WAAS Technical Memorandum
William J. Hughes Technical Center
Pomona, New Jersey
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Author(s): Noah Rosen

DR #89 PRN 4 NANU Affects WAAS Coverage
GPS Week/Day: Week 1568 Day 2 (1/26/2010)

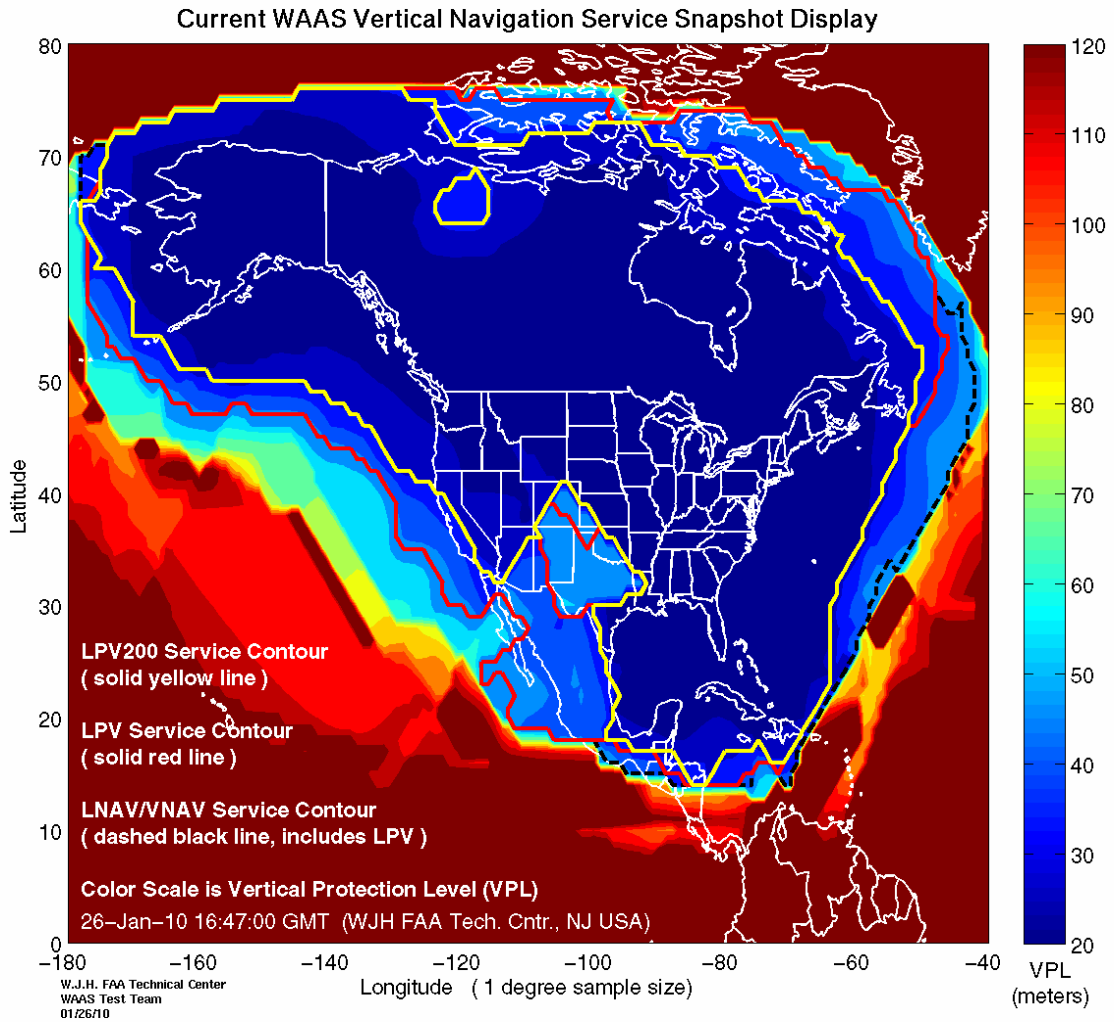
Discussion:

On January 26, 2010, a GPS NANU (Notice Advisory to Navstar User) was issued which alerted GPS users that PRN 4 was unusable from 14:12 GMT on January 26, 2010 to 00:13 GMT on January 27, 2010. On January 26, there was a significant loss of LPV200 and LPV coverage in CONUS. There was a negligible effect on LPV and LPV200 coverage in Alaska.

PRN 4 is a critical satellite to the geometry in CONUS. The loss of PRN 4 as a ranging source during the NANU times caused a reduction in WAAS coverage because it caused a poor satellite constellation geometry.

Figure 1 shows a plot of WAAS Coverage when LPV and LPV200 service near southwestern CONUS was unavailable.

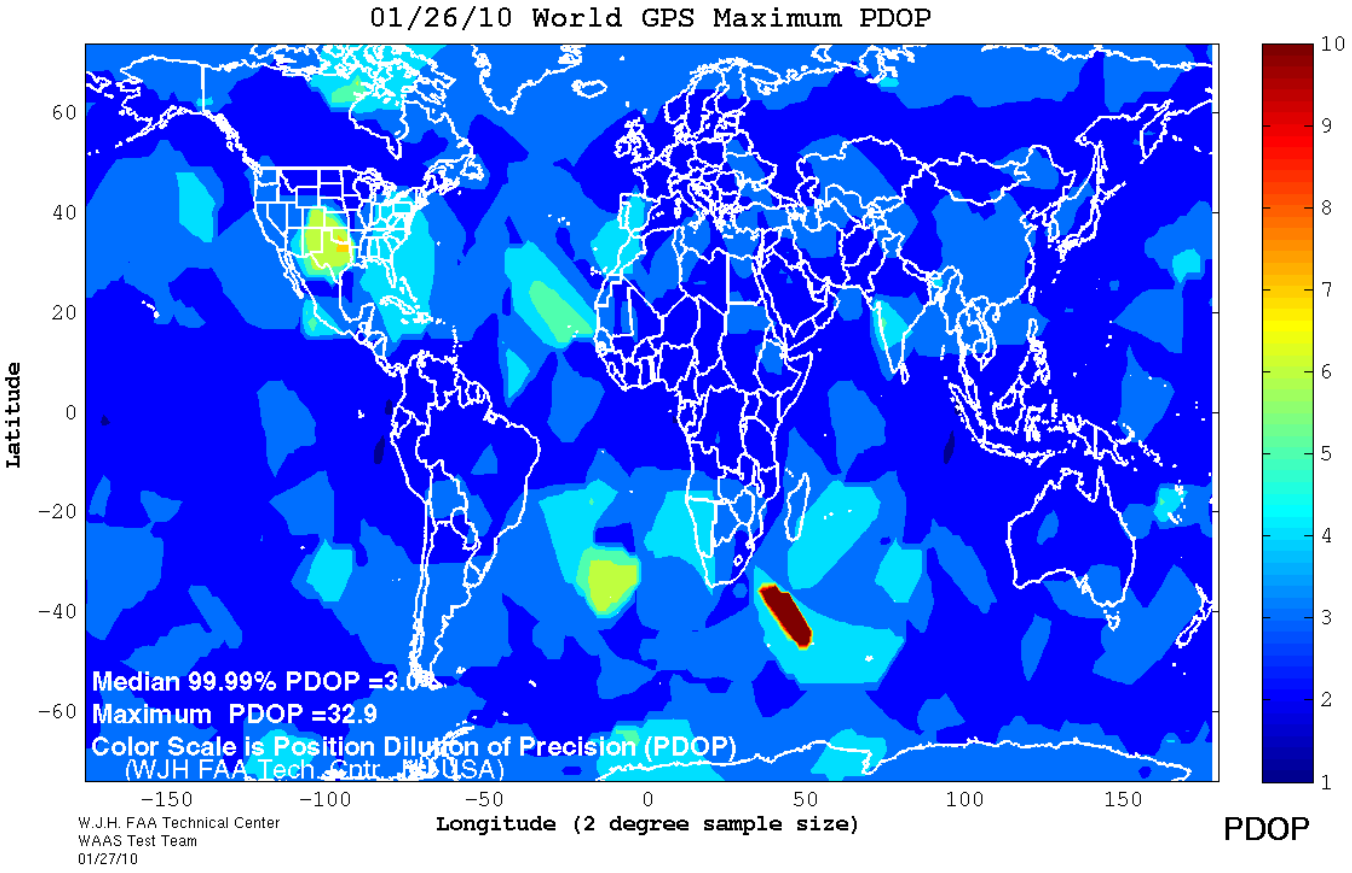
Figure 1: WAAS Service at 16:47 GMT



The LPV outage in CONUS lasted less than 15, minutes, which affected only the 100% availability for the day. The most significant part of the LPV200 outage lasted approximately 40 minutes.

Figure 2 shows a plot of the SPS PDOP at the time of the coverage drop. The PDOP plot emphasizes how the loss of PRN 4 led to a poor geometry. The maximum PDOP over a significant part of CONUS was 5, with a small area having a maximumPDOP of 6.

Figure 2: World DOP Plot for 1/26/10



Figures 3 and 4 show plots of LPV and LPV200 coverage respectively, for 1/26/10.

Figure 3: LPV Coverage on 1/26/10

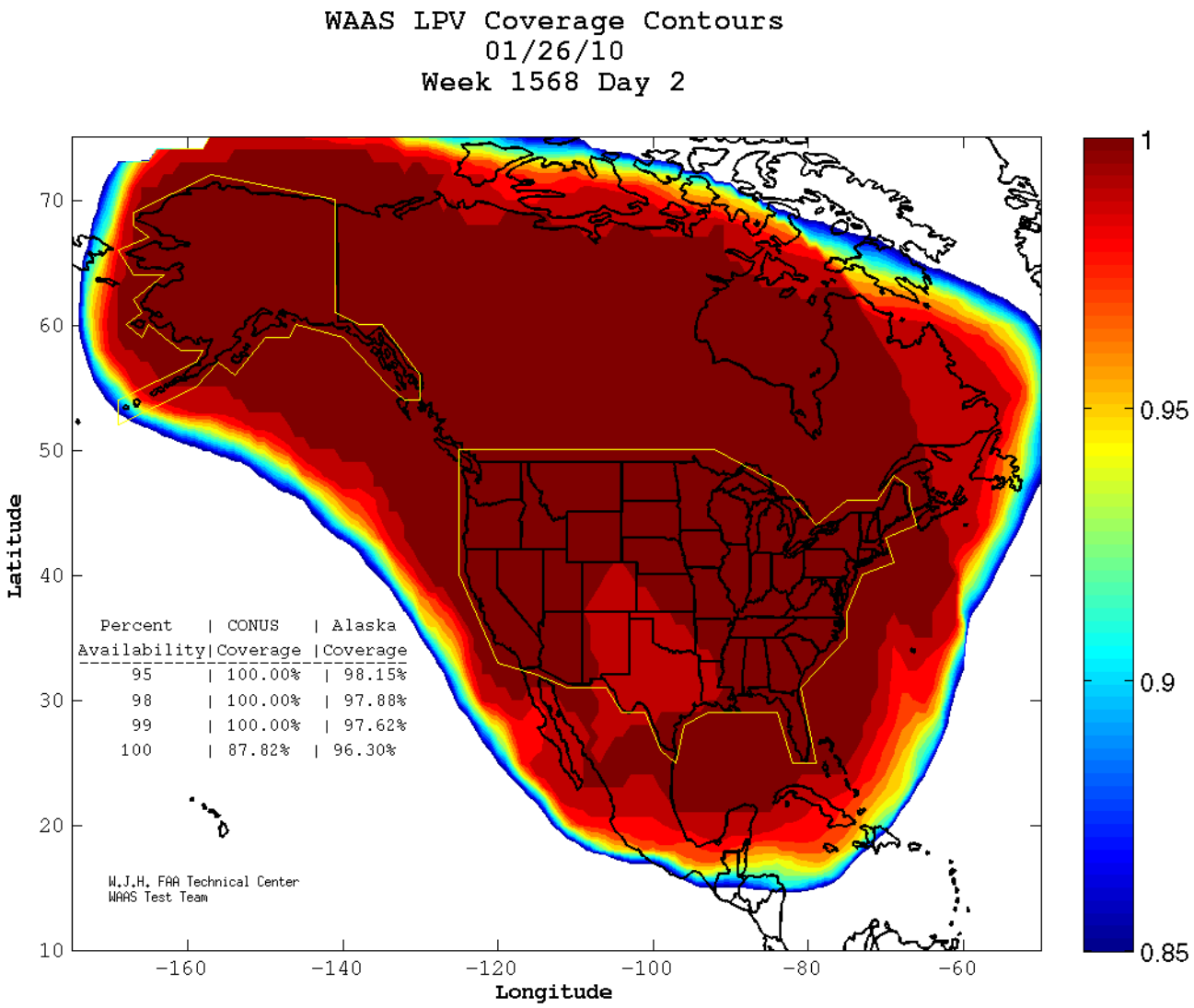
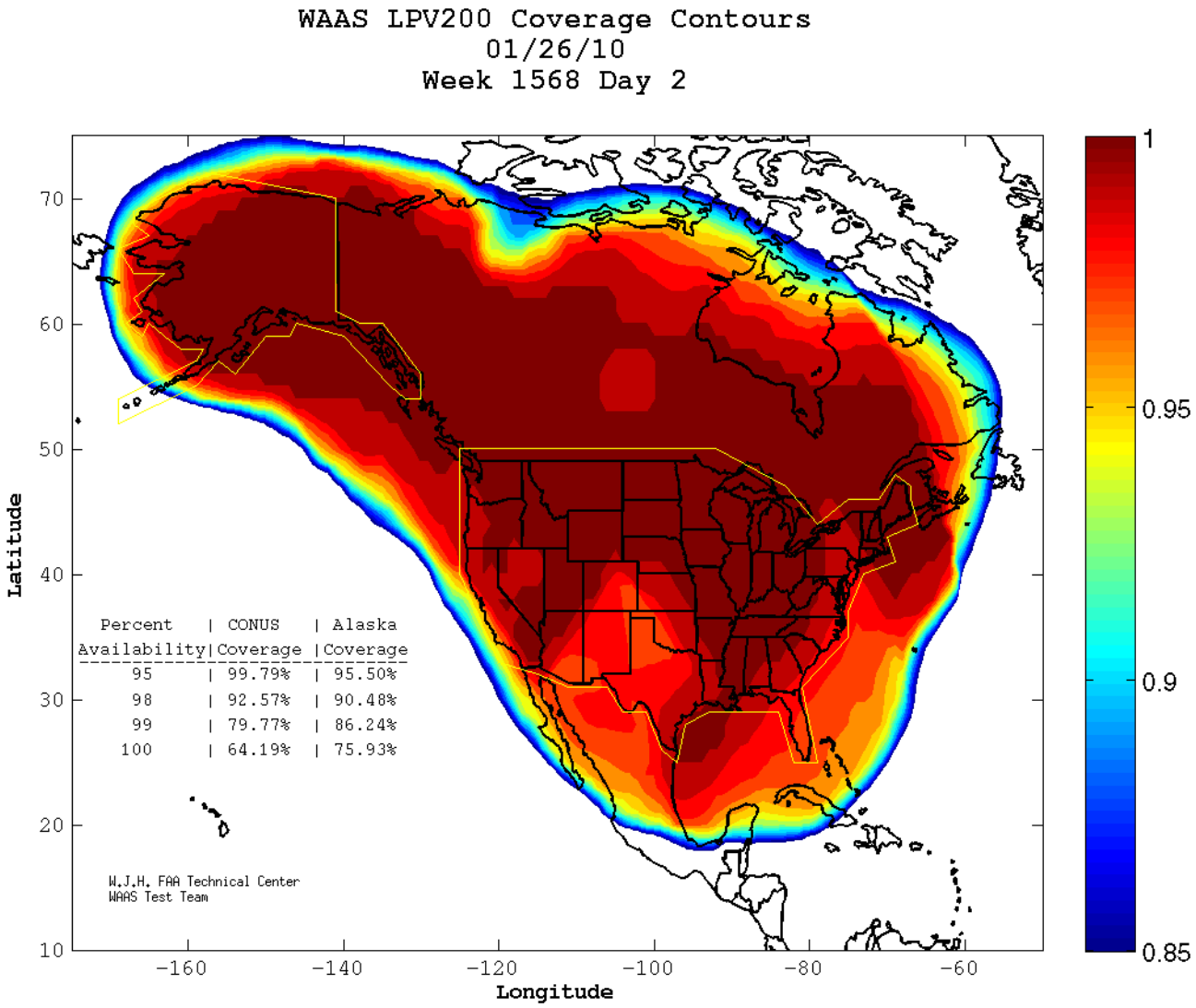


Figure 4: LPV200 Coverage on 1/26/10.



Conclusion:

The PRN 4 outage had a large impact on CONUS coverage near the southwestern region. There was an LPV outage in that area for less that 15 minutes. This outage only affected the 100% LPV availability for the day. There was a more significant impact on LPV200 availability. The 100% LPV200 availability dropped to 64.19%. The coverage drop was caused by poor satellite constellation geometry during the time of the PRN 4 NANU. RNP1, RNP3, and LP coverage were unaffected by the PRN4 NANU.