WAAS Technical Memorandum

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DR #87 PRN 8 NANU Affects WAAS Coverage
GPS Week/Day: Week 1553 Day 5 to Week 1555 Day 1 (10/16/09 to 10/26/09)

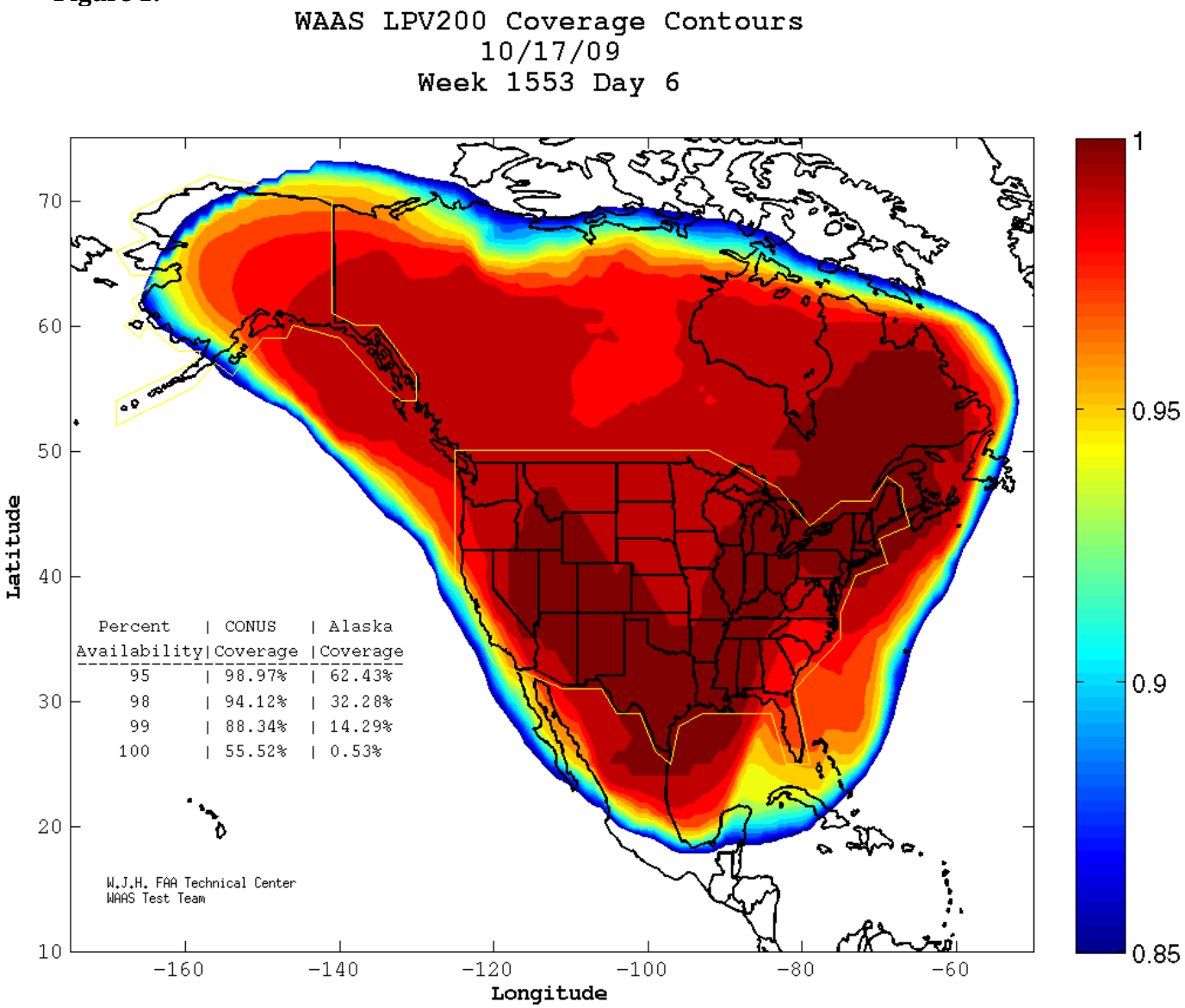
Discussion:

On October 14, 2009, a GPS NANU (Notice Advisory to Navstar User) was issued which alerted GPS users that PRN 8 would be unusable until further notice. An UNUSABLE NANU was later issued on October 27th, 2009, which ended the satellite outage. During this time, there was a significant effect on LPV200 coverage in Alaska and a pronounced effect on CONUS LPV200 coverage.

The PRN 8 outage had a large effect on Alaska coverage for several reasons. Because PRN 8 was located in a primary slot, its absence weakened the satellite constellation geometry in Alaska. Also, during the time when PRN 8 was unusable, the Cold Bay WRS was offline, which further contributed to lower Alaska coverage on the Aleutian Islands during the outage.

Figure 1 shows a plot of LPV200 Coverage on October 17th, when LPV200 coverage was the worst during the time of the PRN8 outage. As can be seen from the plot, there is a significant loss of availability in the CONUS region, particularly around the southeast region as well as western California. Alaska had 62.43% Coverage at 95% Availability.

Figure 1:


WAAS LPV200 Coverage Contours
10/17/09
Week 1553 Day 6
Latitude
Longitude
70
60
50
40
30
20
10
-160
-140
-120
-100
-80
-60
1
0.95
0.9
0.85
Percent Availability | CONUS Coverage | Alaska Coverage
95 | 98.97% | 62.43%
98 | 94.12% | 32.28%
99 | 88.34% | 14.29%
100 | 55.52% | 0.53%
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WAAS Test Team

Figure 2 shows the LPV Coverage on October 17th. As can be seen from the plot, the PRN 8 outage had a much less significant impact on LPV service.

Figure 2:

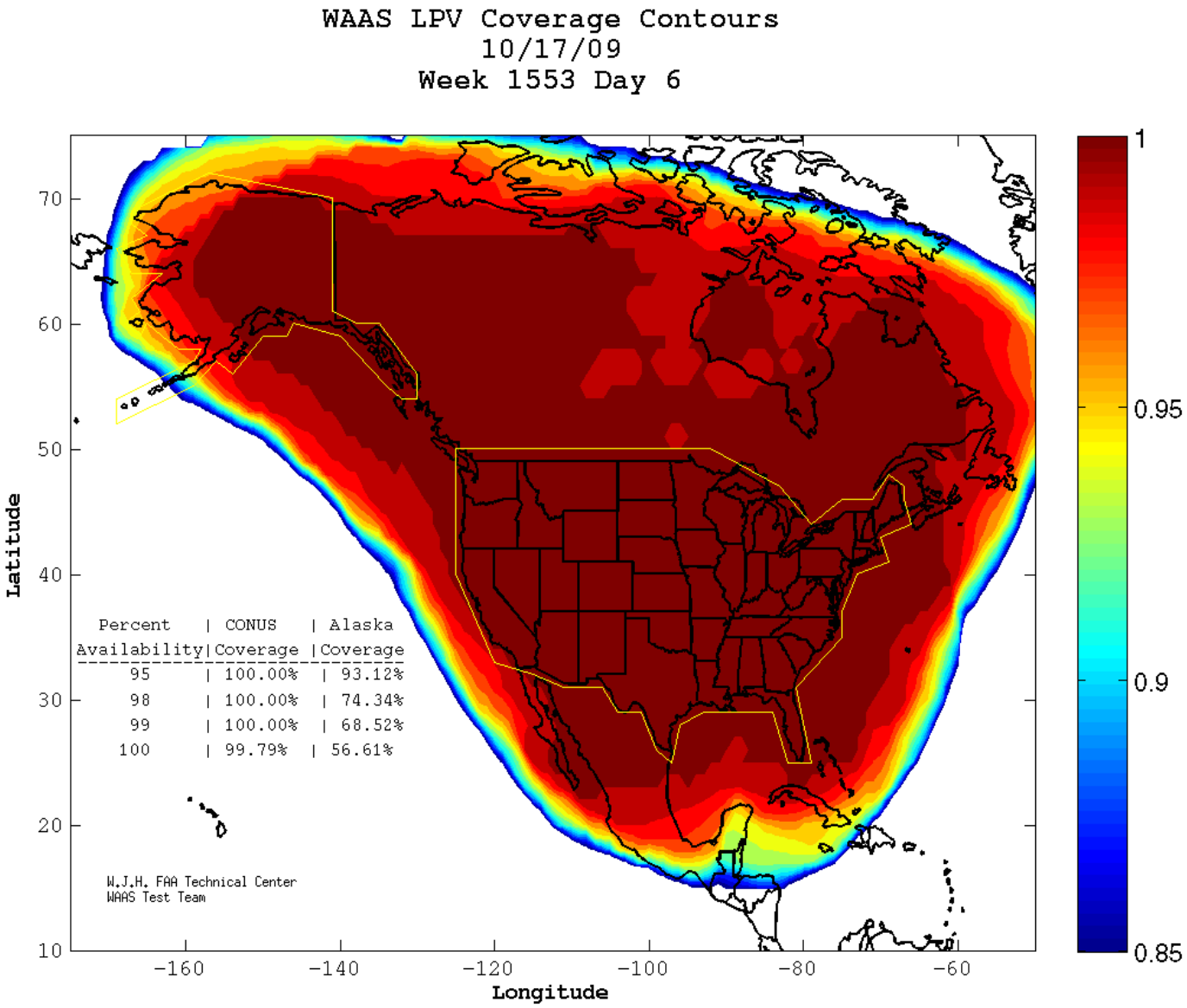
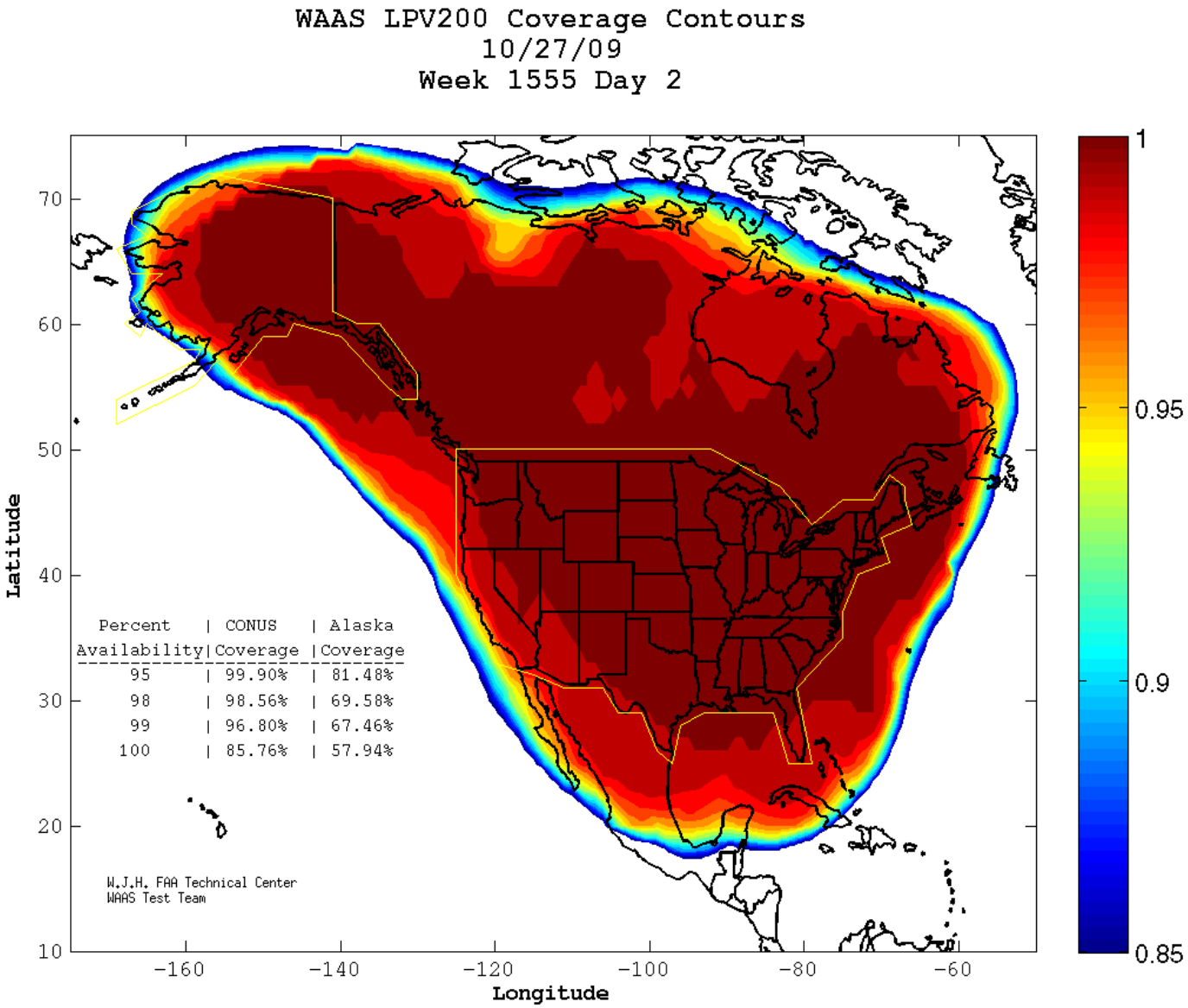


Figure 3 shows the LPV200 coverage plot for October 27th, when PRN 8 became usable.

Figure 3:



Conclusion:

The PRN 8 outage had a large impact on Alaska LPV200 coverage and CONUS LPV200 coverage in the southeast region and in western California because its absence weakened the GPS constellation. When PRN 8 was usable on October 27th, coverage levels in Alaska and Conus returned to normal.