WIDE-AREA AUGMENTATION SYSTEM PERFORMANCE ANALYSIS REPORT

Report #54

Reporting Period: July 1 to September 30, 2015

October 2015

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NSTB/WAAS T&E Team
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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 #54; it covers WAAS performance during the period from July 1, 2015 to September 30, 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 is being upgraded to G3 receivers in preparation for a full constellation of dual civil frequency GPS satellites (L1/L5). This is the last reporting period for the stand-alone G3 receiver analysis. All of the analysis to date has supported a positive deployment decision for SSM-WAAS-043 which began cutover in August 2015.

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. LPV200 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 1.363 meters	Denver 0.513 meters	Anchorage 0.758 meters	Barrow 0.591 meters
95% Vertical Accuracy (VPL <= 50 meters)	Atlantic City 1.684 meters	Denver 0.8 meters	Fairbanks 1.412 meters	Bethel .943 meters
LP Availability (HPL <= 40 meters)	All Sites 100%	All Sites 100%	Multiple Sites 100%	Kotzebue 99.99%
LPV Availability (HPL <= 40 meters & VPL <= 50 meters)	Multiple Sites 100%	Oakland 99.99%	Multiple Sites 100%	Barrow 99.87%
LPV200 Availability (HPL <= 40 meters & VPL < =35 meters)	Multiple Sites 100%	Oakland 99.76%	Juneau 99.99	Cold Bay 956.64%
99% HPL	Oakland 17.075 meters	Denver 10.703 meters	Cold Bay 26.985 meters	Juneau 13.84 meters
99% VPL	Oakland 31.61 meters	Kansas City 19.114 meters	Barrow 39.928 meters	Juneau 22.304 meters

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDIX

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 (GEOs) 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 Klobuchar 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 Klobuchar 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:		
Arcata	88	7632144
Atlantic City	91	7905326
Grand Forks	88	7617972
Oklahoma City	78	6742978
WAAS:		
Albuquerque	92	7909965
Anchorage	91	7857559
Atlanta	92	7910291
Barrow	91	7844041
Bethel	91	7845037
Billings	92	7922504
Boston	92	7915983
Chicago	92	7923550
Cleveland	92	7913859
Cold Bay	92	7909795
Dallas	92	7923784
Denver	92	7922432
Fairbanks	91	7831523
Gander	92	7922749
Goose Bay	92	7921515
Houston	92	7909082
Iqaluit	92	7920519
Jacksonville	92	7924376
Juneau	92	7923371
Kansas City	92	7923414
Kotzebue	92	7910361
Los Angeles	92	7915458
Memphis	92	7909487
Merida	92	7907512
Mexico City	92	7906177
Miami	92	7909395
Minneapolis	92	7922212
New York	92	7906846
Oakland	92	7921870
Puerto Vallarta	90	7813965
Salt Lake City	92	7923354
San Jose Del Cabo	91	7901890
Seattle	90	7811937
Washington DC	91	7899467
Winnipeg	92	7923406

Table 1-3 NPA Evaluation Sites

Location	Number of Days Evaluated	Number of Samples
Albuquerque	91	7905040
Anchorage	92	7914853
Atlanta	91	7903639
Barrow	91	7904173
Bethel	91	7901892
Billings	92	7916209
Boston	92	7910734
Cleveland	92	7918949
Cold Bay	92	7906566
Fairbanks	91	7890901
Gander	92	7915299
Honolulu	92	7916988
Houston	91	7903528
Iqaluit	92	7918378
Juneau	92	7914083
Kansas City	92	7916605
Kotzebue	91	7903747
Los Angeles	92	7906329
Merida	91	7899375
Miami	91	7904791
Minneapolis	92	7917338
Oakland	92	7918202
Salt Lake City	92	7918367
San Jose Del Cabo	91	7903991
San Juan	92	7916697
Seattle	91	7874156
Tapachula	51	4423198
Washington DC	91	7888015

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. 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, receiver maintenance, and ionospheric activity. The reporting of ionospheric activity includes reference to the Kp index for the event time period. The Kp index 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.

Analyses of events that merit more detailed investigations are documented in the Discrepancy Reports (DRs). 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. Note that "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
6/30/2015	7/14/2015	Tapachula (MTP1), Tapachula (MTP2), Tapachula (MTP3)	None	The Tapachula site was shut down due to a UPS failure. There was concern that commercial power fluctuations would damage the WRS equipment. New parts for the UPS have been ordered.
7/4/2015	7/5/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200_Alaska, LPV200_Canada	Geomagnetic activity (Kp = 5 on 7/4 and Kp = 6 on 7/5) disturbed the ionosphere causing elevated GIVE values. This resulted in moderate degradation of: (1) LPV200 service coverage in Alaska from about 19:22 GMT to 19:40 GMT on 7/4 and from the beginning of the day to 00:40 GMT on 7/5, and (2) LPV200 service coverage in Canada from about 21:22 GMT until the end of the

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
				day on 7/4. Please see plot(s): LPV200_7/4/2015 LPV200_7/5/2015
7/8/2015	7/8/2015	Miami (ZMA1), Miami (ZMA2), Miami (ZMA3)	Local	Local RFI caused degraded SV tracking of reference receivers at Miami reference station. The RFI caused the number of valid satellites tracked to drop from 11 SVs to 5 SVs resulting in an LPV200 outage at the receiver location from 20:58 GMT to 21:00 GMT.
7/16/2015	7/16/2015	PRN10	LPV200_CONUS	SVN40 (PRN-10) was decommissioned (see NANU 2015069). This change in constellation caused a daily LPV200 outage in coastal California for about 7 minutes to be observed and the LPV200 service area along the southwest coast was pulled in without affecting any airports in that area. This moderate change in LPV200 service for CONUS is expected for subsequent days starting on July 16th. Please see plot(s): LPV200_7/16/2015
7/18/2015	7/18/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	None	As of 18 July 2015 until further notice, the UDRE for the WAAS AMR geostationary satellite (PRN-133) will be set to Not Monitored (NM). This setting means that users can still use WAAS corrections from PRN-133 but that satellite cannot be used by WAAS users for ranging.
7/18/2015	7/18/2015	Cold Bay (CDB1), Cold Bay (CDB2), Cold Bay (CDB3)	LPV200_Alaska	A 5318 second data outage from Cold Bay reference station at about 01:17 GMT resulted in the loss of measurements and caused elevated GIVE values. The elevated GIVE values resulted in moderate degradation of the LPV200 service outage in southwest Alaska from about 01:48 GMT until 02:30 GMT. Please see plot(s): LPV200_7/18/2015 Cov_vs_Time_Alaska_7/18/2015
7/28/2015	7/28/2015	PRN17	LPV_CONUS, LPV_Canada, LPV200_CONUS, LPV200_Alaska, LPV200_Canada	The reduction in CONUS, Alaska, Canada coverage was due to a GPS NANU on PRN-17 (see NANU 2015071), which was unusable from 16:24 GMT to 21:32 GMT on 7/28. This resulted in significant degradation of: (1) LPV200 service coverage in CONUS from 18:25 GMT to 18:50 GMT and expanded the normal 7 minute LPV200 service outage at 20:44 GMT to 21:06 GMT; (2) LPV200 service coverage in Canada from 18:09 GMT to 18:20 GMT, 19:16 GMT to 20:10 GMT, and 21:06 GMT to 21:36 GMT. The NANU also resulted in moderate degradation of LPV service coverage in CONUS from 20:44 GMT to 21:00 GMT. The NANU also resulted in minor degradation of: (1) LPV service coverage in Canada from 19:35 GMT to 20:07 GMT; and (2) LPV200 service coverage in Alaska from 20:06 GMT to 20:11 GMT and 22:26 GMT to 22:43 GMT. Please see plot(s): LPV_7/28/2015

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
				LPV200_7/28/2015 Cov_vs_Time_Canada_7/28/2015 Cov_vs_Time_Conus_7/28/2015
7/29/2015	7/30/2015	GEO135,Littleton (APA)	LPV_Alaska, LPV200_Alaska, LPV200_Canada	The uplink for the CRW GEO, PRN-135 switched from the Littleton uplink site to the Napa uplink site at 08:25 GMT. This caused a 16-second outage of the GEO broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN-135. This resulted in LP, LPV and LPV200 outages for those areas of northwest Alaska that do not have redundant GEO coverage at the time of the switchover. This also caused the UDRE for PRN-135 to be elevated. The elevated UDRE caused moderate degradation of LPV200 service coverage in Alaska, extending the daily outages at 10:30 GMT, 17:40 GMT, and 22:15 GMT on 7/29 and at 10:30 GMT and 17:40 GMT on 7/30. Please see plot(s): LP_7/29/2015 LPV_7/29/2015 LPV200_7/29/2015 LPV200_7/30/2015
7/31/2015	7/31/2015	GEO138,Woodbine (QWE),Atlanta (CnV)	None	Woodbine had CnV Source Select from Atlanta to Los Angeles. CnV Switch resets following the SSM-43 ring 1 communication upgrade. TOW 436629-436631
7/31/2015	8/2/2015	GEO135,Napa (APC)	LPV200_Alaska	The uplink for the CRW GEO, PRN-135 switched from the Napa uplink site to the Littleton uplink site at 09:54 GMT. This caused a 5-second outage of the GEO broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN-135. This caused the UDRE for CRW to be elevated. The elevated UDRE for CRW resulted in moderate degradation of: (1) LPV200 service coverage in Alaska extending the daily outages around 17:40 GMT and 22:15 GMT on 7/31; and (2) LPV200 service coverage in Alaska extending the daily outages around 01:30 GMT, 10:30 GMT, 17:40 GMT, and 22:15 GMT on 8/1. The elevated UDRE for CRW also resulted in minor degration of LPV200 service coverage in Alaska around 01:30 GMT on 8/2. CRW remained at a higher UDRE for an extended period of time compared to past CRW switchovers (~42 hours compared to ~36 hours). Please see plot(s): LPV200_7/31/2015
7/31/2015	7/31/2015	GEO135,Napa (APC),Atlanta (CnV)	None	Napa had CnV Source Select from Atlanta to Los Angeles. CnV Switch resets following the SSM-43 ring 1 communication upgrade. TOW 436629-436631
8/6/2015	8/6/2015	Miami (ZMA1), Miami (ZMA2), Miami (ZMA3)	Local	Local RFI caused degraded SV tracking of reference receivers at Miami reference station. The RFI caused the number of valid satellites tracked to drop from 13 SVs to 7 SVs resulting in an LPV/LPV200 outage at the receiver location from 14:57 GMT to 15:00 GMT.

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
8/10/2015	8/12/2015	GEO135, Littleton (APA)	LPV_Alaska, LPV200_Alaska, LPV200_Canada	The uplink for the CRW GEO, PRN-135 switched from the Littleton uplink site to the Napa uplink site at 20:03 GMT. This caused a 12-second outage of the CRW broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN-135. This resulted in LPV and LPV200 outages for those areas of northwest Alaska that do not have redundant GEO coverage. This also caused the UDRE for PRN-135 to be elevated. The elevated UDRE resulted in moderate degradation of: (1) LPV200 service outages in Alaska from 21:15 GMT to 22:05 GMT on 8/10; (2) LPV200 service outages in Alaska around 02:20 GMT, 09:50 GMT, 16:50 GMT, and 21:15 GMT on 8/11; and (3) LPV200 service outages in Alaska from 00:09 GMT until 00:25 GMT on 8/12. The elevated UDRE for PRN-135 also resulted in minor degradation of: (1) LPV service outages in Alaska from 00:10 GMT to 00:50 GMT on 8/11; (2) LPV200 service outages in Canada from 00:09 GMT to 00:25 GMT on 8/11; and (3) LPV200 service outages in Canada from 00:09 GMT to 00:25 GMT on 8/12. CRW remained at a higher UDRE for an extended period of time compared to past CRW switchovers (~42 hours compared to ~36 hours). Please see plot(s): LPV200_8/10/2015
8/11/2015	8/11/2015	Barrow (BRW1), Barrow (BRW2), Barrow (BRW3), Bethel (BET1), Bethel (BET2), Bethel (BET3), Kotzebue (OTZ1), Kotzebue (OTZ2), Kotzebue (OTZ3)	LPV200_Alaska	Short 5-10 second data outages from multiple Alaska reference stations resulted in the reinitialization of the WAAS carrier smoothing algorithm for those sites. The loss of measurements resulted in elevated GIVE values and the combination of elevated UDRE on PRN-135 caused moderate degradation to the LPV200 service outage around 21:11 GMT and 21:38 GMT in Alaska. Please see plot(s): LPV200_8/11/2015
8/12/2015	8/12/2015	PRN8	None	GPS SATELLITE SVN72 (PRN-08) WAS USABLE AS OF August 12th BEGINNING 16:53 GMT.
8/15/2015	8/16/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200_Canada	Geomagnetic activity (Kp = 7 on 8/15; Kp = 6 on 8/16) disturbed the ionosphere causing elevated GIVE values. This resulted in minor degradation of the LPV200 service coverage in Canada from about 11:28 GMT to 11:48 GMT on August 15th and 23:45 GMT to 23:58 GMT on August 16th. Please see plot(s): LPV200_8/15/2015 LPV200_8/16/2015
8/20/2015	8/21/2015	GEO135,Napa (APC)	LPV200_Alaska	The uplink for the CRW GEO, PRN-135 switched from the Napa uplink site to the Littleton uplink site at 08:10 GMT. This caused a 4-second outage of the CRW broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN-135. This caused the UDRE for CRW to be

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
				elevated. The elevated UDRE for CRW resulted in moderate degradation of: (1) LPV200 service outages in Alaska around 09:00 GMT, 12:15 GMT, 16:30 GMT, 21:00 GMT, and 23:30 GMT on 8/20; and (2) LPV200 service outages in Alaska around 09:00 GMT, 16:30 GMT, 21:00 GMT, and 23:30 GMT on 8/21. Please see plot(s): LPV200_8/20/2015 LPV200_8/21/2015
8/21/2015	8/21/2015	Miami (ZMA1), Miami (ZMA2), Miami (ZMA3)	Local	Local RFI caused degraded SV tracking of reference receivers at Miami reference station. The RFI caused the number of valid satellites tracked to drop from 8 SVs to 5 SVs resulting in an LPV and LPV200 outage at the receiver location from 18:46 GMT until 18:47 GMT.
8/23/2015	8/23/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	None	Geomagnetic activity (Kp = 6) disturbed the ionosphere causing increased signal propagation delays for localized Alaska regions. This resulted in increased vertical position errors (VPE) for multiple Alaska receivers from about 10:40 GMT to 11:10 GMT.
8/26/2015	8/26/2015	Barrow (BRW1), Barrow (BRW2), Barrow (BRW3), Bethel (BET1), Bethel (BET2), Bethel (BET3), Fairbanks (FAI1), Fairbanks (FAI2), Fairbanks (FAI3), Kotzebue (OTZ1), Kotzebue (OTZ2), Kotzebue (OTZ3)	LPV200_Alaska	Short 5-10 second data outages from multiple Alaska reference stations at about 23:25 GMT resulted in the reinitialization of the WAAS carrier smoothing algorithm for those sites. The loss of measurements resulted in elevated GIVE values. This caused minor degradation of the LPV200 service coverage in Alaska at about 23:25 GMT.
8/26/2015	8/26/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Alaska, LPV200_Alaska, LPV200_Canada	Geomagnetic activity (Kp = 5) disturbed the ionosphere causing elevated GIVE values. The elevated GIVE values, and the combination of 6 second network outages in Alaska, resulted in moderate degradation of: (1) LPV200 service coverage in Alaska from about 23:03 GMT until 23:05 GMT; and (2) LPV 200 service coverage in Canada from about 23:10 GMT until 23:40 GMT. The elevated GIVE values also resulted in minor degradation of LPV service coverage in Alaska from about 23:18 GMT until 23:34 GMT. Please see plot(s): LPV_8/26/2015 LPV200_8/26/2015
8/27/2015	8/28/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200_Alaska, LPV200_Canada	Geomagnetic activity (Kp = 6) disturbed the ionosphere causing elevated GIVE values. This resulted in moderate degradation of: (1) LPV200 service coverage in Alaska from 08:40 to 09:00 GMT and from 15:44 to 16:00 GMT on 8/27; and (2) LPV200 service coverage in Canada from 10:05 to 10:30 GMT and from 01:10 to 01:15 GMT on 8/27. The elevated GIVE values also

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
				resulted in minor degradation of: (1) LPV200 service coverage in Alaska from 15:40 to 16:00 GMT on 8/28; and (2) LPV200 service coverage in Canada from 10:35 to 10:50 GMT on 8/28. Please see plot(s): LPV200_8/27/2015 LPV200_8/28/2015
9/1/2015	9/2/2015	PRN6	LPV200_CONUS, LPV200_Canada	The reduction in CONUS and Canada coverage was due to a GPS NANU on PRN-6 (see NANU2015078), which was unusable from 18:59 GMT on 9/1 to 02:45 GMT on 9/2. The NANU caused moderate degradation of: (1) LPV200 service coverage in CONUS from 21:15 to 21:18 GMT in Colorado and from 22:00 to 22:30 GMT on the eastern coast on 9/1; and (2) LPV200 service coverage in Canada from 19:00 to 21:15 GMT on 9/1. The NANU also caused minor degradation of LPV service coverage in Canada from 19:30 to 19:40 GMT on 9/1. Please see plot(s): LPV_9/1/2015 LPV200_9/1/2015
9/3/2015	9/4/2015	Atlanta (CnV)	LPV_Alaska, LPV200_CONUS, LPV200_Alaska	High UDREs on PRN-135 as reported by CRW GEO were elevated to UDRE 11 following a C&V source switch on CRW from Washington D.C to Atlanta. The elevated UDREs resulted in moderate degradation of LPV200 service coverage in Alaska extending the daily outages around 15:15 GMT to 15:35 GMT, 19:50 GMT to 20:10 GMT, and 22:35 to 22:50 GMT on 9/3. The elevated UDREs also resulted in minor degradation of: (1) LPV service coverage in Alaska from about 22:35 GMT until 22:45 GMT on 9/3; (2) LPV200 service coverage in CONUS from about 16:45 GMT and 18:00 GMT on 9/3; and (3) LPV200 service coverage in Alaska from about 08:08 GMT until 08:30 GMT on 9/4. Please see plot(s): LPV_9/3/2015 LPV200_9/3/2015 LPV200_9/4/2015
9/4/2015	9/4/2015	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	Data outages (25 - 112 seconds) from multiple Alaska reference stations at about 22:03 GMT resulted in the reinitialization of the WAAS carrier smoothing algorithm for those sites. The loss of measurements resulted in elevated GIVE values and caused minor degradation of LPV/LPV200 service coverage in Alaska at 22:04 GMT until 22:10 GMT. Please see plot(s): LPV_9/4/2015 LPV200_9/4/2015 Cov_vs_Time_Alaska_9/4/2015
9/8/2015	9/8/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	None	Geomagnetic activity (Kp = 6) disturbed the ionosphere causing increased errors at multiple CONUS receivers with low protection levels, causing elevated horizontal ratios.
9/9/2015	9/9/2015	Washington D.C.	LPV_Alaska,	Geomagnetic activity (Kp = 6) disturbed the

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
		(CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200_Alaska, LPV200_Canada	ionosphere causing elevated GIVE values. This resulted in moderate degradation of: (1) LP/LPV/LPV200 service coverage in Alaska from 07:03 GMT to 07:36 GMT; and (2) LPV200 service coverage in Canada from 09:38 GMT to 10:05 GMT. See DR, "DR128 Effect on WAAS from Iono Activity September 9 2015". Please see plot(s): LP_9/9/2015 LPV_9/9/2015 LPV200_9/9/2015 Cov_vs_Time_Alaska_9/9/2015 Cov_vs_Time_Canada_9/9/2015
9/11/2015	9/11/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200_Alaska	Geomagnetic activity (Kp = 7) disturbed the ionosphere causing elevated GIVE values. This resulted in minor degradation of the LPV200 service coverage in Alaska from about 08:40 GMT until 08:45 GMT on 9/11. A GPS NANU on PRN-23 caused most of the degradation of service coverage in Alaska and Canada on 9/11 (see event). Please see plot(s): LPV200_9/11/2015
9/11/2015	9/11/2015	PRN23	LPV_Alaska, LPV200_Alaska, LPV200_Canada	The reduction in Alaska and Canada coverage was due to a GPS NANU on PRN-23 (see NANU 201581), which was unusable from 03:30 GMT to 10:01 GMT on 9/11. The NANU resulted in moderate degradation of: (1) LPV service coverage in Alaska from about 07:44 GMT until 08:10 GMT; (2) LPV200 service coverage in Alaska from about 07:28 GMT until 08:20 GMT; and (3) LPV 200 service coverage in Canada from about 07:40 GMT until 08:20 GMT and 09:25 GMT until 09:45 GMT. There was also geomagnetic activity which minorly contributed to loss of service coverage in Alaska (see event). Please see plot(s): LPV_9/11/2015 LPV200_9/11/2015
9/15/2015	9/16/2015	GEO138,Woodbine (QWE)	LPV200_Alaska, LPV200_Canada	The uplink for the CRE GEO, PRN-138 switched from the Woodbine uplink site to the Brewster uplink site at 08:00:05 GMT. This caused a 4-second outage of the CRE broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN-138. This caused the UDRE for CRE to be elevated. The elevated UDRE for CRE resulted in a moderate degradation of LPV200 service coverage in Canada, extending the daily outages at 09:00GMT, 17:30 GMT, 18:30 GMT and 23:45 GMT on 9/15 and 00:000 GMT and 09:00 GMT 9/16 . The elevated UDREs also resulted in minor degradation of LPV200 service coverage in Alaska from about 21:47 GMT to 22:00 GMT on 9/15. Please see plot(s): LPV200_9/15/2015
9/16/2015	9/17/2015	GEO138,Brewster-B (BRE-B)	LPV200_CONUS, LPV200_Alaska	The uplink for the CRE GEO, PRN-138 switched from the Brewster uplink site to the Woodbine uplink site at 19:23:04 GMT. This caused a 4-second outage of the CRE broadcast and also

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
				caused the WAAS carrier smoothing algorithm to reinitialize for PRN-138. This caused the UDRE for CRE to be elevated. The elevated UDRE for CRE resulted in a moderate degradation of LPV200 service coverage in Canada, extending the daily outages at 22:00 GMT and 23:45 GMT on 9/16 and 00:000 GMT, 09:00 GMT, 17:10 GMT, and 23:45 GMT on 9/17. The elevated UDREs also resulted in minor degradation of LPV200 service coverage in Alaska from about 21:43 GMT to 21:56 GMT on 9/16. Please see plot(s): LPV200_9/16/2015
9/20/2015	9/20/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Alaska, LPV200_Alaska, LPV200_Canada	Geomagnetic activity (Kp = 7) disturbed the ionosphere causing elevated GIVE values. This resulted in moderate degradation of: (1) LPV200 service coverage in Alaska from about 07:13 GMT to 07:45 GMT, 14:12 GMT to 14:22 GMT, and 18:45 GMT to 19:00 GMT; (2) LPV200 service coverage in Canada from about 07:13 GMT to 07:50 GMT. The elevated GIVE values also resulted in minor degradation of LPV service coverage in Alaska from about 07:18 GMT to 07:25 GMT. Please see plot(s): LPV_9/20/2015 LPV200_9/20/2015
9/24/2015	9/24/2015	Los Angeles (ZLA1), Los Angeles (ZLA2), Los Angeles (ZLA3)	LPV200_CONUS	SSM-44: This system support modification (SSM) upgrades Ring 2 of the WAAS Terrestrial Communications Subsystem (TCS) and the WAAS Reference Stations and Master Stations. This upgrade supports the transition to WAAS dual frequency operations. ZLA WAAS reference receiver and router was upgraded around 16:19 GMT until 18:43 GMT, during which time the normal west coast service outage extended causing minor degradation of the LPV200 service coverage in CONUS from around 16:22 GMT to 16:24 GMT and from around 18:44 GMT to 18:46 GMT. Please see plot(s): LPV200_9/24/2015
9/25/2015	9/25/2015	Miami (ZMA1), Miami (ZMA2), Miami (ZMA3)	Local	Local RFI caused degraded SV tracking of reference receivers at Miami reference station. The RFI caused the number of valid satellites tracked to drop from 11 to 7 resulting in an LPV200 outage at the receiver location from 21:58 GMT to 22:01 GMT.
9/30/2015	10/1/2015	GEO138,Woodbine (QWE)	LPV200_Alaska, LPV200_Canada	The uplink for the CRE GEO, PRN-138 switched from the Woodbine uplink site to the Brewster uplink site at 06:01 GMT. This caused a 4-second outage of the CRE broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN-138. This caused the UDRE for CRE to be elevated. The elevated UDRE for CRE caused moderate degradation of LPV200 service coverage in Canada, extending the daily outages at 07:30

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
				GMT, 08:40 GMT, 16:00 GMT, 17:25 GMT, 20:50 GMT, and 22:00 GMT on 9/30. The elevated UDRE for CRE also caused minor degradation of: (1) LPV200 service coverage in Alaska from about 20:40 GMT until 21:00 GMT on 9/30; and (2) LPV200 service coverage in Canada, extending the daily outages at 07:40 GMT for 25 minutes on 10/1. Please see plot(s): LPV200_9/30/2015

Table 1-6 WAAS Upgrades

Stare Date	End Date	Location	Event Description
07/27/2015	07/31/2015	Woodbine (QWE)	SSM-43: This system support modification (SSM) upgrades Ring 1 of the WAAS Terrestrial Communications Subsystem (TCS). This upgrade supports the transition to WAAS dual frequency operations.
08/24/2015	08/28/2015		SSM-44: This system support modification (SSM) upgrades Ring 2 of the WAAS Terrestrial Communications Subsystem (TCS). This upgrade supports the transition to WAAS dual frequency operations.
09/01/2015	09/01/2015	Los Angeles (CnV)	SSM-44: This system support modification (SSM) upgrades Ring 2 of the WAAS Terrestrial Communications Subsystem (TCS) and the WAAS Reference Stations and Master Stations. This upgrade supports the transition to WAAS dual frequency operations. ZLA master station upgrade.
09/02/2015	09/02/2015	Atlanta (CnV)	SSM-44: This system support modification (SSM) upgrades Ring 2 of the WAAS Terrestrial Communications Subsystem (TCS) and the WAAS Reference Stations and Master Stations. This upgrade supports the transition to WAAS dual frequency operations. ZTL master station upgrade.
09/03/2015	09/03/2015	Seattle (ZSE1), Seattle (ZSE2), Seattle (ZSE3), Washington DC (ZDC1), Washington DC (ZDC2), Washington DC (ZDC3)	SSM-44: This system support modification (SSM) upgrades Ring 2 of the WAAS Terrestrial Communications Subsystem (TCS) and the WAAS Reference Stations and Master Stations. This upgrade supports the transition to WAAS dual frequency operations. ZDC and ZSE WAAS reference receiver and router upgrade.

Stare Date	End Date	Location	Event Description
09/03/2015	09/03/2015	Washington D.C. (CnV)	SSM-44: This system support modification (SSM) upgrades Ring 2 of the WAAS Terrestrial Communications Subsystem (TCS) and the WAAS Reference Stations and Master Stations. This upgrade supports the transition to WAAS dual frequency operations. ZDC master station upgrade.
09/24/2015	09/24/2015	Los Angeles (ZLA1), Los Angeles (ZLA2), Los Angeles (ZLA3)	SSM-44: This system support modification (SSM) upgrades Ring 2 of the WAAS Terrestrial Communications Subsystem (TCS) and the WAAS Reference Stations and Master Stations. This upgrade supports the transition to WAAS dual frequency operations. ZLA WAAS reference receiver and router was upgraded around 16:19 GMT until 18:43 GMT, during which time the normal west coast service outage extended causing minor degradation of the LPV200 service coverage in CONUS from around 16:22 GMT to 16:24 GMT and from around 18:44 GMT to 18:46 GMT.

Table 1-7 GUS Switchovers

Start Date	End Date	GUS Switch	Location/ Satellite	Service Affected	Event Description
7/29/2015	7/30/2015	Faulted	GEO135, Littleton (APA)	LPV_Alaska, LPV200_Alaska, LPV200_Canada	The uplink for the CRW GEO, PRN-135 switched from the Littleton uplink site to the Napa uplink site at 08:25 GMT. This caused a 16-second outage of the GEO broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN-135. This resulted in LP, LPV and LPV200 outages for those areas of northwest Alaska that do not have redundant GEO coverage at the time of the switchover. This also caused the UDRE for PRN-135 to be elevated. The elevated UDRE caused moderate degradation of LPV200 service coverage in Alaska, extending the daily outages at 10:30 GMT, 17:40 GMT, and 22:15 GMT on 7/29 and at 10:30 GMT and 17:40 GMT on 7/30. Please see plot(s): LP_7/29/2015 LPV_7/29/2015 LPV200_7/29/2015 LPV200_7/30/2015
7/29/2015	7/29/2015	Missed Navigation Message	GEO133, Paumalu (HDH), Los Angeles (CnV)	None	Paumalu had CnV Source Select from Los Angeles to Atlanta. Paumalu had CnV Source Select from Los Angeles to Atlanta. Paumalu had CnV Source Select from Los Angeles to Atlanta. Paumalu had CnV Source Select from Los Angeles to Atlanta. TOW 286664-286666
7/29/2015	7/29/2015	Manual	GEO133, Santa_Paula (SZP)	None	The uplink for the AMR GEO, PRN133 switched from the Santa Paula uplink site to the Paumalu

Start Date	End Date	GUS Switch	Location/ Satellite	Service Affected	Event Description
					uplink site at 4:15 GMT. This caused a 4 second outage of the GEO broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN133.
7/30/2015	7/30/2015	Missed Navigation Message	GEO133, Paumalu (HDH), Atlanta (CnV)	None	Paumalu had CnV Source Select from Atlanta to Los Angeles. TOW 345600-431999
7/31/2015	8/2/2015	Manual	GEO135, Napa (APC)	LPV200_Alaska	The uplink for the CRW GEO, PRN-135 switched from the Napa uplink site to the Littleton uplink site at 09:54 GMT. This caused a 5-second outage of the GEO broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN-135. This caused the UDRE for CRW to be elevated. The elevated UDRE for CRW resulted in moderate degradation of: (1) LPV200 service coverage in Alaska extending the daily outages around 17:40 GMT and 22:15 GMT on 7/31; and (2) LPV200 service coverage in Alaska extending the daily outages around 01:30 GMT, 10:30 GMT, 17:40 GMT, and 22:15 GMT on 8/1. The elevated UDRE for CRW also resulted in minor degration of LPV200 service coverage in Alaska around 01:30 GMT on 8/2. CRW remained at a higher UDRE for an extended period of time compared to past CRW switchovers (~42 hours compared to ~36 hours). Please see plot(s): LPV200_7/31/2015
7/31/2015	7/31/2015	Missed Navigation Message	GEO138, Woodbine (QWE), Atlanta (CnV)	None	Woodbine had CnV Source Select from Atlanta to Los Angeles. CnV Switch resets following the SSM-43 ring 1 communication upgrade. TOW 436629-436631
7/31/2015	7/31/2015	Missed Navigation Message	GEO135, Napa (APC), Atlanta (CnV)	None	Napa had CnV Source Select from Atlanta to Los Angeles. CnV Switch resets following the SSM-43 ring 1 communication upgrade. TOW 436629-436631
8/4/2015	8/4/2015	Manual	GEO133, Paumalu (HDH)	None	The uplink for the AMR GEO, PRN133 switched from the Paumalu uplink site to the Santa Paula uplink site at 21:43 GMT. This caused a 4 second outage of the GEO broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN133. TOW 251034-251039
8/10/2015	8/12/2015	Manual	GEO135, Littleton (APA)	LPV_Alaska, LPV200_Alaska, LPV200_Canada	The uplink for the CRW GEO, PRN-135 switched from the Littleton uplink site to the Napa uplink site at 20:03 GMT. This caused a 12-second outage of the CRW broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN-135. This resulted in LPV and LPV200 outages for those areas of northwest Alaska that do not have redundant GEO coverage. This also caused the UDRE for PRN-135 to be elevated. The elevated UDRE resulted in moderate degradation of: (1) LPV200 service

Start Date	End Date	GUS Switch	Location/ Satellite	Service Affected	Event Description
					outages in Alaska from 21:15 GMT to 22:05 GMT on 8/10; (2) LPV200 service outages in Alaska around 02:20 GMT, 09:50 GMT, 16:50 GMT, and 21:15 GMT on 8/11; and (3) LPV200 service outages in Alaska from 00:09 GMT until 00:25 GMT on 8/12. The elevated UDRE for PRN-135 also resulted in minor degradation of: (1) LPV service outages in Alaska from 00:10 GMT to 00:50 GMT on 8/11; (2) LPV200 service outages in Canada from 00:09 GMT to 00:25 GMT on 8/11; and (3) LPV200 service outages in Canada from 00:09 GMT to 00:25 GMT on 8/12. CRW remained at a higher UDRE for an extended period of time compared to past CRW switchovers (~42 hours compared to ~36 hours). Please see plot(s): LPV200_8/10/2015
8/20/2015	8/21/2015	Manual	GEO135, Napa (APC)	LPV200_Alaska	The uplink for the CRW GEO, PRN-135 switched from the Napa uplink site to the Littleton uplink site at 08:10 GMT. This caused a 4-second outage of the CRW broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN-135. This caused the UDRE for CRW to be elevated. The elevated UDRE for CRW resulted in moderate degradation of: (1) LPV200 service outages in Alaska around 09:00 GMT, 12:15 GMT, 16:30 GMT, 21:00 GMT, and 23:30 GMT on 8/20; and (2) LPV200 service outages in Alaska around 09:00 GMT, 16:30 GMT, 21:00 GMT, and 23:30 GMT on 8/21. Please see plot(s): LPV200_8/20/2015 LPV200_8/21/2015
8/25/2015	8/25/2015	Missed Navigation Message	GEO133, Santa_Paula (SZP), Los Angeles (CnV)	None	The Santa Paula uplink for the AMR GEO, PRN133 switched from the Los Angeles C&V as the selected source to the Atlanta C&V Source at 05:25 GMT. This caused a 1 second outage of the GEO broadcast.
9/15/2015	9/16/2015	Manual	GEO138, Woodbine (QWE)	LPV200_Alaska, LPV200_Canada	The uplink for the CRE GEO, PRN-138 switched from the Woodbine uplink site to the Brewster uplink site at 08:00:05 GMT. This caused a 4-second outage of the CRE broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN-138. This caused the UDRE for CRE to be elevated. The elevated UDRE for CRE resulted in a moderate degradation of LPV200 service coverage in Canada, extending the daily outages at 09:00GMT, 17:30 GMT, 18:30 GMT and 23:45 GMT on 9/15 and 00:000 GMT and 09:00 GMT 9/16 . The elevated UDREs also resulted in minor degradation of LPV200 service coverage in Alaska from about 21:47 GMT to 22:00 GMT on 9/15. Please see plot(s): LPV200_9/15/2015
9/16/2015	9/17/2015	Manual	GEO138,	LPV200_CONUS,	The uplink for the CRE GEO, PRN-138 switched

Start Date	End Date	GUS Switch	Location/ Satellite	Service Affected	Event Description
			Brewster-B (BRE-B)	LPV200_Alaska	from the Brewster uplink site to the Woodbine uplink site at 19:23:04 GMT. This caused a 4-second outage of the CRE broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN-138. This caused the UDRE for CRE to be elevated. The elevated UDRE for CRE resulted in a moderate degradation of LPV200 service coverage in Canada, extending the daily outages at 22:00 GMT and 23:45 GMT on 9/16 and 00:000 GMT, 09:00 GMT, 17:10 GMT, and 23:45 GMT on 9/17 . The elevated UDREs also resulted in minor degradation of LPV200 service coverage in Alaska from about 21:43 GMT to 21:56 GMT on 9/16. Please see plot(s): LPV200_9/16/2015
9/30/2015	10/1/2015	Manual	GEO138, Woodbine (QWE)	LPV200_Alaska, LPV200_Canada	The uplink for the CRE GEO, PRN-138 switched from the Woodbine uplink site to the Brewster uplink site at 06:01 GMT. This caused a 4-second outage of the CRE broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN-138. This caused the UDRE for CRE to be elevated. The elevated UDRE for CRE caused moderate degradation of LPV200 service coverage in Canada, extending the daily outages at 07:30 GMT, 08:40 GMT, 16:00 GMT, 17:25 GMT, 20:50 GMT, and 22:00 GMT on 9/30. The elevated UDRE for CRE also caused minor degradation of: (1) LPV200 service coverage in Alaska from about 20:40 GMT until 21:00 GMT on 9/30; and (2) LPV200 service coverage in Canada, extending the daily outages at 07:40 GMT for 25 minutes on 10/1. Please see plot(s): LPV200_9/30/2015

1.2 Report Overview

Section 2 documents the LPV and NPA performance observed for the indicated receiver locations (see Table 1-2 and Table 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 HMI analysis for the reporting period and presents a safety margin index for each receiver. 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. 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. During this reporting period, the maximum 95% CONUS horizontal and vertical LPV errors were 1.363 meters and 1.684 meters at Atlantic City, respectively. The minimum 95% CONUS horizontal and vertical LPV errors were 0.513 meters and 0.800 meters at Denver, respectively.

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. The table also shows the maximum NPA horizontal position error for the quarter. The maximum 95% and 99.999% NPA horizontal errors were 3.401 meters and 8.989 meters at Honolulu and Tapachula, respectively. The minimum 95% and 99.999% horizontal errors were 1.050 meters and 2.269 meters at Kansas City, respectively.

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 horizontal and vertical LPV errors were 3.03 meters and 7.051 meters at Goose Bay and Kotzebue, respectively.

Figure 2-1, Figure 2-2, and Figure 2-3 show the daily LPV 95% horizontal accuracy at the PA evaluation sites for the reporting period. Figure 2-4, Figure 2-5, and Figure 2-6 show the daily LPV 95% vertical accuracy. Noteworthy increases in the 95% PA position errors over multiple evaluation sites due to geomagnetic activity in Figure 2-1 through Figure 2-6 are listed below.

- On 7/4/15 and 7/5/2015, position errors in CONUS, Alaska, Canada, and Mexico were elevated. The maximum 95% horizontal and vertical LPV errors were 1.833 meters and 2.999 meters at Goose Bay and Mexico City, respectively. The Kp index was from 5 to 6 during these days.
- On 7/11/15, position errors in Canada were elevated. The maximum 95% horizontal and vertical LPV errors were 1.233 meters and 1.532 meters at Gander and Winnipeg, respectively. The Kp index was 5 during this day.
- On 7/13/15, position errors in Alaska and Mexico were elevated. The maximum 95% horizontal and vertical LPV errors were 1.363 meters and 2.696 meters at Mexico City. The Kp index was 5 during this day.
- On 8/7/15, position errors in Mexico were elevated. The maximum 95% horizontal and vertical LPV errors were 1.352 meters and 2.351 meters at San Jose Del Cabo and Mexico City, respectively. The Kp index was 5 during this day.
- On 8/16/15, position errors in CONUS and Alaska were elevated. The maximum 95% horizontal and vertical LPV errors were 1.331 meters and 1.576 meters at Atlantic City and Kotzebue, respectively. The Kp index was 6 during this day.
- On 8/26/15 to 8/28/15, position errors in CONUS, Alaska, and Canada were elevated. The maximum 95% horizontal and vertical LPV errors were 1.386 meters and 2.006 meters at Gander and Kotzebue, respectively. The Kp index was 5 to 6 during these days.
- On 9/19/15 and 9/20/15, position errors in Alaska were elevated. The maximum 95% horizontal and vertical LPV errors were 0.962 meters and 2.441 meters at Fairbanks and Kotzebue, respectively. The Kp index was 5 to 7 during these days.

Figure 2-7 and Figure 2-8 show the daily NPA 95% horizontal accuracy at the NPA evaluation sites for the reporting period. The increases in 95% NPA position errors on 7/4/15 to 7/5/15, 7/10/15 to 7/11/15, 7/30/15 to 7/31/15, 8/7/15, 9/7/15 to 9/8/15, and 9/14/15 were due to geomagnetic activity.

Figure 2-9 through Figure 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 Figure 2-9 and Figure 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 level. 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 Figure 2-11 and Figure 2-12 show the distributions of horizontal and vertical position errors and normalized position errors. The blue trace shows the distributions of the actual horizontal and vertical 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 horizontal and vertical errors normalized by one-sigma value of the protection level; horizontal - (HPL/6.0) and vertical - (VPL/5.33). 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)
Arcata	1.187	1.187	1.111	100	*	*
Atlantic City	1.363	1.363	1.684	100		
Grand Forks	1.157	1.157	1.483	100	*	*
Oklahoma City	0.772	0.772	1.07	100	*	*
Albuquerque	0.664	0.664	0.873	100	1.978	3.912
Anchorage	0.758	0.758	1.208	100	*	*
Atlanta	0.649	0.649	0.915	100	1.957	3.670
Barrow	0.591	0.591	1.246	99.9999	*	*
Bethel	0.641	0.641	0.943	100	1.907	3.656
Billings	0.661	0.661	0.839	100	1.537	3.638
Boston	0.714	0.714	0.977	100	1.828	3.412
Chicago	0.81	0.81	0.929	100	*	*
Cleveland	0.752	0.752	1.004	100	1.748	3.420
Cold Bay	0.644	0.644	0.984	100	*	*
Dallas	0.638	0.638	1.056	100	*	*
Denver	0.513	0.513	0.8	100	*	*
Fairbanks	0.73	0.73	1.412	100	1.880	3.664
Gander	0.784	0.784	1.076	100	*	*
Goose Bay	0.722	0.722	1.091	100	*	*
Houston	0.774	0.774	1.228	100	2.544	3.946
Iqaluit	0.835	0.835	1.248	100	*	*
Jacksonville	0.697	0.697	0.956	100	*	*
Juneau	0.665	0.665	1.078	100	*	*
Kansas City	0.539	0.539	0.956	100	1.713	3.643
Kotzebue	0.653	0.653	1.28	99.9999	2.168	4.472
Los Angeles	0.665	0.665	1.18	100	2.168	4.472
Memphis	0.607	0.607	0.992	100	*	*
Merida	0.819	0.819	1.311	100	*	*
Mexico City	0.791	0.791	2.357	100	*	*
Miami	0.897	0.897	1.18	100	3.008	4.143
Minneapolis	0.675	0.675	1.04	100	1.600	3.434
New York	0.739	0.739	0.957	100	*	*
Oakland	0.683	0.683	1.354	100	2.006	4.676
Puerto Vallarta	0.839	0.839	1.237	100	*	*
Salt Lake City	0.576	0.576	0.85	100	1.652	3.899
San Jose Del Cabo	0.911	0.911	1.311	100	*	*
Seattle	0.601	0.601	0.826	100	1.572	4.037
Washington DC	0.727	0.727	0.988	100	1.840	3.595
Winnipeg	0.64	0.64	1.1	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	1.307	2.693	100	2.874
Anchorage	2.012	3.457	100	3.703
Atlanta	1.388	3.403	100	3.59
Barrow	1.488	3.452	100	3.583
Bethel	1.733	3.923	100	4.101
Billings	1.349	3.74	100	3.93
Boston	1.347	5.309	100	5.555
Cleveland	1.232	4.175	100	4.391
Cold Bay	1.428	3.083	100	3.276
Fairbanks	2.197	3.733	100	3.972
Gander	1.536	6.123	100	6.333
Honolulu	3.401	6.689	100	6.995
Houston	2.146	3.854	100	4.045
Iqaluit	1.209	3.723	100	5.54
Juneau	1.616	2.932	100	3.554
Kansas City	1.05	2.269	100	2.415
Kotzebue	1.794	4.137	100	8.851
Los Angeles	1.777	3.398	100	3.569
Merida	2.721	6.258	100	7.621
Miami	2.348	4.763	100	4.87
Minneapolis	1.263	4.882	100	5.13
Oakland	1.411	3.414	100	3.604
Salt Lake City	1.169	3.487	100	3.615
San Jose Del Cabo	2.8	6.156	100	6.404
San Juan	2.469	7.928	100	8.319
Seattle	1.145	2.503	100	2.795
Tapachula	3.222	8.989	100	9.185
Washington DC	1.427	3.815	100	3.919

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
Arcata	2.398	0.157	0.213	3.570	0.122	0.160
Atlantic City	2.872	0.134	0.240	3.804	0.105	0.200
Grand Forks	2.471	0.093	0.196	3.553	0.165	0.201
Oklahoma City	1.700	0.169	0.193	3.027	0.178	0.184
Albuquerque	1.471	0.076	0.134	2.084	0.124	0.148
Anchorage	2.982	0.112	0.202	4.165	0.181	0.232
Atlanta	1.294	0.118	0.151	2.457	0.153	0.182
Barrow	2.473	0.110	0.158	6.303	0.160	0.188
Bethel	2.415	0.148	0.150	3.526	0.153	0.153
Billings	2.706	0.245	0.247	3.044	0.141	0.165
Boston	2.632	0.191	0.191	2.832	0.150	0.167
Chicago	2.199	0.217	0.217	2.713	0.174	0.174
Cleveland	2.353	0.225	0.225	3.130	0.207	0.207
Cold Bay	1.852	0.069	0.105	2.531	0.079	0.125
Dallas	1.287	0.168	0.168	2.507	0.148	0.185
Denver	1.311	0.153	0.153	2.507	0.075	0.146
Fairbanks	1.996	0.154	0.195	6.500	0.289	0.289
Gander	2.705	0.155	0.163	2.972	0.097	0.124
Goose Bay	3.222	0.150	0.155	3.436	0.105	0.161
Houston	1.809	0.171	0.179	2.931	0.190	0.195
Iqaluit	3.053	0.114	0.170	4.115	0.084	0.185
Jacksonville	1.649	0.095	0.155	2.961	0.160	0.170
Juneau	2.747	0.203	0.204	5.418	0.147	0.249
Kansas City	1.188	0.133	0.136	2.963	0.186	0.194
Kotzebue	3.026	0.220	0.221	7.051	0.201	0.214
Los Angeles	2.101	0.093	0.137	2.737	0.139	0.154
Memphis	1.281	0.130	0.146	2.344	0.140	0.173
Merida	2.053	0.114	0.172	3.164	0.135	0.154
Mexico City	2.098	0.116	0.152	4.309	0.157	0.166
Miami	1.812	0.137	0.163	2.924	0.133	0.150
Minneapolis	2.698	0.251	0.251	2.658	0.142	0.169
New York	2.238	0.192	0.192	2.381	0.146	0.146
Oakland	1.630	0.135	0.154	2.939	0.081	0.154
Puerto Vallarta	2.045	0.098	0.111	3.505	0.128	0.129
Salt Lake City	1.689	0.154	0.167	2.655	0.158	0.167
San Jose Del Cabo	2.050	0.119	0.130	4.213	0.145	0.167
Seattle	1.629	0.137	0.157	2.691	0.169	0.172
Washington DC	1.863	0.166	0.166	2.485	0.117	0.154
Winnipeg	2.952	0.186	0.196	4.517	0.282	0.282

Figure 2-1 LPV 95% Horizontal Accuracy

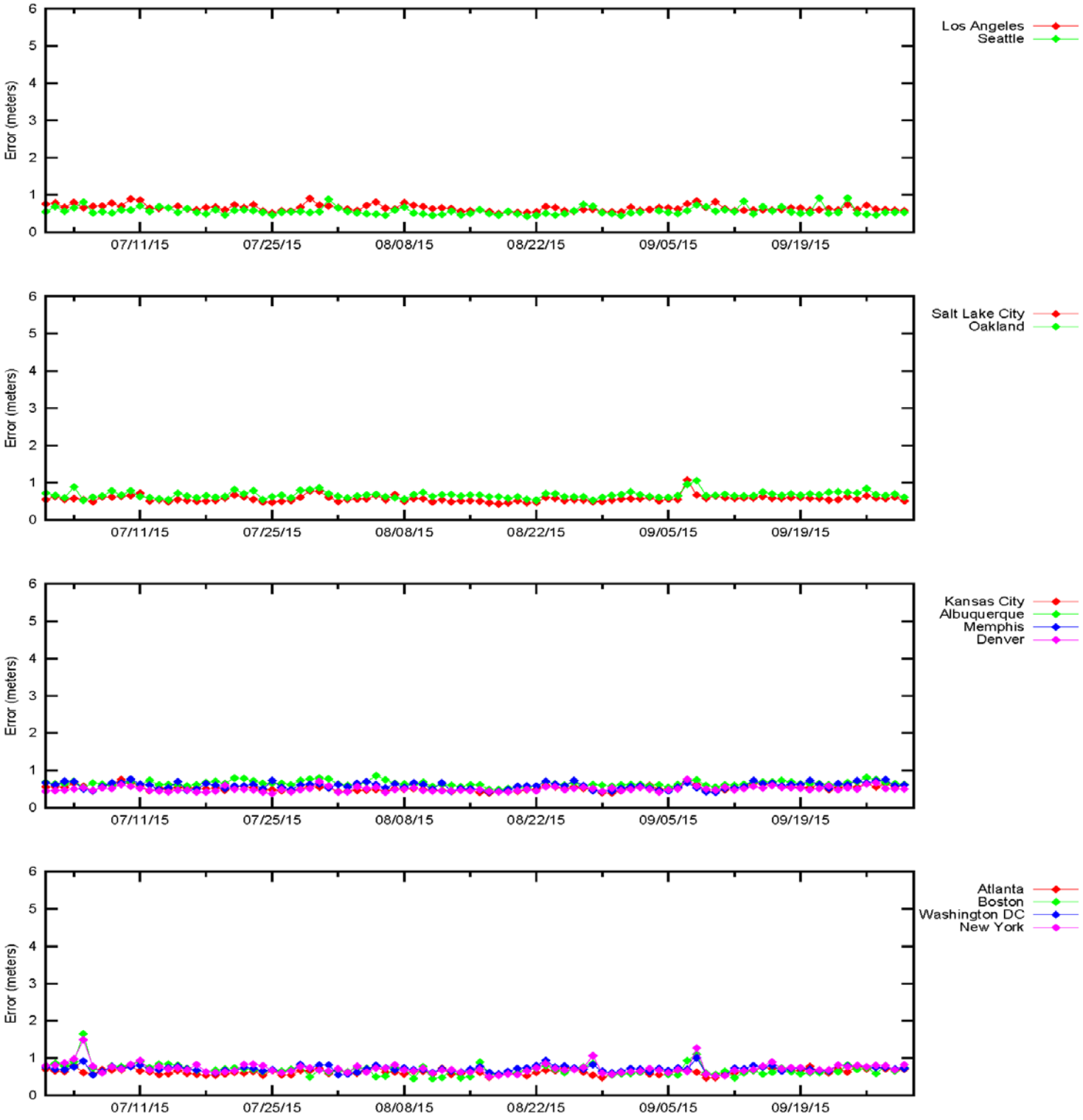


Figure 2-2 LPV 95% Horizontal Accuracy

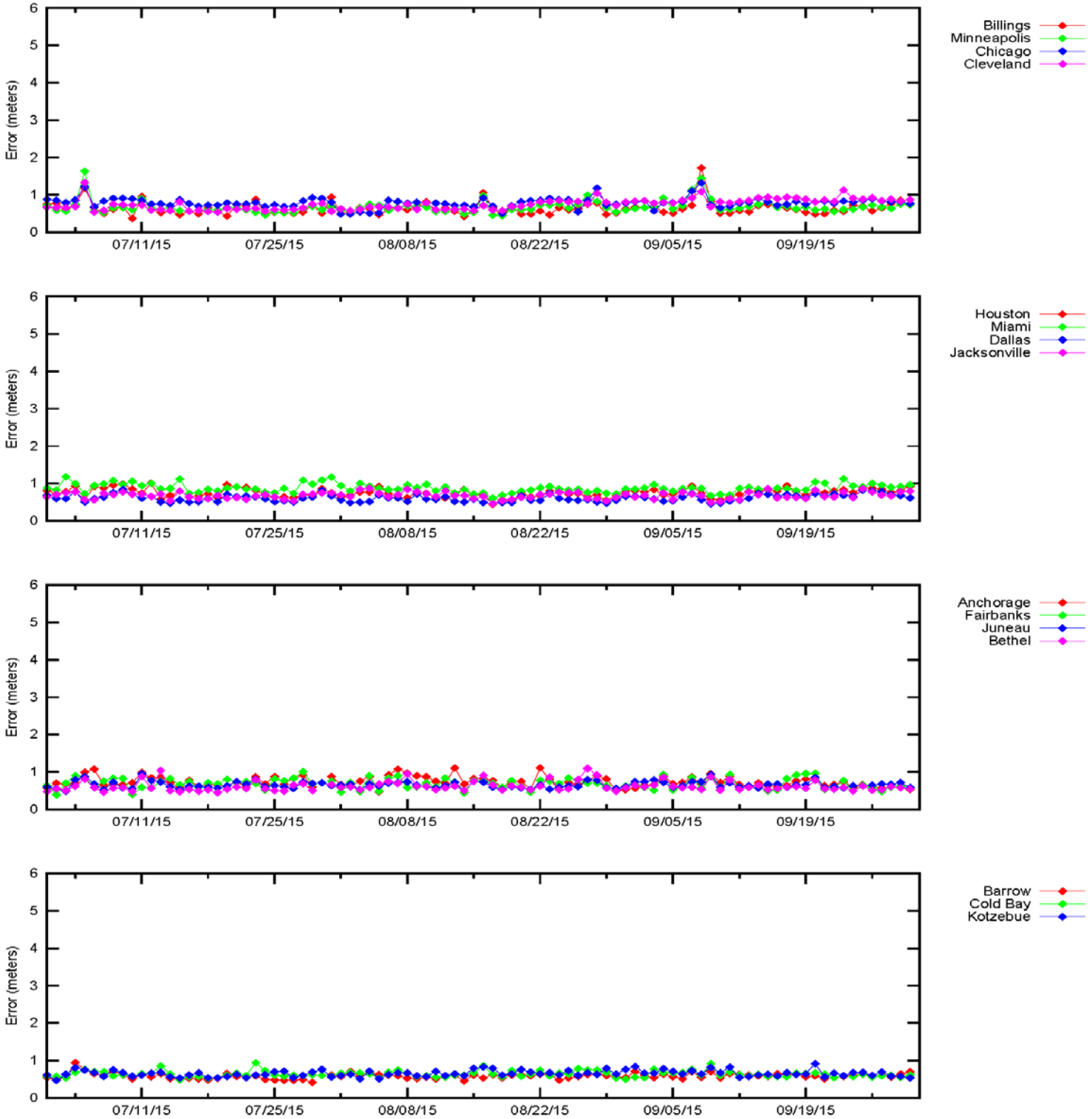


Figure 2-3 LPV 95% Horizontal Accuracy

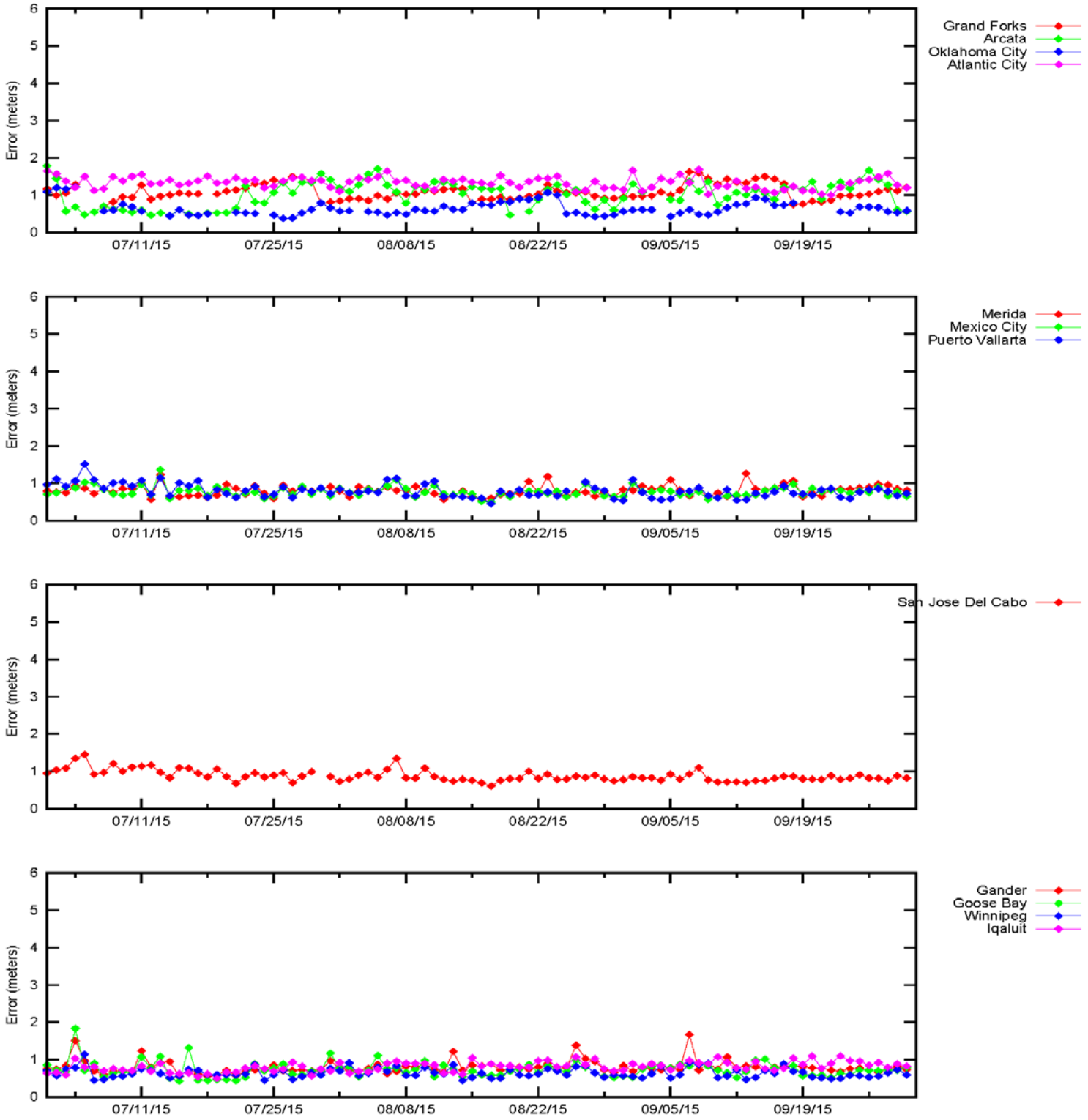


Figure 2-4 LPV 95% Vertical Accuracy

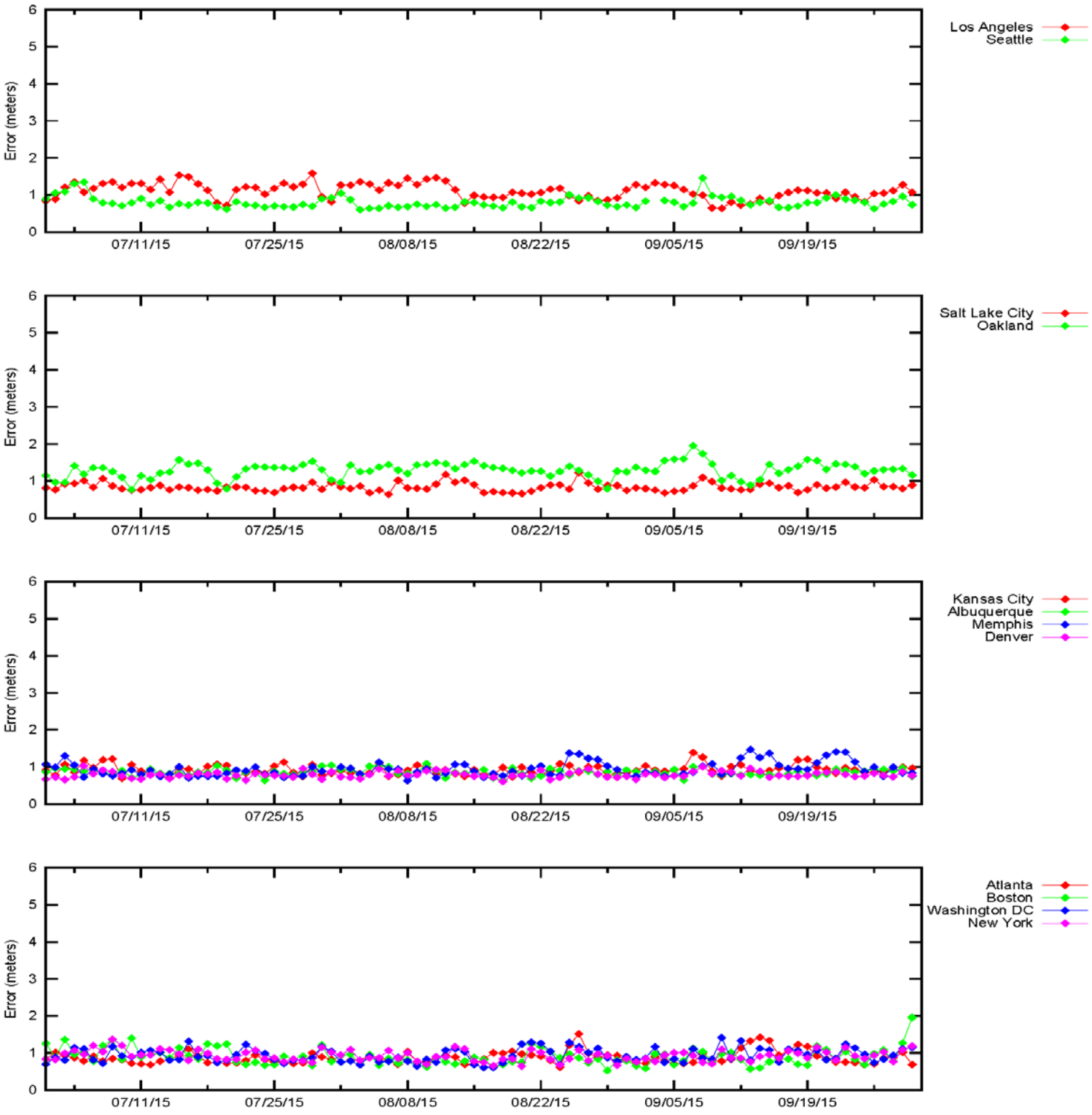


Figure 2-5 LPV 95% Vertical Accuracy

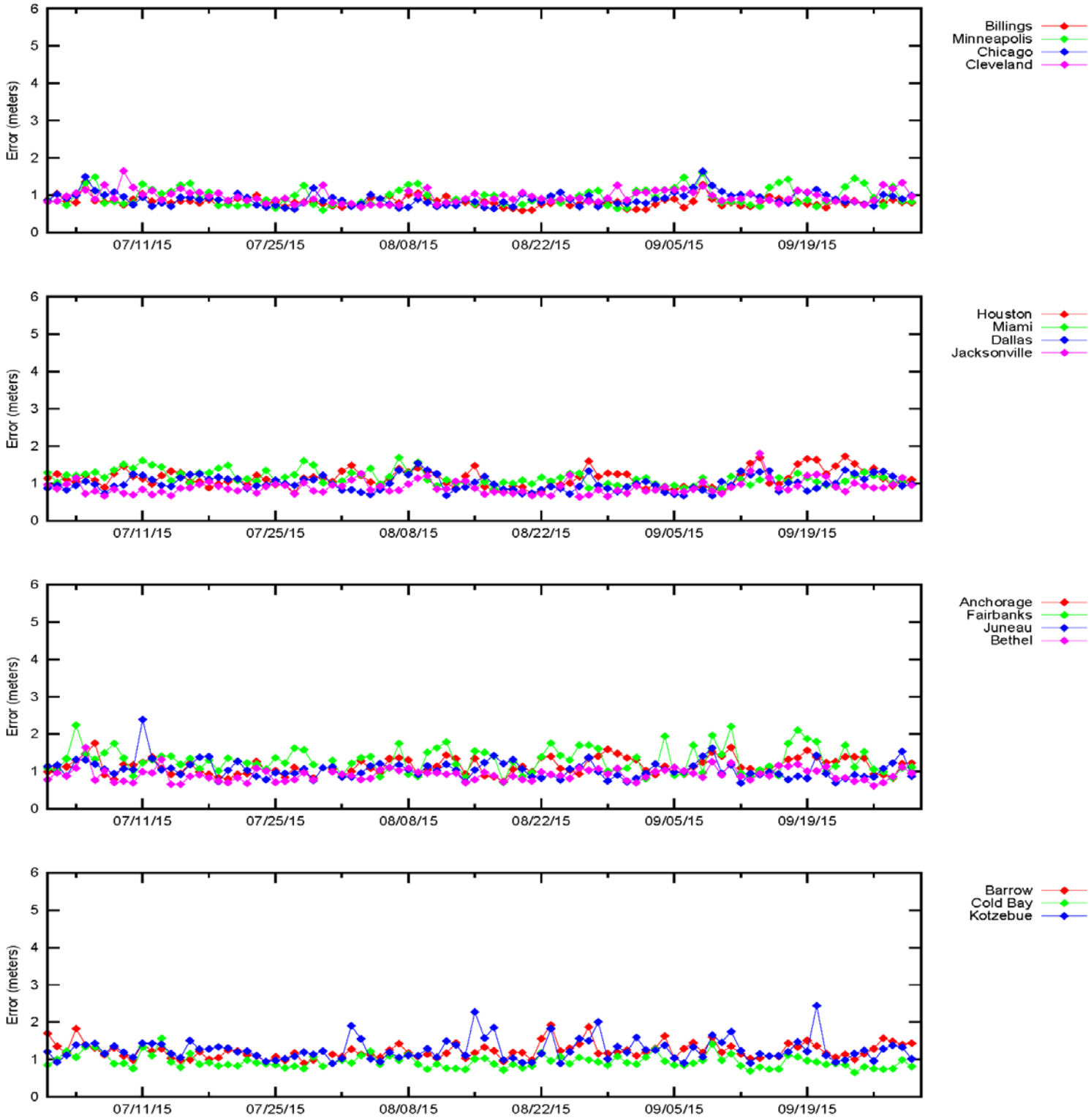


Figure 2-6 LPV 95% Vertical Accuracy

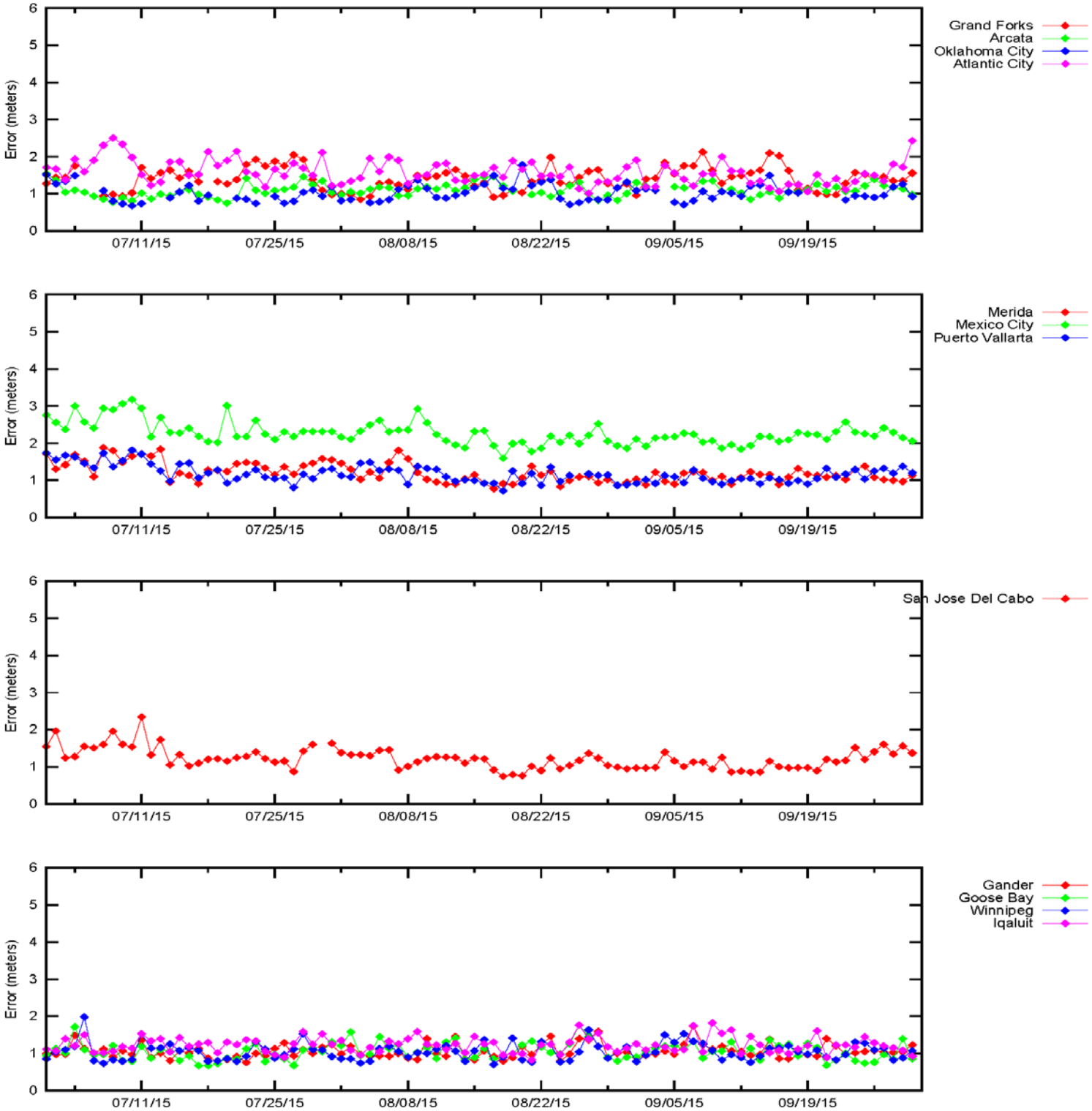


Figure 2-7 NPA 95% Horizontal Accuracy

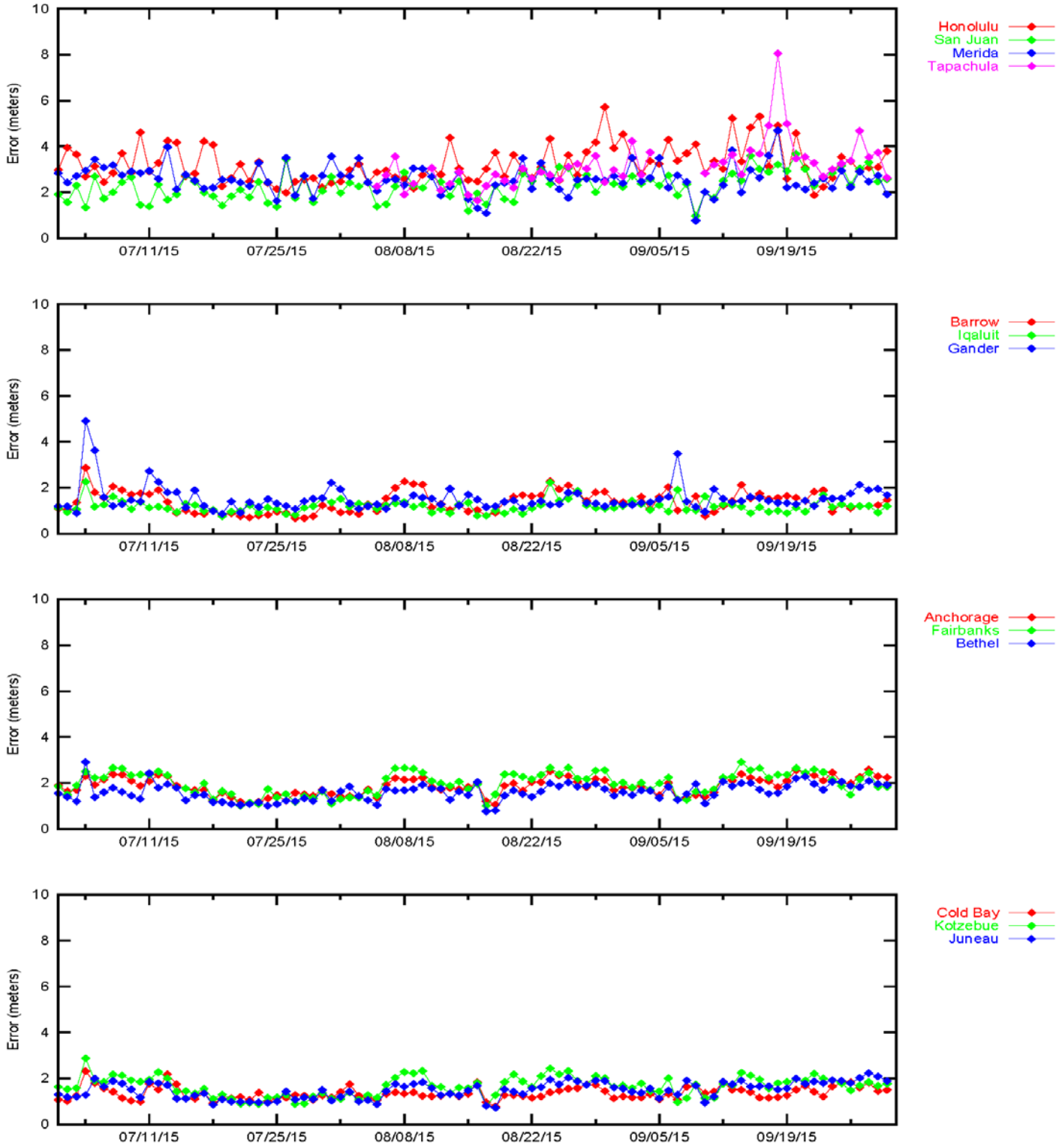


Figure 2-8 NPA 95% Horizontal Accuracy

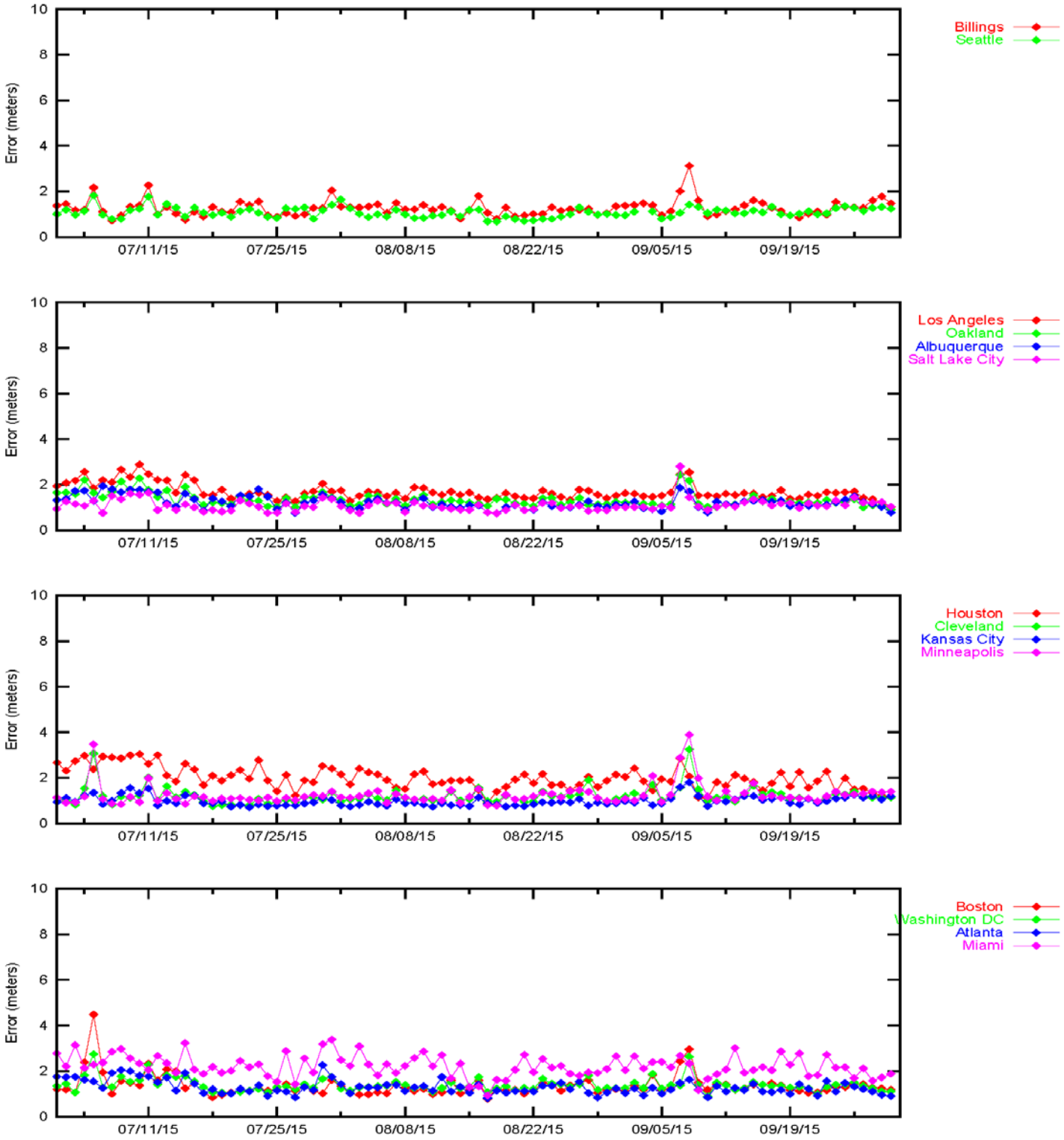


Figure 2-9 LPV Horizontal Error Bounding Triangle Chart

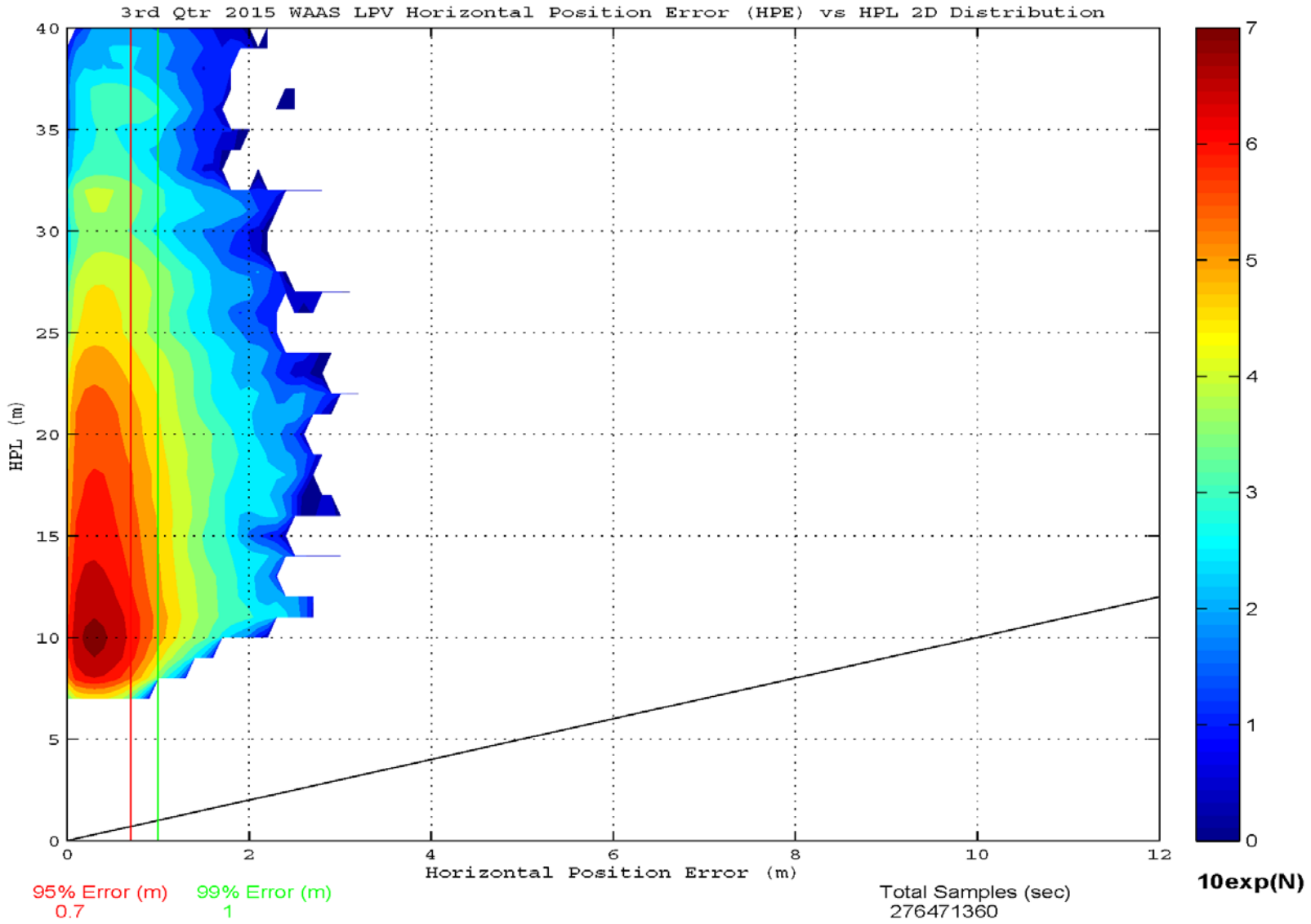


Figure 2-10 LPV Vertical Error Bounding Triangle Chart

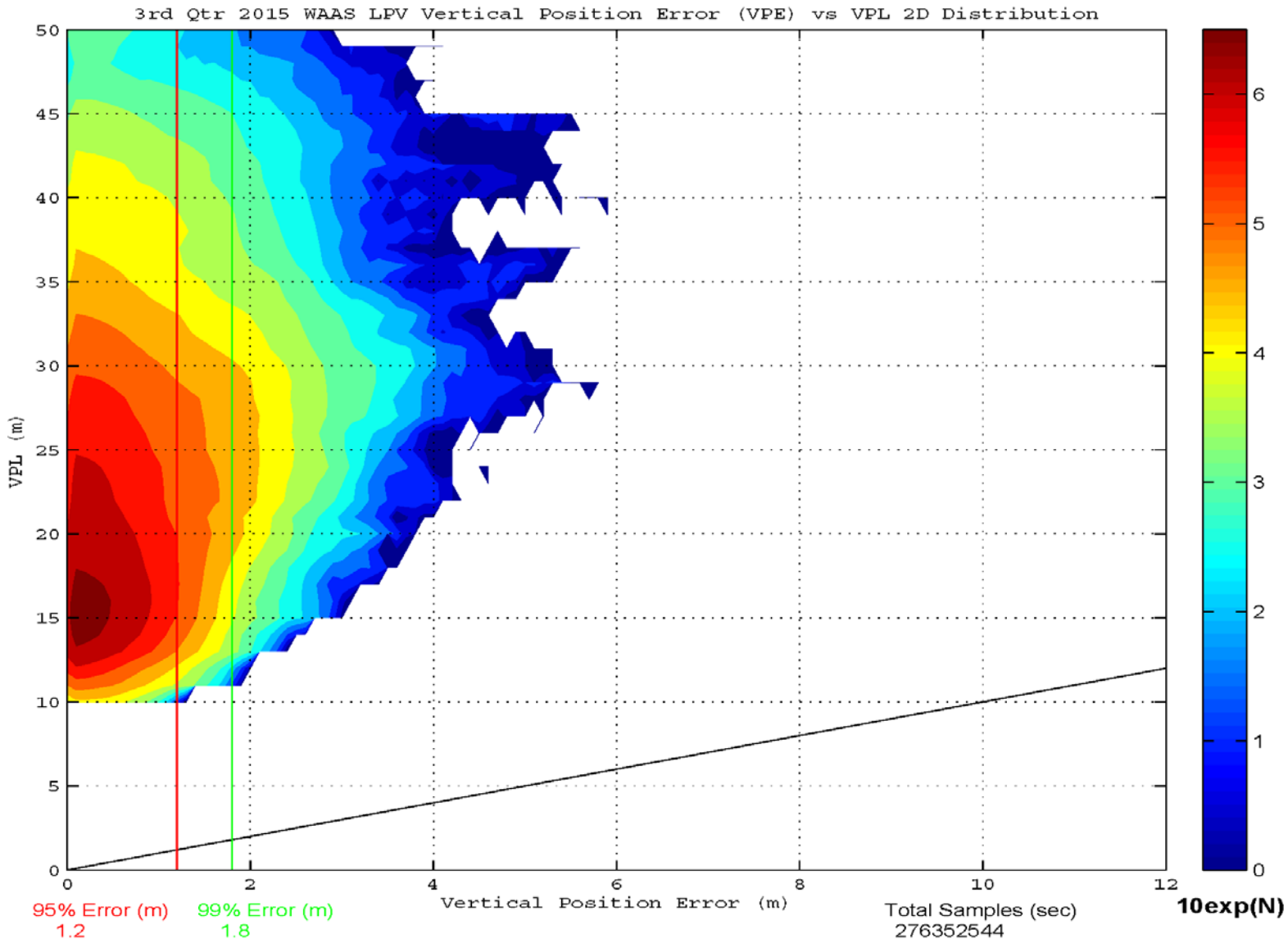


Figure 2-11 LPV 2-D Horizontal Error Distribution Histogram

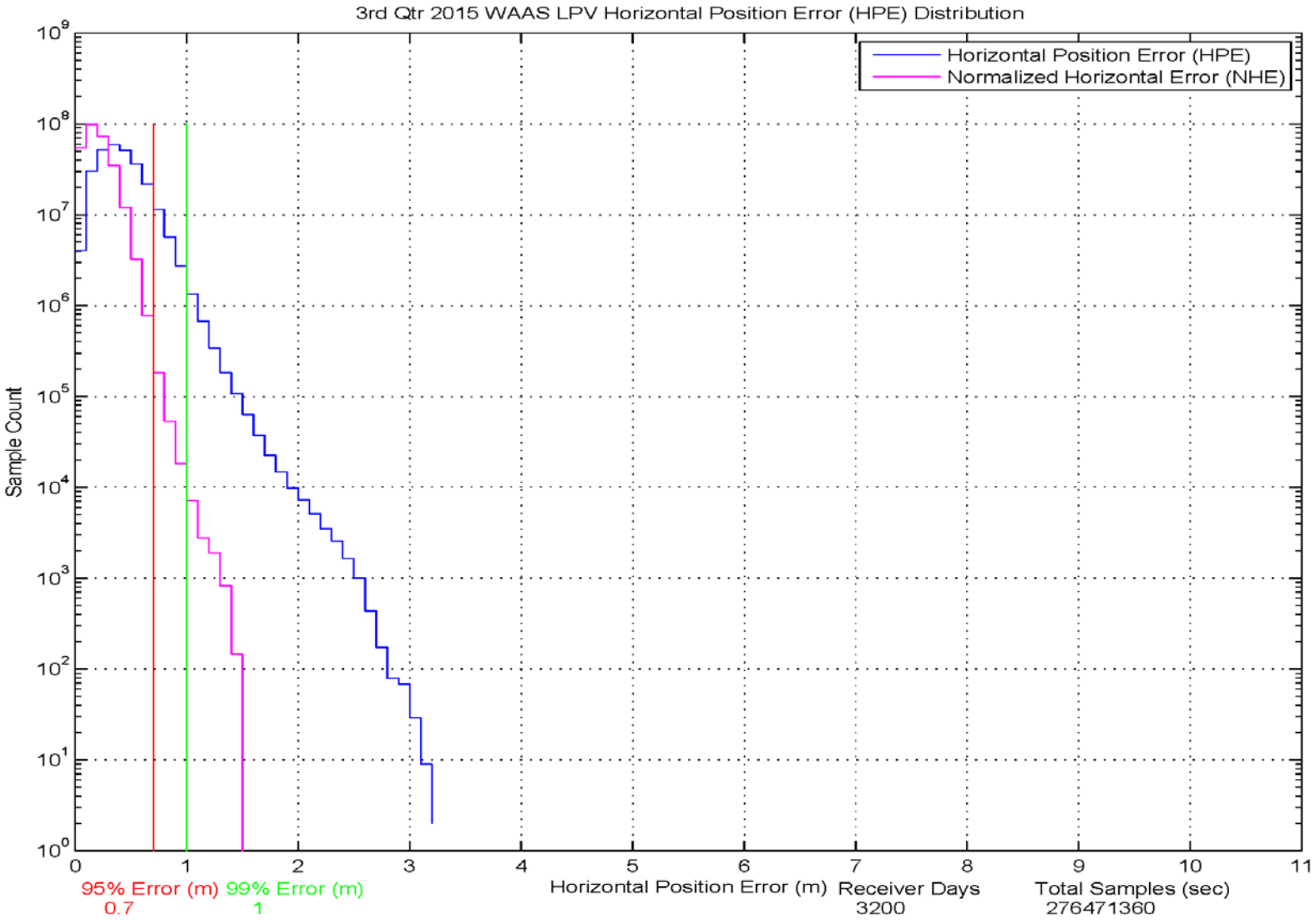
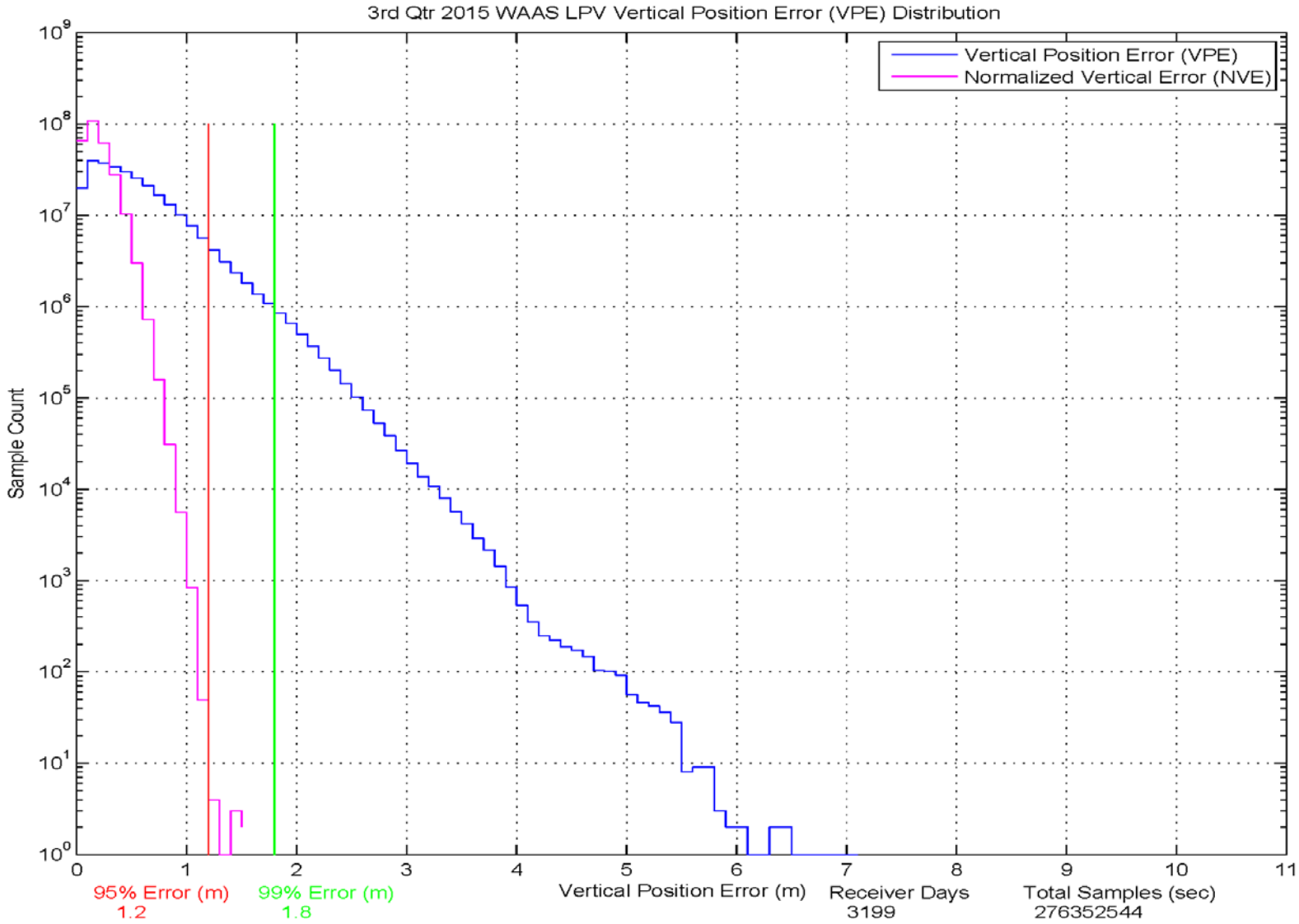


Figure 2-12 LPV 2-D Vertical Error Distribution Histogram



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 17.08 meters and 31.61 meters, both at Oakland. The minimum 99% CONUS HPL and VPL are 10.7 meters at Denver and 19.11 meters at Kansas City. The maximum 99% Alaska HPL and VPL are 26.99 meters at Cold Bay and 39.93 meters at Barrow. The minimum 99% Alaska HPL and VPL are 13.84 meters and 22.30 meters, both at Juneau.

Availability of LP, LPV and LPV200 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 LPV200 service is available using the 15-minute window criteria is presented in Table 3-2. The LP, LPV, and LPV200 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. Figure 3-1 through Figure 3-6 show the daily availability of LPV and LPV200 service levels. Figure 3-7 through Figure 3-12 show the daily interruptions of LPV and LPV200 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 15-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, geomagnetic activity, and elevated GIVE and UDRE values. Noteworthy events that caused outages and/or affected availability are listed below.

- On July 8, August 6, August 21, and September 25; local RFI caused degraded SV tracking of reference receivers at Miami reference station resulting in an LPV/LPV200 outage at the receiver location. These outages did not affect WAAS availability.
- On July 28, the reduction in CONUS, Alaska, and Canada availability was due to a GPS NANU on PRN-17, which was unusable from 16:24 GMT to 21:32 GMT on July 28th.
- On September 1, the reduction in CONUS and Canada availability was due to a GPS NANU on PRN-6, which was unusable from 18:59 GMT on 9/1 to 02:45 GMT on 9/2.
- On September 9, geomagnetic activity caused elevated GIVE values, which affected LP, LPV, and LPV200 availability in Alaska and LPV200 service in Canada. See DR, "DR128 Effect on WAAS from Iono Activity September 9 2015".
- On September 11, the reduction in Alaska and Canada availability was due to a GPS NANU on PRN-23, which was unusable from 03:30 GMT to 10:01 GMT on 9/11.
- On September 20, geomagnetic activity affected LPV and LPV200 availability in Alaska, and LPV200 coverage in Canada.

Table 3-1 99% Protection Level

Location	99% HPL (meters)	99% VPL (meters)	Percentage in PA mode (%)
Arcata	16.791	31.172	100
Atlantic City	15.197	22.612	100
Grand Forks	13.812	22.19	100
Oklahoma City	11.058	22.214	100
Albuquerque	10.815	20.393	100
Anchorage	14.115	24.196	100
Atlanta	12.628	21.587	100
Barrow	18.066	39.928	99.9999
Bethel	17.547	30.29	100
Billings	12.147	21.579	100
Boston	14.779	20.509	100
Chicago	11.677	19.558	100
Cleveland	15.042	22.62	100
Cold Bay	26.985	39.197	100
Dallas	11.254	19.5	100
Denver	10.703	22.208	100
Fairbanks	14.007	25.391	100
Gander	24.287	33.644	100
Goose Bay	20.447	26.608	100
Houston	11.601	21.351	100
Iqaluit	31.056	40.808	100
Jacksonville	13.156	23.647	100
Juneau	13.84	22.304	100
Kansas City	10.812	19.114	100
Kotzebue	17.21	34.582	99.9999
Los Angeles	14.096	29.556	100
Memphis	11.048	19.825	100
Merida	19.368	35.104	100
Mexico City	25.233	40.516	100
Miami	15.913	26.677	100
Minneapolis	12.29	20.351	100
New York	14.153	20.718	100
Oakland	17.075	31.61	100
Puerto Vallarta	30.045	50.734	100
Salt Lake City	11.118	21.417	100
San Jose Del Cabo	24.998	39.387	100
Seattle	12.957	21.786	100
Washington DC	14.195	22.508	100
Winnipeg	14.07	21.272	100

Table 3-2 PA Availability (15-minute window)

Location	LP WAAS Availability (%)	LPV WAAS Availability (%)	LPV200 WAAS Availability (%)
Arcata	100	100	99.97
Atlantic City	100	100	99.99
Grand Forks	100	100	100
Oklahoma City	100	100	100
Albuquerque	100	100	100
Anchorage	100	99.97	99.96
Atlanta	100	100	100
Barrow	100	99.87	96.66
Bethel	100	100	99.94
Billings	100	100	100
Boston	100	100	99.99
Chicago	100	100	100
Cleveland	100	100	100
Cold Bay	100	99.98	96.64
Dallas	100	100	100
Denver	100	100	100
Fairbanks	100	99.96	99.91
Gander	100	99.99	99.27
Goose Bay	100	100	99.93
Houston	100	100	100
Iqaluit	99.97	99.87	92.94
Jacksonville	100	100	100
Juneau	100	100	99.99
Kansas City	100	100	100
Kotzebue	99.99	99.94	98.53
Los Angeles	100	100	99.99
Memphis	100	100	100
Merida	100	99.99	98.41
Mexico City	100	99.95	96.05
Miami	100	100	99.97
Minneapolis	100	100	100
New York	100	100	100
Oakland	100	99.99	99.76
Puerto Vallarta	99.99	98.69	91.5
Salt Lake City	100	100	99.99
San Jose Del Cabo	100	99.95	93.22
Seattle	100	100	100
Washington DC	100	100	100
Winnipeg	100	100	100

Table 3-3 NPA Availability (15-minute window)

Location	NPA Availability (%) (Excluding RAIM/FDE)
Albuquerque	100
Anchorage	100
Atlanta	100
Barrow	100
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	100
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 LPV200 Outage Rate (Per 150 sec approach)

Location	LP Outages	LP Outage Rates	LPV Outages	LPV Outage Rates	LPV200 Outages	LPV200 Outage Rates
Arcata	0	0	0	0	3	0.000059
Atlantic City	0	0	0	0	1	0.000019
Grand Forks	0	0	0	0	0	0
Oklahoma City	0	0	0	0	0	0
Albuquerque	0	0	0	0	0	0
Anchorage	0	0	2	0.000038	8	0.000153
Atlanta	0	0	0	0	0	0
Barrow	3	0.000057	19	0.000364	263	0.005203
Bethel	1	0.000019	1	0.000019	8	0.000153
Billings	0	0	0	0	0	0
Boston	0	0	0	0	1	0.000019
Chicago	0	0	0	0	0	0
Cleveland	0	0	0	0	0	0
Cold Bay	0	0	1	0.000019	404	0.007928
Dallas	0	0	0	0	0	0
Denver	0	0	0	0	1	0.000019
Fairbanks	0	0	2	0.000038	17	0.000326
Gander	1	0.000019	3	0.000057	132	0.002518
Goose Bay	0	0	0	0	5	0.000095
Houston	0	0	0	0	0	0
Iqaluit	7	0.000133	23	0.000436	498	0.010147
Jacksonville	0	0	0	0	0	0
Juneau	0	0	2	0.000038	5	0.000095
Kansas City	0	0	0	0	0	0
Kotzebue	5	0.000095	12	0.000228	145	0.002791
Los Angeles	0	0	0	0	3	0.000057
Memphis	0	0	0	0	0	0
Merida	0	0	2	0.000038	138	0.00266
Mexico City	1	0.000019	4	0.000076	532	0.010508
Miami	1	0.000019	2	0.000038	6	0.000114
Minneapolis	0	0	0	0	0	0
New York	0	0	0	0	1	0.000019
Oakland	0	0	1	0.000019	68	0.001291
Puerto Vallarta	2	0.000038	177	0.003443	493	0.010343
Salt Lake City	0	0	0	0	2	0.000038
San Jose Del Cabo	0	0	10	0.00019	423	0.008614
Seattle	0	0	0	0	0	0
Washington DC	0	0	0	0	1	0.000019
Winnipeg	0	0	0	0	0	0

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	0	0
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	0	0
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

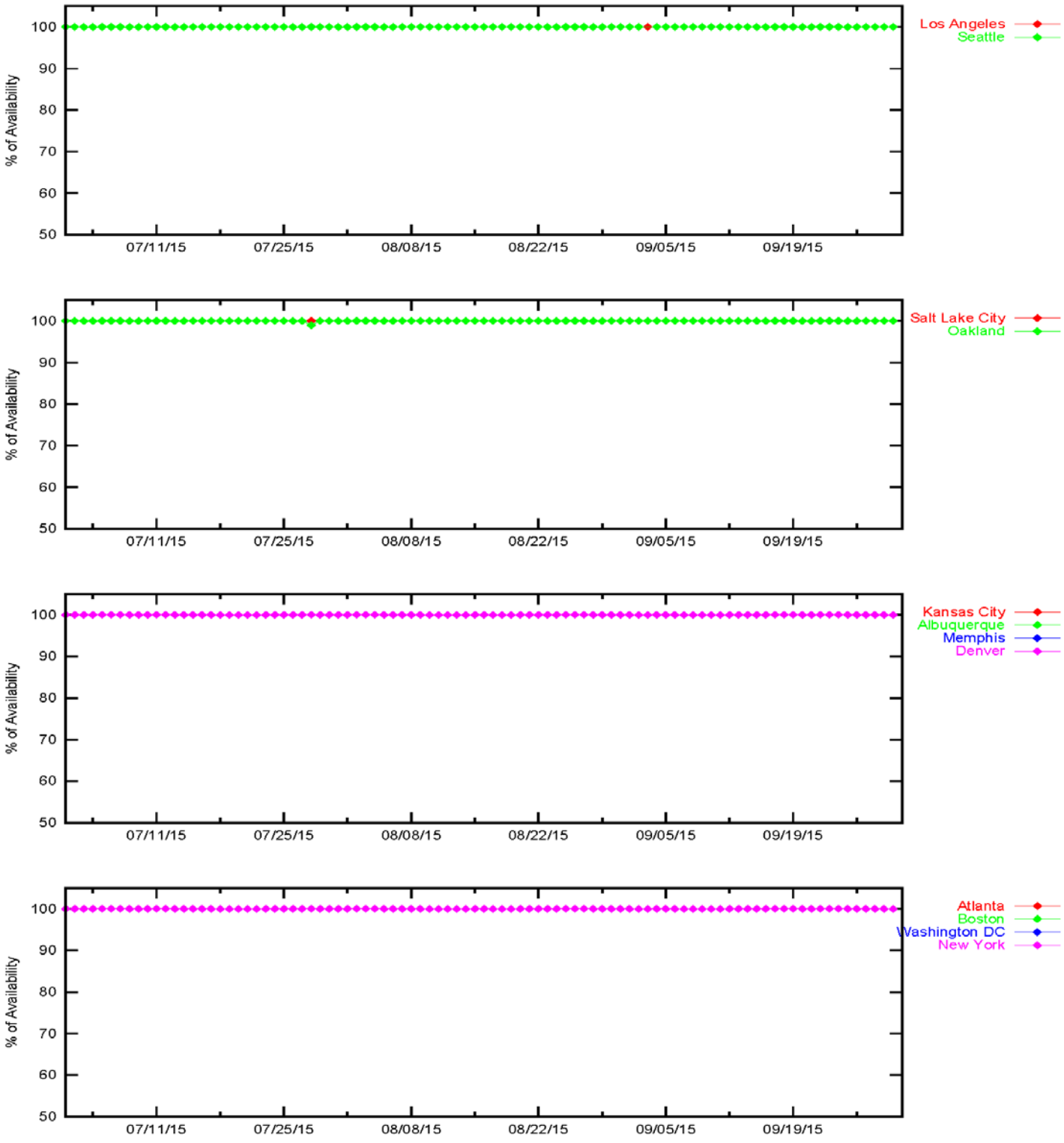


Figure 3-2 LPV Instantaneous Availability

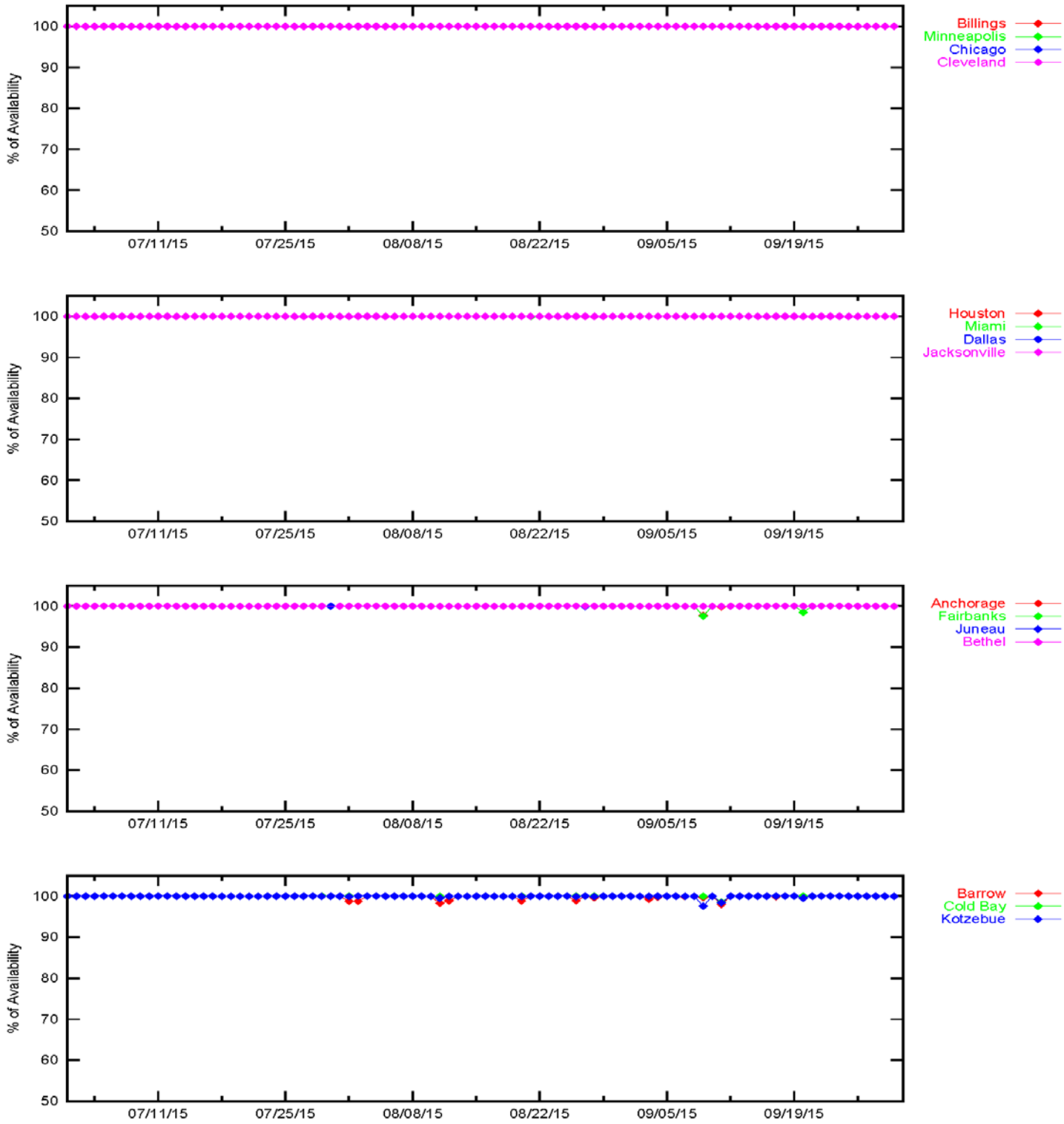


Figure 3-3 LPV Instantaneous Availability

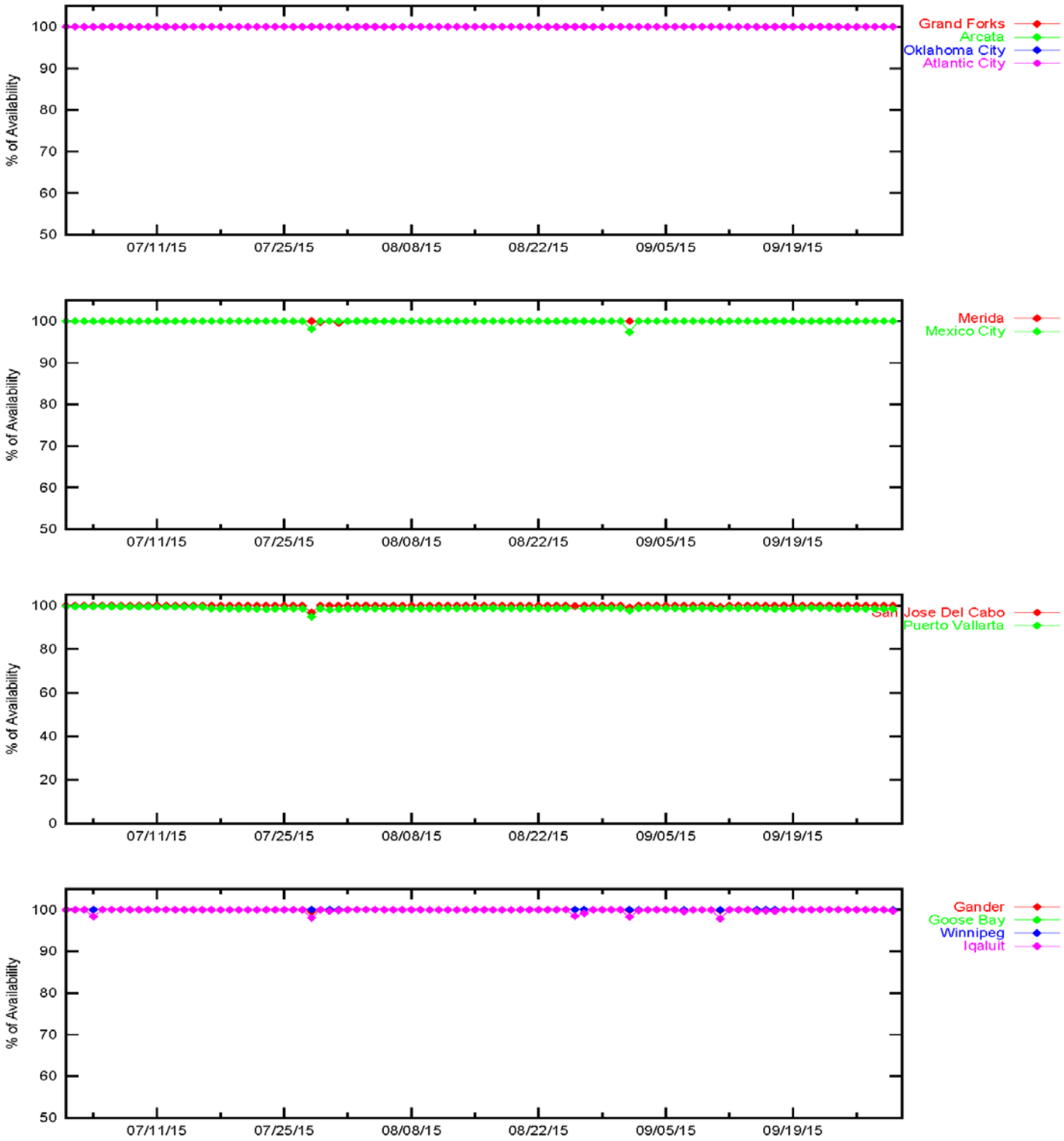


Figure 3-4 LPV200 Instantaneous Availability

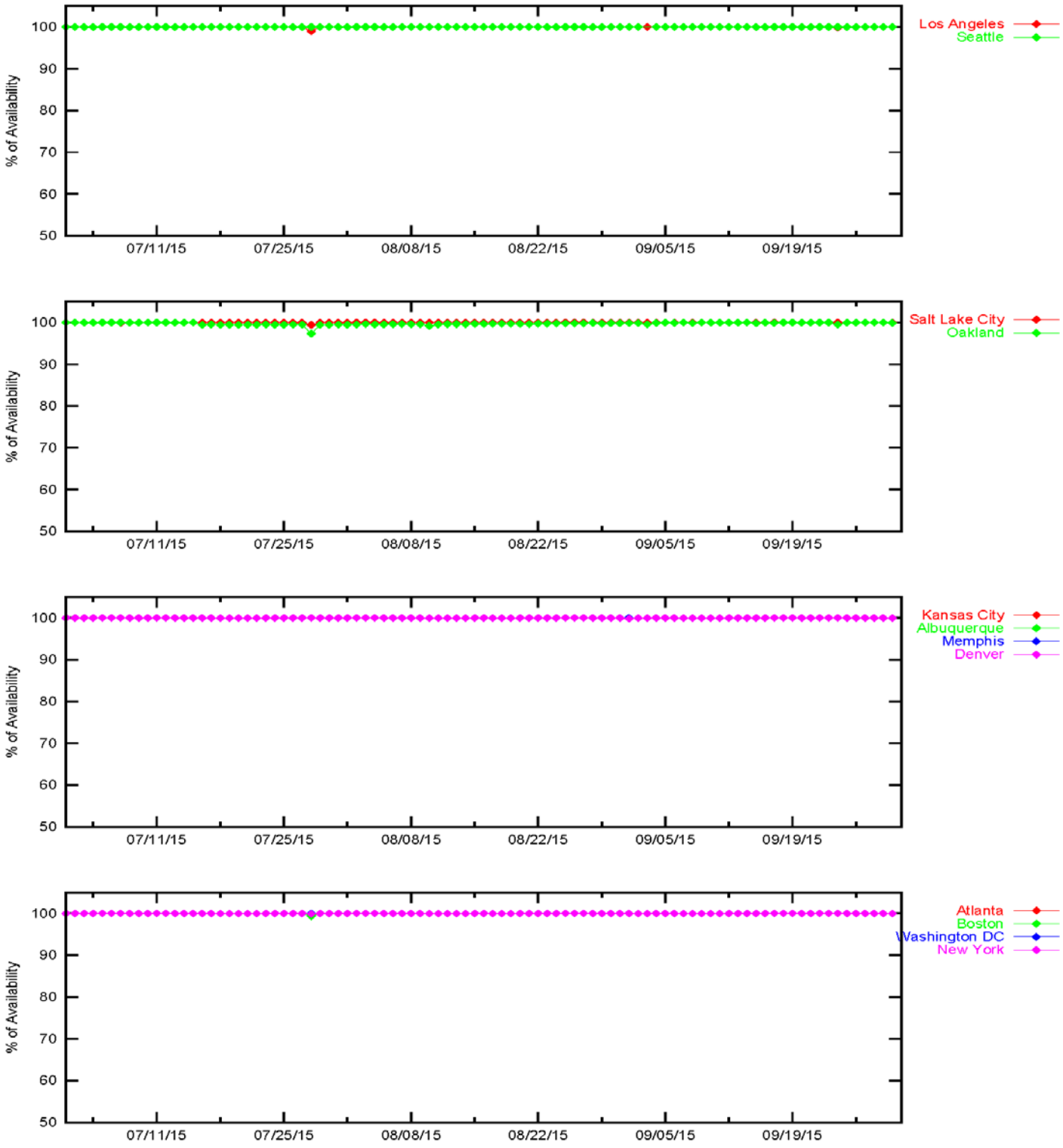


Figure 3-5 LPV200 Instantaneous Availability

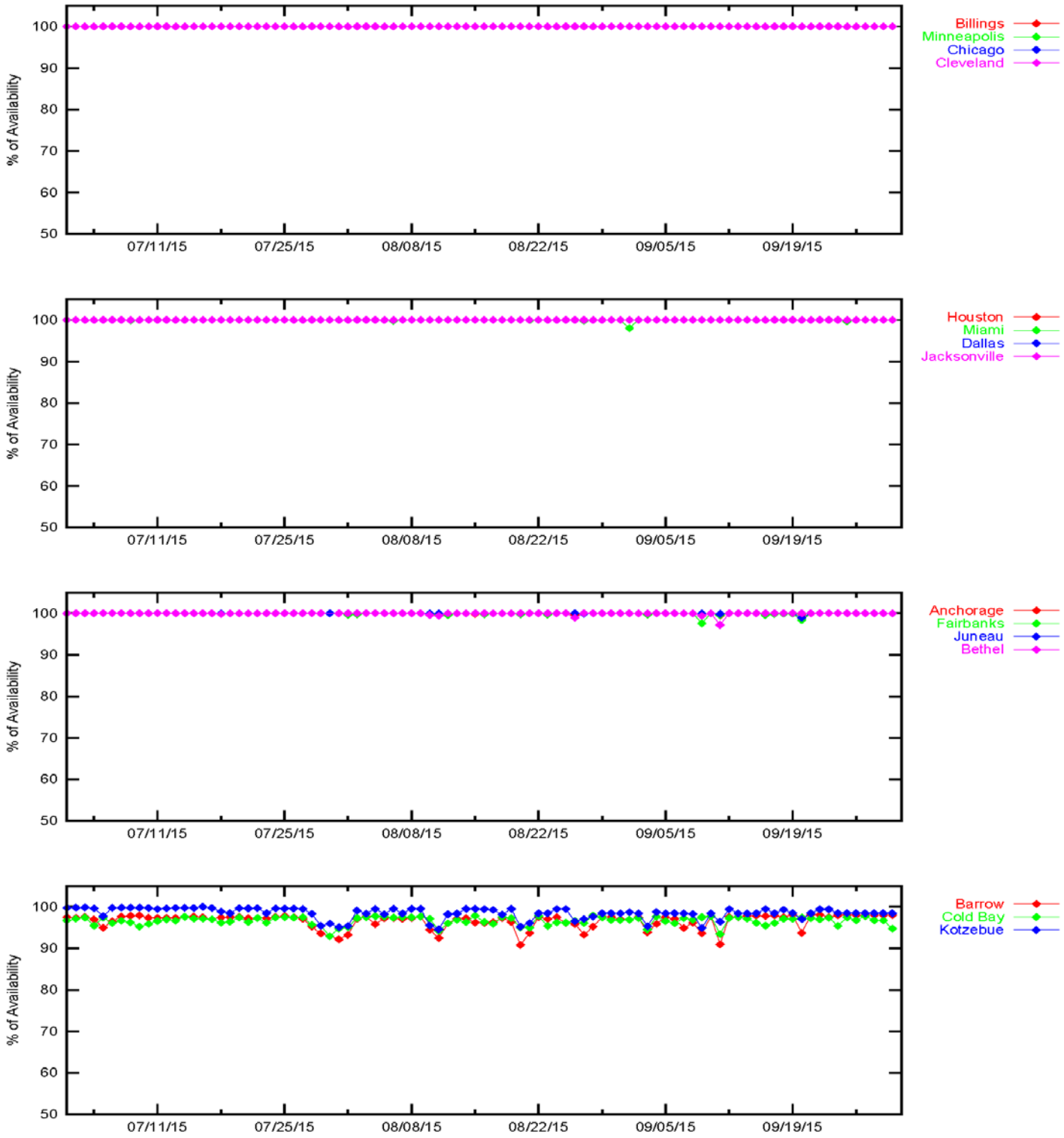


Figure 3-6 LPV200 Instantaneous Availability

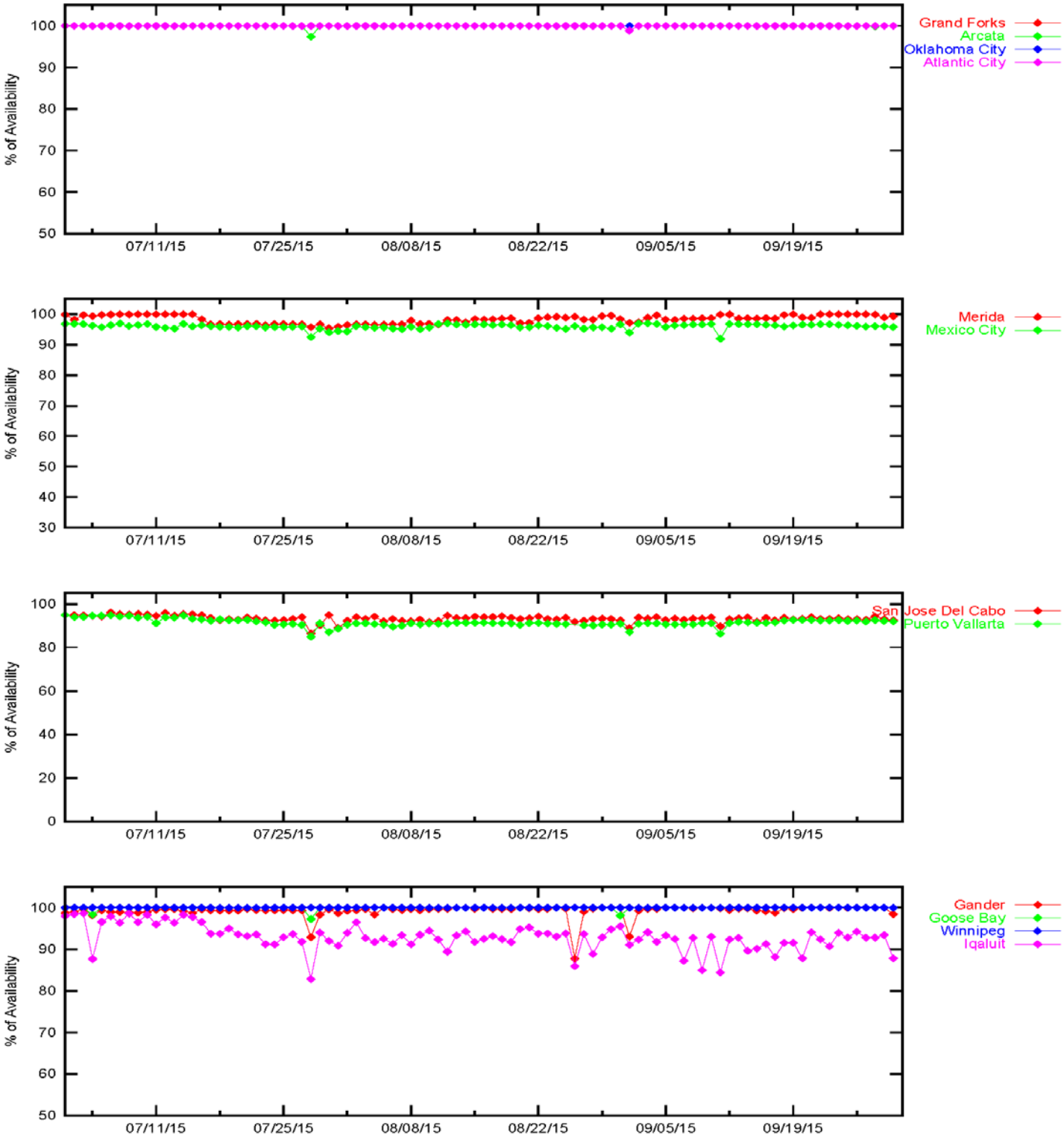


Figure 3-7 LPV Outages

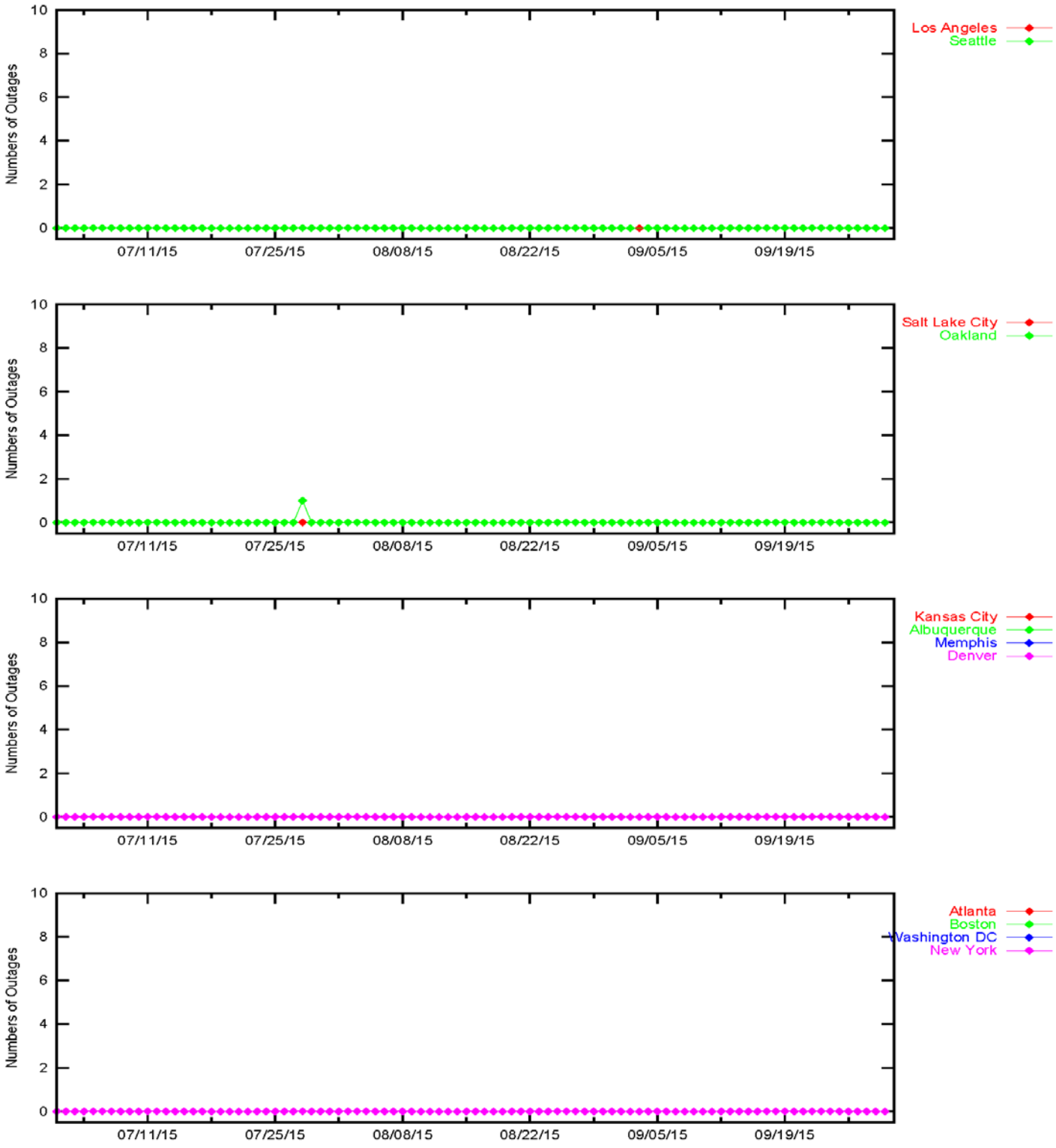


Figure 3-8 LPV Outages

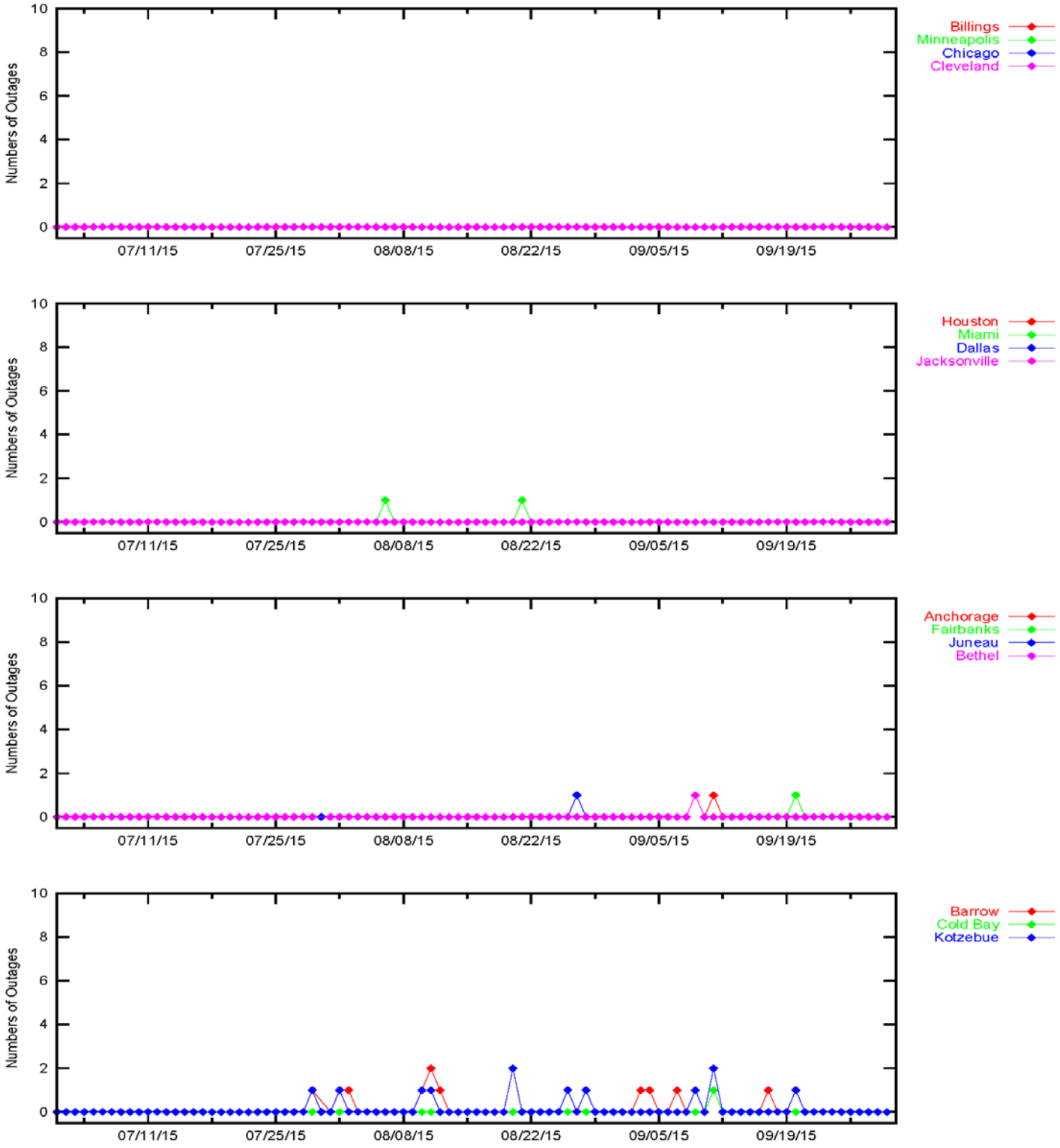


Figure 3-9 LPV Outages

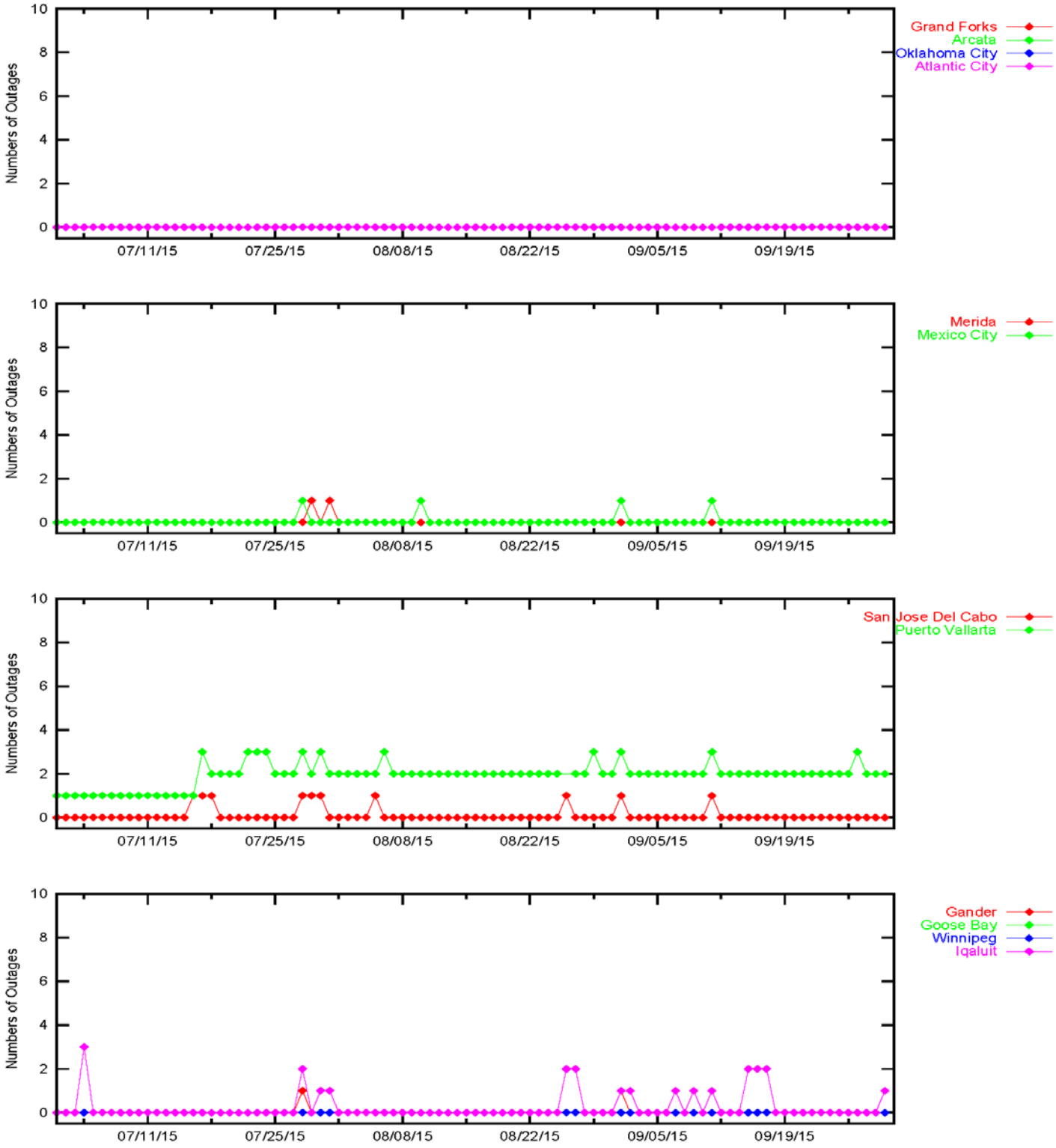


Figure 3-10 LPV200 Outages

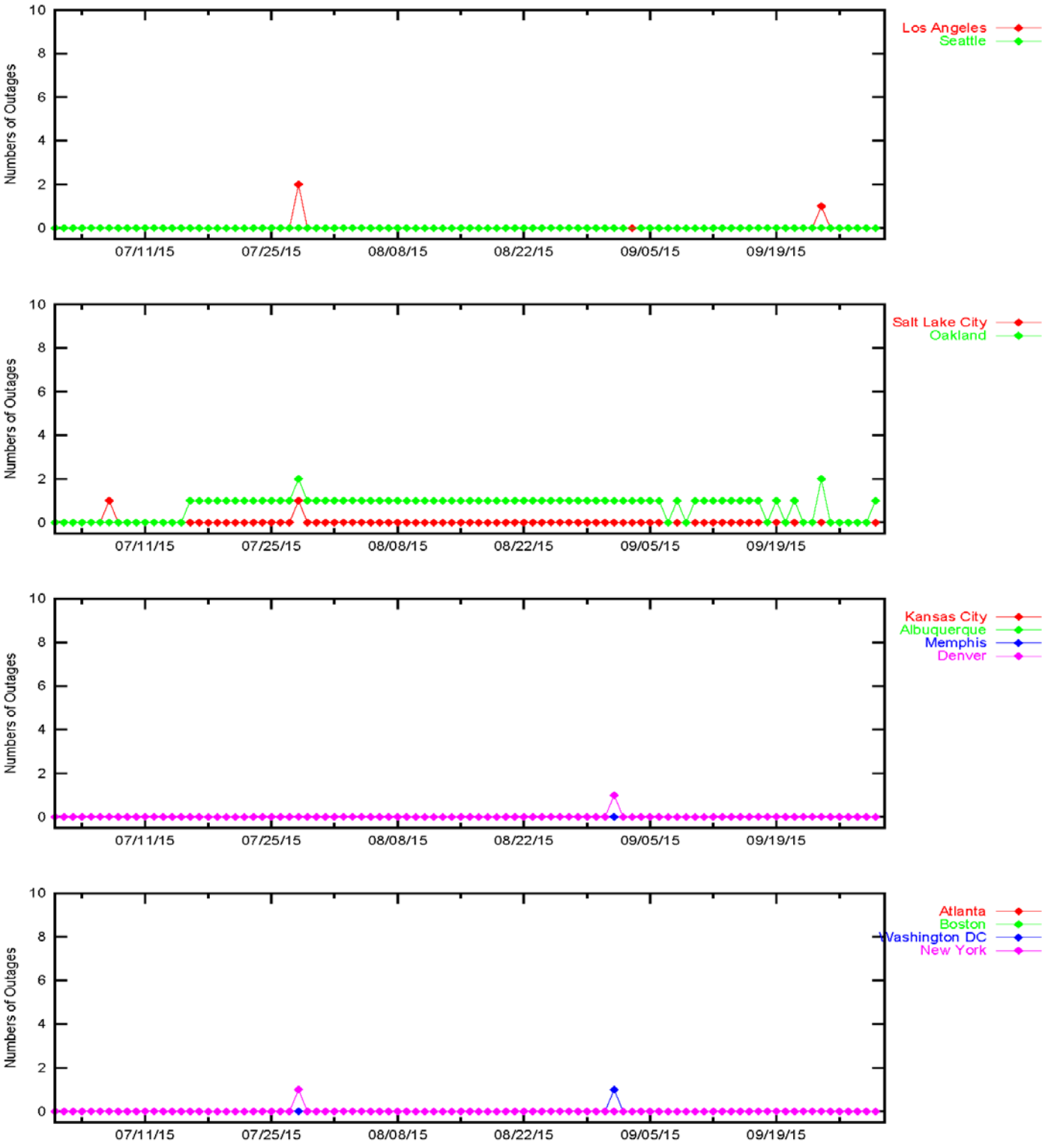


Figure 3-11 LPV200 Outages

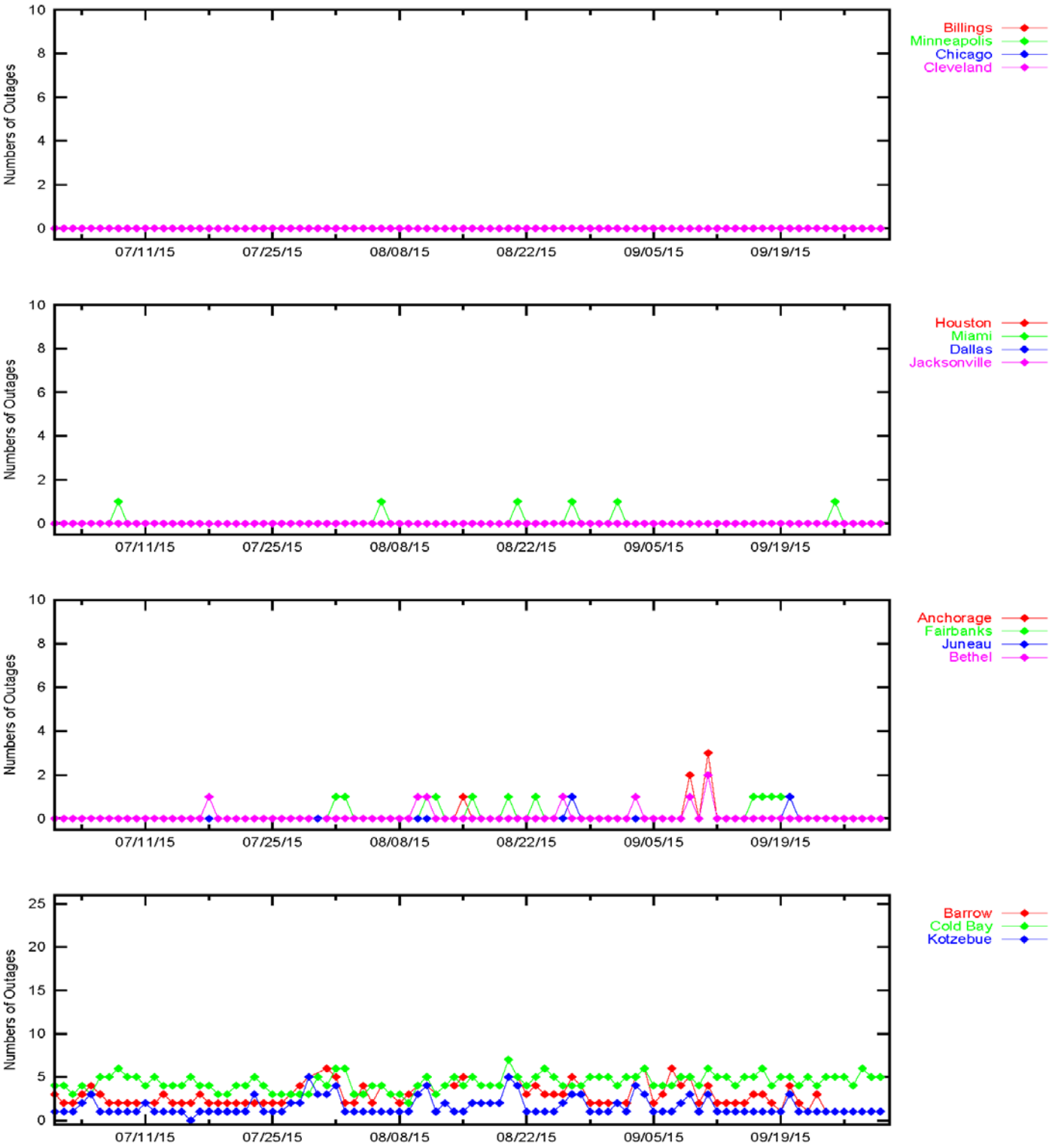
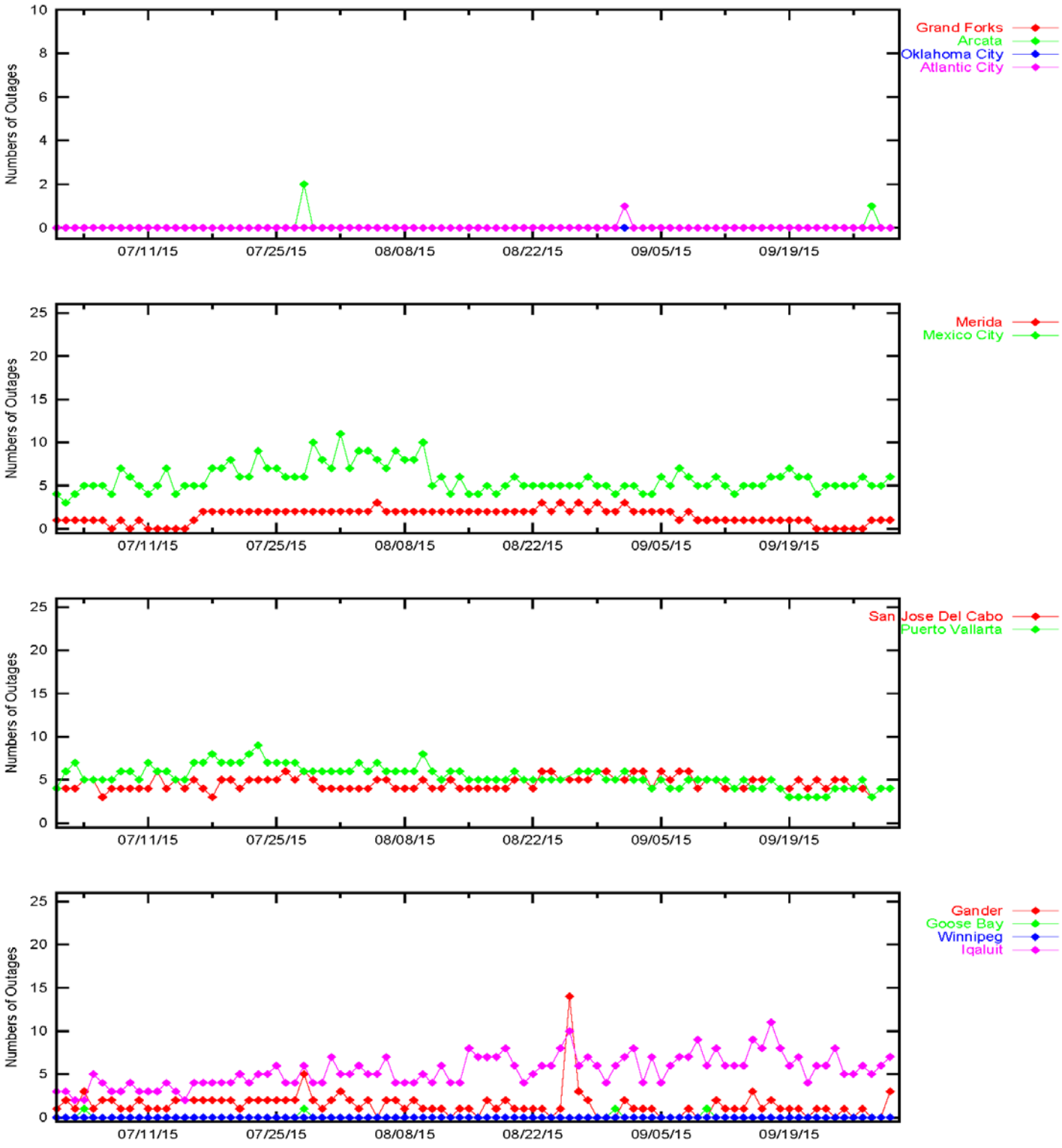


Figure 3-12 LPV200 Outages



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-second intervals at one degree spacing over the PA service volume, while NPA coverage were calculated at 30-second intervals at five degree spacing over the NPA service volume.

Daily analysis for PA was conducted for LP, LPV and LPV200 service levels. The PA 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 LPV200 North America coverage. Figure 4-6 shows the daily LPV and LPV200 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 LPV200 Canada coverage at 99% availability and ionosphere Kp index values for this quarter. See Appendix B for coverage plots of 98% LP and LPV availability contour, and 99% LPV200 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. 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 satellite outages, geomagnetic activity, communication outages, and elevated UDRE and GIVE values. Noteworthy events that affected coverage are listed below.

- On July 4, geomagnetic activity caused elevated GIVE values, which affected LPV200 coverage in Alaska and Canada.
- On July 28, the reduction in CONUS, Alaska, and Canada coverage was due to a GPS NANU on PRN-17, which was unusable from 16:24 GMT to 21:32 GMT on July 28th.
- On August 11, data outages from several Alaska reference stations resulted in elevated GIVE values. The combination of elevated UDREs on PRN-135 along with elevated GIVEs affected LPV200 coverage.
- On September 1, the reduction in CONUS and Canada coverage was due to a GPS NANU on PRN-6, which was unusable from 18:59 GMT on 9/1 to 02:45 GMT on 9/2.
- On September 9, geomagnetic activity caused elevated GIVE values, which affected LP, LPV, and LPV200 coverage in Alaska and LPV200 service in Canada. See DR, "DR128 Effect on WAAS from Iono Activity September 9 2015".
- On September 11, the reduction in Alaska and Canada coverage was due to a GPS NANU on PRN-23, which was unusable from 03:30 GMT to 10:01 GMT on 9/11.
- On September 20, geomagnetic activity affected LPV and LPV200 coverage in Alaska, and LPV200 coverage in Canada.

Figure 4-1 LP North America Coverage for the Quarter

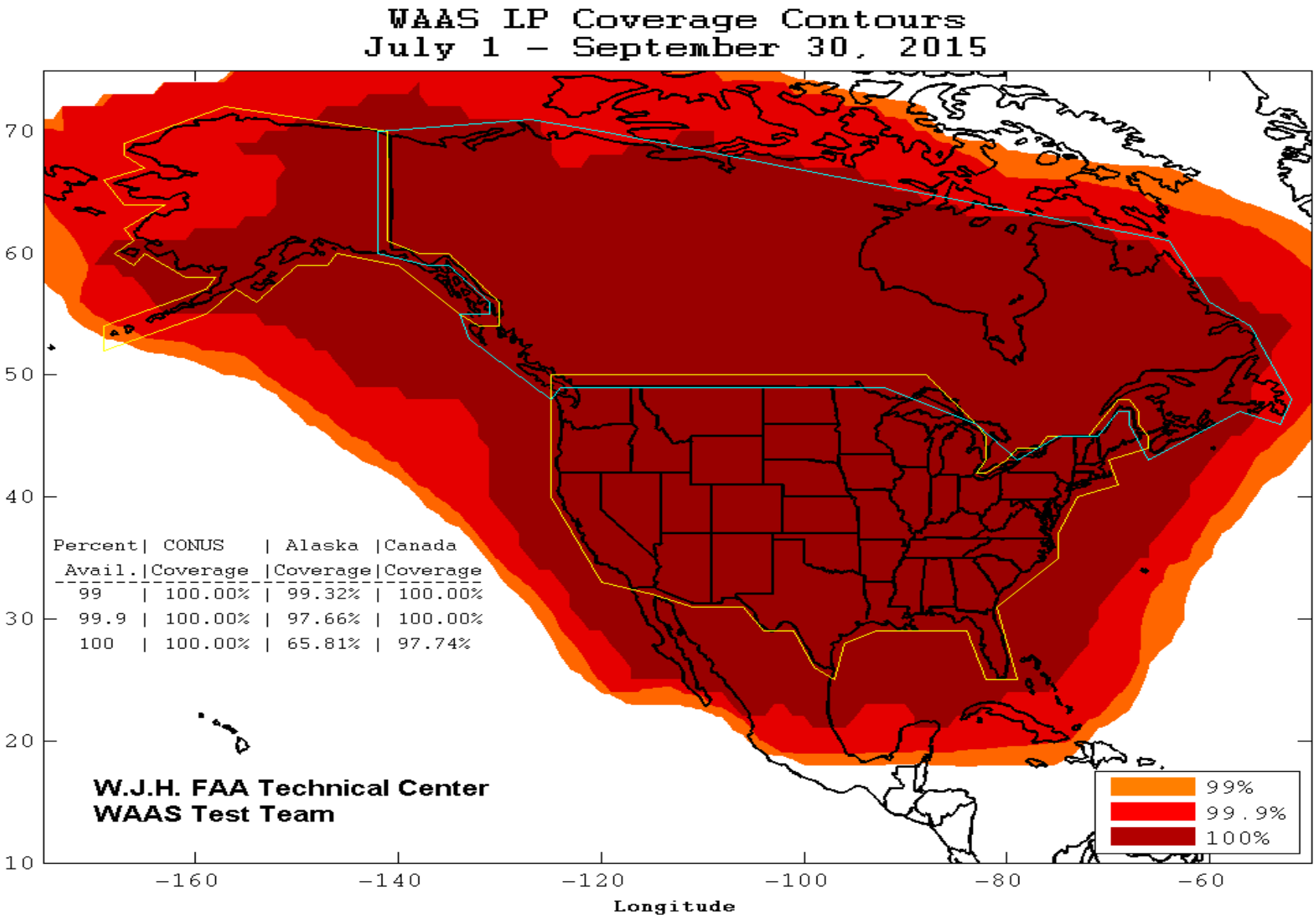


Figure 4-2 LPV North America Coverage for the Quarter

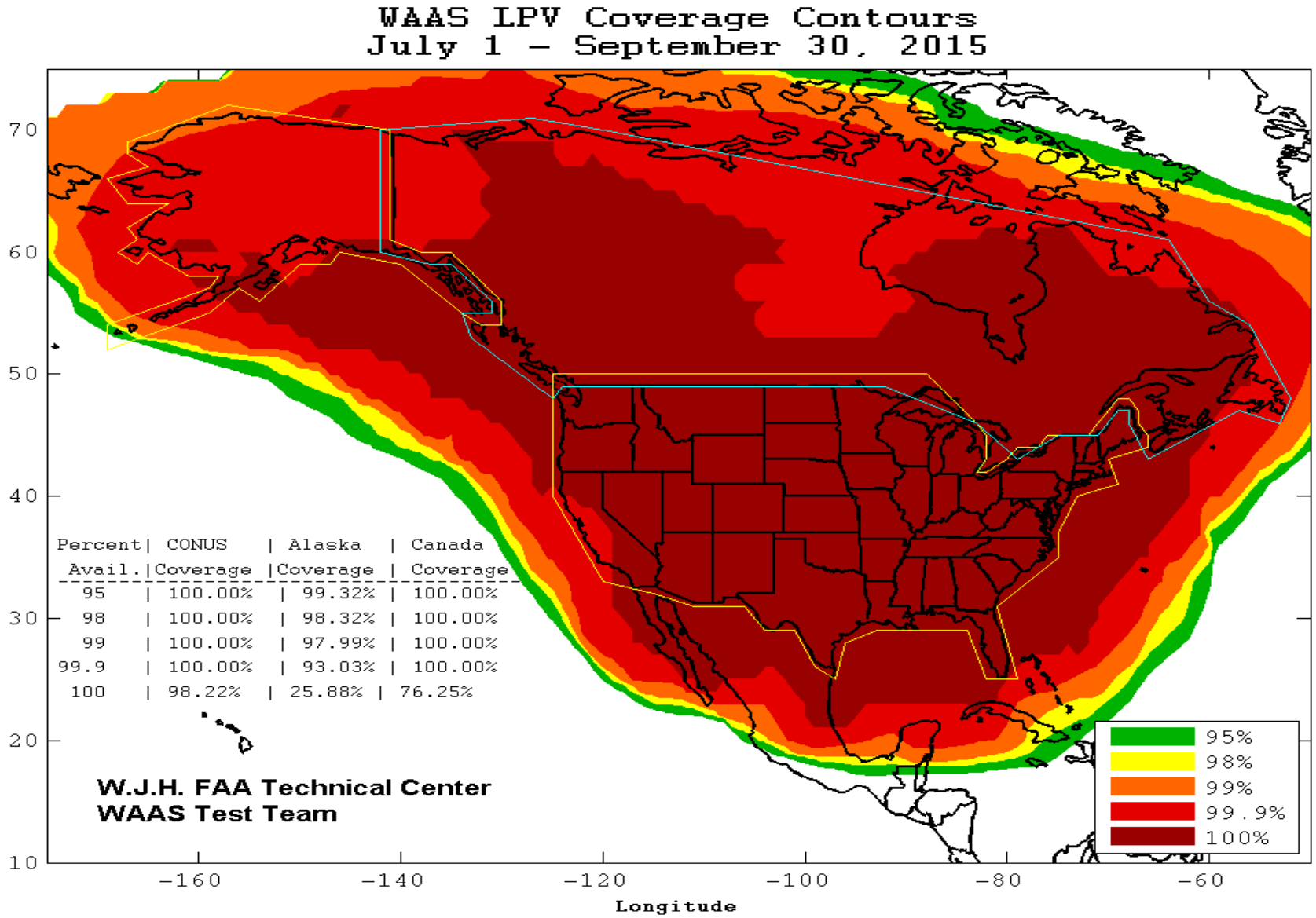


Figure 4-3 LPV200 North America Coverage for the Quarter

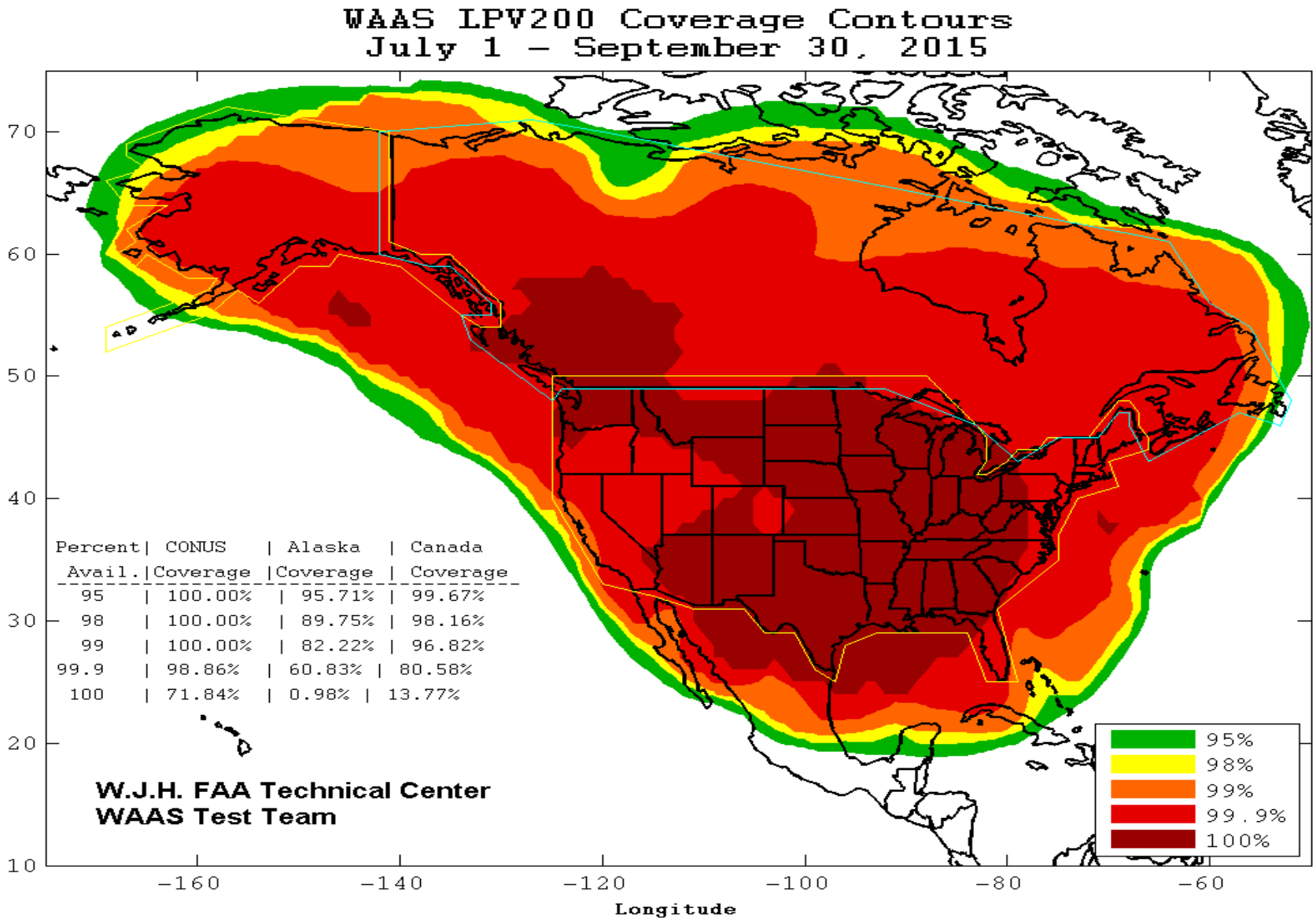


Figure 4-4 RNP 0.1 Coverage for the Quarter

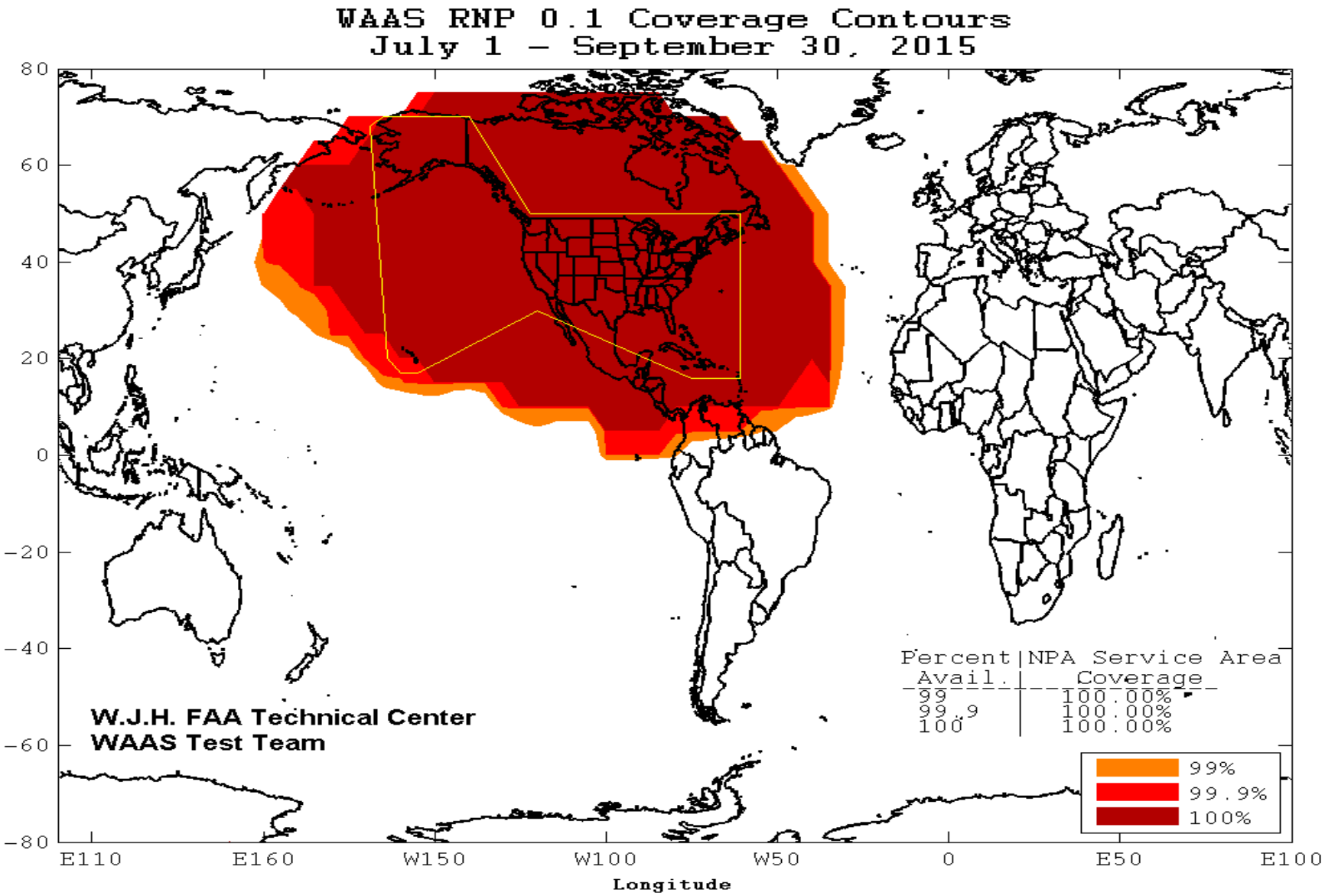


Figure 4-5 RNP 0.3 Coverage for the Quarter

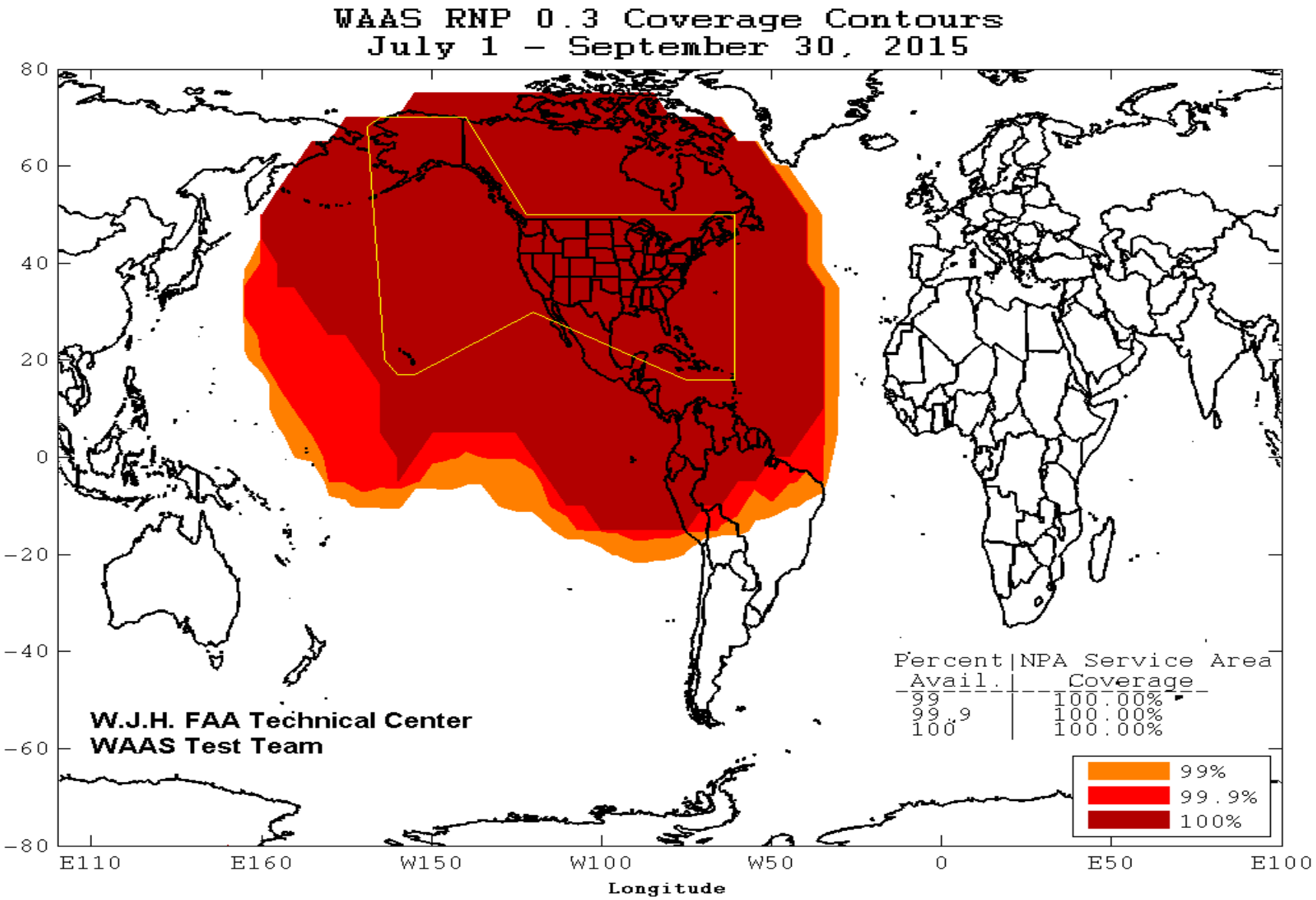


Figure 4-6 Daily LPV and LPV200 CONUS Coverage

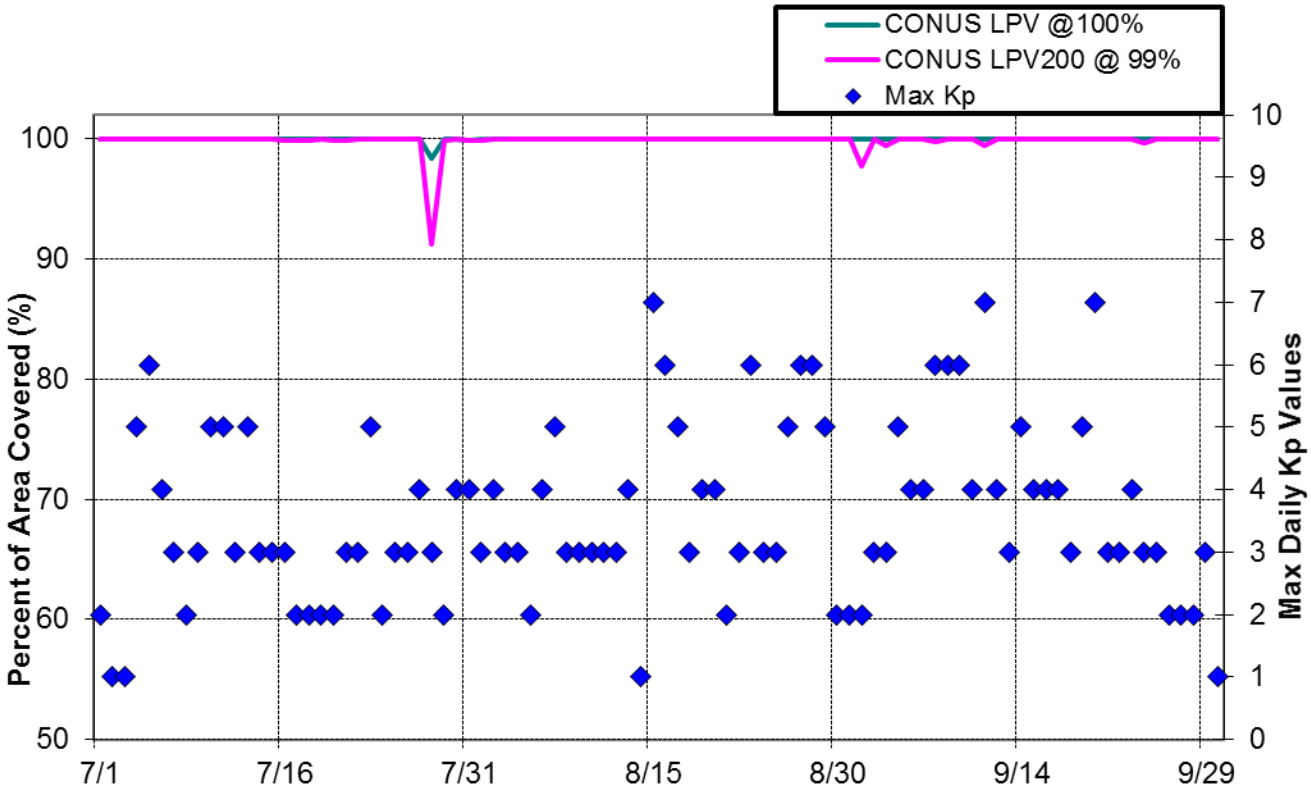


Figure 4-7 Daily LPV and LPV200 Alaska Coverage

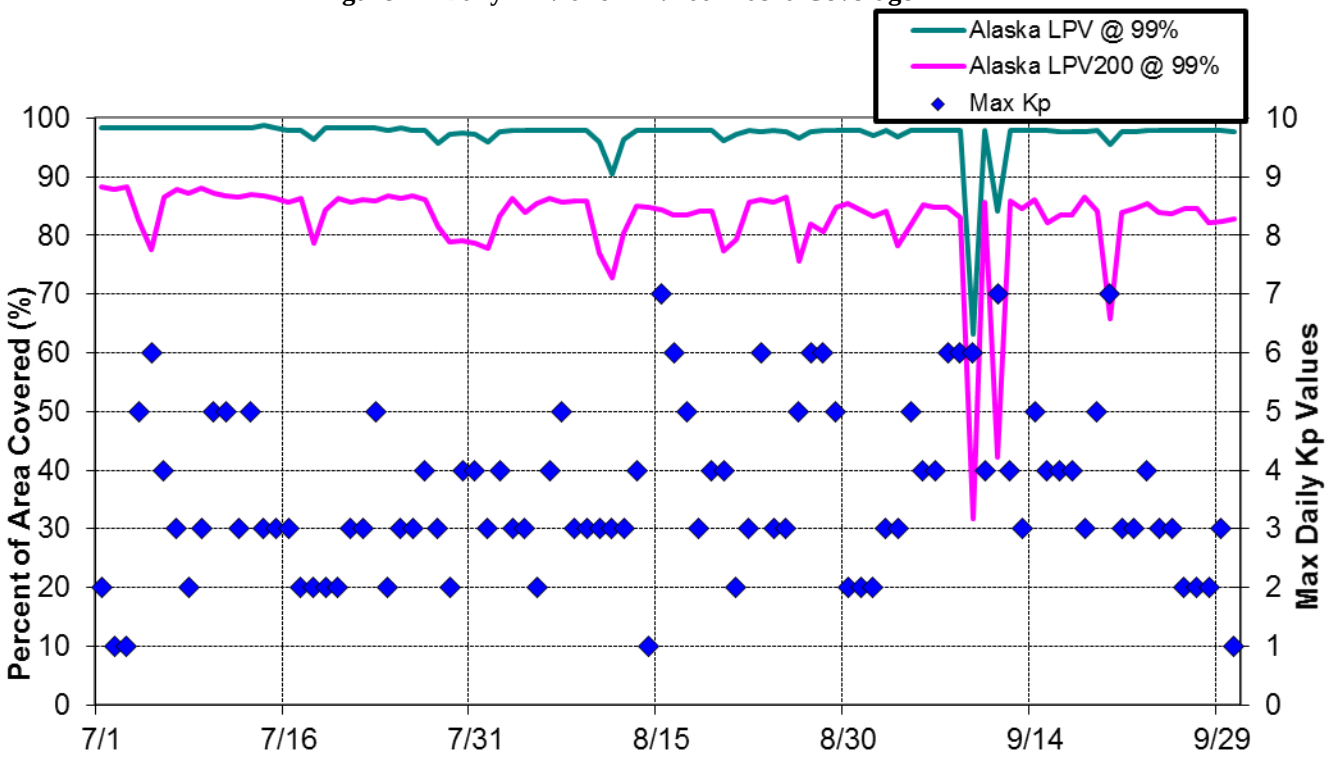


Figure 4-8 Daily LPV and LPV200 Canada Coverage

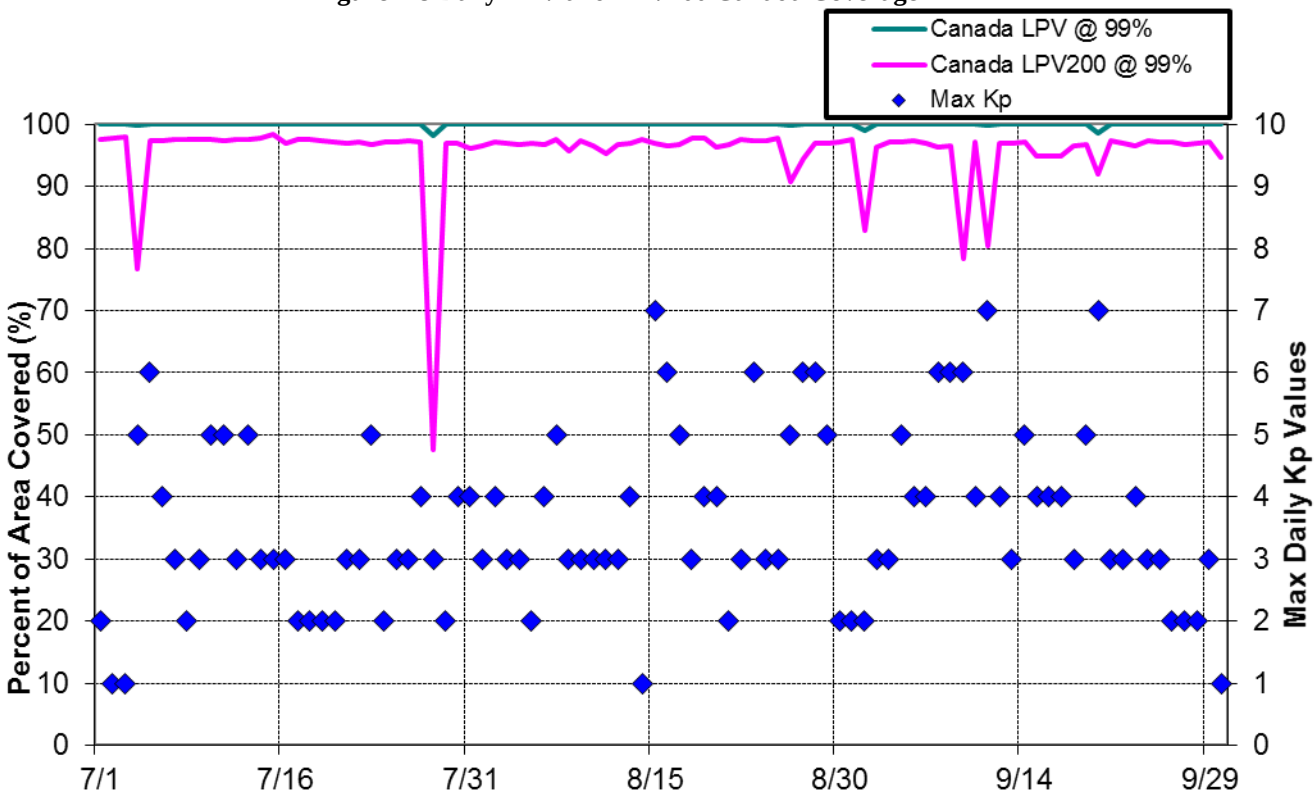
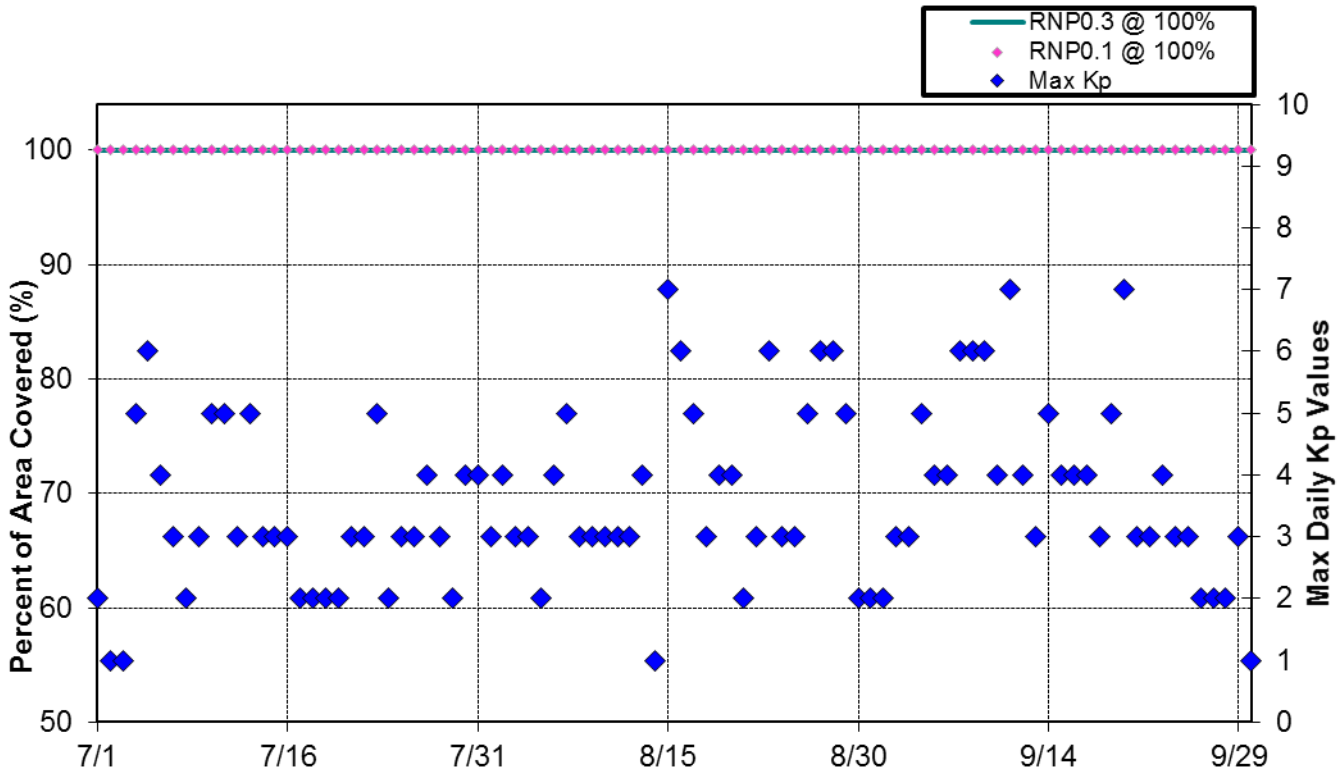


Figure 4-9 Daily RNP Coverage



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 horizontal and vertical safety margin index is the ratio of HPL/Horizontal Position Error and VPL/Vertical Position Error, respectively, at the time the maximum position error occurred. A detailed description of the methodology for computing HPL, VPL, and position errors is given in Section 2.0.

A computed safety margin 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 maximum position error was equal to the protection level. An HMI event 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 margin index and the number of HMI events. For this evaluation period, the lowest safety margin index is 3.46 at Fairbanks. There were no HMI events. 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
Arcata	6.35	8.17	0
Atlantic City	7.48	9.48	0
Grand Forks	10.70	6.06	0
Oklahoma City	5.91	5.60	0
Albuquerque	13.10	8.08	0
Anchorage	8.94	5.51	0
Atlanta	8.51	6.55	0
Barrow	9.09	6.26	0
Bethel	6.76	6.54	0
Billings	4.08	7.10	0
Boston	5.23	6.67	0
Chicago	4.62	5.73	0
Cleveland	4.45	4.84	0
Cold Bay	14.40	12.72	0
Dallas	5.97	6.78	0
Denver	6.52	13.40	0
Fairbanks	6.51	3.46	0
Gander	6.45	10.34	0
Goose Bay	6.68	9.53	0
Houston	5.86	5.25	0
Iqaluit	8.74	11.84	0
Jacksonville	10.55	6.26	0
Juneau	4.93	6.79	0
Kansas City	7.55	5.38	0
Kotzebue	4.55	4.97	0
Los Angeles	10.79	7.18	0
Memphis	7.67	7.13	0
Merida	8.77	7.43	0
Mexico City	8.61	6.36	0
Miami	7.31	7.50	0
Minneapolis	3.98	7.04	0
New York	5.21	6.87	0
Oakland	7.42	12.28	0
Puerto Vallarta	10.19	7.81	0
Salt Lake City	6.49	6.32	0
San Jose Del Cabo	8.38	6.88	0
Seattle	7.28	5.92	0
Washington DC	6.01	8.58	0
Winnipeg	5.37	3.54	0

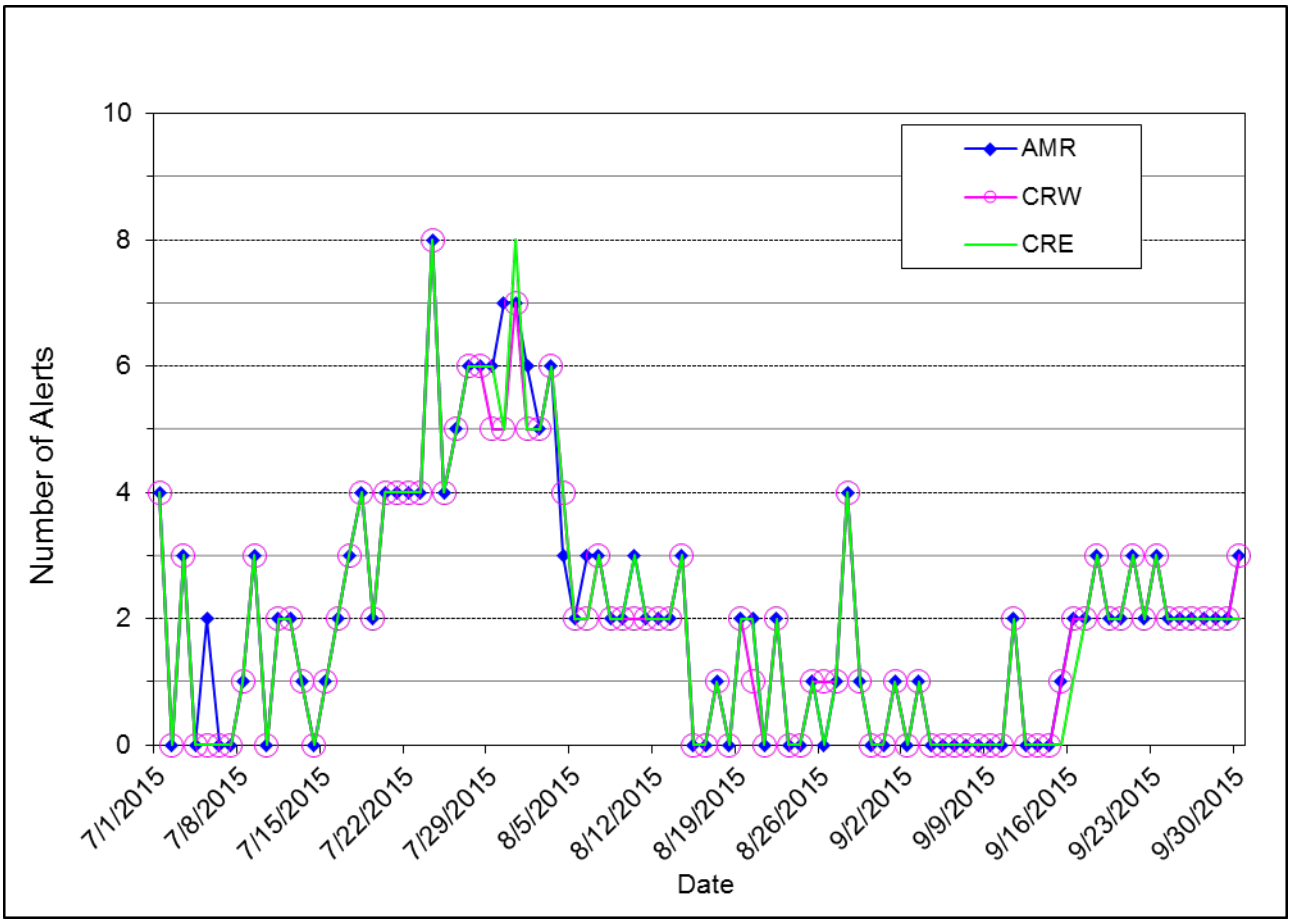
5.2 Broadcast Alerts

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

Table 5-2 WAAS SV Alert

Message Type	Number of Alerts			Average Alerts Per Day		
	AMR	CRW	CRE	AMR	CRW	CRE
2	147	142	142	1.5978	1.5435	1.5435
3	18	19	19	0.1957	0.2065	0.2065
4	27	24	24	0.2935	0.2609	0.2609
5	0	0	0	0	0	0
6	0	0	0	0	0	0
24	0	0	0	0	0	0
26	0	0	0	0	0	0
Total Alerts	192	185	185	2.087	2.0109	2.0109
Days in Service	92	92	92			

Figure 5-1 SV Daily Alert Trend



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

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

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

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

Table 5-4 through Table 5-8 show fast correction, long correction, ephemeris covariance, ionosphere correction, and ionospheric mask message rates statistics broadcasted on AMR GEO. Table 5-9 through Table 5-13 show message rates statistics broadcasted on CRW GEO. Table 5-14 through Table 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	103564	23	1674
2	1324390	107	1656
3	1323935	149	1656
4	1323991	135	1656
7	96852	29	1782
9	93071	21	1709
10	96962	28	1715
17	31343	17	1962

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

SV	On Time	Late	Max Late Length (seconds)
1	49329	16	1717
2	47676	5	334
3	48539	13	1720
4	49685	19	1790
5	48207	3	263
6	47834	10	331
7	47470	5	361
8	26233	5	276
9	47846	7	337
10	8329	0	0
11	48722	22	1711
12	47564	21	1709
13	49238	4	337
14	47305	21	1792
15	48429	13	338
16	48119	8	342
17	46955	15	1704
18	47143	17	1720
19	48339	15	343
20	47450	8	343
21	47823	15	346
22	46612	21	1698
23	47228	10	1800
24	49133	19	1780
25	49180	18	1780
26	48612	11	1711
27	49351	12	346
28	47990	15	344
29	47546	10	335
30	47438	5	338
31	48199	22	1733

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

SV	On Time	Late	Max Late Length (seconds)
1	40539	18	1772
2	39204	6	312
3	39916	14	1770
4	40806	21	1765
5	39532	5	419
6	39237	8	312
7	38940	5	312
8	21537	6	312
9	39276	7	312
10	6842	0	0
11	39992	23	1770
12	39074	23	1662
13	40401	7	312
14	38848	18	1768
15	39742	14	418
16	39511	6	312
17	38577	9	1770
18	38668	17	1772
19	39673	17	418
20	38883	12	312
21	39309	17	418
22	38254	25	1770
23	38781	10	1765
24	40378	23	1768
25	40379	17	1662
26	39905	11	1768
27	40522	13	416
28	39440	13	418
29	39129	6	416
30	38953	8	313
31	39508	17	1770
32	38709	18	1770
133	14374	0	0
135	76230	23	1766
138	76305	30	4232

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

Band	Block	On Time	Late	Max Late Length (seconds)
0	0	27563	20	1728
0	1	27576	16	1733
0	2	27568	18	2016
1	0	27554	19	2016
1	1	27589	18	2016
1	2	27544	22	2022
1	3	27546	19	2027
1	4	27563	17	2023
2	0	27564	21	2023
2	1	27553	26	2021
2	2	27554	24	2017
2	3	27551	19	2017
2	4	27551	19	2022
3	0	27547	24	2017
3	1	27568	23	2017
3	2	27564	18	2016
9	0	27568	18	2016
9	1	27560	13	2016
9	2	27578	19	2027
9	3	27560	18	2022
9	4	27569	16	1728
9	5	27563	17	1728
9	6	27566	18	1729

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

Band	On Time	Late	Max Late Length (seconds)
0	35557	21	1736
1	35595	10	1751
2	35560	16	1717
3	35557	18	1991
9	35569	17	1793

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

Message Type	On Time	Late	Max Late Length (seconds)
1	101606	20	1782
2	1324481	58	1656
3	1324084	79	1656
4	1324112	71	1650
7	95101	25	1756
9	93073	19	1716
10	94991	26	1738
17	31188	8	1807

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

SV	On Time	Late	Max Late Length (seconds)
1	49314	14	1703
2	47680	1	334
3	48544	10	1794
4	49668	16	1712
5	48189	2	353
6	47846	2	336
7	47460	1	361
8	26223	5	272
9	47849	1	257
10	8329	0	0
11	48722	16	1702
12	47568	16	1716
13	49202	3	342
14	47311	17	1703
15	48432	12	344
16	48131	3	348
17	46972	8	1705
18	47144	16	1794
19	48338	13	348
20	47445	8	353
21	47813	12	341
22	46572	16	1700
23	47234	5	1788
24	49127	14	1794
25	49150	13	1794
26	48618	5	1702
27	49326	11	348
28	47964	11	344
29	47552	4	335
30	47436	4	344
31	48226	13	1720
32	47148	14	1705

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

SV	On Time	Late	Max Late Length (seconds)
1			
2	1	40530	14
3	2	39222	4
4	3	39921	9
5	4	40803	16
6	5	39530	3
7	6	39236	4
8	7	38923	4
9	8	21528	5
10	9	39285	2
11	10	6848	2
12	11	40005	15
13	12	39097	15
14	13	40378	3
15	14	38838	17
16	15	39748	12
17	16	39489	4
18	17	38574	9
19	18	38654	15
20	19	39667	14
21	20	38881	8
22	21	39307	13
23	22	38228	16
24	23	38788	6
25	24	40377	14
26	25	40355	14
27	26	39899	5
28	27	40530	14
29	28	39396	15
30	29	39128	4
31	30	38956	3
32	31	39513	14
133	32	38717	13
135	133	14372	0

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

Band	Block	On Time	Late	Max Late Length (seconds)
0	0	27583	12	2016
0	1	27569	15	2016
0	2	27565	18	2016
1	0	27579	12	2016
1	1	27565	13	1728
1	2	27568	13	1728
1	3	27566	15	1728
1	4	27571	14	1728
2	0	27567	16	1728
2	1	27582	11	1728
2	2	27558	14	2020
2	3	27575	11	2018
2	4	27576	10	2017
3	0	27569	10	2016
3	1	27568	14	2022
3	2	27569	14	2016
9	0	27568	14	2020
9	1	27581	14	2018
9	2	27578	16	2016
9	3	27556	14	2016
9	4	27563	16	2016
9	5	27575	13	2016
9	6	27557	13	2016

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

Band	On Time	Late	Max Late Length (seconds)
0	35322	12	1883
1	35296	13	1860
2	35264	13	1872
3	35277	12	1859
9	35316	11	1800

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

Message Type	On Time	Late	Max Late Length (seconds)
1	100677	21	1818
2	1324485	55	1656
3	1324083	79	1656
4	1324117	70	1650
7	94347	24	1711
9	93077	17	1715
10	94215	23	1716
17	31079	17	1763

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

SV	On Time	Late	Max Late Length (seconds)
1	49309	15	1703
2	47691	1	334
3	48541	11	1794
4	49671	16	1712
5	48192	1	269
6	47845	3	331
7	47461	2	349
8	26229	5	259
9	47848	1	336
10	8332	0	0
11	48726	16	1702
12	47572	15	1723
13	49186	3	342
14	47315	16	1703
15	48436	12	354
16	48119	4	348
17	46965	8	1705
18	47153	16	1794
19	48341	13	342
20	47462	8	343
21	47816	12	346
22	46576	16	1700
23	47233	5	1788
24	49122	14	1716
25	49153	13	1716
26	48609	5	1702
27	49338	11	346
28	47957	11	344
29	47560	3	335
30	47438	4	354
31	48226	13	1720

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

SV	On Time	Late	Max Late Length (seconds)
1	40519	15	1772
2	39211	3	311
3	39919	10	1764
4	40811	16	1769
5	39532	2	416
6	39250	2	312
7	38934	4	312
8	21535	3	312
9	39285	1	419
10	6851	0	0
11	39998	15	1764
12	39091	15	1661
13	40385	6	314
14	38846	15	1765
15	39753	11	414
16	39496	4	312
17	38574	8	1764
18	38665	15	1772
19	39679	10	416
20	38903	8	360
21	39320	13	414
22	38251	17	1765
23	38779	5	1769
24	40361	15	1769
25	40384	14	1661
26	39877	7	1769
27	40514	14	414
28	39418	15	416
29	39132	3	419
30	38958	3	312
31	39518	14	1668
32	38722	12	1668
133	14373	0	0
135	76252	19	4344
138	76341	18	1769

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

Band	Block	On Time	Late	Max Late Length (seconds)
0	0	27559	18	2016
0	1	27567	15	2016
0	2	27580	12	2016
1	0	27567	11	2016
1	1	27585	14	2016
1	2	27580	12	2016
1	3	27573	8	2016
1	4	27570	10	1728
2	0	27576	9	1728
2	1	27593	11	1728
2	2	27586	11	1728
2	3	27570	10	1728
2	4	27571	13	2020
3	0	27585	13	2016
3	1	27569	17	2016
3	2	27552	17	2016
9	0	27562	16	2016
9	1	27560	21	2016
9	2	27557	19	2016
9	3	27556	20	2022
9	4	27558	18	2017
9	5	27569	19	2016
9	6	27562	16	2016

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

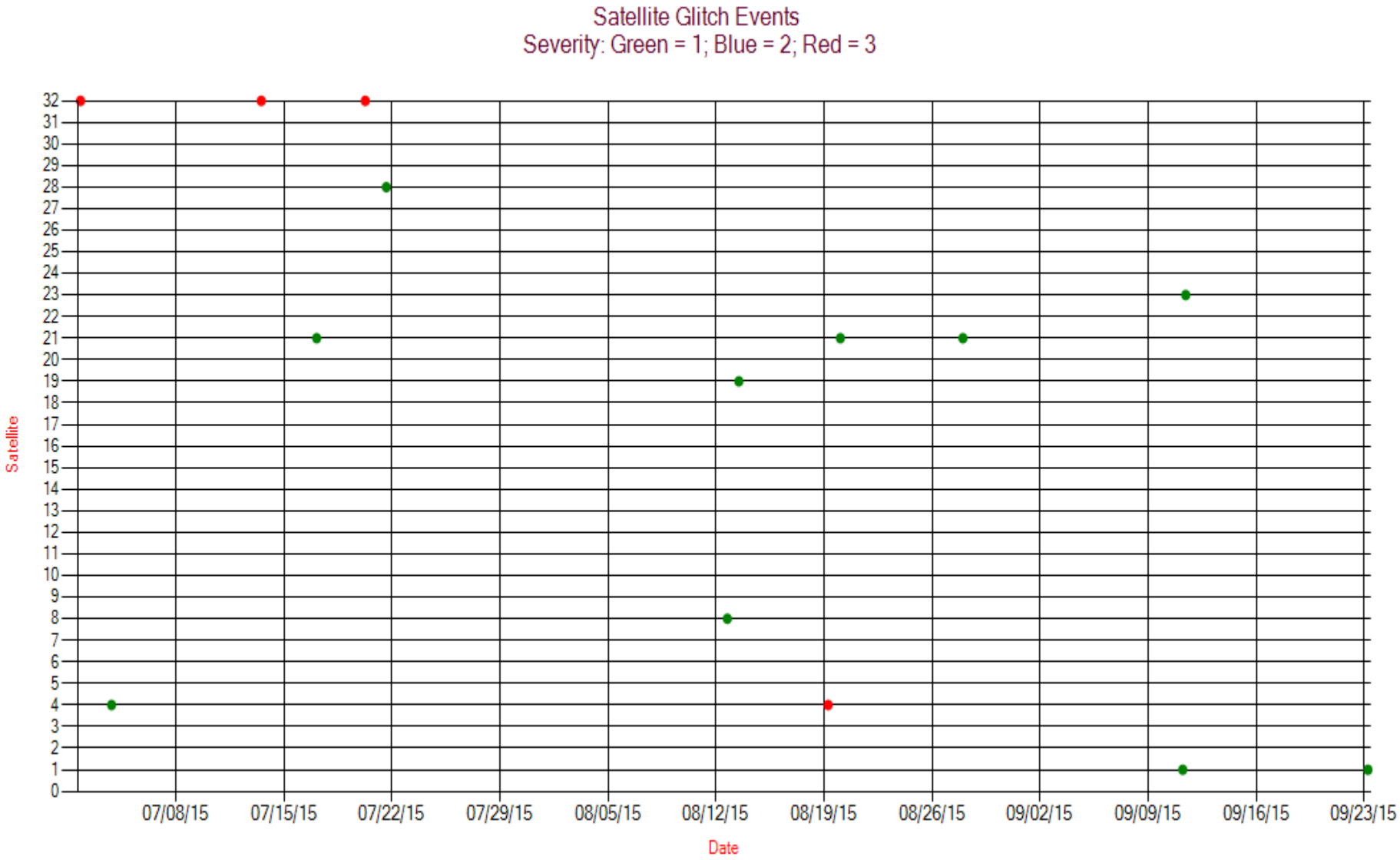
Band	On Time	Late	Max Late Length (seconds)
0	35169	13	1831
1	35206	11	2078
2	35203	12	1979
3	35173	11	1854
9	35193	13	1877

5.4 Satellite Glitches

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

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

Figure 5-2 SV Glitch Trend



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 comparing it to the residual error.

GPS satellite range residual errors were calculated for twelve WAAS receivers during the quarter. Table 6-1 and Table 6-2 show the range error 95% index and 99.9% bounding statistics for each SV at the selected locations. Figure 6-1 and Figure 6-2 show the 95% range error for each SV as measured by the WAAS receivers at the Chicago reference station.

A GIVE is broadcast by the WAAS for each IGP that is monitored by the system and the 99.9% 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 Table 6-4 show the ionospheric error 95% index and 99.9% bounding statistics for each SV at the selected locations. Figure 6-3 and Figure 6-4 show the 95% ionospheric error for each SV as measured by the WAAS receiver at the Chicago reference station.

For this reporting period, satellite range errors were bounded at least 99.9% of the time by UDRE, with the exception of PRN-6 at Kansas City reference station (98.37%). PRN-6 is a Block IIF satellite. Block IIF satellites experience reduced bounding due to the difference between L1 C/A and L1P satellite signal delays. For this quarter, there was reduced bounding on the following Block IIF satellites; PRN-1, PRN-3, PRN-6, and PRN-26. Other unbounded errors (i.e., errors bounded less than 100% of the time) were due to geomagnetic activity, noise, and/or multipath.

Table 6-1 Range Error 95% Index and 99.9% Bounding

Site →	Billings		Albuquerque		Boston		Washington DC		Houston		Kansas City	
SV ↓	95% Range Error (m)	99.9% Bounding (%)	95% Range Error (m)	99.9% Bounding (%)	95% Range Error (m)	99.9% Bounding (%)	95% Range Error (m)	99.9% Bounding (%)	95% Range Error (m)	99.9% Bounding (%)	95% Range Error (m)	99.9% Bounding (%)
1*	2.896	100	3.217	100	3.198	100	2.933	99.9984	3.245	99.99457	3.154	99.99194
2	1.84	100	2.218	100	2.289	100	2.806	100	3.019	99.98949	2.278	100
3*	3.271	99.9881	3.007	100	2.57	100	3.241	100	3.07	100	2.83	99.99996
4	1.848	100	2.045	100	1.488	100	1.521	100	1.694	100	2.452	100
5	1.901	100	1.784	100	1.625	100	1.23	100	1.401	100	1.746	100
6*	4.071	99.67125	3.454	99.99683	3.06	99.99991	3.005	99.9962	3.494	99.99621	4.126	98.37113
7	1.168	100	1.162	100	1.279	100	1.385	100	0.937	100	1.383	100
8*	2.298	100	2.286	100	2.13	100	1.989	100	2.313	100	2.264	100
9*	2.553	100	2.709	100	2.629	100	2.124	100	2.057	100	2.508	100
10	0.944	100	0.968	100	0.751	100	1.155	100	1.807	100	0.966	100
11	0.913	100	1.229	100	1.486	100	1.193	100	1.13	100	1.232	100
12	1.011	100	1.17	100	1.594	100	1.246	100	1.125	100	1.074	100
13	1.289	100	1.049	100	1.166	100	1.263	100	1.063	100	0.992	100
14	0.893	100	0.696	100	1.038	100	1.401	100	1.306	100	1.132	100
15	1.499	100	1.561	100	1.542	100	1.26	100	1.182	100	1.494	100
16	1.718	100	1.004	100	0.924	100	1.092	100	1.683	100	1.294	100
17	1.822	100	1.28	100	1.511	100	0.835	100	1.566	100	1.025	100
18	1.085	100	1.202	100	1.074	100	1.766	100	1.683	100	1.333	100
19	2.852	100	2.293	100	2.893	100	2.646	100	3.055	99.99177	2.484	100
20	1.125	100	1.194	100	2.043	100	1.561	100	2.148	100	1.541	100
21	1.283	100	1.184	100	1.76	100	2.024	100	1.785	100	1.884	100
22	2.069	100	2.234	100	1.93	100	2.654	100	2.85	100	2.225	100
23	1.511	100	1.61	100	2.067	100	2.061	100	2.591	100	1.561	100
24*	2.685	100	2.777	100	2.907	100	2.753	100	2.76	100	2.72	100
25*	2.398	100	2.985	100	2.32	100	2.112	100	2.742	100	2.627	100
26*	2.71	100	2.993	100	2.799	100	2.773	100	2.789	100	3.02	99.96671
27*	2.548	100	2.385	100	2.406	100	2.114	100	2.021	100	2.308	100
28	0.78	100	0.989	100	1.203	100	1.267	100	1.33	100	1.38	100
29	1.704	100	1.745	100	1.396	100	1.27	100	0.982	100	1.487	100
30*	2.799	100	2.398	100	2.211	100	2.15	100	2.000	100	2.649	100
31	2.02	100	1.073	100	1.01	100	0.854	100	1.096	100	2.354	100
32	0.848	100	1.145	100	0.99	100	0.82	100	1.114	100	1.171	100
135	1.798	100	1.780	100	2.932	100	1.628	100	2.189	100	1.65	100
138	1.559	100	1.308	100	1.178	100	1.675	100	1.287	100	1.761	100

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

Table 6-2 Range Error 95% Index and 99.9% Bounding

Site →	Los Angeles		Salt Lake City		Miami		Minneapolis		Atlanta		Juneau	
SV ↓	95% Range Error (m)	99.9% Bounding (%)	95% Range Error (m)	99.9% Bounding (%)	95% Range Error (m)	99.9% Bounding (%)	95% Range Error (m)	99.9% Bounding (%)	95% Range Error (m)	99.9% Bounding (%)	95% Range Error (m)	99.9% Bounding (%)
1*	2.646	100	3.512	99.99194	3.157	100	3.273	99.97836	3.012	99.98971	3.269	100
2	2.492	100	2.143	100	2.313	100	2.158	99.99573	2.393	99.99957	1.651	100
3*	2.876	100	3.886	99.9979	2.917	100	2.925	100	2.805	100	3.205	100
4	1.259	100	1.776	100	1.656	100	1.86	100	1.339	100	1.884	100
5	1.299	100	1.613	100	1.577	100	1.991	100	1.174	100	2.078	100
6*	3.459	100	3.942	99.60343	3.673	100	3.225	99.35751	3.085	100	4.02	99.96148
7	0.918	100	1.784	100	1.263	100	1.546	100	1.31	100	2.134	100
8*	2.159	100	2.295	100	2.371	100	2.471	100	2.018	100	2.789	100
9*	2.223	100	2.452	100	2.559	100	2.568	100	2.384	100	2.886	100
10	1.155	100	1.033	100	1.17	100	0.835	100	0.925	100	1.159	100
11	1.823	100	0.959	100	1.009	100	1.01	100	1.283	100	1.009	100
12	0.823	100	1.124	100	1.266	100	1.71	100	0.85	100	1.563	100
13	1.147	100	1.145	100	0.961	100	1.131	100	1.089	100	1.475	100
14	1.264	100	1.052	100	0.862	100	0.817	100	0.879	100	0.962	100
15	1.897	100	1.649	100	1.221	100	1.626	100	1.156	100	1.914	100
16	1.359	100	0.93	100	1.237	100	1.1	100	1.178	100	0.976	100
17	0.966	100	1.404	100	1.236	100	1.136	100	0.825	100	1.466	100
18	1.566	100	1.321	100	1.392	100	1.215	100	1.459	100	0.894	100
19	2.637	100	2	100	2.407	100	2.138	100	2.554	100	1.63	100
20	1.308	100	1.051	100	1.975	100	1.21	100	1.304	100	1.049	100
21	1.329	100	0.95	100	2.004	100	1.283	100	1.365	100	0.755	100
22	2.504	100	2.02	100	2.189	100	2.18	100	2.361	100	1.871	100
23	2.137	100	1.549	100	2.05	100	1.431	100	1.689	100	1.274	100
24*	2.613	99.9996	3.157	99.99831	2.489	100	2.849	99.99864	2.418	100	3.605	99.99988
25*	2.143	100	2.345	99.99252	2.183	100	2.329	100	1.852	100	2.841	100
26*	2.6	100	2.854	100	2.668	100	3.068	99.99884	2.577	100	3.273	99.97693
27*	2.697	100	2.22	100	2.573	100	3.062	100	2.027	100	2.648	99.99948
28	1.22	100	1.927	100	1.371	100	1.089	100	1.007	100	1.183	100
29	1.209	100	1.778	100	1.511	100	1.462	100	0.999	100	2.047	100
30*	2.126	100	2.318	100	2.209	100	2.602	100	2.182	100	2.766	100
31	1.379	100	1.365	100	0.974	100	0.951	100	0.697	100	1.422	100
32	1.057	100	1.024	100	1.129	100	1.258	100	0.74	100	1.312	100
135	1.617	100	1.498	100	1.484	100	1.879	100	1.806	100	1.456	100
138	2.805	100	1.347	100	1.944	100	1.564	100	1.363	100	1.614	100

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

Table 6-3 Ionospheric Error 95% Index and 99.9% Sigma Bounding

Site →	Billings		Albuquerque		Boston		Washington DC		Houston		Kansas City	
SV ↓	95% Iono Error (m)	99.9% Bounding (%)	95% Iono Error (m)	99.9% Bounding (%)	95% Iono Error (m)	99.9% Bounding (%)	95% Iono Error (m)	99.9% Bounding (%)	95% Iono Error (m)	99.9% Bounding (%)	95% Iono Error (m)	99.9% Bounding (%)
1	1.598	100	1.876	100	2.252	100	1.829	100	2.044	100	1.955	100
2	1.302	100	1.588	100	1.494	100	1.920	100	1.759	100	1.476	100
3	2.167	100	2.390	100	1.734	100	1.942	100	1.738	100	1.725	100
4	0.839	100	0.967	100	0.748	100	0.671	100	0.661	100	1.132	100
5	0.996	100	1.070	100	1.174	100	0.750	100	1.282	100	1.210	100
6	3.122	99.9639	2.816	100	2.467	100	2.702	100	3.067	100	3.223	99.98956
7	0.440	100	0.707	100	0.519	100	0.597	100	0.586	100	0.705	100
8	1.451	100	1.317	100	1.405	100	1.212	100	1.774	100	1.572	100
9	1.452	100	2.018	100	1.646	100	1.428	100	1.486	100	1.711	100
10	0.319	100	0.353	100	0.298	100	0.339	100	0.831	100	0.378	100
11	0.372	100	0.446	100	0.529	100	0.549	100	0.538	100	0.484	100
12	0.406	100	0.614	100	0.638	100	0.538	100	0.488	100	0.502	100
13	0.521	100	0.430	100	0.443	100	0.459	100	0.537	100	0.354	100
14	0.480	100	0.397	100	0.480	100	0.683	100	0.620	100	0.471	100
15	0.556	100	0.753	100	0.802	100	0.688	100	0.705	100	0.756	100
16	0.790	100	0.563	100	0.508	100	0.739	100	0.921	100	0.590	100
17	0.849	100	0.704	100	0.901	100	0.481	100	1.075	100	0.578	100
18	0.620	100	0.663	100	0.700	100	1.075	100	0.804	100	0.514	100
19	1.397	100	1.249	100	1.704	100	1.770	100	1.772	100	1.526	100
20	0.752	100	0.550	100	1.378	100	0.853	100	1.003	100	0.626	100
21	0.664	100	0.866	100	0.935	100	1.218	100	1.023	100	1.053	100
22	1.741	100	1.591	100	1.490	100	1.934	100	2.116	100	1.567	100
23	1.323	100	1.234	100	1.540	100	1.729	100	1.726	100	1.176	100
24	1.535	100	1.646	100	1.973	100	1.609	100	1.713	100	1.703	100
25	1.447	100	1.812	100	1.274	100	1.241	100	1.364	100	1.458	100
26	1.771	100	1.818	100	1.907	100	1.957	100	2.225	100	2.204	100
27	1.285	100	1.355	100	1.553	100	1.192	100	1.328	100	1.447	100
28	0.442	100	0.428	100	0.472	100	0.679	100	0.579	100	0.626	100
29	0.769	100	1.008	100	0.678	100	0.727	100	0.720	100	0.788	100
30	1.488	100	1.689	100	1.449	100	1.427	100	1.508	100	1.711	100
31	1.134	100	0.664	100	0.336	100	0.454	100	0.835	100	1.475	100
32	0.323	100	0.595	100	0.403	100	0.423	100	0.521	100	0.518	100

Table 6-4 Ionospheric Error 95% Index and 99.9% Bounding

Site →	Los Angeles		Salt Lake City		Miami		Minneapolis		Atlanta		Juneau	
SV ↓	95% Iono Error (m)	99.9% Bounding (%)	95% Iono Error (m)	99.9% Bounding (%)	95% Iono Error (m)	99.9% Bounding (%)	95% Iono Error (m)	99.9% Bounding (%)	95% Iono Error (m)	99.9% Bounding (%)	95% Iono Error (m)	99.9% Bounding (%)
1	2.143	100	2.027	100	2.213	100	2.155	100	1.908	100	1.284	100
2	1.547	100	1.449	100	1.507	100	1.477	100	1.668	100	2.224	100
3	2.196	100	2.636	100	2.025	100	2.022	100	1.915	100	1.035	100
4	0.874	100	0.987	100	0.871	100	0.963	100	0.569	100	1.220	100
5	0.967	100	1.180	100	1.231	100	1.043	100	0.758	100	2.990	100
6	2.668	100	2.960	100	2.996	100	2.669	100	2.412	100	1.065	100
7	0.677	100	0.911	100	0.792	100	0.646	100	0.545	100	1.792	100
8	1.572	100	1.438	100	1.641	100	1.568	100	1.207	100	1.976	100
9	1.665	100	1.851	100	1.746	100	1.676	100	1.500	100	0.430	100
10	0.425	100	0.321	100	0.476	100	0.359	100	0.434	100	0.325	100
11	0.688	100	0.312	100	0.392	100	0.380	100	0.632	100	0.827	100
12	0.496	100	0.596	100	0.618	100	0.687	100	0.408	100	0.637	100
13	0.640	100	0.484	100	0.472	100	0.494	100	0.338	100	0.459	100
14	0.496	100	0.569	100	0.587	100	0.369	100	0.466	100	1.138	100
15	0.940	100	0.893	100	0.949	100	0.905	100	0.601	100	0.422	100
16	0.730	100	0.443	100	0.481	100	0.566	100	0.661	100	0.839	100
17	0.704	100	0.797	100	0.791	100	0.659	100	0.292	100	0.650	100
18	0.803	100	0.761	100	0.634	100	0.713	100	1.030	100	1.132	100
19	1.593	100	1.078	100	1.484	100	1.458	100	1.687	100	0.783	100
20	0.611	100	0.371	100	0.912	100	0.613	100	0.706	100	0.514	100
21	0.696	100	0.533	100	1.076	100	0.814	100	0.991	100	1.503	100
22	1.527	100	1.351	100	1.426	100	1.633	100	1.905	100	1.073	100
23	1.175	100	1.148	100	1.389	100	1.213	100	1.501	100	2.304	100
24	1.969	100	1.810	100	1.801	100	1.883	100	1.598	100	1.775	100
25	1.518	100	1.538	100	1.532	100	1.462	100	1.159	100	2.323	100
26	2.191	100	1.852	100	2.253	100	2.049	100	1.814	100	1.612	100
27	1.703	100	1.263	100	1.803	100	1.779	100	1.187	100	0.436	100
28	0.470	100	0.858	100	0.813	100	0.470	100	0.747	100	1.005	100
29	0.797	100	0.951	100	0.876	100	0.774	100	0.555	100	1.853	100
30	1.647	100	1.723	100	1.564	100	1.663	100	1.387	100	0.682	100
31	0.596	100	0.806	100	0.839	100	0.511	100	0.333	100	0.680	100
32	0.372	100	0.594	100	0.650	100	0.568	100	0.419	100	1.284	100

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

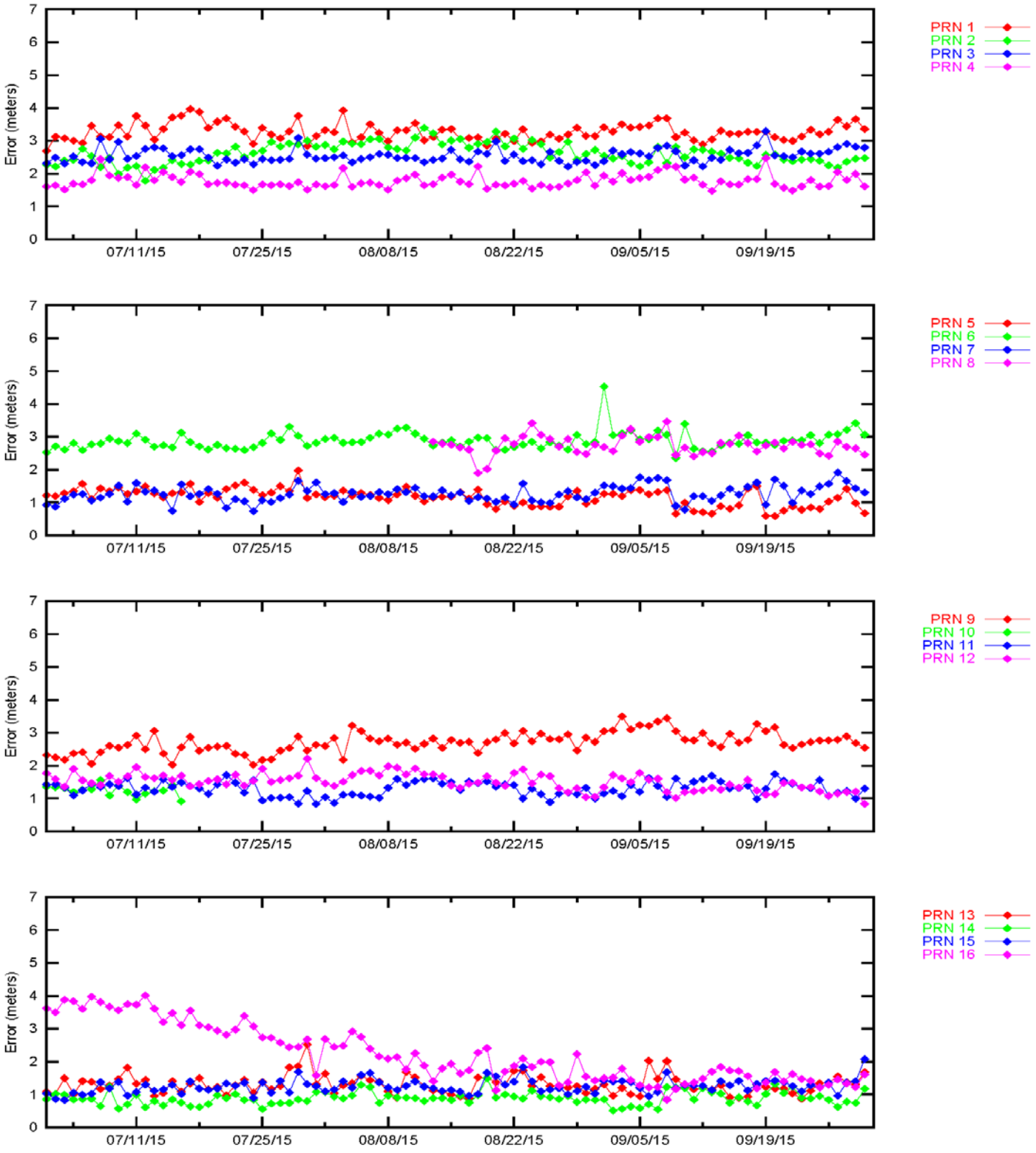


Figure 6-2 95% Range Error (PRN-17 – PRN-32) – Chicago

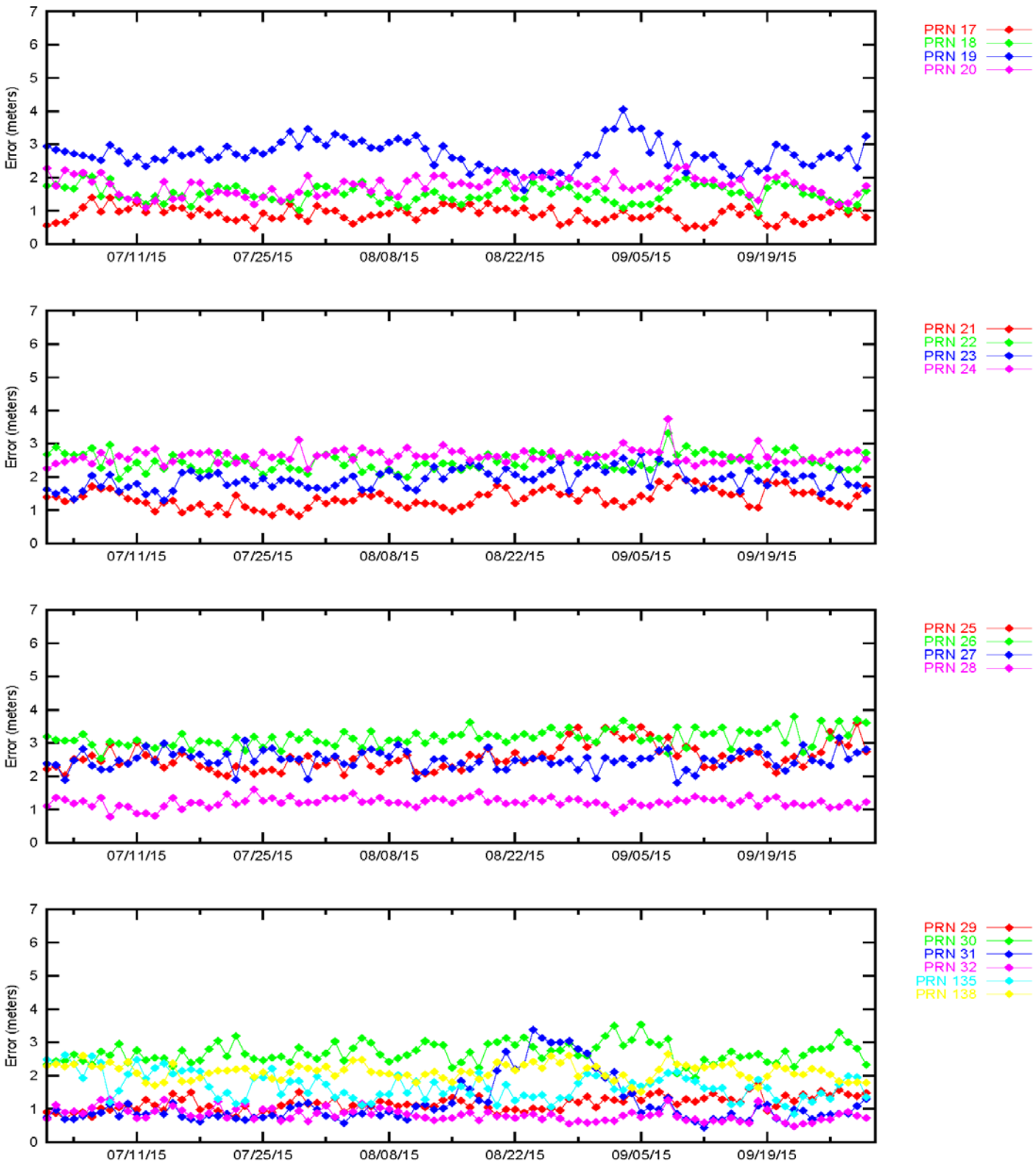


Figure 6-3 95% Ionospheric Error (PRN-1 – PRN-16) – Chicago

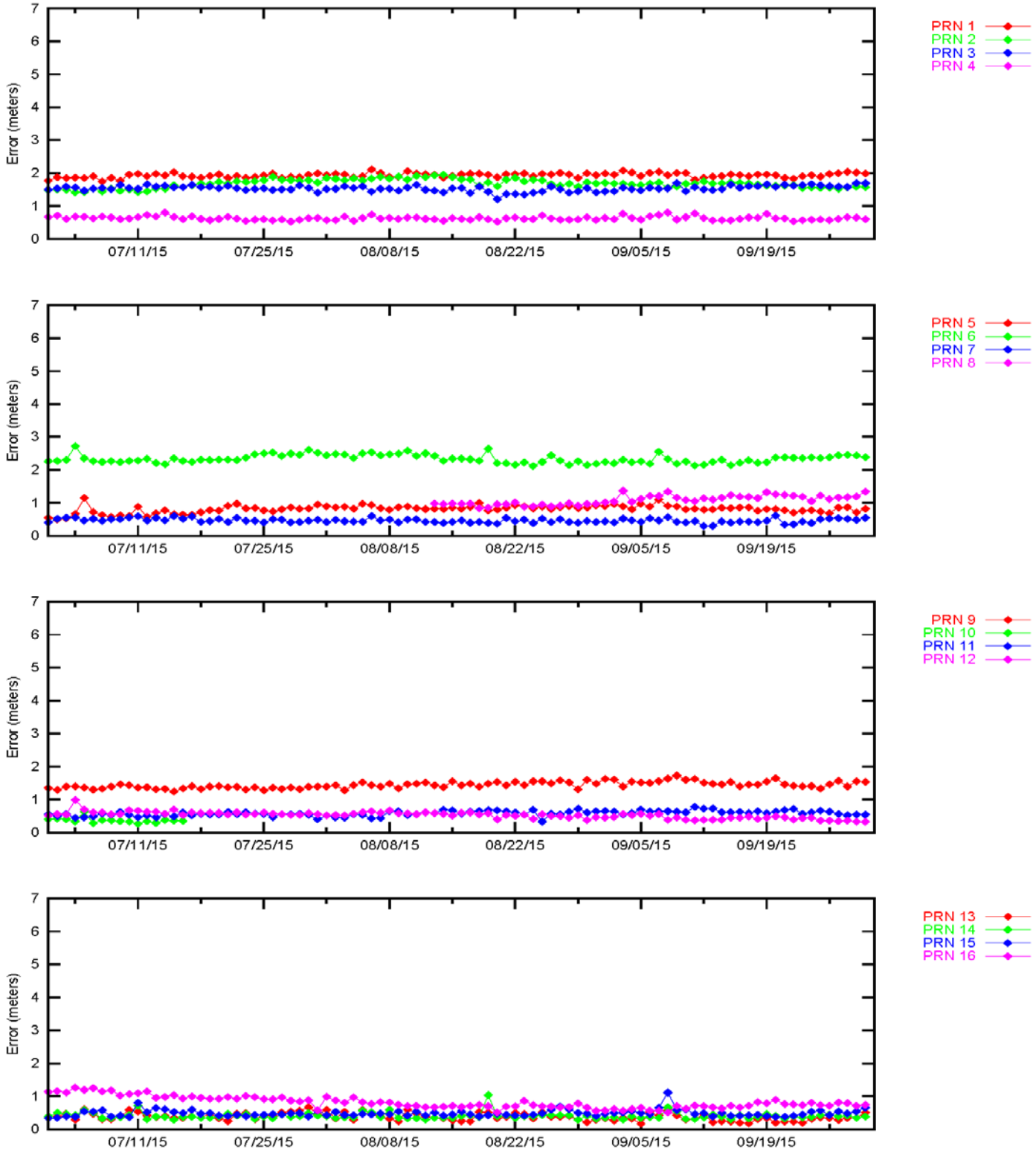
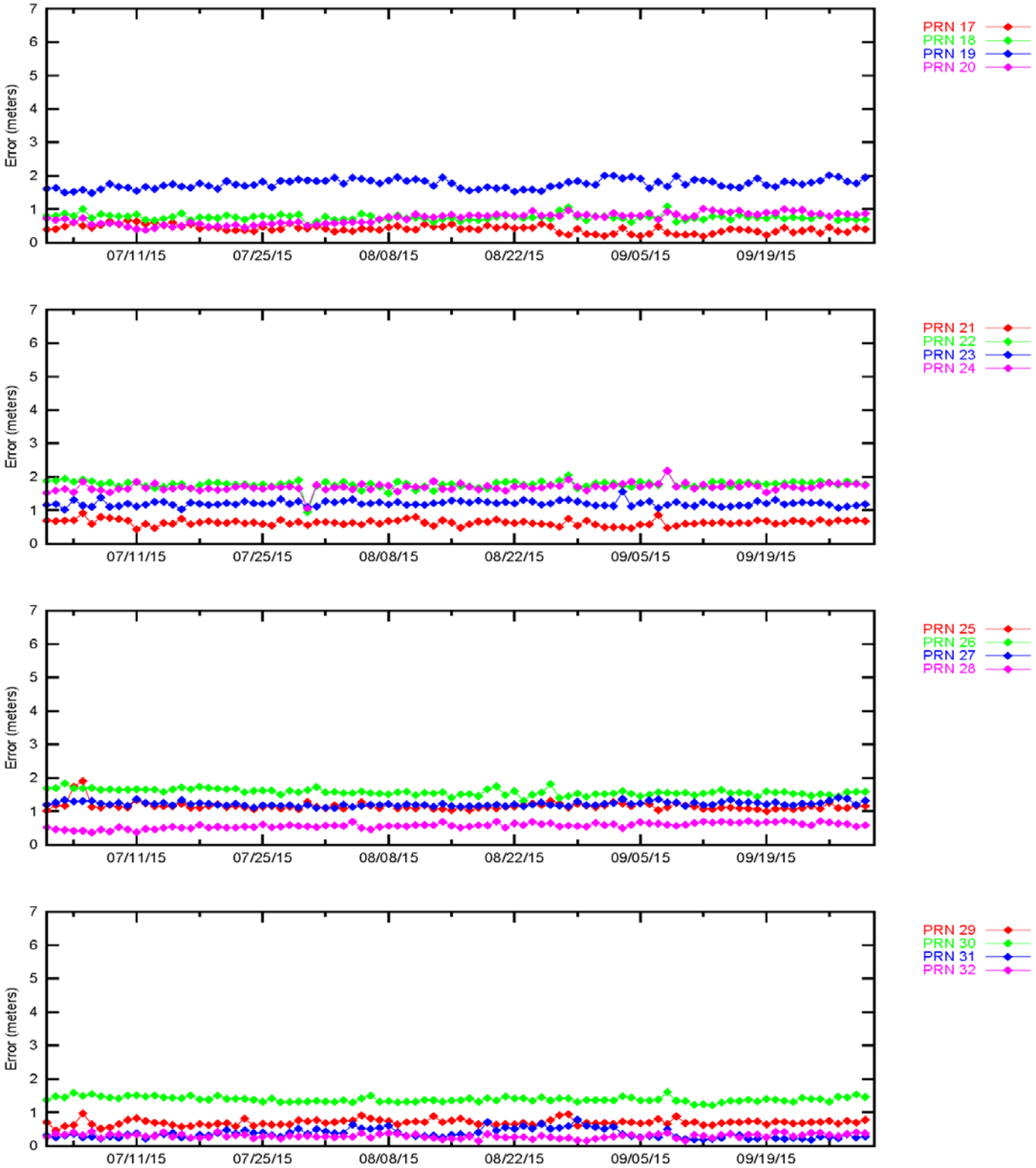


Figure 6-4 95% Ionospheric Error (PRN-17 - PRN-32) – Chicago



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 PA and NPA ranging availability. The table also shows the percentage of time that the GEO UDRE was set to "Not Monitored" and "Do Not Use". Figure 7-1 and Figure 7-2 show the trend of CRW GEO PA and CRE GEO PA ranging availability, respectively.
Figure 7-3 shows the trend of AMR GEO NPA ranging availability.

The reductions in CRW GEO PA and CRE GEO PA ranging availability shown in Figure 7-1 and Figure 7-2 were due to GUS switchovers. Refer to Table 1-7 for detailed information on the GUS switchovers for this reporting period. As shown in
Figure 7-3, AMR NPA ranging availability went to zero on 18 July 2015. On this date, until further notice, the UDRE for AMR was set to "Not Monitored". This setting means that users can still use WAAS corrections from PRN-133 but that satellite cannot be used by WAAS users for ranging. This will be the last reporting period for AMR NPA GEO ranging availability until AMR is returned to a monitored status.

Table 7-1 GEO Ranging Availability

GEO Source	GEO	PA (%)	NPA (%)	Not Monitored (%)	Do Not Use (%)
AMR 133	CRW	98.82	0.91	0.21	0.00
AMR 133	CRE	99.21	0.58	0.16	0.00
AMR 133	AMR	0.00	18.82	81.00	0.13
CRW 135	CRW	98.82	0.91	0.21	0.00
CRW 135	CRE	99.21	0.58	0.16	0.00
CRW 135	AMR	0.00	18.82	81.00	0.13
CRE 138	CRW	98.82	0.91	0.21	0.00
CRE 138	CRE	99.21	0.58	0.16	0.00
CRE 138	AMR	0.00	18.82	81.00	0.13

Figure 7-1 Daily PA CRW GEO Ranging Availability Trend

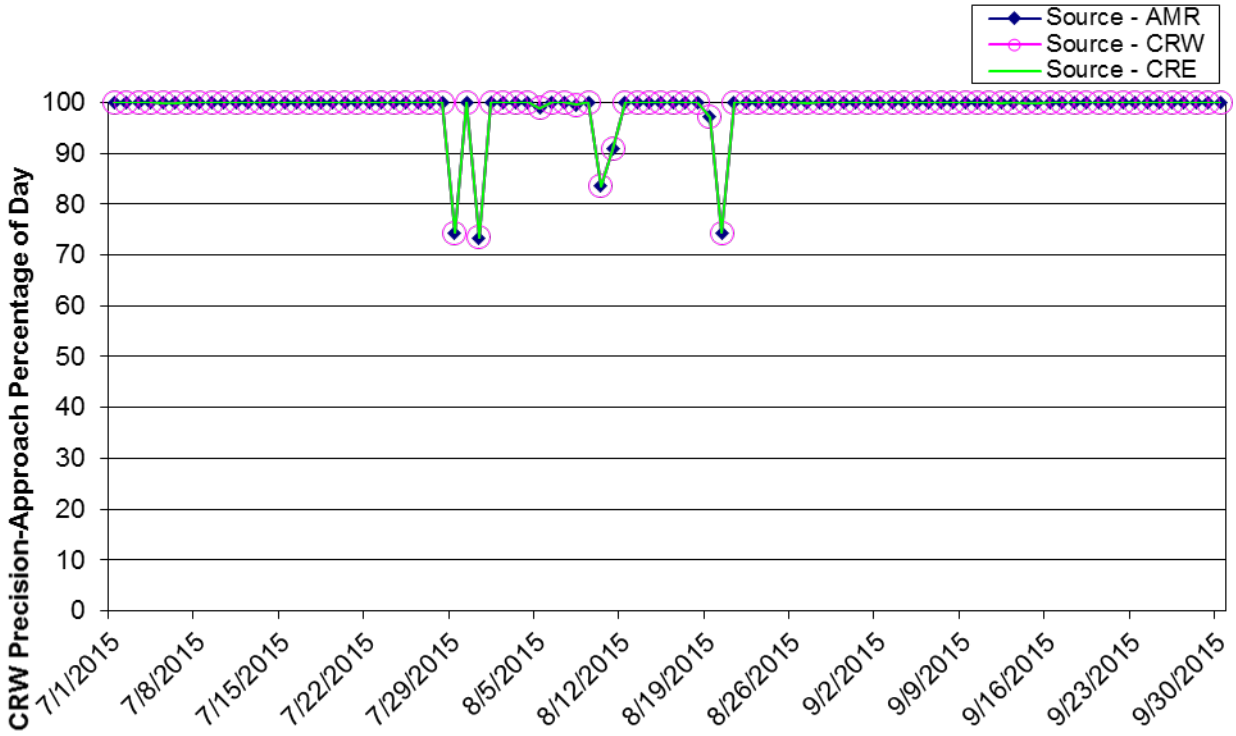


Figure 7-2 Daily PA CRE GEO Ranging Availability Trend

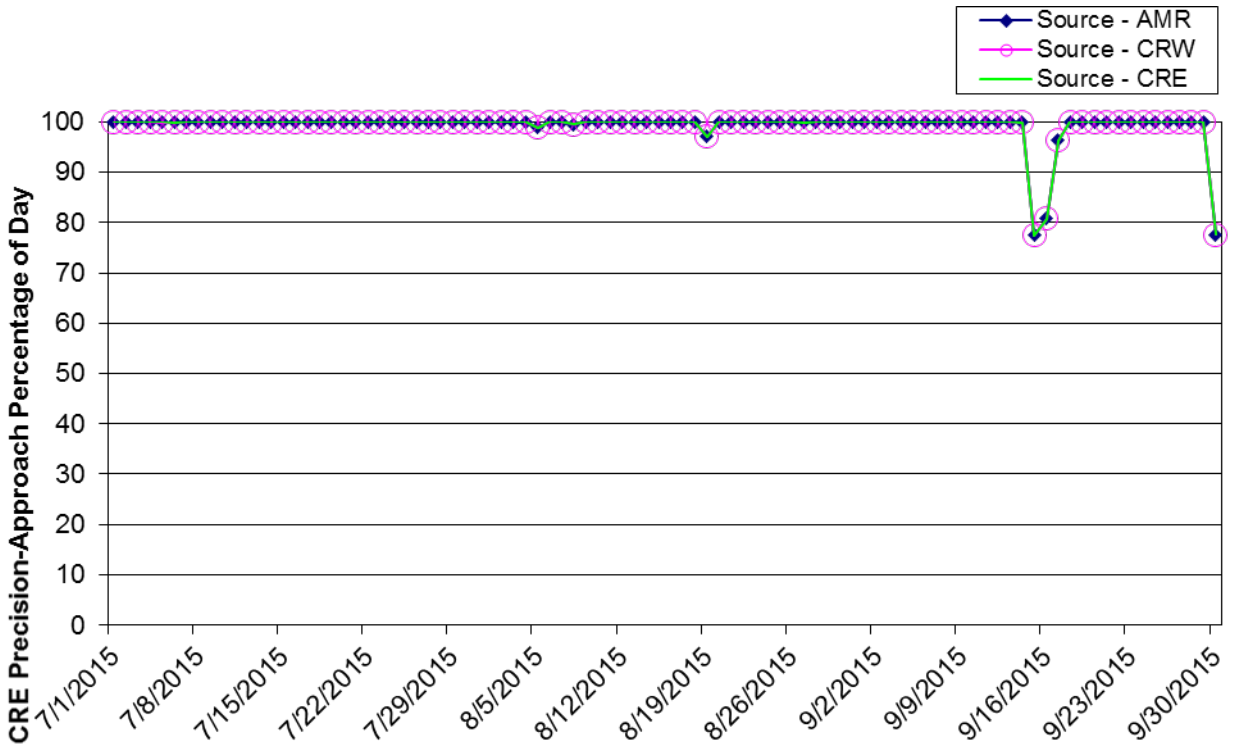
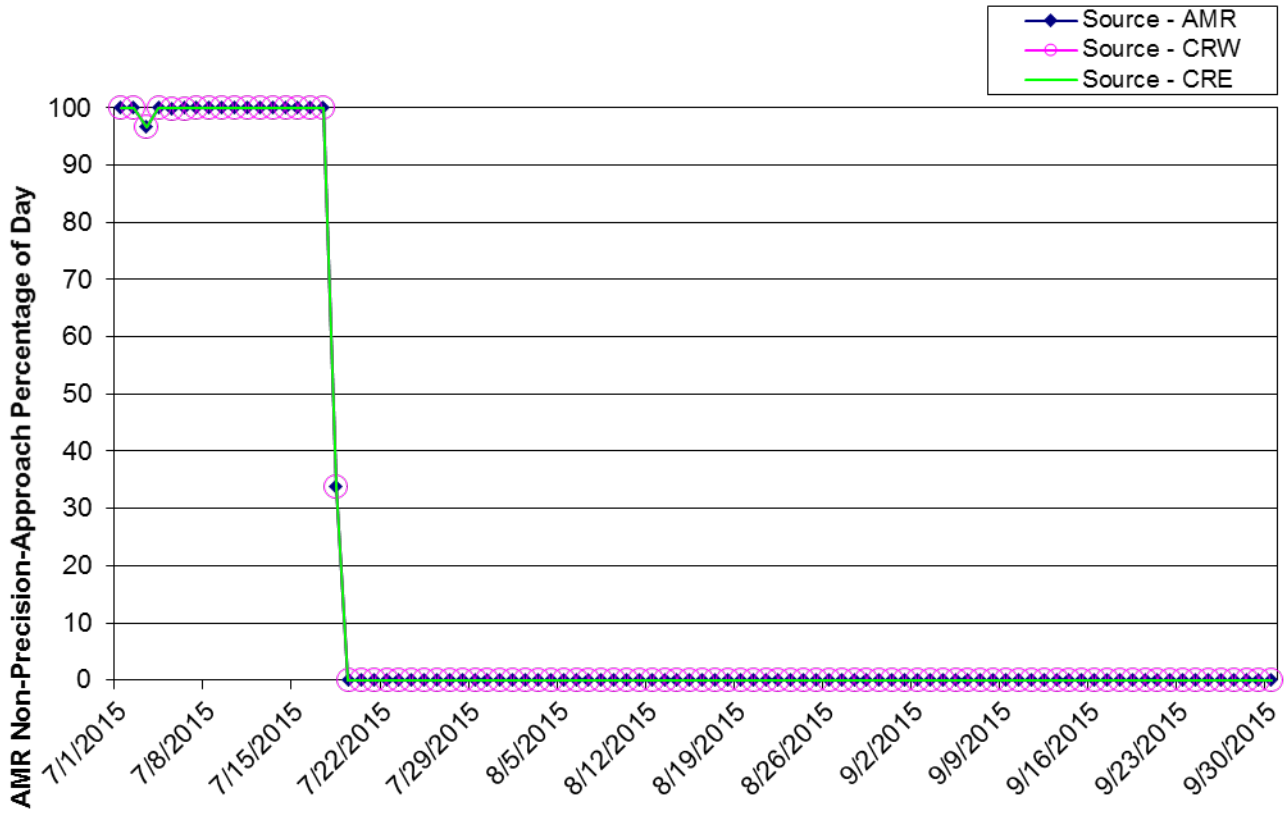


Figure 7-3 Daily NPA AMR GEO Ranging Availability Trend



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 LPV200 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. Figure 8-1 through Figure 8-6 provide the graphical representation of the LP, LPV and LPV200 availability and outage counts at airports in the US and Canada that have published GPS RNAV Instrument Approach Procedures (IAPs). 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 Figure 8-1 and Figure 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 LPV200 availability and the number of outage results as shown in Figure 8-3 through Figure 8-6. The user can review WAAS availability performance for US airports with GPS RNAV IAPs 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	LPV200 Avail
CAL4	FORT MACKAY / ALBIAN AERODROME	AB	LPV	0	100	0	100	2	99.9955
CEV3	VEGREVILLE	AB	LPV	0	100	0	100	1	99.9989
CYEG	EDMONTON / JOSEPHBURG	AB	LPV	0	100	0	100	0	100
CYXD	EDMONTON CITY CTR	AB	LPV	0	100	0	100	0	100
2C7	SHAKTOOLIK	AK	LPV	2	99.9932	1	99.9751	7	99.9426
6A8	ALLAKAKET	AK	LP	1	99.9981	2	99.974	14	99.9287
7KA	TATITLEK	AK	LP	0	100	0	100	3	99.9898
9A3	CHUATHBALUK	AK	LPV	0	100	2	99.9909	4	99.9468
AKN	KING SALMON	AK	LPV	1	99.9989	1	99.9989	5	99.9668
ANC	TED STEVENS ANCHORAGE INTL	AK	LPV200	0	100	1	99.9762	4	99.9721
AQH	QUINHAGAK	AK	LPV	0	100	0	100	11	99.9279
AQT	NUIQSUT	AK	LPV	0	100	1	99.9996	43	99.7581
BET	BETHEL	AK	LPV200	0	100	0	100	6	99.9532
BRW	WILEY POST-WILL ROGERS	AK	LPV	2	99.9985	16	99.8785	232	96.7542

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV200 Avail
CDB	COLD BAY	AK	LPV200	0	100	2	99.9785	385	96.5466
CDV	MERLE K (MUDHOLE) SMITH	AK	LPV	0	100	0	100	2	99.9977
CLP	CLARKS POINT	AK	LPV	1	99.9966	1	99.9966	11	99.949
CXF	COLDFOOT	AK	LP	0	100	2	99.9721	15	99.8913
D76	ROBERT/BOB/CURTIS MEMORIAL	AK	LPV	3	99.9883	8	99.9521	124	99.1202
DLG	DILLINGHAM	AK	LPV	1	99.9966	1	99.9966	7	99.9536
ELI	ELIM	AK	LPV	2	99.9932	1	99.9751	11	99.9373
ENA	KENAI MUNICIPAL	AK	LPV200	0	100	1	99.9762	3	99.9713
ENM	EMMONAK	AK	LPV	1	99.9974	1	99.9751	8	99.9298
FAI	FAIRBANKS INTL	AK	LPV200	0	100	3	99.9811	12	99.934
GAL	EDWARD G. PITKA	AK	LPV	2	99.9955	1	99.9751	4	99.9566
GKN	GULKANA	AK	LPV	0	100	2	99.9962	2	99.9709
HLA	HUSLIA	AK	LPV	1	99.997	1	99.9751	9	99.9502
HOM	HOMER	AK	LPV	0	100	2	99.9898	3	99.9702
HPB	HOOPER BAY	AK	LP	0	100	1	99.9981	27	99.846
ILI	ILIAMNA	AK	LPV	0	100	0	100	3	99.9758
KAL	KALTAG	AK	LPV	2	99.994	1	99.9751	4	99.949
KSM	ST MARY'S	AK	LPV200	1	99.9996	2	99.9906	6	99.9336
KTN	KETCHIKAN INTL	AK	LPV	0	100	0	100	1	99.9974
KWT	KWETHLUK	AK	LPV	0	100	0	100	5	99.9543
KYU	KOYUKUK	AK	LPV	2	99.9955	1	99.9751	4	99.9498
MCG	MCGRATH	AK	LP	0	100	1	99.9751	4	99.9596
MDM	MARSHALL DON HUNTER SR	AK	LP	1	99.9996	2	99.9917	5	99.9385
MDO	MIDDLETON ISLAND	AK	LP	0	100	0	100	2	99.9943
OOK	TOKSOOK BAY	AK	LP	0	100	1	99.997	32	99.8419
ORT	NORTHWAY	AK	LP	0	100	1	99.997	2	99.9528
OTZ	RALPH WIEN MEMORIAL	AK	LPV200	3	99.9909	7	99.9509	137	98.6281
PAQ	PALMER MUNICIPAL	AK	LP	0	100	1	99.9762	3	99.9717
RBY	RUBY	AK	LPV	2	99.9977	1	99.9751	7	99.9566
SCC	DEADHORSE	AK	LPV	0	100	1	99.997	80	99.6415
SCM	SCAMMON BAY	AK	LP	1	99.9996	3	99.9921	15	99.8868
SHG	SHUNGNAK	AK	LP	1	99.997	1	99.9751	16	99.9264
SHX	SHAGELUK	AK	LPV	1	99.9996	1	99.9751	4	99.9464
SMK	ST MICHAEL	AK	LPV	2	99.994	1	99.9751	6	99.946
UNK	UNALAKLEET	AK	LP	2	99.994	1	99.9751	5	99.9487
WLK	SELAWIK	AK	LPV	1	99.9958	1	99.9751	17	99.9279
WNA	NAPAKIAK	AK	LPV	0	100	0	100	8	99.9494
YAK	YAKUTAT	AK	LPV200	0	100	0	100	1	99.997
06A	MOTON FIELD MUNICIPAL	AL	LPV	0	100	0	100	0	100
0J6	HEADLAND MUNICIPAL	AL	LPV	0	100	0	100	0	100
0R1	ATMORE MUNICIPAL	AL	LP	0	100	0	100	0	100
12J	BREWTON MUNICIPAL	AL	LPV	0	100	0	100	0	100
1M4	POSEY FIELD	AL	LPV	0	100	0	100	0	100
1R8	BAY MINETTE MUNICIPAL	AL	LPV	0	100	0	100	0	100
2R5	ST ELMO	AL	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	LPV200 Avail
3M8	NORTH PICKENS	AL	LP	0	100	0	100	0	100
4A9	ISBELL FIELD	AL	LPV	0	100	0	100	0	100
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	0	100
8A0	ALBERTVILLE MUNICIPAL-T. J. BRUMLIK FIELD	AL	LPV	0	100	0	100	0	100
9A4	LAWRENCE COUNTY	AL	LPV200	0	100	0	100	0	100
ANB	ANNISTON METROPOLITAN	AL	LPV	0	100	0	100	0	100
ASN	TALLADEGA MUNICIPAL	AL	LPV200	0	100	0	100	0	100
AUO	AUBURN UNIVERSITY RGNL	AL	LPV200	0	100	0	100	0	100
BFM	MOBILE DOWNTOWN	AL	LPV200	0	100	0	100	0	100
BHM	BIRMINGHAM INTL	AL	LPV200	0	100	0	100	0	100
CQF	H L SONNY CALLAHAN	AL	LPV200	0	100	0	100	0	100
DCU	PRYOR FIELD RGNL	AL	LPV200	0	100	0	100	0	100
DHN	DOTHAN RGNL	AL	LPV200	0	100	0	100	0	100
EDN	ENTERPRISE MUNICIPAL	AL	LPV	0	100	0	100	0	100
EET	SHELBY COUNTY	AL	LPV	0	100	0	100	0	100
EKY	BESSEMER	AL	LPV	0	100	0	100	0	100
EUF	WEEDON FIELD	AL	LPV	0	100	0	100	0	100
GAD	NORTHEAST ALABAMA RGNL	AL	LPV200	0	100	0	100	0	100
HAB	MARION COUNTY-RANKIN FITE	AL	LPV	0	100	0	100	0	100
HSV	HUNTSVILLE INTL-CARL T JONES FLD	AL	LPV200	0	100	0	100	0	100
JFX	WALKER COUNTY-BEVILL FIELD	AL	LPV	0	100	0	100	0	100
JKA	JACK EDWARDS	AL	LPV200	0	100	0	100	0	100
M95	RICHARD ARTHUR FIELD	AL	LPV	0	100	0	100	0	100
MDQ	MADISON COUNTY EXECUTIVE/TOM SHARP JR FLD	AL	LPV	0	100	0	100	0	100
MGM	MONTGOMERY RGNL (DANNELLY FIELD)	AL	LPV200	0	100	0	100	0	100
MOB	MOBILE RGNL	AL	LPV200	0	100	0	100	0	100
MSL	NORTHWEST ALABAMA RGNL	AL	LPV200	0	100	0	100	0	100
PLR	ST CLAIR COUNTY	AL	LPV	0	100	0	100	0	100
PYP	CENTRE-PIEDMONT CHEROKEE COUNTY RGNL	AL	LPV	0	100	0	100	0	100
SCD	MERKEL FIELD SYLACAUGA MUNICIPAL	AL	LPV	0	100	0	100	0	100
SEM	CRAIG FIELD	AL	LPV	0	100	0	100	0	100
TCL	TUSCALOOSA RGNL	AL	LPV	0	100	0	100	0	100
TOI	TROY MUNICIPAL	AL	LPV	0	100	0	100	0	100
4M3	CARLISLE MUNICIPAL	AR	LPV	0	100	0	100	0	100
7M1	MC GEHEE MUNICIPAL	AR	LP	0	100	0	100	0	100
ARG	WALNUT RIDGE RGNL	AR	LPV200	0	100	0	100	0	100
ASG	SPRINGDALE MUNICIPAL	AR	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	LPV200 Avail
AWM	WEST MEMPHIS MUNICIPAL	AR	LPV200	0	100	0	100	0	100
BPK	OZARK RGNL	AR	LPV	0	100	0	100	0	100
BVX	BATESVILLE RGNL	AR	LPV	0	100	0	100	0	100
BYH	ARKANSAS INTL	AR	LPV200	0	100	0	100	0	100
CDH	HARRELL FIELD	AR	LPV	0	100	0	100	0	100
ELD	SOUTH ARKANSAS RGNL AT GOODWIN FIELD	AR	LPV	0	100	0	100	0	100
FSM	FORT SMITH RGNL	AR	LPV200	0	100	0	100	0	100
FYV	DRAKE FIELD	AR	LPV	0	100	0	100	0	100
HRO	BOONE COUNTY	AR	LPV	0	100	0	100	0	100
JBR	JONESBORO MUNICIPAL	AR	LPV	0	100	0	100	0	100
LIT	ADAMS FIELD	AR	LPV200	0	100	0	100	0	100
M19	NEWPORT MUNICIPAL	AR	LPV	0	100	0	100	0	100
M77	HOWARD COUNTY	AR	LP	0	100	0	100	0	100
ORK	NORTH LITTLE ROCK MUNICIPAL	AR	LPV	0	100	0	100	0	100
PBF	GRIDER FIELD	AR	LPV	0	100	0	100	0	100
ROG	ROGERS MUNICIPAL-CARTER FIELD	AR	LPV	0	100	0	100	0	100
RUE	RUSSELLVILLE RGNL	AR	LPV	0	100	0	100	0	100
SGT	STUTTGART MUNICIPAL	AR	LPV	0	100	0	100	0	100
SLG	SMITH FIELD	AR	LPV	0	100	0	100	0	100
SRC	SEARCY MUNICIPAL	AR	LPV	0	100	0	100	0	100
SUZ	SALINE COUNTY RGNL	AR	LPV	0	100	0	100	0	100
TXK	TEXARKANA RGNL-WEBB FIELD	AR	LPV	0	100	0	100	0	100
VBT	BENTONVILLE MUNICIPAL/LOUISE M THADEN FIELD	AR	LPV	0	100	0	100	0	100
XNA	NORTHWEST ARKANSAS RGNL	AR	LPV200	0	100	0	100	0	100
AVQ	MARANA RGNL	AZ	LP	0	100	0	100	0	100
DVT	PHOENIX DEER VALLEY	AZ	LPV	0	100	0	100	0	100
FFZ	FALCON FLD	AZ	LP	0	100	0	100	0	100
FHU	SIERRA VISTA MUNICIPAL-LIBBY AAF	AZ	LPV200	0	100	0	100	0	100
FLG	FLAGSTAFF PULLIAM	AZ	LPV	0	100	0	100	0	100
GEU	GLENDALE MUNICIPAL	AZ	LPV	0	100	0	100	0	100
HII	LAKE HAVASU CITY	AZ	LPV	0	100	0	100	0	100
IFP	LAUGHLIN/BULLHEAD INTL	AZ	LPV	0	100	0	100	0	100
IGM	KINGMAN	AZ	LPV	0	100	0	100	0	100
IWA	PHOENIX-MESA GATEWAY	AZ	LPV200	0	100	0	100	0	100
P33	COCHISE COUNTY	AZ	LPV	0	100	0	100	0	100
PGA	PAGE MUNICIPAL	AZ	LPV	0	100	0	100	0	100
PHX	PHOENIX SKY HARBOR INTL	AZ	LPV	0	100	0	100	0	100
PRC	ERNEST A. LOVE FIELD	AZ	LPV	0	100	0	100	0	100
RQE	WINDOW ROCK	AZ	LP	0	100	0	100	0	100

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV200 Avail
SAD	SAFFORD RGNL	AZ	LPV	0	100	0	100	0	100
SJN	ST JOHNS INDUSTRIAL AIR PARK	AZ	LP	0	100	0	100	0	100
SOW	SHOW LOW RGNL	AZ	LPV	0	100	0	100	0	100
TUS	TUCSON INTL	AZ	LPV	0	100	0	100	0	100
CYBL	CAMPBELL RIVER	BC	LPV	0	100	0	100	0	100
CYCD	NANAIMO	BC	LPV	0	100	0	100	0	100
CYVR	VANCOUVER INTL	BC	LPV	0	100	0	100	0	100
CYXS	PRINCE GEORGE	BC	LPV	0	100	0	100	0	100
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	2	99.9755
ACV	ARCATA	CA	LPV200	0	100	0	100	5	99.9698
APC	NAPA COUNTY	CA	LPV	0	100	1	99.9887	69	99.7581
APV	APPLE VALLEY	CA	LPV	0	100	0	100	1	99.9921
AUN	AUBURN MUNICIPAL	CA	LPV	0	100	0	100	2	99.9732
BFL	MEADOWS FIELD	CA	LPV200	0	100	1	99.9996	2	99.9841
BLH	BLYTHE	CA	LP	0	100	0	100	0	100
C83	BYRON	CA	LPV	0	100	1	99.9913	46	99.8592
CCR	BUCHANAN FIELD	CA	LPV	0	100	1	99.9894	66	99.7864
CEC	JACK MC NAMARA FIELD	CA	LPV200	0	100	0	100	3	99.9834
CIC	CHICO MUNICIPAL	CA	LPV	0	100	0	100	2	99.9691
CMA	CAMARILLO	CA	LPV	0	100	0	100	2	99.9777
CNO	CHINO	CA	LPV	0	100	0	100	2	99.9891
CRQ	MC CLELLAN-PALOMAR	CA	LPV200	0	100	0	100	2	99.9864
CVH	HOLLISTER MUNICIPAL	CA	LPV	0	100	1	99.9909	57	99.8271
DAG	BARSTOW-DAGGETT	CA	LPV	0	100	0	100	1	99.9932
DWA	YOLO COUNTY-DAVIS/WOODLAND/WINTERS	CA	LPV	0	100	1	99.9943	38	99.8932
FAT	FRESNO YOSEMITE INTL	CA	LPV	0	100	1	99.9989	3	99.9815
HAF	HALF MOON BAY	CA	LPV	0	100	1	99.9872	81	99.6079
HHR	HAWTHORNE JACK NORTHROP FIELD	CA	LPV	0	100	0	100	2	99.9834
HWD	HAYWARD EXECUTIVE	CA	LPV	0	100	1	99.9883	76	99.7324
LAX	LOS ANGELES INTL	CA	LPV	0	100	0	100	2	99.9826
LGB	LONG BEACH/DAUGHERTY FIELD	CA	LPV	0	100	0	100	2	99.9838
LHM	LINCOLN RGNL/KARL HARDER FIELD	CA	LPV200	0	100	0	100	7	99.9675
LLR	LITTLE RIVER	CA	LP	0	100	1	99.9875	93	99.5222
LSN	LOS BANOS MUNICIPAL	CA	LPV	0	100	1	99.9936	38	99.9136
LVK	LIVERMORE MUNICIPAL	CA	LPV	0	100	1	99.9902	60	99.7985
MAE	MADERA MUNICIPAL	CA	LPV	0	100	1	99.997	11	99.974
MCE	MERCED RGNL/MACREADY FIELD	CA	LPV	0	100	1	99.9958	23	99.96

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV200 Avail
MER	CASTLE	CA	LPV200	0	100	1	99.9955	23	99.9604
MHR	SACRAMENTO MATHER	CA	LPV200	0	100	0	100	17	99.9551
MIT	SHAFTER-MINTER FIELD	CA	LPV	0	100	1	99.9996	2	99.9834
MOD	MODESTO CITY-CO-HARRY SHAM FLD	CA	LPV	0	100	1	99.9943	33	99.9343
MRY	MONTEREY PENINSULA	CA	LPV	0	100	1	99.9887	83	99.6822
MYF	MONTGOMERY FIELD	CA	LPV200	0	100	0	100	2	99.9845
MYV	YUBA COUNTY	CA	LPV200	0	100	0	100	4	99.9698
O02	NERVINO	CA	LPV	0	100	0	100	2	99.9736
O27	OAKDALE	CA	LPV	0	100	1	99.9955	24	99.9543
O69	PETALUMA MUNICIPAL	CA	LPV	0	100	1	99.9868	80	99.6618
O88	RIO VISTA MUNICIPAL	CA	LP	0	100	1	99.9921	42	99.8755
OAK	METROPOLITAN OAKLAND INTL	CA	LPV	0	100	1	99.9879	78	99.7154
ONT	ONTARIO INTL	CA	LPV	0	100	0	100	2	99.9894
OVE	OROVILLE MUNICIPAL	CA	LPV	0	100	0	100	2	99.9706
OXR	OXNARD	CA	LPV	0	100	0	100	2	99.9766
PMD	PALMDALE USAF PLANT 42	CA	LPV200	0	100	0	100	2	99.9879
POC	BRACKETT FIELD	CA	LPV	0	100	0	100	2	99.9879
PRB	PASO ROBLES MUNICIPALCIPAL	CA	LPV200	0	100	1	99.994	45	99.8751
PVF	PLACERVILLE	CA	LPV	0	100	0	100	2	99.9743
RAL	RIVERSIDE MUNICIPAL	CA	LPV	0	100	0	100	2	99.9898
RBL	RED BLUFF MUNICIPAL	CA	LPV	0	100	0	100	2	99.9683
RDD	REDDING MUNICIPAL	CA	LPV	0	100	0	100	2	99.9694
RHV	REID-HILLVIEW OF SANTA CLARA	CA	LPV	0	100	1	99.9891	74	99.7758
SAC	SACRAMENTO EXECUTIVE	CA	LPV200	0	100	0	100	29	99.9336
SAN	SAN DIEGO INTL	CA	LP	0	100	0	100	2	99.9841
SBA	SANTA BARBARA MUNICIPAL	CA	LPV	0	100	1	99.9989	27	99.9513
SBP	SAN LUIS COUNTY RGNL	CA	LPV200	0	100	1	99.9943	53	99.8524
SCK	STOCKTON METROPOLITAN	CA	LPV	0	100	1	99.9936	36	99.917
SEE	GILLESPIE FIELD	CA	LP	0	100	0	100	2	99.9864
SFO	SAN FRANCISCO INTL	CA	LPV	0	100	1	99.9875	81	99.6566
SJC	NORMAN Y. MINETA SAN JOSE INTL	CA	LPV	0	100	1	99.9887	77	99.7509
SMF	SACRAMENTO INTL	CA	LPV200	0	100	0	100	26	99.9438
SMX	SANTA MARIA PUBLIC/CAPT G ALLAN HANCOCK FIELD	CA	LPV200	0	100	1	99.9955	50	99.8717
SNA	JOHN WAYNE-ORANGE COUNTY	CA	LPV	0	100	0	100	2	99.9872
SNS	SALINAS MUNICIPAL	CA	LPV200	0	100	1	99.9898	75	99.7626
STS	CHARLES M. SCHULZ-SONOMA COUNTY	CA	LPV	0	100	1	99.9864	82	99.6471
TCY	TRACY MUNICIPAL	CA	LPV	0	100	1	99.9917	45	99.8751
TOA	ZAMPERINI FIELD	CA	LPV200	0	100	0	100	2	99.983

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV200 Avail
VCB	NUT TREE	CA	LPV	0	100	1	99.9909	46	99.8505
VCV	SOUTHERN CALIFORNIA LOGISTICS	CA	LPV	0	100	0	100	2	99.9917
VIS	VISALIA MUNICIPAL	CA	LPV200	0	100	1	99.9996	2	99.9838
WJF	GENERAL WM J FOX AIRFIELD	CA	LPV	0	100	0	100	2	99.9872
WLW	WILLOWS-GLENN COUNTY	CA	LPV	0	100	0	100	2	99.9683
ALS	SAN LUIS VALLEY RGNL/BERGMAN FIELD	CO	LPV200	0	100	0	100	0	100
APA	CENTENNIAL	CO	LPV200	0	100	0	100	0	100
BJC	ROCKY MOUNTAIN METROPOLITAN	CO	LPV200	0	100	0	100	0	100
CEZ	CORTEZ MUNICIPAL	CO	LPV	0	100	0	100	0	100
COS	CITY OF COLORADO SPRINGS MUNICIPAL	CO	LPV200	0	100	0	100	0	100
DEN	DENVER INTL	CO	LPV200	0	100	0	100	0	100
DRO	DURANGO-LA PLATA COUNTY	CO	LPV200	0	100	0	100	0	100
FMM	FORT MORGAN MUNICIPAL	CO	LP	0	100	0	100	0	100
FNL	FORT COLLINS-LOVELAND MUNICIPAL	CO	LPV200	0	100	0	100	0	100
FTG	FRONT RANGE	CO	LPV200	0	100	0	100	0	100
GJT	GRAND JUNCTION RGNL	CO	LPV200	0	100	0	100	0	100
GXY	GREELEY-WELD COUNTY	CO	LPV	0	100	0	100	1	99.9996
HDN	YAMPA VALLEY	CO	LPV	0	100	0	100	1	99.9996
ITR	KIT CARSON COUNTY	CO	LPV	0	100	0	100	1	99.9977
LAA	LAMAR MUNICIPAL	CO	LPV	0	100	0	100	1	99.9989
LHX	LA JUNTA MUNICIPAL	CO	LPV	0	100	0	100	1	99.9996
MTJ	MONTROSE RGNL	CO	LPV	0	100	0	100	0	100
PUB	PUEBLO MEMORIAL	CO	LPV200	0	100	0	100	0	100
RIL	GARFIELD COUNTY RGNL	CO	LPV	0	100	0	100	0	100
STK	STERLING MUNICIPAL	CO	LPV	0	100	0	100	0	100
TEX	TELLURIDE RGNL	CO	LP	0	100	0	100	0	100
BDL	BRADLEY INTL	CT	LPV200	0	100	0	100	1	99.9955
GON	GROTON-NEW LONDON	CT	LPV	0	100	0	100	1	99.9955
HVN	TWEED-NEW HAVEN	CT	LPV	0	100	0	100	1	99.9966
IJD	WINDHAM	CT	LP	0	100	0	100	1	99.9951
OXC	WATERBURY-OXFORD	CT	LPV	0	100	0	100	1	99.9974
DCA	RONALD REAGAN WASHINGTON NATL	DC	LPV	0	100	0	100	1	99.9974
HEF	MANASSAS RGNL/HARRY P. DAVIS FIELD	DC	LPV	0	100	0	100	0	100
IAD	WASHINGTON DULLES INTL	DC	LPV200	0	100	0	100	1	99.9996
33N	DELAWARE AIRPARK	DE	LP	0	100	0	100	1	99.9864
EVY	SUMMIT	DE	LPV	0	100	0	100	1	99.9868
GED	SUSSEX COUNTY	DE	LPV	0	100	0	100	1	99.9834
ILG	NEW CASTLE	DE	LPV	0	100	0	100	1	99.9868
1J0	TRI-COUNTY	FL	LP	0	100	0	100	0	100

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV200 Avail
28J	PALATKA MUNICIPALCIPAL ARPT	FL	LPV	0	100	0	100	0	100
40J	PERRY-FOLEY	FL	LPV	0	100	0	100	0	100
54J	DEFUNIAK SPRINGS	FL	LP	0	100	0	100	0	100
AAF	APALACHICOLA MUNICIPAL	FL	LPV	0	100	0	100	0	100
APF	NAPLES MUNICIPAL	FL	LPV	0	100	0	100	2	99.9834
AVO	AVON PARK EXECUTIVE	FL	LPV	0	100	0	100	1	99.9883
BCT	BOCA RATON	FL	LPV	0	100	0	100	2	99.9796
BKV	HERNANDO COUNTY	FL	LPV	0	100	0	100	1	99.9974
BOW	BARTOW MUNICIPAL	FL	LPV	0	100	0	100	1	99.9913
CEW	BOB SIKES	FL	LPV	0	100	0	100	0	100
CHN	WAUCHULA MUNICIPAL	FL	LP	0	100	0	100	1	99.9887
COI	MERRITT ISLAND	FL	LPV	0	100	0	100	1	99.9875
CRG	CRAIG MUNICIPAL	FL	LPV200	0	100	0	100	0	100
CTY	CROSS CITY	FL	LPV	0	100	0	100	0	100
DAB	DAYTONA BEACH INTL	FL	LPV200	0	100	0	100	1	99.9947
DED	DELAND MUNICIPAL-SIDNEY H TAYLOR FLD	FL	LPV	0	100	0	100	1	99.9947
DTS	DESTIN-FORT WALTON BEACH	FL	LP	0	100	0	100	0	100
ECP	NORTHWEST FLORIDA BEACHES INTL	FL	LPV200	0	100	0	100	0	100
EVB	NEW SMYRNA BEACH MUNICIPAL	FL	LPV	0	100	0	100	1	99.9906
EYW	KEY WEST INTL	FL	LPV	0	100	0	100	2	99.9774
F45	NORTH PALM BEACH COUNTY GENERAL AVIATION	FL	LPV	0	100	0	100	1	99.9808
FHB	FERNANDINA BEACH MUNICIPAL	FL	LPV	0	100	0	100	0	100
FLL	FORT LAUDERDALE/HOLLYWOOD INTL	FL	LPV	0	100	0	100	2	99.9789
FMY	PAGE FIELD	FL	LPV	0	100	0	100	1	99.9857
FPR	ST LUCIE COUNTY INTL	FL	LPV	0	100	0	100	1	99.9838
FXE	FT LAUDERDALE EXECUTIVE	FL	LPV200	0	100	0	100	2	99.9796
GIF	WINTER HAVEN'S GILBERT	FL	LPV	0	100	0	100	1	99.9917
GNV	GAINESVILLE RGNL	FL	LPV	0	100	0	100	0	100
HEG	HERLONG RECREATIONAL	FL	LP	0	100	0	100	0	100
IMM	IMMOKALEE RGNL	FL	LPV	0	100	0	100	1	99.9838
ISM	KISSIMMEE GATEWAY	FL	LPV200	0	100	0	100	1	99.9891
JAX	JACKSONVILLE INTL	FL	LPV200	0	100	0	100	0	100
LAL	LAKELAND LINDER RGNL	FL	LPV200	0	100	0	100	1	99.9928
LCQ	LAKE CITY MUNICIPAL	FL	LPV	0	100	0	100	0	100
LEE	LEESBURG INTL	FL	LPV	0	100	0	100	1	99.9966
MCO	ORLANDO INTL	FL	LPV200	0	100	0	100	1	99.9894
MIA	MIAMI INTL	FL	LPV	0	100	0	100	2	99.9777
MKY	MARCO ISLAND	FL	LPV	0	100	0	100	2	99.983
MLB	MELBOURNE INTL	FL	LPV200	0	100	0	100	1	99.9872

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV200 Avail
MTH	THE FLORIDA KEYS MARATHON	FL	LPV	0	100	0	100	2	99.9762
OBE	OKEECHOBEE COUNTY	FL	LPV	0	100	0	100	1	99.9841
OCF	OCALA INTL-JIM TAYLOR FLD	FL	LPV200	0	100	0	100	0	100
OPF	OPA LOCKA EXECUTIVE	FL	LPV200	0	100	0	100	2	99.9785
ORL	EXECUTIVE	FL	LPV200	0	100	0	100	1	99.9921
PBI	PALM BEACH INTL	FL	LPV200	0	100	0	100	1	99.9804
PCM	PLANT CITY MUNICIPAL	FL	LPV	0	100	0	100	1	99.9936
PGD	PUNTA GORDA	FL	LPV200	0	100	0	100	1	99.9875
PHK	PALM BEACH COUNTY GLADES	FL	LPV	0	100	0	100	1	99.983
PIE	ST PETERSBURG-CLEARWATER INTL	FL	LPV200	0	100	0	100	1	99.9966
PMP	POMPANO BEACH AIRPARK	FL	LPV	0	100	0	100	2	99.9796
PNS	PENSACOLA RGNL	FL	LPV200	0	100	0	100	0	100
RSW	SOUTHWEST FLORIDA INTL	FL	LPV	0	100	0	100	1	99.9853
SEF	SEBRING RGNL	FL	LPV	0	100	0	100	1	99.9875
SFB	ORLANDO SANFORD INTL	FL	LPV200	0	100	0	100	1	99.9932
SGJ	ST AUGUSTINE	FL	LPV	0	100	0	100	1	99.9996
SRQ	SARASOTA/BRADENTON INTL	FL	LPV200	0	100	0	100	1	99.9921
SUA	WITHAM FIELD	FL	LPV	0	100	0	100	1	99.9826
TIX	SPACE COAST RGNL	FL	LPV200	0	100	0	100	1	99.9887
TLH	TALLAHASSEE RGNL	FL	LPV200	0	100	0	100	0	100
TMB	KENDALL-TAMIAMI EXECUTIVE	FL	LPV200	0	100	0	100	2	99.9774
TPA	TAMPA INTL	FL	LPV200	0	100	0	100	1	99.9955
TPF	PETER O KNIGHT	FL	LP	0	100	0	100	1	99.9955
VDF	TAMPA EXECUTIVE	FL	LPV	0	100	0	100	1	99.9955
VNC	VENICE MUNICIPAL	FL	LP	0	100	0	100	1	99.9902
VQQ	CECIL FIELD	FL	LPV	0	100	0	100	0	100
VRB	VERO BEACH MUNICIPAL	FL	LPV200	0	100	0	100	1	99.9841
X07	LAKE WALES MUNICIPAL	FL	LP	0	100	0	100	1	99.9891
X14	LA BELLE MUNICIPAL	FL	LPV	0	100	0	100	1	99.9849
X26	SEBASTIAN MUNICIPAL	FL	LP	0	100	0	100	1	99.9845
X35	MARION CO & PARK OF COMMERCE	FL	LP	0	100	0	100	0	100
X51	HOMESTEAD GENERAL AVIATION	FL	LPV	0	100	0	100	2	99.9774
ZPH	ZEPHYRHILLS MUNICIPAL	FL	LPV	0	100	0	100	1	99.9955
09J	JEKYLL ISLAND	GA	LPV200	0	100	0	100	0	100
15J	COOK COUNTY	GA	LPV	0	100	0	100	0	100
17J	DONALSONVILLE MUNICIPAL	GA	LPV	0	100	0	100	0	100
18A	FRANKLIN COUNTY	GA	LPV	0	100	0	100	0	100
19A	JACKSON COUNTY	GA	LPV	0	100	0	100	0	100
2J5	MILLEN	GA	LPV	0	100	0	100	0	100
3J7	GREENE COUNTY RGNL	GA	LPV	0	100	0	100	0	100
48A	COCHRAN	GA	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	LPV200 Avail
4A4	POLK COUNTY AIRPORT CORNELIUS MOORE FIELD	GA	LPV	0	100	0	100	0	100
4J1	BRANTLEY COUNTY	GA	LPV	0	100	0	100	0	100
52A	MADISON MUNICIPAL	GA	LP	0	100	0	100	0	100
6A2	GRIFFIN-SPALDING COUNTY	GA	LPV	0	100	0	100	0	100
70J	CAIRO-GRADY COUNTY	GA	LPV	0	100	0	100	0	100
ABY	SOUTHWEST GEORGIA RGNL	GA	LPV200	0	100	0	100	0	100
ACJ	JIMMY CARTER RGNL	GA	LPV	0	100	0	100	0	100
AGS	AUGUSTA RGNL AT BUSH FIELD	GA	LPV200	0	100	0	100	0	100
AHN	ATHENS/BEN EPPS	GA	LPV	0	100	0	100	0	100
AJR	HABERSHAM COUNTY	GA	LPV	0	100	0	100	0	100
ATL	HARTSFIELD - JACKSON ATLANTA INTL	GA	LPV200	0	100	0	100	0	100
AYS	WAYCROSS-WARE COUNTY	GA	LPV200	0	100	0	100	0	100
BGE	DECATUR COUNTY INDUSTRIAL AIR PARK	GA	LPV200	0	100	0	100	0	100
BHC	BAXLEY MUNICIPAL	GA	LPV	0	100	0	100	0	100
BIJ	EARLY COUNTY	GA	LPV	0	100	0	100	0	100
BQK	BRUNSWICK GOLDEN ISLES	GA	LPV200	0	100	0	100	0	100
CCO	NEWNAN COWETA COUNTY	GA	LPV	0	100	0	100	0	100
CKF	CRISP COUNTY-CORDELE	GA	LPV	0	100	0	100	0	100
CNI	CHEROKEE COUNTY	GA	LPV	0	100	0	100	0	100
CSG	COLUMBUS METROPOLITAN	GA	LPV	0	100	0	100	0	100
CTJ	WEST GEORGIA RGNL-O V GRAY FIELD	GA	LPV	0	100	0	100	0	100
CVC	COVINGTON MUNICIPAL	GA	LPV	0	100	0	100	0	100
CWV	CLAXTON-EVANS COUNTY	GA	LPV	0	100	0	100	0	100
D73	MONROE-WALTON COUNTY	GA	LP	0	100	0	100	0	100
DNN	DALTON MUNICIPAL	GA	LPV	0	100	0	100	0	100
DQH	DOUGLAS MUNICIPAL	GA	LPV200	0	100	0	100	0	100
EZM	HEART OF GEORGIA RGNL	GA	LPV	0	100	0	100	0	100
FFC	ATLANTA RGNL FALCON FIELD	GA	LPV200	0	100	0	100	0	100
FTY	FULTON COUNTY AIRPORT-BROWN FIELD	GA	LPV	0	100	0	100	0	100
FZG	FITZGERALD MUNICIPAL	GA	LPV	0	100	0	100	0	100
GVL	LEE GILMER MEMORIAL	GA	LPV	0	100	0	100	0	100
HOE	HOMERVILLE	GA	LPV	0	100	0	100	0	100
HQU	THOMSON-MCDUFFIE COUNTY	GA	LPV	0	100	0	100	0	100
IIY	WASHINGTON-WILKES COUNTY	GA	LPV	0	100	0	100	0	100
JES	JESUP-WAYNE COUNTY	GA	LPV	0	100	0	100	0	100
JYL	PLANTATION ARPK	GA	LPV	0	100	0	100	0	100
JZP	PICKENS COUNTY	GA	LPV	0	100	0	100	0	100
LGC	LAGRANGE-CALLAWAY	GA	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	LPV200 Avail
LZU	GWINNETT COUNTY-BRISCOE FIELD	GA	LPV200	0	100	0	100	0	100
MAC	MACON DOWNTOWN	GA	LP	0	100	0	100	0	100
MCN	MIDDLE GEORGIA RGNL	GA	LPV200	0	100	0	100	0	100
MGR	MOULTRIE MUNICIPAL	GA	LPV200	0	100	0	100	0	100
MLJ	BALDWIN COUNTY	GA	LPV	0	100	0	100	0	100
MQW	TELFAIR-WHEELER	GA	LPV	0	100	0	100	0	100
OKZ	KAOLIN FIELD	GA	LPV	0	100	0	100	0	100
OPN	THOMASTON-UPSON COUNTY	GA	LPV200	0	100	0	100	0	100
PIM	HARRIS COUNTY	GA	LPV	0	100	0	100	0	100
PUJ	PAULDING NORTHWEST ATLANTA	GA	LPV200	0	100	0	100	0	100
PXE	PERRY-HOUSTON COUNTY	GA	LPV	0	100	0	100	0	100
RMG	RICHARD B RUSSELL	GA	LPV	0	100	0	100	0	100
RVJ	SWINTON SMITH FLD AT REIDSVILLE MUNICIPAL	GA	LP	0	100	0	100	0	100
RYY	COBB COUNTY-MC COLLUM FIELD	GA	LPV200	0	100	0	100	0	100
SAV	SAVANNAH/HILTON HEAD INTL	GA	LPV200	0	100	0	100	0	100
SBO	EAST GEORGIA REGIONAL	GA	LPV	0	100	0	100	0	100
TBR	STATESBORO-BULLOCH COUNTY	GA	LPV	0	100	0	100	0	100
TMA	HENRY TIFTON MYERS	GA	LPV	0	100	0	100	0	100
TOC	TOCCOA RG LETOURNEAU FIELD	GA	LPV	0	100	0	100	0	100
TVI	THOMASVILLE RGNL	GA	LPV	0	100	0	100	0	100
VDI	VIDALIA RGNL	GA	LPV	0	100	0	100	0	100
VLD	VALDOSTA RGNL	GA	LPV	0	100	0	100	0	100
VPC	CARTERSVILLE	GA	LPV	0	100	0	100	0	100
WDR	WINDER-BARROW	GA	LPV	0	100	0	100	0	100
AIO	ATLANTIC MUNICIPAL	IA	LPV	0	100	0	100	0	100
ALO	WATERLOO RGNL	IA	LPV	0	100	0	100	0	100
AMW	AMES MUNICIPAL	IA	LPV	0	100	0	100	0	100
AWG	WASHINGTON MUNICIPAL	IA	LPV200	0	100	0	100	0	100
BRL	SOUTHEAST IOWA RGNL	IA	LPV200	0	100	0	100	0	100
CBF	COUNCIL BLUFFS MUNICIPAL	IA	LPV200	0	100	0	100	0	100
CID	THE EASTERN IOWA	IA	LPV200	0	100	0	100	0	100
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	0	100
CWI	CLINTON MUNICIPAL	IA	LPV200	0	100	0	100	0	100
DBQ	DUBUQUE RGNL	IA	LPV200	0	100	0	100	0	100
DEH	DECORAH MUNICIPAL	IA	LPV	0	100	0	100	0	100
DNS	DENISON MUNICIPAL	IA	LPV	0	100	0	100	0	100
DSM	DES MOINES INTL	IA	LPV	0	100	0	100	0	100
DVN	DAVENPORT 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	LPV200 Avail
EBS	WEBSTER CITY MUNICIPAL	IA	LPV	0	100	0	100	0	100
EFW	JEFFERSON MUNICIPAL	IA	LPV	0	100	0	100	0	100
EOK	KEOKUK MUNICIPAL	IA	LPV	0	100	0	100	0	100
EST	ESTHERVILLE MUNICIPAL	IA	LPV	0	100	0	100	0	100
FFL	FAIRFIELD MUNICIPAL	IA	LPV	0	100	0	100	0	100
FOD	FORT DODGE RGNL	IA	LPV200	0	100	0	100	0	100
FXY	FOREST CITY MUNICIPAL	IA	LPV	0	100	0	100	0	100
GGI	GRINNELL RGNL	IA	LPV	0	100	0	100	0	100
I75	OSCEOLA MUNICIPAL	IA	LPV	0	100	0	100	0	100
ICL	SCHENCK FIELD	IA	LPV	0	100	0	100	0	100
IIB	INDEPENDENCE MUNICIPAL	IA	LP	0	100	0	100	0	100
IKV	ANKENY RGNL	IA	LPV	0	100	0	100	0	100
IOW	IOWA CITY MUNICIPAL	IA	LPV	0	100	0	100	0	100
LRJ	LE MARS MUNICIPAL	IA	LPV	0	100	0	100	0	100
MCW	MASON CITY MUNICIPAL	IA	LPV200	0	100	0	100	0	100
MPZ	MOUNT PLEASANT MUNICIPALCIPAL	IA	LPV	0	100	0	100	0	100
MUT	MUSCATINE MUNICIPAL	IA	LPV	0	100	0	100	0	100
MXO	MONTICELLO RGNL	IA	LP	0	100	0	100	0	100
OOA	OSKALOOSA MUNICIPAL	IA	LPV	0	100	0	100	0	100
OTM	OTTUMWA RGNL	IA	LPV	0	100	0	100	0	100
OXV	KNOXVILLE MUNICIPAL	IA	LPV	0	100	0	100	0	100
PEA	PELLA MUNICIPAL	IA	LPV	0	100	0	100	0	100
POH	POCAHONTAS MUNICIPAL	IA	LPV	0	100	0	100	0	100
PRO	PERRY MUNICIPAL	IA	LPV200	0	100	0	100	0	100
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	0	100
SKI	SAC CITY MUNICIPAL	IA	LPV	0	100	0	100	0	100
SLB	STORM LAKE MUNICIPAL	IA	LPV	0	100	0	100	0	100
SPW	SPENCER MUNICIPAL	IA	LPV200	0	100	0	100	0	100
SUX	SIOUX GATEWAY/COL BUD DAY FIELD	IA	LPV200	0	100	0	100	0	100
TNU	NEWTON MUNICIPAL	IA	LPV	0	100	0	100	0	100
TVK	CENTERVILLE MUNICIPAL	IA	LPV	0	100	0	100	0	100
TZT	BELLE PLAINE MUNICIPAL	IA	LPV	0	100	0	100	0	100
VTI	VINTON VETERANS MEML ARPK	IA	LPV	0	100	0	100	0	100
BOI	BOISE AIR TERMINAL/GOWEN FLD	ID	LPV	0	100	0	100	1	99.994
COE	PAPPY BOYINGTON FIELD	ID	LPV200	0	100	0	100	0	100
DIJ	DRIGGS-REED MEMORIAL	ID	LP	0	100	0	100	0	100
EUL	CALDWELL INDUSTRIAL	ID	LPV	0	100	0	100	1	99.9936
GNG	GOODING MUNICIPAL	ID	LPV	0	100	0	100	1	99.9936
IDA	IDAHO FALLS RGNL	ID	LPV200	0	100	0	100	1	99.9996
JER	JEROME COUNTY	ID	LPV	0	100	0	100	1	99.9936

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV200 Avail
LWS	LEWISTON-NEZ PERCE COUNTY	ID	LPV200	0	100	0	100	0	100
MAN	NAMPA MUNICIPAL	ID	LPV	0	100	0	100	1	99.9936
MYL	MC CALL MUNICIPALCIPAL	ID	LPV	0	100	0	100	0	100
PIH	POCATELLO RGNL	ID	LPV200	0	100	0	100	1	99.9974
TWF	JOSLIN FIELD-MAGIC VALLEY RGNL	ID	LPV200	0	100	0	100	1	99.9928
U76	MOUNTAIN HOME MUNICIPAL	ID	LPV	0	100	0	100	1	99.9932
3LF	LITCHFIELD MUNICIPAL	IL	LPV	0	100	0	100	0	100
3MY	MOUNT HAWLEY AUXILIARY	IL	LPV	0	100	0	100	0	100
AJG	MOUNT CARMEL MUNICIPAL	IL	LPV	0	100	0	100	0	100
ALN	ST LOUIS RGNL	IL	LPV200	0	100	0	100	0	100
ARR	AURORA MUNICIPAL	IL	LPV200	0	100	0	100	0	100
BLV	SCOTT AFB/MIDAMERICA	IL	LPV200	0	100	0	100	0	100
BMI	CENTRAL IL REGL ARPT AT BLOOMINGTON-NORMAL	IL	LPV	0	100	0	100	0	100
C15	PEKIN MUNICIPAL	IL	LPV	0	100	0	100	0	100
C73	DIXON MUNICIPAL-CHARLES R. WALGREEN FLD	IL	LPV	0	100	0	100	0	100
CMI	UNIVERSITY OF ILLINOIS-WILLARD	IL	LPV200	0	100	0	100	0	100
CPS	ST LOUIS DOWNTOWN	IL	LPV200	0	100	0	100	0	100
CUL	CARMI MUNICIPAL	IL	LP	0	100	0	100	0	100
DEC	DECATUR	IL	LPV200	0	100	0	100	0	100
DKB	DE KALB TAYLOR MUNICIPAL	IL	LPV	0	100	0	100	0	100
DNV	VERMILION COUNTY	IL	LPV	0	100	0	100	0	100
DPA	DUPAGE	IL	LPV200	0	100	0	100	0	100
ENL	CENTRALIA MUNICIPAL	IL	LPV	0	100	0	100	0	100
FEP	ALBERTUS	IL	LPV	0	100	0	100	0	100
FOA	FLORA MUNICIPAL	IL	LPV	0	100	0	100	0	100
GBG	GALESBURG MUNICIPAL	IL	LPV200	0	100	0	100	0	100
HSB	HARRISBURG-RALEIGH	IL	LPV	0	100	0	100	0	100
I63	MOUNT STERLING MUNICIPAL	IL	LPV	0	100	0	100	0	100
IGQ	LANSING MUNICIPAL	IL	LPV	0	100	0	100	0	100
IKK	GREATER KANKAKEE	IL	LPV	0	100	0	100	0	100
LOT	LEWIS UNIVERSITY	IL	LPV200	0	100	0	100	0	100
LWV	LAWRENCEVILLE-VINCENNES INTL	IL	LPV200	0	100	0	100	0	100
MDW	CHICAGO MIDWAY INTL	IL	LPV	0	100	0	100	0	100
MLI	QUAD CITY INTL	IL	LPV200	0	100	0	100	0	100
MTO	COLES COUNTY MEMORIAL	IL	LPV	0	100	0	100	0	100
MVN	MOUNT VERNON	IL	LPV	0	100	0	100	0	100
MWA	WILLIAMSON COUNTY RGNL	IL	LPV200	0	100	0	100	0	100
ORD	CHICAGO-O'HARE INTL	IL	LPV200	0	100	0	100	0	100
PIA	GREATER PEORIA RGNL	IL	LPV	0	100	0	100	0	100
PNT	PONTIAC MUNICIPAL	IL	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	LPV200 Avail
PWK	CHICAGO EXECUTIVE	IL	LPV	0	100	0	100	0	100
RFD	CHICAGO/ROCKFORD INTL	IL	LPV200	0	100	0	100	0	100
RPJ	ROCHELLE MUNICIPAL-KORITZ FIELD	IL	LPV200	0	100	0	100	0	100
RSV	ROBINSON MUNICIPAL	IL	LPV	0	100	0	100	0	100
SAR	SPARTA COMMUNICIPALTY-HUNTER FIELD	IL	LPV	0	100	0	100	0	100
SFY	TRI-TOWNSHIP	IL	LP	0	100	0	100	0	100
SPI	ABRAHAM LINCOLN CAPITAL	IL	LPV	0	100	0	100	0	100
SQI	WHITESIDE COUNTY-JOS J BITTORF FLD	IL	LPV	0	100	0	100	0	100
UGN	WAUKEGAN RGNL	IL	LPV	0	100	0	100	0	100
UIN	QUINCY RGNL-BALDWIN FIELD	IL	LPV200	0	100	0	100	0	100
4I7	PUTNAM COUNTY	IN	LPV	0	100	0	100	0	100
AID	ANDERSON MUNICIPAL-DARLINGTON FIELD	IN	LPV	0	100	0	100	0	100
ASW	WARSAW MUNICIPALCIPAL	IN	LPV	0	100	0	100	0	100
BAK	COLUMBUS MUNICIPAL	IN	LPV	0	100	0	100	0	100
BFR	VIRGIL I GRISSOM MUNICIPAL	IN	LP	0	100	0	100	0	100
BMG	MONROE COUNTY	IN	LPV200	0	100	0	100	0	100
CEV	METTEL FIELD	IN	LPV	0	100	0	100	0	100
EKM	ELKHART MUNICIPAL	IN	LPV	0	100	0	100	0	100
EVV	EVANSVILLE RGNL	IN	LPV200	0	100	0	100	0	100
EYE	EAGLE CREEK AIRPARK	IN	LPV	0	100	0	100	0	100
FRH	FRENCH LICK MUNICIPAL	IN	LPV	0	100	0	100	0	100
FWA	FORT WAYNE INTL	IN	LPV200	0	100	0	100	0	100
GEZ	SHELBYVILLE MUNICIPAL	IN	LPV	0	100	0	100	0	100
GGP	LOGANSPORT/CASS COUNTY	IN	LPV200	0	100	0	100	0	100
GSH	GOSHEN MUNICIPAL	IN	LPV	0	100	0	100	0	100
GWB	DE KALB COUNTY	IN	LPV	0	100	0	100	0	100
GYY	GARY/CHICAGO INTL	IN	LPV200	0	100	0	100	0	100
HFY	GREENWOOD MUNICIPAL	IN	LPV	0	100	0	100	0	100
HNB	HUNTINGBURG	IN	LPV	0	100	0	100	0	100
HUF	TERRE HAUTE INTL-HULMAN FIELD	IN	LPV200	0	100	0	100	0	100
I22	RANDOLPH COUNTY	IN	LPV	0	100	0	100	0	100
IMS	MADISON MUNICIPAL	IN	LPV	0	100	0	100	0	100
IND	INDIANAPOLIS INTL	IN	LPV	0	100	0	100	0	100
JVY	CLARK RGNL	IN	LPV200	0	100	0	100	0	100
LAF	PURDUE UNIVERSITY	IN	LPV	0	100	0	100	0	100
MCX	WHITE COUNTY	IN	LP	0	100	0	100	0	100
MIE	DELAWARE COUNTY-JOHNSON FIELD	IN	LPV	0	100	0	100	0	100
MQJ	MOUNT COMFORT	IN	LPV	0	100	0	100	0	100
MZZ	MARION MUNICIPAL	IN	LPV	0	100	0	100	0	100
OKK	KOKOMO MUNICIPAL	IN	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	LPV200 Avail
OVO	NORTH VERNON	IN	LPV	0	100	0	100	0	100
OXI	STARKE COUNTY	IN	LPV	0	100	0	100	0	100
PLD	PORTLAND MUNICIPAL	IN	LPV	0	100	0	100	0	100
RCR	FULTON COUNTY	IN	LPV	0	100	0	100	0	100
RID	RICHMOND MUNICIPAL	IN	LPV200	0	100	0	100	0	100
RZL	JASPER COUNTY	IN	LPV	0	100	0	100	0	100
SBN	SOUTH BEND RGNL	IN	LPV	0	100	0	100	0	100
SER	FREEMAN MUNICIPAL	IN	LPV	0	100	0	100	0	100
SMD	SMITH FIELD	IN	LPV	0	100	0	100	0	100
TEL	PERRY COUNTY MUNICIPAL	IN	LP	0	100	0	100	0	100
TYQ	INDIANAPOLIS EXECUTIVE	IN	LPV	0	100	0	100	0	100
VPZ	PORTER COUNTY MUNICIPAL	IN	LPV	0	100	0	100	0	100
3AU	AUGUSTA MUNICIPAL	KS	LP	0	100	0	100	0	100
3K3	SYRACUSE-HAMILTON COUNTY MUNICIPALCIPAL	KS	LPV	0	100	0	100	0	100
AAO	COLONEL JAMES JABARA	KS	LPV	0	100	0	100	0	100
ADT	ATWOOD-RAWLINS COUNTY CITY-COUNTY	KS	LPV	0	100	0	100	0	100
ANY	ANTHONY MUNICIPAL	KS	LP	0	100	0	100	0	100
CBK	SHALZ FIELD	KS	LPV	0	100	0	100	0	100
CNK	BLOSSER MUNICIPAL	KS	LP	0	100	0	100	0	100
DDC	DODGE CITY RGNL	KS	LPV	0	100	0	100	0	100
EGT	WELLINGTON MUNICIPAL	KS	LPV	0	100	0	100	0	100
EHA	ELKHART-MORTON COUNTY	KS	LPV	0	100	0	100	0	100
EMP	EMPORIA MUNICIPAL	KS	LPV	0	100	0	100	0	100
EWK	NEWTON-CITY-COUNTY	KS	LPV	0	100	0	100	0	100
FOE	FORBES FIELD	KS	LPV	0	100	0	100	0	100
FSK	FORT SCOTT MUNICIPAL	KS	LPV	0	100	0	100	0	100
GBD	GREAT BEND MUNICIPAL	KS	LPV200	0	100	0	100	0	100
GCK	GARDEN CITY RGNL	KS	LPV	0	100	0	100	0	100
GLD	RENNER FLD/GOODLAND MUNICIPAL/	KS	LPV200	0	100	0	100	1	99.9996
HQG	HUGOTON MUNICIPAL	KS	LPV	0	100	0	100	0	100
HUT	HUTCHINSON MUNICIPAL	KS	LPV	0	100	0	100	0	100
HYS	HAYS RGNL	KS	LPV200	0	100	0	100	0	100
ICT	WICHITA MID-CONTINENT	KS	LPV200	0	100	0	100	0	100
IDP	INDEPENDENCE MUNICIPAL	KS	LPV	0	100	0	100	0	100
IXD	NEW CENTURY AIRCENTER	KS	LPV	0	100	0	100	0	100
K88	ALLEN COUNTY	KS	LPV	0	100	0	100	0	100
LBL	LIBERAL MID-AMERICA RGNL	KS	LPV	0	100	0	100	0	100
LQR	LARNED PAWNEE CO	KS	LPV	0	100	0	100	0	100
LWC	LAWRENCE MUNICIPAL	KS	LPV200	0	100	0	100	0	100
MHK	MANHATTAN RGNL	KS	LPV200	0	100	0	100	0	100
MPR	MCPHERSON	KS	LPV	0	100	0	100	0	100
MYZ	MARYSVILLE MUNICIPAL	KS	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	LPV200 Avail
NRN	NORTON MUNICIPAL	KS	LPV	0	100	0	100	0	100
OEL	OAKLEY MUNICIPAL	KS	LPV	0	100	0	100	0	100
OJC	JOHNSON COUNTY EXECUTIVE	KS	LPV	0	100	0	100	0	100
OWI	OTTAWA MUNICIPAL	KS	LP	0	100	0	100	0	100
PPF	TRI-CITY	KS	LPV	0	100	0	100	0	100
PTS	ATKINSON MUNICIPAL	KS	LPV	0	100	0	100	0	100
PTT	PRATT INDUSTRIAL	KS	LPV	0	100	0	100	0	100
RPB	BELLEVILLE MUNICIPAL	KS	LPV	0	100	0	100	0	100
RSL	RUSSELL MUNICIPAL	KS	LPV	0	100	0	100	0	100
SLN	SALINA MUNICIPAL	KS	LPV	0	100	0	100	0	100
TOP	PHILIP BILLARD MUNICIPAL	KS	LPV200	0	100	0	100	0	100
TQK	SCOTT CITY MUNICIPAL	KS	LPV	0	100	0	100	0	100
UKL	COFFEY COUNTY	KS	LPV	0	100	0	100	0	100
ULS	ULYSSES	KS	LPV	0	100	0	100	0	100
27K	GEORGETOWN SCOTT CO-MARSHALL FLD	KY	LPV200	0	100	0	100	0	100
2I0	MADISONVILLE MUNICIPAL	KY	LPV	0	100	0	100	0	100
6I2	LEBANON-SPRINGFIELD	KY	LP	0	100	0	100	0	100
AAS	TAYLOR COUNTY	KY	LP	0	100	0	100	0	100
BRY	SAMUELS FIELD	KY	LPV	0	100	0	100	0	100
BWG	BOWLING GREEN-WARREN CTY RGNL	KY	LPV	0	100	0	100	0	100
BYL	WILLIAMSBURG-WHITLEY COUNTY	KY	LPV	0	100	0	100	0	100
CEY	KYLE-OAKLEY FIELD	KY	LPV	0	100	0	100	0	100
CPF	WENDELL H FORD	KY	LPV200	0	100	0	100	0	100
CVG	CINCINNATI/NORTHERN KENTUCKY INTL	KY	LPV200	0	100	0	100	0	100
DVK	STUART POWELL FIELD	KY	LPV	0	100	0	100	0	100
DWU	ASHLAND RGNL	KY	LP	0	100	0	100	0	100
EHR	HENDERSON CITY-COUNTY	KY	LPV	0	100	0	100	0	100
EKX	ADDINGTON FIELD	KY	LPV	0	100	0	100	0	100
FGX	FLEMING-MASON	KY	LPV	0	100	0	100	0	100
GLW	GLASGOW MUNICIPAL	KY	LPV	0	100	0	100	0	100
HVC	HOPKINSVILLE-CHRISTIAN COUNTY	KY	LPV	0	100	0	100	0	100
I39	MADISON	KY	LPV200	0	100	0	100	0	100
KY8	HANCOCK CO-RON LEWIS FIELD	KY	LPV	0	100	0	100	0	100
LEX	BLUE GRASS	KY	LPV	0	100	0	100	0	100
LOU	BOWMAN FIELD	KY	LPV	0	100	0	100	0	100
LOZ	LONDON-CORBIN ARPT-MAGEE FLD	KY	LPV	0	100	0	100	0	100
M21	MUHLENBERG COUNTY	KY	LP	0	100	0	100	0	100
OWB	OWENSBORO-DAVIESS COUNTY	KY	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	LPV200 Avail
PAH	BARKLEY RGNL	KY	LPV	0	100	0	100	0	100
SDF	LOUISVILLE INTL-STANDIFORD FLD	KY	LPV200	0	100	0	100	0	100
SME	LAKE CUMBERLAND RGNL	KY	LPV	0	100	0	100	0	100
TWT	STURGIS MUNICIPAL	KY	LPV	0	100	0	100	0	100
TZV	TOMPKINSVILLE-MONROE COUNTY	KY	LPV	0	100	0	100	0	100
1L0	ST JOHN THE BAPTIST PARISH	LA	LPV	0	100	0	100	0	100
3R4	HART	LA	LPV	0	100	0	100	0	100
ACP	ALLEN PARISH	LA	LPV	0	100	0	100	0	100
AEX	ALEXANDRIA INTL	LA	LPV200	0	100	0	100	0	100
ARA	ACADIANA RGNL	LA	LPV	0	100	0	100	0	100
BQP	MOREHOUSE MEMORIAL	LA	LPV	0	100	0	100	0	100
BTR	BATON ROUGE METRO	LA	LPV200	0	100	0	100	0	100
BXA	GEORGE R CARR MEMORIAL AIR FIELD	LA	LPV	0	100	0	100	0	100
CWF	CHENNAULT INTL	LA	LPV200	0	100	0	100	0	100
DTN	SHREVEPORT DOWNTOWN	LA	LPV	0	100	0	100	0	100
ESF	ESLER RGNL	LA	LPV200	0	100	0	100	0	100
F88	JONESBORO	LA	LP	0	100	0	100	0	100
GAO	SOUTH LAFOURCHE LEONARD MILLER JR	LA	LPV	0	100	0	100	0	100
HDC	HAMMOND NORTHSHORE RGNL	LA	LPV200	0	100	0	100	0	100
HUM	HOUMA-TERREBONNE	LA	LPV200	0	100	0	100	0	100
HZR	FALSE RIVER RGNL	LA	LPV	0	100	0	100	0	100
IER	NATCHITOCHES RGNL	LA	LPV	0	100	0	100	0	100
IYA	ABBEVILLE CHRIS CRUSTA MEML	LA	LPV	0	100	0	100	0	100
L38	LOUISIANA RGNL	LA	LPV	0	100	0	100	0	100
L39	LEESVILLE	LA	LPV	0	100	0	100	0	100
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	0	100
MLU	MONROE RGNL	LA	LPV200	0	100	0	100	0	100
MSY	LOUIS ARMSTRONG NEW ORLEANS INTL	LA	LPV200	0	100	0	100	0	100
NEW	LAKEFRONT	LA	LPV	0	100	0	100	0	100
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	0	100
SHV	SHREVEPORT RGNL	LA	LPV200	0	100	0	100	0	100
SPH	SPRINGHILL	LA	LPV	0	100	0	100	0	100
TVR	VICKSBURG TALLULAH RGNL	LA	LPV	0	100	0	100	0	100
UXL	SOUTHLAND FIELD	LA	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	LPV200 Avail
3B0	SOUTHBRIDGE MUNICIPAL	MA	LPV	0	100	0	100	1	99.9947
ACK	NANTUCKET MEMORIAL	MA	LPV200	0	100	0	100	1	99.9913
BAF	BARNES MUNICIPAL	MA	LPV	0	100	0	100	1	99.9955
BED	LAURENCE G HANSCOM FLD	MA	LPV200	0	100	0	100	1	99.9928
BOS	GEN EDWARD LAWRENCE LOGAN INTL	MA	LPV200	0	100	0	100	1	99.9921
BVY	BEVERLY MUNICIPAL	MA	LPV	0	100	0	100	1	99.9917
EWB	NEW BEDFORD RGNL	MA	LP	0	100	0	100	1	99.9932
GBR	WALTER J KOLADZA	MA	LP	0	100	0	100	1	99.9962
HYA	BARNSTABLE MUNICIPAL-BOARDMAN/POLANDO FIELD	MA	LPV200	0	100	0	100	1	99.9917
LWM	LAWRENCE MUNICIPAL	MA	LPV200	0	100	0	100	1	99.9917
MVY	MARTHAS VINEYARD	MA	LPV200	0	100	0	100	1	99.9928
ORE	ORANGE MUNICIPAL	MA	LPV	0	100	0	100	1	99.9943
ORH	WORCESTER RGNL	MA	LPV200	0	100	0	100	1	99.9943
OWD	NORWOOD MEMORIAL	MA	LPV	0	100	0	100	1	99.9928
PYM	PLYMOUTH MUNICIPAL	MA	LPV200	0	100	0	100	1	99.9925
2G4	GARRETT COUNTY	MD	LPV	0	100	0	100	0	100
2W6	ST. MARY'S COUNTY RGNL	MD	LPV	0	100	0	100	1	99.9928
BWI	BALTIMORE/WASHINGTON INTL THURGOOD MARSHALL	MD	LPV200	0	100	0	100	1	99.9936
CBE	GREATER CUMBERLAND RGNL	MD	LP	0	100	0	100	0	100
DMW	CARROLL COUNTY REGNL/JACK B POAGE FIELD	MD	LPV200	0	100	0	100	1	99.997
ESN	EASTON/NEWNAM FIELD	MD	LPV	0	100	0	100	1	99.9913
FDK	FREDERICK MUNICIPAL	MD	LPV	0	100	0	100	1	99.9989
GAI	MONTGOMERY COUNTY AIRPARK	MD	LPV	0	100	0	100	1	99.9974
HGR	HAGERSTOWN RGNL-RICHARD A HENSON FIELD	MD	LPV200	0	100	0	100	0	100
MTN	MARTIN STATE	MD	LPV	0	100	0	100	1	99.9928
OXB	OCEAN CITY MUNICIPAL	MD	LPV	0	100	0	100	1	99.9826
SBY	SALISBURY-OCEAN CITY WICOMICO RGNL	MD	LPV200	0	100	0	100	1	99.9838
1B0	DEXTER RGNL	ME	LP	0	100	0	100	1	99.9883
81B	OXFORD COUNTY RGNL	ME	LP	0	100	0	100	1	99.9894
AUG	AUGUSTA STATE	ME	LPV200	0	100	0	100	1	99.9883
BGR	BANGOR INTL	ME	LPV	0	100	0	100	1	99.9883
BHB	HANCOCK COUNTY-BAR HARBOR	ME	LPV200	0	100	0	100	1	99.9879
BXM	BRUNSWICK EXECUTIVE	ME	LPV	0	100	0	100	1	99.9883
FVE	NORTHERN AROOSTOOK RGNL	ME	LPV	0	100	0	100	1	99.9894
HUL	HOULTON INTL	ME	LP	0	100	0	100	1	99.9891
LEW	AUBURN/LEWISTON MUNICIPAL	ME	LPV200	0	100	0	100	1	99.9891
MLT	MILLINOCKET MUNICIPAL	ME	LPV	0	100	0	100	1	99.9883

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV200 Avail
PQI	NORTHERN MAINE RGNL ARPT AT PRESQUE IS	ME	LPV200	0	100	0	100	1	99.9891
PWM	PORTLAND INTL JETPORT	ME	LPV200	0	100	0	100	1	99.9898
RKD	KNOX COUNTY RGNL	ME	LPV	0	100	0	100	1	99.9879
SFM	SANFORD RGNL	ME	LPV200	0	100	0	100	1	99.9906
WVL	WATERVILLE ROBERT LAFLEUR	ME	LPV200	0	100	0	100	1	99.9883
77G	MARLETTE	MI	LPV	0	100	0	100	0	100
9D9	HASTINGS	MI	LP	0	100	0	100	0	100
ACB	ANTRIM COUNTY	MI	LPV	0	100	0	100	0	100
ADG	LENAWEE COUNTY	MI	LPV	0	100	0	100	0	100
AMN	GRATIOT COMMUNICIPALTY	MI	LPV	0	100	0	100	0	100
ANJ	SAULT STE MARIE MUNICIPAL - SANDERSON FIELD	MI	LPV	0	100	0	100	1	99.9996
APN	ALPENA COUNTY RGNL	MI	LPV	0	100	0	100	0	100
ARB	ANN ARBOR MUNICIPAL	MI	LPV	0	100	0	100	0	100
AZO	KALAMAZOO/BATTLE CREEK INTL	MI	LPV	0	100	0	100	0	100
BAX	HURON COUNTY MEMORIAL	MI	LPV	0	100	0	100	0	100
BEH	SOUTHWEST MICHIGAN RGNL	MI	LPV200	0	100	0	100	0	100
BIV	TULIP CITY	MI	LPV	0	100	0	100	0	100
BTL	W K KELLOGG	MI	LPV200	0	100	0	100	0	100
CAD	WEXFORD COUNTY	MI	LPV200	0	100	0	100	0	100
CIU	CHIPPEWA COUNTY INTL	MI	LPV	0	100	0	100	0	100
CMX	HOUGHTON COUNTY MEMORIAL	MI	LPV	0	100	0	100	0	100
CVX	CHARLEVOIX MUNICIPAL	MI	LPV	0	100	0	100	0	100
DET	COLEMAN A YOUNG MUNICIPAL	MI	LPV	0	100	0	100	0	100
DTW	DETROIT METROPOLITAN WAYNE COUNTY	MI	LPV200	0	100	0	100	0	100
ERY	LUCE COUNTY	MI	LPV	0	100	0	100	0	100
ESC	DELTA COUNTY	MI	LPV200	0	100	0	100	0	100
FFX	FREMONT MUNICIPAL	MI	LPV	0	100	0	100	0	100
FNT	BISHOP INTL	MI	LPV200	0	100	0	100	0	100
GDW	GLADWIN ZETTEL MEMORIAL	MI	LP	0	100	0	100	0	100
GLR	GAYLORD RGNL	MI	LPV	0	100	0	100	0	100
GRR	GERALD R. FORD INTL	MI	LPV200	0	100	0	100	0	100
HYX	SAGINAW COUNTY H.W. BROWNE	MI	LPV	0	100	0	100	0	100
IKW	JACK BARSTOW	MI	LPV	0	100	0	100	0	100
IMT	FORD	MI	LPV	0	100	0	100	0	100
IRS	KIRSCH MUNICIPAL	MI	LPV	0	100	0	100	0	100
ISQ	SCHOOLCRAFT COUNTY	MI	LP	0	100	0	100	0	100
IWD	GOGEBIC-IRON COUNTY	MI	LPV200	0	100	0	100	0	100
JXN	JACKSON COUNTY-REYNOLDS FIELD	MI	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	LPV200 Avail
LAN	CAPITAL REGION INTL	MI	LPV200	0	100	0	100	0	100
LDM	MASON COUNTY	MI	LPV	0	100	0	100	0	100
MBS	MBS INTL	MI	LPV200	0	100	0	100	0	100
MCD	MACKINAC ISLAND	MI	LPV	0	100	0	100	0	100
MKG	MUSKEGON COUNTY	MI	LPV200	0	100	0	100	0	100
MNM	MENOMINEE-MARINETTE TWIN COUNTY	MI	LPV200	0	100	0	100	0	100
MOP	MOUNT PLEASANT MUNICIPAL	MI	LPV	0	100	0	100	0	100
N98	BOYNE CITY MUNICIPAL	MI	LP	0	100	0	100	0	100
OEB	BRANCH COUNTY MEMORIAL	MI	LPV	0	100	0	100	0	100
OSC	OSCODA-WURTSMITH	MI	LPV200	0	100	0	100	0	100
OZW	LIVINGSTON COUNTY SPENCER J. HARDY	MI	LPV200	0	100	0	100	0	100
PHN	SAINT CLAIR COUNTY INTL	MI	LPV200	0	100	0	100	0	100
PLN	PELLSTON RGNL AIRPORT OF EMMET COUNTY	MI	LPV200	0	100	0	100	0	100
PTK	OAKLAND COUNTY INTL	MI	LPV200	0	100	0	100	0	100
RNP	OWOSSO COMMUNICIPALTY	MI	LPV	0	100	0	100	0	100
SAW	SAWYER INTL	MI	LPV200	0	100	0	100	0	100
SLH	CHEBOYGAN COUNTY	MI	LPV	0	100	0	100	0	100
TTF	CUSTER	MI	LPV	0	100	0	100	0	100
TVC	CHERRY CAPITAL	MI	LPV	0	100	0	100	0	100
YIP	WILLOW RUN	MI	LPV	0	100	0	100	0	100
AEL	ALBERT LEA MUNICIPAL	MN	LPV	0	100	0	100	0	100
ANE	ANOKA COUNTY-BLAINE ARPT (JANES FIELD)	MN	LPV	0	100	0	100	0	100
AUM	AUSTIN MUNICIPAL	MN	LPV200	0	100	0	100	0	100
AXN	CHANDLER FIELD	MN	LPV	0	100	0	100	0	100
BBB	BENSON MUNICIPAL	MN	LPV	0	100	0	100	0	100
BDE	BAUDETTE INTL	MN	LPV	0	100	0	100	0	100
BDH	WILLMAR MUNICIPAL-JOHN L RICE FIELD	MN	LPV	0	100	0	100	0	100
BJI	BEMIDJI RGNL	MN	LPV200	0	100	0	100	0	100
BRD	BRAINERD LAKES RGNL	MN	LPV200	0	100	0	100	0	100
CBG	CAMBRIDGE MUNICIPAL	MN	LPV	0	100	0	100	0	100
CKC	GRAND MARAIS/COOK COUNTY	MN	LPV	0	100	0	100	0	100
CKN	CROOKSTON MUNICIPAL/KIRKWOOD FLD	MN	LPV	0	100	0	100	0	100
CNB	MYERS FIELD	MN	LPV	0	100	0	100	0	100
COQ	CLOQUET CARLTON COUNTY	MN	LPV	0	100	0	100	0	100
CQM	COOK MUNICIPAL	MN	LP	0	100	0	100	0	100
D39	SAUK CENTRE MUNICIPAL	MN	LP	0	100	0	100	0	100
DLH	DULUTH INTL	MN	LPV200	0	100	0	100	0	100
DTL	DETROIT LAKES-WETHING FIELD	MN	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	LPV200 Avail
DXX	LAC QUI PARLE COUNTY	MN	LPV200	0	100	0	100	0	100
ELO	ELY MUNICIPAL	MN	LPV200	0	100	0	100	0	100
ETH	WHEATON MUNICIPAL	MN	LP	0	100	0	100	0	100
FCM	FLYING CLOUD	MN	LPV200	0	100	0	100	0	100
FFM	FERGUS FALLS MUNICIPAL-EINAR MICKELSON FLD	MN	LPV200	0	100	0	100	0	100
FKA	FILLMORE COUNTY	MN	LPV	0	100	0	100	0	100
FOZ	BIGFORK MUNICIPALCIPAL	MN	LP	0	100	0	100	0	100
FRM	FAIRMONT MUNICIPAL	MN	LPV	0	100	0	100	0	100
FSE	FOSSTON MUNICIPAL	MN	LP	0	100	0	100	0	100
GPZ	GRAND RAPIDS/ITASCA CO-GORDON NEWSTROM	MN	LPV	0	100	0	100	0	100
HCD	HUTCHINSON MUNICIPAL-BUTLER FIELD	MN	LPV	0	100	0	100	0	100
HIB	RANGE RGNL	MN	LPV200	0	100	0	100	0	100
INL	FALLS INTL	MN	LPV	0	100	0	100	0	100
JKJ	MOORHEAD MUNICIPAL	MN	LPV	0	100	0	100	0	100
LJF	LITCHFIELD MUNICIPAL	MN	LPV	0	100	0	100	0	100
LVN	AIRLAKE	MN	LPV200	0	100	0	100	0	100
LXL	LITTLE FALLS/MORRISON CO-LINDBERGH FLD	MN	LPV	0	100	0	100	0	100
LYV	QUENTIN AANENSON FIELD	MN	LPV200	0	100	0	100	0	100
MGG	MAPLE LAKE MUNICIPAL	MN	LP	0	100	0	100	0	100
MKT	MANKATO RGNL	MN	LPV200	0	100	0	100	0	100
MML	SOUTHWEST MINNESOTA RGNL MARSHALL/RYAN FIELD	MN	LPV200	0	100	0	100	0	100
MSP	MINNEAPOLIS-ST PAUL INTL/WOLD-CHAMBERLAIN	MN	LPV200	0	100	0	100	0	100
MZH	MOOSE LAKE CARLTON COUNTY	MN	LPV	0	100	0	100	0	100
ONA	WINONA MUNICIPAL-MAX CONRAD FLD	MN	LPV	0	100	0	100	0	100
ORB	ORR RGNL	MN	LP	0	100	0	100	0	100
OTG	WORTHINGTON MUNICIPAL	MN	LPV200	0	100	0	100	0	100
OWA	OWATONNA DEGNER RNGL	MN	LPV200	0	100	0	100	0	100
PKD	PARK RAPIDS MUNICIPAL-KONSHOK FIELD	MN	LPV200	0	100	0	100	0	100
RGK	RED WING RGNL	MN	LPV200	0	100	0	100	0	100
ROS	RUSH CITY RGNL	MN	LPV	0	100	0	100	0	100
ROX	ROSEAU MUNICIPAL/RUDY BILLBERG FIELD	MN	LPV	0	100	0	100	0	100
RRT	WARROAD INTL MEMORIAL	MN	LPV	0	100	0	100	0	100
RST	ROCHESTER INTL	MN	LPV200	0	100	0	100	0	100
RWF	REDWOOD FALLS MUNICIPAL	MN	LPV	0	100	0	100	0	100
SAZ	STAPLES MUNICIPAL	MN	LPV	0	100	0	100	0	100
STC	ST CLOUD RGNL	MN	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	LPV200 Avail
STP	ST PAUL DOWNTOWN HOLMAN FLD	MN	LPV	0	100	0	100	0	100
TVF	THIEF RIVER FALLS	MN	LPV	0	100	0	100	0	100
TWM	RICHARD B HELGESON	MN	LPV	0	100	0	100	0	100
VVV	ORTONVILLE MUNICIPAL-MARTINSON FIELD	MN	LP	0	100	0	100	0	100
1H0	CREVE COEUR	MO	LPV	0	100	0	100	0	100
2H2	JERRY SUMNERS SR AURORA MUNICIPALCIPAL	MO	LP	0	100	0	100	0	100
6M6	LEWIS COUNTY RGNL	MO	LPV	0	100	0	100	0	100
8WC	WASHINGTON COUNTY AIRPORT	MO	LPV	0	100	0	100	0	100
AIZ	LEE C FINE MEMORIAL	MO	LPV	0	100	0	100	0	100
BBG	BRANSON	MO	LPV200	0	100	0	100	0	100
BUM	BUTLER MEMORIAL	MO	LPV	0	100	0	100	0	100
CGI	CAPE GIRARDEAU RGNL	MO	LPV	0	100	0	100	0	100
CHT	CHILLICOTHE MUNICIPAL	MO	LPV	0	100	0	100	0	100
COU	COLUMBIA RGNL	MO	LPV	0	100	0	100	0	100
DMO	SEDALIA MEMORIAL	MO	LPV	0	100	0	100	0	100
DXE	DEXTER MUNICIPAL	MO	LPV	0	100	0	100	0	100
EIW	COUNTY MEMORIAL	MO	LPV	0	100	0	100	0	100
EOS	NEOSHO HUGH ROBINSON	MO	LPV	0	100	0	100	0	100
EVU	NORTHWEST MISSOURI RGNL	MO	LPV	0	100	0	100	0	100
EZZ	CAMERON MEMORIAL	MO	LPV	0	100	0	100	0	100
FAM	FARMINGTON RGNL	MO	LPV	0	100	0	100	0	100
FTT	ELTON HENSLEY MEMORIAL	MO	LPV	0	100	0	100	0	100
FWB	BRANSON WEST MUNICIPAL-EMERSON FIELD	MO	LPV200	0	100	0	100	0	100
FYG	WASHINGTON RGNL	MO	LPV	0	100	0	100	0	100
GPH	MIDWEST NATIONAL AIR CENTER	MO	LPV	0	100	0	100	0	100
H79	ELDON MODEL AIRPARK	MO	LP	0	100	0	100	0	100
HAE	HANNIBAL RGNL	MO	LPV	0	100	0	100	0	100
HFJ	MONETT MUNICIPAL	MO	LPV	0	100	0	100	0	100
HIG	HIGGINSVILLE INDUSTRIAL MUNICIPAL	MO	LPV	0	100	0	100	0	100
IRK	KIRKSVILLE RGNL	MO	LPV200	0	100	0	100	0	100
JEF	JEFFERSON CITY MEMORIAL	MO	LPV	0	100	0	100	0	100
JLN	JOPLIN RGNL	MO	LPV	0	100	0	100	0	100
K02	PERRYVILLE MUNICIPAL	MO	LPV	0	100	0	100	0	100
K57	GOULD PETERSON MUNICIPAL	MO	LPV	0	100	0	100	0	100
LRY	LAWRENCE SMITH MEMORIAL	MO	LPV	0	100	0	100	0	100
LXT	LEE'S SUMMIT MUNICIPAL	MO	LPV	0	100	0	100	0	100
M05	CARUTHERSVILLE MEM	MO	LPV	0	100	0	100	0	100
M17	BOLIVAR MUNICIPAL	MO	LPV	0	100	0	100	0	100
M48	HOUSTON MEMORIAL	MO	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	LPV200 Avail
MAW	MALDEN MUNICIPAL	MO	LPV	0	100	0	100	0	100
MBY	OMAR N BRADLEY	MO	LPV	0	100	0	100	0	100
MCI	KANSAS CITY INTL	MO	LPV	0	100	0	100	0	100
MHL	MARSHALL MEML MUNICIPAL	MO	LPV	0	100	0	100	0	100
MKC	CHARLES B. WHEELER DOWNTOWN	MO	LPV200	0	100	0	100	0	100
MO8	NORTH CENTRAL MISSOURI RGNL	MO	LPV	0	100	0	100	0	100
MYJ	MEXICO MEMORIAL	MO	LPV	0	100	0	100	0	100
NVD	NEVADA MUNICIPAL	MO	LPV200	0	100	0	100	0	100
PLK	M. GRAHAM CLARK DOWNTOWN	MO	LPV200	0	100	0	100	0	100
POF	POPLAR BLUFF MUNICIPAL	MO	LPV	0	100	0	100	0	100
RCM	SKYHAVEN	MO	LPV	0	100	0	100	0	100
SGF	SPRINGFIELD-BRANSON NATIONAL	MO	LPV	0	100	0	100	0	100
SIK	SIKESTON MEML MUNICIPAL	MO	LPV	0	100	0	100	0	100
STJ	ROSECRANS MEMORIAL	MO	LPV200	0	100	0	100	0	100
STL	LAMBERT-ST LOUIS INTL	MO	LPV200	0	100	0	100	0	100
SUS	SPIRIT OF ST LOUIS	MO	LPV200	0	100	0	100	0	100
TBN	WAYNESVILLE-ST ROBERT RGNL/FORNEY AAF	MO	LPV	0	100	0	100	0	100
TRX	TRENTON MUNICIPAL	MO	LPV	0	100	0	100	0	100
UBX	CUBA MUNICIPAL	MO	LPV	0	100	0	100	0	100
UNO	WEST PLAINS MUNICIPAL	MO	LPV	0	100	0	100	0	100
UUV	SULLIVAN RGNL	MO	LPV	0	100	0	100	0	100
VER	JESSE VIERTEL MEMORIAL	MO	LPV	0	100	0	100	0	100
VIH	ROLLA NATIONAL	MO	LPV200	0	100	0	100	0	100
87I	YAZOO COUNTY	MS	LPV	0	100	0	100	0	100
CKM	FLETCHER FIELD	MS	LPV	0	100	0	100	0	100
CRX	ROSCOE TURNER	MS	LPV200	0	100	0	100	0	100
GLH	MID DELTA RGNL	MS	LPV200	0	100	0	100	0	100
GNF	GRENADA MUNICIPAL	MS	LPV	0	100	0	100	0	100
GPT	GULFPORT-BILOXI INTL	MS	LPV200	0	100	0	100	0	100
GTR	GOLDEN TRIANGLE RGNL	MS	LPV200	0	100	0	100	0	100
GWO	GREENWOOD-LEFLORE	MS	LPV	0	100	0	100	0	100
HBG	HATTIESBURG BOBBY L. CHAIN MUNICIPAL	MS	LPV200	0	100	0	100	0	100
HEZ	HARDY-ANDERS FLD NATCHEZ-ADAMS COUNTY	MS	LPV	0	100	0	100	0	100
HKS	HAWKINS FIELD	MS	LPV200	0	100	0	100	0	100
HSA	STENNIS INTL	MS	LPV200	0	100	0	100	0	100
IDL	INDIANOLA MUNICIPAL	MS	LPV	0	100	0	100	0	100
JAN	JACKSON-EVERS INTL	MS	LPV200	0	100	0	100	0	100
JVW	JOHN BELL WILLIAMS	MS	LPV200	0	100	0	100	0	100
LUL	HESLER-NOBLE FIELD	MS	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	LPV200 Avail
M40	MONROE COUNTY	MS	LPV	0	100	0	100	0	100
M43	PRENTISS-JEFFERSON DAVIS COUNTY	MS	LPV	0	100	0	100	0	100
MCB	MC COMB-PIKE COUNTY-JOHN E LEWIS FIELD	MS	LPV	0	100	0	100	0	100
MEI	KEY FIELD	MS	LPV200	0	100	0	100	0	100
MJD	PICAYUNE MUNICIPAL	MS	LPV	0	100	0	100	0	100
MPE	PHILADELPHIA MUNICIPAL	MS	LPV	0	100	0	100	0	100
OLV	OLIVE BRANCH	MS	LPV	0	100	0	100	0	100
PIB	HATTIESBURG-LAUREL RGNL	MS	LPV200	0	100	0	100	0	100
PQL	TRENT LOTT INTL	MS	LPV200	0	100	0	100	0	100
RNV	CLEVELAND MUNICIPAL	MS	LPV	0	100	0	100	0	100
STF	GEORGE M BRYAN	MS	LPV200	0	100	0	100	0	100
TUP	TUPELO RGNL	MS	LPV200	0	100	0	100	0	100
UOX	UNIVERSITY-OXFORD	MS	LPV	0	100	0	100	0	100
UTA	TUNICA MUNICIPAL	MS	LPV200	0	100	0	100	0	100
1S3	TILLITT FIELD	MT	LPV	0	100	0	100	0	100
4U6	CIRCLE TOWN COUNTY	MT	LPV	0	100	0	100	0	100
6S8	LAUREL MUNICIPALCIPAL	MT	LPV	0	100	0	100	0	100
7S0	RONAN	MT	LPV	0	100	0	100	0	100
BIL	BILLINGS LOGAN INTL	MT	LPV200	0	100	0	100	0	100
BTM	BERT MOONEY	MT	LPV	0	100	0	100	0	100
BZN	GALLATIN FIELD	MT	LPV	0	100	0	100	0	100
GDV	DAWSON COMMUNICIPALTY	MT	LPV	0	100	0	100	0	100
GGW	WOKAL FIELD/GLASGOW INTL	MT	LPV200	0	100	0	100	0	100
GPI	GLACIER PARK INTL	MT	LPV	0	100	0	100	0	100
GTF	GREAT FALLS INTL	MT	LPV200	0	100	0	100	0	100
HLN	HELENA RGNL	MT	LPV	0	100	0	100	0	100
HVR	HAVRE CITY-COUNTY	MT	LPV	0	100	0	100	0	100
LVM	MISSION FIELD	MT	LP	0	100	0	100	0	100
LWT	LEWISTOWN MUNICIPAL	MT	LPV200	0	100	0	100	0	100
M75	MALTA	MT	LP	0	100	0	100	0	100
MLS	FRANK WILEY FIELD	MT	LPV	0	100	0	100	0	100
MSO	MISSOULA INTL	MT	LPV	0	100	0	100	0	100
OLF	L M CLAYTON	MT	LPV200	0	100	0	100	0	100
PWD	SHER-WOOD	MT	LPV200	0	100	0	100	1	99.9947
RPX	ROUNDUP	MT	LPV	0	100	0	100	0	100
SBX	SHELBY	MT	LP	0	100	0	100	0	100
SDY	SIDNEY-RICHLAND MUNICIPAL	MT	LPV	0	100	0	100	0	100
WYS	YELLOWSTONE	MT	LPV200	0	100	0	100	0	100
CYCL	CHARLO	NB	LPV	0	100	0	100	1	99.9925
CYQM	MONCTON INTL	NB	LPV	0	100	0	100	1	99.9887
AFP	ANSON COUNTY-JEFF CLOUD FLD	NC	LPV	0	100	0	100	0	100
AKH	GASTONIA MUNICIPAL	NC	LPV	0	100	0	100	0	100
AVL	ASHEVILLE RGNL	NC	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	LPV200 Avail
BUY	BURLINGTON-ALAMANCE RGNL	NC	LPV200	0	100	0	100	0	100
CLT	CHARLOTTE/DOUGLAS INTL	NC	LPV200	0	100	0	100	0	100
CTZ	CLINTON-SAMPSON COUNTY	NC	LPV200	0	100	0	100	0	100
DPL	DUPLIN COUNTY	NC	LPV200	0	100	0	100	1	99.9981
ECG	ELIZABETH CITY CG AIR STATION/RGNL	NC	LPV	0	100	0	100	1	99.9891
EDE	NORTHEASTERN RGNL	NC	LPV200	0	100	0	100	1	99.9913
EHO	SHELBY-CLEVELAND COUNTY RGNL	NC	LPV	0	100	0	100	0	100
EQY	MONROE RGNL	NC	LPV	0	100	0	100	0	100
EWN	COASTAL CAROLINA RGNL	NC	LPV	0	100	0	100	1	99.9917
EXX	DAVIDSON COUNTY	NC	LPV	0	100	0	100	0	100
EYF	CURTIS L BROWN JR FIELD	NC	LPV200	0	100	0	100	0	100
FAY	FAYETTEVILLE RGNL/GRANNIS FIELD	NC	LPV200	0	100	0	100	0	100
FQD	RUTHERFORD CO/MARCHMAN FIELD	NC	LPV	0	100	0	100	0	100
GSO	PIEDMONT TRIAD INTL	NC	LPV200	0	100	0	100	0	100
GWW	WAYNE EXECUTIVE JETPORT	NC	LPV200	0	100	0	100	1	99.9981
HKY	HICKORY RGNL	NC	LPV200	0	100	0	100	0	100
HNZ	HENDERSON-OXFORD	NC	LPV	0	100	0	100	0	100
HRJ	HARNETT COUNTY	NC	LPV	0	100	0	100	0	100
ILM	WILMINGTON INTL	NC	LPV200	0	100	0	100	1	99.9955
INT	SMITH REYNOLDS	NC	LPV200	0	100	0	100	0	100
IPJ	LINCOLNTON-LINCOLN COUNTY RGNL	NC	LPV	0	100	0	100	0	100
ISO	KINSTON REGL JETPORT AT STALLINGS FLD	NC	LPV	0	100	0	100	1	99.9962
IXA	HALIFAX-NORTHAMPTON RGNL	NC	LPV200	0	100	0	100	1	99.9981
JNX	JOHNSTON COUNTY	NC	LPV200	0	100	0	100	0	100
JQF	CONCORD RGNL	NC	LPV	0	100	0	100	0	100
LBT	LUMBERTON MUNICIPAL	NC	LPV	0	100	0	100	0	100
LHZ	TRIANGLE NORTH EXECUTIVE	NC	LPV200	0	100	0	100	0	100
MEB	LAURINBURG-MAXTON	NC	LPV200	0	100	0	100	0	100
MQI	DARE COUNTY RGNL	NC	LPV	0	100	0	100	1	99.9864
MRH	MICHAEL J. SMITH FIELD	NC	LPV	0	100	0	100	1	99.9894
MRN	FOOTHILLS RGNL	NC	LPV200	0	100	0	100	0	100
MWK	MOUNT AIRY/SURRY COUNTY	NC	LPV	0	100	0	100	0	100
OAJ	ALBERT J ELLIS	NC	LPV200	0	100	0	100	1	99.9955
OCW	WARREN FIELD	NC	LPV	0	100	0	100	1	99.9928
ONX	CURRITUCK COUNTY RGNL	NC	LPV	0	100	0	100	1	99.9879
PGV	PITT-GREENVILLE	NC	LPV	0	100	0	100	1	99.9955
PMZ	PLYMOUTH MUNICIPAL	NC	LP	0	100	0	100	1	99.9913
RCZ	RICHMOND COUNTY	NC	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	LPV200 Avail
RDU	RALEIGH-DURHAM INTL	NC	LPV200	0	100	0	100	0	100
RUQ	ROWAN COUNTY	NC	LPV200	0	100	0	100	0	100
RWI	ROCKY MOUNT-WILSON RGNL	NC	LPV	0	100	0	100	1	99.9985
SOP	MOORE COUNTY	NC	LPV	0	100	0	100	0	100
SUT	CAPE FEAR RGNL JETPORT/HOWIE FRANKLIN FLD	NC	LPV	0	100	0	100	1	99.9958
SVH	STATESVILLE RGNL	NC	LPV	0	100	0	100	0	100
TDF	PERSON COUNTY	NC	LPV200	0	100	0	100	0	100
TTA	RALEIGH EXEC AT SANFORD-LEE COUNTY	NC	LPV200	0	100	0	100	0	100
VUJ	STANLY COUNTY	NC	LPV200	0	100	0	100	0	100
2C8	CAVALIER MUNICIPAL	ND	LPV	0	100	0	100	0	100
5N8	CASSELTON ROBERT MILLER RGNL	ND	LPV	0	100	0	100	0	100
BAC	BARNES COUNTY MUNICIPAL	ND	LPV	0	100	0	100	0	100
BIS	BISMARCK MUNICIPAL	ND	LPV200	0	100	0	100	0	100
BWP	HARRY STERN	ND	LPV	0	100	0	100	0	100
D09	BOTTINEAU MUNICIPAL	ND	LPV	0	100	0	100	0	100
D55	ROBERTSON FIELD	ND	LPV	0	100	0	100	0	100
D60	TIOGA MUNICIPAL	ND	LPV	0	100	0	100	0	100
DIK	DICKINSON-THEODORE ROOSEVELT RGNL	ND	LPV200	0	100	0	100	0	100
DVL	DEVILS LAKE RGNL	ND	LPV	0	100	0	100	0	100
FAR	HECTOR INTL	ND	LPV200	0	100	0	100	0	100
GAF	HUTSON FIELD	ND	LPV	0	100	0	100	0	100
GFK	GRAND FORKS INTL	ND	LPV	0	100	0	100	0	100
GWR	GWINNER-ROGER MELROE FIELD	ND	LPV200	0	100	0	100	0	100
HZE	MERCER COUNTY RGNL	ND	LPV	0	100	0	100	0	100
ISN	SLOULIN FLD INTL	ND	LPV200	0	100	0	100	0	100
JMS	JAMESTOWN RGNL	ND	LPV200	0	100	0	100	0	100
MOT	MINOT INTL	ND	LPV	0	100	0	100	0	100
RUG	RUGBY MUNICIPAL	ND	LP	0	100	0	100	0	100
S25	WATFORD CITY MUNICIPAL	ND	LPV	0	100	0	100	0	100
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	0	100
6K3	CREIGHTON MUNICIPAL	NE	LPV	0	100	0	100	0	100
7V7	RED CLOUD MUNICIPAL	NE	LPV	0	100	0	100	0	100
8V2	STUART-ATKINSON MUNICIPAL	NE	LPV	0	100	0	100	0	100
93Y	DAVID CITY MUNICIPAL	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	LPV200 Avail
9V5	MODISETT	NE	LPV	0	100	0	100	0	100
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	0	100
ANW	AINSWORTH MUNICIPAL	NE	LPV200	0	100	0	100	0	100
AUH	AURORA MUNICIPALCIPAL - AL POTTER FIELD	NE	LPV	0	100	0	100	0	100
BBW	BROKEN BOW MUNICIPAL	NE	LPV	0	100	0	100	0	100
BFF	WESTERN NEB. RGNL/WILLIAM B. HEILIG FIELD	NE	LPV	0	100	0	100	0	100
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	0	100
CEK	CRETE MUNICIPALCIPAL	NE	LPV	0	100	0	100	0	100
CZD	COZAD MUNICIPAL	NE	LPV	0	100	0	100	0	100
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	0	100
GGF	GRANT MUNICIPAL	NE	LPV	0	100	0	100	0	100
GRI	CENTRAL NEBRASKA RGNL	NE	LPV	0	100	0	100	0	100
GRN	GORDON MUNICIPAL	NE	LPV	0	100	0	100	0	100
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	0	100
IML	IMPERIAL MUNICIPAL	NE	LPV	0	100	0	100	0	100
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	0	100
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	0	100
MCK	MCCOOK RGNL	NE	LPV	0	100	0	100	0	100
MLE	MILLARD	NE	LPV	0	100	0	100	0	100
ODX	EVELYN SHARP FIELD	NE	LPV	0	100	0	100	0	100
OFK	KARL STEFAN MEMORIAL	NE	LPV	0	100	0	100	0	100
OGA	SEARLE FIELD	NE	LPV	0	100	0	100	0	100
OKS	GARDEN COUNTY	NE	LPV	0	100	0	100	0	100
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	0	100
PMV	PLATTSMOUTH MUNICIPAL	NE	LPV	0	100	0	100	0	100
RBE	ROCK COUNTY	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	LPV200 Avail
SNY	SIDNEY MUNICIPAL/LLOYD W. CARR FIELD	NE	LPV	0	100	0	100	0	100
SWT	SEWARD MUNICIPALCIPAL	NE	LPV	0	100	0	100	0	100
TIF	THOMAS COUNTY	NE	LPV	0	100	0	100	0	100
VTN	MILLER FIELD	NE	LPV	0	100	0	100	0	100
ASH	BOIRE FLD	NH	LPV	0	100	0	100	1	99.9928
CON	CONCORD MUNICIPAL	NH	LPV	0	100	0	100	1	99.9917
DAW	SKYHAVEN	NH	LPV	0	100	0	100	1	99.9909
EEN	DILLANT-HOPKINS	NH	LPV	0	100	0	100	1	99.994
HIE	MOUNT WASHINGTON RGNL	NH	LPV	0	100	0	100	1	99.9902
LCI	LACONIA MUNICIPAL	NH	LPV	0	100	0	100	1	99.9913
LEB	LEBANON MUNICIPAL	NH	LPV	0	100	0	100	1	99.9925
MHT	MANCHESTER	NH	LPV200	0	100	0	100	1	99.9921
PSM	PORTSMOUTH INTL AT PEASE	NH	LPV200	0	100	0	100	1	99.9909
47N	CENTRAL JERSEY RGNL	NJ	LP	0	100	0	100	1	99.9936
4N1	GREENWOOD LAKE	NJ	LP	0	100	0	100	2	99.9966
ACY	ATLANTIC CITY INTL	NJ	LPV200	0	100	0	100	1	99.9875
CDW	ESSEX COUNTY	NJ	LPV	0	100	0	100	2	99.9962
EWR	NEWARK LIBERTY INTL	NJ	LPV	0	100	0	100	2	99.9962
MIV	MILLVILLE MUNICIPAL	NJ	LPV200	0	100	0	100	1	99.9841
MMU	MORRISTOWN MUNICIPAL	NJ	LPV200	0	100	0	100	2	99.9955
N14	FLYING W	NJ	LPV	0	100	0	100	1	99.9891
N40	SKY MANOR	NJ	LP	0	100	0	100	1	99.9913
TEB	TETERBORO	NJ	LPV	0	100	0	100	2	99.997
TTN	TRENTON MERCER	NJ	LPV200	0	100	0	100	1	99.9909
VAY	SOUTH JERSEY RGNL	NJ	LP	0	100	0	100	1	99.9887
WWD	CAPE MAY COUNTY	NJ	LPV	0	100	0	100	1	99.9826
CYDF	DEER LAKE	NL	LPV	0	100	0	100	6	99.8943
CNM	CAVERN CITY AIR TRML	NM	LP	0	100	0	100	0	100
CVN	CLOVIS MUNICIPAL	NM	LPV	0	100	0	100	0	100
DMN	DEMING MUNICIPAL	NM	LPV	0	100	0	100	0	100
FMN	FOUR CORNERS RGNL	NM	LPV200	0	100	0	100	0	100
HOB	LEA COUNTY RGNL	NM	LPV200	0	100	0	100	0	100
LAM	LOS ALAMOS	NM	LP	0	100	0	100	0	100
ONM	SOCORRO MUNICIPAL	NM	LP	0	100	0	100	0	100
ROW	ROSWELL INTL AIR CENTER	NM	LPV	0	100	0	100	0	100
SRR	SIERRA BLANCA RGNL	NM	LPV200	0	100	0	100	0	100
SVC	GRANT COUNTY	NM	LPV	0	100	0	100	0	100
CYHZ	HALIFAX / STANFIELD INTL	NS	LPV	0	100	0	100	1	99.9849
CYEV	INUVIK	NT	LPV	0	100	0	100	32	99.8275
ELY	ELY ARPT-YELLAND FLD	NV	LPV	0	100	0	100	1	99.9925
LAS	MC CARRAN INTL	NV	LPV	0	100	0	100	0	100
RNO	RENO/TAHOE INTL	NV	LPV	0	100	0	100	2	99.977
RTS	RENO/STEAD	NV	LPV	0	100	0	100	2	99.9758
TPH	TONOPAH	NV	LP	0	100	0	100	1	99.9921

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV200 Avail
WMC	WINNEMUCCA MUNICIPAL	NV	LPV	0	100	0	100	1	99.9834
06N	RANDALL	NY	LP	0	100	0	100	2	99.9974
1B1	COLUMBIA COUNTY	NY	LPV	0	100	0	100	1	99.997
44N	SKY ACRES	NY	LPV	0	100	0	100	1	99.9977
4B6	TICONDEROGA MUNICIPAL	NY	LPV	0	100	0	100	1	99.994
5B2	SARATOGA COUNTY	NY	LPV	0	100	0	100	1	99.9958
5G0	LE ROY	NY	LP	0	100	0	100	1	99.9966
9G0	BUFFALO AIRFIELD	NY	LP	0	100	0	100	1	99.9996
ALB	ALBANY INTL	NY	LPV200	0	100	0	100	1	99.9958
ART	WATERTOWN INTL	NY	LPV200	0	100	0	100	1	99.997
BGM	GREATER BINGHAMTON/EDWIN A LINK FIELD	NY	LPV200	0	100	0	100	2	99.9943
BUF	BUFFALO NIAGARA INTL	NY	LPV200	0	100	0	100	1	99.9996
D38	CANANDAIGUA	NY	LP	0	100	0	100	1	99.9955
ELM	ELMIRA/CORNING RGNL	NY	LPV200	0	100	0	100	1	99.9936
ELZ	WELLSVILLE MUNICIPAL ARPT	NY	LPV	0	100	0	100	1	99.9981
FOK	FRANCIS S. GABRESKI	NY	LPV200	0	100	0	100	1	99.997
FRG	REPUBLIC	NY	LPV200	0	100	0	100	1	99.9985
FZY	OSWEGO COUNTY	NY	LPV	0	100	0	100	2	99.9966
GFL	FLOYD BENNETT MEMORIAL	NY	LPV	0	100	0	100	1	99.9951
GVQ	BATAVIA	NY	LPV200	0	100	0	100	1	99.9977
HPN	WESTCHESTER COUNTY	NY	LPV	0	100	0	100	1	99.9985
HTF	HORNELL MUNICIPAL	NY	LPV	0	100	0	100	1	99.9958
HTO	EAST HAMPTON	NY	LPV	0	100	0	100	1	99.9962
HWV	BROOKHAVEN	NY	LPV	0	100	0	100	1	99.9974
IAG	NIAGARA FALLS INTL	NY	LPV	0	100	0	100	0	100
ISP	LONG ISLAND MAC ARTHUR	NY	LPV200	0	100	0	100	1	99.9981
ITH	ITHACA TOMPKINS RGNL	NY	LPV	0	100	0	100	2	99.9932
JFK	JOHN F KENNEDY INTL	NY	LPV	0	100	0	100	2	99.9974
JHW	CHAUTAUQUA COUNTY/JAMESTOWN	NY	LPV200	0	100	0	100	0	100
K09	PISECO	NY	LP	0	100	0	100	1	99.9958
LGA	LA GUARDIA	NY	LPV200	0	100	0	100	2	99.9974
MAL	MALONE-DUFORT	NY	LPV	0	100	0	100	1	99.9932
MGJ	ORANGE COUNTY	NY	LPV	0	100	0	100	2	99.9977
MSS	MASSENA INTL-RICHARDS FIELD	NY	LPV	0	100	0	100	1	99.9936
MSV	SULLIVAN COUNTY INTL	NY	LPV	0	100	0	100	2	99.9966
N66	ONEONTA MUNICIPAL	NY	LPV	0	100	0	100	2	99.9977
NY0	FULTON COUNTY	NY	LPV	0	100	0	100	1	99.9962
OGS	OGDENSBURG INTL	NY	LPV	0	100	0	100	1	99.9955
OLE	CATTARAUGUS COUNTY-OLEAN	NY	LPV	0	100	0	100	1	99.9996
PBG	PLATTSBURGH INTL	NY	LPV	0	100	0	100	1	99.9925
PEO	PENN YAN	NY	LPV	0	100	0	100	1	99.9943

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV200 Avail
POU	DUTCHESS COUNTY	NY	LPV	0	100	0	100	1	99.9981
RME	GRIFFISS INTL	NY	LPV200	0	100	0	100	1	99.9977
ROC	GREATER ROCHESTER INTL	NY	LPV200	0	100	0	100	1	99.9962
SCH	SCHENECTADY COUNTY	NY	LPV200	0	100	0	100	1	99.9962
SDC	WILLIAMSON-SODUS	NY	LPV	0	100	0	100	2	99.9958
SLK	ADIRONDACK RGNL	NY	LPV200	0	100	0	100	1	99.9943
SWF	STEWART INTL	NY	LPV200	0	100	0	100	1	99.9985
SYR	SYRACUSE HANCOCK INTL	NY	LPV200	0	100	0	100	2	99.997
VGC	HAMILTON MUNICIPAL	NY	LPV	0	100	0	100	2	99.9977
0G6	WILLIAMS COUNTY	OH	LPV	0	100	0	100	0	100
16G	SENECA COUNTY	OH	LPV	0	100	0	100	0	100
1G0	WOOD COUNTY	OH	LPV	0	100	0	100	0	100
1G3	KENT STATE UNIV	OH	LPV	0	100	0	100	0	100
4I3	KNOX COUNTY	OH	LPV200	0	100	0	100	0	100
6G5	BARNESVILLE-BRADFIELD	OH	LP	0	100	0	100	0	100
AOH	LIMA ALLEN COUNTY	OH	LPV200	0	100	0	100	0	100
AXV	NEIL ARMSTRONG	OH	LPV	0	100	0	100	0	100
BJJ	WAYNE COUNTY	OH	LPV	0	100	0	100	0	100
BKL	BROOKHAVEN	OH	LPV	0	100	0	100	0	100
CAK	AKRON-CANTON RGNL	OH	LPV200	0	100	0	100	0	100
CGF	CUYAHOGA COUNTY	OH	LPV	0	100	0	100	0	100
CLE	CLEVELAND-HOPKINS INTL	OH	LPV200	0	100	0	100	0	100
CMH	PORT COLUMBUS INTL	OH	LPV200	0	100	0	100	0	100
CQA	LAKEFIELD	OH	LPV	0	100	0	100	0	100
CXY	CAPITAL CITY	OH	LPV	0	100	0	100	1	99.9947
DAY	JAMES M COX DAYTON INTL	OH	LPV200	0	100	0	100	0	100
DLZ	DELAWARE MUNICIPAL	OH	LPV	0	100	0	100	0	100
EDJ	BELLEFONTAINE RGNL	OH	LPV	0	100	0	100	0	100
FDY	FINDLAY	OH	LPV	0	100	0	100	0	100
FZI	FOSTORIA METROPOLITAN	OH	LPV	0	100	0	100	0	100
GQQ	GALION MUNICIPAL	OH	LP	0	100	0	100	0	100
HAO	BUTLER CO RGNL	OH	LPV	0	100	0	100	0	100
HZY	ASHTABULA COUNTY	OH	LPV	0	100	0	100	0	100
I19	GREENE COUNTY-LEWIS A JACKSON RGNL	OH	LPV	0	100	0	100	0	100
I66	CLINTON FIELD	OH	LPV	0	100	0	100	0	100
I68	LEBANON-WARREN COUNTY	OH	LPV	0	100	0	100	0	100
I69	CLERMONT COUNTY	OH	LP	0	100	0	100	0	100
I74	GRIMES FIELD	OH	LPV	0	100	0	100	0	100
ILN	AIRBORNE AIRPARK	OH	LPV200	0	100	0	100	0	100
LCK	RICKENBACKER INTL	OH	LPV200	0	100	0	100	0	100
LHQ	FAIRFIELD COUNTY	OH	LPV200	0	100	0	100	0	100
LNN	WILLOUGHBY	OH	LPV	0	100	0	100	0	100
LPR	LORAIN COUNTY RGNL	OH	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	LPV200 Avail
LUK	CINCINNATI MUNICIPAL AIRPORT-LUNKEN FIELD	OH	LPV	0	100	0	100	0	100
MFD	MANSFIELD LAHM RGNL	OH	LPV200	0	100	0	100	0	100
MGY	DAYTON-WRIGHT BROTHERS	OH	LPV	0	100	0	100	0	100
MNN	MARION MUNICIPAL	OH	LPV	0	100	0	100	0	100
MRT	UNION COUNTY	OH	LP	0	100	0	100	0	100
MWO	MIDDLETOWN REGIONAL/HOOK FIELD	OH	LPV	0	100	0	100	0	100
OSU	OHIO STATE UNIVERSITY	OH	LPV200	0	100	0	100	0	100
OWX	PUTNAM COUNTY	OH	LPV	0	100	0	100	0	100
OXD	MIAMI UNIVERSITY	OH	LPV	0	100	0	100	0	100
PCW	CARL R KELLER FIELD	OH	LPV	0	100	0	100	0	100
PHD	HARRY CLEVER FIELD	OH	LP	0	100	0	100	0	100
PMH	GREATER PORTSMOUTH RGNL	OH	LPV	0	100	0	100	0	100
RZT	ROSS COUNTY	OH	LPV	0	100	0	100	0	100
S24	SANDUSKY COUNTY RGNL	OH	LPV	0	100	0	100	0	100
SGH	SPRINGFIELD-BECKLEY MUNICIPAL	OH	LPV200	0	100	0	100	0	100
TDZ	TOLEDO EXECUTIVE	OH	LP	0	100	0	100	0	100
TOL	TOLEDO EXPRESS	OH	LPV200	0	100	0	100	0	100
TSO	CARROLL COUNTY-TOLSON	OH	LP	0	100	0	100	0	100
TZR	BOLTON FIELD	OH	LPV200	0	100	0	100	0	100
UNI	OHIO UNIVERSITY SNYDER FIELD	OH	LPV200	0	100	0	100	0	100
USE	FULTON COUNTY	OH	LPV	0	100	0	100	0	100
UYF	MADISON COUNTY	OH	LPV	0	100	0	100	0	100
YNG	YOUNGSTOWN/WARREN RGNL	OH	LPV	0	100	0	100	0	100
1F0	ARDMORE DOWNTOWN EXECUTIVE	OK	LP	0	100	0	100	0	100
80F	ANTLERS MUNICIPAL	OK	LPV	0	100	0	100	0	100
ADH	ADA MUNICIPAL	OK	LPV	0	100	0	100	0	100
ADM	ARDMORE MUNICIPAL	OK	LPV200	0	100	0	100	0	100
AXS	ALTUS/QUARTZ MOUNTAIN RGNL	OK	LPV	0	100	0	100	0	100
BKN	BLACKWELL-TONKAWA MUNICIPAL	OK	LPV	0	100	0	100	0	100
BVO	BARTLESVILLE MUNICIPAL	OK	LPV	0	100	0	100	0	100
CHK	CHICKASHA MUNICIPAL	OK	LPV200	0	100	0	100	0	100
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	0	100
DUC	HALLIBURTON FIELD	OK	LPV	0	100	0	100	0	100
ELK	ELK CITY RGNL BUSINESS	OK	LPV	0	100	0	100	0	100
F22	PERRY MUNICIPAL	OK	LPV	0	100	0	100	0	100
FDR	FREDERICK RGNL	OK	LPV200	0	100	0	100	0	100
GCM	CLAREMORE RGNL	OK	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	LPV200 Avail
GMJ	GROVE MUNICIPAL	OK	LPV	0	100	0	100	0	100
GOK	GUTHRIE-EDMOND RGNL	OK	LPV	0	100	0	100	0	100
GUY	GUYMON MUNICIPAL	OK	LPV	0	100	0	100	0	100
GZL	STIGLER RGNL	OK	LPV	0	100	0	100	0	100
HBR	HOBART MUNICIPAL	OK	LPV	0	100	0	100	0	100
HSD	SUNDANCE AIRPARK	OK	LPV	0	100	0	100	0	100
MKO	DAVIS FIELD	OK	LPV	0	100	0	100	0	100
MLC	MC ALESTER RGNL	OK	LPV	0	100	0	100	0	100
OKC	WILL ROGERS WORLD	OK	LPV200	0	100	0	100	0	100
OKM	OKMULGEE RGNL	OK	LPV	0	100	0	100	0	100
OUN	UNIVERSITY OF OKLAHOMA WESTHEIMER	OK	LPV200	0	100	0	100	0	100
OWP	WILLIAM R. POGUE MUNICIPAL	OK	LPV	0	100	0	100	0	100
PNC	PONCA CITY RGNL	OK	LPV	0	100	0	100	0	100
PVJ	PAULS VALLEY MUNICIPAL	OK	LPV200	0	100	0	100	0	100
PWA	WILEY POST	OK	LPV200	0	100	0	100	0	100
RCE	CLARENCE E. PAGE MUNICIPAL	OK	LPV	0	100	0	100	0	100
RVS	RICHARD LLOYD JONES JR	OK	LPV	0	100	0	100	0	100
SNL	SHAWNEE RGNL	OK	LPV200	0	100	0	100	0	100
SWO	STILLWATER RGNL	OK	LPV	0	100	0	100	0	100
TQH	TAHLEQUAH MUNICIPAL	OK	LPV	0	100	0	100	0	100
TUL	TULSA INTL	OK	LPV200	0	100	0	100	0	100
WDG	ENID WOODRING RGNL	OK	LPV200	0	100	0	100	0	100
WWR	WEST WOODWARD	OK	LPV	0	100	0	100	0	100
CNS7	KINCARDINE	ON	LPV	0	100	0	100	0	100
CYHD	DRYDEN REGIONAL	ON	LPV	0	100	0	100	1	99.9981
CYKF	KITCHENER / WATERLOO	ON	LPV	0	100	0	100	0	100
CYOW	OTTAWA / MACDONALDCARTIER INTL	ON	LPV	0	100	0	100	1	99.994
CYQT	THUNDER BAY	ON	LPV	0	100	0	100	1	99.9996
CYTS	TIMMINS / VICTOR M POWER	ON	LPV	0	100	0	100	1	99.9928
CYXL	SIOUX LOOKOUT	ON	LPV	0	100	0	100	1	99.9962
AST	ASTORIA RGNL	OR	LPV	0	100	0	100	0	100
BDN	BEND MUNICIPAL	OR	LPV	0	100	0	100	1	99.9928
CVO	CORVALLIS MUNICIPAL	OR	LPV200	0	100	0	100	0	100
EUG	MAHLON SWEET FIELD	OR	LPV200	0	100	0	100	0	100
GCD	GRANT CO RGNL/OGILVIE FIELD	OR	LPV	0	100	0	100	1	99.9928
HIO	PORTLAND-HILLSBORO	OR	LPV200	0	100	0	100	0	100
LGD	LA GRANDE/UNION COUNTY	OR	LPV	0	100	0	100	1	99.9989
LMT	KLAMATH FALLS	OR	LPV	0	100	0	100	2	99.9804
MMV	MCMINNVILLE MUNICIPAL	OR	LPV	0	100	0	100	0	100
ONO	ONTARIO MUNICIPAL	OR	LPV	0	100	0	100	1	99.9947
PDT	EASTERN OREGON RGNL AT PENDLETON	OR	LPV200	0	100	0	100	1	99.9996

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV200 Avail
PDX	PORTLAND INTL	OR	LPV200	0	100	0	100	0	100
RDM	ROBERTS FIELD	OR	LPV200	0	100	0	100	1	99.9932
S33	MADRAS MUNICIPALCIPAL	OR	LPV	0	100	0	100	1	99.9962
SLE	MCNARY FLD	OR	LPV200	0	100	0	100	0	100
SPB	SCAPPOOSE INDUSTRIAL AIRPARK	OR	LPV	0	100	0	100	0	100
UAO	AURORA STATE	OR	LPV	0	100	0	100	0	100
22N	JAKE ARNER MEMORIAL	PA	LP	0	100	0	100	1	99.9891
2G9	SOMERSET COUNTY	PA	LPV	0	100	0	100	0	100
8G2	CORRY-LAWRENCE	PA	LPV	0	100	0	100	0	100
8N8	DANVILLE	PA	LP	0	100	0	100	1	99.9917
9D4	DECK	PA	LPV	0	100	0	100	1	99.9898
ABE	LEHIGH VALLEY INTL	PA	LPV	0	100	0	100	1	99.9894
AFJ	WASHINGTON COUNTY	PA	LPV200	0	100	0	100	0	100
AGC	ALLEGHENY COUNTY	PA	LPV200	0	100	0	100	0	100
AOO	ALTOONA-BLAIR COUNTY	PA	LPV	0	100	0	100	0	100
AVP	WILKES-BARRE/SCRANTON INTL	PA	LPV	0	100	0	100	1	99.9917
AXQ	CLARION COUNTY	PA	LPV	0	100	0	100	0	100
BFD	BRADFORD RGNL	PA	LPV200	0	100	0	100	0	100
BTP	BUTLER COUNTY/K W SCHOLTER FLD	PA	LPV	0	100	0	100	0	100
BVI	BEAVER FALLS MUNICIPAL	PA	LPV	0	100	0	100	0	100
DUJ	DUBOIS RGNL	PA	LPV200	0	100	0	100	0	100
ERI	ERIE INTL/TOM RIDGE FIELD	PA	LPV	0	100	0	100	0	100
FIG	CLEARFIELD-LAWRENCE	PA	LPV	0	100	0	100	0	100
FKL	VENANGO RGNL	PA	LPV	0	100	0	100	0	100
FWQ	ROSTRAVER	PA	LPV	0	100	0	100	0	100
GKJ	PORT MEADVILLE	PA	LP	0	100	0	100	0	100
HMZ	BEDFORD COUNTY	PA	LPV	0	100	0	100	0	100
IPT	WILLIAMSPORT RGNL	PA	LPV	0	100	0	100	1	99.9936
JST	JOHN MURTHA JOHNSTOWN-CAMBRIA COUNTY	PA	LPV200	0	100	0	100	0	100
LBE	ARNOLD PALMER RGNL	PA	LPV	0	100	0	100	0	100
LNS	LANCASTER	PA	LPV	0	100	0	100	1	99.9898
LOM	WINGS FIELD	PA	LPV	0	100	0	100	1	99.9875
MDT	HARRISBURG INTL	PA	LPV	0	100	0	100	1	99.994
MPO	POCONO MOUNTAINS MUNICIPAL	PA	LPV	0	100	0	100	1	99.9925
MQS	CHESTER COUNTY G O CARLSON	PA	LPV	0	100	0	100	1	99.9883
N38	WELLSBORO JOHNSTON	PA	LP	0	100	0	100	1	99.9947
N79	NORTHUMBERLAND COUNTY	PA	LPV	0	100	0	100	1	99.9925
OYM	ST MARYS MUNICIPAL	PA	LPV	0	100	0	100	0	100
PHL	PHILADELPHIA INTL	PA	LPV	0	100	0	100	1	99.9864
PIT	PITTSBURGH INTL	PA	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	LPV200 Avail
PNE	NORTHEAST PHILADELPHIA	PA	LPV	0	100	0	100	1	99.9887
PSB	MID STATE	PA	LPV	0	100	0	100	0	100
RDG	READING RGNL/CARL A SPAATZ FLD	PA	LPV	0	100	0	100	1	99.9891
RVL	MIFFLIN COUNTY	PA	LPV	0	100	0	100	1	99.9996
THV	YORK	PA	LP	0	100	0	100	1	99.9947
UCP	NEW CASTLE MUNICIPAL	PA	LPV	0	100	0	100	0	100
UKT	QUAKERTOWN	PA	LP	0	100	0	100	1	99.9883
UNV	UNIVERSITY PARK	PA	LPV200	0	100	0	100	0	100
VVS	JOSEPH A. HARDY CONNELLSVILLE	PA	LPV200	0	100	0	100	0	100
WAY	GREENE COUNTY	PA	LPV	0	100	0	100	0	100
WBW	WILKES-BARRE WYOMING VALLEY	PA	LPV	0	100	0	100	1	99.9906
XLL	ALLENTOWN-QUEEN CITY MUNICIPAL	PA	LP	0	100	0	100	1	99.9887
ZER	SCHUYLKILL COUNTY/JOE ZERBEY	PA	LPV200	0	100	0	100	1	99.9902
CPN8	OPINACA	QC	LPV	0	100	0	100	1	99.9883
CSR3	VICTORIAVILLE	QC	LPV	0	100	0	100	1	99.9883
CTP9	KATTINIQ / DONALDSON	QC	LPV	0	100	0	100	9	99.8188
CYEY	AMOS	QC	LPV	0	100	0	100	1	99.9906
CYHU	MONTREAL / STHUBERT	QC	LPV	0	100	0	100	1	99.9913
CYIF	STAUGUSTIN	QC	LPV	0	100	0	100	5	99.9385
CYMX	MONTREAL (MIRABEL INTL)	QC	LPV	0	100	0	100	1	99.9917
CYQB	QUEBEC / JEAN LESAGE INTL	QC	LPV	0	100	0	100	1	99.9883
CYRI	RIVIEREDULOUP	QC	LPV	0	100	0	100	1	99.9883
CYRQ	TROISRIVIERES	QC	LPV	0	100	0	100	1	99.9891
CYVB	BONAVENTURE	QC	LPV	0	100	0	100	1	99.9932
CYVP	KUUJJUAQ	QC	LPV	0	100	0	100	6	99.8834
CYYY	MONTJOLI	QC	LPV	0	100	0	100	1	99.9902
BID	BLOCK ISLAND STATE	RI	LPV	0	100	0	100	1	99.9947
OQU	QUONSET STATE	RI	LPV	0	100	0	100	1	99.994
PVD	THEODORE FRANCIS GREEN STATE	RI	LPV200	0	100	0	100	1	99.994
6J0	LEXINGTON COUNTY AT PELION	SC	LPV	0	100	0	100	0	100
AIK	AIKEN MUNICIPAL	SC	LPV200	0	100	0	100	0	100
AND	ANDERSON RGNL	SC	LPV200	0	100	0	100	0	100
ARW	BEAUFORT COUNTY	SC	LPV200	0	100	0	100	0	100
BBP	MARLBORO COUNTY JETPORT-H E AVENT FIELD	SC	LPV	0	100	0	100	0	100
BNL	BARNWELL RGNL	SC	LPV	0	100	0	100	0	100
CAE	COLUMBIA METROPOLITAN	SC	LPV200	0	100	0	100	0	100
CDN	WOODWARD FIELD	SC	LPV	0	100	0	100	0	100
CEU	OCONEE COUNTY RGNL	SC	LPV200	0	100	0	100	0	100
CHS	CHARLESTON AFB/INTL	SC	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	LPV200 Avail
CRE	GRAND STRAND	SC	LPV200	0	100	0	100	1	99.9996
DCM	CHESTER CATAWBA RGNL	SC	LPV	0	100	0	100	0	100
DYB	SUMMERVILLE	SC	LPV200	0	100	0	100	0	100
FDW	FAIRFIELD COUNTY	SC	LPV	0	100	0	100	0	100
FLO	FLORENCE RGNL	SC	LPV	0	100	0	100	0	100
GGE	GEORGETOWN COUNTY	SC	LPV200	0	100	0	100	0	100
GMU	GREENVILLE DOWNTOWN	SC	LPV200	0	100	0	100	0	100
GSP	GREENVILLE-SPARTANBURG INTL - ROGER MILLIKEN	SC	LPV200	0	100	0	100	0	100
GYH	DONALDSON CENTER	SC	LPV	0	100	0	100	0	100
HYW	CONWAY-HORRY COUNTY	SC	LPV	0	100	0	100	0	100
JZI	CHARLESTON EXECUTIVE	SC	LPV200	0	100	0	100	0	100
LKR	LANCASTER COUNTY-MC WHIRTER FIELD	SC	LPV200	0	100	0	100	0	100
LQK	PICKENS COUNTY	SC	LPV	0	100	0	100	0	100
LRO	MT PLEASANT RGNL-FAISON FIELD	SC	LPV	0	100	0	100	0	100
MKS	BERKELEY COUNTY	SC	LPV	0	100	0	100	0	100
MYR	MYRTLE BEACH INTL	SC	LPV200	0	100	0	100	0	100
OGB	ORANGEBURG MUNICIPAL	SC	LPV200	0	100	0	100	0	100
RBW	LOWCOUNTRY RGNL	SC	LPV200	0	100	0	100	0	100
SMS	SUMTER	SC	LPV200	0	100	0	100	0	100
SPA	SPARTANBURG DOWNTOWN MEMORIAL	SC	LPV200	0	100	0	100	0	100
UDG	DARLINGTON COUNTY JETPORT	SC	LPV	0	100	0	100	0	100
UZA	ROCK HILL/YORK CO/BRYANT FIELD	SC	LPV200	0	100	0	100	0	100
0D8	GETTYSBURG MUNICIPAL	SD	LPV200	0	100	0	100	0	100
49B	STURGIS MUNICIPAL	SD	LPV	0	100	0	100	0	100
9D1	GREGORY MUNICIPAL - FLYNN FIELD	SD	LPV	0	100	0	100	0	100
ABR	ABERDEEN RGNL	SD	LPV200	0	100	0	100	0	100
ATY	WATERTOWN RGNL	SD	LPV200	0	100	0	100	0	100
BKX	BROOKINGS RGNL	SD	LPV	0	100	0	100	0	100
EFC	BELLE FOURCHE MUNICIPAL	SD	LPV	0	100	0	100	0	100
FSD	JOE FOSS FIELD	SD	LPV200	0	100	0	100	0	100
HON	HURON RGNL	SD	LPV200	0	100	0	100	0	100
HSR	HOT SPRINGS MUNICIPAL	SD	LP	0	100	0	100	0	100
ICR	WINNER RGNL	SD	LPV	0	100	0	100	0	100
MBG	MOBRIDGE MUNICIPAL	SD	LPV	0	100	0	100	0	100
MDS	MADISON MUNICIPAL	SD	LPV	0	100	0	100	0	100
MHE	MITCHELL MUNICIPAL	SD	LPV	0	100	0	100	0	100
MKA	MILLER MUNICIPAL	SD	LPV200	0	100	0	100	0	100
PIR	PIERRE RGNL	SD	LPV	0	100	0	100	0	100
RAP	RAPID CITY RGNL	SD	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	LPV200 Avail
SPF	BLACK HILLS-CLYDE ICE FIELD	SD	LPV	0	100	0	100	0	100
VMR	HAROLD DAVIDSON FIELD	SD	LPV	0	100	0	100	0	100
YKN	CHAN GURNEY MUNICIPAL	SD	LPV200	0	100	0	100	0	100
CKQ8	MCARTHUR RIVER	SK	LPV	0	100	1	99.9974	5	99.9747
CYKJ	KEY LAKE	SK	LPV	0	100	1	99.9962	4	99.9766
0A3	SMITHVILLE MUNICIPAL	TN	LP	0	100	0	100	0	100
0M3	JOHN A BAKER	TN	LP	0	100	0	100	0	100
0M4	BENTON COUNTY	TN	LPV	0	100	0	100	0	100
0M5	HUMPHREYS COUNTY	TN	LP	0	100	0	100	0	100
1A3	MARTIN CAMPBELL FIELD	TN	LP	0	100	0	100	0	100
1M5	PORTLAND MUNICIPAL	TN	LPV	0	100	0	100	0	100
2A0	MARK ANTON	TN	LPV	0	100	0	100	0	100
2M8	CHARLES W. BAKER	TN	LPV	0	100	0	100	0	100
3M7	LAFAYETTE MUNICIPAL	TN	LPV	0	100	0	100	0	100
BGF	WINCHESTER MUNICIPAL	TN	LPV	0	100	0	100	0	100
BNA	NASHVILLE INTL	TN	LPV200	0	100	0	100	0	100
CHA	LOVELL FIELD	TN	LPV200	0	100	0	100	0	100
CKV	OUTLAW FIELD	TN	LPV	0	100	0	100	0	100
CSV	CROSSVILLE MEMORIAL-WHITSON FIELD	TN	LPV200	0	100	0	100	0	100
DYR	DYERSBURG RGNL	TN	LPV	0	100	0	100	0	100
FYE	FAYETTE CO	TN	LPV	0	100	0	100	0	100
FYM	FAYETTEVILLE MUNICIPAL	TN	LPV	0	100	0	100	0	100
GKT	GATLINBURG-PIGEON FORGE	TN	LPV	0	100	0	100	0	100
GZS	ABERNATHY FIELD	TN	LPV	0	100	0	100	0	100
HZD	CARROLL COUNTY	TN	LPV	0	100	0	100	0	100
JWN	JOHN C. TUNE	TN	LPV	0	100	0	100	0	100
LUG	ELLINGTON	TN	LPV	0	100	0	100	0	100
M01	GENERAL DEWITT SPAIN	TN	LPV	0	100	0	100	0	100
M33	SUMNER COUNTY RGNL	TN	LP	0	100	0	100	0	100
M54	LEBANON MUNICIPAL	TN	LPV	0	100	0	100	0	100
M91	SPRINGFIELD ROBERTSON COUNTY	TN	LPV	0	100	0	100	0	100
MBT	MURFREESBORO MUNICIPAL	TN	LPV	0	100	0	100	0	100
MEM	MEMPHIS INTL	TN	LPV200	0	100	0	100	0	100
MKL	MC KELLAR-SIPES RGNL	TN	LPV200	0	100	0	100	0	100
MMI	MCMINN COUNTY	TN	LPV	0	100	0	100	0	100
MOR	MOORE-MURRELL	TN	LPV	0	100	0	100	0	100
MQY	SMYRNA	TN	LPV	0	100	0	100	0	100
MRC	MAURY COUNTY	TN	LPV	0	100	0	100	0	100
NQA	MILLINGTON RGNL JETPORT	TN	LPV	0	100	0	100	0	100
PHT	HENRY COUNTY	TN	LPV200	0	100	0	100	0	100
PVE	BEECH RIVER RGNL	TN	LPV	0	100	0	100	0	100
RKW	ROCKWOOD MUNICIPAL	TN	LPV	0	100	0	100	0	100
SNH	SAVANNAH-HARDIN COUNTY	TN	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	LPV200 Avail
SRB	UPPER CUMBERLAND RGNL	TN	LPV200	0	100	0	100	0	100
SYI	BOMAR FIELD-SHELBYVILLE MUNICIPAL	TN	LPV	0	100	0	100	0	100
SZY	ROBERT SIBLEY	TN	LPV	0	100	0	100	0	100
THA	TULLAHOMA RGNL/WM NORTHERN FLD	TN	LPV	0	100	0	100	0	100
TRI	TRI-CITIES RGNL TN/VA	TN	LPV200	0	100	0	100	0	100
TYS	MCGHEE-TYSON	TN	LPV	0	100	0	100	0	100
UCY	EVERETT-STEWART RGNL	TN	LPV200	0	100	0	100	0	100
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	0	100
3T5	FAYETTE RGNL AIR CENTER	TX	LPV	0	100	0	100	0	100
45R	HAWTHORNE FIELD	TX	LP	0	100	0	100	0	100
50R	LOCKHART MUNICIPAL	TX	LPV	0	100	0	100	0	100
5C1	BOERNE STAGE FIELD	TX	LP	0	100	0	100	0	100
5T9	MAVERICK COUNTY MEMORIAL INTL	TX	LPV	0	100	0	100	0	100
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	0	100
AFW	FORT WORTH ALLIANCE	TX	LPV200	0	100	0	100	0	100
ALI	ALICE INTL	TX	LPV	0	100	0	100	0	100
AMA	RICK HUSBAND AMARILLO INTL	TX	LPV200	0	100	0	100	0	100
ARM	WHARTON RGNL	TX	LPV	0	100	0	100	0	100
ASL	HARRISON COUNTY	TX	LPV	0	100	0	100	0	100
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	0	100
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	0	100
BWD	BROWNWOOD RGNL	TX	LPV	0	100	0	100	0	100
BYY	BAY CITY MUNICIPAL	TX	LPV	0	100	0	100	0	100
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

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV200 Avail
CRP	CORPUS CHRISTI INTL	TX	LPV200	0	100	0	100	0	100
CXO	LONE STAR EXECUTIVE	TX	LPV200	0	100	0	100	0	100
DAL	DALLAS LOVE FIELD	TX	LPV200	0	100	0	100	0	100
DFW	DALLAS-FT WORTH INTL	TX	LPV200	0	100	0	100	0	100
DKR	HOUSTON COUNTY	TX	LP	0	100	0	100	0	100
DRT	DEL RIO INTL	TX	LPV	0	100	0	100	0	100
DTO	DENTON MUNICIPAL	TX	LPV	0	100	0	100	0	100
DUX	MOORE COUNTY	TX	LPV200	0	100	0	100	0	100
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
E38	ALPINE-CASPARIS MUNICIPALCIPAL	TX	LP	0	100	0	100	0	100
EBG	EDINBURG INTL	TX	LPV	0	100	0	100	0	100
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	0	100
ERV	KERRVILLE MUNICIPAL/LOUIS SCHREINER FLD	TX	LPV	0	100	0	100	0	100
ETN	EASTLAND MUNICIPAL	TX	LP	0	100	0	100	0	100
F00	JONES FIELD	TX	LPV	0	100	0	100	0	100
F05	WILBARGER COUNTY	TX	LPV	0	100	0	100	0	100
FST	FT. STOCKTON-PECOS COUNTY	TX	LPV	0	100	0	100	0	100
FTW	FORT WORTH MEACHAM INTL	TX	LPV200	0	100	0	100	0	100
FWS	FORT WORTH SPINKS	TX	LPV200	0	100	0	100	0	100
GDJ	GRANBURY RGNL	TX	LPV	0	100	0	100	0	100
GGG	EAST TEXAS RGNL	TX	LPV	0	100	0	100	0	100
GKY	ARLINGTON MUNICIPAL	TX	LPV200	0	100	0	100	0	100
GLE	GAINESVILLE MUNICIPAL	TX	LPV	0	100	0	100	0	100
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	0	100
GYI	NORTH TEXAS RGNL/PERRIN FIELD	TX	LPV200	0	100	0	100	0	100
HBV	JIM HOGG COUNTY	TX	LPV	0	100	0	100	0	100
HDO	HONDO MUNICIPAL	TX	LPV	0	100	0	100	0	100
HOU	WILLIAM P HOBBY	TX	LPV200	0	100	0	100	0	100
HQZ	MESQUITE METRO	TX	LPV	0	100	0	100	0	100
HRL	VALLEY INTL	TX	LPV200	0	100	0	100	0	100
HRX	HEREFORD MUNICIPAL	TX	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	LPV200 Avail
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	TX	LPV200	0	100	0	100	0	100
IKG	KLEBERG COUNTY	TX	LPV	0	100	0	100	0	100
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	0	100
JWY	MID-WAY RGNL	TX	LPV200	0	100	0	100	0	100
LBB	LUBBOCK PRESTON SMITH INTL	TX	LPV200	0	100	0	100	0	100
LBX	BRAZORIA COUNTY	TX	LPV	0	100	0	100	0	100
LFK	ANGELINA COUNTY	TX	LPV	0	100	0	100	0	100
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	0	100
LRD	LAREDO INTL	TX	LPV200	0	100	0	100	0	100
LUD	DECATUR MUNICIPAL	TX	LPV	0	100	0	100	0	100
LVJ	PEARLAND RGNL	TX	LPV	0	100	0	100	0	100
LXY	MEXIA-LIMESTONE CO	TX	LP	0	100	0	100	0	100
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	0	100
MNZ	HAMILTON MUNICIPAL	TX	LPV	0	100	0	100	0	100
OCH	A L MANGHAM JR RGNL	TX	LPV200	0	100	0	100	0	100
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	0	100
PIL	PORT ISABEL-CAMERON COUNTY	TX	LPV	0	100	0	100	0	100
PPA	PERRY LEFORS FIELD	TX	LPV	0	100	0	100	0	100
PRX	COX FIELD	TX	LPV	0	100	0	100	0	100
PSX	PALACIOS MUNICIPAL	TX	LPV	0	100	0	100	0	100
PVW	HALE COUNTY	TX	LPV	0	100	0	100	0	100
RAS	MUSTANG BEACH	TX	LPV	0	100	0	100	0	100
RBD	DALLAS EXECUTIVE	TX	LPV	0	100	0	100	0	100
RBO	NUECES COUNTY	TX	LP	0	100	0	100	0	100
RKP	ARANSAS COUNTY	TX	LPV	0	100	0	100	0	100
RYW	LAGO VISTA TX - RUSTY ALLEN	TX	LP	0	100	0	100	0	100
SAT	SAN ANTONIO INTL	TX	LPV200	0	100	0	100	0	100
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	0	100
SNK	WINSTON FIELD	TX	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	LPV200 Avail
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	0	100
TKI	COLLIN COUNTY RGNL AT MC KINNEY	TX	LPV200	0	100	0	100	0	100
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	0	100
TYR	TYLER POUNDS RGNL	TX	LPV200	0	100	0	100	0	100
UTS	HUNTSVILLE MUNICIPAL	TX	LPV	0	100	0	100	0	100
VCT	VICTORIA RGNL	TX	LPV200	0	100	0	100	0	100
XBP	BRIDGEPORT MUNICIPAL	TX	LPV	0	100	0	100	0	100
BCE	BRYCE CANYON	UT	LPV	0	100	0	100	0	100
BDG	BLANDING MUNICIPAL	UT	LPV	0	100	0	100	0	100
BMC	BRIGHAM CITY	UT	LP	0	100	0	100	1	99.9928
DTA	DELTA MUNICIPAL	UT	LP	0	100	0	100	1	99.9958
ENV	WENDOVER	UT	LPV	0	100	0	100	1	99.9898
FOM	FILLMORE MUNICIPAL	UT	LPV	0	100	0	100	1	99.9977
LGU	LOGAN-CACHE	UT	LPV	0	100	0	100	1	99.994
OGD	OGDEN-HINCKLEY	UT	LPV	0	100	0	100	1	99.9928
PUC	CARBON COUNTY RGNL/BUCK DAVIS FIELD	UT	LP	0	100	0	100	1	99.9977
PVU	PROVO MUNICIPAL	UT	LPV200	0	100	0	100	1	99.9943
SGU	ST GEORGE MUNICIPAL	UT	LPV	0	100	0	100	0	100
SLC	SALT LAKE CITY INTL	UT	LP	0	100	0	100	1	99.9925
U14	NEPHI MUNICIPAL	UT	LPV	0	100	0	100	1	99.9958
U55	PANGUITCH MUNICIPAL	UT	LPV200	0	100	0	100	0	100
VEL	VERNAL	UT	LP	0	100	0	100	1	99.997
0VG	LEE COUNTY	VA	LPV	0	100	0	100	0	100
AVC	MECKLENBURG-BRUNSWICK RGNL	VA	LPV	0	100	0	100	0	100
BCB	VIRGINIA TECH/MONTGOMERY EXECUTIVE	VA	LPV	0	100	0	100	0	100
CHO	CHARLOTTESVILLE-ALBEMARLE	VA	LPV	0	100	0	100	0	100
CJR	CULPEPER RGNL	VA	LPV	0	100	0	100	0	100
CPK	CHESAPEAKE RGNL	VA	LPV200	0	100	0	100	1	99.9906
DAN	DANVILLE RGNL	VA	LPV200	0	100	0	100	0	100
EMV	EMPORIA-GREENSVILLE RGNL	VA	LPV200	0	100	0	100	1	99.9974
FCI	CHESTERFIELD COUNTY	VA	LPV	0	100	0	100	1	99.9989
FKN	FRANKLIN MUN-JOHN BEVERLY ROSE	VA	LPV	0	100	0	100	1	99.9932

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV200 Avail
FVX	FARMVILLE RGNL	VA	LPV	0	100	0	100	0	100
FYJ	MIDDLE PENINSULA RGNL	VA	LPV	0	100	0	100	1	99.9932
HLX	TWIN COUNTY	VA	LPV	0	100	0	100	0	100
HSP	INGALLS FIELD	VA	LPV	0	100	0	100	0	100
HWY	WARRENTON-FAUQUIER	VA	LPV200	0	100	0	100	0	100
JFZ	TAZEWELL COUNTY	VA	LPV	0	100	0	100	0	100
JYO	LEESBURG EXECUTIVE	VA	LPV	0	100	0	100	0	100
LKU	LOUISA COUNTY/FREEMAN FIELD	VA	LPV	0	100	0	100	0	100
LNP	LONESOME PINE	VA	LPV	0	100	0	100	0	100
LUA	LURAY CAVERNS	VA	LP	0	100	0	100	0	100
LYH	LYNCHBURG RGNL/PRESTON GLENN FLD	VA	LPV	0	100	0	100	0	100
MFV	ACCOMACK COUNTY	VA	LPV	0	100	0	100	1	99.9891
MKJ	MOUNTAIN EMPIRE	VA	LPV	0	100	0	100	0	100
MTV	BLUE RIDGE	VA	LPV	0	100	0	100	0	100
OFP	HANOVER COUNTY MUNICIPAL	VA	LPV	0	100	0	100	1	99.9989
OKV	WINCHESTER RGNL	VA	LPV200	0	100	0	100	0	100
ORF	NORFOLK INTL	VA	LPV200	0	100	0	100	1	99.9906
PHF	NEWPORT NEWS/WILLIAMSBURG INTL	VA	LPV200	0	100	0	100	1	99.9928
PSK	NEW RIVER VALLEY	VA	LPV200	0	100	0	100	0	100
PTB	DINWIDDIE COUNTY	VA	LPV	0	100	0	100	1	99.9981
RIC	RICHMOND INTL	VA	LPV200	0	100	0	100	1	99.9974
RMN	STAFFORD RGNL	VA	LPV	0	100	0	100	1	99.9996
ROA	ROANOKE RGNL/WOODRUM FIELD	VA	LPV	0	100	0	100	0	100
SFQ	SUFFOLK EXECUTIVE	VA	LP	0	100	0	100	1	99.9928
SHD	SHENANDOAH VALLEY RGNL	VA	LPV200	0	100	0	100	0	100
VJI	VIRGINIA HIGHLANDS	VA	LPV	0	100	0	100	0	100
W63	MARKS MUNICIPAL	VA	LP	0	100	0	100	0	100
W78	WILLIAM M TUCK	VA	LPV	0	100	0	100	0	100
XSA	TAPPAHANNOCK-ESSEX COUNTY	VA	LPV	0	100	0	100	1	99.9947
BTV	BURLINGTON INTL	VT	LPV200	0	100	0	100	1	99.9921
FSO	FRANKLIN COUNTY STATE	VT	LPV	0	100	0	100	1	99.9917
MPV	EDWARD F KNAPP STATE	VT	LPV	0	100	0	100	1	99.9917
RUT	RUTLAND-SOUTHERN VERMONT RGNL	VT	LPV	0	100	0	100	1	99.994
ALW	WALLA WALLA RGNL	WA	LPV	0	100	0	100	0	100
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

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV200 Avail
DEW	DEER PARK	WA	LPV	0	100	0	100	0	100
EPH	EPHRATA MUNICIPAL	WA	LPV	0	100	0	100	0	100
FHR	FRIDAY HARBOR	WA	LPV	0	100	0	100	0	100
GEG	SPOKANE INTL	WA	LPV200	0	100	0	100	0	100
HQM	BOWERMAN	WA	LPV200	0	100	0	100	0	100
MWH	GRANT CO INTL	WA	LPV200	0	100	0	100	0	100
OLM	OLYMPIA RGNL	WA	LPV	0	100	0	100	0	100
OTH	SOUTHWEST OREGON RGNL	WA	LPV	0	100	0	100	1	99.9966
PAE	SNOHOMISH COUNTY (PAINE FLD)	WA	LPV200	0	100	0	100	0	100
PSC	TRI-CITIES	WA	LPV200	0	100	0	100	0	100
PWT	BREMERTON NATIONAL	WA	LPV	0	100	0	100	0	100
RLD	RICHLAND	WA	LPV	0	100	0	100	0	100
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	0	100	0	100	0	100
82C	MAUSTON-NEW LISBON UNION	WI	LP	0	100	0	100	0	100
8D1	NEW HOLSTEIN MUNICIPAL	WI	LPV	0	100	0	100	0	100
ARV	LAKELAND/NOBLE F. LEE MEMORIAL FIELD	WI	LPV	0	100	0	100	0	100
ASX	JOHN F. KENNEDY MEMORIAL	WI	LPV	0	100	0	100	0	100
ATW	OUTAGAMIE COUNTY RGNL	WI	LPV200	0	100	0	100	0	100
AUW	WAUSAU DOWNTOWN	WI	LPV200	0	100	0	100	0	100
BCK	BLACK RIVER FALLS AREA	WI	LPV	0	100	0	100	0	100
C29	MIDDLETON MUNICIPAL-MOREY FIELD	WI	LPV	0	100	0	100	0	100
C35	REEDSBURG MUNICIPAL	WI	LP	0	100	0	100	0	100
CLI	CLINTONVILLE MUNICIPAL	WI	LPV	0	100	0	100	0	100
CMY	SPARTA/FORT MC COY	WI	LPV	0	100	0	100	0	100
CWA	CENTRAL WISCONSIN	WI	LPV200	0	100	0	100	0	100
DLL	BARABOO WISCONSIN DELLS	WI	LPV	0	100	0	100	0	100
EAU	CHIPPEWA VALLEY RGNL	WI	LPV200	0	100	0	100	0	100
EGV	EAGLE RIVER UNION	WI	LPV	0	100	0	100	0	100
ENW	KENOSHA RGNL	WI	LPV200	0	100	0	100	0	100
ETB	WEST BEND MUNICIPAL	WI	LPV	0	100	0	100	0	100
EZS	SHAWANO MUNICIPAL	WI	LPV	0	100	0	100	0	100
FLD	FOND DU LAC COUNTY	WI	LPV	0	100	0	100	0	100
GRB	AUSTIN STRAUBEL INTL	WI	LPV200	0	100	0	100	0	100
HXF	HARTFORD MUNICIPAL	WI	LPV	0	100	0	100	0	100
HYR	SAWYER COUNTY	WI	LPV	0	100	0	100	0	100
JVL	SOUTHERN WISCONSIN RGNL	WI	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	LPV200 Avail
LNR	TRI-COUNTY RGNL	WI	LPV	0	100	0	100	0	100
LSE	LA CROSSE MUNICIPAL	WI	LPV	0	100	0	100	0	100
LUM	MENOMONIE MUNICIPALCIPAL-SCORE FIELD	WI	LPV	0	100	0	100	0	100
MDZ	TAYLOR COUNTY	WI	LPV	0	100	0	100	0	100
MFI	MARSHFIELD MUNICIPAL	WI	LPV	0	100	0	100	0	100
MKE	GENERAL MITCHELL INTL	WI	LPV200	0	100	0	100	0	100
MRJ	IOWA COUNTY	WI	LPV200	0	100	0	100	0	100
MSN	DANE COUNTY RGNL-TRUAX FIELD	WI	LPV200	0	100	0	100	0	100
MTW	MANITOWOC COUNTY	WI	LPV200	0	100	0	100	0	100
MWC	LAWRENCE J TIMMERMAN	WI	LPV	0	100	0	100	0	100
OCQ	J DOUGLAS BAKE MEML	WI	LP	0	100	0	100	0	100
OSH	WITTMAN RGNL	WI	LPV	0	100	0	100	0	100
OVS	BOSCOBEL	WI	LPV	0	100	0	100	0	100
PBH	PRICE COUNTY	WI	LPV	0	100	0	100	0	100
PCZ	WAUPACA MUNICIPAL	WI	LPV	0	100	0	100	0	100
PVB	PLATTEVILLE MUNICIPALCIPAL	WI	LPV	0	100	0	100	0	100
RAC	JOHN H. BATTEN	WI	LPV	0	100	0	100	0	100
RCX	RUSK COUNTY	WI	LPV	0	100	0	100	0	100
RHI	RHINELANDER-ONEIDA COUNTY	WI	LPV200	0	100	0	100	0	100
RNH	NEW RICHMOND RGNL	WI	LPV	0	100	0	100	0	100
RPD	RICE LAKE RGNL - CARL'S FIELD	WI	LPV	0	100	0	100	0	100
RRL	MERRILL MUNICIPAL	WI	LPV	0	100	0	100	0	100
SBM	SHEBOYGAN COUNTY MEMORIAL	WI	LPV200	0	100	0	100	0	100
STE	STEVENS POINT MUNICIPAL	WI	LPV200	0	100	0	100	0	100
SUE	DOOR COUNTY CHERRYLAND	WI	LPV	0	100	0	100	0	100
SUW	RICHARD I BONG	WI	LP	0	100	0	100	0	100
TKV	TOMAHAWK RGNL	WI	LP	0	100	0	100	0	100
UES	WAUKESHA COUNTY	WI	LPV200	0	100	0	100	0	100
UNU	DODGE COUNTY	WI	LPV	0	100	0	100	0	100
VIQ	NEILLSVILLE MUNICIPAL	WI	LPV	0	100	0	100	0	100
Y50	WAUTOMA MUNICIPAL	WI	LP	0	100	0	100	0	100
3I2	MASON COUNTY	WV	LPV	0	100	0	100	0	100
BKW	RALEIGH COUNTY MEMORIAL	WV	LPV200	0	100	0	100	0	100
BLF	MERCER COUNTY	WV	LPV	0	100	0	100	0	100
CKB	NORTH CENTRAL WEST VIRGINIA	WV	LPV	0	100	0	100	0	100
CRW	YEAGER	WV	LPV200	0	100	0	100	0	100
HLG	WHEELING OHIO CO	WV	LPV200	0	100	0	100	0	100
HTS	TRI-STATE/MILTON J. FERGUSON FIELD	WV	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	LPV200 Avail
I18	JACKSON COUNTY	WV	LPV200	0	100	0	100	0	100
LWB	GREENBRIER VALLEY	WV	LPV	0	100	0	100	0	100
MGW	MORGANTOWN MUNICIPAL-WALTER L. BILL HART FIELD	WV	LPV200	0	100	0	100	0	100
MRB	EASTERN WV RGNL/SHEPHERD	WV	LPV	0	100	0	100	0	100
PKB	MID-OHIO VALLEY RGNL	WV	LPV	0	100	0	100	0	100
SXL	SUMMERSVILLE	WV	LP	0	100	0	100	0	100
USW	BOGGS FIELD	WV	LP	0	100	0	100	0	100
W22	UPSHUR COUNTY RGNL	WV	LPV	0	100	0	100	0	100
COD	YELLOWSTONE RGNL	WY	LPV	0	100	0	100	0	100
CPR	NATRONA COUNTY INTL	WY	LPV	0	100	0	100	0	100
CYS	CHEYENNE RGNL/JERRY OLSON FIELD	WY	LPV	0	100	0	100	0	100
DGW	CONVERSE COUNTY	WY	LPV200	0	100	0	100	0	100
ECS	MONDELL FIELD	WY	LPV	0	100	0	100	0	100
EVW	EVANSTON-UINTA COUNTY BURNS FIELD	WY	LPV	0	100	0	100	1	99.994
GCC	GILLETTE-CAMPBELL COUNTY	WY	LPV	0	100	0	100	0	100
JAC	JACKSON HOLE	WY	LPV	0	100	0	100	0	100
LAR	LARAMIE RGNL	WY	LPV	0	100	0	100	0	100
PNA	RALPH WENZ FIELD	WY	LPV	0	100	0	100	1	99.9996
RIW	RIVERTON RGNL	WY	LPV200	0	100	0	100	0	100
RKS	ROCK SPRINGS-SWEETWATER COUNTY	WY	LPV200	0	100	0	100	1	99.9977
RWL	RAWLINS MUNICIPAL/HARVEY FIELD	WY	LPV	0	100	0	100	0	100
SAA	SHIVELY FIELD	WY	LPV	0	100	0	100	0	100
SHR	SHERIDAN COUNTY	WY	LPV	0	100	0	100	0	100
WRL	WORLAND MUNICIPAL	WY	LPV	0	100	0	100	0	100
CYQH	WATSON LAKE	YT	LPV	0	100	0	100	1	99.9932
CYXY	WHITEHORSE / ERIK NIELSEN INTL	YT	LPV	0	100	0	100	1	99.9947

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

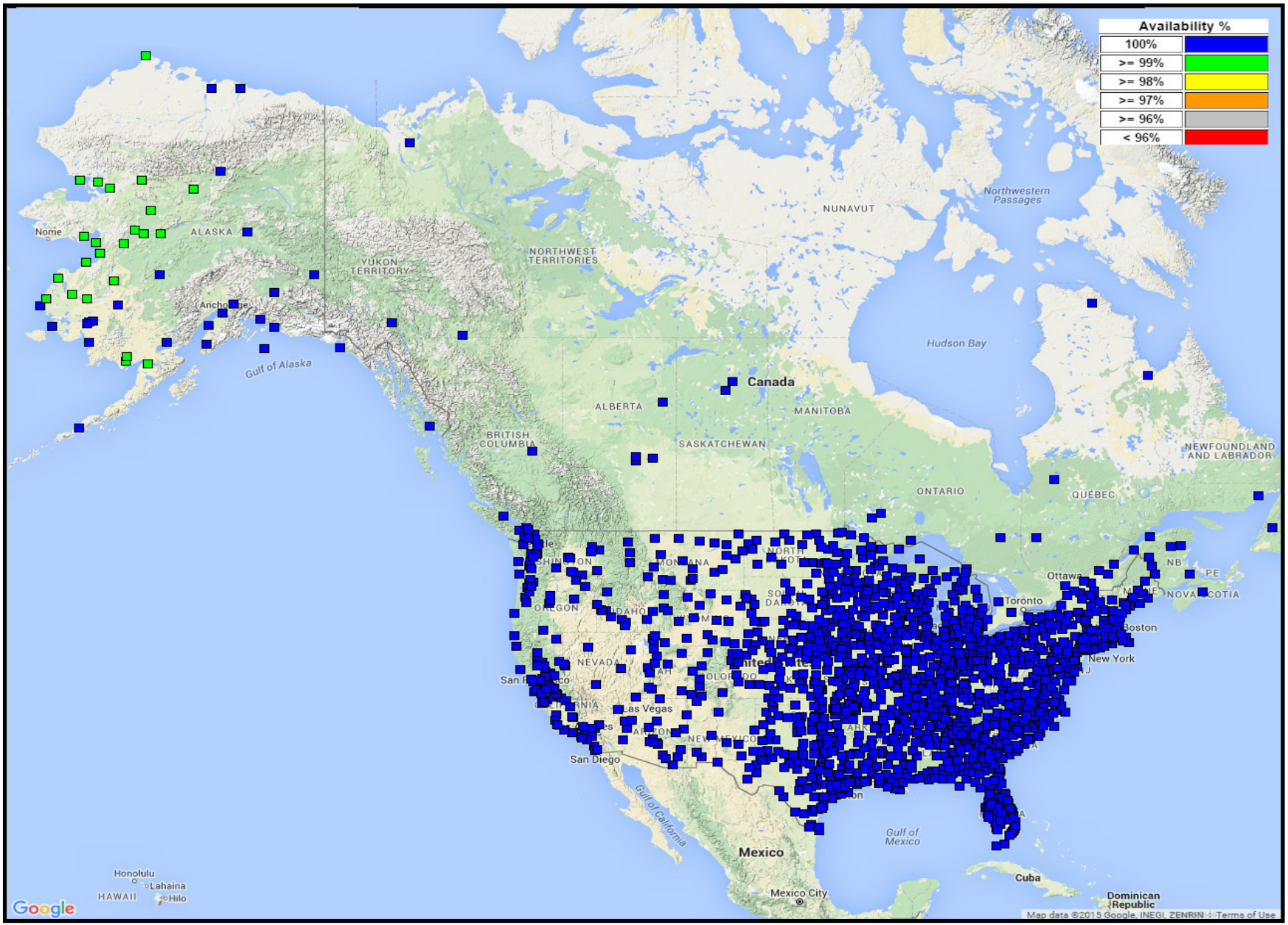


Figure 8-2 WAAS LP Outages at Airports in the US and Canada with GPS RNAV IAPs

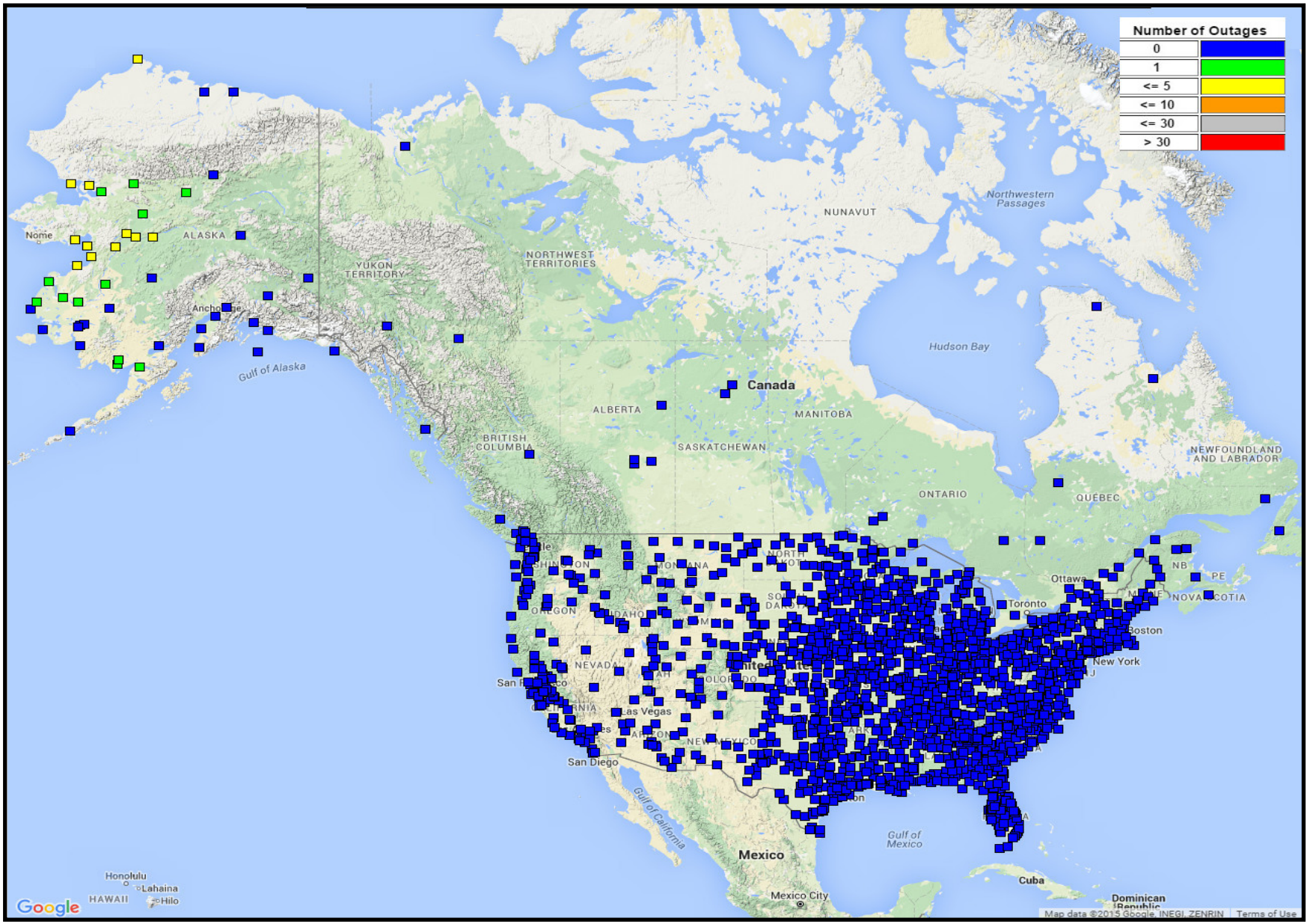


Figure 8-3 WAAS LPV Availability Airports in the US and Canada with GPS RNAV IAPs

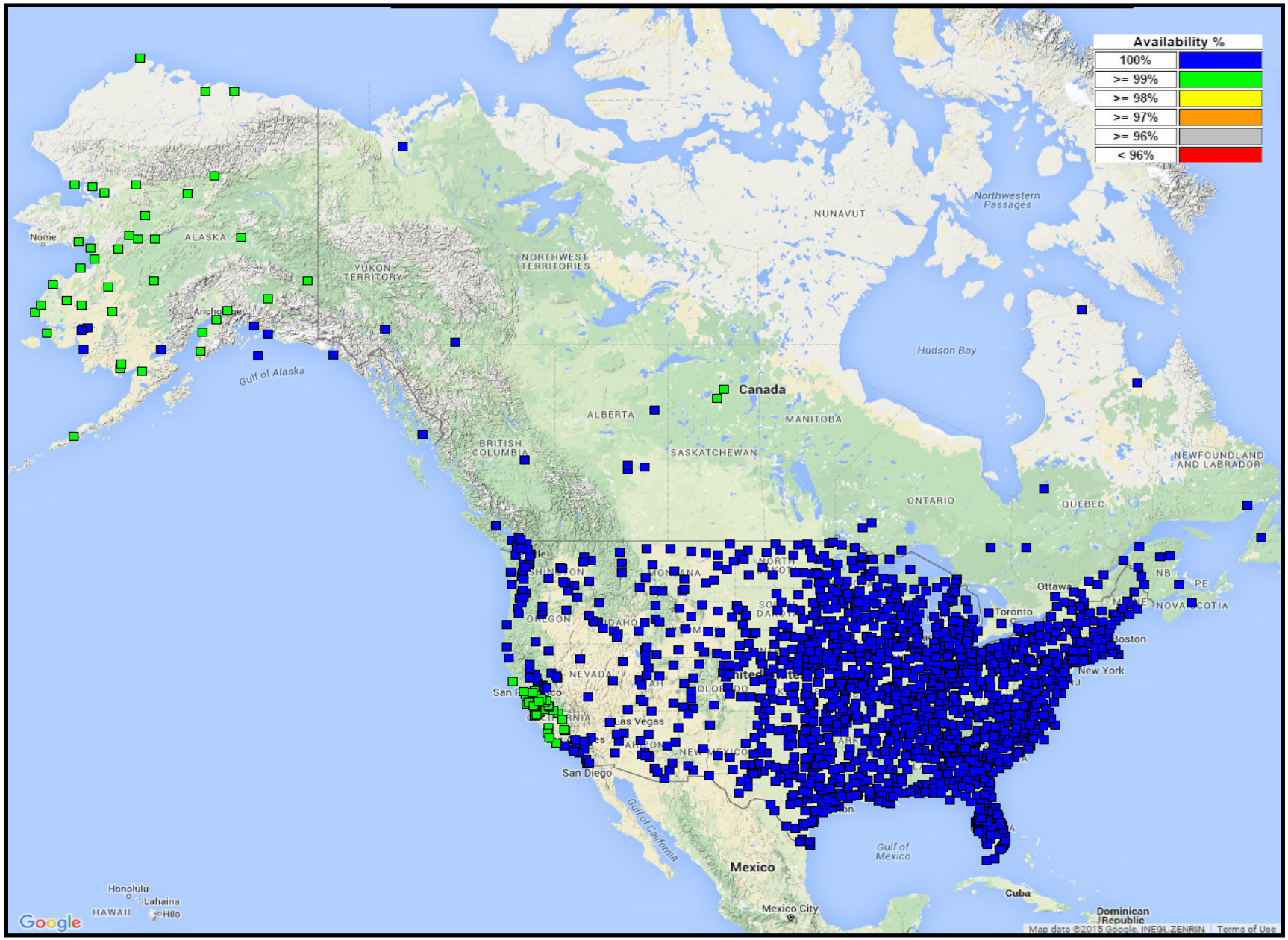


Figure 8-4 WAAS LPV Outages at Airports in the US and Canada with GPS RNAV IAPs

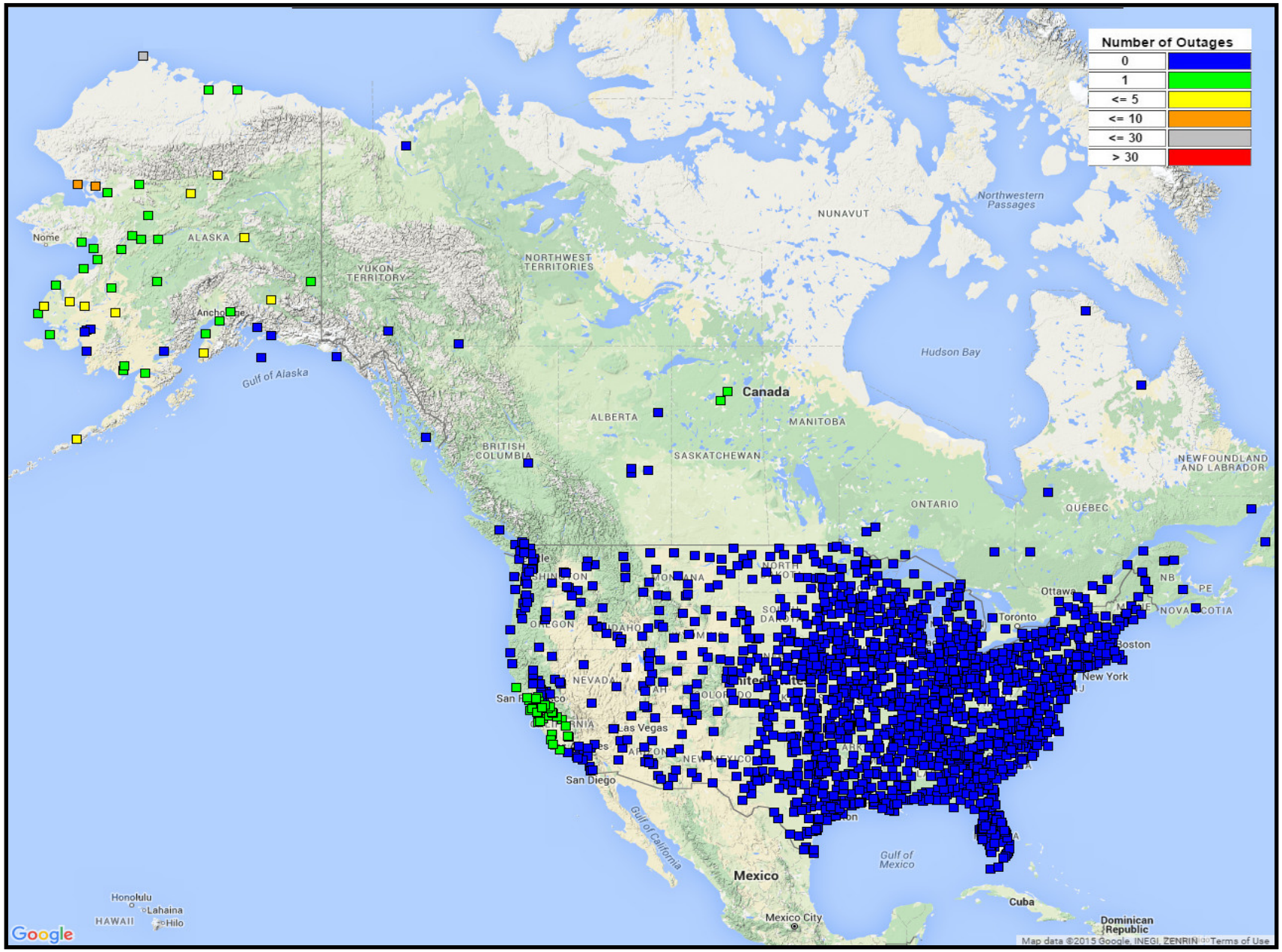


Figure 8-5 WAAS LPV200 Availability at Airports in the US and Canada with GPS RNAV IAPs

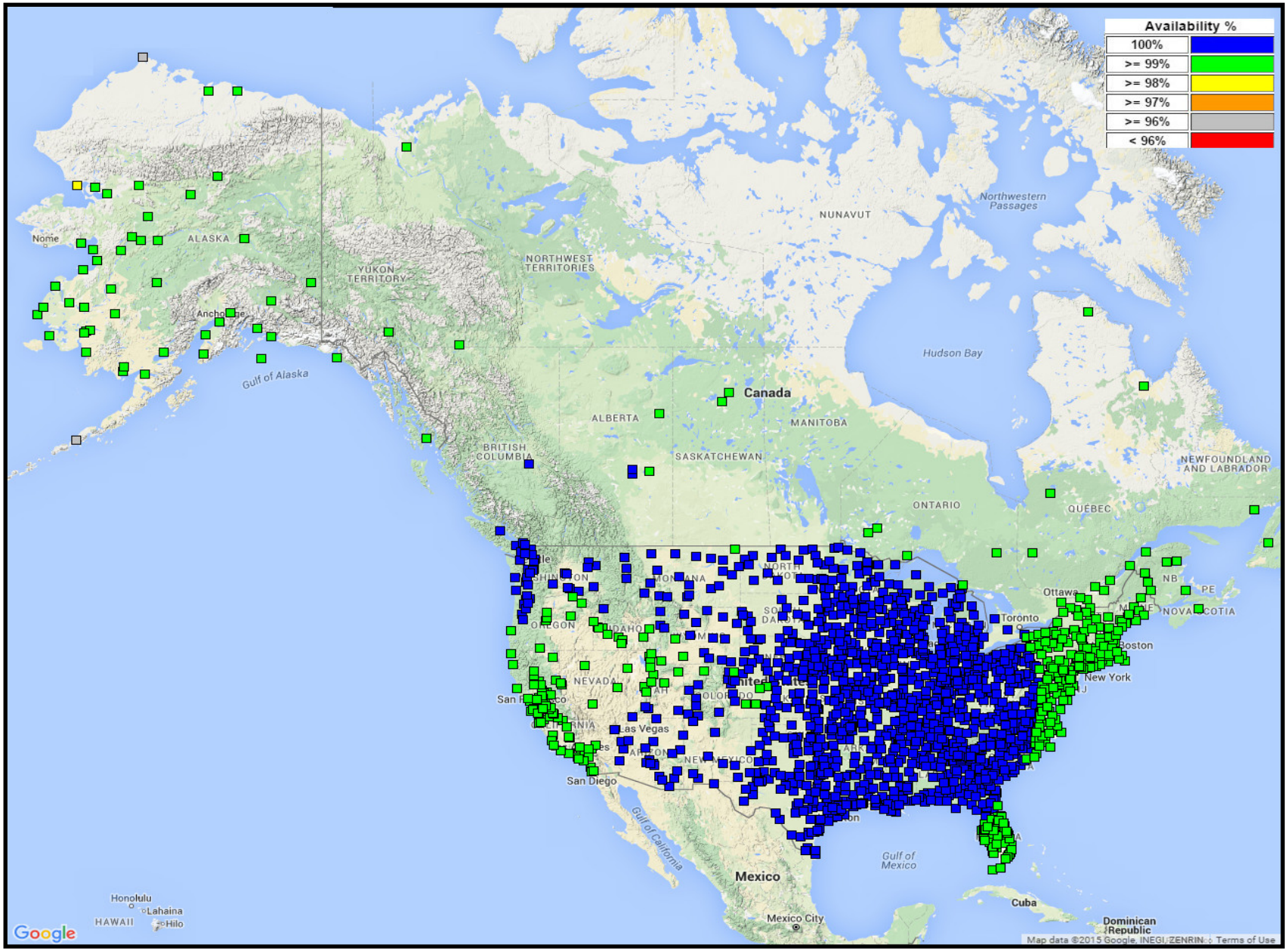
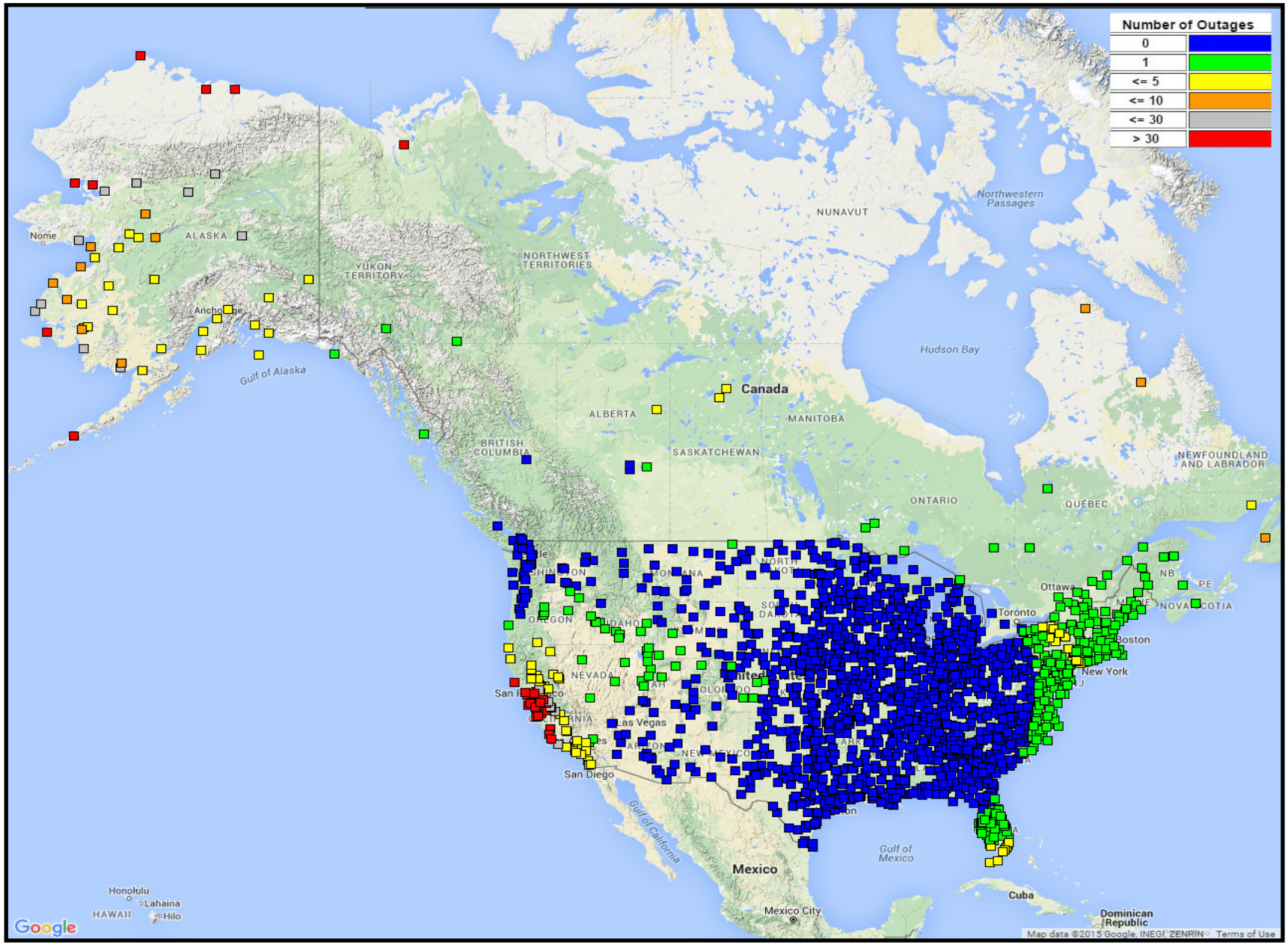


Figure 8-6 WAAS LPV200 Outages at Airports in the US and Canada with GPS RNAV IAPs



9.0 WAAS CODE NOISE AND MULTIPATH (CNMP) BOUNDING ANALYSIS

The purpose of the WAAS Code Noise and Multipath (CNMP) Bounding Analysis is to evaluate the performance of the CNMP algorithm and identify any undetected anomalous events in order to limit exposure to faulted receivers and persistent large multipath errors. The identification of undetected anomalous events ensures that the probability of more than one WRS producing persistent unbounded measurement errors is negligible. This off-line analysis is critical in ensuring that CNMP bounding is not invalidated by changes in WRE environmental conditions.

The operational CNMP functionality resides in the WAAS safety processor. The CNMP algorithm estimates, and corrects for, observed code noise and multipath and then provides confidence estimates for residual error in multipath-corrected pseudorange measurements. These confidence terms provide a conservative Gaussian overbound of the true error distribution and are used by integrity monitors in the weighting of the measurements.

For the off-line analysis summarized in this section, the measurement data is post-processed to estimate the carrier phase ambiguity for each entire arc of measurements for each satellite pass. The ambiguity estimate is used to level the carrier measurement. The leveled carrier is then used as a multipath-free truth estimate. The WAAS real-time CNMP smoothing algorithm is then applied to the original measurements. The difference between the smoothed measurements and the multipath-free truth estimates is the observed residual error. 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 Gaussian distributions with 0.1 multiples of the CNMP standard deviation bound the observed residual error. 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 this analysis for the last 12 months. The plot shows color-coded performance for all three threads of WAAS reference equipment at each WAAS reference station. The color coding represents four levels of performance based on the magnitude and probability distribution of the residual error and the bounding performance of the CNMP algorithm.

Table 9-1 CNMP Bounding Statistics

WAAS Site	WRE	Oct 14	Nov 14	Dec 14	Jan 15	Feb 15	Mar 15	Apr 15	May 15	Jun 15	Jul 15	Aug 15	Sep 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	Oct 14	Nov 14	Dec 14	Jan 15	Feb 15	Mar 15	Apr 15	May 15	Jun 15	Jul 15	Aug 15	Sep 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 24 hour sets of data from 00:00 on 9/30/15 to 23:59:30 on 9/30/15.

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 9/30/15 data set were all <= 10 mm. The OPUS and CSRS surveys for the 9/30/15 data set agreed to an average of 1.6 cm. with a standard deviation of 8 mm. The maximum of difference was 4.7 cm. for thread 3 at Juneau, AK. Threads A and B at JNU were also outliers at 4.1 cm and 5.0 cm respectively. Houston Thread C had a 3.9 cm difference.

The OPUS positions were compared to the positions in the currently fielded WAAS software Build W7.126 which was fielded starting in August 2015. The OPUS surveys agree with the Build W7.126 positions to better or equal than 15 cm for all sites. The maximum was 15 cm at Mexico City thread B (MMX2). Honolulu (6.2 cm) and Kotzebue (4.8cm) were also outliers.

Table 10-1 lists the WAAS antenna L1 phase center positions as of 9/30/15 using the OPUS data.

Figures 10-1 to 10-3 show the RSS of the ECEF differences between the 9/30/15 OPUS survey antenna phase center locations and the locations in the Build W7.126 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.

Table 10-1 WAAS Antenna Positions (OPUS IGS08) as of 9/30//15

WRE	X(m)	Y(m)	Z(m)	Latitude	Longitude	H(m)
BET1	-2965385.089	-972576.635	5543892.880	60.787915	-161.841725	52.189
BET2	-2965385.860	-972580.361	5543891.826	60.787896	-161.841664	52.194
BET3	-2965388.428	-972577.484	5543890.955	60.787880	-161.841729	52.186
BIL1	-1416445.900	-4223577.018	4550862.140	45.803707	-108.539723	1112.240
BIL2	-1416449.981	-4223574.875	4550862.864	45.803716	-108.539782	1112.247
BIL3	-1416441.598	-4223574.273	4550865.994	45.803756	-108.539682	1112.235
BRW1	-1886758.965	-809058.677	6018494.462	71.282765	-156.789925	15.572
BRW2	-1886756.380	-809055.935	6018495.643	71.282797	-156.789967	15.582
BRW3	-1886755.288	-809059.717	6018495.461	71.282793	-156.789858	15.565
CDB1	-3484099.105	-1084748.788	5213678.615	55.192374	-162.706405	49.714
CDB2	-3484105.741	-1084741.586	5213675.668	55.192328	-162.706544	49.690
CDB3	-3484112.018	-1084734.819	5213672.922	55.192284	-162.706675	49.708
FAI1	-2304741.853	-1448715.288	5748843.666	64.809630	-147.847341	149.935
FAI2	-2304741.379	-1448706.480	5748846.062	64.809680	-147.847493	149.937
FAI3	-2304732.847	-1448707.420	5748849.202	64.809747	-147.847381	149.917
HNL1	-5508637.126	-2234493.115	2303722.296	21.312991	-157.920829	24.661
HNL2	-5508656.290	-2234483.434	2303687.054	21.312648	-157.920985	25.006
HNL3	-5508647.706	-2234497.365	2303694.149	21.312717	-157.920830	25.052
JNU1	-2354254.966	-2388549.683	5407043.135	58.362574	-134.585708	16.157
JNU2	-2354252.881	-2388565.793	5407036.967	58.362469	-134.585489	16.157
JNU3	-2354239.667	-2388568.643	5407041.428	58.362545	-134.585294	16.154
MMD1	35070.397	-5959686.657	2264365.771	20.931909	-89.662841	29.111
MMD2	35065.474	-5959687.022	2264364.986	20.931902	-89.662888	29.145
MMD3	35065.134	-5959685.240	2264369.645	20.931947	-89.662891	29.143
MMX1	-948700.978	-5943934.737	2109212.417	19.431654	-99.068390	2234.672
MMX2	-948696.548	-5943934.565	2109214.840	19.431677	-99.068348	2234.659
MMX3	-948705.408	-5943934.925	2109209.993	19.431630	-99.068431	2234.699
MPR1	-1570142.235	-5759530.592	2238184.755	20.679003	-105.249203	10.971
MPR2	-1570139.407	-5759530.100	2238188.802	20.679041	-105.249178	11.260
MPR3	-1570143.515	-5759527.978	2238190.570	20.679059	-105.249222	10.979
MSD1	-1979519.870	-5523222.956	2493106.866	23.160448	-109.717650	104.277
MSD2	-1979521.439	-5523225.296	2493100.465	23.160385	-109.717656	104.271
MSD3	-1979525.885	-5523222.024	2493104.135	23.160421	-109.717708	104.262
MTP1	-254854.376	-6162909.163	1617805.057	14.791366	-92.367999	54.938
MTP2	-254850.761	-6162910.198	1617801.627	14.791334	-92.367965	54.917
MTP3	-254855.524	-6162910.301	1617800.098	14.791320	-92.368010	54.817
OTZ1	-2396056.072	-750356.189	5843502.491	66.887332	-162.611373	10.886
OTZ2	-2396052.899	-750354.359	5843504.013	66.887366	-162.611391	10.882
OTZ3	-2396052.881	-750358.296	5843503.524	66.887355	-162.611305	10.887
YFB1	1035381.401	-2634289.648	5696539.551	63.731491	-68.543184	10.032
YFB2	1035372.200	-2634296.064	5696538.189	63.731464	-68.543405	9.965
YFB3	1035366.119	-2634306.818	5696534.415	63.731387	-68.543599	10.025
YQX1	2430424.605	-3419640.390	4788223.853	48.966490	-54.597632	146.882
YQX2	2430432.565	-3419639.050	4788220.798	48.966448	-54.597533	146.888
YQX3	2430440.472	-3419637.683	4788217.794	48.966407	-54.597434	146.898
YWG1	-520164.416	-4083475.955	4855843.031	49.900574	-97.259398	222.107

WRE	X(m)	Y(m)	Z(m)	Latitude	Longitude	H(m)
YWG2	-520150.542	-4083468.894	4855850.427	49.900677	-97.259219	222.123
YWG3	-520152.418	-4083478.012	4855842.600	49.900568	-97.259229	222.114
YYR1	1885341.379	-3321428.358	5091171.680	53.308647	-60.419469	37.851
YYR2	1885344.339	-3321419.876	5091176.094	53.308714	-60.419367	37.857
YYR3	1885340.057	-3321413.058	5091182.097	53.308804	-60.419373	37.864
ZAB1	-1488636.869	-5003946.546	3654557.700	35.173575	-106.567350	1620.132
ZAB2	-1488631.535	-5003948.228	3654557.676	35.173575	-106.567289	1620.193
ZAB3	-1488632.312	-5003950.814	3654553.823	35.173532	-106.567289	1620.180
ZAN1	-2659536.695	-1549114.769	5567750.766	61.229202	-149.780251	80.722
ZAN2	-2659548.449	-1549110.817	5567746.283	61.229118	-149.780425	80.724
ZAN3	-2659541.398	-1549106.690	5567750.750	61.229201	-149.780425	80.708
ZAU1	138704.090	-4761244.124	4227763.925	41.782658	-88.331337	195.870
ZAU2	138704.344	-4761248.745	4227758.767	41.782596	-88.331336	195.883
ZAU3	138711.055	-4761248.482	4227758.848	41.782597	-88.331255	195.887
ZBW1	1490299.194	-4448983.179	4306010.513	42.735721	-71.480426	39.125
ZBW2	1490304.304	-4448981.170	4306010.858	42.735725	-71.480359	39.153
ZBW3	1490306.014	-4448984.795	4306006.547	42.735672	-71.480353	39.151
ZDC1	1069125.738	-4839598.987	4001126.515	39.101596	-77.542747	80.064
ZDC2	1069128.134	-4839603.618	4001120.310	39.101524	-77.542731	80.061
ZDC3	1069124.032	-4839602.709	4001122.506	39.101549	-77.542775	80.070
ZDV1	-1273628.638	-4711375.570	4094890.105	40.187303	-105.127225	1541.353
ZDV2	-1273622.936	-4711377.083	4094890.118	40.187303	-105.127155	1541.341
ZDV3	-1273624.946	-4711380.278	4094885.827	40.187253	-105.127168	1541.329
ZFW1	-659983.216	-5324060.787	3438276.475	32.830650	-97.066472	155.631
ZFW2	-659988.487	-5324063.339	3438271.475	32.830596	-97.066524	155.592
ZFW3	-659983.515	-5324063.866	3438271.685	32.830598	-97.066471	155.632
ZHU1	-513864.488	-5506451.676	3166720.462	29.961896	-95.331426	10.820
ZHU2	-513867.138	-5506455.074	3166714.297	29.961832	-95.331451	10.885
ZHU3	-513873.413	-5506457.720	3166708.703	29.961774	-95.331513	10.880
ZJX1	772646.419	-5434462.196	3237231.751	30.698860	-81.908185	2.143
ZJX2	772649.757	-5434463.747	3237228.352	30.698824	-81.908153	2.132
ZJX3	772645.690	-5434466.182	3237225.244	30.698792	-81.908199	2.126
ZKC1	-415247.539	-4954556.388	3982161.117	38.880159	-94.790834	305.899
ZKC2	-415231.144	-4954557.708	3982161.170	38.880160	-94.790645	305.891
ZKC3	-415237.268	-4954561.056	3982155.975	38.880102	-94.790712	305.625
ZLA1	-2474409.990	-4637294.618	3602183.549	34.603518	-118.083896	763.519
ZLA2	-2474404.709	-4637297.420	3602183.553	34.603519	-118.083831	763.510
ZLA3	-2474411.322	-4637297.099	3602179.571	34.603474	-118.083896	763.577
ZLC1	-1808273.248	-4486410.819	4145303.005	40.786043	-111.952178	1287.430
ZLC2	-1808274.646	-4486414.433	4145298.514	40.785990	-111.952177	1287.430
ZLC3	-1808270.438	-4486416.141	4145298.510	40.785990	-111.952124	1287.436
ZMA1	966042.281	-5662999.809	2761581.512	25.824612	-80.319190	-7.597
ZMA2	966029.304	-5662999.104	2761585.994	25.824660	-80.319316	-8.234
ZMA3	966037.388	-5662997.946	2761586.350	25.824662	-80.319235	-7.884
ZME1	4070.872	-5226189.295	3644028.425	35.067394	-89.955370	68.602
ZME2	4070.899	-5226186.747	3644032.542	35.067438	-89.955370	68.882
ZME3	4064.706	-5226186.623	3644032.698	35.067440	-89.955438	68.867

WRE	X(m)	Y(m)	Z(m)	Latitude	Longitude	H(m)
ZMP1	-249978.408	-4539297.498	4458955.046	44.637463	-93.152086	262.650
ZMP2	-249972.607	-4539297.837	4458955.044	44.637463	-93.152013	262.663
ZMP3	-249973.705	-4539302.117	4458950.570	44.637407	-93.152023	262.603
ZNY1	1406144.609	-4627343.990	4144322.072	40.784329	-73.097166	6.458
ZNY2	1406146.398	-4627347.019	4144317.290	40.784276	-73.097156	5.922
ZNY3	1406140.843	-4627348.678	4144317.327	40.784276	-73.097225	5.925
ZOA1	-2684436.920	-4293337.361	3865351.881	37.543054	-122.015949	-3.500
ZOA2	-2684433.915	-4293341.442	3865349.458	37.543027	-122.015895	-3.496
ZOA3	-2684438.286	-4293342.316	3865345.600	37.542982	-122.015932	-3.422
ZOB1	650770.149	-4754715.651	4187420.752	41.297155	-82.206445	223.663
ZOB2	650777.828	-4754714.830	4187422.772	41.297167	-82.206353	225.167
ZOB3	650776.159	-4754719.654	4187414.980	41.297087	-82.206380	223.446
ZSE1	-2308930.286	-3668169.684	4663526.469	47.286993	-122.188373	82.104
ZSE2	-2308934.681	-3668175.231	4663520.065	47.286908	-122.188383	82.170
ZSE3	-2308935.740	-3668179.503	4663516.121	47.286856	-122.188365	82.108
ZSU1	2462589.457	-5529372.114	2003724.502	18.431336	-65.993477	-28.088
ZSU2	2462587.526	-5529377.484	2003712.212	18.431219	-65.993514	-28.065
ZSU3	2462594.154	-5529375.224	2003710.132	18.431199	-65.993448	-28.123
ZTL1	529840.384	-5305248.812	3489342.855	33.379689	-84.296726	261.137
ZTL2	529846.764	-5305247.969	3489343.140	33.379692	-84.296657	261.123
ZTL3	529847.448	-5305251.409	3489337.906	33.379635	-84.296653	261.159

Figure 10-1 Build W7.012 Antenna Positions Deltas from 9/30//15 OPUS Survey

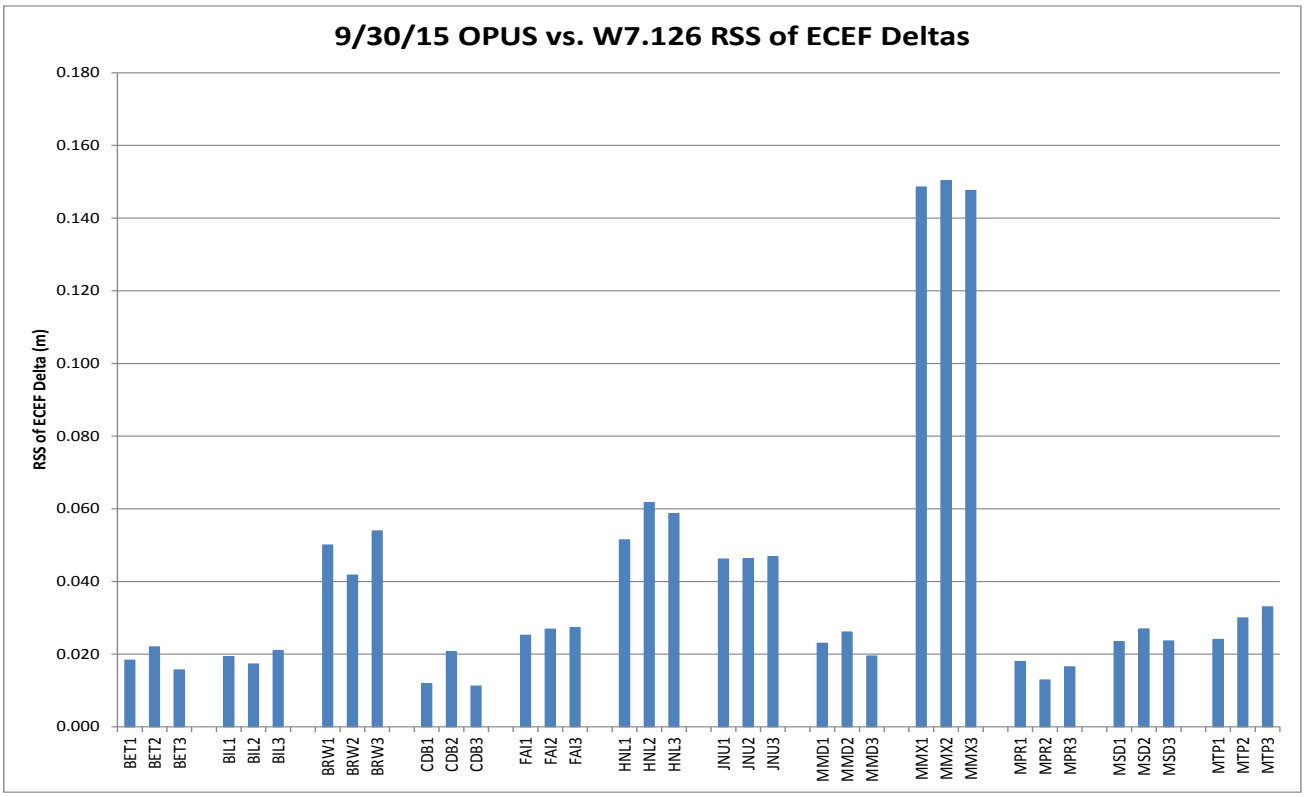


Figure 10-2 Build W7.012 Antenna Positions Deltas from 9/30/15 OPUS Survey

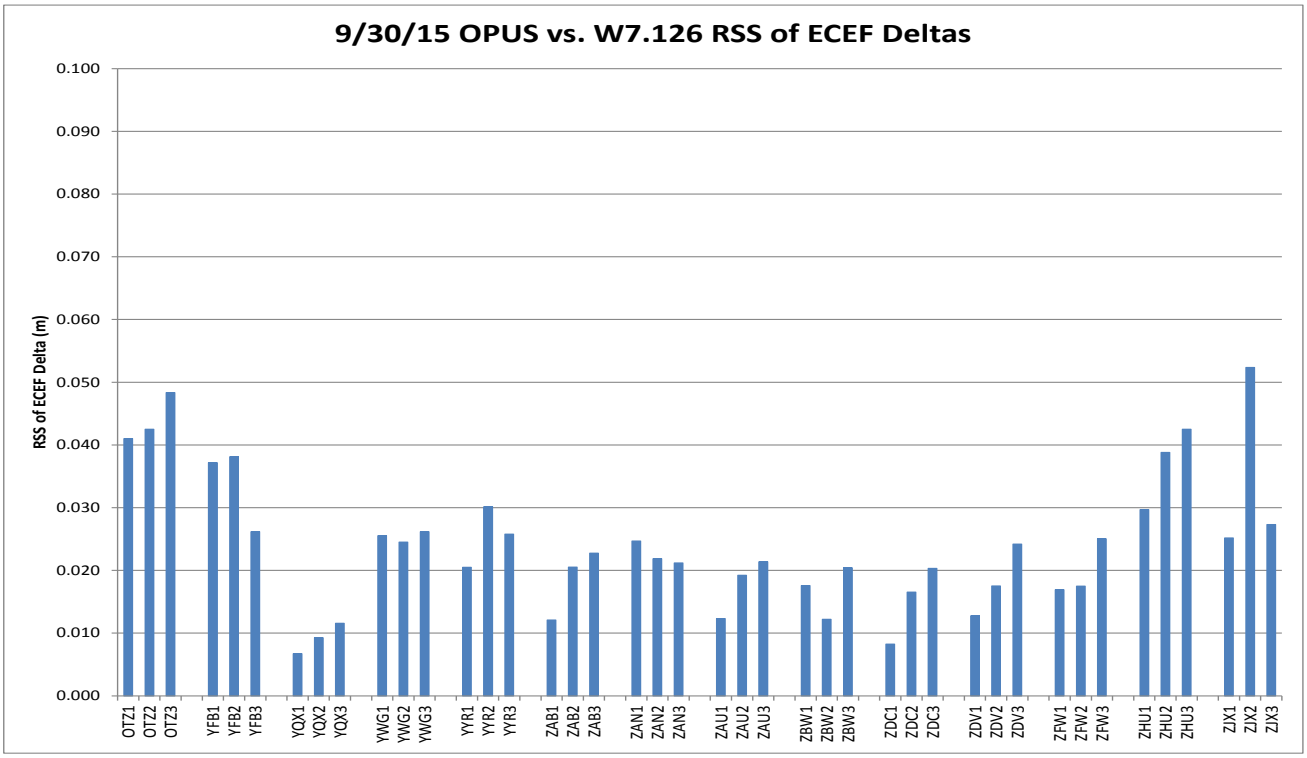


Figure 10-3 Build W7.012 Antenna Positions Deltas from 9/30/15 OPUS Survey

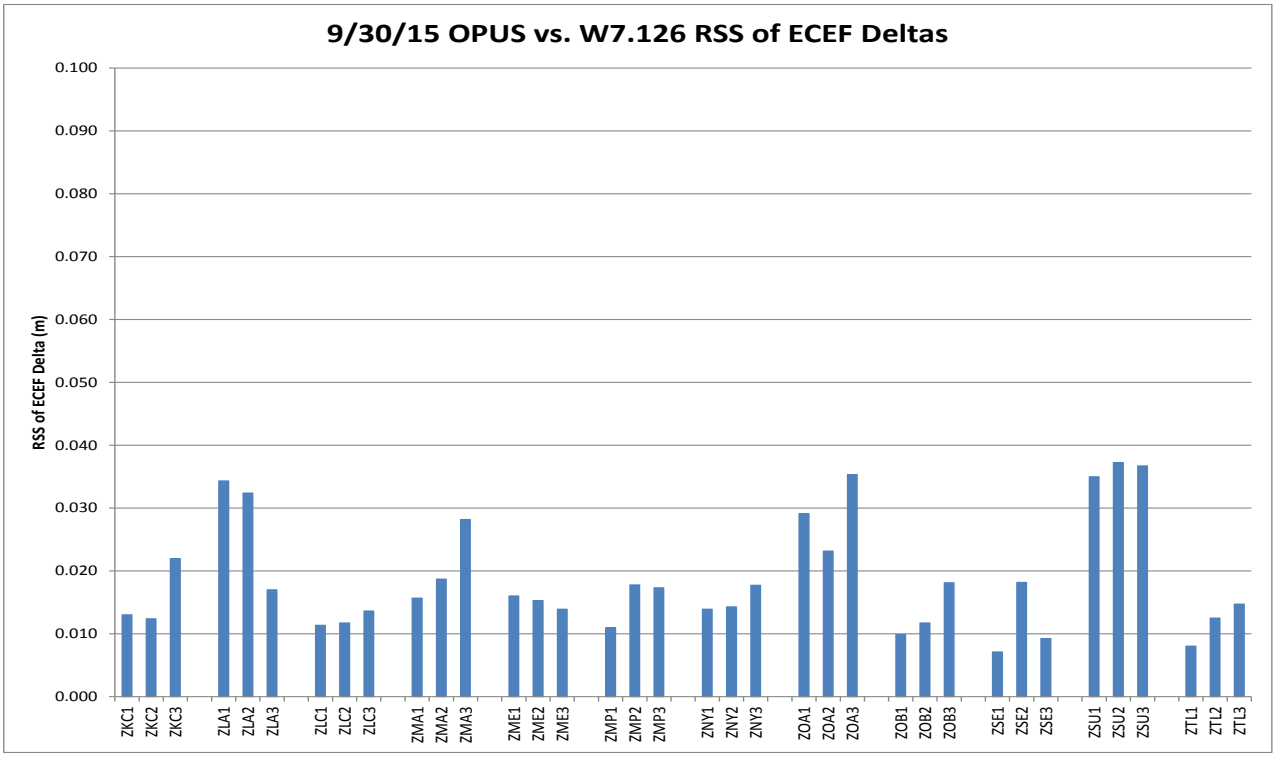


Figure 10-4 9/30/15 OPUS Survey Overall RMS Qualities

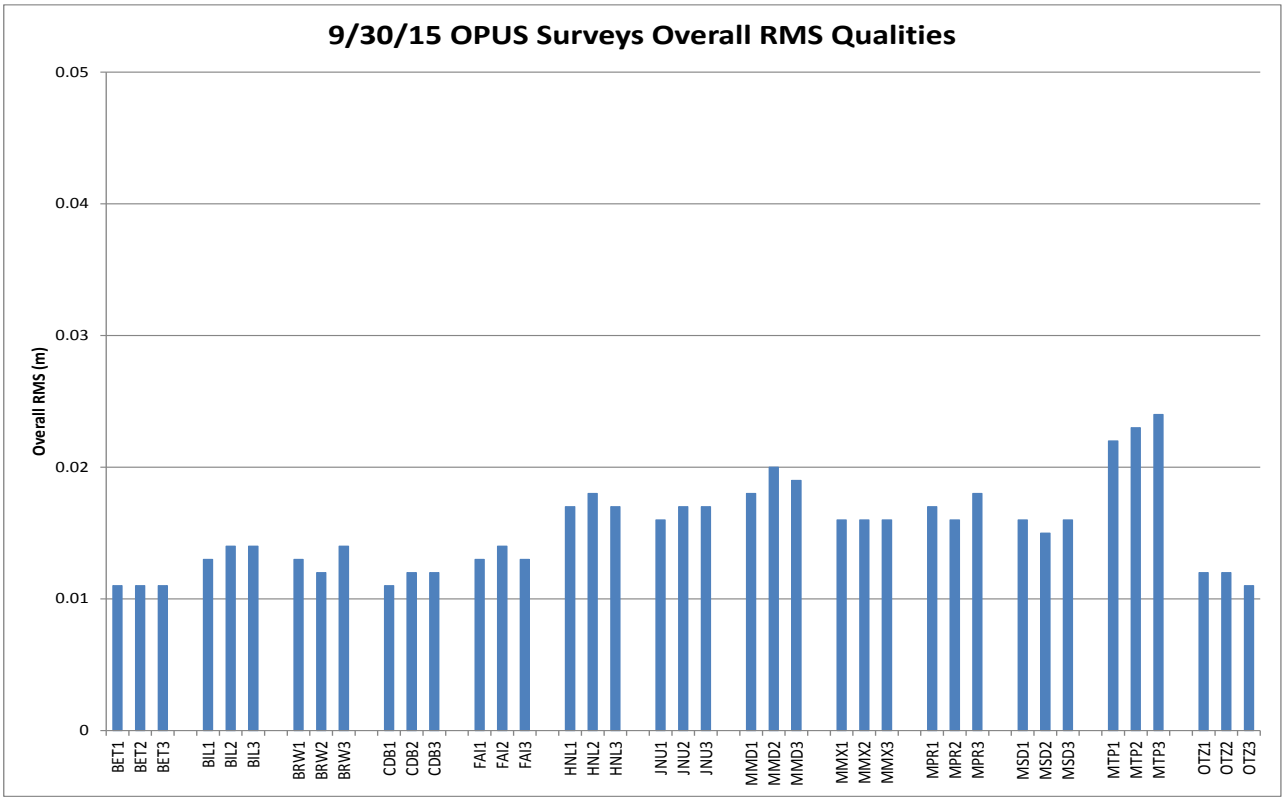


Figure 10-5 9/30/15 OPUS Survey Overall RMS Qualities

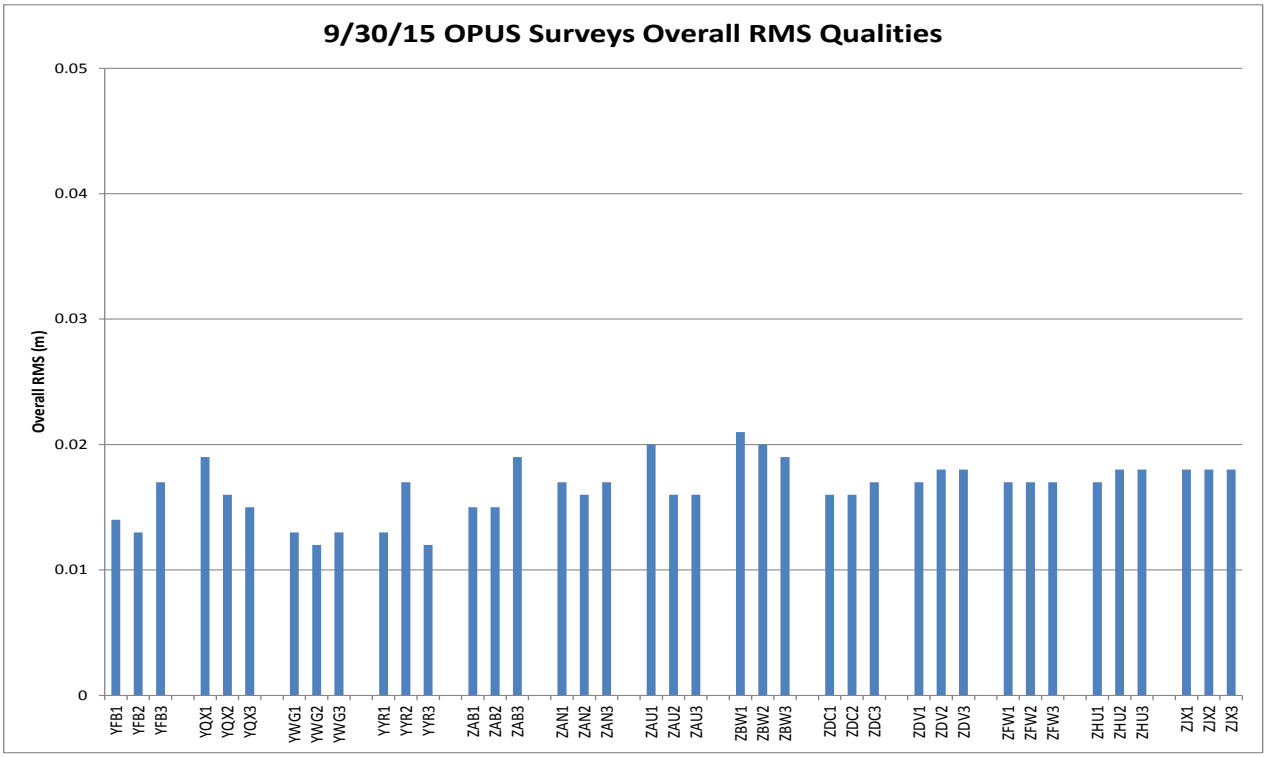


Figure 10-6 9/30/15 OPUS Survey Overall RMS Qualities

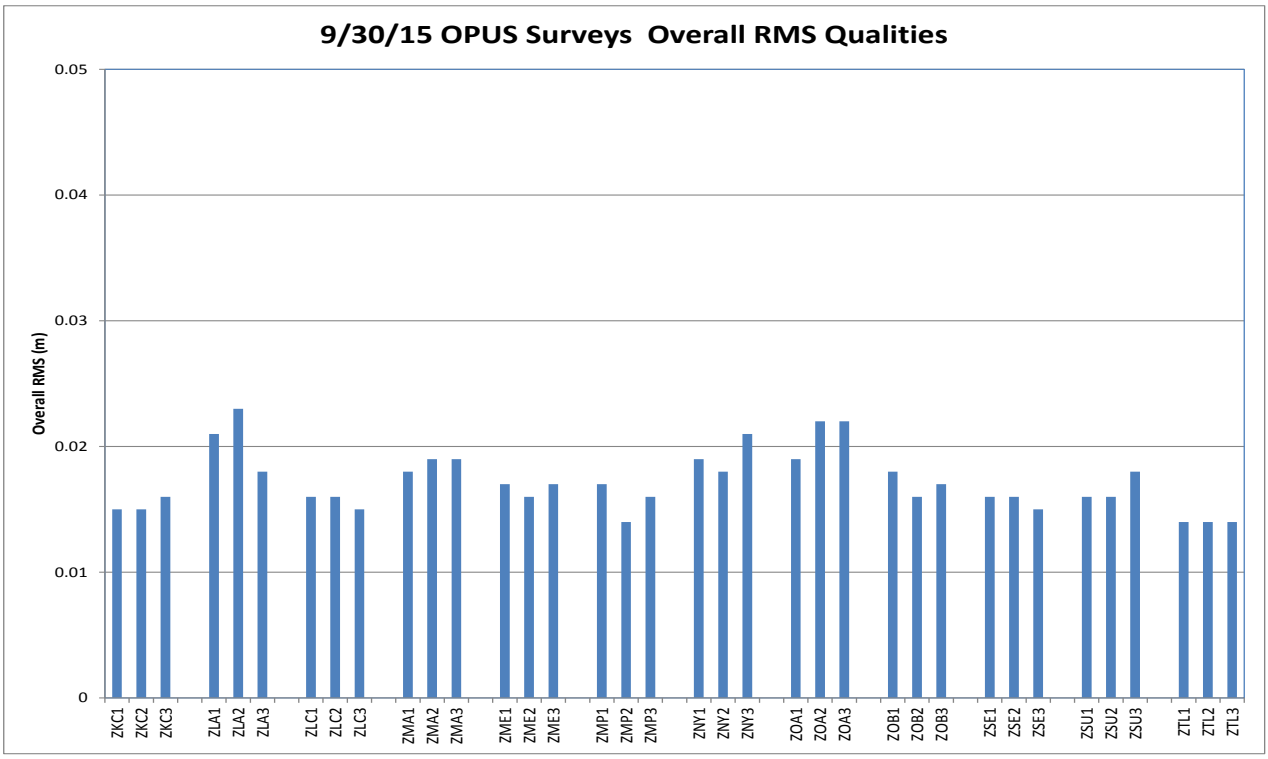


Figure 10-7 9/30/15 OPUS vs. CSRS RSS ECEF Deltas

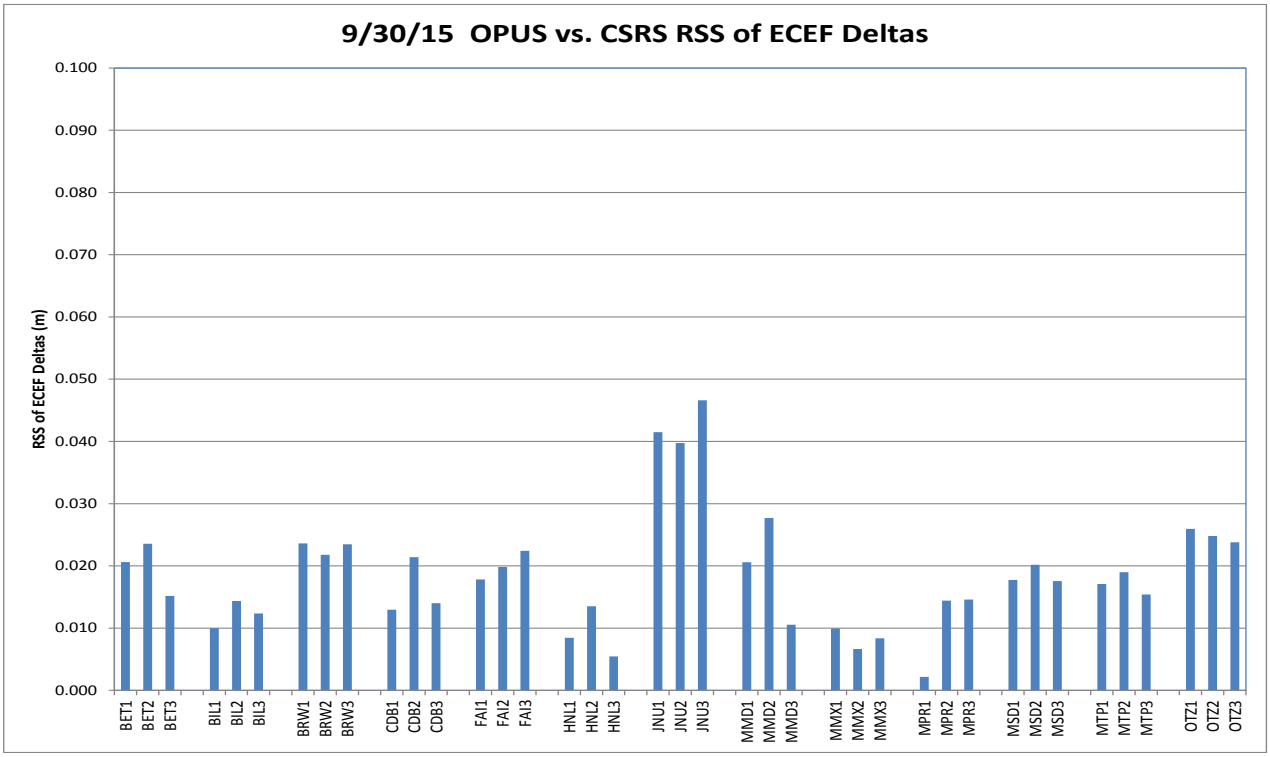


Figure 10-8 9/30/15 OPUS vs. CSRS RSS ECEF Deltas

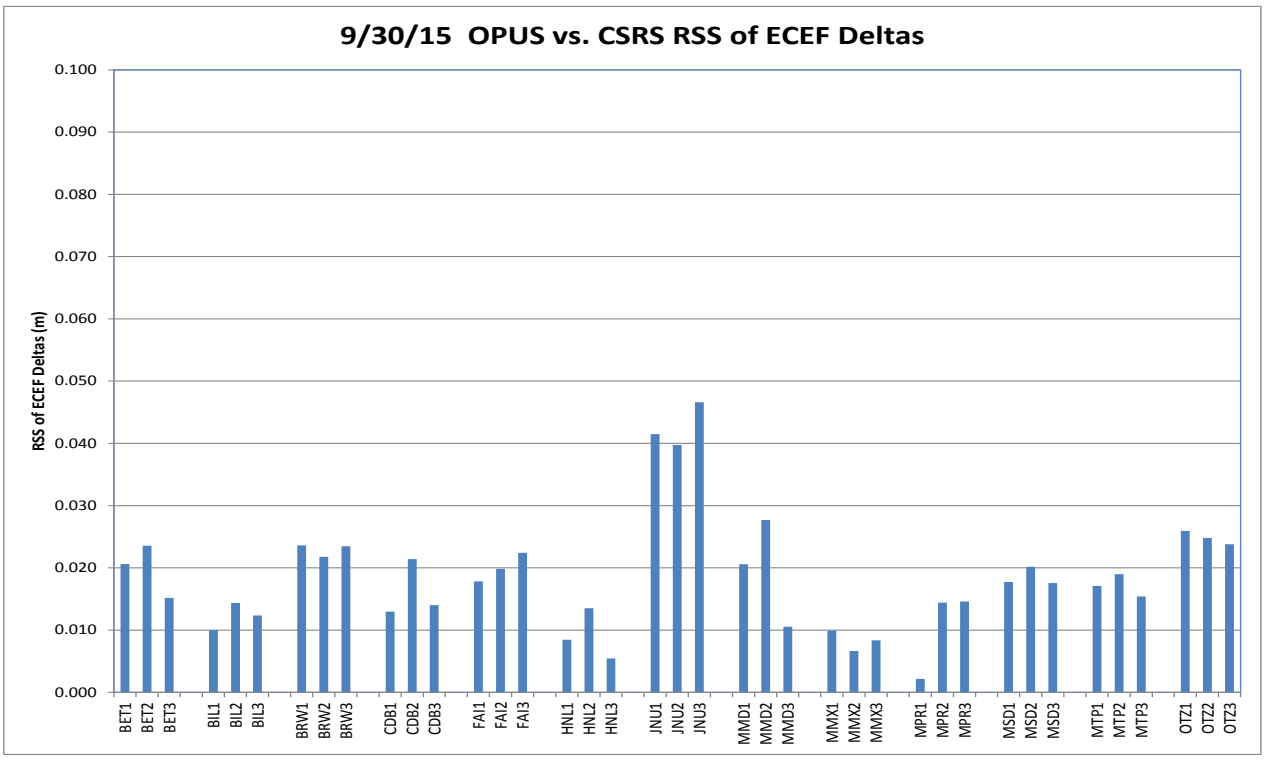


Figure 10-9 9/30/15 OPUS vs. CSRS RSS ECEF Deltas

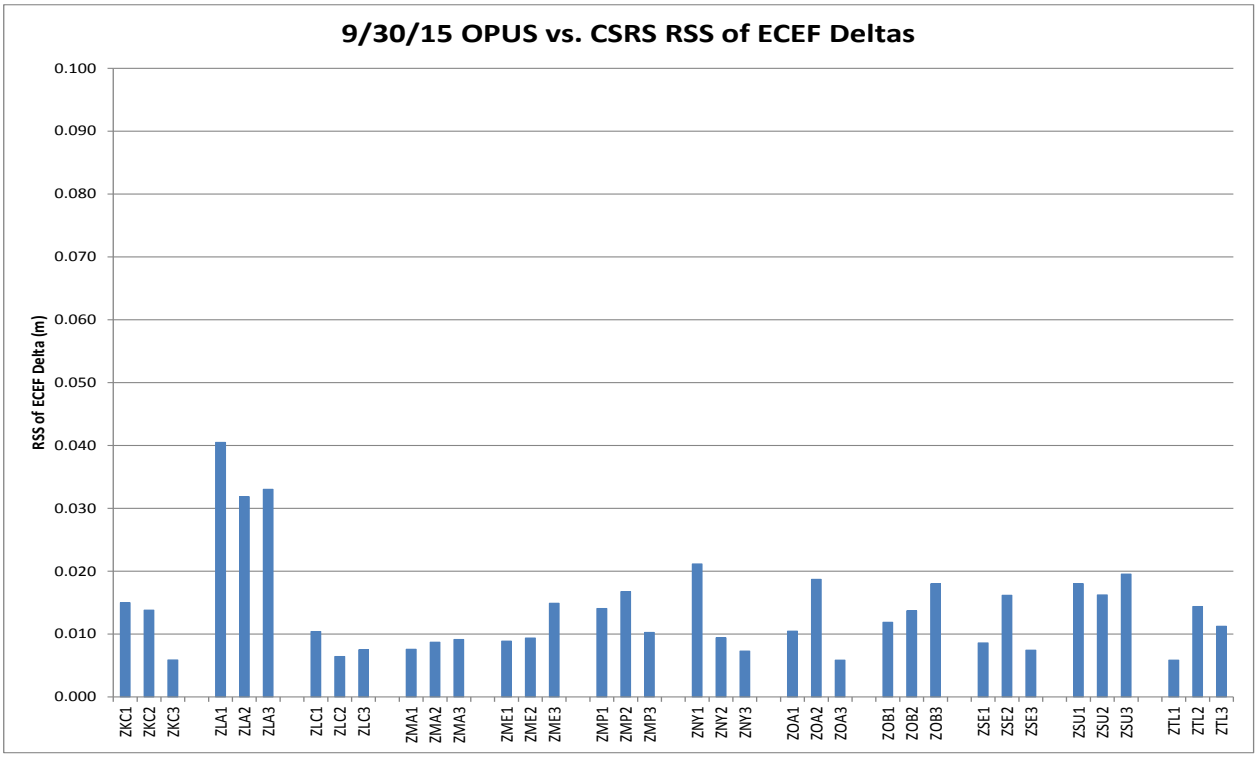


Figure 10-10 9/30/15 CSRS Survey Qualities

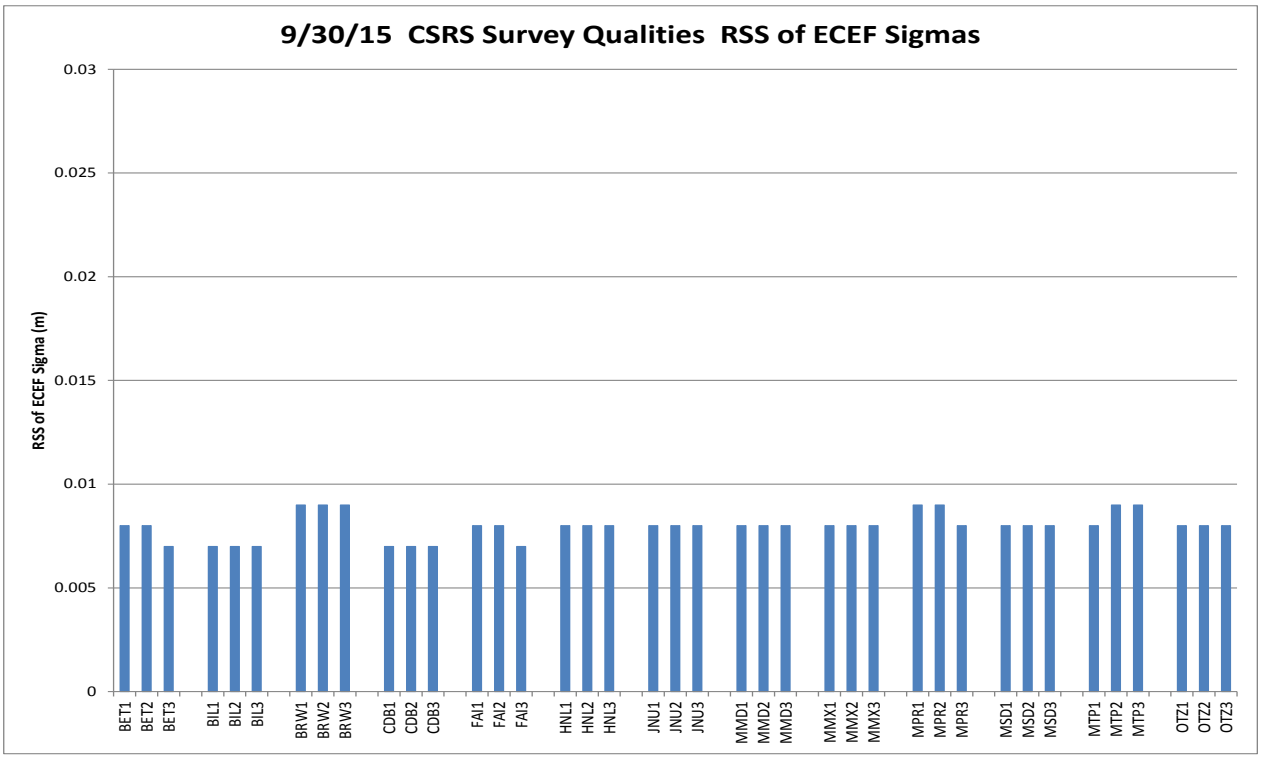


Figure 10-11 9/30/15 CSRS Survey Qualities

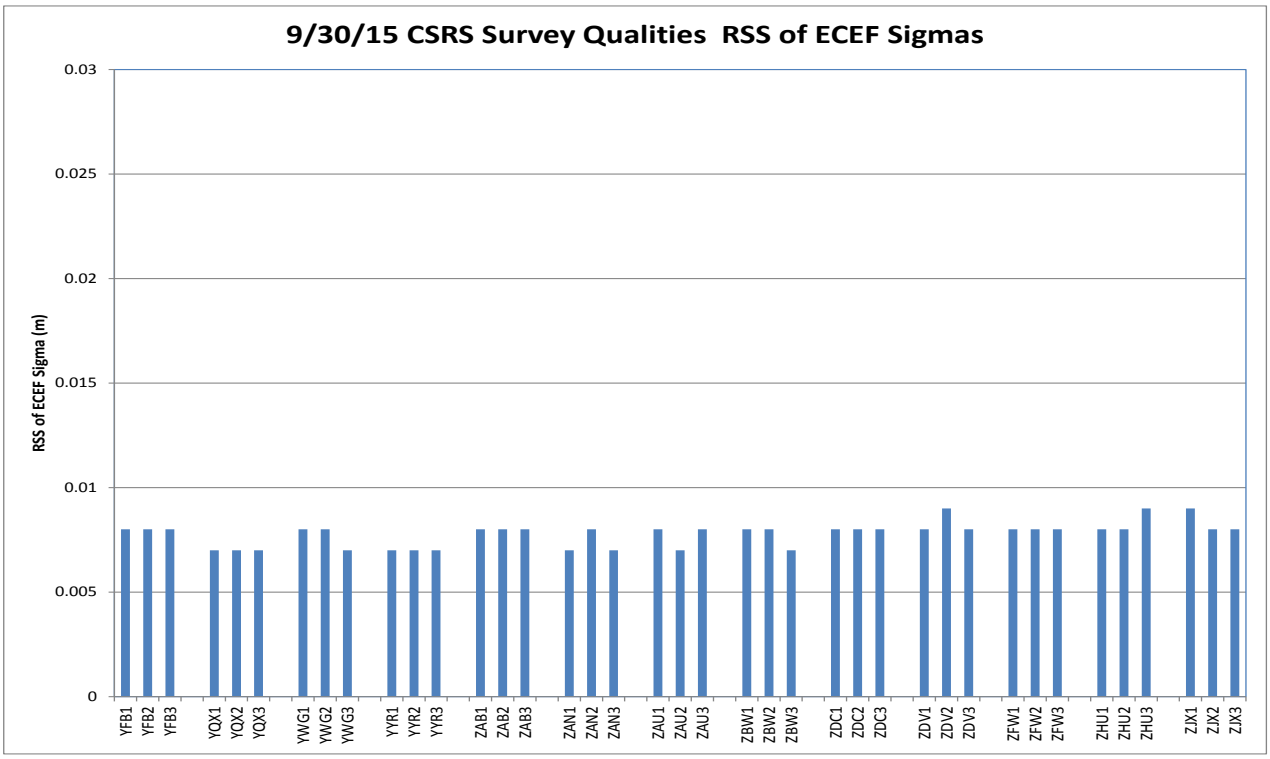
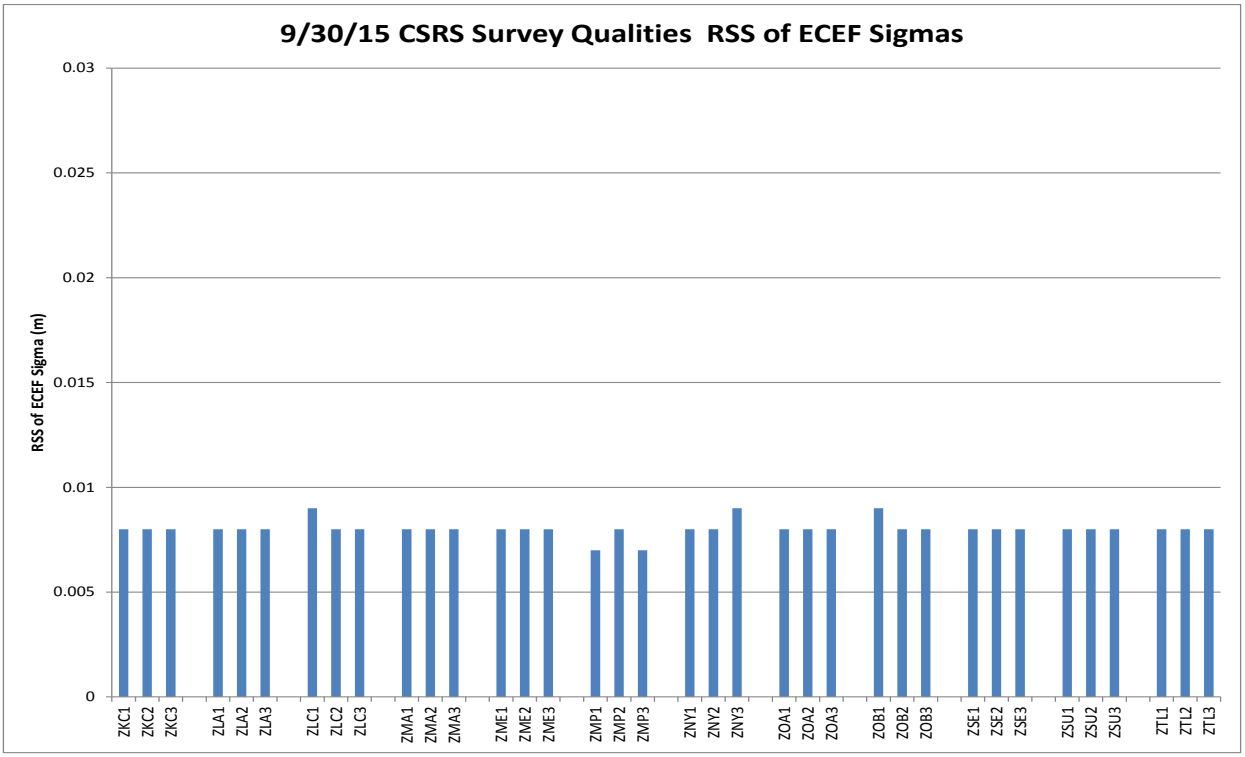


Figure 10-12 9/30/15 CSRS Survey Qualities



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. Table 11-2 shows the rollup average for the quarter. Table 11-3 shows the rollup average since January 1, 2008. Figure 11-1 shows the daily average for the four detection metrics for the quarter.

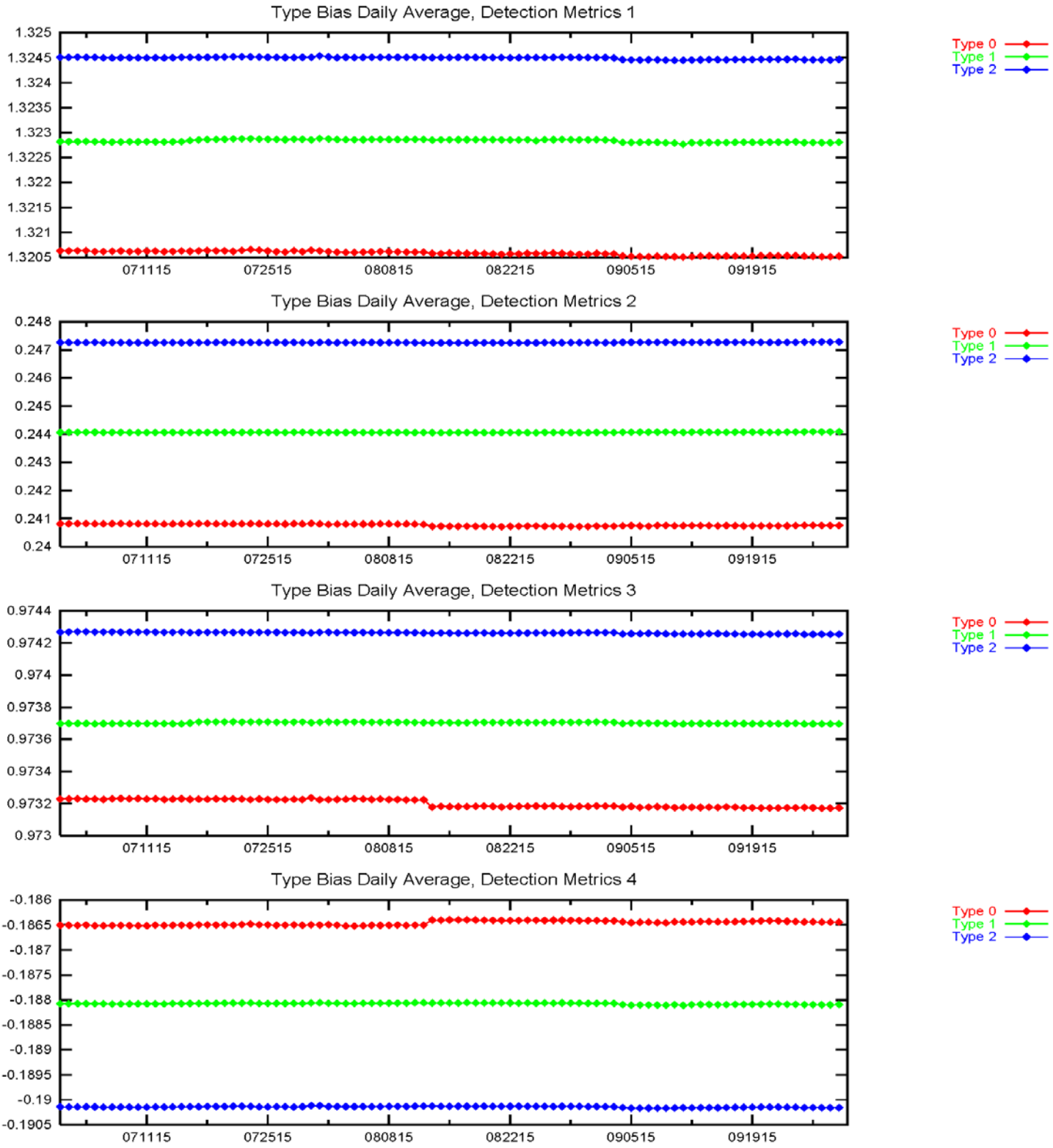
Table 11-2 Type Bias Average for the Quarter

Detection Metric	Type 0	Type 1	Type 2
DM 1	1.320590	1.322840	1.324490
DM 2	0.240770	0.244066	0.247262
DM 3	0.973202	0.973703	0.974263
DM 4	-0.186463	-0.188075	-0.190141

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

Detection Metric	Type 0	Type 1	Type 2
DM 1	1.3208600	1.3228700	1.3245700
DM 2	0.2408440	0.2440860	0.2472710
DM 3	0.9731800	0.9737080	0.9742740
DM 4	-0.1862570	-0.1880660	-0.1901100

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. The maximum average for DM1 for this quarter is PRN-23 at 0.0010853. The maximum average for DM2 is PRN-11 at 0.0002199. The maximum average for DM3 is PRN-10 at 0.0003041 and the maximum average for DM4 is PRN-23 at 0.0004479.

Figure 11-3 through Figure 11-10 show the PRN bias average trend for each SV. A NANU on July 28, 2015 caused a small spike on PRN-17 in Figure 11-7. A Network outage on July 30, 2015 caused the small spikes on PRN-14, PRN-19, and PRN-24 in Figure 11-6, Figure 11-7, and Figure 11-8. A NANU on September 11 caused a small spike on PRN-23 in Figure 11-8. PRN-10 (SVN-40) was unusable July 16, 2015. PRN-8 (SVN-72) was usable on 8/12/15.

Table 11-4 PRN Bias Average for the Quarter

PRN	SVN	DM1	DM2	DM3	DM4
1	63	0.0001533	0.0000908	0.0000738	0.0000962
2	61	0.0005679	0.0001328	0.0000932	0.0001174
3	69	0.0001221	0.0000504	0.0000718	0.0000957
4	34	0.0001978	0.0000526	0.0000639	0.0001457
5	50	0.0001257	0.0001096	0.0000601	0.0001262
6	67	0.0002125	0.0002096	0.0001505	0.0001472
7	48	0.0001358	0.0000656	0.0000343	0.0001413
8	72	0.0003837	0.0001226	0.0000323	0.0001373
9	39	0.0001624	0.0000776	0.0000912	0.0003511
10	40	0.0007673	0.0000472	0.0003041	0.0001017
11	46	0.0010002	0.0002199	0.0000661	0.0002661
12	58	0.0001478	0.0000698	0.0000890	0.0000812
13	43	0.0005637	0.0000488	0.0000693	0.0001782
14	41	0.0007218	0.0001414	0.0001278	0.0001245
15	55	0.0001394	0.0000547	0.0000237	0.0001506
16	56	0.0001346	0.0000533	0.0001369	0.0003086
17	53	0.0001717	0.0000647	0.0000440	0.0001176
18	54	0.0007323	0.0001462	0.0000507	0.0002505
19	59	0.0004908	0.0001852	0.0000567	0.0001001
20	51	0.0001501	0.0000466	0.0000306	0.0001458
21	45	0.0003991	0.0001362	0.0001724	0.0001088
22	47	0.0003472	0.0000582	0.0001009	0.0003322
23	60	0.0010853	0.0001854	0.0000375	0.0004479
24	65	0.0002298	0.0000529	0.0000344	0.0001197
25	62	0.0002922	0.0001799	0.0000754	0.0001191
26	71	0.0002676	0.0001098	0.0000626	0.0001208
27	66	0.0005911	0.0001763	0.0000682	0.0002839
28	44	0.0003101	0.0000514	0.0000324	0.0000989
29	57	0.0003179	0.0000518	0.0000883	0.0003014
30	64	0.0002147	0.0000611	0.0000492	0.0001380
31	52	0.0003498	0.0001320	0.0000282	0.0002441
32	23	0.0001743	0.0000736	0.0000903	0.0000945

Figure 11-2 PRN Bias Average for the Quarter

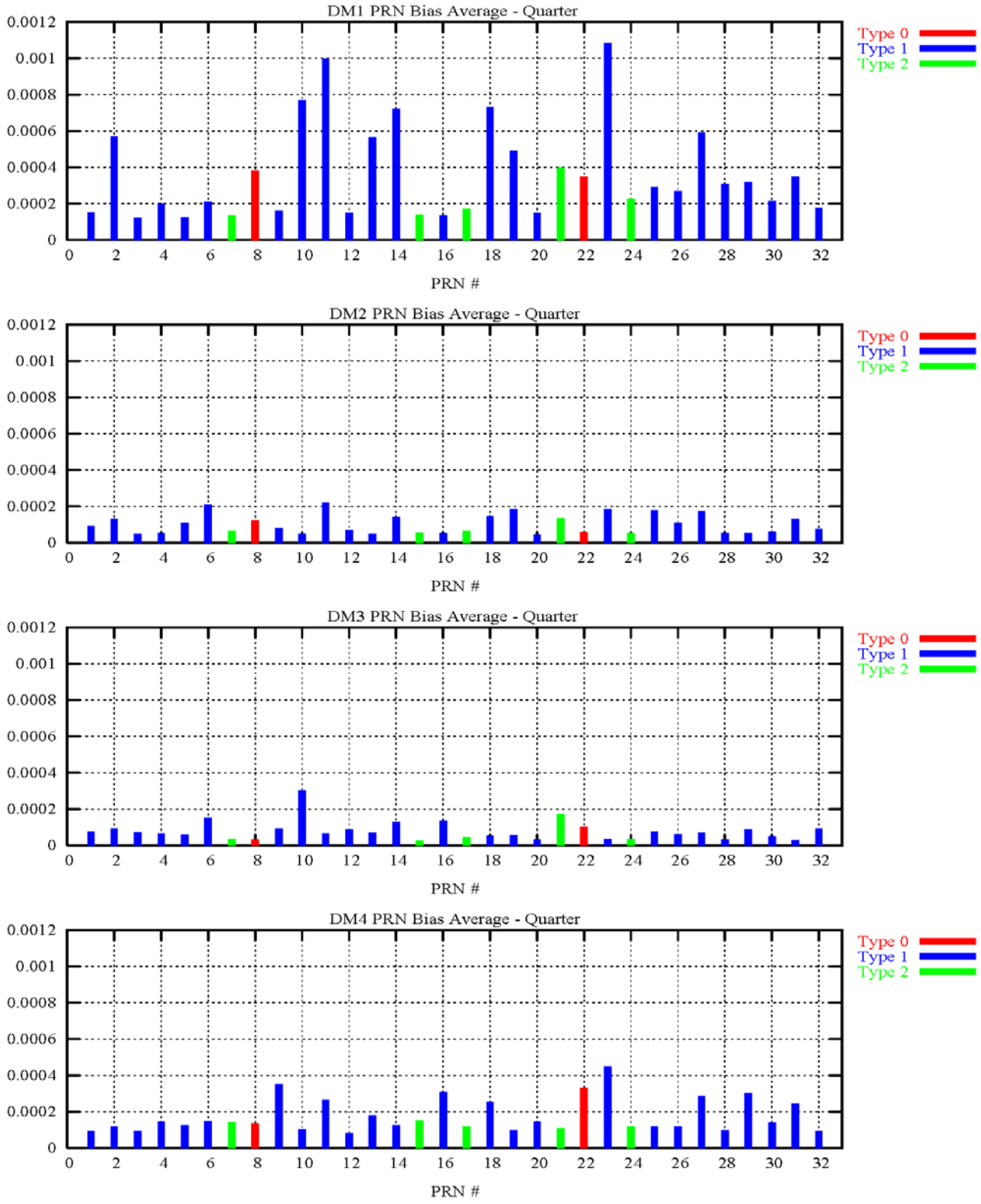


Figure 11-3 PRN Bias Average Trend (PRN-1 – PRN-4)

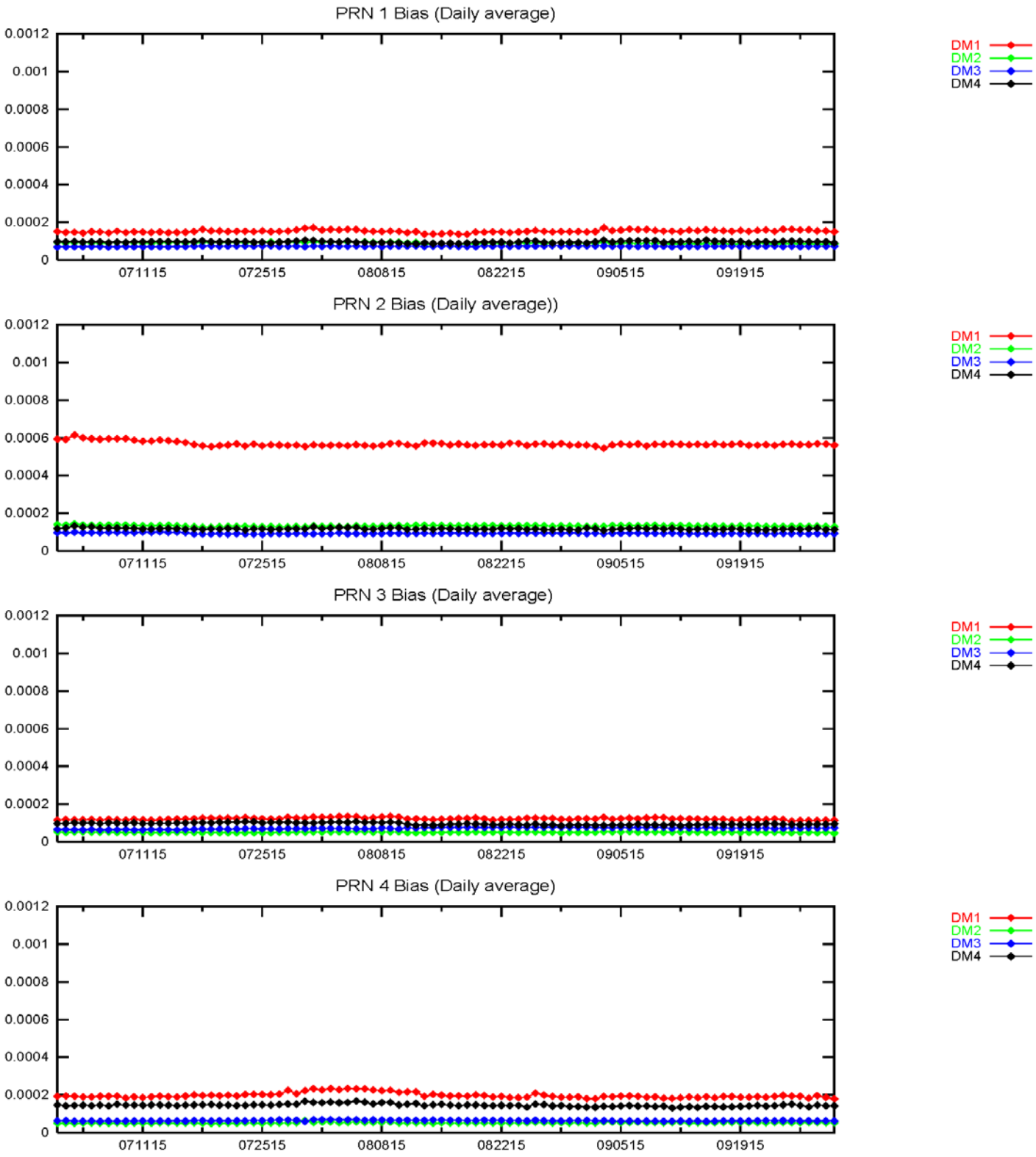


Figure 11-4 PRN Bias Average Trend (PRN-5 – PRN-8)

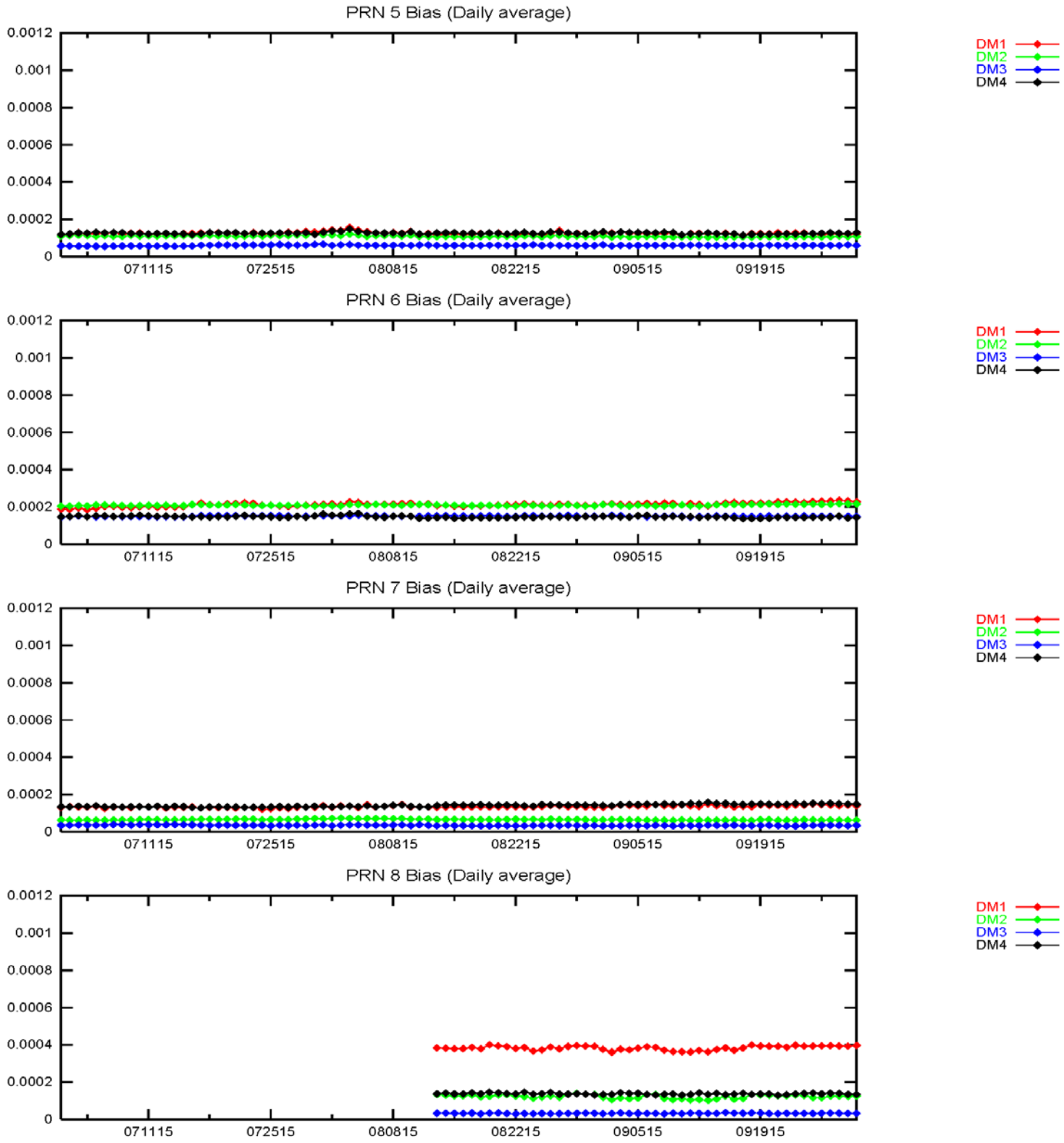


Figure 11-5 PRN Bias Average Trend (PRN-9 – PRN-12)

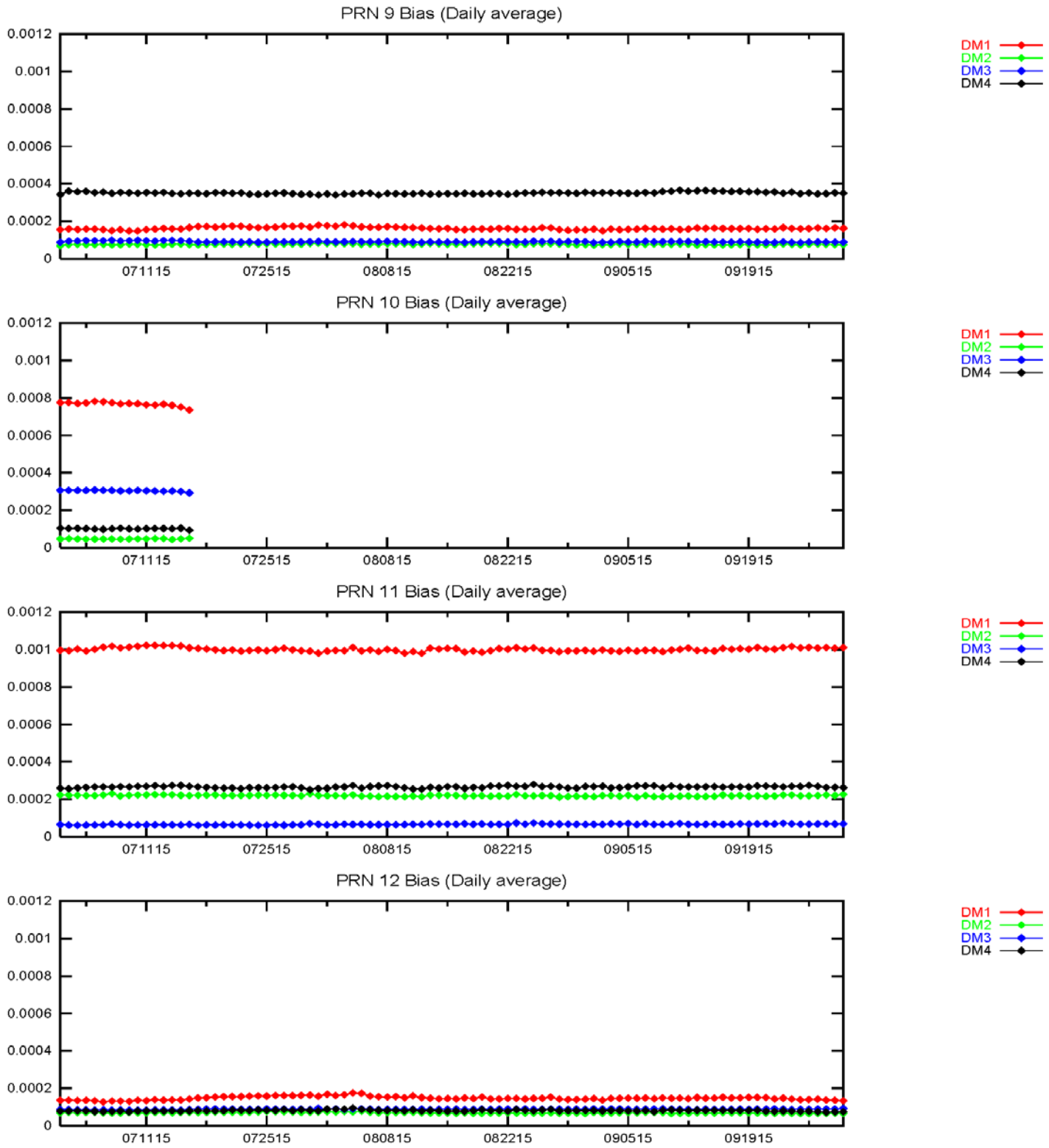


Figure 11-6 PRN Bias Average Trend (PRN-13 – PRN-16)

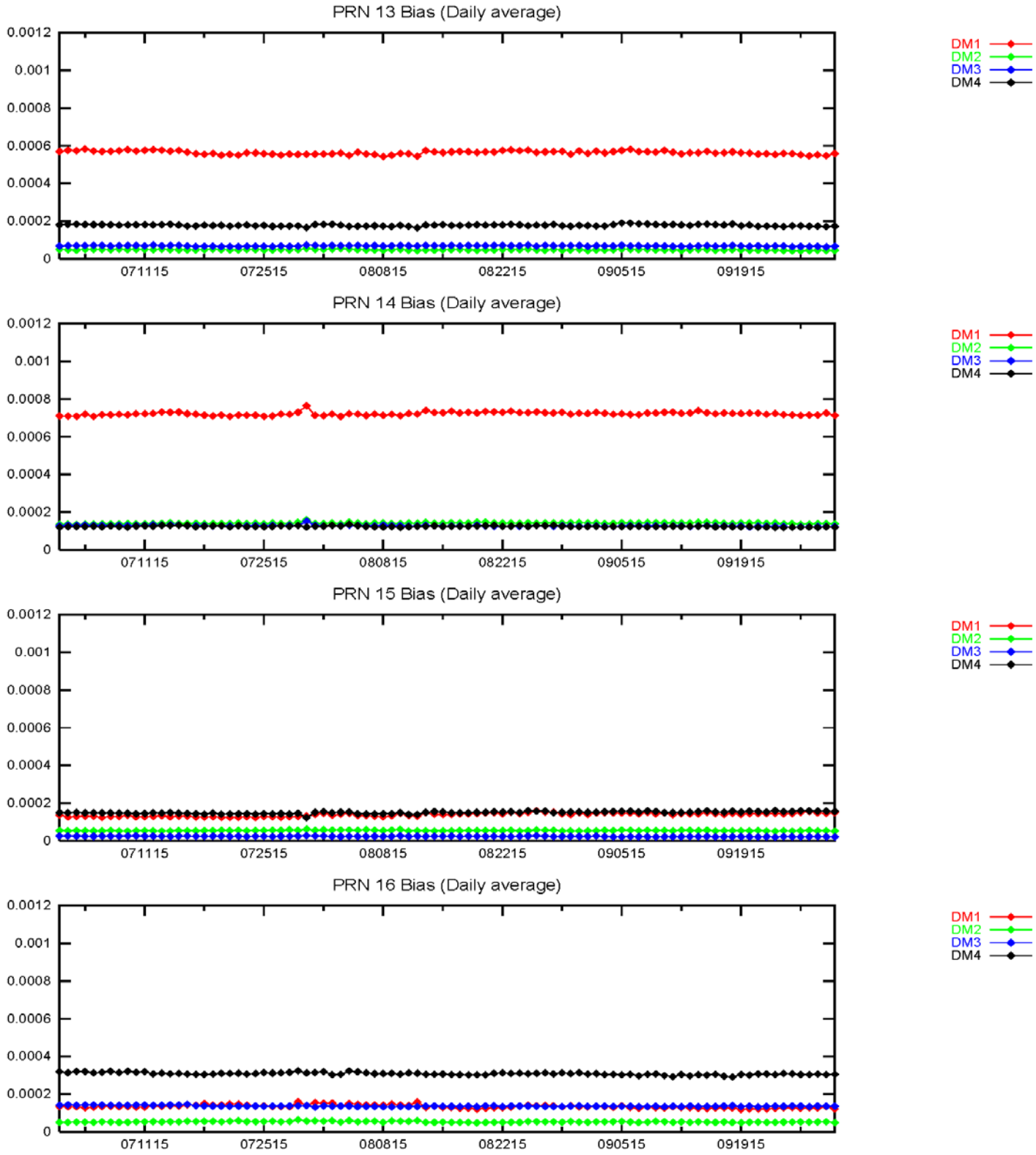


Figure 11-7 PRN Bias Average Trend (PRN-17 – PRN-20)

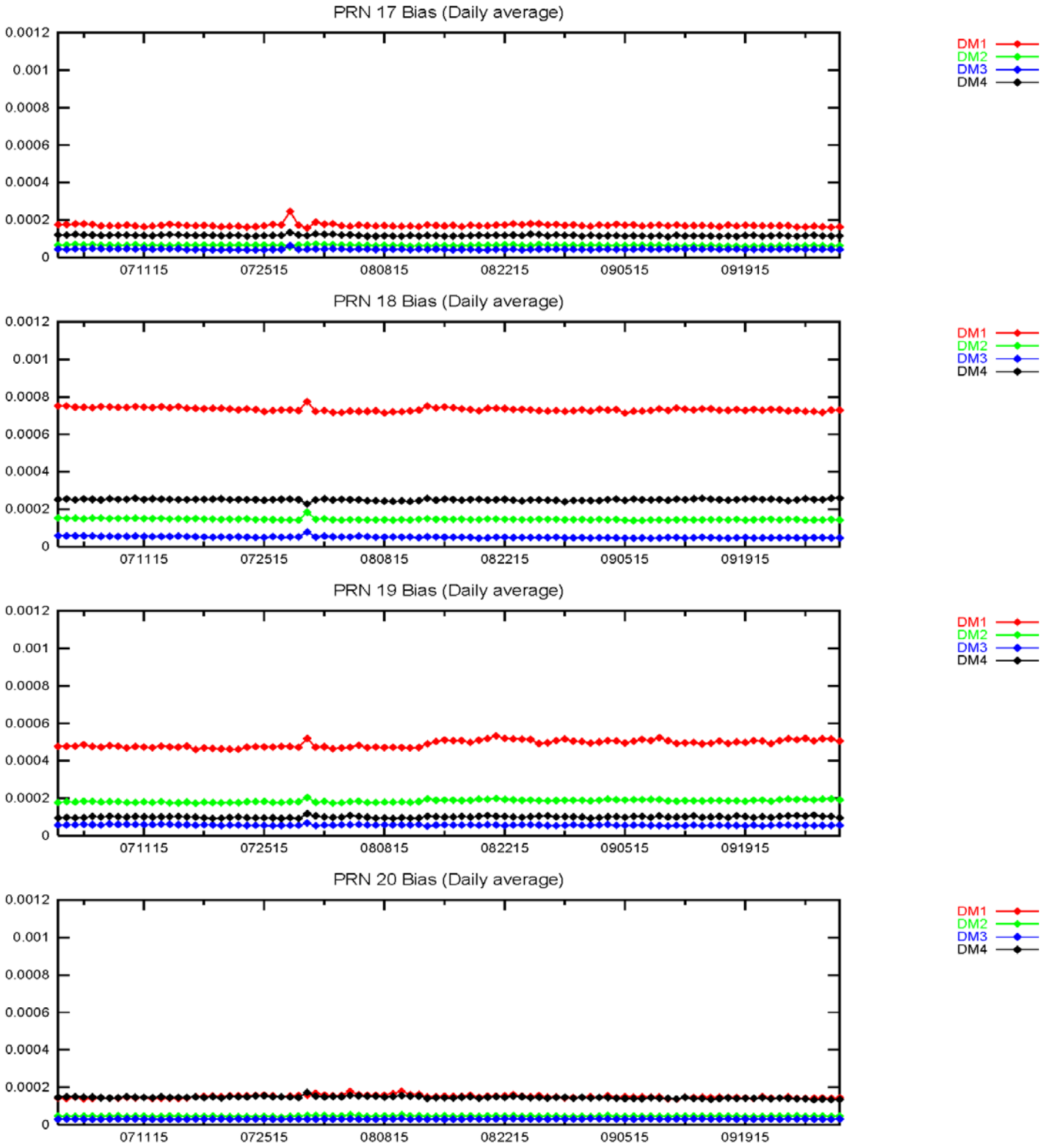


Figure 11-8 PRN Bias Average Trend (PRN-21 – PRN-24)

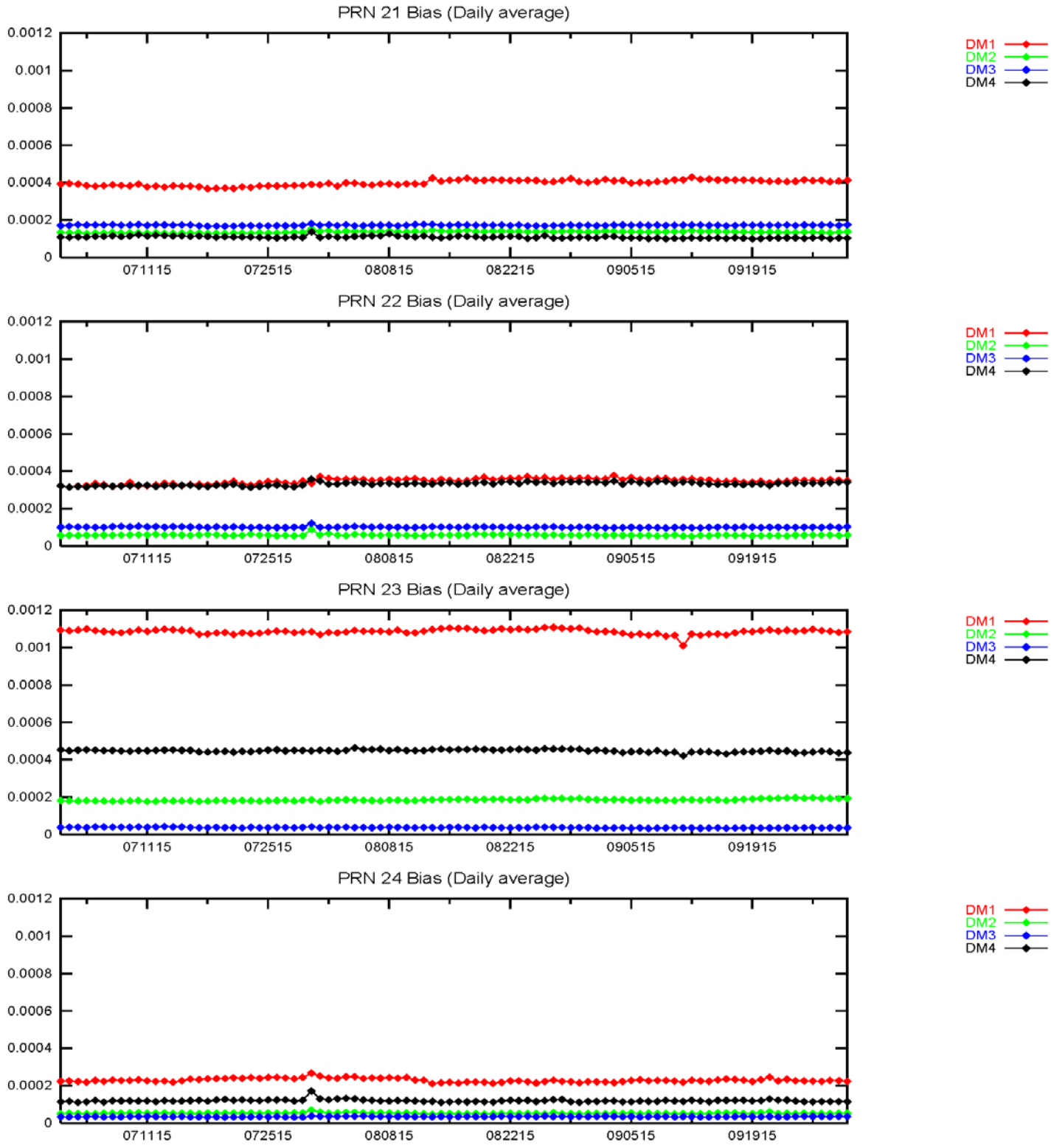


Figure 11-9 PRN Bias Average Trend (PRN-25 – PRN-28)

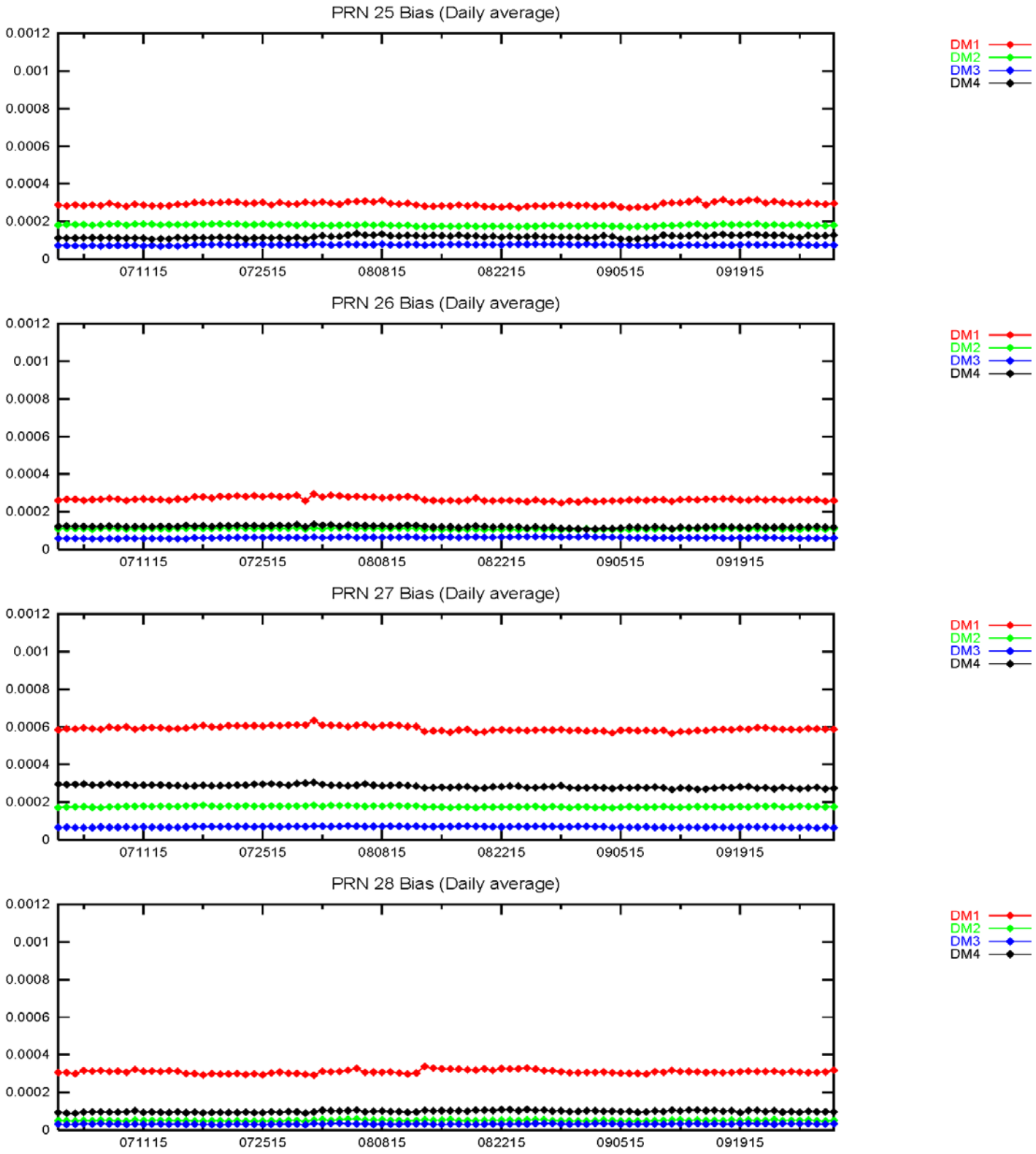
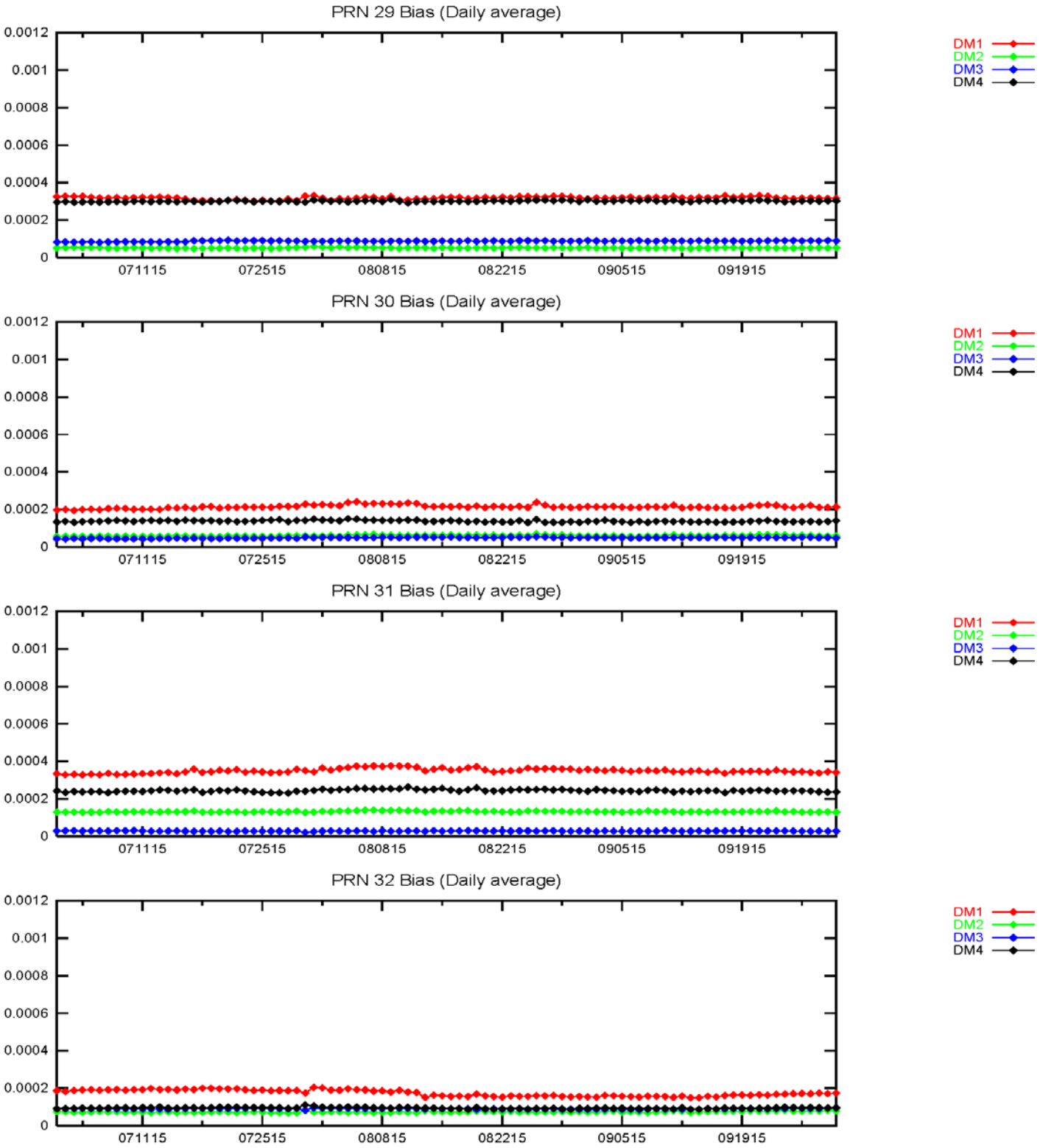


Figure 11-10 PRN Bias Average Trend (PRN-29 – PRN-32)



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. 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.

The analysis presented is for July and August 2015. This is the last reporting period for the G3 receiver analysis. All of the analysis to date has supported a positive deployment decision for SSM-WAAS-043 which began cutover in August 2015.

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. Figure 12-1 through Figure 12-6 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 0.925 meters at Miami-4 and 1.583 meters at Fairbanks-4, respectively. The minimum 95% horizontal and vertical LPV errors are 0.574 meters at Chicago-5 and 0.832 meters at Seattle-5, respectively.

Figure 12-7 through Figure 12-10 show the distributions of the vertical and horizontal errors for all 12 G3 receivers combined in triangle charts and 2-D histogram plots for the quarter. The triangle charts in Figure 12-7 and Figure 12-8 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 level. 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 Figure 12-9 and Figure 12-10 show the distributions of horizontal and vertical position errors and normalized position errors. The blue trace shows the distributions of the actual horizontal and vertical 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 horizontal and vertical errors normalized by one-sigma value of the protection level; horizontal - (HPL/6.0) and vertical - (VPL/5.33). 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 12-1 PA Evaluation Sites for G3 Receivers

Location	Days Evaluated	Samples
Boston-4	46	3958786
Boston-5	54	4653732
Chicago-4	61	5257274
Chicago-5	55	4740273
Fairbanks-4	43	3748601
Fairbanks-5	55	4774213
Honolulu-4	59	5100932
Honolulu-5	59	5108334
Miami-4	61	5257759
Miami-5	61	5253408
Seattle-4	61	5256775
Seattle-5	61	5257700

Table 12-2 PA 95% Horizontal and Vertical Accuracy for G3 Receivers

Location	Horizontal (HAL = 40 meters)	Horizontal (HAL = 556 meters)	Vertical (VAL = 50 meters)	Percentage in PA Mode
Boston-4	0.726	0.726	0.958	100
Boston-5	0.761	0.761	0.944	100
Chicago-4	0.83	0.83	0.922	100
Chicago-5	0.574	0.574	0.906	100
Fairbanks-4	0.863	0.863	1.583	100
Fairbanks-5	0.655	0.655	1.131	100
Miami-4	0.925	0.925	1.281	100
Miami-5	0.856	0.856	1.087	100
Seattle-4	0.583	0.583	0.851	100
Seattle-5	0.785	0.785	0.832	100
No Service or PA Mode required.				
Honolulu-4	3.376	8.295		99.45365
Honolulu-5	3.4	8.453		99.45453

* 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-4	2.663	0.192	0.192	2.364	0.116	0.134
Boston-5	2.706	0.195	0.195	2.634	0.129	0.148
Chicago-4	1.886	0.196	0.196	2.649	0.177	0.177
Chicago-5	1.598	0.165	0.165	2.593	0.157	0.182
Fairbanks-4	1.898	0.166	0.166	4.664	0.149	0.215
Fairbanks-5	1.99	0.163	0.163	4.62	0.223	0.223
Miami-4	2.037	0.161	0.161	3.065	0.137	0.15
Miami-5	1.852	0.158	0.158	4.35	0.17	0.17
Seattle-4	2.19	0.205	0.205	4.318	0.233	0.233
Seattle-5	1.946	0.181	0.181	3.111	0.164	0.168
No Service or PA Mode required. Max Ratio not available with no service						
Honolulu-4	6.925	0.101		16.245	0.189	
Honolulu-5	7.053	0.103		16.341	0.19	

* 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

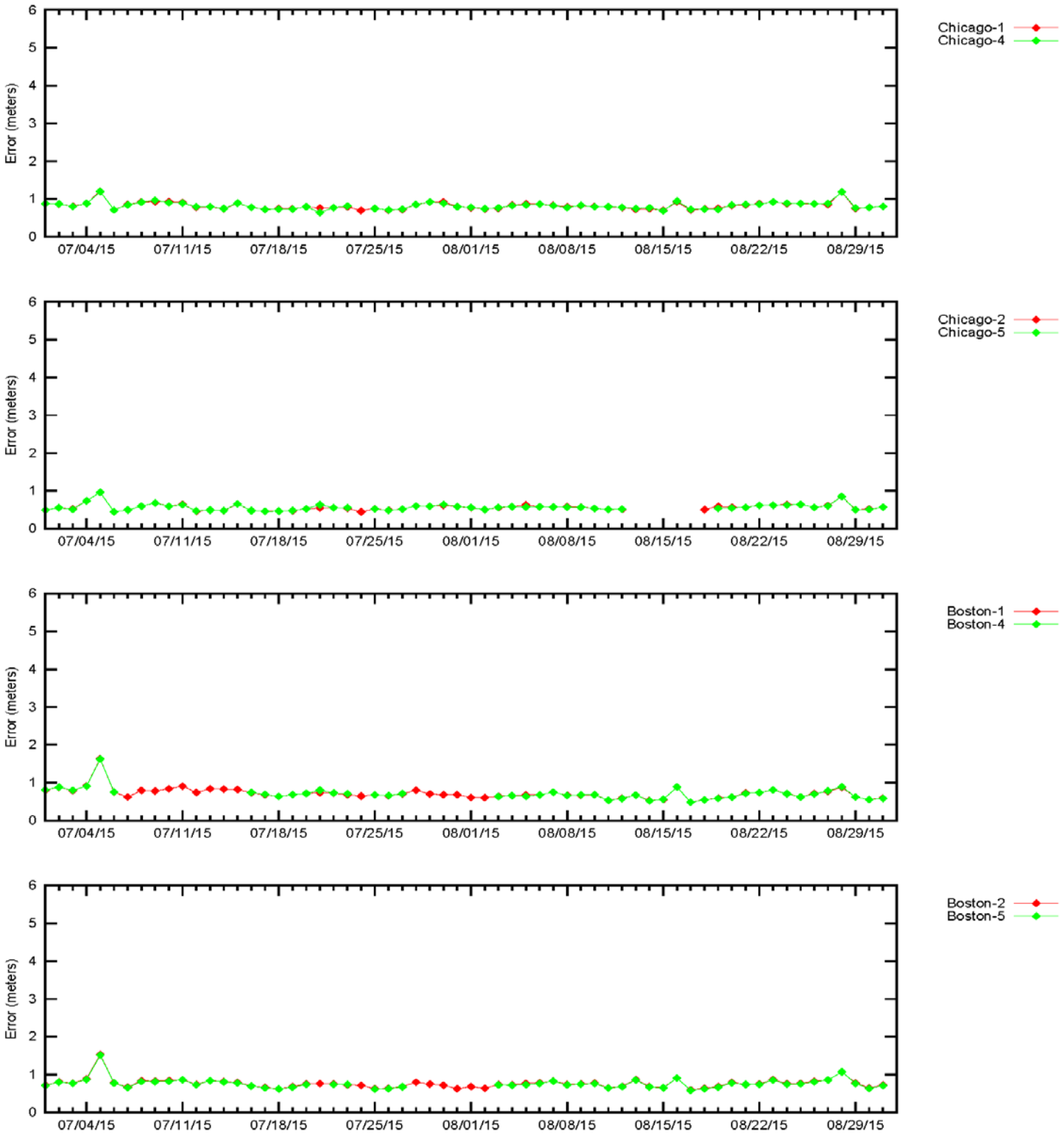


Figure 12-2 LPV 95% Horizontal Accuracy

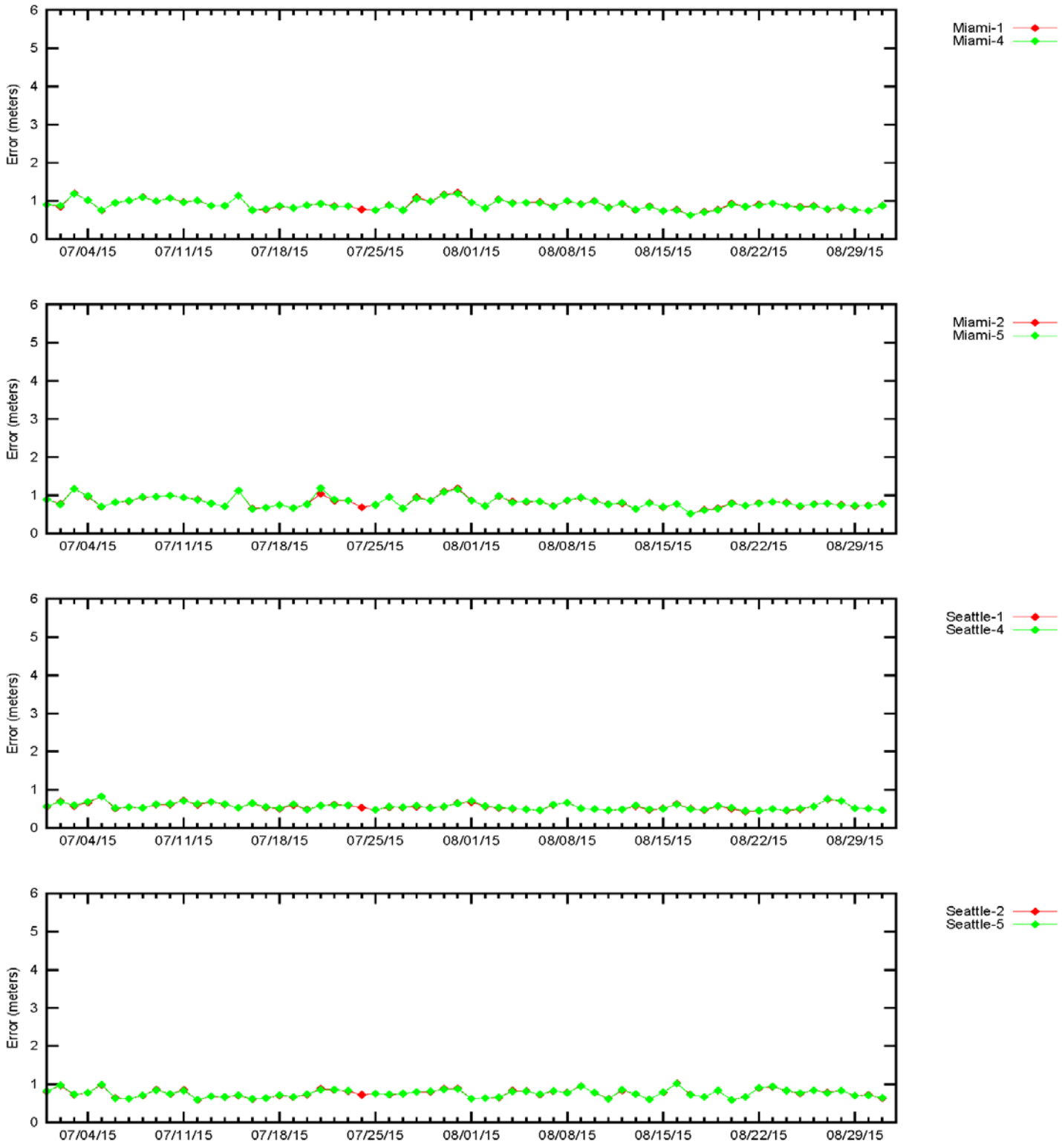


Figure 12-3 LPV 95% Horizontal Accuracy

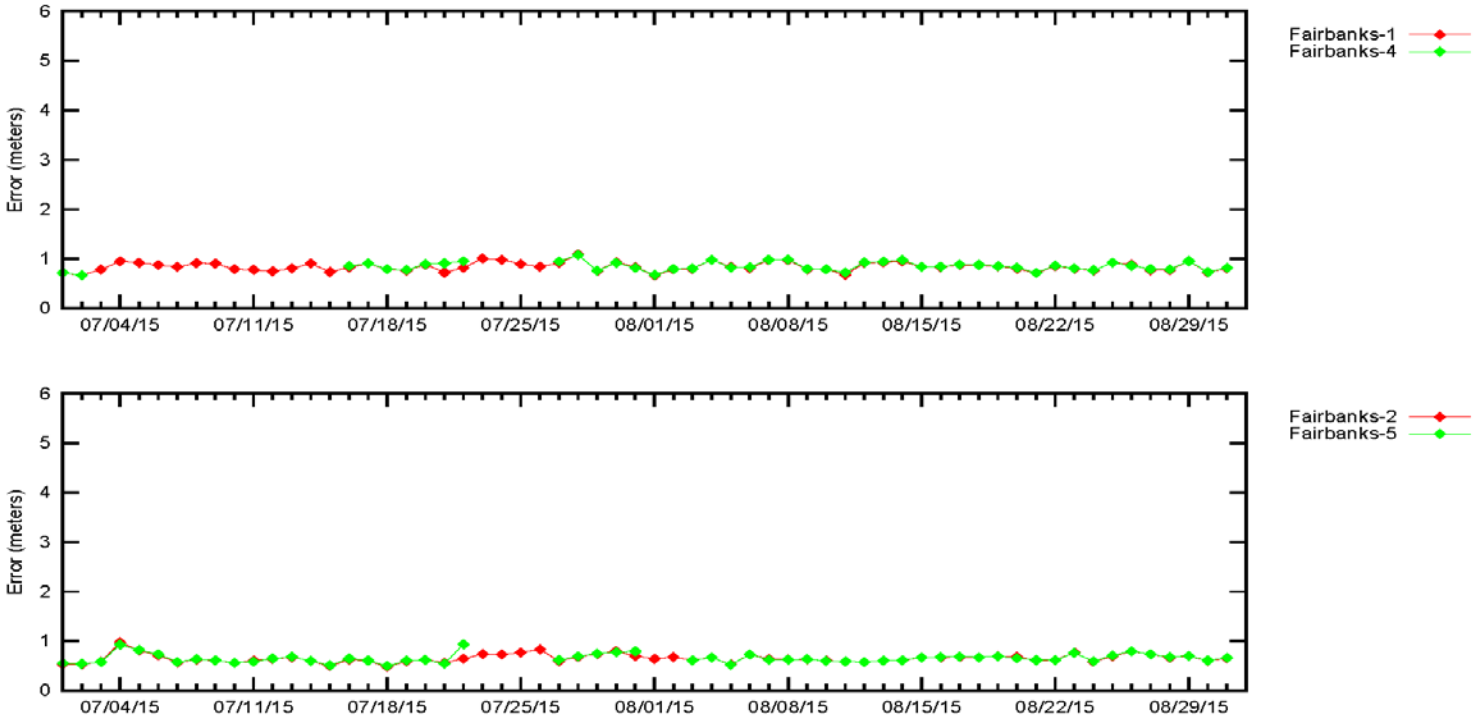


Figure 12-4 LPV 95% Vertical Accuracy

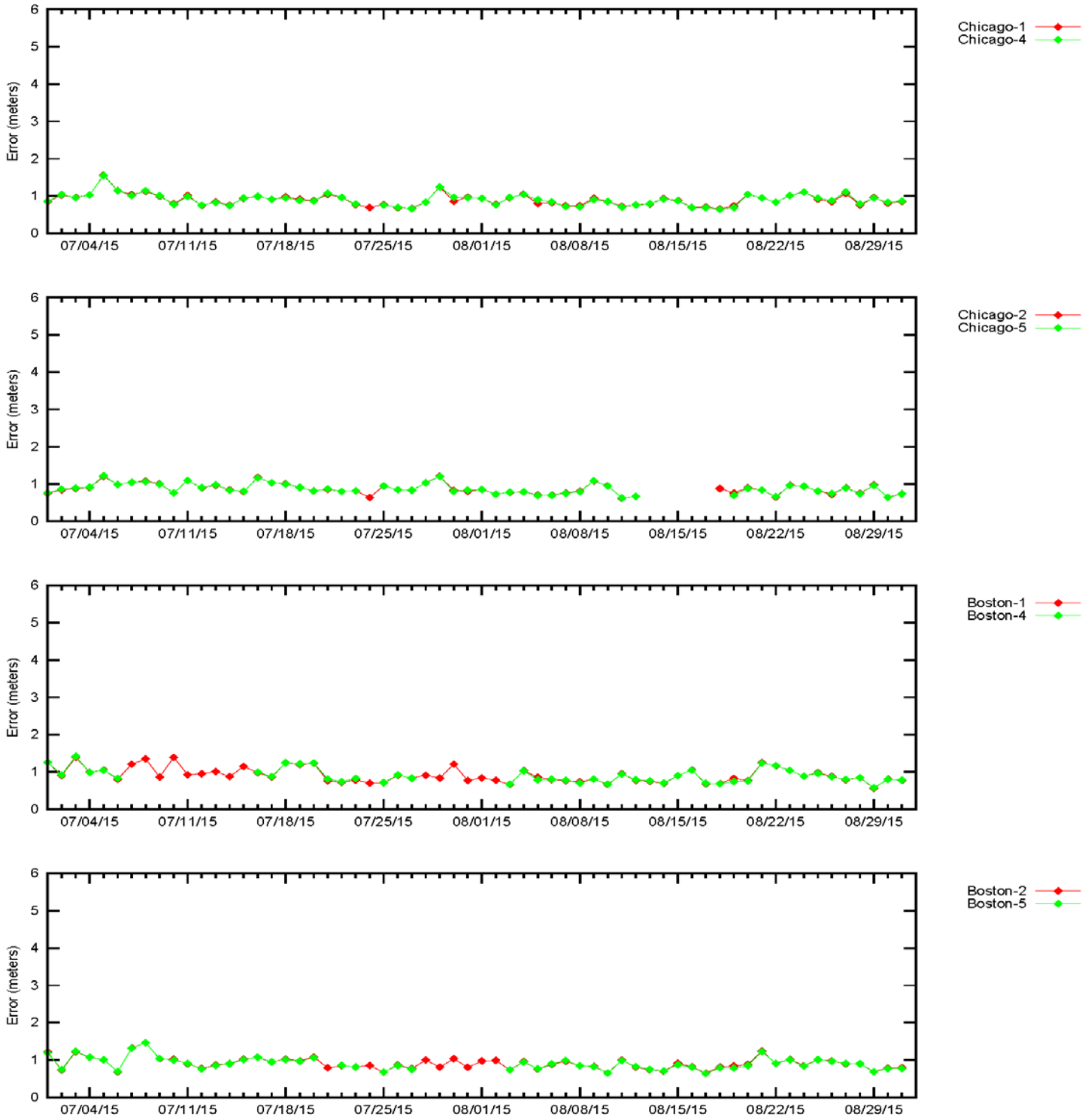


Figure 12-5 LPV 95% Vertical Accuracy

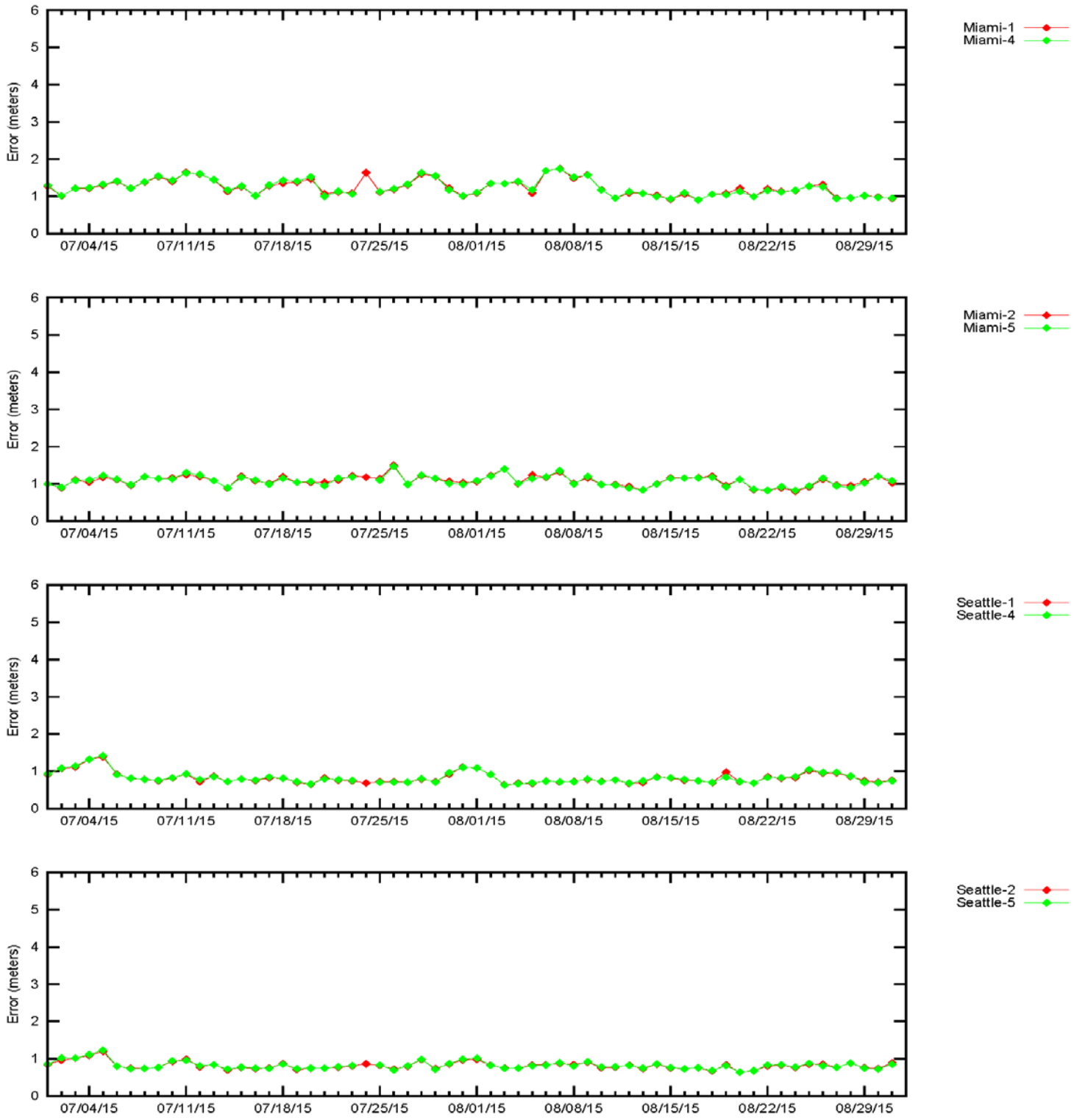


Figure 12-6 LPV 95% Vertical Accuracy

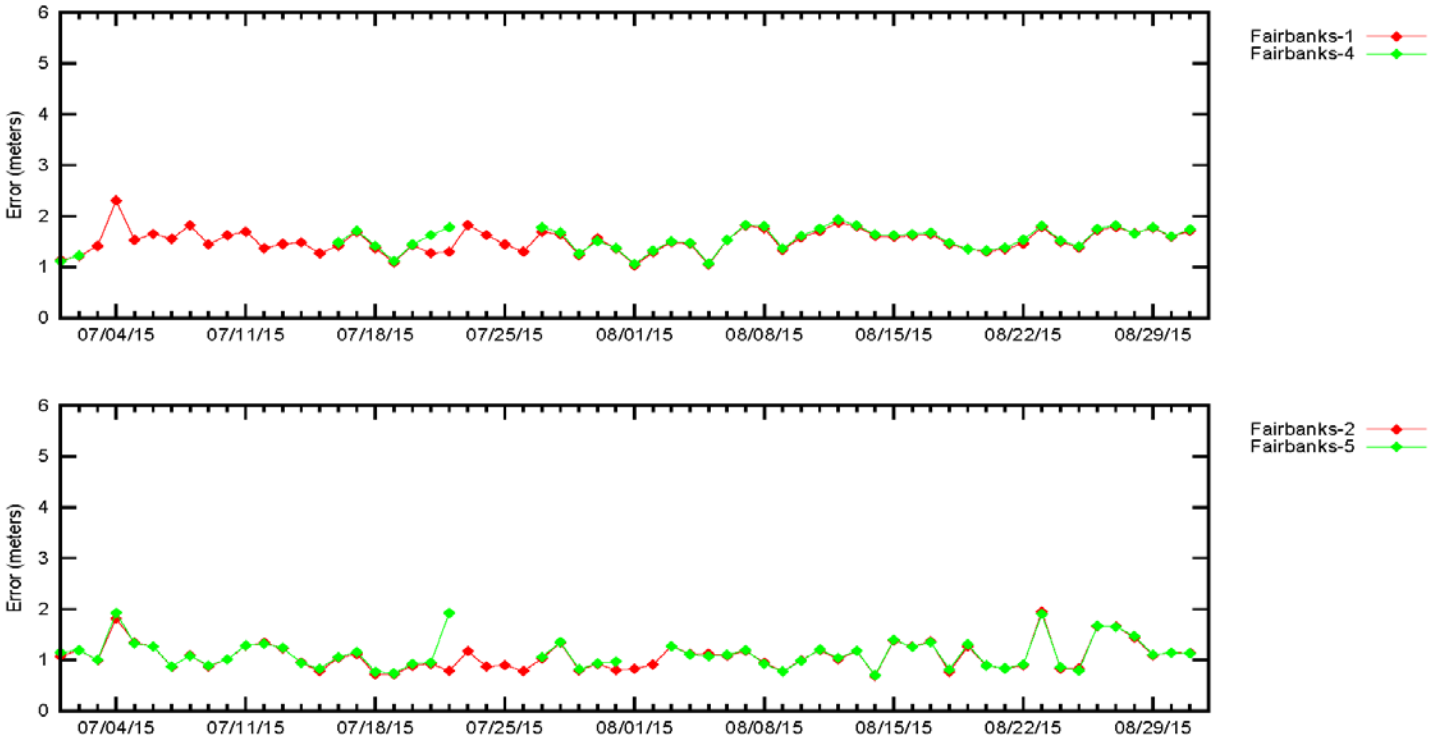


Figure 12-7 LPV Horizontal Error Distribution Histogram

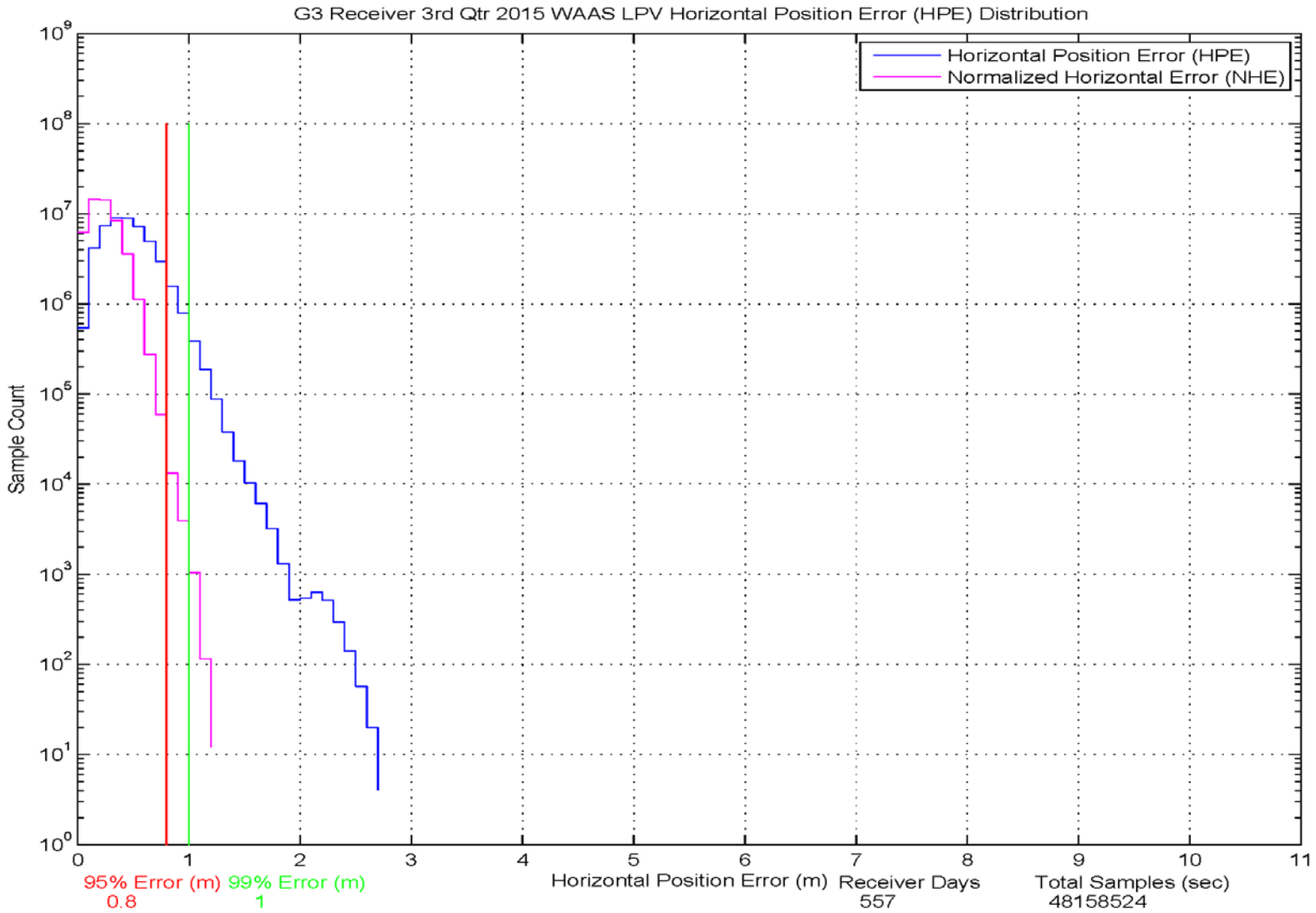


Figure 12-8 LPV Vertical Error Distribution Histogram

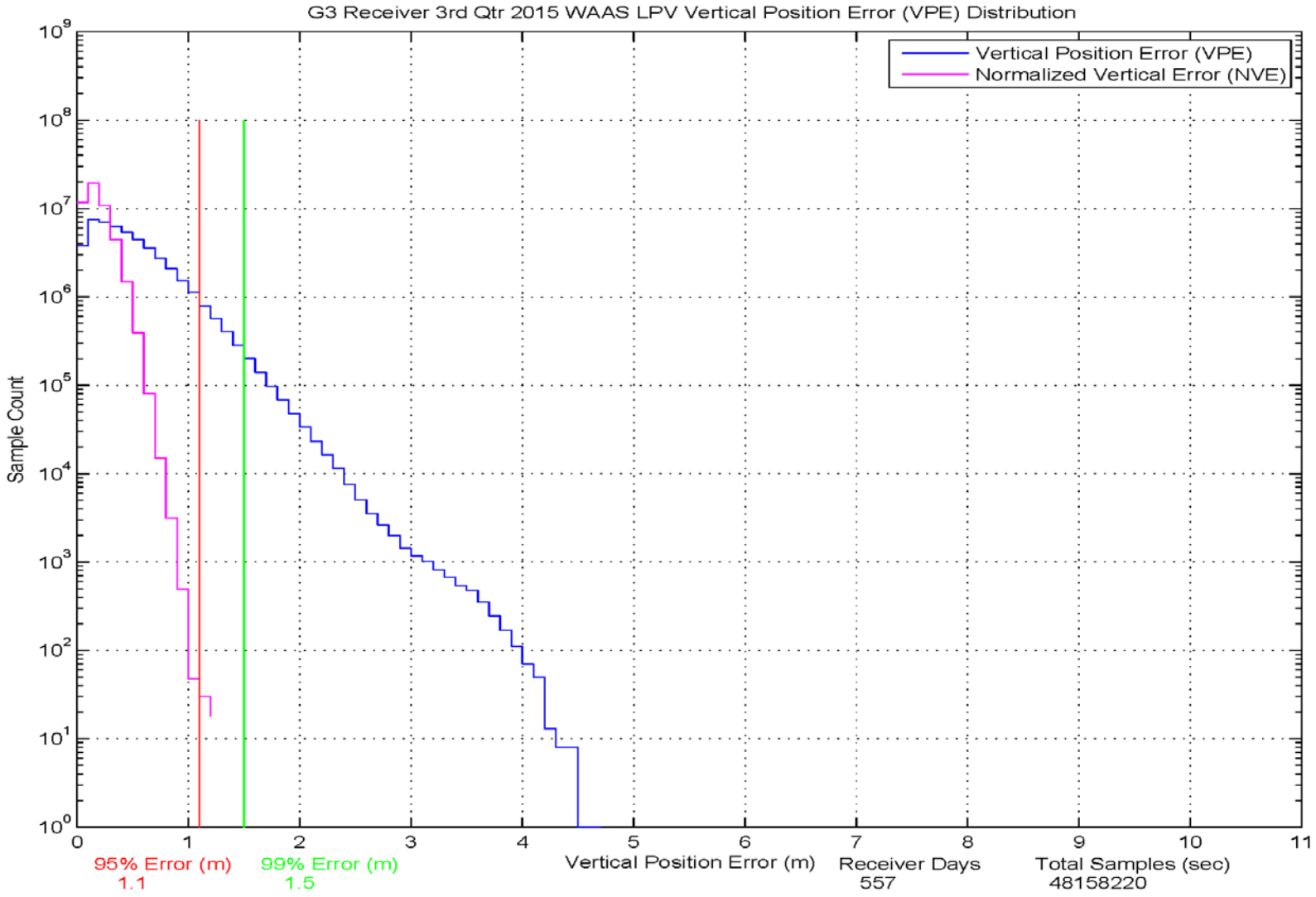


Figure 12-9 LPV 95% Horizontal Error Bounding Triangle Chart

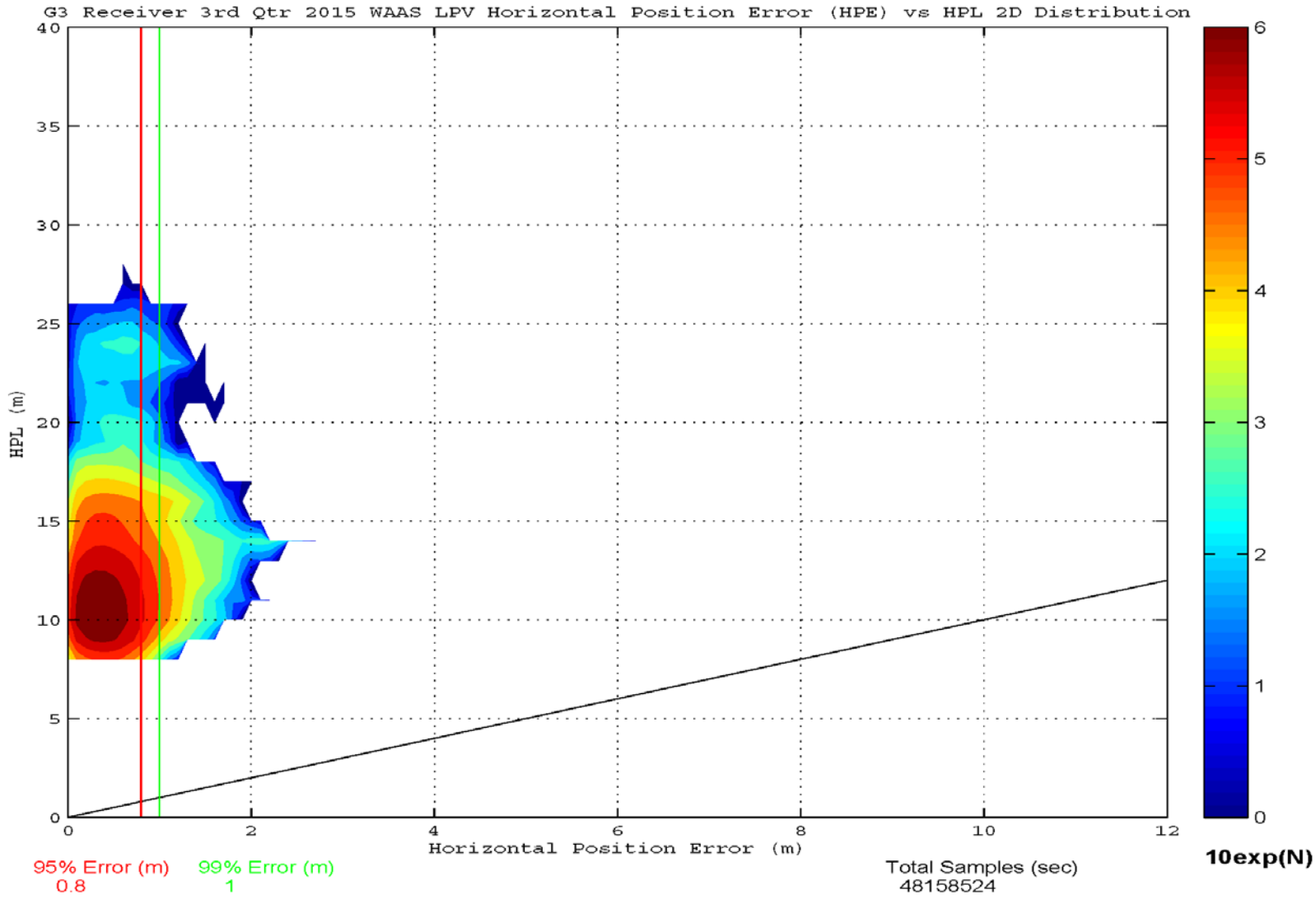
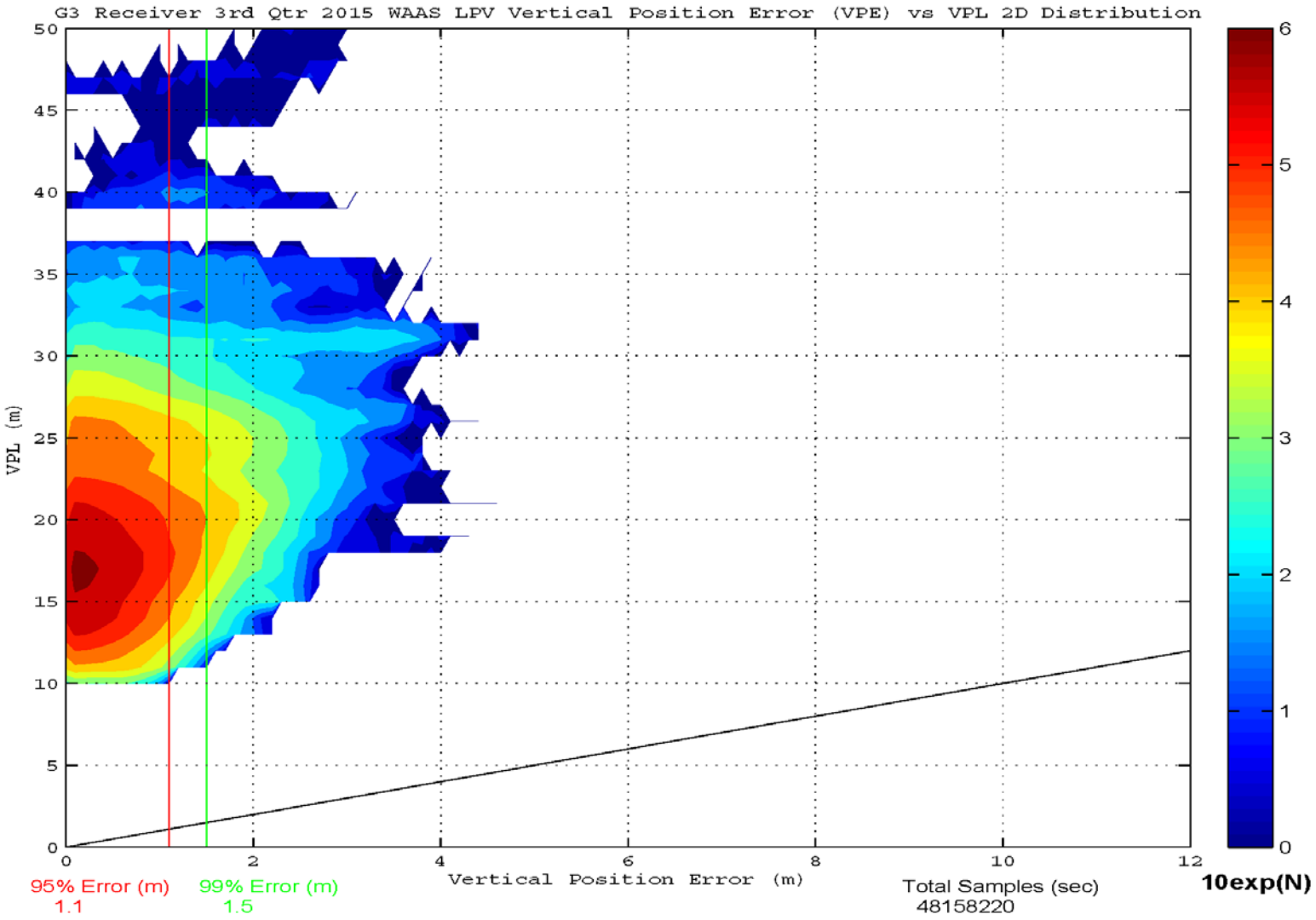


Figure 12-10 LPV 95% Vertical Error Bounding Triangle Chart



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 12-4 and Table 12-5 show the range error 95% index and 99.9% 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% 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 12-6 and Table 12-7 show the ionospheric error 95% index and 99.9% bounding statistics for each SV at the test locations.

Table 12-4 Range Error 95% Index and 99.9% Bounding

Site →	Chicago 4		Chicago 5		Boston 4		Boston 5		Seattle 4		Seattle 5	
SV ↓	95% Range Error (m)	99.9% Bounding (%)	95% Range Error (m)	99.9% Bounding (%)	95% Range Error (m)	99.9% Bounding (%)	2.988	100	95% Range Error (m)	99.9% Bounding (%)	95% Range Error (m)	99.9% Bounding (%)
1	3.206	99.99551	3.214	99.96683	3.082	100	2.513	100	2.746	100	3.46	100
2	2.813	100	2.54	100	2.411	100	2.797	100	2.431	100	2.652	100
3	2.554	100	3.114	100	2.41	100	1.544	100	2.569	100	2.559	100
4	1.841	100	1.591	100	1.348	100	1.497	100	1.209	100	1.43	100
5	1.297	100	1.531	100	1.495	100	3.087	100	2.404	100	1.933	100
6	2.904	99.99993	3.538	98.81726	2.896	100	1.07	100	2.848	100	3.156	100
7	1.334	100	1.848	100	1.169	100	2.151	100	1.119	100	1.483	100
8	2.766	100	1.974	100	1.934	100	2.189	100	1.796	100	2.251	100
9	2.697	100	2.396	100	2.53	100	0.799	100	1.785	100	2.417	100
10	1.423	100	1.115	100	0.927	100	1.104	100	1.999	100	1.519	100
11	1.346	100	0.899	100	1.782	100	1.678	100	1.505	100	1.779	100
12	1.677	100	1.227	100	1.382	100	1.27	100	1.404	100	0.894	100
13	1.373	100	1.199	100	1.183	100	0.837	100	1.059	100	1.037	100
14	0.92	100	1.011	100	1.093	100	1.393	100	1.184	100	0.981	100
15	1.265	100	2.067	100	1.437	100	0.93	100	0.892	100	1.082	100
16	2.61	100	1.089	100	1.193	100	0.916	100	1.128	100	1.227	100
17	0.974	100	1.103	100	1.018	100	1.335	100	0.821	100	1.223	100
18	1.61	100	1.162	100	1.074	100	2.287	100	1.495	100	1.434	100
19	2.809	100	2.537	100	3.225	100	1.19	100	3.182	100	2.461	100
20	1.826	100	1.197	100	2.192	100	0.995	100	1.386	100	1.721	100
21	1.35	100	1.514	100	1.561	100	2.411	100	1.482	99.99993	1.415	99.99987
22	2.495	100	2.181	100	2.031	100	1.822	100	2.625	100	2.538	100
23	1.994	100	1.638	100	2.3	100	3.348	100	2.266	100	2.23	100
24	2.641	100	2.88	100	2.731	100	2.161	100	2.559	100	2.202	100
25	2.387	100	2.159	100	2.115	100	2.954	100	1.695	100	1.798	100
26	3.073	100	2.651	100	2.665	100	2.272	100	2.119	100	2.993	100
27	2.444	100	2.356	100	2.225	100	1.091	100	2.123	100	2.318	100
28	1.24	100	1.087	100	1.235	100	1.617	100	1.302	100	1.43	100
29	1.189	100	1.377	100	1.307	100	2.392	100	0.917	100	1.415	100
30	2.636	100	2.457	100	2.09	100	0.986	100	1.611	100	1.979	100
31	1.206	100	1.344	100	0.84	100	0.989	100	0.725	100	0.944	100
32	0.87	100	1.129	100	0.883	100	1.662	100	0.763	100	0.698	100
135	2.013	100	1.546	100	3.079	100	1.912	100	1.36	100	2.033	100
138	2.218	100	1.522	100	1.179	100	2.988	100	1.386	100	1.472	100

Table 12-5 Range Error 95% Index and 99.9% Bounding

Site →	Miami 4		Miami 5		Fairbanks 4		Fairbanks 5	
SV ↓	95% Range Error (m)	99.9% Bounding (%)	95% Range Error (m)	99.9% Bounding (%)	95% Range Error (m)	99.9% Bounding (%)	95% Range Error (m)	99.9% Bounding (%)
1	3.05	100	3.843	100	2.748	100	3.162	99.87876
2	2.53	100	2.447	100	2.718	100	2.469	100
3	2.75	100	3.117	100	2.777	100	3.261	99.90977
4	1.543	100	1.442	100	1.23	100	1.729	100
5	1.29	100	1.372	100	1.215	100	2.119	100
6	3.445	100	3.393	100	3.087	100	3.684	99.4842
7	1.177	100	1.097	100	1.289	100	1.686	100
8	2.322	100	2.228	100	1.87	100	2.181	100
9	2.575	100	2.507	100	2.188	100	2.734	100
10	1.29	100	2.048	100	1.908	100	2.198	100
11	0.919	100	1.399	100	1.742	100	1.618	100
12	0.978	100	1.07	100	1.18	100	1.342	100
13	1.056	100	1.016	100	1.256	100	1.062	99.99994
14	0.85	100	1.24	100	1.343	100	1.272	100
15	1.143	100	1.293	100	0.884	100	1.562	100
16	1.201	100	1.766	100	1.468	100	1.33	100
17	1.163	100	1.327	100	1.122	100	1.487	100
18	1.617	100	1.477	100	1.932	100	1.417	100
19	2.493	100	2.312	100	3.191	100	2.677	100
20	2.214	100	1.409	100	1.546	100	1.515	100
21	2.118	100	1.719	100	1.711	100	1.749	100
22	2.375	100	2.433	100	2.608	100	2.36	100
23	2.298	100	1.93	100	2.337	100	2.037	100
24	2.313	100	2.679	100	2.317	100	3.233	100
25	2.006	100	1.888	100	2.037	100	2.471	99.96985
26	2.632	100	2.73	100	2.462	100	3.092	99.99631
27	2.529	100	2.156	100	2.014	100	2.542	100
28	1.593	100	1.212	100	1.749	100	1.573	100
29	1.479	100	1.234	100	1.157	100	2.251	100
30	2.047	100	2.339	100	2.311	100	2.724	100
31	0.943	100	1.361	100	1.246	100	1.165	100
32	1.031	100	0.907	100	1.261	100	1.555	100
135	1.619	100	1.642	100	3.19	100	1.7	100
138	2.034	100	1.474	100	2.155	100	1.847	100

Table 12-6 Ionospheric Error 95% Index and 99.9% Bounding

Site →	Chicago 4		Chicago 5		Boston 4		Boston 5		Seattle 4		Seattle 5	
SV ↓	95% Iono Error (m)	99.9% Bounding (%)	95% Iono Error (m)	99.9% Bounding (%)	95% Iono Error (m)	99.9% Bounding (%)	95% Iono Error (m)	99.9% Bounding (%)	95% Iono Error (m)	99.9% Bounding (%)	95% Iono Error (m)	99.9% Bounding (%)
1	2.098	100	2.076	100	2.123	100	2.047	100	2.070	100	2.163	100
2	1.788	100	1.644	100	1.737	100	1.711	100	1.898	100	2.020	100
3	1.505	100	1.825	100	1.719	100	1.921	100	1.970	100	1.880	100
4	0.800	100	0.723	100	0.715	100	0.752	100	0.670	100	0.801	100
5	1.024	100	0.986	100	0.879	100	0.931	100	1.571	100	1.380	100
6	2.572	100	3.013	100	2.328	100	2.570	100	2.336	100	2.403	100
7	0.612	100	0.910	100	0.431	100	0.477	100	0.696	100	0.768	100
8	1.426	100	1.301	100	1.050	100	1.097	100	1.046	100	1.220	100
9	1.536	100	1.535	100	1.646	100	1.500	100	1.267	100	1.643	100
10	0.445	100	0.654	100	0.365	100	0.405	100	0.948	100	0.719	100
11	0.552	100	0.397	100	0.661	100	0.419	100	0.630	100	0.798	100
12	0.660	100	0.554	100	0.510	100	0.775	100	0.516	100	0.428	100
13	0.589	100	0.564	100	0.440	100	0.697	100	0.615	100	0.381	100
14	0.479	100	0.515	100	0.442	100	0.444	100	0.605	100	0.600	100
15	0.855	100	1.265	100	0.703	100	0.782	100	0.552	100	0.570	100
16	1.213	100	0.526	100	0.659	100	0.579	100	0.752	100	0.916	100
17	0.670	100	0.690	100	0.630	100	0.526	100	0.486	100	0.531	100
18	0.996	100	0.601	100	0.809	100	0.883	100	0.912	100	0.889	100
19	1.777	100	1.566	100	1.912	100	1.750	100	1.831	100	1.737	100
20	0.946	100	0.584	100	1.534	100	0.658	100	0.991	100	1.193	100
21	0.900	100	0.980	100	1.025	100	0.750	100	0.826	100	0.938	100
22	1.898	100	1.606	100	1.734	100	1.922	100	1.936	100	1.919	100
23	1.403	100	1.343	100	1.783	100	1.480	100	1.664	100	1.688	100
24	1.728	100	1.895	100	1.827	100	2.131	100	1.802	100	1.564	100
25	1.201	100	1.192	100	1.177	100	1.308	100	1.257	100	1.156	100
26	2.108	100	2.000	100	1.740	100	1.914	100	1.605	100	1.865	100
27	1.405	100	1.570	100	1.381	100	1.324	100	1.397	100	1.476	100
28	0.621	100	0.516	100	0.571	100	0.656	100	0.628	100	0.672	100
29	0.729	100	0.756	100	0.689	100	0.820	100	0.582	100	0.659	100
30	1.587	100	1.656	100	1.370	100	1.550	100	1.204	100	1.246	100
31	0.630	100	0.866	100	0.233	100	0.411	100	0.333	100	0.561	100
32	0.392	100	0.477	100	0.395	100	0.369	100	0.353	100	0.336	100

Table 12-7 Ionospheric Error 95% Index and 99.9% Bounding

Site →	Miami 4		Miami 5		Fairbanks 4		Fairbanks 5	
SV ↓	95% Iono Error (m)	99.9% Bounding (%)	95% Iono Error (m)	99.9% Bounding (%)	95% Iono Error (m)	99.9% Bounding (%)	95% Iono Error (m)	99.9% Bounding (%)
1	2.071	100	2.378	100	2.116	100	2.170	99.5688
2	1.629	100	1.672	100	1.335	100	1.362	100
3	1.683	100	1.803	100	2.195	100	2.232	99.33758
4	0.706	100	0.674	100	0.877	100	0.885	100
5	1.160	100	1.078	100	0.731	100	0.918	100
6	2.946	100	2.726	100	2.053	100	2.031	99.55797
7	0.785	100	0.709	100	0.645	100	0.590	100
8	1.502	100	1.569	100	1.302	100	1.179	100
9	1.614	100	1.512	100	1.614	100	1.784	99.38449
10	0.481	100	0.615	100	0.688	100	1.033	100
11	0.508	100	0.731	100	0.656	100	0.683	100
12	0.541	100	0.546	100	0.453	100	0.600	100
13	0.392	100	0.752	100	0.413	100	0.481	100
14	0.540	100	0.595	100	0.401	100	0.574	100
15	0.925	100	0.905	100	0.686	100	0.856	100
16	0.582	100	0.829	100	0.508	100	0.585	100
17	0.732	100	0.611	100	0.565	100	0.530	100
18	0.832	100	0.892	100	1.042	100	0.718	100
19	1.726	100	1.788	100	1.603	100	1.465	100
20	1.134	100	0.609	100	0.592	100	0.672	100
21	1.153	100	1.112	100	0.763	100	0.931	100
22	1.580	100	2.035	100	1.706	100	1.638	100
23	1.600	100	1.565	100	1.349	100	1.507	100
24	1.589	100	1.724	100	1.903	99.99975	2.242	99.86634
25	1.222	100	1.064	100	1.693	100	1.624	99.48085
26	2.221	100	2.176	100	1.769	100	1.757	100
27	1.724	100	1.262	100	1.423	100	1.470	100
28	1.052	100	0.818	100	0.655	100	0.563	100
29	0.911	100	0.735	100	0.661	100	0.811	100
30	1.522	100	1.607	100	1.863	100	1.667	99.67104
31	0.750	100	0.814	100	0.381	100	0.393	100
32	0.558	100	0.422	100	0.440	100	0.522	100

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.

LPV200. Localizer Performance with Vertical Guidance to 200 ft decision height. LPV200 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% LPV200 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% LPV200 availability contour. Figure B.6 shows Alaska coverage with 99% LPV200 availability contour.

Figure B-1 98% CONUS LP Availability Contour

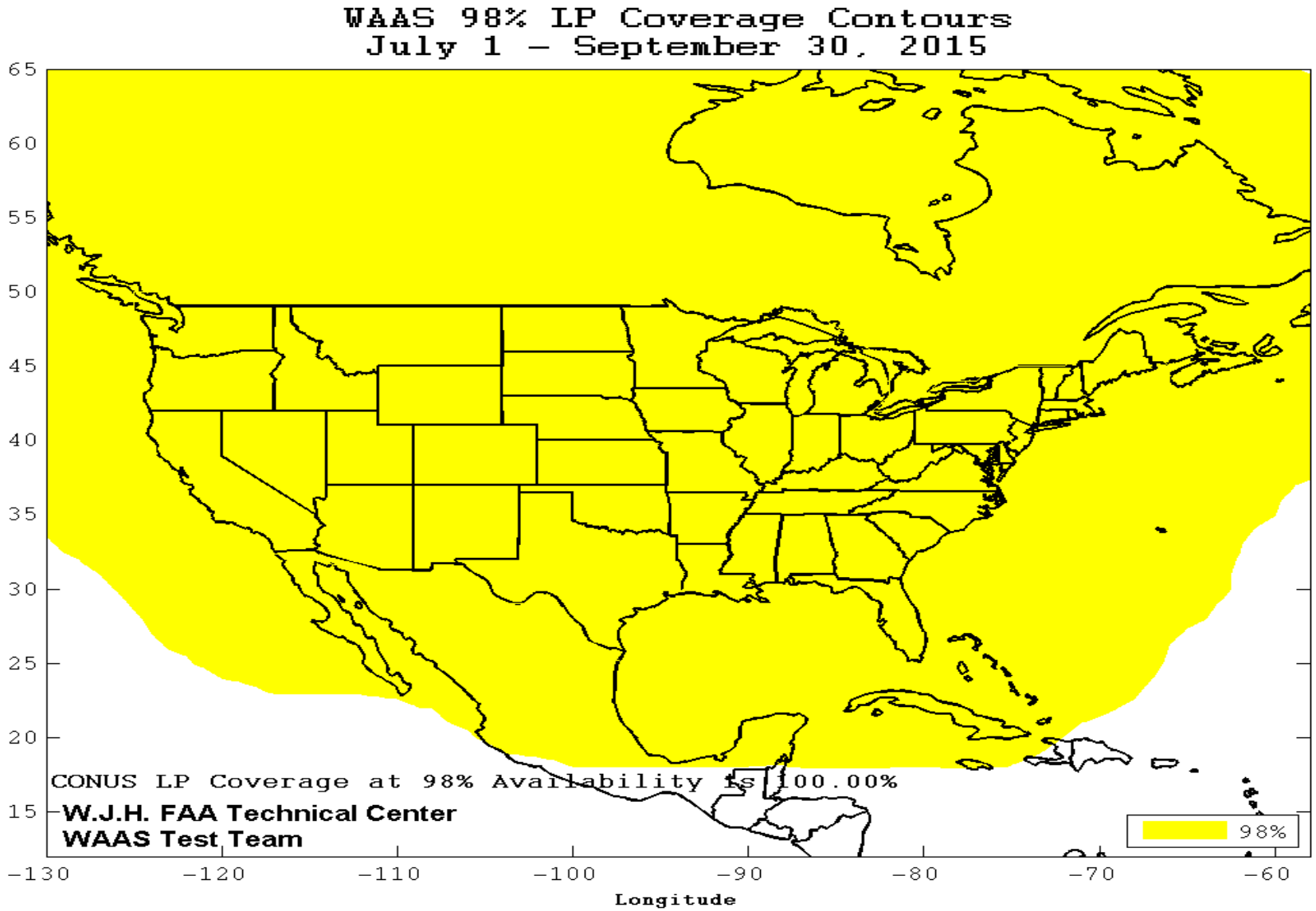


Figure B-2 98% Alaska LP Availability Contour

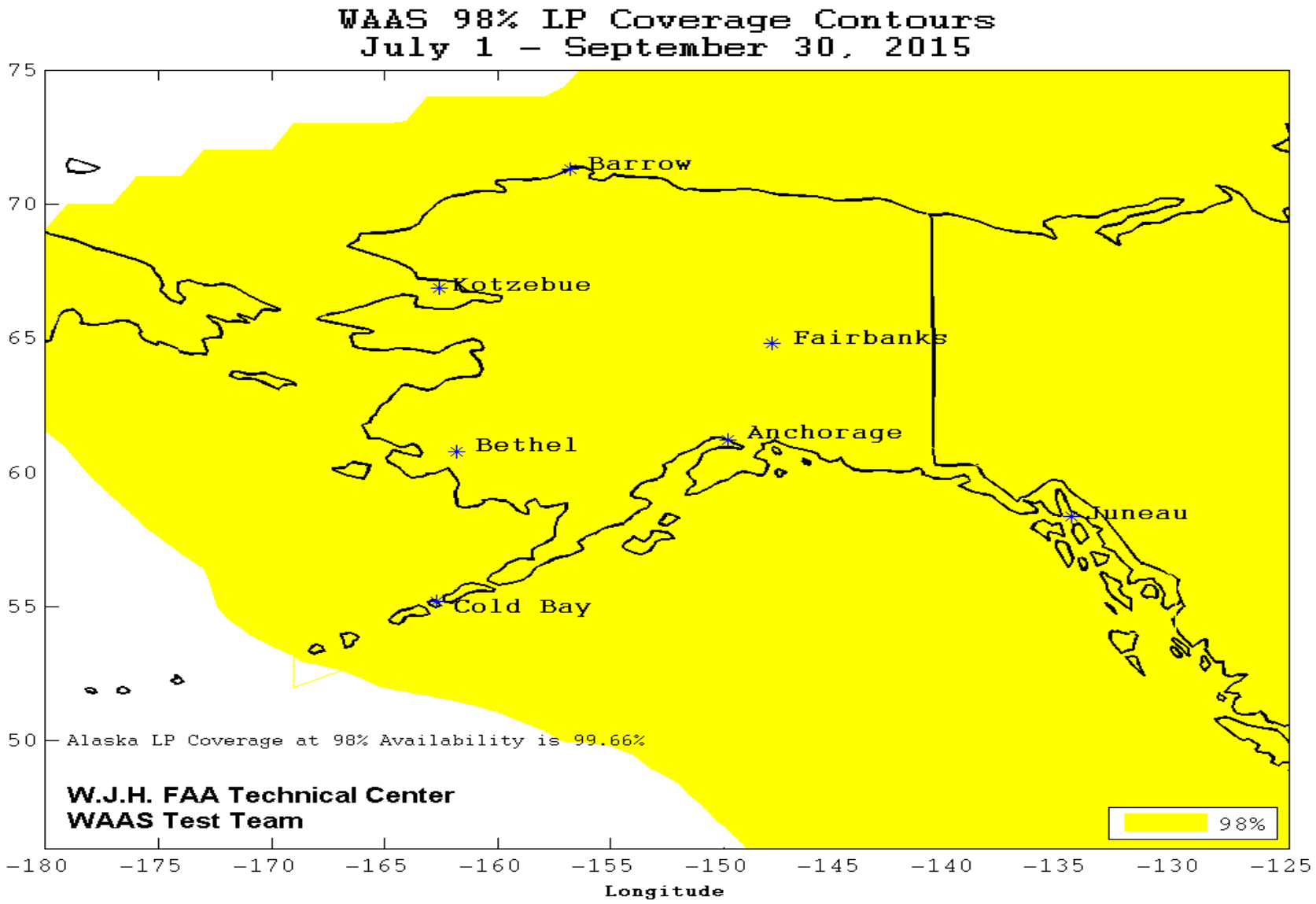


Figure B-3 98% CONUS LPV Availability Contour

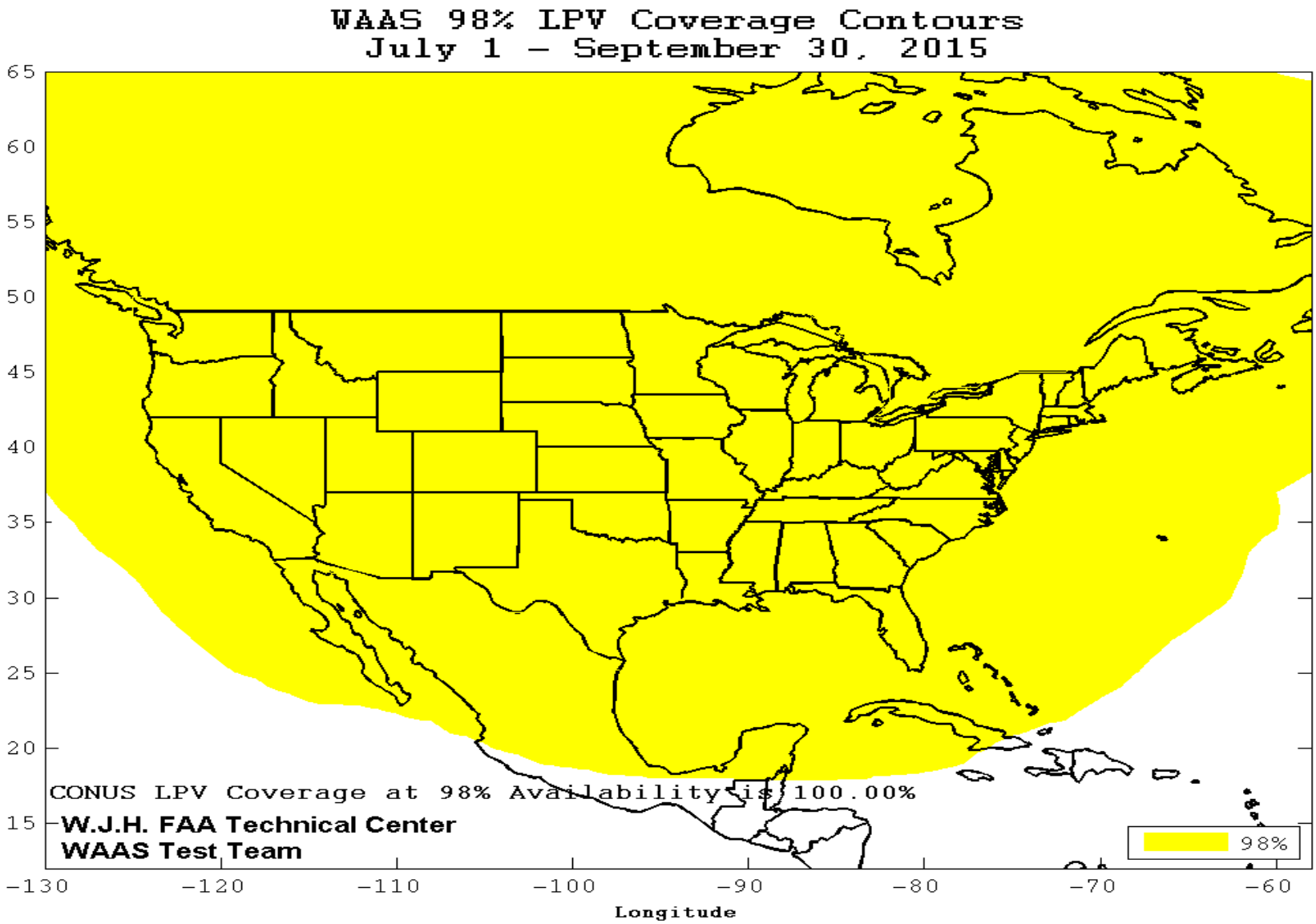


Figure B-4 98% Alaska LPV Availability Contour

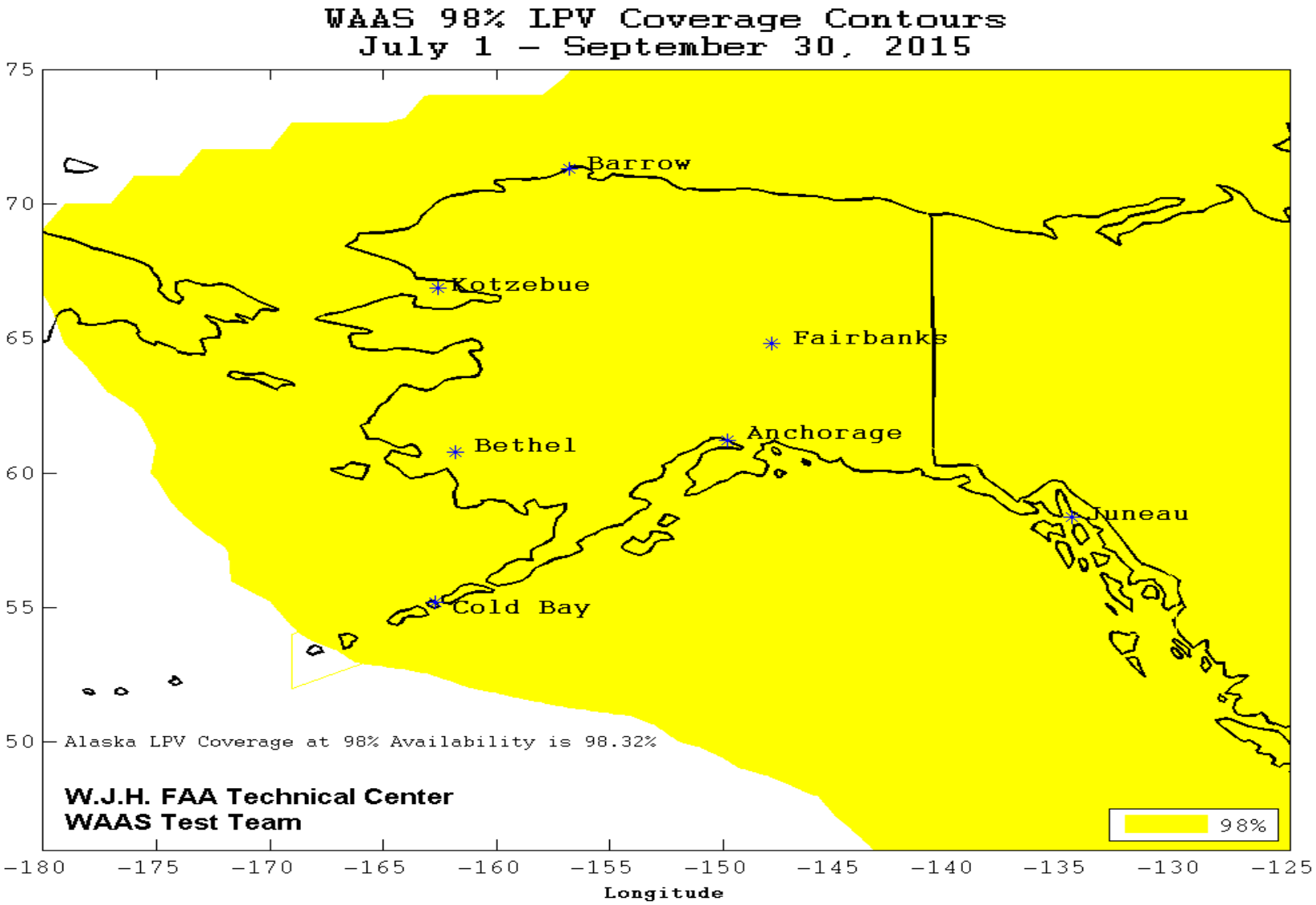


Figure B-5 99% CONUS LPV200 Availability Contour

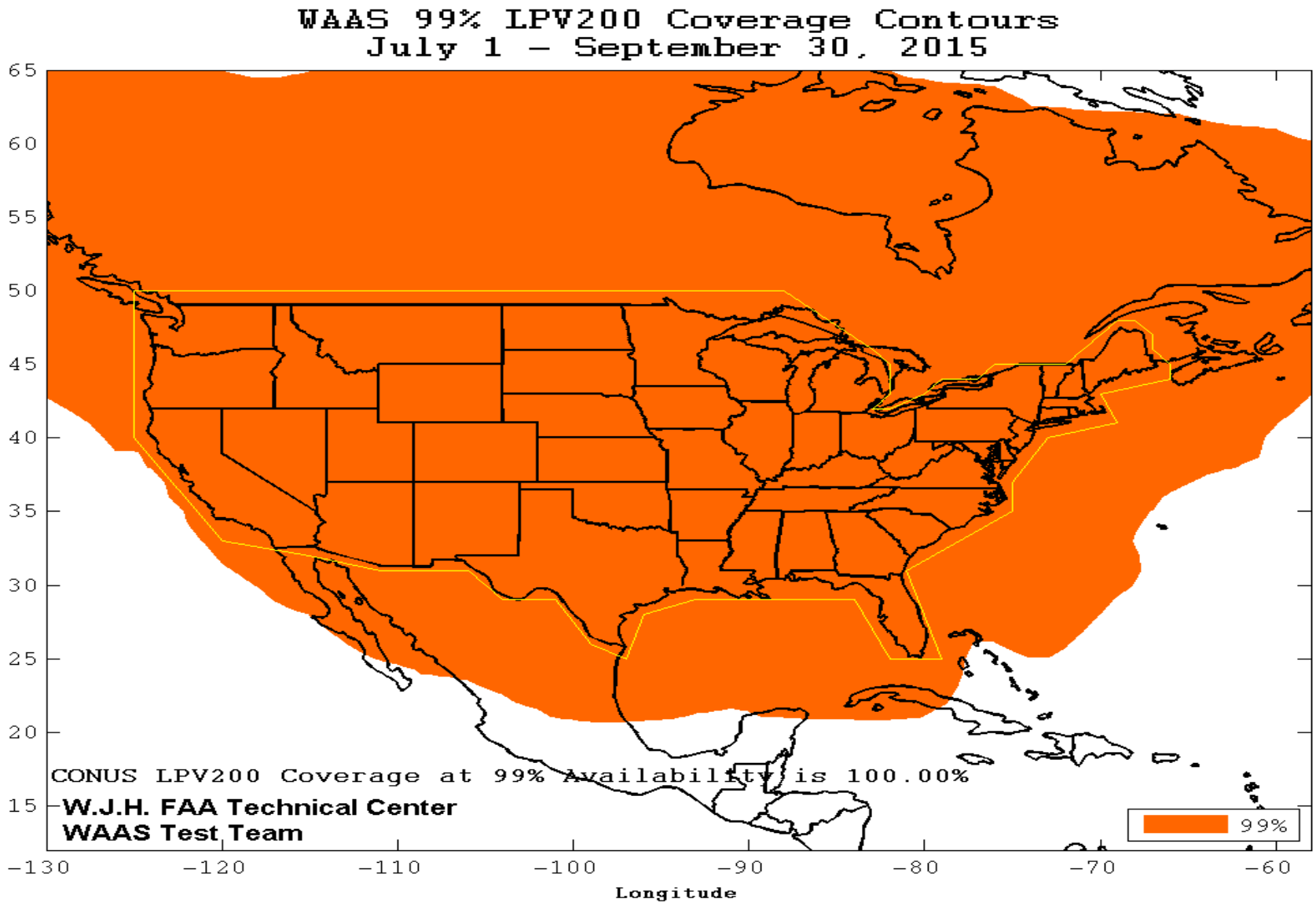


Figure B-6 99% Alaska LPV200 Availability Contour