

**WIDE-AREA AUGMENTATION SYSTEM  
PERFORMANCE ANALYSIS REPORT**

**Report #51**

**(Revised on 3/3/2015)**

**Reporting Period: October 1 to December 31, 2014**

**January 2015**

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**Report:** WAAS PAN Report #51  
**Revision:** 1  
**Revision Date:** 3/3/2014

**Changes:**

Changes made to Table 13.5 (page 219) and Table 13.7 (page 221). The revised tables now reflect twelve weeks of data for the two G3 receivers at Fairbank instead of the eleven weeks of data in the previous report.

**Executive Summary**

Since 1999 the WAAS Test Team at the William J. Hughes Technical Center has reported GPS performance as measured against the GPS Standard Positioning Service (SPS) Signal Specification. These quarterly reports are known as the GPS PAN (Performance Analysis Network) Report. In addition to the GPS PAN reports, the WAAS Test Team also reports on the performance of the Wide-Area Augmentation System (WAAS). This is WAAS PAN Report #51; it covers WAAS performance during the period from October 1, 2014 to December 31, 2014.

This report shows results for the following: accuracy, availability, coverage, safety index, range accuracy, WAAS broadcast message rates, GEO ranging availability, WAAS airport availability, WAAS CNMP analysis, WAAS reference station survey validation, SQM, GPS Broadcast Orbit vs. NGA Precise Orbits analysis, and URA Bounding analysis.

A section on G3 receiver performance is also included in this report. Twelve Novatel WAAS G3 receivers were setup at six existing WAAS reference sites with two receivers at each site on October 2013. The WAAS system will be upgraded to G3 receivers in preparation for a full constellation of dual civil frequency GPS satellites (L1/L5). This is the fourth report showing results on G3 receiver performance.

The following table shows observations for accuracy and availability made during the reporting period for CONUS and Alaska sites. The international sites are excluded from this table, but are included in the body of the report. LP service is available when the calculated Horizontal Protection Level (HPL) is less than 40 meters. LPV service is available when the calculated HPL is less than 40 meters and the Vertical Protection Level (VPL) is less than 50 meters. LPV 200 service is available when the calculated HPL is less than 40 meters, and the VPL is less than 35 meters. The NSTB sites—Grand Forks, Atlantic City, and Arcata—are outliers due to receiver quality issues, and not due to the WAAS signal in space quality.

<b>Parameter</b>	<b>CONUS Site/Maximum</b>	<b>CONUS Site/Minimum</b>	<b>Alaska Site/Maximum</b>	<b>Alaska Site/Minimum</b>
95% Horizontal Accuracy (HPL <= 40 meters)	Atlantic City 1.38 meters	Salt Lake City 0.655 meters	Barrow 0.919 meters	Bethel 0.693 meters
95% Vertical Accuracy (VPL <= 50 meters)	Miami 2.08 meters	Denver 0.991 meters	Barrow 2.02 meters	Bethel 1.139 meters
LP Availability (HPL <= 40 meters)	Multiple Sites 100%	Multiple Sites 100%	Juneau 99.99%	Barrow 99.63%
LPV Availability (HPL <= 40 meters & VPL <= 50 meters)	Multiple Sites 100%	Grand Forks 99.99%	Bethel 99.94%	Barrow 99.44%
LPV 200 Availability (HPL <= 40 meters & VPL <=35 meters)	Multiple Sites 100%	Oakland 99.92%	Bethel 99.84%	Cold Bay 92.12%
99% HPL	Miami 18.678 meters	Memphis 11.737 meters	Cold Bay 30.432meters	Anchorage 15.27 meters
99% VPL	Oakland 31.319 meters	Houston 21.47 meters	Barrow 42.071 meters	Anchorage 24.997 meters

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**1.0 INTRODUCTION**

The FAA monitors WAAS and GPS SPS performance in order to ensure the safe and effective use of the satellite navigation system in the National Airspace System (NAS). The Wide Area Augmentation System (WAAS) adds more timely integrity monitoring of GPS and improves position accuracy and availability of GPS within the WAAS coverage area.

Objectives of this report are:

- a. To evaluate and monitor the ability of WAAS to augment GPS by characterizing important performance parameters.
- b. To analyze the effects of GPS satellite operation and maintenance, and ionospheric activity on the WAAS performance.
- c. To investigate any GPS and WAAS anomalies and determine their impact on potential users.
- d. To archive performance of GPS and WAAS for future evaluations.

The WAAS data transmitted from Geostationary satellites (GEO) PRN#135 (CRW), PRN#138 (CRE) and PRN#133 (AMR) are used in the evaluation. CRE and CRW GEOs provide a precision approach (PA) ranging capability that supports all levels of WAAS service. AMR GEO provides only non-precision approach (NPA) ranging service.

The terms "PA" and "NPA" are used in this report to refer to the two modes of user equipment operation. PA and NPA are terms used in the original WAAS specification, FAA-E-2892. See Table 1-1 for a mapping of these terms to the user service levels.

Receivers in PA mode are required to: use all WAAS corrections, use only corrected satellites, not mix corrections from multiple GEOs, only use the designated Space Based Augmentation System (SBAS) for the published approach procedure, and not use ranging from a GPS or GEO satellite having a User Differential Range Error (UDRE) status of greater than 15 meters. Receiver in NPA mode may: mix corrected and uncorrected satellites, mix corrections from different GEOs or SBASs, use either the WAAS ionosphere corrections or the GPS Klobachar model for ionosphere corrections, and use ranging from a GPS or GEO satellite that have a UDRE status of greater than 15 meters. NPA mode receivers may also operate using Fault Detection / Fault Detection Exclusion (FD/FDE) in the absence of a SBAS. The data presented in this report does not take credit for the additional NPA mode availability and continuity provided by the use of FD/FDE, whether full FD/FDE or partial FD/FDE used to allow the mixing of corrected and uncorrected satellites. The NPA accuracy data presented in this report uses Klobachar ionosphere corrections in order to be conservative.

The results in this report are based on the application of the WAAS corrections to receiver data from the WAAS receiver network and receivers of the FAA's National Satellite Test Bed (NSTB) network and from analysis based on the correction data broadcast by WAAS. Table 1-2 lists the receivers used in the PA analyses. Table 1-3 lists the receivers used in the NPA analyses.

**Table 1-1 WAAS Service Levels**

User Service	NPA or PA	WAAS Protection Levels
RNP 0.3	NPA	HPL <= 0.3 nmi
RNP 0.1	NPA	HPL <= 0.1 nmi
LNAV	NPA	HPL <= 556 m
LNAV/VNAV	PA	HPL <= 556 m VPL <= 50 m
LP	PA	HPL <= 40 m
LPV	PA	HPL <= 40 m VPL <= 50 m
LPV200	PA	HPL <= 40 m VPL <= 35 m

Table 1-2 PA Evaluation Sites

	Number of Days Evaluated	Number of Samples
<b>NSTB:</b>		
Atlantic City	91	7884356
Grand Forks	87	7548390
Oklahoma City	85	7342623
<b>WAAS:</b>		
Albuquerque	92	7948792
Anchorage	92	7948229
Atlanta	92	7948704
Barrow	92	7947577
Bethel	92	7948126
Billings	92	7937719
Boston	92	7948661
Chicago	86	7429552
Cleveland	91	7904628
Cold Bay	92	7941044
Dallas	92	7920842
Denver	92	7942382
Fairbanks	92	7948707
Gander	92	7935260
Goose Bay	88	7639606
Houston	92	7933667
Iqaluit	91	7839254
Jacksonville	92	7948514
Juneau	92	7946100
Kansas City	92	7948581
Kotzebue	92	7945366
Los Angeles	92	7948735
Memphis	92	7948741
Merida	92	7946675
Mexico City	92	7945913
Miami	92	7948491
Minneapolis	92	7948258
New York	92	7948792
Oakland	92	7948159
Puerto Vallarta	92	7929662
Salt Lake City	92	7948574
San Jose Del Cabo	91	7858197
Seattle	92	7947034
Washington DC	92	7948735
Winnipeg	92	7948797

**Table 1-3 NPA Evaluation Sites**

<b>Location</b>	<b>Number of Days Evaluated</b>	<b>Number of Samples</b>
Albuquerque	92	7948788
Anchorage	92	7948552
Atlanta	92	7946140
Barrow	92	7948538
Bethel	92	7948094
Billings	92	7937650
Boston	92	7948662
Cleveland	92	7938247
Cold Bay	92	7940944
Fairbanks	92	7948720
Gander	92	7946552
Honolulu	92	7933216
Houston	92	7945563
Iqaluit	91	7852770
Juneau	92	7943893
Kansas City	92	7946458
Kotzebue	92	7947730
Los Angeles	92	7947457
Merida	92	7946650
Miami	92	7948711
Minneapolis	92	7947163
Oakland	92	7947228
Salt Lake City	92	7948518
San Jose Del Cabo	92	7917617
San Juan	88	7628500
Seattle	92	7948648
Tapachula	92	7945103
Washington DC	91	7878359

The report is divided in the performance categories listed below.

1. WAAS Position Accuracy
2. WAAS Operational Service Availability
3. WAAS Coverage
4. WAAS Integrity
5. WAAS Range Domain Accuracy
6. WAAS GEO Ranging Performance
7. WAAS Airport Availability
8. WAAS CNMP Analysis
9. WAAS Antenna Survey Validation
10. WAAS SQM Analysis
11. GPS Broadcast Orbits to IGS Precise Orbits and URA Bounding Analysis
12. WAAS G3 Receiver Analysis

Table 1-4 lists the performance parameters evaluated for the WAAS in this report. Please note that these are the performance parameters associated with the WAAS system. These requirements are extracted from the FAA Specification FAA-E-2892C and FAA Specification FAA-E-2976, as applicable.

**Table 1-4 WAAS Performance Parameters**

Performance Parameter	Expected WAAS Performance
LPV Accuracy Horizontal	≤ 1.5m error 95% of the time
LPV Accuracy Vertical	≤ 2m error 95% of the time
LNAV Accuracy Horizontal	≤ 36m error 95% of the time
Availability LPV CONUS	99% availability of 100% of CONUS
Availability LPV Alaska	95% availability of 75% of Alaska
Availability LNAV CONUS	99.99% availability with HPL < 556m
Availability LNAV Alaska	99.9% availability with HPL < 556m
Availability En route OCONUS	99.9% availability with HPL < 2nmi
Probability of Hazardously Misleading Information (HMI)	< 10e-7 per approach

**1.1 Event Summary**

Table 1-5 lists events that affected WAAS performance or the ability to determine the WAAS performance during the reporting period. These events include GPS or WAAS anomalies, relevant receiver malfunctions, and receiver maintenance conducted. Detailed analyses of particular events are documented in the Discrepancy Reports (DR). The DRs are posted on the website <http://www.nstb.tc.faa.gov> under ‘WAAS Technical Reports’ and can also be accessed via hyperlink from Table 1-5 below. Please note “TOW” is the time of GPS week, which is the cumulative number of seconds since 00:00:00 Sunday (GMT without leap seconds).

Table 1-6 lists events related to WAAS upgrades that happened this quarter. Table 1-7 lists events related to GUS switchovers. A GUS switchover is the transition from one uplink site to the other uplink site for a GEO.

**Table 1-5 Events**

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
9/26/2014	10/9/2014	Chicago (ZAU1), Chicago (ZAU2), Chicago (ZAU3)	None	Fire at Chicago ARTCC (ZAU) resulted in the WAAS equipment at ZAU being powered down and the disruption of the communications circuits used by WAAS at ZAU. The impacted equipments were two backbone concentrator network node routers and the 3 sets of receiving equipment of the ZAU WRS. WAAS system level performance was not impacted by the event due to the WAAS redundancy architecture.
9/29/2014	10/1/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Canada, LPV200_Canada	Geomagnetic activity over the three days (Kp = 4 all three days) mildly disturbed the ionosphere and caused elevated GIVE values. This event resulted in minor LPV200 outages all three days in northern Canada and LPV service in northern Canada on 9/30/14. Please see plot(s): <a href="#">LPV200_9/29/2014</a> <a href="#">LPV_9/30/2014</a> <a href="#">LPV200_9/30/2014</a> <a href="#">LPV200_10/1/2014</a>
10/1/2014	10/1/2014	Washington D.C. (CnV), Los	LPV200_Alaska	Geomagnetic activity, Kp =4, disturbed the ionosphere and caused elevated GIVE values. This resulted in degraded LPV

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
		Angeles (CnV), Atlanta (CnV)		200 service in north eastern Alaska and north central and west Canada. Time of the impact was approximately 01:00 to 02:00. Please see plot(s): <a href="#">LPV200_10/1/2014</a>
10/2/2014	10/2/2014	PRN25	LPV_CONUS, LPV_Alaska, LPV_Canada, LPV200_CONUS, LPV200_Alaska, LPV200_Canada	Planned maintenance on PRN-25, NANU 2014074, delta V maneuver, resulted in the temporary loss of service from that GPS satellite. This resulted in: a short LPV-200 outages in western CONUS (California, Nevada, Oregon, and Arizona) from approximately 19:30 to 20:00, a minor LPV outage in south west Alaska, significant LPV200 service degradation for western and northern Alaska from about 18:00 to 19:30, and degradation of the LPV-200 service in northern Canada for the last quarter of the day. Please see plot(s): <a href="#">LPV_10/2/2014</a> <a href="#">LPV200_10/2/2014</a>
10/3/2014	10/3/2014	PRN17, PRN20, PRN23, PRN24	LPV_Canada, LPV200_Canada	High UDREs on satellites 17, 20, 23, 24 from GEO 138 message stream at 04:43 contributed to elevated GIVE values and the loss of service in LPV/LPV200 Canada. SV Alert on PRN 24 occurred at this time on all three GEOs.
10/3/2014	10/5/2014	Iqaluit (YFB1), Iqaluit (YFB2), Iqaluit (YFB3)	LPV_Canada, LPV200_Alaska, LPV200_Canada	Sporadic communications outages on network 1 from Iqaluit (YFB) resulted in the loss of measurement data from that site because network 2 was already out of service due to the fire damage at ZAU. The loss of measurements resulted in elevated GIVE values and caused degradation to the LPV and LPV-200 services in Canada over the course of the three days (10/3, 10/4, and 10/5). LPV-200 service in north east Alaska was also impacted on 10/4. Please see plot(s): <a href="#">LPV_10/3/2014</a> <a href="#">LPV200_10/3/2014</a> <a href="#">LPV_10/4/2014</a> <a href="#">LPV200_10/4/2014</a> <a href="#">LPV_10/5/2014</a> <a href="#">LPV200_10/5/2014</a>
10/6/2014	10/6/2014	Barrow (BRW1), Barrow (BRW2), Barrow (BRW3), Bethel (BET1), Bethel (BET2), Bethel (BET3), Fairbanks (FAI1), Fairbanks (FAI2), Fairbanks (FAI3), Kotzebue (OTZ1), Kotzebue (OTZ2), Kotzebue (OTZ3)	LPV200_Alaska	A 5 second data outage at 03:01 for the 6 northern Alaska reference stations resulted in the reinitialization of WAAS carrier smoothing algorithm for those sites. This resulted in elevated UDRE values that caused a brief LPV-200 service outage in northern Alaska. The ongoing ZAU issue contributed to this outage because those sites were operating with only 1 network. Please see plot(s): <a href="#">LPV200_10/6/2014</a>
10/7/2014	10/7/2014	Barrow (BRW1), Barrow (BRW2), Barrow (BRW3), Bethel (BET1), Bethel (BET2), Bethel (BET3), Fairbanks (FAI1), Fairbanks (FAI2), Fairbanks (FAI3), Iqaluit (YFB1), Iqaluit (YFB2), Iqaluit (YFB3),	LPV_Canada, LPV200_Alaska, LPV200_Canada	Short data outages to multiple reference stations during the period from 18:30 to 19:00 resulted in the reinitialization of WAAS carrier smoothing algorithm for those sites. This caused elevated UDRE values as the carrier smoothing algorithm re-converged, resulted in brief LPV and LPV-200 service outages in Canada and a brief LPV-200 outage in Alaska. The lack of redundancy in the feeder circuits from those reference stations to the WAAS networks due to the outage of both backbone routers (network 1 and network 2) at ZAU was the cause of this issue. Please see plot(s): <a href="#">LPV_10/7/2014</a> <a href="#">LPV200_10/7/2014</a>

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
		Kotzebue		
10/8/2014	10/8/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Canada, LPV200_Alaska, LPV200_Canada	Geomagnetic activity, Kp =3, disturbed the ionosphere and caused elevated GIVE values. This resulted in degraded LPV and LPV-200 service in Canada and degraded LPV-200 service in north eastern Alaska. Time of the impact was approximately 18:00 to the end of the day. Please see plot(s): <a href="#">LPV_10/8/2014 LPV200_10/8/2014</a>
10/9/2014	10/9/2014	Iqaluit (YFB1), Iqaluit (YFB2), Iqaluit (YFB3)	LPV_Canada, LPV200_Canada	An approximate 5 minute data outage from the Iqaluit reference station (YFB) from ~18:41 to 18:46 resulted in brief LPV and LPV-200 service outages in northern Canada. Please see plot(s): <a href="#">LPV_10/9/2014 LPV200_10/9/2014</a>
10/11/2014	10/11/2014	Barrow (BRW1), Barrow (BRW2), Barrow (BRW3), Bethel (BET1), Bethel (BET2), Bethel (BET3), Fairbanks (FAI1), Fairbanks (FAI2), Fairbanks (FAI3), Kotzebue (OTZ1), Kotzebue (OTZ2), Kotzebue (OTZ3)	LPV200_Alaska	Short 5-10 second data outages from multiple Alaska reference stations at about 20:53:30 resulted in the reinitialization of the WAAS carrier smoothing algorithm for those sites. This caused WAAS to broadcast elevated UDRE values for a couple GPS satellites and resulted in a short LPV-200 service outage for western Alaska. Please see plot(s): <a href="#">LPV200_10/11/2014</a>
10/13/2014	10/13/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200_Canada	Geomagnetic activity, Kp =3, disturbed the ionosphere and caused elevated GIVE values. This resulted in degraded LPV 200 service in the Hudson Bay vicinity. Time of the impact was approximately 20:00 to day rollover. Please see plot(s): <a href="#">LPV200_10/13/2014</a>
10/14/2014	10/15/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Canada, LPV200_CONUS, LPV200_Alaska, LPV200_Canada	Geomagnetic activity, Kp = 5 on both days, disturbed the ionosphere and caused elevated GIVE values and GIVEs being set to the ionosphere storm state of 45 meters. This resulted in degraded LPV 200 service in the Hudson Bay vicinity. Time of the impact was approximately 20:00 to day rollover. This also caused degradation of the LPV and LPV-200 services in Canada and the LPV-200 service in Alaska on both days. There were also brief LPV-200 service impacts to the Seattle and Miami areas on the second day, 10/15/14. Please see plot(s): <a href="#">LPV_10/14/2014 LPV200_10/14/2014 LPV_10/15/2014 LPV200_10/15/2014</a>
10/14/2014	10/14/2014	PRN32	LPV200_CONUS	The signal from PRN-32 became unstable from 05:27:39 to 05:34:34 causing the WAAS receivers to lose and then reacquire signal tracking. This resulted in the loss of observation data for the outage interval and the reinitialization of the WAAS carrier smoothing algorithms. WAAS alarmed PRN-32 to a UDRE of "Not Monitored". It took about 30 minutes for the broadcast UDRE to recover as the carrier smoothing algorithm converged. The elevated UDRE for PRN-32 caused a short LPV-200 service outage on the west coast (2 minutes for Los Angles, 3 minutes for Oakland). There was no NANU for this event. Please see plot(s): <a href="#">LPV200_10/14/2014</a>
10/18/2014	10/18/2014	Washington D.C. (CnV),	LPV_Canada, LPV200_Alaska,	Geomagnetic activity, Kp =4, disturbed the ionosphere and caused elevated GIVE values. This resulted in degraded LPV

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
		Los Angeles (CnV), Atlanta (CnV)	LPV200_Canada	and LPV-200 service in Canada and degraded LPV-200 service in Alaska. Please see plot(s): <a href="#">LPV 10/18/2014 LPV200 10/18/2014</a>
10/18/2014	10/18/2014	GEO135, Littleton (APA)	Alaska, LPV200_CONUS	The uplink for the CRW GEO, PRN-135 switched from the Littleton CO uplink site to the Napa CA uplink site at 15:13:01. This caused a 12 second outage of the CRW broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN-135, resulted in LPV and LPV-200 outages for those areas of north west Alaska that do not have redundant GEO coverage. This also caused the UDRE for CRW to be elevated. It took about 6 hours before CRW supported precision approach quality ranging and approximately 38 hours to fully converge. The elevated UDRE for CRW contributed to the small, short LPV-200 outages in CONUS. Please see plot(s): <a href="#">LP 10/18/2014 LPV 10/18/2014 LPV200 10/18/2014</a>
10/19/2014	10/19/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Canada, LPV200_Alaska, LPV200_Canada	Geomagnetic activity, Kp =3, disturbed the ionosphere and caused elevated GIVE values. This resulted in degraded LPV and LPV-200 service in Canada and degraded LPV-200 service in Alaska. The elevated UDRE on CRW from the uplink switch on the prior day may have also contributed to the outages Please see plot(s): <a href="#">LPV200 10/19/2014</a>
10/20/2014	10/20/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Canada, LPV200_Alaska, LPV200_Canada	Geomagnetic activity, Kp =5, disturbed the ionosphere and caused elevated GIVE values. This resulted in degraded LPV and LPV-200 service in Canada and degraded LPV-200 service in Alaska. Please see plot(s): <a href="#">LPV 10/20/2014 LPV200 10/20/2014</a>
10/21/2014	10/21/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Canada, LPV200_Alaska, LPV200_Canada	Geomagnetic activity, Kp =4, disturbed the ionosphere and caused elevated GIVE values. This resulted in degraded LPV and LPV-200 service in Canada and degraded LPV-200 service in Alaska. Please see plot(s): <a href="#">LPV 10/21/2014 LPV200 10/21/2014</a>
10/22/2014	10/22/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Canada, LPV200_Alaska, LPV200_Canada	Geomagnetic activity, Kp =4, disturbed the ionosphere and caused elevated GIVE values. This resulted in degraded LPV and LPV-200 service in Canada and degraded LPV-200 service in Alaska. Please see plot(s): <a href="#">LPV 10/22/2014 LPV200 10/22/2014</a>
10/23/2014	10/23/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Canada, LPV200_Alaska, LPV200_Canada	Geomagnetic activity, Kp =4, disturbed the ionosphere causing elevated GIVE values. This resulted in degraded LPV and LPV-200 service in Canada and degraded LPV-200 service in Alaska. Please see plot(s): <a href="#">LPV 10/23/2014 LPV200 10/23/2014</a>
10/23/2014	10/23/2014	PRN12	LPV_Alaska, LPV_Canada, LPV200_CONUS, LPV200_Alaska, LPV200_Canada	Planned maintenance on PRN-12, NANU 2014077, delta V maneuver, resulted in the temporary loss of service from that GPS satellite from 13:55 to 18:02. This resulted in short LPV and LPV-200 outages in Alaska and Canada and a short LPV-200 outage in CONUS. The Alaska and Canada impacts were from approximately 15:00 to 16:00 and the CONUS impact was from approximately 14:00 to 15:00. Please see plot(s): <a href="#">LPV 10/23/2014 LPV200 10/23/2014</a>
10/24/2014	10/24/2014	Washington D.C. (CnV),	LPV_Canada, LPV200_Alaska,	Geomagnetic activity, Kp =4, disturbed the ionosphere and caused elevated GIVE values. This resulted in degraded LPV



Start Date	End Date	Location/ Satellite	Service Affected	Event Description
		Los Angeles (CnV), Atlanta (CnV)	LPV200_Canada	and LPV-200 service in Canada and degraded LPV-200 service in Alaska. Please see plot(s): <a href="#">LPV_10/24/2014 LPV200_10/24/2014</a>
10/25/2014	10/25/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Canada, LPV200_Alaska, LPV200_Canada	Geomagnetic activity, Kp =3, disturbed the ionosphere and caused elevated GIVE values. This resulted in degraded LPV and LPV-200 service in Canada and degraded LPV-200 service in Alaska. Please see plot(s): <a href="#">LPV_10/25/2014 LPV200_10/25/2014</a>
10/26/2014	10/26/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Canada, LPV200_Alaska, LPV200_Canada	Geomagnetic activity, Kp =3, disturbed the ionosphere and caused elevated GIVE values. This resulted in degraded LPV and LPV-200 service in Canada and degraded LPV-200 service in Alaska. Please see plot(s): <a href="#">LPV_10/26/2014 LPV200_10/26/2014</a>
10/27/2014	10/28/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Alaska, LPV_Canada, LPV200_CONUS, LPV200_Alaska, LPV200_Canada	Geomagnetic activity, Kp =4 on both days, disturbed the ionosphere and caused elevated GIVE values. This resulted in degraded LPV and LPV-200 service in Canada and Alaska on both days and degraded LPV-200 service in CONUS on the second days, 10/18/14. Please see plot(s): <a href="#">LPV_10/27/2014 LPV200_10/27/2014</a> <a href="#">LPV_10/28/2014 LPV200_10/28/2014</a>
10/29/2014	10/29/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Canada, LPV200_Canada	Geomagnetic activity, Kp =4, disturbed the ionosphere and caused elevated GIVE values. This resulted in degraded LPV and LPV-200 service in Canada. Please see plot(s): <a href="#">LPV_10/29/2014 LPV200_10/29/2014</a>
10/30/2014	10/30/2014	PRN8	None	NANU2014083 – PRN-8 removed from the almanac. SVN-49 will be assigned PRN-8 but will not be in the Almanac
10/31/2014	10/31/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Canada, LPV200_Alaska, LPV200_Canada	Geomagnetic activity, Kp =3, disturbed the ionosphere causing elevated GIVE values. This resulted in degraded LPV and LPV-200 service in Canada and degraded LPV-200 service in Alaska. There was also a 4 to 6 second data outage starting at 20:35:57 from multiple sites in northern Alaska that caused the WAAS carrier smoothing algorithm to reinitialize for those sites, resulting in elevated UDRE values to be broadcast for several GPS satellites for a short period. This resulted in a brief (~ 10 minute) LPV-200 outage in north east Alaska starting at that time. The reinitialization of the WAAS carrier smoothing algorithm may have also contributed to the elevated GIVEs for the high latitude IGPs. Please see plot(s): <a href="#">LPV_10/31/2014 LPV200_10/31/2014</a>
11/2/2014	11/2/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Canada, LPV200_Canada	Geomagnetic activity, Kp =3, disturbed the ionosphere and caused elevated GIVE values. This resulted in degraded LPV and LPV-200 service in Canada. Please see plot(s): <a href="#">LPV_11/2/2014 LPV200_11/2/2014</a>
11/4/2014	11/4/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200_CONUS	Elevated GIVE values also caused a separate LPV-200 outage in southern Florida for about 2 minutes starting at approximately 21:29. The elevated UDRE on CRW, PRN-135 may have also contributed to this outage. Please see plot(s): <a href="#">LPV200_11/4/2014</a>
11/4/2014	11/4/2014	GEO135, Napa (APC)	LPV_Alaska, LPV_Canada,	The uplink for the CRW GEO, PRN-135 switched from the Littleton CO uplink site to the Napa CA uplink site at 14:22:02.

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
			LPV200_CONUS, LPV200_Alaska, LPV200_Canada	This caused a 4 second outage of the CRW broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN-135. This also caused the UDRE for CRW to be elevated. It took about 6 hours before CRW supported precision approach quality ranging and approximately 40 hours to fully converge. The elevated UDRE for CRW exacerbated the service outages caused by elevated GIVEs on this day.. Please see plot(s): <a href="#">LPV_11/4/2014 LPV200_11/4/2014</a>
11/4/2014	11/4/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Alaska, LPV_Canada, LPV200_CONUS, LPV200_Alaska, LPV200_Canada	Geomagnetic activity, Kp =4, disturbed the ionosphere and caused elevated GIVE values and also caused some GIVEs to be set to the ionosphere storm state of 45 meters. The elevated GIVE values resulted in the loss of all of LP and LPV-200 Alaska service from approximately 11:00 to 12:00. Alaska service was also affected from 16:00 to 18:00, and 19:00 to 20:00, in the North-Western region (edge of coverage). The coverage loss was amplified by the increased UDRE (=12) on CRW, PRN-135. Canada LPV and LPV-200 service was affected from 13:00 to 18:00 due to high GIVEs and elevated UDRE on CRW, PRN-135. CONUS LPV-200 service in the California area was affected from approximately 13:40 to 14:40 due to high GIVEs only, and from approximately 17:20 to 17:50 due to high GIVEs and the increased UDRE on CRW, PRN-135. Please see plot(s): <a href="#">LPV_11/4/2014 LPV200_11/4/2014</a>
11/5/2014	11/5/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200_CONUS	Slightly elevated GIVE values in conjunction with the elevated UDRE values on the CRW GEO, PRN-135, resulted in a brief 5 minute LPV-200 outage in the Oklahoma area starting at about 05:00. Please see plot(s): <a href="#">LPV200_11/5/2014</a>
11/7/2014	11/7/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200_Alaska	The selected master station source for the CRW GEO, PRN-135 was changed from the Los Angeles master station to the Atlanta master station at 21:34. This temporarily caused elevated UDRE values to be broadcast for the CRW ranging signal resulting in a two to three minute LPV-200 service outage in northern Alaska. Please see plot(s): <a href="#">LPV200_11/7/2014</a>
11/7/2014	11/7/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Canada, LPV200_Canada	Geomagnetic activity, Kp =3, disturbed the ionosphere and caused elevated GIVE values. This resulted in degraded LPV and LPV-200 service in North Central & North Eastern (edge of coverage) Canada from 18:00 to the end of day. Please see plot(s): <a href="#">LPV_11/7/2014 LPV200_11/7/2014</a>
11/8/2014	11/8/2014	Atlanta (CnV)	LPV200_Alaska	Elevated UDRE for the CRW, PRN-135 ranging signal caused a loss of LPV-200 service in Northwestern (edge of coverage) Alaska starting at approximately 04:43 and continuing for about 30 minutes. The elevated UDRE on CRW were the result of the master station source switch during the prior day. Please see plot(s): <a href="#">LPV200_11/8/2014</a>
11/9/2014	11/9/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Canada, LPV200_Canada	Geomagnetic activity, Kp =4, disturbed the ionosphere and caused elevated GIVE values and also caused some GIVEs to be set to the ionosphere storm state of 45 meters. The elevated GIVE values caused the loss of LPV and LPV-200 service in North Central & North Eastern (edge of coverage) Canada from 17:30 to end of day.

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
				Please see plot(s): <a href="#">LPV_11/9/2014 LPV200_11/9/2014</a>
11/10/2014	11/10/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Canada, LPV200_CONUS, LPV200_Alaska, LPV200_Canada	Geomagnetic activity, Kp =5 disturbed the ionosphere and caused elevated GIVE values. This resulted in degraded LPV and LPV-200 service in Canada, degraded LPV-200 service in Alaska, and degraded LPV-200 service in north western CONUS. The CONUS impact was approximately 1 hour, starting at 19:40. Please see plot(s): <a href="#">LPV_11/10/2014 LPV200_11/10/2014</a>
11/11/2014	11/14/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Canada, LPV200_CONUS, LPV200_Alaska	Geomagnetic activity, Kp =5, disturbed the ionosphere and caused elevated GIVE values at the end of day 2 into day 3. This event affected Canada LPV and LPV-200 service and Alaska LPV-200 service. Elevated UDRE on CRE, PRN-138 after the uplink switchover on day 3 (08:00) also contributed to loss of service. Goose Bay communications outages beginning on day 2 at 17:32 continuing through day 5 (entire day) also affected coverage in Canada Please see plot(s): <a href="#">LPV200_11/11/2014 LPV_11/12/2014 LPV200_11/12/2014 LPV200_11/13/2014 LPV_11/14/2014 LPV200_11/14/2014</a>
11/12/2014	11/13/2014	GEO138, Woodbine (QWE)	LPV_Canada, LPV200_Alaska, LPV200_Canada	The uplink for the CRE GEO, PRN-138 switched from the Woodbine MD uplink site to the Brewster WA uplink site at 08:00:34. This caused a 4 second outage of the CRE broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN-138. This also caused the UDRE for CRE to be elevated. It took about 5.75 hours before CRE supported precision approach quality ranging and approximately 34 hours to fully converge. The elevated UDRE for CRE exacerbated the service outages caused by elevated GIVEs on these two days. Please see plot(s): <a href="#">LPV_11/12/2014 LPV200_11/12/2014</a>
11/14/2014	11/14/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200_CONUS	Brief LPV-200 outage in the vicinity of MRH airport in North Carolina occurred around 07:00. This outage was caused by a geometry change in the GPS constellation, and the outage will be a recurring daily event. Please see plot(s): <a href="#">LPV200_11/14/2014</a>
11/14/2014	11/14/2014	GEO133, Santa Paula (SZP)	None	AMR GEO, PRN-133, manually initiated switchover from Santa Paula CA uplink site to the Paumalu HI uplink site at 22:41:38. The WAAS operators initiated the action because of multiple missed or corrupted messages in the AMR broadcast starting at 22:39:47. The message quality problems were caused by degraded hardware at the Santa Paula site. There was no impact on WAAS service.
11/15/2014	11/16/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Canada, LPV200_Alaska, LPV200_Canada	Geomagnetic activity, Kp =4 on both days, disturbed the ionosphere and caused elevated GIVE values. This resulted in degraded LPV and LPV-200 service in Canada and degraded LPV-200 service in northern Alaska. The event started on the day rollover between the two days and extended about 3 hours into the second day (11/16). Please see plot(s): <a href="#">LPV200_11/15/2014 LPV_11/16/2014 LPV200_11/16/2014</a>
11/17/2014	11/17/2014	Washington D.C. (CnV), Los Angeles	LPV_Canada, LPV200_Canada	Geomagnetic activity, Kp =3, disturbed the ionosphere and caused elevated GIVE values and also caused some GIVEs to be set to the ionosphere storm state of 45 meters. The elevated

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
		(CnV), Atlanta (CnV)		GIVEs caused loss of LPV and LPV200 service in north central and north eastern Canada (edge of coverage) from 17:00 to the end of the day. Please see plot(s): <a href="#">LPV_11/17/2014</a> <a href="#">LPV200_11/17/2014</a>
11/18/2014	11/18/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Canada, LPV200_Canada	Geomagnetic activity, Kp =3, disturbed the ionosphere and caused elevated GIVE values and also caused some GIVEs to be set to the ionosphere storm state of 45 meters. The elevated GIVEs caused loss of LPV and LPV200 service in north central and north eastern Canada (edge of coverage) from 15:00 to 18:00. Please see plot(s): <a href="#">LPV_11/18/2014</a> <a href="#">LPV200_11/18/2014</a>
11/18/2014	11/18/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Canada, LPV200_CONUS, LPV200_Canada	Carrier phase instability on PRN-21 caused the WAAS carrier smoothing algorithm to reinitialize for PRN-21. This caused elevated measurement uncertainty which resulted in elevated UDREs to be broadcast for PRN-21. WAAS alerted PRN-21 to a UDRE of "Not Monitored" at 06:45:10. UDRE's for PRN-21 returned to normal by about 07:30. This event caused the loss of LPV-200 service on the east coast of CONUS, and the loss of LPV and LPV-200 services on the east coast of Canada. Please see plot(s): <a href="#">LPV_11/18/2014</a> <a href="#">LPV200_11/18/2014</a>
11/19/2014	11/19/2014	GEO135, Littleton (APA)	LPV200_CONUS, LPV200_Alaska	CRW GEO, PRN-135, manually initiated switchover from the Littleton CO uplink site to the Napa CA uplink site at 9:36:28. The WAAS operators initiated the action to support planned semi-annual maintenance at the site. This caused a 4 second outage of the CRW broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN-135. This also caused the UDRE for CRW to be elevated. It took about ~ 6.25 hours before CRW supported precision approach quality ranging. The CRW UDRE did not fully recover until 05:00 on 11/22 because of another GUS switch on 11/20. The elevated UDRE for the CRW ranging signal caused an LPV-200 service outage in Texas from 19:25 to 19:27), and in north western Alaska(edge of coverage). Please see plot(s): <a href="#">LPV200_11/19/2014</a>
11/19/2014	11/19/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Canada, LPV200_Canada	Geomagnetic activity, Kp =4, disturbed the ionosphere and caused elevated GIVE values and also caused some GIVEs to be set to the ionosphere storm state of 45 meters. The elevated GIVE values resulted in a loss of LPV and LPV200 service in north central and north eastern Canada (edge of coverage) from 17:00 to the end of the day. Please see plot(s): <a href="#">LPV_11/19/2014</a> <a href="#">LPV200_11/19/2014</a>
11/19/2014	11/19/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Canada, LPV200_Canada	The UDRE for the CRE GEO ranging signal, PRN-138, increased to the "Not Monitored" condition at about 02:00 for about 20 minutes. There was no corresponding SV alert. The elevated UDRE resulted in a loss of LPV and LPV-200 service in northeast Canada (edge of coverage) during that interval. Please see plot(s): <a href="#">LPV_11/19/2014</a> <a href="#">LPV200_11/19/2014</a>
11/20/2014	11/21/2014	GEO135, Napa (APC)	LPV_Alaska, LPV_Canada, LPV200_CONUS, LPV200_Alaska, LPV200_Canada	CRW GEO, PRN-135, manually initiated switchover from the Napa CA uplink site to the Littleton CO uplink site at 16:00:29. This caused a 4 second outage of the CRW broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN-135. This also caused the UDRE for CRW to be elevated.

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
				It took about ~ 6.25 hours before CRW supported precision approach quality ranging. The CRW UDRE did not fully recover until 05:00 on 11/22. The elevated UDRE for the CRW ranging signal caused a LPV and LPV-20000 service outages in Alaska on 11/20 and a LPV-200 outage in northern Alaska (edge of coverage) on 11/21. On 11/20 the elevated UDRE for CRW also caused brief (< 5 minute) outages in Texas (~19:21) and California (~16:17). Please see plot(s): <a href="#">LPV_11/20/2014 LPV200_11/20/2014 LPV200_11/21/2014</a>
11/20/2014	11/20/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Canada, LPV200_CONUS, LPV200_Alaska, LPV200_Canada	Geomagnetic activity, Kp =4, disturbed the ionosphere and caused elevated GIVE values. This resulted in degraded LPV and LPV-200 service in Canada and degraded LPV-200 service in north eastern Alaska. Time of the impact was approximately 17:00 to the end of the day. The elevated GIVE values also caused an LPV-200 service outage in southern Florida from ~02:00 to ~02:20. The ongoing elevated UDRE for the CRW ranging signal contributed to the outages in Alaska and Canada but did not contribute to the Florida outage. Please see plot(s): <a href="#">LPV_11/20/2014 LPV200_11/20/2014</a>
11/21/2014	11/21/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Canada, LPV200_Alaska, LPV200_Canada	Geomagnetic activity, Kp =4, disturbed the ionosphere and caused elevated GIVE values. This resulted in degraded LPV and LPV-200 service in Canada and degraded LPV-200 service in north eastern Alaska. Time of the impact was approximately 15:00 to the end of the day.
11/21/2014	11/21/2014	PRN4	LPV_Alaska, LPV_Canada, LPV200_Alaska, LPV200_Canada	Planned maintenance on PRN-4, NANU 2014085 delta V maneuver, resulted in the temporary loss of service from that GPS satellite from 16:14 to 23:52. This resulted in LPV and LPV-200 service outages in Alaska and Canada from 22:00 to 23:52. Please see plot(s): <a href="#">LPV_11/21/2014 LPV200_11/21/2014</a>
11/22/2014	11/22/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Canada, LPV200_Alaska, LPV200_Canada	Geomagnetic activity, Kp =4, disturbed the ionosphere and caused elevated GIVE values. This resulted in degraded LPV and LPV-200 service in Canada from 16:00 to the end of the day, and degraded LPV-200 service in Alaska from 22:00 to 23:00. Please see plot(s): <a href="#">LPV_11/22/2014 LPV200_11/22/2014</a>
11/23/2014	11/23/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Canada, LPV200_Alaska, LPV200_Canada	Geomagnetic activity, Kp =3, disturbed the ionosphere and caused elevated GIVE values. This resulted in degraded LPV and LPV-200 service in Canada and degraded LPV-200 service in Alaska from 16:00 to 22:00. Please see plot(s): <a href="#">LPV_11/23/2014 LPV200_11/23/2014</a>
11/24/2014	11/24/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Alaska, LPV_Canada, LPV200_CONUS, LPV200_Alaska, LPV200_Canada	UDRE for the CRW GEO, PRN-135, alerted to "Not Monitored" at 02:51 due to the WAAS carrier smoothing algorithm being reinitialized due to signal quality issues. It took about ~5 hours before CRW supported precision approach quality ranging. This event caused loss of LPV-200 service in the Oklahoma and Kansas area at 3:42 for less than 5 minutes and in California at 16:02 for 3 minutes. The elevated UDRE for the CRW ranging signal contributed to service outages in Alaska and Canada documented in other events. Please see plot(s): <a href="#">LPV200_11/24/2014</a>

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
11/24/2014	11/30/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Canada, LPV200_Alaska, LPV200_Canada	Multiple day event from 11/24 to 11/30. High GIVE values and high UDRE values for the CRW GEO, PRN-135, caused LPV and LPV-200 service outages in northern Alaska and northern Canada. Signal quality issues caused the WAAS carrier smoothing algorithm to reinitialize for CRW on 11/24 and 11/26, eventually resulting in an uplink switch on 11/30. The Goose Bay Canada reference station had sporadic communications outages on 11/24 through 11/27. There was also mild geomagnetic activity on all days, Kp 3, 2, 2, 3, 3, 2, 3 respectively from 11/24 to 11/30. The geomagnetic activity and the loss of observations from Goose Bay contributed to elevated GIVE values. The loss of observations from Goose Bay also contributed to elevated UDRE values for some GPS satellites. LPV-200 service was degraded in Alaska and Canada on all 7 days. LPV service in Alaska was degraded on 11/24, 11/26, 11/27, and 11/30 only. LPV service in Canada was degraded on all days except 11/28. Please see plot(s): <a href="#">LPV_11/24/2014 LPV200_11/24/2014 LPV_11/25/2014 LPV200_11/25/2014 LPV_11/26/2014 LPV200_11/26/2014 LPV_11/27/2014 LPV200_11/27/2014 LPV200_11/28/2014 LPV_11/29/2014 LPV200_11/29/2014 LPV_11/30/2014 LPV200_11/30/2014</a>
11/26/2014	11/26/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Alaska, LPV_Canada, LPV200_CONUS, LPV200_Alaska, LPV200_Canada	UDRE for the CRW GEO, PRN-135, alerted to "Not Monitored" at 07:16 due to the WAAS carrier smoothing algorithm being reinitialized due to signal quality issues. It took about ~5 hours before CRW supported precision approach quality ranging. This event caused a loss of LPV-200 service in California at 15:50 for less than 5 minutes. The elevated UDRE for the CRW ranging signal contributed to service outages in Alaska and Canada documented in other events. Please see plot(s): <a href="#">LPV200_11/26/2014</a>
11/30/2014	11/30/2014	GEO135, Littleton (APA)	LPV_Alaska, LPV_Canada, LPV200_Alaska, LPV200_Canada	The uplink for the CRW GEO, PRN-135 switched from the Littleton CO uplink site to the Napa CA uplink site at 15:52:27. This caused an 11 second outage of the CRW broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN-135. The switch was caused by an equipment failure at Littleton. This also caused the UDRE for CRW to be elevated. It took about 6 hours before CRW supported precision approach quality ranging and approximately 38 hours to fully converge. The elevated UDRE for CRW exacerbated the service outages caused by elevated GIVEs on this day. Elevated UDREs for the CRW ranging signal combined with high GIVEs from other events contributed to service outages in Alaska and Canada. Please see plot(s): <a href="#">LPV_11/30/2014 LPV200_11/30/2014</a>
11/30/2014	11/30/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV), PRN11	LPV200_CONUS	A known issue in the WAAS software allowed multipath to cause a maneuver to be falsely detected for PRN-11 as that satellite came into view. The orbit estimation filter did not sufficiently re-converge for PRN-11 until PRN-11 had been in view for a short time. This resulted in a loss of LPV-200 service in Florida for about 20 minutes starting at 06:06. Please see plot(s): <a href="#">LPV200_11/30/2014</a>
12/1/2014	12/2/2014	Washington D.C. (CnV),	LPV_Alaska, LPV_Canada,	Geomagnetic activity, Kp =4 on 12/1 and Kp = 3 on 12/2, disturbed the ionosphere and caused elevated GIVE values. This

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
		Los Angeles (CnV), Atlanta (CnV)	LPV200_Alaska, LPV200_Canada	resulted in degraded LPV and LPV-200 service in Canada and Alaska from 22:00 on 12/1 to 01:00 on 12/2. Please see plot(s): <a href="#">LPV_12/1/2014 LPV200_12/1/2014 LPV_12/2/2014 LPV200_12/2/2014</a>
12/1/2014	12/3/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Canada, LPV200_Canada	Geomagnetic activity, Kp =4 on 12/1 and Kp = 3 on 12/2 and 12/3, disturbed the ionosphere and caused elevated GIVE values. This resulted in degraded LPV and LPV-200 service in Canada from 18:00 to 22:00 on all three days. Please see plot(s): <a href="#">LPV_12/1/2014 LPV200_12/1/2014 LPV_12/2/2014 LPV200_12/2/2014 LPV_12/3/2014 LPV200_12/3/2014</a>
12/4/2014	12/4/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Canada, LPV200_Alaska, LPV200_Canada	Geomagnetic activity, Kp =3, disturbed the ionosphere and caused elevated GIVE values. This resulted in degraded LPV and LPV-200 service in Canada from 16:00 to 21:00 and degraded LPV-200 service in Alaska from 17:00 to 18:00. Please see plot(s): <a href="#">LPV_12/4/2014 LPV200_12/4/2014</a>
12/6/2014	12/9/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Alaska, LPV_Canada, LPV200_CONUS, LPV200_Alaska, LPV200_Canada	Geomagnetic activity disturbed the ionosphere and caused elevated GIVE values. The Kp values were 4, 5, 4, and 4 respectively for 12/6 through 12/9. The high GIVEs caused the following service outages: LPV-200 service in Florida on 12/6 from 02:23 until 02:42. LPV-200 service in north western Alaska on 12/6 from 14:00 until 16:00 and from 17:00 to 18:00. LPV-200 service in Canada spanning the day rollover from 18:00 on 12/6 to 06:00 on 12/7. LPV-200 service in Alaska on 12/7 from 23:00 to the end of the day. LPV and LPV-200 service in Canada on 12/8 from 15:00 to 22:00 LPV and LPV-200 service in Canada on 12/9 from 16:00 to 22:00 Please see plot(s): <a href="#">LPV200_12/6/2014 LPV200_12/7/2014 LPV_12/8/2014 LPV200_12/8/2014 LPV_12/9/2014</a>
12/10/2014	12/10/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV), PRN138	LPV_Canada, LPV200_Canada	The UDRE for the CRE GEO, PRN-138, ranging signal sporadically jumped to the "Not Monitored" value between 04:00 and 08:00. The elevated UDREs for CRW caused LPV and LPV-200 service outages in Canada between 04:00 and 05:00. Please see plot(s): <a href="#">LPV_12/10/2014 LPV200_12/10/2014</a>
12/11/2014	12/11/2014	PRN15	LPV_CONUS, LPV_Canada, LPV200_CONUS, LPV200_Canada	Planned maintenance on PRN-15, NANU 2014089 delta V maneuver, resulted in the temporary loss of service from that GPS satellite from 15:39 to 21:11. This resulted in the following service outages: loss LPV-200 service in Florida from 18:45 to 19:05, loss of LPV-200 service in Maine from 20:56 to 21:24, and the loss of LPV and LPV-200 service in south eastern Canada from 21:00 to 21:40. The new constellation geometry as the result of this maneuver initiated a daily recurring LPV-200 outage in southern Florida. Please see plot(s): <a href="#">LPV_12/11/2014 LPV200_12/11/2014</a>
12/12/2014	12/14/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Canada, LPV200_Alaska, LPV200_Canada	Geomagnetic activity, Kp =5 on 12/12 and Kp = 3 on 12/13 and 12/14, disturbed the ionosphere and caused elevated GIVE values. This resulted in degraded LPV and LPV-200 service in Canada on all three days, and degraded LPV-200 service in Alaska on 12/12. Please see plot(s): <a href="#">LPV_12/12/2014 LPV200_12/12/2014 LPV_12/13/2014 LPV200_12/13/2014 LPV_12/14/2014</a>

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
				<a href="#">LPV200_12/14/2014</a>
12/15/2014	12/16/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Canada, LPV200_Canada	Geomagnetic activity, Kp =3 on both days, disturbed the ionosphere and caused elevated GIVE values. This resulted in degraded LPV and LPV-200 service in Canada on 12/15 from 15:00 to 21:00 and on 12/16 from 14:00 to 21:00. Please see plot(s): <a href="#">LPV_12/15/2014</a> <a href="#">LPV_12/16/2014</a> <a href="#">LPV200_12/16/2014</a>
12/16/2014	12/16/2014	PRN20	LPV_Alaska, LPV200_Alaska	Planned maintenance on PRN-20, NANU 2014091 delta V maneuver, resulted in the temporary loss of service from that GPS satellite from 22:00 to the end of the day. This resulted in degraded LPV and LPV-200 service in the Aleutians peninsula of Alaska from 23:00 to the end of the day. Please see plot(s): <a href="#">LPV_12/16/2014</a> <a href="#">LPV200_12/16/2014</a>
12/17/2014	12/17/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200_CONUS	Geomagnetic activity, Kp =3, disturbed the ionosphere and caused elevated GIVE values to the south. This resulted in a two minute LPV-200 service outage in southern Florida starting at 01:43. Please see plot(s): <a href="#">LPV200_12/17/2014</a>
12/18/2014	12/20/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Alaska, LPV_Canada, LPV200_Alaska, LPV200_Canada	Geomagnetic activity, Kp =3 all three days, disturbed the ionosphere and caused elevated GIVE. This resulted LPV and LPV-200 service outages in both Alaska and Canada. Please see plot(s): <a href="#">LPV_12/18/2014</a> <a href="#">LPV200_12/18/2014</a> <a href="#">LPV_12/19/2014</a> <a href="#">LPV200_12/19/2014</a> <a href="#">LPV_12/20/2014</a> <a href="#">LPV200_12/20/2014</a>
12/18/2014	12/18/2014	Miami (TMB1), Miami (ZMA1), Miami (ZMA2), Miami (ZMA3)	Local	Local RFI caused 2 brief LPV and LPV-200 outages to be observed for the Miami receiver. The events were 60 to 100 seconds in duration.
12/19/2014	12/19/2014	PRN7	LPV_Alaska, LPV_Canada, LPV200_Alaska, LPV200_Canada	Planned maintenance on PRN-7, NANU 2014092 delta V maneuver caused the temporary loss of service from that GPS satellite from 02:00 to 07:15. This resulted in degraded LPV and LPV-200 service in Alaska and Canada. Please see plot(s): <a href="#">LPV_12/19/2014</a> <a href="#">LPV200_12/19/2014</a>
12/21/2014	12/21/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Alaska, LPV_Canada, LPV200_CONUS, LPV200_Alaska, LPV200_Canada	Geomagnetic activity, Kp =4, disturbed the ionosphere and caused elevated GIVE values. This resulted in degraded LPV and LPV-200 service in Canada from 14:40 to the end of the day and in Alaska from 15:30 to 16:30. There were also 3 short LPV-200 service outages in CONUS: Maine area at 20:40 for 5 minutes, Michigan area at 21:15 for 15 minutes, and the Oregon area at 22:20 for 7 minutes. Please see plot(s): <a href="#">LPV_12/21/2014</a> <a href="#">LPV200_12/21/2014</a>
12/22/2014	12/26/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_CONUS, LPV_Alaska, LPV_Canada, LPV200_CONUS, LPV200_Alaska, LPV200_Canada	Multiple day event from 12/22 to 12/26. Geomagnetic activity, Kp =5 on 12/22 and Kp 4 on the other 4 days, disturbed the ionosphere and caused elevated GIVE. This resulted in LPV and LPV-200 service outages in both Alaska and Canada on all 5 days. LPV and LPV-200 service were also impacted in CONUS on 12/23 between 23:00 and the end of the days for the edge of California and the north central states. Please see plot(s): <a href="#">LPV_12/22/2014</a> <a href="#">LPV200_12/22/2014</a> <a href="#">LPV_12/23/2014</a> <a href="#">LPV200_12/23/2014</a> <a href="#">LPV_12/24/2014</a> <a href="#">LPV200_12/24/2014</a> <a href="#">LPV_12/25/2014</a> <a href="#">LPV200_12/25/2014</a> <a href="#">LPV_12/26/2014</a> <a href="#">LPV200_12/26/2014</a>



Start Date	End Date	Location/ Satellite	Service Affected	Event Description
12/22/2014	12/22/2014	Salt Lake City (ZLC1)	Local	Local RFI caused a brief LPV-200 outage to be observed for the Salt Lake City receiver at 17:24. The even lasted less than two minutes.
12/25/2014	12/25/2014	PRN21	LPV200_CONUS	Carrier phase instability on PRN-21 caused the WAAS carrier smoothing algorithm to reinitialize for PRN-21. This resulted in the UDRE for PRN-21 being alerted to "Not Monitored" at 15:34:51. It took about 30 minutes for the UDRE to recover. The elevated UDRE for PRN-21 caused a small, brief LPV-200 outage to impact areas from Kansas up through Montana. Also, geomagnetic activity, Kp =4, disturbed the ionosphere and caused elevated GIVE values. This resulted in degraded LPV and LPV-200 service in Canada and Alaska. Please see plot(s): <a href="#">LPV_12/25/2014 LPV200_12/25/2014</a>
12/29/2014	12/30/2014	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Canada, LPV200_Alaska, LPV200_Canada	Geomagnetic activity, Kp =5 on 12/29 and Kp = 4 on 12/30, disturbed the ionosphere caused elevated GIVE values. This resulted in degraded LPV and LPV-200 service in Canada and degraded LPV-200 service in Alaska from 15:00 on 12/29 to 02:00 on 12/30. Please see plot(s): <a href="#">LPV_12/29/2014 LPV200_12/29/2014 LPV_12/30/2014 LPV200_12/30/2014</a>

**Table 1-6 WAAS Upgrades**

There were no WAAS upgrades for this reporting period.

**Table 1-7 GUS Switchovers**

Start Date	End Date	GUS Switch	Location/ Satellite	Service Affected	Event Description
10/18/2014	10/18/2014	Faulted	GEO135, Littleton (APA)	Alaska, LPV200_CONUS	The uplink for the CRW GEO, PRN-135 switched from the Littleton CO uplink site to the Napa CA uplink site at 15:13:01. This caused a 12 second outage of the CRW broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN-135. This resulted in LPV and LPV-200 outages for those areas of north west Alaska that do not have redundant GEO coverage. This also caused the UDRE for CRW to be elevated. It took about 6 hours before CRW supported precision approach quality ranging and approximately 38 hours to fully converge. The elevated UDRE for CRW contributed to the small, short LPV-200 outages in CONUS. Please see plot(s): <a href="#">LP_10/18/2014 LPV_10/18/2014 LPV200_10/18/2014</a>
10/19/2014	10/19/2014	Faulted	GEO133, Paumalu (HDH)	None	The uplink for AMR GEO, PRN-133 switched from Paumalu HI uplink site to Santa Paula CA uplink site at 17:6:33 (Paumalu uplink site faulted). There was no impact on WAAS service.
10/31/2014	10/31/2014	Faulted	GEO133, Santa_Paula	None	The uplink for AMR GEO, PRN-133 switched from Santa Paula CA uplink site to Paumalu HI uplink site at 17:44:40

Start Date	End Date	GUS Switch	Location/ Satellite	Service Affected	Event Description
			(SZP)		(Santa Paula uplink site faulted). There was no impact on WAAS service.
11/4/2014	11/4/2014	Manual	GEO135, Napa (APC)	LPV_Alaska, LPV_Canada, LPV200_CONUS, LPV200_Alaska, LPV200_Canada	The uplink for the CRW GEO, PRN-135 switched from the Littleton CO uplink site to the Napa CA uplink site at 14:22:02. This caused a 4 second outage of the CRW broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN-135. This also caused the UDRE for CRW to be elevated. It took about 6 hours before CRW supported precision approach quality ranging and approximately 40 hours to fully converge. The elevated UDRE for CRW exacerbated the service outages caused by elevated GIVEs on this day. Please see plot(s): <a href="#">LPV_11/4/2014 LPV200_11/4/2014</a>
11/12/2014	11/12/2014	Manual	GEO133, Paumalu (HDH)	None	The uplink for AMR GEO, PRN-133 switched from Paumalu HI uplink site to Santa Paula CA uplink site at 09:01:46. The manual switchover had no impact on WAAS service.
11/12/2014	11/13/2014	Manual	GEO138, Woodbine (QWE)	LPV_Canada, LPV200_Alaska, LPV200_Canada	The uplink for the CRE GEO, PRN-138 switched from the Woodbine MD uplink site to the Brewster WA uplink site at 08:00:34. This caused a 4 second outage of the CRE broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN-138. This also caused the UDRE for CRE to be elevated. It took about 5.75 hours before CRE supported precision approach quality ranging and approximately 34 hours to fully converge. The elevated UDRE for CRE exacerbated the service outages caused by elevated GIVEs on these two days. Please see plot(s): <a href="#">LPV_11/12/2014 LPV200_11/12/2014</a>
11/14/2014	11/14/2014	Manual	GEO133, Santa Paula (SZP)	None	The uplink for AMR GEO, PRN-133 switched from Santa Paula CA uplink site to Paumalu HI uplink site at 22:41:38. The manual switchover was initiated because of multiple missed or corrupted messages in the AMR broadcast starting at 22:39:47, which was due to degraded hardware issue. There was no impact on WAAS service.
11/19/2014	11/19/2014	Manual	GEO135, Littleton (APA)	LPV200_CONUS, LPV200_Alaska	CRW GEO, PRN-135, manually initiated switchover from the Littleton CO uplink site to the Napa CA uplink site at 9:36:28. The WAAS operators initiated the action to support planned semi-annual maintenance at the site. This caused a 4 second outage of the CRW broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN-135. This also caused the UDRE for CRW to be elevated. It took about ~ 6.25 hours before CRW supported precision approach quality ranging. The CRW UDRE did not fully recover until 05:00 on 11/22 because of another GUS switch on 11/20. The elevated UDRE for the CRW ranging signal caused an LPV-200 service outage in Texas (from 19:25 to 19:27), and in north western Alaska (edge of coverage). Please see plot(s): <a href="#">LPV200_11/19/2014</a>
11/20/2014	11/21/2014	Manual	GEO135, Napa (APC)	LPV_Alaska, LPV_Canada, LPV200_CONUS, LPV200_Alaska,	CRW GEO, PRN-135, manually initiated switchover from the Napa CA uplink site to the Littleton CO uplink site at 16:00:29. This caused a 4 second outage of the CRW broadcast and also caused the WAAS carrier smoothing

Start Date	End Date	GUS Switch	Location/Satellite	Service Affected	Event Description
				LPV200_Canada	algorithm to reinitialize for PRN-135. This also caused the UDRE for CRW to be elevated. It took about ~ 6.25 hours before CRW supported precision approach quality ranging. The CRW UDRE did not fully recover until 05:00 on 11/22. The elevated UDRE for the CRW ranging signal caused a LPV and LPV-20000 service outages in Alaska on 11/20 and a LPV-200 outage in northern Alaska (edge of coverage) on 11/21. On 11/20 the elevated UDRE for CRW also caused brief (< 5 minute) outages in Texas (~19:21) and California (~16:17). Please see plot(s): <a href="#">LPV_11/20/2014</a> <a href="#">LPV200_11/20/2014</a> <a href="#">LPV200_11/21/2014</a>
11/30/2014	11/30/2014	Faulted	GEO135, Littleton (APA)	LPV_Alaska, LPV_Canada, LPV200_Alaska, LPV200_Canada	The uplink for the CRW GEO, PRN-135 switched from the Littleton CO uplink site to the Napa CA uplink site at 15:52:27. This caused an 11 second outage of the CRW broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN-135. The switch was caused by an equipment failure at Littleton. This also caused the UDRE for CRW to be elevated. It took about 6 hours before CRW supported precision approach quality ranging and approximately 38 hours to fully converge. The elevated UDRE for CRW exacerbated the service outages caused by elevated GIVEs on this day. Elevated UDREs for the CRW ranging signal combined with high GIVEs from other events contributed to service outages in Alaska and Canada. Please see plot(s): <a href="#">LPV_11/30/2014</a> <a href="#">LPV200_11/30/2014</a>
12/9/2014	12/9/2014	Manual	GEO133, Paumalu (HDH)	None	The uplink for AMR GEO, PRN-133 was switched manually from Paumalu HI uplink site to Santa Paula CA uplink site at 13:41:11. There was no impact on WAAS service.
12/12/2014	12/12/2014	Faulted	GEO133, Santa Paula (SZP)	None	The uplink for AMR GEO, PRN-133 was switched from Paumalu HI uplink site to Santa Paula CA uplink site at 14:57:14 (Paumalu uplink site faulted). There was no impact on WAAS service.
12/29/2014	12/29/2014	Faulted	GEO133, Santa Paula (SZP)	None	The uplink for AMR GEO, PRN-133 was switched from Santa Paula CA uplink site to Paumalu HI uplink site at 02:19:55 (Santa Paula uplink site faulted). There was no impact on WAAS service.

## 1.2 Report Overview

Section 2 documents the LPV and NPA performance observed for the indicated receiver locations (see Tables 1-2 and 1-3). The 95% accuracy index and the maximum inaccuracy for the reporting period are tabulated. The daily 95% accuracy index is plotted for each receiver. Histograms of the vertical and horizontal error distribution using the data from all the evaluated receivers are provided..

Section 3 summarizes the WAAS instantaneous availability performance, at each receiver, for three operational service levels during the reporting period. Daily availability is also plotted for each receiver evaluated. The number of outages and outage rate for each site is reported.

Section 4 provides geographic plots of the availability of the WAAS services rolled up for the quarter. Plots of the percent of the CONUS and Alaska service areas covered by various levels of service availability are provided.

Section 5 summarizes the number of HMI events detected during the reporting period and presents a safety margin index for each receiver. The safety margin index reflects the amount of over bounding of position error by WAAS protection levels. This section also includes update rates of WAAS messages transmitted from CRE, CRW, and AMR.

Section 6 provides the UDRE and GIVE bounding percentage and the 95% index of the range and ionospheric accuracy for each satellite tracked by the WAAS receiver at 12 locations.

Section 7 provides the GEO ranging performance for CRE and CRW.

Section 8 provides WAAS LPV availability and outages at selected airports.

Section 9 provides the assessment of WAAS CNMP bounding for the 114 WAAS receivers.

Section 10 provides the surveyed positions of all WREs and the difference between the WRE survey positions in the current operational software and the survey positions in this report.

Section 11 provides the daily and quarterly average of SQM PRN type biases and PRN biases.

Section 12 compares GPS broadcast orbits to IGS precise orbits and URA bounding analysis.

Section 13 provides the WAAS G3 Novatel receiver performance.

## **2.0 WAAS POSITION ACCURACY**

Navigation error data, collected from WAAS and NSTB reference stations, was processed to determine position accuracy at each location. This was accomplished by utilizing the GPS/WAAS position solution tool to compute a RTCA DO-229D weighted least squares user navigation solution, and WAAS horizontal and vertical protection levels (HPL & VPL), once every second. The user position calculated for each receiver was compared to the surveyed position of the antenna to assess position error associated with the WAAS SIS over time. The position errors were analyzed and statistics were generated for the operational service levels shown in Table 1-1.

Table 2-1 shows PA horizontal and vertical position accuracy maintained for 95% of the time at LP, LPV and LNAV/VNAV operational service levels for the quarter. The table also includes 95% SPS accuracy for certain locations. Figures 2-1 to 2-6 show the daily horizontal and vertical 95% accuracy for LPV operational service level for the period. Note that WAAS accuracy statistics presented are compiled only when all WAAS corrections (fast, long term, and ionospheric) for at least 4 satellites are available. This is referred to as PA navigation mode. The percentage of time that PA navigation mode was supported by WAAS at each receiver is also shown in Table 2-1. A user is considered to be in NPA navigation mode if only WAAS fast and long term corrections are available to a user (i.e. no ionospheric corrections). Table 2-2 shows NPA horizontal position accuracy for 95% and 99.999% of the time. This table also shows the maximum NPA horizontal position error for the quarter. Figures 2-7 to 2-8 show the daily horizontal 95% accuracy for NPA.

Table 2-3 shows the maximum LPV error statistics. The column marked 'Horizontal Error' shows the maximum position errors while the calculated HPL meets the LPV service level defined in Table 1-1. The column marked 'Vertical Error' shows the maximum position errors while the calculated VPL meets the LPV service level. The columns marked 'Horizontal Error/HPL' and 'Vertical Error/VPL' show the ratio of position error to protection level at the time the maximum error occurred. The columns marked 'Horizontal Maximum Ratio' and 'Vertical Maximum Ratio' show the maximum position error to protection level ratio for the quarter.

During this reporting period, the maximum 95% CONUS horizontal and vertical LPV errors were 1.38 meters at Atlantic City and 2.08 meters at Miami, respectively. The minimum 95% CONUS horizontal and vertical LPV errors were 0.655 meters at Salt Lake City and 0.991 meters at Denver, respectively. The maximum 95% and

99.999% NPA horizontal errors were 8.712 meters and 19.187 meters, both at Honolulu, respectively. The minimum 95% and 99.999% horizontal errors were 1.554 meters at Oakland and 3.087 meters at Atlanta, respectively.

The increases in 95% PA position errors in Figure 2-1 to 2-6 on the following days were due to geomagnetic activity: On 11/04/2014, 11/05/2014, 11/10/2014, 11/11/14, 12/06/14, 12/07/14, and 12/29/14 position errors in CONUS, Alaska, and Canada were elevated. On 12/23/14 position errors in Alaska and Canada were elevated. The increases in 95% NPA position errors on 10/01/2014, 11/10/2014, 11/16/2014, 12/23/14, and 12/24/2014 in Figure 2.7 to 2.8 were due to geomagnetic activity as well.

Figures 2-9 to 2-12 show the distributions of the vertical and horizontal errors at all 38 WAAS receiver locations combined in triangle charts and 2-D histogram plots for the quarter. The triangle charts in Figures 2-9 and 2-10 show the distributions of vertical position errors (VPE) versus vertical protection levels (VPL) and horizontal position errors (HPE) versus horizontal protection levels (HPL). The horizontal axis is the position error and the vertical axis is the WAAS protection levels. Lower protection levels equate to better availability. The diagonal line shows the point where error equals protection level. Above and to the left of the diagonal line in the chart, errors are bounded (WAAS is providing integrity in the position domain); below and to the right, errors are not bounded (HMI could be present). The 2-D histogram plots in Figures 2-11 to 2-12 show the distributions of vertical and horizontal position errors and normalized position errors. The blue trace shows the distributions of the actual vertical and horizontal errors. The horizontal axis is the position errors and the vertical axis is the total count of data samples (log scale) in each 0.1-meter bin. The magenta trace show the distributions of the actual vertical and horizontal errors normalized by one-sigma value of the protection level; vertical -  $(VPL/5.33)$  and horizontal -  $(HPL/6.0)$ . The horizontal axis is the standard units and vertical axis is the observed distribution of normalized errors data samples in each 0.1-sigma bin. Narrowness of the normalized error distributions shows very good observed safety performance.

Table 2-1 PA 95% Horizontal and Vertical Accuracy

Location	Horizontal (HAL=40m) (Meters)	Horizontal (HAL=556m) (Meters)	Vertical (VAL=50m) (Meters)	Percentage in PA mode (%)	SPS Accuracy	
					95% Horizontal (Meters)	95% Vertical (Meters)
Atlantic City	1.383	1.383	1.755	100	*	*
Grand Forks	1.21	1.21	1.484	100	*	*
Oklahoma City	0.909	0.909	1.448	100	*	*
Albuquerque	0.716	0.716	1.02	100	2.228	7.188
Anchorage	0.804	0.804	1.456	100	*	*
Atlanta	0.832	0.832	1.403	100	2.533	6.905
Barrow	0.919	0.929	2.02	99.99981	*	*
Bethel	0.693	0.693	1.139	100	2.512	9.488
Billings	0.808	0.808	1.061	100	2.327	6.619
Boston	0.922	0.922	1.119	100	2.695	5.711
Chicago	0.99	0.99	1.044	100	*	*
Cleveland	0.84	0.84	1.072	100	2.612	6.076
Cold Bay	0.815	0.815	1.209	100	*	*
Dallas	0.774	0.774	1.468	100	*	*
Denver	0.676	0.676	0.991	100	*	*
Fairbanks	0.796	0.803	1.532	100	2.849	9.139
Gander	1.014	1.015	1.4	100	*	*
Goose Bay	1.132	1.141	1.554	100	*	*
Houston	0.826	0.826	1.679	100	2.493	7.364
Iqaluit	1.648	1.719	2.775	99.99755	*	*
Jacksonville	0.886	0.886	1.878	100	*	*
Juneau	0.837	0.837	1.23	100	*	*
Kansas City	0.732	0.732	1.053	100	2.407	6.465
Kotzebue	0.9	0.907	1.572	99.99981	2.749	9.513
Los Angeles	0.706	0.706	1.107	100	2.249	7.994
Memphis	0.831	0.831	1.243	100	*	*
Merida	0.929	0.929	2.031	100	*	*
Mexico City	1.096	1.097	2.473	100	*	*
Miami	1.042	1.042	2.081	100	2.878	7.202
Minneapolis	0.828	0.828	1.057	100	2.435	6.153
New York	0.994	0.994	1.101	100	*	*
Oakland	0.684	0.684	1.151	100	2.203	8.042
Puerto Vallarta	1.181	1.184	1.754	100	*	*
Salt Lake City	0.655	0.655	1.015	100	2.213	7.159
San Jose Del Cabo	1.086	1.086	1.859	100	*	*
Seattle	0.891	0.891	1.042	100	2.232	7.34
Washington DC	0.919	0.919	1.232	100	2.619	6.23
Winnipeg	0.847	0.847	1.312	100	*	*

\* = SPS Data not processed.

**Table 2-2 NPA 95% and 99.999% Horizontal Accuracy**

<b>Location</b>	<b>95% Horizontal (meters)</b>	<b>99.999% Horizontal (meters)</b>	<b>Percentage in NPA mode (%)</b>	<b>Maximum Horizontal Error</b>
Albuquerque	1.743	3.385	100.000	3.600
Anchorage	2.535	6.148	100.000	6.284
Atlanta	1.695	3.087	100.000	3.241
Barrow	2.915	5.759	100.000	5.910
Bethel	2.261	5.673	100.000	5.812
Billings	1.864	6.507	100.000	6.692
Boston	1.971	3.821	100.000	4.009
Cleveland	1.693	5.033	100.000	5.357
Cold Bay	1.812	4.730	100.000	4.878
Fairbanks	2.713	6.304	100.000	6.507
Gander	1.986	5.758	100.000	5.971
Honolulu	8.712	19.187	100.000	19.839
Houston	1.975	5.077	100.000	5.300
Iqaluit	3.987	7.142	100.000	7.251
Juneau	2.409	5.580	100.000	5.753
Kansas City	1.650	4.803	100.000	4.969
Kotzebue	2.581	5.476	100.000	6.612
Los Angeles	1.813	3.756	100.000	3.913
Merida	2.350	9.587	100.000	9.997
Miami	1.994	5.078	100.000	5.252
Minneapolis	1.791	4.549	100.000	4.673
Oakland	1.554	3.572	100.000	3.704
Salt Lake City	1.629	3.667	100.000	3.959
San Jose Del Cabo	2.560	8.822	100.000	9.179
San Juan	4.635	13.399	100.000	14.096
Seattle	1.774	6.129	100.000	6.319
Tapachula	4.269	14.419	100.000	14.617
Washington DC	1.823	4.161	100.000	4.411

Table 2-3 Maximum LPV Error Statistics

Location	Horizontal Error (m)	Horizontal Error/HPL	Horizontal Maximum Ratio	Vertical Error (m)	Vertical Error/VPL	Vertical Maximum Ratio
Atlantic City	2.845	0.247	0.253	4.134	0.204	0.216
Grand Forks	2.667	0.147	0.211	3.919	0.130	0.200
Oklahoma City	2.017	0.184	0.209	3.802	0.128	0.196
Albuquerque	1.884	0.200	0.204	2.621	0.102	0.147
Anchorage	2.492	0.105	0.174	5.347	0.179	0.186
Atlanta	1.865	0.184	0.184	3.580	0.173	0.200
Barrow	3.879	0.145	0.170	6.544	0.184	0.200
Bethel	2.128	0.077	0.148	3.387	0.151	0.158
Billings	1.992	0.168	0.180	3.559	0.168	0.197
Boston	1.934	0.134	0.165	3.235	0.170	0.177
Chicago	2.466	0.200	0.201	2.962	0.125	0.178
Cleveland	1.853	0.169	0.177	3.015	0.166	0.180
Cold Bay	2.357	0.099	0.109	3.356	0.103	0.128
Dallas	1.869	0.172	0.240	3.650	0.166	0.256
Denver	1.650	0.158	0.182	3.809	0.152	0.206
Fairbanks	3.499	0.124	0.236	6.323	0.195	0.270
Gander	3.805	0.117	0.133	5.655	0.163	0.170
Goose Bay	4.416	0.204	0.204	5.421	0.168	0.168
Houston	1.918	0.157	0.203	3.687	0.270	0.270
Iqaluit	5.074	0.151	0.180	9.312	0.187	0.259
Jacksonville	2.334	0.159	0.201	3.676	0.168	0.226
Juneau	3.139	0.095	0.152	4.572	0.092	0.199
Kansas City	1.688	0.192	0.196	3.963	0.150	0.188
Kotzebue	2.992	0.101	0.161	5.796	0.180	0.229
Los Angeles	1.669	0.119	0.130	3.519	0.136	0.174
Memphis	1.863	0.176	0.203	2.824	0.133	0.202
Merida	2.319	0.158	0.173	4.306	0.143	0.213
Mexico City	3.009	0.082	0.168	4.654	0.110	0.170
Miami	2.256	0.186	0.189	5.071	0.109	0.250
Minneapolis	1.852	0.166	0.188	4.105	0.160	0.209
New York	1.944	0.145	0.174	2.973	0.172	0.179
Oakland	1.814	0.152	0.165	3.821	0.108	0.180
Puerto Vallarta	3.242	0.203	0.203	4.369	0.106	0.160
Salt Lake City	1.642	0.115	0.159	2.759	0.158	0.158
San Jose Del Cabo	2.537	0.163	0.189	4.467	0.092	0.189
Seattle	2.626	0.170	0.170	3.341	0.149	0.180
Washington DC	1.907	0.166	0.190	2.998	0.145	0.168
Winnipeg	2.534	0.212	0.212	4.175	0.100	0.182



Figure 2-1 LPV 95% Horizontal Accuracy

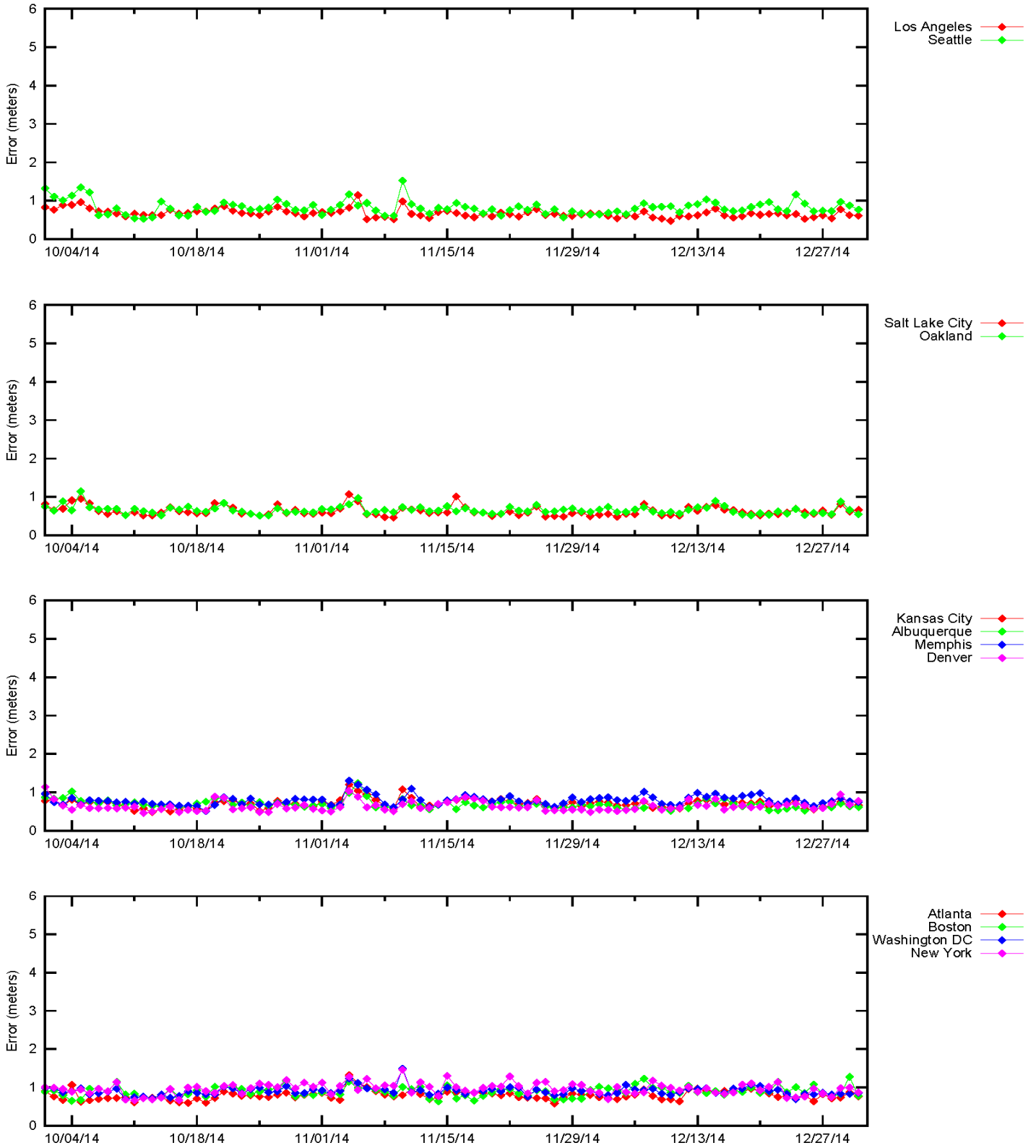


Figure 2-2 LPV 95% Horizontal Accuracy

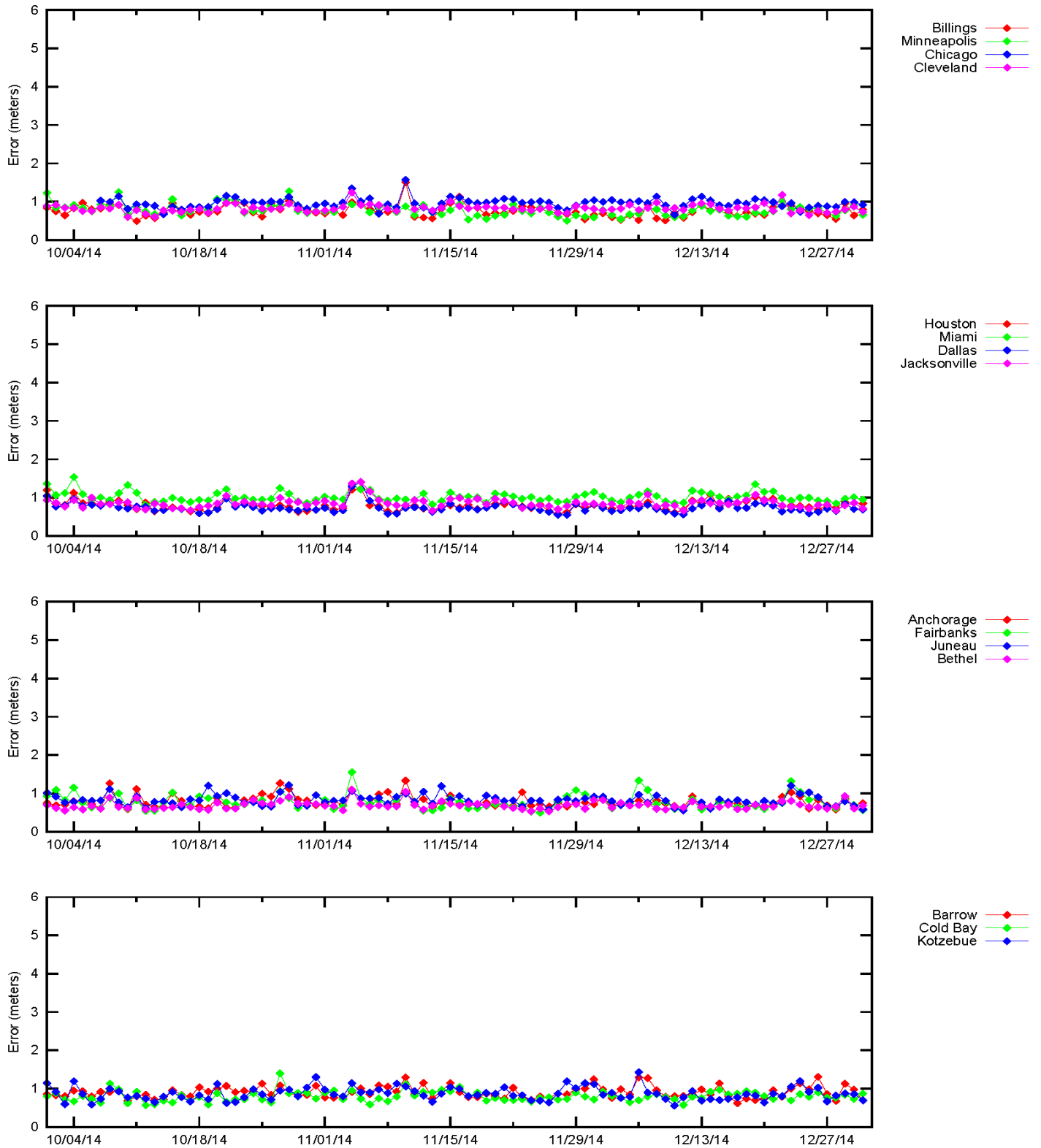


Figure 2-3 LPV 95% Horizontal Accuracy

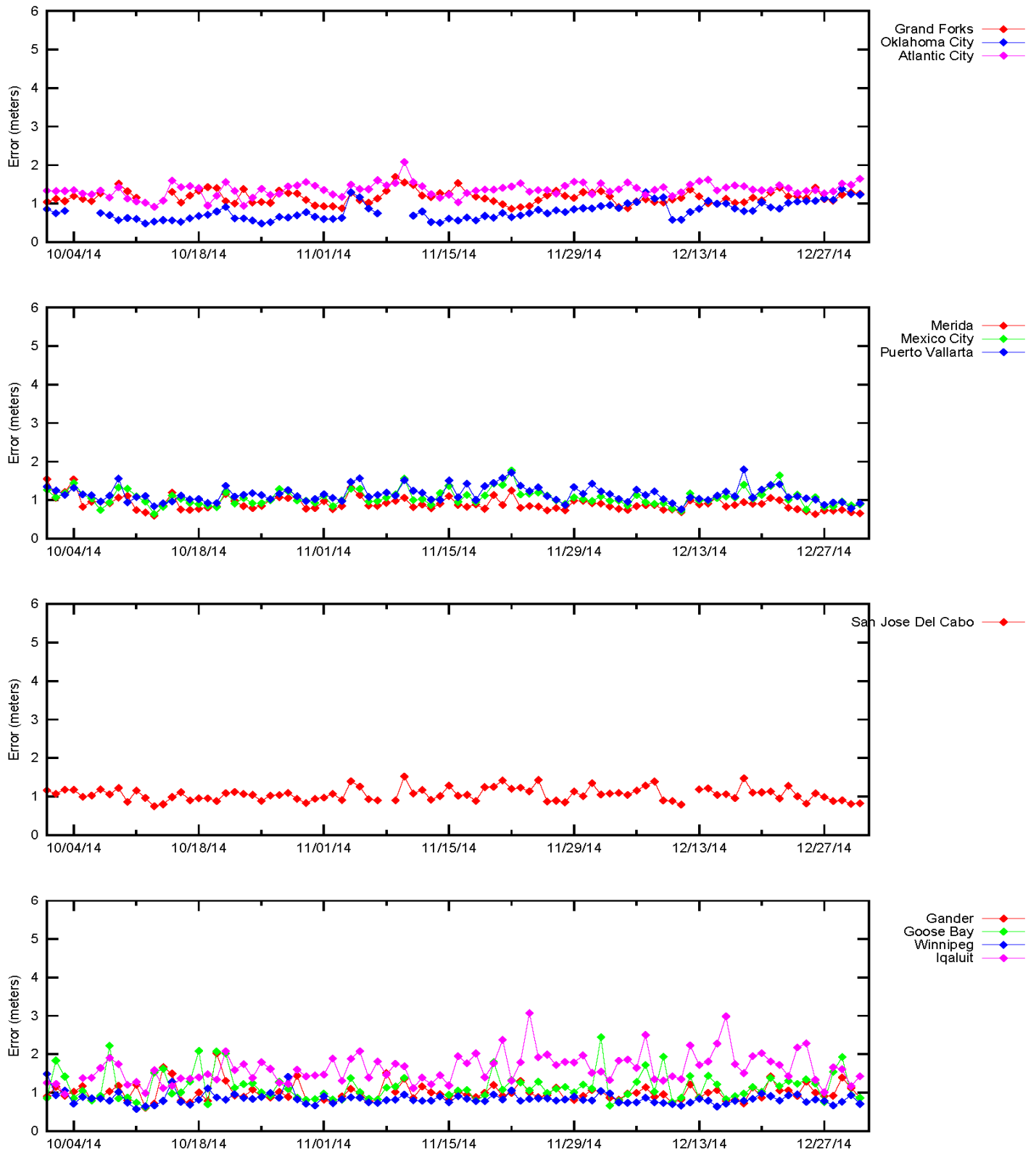


Figure 2-4 LPV 95% Vertical Accuracy

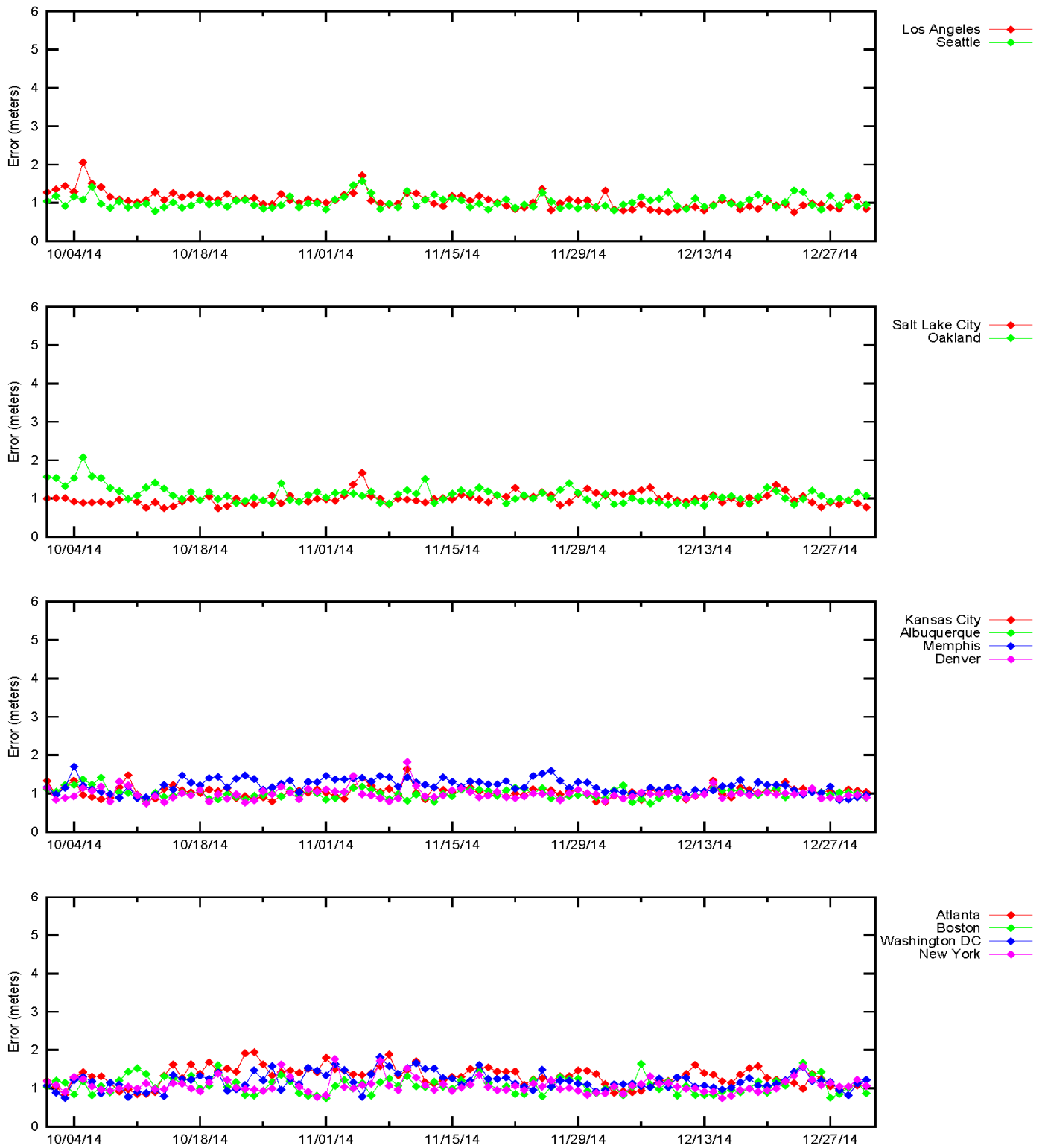


Figure 2-5 LPV 95% Vertical Accuracy

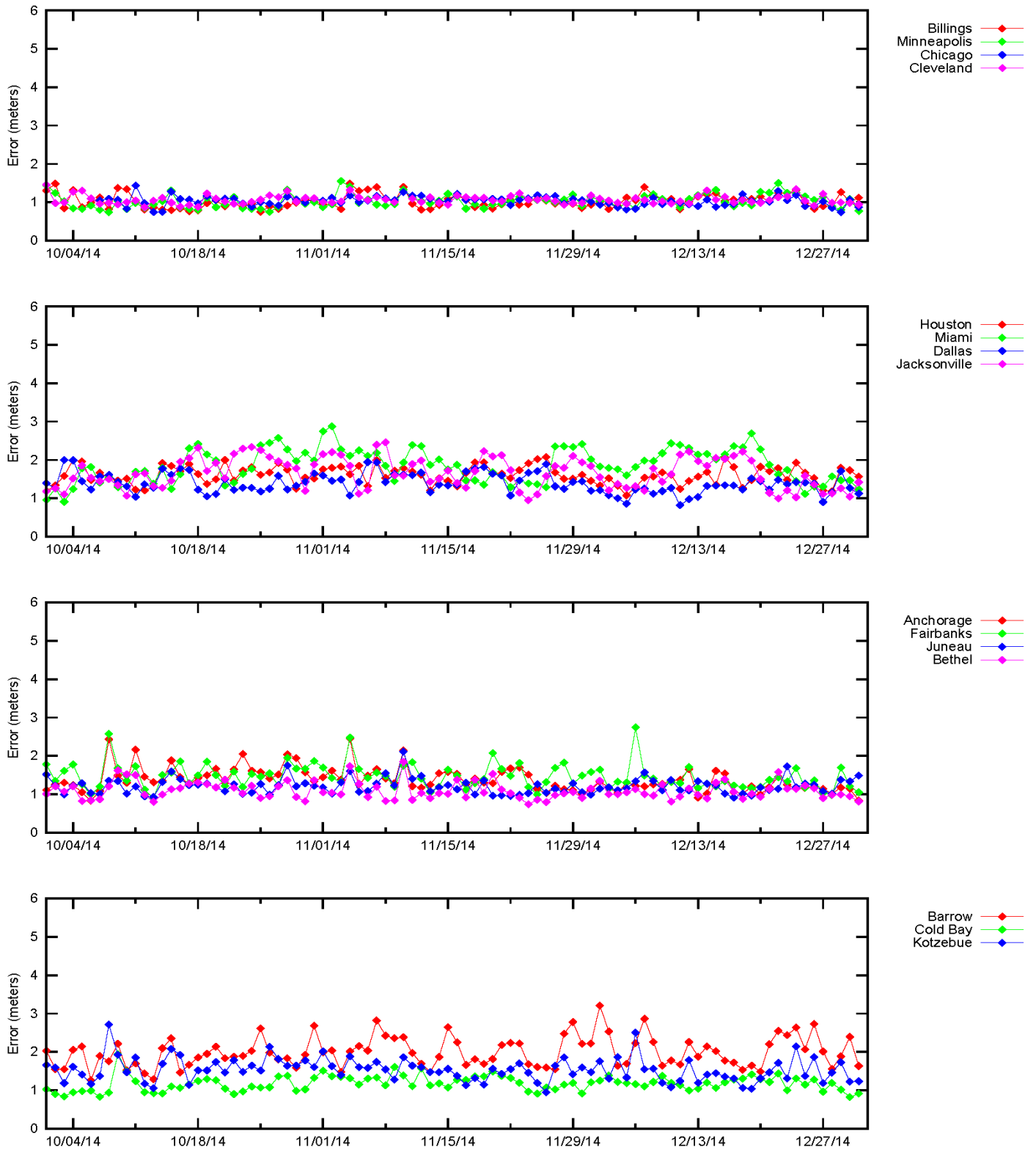


Figure 2-6 LPV 95% Vertical Accuracy

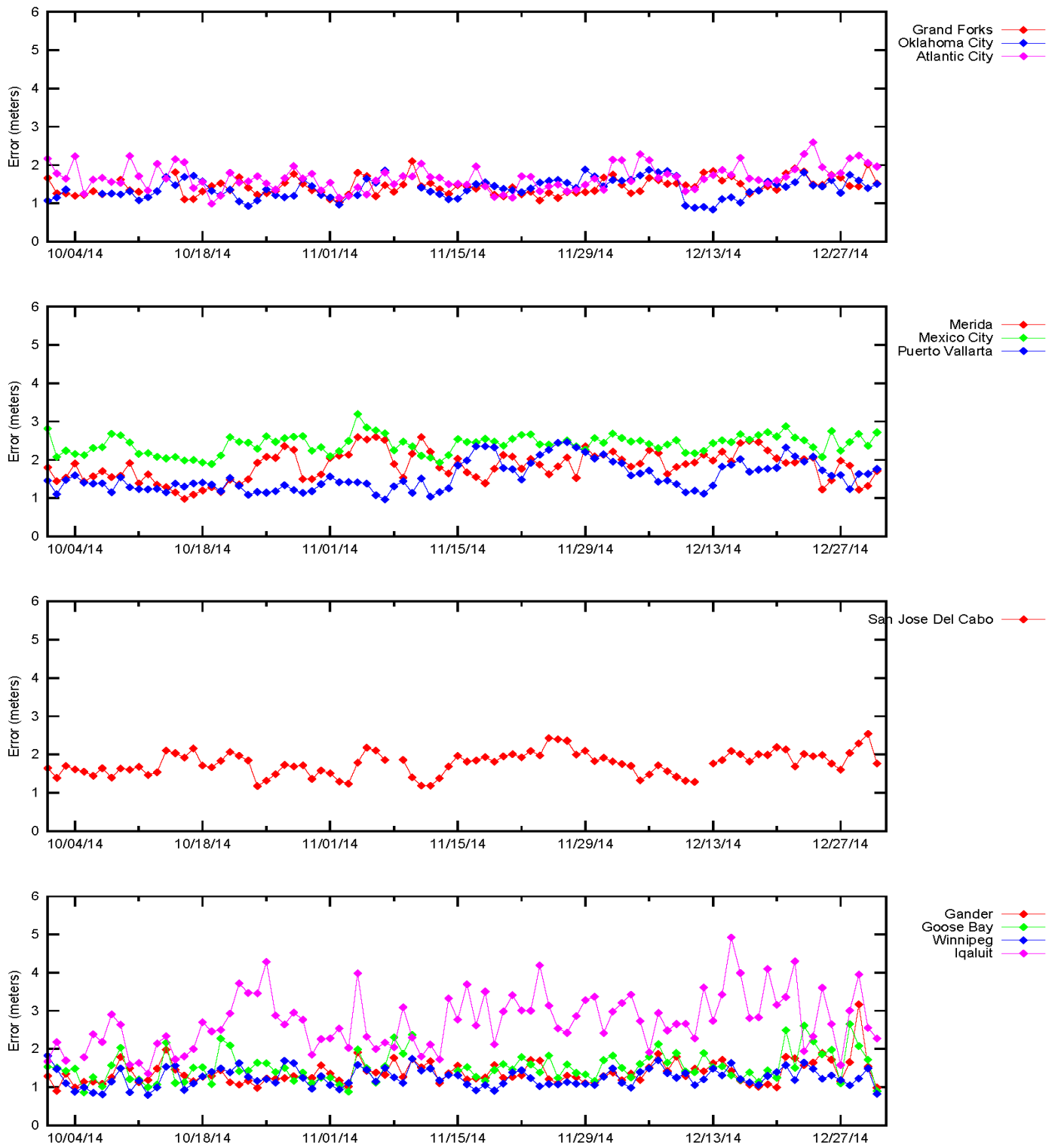


Figure 2-7 NPA 95% Horizontal Accuracy

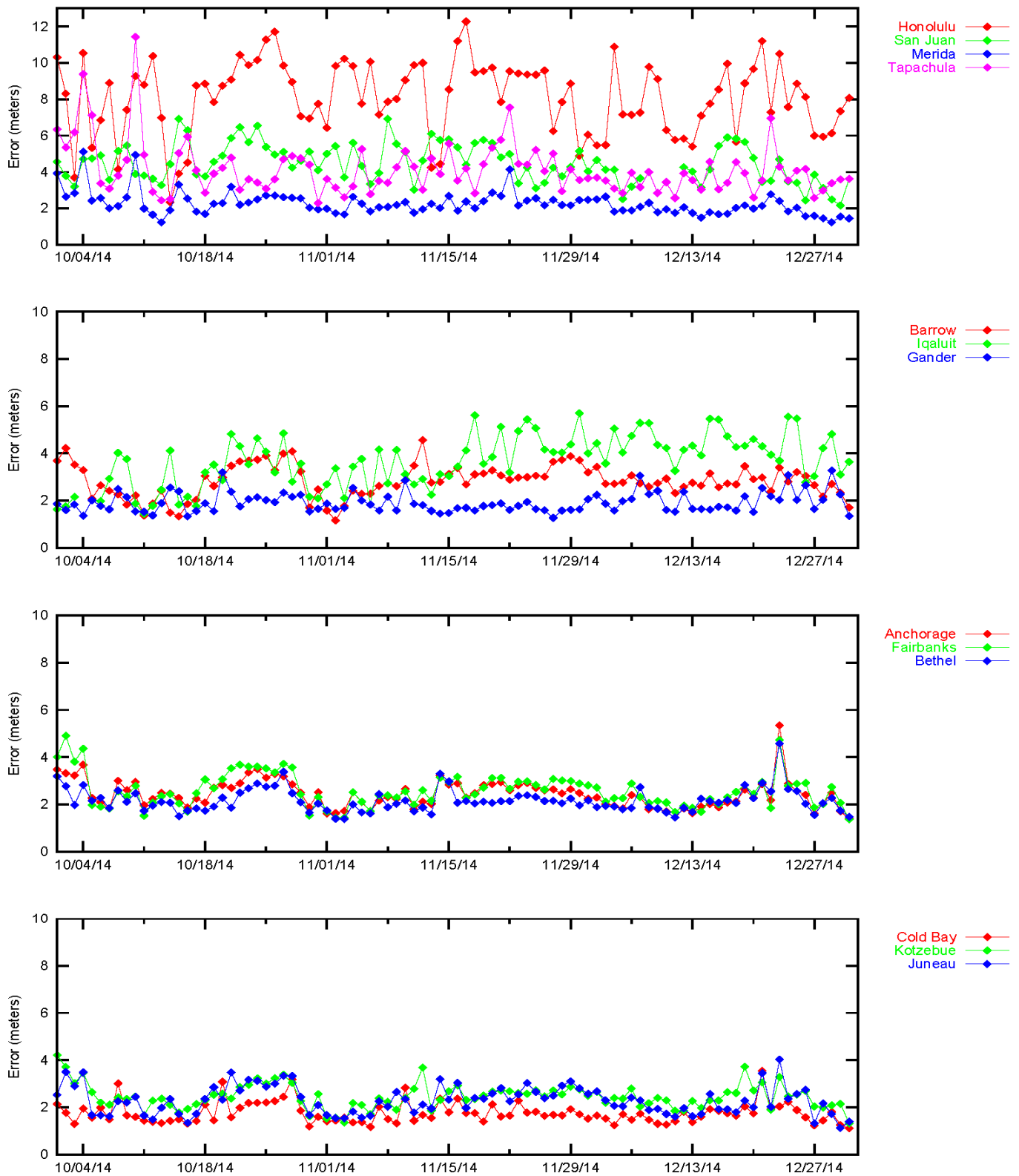


Figure 2-8 NPA 95% Horizontal Accuracy

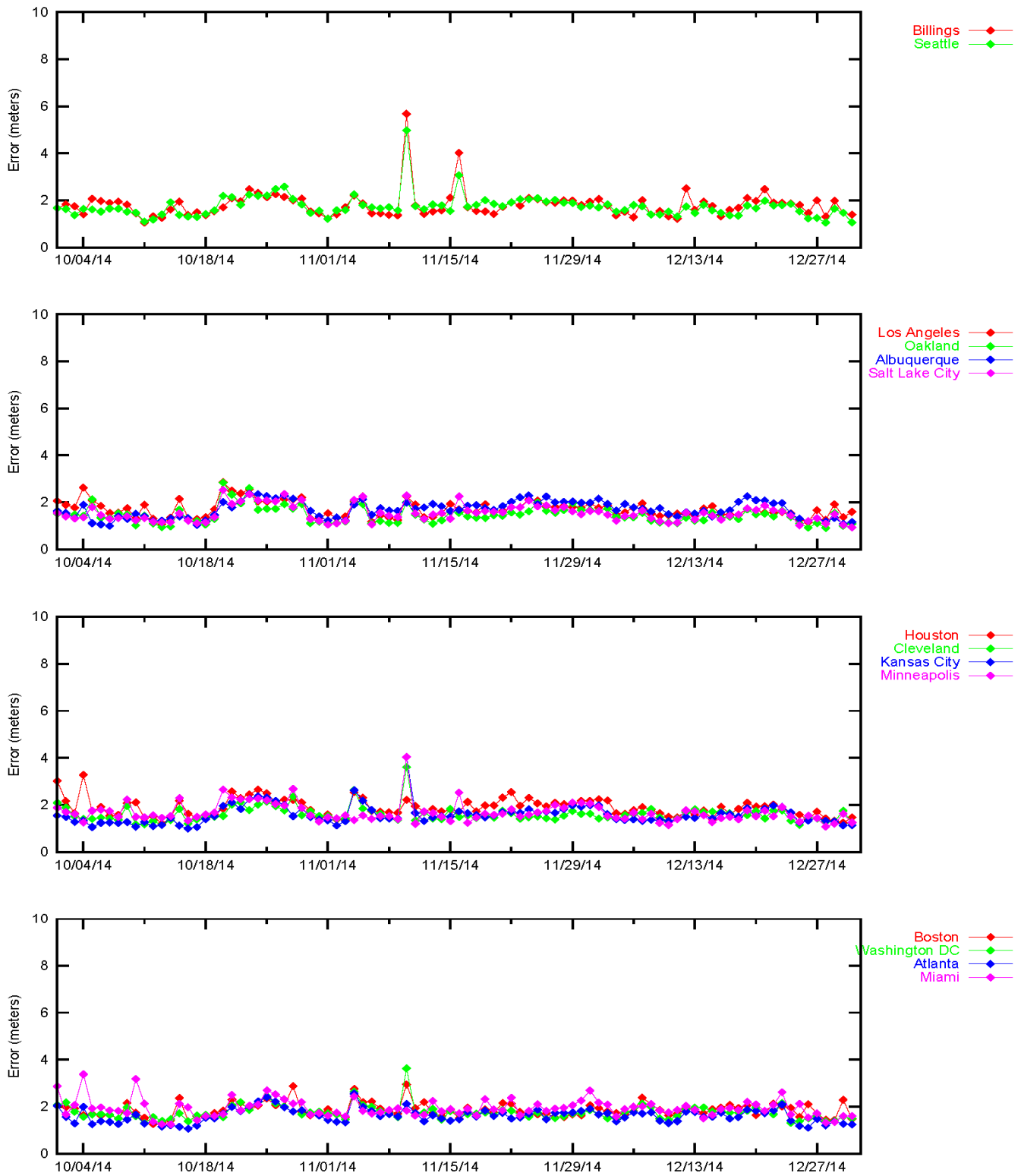




Figure 2-9 LPV Horizontal Error Bounding Triangle Chart

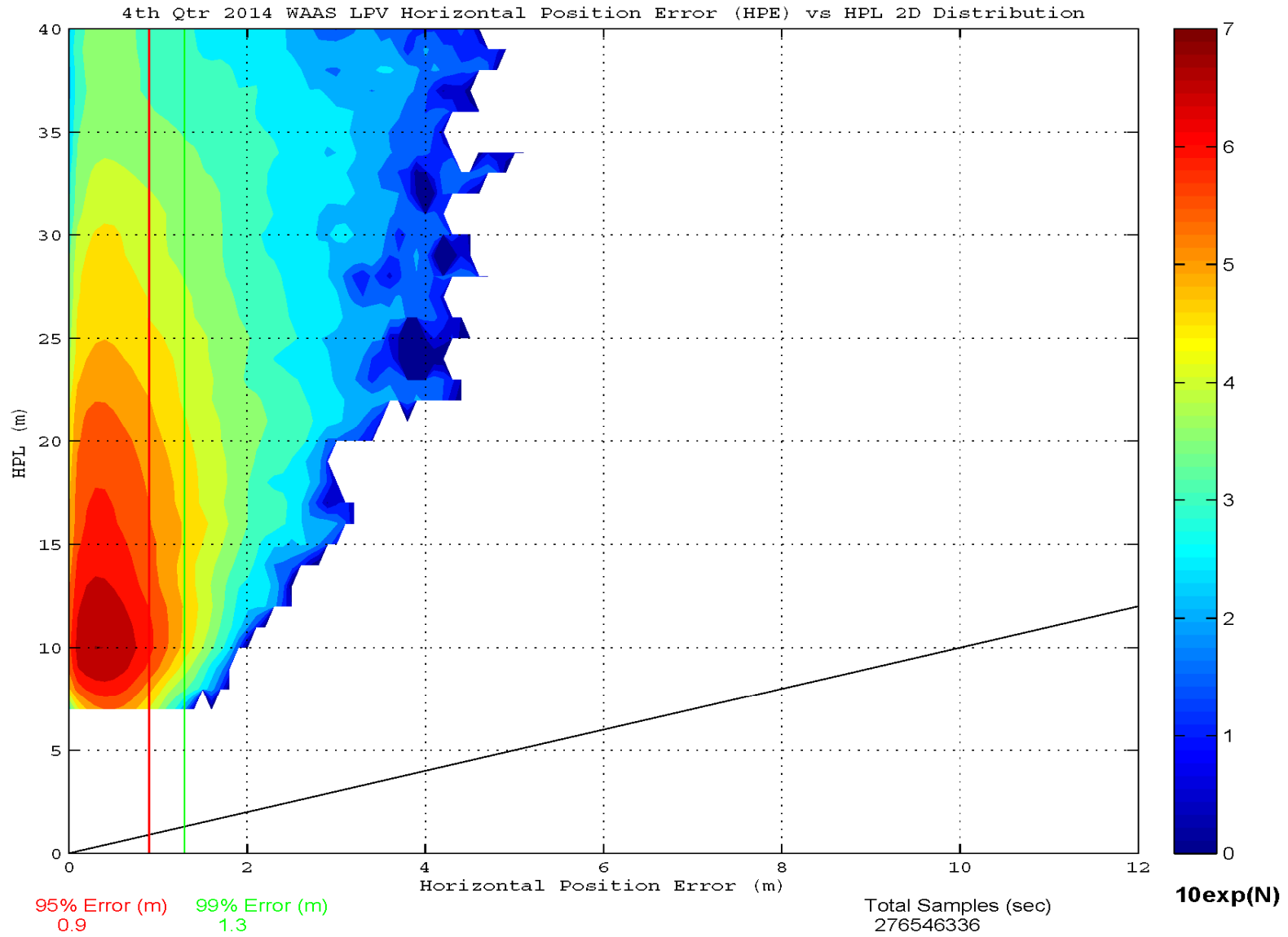


Figure 2-10 LPV Vertical Error Bounding Triangle Chart

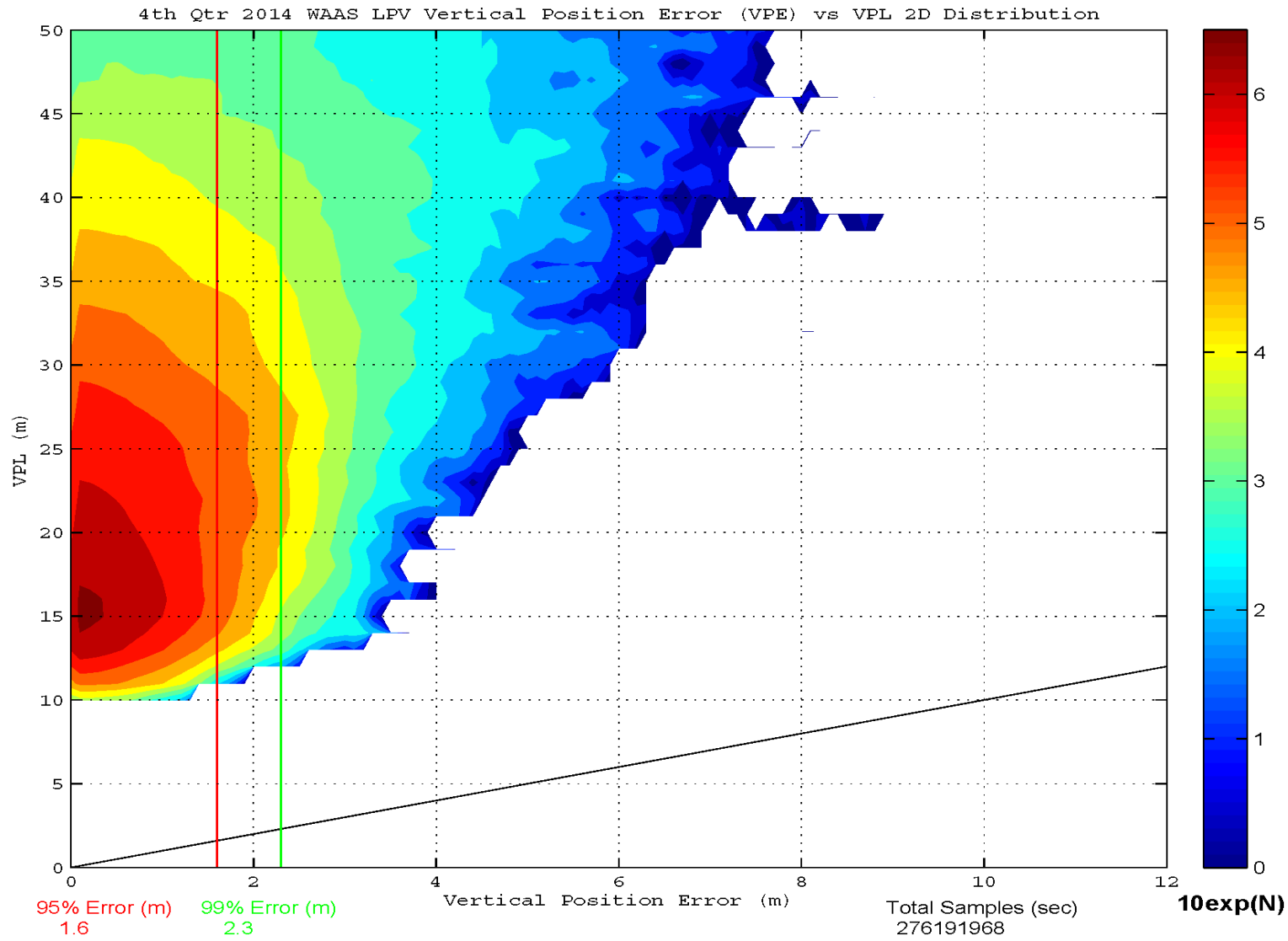


Figure 2-11 LPV 2-D Horizontal Error Distribution Histogram

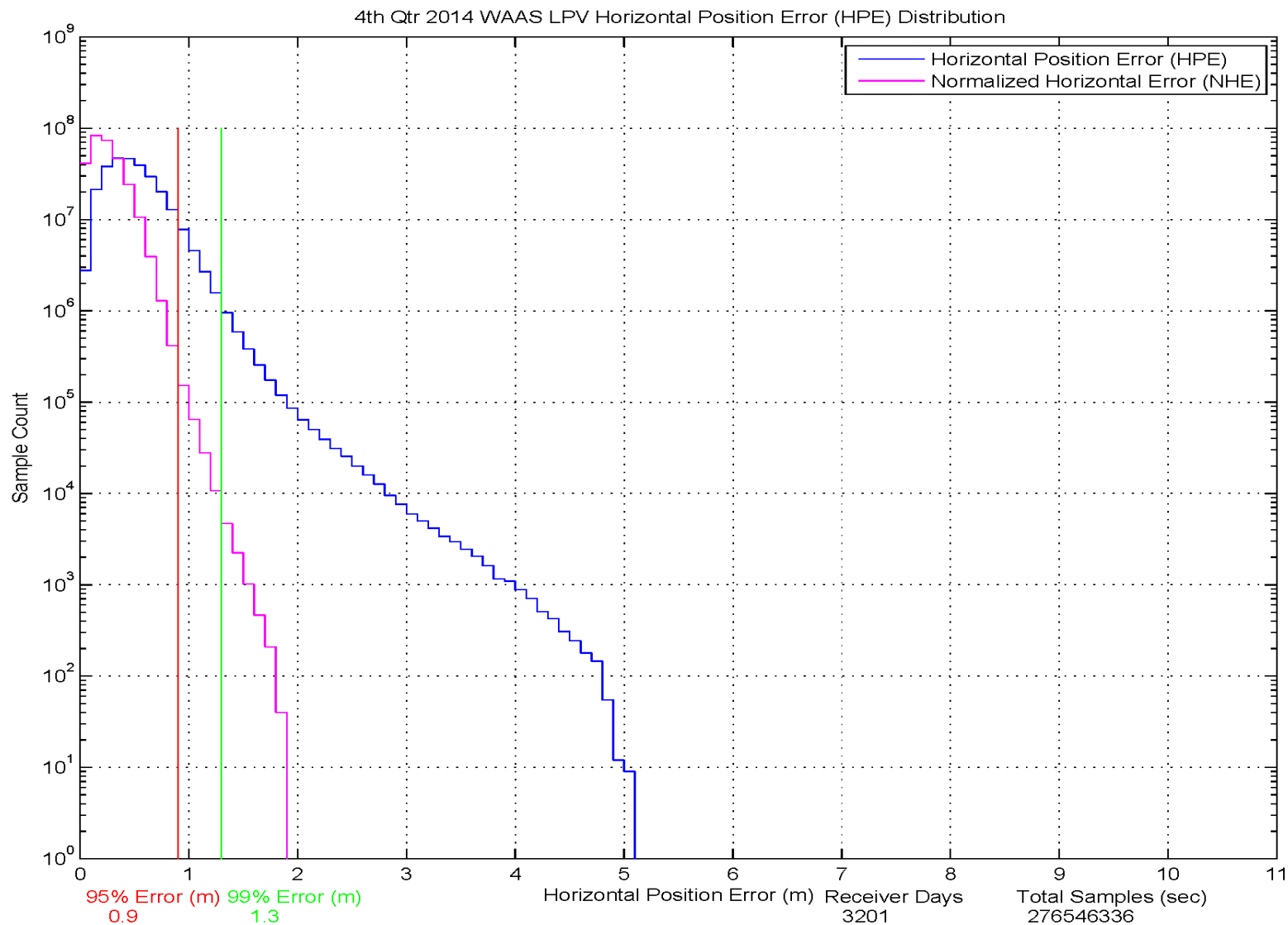
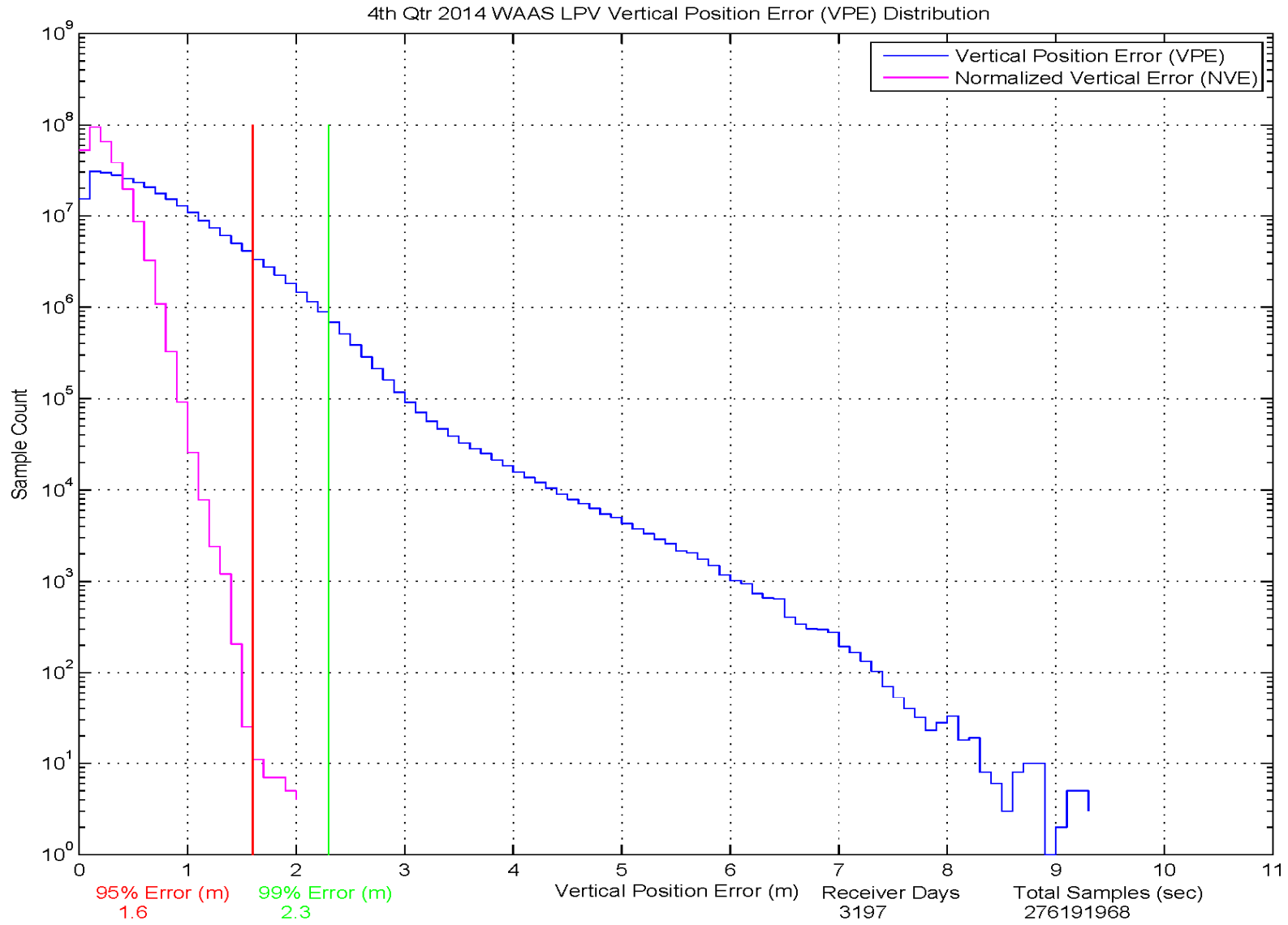


Figure 2-12 LPV 2-D Vertical Error Distribution Histogram



### 3.0 AVAILABILITY

The WAAS availability evaluation documents the percentage of time that the WAAS provided service for the operational service levels defined in Table 1-1. RTCA DO-229D Vertical and Horizontal Protection Levels were computed for each receiver being evaluated. Table 3-1 shows the protection levels that were maintained for 99% of the time for each receiver location for the quarter. The table also included the percentage in PA mode as described in section 2.0.

For this reporting period, the maximum 99% CONUS HPL and VPL are 18.678 meters at Miami and 31.319 meters at Oakland. The minimum 99% CONUS HPL and VPL are 11.737 meters at Memphis and 21.472 meters at Houston. The maximum 99% Alaska HPL and VPL are 30.432 meters at Cold Bay and 42.071 meters at Barrow. The minimum 99% Alaska HPL and VPL are 15.27 meters and 24.997 meters, both at Anchorage.

Availability of LP, LPV and LPV 200 service are evaluated by monitoring the WAAS protection levels at receiver locations throughout the test period. If both the vertical and horizontal protection levels are not greater than their respective alert limits (VAL and HAL) then the service is available. If either of the protection levels exceeds the required alert limit then the operational service at that location is considered unavailable and an outage in service is recorded with its duration. The operational service is not considered available again until the protection levels are both within the alert limits for at least 15 minutes. Although this will reduce operational service availability minimally, it substantially reduces the number of service outages and prevents excessive switching in and out of service availability. The percent of time that LP, LPV, and LPV 200 service is available using the fifteen-minute window criteria is presented in Table 3-2. The LP, LPV, and LPV 200 service outages and associated outage rate for the reporting period is presented in Table 3-4. The outage rate is the percent of approaches that theoretically would be interrupted by a loss of operational service once the approach had started. Figures 3-1 to 3-6 show the daily availability of LPV and LPV 200 service levels. Figures 3-7 to 3-12 show the daily interruptions of LPV and LPV 200 service levels for the evaluation period.

Availability of NPA service is evaluated by monitoring the WAAS horizontal protection level at receiver locations throughout the test period. If the horizontal protection level is not greater than the horizontal alert limit (HAL = 556m) then the service is available. If the horizontal protection level exceeds the required alert level or if WAAS navigation message is not received then the NPA service at that location is considered unavailable and an outage in service is recorded with its duration. The NPA service is not considered available again until the horizontal protection level is within the alert limit for at least 15 minutes. The percent of time that NPA service is available using the fifteen-minute window criteria is presented in Table 3-3. The NPA service outages and associated outage rate for this period is presented in Table 3-5. The outage rate is the percent of NPA approaches that theoretically would be interrupted by a loss of operational service once the approach had started.

Low PA and NPA availability for this reporting period were due to GPS satellite outages, carrier phase anomalies, communication outages, GUS switchovers, geomagnetic activity, and elevated GIVE and UDRE values. The significant events are discussed below; please refer to Table 1-5 for all the events that affected availability.

Beginning on November 14, LPV200 CONUS availability reduction was observed daily for less than 10 minutes in North Carolina due to a change in satellite orbit of PRN-13.

Solar max caused more intense geomagnetic activity resulting in Canada availability degradation throughout this quarter.

Significant events that reduced CONUS availability were observed on the following days:

- On October 2, planned maintenance on PRN-25 slightly affected LPV/LPV200 availability.
- On October 23, planned maintenance on PRN-12 caused minor LPV200 availability loss.
- On November 4- 5, high GIVE values due to geomagnetic activity along with elevated UDRE values after the manual GUS switchover on CRW (PRN-135) reduced LPV200 availability.
- On November 10, geomagnetic activity elevated GIVE values resulting in a slight reduction of LPV200 availability.
- On December 11, planned maintenance on PRN-15 caused minor degradation in LPV/LPV200 availability.

- On December 21 and 23, geomagnetic activity elevated GIVE values caused slight loss of LPV/LPV200 availability.
- On December 25, carrier phase spike on PRN-21 affected LPV/LPV200 availability.

Significant events that reduced Alaska availability were observed on the following days:

- On October 2, planned maintenance on PRN-25 slightly affected LPV/LPV200 availability.
- On October 23, planned maintenance on PRN-12 caused degradation in LPV/LPV200 availability.
- On October 27-28, geomagnetic activity elevated GIVE values resulting in a reduction of LPV/LPV200 availability.
- On November 4-5, high GIVE values due to geomagnetic activity along with elevated UDRE values after the manual GUS switchover on CRW (PRN-135) reduced LPV200 availability.
- On November 30, GUS switchover on CRW (PRN-135) reduced LPV/LPV200 availability.
- On December 1-2, geomagnetic activity elevated GIVE values and slightly affected LPV/LPV200 availability.
- On December 23-24, geomagnetic storm elevated GIVE values and caused LPV/LPV200 availability degradation.

Significant events that reduced Canada availability were observed on the following days:

- On October 14-15 and October 27-28, geomagnetic activity elevated GIVE values and caused degradation in LPV/LPV200 availability.
- On November 4-5, high GIVE values due to geomagnetic activity along with elevated UDRE values after the manual GUS switchover on CRW (PRN-135) reduced LPV/LPV200 Canada availability.
- On November 10, high GIVE values due to geomagnetic activity caused degradation in LPV/LPV200 availability.
- On December 2, 7, 21, 23-27, and 29-30, geomagnetic activity elevated GIVE values and affected LPV/LPV200 availability.

Radio frequency interference (RFI) caused localized loss of LPV/LPV200 availability at Miami on December 18, and LPV200 availability at Salt Lake City on December 22, but had no effect on WAAS service.

**Table 3-1 99% Protection Level**

<b>Location</b>	<b>99% HPL (meters)</b>	<b>99% VPL (meters)</b>	<b>Percentage in PA mode</b>
Atlantic City	14.358	24.820	100
Grand Forks	15.703	27.970	100
Oklahoma City	12.424	26.034	100
Albuquerque	12.147	24.955	100
Anchorage	15.270	24.997	100
Atlanta	12.674	22.081	100
Barrow	22.230	42.071	99.999810
Bethel	18.749	30.288	100
Billings	14.227	24.348	100
Boston	16.135	25.084	100
Chicago	12.120	23.763	100
Cleveland	14.093	24.338	100
Cold Bay	30.432	40.220	100
Dallas	12.982	21.864	100
Denver	12.428	22.941	100
Fairbanks	15.416	27.268	100
Gander	29.493	44.344	100
Goose Bay	27.427	36.433	100
Houston	12.688	21.472	100
Iqaluit	54.543	76.917	99.997550
Jacksonville	14.235	23.691	100
Juneau	15.536	25.444	100
Kansas City	12.207	24.547	100
Kotzebue	18.851	36.754	99.999810
Los Angeles	14.835	29.223	100
Memphis	11.737	22.228	100
Merida	20.778	37.969	100
Mexico City	34.868	48.516	100
Miami	18.678	27.522	100
Minneapolis	12.763	26.812	100
New York	15.071	25.082	100
Oakland	17.198	31.319	100
Puerto Vallarta	39.234	63.646	100
Salt Lake City	13.457	21.676	100
San Jose Del Cabo	28.891	41.281	100
Seattle	14.205	24.507	100
Washington DC	13.604	24.497	100
Winnipeg	16.843	27.107	100

**Table 3-2 Quarterly Availability Statistics**

<b>Location</b>	<b>LP WAAS Availability (%) With 15 minute window</b>	<b>LPV WAAS Availability (%) With 15 minute window</b>	<b>LPV 200 WAAS Availability (%) With 15 minute window</b>
Atlantic City	100.00%	100.00%	100.00%
Grand Forks	100.00%	99.99%	99.99%
Oklahoma City	100.00%	100.00%	99.99%
Albuquerque	100.00%	100.00%	100.00%
Anchorage	99.95%	99.93%	99.80%
Atlanta	100.00%	100.00%	100.00%
Barrow	99.63%	99.44%	95.85%
Bethel	99.95%	99.94%	99.84%
Billings	100.00%	100.00%	100.00%
Boston	100.00%	100.00%	100.00%
Chicago	100.00%	100.00%	100.00%
Cleveland	100.00%	100.00%	100.00%
Cold Bay	99.96%	99.91%	92.12%
Dallas	100.00%	100.00%	100.00%
Denver	100.00%	100.00%	100.00%
Fairbanks	99.73%	99.68%	99.60%
Gander	99.89%	99.73%	85.37%
Goose Bay	99.63%	99.58%	98.16%
Houston	100.00%	100.00%	100.00%
Iqaluit	97.47%	95.32%	75.58%
Jacksonville	100.00%	100.00%	100.00%
Juneau	99.99%	99.93%	99.71%
Kansas City	100.00%	100.00%	100.00%
Kotzebue	99.70%	99.67%	98.02%
Los Angeles	100.00%	100.00%	99.97%
Memphis	100.00%	100.00%	100.00%
Merida	100.00%	99.49%	98.69%
Mexico City	99.60%	99.00%	92.75%
Miami	100.00%	100.00%	99.94%
Minneapolis	100.00%	100.00%	100.00%
New York	100.00%	100.00%	100.00%
Oakland	100.00%	100.00%	99.72%
Puerto Vallarta	99.08%	97.38%	91.13%
Salt Lake City	100.00%	100.00%	100.00%
San Jose Del Cabo	99.99%	99.89%	94.72%
Seattle	100.00%	100.00%	99.99%
Washington DC	100.00%	100.00%	100.00%
Winnipeg	100.00%	99.99%	99.97%



**Table 3-3 NPA Availability**

<b>Location</b>	<b>NPA Availability (%) (Excluding RAIM/FDE)</b>
Albuquerque	100%
Anchorage	100%
Atlanta	100%
Barrow	99.99%
Bethel	100%
Billings	100%
Boston	100%
Cleveland	100%
Cold Bay	100%
Fairbanks	100%
Gander	100%
Honolulu	100%
Houston	100%
Iqaluit	100%
Juneau	100%
Kansas City	100%
Kotzebue	99.99%
Los Angeles	100%
Merida	100%
Miami	100%
Minneapolis	100%
Oakland	100%
Salt Lake City	100%
San Jose Del Cabo	100%
San Juan	100%
Seattle	100%
Tapachula	100%
Washington DC	100%

**Table 3-4 LPV and LPV 200 Outage Rate (Per 150 sec approach)**

Location	LP Outages	LP Outage Rates	LPV Outages	LPV Outage Rates	LPV 200 Outages	LPV 200 Outage Rates
Atlantic City	0	0	0	0	0	0
Grand Forks	0	0	1	0.000020	1	0.000020
Oklahoma City	0	0	0	0	2	0.000041
Albuquerque	0	0	0	0	1	0.000019
Anchorage	4	0.000076	5	0.000094	10	0.000189
Atlanta	0	0	0	0	0	0
Barrow	10	0.000189	28	0.000531	292	0.005750
Bethel	2	0.000038	2	0.000038	17	0.000321
Billings	0	0	0	0	0	0
Boston	0	0	0	0	1	0.000019
Chicago	0	0	0	0	0	0
Cleveland	0	0	0	0	0	0
Cold Bay	2	0.000038	5	0.000095	342	0.007012
Dallas	0	0	0	0	0	0
Denver	0	0	0	0	0	0
Fairbanks	8	0.000151	6	0.000114	22	0.000417
Gander	6	0.000114	35	0.000663	549	0.012157
Goose Bay	10	0.000197	12	0.000237	169	0.003380
Houston	0	0	0	0	0	0
Iqaluit	117	0.002297	225	0.004517	784	0.019848
Jacksonville	0	0	0	0	0	0
Juneau	2	0.000038	5	0.000094	8	0.000151
Kansas City	0	0	0	0	1	0.000019
Kotzebue	9	0.000170	14	0.000265	165	0.003178
Los Angeles	0	0	0	0	4	0.000076
Memphis	0	0	0	0	0	0
Merida	0	0	54	0.001025	207	0.003959
Mexico City	104	0.001971	150	0.002860	530	0.010787
Miami	0	0	0	0	9	0.000170
Minneapolis	0	0	0	0	0	0
New York	0	0	0	0	1	0.000019
Oakland	0	0	0	0	43	0.000814
Puerto Vallarta	142	0.002711	181	0.003516	442	0.009175
Salt Lake City	0	0	0	0	1	0.000019
San Jose Del Cabo	2	0.000038	27	0.000516	371	0.007476
Seattle	0	0	0	0	3	0.000057
Washington DC	0	0	0	0	0	0
Winnipeg	0	0	1	0.000019	1	0.000019

**Table 3-5 NPA Outage Rates (Excluding FD/FDE)**

<b>Location</b>	<b>NPA Outages</b>	<b>NPA Outage Rate</b>
Albuquerque	0	0
Anchorage	0	0
Atlanta	0	0
Barrow	1	0.000019
Bethel	0	0
Billings	0	0
Boston	0	0
Cleveland	0	0
Cold Bay	0	0
Fairbanks	0	0
Gander	0	0
Honolulu	0	0
Houston	0	0
Iqaluit	0	0
Juneau	0	0
Kansas City	0	0
Kotzebue	1	0.000019
Los Angeles	0	0
Merida	0	0
Miami	0	0
Minneapolis	0	0
Oakland	0	0
Salt Lake City	0	0
San Jose Del Cabo	0	0
San Juan	0	0
Seattle	0	0
Tapachula	0	0
Washington DC	0	0

Figure 3-1 LPV Instantaneous Availability

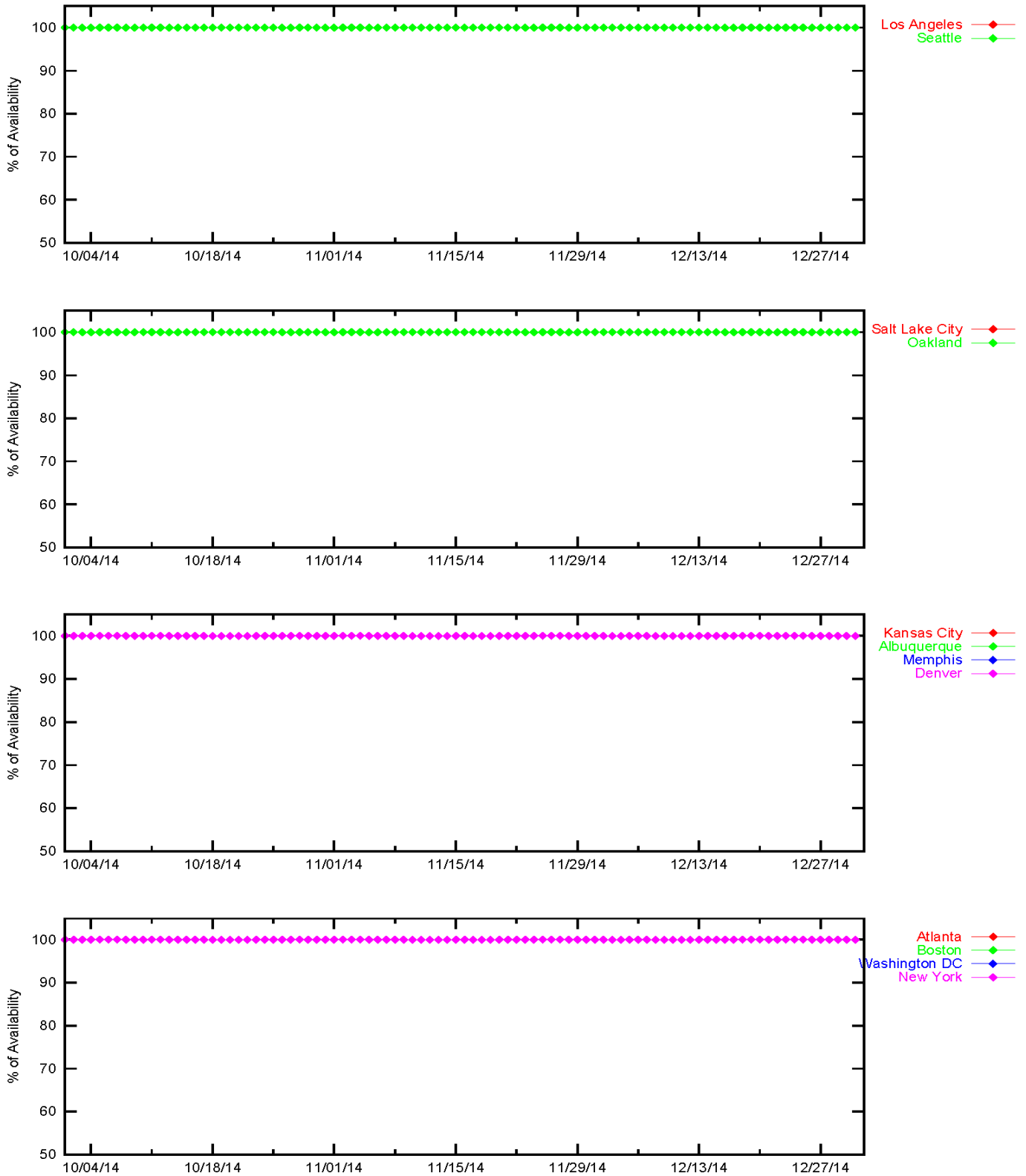


Figure 3-2 LPV Instantaneous Availability

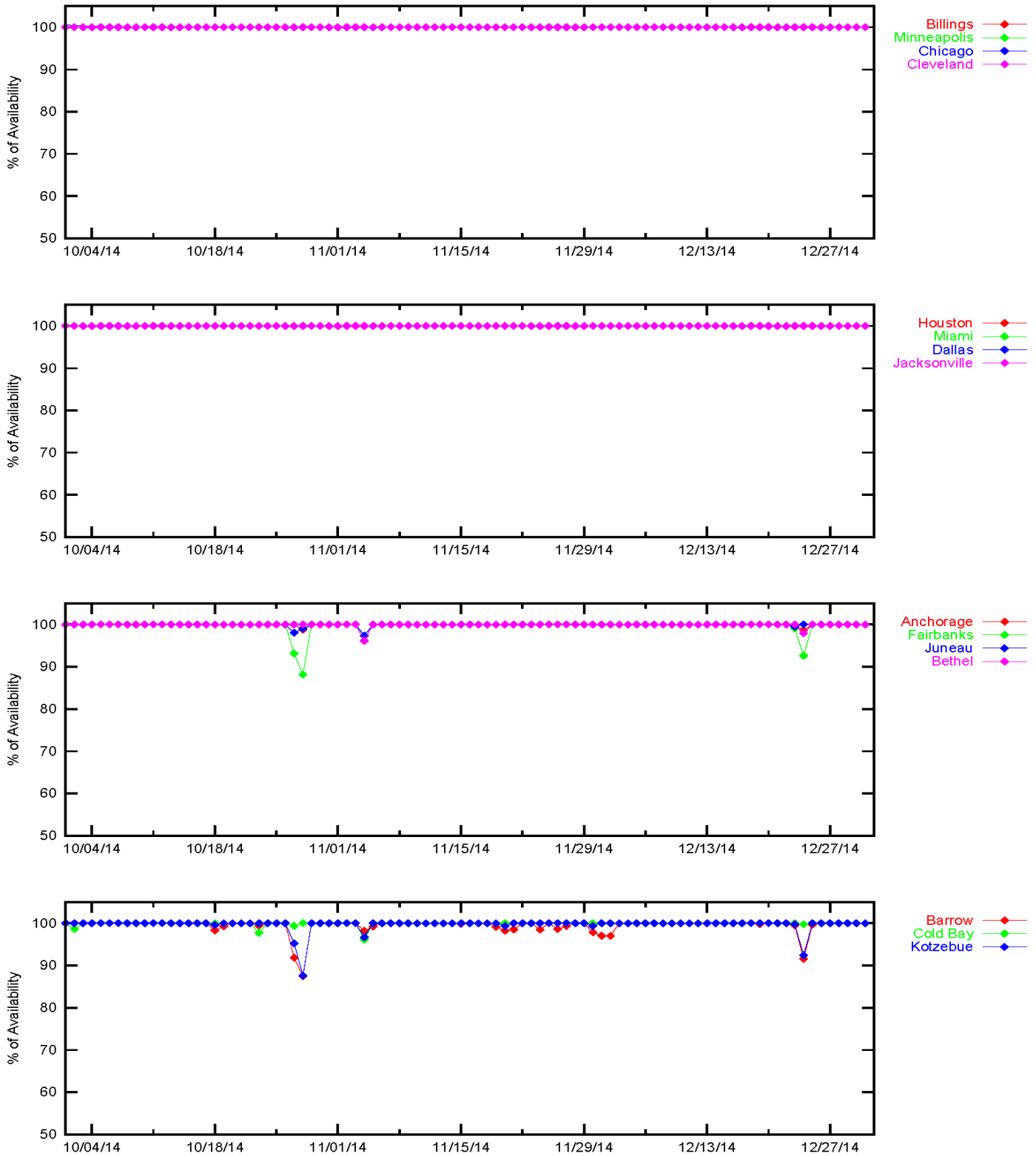


Figure 3-3 LPV Instantaneous Availability

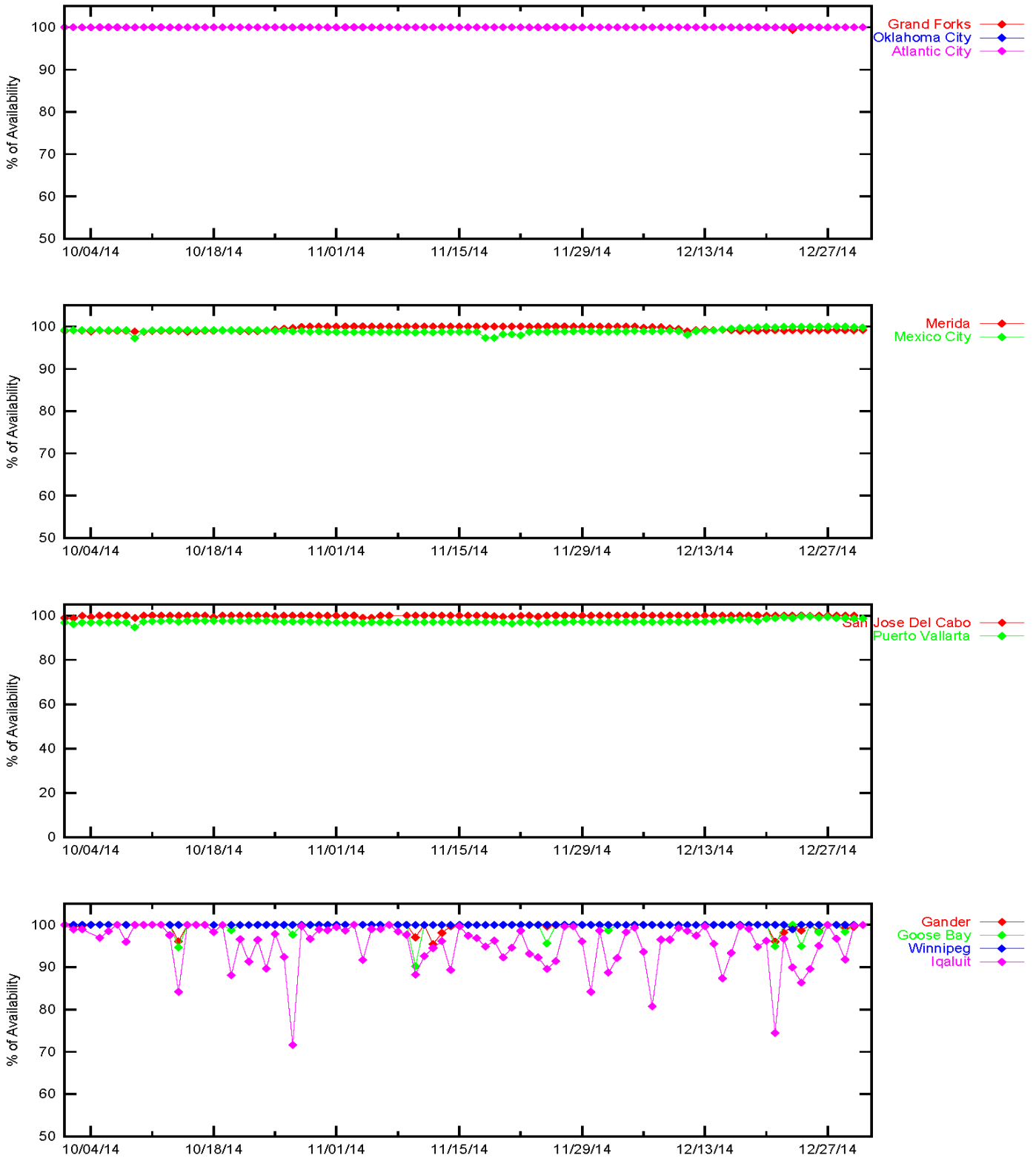


Figure 3-4 LPV 200 Instantaneous Availability

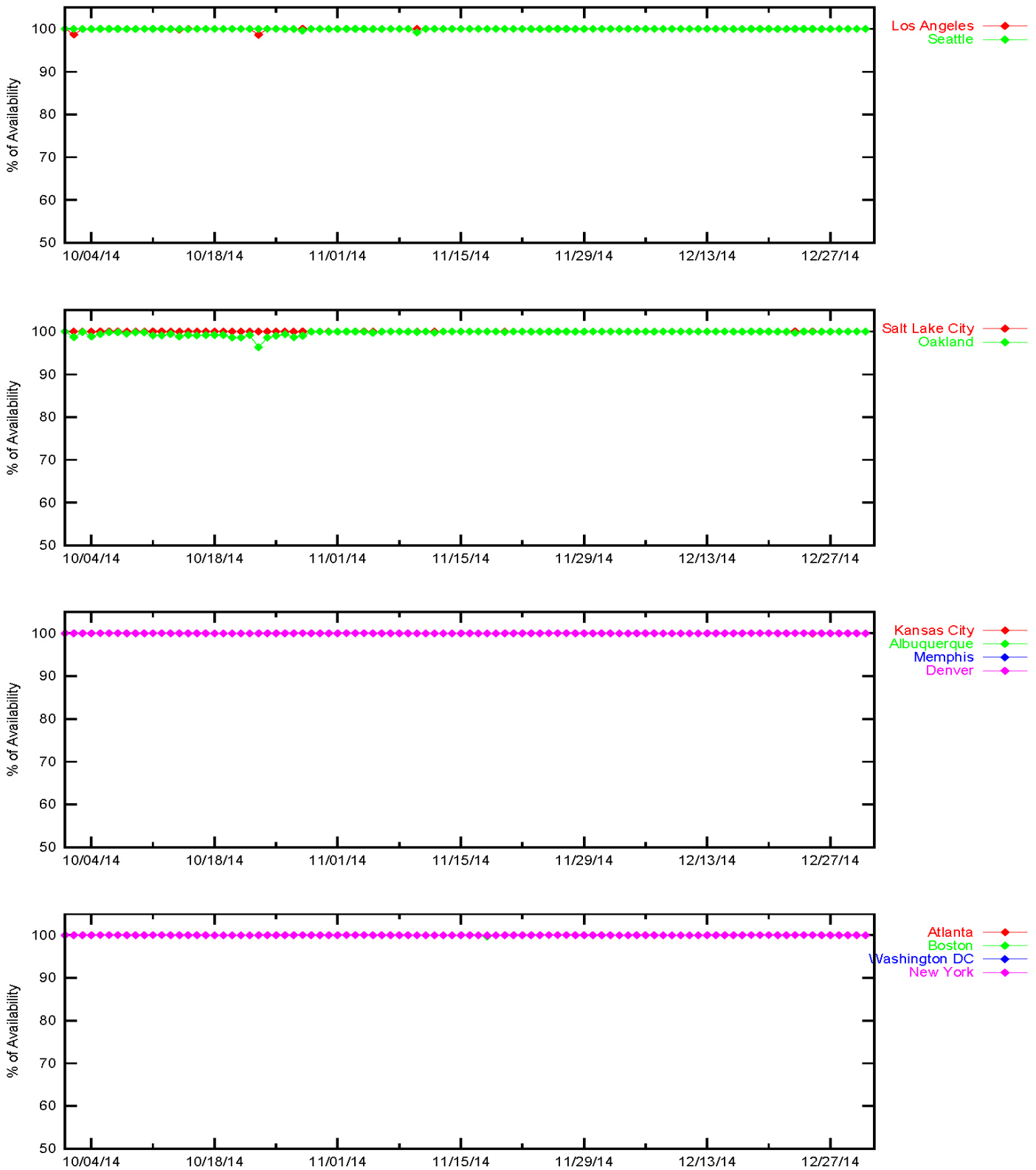


Figure 3-5 LPV 200 Instantaneous Availability

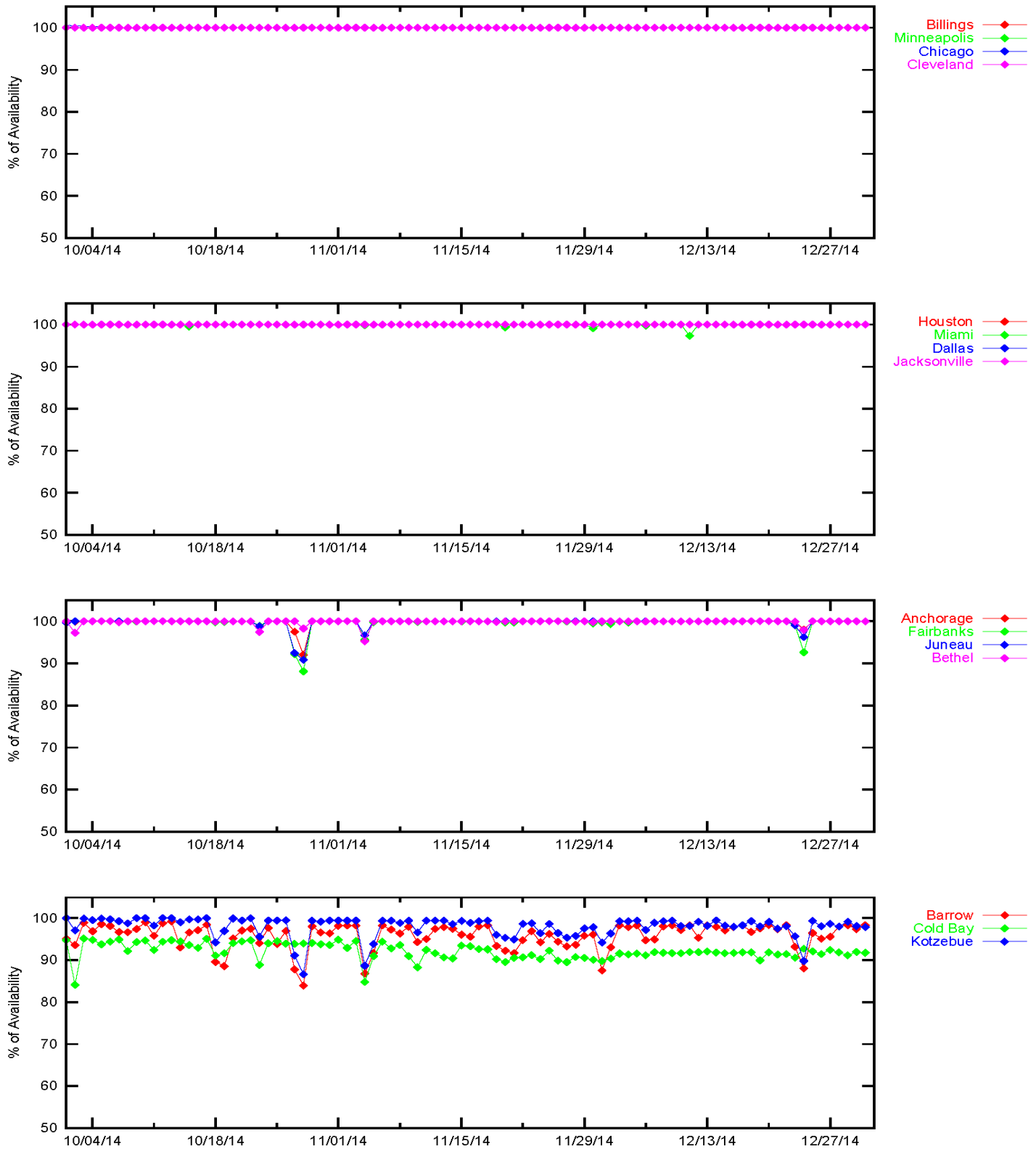




Figure 3-6 LPV 200 Instantaneous Availability

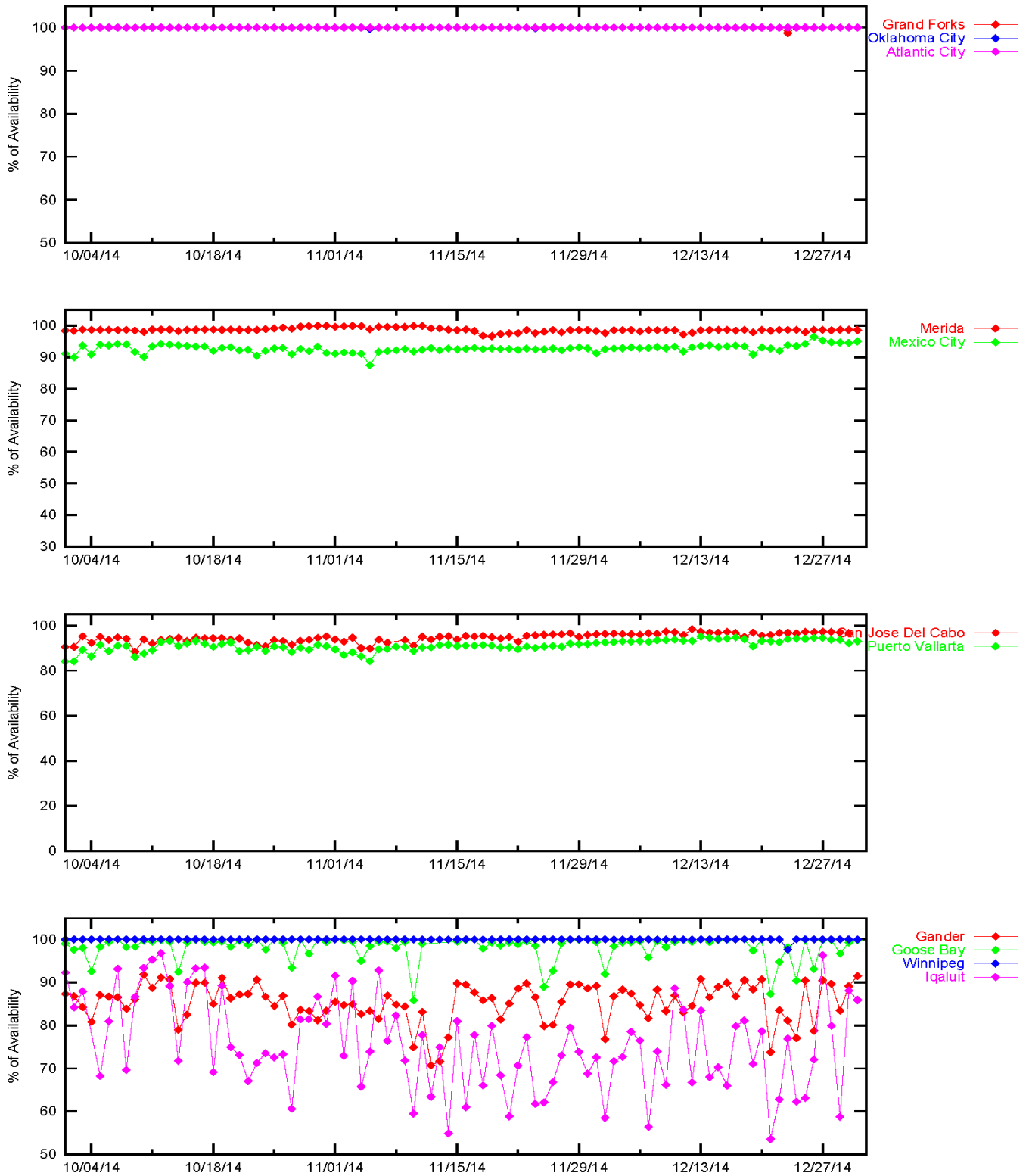


Figure 3-7 LPV Outages

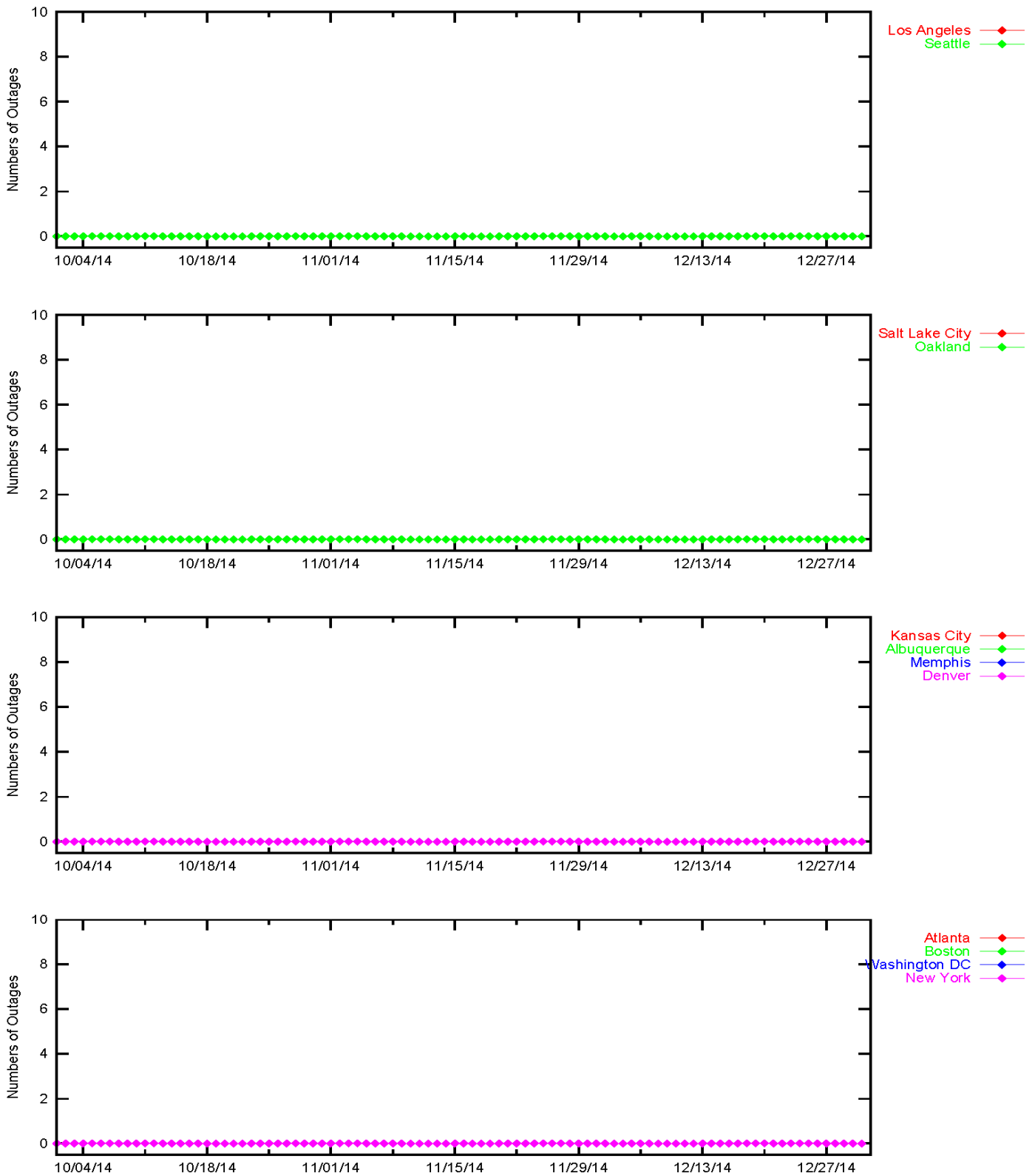


Figure 3-8 LPV Outages

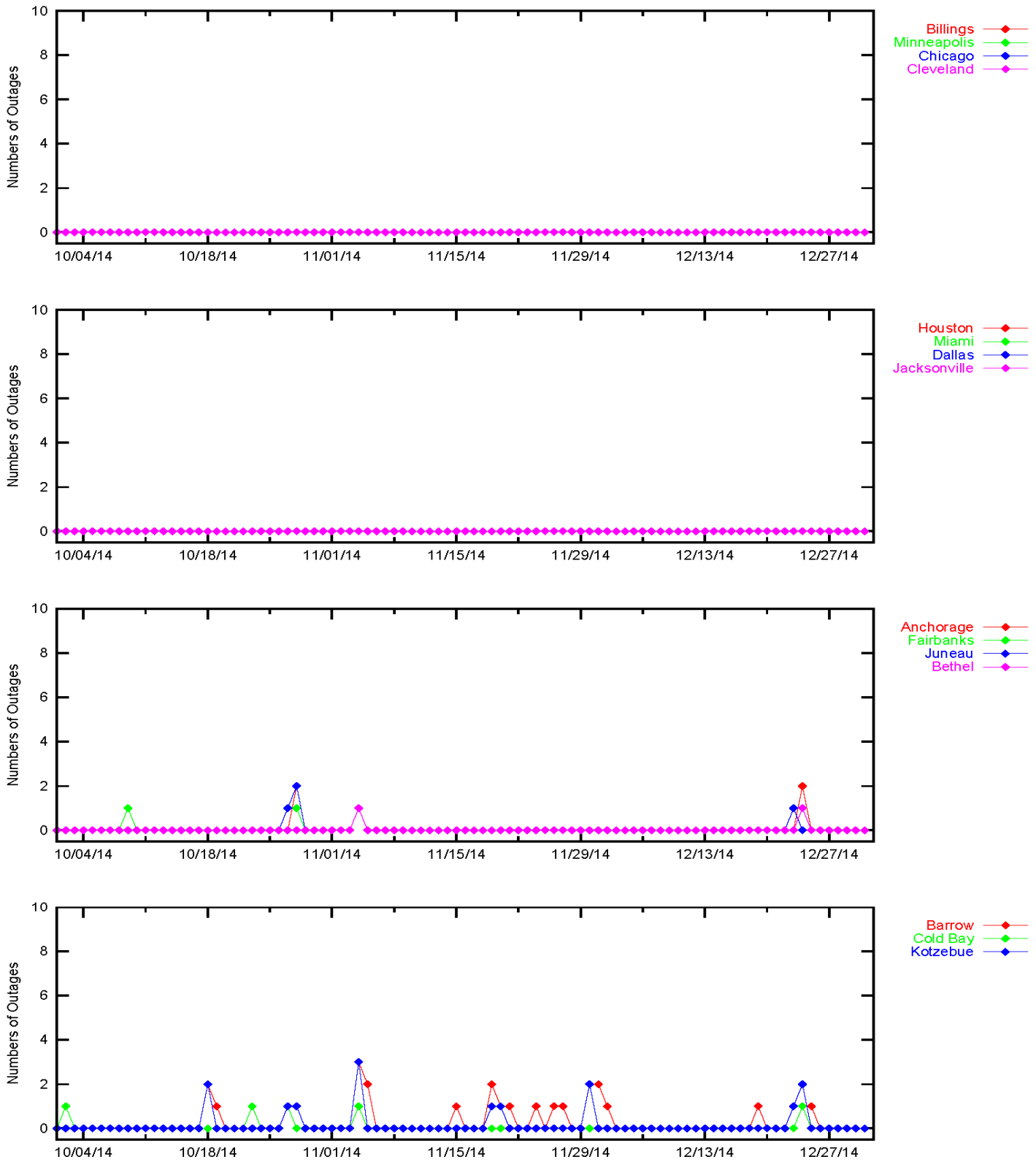


Figure 3-9 LPV Outages

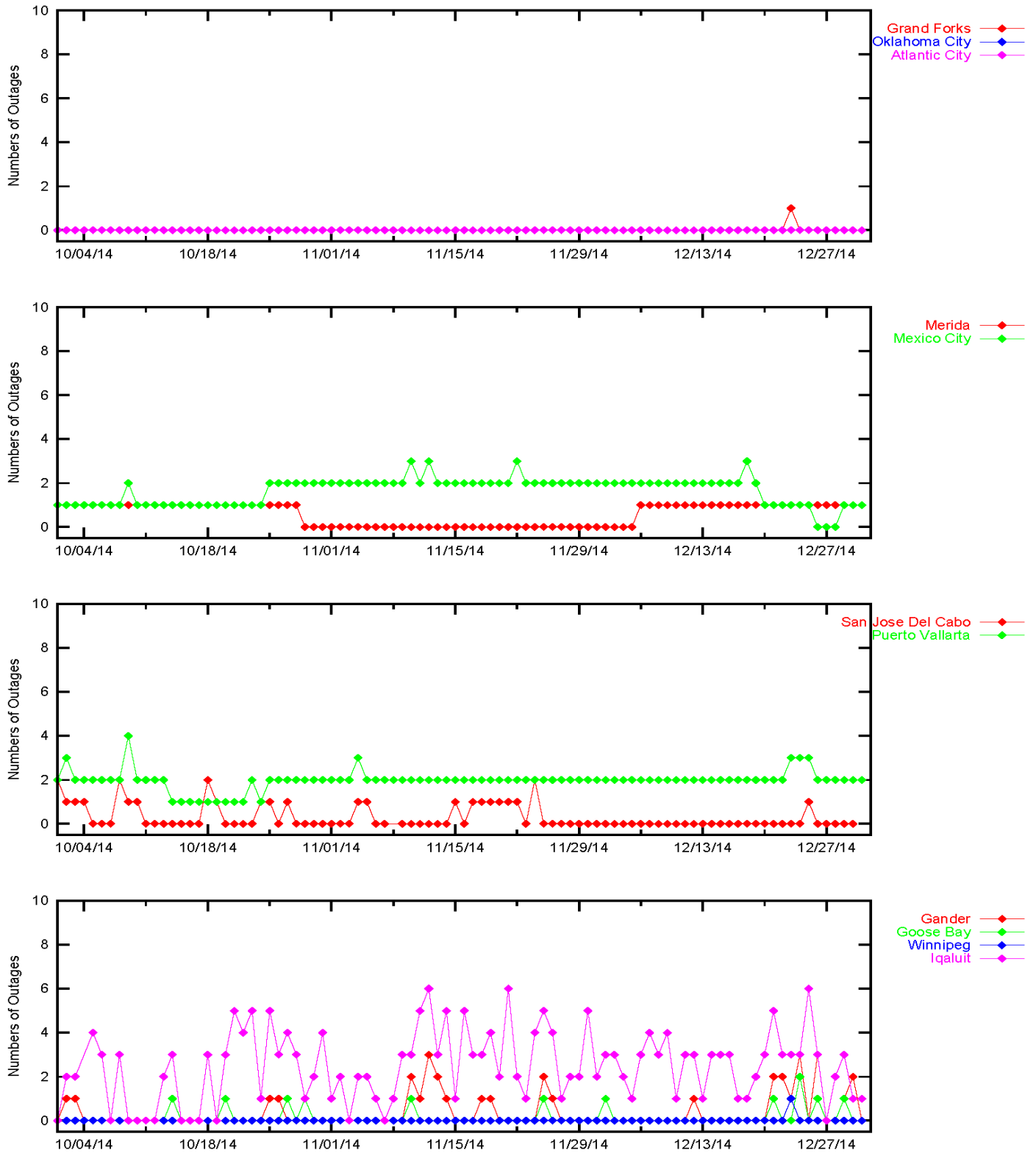


Figure 3-10 LPV 200 Outages

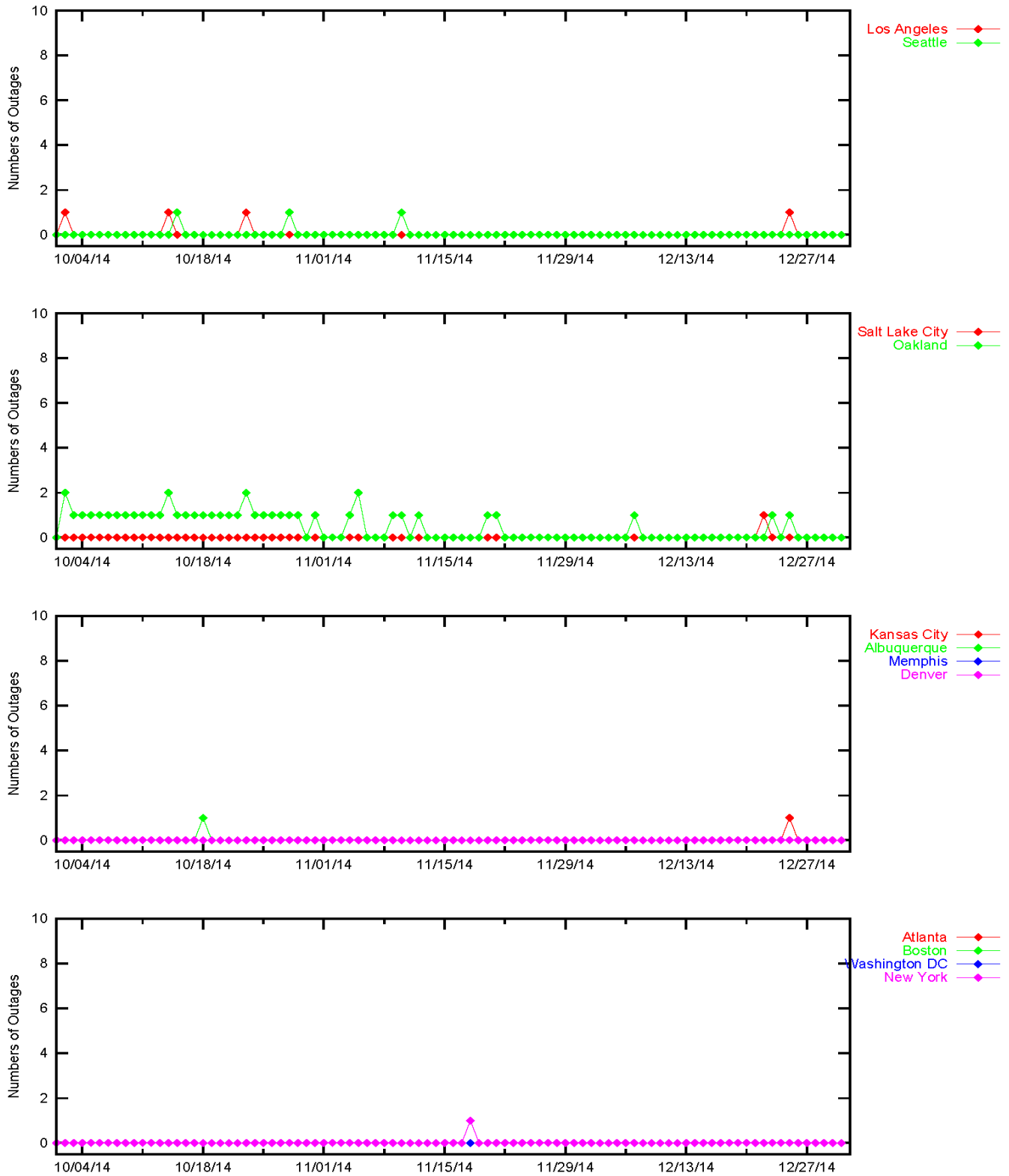


Figure 3-11 LPV 200 Outages

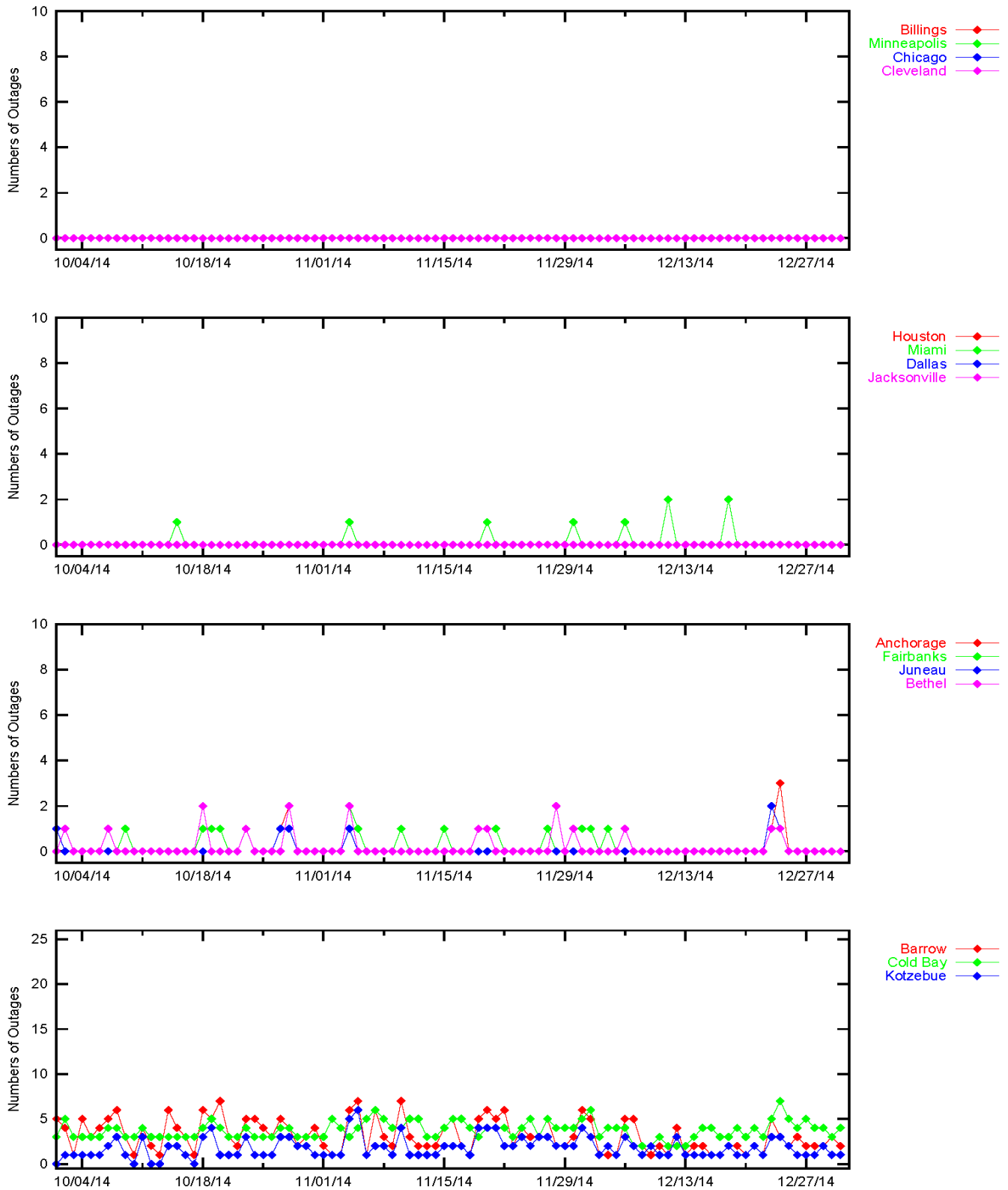
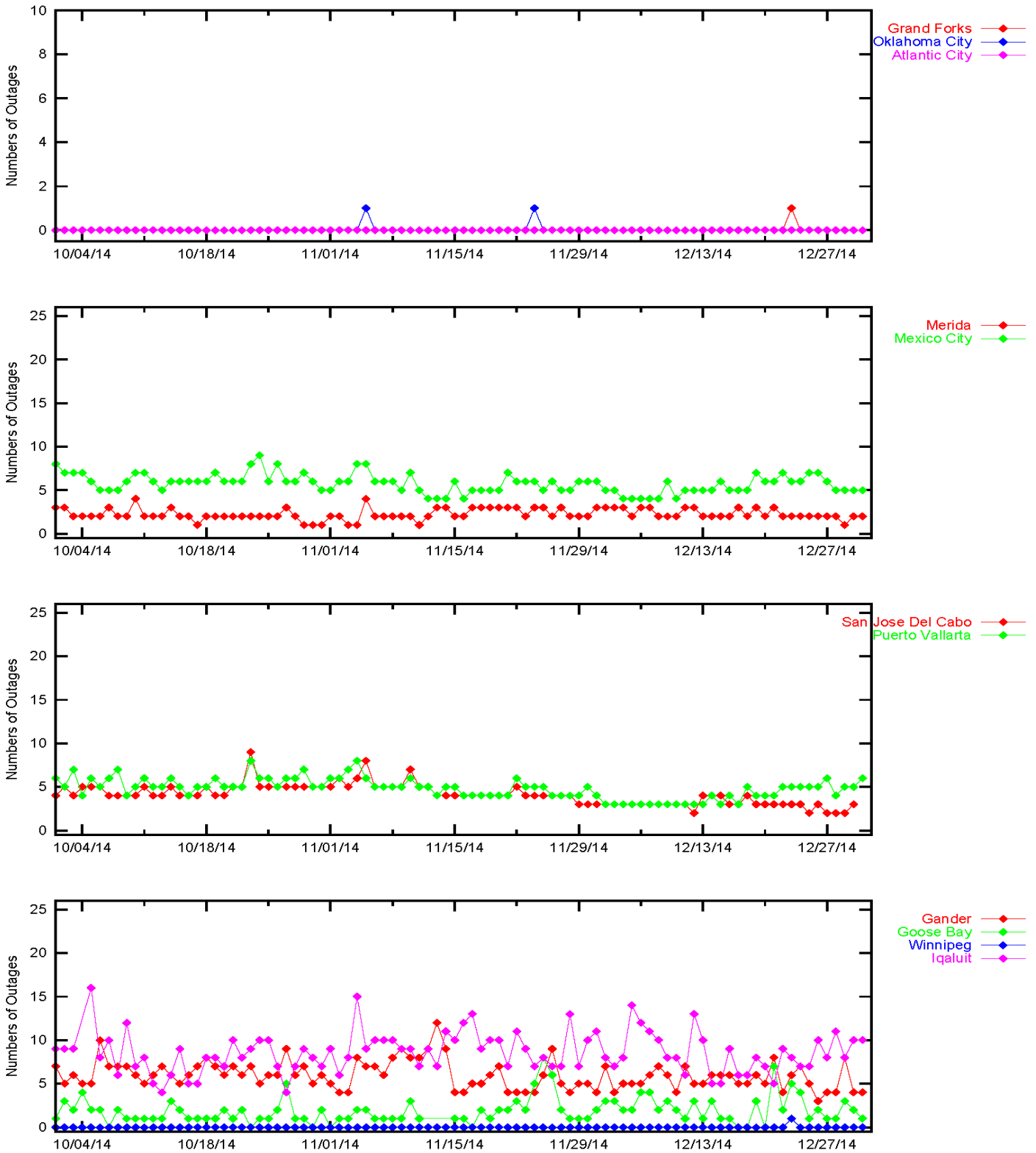


Figure 3-12 LPV 200 Outages



## 4.0 COVERAGE

The WAAS coverage area evaluation estimates the percent of service volume where WAAS provided service for the operational service levels defined in Table 1-1. The WAAS message and the GPS/GEO satellite status are used to determine WAAS availability across North America. For PA coverage, protection levels were calculated at 30-sec intervals at one degree spacing over the PA service volume, while NPA coverage were calculated at 30-sec intervals at five degree spacing over the NPA service volume.

Daily analysis for PA was conducted for LP, LPV and LPV 200 service levels. The coverage plots provide 100, 99.9, 99, 98 and 95% availability contours. Figure 4-1 shows the rollup LP North America coverage. Figure 4-2 shows the rollup LPV North America coverage. Figure 4-3 shows the rollup LPV 200 North America coverage. Figure 4-6 shows the daily LPV and LPV 200 CONUS coverage, and Figure 4-7 shows the daily LPV Alaska coverage at 99% availability and ionosphere Kp index values for this quarter. Figure 4-8 shows the daily LPV and LPV 200 Canada coverage at 99% availability and ionosphere Kp index values for this quarter. Please see Appendix B for coverage plots of 98% LP and LPV availability contour, and 99% LPV 200 availability contour. Kp quantifies the disturbance in the earth's magnetic field and is an indicator of solar storms causing geomagnetic disturbances that can cause the ionosphere to become unpredictable. WAAS increases GIVE values making PA service unavailable when WAAS detects that the ionosphere is disturbed.

Daily analysis for NPA was conducted for RNP 0.1 and RNP 0.3 service levels based on a 100% availability requirement. RNP 0.1 service is asserted to be available when HPL is less than 185 meters and RNP 0.3 service is asserted to be available when HPL is less than 556 meters. The NPA coverage plots provide 100, 99.9 and 99% availability contours. Figure 4-4 shows the rollup RNP 0.1 coverage and Figure 4-5 shows the rollup RNP 0.3 coverage for the quarter. Figure 4-9 shows the daily RNP coverage at 100% availability and ionosphere Kp index values for this quarter.

The coverage decreases for this quarter were due to GUS switchovers, satellite outages, carrier phase anomalies, geomagnetic activity, communication outages, and elevated UDRE and GIVE values. The significant events are discussed below; please refer to Table 1-5 for all the events that affected coverage.

Beginning on November 14, LPV200 CONUS coverage reduction was observed daily for less than 10 minutes in North Carolina due to a change in satellite orbit of PRN-13.

Solar max caused more intense geomagnetic activity resulting in Canada coverage degradation throughout this quarter.

Significant events that reduced CONUS coverage in Figure 4-6 were observed on the following days:

- On October 2, planned maintenance on PRN-25 slightly affected LPV/LPV200 coverage.
- On October 23, planned maintenance on PRN-12 caused minor LPV200 coverage loss.
- On November 4-5, high GIVE values due to geomagnetic activity along with elevated UDRE values after the manual GUS switchover on CRW (PRN-135) reduced LPV200 coverage.
- On November 10, geomagnetic activity elevated GIVE values resulting in a slight reduction of LPV200 coverage.
- On December 11, planned maintenance on PRN-15 caused minor degradation in LPV/LPV200 coverage.
- On December 21 and 23, geomagnetic activity elevated GIVE values caused slight loss of LPV/LPV200 coverage.
- On December 25, carrier phase spike on PRN-21 affected LPV/LPV200 coverage.

Significant events that reduced Alaska coverage in Figure 4-7 were observed on the following days:

- On October 2, planned maintenance on PRN-25 slightly affected LPV/LPV200 coverage.
- On October 23, planned maintenance on PRN-12 caused degradation in LPV/LPV200 coverage.
- On October 27-28, geomagnetic activity elevated GIVE values resulting in a reduction of LPV/LPV200 coverage.
- On November 4-5, high GIVE values due to geomagnetic activity along with elevated UDRE values after the manual GUS switchover on CRW (PRN-135) reduced LPV200 coverage.



- On November 30, GUS switchover on CRW (PRN-135) reduced LPV/LPV200 coverage.
- On December 1-2, geomagnetic activity elevated GIVE values and slightly affected LPV/LPV200 coverage.
- On December 23-24, geomagnetic storm elevated GIVE values and caused LPV/LPV200 coverage degradation.

Significant events that reduced Canada coverage in Figure 4-8 were observed on the following days:

- On October 14-15 and October 27-28, geomagnetic activity elevated GIVE values and caused degradation in LPV/LPV200 coverage.
- On November 4-5, high GIVE values due to geomagnetic activity along with elevated UDRE values after the manual GUS switchover on CRW (PRN-135) reduced LPV/LPV200 Canada coverage.
- On November 10, high GIVE values due to geomagnetic activity caused degradation in LPV/LPV200 coverage.
- On December 2, 7, 21, 23-27, and 29-30, geomagnetic activity elevated GIVE values and affected LPV/LPV200 coverage.

Radio frequency interference (RFI) caused localized loss of LPV/LPV200 coverage at Miami on December 18, and LPV200 coverage at Salt Lake City on December 22, but had no effect on WAAS service.

Figure 4-1 LP North America Coverage for the Quarter

WAAS LP Coverage Contours  
 October 1 - December 31, 2014

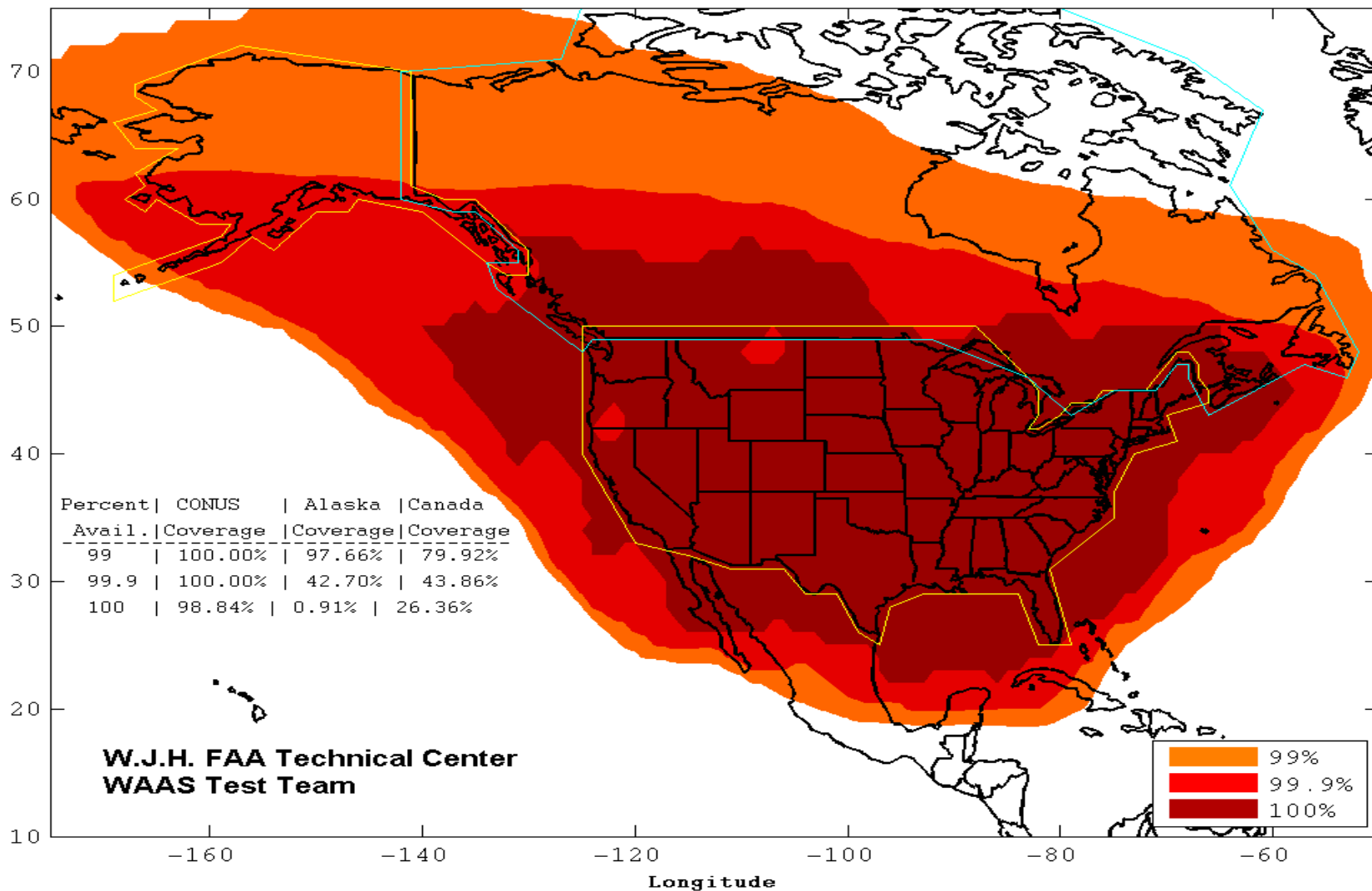


Figure 4-2 LPV North America Coverage for the Quarter

**WAAS LPV Coverage Contours  
October 1 – December 31, 2014**

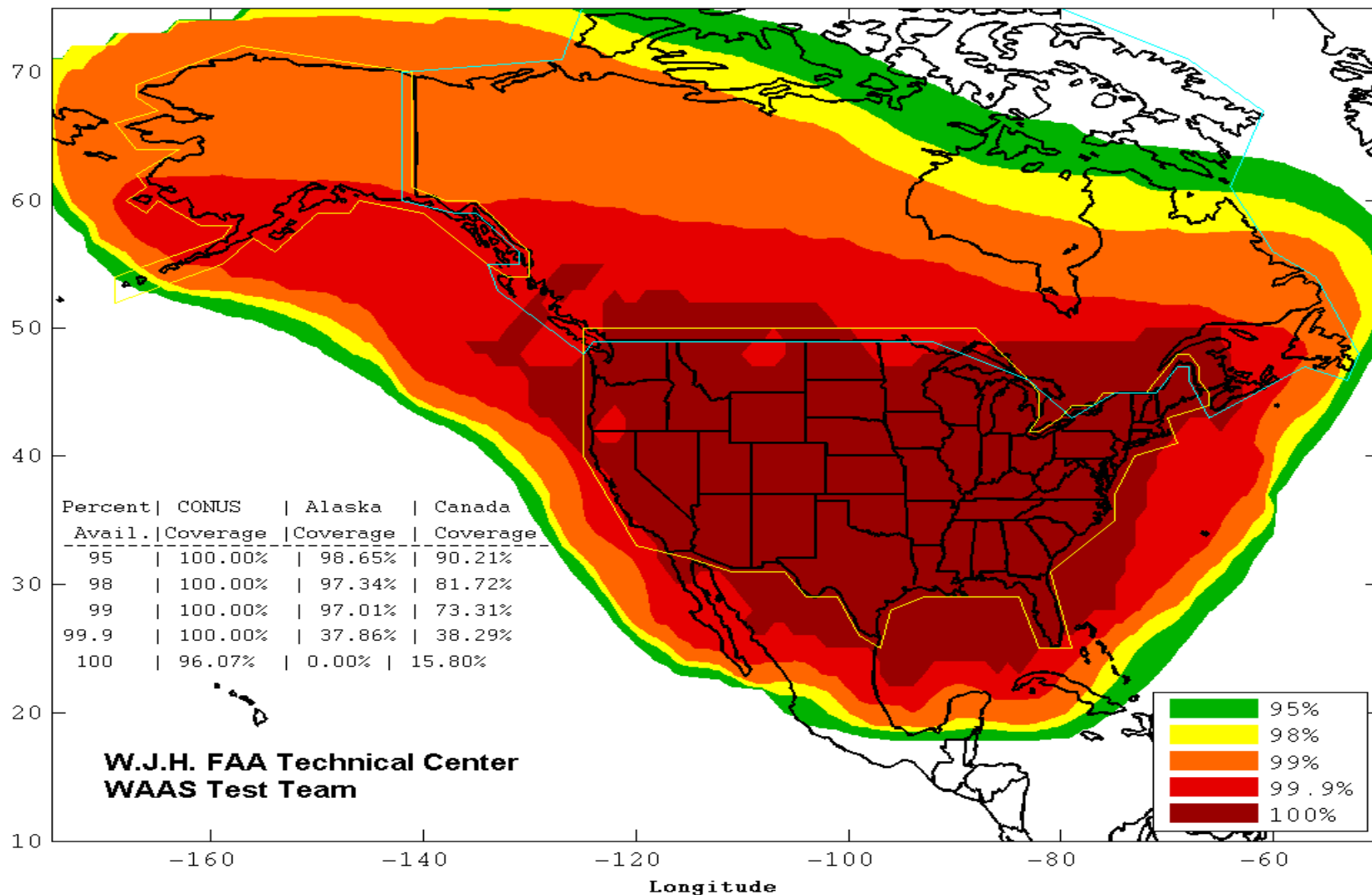


Figure 4-3 LPV 200 North America Coverage for the Quarter

**WAAS LPV200 Coverage Contours  
October 1 - December 31, 2014**

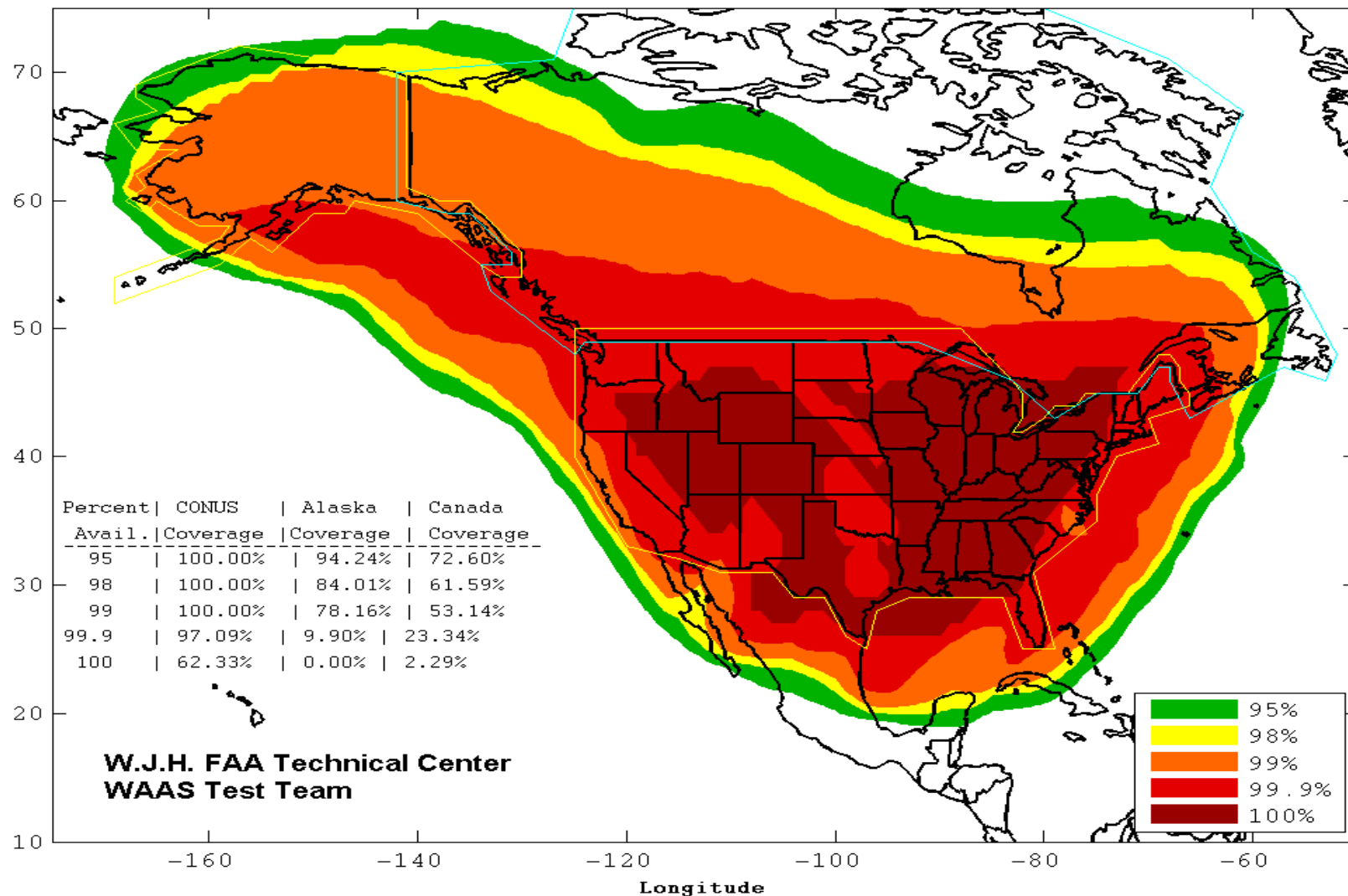


Figure 4-4 RNP 0.1 Coverage for the Quarter

**WAAS RNP 0.1 Coverage Contours  
October 1 – December 31, 2014**

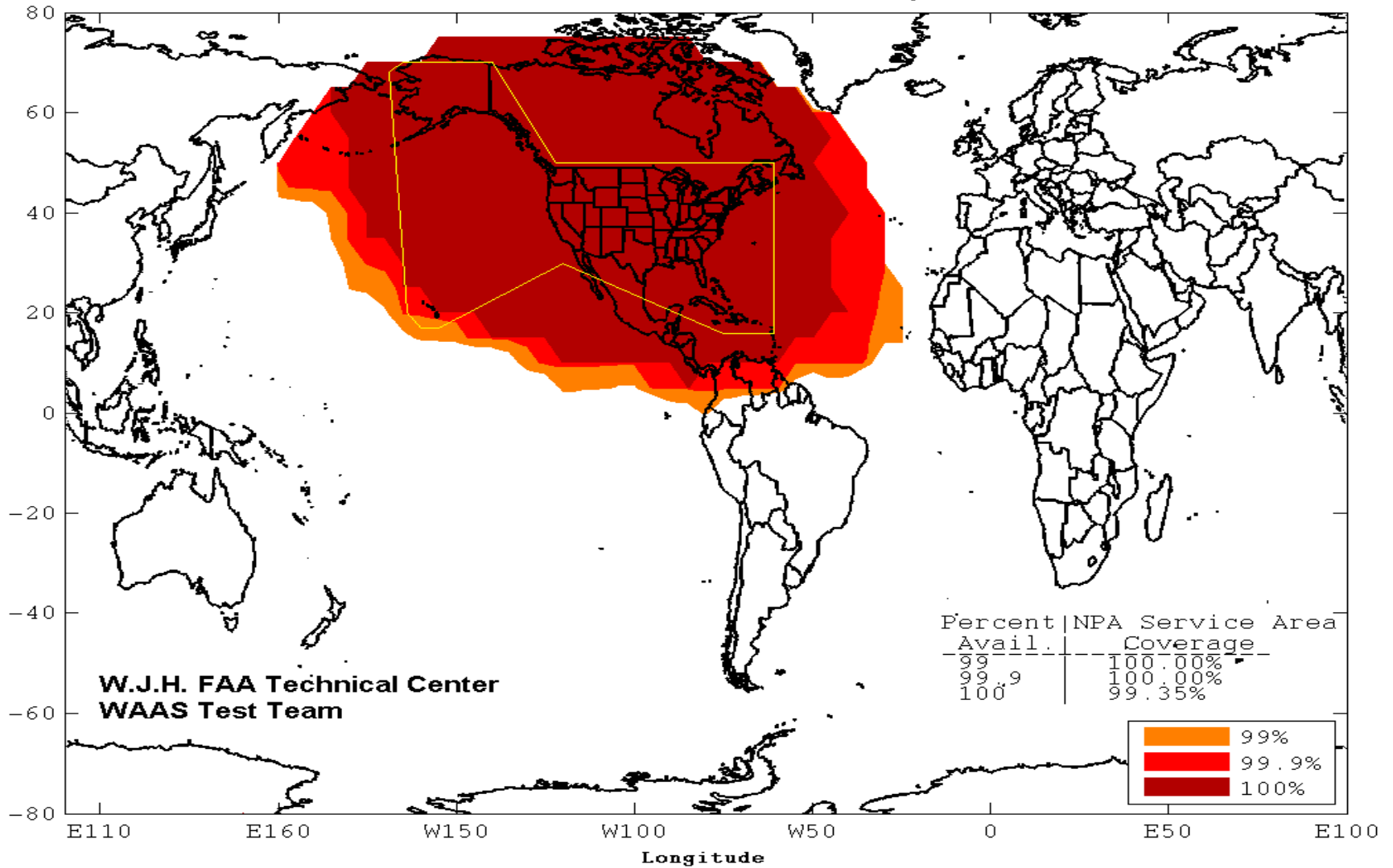


Figure 4-5 RNP 0.3 Coverage for the Quarter

**WAAS RNP 0.3 Coverage Contours  
October 1 – December 31, 2014**

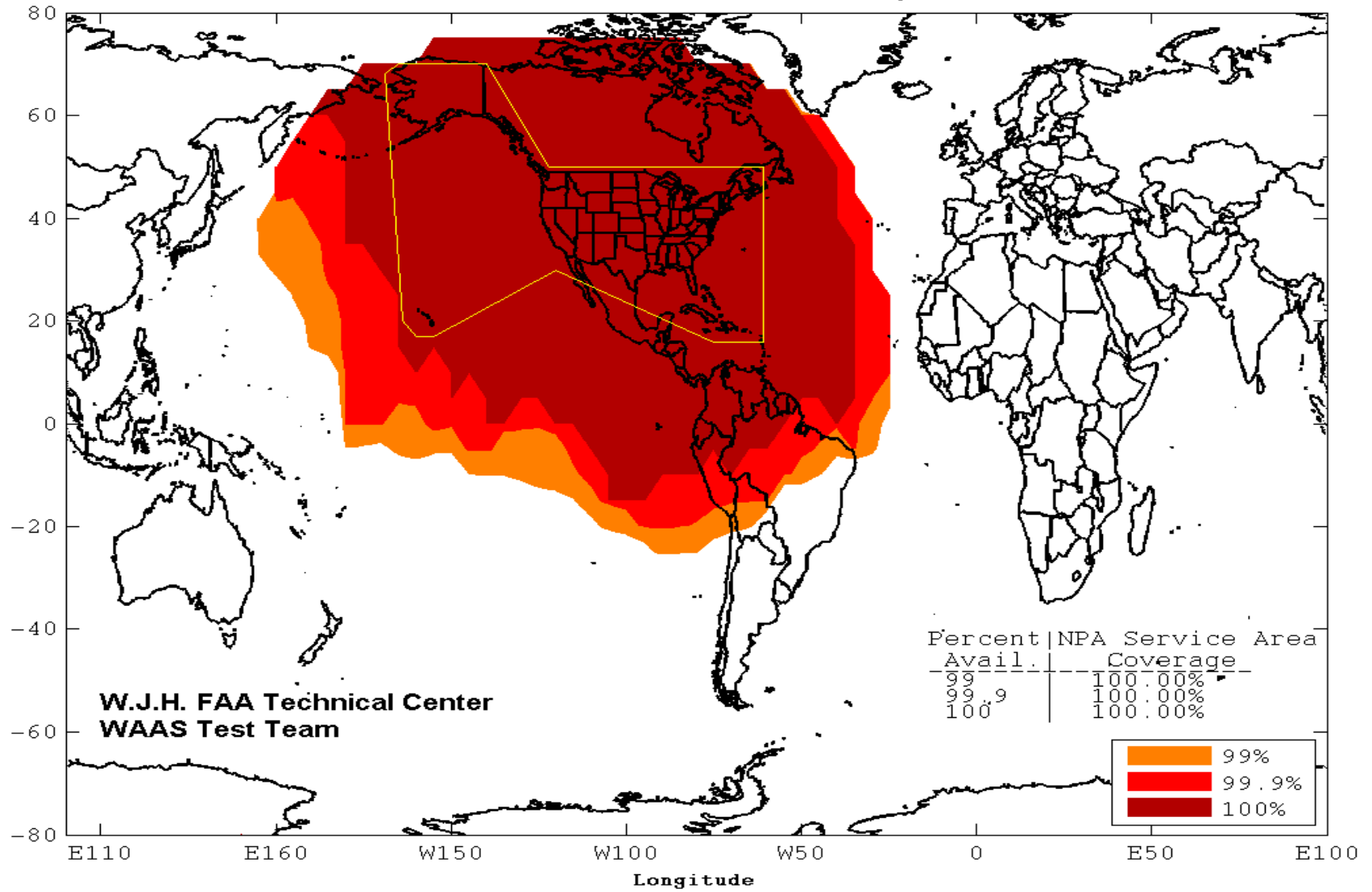


Figure 4-6 Daily LPV and LPV 200 CONUS Coverage

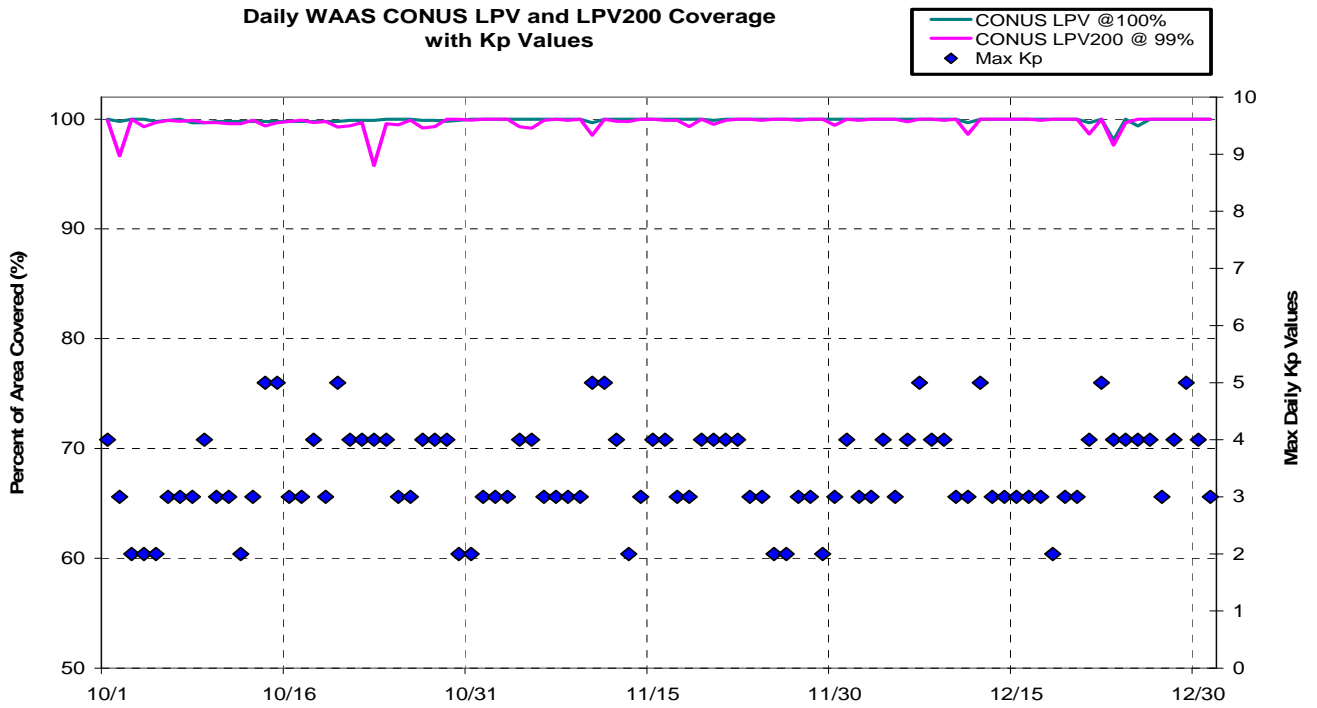


Figure 4-7 Daily LPV and LPV 200 Alaska Coverage

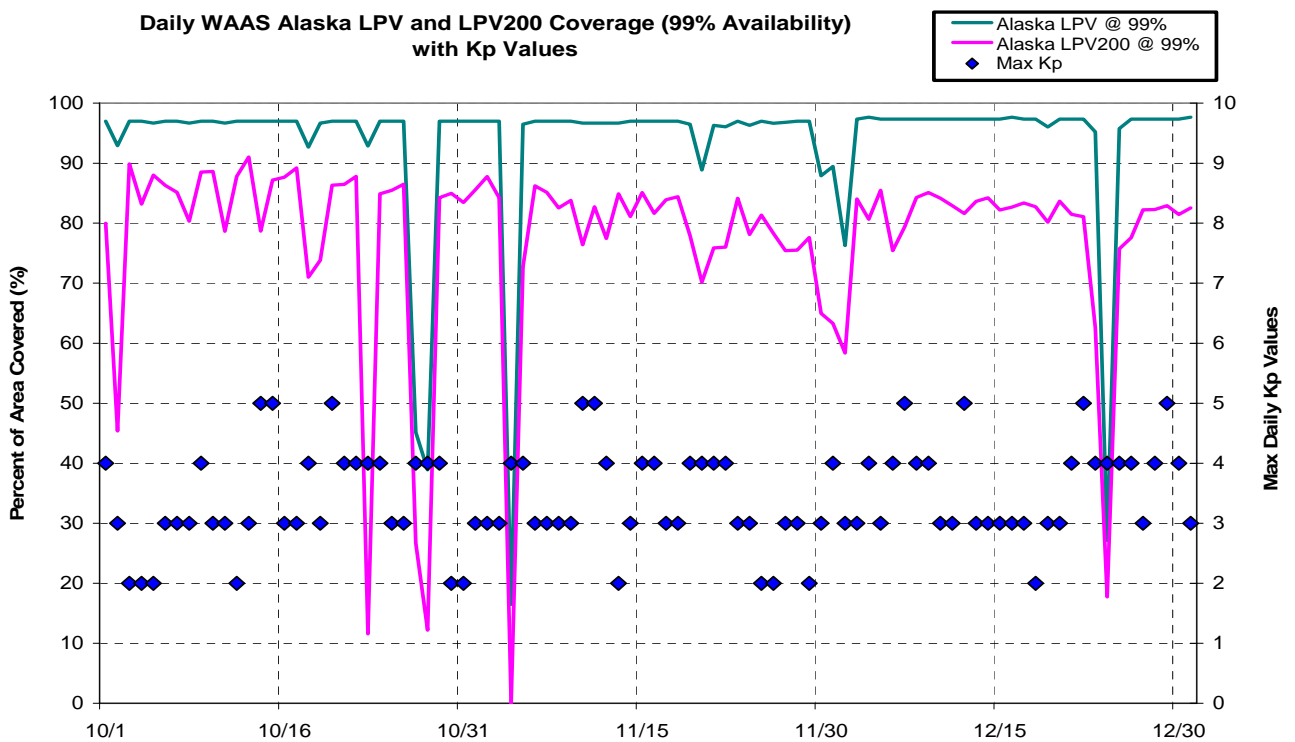


Figure 4-8 Daily LPV and LPV 200 Canada Coverage

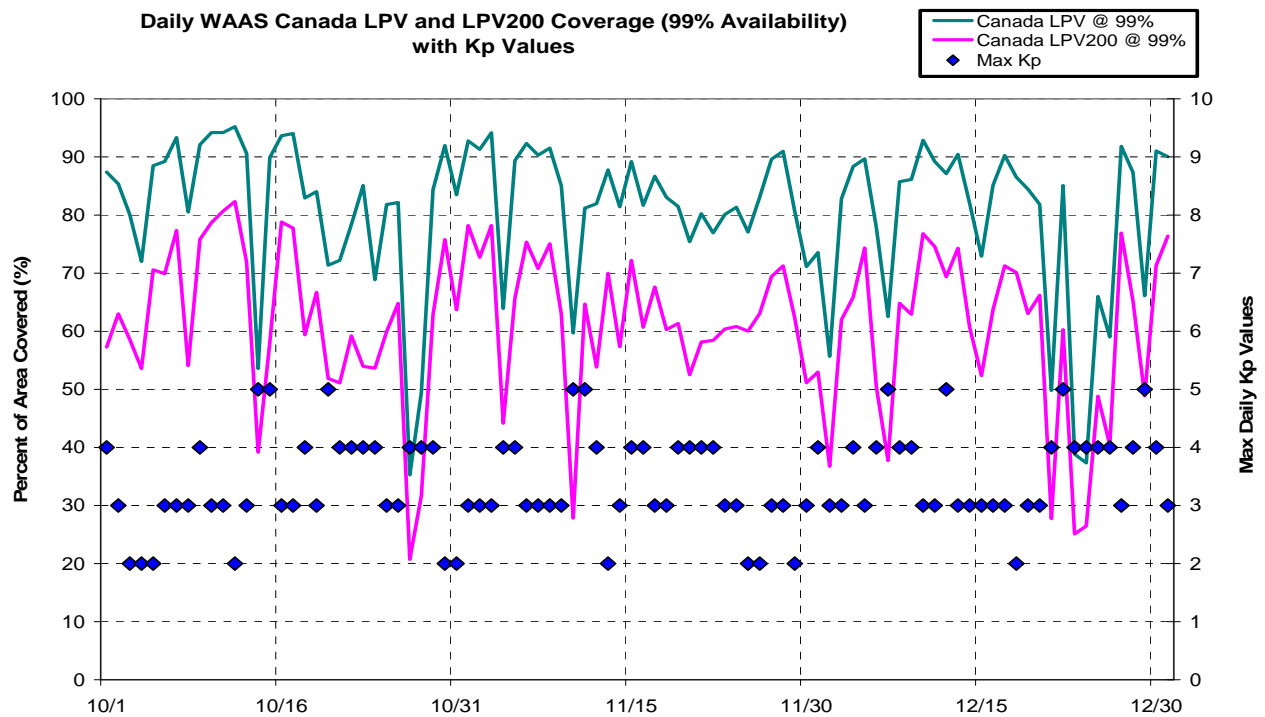
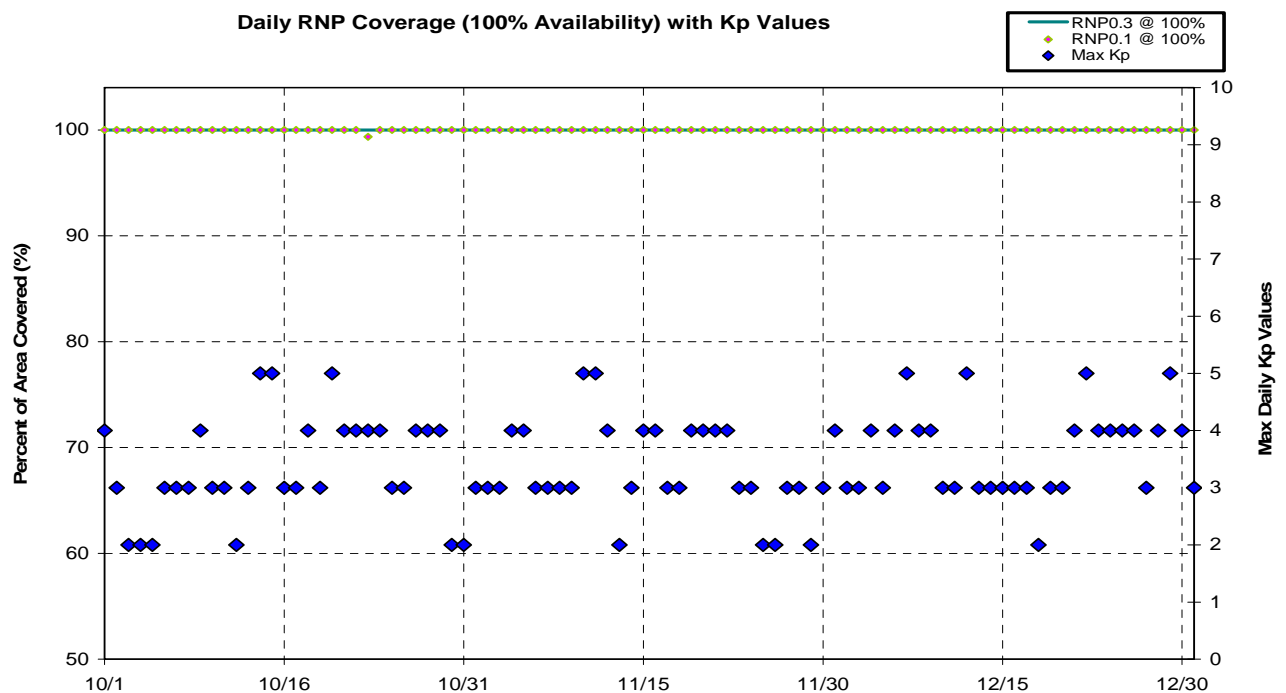


Figure 4-9 Daily RNP Coverage





## **5.0 INTEGRITY**

### **5.1 HMI Analysis**

Analysis of integrity includes the identification and evaluation of HMI (hazardously misleading information), as well as the generation of a safety index to illustrate the margin of safety that WAAS protection levels are providing. The safety index is a metric that shows how well the protection levels are bounding the maximum observed error when LPV service is available. The process for determining this index involves dividing the protection limit observed by the maximum observed error. An observed safety index of greater than one indicates safe bounding of the greatest observed error, less than one indicates that the maximum error was not bounded, and a result equal to one means that the error was equal to the protection level. An HMI occurs if the position error exceeds the protection level in the vertical or horizontal dimensions at any time and 6.2 seconds or more passes before this event is corrected by WAAS.

Table 5-1 lists the safety index and the number of HMI events. For this evaluation period, the lowest safety margin index is 3.7 at Houston. There was no HMI event. Since WAAS was made available to the public in August 2000 there has not been an HMI event. WAAS was commissioned by the FAA for safety of life services in July 2003.

**Table 5-1 Minimum Safety Margin Index and HMI Statistics**

Location	Safety Index		Number of HMIs
	Horizontal	Vertical	
Atlantic City	4.05	4.91	0
Grand Forks	6.79	7.69	0
Oklahoma City	5.44	7.84	0
Albuquerque	5.00	9.80	0
Anchorage	9.54	5.59	0
Atlanta	5.43	5.78	0
Barrow	6.89	5.44	0
Bethel	13.04	6.64	0
Billings	5.96	5.97	0
Boston	7.49	5.87	0
Chicago	5.00	7.98	0
Cleveland	5.92	6.04	0
Cold Bay	10.06	9.76	0
Dallas	5.80	6.02	0
Denver	6.32	6.56	0
Fairbanks	8.08	5.13	0
Gander	8.57	6.12	0
Goose Bay	4.91	5.95	0
Houston	6.39	3.70	0
Iqaluit	6.64	5.35	0
Jacksonville	6.29	5.95	0
Juneau	10.53	10.82	0
Kansas City	5.20	6.67	0
Kotzebue	9.94	5.55	0
Los Angeles	8.44	7.33	0
Memphis	5.69	7.50	0
Merida	6.33	7.02	0
Mexico City	12.26	9.12	0
Miami	5.37	9.16	0
Minneapolis	6.03	6.26	0
New York	6.90	5.80	0
Oakland	6.59	9.30	0
Puerto Vallarta	4.94	9.46	0
Salt Lake City	8.70	6.33	0
San Jose Del Cabo	6.14	10.85	0
Seattle	5.87	6.70	0
Washington DC	6.04	6.90	0
Winnipeg	4.72	9.97	0

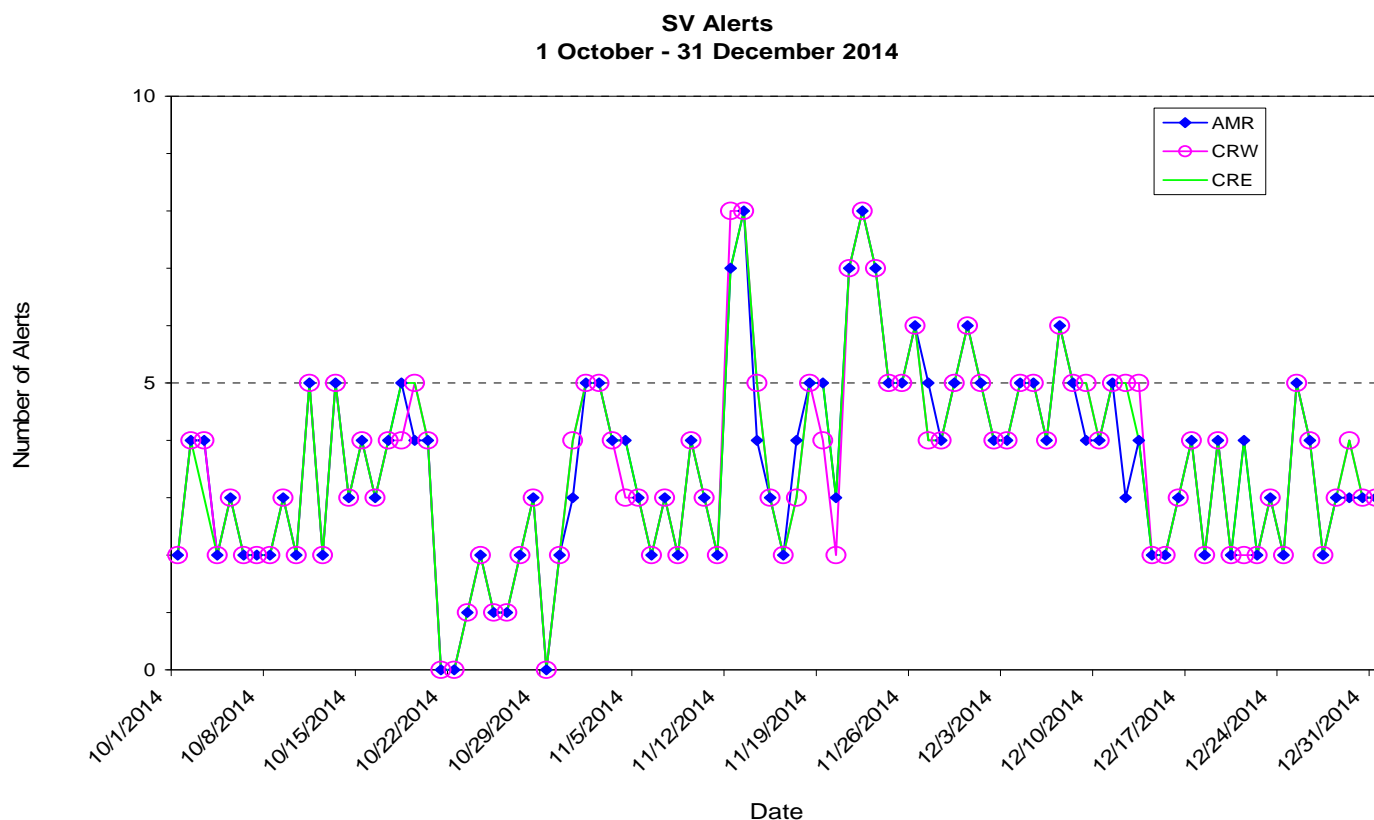
### 5.2 Broadcast Alerts

The WAAS transmits alert messages to protect the users if the active WAAS corrections are no longer bound by the UDREs. Alerts increase the User Differential Range Error (UDRE) for one or more PRNs, which can reduce the weighting of the satellite in the navigation solution, or completely exclude the satellite from the navigation solution. An increase in UDRE's after an alert effectively increases the user protection levels (HPL and VPL), which affects the availability. Additionally, if an alert message sequence lasts for more than 12 seconds, WAAS fast corrections can time out, causing a loss of continuity. Table 5-2 shows the total number of alerts and the average number of alerts per day. Figure 5-1 shows the number of SV alerts that occurred daily during the reporting period. Often the number of alerts on one GEO is the same as the number of alerts on the other GEO. Therefore, lines tend to overlap in most points on this plot.

**Table 5-2 WAAS SV Alert**

Message Type	Number of Alerts			Average Alerts Per Day		
	AMR	CRW	CRE	AMR	CRW	CRE
2	275	278	276	2.9891	3.0217	3.0000
3	29	25	26	0.3152	0.2717	0.2826
4	23	25	29	0.2500	0.2717	0.3152
5	0	0	0	0.0000	0.0000	0.0000
6	0	0	0	0.0000	0.0000	0.0000
24	0	0	0	0.0000	0.0000	0.0000
26	0	0	0	0.0000	0.0000	0.0000
<b>Days in Service</b>	92	92	92			

**Figure 5-1 SV Daily Alert Trend**



**5.3 Availability of WAAS Messages (CRE, CRW, and AMR)**

For an accurate and current user position to be calculated, the content of the WAAS message must be broadcast and received within precise time specifications. This aspect of the WAAS is critical to maintaining continuity requirements. Each message type in the WAAS SIS has a specific timeout interval and an expected worst case broadcast interval. Table 5-3 lists the maximum intervals at which each message must broadcast to meet system requirements.

GUS switchovers or broadcast WAAS alerts can interrupt the normal broadcast message stream. If these events occur at a time when the maximum interval of a specific message is approaching, that message may be delayed, resulting in its late transmittal.

Late messages statistics reported during the quarter were mainly caused by GEO SIS outages, GUS switchovers and SV alerts except message type 7 and 10. Occasionally, message type 7 and 10 were late and they were not caused by GEO SIS outages, GUS switchovers or SV alerts. The lateness of type 7 and type 10 messages has little or no impact on user performance and safety.

Tables 5-4 to 5-8 show fast correction, long correction, ephemeris covariance, ionosphere correction, and ionospheric mask message rates statistics broadcasted on AMR GEO. Table 5-9 to 5-13 show message rates statistics broadcasted on CRW GEO. Table 5-14 to 5-18 show message rates statistics on CRE GEO.

**Table 5-3 Update Rates for WAAS Messages**

<b>Data</b>	<b>Associated Message Types</b>	<b>Maximum Update Interval (seconds)</b>	<b>En Route, Terminal, NPA Timeout (seconds)</b>	<b>Precision Approach Timeout (seconds)</b>
WAAS in Test Mode	0	6	N/A	N/A
PRN Mask	1	60	None	None
UDREI	2-6, 24	6	18	12
Fast Corrections	2-5, 24	See Table A-8 in RTCA DO-229C	See Table A-8 in RTCA DO-229C	See Table A-8 in RTCA DO-229C
Long Term Corrections	24, 25	120	360	240
GEO Nav. Data	9	120	360	240
Fast Correction Degradation	7	120	360	240
Weighting Factors	8	120	240	240
Degradation Parameters	10	120	360	240
Ionospheric Grid Mask	18	300	None	None
Ionospheric Corrections	26	300	600	600
UTC Timing Data	12	300	None	None
Almanac Data	17	300	None	None

**Table 5-4 WAAS Fast Correction and Degradation Message Rates – AMR**

Message Type	On Time	Late	Max Late Length (seconds)
1	103218	4	3800
2	1324545	49	3758
3	1323730	107	3758
4	1323719	106	3758
7	96281	15	3800
9	93069	4	3765
10	96334	10	3824
17	31331	2	3945

**Table 5-5 WAAS Long Correction Message Rates (Type 24 and 25) – AMR**

SV	On Time	Late	Max Late Length (seconds)
1	49616	1	185
2	47352	2	188
3	10086	0	0
4	49638	0	0
5	47858	0	0
6	47807	2	165
7	47115	1	146
8	15257	1	174
9	47424	1	167
10	48589	2	186
11	49772	0	0
12	47235	0	0
13	48618	1	169
14	47531	1	181
15	48131	0	0
16	47892	1	177
17	47546	2	188
18	47040	1	178
19	48929	0	0
20	49187	0	0
21	47573	1	168
22	47164	1	168
23	47408	1	174
24	49233	1	167
25	48649	2	186
26	48222	0	0
27	49376	1	178
28	48097	1	169
29	47333	0	0
30	47185	0	0
31	48277	0	0
32	47505	0	0

**Table 5-6 WAAS Ephemeris Covariance Message Rates (Type 28) – AMR**

<b>SV</b>	<b>On Time</b>	<b>Late</b>	<b>Max Late Length (seconds)</b>
1	40776	2	167
2	38869	5	1456
3	8294	0	0
4	40800	1	182
5	39297	2	3853
6	39218	1	145
7	38675	2	136
8	12531	1	216
9	38937	4	3856
10	39920	4	3934
11	40921	3	208
12	38792	4	3891
13	39932	2	208
14	39061	1	209
15	39493	1	1352
16	39286	0	0
17	39044	1	209
18	38598	0	0
19	40140	1	144
20	40383	1	206
21	39090	1	181
22	38731	7	209
23	38924	2	209
24	40423	1	144
25	39909	4	3934
26	39605	2	160
27	40633	3	224
28	39500	2	138
29	38889	3	3856
30	38749	1	131
31	39552	4	3853
32	38987	0	0
133	76118	2	12200
135	76230	3	4273
138	76435	2	1352

**Table 5-7 WAAS Ionospheric Correction Message Rates (Type 26) – AMR**

<b>Band</b>	<b>Block</b>	<b>On Time</b>	<b>Late</b>	<b>Max Late Length (seconds)</b>
0	0	27564	8	4033
0	1	27567	8	4033
0	2	27551	11	4064
1	0	27567	9	4064
1	1	27558	9	4063
1	2	27567	5	4089
1	3	27563	4	4082
1	4	27559	8	4105
2	0	27570	9	4100
2	1	27551	7	4077
2	2	27573	7	4075
2	3	27575	7	3800
2	4	27557	9	3805
3	0	27567	11	4065
3	1	27562	11	4076
3	2	27561	9	4077
9	0	27561	10	4064
9	1	27557	11	4075
9	2	27557	11	4065
9	3	27565	11	4069
9	4	27568	6	4064
9	5	27578	6	4075
9	6	27568	4	4064

**Table 5-8 WAAS Ionospheric Mask Message Rates (Type 18) – AMR**

<b>Band</b>	<b>On Time</b>	<b>Late</b>	<b>Max Late Length (seconds)</b>
0	35568	3	4040
1	35534	2	4088
2	35621	4	3948
3	35525	2	3904
9	35577	3	3969

**Table 5-9 WAAS Fast Correction and Degradation Message Rates – CRW**

Message Type	On Time	Late	Max Late Length (seconds)
1	105527	1	149
2	1325549	41	20
3	1324715	99	19
4	1324733	91	18
7	98506	15	138
9	93142	0	0
10	98306	3	128
17	31563	0	0

**Table 5-10 WAAS Long Correction Message Rates (Type 24 and 25) - CRW**

SV	On Time	Late	Max Late Length (seconds)
	49620	0	0
2	47421	0	0
3	10085	0	0
4	49642	0	0
5	47935	0	0
6	47888	0	0
7	47163	0	0
8	15263	0	0
9	47495	0	0
10	48655	1	164
11	49775	0	0
12	47308	0	0
13	48695	0	0
14	47534	1	146
15	48158	1	144
16	47954	0	0
17	47549	0	0
18	47057	0	0
19	48938	0	0
20	49191	0	0
21	47653	0	0
22	47170	0	0
23	47460	0	0
24	49246	0	0
25	48724	1	164
26	48299	0	0
27	49386	0	0
28	48097	0	0
29	47405	0	0
30	47192	1	144
31	48332	0	0
32	47509	0	0



**Table 5-11 WAAS Ephemeris Covariance Message Rates (Type 28) – CRW**

<b>SV</b>	<b>On Time</b>	<b>Late</b>	<b>Max Late Length (seconds)</b>
1	40779	0	0
2	38936	0	0
3	8297	0	0
4	40818	1	160
5	39367	1	206
6	39281	0	0
7	38702	4	192
8	12531	0	0
9	38995	0	0
10	39983	1	158
11	40913	1	131
12	38843	0	0
13	39980	2	212
14	39071	0	0
15	39527	0	0
16	39338	1	211
17	39051	0	0
18	38617	0	0
19	40169	2	212
20	40397	0	0
21	39182	2	206
22	38732	0	0
23	38976	2	211
24	40458	0	0
25	39968	0	0
26	39669	1	168
27	40621	2	224
28	39482	1	126
29	38969	0	0
30	38762	0	0
31	39617	0	0
32	38978	0	0
133	76100	2	4262
135	76293	2	4253
138	76433	1	128

**Table 5-12 WAAS Ionospheric Correction Message Rates (Type 26) – CRW**

<b>Band</b>	<b>Block</b>	<b>On Time</b>	<b>Late</b>	<b>Max Late Length (seconds)</b>
0	0	27584	4	407
0	1	27575	9	414
0	2	27583	5	385
1	0	27579	6	305
1	1	27592	8	305
1	2	27585	10	534
1	3	27578	5	509
1	4	27581	6	505
2	0	27588	7	506
2	1	27594	6	304
2	2	27593	3	304
2	3	27589	7	305
2	4	27577	6	431
3	0	27583	4	450
3	1	27590	9	431
3	2	27577	10	415
9	0	27576	7	408
9	1	27598	5	397
9	2	27587	8	419
9	3	27583	8	418
9	4	27573	10	416
9	5	27583	9	396
9	6	27596	4	396

**Table 5-13 WAAS Ionospheric Mask Message Rates (Type 18) – CRW**

<b>Band</b>	<b>On Time</b>	<b>Late</b>	<b>Max Late Length (seconds)</b>
0	35909	1	377
1	35898	0	0
2	35922	0	0
3	35843	2	342
9	35863	1	434

**Table 5-14 WAAS Fast Correction and Degradation Message Rates – CRE**

Message Type	On Time	Late	Max Late Length (seconds)
1	104265	2	121
2	1325549	41	10
3	1324724	99	10
4	1324746	89	12
7	97341	12	138
9	93142	0	0
10	97433	7	149
17	31481	2	457

**Table 5-15 WAAS Long Correction Message Rates (Type 24 and 25) – CRE**

SV	On Time	Late	Max Late Length (seconds)
1	49623	0	0
2	47423	0	0
3	10085	0	0
4	49644	0	0
5	47937	0	0
6	47882	0	0
7	47160	0	0
8	15261	0	0
9	47496	0	0
10	48658	0	0
11	49774	0	0
12	47307	0	0
13	48700	0	0
14	47537	0	0
15	48170	0	0
16	47943	0	0
17	47549	0	0
18	47062	0	0
19	48934	0	0
20	49185	0	0
21	47650	1	166
22	47171	0	0
23	47462	0	0
24	49246	0	0
25	48733	0	0
26	48301	0	0
27	49386	0	0
28	48098	0	0
29	47404	0	0
30	47198	0	0
31	48336	0	0
32	47506	0	0

**Table 5-16 WAAS Ephemeris Covariance Message Rates (Type 28) – CRE**

<b>SV</b>	<b>On Time</b>	<b>Late</b>	<b>Max Late Length (seconds)</b>
1	40796	1	168
2	38936	0	0
3	8293	0	0
4	40823	0	0
5	39360	0	0
6	39275	1	152
7	38722	4	178
8	12532	0	0
9	39005	0	0
10	39982	1	146
11	40910	0	0
12	38854	0	0
13	39986	0	0
14	39070	0	0
15	39536	0	0
16	39348	0	0
17	39046	0	0
18	38643	0	0
19	40154	2	204
20	40377	0	0
21	39175	0	0
22	38734	0	0
23	38981	0	0
24	40438	0	0
25	39966	0	0
26	39663	2	144
27	40629	2	205
28	39510	0	0
29	38961	0	0
30	38769	0	0
31	39643	0	0
32	39001	0	0
133	76082	1	4334
135	76289	1	130
138	76435	2	4308

**Table 5-17 WAAS Ionospheric Correction Message Rates (Type 26) – CRE**

<b>Band</b>	<b>Block</b>	<b>On Time</b>	<b>Late</b>	<b>Max Late Length (seconds)</b>
0	0	27583	5	305
0	1	27584	4	301
0	2	27597	3	304
1	0	27593	7	310
1	1	27584	4	304
1	2	27579	5	304
1	3	27585	11	304
1	4	27592	4	304
2	0	27579	4	510
2	1	27593	10	506
2	2	27594	5	518
2	3	27573	7	522
2	4	27590	3	304
3	0	27585	4	305
3	1	27594	7	304
3	2	27583	9	578
9	0	27580	4	306
9	1	27579	9	304
9	2	27588	4	304
9	3	27592	7	547
9	4	27588	4	304
9	5	27578	10	305
9	6	27586	2	301

**Table 5-18 WAAS Ionospheric Mask Message Rates (Type 18) – CRE**

<b>Band</b>	<b>On Time</b>	<b>Late</b>	<b>Max Late Length (seconds)</b>
0	35717	0	0
1	35737	0	0
2	35721	0	0
3	35782	1	373
9	35760	1	450

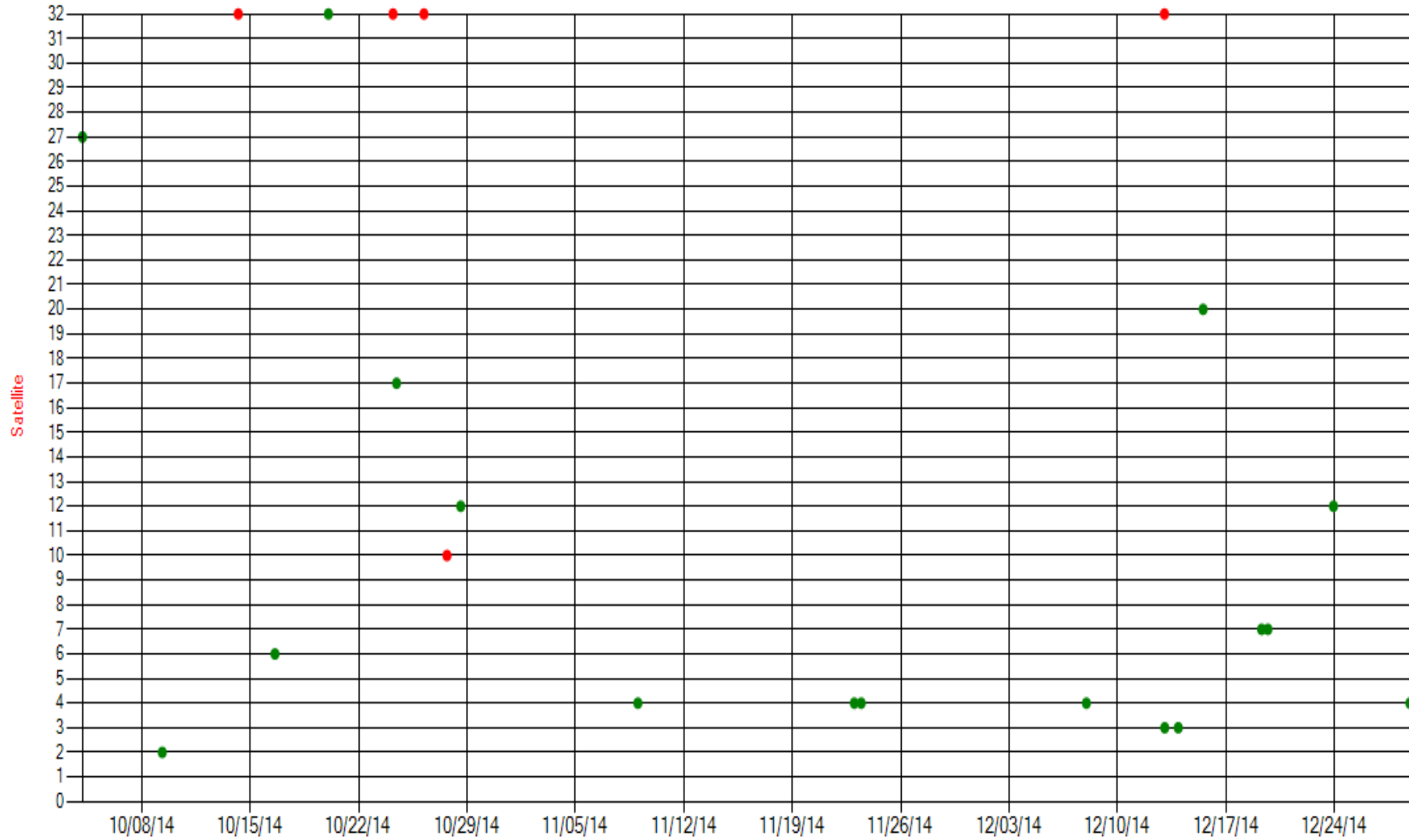
#### 5.4 Satellite Glitches

The GPS satellites occasionally have periods of signal carrier stability ‘glitches’ of varying magnitude. These are short degradations in the signal that in severe cases cause WAAS to lose track or cycle slip for some or all of the WAAS receivers. The more severe glitches will cause the WAAS reported UDRE spike to ‘Not Monitor’ and result in an alert.

Figure 5-2 shows the satellite glitches visible to WAAS for the quarter. Glitches are categorized into three severity levels. Severity one glitches cause a significant number of the receivers to simultaneously have bad subframe parity, but not all receivers. Severity two glitches cause all of the receivers to report bad subframe parity data and some receivers to also have cycle slips and or lose tracking of L2 and or L1. Severity three glitches cause all of the receivers to lose track of both L1 and L2 data. Note, the tool that performs this Satellite Glitch Analysis also reports times when more than 14 GPS satellites are in view for some of the WAAS reference stations. The NovAtel WAAS G2 receiver is only capable of tracking 14 GPS satellites at a given time; GPS users may also experience this condition.

Figure 5-2 SV Glitch Trend

Satellite Glitch Events  
Severity: Green = 1; Blue = 2; Red = 3



## 6.0 SV RANGE ACCURACY

Range accuracy evaluation computes the probability that the WAAS User Differential Range Error (UDRE) and Grid Ionospheric Vertical Error (GIVE) statistically bound 99.9% of the range residuals for each satellite tracked by the receiver. A UDRE is broadcast by the WAAS for each satellite that is monitored by the system and the 99.9% bound (3.29 sigma) of the residual error on a pseudorange after application of fast and long-term corrections is checked. The pseudorange residual error is determined by taking the difference between the raw pseudorange and a calculated reference range. The reference range is equal to the true range between the corrected satellite position and surveyed user antenna plus all corrections (WAAS Fast Clock, WAAS Long-Term Clock, WAAS Ionospheric delay, Tropospheric delay, Receiver Clock Bias, and Multipath). Since the true ionospheric delay and multipath error are not precisely known, the estimated variance in these error sources are added to the UDRE before the comparing it to the residual error.

GPS satellite range residual errors were calculated for twelve WAAS receivers during the quarter. Table 6-1 and 6-2 show the range error 95% index and 99.9% (3.29 sigma) bounding statistics for each SV at the selected locations. Figures 6-1 to 6-2 show the range error for each SV as measured by the WAAS receivers at the Washington DC reference station.

A GIVE is broadcast by the WAAS for each IGP that is monitored by the system and the 99.9% (3.29 sigma) bound of the ionospheric error is checked. The WAAS broadcasts the ionospheric model using IGP's at predefined geographic locations. Each IGP contains the vertical ionospheric delay and the error in that delay in the form of the GIVE. The ionospheric error is determined by taking the difference between the WAAS vertical ionospheric delay interpolated from the IGP's and GPS dual frequency measurement at that GPS satellite.

GPS satellite ionospheric errors were calculated for twelve WAAS receivers during the quarter. Table 6-3 and 6-4 show the ionospheric error 95% index and 99.9% (3.29 sigma) bounding statistics for each SV at the selected locations. Figures 6-3 to 6-4 show the ionospheric error for each SV as measured by the WAAS receiver at the Washington DC reference station.

For this reporting period, most satellites range errors were bounded 99.9% of the time by UDRE. The unbounded errors were due to geomagnetic activity and noise and multipath.



**Table 6-1 Range Error 95% index and 3.29 Sigma Bounding**

Site → SV ↓	Billings		Albuquerque		Boston		Washington DC		Houston		Kansas City	
	95% Range Error	3.29 Sigma Bounding (%)	95% Range Error	3.29 Sigma Bounding (%)	95% Range Error	3.29 Sigma Bounding (%)	95% Range Error	3.29 Sigma Bounding (%)	95% Range Error	3.29 Sigma Bounding (%)	95% Range Error	3.29 Sigma Bounding (%)
1	2.888	100	3.579	100	3.110	100	2.706	100	2.606	100	2.802	100
2	2.083	100	2.221	100	2.438	100	2.406	100	2.586	100	2.830	100
3	2.629	100	2.385	100	2.129	100	1.964	100	1.976	100	2.099	100
4	1.681	100	1.725	100	1.524	100	1.307	100	1.129	100	1.558	100
5	2.039	100	1.854	100	1.990	100	1.201	100	1.479	100	1.874	100
6	3.639	99.5013*	3.436	99.7852*	3.489	99.8908*	3.155	99.9990*	3.391	99.9735*	4.153	96.9547*
7	1.915	100	1.126	100	1.698	100	1.520	100	1.084	100	1.236	100
8	1.130	100	0.699	100	1.201	100	0.809	100	1.561	100	1.008	100
9	2.868	100	2.621	100	2.650	100	2.204	100	1.337	100	2.758	100
10	1.021	100	0.936	100	1.056	100	1.145	100	2.058	100	1.268	100
11	0.818	100	0.998	100	1.259	100	1.262	100	1.946	100	1.701	100
12	1.597	100	1.310	100	1.744	100	1.548	100	1.170	100	1.304	100
13	1.450	100	1.312	100	1.340	100	1.086	100	1.490	100	1.373	100
14	1.300	100	0.886	100	1.070	100	1.677	100	1.673	100	1.647	100
15	1.900	100	1.766	100	1.333	100	0.904	100	1.268	100	1.305	100
16	1.697	100	1.046	100	1.213	100	1.234	100	2.185	100	1.176	100
17	1.635	100	1.131	100	1.248	100	0.990	100	1.229	100	1.202	100
18	1.058	100	1.264	100	1.478	100	2.041	100	1.969	100	1.551	100
19	2.210	100	2.261	100	2.774	100	2.869	100	3.222	100	2.828	100
20	1.016	100	1.108	100	1.376	100	1.458	100	2.828	100	1.241	100
21	1.085	100	1.077	100	2.099	100	2.011	100	1.810	100	1.815	100
22	2.088	100	2.329	100	2.101	100	2.985	100	2.987	99.9995	2.387	100
23	1.637	100	1.756	100	2.334	100	2.060	100	3.443	99.9942	2.070	100
24	2.990	99.9613*	3.184	99.9693*	2.980	99.9885*	2.888	100	2.923	100	2.659	100
25	2.613	99.9999	2.452	100	2.447	100	2.045	100	2.711	100	2.390	100
26	1.836	100	1.569	100	1.582	100	1.271	100	1.308	100	1.538	100
27	2.703	100	2.261	100	2.210	100	2.091	100	1.609	100	2.121	100
28	1.953	100	0.963	100	1.195	100	1.079	100	1.849	100	1.130	100
29	2.006	100	2.148	100	1.308	100	1.786	100	1.065	100	1.658	100
30	2.223	100	2.218	100	2.485	100	2.366	100	1.628	100	2.561	99.9956
31	1.483	100	0.784	100	0.943	100	0.897	100	1.421	100	1.310	100
32	0.865	100	0.905	100	1.074	100	1.015	100	1.540	100	0.975	100
135	2.146	100	2.276	100	2.599	100	2.069	100	2.483	100	1.528	100
138	1.359	100	1.238	100	1.495	100	1.734	100	1.384	100	1.622	100

\*Note: Reduced range bounding due to the difference between L1 C/A and L1P satellite signal delays on Block IIF space vehicles.

**Table 6-2 Range Error 95% index and 3.29 Sigma Bounding**

Site → SV ↓	Los Angeles		Salt Lake City		Miami		Minneapolis		Atlanta		Juneau	
	95% Range Error	3.29 Sigma Bounding (%)	95% Range Error	3.29 Sigma Bounding (%)	95% Range Error	3.29 Sigma Bounding (%)	95% Range Error	3.29 Sigma Bounding (%)	95% Range Error	3.29 Sigma Bounding (%)	95% Range Error	3.29 Sigma Bounding (%)
1	2.585	100	3.248	99.9999	2.587	100	2.908	100	2.618	100	3.070	100
2	2.194	100	1.829	100	3.028	100	2.090	100	2.335	100	1.876	100
3	2.23	100	2.637	100	1.760	100	2.246	100	2.113	100	2.538	100
4	1.544	100	1.574	100	1.226	100	1.630	100	1.057	100	1.941	100
5	1.683	100	1.911	100	1.573	100	1.972	100	1.210	100	2.085	100
6	3.672	100	3.830	99.7691*	4.147	99.8936*	3.454	98.2492*	3.049	100	3.659	99.9861*
7	1.299	100	1.653	100	1.618	100	1.690	100	0.842	100	2.097	100
8	0.974	100	1.119	100	1.369	100	1.003	100	1.169	100	1.332	100
9	2.063	100	2.446	100	2.137	100	2.608	99.9992	2.016	100	2.670	100
10	0.999	100	1.018	100	1.051	100	0.979	100	1.073	100	1.200	100
11	1.95	100	0.989	100	2.110	100	0.990	100	1.990	100	1.047	100
12	1.354	100	1.500	100	1.154	100	1.510	100	1.033	100	1.427	100
13	1.049	100	1.641	100	1.172	100	1.380	100	1.302	100	1.641	100
14	0.936	100	1.079	100	2.013	100	1.089	100	1.603	100	0.999	100
15	1.724	100	1.773	100	0.990	100	1.876	100	0.763	100	1.837	100
16	1.246	100	1.091	100	1.922	100	1.172	100	1.759	100	1.041	100
17	1.038	100	1.382	100	1.254	100	1.226	100	1.084	100	1.370	100
18	1.097	100	1.552	100	2.284	100	1.382	100	2.105	100	1.078	100
19	2.132	100	1.976	100	2.982	100	1.992	100	3.193	99.9998	2.331	99.9778
20	1.184	100	1.160	100	1.498	100	1.052	100	1.681	100	0.944	100
21	1.033	100	0.887	100	2.247	100	1.264	100	1.820	100	1.236	100
22	2.237	100	2.020	100	3.216	99.9929	2.236	99.9974	3.120	99.9961	2.198	100
23	2.103	100	1.620	100	2.472	100	1.408	100	2.560	100	1.488	100
24	2.795	99.9830*	3.568	99.0583*	2.765	100	3.222	100	2.566	100	3.704	100
25	2.442	100	2.766	99.9816	2.250	100	2.441	100	1.650	100	2.600	100
26	1.695	100	1.580	100	0.995	100	1.750	100	1.295	100	1.741	100
27	2.815	100	2.651	100	1.649	100	2.640	100	1.738	100	2.424	100
28	1.116	100	0.944	100	2.487	100	0.919	100	1.392	100	1.051	100
29	1.584	100	2.205	100	1.357	100	1.669	100	1.072	100	1.720	100
30	2.085	100	2.375	100	2.116	100	2.575	100	1.687	100	2.942	100
31	1.617	100	0.997	100	1.628	100	1.029	100	1.306	100	1.338	100
32	0.805	100	1.458	100	1.255	100	1.226	100	1.445	100	1.142	100
135	1.882	100	1.690	100	1.893	100	2.352	100	2.251	100	1.627	100
138	2.481	100	1.743	100	2.434	100	2.276	100	1.308	100	1.794	100

\*Note: Reduced range bounding due to the difference between L1 C/A and L1P satellite signal delays on Block IIF space vehicles.

**Table 6-3 Ionospheric Error 95% index and 3.29 Sigma Bounding**

Site → SV ↓	Billings		Albuquerque		Boston		Washington DC		Houston		Kansas City	
	95% Iono Error	3.29 Sigma Bounding (%)	95% Iono Error	3.29 Sigma Bounding (%)	95% Iono Error	3.29 Sigma Bounding (%)	95% Iono Error	3.29 Sigma Bounding (%)	95% Iono Error	3.29 Sigma Bounding (%)	95% Iono Error	3.29 Sigma Bounding (%)
1	1.789	100	2.022	100	2.364	100	1.840	100	1.893	100	1.869	100
2	1.684	100	1.508	100	1.583	100	1.613	100	1.744	100	1.852	100
3	1.756	100	1.684	100	1.416	100	1.298	100	1.079	100	1.258	100
4	0.817	100	0.949	100	1.010	100	0.684	100	0.732	100	0.766	100
5	1.133	100	1.225	100	1.384	100	0.630	100	1.270	100	1.266	100
6	2.781	100	2.827	100	2.978	100	2.679	100	3.007	100	3.375	99.9443
7	1.183	100	0.825	100	1.106	100	0.898	100	0.738	100	0.829	100
8	0.599	100	0.510	100	0.552	100	0.342	100	0.472	100	0.436	100
9	2.120	100	2.069	100	1.795	100	1.564	100	1.311	100	1.966	100
10	0.327	100	0.436	100	0.621	100	0.436	100	0.978	100	0.420	100
11	0.428	100	0.360	100	0.439	100	0.398	100	0.872	100	0.534	100
12	0.765	100	0.837	100	0.844	100	0.555	100	0.616	100	0.551	100
13	0.912	100	0.888	100	0.684	100	0.550	100	0.641	100	0.689	100
14	0.774	100	0.553	100	0.587	100	0.535	100	0.683	100	0.771	100
15	1.008	100	1.065	100	1.044	100	0.690	100	1.305	100	0.942	100
16	0.735	100	0.484	100	0.566	100	0.657	100	1.025	100	0.564	100
17	1.006	100	0.838	100	0.950	100	0.505	100	0.645	100	0.753	100
18	0.699	100	0.592	100	0.656	100	0.938	100	0.935	100	0.597	100
19	1.369	100	1.234	100	1.621	100	1.693	100	2.166	100	1.686	100
20	0.611	100	0.578	100	0.681	100	0.657	100	1.168	100	0.444	100
21	0.663	100	0.760	100	0.974	100	1.128	100	1.181	100	0.941	100
22	1.578	100	1.523	100	1.303	100	1.815	100	2.117	100	1.556	100
23	1.285	100	1.358	100	1.551	100	1.503	100	2.203	100	1.401	100
24	1.788	100	1.913	100	2.101	100	1.811	100	1.794	100	1.650	100
25	1.470	100	1.675	100	1.530	100	1.230	100	1.360	100	1.359	100
26	0.945	100	0.889	100	1.033	100	0.804	100	0.846	100	0.893	100
27	1.304	100	1.257	100	1.672	100	1.337	100	1.261	100	1.341	100
28	1.396	100	0.419	100	0.666	100	0.624	100	0.671	100	0.609	100
29	0.884	100	1.298	100	0.659	100	0.788	100	0.727	100	0.842	100
30	1.672	100	1.906	100	1.871	100	1.718	100	1.660	100	1.873	100
31	0.818	100	0.666	100	0.791	100	0.426	100	0.871	100	1.188	100
32	0.458	100	0.713	100	0.627	100	0.509	100	0.579	100	0.536	100

**Table 6-4 Ionospheric Error 95% index and 3.29 Sigma Bounding**

Site → SV ↓	Los Angeles		Salt Lake City		Miami		Minneapolis		Atlanta		Juneau	
	95% Iono Error	3.29 Sigma Bounding (%)	95% Iono Error	3.29 Sigma Bounding (%)	95% Iono Error	3.29 Sigma Bounding (%)	95% Iono Error	3.29 Sigma Bounding (%)	95% Iono Error	3.29 Sigma Bounding (%)	95% Iono Error	3.29 Sigma Bounding (%)
1	2.104	100	1.888	100	2.068	100	2.021	100	1.784	100	2.146	100
2	1.456	100	1.451	100	1.913	100	1.490	100	1.716	100	1.382	100
3	1.647	100	1.827	100	1.261	100	1.543	100	1.277	100	1.742	100
4	1.025	100	0.826	100	0.792	100	0.915	100	0.562	100	1.126	100
5	1.127	100	1.181	100	1.253	100	1.102	100	0.769	100	1.234	100
6	2.869	100	2.976	100	3.206	100	2.768	100	2.323	100	2.799	100
7	0.937	100	1.005	100	0.914	100	0.910	100	0.553	100	1.046	100
8	0.625	100	0.721	100	0.520	100	0.523	100	0.431	100	0.686	100
9	1.728	100	1.905	100	1.639	100	1.866	100	1.466	100	1.829	100
10	0.500	100	0.404	100	0.444	100	0.419	100	0.595	100	0.489	100
11	0.646	100	0.356	100	0.829	100	0.423	100	0.808	100	0.495	100
12	0.677	100	0.709	100	0.591	100	0.695	100	0.499	100	0.785	100
13	0.655	100	0.934	100	0.683	100	0.768	100	0.613	100	0.778	100
14	0.598	100	0.621	100	0.691	100	0.390	100	0.557	100	0.579	100
15	1.179	100	0.927	100	1.233	100	1.084	100	0.703	100	1.262	100
16	0.495	100	0.442	100	0.651	100	0.689	100	0.869	100	0.542	100
17	0.683	100	0.881	100	0.930	100	0.799	100	0.468	100	0.960	100
18	0.534	100	1.051	100	0.932	100	0.738	100	1.190	100	0.711	100
19	1.461	100	1.202	100	1.627	100	1.494	100	1.888	100	1.524	100
20	0.352	100	0.665	100	0.743	100	0.613	100	0.910	100	0.496	100
21	0.560	100	0.474	100	0.995	100	0.869	100	1.129	100	0.701	100
22	1.484	100	1.478	100	1.964	100	1.559	100	2.071	100	1.340	100
23	1.256	100	1.224	100	1.598	100	1.119	100	1.804	100	1.150	100
24	2.054	100	1.972	100	1.976	100	2.131	100	1.849	100	2.330	100
25	1.591	100	1.647	100	1.490	100	1.564	100	1.133	100	1.697	100
26	1.120	100	0.853	100	0.903	100	1.160	100	0.938	100	1.114	100
27	1.687	100	1.306	100	1.555	100	1.645	100	1.315	100	1.434	100
28	0.347	100	0.420	100	1.286	100	0.474	100	0.887	100	0.732	100
29	0.856	100	1.184	100	0.782	100	0.819	100	0.583	100	1.034	100
30	1.679	100	1.888	100	1.932	100	1.895	100	1.368	100	1.971	100
31	1.007	100	0.702	100	0.810	100	0.695	100	0.450	100	0.792	100
32	0.463	100	0.865	100	0.612	100	0.695	100	0.657	100	0.654	100

Figure 6-1 95% Range Error (PRN 1 – PRN 16) – Washington DC

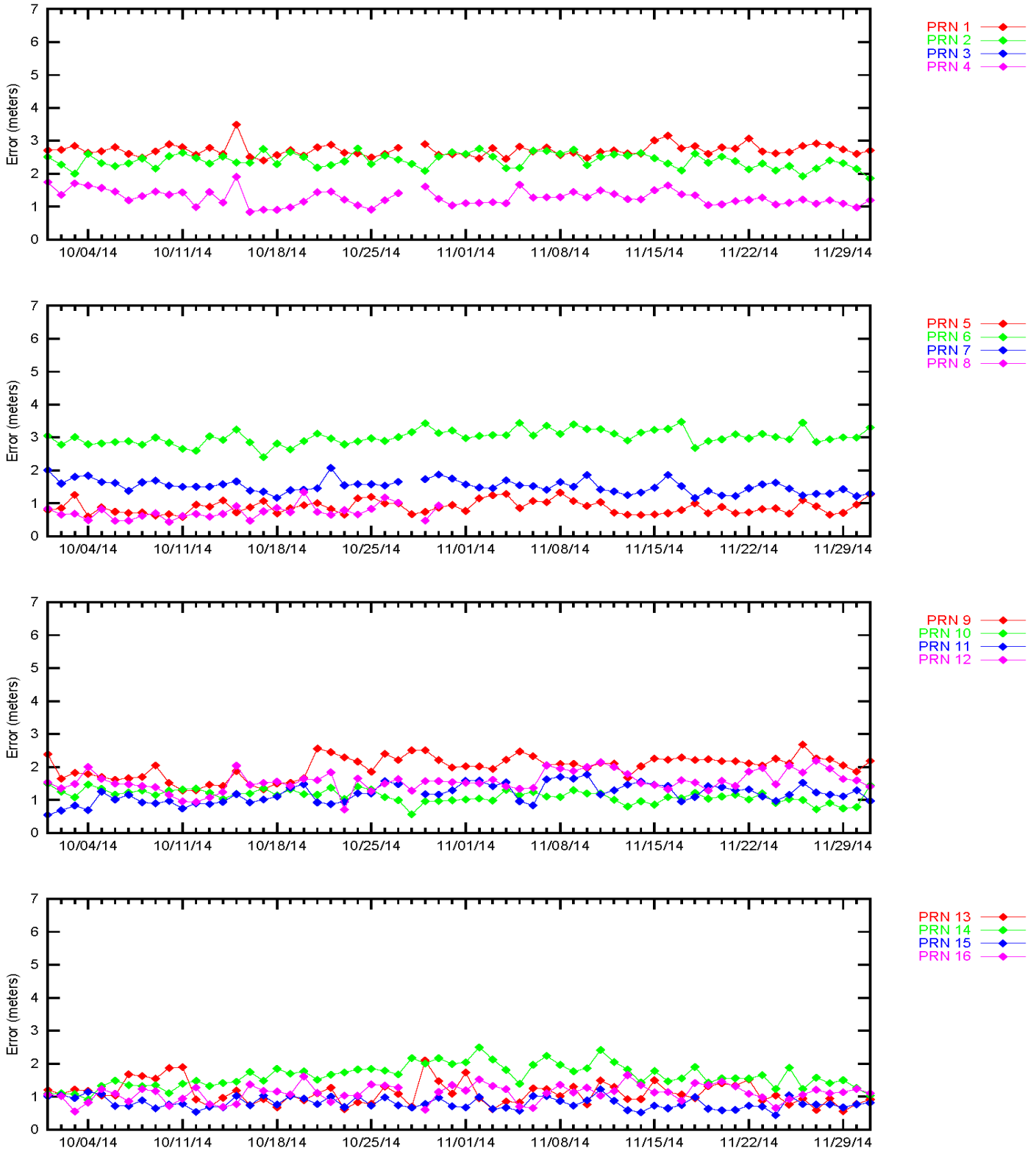


Figure 6-2 95% Range Error (PRN 17 – PRN 32) – Washington DC

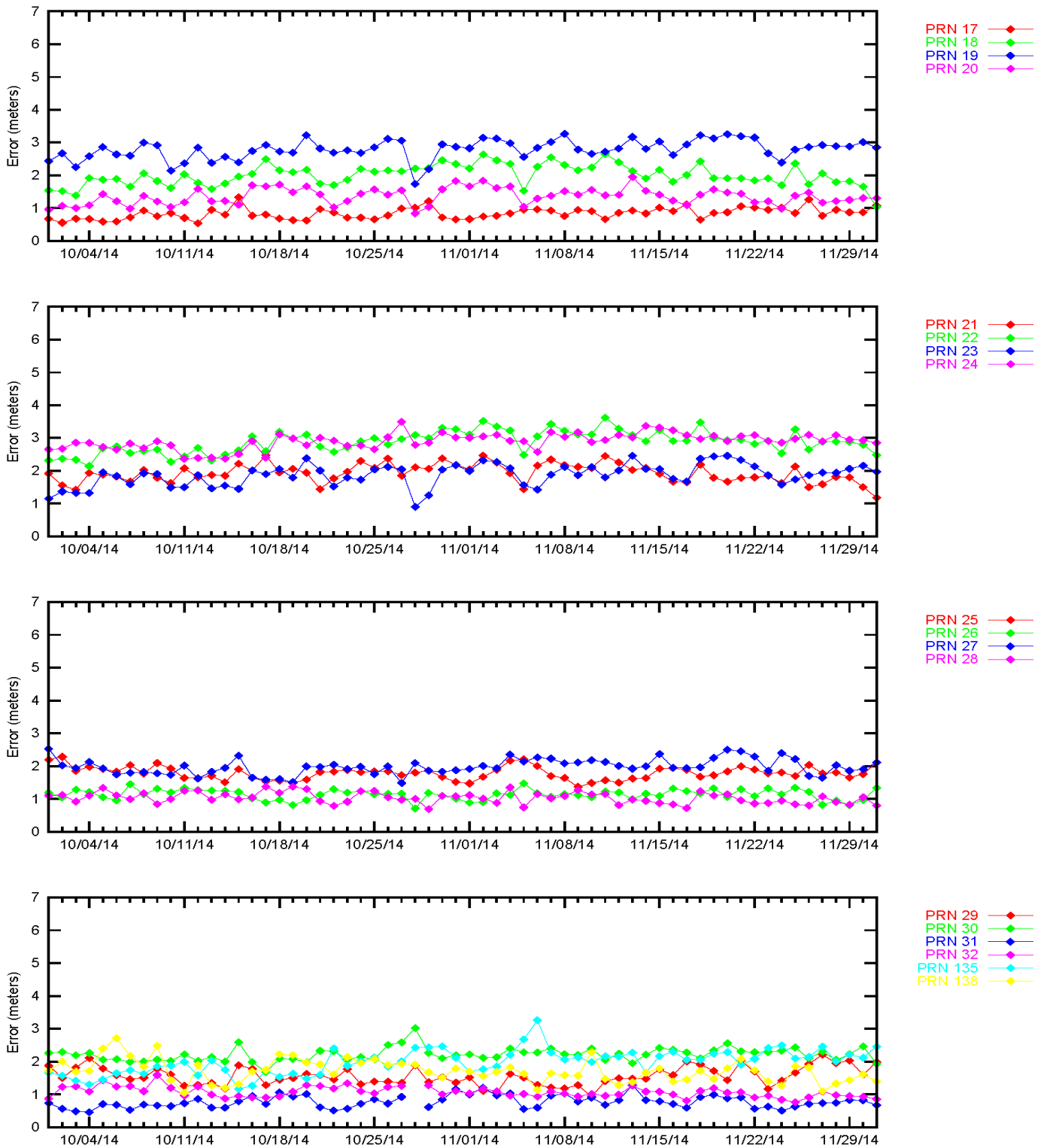


Figure 6-3 95% Ionospheric Error (PRN 1 – PRN 16) – Washington DC

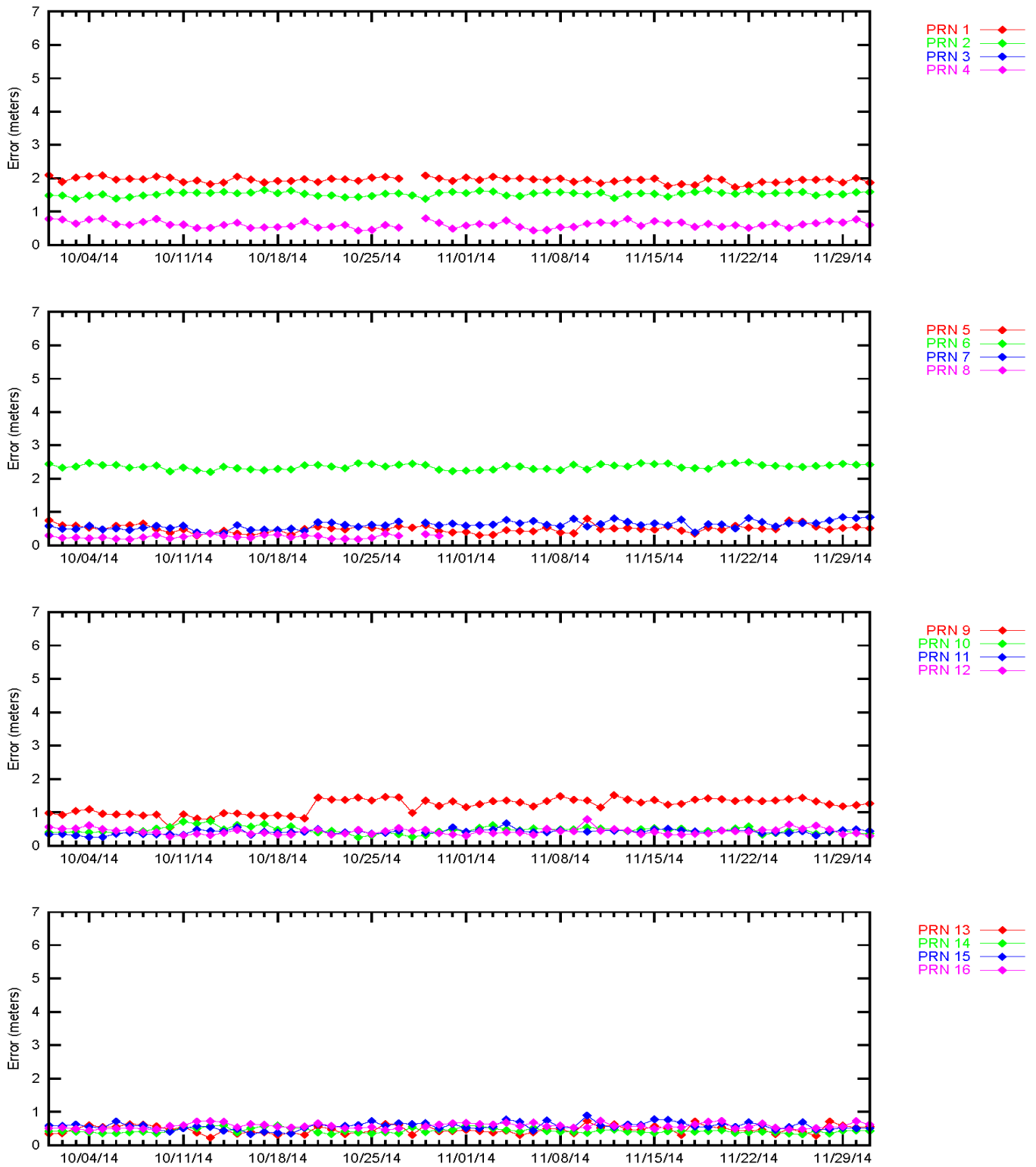
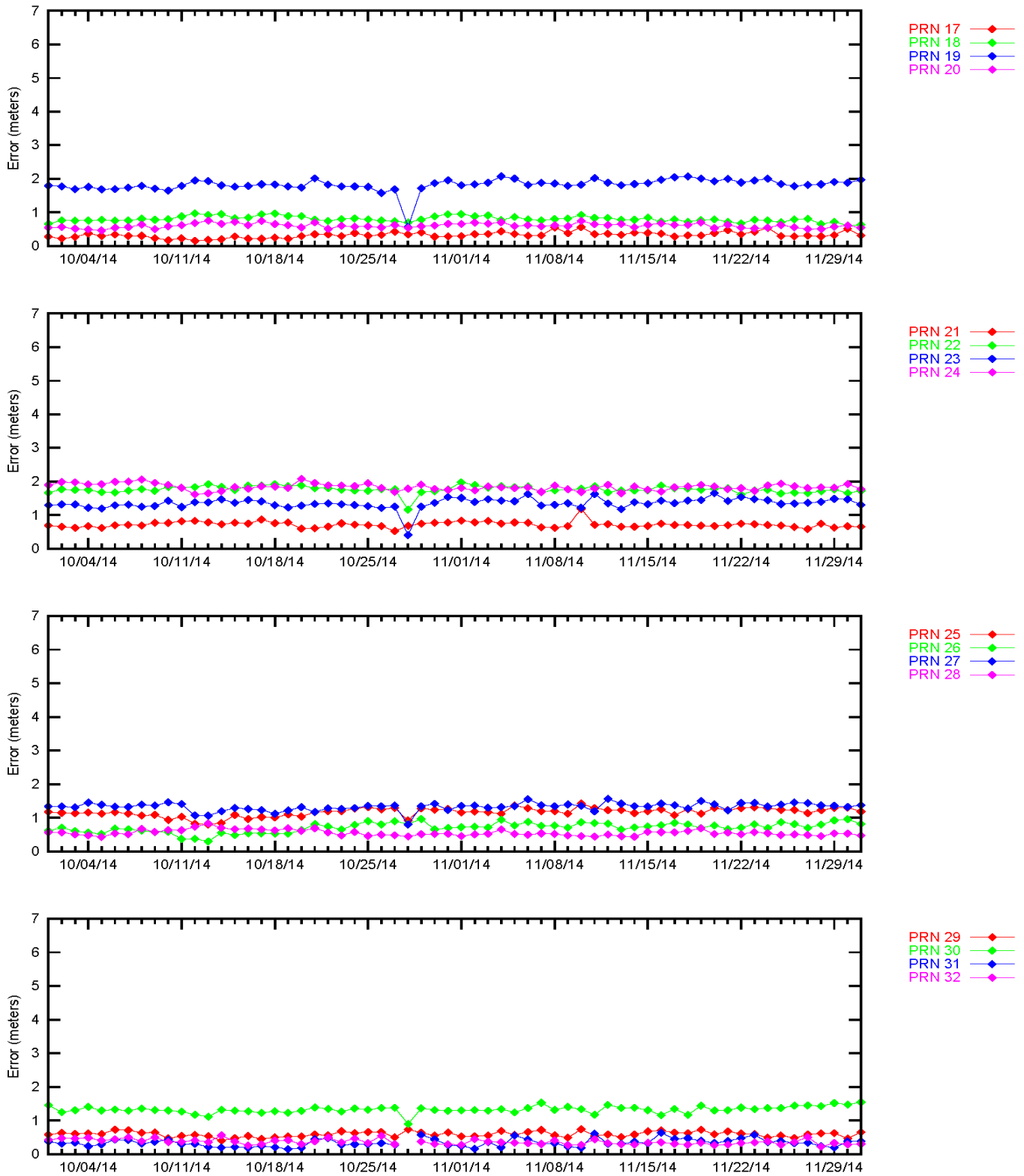


Figure 6-4 95% Ionospheric Error (PRN 17 - PRN 32) – Washington DC





**7.0 GEO RANGING PERFORMANCE**

The WAAS GEO navigation messages provide corrections and UDRE values for each satellite. The GEO ranging availability from each GEO navigation message source was evaluated separately to determine the quality of service provided.

Table 7-1 shows the GEO-Ranging performance. Figure 7-1 shows the trend of CRW GEO PA Ranging Availability. Figure 7-2 shows the trend of CRE GEO PA Ranging Availability. Figure 7-3 shows the trend of AMR GEO NPA Ranging Availability.

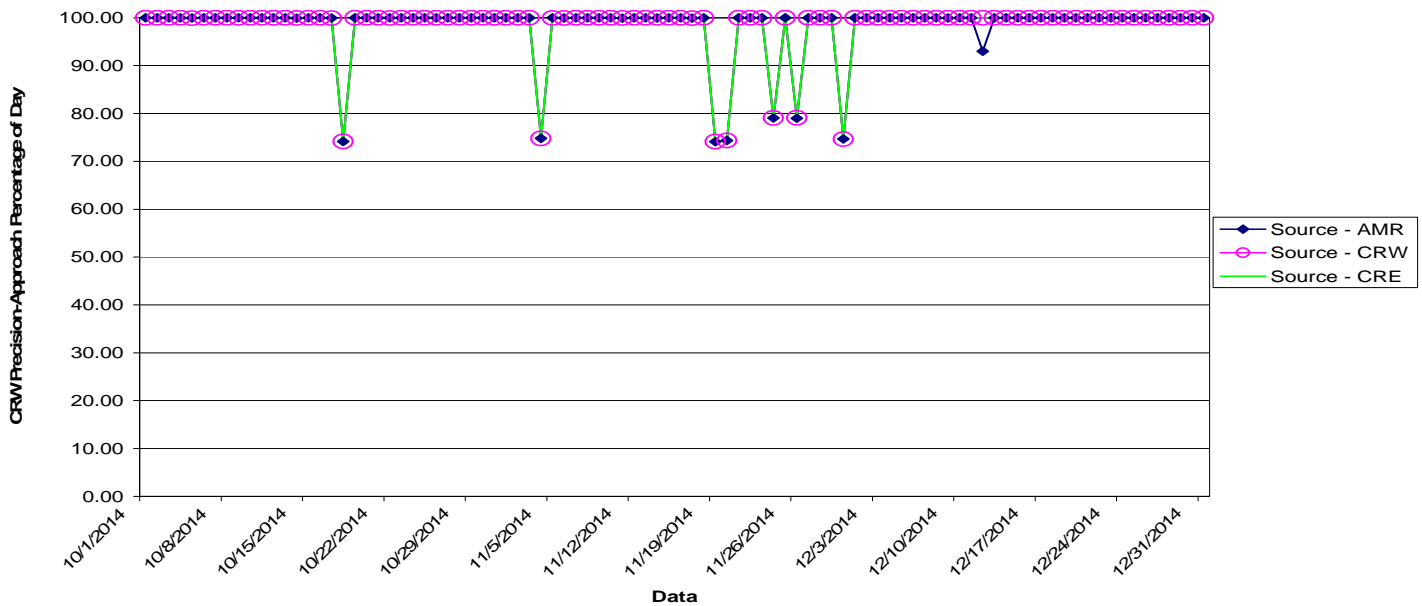
The decreases in AMR NPA ranging availability in Figure 7-3 for the quarter were due to GUS switchovers and SV alerts on the AMR GEO. On December 12, 2014 CRW and CRE PA availability decreases reported by AMR were due to a SIS outage.

**Table 7-1 GEO Ranging Availability**

GEO Source	GEO	PA (%)	NPA (%)	Not Monitored (%)	Do Not Use (%)
AMR 133	CRW	98.07	1.57	0.28	0.00
AMR 133	CRE	99.64	0.20	0.08	0.00
AMR 133	AMR	0.00	99.50	0.41	0.01
CRW 135	CRW	98.15	1.57	0.28	0.00
CRW 135	CRE	99.72	0.20	0.08	0.00
CRW 135	AMR	0.00	99.50	0.49	0.01
CRE 138	CRW	98.15	1.57	0.28	0.00
CRE 138	CRE	99.72	0.20	0.08	0.00
CRE 138	AMR	0.00	99.50	0.49	0.01

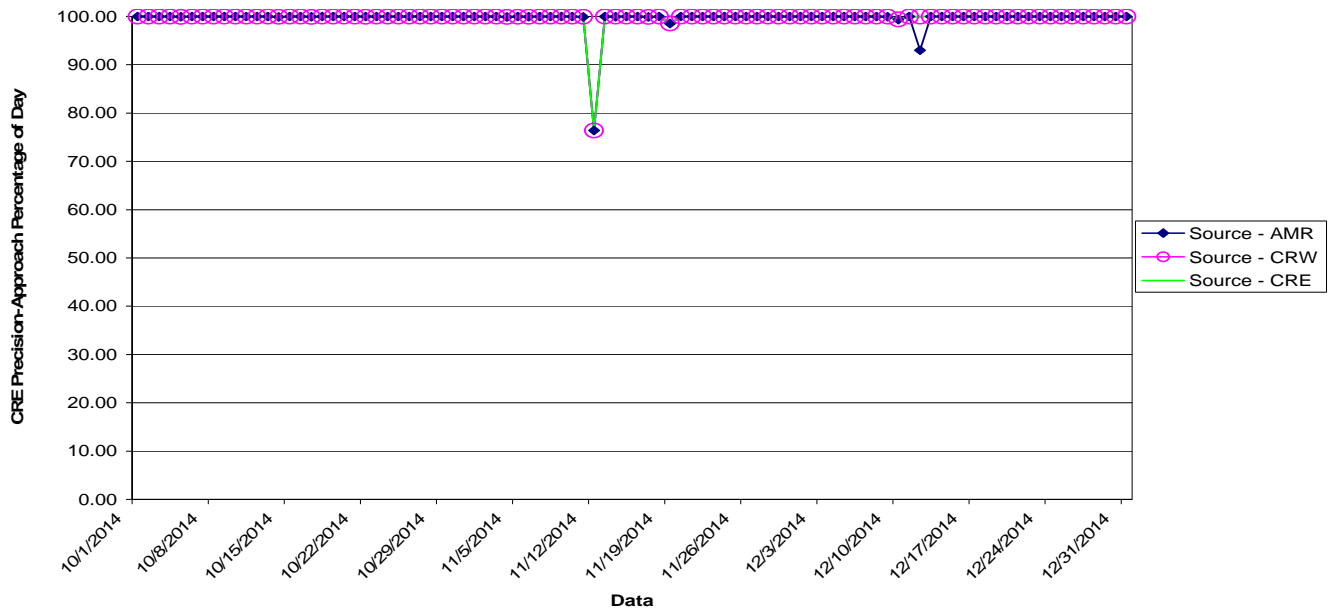
**Figure 7-1 Daily PA CRW GEO Ranging Availability Trend**

**CRW PA-Ranging Performance reported by AMR, CRW, and CRE  
1 October - 31 December 2014**



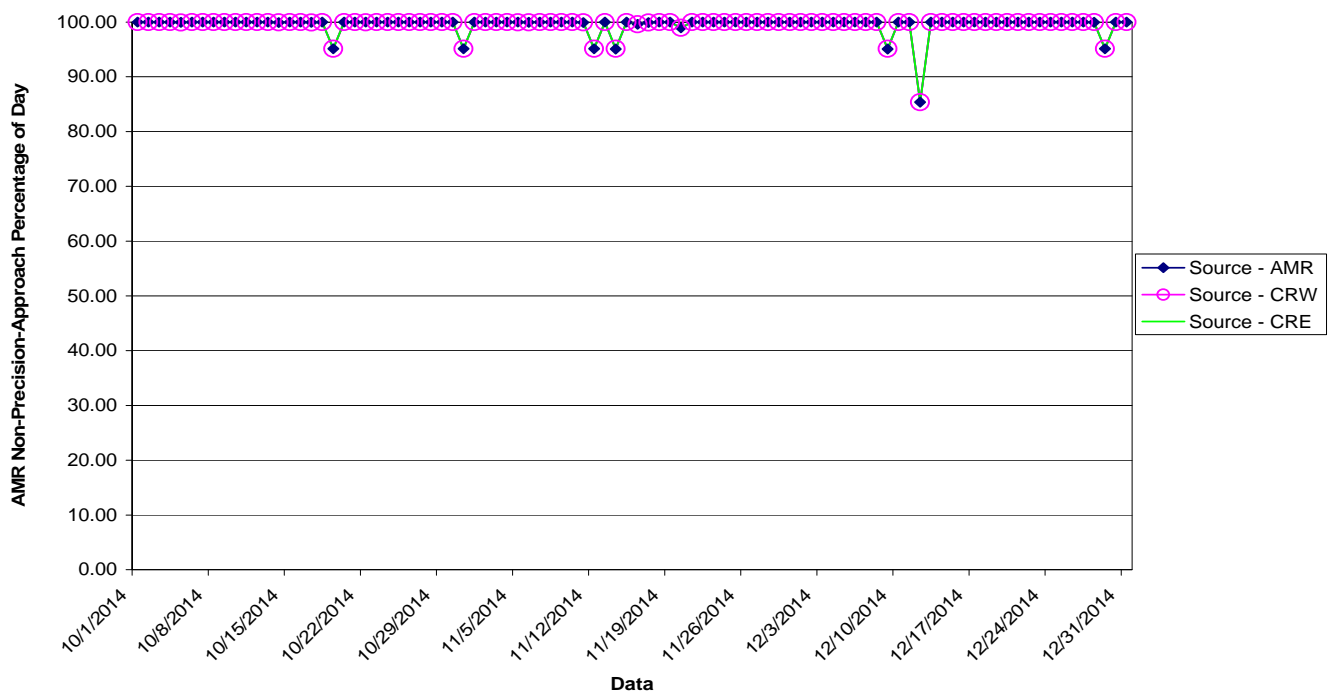
**Figure 7-2 Daily PA CRE GEO Ranging Availability Trend**

**CRE PA-Ranging Performance reported by AMR, CRW, and CRE  
1 October - 31 December 2014**



**Figure 7-3 Daily NPA AMR GEO Ranging Availability Trend**

**AMR NPA-Ranging Performance reported by AMR, CRW, and CRE  
1 October - 31 December 2014**



**8.0 WAAS AIRPORT AVAILABILITY**

The WAAS airport availability evaluation determines the number and length LPV service outages at selected airports from the transmitted WAAS navigation message. The navigation messages transmitted from all GEO satellites are processed simultaneously, and WAAS protection levels (VPL and HPL) are computed at each airport once every 30 second in accordance with the RTCA DO-229D. Once the protection levels have been produced at each airport an LPV service evaluation is conducted to identify outages in service (i.e. when protection levels exceed alert limits). WAAS LPV service is available for a user when the vertical protection level (VPL) is less than or equal to vertical alert limit (VAL) of 50 meters and the horizontal protection level (HPL) is less than or equal to horizontal alert limit (HAL) of 40 meters. If both conditions are met at a specified airport location then WAAS LPV service is available at that airport. If either one of the conditions are not met at a specified airport location then WAAS LPV service at that airport is unavailable and an outage in LPV service is recorded with its duration. When the LPV service becomes unavailable it is not considered available again until protection levels are below or equal to alert limits for at least 15 minutes. Although this will reduce LPV service availability minimally, it substantially reduces the number of service outages and prevents excessive switching in and out of service availability. Similar service analysis is completed for LP and LPV 200 services in accordance with HAL and VAL shown in Table 1-1. The number of WAAS LPV service outages and the availability at selected airports in the US and Canada for this evaluation period of WAAS operation is presented in Table 8-1. Figures 8-1 to 8-6 provide the graphical representation of the LP, LPV and LPV 200 availability and outage counts at all airports, including many that do not have published approaches. These results are depicted geographically on an interactive web page at <http://www.nstb.tc.faa.gov/AirportOutages/>.

The interactive web page can be accessed by entering the web address into an Internet browser and selecting the current quarter from the drop-down menu on the upper left corner and clicking “Submit Request”. The WAAS LPV airport layer will appear providing color coded availability results as shown in Figures 8-1 to 8-2. Rolling over any airport with the cursor displays the LPV availability and number of LPV outages for the reporting period. The “WAAS Layer” menu in the upper right of the display allows the user to select WAAS LP or LPV 200 availability and the number of outage results as shown in Figures 8-3 to 8-6. The user can review WAAS availability performance for US airports with GPS RNAV instrument approach procedures by selecting “Show all Airports”, or limit airports displayed to those with approved LPV approaches as provided in Table 8-1.

**Table 8-1 WAAS LP, LPV, and LPV200 Outages and Availability**

Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
CAL4	FORT MACKAY / ALBIAN AERODROME	AB	LPV	0	100.00%	0	100.00%	7	99.90%
CEV3	VEGREVILLE	AB	LPV	0					
CYEG	EDMONTON / JOSEPHBURG	AB	LPV	0	100.00%	0	100.00%	2	100.00%
CYXD	EDMONTON CITY CTR	AB	LPV	0	100.00%	0	100.00%	2	100.00%
2C7	SHAKTOOLIK	AK	LPV	2	100.00%	0	100.00%	2	100.00%
6A8	ALLAKAKET	AK	LP	3	99.93%	3	99.90%	5	99.86%
7KA	TATITLEK	AK	LP	2	99.92%	4	99.88%	5	99.82%
9A3	CHUATHBALUK	AK	LPV	2	99.97%	2	99.95%	2	99.92%
AKN	KING SALMON	AK	LPV	0	99.95%	3	99.95%	4	99.91%
ANC	TED STEVENS ANCHORAGE INTL	AK	LPV200	2	100.00%	0	100.00%	2	99.98%
AQH	QUINHAGAK	AK	LPV	0	100.00%	2	99.99%	4	99.93%
AQT	NUIQSUT	AK	LPV	4					
BET	BETHEL	AK	LPV200	0	100.00%	1	100.00%	4	99.95%
BRW	WILEY POST-WILL ROGERS MEMORIAL	AK	LPV	8	99.84%	5	99.79%	19	99.66%
CDB	COLD BAY	AK	LPV200	2	100.00%	1	100.00%	8	99.91%
CDV	MERLE K (MUDHOLE) SMITH	AK	LPV	2	99.80%	9	99.76%	217	98.21%

Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
CLP	CLARKS POINT	AK	LPV	0					
CXF	COLDFOOT	AK	LP	3	100.00%	3	99.99%	420	94.52%
D76	ROBERT CURTIS MEMORIAL	AK	LPV	4	99.96%	1	99.93%	2	99.92%
DLG	DILLINGHAM	AK	LPV	0	100.00%	1	100.00%	3	99.98%
ELI	ELIM	AK	LPV	2	99.91%	5	99.86%	6	99.79%
ENA	KENAI MUNICIPAL	AK	LPV200	0	99.90%	5	99.87%	28	99.62%
ENM	EMMONAK	AK	LPV	2	100.00%	1	100.00%	3	99.98%
FAI	FAIRBANKS INTL	AK	LPV200	2	99.93%	3	99.90%	5	99.86%
GAL	EDWARD G. PITKA	AK	LPV	3	100.00%	1	100.00%	3	99.96%
GKN	GULKANA	AK	LPV	2	99.93%	3	99.92%	5	99.86%
HLA	HUSLIA	AK	LPV	3	99.93%	4	99.92%	4	99.84%
HOM	HOMER	AK	LPV	0	99.95%	4	99.93%	5	99.85%
HPB	HOOPER BAY	AK	LP	2	99.94%	2	99.94%	4	99.90%
ILI	ILIAMNA	AK	LPV	0	99.92%	3	99.89%	5	99.82%
KAL	KALTAG	AK	LPV	2	100.00%	0	100.00%	3	99.98%
KSM	ST MARY'S	AK	LPV200	2	99.96%	4	99.95%	52	99.70%
KTN	KETCHIKAN INTL	AK	LPV	0	100.00%	0	100.00%	2	99.99%
KWT	KWETHLUK	AK	LPV	0	99.94%	3	99.91%	5	99.88%
KYU	KOYUKUK	AK	LPV	3	99.95%	4	99.94%	6	99.87%
MCG	MCGRATH	AK	LP	2	100.00%	1	99.96%	2	99.93%
MDM	MARSHALL DON HUNTER SR	AK	LP	2	100.00%	1	100.00%	6	99.92%
MDO	MIDDLETON ISLAND	AK	LP	1	99.95%	4	99.92%	5	99.85%
OOK	TOKSOOK BAY	AK	LP	0	99.96%	4	99.95%	4	99.87%
ORT	NORTHWAY	AK	LP	2	99.95%	4	99.94%	4	99.89%
OTZ	RALPH WIEN MEMORIAL	AK	LPV200	4	99.97%	1	99.93%	1	99.93%
PAQ	PALMER MUNICIPAL	AK	LP	3	100.00%	1	99.99%	17	99.80%
RBV	RUBY	AK	LPV	3	99.94%	3	99.93%	3	99.84%
SCC	DEADHORSE	AK	LPV	5	99.90%	5	99.86%	34	99.54%
SCM	SCAMMON BAY	AK	LP	2	99.98%	3	99.96%	4	99.92%
SHG	SHUNGNAK	AK	LP	2	99.94%	4	99.91%	5	99.85%
SHX	SHAGELUK	AK	LPV	2	99.84%	5	99.80%	21	99.65%
SMK	ST MICHAEL	AK	LPV	2	99.94%	3	99.92%	24	99.82%
UNK	UNALAKLEET	AK	LP	2	99.91%	4	99.88%	5	99.80%
WLK	SELAWIK	AK	LPV	2	99.96%	4	99.94%	4	99.89%
WNA	NAPAKIAK	AK	LPV	0	99.93%	3	99.92%	5	99.87%
YAK	YAKUTAT	AK	LPV200	1	99.93%	3	99.91%	5	99.87%
06A	MOTON FIELD MUNICIPAL	AL	LPV	0	99.91%	3	99.88%	5	99.80%
0J6	HEADLAND MUNICIPAL	AL	LPV	0	100.00%	1	100.00%	9	99.93%
0R1	ATMORE MUNICIPAL	AL	LP	0	99.96%	1	99.94%	4	99.92%
12J	BREWTON MUNICIPAL	AL	LPV	0	100.00%	0	100.00%	0	100.00%
1M4	POSEY FIELD	AL	LPV	0	100.00%	0	100.00%	0	100.00%
1R8	BAY MINETTE MUNICIPAL	AL	LPV	0	100.00%	0	100.00%	0	100.00%
2R5	ST ELMO	AL	LPV	0	100.00%	0	100.00%	0	100.00%
3A1	FOLSOM FIELD	AL	LPV	0	100.00%	0	100.00%	0	100.00%
3M8	NORTH PICKENS	AL	LP	0	100.00%	0	100.00%	0	100.00%
4A9	ISBELL FIELD	AL	LPV	0	100.00%	0	100.00%	0	100.00%
5R4	FOLEY MUNICIPAL	AL	LPV	0	100.00%	0	100.00%	0	100.00%
79J	SOUTH ALABAMA RGNL AT BILL BENTON FIELD	AL	LPV	0	100.00%	0	100.00%	0	100.00%
8A0	ALBERTVILLE MUNICIPAL T. J. BRUMLIK FIELD	AL	LPV	0	100.00%	0	100.00%	0	100.00%

Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
9A4	LAWRENCE COUNTY	AL	LPV200	0	100.00%	0	100.00%	0	100.00%
ANB	ANNISTON METROPOLITAN	AL	LPV	0	100.00%	0	100.00%	0	100.00%
ASN	TALLADEGA MUNICIPAL	AL	LPV200	0	100.00%	0	100.00%	0	100.00%
AUO	AUBURN UNIVERSITY RGNL	AL	LPV200	0					
BFM	MOBILE DOWNTOWN	AL	LPV200	0	100.00%	0	100.00%	0	100.00%
BHM	BIRMINGHAM INTL	AL	LPV200	0	100.00%	0	100.00%	0	100.00%
CQF	H L SONNY CALLAHAN	AL	LPV200	0	100.00%	0	100.00%	0	100.00%
DCU	PRYOR FIELD RGNL	AL	LPV200	0	100.00%	0	100.00%	0	100.00%
DHN	DOTHAN RGNL	AL	LPV200	0	100.00%	0	100.00%	0	100.00%
EDN	ENTERPRISE MUNICIPAL	AL	LPV	0	100.00%	0	100.00%	0	100.00%
EET	SHELBY COUNTY	AL	LPV	0	100.00%	0	100.00%	0	100.00%
EKY	BESSEMER	AL	LPV	0	100.00%	0	100.00%	0	100.00%
EUF	WEEDON FIELD	AL	LPV	0	100.00%	0	100.00%	0	100.00%
GAD	NORTHEAST ALABAMA RGNL	AL	LPV200	0	100.00%	0	100.00%	0	100.00%
HAB	MARION COUNTY RANKIN FITE	AL	LPV	0	100.00%	0	100.00%	0	100.00%
HSV	HUNTSVILLE INTL CARL T JONES FIELD	AL	LPV200	0	100.00%	0	100.00%	0	100.00%
JFX	WALKER COUNTY BEVILL FIELD	AL	LPV	0	100.00%	0	100.00%	0	100.00%
JKA	JACK EDWARDS	AL	LPV200	0	100.00%	0	100.00%	0	100.00%
M95	RICHARD ARTHUR FIELD	AL	LPV	0	100.00%	0	100.00%	0	100.00%
MDQ	MADISON COUNTY EXECUTIVE TOM SHARP JR FIELD	AL	LPV	0					
MGM	MONTGOMERY RGNL (DANNELLY FIELD)	AL	LPV200	0	100.00%	0	100.00%	0	100.00%
MOB	MOBILE RGNL	AL	LPV200	0					
MSL	NORTHWEST ALABAMA RGNL	AL	LPV200	0	100.00%	0	100.00%	0	100.00%
PLR	ST CLAIR COUNTY	AL	LPV	0					
PYP	CENTRE-PIEDMONT CHEROKEE COUNTY RGNL	AL	LPV	0	100.00%	0	100.00%	0	100.00%
SCD	MERKEL FIELD SYLACAUGA MUNICIPAL	AL	LPV	0	100.00%	0	100.00%	0	100.00%
SEM	CRAIG FIELD	AL	LPV	0	100.00%	0	100.00%	0	100.00%
TCL	TUSCALOOSA RGNL	AL	LPV	0					
TOI	TROY MUNICIPAL	AL	LPV	0	100.00%	0	100.00%	0	100.00%
4M3	CARLISLE MUNICIPAL	AR	LPV	0	100.00%	0	100.00%	0	100.00%
7M1	MC GEHEE MUNICIPAL	AR	LP	0	100.00%	0	100.00%	0	100.00%
ARG	WALNUT RIDGE RGNL	AR	LPV200	0					
ASG	SPRINGDALE MUNICIPAL	AR	LPV	0	100.00%	0	100.00%	0	100.00%
AWM	WEST MEMPHIS MUNICIPAL	AR	LPV200	0	100.00%	0	100.00%	0	100.00%
BPK	OZARK RGNL	AR	LPV	0	100.00%	0	100.00%	0	100.00%
BVX	BATESVILLE RGNL	AR	LPV	0					
BYH	ARKANSAS INTERNATIONAL	AR	LPV200	0	100.00%	0	100.00%	0	100.00%
CDH	HARRELL FIELD	AR	LPV	0	100.00%	0	100.00%	0	100.00%
ELD	SOUTH ARKANSAS RGNL AT GOODWIN FIELD	AR	LPV	0	100.00%	0	100.00%	0	100.00%
FSM	FORT SMITH RGNL	AR	LPV200	0	100.00%	0	100.00%	0	100.00%

Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
FYV	DRAKE FIELD	AR	LPV	0	100.00%	0	100.00%	0	100.00%
HRO	BOONE COUNTY	AR	LPV	0	100.00%	0	100.00%	0	100.00%
JBR	JONESBORO MUNICIPAL	AR	LPV	0	100.00%	0	100.00%	0	100.00%
LIT	ADAMS FIELD	AR	LPV200	0	100.00%	0	100.00%	0	100.00%
M19	NEWPORT MUNICIPAL	AR	LPV	0	100.00%	0	100.00%	0	100.00%
M77	HOWARD COUNTY	AR	LP	0	100.00%	0	100.00%	0	100.00%
ORK	NORTH LITTLE ROCK MUNICIPAL	AR	LPV	0	100.00%	0	100.00%	0	100.00%
PBF	GRIDER FIELD	AR	LPV	0	100.00%	0	100.00%	0	100.00%
ROG	ROGERS MUNICIPAL CARTER FIELD	AR	LPV	0	100.00%	0	100.00%	0	100.00%
RUE	RUSSELLVILLE RGNL	AR	LPV	0	100.00%	0	100.00%	0	100.00%
SGT	STUTT GART MUNICIPAL	AR	LPV	0	100.00%	0	100.00%	0	100.00%
SLG	SMITH FIELD	AR	LPV	0	100.00%	0	100.00%	0	100.00%
SRC	SEARCY MUNICIPAL	AR	LPV	0	100.00%	0	100.00%	0	100.00%
SUZ	SALINE COUNTY RGNL	AR	LPV	0	100.00%	0	100.00%	0	100.00%
TXK	TEXARKANA RGNL WEBB FIELD	AR	LPV	0	100.00%	0	100.00%	0	100.00%
VBT	BENTONVILLE MUNICIPAL LOUISE M THADEN FIELD	AR	LPV	0	100.00%	0	100.00%	0	100.00%
XNA	NORTHWEST ARKANSAS RGNL	AR	LPV200	0	100.00%	0	100.00%	0	100.00%
AVQ	MARANA RGNL	AZ	LP	0	100.00%	0	100.00%	0	100.00%
D68	SPRINGERVILLE MUNICIPAL	AZ	LP	0	100.00%	0	100.00%	0	100.00%
DVT	PHOENIX DEER VALLEY	AZ	LPV	0					
FFZ	FALCON FLD	AZ	LP	0	100.00%	0	100.00%	0	100.00%
FHU	SIERRA VISTA MUNICIPAL LIBBY AAF	AZ	LPV200	0	100.00%	0	100.00%	0	100.00%
FLG	FLAGSTAFF PULLIAM	AZ	LPV	0	100.00%	0	100.00%	0	100.00%
GEU	GLENDALE MUNICIPAL	AZ	LPV	0	100.00%	0	100.00%	0	100.00%
HII	LAKE HAVASU CITY	AZ	LPV	0	100.00%	0	100.00%	0	100.00%
IFP	LAUGHLIN/BULLHEAD INTL	AZ	LPV	0	100.00%	0	100.00%	0	100.00%
IGM	KINGMAN	AZ	LPV	0					
IWA	PHOENIX-MESA GATEWAY	AZ	LPV200	0	100.00%	0	100.00%	0	100.00%
P33	COCHISE COUNTY	AZ	LPV	0					
PGA	PAGE MUNICIPAL	AZ	LPV	0	100.00%	0	100.00%	0	100.00%
PHX	PHOENIX SKY HARBOR INTL	AZ	LPV	0					
PRC	ERNEST A. LOVE FIELD	AZ	LPV	0	100.00%	0	100.00%	33	99.88%
RQE	WINDOW ROCK	AZ	LP	0	100.00%	0	100.00%	3	99.99%
SAD	SAFFORD RGNL	AZ	LPV	0	100.00%	0	100.00%	4	99.99%
SJN	ST JOHNS INDUSTRIAL AIR PARK	AZ	LP	0	100.00%	0	100.00%	4	99.98%
SOW	SHOW LOW RGNL	AZ	LPV	0	100.00%	0	100.00%	48	99.87%
TUS	TUCSON INTL	AZ	LPV	0	100.00%	0	100.00%	0	100.00%
CYBL	CAMPBELL RIVER	BC	LPV	0	100.00%	0	100.00%	5	99.99%
CYCD	NANAIMO	BC	LPV	0	100.00%	0	100.00%	1	100.00%
CYVR	VANCOUVER INTL	BC	LPV	0	100.00%	0	100.00%	1	100.00%
CYXS	PRINCE GEORGE	BC	LPV	0	100.00%	0	100.00%	1	100.00%
CYYJ	VICTORIA INTL	BC	LPV	0	100.00%	0	100.00%	4	99.97%
CZBB	VANCOUVER BOUNDARY BAY	BC	LPV	0	100.00%	0	100.00%	7	99.91%

Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
AAT	ALTURAS MUNICIPAL	CA	LPV	0	100.00%	0	100.00%	0	100.00%
ACV	ARCATA	CA	LPV200	0	100.00%	0	100.00%	5	99.99%
APC	NAPA COUNTY	CA	LPV	0	100.00%	0	100.00%	1	100.00%
APV	APPLE VALLEY	CA	LPV	0	100.00%	0	100.00%	0	100.00%
AUN	AUBURN MUNICIPAL	CA	LPV	0	100.00%	0	100.00%	5	99.96%
BFL	MEADOWS FIELD	CA	LPV200	0	100.00%	0	100.00%	3	100.00%
BLH	BLYTHE	CA	LP	0					
C83	BYRON	CA	LPV	0	100.00%	0	100.00%	3	99.98%
CCR	BUCHANAN FIELD	CA	LPV	0	100.00%	0	100.00%	42	99.87%
CEC	JACK MC NAMARA FIELD	CA	LPV200	0	100.00%	0	100.00%	1	99.99%
CIC	CHICO MUNICIPAL	CA	LPV	0	100.00%	0	100.00%	1	100.00%
CMA	CAMARILLO	CA	LPV	0	100.00%	0	100.00%	1	100.00%
CNO	CHINO	CA	LPV	0	100.00%	1	100.00%	3	99.97%
CRQ	MC CLELLAN-PALOMAR	CA	LPV200	0	100.00%	0	100.00%	0	100.00%
CVH	HOLLISTER MUNICIPAL	CA	LPV	0	100.00%	0	100.00%	1	100.00%
DAG	BARSTOW-DAGGETT	CA	LPV	0					
DWA	YOLO COUNTY DAVIS/WOODLAND/WINTERS	CA	LPV	0	100.00%	0	100.00%	0	100.00%
FAT	FRESNO YOSEMITE INTL	CA	LPV	0	100.00%	0	100.00%	110	98.90%
HAF	HALF MOON BAY	CA	LPV	0	100.00%	0	100.00%	98	99.03%
HHR	HAWTHORNE JACK NORTHROP FIELD	CA	LPV	0	100.00%	0	100.00%	2	99.99%
HWD	HAYWARD EXECUTIVE	CA	LPV	0	100.00%	0	100.00%	85	99.70%
LAX	LOS ANGELES INTL	CA	LPV	0	100.00%	0	100.00%	75	99.92%
LGB	LONG BEACH DAUGHERTY FIELD	CA	LPV	0	100.00%	0	100.00%	1	100.00%
LHM	LINCOLN RGNL KARL HARDER FIELD	CA	LPV200	0	100.00%	0	100.00%	96	99.24%
LLR	LITTLE RIVER	CA	LP	0	100.00%	0	100.00%	98	99.07%
LSN	LOS BANOS MUNICIPAL	CA	LPV	0	100.00%	0	100.00%	95	99.43%
LVK	LIVERMORE MUNICIPAL	CA	LPV	0	100.00%	0	100.00%	94	99.73%
MAE	MADERA MUNICIPAL	CA	LPV	0	100.00%	0	100.00%	94	99.85%
MCE	MERCED RGNL MACREADY FIELD	CA	LPV	0	100.00%	0	100.00%	2	99.99%
MER	CASTLE	CA	LPV200	0	100.00%	0	100.00%	2	99.99%
MHR	SACRAMENTO MATHER	CA	LPV200	0	100.00%	0	100.00%	98	99.11%
MIT	SHAFTER-MINTER FIELD	CA	LPV	0	100.00%	0	100.00%	1	99.99%
MOD	MODESTO CITY-CO HARRY SHAM FIELD	CA	LPV	0	100.00%	0	100.00%	97	99.34%
MRY	MONTEREY PENINSULA	CA	LPV	0	100.00%	0	100.00%	75	99.84%
MYF	MONTGOMERY FIELD	CA	LPV200	0	100.00%	0	100.00%	102	98.69%
MYV	YUBA COUNTY	CA	LPV200	0	100.00%	0	100.00%	2	99.99%
O02	NERVINO	CA	LPV	0	100.00%	0	100.00%	99	98.94%
O27	OAKDALE	CA	LPV	0	100.00%	0	100.00%	2	99.99%
O69	PETALUMA MUNICIPAL	CA	LPV	0	100.00%	0	100.00%	2	99.99%
O88	RIO VISTA MUNICIPAL	CA	LP	0					
OAK	METROPOLITAN OAKLAND INTL	CA	LPV	0	100.00%	0	100.00%	89	99.60%
ONT	ONTARIO INTL	CA	LPV	0					
OVE	OROVILLE MUNICIPAL	CA	LPV	0	100.00%	0	100.00%	99	98.74%
OXR	OXNARD	CA	LPV	0	100.00%	0	100.00%	94	99.39%

Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
PMD	PALMDALE USAF PLANT 42	CA	LPV200	0	100.00%	0	100.00%	98	99.12%
POC	BRACKETT FIELD	CA	LPV	0	100.00%	0	100.00%	80	99.71%
PRB	PASO ROBLES MUNICIPAL	CA	LPV200	0	100.00%	0	100.00%	90	99.58%
PVF	PLACERVILLE	CA	LPV	0					
RAL	RIVERSIDE MUNICIPAL	CA	LPV	0	100.00%	0	100.00%	91	99.59%
RBL	RED BLUFF MUNICIPAL	CA	LPV	0	100.00%	0	100.00%	91	99.55%
RDD	REDDING MUNICIPAL	CA	LPV	0	100.00%	0	100.00%	76	99.90%
RHV	REID HILLVIEW OF SANTA CLARA	CA	LPV	0	100.00%	0	100.00%	93	99.47%
SAC	SACRAMENTO EXECUTIVE	CA	LPV200	0					
SAN	SAN DIEGO INTL	CA	LP	0	100.00%	0	100.00%	101	98.90%
SBA	SANTA BARBARA MUNICIPAL	CA	LPV	0	100.00%	0	100.00%	2	99.99%
SBP	SAN LUIS COUNTY RGNL	CA	LPV200	0	100.00%	0	100.00%	92	99.57%
SCK	STOCKTON METROPOLITAN	CA	LPV	0	100.00%	0	100.00%	38	99.95%
SEE	GILLESPIE FIELD	CA	LP	0	100.00%	0	100.00%	90	99.59%
SFO	SAN FRANCISCO INTL	CA	LPV	0	100.00%	0	100.00%	99	98.88%
SJC	NORMAN Y. MINETA SAN JOSE INTL	CA	LPV	0	100.00%	0	100.00%	97	99.34%
SMF	SACRAMENTO INTL	CA	LPV200	0	100.00%	0	100.00%	99	98.91%
SMX	SANTA MARIA PUBLIC CAPT G ALLAN HANCOCK FIELD	CA	LPV200	0					
SNA	JOHN WAYNE ORANGE COUNTY	CA	LPV	0	100.00%	0	100.00%	2	99.99%
SNS	SALINAS MUNICIPAL	CA	LPV200	0	100.00%	0	100.00%	91	99.72%
STS	CHARLES M. SCHULZ SONOMA COUNTY	CA	LPV	0	100.00%	0	100.00%	94	99.79%
TCY	TRACY MUNICIPAL	CA	LPV	0	100.00%	0	100.00%	2	99.99%
TOA	ZAMPERINI FIELD	CA	LPV200	0	100.00%	0	100.00%	2	99.99%
VCB	NUT TREE	CA	LPV	0	100.00%	0	100.00%	97	99.34%
VCV	SOUTHERN CALIFORNIA LOGISTICS	CA	LPV	0	100.00%	0	100.00%	80	99.77%
VIS	VISALIA MUNICIPAL	CA	LPV200	0	100.00%	0	100.00%	2	99.99%
WJF	GENERAL WM J FOX AIRFIELD	CA	LPV	0	100.00%	0	100.00%	93	99.66%
WLW	WILLOWS-GLENN COUNTY	CA	LPV	0	100.00%	0	100.00%	92	99.69%
ALS	SAN LUIS VALLEY RGNL BERGMAN FIELD	CO	LPV200	0	100.00%	0	100.00%	98	99.01%
APA	CENTENNIAL	CO	LPV200	0					
BJC	ROCKY MOUNTAIN METROPOLITAN	CO	LPV200	0	100.00%	0	100.00%	94	99.48%
CEZ	CORTEZ MUNICIPAL	CO	LPV	0	100.00%	0	100.00%	3	99.99%
COS	CITY OF COLORADO SPRINGS MUNICIPAL	CO	LPV200	0	100.00%	1	100.00%	95	99.51%
DEN	DENVER INTL	CO	LPV200	0	100.00%	0	100.00%	99	99.22%
DRO	DURANGO LA PLATA COUNTY	CO	LPV200	0	100.00%	0	100.00%	93	99.42%
FMM	FORT MORGAN MUNICIPAL	CO	LP	0	100.00%	0	100.00%	2	99.99%
FNL	FORT COLLINS LOVELAND MUNICIPAL	CO	LPV200	0	100.00%	0	100.00%	99	98.82%



Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
FTG	FRONT RANGE	CO	LPV200	0	100.00%	0	100.00%	99	98.99%
GJT	GRAND JUNCTION RGNL	CO	LPV200	0					
GXY	GREELEY-WELD COUNTY	CO	LPV	0	100.00%	0	100.00%	96	99.48%
HDN	YAMPA VALLEY	CO	LPV	0	100.00%	1	100.00%	105	99.24%
ITR	KIT CARSON COUNTY	CO	LPV	0					
LAA	LAMAR MUNICIPAL	CO	LPV	0	100.00%	0	100.00%	2	99.99%
LHX	LA JUNTA MUNICIPAL	CO	LPV	0					
MTJ	MONTROSE RGNL	CO	LPV	0	100.00%	0	100.00%	97	99.01%
PUB	PUEBLO MEMORIAL	CO	LPV200	0	100.00%	0	100.00%	98	98.91%
RIL	GARFIELD COUNTY RGNL	CO	LPV	0	100.00%	0	100.00%	96	99.26%
STK	STERLING MUNICIPAL	CO	LPV	0	100.00%	0	100.00%	2	99.99%
TEX	TELLURIDE RGNL	CO	LP	0	100.00%	0	100.00%	97	99.27%
BDL	BRADLEY INTL	CT	LPV200	0	100.00%	0	100.00%	2	99.99%
GON	GROTON-NEW LONDON	CT	LPV	0	100.00%	0	100.00%	69	99.88%
HVN	TWEED-NEW HAVEN	CT	LPV	0	100.00%	0	100.00%	2	99.99%
IJD	WINDHAM	CT	LP	0	100.00%	0	100.00%	97	99.45%
OXC	WATERBURY-OXFORD	CT	LPV	0	100.00%	0	100.00%	0	100.00%
DCA	RONALD REAGAN WASHINGTON NATL	DC	LPV	0					
HEF	MANASSAS RGNL HARRY P. DAVIS FIELD	DC	LPV	0	100.00%	0	100.00%	0	100.00%
IAD	WASHINGTON DULLES INTL	DC	LPV200	0	100.00%	0	100.00%	0	100.00%
33N	DELAWARE AIRPARK	DE	LP	0	100.00%	0	100.00%	0	100.00%
EVY	SUMMIT	DE	LPV	0	100.00%	0	100.00%	0	100.00%
GED	SUSSEX COUNTY	DE	LPV	0	100.00%	0	100.00%	0	100.00%
ILG	NEW CASTLE	DE	LPV	0	100.00%	0	100.00%	0	100.00%
1J0	TRI-COUNTY	FL	LP	0					
28J	PALATKA MUNICIPAL ARPT	FL	LPV	0	100.00%	0	100.00%	0	100.00%
40J	PERRY-FOLEY	FL	LPV	0	100.00%	0	100.00%	0	100.00%
54J	DEFUNIAK SPRINGS	FL	LP	0					
AAF	APALACHICOLA MUNICIPAL	FL	LPV	0	100.00%	0	100.00%	0	100.00%
APF	NAPLES MUNICIPAL	FL	LPV	0	100.00%	0	100.00%	0	100.00%
AVO	AVON PARK EXECUTIVE	FL	LPV	0	100.00%	0	100.00%	0	100.00%
BCT	BOCA RATON	FL	LPV	0	100.00%	0	100.00%	0	100.00%
BKV	HERNANDO COUNTY	FL	LPV	0	100.00%	0	100.00%	0	100.00%
BOW	BARTOW MUNICIPAL	FL	LPV	0	100.00%	0	100.00%	0	100.00%
CEW	BOB SIKES	FL	LPV	0	100.00%	0	100.00%	0	100.00%
CHN	WAUCHULA MUNICIPAL	FL	LP	0	100.00%	0	100.00%	0	100.00%
COI	MERRITT ISLAND	FL	LPV	0	100.00%	0	100.00%	0	100.00%
CRG	CRAIG MUNICIPAL	FL	LPV200	0	100.00%	0	100.00%	0	100.00%
CTY	CROSS CITY	FL	LPV	0	100.00%	0	100.00%	0	100.00%
DAB	DAYTONA BEACH INTL	FL	LPV200	0	100.00%	0	100.00%	0	100.00%
DED	DELAND MUNICIPAL SIDNEY H TAYLOR FIELD	FL	LPV	0	100.00%	0	100.00%	0	100.00%
DTS	DESTIN FORT WALTON BEACH	FL	LP	0	100.00%	0	100.00%	0	100.00%
ECP	NORTHWEST FLORIDA BEACHES INTL	FL	LPV200	0	100.00%	0	100.00%	0	100.00%
EVB	NEW SMYRNA BEACH MUNICIPAL	FL	LPV	0	100.00%	0	100.00%	0	100.00%
EYW	KEY WEST INTL	FL	LPV	0	100.00%	0	100.00%	0	100.00%

Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
F45	NORTH PALM BEACH COUNTY GENERAL AVIATION	FL	LPV	0	100.00%	0	100.00%	0	100.00%
FHB	FERNANDINA BEACH MUNICIPAL	FL	LPV	0	100.00%	0	100.00%	0	100.00%
FLL	FORT LAUDERDALE HOLLYWOOD INTL	FL	LPV	0					
FMY	PAGE FIELD	FL	LPV	0	100.00%	0	100.00%	0	100.00%
FPR	ST LUCIE COUNTY INTL	FL	LPV	0	100.00%	0	100.00%	0	100.00%
FXE	FT LAUDERDALE EXECUTIVE	FL	LPV200	0	100.00%	0	100.00%	0	100.00%
GIF	WINTER HAVEN'S GILBERT	FL	LPV	0	100.00%	0	100.00%	0	100.00%
GNV	GAINESVILLE RGNL	FL	LPV	0	100.00%	0	100.00%	0	100.00%
HEG	HERLONG RECREATIONAL	FL	LP	0	100.00%	0	100.00%	0	100.00%
IMM	IMMOKALEE RGNL	FL	LPV	0	100.00%	0	100.00%	0	100.00%
ISM	KISSIMMEE GATEWAY	FL	LPV200	0	100.00%	0	100.00%	0	100.00%
JAX	JACKSONVILLE INTL	FL	LPV200	0	100.00%	0	100.00%	0	100.00%
LAL	LAKELAND LINDER RGNL	FL	LPV200	0	100.00%	0	100.00%	0	100.00%
LCQ	LAKE CITY MUNICIPAL	FL	LPV	0	100.00%	0	100.00%	5	99.99%
LEE	LEESBURG INTL	FL	LPV	0	100.00%	0	100.00%	3	100.00%
MCO	ORLANDO INTL	FL	LPV200	0	100.00%	0	100.00%	9	99.97%
MIA	MIAMI INTL	FL	LPV	0	100.00%	0	100.00%	0	100.00%
MKY	MARCO ISLAND	FL	LPV	0	100.00%	0	100.00%	0	100.00%
MLB	MELBOURNE INTL	FL	LPV200	0	100.00%	0	100.00%	0	100.00%
MTH	THE FLORIDA KEYS MARATHON	FL	LPV	0	100.00%	0	100.00%	0	100.00%
OBE	OKEECHOBEE COUNTY	FL	LPV	0	100.00%	0	100.00%	3	100.00%
OCF	OCALA INTL JIM TAYLOR FIELD	FL	LPV200	0	100.00%	0	100.00%	0	100.00%
OPF	OPA LOCKA EXECUTIVE	FL	LPV200	0	100.00%	0	100.00%	0	100.00%
ORL	EXECUTIVE	FL	LPV200	0	100.00%	0	100.00%	0	100.00%
PBI	PALM BEACH INTL	FL	LPV200	0	100.00%	0	100.00%	0	100.00%
PCM	PLANT CITY MUNICIPAL	FL	LPV	0					
PGD	PUNTA GORDA	FL	LPV200	0	100.00%	0	100.00%	0	100.00%
PHK	PALM BEACH COUNTY GLADES	FL	LPV	0					
PIE	ST PETERSBURG-CLEARWATER INTL	FL	LPV200	0	100.00%	0	100.00%	0	100.00%
PMP	POMPANNO BEACH AIRPARK	FL	LPV	0	100.00%	0	100.00%	0	100.00%
PNS	PENSACOLA RGNL	FL	LPV200	0	100.00%	0	100.00%	7	99.97%
RSW	SOUTHWEST FLORIDA INTL	FL	LPV	0	100.00%	0	100.00%	9	99.97%
SEF	SEBRING RGNL	FL	LPV	0	100.00%	0	100.00%	0	100.00%
SFB	ORLANDO SANFORD INTL	FL	LPV200	0	100.00%	0	100.00%	11	99.96%
SGJ	ST AUGUSTINE	FL	LPV	0					
SRQ	SARASOTA BRADENTON INTL	FL	LPV200	0	100.00%	0	100.00%	4	100.00%
SUA	WITHAM FIELD	FL	LPV	0	100.00%	0	100.00%	7	99.99%
TIX	SPACE COAST RGNL	FL	LPV200	0	100.00%	0	100.00%	10	99.96%
TLH	TALLAHASSEE RGNL	FL	LPV200	0	100.00%	0	100.00%	1	100.00%
TMB	KENDALL TAMAMIAMI EXECUTIVE	FL	LPV200	0	100.00%	0	100.00%	0	100.00%

Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
TPA	TAMPA INTL	FL	LPV200	0	100.00%	0	100.00%	0	100.00%
TPF	PETER O KNIGHT	FL	LP	0	100.00%	0	100.00%	4	99.99%
VDF	TAMPA EXECUTIVE	FL	LPV	0	100.00%	0	100.00%	2	100.00%
VNC	VENICE MUNICIPAL	FL	LP	0	100.00%	0	100.00%	0	100.00%
VQQ	CECIL FIELD	FL	LPV	0	100.00%	0	100.00%	0	100.00%
VRB	VERO BEACH MUNICIPAL	FL	LPV200	0	100.00%	0	100.00%	0	100.00%
X07	LAKE WALES MUNICIPAL	FL	LP	0	100.00%	0	100.00%	0	100.00%
X14	LA BELLE MUNICIPAL	FL	LPV	0	100.00%	0	100.00%	2	100.00%
X26	SEBASTIAN MUNICIPAL	FL	LP	0	100.00%	0	100.00%	11	99.96%
X35	MARION CO & PARK OF COMMERCE	FL	LP	0	100.00%	0	100.00%	6	99.99%
X51	HOMESTEAD GENERAL AVIATION	FL	LPV	0	100.00%	0	100.00%	4	99.99%
XFL	FLAGLER COUNTY	FL	LPV	0	100.00%	0	100.00%	14	99.94%
ZPH	ZEPHYRHILLS MUNICIPAL	FL	LPV	0	100.00%	0	100.00%	8	99.98%
09J	JEKYLL ISLAND	GA	LPV200	0	100.00%	0	100.00%	0	100.00%
15J	COOK COUNTY	GA	LPV	0					
17J	DONALSONVILLE MUNICIPAL	GA	LPV	0	100.00%	0	100.00%	11	99.96%
18A	FRANKLIN COUNTY	GA	LPV	0	100.00%	0	100.00%	2	100.00%
19A	JACKSON COUNTY	GA	LPV	0	100.00%	0	100.00%	9	99.97%
2J5	MILLEN	GA	LPV	0	100.00%	0	100.00%	0	100.00%
3J7	GREENE COUNTY RGNL	GA	LPV	0	100.00%	0	100.00%	2	100.00%
48A	COCHRAN	GA	LPV	0	100.00%	0	100.00%	9	99.97%
4A4	POLK COUNTY AIRPORT CORNELIUS MOORE FIELD	GA	LPV	0	100.00%	0	100.00%	0	100.00%
4J1	BRANTLEY COUNTY	GA	LPV	0	100.00%	0	100.00%	10	99.97%
4J6	ST MARYS	GA	LPV	0	100.00%	0	100.00%	0	100.00%
52A	MADISON MUNICIPAL	GA	LP	0	100.00%	0	100.00%	5	100.00%
6A2	GRIFFIN-SPALDING COUNTY	GA	LPV	0	100.00%	0	100.00%	3	100.00%
70J	CAIRO-GRADY COUNTY	GA	LPV	0	100.00%	0	100.00%	0	100.00%
ABY	SOUTHWEST GEORGIA RGNL	GA	LPV200	0	100.00%	0	100.00%	0	100.00%
ACJ	JIMMY CARTER RGNL	GA	LPV	0	100.00%	0	100.00%	1	100.00%
AGS	AUGUSTA RGNL AT BUSH FIELD	GA	LPV200	0					
AHN	ATHENS/BEN EPPS	GA	LPV	0	100.00%	0	100.00%	8	99.98%
AJR	HABERSHAM COUNTY	GA	LPV	0	100.00%	0	100.00%	3	100.00%
ATL	HARTSFIELD - JACKSON ATLANTA INTL	GA	LPV200	0	100.00%	0	100.00%	0	100.00%
AYS	WAYCROSS-WARE COUNTY	GA	LPV200	0	100.00%	0	100.00%	11	99.95%
BGE	DECATUR COUNTY INDUSTRIAL AIR PARK	GA	LPV200	0					
BHC	BAXLEY MUNICIPAL	GA	LPV	0	100.00%	0	100.00%	0	100.00%
BIJ	EARLY COUNTY	GA	LPV	0	100.00%	0	100.00%	0	100.00%
BQK	BRUNSWICK GOLDEN ISLES	GA	LPV200	0	100.00%	0	100.00%	0	100.00%
CCO	NEWNAN COWETA COUNTY	GA	LPV	0	100.00%	0	100.00%	2	100.00%
CKF	CRISP COUNTY-CORDELE	GA	LPV	0	100.00%	0	100.00%	0	100.00%
CNI	CHEROKEE COUNTY	GA	LPV	0	100.00%	0	100.00%	6	99.99%
CSG	COLUMBUS METROPOLITAN	GA	LPV	0	100.00%	0	100.00%	3	100.00%
CTJ	WEST GEORGIA RGNL O V GRAY FIELD	GA	LPV	0	100.00%	0	100.00%	4	100.00%

Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
CVC	COVINGTON MUNICIPAL	GA	LPV	0	100.00%	0	100.00%	4	99.99%
CWV	CLAXTON-EVANS COUNTY	GA	LPV	0	100.00%	0	100.00%	0	100.00%
D73	MONROE-WALTON COUNTY	GA	LP	0					
DNN	DALTON MUNICIPAL	GA	LPV	0	100.00%	0	100.00%	11	99.96%
DQH	DOUGLAS MUNICIPAL	GA	LPV200	0	100.00%	0	100.00%	0	100.00%
EZM	HEART OF GEORGIA RGNL	GA	LPV	0	100.00%	0	100.00%	0	100.00%
FFC	ATLANTA RGNL FALCON FIELD	GA	LPV200	0	100.00%	0	100.00%	0	100.00%
FTY	FULTON COUNTY AIRPORT- BROWN FIELD	GA	LPV	0	100.00%	0	100.00%	0	100.00%
FZG	FITZGERALD MUNICIPAL	GA	LPV	0	100.00%	0	100.00%	0	100.00%
GVL	LEE GILMER MEMORIAL	GA	LPV	0	100.00%	0	100.00%	0	100.00%
HOE	HOMERVILLE	GA	LPV	0	100.00%	0	100.00%	0	100.00%
HQU	THOMSON-MCDUFFIE COUNTY	GA	LPV	0	100.00%	0	100.00%	0	100.00%
IHY	WASHINGTON WILKES COUNTY	GA	LPV	0	100.00%	0	100.00%	0	100.00%
JES	JESUP-WAYNE COUNTY	GA	LPV	0	100.00%	0	100.00%	0	100.00%
JYL	PLANTATION ARPK	GA	LPV	0	100.00%	0	100.00%	0	100.00%
JZP	PICKENS COUNTY	GA	LPV	0	100.00%	0	100.00%	0	100.00%
LGC	LAGRANGE-CALLAWAY	GA	LPV200	0	100.00%	0	100.00%	0	100.00%
LZU	GWINNETT COUNTY BRISCOE FIELD	GA	LPV200	0	100.00%	0	100.00%	0	100.00%
MAC	MACON DOWNTOWN	GA	LP	0	100.00%	0	100.00%	0	100.00%
MCN	MIDDLE GEORGIA RGNL	GA	LPV200	0	100.00%	0	100.00%	0	100.00%
MGR	MOULTRIE MUNICIPAL	GA	LPV200	0	100.00%	0	100.00%	0	100.00%
MLJ	BALDWIN COUNTY	GA	LPV	0	100.00%	0	100.00%	0	100.00%
MQW	TELFAIR-WHEELER	GA	LPV	0	100.00%	0	100.00%	0	100.00%
OKZ	KAOLIN FIELD	GA	LPV	0					
OPN	THOMASTON UPSON COUNTY	GA	LPV200	0	100.00%	0	100.00%	0	100.00%
PIM	HARRIS COUNTY	GA	LPV	0	100.00%	0	100.00%	0	100.00%
PUJ	PAULDING NORTHWEST ATLANTA	GA	LPV200	0	100.00%	0	100.00%	0	100.00%
PXE	PERRY-HOUSTON COUNTY	GA	LPV	0	100.00%	0	100.00%	0	100.00%
RMG	RICHARD B RUSSELL	GA	LPV	0	100.00%	0	100.00%	0	100.00%
RVJ	SWINTON SMITH FLD AT REIDSVILLE MUNICIPAL	GA	LP	0	100.00%	0	100.00%	0	100.00%
RYY	COBB COUNTY MC COLLUM FIELD	GA	LPV200	0	100.00%	0	100.00%	0	100.00%
SAV	SAVANNAH HILTON HEAD INTL	GA	LPV200	0	100.00%	0	100.00%	0	100.00%
SBO	EAST GEORGIA REGIONAL	GA	LPV	0	100.00%	0	100.00%	0	100.00%
TBR	STATESBORO BULLOCH COUNTY	GA	LPV	0	100.00%	0	100.00%	0	100.00%
TMA	HENRY TIFTON MYERS	GA	LPV	0	100.00%	0	100.00%	0	100.00%
TOC	TOCCOA RG LETOURNEAU FIELD	GA	LPV	0	100.00%	0	100.00%	0	100.00%
TVI	THOMASVILLE RGNL	GA	LPV	0	100.00%	0	100.00%	0	100.00%
VDI	VIDALIA RGNL	GA	LPV	0					
VLD	VALDOSTA RGNL	GA	LPV	0	100.00%	0	100.00%	0	100.00%

Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
VPC	CARTERSVILLE	GA	LPV	0	100.00%	0	100.00%	0	100.00%
WDR	WINDER-BARROW	GA	LPV	0	100.00%	0	100.00%	0	100.00%
AIO	ATLANTIC MUNICIPAL	IA	LPV	0	100.00%	0	100.00%	0	100.00%
ALO	WATERLOO RGNL	IA	LPV	0	100.00%	0	100.00%	0	100.00%
AMW	AMES MUNICIPAL	IA	LPV	0	100.00%	0	100.00%	0	100.00%
AWG	WASHINGTON MUNICIPAL	IA	LPV200	0	100.00%	0	100.00%	0	100.00%
BRL	SOUTHEAST IOWA RGNL	IA	LPV200	0					
CBF	COUNCIL BLUFFS MUNICIPAL	IA	LPV200	0	100.00%	0	100.00%	0	100.00%
CID	THE EASTERN IOWA	IA	LPV200	0	100.00%	0	100.00%	0	100.00%
CIN	ARTHUR N NEU	IA	LPV	0	100.00%	0	100.00%	0	100.00%
CKP	CHEROKEE COUNTY RGNL	IA	LPV	0	100.00%	0	100.00%	0	100.00%
CSQ	CRESTON MUNICIPAL	IA	LPV	0	100.00%	0	100.00%	0	100.00%
CWI	CLINTON MUNICIPAL	IA	LPV200	0	100.00%	0	100.00%	0	100.00%
DBQ	DUBUQUE RGNL	IA	LPV200	0					
DEH	DECORAH MUNICIPAL	IA	LPV	0	100.00%	0	100.00%	0	100.00%
DNS	DENISON MUNICIPAL	IA	LPV	0	100.00%	0	100.00%	0	100.00%
DSM	DES MOINES INTL	IA	LPV	0	100.00%	0	100.00%	0	100.00%
DVN	DAVENPORT MUNICIPAL	IA	LPV200	0	100.00%	0	100.00%	0	100.00%
EBS	WEBSTER CITY MUNICIPAL	IA	LPV	0	100.00%	0	100.00%	0	100.00%
EFW	JEFFERSON MUNICIPAL	IA	LPV	0					
EOK	KEOKUK MUNICIPAL	IA	LPV	0	100.00%	0	100.00%	0	100.00%
EST	ESTHERVILLE MUNICIPAL	IA	LPV	0	100.00%	0	100.00%	0	100.00%
FFL	FAIRFIELD MUNICIPAL	IA	LPV	0	100.00%	0	100.00%	0	100.00%
FOD	FORT DODGE RGNL	IA	LPV200	0	100.00%	0	100.00%	0	100.00%
FXY	FOREST CITY MUNICIPAL	IA	LPV	0	100.00%	0	100.00%	0	100.00%
GGI	GRINNELL RGNL	IA	LPV	0	100.00%	0	100.00%	0	100.00%
I75	OSCEOLA MUNICIPAL	IA	LPV	0	100.00%	0	100.00%	0	100.00%
ICL	SCHENCK FIELD	IA	LPV	0					
IIB	INDEPENDENCE MUNICIPAL	IA	LP	0	100.00%	0	100.00%	0	100.00%
IKV	ANKENY RGNL	IA	LPV	0	100.00%	0	100.00%	0	100.00%
IOW	IOWA CITY MUNICIPAL	IA	LPV	0					
LRJ	LE MARS MUNICIPAL	IA	LPV	0	100.00%	0	100.00%	0	100.00%
MCW	MASON CITY MUNICIPAL	IA	LPV200	0	100.00%	0	100.00%	0	100.00%
MPZ	MOUNT PLEASANT MUNICIPAL	IA	LPV	0	100.00%	0	100.00%	0	100.00%
MUT	MUSCATINE MUNICIPAL	IA	LPV	0	100.00%	0	100.00%	0	100.00%
MXO	MONTICELLO RGNL	IA	LP	0					
OOA	OSKALOOSA MUNICIPAL	IA	LPV	0	100.00%	0	100.00%	0	100.00%
OTM	OTTUMWA RGNL	IA	LPV	0					
OXV	KNOXVILLE MUNICIPAL	IA	LPV	0	100.00%	0	100.00%	0	100.00%
PEA	PELLA MUNICIPAL	IA	LPV	0	100.00%	0	100.00%	0	100.00%
POH	POCAHONTAS MUNICIPAL	IA	LPV	0					
PRO	PERRY MUNICIPAL	IA	LPV200	0	100.00%	0	100.00%	0	100.00%
RDK	RED OAK MUNICIPAL	IA	LPV	0	100.00%	0	100.00%	0	100.00%
SDA	SHENANDOAH MUNICIPAL	IA	LPV	0					
SHL	SHELDON MUNICIPAL	IA	LPV	0	100.00%	0	100.00%	0	100.00%
SKI	SAC CITY MUNICIPAL	IA	LPV	0	100.00%	0	100.00%	0	100.00%
SLB	STORM LAKE MUNICIPAL	IA	LPV	0	100.00%	0	100.00%	0	100.00%
SPW	SPENCER MUNICIPAL	IA	LPV200	0	100.00%	0	100.00%	0	100.00%
SUX	SIOUX GATEWAY	IA	LPV200	0	100.00%	0	100.00%	0	100.00%

Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
	COL BUD DAY FIELD								
TNU	NEWTON MUNICIPAL	IA	LPV	0	100.00%	0	100.00%	0	100.00%
TVK	CENTERVILLE MUNICIPAL	IA	LPV	0	100.00%	0	100.00%	0	100.00%
TZT	BELLE PLAINE MUNICIPAL	IA	LPV	0	100.00%	0	100.00%	0	100.00%
VTI	VINTON VETERANS MEMORIAL ARPK	IA	LPV	0	100.00%	0	100.00%	0	100.00%
BOI	BOISE AIR TERMINAL GOWEN FIELD	ID	LPV	0	100.00%	0	100.00%	0	100.00%
COE	PAPPY BOYINGTON FIELD	ID	LPV200	0	100.00%	0	100.00%	0	100.00%
DIJ	DRIGGS-REED MEMORIAL	ID	LP	0	100.00%	0	100.00%	0	100.00%
EUL	CALDWELL INDUSTRIAL	ID	LPV	0	100.00%	0	100.00%	0	100.00%
GNG	GOODING MUNICIPAL	ID	LPV	0	100.00%	0	100.00%	0	100.00%
IDA	IDAHO FALLS RGNL	ID	LPV200	0	100.00%	0	100.00%	0	100.00%
JER	JEROME COUNTY	ID	LPV	0	100.00%	0	100.00%	0	100.00%
LWS	LEWISTON NEZ PERCE COUNTY	ID	LPV200	0	100.00%	0	100.00%	0	100.00%
MAN	NAMPA MUNICIPAL	ID	LPV	0	100.00%	0	100.00%	0	100.00%
MYL	MC CALL MUNICIPAL	ID	LPV	0	100.00%	0	100.00%	0	100.00%
PIH	POCATELLO RGNL	ID	LPV200	0	100.00%	0	100.00%	0	100.00%
TWF	JOSLIN FIELD MAGIC VALLEY RGNL	ID	LPV200	0	100.00%	0	100.00%	0	100.00%
U76	MOUNTAIN HOME MUNICIPAL	ID	LPV	0	100.00%	0	100.00%	0	100.00%
3LF	LITCHFIELD MUNICIPAL	IL	LPV	0	100.00%	0	100.00%	0	100.00%
3MY	MOUNT HAWLEY AUXILIARY	IL	LPV	0	100.00%	0	100.00%	0	100.00%
AJG	MOUNT CARMEL MUNICIPAL	IL	LPV	0	100.00%	0	100.00%	0	100.00%
ALN	ST LOUIS RGNL	IL	LPV200	0	100.00%	0	100.00%	0	100.00%
ARR	AURORA MUNICIPAL	IL	LPV200	0	100.00%	0	100.00%	0	100.00%
BLV	SCOTT AFB/MIDAMERICA	IL	LPV200	0	100.00%	0	100.00%	0	100.00%
BMI	CENTRAL IL REGL ARPT AT BLOOMINGTON-NORMAL	IL	LPV	0	100.00%	0	100.00%	0	100.00%
C15	PEKIN MUNICIPAL	IL	LPV	0	100.00%	0	100.00%	0	100.00%
C73	DIXON MUNICIPAL CHARLES R. WALGREEN FLD	IL	LPV	0	100.00%	0	100.00%	0	100.00%
CMI	UNIVERSITY OF ILLINOIS WILLARD	IL	LPV200	0	100.00%	0	100.00%	0	100.00%
CPS	ST LOUIS DOWNTOWN	IL	LPV200	0	100.00%	0	100.00%	0	100.00%
CUL	CARMI MUNICIPAL	IL	LP	0	100.00%	0	100.00%	0	100.00%
DEC	DECATUR	IL	LPV200	0	100.00%	0	100.00%	0	100.00%
DKB	DE KALB TAYLOR MUNICIPAL	IL	LPV	0	100.00%	0	100.00%	0	100.00%
DNV	VERMILION COUNTY	IL	LPV	0	100.00%	0	100.00%	0	100.00%
DPA	DUPAGE	IL	LPV200	0	100.00%	0	100.00%	0	100.00%
ENL	CENTRALIA MUNICIPAL	IL	LPV	0	100.00%	0	100.00%	0	100.00%
FEP	ALBERTUS	IL	LPV	0	100.00%	0	100.00%	0	100.00%
FOA	FLORA MUNICIPAL	IL	LPV	0	100.00%	0	100.00%	0	100.00%
GBG	GALESBURG MUNICIPAL	IL	LPV200	0	100.00%	0	100.00%	0	100.00%
HSB	HARRISBURG-RALEIGH	IL	LPV	0	100.00%	0	100.00%	0	100.00%
I63	MOUNT STERLING MUNICIPAL	IL	LPV	0	100.00%	0	100.00%	0	100.00%

Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
IGQ	LANSING MUNICIPAL	IL	LPV	0	100.00%	0	100.00%	0	100.00%
IKK	GREATER KANKAKEE	IL	LPV	0	100.00%	0	100.00%	0	100.00%
LOT	LEWIS UNIVERSITY	IL	LPV200	0	100.00%	0	100.00%	0	100.00%
LWV	LAWRENCEVILLE-VINCENNES INTL	IL	LPV200	0	100.00%	0	100.00%	0	100.00%
MDW	CHICAGO MIDWAY INTL	IL	LPV	0	100.00%	0	100.00%	0	100.00%
MLI	QUAD CITY INTL	IL	LPV200	0	100.00%	0	100.00%	0	100.00%
MTO	COLES COUNTY MEMORIAL	IL	LPV	0	100.00%	0	100.00%	0	100.00%
MVN	MOUNT VERNON	IL	LPV	0	100.00%	0	100.00%	0	100.00%
MWA	WILLIAMSON COUNTY RGNL	IL	LPV200	0					
ORD	CHICAGO-O'HARE INTL	IL	LPV200	0	100.00%	0	100.00%	0	100.00%
PIA	GREATER PEORIA RGNL	IL	LPV	0	100.00%	0	100.00%	0	100.00%
PNT	PONTIAC MUNICIPAL	IL	LPV	0	100.00%	0	100.00%	0	100.00%
PWK	CHICAGO EXECUTIVE	IL	LPV	0	100.00%	0	100.00%	0	100.00%
RFD	CHICAGO/ROCKFORD INTL	IL	LPV200	0					
RPJ	ROCHELLE MUNICIPAL KORITZ FIELD	IL	LPV200	0	100.00%	0	100.00%	0	100.00%
RSV	ROBINSON MUNICIPAL	IL	LPV	0					
SAR	SPARTA COMMUNITY HUNTER FIELD	IL	LPV	0	100.00%	0	100.00%	0	100.00%
SFY	TRI-TOWNSHIP	IL	LP	0	100.00%	0	100.00%	0	100.00%
SPI	ABRAHAM LINCOLN CAPITAL	IL	LPV	0	100.00%	0	100.00%	0	100.00%
SQI	WHITESIDE COUNTY JOS J BITTORF FIELD	IL	LPV	0	100.00%	0	100.00%	0	100.00%
UGN	WAUKEGAN RGNL	IL	LPV	0	100.00%	0	100.00%	0	100.00%
UIN	QUINCY RGNL BALDWIN FIELD	IL	LPV200	0	100.00%	0	100.00%	0	100.00%
417	PUTNAM COUNTY	IN	LPV	0	100.00%	0	100.00%	0	100.00%
AID	ANDERSON MUNICIPAL DARLINGTON FIELD	IN	LPV	0					
ASW	WARSAW MUNICIPAL	IN	LPV	0	100.00%	0	100.00%	0	100.00%
BAK	COLUMBUS MUNICIPAL	IN	LPV	0	100.00%	0	100.00%	0	100.00%
BFR	VIRGIL I GRISSOM MUNICIPAL	IN	LP	0	100.00%	0	100.00%	0	100.00%
BMG	MONROE COUNTY	IN	LPV200	0	100.00%	0	100.00%	0	100.00%
CEV	METTEL FIELD	IN	LPV	0					
EKM	ELKHART MUNICIPAL	IN	LPV	0	100.00%	0	100.00%	0	100.00%
EVV	EVANSVILLE RGNL	IN	LPV200	0	100.00%	0	100.00%	0	100.00%
EYE	EAGLE CREEK AIRPARK	IN	LPV	0	100.00%	0	100.00%	0	100.00%
FRH	FRENCH LICK MUNICIPAL	IN	LPV	0	100.00%	0	100.00%	0	100.00%
FWA	FORT WAYNE INTL	IN	LPV200	0	100.00%	0	100.00%	0	100.00%
GEZ	SHELBYVILLE MUNICIPAL	IN	LPV	0	100.00%	0	100.00%	0	100.00%
GGP	LOGANSPOUT/CASS COUNTY	IN	LPV200	0	100.00%	0	100.00%	0	100.00%
GSH	GOSHEN MUNICIPAL	IN	LPV	0	100.00%	0	100.00%	0	100.00%
GWB	DE KALB COUNTY	IN	LPV	0	100.00%	0	100.00%	0	100.00%
GYG	GARY CHICAGO INTL	IN	LPV200	0	100.00%	0	100.00%	0	100.00%
HFY	GREENWOOD MUNICIPAL	IN	LPV	0					
HNB	HUNTINGBURG	IN	LPV	0	100.00%	0	100.00%	0	100.00%
HUF	TERRE HAUTE INTL HULMAN FIELD	IN	LPV200	0	100.00%	0	100.00%	0	100.00%

Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
I22	RANDOLPH COUNTY	IN	LPV	0	100.00%	0	100.00%	0	100.00%
IMS	MADISON MUNICIPAL	IN	LPV	0	100.00%	0	100.00%	0	100.00%
IND	INDIANAPOLIS INTL	IN	LPV	0	100.00%	0	100.00%	0	100.00%
JVY	CLARK RGNL	IN	LPV200	0	100.00%	0	100.00%	0	100.00%
LAF	PURDUE UNIVERSITY	IN	LPV	0	100.00%	0	100.00%	0	100.00%
MCX	WHITE COUNTY	IN	LP	0	100.00%	0	100.00%	0	100.00%
MIE	DELAWARE COUNTY JOHNSON FIELD	IN	LPV	0	100.00%	0	100.00%	0	100.00%
MQJ	MOUNT COMFORT	IN	LPV	0	100.00%	0	100.00%	0	100.00%
MZZ	MARION MUNICIPAL	IN	LPV	0	100.00%	0	100.00%	0	100.00%
OKK	KOKOMO MUNICIPAL	IN	LPV200	0	100.00%	0	100.00%	0	100.00%
OVO	NORTH VERNON	IN	LPV	0	100.00%	0	100.00%	0	100.00%
OXI	STARKE COUNTY	IN	LPV	0	100.00%	0	100.00%	0	100.00%
PLD	PORTLAND MUNICIPAL	IN	LPV	0	100.00%	0	100.00%	0	100.00%
RCR	FULTON COUNTY	IN	LPV	0	100.00%	0	100.00%	0	100.00%
RID	RICHMOND MUNICIPAL	IN	LPV200	0	100.00%	0	100.00%	0	100.00%
RZL	JASPER COUNTY	IN	LPV	0	100.00%	0	100.00%	0	100.00%
SBN	SOUTH BEND RGNL	IN	LPV	0	100.00%	0	100.00%	0	100.00%
SER	FREEMAN MUNICIPAL	IN	LPV	0	100.00%	0	100.00%	0	100.00%
SMD	SMITH FIELD	IN	LPV	0	100.00%	0	100.00%	0	100.00%
TEL	PERRY COUNTY MUNICIPAL	IN	LP	0	100.00%	0	100.00%	0	100.00%
TYQ	INDIANAPOLIS EXECUTIVE	IN	LPV	0	100.00%	0	100.00%	0	100.00%
VPZ	PORTER COUNTY MUNICIPAL	IN	LPV	0	100.00%	0	100.00%	0	100.00%
3AU	AUGUSTA MUNICIPAL	KS	LP	0	100.00%	0	100.00%	0	100.00%
3K3	SYRACUSE HAMILTON COUNTY MUNICIPAL	KS	LPV	0	100.00%	0	100.00%	0	100.00%
AAO	COLONEL JAMES JABARA	KS	LPV	0	100.00%	0	100.00%	0	100.00%
ADT	ATWOOD RAWLINS COUNTY CITY-COUNTY	KS	LPV	0	100.00%	0	100.00%	0	100.00%
ANY	ANTHONY MUNICIPAL	KS	LP	0	100.00%	0	100.00%	0	100.00%
CBK	SHALZ FIELD	KS	LPV	0	100.00%	0	100.00%	0	100.00%
CNK	BLOSSER MUNICIPAL	KS	LP	0	100.00%	0	100.00%	0	100.00%
DDC	DODGE CITY RGNL	KS	LPV	0	100.00%	0	100.00%	0	100.00%
EGT	WELLINGTON MUNICIPAL	KS	LPV	0	100.00%	0	100.00%	0	100.00%
EHA	ELKHART-MORTON COUNTY	KS	LPV	0	100.00%	0	100.00%	0	100.00%
EMP	EMPORIA MUNICIPAL	KS	LPV	0	100.00%	0	100.00%	0	100.00%
EWK	NEWTON-CITY-COUNTY	KS	LPV	0	100.00%	0	100.00%	0	100.00%
FOE	FORBES FIELD	KS	LPV	0	100.00%	0	100.00%	0	100.00%
FSK	FORT SCOTT MUNICIPAL	KS	LPV	0	100.00%	0	100.00%	0	100.00%
GBD	GREAT BEND MUNICIPAL	KS	LPV200	0	100.00%	0	100.00%	0	100.00%
GCK	GARDEN CITY RGNL	KS	LPV	0	100.00%	0	100.00%	0	100.00%
GLD	RENNER FIELD GOODLAND MUNICIPAL	KS	LPV200	0	100.00%	0	100.00%	0	100.00%
HQG	HUGOTON MUNICIPAL	KS	LPV	0	100.00%	0	100.00%	0	100.00%
HUT	HUTCHINSON MUNICIPAL	KS	LPV	0	100.00%	0	100.00%	0	100.00%
HYS	HAYS RGNL	KS	LPV200	0	100.00%	0	100.00%	0	100.00%
ICT	WICHITA MID-CONTINENT	KS	LPV200	0	100.00%	0	100.00%	0	100.00%
IDP	INDEPENDENCE MUNICIPAL	KS	LPV	0	100.00%	0	100.00%	0	100.00%



Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
IXD	NEW CENTURY AIRCENTER	KS	LPV	0	100.00%	0	100.00%	0	100.00%
K88	ALLEN COUNTY	KS	LPV	0	100.00%	0	100.00%	0	100.00%
LBL	LIBERAL MID-AMERICA RGNL	KS	LPV	0	100.00%	0	100.00%	0	100.00%
LQR	LARNED PAWNEE CO	KS	LPV	0	100.00%	0	100.00%	0	100.00%
LWC	LAWRENCE MUNICIPAL	KS	LPV200	0	100.00%	0	100.00%	0	100.00%
MHK	MANHATTAN RGNL	KS	LPV200	0	100.00%	0	100.00%	0	100.00%
MPR	MCPHERSON	KS	LPV	0	100.00%	0	100.00%	0	100.00%
MYZ	MARYSVILLE MUNICIPAL	KS	LPV	0	100.00%	0	100.00%	0	100.00%
NRN	NORTON MUNICIPAL	KS	LPV	0	100.00%	0	100.00%	0	100.00%
OEL	OAKLEY MUNICIPAL	KS	LPV	0	100.00%	0	100.00%	0	100.00%
OJC	JOHNSON COUNTY EXECUTIVE	KS	LPV	0	100.00%	0	100.00%	0	100.00%
OWI	OTTAWA MUNICIPAL	KS	LP	0					
PPF	TRI-CITY	KS	LPV	0	100.00%	0	100.00%	0	100.00%
PTS	ATKINSON MUNICIPAL	KS	LPV	0	100.00%	0	100.00%	0	100.00%
PTT	PRATT INDUSTRIAL	KS	LPV	0	100.00%	0	100.00%	0	100.00%
RPB	BELLEVILLE MUNICIPAL	KS	LPV	0	100.00%	0	100.00%	0	100.00%
RSL	RUSSELL MUNICIPAL	KS	LPV	0	100.00%	0	100.00%	0	100.00%
SLN	SALINA MUNICIPAL	KS	LPV	0	100.00%	0	100.00%	0	100.00%
TOP	PHILIP BILLARD MUNICIPAL	KS	LPV200	0	100.00%	0	100.00%	0	100.00%
TQK	SCOTT CITY MUNICIPAL	KS	LPV	0	100.00%	0	100.00%	0	100.00%
UKL	COFFEY COUNTY	KS	LPV	0	100.00%	0	100.00%	0	100.00%
ULS	ULYSSES	KS	LPV	0	100.00%	0	100.00%	0	100.00%
27K	GEORGETOWN SCOTT CO MARSHALL FIELD	KY	LPV200	0	100.00%	0	100.00%	0	100.00%
210	MADISONVILLE MUNICIPAL	KY	LPV	0	100.00%	0	100.00%	0	100.00%
612	LEBANON-SPRINGFIELD	KY	LP	0	100.00%	0	100.00%	0	100.00%
7K4	OHIO COUNTY	KY	LPV	0	100.00%	0	100.00%	0	100.00%
AAS	TAYLOR COUNTY	KY	LP	0	100.00%	0	100.00%	0	100.00%
BRY	SAMUELS FIELD	KY	LPV	0	100.00%	0	100.00%	0	100.00%
BWG	BOWLING GREEN WARREN CTY RGNL	KY	LPV	0	100.00%	0	100.00%	0	100.00%
BYL	WILLIAMSBURG WHITLEY COUNTY	KY	LPV	0	100.00%	0	100.00%	0	100.00%
CEY	KYLE-OAKLEY FIELD	KY	LPV	0	100.00%	0	100.00%	0	100.00%
CPF	WENDELL H FORD	KY	LPV200	0	100.00%	0	100.00%	0	100.00%
CVG	CINCINNATI NORTHERN KENTUCKY INTL	KY	LPV200	0	100.00%	0	100.00%	0	100.00%
DVK	STUART POWELL FIELD	KY	LPV	0	100.00%	0	100.00%	0	100.00%
DWU	ASHLAND RGNL	KY	LP	0	100.00%	0	100.00%	0	100.00%
EHR	HENDERSON CITY-COUNTY	KY	LPV	0	100.00%	0	100.00%	1	100.00%
EKX	ADDINGTON FIELD	KY	LPV	0					
FGX	FLEMING-MASON	KY	LPV	0	100.00%	0	100.00%	0	100.00%
GLW	GLASGOW MUNICIPAL	KY	LPV	0	100.00%	0	100.00%	1	100.00%
HVC	HOPKINSVILLE CHRISTIAN COUNTY	KY	LPV	0					
I39	MADISON	KY	LPV200	0	100.00%	0	100.00%	0	100.00%
K22	BIG SANDY RGNL	KY	LPV	0	100.00%	0	100.00%	1	100.00%
KY8	HANCOCK CO RON LEWIS FIELD	KY	LPV	0	100.00%	0	100.00%	1	100.00%

Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
LEX	BLUE GRASS	KY	LPV	0	100.00%	0	100.00%	0	100.00%
LOU	BOWMAN FIELD	KY	LPV	0	100.00%	0	100.00%	0	100.00%
LOZ	LONDON-CORBIN ARPT MAGEE FIELD	KY	LPV	0	100.00%	0	100.00%	0	100.00%
M21	MUHLENBERG COUNTY	KY	LP	0	100.00%	0	100.00%	0	100.00%
M97	MOREHEAD-ROWAN COUNTY CLYDE A THOMAS RGNL	KY	LPV	0	100.00%	0	100.00%	0	100.00%
OWB	OWENSBORO DAVISS COUNTY	KY	LPV200	0	100.00%	0	100.00%	0	100.00%
PAH	BARKLEY RGNL	KY	LPV	0	100.00%	0	100.00%	0	100.00%
SDF	LOUISVILLE INTL STANDIFORD FIELD	KY	LPV200	0	100.00%	0	100.00%	1	100.00%
SME	LAKE CUMBERLAND RGNL	KY	LPV	0	100.00%	0	100.00%	1	100.00%
TWT	STURGIS MUNICIPAL	KY	LPV	0	100.00%	0	100.00%	1	100.00%
TZV	TOMPKINSVILLE MONROE COUNTY	KY	LPV	0					
1L0	ST JOHN THE BAPTIST PARISH	LA	LPV	0	100.00%	0	100.00%	0	100.00%
3R4	HART	LA	LPV	0	100.00%	0	100.00%	0	100.00%
ACP	ALLEN PARISH	LA	LPV	0	100.00%	0	100.00%	1	100.00%
AEX	ALEXANDRIA INTL	LA	LPV200	0	100.00%	0	100.00%	0	100.00%
ARA	ACADIANA RGNL	LA	LPV	0	100.00%	0	100.00%	0	100.00%
BQP	MOREHOUSE MEMORIAL	LA	LPV	0	100.00%	0	100.00%	0	100.00%
BTR	BATON ROUGE METRO	LA	LPV200	0	100.00%	0	100.00%	0	100.00%
BXA	GEORGE R CARR MEMORIAL AIR FIELD	LA	LPV	0	100.00%	0	100.00%	0	100.00%
CWF	CHENNAULT INTL	LA	LPV200	0	100.00%	0	100.00%	1	100.00%
DTN	SHREVEPORT DOWNTOWN	LA	LPV	0	100.00%	0	100.00%	0	100.00%
ESF	ESLER RGNL	LA	LPV200	0	100.00%	0	100.00%	0	100.00%
F88	JONESBORO	LA	LP	0	100.00%	0	100.00%	0	100.00%
GAO	SOUTH LAFOURCHE LEONARD MILLER JR	LA	LPV	0	100.00%	0	100.00%	0	100.00%
HDC	HAMMOND NORTHSHORE RGNL	LA	LPV200	0	100.00%	0	100.00%	2	100.00%
HUM	HOUMA-TERREBONNE	LA	LPV200	0	100.00%	0	100.00%	1	100.00%
HZR	FALSE RIVER RGNL	LA	LPV	0	100.00%	0	100.00%	0	100.00%
IER	NATCHITOCHESES RGNL	LA	LPV	0	100.00%	0	100.00%	0	100.00%
IYA	ABBEVILLE CHRIS CRUSTA MEML	LA	LPV	0	100.00%	0	100.00%	0	100.00%
L38	LOUISIANA RGNL	LA	LPV	0	100.00%	0	100.00%	0	100.00%
L39	LEESVILLE	LA	LPV	0	100.00%	0	100.00%	0	100.00%
LCH	LAKE CHARLES RGNL	LA	LPV200	0	100.00%	0	100.00%	0	100.00%
LFT	LAFAYETTE RGNL	LA	LPV	0	100.00%	0	100.00%	1	100.00%
M79	JOHN H HOOKS JR MEMORIAL	LA	LPV	0	100.00%	0	100.00%	0	100.00%
MLU	MONROE RGNL	LA	LPV200	0	100.00%	0	100.00%	0	100.00%
MSY	LOUIS ARMSTRONG NEW ORLEANS INTL	LA	LPV200	0	100.00%	0	100.00%	1	100.00%
NEW	LAKEFRONT	LA	LPV	0	100.00%	0	100.00%	0	100.00%
OPL	ST LANDRY PARISH	LA	LPV	0	100.00%	0	100.00%	0	100.00%

Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
	AHART FIELD								
PTN	HARRY P WILLIAMS MEMORIAL	LA	LPV200	0	100.00%	0	100.00%	0	100.00%
RSN	RUSTON RGNL AIRPORT	LA	LPV	0	100.00%	0	100.00%	0	100.00%
SHV	SHREVEPORT RGNL	LA	LPV200	0	100.00%	0	100.00%	0	100.00%
SPH	SPRINGHILL	LA	LPV	0	100.00%	0	100.00%	0	100.00%
TVR	VICKSBURG TALLULAH RGNL	LA	LPV	0	100.00%	0	100.00%	0	100.00%
UXL	SOUTHLAND FIELD	LA	LPV	0	100.00%	0	100.00%	0	100.00%
3B0	SOUTHBRIDGE MUNICIPAL	MA	LPV	0	100.00%	0	100.00%	0	100.00%
ACK	NANTUCKET MEMORIAL	MA	LPV200	0					
BAF	BARNES MUNICIPAL	MA	LPV	0	100.00%	0	100.00%	0	100.00%
BED	LAURENCE G HANSCOM FLD	MA	LPV200	0					
BOS	GEN EDWARD LAWRENCE LOGAN INTL	MA	LPV200	0	100.00%	0	100.00%	0	100.00%
BVY	BEVERLY MUNICIPAL	MA	LPV	0	100.00%	0	100.00%	0	100.00%
EWB	NEW BEDFORD RGNL	MA	LP	0	100.00%	0	100.00%	0	100.00%
GBR	WALTER J KOLADZA	MA	LP	0					
HYA	BARNSTABLE MUNICIPAL BOARDMAN/POLANDO FIELD	MA	LPV200	0	100.00%	0	100.00%	0	100.00%
LWM	LAWRENCE MUNICIPAL	MA	LPV200	0	100.00%	0	100.00%	0	100.00%
MVY	MARTHAS VINEYARD	MA	LPV200	0	100.00%	0	100.00%	0	100.00%
ORE	ORANGE MUNICIPAL	MA	LPV	0	100.00%	0	100.00%	0	100.00%
ORH	WORCESTER RGNL	MA	LPV200	0	100.00%	0	100.00%	0	100.00%
OWD	NORWOOD MEMORIAL	MA	LPV	0	100.00%	0	100.00%	0	100.00%
PYM	PLYMOUTH MUNICIPAL	MA	LPV200	0	100.00%	0	100.00%	0	100.00%
2G4	GARRETT COUNTY	MD	LPV	0					
2W6	ST. MARY'S COUNTY RGNL	MD	LPV	0	100.00%	0	100.00%	0	100.00%
BWI	BALTIMORE WASHINGTON INTL THURGOOD MARSHALL	MD	LPV200	0	100.00%	0	100.00%	0	100.00%
CBE	GREATER CUMBERLAND RGNL	MD	LP	0	100.00%	0	100.00%	0	100.00%
DMW	CARROLL COUNTY REGNL JACK B POAGE FIELD	MD	LPV200	0					
ESN	EASTON/NEWNAM FIELD	MD	LPV	0	100.00%	0	100.00%	0	100.00%
FDK	FREDERICK MUNICIPAL	MD	LPV	0	100.00%	0	100.00%	0	100.00%
GAI	MONTGOMERY COUNTY AIRPARK	MD	LPV	0	100.00%	0	100.00%	0	100.00%
HGR	HAGERSTOWN RGNL RICHARD A HENSON FIELD	MD	LPV200	0	100.00%	0	100.00%	0	100.00%
MTN	MARTIN STATE	MD	LPV	0	100.00%	0	100.00%	0	100.00%
OXB	OCEAN CITY MUNICIPAL	MD	LPV	0	100.00%	0	100.00%	0	100.00%
SBY	SALISBURY OCEAN CITY WICOMICO RGNL	MD	LPV200	0					
1B0	DEXTER RGNL	ME	LP	0	100.00%	0	100.00%	0	100.00%
81B	OXFORD COUNTY RGNL	ME	LP	0	100.00%	0	100.00%	0	100.00%
AUG	AUGUSTA STATE	ME	LPV200	0	100.00%	0	100.00%	0	100.00%
BGR	BANGOR INTL	ME	LPV	0	100.00%	0	100.00%	0	100.00%

Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
BHB	HANCOCK COUNTY BAR HARBOR	ME	LPV200	0	100.00%	0	100.00%	0	100.00%
BXM	BRUNSWICK EXECUTIVE	ME	LPV	0					
FVE	NORTHERN AROOSTOOK RGNL	ME	LPV	0	100.00%	0	100.00%	0	100.00%
HUL	HOULTON INTL	ME	LP	0	100.00%	0	100.00%	0	100.00%
LEW	AUBURN LEWISTON MUNICIPAL	ME	LPV200	0	100.00%	0	100.00%	0	100.00%
MLT	MILLINOCKET MUNICIPAL	ME	LPV	0	100.00%	0	100.00%	0	100.00%
PQI	NORTHERN MAINE RGNL ARPT AT PRESQUE IS	ME	LPV200	0	100.00%	0	100.00%	0	100.00%
PWM	PORTLAND INTL JETPORT	ME	LPV200	0	100.00%	0	100.00%	0	100.00%
RKD	KNOX COUNTY RGNL	ME	LPV	0	100.00%	0	100.00%	0	100.00%
SFM	SANFORD RGNL	ME	LPV200	0	100.00%	0	100.00%	0	100.00%
WVL	WATERVILLE ROBERT LAFLEUR	ME	LPV200	0	100.00%	0	100.00%	0	100.00%
77G	MARLETTE	MI	LPV	0	100.00%	0	100.00%	0	100.00%
9D9	HASTINGS	MI	LP	0	100.00%	0	100.00%	0	100.00%
ACB	ANTRIM COUNTY	MI	LPV	0	100.00%	0	100.00%	0	100.00%
ADG	LENAWEE COUNTY	MI	LPV	0	100.00%	0	100.00%	0	100.00%
AMN	GRATIOT COMMUNITY	MI	LPV	0	100.00%	0	100.00%	0	100.00%
ANJ	SAULT STE MARIE MUNICIPAL SANDERSON FIELD	MI	LPV	0					
APN	ALPENA COUNTY RGNL	MI	LPV	0	100.00%	0	100.00%	0	100.00%
ARB	ANN ARBOR MUNICIPAL	MI	LPV	0	100.00%	0	100.00%	0	100.00%
AZO	KALAMAZOO BATTLE CREEK INTL	MI	LPV	0	100.00%	0	100.00%	0	100.00%
BAX	HURON COUNTY MEMORIAL	MI	LPV	0	100.00%	0	100.00%	0	100.00%
BEH	SOUTHWEST MICHIGAN RGNL	MI	LPV200	0					
BIV	TULIP CITY	MI	LPV	0	100.00%	0	100.00%	0	100.00%
BTL	W K KELLOGG	MI	LPV200	0	100.00%	0	100.00%	0	100.00%
CAD	WEXFORD COUNTY	MI	LPV200	0	100.00%	0	100.00%	0	100.00%
CIU	CHIPPEWA COUNTY INTL	MI	LPV	0	100.00%	0	100.00%	0	100.00%
CMX	HOUGHTON COUNTY MEMORIAL	MI	LPV	0	100.00%	0	100.00%	0	100.00%
CVX	CHARLEVOIX MUNICIPAL	MI	LPV	0	100.00%	0	100.00%	0	100.00%
DET	COLEMAN A YOUNG MUNICIPAL	MI	LPV	0	100.00%	0	100.00%	0	100.00%
DTW	DETROIT METROPOLITAN WAYNE COUNTY	MI	LPV200	0					
ERY	LUCE COUNTY	MI	LPV	0	100.00%	0	100.00%	0	100.00%
ESC	DELTA COUNTY	MI	LPV200	0	100.00%	0	100.00%	0	100.00%
FFX	FREMONT MUNICIPAL	MI	LPV	0					
FNT	BISHOP INTL	MI	LPV200	0	100.00%	0	100.00%	0	100.00%
GDW	GLADWIN ZETTEL MEMORIAL	MI	LP	0	100.00%	0	100.00%	0	100.00%
GLR	GAYLORD RGNL	MI	LPV	0	100.00%	0	100.00%	0	100.00%
GRR	GERALD R. FORD INTL	MI	LPV200	0	100.00%	0	100.00%	0	100.00%
HYX	SAGINAW COUNTY	MI	LPV	0	100.00%	0	100.00%	0	100.00%

Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
	H.W. BROWNE								
IKW	JACK BARSTOW	MI	LPV	0					
IMT	FORD	MI	LPV	0	100.00%	0	100.00%	0	100.00%
IRS	KIRSCH MUNICIPAL	MI	LPV	0	100.00%	0	100.00%	0	100.00%
ISQ	SCHOOLCRAFT COUNTY	MI	LP	0	100.00%	0	100.00%	0	100.00%
IWD	GOGEBIC-IRON COUNTY	MI	LPV200	0	100.00%	0	100.00%	0	100.00%
JXN	JACKSON COUNTY REYNOLDS FIELD	MI	LPV200	0	100.00%	0	100.00%	0	100.00%
LAN	CAPITAL REGION INTL	MI	LPV200	0	100.00%	0	100.00%	0	100.00%
LDM	MASON COUNTY	MI	LPV	0	100.00%	0	100.00%	0	100.00%
LWA	SOUTH HAVEN AREA RGNL	MI	LP	0	100.00%	0	100.00%	0	100.00%
MBS	MBS INTL	MI	LPV200	0	100.00%	0	100.00%	0	100.00%
MCD	MACKINAC ISLAND	MI	LPV	0	100.00%	0	100.00%	0	100.00%
MKG	MUSKEGON COUNTY	MI	LPV200	0	100.00%	0	100.00%	0	100.00%
MNM	MENOMINEE MARINETTE TWIN COUNTY	MI	LPV200	0	100.00%	0	100.00%	0	100.00%
MOP	MOUNT PLEASANT MUNICIPAL	MI	LPV	0	100.00%	0	100.00%	0	100.00%
N98	BOYNE CITY MUNICIPAL	MI	LP	0	100.00%	0	100.00%	0	100.00%
OEB	BRANCH COUNTY MEMORIAL	MI	LPV	0	100.00%	0	100.00%	0	100.00%
OSC	OSCODA-WURTSMITH	MI	LPV200	0	100.00%	0	100.00%	0	100.00%
OZW	LIVINGSTON COUNTY SPENCER J. HARDY	MI	LPV200	0	100.00%	0	100.00%	0	100.00%
PHN	SAINT CLAIR COUNTY INTL	MI	LPV200	0	100.00%	0	100.00%	0	100.00%
PLN	PELLSTON RGNL AIRPORT OF EMMET COUNTY	MI	LPV200	0	100.00%	0	100.00%	0	100.00%
PTK	OAKLAND COUNTY INTL	MI	LPV200	0					
RNP	OWOSSO COMMUNITY	MI	LPV	0	100.00%	0	100.00%	0	100.00%
SAW	SAWYER INTL	MI	LPV200	0	100.00%	0	100.00%	0	100.00%
SLH	CHEBOYGAN COUNTY	MI	LPV	0	100.00%	0	100.00%	0	100.00%
TTF	CUSTER	MI	LPV	0	100.00%	0	100.00%	0	100.00%
TVC	CHERRY CAPITAL	MI	LPV	0	100.00%	0	100.00%	0	100.00%
YIP	WILLOW RUN	MI	LPV	0	100.00%	0	100.00%	0	100.00%
AEL	ALBERT LEA MUNICIPAL	MN	LPV	0	100.00%	0	100.00%	0	100.00%
ANE	ANOKA COUNTY BLAINE ARPT (JANES FIELD)	MN	LPV	0	100.00%	0	100.00%	0	100.00%
AUM	AUSTIN MUNICIPAL	MN	LPV200	0	100.00%	0	100.00%	0	100.00%
AXN	CHANDLER FIELD	MN	LPV	0					
BBB	BENSON MUNICIPAL	MN	LPV	0	100.00%	0	100.00%	0	100.00%
BDE	BAUDETTE INTL	MN	LPV	0	100.00%	0	100.00%	0	100.00%
BDH	WILLMAR MUNICIPAL JOHN L RICE FIELD	MN	LPV	0	100.00%	0	100.00%	0	100.00%
BJI	BEMIDJI RGNL	MN	LPV200	0	100.00%	0	100.00%	0	100.00%
BRD	BRAINERD LAKES RGNL	MN	LPV200	0	100.00%	0	100.00%	0	100.00%
CBG	CAMBRIDGE MUNICIPAL	MN	LPV	0					
CKC	GRAND MARAIS COOK COUNTY	MN	LPV	0	100.00%	0	100.00%	0	100.00%
CKN	CROOKSTON MUNICIPAL KIRKWOOD FIELD	MN	LPV	0	100.00%	0	100.00%	0	100.00%
CNB	MYERS FIELD	MN	LPV	0	100.00%	0	100.00%	0	100.00%

Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
COQ	CLOQUET CARLTON COUNTY	MN	LPV	0	100.00%	0	100.00%	0	100.00%
CQM	COOK MUNICIPAL	MN	LP	0					
D39	SAUK CENTRE MUNICIPAL	MN	LP	0	100.00%	0	100.00%	0	100.00%
DLH	DULUTH INTL	MN	LPV200	0	100.00%	0	100.00%	0	100.00%
DTL	DETROIT LAKES WETHING FIELD	MN	LPV	0	100.00%	0	100.00%	0	100.00%
DXX	LAC QUI PARLE COUNTY	MN	LPV200	0	100.00%	0	100.00%	0	100.00%
ELO	ELY MUNICIPAL	MN	LPV200	0	100.00%	0	100.00%	0	100.00%
ETH	WHEATON MUNICIPAL	MN	LP	0	100.00%	0	100.00%	0	100.00%
FCM	FLYING CLOUD	MN	LPV200	0	100.00%	0	100.00%	0	100.00%
FFM	FERGUS FALLS MUNICIPAL EINAR MICKELSON FLD	MN	LPV200	0	100.00%	0	100.00%	0	100.00%
FKA	FILLMORE COUNTY	MN	LPV	0	100.00%	0	100.00%	0	100.00%
FOZ	BIGFORK MUNICIPAL	MN	LP	0	100.00%	0	100.00%	0	100.00%
FRM	FAIRMONT MUNICIPAL	MN	LPV	0	100.00%	0	100.00%	0	100.00%
FSE	FOSSTON MUNICIPAL	MN	LP	0	100.00%	0	100.00%	0	100.00%
GPZ	GRAND RAPIDS/ITASCA CO-GORDON NEWSTROM	MN	LPV	0					
HCD	HUTCHINSON MUNICIPAL BUTLER FIELD	MN	LPV	0	100.00%	0	100.00%	0	100.00%
HIB	RANGE RGNL	MN	LPV200	0	100.00%	0	100.00%	0	100.00%
INL	FALLS INTL	MN	LPV	0	100.00%	0	100.00%	0	100.00%
JKJ	MOORHEAD MUNICIPAL	MN	LPV	0					
LJF	LITCHFIELD MUNICIPAL	MN	LPV	0	100.00%	0	100.00%	0	100.00%
LVN	AIRLAKE	MN	LPV200	0	100.00%	0	100.00%	0	100.00%
LXL	LITTLE FALLS/MORRISON CO-LINDBERGH FLD	MN	LPV	0	100.00%	0	100.00%	0	100.00%
LYV	QUENTIN AANENSON FIELD	MN	LPV200	0	100.00%	0	100.00%	0	100.00%
MGG	MAPLE LAKE MUNICIPAL	MN	LP	0	100.00%	0	100.00%	0	100.00%
MKT	MANKATO RGNL	MN	LPV200	0	100.00%	0	100.00%	0	100.00%
MML	SOUTHWEST MINNESOTA RGNL MARSHALL/RYAN FIELD	MN	LPV200	0	100.00%	0	100.00%	1	100.00%
MSP	MINNEAPOLIS ST PAUL INTL WOLD-CHAMBERLAIN	MN	LPV200	0	100.00%	0	100.00%	0	100.00%
MZH	MOOSE LAKE CARLTON COUNTY	MN	LPV	0	100.00%	0	100.00%	0	100.00%
ONA	WINONA MUNICIPAL MAX CONRAD FIELD	MN	LPV	0	100.00%	0	100.00%	0	100.00%
ORB	ORR RGNL	MN	LP	0	100.00%	0	100.00%	0	100.00%
OTG	WORTHINGTON MUNICIPAL	MN	LPV200	0	100.00%	0	100.00%	0	100.00%
OWA	OWATONNA DEGNER RNGL	MN	LPV200	0	100.00%	0	100.00%	0	100.00%
PKD	PARK RAPIDS MUNICIPAL KONSHOK FIELD	MN	LPV200	0	100.00%	0	100.00%	0	100.00%
RGK	RED WING RGNL	MN	LPV200	0	100.00%	0	100.00%	0	100.00%
ROS	RUSH CITY RGNL	MN	LPV	0	100.00%	0	100.00%	0	100.00%
ROX	ROSEAU MUNICIPAL RUDY BILLBERG FIELD	MN	LPV	0	100.00%	0	100.00%	0	100.00%
RRT	WARROAD INTL MEMORIAL	MN	LPV	0	100.00%	0	100.00%	0	100.00%

Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
RST	ROCHESTER INTL	MN	LPV200	0					
RWF	REDWOOD FALLS MUNICIPAL	MN	LPV	0	100.00%	0	100.00%	0	100.00%
SAZ	STAPLES MUNICIPAL	MN	LPV	0	100.00%	0	100.00%	0	100.00%
STC	ST CLOUD RGNL	MN	LPV200	0	100.00%	0	100.00%	0	100.00%
STP	ST PAUL DOWNTOWN HOLMAN FLD	MN	LPV	0	100.00%	0	100.00%	0	100.00%
TVF	THIEF RIVER FALLS	MN	LPV	0	100.00%	0	100.00%	1	100.00%
TWM	RICHARD B HELGESON	MN	LPV	0	100.00%	0	100.00%	0	100.00%
VVV	ORTONVILLE MUNICIPAL MARTINSON FIELD	MN	LP	0	100.00%	0	100.00%	0	100.00%
1H0	CREVE COEUR	MO	LPV	0	100.00%	0	100.00%	0	100.00%
2H2	JERRY SUMNERS SR AURORA MUNICIPAL	MO	LP	0	100.00%	0	100.00%	0	100.00%
6M6	LEWIS COUNTY RGNL	MO	LPV	0	100.00%	0	100.00%	0	100.00%
8WC	WASHINGTON COUNTY AIRPORT	MO	LPV	0	100.00%	0	100.00%	0	100.00%
AIZ	LEE C FINE MEMORIAL	MO	LPV	0	100.00%	0	100.00%	0	100.00%
BBG	BRANSON	MO	LPV200	0	100.00%	0	100.00%	0	100.00%
BUM	BUTLER MEMORIAL	MO	LPV	0					
CGI	CAPE GIRARDEAU RGNL	MO	LPV	0	100.00%	0	100.00%	0	100.00%
CHT	CHILLICOTHE MUNICIPAL	MO	LPV	0	100.00%	0	100.00%	0	100.00%
COU	COLUMBIA RGNL	MO	LPV	0	100.00%	0	100.00%	0	100.00%
DMO	SEDALIA MEMORIAL	MO	LPV	0	100.00%	0	100.00%	0	100.00%
DXE	DEXTER MUNICIPAL	MO	LPV	0	100.00%	0	100.00%	0	100.00%
EIW	COUNTY MEMORIAL	MO	LPV	0	100.00%	0	100.00%	0	100.00%
EOS	NEOSHO HUGH ROBINSON	MO	LPV	0	100.00%	0	100.00%	0	100.00%
EVU	NORTHWEST MISSOURI RGNL	MO	LPV	0	100.00%	0	100.00%	0	100.00%
EZZ	CAMERON MEMORIAL	MO	LPV	0	100.00%	0	100.00%	0	100.00%
FAM	FARMINGTON RGNL	MO	LPV	0	100.00%	0	100.00%	1	100.00%
FTT	ELTON HENSLEY MEMORIAL	MO	LPV	0	100.00%	0	100.00%	0	100.00%
FWB	BRANSON WEST MUNICIPAL EMERSON FIELD	MO	LPV200	0	100.00%	0	100.00%	0	100.00%
FYG	WASHINGTON RGNL	MO	LPV	0	100.00%	0	100.00%	0	100.00%
GPH	MIDWEST NATIONAL AIR CENTER	MO	LPV	0	100.00%	0	100.00%	0	100.00%
H21	CAMDENTON MEMORIAL	MO	LPV	0	100.00%	0	100.00%	0	100.00%
H79	ELDON MODEL AIRPARK	MO	LP	0	100.00%	0	100.00%	0	100.00%
HAE	HANNIBAL RGNL	MO	LPV	0					
HFJ	MONETT MUNICIPAL	MO	LPV	0	100.00%	0	100.00%	0	100.00%
HIG	HIGGINSVILLE INDUSTRIAL MUNICIPAL	MO	LPV	0	100.00%	0	100.00%	0	100.00%
IRK	KIRKSVILLE RGNL	MO	LPV200	0	100.00%	0	100.00%	0	100.00%
JEF	JEFFERSON CITY MEMORIAL	MO	LPV	0	100.00%	0	100.00%	1	99.98%
JLN	JOPLIN RGNL	MO	LPV	0	100.00%	0	100.00%	0	100.00%
K02	PERRYVILLE MUNICIPAL	MO	LPV	0					
K57	GOULD PETERSON MUNICIPAL	MO	LPV	0	100.00%	0	100.00%	1	99.99%
LRV	LAWRENCE SMITH MEMORIAL	MO	LPV	0	100.00%	0	100.00%	1	100.00%

Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
LXT	LEE'S SUMMIT MUNICIPAL	MO	LPV	0	100.00%	0	100.00%	0	100.00%
M05	CARUTHERSVILLE MEM	MO	LPV	0	100.00%	0	100.00%	1	99.99%
M17	BOLIVAR MUNICIPAL	MO	LPV	0					
M48	HOUSTON MEMORIAL	MO	LPV	0	100.00%	0	100.00%	1	99.99%
MAW	MALDEN MUNICIPAL	MO	LPV	0					
MBY	OMAR N BRADLEY	MO	LPV	0	100.00%	0	100.00%	0	100.00%
MCI	KANSAS CITY INTL	MO	LPV	0	100.00%	0	100.00%	1	99.99%
MHL	MARSHALL MEML MUNICIPAL	MO	LPV	0	100.00%	0	100.00%	1	99.99%
MKC	CHARLES B. WHEELER DOWNTOWN	MO	LPV200	0	100.00%	0	100.00%	0	100.00%
MO8	NORTH CENTRAL MISSOURI RGNL	MO	LPV	0	100.00%	0	100.00%	1	99.99%
MYJ	MEXICO MEMORIAL	MO	LPV	0	100.00%	0	100.00%	1	100.00%
NVD	NEVADA MUNICIPAL	MO	LPV200	0					
PLK	M. GRAHAM CLARK DOWNTOWN	MO	LPV200	0	100.00%	0	100.00%	0	100.00%
POF	POPLAR BLUFF MUNICIPAL	MO	LPV	0	100.00%	0	100.00%	1	99.99%
RCM	SKYHAVEN	MO	LPV	0	100.00%	0	100.00%	0	100.00%
SGF	SPRINGFIELD BRANSON NATIONAL	MO	LPV	0	100.00%	0	100.00%	0	100.00%
SIK	SIKESTON MEML MUNICIPAL	MO	LPV	0	100.00%	0	100.00%	0	100.00%
STJ	ROSECRANS MEMORIAL	MO	LPV200	0	100.00%	0	100.00%	0	100.00%
STL	LAMBERT-ST LOUIS INTL	MO	LPV200	0	100.00%	0	100.00%	1	99.99%
SUS	SPIRIT OF ST LOUIS	MO	LPV200	0	100.00%	0	100.00%	0	100.00%
TBN	WAYNESVILLE ST ROBERT RGNL FORNEY AAF	MO	LPV	0	100.00%	0	100.00%	1	99.99%
TRX	TRENTON MUNICIPAL	MO	LPV	0	100.00%	0	100.00%	1	99.99%
UBX	CUBA MUNICIPAL	MO	LPV	0	100.00%	0	100.00%	0	100.00%
UNO	WEST PLAINS MUNICIPAL	MO	LPV	0	100.00%	0	100.00%	1	99.99%
UUV	SULLIVAN RGNL	MO	LPV	0	100.00%	0	100.00%	1	99.99%
VER	JESSE VIERTTEL MEMORIAL	MO	LPV	0	100.00%	0	100.00%	1	100.00%
VIH	ROLLA NATIONAL	MO	LPV200	0	100.00%	0	100.00%	0	100.00%
87I	YAZOO COUNTY	MS	LPV	0	100.00%	0	100.00%	0	100.00%
CKM	FLETCHER FIELD	MS	LPV	0	100.00%	0	100.00%	0	100.00%
CRX	ROSCOE TURNER	MS	LPV200	0	100.00%	0	100.00%	0	100.00%
GLH	MID DELTA RGNL	MS	LPV200	0	100.00%	0	100.00%	0	100.00%
GNF	GRENADA MUNICIPAL	MS	LPV	0	100.00%	0	100.00%	0	100.00%
GPT	GULFPORT-BILOXI INTL	MS	LPV200	0	100.00%	0	100.00%	0	100.00%
GTR	GOLDEN TRIANGLE RGNL	MS	LPV200	0					
GWO	GREENWOOD-LEFLORE	MS	LPV	0	100.00%	0	100.00%	0	100.00%
HBG	HATTIESBURG BOBBY L. CHAIN MUNICIPAL	MS	LPV200	0					
HEZ	HARDY-ANDERS FIELD NATCHEZ-ADAMS COUNTY	MS	LPV	0					
HKS	HAWKINS FIELD	MS	LPV200	0	100.00%	0	100.00%	1	100.00%
HSA	STENNIS INTL	MS	LPV200	0	100.00%	0	100.00%	0	100.00%
IDL	INDIANOLA MUNICIPAL	MS	LPV	0					
JAN	JACKSON-EVERS INTL	MS	LPV200	0	100.00%	0	100.00%	1	99.99%
JVW	JOHN BELL WILLIAMS	MS	LPV200	0	100.00%	0	100.00%	0	100.00%



Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
LUL	HESLER-NOBLE FIELD	MS	LPV	0	100.00%	0	100.00%	0	100.00%
M40	MONROE COUNTY	MS	LPV	0	100.00%	0	100.00%	1	100.00%
M43	PRENTISS JEFFERSON DAVIS COUNTY	MS	LPV	0	100.00%	0	100.00%	0	100.00%
MCB	MC COMB PIKE COUNTY JOHN E LEWIS FIELD	MS	LPV	0	100.00%	0	100.00%	0	100.00%
MEI	KEY FIELD	MS	LPV200	0	100.00%	0	100.00%	1	99.98%
MJD	PICAYUNE MUNICIPAL	MS	LPV	0					
MPE	PHILADELPHIA MUNICIPAL	MS	LPV	0	100.00%	0	100.00%	1	99.98%
OLV	OLIVE BRANCH	MS	LPV	0	100.00%	0	100.00%	0	100.00%
PIB	HATTIESBURG-LAUREL RGNL	MS	LPV200	0	100.00%	0	100.00%	0	100.00%
PQL	TRENT LOTT INTL	MS	LPV200	0	100.00%	0	100.00%	0	100.00%
RNV	CLEVELAND MUNICIPAL	MS	LPV	0	100.00%	0	100.00%	0	100.00%
STF	GEORGE M BRYAN	MS	LPV200	0	100.00%	0	100.00%	0	100.00%
TUP	TUPELO RGNL	MS	LPV200	0					
UOX	UNIVERSITY-OXFORD	MS	LPV	0	100.00%	0	100.00%	1	99.99%
UTA	TUNICA MUNICIPAL	MS	LPV200	0	100.00%	0	100.00%	1	99.99%
1S3	TILLITT FIELD	MT	LPV	0	100.00%	0	100.00%	0	100.00%
4U6	CIRCLE TOWN COUNTY	MT	LPV	0					
6S8	LAUREL MUNICIPAL	MT	LPV	0	100.00%	0	100.00%	0	100.00%
7S0	RONAN	MT	LPV	0	100.00%	0	100.00%	0	100.00%
BIL	BILLINGS LOGAN INTL	MT	LPV200	0					
BTM	BERT MOONEY	MT	LPV	0	100.00%	0	100.00%	0	100.00%
BZN	GALLATIN FIELD	MT	LPV	0	100.00%	0	100.00%	0	100.00%
GDV	DAWSON COMMUNITY	MT	LPV	0	100.00%	0	100.00%	0	100.00%
GGW	WOKAL FIELD GLASGOW INTL	MT	LPV200	0	100.00%	0	100.00%	0	100.00%
GPI	GLACIER PARK INTL	MT	LPV	0	100.00%	0	100.00%	0	100.00%
GTF	GREAT FALLS INTL	MT	LPV200	0	100.00%	0	100.00%	0	100.00%
HLN	HELENA RGNL	MT	LPV	0	100.00%	0	100.00%	0	100.00%
HVR	HAVRE CITY-COUNTY	MT	LPV	0	100.00%	0	100.00%	0	100.00%
LVM	MISSION FIELD	MT	LP	0	100.00%	0	100.00%	0	100.00%
LWT	LEWISTOWN MUNICIPAL	MT	LPV200	0	100.00%	0	100.00%	0	100.00%
M75	MALTA	MT	LP	0	100.00%	0	100.00%	0	100.00%
MLS	FRANK WILEY FIELD	MT	LPV	0	100.00%	0	100.00%	0	100.00%
MSO	MISSOULA INTERNATIONAL	MT	LPV	0	100.00%	0	100.00%	0	100.00%
OLF	L M CLAYTON	MT	LPV200	0	100.00%	0	100.00%	0	100.00%
PWD	SHER-WOOD	MT	LPV200	0	100.00%	0	100.00%	0	100.00%
RPX	ROUNDUP	MT	LPV	0	100.00%	0	100.00%	0	100.00%
SBX	SHELBY	MT	LP	0	100.00%	0	100.00%	0	100.00%
SDY	SIDNEY RICHLAND MUNICIPAL	MT	LPV	0	100.00%	0	100.00%	0	100.00%
WYS	YELLOWSTONE	MT	LPV200	0	100.00%	0	100.00%	0	100.00%
CYCL	CHARLO	NB	LPV	0					
CYQM	MONCTON INTL	NB	LPV	0	100.00%	0	100.00%	0	100.00%
AFP	ANSON COUNTY JEFF CLOUD FIELD	NC	LPV	0	100.00%	0	100.00%	0	100.00%
AKH	GASTONIA MUNICIPAL	NC	LPV	0	100.00%	0	100.00%	0	100.00%
AVL	ASHEVILLE RGNL	NC	LPV	0	100.00%	0	100.00%	0	100.00%
BUY	BURLINGTON	NC	LPV200	0	100.00%	0	100.00%	0	100.00%

Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
	ALAMANCE RGNL								
CLT	CHARLOTTE/DOUGLAS INTL	NC	LPV200	0					
CTZ	CLINTON-SAMPSON COUNTY	NC	LPV200	0	100.00%	0	100.00%	0	100.00%
DPL	DUPLIN COUNTY	NC	LPV200	0	100.00%	0	100.00%	0	100.00%
ECG	ELIZABETH CITY CG AIR STATION RGNL	NC	LPV	0	100.00%	0	100.00%	0	100.00%
EDE	NORTHEASTERN RGNL	NC	LPV200	0	100.00%	0	100.00%	0	100.00%
EHO	SHELBY CLEVELAND COUNTY RGNL	NC	LPV	0	100.00%	0	100.00%	0	100.00%
EQY	MONROE RGNL	NC	LPV	0	100.00%	0	100.00%	0	100.00%
EWN	COASTAL CAROLINA RGNL	NC	LPV	0	100.00%	0	100.00%	0	100.00%
EXX	DAVIDSON COUNTY	NC	LPV	0	100.00%	0	100.00%	0	100.00%
EYF	CURTIS L BROWN JR FIELD	NC	LPV200	0	100.00%	0	100.00%	0	100.00%
FAY	FAYETTEVILLE RGNL GRANNIS FIELD	NC	LPV200	0	100.00%	0	100.00%	0	100.00%
FQD	RUTHERFORD CO MARCHMAN FIELD	NC	LPV	0	100.00%	0	100.00%	0	100.00%
GSO	PIEDMONT TRIAD INTL	NC	LPV200	0	100.00%	0	100.00%	0	100.00%
GWV	WAYNE EXECUTIVE JETPORT	NC	LPV200	0	100.00%	0	100.00%	0	100.00%
HKY	HICKORY RGNL	NC	LPV200	0	100.00%	0	100.00%	0	100.00%
HNZ	HENDERSON-OXFORD	NC	LPV	0	100.00%	0	100.00%	0	100.00%
HRJ	HARNETT COUNTY	NC	LPV	0	100.00%	0	100.00%	0	100.00%
ILM	WILMINGTON INTL	NC	LPV200	0	100.00%	0	100.00%	0	100.00%
INT	SMITH REYNOLDS	NC	LPV200	0	100.00%	0	100.00%	0	100.00%
IPJ	LINCOLN LINCOLN COUNTY RGNL	NC	LPV	0	100.00%	0	100.00%	0	100.00%
ISO	KINSTON REGL JETPORT AT STALLINGS FIELD	NC	LPV	0	100.00%	0	100.00%	0	100.00%
IXA	HALIFAX NORTHAMPTON RGNL	NC	LPV200	0	100.00%	0	100.00%	0	100.00%
JNX	JOHNSTON COUNTY	NC	LPV200	0	100.00%	0	100.00%	0	100.00%
JQF	CONCORD RGNL	NC	LPV	0					
LBT	LUMBERTON MUNICIPAL	NC	LPV	0	100.00%	0	100.00%	0	100.00%
LHZ	TRIANGLE NORTH EXECUTIVE	NC	LPV200	0	100.00%	0	100.00%	0	100.00%
MEB	LAURINBURG-MAXTON	NC	LPV200	0	100.00%	0	100.00%	0	100.00%
MQI	DARE COUNTY RGNL	NC	LPV	0	100.00%	0	100.00%	0	100.00%
MRH	MICHAEL J. SMITH FIELD	NC	LPV	0	100.00%	0	100.00%	0	100.00%
MRN	FOOTHILLS RGNL	NC	LPV200	0					
MWK	MOUNT AIRY SURRY COUNTY	NC	LPV	0					
OAJ	ALBERT J ELLIS	NC	LPV200	0	100.00%	0	100.00%	0	100.00%
OCW	WARREN FIELD	NC	LPV	0	100.00%	0	100.00%	0	100.00%
ONX	CURRITUCK COUNTY RGNL	NC	LPV	0	100.00%	0	100.00%	0	100.00%
PGV	PITT-GREENVILLE	NC	LPV	0	100.00%	0	100.00%	0	100.00%
PMZ	PLYMOUTH MUNICIPAL	NC	LP	0	100.00%	0	100.00%	0	100.00%
RCZ	RICHMOND COUNTY	NC	LPV	0	100.00%	0	100.00%	0	100.00%
RDU	RALEIGH-DURHAM INTL	NC	LPV200	0	100.00%	0	100.00%	0	100.00%
RUQ	ROWAN COUNTY	NC	LPV200	0	100.00%	0	100.00%	0	100.00%
RWI	ROCKY MOUNT	NC	LPV	0	100.00%	0	100.00%	0	100.00%

Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
	WILSON RGNL								
SOP	MOORE COUNTY	NC	LPV	0	100.00%	0	100.00%	0	100.00%
SUT	CAPE FEAR RGNL JETPORT HOWIE FRANKLIN FLD	NC	LPV	0	100.00%	0	100.00%	0	100.00%
SVH	STATESVILLE RGNL	NC	LPV	0	100.00%	0	100.00%	0	100.00%
TDF	PERSON COUNTY	NC	LPV200	0	100.00%	0	100.00%	0	100.00%
TTA	RALEIGH EXEC AT SANFORD LEE COUNTY	NC	LPV200	0	100.00%	0	100.00%	0	100.00%
VUJ	STANLY COUNTY	NC	LPV200	0	100.00%	0	100.00%	0	100.00%
2C8	CAVALIER MUNICIPAL	ND	LPV	0					
5N8	CASSELTON ROBERT MILLER RGNL	ND	LPV	0	100.00%	0	100.00%	0	100.00%
BAC	BARNES COUNTY MUNICIPAL	ND	LPV	0	100.00%	0	100.00%	0	100.00%
BIS	BISMARCK MUNICIPAL	ND	LPV200	0	100.00%	0	100.00%	0	100.00%
BWP	HARRY STERN	ND	LPV	0	100.00%	0	100.00%	0	100.00%
D09	BOTTINEAU MUNICIPAL	ND	LPV	0	100.00%	0	100.00%	0	100.00%
D55	ROBERTSON FIELD	ND	LPV	0	100.00%	0	100.00%	0	100.00%
D60	TIOGA MUNICIPAL	ND	LPV	0	100.00%	0	100.00%	0	100.00%
DIK	DICKINSON THEODORE ROOSEVELT RGNL	ND	LPV200	0	100.00%	0	100.00%	0	100.00%
DVL	DEVILS LAKE RGNL	ND	LPV	0	100.00%	0	100.00%	0	100.00%
FAR	HECTOR INTL	ND	LPV200	0					
GAF	HUTSON FIELD	ND	LPV	0	100.00%	0	100.00%	0	100.00%
GFK	GRAND FORKS INTL	ND	LPV	0	100.00%	0	100.00%	0	100.00%
GWR	GWINNER ROGER MELROE FIELD	ND	LPV200	0	100.00%	0	100.00%	0	100.00%
HZE	MERCER COUNTY RGNL	ND	LPV	0	100.00%	0	100.00%	0	100.00%
ISN	SLOULIN FLD INTL	ND	LPV200	0	100.00%	0	100.00%	0	100.00%
JMS	JAMESTOWN RGNL	ND	LPV200	0	100.00%	0	100.00%	0	100.00%
MOT	MINOT INTL	ND	LPV	0	100.00%	0	100.00%	0	100.00%
RUG	RUGBY MUNICIPAL	ND	LP	0	100.00%	0	100.00%	0	100.00%
S25	WATFORD CITY MUNICIPAL	ND	LPV	0	100.00%	0	100.00%	0	100.00%
07K	CENTRAL CITY MUNICIPAL LARRY REINEKE FIELD	NE	LPV	0	100.00%	0	100.00%	0	100.00%
0B4	HARTINGTON MUNICIPAL	NE	LPV	0	100.00%	0	100.00%	0	100.00%
0C4	PENDER MUNICIPAL	NE	LPV	0	100.00%	0	100.00%	0	100.00%
0V3	PIONEER VILLAGE FIELD	NE	LPV	0	100.00%	0	100.00%	0	100.00%
12K	SUPERIOR MUNICIPAL	NE	LPV	0	100.00%	0	100.00%	0	100.00%
4V9	ANTELOPE COUNTY	NE	LPV	0	100.00%	0	100.00%	0	100.00%
6K3	CREIGHTON MUNICIPAL	NE	LPV	0	100.00%	0	100.00%	0	100.00%
7V7	RED CLOUD MUNICIPAL	NE	LPV	0	100.00%	0	100.00%	0	100.00%
8V2	STUART ATKINSON MUNICIPAL	NE	LPV	0	100.00%	0	100.00%	0	100.00%
93Y	DAVID CITY MUNICIPAL	NE	LPV	0	100.00%	0	100.00%	0	100.00%
9V5	MODISSETT	NE	LPV	0	100.00%	0	100.00%	0	100.00%
AFK	NEBRASKA CITY MUNICIPAL	NE	LPV	0	100.00%	0	100.00%	0	100.00%
AHQ	WAHOO MUNICIPAL	NE	LPV	0					
AIA	ALLIANCE MUNICIPAL	NE	LPV200	0	100.00%	0	100.00%	0	100.00%
ANW	AINSWORTH MUNICIPAL	NE	LPV200	0	100.00%	0	100.00%	0	100.00%

Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
AUH	AURORA MUNICIPAL AL POTTER FIELD	NE	LPV	0	100.00%	0	100.00%	0	100.00%
BBW	BROKEN BOW MUNICIPAL	NE	LPV	0	100.00%	0	100.00%	0	100.00%
BFF	WESTERN NEB. RGNL WILLIAM B. HEILIG FIELD	NE	LPV	0	100.00%	0	100.00%	0	100.00%
BIE	BEATRICE MUNICIPAL	NE	LPV200	0	100.00%	0	100.00%	0	100.00%
BVN	ALBION MUNICIPAL	NE	LPV	0	100.00%	0	100.00%	0	100.00%
CDR	CHADRON MUNICIPAL	NE	LPV200	0	100.00%	0	100.00%	0	100.00%
CEK	CRETE MUNICIPAL	NE	LPV	0	100.00%	0	100.00%	0	100.00%
CZD	COZAD MUNICIPAL	NE	LPV	0	100.00%	0	100.00%	0	100.00%
EAR	KEARNEY RGNL	NE	LPV200	0	100.00%	0	100.00%	0	100.00%
FBY	FAIRBURY MUNICIPAL	NE	LPV	0	100.00%	0	100.00%	0	100.00%
FET	FREMONT MUNICIPAL	NE	LPV	0	100.00%	0	100.00%	0	100.00%
FMZ	FAIRMONT STATE AIRFIELD	NE	LPV	0	100.00%	0	100.00%	0	100.00%
FNB	BRENNER FIELD	NE	LPV	0					
GGF	GRANT MUNICIPAL	NE	LPV	0	100.00%	0	100.00%	0	100.00%
GRI	CENTRAL NEBRASKA RGNL	NE	LPV	0	100.00%	0	100.00%	0	100.00%
GRN	GORDON MUNICIPAL	NE	LPV	0	100.00%	0	100.00%	0	100.00%
HDE	BREWSTER FIELD	NE	LPV	0	100.00%	0	100.00%	0	100.00%
HSI	HASTINGS MUNICIPAL	NE	LPV	0					
IBM	KIMBALL MUNICIPAL ROBERT E ARRAJ FIELD	NE	LPV	0	100.00%	0	100.00%	0	100.00%
IML	IMPERIAL MUNICIPAL	NE	LPV	0	100.00%	0	100.00%	0	100.00%
JYR	YORK MUNICIPAL	NE	LPV	0	100.00%	0	100.00%	0	100.00%
LBF	NORTH PLATTE RGNL AIRPORT LEE BIRD FIELD	NE	LPV	0					
LCG	WAYNE MUNICIPAL	NE	LPV	0	100.00%	0	100.00%	0	100.00%
LNK	LINCOLN	NE	LPV	0	100.00%	0	100.00%	0	100.00%
LXN	JIM KELLY FIELD	NE	LPV	0	100.00%	0	100.00%	0	100.00%
MCK	MCCOOK RGNL	NE	LPV	0	100.00%	0	100.00%	0	100.00%
MLE	MILLARD	NE	LPV	0					
ODX	EVELYN SHARP FIELD	NE	LPV	0	100.00%	0	100.00%	0	100.00%
OFK	KARL STEFAN MEMORIAL	NE	LPV	0	100.00%	0	100.00%	0	100.00%
OGA	SEARLE FIELD	NE	LPV	0					
OKS	GARDEN COUNTY	NE	LPV	0	100.00%	0	100.00%	0	100.00%
OLU	COLUMBUS MUNICIPAL	NE	LPV	0	100.00%	0	100.00%	0	100.00%
OMA	EPPLEY AIRFIELD	NE	LPV	0	100.00%	0	100.00%	0	100.00%
ONL	THE O'NEILL MUNICIPAL JOHN L BAKER FIELD	NE	LPV	0	100.00%	0	100.00%	0	100.00%
PMV	PLATTSMOUTH MUNICIPAL	NE	LPV	0	100.00%	0	100.00%	0	100.00%
RBE	ROCK COUNTY	NE	LPV	0	100.00%	0	100.00%	0	100.00%
SNY	SIDNEY MUNICIPAL LLOYD W. CARR FIELD	NE	LPV	0	100.00%	0	100.00%	0	100.00%
SWT	SEWARD MUNICIPAL	NE	LPV	0	100.00%	0	100.00%	0	100.00%
TIF	THOMAS COUNTY	NE	LPV	0	100.00%	0	100.00%	0	100.00%
VTN	MILLER FIELD	NE	LPV	0	100.00%	0	100.00%	0	100.00%
ASH	BOIRE FLD	NH	LPV	0	100.00%	0	100.00%	0	100.00%
CNH	CLAREMONT MUNICIPAL	NH	LP	0	100.00%	0	100.00%	0	100.00%
CON	CONCORD MUNICIPAL	NH	LPV	0	100.00%	0	100.00%	0	100.00%
DAW	SKYHAVEN	NH	LPV	0	100.00%	0	100.00%	0	100.00%
EEN	DILLANT-HOPKINS	NH	LPV	0					

Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
HIE	MOUNT WASHINGTON RGNL	NH	LPV	0	100.00%	0	100.00%	0	100.00%
LCI	LACONIA MUNICIPAL	NH	LPV	0	100.00%	0	100.00%	0	100.00%
LEB	LEBANON MUNICIPAL	NH	LPV	0					
MHT	MANCHESTER	NH	LPV200	0	100.00%	0	100.00%	0	100.00%
PSM	PORTSMOUTH INTL AT PEASE	NH	LPV200	0	100.00%	0	100.00%	0	100.00%
39N	PRINCETON	NJ	LPV	0	100.00%	0	100.00%	0	100.00%
47N	CENTRAL JERSEY RGNL	NJ	LP	0	100.00%	0	100.00%	0	100.00%
4N1	GREENWOOD LAKE	NJ	LP	0	100.00%	0	100.00%	0	100.00%
ACY	ATLANTIC CITY INTL	NJ	LPV200	0	100.00%	0	100.00%	0	100.00%
CDW	ESSEX COUNTY	NJ	LPV	0	100.00%	0	100.00%	0	100.00%
EWR	NEWARK LIBERTY INTL	NJ	LPV	0	100.00%	0	100.00%	0	100.00%
MIV	MILLVILLE MUNICIPAL	NJ	LPV200	0	100.00%	0	100.00%	0	100.00%
MMU	MORRISTOWN MUNICIPAL	NJ	LPV200	0					
N14	FLYING W	NJ	LPV	0	100.00%	0	100.00%	0	100.00%
N40	SKY MANOR	NJ	LP	0	100.00%	0	100.00%	0	100.00%
TEB	TETERBORO	NJ	LPV	0	100.00%	0	100.00%	0	100.00%
TTN	TRENTON MERCER	NJ	LPV200	0	100.00%	0	100.00%	0	100.00%
VAY	SOUTH JERSEY RGNL	NJ	LP	0	100.00%	0	100.00%	0	100.00%
WWD	CAPE MAY COUNTY	NJ	LPV	0	100.00%	0	100.00%	0	100.00%
CYDF	DEER LAKE	NL	LPV	0	100.00%	0	100.00%	0	100.00%
ABQ	ALBUQUERQUE INTL SUNPORT	NM	LPV	0	100.00%	0	100.00%	0	100.00%
CNM	CAVERN CITY AIR TRML	NM	LP	0	100.00%	0	100.00%	0	100.00%
CVN	CLOVIS MUNICIPAL	NM	LPV	0					
DMN	DEMING MUNICIPAL	NM	LPV	0	100.00%	0	100.00%	0	100.00%
FMN	FOUR CORNERS RGNL	NM	LPV200	0	100.00%	0	100.00%	0	100.00%
HOB	LEA COUNTY RGNL	NM	LPV200	0					
LAM	LOS ALAMOS	NM	LP	0	100.00%	0	100.00%	0	100.00%
ONM	SOCORRO MUNICIPAL	NM	LP	0	100.00%	0	100.00%	0	100.00%
ROW	ROSWELL INTL AIR CENTER	NM	LPV	0	100.00%	0	100.00%	0	100.00%
SRR	SIERRA BLANCA RGNL	NM	LPV200	0					
SVC	GRANT COUNTY	NM	LPV	0	100.00%	0	100.00%	0	100.00%
CYHZ	HALIFAX / STANFIELD INTL	NS	LPV	0	100.00%	0	100.00%	1	99.99%
CYEV	INUVIK	NT	LPV	4	100.00%	0	100.00%	1	100.00%
ELY	ELY ARPT-YELLAND FLD	NV	LPV	0					
LAS	MC CARRAN INTL	NV	LPV	0	100.00%	0	100.00%	0	100.00%
RNO	RENO/TAHOE INTL	NV	LPV	0	100.00%	0	100.00%	0	100.00%
RTS	RENO/STEAD	NV	LPV	0	100.00%	0	100.00%	0	100.00%
TPH	TONOPAH	NV	LP	0	100.00%	0	100.00%	0	100.00%
WMC	WINNEMUCCA MUNICIPAL	NV	LPV	0	100.00%	0	100.00%	1	99.99%
06N	RANDALL	NY	LP	0	100.00%	0	100.00%	0	100.00%
1B1	COLUMBIA COUNTY	NY	LPV	0	100.00%	0	100.00%	0	100.00%
44N	SKY ACRES	NY	LPV	0					
4B6	TICONDEROGA MUNICIPAL	NY	LPV	0	100.00%	0	100.00%	1	100.00%
5B2	SARATOGA COUNTY	NY	LPV	0	100.00%	0	100.00%	1	100.00%
5G0	LE ROY	NY	LP	0	100.00%	0	100.00%	1	99.99%
7G0	LEDGEDALE AIRPARK	NY	LPV	0	100.00%	0	100.00%	1	100.00%
9G0	BUFFALO AIRFIELD	NY	LP	0	100.00%	0	100.00%	0	100.00%
ALB	ALBANY INTL	NY	LPV200	0					
ART	WATERTOWN INTL	NY	LPV200	0	100.00%	0	100.00%	0	100.00%

Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
BGM	GREATER BINGHAMTON EDWIN A LINK FIELD	NY	LPV200	0	100.00%	0	100.00%	0	100.00%
BUF	BUFFALO NIAGARA INTL	NY	LPV200	0	100.00%	0	100.00%	0	100.00%
D38	CANANDAIGUA	NY	LP	0	100.00%	0	100.00%	0	100.00%
ELM	ELMIRA/CORNING RGNL	NY	LPV200	0	100.00%	0	100.00%	0	100.00%
ELZ	WELLSVILLE MUNICIPAL	NY	LPV	0	100.00%	0	100.00%	0	100.00%
FOK	FRANCIS S. GABRESKI	NY	LPV200	0	100.00%	0	100.00%	0	100.00%
FRG	REPUBLIC	NY	LPV200	0	100.00%	0	100.00%	0	100.00%
FZY	OSWEGO COUNTY	NY	LPV	0	100.00%	0	100.00%	0	100.00%
GFL	FLOYD BENNETT MEMORIAL	NY	LPV	0	100.00%	0	100.00%	1	100.00%
GVQ	BATAVIA	NY	LPV200	0	100.00%	0	100.00%	1	100.00%
HPN	WESTCHESTER COUNTY	NY	LPV	0	100.00%	0	100.00%	0	100.00%
HTF	HORNELL MUNICIPAL	NY	LPV	0	100.00%	0	100.00%	0	100.00%
HTO	EAST HAMPTON	NY	LPV	0	100.00%	0	100.00%	1	100.00%
HWV	BROOKHAVEN	NY	LPV	0	100.00%	0	100.00%	0	100.00%
IAG	NIAGARA FALLS INTL	NY	LPV	0					
ISP	LONG ISLAND MAC ARTHUR	NY	LPV200	0	100.00%	0	100.00%	0	100.00%
ITH	ITHACA TOMPKINS RGNL	NY	LPV	0	100.00%	0	100.00%	0	100.00%
JFK	JOHN F KENNEDY INTL	NY	LPV	0	100.00%	0	100.00%	0	100.00%
JHW	CHAUTAUQUA COUNTY JAMESTOWN	NY	LPV200	0	100.00%	0	100.00%	0	100.00%
K09	PISECO	NY	LP	0	100.00%	0	100.00%	0	100.00%
LGA	LA GUARDIA	NY	LPV200	0	100.00%	0	100.00%	0	100.00%
MAL	MALONE-DUFORT	NY	LPV	0	100.00%	0	100.00%	0	100.00%
MGJ	ORANGE COUNTY	NY	LPV	0					
MSS	MASSENA INTL RICHARDS FIELD	NY	LPV	0	100.00%	0	100.00%	0	100.00%
MSV	SULLIVAN COUNTY INTL	NY	LPV	0	100.00%	0	100.00%	0	100.00%
N66	ONEONTA MUNICIPAL	NY	LPV	0	100.00%	0	100.00%	0	100.00%
NY0	FULTON COUNTY	NY	LPV	0	100.00%	0	100.00%	0	100.00%
OGS	OGDENSBURG INTL	NY	LPV	0	100.00%	0	100.00%	0	100.00%
OLE	CATTARAUGUS COUNTY OLEAN	NY	LPV	0	100.00%	0	100.00%	0	100.00%
PBG	PLATTSBURGH INTL	NY	LPV	0	100.00%	0	100.00%	2	99.99%
PEO	PENN YAN	NY	LPV	0	100.00%	0	100.00%	1	100.00%
POU	DUTCHESS COUNTY	NY	LPV	0	100.00%	0	100.00%	0	100.00%
RME	GRIFFISS INTL	NY	LPV200	0	100.00%	0	100.00%	0	100.00%
ROC	GREATER ROCHESTER INTL	NY	LPV200	0	100.00%	0	100.00%	0	100.00%
SCH	SCHENECTADY COUNTY	NY	LPV200	0	100.00%	0	100.00%	0	100.00%
SDC	WILLIAMSON-SODUS	NY	LPV	0	100.00%	0	100.00%	0	100.00%
SLK	ADIRONDACK RGNL	NY	LPV200	0	100.00%	0	100.00%	0	100.00%
SWF	STEWART INTL	NY	LPV200	0	100.00%	0	100.00%	0	100.00%
SYR	SYRACUSE HANCOCK INTL	NY	LPV200	0	100.00%	0	100.00%	3	99.99%
VGC	HAMILTON MUNICIPAL	NY	LPV	0	100.00%	0	100.00%	0	100.00%
0G6	WILLIAMS COUNTY	OH	LPV	0	100.00%	0	100.00%	0	100.00%
16G	SENECA COUNTY	OH	LPV	0	100.00%	0	100.00%	0	100.00%
1G0	WOOD COUNTY	OH	LPV	0	100.00%	0	100.00%	0	100.00%
1G3	KENT STATE UNIV	OH	LPV	0	100.00%	0	100.00%	2	100.00%
413	KNOX COUNTY	OH	LPV200	0	100.00%	0	100.00%	0	100.00%
6G5	BARNESVILLE-BRADFIELD	OH	LP	0	100.00%	0	100.00%	0	100.00%
AOH	LIMA ALLEN COUNTY	OH	LPV200	0	100.00%	0	100.00%	3	99.99%

Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
AXV	NEIL ARMSTRONG	OH	LPV	0	100.00%	0	100.00%	2	100.00%
BJJ	WAYNE COUNTY	OH	LPV	0	100.00%	0	100.00%	0	100.00%
BKL	BROOKHAVEN	OH	LPV	0	100.00%	0	100.00%	0	100.00%
CAK	AKRON-CANTON RGNL	OH	LPV200	0	100.00%	0	100.00%	0	100.00%
CGF	CUYAHOGA COUNTY	OH	LPV	0	100.00%	0	100.00%	0	100.00%
CLE	CLEVELAND-HOPKINS INTL	OH	LPV200	0	100.00%	0	100.00%	0	100.00%
CMH	PORT COLUMBUS INTL	OH	LPV200	0	100.00%	0	100.00%	0	100.00%
CQA	LAKEFIELD	OH	LPV	0	100.00%	0	100.00%	0	100.00%
CXY	CAPITAL CITY	OH	LPV	0	100.00%	0	100.00%	0	100.00%
DAY	JAMES M COX DAYTON INTL	OH	LPV200	0	100.00%	0	100.00%	0	100.00%
DLZ	DELAWARE MUNICIPAL	OH	LPV	0	100.00%	0	100.00%	0	100.00%
EDJ	BELLEFONTAINE RGNL	OH	LPV	0	100.00%	0	100.00%	0	100.00%
FDY	FINDLAY	OH	LPV	0					
FZI	FOSTORIA METROPOLITAN	OH	LPV	0	100.00%	0	100.00%	0	100.00%
GQQ	GALION MUNICIPAL	OH	LP	0	100.00%	0	100.00%	0	100.00%
HAO	BUTLER CO RGNL	OH	LPV	0	100.00%	0	100.00%	0	100.00%
HZY	ASHTABULA COUNTY	OH	LPV	0	100.00%	0	100.00%	0	100.00%
I19	GREENE COUNTY LEWIS A JACKSON RGNL	OH	LPV	0	100.00%	0	100.00%	0	100.00%
I66	CLINTON FIELD	OH	LPV	0	100.00%	0	100.00%	0	100.00%
I68	LEBANON-WARREN COUNTY	OH	LPV	0	100.00%	0	100.00%	0	100.00%
I69	CLERMONT COUNTY	OH	LP	0	100.00%	0	100.00%	0	100.00%
I74	GRIMES FIELD	OH	LPV	0	100.00%	0	100.00%	0	100.00%
ILN	AIRBORNE AIRPARK	OH	LPV200	0	100.00%	0	100.00%	0	100.00%
LCK	RICKENBACKER INTL	OH	LPV200	0	100.00%	0	100.00%	0	100.00%
LHQ	FAIRFIELD COUNTY	OH	LPV200	0	100.00%	0	100.00%	0	100.00%
LNN	WILLOUGHBY	OH	LPV	0	100.00%	0	100.00%	0	100.00%
LPR	LORAIN COUNTY RGNL	OH	LPV200	0	100.00%	0	100.00%	0	100.00%
LUK	CINCINNATI MUNICIPAL LUNKEN FIELD	OH	LPV	0	100.00%	0	100.00%	0	100.00%
MFD	MANSFIELD LAHM RGNL	OH	LPV200	0	100.00%	0	100.00%	0	100.00%
MGY	DAYTON-WRIGHT BROTHERS	OH	LPV	0	100.00%	0	100.00%	0	100.00%
MNN	MARION MUNICIPAL	OH	LPV	0	100.00%	0	100.00%	0	100.00%
MRT	UNION COUNTY	OH	LP	0	100.00%	0	100.00%	0	100.00%
MWO	MIDDLETOWN REGIONAL HOOK FIELD	OH	LPV	0	100.00%	0	100.00%	0	100.00%
OSU	OHIO STATE UNIVERSITY	OH	LPV200	0	100.00%	0	100.00%	0	100.00%
OWX	PUTNAM COUNTY	OH	LPV	0	100.00%	0	100.00%	0	100.00%
OXD	MIAMI UNIVERSITY	OH	LPV	0	100.00%	0	100.00%	0	100.00%
PCW	CARL R KELLER FIELD	OH	LPV	0	100.00%	0	100.00%	0	100.00%
PHD	HARRY CLEVER FIELD	OH	LP	0	100.00%	0	100.00%	0	100.00%
PMH	GREATER PORTSMOUTH RGNL	OH	LPV	0	100.00%	0	100.00%	0	100.00%
RZT	ROSS COUNTY	OH	LPV	0	100.00%	0	100.00%	0	100.00%
S24	SANDUSKY COUNTY RGNL	OH	LPV	0	100.00%	0	100.00%	109	99.24%
SGH	SPRINGFIELD BECKLEY MUNICIPAL	OH	LPV200	0	100.00%	0	100.00%	0	100.00%
TDZ	TOLEDO EXECUTIVE	OH	LP	0	100.00%	0	100.00%	0	100.00%
TOL	TOLEDO EXPRESS	OH	LPV200	0	100.00%	0	100.00%	0	100.00%
TSO	CARROLL COUNTY-TOLSON	OH	LP	0	100.00%	0	100.00%	4	99.98%

Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
TZR	BOLTON FIELD	OH	LPV200	0	100.00%	0	100.00%	0	100.00%
UNI	OHIO UNIVERSITY SNYDER FIELD	OH	LPV200	0	100.00%	0	100.00%	0	100.00%
USE	FULTON COUNTY	OH	LPV	0	100.00%	0	100.00%	0	100.00%
UYF	MADISON COUNTY	OH	LPV	0	100.00%	0	100.00%	0	100.00%
YNG	YOUNGSTOWN WARREN RGNL	OH	LPV	0	100.00%	0	100.00%	0	100.00%
1F0	ARDMORE DOWNTOWN EXECUTIVE	OK	LP	0	100.00%	0	100.00%	0	100.00%
80F	ANTLERS MUNICIPAL	OK	LPV	0	100.00%	0	100.00%	4	99.97%
ADH	ADA MUNICIPAL	OK	LPV	0	100.00%	0	100.00%	0	100.00%
ADM	ARDMORE MUNICIPAL	OK	LPV200	0	99.85%	5	99.81%	24	99.54%
AXS	ALTUS QUARTZ MOUNTAIN RGNL	OK	LPV	0	100.00%	0	100.00%	0	100.00%
BKN	BLACKWELL TONKAWA MUNICIPAL	OK	LPV	0	100.00%	0	100.00%	1	100.00%
BVO	BARTLESVILLE MUNICIPAL	OK	LPV	0	100.00%	0	100.00%	18	99.99%
CHK	CHICKASHA MUNICIPAL	OK	LPV200	0	100.00%	0	100.00%	17	99.99%
CLK	CLINTON RGNL	OK	LPV200	0	100.00%	0	100.00%	1	100.00%
CSM	CLINTON-SHERMAN	OK	LPV200	0	100.00%	0	100.00%	0	100.00%
DUA	EAKER FIELD	OK	LPV	0	100.00%	0	100.00%	0	100.00%
DUC	HALLIBURTON FIELD	OK	LPV	0	100.00%	0	100.00%	0	100.00%
ELK	ELK CITY RGNL BUSINESS	OK	LPV	0	100.00%	0	100.00%	0	100.00%
F22	PERRY MUNICIPAL	OK	LPV	0	100.00%	0	100.00%	0	100.00%
FDR	FREDERICK RGNL	OK	LPV200	0	100.00%	0	100.00%	0	100.00%
GCM	CLAREMORE RGNL	OK	LPV	0	100.00%	0	100.00%	0	100.00%
GMJ	GROVE MUNICIPAL	OK	LPV	0	100.00%	0	100.00%	0	100.00%
GOK	GUTHRIE-EDMOND RGNL	OK	LPV	0	100.00%	0	100.00%	0	100.00%
GUY	GUYMON MUNICIPAL	OK	LPV	0	100.00%	0	100.00%	0	100.00%
GZL	STIGLER RGNL	OK	LPV	0	100.00%	0	100.00%	0	100.00%
HBR	HOBART MUNICIPAL	OK	LPV	0	100.00%	0	100.00%	0	100.00%
HSD	SUNDANCE AIRPARK	OK	LPV	0					
MKO	DAVIS FIELD	OK	LPV	0	100.00%	0	100.00%	0	100.00%
MLC	MC ALESTER RGNL	OK	LPV	0	100.00%	0	100.00%	0	100.00%
OKC	WILL ROGERS WORLD	OK	LPV200	0	100.00%	0	100.00%	0	100.00%
OKM	OKMULGEE RGNL	OK	LPV	0	100.00%	0	100.00%	0	100.00%
OUN	UNIVERSITY OF OKLAHOMA WESTHEIMER	OK	LPV200	0	100.00%	0	100.00%	0	100.00%
OWP	WILLIAM R. POGUE MUNICIPAL	OK	LPV	0	100.00%	0	100.00%	0	100.00%
PNC	PONCA CITY RGNL	OK	LPV	0	100.00%	0	100.00%	0	100.00%
PVJ	PAULS VALLEY MUNICIPAL	OK	LPV200	0	100.00%	0	100.00%	0	100.00%
PWA	WILEY POST	OK	LPV200	0	100.00%	0	100.00%	0	100.00%
RCE	CLARENCE E. PAGE MUNICIPAL	OK	LPV	0	100.00%	0	100.00%	0	100.00%
RVS	RICHARD LLOYD JONES JR	OK	LPV	0	100.00%	0	100.00%	0	100.00%
SNL	SHAWNEE RGNL	OK	LPV200	0	100.00%	0	100.00%	0	100.00%
SWO	STILLWATER RGNL	OK	LPV	0	100.00%	0	100.00%	0	100.00%
TQH	TAHLEQUAH MUNICIPAL	OK	LPV	0	100.00%	0	100.00%	0	100.00%
TUL	TULSA INTL	OK	LPV200	0	100.00%	0	100.00%	0	100.00%
WDG	ENID WOODRING RGNL	OK	LPV200	0	100.00%	0	100.00%	0	100.00%



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WWR	WEST WOODWARD	OK	LPV	0	100.00%	0	100.00%	0	100.00%
CNS7	KINCARDINE	ON	LPV	0	100.00%	0	100.00%	0	100.00%
CYHD	DRYDEN REGIONAL	ON	LPV	0					
CYKF	KITCHENER / WATERLOO	ON	LPV	0	100.00%	0	100.00%	0	100.00%
CYOW	OTTAWA MACDONALD CARTIER INTL	ON	LPV	0	100.00%	0	100.00%	0	100.00%
CYQT	THUNDER BAY	ON	LPV	0	100.00%	0	100.00%	0	100.00%
CYTS	TIMMINS / VICTOR M POWER	ON	LPV	0	100.00%	0	100.00%	0	100.00%
CYXL	SIOUX LOOKOUT	ON	LPV	0	100.00%	0	100.00%	0	100.00%
AST	ASTORIA RGNL	OR	LPV	0					
BDN	BEND MUNICIPAL	OR	LPV	0	100.00%	0	100.00%	0	100.00%
CVO	CORVALLIS MUNICIPAL	OR	LPV200	0	100.00%	0	100.00%	0	100.00%
EUG	MAHLON SWEET FIELD	OR	LPV200	0	100.00%	0	100.00%	0	100.00%
GCD	GRANT CO RGNL OGILVIE FIELD	OR	LPV	0	100.00%	0	100.00%	0	100.00%
HIO	PORTLAND-HILLSBORO	OR	LPV200	0	100.00%	0	100.00%	0	100.00%
LGD	LA GRANDE/UNION COUNTY	OR	LPV	0	100.00%	0	100.00%	0	100.00%
LMT	KLAMATH FALLS	OR	LPV	0	100.00%	0	100.00%	0	100.00%
MMV	MCMINNVILLE MUNICIPAL	OR	LPV	0	100.00%	0	100.00%	0	100.00%
ONO	ONTARIO MUNICIPAL	OR	LPV	0	100.00%	0	100.00%	0	100.00%
PDT	EASTERN OREGON RGNL AT PENDLETON	OR	LPV200	0	100.00%	0	100.00%	0	100.00%
PDX	PORTLAND INTL	OR	LPV200	0	100.00%	0	100.00%	0	100.00%
RDM	ROBERTS FIELD	OR	LPV200	0	100.00%	0	100.00%	0	100.00%
S33	MADRAS MUNICIPAL	OR	LPV	0	100.00%	0	100.00%	0	100.00%
SLE	MCNARY FLD	OR	LPV200	0	100.00%	0	100.00%	0	100.00%
SPB	SCAPPOOSE INDUSTRIAL AIRPARK	OR	LPV	0	100.00%	0	100.00%	0	100.00%
UAO	AURORA STATE	OR	LPV	0	100.00%	0	100.00%	0	100.00%
22N	JAKE ARNER MEMORIAL	PA	LP	0	100.00%	0	100.00%	0	100.00%
2G9	SOMERSET COUNTY	PA	LPV	0	100.00%	0	100.00%	0	100.00%
8G2	CORRY-LAWRENCE	PA	LPV	0	100.00%	0	100.00%	0	100.00%
8N8	DANVILLE	PA	LP	0	100.00%	0	100.00%	0	100.00%
9D4	DECK	PA	LPV	0	100.00%	0	100.00%	0	100.00%
ABE	LEHIGH VALLEY INTL	PA	LPV	0	100.00%	0	100.00%	0	100.00%
AFJ	WASHINGTON COUNTY	PA	LPV200	0	100.00%	0	100.00%	0	100.00%
AGC	ALLEGHENY COUNTY	PA	LPV200	0	100.00%	0	100.00%	0	100.00%
AOO	ALTOONA-BLAIR COUNTY	PA	LPV	0	100.00%	0	100.00%	0	100.00%
AVP	WILKES-BARRE SCRANTON INTL	PA	LPV	0	100.00%	0	100.00%	0	100.00%
AXQ	CLARION COUNTY	PA	LPV	0	100.00%	0	100.00%	0	100.00%
BFD	BRADFORD RGNL	PA	LPV200	0	100.00%	0	100.00%	0	100.00%
BTP	BUTLER COUNTY K W SCHOLTER FLD	PA	LPV	0	100.00%	0	100.00%	0	100.00%
BVI	BEAVER FALLS MUNICIPAL	PA	LPV	0	100.00%	0	100.00%	0	100.00%
DUJ	DUBOIS RGNL	PA	LPV200	0	100.00%	0	100.00%	0	100.00%
ERI	ERIE INTL/TOM RIDGE FIELD	PA	LPV	0	100.00%	0	100.00%	0	100.00%
FIG	CLEARFIELD-LAWRENCE	PA	LPV	0	100.00%	0	100.00%	0	100.00%
FKL	VENANGO RGNL	PA	LPV	0	100.00%	0	100.00%	0	100.00%
FWQ	ROSTRAVER	PA	LPV	0	100.00%	0	100.00%	0	100.00%
GKJ	PORT MEADVILLE	PA	LP	0	100.00%	0	100.00%	0	100.00%

Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
HMZ	BEDFORD COUNTY	PA	LPV	0	100.00%	0	100.00%	0	100.00%
HZL	HAZLETON MUNICIPAL	PA	LPV	0	100.00%	0	100.00%	0	100.00%
IPT	WILLIAMSPORT RGNL	PA	LPV	0	100.00%	0	100.00%	0	100.00%
JST	JOHN MURTHA JOHNSTOWN CAMBRIA COUNTY	PA	LPV200	0	100.00%	0	100.00%	0	100.00%
LBE	ARNOLD PALMER RGNL	PA	LPV	0	100.00%	0	100.00%	0	100.00%
LNS	LANCASTER	PA	LPV	0					
LOM	WINGS FIELD	PA	LPV	0	100.00%	0	100.00%	0	100.00%
MDT	HARRISBURG INTL	PA	LPV	0	100.00%	0	100.00%	0	100.00%
MPO	POCONO MOUNTAINS MUNICIPAL	PA	LPV	0	100.00%	0	100.00%	0	100.00%
MQS	CHESTER COUNTY G O CARLSON	PA	LPV	0	100.00%	0	100.00%	0	100.00%
N38	WELLSBORO JOHNSTON	PA	LP	0	100.00%	0	100.00%	0	100.00%
N79	NORTHUMBERLAND COUNTY	PA	LPV	0	100.00%	0	100.00%	0	100.00%
OYM	ST MARYS MUNICIPAL	PA	LPV	0	100.00%	0	100.00%	0	100.00%
PHL	PHILADELPHIA INTL	PA	LPV	0	100.00%	0	100.00%	0	100.00%
PIT	PITTSBURGH INTL	PA	LPV200	0	100.00%	0	100.00%	0	100.00%
PNE	NORTHEAST PHILADELPHIA	PA	LPV	0	100.00%	0	100.00%	0	100.00%
PSB	MID STATE	PA	LPV	0	100.00%	0	100.00%	0	100.00%
RDG	READING RGNL CARL A SPAATZ FLD	PA	LPV	0	100.00%	0	100.00%	0	100.00%
RVL	MIFFLIN COUNTY	PA	LPV	0	100.00%	0	100.00%	0	100.00%
THV	YORK	PA	LP	0	100.00%	0	100.00%	0	100.00%
UCP	NEW CASTLE MUNICIPAL	PA	LPV	0	100.00%	0	100.00%	0	100.00%
UKT	QUAKERTOWN	PA	LP	0	100.00%	0	100.00%	0	100.00%
UNV	UNIVERSITY PARK	PA	LPV200	0	100.00%	0	100.00%	0	100.00%
VVS	JOSEPH A. HARDY CONNELLSVILLE	PA	LPV200	0	100.00%	0	100.00%	0	100.00%
WAY	GREENE COUNTY	PA	LPV	0	100.00%	0	100.00%	0	100.00%
WBW	WILKES-BARRE WYOMING VALLEY	PA	LPV	0	100.00%	0	100.00%	0	100.00%
XLL	ALLENTOWN QUEEN CITY MUNICIPAL	PA	LP	0	100.00%	0	100.00%	0	100.00%
ZER	SCHUYLKILL COUNTY JOE ZERBEY	PA	LPV200	0	100.00%	0	100.00%	0	100.00%
CPN8	OPINACA	QC	LPV	1	100.00%	0	100.00%	0	100.00%
CSR3	VICTORIAVILLE	QC	LPV	0	100.00%	0	100.00%	0	100.00%
CTP9	KATTINIQ / DONALDSON	QC	LPV	13					
CYFY	AMOS	QC	LPV	0	100.00%	0	100.00%	0	100.00%
CYHU	MONTREAL / STHUBERT	QC	LPV	0	100.00%	0	100.00%	0	100.00%
CYIF	STAUGUSTIN	QC	LPV	1	100.00%	0	100.00%	0	100.00%
CYMX	MONTREAL (MIRABEL INTL)	QC	LPV	0	100.00%	0	100.00%	0	100.00%
CYQB	QUEBEC / JEAN LESAGE INTL	QC	LPV	0	100.00%	0	100.00%	0	100.00%
CYRI	RIVIEREDULOUP	QC	LPV	0					
CYRQ	TROISRIVIERES	QC	LPV	0	100.00%	0	100.00%	0	100.00%
CYVB	BONAVENTURE	QC	LPV	0	100.00%	0	100.00%	0	100.00%
CYVP	KUUIJUAQ	QC	LPV	4	100.00%	0	100.00%	0	100.00%
CYYY	MONTJOLI	QC	LPV	0					
BID	BLOCK ISLAND STATE	RI	LPV	0	100.00%	0	100.00%	0	100.00%

Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
OQU	QUONSET STATE	RI	LPV	0	100.00%	0	100.00%	0	100.00%
PVD	THEODORE FRANCIS GREEN STATE	RI	LPV200	0	100.00%	0	100.00%	0	100.00%
6J0	LEXINGTON COUNTY AT PELION	SC	LPV	0	100.00%	0	100.00%	0	100.00%
AIK	AIKEN MUNICIPAL	SC	LPV200	0	100.00%	0	100.00%	0	100.00%
AND	ANDERSON RGNL	SC	LPV200	0					
ARW	BEAUFORT COUNTY	SC	LPV200	0	100.00%	0	100.00%	0	100.00%
BBP	MARLBORO COUNTY JETPORT H E AVENT FIELD	SC	LPV	0					
BNL	BARNWELL RGNL	SC	LPV	0	100.00%	0	100.00%	0	100.00%
CAE	COLUMBIA METROPOLITAN	SC	LPV200	0	100.00%	0	100.00%	0	100.00%
CDN	WOODWARD FIELD	SC	LPV	0	100.00%	0	100.00%	0	100.00%
CEU	OCONEE COUNTY RGNL	SC	LPV200	0	100.00%	0	100.00%	0	100.00%
CHS	CHARLESTON AFB/INTL	SC	LPV200	0	100.00%	0	100.00%	0	100.00%
CRE	GRAND STRAND	SC	LPV200	0	100.00%	0	100.00%	0	100.00%
DCM	CHESTER CATAWBA RGNL	SC	LPV	0	100.00%	0	100.00%	0	100.00%
DYB	SUMMERVILLE	SC	LPV200	0	100.00%	0	100.00%	0	100.00%
FDW	FAIRFIELD COUNTY	SC	LPV	0	100.00%	0	100.00%	0	100.00%
FLO	FLORENCE RGNL	SC	LPV	0	100.00%	0	100.00%	0	100.00%
GGE	GEORGETOWN COUNTY	SC	LPV200	0	100.00%	0	100.00%	0	100.00%
GMU	GREENVILLE DOWNTOWN	SC	LPV200	0	100.00%	0	100.00%	0	100.00%
GSP	GREENVILLE SPARTANBURG INTL ROGER MILLIKEN	SC	LPV200	0	100.00%	0	100.00%	0	100.00%
GYH	DONALDSON CENTER	SC	LPV	0	100.00%	0	100.00%	0	100.00%
HYW	CONWAY-HORRY COUNTY	SC	LPV	0	100.00%	0	100.00%	0	100.00%
JZI	CHARLESTON EXECUTIVE	SC	LPV200	0	100.00%	0	100.00%	0	100.00%
LKR	LANCASTER COUNTY MC WHIRTER FIELD	SC	LPV200	0	100.00%	0	100.00%	0	100.00%
LQK	PICKENS COUNTY	SC	LPV	0	100.00%	0	100.00%	0	100.00%
LRO	MT PLEASANT RGNL FAISON FIELD	SC	LPV	0	100.00%	0	100.00%	0	100.00%
MKS	BERKELEY COUNTY	SC	LPV	0	100.00%	0	100.00%	0	100.00%
MYR	MYRTLE BEACH INTL	SC	LPV200	0	100.00%	0	100.00%	0	100.00%
OGB	ORANGEBURG MUNICIPAL	SC	LPV200	0	100.00%	0	100.00%	0	100.00%
RBW	LOWCOUNTRY RGNL	SC	LPV200	0	100.00%	0	100.00%	0	100.00%
SMS	SUMTER	SC	LPV200	0	100.00%	0	100.00%	0	100.00%
SPA	SPARTANBURG DOWNTOWN MEMORIAL	SC	LPV200	0	100.00%	0	100.00%	0	100.00%
UDG	DARLINGTON COUNTY JETPORT	SC	LPV	0	100.00%	0	100.00%	0	100.00%
UZA	ROCK HILL YORK CO BRYANT FIELD	SC	LPV200	0	100.00%	0	100.00%	0	100.00%
0D8	GETTYSBURG MUNICIPAL	SD	LPV200	0	100.00%	0	100.00%	0	100.00%
49B	STURGIS MUNICIPAL	SD	LPV	0	100.00%	0	100.00%	0	100.00%
9D1	GREGORY MUNICIPAL FLYNN FIELD	SD	LPV	0	100.00%	0	100.00%	0	100.00%
ABR	ABERDEEN RGNL	SD	LPV200	0	100.00%	0	100.00%	0	100.00%
ATY	WATERTOWN RGNL	SD	LPV200	0	100.00%	0	100.00%	0	100.00%
BKX	BROOKINGS RGNL	SD	LPV	0	100.00%	0	100.00%	0	100.00%

Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
EFC	BELLE FOURCHE MUNICIPAL	SD	LPV	0	100.00%	0	100.00%	0	100.00%
FSD	JOE FOSS FIELD	SD	LPV200	0	100.00%	0	100.00%	3	99.97%
HON	HURON RGNL	SD	LPV200	0	100.00%	0	100.00%	0	100.00%
HSR	HOT SPRINGS MUNICIPAL	SD	LP	0	100.00%	0	100.00%	0	100.00%
ICR	WINNER RGNL	SD	LPV	0	100.00%	0	100.00%	2	99.99%
MBG	MOBRIDGE MUNICIPAL	SD	LPV	0	100.00%	0	100.00%	0	100.00%
MDS	MADISON MUNICIPAL	SD	LPV	0	100.00%	0	100.00%	3	99.97%
MHE	MITCHELL MUNICIPAL	SD	LPV	0	100.00%	0	100.00%	5	100.00%
MKA	MILLER MUNICIPAL	SD	LPV200	0	100.00%	0	100.00%	0	100.00%
PIR	PIERRE RGNL	SD	LPV	0	100.00%	0	100.00%	4	100.00%
RAP	RAPID CITY RGNL	SD	LPV200	0	100.00%	0	100.00%	4	100.00%
SPF	BLACK HILLS CLYDE ICE FIELD	SD	LPV	0	100.00%	0	100.00%	0	100.00%
VMR	HAROLD DAVIDSON FIELD	SD	LPV	0					
YKN	CHAN GURNEY MUNICIPAL	SD	LPV200	0	100.00%	0	100.00%	0	100.00%
CKQ8	MCARTHUR RIVER	SK	LPV	1	100.00%	0	100.00%	0	100.00%
CYKJ	KEY LAKE	SK	LPV	0	100.00%	0	100.00%	0	100.00%
0A3	SMITHVILLE MUNICIPAL	TN	LP	0	100.00%	0	100.00%	1	100.00%
0M3	JOHN A BAKER	TN	LP	0	100.00%	0	100.00%	0	100.00%
0M4	BENTON COUNTY	TN	LPV	0	100.00%	0	100.00%	0	100.00%
0M5	HUMPHREYS COUNTY	TN	LP	0					
1A3	MARTIN CAMPBELL FIELD	TN	LP	0	100.00%	0	100.00%	0	100.00%
1M5	PORTLAND MUNICIPAL	TN	LPV	0	100.00%	0	100.00%	0	100.00%
2A0	MARK ANTON	TN	LPV	0	100.00%	0	100.00%	0	100.00%
2M8	CHARLES W. BAKER	TN	LPV	0	100.00%	0	100.00%	0	100.00%
3M7	LAFAYETTE MUNICIPAL	TN	LPV	0	100.00%	0	100.00%	0	100.00%
BGF	WINCHESTER MUNICIPAL	TN	LPV	0	100.00%	0	100.00%	0	100.00%
BNA	NASHVILLE INTL	TN	LPV200	0	100.00%	0	100.00%	0	100.00%
CHA	LOVELL FIELD	TN	LPV200	0	100.00%	0	100.00%	0	100.00%
CKV	OUTLAW FIELD	TN	LPV	0	100.00%	0	100.00%	0	100.00%
CSV	CROSSVILLE MEMORIAL WHITSON FIELD	TN	LPV200	0	100.00%	0	100.00%	0	100.00%
DKX	KNOXVILLE DOWNTOWN ISLAND	TN	LPV	0	100.00%	0	100.00%	0	100.00%
DYR	DYERSBURG RGNL	TN	LPV	0	100.00%	0	100.00%	0	100.00%
FYE	FAYETTE CO	TN	LPV	0	100.00%	0	100.00%	0	100.00%
FYM	FAYETTEVILLE MUNICIPAL	TN	LPV	0	100.00%	0	100.00%	0	100.00%
GKT	GATLINBURG-PIGEON FORGE	TN	LPV	0	100.00%	0	100.00%	0	100.00%
GZS	ABERNATHY FIELD	TN	LPV	0	100.00%	0	100.00%	0	100.00%
HZD	CARROLL COUNTY	TN	LPV	0					
JWN	JOHN C. TUNE	TN	LPV	0	100.00%	0	100.00%	0	100.00%
LUG	ELLINGTON	TN	LPV	0	100.00%	0	100.00%	0	100.00%
M01	GENERAL DEWITT SPAIN	TN	LPV	0	100.00%	0	100.00%	0	100.00%
M33	SUMNER COUNTY RGNL	TN	LP	0					
M54	LEBANON MUNICIPAL	TN	LPV	0	100.00%	0	100.00%	0	100.00%
M91	SPRINGFIELD ROBERTSON COUNTY	TN	LPV	0	100.00%	0	100.00%	0	100.00%
MBT	MURFREESBORO MUNICIPAL	TN	LPV	0	100.00%	0	100.00%	0	100.00%
MEM	MEMPHIS INTL	TN	LPV200	0	100.00%	0	100.00%	0	100.00%
MKL	MC KELLAR-SIPES RGNL	TN	LPV200	0	100.00%	0	100.00%	0	100.00%

Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
MMI	MCMINN COUNTY	TN	LPV	0	100.00%	0	100.00%	0	100.00%
MOR	MOORE-MURRELL	TN	LPV	0	100.00%	0	100.00%	0	100.00%
MQY	SMYRNA	TN	LPV	0	100.00%	0	100.00%	0	100.00%
MRC	MAURY COUNTY	TN	LPV	0	100.00%	0	100.00%	0	100.00%
NQA	MILLINGTON RGNL JETPORT	TN	LPV	0	100.00%	0	100.00%	0	100.00%
PHT	HENRY COUNTY	TN	LPV200	0	100.00%	0	100.00%	0	100.00%
PVE	BEECH RIVER RGNL	TN	LPV	0					
RKW	ROCKWOOD MUNICIPAL	TN	LPV	0	100.00%	0	100.00%	0	100.00%
SNH	SAVANNAH HARDIN COUNTY	TN	LPV	0	100.00%	0	100.00%	0	100.00%
SRB	UPPER CUMBERLAND RGNL	TN	LPV200	0	100.00%	0	100.00%	0	100.00%
SYI	BOMAR FIELD SHELBYVILLE MUNICIPAL	TN	LPV	0	100.00%	0	100.00%	0	100.00%
SZY	ROBERT SIBLEY	TN	LPV	0	100.00%	0	100.00%	0	100.00%
THA	TULLAHOMA RGNL WM NORTHERN FLD	TN	LPV	0	100.00%	0	100.00%	0	100.00%
TRI	TRI-CITIES RGNL TN/VA	TN	LPV200	0					
TYS	MCGHEE-TYSON	TN	LPV	0	100.00%	0	100.00%	0	100.00%
UCY	EVERETT-STEWART RGNL	TN	LPV200	0	100.00%	0	100.00%	0	100.00%
11R	BRENHAM MUNICIPAL	TX	LPV	0	100.00%	0	100.00%	0	100.00%
2F5	LAMESA MUNICIPAL	TX	LP	0	100.00%	0	100.00%	0	100.00%
2R9	KARNES COUNTY	TX	LP	0	100.00%	0	100.00%	0	100.00%
3T5	FAYETTE RGNL AIR CENTER	TX	LPV	0	100.00%	0	100.00%	0	100.00%
45R	HAWTHORNE FIELD	TX	LP	0	100.00%	0	100.00%	0	100.00%
50R	LOCKHART MUNICIPAL	TX	LPV	0	100.00%	0	100.00%	0	100.00%
5C1	BOERNE STAGE FIELD	TX	LP	0					
5T9	MAVERICK COUNTY MEMORIAL INTL	TX	LPV	0	100.00%	0	100.00%	0	100.00%
6R3	CLEVELAND MUNICIPAL	TX	LPV	0	100.00%	0	100.00%	0	100.00%
77F	WINTERS MUNICIPAL	TX	LP	0	100.00%	0	100.00%	0	100.00%
8F3	CROSBYTON MUNICIPAL	TX	LP	0	100.00%	0	100.00%	0	100.00%
ABI	ABILENE RGNL	TX	LPV200	0	100.00%	0	100.00%	0	100.00%
ACT	WACO RGNL	TX	LPV200	0	100.00%	0	100.00%	0	100.00%
ADS	ADDISON	TX	LPV	0	100.00%	0	100.00%	0	100.00%
AFW	FORT WORTH ALLIANCE	TX	LPV200	0	100.00%	0	100.00%	0	100.00%
ALI	ALICE INTERNATIONAL	TX	LPV	0					
AMA	RICK HUSBAND AMARILLO INTL	TX	LPV200	0	100.00%	0	100.00%	0	100.00%
ARM	WHARTON RGNL	TX	LPV	0					
ASL	HARRISON COUNTY	TX	LPV	0	100.00%	0	100.00%	0	100.00%
AUS	AUSTIN-BERGSTROM INTL	TX	LPV200	0					
AXH	HOUSTON-SOUTHWEST	TX	LPV	0	100.00%	2	100.00%	5	99.93%
BAZ	NEW BRAUNFELS MUNICIPAL	TX	LPV	0	100.00%	0	100.00%	0	100.00%
BBD	CURTIS FIELD	TX	LPV	0	99.68%	19	99.62%	120	98.08%
BKD	STEPHENS COUNTY	TX	LP	0	100.00%	0	100.00%	0	100.00%
BPG	BIG SPRING MC MAHON WRINKLE	TX	LPV	0	100.00%	0	100.00%	0	100.00%
BPT	SOUTHEAST TEXAS RGNL	TX	LPV200	0	100.00%	1	99.99%	57	99.65%
BRO	BROWNSVILLE SOUTH PADRE ISLAND INTL	TX	LP	0	100.00%	0	100.00%	0	100.00%

Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
BWD	BROWNWOOD RGNL	TX	LPV	0	100.00%	0	100.00%	0	100.00%
BYY	BAY CITY MUNICIPAL	TX	LPV	0	100.00%	0	100.00%	0	100.00%
CFD	COULTER FIELD	TX	LPV	0	100.00%	0	100.00%	0	100.00%
CLL	EASTERWOOD FIELD	TX	LPV200	0	100.00%	0	100.00%	0	100.00%
CNW	TSTC WACO	TX	LPV200	0	99.90%	6	99.82%	50	99.21%
COM	COLEMAN MUNICIPAL	TX	LPV	0	100.00%	0	100.00%	0	100.00%
CRP	CORPUS CHRISTI INTL	TX	LPV200	0	100.00%	0	100.00%	0	100.00%
CXO	LONE STAR EXECUTIVE	TX	LPV200	0	100.00%	0	100.00%	0	100.00%
DAL	DALLAS LOVE FIELD	TX	LPV200	0	100.00%	0	100.00%	0	100.00%
DFW	DALLAS-FT WORTH INTL	TX	LPV200	0					
DKR	HOUSTON COUNTY	TX	LP	0	100.00%	0	100.00%	0	100.00%
DRT	DEL RIO INTL	TX	LPV	0					
DTO	DENTON MUNICIPAL	TX	LPV	0	100.00%	0	100.00%	0	100.00%
DUX	MOORE COUNTY	TX	LPV200	0	100.00%	0	100.00%	0	100.00%
DWH	DAVID WAYNE HOOKS MEMORIAL	TX	LPV	0	100.00%	0	100.00%	0	100.00%
E01	ROY HURD MEMORIAL	TX	LP	0	100.00%	0	100.00%	0	100.00%
E11	ANDREWS COUNTY	TX	LPV	0	100.00%	0	100.00%	0	100.00%
E19	GRUVER MUNICIPAL	TX	LP	0	100.00%	0	100.00%	0	100.00%
E30	BRUCE FIELD	TX	LPV	0	100.00%	0	100.00%	0	100.00%
E38	ALPINE-CASPARIS MUNICIPAL	TX	LP	0	100.00%	0	100.00%	0	100.00%
EBG	EDINBURG INTL	TX	LPV	0	100.00%	0	100.00%	0	100.00%
EDC	AUSTIN EXECUTIVE	TX	LPV200	0	100.00%	0	100.00%	0	100.00%
EFD	ELLINGTON FIELD	TX	LPV200	0	100.00%	0	100.00%	0	100.00%
ELA	EAGLE LAKE	TX	LP	0	100.00%	0	100.00%	0	100.00%
ELP	EL PASO INTL	TX	LP	0	100.00%	0	100.00%	0	100.00%
ERV	KERRVILLE MUNICIPAL LOUIS SCHREINER FLD	TX	LPV	0	100.00%	0	100.00%	0	100.00%
ETN	EASTLAND MUNICIPAL	TX	LP	0	100.00%	0	100.00%	0	100.00%
F00	JONES FIELD	TX	LPV	0	100.00%	0	100.00%	0	100.00%
F05	WILBARGER COUNTY	TX	LPV	0	100.00%	0	100.00%	0	100.00%
FST	FT. STOCKTON PECOS COUNTY	TX	LPV	0					
FTW	FORT WORTH MEACHAM INTL	TX	LPV200	0					
FWS	FORT WORTH SPINKS	TX	LPV200	0	100.00%	0	100.00%	0	100.00%
GDJ	GRANBURY RGNL	TX	LPV	0	100.00%	0	100.00%	0	100.00%
GGG	EAST TEXAS RGNL	TX	LPV	0	100.00%	0	100.00%	0	100.00%
GKY	ARLINGTON MUNICIPAL	TX	LPV200	0	100.00%	0	100.00%	0	100.00%
GLE	GAINESVILLE MUNICIPAL	TX	LPV	0					
GLS	SCHOLES INTL AT GALVESTON	TX	LPV200	0	100.00%	0	100.00%	0	100.00%
GNC	GAINES COUNTY	TX	LPV	0	100.00%	0	100.00%	0	100.00%
GRK	ROBERT GRAY AAF	TX	LPV200	0					
GVT	MAJORS	TX	LPV	0	100.00%	0	100.00%	0	100.00%
GYI	NORTH TEXAS RGNL PERRIN FIELD	TX	LPV200	0	100.00%	0	100.00%	0	100.00%
HBV	JIM HOGG COUNTY	TX	LPV	0	100.00%	0	100.00%	0	100.00%
HDO	HONDO MUNICIPAL	TX	LPV	0	100.00%	0	100.00%	0	100.00%
HOU	WILLIAM P HOBBY	TX	LPV200	0	100.00%	0	100.00%	0	100.00%

Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
HQZ	MESQUITE METRO	TX	LPV	0	100.00%	0	100.00%	0	100.00%
HRL	VALLEY INTL	TX	LPV200	0					
HRX	HEREFORD MUNICIPAL	TX	LPV200	0	100.00%	0	100.00%	0	100.00%
IAH	GEORGE BUSH INTERCONTINENTAL HOUSTON	TX	LPV200	0	100.00%	0	100.00%	0	100.00%
IKG	KLEBERG COUNTY	TX	LPV	0					
INJ	HILLSBORO MUNICIPAL	TX	LPV	0	100.00%	0	100.00%	0	100.00%
IWS	WEST HOUSTON	TX	LP	0	100.00%	0	100.00%	0	100.00%
JAS	JASPER COUNTY-BELL FIELD	TX	LPV	0	100.00%	0	100.00%	0	100.00%
JSO	CHEROKEE COUNTY	TX	LPV200	0	100.00%	0	100.00%	0	100.00%
JWY	MID-WAY RGNL	TX	LPV200	0	100.00%	0	100.00%	0	100.00%
LBB	LUBBOCK PRESTON SMITH INTL	TX	LPV200	0	100.00%	0	100.00%	0	100.00%
LBX	BRAZORIA COUNTY	TX	LPV	0	100.00%	0	100.00%	0	100.00%
LFK	ANGELINA COUNTY	TX	LPV	0	100.00%	0	100.00%	0	100.00%
LHB	HEARNE MUNICIPAL	TX	LPV200	0	100.00%	0	100.00%	0	100.00%
LLN	LEVELLAND MUNICIPAL	TX	LPV	0	100.00%	0	100.00%	0	100.00%
LNC	LANCASTER	TX	LPV200	0	100.00%	0	100.00%	0	100.00%
LRD	LAREDO INTL	TX	LPV200	0	100.00%	0	100.00%	0	100.00%
LUD	DECATUR MUNICIPAL	TX	LPV	0	100.00%	0	100.00%	0	100.00%
LVJ	PEARLAND RGNL	TX	LPV	0	100.00%	0	100.00%	0	100.00%
LXY	MEXIA-LIMESTONE CO	TX	LP	0	100.00%	0	100.00%	0	100.00%
MAF	MIDLAND INTL	TX	LPV200	0	100.00%	0	100.00%	0	100.00%
MDD	MIDLAND AIRPARK	TX	LPV	0	100.00%	0	100.00%	0	100.00%
MFE	MC ALLEN MILLER INTL	TX	LPV	0	100.00%	0	100.00%	0	100.00%
MNZ	HAMILTON MUNICIPAL	TX	LPV	0					
OCH	A L MANGHAM JR RGNL	TX	LPV200	0	100.00%	0	100.00%	0	100.00%
ODO	ODESSA-SCHLEMEYER FIELD	TX	LPV200	0	100.00%	0	100.00%	0	100.00%
ONY	OLNEY MUNICIPAL	TX	LPV	0	100.00%	3	99.98%	15	99.75%
ORG	ORANGE COUNTY	TX	LPV	0	100.00%	1	99.99%	14	99.83%
PEQ	PECOS MUNICIPAL	TX	LPV200	0	100.00%	0	100.00%	0	100.00%
PIL	PORT ISABEL CAMERON COUNTY	TX	LPV	0	100.00%	0	100.00%	0	100.00%
PPA	PERRY LEFORS FIELD	TX	LPV	0	100.00%	0	100.00%	0	100.00%
PRX	COX FIELD	TX	LPV	0	100.00%	0	100.00%	0	100.00%
PSX	PALACIOS MUNICIPAL	TX	LPV	0	100.00%	0	100.00%	0	100.00%
PVW	HALE COUNTY	TX	LPV	0	100.00%	0	100.00%	0	100.00%
RAS	MUSTANG BEACH	TX	LPV	0	100.00%	0	100.00%	0	100.00%
RBD	DALLAS EXECUTIVE	TX	LPV	0	100.00%	0	100.00%	0	100.00%
RBO	NUECES COUNTY	TX	LP	0	100.00%	0	100.00%	0	100.00%
RKP	ARANSAS COUNTY	TX	LPV	0	100.00%	0	100.00%	0	100.00%
RYW	LAGO VISTA TX RUSTY ALLEN	TX	LP	0	100.00%	0	100.00%	0	100.00%
SAT	SAN ANTONIO INTL	TX	LPV200	0	100.00%	0	100.00%	0	100.00%
SGR	SUGAR LAND RGNL	TX	LPV200	0	100.00%	0	100.00%	0	100.00%
SJT	SAN ANGELO RGNL MATHIS FIELD	TX	LPV	0	100.00%	0	100.00%	0	100.00%
SLR	SULPHUR SPRINGS MUNICIPAL	TX	LPV200	0	100.00%	0	100.00%	0	100.00%

Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
SNK	WINSTON FIELD	TX	LPV200	0					
SWW	AVENGER FIELD	TX	LPV	0	100.00%	0	100.00%	0	100.00%
T41	LA PORTE MUNICIPAL	TX	LPV	0	100.00%	0	100.00%	0	100.00%
T59	WHEELER MUNICIPAL	TX	LP	0	100.00%	0	100.00%	0	100.00%
T78	LIBERTY MUNICIPAL	TX	LP	0	100.00%	0	100.00%	0	100.00%
T82	GILLESPIE COUNTY	TX	LPV	0	100.00%	0	100.00%	0	100.00%
TFP	T P MC CAMPBELL	TX	LPV	0	100.00%	0	100.00%	0	100.00%
TKI	COLLIN COUNTY RGNL AT MC KINNEY	TX	LPV200	0	100.00%	0	100.00%	0	100.00%
TME	HOUSTON EXECUTIVE	TX	LPV	0	100.00%	0	100.00%	0	100.00%
TPL	DRAUGHON-MILLER CENTRAL TEXAS RGNL	TX	LPV200	0	100.00%	0	100.00%	0	100.00%
TRL	TERRELL MUNICIPAL	TX	LPV	0	100.00%	0	100.00%	0	100.00%
TYR	TYLER POUNDS RGNL	TX	LPV200	0	100.00%	0	100.00%	0	100.00%
UTS	HUNTSVILLE MUNICIPAL	TX	LPV	0	100.00%	0	100.00%	0	100.00%
VCT	VICTORIA RGNL	TX	LPV200	0					
XBP	BRIDGEPORT MUNICIPAL	TX	LPV	0	100.00%	0	100.00%	0	100.00%
BCE	BRYCE CANYON	UT	LPV	0	100.00%	0	100.00%	0	100.00%
BDG	BLANDING MUNICIPAL	UT	LPV	0	100.00%	0	100.00%	0	100.00%
BMC	BRIGHAM CITY	UT	LP	0	100.00%	0	100.00%	0	100.00%
DTA	DELTA MUNICIPAL	UT	LP	0	100.00%	0	100.00%	0	100.00%
ENV	WENDOVER	UT	LPV	0	100.00%	0	100.00%	0	100.00%
FOM	FILLMORE MUNICIPAL	UT	LPV	0	100.00%	0	100.00%	0	100.00%
LGU	LOGAN-CACHE	UT	LPV	0	100.00%	0	100.00%	0	100.00%
OGD	OGDEN-HINCKLEY	UT	LPV	0	100.00%	0	100.00%	0	100.00%
PUC	CARBON COUNTY RGNL BUCK DAVIS FIELD	UT	LP	0	100.00%	0	100.00%	0	100.00%
PVU	PROVO MUNICIPAL	UT	LPV200	0	100.00%	0	100.00%	0	100.00%
SGU	ST GEORGE MUNICIPAL	UT	LPV	0	100.00%	0	100.00%	0	100.00%
SLC	SALT LAKE CITY INTL	UT	LP	0					
U14	NEPHI MUNICIPAL	UT	LPV	0	100.00%	0	100.00%	0	100.00%
U55	PANGUITCH MUNICIPAL	UT	LPV200	0	100.00%	0	100.00%	0	100.00%
VEL	VERNAL	UT	LP	0					
0VG	LEE COUNTY	VA	LPV	0	100.00%	0	100.00%	0	100.00%
8W2	NEW MARKET	VA	LP	0	100.00%	0	100.00%	0	100.00%
AVC	MECKLENBURG BRUNSWICK RGNL	VA	LPV	0					
BCB	VIRGINIA TECH MONTGOMERY EXECUTIVE	VA	LPV	0	100.00%	0	100.00%	0	100.00%
CHO	CHARLOTTESVILLE ALBEMARLE	VA	LPV	0	100.00%	0	100.00%	0	100.00%
CJR	CULPEPER RGNL	VA	LPV	0	100.00%	0	100.00%	0	100.00%
CPK	CHESAPEAKE RGNL	VA	LPV200	0	100.00%	0	100.00%	0	100.00%
DAN	DANVILLE RGNL	VA	LPV200	0	100.00%	0	100.00%	0	100.00%
EMV	EMPORIA GREENSVILLE RGNL	VA	LPV200	0	100.00%	0	100.00%	0	100.00%
FCI	CHESTERFIELD COUNTY	VA	LPV	0	100.00%	0	100.00%	0	100.00%
FKN	FRANKLIN MUNICIPAL JOHN BEVERLY ROSE	VA	LPV	0	100.00%	0	100.00%	0	100.00%
FVX	FARMVILLE RGNL	VA	LPV	0	100.00%	0	100.00%	0	100.00%
FYJ	MIDDLE PENINSULA RGNL	VA	LPV	0	100.00%	0	100.00%	0	100.00%



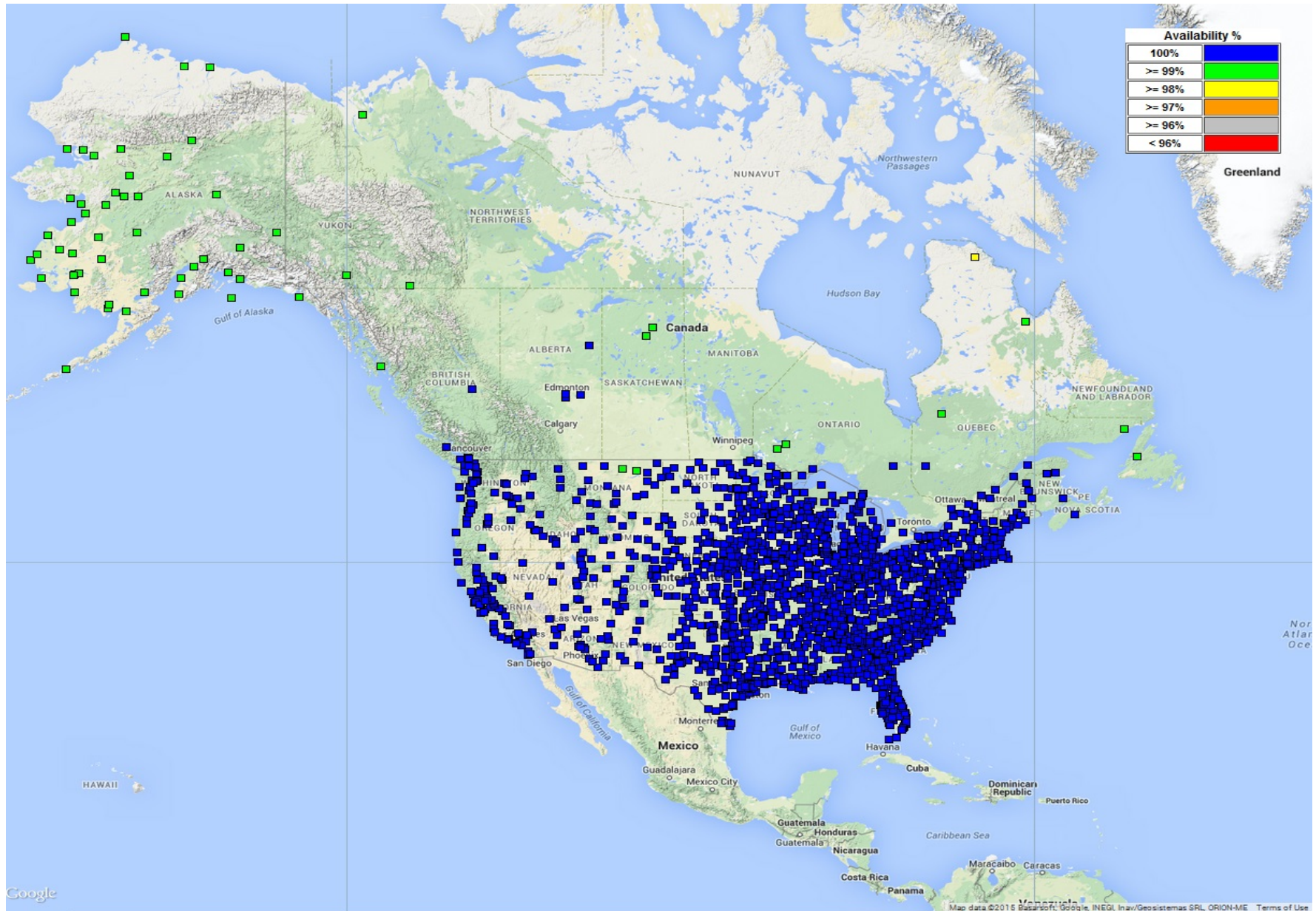
Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
HLX	TWIN COUNTY	VA	LPV	0	100.00%	0	100.00%	1	100.00%
HSP	INGALLS FIELD	VA	LPV	0	100.00%	0	100.00%	0	100.00%
HWY	WARRENTON-FAUQUIER	VA	LPV200	0	100.00%	0	100.00%	0	100.00%
JFZ	TAZEWELL COUNTY	VA	LPV	0	100.00%	0	100.00%	0	100.00%
JYO	LEESBURG EXECUTIVE	VA	LPV	0	100.00%	0	100.00%	0	100.00%
LKU	LOUISA COUNTY FREEMAN FIELD	VA	LPV	0	100.00%	0	100.00%	0	100.00%
LNP	LONESOME PINE	VA	LPV	0	100.00%	0	100.00%	0	100.00%
LUA	LURAY CAVERNS	VA	LP	0	100.00%	0	100.00%	0	100.00%
LYH	LYNCHBURG RGNL PRESTON GLENN FIELD	VA	LPV	0	100.00%	0	100.00%	0	100.00%
MFV	ACCOMACK COUNTY	VA	LPV	0	100.00%	0	100.00%	0	100.00%
MKJ	MOUNTAIN EMPIRE	VA	LPV	0					
MTV	BLUE RIDGE	VA	LPV	0	100.00%	0	100.00%	0	100.00%
OPF	HANOVER COUNTY MUNICIPAL	VA	LPV	0	100.00%	0	100.00%	0	100.00%
OKV	WINCHESTER RGNL	VA	LPV200	0	100.00%	0	100.00%	0	100.00%
ORF	NORFOLK INTL	VA	LPV200	0	100.00%	0	100.00%	0	100.00%
PHF	NEWPORT NEWS WILLIAMSBURG INTL	VA	LPV200	0	100.00%	0	100.00%	0	100.00%
PSK	NEW RIVER VALLEY	VA	LPV200	0	100.00%	0	100.00%	0	100.00%
PTB	DINWIDDIE COUNTY	VA	LPV	0	100.00%	0	100.00%	0	100.00%
RIC	RICHMOND INTL	VA	LPV200	0	100.00%	0	100.00%	0	100.00%
RMN	STAFFORD RGNL	VA	LPV	0	100.00%	0	100.00%	0	100.00%
ROA	ROANOKE RGNL WOODRUM FIELD	VA	LPV	0	100.00%	0	100.00%	1	100.00%
SFQ	SUFFOLK EXECUTIVE	VA	LP	0					
SHD	SHENANDOAH VALLEY RGNL	VA	LPV200	0	100.00%	0	100.00%	0	100.00%
VJI	VIRGINIA HIGHLANDS	VA	LPV	0	100.00%	0	100.00%	0	100.00%
W63	MARKS MUNICIPAL	VA	LP	0	100.00%	0	100.00%	0	100.00%
W78	WILLIAM M TUCK	VA	LPV	0	100.00%	0	100.00%	0	100.00%
XSA	TAPPAHANNOCK-ESSEX COUNTY	VA	LPV	0	100.00%	0	100.00%	0	100.00%
BTV	BURLINGTON INTL	VT	LPV200	0	100.00%	0	100.00%	0	100.00%
FSO	FRANKLIN COUNTY STATE	VT	LPV	0	100.00%	0	100.00%	0	100.00%
MPV	EDWARD F KNAPP STATE	VT	LPV	0	100.00%	0	100.00%	0	100.00%
RUT	RUTLAND SOUTHERN VERMONT RGNL	VT	LPV	0	100.00%	0	100.00%	0	100.00%
ALW	WALLA WALLA RGNL	WA	LPV	0	100.00%	0	100.00%	0	100.00%
AWO	ARLINGTON MUNICIPAL	WA	LPV200	0	100.00%	0	100.00%	0	100.00%
BLI	BELLINGHAM INTL	WA	LPV200	0	100.00%	0	100.00%	0	100.00%
BVS	SKAGIT RGNL	WA	LPV	0	100.00%	0	100.00%	0	100.00%
CLM	WILLIAM R FAIRCHILD INTL	WA	LPV	0	100.00%	0	100.00%	0	100.00%
CLS	CHEHALIS-CENTRALIA	WA	LPV	0	100.00%	0	100.00%	0	100.00%
DEW	DEER PARK	WA	LPV	0	100.00%	0	100.00%	0	100.00%
EPH	EPHRATA MUNICIPAL	WA	LPV	0	100.00%	0	100.00%	0	100.00%
FHR	FRIDAY HARBOR	WA	LPV	0	100.00%	0	100.00%	0	100.00%
GEG	SPOKANE INTL	WA	LPV200	0	100.00%	0	100.00%	0	100.00%
HQM	BOWERMAN	WA	LPV200	0	100.00%	0	100.00%	3	100.00%
MWH	GRANT CO INTL	WA	LPV200	0	100.00%	0	100.00%	1	100.00%

Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
OLM	OLYMPIA RGNL	WA	LPV	0	100.00%	0	100.00%	0	100.00%
OTH	SOUTHWEST OREGON RGNL	WA	LPV	0	100.00%	0	100.00%	0	100.00%
PAE	SNOHOMISH COUNTY (PAINE FIELD)	WA	LPV200	0	100.00%	0	100.00%	0	100.00%
PSC	TRI-CITIES	WA	LPV200	0	100.00%	0	100.00%	4	99.99%
PWT	BREMERTON NATIONAL	WA	LPV	0	100.00%	0	100.00%	0	100.00%
RLD	RICHLAND	WA	LPV	0	100.00%	0	100.00%	0	100.00%
RNT	RENTON MUNICIPAL	WA	LPV	0	100.00%	0	100.00%	0	100.00%
SEA	SEATTLE-TACOMA INTL	WA	LPV200	0	100.00%	0	100.00%	0	100.00%
TDO	ED CARLSON MEMORIAL SOUTH LEWIS CO	WA	LPV	0	100.00%	0	100.00%	0	100.00%
TIW	TACOMA NARROWS	WA	LPV	0					
YKM	YAKIMA AIR TERMINAL MCALLISTER FIELD	WA	LPV200	0	100.00%	0	100.00%	0	100.00%
57C	EAST TROY MUNICIPAL	WI	LPV	0	100.00%	0	100.00%	0	100.00%
82C	MAUSTON NEW LISBON UNION	WI	LP	0	100.00%	0	100.00%	0	100.00%
8D1	NEW HOLSTEIN MUNICIPAL	WI	LPV	0	100.00%	0	100.00%	0	100.00%
ARV	LAKELAND NOBLE F. LEE MEMORIAL FIELD	WI	LPV	0	100.00%	0	100.00%	0	100.00%
ASX	JOHN F. KENNEDY MEMORIAL	WI	LPV	0	100.00%	0	100.00%	0	100.00%
ATW	OUTAGAMIE COUNTY RGNL	WI	LPV200	0	100.00%	0	100.00%	0	100.00%
AUW	WAUSAU DOWNTOWN	WI	LPV200	0					
BCK	BLACK RIVER FALLS AREA	WI	LPV	0	100.00%	0	100.00%	0	100.00%
C29	MIDDLETON MUNICIPAL MOREY FIELD	WI	LPV	0	100.00%	0	100.00%	0	100.00%
C35	REEDSBURG MUNICIPAL	WI	LP	0	100.00%	0	100.00%	0	100.00%
CLI	CLINTONVILLE MUNICIPAL	WI	LPV	0	100.00%	0	100.00%	0	100.00%
CMY	SPARTA/FORT MC COY	WI	LPV	0					
CWA	CENTRAL WISCONSIN	WI	LPV200	0	100.00%	0	100.00%	1	100.00%
DLL	BARABOO WISCONSIN DELLS	WI	LPV	0	100.00%	0	100.00%	0	100.00%
EAU	CHIPPEWA VALLEY RGNL	WI	LPV200	0	100.00%	0	100.00%	0	100.00%
EGV	EAGLE RIVER UNION	WI	LPV	0	100.00%	0	100.00%	0	100.00%
ENW	KENOSHA RGNL	WI	LPV200	0	100.00%	0	100.00%	1	100.00%
ETB	WEST BEND MUNICIPAL	WI	LPV	0	100.00%	0	100.00%	0	100.00%
EZS	SHAWANO MUNICIPAL	WI	LPV	0	100.00%	0	100.00%	0	100.00%
FLD	FOND DU LAC COUNTY	WI	LPV	0					
GRB	AUSTIN STRAUBEL INTL	WI	LPV200	0	100.00%	0	100.00%	0	100.00%
HXF	HARTFORD MUNICIPAL	WI	LPV	0	100.00%	0	100.00%	0	100.00%
HYR	SAWYER COUNTY	WI	LPV	0	100.00%	0	100.00%	0	100.00%
JVL	SOUTHERN WISCONSIN RGNL	WI	LPV200	0	100.00%	0	100.00%	0	100.00%
LNR	TRI-COUNTY RGNL	WI	LPV	0	100.00%	0	100.00%	0	100.00%
LSE	LA CROSSE MUNICIPAL	WI	LPV	0	100.00%	0	100.00%	0	100.00%
LUM	MENOMONIE MUNICIPAL SCORE FIELD	WI	LPV	0	100.00%	0	100.00%	0	100.00%
MDZ	TAYLOR COUNTY	WI	LPV	0					
MFI	MARSHFIELD MUNICIPAL	WI	LPV	0	100.00%	0	100.00%	0	100.00%

Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
MKE	GENERAL MITCHELL INTL	WI	LPV200	0	100.00%	0	100.00%	0	100.00%
MRJ	IOWA COUNTY	WI	LPV200	0	100.00%	0	100.00%	0	100.00%
MSN	DANE COUNTY RGNL TRUAX FIELD	WI	LPV200	0	100.00%	0	100.00%	0	100.00%
MTW	MANITOWOC COUNTY	WI	LPV200	0	100.00%	0	100.00%	0	100.00%
MWC	LAWRENCE J TIMMERMAN	WI	LPV	0	100.00%	0	100.00%	4	100.00%
OCQ	J DOUGLAS BAKE MEML	WI	LP	0	100.00%	0	100.00%	0	100.00%
OSH	WITTMAN RGNL	WI	LPV	0	100.00%	0	100.00%	0	100.00%
OVS	BOSCOBEL	WI	LPV	0	100.00%	0	100.00%	0	100.00%
PBH	PRICE COUNTY	WI	LPV	0	100.00%	0	100.00%	0	100.00%
PCZ	WAUPACA MUNICIPAL	WI	LPV	0	100.00%	0	100.00%	0	100.00%
PVB	PLATTEVILLE MUNICIPAL	WI	LPV	0	100.00%	0	100.00%	1	100.00%
RAC	JOHN H. BATTEN	WI	LPV	0	100.00%	0	100.00%	0	100.00%
RCX	RUSK COUNTY	WI	LPV	0	100.00%	0	100.00%	0	100.00%
RHI	RHINELANDER ONEIDA COUNTY	WI	LPV200	0	100.00%	0	100.00%	0	100.00%
RNH	NEW RICHMOND RGNL	WI	LPV	0	100.00%	0	100.00%	0	100.00%
RPD	RICE LAKE RGNL CARL'S FIELD	WI	LPV	0	100.00%	0	100.00%	0	100.00%
RRL	MERRILL MUNICIPAL	WI	LPV	0	100.00%	0	100.00%	0	100.00%
SBM	SHEBOYGAN COUNTY MEMORIAL	WI	LPV200	0	100.00%	0	100.00%	1	100.00%
STE	STEVENS POINT MUNICIPAL	WI	LPV200	0					
SUE	DOOR COUNTY CHERRYLAND	WI	LPV	0	100.00%	0	100.00%	0	100.00%
SUW	RICHARD I BONG	WI	LP	0	100.00%	0	100.00%	0	100.00%
TKV	TOMAHAWK RGNL	WI	LP	0	100.00%	0	100.00%	0	100.00%
UES	WAUKESHA COUNTY	WI	LPV200	0	100.00%	0	100.00%	0	100.00%
UNU	DODGE COUNTY	WI	LPV	0	100.00%	0	100.00%	0	100.00%
VIQ	NEILLSVILLE MUNICIPAL	WI	LPV	0	100.00%	0	100.00%	0	100.00%
Y50	WAUTOMA MUNICIPAL	WI	LP	0	100.00%	0	100.00%	0	100.00%
312	MASON COUNTY	WV	LPV	0	100.00%	0	100.00%	0	100.00%
BKW	RALEIGH COUNTY MEMORIAL	WV	LPV200	0	100.00%	0	100.00%	0	100.00%
BLF	MERCER COUNTY	WV	LPV	0					
CKB	NORTH CENTRAL WEST VIRGINIA	WV	LPV	0	100.00%	0	100.00%	0	100.00%
CRW	YEAGER	WV	LPV200	0	100.00%	0	100.00%	0	100.00%
HLG	WHEELING OHIO CO	WV	LPV200	0	100.00%	0	100.00%	0	100.00%
HTS	TRI-STATE MILTON J. FERGUSON FIELD	WV	LPV200	0					
I18	JACKSON COUNTY	WV	LPV200	0	100.00%	0	100.00%	0	100.00%
LWB	GREENBRIER VALLEY	WV	LPV	0	100.00%	0	100.00%	0	100.00%
MGW	MORGANTOWN MUNICIPAL WALTER L. BILL HART FIELD	WV	LPV200	0	100.00%	0	100.00%	0	100.00%
MRB	EASTERN WV RGNL SHEPHERD	WV	LPV	0	100.00%	0	100.00%	0	100.00%
PKB	MID-OHIO VALLEY RGNL	WV	LPV	0	100.00%	0	100.00%	0	100.00%
SXL	SUMMERSVILLE	WV	LP	0	100.00%	0	100.00%	0	100.00%
USW	BOGGS FIELD	WV	LP	0	100.00%	0	100.00%	0	100.00%
W22	UPSHUR COUNTY RGNL	WV	LPV	0	100.00%	0	100.00%	0	100.00%

Airport Id	Airport Name	State	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
7V6	CAMP GUERNSEY	WY	LP	0	100.00%	0	100.00%	0	100.00%
COD	YELLOWSTONE RGNL	WY	LPV	0					
CPR	NATRONA COUNTY INTL	WY	LPV	0	100.00%	0	100.00%	0	100.00%
CYS	CHEYENNE RGNL JERRY OLSON FIELD	WY	LPV	0	100.00%	0	100.00%	0	100.00%
DGW	CONVERSE COUNTY	WY	LPV200	0	100.00%	0	100.00%	0	100.00%
ECS	MONDELL FIELD	WY	LPV	0	100.00%	0	100.00%	0	100.00%
EVW	EVANSTON UINTA COUNTY BURNS FIELD	WY	LPV	0	100.00%	0	100.00%	0	100.00%
GCC	GILLETTE CAMPBELL COUNTY	WY	LPV	0	100.00%	0	100.00%	0	100.00%
JAC	JACKSON HOLE	WY	LPV	0	100.00%	0	100.00%	0	100.00%
LAR	LARAMIE RGNL	WY	LPV	0	100.00%	0	100.00%	0	100.00%
PNA	RALPH WENZ FIELD	WY	LPV	0	100.00%	0	100.00%	0	100.00%
RIW	RIVERTON RGNL	WY	LPV200	0	100.00%	0	100.00%	0	100.00%
RKS	ROCK SPRINGS SWEETWATER COUNTY	WY	LPV200	0	100.00%	0	100.00%	0	100.00%
RWL	RAWLINS MUNICIPAL HARVEY FIELD	WY	LPV	0	100.00%	0	100.00%	0	100.00%
SAA	SHIVELY FIELD	WY	LPV	0	100.00%	0	100.00%	0	100.00%
SHR	SHERIDAN COUNTY	WY	LPV	0	100.00%	0	100.00%	0	100.00%
WRL	WORLAND MUNICIPAL	WY	LPV	0	100.00%	0	100.00%	0	100.00%
CYQH	WATSON LAKE	YT	LPV	1	100.00%	0	100.00%	0	100.00%
CYXY	WHITEHORSE ERIK NIELSEN INTL	YT	LPV	1	100.00%	0	100.00%	0	100.00%

Figure 8-1 WAAS LP Availability at Airports in the US and Canada with GPS RNAV Instrument Approach Procedures



**Figure 8-2 WAAS LP Outages at Airports in the US and Canada with GPS RNAV Instrument Approach Procedures**

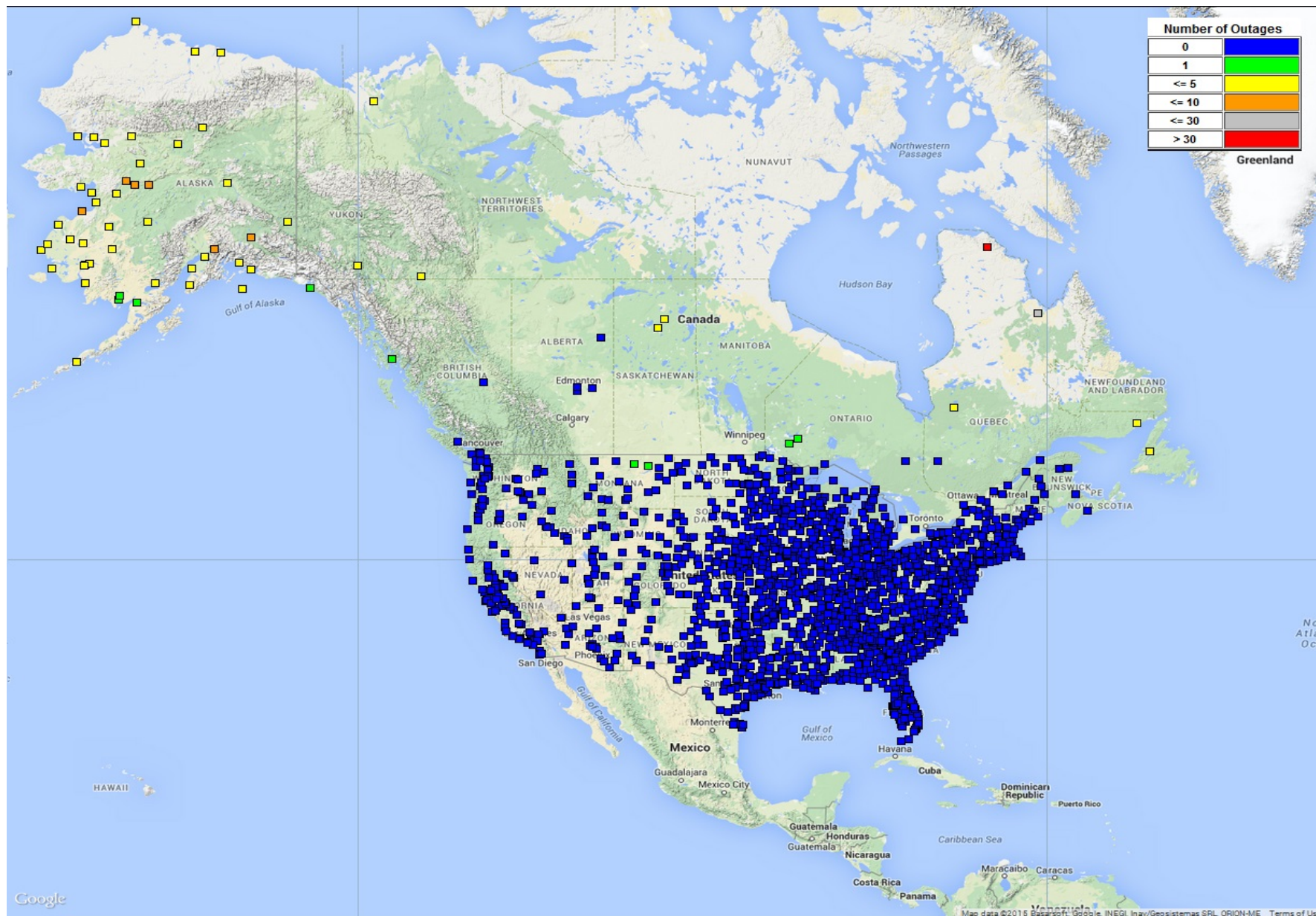
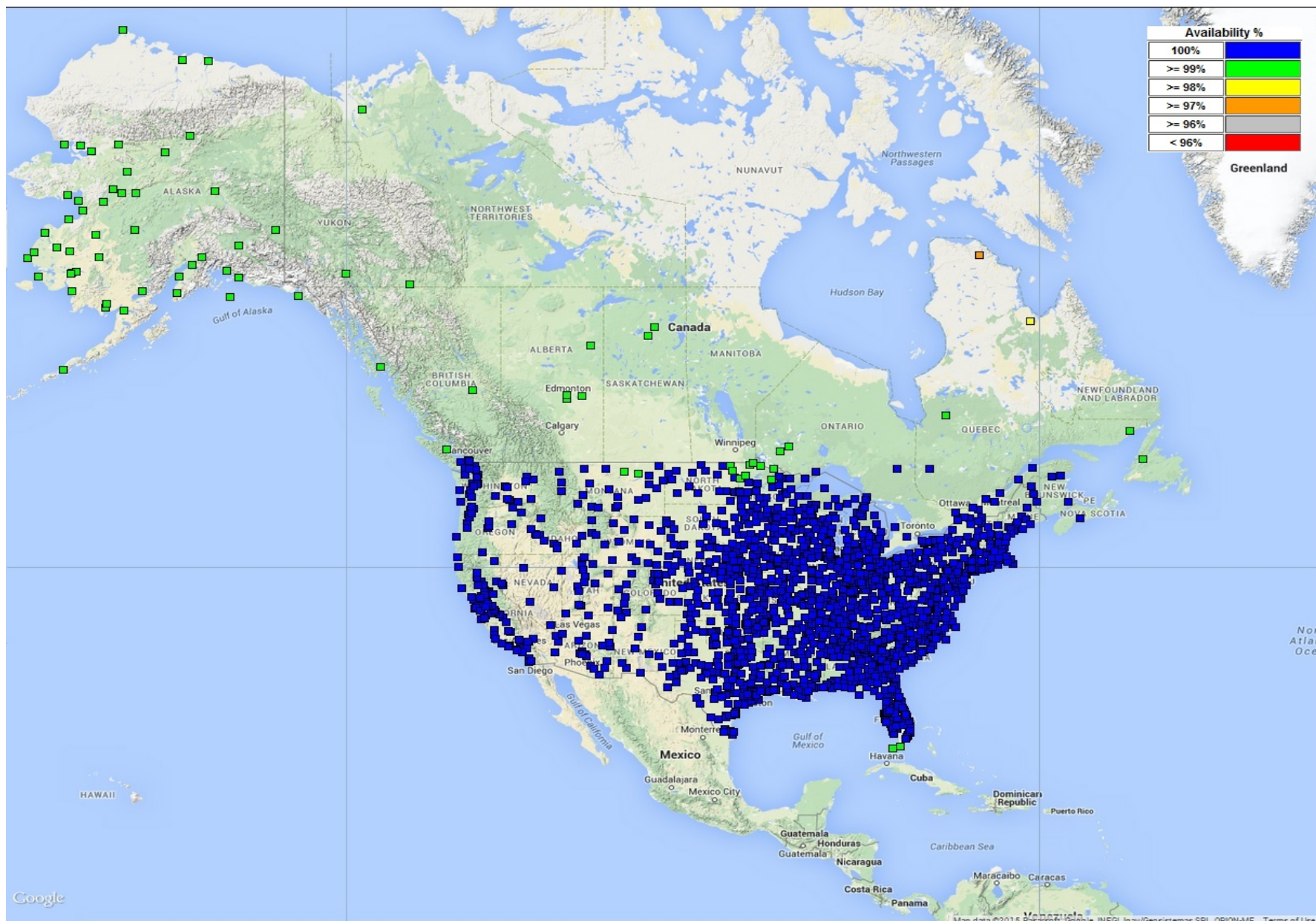


Figure 8-3 WAAS LPV Availability Airports in the US and Canada with GPS RNAV Instrument Approach Procedures



**Figure 8-4 WAAS LPV Outages at Airports in the US and Canada with GPS RNAV Instrument Approach Procedures**

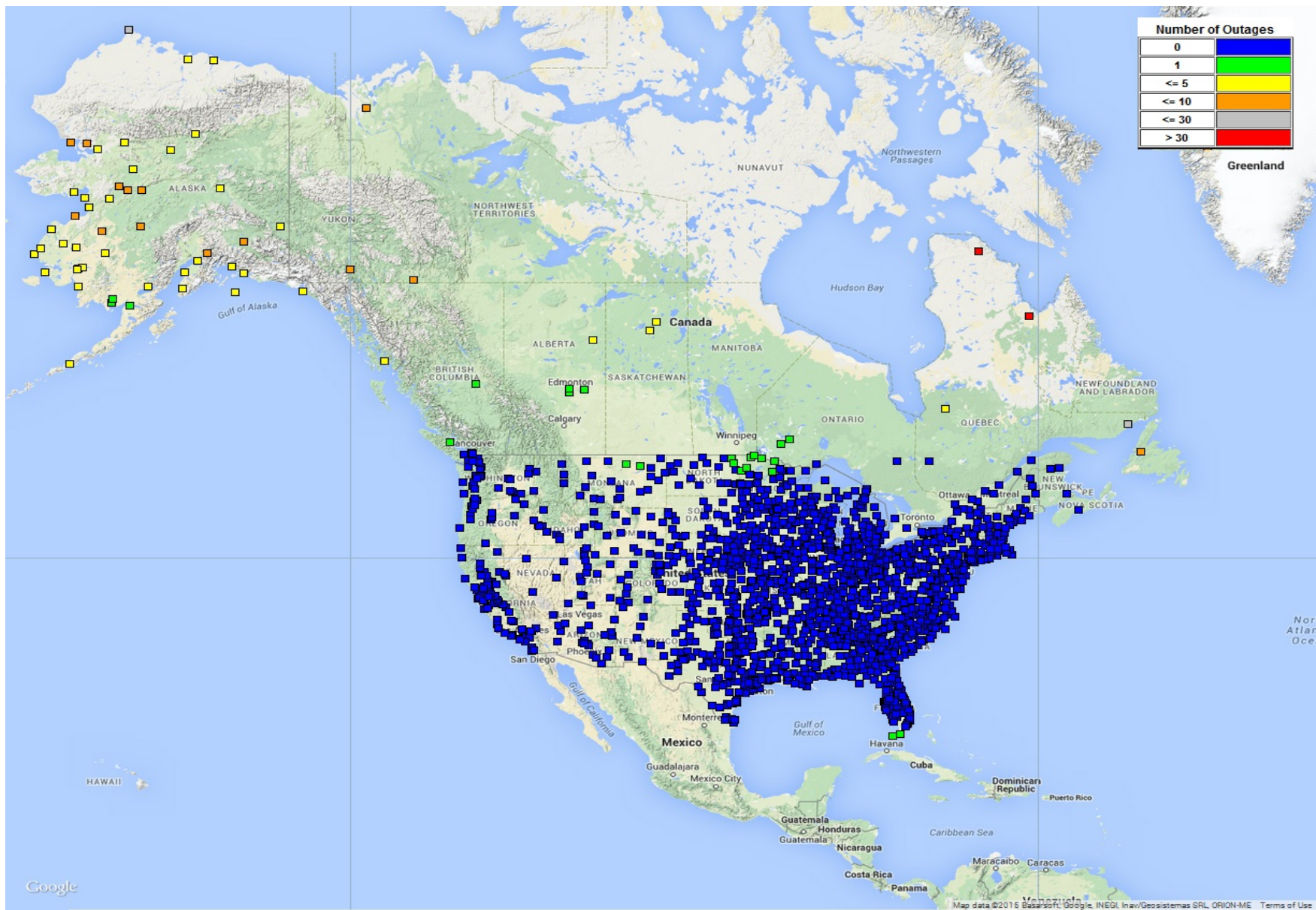




Figure 8-5 WAAS LPV 200 Availability at Airports in the US and Canada with GPS RNAV Instrument Approach Procedures

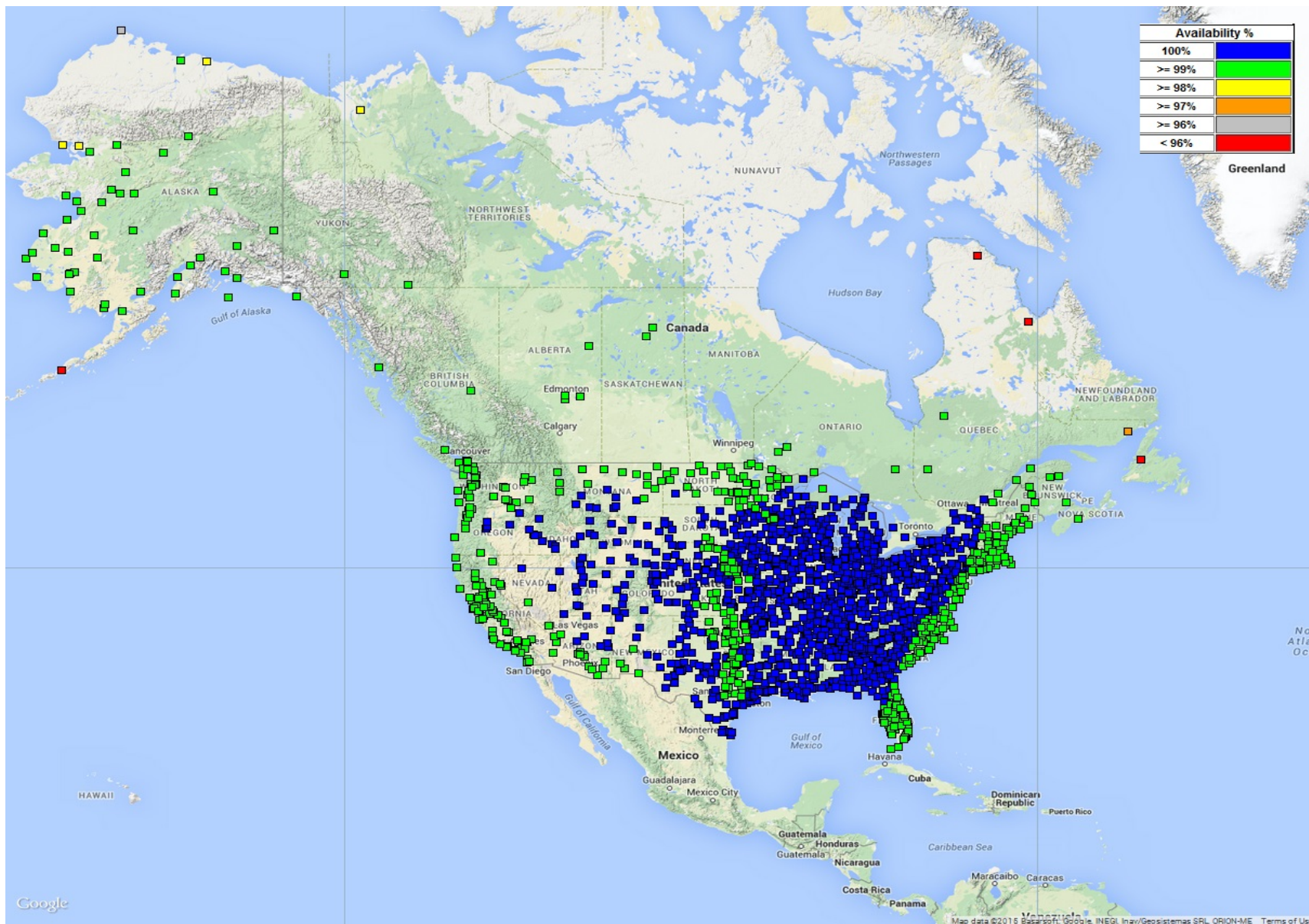
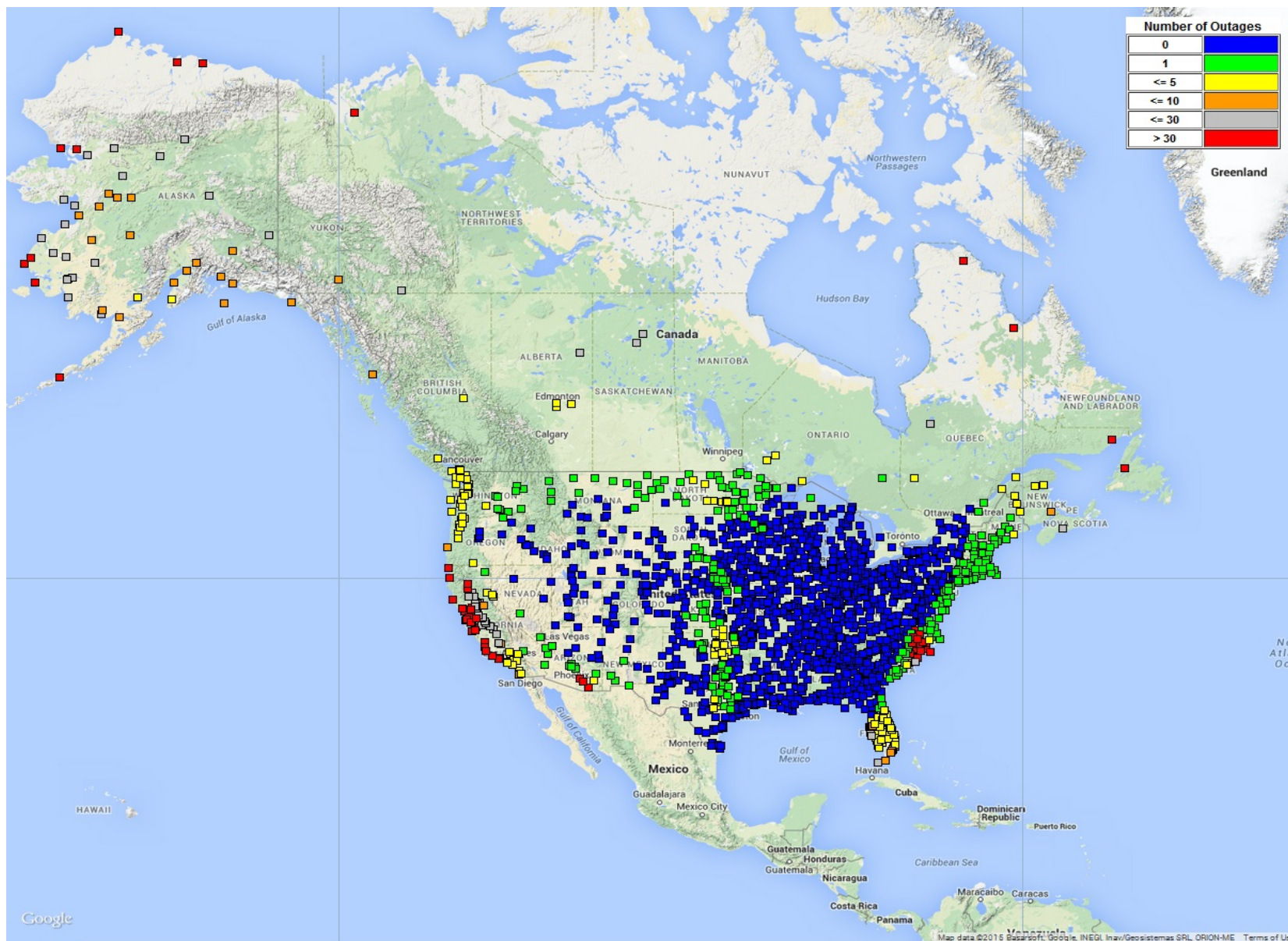


Figure 8-6 WAAS LPV 200 Outages at Airports in the US and Canada with GPS RNAV Instrument Approach Procedures



## 9.0 WAAS DETERMINISTIC CODE NOISE AND MULTIPATH (CNMP) BOUNDING ANALYSIS

WAAS utilizes a deterministic model to estimate the residual CNMP noise after the application of standard dual frequency carrier smoothing techniques to minimize the effects of multipath and code noise. This analysis performs an assessment of how well that deterministic model bounds the actual errors. This analysis is periodically performed as part of the WAAS Test Team's off-line monitoring to ensure that there are no drastic detrimental changes to the multipath environment at the WAAS Reference Stations (WRSs). This analysis also ensures that WAAS system is not indefinitely exposed to conspiring receiver failure symptoms that would invalidate the CNMP bounding estimate in a manner that would exceed the assumption that no more than one reference station is conspiring to deceive the WAAS monitors at any time by underestimating the residual measurement noise the safety monitors. Although some failures mechanisms that cause CNMP bounding issues are occasionally seen, no "conspiring" errors have ever been detected. That is, data has caused the safety monitors to trip unnecessarily versus missing a necessary trip.

The analysis post processes measurement data to estimate the pseudorange code to carrier ambiguity for each entire arc of measurements for each satellite pass. The ambiguity estimate is then used to level the carrier measurement. The leveled carrier is then used as a multipath free truth estimate. The WAAS real time deterministic CNMP smoothing algorithm is then applied to the original measurements. The difference between the smoothed measurements and the leveled truth measurements is compared to the deterministic noise estimates. Only arcs with continuous carrier phase greater in length than 7200 seconds are utilized for this analysis to minimize the impacts of non-zero mean multipath biasing the truth estimates. The WAAS dual frequency cycle slip detector algorithm is used to detect any discontinuities in the carrier phase.

Statistics are calculated on how well the 0.1 multiples of the deterministically estimated standard deviation bounds the difference between the leveled truth and the real time smoothed measurements. Those statistics are then compared to a theoretical Gaussian distribution and an extensive set of plots are generated and manually reviewed. Table 9-1 recaps the results of that manual analysis.

Table 9-1 CNMP Bounding Statistics

WAAS Site	WRE	Jan 14	Feb 14	Mar 14	Apr 14	May 14	Jun 14	Jul 14	Aug 14	Sep 14	Oct 14	Nov 14	Dec 14
Albuquerque	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Anchorage	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Atlanta	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Barrow	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Bethel	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	—	●	●	●	●	●	●	●	●	●	●
Billings	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Boston	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Chicago	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Cleveland	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Cold Bay	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Dallas	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Denver	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Fairbanks	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Gander	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Goose Bay	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Honolulu	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Houston	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Iqaluit	A	●	●	●	●	●	●	●	●	●	—	—	—
	B	●	●	●	●	●	●	●	●	●	—	—	—
	C	●	●	●	●	●	●	●	●	●	—	—	—
Jacksonville	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●

- Excellent - 3.29σ bounded 100%
- Good - 4σ bounded 100%
- Fair - 4σ bounded 100% with one worst satellite excluded (Requires manual review if symptoms repeat from month to month)
- Poor – Requires manual review
- No data available

WAAS Site	WRE	Jan 14	Feb 14	Mar 14	Apr 14	May 14	Jun 14	Jul 14	Aug 14	Sep 14	Oct 14	Nov 14	Dec 14
Juneau	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Kansas City	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Kotzebue	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Los Angeles	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Memphis	A	—	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Merida	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Mexico City	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Miami	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Minneapolis	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
New York	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Oakland	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Puerto Vallarta	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Salt Lake City	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
San Jose Del Cabo	A	●	●	●	●	●	●	●	●	●	—	—	—
	B	●	●	●	●	●	●	●	●	●	—	—	—
	C	●	●	●	●	●	●	●	●	●	—	—	—
San Juan	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Seattle	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Tapachula	A	●	●	●	●	●	●	●	●	●	—	—	●
	B	●	●	●	●	●	●	●	●	—	—	—	●
	C	●	●	●	●	●	●	●	●	●	—	—	●
Washington, DC	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Winnipeg	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●

- Excellent - 3.29σ bounded 100%
- Good - 4σ bounded 100%
- Fair - 4σ bounded 100% with one worst satellite excluded (Requires manual review if symptoms repeat from month to month)
- Poor – Requires manual review
- No data available

## 10.0 WAAS REFERENCE STATION SURVEY VALIDATION

Antenna L1 phase center position surveys were performed for all the WAAS Reference Station antennas using 25 hour sets of data from 23:00 on 1/2/15 to 23:59:30 on 1/3/15.

Duplicate surveys were performed using both the National Geodetic Survey (NGS) Online Positioning User Service (OPUS) and the Canadian Spatial Reference System (CSRS) Precise Point Positioning (PPP) service. The IGS08 reference frame is used for the OPUS solutions. A value of -0.4445 meters was used for the antenna reference point (ARP) to antenna phase center (APC) offset for the MicroPulse MPL-WAAS-2225W WAAS antennas in the processing.

The overall RMS quality metrics reported by OPUS were all  $\leq 2.3$  cm. The CSRS surveys' RSSs of the reported ECEF sigmas for the 1/3/15 data set were all  $\leq 10$  mm. The OPUS and CSRS surveys for the 1/3/15 data set agreed to an average of 1.6 cm. with a standard deviation of 7 mm. The maximum of difference was 3.9 cm. for threads 2 and 3 at Juneau Alaska (JNU).

The OPUS positions were compared to the positions in the currently fielded WAAS software Build W7.012 which was fielded in August 2014. Build W7.012 contains updated antenna positions that have been extrapolated forward in time to maximize the time interval before the next update is required. The OPUS surveys agree with the Build W7.012 positions to better or equal than 4.6 cm. for all sites. The maximum was 4.6 cm at Jacksonville C, ZJX3. Note for this report Mexico City errors are small because the date of the survey is near the mid point of the extrapolation period.

Table 10-1 lists the WAAS antenna L1 phase center positions as of 1/3/15 using the OPUS data.

Figures 10-1 to 10-3 show the RSS of the ECEF differences between the 1/3/15 OPUS survey antenna phase center locations and the locations in the Build W7.012 software. Each reference station has three independent strings of WAAS receiving equipment (WRE). A surveyed antenna phase center location is required for each WRE. All three strings of a reference station are shown in the three figures. For example, BET1 identifies the RSS of the ECEF deltas for the Bethel WRE string 1(A). The next two bars in the chart are Bethel string 2(B) and Bethel string 3(C). Figure 10-4 to 10-6 shows the OPUS surveys overall RMS quality indications.

The "take action" threshold established by the WAAS Integrity Performance Panel (WIPP) is 25 cm. for Mexico City and 10 cm. for the remaining sites. The large MMX allowance is required because of the rapid subsidence in Mexico City (approximately 28 to 30 cm / year).

Figures 10-7 to 10-9 show the RSS of the ECEF difference between the positions obtained from OPUS and the positions obtained from CSRS. Note that that OPUS positions are in IGS08 and the CSRS positions are in ITRF-2008. Figures 10-10 to 10-12 show the RSS of the ECEF sigma's survey qualities reported by CSRS.

The OPUS positions were also compared to the positions that will be used in the CY15 annual maintenance software release. The proposed positions were obtained from the software change request documentation for SCR waas00121649 and crossed checked against the values in Build W7.121C. The SCR values were confirmed to be identical to the values in W7.121C. Figures 10-13 to 10-15 show the RSS of the ECEF differences between the 1/3/15 OPUS survey antenna phase center locations and the locations in the Build W7.121C software. The positions in W7.121C have been interpolated forward in time to maximize the duration of the period of time that the Mexico City positions will be within the +/- 25 cm tolerance assuming the CY15 maintenance release is fielded early in the summer of 2015.

**Table 10-1 WAAS Antenna Positions (OPUS IGS08) as of 9/25/14**

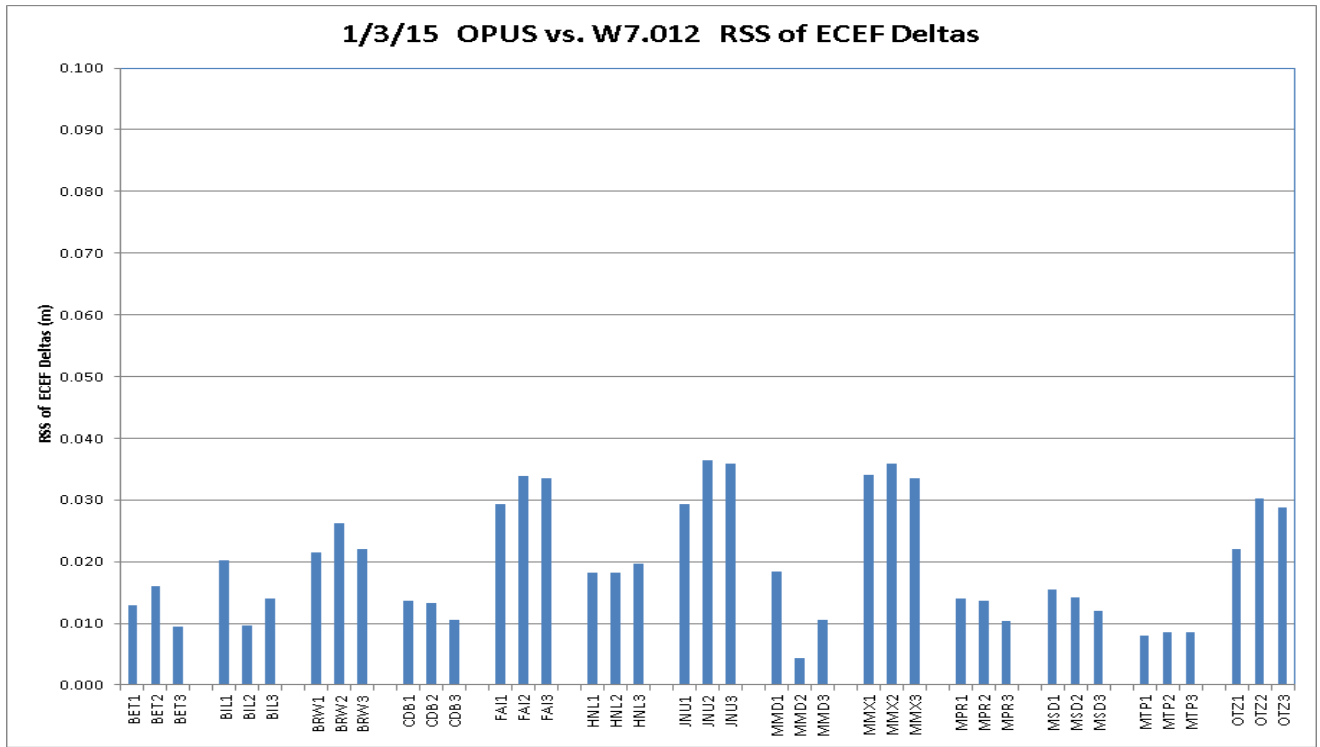
WRE	X(m)	Y(m)	Z(m)	Latitude	Longitude	H(m)
BET1	-2965385.081	-972576.620	5543892.884	60.7879151527778	-161.8417252055560	52.187
BET2	-2965385.852	-972580.344	5543891.832	60.7878957166667	-161.8416646527780	52.193
BET3	-2965388.415	-972577.474	5543890.958	60.7878798166667	-161.8417293833330	52.182
BIL1	-1416445.898	-4223577.009	4550862.136	45.8037067583333	-108.5397233194440	1112.231
BIL2	-1416449.975	-4223574.872	4550862.856	45.8037159805556	-108.5397817750000	1112.238
BIL3	-1416441.598	-4223574.267	4550865.995	45.8037565416667	-108.5396821000000	1112.232
BRW1	-1886758.955	-809058.665	6018494.464	71.2827646305555	-156.7899250722220	15.570
BRW2	-1886756.378	-809055.922	6018495.632	71.2827972694444	-156.7899670861110	15.569
BRW3	-1886755.281	-809059.702	6018495.470	71.2827927166667	-156.7898580611110	15.570
CDB1	-3484099.079	-1084748.783	5213678.613	55.1923738694444	-162.7064048027780	49.698
CDB2	-3484105.716	-1084741.581	5213675.666	55.1923278111111	-162.7065437500000	49.674
CDB3	-3484111.994	-1084734.812	5213672.919	55.1922843583333	-162.7066745333330	49.691
FAI1	-2304741.832	-1448715.274	5748843.648	64.8096297444444	-147.8473411972220	149.908
FAI2	-2304741.355	-1448706.464	5748846.040	64.8096802083333	-147.8474928444440	149.905
FAI3	-2304732.825	-1448707.400	5748849.182	64.8097467722222	-147.8473806222220	149.887
HNL1	-5508637.126	-2234493.156	2303722.273	21.3129910611111	-157.9208289805560	24.667
HNL2	-5508656.290	-2234483.477	2303687.033	21.3126482000000	-157.9209848583330	25.013
HNL3	-5508647.698	-2234497.407	2303694.129	21.3127168527778	-157.9208293166670	25.053
JNU1	-2354254.927	-2388549.651	5407043.112	58.3625744138889	-134.5857074305560	16.112
JNU2	-2354252.839	-2388565.762	5407036.938	58.3624688361111	-134.5854888111110	16.105
JNU3	-2354239.618	-2388568.611	5407041.401	58.3625452833333	-134.5852937805560	16.101
MMD1	35070.392	-5959686.643	2264365.775	20.9319094111111	-89.6628409555556	29.100
MMD2	35065.475	-5959687.025	2264364.991	20.9319016583333	-89.6628882472222	29.149
MMD3	35065.135	-5959685.232	2264369.651	20.9319467611111	-89.6628914138889	29.138
MMX1	-948701.006	-5943934.922	2109212.488	19.4316537500000	-99.0683898055556	2234.872
MMX2	-948696.575	-5943934.749	2109214.910	19.4316769861111	-99.0683484138889	2234.858
MMX3	-948705.437	-5943935.111	2109210.064	19.4316304472222	-99.0684311722222	2234.900
MPR1	-1570142.232	-5759530.603	2238184.748	20.6790032500000	-105.2492033194440	10.977
MPR2	-1570139.409	-5759530.103	2238188.806	20.6790414500000	-105.2491784416670	11.264
MPR3	-1570143.515	-5759527.982	2238190.573	20.6790594638889	-105.2492218166670	10.984
MSD1	-1979519.845	-5523222.960	2493106.843	23.1604475000000	-109.7176495055560	104.264
MSD2	-1979521.413	-5523225.297	2493100.441	23.1603846611111	-109.7176562222220	104.255
MSD3	-1979525.862	-5523222.032	2493104.119	23.1604207777778	-109.7177078777780	104.256
MTP1	-254854.375	-6162909.150	1617805.061	14.7913659916667	-92.3679993888889	54.926
MTP2	-254850.755	-6162910.189	1617801.631	14.7913339694444	-92.3679653944444	54.909
MTP3	-254855.526	-6162910.299	1617800.108	14.7913199527778	-92.3680096305555	54.817
OTZ1	-2396056.049	-750356.169	5843502.499	66.8873318638889	-162.6113729416670	10.882
OTZ2	-2396052.877	-750354.336	5843504.021	66.8873667055556	-162.6113912250000	10.878
OTZ3	-2396052.859	-750358.281	5843503.530	66.8873553944445	-162.6113051916670	10.883

WRE	X(m)	Y(m)	Z(m)	Latitude	Longitude	H(m)
YFB1	1035381.410	-2634289.640	5696539.551	63.7314906805556	-68.5431841250000	10.031
YFB2	1035372.182	-2634296.047	5696538.199	63.7314644972222	-68.5434054194444	9.963
YFB3	1035366.123	-2634306.820	5696534.415	63.7313866472222	-68.5435993388889	10.027
YQX1	2430424.606	-3419640.397	4788223.843	48.9664901555556	-54.5976325111111	146.879
YQX2	2430432.557	-3419639.058	4788220.778	48.9664482222222	-54.5975334083333	146.874
YQX3	2430440.464	-3419637.690	4788217.791	48.9664070833333	-54.5974345638889	146.896
YWG1	-520164.410	-4083475.949	4855843.043	49.9005742694444	-97.2593980750000	222.111
YWG2	-520150.538	-4083468.888	4855850.428	49.9006772555556	-97.2592189611111	222.120
YWG3	-520152.412	-4083478.005	4855842.608	49.9005681500000	-97.2592288027778	222.116
YYR1	1885341.395	-3321428.366	5091171.668	53.3086472388889	-60.4194687222222	37.851
YYR2	1885344.356	-3321419.886	5091176.083	53.3087135444444	-60.4193672916667	37.858
YYR3	1885340.075	-3321413.069	5091182.085	53.3088037083333	-60.4193726583333	37.866
ZAB1	-1488636.857	-5003946.543	3654557.701	35.1735753027778	-106.5673499166670	1620.127
ZAB2	-1488631.525	-5003948.214	3654557.674	35.1735746833333	-106.5672885972220	1620.178
ZAB3	-1488632.302	-5003950.803	3654553.824	35.1735322916667	-106.5672886694440	1620.170
ZAN1	-2659536.675	-1549114.764	5567750.751	61.2292016000000	-149.7802512666670	80.700
ZAN2	-2659548.426	-1549110.817	5567746.268	61.2291179916667	-149.7804248611110	80.701
ZAN3	-2659541.377	-1549106.689	5567750.738	61.2292015555556	-149.7804252166670	80.688
ZAU1	138704.094	-4761244.142	4227763.932	41.7826580555556	-88.3313369500000	195.888
ZAU2	138704.353	-4761248.762	4227758.771	41.7825956611111	-88.3313354555555	195.899
ZAU3	138711.057	-4761248.494	4227758.850	41.7825966250000	-88.3312547555555	195.897
ZBW1	1490299.196	-4448983.171	4306010.499	42.7357205638889	-71.4804261416667	39.111
ZBW2	1490304.310	-4448981.162	4306010.846	42.7357245722222	-71.4803591333333	39.140
ZBW3	1490306.017	-4448984.786	4306006.534	42.7356717583333	-71.4803534250000	39.136
ZDC1	1069125.739	-4839598.980	4001126.509	39.1015959777778	-77.5427467833333	80.055
ZDC2	1069128.136	-4839603.611	4001120.306	39.1015239916667	-77.5427312750000	80.054
ZDC3	1069124.034	-4839602.704	4001122.503	39.1015494083333	-77.5427753166667	80.065
ZDV1	-1273628.631	-4711375.567	4094890.102	40.1873032222222	-105.1272245944440	1541.348
ZDV2	-1273622.931	-4711377.083	4094890.118	40.1873034722222	-105.1271553527780	1541.340
ZDV3	-1273624.939	-4711380.276	4094885.830	40.1872530250000	-105.1271683250000	1541.328
ZFW1	-659983.215	-5324060.789	3438276.475	32.8306496861111	-97.0664719444444	155.632
ZFW2	-659988.480	-5324063.335	3438271.474	32.8305962750000	-97.0665244027778	155.588
ZFW3	-659983.512	-5324063.864	3438271.686	32.8305983027778	-97.0664710527778	155.631
ZHU1	-513864.481	-5506451.703	3166720.464	29.9618962888889	-95.3314263750000	10.844
ZHU2	-513867.126	-5506455.099	3166714.299	29.9618317666667	-95.3314503888889	10.907
ZHU3	-513873.405	-5506457.748	3166708.704	29.9617735277778	-95.3315126083333	10.903
ZJX1	772646.429	-5434462.179	3237231.741	30.6988596972222	-81.9081852500000	2.125
ZJX2	772649.752	-5434463.735	3237228.345	30.6988241083333	-81.9081531944445	2.118
ZJX3	772645.689	-5434466.161	3237225.236	30.6987915694444	-81.9081987472222	2.104

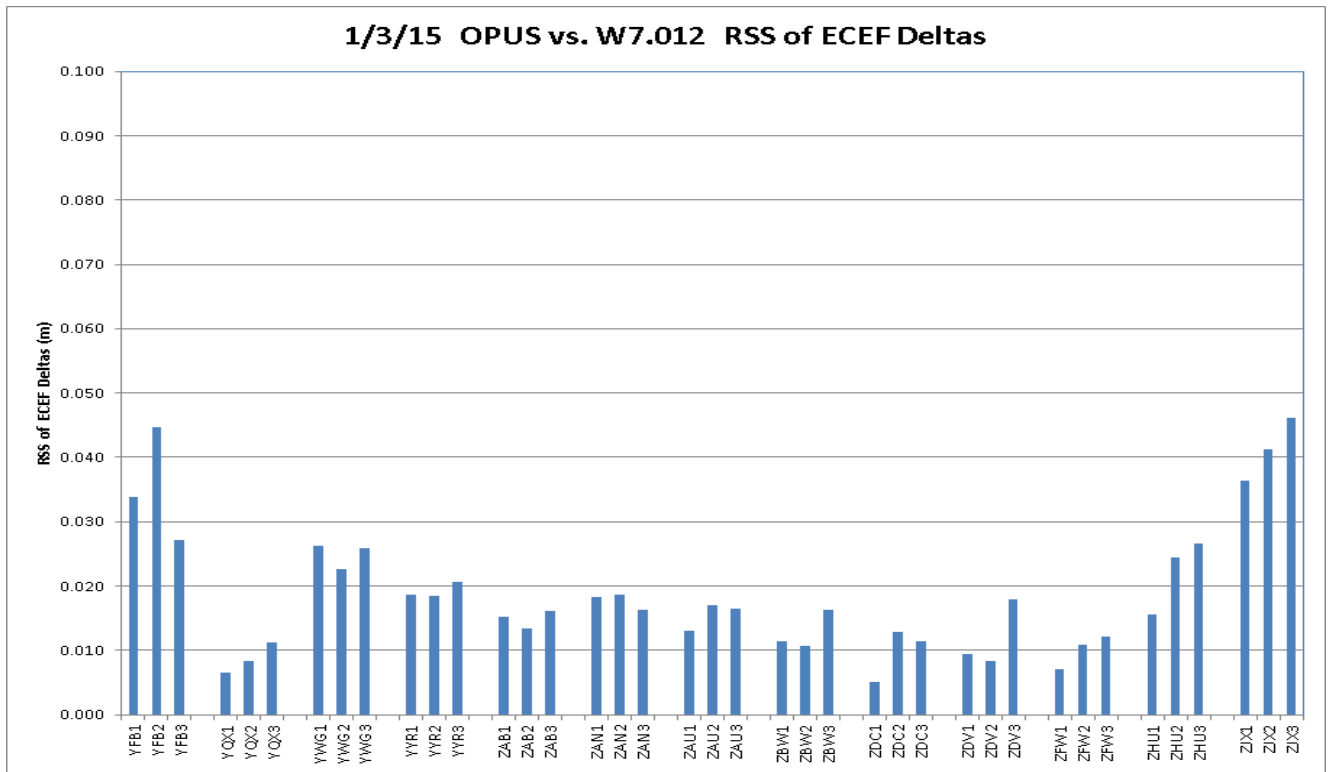


WRE	X(m)	Y(m)	Z(m)	Latitude	Longitude	H(m)
ZKC1	-415247.536	-4954556.387	3982161.113	38.8801593916667	-94.7908340527778	305.896
ZKC2	-415231.143	-4954557.713	3982161.172	38.8801600750000	-94.7906445277778	305.896
ZKC3	-415237.262	-4954561.062	3982155.978	38.8801018972222	-94.7907115722222	305.631
ZLA1	-2474409.963	-4637294.609	3602183.538	34.6035184500000	-118.0838958416670	763.495
ZLA2	-2474404.684	-4637297.405	3602183.536	34.6035185305556	-118.0838307250000	763.479
ZLA3	-2474411.296	-4637297.094	3602179.566	34.6034745472222	-118.0838959083330	763.561
ZLC1	-1808273.236	-4486410.817	4145303.011	40.7860432194444	-111.9521778222220	1287.429
ZLC2	-1808274.626	-4486414.431	4145298.519	40.7859898277778	-111.9521770888890	1287.426
ZLC3	-1808270.421	-4486416.135	4145298.514	40.7859897444444	-111.9521233472220	1287.429
ZMA1	966042.286	-5662999.813	2761581.500	25.8246122527778	-80.3191899194444	-7.598
ZMA2	966029.311	-5662999.117	2761585.986	25.8246599777778	-80.3193163138889	-8.226
ZMA3	966037.389	-5662997.953	2761586.340	25.8246620250000	-80.3192349444444	-7.881
ZME1	4070.873	-5226189.298	3644028.423	35.0673941083333	-89.9553701972222	68.604
ZME2	4070.904	-5226186.739	3644032.538	35.0674377166667	-89.9553698361111	68.874
ZME3	4064.708	-5226186.621	3644032.693	35.0674394972222	-89.9554377638889	68.862
ZMP1	-249978.408	-4539297.500	4458955.053	44.6374632611111	-93.1520858166667	262.656
ZMP2	-249972.605	-4539297.843	4458955.055	44.6374631277778	-93.1520125555556	262.674
ZMP3	-249973.701	-4539302.117	4458950.576	44.6374070833333	-93.1520233833333	262.607
ZNY1	1406144.608	-4627343.980	4144322.057	40.7843286500000	-73.0971659805555	6.441
ZNY2	1406146.407	-4627347.014	4144317.276	40.7842759000000	-73.0971560388889	5.912
ZNY3	1406140.848	-4627348.672	4144317.314	40.7842763361111	-73.0972247611111	5.914
ZOA1	-2684436.896	-4293337.368	3865351.867	37.5430540111111	-122.0159482444440	-3.514
ZOA2	-2684433.887	-4293341.445	3865349.443	37.5430264722222	-122.0158949166670	-3.515
ZOA3	-2684438.265	-4293342.326	3865345.591	37.5429821083333	-122.0159316361110	-3.429
ZOB1	650770.160	-4754715.668	4187420.752	41.2971545055556	-82.2064450055556	223.677
ZOB2	650777.840	-4754714.840	4187422.768	41.2971668277778	-82.2063528194444	225.174
ZOB3	650776.171	-4754719.669	4187414.981	41.2970870694444	-82.2063803805556	223.459
ZSE1	-2308930.285	-3668169.682	4663526.479	47.2869931861111	-122.1883729500000	82.109
ZSE2	-2308934.670	-3668175.224	4663520.064	47.2869076138889	-122.1883829805560	82.162
ZSE3	-2308935.728	-3668179.494	4663516.120	47.2868559416667	-122.1883647472220	82.097
ZSU1	2462589.445	-5529372.114	2003724.493	18.4313359388889	-65.9934766833333	-28.095
ZSU2	2462587.518	-5529377.484	2003712.202	18.4312188166667	-65.9935140277778	-28.071
ZSU3	2462594.145	-5529375.233	2003710.123	18.4311991694444	-65.9934480555556	-28.122
ZTL1	529840.385	-5305248.821	3489342.859	33.3796886138889	-84.2967262138889	261.147
ZTL2	529846.760	-5305247.970	3489343.138	33.3796917722222	-84.2966571361111	261.123
ZTL3	529847.443	-5305251.417	3489337.909	33.3796350555556	-84.2966535138889	261.167

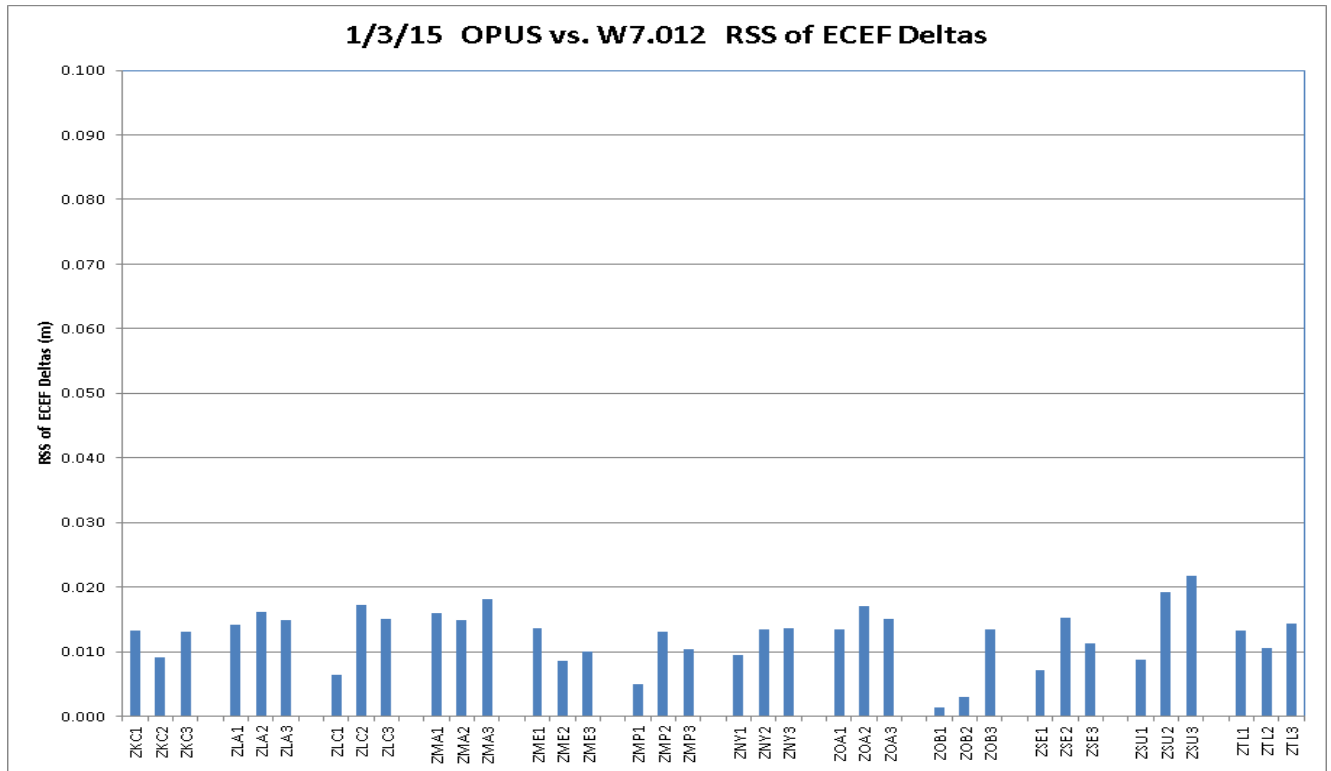
**Figure 10-1 Build W7.012 Antenna Positions Deltas from 1/3/15 OPUS Survey**



**Figure 10-2 Build W7.012 Antenna Positions Deltas from 1/3/15 OPUS Survey**



**Figure 10-3 Build W7.012 Antenna Positions Deltas from 1/3/15 OPUS Survey**



**Figure 10-4 1/3/15 OPUS Survey Overall RMS Qualities**

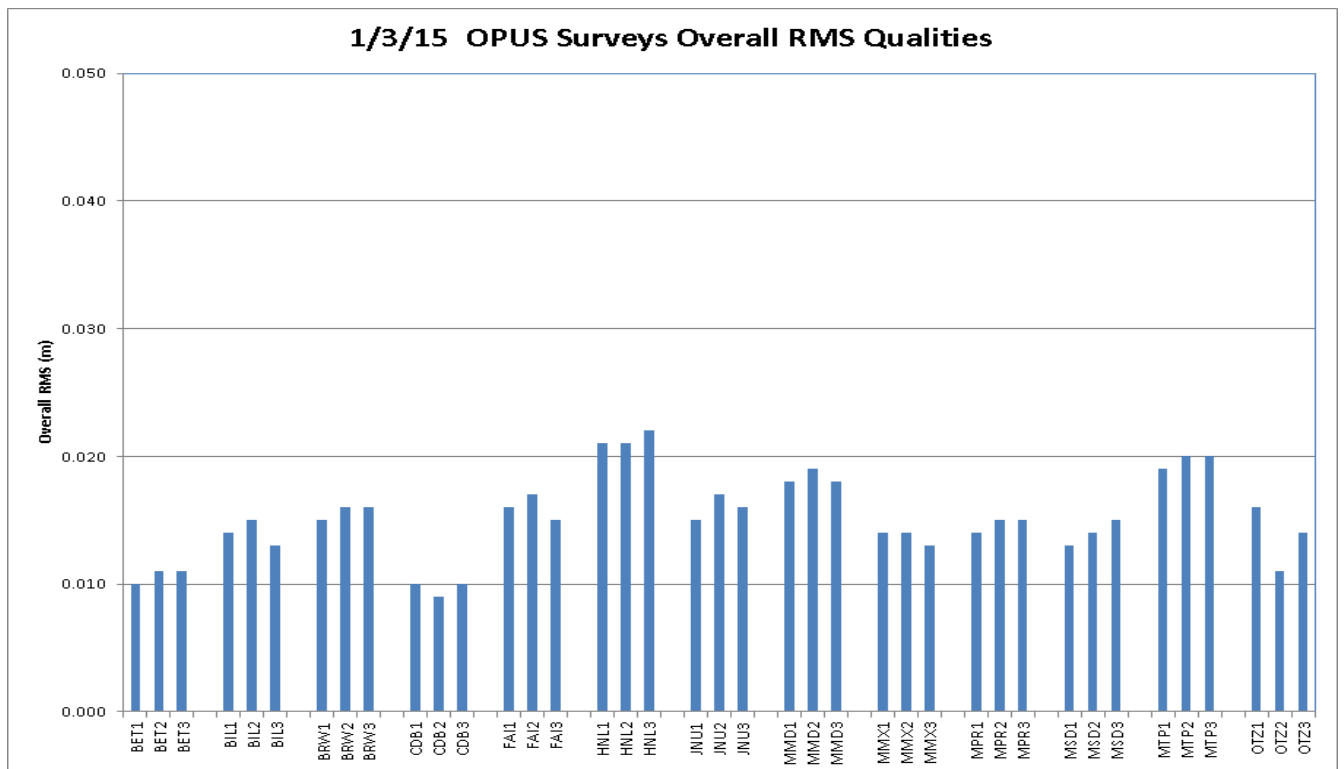


Figure 10-5 1/3/15 OPUS Survey Overall RMS Qualities

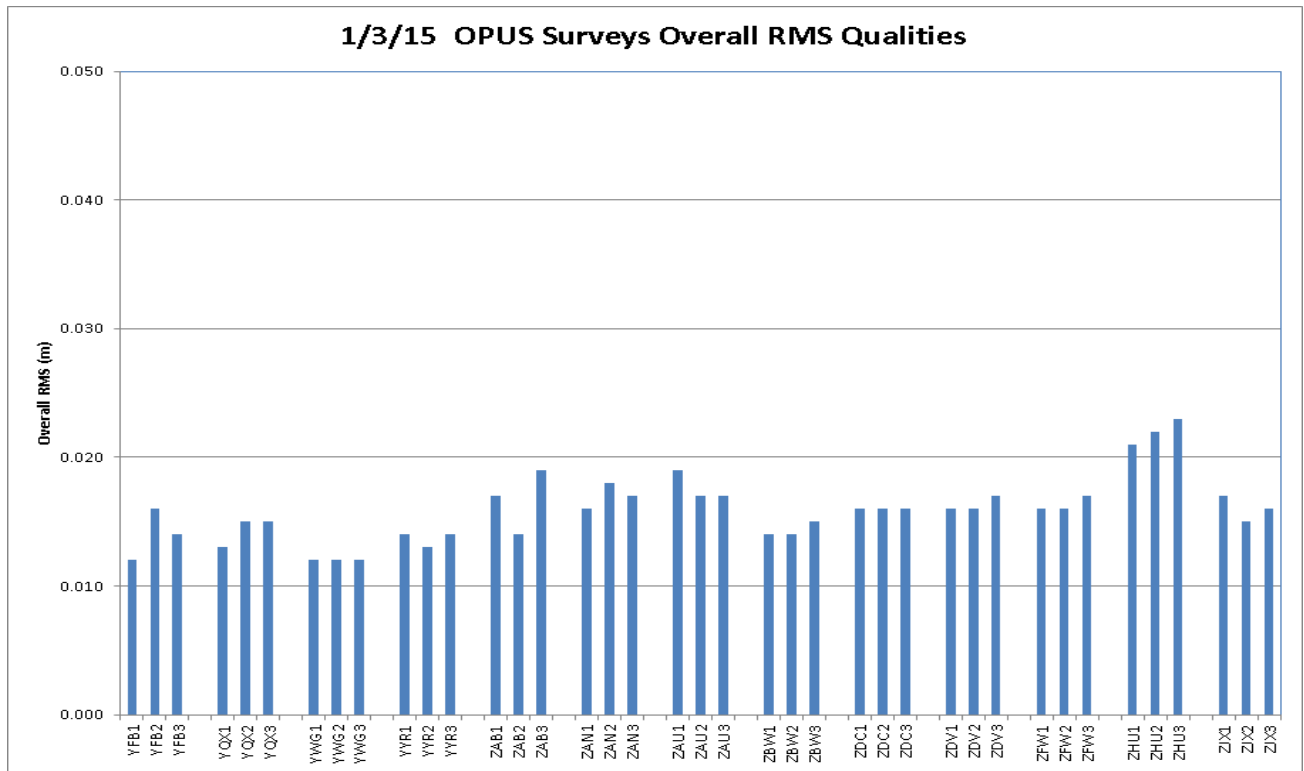


Figure 10-6 1/3/15 OPUS Survey Overall RMS Qualities

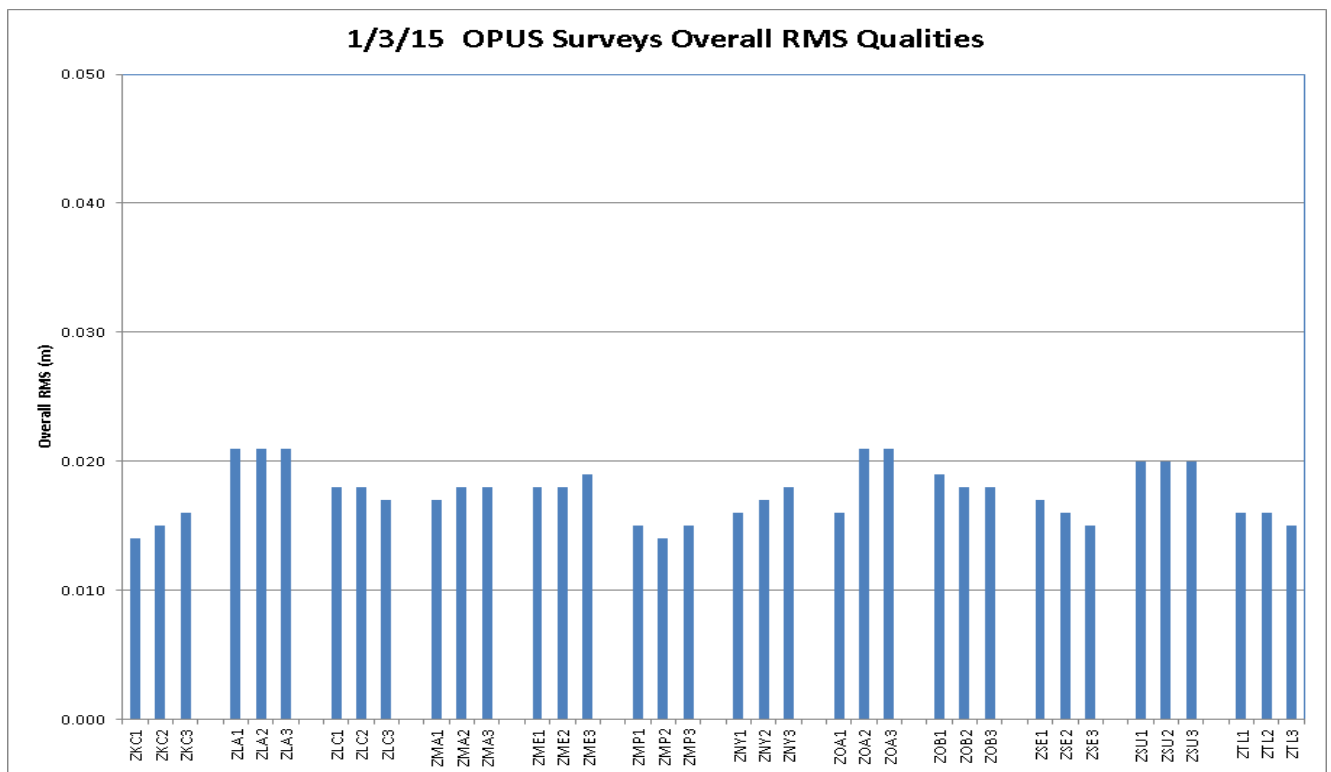


Figure 10-7 1/3/15 OPUS vs. CSRS RSS ECEF Deltas

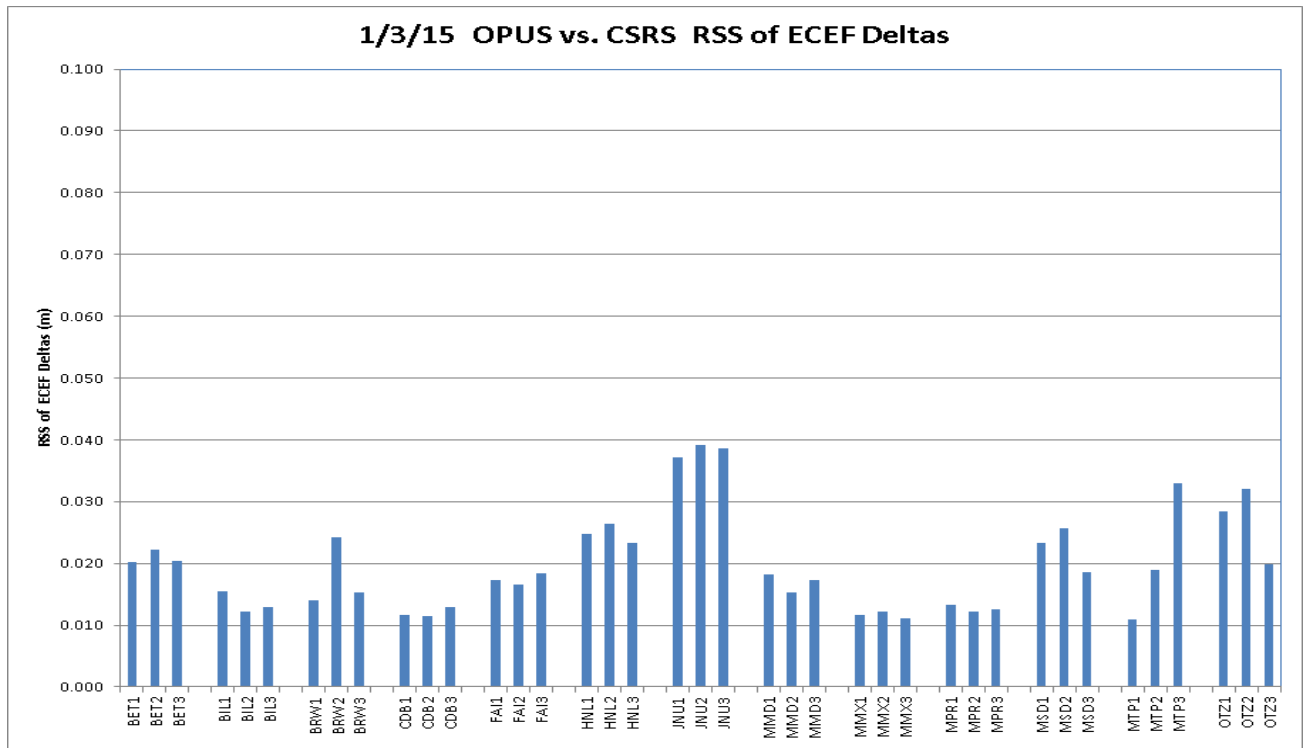


Figure 10-8 1/3/15 OPUS vs. CSRS RSS ECEF Deltas

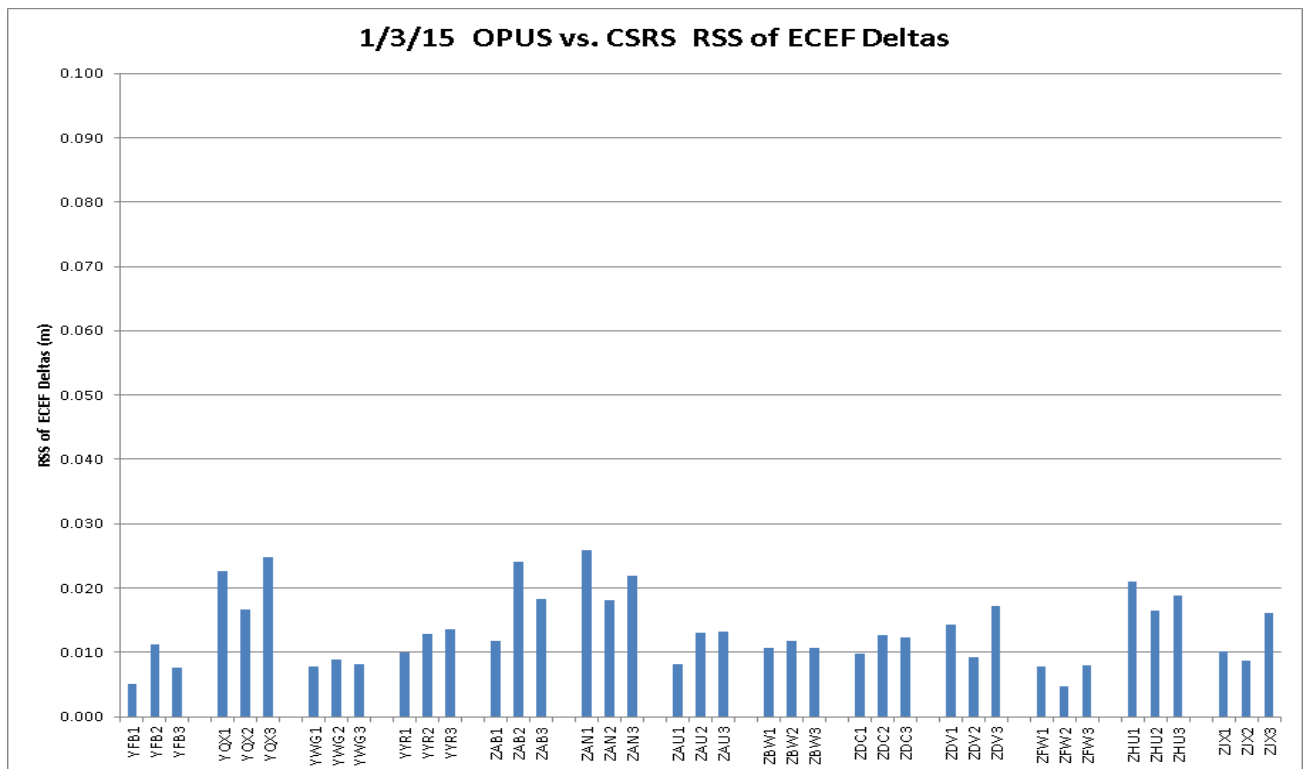


Figure 10-9 1/3/15 OPUS vs. CSRS RSS ECEF Deltas

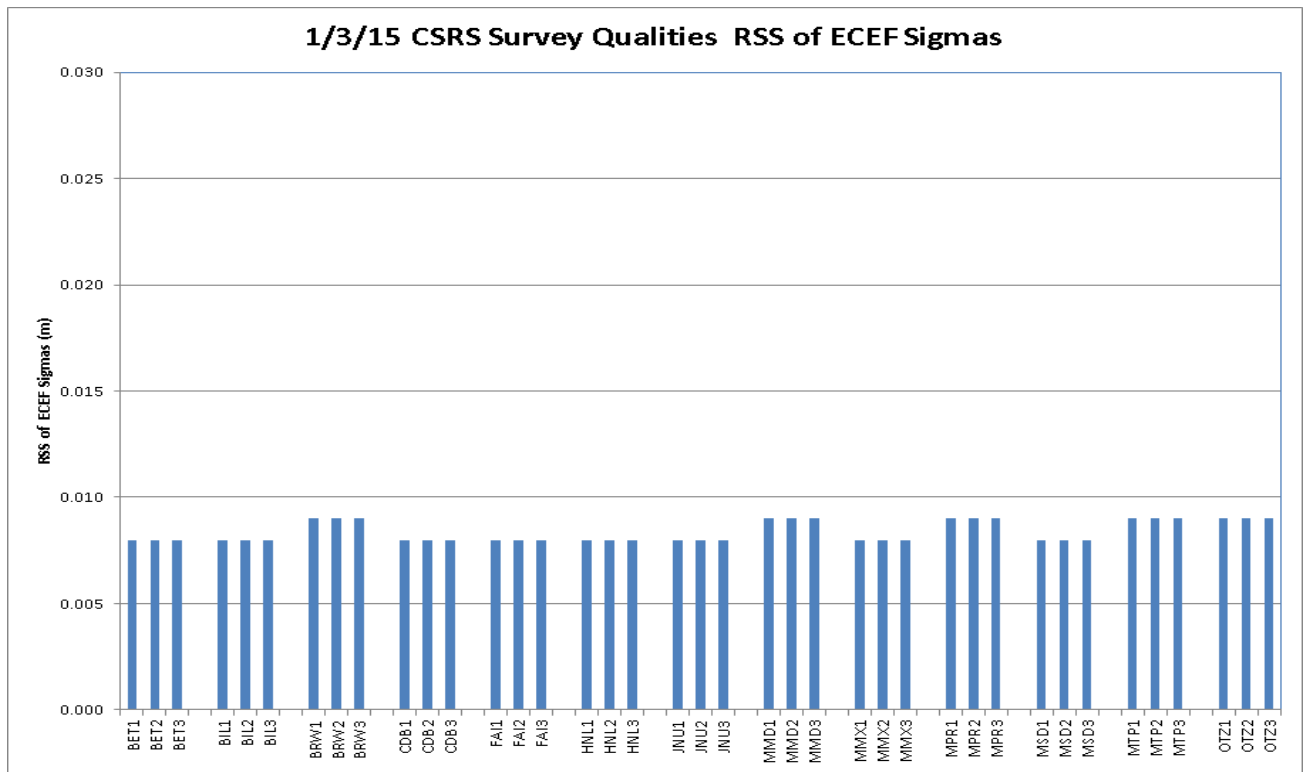


Figure 10-10 1/3/15 CSRS Survey Qualities

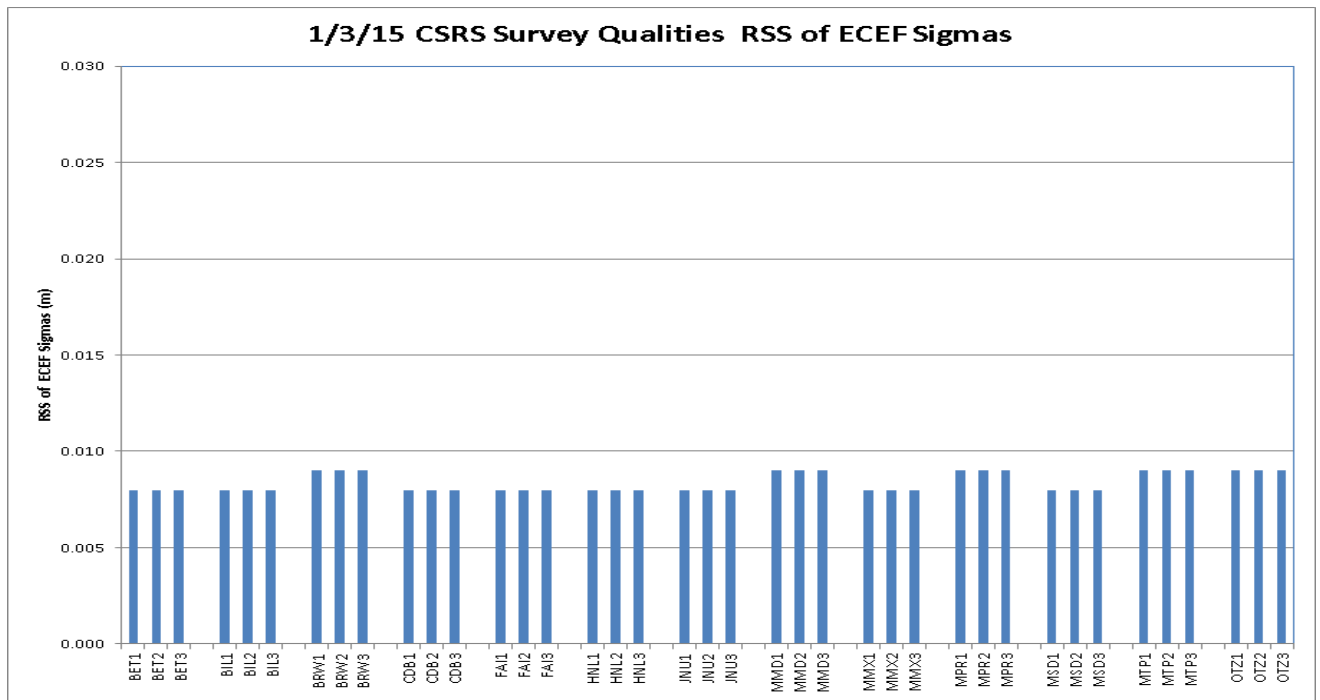


Figure 10-11 1/3/15 CSRS Survey Qualities

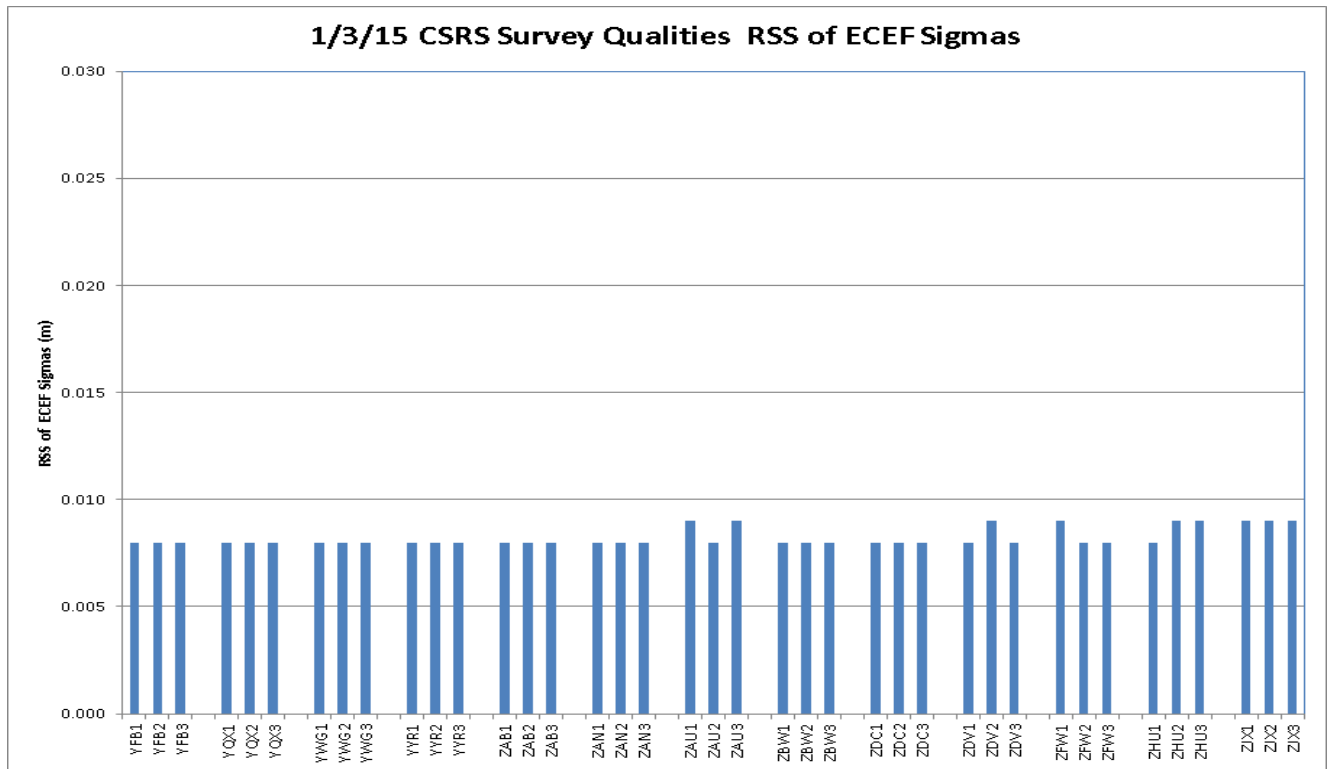
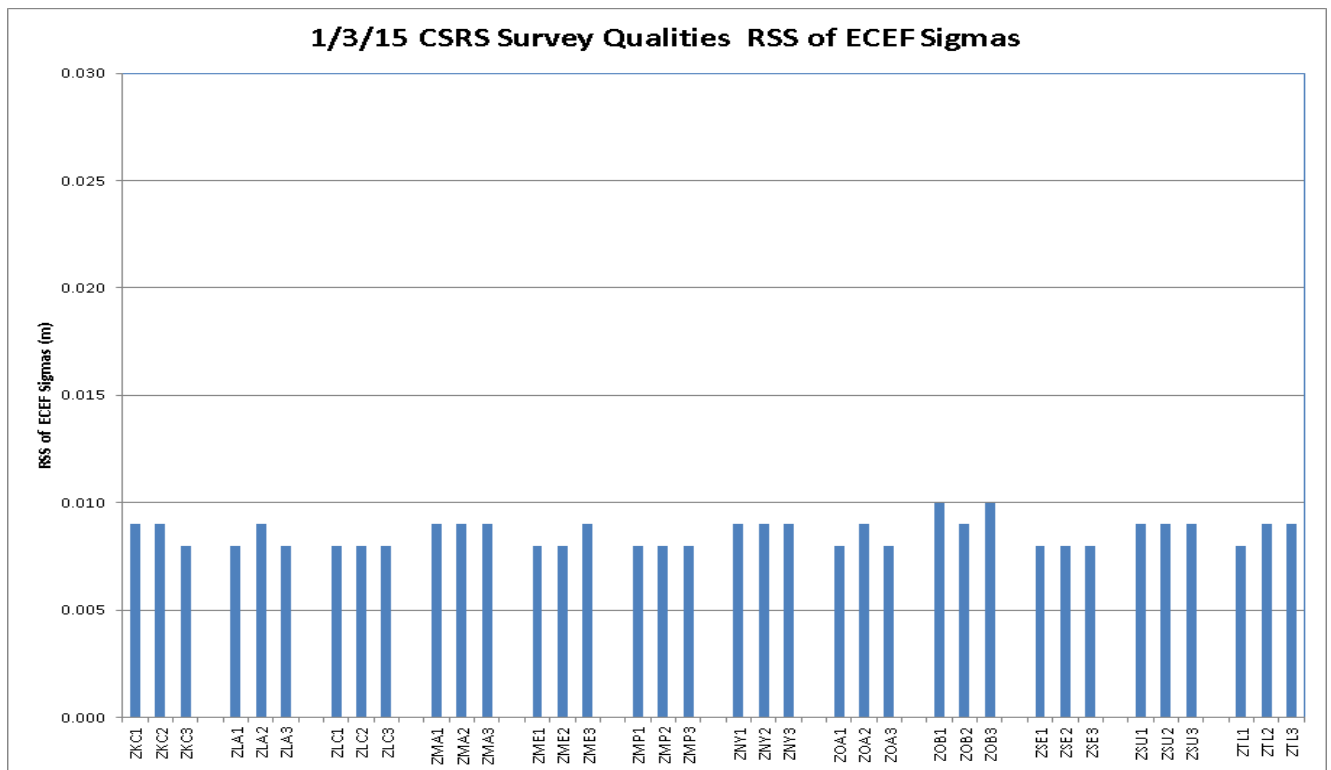


Figure 10-12 1/3/15 CSRS Survey Qualities



**11.0 SIGNAL QUALITY MONITOR (SQM)**

The Signal Quality Monitor (SQM) is designed to detect signal deformations that originate in the GPS or GEO satellites and ensures that the UDRE values are sufficiently inflated to protect given the monitor’s current observations. SQM processes various correlator spacing measurements produced by the reference station receivers to form four detection metrics for each receiver and calculates statistics based on the observed performance against “ideal” signal correlation peaks. This results in an estimate of the overall deformation per satellite. The deformation level calculated is then compared against threshold values, which includes the acceptable error levels per UDRE value. If the estimated deformation exceeds threshold, the monitor trips for the given satellite and the UDRE value is set to ‘Don’t Use’. The monitor depends on the entire ground network in order to ensure that the satellite is the source of any problem detected rather than a localized affect. Currently all 114 receivers are being used in the SQM computations.

WAAS SQM offline monitoring effort includes the monitoring of the PRN type biases, trips, and the estimated deformation for each satellite that will be referred to as PRN bias in this report.

**11.1 Alpha Metrics**

The alpha metrics values are pre-determined by offline integrity analysis and are defined as constants in the SQM algorithm. These values remained unchanged for this reporting period and are listed in Table 11-1. Currently there are 4 sets of alpha metrics in the WAAS SQM algorithm that form four detection metrics for each receiver channel. For this report, the four detection metrics will be referred to as: DM1, DM2, DM3, and DM4.

**Table 11-1 Alpha Metrics**

<b>Correlator Spacing</b>	<b>DM1</b>	<b>DM2</b>	<b>DM3</b>	<b>DM4</b>
-0.1	0	0.43407318	0	-0.36110353
-0.075	0	0.48570652	-0.0058771682	-0.74860302
-0.05	-0.4071265	-0.69931105	-0.011382325	0.23726003
-0.025	1	-0.010099034	0.00037033029	-0.0076011735
0	0	0	0	0
0.025	-0.25	0.13317879	0.99991788	-0.062414070
0.05	1.008525	-0.22851782	0	0.25177272
0.075	0	0.10209042	0	0.42875623
0.1	0	0.078436452	0	0.41602138

**11.2 Type Bias**

PRN Type biases are evaluated as part of the WAAS SQM offline monitoring effort. Depending on the PRN number of any given satellite, it can be classified into three categories of correlation function shapes: skinny (Type 0), nominal (Type 1), and broad (Type 2). Wideband geostationary satellites are considered a different type (Type 3). PRN-type estimates are computed at each epoch and daily averages are computed for each type, for four detection metrics.

For this reporting period, geostationary satellites type biases are not evaluated. Table11-3 shows the rollup average for the quarter. Table 11-4 shows the rollup average since January 1, 2008. Figure 11-1 shows the daily average for the four detection metrics for the quarter. The shift in Type Bias Type 0 in Figure 11-1 was due to PRN-8/SVN-38 went offline.



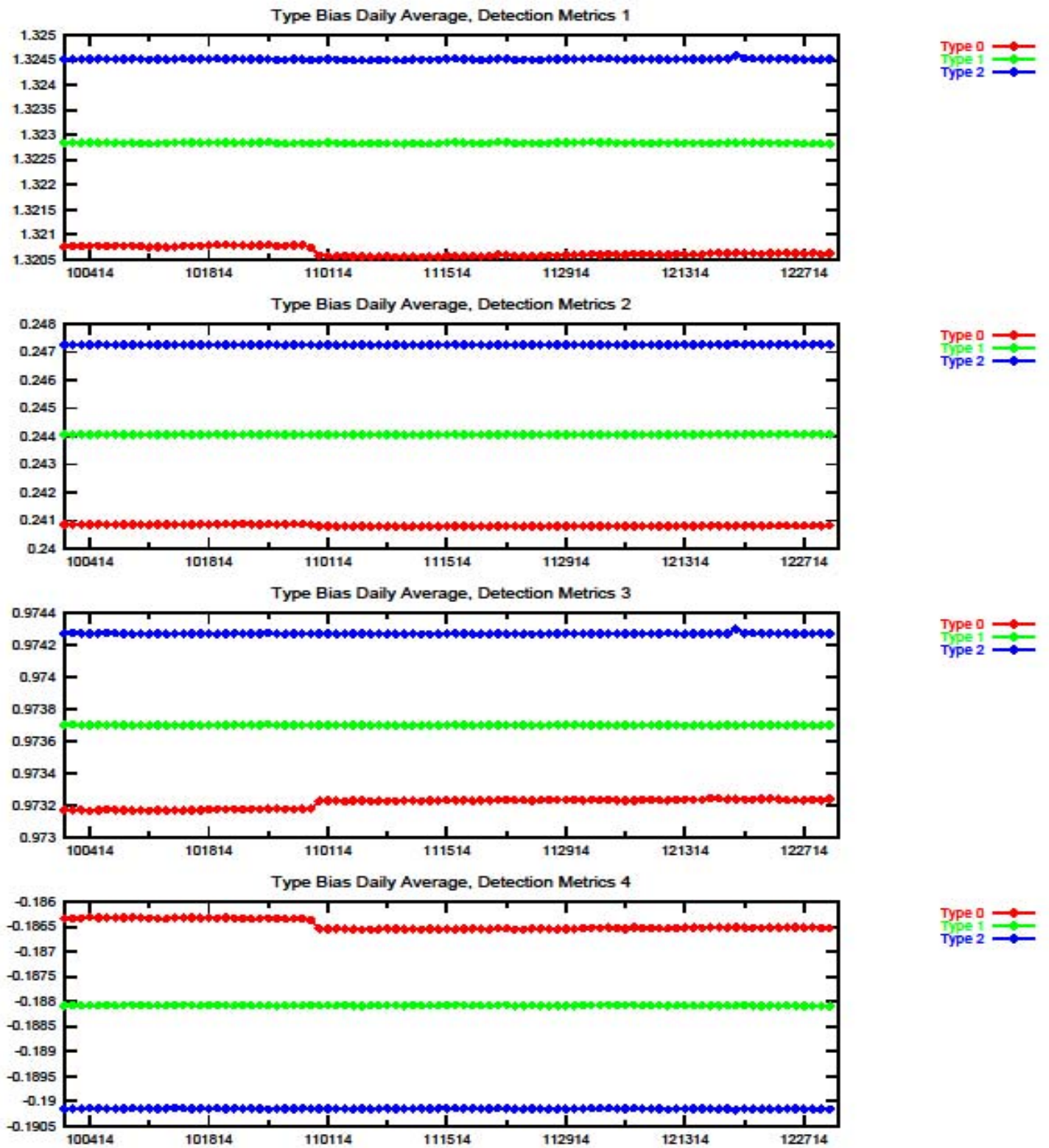
**Table 11-2 Type Bias Average for the Quarter**

<b>Detection Metric</b>	<b>Type 0</b>	<b>Type 1</b>	<b>Type 2</b>
DM 1	1.3206600	1.3228400	1.3245200
DM 2	0.2408220	0.2440600	0.2472590
DM 3	0.9732130	0.9737000	0.9742700
DM 4	-0.1864690	-0.1880780	-0.1901460

**Table 11-3 Type Bias Average Since January 1, 2008**

<b>Detection Metric</b>	<b>Type 0</b>	<b>Type 1</b>	<b>Type 2</b>
DM 1	1.3208900	1.3228700	1.3245800
DM 2	0.2408490	0.2440880	0.2472710
DM 3	0.9731760	0.9737080	0.9742750
DM 4	-0.1862320	-0.1880650	-0.1901060

Figure 11-1 Type Bias Average Trend



### 11.3 PRN Bias

PRN biases are evaluated as part of the WAAS SQM offline monitoring effort. PRN bias is the overall estimated deformation per satellite across receivers. Detection metrics are adjusted for inter-receiver bias, corrected for PRN type bias, and combined across receivers for each satellite. Relying on the assertion that the majority of the SV signals are healthy and normal, detection metrics are normalized over all the satellites on orbit resulting in an overall PRN bias for each satellite. PRN biases are collected at each epoch and daily averages are computed for each satellite, for four detection metrics.

Table 11-4 and Figure 11-2 show the rollup PRN bias average for the quarter. Figures 11-3 to 11-10 show the PRN bias average trend for each SV. The maximum average for DM1 for this quarter is PRN 23 at 0.001032. The maximum average for DM2 is PRN 11 at 0.0002164. The maximum average for DM3 is PRN 10 at 0.0002591 and the maximum average for DM4 is PRN 23 at 0.0004056.

For this reporting period, geostationary satellite biases are not evaluated. Please refer to Table 1-5 for events that may have an impact on PRN bias statistics. The small spikes in PRN bias daily averages are due to satellite outages. On the days of satellite maintenance, partial data resulted in a slightly varied PRN bias daily average compared to full day data average. PRN-3 (SVN-69) became operational on 12/12/14; PRN-8 (SVN-38) went offline on 10/30/14.

**Table 11-4 PRN Bias Average for the Quarter**

PRN	SVN	DM1	DM2	DM3	DM4
1	63	0.0001438	0.0000877	0.0000761	0.0000900
2	61	0.0005709	0.0001287	0.0000940	0.0001091
3	69	0.0001207	0.0000462	0.0000803	0.0000917
4	34	0.0001893	0.0000506	0.0000667	0.0001477
5	50	0.0001143	0.0001122	0.0000588	0.0001011
6	67	0.0002008	0.0002071	0.0001496	0.0001469
7	48	0.0001280	0.0000653	0.0000322	0.0001290
8	38	0.0001342	0.0001692	0.0000377	0.0001151
9	39	0.0001833	0.0000722	0.0000864	0.0003918
10	40	0.0006317	0.0000457	0.0002591	0.0001028
11	46	0.0009782	0.0002164	0.0000693	0.0002519
12	58	0.0001418	0.0000720	0.0000933	0.0000777
13	43	0.0005734	0.0000494	0.0000745	0.0001516
14	41	0.0007039	0.0001360	0.0001196	0.0001217
15	55	0.0001435	0.0000505	0.0000230	0.0001466
16	56	0.0001339	0.0000577	0.0001257	0.0003397
17	53	0.0001692	0.0000654	0.0000441	0.0001237
18	54	0.0006934	0.0001340	0.0000492	0.0002284
19	59	0.0004769	0.0001836	0.0000567	0.0000986
20	51	0.0001303	0.0000559	0.0000354	0.0001768
21	45	0.0003825	0.0001260	0.0001744	0.0001218
22	47	0.0003675	0.0000559	0.0000985	0.0003521
23	60	0.0010320	0.0001760	0.0000359	0.0004056
24	65	0.0002178	0.0000487	0.0000356	0.0001145
25	62	0.0002846	0.0001843	0.0000826	0.0001164
26	26	0.0002199	0.0000566	0.0001363	0.0000925
27	66	0.0005949	0.0001771	0.0000716	0.0002953
28	44	0.0003083	0.0000488	0.0000324	0.0000902
29	57	0.0002874	0.0000571	0.0000954	0.0002878
30	64	0.0002219	0.0000532	0.0000529	0.0001646
31	52	0.0003704	0.0001422	0.0000317	0.0002583
32	23	0.0001741	0.0000695	0.0000921	0.0001000

Figure 11-2 PRN Bias Average for the Quarter

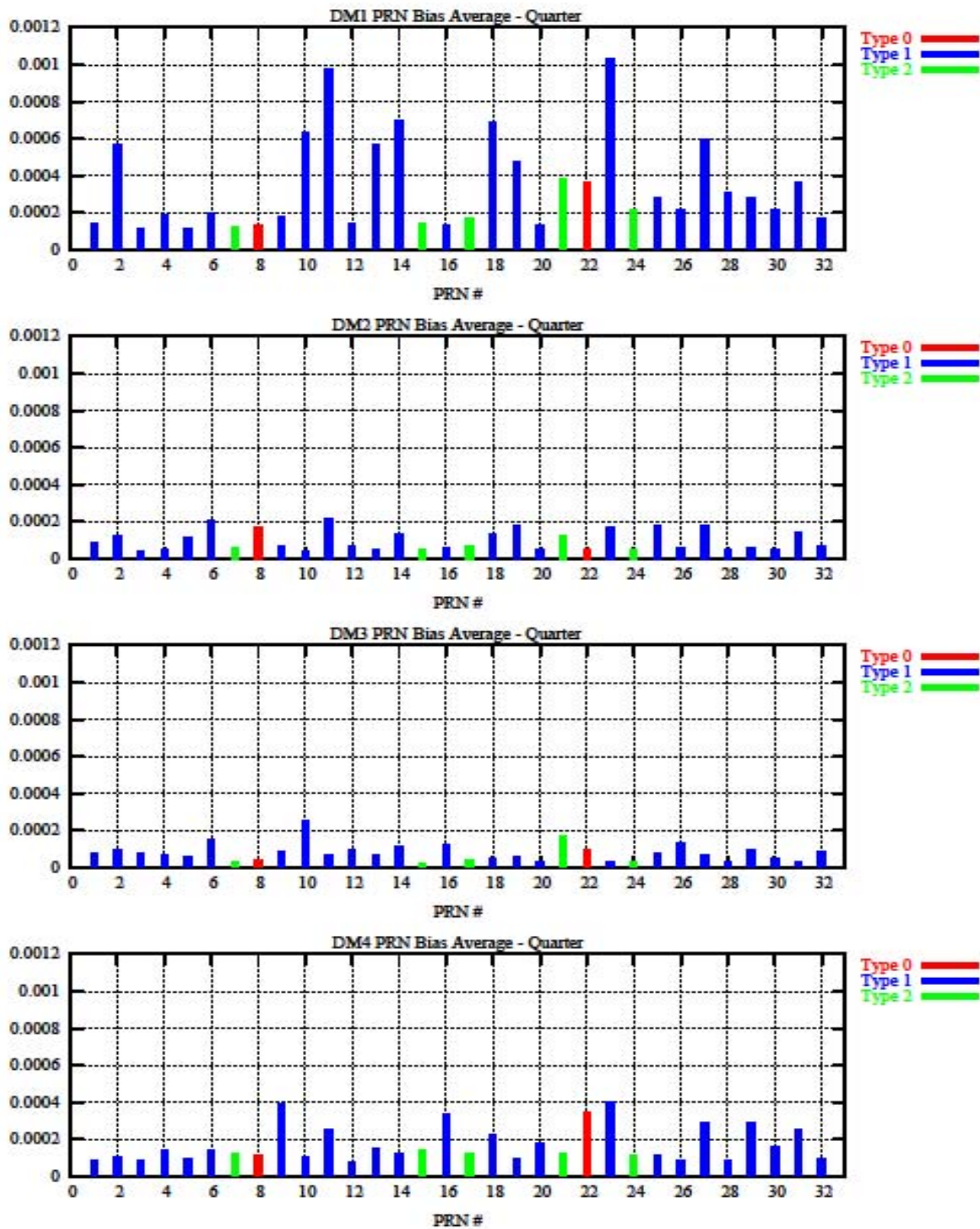


Figure 11-3 PRN Bias Average Trend (PRN 1 – PRN 4)

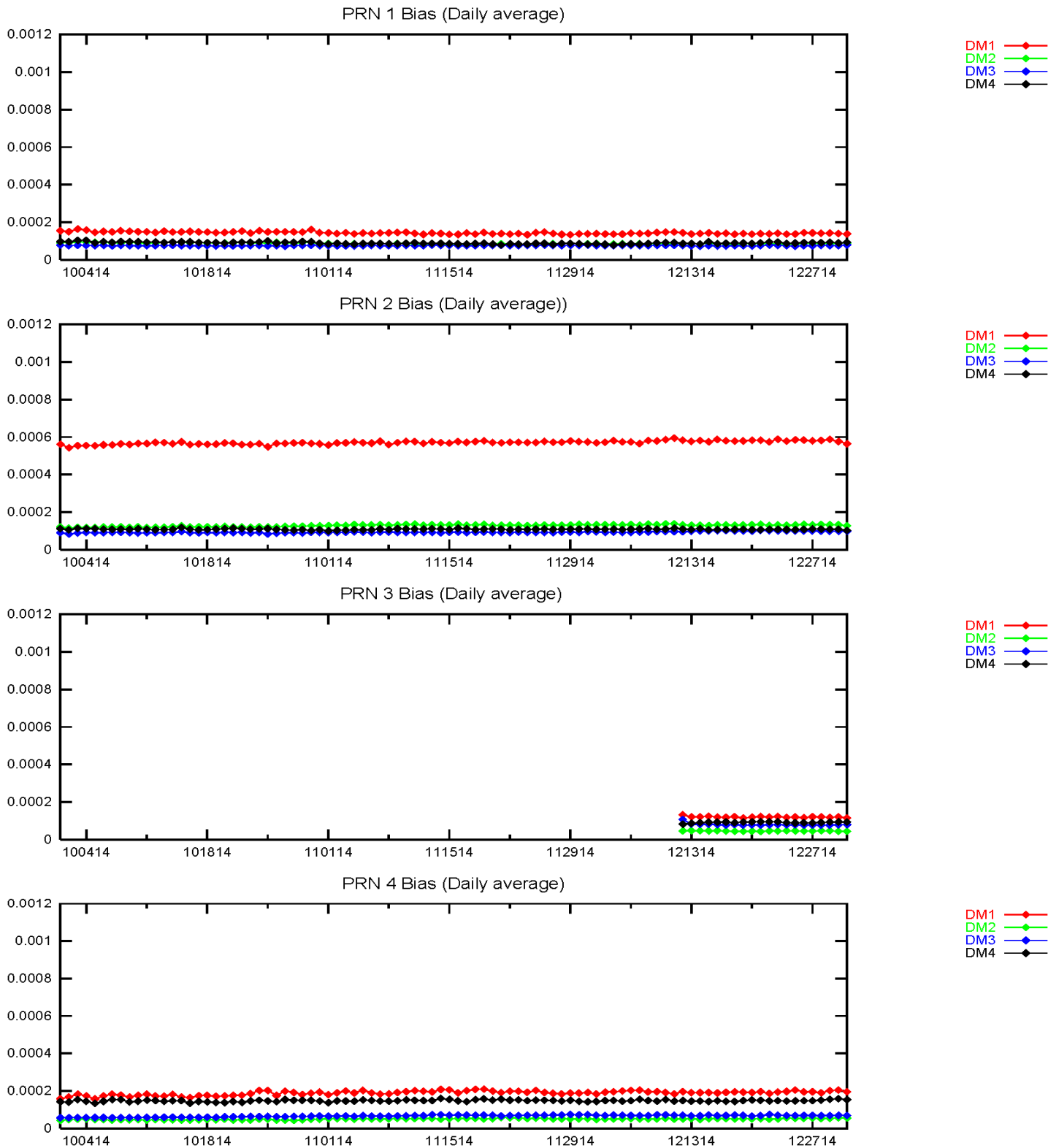


Figure 11-4 PRN Bias Average Trend (PRN 5 – PRN 8)

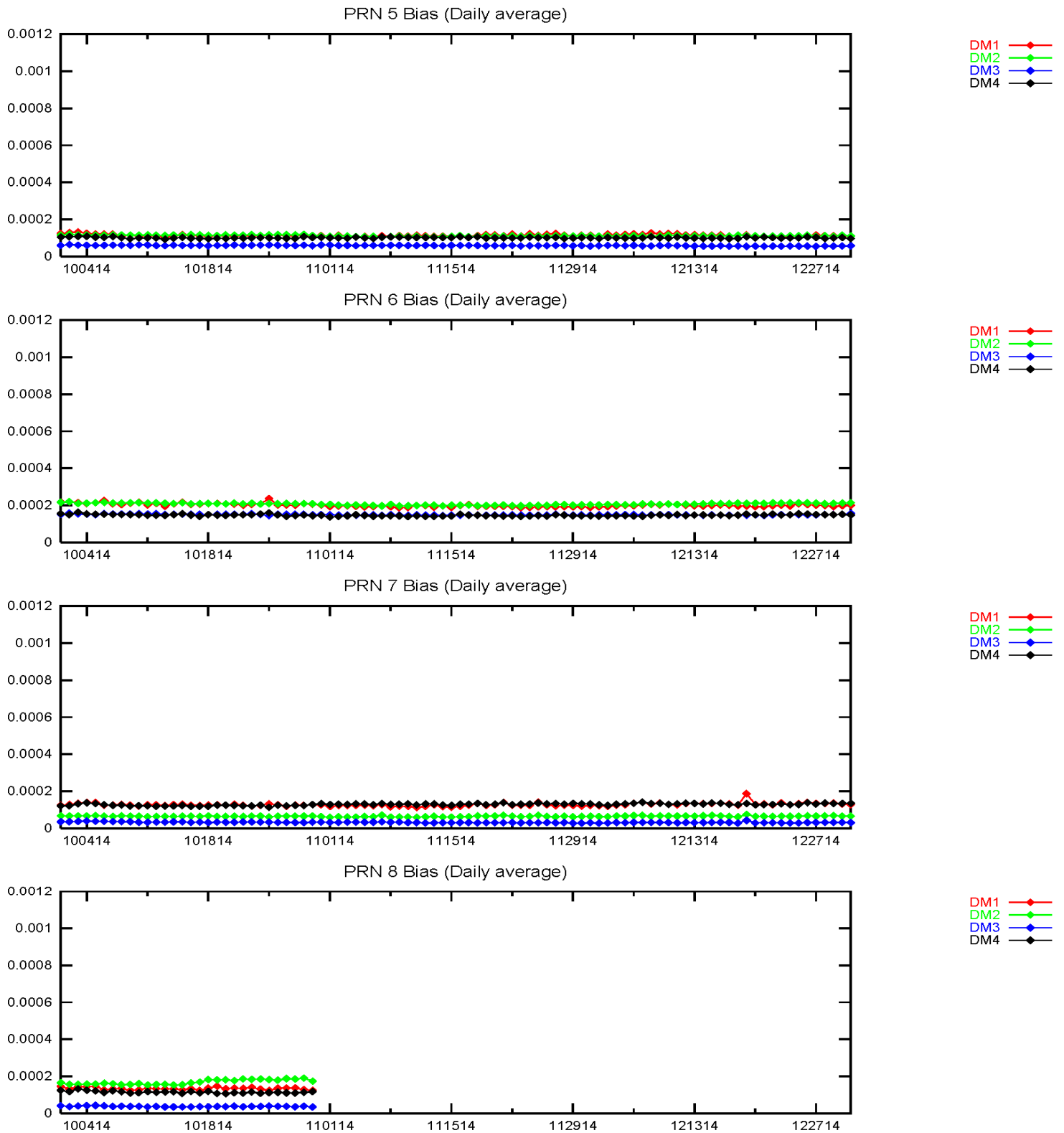


Figure 11-5 PRN Bias Average Trend (PRN 9 – PRN 12)

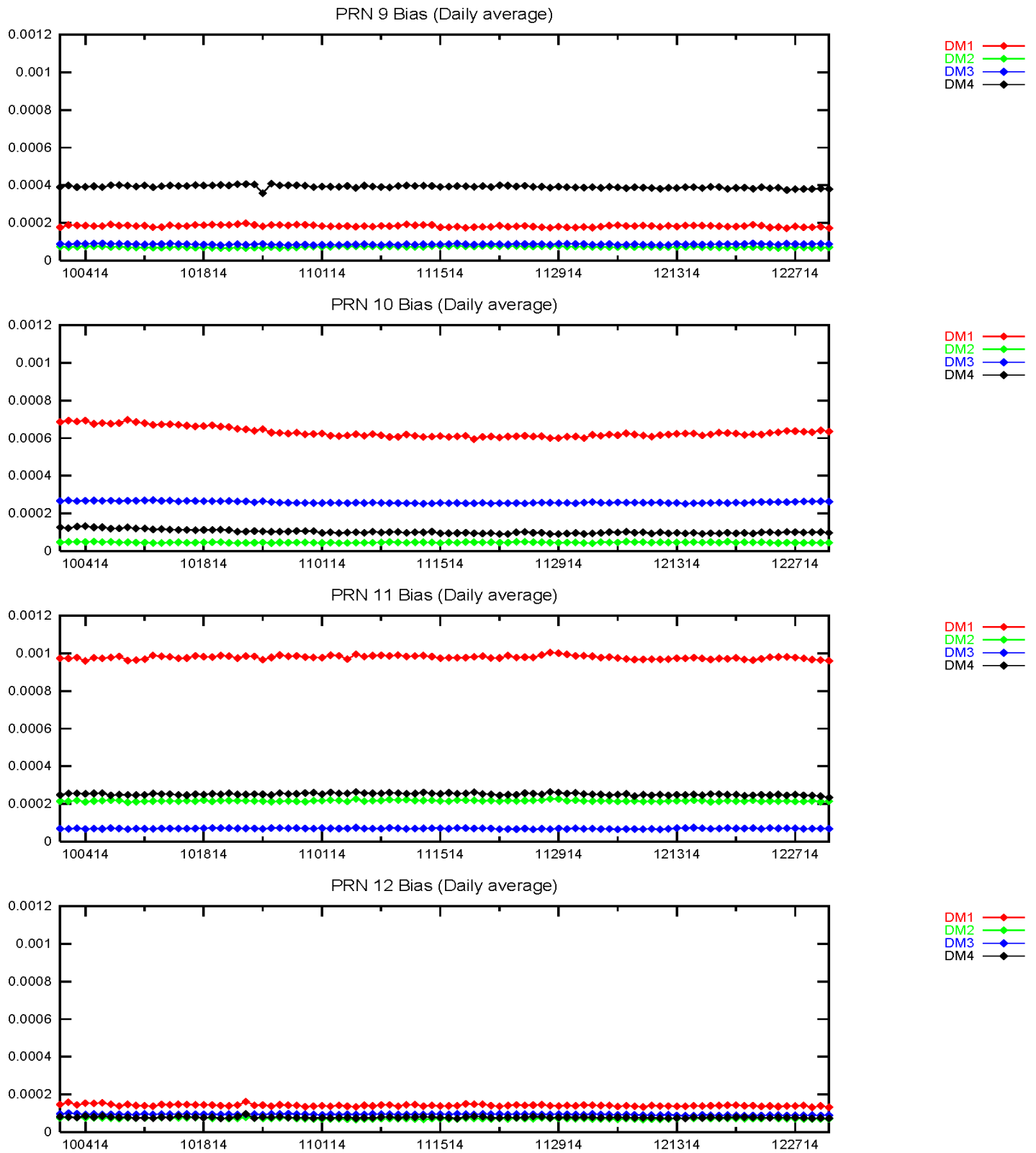




Figure 11-6 PRN Bias Average Trend (PRN 13 – PRN 16)

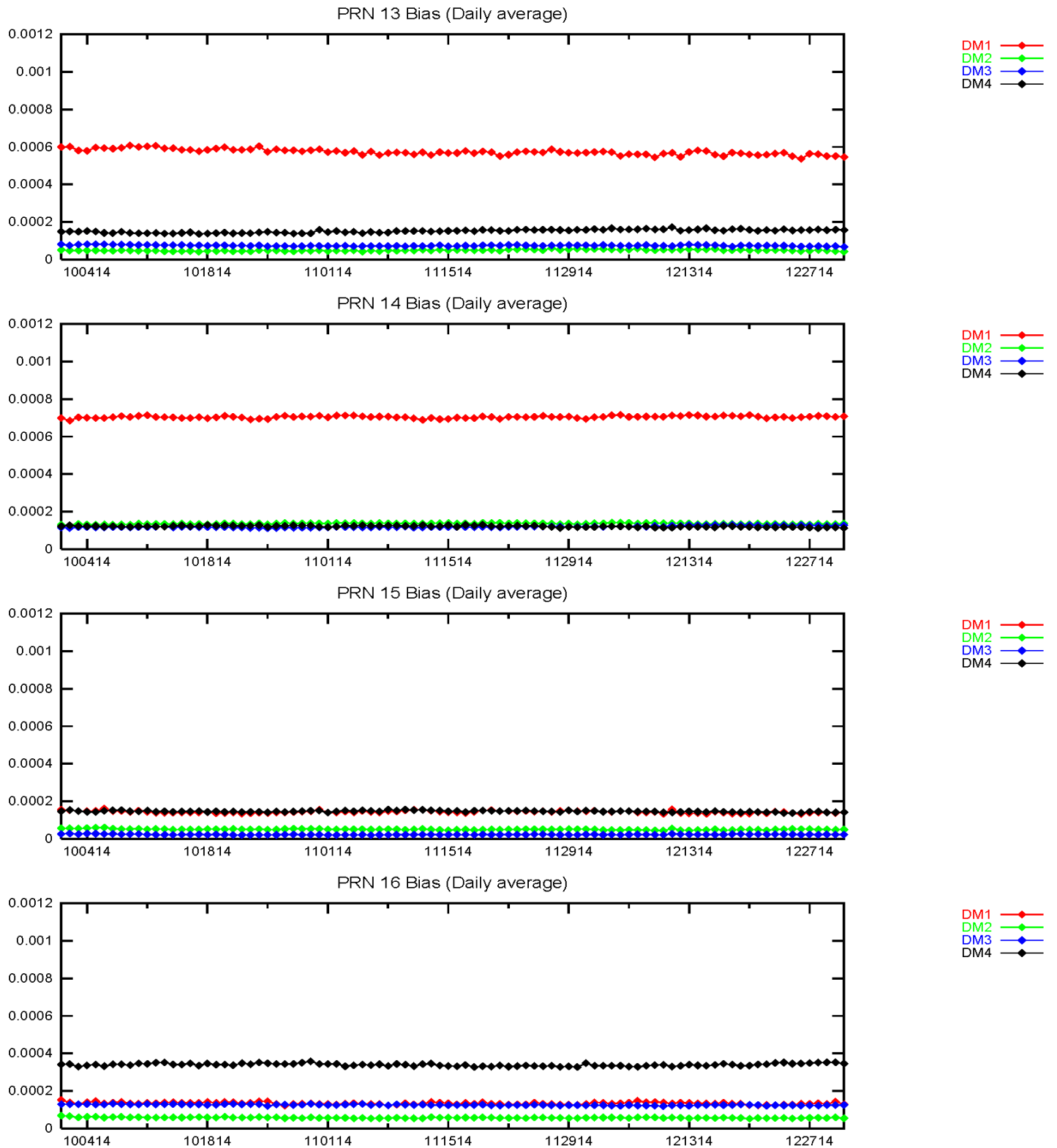
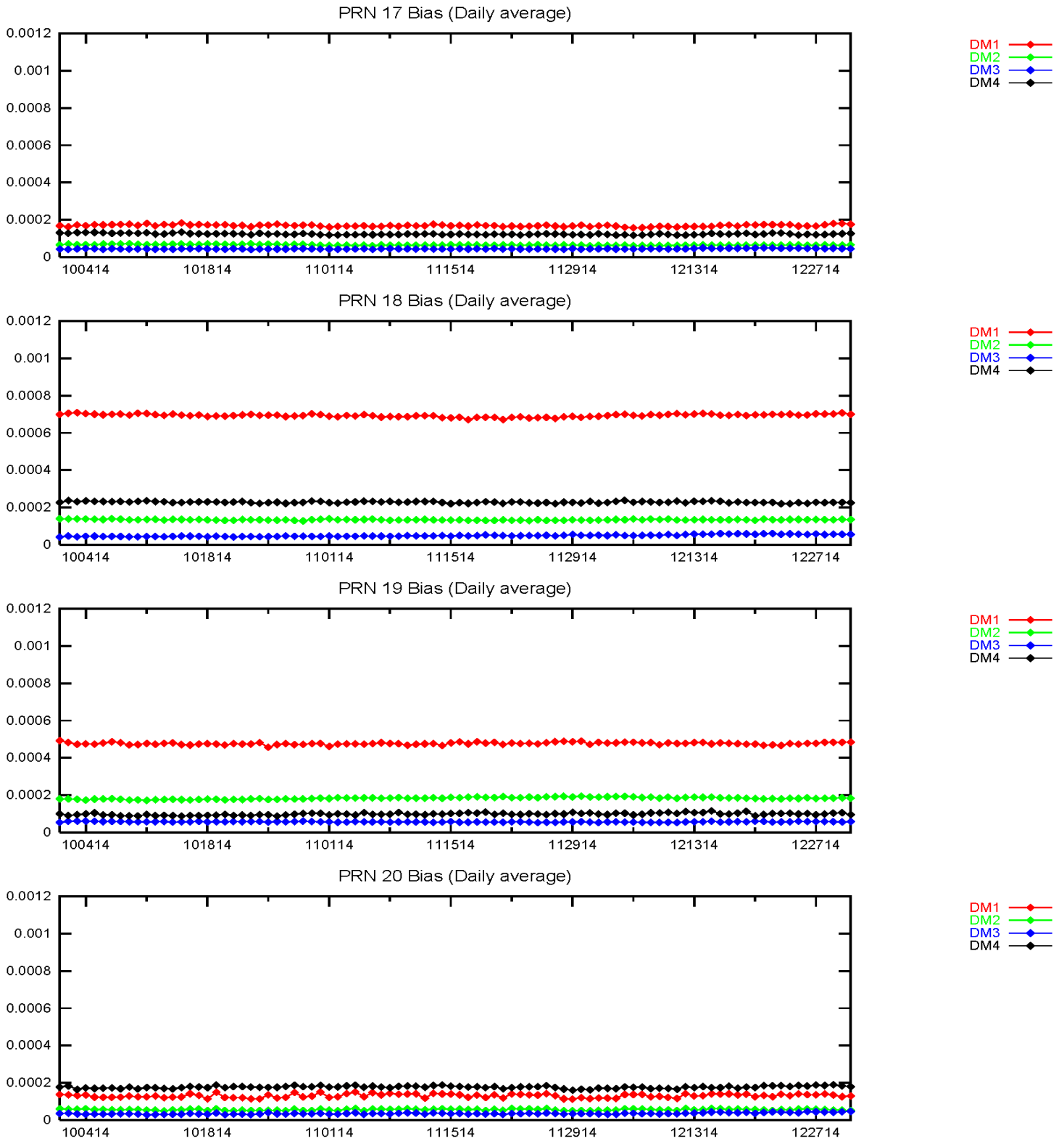


Figure 11-7 PRN Bias Average Trend (PRN 17 – PRN 20)



**Figure 11-8 PRN Bias Average Trend (PRN 21 – PRN 24)**

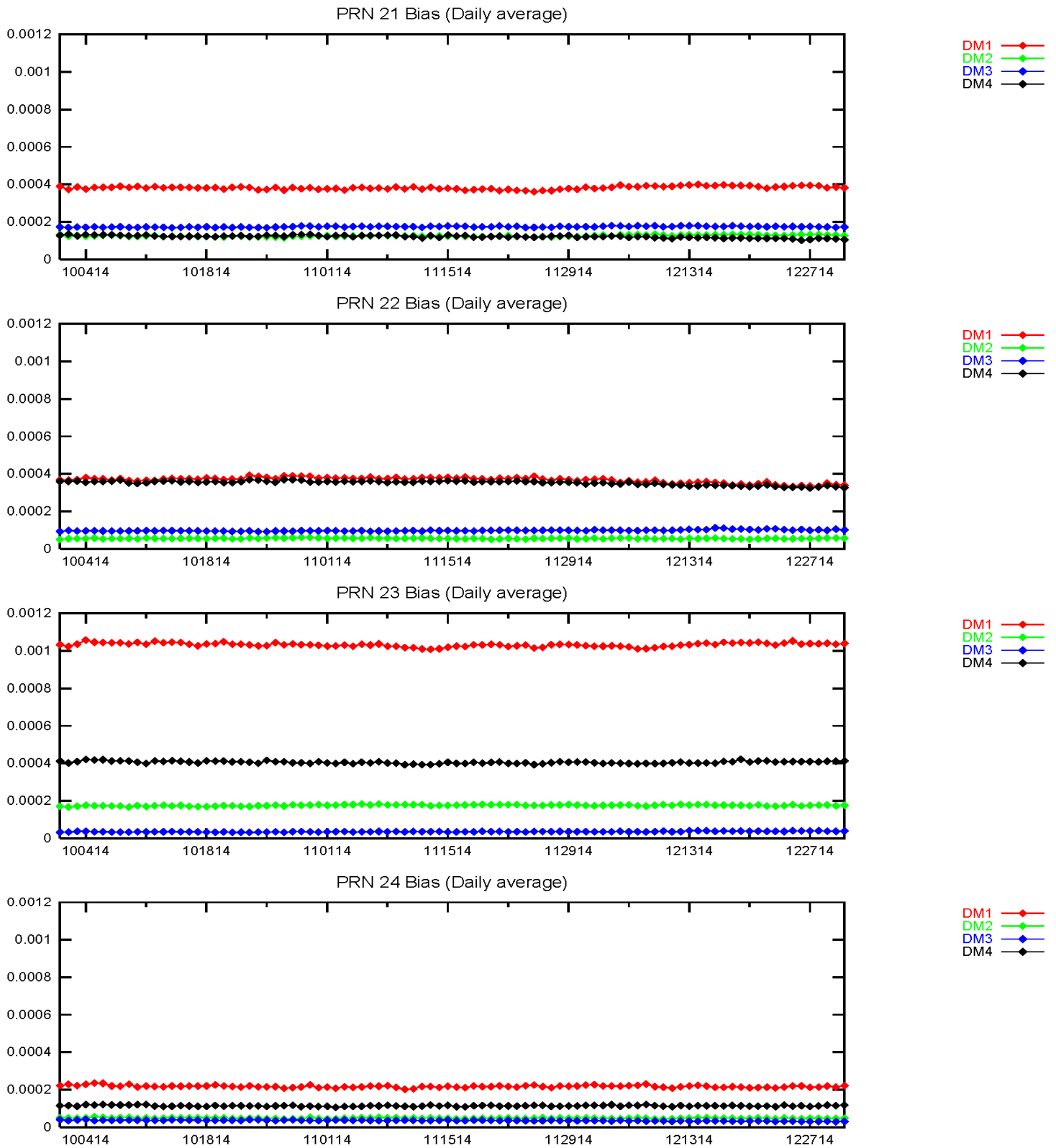


Figure 11-9 PRN Bias Average Trend (PRN 25 – PRN 28)

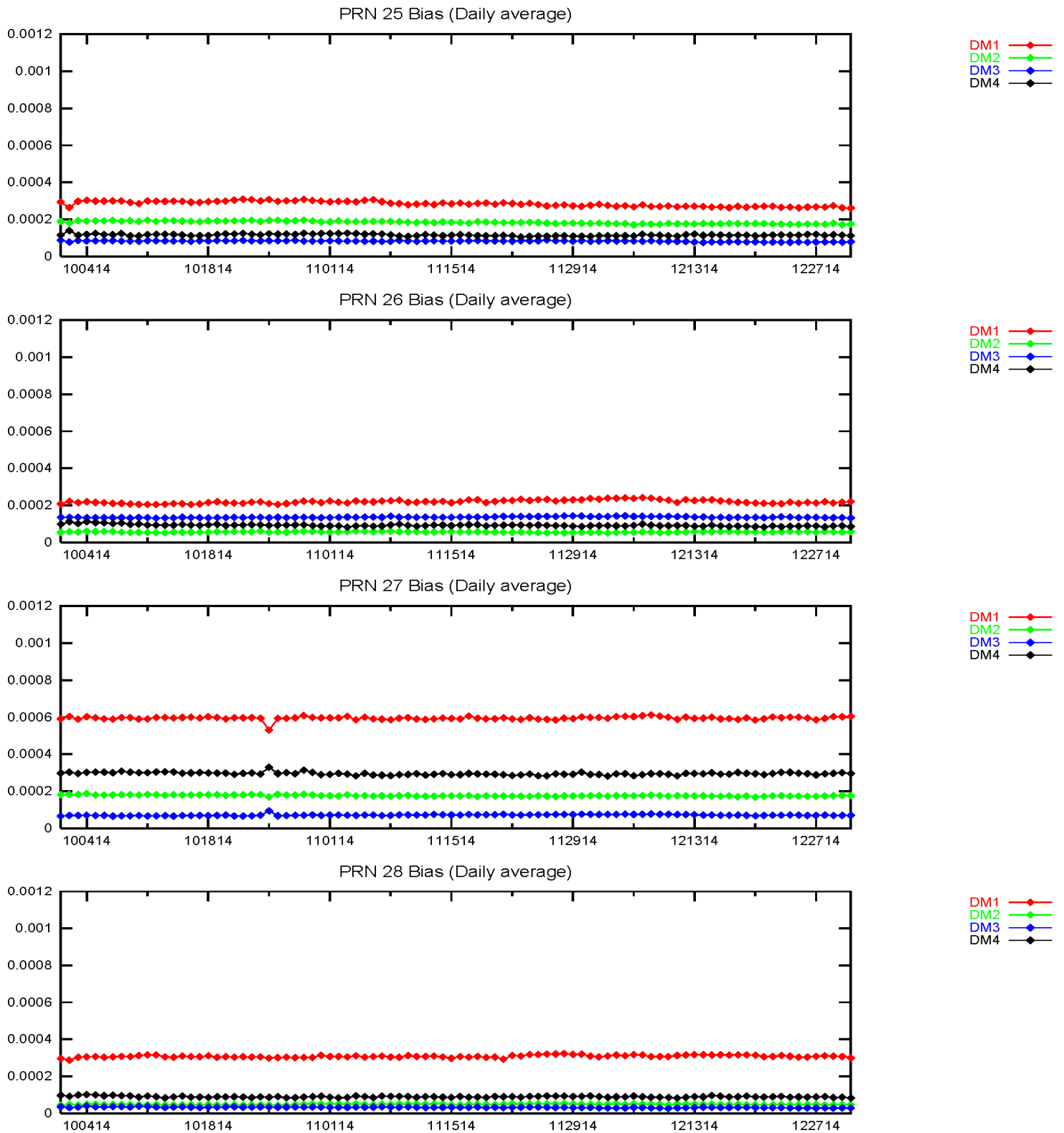
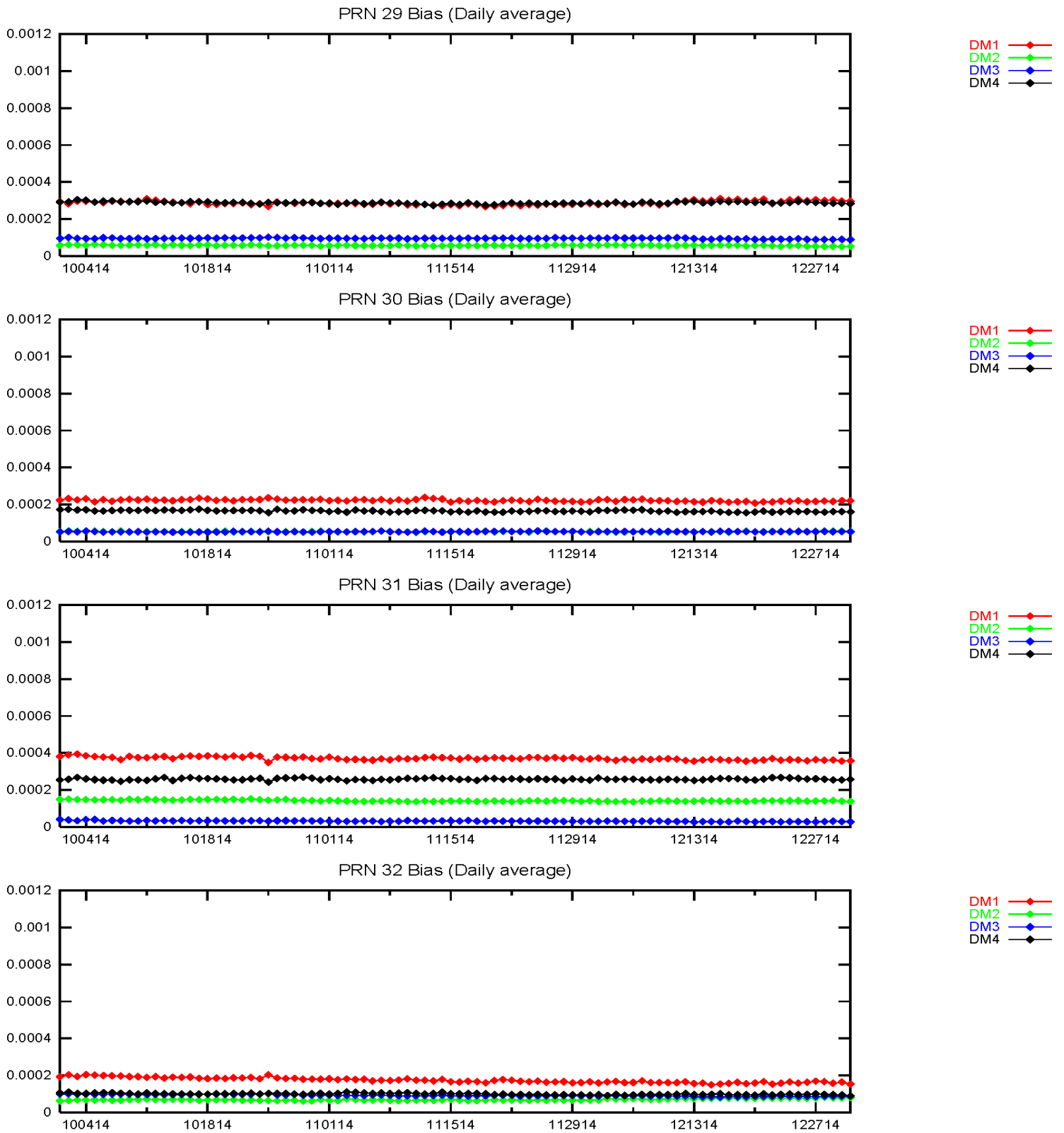


Figure 11-10 PRN Bias Average Trend (PRN 29 – PRN 32)



## 11.4 SQM Trips

SQM trip occurs when the estimated deformation exceeds threshold. There were no SQM trips for this quarter.

## 12.0 GPS BROADCAST ORBIT VS. NGA PRECISE ORBITS ANALYSIS AND URA BOUNDING ANALYSIS

As part of the WAAS off-line monitoring process, the accuracy of the GPS broadcast ephemeris is periodically compared to the NGA precise orbit information to monitor the validity of an a priori assumption concerning the accuracy of the GPS broadcast ephemeris information that is part of a brute force computer simulation analysis utilized as part of the safety proof of the WAAS MT-28 functionality. That brute force analysis searches a simulated error sphere around a GPS satellite for a worst-case projection of post correction ephemeris error to any user. A pessimistic extrapolation of historical data was used as an a priori to limit the radius of the searched sphere to a finite distance. This periodic off-line monitoring verifies that the original logic of the a priori assumption remains sound.

The assumption being validated is:

Height Error:	+/- 15 meters (standard deviation < 2.8 m),
Along Track Error:	+/- 65 meters (standard deviation < 12.2 m)
Cross Track Error:	+/- 30 meters (standard deviation < 5.6 m)

All IGS high rate 15 minute broadcast navigation data RINEX format files are downloaded and merged into 24 hour broadcast navigation data files. A majority voting algorithm is used to screen the high rate navigation data after a LSB recovery algorithm is applied. NGA APC precise ephemeris referenced to the GPS satellite antenna phase center is downloaded from the NGA site. GPS satellite positions are computed every 15 minutes and differenced with the precise orbits. The resulting error information is then segregated into the Height, Along Track, and Cross Track (HAC) error data. The standard deviation of the error is then computed for each dimension for each satellite.

The assumption is valid if a 5.33 scaling of the standard deviation across all satellites is within the a priori. One year of data from 1/1/14 to 12/31/14 is presented. Only data points where GPS is healthy and valid precise data is available are considered. Figure 12-3 shows the availability of data. There were no points where GPS was healthy and the NGA data was missing. There are no points where GPS navigation data is unavailable other than during NANUs.

The sign convention for this analysis is error = broadcast ECEF - precise ECEF. Along track is positive in the direction of the velocity vector. Cross track completes a right hand system with height and along track.

Figures 12-4 through 12-35 are plots of the height, along track, and cross track error relative to NGA precise orbits by PRN number. These plots do not include clock error.

Figures 12-36 through 12-44 are QQ plots of the URA normalized total range error (height, along track, cross track, and clock) projected onto the surface of the earth. +/- 13.8° from the boresight of the satellite is used to approximate the surface of the earth. The max URA of the broadcast URA index range is used. The range of the QQ plot axis's have been fixed at +/- 5. Annotations are provided for any instances beyond that range.

Errors larger than 3 times URA were investigated.

Figures 12-45 through 12-79 are histograms of the height error, along track error, cross track error, and URA normalized range error.

Figures 12-80 and 12-81 are URA bounding plots. Figure 80 uses the maximum URA value per the broadcast URA index per the index ranges in IS-GPS-200. Figure 81 uses the nominal URA value per the broadcast URA index and the formula in IS-GPS-200.

Figure 12-1 GPS Broadcast Orbit Accuracy Standard Deviations

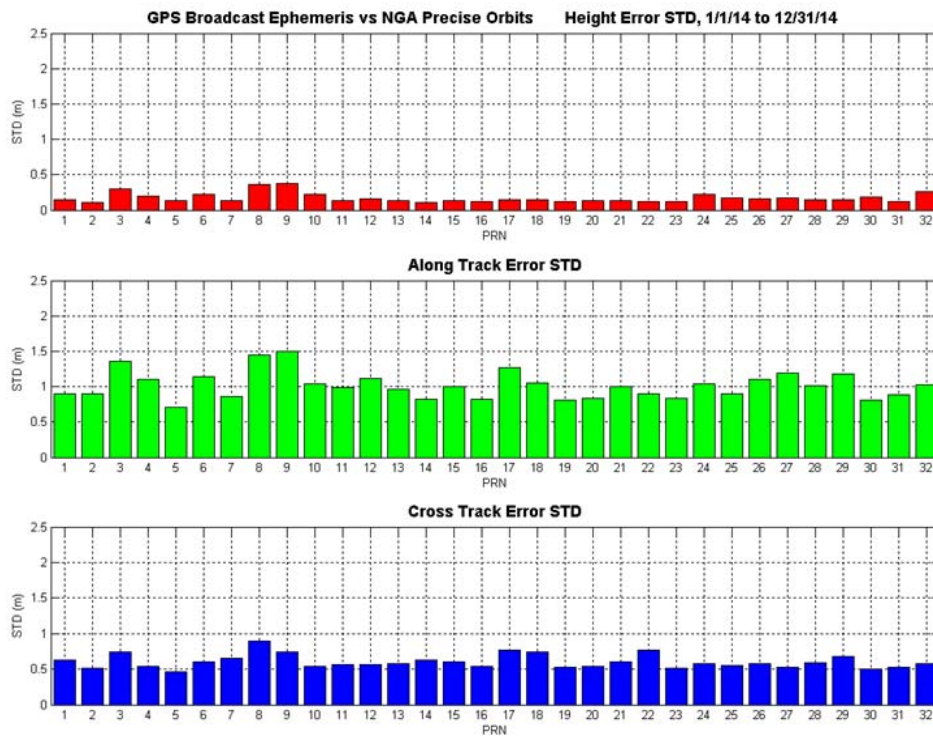
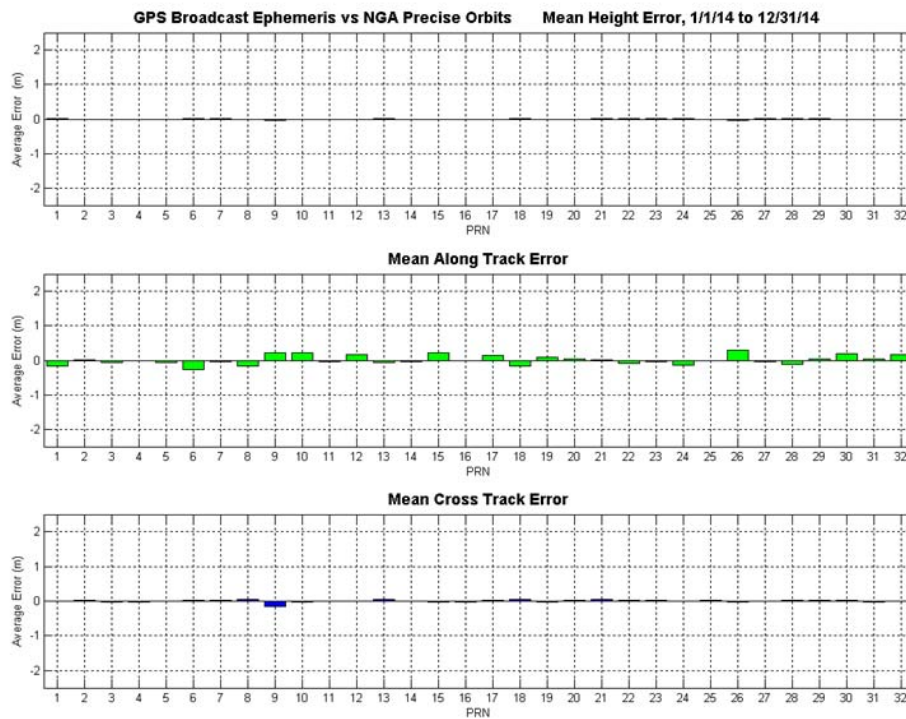
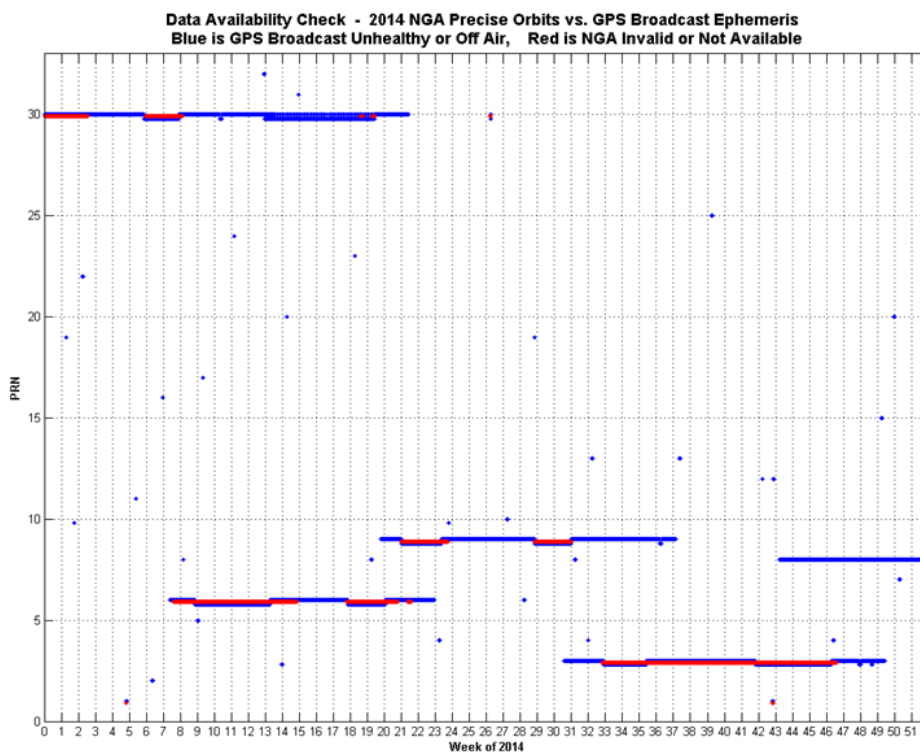


Figure 12-2 GPS Broadcast Orbit Error Mean



**Figure 12-3 Broadcast Ephemeris vs. NGA Precise Data Availability**



**Figure 12-4 Orbit Error PRN-1 (SVN-63)**

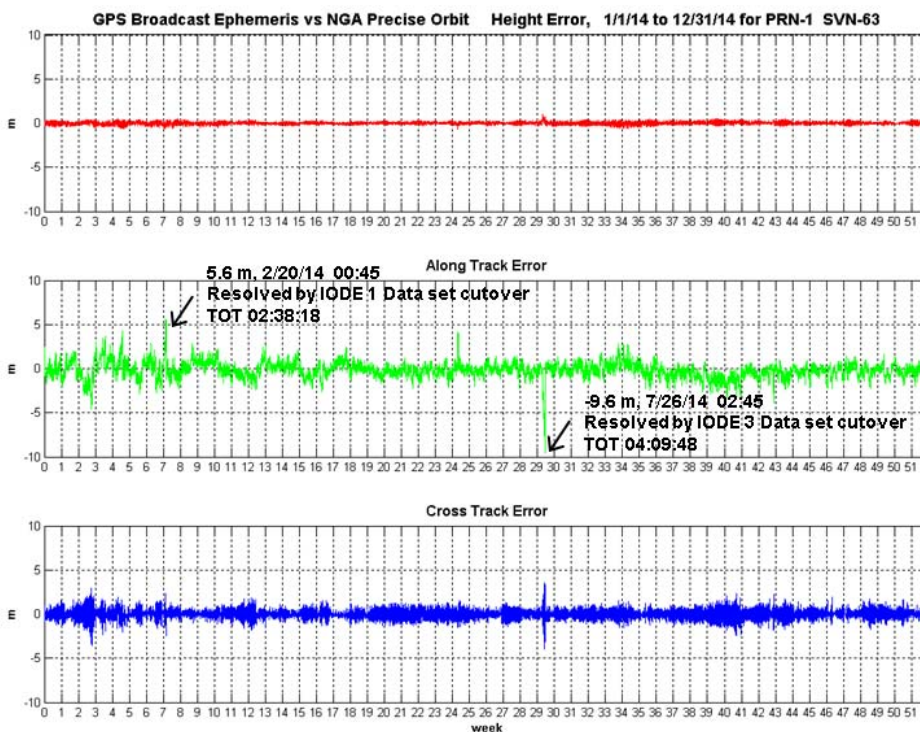




Figure 12-5 Orbit Error PRN-2 (SVN-61)

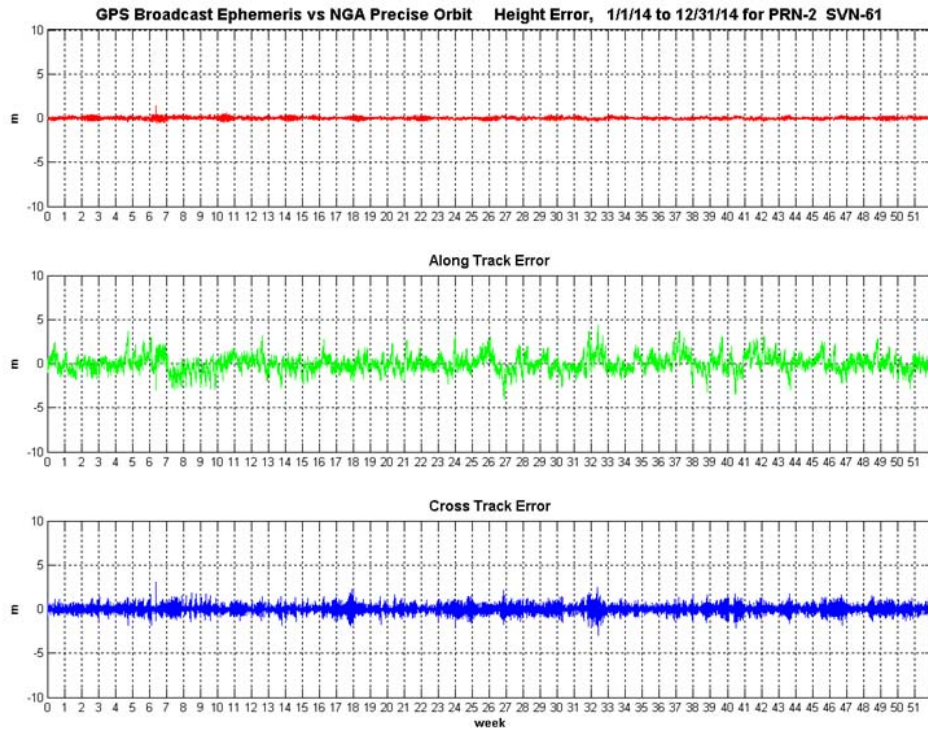


Figure 12-6 Orbit Error PRN-3 (SVN-69)

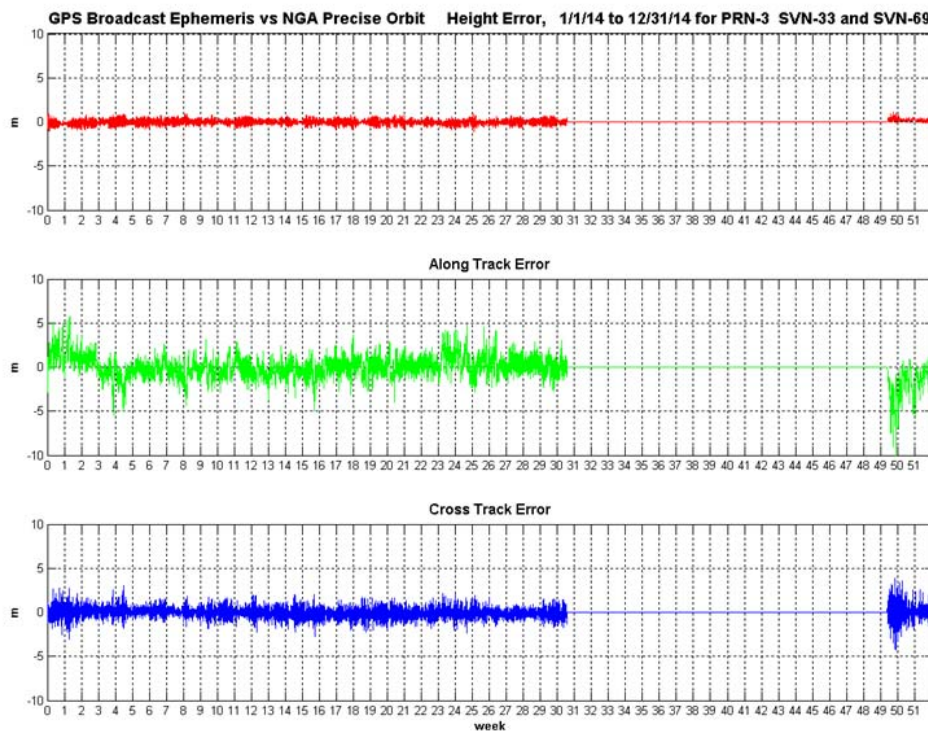


Figure 12-7 Orbit Error PRN-4 (SVN-34)

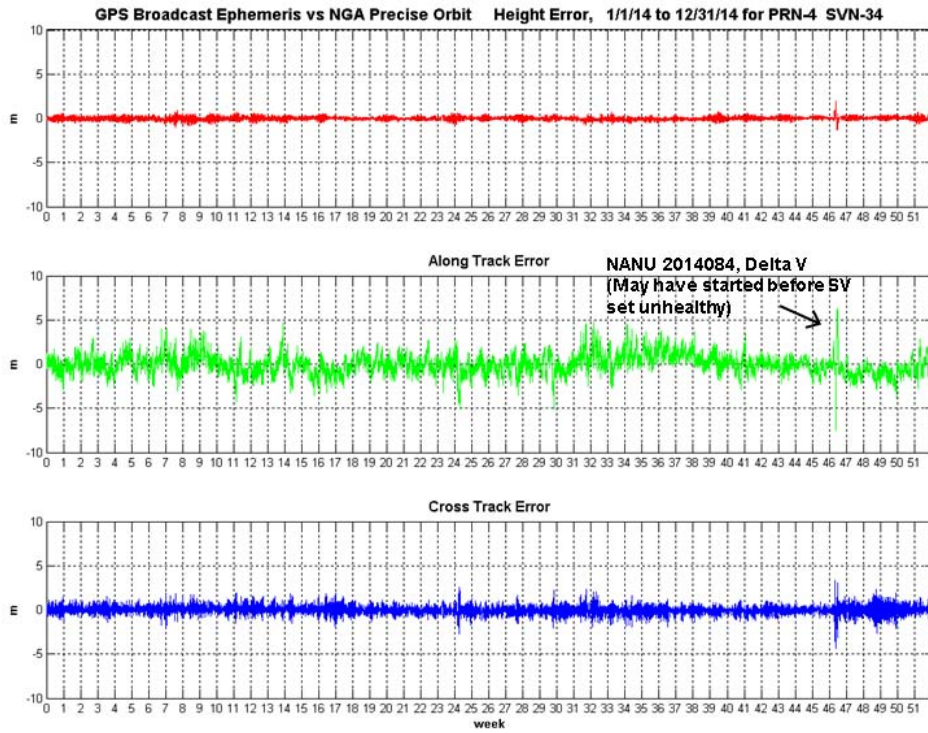


Figure 12-8 Orbit Error PRN-5 (SVN-50)

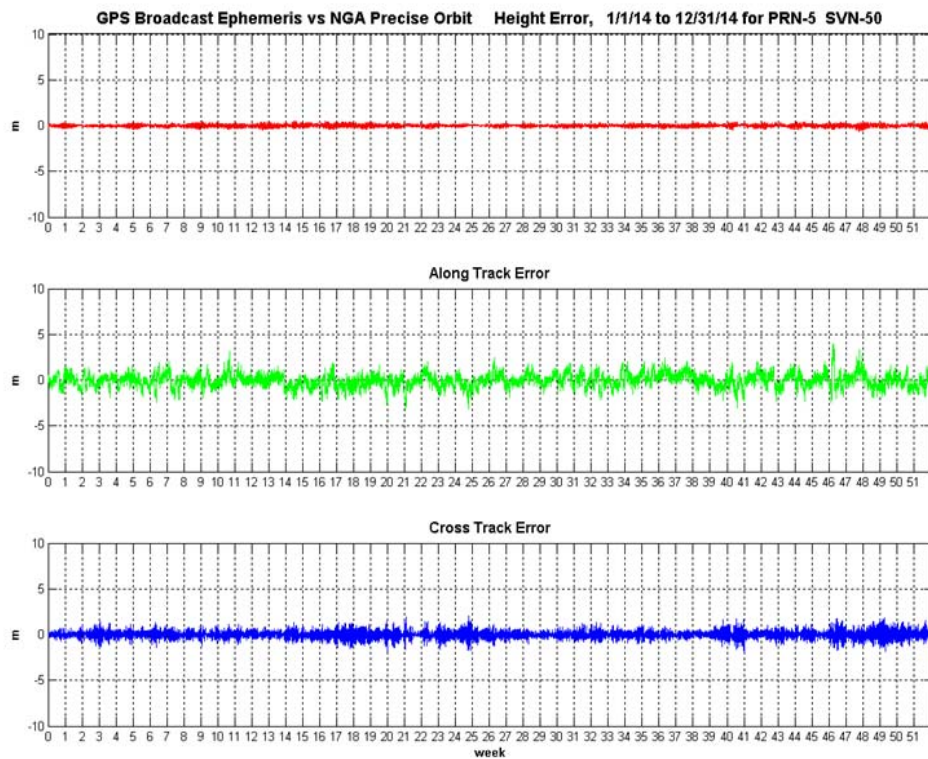


Figure 12-9 Orbit Error PRN-6 (SVN-36)

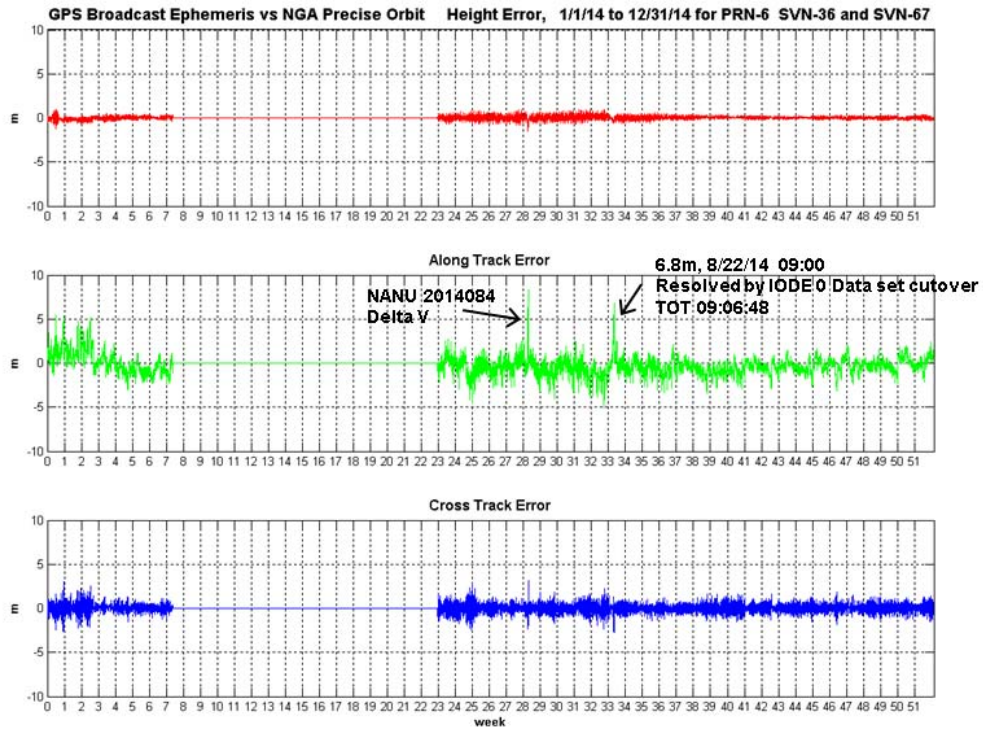


Figure 12-10 Orbit Error PRN-7 (SVN-48)

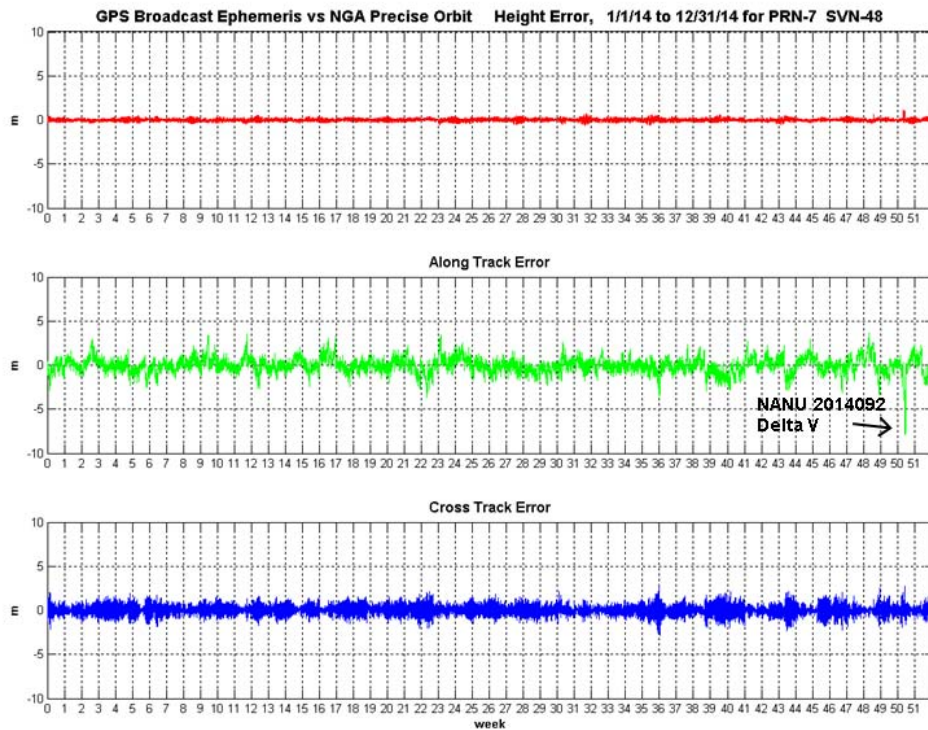


Figure 12-11 Orbit Error PRN-8 (SVN-38)

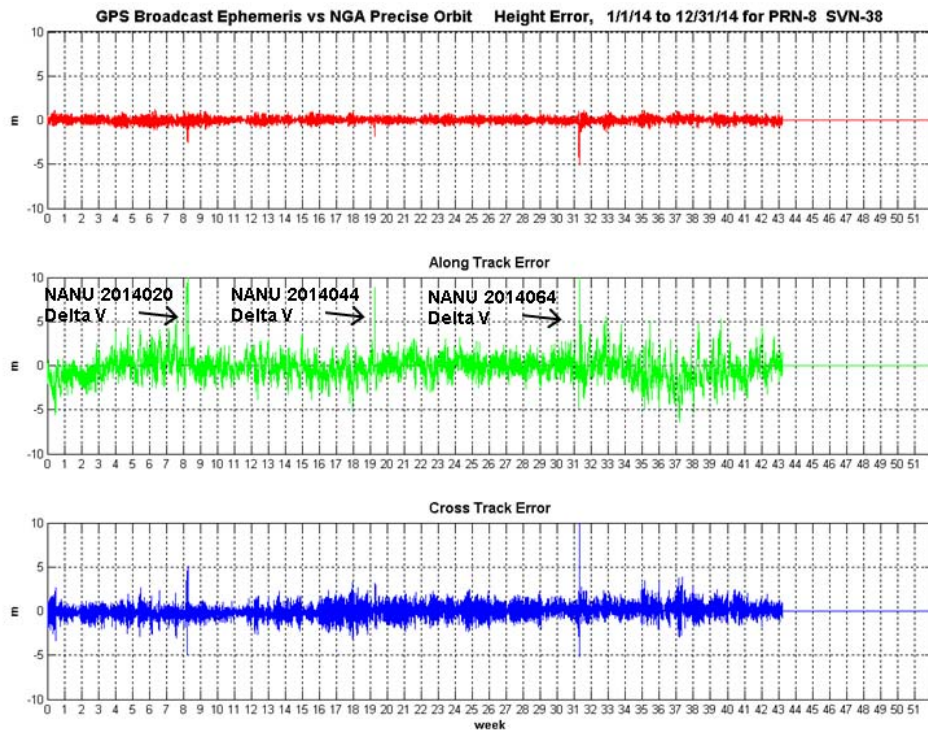


Figure 12-12 Orbit Error PRN-9 (SVN-39 and SVN-68)

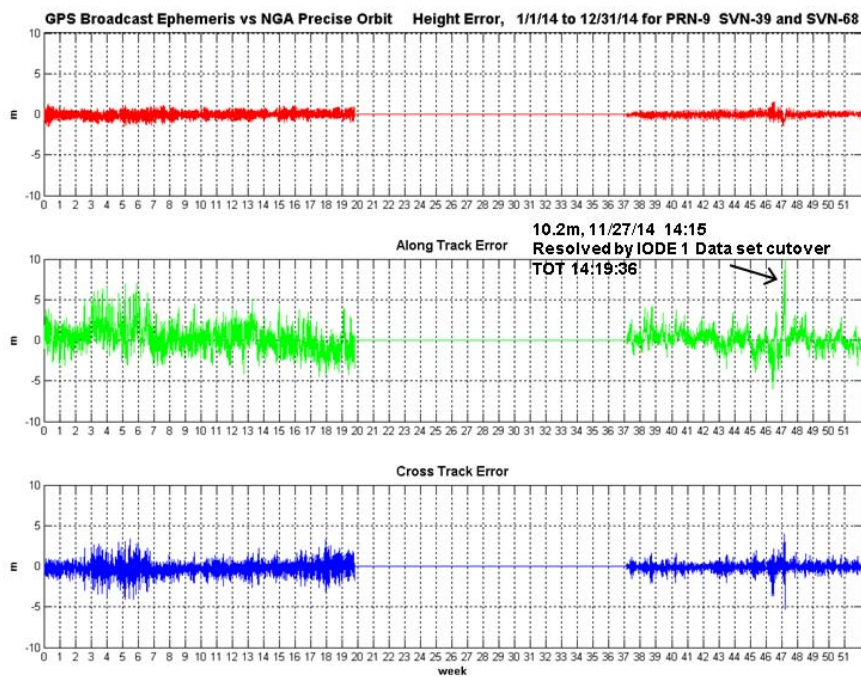


Figure 12-13 Orbit Error PRN-10 (SVN-40)

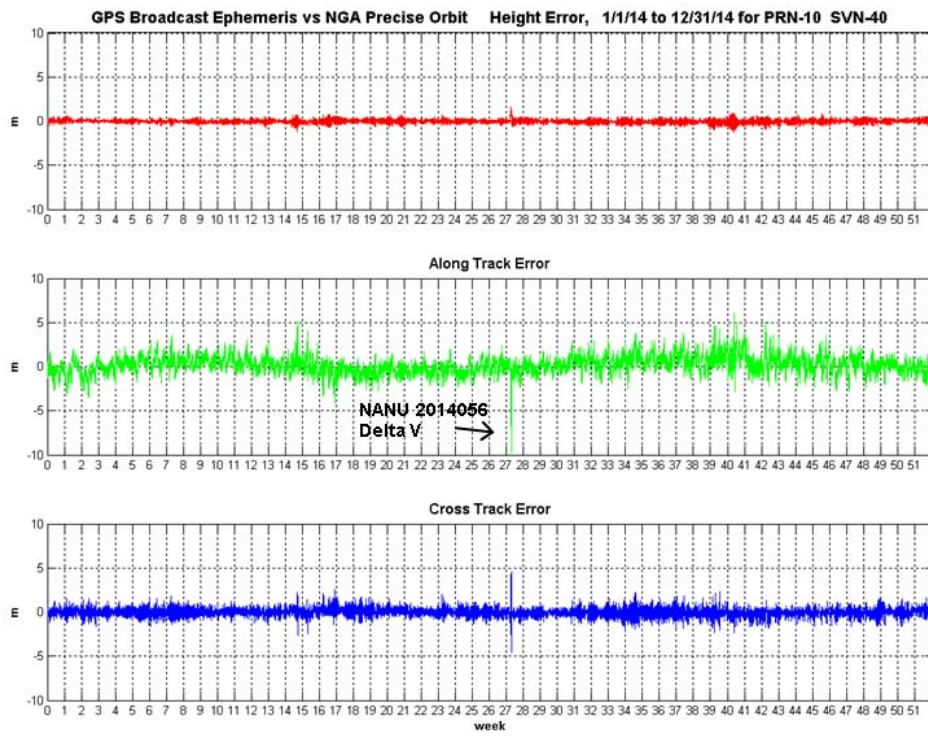


Figure 12-14 Orbit Error PRN-11 (SVN-46)

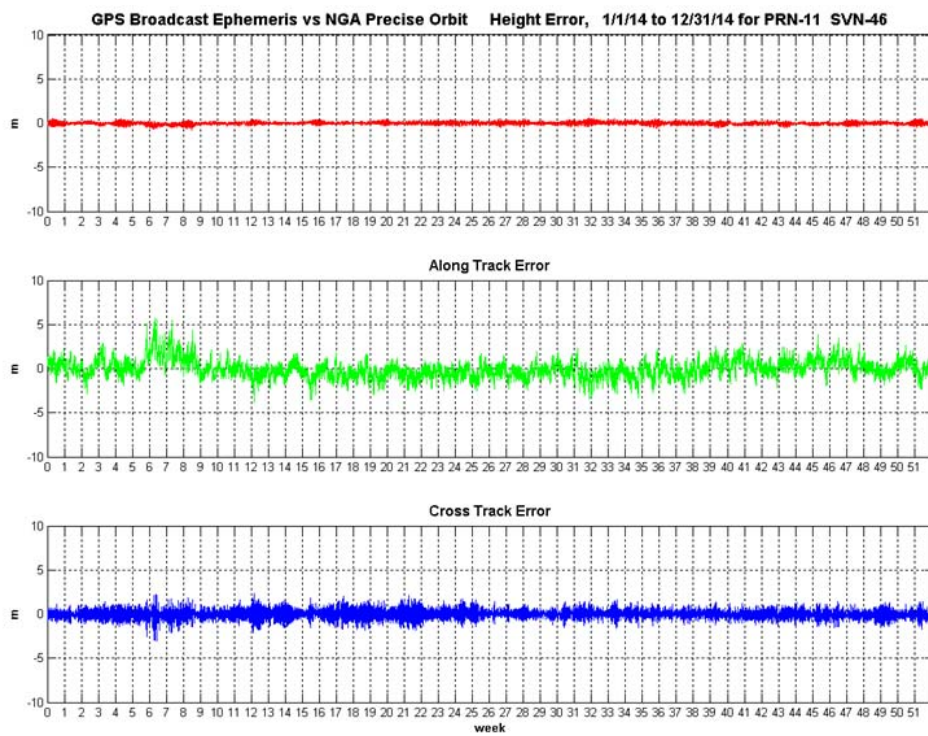


Figure 12-15 Orbit Error PRN-12 (SVN-58)

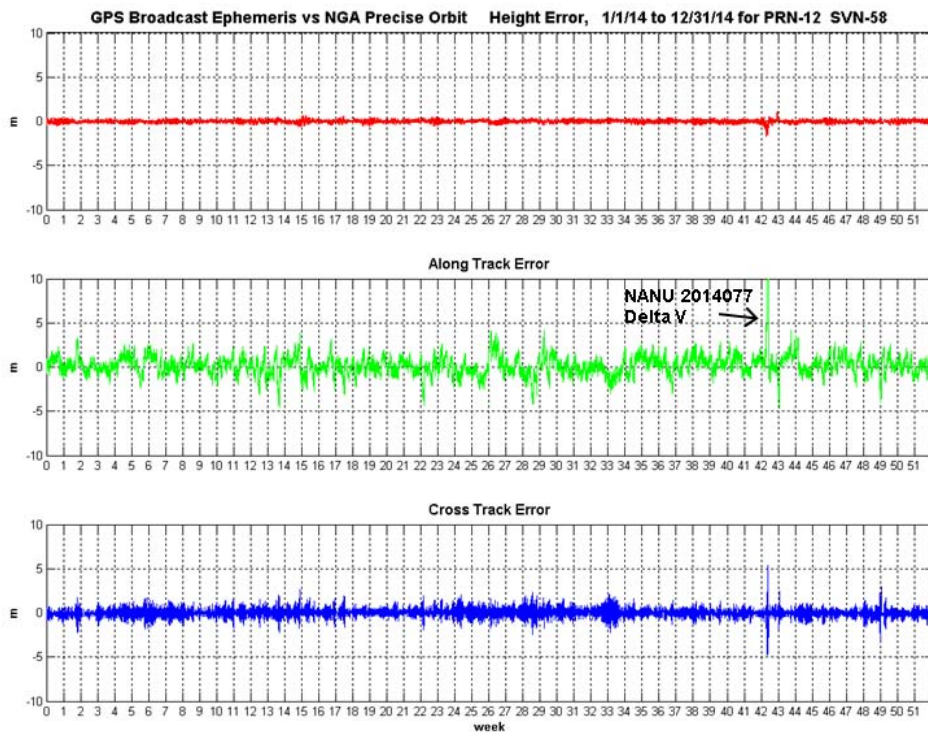


Figure 12-16 Orbit Error PRN-13 (SVN-43)

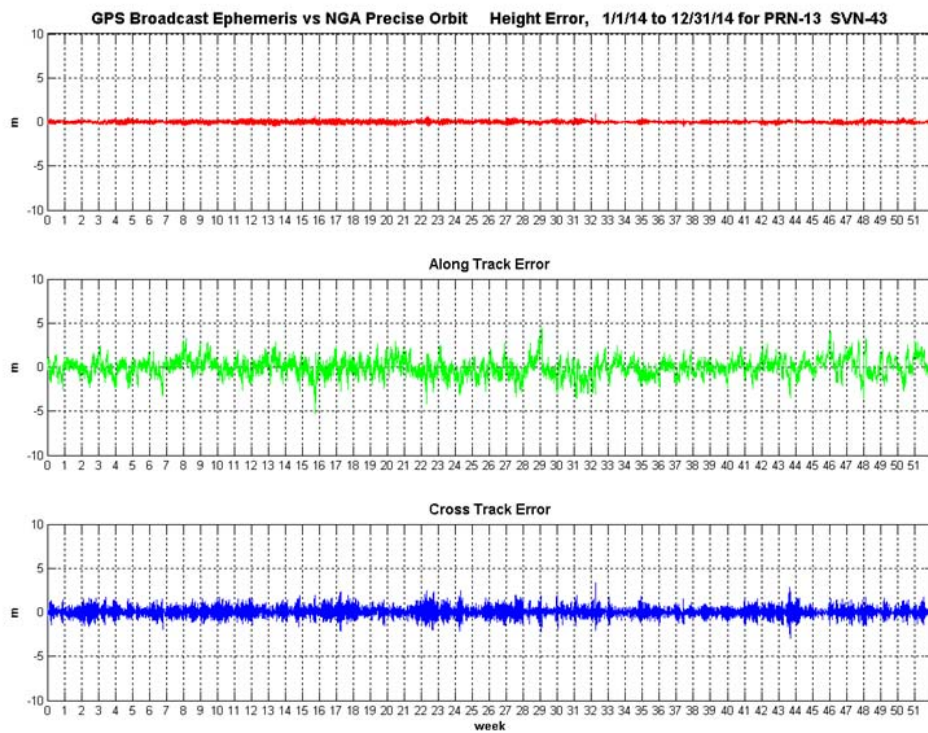


Figure 12-17 Orbit Error PRN-14 (SVN-41)

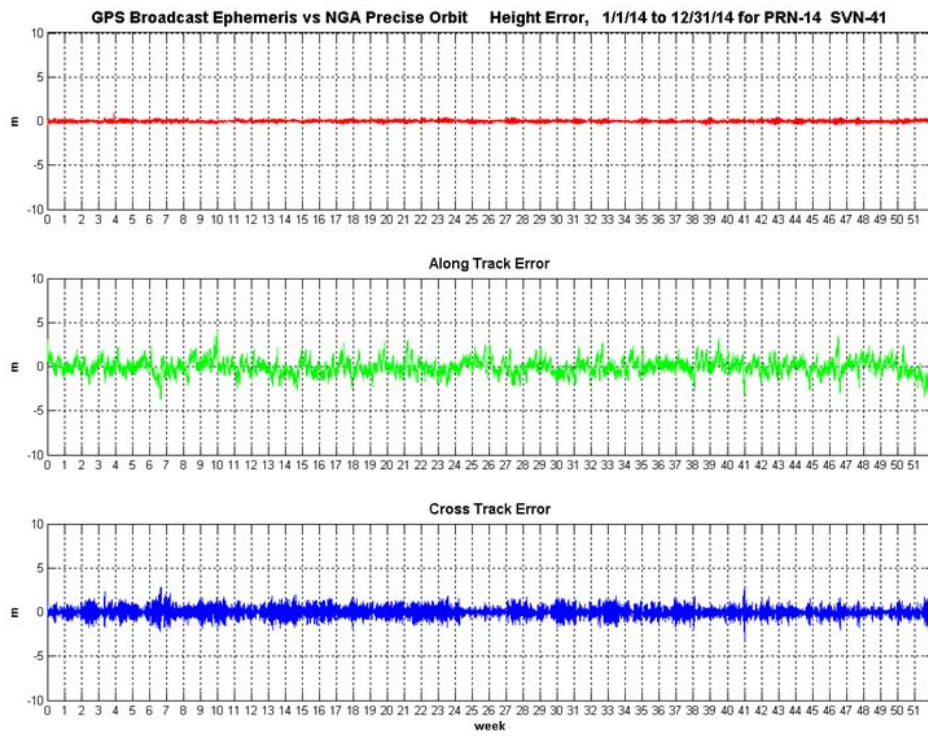


Figure 12-18 Orbit Error PRN-15 (SVN-55)

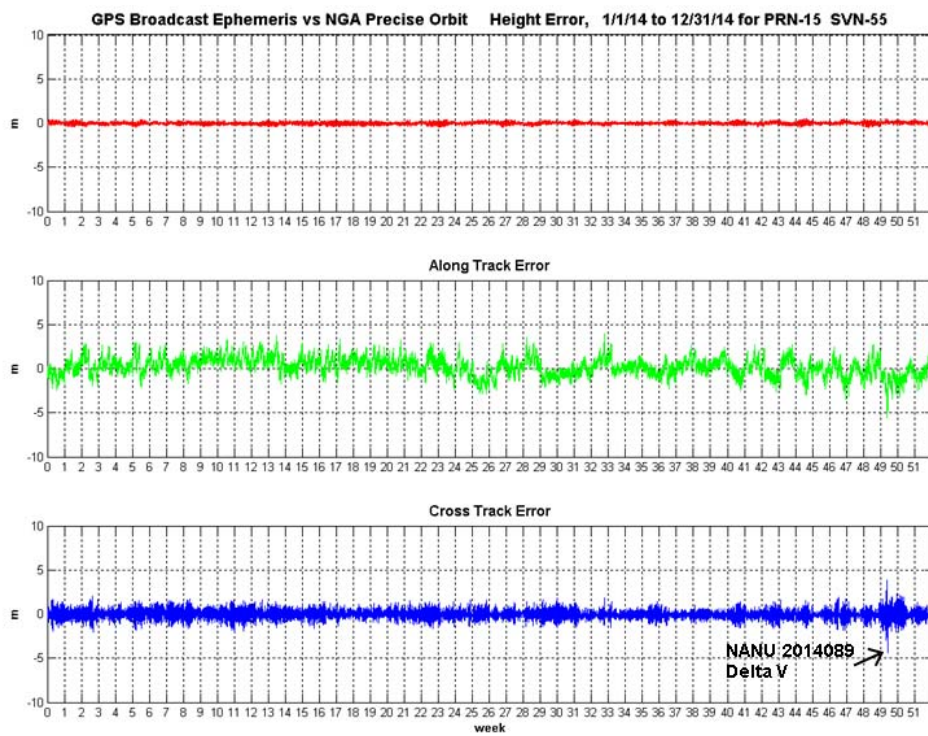


Figure 12-19 Orbit Error PRN-16 (SVN-56)

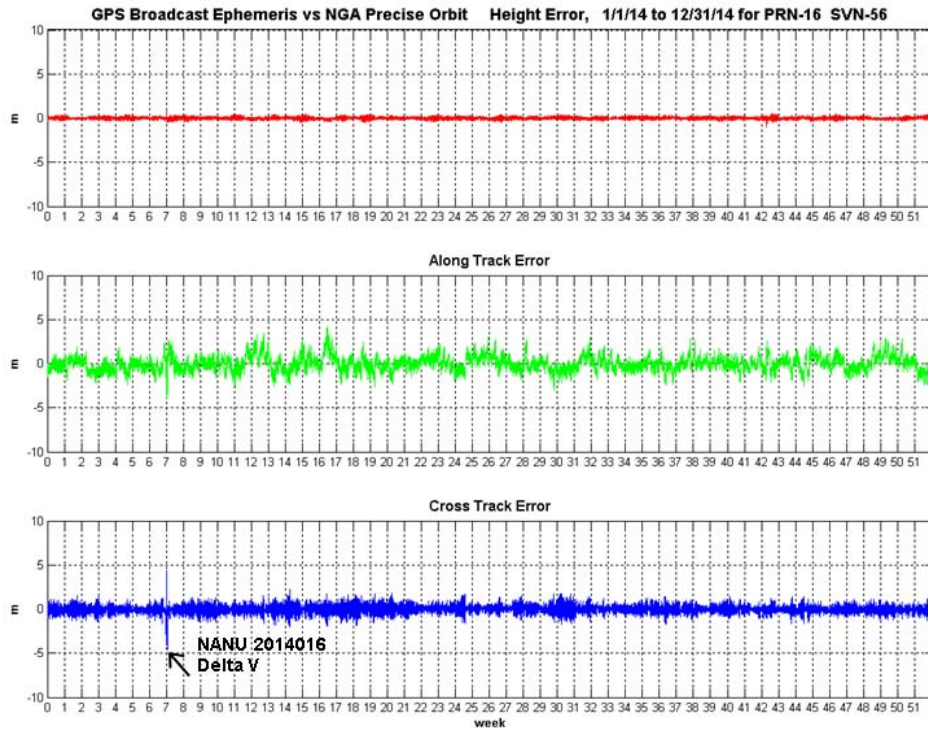


Figure 12-20 Orbit Error PRN-17 (SVN-53)

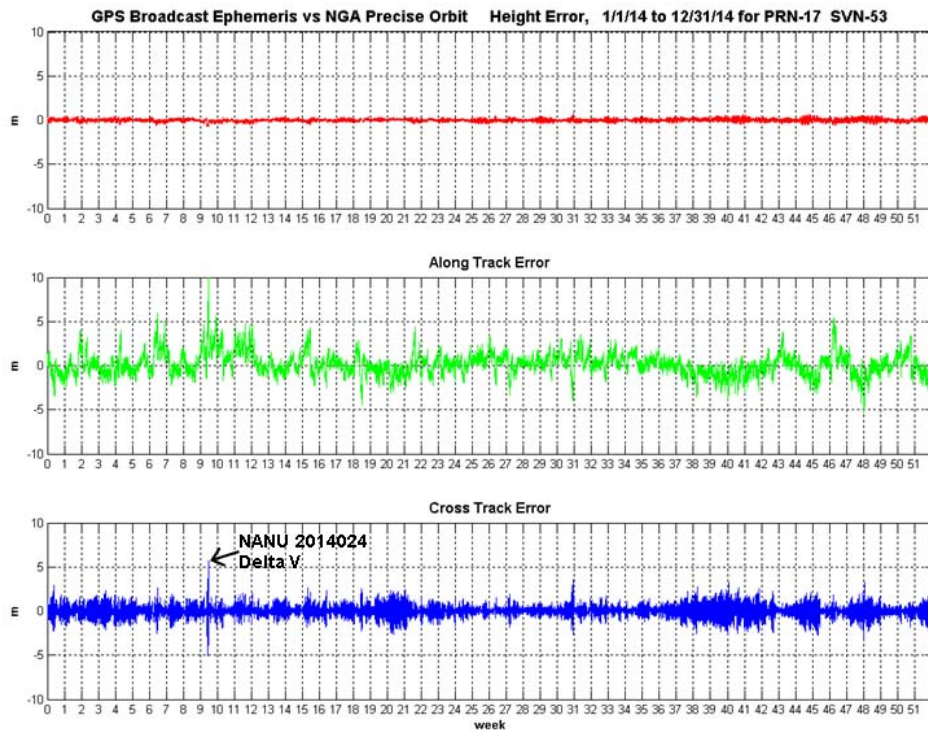




Figure 12-21 Orbit Error PRN-18 (SVN-54)

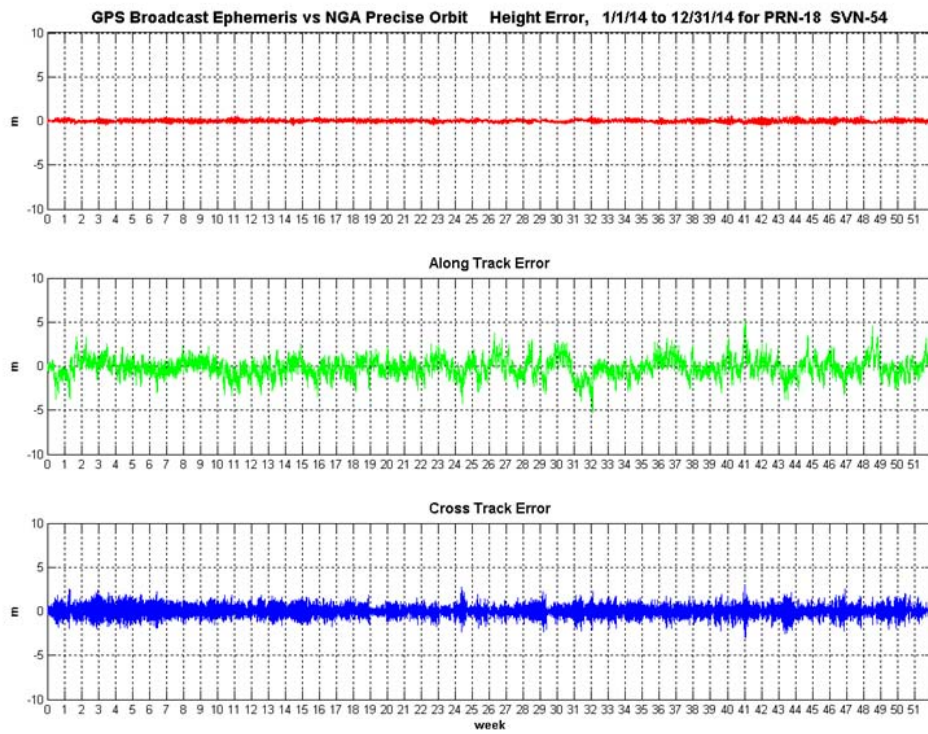


Figure 12-22 Orbit Error PRN-19 (SVN-59)

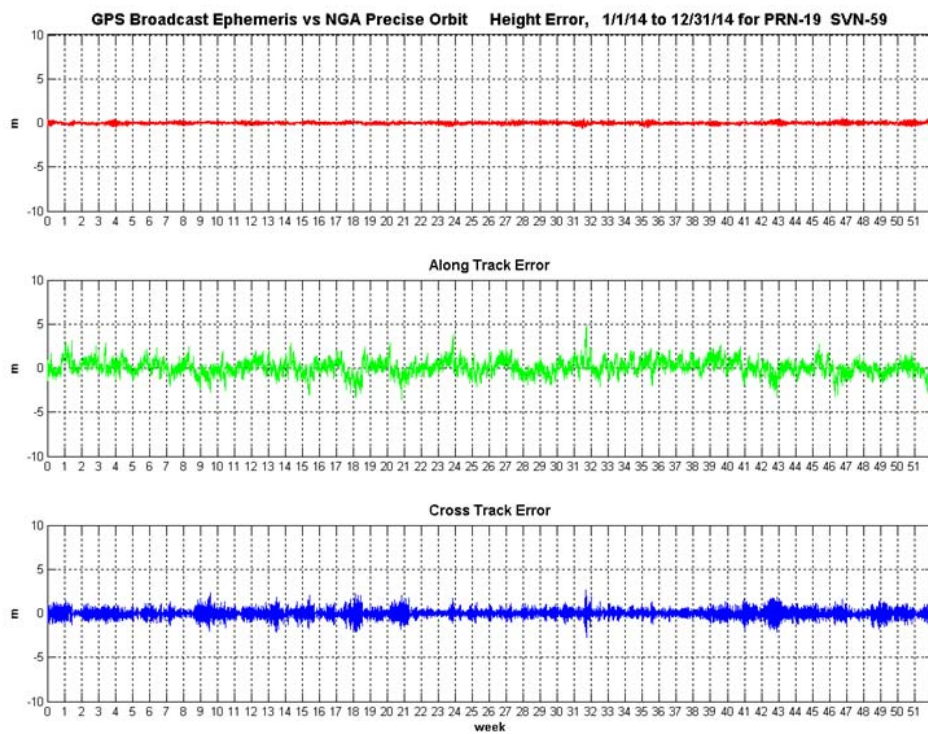


Figure 12-23 Orbit Error PRN-20 (SVN-51)

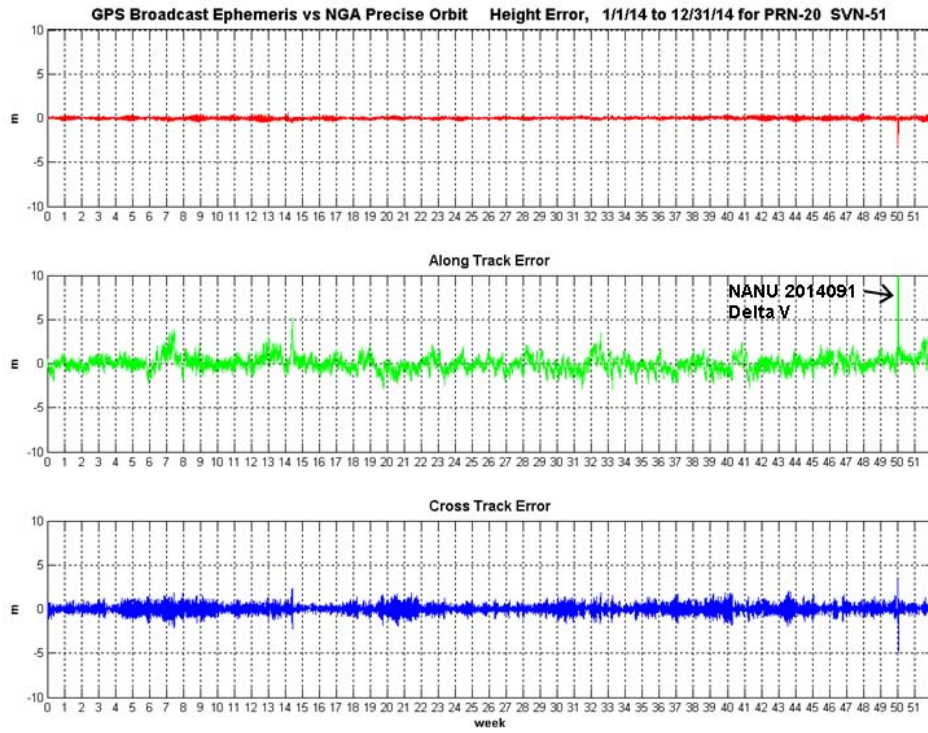


Figure 12-24 Orbit Error PRN-21 (SVN-45)

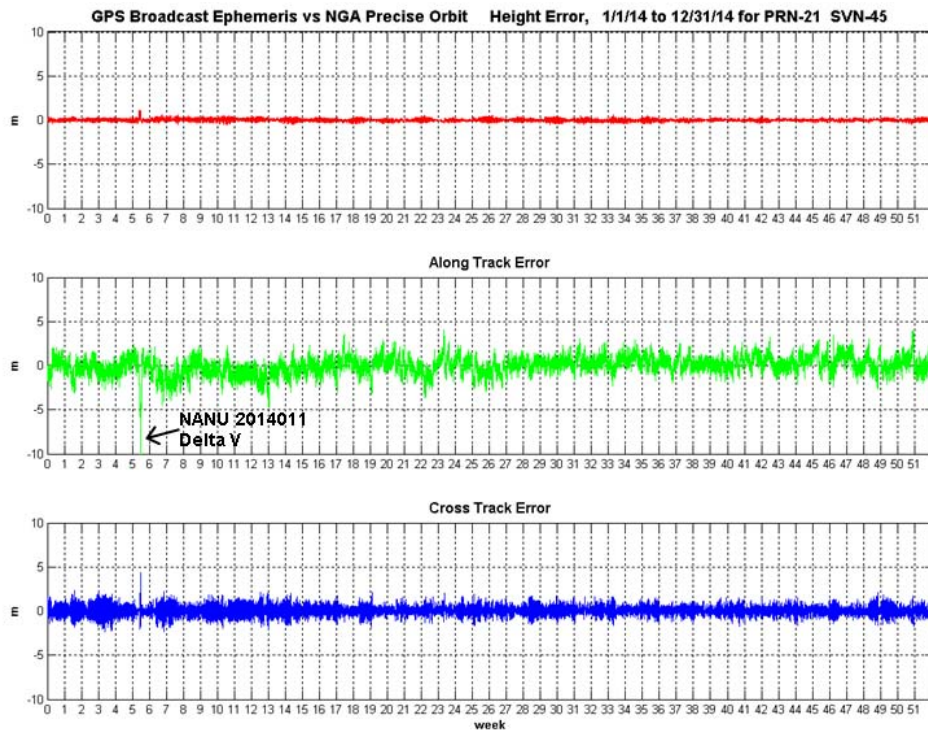


Figure 12-25 Orbit Error PRN-22 (SVN-47)

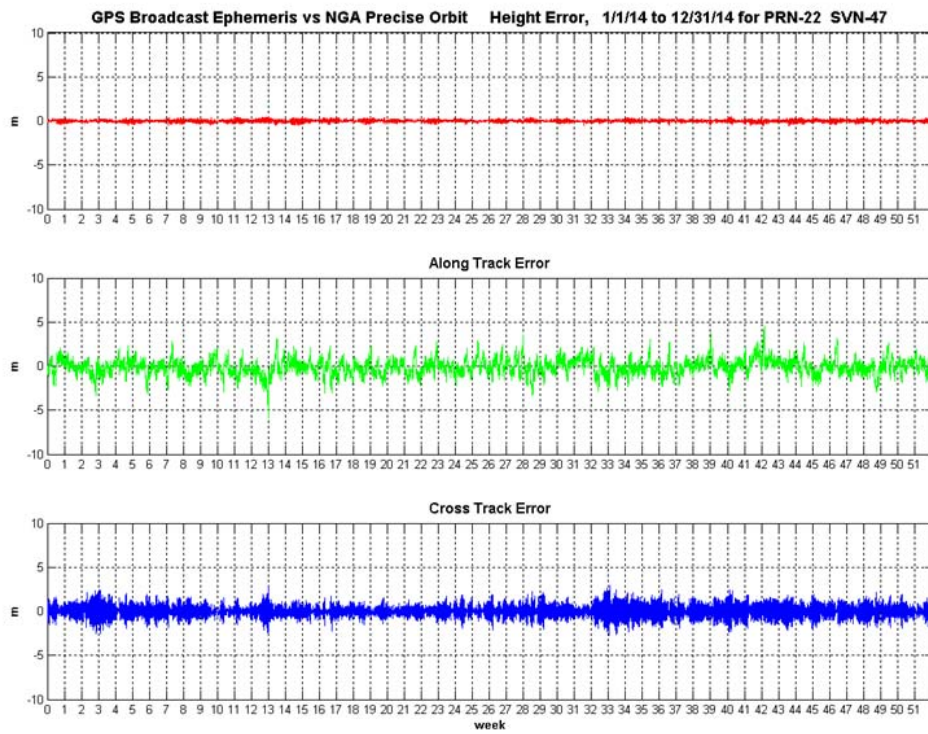


Figure 12-26 Orbit Error PRN-23 (SVN-60)

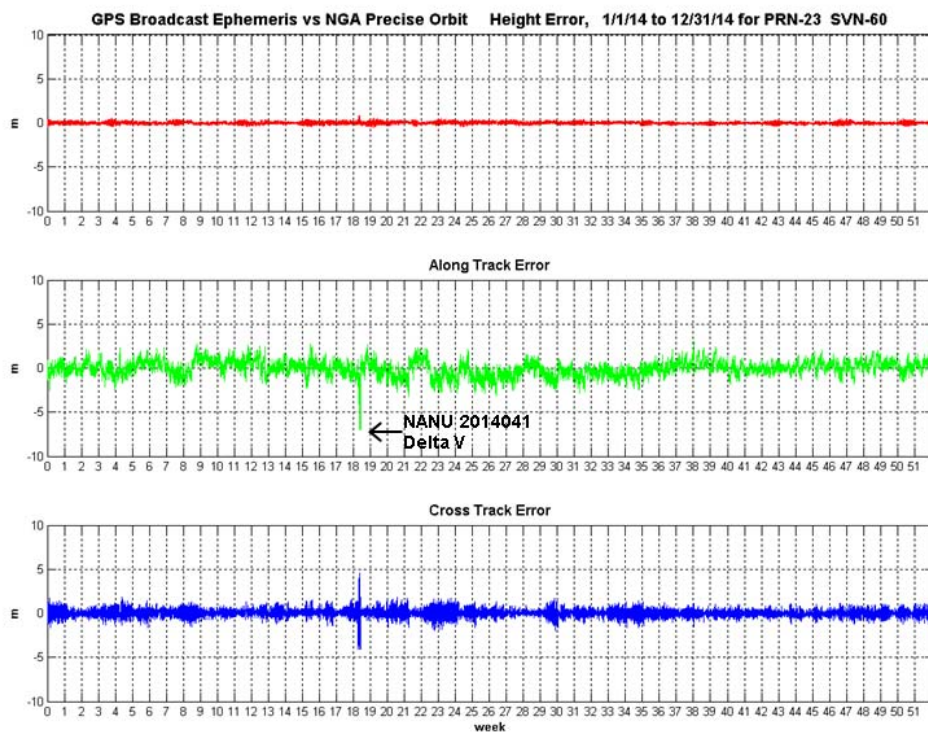


Figure 12-27 Orbit Error PRN-24 (SVN-65)

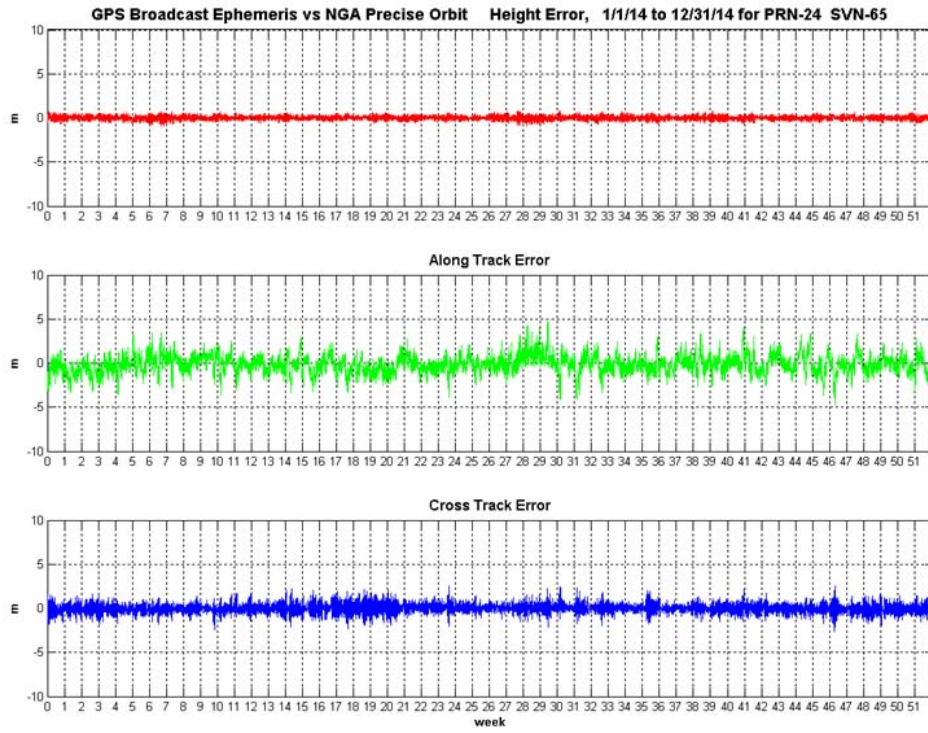


Figure 12-28 Orbit Error PRN-25 (SVN-62)

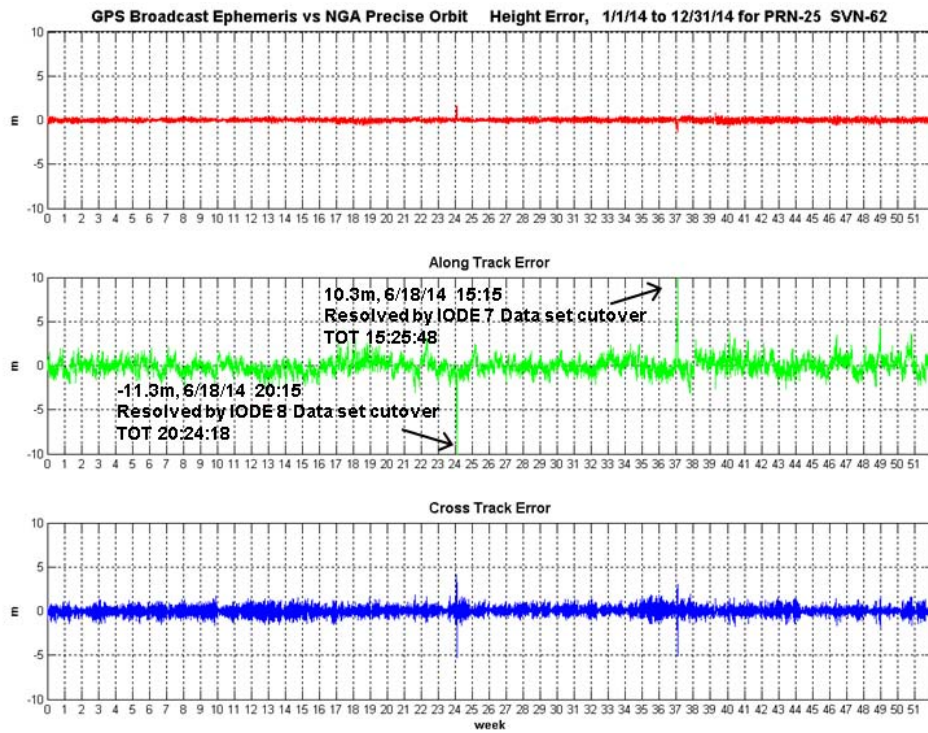


Figure 12-29 Orbit Error PRN-26 (SVN-26)

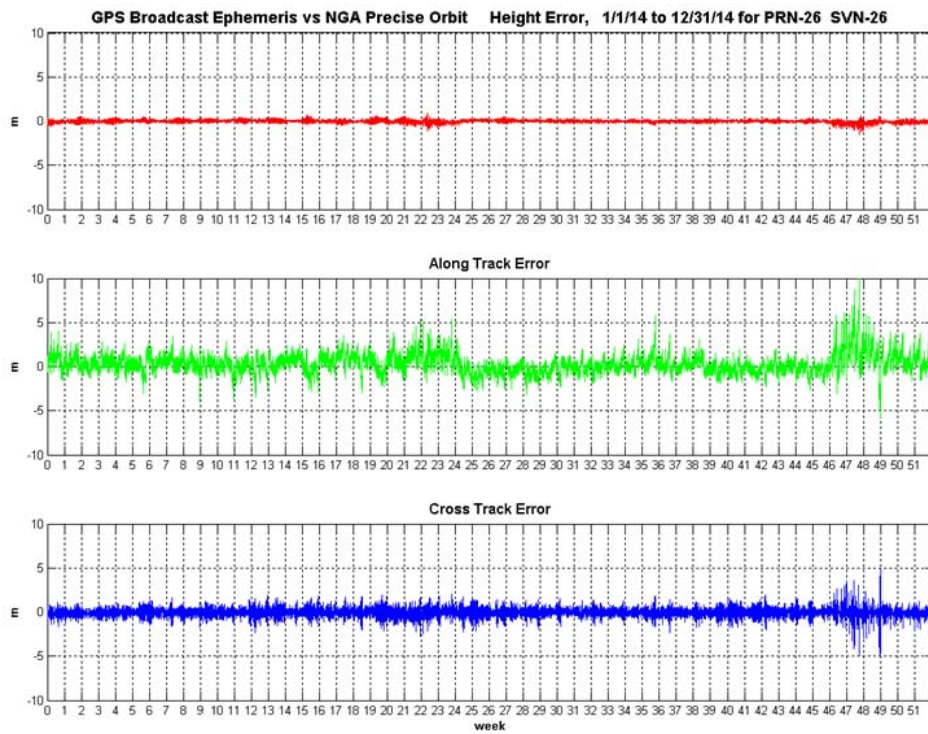


Figure 12-30 Orbit Error PRN-27 (SVN-66)

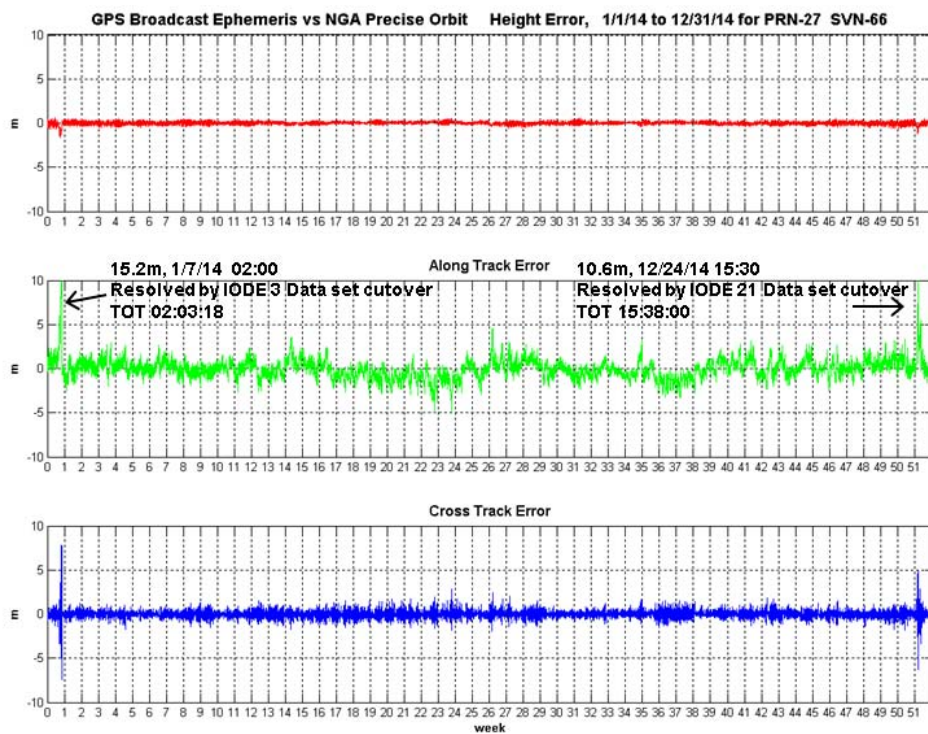


Figure 12-31 Orbit Error PRN-28 (SVN-44)

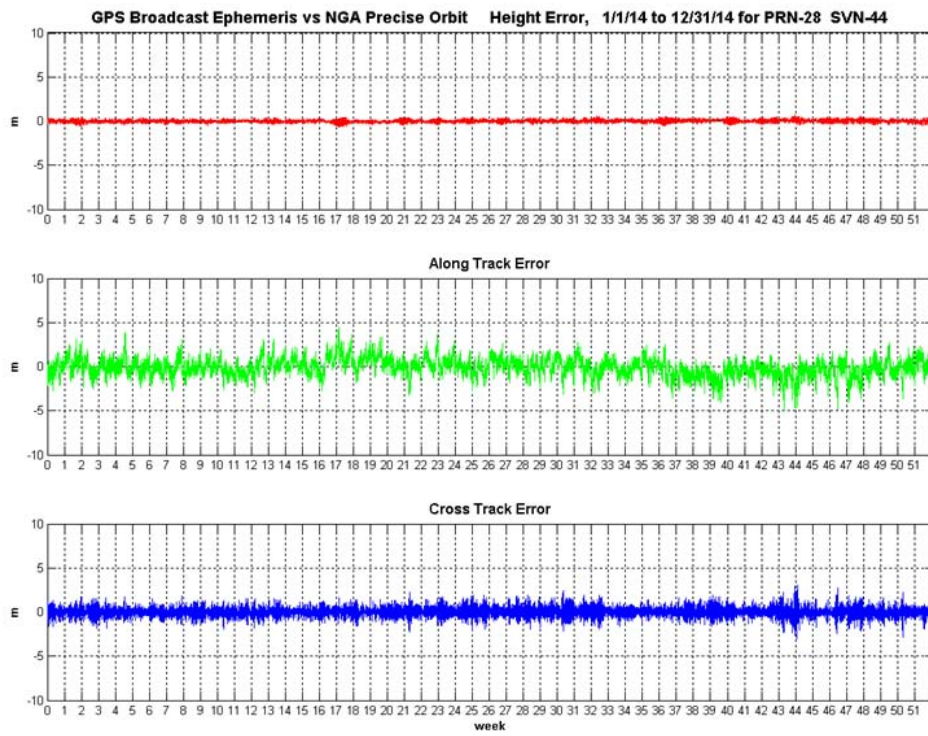


Figure 12-32 Orbit Error PRN-29 (SVN-57)

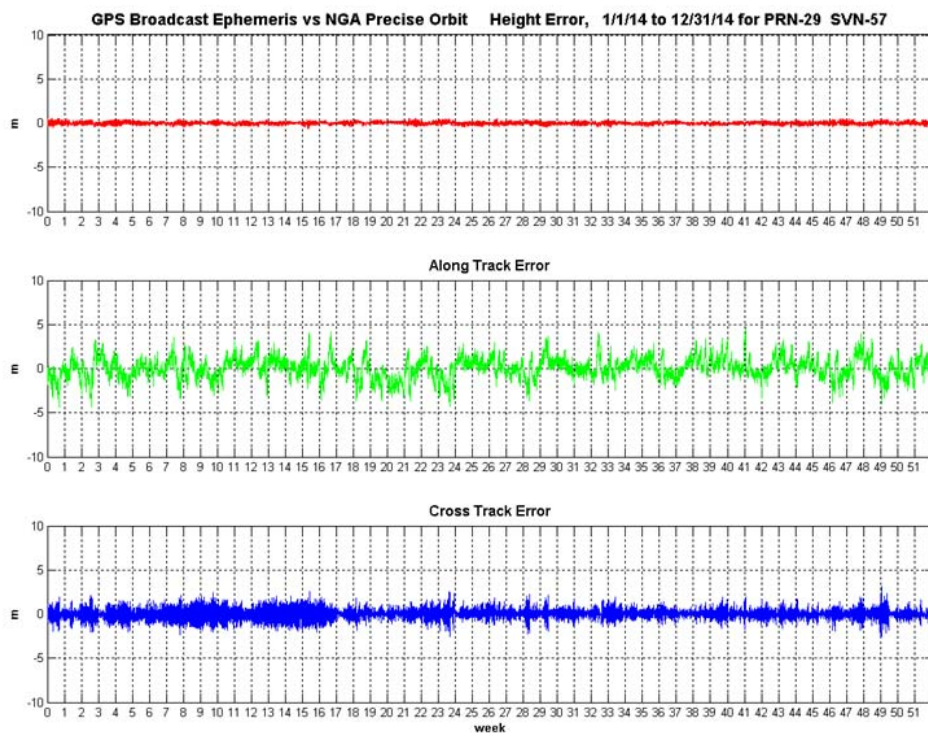


Figure 12-33 Orbit Error PRN-30 (SVN-65)

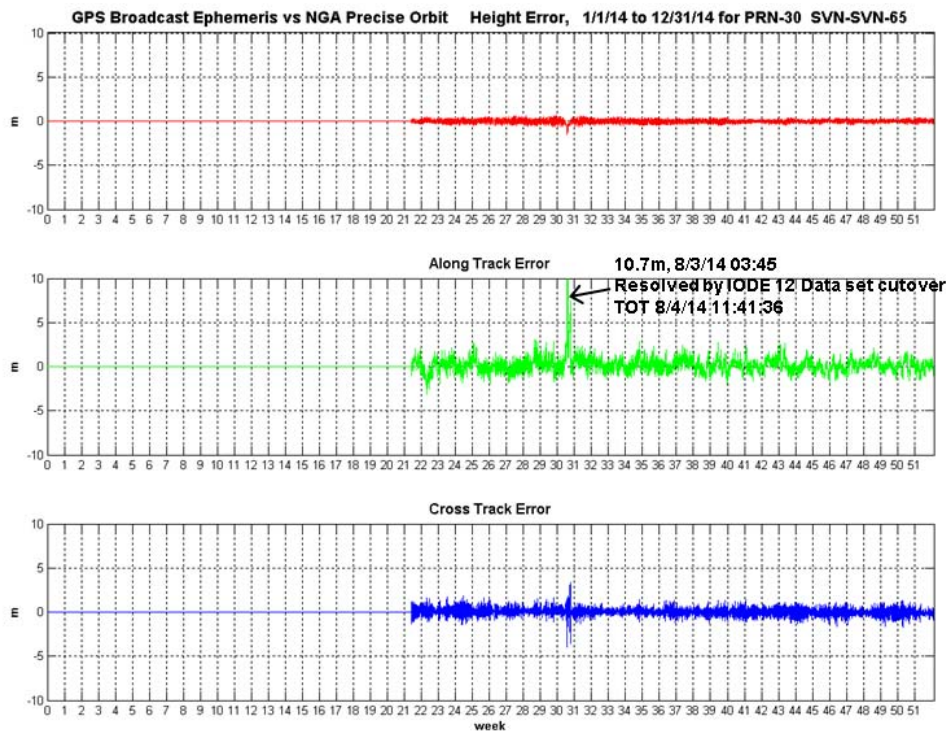


Figure 12-34 Orbit Error PRN-31 (SVN-52)

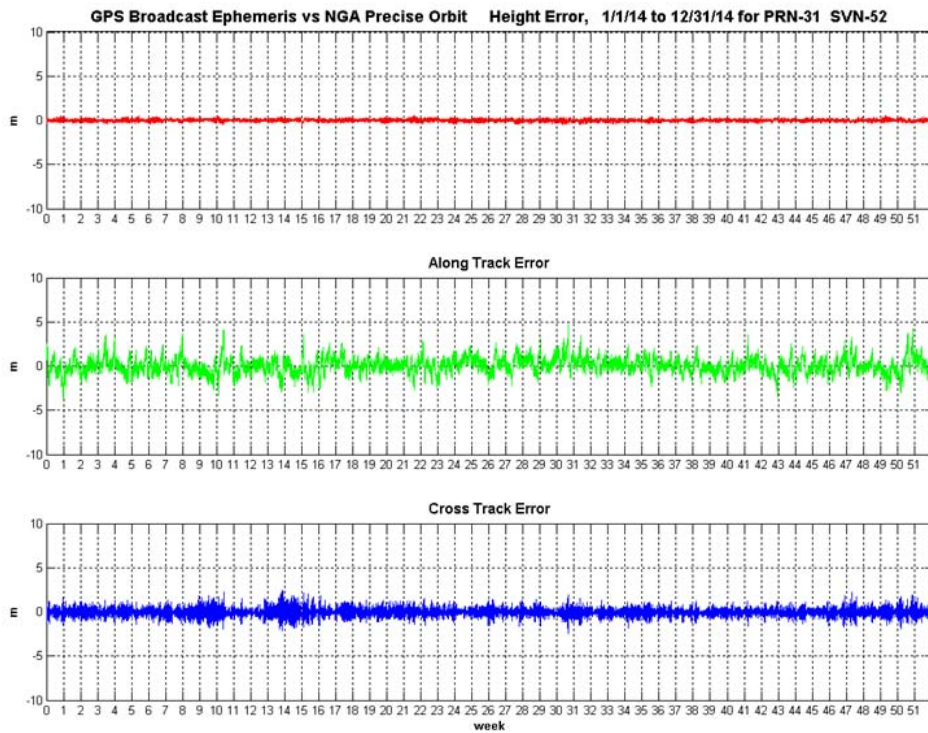


Figure 12-35 Orbit Error PRN-32 (SVN-23)

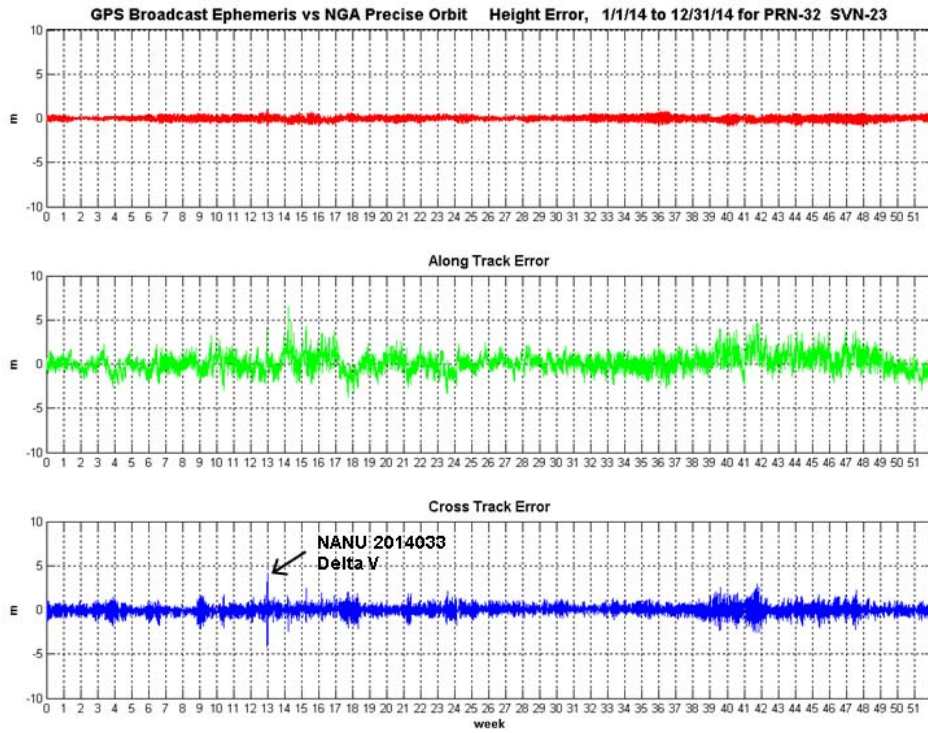


Figure 12-36 QQ Plots of Range Error PRNs 1 to 3

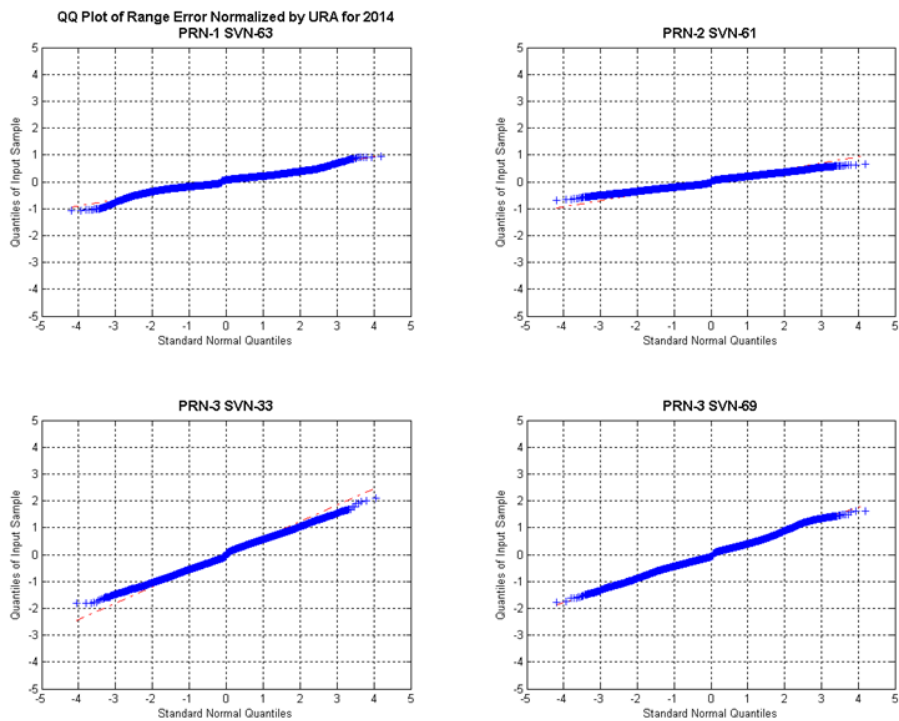




Figure 12-37 QQ Plots of Range Error PRNs 4 to 6

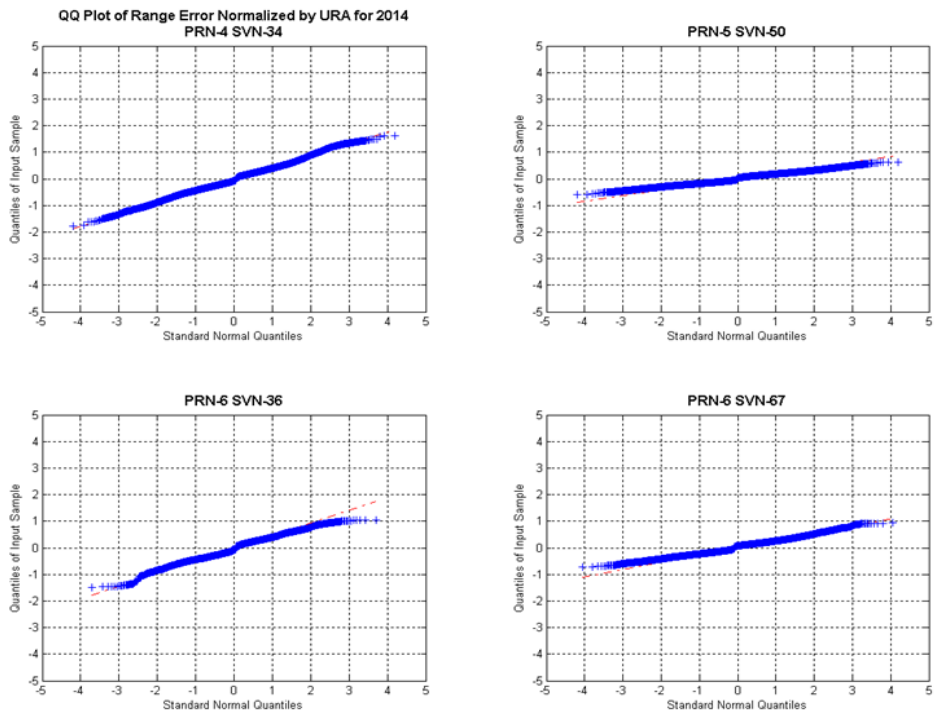
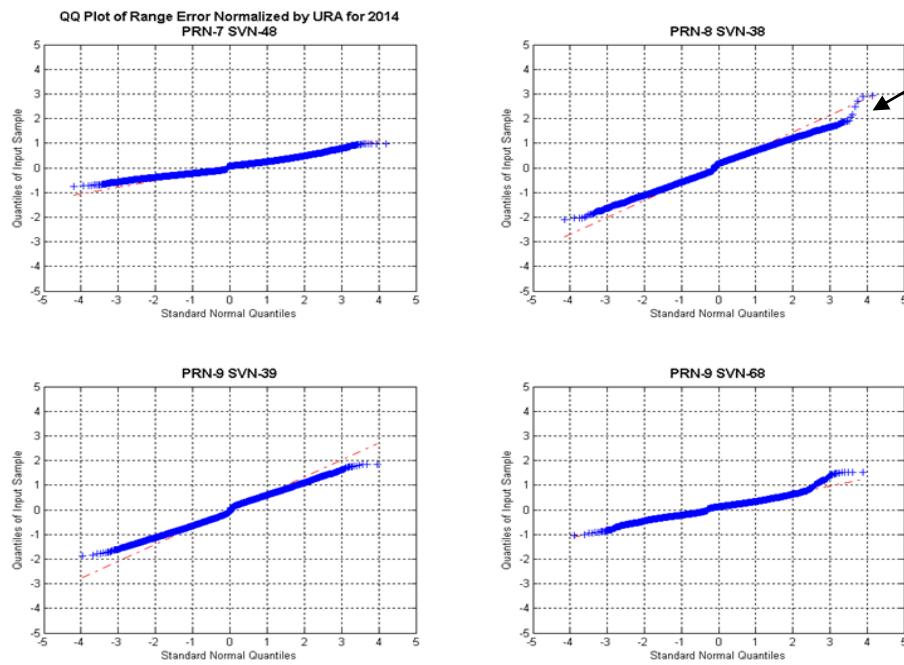


Figure 12-38 QQ Plots of Range Error PRNs 7 to 9



8/8/14 06:15 2.93 sigma  
Resolved by Data set  
cutover IODE 14  
TOT 06:17:18

Figure 12-39 QQ Plots of Range Error PRNs 10 to 13

4/24/14 22:45 -3.66 sigma  
3 rapid ephemeris updates  
2nd and 3rd, TOE indicated  
data set cutover

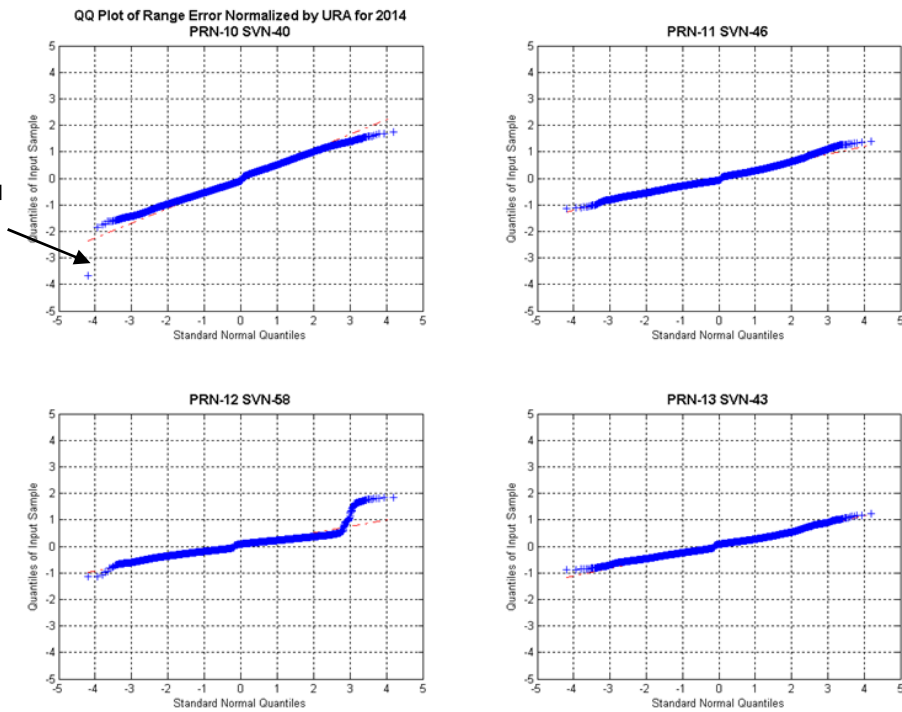
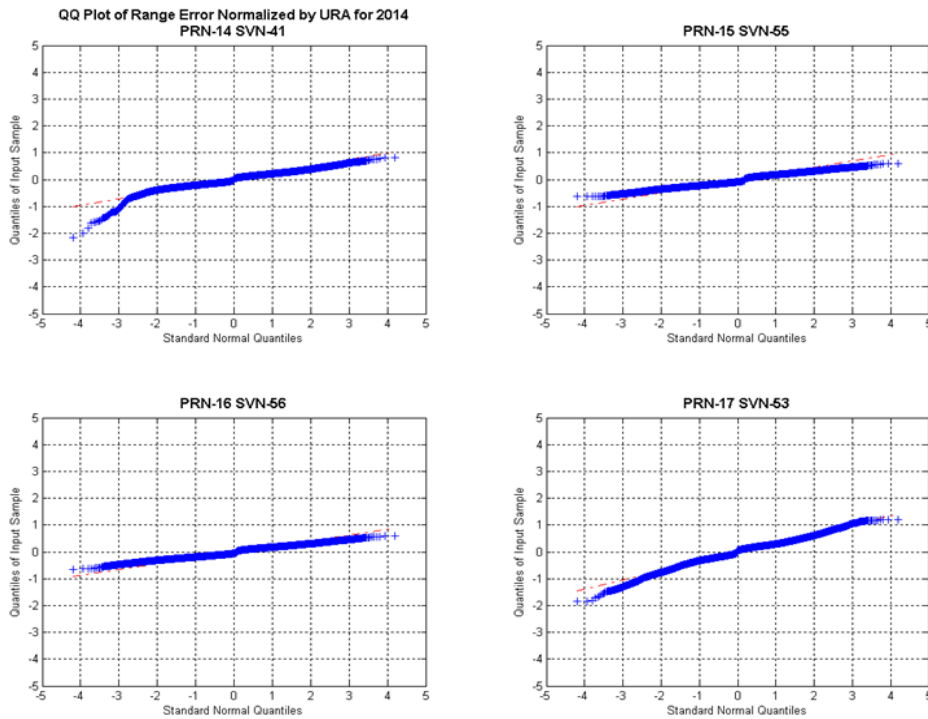
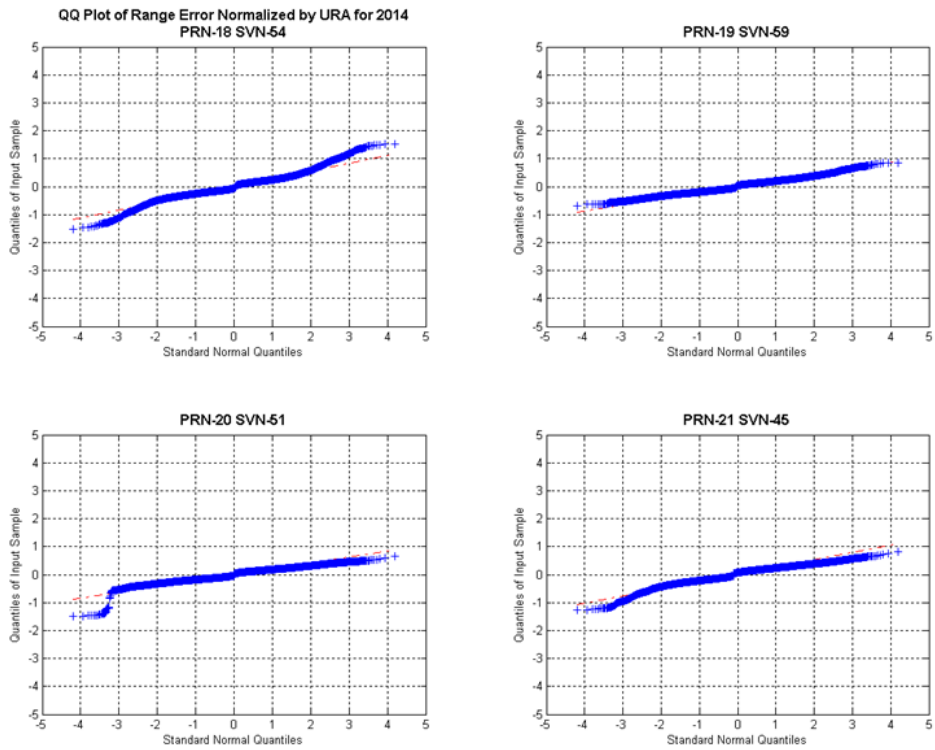


Figure 12-40 QQ Plots of Range Error PRNs 14 to 17



**Figure 12-41 QQ Plots of Range Error PRNs 18 to 21**



**Figure 12-42 QQ Plots of Range Error PRNs 22 to 25**

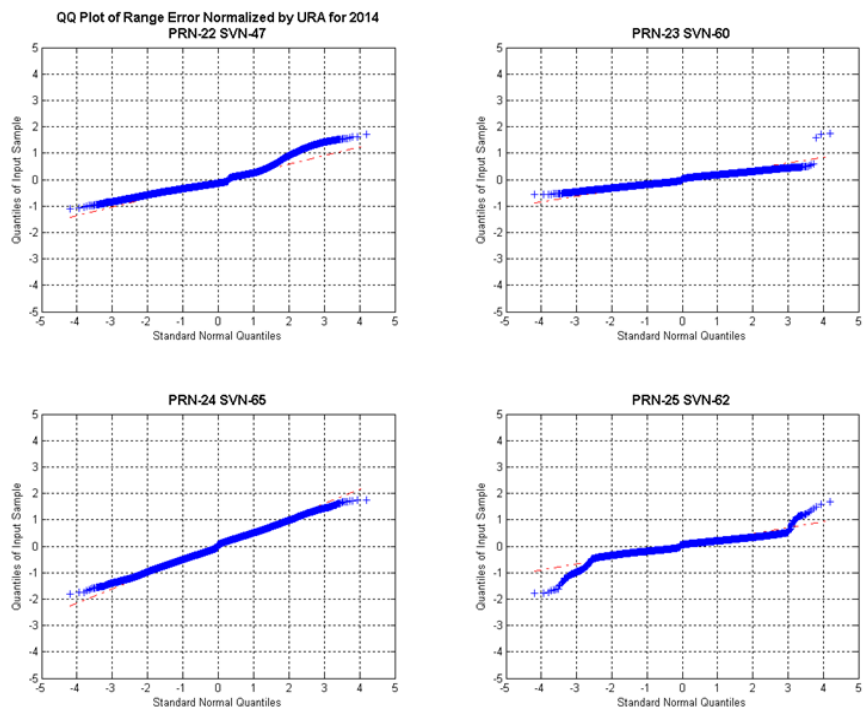


Figure 12-43 QQ Plots of Range Error PRNs 26 to 29

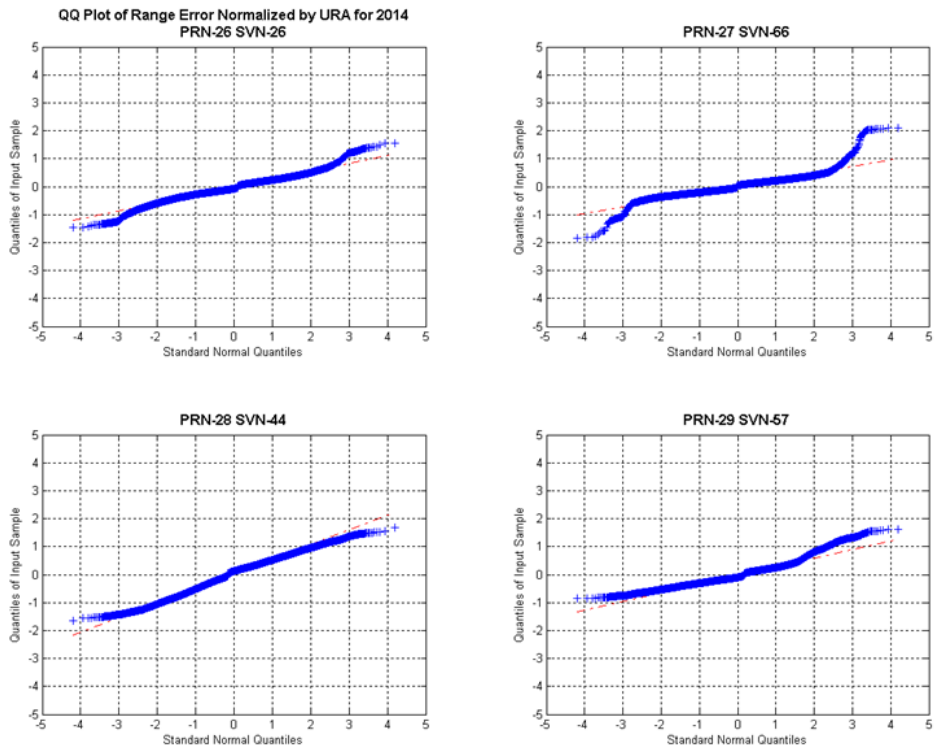


Figure 12-44 QQ Plots of Range Error PRNs 30 to 32

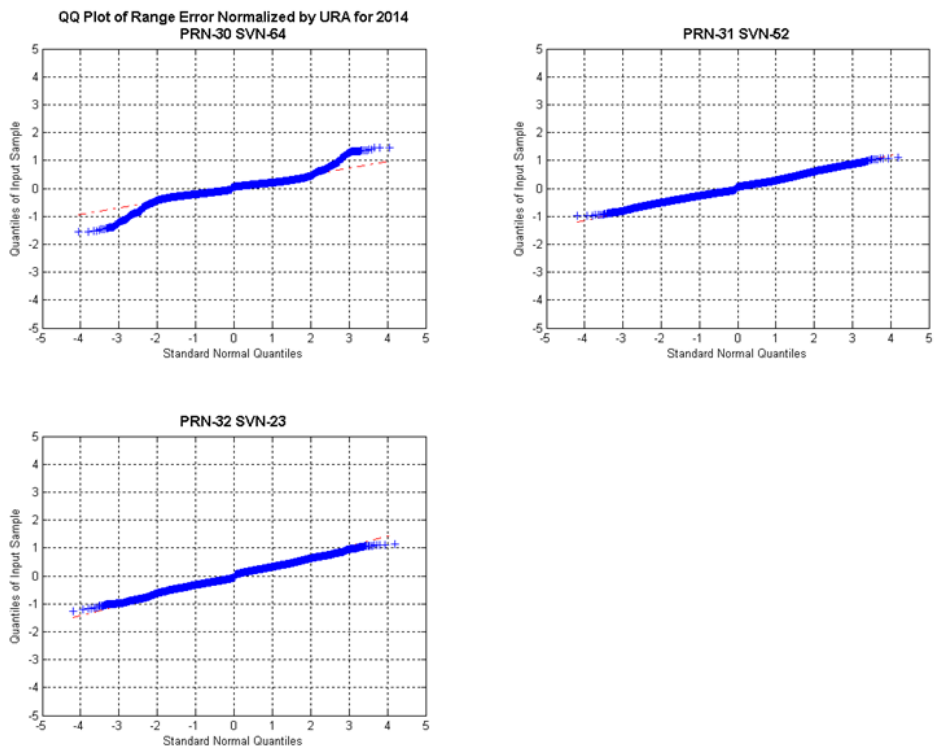


Figure 12-45 Histograms of H, A, C, and Range Error PRN-1 (SVN-63)

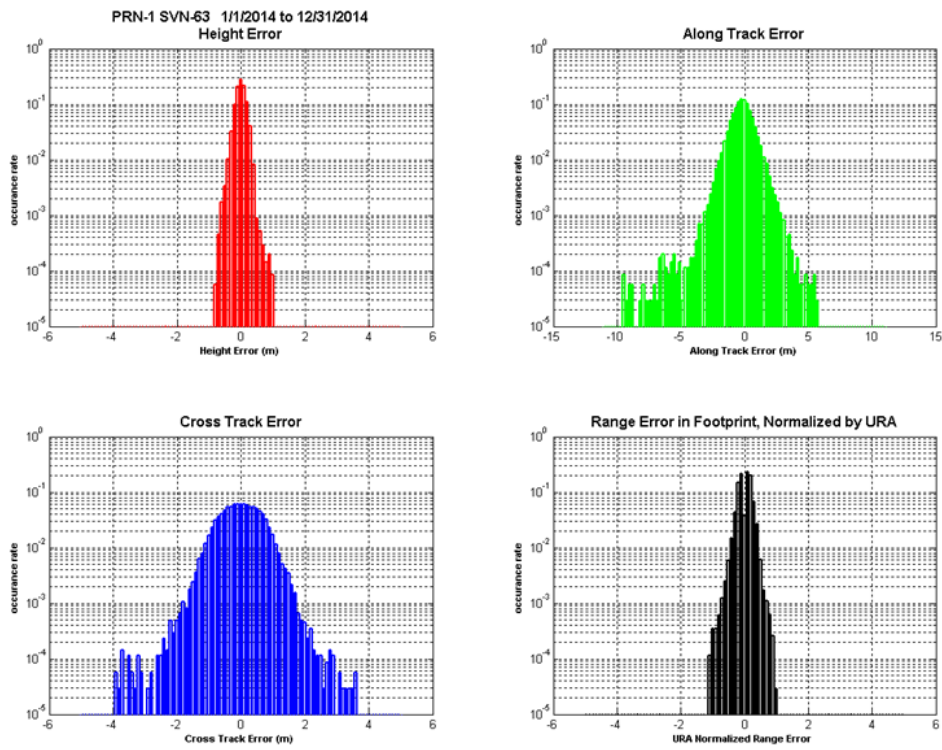


Figure 12-46 Histograms of H, A, C, and Range Error PRN-2 (SVN-61)

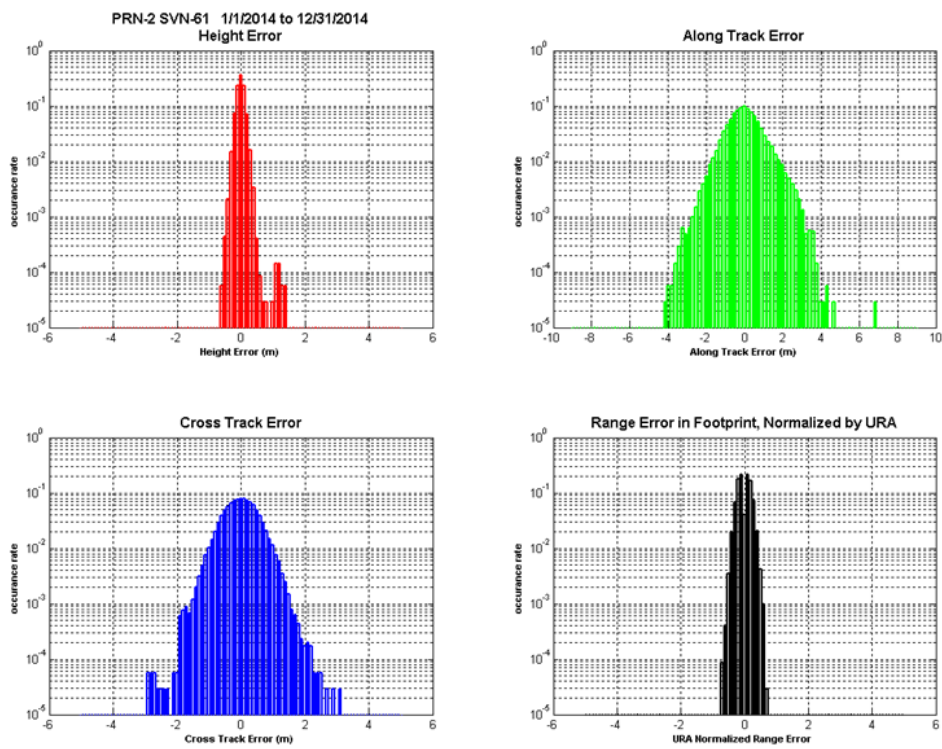


Figure 12-47 Histograms of H, A, C, and Range Error PRN-3 (SVN-33)

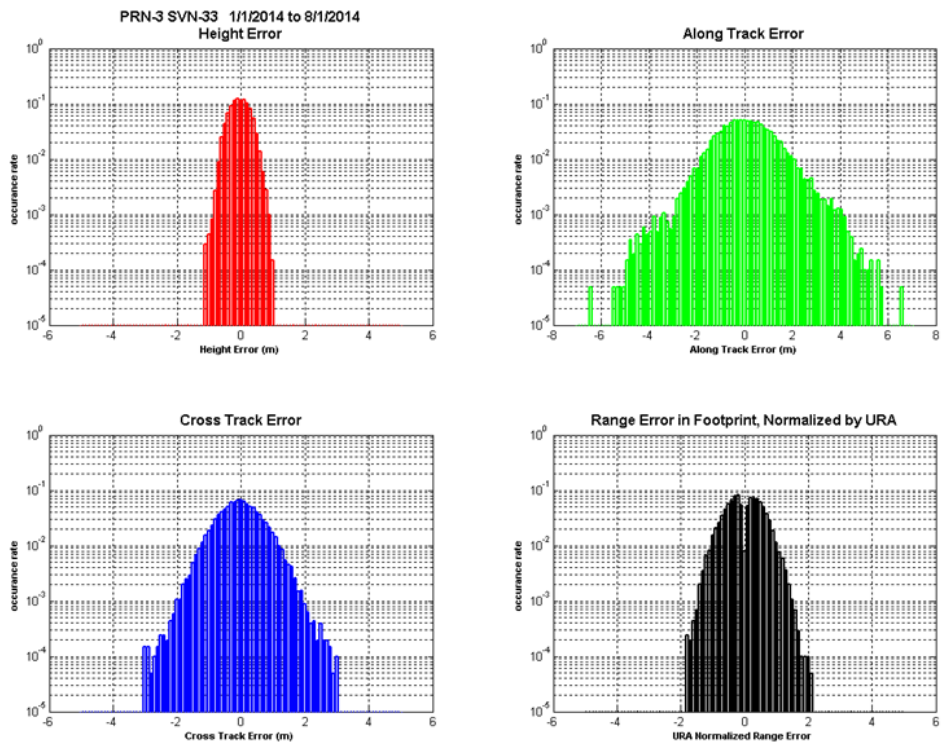


Figure 12-48 Histograms of H, A, C, and Range Error PRN-3 (SVN-69)

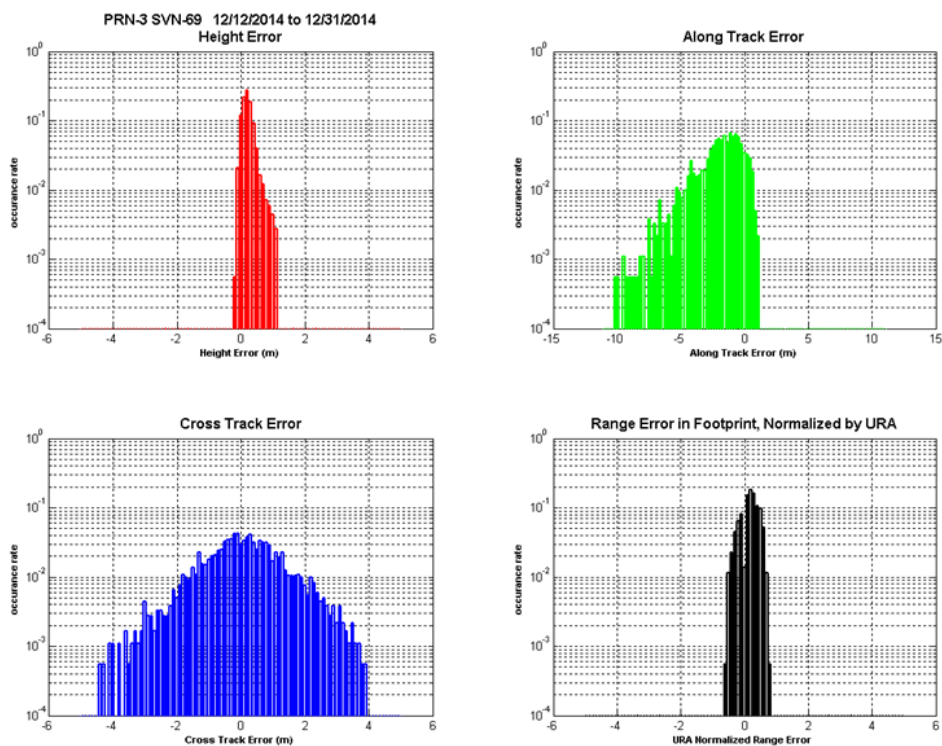


Figure 12-49 Histograms of H, A, C, and Range Error PRN-4 (SVN-34)

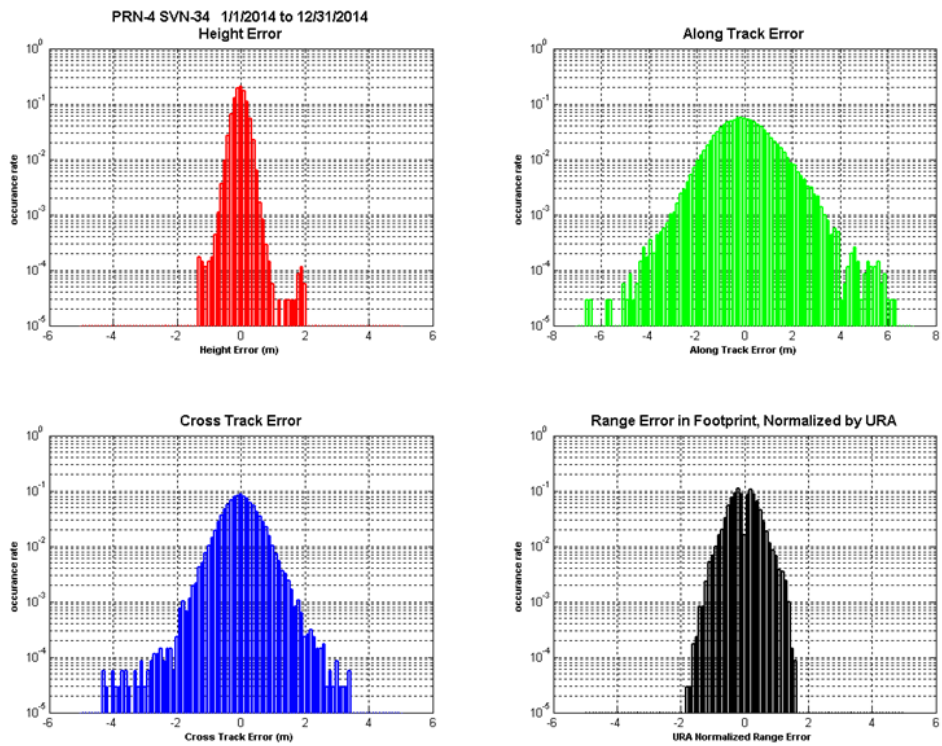
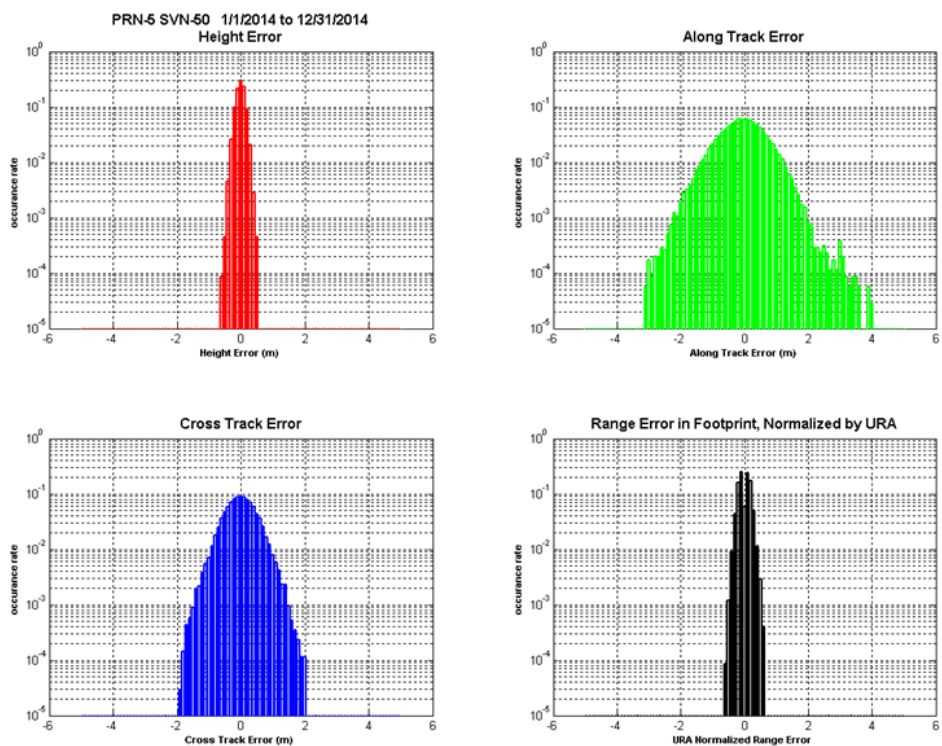
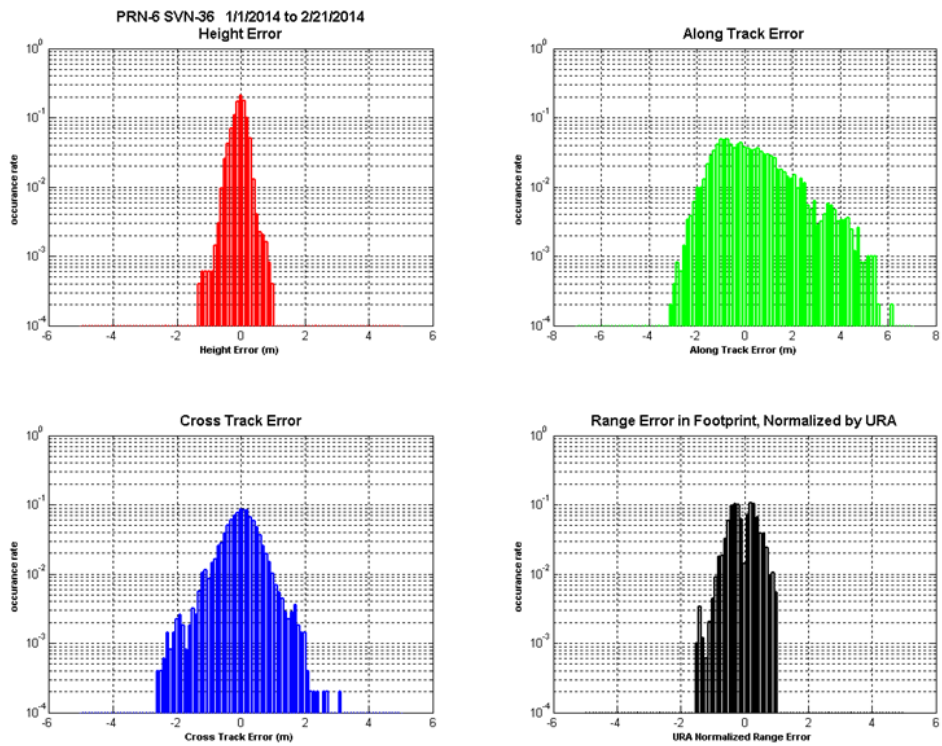


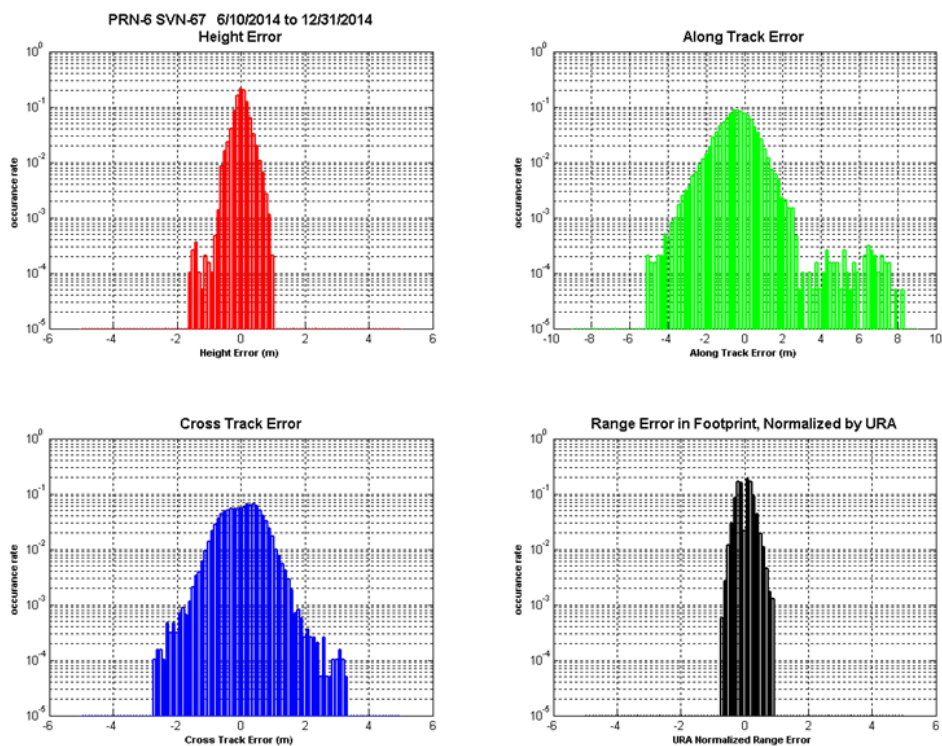
Figure 12-50 Histograms of H, A, C, and Range Error PRN-5 (SVN-50)



**Figure 12-51 Histograms of H, A, C, and Range Error PRN-6 (SVN-36)**

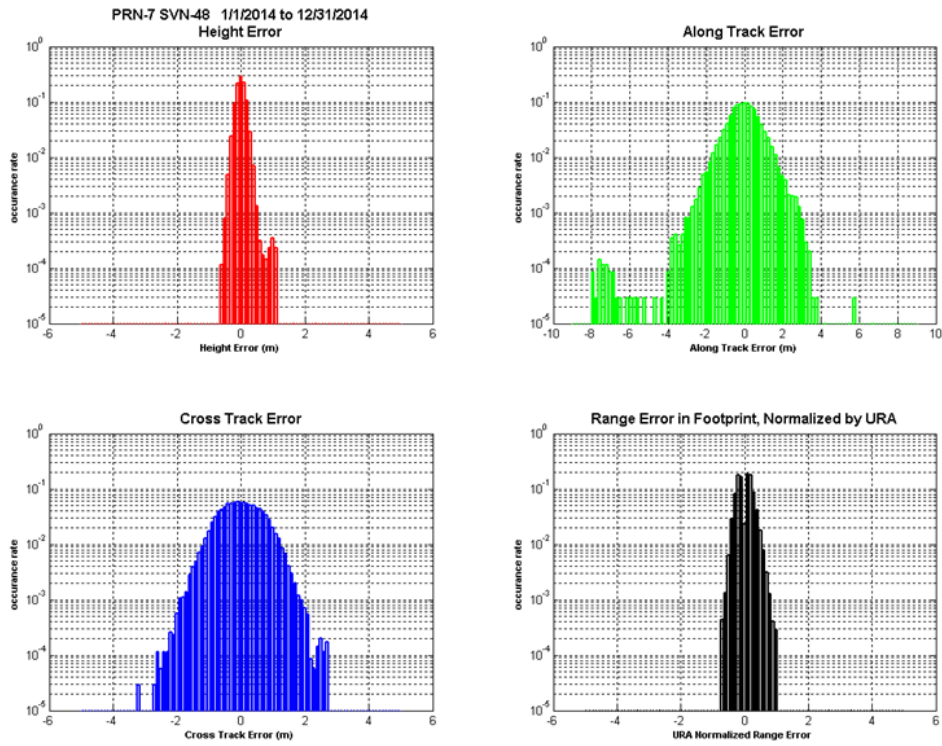


**Figure 12-52 Histograms of H, A, C, and Range Error PRN-6 (SVN-67)**

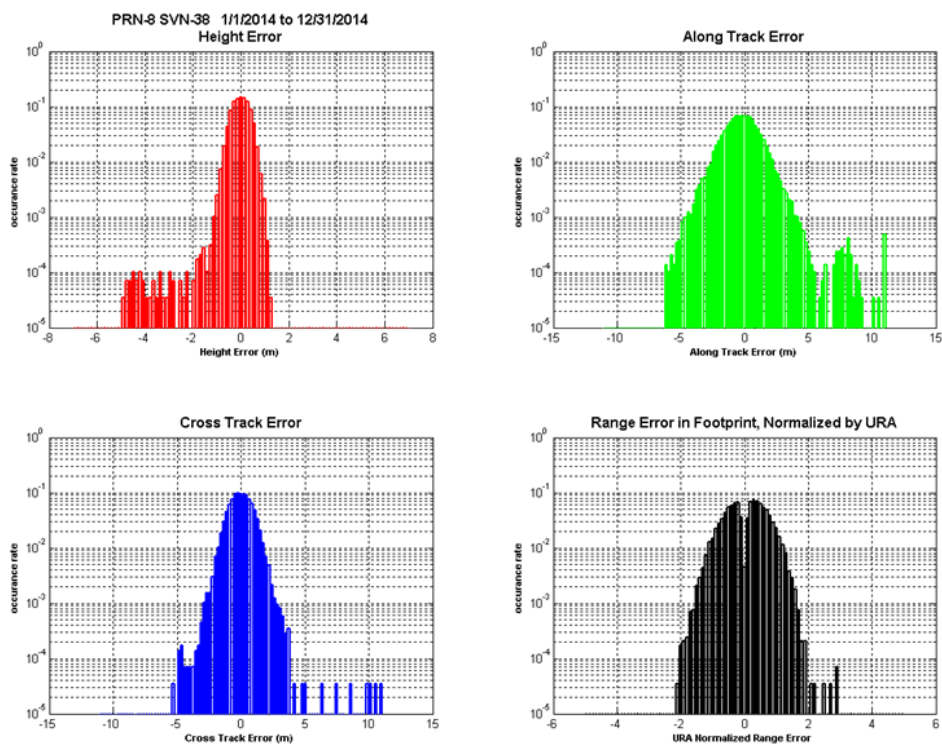




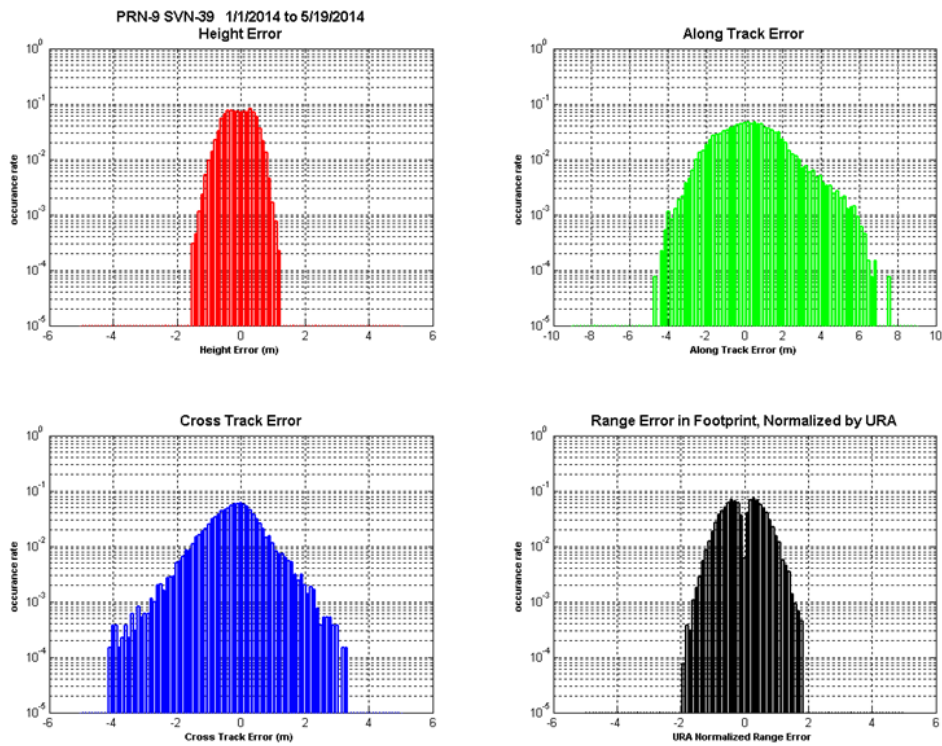
**Figure 12-53 Histograms of H, A, C, and Range Error PRN-7 (SVN-48)**



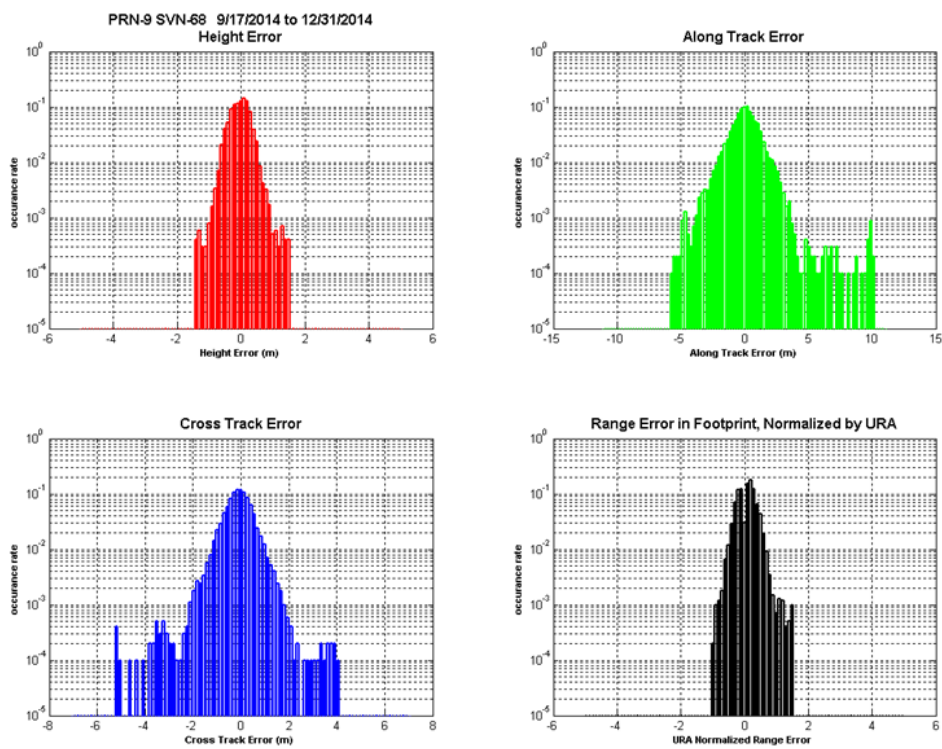
**Figure 12-54 Histograms of H, A, C, and Range Error PRN-8 (SVN-38)**



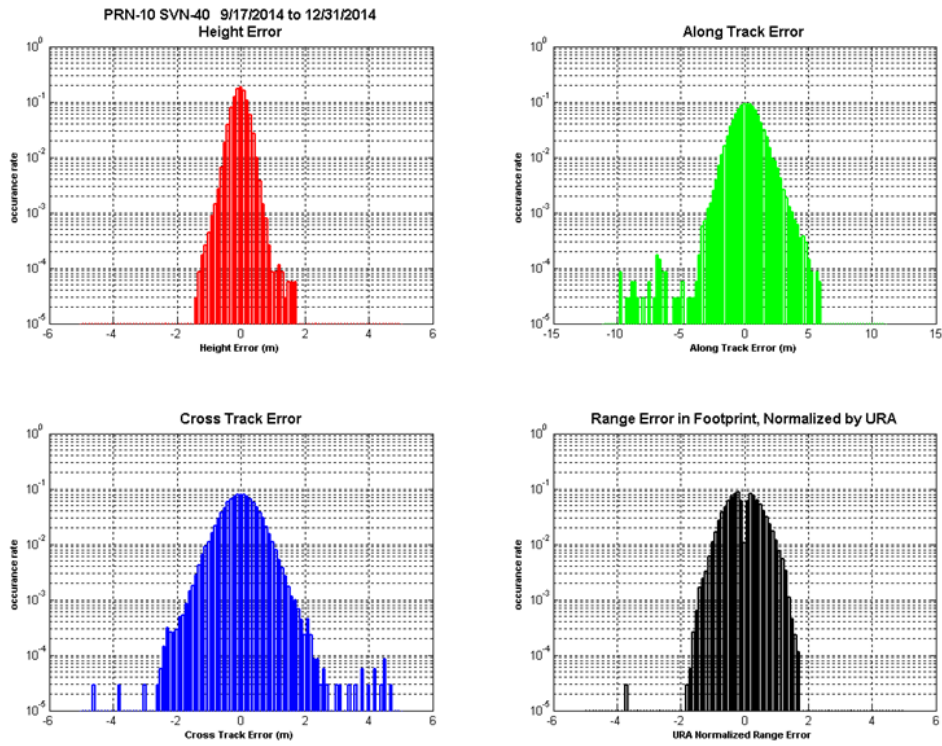
**Figure 12-55 Histograms of H, A, C, and Range Error PRN-9 (SVN-39)**



**Figure 12-56 Histograms of H, A, C, and Range Error PRN-9 (SVN-68)**



**Figure 12-57 Histograms of H, A, C, and Range Error PRN-10 (SVN-40)**



**Figure 12-58 Histograms of H, A, C, and Range Error PRN-11 (SVN-46)**

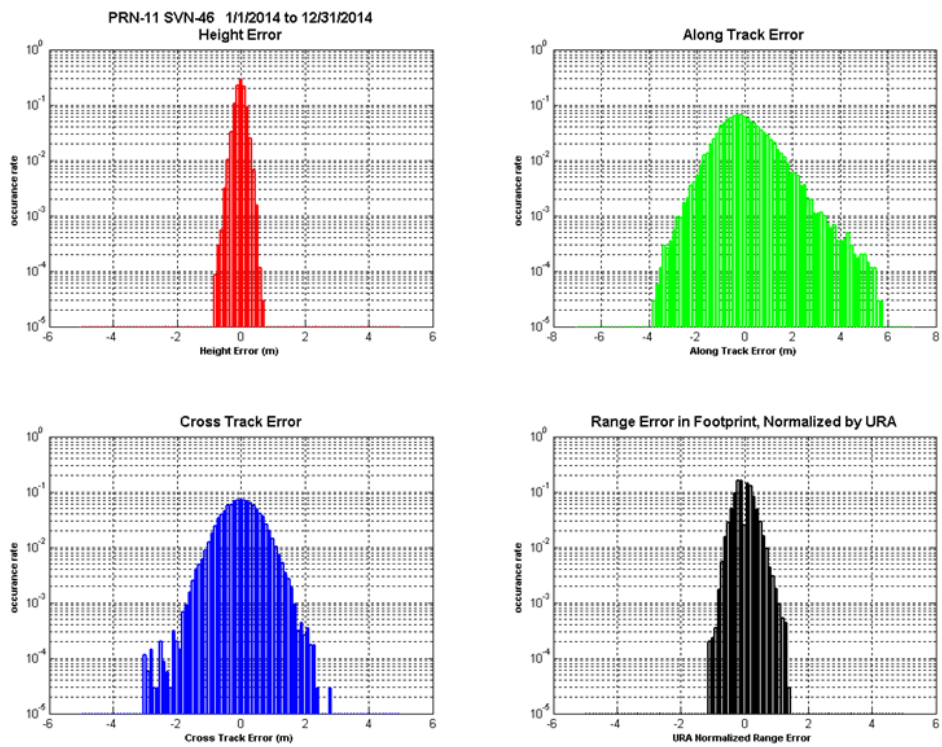


Figure 12-59 Histograms of H, A, C, and Range Error PRN-12 (SVN-58)

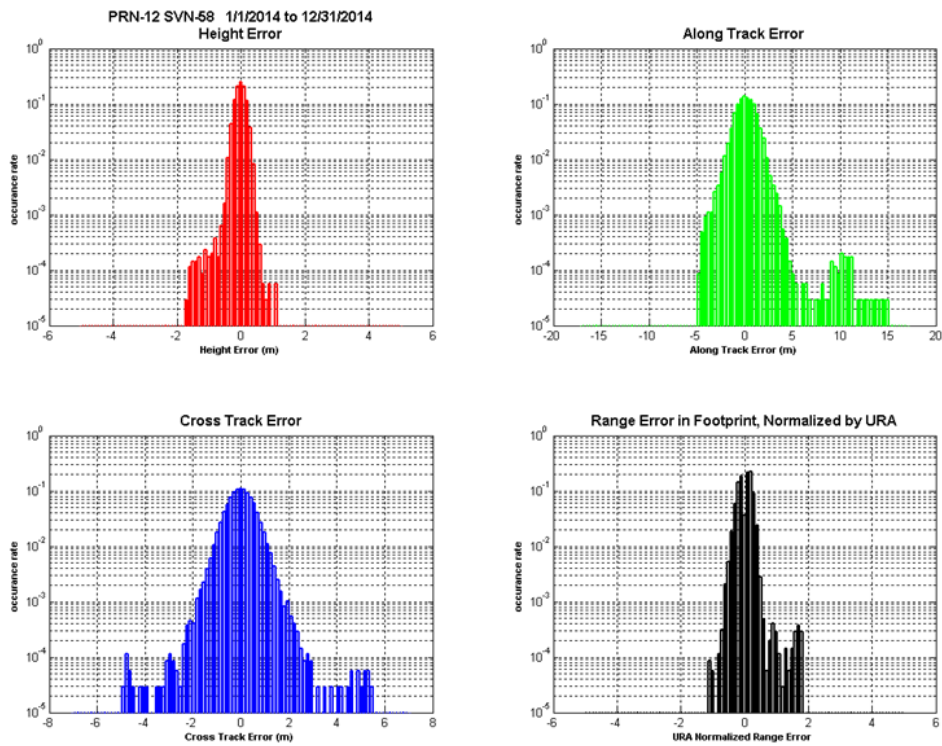
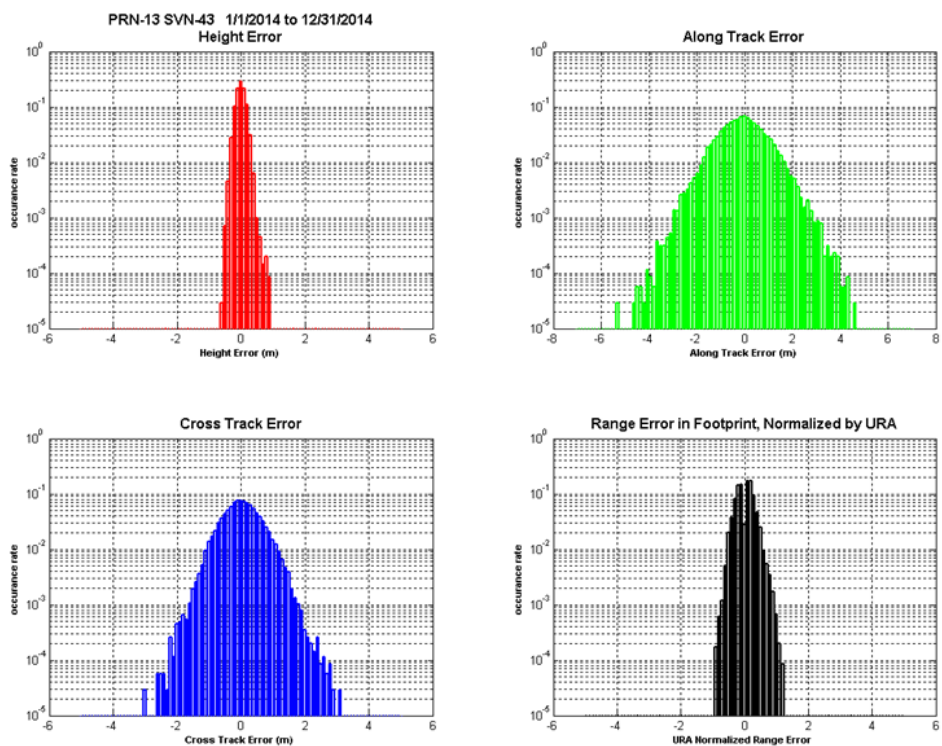
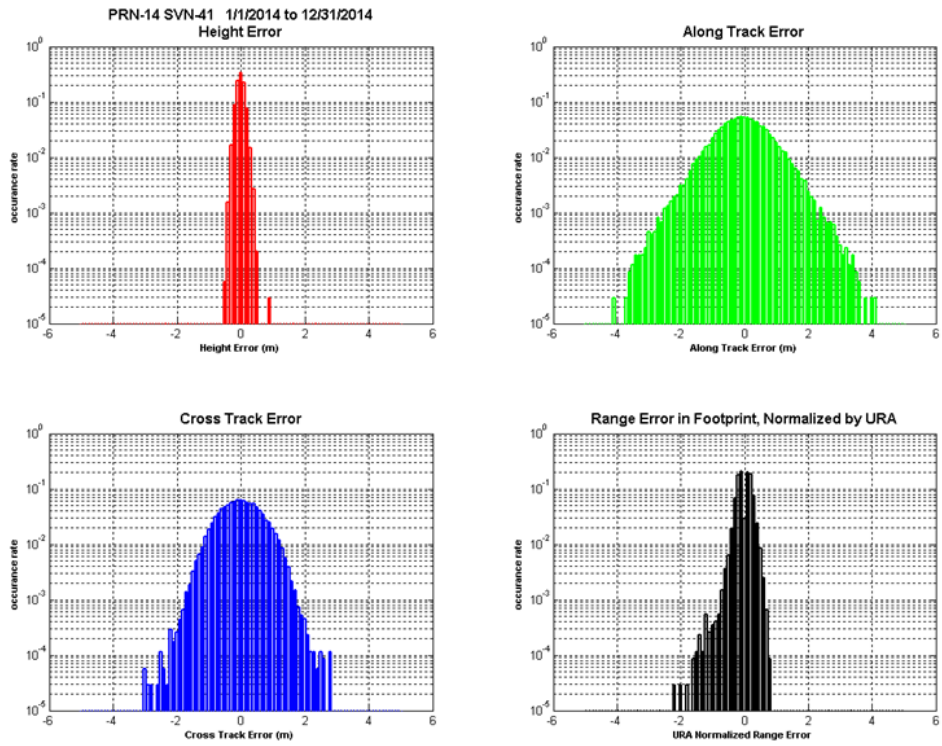


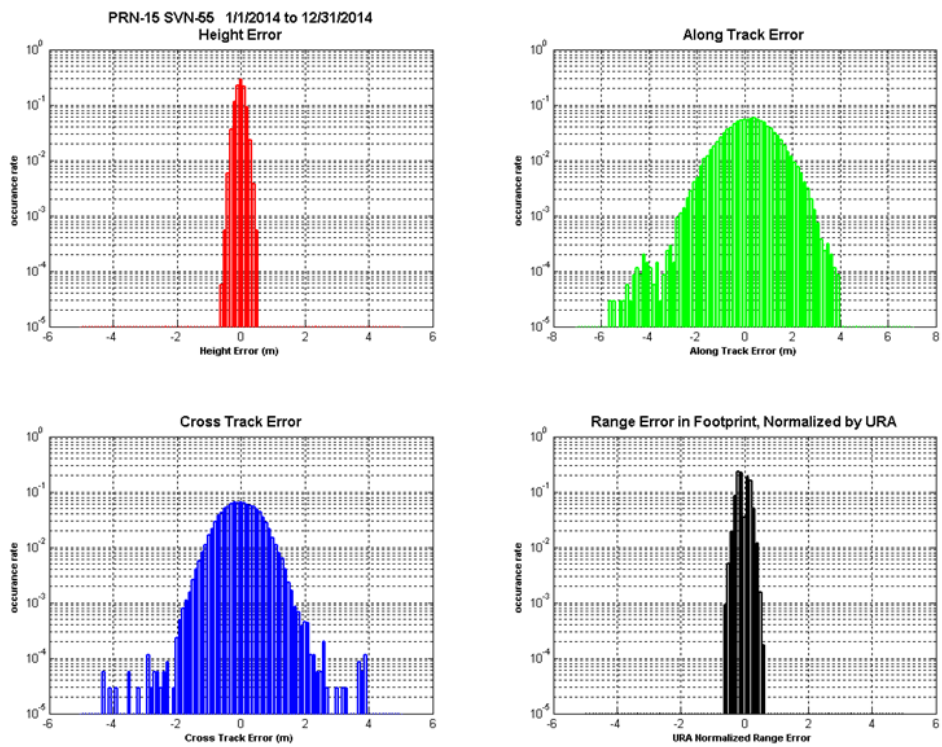
Figure 12-60 Histograms of H, A, C, and Range Error PRN-13 (SVN-43)



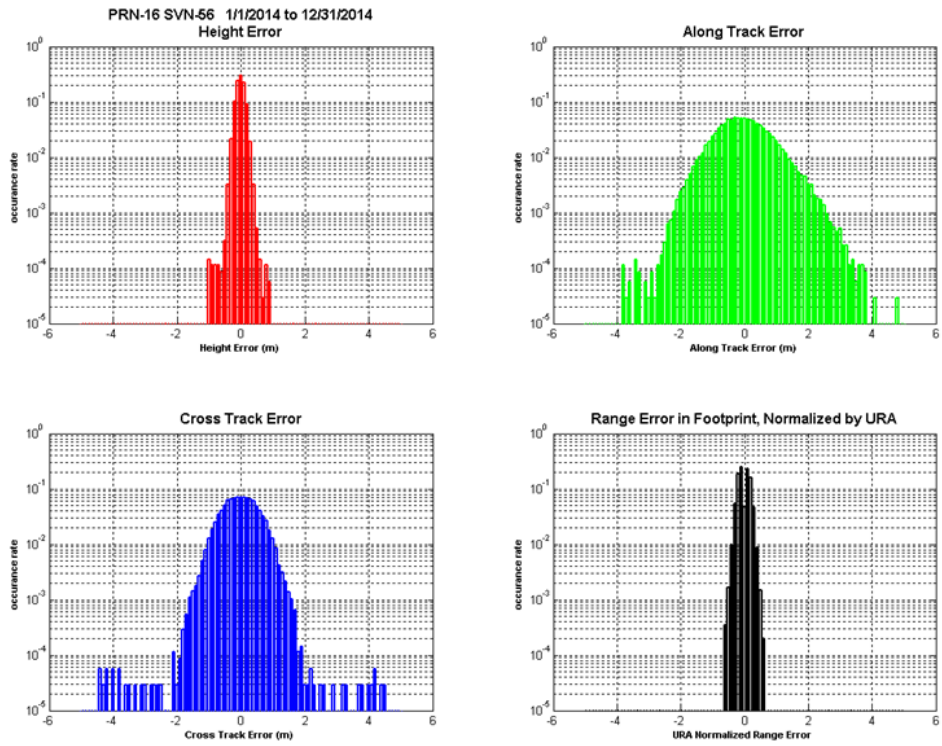
**Figure 12-61 Histograms of H, A, C, and Range Error PRN-14 (SVN-41)**



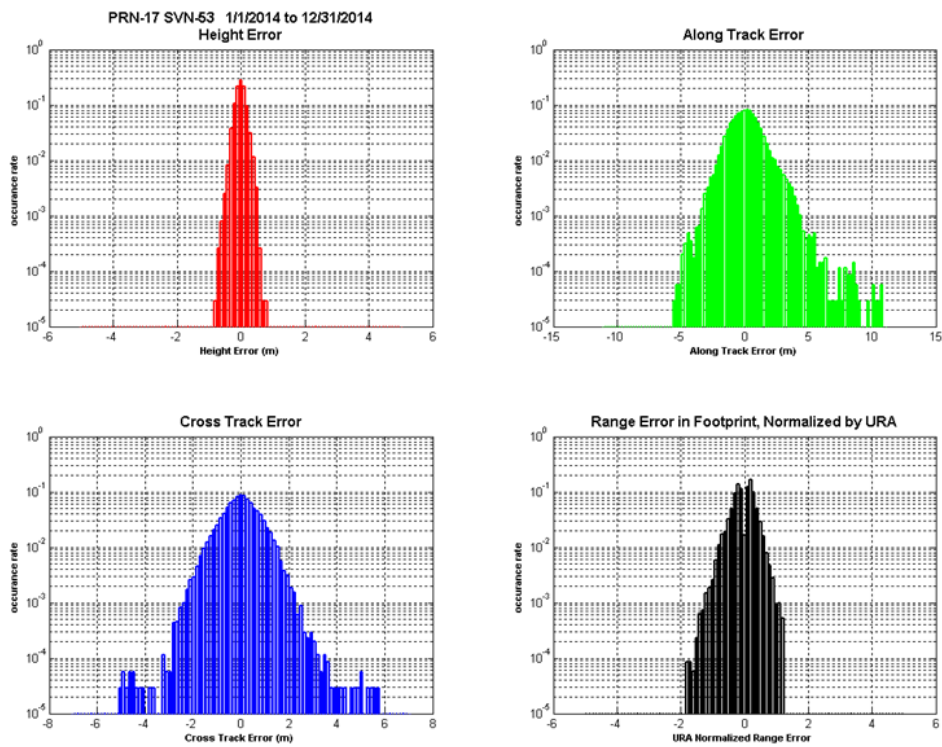
**Figure 12-62 Histograms of H, A, C, and Range Error PRN-15 (SVN-55)**



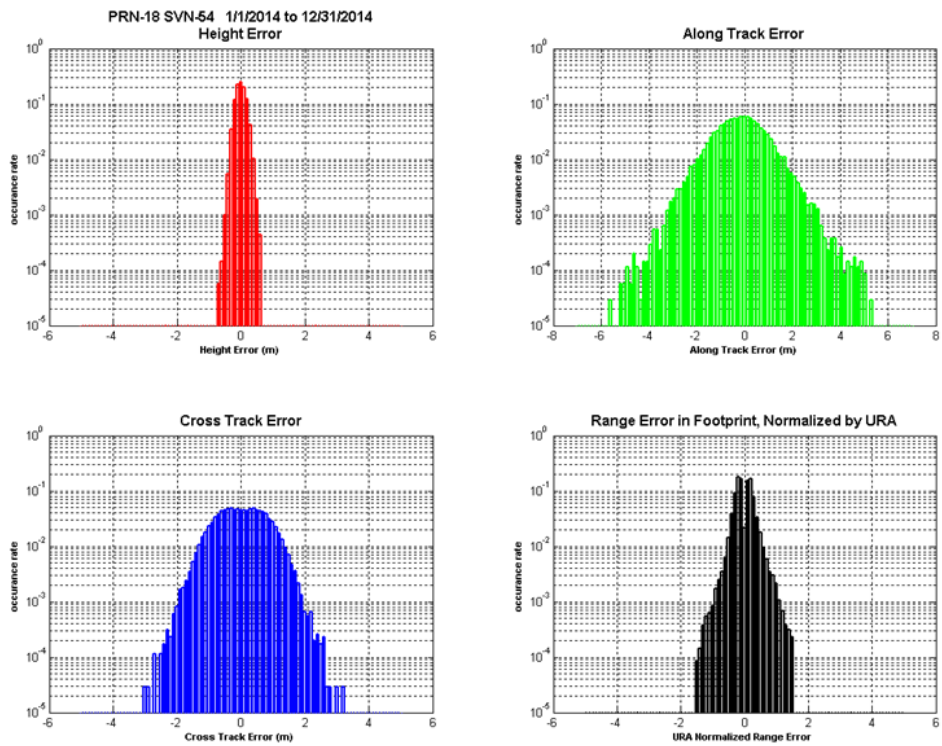
**Figure 12-63 Histograms of H, A, C, and Range Error PRN-16 (SVN-56)**



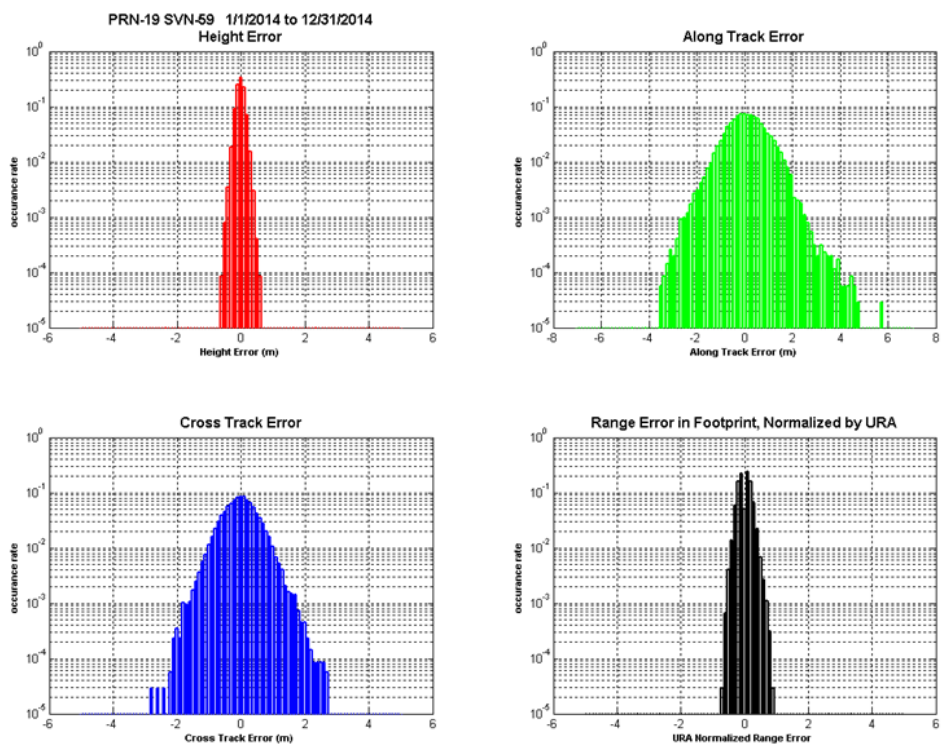
**Figure 12-64 Histograms of H, A, C, and Range Error PRN-17 (SVN-53)**



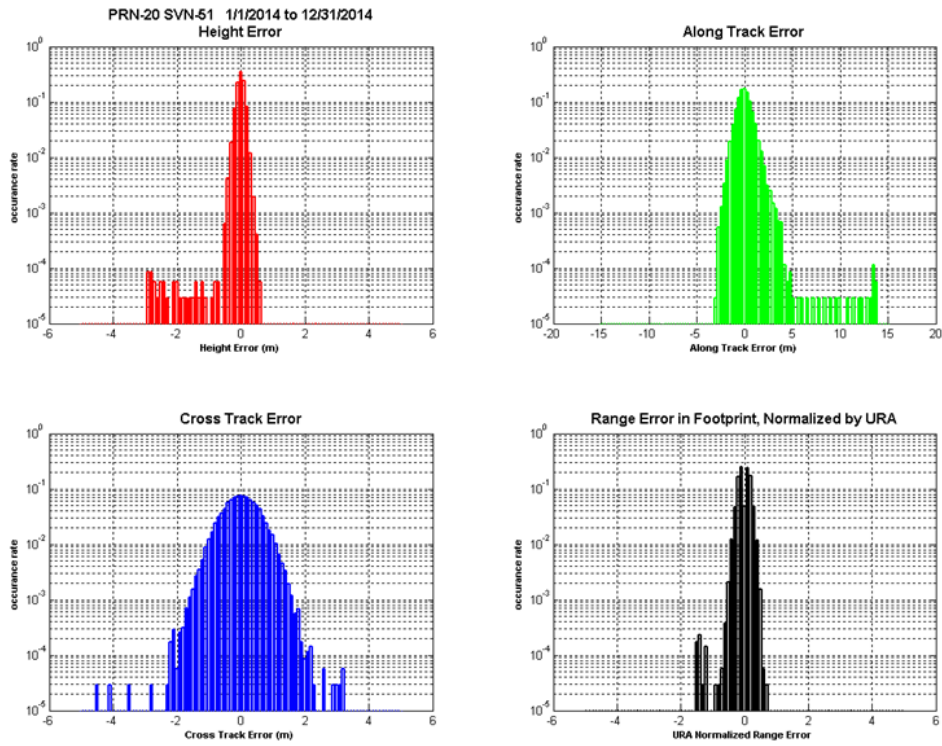
**Figure 12-65 Histograms of H, A, C, and Range Error PRN-18 (SVN-54)**



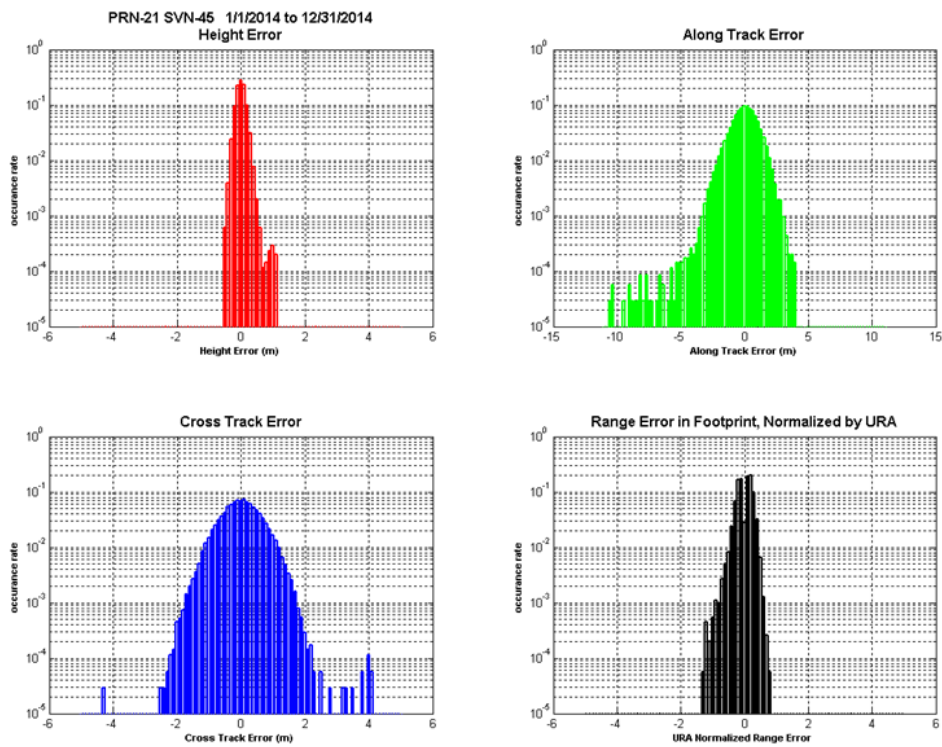
**Figure 12-66 Histograms of H, A, C, and Range Error PRN-19 (SVN-59)**



**Figure 12-67 Histograms of H, A, C, and Range Error PRN-20 (SVN-51)**

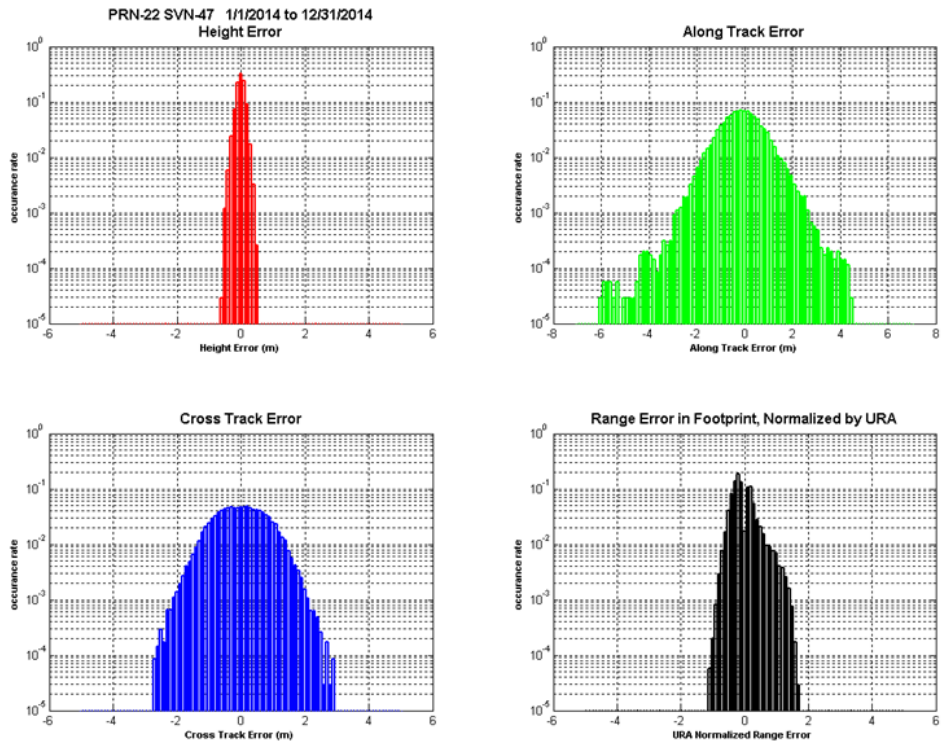


**Figure 12-68 Histograms of H, A, C, and Range Error PRN-21 (SVN-45)**

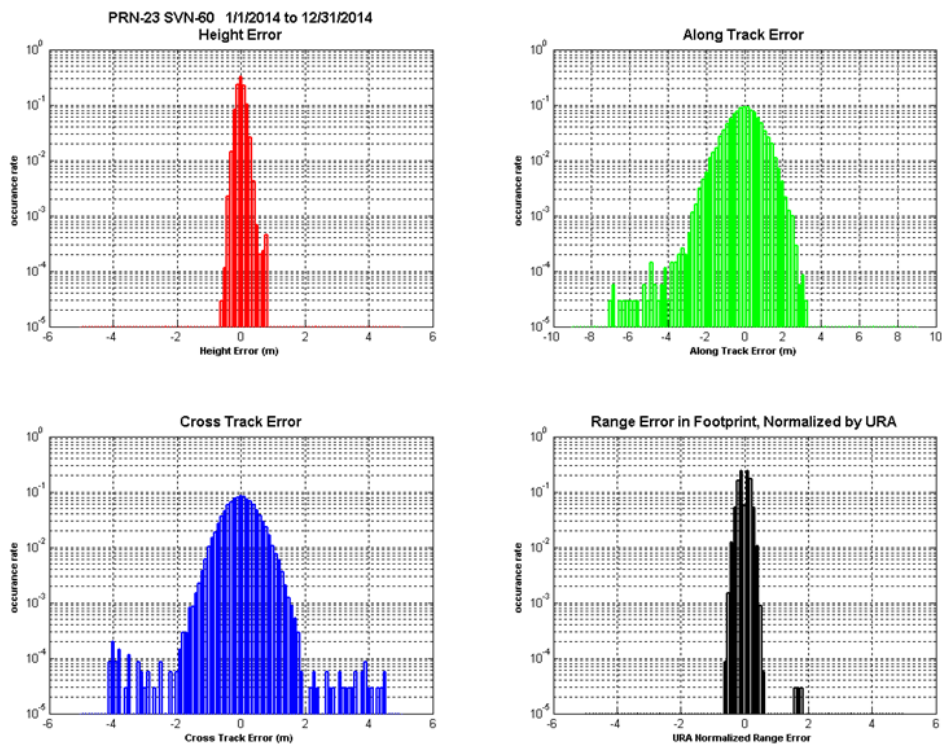




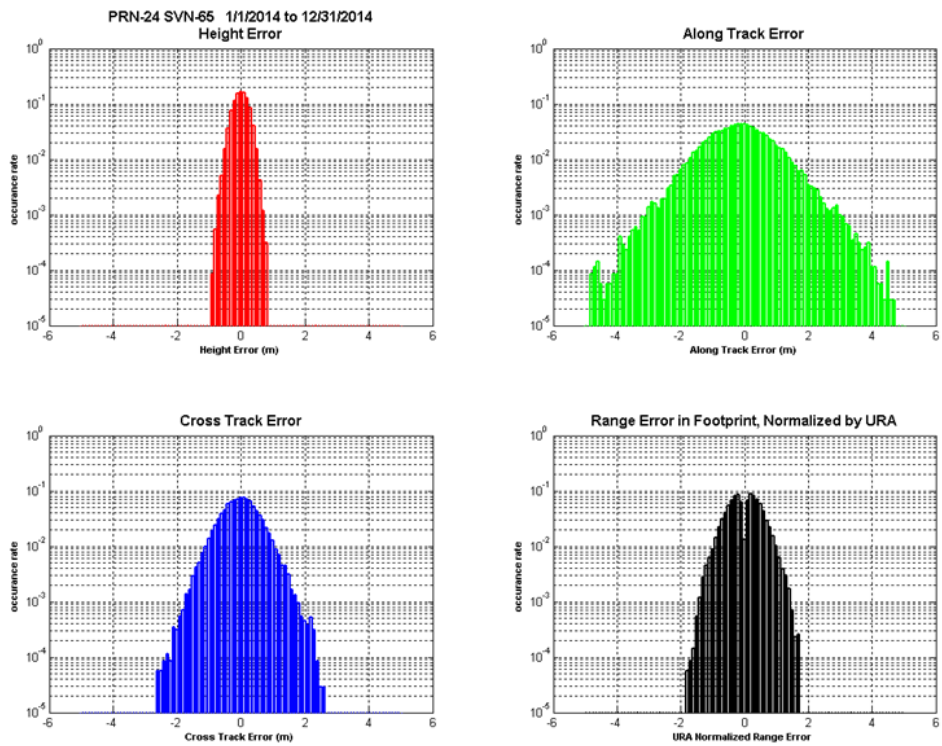
**Figure 12-69 Histograms of H, A, C, and Range Error PRN-22 (SVN-47)**



**Figure 12-70 Histograms of H, A, C, and Range Error PRN-23 (SVN-60)**



**Figure 12-71 Histograms of H, A, C, and Range Error PRN-24 (SVN-65)**



**Figure 12-72 Histograms of H, A, C, and Range Error PRN-25 (SVN-62)**

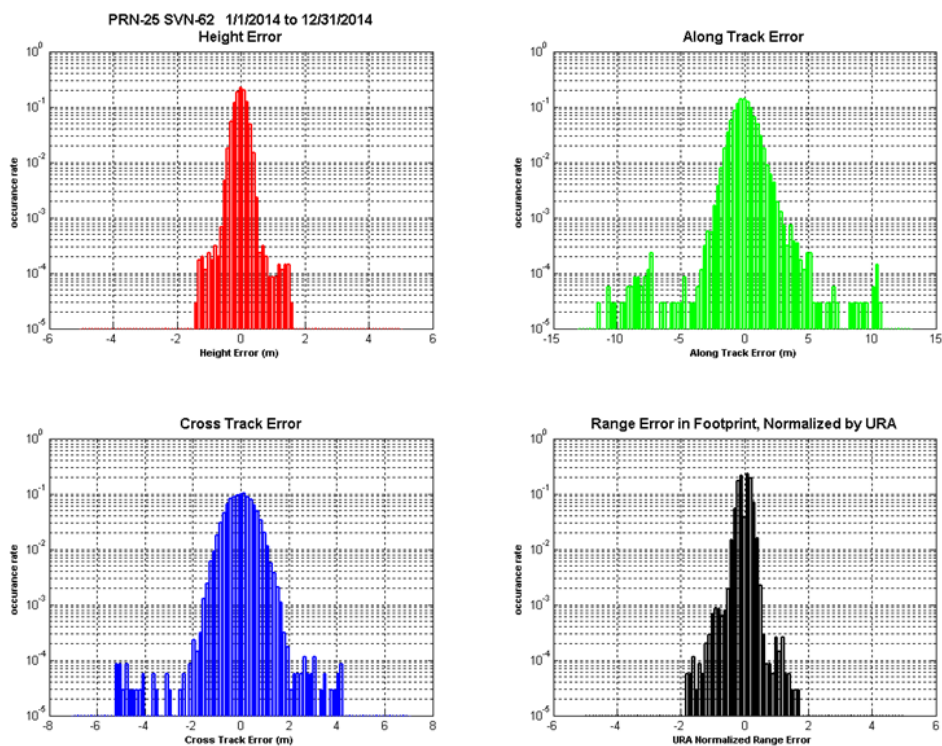


Figure 12-73 Histograms of H, A, C, and Range Error PRN-26 (SVN-26)

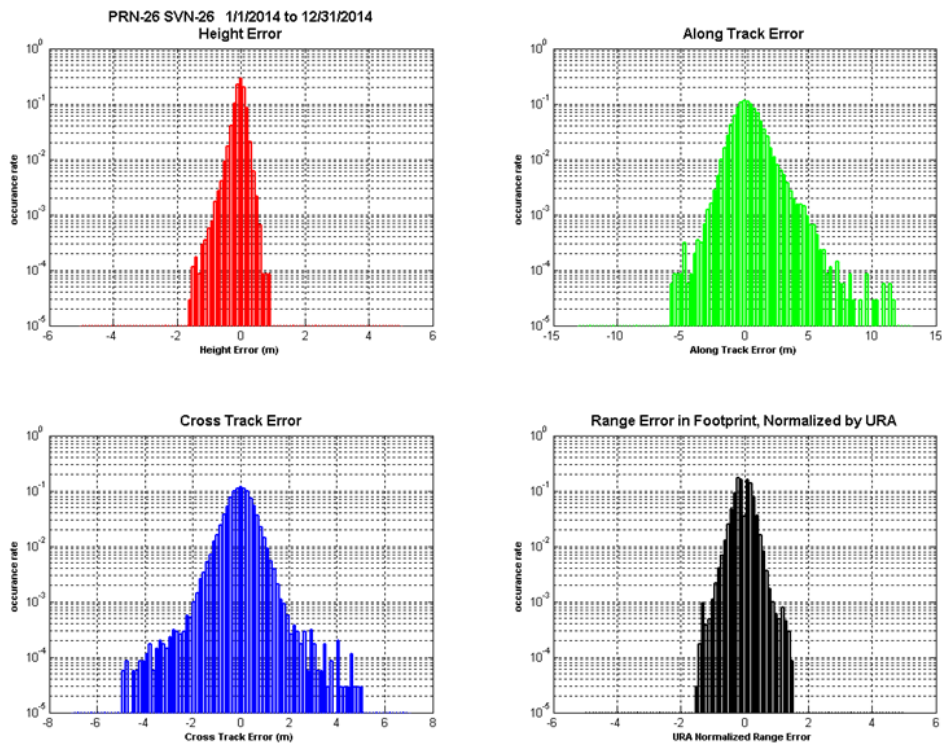


Figure 12-74 Histograms of H, A, C, and Range Error PRN-27 (SVN-66)

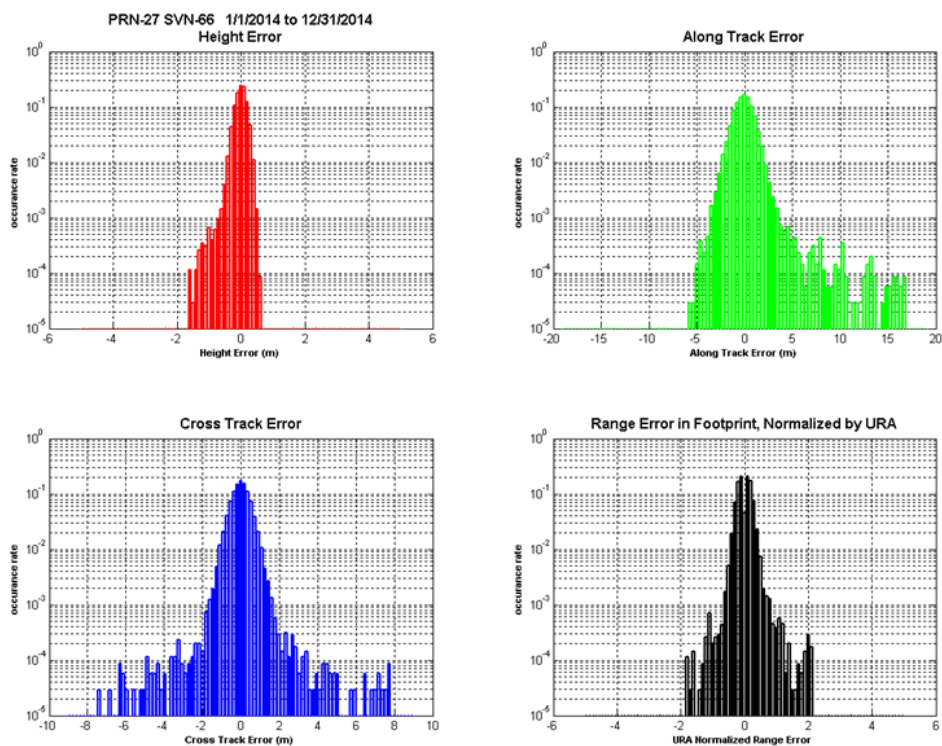


Figure 12-75 Histograms of H, A, C, and Range Error PRN-28 (SVN-44)

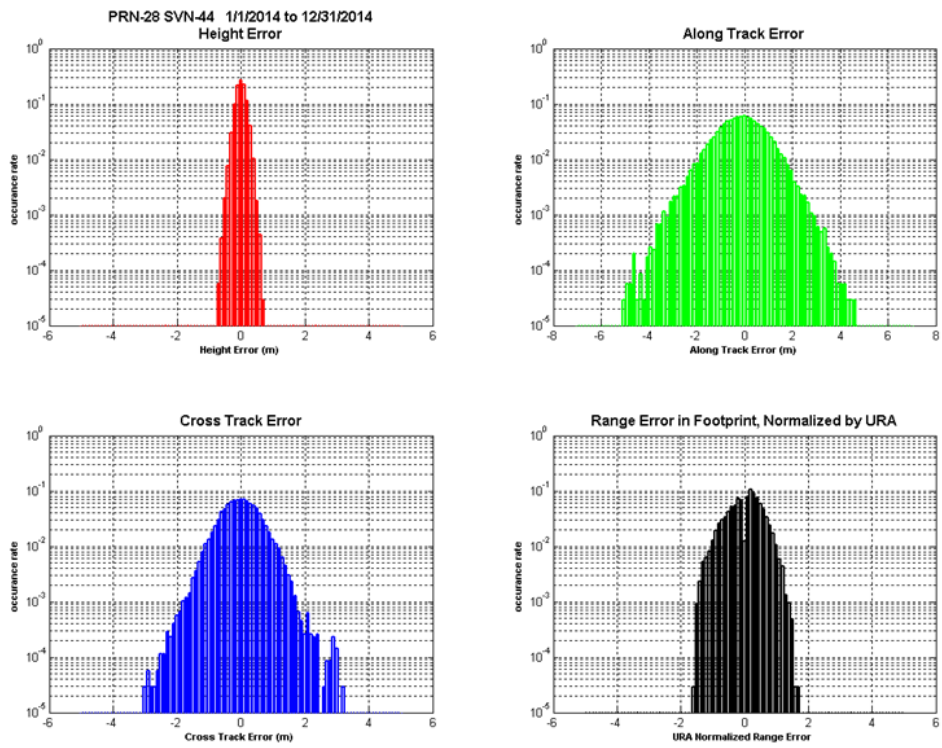


Figure 12-76 Histograms of H, A, C, and Range Error PRN-29 (SVN-67)

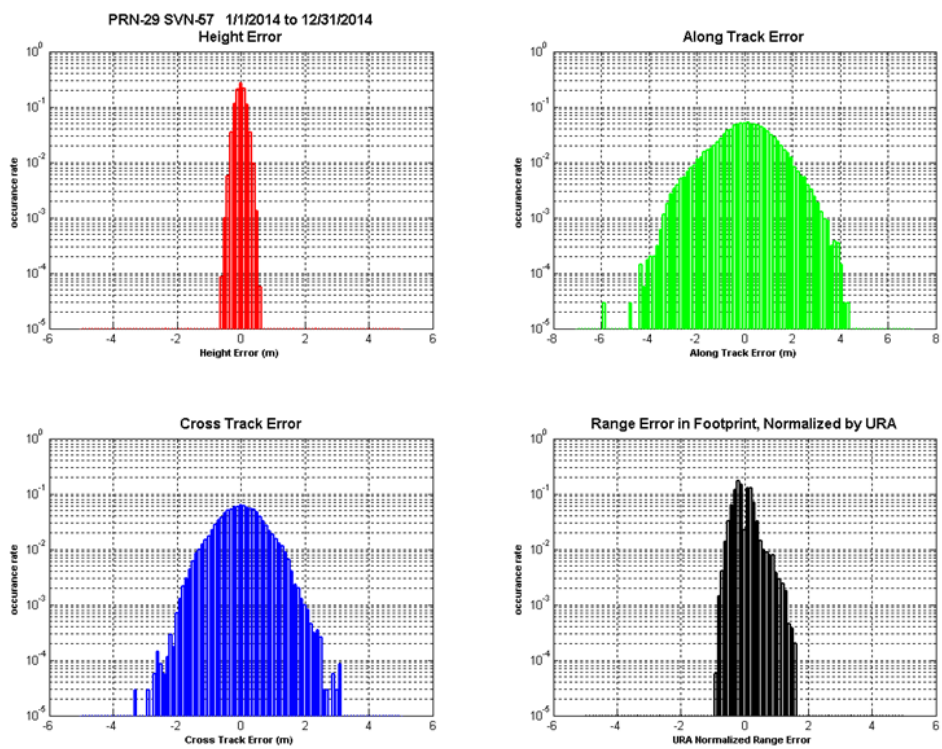


Figure 12-77 Histograms of H, A, C, and Range Error PRN-30 (SVN-64)

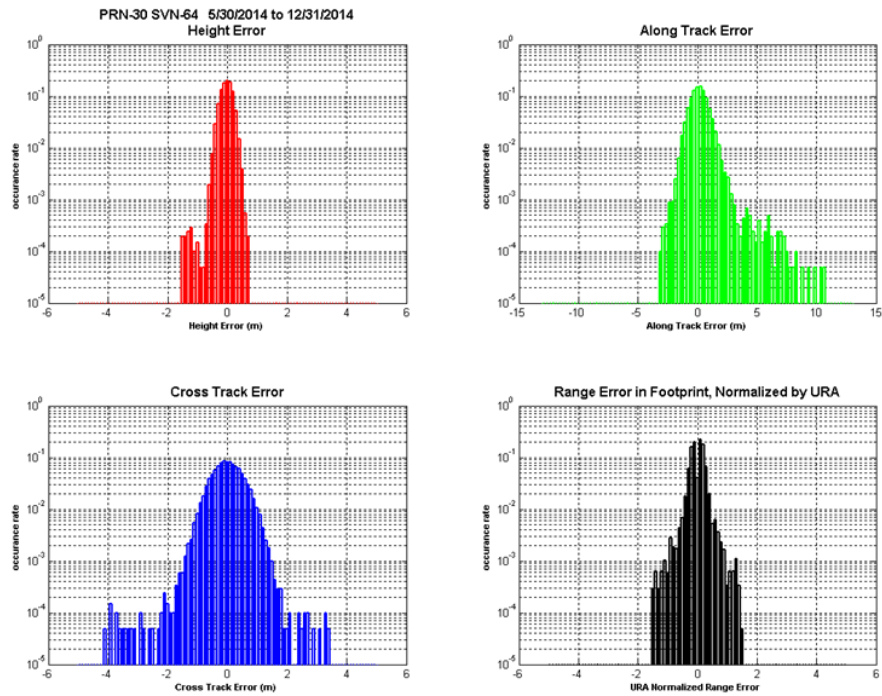
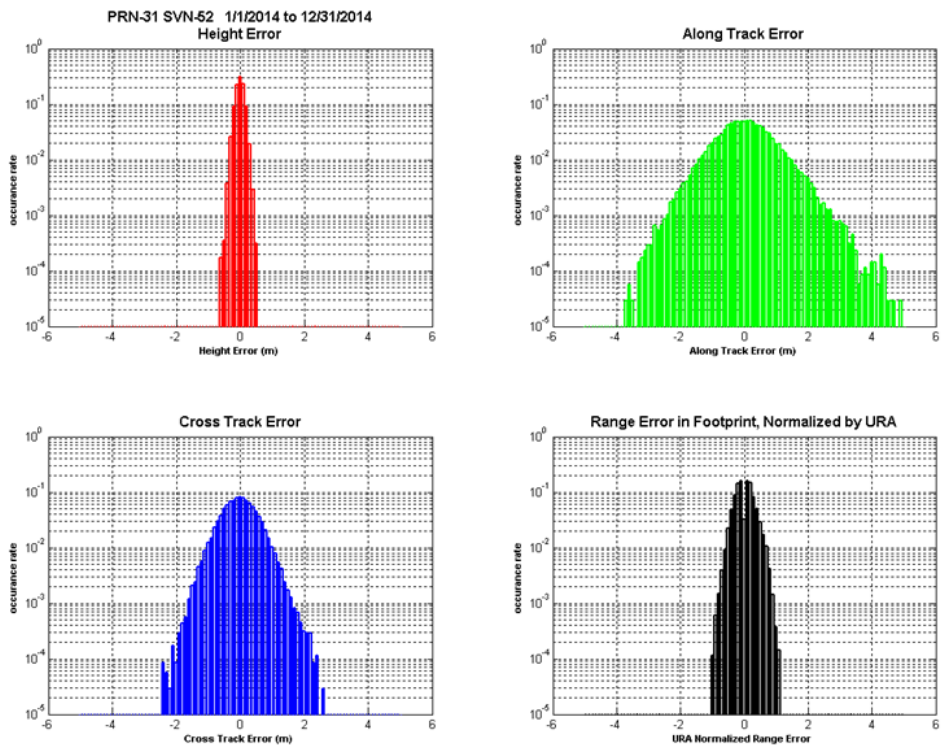
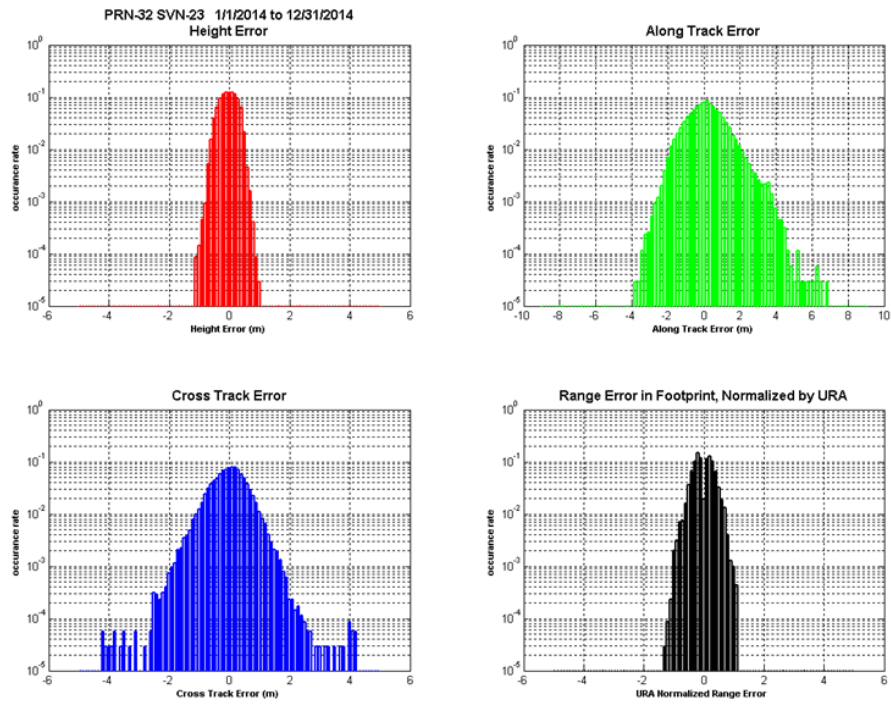


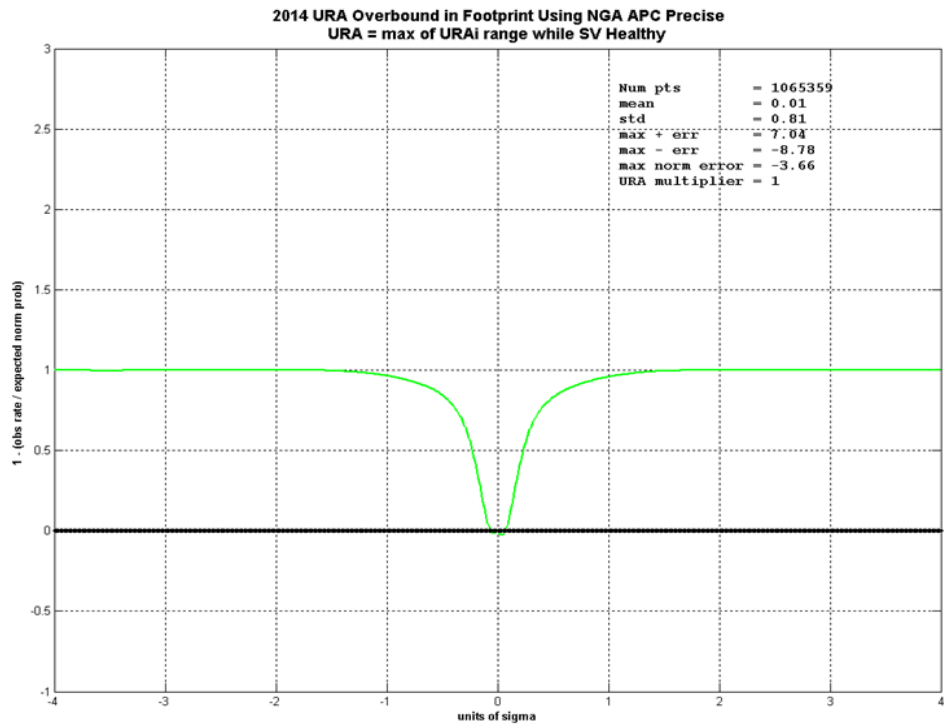
Figure 12-78 Histograms of H, A, C, and Range Error PRN-31 (SVN-52)



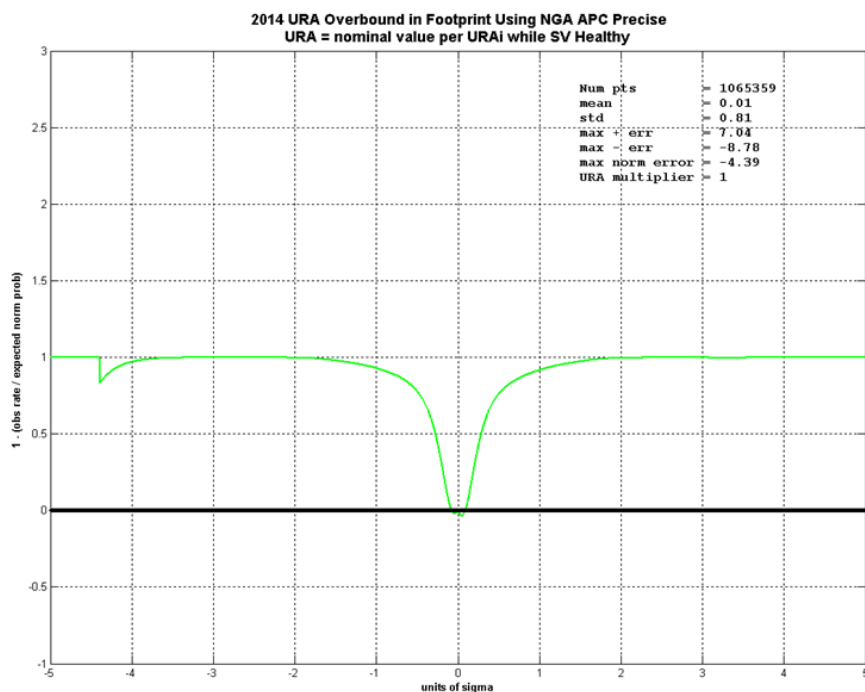
**Figure 12-79 Histograms of H, A, C, and Range Error PRN-32 (SVN-23)**



**Figure 12-80 2014 URA Over-bounding, Max URA**



**Figure 12-81 2014 2014 URA Over-bounding, Nominal URA**



**13.0 G3 RECEIVER ANALYSIS**

The WAAS G3 receiver analysis determines the position and range domain performance of the new Novatel G3 receiver as compared to the currently fielded Novatel G2 receiver. In preparation for a full constellation of dual civil frequency GPS satellites (L1/L5), the WAAS system will be upgraded with new receivers in order to fully recognize the benefit of GPS modernization. The receivers have already undergone extensive factory testing by the manufacturer and the first test receivers were delivered to the Federal Aviation Administration in October 2013. The new receivers were setup at six existing WAAS reference sites (WRS) using the existing antenna subsystems and reference clocks for input. The six sites are:

- |                                |                     |
|--------------------------------|---------------------|
| Nashua, New Hampshire (Boston) | Honolulu, Hawaii    |
| Aurora, Illinois               | Miami, Florida      |
| Fairbanks, Alaska              | Seattle, Washington |

Two Novatel G3 receivers were installed at each site for a total of twelve test receivers. The test receiver navigation error data was collected and processed to determine position accuracy at each location. This was accomplished by utilizing the GPS/WAAS position solution tool to compute a RTCA DO-229D weighted least squares user navigation solution once every second for the month of March 2014. The G3 test receivers are marked as 4 and 5, while the fielded G2 receivers are marked 1 and 2 for each site. Receivers 1 and 4 are tied to the same antenna and clock hardware, as are receivers 2 and 5.

**13.1 G3 Position Accuracy**

Table 12-1 lists the receivers used in the PA analysis. Table 12-2 shows PA horizontal and vertical position accuracy maintained for 95% of the time at LP, LPV and LNAV/VNAV operational service levels for the quarter. Figures 12-1 to 12-4 show the daily horizontal and vertical 95% accuracy for LPV operational service level for the

reporting period. Note that WAAS accuracy statistics presented are compiled only when all WAAS corrections (fast, long term, and ionospheric) for at least 4 satellites are available. This is referred to as PA navigation mode. The percentage of time that PA navigation mode was supported by WAAS at each receiver is also shown in Table 12-2. The Honolulu site is an exception to the rule because it is so far outside CONUS. Honolulu was evaluated solely in NPA mode for all position results.

Table 12-3 shows the maximum LPV error statistics. The column marked 'Horizontal Error' shows the maximum position errors while the calculated HPL meets the LPV service level defined in Table 1-1. The column marked 'Vertical Error' shows the maximum position errors while the calculated VPL meets the LPV service level. The columns marked 'Horizontal Error/HPL' and 'Vertical Error/VPL' show the ratio of position error to protection level at the time the maximum error occurred. The columns marked 'Horizontal Maximum Ratio' and 'Vertical Maximum Ratio' show the maximum position error to protection level ratio for the quarter.

During this reporting period, the maximum 95% horizontal and vertical LPV errors are 1.066 meters and 2.017 meters, both at Miami-A, respectively. The minimum 95% horizontal and vertical LPV errors are 0.717 meters and 0.1009 meters, both at Chicago-B, respectively.

**Table 13-1 PA Evaluation Sites for G3 Receivers**

<b>Location</b>	<b>Days Evaluated</b>	<b>Samples</b>
Boston-A	92	7920089
Boston-B	92	7920517
Chicago-A	61	5236929
Chicago-B	74	6371852
Fairbanks-A	76	6604869
Fairbanks-B	72	6225232
Honolulu-A	91	7862313
Honolulu-B	91	7863538
Miami-A	92	7919797
Miami-B	70	6044912
Seattle-A	92	7919982
Seattle-B	89	7673938



**Table 13-2 PA 95% Horizontal and Vertical Accuracy for G3 Receivers**

Location	Horizontal (HAL = 40m) (Meters)	Horizontal (HAL=556m) (Meters)	Vertical (VAL=50m) (Meters)	Percentage in PA mode (%)
Boston-A	0.931	0.931	1.155	100
Boston-B	0.964	0.964	1.094	100
Chicago-A	1.014	1.014	1.086	100
Chicago-B	0.717	0.717	1.009	100
Fairbanks-A	0.854	0.86	1.618	100
Fairbanks-B	0.948	0.955	1.672	100
Miami-A	1.066	1.066	2.082	100
Miami-B	0.989	0.989	2.017	100
Seattle-A	0.822	0.822	1.043	100
Seattle-B	1.047	1.047	1.064	100
Honolulu-A *	9.344	17.363	-	98.91195
Honolulu-B *	9.413	17.611	-	98.92736

\* Note: Because Honolulu sites are so far outside CONUS, they were evaluated for position in Non-Precision Approach (NPA) mode only. Because NPA mode was used, no vertical accuracy is given. The percentage value for Honolulu is the percent of total time evaluated of March 2014.

**Table 13-3 Maximum LPV Error Statistics for G3 Receivers**

Location	Horizontal Error (m)	Horizontal Error/HPL	Horizontal Maximum Ratio	Vertical Error (m)	Vertical Error/VPL	Vertical Maximum Ratio
Boston-A	2.229	0.162	0.166	5.017	0.22	0.22
Boston-B	2.086	0.177	0.177	4.422	0.174	0.186
Chicago-A	2.481	0.2	0.259	3.133	0.164	0.241
Chicago-B	2.043	0.165	0.176	3.37	0.142	0.156
Fairbanks-A	3.251	0.115	0.174	5.54	0.133	0.225
Fairbanks-B	3.063	0.18	0.182	7.571	0.202	0.269
Miami-A	2.268	0.186	0.193	5.255	0.112	0.25
Miami-B	2.198	0.097	0.179	4.905	0.119	0.242
Seattle-A	2.675	0.172	0.188	3.599	0.161	0.21
Seattle-B	3.167	0.204	0.208	4.441	0.243	0.243
Honolulu-A *	20.028	0.257	-	29.127	0.345	-
Honolulu-B *	19.829	0.255	-	30.148	0.357	-

\* Note: Because Honolulu sites are so far outside CONUS, they were evaluated for position in Non-Precision Approach (NPA) mode only. Because NPA mode was used, no vertical accuracy is given. The percentage value for Honolulu is the percent of total time evaluated of March 2014.

Figure 13-1 LPV 95% Horizontal Accuracy

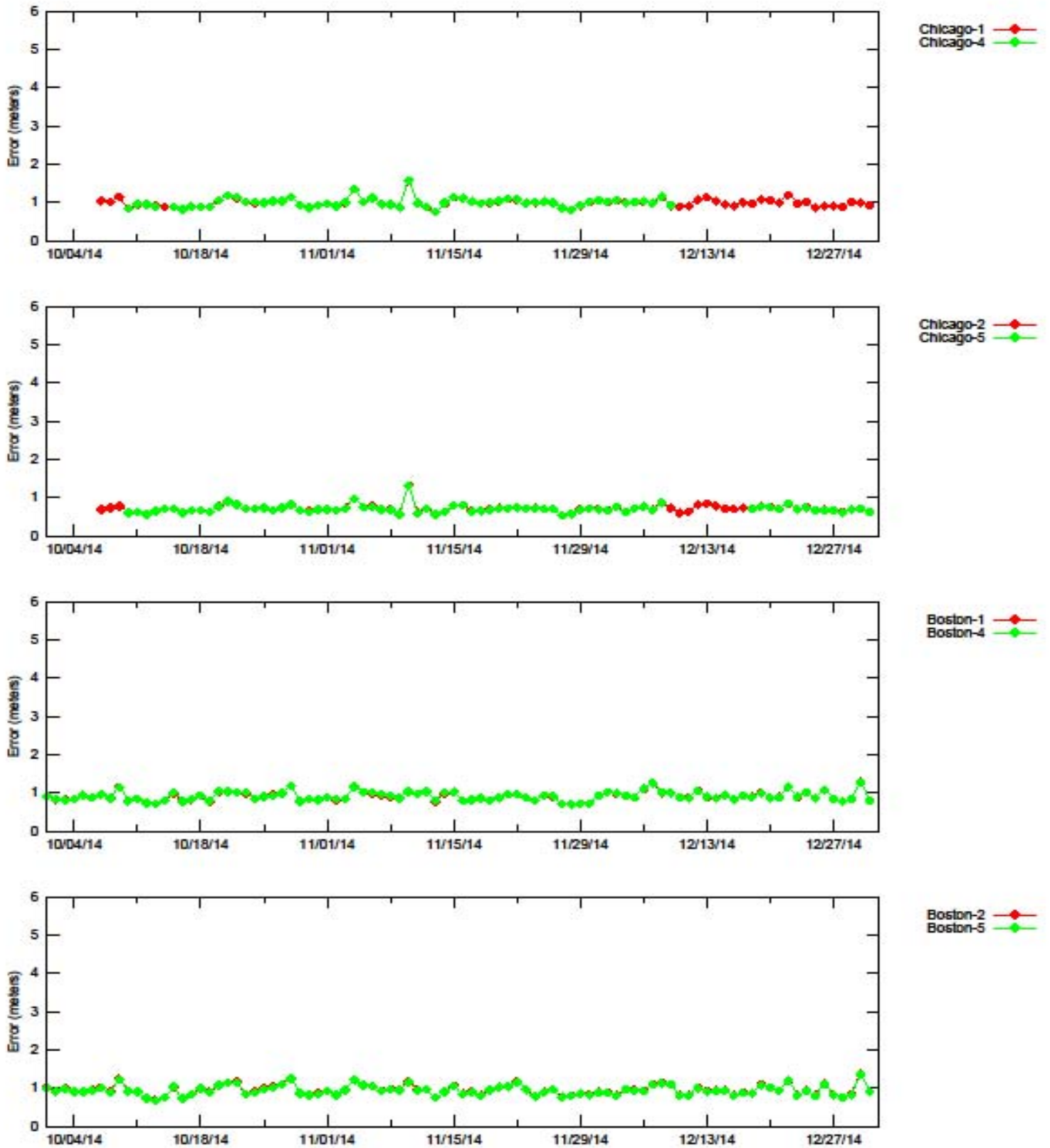


Figure 13-2 LPV 95% Horizontal Accuracy

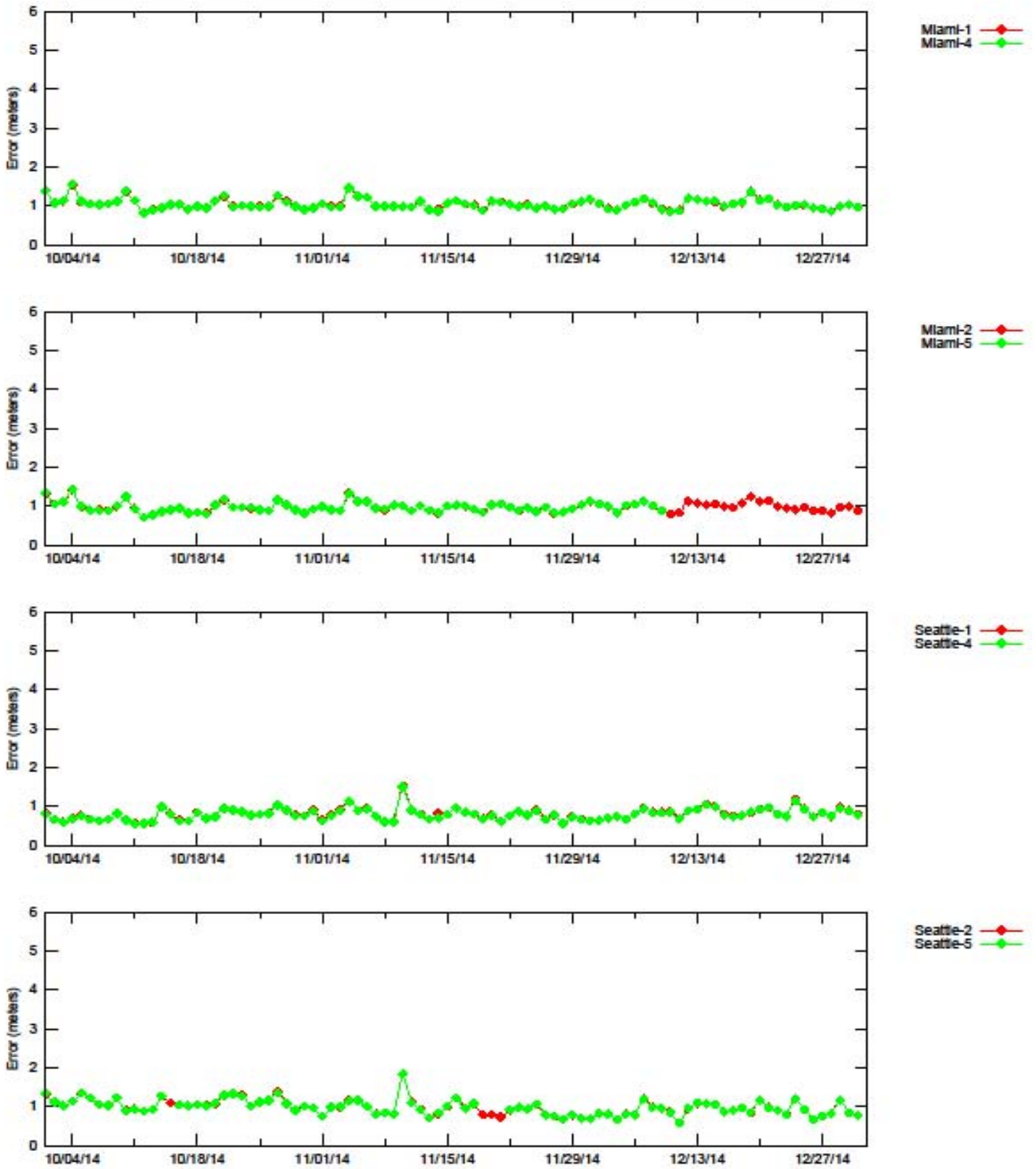


Figure 13-3 LPV 95% Vertical Accuracy

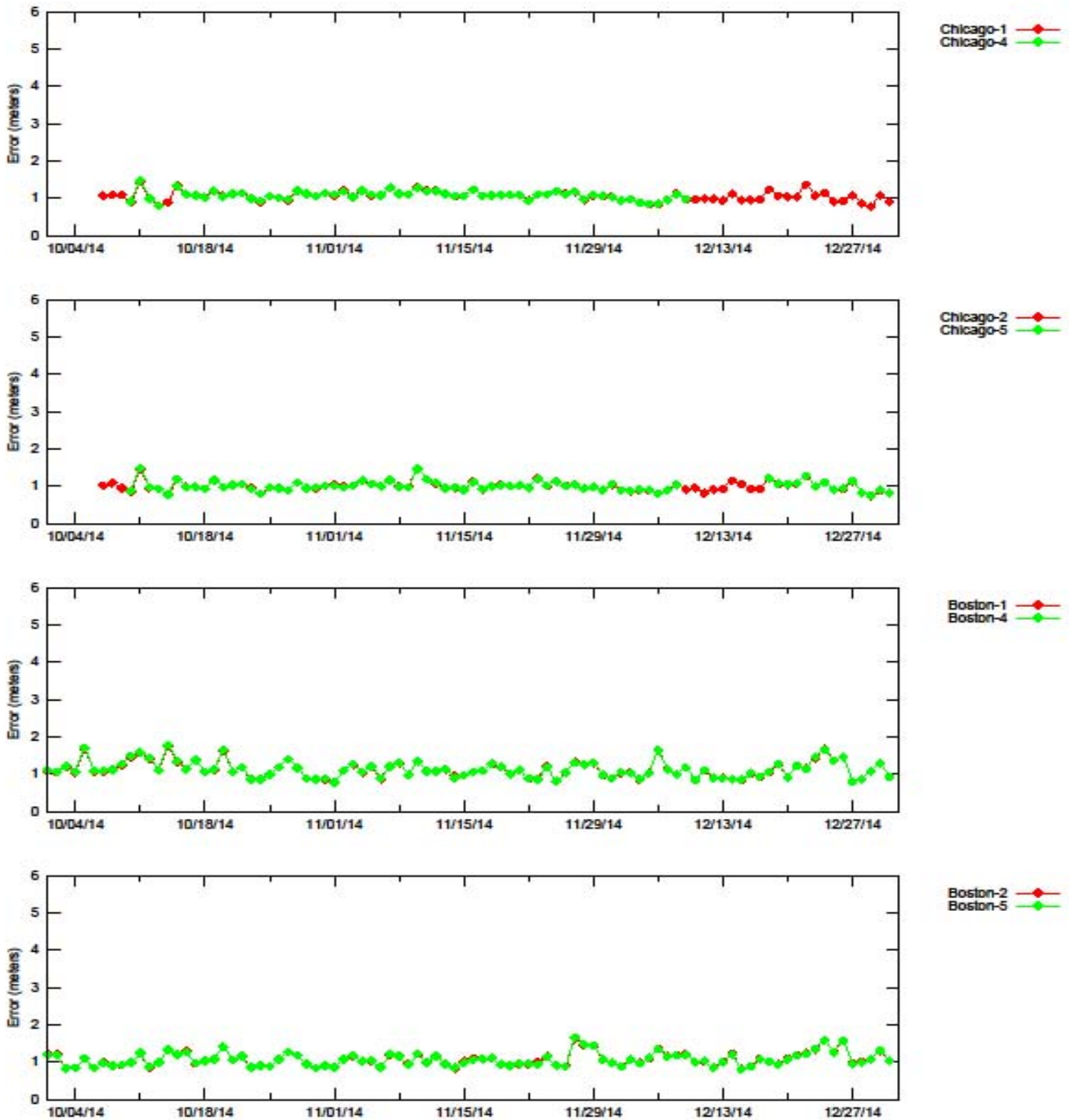


Figure 13-4 LPV 95% Vertical Accuracy

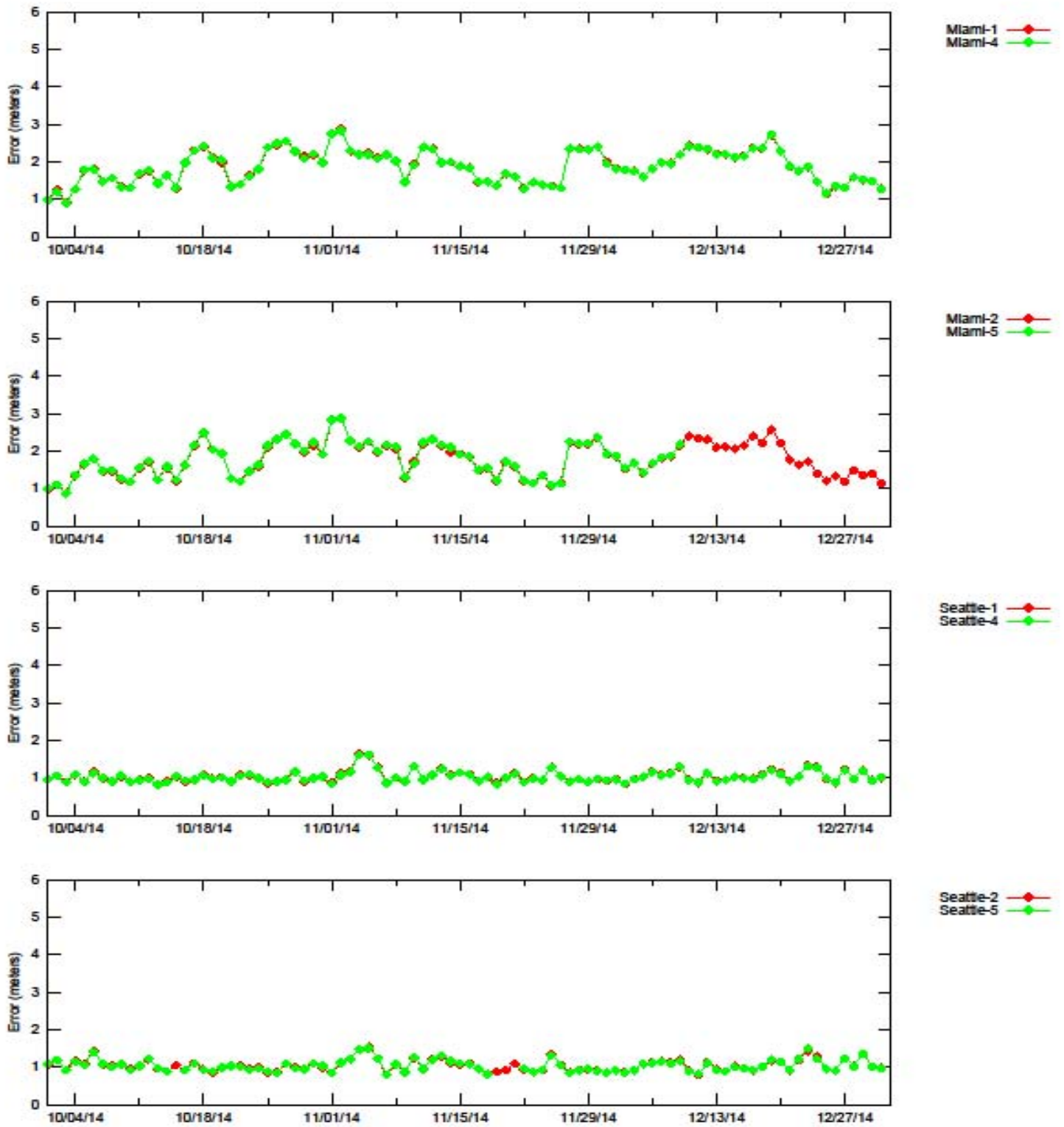


Figure 13-5 LPV Horizontal Error Distribution Histogram

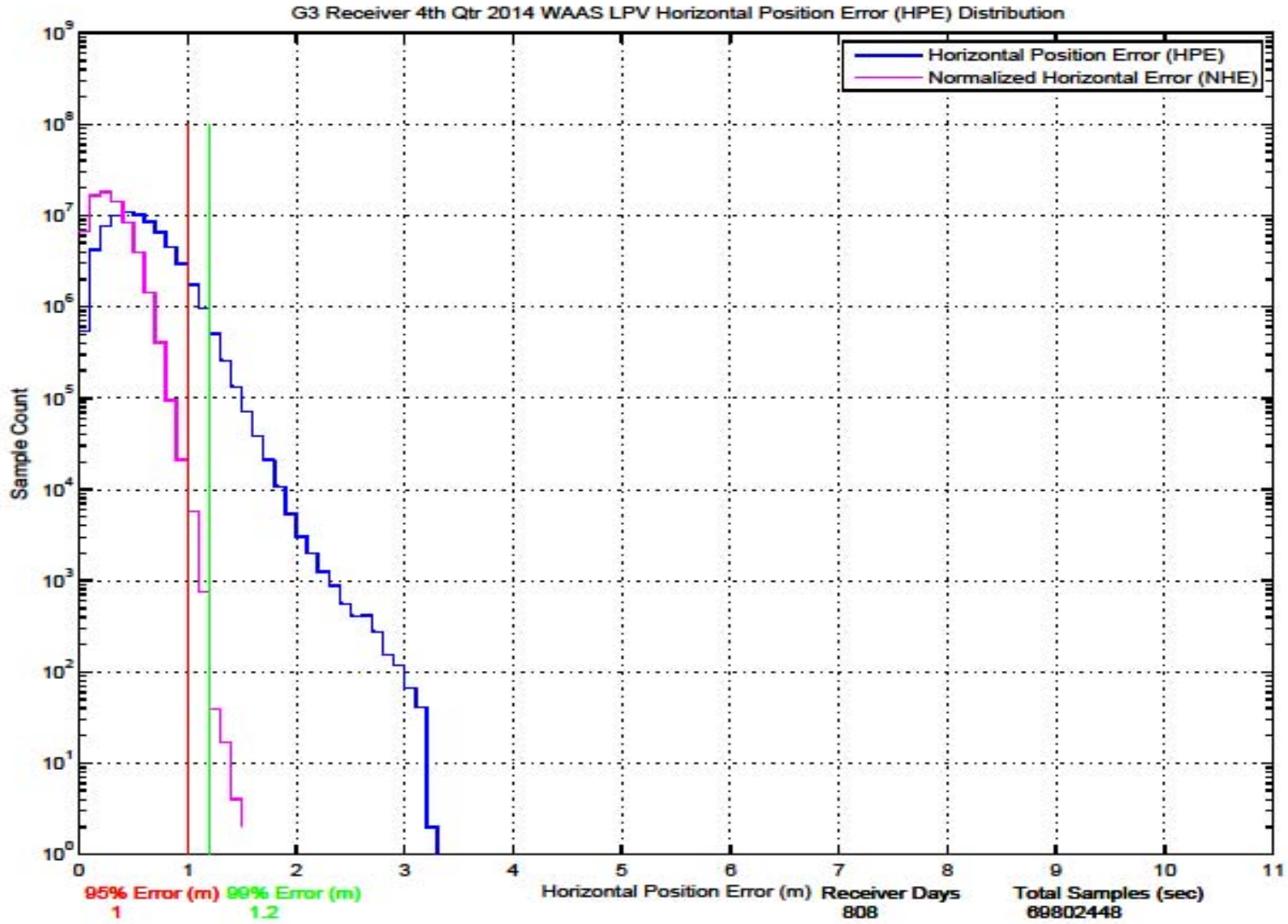


Figure 13-6 LPV Vertical Error Distribution Histogram

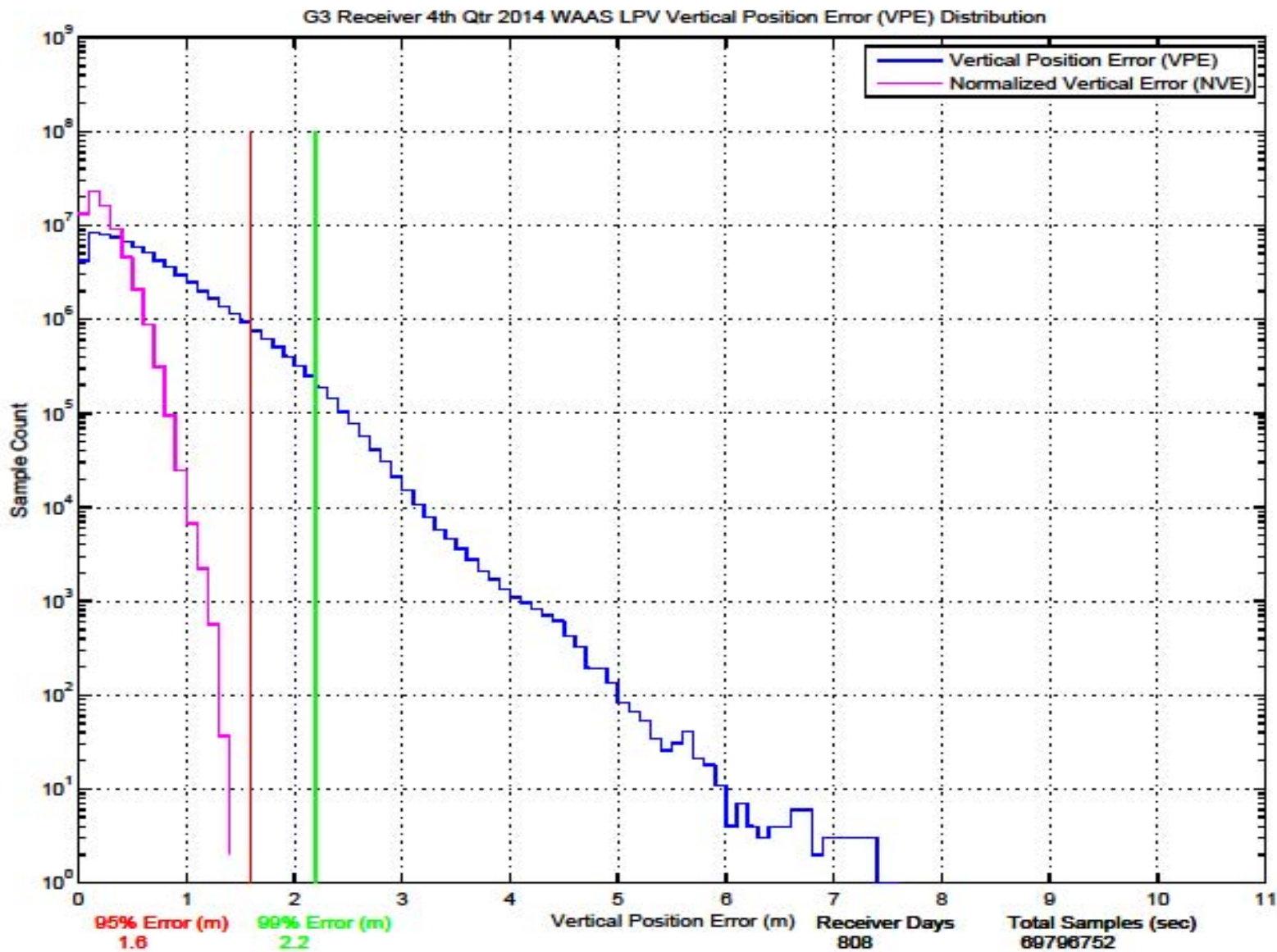


Figure 13-7 LPV 95% Horizontal Error Bounding Triangle Chart

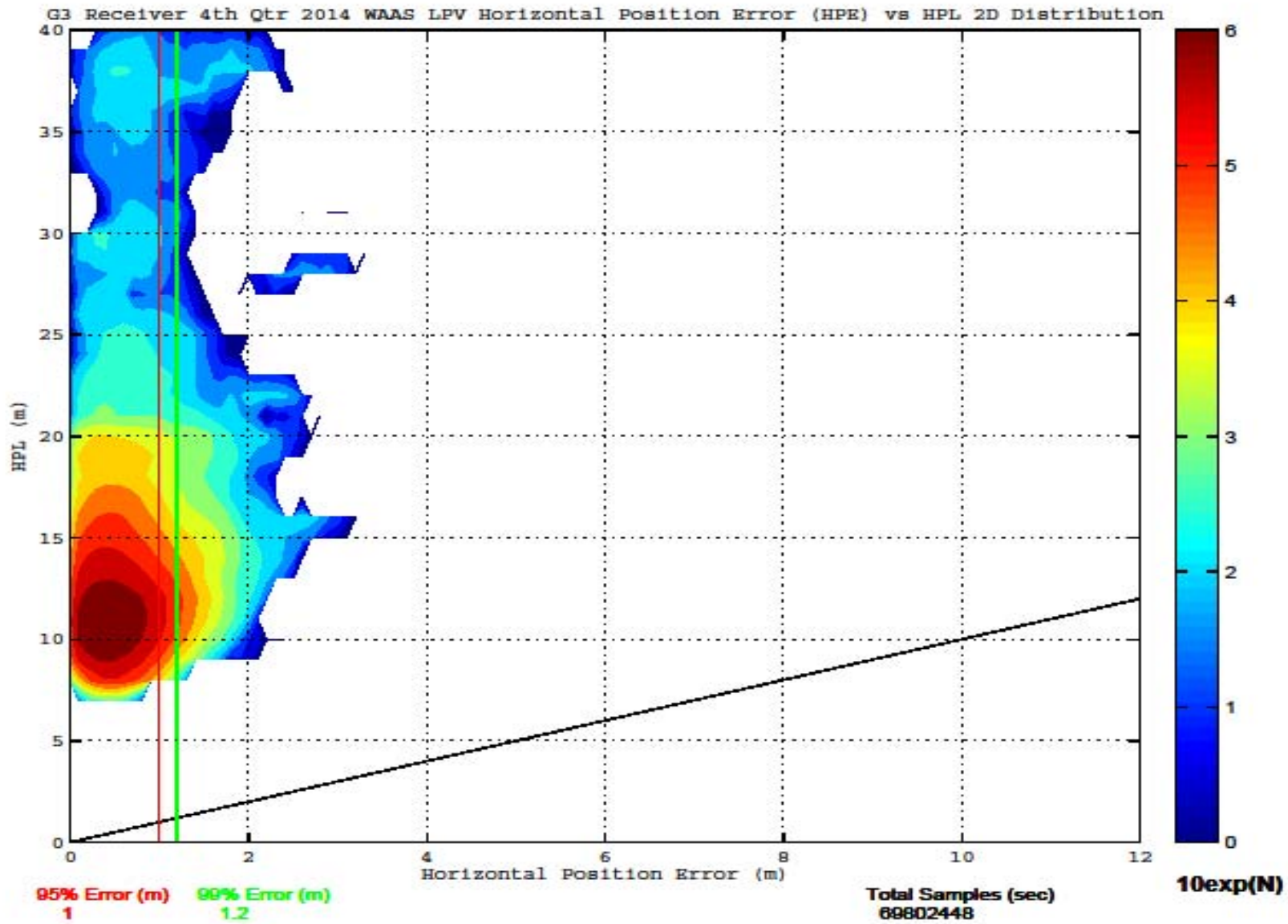
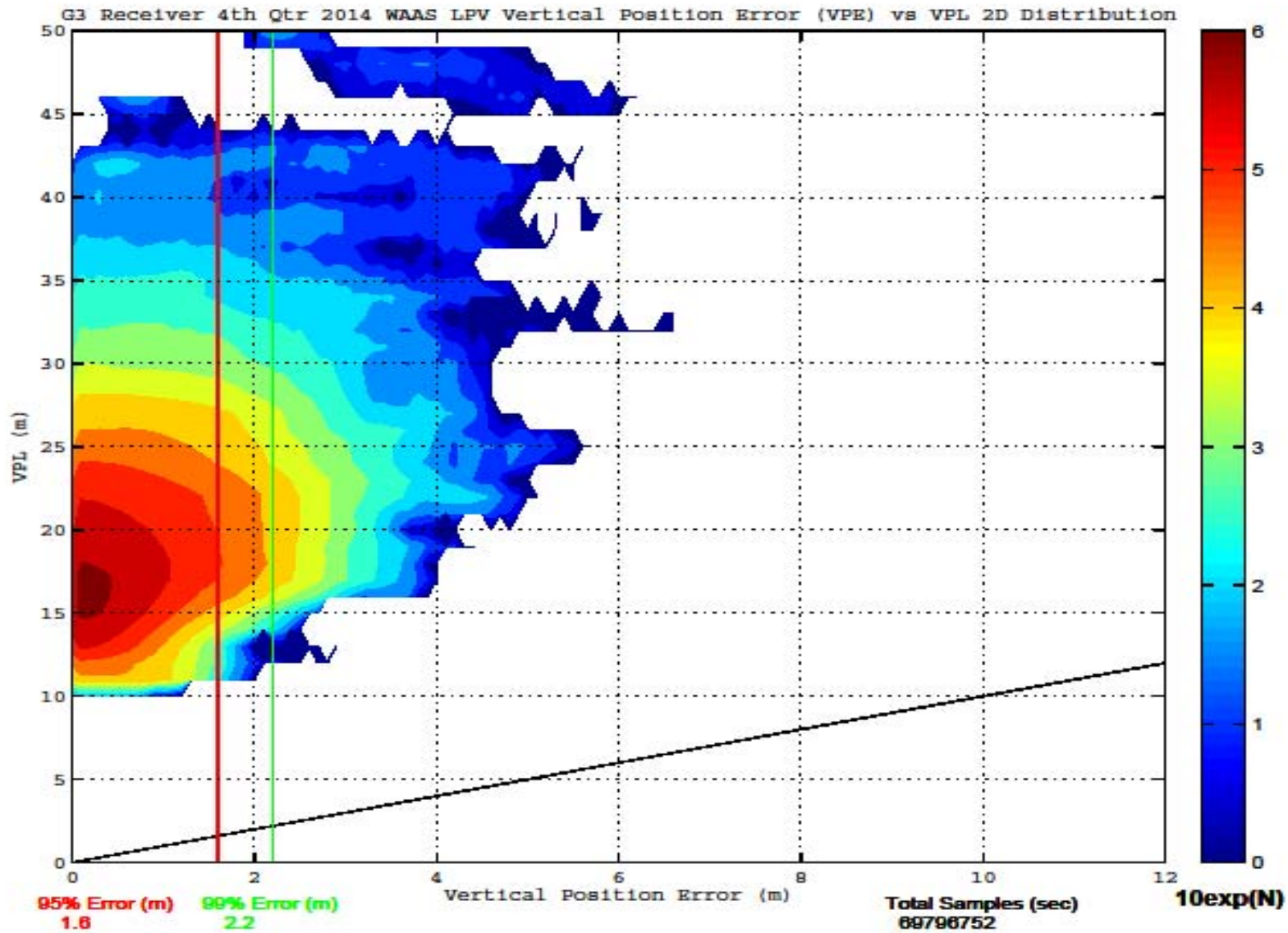




Figure 13-8 LPV 95% Vertical Error Bounding Triangle Chart



### 13.2 G3 SV Range Accuracy

Range accuracy evaluation computes the probability that the WAAS User Differential Range Error (UDRE) and Grid Ionospheric Vertical Error (GIVE) statistically bound 99.9% of the range residuals for each satellite tracked by the receiver. A UDRE is broadcast by the WAAS for each satellite that is monitored by the system and the 99.9% bound (3.29 sigma) of the residual error on a pseudorange after application of fast and long-term corrections is checked. The pseudorange residual error is determined by taking the difference between the raw pseudorange and a calculated reference range. The reference range is equal to the true range between the corrected satellite position and surveyed user antenna plus all corrections (WAAS Fast Clock, WAAS Long-Term Clock, WAAS Ionospheric delay, Tropospheric delay, Receiver Clock Bias, and Multipath). Since the true ionospheric delay and multipath error are not precisely known, the estimated variance in these error sources are added to the UDRE before the comparing it to the residual error. GPS satellite range residual errors were calculated for the twelve test receivers during the period. Table 13-4 and 13-5 show the range error 95% index and 99.9% (3.29 sigma) bounding statistics for each SV at the selected locations. A GIVE is broadcast by the WAAS for each IGP that is monitored by the system and the 99.9% (3.29 sigma) bound of the ionospheric error is checked. The WAAS broadcasts the ionospheric model using IGP's at predefined geographic locations. Each IGP contains the vertical ionospheric delay and the error in that delay in the form of the GIVE. The ionospheric error is determined by taking the difference between the WAAS vertical ionospheric delay interpolated from the IGP's and GPS dual frequency measurement at that GPS satellite. GPS satellite ionospheric errors were calculated for the twelve test receivers during the period. Table 13-6 and 13-7 show the ionospheric error 95% index and 99.9% (3.29 sigma) bounding statistics for each SV at the test locations.

**Table 13-4 Range Error 95% Index and 3.29 Sigma Bounding**

Site → SV ↓	Chicago 4		Chicago 5		Boston 4		Boston 5		Seattle 4		Seattle 5	
	95% Range Error	3.29 Sigma Bounding(%)	95% Range Error	3.29 Sigma Bounding(%)	95% Range Error	3.29 Sigma Bounding(%)	95% Range Error	3.29 Sigma Bounding(%)	95% Range Error	3.29 Sigma Bounding(%)	95% Range Error	3.29 Sigma Bounding(%)
1	3.108	100	2.759	100	2.988	100	3.296	100	2.84	100	2.98	99.999
2	2.551	100	2.35	100	2.68	100	2.227	100	2.347	100	2.411	100
3	*	*	2.183	100	1.956	100	2.381	100	1.851	100	2.153	100
4	1.58	100	1.439	100	1.352	100	1.786	100	1.693	100	1.515	100
5	1.407	100	1.461	100	1.832	100	1.675	100	1.665	100	2.03	100
6	3.263	99.972	3.096	99.9132	3.276	99.994	3.55	99.778	3.331	100	3.497	100
7	1.262	100	1.5	100	1.503	100	1.413	100	1.163	100	1.48	100
8	1.015	100	1.011	100	1.156	100	1.052	100	0.84	100	0.996	100
9	2.708	100	2.369	100	2.462	100	2.619	100	1.895	100	2.282	100
10	1.15	100	0.912	100	1.02	100	1.042	100	1.094	100	1.052	100
11	1.383	100	1.496	100	1.446	100	0.969	100	1.051	100	1.598	100
12	1.251	100	1.023	100	1.616	100	1.216	100	1.105	100	1.056	100
13	1.465	100	1.16	100	1.195	100	1.359	100	1.064	100	1.258	100
14	1.074	100	1.39	100	1.145	100	1.154	100	1.361	100	1.265	100
15	1.598	100	1.518	100	1.14	100	1.483	100	1.671	100	1.404	100
16	2.969	100	1.284	100	1.441	100	1.019	100	0.978	100	1.124	100
17	1.184	100	1.08	100	1.09	100	1.228	100	1.637	100	1.062	100
18	1.721	100	1.504	100	1.644	100	1.656	100	1.368	100	1.484	100
19	2.578	100	2.249	100	3.139	100	2.039	100	3.373	100	2.578	100
20	1.319	100	1.291	100	1.564	100	1.271	100	1.354	100	1.149	100
21	1.501	100	1.308	100	2.358	100	1.332	100	1.386	100	1.25	100
22	2.715	100	2.42	100	2.316	100	2.638	100	2.381	100	2.574	100
23	1.88	100	1.87	100	2.696	100	2.068	100	2.105	100	1.952	100
24	2.678	100	2.94	100	2.742	100	3.255	100	2.46	100	3.053	100
25	2.289	100	2.382	100	2.206	100	2.405	100	2.301	100	2.426	100
26	1.459	100	1.539	100	1.427	100	1.558	100	1.725	100	1.354	100
27	2.404	100	2.203	100	2.035	100	2.442	100	2.44	100	2.199	100
28	0.792	100	1.163	100	1.44	100	0.977	100	1.14	100	1.36	100
29	0.95	100	1.255	100	1.195	100	1.693	100	1.282	100	1.747	100
30	3.119	100	2.191	100	2.295	100	2.524	100	2.244	100	2.501	100
31	0.796	100	0.87	100	0.897	100	1.298	100	1.498	100	1.127	100
32	1.166	100	0.941	100	1.005	100	1.221	100	0.894	100	0.962	100
135	1.897	100	1.573	100	2.665	100	1.991	100	1.752	100	2.027	100
138	2.788	100	1.801	100	1.502	100	1.942	100	1.771	100	1.637	100

**Table 13-5 Range Error 95% Index and 3.29 Sigma Bounding**

Site → SV ↓	Miami 4		Miami 5		Fairbanks 4		Fairbanks 5	
	95% Range Error	3.29 Sigma Bounding (%)	95% Range Error	3.29 Sigma Bounding (%)	95% Range Error	3.29 Sigma Bounding (%)	95% Range Error	3.29 Sigma Bounding (%)
1	2.584	100	3.196	100	2.875	100	2.518	100
2	3.247	99.999	2.865	100	2.536	100	3.003	100
3	1.733	100	*	*	2.083	100	1.897	100
4	1.227	100	1.339	100	1.386	100	1.285	100
5	1.503	100	1.156	100	1.553	100	1.559	99.9999
6	3.977	99.930	3.197	100	3.434	99.995	3.344	99.9985
7	1.788	100	1.234	100	2.301	100	1.802	100
8	1.439	100	1.381	100	1.253	100	1.158	100
9	2.093	100	1.769	100	2.169	100	2.21	100
10	1.134	100	1.388	100	1.2	100	1.556	100
11	2.258	100	1.546	100	1.875	100	1.854	100
12	1.18	100	1.228	100	1.233	100	1.345	100
13	1.162	100	1.114	100	1.089	100	1.294	100
14	2.092	100	2.156	100	1.343	100	1.687	100
15	1.017	100	1.099	100	1.39	100	1.35	100
16	2.057	100	3.171	100	1.38	100	1.622	100
17	1.174	100	1.401	100	1.27	100	1.157	100
18	2.383	100	2.409	99.997	1.776	100	1.953	100
19	3.188	100	2.976	100	2.654	100	2.801	100
20	1.573	100	1.763	100	1.559	100	1.615	100
21	2.343	100	2.24	100	1.46	99.9999	1.819	100
22	3.322	99.981	3.377	99.867	2.75	100	2.994	100
23	2.766	100	3.117	100	2.115	100	2.255	100
24	2.615	100	2.544	100	2.84	100	3.306	100
25	2.096	100	1.904	100	2.135	100	2.271	100
26	1.03	100	1.292	100	1.298	100	1.431	100
27	1.592	100	1.666	100	2.185	100	1.996	100
28	2.868	100	1.846	100	1.667	100	1.693	100
29	1.342	100	1.338	100	1.331	100	1.544	100
30	2.06	100	2.289	100	2.803	100	2.386	100
31	1.767	100	1.616	100	1.011	100	1.295	100
32	1.255	100	1.519	100	1.187	100	1.265	100
135	1.902	100	2.118	100	3.874	100	3.822	100
138	2.421	100	1.531	100	3.600	100	4.116	100

**Table 13-6 Ionospheric Error 95% Index and 3.29 Sigma Bounding**

Site → SV ↓	Chicago 4		Chicago 5		Boston 4		Boston 5		Seattle 4		Seattle 5	
	95% Iono Error	3.29 Sigma Bounding(%)	95% Iono Error	3.29 Sigma Bounding(%)	95% Iono Error	3.29 Sigma Bounding(%)	95% Iono Error	3.29 Sigma Bounding(%)	95% Iono Error	3.29 Sigma Bounding(%)	95% Iono Error	3.29 Sigma Bounding(%)
1	2.089	100	2.012	100	2.169	100	2.261	100	2.023	100	1.933	100
2	1.789	100	1.771	100	1.810	100	1.588	100	1.888	100	2.058	100
3	*	*	1.740	100	1.386	100	1.632	100	1.396	100	1.478	100
4	0.878	100	0.905	100	0.873	100	1.059	100	0.878	100	0.819	100
5	0.885	100	0.844	100	1.178	100	1.010	100	1.080	100	1.164	100
6	2.506	100	2.403	100	2.748	100	2.728	100	2.488	100	2.591	100
7	0.677	100	0.897	100	0.927	100	1.001	100	0.684	100	0.808	100
8	0.357	100	0.556	100	0.490	100	0.520	100	0.452	100	0.470	100
9	1.657	100	1.593	100	1.706	100	1.666	100	1.375	100	1.597	100
10	0.399	100	0.384	100	0.560	100	0.566	100	0.502	100	0.485	100
11	0.484	100	0.563	100	0.545	100	0.448	100	0.580	100	0.706	100
12	0.491	100	0.443	100	0.739	100	0.607	100	0.473	100	0.507	100
13	0.605	100	0.595	100	0.625	100	0.743	100	0.698	100	0.672	100
14	0.376	100	0.654	100	0.464	100	0.413	100	0.988	100	0.793	100
15	0.953	100	0.783	100	0.829	100	1.043	100	0.907	100	0.904	100
16	1.192	100	0.556	100	0.696	100	0.526	100	0.706	100	0.804	100
17	0.726	100	0.596	100	0.828	100	0.585	100	1.007	100	0.685	100
18	0.777	100	0.808	100	0.858	100	0.957	100	0.837	100	0.932	100
19	1.861	100	1.700	100	1.876	100	1.579	100	2.101	100	1.905	100
20	0.642	100	0.549	100	0.880	100	0.779	100	0.723	100	0.674	100
21	0.924	100	0.746	100	1.194	100	0.720	100	0.851	100	0.878	100
22	1.940	100	1.639	100	1.527	100	1.728	100	1.716	100	1.862	100
23	1.346	100	1.316	100	1.899	100	1.437	100	1.491	100	1.440	100
24	1.928	100	2.004	100	1.937	100	2.250	100	1.824	100	2.060	100
25	1.213	100	1.311	100	1.396	100	1.632	100	1.565	100	1.472	100
26	0.954	100	0.994	100	0.875	100	1.018	100	1.097	100	0.668	100
27	1.490	100	1.502	100	1.502	100	1.771	100	1.483	100	1.249	100
28	0.447	100	0.687	100	0.881	100	0.713	100	0.755	100	0.883	100
29	0.607	100	0.636	100	0.562	100	0.779	100	0.721	100	0.763	100
30	1.890	100	1.742	100	1.738	100	1.849	100	1.594	100	1.646	100
31	0.648	100	0.385	100	0.611	100	0.876	100	0.927	100	0.750	100
32	0.534	100	0.473	100	0.506	100	0.641	100	0.421	100	0.427	100

**Table 13-7 Ionospheric Error 95% Index and 3.29 Sigma Bounding**

Site → SV ↓	Miami 4		Miami 5		Fairbanks 4		Fairbanks 5	
	95% Iono Error	3.29 Sigma Bounding(%)	95% Iono Error	3.29 Sigma Bounding(%)	95% Iono Error	3.29 Sigma Bounding(%)	95% Iono Error	3.29 Sigma Bounding(%)
1	2.035	100	2.248	100	2.130	100	1.787	100
2	2.004	100	1.883	100	1.516	100	1.563	100
3	1.268	100	*	*	1.577	100	1.416	100
4	0.741	100	0.841	100	0.871	100	0.762	100
5	1.193	100	1.000	100	0.940	100	0.778	100
6	2.975	100	2.400	100	2.192	100	2.072	100
7	0.986	100	0.777	100	1.060	100	0.776	100
8	0.541	100	0.467	100	0.566	100	0.520	100
9	1.553	100	1.324	100	1.637	100	1.517	100
10	0.515	100	0.760	100	0.571	100	0.610	100
11	0.896	100	0.827	100	0.794	100	0.856	100
12	0.527	100	0.513	100	0.802	100	0.886	100
13	0.597	100	0.583	100	0.655	100	0.583	100
14	0.728	100	0.787	100	0.584	100	0.733	100
15	1.198	100	1.238	100	0.979	100	0.835	100
16	0.738	100	1.168	100	0.636	100	0.847	100
17	0.836	100	0.601	100	0.815	100	0.686	100
18	1.037	100	1.103	100	0.958	100	0.949	100
19	1.878	100	1.950	100	1.625	100	1.780	100
20	0.714	100	0.762	100	0.836	100	0.865	100
21	1.154	100	1.136	100	0.781	100	0.964	100
22	2.203	100	2.305	100	1.764	100	1.752	100
23	1.866	100	1.885	100	1.442	100	1.487	100
24	1.795	100	1.809	100	2.311	100	2.064	100
25	1.120	100	1.085	100	1.749	100	1.645	100
26	0.822	100	1.180	100	0.941	100	0.970	100
27	1.463	100	1.447	100	1.607	100	1.329	100
28	1.580	100	0.963	100	0.684	100	0.765	100
29	0.758	100	0.738	100	0.842	100	0.718	100
30	1.910	100	1.737	100	1.887	99.998	1.595	100
31	0.800	100	0.789	100	0.605	100	0.551	100
32	0.564	100	0.553	100	0.510	100	0.527	100

\*No data available due to receiver in maintenance

### 13.3 G3 SQM

G3 SQM analysis includes the processing of data from 114 G2 receivers and 12 G3 receivers. The same analysis in Section 11 (SQM G2 only) is used in this section for the combined G2 and G3 data. G3 SQM monitoring effort includes the monitoring of PRN type biases, PRN biases, and SQM trips.

For this reporting period, there were no SQM anomalies observed.

## Appendix A: Glossary

### General Terms and Definitions

**Alert.** An alert is an indication provided by the GPS/WAAS equipment to inform the user when the positioning performance achieved by the equipment does not meet the integrity requirements.

**Availability.** The availability of a navigation system is the ability of the system to provide the required function and performance at the initiation of the intended operation. Availability is an indication of the ability of the system to provide usable service within the specified coverage area.

**C&V.** The Correction and Verification Subsystem.

**CONUS.** Continental United States.

**Continuity.** The continuity of a system is the ability of the total system (comprising all elements necessary to maintain aircraft position within the defined airspace) to perform its function without interruption during the intended operation. More specifically, continuity is the probability that the specified system performance will be maintained for the duration of a phase of operation, presuming that the system was available at the beginning of that phase of operation.

**Coverage.** The coverage provided by a radio navigation system is that surface area or space volume in which the signals are adequate to permit the user to determine position to a specified level of accuracy. Coverage is influenced by system geometry, signal power levels, receiver sensitivity, atmospheric noise conditions, and other factors that affect signal availability.

**Dilution of Precision (DOP).** The magnifying effect on GPS position error induced by mapping GPS ranging errors into position through the position solution. The DOP may be represented in any user local coordinate desired. Examples are HDOP for local horizontal, VDOP for local vertical, PDOP for all three coordinates, and TDOP for time.

**DR.** Discrepancy Report

**Fault Detection and Exclusion (FDE).** Fault detection and exclusion is a receiver processing scheme that autonomously provides integrity monitoring for the position solution, using redundant range measurements. The FDE consists of two distinct parts: fault detection and fault exclusion. The fault detection part detects the presence of an unacceptably large position error for a given mode of flight. Upon the detection, fault exclusion follows and excludes the source of the unacceptably large position error, thereby allowing navigation to return to normal performance without an interruption in service.

**GEO.** Geostationary Satellite.

**Global Positioning System (GPS).** A space-based positioning, velocity, and time system composed of space, control, and user segments. The space segment, when fully operational, will be composed of 24 satellites in six orbital planes. The control segment consists of five monitor stations, three ground antennas, and a master control station. The user segment consists of antennas and receiver-processors that provide positioning, velocity, and precise timing to the user.

**Grid Ionospheric Vertical Error (GIVE).** GIVES indicate the accuracy of ionospheric vertical delay correction at a geographically defined ionospheric grid point (IGP). WAAS transmits one GIVE for each IGP in the mask.

**Hazardous Misleading Information (HMI).** Hazardous misleading information is any position data, that is output, that has an error larger than the current protection level (HPL/VPL), without any indication of the error (e.g., alert message sequence).

**Horizontal Alert Limit (HAL).** The Horizontal Alert Limit (HAL) is the radius of a circle in the horizontal plane (the local plane tangent to the WGS-84 ellipsoid), with its center being at the true position, which describes the region that is



required to contain the indicated horizontal position with a probability of  $1-10^{-7}$  per flight hour, for a particular navigation mode, assuming the probability of a GPS satellite integrity failure being included in the position solution is less than or equal to  $10^{-4}$  per hour.

**Horizontal Protection Level (HPL).** The Horizontal Protection Level is the radius of a circle in the horizontal plane (the plane tangent to the WGS-84 ellipsoid), with its center being at the true position, which describes the region that is assured to contain the indicated horizontal position. It is based upon the error estimates provided by WAAS.

**IGS.** International GPS Service.

**Ionospheric Grid Point (IGP).** IGP is a geographically defined point for which the WAAS provides the vertical ionospheric delay.

**LNAV.** Lateral Navigation.

**LP.** Localizer Performance. LP is a WAAS operational service level with a HAL equal to 40 meters.

**LPV.** Localizer Performance with Vertical Guidance. LPV is a WAAS operational service level with a HAL equal to 40 meters and a VAL equal to 50 meters.

**LPV 200.** Localizer Performance with Vertical Guidance to 200 ft decision height. LPV 200 is a WAAS operational service level with a HAL equal to 40 meters and a VAL equal to 35 meters.

**MOPS.** Minimum Operational Performance Standards.

**NANU.** Notice Advisory to Navstar Users. NANU is an advisory message to inform users of a change in the GPS constellation. These messages inform users in advance of planned maintenance and also notify users of unscheduled outages.

**Navigation Message.** Message structure designed to carry navigation data.

**Non-Precision Approach (NPA) Navigation Mode.** The Non-Precision Approach navigation mode refers to the navigation solution operating with a minimum of four satellites with fast and long term WAAS corrections (no WAAS ionospheric corrections) available.

**Position Solution.** The use of ranging signal measurements and navigation data from at least four satellites to solve for three position coordinates and a time offset.

**Precision Approach (PA) Navigation Mode.** The Precision Approach navigation mode refers to the navigation solution operating with a minimum of four satellites with all WAAS corrections (fast, long term, and ionospheric) available.

**RFI.** Radio Frequency Interference.

**Selective Availability.** Protection technique employed by the DOD to deny full system accuracy to unauthorized users.

**Signal Quality Monitor (SQM).** SQM monitors correlator measurements to detect signal deformations that originate in the GPS or GEO satellites and ensures that the UDREs are sufficiently inflated to protect given the monitor's current observations.

**Standard Positioning Service (SPS).** Three-dimensional position and time determination capability provided to a user equipped with a minimum capability GPS SPS receiver in accordance with GPS national policy and the performance specifications.

**SV.** Space Vehicle.

**User Differential Range Error (UDRE).** UDRE's indicate the accuracy of combined fast and slow error corrections. WAAS transmits one UDRE for each satellite in the mask.

**Vertical Alert Limit (VAL).** The Vertical Alert Limit is half the length of a segment on the vertical axis (perpendicular to the horizontal plane of WGS-84 ellipsoid), with its center being at the true position, which describes the region that is required to contain the indicated vertical position with a probability of  $1-10^{-7}$  per flight hour, for a particular navigation mode, assuming the probability of a GPS satellite integrity failure being included in the position solution is less than or equal to  $10^{-4}$  per hour.

**Vertical Protection Level (VPL).** The Vertical Protection Level is half the length of a segment on the vertical axis (perpendicular to the horizontal plane of WGS-84 ellipsoid), with its center being at the true position, which describes the region that is assured to contain the indicated vertical position. It is based upon the error estimates provided by WAAS.

**VNAV.** Vertical Navigation.

**Wide Area Augmentation System (WAAS).** The WAAS is made up of an integrity reference monitoring network, processing facilities, geostationary satellites, and control facilities. Wide area reference stations and integrity monitors are widely dispersed data collection sites that contain GPS/WAAS ranging receivers that monitor all signals from the GPS, as well as the WAAS geostationary satellites. The reference stations collect measurements from the GPS and WAAS satellites so that differential corrections, ionospheric delay information, GPS/WAAS accuracy, WAAS network time, GPS time, and UTC can be determined. The wide area reference station and integrity monitor data are forwarded to the central data processing sites. These sites process the data in order to determine differential corrections, ionospheric delay information, and GPS/WAAS accuracy, as well as verify residual error bounds for each monitored satellite. The central data processing sites also generate navigation messages for the geostationary satellites and WAAS messages. This information is modulated on the GPS-like signal and broadcast to the users from geostationary satellites.

**Appendix B: Additional Coverage Plots**

This section includes coverage plots with 99% LPV 200 availability contour, 98% LPV availability contours, and 98% LP availability contours for the quarter. Figure B.1 shows CONUS coverage with 98% LP availability contour. Figure B.2 shows Alaska coverage with 98% LP availability contour. Figure B.3 shows CONUS coverage with 98% LPV availability contour. Figure B.4 shows Alaska coverage with 98% LPV availability contour. Figure B.5 shows CONUS coverage with 99% LPV 200 availability contour. Figure B.6 shows Alaska coverage with 99% LPV 200 availability contour.

Figure B-1 98% CONUS LP Availability Contour

**WAAS 98% LP Coverage Contours  
October 1 - December 31, 2014**

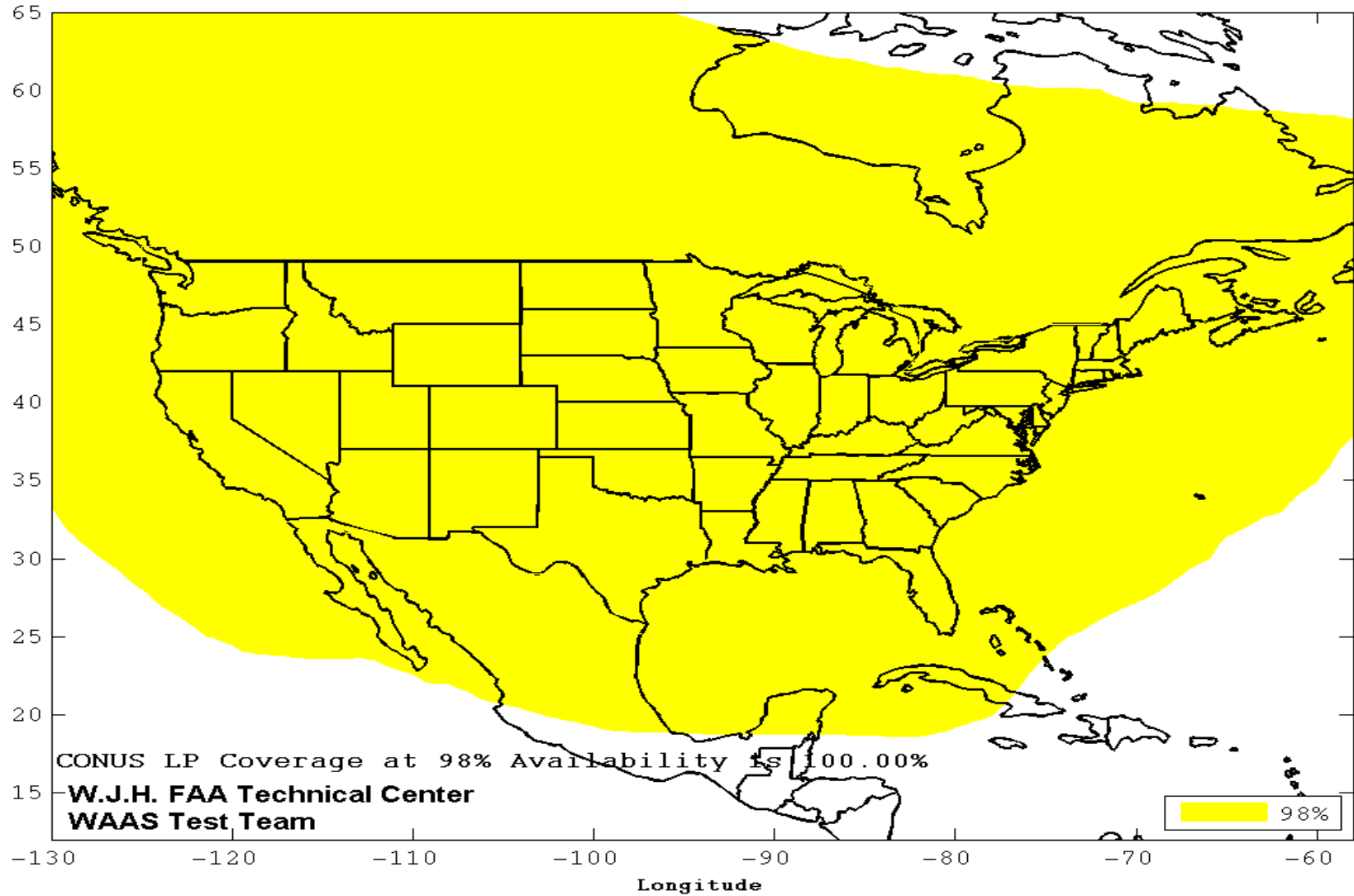


Figure B-2 98% Alaska LP Availability Contour

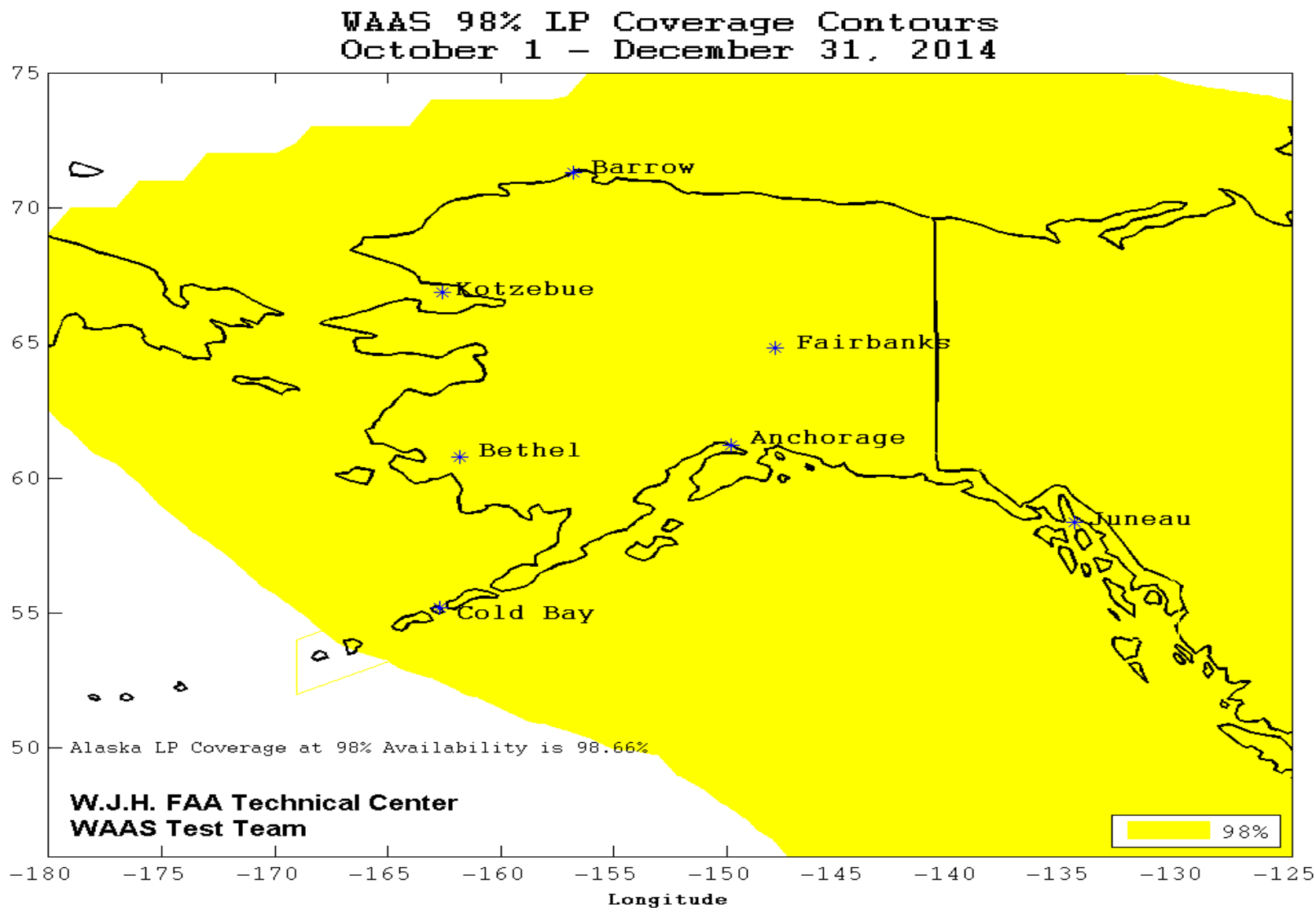


Figure B-3 98% CONUS LPV Availability Contour

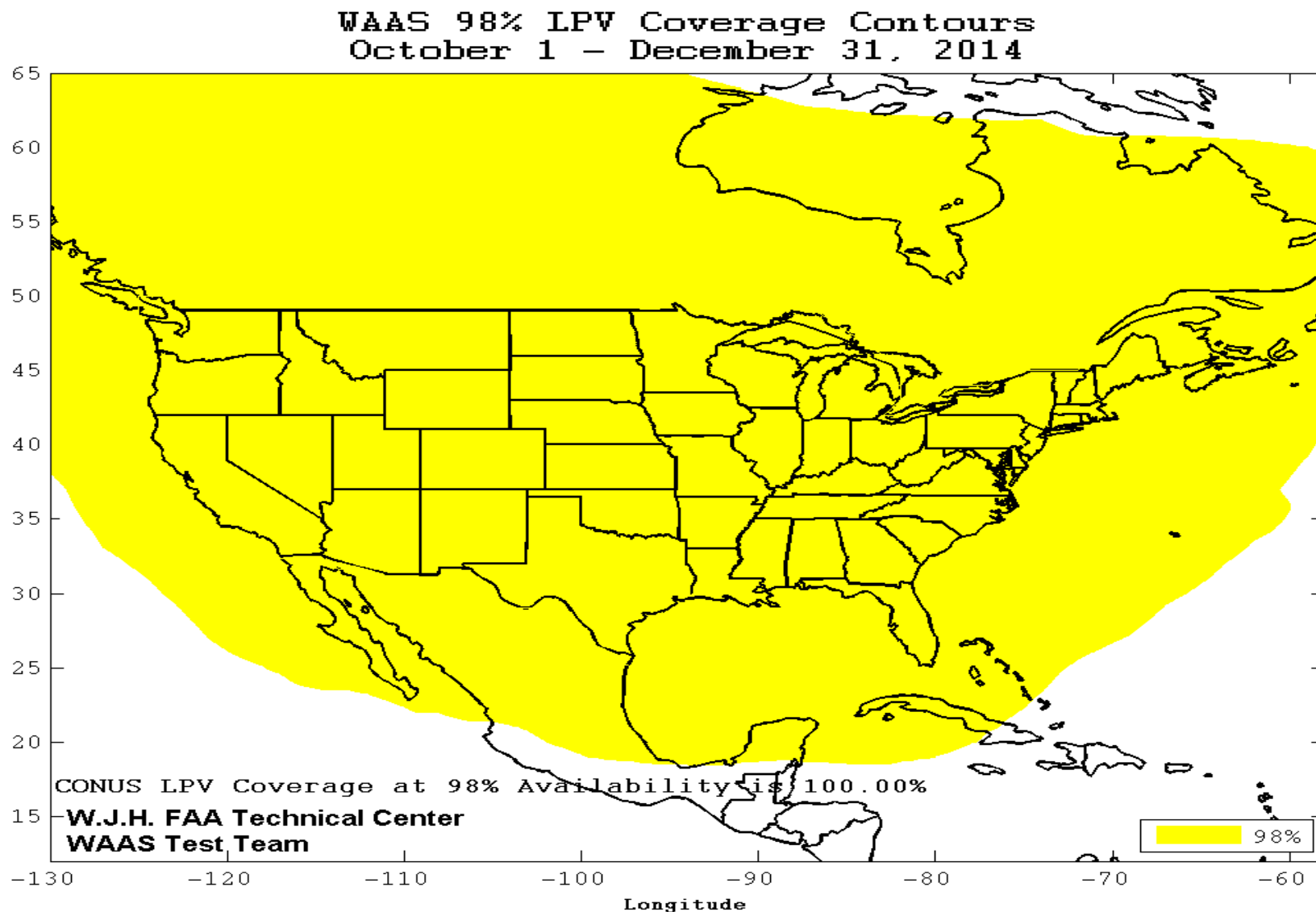


Figure B-4 98% Alaska LPV Availability Contour

**WAAS 98% LPV Coverage Contours  
October 1 - December 31, 2014**

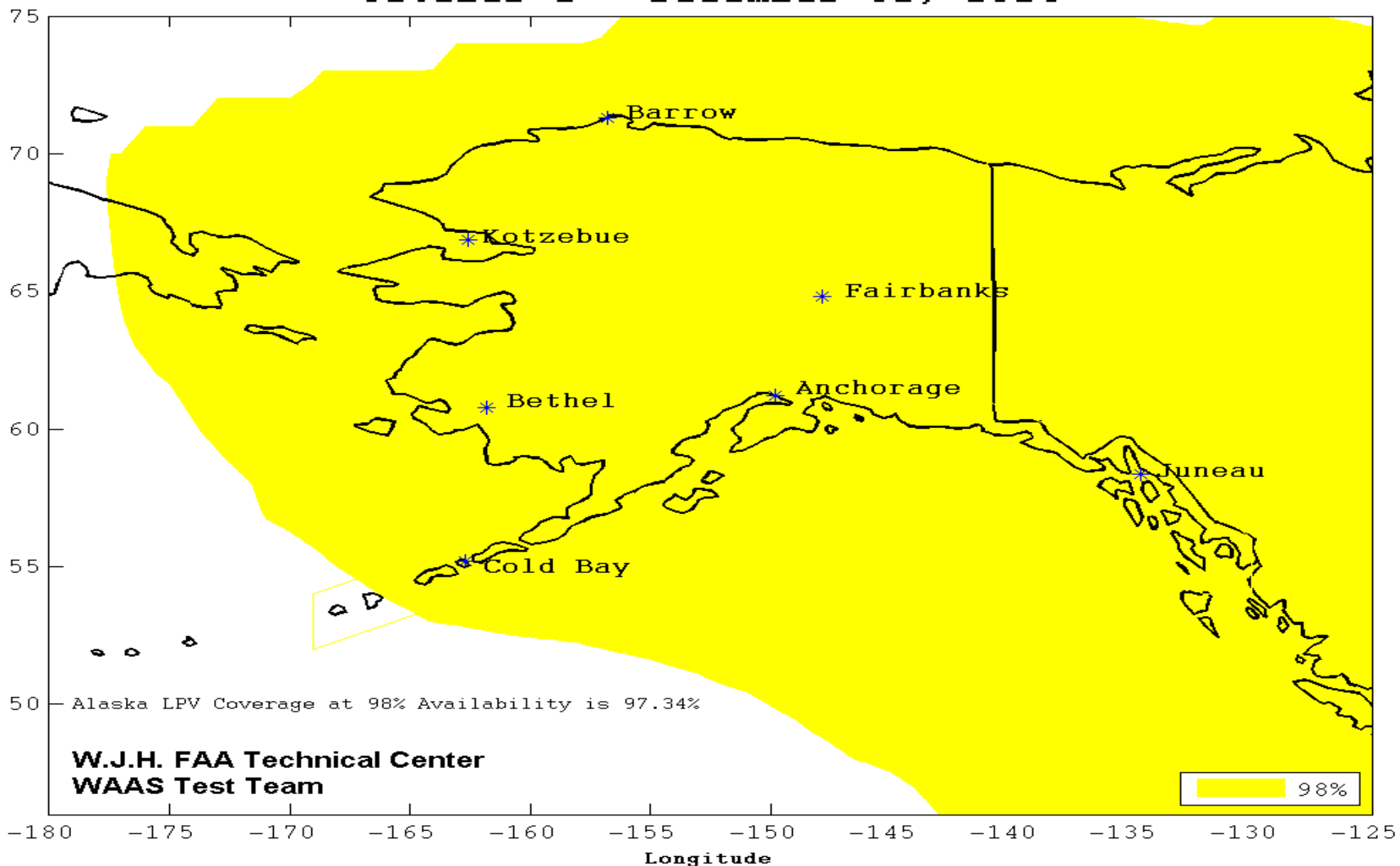


Figure B-5 99% CONUS LPV 200 Availability Contour

**WAAS 99% LPV200 Coverage Contours  
October 1 – December 31, 2014**

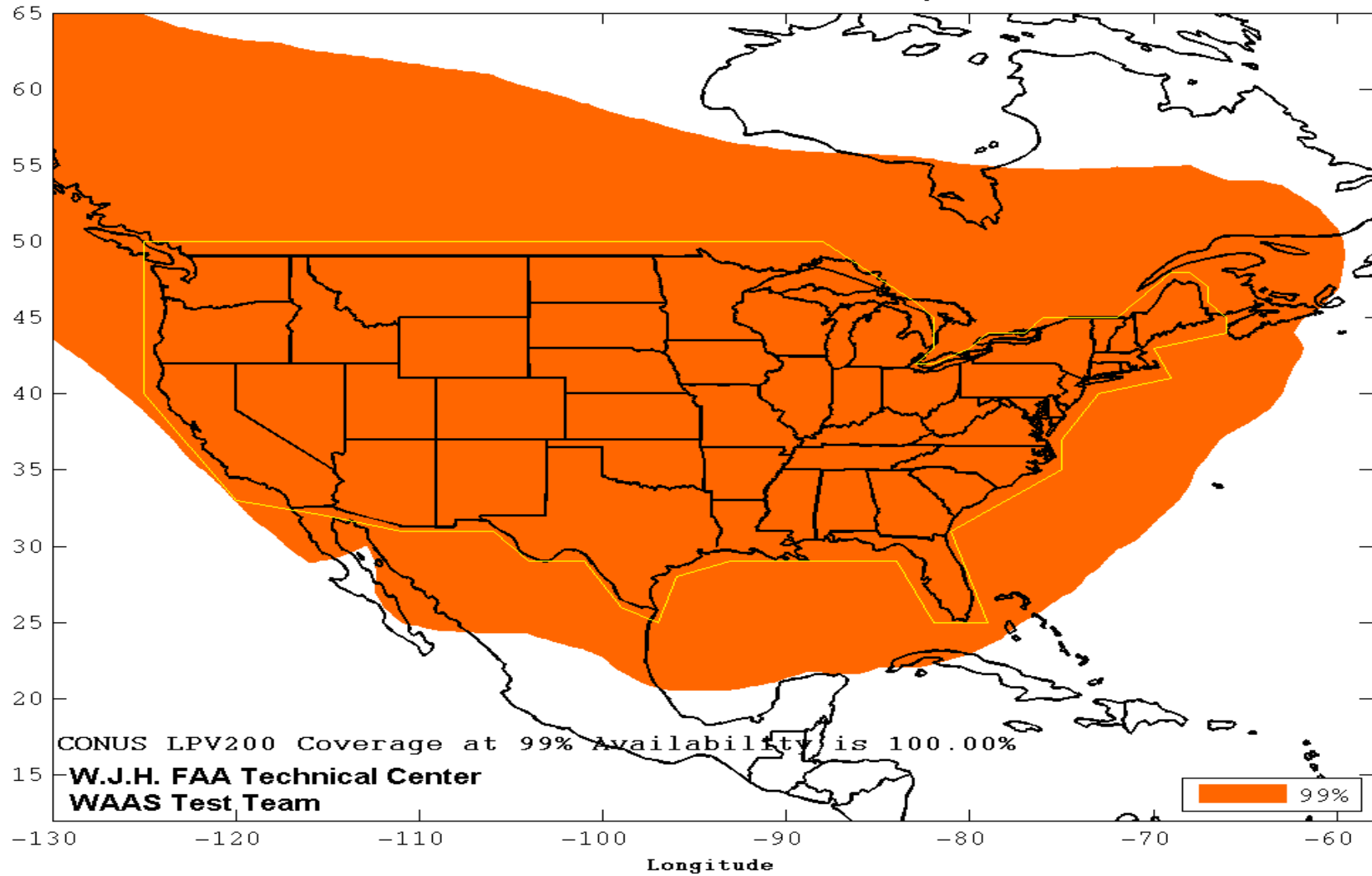




Figure B-6 99% Alaska LPV 200 Availability Contour

**WAAS 99% LPV200 Coverage Contours  
October 1 - December 31, 2014**

