WAAS Technical Report
William J. Hughes Technical Center
Pomona, New Jersey
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DR# 33: Loss of Availability due to Satellite Maintenance on SV 13 (NANU 2006047)
GPS Week/Day: Week 1376 Day 5 (5/26/06)

Discussion:

On GPS Week 1376 Day 1 NANU 2006047 was issued concerning satellite maintenance on SV 30 to occur Week 1376 Days 4 and 5. The contents of the NANU are listed below.

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NOTICE ADVISORY TO NAVSTAR USERS (NANU) 2006047
SUBJ: SVN43 (PRN13) FORECAST OUTAGE JDAY 145/2100 - JDAY 146/0900
1.     NANU TYPE: FCSTDV
       NANU NUMBER: 2006047
       NANU DTG: 192319Z MAY 2006
       REFERENCE NANU: N/A
       REF NANU DTG: N/A
       SVN: 43
       PRN: 13
       START JDAY: 145
       START TIME ZULU: 2100
       START CALENDAR DATE: 25 MAY 2006
       STOP JDAY: 146
       STOP TIME ZULU: 0900
       STOP CALENDAR DATE: 26 MAY 2006

2.  CONDITION: GPS SATELLITE SVN43 (PRN13) WILL BE UNUSABLE ON JDAY 145
    (25 MAY 2006) BEGINNING 2100 ZULU UNTIL JDAY 146 (26 MAY 2006)
    ENDING 0900 ZULU.

3.  POC: CIVILIAN - NAVCEN AT 703-313-5900, HTTP://WWW.NAVCEN.USCG.GOV
    MILITARY - GPS OPERATIONS CENTER at
HTTP://WWW.SCHRIEVER.AF.MIL/GPSSUPPORTCENTER, DSN 560-2541,
    COMM 719-567-2541, gps_support@schriever.af.mil,
HTTP://WWW.SCHRIEVER.AF.MIL/GPS
    MILITARY ALTERNATE - JOINT SPACE OPERATIONS CENTER, DSN 276-9994,
   COMM 805-606-9994, SPACEAF.AOC@VANDENBERG.AF.MIL
```

Figure 1 shows the loss of LPV WAAS service that occurred GPS Week 1376 Day 5.

Figure 1 – LPV Coverage for Week 1376 Day 5

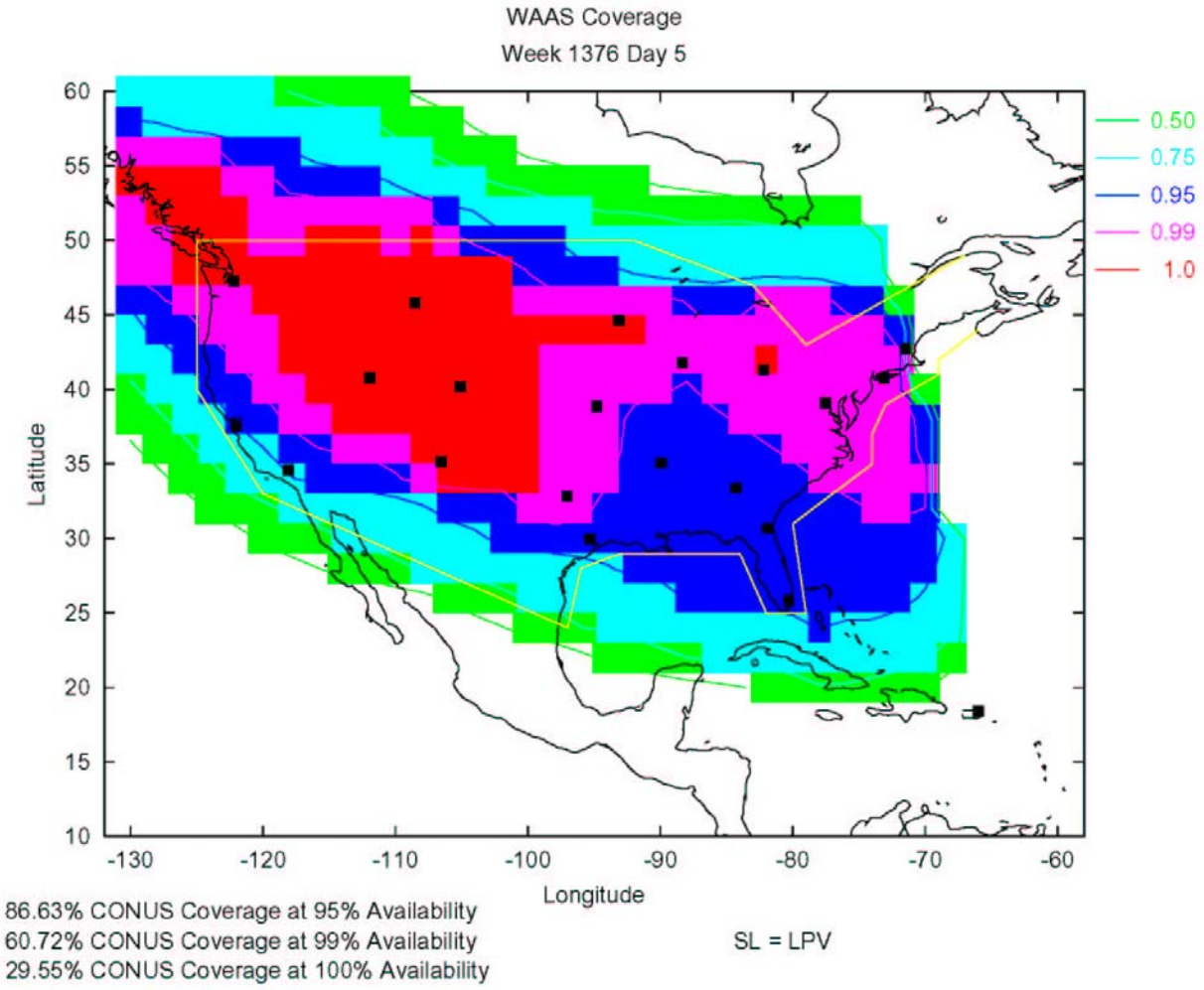
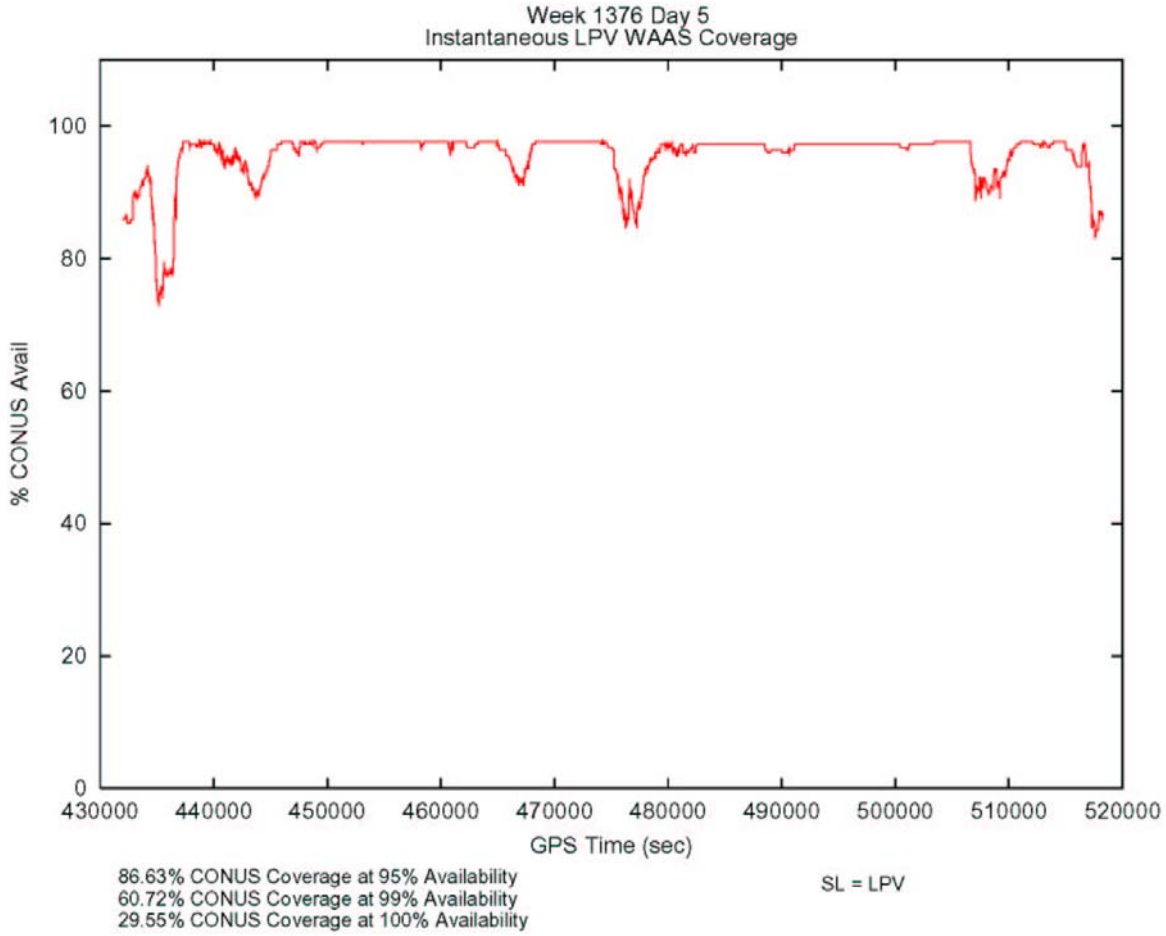


Figure 1 displays a substantial loss of 99% and 100% LPV service across much of the eastern half of CONUS.

Figure 2 shows the instantaneous (30 sec sampling) LPV coverage trend from Week 1376 Day 5.

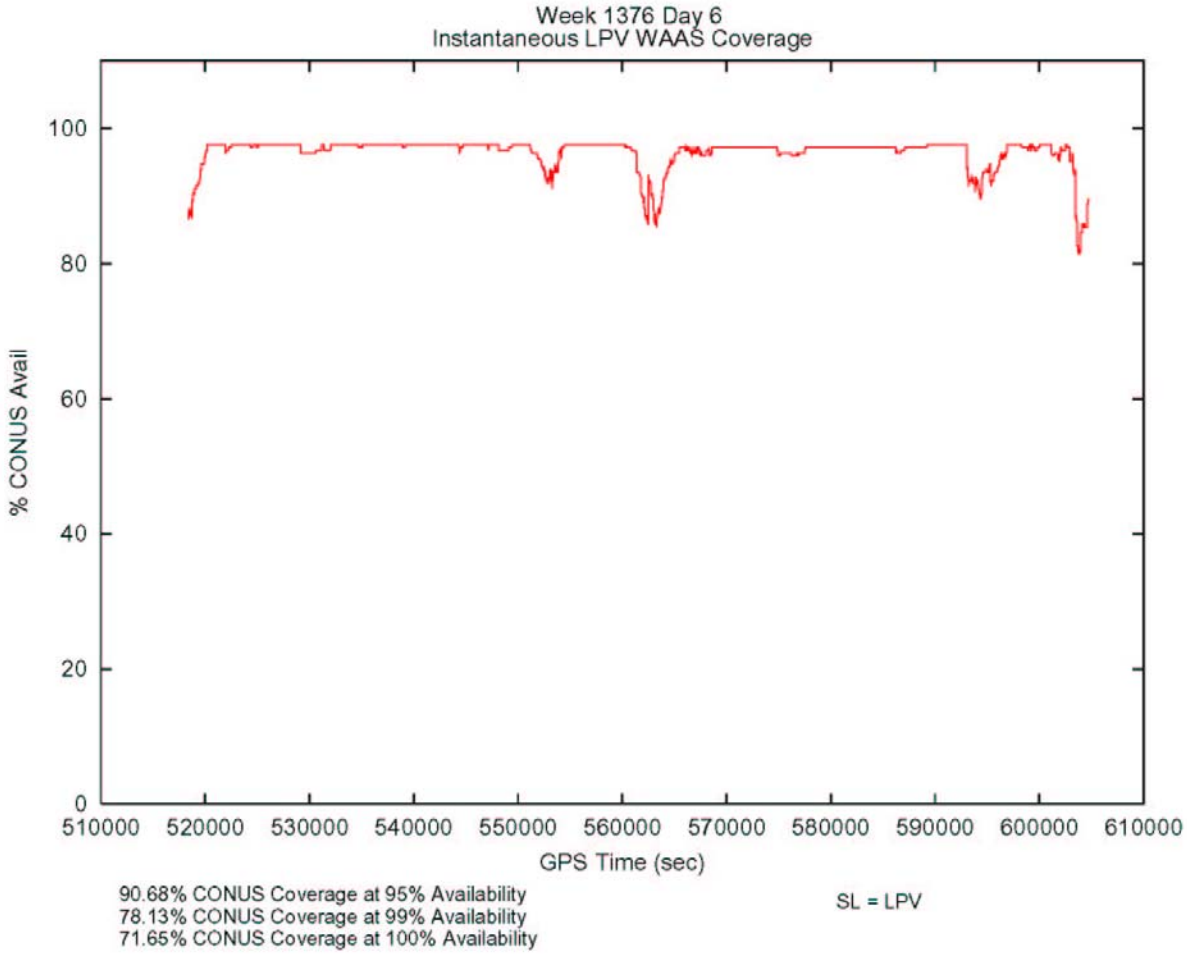
Figure 2 – Instantaneous LPV Coverage for Week 1376 Day 5



The most apparent loss of LPV service occurred at the beginning of the day.

Figure 3 is a trend of the instantaneous (30 sec sampling) LPV coverage from Week 1376 Day 6, a day during which PRN 13 was available for PA ranging for the entire day. Note that a substantial loss of LPV service occurs early in the day on Day 5 as opposed to Day 6.

Figure 3 – Instantaneous LPV Coverage for Week 1376 Day 6



The contents of NANU 2006050 are listed below and contain details about the actual outage of PRN 13 due to the maintenance that was scheduled by NANU 2006047. This information provides a time frame during which PRN 13 was unavailable due to this maintenance action.

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NOTICE ADVISORY TO NAVSTAR USERS (NANU) 2006050
SUBJ: SVN43 (PRN13) FORECAST OUTAGE SUMMARY JDAY 145/2111 - JDAY
146/0413
1.      NANU TYPE: FCSTSUMM
        NANU NUMBER: 2006050
        NANU DTG: 260414Z MAY 2006
        REFERENCE NANU: 2006047
        REF NANU DTG: 192319Z MAY 2006
        SVN: 43
```

PRN: 13
START JDAY: 145
START TIME ZULU: 2111
START CALENDAR DATE: 25 MAY 2006
STOP JDAY: 146
STOP TIME ZULU: 0413
STOP CALENDAR DATE: 26 MAY 2006

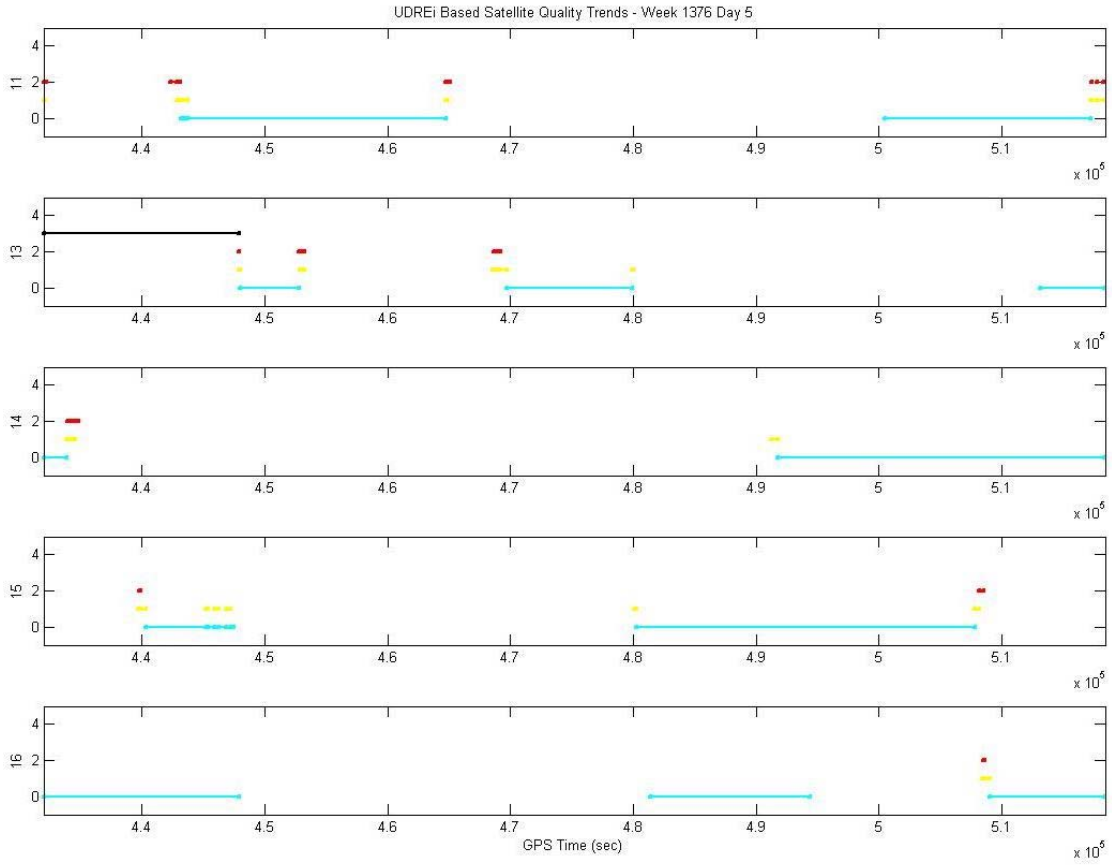
2. CONDITION: GPS SATELLITE SVN43 (PRN13) WAS UNUSABLE ON JDAY 145 (25 MAY 2006) BEGINNING 2111 ZULU UNTIL JDAY 146 (26 MAY 2006) ENDING 0413 ZULU.

3. POC: CIVILIAN - NAVCEN AT 703-313-5900, HTTP://WWW.NAVCEN.USCG.GOV MILITARY - GPS OPERATIONS CENTER at HTTP://WWW.SCHRIEVER.AF.MIL/GPSSUPPORTCENTER, DSN 560-2541, COMM 719-567-2541, gps_support@schriever.af.mil, HTTP://WWW.SCHRIEVER.AF.MIL/GPS MILITARY ALTERNATE - JOINT SPACE OPERATIONS CENTER, DSN 276-9994, COMM 805-606-9994, SPACEAF.AOC@VANDENBERG.AF.MIL

As reported in NANU 2006050, the maintenance action of PRN 13 occurred from 21:11 Zulu on the 25th till 4:13 Zulu on the 26th. This corresponds to about 421860 GPS Time of Week (Day 5) till 447180 GPS Time of Week (Day 6). These times are consistent with a plot of PRN 13's UDREi quality (Figure 4 UDREi's for PRN 11, 13, 14, 15, and 16) and demonstrate the importance of PRN 13 to WAAS LPV service availability over CONUS.

In Figure 4, each subplot is titled on the left with the PRN number it applies and the color of the plotted line corresponds to that PRN's UDREi quality over the course of the day (black is Do Not Use, red is Not Monitored, yellow is NPA, and blue is PA).

Figure 4 – UDREi Quality for PRN 13, Week 1376 Day 5



Conclusion:

The loss of PRN 13 as a PA ranging source caused a noticeable drop in LPV 99% and 100% service availability on Day 5 of Week 1376. This loss of LPV service was not observed on Day 6 after PRN 13 returned to service.