WAAS Technical Memorandum
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DR #106: UDRE Spikes Lead to Reduced WAAS Availability
GPS Week/Day: Between W1660D4 and W1664D3 (11/3/2011 and 11/30/2011)

Discussion:

On several occasions in the past few weeks, the UDREs on multiple satellites were unexpectedly bumped to higher values. The UDRE bumping caused a degredation of WAAS availability.

Table 1 lists the typical CONUS and Alaska coverage at 100% availability during this time period.

Table 1: Typical CONUS and Alaska 100% coverage contours

	CONUS	Alaska
LPV	99.9%	96.7%
LPV200	92.2%	80.6%

Table 2 lists the 100% coverage contours for the days where UDRE bumping occurred and general timeframes when UDRE bumping occured on those days. All times are listed are GMT.

Table 2: CONUS and Alaska 100% Availability on Days When UDRE spikes occurred.

Date	GPS Week	GPS Day	Timeframe of	CONUS 100%	CONUS 100%	Alaska 100%	Alaska 100%
			Elevated UDREs	LPV Availability	LPV200 Availability	LPV Availability	LPV200 Availability
11/03/2011	1660	4	0200 to 0300	99.9	89.5	84.06	71.9
11/06/2011	1661	0	0300 to 0500	98.9	90.2	96.56	78.7
11/07/2011	1661	1	2000 to 2100	98	72.8	76.29	6.2
11/11/2011	1661	5	0300 to 0400	87.3	46	96.55	78.9
11/12/2011	1661	6	2200 to 2300	97.4	77.5	94.98	10.3
11/13/2011	1662	0	0200 to 0400	77.6	23.8	96.56	78.4
11/15/2011	1662	2	0200 to 0400	77.2	24	96.56	77.6
11/20/2011	1663	0	1900 to 2300	98.6	62.1	96.68	69.1
11/21/2011	1663	1	0100 to 0400	99.9	91.4	97.01	81.3
11/23/2011	1663	3	1800 to 2000,2200	99	86.2	94.44	59.5
11/24/2011	1663	4	0200 to 0300	99.9	92.6	97.01	82.7
11/25/2011	1663	5	1900 to 2000,2100	99.9	93.2	96.03	81.2

On 11/23/2011, a NANU also occurred which was primarily responsbile for reducing WAAS coverage.

UDRE Bumping on November 15, 2011

On November 15, 2011, LPV and LPV200 coverage at 100% availability was significantly reduced due to UDRE spikes on several satellites between 02:00 and 04:00 GMT. The satellites which were affected and the general hours the satellite UDREs were elevated above their expected level are listed in Table 3. Times listed are GMT.

Table 3: Satellites Which Experinced Elevated UDREs on November 15, 2011

PRN	Minimum UDRE (m)	Maximum Bumped UDRE (m)
1	3	7.5
11	3	15
12	3.75	15
14	3	15
18	3	15
19	3	175
22	3	15
25	3.75	15
30	5.25	200
31	3	15
32	3	15
135	7.5	50
138	7.5	50

UDREs were not bumped on November 15th for the following PRNs (monitored in the WAAS service volume): 3,6,9,17,20,21,28,133

Figure 1 shows a plot of the satellites positions and their WAAS status at 0327 GMT on November 15th. Figure 2 shows the LPV200 coverage contours for November 15th.

Figure 1: Satellite Position and WAAS Status at 03:26 GMT, November 15, 2011

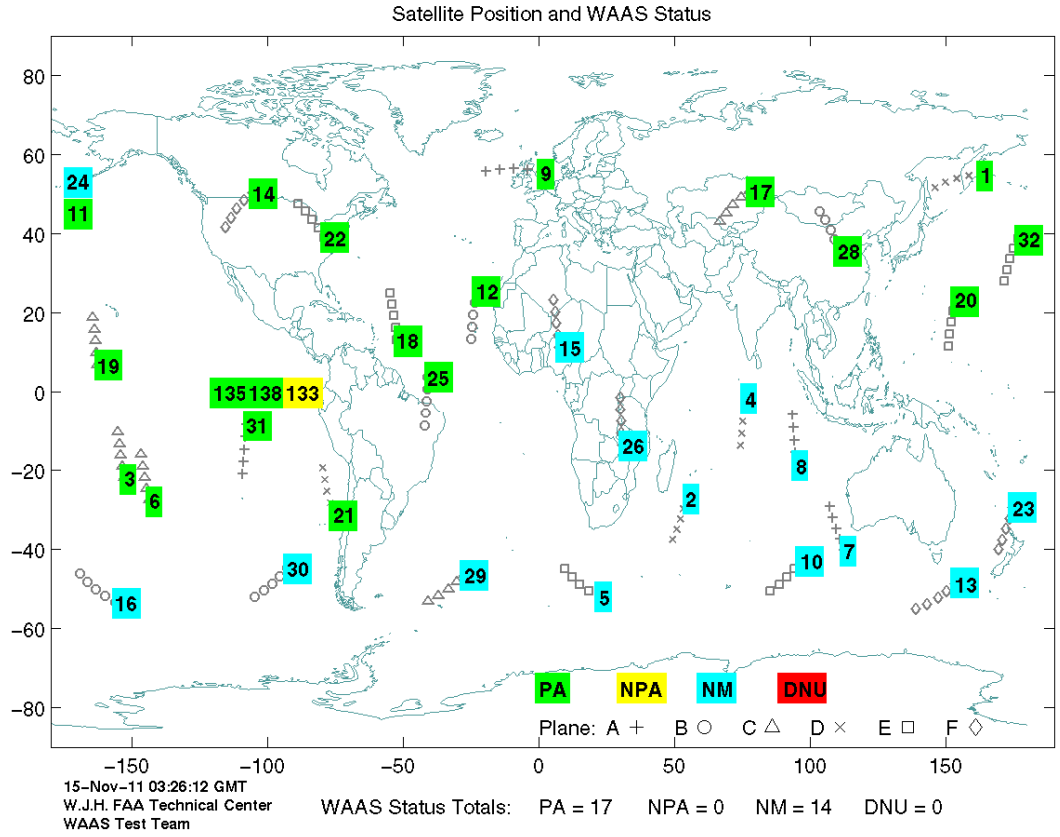
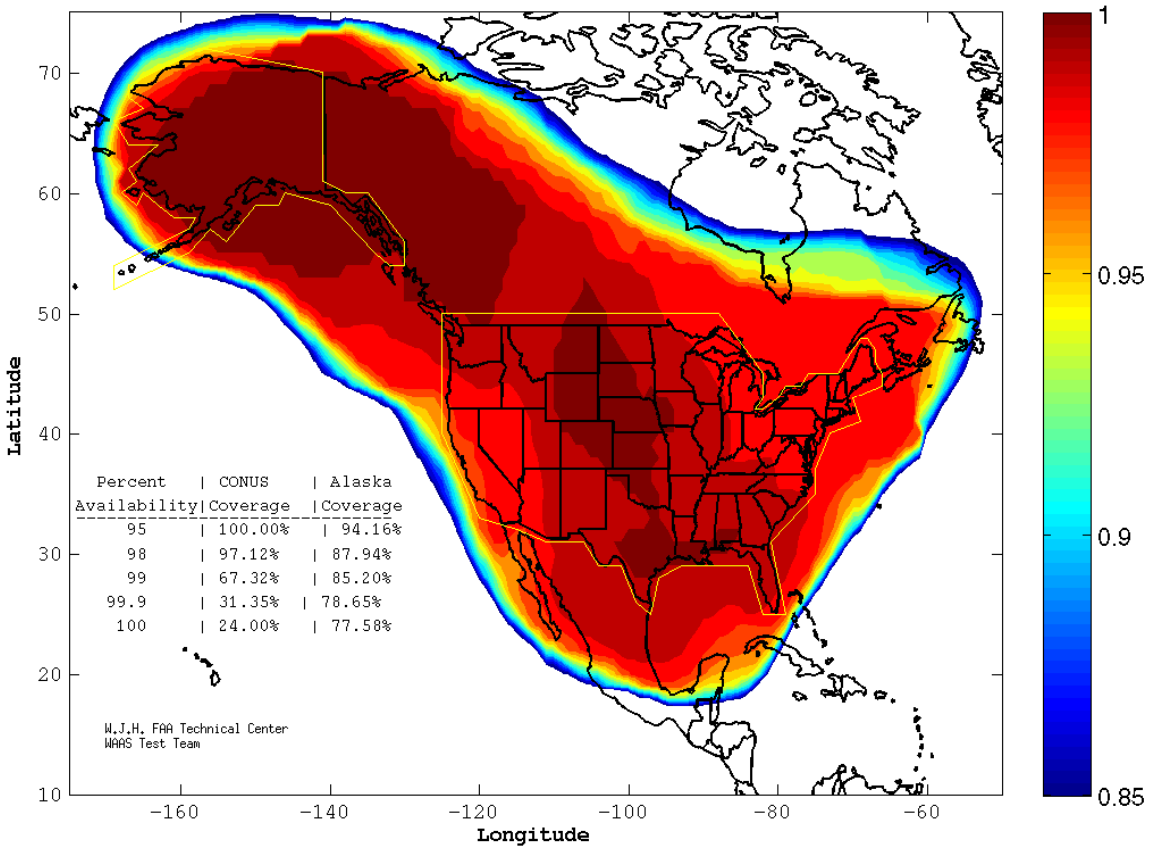


Figure 2: LPV200 Coverage Plot on November 15, 2011



Conclusion:

UDREs on multiple monitored WAAS satelites were unexpectedly bumped to higher levels on several days over the past few weeks. The satellites remained usable for precision approaches during the time UDREs were bumped. The elevated UDREs contributed to reduced LPV and LPV200 availability in the WAAS service volume.