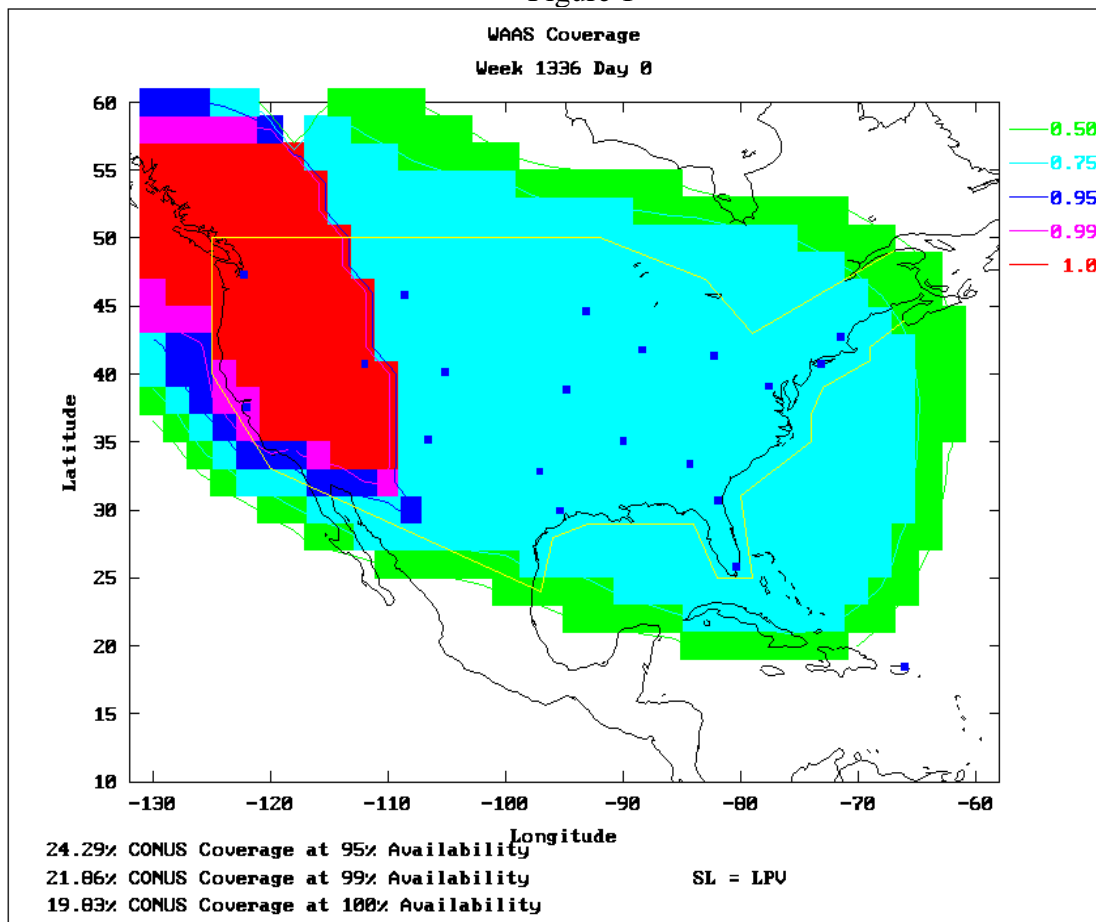
Normal WAAS navigation messages stopped being received at the reference station at GPS time 51606 (14:20:06 GMT). The new G2 receiver started outputting WAAS messages that failed the CRC check at GPS time 51606 (14:20:06 GMT) for 3 to 8 seconds depending on the receiver.

The G2 receivers were installed at 15 of the 25 WAAS reference stations as part of Release 2. The G2 receiver transmits all data it receives and that data is input into the WAAS. The legacy receivers do not transmit any messages that fail a CRC check. The WAAS C&V (master station processors) receive the so-called 'garbled' messages from the G2 receiver and fail one of the message quality checks. This causes one of the C&V's to fail while the other wants to fail but doesn't fail due to logic in the software that will not allow a failure to occur on the last C&V that is available. However, that last C&V goes into a degraded state in which it sets all satellites to 'not monitored'.

The 'garbled' messages are generated when there is a GUS switchover. The other condition in which a message is sent and it has a bad CRC (other than messages that experience bit errors) is the loss message. The loss message is generated when the primary GUS does not receive a message from the C&V.

Conclusion
A WAAS LPV service outage on the AOR-W GEO occurred on August 14, 2005. The outage lasted for more than 3 hours during which time AORW GUS switches occurred followed by a satellite UDRE's was being set to not monitored on the AOR-W message stream. The WAAS POR navigation message stream transmitted normal URDE's for all satellites providing LPV service in the POR service area during the time that this AOR-W anomaly occurred.

This condition was fixed in Release 3 Build 1 that was deployed to each operational C&V on September 14 and 15.