

WAAS Technical Report
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DR# 38: False RDM & UPM monitor at ZDC C&V.
GPS Week/Day: Week 1383 Day 0 (7/9/2006)

Discussion:

On week 1383 Day 0 RDM monitor trip occurred in Denver, Houston, Kansas City and Miami from ZDC C&V at GPS time 14562 (GMT 04:02:42). 2 seconds later UPM monitor trip was recorded in Miami at GPS time 14564 (GMT 04:02:44) and 14565 (GMT 04:02:45) from ZLA C&V. Followed by C&V selected source switch for GUS STA-B and Brewster from ZDC to ZLA at GPS time 14565 (GMT 04:02:45) and 14566 (GMT 04:02:46) respectively. More UPM (Jacksonville) and RDM (New York & Boston) monitor trips from ZDC C&V followed, together with SV Alerts before, between and after the monitor trips. The last significant event was the selected source switch for GUS STA-A and Clarksburg from ZDC to ZLA at GPS time 14645 (GMT 04:04:05) and 14646 (GMT 04:04:06) respectively. Detail of all the events was summarized in table 1 below. There was no RDM monitor trip recorded in ZLA C&V during this period of time.

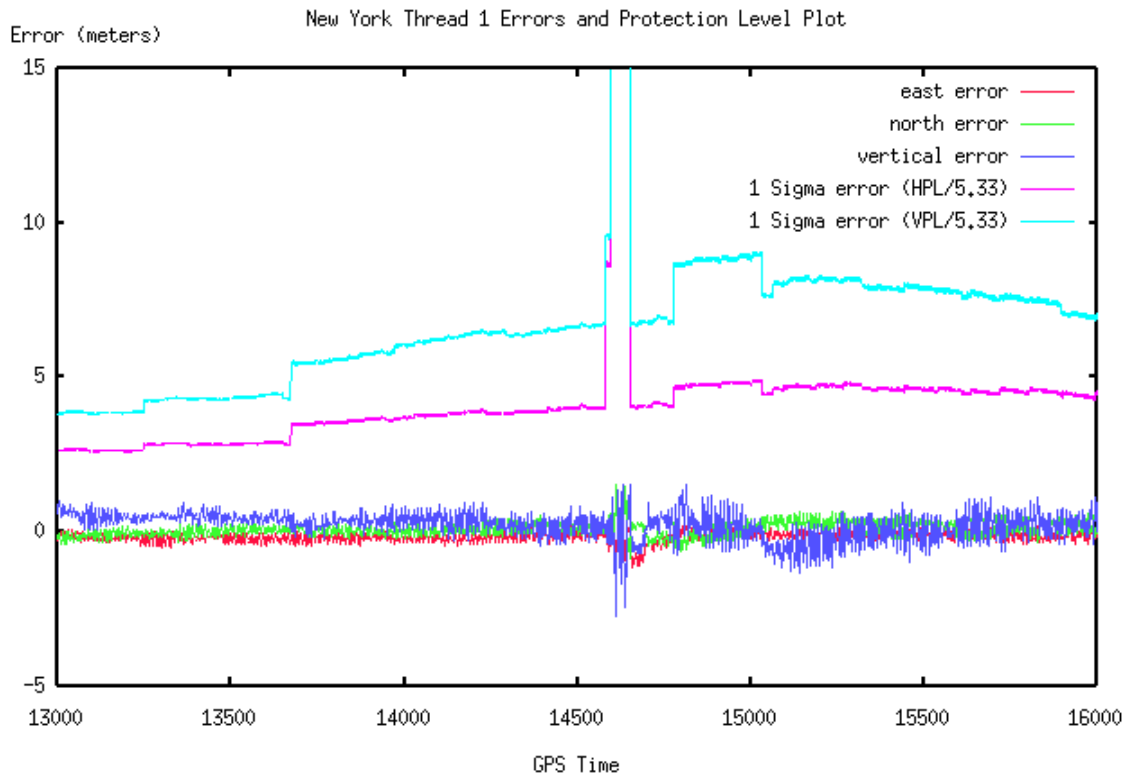
Table 1: Events Log

| GPS Time | Event |
|----------|---|
| 14562 | RDM monitor trip in Denver, Houston, KC, LA, Miami (from C&V ZDC) |
| 14564 | UPM Monitor trip in Miami (from C&V ZLA) |
| 14565 | UPM Monitor trip in Miami (from C&V ZLA) |
| 14565 | C&V switched for STA-B from ZDC to ZLA |
| 14566 | C&V switched for BRE from ZDC to ZLA |
| 14567 | POR Partial Alerts T3 2 messages |
| 14567 | UPM monitor trip in Jacksonville (from C&V ZDC) |
| 14568 | UPM monitor trip in Jacksonville (from C&V ZDC) |
| 14570 | POR Alerts T2 – no change in UDREI |
| 14575 | POR Alerts T3 9 messages – change most PRN to UDREI of 14 |
| 14577 | RDM monitor trip in Boston and NY (from C&V ZDC) |
| 14581 | AORW SV Alert T3 – UDREI of PRN 17 and 20 changed to 12 |
| 14596 | AORW SV Alert T3 – UDREI of PRN 19 changed to 14 |
| 14645 | C&V switched for STA-A from ZDC to ZLA |
| 14646 | C&V switched for CLK from ZDC to ZLA |

Prior to the RDM monitor tripped in Boston and New York at GPS time 14577 (GMT 04:02:57), all position and range errors across all three threads in both sites were less than 50 cm. 4 seconds after the monitor trip at GPS time 14581 (GMT 04:03:01), an AORW SV alert changed the UDREI of PRN 17 and 20 to 12 (NPA) from 5 and 9. Both satellites were dropped from the solution in Boston and New York sites resulted in the increase of HPL to around 48 meters and VPL to around 50 meters. 15 seconds later at GPS time 14596 (GMT 04:03:16), another AORW SV alert changed the UDREI of PRN 19 from 9 to 14 (not monitored). Again PRN 19 was dropped from Boston and New York sites solution resulted in huge jump in HPL to around 100 meters and VPL to around 150 meters. At GPS time 14655 (GMT 04:04:15), both sites were back to normal where UDREi of all three satellites was back to PA quality ($UDREi < 12$).

The similar condition can be applied to UPM monitor trip in Jacksonville at GPS time 14567 (GMT 04:02:47) and 14568 (GMT 04:02:48). All position and range errors across all 3 threads in Jacksonville were less than 50 cm before the UPM monitor trip. About 12 seconds later after the monitor trip, 2 satellites were also dropped from solution in Jacksonville. Everything was back to normal at GPS time 14655 (GMT 04:04:15).

Figure 1



Conclusion

In a short period of just about 82 seconds, RDM and UPM monitor trip have occurred in various WAAS sites where almost all the trips were from ZDC C&V except 1 UPM monitor trip from ZLA C&V. There were also SV Alerts from both AORW and POR with UDERI changes that affected at least 3 WAAS sites performance. Selected source switch for all GUS from ZDC C&V to ZLA C&V had also occurred during this period of time. After reviewing the Range and Iono errors including biases at Boston, New York and Jacksonville, there appears to be no anomaly at any threads prior to the monitor trip at these sites.