WIDE-AREA AUGMENTATION SYSTEM PERFORMANCE ANALYSIS REPORT

Report #52

Reporting Period: January 1 to March 31, 2015

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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 #52; it covers WAAS performance during the period from January 1, 2015 to March 31, 2015.

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, and SQM.

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 fifth 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.

Parameter	CONUS Site/Maximum	CONUS Site/Minimum	Alaska Site/Maximum	Alaska Site/Minimum
95% Horizontal Accuracy (HPL <= 40 meters)	Atlantic City 1.51 meters	Oakland 0.693 meters	Barrow 0.849 meters	Bethel 0.712 meters
95% Vertical Accuracy (VPL <= 50 meters)	Miami 1.93 meters	Denver 0.926 meters	Barrow 1.892 meters	Cold Bay 1.128 meters
LP Availability (HPL <= 40 meters)	Multiple Sites 100%	Washington D.C. 99.91%	Cold Bay 100%	Barrow 99.90%
LPV Availability (HPL <= 40 meters & VPL <= 50 meters)	Multiple Sites 100%	Cleveland 99.86%	Juneau 99.94%	Barrow 99.50%
LPV 200 Availability (HPL <= 40 meters & VPL < =35 meters)	Multiple Sites 100%	Cleveland 99.86%	Anchorage 99.86%	Cold Bay 90.96%
99% HPL	Oakland 17.905 meters	Memphis 11.592 meters	Cold Bay 29.43 meters	Juneau 14.87 meters
99% VPL	Oakland 30.07 meters	Salt Lake City 20.70 meters	Barrow 45.21 meters	Juneau 25.95 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
NSTB:		
Atlantic City	87	7559844
Grand Forks	86	7438772
Oklahoma City	86	7453693
WAAS:		
Albuquerque	90	7775736
Anchorage	90	7775103
Atlanta	90	7775781
Barrow	90	7774151
Bethel	90	7775125
Billings	90	7774370
Boston	90	7775315
Chicago	90	7774857
Cleveland	90	7770053
Cold Bay	90	7775000
Dallas	90	7772602
Denver	90	7770600
Fairbanks	90	7754748
Gander	90	7775434
Goose Bay	90	7748813
Houston	90	7765111
Iqaluit	90	7771604
Jacksonville	90	7775056
Juneau	90	7775119
Kansas City	90	7775791
Kotzebue	90	7774736
Los Angeles	90	7775655
Memphis	90	7775783
Merida	90	7771961
Mexico City	90	7774281
Miami	90	7775693
Minneapolis	90	7775790
New York	90	7774487
Oakland	90	7774951
Puerto Vallarta	90	7764532
Salt Lake City	90	7775433
San Jose Del Cabo	90	7768774
Seattle	90	7773050
Washington DC	90	7775126
Winnipeg	90	7775789

Table 1-3 NPA Evaluation Sites

Location	Number of Days Evaluated	Number of Samples
Albuquerque	90	7775769
Anchorage	90	7775654
Atlanta	90	7775760
Barrow	90	7775544
Bethel	90	7775554
Billings	90	7773218
Boston	90	7767228
Cleveland	90	7775764
Cold Bay	90	7774919
Fairbanks	90	7775707
Gander	90	7775745
Honolulu	90	7775646
Houston	90	7769895
Iqaluit	90	7772000
Juneau	90	7775762
Kansas City	90	7775761
Kotzebue	90	7775556
Los Angeles	90	7775763
Merida	90	7772111
Miami	90	7775641
Minneapolis	90	7759644
Oakland	90	7775753
Salt Lake City	90	7775549
San Jose Del Cabo	90	7772557
San Juan	90	7775229
Seattle	90	7775746
Tapachula	90	7771173
Washington DC	90	7775765

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. 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
1/1/2015	1/1/2015	GEO135, Napa (APC), Los Angeles (CnV)	LPV_Alaska, LPV200_Alaska	The Los Angles Corrections and Verification (C&V) system faulted and went off line. This resulted in the selected broadcast message source for the CRW GEO, PRN-135, automatically changing from the Los Angles C&V to the Atlanta C&V at 11:08:55 (GPS) after data was not received by the CRW uplink site from Los Angles for 1 second. The last to be broadcast message for CRW from Los Angles did not get sent to the Atlanta C&V before the Los Angles C&V went off line. This caused the Atlanta C&V to be unable to perform broadcast message validation for 1 second, resulting in a Zero Filled Type Zero (ZFTZ) alarm being broadcast on CRW. The ZFTZ causes user equipment to discard any stored data from CRW and reacquire fresh data. This resulted in a brief ~ 5 minute outage in the north west portion of Alaska where CRW is the only WAAS GEO in view. Note, the CRW uplink

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
				inserted a message with a deliberately bad CRC for the one second of missing data. This is done to initiate the user equipment time out processing. Please see plot(s): LP_1/1/2015 LPV_1/1/2015
1/2/2015	1/3/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Canada, LPV200_Alaska, LPV200_Canada	Geomagnetic activity, Kp = 5 on both days, disturbed the ionosphere resulting in elevated GIVE values being broadcast. The high GIVE values caused degraded LPV-200 service in northern Alaska and northern Canada and degraded LPV service in northern Canada from 20:00 on the first day through 03:00 the second day. Please see plot(s): LPV_1/2/2015 LPV200_1/2/2015
1/2/2015	1/2/2015	Los Angeles (CnV), PRN135, PRN138	LPV_Alaska, LPV_Canada, LPV200_Alaska, LPV200_Canada	Elevated UDREs for the ranging signals from the CRW, PRN-135, and CRE, PRN-138, GEOs broadcast by the CRW GEO affected LPV and LPV-200 service in northern Alaska and northern Canada. The event started when the selected C&V source for CRW was manually switched from Atlanta to Los Angles at 09:00 to restore the preferred single GEO per C&V configuration following event 11892. The UDRE for CRE reached the steady state value at about 16:30 and the UDRE for CRW reached the steady state value at about 03:15 the next day. The coverage plots for this day show worst case coverage for receivers using CRW data, receivers using CRE or AMR would not have seen the CRW high UDRE issue, but there were also high GIVEs associated with geomagnetic disturbances to ionosphere during the same period. When two or more GEOs are being tracked, user receivers are expected to select the GEO to support availability. Please see plot(s): LPV_1/2/2015 LPV200_1/2/2015
1/4/2015	1/4/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_CONUS, LPV_Alaska, LPV_Canada, LPV200_CONUS, LPV200_Alaska, LPV200_Canada	Geomagnetic activity, Kp = 5, disturbed the ionosphere resulting in elevated GIVE values being broadcast. The high GIVEs affected LPV and LPV-200 service in Canada from 13:00 to 22:00 GMT and LPV and LPV200 service in Alaska at15:00 GMT for less than 20 minutes. LPV and LPV-200 service in CONUS was also affected by the high GIVEs. Maine region: at 17:35 GMT for less than 40 minutes, and at 19:30 GMT for less than 20 minutes, Oakland, CA region: at 21:40 for about 6 minutes. Please see plot(s): LPV_1/4/2015 LPV200_1/4/2015
1/5/2015	1/7/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Alaska, LPV_Canada, LPV200_Alaska, LPV200_Canada	Geomagnetic activity caused elevated GIVE values and a resulting reduction in LPV and LPV 200 service in Alaska and Canada. See DR 126 Effect on WAAS from Iono Activity January 7 2015. Please see plot(s): LPV_1/5/2015 LPV200_1/5/2015 LPV_1/6/2015 LPV200_1/6/2015 LPV_1/7/2015 LPV200_1/7/2015
1/5/2015	1/5/2015	PRN26	None	PRN26 was decommissioned and set unusable on January 5, 2015. Coverage was not affected. See NANU2015005.

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
1/8/2015	1/8/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Canada, LPV200_Canada	Geomagnetic activity, Kp = 4, disturbed the ionosphere resulting in elevated GIVE values being broadcast. The high GIVEs affected LPV and LPV-200 service in Canada between 15:00 to 18:00 GMT. Please see plot(s): LPV_1/8/2015 LPV200_1/8/2015
1/9/2015	1/9/2015	PRN13	LPV_Alaska, LPV200_Alaska	Planned maintenance on PRN-13, NANU 2015006 delta V maneuver, caused PRN-13 to be temporarily unavailable resulting in degraded LPV and LPV-200 service in Alaska from approximately 06:00 to 08:00 GMT. Please see plot(s): LPV_1/9/2015 LPV200_1/9/2015
1/12/2015	1/13/2015	Boston (ZBW1), Boston (ZBW2), Boston (ZBW3)	Local	On January 12th local RFI events at ZBW caused LPV and LPV200 service outages to be observed at 17:05 GMT for 55 seconds and at 17:54 GMT for 58 seconds. On January 13th a local RFI event caused LPV and LPV200 outage to be observed at 16:55 for 55 seconds.
1/14/2015	1/14/2015	Washington DC (ZDC1), Washington DC (ZDC2), Washington DC (ZDC3)	Local	A local RFI event at ZDC at 14:44 GMT caused an LPV-200 service outage to be observed for 14 seconds.
1/21/2015	1/21/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Alaska, LPV_Canada, LPV200_Alaska, LPV200_Canada	Geomagnetic activity, Kp = 4, disturbed the ionosphere causing elevated GIVEs to be broadcast. This resulted in LPV and LPV-200 service outages in Alaska from 14:00 GMT for less than 1 hour, and in Canada from about 14:00 GMT to 20:00 GMT. Please see plot(s): LPV_1/21/2015 LPV200_1/21/2015
1/22/2015	1/22/2015	Boston (ZBW1), Boston (ZBW2), Boston (ZBW3)	Local	Localized RFI caused degraded tracking at the ZBW reference station resulting in a 74 second LPV and LPV-200 service outage to be observed for that receiver that is used in this report (02:46:14 to 02:47:28).
1/26/2015	1/26/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Alaska, LPV_Canada, LPV200_Alaska, LPV200_Canada	Geomagnetic activity, Kp = 4, disturbed the ionosphere causing elevated GIVEs to be broadcast. This resulted in LPV and LPV-200 service outages in central Alaska and north-western Canada starting at 13:40 for about 30 minutes. Please see plot(s): LPV_1/26/2015 LPV200_1/26/2015
1/26/2015	1/26/2015	PRN32	LPV_Canada, LPV200_Canada	Intermittent signal instability on PRN-32 caused the WAAS receivers to lose and reacquire tracking. This caused WAAS to broadcast "Not Monitored" alarms and caused the WAAS carrier smoothing algorithm to reinitialize. It takes about 20 to 40 minutes for the broadcast UDRE to return to the steady state value after the carrier smoothing is initialized. The first event at 06:36:43 did not impact service, but the second event at 20:17:54 affected LPV and LPV-200 service in south-west Alaska for less than 20

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
				minutes. Please see plot(s): LP_1/26/2015 LPV_1/26/2015
1/28/2015	1/28/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200_Alaska	Geomagnetic activity, Kp = 3, disturbed the ionosphere causing elevated GIVEs to be broadcast. This resulted in a LPV-200 service outages in Alaska starting at 10:50 and lasting for less than 30 minutes. Please see plot(s): LPV200_1/28/2015
1/28/2015	1/28/2015	PRN21	LPV_Canada, LPV200_Canada	Carrier phase instability on PRN-21 caused the WAAS carrier smoothing algorithm to reinitialize for PRN-21. This caused a "Not Monitored" alarms to be broadcast for PRN-21 at 01:25:21 and at 01:26:23. The elevated broadcast UDRE for PRN-21 affected LPV and LPV-200 service in eastern Canada starting at 01:25 and lasting for less than 10 minutes. Please see plot(s): LPV_1/28/2015 LPV200_1/28/2015
2/1/2015	2/2/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Canada, LPV200_Alaska, LPV200_Canada	Geomagnetic activity (Kp = 5 for both days) mildly disturbed the ionosphere causing elevated GIVE values to be broadcast. This resulted in minor degradations of the LPV and LPV-200 service coverage in northern Canada from about 18:00 GMT through the day rollover until 3:00 GMT the next day. LPV-200 service in Alaska was affected during the beginning of the day on February 2. Please see plot(s): LPV_2/1/2015 LPV200_2/1/2015
2/6/2015	2/6/2015	PRN30	LPV200_CONUS	Planned for PRN-30, NANU 2015009 delta V maneuver caused PRN-30 to be temporarily unavailable. The absence of PRN-30 for that time caused a brief LPV-200 service outage in California, Texas and New Mexico. That outage started at 04:30 and lasted for less than 10 minutes. Please see plot(s): LPV200_2/6/2015
2/7/2015	2/7/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Alaska, LPV_Canada, LPV200_Alaska, LPV200_Canada	Geomagnetic activity (Kp = 3) mildly disturbed the ionosphere causing elevated GIVE values to be broadcast. This resulted in 2 minor degradations of the LPV and LPV-200 service in Alaska and western Canada. One starting at about 10:00 GMT for less than 1 hour and the other starting at 12:30 GMT for less than 2 hours. Please see plot(s): LPV_2/7/2015 LPV200_2/7/2015
2/8/2015	2/8/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200_Canada	Geomagnetic activity (Kp = 3) mildly disturbed the ionosphere causing elevated GIVE values to be broadcast. This resulted in minor degradations of the LPV and LPV-200 service coverage in northern Canada from about 18:00 GMT until 22:00 GMT. Please see plot(s): LPV200_2/8/2015
2/9/2015	2/9/2015	Miami (ZMA1), Miami (ZMA2), Miami (ZMA3)	None	Localized RFI caused degraded tracking at the ZMA reference station resulting in a 102 second LPV and LPV-200 service outage to be observed for that receiver in this report (23:00:41 to 23:02:23).

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
2/9/2015	2/9/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Canada, LPV200_Canada	Geomagnetic activity (Kp = 3) mildly disturbed the ionosphere causing elevated GIVE values to be broadcast. This resulted in minor degradations of the LPV and LPV-200 service coverage in northern Canada from about 21:00 GMT until 23:00 GMT. Please see plot(s): LPV_2/9/2015 LPV200_2/9/2015
2/11/2015	2/11/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Alaska, LPV200_Alaska	Geomagnetic activity (Kp = 4) mildly disturbed the ionosphere causing elevated GIVE values to be broadcast. This resulted in minor degradations of the LPV and LPV-200 service coverage in Alaska starting at about 12:30 GMT and lasting less than 30 minutes. Please see plot(s): LPV_2/11/2015 LPV200_2/11/2015
2/15/2015	2/15/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Alaska, LPV200_Alaska	Geomagnetic activity (Kp = 3) mildly disturbed the ionosphere causing elevated GIVE values to be broadcast. This resulted in minor degradations of the LPV and LPV-200 service coverage in Alaska starting at about 12:00 GMT and lasting less than 60 minutes. Please see plot(s): LPV_2/15/2015 LPV200_2/15/2015
2/16/2015	2/16/2015	San Jose Del Cabo (MSD1), San Jose Del Cabo (MSD2), San Jose Del Cabo (MSD3)	Local	Localized RFI caused degraded tracking at the MSD reference station resulting in a 208 second LPV and LPV-200 service outage to be observed for that receiver in this report (18:48:24 to 18:51:52).
2/17/2015	2/18/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Alaska, LPV_Canada, LPV200_CONUS, LPV200_Alaska, LPV200_Canada	Geomagnetic activity (Kp = 5 both days) mildly disturbed the ionosphere causing elevated GIVE values to be broadcast. This resulted in degradations of the LPV and LPV-200 service in northern Canada on February 17 from about 0:30 GMT to 3:30 GMT and from 22:30 GMT through the day rollover until 2:00 GMT on February 18. LPV and LPV-200 Alaska coverage was affected in the beginning of the day on February 17 from about 1:00 GMT to 3:00 GMT and on February 18 from about 0:30 GMT until 4:00 GMT. CONUS LPV-200 coverage (north of Minnesota) was affected on February 17 starting at about 23:44 GMT and lasting for less than 15 minutes. Please see plot(s): LPV_2/17/2015 LPV200_2/17/2015
2/18/2015	2/18/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV), PRN138	None	The UDRE for the CRE GEO, PRN-138, ranging signal was set to "Not Monitored" from 03:00 to 03:30 for all 3 GEO broadcast streams. There was no user service impact.
2/19/2015	2/20/2015	PRN11	LPV200_CONUS	Unplanned maintenance on PRN-11 caused that satellite to be unavailable from 04:50 on 2/19/15 until 02:45 on 2/20/15. See NANU 201512. The unavailability of PRN-11 caused the loss of LPV-

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
				200 service in North and South Carolina starting at 00:25 on 2/20/15 lasting for less than 10 minutes and also in Florida starting at 00:32 lasting for less than 10 minutes.
2/21/2015	2/22/2015	Goose Bay (YYR1) Goose Bay (YYR2) Goose Bay (YYR3)	LPV200_Canada	The Goose Bay Canada (YYR) reference station was off line due to communications outages. Loss of services from the YYR reference station contributed to several IGPs being set to "Not Monitored" and /or having higher than normal GIVE values. This slightly affected LPV-200 service in eastern Canada.
2/25/2015	2/25/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV), PRN135, PRN138	LPV200_Alaska	The UDRE for the CRW GEO, PRN-135, ranging quality was elevated from about 05:30 to 11:00 GMT, and the UDRE for the CRE GEO, PRN-138, ranging quality was elevated from about 06:00 to 09:30 GMT. The elevated UDREs contributed to LPV-200 service outages in northern Alaska. Please see plot(s): LPV200_2/25/2015
2/27/2015	2/27/2015	Barrow (BRW1), Barrow (BRW2), Barrow (BRW3), Bethel (BET1), Bethel (BET2), Bethel (BET3), Fairbanks (FAI1), Fairbanks (FAI2), Fairbanks (FAI3), Kotzebue (OTZ1), Kotzebue (OTZ2), Kotzebue (OTZ3)	LPV_Alaska, LPV200_Alaska	Short (5-10 second) data outages from multiple Alaska reference stations at about 20:54:52 resulted in the re-initialization of the WAAS carrier smoothing algorithm for those sites. The degradation of the measurements resulted in elevated GIVE values being broadcast. The elevated GIVEs affected the LPV and LPV-200 service (about 15 minutes) for north-western Alaska. Please see plot(s): LPV_2/27/2015 LPV200_2/27/2015
2/27/2015	2/27/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV), PRN21	LPV200_Alaska	Carrier phase instability on PRN-21 caused the WAAS carrier smoothing algorithm to reinitialize for PRN-21. This caused a "Not Monitored" alarm to be broadcast for PRN-21 at 11:59 GMT. The elevated broadcast UDRE for PRN-21 affected LPV-200 service in Alaska for less than 10 minutes.
2/28/2015	3/1/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Canada, LPV200_Alaska, LPV200_Canada	Geomagnetic activity (Kp = 4 on February 28 and Kp = 5 on March 1) mildly disturbed the ionosphere causing elevated GIVE values to be broadcast. This resulted in minor degradations of the LPV and LPV-200 service in Canada from about 20:00 GMT through the day rollover until 3:00 GMT. LPV-2000 service in Alaska was affected on March 1 from about 1:00 GMT to 4:30 GMT. Please see plot(s): LPV_2/28/2015 LPV200_2/28/2015 LPV_3/1/2015 LPV200_3/1/2015
3/2/2015	3/2/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Alaska, LPV200_Alaska, LPV200_Canada	Geomagnetic activity (Kp = 5) mildly disturbed the ionosphere causing elevated GIVE values to be broadcast. This resulted in minor degradation of the LPV and LPV-200 service in Alaska and the LPV-200 coverage in Canada from about 2:30 GMT until 12:00 GMT. Please see plot(s): LPV_3/2/2015 LPV200_3/2/2015

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
3/2/2015	3/2/2015	Barrow (BRW1), Barrow (BRW2), Barrow (BRW3), Bethel (BET1), Bethel (BET2), Bethel (BET3), Fairbanks (FAI1), Fairbanks (FAI2), Fairbanks (FAI3), Kotzebue (OTZ1), Kotzebue (OTZ2), Kotzebue (OTZ3)	LPV_Alaska, LPV200_Alaska	Short 5-10 second data outages from multiple Alaska reference stations at about 20:41:54 resulted in the re-initialization of the WAAS carrier smoothing algorithm for those sites. The loss of measurements resulted in elevated GIVE values being broadcast. The elevated GIVE values caused degradation to the LPV and LPV-200 service outage for north-western Alaska for about 15 minutes. Please see plot(s): LPV_3/2/2015 LPV200_3/2/2015
3/3/2015	3/3/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200_CONUS	Geomagnetic activity (Kp = 3) mildly disturbed the ionosphere causing elevated GIVE values to be broadcast. This resulted in minor degradations of the LPV-200 service coverage in CONUS (North Carolina, South Carolina, Virginia, and Florida) starting at about 23:30 GMT and lasting for less than 15 minutes. Please see plot(s): LPV200_3/3/2015
3/5/2015	3/5/2015	Los Angeles (ZLA1), Los Angeles (ZLA2), Los Angeles (ZLA3)	Local	Localized RFI caused degraded tracking at the ZLA reference station resulting in a 195 second LPV-200 outage being observed for that receiver in this report (2:18:14 to 2:21:28).
3/5/2015	3/5/2015	PRN14	LPV_CONUS, LPV200_CONUS, LPV200_Canada	Planned maintenance on PRN-14, NANU 2015014 delta V maneuver, caused PRN-14 to be temporarily unavailable resulting in degraded LPV and LPV-200 service in CONUS (Florida, Louisiana, Mississippi, Arkansas, and Oklahoma) starting at 20:30 GMT and lasting for less than 20 minutes. LPV-200 service in north-eastern Canada was also impacted. (17:00 to 21:00 GMT). Please see plot(s): LPV_3/5/2015 LPV200_3/5/2015
3/7/2015	3/7/2015	Barrow (BRW1), Barrow (BRW2), Barrow (BRW3), Bethel (BET1), Bethel (BET2), Bethel (BET3), Kotzebue (OTZ1), Kotzebue (OTZ2), Kotzebue (OTZ3)	LPV_Alaska, LPV200_Alaska, LPV200_Canada	Short (5-13) second data outages from multiple Alaska reference stations at about 3:58:40 resulted in the re-initialization of the WAAS carrier smoothing algorithm for those sites. The loss of measurements resulted in elevated GIVE values and caused degradation to the LPV and LPV-200 service (about 15 minutes) for north-western Alaska and Western Canada. Elevated GIVEs from geomagnetic activity (Kp=4) disturbing the ionosphere also contributed to the outages. Please see plot(s): LPV_3/7/2015 LPV200_3/7/2015
3/9/2015	3/10/2015	Barrow (BRW1), Barrow (BRW2), Barrow (BRW3), Bethel (BET1), Bethel (BET2), Bethel (BET3), Cold Bay (CDB1), Cold Bay (CDB2), Cold	LPV200_Alaska	Short 5-10 second data outages from multiple Alaska reference stations at about 3:28 GMT on March 9 and 22:36 GMT on March 10 resulted in the re-initialization of the WAAS carrier smoothing algorithm for those sites. The loss of measurements resulted in elevated GIVE values and caused degradation to the LPV-200 service (about 5

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
		Bay (CDB3), Fairbanks (FAI1), Fairbanks (FAI2), Fairbanks (FAI3)		minutes) in Alaska for both days. Please see plot(s): LPV200_3/9/2015
3/12/2015	3/12/2015	PRN29	LPV_CONUS, LPV_Alaska, LPV_Canada, LPV200_CONUS, LPV200_Alaska, LPV200_Canada	Planned maintenance on PRN-29, NANU 2015016 delta V maneuver, caused PRN-29 to be temporarily unavailable from 4:31 GMT to 10:48 on March 12. The unavailability of PRN-29 caused a loss of LPV and LPV-200 service in Alaska and Canada form about 9:00 GMT to 10:30 GMT, and loss of LPV-200 service in CONUS starting at 9:52 and lasting for about 1 hour. CONUS LPV service in Southern California was lost starting at 10:45 and lasting less than 10 minutes. Please see plot(s): LPV_3/12/2015 LPV200_3/12/2015
3/15/2015	3/15/2015	Barrow (BRW1), Barrow (BRW2), Barrow (BRW3), Bethel (BET1), Bethel (BET2), Bethel (BET3), Kotzebue (OTZ1), Kotzebue (OTZ2), Kotzebue (OTZ3)	LPV_Alaska, LPV200_Alaska	Short (5-10 second) data outages from multiple Alaska reference stations at about 4:44:21 resulted in the re-initialization of the WAAS carrier smoothing algorithm for those sites. The loss of measurements resulted in elevated GIVE values and caused degradation to the LPV and LPV-200 service in Alaska for about 10 minutes. Please see plot(s): LPV_3/15/2015 LPV200_3/15/2015
3/17/2015	3/18/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_CONUS, LPV_Alaska, LPV_Canada, LPV200_CONUS, LPV200_Alaska, LPV200_Canada	Geomagnetic activity (Kp = 8 on March 17 and KP = 6 on March 18) mildly disturbed the ionosphere causing elevated GIVE values to be broadcast. This resulted in minor degradations of the LPV and LPV-200 service in Alaska, Canada and CONUS. LPV and LPV-200 service in Alaska was affected starting at 09:00 GMT and lasting for about 2 hours, and starting at 16:30 GMT and lasting for less than 1 hour. LPV and LPV-200 service in Canada was affected starting at 09:00 GMT and lasting for about 2 hours and starting at 16:30 GMT and lasting until 01:10 GMT on the next day LPV and LPV-200 service in CONUS (Eastern half) was affected starting at 16:30 GMT and lasting for about 4 hours and from 22:10 GMT until 1:10 GMT on the next day. For more details, see DR 127 Effect on WAAS from Iono Activity March 17 2015. Please see plot(s): LPV_3/17/2015 LPV200_3/17/2015
3/18/2015	3/18/2015	Boston (ZBW1), Boston (ZBW2), Boston (ZBW3)	Local	Localized RFI caused degraded tracking at the ZBW reference station resulting in a 75 second LPV and LPV-200 service outage to be observed for that receiver in this report (from 15:46:54 to 15:48:19 GMT).
3/19/2015	3/19/2015	PRN10	LPV_Alaska, LPV200_Alaska, LPV200_Canada	Signal instability on PRN-10 caused the WAAS carrier smoothing algorithm to reinitialize for PRN-10 for some WAAS reference stations, resulting in the UDRE for PRN-10 being set to "Not Monitored"

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
				without an alarm causing a brief LPV and LPV-200 service outage in Alaska and Canada. The event started at 09:14:26 and lasted for less than 5 minutes. Note - the normal daily outages in Alaska and Canada were larger than normal on this day because the UDRE for the CRE GEO, PRN-138, was elevated from the prior day. Please see plot(s): LPV_3/19/2015 LPV200_3/19/2015
3/25/2015	3/26/2015	NAPA (APC)	LPV_Alaska, LPV200_CONUS, LPV200_Alaska	The uplink for the CRW GEO, PRN-135 switched from the Napa uplink site to the Littleton uplink site at 8:00:38 GMT. This caused a 4 second outage of the GEO broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN-135. This also caused the UDRE for CRW to be elevated. The elevated UDRE for CRW affected LPV and LPV-200 service in Alaska starting at 09:10 and lasting for less than 90 minutes, and LPV-200 service in CONUS in Arizona starting at 08:01 GMT lasting for less than 2 minutes. LPV and LPV200 service in Alaska was affected on March 26 due to elevated UDRE on PRN-135.
3/25/2015	3/25/2015	Boston (ZBW1), Boston (ZBW2), Boston (ZBW3)	Local	Localized RFI caused degraded tracking at the ZBW reference station resulting in a 80 second LPV and LPV-200 service outage to be observed for that receiver in this report (15:39:08- 15:40:50).
3/28/2015	3/28/2015	Chicago (ZAU1), Chicago (ZAU2), Chicago (ZAU3)	Local	Localized RFI caused degraded tracking at the Chicago reference station resulting in an 8 second LPV-200 service outage to be observed for that receiver in this report (21:12:21 to 21:12:28).
3/28/2015	3/28/2015	Los Angeles (CnV), PRN135, PRN138	LPV200_Alaska, LPV200_Canada	Elevated UDREs on the CRW GEO (PRN-135) and the CRE GEO (138) caused LPV-200 service outages in Alaska and Canada. The elevated UDREs were broadcast by CRE GEO only. The coverage plots for this day show coverage for receivers using the CRE GEO, receivers using the CRW or AMR would not have seen the outages. User receivers tracking more than 1 GEO are expected to select the GEO to support availability. Please see plot(s): LPV_3/28/2015 LPV200_3/28/2015
3/30/2015	3/31/2015	PRN32	LPV200_CONUS, LPV200_Alaska	Planned maintenance on PRN-32, NANU 2015023, caused PRN-32 to be temporarily unavailable from 3/30/2015 00:05:00 GMT to 3/31/2015 23:44:00 GMT. The unavailability of PRN-32 caused a small, short LPV-200 service outage in California starting at approximately 20:00 GMT and lasting for less than 5 minutes. LPV-200 service in Alaska was also slightly degraded throughout the day due the unavailability of PRN-32. Please see plot(s): LPV200_3/30/2015 LPV200_3/31/2015

Table 1-6 WAAS Upgrades

START DATE	END DATE	LOCATION	EVENT DESCRIPTION
03/03/2015	03/03/2015	Santa Paula (SZP)	SSM - 42 a. This system support modification (SSM) provides a Firmware Upgrade for the Wide Area Augmentation System (WAAS) Wide-area Master Station (WMS) GPS Clock. The manufacturer and software maintenance organization, Zyfer, has provided this upgrade which corrects an invalid time offset that causes intermittent faults. WAAS WMS failures have been attributed to this fault. b. This SSM also replaces two cables connected between the WAAS Signal Generation Subsystem (SGS) Safety Computer and Signal Generator with longer versions of the same cables. The increased cable lengths cause a slight delay for signals passing through the cables. WAAS SGS failures have been attributed to an errant pulse on the Safety Computer Comparator Card. The longer cables effectively move the pulse to a new location in time where the errant pulse has no detrimental effects.
03/17/2015	03/17/2015	Woodbine (QWE)	SSM - 42 a. This system support modification (SSM) provides a Firmware Upgrade for the Wide Area Augmentation System (WAAS) Wide-area Master Station (WMS) GPS Clock. The manufacturer and software maintenance organization, Zyfer, has provided this upgrade which corrects an invalid time offset that causes intermittent faults. WAAS WMS failures have been attributed to this fault. b. This SSM also replaces two cables connected between the WAAS Signal Generation Subsystem (SGS) Safety Computer and Signal Generator with longer versions of the same cables. The increased cable lengths cause a slight delay for signals passing through the cables. WAAS SGS failures have been attributed to an errant pulse on the Safety Computer Comparator Card. The longer cables effectively move the pulse to a new location in time where the errant pulse has no detrimental effects.
03/19/2015	03/19/2015	Brewster (BRE-B)	SSM - 42 a. This system support modification (SSM) provides a Firmware Upgrade for the Wide Area Augmentation System (WAAS) Wide-area Master Station (WMS) GPS Clock. The manufacturer and software maintenance organization, Zyfer, has provided this upgrade which corrects an invalid time offset that causes intermittent faults. WAAS WMS failures have been attributed to this fault. b. This SSM also replaces two cables connected between the WAAS Signal Generation Subsystem (SGS) Safety Computer and Signal Generator with longer versions of the same cables. The increased cable lengths cause a slight delay for signals passing through the cables. WAAS SGS failures have been attributed to an errant pulse on the Safety Computer Comparator Card. The longer cables effectively move the pulse to a new location in time where the errant pulse has no detrimental effects.

START DATE	END DATE	LOCATION	EVENT DESCRIPTION
03/23/2015	03/23/2015	Littleton (APA)	SSM - 42 a. This system support modification (SSM) provides a Firmware Upgrade for the Wide Area Augmentation System (WAAS) Wide-area Master Station (WMS) GPS Clock. The manufacturer and software maintenance organization, Zyfer, has provided this upgrade which corrects an invalid time offset that causes intermittent faults. WAAS WMS failures have been attributed to this fault. b. This SSM also replaces two cables connected between the WAAS Signal Generation Subsystem (SGS) Safety Computer and Signal Generator with longer versions of the same cables. The increased cable lengths cause a slight delay for signals passing through the cables. WAAS SGS failures have been attributed to an errant pulse on the Safety Computer Comparator Card. The longer cables effectively move the pulse to a new location in time where the errant pulse has no detrimental effects.
03/25/2015	03/25/2015	NAPA (APC)	SSM - 42 a. This system support modification (SSM) provides a Firmware Upgrade for the Wide Area Augmentation System (WAAS) Wide-area Master Station (WMS) GPS Clock. The manufacturer and software maintenance organization, Zyfer, has provided this upgrade which corrects an invalid time offset that causes intermittent faults. WAAS WMS failures have been attributed to this fault. b. This SSM also replaces two cables connected between the WAAS Signal Generation Subsystem (SGS) Safety Computer and Signal Generator with longer versions of the same cables. The increased cable lengths cause a slight delay for signals passing through the cables. WAAS SGS failures have been attributed to an errant pulse on the Safety Computer Comparator Card. The longer cables effectively move the pulse to a new location in time where the errant pulse has no detrimental effects.
03/25/2015	03/25/2015	Atlanta (CnV)	SSM - 42 a. This system support modification (SSM) provides a Firmware Upgrade for the Wide Area Augmentation System (WAAS) Wide-area Master Station (WMS) GPS Clock. The manufacturer and software maintenance organization, Zyfer, has provided this upgrade which corrects an invalid time offset that causes intermittent faults. WAAS WMS failures have been attributed to this fault. b. This SSM also replaces two cables connected between the WAAS Signal Generation Subsystem (SGS) Safety Computer and Signal Generator with longer versions of the same cables. The increased cable lengths cause a slight delay for signals passing through the cables. WAAS SGS failures have been attributed to an errant pulse on the Safety Computer Comparator Card. The longer cables effectively move the pulse to a new location in time where the errant pulse has no detrimental effects.

START DATE	END DATE	LOCATION	EVENT DESCRIPTION
03/28/2015	03/28/2015	Washington D.C. (CnV)	SSM - 42 a. This system support modification (SSM) provides a Firmware Upgrade for the Wide Area Augmentation System (WAAS) Wide-area Master Station (WMS) GPS Clock. The manufacturer and software maintenance organization, Zyfer, has provided this upgrade which corrects an invalid time offset that causes intermittent faults. WAAS WMS failures have been attributed to this fault. b. This SSM also replaces two cables connected between the WAAS Signal Generation Subsystem (SGS) Safety Computer and Signal Generator with longer versions of the same cables. The increased cable lengths cause a slight delay for signals passing through the cables. WAAS SGS failures have been attributed to an errant pulse on the Safety Computer Comparator Card. The longer cables effectively move the pulse to a new location in time where the errant pulse has no detrimental effects.

Table 1-7 GUS Switchovers

Start Date	End Date	GUS Switch	Location/ Satellite	Service Affected	Event Description
1/1/2015	1/1/2015	Missed Navigation Message	GEO135, Napa (APC), Los Angeles (CnV)	LPV_Alaska, LPV200_Alaska	The Los Angles Corrections and Verification (C&V) system faulted and went off line. This resulted in the selected broadcast message source for the CRW GEO, PRN-135, automatically changing from the Los Angles C&V to the Atlanta C&V at 11:08:55 (GPS) after data was not received by the CRW uplink site from Los Angles for 1 second. The last to be broadcast message for CRW from Los Angles did not get sent to the Atlanta C&V before the Los Angles C&V went off line. This caused the Atlanta C&V to be unable to perform broadcast message validation for 1 second, resulting in a Zero Filled Type Zero (ZFTZ) alarm being broadcast on CRW. The ZFTZ causes user equipment to discard any stored data from CRW and reacquire fresh data. This resulted in a brief ~ 5 minute outage in the north west portion of Alaska where CRW is the only WAAS GEO in view. Note, the CRW uplink inserted a message with a deliberately bad CRC for the one second of missing data. This is done to initiate the user equipment time out processing. Please see plot(s): LP_1/1/2015 LPV_1/1/2015
1/3/2015	1/3/2015	Faulted	GEO133, Santa Paula (SZP)	None	GEO 133 switched to Paumalu, Santa_Paula faulted. TOW 581642-581656.
1/3/2015	1/3/2015	Faulted	GEO133, Paumalu (HDH)	None	GEO 133 switched to Santa_Paula, Paumalu faulted. TOW 551830-551845.

Start Date	End Date	GUS Switch	Location/ Satellite	Service Affected	Event Description
1/8/2015	1/8/2015	Manual	GEO138, Brewster (BRE-B)	None	GEO 138, manual switchover from Brewster-B to Woodbine. TOW 374465-374470.
1/20/2015	1/20/2015	Manual	GEO133, Paumalu (HDH)	None	GEO 133, manual switchover from Paumalu to Santa_Paula. TOW 249212-249217.
1/21/2015	1/21/2015	Faulted	GEO138, Woodbine (QWE)	None	GEO 138 switched to Brewster-B, Woodbine faulted. TOW 342636-342648.
1/27/2015	1/27/2015	Manual	GEO133, Santa Paula (SZP)	None	GEO 133, manual switchover from Santa_Paula to Paumalu. TOW 202457-202464.
3/8/2015	3/8/2015	Manual	GEO133 ,Paumalu (HDH)	None	GEO 133, manual switchover from Paumalu to Santa_Paula. TOW 45886-45893.
3/18/2015	3/18/2015	Manual	GEO138, Brewster-B (BRE-B)	None	GEO 138, manual switchover from Brewster-B to Woodbine. TOW 288016-288021.
3/21/2015	3/21/2015	Missed Navigation Message	GEO133, Santa_Paula (SZP), Atlanta (CnV)	None	Santa_Paula uplink switched C&V Source Select from Atlanta to Los Angeles. TOW 595582-595584.
3/25/2015	3/26/2015	Manual	NAPA (APC)	LPV_Alaska, LPV200_CONUS, LPV200_Alaska	The uplink for the CRW GEO, PRN-135 switched from the Napa uplink site to the Littleton uplink site at 8:00:38 GMT. This caused a 4 second outage of the GEO broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN-135. This also caused the UDRE for CRW to be elevated. The elevated UDRE for CRW affected LPV and LPV-200 service in Alaska starting at 09:10 and lasting for less than 90 minutes, and LPV-200 service in CONUS in Arizona starting at 08:01 GMT lasting for less than 2 minutes. LPV and LPV200 service in Alaska was affected on March 26 due to elevated UDRE on PRN-135.

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 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 1.51 meters at Atlantic City and 1.93 meters at Miami, respectively. The minimum 95% CONUS horizontal and vertical LPV errors were 0.693 meters at Oakland and 0.926 meters at Denver, respectively. The maximum 95% and 99.999% NPA horizontal errors were 7.90 meters at Honolulu and 16.43 meters, both at San Juan, respectively. The minimum 95% and 99.999% horizontal errors were 1.404 meters and 3.564 meters, both at Albuquerque, 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 3/17/2015 and 3/18/2015 position errors in CONUS, Alaska, Canada, and Mexico were elevated. On 2/07/2015 position errors in CONUS, Alaska, and Mexico were elevated. On 1/26/2015, 3/02/2015, and 3/29/15 position errors in CONUS and Alaska were elevated. On 2/02/15 position errors in Alaska were elevated. On 1/04/2015 and 1/07/2015 position errors in Alaska and Canada were elevated. The increases in 95% NPA position errors on 1/02/2015, 1/04/2015, 1/07/2015, 1/21/2015, 1/26/2015, 2/17/2015, 2/18/2015, 2/23/2015, 3/02/2015, 3/17/2015, 3/18/2015, 3/22/2015, and 3/29/2015 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	1.510	1.512	1.706	100	*	*
Grand Forks	1.289	1.289	1.611	100	*	*
Oklahoma City	1.049	1.049	1.337	100	*	*
Albuquerque	0.694	0.694	0.932	100	2.285	4.185
Anchorage	0.828	0.828	1.370	100	*	*
Atlanta	0.842	0.842	1.353	100	2.696	4.090
Barrow	0.849	0.851	1.892	99.99532	*	*
Bethel	0.712	0.712	1.145	100	2.282	5.603
Billings	0.861	0.861	1.148	100	2.181	4.071
Boston	0.902	0.902	1.151	100	2.651	4.004
Chicago	0.941	0.942	1.065	100	*	*
Cleveland	0.881	0.882	1.087	100	2.597	4.035
Cold Bay	0.806	0.806	1.128	100	*	*
Dallas	0.788	0.788	1.272	100	*	*
Denver	0.705	0.705	0.926	100	*	*
Fairbanks	0.762	0.763	1.399	100	2.422	5.508
Gander	1.063	1.069	1.368	100	*	*
Goose Bay	1.082	1.092	1.448	100	*	*
Houston	0.876	0.876	1.575	100	2.742	4.319
Iqaluit	1.310	1.333	2.344	100	*	*
Jacksonville	0.860	0.860	1.665	100	*	*
Juneau	0.813	0.813	1.355	100	*	*
Kansas City	0.735	0.735	0.992	100	2.507	4.217
Kotzebue	0.800	0.801	1.470	99.99538	2.465	5.777
Los Angeles	0.697	0.697	1.067	100	2.168	4.629
Memphis	0.825	0.825	1.128	100	*	*
Merida	0.837	0.837	1.879	100	*	*
Mexico City	0.890	0.889	2.623	100	*	*
Miami	1.016	1.016	1.930	100	3.111	4.348
Minneapolis	0.844	0.844	1.091	100	2.371	4.166
New York	0.950	0.952	1.177	100	*	*
Oakland	0.693	0.693	0.987	100	2.182	4.806
Puerto Vallarta	0.940	0.940	1.968	100	*	*
Salt Lake City	0.747	0.747	0.989	100	2.191	4.261
San Jose Del Cabo	0.987	0.987	2.034	100	*	*
Seattle	0.879	0.879	1.106	100	2.055	4.288
Washington DC	0.933	0.935	1.138	100	2.700	4.087
Winnipeg	0.795	0.795	1.288	100	*	*

* = SPS Data not processed.

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

Location	95% Horizontal (meters)	99.999% Horizontal (meters)	Percentage in NPA mode (%)	Maximum Horizontal Error
Albuquerque	1.404	3.564	100	3.772
Anchorage	2.097	4.201	100	4.342
Atlanta	1.644	4.995	100	5.191
Barrow	2.476	5.158	99.999	5.300
Bethel	1.964	4.329	100	4.505
Billings	1.703	5.457	100	5.627
Boston	1.867	4.291	100	4.422
Cleveland	1.700	3.864	100	4.040
Cold Bay	1.550	4.215	100	4.390
Fairbanks	2.200	4.720	100	4.929
Gander	1.944	6.824	100	7.117
Honolulu	7.897	14.378	100	14.869
Houston	1.994	6.154	100	6.368
Iqaluit	3.117	8.622	100	8.815
Juneau	1.890	4.811	100	5.022
Kansas City	1.487	4.415	100	4.776
Kotzebue	2.154	4.105	99.999	6.823
Los Angeles	1.701	5.096	100	5.272
Merida	2.569	7.649	100	7.881
Miami	2.169	7.145	100	7.334
Minneapolis	1.685	4.299	100	4.478
Oakland	1.416	3.780	100	3.973
Salt Lake City	1.464	4.940	100	5.162
San Jose Del Cabo	2.603	8.037	100	8.239
San Juan	4.130	16.428	100	16.723
Seattle	1.522	4.189	100	4.557
Tapachula	4.031	15.124	100	15.375
Washington DC	1.858	5.389	100	5.510

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	4.625	0.118	0.235	3.964	0.151	0.206
Grand Forks	2.922	0.183	0.253	3.842	0.166	0.205
Oklahoma City	2.341	0.195	0.249	4.141	0.107	0.231
Albuquerque	1.732	0.167	0.169	2.897	0.120	0.155
Anchorage	2.508	0.153	0.171	5.067	0.111	0.188
Atlanta	2.075	0.116	0.200	6.059	0.124	0.206
Barrow	3.392	0.092	0.178	8.080	0.201	0.229
Bethel	2.586	0.152	0.152	3.705	0.125	0.166
Billings	2.143	0.172	0.212	3.528	0.132	0.193
Boston	4.728	0.169	0.188	5.476	0.167	0.205
Chicago	2.908	0.077	0.199	4.777	0.124	0.198
Cleveland	2.895	0.132	0.214	5.951	0.144	0.190
Cold Bay	2.423	0.092	0.117	3.814	0.109	0.122
Dallas	1.941	0.154	0.182	3.501	0.118	0.179
Denver	2.648	0.253	0.260	2.817	0.135	0.154
Fairbanks	3.893	0.138	0.316	6.371	0.151	0.266
Gander	3.277	0.106	0.151	4.999	0.126	0.148
Goose Bay	4.127	0.246	0.246	5.965	0.124	0.206
Houston	2.461	0.211	0.224	3.437	0.178	0.222
Iqaluit	6.013	0.166	0.174	9.826	0.212	0.236
Jacksonville	2.461	0.176	0.201	3.788	0.144	0.229
Juneau	2.583	0.100	0.205	4.999	0.101	0.220
Kansas City	3.201	0.164	0.310	3.649	0.199	0.205
Kotzebue	3.495	0.123	0.152	5.662	0.144	0.176
Los Angeles	1.779	0.145	0.145	2.906	0.119	0.135
Memphis	2.333	0.135	0.207	4.512	0.107	0.175
Merida	2.791	0.120	0.151	4.167	0.123	0.215
Mexico City	2.314	0.108	0.136	5.263	0.185	0.198
Miami	3.587	0.150	0.193	4.167	0.157	0.199
Minneapolis	2.476	0.103	0.198	4.206	0.157	0.169
New York	3.956	0.133	0.159	5.098	0.165	0.226
Oakland	1.981	0.148	0.154	2.893	0.099	0.152
Puerto Vallarta	2.415	0.149	0.151	5.224	0.175	0.175
Salt Lake City	2.840	0.252	0.261	2.625	0.144	0.180
San Jose Del Cabo	2.437	0.089	0.170	5.208	0.146	0.196
Seattle	2.175	0.159	0.174	3.255	0.119	0.189
Washington DC	4.173	0.156	0.182	4.328	0.151	0.182
Winnipeg	2.643	0.134	0.203	4.807	0.178	0.215

Figure 2-1 LPV 95% Horizontal Accuracy

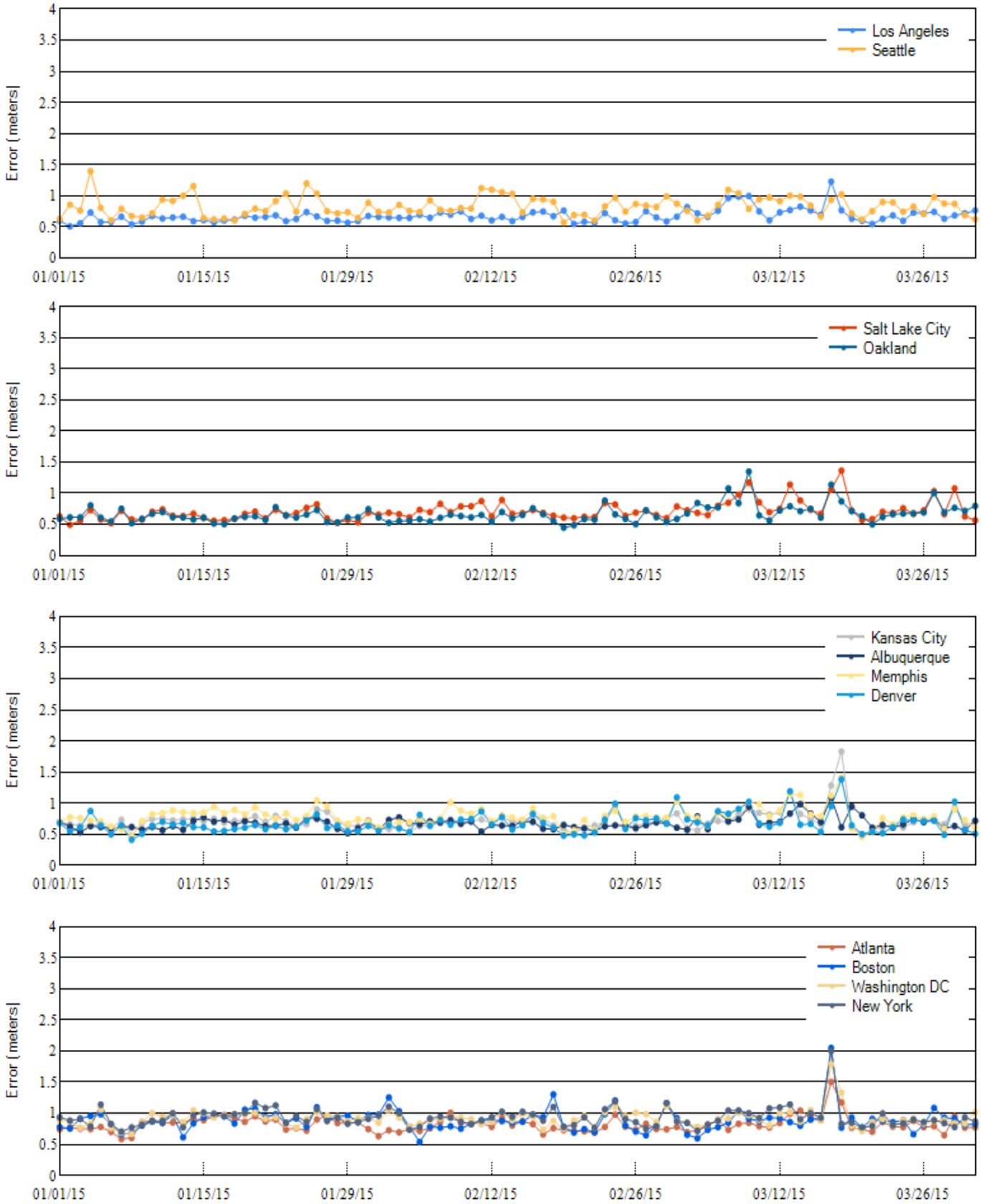


Figure 2-2 LPV 95% Horizontal Accuracy

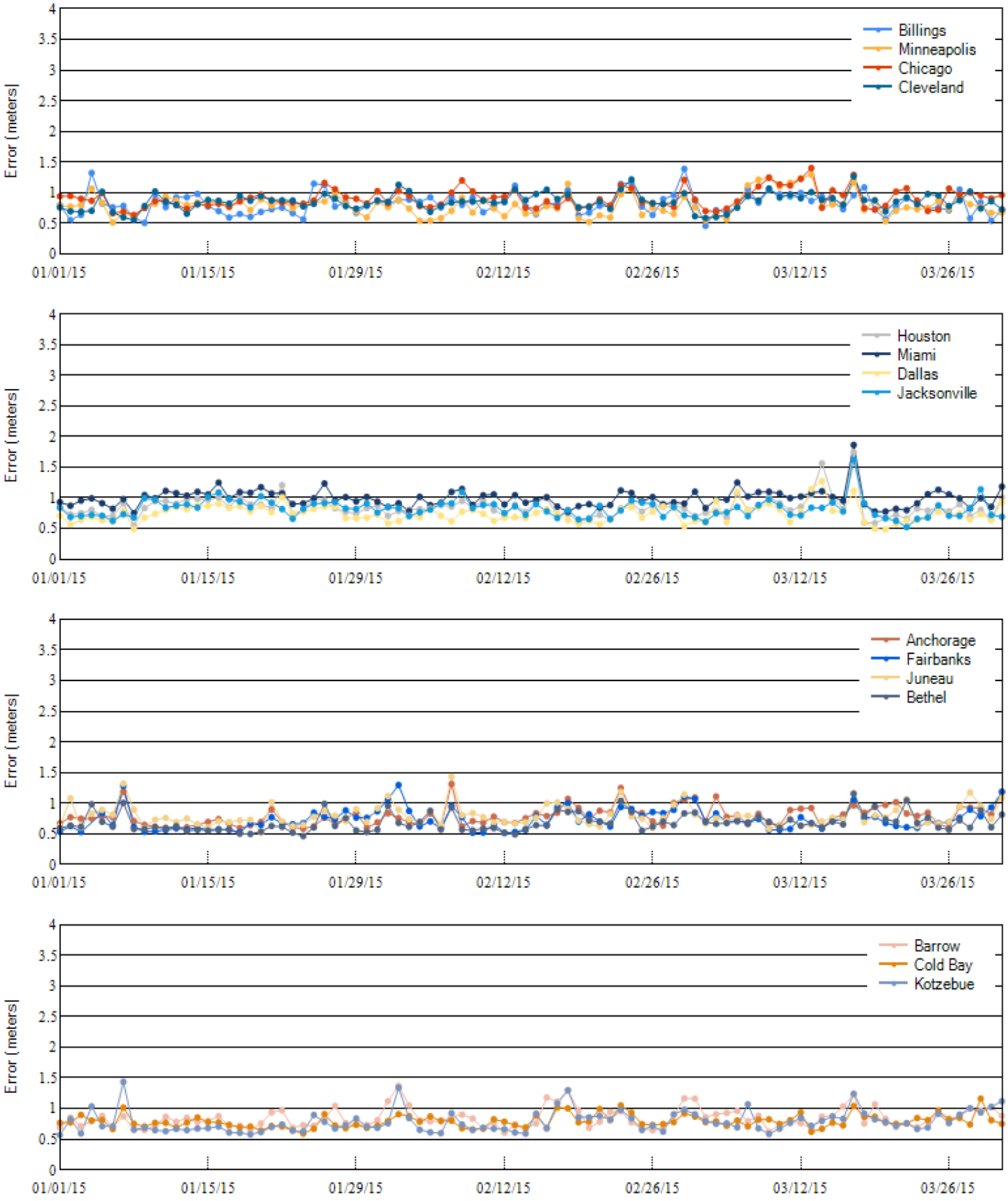


Figure 2-3 LPV 95% Horizontal Accuracy

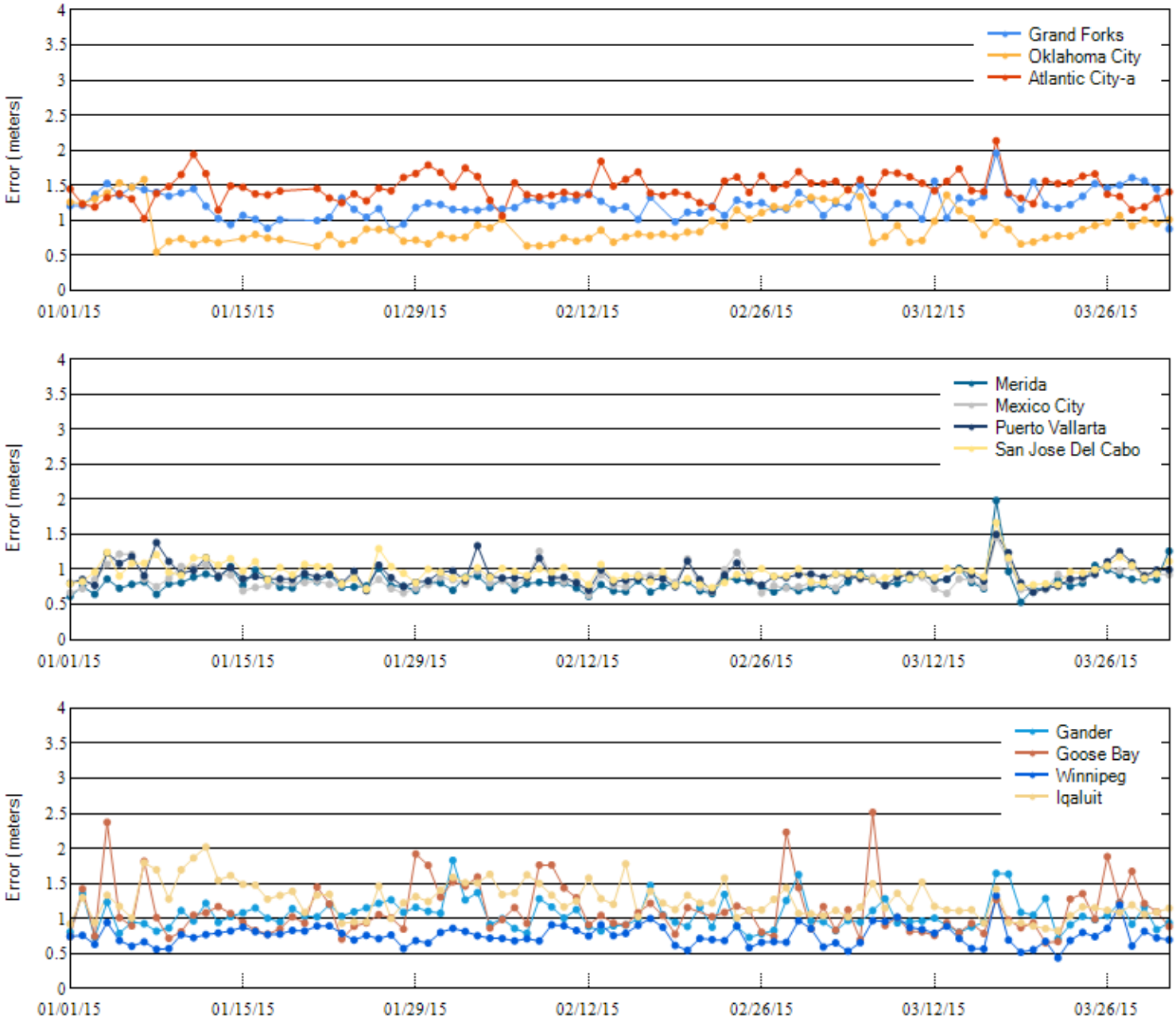


Figure 2-4 LPV 95% Vertical Accuracy

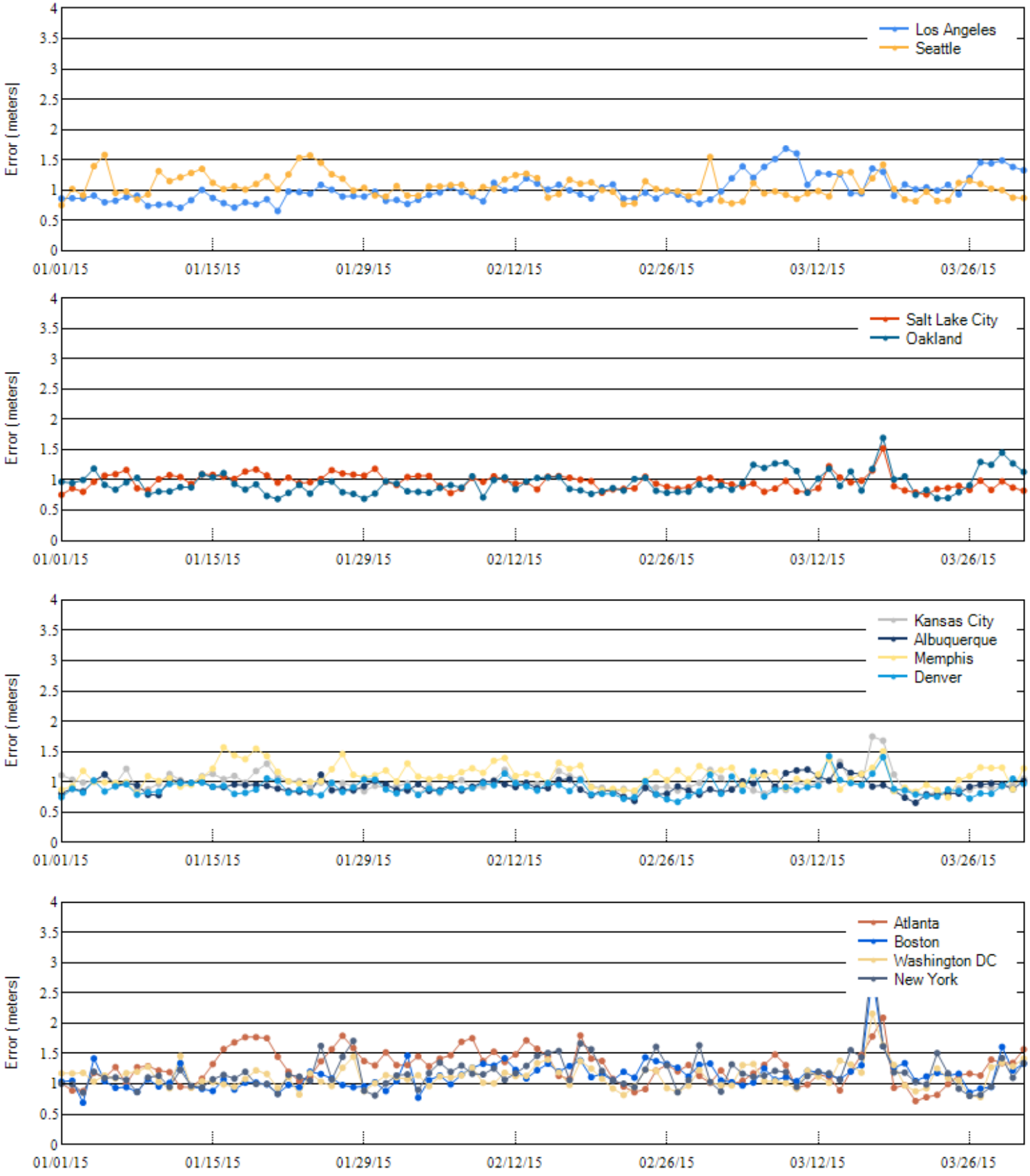


Figure 2-5 LPV 95% Vertical Accuracy

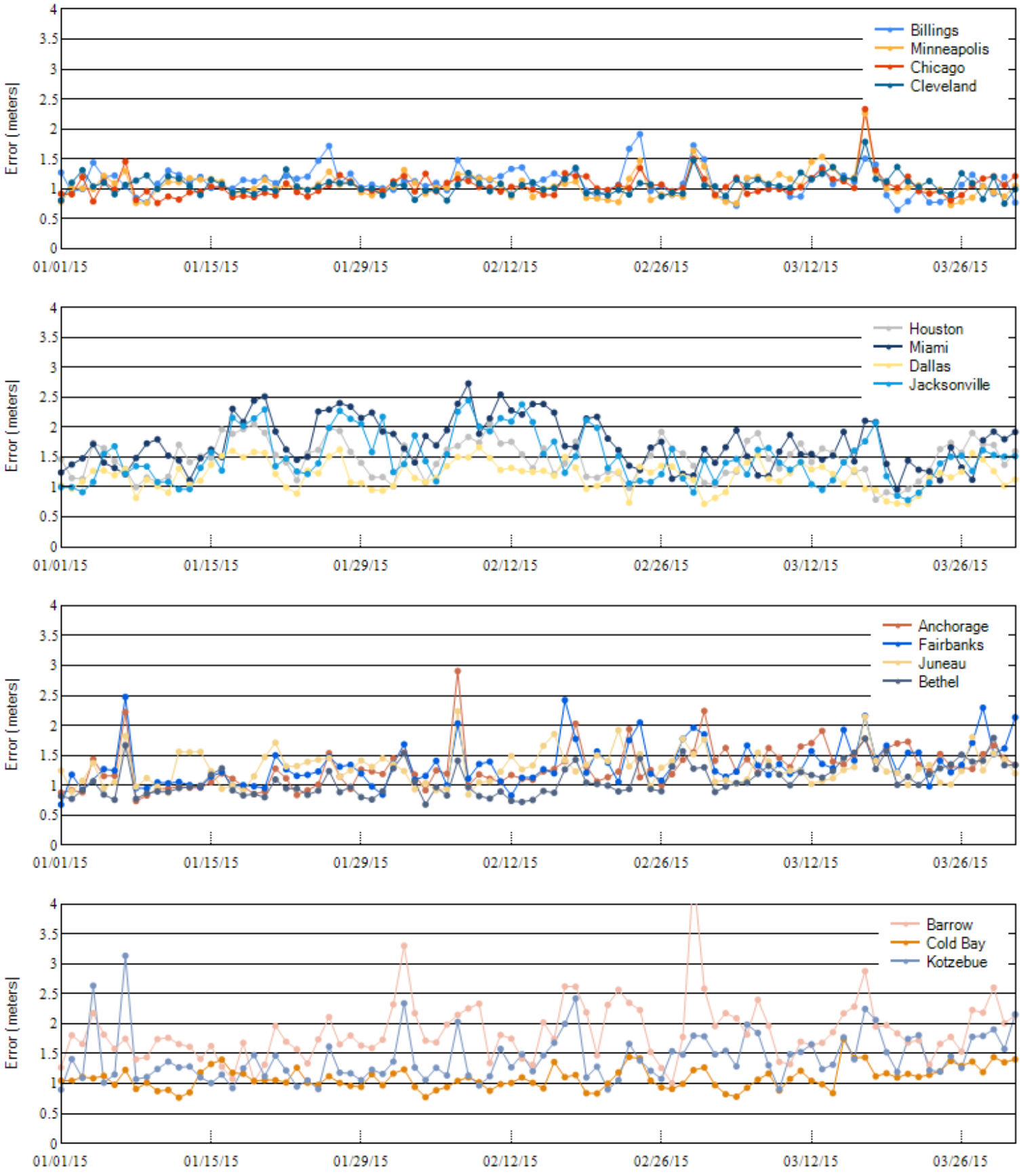


Figure 2-6 LPV 95% Vertical Accuracy

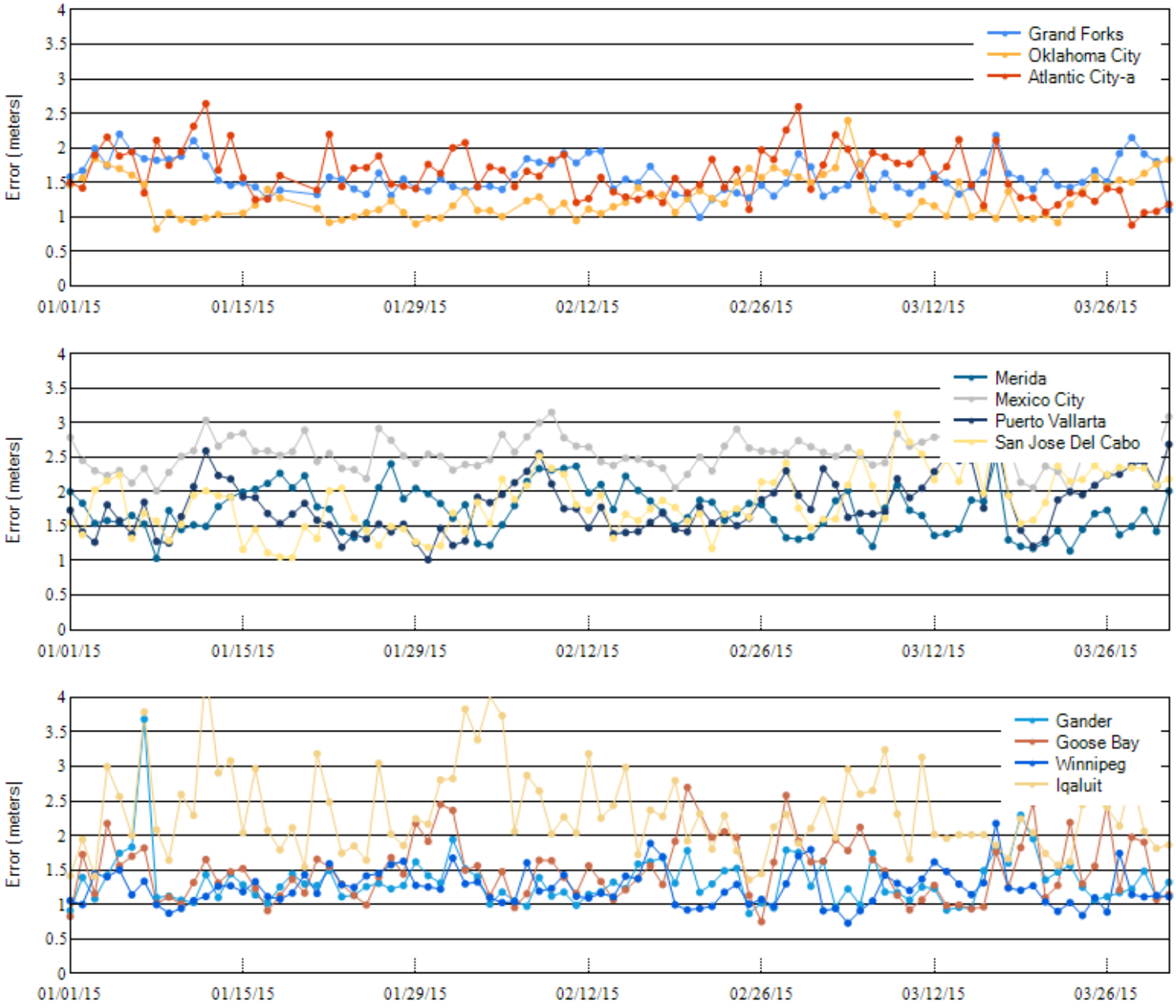


Figure 2-7 NPA 95% Horizontal Accuracy

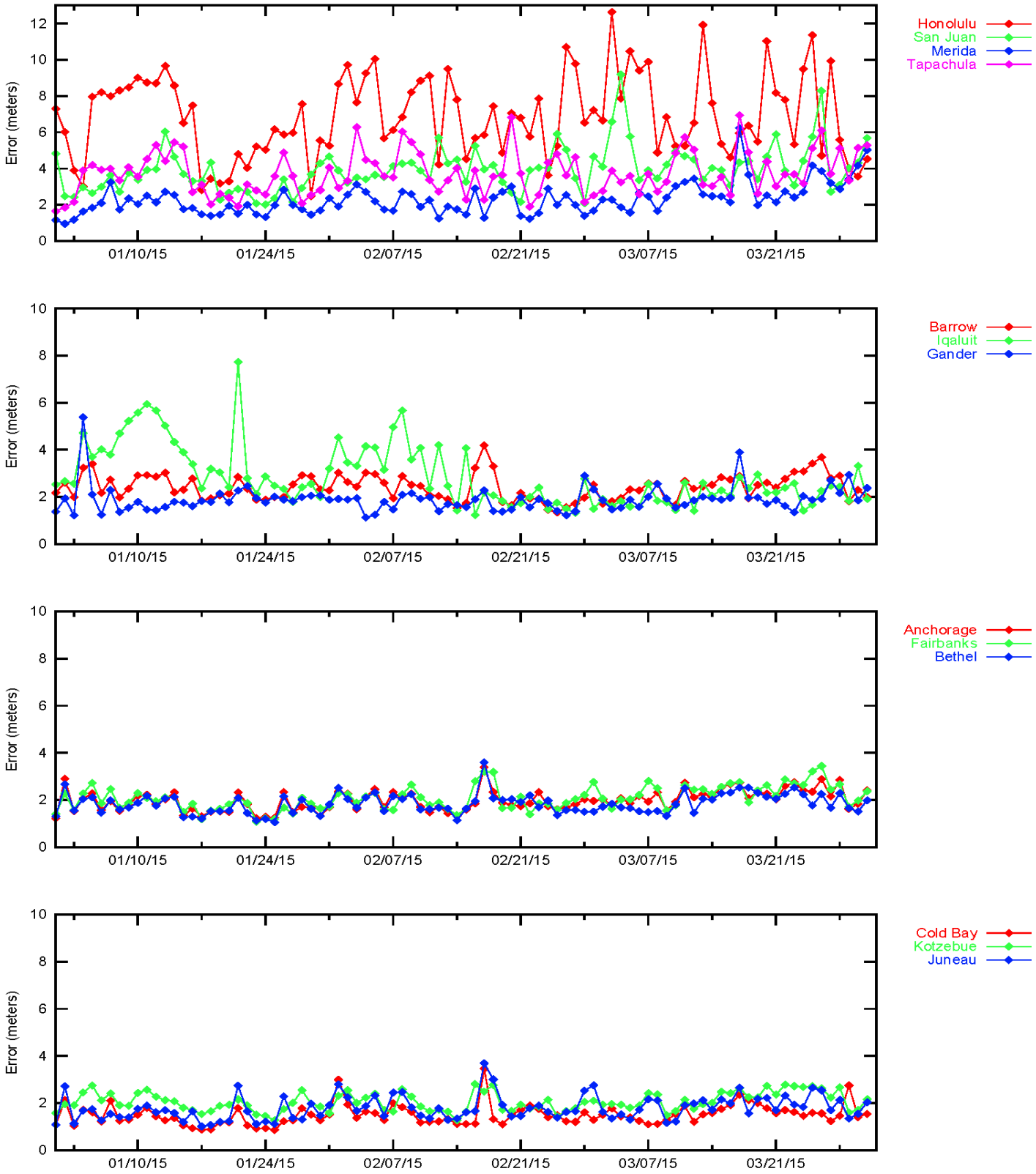


Figure 2-8 NPA 95% Horizontal Accuracy

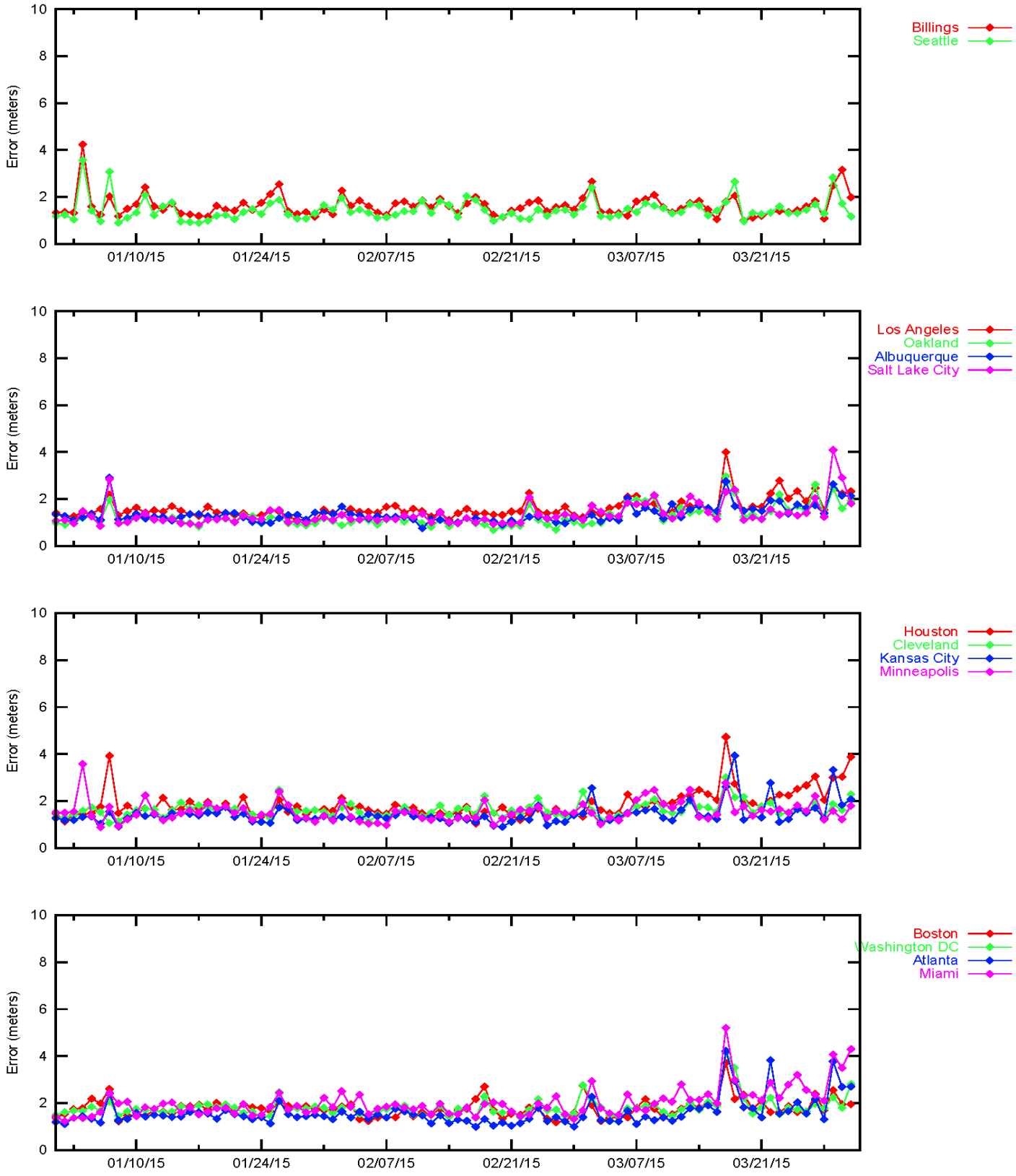


Figure 2-9 LPV Horizontal Error Bounding Triangle Chart

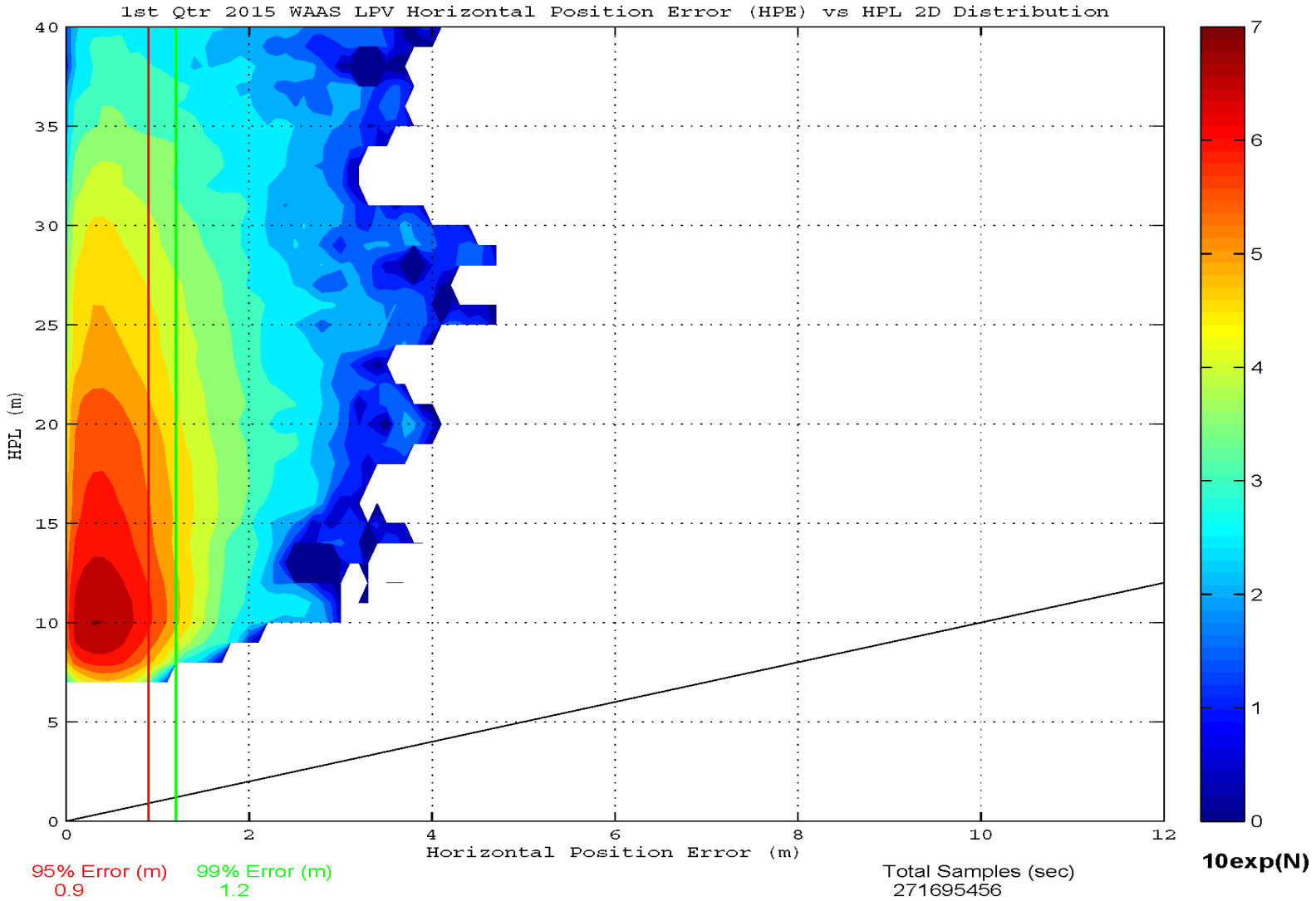


Figure 2-10 LPV Vertical Error Bounding Triangle Chart

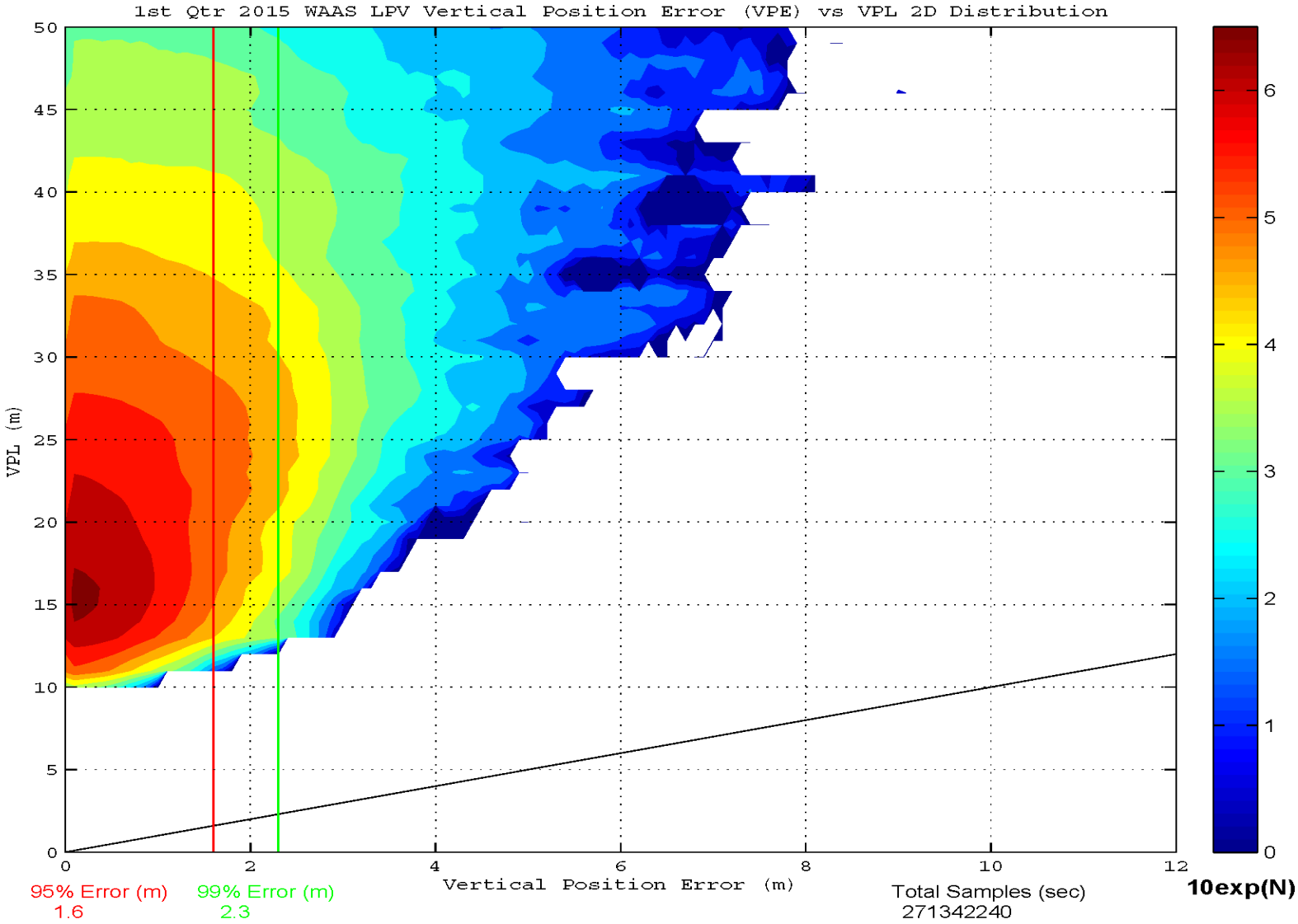


Figure 2-11 LPV 2-D Horizontal Error Distribution Histogram

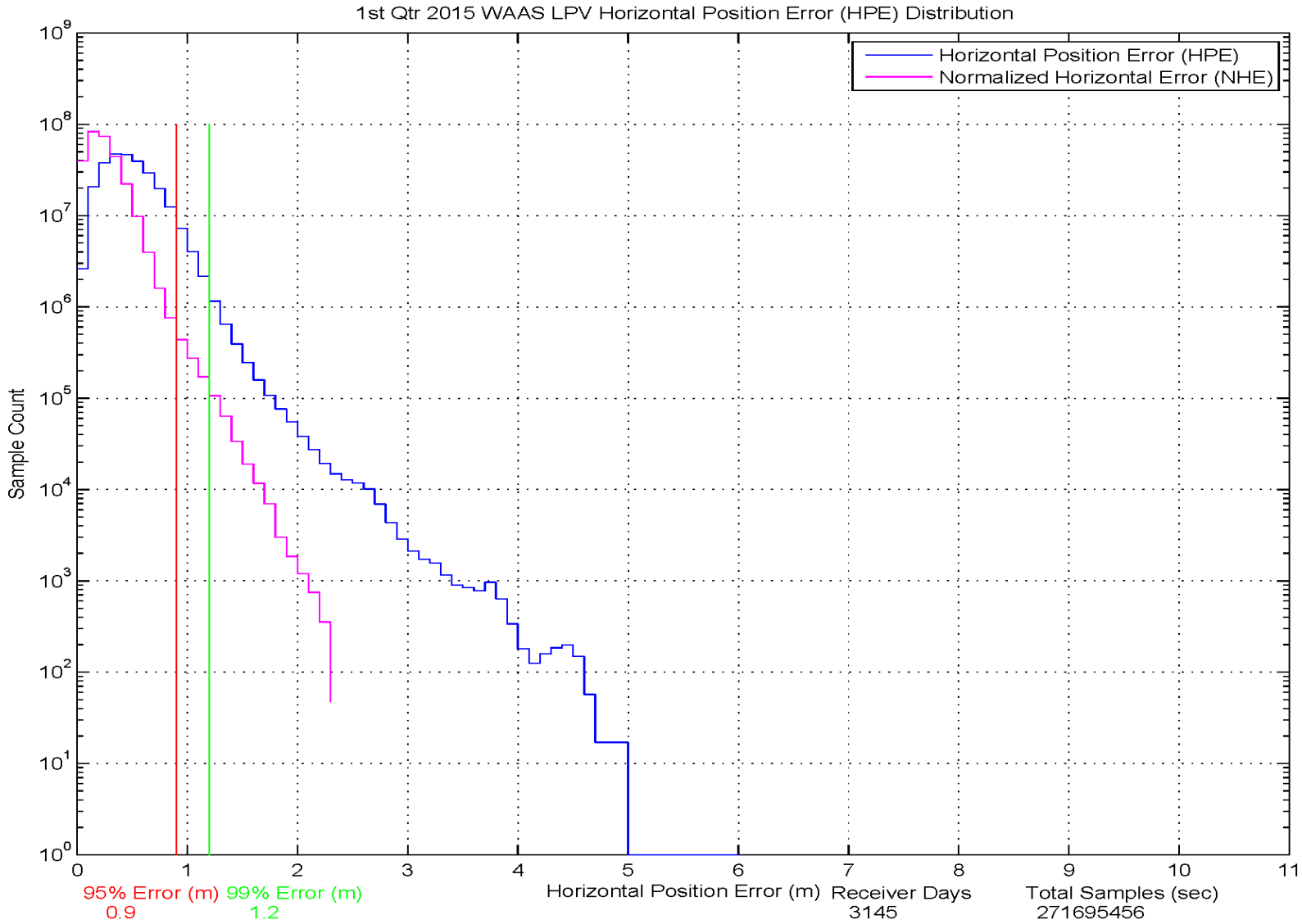
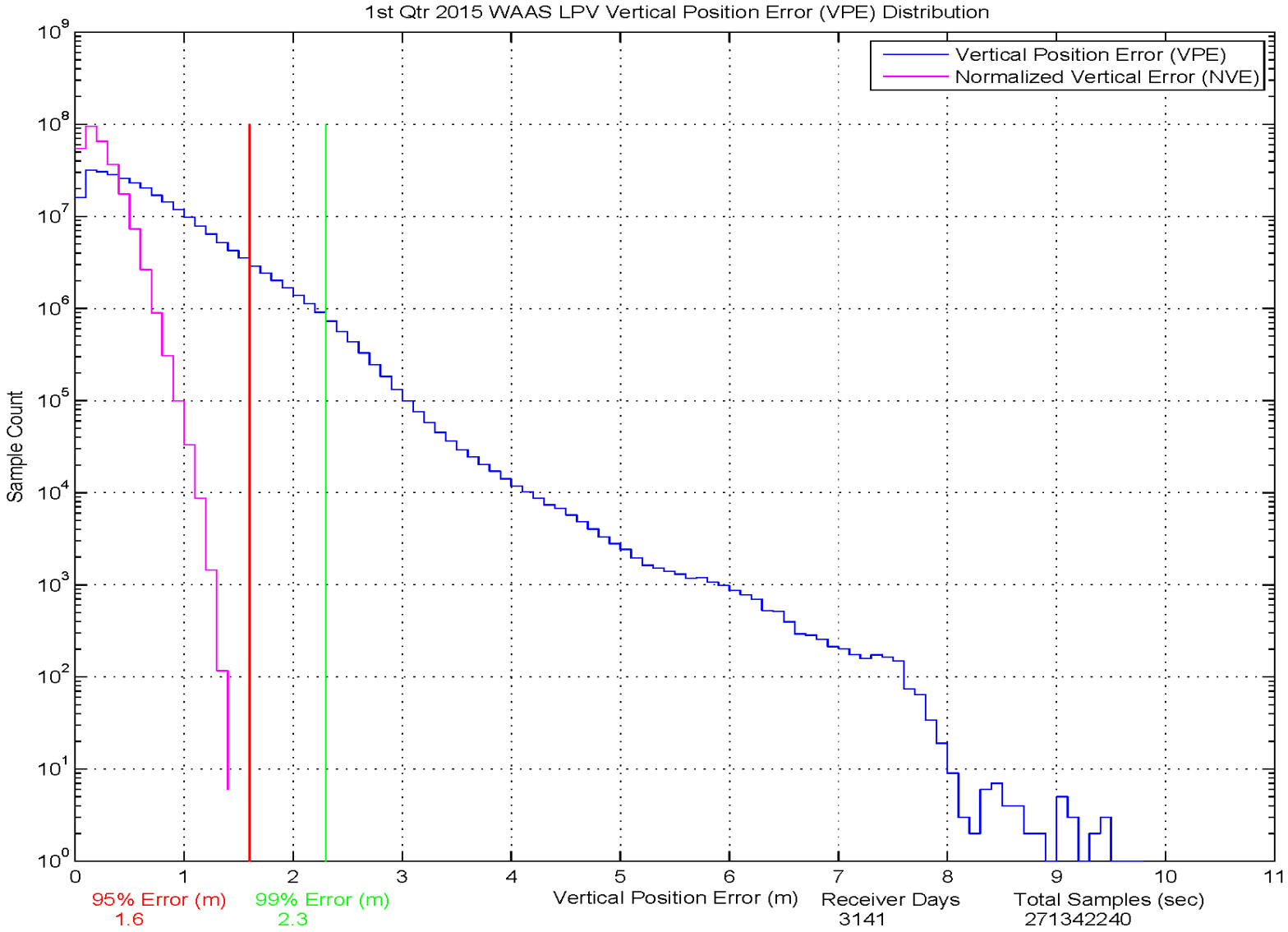


Figure 2-12 LPV 2-D Vertical Error Distribution Histogram



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 17.90 meters and 30.07 meters, both at Oakland. The minimum 99% CONUS HPL and VPL are 11.59 meters at Memphis and 20.70 meters at Salt Lake City. The maximum 99% Alaska HPL and VPL are 29.43 meters at Cold Bay and 45.21 meters at Barrow. The minimum 99% Alaska HPL and VPL are 14.87 meters and 25.95 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.

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

- On January 4, geomagnetic activity elevated GIVE values resulting in a slight reduction of LPV/LPV200 availability.
- On February 6, planned maintenance on PRN-30 slightly affected LPV200 availability.
- February 17, elevated GIVE values due to geomagnetic activity caused minor loss of LPV availability.
- On February 20, planned maintenance on PRN-11 resulted in slight degradation in LPV200 availability.
- On March 3, geomagnetic activity elevated GIVE values and affected LPV200 availability.
- On March 5, planned maintenance on PRN-14 caused minor loss in LPV/ LPV200 availability.
- On March 12, planned maintenance on PRN-29 resulting in a slight reduction of LPV/ LPV200 availability.
- On March 17-18, high GIVE values due to geomagnetic activity affected LPV/LPV200 availability.
- On March 30-31, planned maintenance on PRN-32 caused minor degradation in LPV200 availability.

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

- On January 7 and February 7, geomagnetic activity elevated GIVE values and caused slight degradation in LPV/LPV200 availability.
- On February 17, high GIVE values due to geomagnetic activity resulted in minor reduction of LPV200 availability.
- On March 12, planned maintenance on PRN-29 caused degradation in LPV/ LPV200 availability.
- On March 17, geomagnetic activity elevated GIVE values and slightly affected LPV/LPV200 availability.

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

- On January 4, January 7, January 21, February 1-2, and February 17-18, geomagnetic activity elevated GIVE values and resulted in degradation of LPV/LPV200 availability.
- On February 29-March 2, geomagnetic activity elevated GIVE values and affected LPV200 availability.
- On March 12, planned maintenance on PRN-29 caused degradation in LPV/ LPV200 availability.
- On March 17-18 high GIVE values due to geomagnetic activity caused minor loss of LPV/LPV200 availability.

Radio frequency interference (RFI) caused localized loss of availability at several WAAS reference stations, but had no effect on WAAS service. RFI events were observed on the following days:

- On January 12-13, January 22, March 18, and March 25, LPV/LPV200 availability was affected at Boston.
- On January 14, LPV200 availability was affected at Washington, DC.
- On February 9, LPV/LPV200 availability was affected at Miami.
- On February 16, LPV/LPV200 availability was affected at San Jose Del Cabo.
- On March 5, LPV200 availability was affected at Los Angeles.
- On March 28, LPV200 availability was affected at Chicago.

Table 3-1 99% Protection Level

Location	99% HPL (meters)	99% VPL (meters)	Percentage in PA mode (%)
Atlantic City	14.113	24.319	100
Grand Forks	16.265	25.123	100
Oklahoma City	12.236	23.691	100
Albuquerque	11.865	25.001	100
Anchorage	15.355	26.247	100
Atlanta	12.560	22.896	100
Barrow	20.439	45.211	99.995320
Bethel	19.416	31.283	100
Billings	15.444	24.756	100
Boston	15.533	24.738	100
Chicago	12.184	22.503	100
Cleveland	14.106	25.120	100
Cold Bay	29.425	40.895	100
Dallas	12.389	22.814	100
Denver	12.852	24.220	100
Fairbanks	15.562	28.463	100
Gander	28.801	45.784	100
Goose Bay	23.276	36.843	100
Houston	12.096	23.005	100
Iqaluit	38.793	54.632	100
Jacksonville	13.706	24.352	100
Juneau	14.870	25.949	100
Kansas City	12.052	22.626	100
Kotzebue	18.915	38.095	99.995380
Los Angeles	14.727	27.695	100
Memphis	11.592	22.935	100
Merida	20.445	36.201	100
Mexico City	29.795	41.154	100
Miami	17.616	28.484	100
Minneapolis	13.464	24.908	100
New York	14.642	24.445	100
Oakland	17.905	30.073	100
Puerto Vallarta	32.566	55.354	100
Salt Lake City	13.945	20.699	100
San Jose Del Cabo	28.232	42.873	100
Seattle	14.830	23.829	100
Washington DC	13.323	24.098	100
Winnipeg	16.921	24.796	100

Table 3-2 Quarterly Availability Statistics

Location	LP WAAS Availability (%) With 15 minute window	LPV WAAS Availability (%) With 15 minute window	LPV 200 WAAS Availability (%) With 15 minute window
Atlantic City	99.93	99.92	99.89
Grand Forks	100	100	99.99
Oklahoma City	100	100	99.98
Albuquerque	100	100	100
Anchorage	99.96	99.93	99.86
Atlanta	100	99.95	99.94
Barrow	99.90	99.50	95.85
Bethel	99.98	99.92	99.73
Billings	100	100	100
Boston	99.97	99.93	99.87
Chicago	99.94	99.93	99.90
Cleveland	99.93	99.86	99.86
Cold Bay	100	99.93	90.96
Dallas	100	100	99.99
Denver	100	100	99.99
Fairbanks	99.96	99.88	99.71
Gander	99.61	99.42	88.31
Goose Bay	99.62	99.54	98.40
Houston	100	100	100
Iqaluit	99.04	97.87	83.60
Jacksonville	100	100	99.98
Juneau	99.99	99.94	99.84
Kansas City	100	100	99.98
Kotzebue	99.94	99.82	97.42
Los Angeles	100	100	99.97
Memphis	99.98	99.94	99.94
Merida	100	99.35	98.70
Mexico City	99.99	99.51	93.53
Miami	100	100	99.94
Minneapolis	100	100	99.98
New York	99.95	99.92	99.88
Oakland	100	100	99.96
Puerto Vallarta	99.98	98.20	87.65
Salt Lake City	100	100	99.99
San Jose Del Cabo	100	99.95	94.28
Seattle	100	100	100
Washington DC	99.91	99.90	99.88
Winnipeg	100	100	99.99

Table 3-3 NPA Availability

Location	NPA Availability (%) (Excluding RAIM/FDE)
Albuquerque	100
Anchorage	100
Atlanta	100
Barrow	99.999
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	99.999
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	3	0.00006	3	0.00006	3	0.00006
Grand Forks	0	0	0	0	1	0.00002
Oklahoma City	0	0	0	0	1	0.00002
Albuquerque	0	0	0	0	1	0.000019
Anchorage	2	0.000039	5	0.000097	6	0.000116
Atlanta	0	0	2	0.000039	2	0.000039
Barrow	8	0.000155	55	0.001067	252	0.005073
Bethel	1	0.000019	4	0.000077	47	0.000909
Billings	0	0	0	0	1	0.000019
Boston	6	0.000116	8	0.000154	10	0.000193
Chicago	4	0.000077	4	0.000077	4	0.000077
Cleveland	5	0.000097	2	0.000039	2	0.000039
Cold Bay	1	0.000019	3	0.000058	511	0.010838
Dallas	0	0	0	0	1	0.000019
Denver	0	0	0	0	1	0.000019
Fairbanks	5	0.000097	5	0.000097	47	0.000912
Gander	6	0.000116	28	0.000543	500	0.010922
Goose Bay	6	0.000117	14	0.000272	155	0.003049
Houston	0	0	0	0	0	0
Iqaluit	35	0.000682	131	0.002583	652	0.015053
Jacksonville	0	0	0	0	2	0.000039
Juneau	3	0.000058	3	0.000058	9	0.000174
Kansas City	0	0	1	0.000019	2	0.000039
Kotzebue	5	0.000097	15	0.00029	157	0.003109
Los Angeles	0	0	1	0.000019	2	0.000039
Memphis	1	0.000019	2	0.000039	2	0.000039
Merida	0	0	76	0.001476	130	0.002542
Mexico City	2	0.000039	93	0.001803	562	0.011593
Miami	1	0.000019	1	0.000019	6	0.000116
Minneapolis	0	0	0	0	1	0.000019
New York	3	0.000058	3	0.000058	2	0.000039
Oakland	0	0	0	0	12	0.000232
Puerto Vallarta	16	0.000309	140	0.002754	634	0.013973
Salt Lake City	0	0	0	0	1	0.000019
San Jose Del Cabo	1	0.000019	15	0.00029	386	0.007905
Seattle	0	0	0	0	0	0
Washington DC	3	0.000058	3	0.000058	5	0.000097
Winnipeg	0	0	0	0	2	0.000039

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

Location	NPA Outages	NPA Outage Rate
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

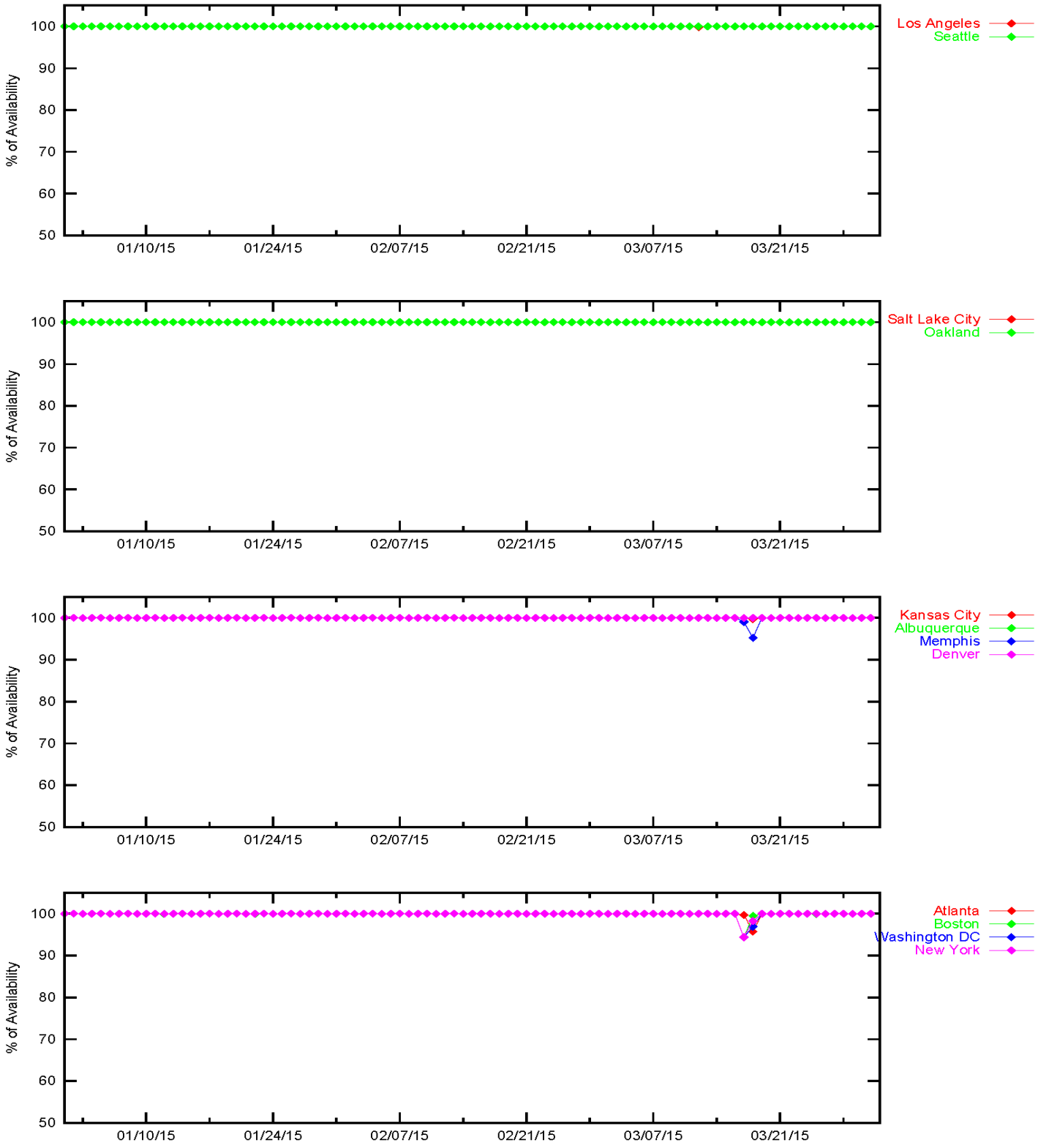


Figure 3-2 LPV Instantaneous Availability

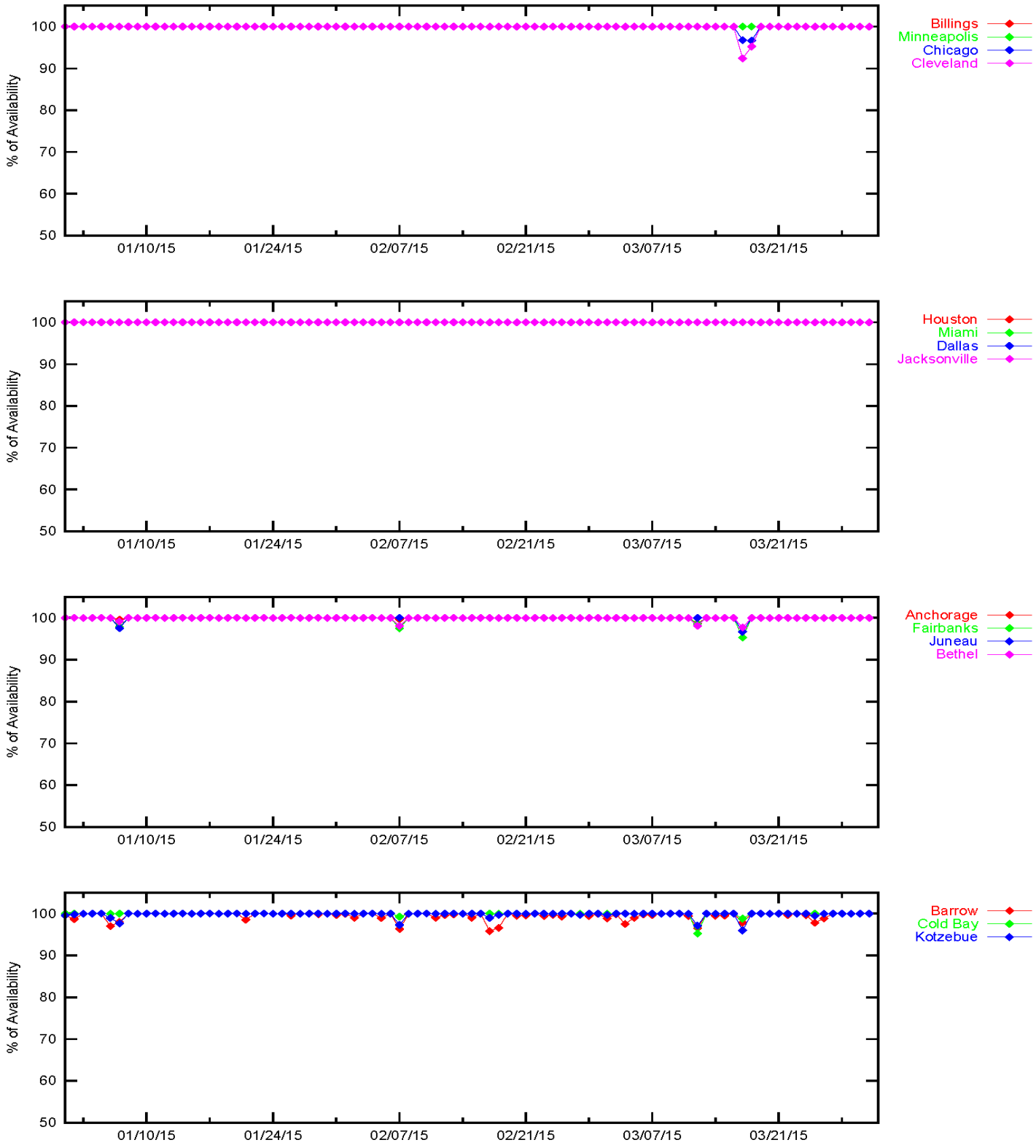


Figure 3-3 LPV Instantaneous Availability

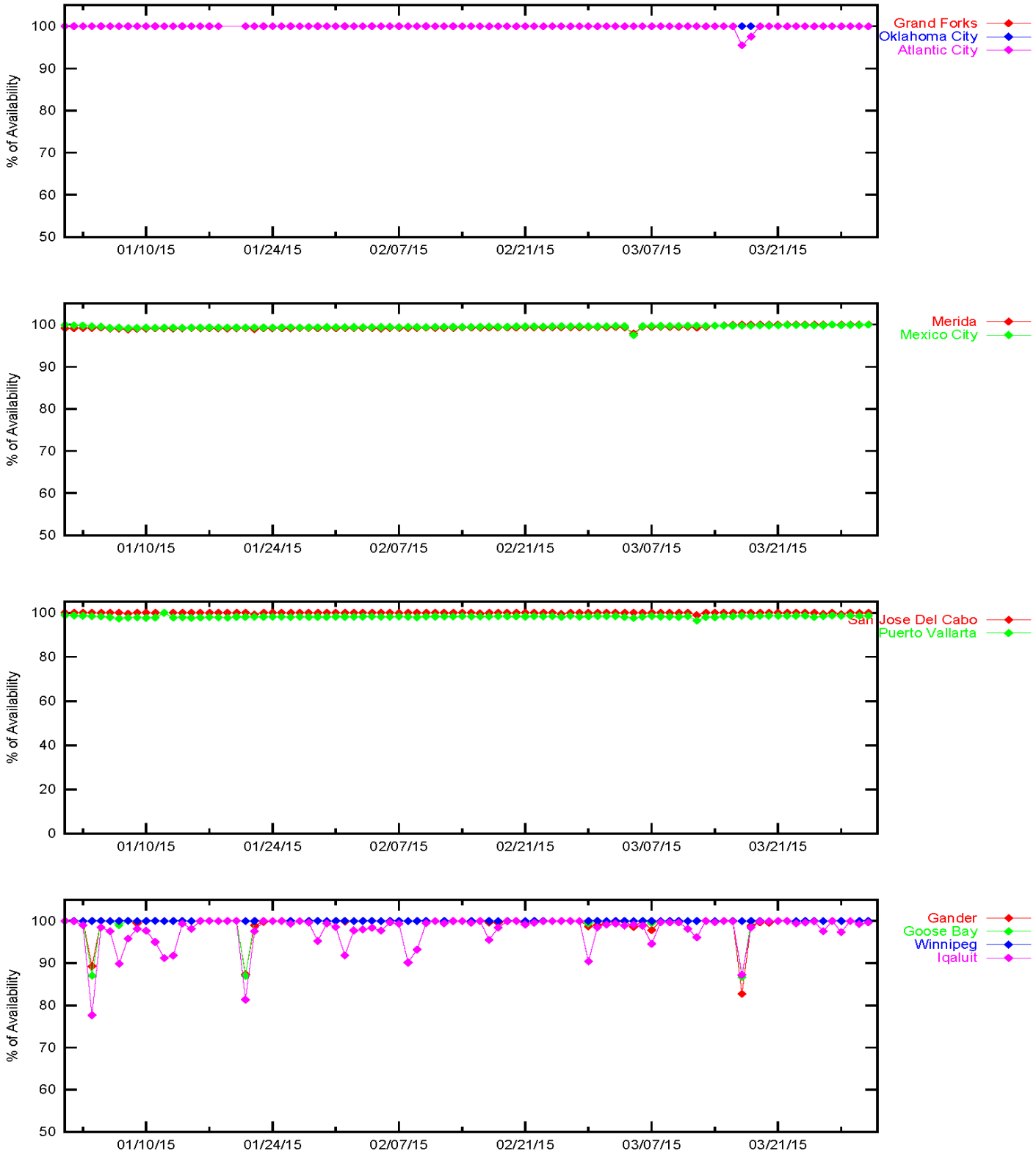


Figure 3-4 LPV 200 Instantaneous Availability

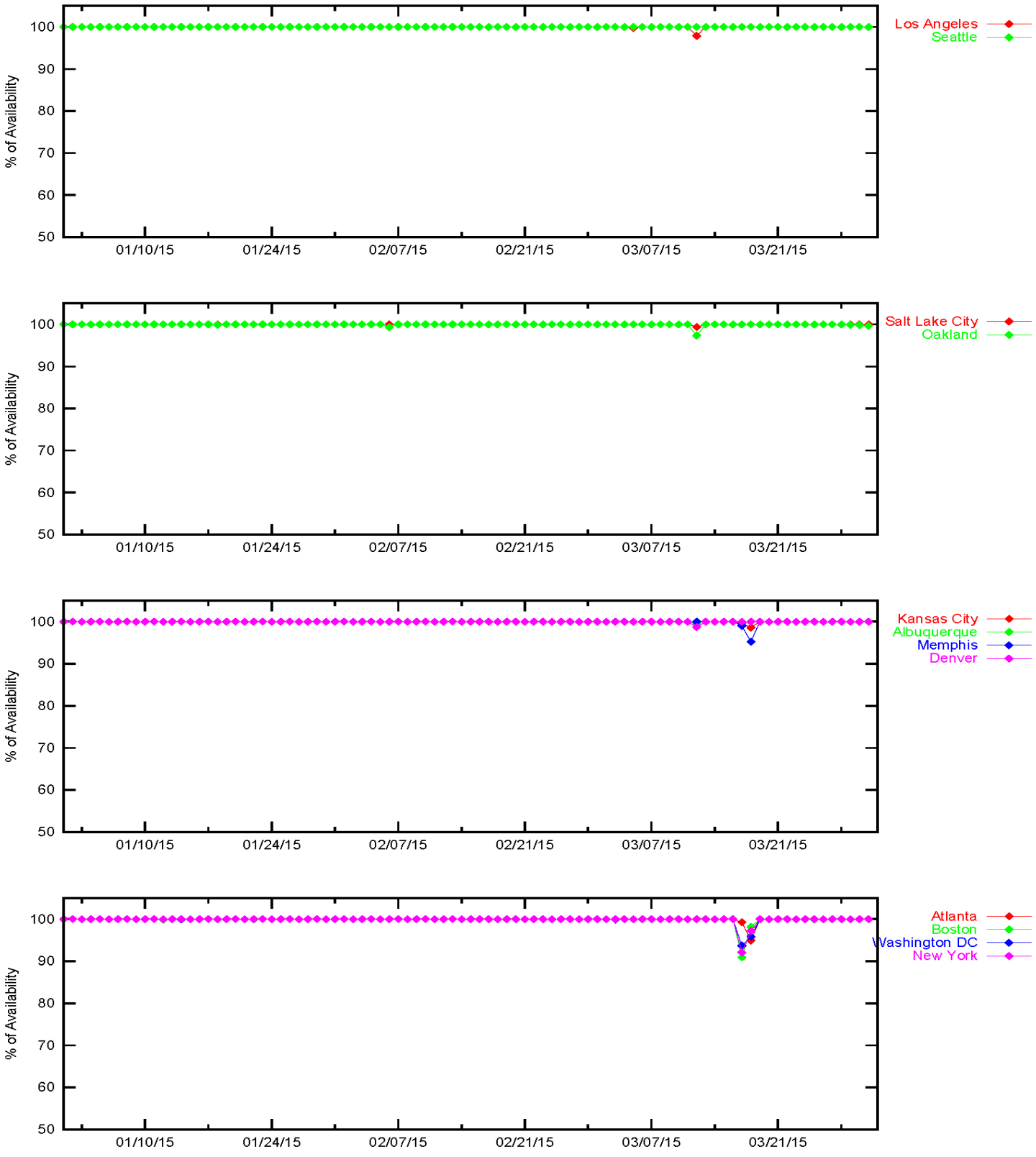


Figure 3-5 LPV 200 Instantaneous Availability

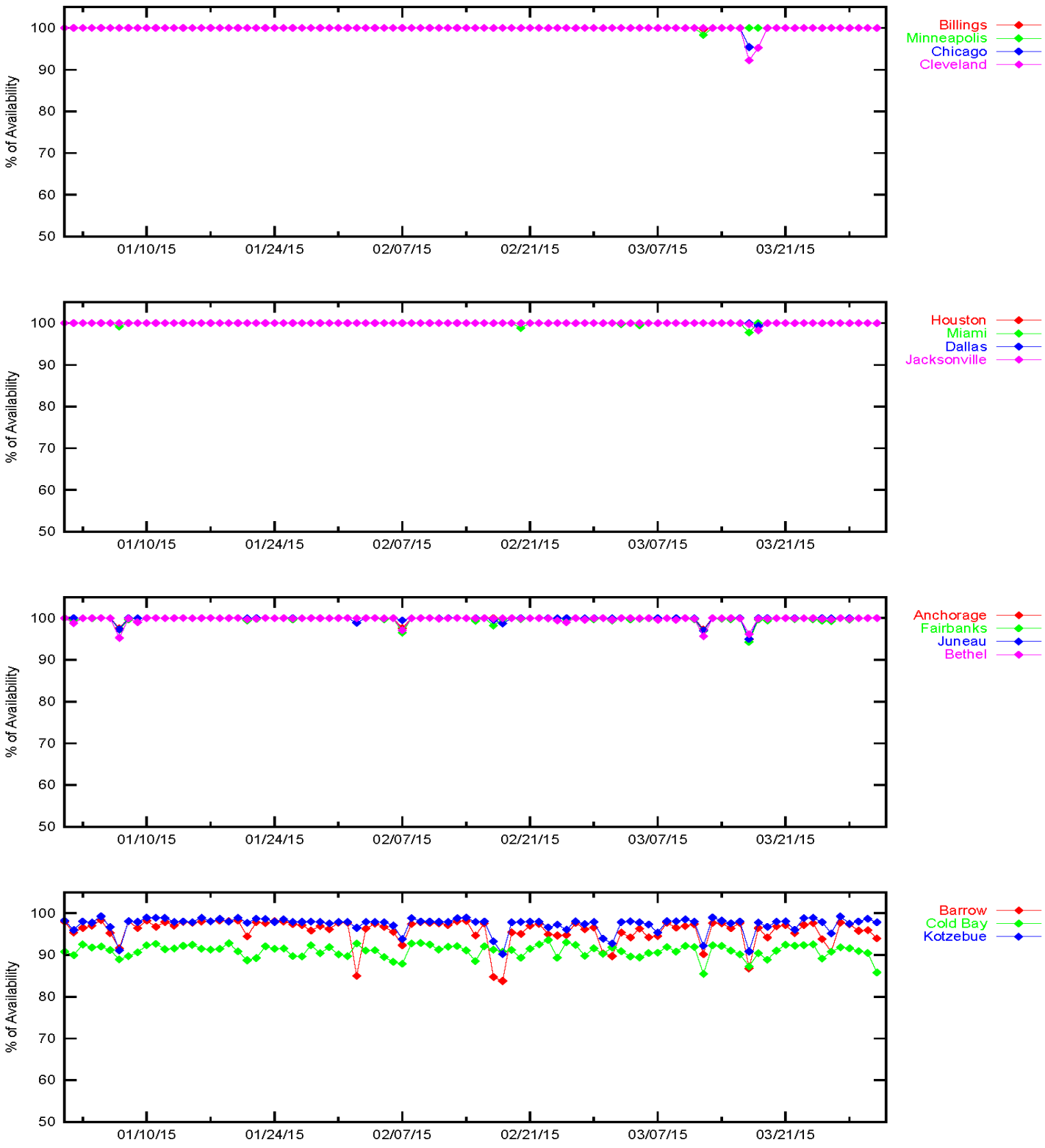


Figure 3-6 LPV 200 Instantaneous Availability

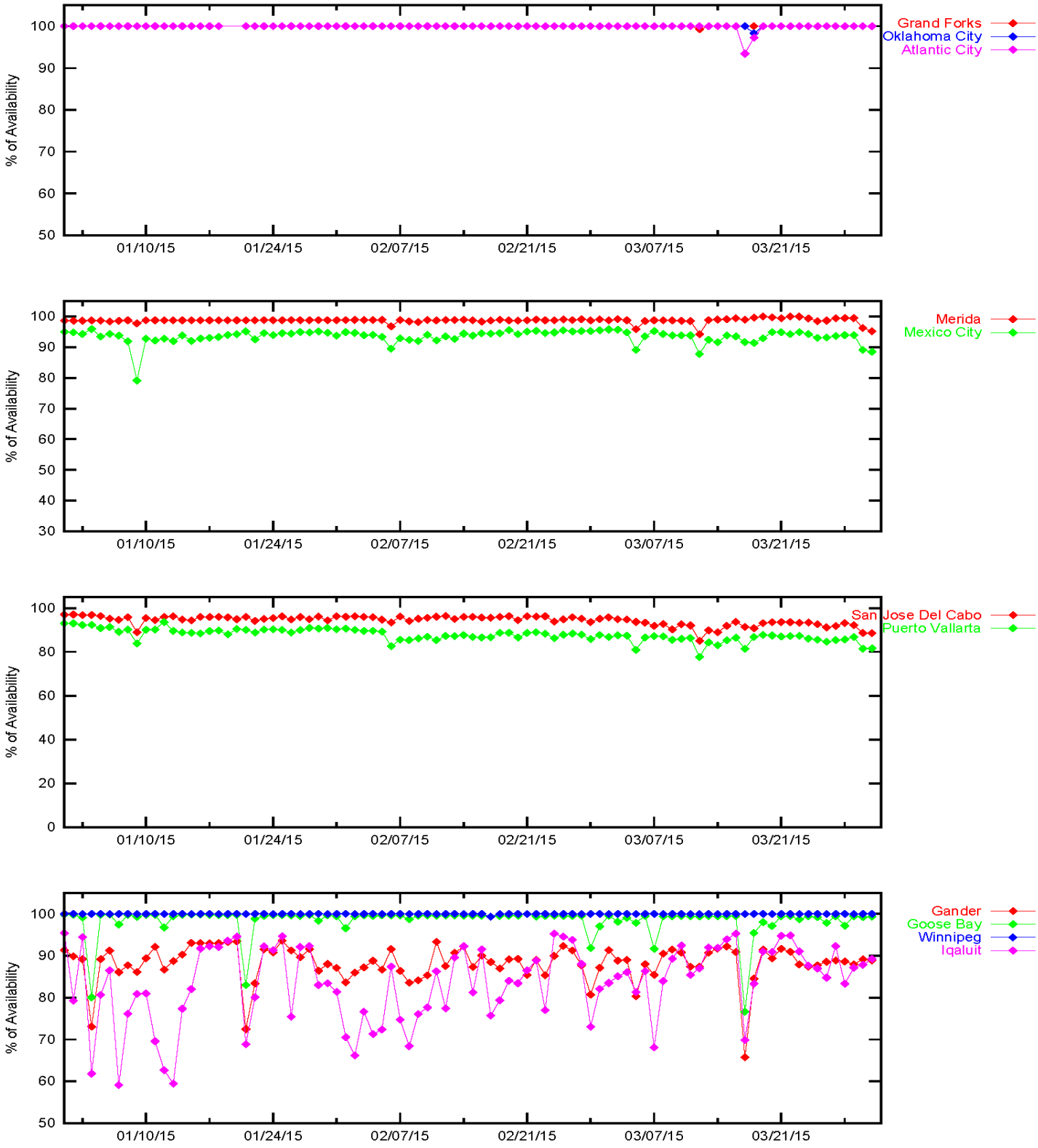


Figure 3-7 LPV Outages

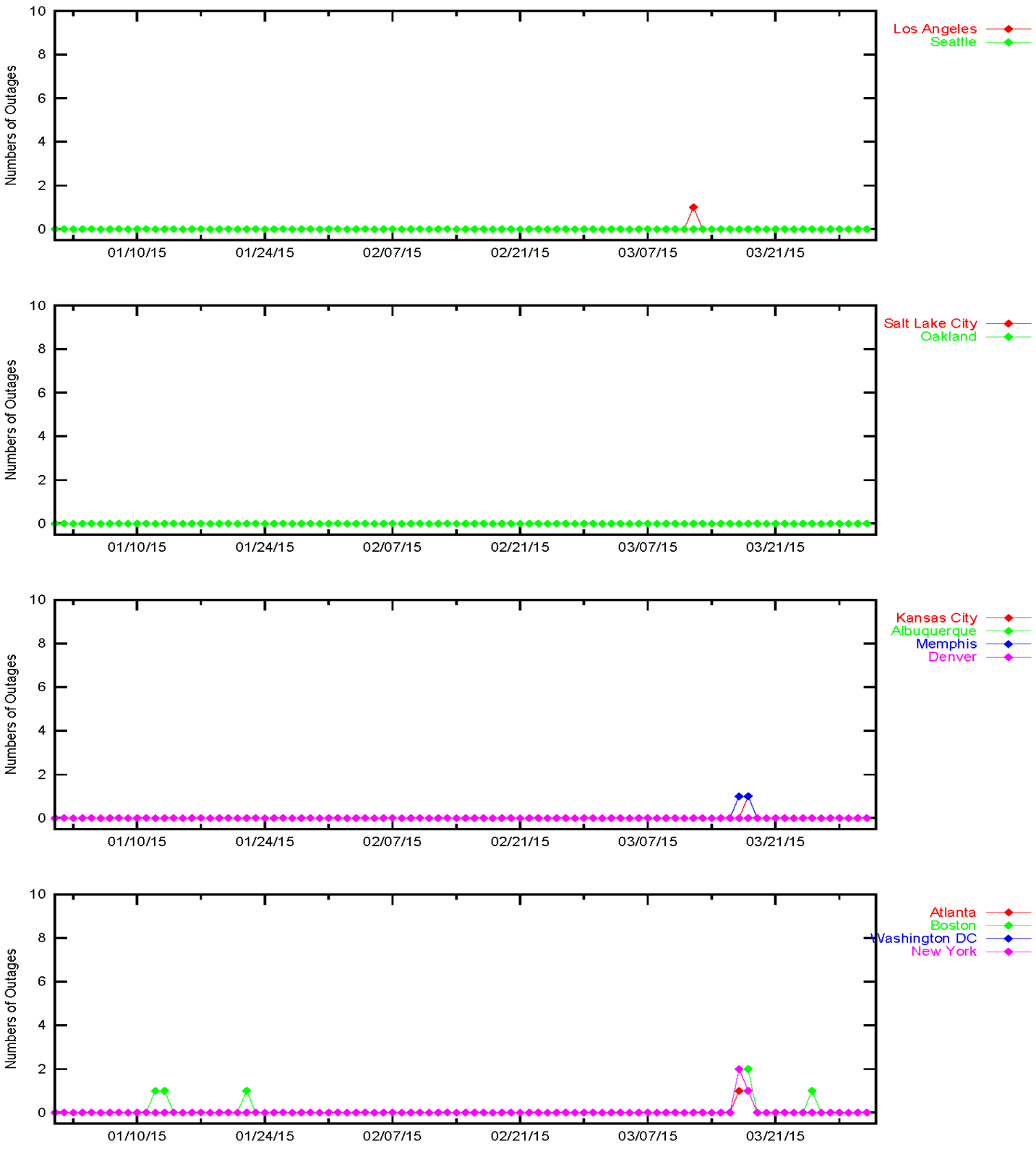


Figure 3-8 LPV Outages

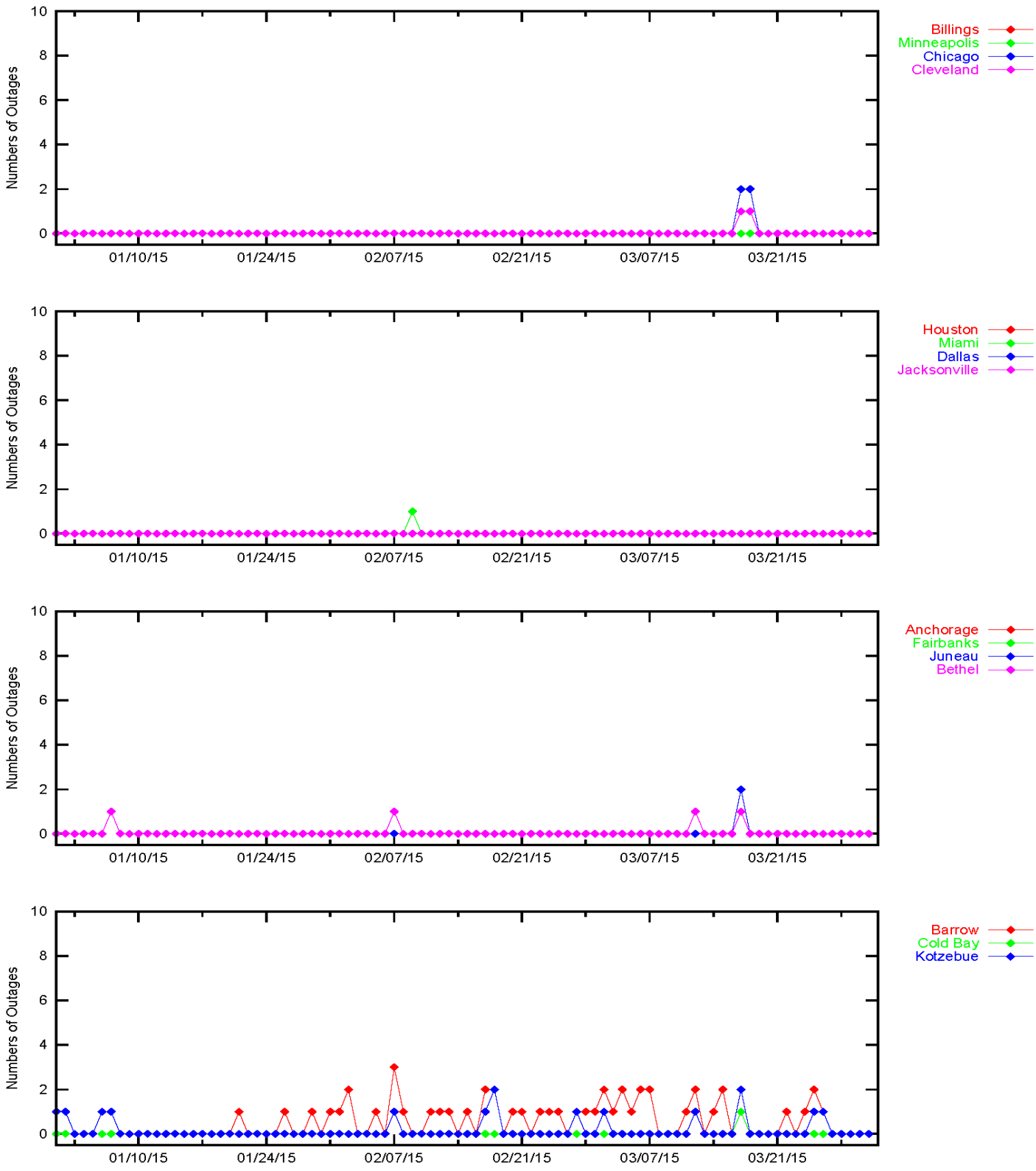


Figure 3-9 LPV Outages

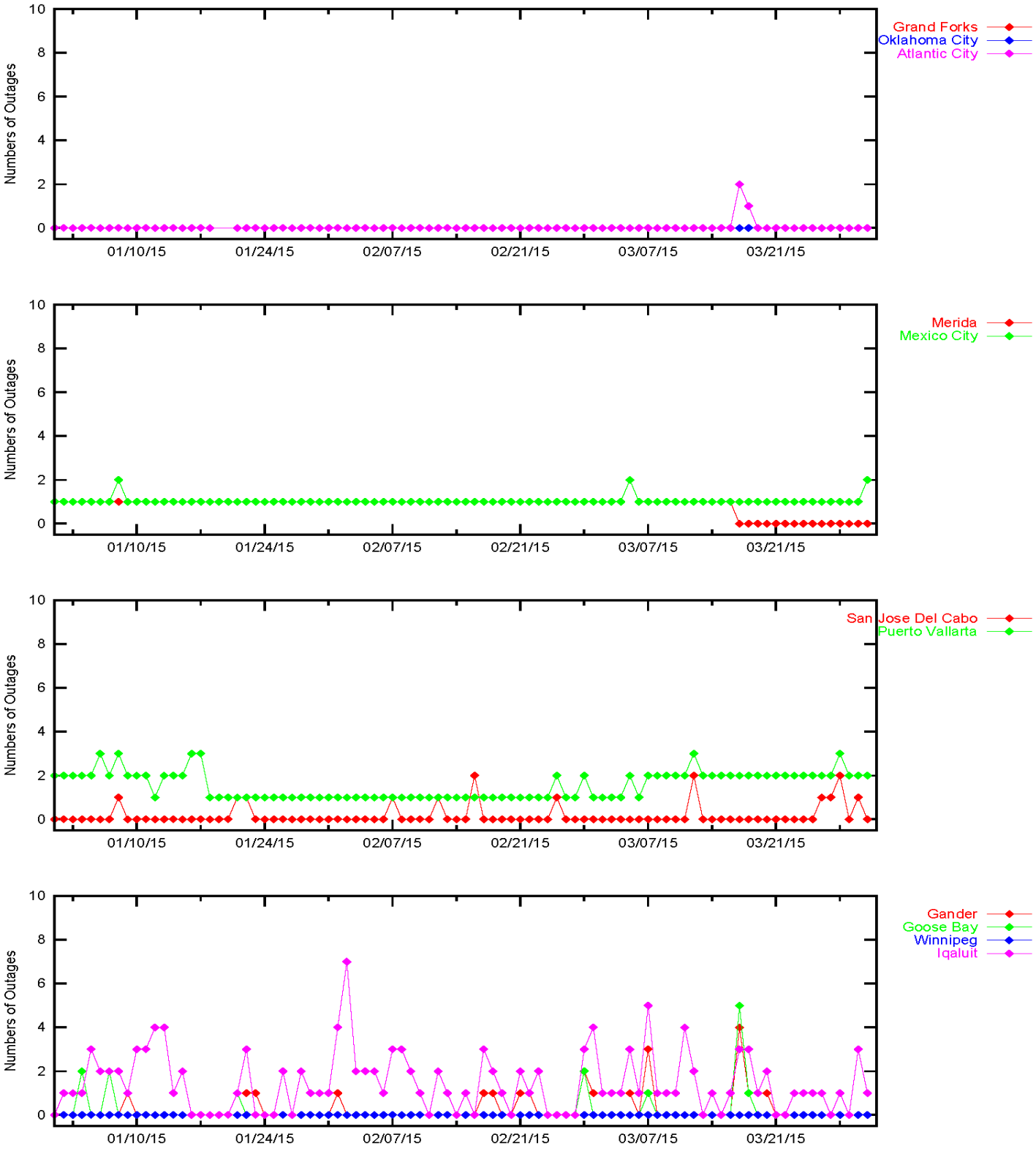


Figure 3-10 LPV 200 Outages

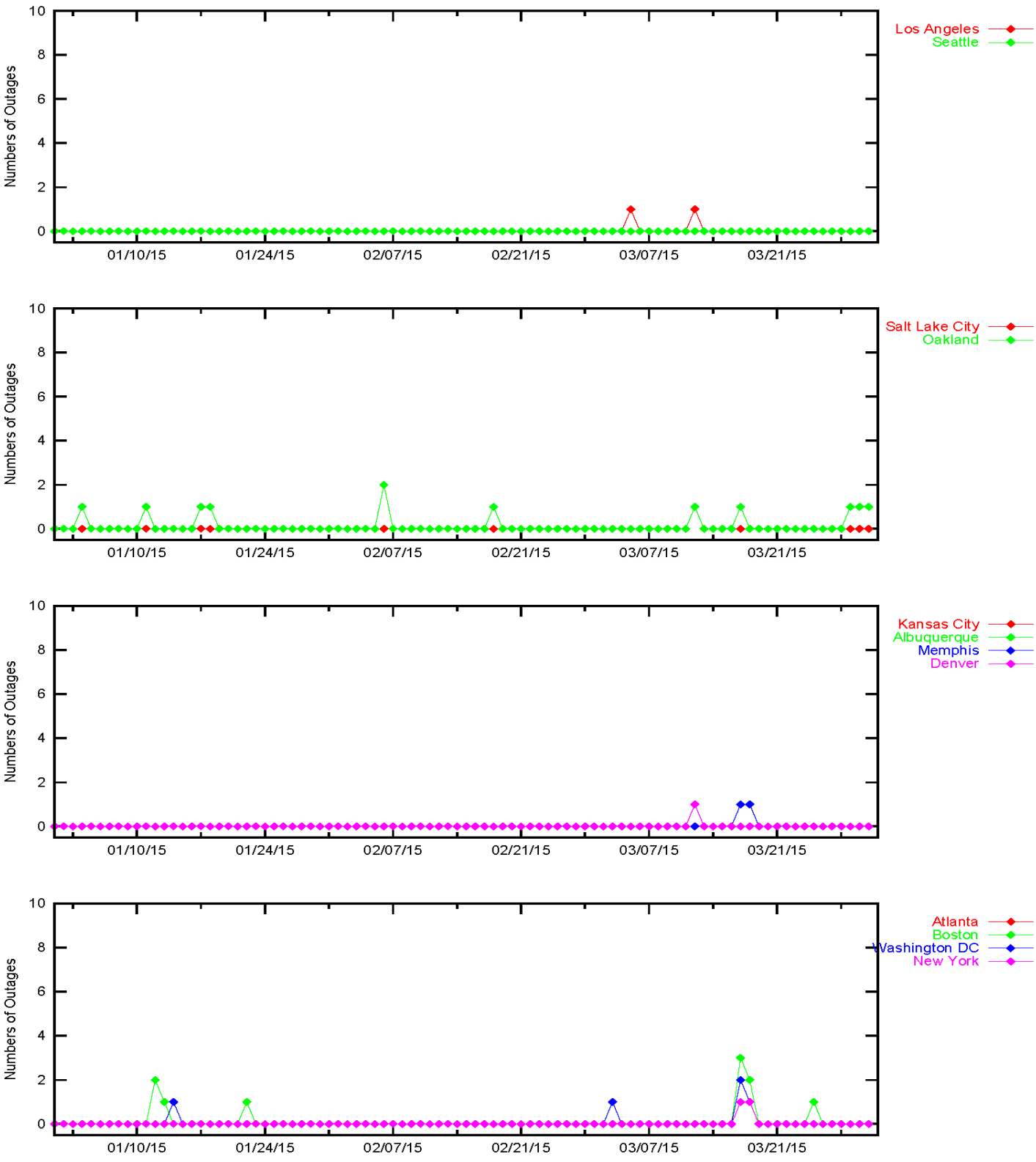


Figure 3-11 LPV 200 Outages

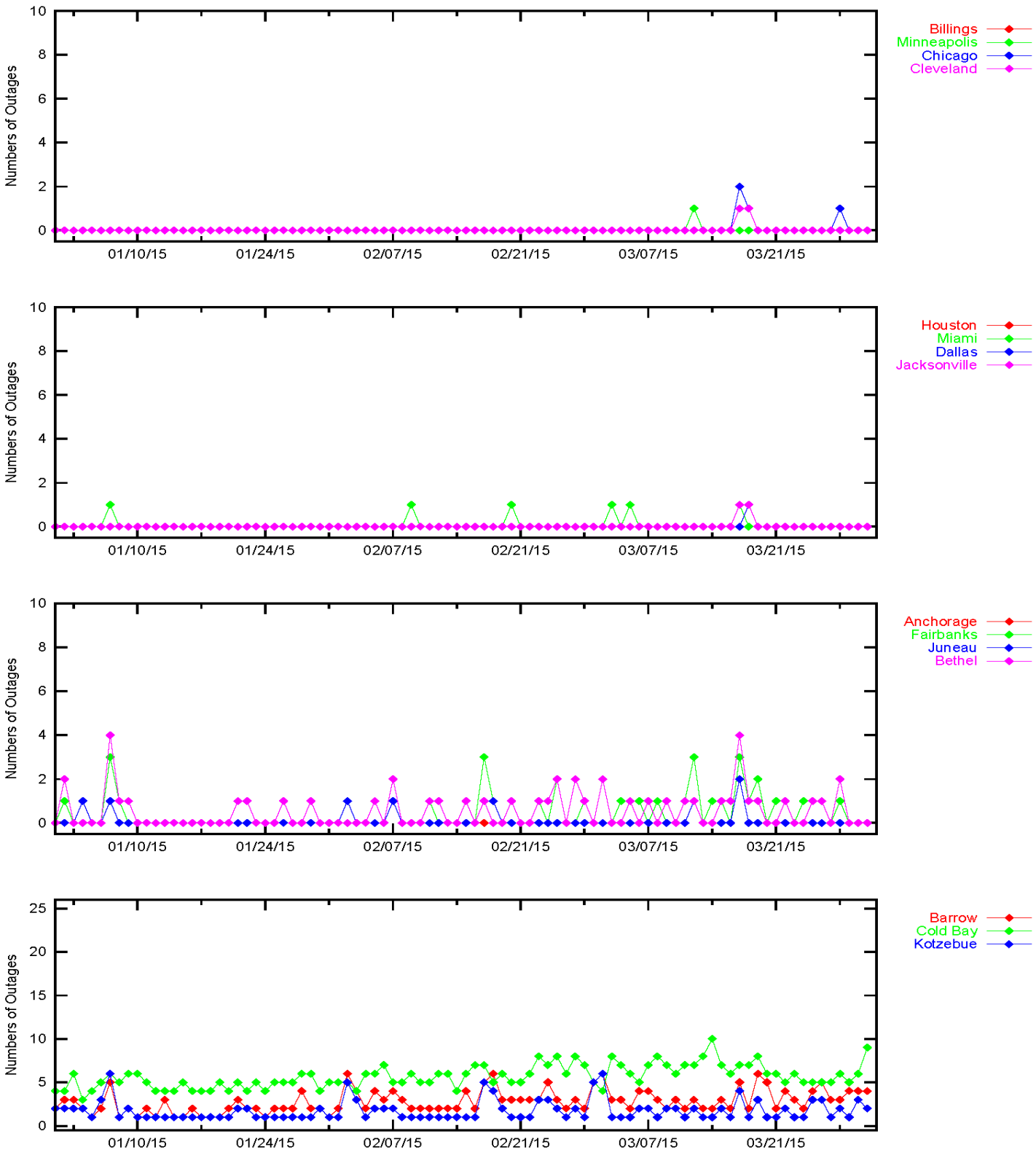
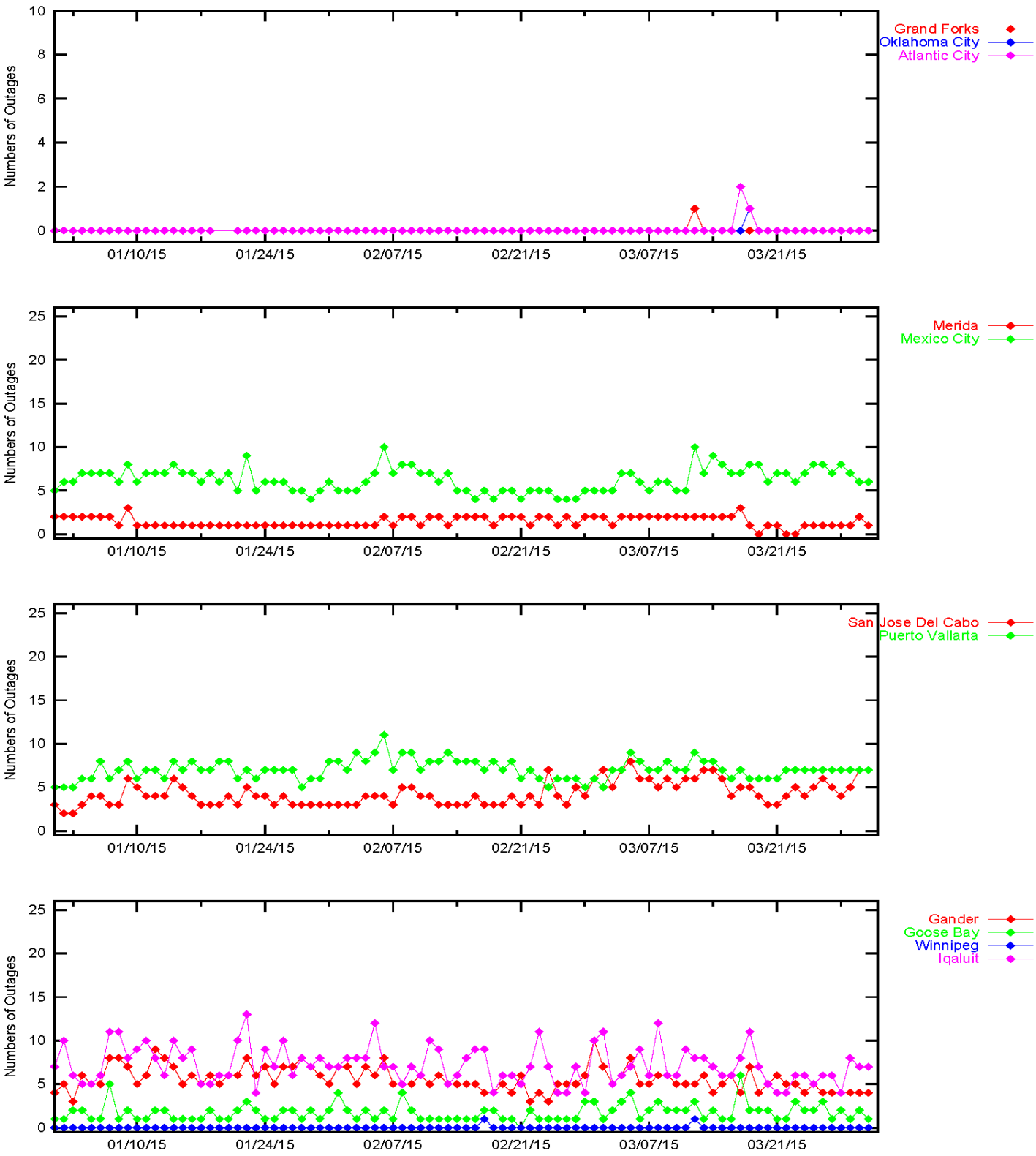


Figure 3-12 LPV 200 Outages



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.

Significant events that reduced CONUS coverage in Figure 4.6 were observed on the following days:

- On January 4, geomagnetic activity elevated GIVE values resulting in a slight reduction of LPV/LPV200 coverage.
- On February 6, planned maintenance on PRN-30 slightly affected LPV200 coverage.
- February 17, elevated GIVE values due to geomagnetic activity caused minor loss of LPV coverage.
- On February 20, planned maintenance on PRN-11 resulted in slight degradation in LPV200 coverage.
- On March 3, geomagnetic activity elevated GIVE values and affected LPV200 coverage.
- On March 5, planned maintenance on PRN-14 caused minor loss in LPV/ LPV200 coverage.
- On March 12, planned maintenance on PRN-29 resulting in a slight reduction of LPV/ LPV200 coverage.
- On March 17-18, high GIVE values due to geomagnetic activity affected LPV/LPV200 coverage.
- On March 30-31, planned maintenance on PRN-32 caused minor degradation in LPV200 coverage.

Significant events that reduced Alaska coverage in Figure 4.7 were observed on the following days:

- On January 7 and February 7, geomagnetic activity elevated GIVE values and caused slight degradation in LPV/LPV200 coverage.
- On February 17, high GIVE values due to geomagnetic activity resulted in minor reduction of LPV200 coverage.
- On March 12, planned maintenance on PRN-29 caused degradation in LPV/ LPV200 coverage.
- On March 17, geomagnetic activity elevated GIVE values and slightly affected LPV/LPV200 coverage.

Significant events that reduced Canada coverage in Figure 4.8 were observed on the following days:

- On January 4, January 7, January 21, February 1-2, and February 17-18, geomagnetic activity elevated GIVE values and resulted in degradation of LPV/LPV200 coverage.
- On February 29-March 2, geomagnetic activity elevated GIVE values and affected LPV200 coverage.
- On March 12, planned maintenance on PRN-29 caused degradation in LPV/ LPV200 coverage.

- On March 17-18 high GIVE values due to geomagnetic activity caused minor loss of LPV/LPV200 coverage.

Radio frequency interference (RFI) caused localized loss of coverage at several WAAS reference stations, but had no effect on WAAS service. RFI events were observed on the following days:

- On January 12-13, January 22, March 18, and March 25, LPV/LPV200 coverage was affected at Boston.
- On January 14, LPV200 coverage was affected at Washington, DC.
- On February 9, LPV/LPV200 coverage was affected at Miami.
- On February 16, LPV/LPV200 coverage was affected at San Jose Del Cabo.
- On March 5, LPV200 coverage was affected at Los Angeles.
- On March 28, LPV200 coverage was affected at Chicago.

Figure 4-1 LP North America Coverage for the Quarter

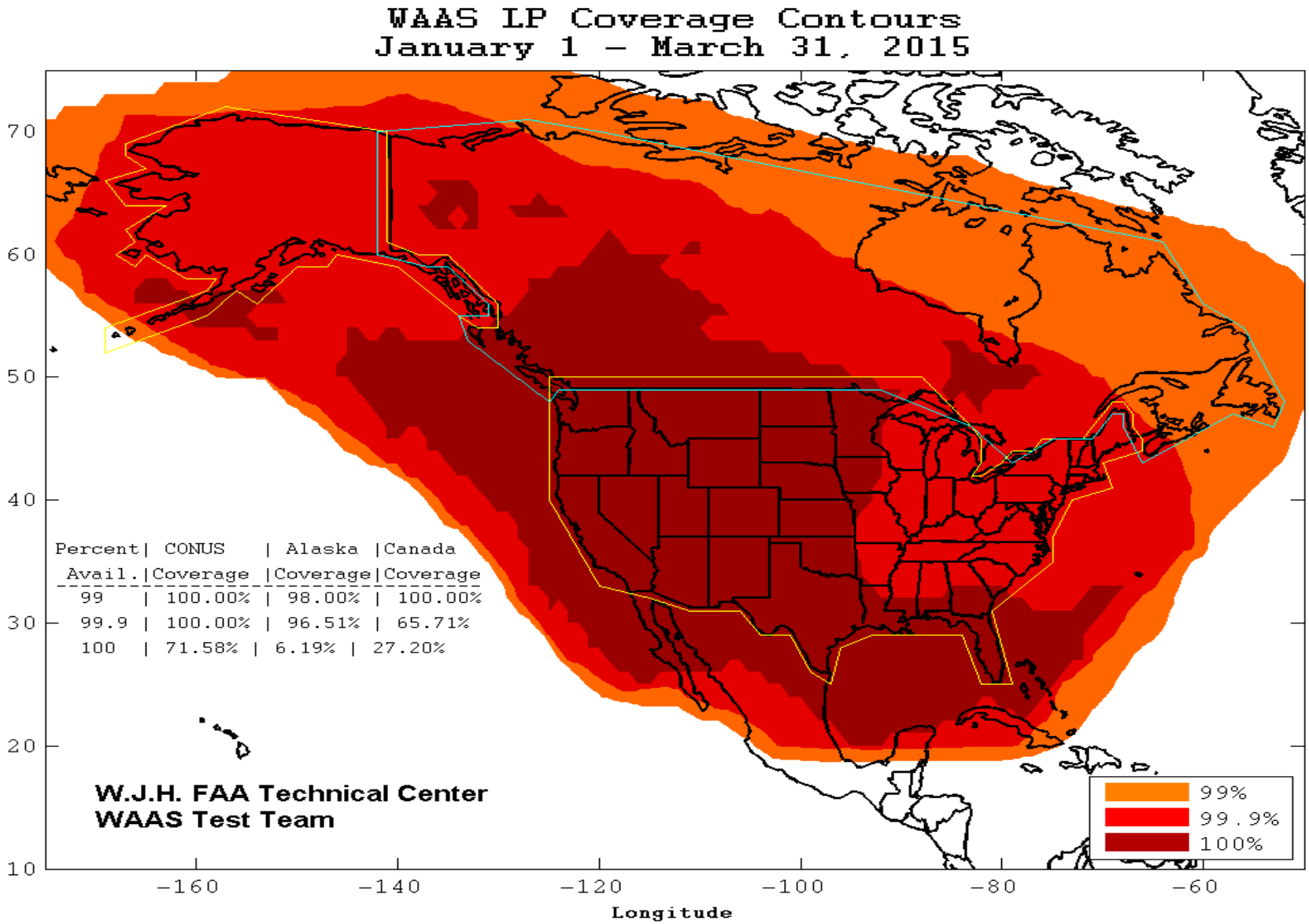


Figure 4-2 LPV North America Coverage for the Quarter

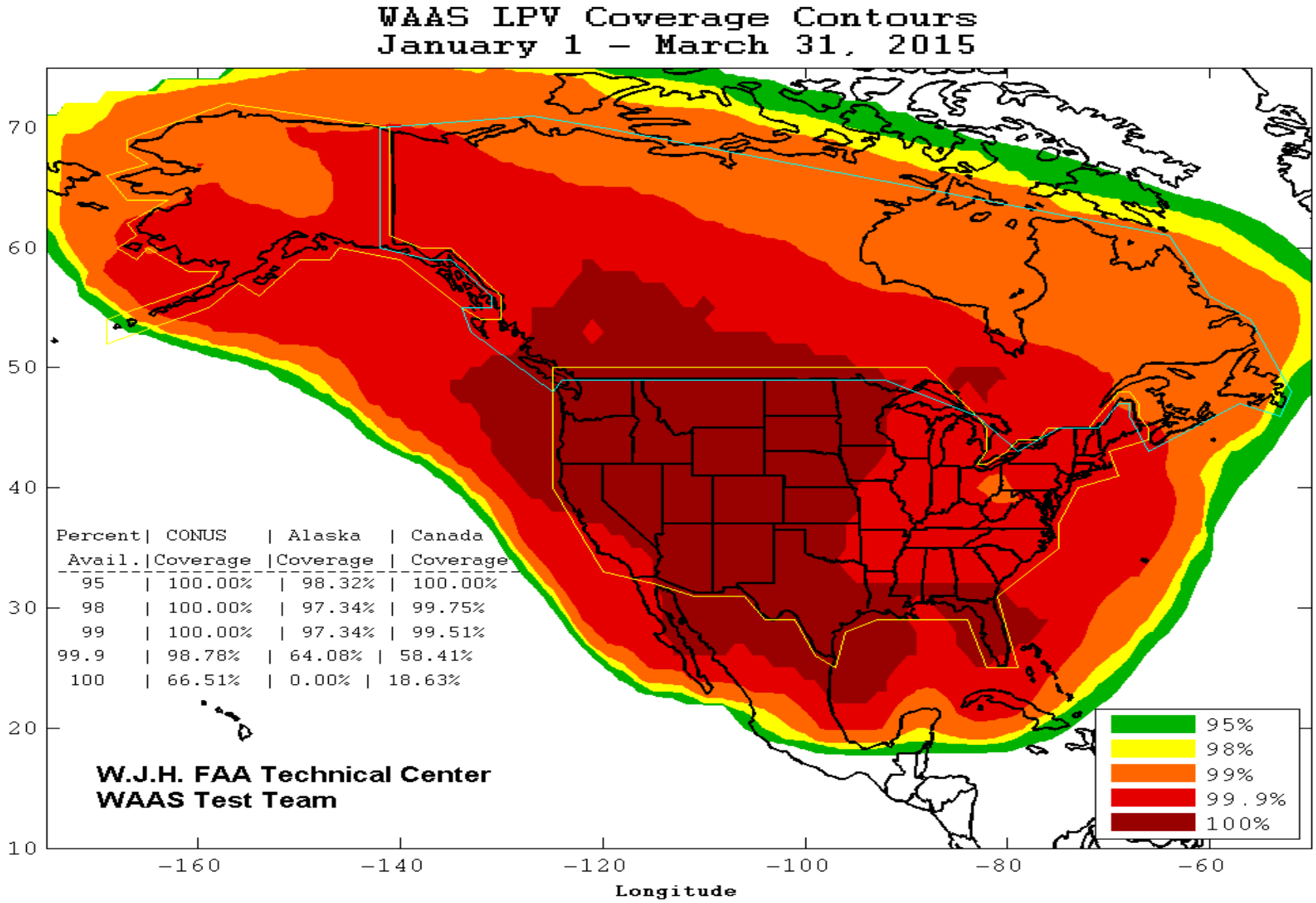


Figure 4-3 LPV 200 North America Coverage for the Quarter

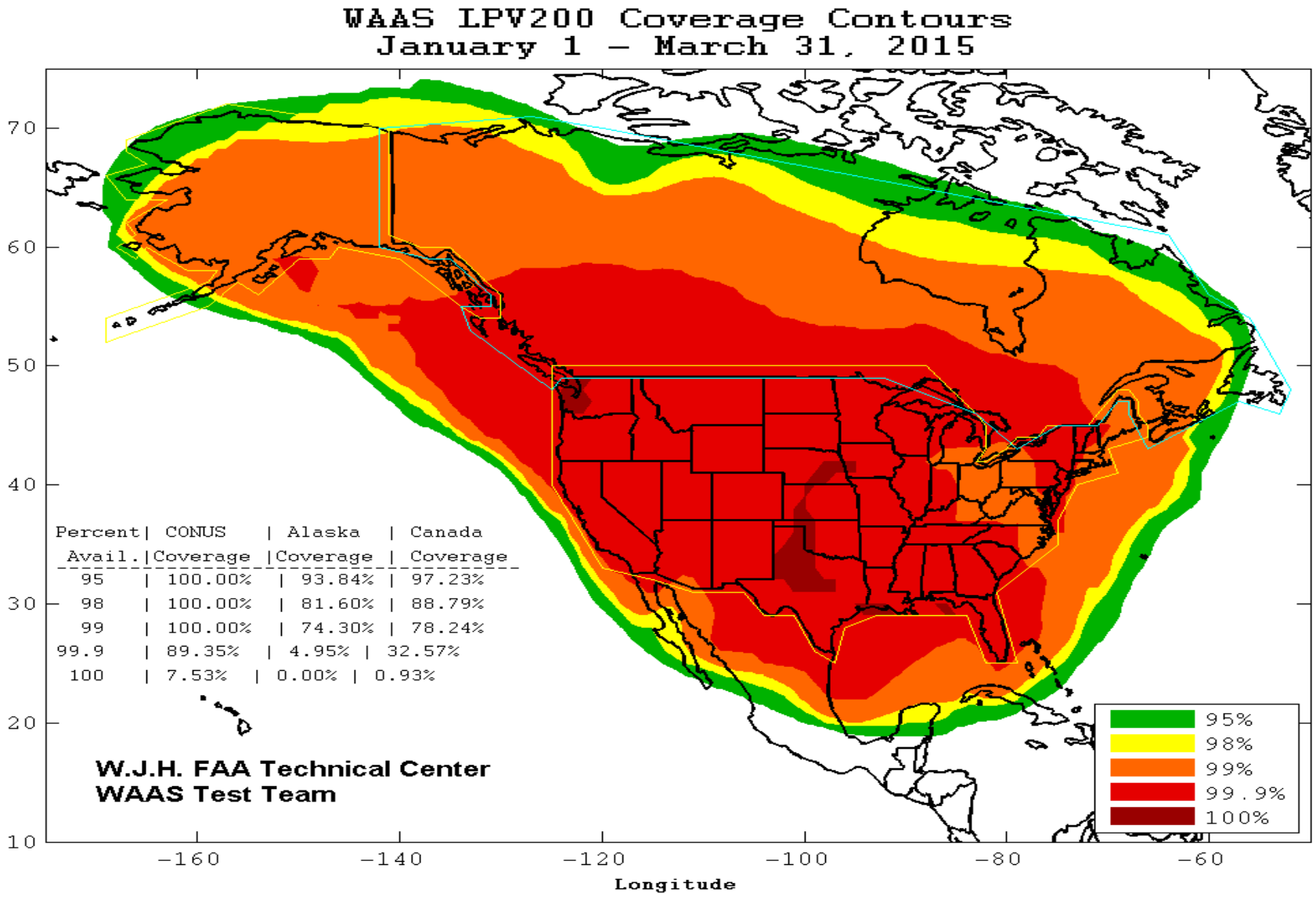


Figure 4-4 RNP 0.1 Coverage for the Quarter

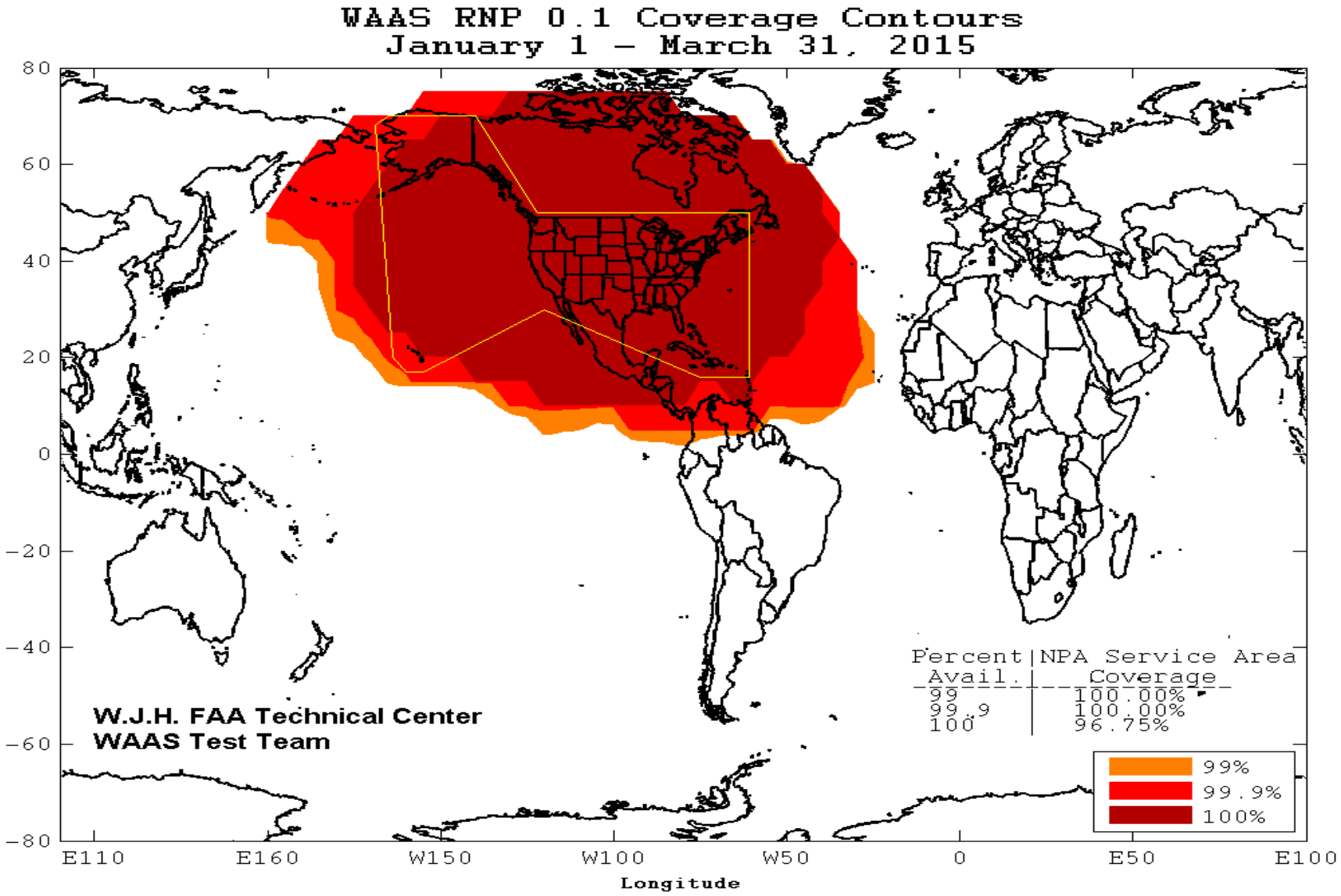


Figure 4-5 RNP 0.3 Coverage for the Quarter

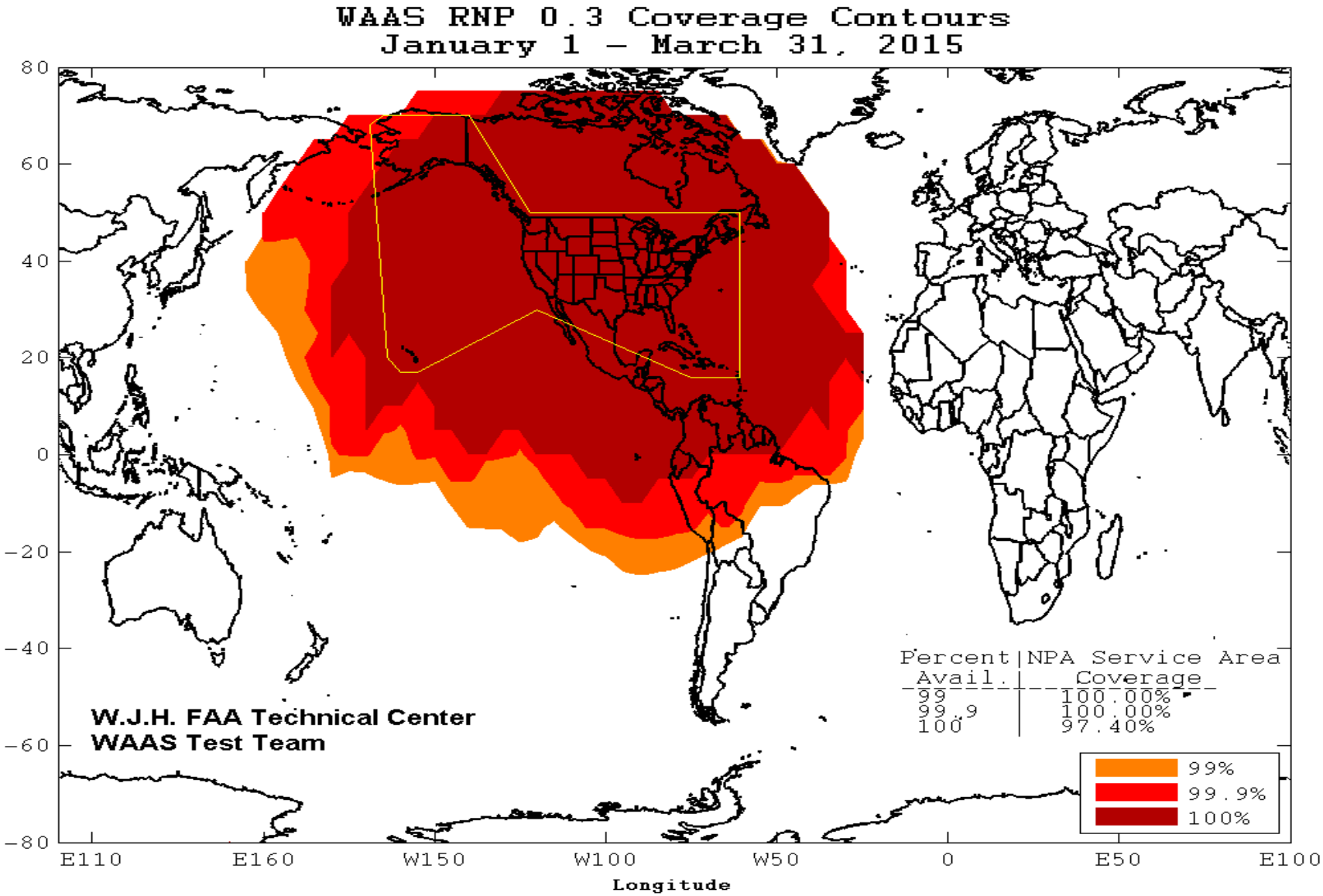


Figure 4-6 Daily LPV and LPV 200 CONUS Coverage

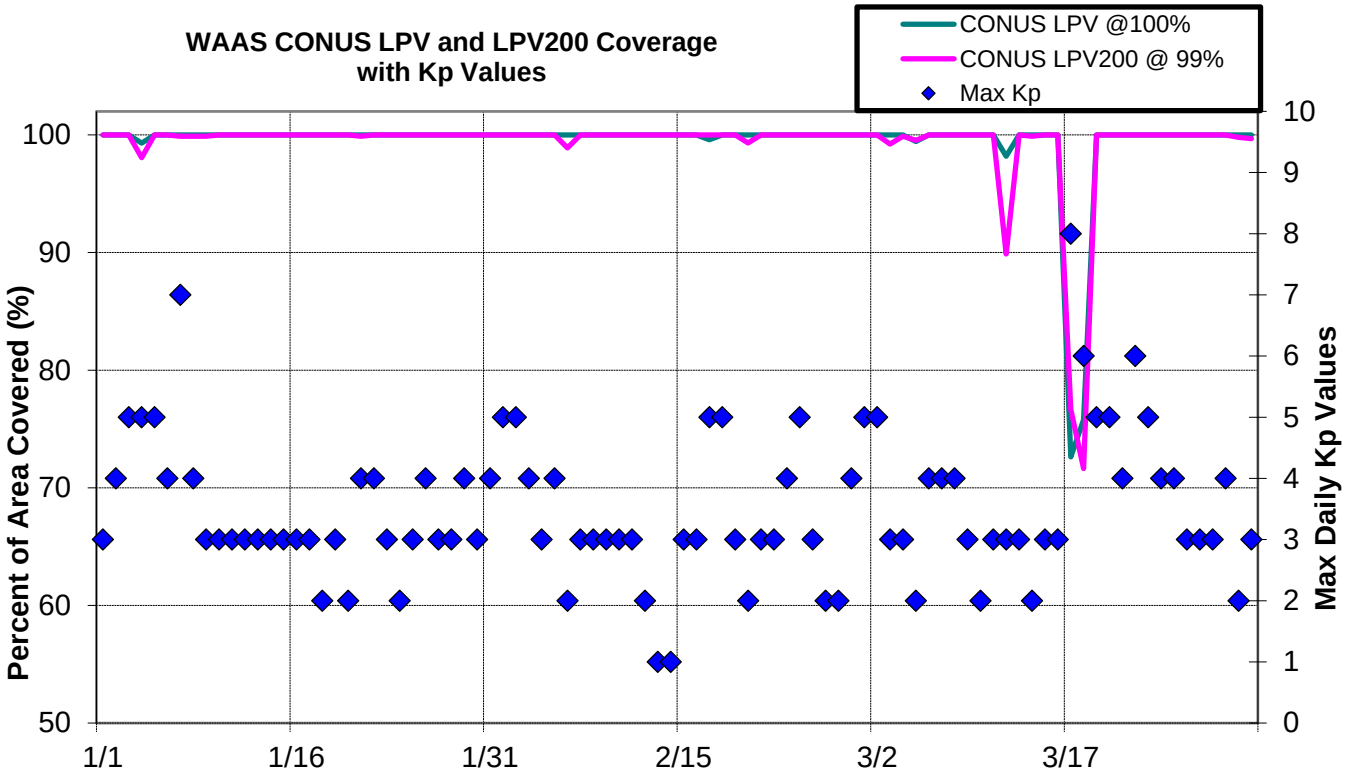


Figure 4-7 Daily LPV and LPV 200 Alaska Coverage

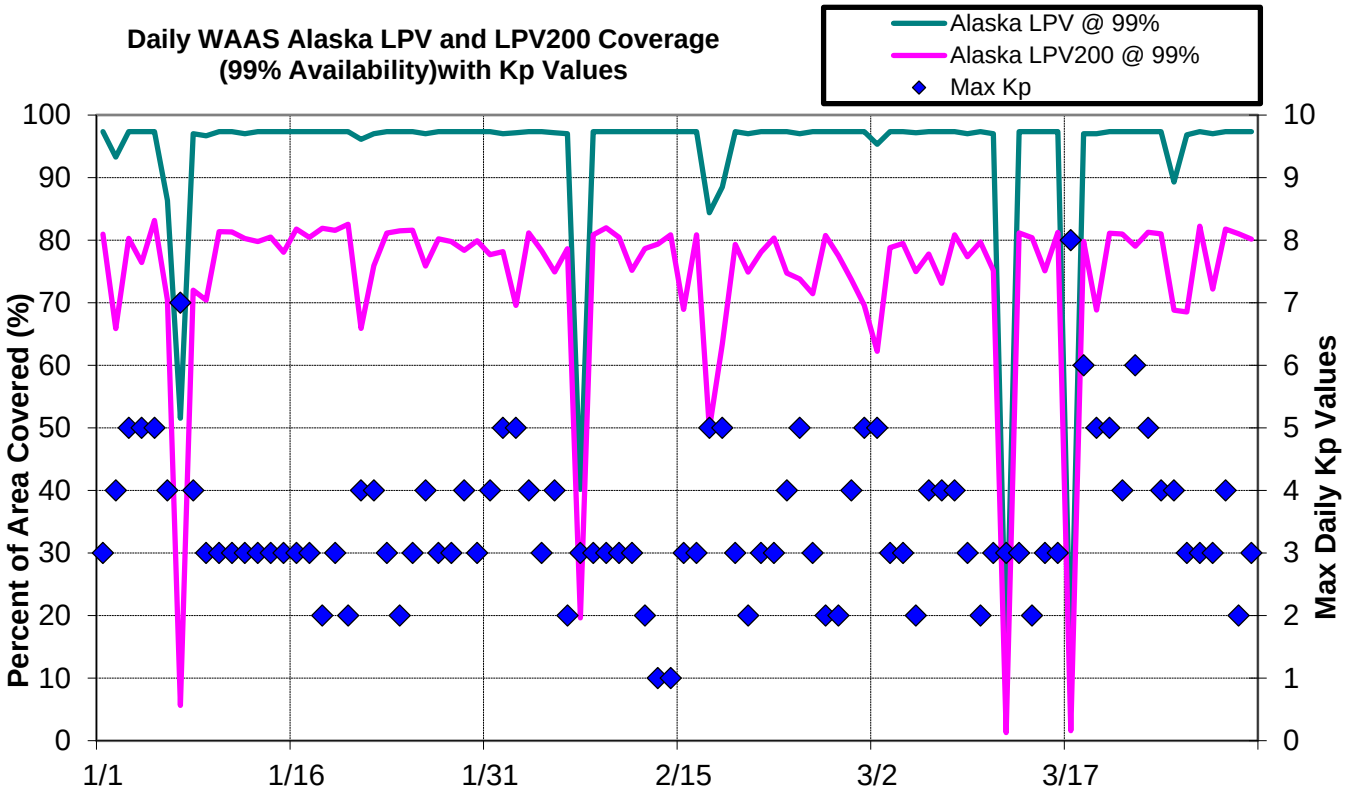


Figure 4-8 Daily LPV and LPV 200 Canada Coverage

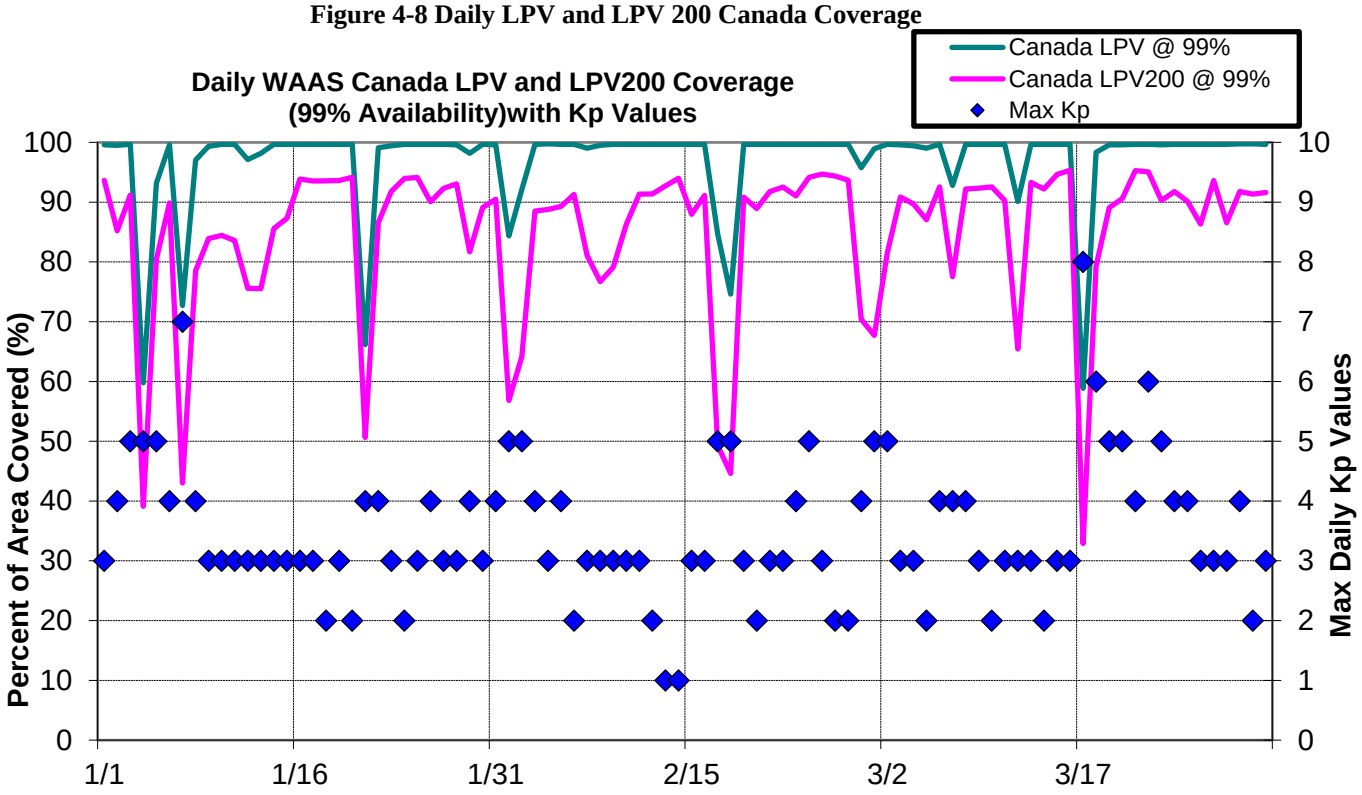
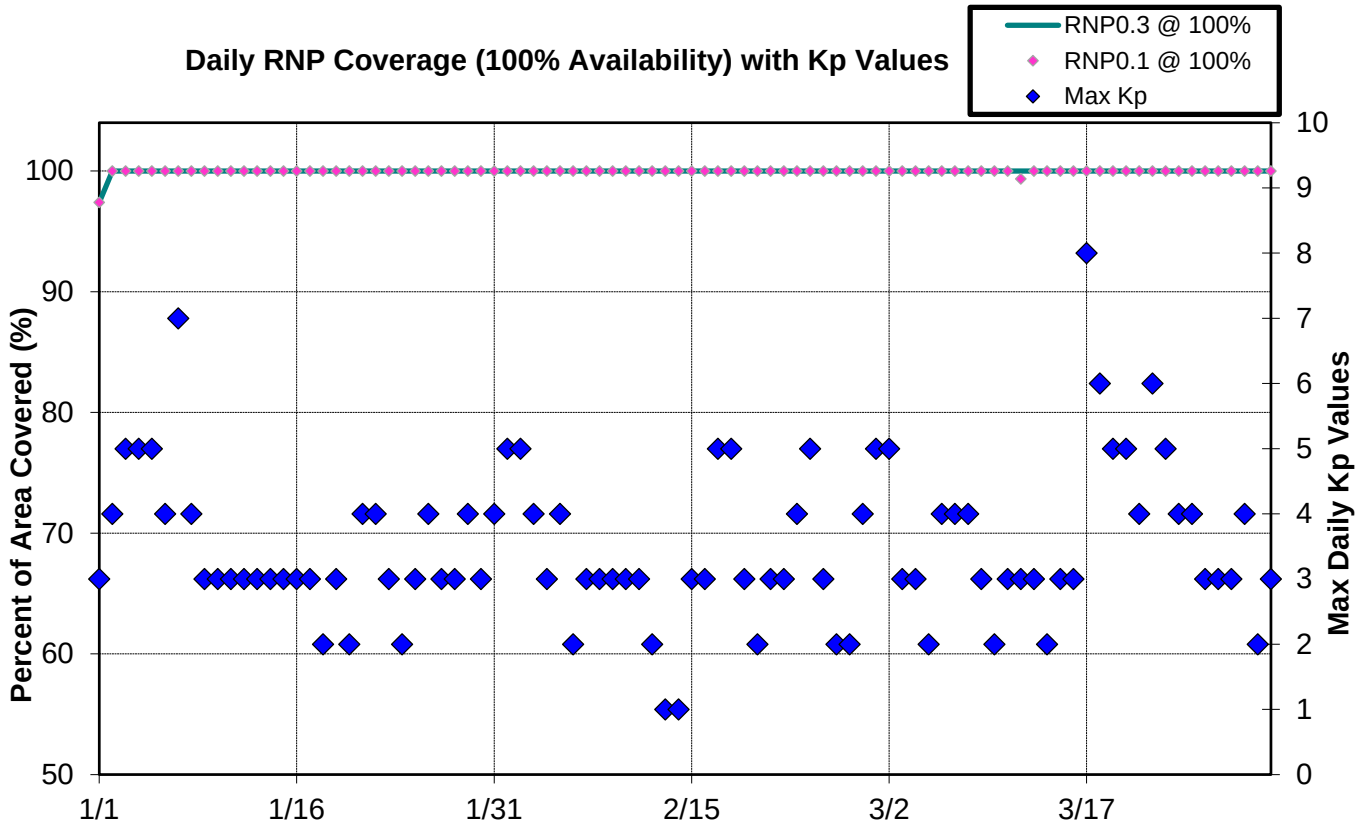


Figure 4-9 Daily RNP Coverage



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 3.95 at Denver. 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		
	Horizontal	Vertical	Number of HMIs
Atlantic City	8.49	6.62	0
Grand Forks	5.47	6.03	0
Oklahoma City	5.13	9.32	0
Albuquerque	5.99	8.36	0
Anchorage	6.52	9.00	0
Atlanta	8.60	8.05	0
Barrow	10.84	4.97	0
Bethel	6.59	7.99	0
Billings	5.81	7.57	0
Boston	5.91	6.00	0
Chicago	12.98	8.06	0
Cleveland	7.57	6.94	0
Cold Bay	10.87	9.20	0
Dallas	6.50	8.46	0
Denver	3.95	7.43	0
Fairbanks	7.26	6.62	0
Gander	9.41	7.91	0
Goose Bay	4.07	8.07	0
Houston	4.73	5.62	0
Iqaluit	6.02	4.71	0
Jacksonville	5.69	6.94	0
Juneau	9.96	9.92	0
Kansas City	6.09	5.02	0
Kotzebue	8.16	6.94	0
Los Angeles	6.91	8.38	0
Memphis	7.39	9.36	0
Merida	8.34	8.12	0
Mexico City	9.30	5.40	0
Miami	6.66	6.36	0
Minneapolis	9.72	6.36	0
New York	7.50	6.06	0
Oakland	6.78	10.07	0
Puerto Vallarta	6.70	5.70	0
Salt Lake City	3.96	6.95	0
San Jose Del Cabo	11.21	6.86	0
Seattle	6.31	8.38	0
Washington DC	6.42	6.63	0
Winnipeg	7.46	5.61	0

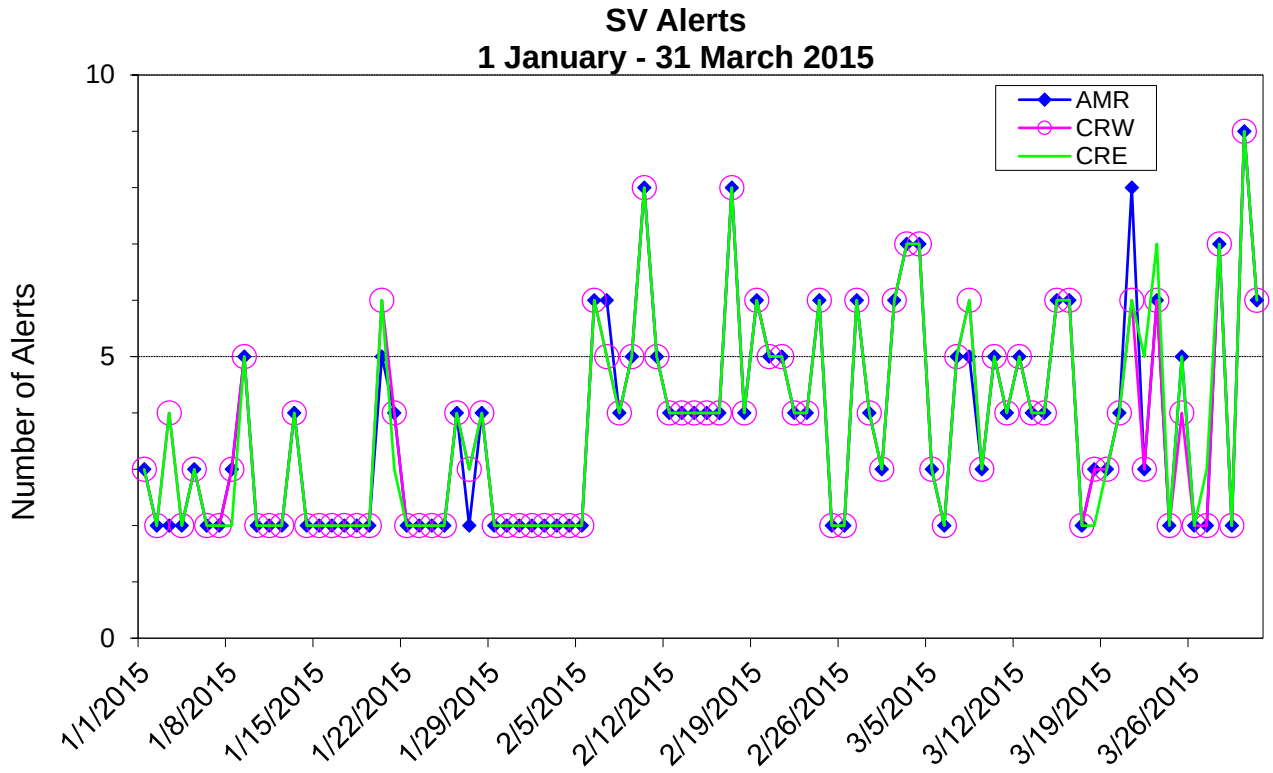
5.2 Broadcast Alerts

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

	Number of Alerts			Average Alerts Per Day		
Message Type	**AMR**	**CRW**	**CRE**	**AMR**	**CRW**	**CRE**
2	228	226	229	2.5333	2.5111	2.5444
3	86	85	86	0.9556	0.9444	0.9556
4	24	28	26	0.2667	0.3111	0.2889
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
Total Alerts	338	339	341	3.7556	3.7667	3.7889
Days in Service	90	90	90			

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

Data	**Associated Message Types**	**Maximum Update Interval** (seconds)	**En Route, Terminal, NPA Timeout** (seconds)	**Precision Approach Timeout** (seconds)
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	97988	1	122
2	1296528	102	36
3	1296058	133	36
4	1295891	113	36
7	91616	6	136
9	91105	3	179
10	91750	8	132
17	30392	0	0

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

SV	On Time	Late	Max Late Length (seconds)
1	48550	1	164
2	46598	1	161
3	47615	0	0
4	48888	0	0
5	47008	0	0
6	46913	1	168
7	46542	2	183
9	46519	0	0
10	47837	0	0
11	47996	0	0
12	46464	0	0
13	47886	1	186
14	45918	0	0
15	47240	1	161
16	46980	1	164
17	46392	0	0
18	46020	0	0
19	47903	0	0
20	48633	1	168
21	46750	0	0
22	46346	1	183
23	46600	0	0
24	48120	1	178
25	47859	0	0
26	2561	0	0
27	48504	1	169
28	47165	1	186
29	46302	0	0
30	46006	2	179
31	47229	1	168
32	45348	1	168
1	48550	1	164

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

SV	On Time	Late	Max Late Length (seconds)
1	39882	2	208
2	38236	0	0
3	39142	0	0
4	40184	2	208
5	38599	0	0
6	38463	0	0
7	38210	1	133
9	38177	1	206
10	39287	0	0
11	39373	1	208
12	38152	0	0
13	39340	1	208
14	37703	0	0
15	38774	0	0
16	38577	0	0
17	38117	0	0
18	37755	0	0
19	39335	1	137
20	39941	0	0
21	38414	3	210
22	38085	1	144
23	38289	0	0
24	39488	0	0
25	39296	0	0
26	2102	0	0
27	39873	0	0
28	38694	1	208
29	38044	2	208
30	37775	0	0
31	38721	0	0
32	37216	1	208
133	74297	0	0
135	74740	2	212
138	74670	1	212
1	39882	2	208

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

Band	Block	On Time	Late	Max Late Length (seconds)
0	0	27000	0	0
0	1	26989	2	302
0	2	26985	2	306
1	0	26986	5	306
1	1	26981	7	309
1	2	26983	1	302
1	3	26990	2	304
1	4	26986	1	583
2	0	26988	4	305
2	1	26994	2	301
2	2	26983	1	301
2	3	26982	2	304
2	4	26988	4	304
3	0	26985	3	304
3	1	26983	5	306
3	2	26984	2	451
9	0	26988	2	458
9	1	26992	2	452
9	2	26993	2	474
9	3	26984	2	469
9	4	27000	2	482
9	5	26984	5	581
9	6	26996	2	482

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

Band	On Time	Late	Max Late Length (seconds)
0	34379	0	0
1	34376	0	0
2	34416	0	0
3	34403	0	0
9	34379	0	0

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

Message Type	On Time	Late	Max Late Length (seconds)
1	101705	1	121
2	1296528	100	36
3	1296056	134	36
4	1295905	110	36
7	95228	11	161
9	91106	2	179
10	95072	8	162
17	30706	1	315

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

SV	On Time	Late	Max Late Length (seconds)
1	48552	0	0
2	46599	0	0
3	47616	0	0
4	48889	1	170
5	47012	0	0
6	46911	1	176
7	46544	1	167
9	46514	0	0
10	47844	0	0
11	47994	0	0
12	46458	0	0
13	47891	1	186
14	45917	1	166
15	47243	1	183
16	46984	0	0
17	46397	0	0
18	46015	0	0
19	47902	0	0
20	48644	1	176
21	46754	0	0
22	46356	0	0
23	46594	0	0
24	48114	0	0
25	47858	0	0
26	2560	0	0
27	48503	1	174
28	47165	1	186
29	46300	0	0
30	46008	2	183
31	47240	0	0
32	45356	0	0
1	48552	0	0

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

SV	On Time	Late	Max Late Length (seconds)
1	39882	2	206
2	38244	0	0
3	39143	0	0
4	40193	1	205
5	38608	1	128
6	38478	0	0
7	38236	0	0
9	38169	1	210
10	39259	0	0
11	39382	0	0
12	38167	0	0
13	39352	0	0
14	37707	0	0
15	38775	0	0
16	38583	0	0
17	38099	1	121
18	37739	0	0
19	39337	0	0
20	39922	1	164
21	38421	1	150
22	38067	1	172
23	38292	0	0
24	39494	1	121
25	39287	0	0
26	2100	1	128
27	39874	1	150
28	38698	0	0
29	38041	2	210
30	37763	1	190
31	38725	1	145
32	37210	1	206
133	74219	1	151
135	74830	1	205
138	74675	2	205

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

Band	Block	On Time	Late	Max Late Length (seconds)
0	0	26994	3	386
0	1	26979	2	405
0	2	26990	3	376
1	0	26982	3	380
1	1	26983	3	383
1	2	26982	4	381
1	3	26985	5	370
1	4	26980	6	387
2	0	26985	4	376
2	1	26986	3	387
2	2	26971	5	518
2	3	26984	4	510
2	4	26988	5	505
3	0	26993	3	576
3	1	26968	8	576
3	2	27001	3	576
9	0	26983	3	303
9	1	26990	0	0
9	2	26987	6	376
9	3	26985	4	368
9	4	26972	5	358
9	5	26986	7	363
9	6	26989	4	357

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

Band	On Time	Late	Max Late Length (seconds)
0	34880	0	0
1	34877	1	398
2	34864	0	0
3	34850	0	0
9	34836	2	397

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

Message Type	On Time	Late	Max Late Length (seconds)
1	97666	0	0
2	1296531	102	36
3	1296061	132	36
4	1295896	113	36
7	91495	7	126
9	91106	2	179
10	91533	9	133
17	30391	0	0

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

SV	On Time	Late	Max Late Length (seconds)
1	48552	0	0
2	46588	1	161
3	47614	0	0
4	48884	0	0
5	47008	0	0
6	46911	1	181
7	46547	1	157
9	46510	0	0
10	47824	2	174
11	47998	0	0
12	46462	0	0
13	47888	1	186
14	45913	0	0
15	47240	0	0
16	46990	0	0
17	46396	0	0
18	46021	0	0
19	47900	0	0
20	48640	1	181
21	46753	0	0
22	46352	0	0
23	46601	0	0
24	48113	0	0
25	47848	2	174
26	2558	0	0
27	48505	1	169
28	47166	1	186
29	46298	0	0
30	46002	1	179
31	47231	1	169
32	45352	1	169
1	48552	0	0

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

SV	On Time	Late	Max Late Length (seconds)
1	39883	1	208
2	38236	0	0
3	39140	0	0
4	40183	1	144
5	38597	0	0
6	38461	0	0
7	38211	0	0
9	38174	1	206
10	39269	3	221
11	39373	0	0
12	38152	0	0
13	39341	0	0
14	37696	1	137
15	38775	0	0
16	38581	1	143
17	38116	0	0
18	37757	0	0
19	39336	1	134
20	39944	1	131
21	38417	2	210
22	38082	1	144
23	38288	0	0
24	39487	0	0
25	39294	1	131
26	2102	0	0
27	39875	0	0
28	38688	0	0
29	38046	1	206
30	37782	0	0
31	38716	0	0
32	37215	1	208
133	74304	2	210
135	74723	1	201
138	74671	0	0
1	39883	1	208

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

Band	Block	On Time	Late	Max Late Length (seconds)
0	0	26990	1	301
0	1	26984	3	324
0	2	26978	1	301
1	0	26992	3	316
1	1	26997	2	324
1	2	26986	1	316
1	3	26986	1	311
1	4	26985	2	305
2	0	26987	0	0
2	1	26985	2	304
2	2	26991	0	0
2	3	26987	0	0
2	4	26993	1	304
3	0	26999	3	304
3	1	26986	2	576
3	2	26975	2	576
9	0	26997	2	304
9	1	26994	1	301
9	2	26985	1	581
9	3	26989	1	538
9	4	26990	1	515
9	5	26988	5	577
9	6	26985	4	583

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

Band	On Time	Late	Max Late Length (seconds)
0	34389	0	0
1	34335	1	475
2	34348	1	366
3	34365	0	0
9	34376	1	317

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.

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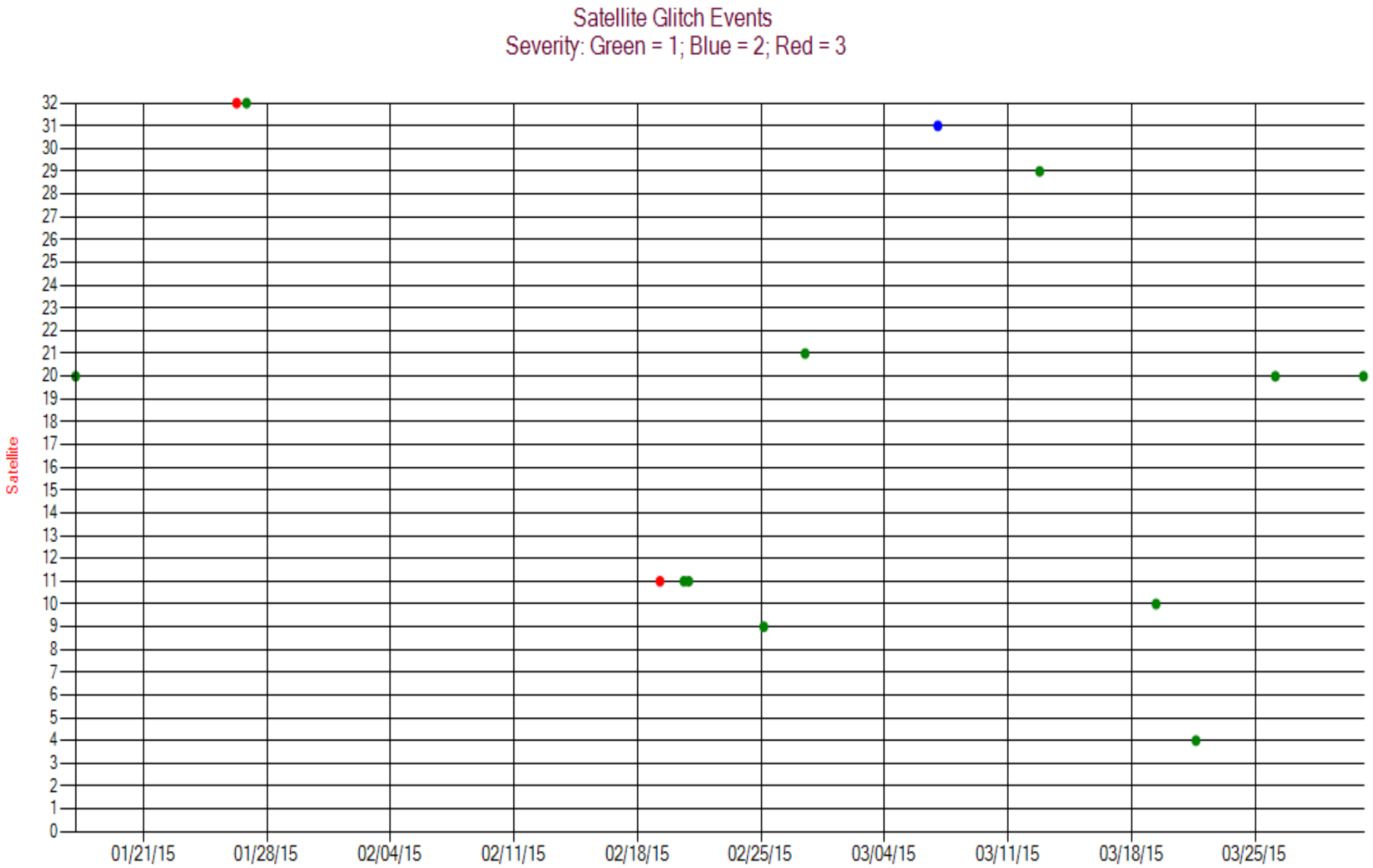
Figure 5-2 SV Glitch Trend



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 →	Billings		Albuquerque		Boston		Washington DC		Houston		Kansas City	
SV ↓	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	2.975	100	3.732	99.9996	3.086	100	2.645	100	2.629	100	2.705	99.9991
2	1.873	100	2.174	100	2.085	100	2.280	100	3.630	99.8304	2.374	100
3	3.698	99.9802	3.088	100	2.641	100	3.195	100	2.600	100	2.844	100
4	1.891	100	1.768	100	1.430	100	1.282	100	1.060	100	1.510	100
5	1.839	100	1.614	100	1.712	100	1.429	100	1.170	100	1.937	100
6	3.596	99.9199*	3.175	100	3.516	99.8856*	3.015	100	2.832	100	3.681	98.9818*
7	1.768	100	1.298	100	1.660	100	1.434	100	1.015	100	1.374	100
8	-	-	-	-	-	-	-	-	-	-	-	-
9	2.924	100	2.736	100	2.550	100	2.125	100	1.687	100	2.642	100
10	0.982	100	0.843	100	0.947	100	1.107	100	1.956	100	1.177	100
11	0.841	100	0.847	100	1.451	100	1.950	100	1.569	100	1.687	100
12	1.609	100	1.244	100	1.953	100	0.895	100	1.230	100	1.367	100
13	1.626	100	1.145	100	1.478	100	1.105	100	1.159	100	1.284	100
14	2.579	100	0.871	100	1.525	100	1.301	100	1.396	100	1.225	100
15	1.879	100	1.670	100	1.717	100	1.306	100	1.695	100	1.643	100
16	0.975	100	1.214	100	1.370	100	1.517	100	1.864	100	1.476	100
17	1.574	100	0.990	100	1.516	100	0.853	100	1.530	100	1.693	100
18	1.020	100	1.207	100	1.295	100	1.543	100	1.719	100	1.382	100
19	2.229	100	1.936	100	2.723	100	2.972	100	2.899	100	2.774	100
20	1.026	100	1.352	100	1.143	100	1.401	100	2.090	100	1.430	100
21	0.849	100	1.150	100	1.334	100	1.577	100	1.793	100	1.735	100
22	1.922	100	2.157	100	2.291	100	2.649	100	2.717	100	2.315	100
23	1.688	100	1.649	100	3.036	100	2.247	100	3.167	99.9993	1.952	100
24	3.018	99.9964	3.067	100	3.046	100	2.582	100	2.834	100	2.635	100
25	3.294	99.9596	2.757	100	2.870	100	2.157	100	3.022	100	2.577	100
26	1.881	100	1.602	100	1.405	100	1.438	100	1.253	100	1.773	100
27	2.730	100	2.264	100	2.175	100	2.169	100	2.000	100	2.137	100
28	1.804	100	1.063	100	1.291	100	1.407	100	2.173	100	1.136	100
29	1.715	100	1.640	100	1.456	100	1.868	100	1.060	100	1.926	100
30	2.322	100	2.176	100	2.587	100	2.535	100	1.491	100	2.601	99.9285
31	1.690	100	1.224	100	0.966	100	1.011	100	1.405	100	2.360	100
32	1.053	100	1.162	100	1.072	100	1.152	100	1.113	100	0.950	100
135	2.122	100	2.313	100	2.697	100	1.944	100	2.336	100	1.788	100
138	1.380	100	1.234	100	1.482	100	1.576	100	1.460	100	2.014	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 →	Los Angeles		Salt Lake City		Miami		Minneapolis		Atlanta		Juneau	
SV ↓	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	2.788	100	3.544	99.9851	2.238	100	3.067	100	2.392	100	3.152	100
2	2.259	100	1.884	100	2.515	100	1.936	100	2.423	100	1.795	100
3	3.288	100	4.557	99.5170	2.352	100	2.896	100	2.353	100	3.111	100
4	1.522	100	1.668	100	1.415	100	1.599	100	0.942	100	1.966	100
5	1.423	100	1.897	100	1.555	100	1.764	100	1.348	100	2.054	100
6	3.578	100	3.854	99.8114*	4.212	99.9010*	3.408	98.6036*	2.816	100	3.700	99.9562*
7	1.494	100	1.870	100	1.642	100	1.549	100	0.943	100	1.850	100
8	-	-	-	-	-	-	-	-	-	-	-	-
9	2.162	100	2.532	100	2.096	100	2.709	100	2.001	100	2.674	100
10	0.935	100	0.957	100	1.546	100	0.883	100	1.480	100	1.135	100
11	1.463	100	1.366	100	1.879	100	1.163	100	2.008	100	1.145	100
12	1.172	100	1.384	100	1.178	100	1.749	100	0.938	100	1.837	100
13	1.135	100	1.451	100	1.178	100	1.354	100	0.947	100	1.525	100
14	0.951	100	1.106	100	1.739	100	0.830	100	1.402	100	1.036	100
15	1.982	100	1.783	100	1.608	100	1.904	100	1.337	100	1.838	100
16	1.203	100	0.897	100	1.798	100	1.383	100	1.791	100	1.020	100
17	0.975	100	1.723	100	1.542	100	1.314	100	1.027	100	1.391	100
18	1.387	100	1.350	100	1.655	100	1.102	100	1.662	100	1.055	100
19	2.161	100	1.845	100	3.016	100	2.002	100	3.151	99.9430	2.770	100
20	1.359	100	1.324	100	1.915	100	1.119	100	1.651	100	0.935	100
21	1.094	100	0.776	100	1.921	100	0.896	100	1.331	100	0.948	100
22	2.031	100	1.892	100	2.793	99.9974	2.090	100	2.697	100	2.079	100
23	2.031	100	1.617	100	2.539	100	1.556	100	2.607	99.9972	1.574	100
24	2.770	100	3.332	99.7615*	2.663	100	3.000	100	2.716	99.9990	3.770	99.9465*
25	2.508	100	2.730	99.9601	2.426	100	2.399	100	2.081	100	3.129	99.9989
26	1.738	100	1.662	100	0.811	100	1.855	100	1.433	100	1.486	100
27	3.144	100	2.715	100	1.655	100	2.526	100	1.898	100	2.430	100
28	1.079	100	0.890	100	2.500	100	0.944	100	1.689	100	0.984	100
29	1.271	100	2.910	100	1.545	100	1.914	100	1.234	100	2.375	100
30	2.147	100	2.327	100	1.567	100	2.471	100	1.449	100	2.709	100
31	1.382	100	1.334	100	1.824	100	0.958	100	1.134	100	1.709	100
32	0.851	100	1.967	100	1.210	100	1.131	100	1.268	100	1.324	100
135	1.573	100	1.670	100	1.644	100	2.414	100	1.973	100	1.885	100
138	2.499	100	1.778	100	2.222	100	2.234	100	1.408	100	1.787	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 →	Billings		Albuquerque		Boston		Washington DC		Houston		Kansas City	
SV ↓	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	1.733	100	2.013	100	2.416	100	1.909	100	1.846	100	1.844	100
2	1.562	100	1.522	100	1.568	100	1.735	100	2.016	100	1.663	100
3	2.475	100	2.418	100	1.792	100	1.933	100	1.635	100	1.789	100
4	0.907	100	0.944	100	0.941	100	0.716	100	0.609	100	0.689	100
5	1.038	100	1.076	100	0.963	100	0.716	100	1.060	100	1.158	100
6	2.672	100	2.746	100	2.957	100	2.711	100	2.732	100	3.096	100
7	1.119	100	0.838	100	1.026	100	0.793	100	0.749	100	0.818	100
8												
9	2.088	100	2.127	100	1.691	100	1.488	100	1.351	100	1.774	100
10	0.333	100	0.370	100	0.462	100	0.390	100	1.044	100	0.424	100
11	0.354	100	0.366	100	0.489	100	0.557	100	0.726	100	0.527	100
12	0.785	100	0.900	100	0.941	100	0.520	100	0.616	100	0.667	100
13	0.725	100	0.605	100	0.771	100	0.525	100	0.669	100	0.506	100
14	1.465	100	0.513	100	0.900	100	0.484	100	0.821	100	0.566	100
15	0.942	100	0.966	100	1.039	100	0.732	100	1.313	100	0.937	100
16	0.503	100	0.573	100	0.494	100	0.625	100	0.814	100	0.645	100
17	1.004	100	0.831	100	1.105	100	0.544	100	0.739	100	0.742	100
18	0.759	100	0.700	100	0.712	100	0.941	100	1.017	100	0.584	100
19	1.313	100	1.179	100	1.566	100	1.646	100	2.048	100	1.651	100
20	0.563	100	0.651	100	0.535	100	0.650	100	0.967	100	0.633	100
21	0.741	100	0.771	100	0.923	100	1.243	100	1.016	100	1.002	100
22	1.596	100	1.611	100	1.500	100	1.834	100	2.142	100	1.638	100
23	1.383	100	1.336	100	1.623	100	1.458	100	2.107	100	1.325	100
24	1.757	100	1.824	100	2.047	100	1.582	100	1.704	100	1.637	100
25	1.758	100	2.022	100	1.653	100	1.294	100	1.446	100	1.491	100
26	0.804	100	0.884	100	0.832	100	0.564	100	0.590	100	0.650	100
27	1.314	100	1.298	100	1.582	100	1.327	100	1.270	100	1.367	100
28	1.202	100	0.398	100	0.690	100	0.688	100	0.981	100	0.570	100
29	1.009	100	1.106	100	0.786	100	0.824	100	0.759	100	0.980	100
30	1.764	100	1.854	100	1.848	100	1.715	100	1.596	100	1.886	100
31	0.746	100	0.808	100	0.535	100	0.526	100	0.965	100	1.447	100
32	0.474	100	0.715	100	0.426	100	0.492	100	0.514	100	0.511	100

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

Site →	Los Angeles		Salt Lake City		Miami		Minneapolis		Atlanta		Juneau	
SV ↓	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	2.066	100	1.938	100	2.132	100	2.083	100	1.773	100	2.097	100
2	1.426	100	1.540	100	1.550	100	1.532	100	1.809	100	1.512	100
3	2.358	100	2.823	100	1.790	100	1.985	100	1.743	100	2.196	100
4	0.926	100	0.884	100	0.909	100	0.869	100	0.554	100	0.996	100
5	1.104	100	1.200	100	1.235	100	1.050	100	0.755	100	1.258	100
6	2.847	100	2.888	100	3.383	99.8162	2.589	100	2.246	100	2.682	100
7	0.870	100	1.040	100	0.954	100	0.865	100	0.564	100	1.081	100
8	-	-	-	-	-	-	-	-	-	-	-	-
9	1.772	100	1.927	100	1.565	100	1.801	100	1.443	100	1.926	100
10	0.456	100	0.367	100	0.379	100	0.447	100	0.638	100	0.414	100
11	0.597	100	0.424	100	0.602	100	0.464	100	0.794	100	0.595	100
12	0.705	100	1.041	100	0.760	100	0.805	100	0.584	100	1.030	100
13	0.731	100	0.672	100	0.669	100	0.648	100	0.403	100	0.789	100
14	0.471	100	0.570	100	0.775	100	0.412	100	0.558	100	0.556	100
15	1.195	100	0.872	100	1.058	100	1.011	100	0.610	100	1.095	100
16	0.476	100	0.456	100	0.686	100	0.591	100	0.858	100	0.548	100
17	0.768	100	1.083	100	0.769	100	0.738	100	0.437	100	0.777	100
18	0.714	100	0.821	100	0.815	100	0.761	100	1.154	100	0.752	100
19	1.451	100	1.133	100	1.686	100	1.474	100	1.760	100	1.755	100
20	0.622	100	0.632	100	0.875	100	0.612	100	0.883	100	0.521	100
21	0.443	100	0.604	100	1.140	100	0.792	100	1.040	100	0.732	100
22	1.436	100	1.423	100	1.634	100	1.635	100	2.031	100	1.515	100
23	1.338	100	1.246	100	1.596	100	1.166	100	1.771	100	1.099	100
24	2.017	100	1.901	100	1.946	100	2.023	100	1.719	100	2.314	100
25	1.767	100	1.769	100	1.500	100	1.513	100	1.252	100	1.990	100
26	1.032	100	0.884	100	0.654	100	0.956	100	0.646	100	0.802	100
27	1.902	100	1.318	100	1.524	100	1.563	100	1.252	100	1.569	100
28	0.373	100	0.392	100	1.438	100	0.511	100	0.993	100	0.469	100
29	0.853	100	1.459	100	0.855	100	0.993	100	0.593	100	1.119	100
30	1.675	100	1.828	100	1.870	100	1.821	100	1.334	100	1.970	100
31	0.753	100	0.766	100	0.739	100	0.632	100	0.405	100	0.927	100
32	0.475	100	1.094	100	0.548	100	0.544	100	0.507	100	0.739	100

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

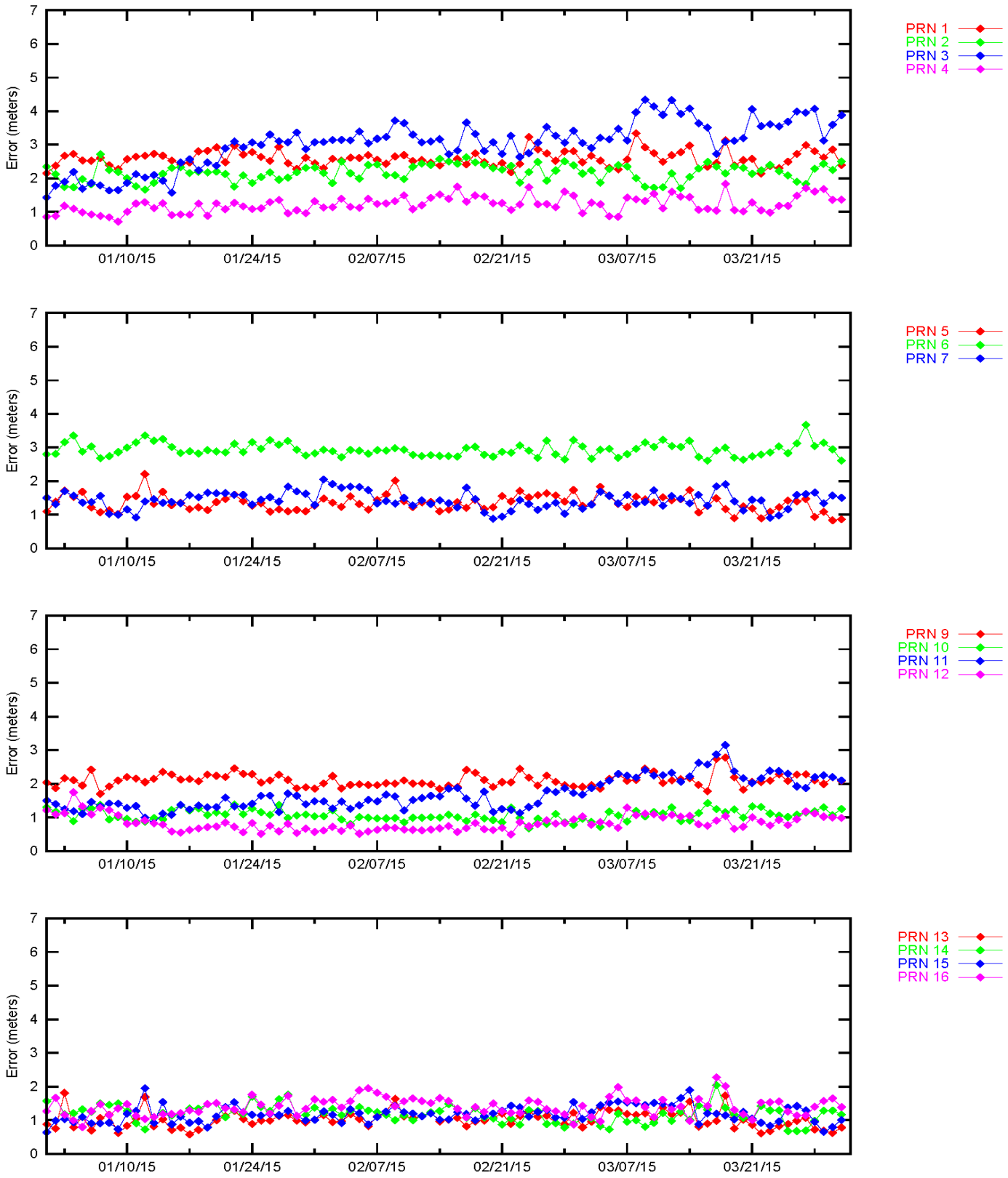


Figure 6-2 95% Range Error (PRN 17 – PRN 32) – Washington DC

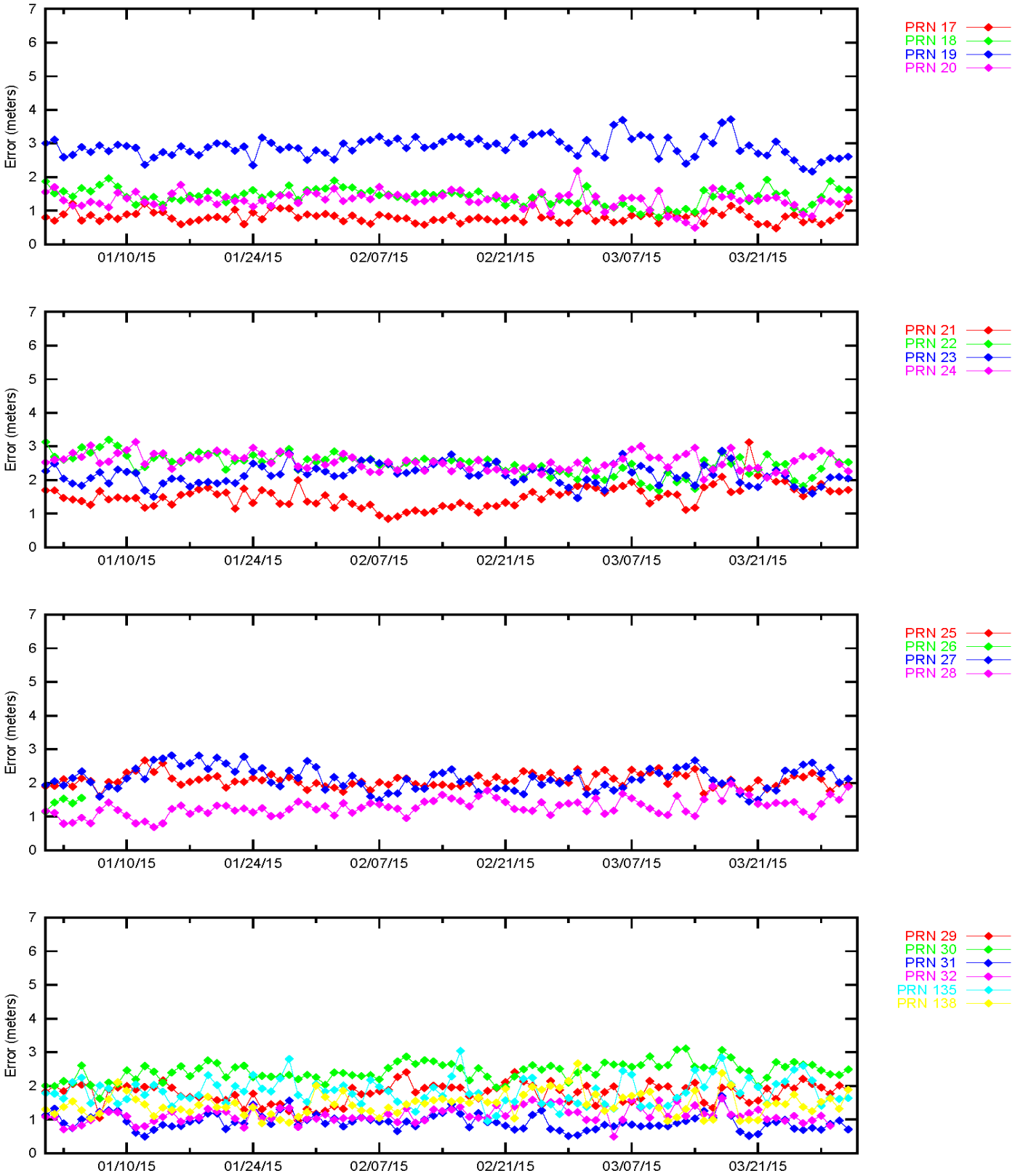


Figure 6-3 95% Ionospheric Error (PRN 1 – PRN 16) – Washington DC

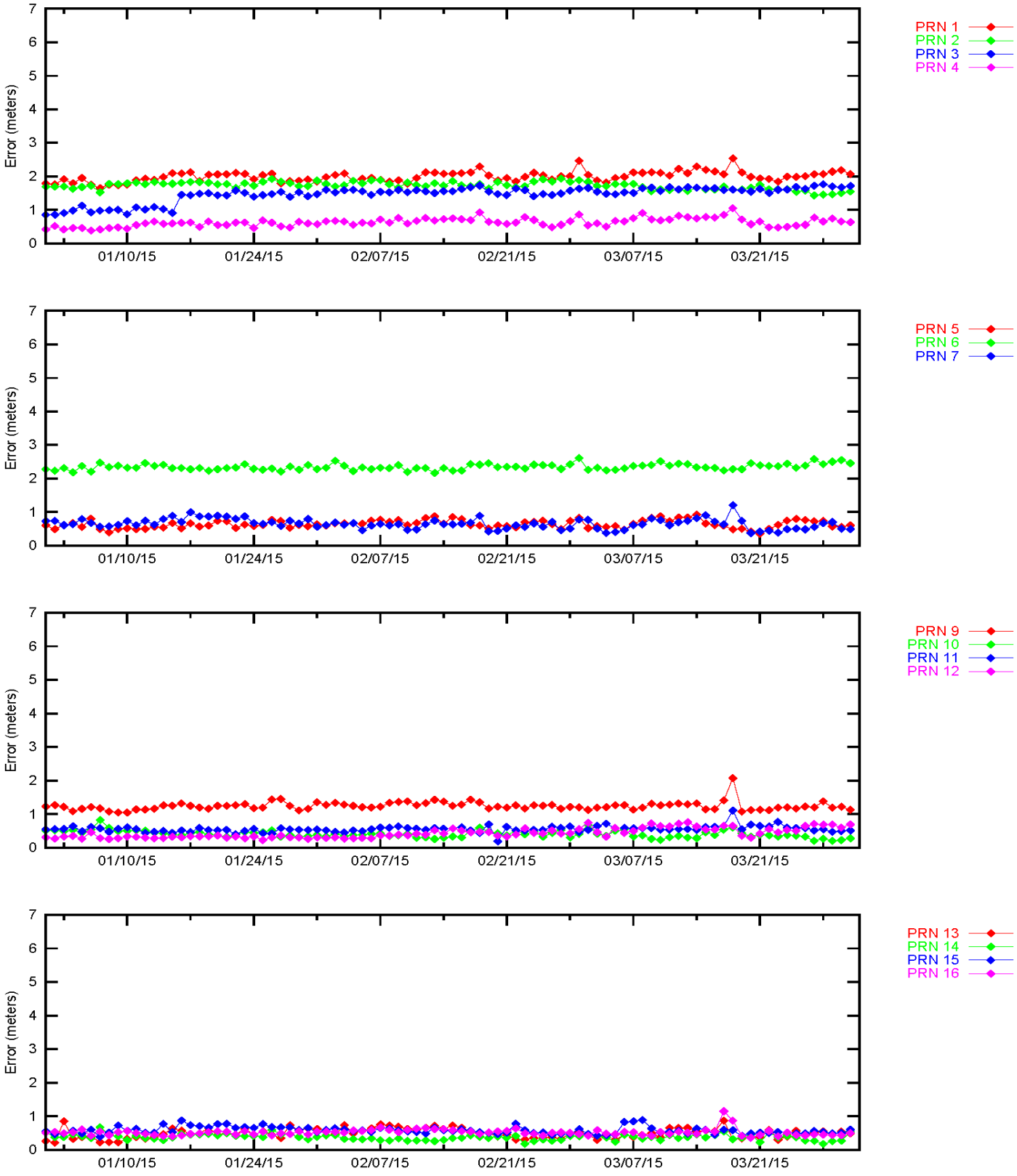
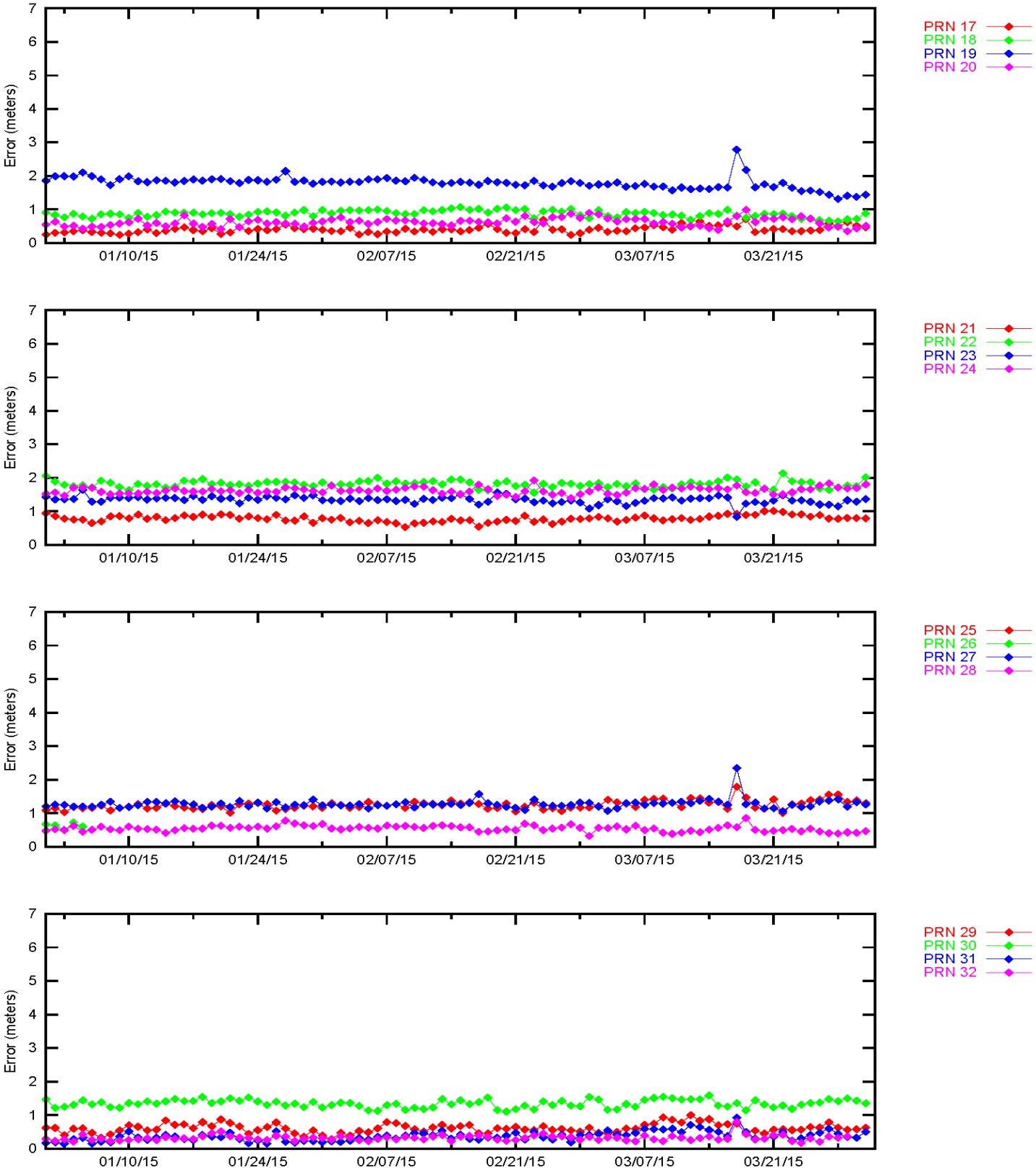


Figure 6-4 95% Ionospheric Error (PRN 17 - PRN 32) – Washington DC



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.

Table 7-1 GEO Ranging Availability

GEO Source	GEO	PA (%)	NPA (%)	Not Monitored (%)	Do Not Use (%)
AMR 133	CRW	99.989	0	0	0
AMR 133	CRE	99.989	0	0	0
AMR 133	AMR	0	96.744	0	0
CRW 135	CRW	99.997	0	0	0.001
CRW 135	CRE	99.997	0	0	0.001
CRW 135	AMR	0.00	96.74	0	0
CRE 138	CRW	100	0	0	0
CRE 138	CRE	100	0	0	0
CRE 138	AMR	0	96.743	0	0

Figure 7-1 Daily PA CRW GEO Ranging Availability Trend

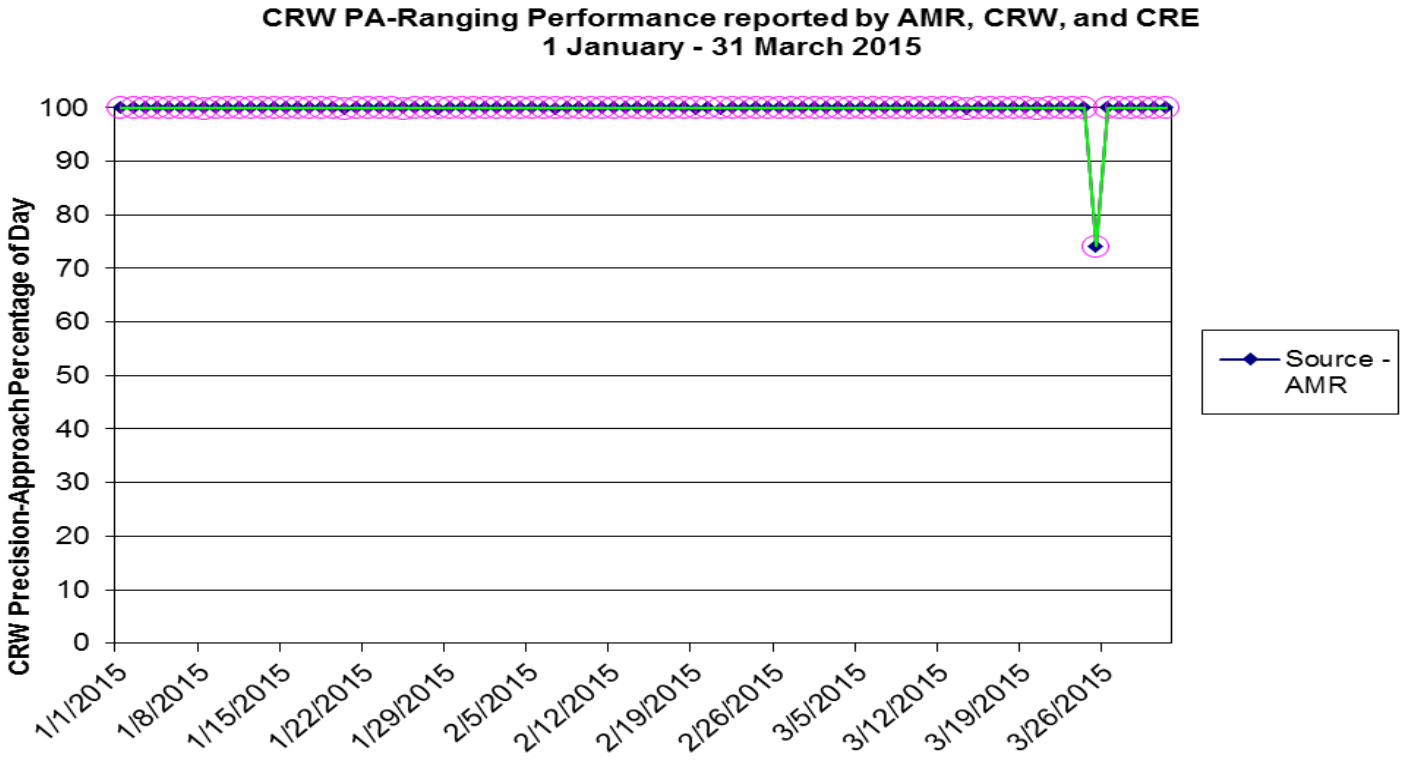


Figure 7-2 Daily PA CRE GEO Ranging Availability Trend

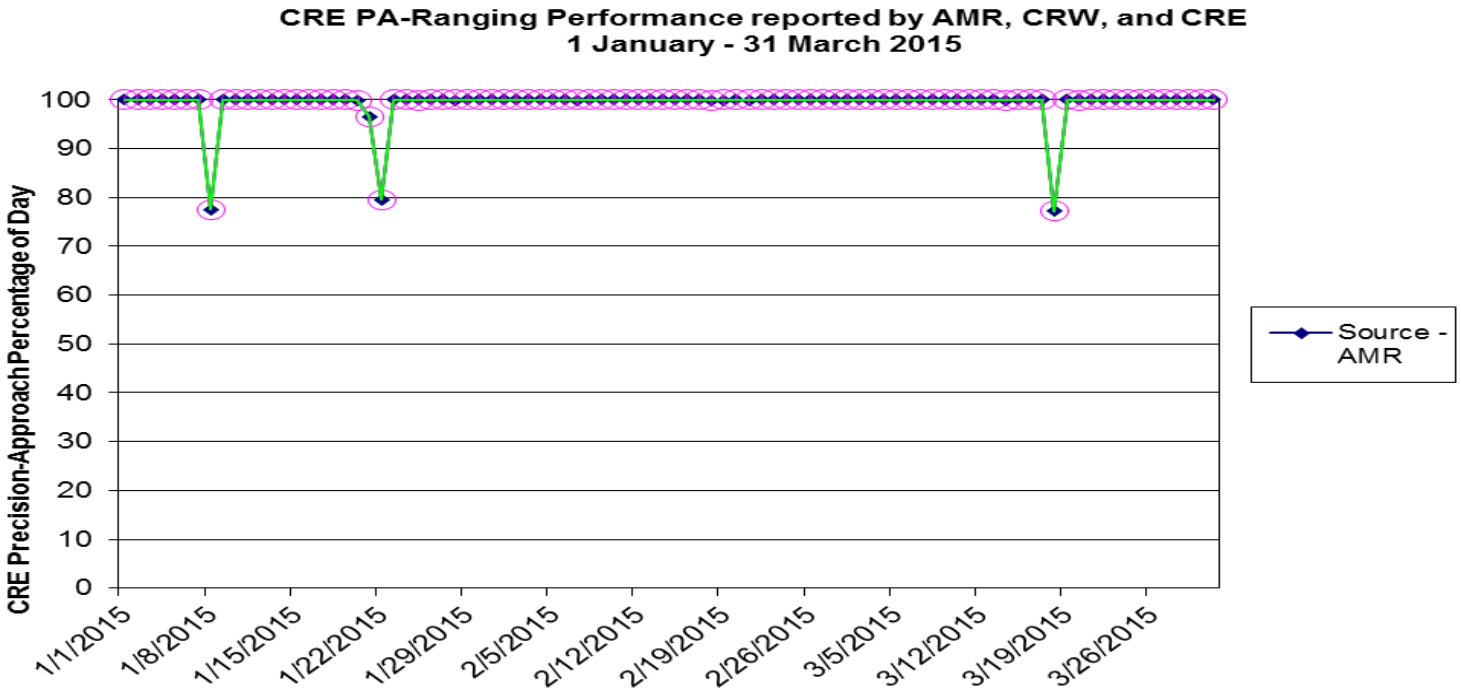
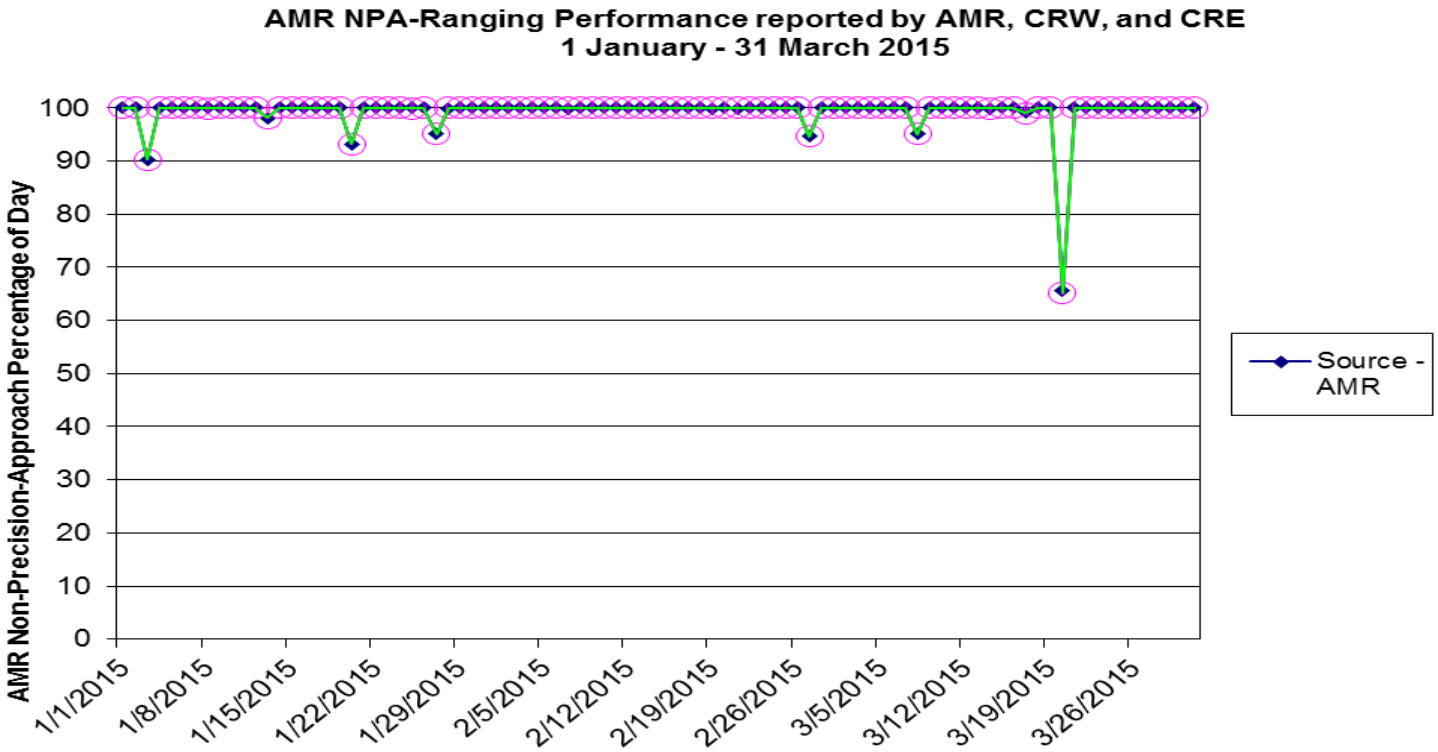


Figure 7-3 Daily NPA AMR GEO Ranging Availability Trend



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/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
CAL4	FORT MACKAY / ALBIAN AERODROME	AB	LPV	0	100	2	99.9985	4	99.9117
CEV3	VEGREVILLE	AB	LPV	0	100	0	100	4	99.9726
CYEG	EDMONTON / JOSEPHBURG	AB	LPV	0	100	0	100	3	99.9718
CYXD	EDMONTON CITY CTR	AB	LPV	0	100	0	100	3	99.9715
2C7	SHAKTOOLIK	AK	LPV	3	99.9560	5	99.8966	23	99.7539
6A8	ALLAKAKET	AK	LP	3	99.9757	5	99.8854	70	99.6563
7KA	TATITLEK	AK	LP	3	99.9564	4	99.9194	5	99.8708
9A3	CHUATHBALUK	AK	LPV	3	99.9734	5	99.9290	23	99.8422
AKN	KING SALMON	AK	LPV	2	99.9819	4	99.9371	15	99.8434
ANC	TED STEVENS ANCHORAGE INTL	AK	LPV200	2	99.9672	5	99.9302	5	99.8627
AQH	QUINHAGAK	AK	LPV	1	99.9834	4	99.9124	36	99.6732
AQT	NUIQSUT	AK	LPV	3	99.9587	8	99.8989	121	98.6235
BET	BETHEL	AK	LPV200	1	99.9780	4	99.9201	41	99.7411
BRW	WILEY POST-WILL ROGERS MEM	AK	LPV	5	99.9028	46	99.5922	234	96.0189
CDB	COLD BAY	AK	LPV200	1	99.9996	3	99.9286	506	91.1073
CDV	MERLE K (MUDHOLE) SMITH	AK	LPV	2	99.9819	4	99.9279	6	99.8723

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
CLP	CLARKS POINT	AK	LPV	1	99.9815	3	99.9387	26	99.7951
CXF	COLDFOOT	AK	LP	2	99.9722	5	99.8893	69	99.5158
D76	ROBERT/BOB/CURTIS MEMORIAL	AK	LPV	4	99.9549	12	99.8569	148	98.2581
DLG	DILLINGHAM	AK	LPV	1	99.9830	3	99.9402	21	99.8056
ELI	ELIM	AK	LPV	3	99.9560	5	99.8947	29	99.7022
ENA	KENAI MUNICIPAL	AK	LPV200	2	99.9660	3	99.9344	5	99.8835
ENM	EMMONAK	AK	LPV	2	99.9622	5	99.8974	46	99.6173
FAI	FAIRBANKS INTL	AK	LPV200	5	99.9576	5	99.8862	37	99.7330
GAL	EDWARD G. PITKA	AK	LPV	4	99.9367	5	99.89000	15	99.8056
GKN	GULKANA	AK	LPV	2	99.9846	4	99.9232	9	99.8592
HLA	HUSLIA	AK	LPV	4	99.9448	5	99.8846	31	99.7770
HOM	HOMER	AK	LPV	2	99.9699	4	99.9348	6	99.8897
HPB	HOOPER BAY	AK	LP	1	99.9776	3	99.9271	113	99.2434
ILI	ILIAMNA	AK	LPV	1	99.9834	4	99.9336	9	99.8650
KAL	KALTAG	AK	LPV	4	99.9522	5	99.8989	15	99.8002
KSM	ST MARY'S	AK	LPV200	2	99.9734	5	99.9198	51	99.6867
KTN	KETCHIKAN INTL	AK	LPV	1	99.9996	2	99.9911	4	99.9217
KWT	KWETHLUK	AK	LPV	1	99.9780	4	99.9205	36	99.7512
KYU	KOYUKUK	AK	LPV	4	99.9433	5	99.8904	16	99.8013
MCG	MCGRATH	AK	LP	3	99.9545	5	99.9109	18	99.8260
MDM	MARSHALL DON HUNTER SR	AK	LP	2	99.9730	4	99.9240	40	99.7569
MDO	MIDDLETON ISLAND	AK	LP	3	99.9699	4	99.9201	6	99.8846
OOK	TOKSOOK BAY	AK	LP	1	99.9780	4	99.9105	118	99.2851
ORT	NORTHWAY	AK	LP	3	99.9784	5	99.9140	50	99.8191
OTZ	RALPH WIEN MEMORIAL	AK	LPV200	5	99.9444	14	99.8329	143	97.5529
PAQ	PALMER MUNICIPAL	AK	LP	2	99.9633	5	99.9132	5	99.8619
RBY	RUBY	AK	LPV	4	99.9340	5	99.8881	17	99.8029
SCC	DEADHORSE	AK	LPV	5	99.9460	8	99.8681	117	98.6563
SCM	SCAMMON BAY	AK	LP	1	99.9776	3	99.9267	77	99.4379
SHG	SHUNGNAK	AK	LP	3	99.9541	5	99.8808	66	99.5984
SHX	SHAGELUK	AK	LPV	2	99.9618	4	99.9155	25	99.8106
SMK	ST MICHAEL	AK	LPV	3	99.9568	5	99.8981	27	99.7515
UNK	UNALAKLEET	AK	LP	3	99.9560	5	99.8981	22	99.7855
WLK	SELAWIK	AK	LPV	3	99.9579	5	99.9008	53	99.5448
WNA	NAPAKIAK	AK	LPV	1	99.9780	4	99.9163	41	99.7377
YAK	YAKUTAT	AK	LPV200	2	99.9838	4	99.9282	7	99.8850
06A	MOTON FIELD MUNICIPAL	AL	LPV	0	100	0	100	1	99.9448
0J6	HEADLAND MUNICIPAL	AL	LPV	0	100	0	100	2	99.9780
0R1	ATMORE MUNICIPAL	AL	LP	0	100	0	100	1	99.9981
12J	BREWTON MUNICIPAL	AL	LPV	0	100	0	100	2	99.9923
1M4	POSEY FIELD	AL	LPV	1	99.9942	1	99.9510	1	99.9336
1R8	BAY MINETTE MUNICIPAL	AL	LPV	0	100	0	100	1	99.9981
2R5	ST ELMO	AL	LPV	0	100	0	100	1	99.9981
3A1	FOLSOM FIELD	AL	LPV	1	99.9954	1	99.9533	1	99.9336

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
3M8	NORTH PICKENS	AL	LP	1	99.9927	1	99.9618	1	99.9375
4A9	ISBELL FIELD	AL	LPV	2	99.9869	1	99.9468	1	99.9336
5R4	FOLEY MUNICIPAL	AL	LPV	0	100	0	100	0	100
79J	SOUTH ALABAMA RGNL AT BILL BENTON FIELD	AL	LPV	0	100	0	100	1	99.9853
8A0	ALBERTVILLE MUNICIPAL-T. J. BRUMLIK FIELD	AL	LPV	1	99.9958	1	99.9498	1	99.9363
9A4	LAWRENCE COUNTY	AL	LPV200	1	99.9792	2	99.9502	1	99.9336
ANB	ANNISTON METROPOLITAN	AL	LPV	1	99.9942	1	99.9495	1	99.9375
ASN	TALLADEGA MUNICIPAL	AL	LPV200	1	99.9942	1	99.9498	1	99.9375
AUO	AUBURN UNIVERSITY RGNL	AL	LPV200	0	100	0	100	1	99.9444
BFM	MOBILE DOWNTOWN	AL	LPV200	0	100	0	100	0	100
BHM	BIRMINGHAM INTL	AL	LPV200	1	99.9934	1	99.9552	1	99.9352
CQF	H L SONNY CALLAHAN	AL	LPV200	0	100	0	100	0	100
DCU	PRYOR FIELD RGNL	AL	LPV200	1	99.9799	1	99.9502	1	99.9336
DHN	DOTHAN RGNL	AL	LPV200	0	100	0	100	2	99.9796
EDN	ENTERPRISE MUNICIPAL	AL	LPV	0	100	0	100	1	99.9826
EET	SHELBY COUNTY	AL	LPV	1	99.9923	1	99.9761	1	99.9402
EKY	BESSEMER	AL	LPV	1	99.9923	1	99.9757	1	99.9387
EUF	WEEDON FIELD	AL	LPV	0	100	0	100	2	99.9614
GAD	NORTHEAST ALABAMA RGNL	AL	LPV200	1	99.9954	1	99.9491	1	99.9371
HAB	MARION COUNTY-RANKIN FITE	AL	LPV	1	99.9942	1	99.9495	1	99.9375
HSV	HUNTSVILLE INTL-CARL T JONES FLD	AL	LPV200	1	99.9834	1	99.9506	1	99.9336
JFX	WALKER COUNTY-BEVILL FIELD	AL	LPV	1	99.9938	1	99.9572	1	99.9336
JKA	JACK EDWARDS	AL	LPV200	0	100	0	100	0	100
M95	RICHARD ARTHUR FIELD	AL	LPV	1	99.9931	1	99.9583	1	99.9375
MDQ	MADISON COUNTY EXECUTIVE/TOM SHARP JR FLD	AL	LPV	1	99.9834	1	99.9487	1	99.9336
MGM	MONTGOMERY RGNL (DANNELLY FIELD)	AL	LPV200	0	100	0	100	1	99.9495
MOB	MOBILE RGNL	AL	LPV200	0	100	0	100	2	99.9985
MSL	NORTHWEST ALABAMA RGNL	AL	LPV200	1	99.9784	1	99.9375	1	99.9336
PLR	ST CLAIR COUNTY	AL	LPV	1	99.9938	1	99.9510	1	99.9375
PYP	CENTRE-PIEDMONT CHEROKEE COUNTY RGNL	AL	LPV	2	99.9880	1	99.9471	1	99.9371
SCD	MERKEL FIELD SYLACAUGA MUNICIPAL	AL	LPV	1	99.9927	1	99.9549	1	99.9429
SEM	CRAIG FIELD	AL	LPV	0	100	0	100	1	99.9545
TCL	TUSCALOOSA RGNL	AL	LPV	1	99.9919	1	99.9745	1	99.9375
TOI	TROY MUNICIPAL	AL	LPV	0	100	0	100	2	99.9626
4M3	CARLISLE MUNICIPAL	AR	LPV	2	99.9938	1	99.9394	1	99.9375
7M1	MC GEHEE MUNICIPAL	AR	LP	1	99.9969	2	99.9672	2	99.9336
ARG	WALNUT RIDGE RGNL	AR	LPV200	1	99.9884	1	99.9375	1	99.9375
ASG	SPRINGDALE MUNICIPAL	AR	LPV	1	99.9931	1	99.9842	2	99.9414
AWM	WEST MEMPHIS MUNICIPAL	AR	LPV200	1	99.9776	1	99.9375	1	99.9375

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
BPK	OZARK RGNL	AR	LPV	1	99.9904	1	99.9402	1	99.9375
BVX	BATESVILLE RGNL	AR	LPV	1	99.9896	1	99.9387	1	99.9375
BYH	ARKANSAS INTL	AR	LPV200	2	99.9664	1	99.9375	1	99.9375
CDH	HARRELL FIELD	AR	LPV	1	99.9988	2	99.9884	2	99.9363
ELD	SOUTH ARKANSAS RGNL AT GOODWIN FIELD	AR	LPV	0	100	1	99.9904	2	99.9387
FSM	FORT SMITH RGNL	AR	LPV200	0	100	1	99.9857	2	99.9579
FYV	DRAKE FIELD	AR	LPV	1	99.9942	1	99.9846	2	99.9425
HRO	BOONE COUNTY	AR	LPV	1	99.9915	1	99.9448	1	99.9387
JBR	JONESBORO MUNICIPAL	AR	LPV	1	99.9884	1	99.9375	1	99.9375
LIT	ADAMS FIELD	AR	LPV200	0	100	1	99.9410	2	99.9348
M19	NEWPORT MUNICIPAL	AR	LPV	1	99.9892	1	99.9375	1	99.9375
M77	HOWARD COUNTY	AR	LP	0	100	1	99.9884	2	99.9576
ORK	NORTH LITTLE ROCK MUNICIPAL	AR	LPV	1	99.9969	1	99.9410	2	99.9363
PBF	GRIDER FIELD	AR	LPV	1	99.9988	2	99.9653	2	99.9306
ROG	ROGERS MUNICIPAL-CARTER FIELD	AR	LPV	1	99.9923	1	99.9838	1	99.9448
RUE	RUSSELLVILLE RGNL	AR	LPV	1	99.9934	1	99.9549	2	99.9356
SGT	STUTTGART MUNICIPAL	AR	LPV	1	99.9992	1	99.9390	1	99.9375
SLG	SMITH FIELD	AR	LPV	1	99.9934	1	99.9838	3	99.9568
SRC	SEARCY MUNICIPAL	AR	LPV	1	99.9907	1	99.9390	1	99.9375
SUZ	SALINE COUNTY RGNL	AR	LPV	0	100	1	99.9522	2	99.9279
TXK	TEXARKANA RGNL-WEBB FIELD	AR	LPV	0	100	1	99.9896	2	99.9599
VBT	BENTONVILLE MUNICIPAL/LOUISE M THADEN FIELD	AR	LPV	1	99.9923	1	99.9838	2	99.9414
XNA	NORTHWEST ARKANSAS RGNL	AR	LPV200	1	99.9927	1	99.9838	2	99.9421
AVQ	MARANA RGNL	AZ	LP	0	100	0	100	43	99.9201
D68	SPRINGERVILLE MUNICIPAL	AZ	LP	0	100	0	100	1	99.9961
DVT	PHOENIX DEER VALLEY	AZ	LPV	0	100	0	100	1	99.9861
FFZ	FALCON FLD	AZ	LP	0	100	0	100	1	99.9861
FHU	SIERRA VISTA MUNICIPAL-LIBBY AAF	AZ	LPV200	0	100	0	100	53	99.9209
FLG	FLAGSTAFF PULLIAM	AZ	LPV	0	100	0	100	1	99.9888
GEU	GLENDALE MUNICIPAL	AZ	LPV	0	100	0	100	1	99.9857
HII	LAKE HAVASU CITY	AZ	LPV	0	100	0	100	1	99.9819
IFP	LAUGHLIN/BULLHEAD INTL	AZ	LPV	0	100	0	100	1	99.9826
IGM	KINGMAN	AZ	LPV	0	100	0	100	1	99.9846
IWA	PHOENIX-MESA GATEWAY	AZ	LPV200	0	100	0	100	5	99.9834
P33	COCHISE COUNTY	AZ	LPV	0	100	0	100	5	99.9934
PGA	PAGE MUNICIPAL	AZ	LPV	0	100	0	100	1	99.9919
PHX	PHOENIX SKY HARBOR INTL	AZ	LPV	0	100	0	100	1	99.9857
PRC	ERNEST A. LOVE FIELD	AZ	LPV	0	100	0	100	1	99.9861
RQE	WINDOW ROCK	AZ	LP	0	100	0	100	1	99.9934
SAD	SAFFORD RGNL	AZ	LPV	0	100	0	100	1	99.9961
SJN	ST JOHNS INDUSTRIAL AIR PARK	AZ	LP	0	100	0	100	1	99.9961
SOW	SHOW LOW RGNL	AZ	LPV	0	100	0	100	1	99.9961

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
TUS	TUCSON INTL	AZ	LPV	0	100	0	100	49	99.9155
CYBL	CAMPBELL RIVER	BC	LPV	0	100	0	100	2	99.9934
CYCD	NANAIMO	BC	LPV	0	100	0	100	1	99.9996
CYVR	VANCOUVER INTL	BC	LPV	0	100	0	100	0	100
CYXS	PRINCE GEORGE	BC	LPV	0	100	0	100	3	99.9892
CYYJ	VICTORIA INTL	BC	LPV	0	100	0	100	0	100
CZBB	VANCOUVER / BOUNDARY BAY	BC	LPV	0	100	0	100	0	100
AAT	ALTURAS MUNICIPAL	CA	LPV	0	100	0	100	1	99.9934
ACV	ARCATA	CA	LPV200	0	100	0	100	2	99.9873
APC	NAPA COUNTY	CA	LPV	0	100	0	100	1	99.9707
APV	APPLE VALLEY	CA	LPV	0	100	1	99.9988	1	99.9776
AUN	AUBURN MUNICIPAL	CA	LPV	0	100	0	100	1	99.9888
BFL	MEADOWS FIELD	CA	LPV200	0	100	1	99.9992	3	99.9738
BLH	BLYTHE	CA	LP	0	100	0	100	1	99.9819
C83	BYRON	CA	LPV	0	100	0	100	2	99.9715
CCR	BUCHANAN FIELD	CA	LPV	0	100	0	100	2	99.9703
CEC	JACK MC NAMARA FIELD	CA	LPV200	0	100	0	100	2	99.9877
CIC	CHICO MUNICIPAL	CA	LPV	0	100	0	100	2	99.9884
CMA	CAMARILLO	CA	LPV	0	100	1	99.9958	5	99.9483
CNO	CHINO	CA	LPV	0	100	1	99.9969	1	99.9749
CRQ	MC CLELLAN-PALOMAR	CA	LPV200	0	100	1	99.9954	2	99.9742
CVH	HOLLISTER MUNICIPAL	CA	LPV	0	100	0	100	6	99.9556
DAG	BARSTOW-DAGGETT	CA	LPV	0	100	0	100	1	99.9788
DWA	YOLO COUNTY-DAVIS/WOODLAND/WINTERS	CA	LPV	0	100	0	100	2	99.9846
FAT	FRESNO YOSEMITE INTL	CA	LPV	0	100	0	100	3	99.9722
HAF	HALF MOON BAY	CA	LPV	0	100	0	100	24	99.9317
HHR	HAWTHORNE JACK NORTHROP FIELD	CA	LPV	0	100	1	99.9958	2	99.9703
HWD	HAYWARD EXECUTIVE	CA	LPV	0	100	0	100	11	99.9572
LAX	LOS ANGELES INTL	CA	LPV	0	100	1	99.9958	3	99.9699
LGB	LONG BEACH/DAUGHERTY FIELD	CA	LPV	0	100	1	99.9958	2	99.9703
LHM	LINCOLN RGNL/KARL HARDER FIELD	CA	LPV200	0	100	0	100	1	99.9877
LLR	LITTLE RIVER	CA	LP	0	100	0	100	6	99.9807
LSN	LOS BANOS MUNICIPAL	CA	LPV	0	100	0	100	4	99.9653
LVK	LIVERMORE MUNICIPAL	CA	LPV	0	100	0	100	5	99.9641
MAE	MADERA MUNICIPAL	CA	LPV	0	100	0	100	3	99.9707
MCE	MERCED RGNL/MACREADY FIELD	CA	LPV	0	100	0	100	3	99.9699
MER	CASTLE	CA	LPV200	0	100	0	100	3	99.9711
MHR	SACRAMENTO MATHER	CA	LPV200	0	100	0	100	2	99.9873
MIT	SHAFTER-MINTER FIELD	CA	LPV	0	100	1	99.9992	3	99.9730
MOD	MODESTO CITY-CO-HARRY SHAM FLD	CA	LPV	0	100	0	100	3	99.9738
MRY	MONTEREY PENINSULA	CA	LPV	0	100	1	99.9996	29	99.9151
MYF	MONTGOMERY FIELD	CA	LPV200	0	100	1	99.9958	2	99.9715
MYV	YUBA COUNTY	CA	LPV200	0	100	0	100	1	99.9880

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
O02	NERVINO	CA	LPV	0	100	0	100	1	99.9938
O27	OAKDALE	CA	LPV	0	100	0	100	1	99.9772
O69	PETALUMA MUNICIPAL	CA	LPV	0	100	0	100	5	99.9819
O88	RIO VISTA MUNICIPAL	CA	LP	0	100	0	100	1	99.9711
OAK	METROPOLITAN OAKLAND INTL	CA	LPV	0	100	0	100	13	99.9572
ONT	ONTARIO INTL	CA	LPV	0	100	1	99.9973	1	99.9749
OVE	OROVILLE MUNICIPAL	CA	LPV	0	100	0	100	1	99.9888
OXR	OXNARD	CA	LPV	0	100	1	99.9958	5	99.9475
PMD	PALMDALE USAF PLANT 42	CA	LPV200	0	100	1	99.9981	1	99.9749
POC	BRACKETT FIELD	CA	LPV	0	100	1	99.9969	1	99.9749
PRB	PASO ROBLES MUNICIPALCIPAL	CA	LPV200	0	100	1	99.9981	5	99.9549
PVF	PLACERVILLE	CA	LPV	0	100	0	100	1	99.9919
RAL	RIVERSIDE MUNICIPAL	CA	LPV	0	100	1	99.9973	1	99.9749
RBL	RED BLUFF MUNICIPAL	CA	LPV	0	100	0	100	2	99.9884
RDD	REDDING MUNICIPAL	CA	LPV	0	100	0	100	2	99.9888
RHV	REID-HILLVIEW OF SANTA CLARA	CA	LPV	0	100	0	100	10	99.9552
SAC	SACRAMENTO EXECUTIVE	CA	LPV200	0	100	0	100	2	99.9853
SAN	SAN DIEGO INTL	CA	LP	0	100	1	99.9954	3	99.9711
SBA	SANTA BARBARA MUNICIPAL	CA	LPV	0	100	1	99.9954	7	99.9398
SBP	SAN LUIS COUNTY RGNL	CA	LPV200	0	100	1	99.9969	11	99.9452
SCK	STOCKTON METROPOLITAN	CA	LPV	0	100	0	100	1	99.9734
SEE	GILLESPIE FIELD	CA	LP	0	100	1	99.9961	2	99.9718
SFO	SAN FRANCISCO INTL	CA	LPV	0	100	0	100	16	99.9495
SJC	NORMAN Y. MINETA SAN JOSE INTL	CA	LPV	0	100	0	100	15	99.9529
SMF	SACRAMENTO INTL	CA	LPV200	0	100	0	100	1	99.9873
SMX	SANTA MARIA PUBLIC/CAPT G ALLAN HANCOCK FIELD	CA	LPV200	0	100	1	99.9965	9	99.9340
SNA	JOHN WAYNE-ORANGE COUNTY	CA	LPV	0	100	1	99.9958	2	99.9703
SNS	SALINAS MUNICIPAL	CA	LPV200	0	100	1	99.9996	16	99.9406
STS	CHARLES M. SCHULZ-SONOMA COUNTY	CA	LPV	0	100	0	100	4	99.9830
TCY	TRACY MUNICIPAL	CA	LPV	0	100	0	100	4	99.9703
TOA	ZAMPERINI FIELD	CA	LPV200	0	100	1	99.9958	2	99.9703
VCB	NUT TREE	CA	LPV	0	100	0	100	1	99.9707
VCV	SOUTHERN CALIFORNIA LOGISTICS	CA	LPV	0	100	1	99.9988	1	99.9765
VIS	VISALIA MUNICIPAL	CA	LPV200	0	100	0	100	3	99.9742
WJF	GENERAL WM J FOX AIRFIELD	CA	LPV	0	100	1	99.9981	1	99.9749
WLW	WILLOWS-GLENN COUNTY	CA	LPV	0	100	0	100	2	99.9880
ALS	SAN LUIS VALLEY RGNL/BERGMAN FIELD	CO	LPV200	0	100	0	100	1	99.9915
APA	CENTENNIAL	CO	LPV200	0	100	0	100	1	99.9877
BJC	ROCKY MOUNTAIN METROPOLITAN	CO	LPV200	0	100	0	100	1	99.9865
CEZ	CORTEZ MUNICIPAL	CO	LPV	0	100	0	100	1	99.9904
COS	CITY OF COLORADO SPRINGS MUNICIPAL	CO	LPV200	0	100	0	100	1	99.9888

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
DEN	DENVER INTL	CO	LPV200	0	100	0	100	1	99.9865
DRO	DURANGO-LA PLATA COUNTY	CO	LPV200	0	100	0	100	1	99.9911
FMM	FORT MORGAN MUNICIPAL	CO	LP	0	100	0	100	1	99.9865
FNL	FORT COLLINS-LOVELAND MUNICIPAL	CO	LPV200	0	100	0	100	1	99.9865
FTG	FRONT RANGE	CO	LPV200	0	100	0	100	1	99.9865
GJT	GRAND JUNCTION RGNL	CO	LPV200	0	100	0	100	1	99.9896
GXY	GREELEY-WELD COUNTY	CO	LPV	0	100	0	100	1	99.9861
HDN	YAMPA VALLEY	CO	LPV	0	100	0	100	1	99.9884
ITR	KIT CARSON COUNTY	CO	LPV	0	100	0	100	1	99.9919
LAA	LAMAR MUNICIPAL	CO	LPV	0	100	0	100	1	99.9931
LHX	LA JUNTA MUNICIPAL	CO	LPV	0	100	0	100	1	99.9911
MTJ	MONTROSE RGNL	CO	LPV	0	100	0	100	1	99.9884
PUB	PUEBLO MEMORIAL	CO	LPV200	0	100	0	100	1	99.9896
RIL	GARFIELD COUNTY RGNL	CO	LPV	0	100	0	100	1	99.9888
STK	STERLING MUNICIPAL	CO	LPV	0	100	0	100	1	99.9877
TEX	TELLURIDE RGNL	CO	LP	0	100	0	100	1	99.9896
BDL	BRADLEY INTL	CT	LPV200	3	99.9518	2	99.9190	2	99.8985
GON	GROTON-NEW LONDON	CT	LPV	2	99.9510	2	99.9190	3	99.8912
HVN	TWEED-NEW HAVEN	CT	LPV	2	99.9498	2	99.9190	1	99.8819
IJD	WINDHAM	CT	LP	3	99.9518	2	99.9190	2	99.8927
OXC	WATERBURY-OXFORD	CT	LPV	3	99.9506	2	99.9190	2	99.8974
DCA	RONALD REAGAN WASHINGTON NATL	DC	LPV	2	99.9252	2	99.9194	2	99.8985
HEF	MANASSAS RGNL/HARRY P. DAVIS FIELD	DC	LPV	2	99.9244	2	99.9051	2	99.8893
IAD	WASHINGTON DULLES INTL	DC	LPV200	2	99.9194	2	99.9055	2	99.8893
33N	DELAWARE AIRPARK	DE	LP	2	99.9271	2	99.9198	2	99.9012
EVY	SUMMIT	DE	LPV	2	99.9286	2	99.9198	2	99.8978
GED	SUSSEX COUNTY	DE	LPV	2	99.9302	2	99.9198	2	99.9001
ILG	NEW CASTLE	DE	LPV	2	99.9298	2	99.9198	2	99.8978
1J0	TRI-COUNTY	FL	LP	0	100	0	100	1	99.9830
28J	PALATKA MUNICIPALCIPAL ARPT	FL	LPV	0	100	0	100	2	99.9865
40J	PERRY-FOLEY	FL	LPV	0	100	0	100	1	99.9842
54J	DEFUNIAK SPRINGS	FL	LP	0	100	0	100	1	99.9861
AAF	APALACHICOLA MUNICIPAL	FL	LPV	0	100	0	100	0	100
APF	NAPLES MUNICIPAL	FL	LPV	0	100	0	100	32	99.9495
AVO	AVON PARK EXECUTIVE	FL	LPV	0	100	0	100	8	99.99000
BCT	BOCA RATON	FL	LPV	0	100	0	100	5	99.9495
BKV	HERNANDO COUNTY	FL	LPV	0	100	0	100	20	99.99000
BOW	BARTOW MUNICIPAL	FL	LPV	0	100	0	100	13	99.9907
CEW	BOB SIKES	FL	LPV	0	100	0	100	1	99.9877
CHN	WAUCHULA MUNICIPAL	FL	LP	0	100	0	100	23	99.9830
COI	MERRITT ISLAND	FL	LPV	0	100	0	100	4	99.9915
CRG	CRAIG MUNICIPAL	FL	LPV200	0	100	0	100	1	99.9792
CTY	CROSS CITY	FL	LPV	0	100	0	100	1	99.9888

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
DAB	DAYTONA BEACH INTL	FL	LPV200	0	100	0	100	3	99.9880
DED	DELAND MUNICIPAL-SIDNEY H TAYLOR FLD	FL	LPV	0	100	0	100	3	99.9931
DTS	DESTIN-FORT WALTON BEACH	FL	LP	0	100	0	100	1	99.9927
ECP	NORTHWEST FLORIDA BEACHES INTL	FL	LPV200	0	100	0	100	1	99.9865
EVB	NEW SMYRNA BEACH MUNICIPAL	FL	LPV	0	100	0	100	5	99.9888
EYW	KEY WEST INTL	FL	LPV	0	100	1	99.9973	41	99.8549
F45	NORTH PALM BEACH COUNTY GENERAL AVIATION	FL	LPV	0	100	0	100	5	99.9695
FHB	FERNANDINA BEACH MUNICIPAL	FL	LPV	0	100	0	100	1	99.9780
FLL	FORT LAUDERDALE/HOLLYWOOD INTL	FL	LPV	0	100	0	100	5	99.9398
FMY	PAGE FIELD	FL	LPV	0	100	0	100	33	99.9715
FPR	ST LUCIE COUNTY INTL	FL	LPV	0	100	0	100	4	99.9857
FXE	FT LAUDERDALE EXECUTIVE	FL	LPV200	0	100	0	100	5	99.9429
GIF	WINTER HAVEN'S GILBERT	FL	LPV	0	100	0	100	12	99.9919
GNV	GAINESVILLE RGNL	FL	LPV	0	100	0	100	2	99.9892
HEG	HERLONG RECREATIONAL	FL	LP	0	100	0	100	1	99.9799
IMM	IMMOKALEE RGNL	FL	LPV	0	100	0	100	9	99.9734
ISM	KISSIMMEE GATEWAY	FL	LPV200	0	100	0	100	6	99.9934
JAX	JACKSONVILLE INTL	FL	LPV200	0	100	0	100	1	99.9780
LAL	LAKELAND LINDER RGNL	FL	LPV200	0	100	0	100	23	99.9850
LCQ	LAKE CITY MUNICIPAL	FL	LPV	0	100	0	100	1	99.9815
LEE	LEESBURG INTL	FL	LPV	0	100	0	100	5	99.9969
MCO	ORLANDO INTL	FL	LPV200	0	100	0	100	5	99.9934
MIA	MIAMI INTL	FL	LPV	0	100	0	100	5	99.9437
MKY	MARCO ISLAND	FL	LPV	0	100	0	100	23	99.9483
MLB	MELBOURNE INTL	FL	LPV200	0	100	0	100	3	99.9911
MTH	THE FLORIDA KEYS MARATHON	FL	LPV	0	100	1	99.9973	17	99.9101
OBE	OKEECHOBEE COUNTY	FL	LPV	0	100	0	100	5	99.9877
OCF	OCALA INTL-JIM TAYLOR FLD	FL	LPV200	0	100	0	100	1	99.9996
OPF	OPA LOCKA EXECUTIVE	FL	LPV200	0	100	0	100	5	99.9448
ORL	EXECUTIVE	FL	LPV200	0	100	0	100	5	99.9946
PBI	PALM BEACH INTL	FL	LPV200	0	100	0	100	5	99.9514
PCM	PLANT CITY MUNICIPAL	FL	LPV	0	100	0	100	24	99.9823
PGD	PUNTA GORDA	FL	LPV200	0	100	0	100	33	99.9718
PHK	PALM BEACH COUNTY GLADES	FL	LPV	0	100	0	100	5	99.9761
PIE	ST PETERSBURG-CLEARWATER INTL	FL	LPV200	0	100	0	100	27	99.9742
PMP	POMPANO BEACH AIRPARK	FL	LPV	0	100	0	100	5	99.9410
PNS	PENSACOLA RGNL	FL	LPV200	0	100	0	100	0	100
RSW	SOUTHWEST FLORIDA INTL	FL	LPV	0	100	0	100	27	99.9742
SEF	SEBRING RGNL	FL	LPV	0	100	0	100	7	99.9896
SFB	ORLANDO SANFORD INTL	FL	LPV200	0	100	0	100	4	99.9954
SGJ	ST AUGUSTINE	FL	LPV	0	100	0	100	2	99.9823
SRQ	SARASOTA/BRADENTON INTL	FL	LPV200	0	100	0	100	32	99.9633

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
SUA	WITHAM FIELD	FL	LPV	0	100	0	100	5	99.9730
TIX	SPACE COAST RGNL	FL	LPV200	0	100	0	100	4	99.9915
TLH	TALLAHASSEE RGNL	FL	LPV200	0	100	0	100	1	99.9826
TMB	KENDALL-TAMIAMI EXECUTIVE	FL	LPV200	0	100	1	99.9988	6	99.9448
TPA	TAMPA INTL	FL	LPV200	0	100	0	100	27	99.9769
TPF	PETER O KNIGHT	FL	LP	0	100	0	100	26	99.9757
VDF	TAMPA EXECUTIVE	FL	LPV	0	100	0	100	24	99.9796
VNC	VENICE MUNICIPAL	FL	LP	0	100	0	100	35	99.9560
VQQ	CECIL FIELD	FL	LPV	0	100	0	100	1	99.9807
VRB	VERO BEACH MUNICIPAL	FL	LPV200	0	100	0	100	3	99.9884
X07	LAKE WALES MUNICIPAL	FL	LP	0	100	0	100	9	99.9911
X14	LA BELLE MUNICIPAL	FL	LPV	0	100	0	100	9	99.9826
X26	SEBASTIAN MUNICIPAL	FL	LP	0	100	0	100	3	99.9896
X35	MARION CO & PARK OF COMMERCE	FL	LP	0	100	0	100	1	99.9996
X51	HOMESTEAD GENERAL AVIATION	FL	LPV	0	100	1	99.9981	7	99.9421
XFL	FLAGLER COUNTY	FL	LPV	0	100	0	100	3	99.9869
ZPH	ZEPHYRHILLS MUNICIPAL	FL	LPV	0	100	0	100	22	99.9850
09J	JEKYLL ISLAND	GA	LPV200	0	100	0	100	1	99.9753
15J	COOK COUNTY	GA	LPV	0	100	0	100	1	99.9780
17J	DONALSONVILLE MUNICIPAL	GA	LPV	0	100	0	100	1	99.9792
18A	FRANKLIN COUNTY	GA	LPV	1	99.9873	1	99.9502	2	99.9336
19A	JACKSON COUNTY	GA	LPV	1	99.9877	1	99.9495	1	99.9340
2J5	MILLEN	GA	LPV	0	100	1	99.9780	1	99.9610
3J7	GREENE COUNTY RGNL	GA	LPV	0	100	1	99.9707	1	99.9371
48A	COCHRAN	GA	LPV	0	100	0	100	1	99.9545
4A4	POLK COUNTY AIRPORT CORNELIUS MOORE FIELD	GA	LPV	2	99.9877	1	99.9471	1	99.9375
4J1	BRANTLEY COUNTY	GA	LPV	0	100	0	100	1	99.9749
4J6	ST MARYS	GA	LPV	0	100	0	100	1	99.9772
52A	MADISON MUNICIPAL	GA	LP	0	100	1	99.9529	1	99.9344
6A2	GRIFFIN-SPALDING COUNTY	GA	LPV	0	100	2	99.9688	1	99.9363
70J	CAIRO-GRADY COUNTY	GA	LPV	0	100	0	100	1	99.9780
ABY	SOUTHWEST GEORGIA RGNL	GA	LPV200	0	100	0	100	2	99.9734
ACJ	JIMMY CARTER RGNL	GA	LPV	0	100	0	100	2	99.9699
AGS	AUGUSTA RGNL AT BUSH FIELD	GA	LPV200	0	100	1	99.9707	1	99.9579
AHN	ATHENS/BEN EPPS	GA	LPV	0	100	1	99.9510	1	99.9340
AJR	HABERSHAM COUNTY	GA	LPV	1	99.9846	1	99.9483	1	99.9340
ATL	HARTSFIELD - JACKSON ATLANTA INTL	GA	LPV200	0	100	1	99.9495	1	99.9363
AYS	WAYCROSS-WARE COUNTY	GA	LPV200	0	100	0	100	1	99.9761
BGE	DECATUR COUNTY INDUSTRIAL AIR PARK	GA	LPV200	0	100	0	100	1	99.9788
BHC	BAXLEY MUNICIPAL	GA	LPV	0	100	0	100	1	99.9745
BIJ	EARLY COUNTY	GA	LPV	0	100	0	100	2	99.9757
BQK	BRUNSWICK GOLDEN ISLES	GA	LPV200	0	100	0	100	1	99.9745

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
CCO	NEWNAN COWETA COUNTY	GA	LPV	0	100	2	99.9657	1	99.9375
CKF	CRISP COUNTY-CORDELE	GA	LPV	0	100	0	100	2	99.9699
CNI	CHEROKEE COUNTY	GA	LPV	1	99.9884	1	99.9479	1	99.9363
CSG	COLUMBUS METROPOLITAN	GA	LPV	0	100	0	100	1	99.9441
CTJ	WEST GEORGIA RGNL-O V GRAY FIELD	GA	LPV	1	99.9996	1	99.9479	1	99.9375
CVC	COVINGTON MUNICIPAL	GA	LPV	0	100	2	99.9641	1	99.9348
CWV	CLAXTON-EVANS COUNTY	GA	LPV	0	100	0	100	1	99.9672
D73	MONROE-WALTON COUNTY	GA	LP	0	100	1	99.9514	1	99.9344
DNN	DALTON MUNICIPAL	GA	LPV	2	99.9823	1	99.9448	1	99.9336
DQH	DOUGLAS MUNICIPAL	GA	LPV200	0	100	0	100	1	99.9772
EZM	HEART OF GEORGIA RGNL	GA	LPV	0	100	0	100	2	99.9742
FFC	ATLANTA RGNL FALCON FIELD	GA	LPV200	0	100	2	99.9660	1	99.9371
FTY	FULTON COUNTY AIRPORT-BROWN FIELD	GA	LPV	1	99.9954	1	99.9491	1	99.9367
FZG	FITZGERALD MUNICIPAL	GA	LPV	0	100	0	100	1	99.9780
GVL	LEE GILMER MEMORIAL	GA	LPV	1	99.9838	1	99.9487	1	99.9348
HOE	HOMERVILLE	GA	LPV	0	100	0	100	1	99.9780
HQU	THOMSON-MCDUFFIE COUNTY	GA	LPV	0	100	1	99.9707	1	99.9375
IIY	WASHINGTON-WILKES COUNTY	GA	LPV	0	100	1	99.9703	1	99.9371
JES	JESUP-WAYNE COUNTY	GA	LPV	0	100	0	100	1	99.9745
JYL	PLANTATION ARPK	GA	LPV	0	100	1	99.9931	1	99.9672
JZP	PICKENS COUNTY	GA	LPV	1	99.9842	1	99.9471	1	99.9363
LGC	LAGRANGE-CALLAWAY	GA	LPV200	0	100	2	99.9680	1	99.9387
LZU	GWINNETT COUNTY-BRISCOE FIELD	GA	LPV200	1	99.9942	1	99.9498	1	99.9352
MAC	MACON DOWNTOWN	GA	LP	0	100	1	99.9780	1	99.9406
MCN	MIDDLE GEORGIA RGNL	GA	LPV200	0	100	1	99.9904	1	99.9414
MGR	MOULTRIE MUNICIPAL	GA	LPV200	0	100	0	100	1	99.9780
MLJ	BALDWIN COUNTY	GA	LPV	0	100	1	99.9780	1	99.9387
MQW	TELFAIR-WHEELER	GA	LPV	0	100	0	100	2	99.9757
OKZ	KAOLIN FIELD	GA	LPV	0	100	1	99.9780	1	99.9402
OPN	THOMASTON-UPSON COUNTY	GA	LPV200	0	100	2	99.9772	1	99.9367
PIM	HARRIS COUNTY	GA	LPV	0	100	2	99.9711	1	99.9379
PUJ	PAULDING NORTHWEST ATLANTA	GA	LPV200	2	99.9888	1	99.9475	1	99.9375
PXE	PERRY-HOUSTON COUNTY	GA	LPV	0	100	0	100	1	99.9468
RMG	RICHARD B RUSSELL	GA	LPV	2	99.9853	1	99.9452	1	99.9363
RVJ	SWINTON SMITH FLD AT REIDSVILLE MUNICIPAL	GA	LP	0	100	0	100	1	99.9745
RYY	COBB COUNTY-MC COLLUM FIELD	GA	LPV200	1	99.9915	1	99.9483	1	99.9371
SAV	SAVANNAH/HILTON HEAD INTL	GA	LPV200	0	100	0	100	1	99.9745
SBO	EAST GEORGIA REGIONAL	GA	LPV	0	100	1	99.9934	1	99.9633
TBR	STATESBORO-BULLOCH COUNTY	GA	LPV	0	100	1	99.9973	1	99.9672
TMA	HENRY TIFTON MYERS	GA	LPV	0	100	0	100	1	99.9780
TOC	TOCCOA RG LETOURNEAU FIELD	GA	LPV	1	99.9826	2	99.9637	2	99.9267
TVI	THOMASVILLE RGNL	GA	LPV	0	100	0	100	1	99.9780

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
VDI	VIDALIA RGNL	GA	LPV	0	100	0	100	1	99.9672
VLD	VALDOSTA RGNL	GA	LPV	0	100	0	100	1	99.9780
VPC	CARTERSVILLE	GA	LPV	2	99.9873	1	99.9475	1	99.9371
WDR	WINDER-BARROW	GA	LPV	1	99.9942	1	99.9498	1	99.9344
AIO	ATLANTIC MUNICIPAL	IA	LPV	0	100	0	100	0	100
ALO	WATERLOO RGNL	IA	LPV	0	100	0	100	3	99.9491
AMW	AMES MUNICIPAL	IA	LPV	0	100	0	100	2	99.9857
AWG	WASHINGTON MUNICIPAL	IA	LPV200	1	99.9965	3	99.9618	1	99.9375
BRL	SOUTHEAST IOWA RGNL	IA	LPV200	2	99.9923	2	99.9498	1	99.9336
CBF	COUNCIL BLUFFS MUNICIPAL	IA	LPV200	0	100	0	100	0	100
CID	THE EASTERN IOWA	IA	LPV200	0	100	2	99.9772	2	99.9495
CIN	ARTHUR N NEU	IA	LPV	0	100	0	100	0	100
CKP	CHEROKEE COUNTY RGNL	IA	LPV	0	100	0	100	0	100
CSQ	CRESTON MUNICIPAL	IA	LPV	0	100	0	100	1	99.9873
CWI	CLINTON MUNICIPAL	IA	LPV200	3	99.9664	3	99.9367	2	99.9198
DBQ	DUBUQUE RGNL	IA	LPV200	1	99.9927	3	99.9533	2	99.9302
DEH	DECORAH MUNICIPAL	IA	LPV	0	100	0	100	4	99.9549
DNS	DENISON MUNICIPAL	IA	LPV	0	100	0	100	0	100
DSM	DES MOINES INTL	IA	LPV	0	100	0	100	1	99.9850
DVN	DAVENPORT MUNICIPAL	IA	LPV200	3	99.9776	3	99.9460	2	99.9263
EBS	WEBSTER CITY MUNICIPAL	IA	LPV	0	100	0	100	1	99.9988
EFW	JEFFERSON MUNICIPAL	IA	LPV	0	100	0	100	0	100
EOK	KEOKUK MUNICIPAL	IA	LPV	1	99.9950	2	99.9506	1	99.9375
EST	ESTHERVILLE MUNICIPAL	IA	LPV	0	100	0	100	1	99.9973
FFL	FAIRFIELD MUNICIPAL	IA	LPV	1	99.9985	3	99.9657	1	99.9375
FOD	FORT DODGE RGNL	IA	LPV200	0	100	0	100	1	99.9988
FXY	FOREST CITY MUNICIPAL	IA	LPV	0	100	0	100	1	99.9973
GGI	GRINNELL RGNL	IA	LPV	0	100	0	100	3	99.9626
I75	OSCEOLA MUNICIPAL	IA	LPV	0	100	0	100	1	99.9788
ICL	SCHENCK FIELD	IA	LPV	0	100	0	100	0	100
IIB	INDEPENDENCE MUNICIPAL	IA	LP	0	100	0	100	3	99.9502
IKV	ANKENY RGNL	IA	LPV	0	100	0	100	1	99.9861
IOW	IOWA CITY MUNICIPAL	IA	LPV	1	99.9996	3	99.9626	1	99.9375
LRJ	LE MARS MUNICIPAL	IA	LPV	0	100	0	100	0	100
MCW	MASON CITY MUNICIPAL	IA	LPV200	0	100	0	100	2	99.9946
MPZ	MOUNT PLEASANT MUNICIPALCIPAL	IA	LPV	1	99.9931	2	99.9495	1	99.9375
MUT	MUSCATINE MUNICIPAL	IA	LPV	1	99.9919	1	99.9375	2	99.9356
MXO	MONTICELLO RGNL	IA	LP	0	100	2	99.9761	2	99.9302
OOA	OSKALOOSA MUNICIPAL	IA	LPV	0	100	2	99.9699	1	99.9375
OTM	OTTUMWA RGNL	IA	LPV	0	100	2	99.9691	1	99.9375
OXV	KNOXVILLE MUNICIPAL	IA	LPV	0	100	0	100	3	99.9660
PEA	PELLA MUNICIPAL	IA	LPV	0	100	0	100	3	99.9637
POH	POCAHONTAS MUNICIPAL	IA	LPV	0	100	0	100	1	99.9996
PRO	PERRY MUNICIPAL	IA	LPV200	0	100	0	100	0	100

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
RDK	RED OAK MUNICIPAL	IA	LPV	0	100	0	100	0	100
SDA	SHENANDOAH MUNICIPAL	IA	LPV	0	100	0	100	0	100
SHL	SHELDON MUNICIPAL	IA	LPV	0	100	0	100	1	99.9988
SKI	SAC CITY MUNICIPAL	IA	LPV	0	100	0	100	1	99.9996
SLB	STORM LAKE MUNICIPAL	IA	LPV	0	100	0	100	0	100
SPW	SPENCER MUNICIPAL	IA	LPV200	0	100	0	100	1	99.9996
SUX	SIOUX GATEWAY/COL BUD DAY FIELD	IA	LPV200	0	100	0	100	0	100
TNU	NEWTON MUNICIPAL	IA	LPV	0	100	0	100	3	99.9657
TVK	CENTERVILLE MUNICIPAL	IA	LPV	0	100	2	99.9761	3	99.9626
TZT	BELLE PLAINE MUNICIPAL	IA	LPV	0	100	1	99.9958	2	99.9502
VTI	VINTON VETERANS MEML ARPK	IA	LPV	0	100	1	99.9958	2	99.9502
BOI	BOISE AIR TERMINAL/GOWEN FLD	ID	LPV	0	100	0	100	1	99.9977
COE	PAPPY BOYINGTON FIELD	ID	LPV200	0	100	0	100	0	100
DIJ	DRIGGS-REED MEMORIAL	ID	LP	0	100	0	100	1	99.9942
EUL	CALDWELL INDUSTRIAL	ID	LPV	0	100	0	100	1	99.9977
GNG	GOODING MUNICIPAL	ID	LPV	0	100	0	100	1	99.9965
IDA	IDAHO FALLS RGNL	ID	LPV200	0	100	0	100	1	99.9942
JER	JEROME COUNTY	ID	LPV	0	100	0	100	1	99.9961
LWS	LEWISTON-NEZ PERCE COUNTY	ID	LPV200	0	100	0	100	1	99.9988
MAN	NAMPA MUNICIPAL	ID	LPV	0	100	0	100	1	99.9977
MYL	MC CALL MUNICIPALCIPAL	ID	LPV	0	100	0	100	1	99.9973
PIH	POCATELLO RGNL	ID	LPV200	0	100	0	100	1	99.9946
TWF	JOSLIN FIELD-MAGIC VALLEY RGNL	ID	LPV200	0	100	0	100	1	99.9961
U76	MOUNTAIN HOME MUNICIPAL	ID	LPV	0	100	0	100	1	99.9969
3LF	LITCHFIELD MUNICIPAL	IL	LPV	2	99.9761	1	99.9375	1	99.9336
3MY	MOUNT HAWLEY AUXILIARY	IL	LPV	3	99.9356	3	99.9255	2	99.9090
AJG	MOUNT CARMEL MUNICIPAL	IL	LPV	3	99.9429	2	99.9171	2	99.9055
ALN	ST LOUIS RGNL	IL	LPV200	2	99.9745	1	99.9375	1	99.9336
ARR	AURORA MUNICIPAL	IL	LPV200	3	99.9464	3	99.9279	2	99.8970
BLV	SCOTT AFB/MIDAMERICA	IL	LPV200	2	99.9703	1	99.9375	1	99.9336
BMI	CENTRAL IL REGL ARPT AT BLOOMINGTON-NORMAL	IL	LPV	3	99.9313	3	99.9201	2	99.9008
C15	PEKIN MUNICIPAL	IL	LPV	4	99.9537	3	99.9313	2	99.9144
C73	DIXON MUNICIPAL-CHARLES R. WALGREEN FLD	IL	LPV	3	99.9444	3	99.9259	2	99.9086
CMI	UNIVERSITY OF ILLINOIS-WILLARD	IL	LPV200	3	99.9306	2	99.9047	2	99.9005
CPS	ST LOUIS DOWNTOWN	IL	LPV200	2	99.9715	1	99.9375	1	99.9336
CUL	CARMI MUNICIPAL	IL	LP	2	99.9614	1	99.9375	2	99.9333
DEC	DECATUR	IL	LPV200	4	99.9444	3	99.9198	2	99.9024
DKB	DE KALB TAYLOR MUNICIPAL	IL	LPV	3	99.9460	3	99.9275	2	99.8970
DNV	VERMILION COUNTY	IL	LPV	3	99.9294	2	99.9047	2	99.8974
DPA	DUPAGE	IL	LPV200	3	99.9468	3	99.9282	2	99.8951
ENL	CENTRALIA MUNICIPAL	IL	LPV	2	99.9695	1	99.9375	1	99.9336
FEP	ALBERTUS	IL	LPV	3	99.9587	3	99.9371	2	99.8970

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
FOA	FLORA MUNICIPAL	IL	LPV	2	99.9707	1	99.9375	2	99.9298
GBG	GALESBURG MUNICIPAL	IL	LPV200	2	99.9834	2	99.9498	2	99.9263
HSB	HARRISBURG-RALEIGH	IL	LPV	2	99.9657	1	99.9375	1	99.9375
I63	MOUNT STERLING MUNICIPAL	IL	LPV	2	99.9884	2	99.9518	1	99.9336
IGQ	LANSING MUNICIPAL	IL	LPV	3	99.9333	3	99.9221	2	99.8897
IKK	GREATER KANKAKEE	IL	LPV	3	99.9279	3	99.9167	2	99.8974
LOT	LEWIS UNIVERSITY	IL	LPV200	3	99.9402	3	99.9271	2	99.8947
LWV	LAWRENCEVILLE-VINCENNES INTL	IL	LPV200	3	99.9367	2	99.9140	2	99.9028
MDW	CHICAGO MIDWAY INTL	IL	LPV	3	99.9375	3	99.9248	2	99.8885
MLI	QUAD CITY INTL	IL	LPV200	3	99.9776	2	99.9340	2	99.9263
MTO	COLES COUNTY MEMORIAL	IL	LPV	3	99.9363	2	99.9074	2	99.9035
MVN	MOUNT VERNON	IL	LPV	2	99.9680	1	99.9375	1	99.9336
MWA	WILLIAMSON COUNTY RGNL	IL	LPV200	2	99.9645	1	99.9375	1	99.9348
ORD	CHICAGO-O'HARE INTL	IL	LPV200	3	99.9475	3	99.9290	2	99.8889
PIA	GREATER PEORIA RGNL	IL	LPV	3	99.9375	3	99.9275	2	99.9109
PNT	PONTIAC MUNICIPAL	IL	LPV	3	99.9309	3	99.9174	2	99.9012
PWK	CHICAGO EXECUTIVE	IL	LPV	3	99.9475	3	99.9375	2	99.8889
RFD	CHICAGO/ROCKFORD INTL	IL	LPV200	3	99.9452	3	99.9271	2	99.8970
RPJ	ROCHELLE MUNICIPAL-KORITZ FIELD	IL	LPV200	3	99.9452	3	99.9267	2	99.8970
RSV	ROBINSON MUNICIPAL	IL	LPV	3	99.9379	2	99.9113	2	99.9008
SAR	SPARTA COMMUNICIPALTY-HUNTER FIELD	IL	LPV	2	99.9676	1	99.9375	1	99.9336
SFY	TRI-TOWNSHIP	IL	LP	3	99.9603	3	99.9271	2	99.9136
SPI	ABRAHAM LINCOLN CAPITAL	IL	LPV	4	99.9780	3	99.9502	2	99.9317
SQI	WHITESIDE COUNTY-JOS J BITTORF FLD	IL	LPV	3	99.9421	3	99.9255	2	99.9082
UGN	WAUKEGAN RGNL	IL	LPV	3	99.9479	3	99.9406	2	99.8912
UIN	QUINCY RGNL-BALDWIN FIELD	IL	LPV200	2	99.9946	2	99.9518	1	99.9336
4I7	PUTNAM COUNTY	IN	LPV	3	99.9221	2	99.9032	2	99.8974
AID	ANDERSON MUNICIPAL-DARLINGTON FIELD	IN	LPV	3	99.9201	2	99.8974	2	99.8974
ASW	WARSAW MUNICIPALCIPAL	IN	LPV	3	99.9252	3	99.9093	2	99.89000
BAK	COLUMBUS MUNICIPAL	IN	LPV	2	99.9155	2	99.8997	2	99.8974
BFR	VIRGIL I GRISSOM MUNICIPAL	IN	LP	2	99.9190	2	99.9105	2	99.8974
BMG	MONROE COUNTY	IN	LPV200	2	99.9171	2	99.9066	2	99.8974
CEV	METTEL FIELD	IN	LPV	2	99.9194	2	99.8981	2	99.8974
EKM	ELKHART MUNICIPAL	IN	LPV	3	99.9252	3	99.9178	2	99.8897
EVV	EVANSVILLE RGNL	IN	LPV200	3	99.9533	2	99.9279	2	99.9113
EYE	EAGLE CREEK AIRPARK	IN	LPV	3	99.9213	2	99.8981	2	99.8974
FRH	FRENCH LICK MUNICIPAL	IN	LPV	2	99.9221	2	99.9132	2	99.8974
FWA	FORT WAYNE INTL	IN	LPV200	3	99.9171	3	99.9097	2	99.8904
GEZ	SHELBYVILLE MUNICIPAL	IN	LPV	2	99.9174	2	99.8985	2	99.8974
GGP	LOGANSPORT/CASS COUNTY	IN	LPV200	3	99.9174	3	99.9101	2	99.8974
GSH	GOSHEN MUNICIPAL	IN	LPV	3	99.9255	3	99.9182	2	99.8889

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
GWB	DE KALB COUNTY	IN	LPV	3	99.9267	2	99.8974	3	99.8893
GYY	GARY/CHICAGO INTL	IN	LPV200	3	99.9336	3	99.9225	2	99.8897
HFY	GREENWOOD MUNICIPAL	IN	LPV	2	99.9178	2	99.8993	2	99.8974
HNB	HUNTINGBURG	IN	LPV	2	99.9263	2	99.9209	2	99.8974
HUF	TERRE HAUTE INTL-HULMAN FIELD	IN	LPV200	3	99.9248	2	99.9051	2	99.8939
I22	RANDOLPH COUNTY	IN	LPV	2	99.9078	2	99.8985	3	99.8970
IMS	MADISON MUNICIPAL	IN	LPV	2	99.9194	2	99.9063	2	99.8974
IND	INDIANAPOLIS INTL	IN	LPV	3	99.9225	2	99.8997	2	99.8974
JVY	CLARK RGNL	IN	LPV200	2	99.9232	2	99.9124	2	99.8974
LAF	PURDUE UNIVERSITY	IN	LPV	3	99.9182	2	99.9005	2	99.8974
MCX	WHITE COUNTY	IN	LP	3	99.9174	3	99.9105	2	99.8974
MIE	DELAWARE COUNTY-JOHNSON FIELD	IN	LPV	3	99.9194	2	99.8974	2	99.8974
MQJ	MOUNT COMFORT	IN	LPV	2	99.9070	2	99.8974	2	99.8974
MZZ	MARION MUNICIPAL	IN	LPV	3	99.9182	2	99.8974	2	99.8974
OKK	KOKOMO MUNICIPAL	IN	LPV200	3	99.9178	2	99.8974	2	99.8974
OVO	NORTH VERNON	IN	LPV	2	99.9163	2	99.9012	2	99.8974
OXI	STARKE COUNTY	IN	LPV	3	99.9236	2	99.8974	2	99.8897
PLD	PORTLAND MUNICIPAL	IN	LPV	3	99.9194	2	99.8981	3	99.8970
RCR	FULTON COUNTY	IN	LPV	3	99.9171	3	99.9097	2	99.8974
RID	RICHMOND MUNICIPAL	IN	LPV200	2	99.9198	2	99.8985	3	99.8970
RZL	JASPER COUNTY	IN	LPV	3	99.9236	3	99.9151	2	99.8974
SBN	SOUTH BEND RGNL	IN	LPV	3	99.9252	3	99.9171	2	99.8897
SER	FREEMAN MUNICIPAL	IN	LPV	2	99.9174	2	99.9051	2	99.8974
SMD	SMITH FIELD	IN	LPV	3	99.9263	3	99.9093	2	99.89000
TEL	PERRY COUNTY MUNICIPAL	IN	LP	2	99.9286	2	99.9240	2	99.8974
TYQ	INDIANAPOLIS EXECUTIVE	IN	LPV	3	99.9201	2	99.8974	2	99.8974
VPZ	PORTER COUNTY MUNICIPAL	IN	LPV	3	99.9333	3	99.9178	2	99.8897
3AU	AUGUSTA MUNICIPAL	KS	LP	0	100	0	100	2	99.9919
3K3	SYRACUSE-HAMILTON COUNTY MUNICIPALCIPAL	KS	LPV	0	100	0	100	1	99.9961
AAO	COLONEL JAMES JABARA	KS	LPV	0	100	0	100	2	99.9923
ADT	ATWOOD-RAWLINS COUNTY CITY-COUNTY	KS	LPV	0	100	0	100	1	99.9973
ANY	ANTHONY MUNICIPAL	KS	LP	0	100	0	100	1	99.9946
CBK	SHALZ FIELD	KS	LPV	0	100	0	100	1	99.9973
CNK	BLOSSER MUNICIPAL	KS	LP	0	100	0	100	1	99.9981
DDC	DODGE CITY RGNL	KS	LPV	0	100	0	100	0	100
EGT	WELLINGTON MUNICIPAL	KS	LPV	0	100	0	100	2	99.9911
EHA	ELKHART-MORTON COUNTY	KS	LPV	0	100	0	100	1	99.9985
EMP	EMPORIA MUNICIPAL	KS	LPV	0	100	0	100	2	99.9904
EWK	NEWTON-CITY-COUNTY	KS	LPV	0	100	0	100	2	99.9931
FOE	FORBES FIELD	KS	LPV	0	100	0	100	1	99.9915
FSK	FORT SCOTT MUNICIPAL	KS	LPV	0	100	0	100	1	99.9452
GBD	GREAT BEND MUNICIPAL	KS	LPV200	0	100	0	100	1	99.9977

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
GCK	GARDEN CITY RGNL	KS	LPV	0	100	0	100	0	100
GLD	RENNER FLD/GOODLAND MUNICIPAL/	KS	LPV200	0	100	0	100	1	99.9942
HQG	HUGOTON MUNICIPAL	KS	LPV	0	100	0	100	1	99.9996
HUT	HUTCHINSON MUNICIPAL	KS	LPV	0	100	0	100	1	99.9973
HYS	HAYS RGNL	KS	LPV200	0	100	0	100	1	99.9985
ICT	WICHITA MID-CONTINENT	KS	LPV200	0	100	0	100	2	99.9931
IDP	INDEPENDENCE MUNICIPAL	KS	LPV	0	100	0	100	2	99.9722
IXD	NEW CENTURY AIRCENTER	KS	LPV	0	100	1	99.9996	1	99.9815
K88	ALLEN COUNTY	KS	LPV	0	100	0	100	2	99.9691
LBL	LIBERAL MID-AMERICA RGNL	KS	LPV	0	100	0	100	0	100
LQR	LARNED PAWNEE CO	KS	LPV	0	100	0	100	1	99.9985
LWC	LAWRENCE MUNICIPAL	KS	LPV200	0	100	0	100	1	99.9907
MHK	MANHATTAN RGNL	KS	LPV200	0	100	0	100	1	99.9927
MPR	MCPHERSON	KS	LPV	0	100	0	100	1	99.9961
MYZ	MARYSVILLE MUNICIPAL	KS	LPV	0	100	0	100	1	99.9954
NRN	NORTON MUNICIPAL	KS	LPV	0	100	0	100	0	100
OEL	OAKLEY MUNICIPAL	KS	LPV	0	100	0	100	1	99.9996
OJC	JOHNSON COUNTY EXECUTIVE	KS	LPV	0	100	1	99.9969	1	99.9811
OWI	OTTAWA MUNICIPAL	KS	LP	0	100	0	100	2	99.9877
PPF	TRI-CITY	KS	LPV	0	100	0	100	2	99.9715
PTS	ATKINSON MUNICIPAL	KS	LPV	1	99.9985	1	99.9985	1	99.9452
PTT	PRATT INDUSTRIAL	KS	LPV	0	100	0	100	1	99.9996
RPB	BELLEVILLE MUNICIPAL	KS	LPV	0	100	0	100	0	100
RSL	RUSSELL MUNICIPAL	KS	LPV	0	100	0	100	1	99.9981
SLN	SALINA MUNICIPAL	KS	LPV	0	100	0	100	1	99.9950
TOP	PHILIP BILLARD MUNICIPAL	KS	LPV200	0	100	0	100	1	99.9915
TQK	SCOTT CITY MUNICIPAL	KS	LPV	0	100	0	100	0	100
UKL	COFFEY COUNTY	KS	LPV	0	100	0	100	2	99.9880
ULS	ULYSSES	KS	LPV	0	100	0	100	1	99.9996
27K	GEORGETOWN SCOTT CO-MARSHALL FLD	KY	LPV200	2	99.9178	2	99.9051	2	99.8974
2I0	MADISONVILLE MUNICIPAL	KY	LPV	2	99.9622	1	99.9375	2	99.9151
6I2	LEBANON-SPRINGFIELD	KY	LP	2	99.9352	2	99.9151	2	99.8947
7K4	OHIO COUNTY	KY	LPV	1	99.9406	1	99.9375	2	99.9093
AAS	TAYLOR COUNTY	KY	LP	2	99.9406	2	99.9255	2	99.8954
BRY	SAMUELS FIELD	KY	LPV	2	99.9325	2	99.9144	2	99.8947
BWG	BOWLING GREEN-WARREN CTY RGNL	KY	LPV	1	99.9421	1	99.9375	2	99.9151
BYL	WILLIAMSBURG-WHITLEY COUNTY	KY	LPV	1	99.9622	2	99.9182	2	99.8974
CEY	KYLE-OAKLEY FIELD	KY	LPV	2	99.9610	1	99.9375	1	99.9375
CPF	WENDELL H FORD	KY	LPV200	2	99.9549	2	99.9144	2	99.8974
CVG	CINCINNATI/NORTHERN KENTUCKY INTL	KY	LPV200	2	99.9178	2	99.8997	2	99.8974
DVK	STUART POWELL FIELD	KY	LPV	2	99.9367	2	99.9147	2	99.8974
DWU	ASHLAND RGNL	KY	LP	2	99.9340	2	99.9024	2	99.8789

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
EHR	HENDERSON CITY-COUNTY	KY	LPV	3	99.9599	2	99.9356	2	99.9205
EKX	ADDINGTON FIELD	KY	LPV	2	99.9352	2	99.9294	2	99.8951
FGX	FLEMING-MASON	KY	LPV	2	99.9263	2	99.9028	3	99.8924
GLW	GLASGOW MUNICIPAL	KY	LPV	1	99.9425	2	99.9348	2	99.8981
HVC	HOPKINSVILLE-CHRISTIAN COUNTY	KY	LPV	2	99.9614	1	99.9375	1	99.9336
I39	MADISON	KY	LPV200	2	99.9383	2	99.9144	2	99.8974
K22	BIG SANDY RGNL	KY	LPV	2	99.9464	2	99.9140	2	99.8843
KY8	HANCOCK CO-RON LEWIS FIELD	KY	LPV	3	99.9468	2	99.9259	2	99.8974
LEX	BLUE GRASS	KY	LPV	2	99.9298	2	99.9120	2	99.8974
LOU	BOWMAN FIELD	KY	LPV	2	99.9252	2	99.9128	2	99.8974
LOZ	LONDON-CORBIN ARPT-MAGEE FLD	KY	LPV	2	99.9614	2	99.9167	2	99.8947
M21	MUHLENBERG COUNTY	KY	LP	2	99.9591	1	99.9375	2	99.9140
M97	MOREHEAD-ROWAN COUNTY CLYDE A THOMAS RGNL	KY	LPV	2	99.9394	2	99.9059	2	99.8854
OWB	OWENSBORO-DAVIESS COUNTY	KY	LPV200	3	99.9518	2	99.9325	2	99.9101
PAH	BARKLEY RGNL	KY	LPV	2	99.9618	1	99.9375	1	99.9375
SDF	LOUISVILLE INTL-STANDIFORD FLD	KY	LPV200	2	99.9267	2	99.9128	2	99.8974
SME	LAKE CUMBERLAND RGNL	KY	LPV	1	99.9483	2	99.9186	2	99.8966
TWT	STURGIS MUNICIPAL	KY	LPV	2	99.9614	1	99.9375	2	99.9313
TZV	TOMPKINSVILLE-MONROE COUNTY	KY	LPV	1	99.9429	1	99.9375	2	99.9055
1L0	ST JOHN THE BAPTIST PARISH	LA	LPV	0	100	0	100	1	99.9985
3R4	HART	LA	LPV	0	100	0	100	1	99.9938
ACP	ALLEN PARISH	LA	LPV	0	100	0	100	0	100
AEX	ALEXANDRIA INTL	LA	LPV200	0	100	0	100	1	99.9942
ARA	ACADIANA RGNL	LA	LPV	0	100	0	100	0	100
BQP	MOREHOUSE MEMORIAL	LA	LPV	0	100	1	99.9915	2	99.9371
BTR	BATON ROUGE METRO	LA	LPV200	0	100	0	100	1	99.9988
BXA	GEORGE R CARR MEMORIAL AIR FIELD	LA	LPV	0	100	0	100	2	99.9923
CWF	CHENNAULT INTL	LA	LPV200	0	100	0	100	0	100
DTN	SHREVEPORT DOWNTOWN	LA	LPV	0	100	0	100	2	99.9734
ESF	ESLER RGNL	LA	LPV200	0	100	0	100	1	99.9942
F88	JONESBORO	LA	LP	0	100	0	100	3	99.9873
GAO	SOUTH LAFOURCHE LEONARD MILLER JR	LA	LPV	0	100	0	100	1	99.9985
HDC	HAMMOND NORTHSHORE RGNL	LA	LPV200	0	100	0	100	2	99.9965
HUM	HOUMA-TERREBONNE	LA	LPV200	0	100	0	100	1	99.9996
HZR	FALSE RIVER RGNL	LA	LPV	0	100	0	100	1	99.9996
IER	NATCHITOCHES RGNL	LA	LPV	0	100	0	100	1	99.9934
IYA	ABBEVILLE CHRIS CRUSTA MEML	LA	LPV	0	100	0	100	0	100
L38	LOUISIANA RGNL	LA	LPV	0	100	0	100	1	99.9992
L39	LEESVILLE	LA	LPV	0	100	0	100	1	99.9946
LCH	LAKE CHARLES RGNL	LA	LPV200	0	100	0	100	0	100
LFT	LAFAYETTE RGNL	LA	LPV	0	100	0	100	0	100
M79	JOHN H HOOKS JR MEMORIAL	LA	LPV	0	100	0	100	3	99.9603

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
MLU	MONROE RGNL	LA	LPV200	0	100	0	100	3	99.9618
MSY	LOUIS ARMSTRONG NEW ORLEANS INTL	LA	LPV200	0	100	0	100	1	99.9977
NEW	LAKEFRONT	LA	LPV	0	100	0	100	1	99.9969
OPL	ST LANDRY PARISH-AHART FIELD	LA	LPV	0	100	0	100	0	100
PTN	HARRY P WILLIAMS MEMORIAL	LA	LPV200	0	100	0	100	0	100
RSN	RUSTON RGNL AIRPORT	LA	LPV	0	100	0	100	2	99.9718
SHV	SHREVEPORT RGNL	LA	LPV200	0	100	0	100	2	99.9742
SPH	SPRINGHILL	LA	LPV	0	100	1	99.9907	2	99.9610
TVR	VICKSBURG TALLULAH RGNL	LA	LPV	0	100	0	100	4	99.9757
UXL	SOUTHLAND FIELD	LA	LPV	0	100	0	100	0	100
3B0	SOUTHBRIDGE MUNICIPAL	MA	LPV	3	99.9537	2	99.9252	2	99.8924
ACK	NANTUCKET MEMORIAL	MA	LPV200	2	99.9595	2	99.9302	4	99.8573
BAF	BARNES MUNICIPAL	MA	LPV	2	99.9541	2	99.9198	2	99.9008
BED	LAURENCE G HANSCOM FLD	MA	LPV200	3	99.9676	2	99.9336	3	99.8808
BOS	GEN EDWARD LAWRENCE LOGAN INTL	MA	LPV200	3	99.9680	2	99.9379	3	99.8831
BVY	BEVERLY MUNICIPAL	MA	LPV	3	99.9684	2	99.9375	3	99.8870
EWB	NEW BEDFORD RGNL	MA	LP	2	99.9591	2	99.9302	4	99.8750
GBR	WALTER J KOLADZA	MA	LP	2	99.9583	2	99.9194	3	99.8970
HYA	BARNSTABLE MUNICIPAL-BOARDMAN/POLANDO FIELD	MA	LPV200	2	99.9695	2	99.9336	4	99.8630
LWM	LAWRENCE MUNICIPAL	MA	LPV200	3	99.9684	2	99.9371	3	99.8819
MVY	MARTHAS VINEYARD	MA	LPV200	2	99.9587	2	99.9302	4	99.8696
ORE	ORANGE MUNICIPAL	MA	LPV	2	99.9691	2	99.9267	3	99.8920
ORH	WORCESTER RGNL	MA	LPV200	3	99.9672	2	99.9298	3	99.8889
OWD	NORWOOD MEMORIAL	MA	LPV	3	99.9680	2	99.9336	3	99.8823
PYM	PLYMOUTH MUNICIPAL	MA	LPV200	3	99.9684	2	99.9336	4	99.8723
2G4	GARRETT COUNTY	MD	LPV	2	99.9078	2	99.8866	2	99.8750
2W6	ST. MARY'S COUNTY RGNL	MD	LPV	2	99.9313	2	99.9313	2	99.9012
BWI	BALTIMORE/WASHINGTON INTL THURGOOD MARSHALL	MD	LPV200	2	99.9255	2	99.9198	2	99.8981
CBE	GREATER CUMBERLAND RGNL	MD	LP	2	99.9074	3	99.9063	2	99.8738
DMW	CARROLL COUNTY REGNL/JACK B POAGE FIELD	MD	LPV200	2	99.9194	2	99.9082	2	99.9008
ESN	EASTON/NEWNAM FIELD	MD	LPV	2	99.9282	2	99.9198	2	99.8978
FDK	FREDERICK MUNICIPAL	MD	LPV	2	99.9194	2	99.9063	2	99.8877
GAI	MONTGOMERY COUNTY AIRPARK	MD	LPV	2	99.9194	2	99.9182	2	99.8966
HGR	HAGERSTOWN RGNL-RICHARD A HENSON FIELD	MD	LPV200	2	99.9082	2	99.9063	2	99.8777
MTN	MARTIN STATE	MD	LPV	2	99.9259	2	99.9198	2	99.8985
OXB	OCEAN CITY MUNICIPAL	MD	LPV	1	99.9336	2	99.9321	2	99.9005
SBY	SALISBURY-OCEAN CITY WICOMICO RGNL	MD	LPV200	1	99.9336	1	99.9336	2	99.9047
1B0	DEXTER RGNL	ME	LP	4	99.9421	3	99.9263	5	99.8661
81B	OXFORD COUNTY RGNL	ME	LP	2	99.9803	2	99.9560	4	99.8985

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
AUG	AUGUSTA STATE	ME	LPV200	3	99.9776	2	99.9549	4	99.8958
BGR	BANGOR INTL	ME	LPV	4	99.9421	3	99.9244	5	99.8657
BHB	HANCOCK COUNTY-BAR HARBOR	ME	LPV200	4	99.9437	3	99.9205	5	99.8434
BXM	BRUNSWICK EXECUTIVE	ME	LPV	3	99.9815	2	99.9564	3	99.88000
FVE	NORTHERN AROOSTOOK RGNL	ME	LPV	4	99.9163	3	99.8823	7	99.7697
HUL	HOULTON INTL	ME	LP	3	99.9132	4	99.8958	7	99.7639
LEW	AUBURN/LEWISTON MUNICIPAL	ME	LPV200	3	99.9780	2	99.9552	4	99.8978
MLT	MILLINOCKET MUNICIPAL	ME	LPV	4	99.9340	3	99.9205	7	99.8063
PQI	NORTHERN MAINE RGNL ARPT AT PRESQUE IS	ME	LPV200	4	99.9286	3	99.8858	7	99.7685
PWM	PORTLAND INTL JETPORT	ME	LPV200	3	99.9776	2	99.9564	3	99.8823
RKD	KNOX COUNTY RGNL	ME	LPV	4	99.9780	3	99.9506	3	99.8715
SFM	SANFORD RGNL	ME	LPV200	3	99.9792	2	99.9564	3	99.8819
WVL	WATERVILLE ROBERT LAFLEUR	ME	LPV200	4	99.9757	3	99.9541	4	99.8954
77G	MARLETTE	MI	LPV	2	99.9660	3	99.9657	2	99.8831
9D9	HASTINGS	MI	LP	3	99.9468	3	99.9282	1	99.8619
ACB	ANTRIM COUNTY	MI	LPV	1	99.99000	1	99.9745	3	99.9630
ADG	LENAWEE COUNTY	MI	LPV	3	99.9290	3	99.9217	1	99.8623
AMN	GRATIOT COMMUNICIPALTY	MI	LPV	2	99.9676	2	99.9633	2	99.8789
ANJ	SAULT STE MARIE MUNICIPAL - SANDERSON FIELD	MI	LPV	1	99.9819	1	99.9745	2	99.9722
APN	ALPENA COUNTY RGNL	MI	LPV	1	99.9745	1	99.9745	2	99.9591
ARB	ANN ARBOR MUNICIPAL	MI	LPV	3	99.9410	3	99.9225	1	99.8611
AZO	KALAMAZOO/BATTLE CREEK INTL	MI	LPV	3	99.9329	3	99.9190	2	99.8870
BAX	HURON COUNTY MEMORIAL	MI	LPV	1	99.9745	1	99.9745	3	99.9101
BEH	SOUTHWEST MICHIGAN RGNL	MI	LPV200	3	99.9433	3	99.9336	2	99.8873
BIV	TULIP CITY	MI	LPV	3	99.9483	3	99.9441	2	99.8850
BTL	W K KELLOGG	MI	LPV200	3	99.9336	3	99.9194	2	99.8746
CAD	WEXFORD COUNTY	MI	LPV200	1	99.9834	1	99.9745	3	99.9491
CIU	CHIPPEWA COUNTY INTL	MI	LPV	1	99.9819	1	99.9745	2	99.9707
CMX	HOUGHTON COUNTY MEMORIAL	MI	LPV	1	99.9865	1	99.9865	4	99.9711
CVX	CHARLEVOIX MUNICIPAL	MI	LPV	1	99.9857	1	99.9745	3	99.9560
DET	COLEMAN A YOUNG MUNICIPAL	MI	LPV	3	99.9537	3	99.9194	1	99.86000
DTW	DETROIT METROPOLITAN WAYNE COUNTY	MI	LPV200	3	99.9417	3	99.9232	1	99.8607
ERY	LUCE COUNTY	MI	LPV	1	99.9950	1	99.9819	2	99.9715
ESC	DELTA COUNTY	MI	LPV200	1	99.9842	1	99.9842	3	99.9603
FFX	FREMONT MUNICIPAL	MI	LPV	2	99.9680	2	99.9680	3	99.9024
FNT	BISHOP INTL	MI	LPV200	2	99.9626	3	99.9410	1	99.86000
GDW	GLADWIN ZETTEL MEMORIAL	MI	LP	2	99.9761	2	99.9688	5	99.9468
GLR	GAYLORD RGNL	MI	LPV	1	99.9819	1	99.9745	3	99.9637
GRR	GERALD R. FORD INTL	MI	LPV200	3	99.9525	3	99.9390	2	99.8843
HYX	SAGINAW COUNTY H.W. BROWNE	MI	LPV	2	99.9672	2	99.9672	2	99.8773
IKW	JACK BARSTOW	MI	LPV	2	99.9691	2	99.9691	4	99.9120

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
IMT	FORD	MI	LPV	1	99.9784	1	99.9784	3	99.9610
IRS	KIRSCH MUNICIPAL	MI	LPV	3	99.9263	3	99.9190	2	99.8885
ISQ	SCHOOLCRAFT COUNTY	MI	LP	1	99.9904	1	99.9819	3	99.9630
IWD	GOGEBIC-IRON COUNTY	MI	LPV200	1	99.9807	1	99.9807	3	99.9657
JXN	JACKSON COUNTY-REYNOLDS FIELD	MI	LPV200	3	99.9406	3	99.9321	1	99.8619
LAN	CAPITAL REGION INTL	MI	LPV200	3	99.9541	3	99.9321	1	99.8611
LDM	MASON COUNTY	MI	LPV	1	99.9745	1	99.9745	3	99.9263
LWA	SOUTH HAVEN AREA RGNL	MI	LP	3	99.9448	3	99.9336	2	99.8870
MBS	MBS INTL	MI	LPV200	2	99.9695	2	99.9695	3	99.8962
MCD	MACKINAC ISLAND	MI	LPV	1	99.9819	1	99.9745	2	99.9703
MKG	MUSKEGON COUNTY	MI	LPV200	3	99.9583	3	99.9583	2	99.8843
MNM	MENOMINEE-MARINETTE TWIN COUNTY	MI	LPV200	1	99.9745	1	99.9745	3	99.9537
MOP	MOUNT PLEASANT MUNICIPAL	MI	LPV	2	99.9761	2	99.9688	4	99.9066
N98	BOYNE CITY MUNICIPAL	MI	LP	1	99.9819	1	99.9745	3	99.9633
OEB	BRANCH COUNTY MEMORIAL	MI	LPV	3	99.9271	3	99.9198	2	99.8750
OSC	OSCODA-WURTSMITH	MI	LPV200	1	99.9745	1	99.9745	3	99.9630
OZW	LIVINGSTON COUNTY SPENCER J. HARDY	MI	LPV200	3	99.9579	3	99.9333	1	99.8607
PHN	SAINT CLAIR COUNTY INTL	MI	LPV200	3	99.9579	3	99.9174	2	99.8750
PLN	PELLSTON RGNL AIRPORT OF EMMET COUNTY	MI	LPV200	1	99.9819	1	99.9745	3	99.9691
PTK	OAKLAND COUNTY INTL	MI	LPV200	3	99.9564	3	99.9306	1	99.86000
RNP	OWOSSO COMMUNICIPALTY	MI	LPV	2	99.9618	3	99.9402	1	99.86000
SAW	SAWYER INTL	MI	LPV200	1	99.9869	1	99.9869	3	99.9641
SLH	CHEBOYGAN COUNTY	MI	LPV	1	99.9819	1	99.9745	2	99.9699
TTF	CUSTER	MI	LPV	3	99.9302	3	99.9228	1	99.8615
TVC	CHERRY CAPITAL	MI	LPV	1	99.9861	1	99.9819	3	99.9533
YIP	WILLOW RUN	MI	LPV	3	99.9414	3	99.9228	1	99.8611
AEL	ALBERT LEA MUNICIPAL	MN	LPV	0	100	0	100	1	99.9954
ANE	ANOKA COUNTY-BLAINE ARPT (JANES FIELD)	MN	LPV	0	100	0	100	1	99.9923
AUM	AUSTIN MUNICIPAL	MN	LPV200	0	100	0	100	1	99.9946
AXN	CHANDLER FIELD	MN	LPV	0	100	0	100	1	99.9853
BBB	BENSON MUNICIPAL	MN	LPV	0	100	0	100	1	99.9850
BDE	BAUDETTE INTL	MN	LPV	0	100	0	100	2	99.9931
BDH	WILLMAR MUNICIPAL-JOHN L RICE FIELD	MN	LPV	0	100	0	100	1	99.9842
BJI	BEMIDJI RGNL	MN	LPV200	0	100	0	100	1	99.9923
BRD	BRAINERD LAKES RGNL	MN	LPV200	0	100	0	100	1	99.9877
CBG	CAMBRIDGE MUNICIPAL	MN	LPV	0	100	0	100	1	99.9842
CKC	GRAND MARAIS/COOK COUNTY	MN	LPV	1	99.9969	1	99.9969	3	99.9730
CKN	CROOKSTON MUNICIPAL/KIRKWOOD FLD	MN	LPV	0	100	0	100	1	99.9931
CNB	MYERS FIELD	MN	LPV	0	100	0	100	1	99.9838

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
COQ	CLOQUET CARLTON COUNTY	MN	LPV	0	100	0	100	1	99.9896
CQM	COOK MUNICIPAL	MN	LP	0	100	0	100	2	99.9873
D39	SAUK CENTRE MUNICIPAL	MN	LP	0	100	0	100	1	99.9850
DLH	DULUTH INTL	MN	LPV200	0	100	0	100	2	99.9826
DTL	DETROIT LAKES-WETHING FIELD	MN	LPV	0	100	0	100	1	99.9892
DXX	LAC QUI PARLE COUNTY	MN	LPV200	0	100	0	100	1	99.9846
ELO	ELY MUNICIPAL	MN	LPV200	0	100	0	100	3	99.9699
ETH	WHEATON MUNICIPAL	MN	LP	0	100	0	100	1	99.9861
FCM	FLYING CLOUD	MN	LPV200	0	100	0	100	1	99.9931
FFM	FERGUS FALLS MUNICIPAL-EINAR MICKELSON FLD	MN	LPV200	0	100	0	100	1	99.9865
FKA	FILLMORE COUNTY	MN	LPV	0	100	0	100	2	99.9803
FOZ	BIGFORK MUNICIPALCIPAL	MN	LP	0	100	0	100	2	99.9873
FRM	FAIRMONT MUNICIPAL	MN	LPV	0	100	0	100	1	99.9965
FSE	FOSSTON MUNICIPAL	MN	LP	0	100	0	100	1	99.9923
GPZ	GRAND RAPIDS/ITASCA CO-GORDON NEWSTROM	MN	LPV	0	100	0	100	1	99.9915
HCD	HUTCHINSON MUNICIPAL-BUTLER FIELD	MN	LPV	0	100	0	100	1	99.9842
HIB	RANGE RGNL	MN	LPV200	0	100	0	100	2	99.9853
INL	FALLS INTL	MN	LPV	0	100	0	100	2	99.9907
JKJ	MOORHEAD MUNICIPAL	MN	LPV	0	100	0	100	1	99.9888
LJF	LITCHFIELD MUNICIPAL	MN	LPV	0	100	0	100	1	99.9838
LVN	AIRLAKE	MN	LPV200	0	100	0	100	1	99.9815
LXL	LITTLE FALLS/MORRISON CO-LINDBERGH FLD	MN	LPV	0	100	0	100	1	99.9857
LYV	QUENTIN AANENSON FIELD	MN	LPV200	0	100	0	100	1	99.9823
MGG	MAPLE LAKE MUNICIPAL	MN	LP	0	100	0	100	1	99.9838
MKT	MANKATO RGNL	MN	LPV200	0	100	0	100	2	99.9946
MML	SOUTHWEST MINNESOTA RGNL MARSHALL/RYAN FIELD	MN	LPV200	0	100	0	100	1	99.9838
MSP	MINNEAPOLIS-ST PAUL INTL/WOLD-CHAMBERLAIN	MN	LPV200	0	100	0	100	1	99.9927
MZH	MOOSE LAKE CARLTON COUNTY	MN	LPV	0	100	0	100	1	99.9880
ONA	WINONA MUNICIPAL-MAX CONRAD FLD	MN	LPV	0	100	0	100	2	99.9850
ORB	ORR RGNL	MN	LP	0	100	0	100	2	99.9884
OTG	WORTHINGTON MUNICIPAL	MN	LPV200	0	100	0	100	2	99.9977
OWA	OWATONNA DEGNER RNGL	MN	LPV200	0	100	0	100	2	99.9938
PKD	PARK RAPIDS MUNICIPAL-KONSHOK FIELD	MN	LPV200	0	100	0	100	1	99.9896
RGK	RED WING RGNL	MN	LPV200	0	100	0	100	1	99.9815
ROS	RUSH CITY RGNL	MN	LPV	0	100	0	100	1	99.9846
ROX	ROSEAU MUNICIPAL/RUDY BILLBERG FIELD	MN	LPV	0	100	0	100	2	99.9946

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
RRT	WARROAD INTL MEMORIAL	MN	LPV	0	100	0	100	2	99.9946
RST	ROCHESTER INTL	MN	LPV200	0	100	0	100	1	99.9938
RWF	REDWOOD FALLS MUNICIPAL	MN	LPV	0	100	0	100	1	99.9842
SAZ	STAPLES MUNICIPAL	MN	LPV	0	100	0	100	1	99.9873
STC	ST CLOUD RGNL	MN	LPV200	0	100	0	100	1	99.9842
STP	ST PAUL DOWNTOWN HOLMAN FLD	MN	LPV	0	100	0	100	1	99.9927
TVF	THIEF RIVER FALLS	MN	LPV	0	100	0	100	1	99.9942
TWM	RICHARD B HELGESON	MN	LPV	0	100	0	100	3	99.9680
VVV	ORTONVILLE MUNICIPAL-MARTINSON FIELD	MN	LP	0	100	0	100	1	99.9823
1H0	CREVE COEUR	MO	LPV	2	99.9745	1	99.9375	1	99.9336
2H2	JERRY SUMNERS SR AURORA MUNICIPALCIPAL	MO	LP	1	99.9915	1	99.9826	1	99.9433
6M6	LEWIS COUNTY RGNL	MO	LPV	1	99.9961	3	99.9630	1	99.9375
8WC	WASHINGTON COUNTY AIRPORT	MO	LPV	2	99.9711	1	99.9375	1	99.9336
AIZ	LEE C FINE MEMORIAL	MO	LPV	1	99.9869	1	99.9394	1	99.9375
BBG	BRANSON	MO	LPV200	1	99.9904	1	99.9444	1	99.9398
BUM	BUTLER MEMORIAL	MO	LPV	0	100	1	99.9969	1	99.9437
CGI	CAPE GIRARDEAU RGNL	MO	LPV	2	99.9630	1	99.9375	1	99.9375
CHT	CHILLICOTHE MUNICIPAL	MO	LPV	0	100	1	99.9907	3	99.9711
COU	COLUMBIA RGNL	MO	LPV	1	99.9919	1	99.9379	1	99.9375
DMO	SEDALIA MEMORIAL	MO	LPV	1	99.9934	1	99.9606	1	99.9375
DXE	DEXTER MUNICIPAL	MO	LPV	2	99.9618	1	99.9375	1	99.9375
EIW	COUNTY MEMORIAL	MO	LPV	2	99.9610	1	99.9375	1	99.9375
EOS	NEOSHO HUGH ROBINSON	MO	LPV	1	99.9927	1	99.9884	1	99.9452
EVU	NORTHWEST MISSOURI RGNL	MO	LPV	0	100	0	100	1	99.9888
EZZ	CAMERON MEMORIAL	MO	LPV	0	100	1	99.9954	2	99.9799
FAM	FARMINGTON RGNL	MO	LPV	2	99.9664	1	99.9375	1	99.9375
FTT	ELTON HENSLEY MEMORIAL	MO	LPV	1	99.9915	1	99.9375	1	99.9375
FWB	BRANSON WEST MUNICIPAL-EMERSON FIELD	MO	LPV200	1	99.9904	2	99.9745	1	99.9425
FYG	WASHINGTON RGNL	MO	LPV	2	99.9803	1	99.9375	1	99.9336
GPH	MIDWEST NATIONAL AIR CENTER	MO	LPV	0	100	1	99.9954	1	99.9807
H21	CAMDENTON MEMORIAL	MO	LPV	1	99.9861	1	99.9402	1	99.9375
H79	ELDON MODEL AIRPARK	MO	LP	1	99.9888	1	99.9390	1	99.9375
HAE	HANNIBAL RGNL	MO	LPV	1	99.9977	3	99.9641	1	99.9375
HFJ	MONETT MUNICIPAL	MO	LPV	1	99.9919	1	99.9826	1	99.9441
HIG	HIGGINSVILLE INDUSTRIAL MUNICIPAL	MO	LPV	0	100	1	99.9973	2	99.9722
IRK	KIRKSVILLE RGNL	MO	LPV200	1	99.9988	2	99.9715	1	99.9375
JEF	JEFFERSON CITY MEMORIAL	MO	LPV	1	99.9896	1	99.9379	1	99.9375
JLN	JOPLIN RGNL	MO	LPV	1	99.9938	1	99.99000	1	99.9452
K02	PERRYVILLE MUNICIPAL	MO	LPV	2	99.9660	1	99.9375	1	99.9336
K57	GOULD PETERSON MUNICIPAL	MO	LPV	0	100	0	100	1	99.9869
LRY	LAWRENCE SMITH MEMORIAL	MO	LPV	0	100	1	99.9961	3	99.9718

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
LXT	LEE'S SUMMIT MUNICIPAL	MO	LPV	0	100	1	99.9954	1	99.9799
M05	CARUTHERSVILLE MEM	MO	LPV	2	99.9645	1	99.9375	1	99.9375
M17	BOLIVAR MUNICIPAL	MO	LPV	1	99.9853	1	99.9479	1	99.9417
M48	HOUSTON MEMORIAL	MO	LPV	1	99.9815	1	99.9383	1	99.9375
MAW	MALDEN MUNICIPAL	MO	LPV	2	99.9614	1	99.9375	1	99.9375
MBY	OMAR N BRADLEY	MO	LPV	1	99.9996	2	99.9745	1	99.9375
MCI	KANSAS CITY INTL	MO	LPV	0	100	1	99.9961	1	99.9803
MHL	MARSHALL MEML MUNICIPAL	MO	LPV	1	99.9985	1	99.9664	1	99.9375
MKC	CHARLES B. WHEELER DOWNTOWN	MO	LPV200	0	100	1	99.9954	1	99.9803
MO8	NORTH CENTRAL MISSOURI RGNL	MO	LPV	0	100	2	99.9749	2	99.9510
MYJ	MEXICO MEMORIAL	MO	LPV	1	99.9950	2	99.9514	1	99.9375
NVD	NEVADA MUNICIPAL	MO	LPV200	1	99.9965	2	99.9946	1	99.9437
PLK	M. GRAHAM CLARK DOWNTOWN	MO	LPV200	1	99.9904	1	99.9448	1	99.9421
POF	POPLAR BLUFF MUNICIPAL	MO	LPV	2	99.9622	1	99.9375	1	99.9375
RCM	SKYHAVEN	MO	LPV	1	99.9985	2	99.9954	2	99.9579
SGF	SPRINGFIELD-BRANSON NATIONAL	MO	LPV	1	99.9915	2	99.9799	1	99.9421
SIK	SIKESTON MEML MUNICIPAL	MO	LPV	2	99.9618	1	99.9375	1	99.9375
STJ	ROSECRANS MEMORIAL	MO	LPV200	0	100	0	100	1	99.9815
STL	LAMBERT-ST LOUIS INTL	MO	LPV200	2	99.9738	1	99.9375	1	99.9336
SUS	SPIRIT OF ST LOUIS	MO	LPV200	2	99.9757	1	99.9375	1	99.9336
TBN	WAYNESVILLE-ST ROBERT RGNL/FORNEY AAF	MO	LPV	1	99.9838	1	99.9383	1	99.9375
TRX	TRENTON MUNICIPAL	MO	LPV	0	100	1	99.99000	3	99.9749
UBX	CUBA MUNICIPAL	MO	LPV	2	99.9830	1	99.9375	1	99.9375
UNO	WEST PLAINS MUNICIPAL	MO	LPV	1	99.9803	1	99.9383	1	99.9375
UUV	SULLIVAN RGNL	MO	LPV	2	99.9792	1	99.9375	1	99.9375
VER	JESSE VIERTEL MEMORIAL	MO	LPV	1	99.9946	2	99.9583	1	99.9375
VIH	ROLLA NATIONAL	MO	LPV200	1	99.9857	1	99.9375	1	99.9375
87I	YAZOO COUNTY	MS	LPV	1	99.9946	1	99.9745	2	99.9367
CKM	FLETCHER FIELD	MS	LPV	1	99.9973	1	99.9375	1	99.9375
CRX	ROSCOE TURNER	MS	LPV200	1	99.9772	1	99.9375	1	99.9375
GLH	MID DELTA RGNL	MS	LPV200	1	99.9965	2	99.9699	2	99.9367
GNF	GRENADA MUNICIPAL	MS	LPV	1	99.9958	1	99.9518	1	99.9375
GPT	GULFPORT-BILOXI INTL	MS	LPV200	0	100	1	99.9996	1	99.9938
GTR	GOLDEN TRIANGLE RGNL	MS	LPV200	1	99.9934	1	99.9587	1	99.9375
GWO	GREENWOOD-LEFLORE	MS	LPV	1	99.9954	1	99.9556	1	99.9375
HBG	HATTIESBURG BOBBY L. CHAIN MUNICIPAL	MS	LPV200	0	100	0	100	2	99.9904
HEZ	HARDY-ANDERS FLD NATCHEZ-ADAMS COUNTY	MS	LPV	0	100	0	100	2	99.9915
HKS	HAWKINS FIELD	MS	LPV200	0	100	0	100	3	99.9610
HSA	STENNIS INTL	MS	LPV200	0	100	0	100	1	99.9946
IDL	INDIANOLA MUNICIPAL	MS	LPV	1	99.9961	2	99.9676	1	99.9375
JAN	JACKSON-EVERS INTL	MS	LPV200	0	100	0	100	3	99.9641

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
JVW	JOHN BELL WILLIAMS	MS	LPV200	0	100	0	100	4	99.9734
LUL	HESLER-NOBLE FIELD	MS	LPV	0	100	0	100	1	99.9823
M40	MONROE COUNTY	MS	LPV	1	99.9942	1	99.9510	1	99.9375
M43	PRENTISS-JEFFERSON DAVIS COUNTY	MS	LPV	0	100	0	100	2	99.9772
MCB	MC COMB-PIKE COUNTY-JOHN E LEWIS FIELD	MS	LPV	0	100	0	100	2	99.9915
MEI	KEY FIELD	MS	LPV200	0	100	0	100	2	99.9633
MJD	PICAYUNE MUNICIPAL	MS	LPV	0	100	0	100	1	99.9950
MPE	PHILADELPHIA MUNICIPAL	MS	LPV	1	99.9961	1	99.9780	1	99.9375
OLV	OLIVE BRANCH	MS	LPV	1	99.9772	1	99.9375	1	99.9375
PIB	HATTIESBURG-LAUREL RGNL	MS	LPV200	0	100	0	100	2	99.9915
PQL	TRENT LOTT INTL	MS	LPV200	0	100	1	99.9996	1	99.9946
RNV	CLEVELAND MUNICIPAL	MS	LPV	1	99.9965	1	99.9522	1	99.9375
STF	GEORGE M BRYAN	MS	LPV200	1	99.9938	1	99.9587	1	99.9375
TUP	TUPELO RGNL	MS	LPV200	1	99.9954	1	99.9375	1	99.9375
UOX	UNIVERSITY-OXFORD	MS	LPV	2	99.9934	1	99.9375	1	99.9375
UTA	TUNICA MUNICIPAL	MS	LPV200	2	99.9907	1	99.9375	1	99.9375
1S3	TILLITT FIELD	MT	LPV	0	100	0	100	1	99.9907
4U6	CIRCLE TOWN COUNTY	MT	LPV	0	100	0	100	1	99.9923
6S8	LAUREL MUNICIPALCIPAL	MT	LPV	0	100	0	100	1	99.9965
7S0	RONAN	MT	LPV	0	100	0	100	1	99.9961
BIL	BILLINGS LOGAN INTL	MT	LPV200	0	100	0	100	1	99.9965
BTM	BERT MOONEY	MT	LPV	0	100	0	100	1	99.9973
BZN	GALLATIN FIELD	MT	LPV	0	100	0	100	1	99.9969
GDV	DAWSON COMMUNICIPALTY	MT	LPV	0	100	0	100	1	99.9911
GGW	WOKAL FIELD/GLASGOW INTL	MT	LPV200	0	100	0	100	1	99.9938
GPI	GLACIER PARK INTL	MT	LPV	0	100	0	100	1	99.9969
GTF	GREAT FALLS INTL	MT	LPV200	0	100	0	100	1	99.9946
HLN	HELENA RGNL	MT	LPV	0	100	0	100	1	99.9981
HVR	HAVRE CITY-COUNTY	MT	LPV	0	100	0	100	1	99.9954
LVM	MISSION FIELD	MT	LP	0	100	0	100	1	99.9965
LWT	LEWISTOWN MUNICIPAL	MT	LPV200	0	100	0	100	1	99.9931
M75	MALTA	MT	LP	0	100	0	100	1	99.9946
MLS	FRANK WILEY FIELD	MT	LPV	0	100	0	100	1	99.9904
MSO	MISSOULA INTL	MT	LPV	0	100	0	100	1	99.9992
OLF	L M CLAYTON	MT	LPV200	0	100	0	100	1	99.9934
PWD	SHER-WOOD	MT	LPV200	0	100	0	100	1	99.9942
RPX	ROUNDUP	MT	LPV	0	100	0	100	1	99.9923
SBX	SHELBY	MT	LP	0	100	0	100	1	99.9965
SDY	SIDNEY-RICHLAND MUNICIPAL	MT	LPV	0	100	0	100	1	99.9923
WYS	YELLOWSTONE	MT	LPV200	0	100	0	100	1	99.9961
CYCL	CHARLO	NB	LPV	3	99.8565	3	99.8503	8	99.7377
CYQM	MONCTON INTL	NB	LPV	3	99.8792	4	99.8634	8	99.7392
AFP	ANSON COUNTY-JEFF CLOUD FLD	NC	LPV	1	99.9757	1	99.9633	2	99.9360

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
AKH	GASTONIA MUNICIPAL	NC	LPV	1	99.9772	1	99.9633	2	99.9464
AVL	ASHEVILLE RGNL	NC	LPV	1	99.9873	2	99.9633	2	99.9236
BUY	BURLINGTON-ALAMANCE RGNL	NC	LPV200	1	99.9595	2	99.9549	2	99.9086
CLT	CHARLOTTE/DOUGLAS INTL	NC	LPV200	1	99.9757	1	99.9633	2	99.9460
CTZ	CLINTON-SAMPSON COUNTY	NC	LPV200	1	99.9722	2	99.9579	92	99.7944
DPL	DUPLIN COUNTY	NC	LPV200	1	99.9703	2	99.9549	92	99.5910
ECG	ELIZABETH CITY CG AIR STATION/RGNL	NC	LPV	2	99.9510	2	99.9417	30	99.8140
EDE	NORTHEASTERN RGNL	NC	LPV200	2	99.9622	2	99.9336	60	99.6443
EHO	SHELBY-CLEVELAND COUNTY RGNL	NC	LPV	1	99.9927	1	99.9633	2	99.9471
EQY	MONROE RGNL	NC	LPV	1	99.9772	1	99.9637	2	99.9390
EWN	COASTAL CAROLINA RGNL	NC	LPV	1	99.9734	2	99.9398	92	99.5185
EXX	DAVIDSON COUNTY	NC	LPV	1	99.9630	2	99.9572	2	99.9282
EYF	CURTIS L BROWN JR FIELD	NC	LPV200	1	99.9780	2	99.9610	90	99.8812
FAY	FAYETTEVILLE RGNL/GRANNIS FIELD	NC	LPV200	1	99.9757	1	99.9610	4	99.9240
FQD	RUTHERFORD CO/MARCHMAN FIELD	NC	LPV	1	99.9927	1	99.9633	2	99.9228
GSO	PIEDMONT TRIAD INTL	NC	LPV200	1	99.9595	2	99.9468	2	99.9086
GWW	WAYNE EXECUTIVE JETPORT	NC	LPV200	1	99.9633	2	99.9545	92	99.5868
HKY	HICKORY RGNL	NC	LPV200	1	99.9633	2	99.9591	2	99.9329
HNZ	HENDERSON-OXFORD	NC	LPV	1	99.9595	2	99.9437	28	99.8846
HRJ	HARNETT COUNTY	NC	LPV	1	99.9633	2	99.9572	4	99.9194
ILM	WILMINGTON INTL	NC	LPV200	1	99.9780	2	99.9595	92	99.7581
INT	SMITH REYNOLDS	NC	LPV200	1	99.9595	2	99.9460	2	99.9178
IPJ	LINCOLNTON-LINCOLN COUNTY RGNL	NC	LPV	1	99.9745	1	99.9633	2	99.9452
ISO	KINSTON REGL JETPORT AT STALLINGS FLD	NC	LPV	1	99.9633	2	99.9541	92	99.4680
IXA	HALIFAX-NORTHAMPTON RGNL	NC	LPV200	2	99.9591	2	99.9263	92	99.4591
JNX	JOHNSTON COUNTY	NC	LPV200	1	99.9633	2	99.9552	92	99.8403
JQF	CONCORD RGNL	NC	LPV	1	99.9633	1	99.9595	2	99.9352
LBT	LUMBERTON MUNICIPAL	NC	LPV	1	99.9780	1	99.9633	4	99.9306
LHZ	TRIANGLE NORTH EXECUTIVE	NC	LPV200	2	99.9591	2	99.9537	91	99.8329
MEB	LAURINBURG-MAXTON	NC	LPV200	1	99.9780	1	99.9633	2	99.9363
MQI	DARE COUNTY RGNL	NC	LPV	2	99.9514	2	99.9433	23	99.8492
MRH	MICHAEL J. SMITH FIELD	NC	LPV	1	99.9784	2	99.9402	92	99.6520
MRN	FOOTHILLS RGNL	NC	LPV200	2	99.9861	2	99.9630	2	99.9340
MWK	MOUNT AIRY/SURRY COUNTY	NC	LPV	1	99.9595	2	99.9429	2	99.9051
OAJ	ALBERT J ELLIS	NC	LPV200	1	99.9780	2	99.9564	92	99.5872
OCW	WARREN FIELD	NC	LPV	2	99.9630	2	99.9402	92	99.3843
ONX	CURRITUCK COUNTY RGNL	NC	LPV	1	99.9495	2	99.9444	19	99.8669
PGV	PITT-GREENVILLE	NC	LPV	2	99.9626	2	99.9460	92	99.3808
PMZ	PLYMOUTH MUNICIPAL	NC	LP	2	99.9622	2	99.9360	88	99.4857
RCZ	RICHMOND COUNTY	NC	LPV	1	99.9772	1	99.9633	2	99.9363
RDU	RALEIGH-DURHAM INTL	NC	LPV200	1	99.9595	2	99.9552	2	99.9144
RUQ	ROWAN COUNTY	NC	LPV200	1	99.9633	2	99.9579	2	99.9298

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
RWI	ROCKY MOUNT-WILSON RGNL	NC	LPV	2	99.9591	2	99.9533	92	99.5748
SOP	MOORE COUNTY	NC	LPV	1	99.9703	2	99.9622	2	99.9317
SUT	CAPE FEAR RGNL JETPORT/HOWIE FRANKLIN FLD	NC	LPV	1	99.9780	2	99.9637	73	99.8569
SVH	STATESVILLE RGNL	NC	LPV	1	99.9633	2	99.9591	2	99.9294
TDF	PERSON COUNTY	NC	LPV200	1	99.9595	2	99.9483	2	99.8985
TTA	RALEIGH EXEC AT SANFORD-LEE COUNTY	NC	LPV200	1	99.9633	2	99.9564	2	99.9240
VUJ	STANLY COUNTY	NC	LPV200	1	99.9633	2	99.9591	2	99.9348
2C8	CAVALIER MUNICIPAL	ND	LPV	0	100	0	100	1	99.9965
5N8	CASSELTON ROBERT MILLER RGNL	ND	LPV	0	100	0	100	1	99.9888
BAC	BARNES COUNTY MUNICIPAL	ND	LPV	0	100	0	100	1	99.9888
BIS	BISMARCK MUNICIPAL	ND	LPV200	0	100	0	100	1	99.9892
BWP	HARRY STERN	ND	LPV	0	100	0	100	1	99.9865
D09	BOTTINEAU MUNICIPAL	ND	LPV	0	100	0	100	1	99.9958
D55	ROBERTSON FIELD	ND	LPV	0	100	0	100	1	99.9961
D60	TIOGA MUNICIPAL	ND	LPV	0	100	0	100	1	99.9931
DIK	DICKINSON-THEODORE ROOSEVELT RGNL	ND	LPV200	0	100	0	100	1	99.9904
DVL	DEVILS LAKE RGNL	ND	LPV	0	100	0	100	1	99.9931
FAR	HECTOR INTL	ND	LPV200	0	100	0	100	1	99.9892
GAF	HUTSON FIELD	ND	LPV	0	100	0	100	1	99.9950
GFK	GRAND FORKS INTL	ND	LPV	0	100	0	100	1	99.9934
GWR	GWINNER-ROGER MELROE FIELD	ND	LPV200	0	100	0	100	1	99.9857
HZE	MERCER COUNTY RGNL	ND	LPV	0	100	0	100	1	99.9907
ISN	SLOULIN FLD INTL	ND	LPV200	0	100	0	100	1	99.9931
JMS	JAMESTOWN RGNL	ND	LPV200	0	100	0	100	1	99.9888
MOT	MINOT INTL	ND	LPV	0	100	0	100	1	99.9931
RUG	RUGBY MUNICIPAL	ND	LP	0	100	0	100	1	99.9938
S25	WATFORD CITY MUNICIPAL	ND	LPV	0	100	0	100	1	99.9919
07K	CENTRAL CITY MUNICIPAL-LARRY REINEKE FIELD	NE	LPV	0	100	0	100	0	100
0B4	HARTINGTON MUNICIPAL	NE	LPV	0	100	0	100	0	100
0C4	PENDER MUNICIPAL	NE	LPV	0	100	0	100	0	100
0V3	PIONEER VILLAGE FIELD	NE	LPV	0	100	0	100	0	100
12K	SUPERIOR MUNICIPAL	NE	LPV	0	100	0	100	0	100
4V9	ANTELOPE COUNTY	NE	LPV	0	100	0	100	1	99.9996
6K3	CREIGHTON MUNICIPAL	NE	LPV	0	100	0	100	1	99.9996
7V7	RED CLOUD MUNICIPAL	NE	LPV	0	100	0	100	0	100
8V2	STUART-ATKINSON MUNICIPAL	NE	LPV	0	100	0	100	1	99.9904
93Y	DAVID CITY MUNICIPAL	NE	LPV	0	100	0	100	0	100
9V5	MODISETT	NE	LPV	0	100	0	100	1	99.99000
AFK	NEBRASKA CITY MUNICIPAL	NE	LPV	0	100	0	100	0	100
AHQ	WAHOO MUNICIPAL	NE	LPV	0	100	0	100	0	100
AIA	ALLIANCE MUNICIPAL	NE	LPV200	0	100	0	100	1	99.9888

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
ANW	AINSWORTH MUNICIPAL	NE	LPV200	0	100	0	100	1	99.9892
AUH	AURORA MUNICIPALCIPAL - AL POTTER FIELD	NE	LPV	0	100	0	100	0	100
BBW	BROKEN BOW MUNICIPAL	NE	LPV	0	100	0	100	1	99.9961
BFF	WESTERN NEB. RGNL/WILLIAM B. HEILIG FIELD	NE	LPV	0	100	0	100	1	99.9888
BIE	BEATRICE MUNICIPAL	NE	LPV200	0	100	0	100	0	100
BVN	ALBION MUNICIPAL	NE	LPV	0	100	0	100	0	100
CDR	CHADRON MUNICIPAL	NE	LPV200	0	100	0	100	1	99.9907
CEK	CRETE MUNICIPALCIPAL	NE	LPV	0	100	0	100	0	100
CZD	COZAD MUNICIPAL	NE	LPV	0	100	0	100	1	99.9988
EAR	KEARNEY RGNL	NE	LPV200	0	100	0	100	0	100
FBY	FAIRBURY MUNICIPAL	NE	LPV	0	100	0	100	0	100
FET	FREMONT MUNICIPAL	NE	LPV	0	100	0	100	0	100
FMZ	FAIRMONT STATE AIRFIELD	NE	LPV	0	100	0	100	0	100
FNB	BRENNER FIELD	NE	LPV	0	100	0	100	1	99.9880
GGF	GRANT MUNICIPAL	NE	LPV	0	100	0	100	1	99.99000
GRI	CENTRAL NEBRASKA RGNL	NE	LPV	0	100	0	100	0	100
GRN	GORDON MUNICIPAL	NE	LPV	0	100	0	100	1	99.99000
HDE	BREWSTER FIELD	NE	LPV	0	100	0	100	0	100
HSI	HASTINGS MUNICIPAL	NE	LPV	0	100	0	100	0	100
IBM	KIMBALL MUNICIPAL/ROBERT E ARRAJ FI	NE	LPV	0	100	0	100	1	99.9873
IML	IMPERIAL MUNICIPAL	NE	LPV	0	100	0	100	1	99.9919
JYR	YORK MUNICIPALCIPAL	NE	LPV	0	100	0	100	0	100
LBF	NORTH PLATTE RGNL AIRPORT LEE BIRD FIELD	NE	LPV	0	100	0	100	1	99.9919
LCG	WAYNE MUNICIPAL	NE	LPV	0	100	0	100	0	100
LNK	LINCOLN	NE	LPV	0	100	0	100	0	100
LXN	JIM KELLY FIELD	NE	LPV	0	100	0	100	1	99.9996
MCK	MCCOOK RGNL	NE	LPV	0	100	0	100	1	99.9996
MLE	MILLARD	NE	LPV	0	100	0	100	0	100
ODX	EVELYN SHARP FIELD	NE	LPV	0	100	0	100	1	99.9996
OFK	KARL STEFAN MEMORIAL	NE	LPV	0	100	0	100	0	100
OGA	SEARLE FIELD	NE	LPV	0	100	0	100	1	99.9892
OKS	GARDEN COUNTY	NE	LPV	0	100	0	100	1	99.9877
OLU	COLUMBUS MUNICIPAL	NE	LPV	0	100	0	100	0	100
OMA	EPPLEY AIRFIELD	NE	LPV	0	100	0	100	0	100
ONL	THE O'NEILL MUNICIPAL-JOHN L BAKER FIELD	NE	LPV	0	100	0	100	1	99.9931
PMV	PLATTSMOUTH MUNICIPAL	NE	LPV	0	100	0	100	0	100
RBE	ROCK COUNTY	NE	LPV	0	100	0	100	1	99.9904
SNY	SIDNEY MUNICIPAL/LLOYD W. CARR FIELD	NE	LPV	0	100	0	100	1	99.9865
SWT	SEWARD MUNICIPALCIPAL	NE	LPV	0	100	0	100	0	100

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
TIF	THOMAS COUNTY	NE	LPV	0	100	0	100	1	99.99000
VTN	MILLER FIELD	NE	LPV	0	100	0	100	1	99.9896
ASH	BOIRE FLD	NH	LPV	2	99.9684	2	99.9340	3	99.8804
CNH	CLAREMONT MUNICIPAL	NH	LP	2	99.9726	2	99.9325	4	99.9005
CON	CONCORD MUNICIPAL	NH	LPV	2	99.9699	2	99.9360	3	99.8804
DAW	SKYHAVEN	NH	LPV	2	99.9722	2	99.9383	3	99.8866
EEN	DILLANT-HOPKINS	NH	LPV	2	99.9703	2	99.9263	3	99.8893
HIE	MOUNT WASHINGTON RGNL	NH	LPV	2	99.9850	2	99.9417	4	99.9101
LCI	LACONIA MUNICIPAL	NH	LPV	2	99.9734	2	99.9379	3	99.8843
LEB	LEBANON MUNICIPAL	NH	LPV	2	99.9730	2	99.9317	4	99.9001
MHT	MANCHESTER	NH	LPV200	2	99.9688	2	99.9363	3	99.8812
PSM	PORTSMOUTH INTL AT PEASE	NH	LPV200	3	99.9703	2	99.9375	3	99.8870
39N	PRINCETON	NJ	LPV	2	99.9475	2	99.9309	2	99.9008
47N	CENTRAL JERSEY RGNL	NJ	LP	2	99.9479	2	99.9309	2	99.9008
4N1	GREENWOOD LAKE	NJ	LP	2	99.9514	2	99.9194	2	99.8974
ACY	ATLANTIC CITY INTL	NJ	LPV200	2	99.9286	2	99.9232	2	99.9001
CDW	ESSEX COUNTY	NJ	LPV	2	99.9498	2	99.9194	2	99.8974
EWR	NEWARK LIBERTY INTL	NJ	LPV	2	99.9514	2	99.9309	2	99.8974
MIV	MILLVILLE MUNICIPAL	NJ	LPV200	2	99.9279	2	99.9198	2	99.9005
MMU	MORRISTOWN MUNICIPAL	NJ	LPV200	2	99.9495	2	99.9309	2	99.8974
N14	FLYING W	NJ	LPV	2	99.9329	2	99.9232	2	99.9008
N40	SKY MANOR	NJ	LP	2	99.9383	2	99.9236	2	99.9020
TEB	TETERBORO	NJ	LPV	2	99.9525	2	99.9194	2	99.8974
TTN	TRENTON MERCER	NJ	LPV200	2	99.9360	2	99.9236	2	99.9012
VAY	SOUTH JERSEY RGNL	NJ	LP	2	99.9333	2	99.9232	2	99.9008
WWD	CAPE MAY COUNTY	NJ	LPV	2	99.9228	2	99.9198	2	99.9001
CYDF	DEER LAKE	NL	LPV	7	99.7060	13	99.5640	219	96.4298
ABQ	ALBUQUERQUE INTL SUNPORT	NM	LPV	0	100	0	100	1	99.9965
CNM	CAVERN CITY AIR TRML	NM	LP	0	100	0	100	1	99.9992
CVN	CLOVIS MUNICIPAL	NM	LPV	0	100	0	100	0	100
DMN	DEMING MUNICIPAL	NM	LPV	0	100	0	100	1	99.9961
FMN	FOUR CORNERS RGNL	NM	LPV200	0	100	0	100	1	99.9915
HOB	LEA COUNTY RGNL	NM	LPV200	0	100	0	100	0	100
LAM	LOS ALAMOS	NM	LP	0	100	0	100	1	99.9946
ONM	SOCORRO MUNICIPAL	NM	LP	0	100	0	100	1	99.9969
ROW	ROSWELL INTL AIR CENTER	NM	LPV	0	100	0	100	1	99.9988
SRR	SIERRA BLANCA RGNL	NM	LPV200	0	100	0	100	1	99.9981
SVC	GRANT COUNTY	NM	LPV	0	100	0	100	1	99.9961
CYHZ	HALIFAX / STANFIELD INTL	NS	LPV	4	99.8978	5	99.8754	9	99.6717
CYEV	INUVIK	NT	LPV	2	99.9633	9	99.9086	67	99.1223
ELY	ELY ARPT-YELLAND FLD	NV	LPV	0	100	0	100	1	99.9946
LAS	MC CARRAN INTL	NV	LPV	0	100	0	100	1	99.9853
RNO	RENO/TAHOE INTL	NV	LPV	0	100	0	100	1	99.9931
RTS	RENO/STEAD	NV	LPV	0	100	0	100	1	99.9934

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
TPH	TONOPAH	NV	LP	0	100	0	100	1	99.9904
WMC	WINNEMUCCA MUNICIPAL	NV	LPV	0	100	0	100	1	99.9954
06N	RANDALL	NY	LP	2	99.9533	2	99.9190	2	99.8974
1B1	COLUMBIA COUNTY	NY	LPV	2	99.9595	2	99.9194	3	99.8974
44N	SKY ACRES	NY	LPV	2	99.9564	2	99.9190	2	99.8974
4B6	TICONDEROGA MUNICIPAL	NY	LPV	2	99.9734	3	99.9487	4	99.9144
5B2	SARATOGA COUNTY	NY	LPV	2	99.9757	2	99.9221	3	99.9070
5G0	LE ROY	NY	LP	2	99.9325	2	99.9252	2	99.9074
7G0	LEDGEDALE AIRPARK	NY	LPV	2	99.9344	2	99.9263	2	99.9078
9G0	BUFFALO AIRFIELD	NY	LP	2	99.9336	2	99.9232	2	99.8789
ALB	ALBANY INTL	NY	LPV200	2	99.9757	2	99.9194	3	99.8997
ART	WATERTOWN INTL	NY	LPV200	2	99.9514	2	99.9475	2	99.9086
BGM	GREATER BINGHAMTON/EDWIN A LINK FIELD	NY	LPV200	2	99.9325	2	99.9194	2	99.9035
BUF	BUFFALO NIAGARA INTL	NY	LPV200	2	99.9344	2	99.9240	2	99.8789
D38	CANANDAIGUA	NY	LP	2	99.9329	2	99.9329	2	99.9032
ELM	ELMIRA/CORNING RGNL	NY	LPV200	2	99.9302	2	99.9194	2	99.9008
ELZ	WELLSVILLE MUNICIPAL ARPT	NY	LPV	2	99.9186	2	99.9124	2	99.8754
FOK	FRANCIS S. GABRESKI	NY	LPV200	2	99.9487	2	99.9190	2	99.8812
FRG	REPUBLIC	NY	LPV200	2	99.9464	2	99.9194	2	99.8974
FZY	OSWEGO COUNTY	NY	LPV	2	99.9379	2	99.9375	2	99.9086
GFL	FLOYD BENNETT MEMORIAL	NY	LPV	2	99.9745	2	99.9306	3	99.9109
GVQ	BATAVIA	NY	LPV200	2	99.9325	2	99.9252	3	99.9032
HPN	WESTCHESTER COUNTY	NY	LPV	2	99.9541	2	99.9194	2	99.8974
HTF	HORNELL MUNICIPAL	NY	LPV	2	99.9232	2	99.9132	2	99.9008
HTO	EAST HAMPTON	NY	LPV	2	99.9502	2	99.9190	2	99.8819
HWV	BROOKHAVEN	NY	LPV	2	99.9479	2	99.9190	2	99.8816
IAG	NIAGARA FALLS INTL	NY	LPV	2	99.9371	2	99.9317	3	99.9016
ISP	LONG ISLAND MAC ARTHUR	NY	LPV200	2	99.9471	2	99.9190	1	99.8819
ITH	ITHACA TOMPKINS RGNL	NY	LPV	2	99.9321	2	99.9198	2	99.9012
JFK	JOHN F KENNEDY INTL	NY	LPV	2	99.9468	2	99.9194	2	99.8974
JHW	CHAUTAUQUA COUNTY/JAMESTOWN	NY	LPV200	2	99.9171	3	99.9105	2	99.8719
K09	PISECO	NY	LP	2	99.9757	3	99.9437	3	99.9117
LGA	LA GUARDIA	NY	LPV200	2	99.9522	2	99.9194	2	99.8974
MAL	MALONE-DUFORT	NY	LPV	2	99.9765	2	99.9645	3	99.9232
MGJ	ORANGE COUNTY	NY	LPV	2	99.9549	2	99.9190	2	99.8974
MSS	MASSENA INTL-RICHARDS FIELD	NY	LPV	2	99.9757	2	99.9641	3	99.9228
MSV	SULLIVAN COUNTY INTL	NY	LPV	2	99.9552	2	99.9190	2	99.9008
N66	ONEONTA MUNICIPAL	NY	LPV	1	99.9610	2	99.9182	2	99.9032
NY0	FULTON COUNTY	NY	LPV	2	99.9753	2	99.9198	3	99.9035
OGS	OGDENSBURG INTL	NY	LPV	2	99.9668	2	99.9545	3	99.9225
OLE	CATTARAUGUS COUNTY-OLEAN	NY	LPV	2	99.9190	2	99.9136	2	99.8754
PBG	PLATTSBURGH INTL	NY	LPV	2	99.9753	3	99.9576	3	99.9221
PEO	PENN YAN	NY	LPV	2	99.9317	2	99.9198	2	99.9020

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
POU	DUTCHESS COUNTY	NY	LPV	2	99.9549	2	99.9190	2	99.8974
RME	GRIFFISS INTL	NY	LPV200	2	99.9626	2	99.9352	2	99.9120
ROC	GREATER ROCHESTER INTL	NY	LPV200	2	99.9340	2	99.9340	2	99.9074
SCH	SCHENECTADY COUNTY	NY	LPV200	2	99.9753	2	99.9198	3	99.9001
SDC	WILLIAMSON-SODUS	NY	LPV	2	99.9363	2	99.9363	2	99.9035
SLK	ADIRONDACK RGNL	NY	LPV200	2	99.9699	2	99.9549	2	99.9136
SWF	STEWART INTL	NY	LPV200	2	99.9545	2	99.9190	2	99.8974
SYR	SYRACUSE HANCOCK INTL	NY	LPV200	2	99.9375	2	99.9371	2	99.9059
VGC	HAMILTON MUNICIPAL	NY	LPV	2	99.9587	2	99.9186	2	99.9047
0G6	WILLIAMS COUNTY	OH	LPV	3	99.9178	3	99.9093	2	99.8758
16G	SENECA COUNTY	OH	LPV	3	99.9271	2	99.8974	1	99.8630
1G0	WOOD COUNTY	OH	LPV	3	99.9317	3	99.9093	1	99.8627
1G3	KENT STATE UNIV	OH	LPV	2	99.9282	2	99.8862	1	99.8611
4I3	KNOX COUNTY	OH	LPV200	2	99.9252	2	99.8974	1	99.8634
6G5	BARNESVILLE-BRADFIELD	OH	LP	3	99.9167	2	99.8789	2	99.8750
AOH	LIMA ALLEN COUNTY	OH	LPV200	3	99.9321	2	99.8974	2	99.8762
AXV	NEIL ARMSTRONG	OH	LPV	3	99.9329	2	99.8993	2	99.8773
BJJ	WAYNE COUNTY	OH	LPV	3	99.9383	2	99.8789	1	99.8619
BKL	BROOKHAVEN	OH	LPV	4	99.9491	3	99.9012	1	99.8607
CAK	AKRON-CANTON RGNL	OH	LPV200	3	99.9174	2	99.8789	1	99.8615
CGF	CUYAHOGA COUNTY	OH	LPV	4	99.9491	3	99.9016	1	99.8603
CLE	CLEVELAND-HOPKINS INTL	OH	LPV200	4	99.9425	3	99.8997	1	99.8611
CMH	PORT COLUMBUS INTL	OH	LPV200	2	99.9244	2	99.8974	1	99.8634
CQA	LAKEFIELD	OH	LPV	2	99.9070	2	99.8989	3	99.89000
CXY	CAPITAL CITY	OH	LPV	2	99.9082	2	99.9082	2	99.9032
DAY	JAMES M COX DAYTON INTL	OH	LPV200	2	99.9205	2	99.9001	3	99.8943
DLZ	DELAWARE MUNICIPAL	OH	LPV	2	99.9240	2	99.8974	1	99.8634
EDJ	BELLEFONTAINE RGNL	OH	LPV	2	99.9363	2	99.8974	2	99.8762
FDY	FINDLAY	OH	LPV	3	99.9398	2	99.8974	1	99.8634
FZI	FOSTORIA METROPOLITAN	OH	LPV	3	99.9313	2	99.8974	1	99.8630
GQQ	GALION MUNICIPAL	OH	LP	2	99.9244	2	99.8974	1	99.8630
HAO	BUTLER CO RGNL	OH	LPV	2	99.9201	2	99.8997	3	99.8970
HZY	ASHTABULA COUNTY	OH	LPV	3	99.9271	3	99.9086	2	99.8750
I19	GREENE COUNTY-LEWIS A JACKSON RGNL	OH	LPV	2	99.9209	2	99.9005	2	99.8816
I66	CLINTON FIELD	OH	LPV	3	99.9344	2	99.9008	2	99.8812
I68	LEBANON-WARREN COUNTY	OH	LPV	2	99.9209	2	99.9001	3	99.8947
I69	CLERMONT COUNTY	OH	LP	2	99.9213	2	99.9005	3	99.8947
I74	GRIMES FIELD	OH	LPV	2	99.9360	2	99.8993	2	99.8765
ILN	AIRBORNE AIRPARK	OH	LPV200	3	99.9340	2	99.9008	2	99.8808
LCK	RICKENBACKER INTL	OH	LPV200	2	99.9244	2	99.8974	2	99.8754
LHQ	FAIRFIELD COUNTY	OH	LPV200	2	99.9252	2	99.8974	2	99.8758
LNN	WILLOUGHBY	OH	LPV	4	99.9491	3	99.9016	1	99.86000
LPR	LORAIN COUNTY RGNL	OH	LPV200	4	99.9325	2	99.8789	1	99.8615

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
LUK	CINCINNATI MUNICIPAL AIRPORT-LUNKEN FIELD	OH	LPV	2	99.9198	2	99.9001	2	99.8974
MFD	MANSFIELD LAHM RGNL	OH	LPV200	2	99.9248	2	99.8974	1	99.8627
MGY	DAYTON-WRIGHT BROTHERS	OH	LPV	2	99.9209	2	99.9001	3	99.8943
MNN	MARION MUNICIPAL	OH	LPV	2	99.9236	2	99.8974	1	99.8634
MRT	UNION COUNTY	OH	LP	2	99.9294	2	99.8974	1	99.8634
MWO	MIDDLETOWN REGIONAL/HOOK FIELD	OH	LPV	2	99.9209	2	99.8997	3	99.8951
OSU	OHIO STATE UNIVERSITY	OH	LPV200	2	99.9240	2	99.8974	1	99.8634
OWX	PUTNAM COUNTY	OH	LPV	3	99.9325	3	99.9097	2	99.8754
OXD	MIAMI UNIVERSITY	OH	LPV	2	99.9198	2	99.8989	3	99.8970
PCW	CARL R KELLER FIELD	OH	LPV	3	99.9171	3	99.9117	1	99.8619
PHD	HARRY CLEVER FIELD	OH	LP	3	99.9155	2	99.8789	1	99.8623
PMH	GREATER PORTSMOUTH RGNL	OH	LPV	2	99.9344	2	99.9012	2	99.8789
RZT	ROSS COUNTY	OH	LPV	2	99.9352	2	99.8978	2	99.8762
S24	SANDUSKY COUNTY RGNL	OH	LPV	3	99.9267	2	99.8974	1	99.8623
SGH	SPRINGFIELD-BECKLEY MUNICIPAL	OH	LPV200	3	99.9352	2	99.9001	2	99.8812
TDZ	TOLEDO EXECUTIVE	OH	LP	3	99.9186	3	99.9113	1	99.8623
TOL	TOLEDO EXPRESS	OH	LPV200	3	99.9182	3	99.9109	1	99.8627
TSO	CARROLL COUNTY-TOLSON	OH	LP	3	99.9155	2	99.8789	1	99.8619
TZR	BOLTON FIELD	OH	LPV200	2	99.9240	2	99.8974	1	99.8634
UNI	OHIO UNIVERSITY SNYDER FIELD	OH	LPV200	2	99.9248	2	99.8974	2	99.8769
USE	FULTON COUNTY	OH	LPV	3	99.9294	3	99.9213	1	99.8630
UYF	MADISON COUNTY	OH	LPV	2	99.9356	2	99.8997	2	99.8762
YNG	YOUNGSTOWN/WARREN RGNL	OH	LPV	2	99.9132	3	99.9012	2	99.8754
1F0	ARDMORE DOWNTOWN EXECUTIVE	OK	LP	0	100	0	100	1	99.9830
80F	ANTLERS MUNICIPAL	OK	LPV	0	100	1	99.99000	1	99.9745
ADH	ADA MUNICIPAL	OK	LPV	0	100	0	100	1	99.9745
ADM	ARDMORE MUNICIPAL	OK	LPV200	0	100	0	100	1	99.9745
AXS	ALTUS/QUARTZ MOUNTAIN RGNL	OK	LPV	0	100	0	100	0	100
BKN	BLACKWELL-TONKAWA MUNICIPAL	OK	LPV	0	100	0	100	1	99.9857
BVO	BARTLESVILLE MUNICIPAL	OK	LPV	0	100	0	100	2	99.9742
CHK	CHICKASHA MUNICIPAL	OK	LPV200	0	100	0	100	1	99.9830
CLK	CLINTON RGNL	OK	LPV200	0	100	0	100	0	100
CSM	CLINTON-SHERMAN	OK	LPV200	0	100	0	100	0	100
DUA	EAKER FIELD	OK	LPV	0	100	0	100	1	99.9792
DUC	HALLIBURTON FIELD	OK	LPV	0	100	0	100	1	99.9904
ELK	ELK CITY RGNL BUSINESS	OK	LPV	0	100	0	100	0	100
F22	PERRY MUNICIPAL	OK	LPV	0	100	0	100	1	99.9826
FDR	FREDERICK RGNL	OK	LPV200	0	100	0	100	0	100
GCM	CLAREMORE RGNL	OK	LPV	0	100	1	99.9950	1	99.9745
GMJ	GROVE MUNICIPAL	OK	LPV	1	99.9938	1	99.9884	3	99.9576
GOK	GUTHRIE-EDMOND RGNL	OK	LPV	0	100	0	100	1	99.9815
GUY	GUYMON MUNICIPAL	OK	LPV	0	100	0	100	0	100
GZL	STIGLER RGNL	OK	LPV	0	100	1	99.9857	2	99.9742

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
HBR	HOBART MUNICIPAL	OK	LPV	0	100	0	100	0	100
HSD	SUNDANCE AIRPARK	OK	LPV	0	100	0	100	1	99.9830
MKO	DAVIS FIELD	OK	LPV	0	100	1	99.9850	1	99.9745
MLC	MC ALESTER RGNL	OK	LPV	0	100	1	99.9888	1	99.9745
OKC	WILL ROGERS WORLD	OK	LPV200	0	100	0	100	1	99.9803
OKM	OKMULGEE RGNL	OK	LPV	0	100	0	100	1	99.9745
OUN	UNIVERSITY OF OKLAHOMA WESTHEIMER	OK	LPV200	0	100	0	100	1	99.9753
OWP	WILLIAM R. POGUE MUNICIPAL	OK	LPV	0	100	0	100	1	99.9745
PNC	PONCA CITY RGNL	OK	LPV	0	100	0	100	1	99.9838
PVJ	PAULS VALLEY MUNICIPAL	OK	LPV200	0	100	0	100	1	99.9753
PWA	WILEY POST	OK	LPV200	0	100	0	100	1	99.9807
RCE	CLARENCE E. PAGE MUNICIPAL	OK	LPV	0	100	0	100	1	99.9842
RVS	RICHARD LLOYD JONES JR	OK	LPV	0	100	0	100	1	99.9745
SNL	SHAWNEE RGNL	OK	LPV200	0	100	0	100	1	99.9753
SWO	STILLWATER RGNL	OK	LPV	0	100	0	100	1	99.9753
TQH	TAHLEQUAH MUNICIPAL	OK	LPV	0	100	1	99.9877	2	99.9738
TUL	TULSA INTL	OK	LPV200	0	100	0	100	1	99.9745
WDG	ENID WOODRING RGNL	OK	LPV200	0	100	0	100	1	99.9869
WWR	WEST WOODWARD	OK	LPV	0	100	0	100	0	100
CNS7	KINCARDINE	ON	LPV	2	99.9761	2	99.9761	4	99.9248
CYHD	DRYDEN REGIONAL	ON	LPV	0	100	0	100	4	99.9819
CYKF	KITCHENER / WATERLOO	ON	LPV	2	99.9603	2	99.9302	3	99.8954
CYOW	OTTAWA / MACDONALDCARTIER INTL	ON	LPV	2	99.9738	2	99.9676	3	99.9298
CYQT	THUNDER BAY	ON	LPV	1	99.9892	1	99.9892	4	99.9726
CYTS	TIMMINS / VICTOR M POWER	ON	LPV	0	100	0	100	4	99.9742
CYXL	SIOUX LOOKOUT	ON	LPV	1	99.9946	1	99.9946	4	99.9533
AST	ASTORIA RGNL	OR	LPV	0	100	0	100	0	100
BDN	BEND MUNICIPAL	OR	LPV	0	100	0	100	1	99.9961
CVO	CORVALLIS MUNICIPAL	OR	LPV200	0	100	0	100	2	99.9950
EUG	MAHLON SWEET FIELD	OR	LPV200	0	100	0	100	2	99.9923
GCD	GRANT CO RGNL/OGILVIE FIELD	OR	LPV	0	100	0	100	1	99.9996
HIO	PORTLAND-HILLSBORO	OR	LPV200	0	100	0	100	0	100
LGD	LA GRANDE/UNION COUNTY	OR	LPV	0	100	0	100	1	99.9988
LMT	KLAMATH FALLS	OR	LPV	0	100	0	100	2	99.9911
MMV	MCMINNVILLE MUNICIPAL	OR	LPV	0	100	0	100	1	99.9996
ONO	ONTARIO MUNICIPAL	OR	LPV	0	100	0	100	1	99.9981
PDT	EASTERN OREGON RGNL AT PENDLETON	OR	LPV200	0	100	0	100	1	99.9992
PDX	PORTLAND INTL	OR	LPV200	0	100	0	100	1	99.9996
RDM	ROBERTS FIELD	OR	LPV200	0	100	0	100	1	99.9965
S33	MADRAS MUNICIPALCIPAL	OR	LPV	0	100	0	100	1	99.9973
SLE	MCNARY FLD	OR	LPV200	0	100	0	100	2	99.9988
SPB	SCAPPOOSE INDUSTRIAL AIRPARK	OR	LPV	0	100	0	100	0	100

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
UAO	AURORA STATE	OR	LPV	0	100	0	100	1	99.9996
22N	JAKE ARNER MEMORIAL	PA	LP	2	99.9286	2	99.9117	2	99.9024
2G9	SOMERSET COUNTY	PA	LPV	2	99.9086	3	99.8997	2	99.8758
8G2	CORRY-LAWRENCE	PA	LPV	2	99.9147	3	99.9097	2	99.8731
8N8	DANVILLE	PA	LP	2	99.9124	2	99.9082	2	99.9043
9D4	DECK	PA	LPV	2	99.9140	2	99.9117	2	99.9016
ABE	LEHIGH VALLEY INTL	PA	LPV	2	99.9394	2	99.9232	2	99.9008
AFJ	WASHINGTON COUNTY	PA	LPV200	2	99.9032	2	99.8789	1	99.8619
AGC	ALLEGHENY COUNTY	PA	LPV200	2	99.9105	3	99.8985	1	99.8611
AOO	ALTOONA-BLAIR COUNTY	PA	LPV	2	99.9086	3	99.9082	2	99.8746
AVP	WILKES-BARRE/SCRANTON INTL	PA	LPV	2	99.9417	2	99.9190	2	99.9008
AXQ	CLARION COUNTY	PA	LPV	2	99.9120	3	99.9082	2	99.8742
BFD	BRADFORD RGNL	PA	LPV200	2	99.9155	3	99.9101	2	99.8754
BTP	BUTLER COUNTY/K W SCHOLTER FLD	PA	LPV	2	99.9117	3	99.9012	2	99.8754
BVI	BEAVER FALLS MUNICIPAL	PA	LPV	2	99.9120	3	99.8985	1	99.8607
DUJ	DUBOIS RGNL	PA	LPV200	2	99.9113	3	99.9086	2	99.8735
ERI	ERIE INTL/TOM RIDGE FIELD	PA	LPV	3	99.9267	3	99.9093	2	99.8735
FIG	CLEARFIELD-LAWRENCE	PA	LPV	2	99.9105	3	99.9093	2	99.8754
FKL	VENANGO RGNL	PA	LPV	2	99.9128	3	99.9082	2	99.8742
FWQ	ROSTRAVER	PA	LPV	2	99.9101	3	99.8985	1	99.8611
GKJ	PORT MEADVILLE	PA	LP	2	99.9136	3	99.9078	2	99.8746
HMZ	BEDFORD COUNTY	PA	LPV	2	99.9082	3	99.9070	2	99.8754
HZL	HAZLETON MUNICIPAL	PA	LPV	2	99.9178	2	99.9113	2	99.9035
IPT	WILLIAMSPORT RGNL	PA	LPV	2	99.9140	2	99.9093	2	99.9020
JST	JOHN MURTHA JOHNSTOWN-CAMBRIA COUNTY	PA	LPV200	2	99.9093	3	99.9070	2	99.8750
LBE	ARNOLD PALMER RGNL	PA	LPV	2	99.9097	3	99.8993	2	99.8758
LNS	LANCASTER	PA	LPV	2	99.9205	2	99.9194	2	99.9012
LOM	WINGS FIELD	PA	LPV	2	99.9356	2	99.9232	2	99.9020
MDT	HARRISBURG INTL	PA	LPV	2	99.9086	2	99.9082	2	99.9032
MPO	POCONO MOUNTAINS MUNICIPAL	PA	LPV	2	99.9537	2	99.9190	2	99.9008
MQS	CHESTER COUNTY G O CARLSON	PA	LPV	2	99.9213	2	99.9198	2	99.8989
N38	WELLSBORO JOHNSTON	PA	LP	2	99.9167	2	99.9109	2	99.8974
N79	NORTHUMBERLAND COUNTY	PA	LPV	2	99.9120	2	99.9082	2	99.9039
OYM	ST MARYS MUNICIPAL	PA	LPV	2	99.9128	3	99.9093	2	99.8754
PHL	PHILADELPHIA INTL	PA	LPV	2	99.9298	2	99.9198	2	99.9016
PIT	PITTSBURGH INTL	PA	LPV200	2	99.9113	2	99.8862	1	99.8611
PNE	NORTHEAST PHILADELPHIA	PA	LPV	2	99.9344	2	99.9232	2	99.9012
PSB	MID STATE	PA	LPV	2	99.9097	2	99.9097	2	99.8754
RDG	READING RGNL/CARL A SPAATZ FLD	PA	LPV	2	99.9225	2	99.9194	2	99.9008
RVL	MIFFLIN COUNTY	PA	LPV	2	99.9086	2	99.9086	2	99.8823
THV	YORK	PA	LP	2	99.9101	2	99.9082	2	99.9016
UCP	NEW CASTLE MUNICIPAL	PA	LPV	2	99.9124	3	99.9020	2	99.8754
UKT	QUAKERTOWN	PA	LP	2	99.9379	2	99.9232	2	99.8997

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
UNV	UNIVERSITY PARK	PA	LPV200	2	99.9097	2	99.9093	2	99.8754
VVS	JOSEPH A. HARDY CONNELLSVILLE	PA	LPV200	2	99.9093	3	99.8989	2	99.8738
WAY	GREENE COUNTY	PA	LPV	2	99.9024	2	99.8789	2	99.8746
WBW	WILKES-BARRE WYOMING VALLEY	PA	LPV	2	99.9232	2	99.9117	2	99.9008
XLL	ALLENTOWN-QUEEN CITY MUNICIPAL	PA	LP	2	99.9390	2	99.9232	2	99.9005
ZER	SCHUYLKILL COUNTY/JOE ZERBEY	PA	LPV200	2	99.9120	2	99.9082	2	99.9035
CPN8	OPINACA	QC	LPV	5	99.9309	6	99.8472	12	99.5961
CSR3	VICTORIAVILLE	QC	LPV	3	99.9880	3	99.9633	7	99.9101
CTP9	KATTINIQ / DONALDSON	QC	LPV	8	99.4707	19	99.3499	206	96.4799
CYEY	AMOS	QC	LPV	1	99.9915	1	99.9915	5	99.9572
CYHU	MONTREAL / STHUBERT	QC	LPV	3	99.9769	3	99.9699	3	99.9255
CYIF	STAUGUSTIN	QC	LPV	4	99.6520	10	99.5806	56	98.8715
CYMX	MONTREAL (MIRABEL INTL)	QC	LPV	2	99.9761	2	99.9703	3	99.9279
CYQB	QUEBEC / JEAN LESAGE INTL	QC	LPV	3	99.9853	4	99.9772	7	99.8430
CYRI	RIVIEREDULOUP	QC	LPV	2	99.9363	3	99.89000	7	99.7840
CYRQ	TROISRIVIERES	QC	LPV	2	99.9765	2	99.9711	4	99.9282
CYVB	BONAVENTURE	QC	LPV	3	99.8499	4	99.8492	8	99.7265
CYVP	KUUJJUAQ	QC	LPV	4	99.5093	11	99.4645	153	97.7029
CYYY	MONTJOLI	QC	LPV	3	99.8831	5	99.8669	8	99.7643
BID	BLOCK ISLAND STATE	RI	LPV	2	99.9522	2	99.9255	3	99.8858
OQU	QUONSET STATE	RI	LPV	2	99.9549	2	99.9267	4	99.8862
PVD	THEODORE FRANCIS GREEN STATE	RI	LPV200	3	99.9556	2	99.9275	4	99.8866
6J0	LEXINGTON COUNTY AT PELION	SC	LPV	1	99.9988	1	99.9680	2	99.9587
AIK	AIKEN MUNICIPAL	SC	LPV200	0	100	1	99.9703	1	99.9599
AND	ANDERSON RGNL	SC	LPV200	1	99.9931	1	99.9672	2	99.9306
ARW	BEAUFORT COUNTY	SC	LPV200	0	100	1	99.9927	1	99.9672
BBP	MARLBORO COUNTY JETPORT-H E AVENT FIELD	SC	LPV	1	99.9780	1	99.9645	2	99.9371
BNL	BARNWELL RGNL	SC	LPV	0	100	1	99.9707	1	99.9633
CAE	COLUMBIA METROPOLITAN	SC	LPV200	2	99.9946	1	99.9672	2	99.9583
CDN	WOODWARD FIELD	SC	LPV	1	99.9780	1	99.9672	2	99.9514
CEU	OCONEE COUNTY RGNL	SC	LPV200	1	99.9861	2	99.9653	2	99.9290
CHS	CHARLESTON AFB/INTL	SC	LPV200	0	100	1	99.9680	2	99.9591
CRE	GRAND STRAND	SC	LPV200	1	99.9784	2	99.9668	29	99.9074
DCM	CHESTER CATAWBA RGNL	SC	LPV	1	99.9780	1	99.9664	2	99.9475
DYB	SUMMERVILLE	SC	LPV200	0	100	1	99.9672	1	99.9595
FDW	FAIRFIELD COUNTY	SC	LPV	1	99.9780	1	99.9672	2	99.9502
FLO	FLORENCE RGNL	SC	LPV	1	99.9780	1	99.9668	2	99.9491
GGE	GEORGETOWN COUNTY	SC	LPV200	1	99.9784	1	99.9672	4	99.9429
GMU	GREENVILLE DOWNTOWN	SC	LPV200	1	99.9931	1	99.9672	2	99.9263
GSP	GREENVILLE-SPARTANBURG INTL - ROGER MILLIKEN	SC	LPV200	1	99.9931	1	99.9664	2	99.9255
GYH	DONALDSON CENTER	SC	LPV	1	99.9931	1	99.9672	2	99.9267
HYW	CONWAY-HORRY COUNTY	SC	LPV	1	99.9780	1	99.9672	5	99.9437

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
JZI	CHARLESTON EXECUTIVE	SC	LPV200	0	100	1	99.9780	2	99.9610
LKR	LANCASTER COUNTY-MC WHIRTER FIELD	SC	LPV200	1	99.9780	1	99.9660	2	99.9475
LQK	PICKENS COUNTY	SC	LPV	1	99.9884	2	99.9664	2	99.9263
LRO	MT PLEASANT RGNL-FAISON FIELD	SC	LPV	0	100	1	99.9672	3	99.9568
MKS	BERKELEY COUNTY	SC	LPV	2	99.9969	1	99.9672	2	99.9591
MYR	MYRTLE BEACH INTL	SC	LPV200	1	99.9784	1	99.9672	4	99.9406
OGB	ORANGEBURG MUNICIPAL	SC	LPV200	0	100	1	99.9672	2	99.9591
RBW	LOWCOUNTRY RGNL	SC	LPV200	0	100	1	99.9703	1	99.9599
SMS	SUMTER	SC	LPV200	1	99.9784	1	99.9672	2	99.9568
SPA	SPARTANBURG DOWNTOWN MEMORIAL	SC	LPV200	1	99.9931	1	99.9660	2	99.9255
UDG	DARLINGTON COUNTY JETPORT	SC	LPV	1	99.9780	1	99.9657	2	99.9375
UZA	ROCK HILL/YORK CO/BRYANT FIELD	SC	LPV200	1	99.9780	1	99.9645	2	99.9468
0D8	GETTYSBURG MUNICIPAL	SD	LPV200	0	100	0	100	1	99.9861
49B	STURGIS MUNICIPAL	SD	LPV	0	100	0	100	1	99.9931
9D1	GREGORY MUNICIPAL - FLYNN FIELD	SD	LPV	0	100	0	100	1	99.99000
ABR	ABERDEEN RGNL	SD	LPV200	0	100	0	100	1	99.9846
ATY	WATERTOWN RGNL	SD	LPV200	0	100	0	100	1	99.9846
BKX	BROOKINGS RGNL	SD	LPV	0	100	0	100	1	99.9838
EFC	BELLE FOURCHE MUNICIPAL	SD	LPV	0	100	0	100	1	99.9938
FSD	JOE FOSS FIELD	SD	LPV200	0	100	0	100	1	99.9819
HON	HURON RGNL	SD	LPV200	0	100	0	100	1	99.9850
HSR	HOT SPRINGS MUNICIPAL	SD	LP	0	100	0	100	1	99.9915
ICR	WINNER RGNL	SD	LPV	0	100	0	100	1	99.9907
MBG	MOBRIDGE MUNICIPAL	SD	LPV	0	100	0	100	1	99.9869
MDS	MADISON MUNICIPAL	SD	LPV	0	100	0	100	1	99.9838
MHE	MITCHELL MUNICIPAL	SD	LPV	0	100	0	100	1	99.9826
MKA	MILLER MUNICIPAL	SD	LPV200	0	100	0	100	1	99.9850
PIR	PIERRE RGNL	SD	LPV	0	100	0	100	1	99.9857
RAP	RAPID CITY RGNL	SD	LPV200	0	100	0	100	1	99.9931
SPF	BLACK HILLS-CLYDE ICE FIELD	SD	LPV	0	100	0	100	1	99.9934
VMR	HAROLD DAVIDSON FIELD	SD	LPV	0	100	0	100	0	100
YKN	CHAN GURNEY MUNICIPAL	SD	LPV200	0	100	0	100	1	99.9996
CKQ8	MCARTHUR RIVER	SK	LPV	2	99.9977	2	99.9684	12	99.8272
CYKJ	KEY LAKE	SK	LPV	1	99.9961	1	99.9807	7	99.8410
0A3	SMITHVILLE MUNICIPAL	TN	LP	1	99.9429	1	99.9375	2	99.9298
0M3	JOHN A BAKER	TN	LP	2	99.9688	1	99.9375	1	99.9336
0M4	BENTON COUNTY	TN	LPV	2	99.9649	1	99.9375	1	99.9348
0M5	HUMPHREYS COUNTY	TN	LP	2	99.9630	1	99.9375	1	99.9336
1A3	MARTIN CAMPBELL FIELD	TN	LP	1	99.9803	2	99.9579	2	99.9317
1M5	PORTLAND MUNICIPAL	TN	LPV	1	99.9417	1	99.9375	2	99.9171
2A0	MARK ANTON	TN	LPV	1	99.9680	1	99.9437	2	99.9286
2M8	CHARLES W. BAKER	TN	LPV	1	99.9772	1	99.9375	1	99.9375

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
3M7	LAFAYETTE MUNICIPAL	TN	LPV	1	99.9421	1	99.9375	2	99.9171
BGF	WINCHESTER MUNICIPAL	TN	LPV	2	99.9730	1	99.9460	1	99.9336
BNA	NASHVILLE INTL	TN	LPV200	1	99.9414	1	99.9375	1	99.9336
CHA	LOVELL FIELD	TN	LPV200	2	99.9826	1	99.9448	1	99.9336
CKV	OUTLAW FIELD	TN	LPV	2	99.9637	1	99.9375	1	99.9336
CSV	CROSSVILLE MEMORIAL-WHITSON FIELD	TN	LPV200	1	99.9506	1	99.9375	2	99.9259
DKX	KNOXVILLE DOWNTOWN ISLAND	TN	LPV	1	99.9633	1	99.9452	2	99.9182
DYR	DYERSBURG RGNL	TN	LPV	2	99.9653	1	99.9375	1	99.9375
FYE	FAYETTE CO	TN	LPV	2	99.9726	1	99.9375	1	99.9375
FYM	FAYETTEVILLE MUNICIPAL	TN	LPV	2	99.9811	1	99.9475	1	99.9336
GKT	GATLINBURG-PIGEON FORGE	TN	LPV	1	99.9668	1	99.9460	2	99.9217
GZS	ABERNATHY FIELD	TN	LPV	1	99.9784	1	99.9375	1	99.9336
HZD	CARROLL COUNTY	TN	LPV	2	99.9645	1	99.9375	1	99.9375
JWN	JOHN C. TUNE	TN	LPV	1	99.9410	1	99.9375	1	99.9336
LUG	ELLINGTON	TN	LPV	2	99.9711	1	99.9375	1	99.9336
M01	GENERAL DEWITT SPAIN	TN	LPV	1	99.9772	1	99.9375	1	99.9375
M33	SUMNER COUNTY RGNL	TN	LP	1	99.9417	1	99.9375	2	99.9313
M54	LEBANON MUNICIPAL	TN	LPV	1	99.9417	1	99.9375	3	99.9321
M91	SPRINGFIELD ROBERTSON COUNTY	TN	LPV	1	99.9414	1	99.9375	2	99.9333
MBT	MURFREESBORO MUNICIPAL	TN	LPV	1	99.9417	1	99.9375	1	99.9336
MEM	MEMPHIS INTL	TN	LPV200	1	99.9772	1	99.9375	1	99.9375
MKL	MC KELLAR-SIPES RGNL	TN	LPV200	2	99.9676	1	99.9375	1	99.9375
MMI	MCMINN COUNTY	TN	LPV	1	99.9672	1	99.9425	2	99.9282
MOR	MOORE-MURRELL	TN	LPV	1	99.9660	2	99.9429	2	99.9163
MQY	SMYRNA	TN	LPV	1	99.9414	1	99.9375	1	99.9336
MRC	MAURY COUNTY	TN	LPV	2	99.9695	1	99.9375	1	99.9336
NQA	MILLINGTON RGNL JETPORT	TN	LPV	2	99.9745	1	99.9375	1	99.9375
PHT	HENRY COUNTY	TN	LPV200	2	99.9630	1	99.9375	1	99.9375
PVE	BEECH RIVER RGNL	TN	LPV	2	99.9676	1	99.9375	1	99.9375
RKW	ROCKWOOD MUNICIPAL	TN	LPV	1	99.9645	1	99.9375	2	99.9232
SNH	SAVANNAH-HARDIN COUNTY	TN	LPV	2	99.9742	1	99.9375	1	99.9375
SRB	UPPER CUMBERLAND RGNL	TN	LPV200	1	99.9437	1	99.9375	2	99.9275
SYI	BOMAR FIELD-SHELBYVILLE MUNICIPAL	TN	LPV	1	99.9417	1	99.9375	1	99.9336
SZY	ROBERT SIBLEY	TN	LPV	2	99.9730	1	99.9375	1	99.9375
THA	TULLAHOMA RGNL/WM NORTHERN FLD	TN	LPV	1	99.9606	1	99.9375	1	99.9336
TRI	TRI-CITIES RGNL TN/VA	TN	LPV200	2	99.9753	2	99.9286	2	99.9039
TYS	MCGHEE-TYSON	TN	LPV	1	99.9668	1	99.9441	2	99.9225
UCY	EVERETT-STEWART RGNL	TN	LPV200	2	99.9606	1	99.9375	1	99.9375
11R	BRENHAM MUNICIPAL	TX	LPV	0	100	0	100	0	100
2F5	LAMESA MUNICIPAL	TX	LP	0	100	0	100	0	100
2R9	KARNES COUNTY	TX	LP	0	100	0	100	1	99.9946

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
3T5	FAYETTE RGNL AIR CENTER	TX	LPV	0	100	0	100	1	99.9996
45R	HAWTHORNE FIELD	TX	LP	0	100	0	100	0	100
50R	LOCKHART MUNICIPAL	TX	LPV	0	100	0	100	1	99.9988
5C1	BOERNE STAGE FIELD	TX	LP	0	100	0	100	1	99.9988
5T9	MAVERICK COUNTY MEMORIAL INTL	TX	LPV	0	100	0	100	1	99.9927
6R3	CLEVELAND MUNICIPAL	TX	LPV	0	100	0	100	0	100
77F	WINTERS MUNICIPAL	TX	LP	0	100	0	100	0	100
8F3	CROSBYTON MUNICIPALCIPAL	TX	LP	0	100	0	100	0	100
ABI	ABILENE RGNL	TX	LPV200	0	100	0	100	0	100
ACT	WACO RGNL	TX	LPV200	0	100	0	100	0	100
ADS	ADDISON	TX	LPV	0	100	0	100	1	99.99000
AFW	FORT WORTH ALLIANCE	TX	LPV200	0	100	0	100	1	99.9904
ALI	ALICE INTL	TX	LPV	0	100	0	100	1	99.9911
AMA	RICK HUSBAND AMARILLO INTL	TX	LPV200	0	100	0	100	0	100
ARM	WHARTON RGNL	TX	LPV	0	100	0	100	1	99.9996
ASL	HARRISON COUNTY	TX	LPV	0	100	0	100	3	99.9861
AUS	AUSTIN-BERGSTROM INTL	TX	LPV200	0	100	0	100	0	100
AXH	HOUSTON-SOUTHWEST	TX	LPV	0	100	0	100	0	100
BAZ	NEW BRAUNFELS MUNICIPAL	TX	LPV	0	100	0	100	1	99.9988
BBD	CURTIS FIELD	TX	LPV	0	100	0	100	0	100
BKD	STEPHENS COUNTY	TX	LP	0	100	0	100	0	100
BPG	BIG SPRING MC MAHON-WRINKLE	TX	LPV	0	100	0	100	0	100
BPT	SOUTHEAST TEXAS RGNL	TX	LPV200	0	100	0	100	0	100
BRO	BROWNSVILLE/SOUTH PADRE ISLAND INTL	TX	LP	0	100	0	100	1	99.9884
BWD	BROWNWOOD RGNL	TX	LPV	0	100	0	100	0	100
BYY	BAY CITY MUNICIPAL	TX	LPV	0	100	0	100	1	99.9985
CFD	COULTER FIELD	TX	LPV	0	100	0	100	0	100
CLL	EASTERWOOD FIELD	TX	LPV200	0	100	0	100	0	100
CNW	TSTC WACO	TX	LPV200	0	100	0	100	0	100
COM	COLEMAN MUNICIPAL	TX	LPV	0	100	0	100	0	100
CRP	CORPUS CHRISTI INTL	TX	LPV200	0	100	0	100	1	99.9915
CXO	LONE STAR EXECUTIVE	TX	LPV200	0	100	0	100	0	100
DAL	DALLAS LOVE FIELD	TX	LPV200	0	100	0	100	1	99.9907
DFW	DALLAS-FT WORTH INTL	TX	LPV200	0	100	0	100	1	99.9904
DKR	HOUSTON COUNTY	TX	LP	0	100	0	100	1	99.9934
DRT	DEL RIO INTL	TX	LPV	0	100	0	100	1	99.9934
DTO	DENTON MUNICIPAL	TX	LPV	0	100	0	100	1	99.99000
DUX	MOORE COUNTY	TX	LPV200	0	100	0	100	1	99.9985
DWH	DAVID WAYNE HOOKS MEMORIAL	TX	LPV	0	100	0	100	0	100
E01	ROY HURD MEMORIAL	TX	LP	0	100	0	100	0	100
E11	ANDREWS COUNTY	TX	LPV	0	100	0	100	0	100
E19	GRUVER MUNICIPAL	TX	LP	0	100	0	100	0	100
E30	BRUCE FIELD	TX	LPV	0	100	0	100	0	100

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
E38	ALPINE-CASPARIS MUNICIPALCIPAL	TX	LP	0	100	0	100	2	99.9931
EBG	EDINBURG INTL	TX	LPV	0	100	0	100	2	99.9884
EDC	AUSTIN EXECUTIVE	TX	LPV200	0	100	0	100	0	100
EFD	ELLINGTON FIELD	TX	LPV200	0	100	0	100	0	100
ELA	EAGLE LAKE	TX	LP	0	100	0	100	0	100
ELP	EL PASO INTL	TX	LP	0	100	0	100	2	99.9965
ERV	KERRVILLE MUNICIPAL/LOUIS SCHREINER FLD	TX	LPV	0	100	0	100	1	99.9988
ETN	EASTLAND MUNICIPAL	TX	LP	0	100	0	100	0	100
F00	JONES FIELD	TX	LPV	0	100	0	100	1	99.9803
F05	WILBARGER COUNTY	TX	LPV	0	100	0	100	0	100
FST	FT. STOCKTON-PECOS COUNTY	TX	LPV	0	100	0	100	1	99.9958
FTW	FORT WORTH MEACHAM INTL	TX	LPV200	0	100	0	100	1	99.9907
FWS	FORT WORTH SPINKS	TX	LPV200	0	100	0	100	1	99.9946
GDJ	GRANBURY RGNL	TX	LPV	0	100	0	100	1	99.9996
GGG	EAST TEXAS RGNL	TX	LPV	0	100	0	100	2	99.99000
GKY	ARLINGTON MUNICIPAL	TX	LPV200	0	100	0	100	1	99.9911
GLE	GAINESVILLE MUNICIPAL	TX	LPV	0	100	0	100	1	99.9884
GLS	SCHOLES INTL AT GALVESTON	TX	LPV200	0	100	0	100	0	100
GNC	GAINES COUNTY	TX	LPV	0	100	0	100	0	100
GRK	ROBERT GRAY AAF	TX	LPV200	0	100	0	100	0	100
GVT	MAJORS	TX	LPV	0	100	0	100	1	99.9884
GYI	NORTH TEXAS RGNL/PERRIN FIELD	TX	LPV200	0	100	0	100	1	99.9826
HBV	JIM HOGG COUNTY	TX	LPV	0	100	0	100	1	99.9904
HDO	HONDO MUNICIPAL	TX	LPV	0	100	0	100	1	99.9981
HOU	WILLIAM P HOBBY	TX	LPV200	0	100	0	100	0	100
HQZ	MESQUITE METRO	TX	LPV	0	100	0	100	1	99.9904
HRL	VALLEY INTL	TX	LPV200	0	100	0	100	1	99.9888
HRX	HEREFORD MUNICIPAL	TX	LPV200	0	100	0	100	0	100
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	TX	LPV200	0	100	0	100	0	100
IKG	KLEBERG COUNTY	TX	LPV	0	100	0	100	1	99.9907
INJ	HILLSBORO MUNICIPAL	TX	LPV	0	100	0	100	0	100
IWS	WEST HOUSTON	TX	LP	0	100	0	100	0	100
JAS	JASPER COUNTY-BELL FIELD	TX	LPV	0	100	0	100	0	100
JSO	CHEROKEE COUNTY	TX	LPV200	0	100	0	100	1	99.9923
JWY	MID-WAY RGNL	TX	LPV200	0	100	0	100	1	99.9946
LBB	LUBBOCK PRESTON SMITH INTL	TX	LPV200	0	100	0	100	0	100
LBX	BRAZORIA COUNTY	TX	LPV	0	100	0	100	1	99.9996
LFK	ANGELINA COUNTY	TX	LPV	0	100	0	100	1	99.9938
LHB	HEARNE MUNICIPAL	TX	LPV200	0	100	0	100	0	100
LLN	LEVELLAND MUNICIPAL	TX	LPV	0	100	0	100	0	100
LNC	LANCASTER	TX	LPV200	0	100	0	100	1	99.9904
LRD	LAREDO INTL	TX	LPV200	0	100	0	100	1	99.9907

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
LUD	DECATUR MUNICIPAL	TX	LPV	0	100	0	100	1	99.9896
LVJ	PEARLAND RGNL	TX	LPV	0	100	0	100	0	100
LXY	MEXIA-LIMESTONE CO	TX	LP	0	100	0	100	1	99.9954
MAF	MIDLAND INTL	TX	LPV200	0	100	0	100	0	100
MDD	MIDLAND AIRPARK	TX	LPV	0	100	0	100	0	100
MFE	MC ALLEN MILLER INTL	TX	LPV	0	100	0	100	2	99.9865
MNZ	HAMILTON MUNICIPAL	TX	LPV	0	100	0	100	0	100
OCH	A L MANGHAM JR RGNL	TX	LPV200	0	100	0	100	1	99.9931
ODO	ODESSA-SCHLEMEYER FIELD	TX	LPV200	0	100	0	100	0	100
ONY	OLNEY MUNICIPAL	TX	LPV	0	100	0	100	0	100
ORG	ORANGE COUNTY	TX	LPV	0	100	0	100	0	100
PEQ	PECOS MUNICIPAL	TX	LPV200	0	100	0	100	2	99.9985
PIL	PORT ISABEL-CAMERON COUNTY	TX	LPV	0	100	0	100	1	99.9888
PPA	PERRY LEFORS FIELD	TX	LPV	0	100	0	100	0	100
PRX	COX FIELD	TX	LPV	0	100	1	99.9904	1	99.9788
PSX	PALACIOS MUNICIPAL	TX	LPV	0	100	0	100	1	99.9961
PVW	HALE COUNTY	TX	LPV	0	100	0	100	0	100
RAS	MUSTANG BEACH	TX	LPV	0	100	0	100	1	99.9923
RBD	DALLAS EXECUTIVE	TX	LPV	0	100	0	100	1	99.9911
RBO	NUECES COUNTY	TX	LP	0	100	0	100	1	99.9915
RKP	ARANSAS COUNTY	TX	LPV	0	100	0	100	1	99.9938
RYW	LAGO VISTA TX - RUSTY ALLEN	TX	LP	0	100	0	100	0	100
SAT	SAN ANTONIO INTL	TX	LPV200	0	100	0	100	1	99.9988
SGR	SUGAR LAND RGNL	TX	LPV200	0	100	0	100	0	100
SJT	SAN ANGELO RGNL/MATHIS FLD	TX	LPV	0	100	0	100	0	100
SLR	SULPHUR SPRINGS MUNICIPAL	TX	LPV200	0	100	0	100	1	99.9811
SNK	WINSTON FIELD	TX	LPV200	0	100	0	100	0	100
SWW	AVENGER FIELD	TX	LPV	0	100	0	100	0	100
T41	LA PORTE MUNICIPAL	TX	LPV	0	100	0	100	0	100
T59	WHEELER MUNICIPAL	TX	LP	0	100	0	100	0	100
T78	LIBERTY MUNICIPAL	TX	LP	0	100	0	100	0	100
T82	GILLESPIE COUNTY	TX	LPV	0	100	0	100	0	100
TFP	T P MC CAMPBELL	TX	LPV	0	100	0	100	1	99.9923
TKI	COLLIN COUNTY RGNL AT MC KINNEY	TX	LPV200	0	100	0	100	1	99.9892
TME	HOUSTON EXECUTIVE	TX	LPV	0	100	0	100	0	100
TPL	DRAUGHON-MILLER CENTRAL TEXAS RGNL	TX	LPV200	0	100	0	100	0	100
TRL	TERRELL MUNICIPAL	TX	LPV	0	100	0	100	1	99.9904
TYR	TYLER POUNDS RGNL	TX	LPV200	0	100	0	100	2	99.9911
UTS	HUNTSVILLE MUNICIPAL	TX	LPV	0	100	0	100	0	100
VCT	VICTORIA RGNL	TX	LPV200	0	100	0	100	1	99.9961
XBP	BRIDGEPORT MUNICIPAL	TX	LPV	0	100	0	100	1	99.9931
BCE	BRYCE CANYON	UT	LPV	0	100	0	100	1	99.9927
BDG	BLANDING MUNICIPAL	UT	LPV	0	100	0	100	1	99.99000

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
BMC	BRIGHAM CITY	UT	LP	0	100	0	100	1	99.9938
DTA	DELTA MUNICIPAL	UT	LP	0	100	0	100	1	99.9934
ENV	WENDOVER	UT	LPV	0	100	0	100	1	99.9954
FOM	FILLMORE MUNICIPAL	UT	LPV	0	100	0	100	1	99.9934
LGU	LOGAN-CACHE	UT	LPV	0	100	0	100	1	99.9938
OGD	OGDEN-HINCKLEY	UT	LPV	0	100	0	100	1	99.9938
PUC	CARBON COUNTY RGNL/BUCK DAVIS FIELD	UT	LP	0	100	0	100	1	99.9919
PVU	PROVO MUNICIPAL	UT	LPV200	0	100	0	100	1	99.9931
SGU	ST GEORGE MUNICIPAL	UT	LPV	0	100	0	100	1	99.99000
SLC	SALT LAKE CITY INTL	UT	LP	0	100	0	100	1	99.9934
U14	NEPHI MUNICIPAL	UT	LPV	0	100	0	100	1	99.9931
U55	PANGUITCH MUNICIPAL	UT	LPV200	0	100	0	100	1	99.9931
VEL	VERNAL	UT	LP	0	100	0	100	1	99.9911
0VG	LEE COUNTY	VA	LPV	1	99.9633	2	99.9221	2	99.9016
8W2	NEW MARKET	VA	LP	2	99.9008	2	99.8978	2	99.8750
AVC	MECKLENBURG-BRUNSWICK RGNL	VA	LPV	2	99.9525	2	99.9248	77	99.7797
BCB	VIRGINIA TECH/MONTGOMERY EXECUTIVE	VA	LPV	2	99.9421	2	99.9348	2	99.8785
CHO	CHARLOTTESVILLE-ALBEMARLE	VA	LPV	3	99.9417	2	99.8970	2	99.8762
CJR	CULPEPER RGNL	VA	LPV	3	99.9221	2	99.9035	2	99.8785
CPK	CHESAPEAKE RGNL	VA	LPV200	1	99.9491	4	99.9433	22	99.8584
DAN	DANVILLE RGNL	VA	LPV200	2	99.9591	2	99.9394	2	99.8962
EMV	EMPORIA-GREENSVILLE RGNL	VA	LPV200	2	99.9452	2	99.9213	79	99.5702
FCI	CHESTERFIELD COUNTY	VA	LPV	2	99.9498	2	99.9171	30	99.7940
FKN	FRANKLIN MUN-JOHN BEVERLY ROSE	VA	LPV	2	99.9471	3	99.9352	44	99.6987
FVX	FARMVILLE RGNL	VA	LPV	2	99.9498	2	99.9182	3	99.8877
FYJ	MIDDLE PENINSULA RGNL	VA	LPV	1	99.9483	1	99.9441	8	99.9005
HLX	TWIN COUNTY	VA	LPV	2	99.9591	2	99.9390	2	99.8873
HSP	INGALLS FIELD	VA	LPV	2	99.9302	2	99.9132	2	99.8765
HWY	WARRENTON-FAUQUIER	VA	LPV200	3	99.9240	2	99.9043	2	99.8850
JFZ	TAZEWELL COUNTY	VA	LPV	3	99.9676	2	99.9367	2	99.8866
JYO	LEESBURG EXECUTIVE	VA	LPV	2	99.9194	2	99.9047	2	99.8839
LKU	LOUISA COUNTY/FREEMAN FIELD	VA	LPV	3	99.9471	2	99.8993	7	99.8816
LNP	LONESOME PINE	VA	LPV	2	99.9572	2	99.9221	2	99.9008
LUA	LURAY CAVERNS	VA	LP	2	99.9008	2	99.8974	2	99.8750
LYH	LYNCHBURG RGNL/PRESTON GLENN FLD	VA	LPV	2	99.9483	2	99.9213	2	99.8781
MFV	ACCOMACK COUNTY	VA	LPV	1	99.9448	2	99.9390	2	99.9059
MKJ	MOUNTAIN EMPIRE	VA	LPV	2	99.9583	2	99.9375	2	99.8870
MTV	BLUE RIDGE	VA	LPV	1	99.9595	2	99.9394	2	99.8970
OFP	HANOVER COUNTY MUNICIPAL	VA	LPV	2	99.9510	2	99.9194	15	99.8596
OKV	WINCHESTER RGNL	VA	LPV200	2	99.9082	2	99.9055	2	99.8738
ORF	NORFOLK INTL	VA	LPV200	1	99.9468	2	99.9433	10	99.8935

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
PHF	NEWPORT NEWS/WILLIAMSBURG INTL	VA	LPV200	1	99.9475	1	99.9441	12	99.89000
PSK	NEW RIVER VALLEY	VA	LPV200	2	99.9506	2	99.9352	2	99.8789
PTB	DINWIDDIE COUNTY	VA	LPV	2	99.9444	2	99.9182	40	99.7384
RIC	RICHMOND INTL	VA	LPV200	2	99.9498	2	99.9167	20	99.8372
RMN	STAFFORD RGNL	VA	LPV	2	99.9286	2	99.9194	2	99.8881
ROA	ROANOKE RGNL/WOODRUM FIELD	VA	LPV	2	99.9425	2	99.9282	2	99.8781
SFQ	SUFFOLK EXECUTIVE	VA	LP	2	99.9510	3	99.9387	30	99.7963
SHD	SHENANDOAH VALLEY RGNL	VA	LPV200	3	99.9252	2	99.8978	2	99.8750
VJI	VIRGINIA HIGHLANDS	VA	LPV	2	99.9753	2	99.9402	2	99.9020
W63	MARKS MUNICIPAL	VA	LP	2	99.9587	2	99.9394	18	99.8870
W78	WILLIAM M TUCK	VA	LPV	2	99.9549	2	99.9352	2	99.8935
XSA	TAPPAHANNOCK-ESSEX COUNTY	VA	LPV	2	99.9479	2	99.9259	2	99.8985
BTV	BURLINGTON INTL	VT	LPV200	2	99.9769	3	99.9564	4	99.9240
FSO	FRANKLIN COUNTY STATE	VT	LPV	2	99.9811	3	99.9633	3	99.9244
MPV	EDWARD F KNAPP STATE	VT	LPV	2	99.9799	2	99.9348	4	99.9155
RUT	RUTLAND-SOUTHERN VERMONT RGNL	VT	LPV	2	99.9742	2	99.9317	4	99.9101
ALW	WALLA WALLA RGNL	WA	LPV	0	100	0	100	1	99.9988
AWO	ARLINGTON MUNICIPAL	WA	LPV200	0	100	0	100	0	100
BLI	BELLINGHAM INTL	WA	LPV200	0	100	0	100	0	100
BVS	SKAGIT RGNL	WA	LPV	0	100	0	100	0	100
CLM	WILLIAM R FAIRCHILD INTL	WA	LPV	0	100	0	100	0	100
CLS	CHEHALIS-CENTRALIA	WA	LPV	0	100	0	100	0	100
DEW	DEER PARK	WA	LPV	0	100	0	100	1	99.9973
EPH	EPHRATA MUNICIPAL	WA	LPV	0	100	0	100	1	99.9992
FHR	FRIDAY HARBOR	WA	LPV	0	100	0	100	0	100
GEG	SPOKANE INTL	WA	LPV200	0	100	0	100	1	99.9996
HQM	BOWERMAN	WA	LPV200	0	100	0	100	0	100
MWH	GRANT CO INTL	WA	LPV200	0	100	0	100	1	99.9992
OLM	OLYMPIA RGNL	WA	LPV	0	100	0	100	0	100
OTH	SOUTHWEST OREGON RGNL	WA	LPV	0	100	0	100	2	99.99000
PAE	SNOHOMISH COUNTY (PAINE FLD)	WA	LPV200	0	100	0	100	0	100
PSC	TRI-CITIES	WA	LPV200	0	100	0	100	1	99.9992
PWT	BREMERTON NATIONAL	WA	LPV	0	100	0	100	0	100
RLD	RICHLAND	WA	LPV	0	100	0	100	1	99.9996
RNT	RENTON MUNICIPAL	WA	LPV	0	100	0	100	0	100
SEA	SEATTLE-TACOMA INTL	WA	LPV200	0	100	0	100	0	100
TDO	ED CARLSON MEMORIAL - SOUTH LEWIS CO	WA	LPV	0	100	0	100	0	100
TIW	TACOMA NARROWS	WA	LPV	0	100	0	100	0	100
YKM	YAKIMA AIR TERMINAL/MCALLISTER FIELD	WA	LPV200	0	100	0	100	0	100
57C	EAST TROY MUNICIPAL	WI	LPV	3	99.9595	3	99.9398	2	99.8935
82C	MAUSTON-NEW LISBON UNION	WI	LP	1	99.9745	1	99.9745	3	99.9221
8D1	NEW HOLSTEIN MUNICIPAL	WI	LPV	1	99.9745	1	99.9745	4	99.9333

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
ARV	LAKELAND/NOBLE F. LEE MEMORIAL FIELD	WI	LPV	1	99.9745	1	99.9745	2	99.9333
ASX	JOHN F. KENNEDY MEMORIAL	WI	LPV	1	99.9996	1	99.9996	2	99.9556
ATW	OUTAGAMIE COUNTY RGNL	WI	LPV200	1	99.9745	1	99.9745	2	99.9460
AUW	WAUSAU DOWNTOWN	WI	LPV200	1	99.9745	1	99.9745	2	99.9417
BCK	BLACK RIVER FALLS AREA	WI	LPV	1	99.9927	1	99.9927	3	99.9684
C29	MIDDLETON MUNICIPAL-MOREY FIELD	WI	LPV	1	99.9745	2	99.9653	3	99.8924
C35	REEDSBURG MUNICIPAL	WI	LP	1	99.9745	1	99.9745	4	99.9028
CLI	CLINTONVILLE MUNICIPAL	WI	LPV	1	99.9745	1	99.9745	2	99.9437
CMY	SPARTA/FORT MC COY	WI	LPV	1	99.9927	1	99.9927	4	99.9525
CWA	CENTRAL WISCONSIN	WI	LPV200	1	99.9745	1	99.9745	2	99.9417
DLL	BARABOO WISCONSIN DELLS	WI	LPV	1	99.9745	1	99.9745	4	99.9039
EAU	CHIPPEWA VALLEY RGNL	WI	LPV200	0	100	0	100	2	99.9757
EGV	EAGLE RIVER UNION	WI	LPV	1	99.9745	1	99.9745	2	99.9390
ENW	KENOSHA RGNL	WI	LPV200	3	99.9479	3	99.9406	2	99.8935
ETB	WEST BEND MUNICIPAL	WI	LPV	1	99.9745	1	99.9745	3	99.9124
EZS	SHAWANO MUNICIPAL	WI	LPV	1	99.9745	1	99.9745	2	99.9421
FLD	FOND DU LAC COUNTY	WI	LPV	1	99.9745	1	99.9745	4	99.9217
GRB	AUSTIN STRAUBEL INTL	WI	LPV200	1	99.9745	1	99.9745	2	99.9444
HXF	HARTFORD MUNICIPAL	WI	LPV	1	99.9745	2	99.9707	3	99.9120
HYR	SAWYER COUNTY	WI	LPV	0	100	0	100	2	99.9738
JVL	SOUTHERN WISCONSIN RGNL	WI	LPV200	3	99.9591	3	99.9383	2	99.8943
LNR	TRI-COUNTY RGNL	WI	LPV	1	99.9745	1	99.9745	3	99.8885
LSE	LA CROSSE MUNICIPAL	WI	LPV	0	100	0	100	3	99.9707
LUM	MENOMONIE MUNICIPALCIPAL-SCORE FIELD	WI	LPV	0	100	0	100	2	99.9749
MDZ	TAYLOR COUNTY	WI	LPV	1	99.9776	1	99.9776	2	99.9425
MFI	MARSHFIELD MUNICIPAL	WI	LPV	1	99.9745	1	99.9745	2	99.9425
MKE	GENERAL MITCHELL INTL	WI	LPV200	3	99.9599	3	99.9410	3	99.9090
MRJ	IOWA COUNTY	WI	LPV200	1	99.9745	2	99.9645	3	99.8958
MSN	DANE COUNTY RGNL-TRUAX FIELD	WI	LPV200	1	99.9745	2	99.9653	3	99.8924
MTW	MANITOWOC COUNTY	WI	LPV200	1	99.9745	1	99.9745	4	99.9344
MWC	LAWRENCE J TIMMERMAN	WI	LPV	3	99.9630	3	99.9564	3	99.9086
OCQ	J DOUGLAS BAKE MEML	WI	LP	1	99.9745	1	99.9745	2	99.9421
OSH	WITTMAN RGNL	WI	LPV	1	99.9745	1	99.9745	3	99.9402
OVS	BOSCOBEL	WI	LPV	1	99.9927	1	99.9927	5	99.9340
PBH	PRICE COUNTY	WI	LPV	1	99.9811	1	99.9811	2	99.9429
PCZ	WAUPACA MUNICIPAL	WI	LPV	1	99.9745	1	99.9745	2	99.9456
PVB	PLATTEVILLE MUNICIPALCIPAL	WI	LPV	1	99.9811	3	99.9672	3	99.9174
RAC	JOHN H. BATTEN	WI	LPV	3	99.9479	3	99.9406	3	99.9055
RCX	RUSK COUNTY	WI	LPV	1	99.9927	1	99.9927	3	99.9587
RHI	RHINELANDER-ONEIDA COUNTY	WI	LPV200	1	99.9745	1	99.9745	2	99.9394
RNH	NEW RICHMOND RGNL	WI	LPV	0	100	0	100	1	99.9919
RPD	RICE LAKE RGNL - CARL'S FIELD	WI	LPV	0	100	0	100	2	99.9846

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
RRL	MERRILL MUNICIPAL	WI	LPV	1	99.9745	1	99.9745	2	99.9417
SBM	SHEBOYGAN COUNTY MEMORIAL	WI	LPV200	1	99.9745	1	99.9745	3	99.9228
STE	STEVENS POINT MUNICIPAL	WI	LPV200	1	99.9745	1	99.9745	2	99.9421
SUE	DOOR COUNTY CHERRYLAND	WI	LPV	1	99.9745	1	99.9745	2	99.9425
SUW	RICHARD I BONG	WI	LP	0	100	0	100	2	99.9823
TKV	TOMAHAWK RGNL	WI	LP	1	99.9745	1	99.9745	2	99.9398
UES	WAUKESHA COUNTY	WI	LPV200	3	99.9622	3	99.9437	2	99.8935
UNU	DODGE COUNTY	WI	LPV	1	99.9745	1	99.9745	4	99.9090
VIQ	NEILLSVILLE MUNICIPAL	WI	LPV	1	99.9803	1	99.9803	2	99.9433
Y50	WAUTOMA MUNICIPAL	WI	LP	1	99.9745	1	99.9745	3	99.9363
3I2	MASON COUNTY	WV	LPV	3	99.9367	2	99.8974	2	99.8777
BKW	RALEIGH COUNTY MEMORIAL	WV	LPV200	2	99.9371	2	99.9263	2	99.8796
BLF	MERCER COUNTY	WV	LPV	2	99.9502	2	99.9352	2	99.8819
CKB	NORTH CENTRAL WEST VIRGINIA	WV	LPV	2	99.9008	2	99.8792	2	99.8773
CRW	YEAGER	WV	LPV200	2	99.9282	2	99.9035	2	99.8789
HLG	WHEELING OHIO CO	WV	LPV200	2	99.9035	2	99.8789	1	99.8623
HTS	TRI-STATE/MILTON J. FERGUSON FIELD	WV	LPV200	2	99.9344	2	99.9035	2	99.8789
I18	JACKSON COUNTY	WV	LPV200	2	99.9232	2	99.8974	2	99.8777
LWB	GREENBRIER VALLEY	WV	LPV	2	99.9402	2	99.9263	2	99.8758
MGW	MORGANTOWN MUNICIPAL-WALTER L. BILL HART FIELD	WV	LPV200	2	99.9012	2	99.8789	2	99.8754
MRB	EASTERN WV RGNL/SHEPHERD	WV	LPV	2	99.9090	2	99.9059	2	99.8719
PKB	MID-OHIO VALLEY RGNL	WV	LPV	3	99.9194	2	99.8789	2	99.8769
SXL	SUMMERSVILLE	WV	LP	2	99.9290	2	99.9051	2	99.8789
USW	BOGGS FIELD	WV	LP	3	99.9217	3	99.8981	2	99.8781
W22	UPSHUR COUNTY RGNL	WV	LPV	2	99.9008	2	99.88000	2	99.8777
7V6	CAMP GUERNSEY	WY	LP	0	100	0	100	1	99.99000
COD	YELLOWSTONE RGNL	WY	LPV	0	100	0	100	1	99.9950
CPR	NATRONA COUNTY INTL	WY	LPV	0	100	0	100	1	99.9919
CYS	CHEYENNE RGNL/JERRY OLSON FIELD	WY	LPV	0	100	0	100	1	99.9880
DGW	CONVERSE COUNTY	WY	LPV200	0	100	0	100	1	99.9907
ECS	MONDELL FIELD	WY	LPV	0	100	0	100	1	99.9923
EVW	EVANSTON-UINTA COUNTY BURNS FIELD	WY	LPV	0	100	0	100	1	99.9931
GCC	GILLETTE-CAMPBELL COUNTY	WY	LPV	0	100	0	100	1	99.9942
JAC	JACKSON HOLE	WY	LPV	0	100	0	100	1	99.9942
LAR	LARAMIE RGNL	WY	LPV	0	100	0	100	1	99.9884
PNA	RALPH WENZ FIELD	WY	LPV	0	100	0	100	1	99.9923
RIW	RIVERTON RGNL	WY	LPV200	0	100	0	100	1	99.9927
RKS	ROCK SPRINGS-SWEETWATER COUNTY	WY	LPV200	0	100	0	100	1	99.9911
RWL	RAWLINS MUNICIPAL/HARVEY FIELD	WY	LPV	0	100	0	100	1	99.99000
SAA	SHIVELY FIELD	WY	LPV	0	100	0	100	1	99.9888
SHR	SHERIDAN COUNTY	WY	LPV	0	100	0	100	1	99.9942
WRL	WORLAND MUNICIPAL	WY	LPV	0	100	0	100	1	99.9931

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV 200 Outages	LPV 200 Avail (%)
CYQH	WATSON LAKE	YT	LPV	2	99.9938	3	99.9468	12	99.8202
CYXY	WHITEHORSE / ERIK NIELSEN INTL	YT	LPV	1	99.9969	4	99.9267	8	99.8634

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

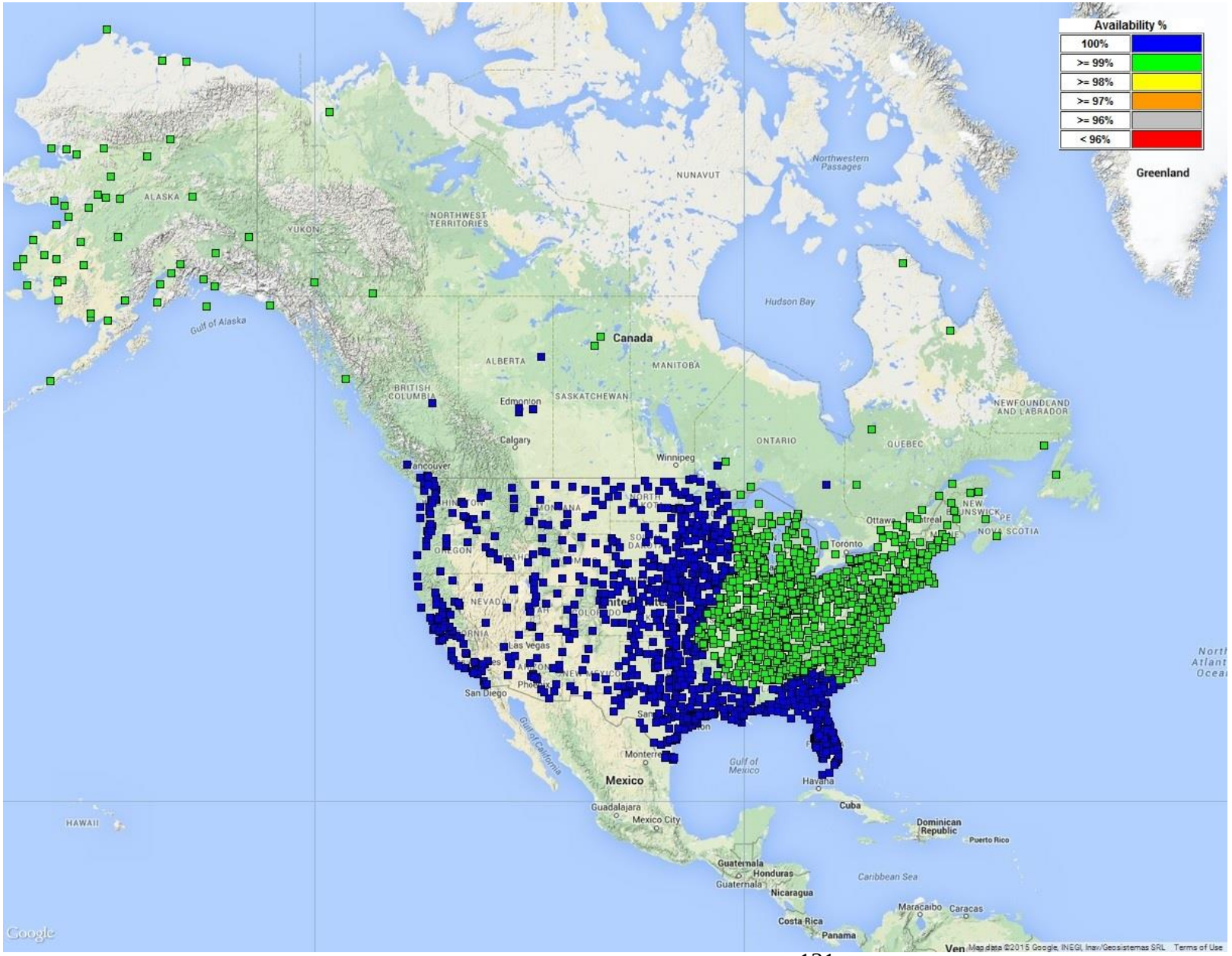


Figure 8-2 WAAS LP Outages at Airports in the US and Canada with GPS RNAV Instrument Approach Procedures

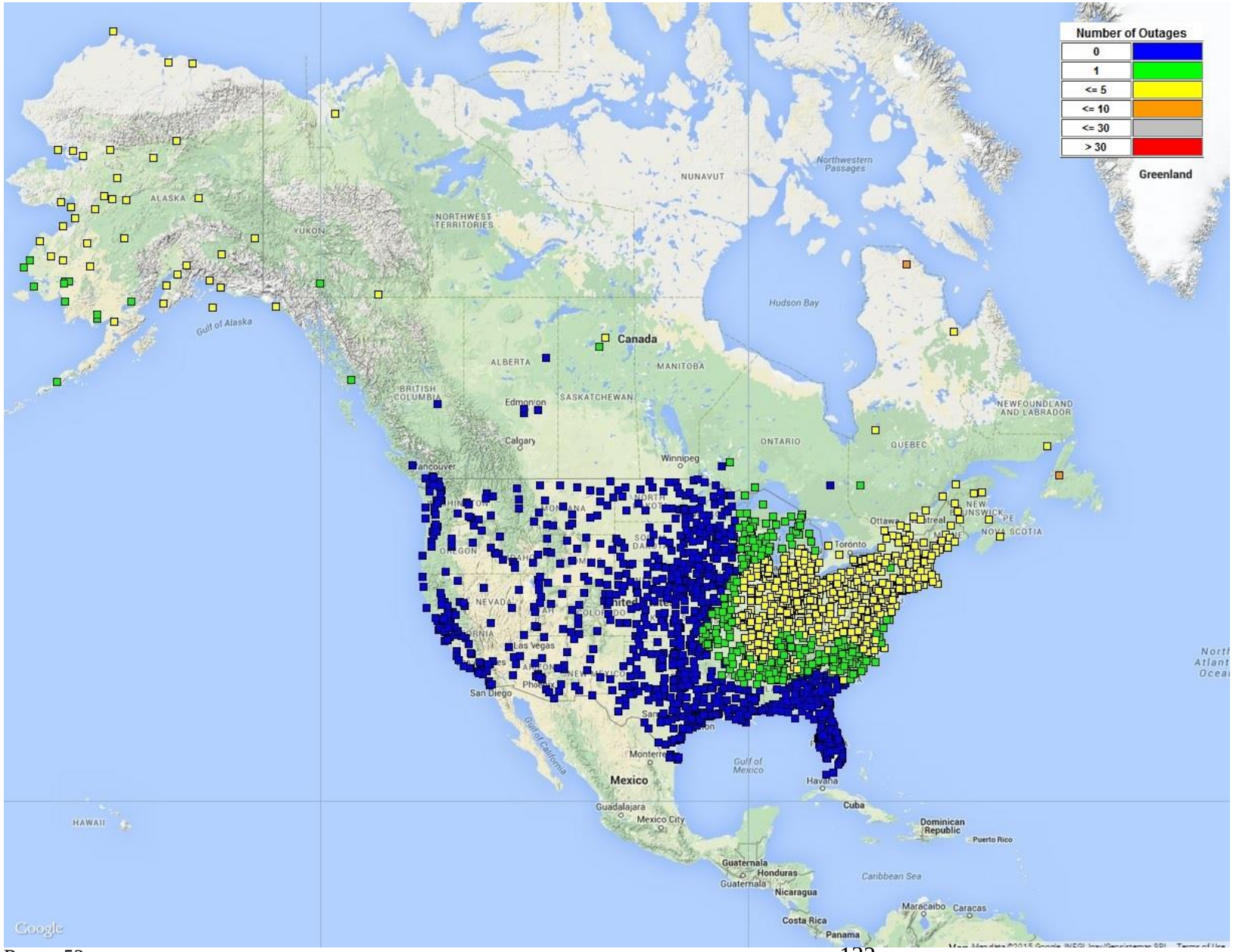


Figure 8-3 WAAS LPV Availability Airports in the US and Canada with GPS RNAV Instrument Approach Procedures

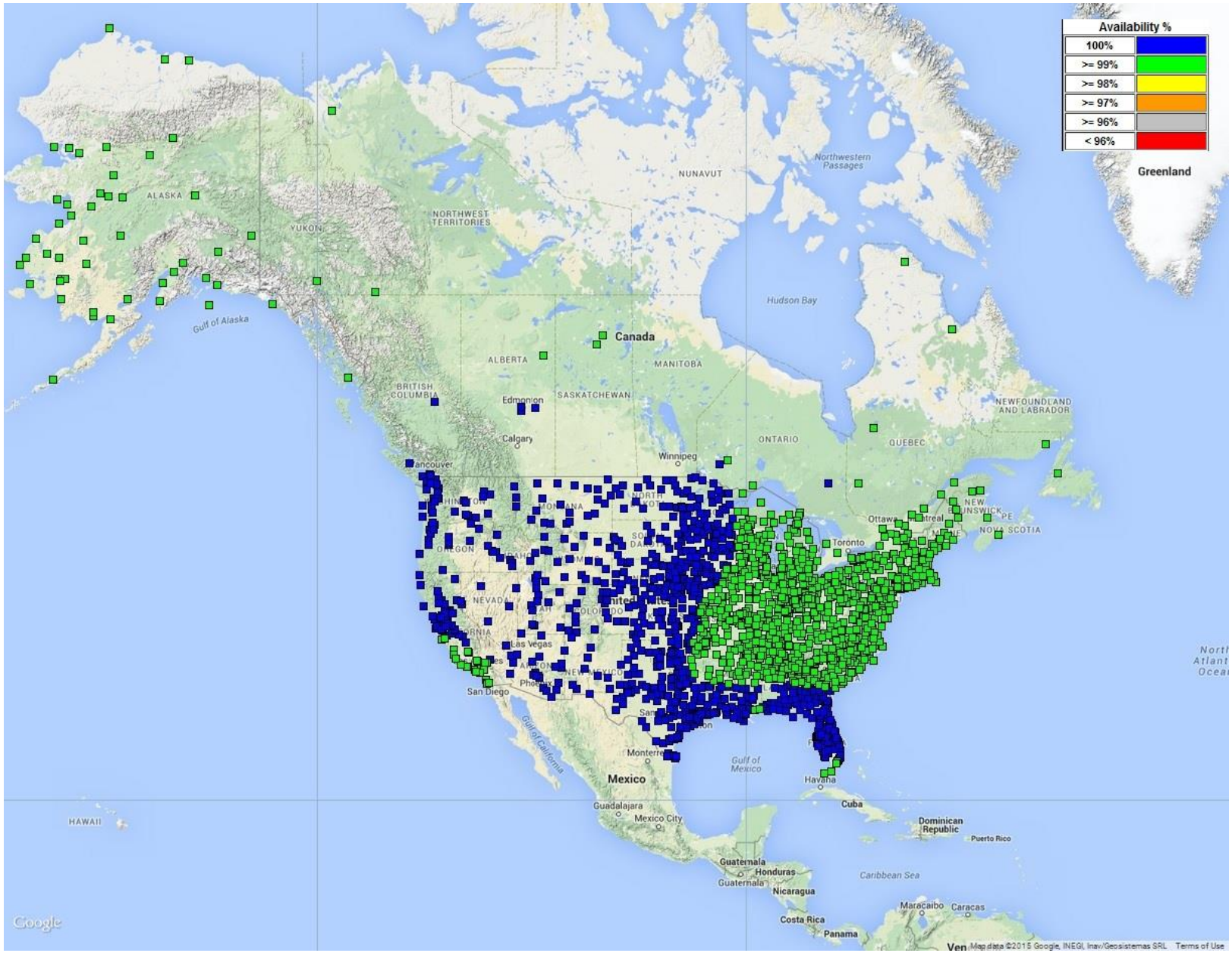


Figure 8-4 WAAS LPV Outages at Airports in the US and Canada with GPS RNAV Instrument Approach Procedures

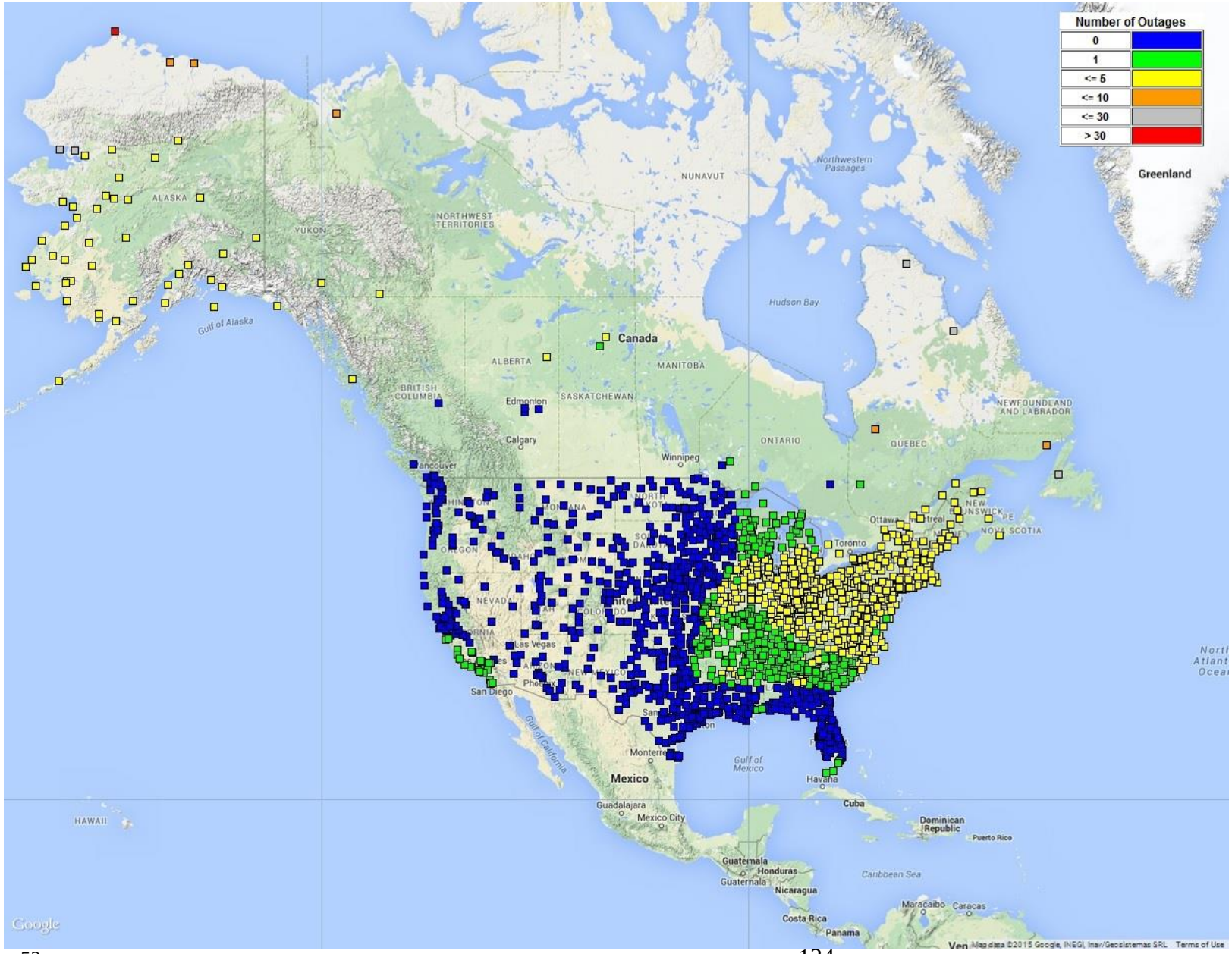


Figure 8-5 WAAS LPV 200 Availability at Airports in the US and Canada with GPS RNAV Instrument Approach Procedures

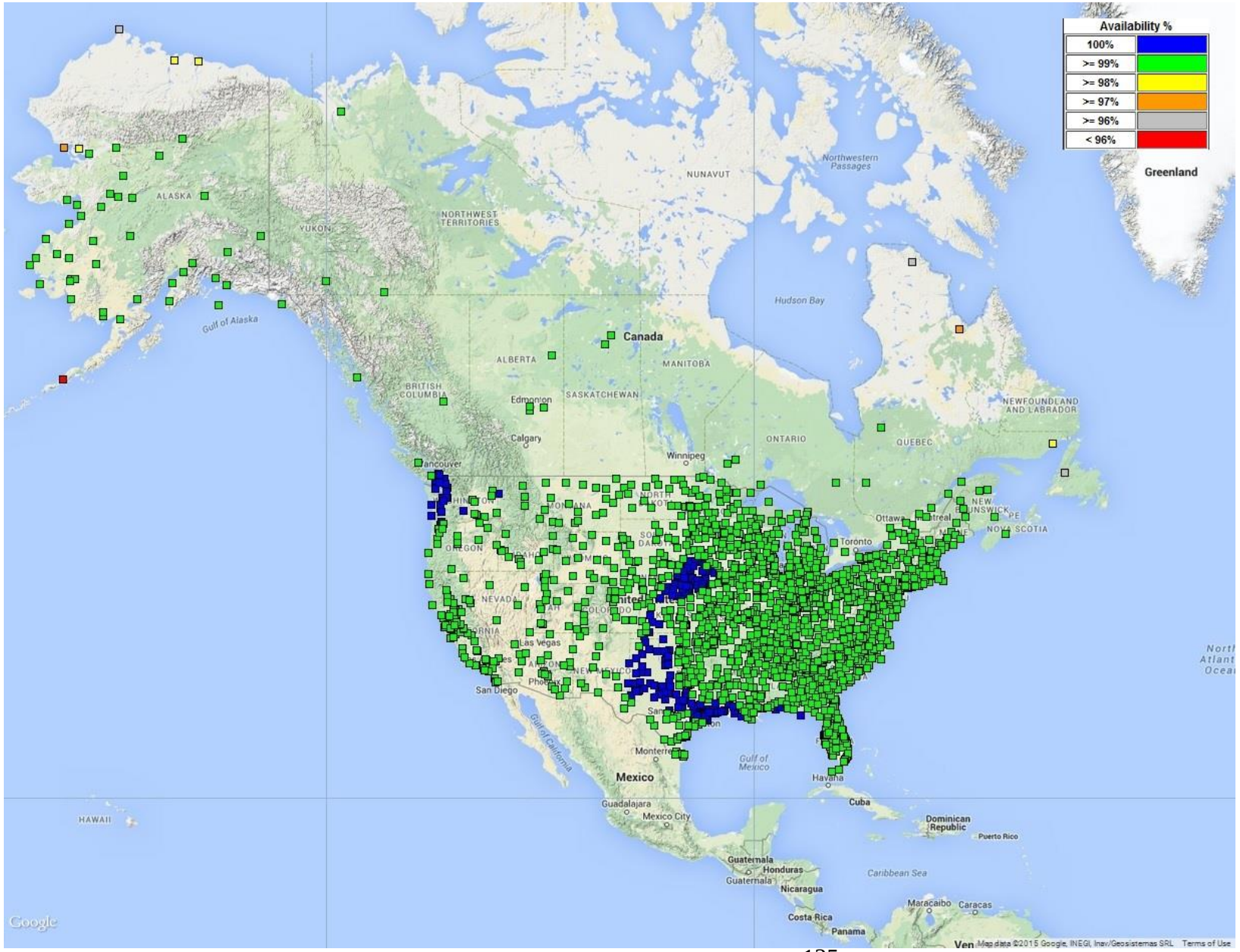
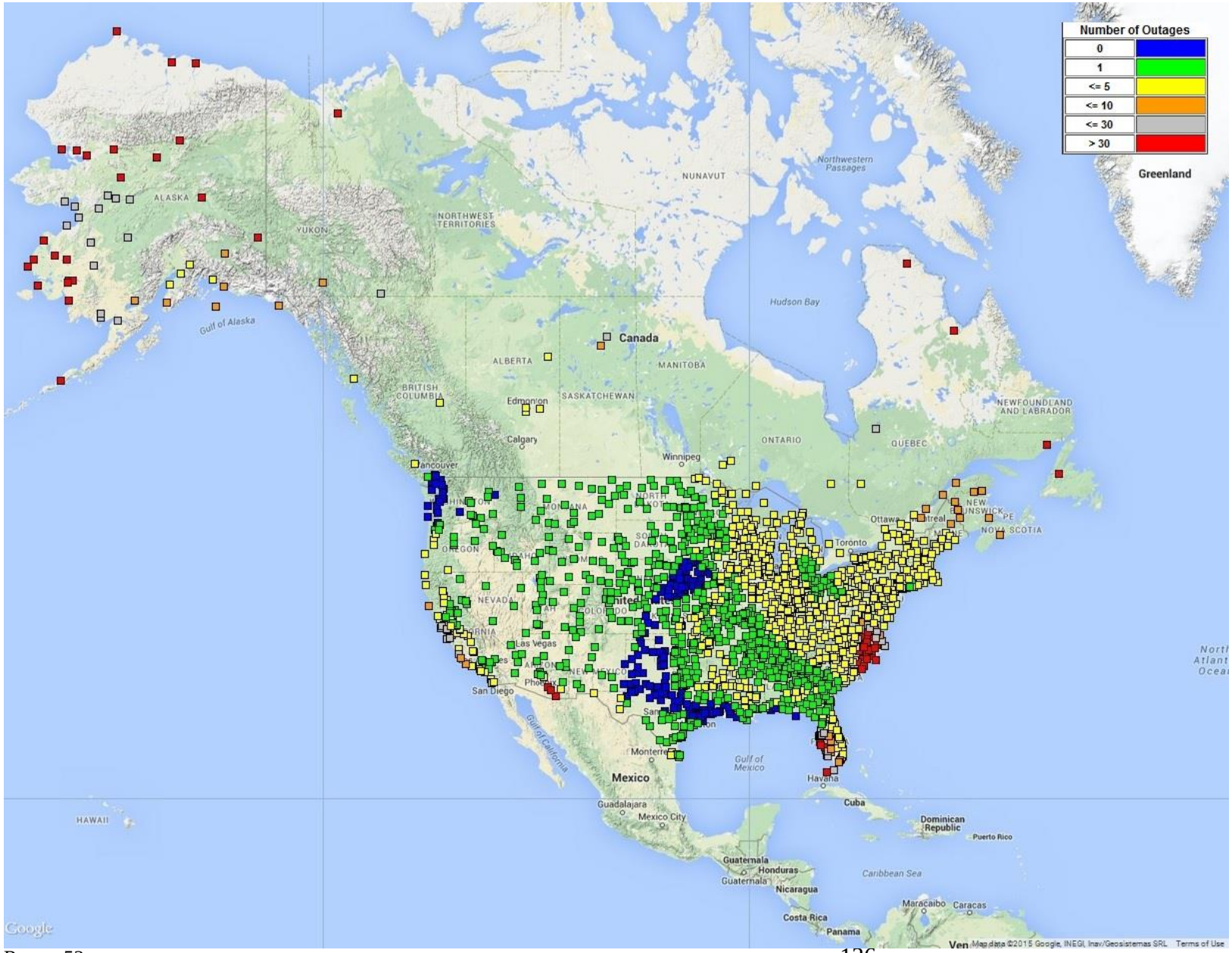


Figure 8-6 WAAS LPV 200 Outages at Airports in the US and Canada with GPS RNAV Instrument Approach Procedures



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	Apr 14	May 14	Jun 14	Jul 14	Aug 14	Sep 14	Oct 14	Nov 14	Dec 14	Jan 15	Feb 15	Mar 15
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	Apr 14	May 14	Jun 14	Jul 14	Aug 14	Sep 14	Oct 14	Nov 14	Dec 14	Jan 15	Feb 15	Mar 15
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 3/28/15 to 23:59:30 on 3/29/15.

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 <= 2.4 cm. The CSRS surveys' RSSs of the reported ECEF sigmas for the 3/29/15 data set were all <= 10 mm. The OPUS and CSRS surveys for the 3/29/15 data set agreed to an average of 1.7 cm. with a standard deviation of 6 mm. The maximum of difference was 3.6 cm. for thread 2 at Juneau Alaska (JNU2).

The OPUS positions were compared to the positions in the currently fielded WAAS software Build W7.012 which was fielded in August 2014 and Build W7.121 which will be fielded starting in June 2015. The OPUS surveys agree with the Build W7.012 positions to better or equal than 5.0 cm for all sites. The maximum was 5.0 cm at Jacksonville B, ZJX2. For Build W7.121 the maximum differences were at Mexico City (28 cm) and Hawaii (10 cm). The antenna positions are interpolated forward in time. The Build W7.012 differences are smaller because we are near the midpoint of the interpolation useable period whereas the Build W7.121 positions are just prior to the beginning of the interpolation useable period.

Table 10-1 lists the WAAS antenna L1 phase center positions as of 3/29/15 using the OPUS data.

Figures 10-1 to 10-3 show the RSS of the ECEF differences between the 3/29/15 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). Figures 10-4 to 10-6 show 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.

Figures 10-13 to 10-15 show the RSS of the ECEF differences between the 3/29/15 OPUS survey antenna phase center locations and the locations in the Build W7.121 software.

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	-2965385.086	-972576.618	5543892.877	60.7879150888889	-161.8417252694440	52.183
BET2	-2965385.857	-972580.343	5543891.824	60.7878956444444	-161.8416647000000	52.188
BET3	-2965388.424	-972577.473	5543890.953	60.7878797305556	-161.8417294527780	52.181
BIL1	-1416445.903	-4223577.017	4550862.153	45.8037068055555	-108.5397233472220	1112.249
BIL2	-1416449.977	-4223574.873	4550862.863	45.8037160138889	-108.5397817944440	1112.244
BIL3	-1416441.601	-4223574.281	4550866.005	45.8037565138889	-108.5396820777780	1112.249
BRW1	-1886758.968	-809058.665	6018494.456	71.2827645055555	-156.7899252166670	15.566
BRW2	-1886756.381	-809055.929	6018495.639	71.2827972444444	-156.7899669416670	15.577
BRW3	-1886755.285	-809059.704	6018495.456	71.2827926388889	-156.7898580527780	15.558
CDB1	-3484099.076	-1084748.792	5213678.612	55.1923738666667	-162.7064046527780	49.697
CDB2	-3484105.723	-1084741.581	5213675.665	55.1923277583333	-162.7065437833330	49.677
CDB3	-3484112.000	-1084734.812	5213672.917	55.1922843055556	-162.7066745611110	49.693
FAI1	-2304741.844	-1448715.284	5748843.661	64.8096296694444	-147.8473411527780	149.926
FAI2	-2304741.375	-1448706.473	5748846.059	64.8096801027778	-147.8474929083330	149.932
FAI3	-2304732.838	-1448707.412	5748849.200	64.8097467000000	-147.8473805527780	149.910
HNL1	-5508637.128	-2234493.147	2303722.282	21.3129911416667	-157.9208290694440	24.669
HNL2	-5508656.291	-2234483.471	2303687.039	21.3126482555556	-157.9209849166670	25.014
HNL3	-5508647.711	-2234497.404	2303694.133	21.3127168527778	-157.9208293888890	25.065
JNU1	-2354254.933	-2388549.656	5407043.113	58.3625743583333	-134.5857074416670	16.117
JNU2	-2354252.839	-2388565.762	5407036.938	58.3624688361111	-134.5854888111110	16.105
JNU3	-2354239.632	-2388568.620	5407041.399	58.3625451500000	-134.5852938444440	16.108
MMD1	35070.400	-5959686.660	2264365.772	20.9319093305556	-89.6628408805556	29.114
MMD2	35065.476	-5959687.026	2264364.983	20.9319015861111	-89.6628882361111	29.147
MMD3	35065.139	-5959685.247	2264369.640	20.9319466194444	-89.6628913777778	29.148
MMX1	-948700.995	-5943934.858	2109212.467	19.4316537666667	-99.0683897972222	2234.804
MMX2	-948696.566	-5943934.688	2109214.890	19.4316770027778	-99.0683484194444	2234.793
MMX3	-948705.428	-5943935.047	2109210.043	19.4316304638889	-99.0684311833333	2234.832
MPR1	-1570142.231	-5759530.597	2238184.756	20.6790033388889	-105.2492033250000	10.974
MPR2	-1570139.406	-5759530.106	2238188.794	20.6790413416667	-105.2491784055560	11.262
MPR3	-1570143.511	-5759527.990	2238190.559	20.6790593250000	-105.2492217583330	10.985
MSD1	-1979519.849	-5523222.966	2493106.850	23.1604475333333	-109.7176495222220	104.273
MSD2	-1979521.418	-5523225.304	2493100.447	23.1603846805556	-109.7176562444440	104.265
MSD3	-1979525.871	-5523222.027	2493104.122	23.1604208083333	-109.7177079750000	104.255
MTP1	-254854.369	-6162909.141	1617805.064	14.7913660388889	-92.3679993361111	54.918
MTP2	-254850.758	-6162910.173	1617801.631	14.7913340055556	-92.3679654277778	54.894
MTP3	-254855.523	-6162910.289	1617800.102	14.7913199222222	-92.3680096083333	54.806
OTZ1	-2396056.055	-750356.170	5843502.497	66.8873318083333	-162.6113729583330	10.882
OTZ2	-2396052.887	-750354.342	5843504.023	66.8873666194445	-162.6113911638890	10.885
OTZ3	-2396052.863	-750358.276	5843503.529	66.8873553722222	-162.6113053277780	10.883
YFB1	1035381.410	-2634289.632	5696539.553	63.7314907472222	-68.5431840666667	10.029
YFB2	1035372.184	-2634296.044	5696538.199	63.7314645138889	-68.5434053583333	9.963
YFB3	1035366.123	-2634306.814	5696534.416	63.7313866972222	-68.5435992944444	10.025

WRE	X(m)	Y(m)	Z(m)	Latitude	Longitude	H(m)
YQX1	2430424.597	-3419640.393	4788223.828	48.9664901250000	-54.5976325805556	146.862
YQX2	2430432.554	-3419639.058	4788220.781	48.9664482527778	-54.5975334416667	146.875
YQX3	2430440.461	-3419637.689	4788217.779	48.9664070305556	-54.5974345916667	146.885
YWG1	-520164.414	-4083475.964	4855843.046	49.9005741805556	-97.2593981027778	222.124
YWG2	-520150.538	-4083468.896	4855850.439	49.9006772666667	-97.2592189472222	222.133
YWG3	-520152.412	-4083478.014	4855842.605	49.9005680722222	-97.2592287861111	222.119
YYR1	1885341.395	-3321428.367	5091171.668	53.3086472333333	-60.4194687305556	37.851
YYR2	1885344.342	-3321419.884	5091176.087	53.3087136277778	-60.4193674583333	37.856
YYR3	1885340.068	-3321413.073	5091182.093	53.3088037527778	-60.4193727805556	37.872
ZAB1	-1488636.865	-5003946.549	3654557.708	35.1735753138889	-106.5673499805560	1620.138
ZAB2	-1488631.531	-5003948.228	3654557.680	35.1735746472222	-106.5672886166670	1620.194
ZAB3	-1488632.305	-5003950.809	3654553.826	35.1735322722222	-106.5672886833330	1620.177
ZAN1	-2659536.677	-1549114.769	5567750.750	61.2292015638889	-149.7802512055560	80.701
ZAN2	-2659548.434	-1549110.815	5567746.269	61.2291179500000	-149.7804249666670	80.705
ZAN3	-2659541.384	-1549106.686	5567750.739	61.2292015222222	-149.7804253305560	80.691
ZAU1	138704.093	-4761244.143	4227763.933	41.7826580583333	-88.3313369638889	195.890
ZAU2	138704.348	-4761248.756	4227758.769	41.7825956833333	-88.3313355138889	195.893
ZAU3	138711.055	-4761248.492	4227758.851	41.7825966444444	-88.3312547777778	195.896
ZBW1	1490299.191	-4448983.169	4306010.497	42.7357205722222	-71.4804261916667	39.107
ZBW2	1490304.304	-4448981.159	4306010.843	42.7357245833333	-71.4803591916667	39.135
ZBW3	1490306.013	-4448984.784	4306006.534	42.7356717777778	-71.4803534638889	39.134
ZDC1	1069125.734	-4839598.984	4001126.510	39.1015959694444	-77.5427468500000	80.058
ZDC2	1069128.128	-4839603.615	4001120.304	39.1015239666667	-77.5427313750000	80.054
ZDC3	1069124.033	-4839602.706	4001122.501	39.1015493833333	-77.5427753333333	80.065
ZDV1	-1273628.636	-4711375.567	4094890.103	40.1873032222222	-105.1272246500000	1541.350
ZDV2	-1273622.931	-4711377.096	4094890.126	40.1873034527778	-105.1271553111110	1541.355
ZDV3	-1273624.941	-4711380.297	4094885.843	40.1872529916667	-105.1271682833330	1541.352
ZFW1	-659983.214	-5324060.765	3438276.470	32.8306497638889	-97.0664719666667	155.610
ZFW2	-659988.484	-5324063.324	3438271.476	32.8305963416667	-97.0665244583333	155.581
ZFW3	-659983.514	-5324063.843	3438271.679	32.8305983527778	-97.0664711027778	155.610
ZHU1	-513864.481	-5506451.683	3166720.459	29.9618963388889	-95.3314263944444	10.824
ZHU2	-513867.129	-5506455.077	3166714.293	29.9618318166667	-95.3314504416667	10.885
ZHU3	-513873.408	-5506457.720	3166708.696	29.9617735888889	-95.3315126666667	10.875
ZJX1	772646.425	-5434462.185	3237231.743	30.6988596861111	-81.9081853000000	2.131
ZJX2	772649.750	-5434463.729	3237228.337	30.6988240750000	-81.9081532055556	2.109
ZJX3	772645.689	-5434466.162	3237225.235	30.6987915555556	-81.9081987472222	2.105
ZKC1	-415247.539	-4954556.397	3982161.120	38.8801593833333	-94.7908340777778	305.908
ZKC2	-415231.145	-4954557.710	3982161.168	38.8801600638889	-94.7906445527778	305.891
ZKC3	-415237.265	-4954561.061	3982155.976	38.8801018861111	-94.7907116083333	305.629
ZLA1	-2474409.972	-4637294.609	3602183.542	34.6035184583333	-118.0838959277780	763.501
ZLA2	-2474404.689	-4637297.391	3602183.536	34.6035185805556	-118.0838308444440	763.471
ZLA3	-2474411.308	-4637297.109	3602179.571	34.6034744888889	-118.0838959472220	763.579
ZLC1	-1808273.230	-4486410.820	4145303.013	40.7860432305556	-111.9521777416670	1287.431
ZLC2	-1808274.634	-4486414.432	4145298.524	40.7859898388889	-111.9521771722220	1287.433

WRE	X(m)	Y(m)	Z(m)	Latitude	Longitude	H(m)
ZLC3	-1808270.423	-4486416.138	4145298.515	40.7859897305556	-111.9521233555560	1287.433
ZMA1	966042.283	-5662999.808	2761581.506	25.8246123222222	-80.3191899388889	-7.601
ZMA2	966029.312	-5662999.116	2761585.994	25.8246600444444	-80.3193163027778	-8.223
ZMA3	966037.387	-5662997.952	2761586.340	25.8246620305556	-80.3192349611111	-7.883
ZME1	4070.868	-5226189.294	3644028.420	35.0673941055556	-89.9553702527778	68.599
ZME2	4070.897	-5226186.745	3644032.542	35.0674377166667	-89.9553699138889	68.881
ZME3	4064.705	-5226186.617	3644032.694	35.0674395250000	-89.9554377972222	68.859
ZMP1	-249978.407	-4539297.504	4458955.058	44.6374632694444	-93.1520858027778	262.663
ZMP2	-249972.606	-4539297.838	4458955.056	44.6374631638889	-93.1520125694445	262.672
ZMP3	-249973.704	-4539302.120	4458950.577	44.6374070722222	-93.1520234194444	262.610
ZNY1	1406144.604	-4627343.981	4144322.056	40.7843286444444	-73.0971660277778	6.440
ZNY2	1406146.400	-4627347.017	4144317.282	40.7842759361111	-73.0971561277778	5.916
ZNY3	1406140.841	-4627348.667	4144317.316	40.7842763888889	-73.0972248250000	5.910
ZOA1	-2684436.912	-4293337.375	3865351.884	37.5430540527778	-122.0159483555560	-3.492
ZOA2	-2684433.893	-4293341.438	3865349.447	37.5430265166667	-122.0158950166670	-3.515
ZOA3	-2684438.278	-4293342.334	3865345.613	37.5429821916667	-122.0159317138890	-3.405
ZOB1	650770.158	-4754715.667	4187420.753	41.2971545194444	-82.2064450277778	223.677
ZOB2	650777.839	-4754714.842	4187422.768	41.2971668194444	-82.2063528361111	225.175
ZOB3	650776.164	-4754719.664	4187414.977	41.2970870777778	-82.2063804555556	223.452
ZSE1	-2308930.281	-3668169.677	4663526.471	47.2869931805556	-122.1883729388890	82.099
ZSE2	-2308934.677	-3668175.219	4663520.062	47.2869076027778	-122.1883830944440	82.160
ZSE3	-2308935.736	-3668179.498	4663516.121	47.2868558972222	-122.1883648083330	82.103
ZSU1	2462589.456	-5529372.122	2003724.498	18.4313359472222	-65.9934766194445	-28.083
ZSU2	2462587.519	-5529377.493	2003712.209	18.4312188527778	-65.9935140527778	-28.061
ZSU3	2462594.153	-5529375.233	2003710.130	18.4311992222222	-65.9934479861111	-28.116
ZTL1	529840.384	-5305248.811	3489342.856	33.3796886416667	-84.2967262138889	261.137
ZTL2	529846.758	-5305247.965	3489343.136	33.3796917833333	-84.2966571527778	261.118
ZTL3	529847.438	-5305251.406	3489337.903	33.3796350666667	-84.2966535555556	261.154

Figure 10-1 Build W7.012 Antenna Positions Deltas from 3/29/15 OPUS Survey

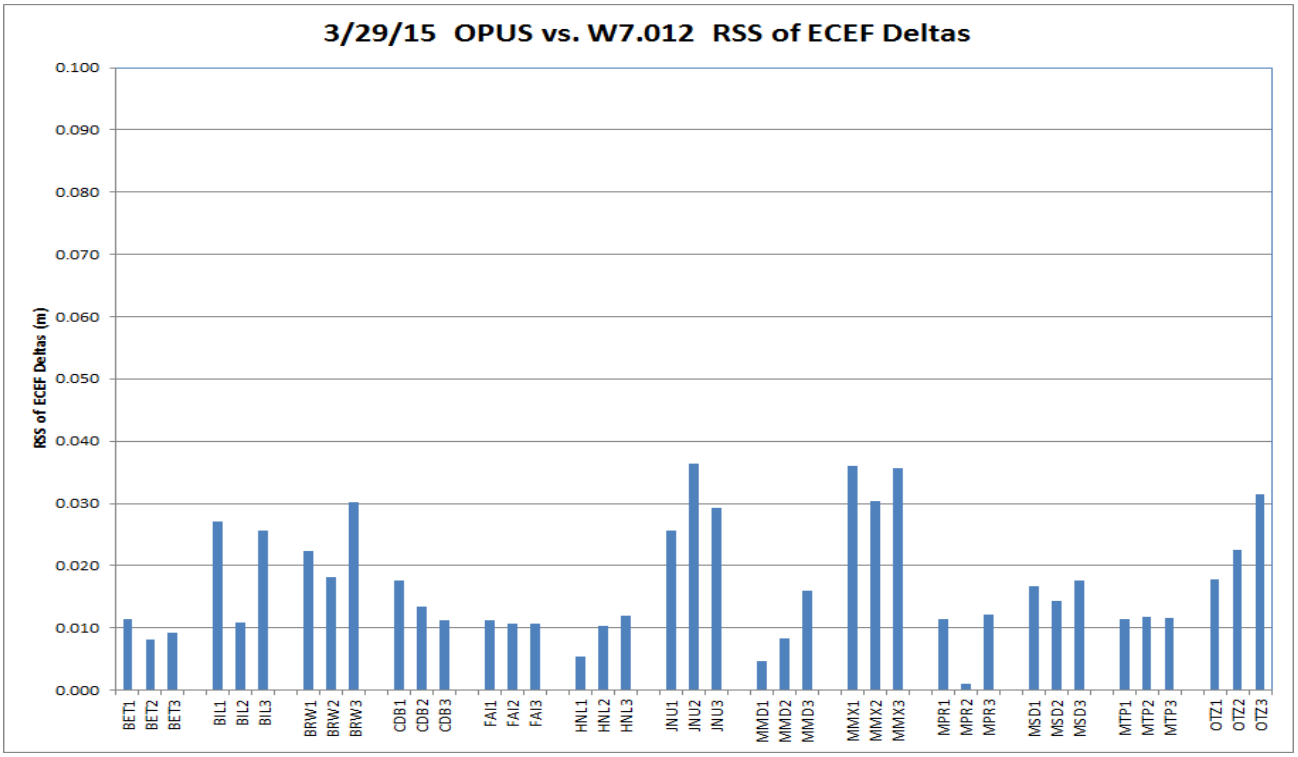


Figure 10-2 Build W7.012 Antenna Positions Deltas from 3/29/15 OPUS Survey

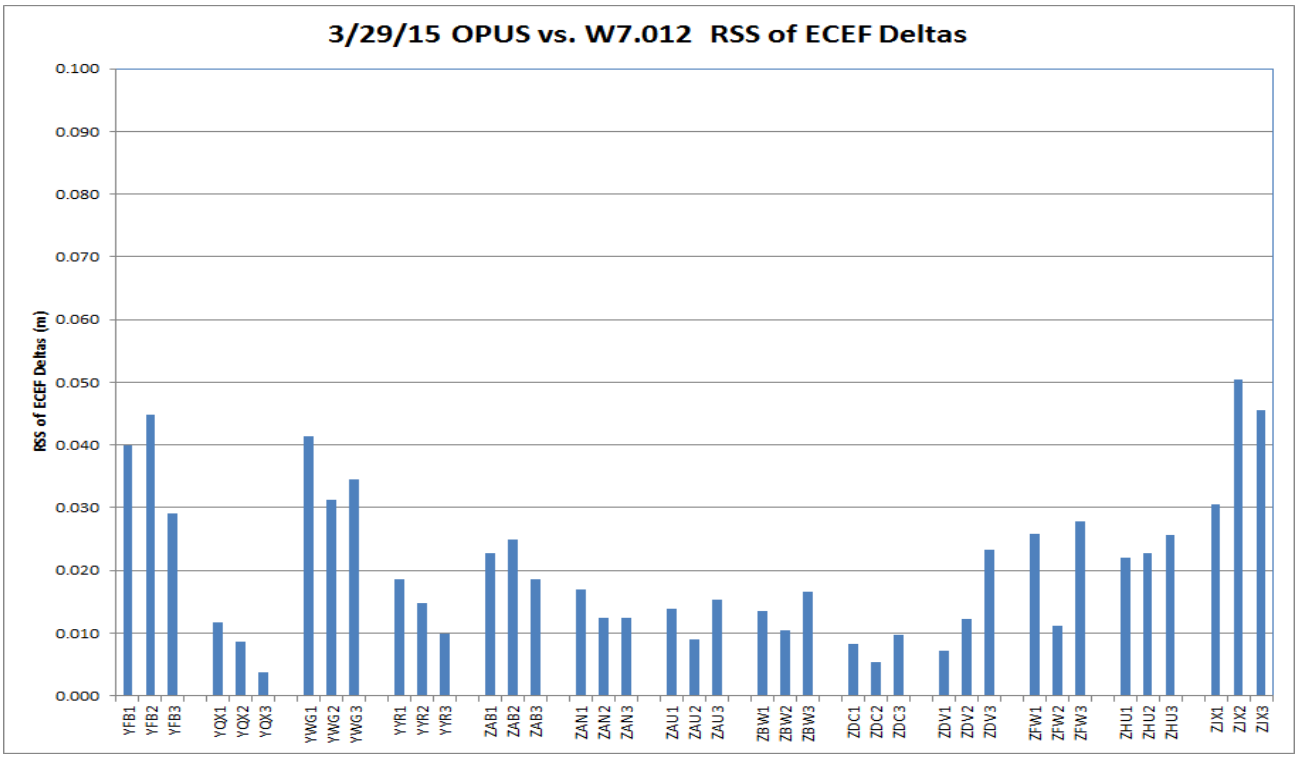


Figure 10-3 Build W7.012 Antenna Positions Deltas from 3/29/15 OPUS Survey

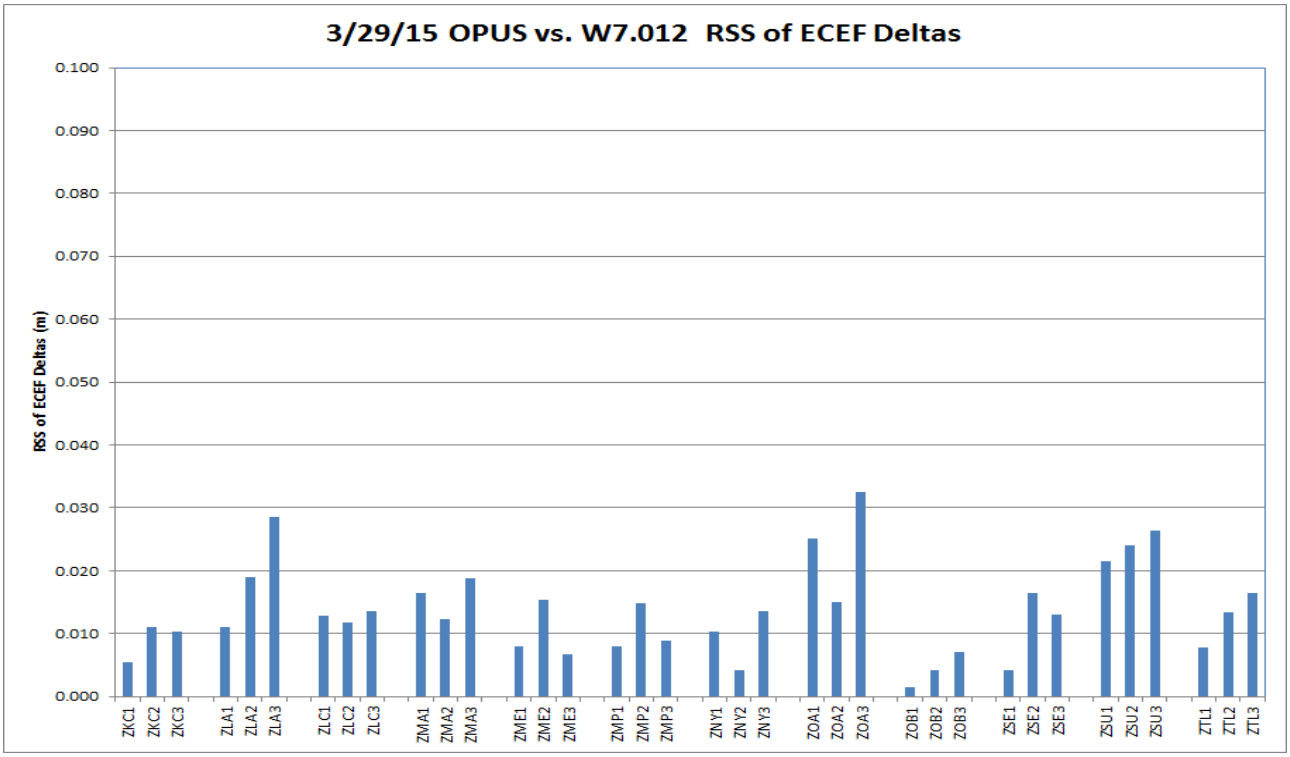


Figure 10-4 3/29/15 OPUS Survey Overall RMS Qualities

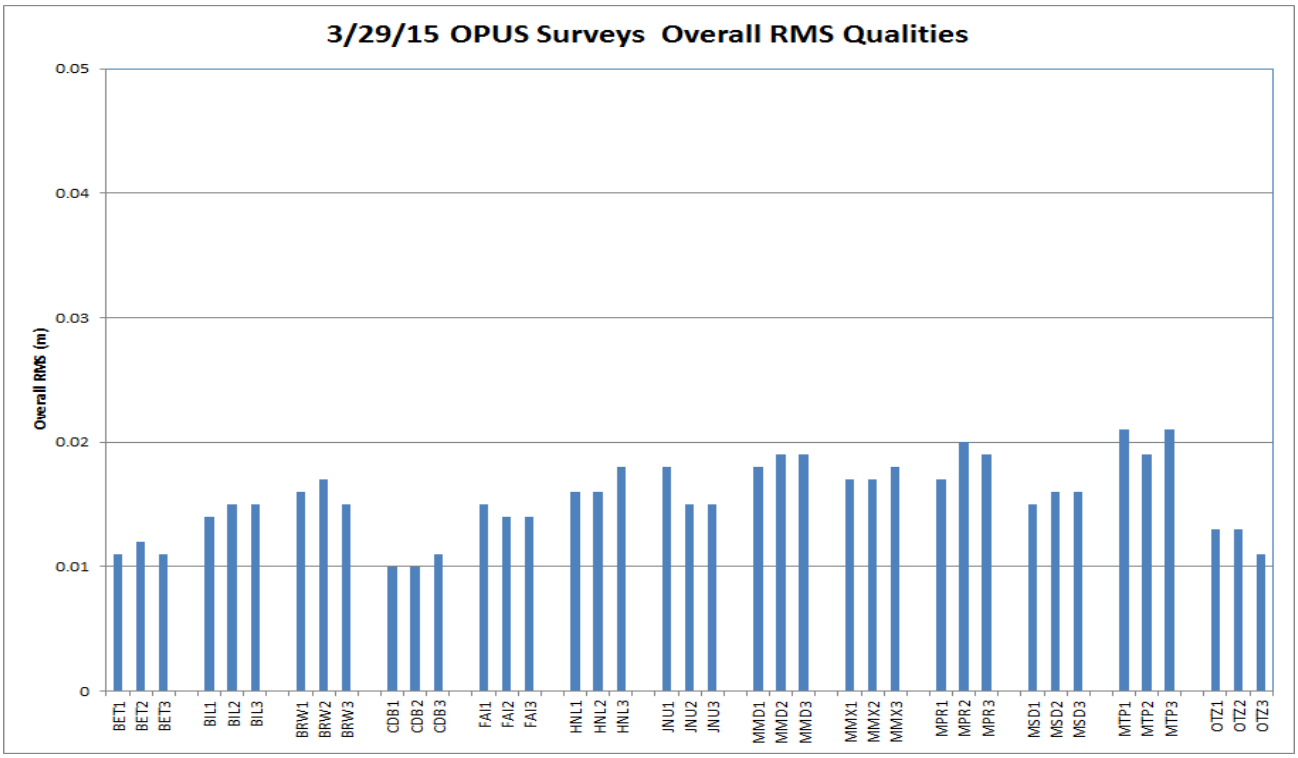


Figure 10-5 3/29/15 OPUS Survey Overall RMS Qualities

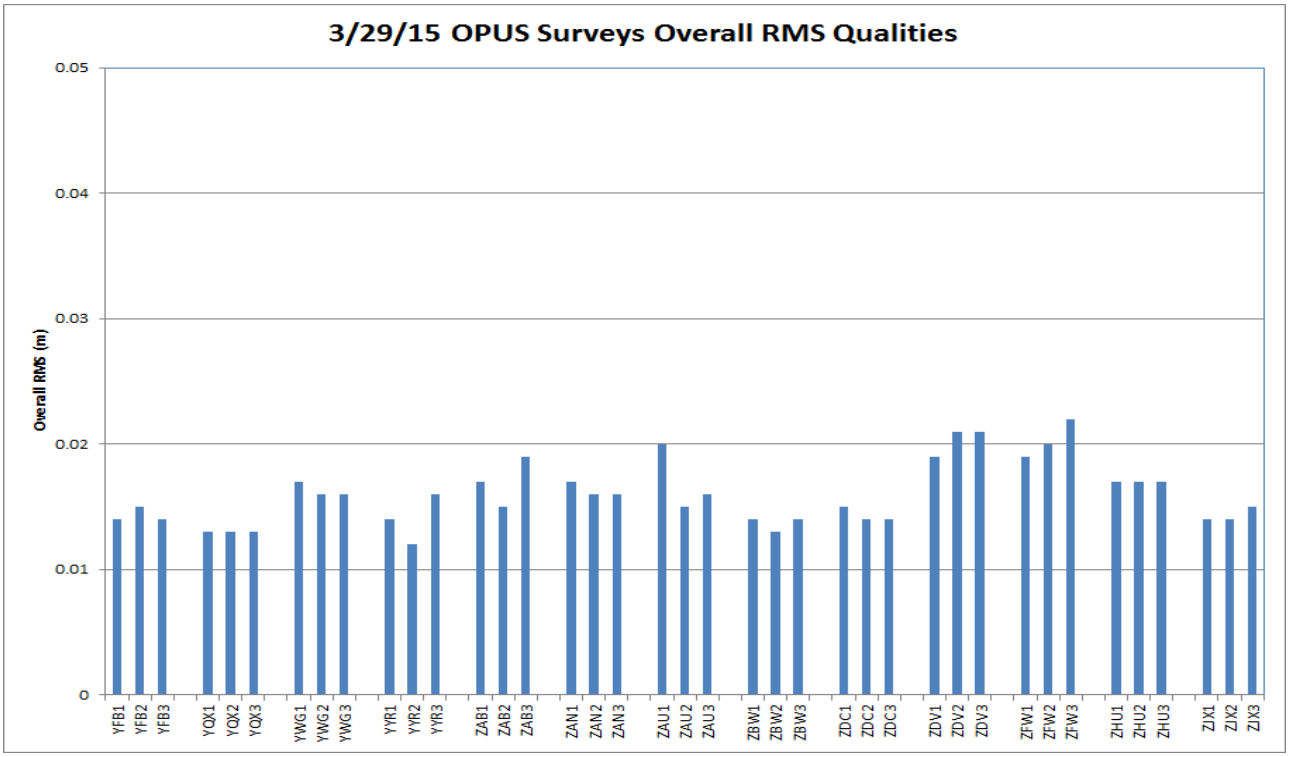


Figure 10-6 3/29/15 OPUS Survey Overall RMS Qualities

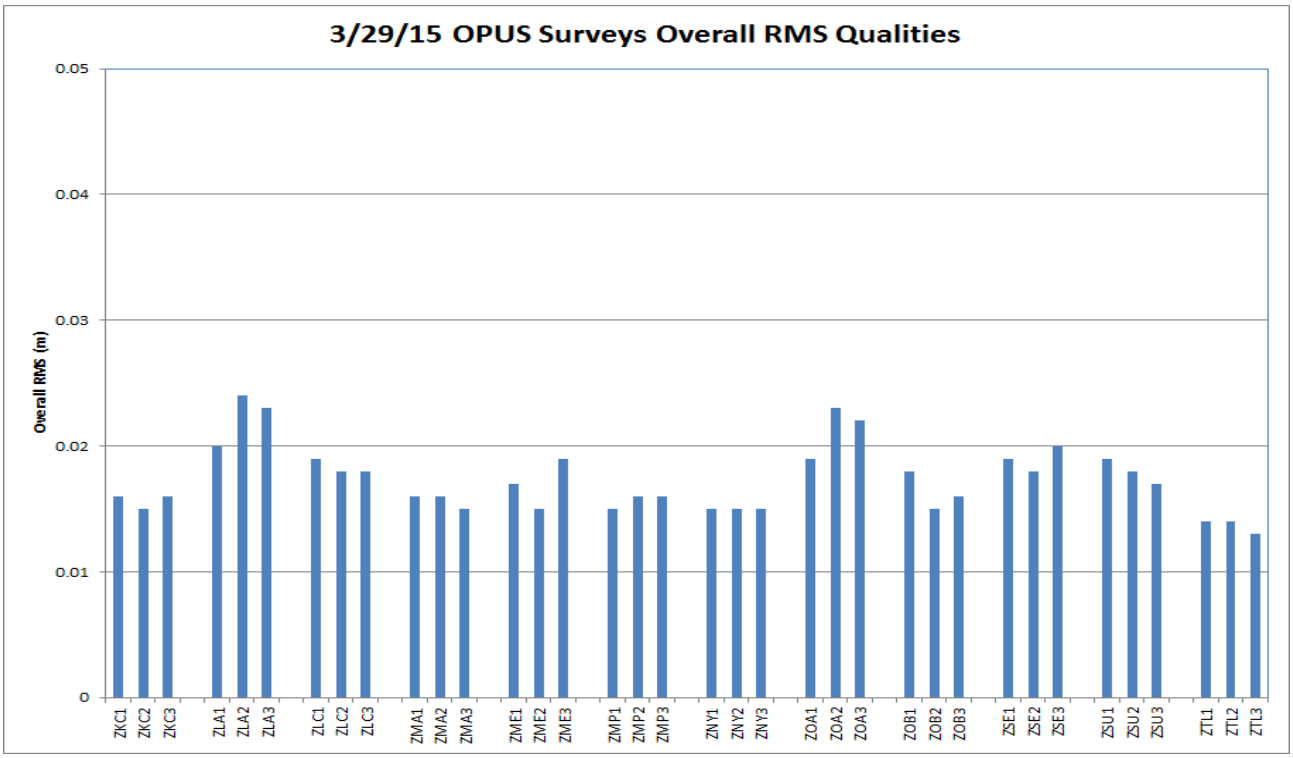


Figure 10-7 3/29/15 OPUS vs. CSRS RSS ECEF Deltas

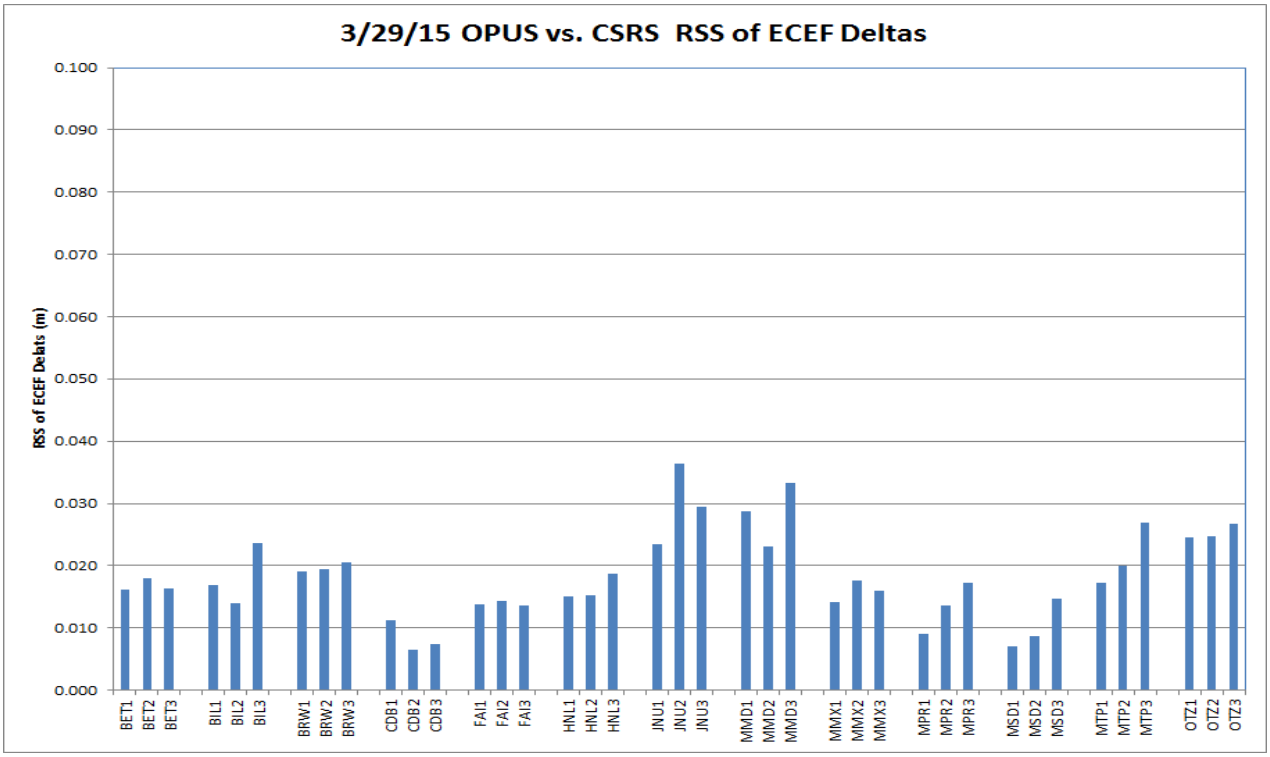


Figure 10-8 3/29/15 OPUS vs. CSRS RSS ECEF Deltas

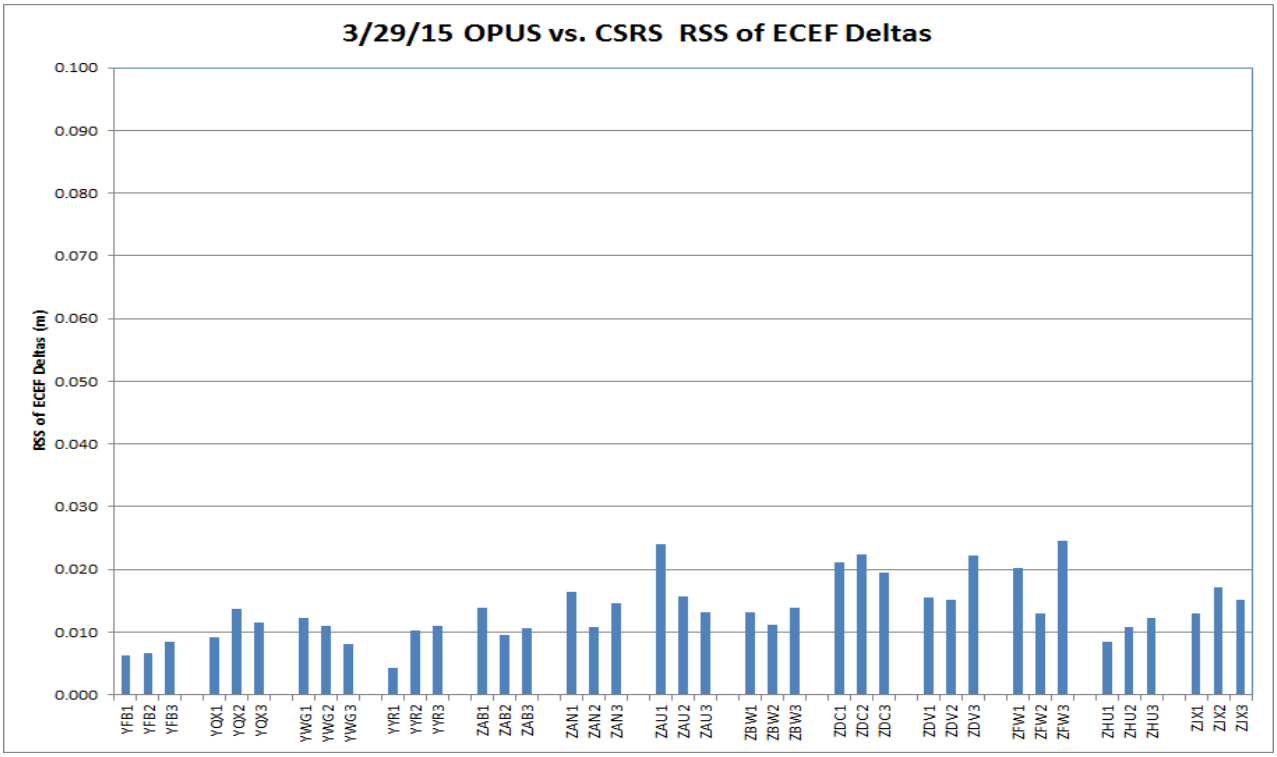


Figure 10-9 3/29/15 OPUS vs. CSRS RSS ECEF Deltas

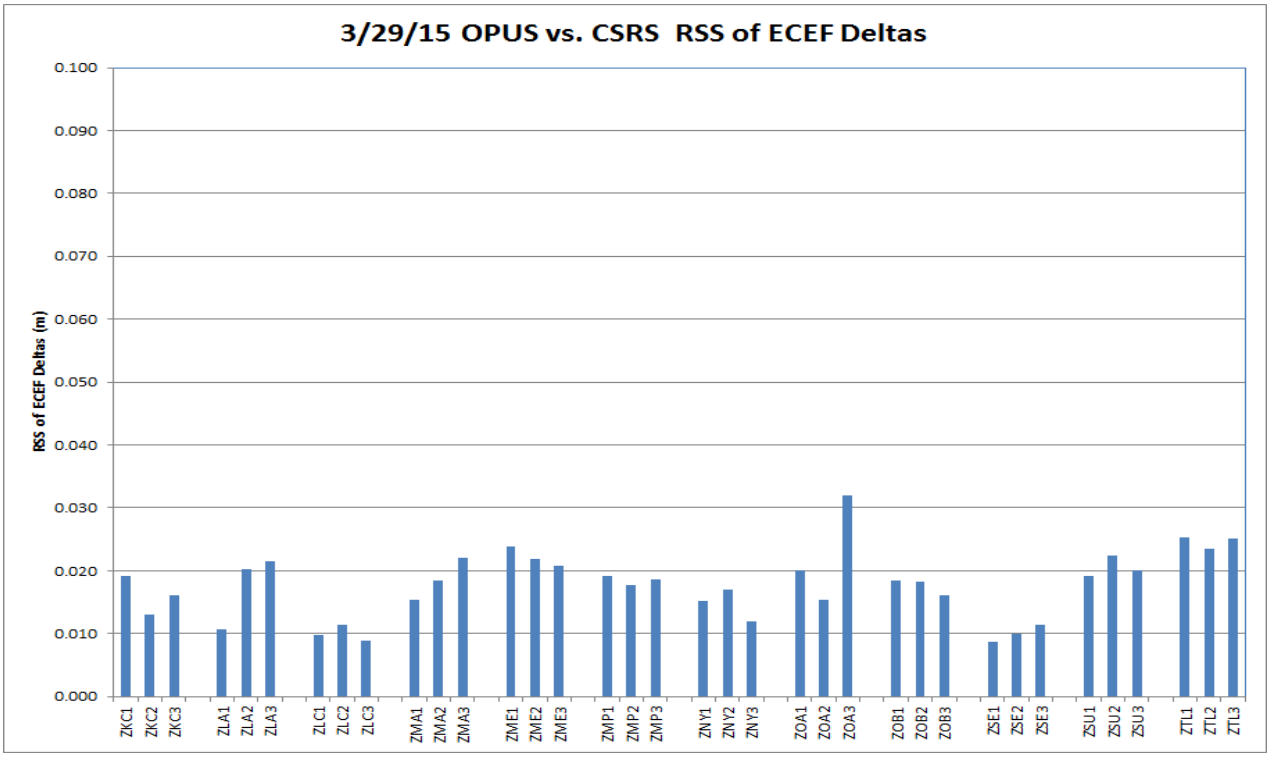


Figure 10-10 3/29/15 CSRS Survey Qualities

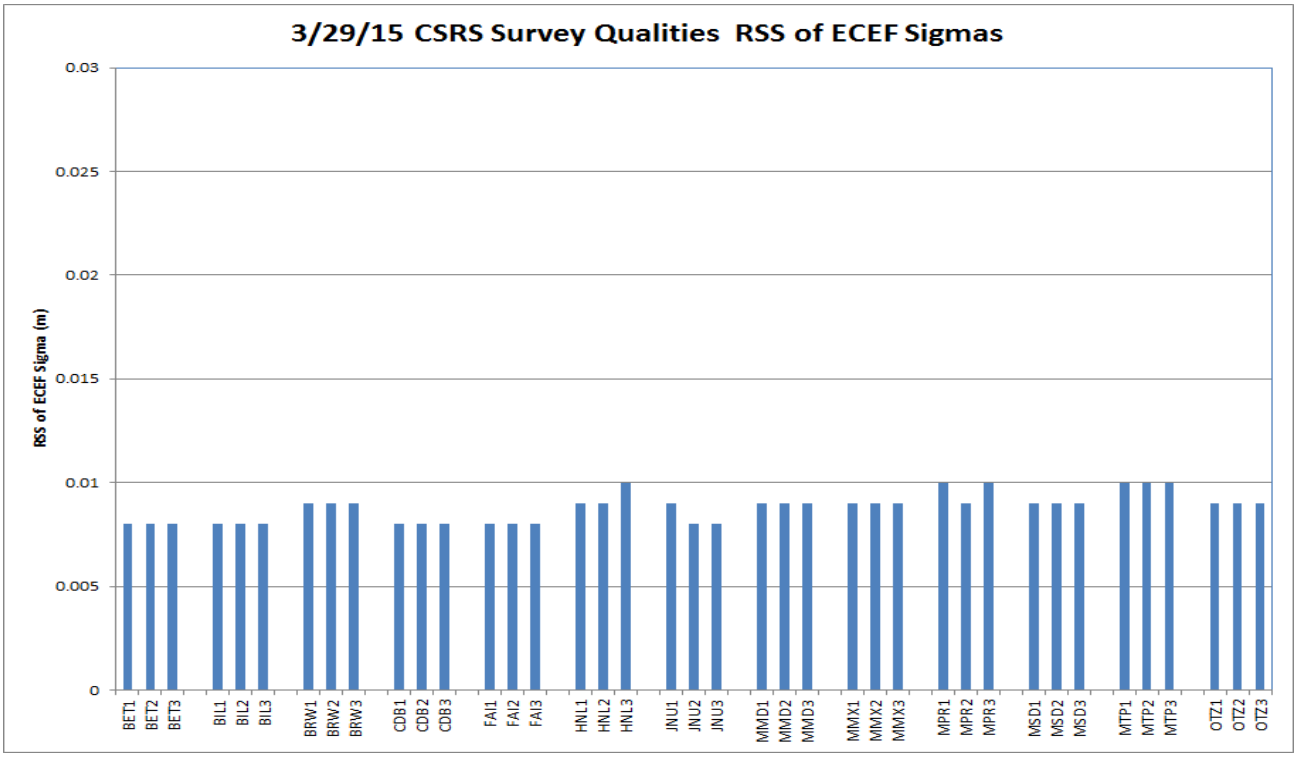


Figure 10-11 3/29/15 CSRS Survey Qualities

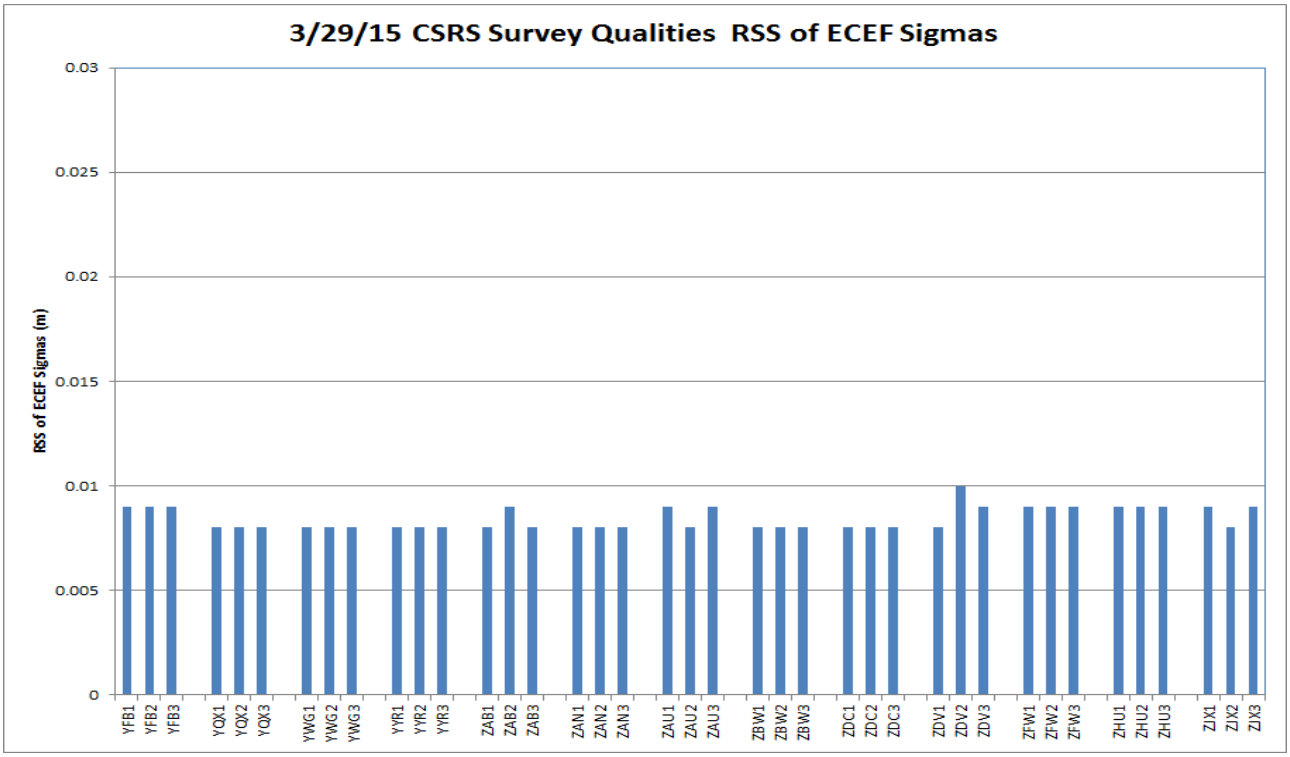
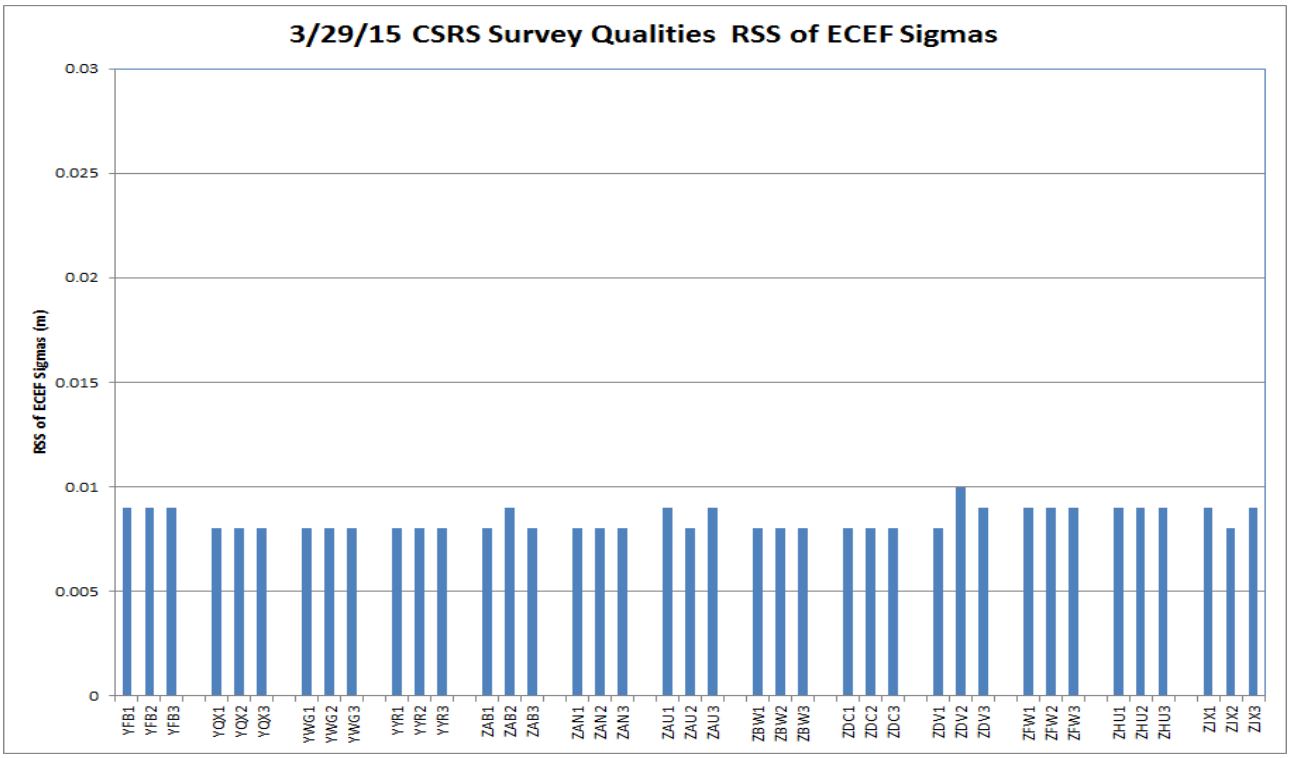


Figure 10-12 3/29/15 CSRS Survey Qualities



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

Correlator Spacing	DM1	DM2	DM3	DM4
-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.

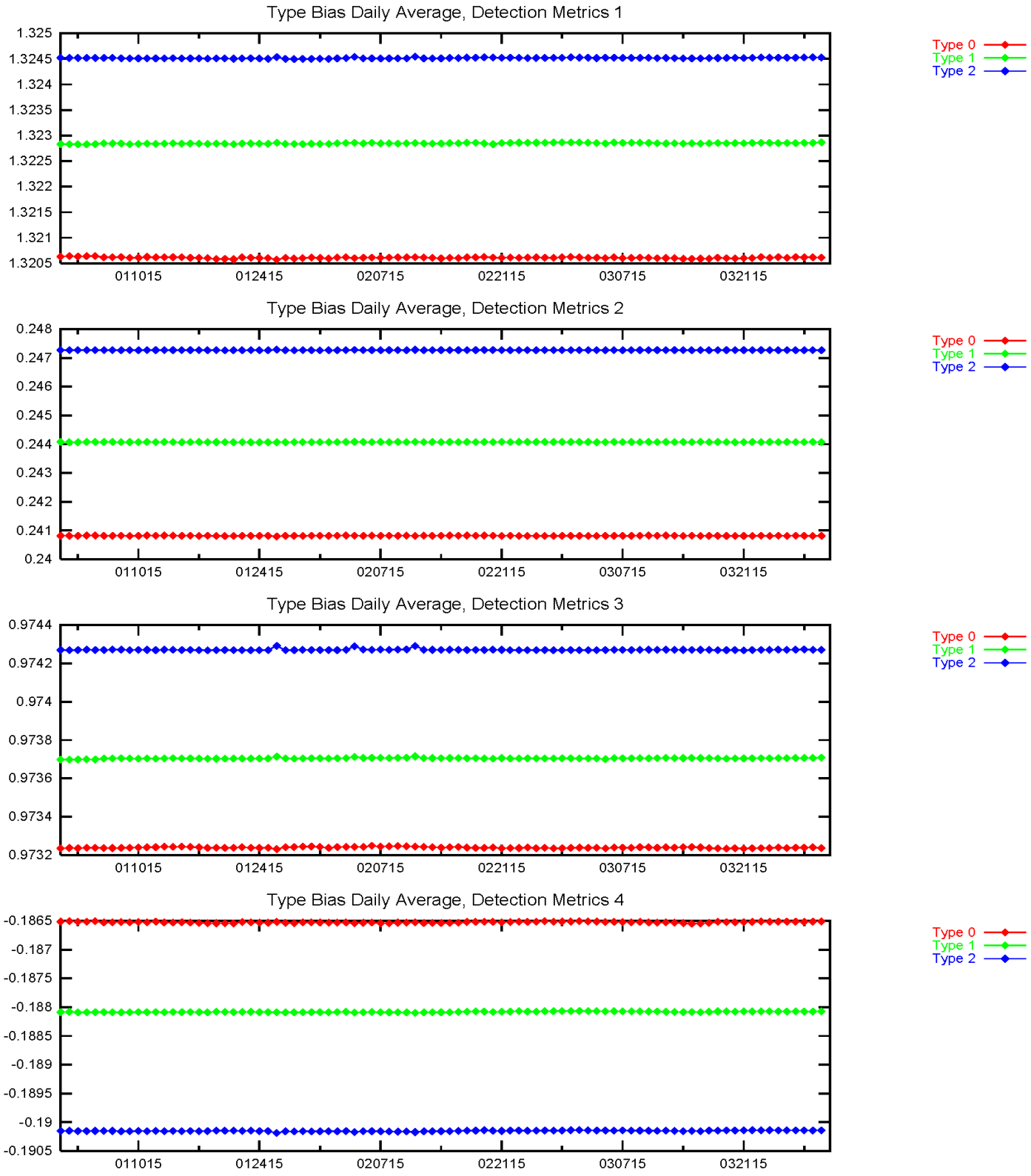
Table 11-2 Type Bias Average for the Quarter

Detection Metric	Type 0	Type 1	Type 2
DM 1	1.3206100	1.3228500	1.3245100
DM 2	0.2408160	0.2440730	0.2472680
DM 3	0.9732390	0.9737050	0.9742710
DM 4	-0.1865240	-0.1880820	-0.1901510

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

Detection Metric	Type 0	Type 1	Type 2
DM 1	1.3208800	1.3228700	1.3245800
DM 2	0.2408480	0.2440870	0.2472710
DM 3	0.9731780	0.9737080	0.9742740
DM 4	-0.1862420	-0.1880660	-0.1901080

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 0.0010489. The maximum average for DM2 is PRN 11 at 0.0002210. The maximum average for DM3 is PRN 10 at 0.0002550 and the maximum average for DM4 is PRN 23 at 0.0004256.

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-8 (SVN-38) was unavailable for this entire quarter; PRN-26 (SVN-26) was decommissioned on 1/5/15 and was available for only 5 days for this quarter.

Table 11-4 PRN Bias Average for the Quarter

PRN	SVN	DM1	DM2	DM3	DM4
1	63	0.0001428	0.0000865	0.0000790	0.0000896
2	61	0.0005654	0.0001278	0.0000947	0.0001056
3	69	0.0001169	0.0000470	0.0000828	0.0000911
4	34	0.0001945	0.0000502	0.0000686	0.0001474
5	50	0.0001154	0.0001114	0.0000614	0.0001067
6	67	0.0001944	0.0002120	0.0001529	0.0001495
7	48	0.0001257	0.0000661	0.0000299	0.0001281
8	38	Offline	Offline	Offline	Offline
9	39	0.0001681	0.0000689	0.0000897	0.0003724
10	40	0.0006026	0.0000422	0.0002550	0.0000974
11	46	0.0009792	0.0002210	0.0000646	0.0002491
12	58	0.0001314	0.0000666	0.0000923	0.0000764
13	43	0.0005424	0.0000445	0.0000645	0.0001629
14	41	0.0007102	0.0001360	0.0001270	0.0001161
15	55	0.0001390	0.0000536	0.0000270	0.0001442
16	56	0.0001346	0.0000552	0.0001199	0.0003415
17	53	0.0001714	0.0000640	0.0000430	0.0001167
18	54	0.0007051	0.0001410	0.0000549	0.0002354
19	59	0.0004706	0.0001835	0.0000510	0.0000934
20	51	0.0001310	0.0000509	0.0000320	0.0001834
21	45	0.0003901	0.0001330	0.0001683	0.0001030
22	47	0.0003670	0.0000559	0.0001025	0.0003384
23	60	0.0010489	0.0001706	0.0000366	0.0004256
24	65	0.0002237	0.0000470	0.0000334	0.0001184
25	62	0.0002861	0.0001796	0.0000800	0.0001299
26	26	0.0002088	0.0000556	0.0001337	0.0000833
27	66	0.0006256	0.0001800	0.0000755	0.0003067
28	44	0.0002914	0.0000459	0.0000295	0.0000877
29	57	0.0002964	0.0000539	0.0000948	0.0002848
30	64	0.0002199	0.0000556	0.0000522	0.0001561
31	52	0.0003557	0.0001378	0.0000306	0.0002566
32	23	0.0001765	0.0000621	0.0000904	0.0000993

Figure 11-2 PRN Bias Average for the Quarter

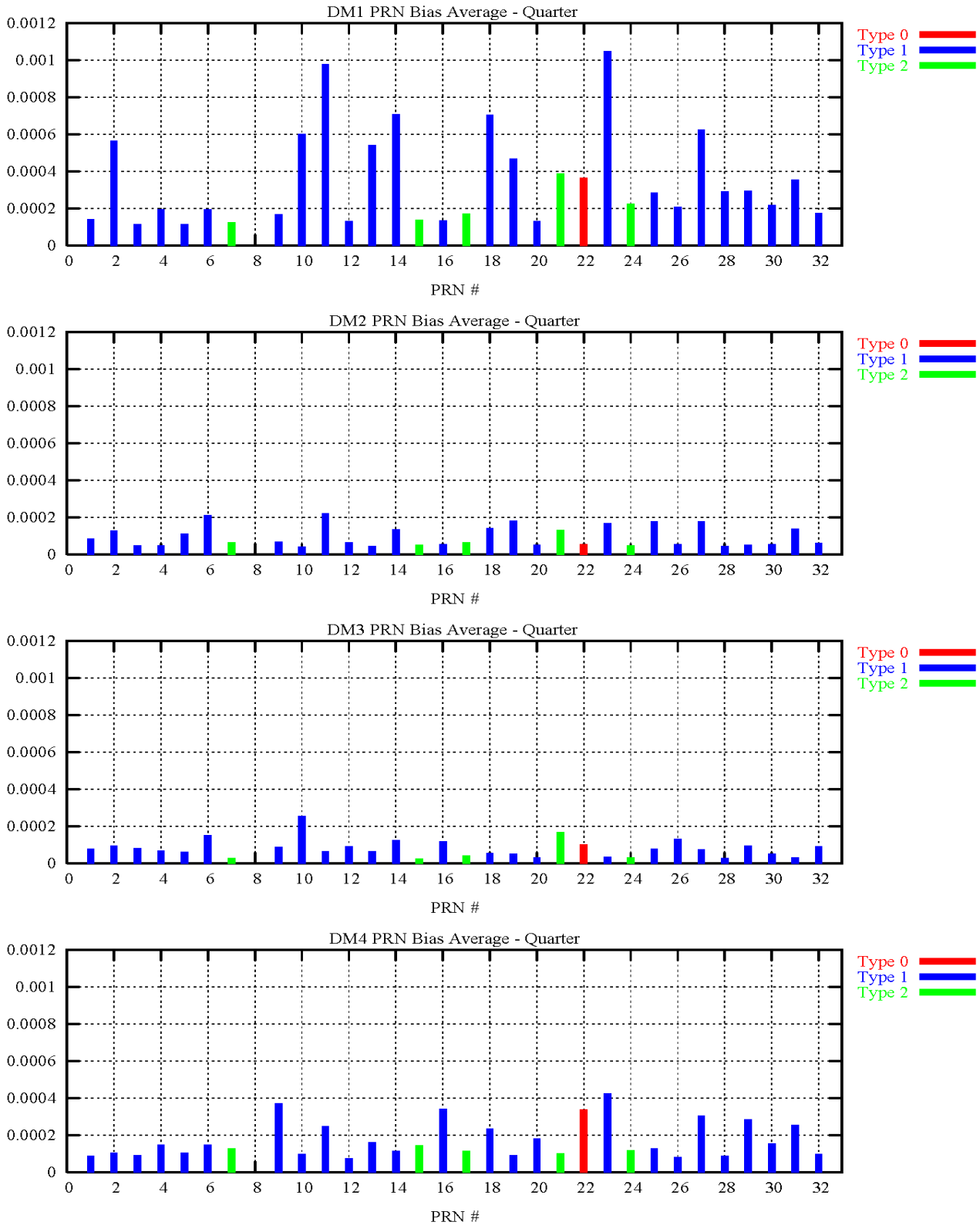


Figure 11-3 PRN Bias Average Trend (PRN 1 – PRN 4)

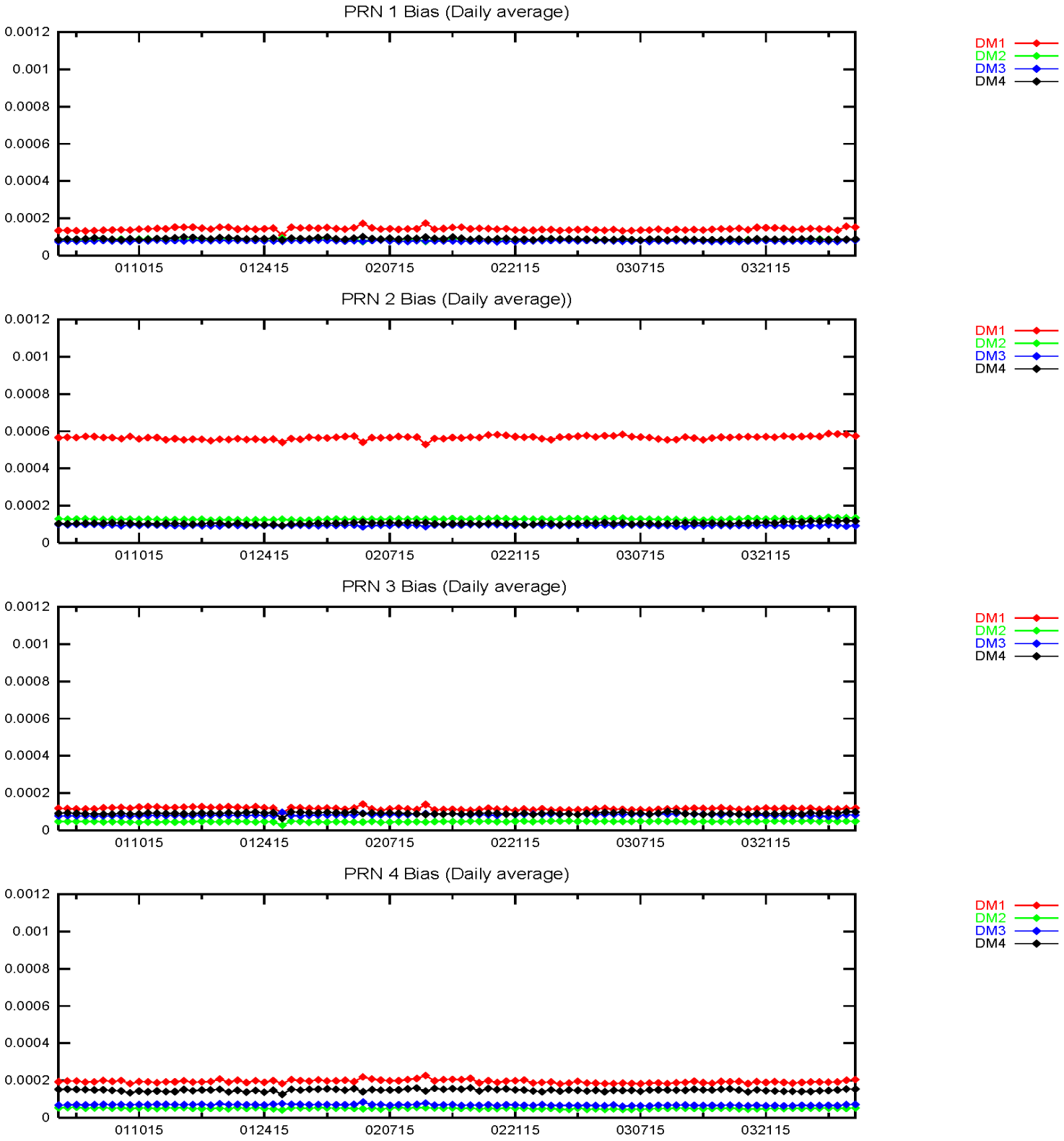


Figure 11-4 PRN Bias Average Trend (PRN 5 – PRN 8)

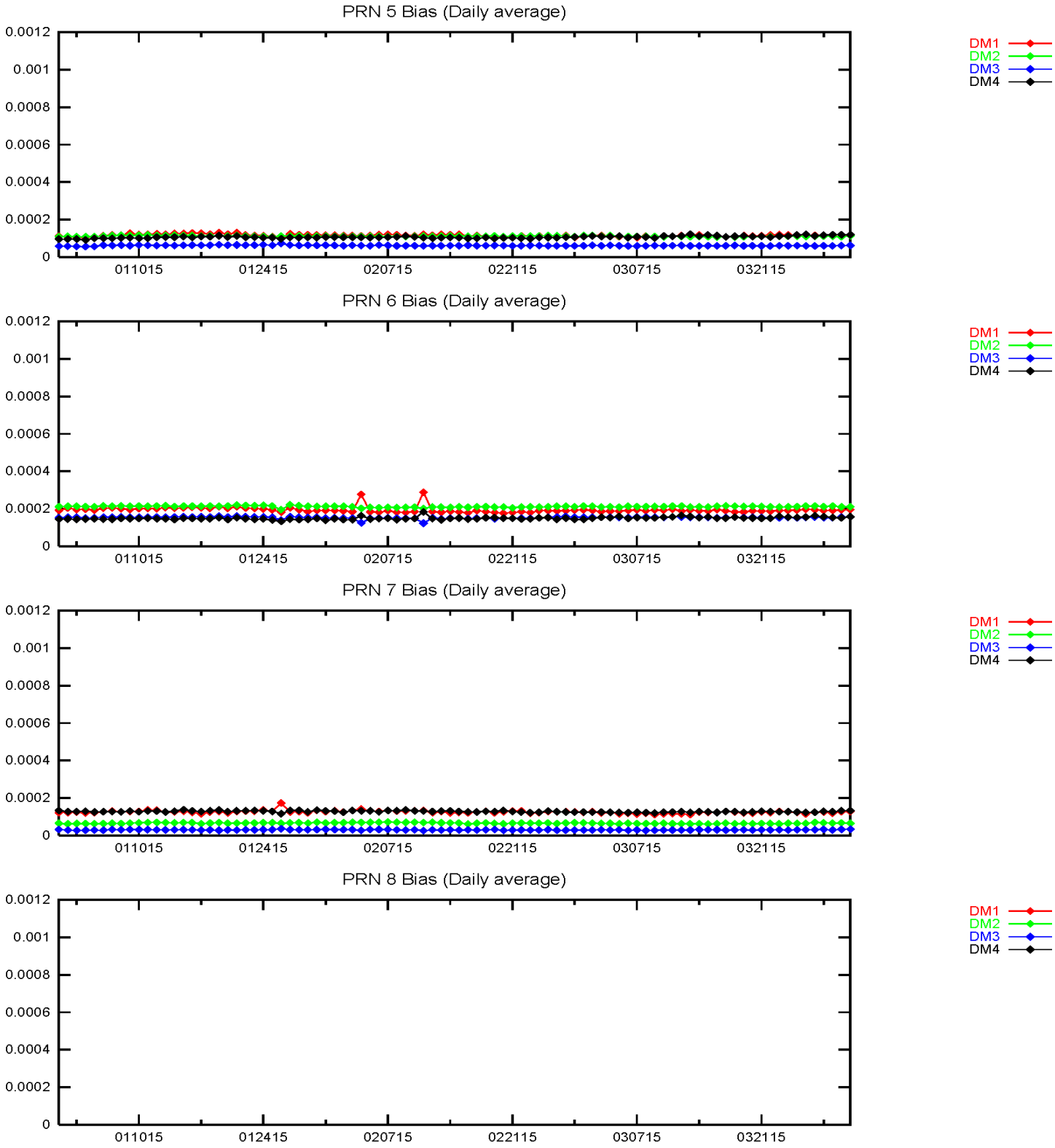


Figure 11-5 PRN Bias Average Trend (PRN 9 – PRN 12)

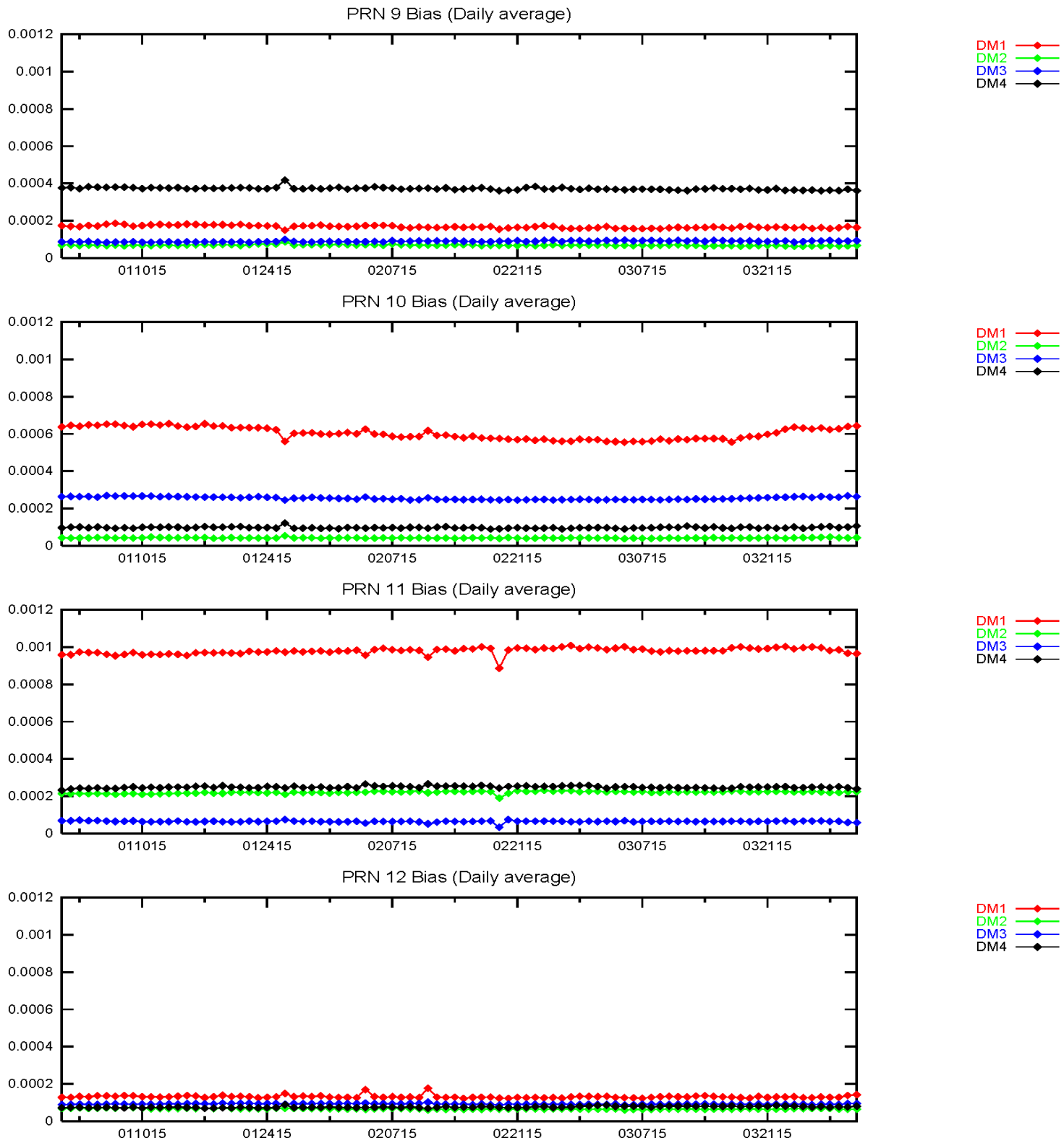


Figure 11-6 PRN Bias Average Trend (PRN 13 – PRN 16)

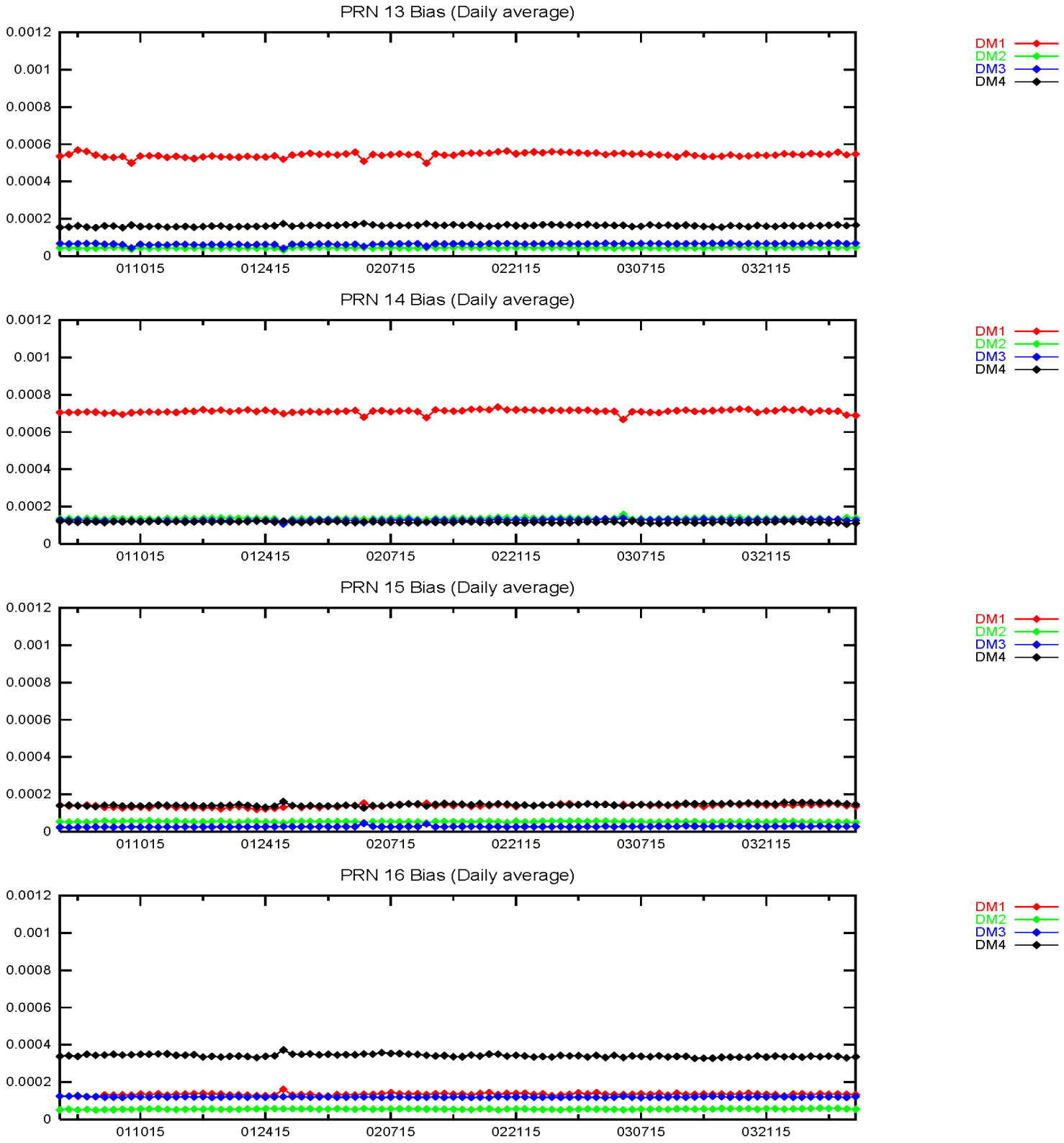


Figure 11-7 PRN Bias Average Trend (PRN 17 – PRN 20)

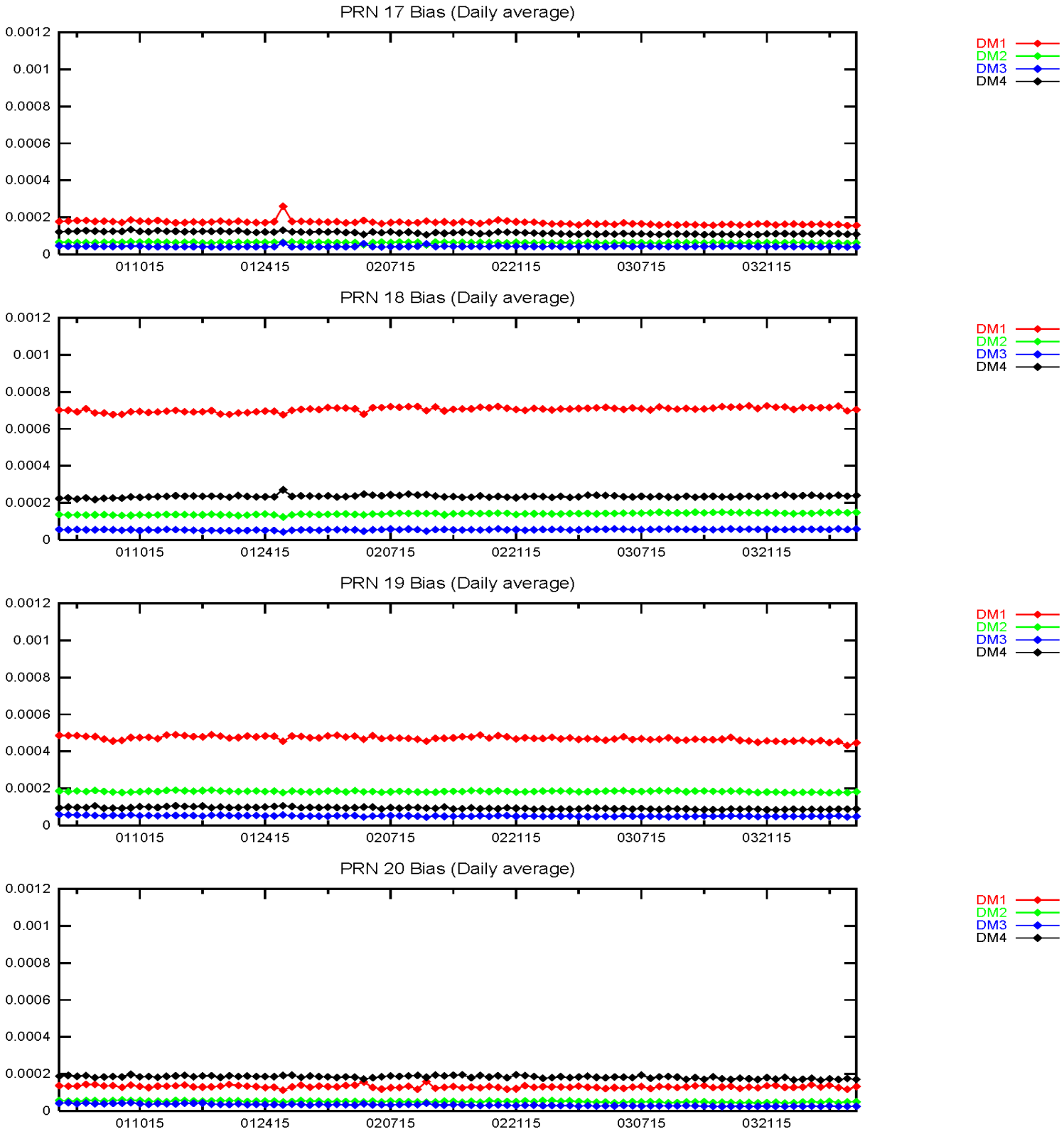


Figure 11-8 PRN Bias Average Trend (PRN 21 – PRN 24)

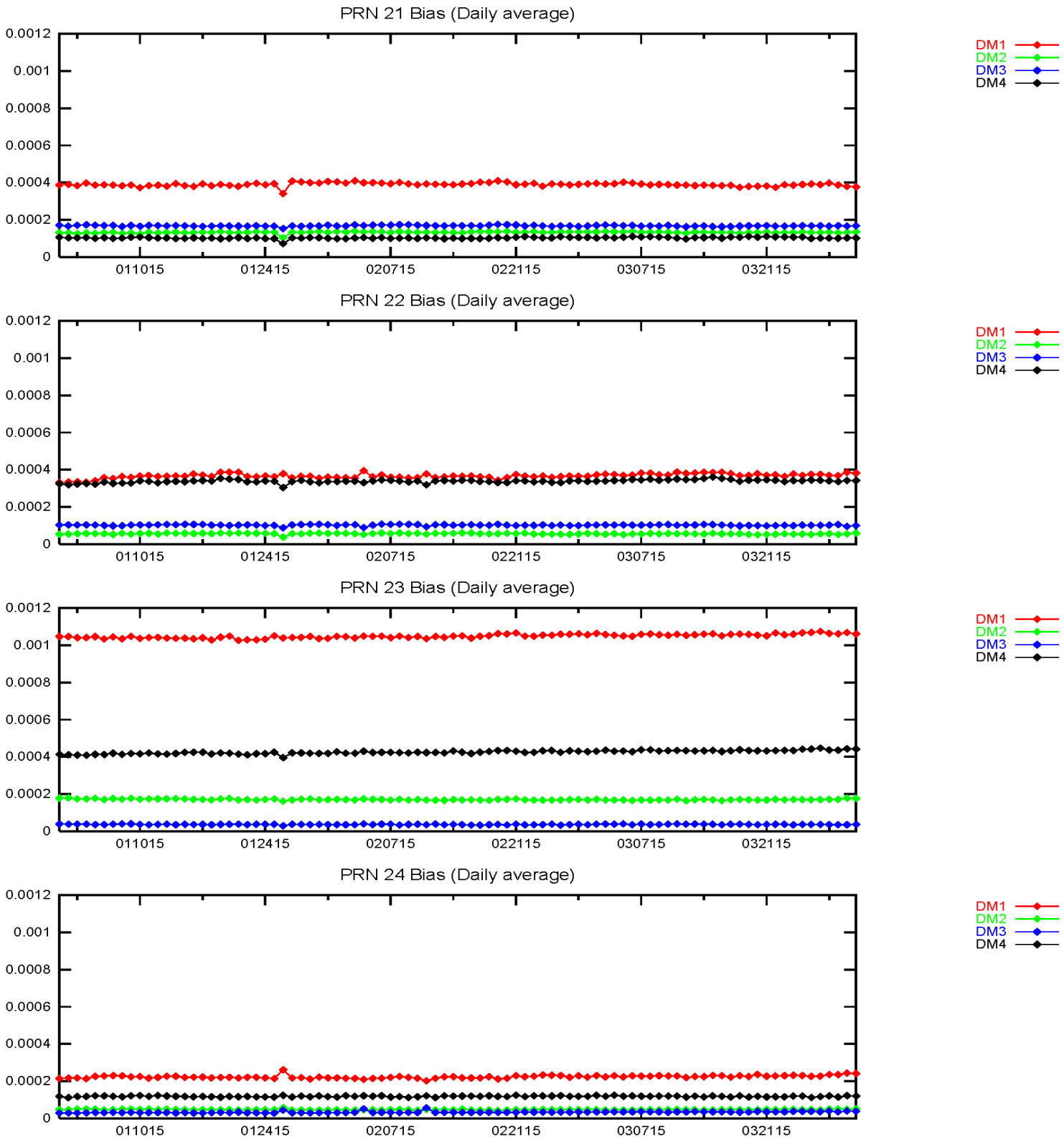


Figure 11-9 PRN Bias Average Trend (PRN 25 – PRN 28)

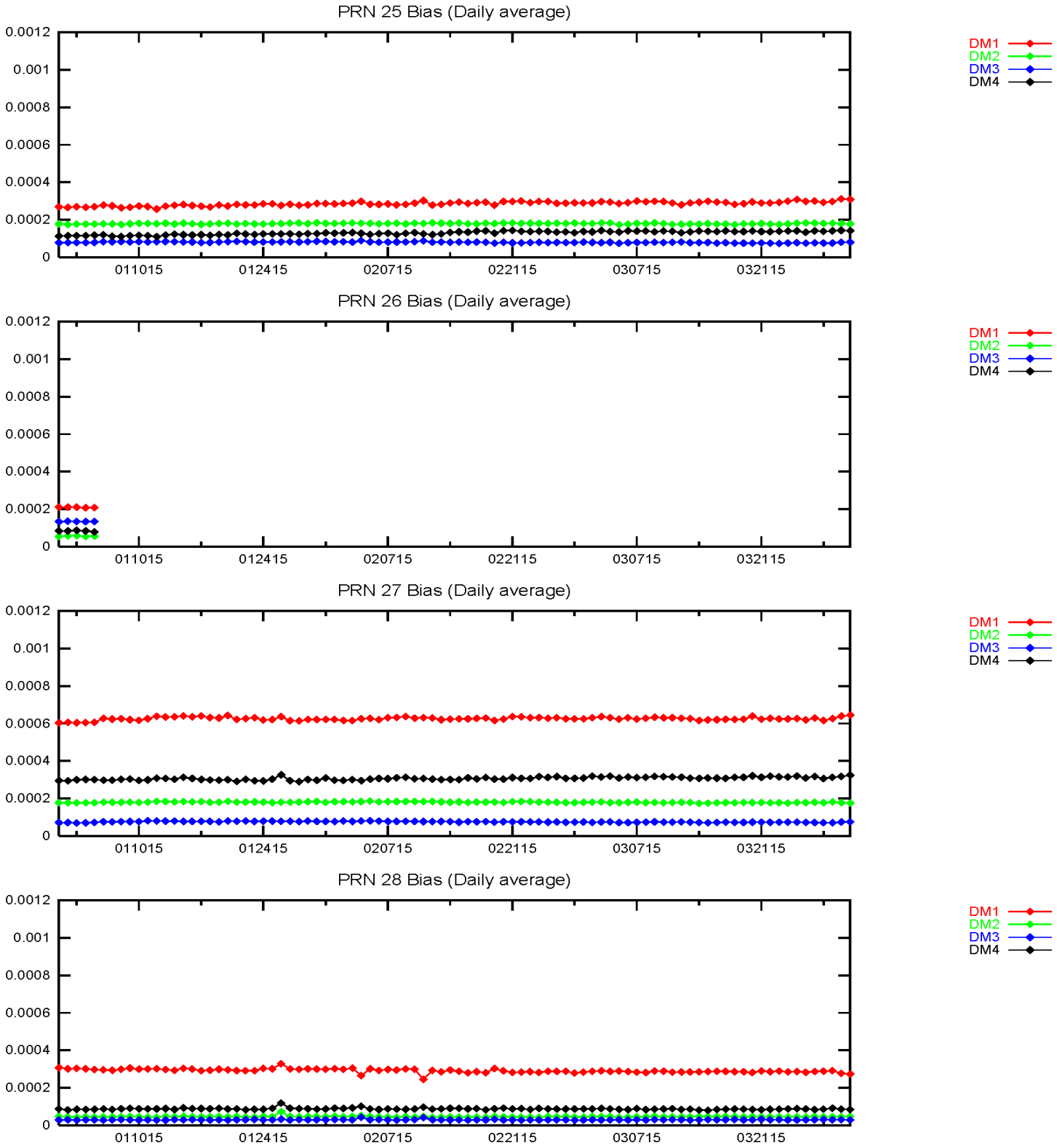
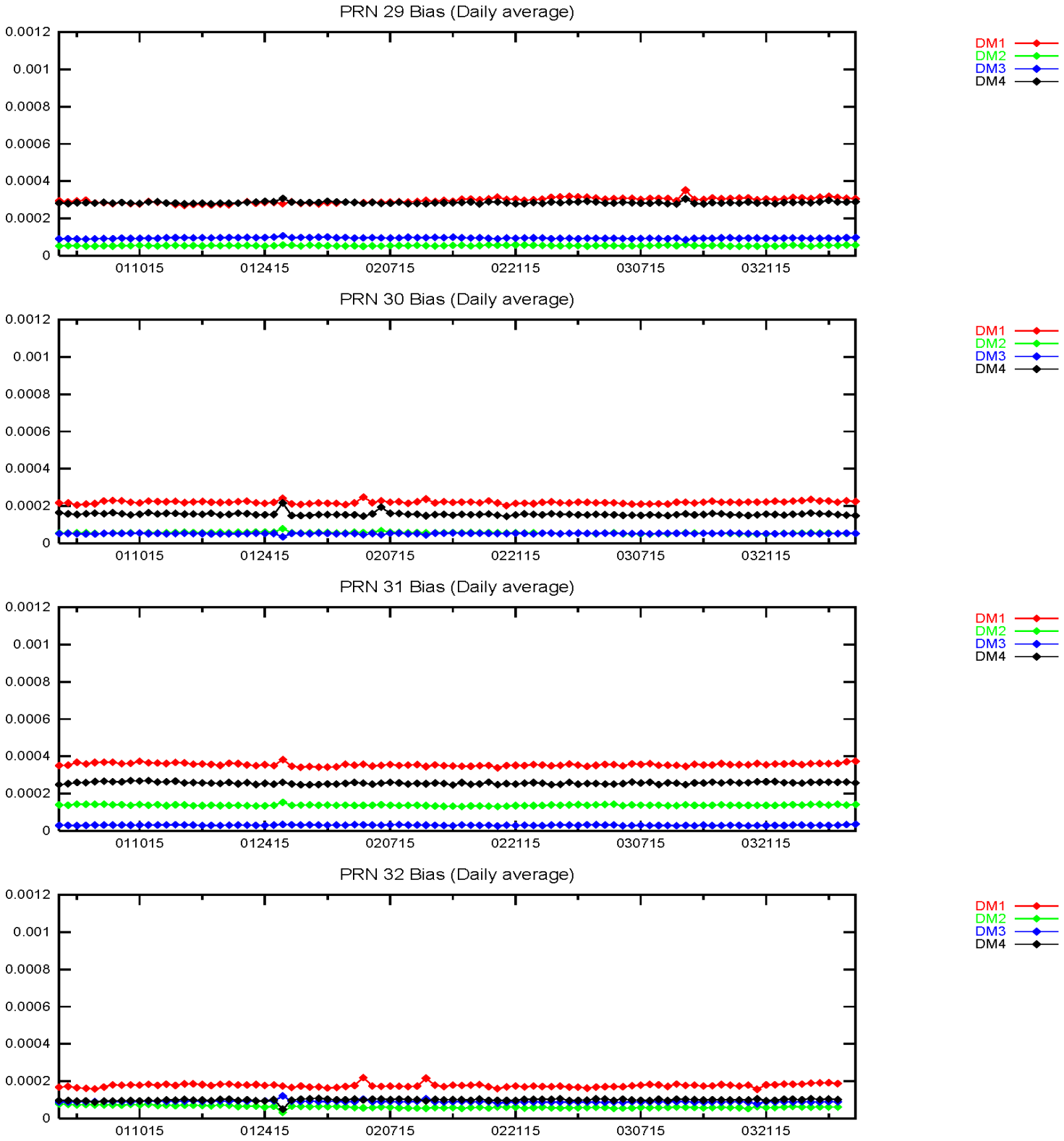


Figure 11-10 PRN Bias Average Trend (PRN 29 – PRN 32)



11.4 SQM Trips

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

12.0 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.

12.1 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 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.

For this reporting period, the maximum 95% horizontal and vertical LPV errors are 1.05 meters at Seattle-B and 1.975 meters at Miami-A, respectively. The minimum 95% horizontal and vertical LPV errors are 0.777 meters and 01.023 meters, both at Chicago-B, respectively. There were a couple data outages for this quarter: January 18-19, and February 20-23.

Table 12-1 PA Evaluation Sites for G3 Receivers

Location	Days Evaluated	Samples
Boston-A	52	4519703
Boston-B	49	4206840
Chicago-A	52	4455747
Chicago-B	58	5038257
Fairbanks-A	58	5027455
Fairbanks-B	56	4806397
Honolulu-A	58	5035854
Honolulu-B	57	4905671
Miami-A	58	5038134
Miami-B	52	4456220
Seattle-A	58	5037802
Seattle-B	58	5038241

Table 12-2 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	0.911	0.911	1.204	100
Boston-B	0.88	0.88	1.129	100
Chicago-A	0.976	0.977	1.115	100
Chicago-B	0.783	0.784	1.022	100
Fairbanks-A	0.819	0.82	1.466	99.99999
Fairbanks-B	0.889	0.89	1.503	100
Miami-A	1.03	1.03	1.914	100
Miami-B	0.97	0.97	1.855	100
Seattle-A	0.845	0.845	1.073	100
Seattle-B	1.056	1.056	1.161	100
Honolulu-A *	8.69	15.011	-	88.08738
Honolulu-B *	8.739	15.11	-	86.40394

* 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.

Table 12-3 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	4.795	0.171	0.19	5.543	0.168	0.205
Boston-B	4.426	0.176	0.176	5.74	0.174	0.189
Chicago-A	2.989	0.079	0.199	4.938	0.128	0.168
Chicago-B	2.865	0.116	0.182	4.593	0.134	0.171
Fairbanks-A	3.865	0.283	0.304	6.991	0.192	0.269
Fairbanks-B	3.461	0.121	0.264	9.21	0.207	0.26
Miami-A	3.643	0.145	0.196	4.195	0.158	0.203
Miami-B	3.824	0.158	0.19	4.205	0.133	0.213
Seattle-A	2.02	0.099	0.191	4.649	0.239	0.266
Seattle-B	2.3	0.149	0.199	4.247	0.207	0.244
Honolulu-A *	15.889	0.237	-	29.597	0.32	-
Honolulu-B *	16.002	0.238	-	29.842	0.323	-

* 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.

Figure 12-1 LPV 95% Horizontal Accuracy

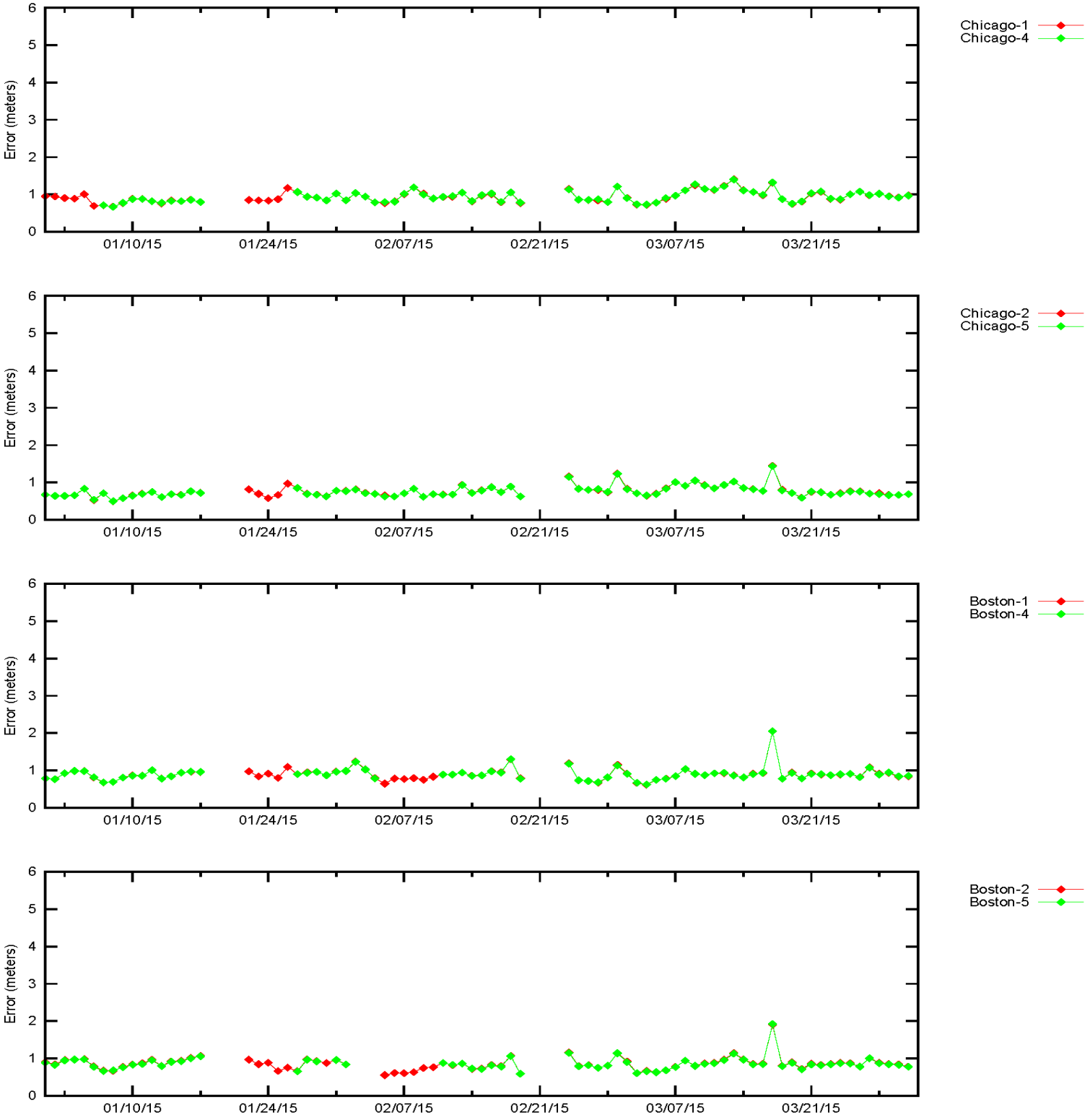


Figure 12-2 LPV 95% Horizontal Accuracy

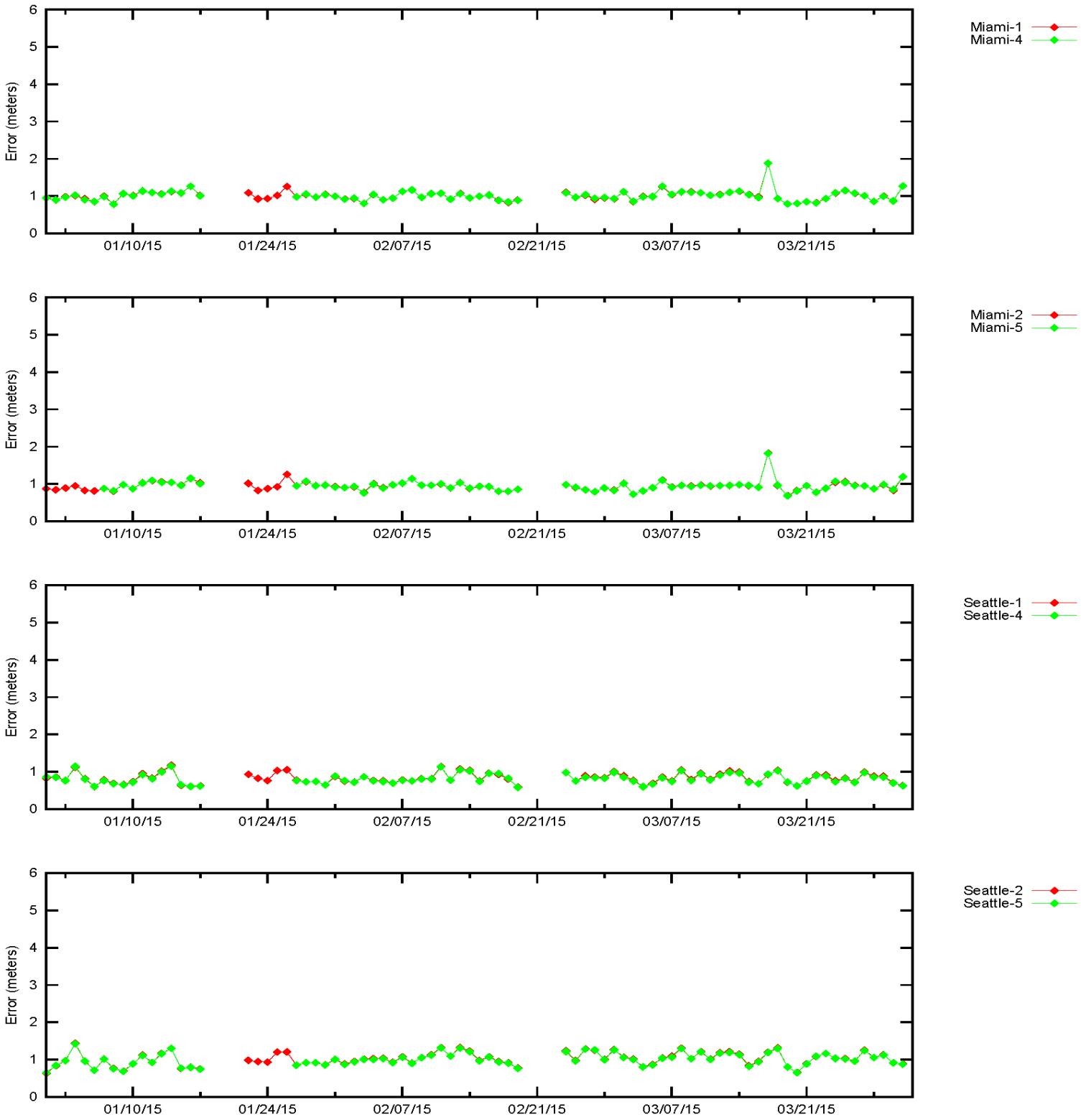


Figure 12-3 LPV 95% Vertical Accuracy

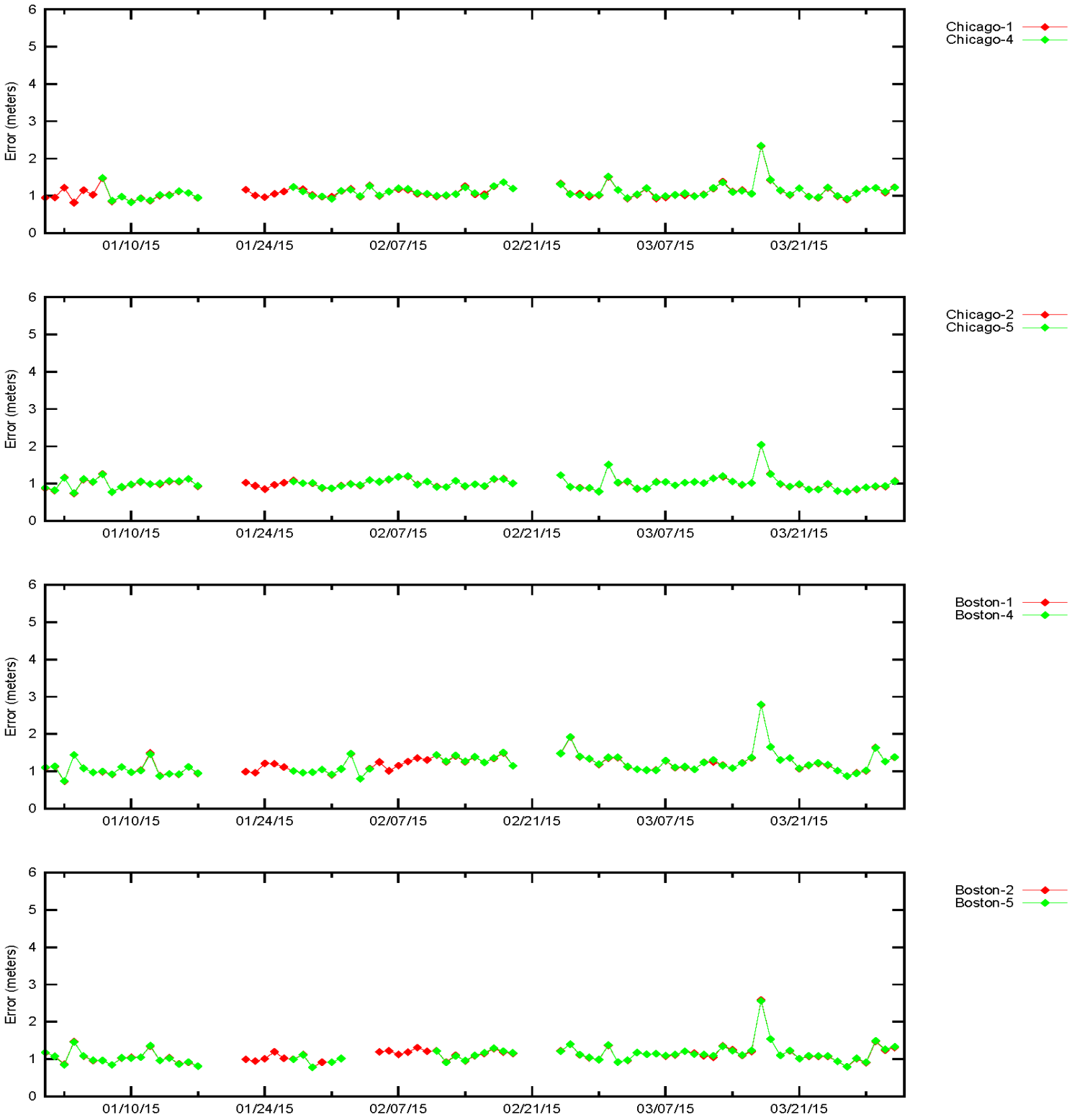


Figure 12-4 LPV 95% Vertical Accuracy

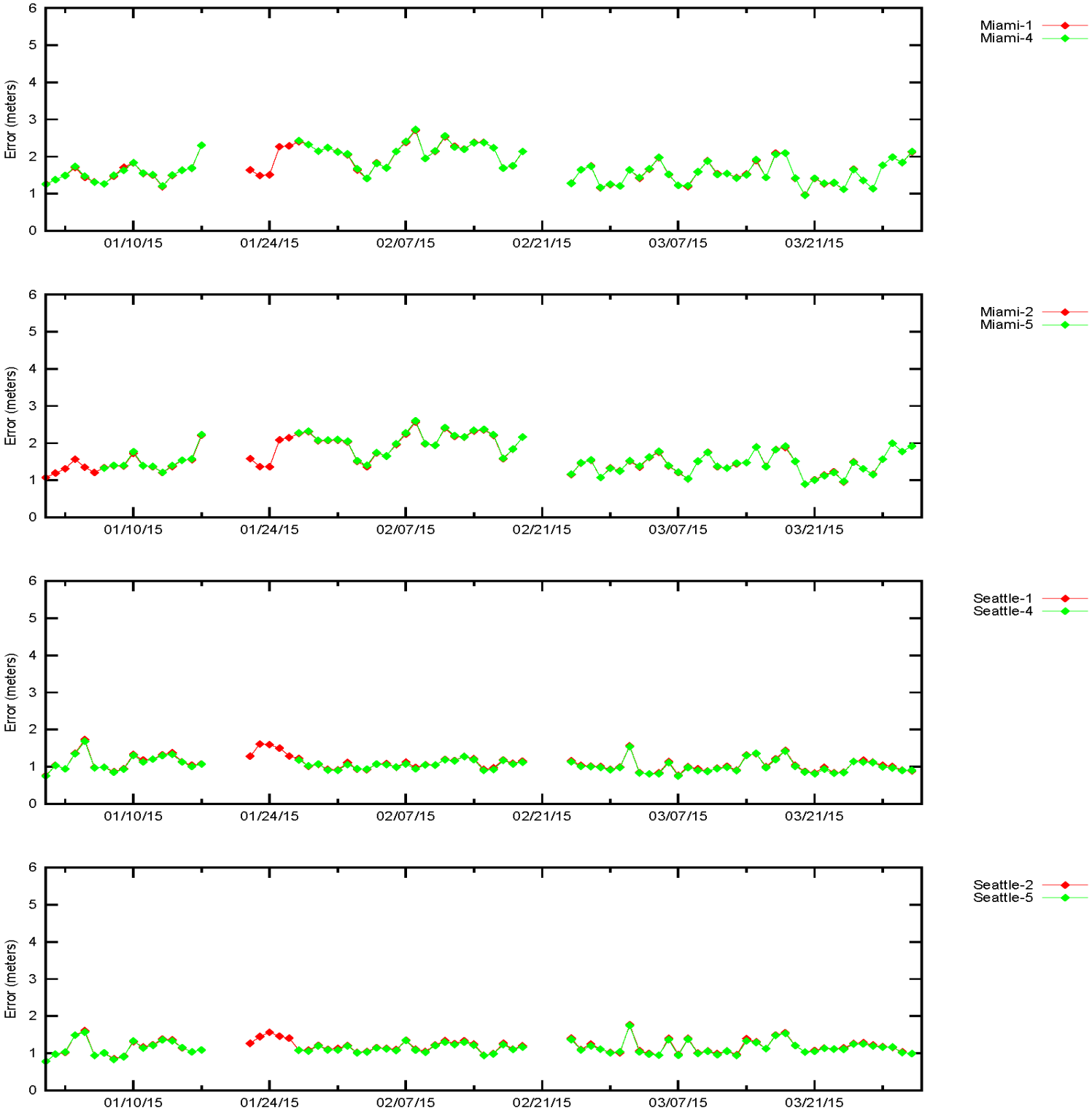


Figure 12-5 LPV Horizontal Error Distribution Histogram

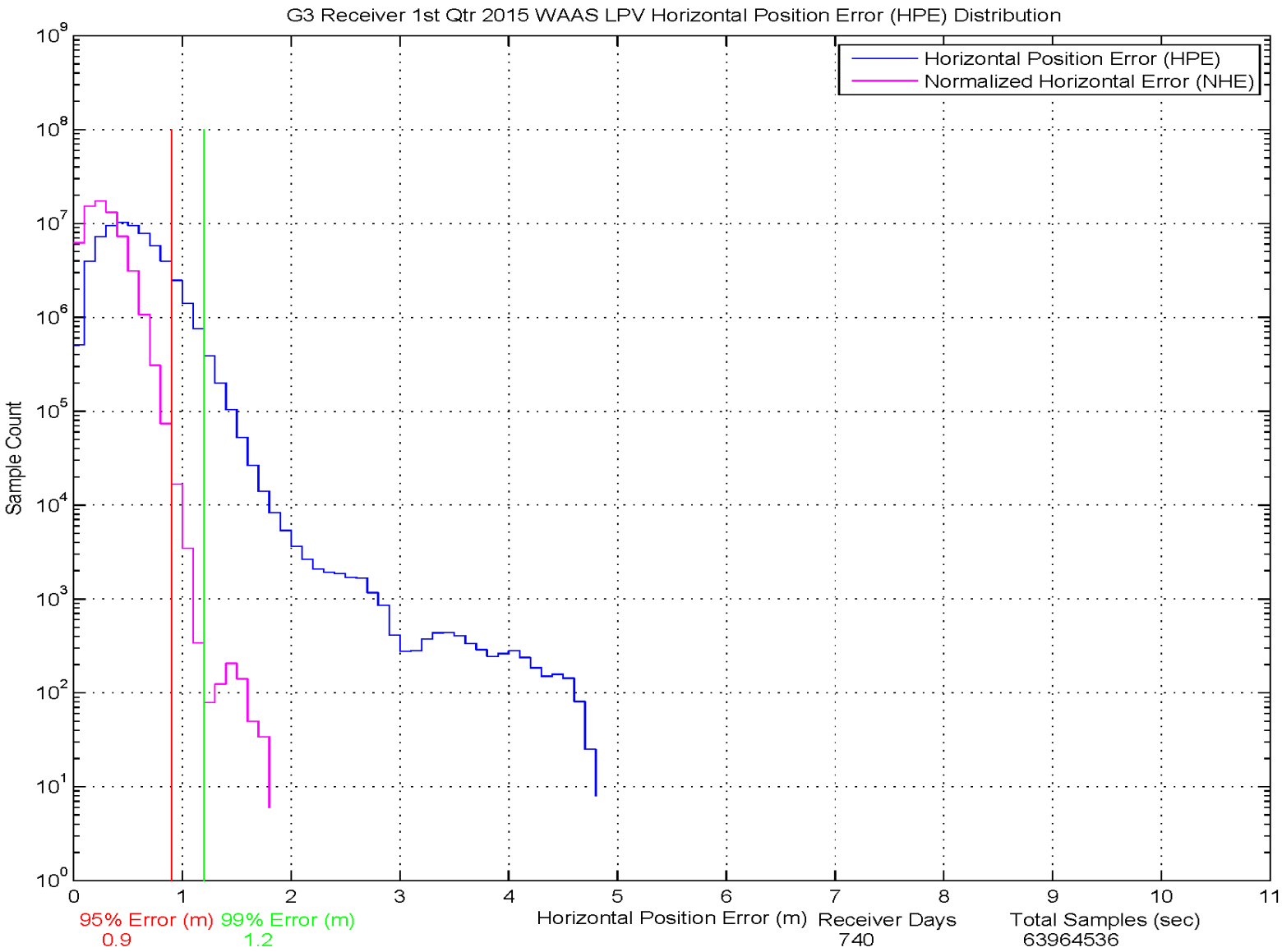


Figure 12-6 LPV Vertical Error Distribution Histogram

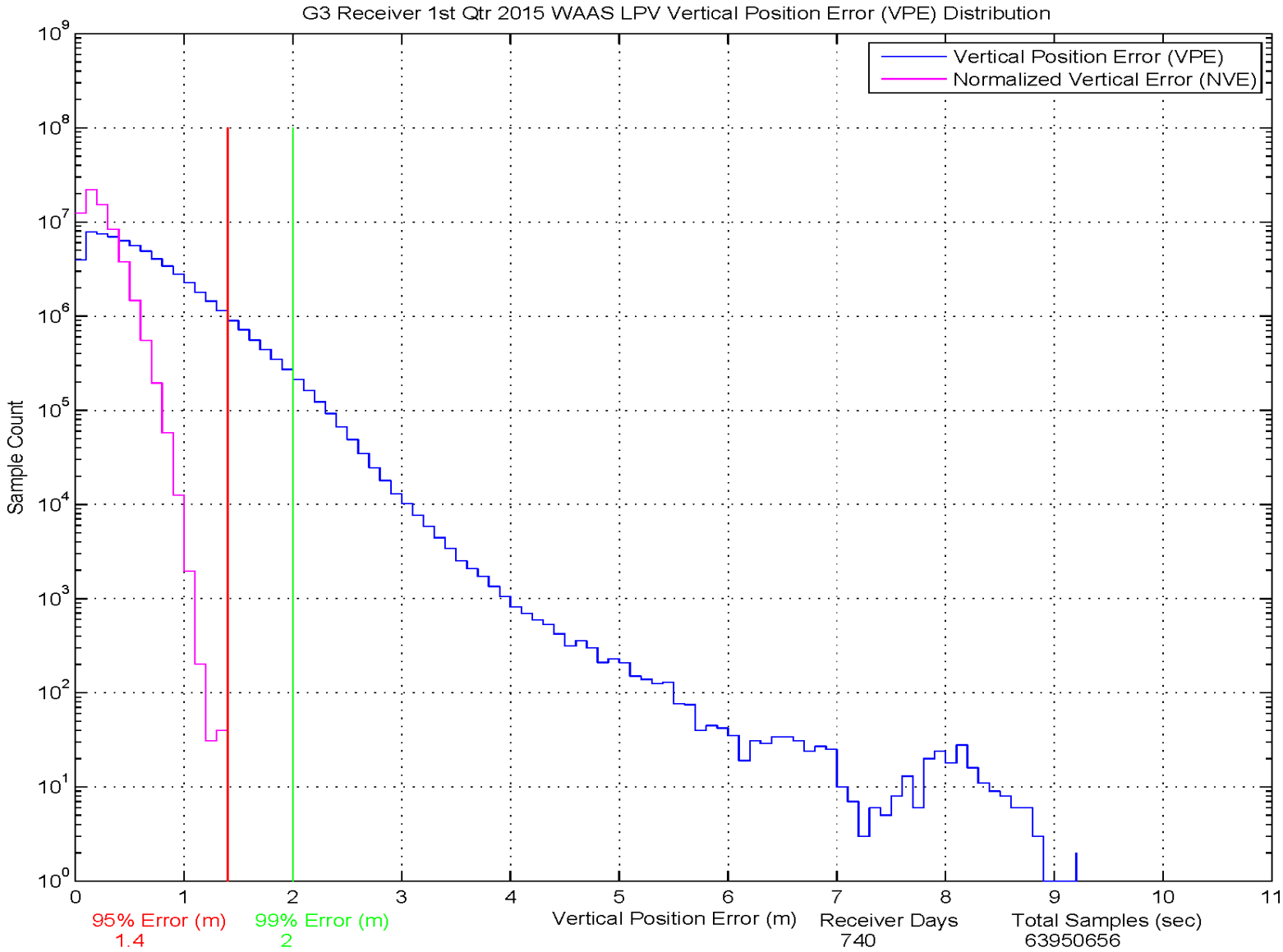


Figure 12-7 LPV 95% Horizontal Error Bounding Triangle Chart

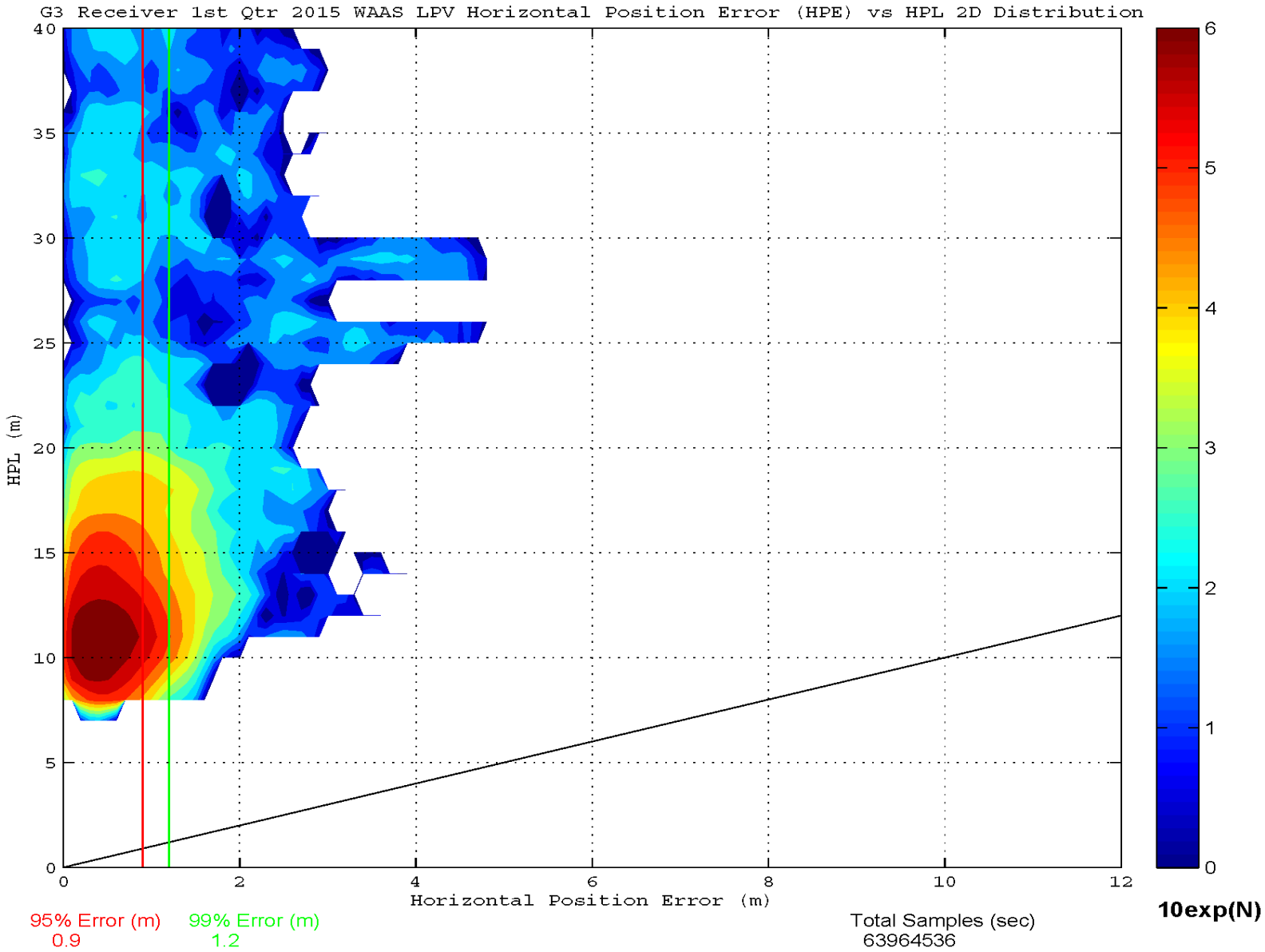
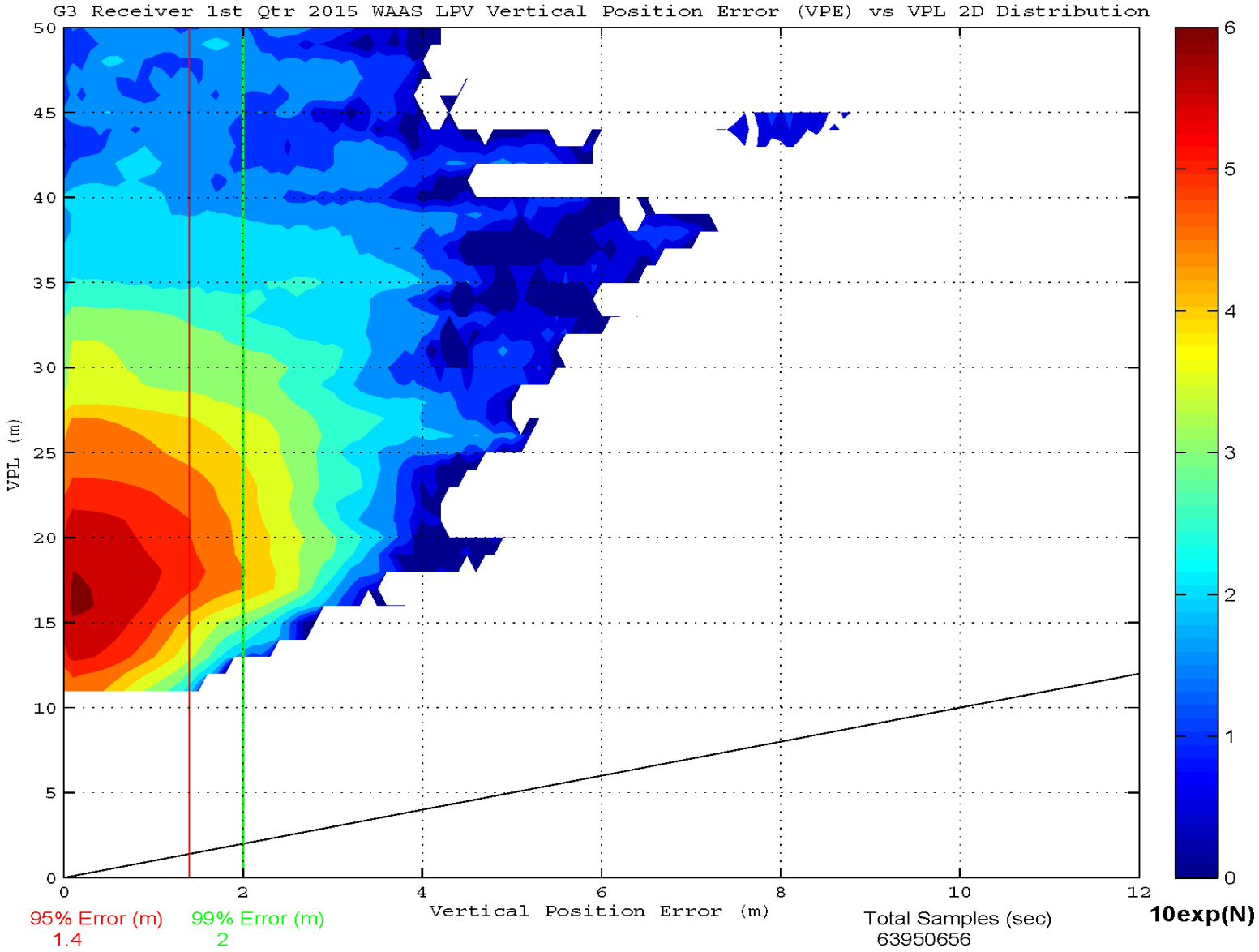


Figure 12-8 LPV 95% Vertical Error Bounding Triangle Chart



12.2 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.

For this reporting period, PRN-8 (SVN-38) was unavailable for the entire quarter and PRN-26 (SVN-26) was only available for the first five days of the quarter (PRN-26 was decommissioned on 1/5/15).

Table 12-4 Range Error 95% Index and 3.29 Sigma Bounding

Site →	Chicago 4		Chicago 5		Boston 4		Boston 5		Seattle 4		Seattle 5	
SV ↓	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	2.783	100	2.681	100	2.931	100	2.843	100	2.788	100	3.162	99.980456
2	2.563	100	2.623	100	2.471	100	2.179	100	2.39	100	2.306	100
3	2.601	100	2.999	100	2.438	100	2.847	100	2.897	99.997	2.777	100
4	1.689	100	1.29	100	1.213	100	1.461	100	1.66	100	1.751	100
5	1.558	100	1.85	100	1.538	100	1.844	100	2.055	100	2.13	100
6	2.894	100	2.974	99.991	3.335	99.997	3.258	99.955	3.472	100	3.419	100
7	1.224	100	1.294	100	1.442	100	1.605	100	1.31	100	1.434	100
8												
9	2.477	100	2.318	100	2.343	100	2.539	100	1.989	100	2.35	100
10	1.228	100	0.785	100	1.057	100	0.851	100	2.084	100	1.032	100
11	1.882	100	1.67	100	1.768	100	1.266	100	1.364	100	1.55	100
12	1.565	100	1.051	100	1.77	100	1.467	100	1.19	100	1.398	100
13	1.278	100	1.351	100	1.34	100	1.714	100	1.433	100	0.937	100
14	1.303	100	1.091	100	1.521	100	1.154	100	1.043	100	1.121	100
15	1.565	100	1.457	100	1.519	100	1.803	100	1.545	100	1.45	100
16	2.621	100	2.106	100	1.656	100	1.428	100	1.067	100	1.378	100
17	0.987	100	1.144	100	1.327	100	1.118	100	1.651	100	1.371	100
18	1.67	100	1.343	100	1.479	100	1.4	100	1.441	100	1.126	100
19	2.872	100	2.388	100	3.029	100	2.473	100	2.491	100	2.547	100
20	1.577	100	1.302	100	1.398	100	1.163	100	1.389	100	1.288	100
21	1.194	100	1.262	100	1.608	100	1.099	100	1.152	100	1.031	100
22	2.674	100	2.308	100	2.513	100	2.438	100	2.206	100	2.249	100
23	2.171	100	1.988	100	3.294	100	2.237	100	1.939	100	1.888	100
24	2.724	100	2.897	100	2.722	100	3.22	100	2.674	100	2.861	100
25	2.629	100	2.264	100	2.664	100	2.361	100	2.247	100	2.5	100
26	*	*	1.484	100	1.241	100	1.693	100	1.731	100	1.269	100
27	2.017	100	2.068	100	1.988	100	2.302	100	2.285	100	2.28	100
28	1.284	100	1.225	100	1.583	100	1.477	100	0.99	100	1.203	100
29	1.484	100	1.307	100	1.258	100	1.811	100	1.392	100	1.992	100
30	2.258	100	1.98	100	2.405	100	2.71	100	2.081	100	2.339	100
31	1.392	100	1.045	100	1.158	100	1.001	100	2.024	100	1.178	100
32	1.313	100	0.958	100	1.218	100	1.106	100	0.86	100	1.033	100
135	3.193	100	2.161	100	2.776	100	2.328	100	1.84	100	1.965	100
138	2.214	100	2.016	100	1.523	100	1.742	100	1.924	100	1.395	100

Table 12-5 Range Error 95% Index and 3.29 Sigma Bounding

Site →	Miami 4		Miami 5		Fairbanks 4		Fairbanks 5	
SV ↓	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	2.201	100	3.06	100	2.852	100	2.625	100
2	2.766	100	2.923	100	2.563	100	2.837	100
3	2.227	100	2.907	100	2.948	100	3.062	100
4	1.331	100	1.222	100	1.2	100	1.425	100
5	1.507	100	1.759	100	1.74	100	1.727	100
6	4.014	99.906	2.929	100	3.375	100	3.38	99.591
7	1.79	100	1.259	100	1.594	100	1.659	100
8								
9	2.047	100	1.989	100	2.346	100	2.446	100
10	1.615	100	2.859	100	1.504	100	1.62	100
11	2.028	100	3.078	100	1.651	100	1.9	100
12	1.101	100	1.096	100	1.301	100	1.512	100
13	1.155	100	1.115	100	1.38	100	1.156	100
14	1.777	100	1.7	100	1.187	100	1.336	100
15	1.557	100	1.476	100	1.532	100	1.636	100
16	1.927	100	2.091	100	1.292	100	1.879	100
17	1.678	100	1.795	100	1.224	100	1.193	100
18	1.76	100	1.821	100	1.668	100	1.806	100
19	3.224	100	3.084	100	2.842	99.999	3.076	100
20	1.992	100	2.063	100	1.549	100	1.668	100
21	2.011	100	1.682	100	1.462	100	1.876	100
22	2.86	99.996	3.04	99.959	2.628	100	2.808	100
23	2.724	100	2.958	100	2.292	100	2.341	100
24	2.55	100	2.528	100	2.696	100	3.085	99.999
25	2.28	100	2.17	100	2.598	100	2.809	99.999
26	0.76	100	*	*	1.269	100	1.086	100
27	1.549	100	2.085	100	2.327	100	2.133	100
28	2.95	100	2.279	100	1.588	100	1.579	100
29	1.549	100	1.574	100	1.807	100	1.849	100
30	1.529	100	1.768	100	2.527	100	2.334	100
31	1.9	100	1.953	100	1.141	100	1.449	100
32	1.281	100	1.324	100	0.945	100	1.143	100
135	1.693	100	1.992	100	4.224	100	3.508	100
138	2.192	100	1.579	100	3.674	100	4.142	100

Table 12-6 Ionospheric Error 95% Index and 3.29 Sigma Bounding

Site →	Chicago 4		Chicago 5		Boston 4		Boston 5		Seattle 4		Seattle 5	
SV ↓	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	1.910	100	1.918	100	2.323	100	2.143	100	1.944	100	1.967	100
2	1.799	100	1.996	100	1.917	100	1.777	100	1.836	100	1.957	100
3	1.586	100	1.670	100	1.777	100	2.058	100	1.997	100	1.859	100
4	0.750	100	0.656	100	0.816	100	1.011	100	0.865	100	0.850	100
5	0.937	100	1.305	100	0.842	100	1.053	100	1.206	100	1.137	100
6	2.464	100	2.257	100	2.717	100	2.648	100	2.436	100	2.357	100
7	0.765	100	0.791	100	0.842	100	0.944	100	0.637	100	0.733	100
8												
9	1.531	100	1.424	100	1.602	100	1.635	100	1.392	100	1.629	100
10	0.500	100	0.503	100	0.462	100	0.561	100	0.870	100	0.417	100
11	0.615	100	0.625	100	0.632	100	0.473	100	0.737	100	0.770	100
12	0.618	100	0.544	100	0.862	100	0.867	100	0.752	100	0.695	100
13	0.575	100	0.568	100	0.693	100	0.917	100	0.772	100	0.470	100
14	0.536	100	0.527	100	0.735	100	0.440	100	0.771	100	0.604	100
15	0.891	100	0.796	100	0.847	100	0.995	100	0.858	100	0.899	100
16	0.895	100	0.734	100	0.638	100	0.539	100	0.800	100	0.866	100
17	0.659	100	0.562	100	0.921	100	0.690	100	0.965	100	0.845	100
18	1.038	100	0.922	100	0.937	100	0.894	100	1.009	100	0.822	100
19	1.788	100	1.708	100	1.838	100	1.605	100	1.957	100	1.903	100
20	0.677	100	0.612	100	0.705	100	0.580	100	0.939	100	0.819	100
21	0.903	100	1.022	100	1.133	100	0.884	100	0.888	100	0.849	100
22	2.099	100	1.769	100	1.746	100	1.756	100	1.839	100	1.962	100
23	1.405	100	1.437	100	1.897	100	1.342	100	1.467	100	1.402	100
24	1.841	100	1.879	100	1.824	100	2.119	100	1.913	100	2.037	100
25	1.305	100	1.248	100	1.555	100	1.630	100	1.550	100	1.492	100
26	*	*	0.708	100	0.725	100	0.893	100	0.930	100	0.534	100
27	1.370	100	1.405	100	1.396	100	1.562	100	1.451	100	1.310	100
28	0.681	100	0.748	100	0.927	100	0.758	100	0.596	100	0.679	100
29	0.839	100	0.664	100	0.669	100	0.883	100	0.732	100	0.857	100
30	1.666	100	1.636	100	1.692	100	1.825	100	1.436	100	1.494	100
31	0.605	100	0.649	100	0.359	100	0.626	100	1.062	100	0.548	100
32	0.634	100	0.444	100	0.462	100	0.493	100	0.380	100	0.517	100

*No data available due to receiver in maintenance

Table 12-7 Ionospheric Error 95% Index and 3.29 Sigma Bounding

Site →	Miami 4		Miami 5		Fairbanks 4		Fairbanks 5	
SV ↓	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	1.975	100	2.288	100	2.195	100	1.999	99.9997
2	1.762	100	1.880	100	1.420	100	1.574	100
3	1.520	100	1.597	100	2.423	100	2.095	99.593
4	0.736	100	0.618	100	0.911	100	0.972	100
5	1.205	100	1.527	100	0.982	100	0.832	100
6	3.377	99.946	2.659	100	1.979	100	1.961	99.699
7	1.022	100	0.691	100	0.903	100	0.918	100
8								
9	1.484	100	1.335	100	1.771	100	1.766	99.493
10	0.406	100	0.748	100	0.706	100	0.670	100
11	0.735	100	1.136	100	0.656	100	0.954	100
12	0.619	100	0.624	100	0.730	100	0.831	100
13	0.612	100	0.817	100	0.710	100	0.698	100
14	0.776	100	0.612	100	0.689	100	0.683	100
15	1.006	100	0.814	100	0.926	100	0.970	100
16	0.784	100	0.867	100	0.617	100	0.734	100
17	0.733	100	0.657	100	0.675	100	0.565	100
18	0.922	100	1.070	100	1.045	100	0.897	100
19	1.936	100	1.886	100	1.718	99.723	1.727	100
20	0.880	100	0.890	100	0.834	100	0.906	100
21	1.302	100	1.217	100	1.049	100	1.226	100
22	1.682	100	2.138	100	1.775	99.682	1.705	100
23	1.809	100	1.794	100	1.486	99.846	1.421	100
24	1.742	100	1.643	100	2.077	100	2.307	99.623
25	1.175	100	1.147	100	1.812	100	1.927	99.723
26	0.632	100	*	*	0.851	100	0.592	100
27	1.385	100	1.595	100	1.665	100	1.497	100
28	1.743	100	1.283	100	0.694	100	0.775	100
29	0.830	100	0.770	100	1.052	100	0.942	100
30	1.813	100	1.627	100	1.742	100	1.618	99.773
31	0.800	100	1.416	100	0.697	100	0.802	100
32	0.505	100	0.485	100	0.636	100	0.615	100

*No data available due to receiver in maintenance

12.3 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 $1\text{-}10^{-7}$ 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.

S**ignal 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 $1\text{-}10^{-7}$ 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

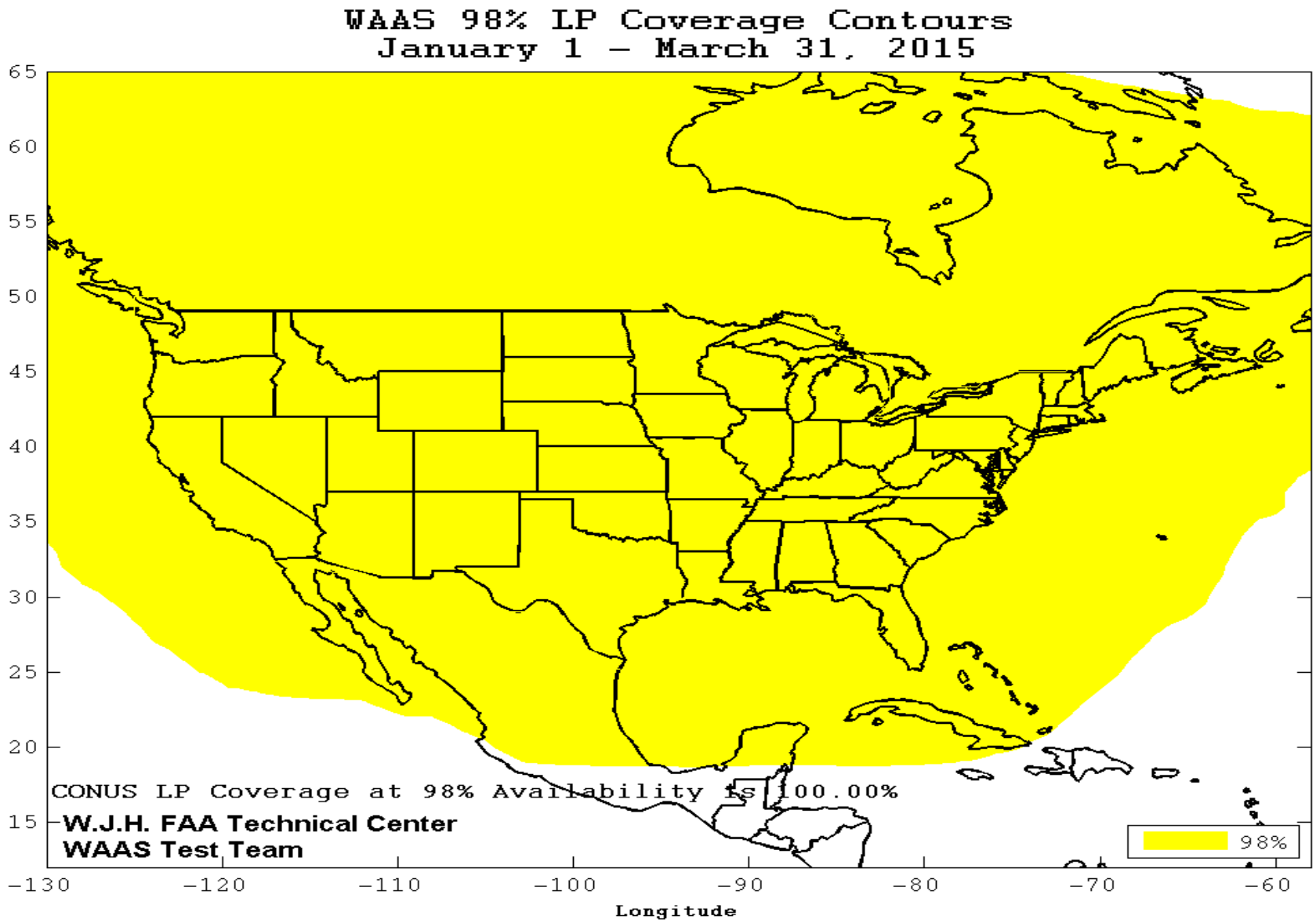


Figure B-2 98% Alaska LP Availability Contour

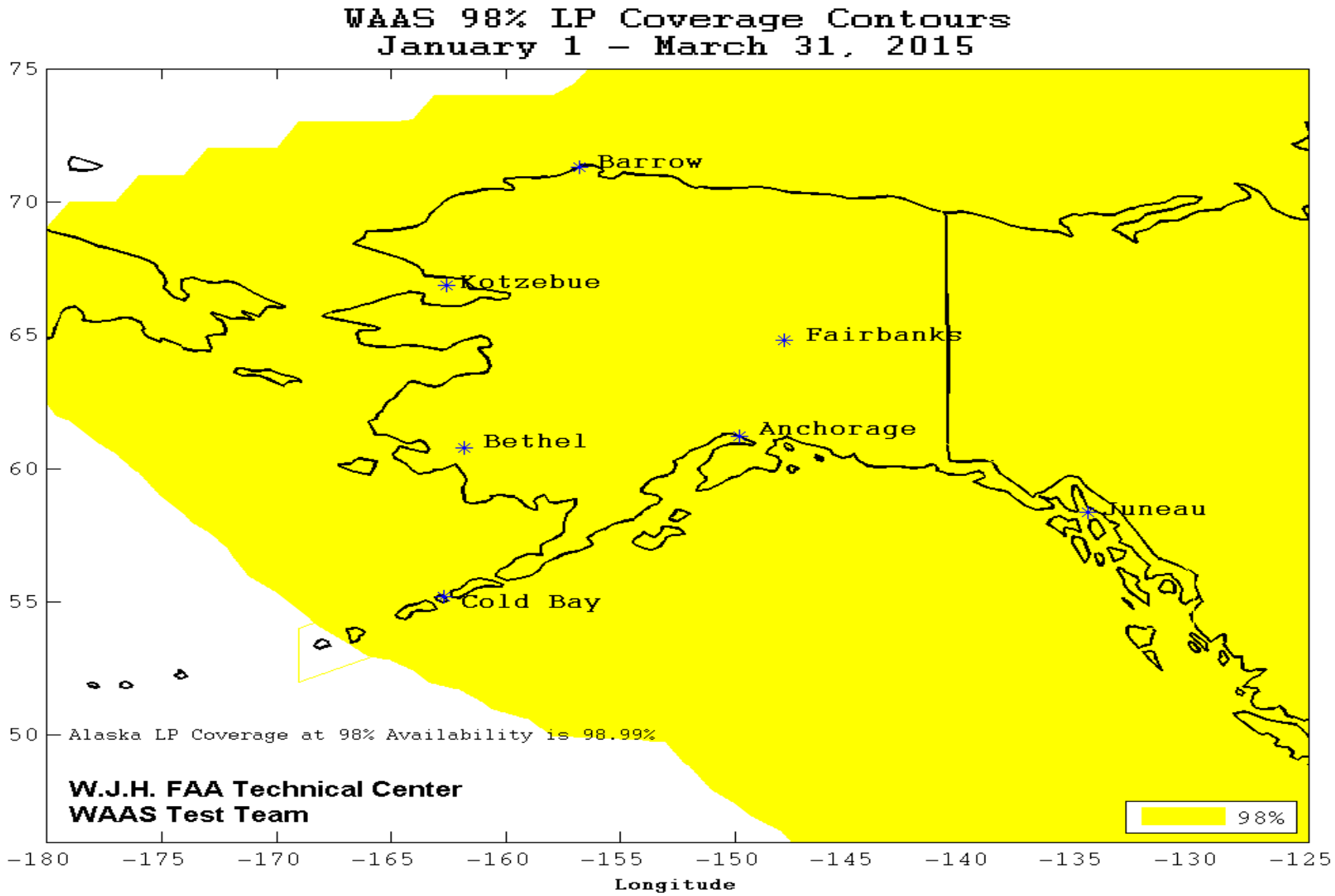


Figure B-3 98% CONUS LPV Availability Contour

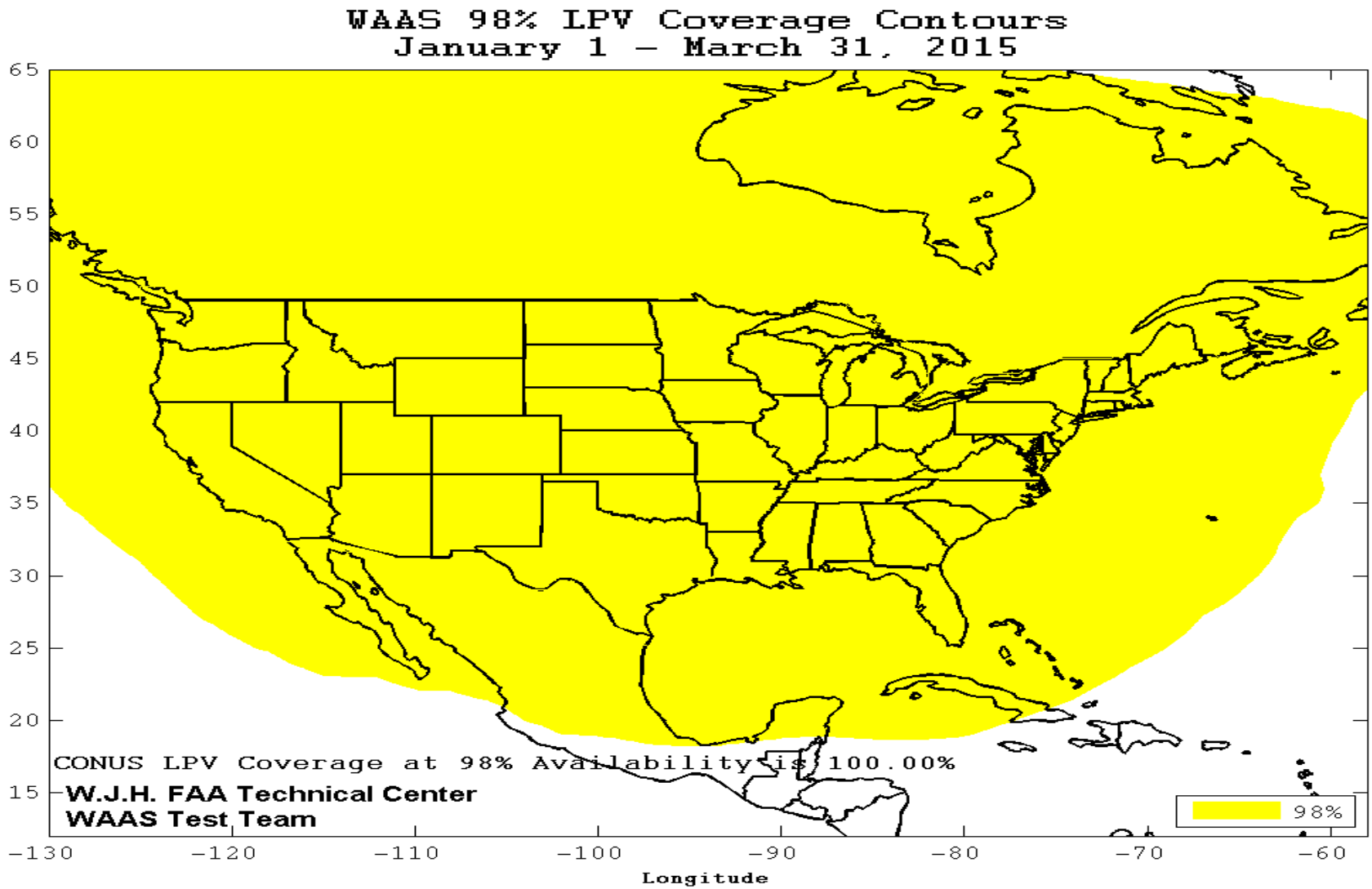


Figure B-4 98% Alaska LPV Availability Contour

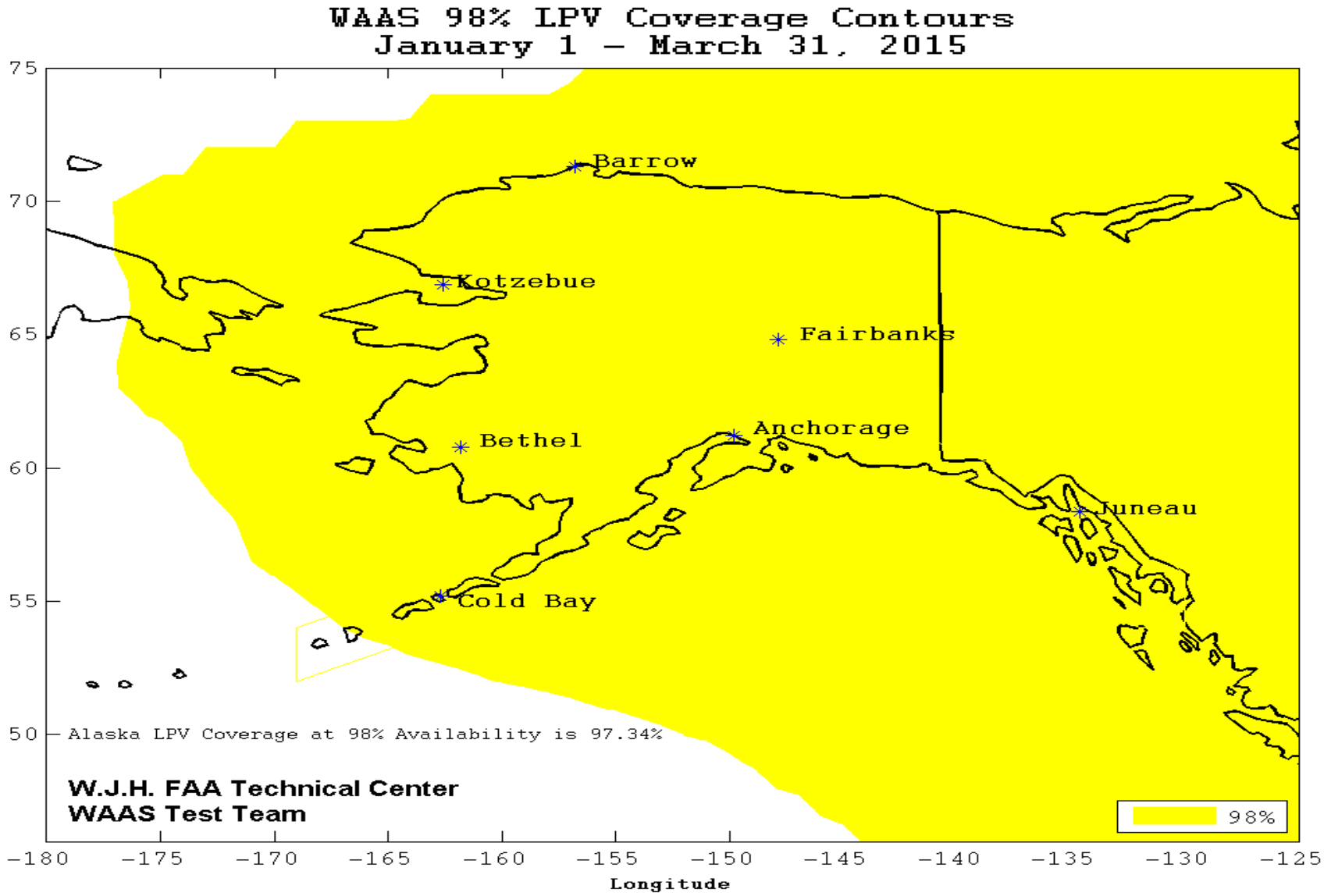


Figure B-5 99% CONUS LPV 200 Availability Contour

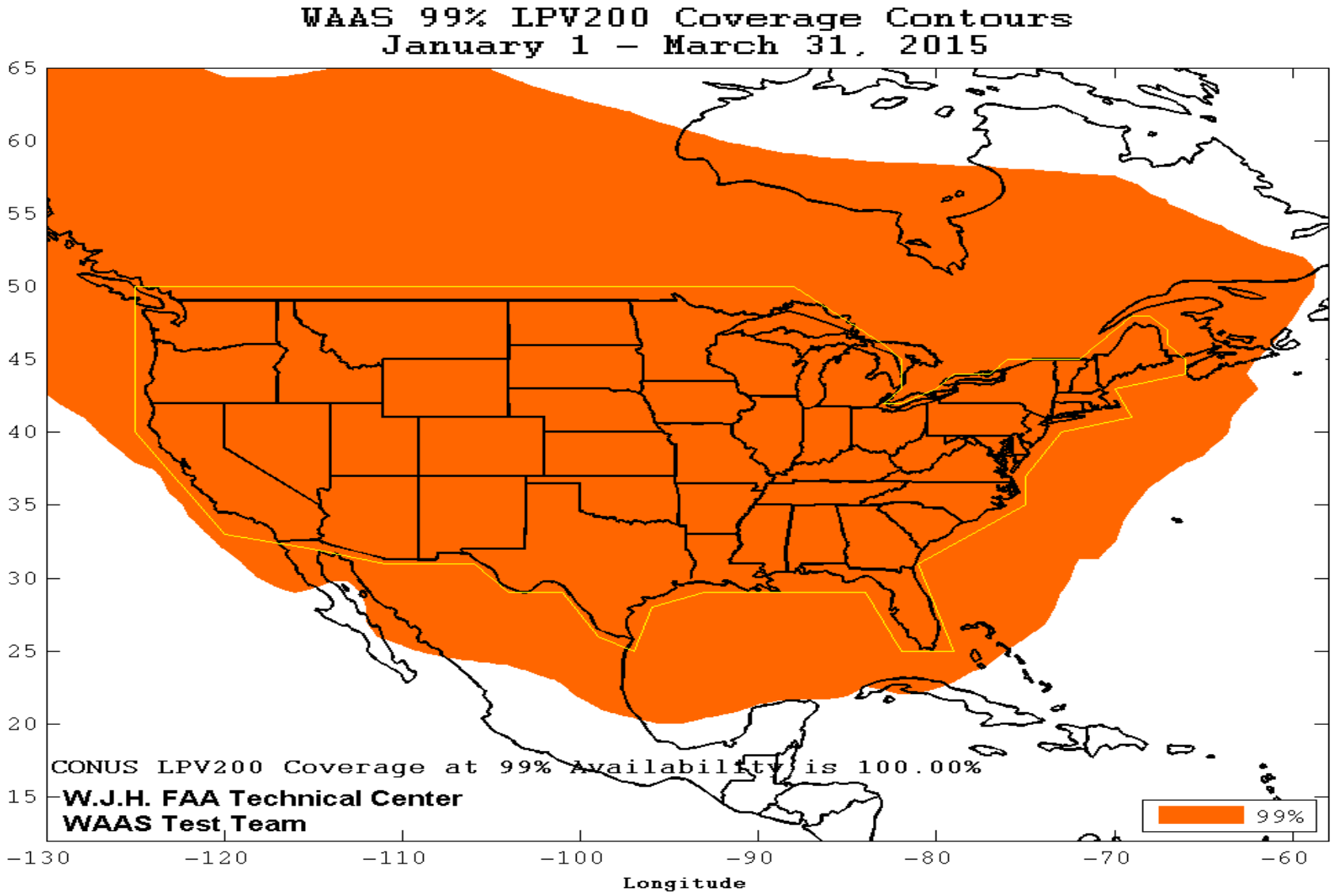


Figure B-6 99% Alaska LPV 200 Availability Contour