WAAS Technical Report
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DR# 36: Multiple drops in AORW signal to noise ratio caused multiple missed messages and eventually an AORW GUS Switchover.
GPS Week/Day: Week 1379 Day 6 (6/17/2006) leading into Week 1380 Days 0 and 1 (6/18/2006 & 6/19/2006).

Discussion:
On week 1379 day 6, AORW GEO suffered four significant drops in signal to noise ration values over a period of approximately 12,000 seconds. These drops in signal level matched four separate instances of missing WAAS messages.

Table 1: Missing AORW Messages on Week 1379 Day 6

Start Time	Stop Time	Length of Gap
592754	592756	3
600731	600733	3
602850	602851	2
604432	604434	3

These signal to noise ratio anomalies and dropped messages preceded eventual switchovers on Week 1380 Days 0 and 1. During the switchover on Day 0, CLK switched from primary to faulted, STA-A was selected as the primary GUS from backup, followed by 8 Type 0 messages. During the switchover on Day 1, STA-A switched from primary to faulted, and CLK was selected as the primary GUS from backup, followed by 8 Type 0 messages. Also occurring on Week 1380 Day 1 were four type six alerts. The events of Day 1 are summarized in Table 2. An AOR signal to noise ratio anomaly also occurred on Week 1382 Day 4 but did not cause a switchover.

Table 2: Events on Week 1380 Day 1

Start Time	Event	UDREi Changes
120219	AOR T6 Alerts	All SVs set to NM
120231	AOR T6 Alerts	4 SV's NM → 5-9 POR → 13 PRN's 3, 25, AOR → DNU
120677	AOR T6 Alerts	All SVs set to NM
120689	AOR T6 Alerts	13 SV's NM → 5-12 POR → 13 PRN's 3, 25, AOR → DNU
120847	AOR Switchover	

The times shown above in Table 2 directly correspond to "Time to Alarm" failures that occurred because the selected source (ZDC) sent out messages that were not received back from the GEO. Figure 1 below shows a plot of AORW signal to noise ratio on 17 June. The first four spikes correspond to the groups of missing messages shown in table 1 above. The fifth spike corresponds to the GUS switchover on Week 1380 Day 0. Please note the GPS times of week for Day 0 were adjusted to fit the plot. Day 0 begins at time 604800. Figure 2 shows a plot of the SNR values for three GEO's at Albuquerque. No switchover occurred on this day.

Figure 1

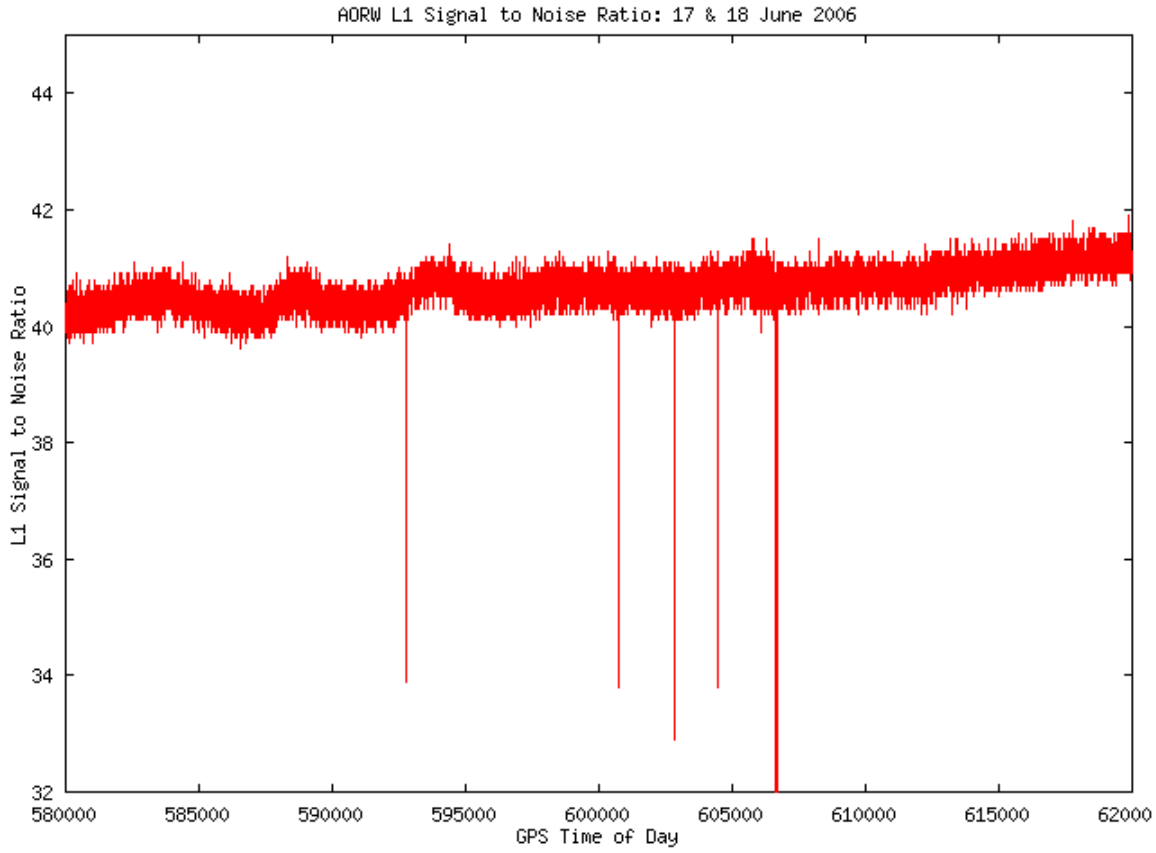

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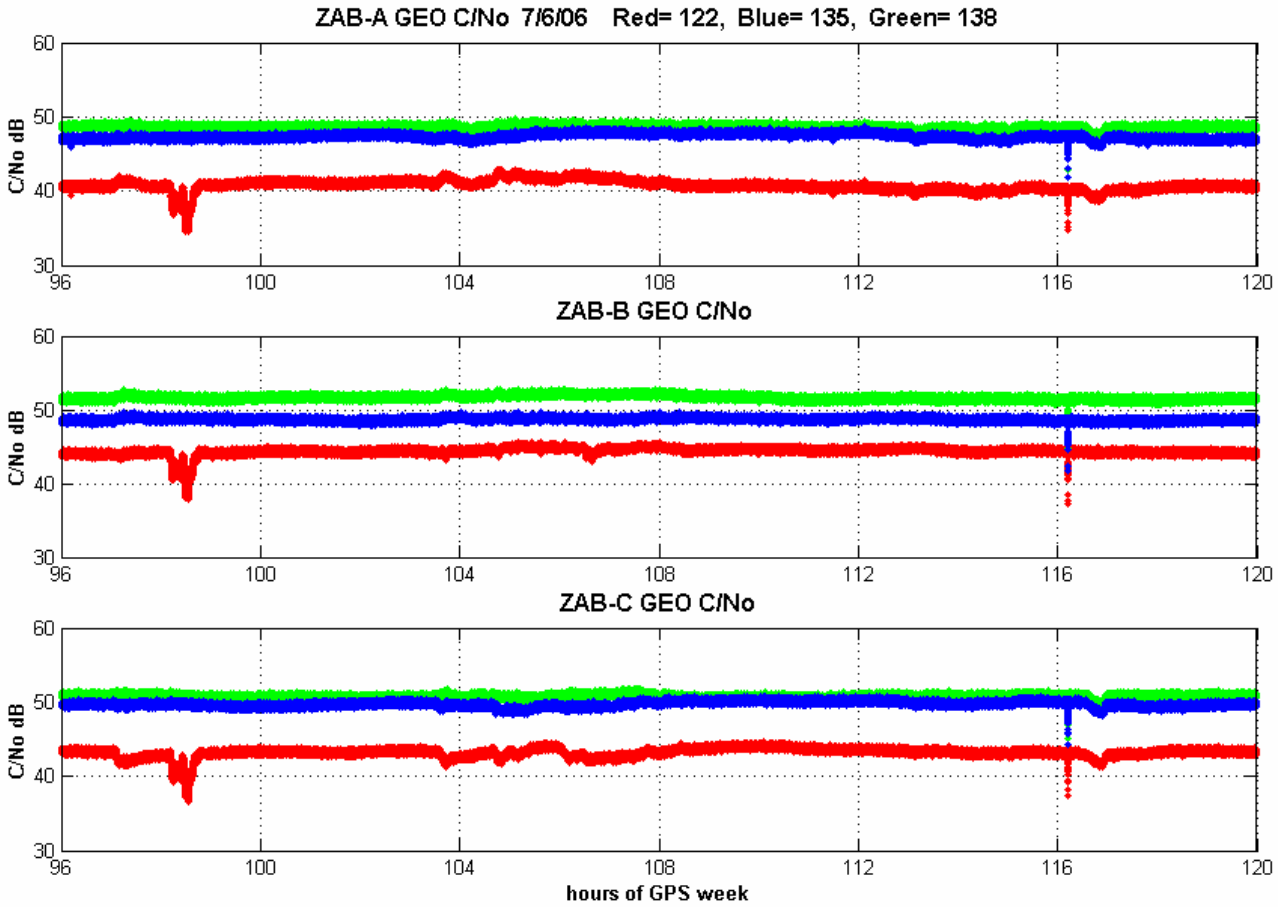
Figure 2



Conclusion

Signal anomalies on AORW caused multiple groups of dropped messages on 17 June 2006. Following this anomaly, there was a GUS switchover on 18 June, four type six alerts on 19 June, as well as another GUS switchover that day. As a result, WAAS coverage was affected over the three days. AOR continued to exhibit this signal to noise ratio anomaly on Week 1382 Day 4, although it did not result in a switchover.