

WAAS Technical Report
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DR#65: Three Unforecasted GPS Satellite Outages Caused Reduced Ranging Availability

GPS Week/Day: Week 1448 Day 1 (October 8, 2007)

Discussion:

On October 8, 2007 (GPS Week 1448 Day 1), three GPS satellites were set unusable. PRN 19 was unusable from 0437 Zulu to 1636 Zulu. PRN 12 was unusable from 0633 Zulu to 1649 Zulu. PRN 14 was unusable from GPS Week 1448 Day 1 at 2104 Zulu until GPS Week 1448 Day 2 at 0143 Zulu. The availability of these satellites lasted for a significant portion of the day. There was a small impact to WAAS coverage because of the constellation outages.

For CONUS LPV service, coverage at 100% availability was reduced by approximately 6% from the previous day. There was negligible impact to CONUS LPV coverage at 95% and 99%. LPV coverage in Alaska at 95% availability was reduced by approximately 6% from the previous day. There was negligible impact to Alaska LPV coverage at 99% and 100%.

LPV 200 CONUS Coverage at 99% Availability was approximately 14% less than the previous day. LPV 200 Coverage at 100% Availability was approximately 24% less than the previous day.

Table 1 provides more details of coverage by service level and availability for GPS Week 1448 Days 0 through 4.

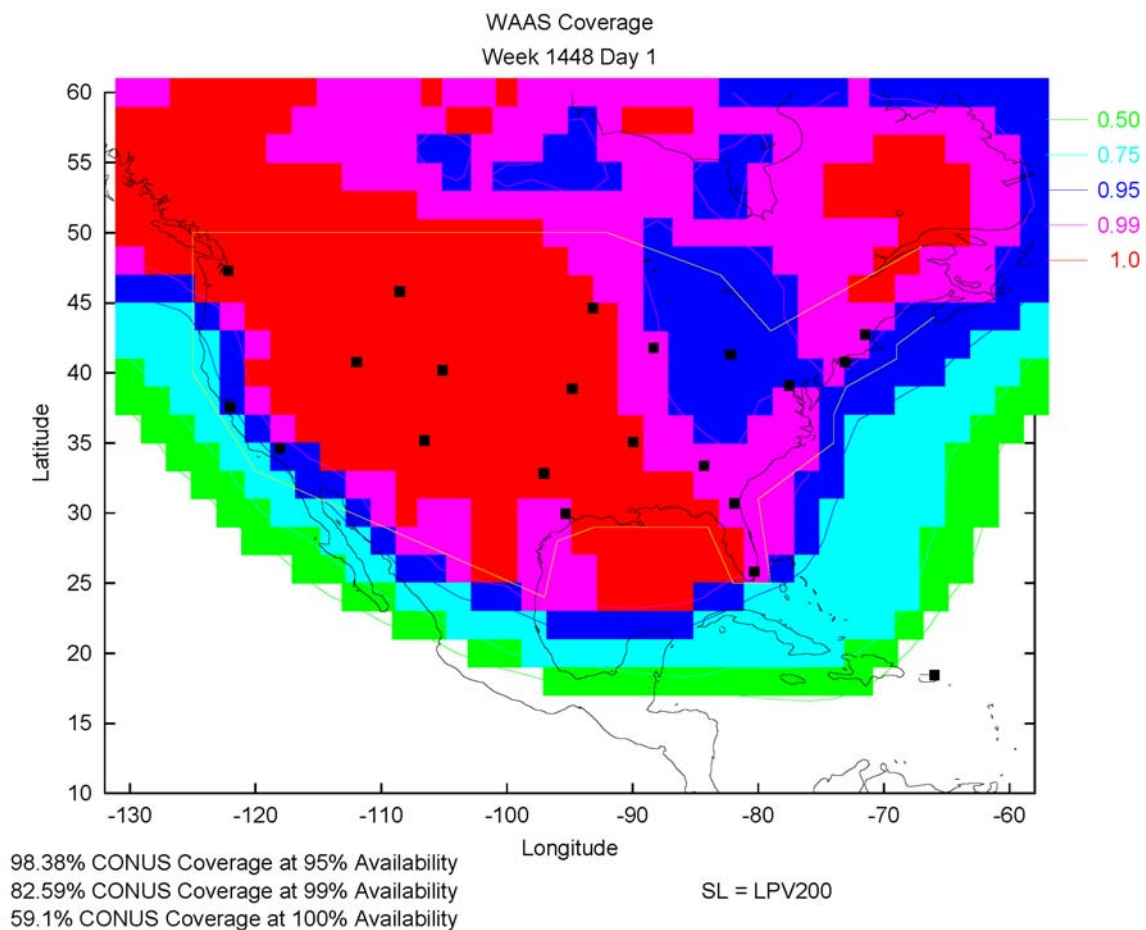
Table 1:

	Week 1448	Week 1448	Week 1448	Week 1448
	Day 0	Day 1	Day 2	Day 3
LPV CONUS Coverage at 95% Availability	100%	100%	100%	100%
LPV CONUS Coverage at 99% Availability	100%	100%	99.59%	100%
LPV CONUS Coverage at 100% Availability	99.19%	93.11%	95.95%	98.78%
LPV Alaska Coverage at 95% Availability	94.56%	88.04%	93.47%	90.21%
LPV Alaska Coverage at 99% Availability	67.39%	66.3%	66.3%	68.47%
LPV Alaska Coverage at 100% Availability	45.65%	44.56%	43.47%	45.65%
LPV 200 CONUS Coverage at 95% Availability	99.19%	98.38%	99.19%	99.19%
LPV 200 CONUS Coverage at 99% Availability	96.35%	82.59%	84.21%	95.54%
LPV 200 CONUS Coverage at 100% Availability	82.99%	59.1%	69.63%	82.18%

NPA Coverage at 95% Availability	100%	100%	100%	100%
NPA Coverage at 99% Availability	100%	100%	100%	100%
NPA Coverage at 100% Availability	99.26%	99.26%	100%	100%

Figure 1 shows a plot of LPV200 Coverage on October 8th, 2007. A weaker satellite geometry caused a reduction in the 99% and 100% Availability contours for the LPV 200 service level.

Figure 1:



Conclusion:

Three unforecasted GPS satellite outages on PRN 19, PRN 14, and PRN 12 caused a change in the satellite constellation, which had a small impact on WAAS Service. The LPV 200 service level showed the most impact from the weakened geometry with a smaller impact to LPV 100% coverage for CONUS and LPV 95% coverage for Alaska.