WIDE-AREA AUGMENTATION SYSTEM PERFORMANCE ANALYSIS REPORT

Report #53

Reporting Period: April 1 to June 30, 2015

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FAA/William J. Hughes Technical Center
NSTB/WAAS T&E Team
Atlantic City International Airport, NJ 08405
Website: http://www.nstb.tc.faa.gov/

Executive Summary

Since 1999 the WAAS Test Team at the William J. Hughes Technical Center has reported GPS performance as measured against the GPS Standard Positioning Service (SPS) Signal Specification. These quarterly reports are known as the GPS PAN (Performance Analysis Network) Report. In addition to the GPS PAN reports, the WAAS Test Team also reports on the performance of the Wide-Area Augmentation System (WAAS). This is WAAS PAN Report #52; it covers WAAS performance during the period from April 1, 2015 to April 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 will be upgraded to G3 receivers in preparation for a full constellation of dual civil frequency GPS satellites (L1/L5). This is the sixth report showing results on G3 receiver performance.

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

Parameter	CONUS Site/Maximum	CONUS Site/Minimum	Alaska Site/Maximum	Alaska Site/Minimum
95% Horizontal Accuracy (HPL <= 40 meters)	Atlantic City 1.372 meters	Denver 0.603 meters	Barrow 0.802 meters	Bethel 0.678 meters
95% Vertical Accuracy (VPL <= 50 meters)	Atlantic City 1.655 meters	Denver 0.859 meters	Barrow 1.626 meters	Bethel 1.179 meters
LP Availability (HPL <= 40 meters)	All Sites 100%	All Sites 100%	Multiple Sites 100%	Cold Bay 99.98%
LPV Availability (HPL <= 40 meters & VPL <= 50 meters)	Multiple Sites 100%	Miami 99.99%	Multiple Sites 100%	Cold Bay 99.96%
LPV 200 Availability (HPL <= 40 meters & VPL < =35 meters)	Multiple Sites 100%	Oakland 99.89%	Juneau 100%	Cold Bay 95.02%
99% HPL	Oakland 17.5 meters	Kansas City 10.766 meters	Cold Bay 28.279 meters	Fairbanks 13.86 meters
99% VPL	Oakland 30.129 meters	Kansas City 19.072 meters	Cold Bay 39.743 meters	Juneau 23.328 meters

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1.0 INTRODUCTION

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

Objectives of this report are:

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

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

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

Receivers in PA mode are required to: use all WAAS corrections, use only corrected satellites, not mix corrections from multiple GEOs, only use the designated Space Based Augmentation System (SBAS) for the published approach procedure, and not use ranging from a GPS or GEO satellite having a User Differential Range Error (UDRE) status of greater than 15 meters. Receiver in NPA mode may: mix corrected and uncorrected satellites, mix corrections from different GEOs or SBASs, use either the WAAS ionosphere corrections or the GPS 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:		
Atlantic City	90	7810830
Grand Forks	87	7515242
Oklahoma City	86	7472514
WAAS:		
Albuquerque	91	7862374
Anchorage	91	7861872
Atlanta	91	7861903
Barrow	91	7861718
Bethel	91	7861323
Billings	91	7862216
Boston	89	7670719
Chicago	91	7862231
Cleveland	91	7840051
Cold Bay	91	7862019
Dallas	91	7860706
Denver	91	7862179
Fairbanks	91	7861828
Gander	91	7860622
Goose Bay	91	7858036
Houston	91	7861624
Iqaluit	91	7856916
Jacksonville	91	7862085
Juneau	91	7862395
Kansas City	91	7862399
Kotzebue	91	7862011
Los Angeles	91	7862224
Memphis	91	7861086
Merida	91	7848764
Mexico City	91	7860981
Miami	91	7862235
Minneapolis	91	7862398
New York	91	7862325
Oakland	91	7858904
Puerto Vallarta	91	7859546
Salt Lake City	91	7861562
San Jose Del Cabo	90	7773412
Seattle	91	7859317
Washington DC	91	7862315
Winnipeg	91	7862386

Table 1-3 NPA Evaluation Sites

Location	Number of Days Evaluated	Number of Samples
Albuquerque	91	7862363
Anchorage	91	7862283
Atlanta	91	7862315
Barrow	91	7861449
Bethel	91	7861727
Billings	91	7862210
Boston	89	7680493
Cleveland	91	7857943
Cold Bay	91	7862236
Fairbanks	91	7861842
Gander	91	7860248
Honolulu	91	7862278
Houston	91	7860413
Iqaluit	91	7857237
Juneau	91	7862306
Kansas City	91	7862378
Kotzebue	90	7813908
Los Angeles	91	7858287
Merida	91	7857671
Miami	91	7862227
Minneapolis	91	7852930
Oakland	91	7860054
Salt Lake City	91	7862284
San Jose Del Cabo	91	7840184
San Juan	91	7859959
Seattle	91	7859443
Tapachula	83	7196555
Washington DC	91	7862388

The report is divided in the performance categories listed below.

1. WAAS Position Accuracy
2. WAAS Operational Service Availability
3. WAAS Coverage
4. WAAS Integrity
5. WAAS Range Domain Accuracy
6. WAAS GEO Ranging Performance
7. WAAS Airport Availability
8. WAAS CNMP Analysis
9. WAAS Antenna Survey Validation
10. WAAS SQM Analysis
11. WAAS G3 Receiver Analysis

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

Table 1-4 WAAS Performance Parameters

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

1.1 Event Summary

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

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

Table 1-5 Events

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
4/11/2015	4/11/2015	PRN21	LPV200_CONUS	A carrier phase discontinuity on PRN-21 caused the WAAS carrier smoothing algorithm to reinitialize, resulting in the UDRE for PRN-21 being set to "Not Monitored" for about 20 minutes. This caused a loss of LPV-200 service across the southern edge of southwest CONUS, Mexico, and the Gulf of Mexico. The outages in CONUS were less than a minute in duration near 07:58 GMT. Please see plot(s): LPV200_4/11/2015
4/14/2015	4/14/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200_Canada	Geomagnetic activity (Kp = 4) disturbed the ionosphere causing elevated GIVE values. This resulted in significant degradation of the LPV200 service coverage in Canada from about 16:21 GMT until the end of the day. Please see plot(s): LPV200_4/14/2015
4/15/2015	4/15/2015	PRN16	LPV_CONUS, LPV_Canada,	The reduction in CONUS and Canada coverage was due to a GPS NANU on PRN-16 (see NANU

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
			LPV200_CONUS, LPV200_Canada	2015025), which was unusable from 16:08:00 GMT to 21:20:00 GMT on April 15th. The unavailability of PRN-16 caused a loss of LPV/LPV200 service in Florida at about 18:12 for less than 1 hr, LPV/LPV200 Canada service at 18:00 GMT for about 3hrs, LPV200 service in Oregon (19:05 for less than 10 min) and East coast (18:44 for less than 10 minutes). Please see plot(s): LPV_4/15/2015 LPV200_4/15/2015
4/16/2015	4/17/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV))	LPV_Canada, LPV200_CONUS, LPV200_Alaska, LPV200_Canada	Geomagnetic activity (Kp = 6 on April 16 and Kp = 5 on April 17) disturbed the ionosphere causing elevated GIVE values. This resulted in significant degradation of LPV-200 service coverage in Canada from about 23:08 GMT on April 16 until 00:40 GMT on April 17. The elevated GIVE values also resulted in moderate degradation of: (1) LPV service coverage in Canada (Central) from about 23:45 GMT on April 16 until 00:20 GMT on April 17; (2) LPV-200 service coverage in CONUS (Northern) from about 23:00 GMT on April 16 until 00:40 GMT on April 17; and (3) LPV-200 service coverage in Alaska from about 03:01 GMT until 03:38 GMT on April 16. Please see plot(s): LPV_4/16/2015 LPV200_4/16/2015 LPV_4/17/2015 LPV200_4/17/2015
4/19/2015	4/19/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV), PRN21	Local	A carrier phase discontinuity on PRN-21 caused the WAAS carrier smoothing algorithm to reinitialize, resulting in the UDRE for PRN-21 being set to "Not Monitored" for about 20 minutes. The elevated UDRE for PRN-21 resulted in LPV-200 outages being observed at the Houston (ZHU) and Albuquerque (ZAB) reference stations at 07:24 GMT for 12 seconds. This event was too short in duration to be seen in the availability plots which use 30 second sampling.
4/27/2015	4/27/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200_Alaska	Geomagnetic activity (Kp = 2) disturbed the ionosphere causing elevated GIVE values. This resulted in minor degradation of LPV-200 service coverage in Alaska from about 16:50 GMT until 17:10 GMT. Please see plot(s): LPV200_4/27/2015
4/28/2015	4/28/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200_Alaska	Geomagnetic activity (Kp = 2) disturbed the ionosphere causing elevated GIVE values. This resulted in minor degradation of LPV-200 service coverage in Alaska from about 00:02 GMT until 00:26 GMT and 07:37 GMT until 07:41 GMT. Please see plot(s): LPV200_4/28/2015
4/29/2015	4/29/2015	Washington D.C. (CnV), Los Angeles (CnV),	LPV200_CONUS	A carrier phase discontinuity on PRN-3 caused the WAAS carrier smoothing algorithm to reinitialize, resulting in the UDRE for PRN-3 being set to "Not

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
		Atlanta (CnV), PRN3		Monitored" for about 20 minutes. This caused a loss of LPV-200 service to be observed at airport OGA, Searle Field NE, for one thirty second sample.
5/1/2015	5/1/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200_Alaska	Geomagnetic activity (Kp = 2) disturbed the ionosphere causing elevated GIVE values. This resulted in moderate degradation of the LPV-200 service coverage in Alaska (Northwest) from about 23:43 GMT until 23:59 GMT. Please see plot(s): LPV200_5/1/2015
5/5/2015	5/6/2015	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 5:36:30 GMT. This caused a 4 second outage of the GEO broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN-135. This also caused the UDRE for CRW to be elevated. The elevated UDRE for CRW affected LPV service outages in Alaska around 07:00 GMT, LPV-200 service outages in Alaska on May 5th and beginning of the day on May 6th, and LPV-200 service outages in Canada around 07:00 GMT. Please see plot(s): LPV_5/5/2015 LPV200_5/5/2015 LPV_5/6/2015 LPV200_5/6/2015
5/6/2015	5/6/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200_Alaska	Geomagnetic activity (Kp = 5) disturbed the ionosphere causing elevated GIVE values. This resulted in moderate degradation of the LPV-200 service coverage in Alaska from about 06:55 to 07:00 GMT (expanding the normal daily service outage further east) and from about 16:20 to 16:43 GMT. Please see plot(s): LPV200_5/6/2015
5/9/2015	5/10/2015	Barrow (BRW1), Barrow (BRW2), Barrow (BRW3), Bethel (BET1), Bethel (BET2), Bethel (BET3), Cold Bay (CDB1), Cold Bay (CDB2), Cold Bay (CDB3), Fairbanks (FAI1), Fairbanks (FAI2), Fairbanks (FAI3), Kotzebue (OTZ1), Kotzebue (OTZ2), Kotzebue (OTZ3)	LPV200_Alaska	Short 5-10 second communications outages from multiple Alaska reference stations at about 21:17 GMT on May 9th and 00:41 GMT resulted in the re-initialization of the WAAS carrier smoothing algorithm for those sites. The degradation of measurement confidence resulted in elevated GIVE values and caused a 10% enlargement for the daily LPV-200 service outage near 23:00 GMT. There was no 5/10/15 impact. Please see plot(s): LPV200_5/9/2015
5/11/2015	5/11/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200_Alaska, LPV200_Canada	Geomagnetic activity (Kp = 4) disturbed the ionosphere causing elevated GIVE values. This resulted in moderate degradation of LPV-200 service coverage in Alaska from 01:20 to 01:45

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
				GMT and from 03:50 to 04:15 GMT. The elevated GIVE values also resulted in minor degradation of LPV-200 service coverage in Canada from 03:20 to 03:55 GMT. Please see plot(s): LPV200_5/11/2015
5/12/2015	5/13/2015	PRN2	LPV200_CONUS	Planned maintenance on PRN-2 (Delta V, see NANU 2015035) resulted in that satellite being unavailable from 18:09 GMT on 5/12/15 to 01:46 on 5/13/15. The unavailability of PRN-2 combined with elevated GIVE values from ionospheric activity caused an LPV-200 outage in California from about 00:30 to 01:30 on 1/13/15. Please see plot(s): LPV200_5/12/2015
5/12/2015	5/12/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200_Alaska, LPV200_Canada	Geomagnetic activity (Kp = 3) disturbed the ionosphere causing elevated GIVE values. This resulted in moderate degradation of LPV-200 service coverage in Canada from about 08:30 to 10:15 GMT. The elevated GIVE values also resulted in minor degradation of LPV-200 service coverage in Alaska from about 03:50 GMT until 04:10 GMT. Please see plot(s): LPV200_5/12/2015
5/13/2015	5/13/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200_CONUS, LPV200_Alaska, LPV200_Canada	Geomagnetic activity (Kp = 6) disturbed the ionosphere causing elevated GIVE values. This resulted in moderate degradation of (1) LPV-200 service coverage in CONUS (West Coast) from about 00:40 to 01:25 GMT; (2) LPV-200 service coverage in Alaska from about 03:50 to 04:10 GMT and from 06:00 to 07:00 GMT; and (3) LPV-200 service coverage in Canada from about 01:40 until 02:00 GMT. Please see plot(s): LPV200_5/13/2015
5/18/2015	5/19/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV))	LPV_Alaska, LPV_Canada, LPV200_CONUS, LPV200_Alaska, LPV200_Canada	Geomagnetic activity (Kp = 6) disturbed the ionosphere causing elevated GIVE values. This resulted in significant degradation of the LPV and LPV-200 service in Canada from 23:00 on 5/18/15 to about 04:00 on 5/19/15. There was a significant LPV-200 outage impacting about 60% of Alaska from about 02:50 to 04:00. There was a LPV-200 outage in CONUS along the Canadian border from the Great Lakes to Montana from about 02:00 to 02:30 on 5/19/15. Please see plot(s): LPV_5/18/2015 LPV200_5/18/2015 LPV_5/19/2015 LPV200_5/19/2015
5/28/2015	5/28/2015	PRN9	LPV200_CONUS, LPV200_Canada	Planned maintenance on PRN-9 (Delta V, see NANU 2015040) resulted in that satellite being unavailable from 14:00 to 19:15 GMT on 5/28/15. The unavailability of PRN-9 combined with elevated UDRE values for the ranging signal from the CRE GEO, PRN-138, caused a minor LPV-200 service outage in central CONUS from

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
				approximately 14:56 to 15:04 GMT and moderate LPV-200 service outage in Canada. Please see plot(s): LPV200_5/28/2015
6/5/2015	6/5/2015	PRN21	LPV_All	Planned maintenance on PRN-21 (Delta V, see NANU 2015040) resulted in that satellite being unavailable from 03:27 to 08:15 GMT on 6/5/15. The unavailability of PRN-21 combined with elevated UDRE values for the ranging signal from the CRE GEO, PRN-138, caused LPV-200 outages in Alaska (~05:30 to 06:00 GMT), Canada (~05:48 to 06:05 GMT), and CONUS (~05:45 to 06:20 GMT). Please see plot(s): LPV200_6/5/2015
6/11/2015	6/11/2015	PRN31	LPV_Canada, LPV200_Canada	Planned maintenance on PRN-11 (Delta V, see NANU 2015047) resulted in that satellite being unavailable from 09:52 to 15:04 GMT on 6/11/15. The unavailability of PRN-31 caused an LPV-200 service outage from about 12:55 to 14:15 GMT and a LPV service outage from about 13:00 to 13:25 GMT. Please see plot(s): LPV_6/11/2015 LPV200_6/11/2015
6/16/2015	6/16/2015	Miami (ZMA1), Miami (ZMA2), Miami (ZMA3)	Local	Localized RFI caused degraded tracking at the Miami (ZMA) reference station resulted in 87 second LPV and LPV-200 service outage to be observed for that receiver (15:11 GMT to 15:12 GMT).
6/16/2015	6/16/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV), PRN27	LPV200_Alaska	Multiple suspected carrier phase discontinuities on PRN-27 at 03:51:50, 04:21:44, and 04:25:58 GMT caused the WAAS carrier smoothing algorithm to reinitialize, resulting in the UDRE for PRN-27 being set to "Not Monitored" longer than normal as PRN-27 came into view of WAAS. The elevated UDRE on PRN-27 contributed to a 10% enlargement of the daily LPV-200 outage in Alaska at about 04:30 GMT. Please see plot(s): LPV200_6/16/2015
6/19/2015	6/19/2015	PRN26	LPV200_Alaska	Planned maintenance on PRN-26 (Forecast maintenance, see NANU 2015056) resulted in that satellite being unavailable from 00:47 to 03:46 GMT on 6/19/15. The unavailability of PRN-26 caused an LPV-200 outage in Alaska from 03:55 to 04:14 GMT. Please see plot(s): LPV200_6/19/2015
6/22/2015	6/23/2015	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_All, LPV200_All	Geomagnetic activity (Kp = 8) disturbed the ionosphere causing elevated GIVE values. This resulted in significant degradation of: (1) LPV-200 service coverage in Canada from about 19:45 GMT until 21:35 GMT on June 22nd. The elevated GIVE values also resulted in moderate degradation of: (1) LPV service coverage in Canada from about 19:45 to 21:16 GMT on June 22nd; (2)LPV-200

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
				service coverage in CONUS (Northeast) from about 19:45 to 21:07 GMT on June 22nd ; and (3) LPV-200 service coverage in Alaska from about 03:25 to 03:40 GM, and 05:07 to 05:45 GMT on June 23rd. The elevated GIVE values also resulted in minor degradation of: (1) LPV service coverage in CONUS (Northeast) from about 19:45 to 20:45 GMT on June 22nd; (2) LPV-200 service coverage in CONUS (Texas) from about 05:40 to 05:50 GMT on June 23rd; (3)LPV service coverage in Alaska from about 05:12 to 05:35 GMT on June 23nd; (4)LPV-200 service coverage in Alaska from about 20:16 to 20:26 GMT on June 22nd; and (5)LPV-200 service coverage in Canada (Central and West) from about 03:30 to 03:40 GMT on June 23rd. Please see plot(s): LPV_6/22/2015 LPV200_6/22/2015 LPV_6/23/2015 LPV200_6/23/2015
6/23/2015	6/24/2015	PRN6	LPV_CONUS	Planned maintenance on PRN-6 (Forecast maintenance, see NANU 2015058) resulted in that satellite being unavailable from 20:54 GMT on 6/23/15 to 01:15 GMT on 6/24/15. The unavailability of PRN-6 caused: Significant degradation of LPV-200 service coverage in CONUS from about 21:57 to 23:35 GMT on June 23rd. Minor degradation of: (1) LPV service coverage in CONUS (California) from about 20:50 to 20:55 GMT on June 23rd; and (2) LPV-200 service coverage in Canada from about 23:38 GMT on June 23rd to 00:42 GMT on June 24th. Please see plot(s): LPV_6/23/2015 LPV200_6/23/2015 LPV200_6/24/2015
6/25/2015	6/25/2015	PRN30	LPV200_CONUS, LPV200_Canada	Planned maintenance on PRN-30 (Forecast maintenance, see NANU 2015061) resulted in that satellite being unavailable from 16:58 to 20:40 on 6/25/15. The unavailability of PRN-30 caused minor degradation of LPV-200 service coverage in CONUS from about 19:07 to 19:35 GMT on June 25th; and LPV-200 service coverage in Canada from about 17:25 to 17:45 GMT and 20:10 to 20:40 GMT. Please see plot(s): LPV200_6/25/2015
6/30/2015	7/14/2015	Tapachula (MTP1), Tapachula (MTP2), Tapachula (MTP3)	None	The Tapachula site was shut down due to an UPS failure. There was concern of a commercial power fluctuations would damage the WRS equipment. New parts for the UPS have been ordered.

Table 1-6 WAAS Upgrades

Start Date	End Date	Location	Event Description
04/14/2015	04/14/2015	Paumalu (HDH)	SSM - 42 a. This system support modification (SSM) provides a Firmware Upgrade for the Wide Area Augmentation System (WAAS) Wide-area Master Station (WMS) GPS Clock. The manufacturer and software maintenance organization, Zyfer, has provided this upgrade which corrects an invalid time offset that causes intermittent faults. WAAS WMS failures have been attributed to this fault. b. This SSM also replaces two cables connected between the WAAS Signal Generation Subsystem (SGS) Safety Computer and Signal Generator with longer versions of the same cables. The increased cable lengths cause a slight delay for signals passing through the cables. WAAS SGS failures have been attributed to an errant pulse on the Safety Computer Comparator Card. The longer cables effectively move the pulse to a new location in time where the errant pulse has no detrimental effects.
04/15/2015	04/15/2015	Los Angeles (CnV)	SSM - 42 a. This system support modification (SSM) provides a Firmware Upgrade for the Wide Area Augmentation System (WAAS) Wide-area Master Station (WMS) GPS Clock. The manufacturer and software maintenance organization, Zyfer, has provided this upgrade which corrects an invalid time offset that causes intermittent faults. WAAS WMS failures have been attributed to this fault. b. This SSM also replaces two cables connected between the WAAS Signal Generation Subsystem (SGS) Safety Computer and Signal Generator with longer versions of the same cables. The increased cable lengths cause a slight delay for signals passing through the cables. WAAS SGS failures have been attributed to an errant pulse on the Safety Computer Comparator Card. The longer cables effectively move the pulse to a new location in time where the errant pulse has no detrimental effects.

Table 1-7 GUS Switchovers

Start Date	End Date	GUS Switch	Location/ Satellite	Service Affected	Event Description
4/16/2015	4/16/2015	Manual	GEO133, Santa Paula (SZP)	None	The uplink for the AMR GEO, PRN-133 switched from the Santa Paula uplink site to Paumalu uplink site. The manual switchover was in response to PRN 133 being set to DNU numerous times due to a bad receiver and multiple CCC Trips. TOW 430342-430347
4/18/2015	4/18/2015	Faulted	GEO133, Paumalu (HDH)	None	The uplink for the AMR GEO, PRN-133 switched from the Paumalu uplink site to

Start Date	End Date	GUS Switch	Location/ Satellite	Service Affected	Event Description
					the Santa Paula uplink site. TOW 593832-593848
4/22/2015	4/22/2015	Manual	GEO133, Santa Paula (SZP)	None	The uplink for the AMR GEO, PRN-133 switched from the Santa Paula uplink site to Paumalu uplink site. TOW 333100-333105
5/1/2015	5/1/2015	Manual	GEO133, Paumalu (HDH)	None	The uplink for the AMR GEO, PRN-133 switched from the Paumalu uplink site to the Santa Paula uplink site.TOW 466756-466764
5/5/2015	5/6/2015	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 5:36:30 GMT. This caused a 4 second outage of the GEO broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN-135. This also caused the UDRE for CRW to be elevated. The elevated UDRE for CRW affected LPV service outages in Alaska around 07:00 GMT, LPV-200 service outages in Alaska on May 5th and beginning of the day on May 6th, and LPV-200 service outages in Canada around 07:00 GMT.
5/11/2015	5/11/2015	Faulted	GEO133, Santa Paula (SZP)	None	The uplink for the AMR GEO, PRN-133 switched from the Santa Paula uplink site to Paumalu uplink site due to a receiver fault at Santa Paula. TOW 93351-93367
5/11/2015	5/11/2015	Manual	GEO133, Paumalu (HDH)	None	GEO 133, manual switchover from Paumalu to Santa_Paula. TOW 114297-114304
5/12/2015	5/12/2015	Manual	GEO138, Woodbine (QWE)	LPV200_Canada	The uplink for the GEO CRE, PRN138 was manually switched from Woodbine to Brewster, TOW 201663-201668. This caused a 4 second outage of the GEO broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN138. This also caused the UDRE for GEO to be elevated. The elevated UDRE for GEO affected LPV200 service in Canada.
5/20/2015	5/20/2015	Manual	GEO138, Brewster-B (BRE-B)	LPV200_Canada	GEO 138, manual switchover from Brewster-B to Woodbine. LPV200 service coverage in Northeast Canada (Iqaluit) was slightly affected. TOW 288357-288362
5/28/2015	5/29/2015	Manual	GEO138, Woodbine (QWE)	LPV200_Alaska	The uplink for the CRE GEO, PRN138 switched from the Woodbine uplink site to the Brewster uplink site 08:00 GMT. This caused a 4 second outage of the CRE broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize

Start Date	End Date	GUS Switch	Location/ Satellite	Service Affected	Event Description
					for PRN138. This also caused the UDRE for CRE to be elevated. The elevated UDRE for CRE affected LPV200 service outages in Alaska on May 29th from 05:19 GMT until 05:24 GMT. TOW 374442-374447
6/2/2015	6/3/2015	Manual	GEO135, NAPA (APC)	LPV200_Alaska	The uplink for the CRW GEO, PRN135 switched from the Napa uplink site to the Littleton uplink site 08:00 GMT. This caused a 4 second outage of the GEO broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN135. This also caused the UDRE for CRW to be elevated. The elevated UDRE for GEO affected LPV200 service outages in Alaska on June 2nd from ~ 14:37 GMT until 14:47 GMT and 21:37 GMT until 22:00 GMT and on June 3rd from ~ 02:17 GMT until 02:40 GMT and 04:57 GMT until 05:03 GMT.
6/5/2015	6/6/2015	Manual	GEO138, Brewster (BRE-B)	LPV200_Alaska	The uplink for the CRE GEO, PRN138 switched from the Brewster uplink site to the Woodbine uplink site 04:01 GMT. This caused a 4 second outage of the CRE broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN138. This also caused the UDRE for CRE to be elevated. The elevated UDRE for CRE affected LPV200 service outages in Alaska on June 6th from 04:47 GMT until 04:52 GMT TOW 446496-446501

1.2 Report Overview

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

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

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

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

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

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

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

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

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

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

Section 12 provides the WAAS G3 Novatel receiver performance.

2.0 WAAS POSITION ACCURACY

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

Table 2-1 shows PA horizontal and vertical position accuracy maintained for 95% of the time at LP, LPV and LNAV/VNAV operational service levels for the quarter. The table also includes 95% SPS accuracy for certain locations. 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 1.372 meters and 1.655 meters at Atlantic City, respectively. The minimum 95% CONUS horizontal and vertical LPV errors were 0.603 meters and 0.859 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 7.195 meters and 16.17 meters at Honolulu, respectively. The minimum 95% and 99.999% horizontal errors were 1.461 meters and 3.029 meters at Kansas City and Seattle, 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 4.208 meters and 7.804 meters at Boston, respectively.

Figures 2-1 to 2-3 show the daily LPV 95% horizontal accuracy at the PA evaluation sites for the reporting period. Figures 2-4 to 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 Figures 2-1 to 2-6 are listed below.

- On 4/14/15 to 4/17/2015, position errors in CONUS, Alaska, Canada, and Mexico were elevated. The maximum 95% horizontal and vertical LPV errors were 1.949 meters and 2.982 meters at Goose Bay and Barrow, respectively. The Kp index range was from 4 to 6 during these days.
- On 5/11/15, position errors in CONUS and Alaska were elevated. The maximum 95% horizontal and vertical LPV errors were 1.383 meters and 2.200 meters at Minneapolis and Juneau, respectively. The Kp index was 4 during this day.
- On 5/19/15, position errors in CONUS, Canada, and Alaska were elevated. The maximum 95% horizontal and vertical LPV errors were 1.774 meters and 2.587 meters at Winnipeg and Fairbanks, respectively. The Kp index was 6 during this day.
- On 6/22/15 and 6/23/15, position errors in CONUS, Alaska, Canada, and Mexico were elevated. The maximum 95% horizontal and vertical LPV errors were 1.942 meters and 4.752 meters at Boston, respectively. The Kp index was 8 during these days.

Figures 2-7 to 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 4/4/15, 4/10/15, 4/11/15, 4/21/15 to 4/23/15, 5/10/15 to 5/13/15, 5/19/15, 6/22/15, and 6/23/15 were due to geomagnetic activity.

Figures 2-9 to 2-12 show the distributions of the vertical and horizontal errors at all 38 WAAS receiver locations combined in triangle charts and 2-D histogram plots for the quarter. The triangle charts in Figures 2-9 and 2-10 show the distributions of vertical position errors (VPE) versus vertical protection levels (VPL) and horizontal position errors (HPE) versus horizontal protection levels (HPL). The horizontal axis is the position error and the vertical axis is the WAAS protection 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 Figures 2-11 and 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)
Atlantic City	1.372	1.372	1.655	100	*	*
Grand Forks	1.138	1.138	1.372	100	*	*
Oklahoma City	0.953	0.953	1.392	100	*	*
Albuquerque	0.736	0.736	1.019	100	2.780	3.949
Anchorage	0.802	0.802	1.425	100	*	*
Atlanta	0.743	0.743	1.096	100	2.804	3.928
Barrow	0.716	0.716	1.626	100	*	*
Bethel	0.678	0.678	1.179	100	2.970	3.949
Billings	0.81	0.81	0.908	100	2.120	3.864
Boston	0.835	0.835	1.106	100	2.404	3.904
Chicago	0.882	0.882	1.008	100	*	*
Cleveland	0.73	0.73	1.137	100	2.292	3.902
Cold Bay	0.68	0.681	1.196	100	*	*
Dallas	0.749	0.749	1.224	100	*	*
Denver	0.602	0.602	0.859	100	*	*
Fairbanks	0.797	0.797	1.528	100	3.297	3.769
Gander	0.9	0.902	1.274	100	*	*
Goose Bay	0.924	0.925	1.066	100	*	*
Houston	0.855	0.855	1.374	100	3.351	4.159
Iqaluit	0.828	0.828	1.405	100	*	*
Jacksonville	0.727	0.727	1.255	100	*	*
Juneau	0.725	0.725	1.188	100	*	*
Kansas City	0.661	0.661	0.977	100	2.362	3.863
Kotzebue	0.738	0.738	1.478	100	3.281	3.960
Los Angeles	0.758	0.758	1.41	100	3.192	4.173
Memphis	0.7	0.7	1.028	100	*	*
Merida	0.914	0.914	1.75	100	*	*
Mexico City	0.902	0.903	2.831	100	*	*
Miami	0.97	0.97	1.459	100	3.815	4.853
Minneapolis	0.728	0.728	0.992	100	2.154	3.860
New York	0.859	0.859	1.025	100	*	*
Oakland	0.777	0.777	1.424	100	2.949	4.148
Puerto Vallarta	1.003	1.004	1.95	100	*	*
Salt Lake City	0.673	0.673	0.906	100	2.263	3.862
San Jose Del Cabo	1.11	1.11	2.214	100	*	*
Seattle	0.719	0.719	0.932	100	2.093	3.755
Washington DC	0.811	0.811	1.062	100	2.517	3.916
Winnipeg	0.729	0.729	1.076	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	1.745	4.489	100	4.795
Anchorage	3.085	6.43	100	6.556
Atlanta	1.989	4.979	100	5.189
Barrow	2.882	5.918	100	6.23
Bethel	2.564	5.347	100	5.516
Billings	1.709	3.407	100	3.626
Boston	1.913	5.96	100	6.139
Cleveland	1.629	4.342	100	4.536
Cold Bay	1.822	4.599	100	4.954
Fairbanks	3.398	6.26	100	6.523
Gander	2.024	5.746	100	5.878
Honolulu	7.195	16.17	100	17.182
Houston	2.72	6.178	100	6.371
Iqaluit	2.02	4.684	100	4.796
Juneau	2.539	5.381	100	5.598
Kansas City	1.461	3.553	100	3.682
Kotzebue	2.925	5.893	100	6.043
Los Angeles	2.507	4.834	100	5.007
Merida	3.295	9.401	100	9.671
Miami	2.957	5.94	100	6.183
Minneapolis	1.621	4.035	100	4.503
Oakland	1.982	4.707	100	5.005
Salt Lake City	1.57	3.364	100	3.599
San Jose Del Cabo	3.53	8.817	100	8.999
San Juan	3.259	16.061	100	16.309
Seattle	1.512	3.029	100	5.169
Tapachula	3.438	12.156	100	12.426
Washington DC	1.914	4.965	100	5.19

Table 2-3 Maximum LPV Error Statistics

Location	Horizontal Error (m)	Horizontal Error/HPL	Horizontal Maximum Ratio	Vertical Error (m)	Vertical Error/VPL	Vertical Maximum Ratio
Atlantic City	2.606	0.218	0.219	4.077	0.191	0.214
Grand Forks	2.822	0.172	0.205	4.698	0.198	0.233
Oklahoma City	2.061	0.185	0.203	3.694	0.182	0.208
Albuquerque	1.939	0.192	0.213	3.201	0.133	0.159
Anchorage	3.252	0.164	0.236	5.396	0.271	0.271
Atlanta	1.673	0.135	0.165	2.445	0.116	0.187
Barrow	2.521	0.114	0.140	6.605	0.184	0.215
Bethel	2.277	0.169	0.191	3.610	0.116	0.171
Billings	2.289	0.190	0.212	3.134	0.172	0.181
Boston	4.208	0.111	0.187	7.804	0.168	0.257
Chicago	2.281	0.207	0.236	3.824	0.222	0.231
Cleveland	2.069	0.169	0.200	3.984	0.165	0.188
Cold Bay	1.987	0.069	0.088	2.846	0.084	0.130
Dallas	1.758	0.213	0.213	2.829	0.176	0.200
Denver	1.672	0.180	0.181	3.252	0.187	0.187
Fairbanks	2.609	0.073	0.187	5.304	0.107	0.256
Gander	2.941	0.147	0.158	5.621	0.135	0.135
Goose Bay	3.336	0.175	0.212	5.718	0.141	0.194
Houston	2.012	0.212	0.232	3.089	0.154	0.237
Iqaluit	3.242	0.107	0.137	5.362	0.124	0.171
Jacksonville	1.762	0.134	0.167	2.812	0.149	0.219
Juneau	3.129	0.170	0.189	4.462	0.159	0.268
Kansas City	1.720	0.179	0.183	2.478	0.161	0.165
Kotzebue	2.397	0.131	0.149	6.179	0.174	0.174
Los Angeles	1.832	0.137	0.150	3.330	0.132	0.182
Memphis	2.107	0.214	0.215	2.487	0.099	0.167
Merida	3.478	0.196	0.196	5.384	0.211	0.211
Mexico City	3.497	0.104	0.171	7.178	0.168	0.223
Miami	1.882	0.111	0.177	3.508	0.173	0.174
Minneapolis	2.377	0.213	0.220	3.338	0.153	0.211
New York	2.532	0.140	0.190	6.382	0.129	0.254
Oakland	2.029	0.141	0.151	3.366	0.176	0.193
Puerto Vallarta	3.470	0.147	0.147	5.809	0.156	0.190
Salt Lake City	2.216	0.231	0.231	2.593	0.178	0.178
San Jose Del Cabo	3.359	0.087	0.150	5.333	0.195	0.210
Seattle	1.790	0.140	0.160	3.176	0.160	0.160
Washington DC	2.089	0.193	0.193	4.209	0.175	0.198
Winnipeg	3.775	0.173	0.184	5.111	0.212	0.235

Figure 2-1 LPV 95% Horizontal Accuracy

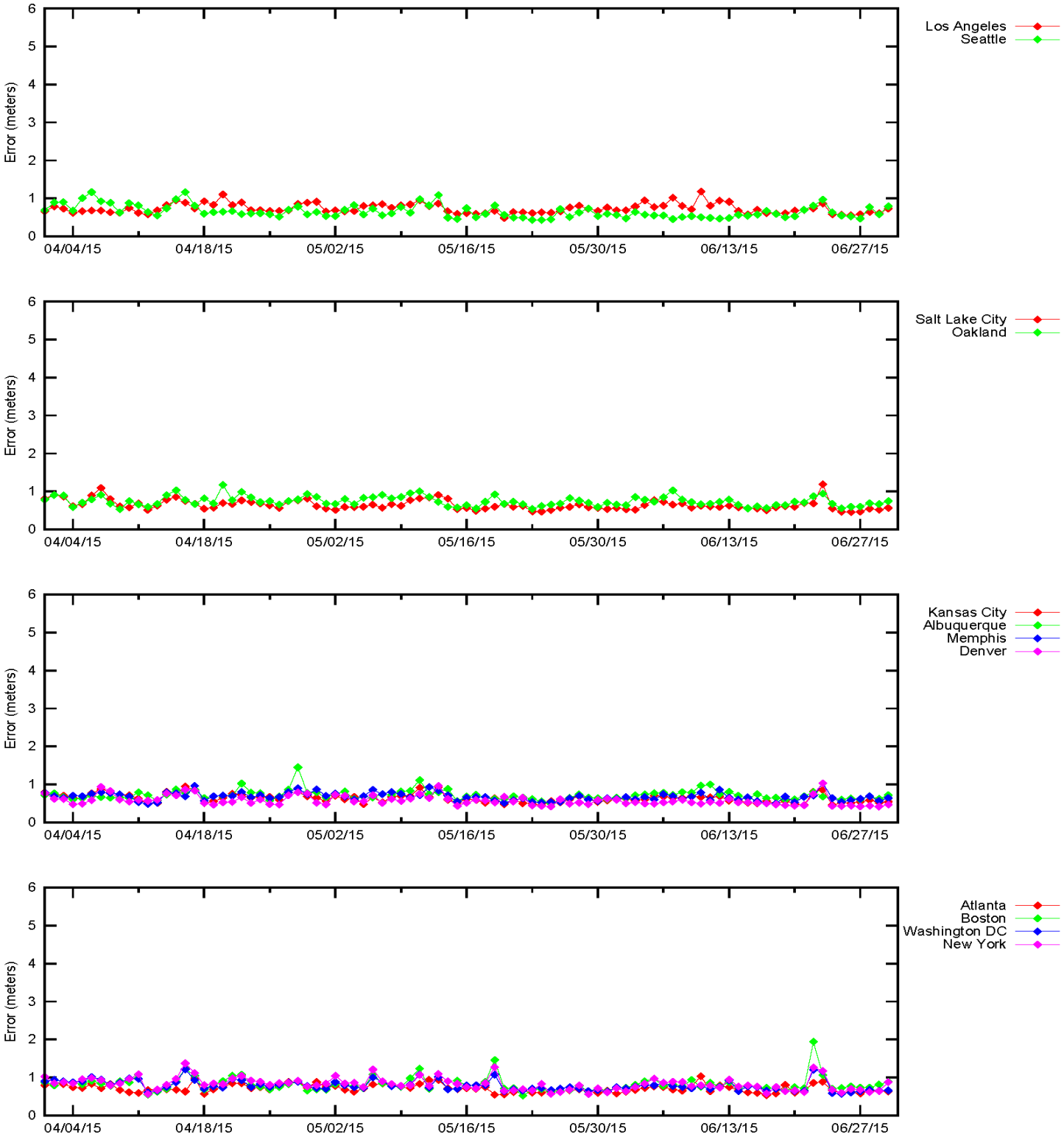


Figure 2-2 LPV 95% Horizontal Accuracy

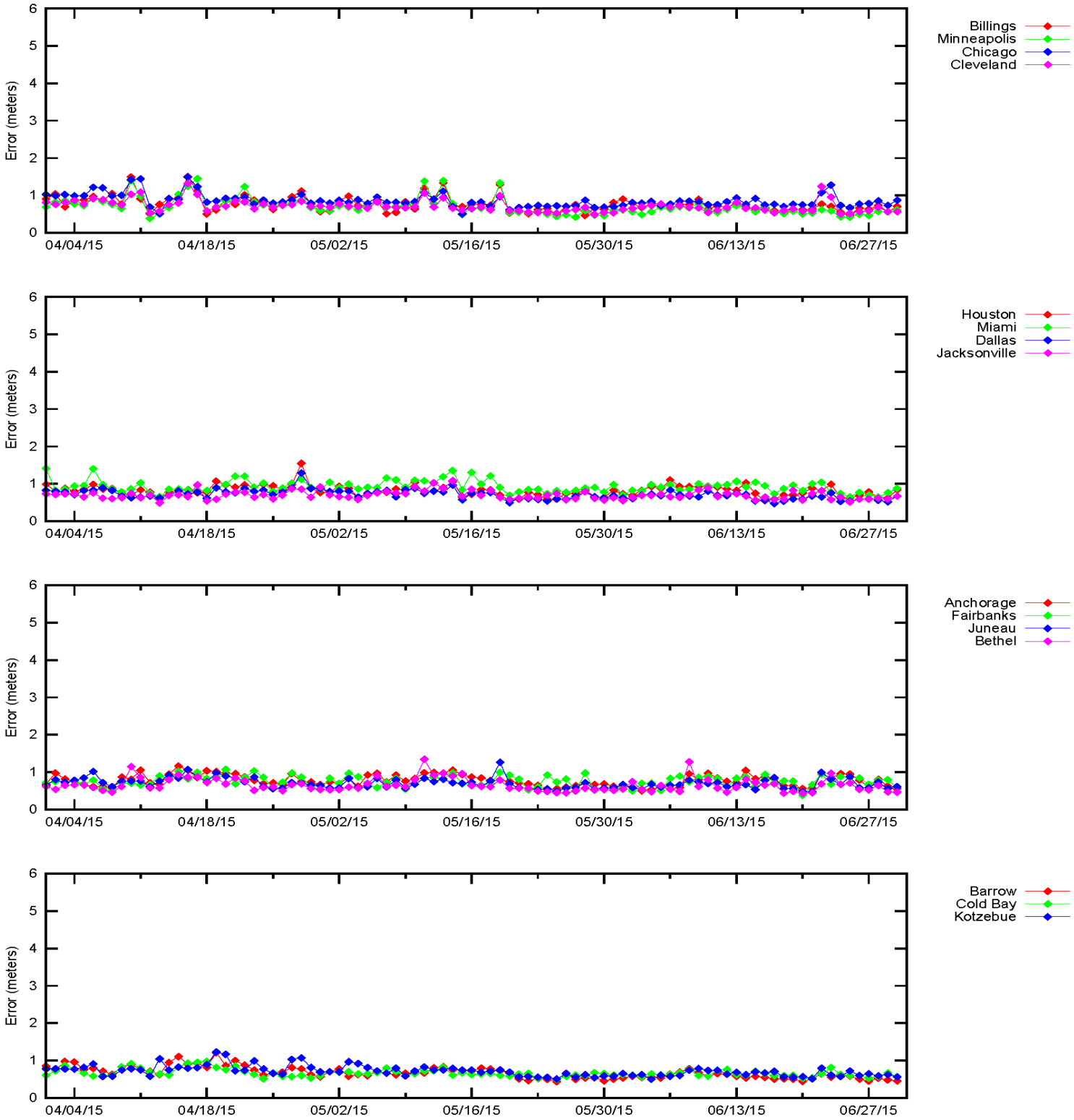


Figure 2-3 LPV 95% Horizontal Accuracy

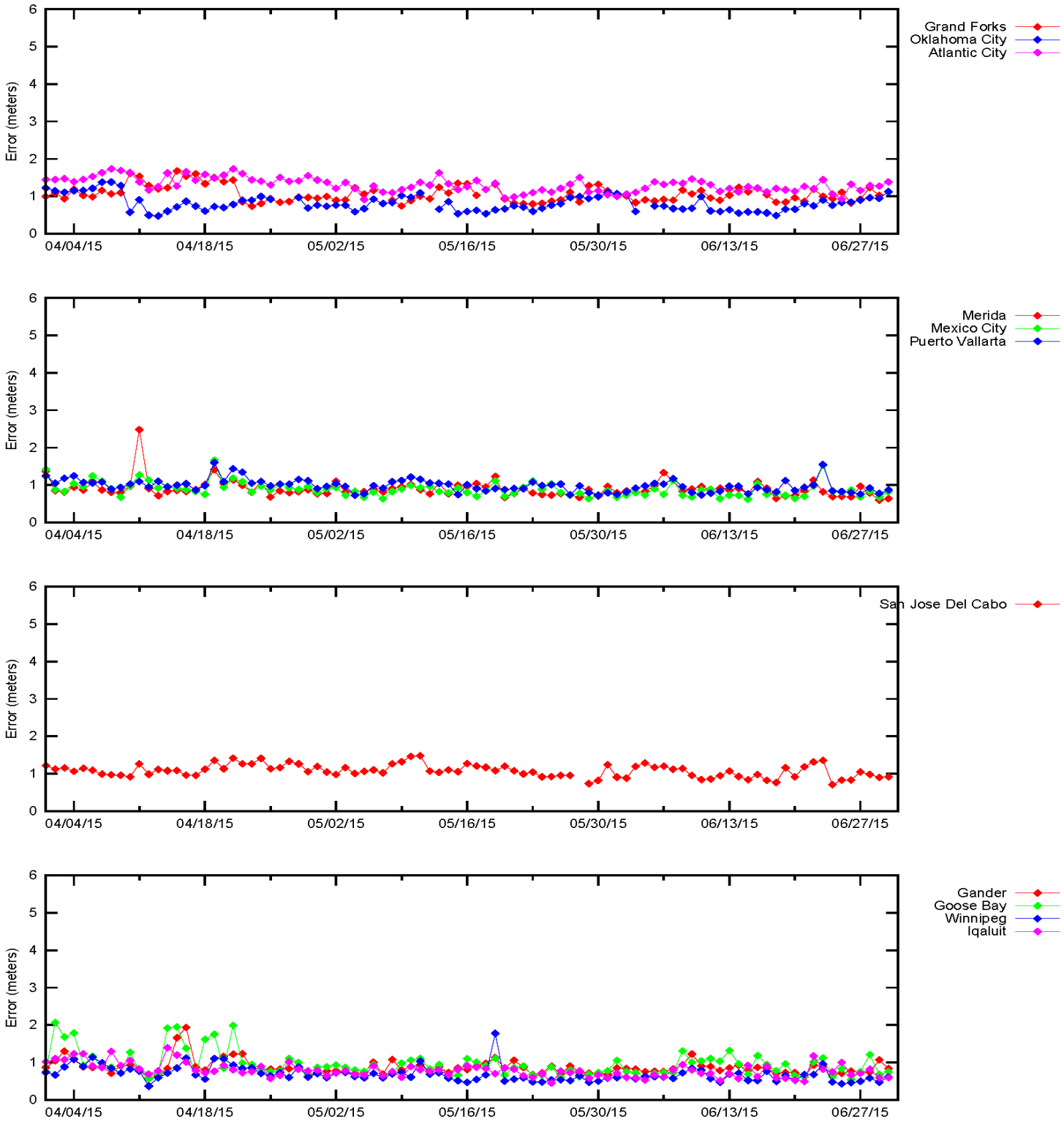


Figure 2-4 LPV 95% Vertical Accuracy

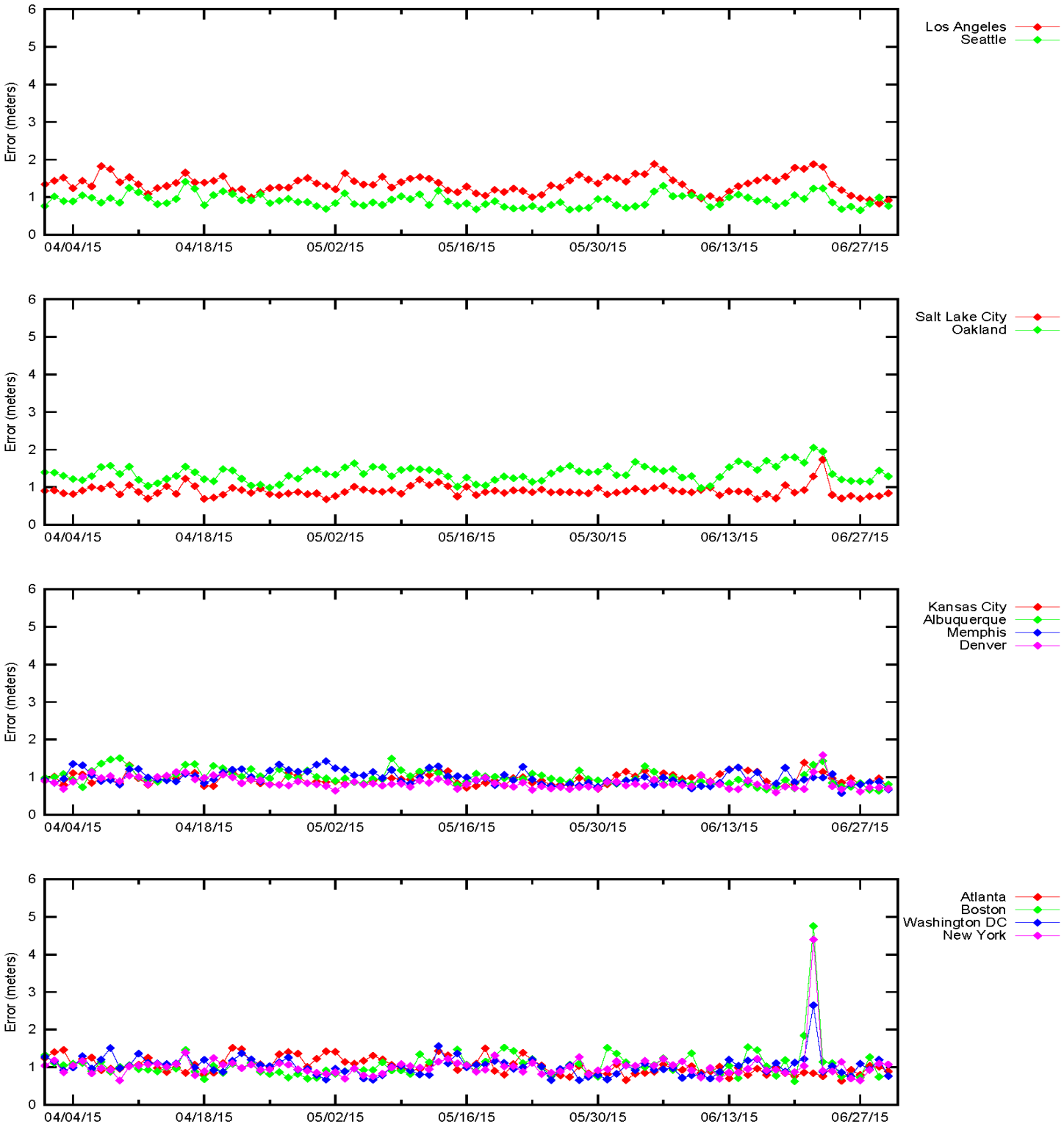


Figure 2-5 LPV 95% Vertical Accuracy

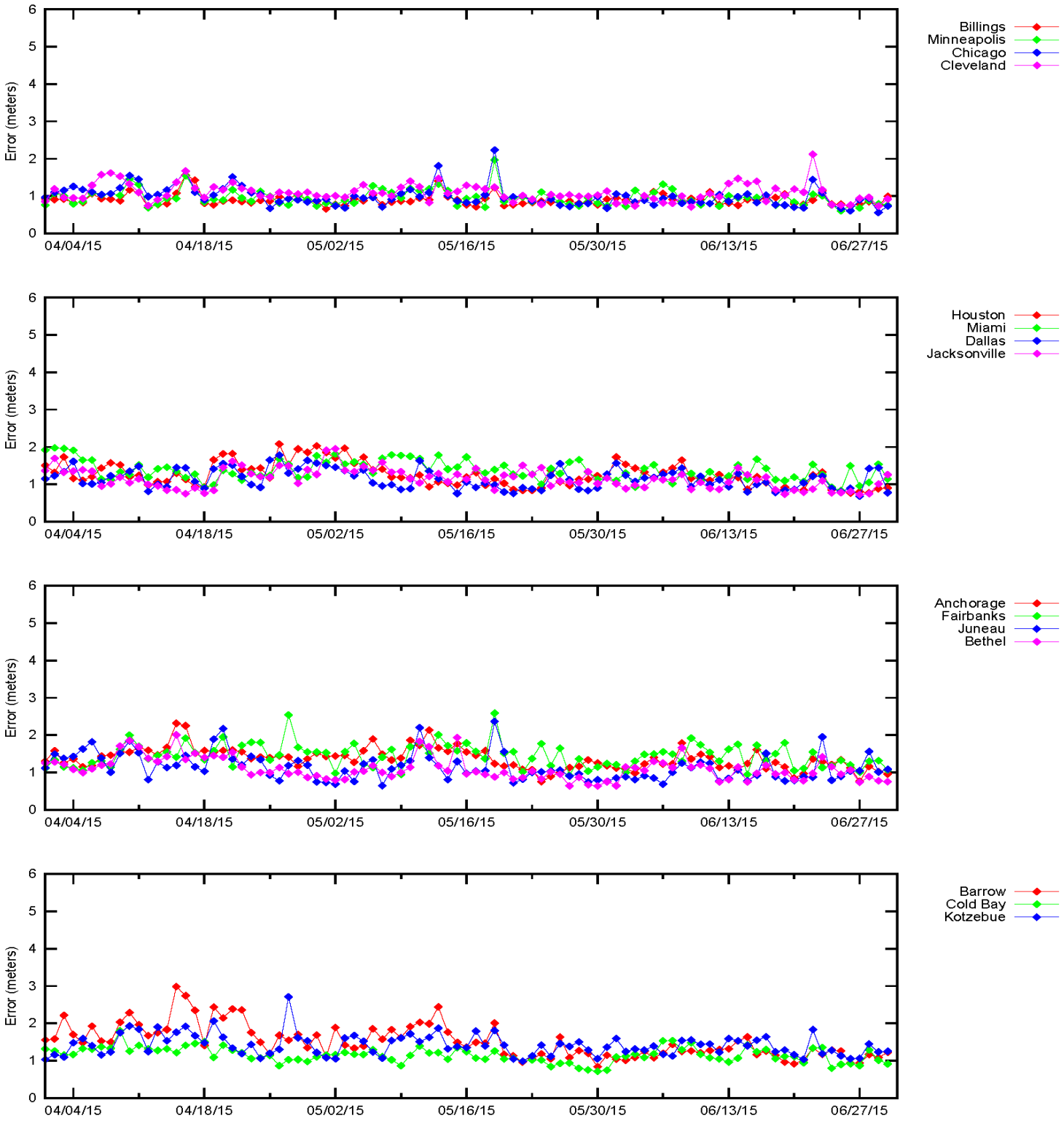


Figure 2-6 LPV 95% Vertical Accuracy

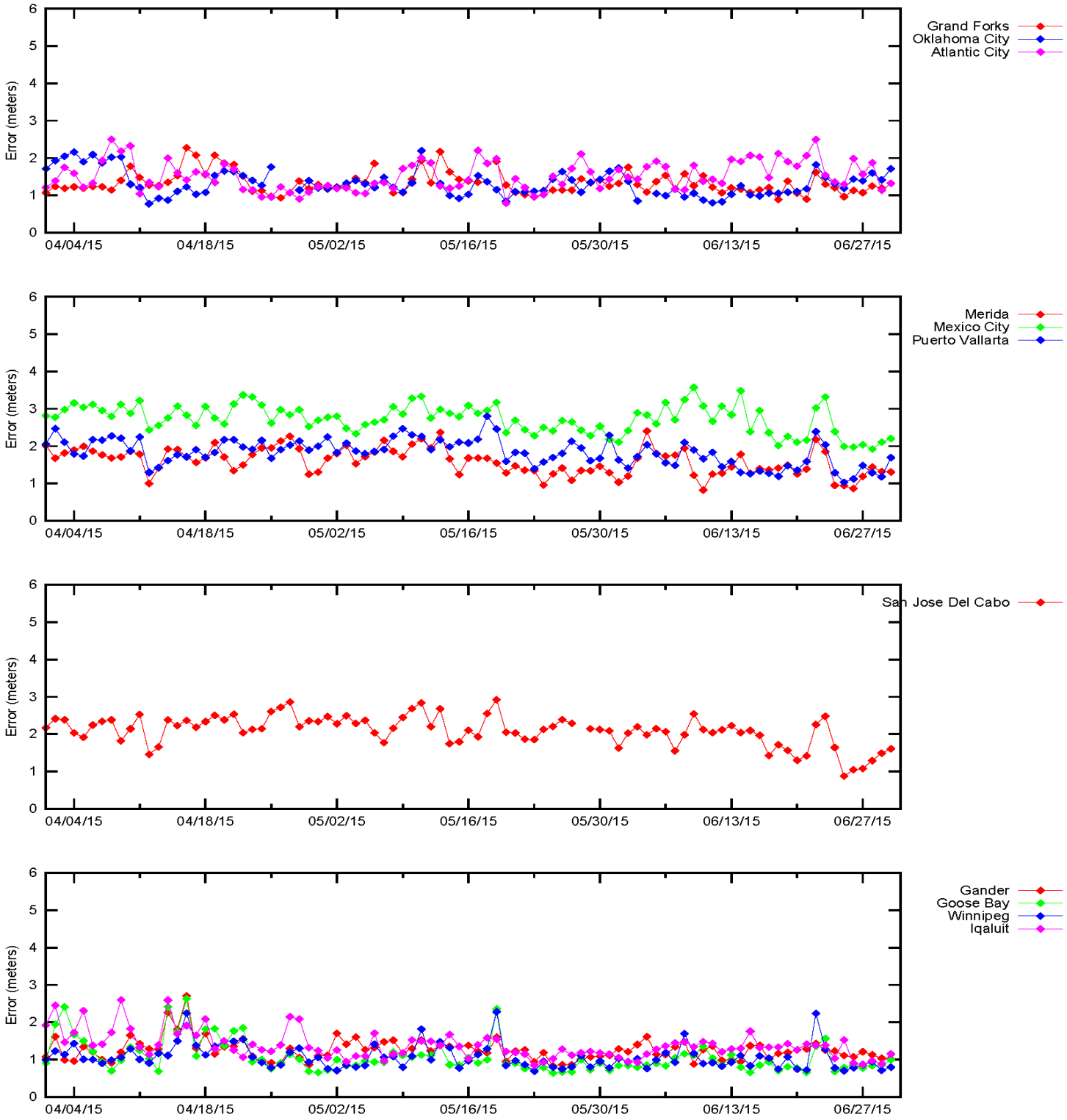


Figure 2-7 NPA 95% Horizontal Accuracy

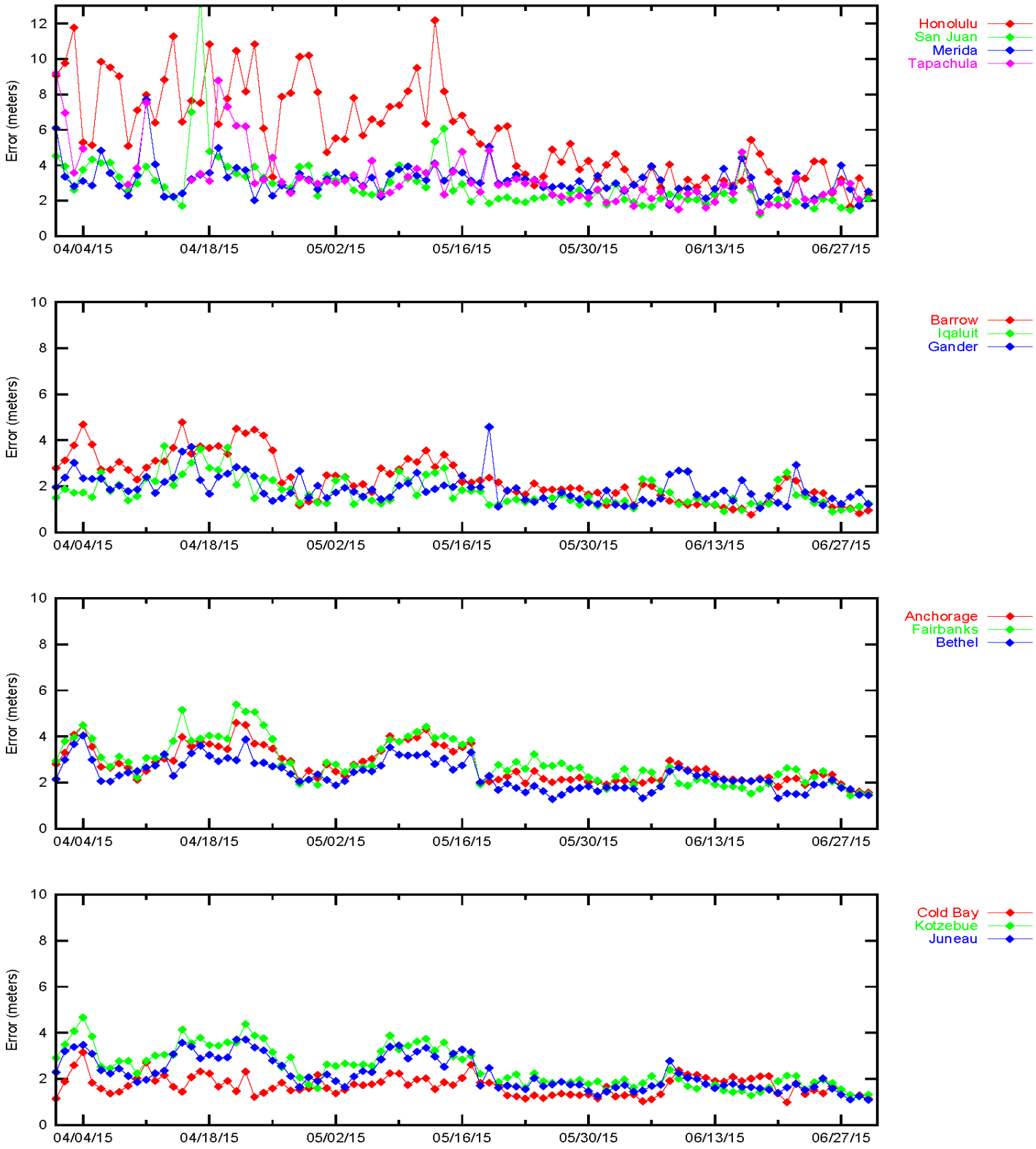


Figure 2-8 NPA 95% Horizontal Accuracy

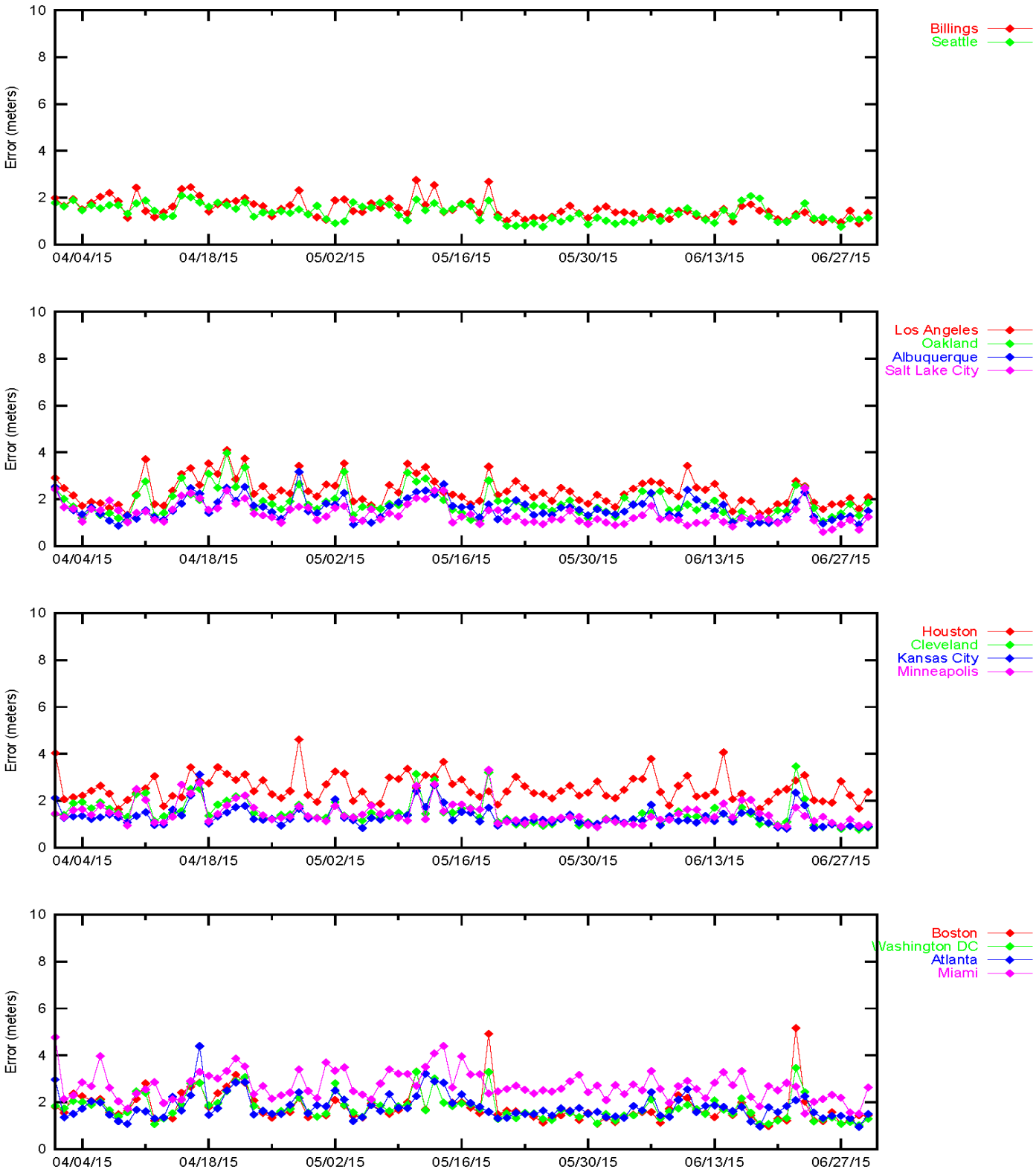


Figure 2-9 LPV Horizontal Error Bounding Triangle Chart

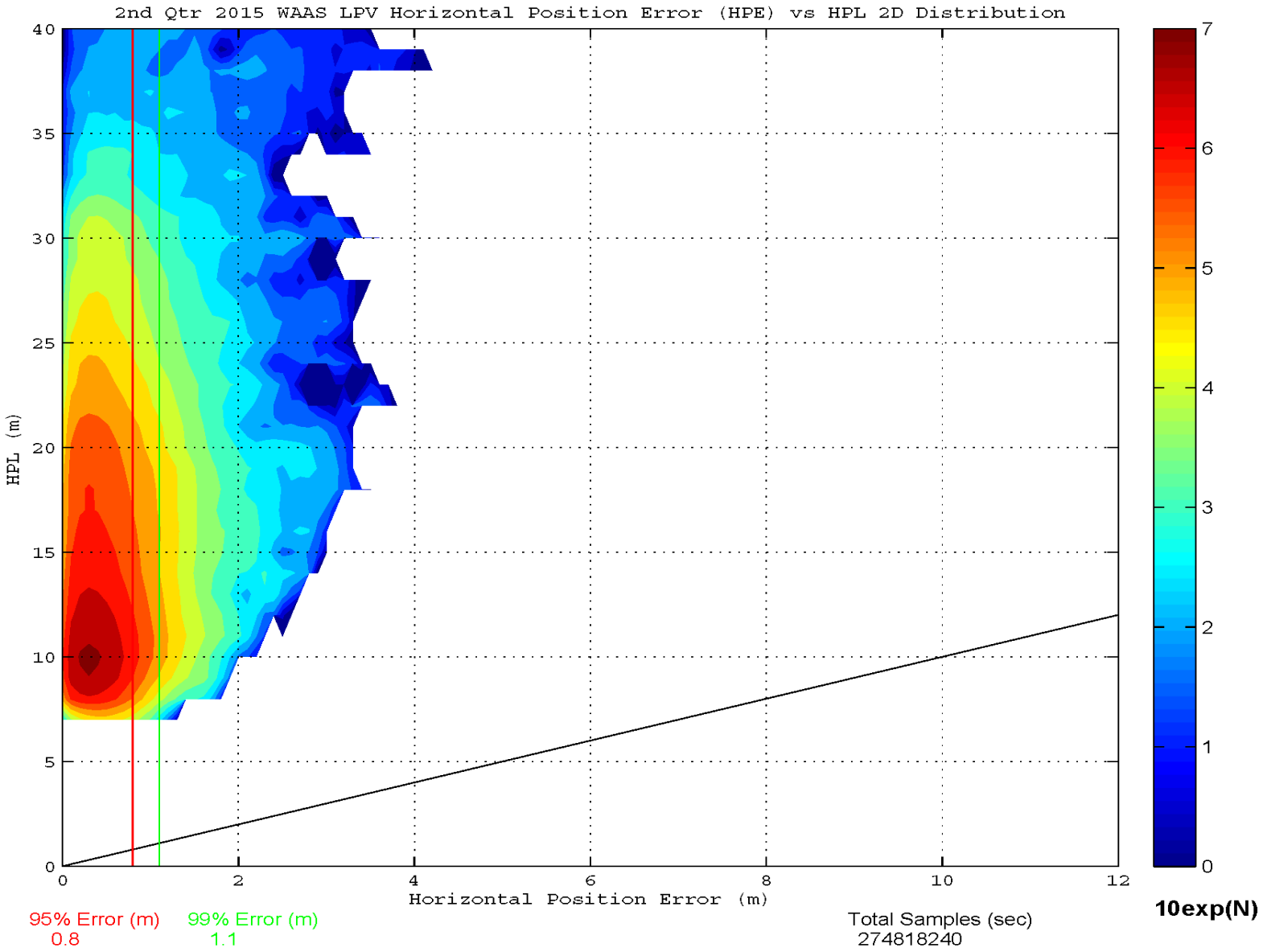


Figure 2-10 LPV Vertical Error Bounding Triangle Chart

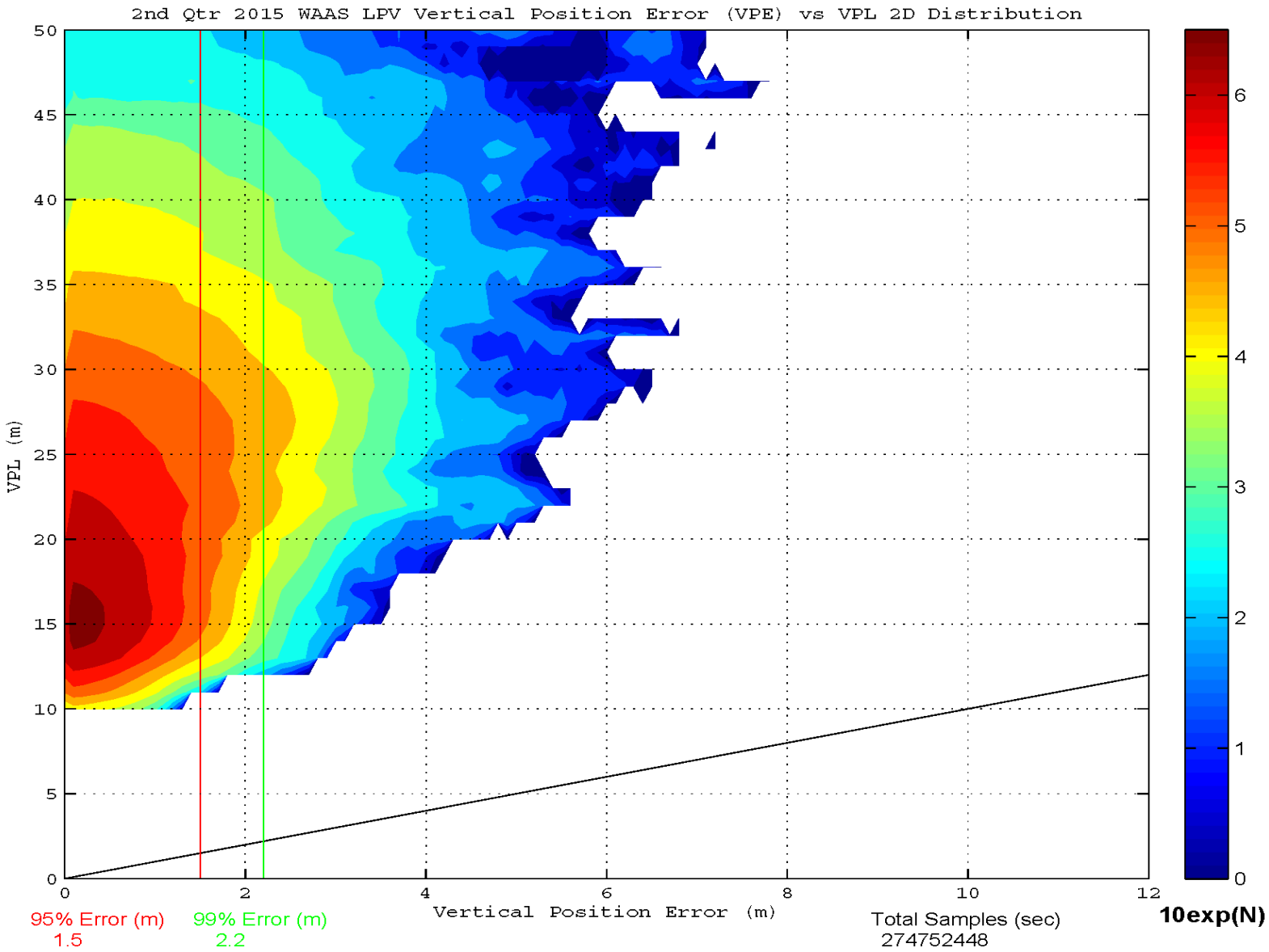


Figure 2-11 LPV 2-D Horizontal Error Distribution Histogram

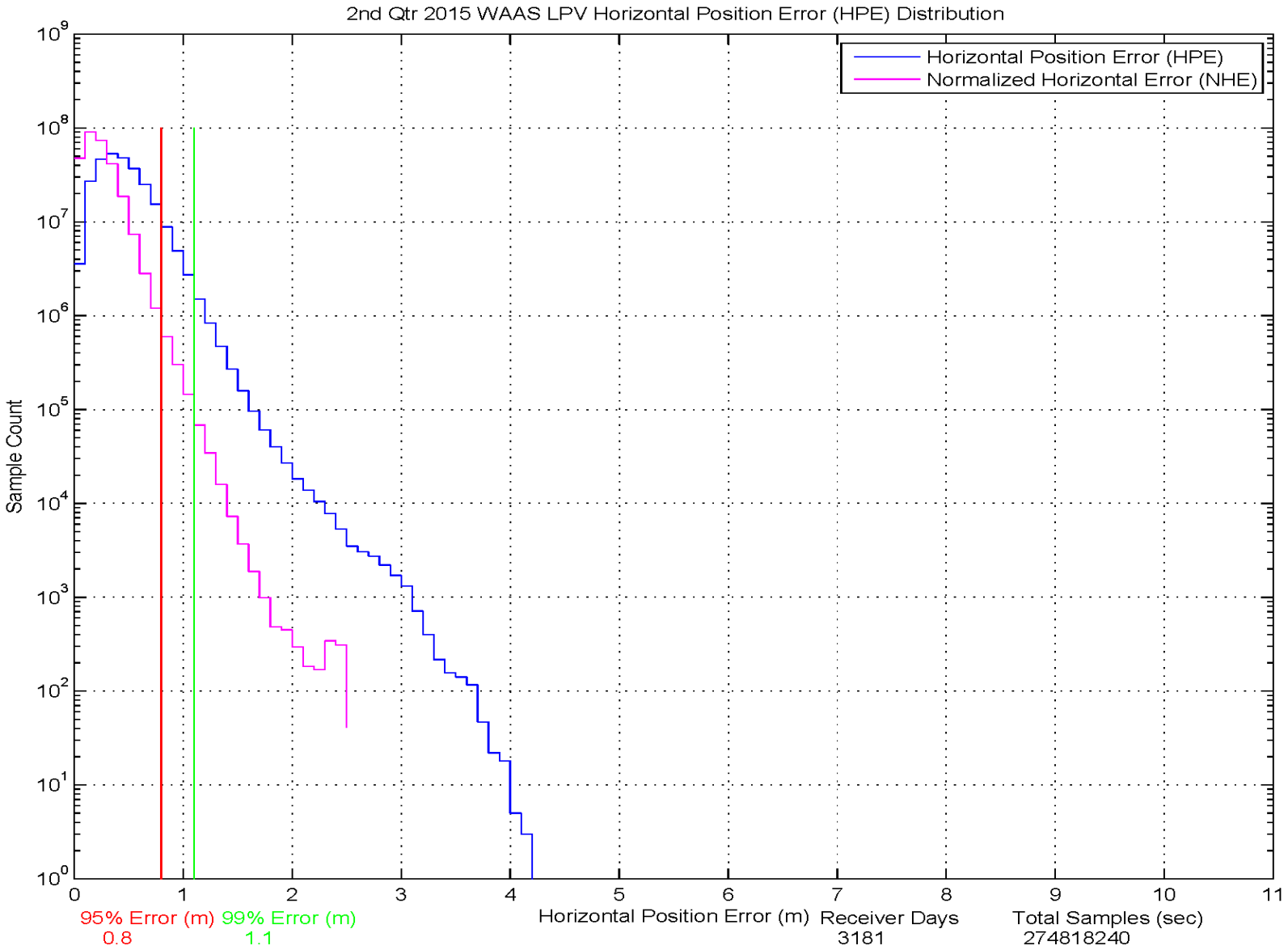
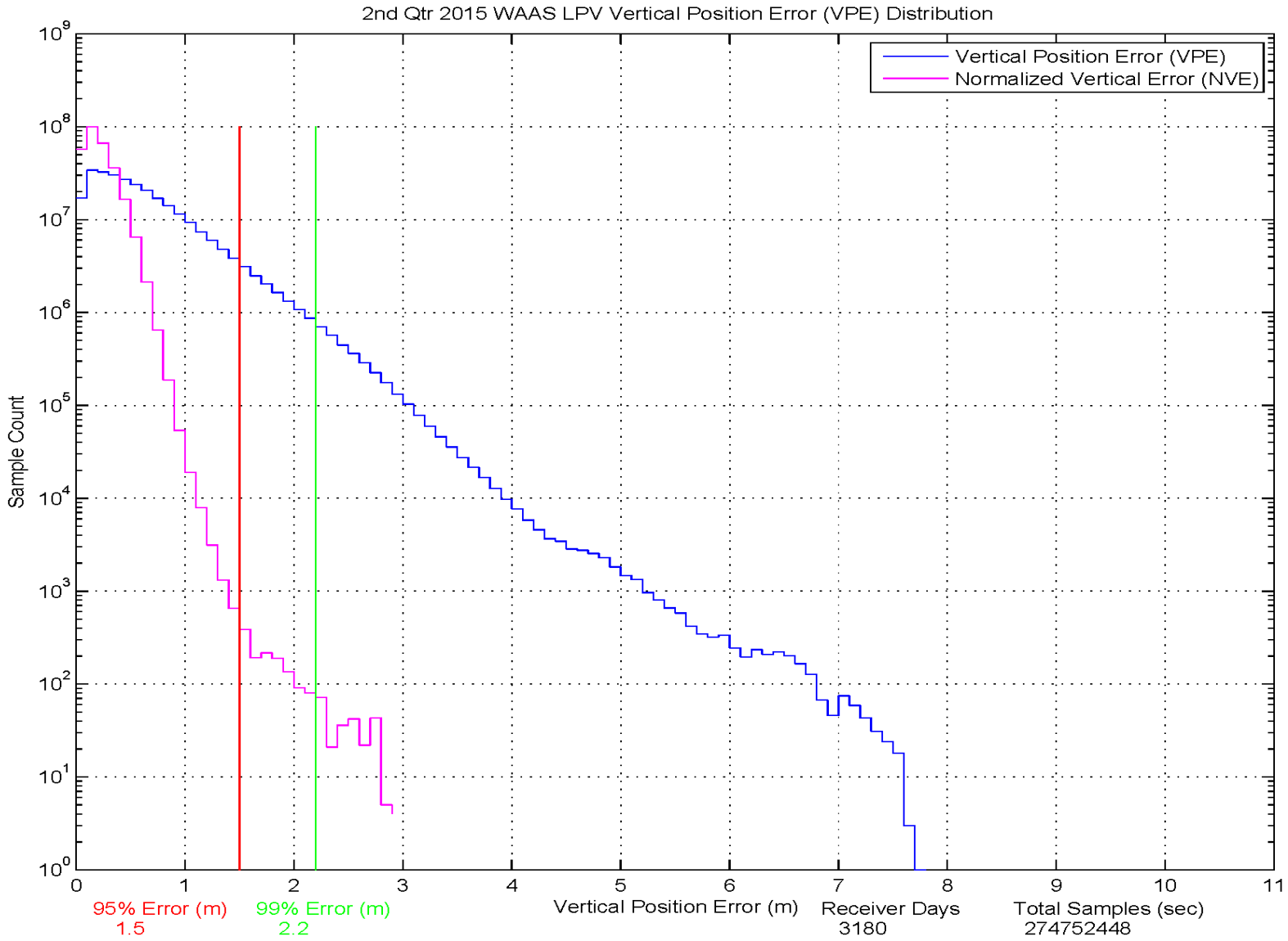


Figure 2-12 LPV 2-D Vertical Error Distribution Histogram



3.0 AVAILABILITY

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

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

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

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

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

Geomagnetic activity on May 19 and June 22-23 elevated GIVE values resulting in a reduction in LPV and LPV200 availability in CONUS, Alaska, and Canada.

Planned maintenance on PRN-21 on June 5 combined with elevated UDRE on CRE caused a reduction in LPV200 availability in CONUS and LPV and LPV200 availability in Alaska and Canada.

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

- On April 15, planned maintenance on PRN-16 slightly affected LPV and LPV200 availability.
- On April 16-17, geomagnetic activity elevated GIVE values, resulting in a reduction in LPV and LPV200 availability.
- On May 13, geomagnetic activity elevated GIVE values, resulting in a minor reduction in LPV200 availability.
- On June 25, planned maintenance on PRN 30 affected LPV200 availability.

Other significant event that reduced Alaska availability was observed on the following day:

- On May 5, a GUS switchover caused elevated UDREs on CRW which reduced LPV and LPV200 availability.

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

- On April 16-17, geomagnetic activity elevated GIVE values, resulting in a reduction in LPV and LPV200 availability.
- On June 11, planned maintenance on PRN-31 caused a reduction in LPV and LPV200 availability.

Radio Frequency Interference (RFI) on June 16 caused localized loss of LPV and LPV200 availability at Miami reference stations but had no effect on WAAS service.

Table 3-1 99% Protection Level

Location	99% HPL (meters)	99% VPL (meters)	Percentage in PA mode (%)
Atlantic City	14.202	21.987	100
Grand Forks	14.018	22.143	100
Oklahoma City	11.321	21.605	100
Albuquerque	11.253	22.457	100
Anchorage	14.414	24.631	100
Atlanta	12.375	20.866	100
Barrow	18.694	38.294	100
Bethel	18.553	30.785	100
Billings	12.771	20.854	100
Boston	15.692	22.08	100
Chicago	11.74	20.579	100
Cleveland	14.202	23.768	100
Cold Bay	28.279	39.743	100
Dallas	11.409	21.591	100
Denver	11.067	21.237	100
Fairbanks	13.861	26.258	100
Gander	27.352	38.88	100
Goose Bay	21.716	29.994	100
Houston	11.35	22.397	100
Iqaluit	27.799	42.175	100
Jacksonville	13.23	22.591	100
Juneau	13.906	23.328	100
Kansas City	10.766	19.072	100
Kotzebue	16.838	33.427	100
Los Angeles	14.059	28.794	100
Memphis	11.098	20.446	100
Merida	19.662	32.036	100
Mexico City	26.722	37.903	100
Miami	16.624	26.265	100
Minneapolis	11.925	20.76	100
New York	14.894	22.145	100
Oakland	17.5	30.129	100
Puerto Vallarta	28.626	42.864	100
Salt Lake City	11.831	20.023	100
San Jose Del Cabo	24.905	39.496	100
Seattle	13.616	22.819	100
Washington DC	13.34	21.887	100
Winnipeg	14.368	21.96	100

Table 3-2 Quarterly Availability Statistics

Location	LP WAAS Availability (%) With 15 minute window	LPV WAAS Availability (%) With 15 minute window	LPV 200 WAAS Availability (%) With 15 minute window
Atlantic City	100	100	99.99
Grand Forks	100	100	99.96
Oklahoma City	100	100	100
Albuquerque	100	100	100
Anchorage	100	100	99.98
Atlanta	100	100	100
Barrow	100	99.97	96.98
Bethel	100	100	99.93
Billings	100	100	99.99
Boston	100	99.98	99.95
Chicago	100	100	100
Cleveland	100	100	100
Cold Bay	99.98	99.96	95.02
Dallas	100	100	100
Denver	100	100	100
Fairbanks	100	100	99.98
Gander	99.93	99.84	95.85
Goose Bay	99.95	99.95	99.43
Houston	100	100	100
Iqaluit	99.96	99.64	95.4
Jacksonville	100	100	100
Juneau	100	100	100
Kansas City	100	100	100
Kotzebue	100	100	99.35
Los Angeles	100	100	99.96
Memphis	100	100	100
Merida	100	99.99	99.57
Mexico City	99.98	99.93	96.72
Miami	100	99.99	99.96
Minneapolis	100	100	100
New York	100	100	99.96
Oakland	100	100	99.89
Puerto Vallarta	99.97	99.49	91.7
Salt Lake City	100	100	100
San Jose Del Cabo	99.99	99.96	93.78
Seattle	100	100	99.99
Washington DC	100	100	100
Winnipeg	100	99.99	99.95

Table 3-3 NPA Availability

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 LPV 200 Outage Rate (Per 150 sec approach)

Location	LP Outages	LP Outage Rates	LPV Outages	LPV Outage Rates	LPV 200 Outages	LPV 200 Outage Rates
Atlantic City	0	0	0	0	1	0.000019
Grand Forks	0	0	0	0	3	0.00006
Oklahoma City	0	0	0	0	0	0
Albuquerque	0	0	0	0	1	0.000019
Anchorage	0	0	0	0	2	0.000038
Atlanta	0	0	0	0	0	0
Barrow	1	0.000019	5	0.000095	229	0.004505
Bethel	0	0	0	0	7	0.000134
Billings	0	0	0	0	1	0.000019
Boston	2	0.000039	2	0.000039	1	0.00002
Chicago	0	0	0	0	0	0
Cleveland	0	0	0	0	0	0
Cold Bay	2	0.000038	4	0.000076	446	0.008955
Dallas	0	0	0	0	1	0.000019
Denver	0	0	0	0	1	0.000019
Fairbanks	2	0.000038	2	0.000038	14	0.000267
Gander	2	0.000038	9	0.000172	274	0.005455
Goose Bay	1	0.000019	2	0.000038	41	0.000787
Houston	0	0	0	0	1	0.000019
Iqaluit	5	0.000095	28	0.000536	338	0.006764
Jacksonville	0	0	0	0	0	0
Juneau	0	0	0	0	3	0.000057
Kansas City	0	0	0	0	0	0
Kotzebue	1	0.000019	2	0.000038	114	0.002189
Los Angeles	0	0	0	0	6	0.000115
Memphis	0	0	0	0	0	0
Merida	0	0	2	0.000038	51	0.000979
Mexico City	4	0.000076	18	0.000344	481	0.00949
Miami	0	0	2	0.000038	3	0.000057
Minneapolis	0	0	0	0	0	0
New York	0	0	1	0.000019	1	0.000019
Oakland	0	0	0	0	4	0.000076
Puerto Vallarta	3	0.000057	109	0.002091	626	0.013029
Salt Lake City	0	0	0	0	1	0.000019
San Jose Del Cabo	1	0.000019	6	0.000116	418	0.008601
Seattle	0	0	0	0	1	0.000019
Washington DC	0	0	0	0	0	0
Winnipeg	0	0	2	0.000038	3	0.000057

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

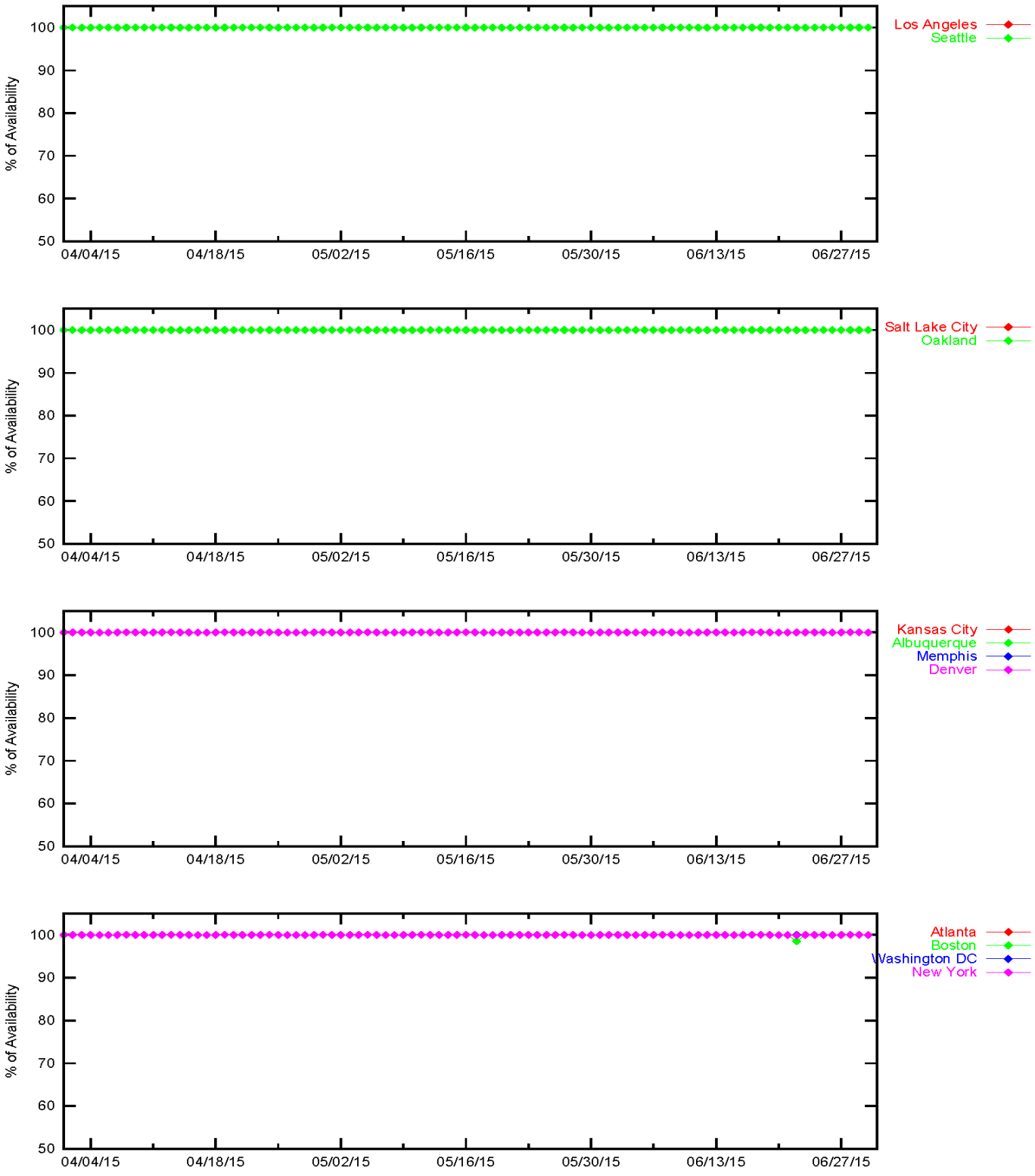


Figure 3-2 LPV Instantaneous Availability

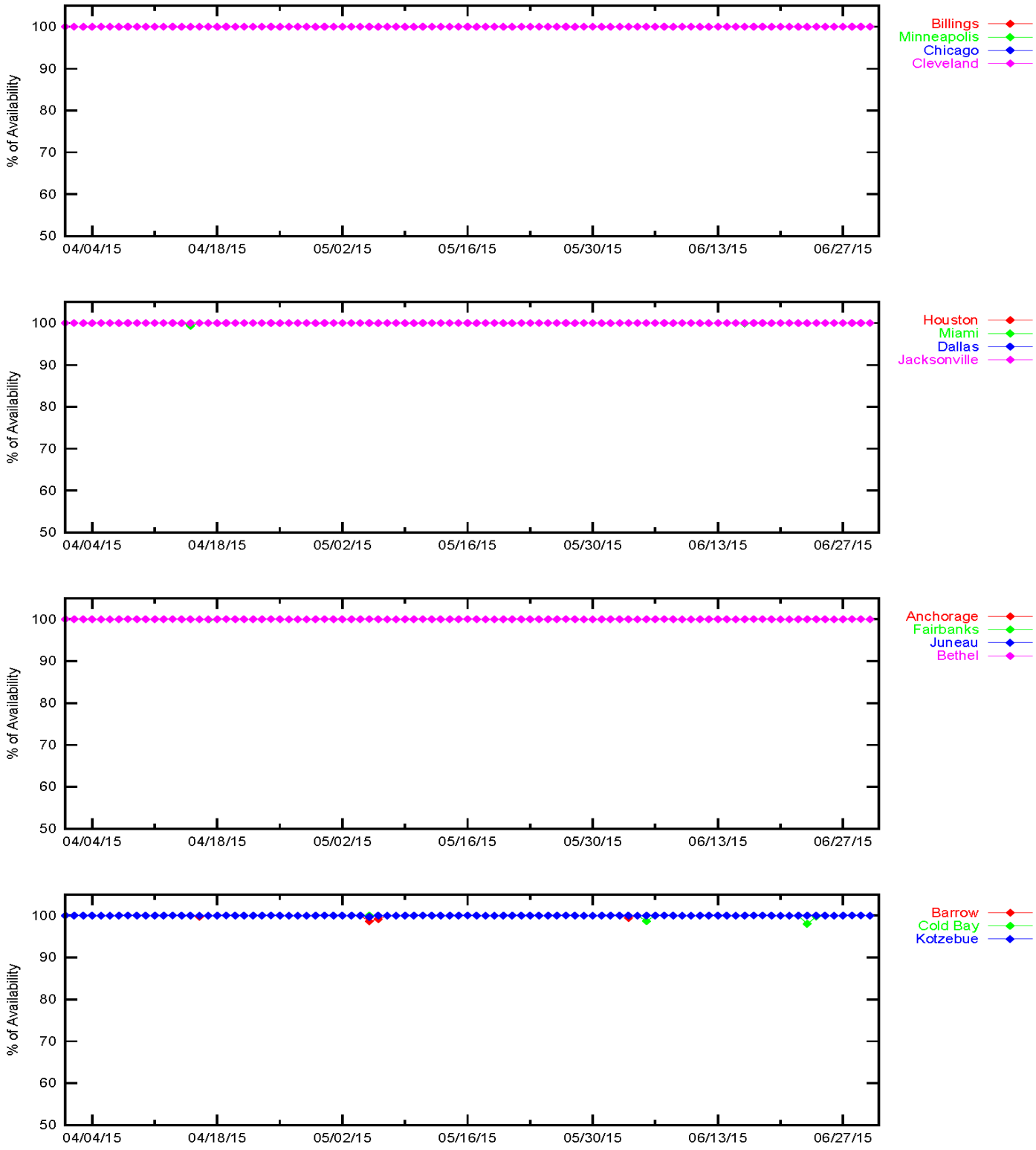


Figure 3-3 LPV Instantaneous Availability

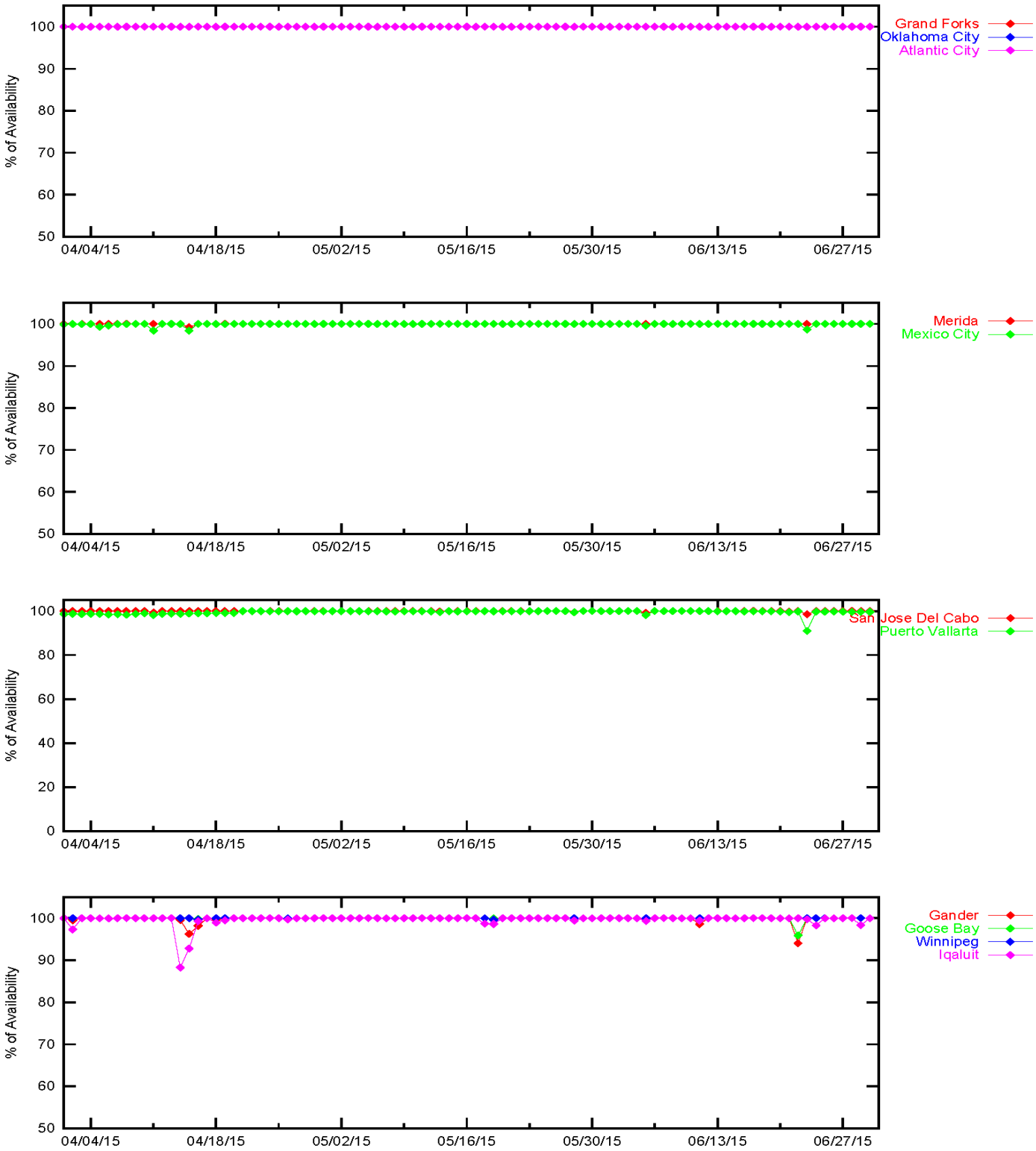


Figure 3-4 LPV 200 Instantaneous Availability

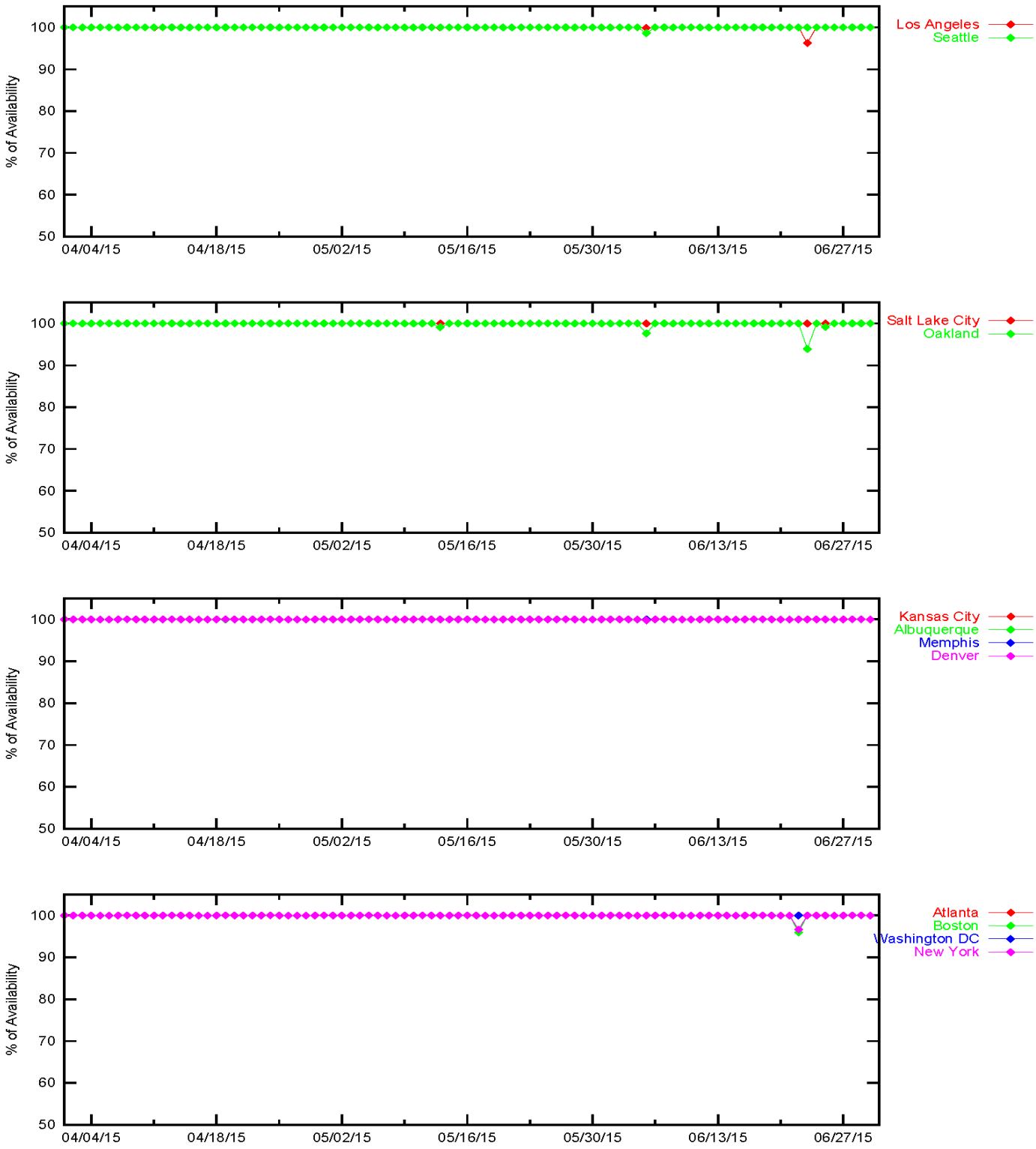


Figure 3-5 LPV 200 Instantaneous Availability

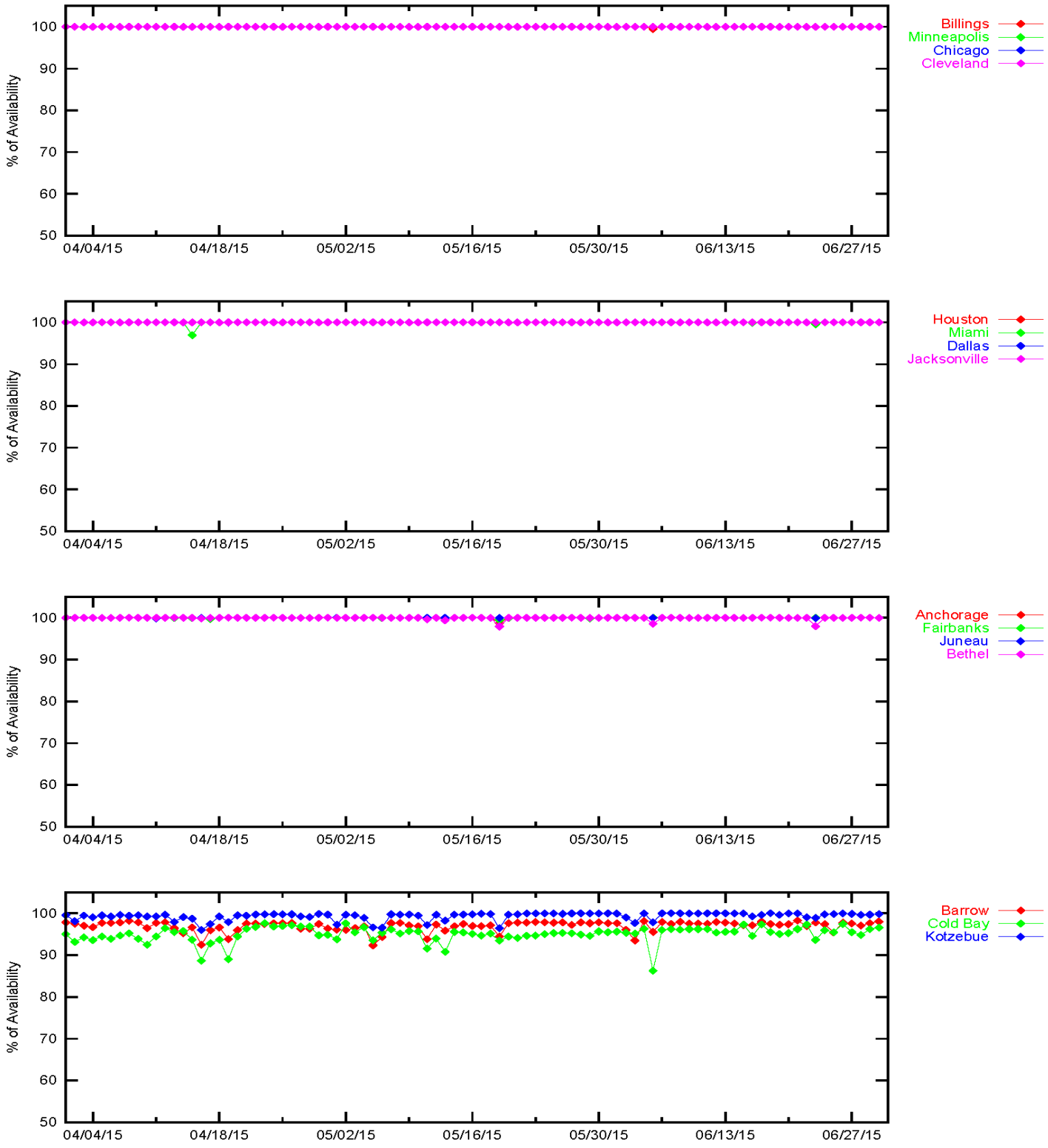


Figure 3-6 LPV 200 Instantaneous Availability

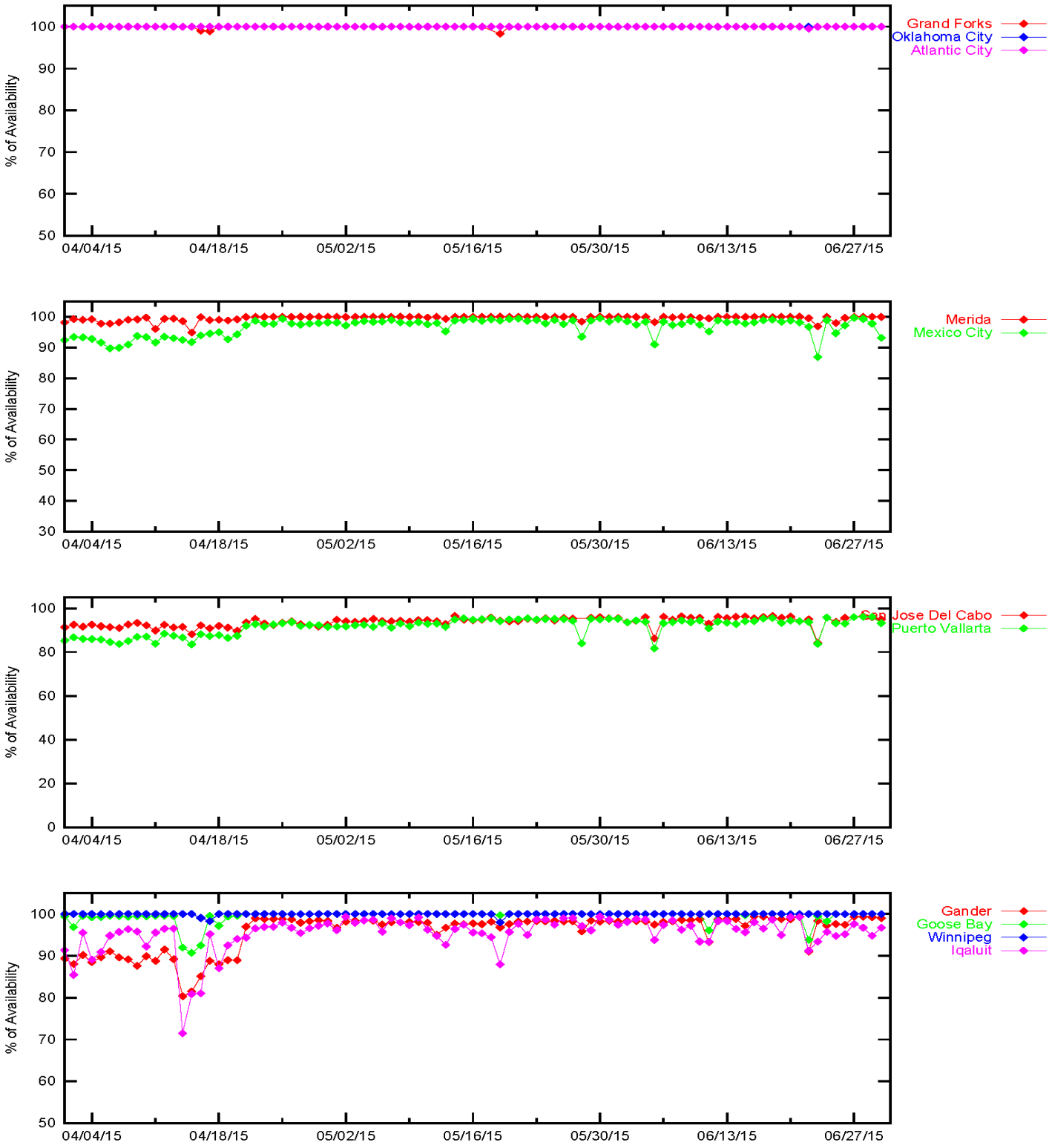


Figure 3-7 LPV Outages

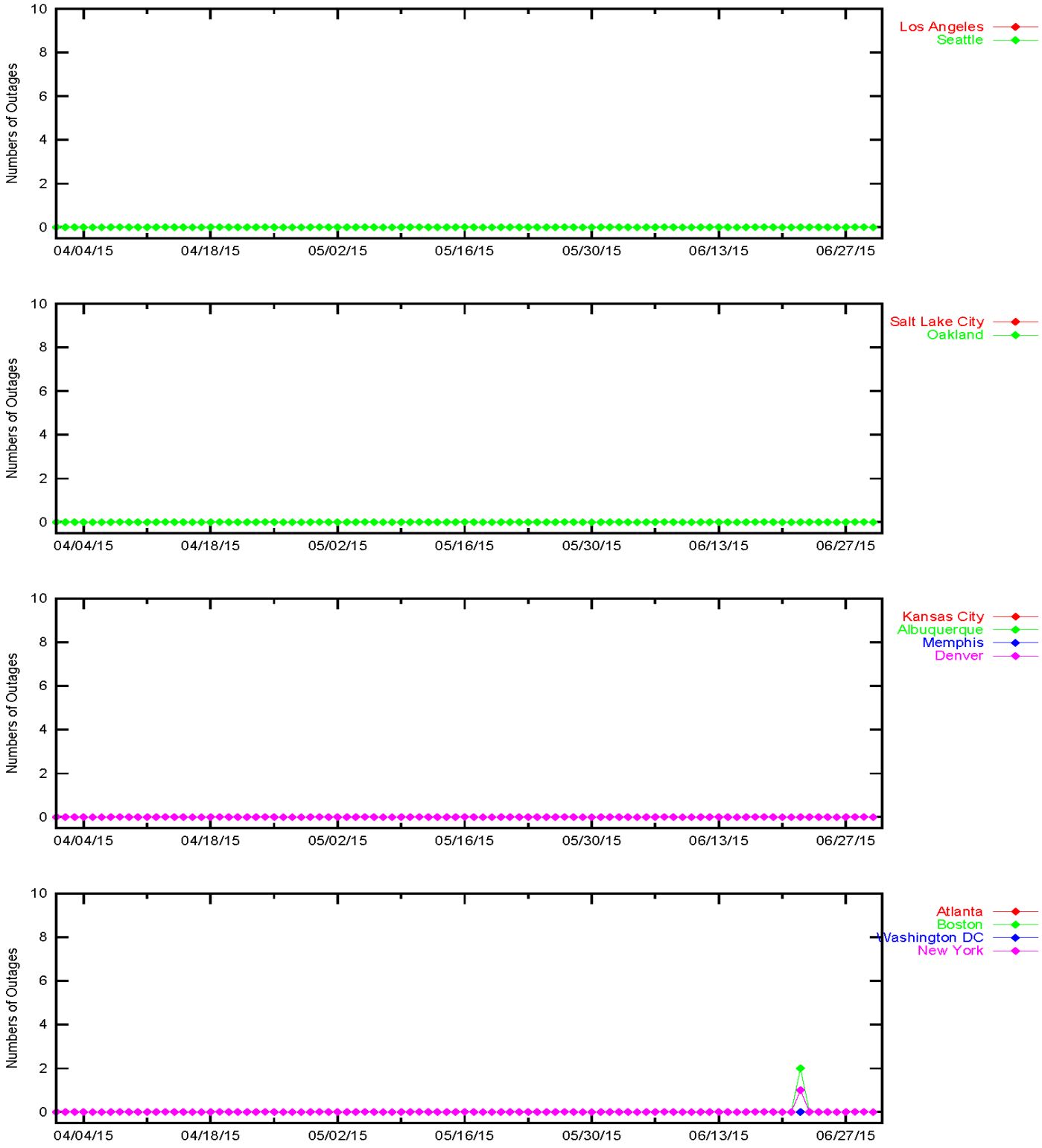


Figure 3-8 LPV Outages

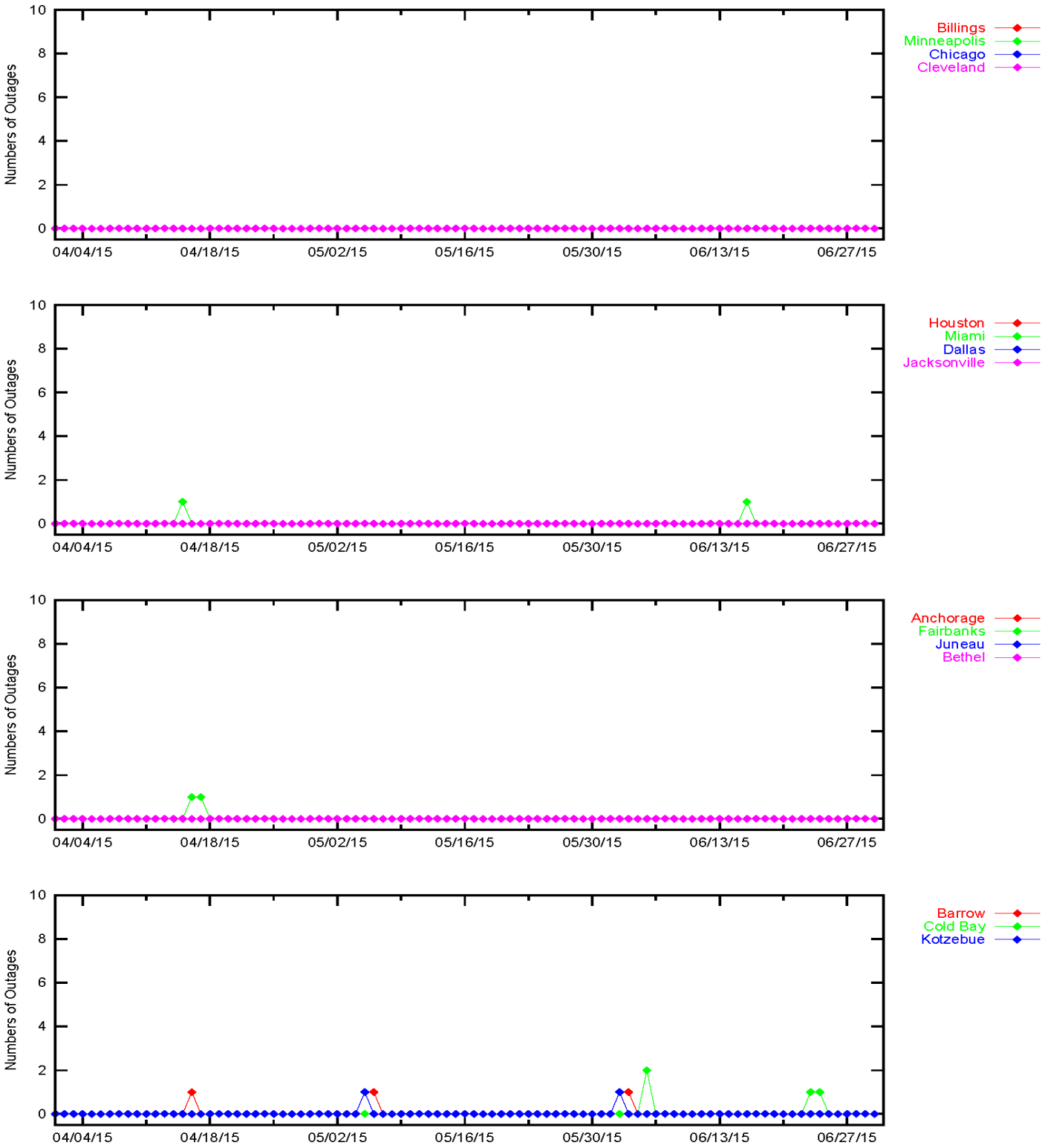


Figure 3-9 LPV Outages

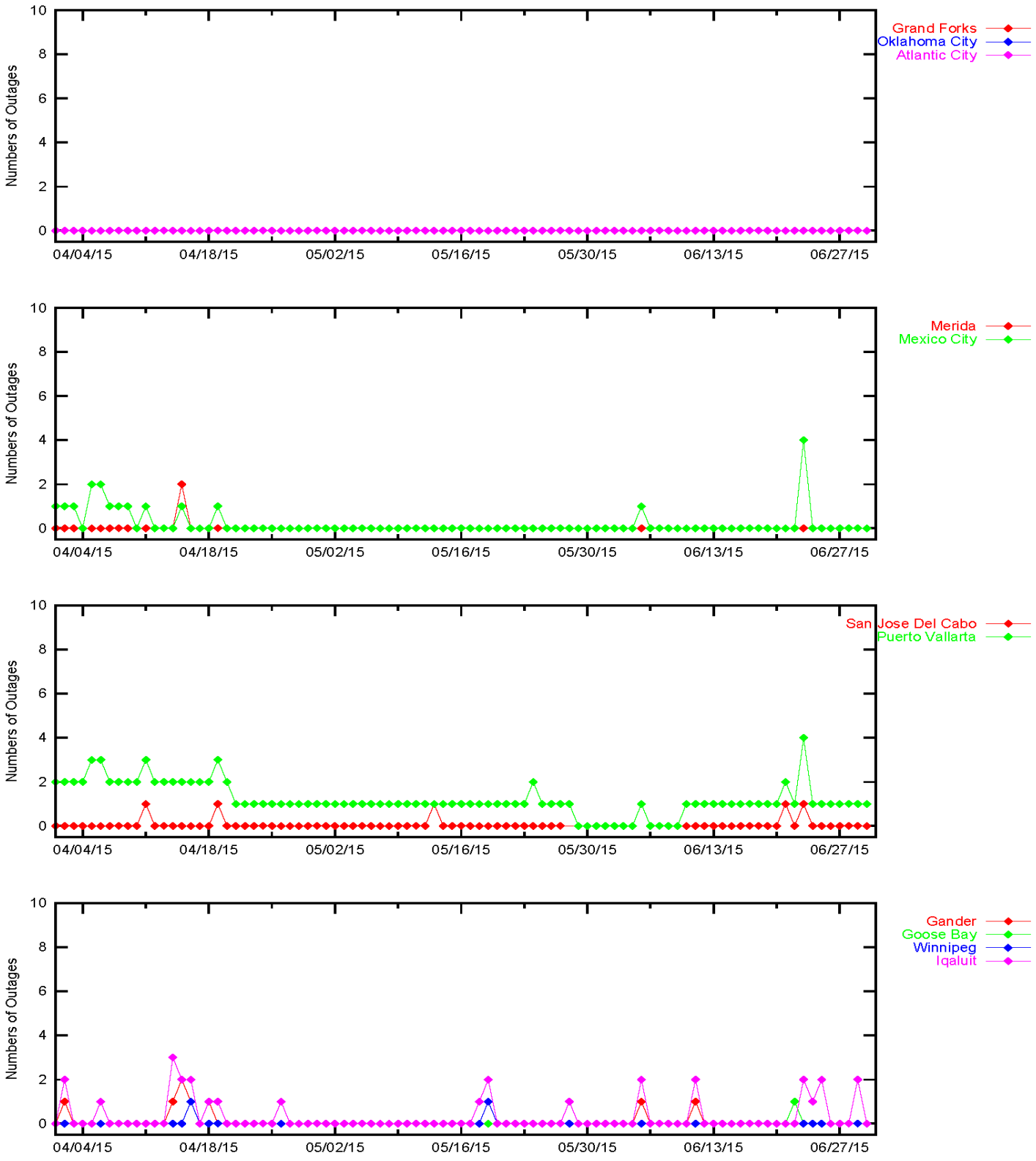


Figure 3-10 LPV 200 Outages

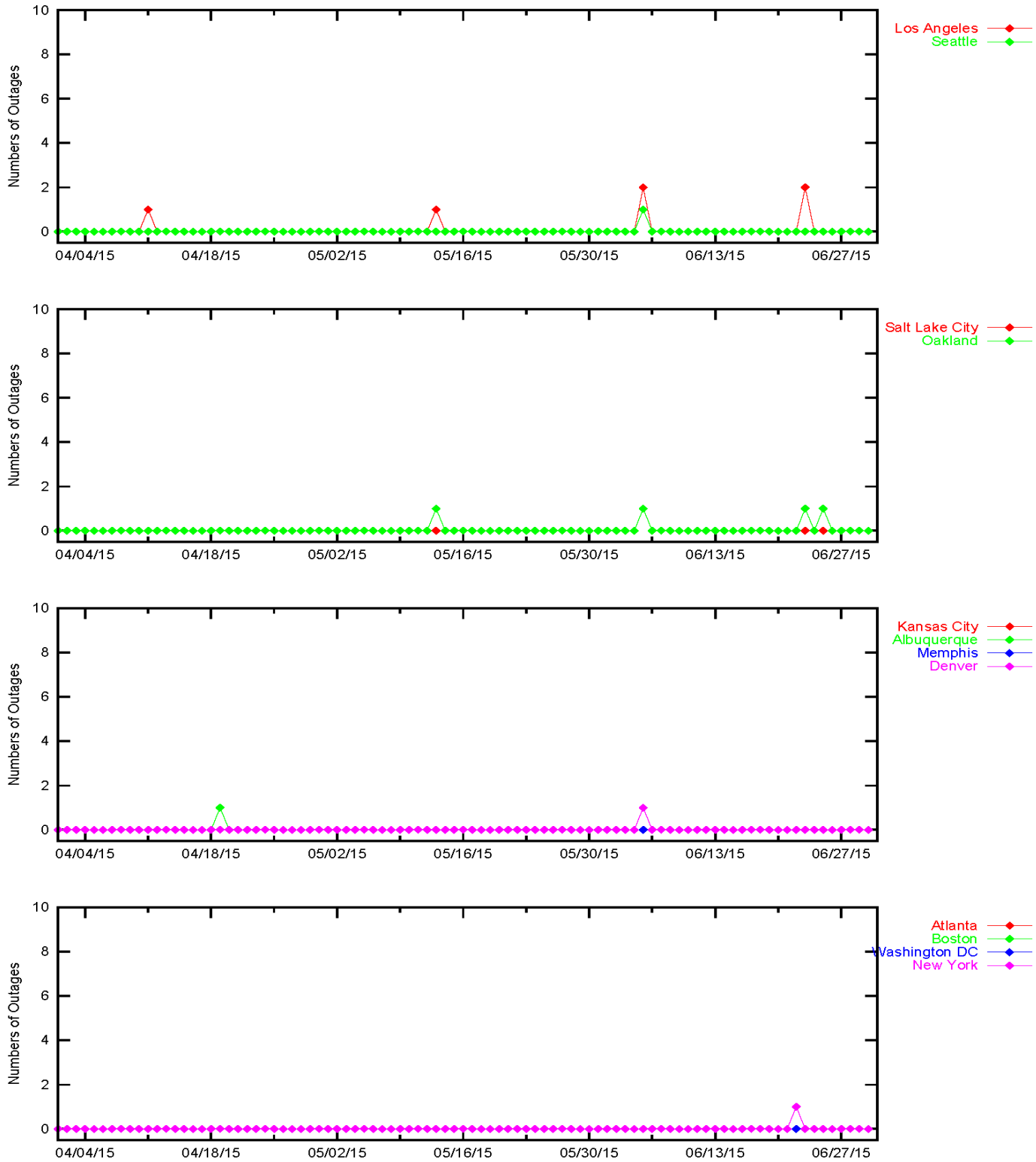


Figure 3-11 LPV 200 Outages

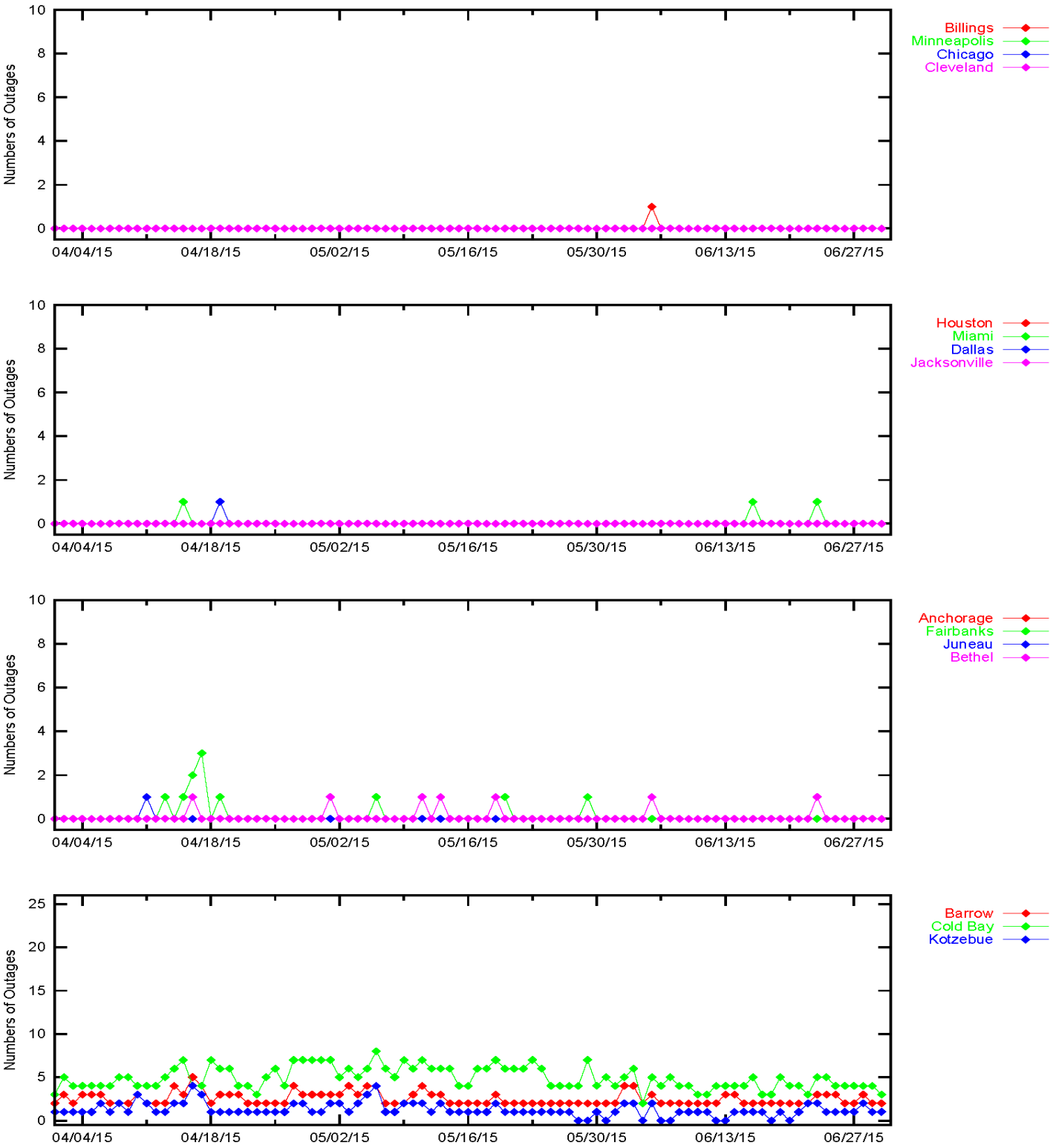
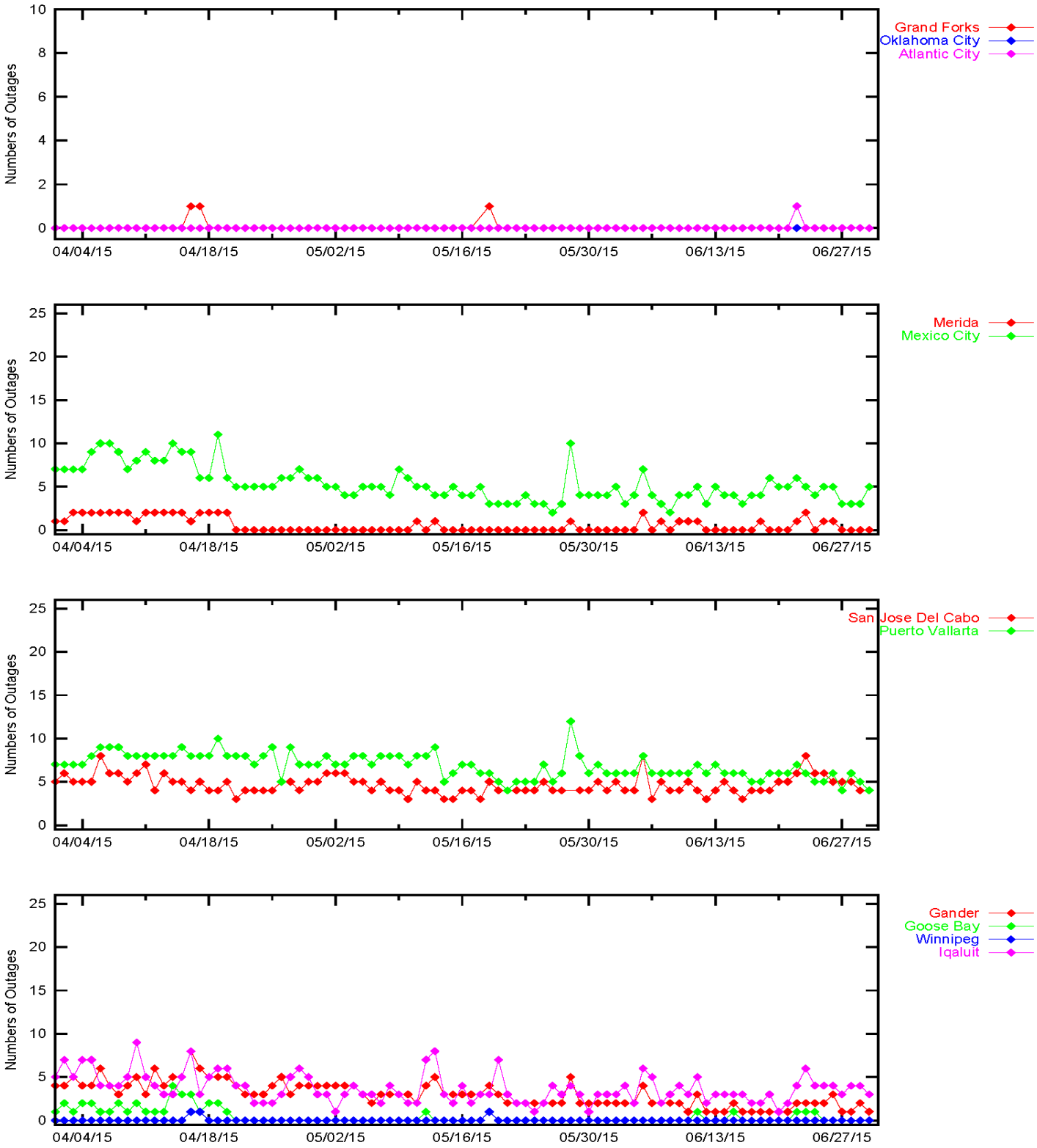


Figure 3-12 LPV 200 Outages



4.0 COVERAGE

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

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

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

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

Geomagnetic activity on May 19 and June 22-23 elevated GIVE values resulting in a reduction in LPV and LPV200 coverage in CONUS, Alaska, and Canada.

Planned maintenance on PRN-21 on June 5 combined with elevated UDRE on CRE caused a reduction in LPV200 coverage in CONUS and LPV and LPV200 coverage in Alaska and Canada.

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

- On April 15, planned maintenance on PRN-16 slightly affected LPV and LPV200 coverage.
- On April 16-17, geomagnetic activity elevated GIVE values, resulting in a reduction in LPV and LPV200 coverage.
- On May 13, geomagnetic activity elevated GIVE values, resulting in a minor reduction in LPV200 coverage.
- On June 25, planned maintenance on PRN 30 affected LPV200 coverage.

Other significant event that reduced Alaska coverage in Figure 4.7 was observed on the following day:

- On May 5, a GUS switchover caused elevated UDREs on CRW which reduced LPV and LPV200 coverage.

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

- On April 16-17, geomagnetic activity elevated GIVE values, resulting in a reduction in LPV and LPV200 coverage.
- On June 11, planned maintenance on PRN-31 caused a reduction in LPV and LPV200 coverage.

Radio frequency interference (RFI) caused localized loss of LPV and LPV200 coverage at Miami but had no effect on WAAS service.

Figure 4-1 LP North America Coverage for the Quarter

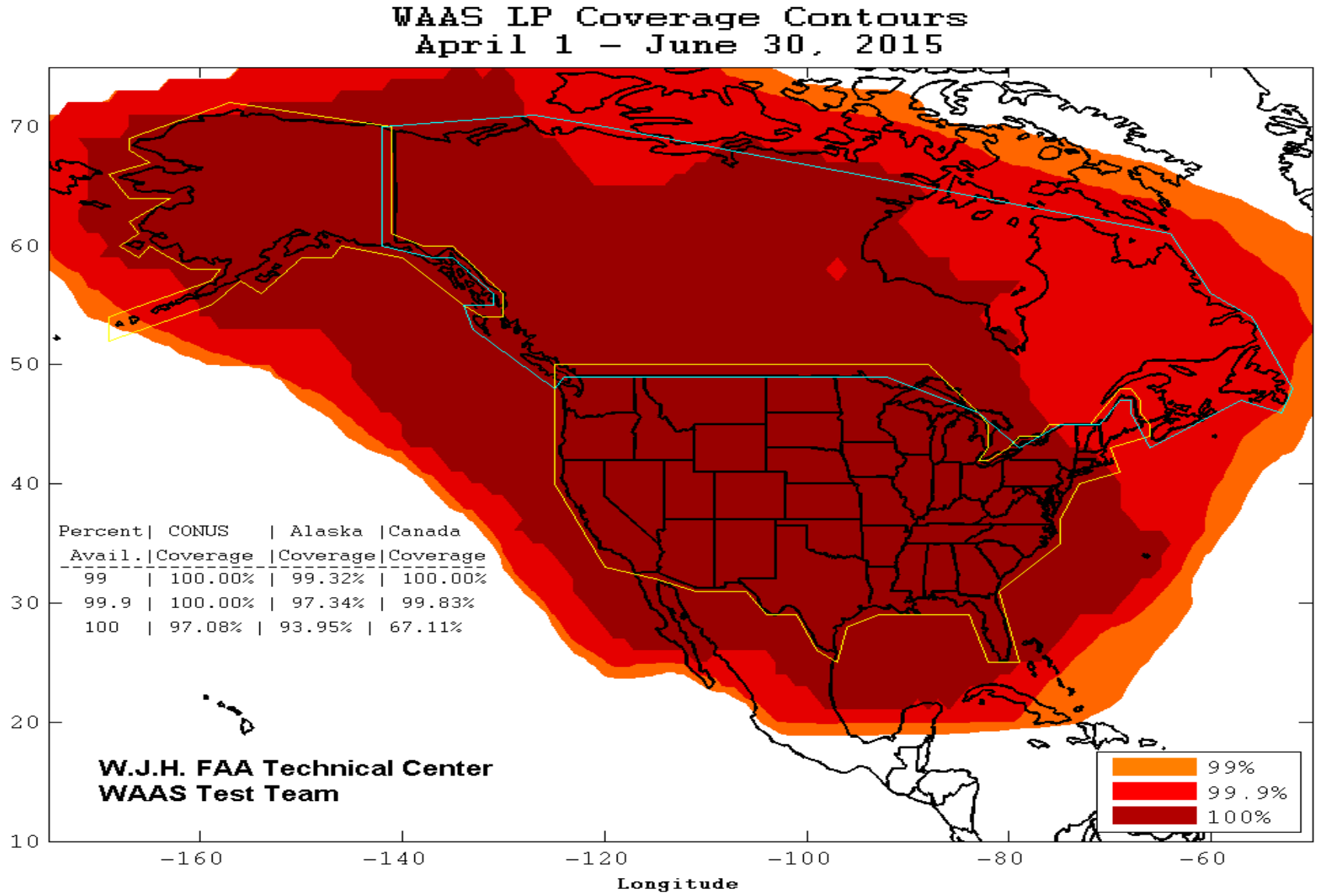


Figure 4-2 LPV North America Coverage for the Quarter

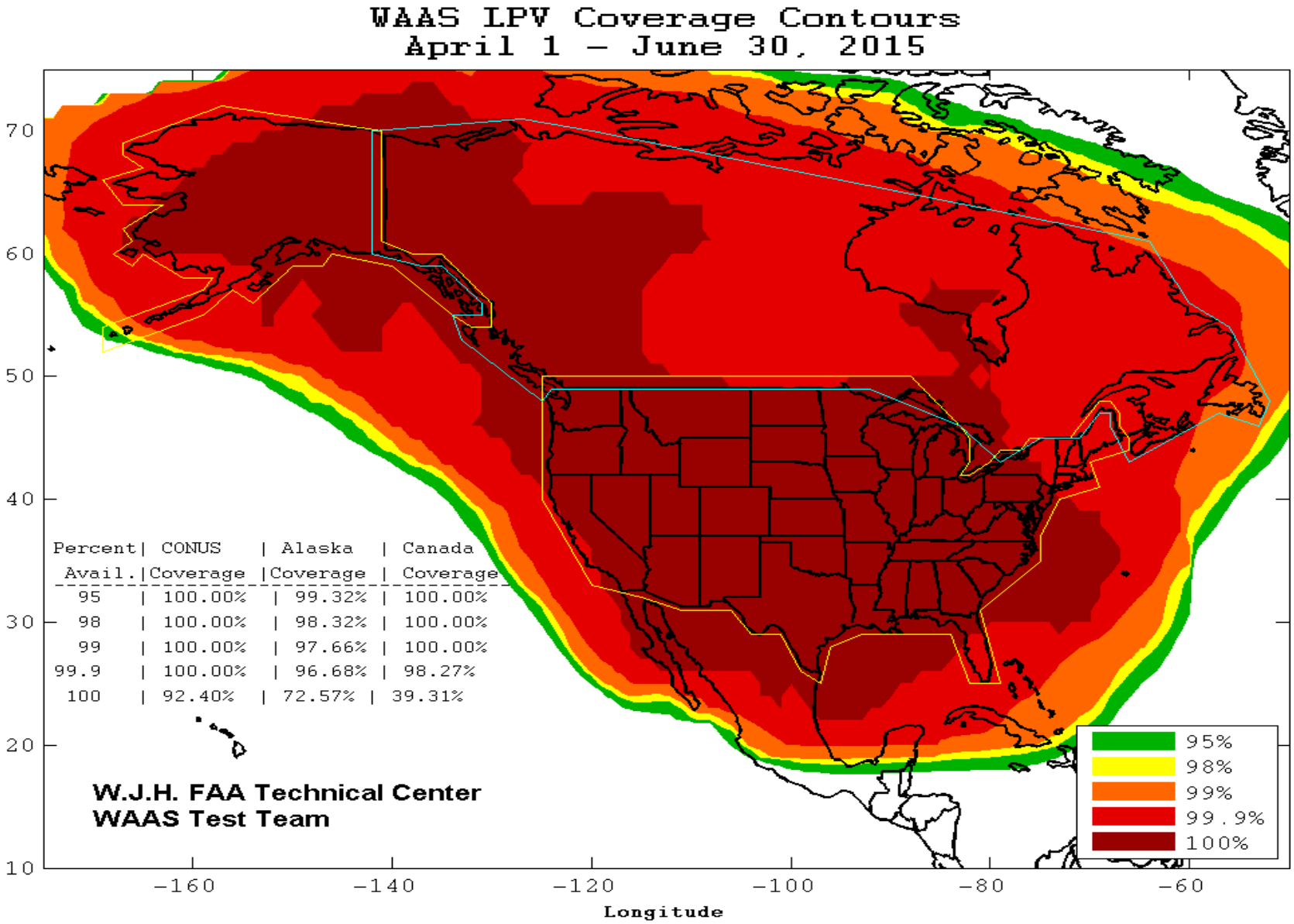


Figure 4-3 LPV 200 North America Coverage for the Quarter

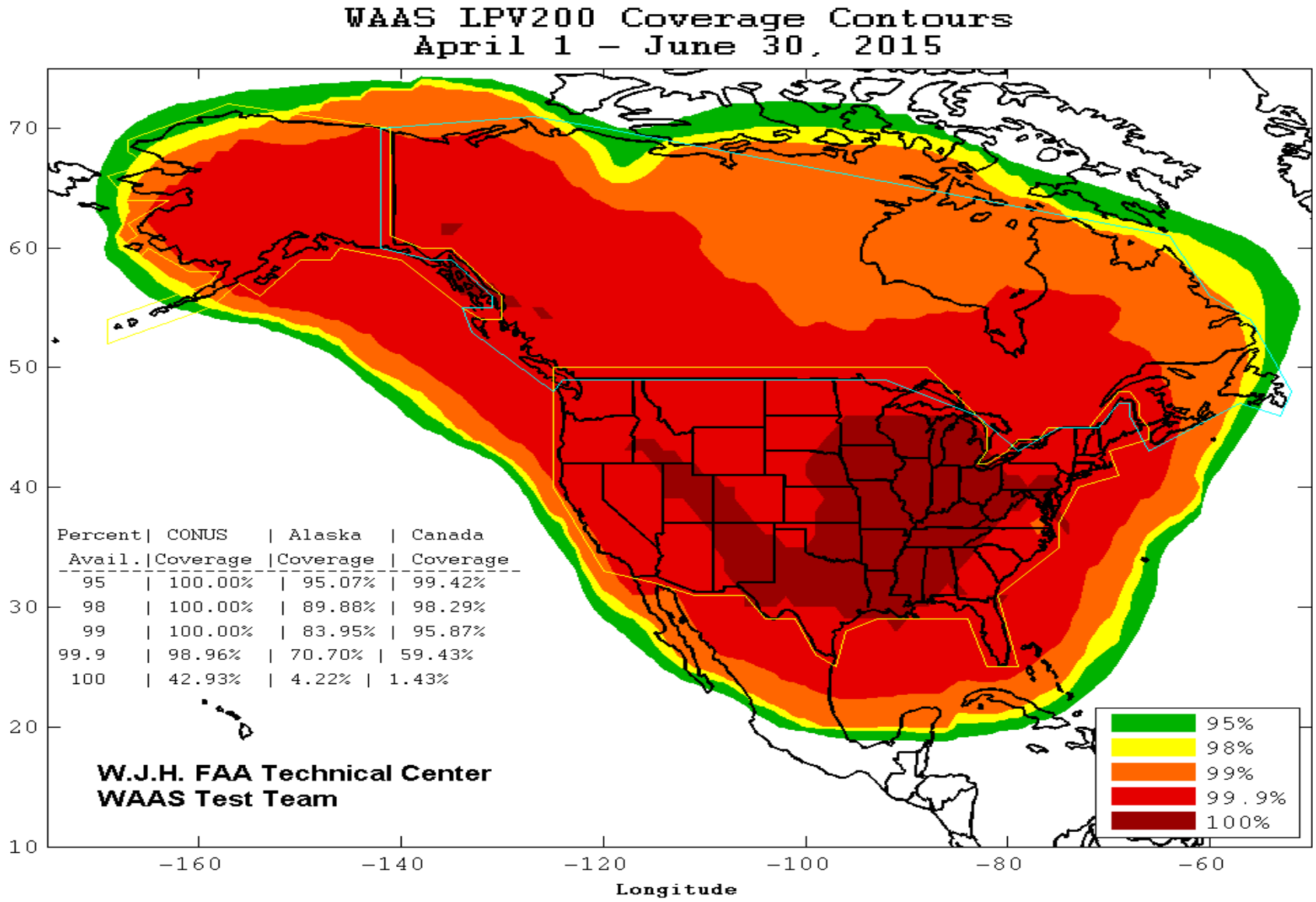


Figure 4-4 RNP 0.1 Coverage for the Quarter

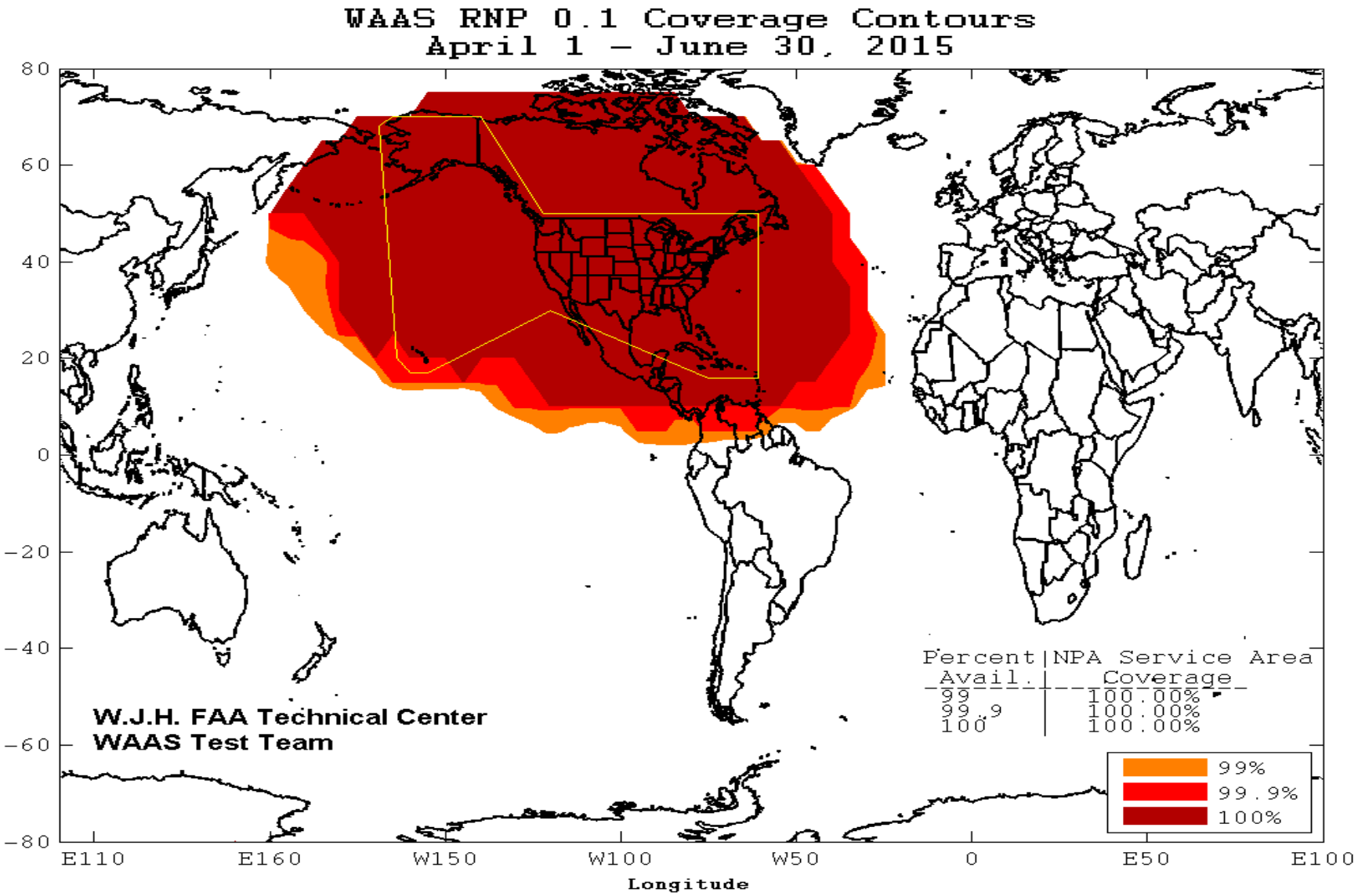


Figure 4-5 RNP 0.3 Coverage for the Quarter

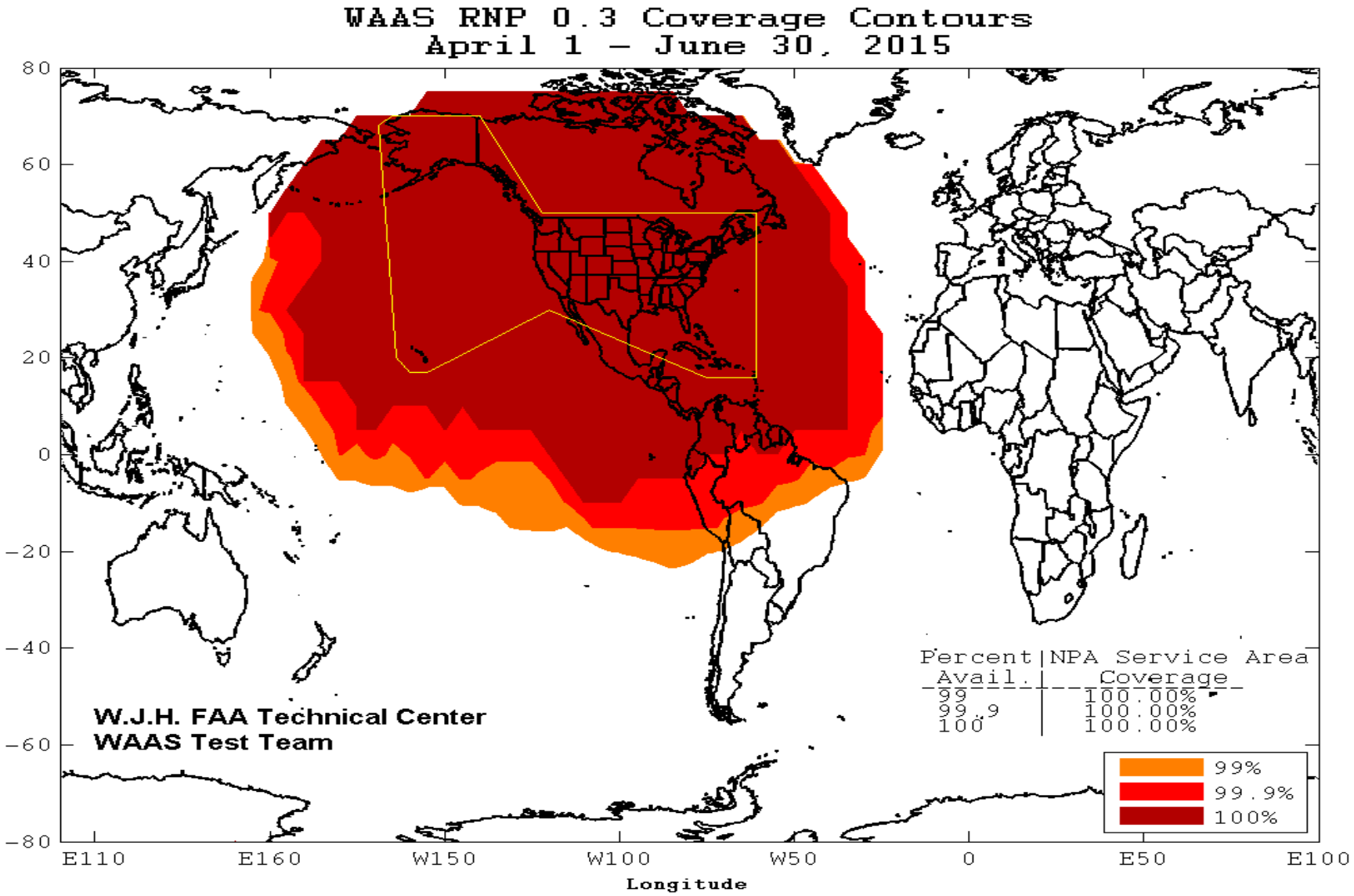


Figure 4-6 Daily LPV and LPV 200 CONUS Coverage

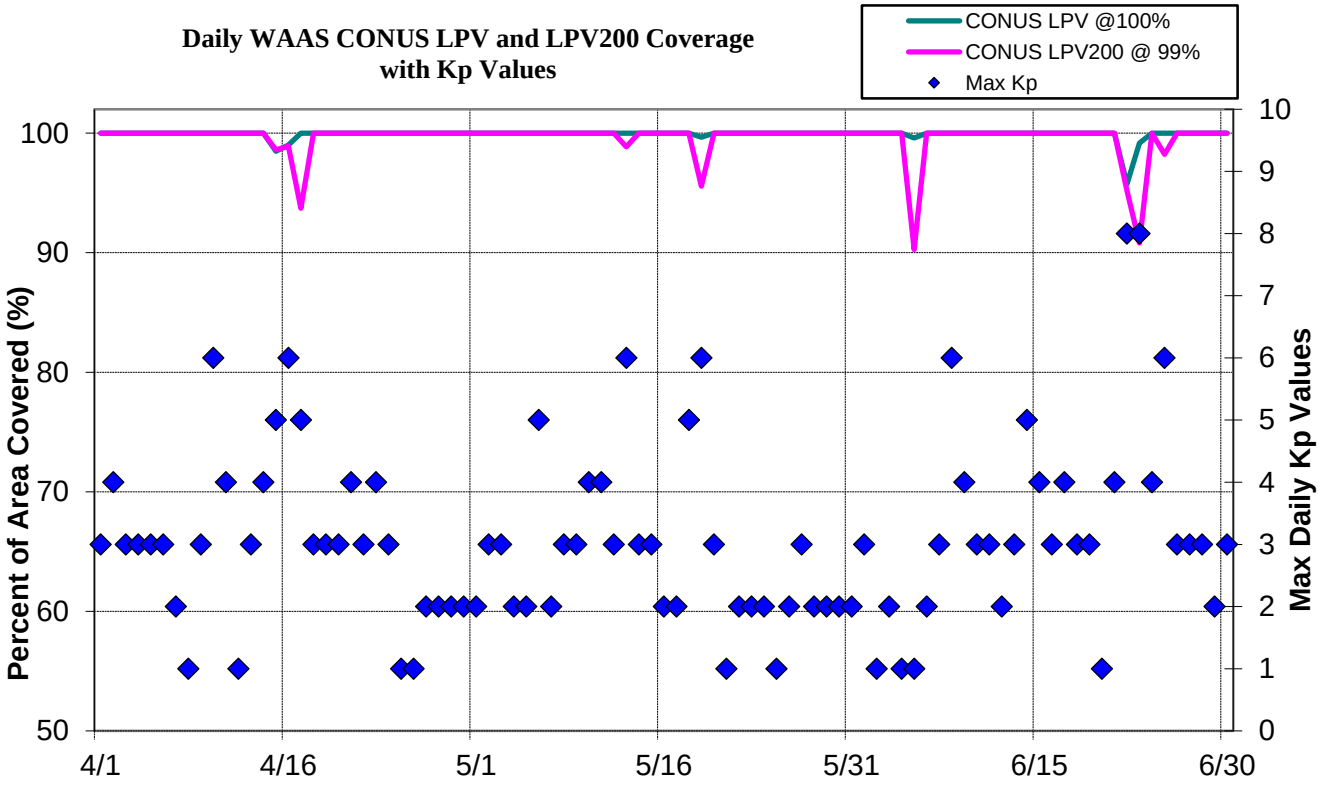


Figure 4-7 Daily LPV and LPV 200 Alaska Coverage

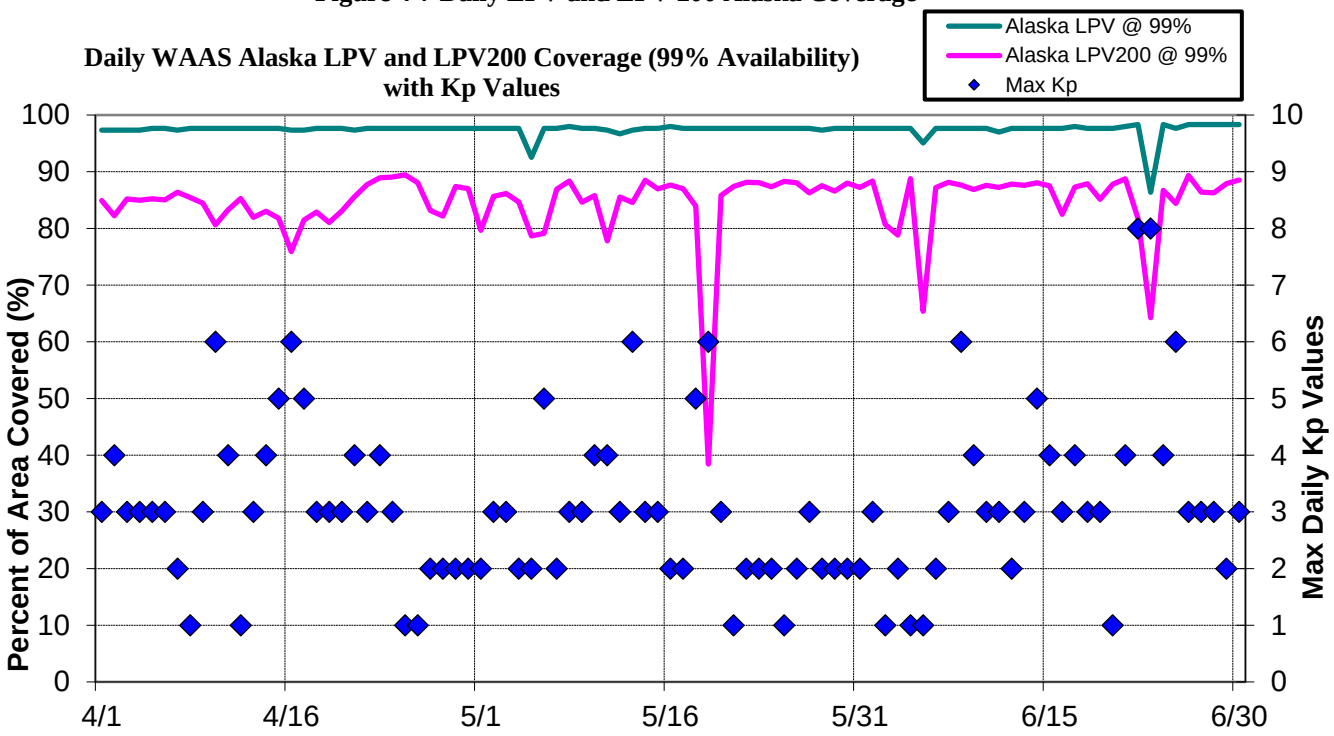


Figure 4-8 Daily LPV and LPV 200 Canada Coverage

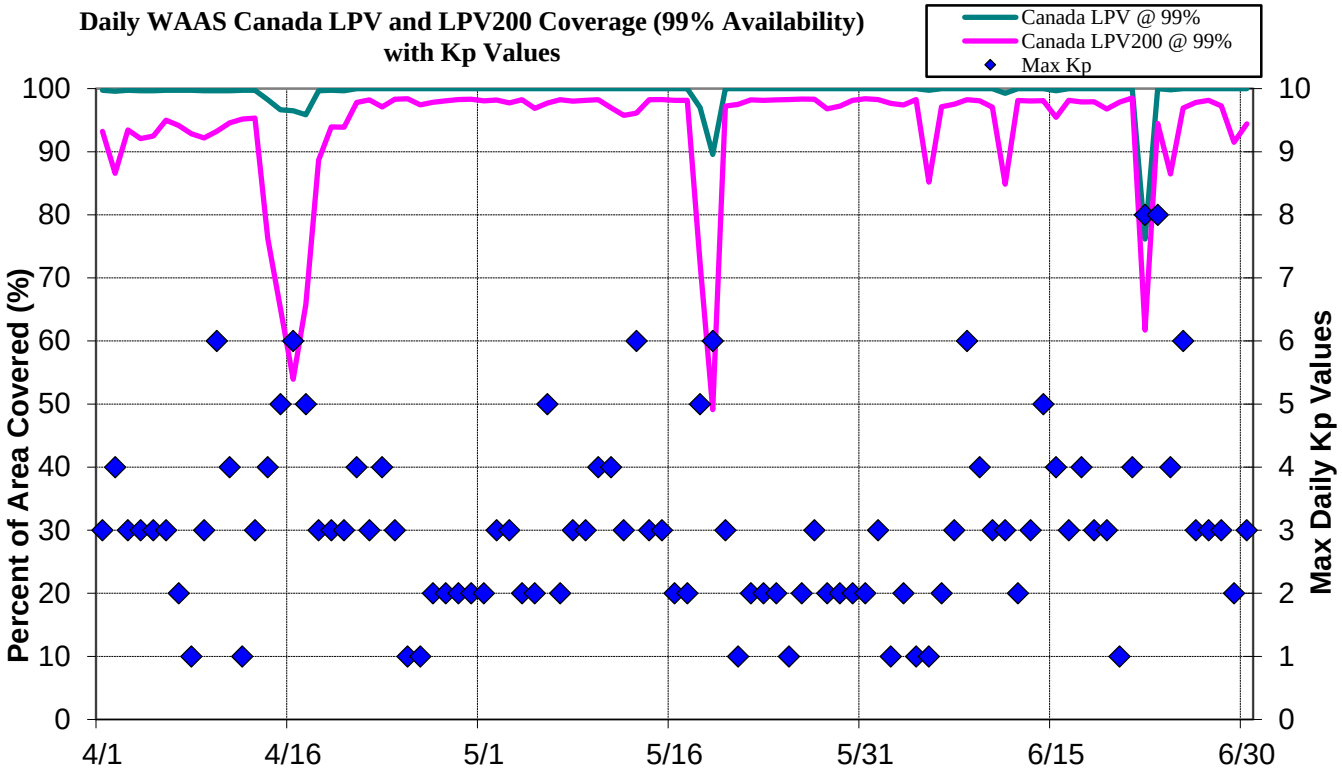
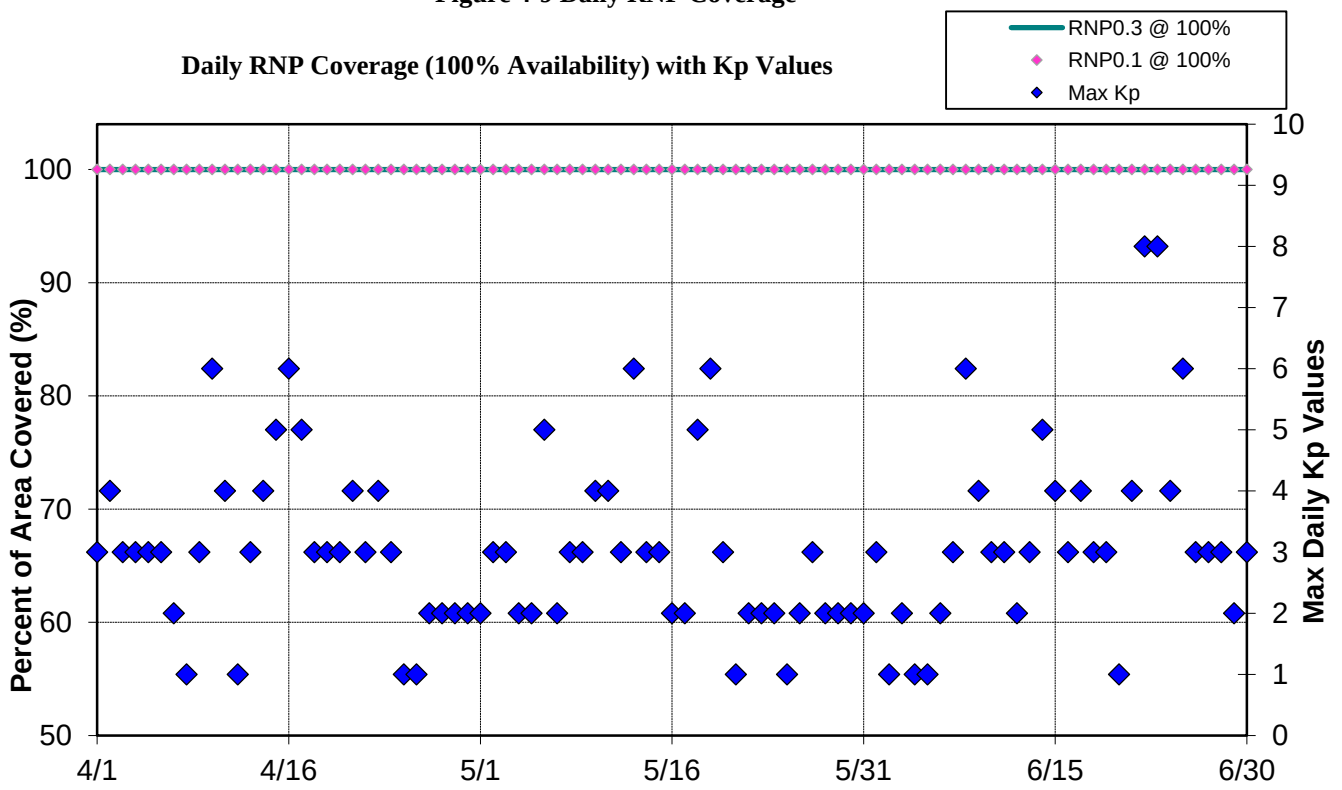


Figure 4-9 Daily RNP Coverage



5.0 INTEGRITY

5.1 HMI Analysis

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

Table 5-1 lists the safety index and the number of HMI events. For this evaluation period, the lowest safety margin index is 3.70 at Anchorage. There was no HMI event. Since WAAS was made available to the public in August 2000 there has not been an HMI event. WAAS was commissioned by the FAA for safety of life services in July 2003.

Table 5-1 Minimum Safety Margin Index and HMI Statistics

Location	Safety Index		
	Horizontal	Vertical	Number of HMIs
Atlantic City	4.60	5.23	0
Grand Forks	5.80	5.06	0
Oklahoma City	5.42	5.48	0
Albuquerque	5.22	7.51	0
Anchorage	6.11	3.70	0
Atlanta	7.43	8.62	0
Barrow	8.74	5.44	0
Bethel	5.92	8.62	0
Billings	5.26	5.82	0
Boston	9.02	5.95	0
Chicago	4.82	4.51	0
Cleveland	5.91	6.05	0
Cold Bay	14.59	11.91	0
Dallas	4.70	5.68	0
Denver	5.56	5.34	0
Fairbanks	13.61	9.39	0
Gander	6.82	7.43	0
Goose Bay	5.73	7.11	0
Houston	4.71	6.49	0
Iqaluit	9.30	8.06	0
Jacksonville	7.45	6.69	0
Juneau	5.90	6.31	0
Kansas City	5.60	6.20	0
Kotzebue	7.65	5.76	0
Los Angeles	7.30	7.57	0
Memphis	4.66	10.09	0
Merida	5.10	4.73	0
Mexico City	9.64	5.96	0
Miami	8.99	5.78	0
Minneapolis	4.70	6.55	0
New York	7.16	7.74	0
Oakland	7.11	5.67	0
Puerto Vallarta	6.81	6.42	0
Salt Lake City	4.33	5.63	0
San Jose Del Cabo	11.49	5.12	0
Seattle	7.16	6.24	0
Washington DC	5.17	5.71	0
Winnipeg	5.77	4.72	0

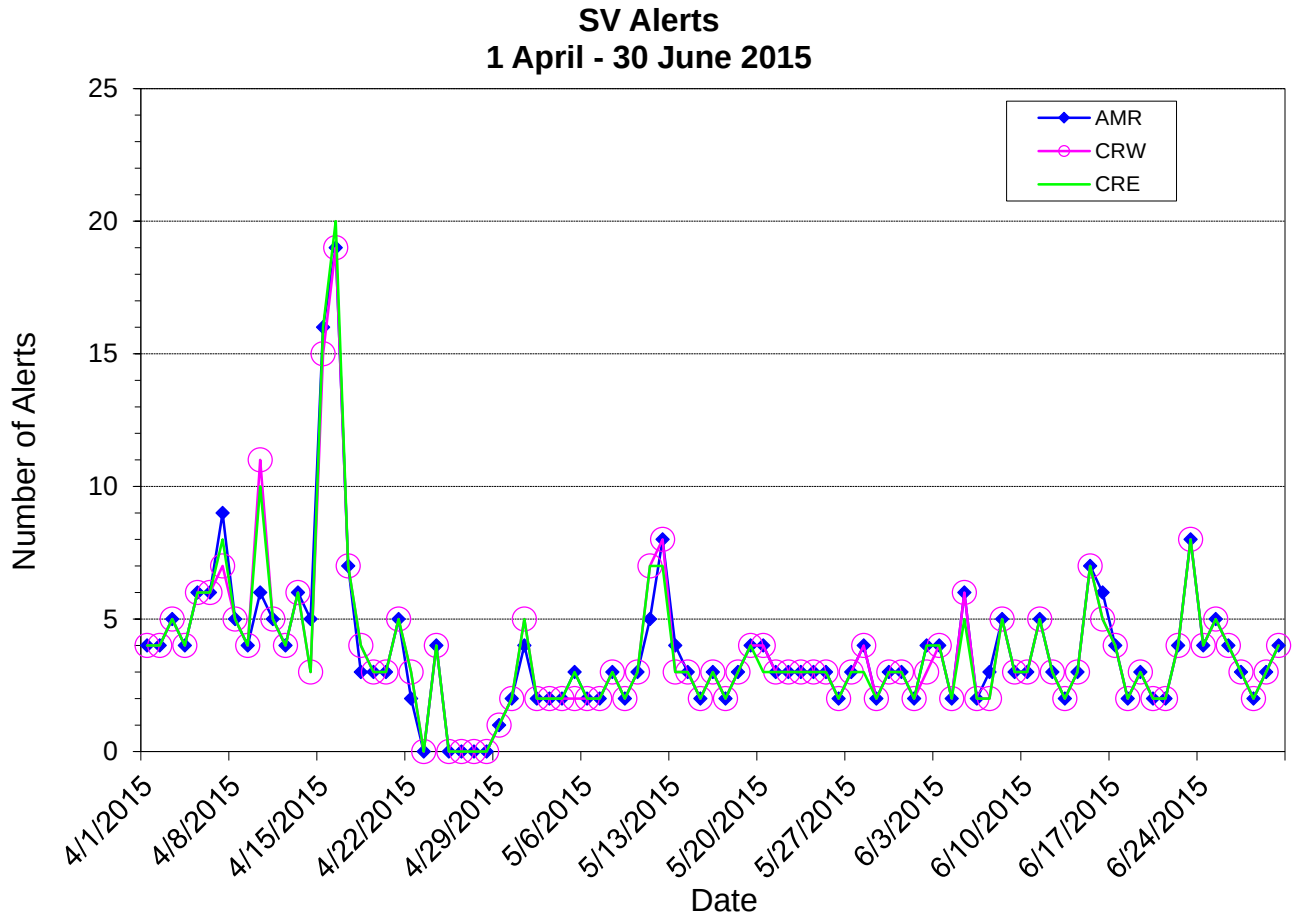
5.2 Broadcast Alerts

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

Table 5-2 WAAS SV Alert

	Number of Alerts			Average Alerts Per Day		
Message Type	**AMR**	**CRW**	**CRE**	**AMR**	**CRW**	**CRE**
2	212	210	210	2.3297	2.3077	2.3077
3	60	60	59	0.6593	0.6593	0.6484
4	71	28	74	0.7802	0.3077	0.8132
5	0	0	0	0.0000	0.0000	0.0000
6	0	0	0	0.0000	0.0000	0.0000
24	0	0	0	0.0000	0.0000	0.0000
26	0	0	0	0.0000	0.0000	0.0000
Total Alerts	343	298	343	3.7692	3.2747	3.7692
Days in Service	91	91	91			

Figure 5-1 SV Daily Alert Trend



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

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

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

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

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

Table 5-3 Update Rates for WAAS Messages

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

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

Message Type	On Time	Late	Max Late Length (seconds)
1	102418	4	143
2	1310863	112	22
3	1310367	146	22
4	1310460	100	20
7	95933	7	138
9	92131	3	186
10	95922	6	188
17	31026	6	512

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

SV	On Time	Late	Max Late Length (seconds)
1	49169	0	0
2	46822	1	186
3	48166	1	185
4	49330	0	0
5	47418	1	167
6	47256	1	175
7	46920	1	173
9	47035	0	0
10	48187	1	170
11	49038	0	0
12	47179	0	0
13	48556	0	0
14	46877	1	182
15	47924	0	0
16	47000	2	180
17	46997	0	0
18	46380	1	186
19	48312	0	0
20	46975	1	167
21	46898	1	166
22	47026	1	173
23	46959	1	183
24	48889	2	183
25	48681	1	170
26	37168	0	0
27	48690	0	0
28	47912	1	170
29	46940	0	0
30	46679	0	0
31	47398	1	180
32	46943	0	0

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

SV	On Time	Late	Max Late Length (seconds)
1	40381	1	144
2	38470	1	205
3	39625	0	0
4	40528	0	0
5	38880	3	208
6	38762	1	177
7	38504	2	210
9	38631	2	206
10	39662	2	143
11	40274	0	0
12	38783	0	0
13	39884	2	209
14	38508	1	135
15	39308	0	0
16	38574	1	209
17	38631	1	121
18	38088	2	204
19	39629	2	208
20	38548	2	208
21	38551	0	0
22	38632	1	208
23	38584	1	135
24	40118	0	0
25	39954	3	204
26	30505	4	210
27	40004	1	208
28	39317	0	0
29	38545	2	206
30	38325	1	204
31	38870	0	0
32	38503	0	0
133	74759	2	9110
135	75579	1	208
138	75499	0	0

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

Band	Block	On Time	Late	Max Late Length (seconds)
0	0	27306	4	576
0	1	27293	2	302
0	2	27288	3	305
1	0	27298	5	305
1	1	27305	2	301
1	2	27296	5	580
1	3	27288	2	478
1	4	27304	5	481
2	0	27299	2	517
2	1	27306	0	0
2	2	27284	5	413
2	3	27310	5	396
2	4	27294	2	576
3	0	27305	4	424
3	1	27284	5	426
3	2	27302	7	431
9	0	27310	6	576
9	1	27289	4	420
9	2	27288	4	578
9	3	27298	3	579
9	4	27290	7	576
9	5	27307	4	304
9	6	27298	1	304

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

Band	On Time	Late	Max Late Length (seconds)
0	35221	0	0
1	35244	0	0
2	35231	0	0
3	35266	1	478
9	35233	2	443

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

Message Type	On Time	Late	Max Late Length (seconds)
1	101041	4	127
2	1310878	104	12
3	1310389	137	13
4	1310499	84	10
7	94668	12	139
9	92137	0	0
10	94731	6	139
17	30953	1	302

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

SV	On Time	Late	Max Late Length (seconds)
1	49164	0	0
2	46821	0	0
3	48163	0	0
4	49325	0	0
5	47414	0	0
6	47254	0	0
7	46934	0	0
9	47036	0	0
10	48187	1	166
11	49044	0	0
12	47177	0	0
13	48555	0	0
14	46875	0	0
15	47920	0	0
16	47001	0	0
17	47000	0	0
18	46374	0	0
19	48315	0	0
20	46982	0	0
21	46911	0	0
22	47038	0	0
23	46967	0	0
24	48874	0	0
25	48675	1	166
26	37175	0	0
27	48704	0	0
28	47916	0	0
29	46939	0	0
30	46667	0	0
31	47397	0	0
32	46941	0	0

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

SV	On Time	Late	Max Late Length (seconds)
1	40397	3	186
2	38466	0	0
3	39613	0	0
4	40529	3	168
5	38890	0	0
6	38756	0	0
7	38509	0	0
9	38637	0	0
10	39631	2	168
11	40275	1	168
12	38776	0	0
13	39892	0	0
14	38480	0	0
15	39316	0	0
16	38589	0	0
17	38647	0	0
18	38090	1	186
19	39631	0	0
20	38556	0	0
21	38536	3	167
22	38638	1	174
23	38571	1	138
24	40081	1	174
25	39972	1	134
26	30511	0	0
27	40006	3	144
28	39348	1	200
29	38557	0	0
30	38330	0	0
31	38877	0	0
32	38496	0	0
133	74753	1	4336
135	75586	0	0
138	75500	0	0

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

Band	Block	On Time	Late	Max Late Length (seconds)
0	0	27294	4	309
0	1	27297	5	302
0	2	27288	6	304
1	0	27305	5	305
1	1	27291	6	546
1	2	27296	2	305
1	3	27312	2	304
1	4	27301	1	301
2	0	27309	2	301
2	1	27300	3	306
2	2	27296	3	302
2	3	27296	3	305
2	4	27289	2	301
3	0	27315	0	0
3	1	27289	6	305
3	2	27304	7	305
9	0	27293	2	301
9	1	27298	4	308
9	2	27292	2	305
9	3	27288	6	304
9	4	27306	4	306
9	5	27309	5	305
9	6	27296	2	305

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

Band	On Time	Late	Max Late Length (seconds)
0	35074	0	0
1	35085	1	385
2	35076	1	313
3	35076	1	406
9	35060	0	0

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

Message Type	On Time	Late	Max Late Length (seconds)
1	100212	1	132
2	1310874	105	13
3	1310386	136	13
4	1310506	83	10
7	93790	13	126
9	92137	0	0
10	93693	11	165
17	30853	0	0

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

SV	On Time	Late	Max Late Length (seconds)
1	49163	0	0
2	46825	0	0
3	48168	0	0
4	49327	0	0
5	47418	1	172
6	47258	0	0
7	46928	0	0
9	47034	0	0
10	48194	0	0
11	49042	0	0
12	47178	0	0
13	48555	0	0
14	46876	0	0
15	47923	0	0
16	46992	0	0
17	47000	0	0
18	46391	0	0
19	48306	1	178
20	46969	1	172
21	46909	0	0
22	47032	0	0
23	46968	0	0
24	48874	0	0
25	48680	0	0
26	37169	1	164
27	48695	1	164
28	47912	0	0
29	46933	0	0
30	46689	0	0
31	47406	0	0
32	46930	0	0

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

SV	On Time	Late	Max Late Length (seconds)
1	40381	1	144
2	38470	1	205
3	39625	0	0
4	40528	0	0
5	38880	3	208
6	38762	1	177
7	38504	2	210
9	38631	2	206
10	39662	2	143
11	40274	0	0
12	38783	0	0
13	39884	2	209
14	38508	1	135
15	39308	0	0
16	38574	1	209
17	38631	1	121
18	38088	2	204
19	39629	2	208
20	38548	2	208
21	38551	0	0
22	38632	1	208
23	38584	1	135
24	40118	0	0
25	39954	3	204
26	30505	4	210
27	40004	1	208
28	39317	0	0
29	38545	2	206
30	38325	1	204
31	38870	0	0
32	38503	0	0
133	74759	2	9110
135	75579	1	208
138	75499	0	0
1	40381	1	144

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

Band	Block	On Time	Late	Max Late Length (seconds)
0	0	27291	4	304
0	1	27302	1	301
0	2	27312	3	305
1	0	27297	2	302
1	1	27292	3	304
1	2	27292	3	310
1	3	27309	2	303
1	4	27296	3	304
2	0	27292	3	304
2	1	27301	5	306
2	2	27294	4	311
2	3	27310	4	310
2	4	27291	3	301
3	0	27288	2	301
3	1	27312	3	306
3	2	27309	2	304
9	0	27288	3	303
9	1	27300	3	303
9	2	27299	0	0
9	3	27301	2	303
9	4	27318	1	301
9	5	27299	4	308
9	6	27301	2	304

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

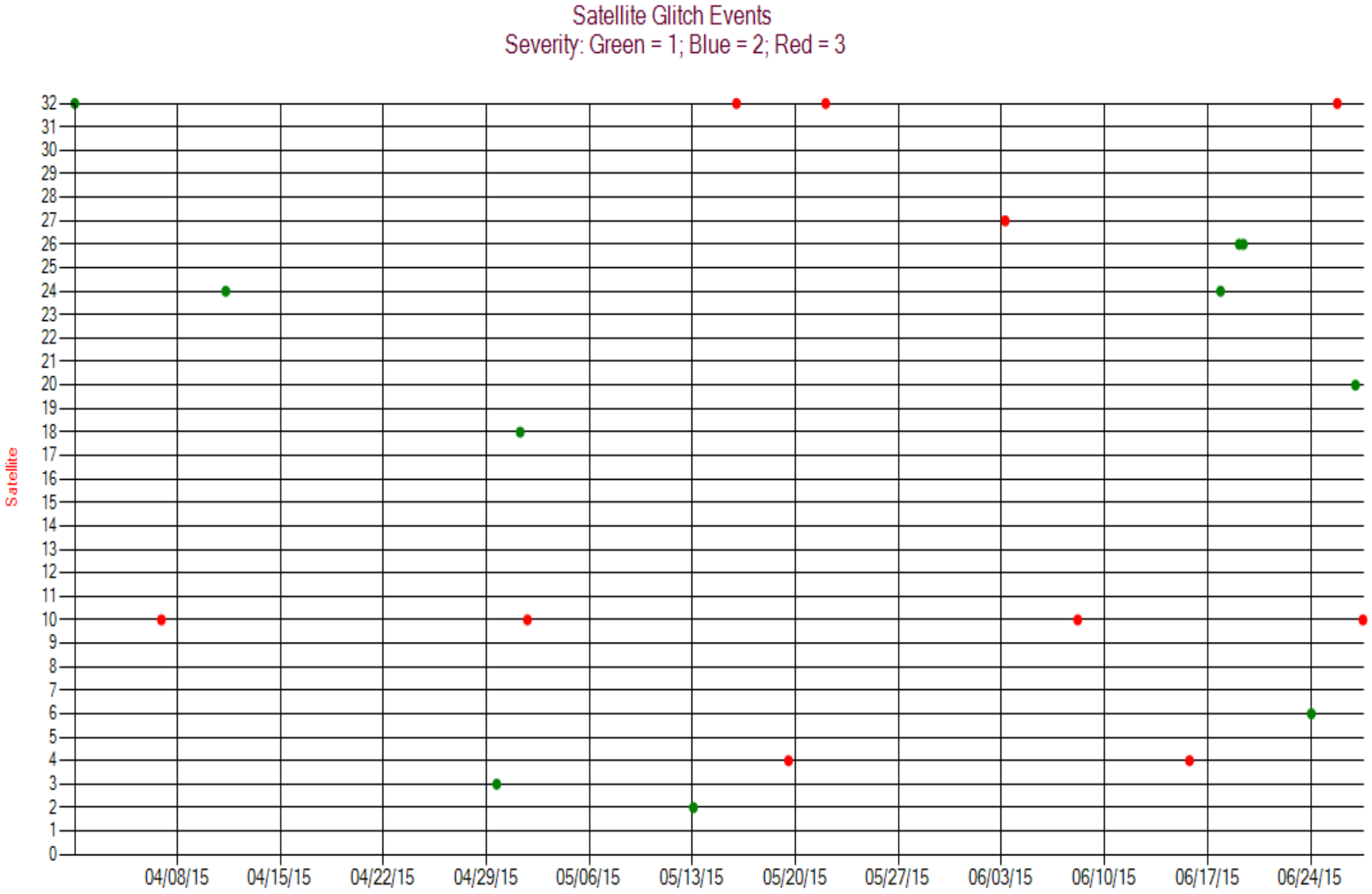
Band	On Time	Late	Max Late Length (seconds)
0	34929	0	0
1	34950	0	0
2	34955	0	0
3	34947	0	0
9	34933	0	0

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 the comparing it to the residual error.

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

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

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

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

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

Site →	Billings		Albuquerque		Boston		Washington DC		Houston		Kansas City	
SV ↓	95% Range Error	3.29 Sigma Bounding (%)	95% Range Error	3.29 Sigma Bounding (%)	95% Range Error	3.29 Sigma Bounding (%)	95% Range Error	3.29 Sigma Bounding (%)	95% Range Error	3.29 Sigma Bounding (%)	95% Range Error	3.29 Sigma Bounding (%)
1	2.823	100	3.06	100	3.092	100	2.967	100	2.972	100	2.831	100
2	1.899	100	2.351	100	2.069	100	2.283	100	3.197	99.99926	2.847	100
3	3.379	99.98809	3.329	100	2.644	100	4.241	100	2.752	100	3.031	99.99985
4	1.798	100	1.774	100	1.585	99.98972	1.726	100	1.434	100	2.685	100
5	1.625	100	1.51	100	1.964	100	1.387	100	1.238	100	1.719	100
6	3.61	99.93512	3.132	100	3.58	99.86882	3.18	99.91184	3.504	99.99659	4.323	95.47238
7	1.515	100	1.408	100	1.36	100	1.614	100	0.98	100	1.65	100
8	-	-	-	-	-	-	-	-	-	-	-	-
9	2.824	100	2.667	100	2.974	100	2.558	100	2.314	100	2.798	100
10	0.91	100	1.009	100	0.857	100	1.146	100	1.83	100	1.023	100
11	0.878	100	1.095	100	1.286	99.96255	1.617	100	0.994	100	1.153	100
12	1.347	100	1.125	100	1.365	100	1.383	100	1.226	100	1.202	100
13	1.349	100	0.848	100	1.401	100	1.077	100	1.242	100	1.151	100
14	2.201	100	0.726	100	1.705	100	0.871	100	1.269	100	1.339	100
15	1.48	100	1.282	100	1.713	100	1.375	100	1.142	100	1.587	100
16	0.862	100	0.963	100	1.173	100	1.203	100	1.382	100	1.396	100
17	2.356	100	0.886	100	1.645	100	0.995	100	1.112	100	1.138	100
18	1.114	100	1.413	100	1.016	100	1.429	100	1.905	100	1.293	100
19	2.623	100	2.038	100	2.407	99.93661	2.526	100	2.661	100	2.493	100
20	1.131	100	1.492	100	1.105	100	1.296	100	1.82	100	1.347	100
21	1.088	100	1.424	100	1.3	100	1.534	99.979	1.752	100	1.22	100
22	1.992	100	2.286	100	1.893	100	2.229	100	2.811	100	2.158	100
23	1.445	100	1.638	100	2.276	100	1.787	100	2.702	100	1.637	100
24	2.886	99.99996	2.685	100	3.269	99.99965	2.774	100	2.969	99.99926	2.899	100
25	2.681	100	3.01	100	2.492	100	2.345	100	2.944	100	2.699	100
26	2.746	100	3.092	100	3.03	100	2.883	100	2.738	100	3.15	99.87708
27	2.729	100	2.042	100	2.244	100	2.375	100	2.22	100	2.322	100
28	1.189	100	1.222	100	1.103	100	1.246	100	1.613	100	1.087	100
29	1.689	100	1.408	100	1.798	100	1.651	100	1.134	100	1.88	100
30	2.246	100	2.229	100	2.647	100	2.422	100	2.043	100	2.749	100
31	2.129	100	0.893	100	1.3	100	1.005	100	1.24	100	1.241	100
32	0.852	100	1.132	100	1.169	100	1.184	100	1.209	100	1.262	100
135	1.886	100	1.995	100	2.906	100	1.67	100	2.181	100	1.547	100
138	1.434	100	1.157	100	1.382	100	1.423	100	1.406	100	1.854	100

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

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

Site →	Los Angeles		Salt Lake City		Miami		Minneapolis		Atlanta		Juneau	
SV ↓	95% Range Error	3.29 Sigma Bounding (%)	95% Range Error	3.29 Sigma Bounding (%)	95% Range Error	3.29 Sigma Bounding (%)	95% Range Error	3.29 Sigma Bounding (%)	95% Range Error	3.29 Sigma Bounding (%)	95% Range Error	3.29 Sigma Bounding (%)
1	2.579	100	3.335	99.99975	2.875	100	3.052	100	2.756	99.99993	3.079	99.9916
2	2.472	100	2.207	100	2.664	100	1.949	100	2.246	100	1.657	100
3	3.218	100	3.872	100	2.805	100	2.824	100	2.728	100	3.169	99.98922
4	1.291	100	1.626	100	1.572	100	2	100	1.348	100	1.746	100
5	1.233	100	1.777	100	1.582	100	1.71	100	1.293	100	1.988	100
6	3.628	100	3.542	99.99812	3.231	100	3.431	98.77381	3.117	99.99071	3.939	99.98778
7	1.101	100	1.837	100	1.209	100	1.631	100	1.29	100	2.056	100
8	-	-	-	-	-	-	-	-	-	-	-	-
9	2.329	100	3.251	99.9999	2.537	100	2.741	100	2.646	100	2.823	100
10	1.189	100	1.114	100	1.275	100	1.003	100	1.246	100	1.182	100
11	2.569	100	1.074	100	1.266	100	0.864	100	1.341	100	1.167	100
12	0.834	100	1.013	100	1.065	100	1.419	100	0.846	100	1.613	100
13	0.807	100	1.077	100	1.092	100	1.02	100	0.901	100	1.366	100
14	1.148	100	0.995	100	1.513	100	0.834	100	0.791	100	1.064	100
15	1.435	100	1.664	100	1.452	100	1.645	100	1.184	100	1.92	100
16	1.437	100	0.987	100	0.998	100	1.359	100	1.141	100	1.136	100
17	0.836	100	1.344	100	1.337	100	1.276	100	0.884	100	1.455	100
18	1.503	100	1.361	100	1.481	100	1.066	100	1.223	100	1.096	100
19	2.33	100	1.949	100	2.338	100	1.805	100	2.434	100	2.007	100
20	1.543	100	1.077	100	1.728	100	1.001	100	1.308	100	1.05	100
21	1.29	100	0.829	100	2.26	100	0.768	100	1.287	100	0.872	100
22	2.439	100	2.029	100	2.031	100	2.092	100	2.143	100	1.974	100
23	2.249	100	1.473	100	1.786	100	1.323	100	1.78	100	1.347	100
24	2.54	99.99996	3.06	99.9942	2.74	100	3.15	100	2.72	99.99172	3.573	99.85375
25	2.259	100	2.53	99.99637	2.431	100	2.483	100	2.12	100	3.034	99.9036
26	2.674	100	3.066	100	2.966	100	3.264	99.99569	2.891	99.99994	3.504	99.89867
27	2.531	100	2.241	100	2.485	100	2.518	100	2.207	100	2.516	100
28	1.364	100	1.778	100	1.976	100	1.049	100	1.222	100	1.04	100
29	1.017	100	2.516	100	1.499	100	1.754	100	1.202	100	2.068	100
30	1.961	100	2.451	100	1.938	100	2.654	100	2.064	100	2.833	100
31	1.434	100	1.603	100	1.472	100	1.03	100	0.851	100	1.669	100
32	1.03	100	1.719	100	1.39	100	1.235	100	0.872	100	1.366	100
135	1.706	100	1.757	100	1.577	100	2.185	100	1.697	100	1.362	100
138	2.852	100	1.46	100	1.795	100	1.945	100	1.381	100	1.659	100

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

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

Site →	Billings		Albuquerque		Boston		Washington DC		Houston		Kansas City	
SV ↓	95% Iono Error	3.29 Sigma Bounding (%)	95% Iono Error	3.29 Sigma Bounding (%)	95% Iono Error	3.29 Sigma Bounding (%)	95% Iono Error	3.29 Sigma Bounding (%)	95% Iono Error	3.29 Sigma Bounding (%)	95% Iono Error	3.29 Sigma Bounding (%)
1	1.711	100	1.854	100	2.336	100	2.056	100	1.941	100	1.927	100
2	1.508	100	1.482	100	1.371	100	1.534	100	1.753	100	1.667	100
3	2.395	100	2.468	100	1.844	100	2.228	100	1.733	100	1.880	100
4	0.887	100	1.103	100	0.956	100	0.904	100	0.652	100	1.172	100
5	1.032	100	1.043	100	1.389	100	0.721	100	1.112	100	1.016	100
6	2.958	100	2.886	99.96379	2.972	99.91171	2.838	100	3.406	100	3.712	99
7	0.912	100	0.780	100	0.780	100	0.756	100	0.681	100	0.744	100
8	-	-	-	-	-	-	-	-	-	-	-	-
9	2.027	100	2.077	100	1.863	100	1.683	100	1.661	100	1.902	100
10	0.300	100	0.325	100	0.394	100	0.369	100	0.975	100	0.301	100
11	0.338	100	0.575	100	0.439	100	0.434	100	0.549	100	0.411	100
12	0.697	100	0.848	100	0.728	100	0.718	100	0.568	100	0.637	100
13	0.581	100	0.466	100	0.660	100	0.449	100	0.693	100	0.453	100
14	1.379	100	0.535	100	0.910	100	0.389	100	0.612	100	0.561	100
15	0.714	100	0.701	100	1.043	100	0.840	100	0.691	100	0.868	100
16	0.486	100	0.540	100	0.606	100	0.557	100	0.750	100	0.792	100
17	1.917	100	0.905	100	1.300	100	0.683	100	0.822	100	0.724	100
18	0.782	100	0.648	100	0.710	100	0.818	100	0.930	100	0.614	100
19	1.322	100	1.089	100	1.531	100	1.496	100	1.814	100	1.448	100
20	0.607	100	0.658	100	0.546	100	0.652	100	0.905	100	0.722	100
21	0.818	100	0.824	100	0.738	100	0.938	100	0.878	100	0.673	100
22	1.653	100	1.521	100	1.491	100	1.636	100	2.061	100	1.564	100
23	1.266	100	1.371	100	1.481	100	1.421	100	1.845	100	1.089	100
24	1.727	100	1.779	100	2.169	100	1.720	100	1.784	100	1.775	100
25	1.601	100	1.912	100	1.457	100	1.396	100	1.438	100	1.571	100
26	1.744	100	1.957	100	2.144	100	2.115	100	2.198	100	2.420	100
27	1.368	100	1.294	100	1.555	100	1.361	100	1.345	100	1.475	100
28	0.750	100	0.508	100	0.461	100	0.492	100	0.775	100	0.508	100
29	0.859	100	0.983	100	0.879	100	0.833	100	0.769	100	0.984	100
30	1.551	100	1.767	100	1.881	100	1.656	100	1.641	100	1.848	100
31	1.261	100	0.605	100	0.447	100	0.593	100	0.794	100	0.699	100
32	0.499	100	0.752	100	0.439	100	0.476	100	0.654	100	0.628	100

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

Site →	Los Angeles		Salt Lake City		Miami		Minneapolis		Atlanta		Juneau	
SV ↓	95% Iono Error	3.29 Sigma Bounding (%)	95% Iono Error	3.29 Sigma Bounding (%)	95% Iono Error	3.29 Sigma Bounding (%)	95% Iono Error	3.29 Sigma Bounding (%)	95% Iono Error	3.29 Sigma Bounding (%)	95% Iono Error	3.29 Sigma Bounding (%)
1	2.074	100	1.932	100	2.241	100	$2.137	100	1.931	100	2.229	100
2	1.412	100	1.408	100	1.523	100	$1.335	100	1.579	100	1.291	100
3	2.288	100	2.515	100	2.022	100	$2.079	100	1.892	100	2.284	100
4	0.836	100	0.953	100	0.994	100	$1.123	100	0.714	100	1.138	100
5	1.118	100	1.239	100	1.509	100	$1.108	100	0.823	100	1.317	100
6	2.870	100	3.006	99.99904	2.990	99.97662	$2.885	99.96325	2.614	100	3.080	100
7	0.731	100	0.944	100	0.843	100	$0.792	100	0.551	100	1.119	100
8	-	-	-	-	-	-	-	-	-	-	-	-
9	1.731	100	2.282	100	1.800	100	$1.846	100	1.640	100	2.025	100
10	0.495	100	0.368	100	0.466	100	$0.440	100	0.478	100	0.536	100
11	0.956	100	0.344	100	0.515	100	$0.364	100	0.546	100	0.711	100
12	0.570	100	0.653	100	0.742	100	$0.729	100	0.540	100	0.777	100
13	0.580	100	0.512	100	0.562	100	$0.446	100	0.373	100	0.683	100
14	0.475	100	0.549	100	0.837	100	$0.446	100	0.463	100	0.643	100
15	0.814	100	0.861	100	1.040	100	$1.000	100	0.666	100	1.203	100
16	0.778	100	0.523	100	0.618	100	$0.588	100	0.705	100	0.581	100
17	0.932	100	1.029	100	0.875	100	$0.840	100	0.617	100	1.015	100
18	0.634	100	0.707	100	0.722	100	$0.662	100	0.888	100	0.658	100
19	1.450	100	1.048	100	1.507	100	$1.315	100	1.568	100	1.449	100
20	0.858	100	0.514	100	0.632	100	$0.565	100	0.755	100	0.512	100
21	0.599	100	0.472	100	1.187	100	$0.578	100	0.880	100	0.706	100
22	1.490	100	1.375	100	1.217	100	$1.652	100	1.771	100	1.416	100
23	1.321	100	1.153	100	1.270	100	$1.095	100	1.495	100	0.976	100
24	2.051	100	1.858	100	2.016	100	$2.043	100	1.747	100	2.407	100
25	1.623	100	1.686	100	1.638	100	$1.584	100	1.230	100	1.854	100
26	2.288	100	2.017	100	2.262	100	$2.255	100	1.958	100	2.519	100
27	1.789	100	1.281	100	1.701	100	$1.644	100	1.302	100	1.671	100
28	0.566	100	0.851	100	1.068	100	$0.477	100	0.711	100	0.556	100
29	0.866	100	1.303	100	1.068	100	$0.976	100	0.669	100	1.047	100
30	1.590	100	1.880	100	1.652	100	$1.774	100	1.450	100	2.001	100
31	0.705	100	0.843	100	0.950	100	$0.542	100	0.369	100	0.866	100
32	0.511	100	1.179	100	0.852	100	$0.618	100	0.420	100	0.820	100

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

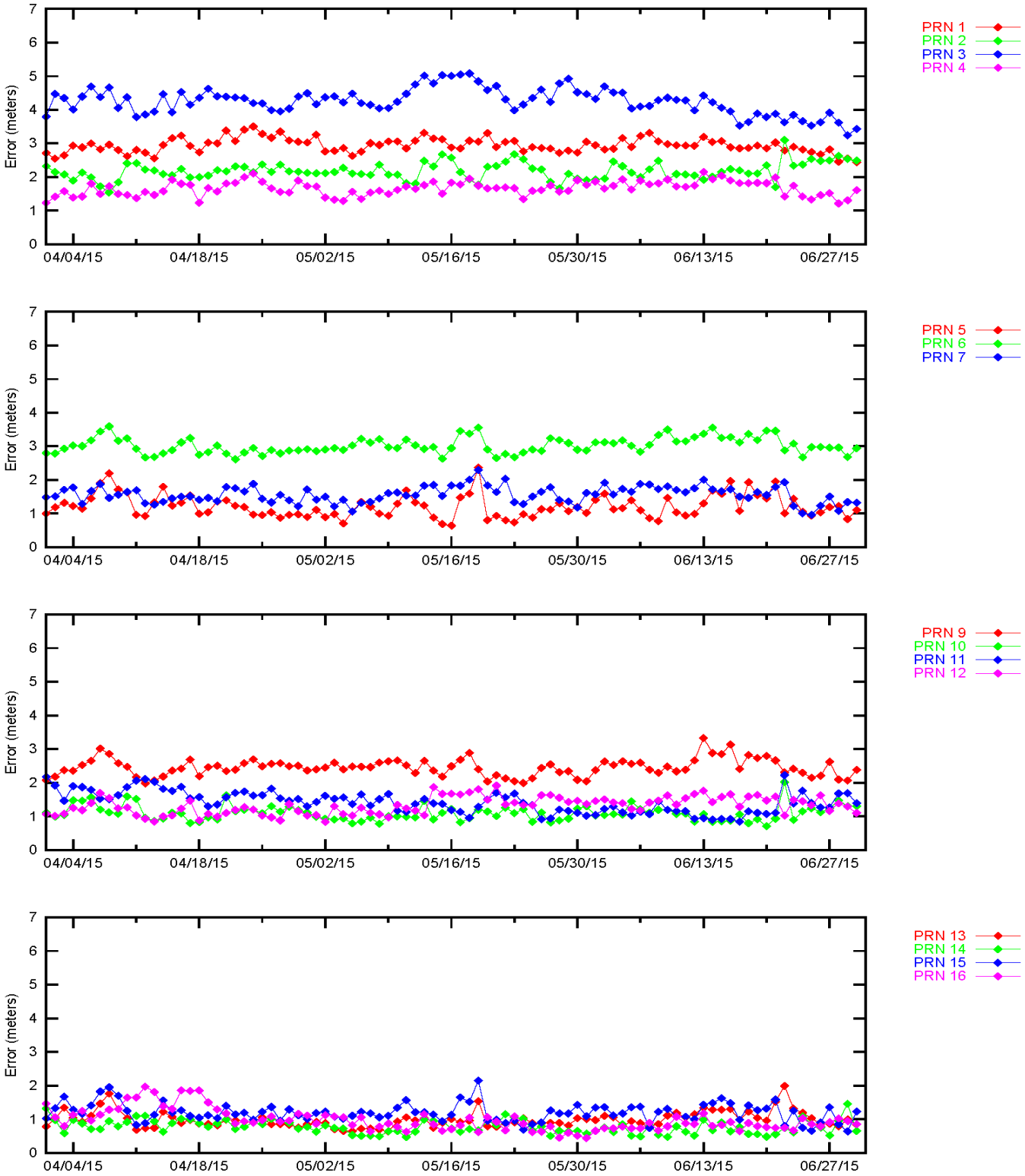


Figure 6-2 95% Range Error (PRN 17 – PRN 32) – Washington DC

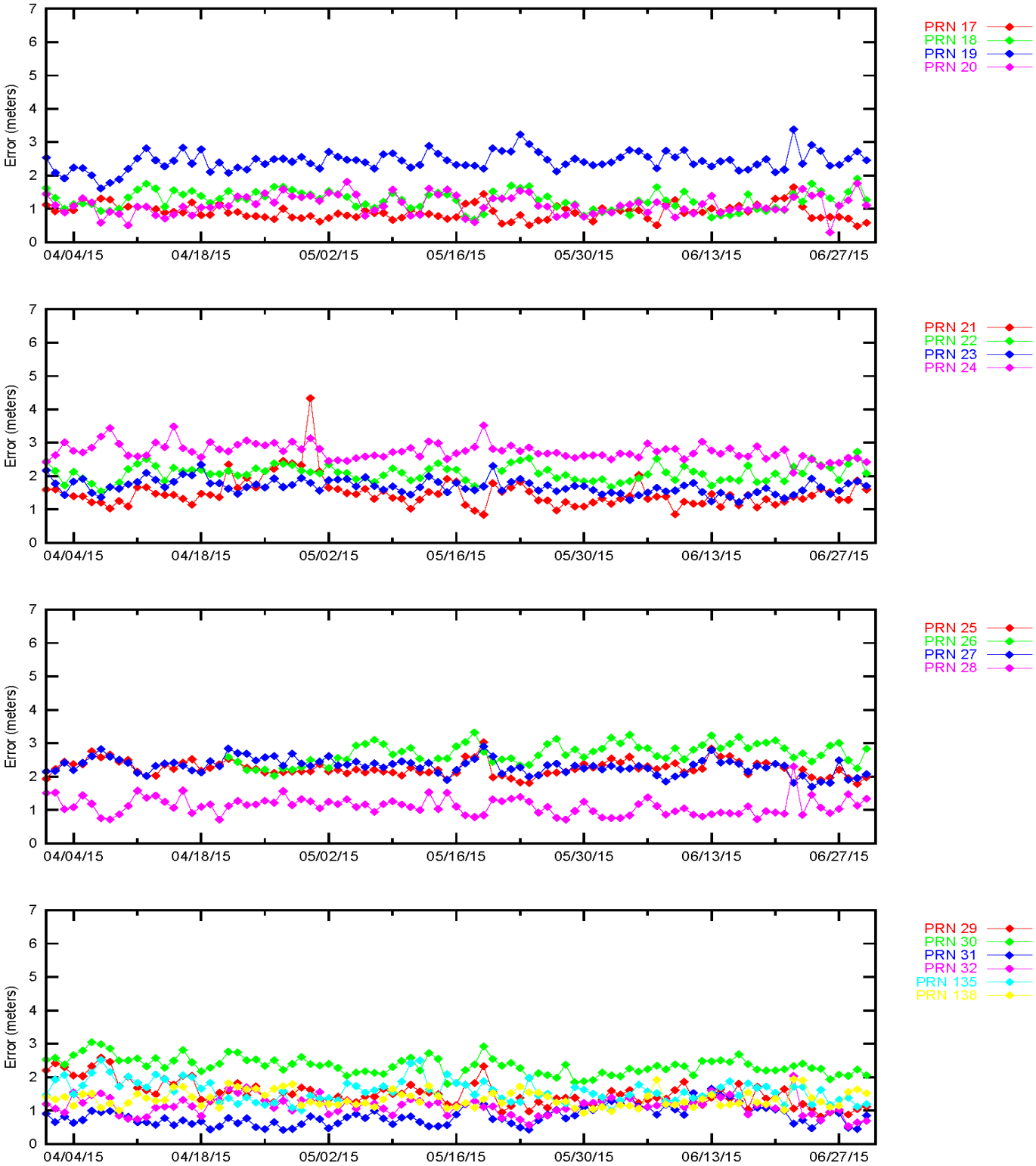


Figure 6-3 95% Ionospheric Error (PRN 1 – PRN 16) – Washington DC

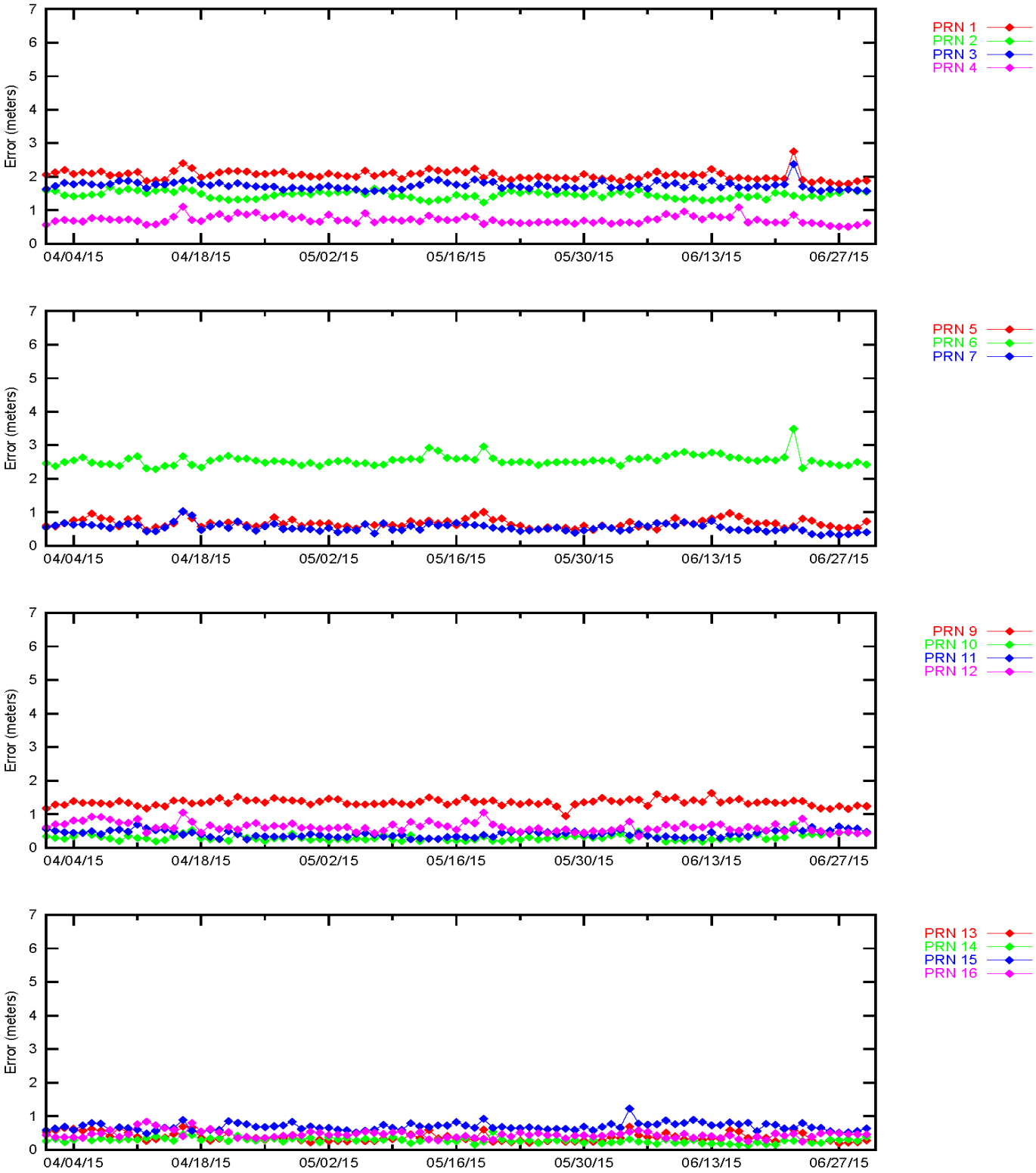
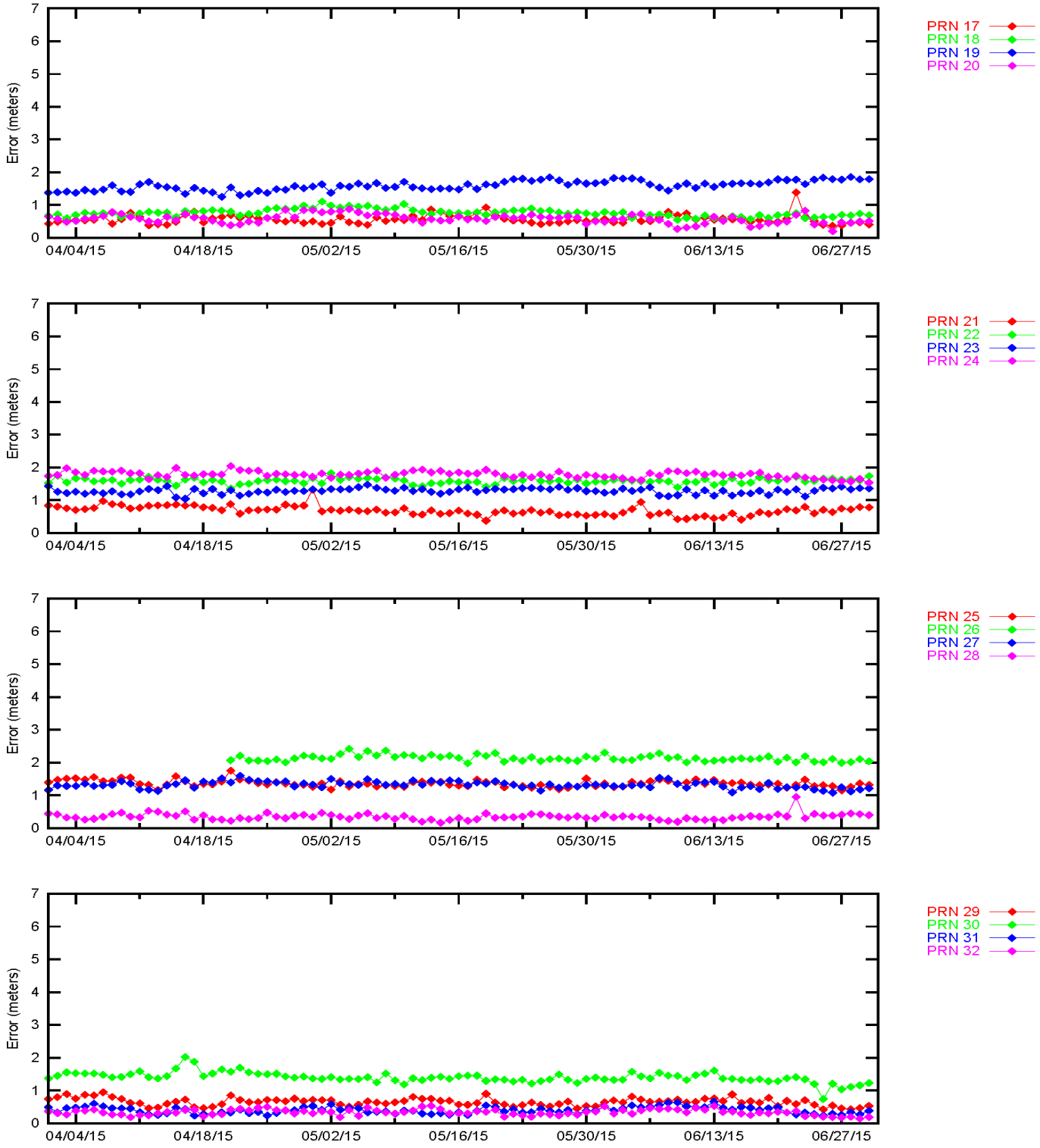


Figure 6-4 95% Ionospheric Error (PRN 17 - PRN 32) – Washington DC



7.0 GEO RANGING PERFORMANCE

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

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

The decreases in AMR NPA ranging availability in Figure 7-3 for the quarter were due to GUS switchovers and SV alerts on the AMR GEO.

Table 7-1 GEO Ranging Availability

GEO Source	GEO	PA (%)	NPA (%)	Not Monitored (%)	Do Not Use (%)
AMR 133	CRW	99.433	0.457	0.109	0
AMR 133	CRE	98.969	0.764	0.234	0.031
AMR 133	AMR	0	98.865	0	0
CRW 135	CRW	99.435	0.457	0.107	0
CRW 135	CRE	98.966	0.763	0.234	0.035
CRW 135	AMR	0.00	98.854	0	0
CRE 138	CRW	99.435	0.457	0.107	0
CRE 138	CRE	98.97	0.764	0.234	0.031
CRE 138	AMR	0	98.848	0	0

Figure 7-1 Daily PA CRW GEO Ranging Availability Trend

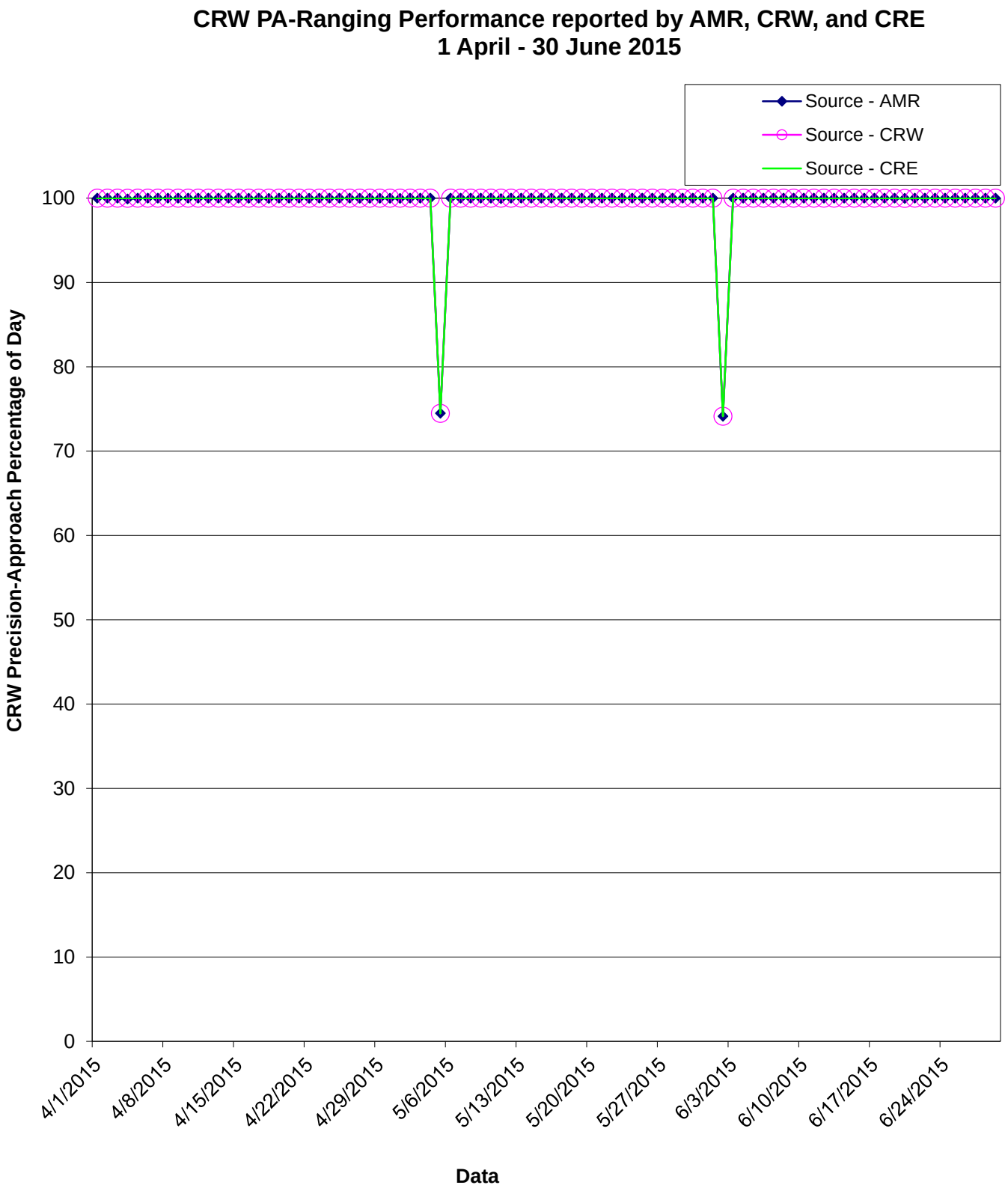


Figure 7-2 Daily PA CRE GEO Ranging Availability Trend

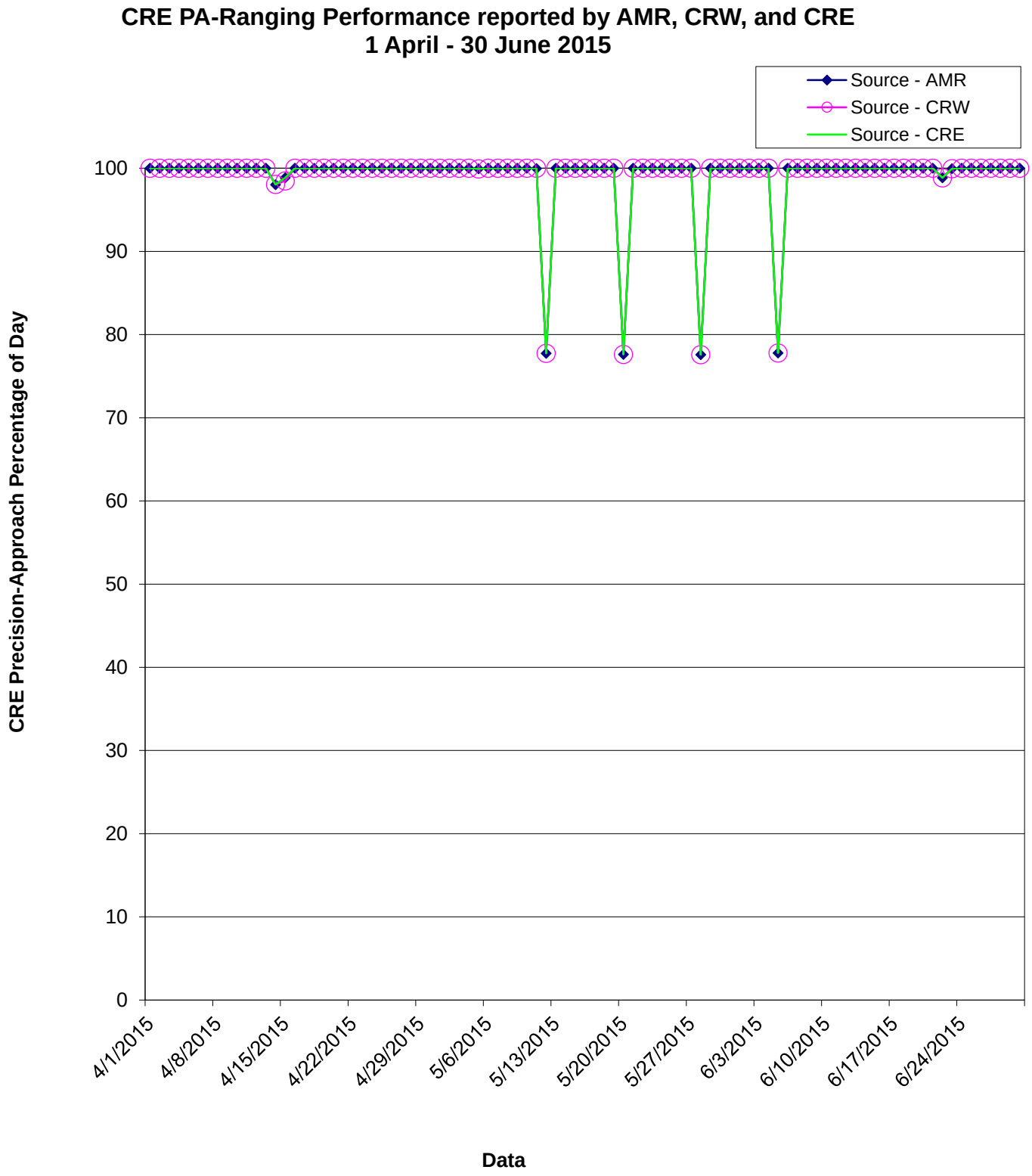
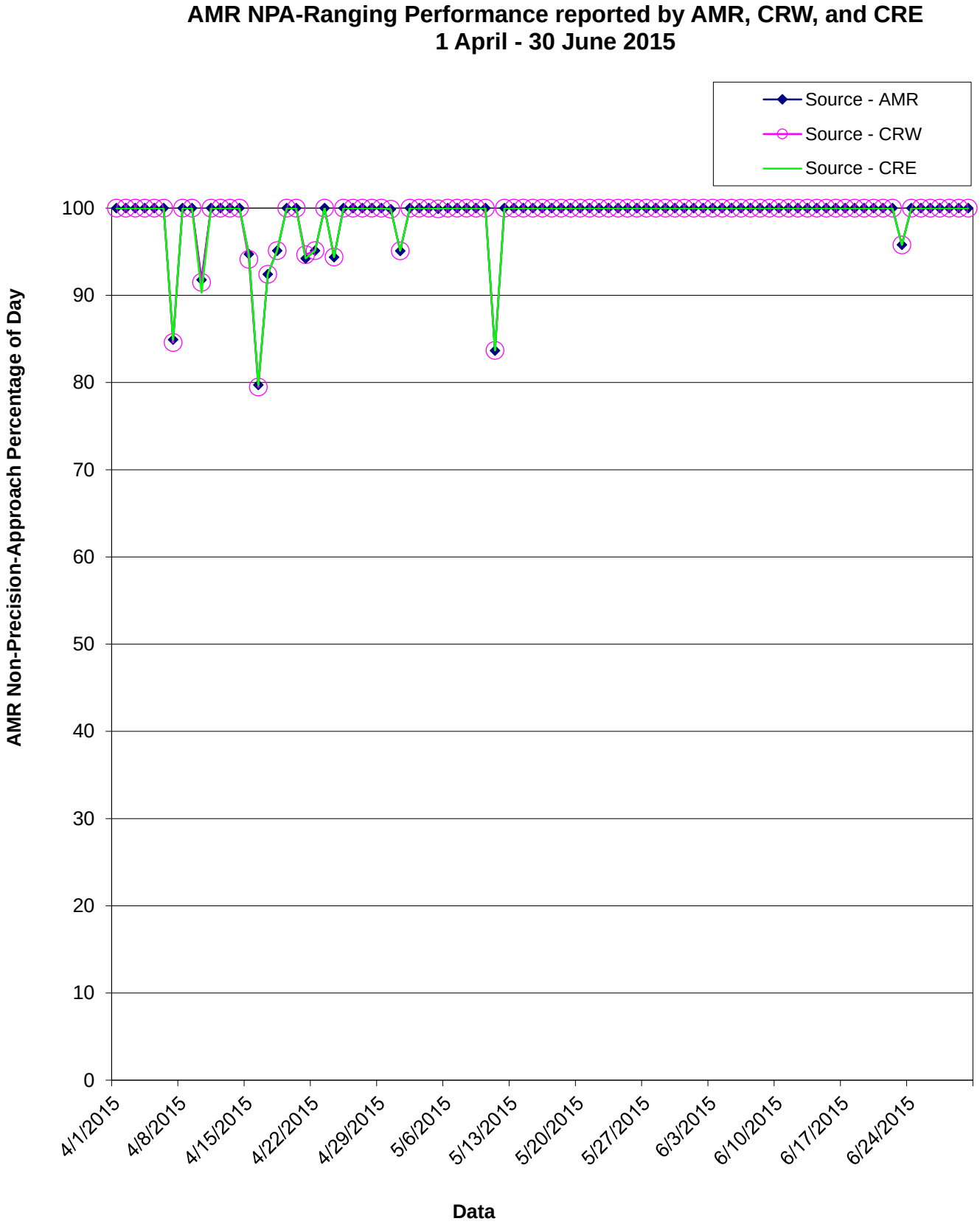


Figure 7-3 Daily NPA AMR GEO Ranging Availability Trend



8.0 WAAS AIRPORT AVAILABILITY

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

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

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

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
CAL4	FORT MACKAY / ALBIAN AERODROME	AB	LPV	0	100	1	99.9798	4	99.9466
CEV3	VEGREVILLE	AB	LPV	0	100	1	99.9775	5	99.9477
CYEG	EDMONTON / JOSEPHBURG	AB	LPV	0	100	1	99.9798	4	99.9580
CYXD	EDMONTON CITY CTR	AB	LPV	0	100	1	99.9798	4	99.9565
2C7	SHAKTOOLIK	AK	LPV	0	100	0	100	5	99.9622
6A8	ALLAKAKET	AK	LP	0	100	0	100	5	99.9718
7KA	TATITLEK	AK	LP	0	100	0	100	1	99.9943
9A3	CHUATHBALUK	AK	LPV	0	100	0	100	4	99.9515
AKN	KING SALMON	AK	LPV	0	100	1	99.9866	4	99.9546
ANC	TED STEVENS ANCHORAGE INTL	AK	LPV200	0	100	0	100	1	99.9878
AQH	QUINHAGAK	AK	LPV	0	100	0	100	9	99.9134
AQT	NUIQSUT	AK	LPV	0	100	0	100	43	99.8302
BET	BETHEL	AK	LPV200	0	100	0	100	5	99.9355
BRW	WILEY POST-WILL ROGERS MEM	AK	LPV	0	100	4	99.9672	215	96.9654

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
CDB	COLD BAY	AK	LPV200	1	99.9805	3	99.9634	419	95.1553
CDV	MERLE K (MUDHOLE) SMITH	AK	LPV	0	100	0	100	1	99.9935
CLP	CLARKS POINT	AK	LPV	0	100	1	99.9836	4	99.9462
CXF	COLDFOOT	AK	LP	0	100	0	100	11	99.9576
D76	ROBERT/BOB/CURTIS MEMORIAL	AK	LPV	0	100	1	99.9985	64	99.6532
DLG	DILLINGHAM	AK	LPV	0	100	1	99.9859	4	99.9466
ELI	ELIM	AK	LPV	0	100	0	100	5	99.9435
ENA	KENAI MUNICIPAL	AK	LPV200	0	100	0	100	1	99.9855
ENM	EMMONAK	AK	LPV	0	100	0	100	7	99.9145
FAI	FAIRBANKS INTL	AK	LPV200	0	100	0	100	4	99.9920
GAL	EDWARD G. PITKA	AK	LPV	0	100	0	100	2	99.9779
GKN	GULKANA	AK	LPV	0	100	0	100	1	99.9966
HLA	HUSLIA	AK	LPV	0	100	0	100	3	99.9718
HOM	HOMER	AK	LPV	0	100	0	100	1	99.9828
HPB	HOOPER BAY	AK	LP	0	100	0	100	20	99.8134
ILI	ILIAMNA	AK	LPV	0	100	0	100	1	99.9836
KAL	KALTAG	AK	LPV	0	100	0	100	3	99.9783
KSM	ST MARY'S	AK	LPV200	0	100	0	100	5	99.9195
KTN	KETCHIKAN INTL	AK	LPV	0	100	0	100	0	100
KWT	KWETHLUK	AK	LPV	0	100	0	100	5	99.9416
KYU	KOYUKUK	AK	LPV	0	100	0	100	3	99.9760
MCG	MCGRATH	AK	LP	0	100	0	100	3	99.9821
MDM	MARSHALL DON HUNTER SR	AK	LP	0	100	0	100	5	99.9359
MDO	MIDDLETON ISLAND	AK	LP	0	100	0	100	1	99.9763
OOK	TOKSOOK BAY	AK	LP	0	100	0	100	52	99.7337
ORT	NORTHWAY	AK	LP	0	100	0	100	21	99.9824
OTZ	RALPH WIEN MEMORIAL	AK	LPV200	0	100	1	99.9969	91	99.4578
PAQ	PALMER MUNICIPAL	AK	LP	0	100	0	100	1	99.9866
RBY	RUBY	AK	LPV	0	100	0	100	2	99.9760
SCC	DEADHORSE	AK	LPV	0	100	0	100	48	99.8535
SCM	SCAMMON BAY	AK	LP	0	100	0	100	15	99.8821
SHG	SHUNGNAK	AK	LP	0	100	0	100	5	99.9653
SHX	SHAGELUK	AK	LPV	0	100	0	100	4	99.9710
SMK	ST MICHAEL	AK	LPV	0	100	0	100	5	99.9527
UNK	UNALAKLEET	AK	LP	0	100	0	100	5	99.9653
WLK	SELAWIK	AK	LPV	0	100	0	100	4	99.9668
WNA	NAPAKIAK	AK	LPV	0	100	0	100	7	99.9294
YAK	YAKUTAT	AK	LPV200	0	100	0	100	1	99.9966
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

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
1R8	BAY MINETTE MUNICIPAL	AL	LPV	0	100	0	100	0	100
2R5	ST ELMO	AL	LPV	0	100	0	100	0	100
3A1	FOLSOM FIELD	AL	LPV	0	100	0	100	0	100
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

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
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
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	1	99.9840
D68	SPRINGERVILLE MUNICIPAL	AZ	LP	0	100	0	100	1	99.9973
DVT	PHOENIX DEER VALLEY	AZ	LPV	0	100	0	100	1	99.9836
FFZ	FALCON FLD	AZ	LP	0	100	0	100	1	99.9859
FHU	SIERRA VISTA MUNICIPAL-LIBBY AAF	AZ	LPV200	0	100	0	100	2	99.9863
FLG	FLAGSTAFF PULLIAM	AZ	LPV	0	100	0	100	1	99.9886
GEU	GLENDALE MUNICIPAL	AZ	LPV	0	100	0	100	1	99.9832
HII	LAKE HAVASU CITY	AZ	LPV	0	100	0	100	2	99.9691
IFP	LAUGHLIN/BULLHEAD INTL	AZ	LPV	0	100	0	100	2	99.9748
IGM	KINGMAN	AZ	LPV	0	100	0	100	1	99.9817

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
IWA	PHOENIX-MESA GATEWAY	AZ	LPV200	0	100	0	100	1	99.9836
P33	COCHISE COUNTY	AZ	LPV	0	100	0	100	1	99.9882
PGA	PAGE MUNICIPAL	AZ	LPV	0	100	0	100	1	99.9973
PHX	PHOENIX SKY HARBOR INTL	AZ	LPV	0	100	0	100	1	99.9836
PRC	ERNEST A. LOVE FIELD	AZ	LPV	0	100	0	100	1	99.9847
RQE	WINDOW ROCK	AZ	LP	0	100	0	100	0	100
SAD	SAFFORD RGNL	AZ	LPV	0	100	0	100	1	99.9897
SJN	ST JOHNS INDUSTRIAL AIR PARK	AZ	LP	0	100	0	100	1	99.9996
SOW	SHOW LOW RGNL	AZ	LPV	0	100	0	100	1	99.9924
TUS	TUCSON INTL	AZ	LPV	0	100	0	100	2	99.9836
CYBL	CAMPBELL RIVER	BC	LPV	0	100	0	100	2	99.9870
CYCD	NANAIMO	BC	LPV	0	100	0	100	1	99.9886
CYVR	VANCOUVER INTL	BC	LPV	0	100	0	100	1	99.9893
CYXS	PRINCE GEORGE	BC	LPV	0	100	0	100	2	99.9985
CYYJ	VICTORIA INTL	BC	LPV	0	100	0	100	1	99.9886
CZBB	VANCOUVER / BOUNDARY BAY	BC	LPV	0	100	0	100	1	99.9893
AAT	ALTURAS MUNICIPAL	CA	LPV	0	100	0	100	3	99.9737
ACV	ARCATA	CA	LPV200	0	100	0	100	7	99.9260
APC	NAPA COUNTY	CA	LPV	0	100	0	100	4	99.9054
APV	APPLE VALLEY	CA	LPV	0	100	0	100	3	99.9603
AUN	AUBURN MUNICIPAL	CA	LPV	0	100	0	100	3	99.9428
BFL	MEADOWS FIELD	CA	LPV200	0	100	0	100	5	99.9298
BLH	BLYTHE	CA	LP	0	100	0	100	3	99.9672
C83	BYRON	CA	LPV	0	100	0	100	4	99.9084
CCR	BUCHANAN FIELD	CA	LPV	0	100	0	100	4	99.9038
CEC	JACK MC NAMARA FIELD	CA	LPV200	0	100	0	100	7	99.9313
CIC	CHICO MUNICIPAL	CA	LPV	0	100	0	100	3	99.9451
CMA	CAMARILLO	CA	LPV	0	100	0	100	5	99.8970
CNO	CHINO	CA	LPV	0	100	0	100	5	99.9557
CRQ	MC CLELLAN-PALOMAR	CA	LPV200	0	100	0	100	6	99.9531
CVH	HOLLISTER MUNICIPAL	CA	LPV	0	100	0	100	4	99.9012
DAG	BARSTOW-DAGGETT	CA	LPV	0	100	0	100	2	99.9622
DWA	YOLO COUNTY-DAVIS/WOODLAND/WINTERS	CA	LPV	0	100	0	100	3	99.9168
FAT	FRESNO YOSEMITE INTL	CA	LPV	0	100	0	100	2	99.9290
HAF	HALF MOON BAY	CA	LPV	0	100	0	100	5	99.8943
HHR	HAWTHORNE JACK NORTHROP FIELD	CA	LPV	0	100	0	100	7	99.9473
HWD	HAYWARD EXECUTIVE	CA	LPV	0	100	0	100	4	99.8989
LAX	LOS ANGELES INTL	CA	LPV	0	100	0	100	7	99.9454
LGB	LONG BEACH/DAUGHERTY FIELD	CA	LPV	0	100	0	100	6	99.9485

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
LHM	LINCOLN RGNL/KARL HARDER FIELD	CA	LPV200	0	100	0	100	3	99.9252
LLR	LITTLE RIVER	CA	LP	0	100	0	100	3	99.9019
LSN	LOS BANOS MUNICIPAL	CA	LPV	0	100	0	100	4	99.9115
LVK	LIVERMORE MUNICIPAL	CA	LPV	0	100	0	100	4	99.9031
MAE	MADERA MUNICIPAL	CA	LPV	0	100	0	100	3	99.9271
MCE	MERCED RGNL/MACREADY FIELD	CA	LPV	0	100	0	100	3	99.9210
MER	CASTLE	CA	LPV200	0	100	0	100	3	99.9206
MHR	SACRAMENTO MATHER	CA	LPV200	0	100	0	100	3	99.9225
MIT	SHAFTER-MINTER FIELD	CA	LPV	0	100	0	100	5	99.9264
MOD	MODESTO CITY-CO-HARRY SHAM FLD	CA	LPV	0	100	0	100	3	99.9183
MRY	MONTEREY PENINSULA	CA	LPV	0	100	1	99.9969	5	99.8790
MYF	MONTGOMERY FIELD	CA	LPV200	0	100	0	100	6	99.9466
MYV	YUBA COUNTY	CA	LPV200	0	100	0	100	4	99.9386
O02	NERVINO	CA	LPV	0	100	0	100	2	99.9481
O27	OAKDALE	CA	LPV	0	100	0	100	3	99.9214
O69	PETALUMA MUNICIPAL	CA	LPV	0	100	0	100	4	99.9012
O88	RIO VISTA MUNICIPAL	CA	LP	0	100	0	100	3	99.9145
OAK	METROPOLITAN OAKLAND INTL	CA	LPV	0	100	0	100	4	99.8985
ONT	ONTARIO INTL	CA	LPV	0	100	0	100	5	99.9561
OVE	OROVILLE MUNICIPAL	CA	LPV	0	100	0	100	3	99.9431
OXR	OXNARD	CA	LPV	0	100	0	100	5	99.8920
PMD	PALMDALE USAF PLANT 42	CA	LPV200	0	100	0	100	5	99.9569
POC	BRACKETT FIELD	CA	LPV	0	100	0	100	5	99.9542
PRB	PASO ROBLES MUNICIPALCIPAL	CA	LPV200	0	100	0	100	5	99.8909
PVF	PLACERVILLE	CA	LPV	0	100	0	100	3	99.9290
RAL	RIVERSIDE MUNICIPAL	CA	LPV	0	100	0	100	5	99.9584
RBL	RED BLUFF MUNICIPAL	CA	LPV	0	100	0	100	3	99.9447
RDD	REDDING MUNICIPAL	CA	LPV	0	100	0	100	3	99.9447
RHV	REID-HILLVIEW OF SANTA CLARA	CA	LPV	0	100	0	100	4	99.8996
SAC	SACRAMENTO EXECUTIVE	CA	LPV200	0	100	0	100	3	99.9199
SAN	SAN DIEGO INTL	CA	LP	0	100	0	100	7	99.9435
SBA	SANTA BARBARA MUNICIPAL	CA	LPV	0	100	0	100	6	99.8745
SBP	SAN LUIS COUNTY RGNL	CA	LPV200	0	100	1	99.9928	5	99.8798
SCK	STOCKTON METROPOLITAN	CA	LPV	0	100	0	100	3	99.9187
SEE	GILLESPIE FIELD	CA	LP	0	100	0	100	6	99.9481
SFO	SAN FRANCISCO INTL	CA	LPV	0	100	0	100	4	99.8970
SJC	NORMAN Y. MINETA SAN JOSE INTL	CA	LPV	0	100	0	100	4	99.8985
SMF	SACRAMENTO INTL	CA	LPV200	0	100	0	100	3	99.9206

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
SMX	SANTA MARIA PUBLIC/CAPT G ALLAN HANCOCK FIELD	CA	LPV200	0	100	1	99.9928	5	99.8737
SNA	JOHN WAYNE-ORANGE COUNTY	CA	LPV	0	100	0	100	6	99.9489
SNS	SALINAS MUNICIPAL	CA	LPV200	0	100	1	99.9985	4	99.8825
STS	CHARLES M. SCHULZ-SONOMA COUNTY	CA	LPV	0	100	0	100	4	99.9027
TCY	TRACY MUNICIPAL	CA	LPV	0	100	0	100	4	99.9092
TOA	ZAMPERINI FIELD	CA	LPV200	0	100	0	100	7	99.9409
VCB	NUT TREE	CA	LPV	0	100	0	100	3	99.9103
VCV	SOUTHERN CALIFORNIA LOGISTICS	CA	LPV	0	100	0	100	4	99.9599
VIS	VISALIA MUNICIPAL	CA	LPV200	0	100	0	100	2	99.9309
WJF	GENERAL WM J FOX AIRFIELD	CA	LPV	0	100	0	100	5	99.9561
WLW	WILLOWS-GLENN COUNTY	CA	LPV	0	100	0	100	3	99.9355
ALS	SAN LUIS VALLEY RGNL/BERGMAN FIELD	CO	LPV200	0	100	0	100	0	100
APA	CENTENNIAL	CO	LPV200	0	100	0	100	1	99.9989
BJC	ROCKY MOUNTAIN METROPOLITAN	CO	LPV200	0	100	0	100	1	99.9981
CEZ	CORTEZ MUNICIPAL	CO	LPV	0	100	0	100	0	100
COS	CITY OF COLORADO SPRINGS MUNICIPAL	CO	LPV200	0	100	0	100	1	99.9989
DEN	DENVER INTL	CO	LPV200	0	100	0	100	2	99.9981
DRO	DURANGO-LA PLATA COUNTY	CO	LPV200	0	100	0	100	0	100
FMM	FORT MORGAN MUNICIPAL	CO	LP	0	100	0	100	2	99.9954
FNL	FORT COLLINS-LOVELAND MUNICIPAL	CO	LPV200	0	100	0	100	1	99.9985
FTG	FRONT RANGE	CO	LPV200	0	100	0	100	2	99.9981
GJT	GRAND JUNCTION RGNL	CO	LPV200	0	100	0	100	0	100
GXY	GREELEY-WELD COUNTY	CO	LPV	0	100	0	100	1	99.9981
HDN	YAMPA VALLEY	CO	LPV	0	100	0	100	1	99.9996
ITR	KIT CARSON COUNTY	CO	LPV	0	100	0	100	2	99.9962
LAA	LAMAR MUNICIPAL	CO	LPV	0	100	0	100	1	99.9977
LHX	LA JUNTA MUNICIPAL	CO	LPV	0	100	0	100	1	99.9989
MTJ	MONTROSE RGNL	CO	LPV	0	100	0	100	0	100
PUB	PUEBLO MEMORIAL	CO	LPV200	0	100	0	100	1	99.9989
RIL	GARFIELD COUNTY RGNL	CO	LPV	0	100	0	100	0	100
STK	STERLING MUNICIPAL	CO	LPV	0	100	0	100	2	99.9928
TEX	TELLURIDE RGNL	CO	LP	0	100	0	100	0	100
BDL	BRADLEY INTL	CT	LPV200	0	100	1	99.9947	1	99.9561
GON	GROTON-NEW LONDON	CT	LPV	0	100	1	99.9928	1	99.9599
HVN	TWEED-NEW HAVEN	CT	LPV	0	100	1	99.9950	1	99.9599
IJD	WINDHAM	CT	LP	0	100	1	99.9931	1	99.9596
OXC	WATERBURY-OXFORD	CT	LPV	0	100	1	99.9958	1	99.9603

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
DCA	RONALD REAGAN WASHINGTON NATL	DC	LPV	0	100	0	100	0	100
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	0	100
33N	DELAWARE AIRPARK	DE	LP	0	100	0	100	0	100
EVY	SUMMIT	DE	LPV	0	100	0	100	0	100
GED	SUSSEX COUNTY	DE	LPV	0	100	0	100	0	100
ILG	NEW CASTLE	DE	LPV	0	100	0	100	0	100
1J0	TRI-COUNTY	FL	LP	0	100	0	100	1	99.9992
28J	PALATKA MUNICIPALCIPAL ARPT	FL	LPV	0	100	0	100	1	99.9981
40J	PERRY-FOLEY	FL	LPV	0	100	0	100	1	99.9981
54J	DEFUNIAK SPRINGS	FL	LP	0	100	0	100	1	99.9989
AAF	APALACHICOLA MUNICIPAL	FL	LPV	0	100	0	100	1	99.9954
APF	NAPLES MUNICIPAL	FL	LPV	0	100	1	99.9962	1	99.9706
AVO	AVON PARK EXECUTIVE	FL	LPV	0	100	1	99.9981	1	99.9886
BCT	BOCA RATON	FL	LPV	0	100	1	99.9939	2	99.9653
BKV	HERNANDO COUNTY	FL	LPV	0	100	0	100	1	99.9916
BOW	BARTOW MUNICIPAL	FL	LPV	0	100	1	99.9992	1	99.9897
CEW	BOB SIKES	FL	LPV	0	100	0	100	1	99.9992
CHN	WAUCHULA MUNICIPAL	FL	LP	0	100	1	99.9985	1	99.9878
COI	MERRITT ISLAND	FL	LPV	0	100	1	99.9985	1	99.9928
CRG	CRAIG MUNICIPAL	FL	LPV200	0	100	0	100	0	100
CTY	CROSS CITY	FL	LPV	0	100	0	100	1	99.9966
DAB	DAYTONA BEACH INTL	FL	LPV200	0	100	0	100	1	99.9962
DED	DELAND MUNICIPAL-SIDNEY H TAYLOR FLD	FL	LPV	0	100	0	100	1	99.9958
DTS	DESTIN-FORT WALTON BEACH	FL	LP	0	100	0	100	1	99.9989
ECP	NORTHWEST FLORIDA BEACHES INTL	FL	LPV200	0	100	0	100	1	99.9977
EVB	NEW SMYRNA BEACH MUNICIPAL	FL	LPV	0	100	0	100	1	99.9958
EYW	KEY WEST INTL	FL	LPV	0	100	1	99.9920	5	99.9466
F45	NORTH PALM BEACH COUNTY GENERAL AVIATION	FL	LPV	0	100	1	99.9950	1	99.9699
FHB	FERNANDINA BEACH MUNICIPAL	FL	LPV	0	100	0	100	0	100
FLL	FORT LAUDERDALE/HOLLYWOOD INTL	FL	LPV	0	100	1	99.9928	2	99.9634
FMY	PAGE FIELD	FL	LPV	0	100	1	99.9969	1	99.9718
FPR	ST LUCIE COUNTY INTL	FL	LPV	0	100	1	99.9966	1	99.9786
FXE	FT LAUDERDALE EXECUTIVE	FL	LPV200	0	100	1	99.9931	2	99.9645
GIF	WINTER HAVEN'S GILBERT	FL	LPV	0	100	1	99.9996	1	99.9905
GNV	GAINESVILLE RGNL	FL	LPV	0	100	0	100	1	99.9977

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
HEG	HERLONG RECREATIONAL	FL	LP	0	100	0	100	0	100
IMM	IMMOKALEE RGNL	FL	LPV	0	100	1	99.9962	1	99.9725
ISM	KISSIMMEE GATEWAY	FL	LPV200	0	100	1	99.9996	1	99.9920
JAX	JACKSONVILLE INTL	FL	LPV200	0	100	0	100	0	100
LAL	LAKELAND LINDER RGNL	FL	LPV200	0	100	1	99.9996	1	99.9897
LCQ	LAKE CITY MUNICIPAL	FL	LPV	0	100	0	100	1	99.9996
LEE	LEESBURG INTL	FL	LPV	0	100	0	100	1	99.9939
MCO	ORLANDO INTL	FL	LPV200	0	100	1	99.9996	1	99.9928
MIA	MIAMI INTL	FL	LPV	0	100	1	99.9924	2	99.9615
MKY	MARCO ISLAND	FL	LPV	0	100	1	99.9958	2	99.9615
MLB	MELBOURNE INTL	FL	LPV200	0	100	1	99.9977	2	99.9916
MTH	THE FLORIDA KEYS MARATHON	FL	LPV	0	100	1	99.9912	5	99.9466
OBE	OKEECHOBEE COUNTY	FL	LPV	0	100	1	99.9966	1	99.9767
OCF	OCALA INTL-JIM TAYLOR FLD	FL	LPV200	0	100	0	100	1	99.9950
OPF	OPA LOCKA EXECUTIVE	FL	LPV200	0	100	1	99.9924	2	99.9622
ORL	EXECUTIVE	FL	LPV200	0	100	1	99.9996	1	99.9931
PBI	PALM BEACH INTL	FL	LPV200	0	100	1	99.9947	1	99.9699
PCM	PLANT CITY MUNICIPAL	FL	LPV	0	100	1	99.9996	1	99.9897
PGD	PUNTA GORDA	FL	LPV200	0	100	1	99.9977	1	99.9844
PHK	PALM BEACH COUNTY GLADES	FL	LPV	0	100	1	99.9958	1	99.9691
PIE	ST PETERSBURG-CLEARWATER INTL	FL	LPV200	0	100	0	100	1	99.9882
PMP	POMPANO BEACH AIRPARK	FL	LPV	0	100	1	99.9931	2	99.9645
PNS	PENSACOLA RGNL	FL	LPV200	0	100	0	100	1	99.9996
RSW	SOUTHWEST FLORIDA INTL	FL	LPV	0	100	1	99.9966	1	99.9718
SEF	SEBRING RGNL	FL	LPV	0	100	1	99.9977	1	99.9882
SFB	ORLANDO SANFORD INTL	FL	LPV200	0	100	0	100	1	99.9943
SGJ	ST AUGUSTINE	FL	LPV	0	100	0	100	1	99.9996
SRQ	SARASOTA/BRADENTON INTL	FL	LPV200	0	100	1	99.9996	1	99.9863
SUA	WITHAM FIELD	FL	LPV	0	100	1	99.9958	1	99.9714
TIX	SPACE COAST RGNL	FL	LPV200	0	100	1	99.9989	1	99.9935
TLH	TALLAHASSEE RGNL	FL	LPV200	0	100	0	100	1	99.9989
TMB	KENDALL-TAMIAMI EXECUTIVE	FL	LPV200	0	100	1	99.9924	2	99.9603
TPA	TAMPA INTL	FL	LPV200	0	100	0	100	1	99.9889
TPF	PETER O KNIGHT	FL	LP	0	100	0	100	1	99.9889
VDF	TAMPA EXECUTIVE	FL	LPV	0	100	0	100	1	99.9897
VNC	VENICE MUNICIPAL	FL	LP	0	100	1	99.9985	1	99.9851
VQQ	CECIL FIELD	FL	LPV	0	100	0	100	0	100
VRB	VERO BEACH MUNICIPAL	FL	LPV200	0	100	1	99.9966	1	99.9790
X07	LAKE WALES MUNICIPAL	FL	LP	0	100	1	99.9992	1	99.9901
X14	LA BELLE MUNICIPAL	FL	LPV	0	100	1	99.9966	1	99.9733
X26	SEBASTIAN MUNICIPAL	FL	LP	0	100	1	99.9969	1	99.9790

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
X35	MARION CO & PARK OF COMMERCE	FL	LP	0	100	0	100	1	99.9947
X51	HOMESTEAD GENERAL AVIATION	FL	LPV	0	100	1	99.9924	3	99.9588
XFL	FLAGLER COUNTY	FL	LPV	0	100	0	100	1	99.9977
ZPH	ZEPHYRHILLS MUNICIPAL	FL	LPV	0	100	0	100	1	99.9908
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	1	99.9969
3J7	GREENE COUNTY RGNL	GA	LPV	0	100	0	100	1	99.9981
48A	COCHRAN	GA	LPV	0	100	0	100	1	99.9981
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
4J6	ST MARYS	GA	LPV	0	100	0	100	0	100
52A	MADISON MUNICIPAL	GA	LP	0	100	0	100	1	99.9985
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	1	99.9996
ACJ	JIMMY CARTER RGNL	GA	LPV	0	100	0	100	1	99.9985
AGS	AUGUSTA RGNL AT BUSH FIELD	GA	LPV200	0	100	0	100	1	99.9962
AHN	ATHENS/BEN EPPS	GA	LPV	0	100	0	100	1	99.9996
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	1	99.9996
BIJ	EARLY COUNTY	GA	LPV	0	100	0	100	1	99.9996
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	1	99.9989
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	1	99.9985
D73	MONROE-WALTON COUNTY	GA	LP	0	100	0	100	0	100
DNN	DALTON MUNICIPAL	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	LPV 200 Avail
DQH	DOUGLAS MUNICIPAL	GA	LPV200	0	100	0	100	0	100
EZM	HEART OF GEORGIA RGNL	GA	LPV	0	100	0	100	1	99.9985
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	1	99.9996
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	1	99.9962
IIY	WASHINGTON-WILKES COUNTY	GA	LPV	0	100	0	100	1	99.9947
JES	JESUP-WAYNE COUNTY	GA	LPV	0	100	0	100	1	99.9996
JYL	PLANTATION ARPK	GA	LPV	0	100	0	100	1	99.9977
JZP	PICKENS COUNTY	GA	LPV	0	100	0	100	0	100
LGC	LAGRANGE-CALLAWAY	GA	LPV200	0	100	0	100	0	100
LZU	GWINNETT COUNTY-BRISCOE FIELD	GA	LPV200	0	100	0	100	0	100
MAC	MACON DOWNTOWN	GA	LP	0	100	0	100	1	99.9969
MCN	MIDDLE GEORGIA RGNL	GA	LPV200	0	100	0	100	1	99.9969
MGR	MOULTRIE MUNICIPAL	GA	LPV200	0	100	0	100	0	100
MLJ	BALDWIN COUNTY	GA	LPV	0	100	0	100	1	99.9962
MQW	TELFAIR-WHEELER	GA	LPV	0	100	0	100	1	99.9989
OKZ	KAOLIN FIELD	GA	LPV	0	100	0	100	1	99.9969
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	1	99.9973
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	1	99.9989
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	1	99.9989
SBO	EAST GEORGIA REGIONAL	GA	LPV	0	100	0	100	1	99.9977
TBR	STATESBORO-BULLOCH COUNTY	GA	LPV	0	100	0	100	1	99.9981
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	1	99.9985
VLD	VALDOSTA RGNL	GA	LPV	0	100	0	100	0	100
VPC	CARTERSVILLE	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	LPV 200 Avail
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
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

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
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	99.9996
COE	PAPPY BOYINGTON FIELD	ID	LPV200	0	100	0	100	1	99.9954
DIJ	DRIGGS-REED MEMORIAL	ID	LP	0	100	0	100	1	99.9985
EUL	CALDWELL INDUSTRIAL	ID	LPV	0	100	0	100	0	100
GNG	GOODING MUNICIPAL	ID	LPV	0	100	0	100	0	100
IDA	IDAHO FALLS RGNL	ID	LPV200	0	100	0	100	1	99.9992
JER	JEROME COUNTY	ID	LPV	0	100	0	100	0	100
LWS	LEWISTON-NEZ PERCE COUNTY	ID	LPV200	0	100	0	100	2	99.9958
MAN	NAMPA MUNICIPAL	ID	LPV	0	100	0	100	0	100
MYL	MC CALL MUNICIPALCIPAL	ID	LPV	0	100	0	100	1	99.9996
PIH	POCATELLO RGNL	ID	LPV200	0	100	0	100	0	100
TWF	JOSLIN FIELD-MAGIC VALLEY RGNL	ID	LPV200	0	100	0	100	0	100
U76	MOUNTAIN HOME MUNICIPAL	ID	LPV	0	100	0	100	0	100
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

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
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
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

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
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
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	1	99.9973
AAO	COLONEL JAMES JABARA	KS	LPV	0	100	0	100	0	100
ADT	ATWOOD-RAWLINS COUNTY CITY-COUNTY	KS	LPV	0	100	0	100	2	99.9924
ANY	ANTHONY MUNICIPAL	KS	LP	0	100	0	100	0	100
CBK	SHALZ FIELD	KS	LPV	0	100	0	100	2	99.9935
CNK	BLOSSER MUNICIPAL	KS	LP	0	100	0	100	0	100
DDC	DODGE CITY RGNL	KS	LPV	0	100	0	100	2	99.9981
EGT	WELLINGTON MUNICIPAL	KS	LPV	0	100	0	100	0	100
EHA	ELKHART-MORTON COUNTY	KS	LPV	0	100	0	100	1	99.9977

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
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	1	99.9996
GCK	GARDEN CITY RGNL	KS	LPV	0	100	0	100	1	99.9969
GLD	RENNER FLD/GOODLAND MUNICIPAL/	KS	LPV200	0	100	0	100	2	99.9954
HQG	HUGOTON MUNICIPAL	KS	LPV	0	100	0	100	1	99.9977
HUT	HUTCHINSON MUNICIPAL	KS	LPV	0	100	0	100	0	100
HYS	HAYS RGNL	KS	LPV200	0	100	0	100	1	99.9989
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	1	99.9981
LQR	LARNED PAWNEE CO	KS	LPV	0	100	0	100	1	99.9996
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
NRN	NORTON MUNICIPAL	KS	LPV	0	100	0	100	1	99.9966
OEL	OAKLEY MUNICIPAL	KS	LPV	0	100	0	100	2	99.9935
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	1	99.9996
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	2	99.9962
UKL	COFFEY COUNTY	KS	LPV	0	100	0	100	0	100
ULS	ULYSSES	KS	LPV	0	100	0	100	1	99.9973
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
7K4	OHIO COUNTY	KY	LPV	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

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
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
K22	BIG SANDY RGNL	KY	LPV	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
M97	MOREHEAD-ROWAN COUNTY CLYDE A THOMAS RGNL	KY	LPV	0	100	0	100	0	100
OWB	OWENSBORO-DAVIESS COUNTY	KY	LPV200	0	100	0	100	0	100
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

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
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
3B0	SOUTHBRIDGE MUNICIPAL	MA	LPV	0	100	1	99.9931	1	99.9561
ACK	NANTUCKET MEMORIAL	MA	LPV200	0	100	1	99.9870	1	99.9596
BAF	BARNES MUNICIPAL	MA	LPV	0	100	1	99.9950	1	99.9561
BED	LAURENCE G HANSCOM FLD	MA	LPV200	0	100	1	99.9912	1	99.9561
BOS	GEN EDWARD LAWRENCE LOGAN INTL	MA	LPV200	1	99.9977	2	99.9882	1	99.9561
BVY	BEVERLY MUNICIPAL	MA	LPV	1	99.9977	1	99.9748	1	99.9561
EWB	NEW BEDFORD RGNL	MA	LP	0	100	1	99.9897	1	99.9561
GBR	WALTER J KOLADZA	MA	LP	0	100	1	99.9966	1	99.9561
HYA	BARNSTABLE MUNICIPAL-BOARDMAN/POLANDO FIELD	MA	LPV200	0	100	1	99.9878	1	99.9561
LWM	LAWRENCE MUNICIPAL	MA	LPV200	2	99.9958	1	99.9748	1	99.9561
MVY	MARTHAS VINEYARD	MA	LPV200	0	100	1	99.9886	1	99.9596
ORE	ORANGE MUNICIPAL	MA	LPV	0	100	1	99.9939	1	99.9561
ORH	WORCESTER RGNL	MA	LPV200	0	100	1	99.9928	1	99.9561
OWD	NORWOOD MEMORIAL	MA	LPV	0	100	1	99.9908	1	99.9561
PYM	PLYMOUTH MUNICIPAL	MA	LPV200	0	100	1	99.9893	1	99.9561

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
2G4	GARRETT COUNTY	MD	LPV	0	100	0	100	0	100
2W6	ST. MARY'S COUNTY RGNL	MD	LPV	0	100	0	100	0	100
BWI	BALTIMORE/WASHINGTON INTL THURGOOD MARSHALL	MD	LPV200	0	100	0	100	0	100
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	0	100
ESN	EASTON/NEWNAM FIELD	MD	LPV	0	100	0	100	0	100
FDK	FREDERICK MUNICIPAL	MD	LPV	0	100	0	100	0	100
GAI	MONTGOMERY COUNTY AIRPARK	MD	LPV	0	100	0	100	0	100
HGR	HAGERSTOWN RGNL-RICHARD A HENSON FIELD	MD	LPV200	0	100	0	100	0	100
MTN	MARTIN STATE	MD	LPV	0	100	0	100	0	100
OXB	OCEAN CITY MUNICIPAL	MD	LPV	0	100	0	100	0	100
SBY	SALISBURY-OCEAN CITY WICOMICO RGNL	MD	LPV200	0	100	0	100	0	100
1B0	DEXTER RGNL	ME	LP	1	99.9710	1	99.9561	1	99.9439
81B	OXFORD COUNTY RGNL	ME	LP	1	99.9744	1	99.9710	1	99.9557
AUG	AUGUSTA STATE	ME	LPV200	1	99.9710	1	99.9638	1	99.9557
BGR	BANGOR INTL	ME	LPV	1	99.9710	1	99.9561	1	99.9416
BHB	HANCOCK COUNTY-BAR HARBOR	ME	LPV200	1	99.9710	1	99.9561	1	99.9416
BXM	BRUNSWICK EXECUTIVE	ME	LPV	1	99.9744	1	99.9649	1	99.9561
FVE	NORTHERN AROOSTOOK RGNL	ME	LPV	1	99.9561	1	99.9561	1	99.9466
HUL	HOULTON INTL	ME	LP	1	99.9561	1	99.9561	1	99.9428
LEW	AUBURN/LEWISTON MUNICIPAL	ME	LPV200	1	99.9744	1	99.9668	1	99.9561
MLT	MILLINOCKET MUNICIPAL	ME	LPV	1	99.9599	1	99.9561	1	99.9424
PQI	NORTHERN MAINE RGNL ARPT AT PRESQUE IS	ME	LPV200	1	99.9561	1	99.9561	1	99.9447
PWM	PORTLAND INTL JETPORT	ME	LPV200	1	99.9748	1	99.9710	1	99.9561
RKD	KNOX COUNTY RGNL	ME	LPV	1	99.9744	1	99.9569	1	99.9424
SFM	SANFORD RGNL	ME	LPV200	1	99.9756	1	99.9710	1	99.9561
WVL	WATERVILLE ROBERT LAFLEUR	ME	LPV200	1	99.9710	1	99.9638	1	99.9557
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	0	100
APN	ALPENA COUNTY RGNL	MI	LPV	0	100	0	100	0	100
ARB	ANN ARBOR MUNICIPAL	MI	LPV	0	100	0	100	0	100

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
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	2	99.9683
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	2	99.9733
JXN	JACKSON COUNTY-REYNOLDS FIELD	MI	LPV200	0	100	0	100	0	100
LAN	CAPITAL REGION INTL	MI	LPV200	0	100	0	100	0	100
LDM	MASON COUNTY	MI	LPV	0	100	0	100	0	100
LWA	SOUTH HAVEN AREA RGNL	MI	LP	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

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
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	2	99.9489
BDH	WILLMAR MUNICIPAL-JOHN L RICE FIELD	MN	LPV	0	100	0	100	0	100
BJI	BEMIDJI RGNL	MN	LPV200	0	100	0	100	2	99.9538
BRD	BRAINERD LAKES RGNL	MN	LPV200	0	100	0	100	2	99.9889
CBG	CAMBRIDGE MUNICIPAL	MN	LPV	0	100	0	100	0	100
CKC	GRAND MARAIS/COOK COUNTY	MN	LPV	0	100	0	100	2	99.9588
CKN	CROOKSTON MUNICIPAL/KIRKWOOD FLD	MN	LPV	0	100	0	100	2	99.9538
CNB	MYERS FIELD	MN	LPV	0	100	0	100	0	100
COQ	CLOQUET CARLTON COUNTY	MN	LPV	0	100	0	100	2	99.9668
CQM	COOK MUNICIPAL	MN	LP	0	100	0	100	2	99.9554
D39	SAUK CENTRE MUNICIPAL	MN	LP	0	100	0	100	0	100
DLH	DULUTH INTL	MN	LPV200	0	100	0	100	2	99.9634
DTL	DETROIT LAKES-WETHING FIELD	MN	LPV	0	100	0	100	2	99.9660
DXX	LAC QUI PARLE COUNTY	MN	LPV200	0	100	0	100	0	100
ELO	ELY MUNICIPAL	MN	LPV200	0	100	0	100	2	99.9550
ETH	WHEATON MUNICIPAL	MN	LP	0	100	0	100	1	99.9996
FCM	FLYING CLOUD	MN	LPV200	0	100	0	100	0	100
FFM	FERGUS FALLS MUNICIPAL-EINAR MICKELSON FLD	MN	LPV200	0	100	0	100	2	99.9889
FKA	FILLMORE COUNTY	MN	LPV	0	100	0	100	0	100
FOZ	BIGFORK MUNICIPALCIPAL	MN	LP	0	100	0	100	2	99.9580
FRM	FAIRMONT MUNICIPAL	MN	LPV	0	100	0	100	0	100
FSE	FOSSTON MUNICIPAL	MN	LP	0	100	0	100	2	99.9542
GPZ	GRAND RAPIDS/ITASCA CO-GORDON NEWSTROM	MN	LPV	0	100	0	100	2	99.9599

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
HCD	HUTCHINSON MUNICIPAL-BUTLER FIELD	MN	LPV	0	100	0	100	0	100
HIB	RANGE RGNL	MN	LPV200	0	100	0	100	2	99.9596
INL	FALLS INTL	MN	LPV	0	100	0	100	2	99.9489
JKJ	MOORHEAD MUNICIPAL	MN	LPV	0	100	0	100	2	99.9653
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	2	99.9874
ONA	WINONA MUNICIPAL-MAX CONRAD FLD	MN	LPV	0	100	0	100	0	100
ORB	ORR RGNL	MN	LP	0	100	0	100	2	99.9538
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	2	99.9611
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	2	99.9534
RRT	WARROAD INTL MEMORIAL	MN	LPV	0	100	0	100	2	99.9489
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	2	99.9886
STC	ST CLOUD RGNL	MN	LPV200	0	100	0	100	0	100
STP	ST PAUL DOWNTOWN HOLMAN FLD	MN	LPV	0	100	0	100	0	100
TVF	THIEF RIVER FALLS	MN	LPV	0	100	0	100	2	99.9538
TWM	RICHARD B HELGESON	MN	LPV	0	100	0	100	2	99.9634
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

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
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
H21	CAMDENTON MEMORIAL	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
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

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
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
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

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
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	1	99.9912
4U6	CIRCLE TOWN COUNTY	MT	LPV	0	100	0	100	2	99.9710
6S8	LAUREL MUNICIPALCIPAL	MT	LPV	0	100	0	100	1	99.9935
7S0	RONAN	MT	LPV	0	100	0	100	1	99.9943
BIL	BILLINGS LOGAN INTL	MT	LPV200	0	100	0	100	1	99.9931
BTM	BERT MOONEY	MT	LPV	0	100	0	100	1	99.9954
BZN	GALLATIN FIELD	MT	LPV	0	100	0	100	1	99.9954
GDV	DAWSON COMMUNICIPALTY	MT	LPV	0	100	0	100	2	99.9706
GGW	WOKAL FIELD/GLASGOW INTL	MT	LPV200	0	100	0	100	2	99.9668
GPI	GLACIER PARK INTL	MT	LPV	0	100	0	100	1	99.9928
GTF	GREAT FALLS INTL	MT	LPV200	0	100	0	100	1	99.9924
HLN	HELENA RGNL	MT	LPV	0	100	0	100	1	99.9939
HVR	HAVRE CITY-COUNTY	MT	LPV	0	100	0	100	2	99.9683
LVM	MISSION FIELD	MT	LP	0	100	0	100	1	99.9947
LWT	LEWISTOWN MUNICIPAL	MT	LPV200	0	100	0	100	1	99.9916
M75	MALTA	MT	LP	0	100	0	100	2	99.9672
MLS	FRANK WILEY FIELD	MT	LPV	0	100	0	100	1	99.9905
MSO	MISSOULA INTL	MT	LPV	0	100	0	100	1	99.9950
OLF	L M CLAYTON	MT	LPV200	0	100	0	100	2	99.9664
PWD	SHER-WOOD	MT	LPV200	0	100	0	100	3	99.9603
RPX	ROUNDUP	MT	LPV	0	100	0	100	1	99.9920
SBX	SHELBY	MT	LP	0	100	0	100	2	99.9836
SDY	SIDNEY-RICHLAND MUNICIPAL	MT	LPV	0	100	0	100	3	99.9634
WYS	YELLOWSTONE	MT	LPV200	0	100	0	100	1	99.9966
CYCL	CHARLO	NB	LPV	1	99.9523	1	99.9523	2	99.9214
CYQM	MONCTON INTL	NB	LPV	1	99.9523	1	99.9523	1	99.9363
AFP	ANSON COUNTY-JEFF CLOUD FLD	NC	LPV	0	100	0	100	1	99.9950
AKH	GASTONIA MUNICIPAL	NC	LPV	0	100	0	100	1	99.9954
AVL	ASHEVILLE RGNL	NC	LPV	0	100	0	100	0	100
BUY	BURLINGTON-ALAMANCE RGNL	NC	LPV200	0	100	0	100	1	99.9966
CLT	CHARLOTTE/DOUGLAS INTL	NC	LPV200	0	100	0	100	1	99.9943
CTZ	CLINTON-SAMPSON COUNTY	NC	LPV200	0	100	0	100	21	99.9534
DPL	DUPLIN COUNTY	NC	LPV200	0	100	0	100	21	99.9374
ECG	ELIZABETH CITY CG AIR STATION/RGNL	NC	LPV	0	100	0	100	20	99.9222

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
EDE	NORTHEASTERN RGNL	NC	LPV200	0	100	0	100	20	99.9248
EHO	SHELBY-CLEVELAND COUNTY RGNL	NC	LPV	0	100	0	100	1	99.9962
EQY	MONROE RGNL	NC	LPV	0	100	0	100	1	99.9943
EWN	COASTAL CAROLINA RGNL	NC	LPV	0	100	0	100	21	99.9718
EXX	DAVIDSON COUNTY	NC	LPV	0	100	0	100	1	99.9954
EYF	CURTIS L BROWN JR FIELD	NC	LPV200	0	100	0	100	21	99.9748
FAY	FAYETTEVILLE RGNL/GRANNIS FIELD	NC	LPV200	0	100	0	100	1	99.9969
FQD	RUTHERFORD CO/MARCHMAN FIELD	NC	LPV	0	100	0	100	1	99.9962
GSO	PIEDMONT TRIAD INTL	NC	LPV200	0	100	0	100	1	99.9966
GWW	WAYNE EXECUTIVE JETPORT	NC	LPV200	0	100	0	100	21	99.9141
HKY	HICKORY RGNL	NC	LPV200	0	100	0	100	1	99.9977
HNZ	HENDERSON-OXFORD	NC	LPV	0	100	0	100	21	99.9802
HRJ	HARNETT COUNTY	NC	LPV	0	100	0	100	9	99.9939
ILM	WILMINGTON INTL	NC	LPV200	0	100	0	100	20	99.9866
INT	SMITH REYNOLDS	NC	LPV200	0	100	0	100	1	99.9966
IPJ	LINCOLNTON-LINCOLN COUNTY RGNL	NC	LPV	0	100	0	100	1	99.9969
ISO	KINSTON REGL JETPORT AT STALLINGS FLD	NC	LPV	0	100	0	100	21	99.9298
IXA	HALIFAX-NORTHAMPTON RGNL	NC	LPV200	0	100	0	100	21	99.8813
JNX	JOHNSTON COUNTY	NC	LPV200	0	100	0	100	21	99.9630
JQF	CONCORD RGNL	NC	LPV	0	100	0	100	1	99.9943
LBT	LUMBERTON MUNICIPAL	NC	LPV	0	100	0	100	1	99.9966
LHZ	TRIANGLE NORTH EXECUTIVE	NC	LPV200	0	100	0	100	21	99.9592
MEB	LAURINBURG-MAXTON	NC	LPV200	0	100	0	100	1	99.9962
MQI	DARE COUNTY RGNL	NC	LPV	0	100	0	100	20	99.9542
MRH	MICHAEL J. SMITH FIELD	NC	LPV	0	100	0	100	5	99.9981
MRN	FOOTHILLS RGNL	NC	LPV200	0	100	0	100	1	99.9985
MWK	MOUNT AIRY/SURRY COUNTY	NC	LPV	0	100	0	100	1	99.9969
OAJ	ALBERT J ELLIS	NC	LPV200	0	100	0	100	21	99.9645
OCW	WARREN FIELD	NC	LPV	0	100	0	100	21	99.9359
ONX	CURRITUCK COUNTY RGNL	NC	LPV	0	100	0	100	20	99.9191
PGV	PITT-GREENVILLE	NC	LPV	0	100	0	100	21	99.9187
PMZ	PLYMOUTH MUNICIPAL	NC	LP	0	100	0	100	21	99.9302
RCZ	RICHMOND COUNTY	NC	LPV	0	100	0	100	1	99.9954
RDU	RALEIGH-DURHAM INTL	NC	LPV200	0	100	0	100	1	99.9977
RUQ	ROWAN COUNTY	NC	LPV200	0	100	0	100	1	99.9950
RWI	ROCKY MOUNT-WILSON RGNL	NC	LPV	0	100	0	100	21	99.9065
SOP	MOORE COUNTY	NC	LPV	0	100	0	100	1	99.9962

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
SUT	CAPE FEAR RGNL JETPORT/HOWIE FRANKLIN FLD	NC	LPV	0	100	0	100	9	99.9947
SVH	STATESVILLE RGNL	NC	LPV	0	100	0	100	1	99.9973
TDF	PERSON COUNTY	NC	LPV200	0	100	0	100	1	99.9973
TTA	RALEIGH EXEC AT SANFORD-LEE COUNTY	NC	LPV200	0	100	0	100	1	99.9966
VUJ	STANLY COUNTY	NC	LPV200	0	100	0	100	1	99.9950
2C8	CAVALIER MUNICIPAL	ND	LPV	0	100	0	100	2	99.9531
5N8	CASSELTON ROBERT MILLER RGNL	ND	LPV	0	100	0	100	2	99.9638
BAC	BARNES COUNTY MUNICIPAL	ND	LPV	0	100	0	100	3	99.9569
BIS	BISMARCK MUNICIPAL	ND	LPV200	0	100	0	100	3	99.9607
BWP	HARRY STERN	ND	LPV	0	100	0	100	3	99.9893
D09	BOTTINEAU MUNICIPAL	ND	LPV	0	100	0	100	3	99.9573
D55	ROBERTSON FIELD	ND	LPV	0	100	0	100	2	99.9515
D60	TIOGA MUNICIPAL	ND	LPV	0	100	0	100	3	99.9576
DIK	DICKINSON-THEODORE ROOSEVELT RGNL	ND	LPV200	0	100	0	100	2	99.9710
DVL	DEVILS LAKE RGNL	ND	LPV	0	100	0	100	2	99.9611
FAR	HECTOR INTL	ND	LPV200	0	100	0	100	2	99.9630
GAF	HUTSON FIELD	ND	LPV	0	100	0	100	2	99.9538
GFK	GRAND FORKS INTL	ND	LPV	0	100	0	100	2	99.9550
GWR	GWINNER-ROGER MELROE FIELD	ND	LPV200	0	100	0	100	3	99.9832
HZE	MERCER COUNTY RGNL	ND	LPV	0	100	0	100	3	99.9576
ISN	SLOULIN FLD INTL	ND	LPV200	0	100	0	100	2	99.9653
JMS	JAMESTOWN RGNL	ND	LPV200	0	100	0	100	3	99.9512
MOT	MINOT INTL	ND	LPV	0	100	0	100	3	99.9496
RUG	RUGBY MUNICIPAL	ND	LP	0	100	0	100	3	99.9584
S25	WATFORD CITY MUNICIPAL	ND	LPV	0	100	0	100	2	99.9664
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
9V5	MODISETT	NE	LPV	0	100	0	100	1	99.9935
AFK	NEBRASKA 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	LPV 200 Avail
AHQ	WAHOO MUNICIPAL	NE	LPV	0	100	0	100	0	100
AIA	ALLIANCE MUNICIPAL	NE	LPV200	0	100	0	100	1	99.9950
ANW	AINSWORTH MUNICIPAL	NE	LPV200	0	100	0	100	1	99.9969
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	1	99.9950
BIE	BEATRICE MUNICIPAL	NE	LPV200	0	100	0	100	0	100
BVN	ALBION MUNICIPAL	NE	LPV	0	100	0	100	0	100
CDR	CHADRON MUNICIPAL	NE	LPV200	0	100	0	100	1	99.9935
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	2	99.9905
GRI	CENTRAL NEBRASKA RGNL	NE	LPV	0	100	0	100	0	100
GRN	GORDON MUNICIPAL	NE	LPV	0	100	0	100	1	99.9931
HDE	BREWSTER FIELD	NE	LPV	0	100	0	100	0	100
HSI	HASTINGS MUNICIPAL	NE	LPV	0	100	0	100	0	100
IBM	KIMBALL MUNICIPAL/ROBERT E ARRAJ FI	NE	LPV	0	100	0	100	1	99.9962
IML	IMPERIAL MUNICIPAL	NE	LPV	0	100	0	100	2	99.9912
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	2	99.9966
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	2	99.9920
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	3	99.9893
OKS	GARDEN COUNTY	NE	LPV	0	100	0	100	2	99.9901
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	LPV 200 Avail
SNY	SIDNEY MUNICIPAL/LLOYD W. CARR FIELD	NE	LPV	0	100	0	100	2	99.9905
SWT	SEWARD MUNICIPALCIPAL	NE	LPV	0	100	0	100	0	100
TIF	THOMAS COUNTY	NE	LPV	0	100	0	100	1	99.9969
VTN	MILLER FIELD	NE	LPV	0	100	0	100	1	99.9947
ASH	BOIRE FLD	NH	LPV	2	99.9969	1	99.9710	1	99.9561
CNH	CLAREMONT MUNICIPAL	NH	LP	1	99.9947	2	99.9924	1	99.9561
CON	CONCORD MUNICIPAL	NH	LPV	1	99.9756	1	99.9710	1	99.9561
DAW	SKYHAVEN	NH	LPV	1	99.9756	1	99.9710	1	99.9561
EEN	DILLANT-HOPKINS	NH	LPV	0	100	1	99.9939	1	99.9561
HIE	MOUNT WASHINGTON RGNL	NH	LPV	1	99.9721	1	99.9710	1	99.9557
LCI	LACONIA MUNICIPAL	NH	LPV	1	99.9756	1	99.9710	1	99.9561
LEB	LEBANON MUNICIPAL	NH	LPV	1	99.9756	1	99.9710	1	99.9561
MHT	MANCHESTER	NH	LPV200	2	99.9954	1	99.9710	1	99.9561
PSM	PORTSMOUTH INTL AT PEASE	NH	LPV200	1	99.9756	1	99.9710	1	99.9561
39N	PRINCETON	NJ	LPV	0	100	0	100	1	99.9996
47N	CENTRAL JERSEY RGNL	NJ	LP	0	100	0	100	1	99.9992
4N1	GREENWOOD LAKE	NJ	LP	0	100	0	100	1	99.9660
ACY	ATLANTIC CITY INTL	NJ	LPV200	0	100	0	100	1	99.9989
CDW	ESSEX COUNTY	NJ	LPV	0	100	0	100	1	99.9939
EWR	NEWARK LIBERTY INTL	NJ	LPV	0	100	0	100	1	99.9935
MIV	MILLVILLE MUNICIPAL	NJ	LPV200	0	100	0	100	0	100
MMU	MORRISTOWN MUNICIPAL	NJ	LPV200	0	100	0	100	1	99.9989
N14	FLYING W	NJ	LPV	0	100	0	100	1	99.9996
N40	SKY MANOR	NJ	LP	0	100	0	100	0	100
TEB	TETERBORO	NJ	LPV	0	100	0	100	2	99.9928
TTN	TRENTON MERCER	NJ	LPV200	0	100	0	100	1	99.9996
VAY	SOUTH JERSEY RGNL	NJ	LP	0	100	0	100	1	99.9996
WWD	CAPE MAY COUNTY	NJ	LPV	0	100	0	100	1	99.9996
CYDF	DEER LAKE	NL	LPV	1	99.9386	6	99.9176	57	99.1010
ABQ	ALBUQUERQUE INTL SUNPORT	NM	LPV	0	100	0	100	0	100
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	1	99.9996
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	1	99.9996
CYHZ	HALIFAX / STANFIELD INTL	NS	LPV	1	99.9561	1	99.9561	4	99.9157
CYEV	INUVIK	NT	LPV	0	100	0	100	9	99.9359
ELY	ELY ARPT-YELLAND FLD	NV	LPV	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	LPV 200 Avail
LAS	MC CARRAN INTL	NV	LPV	0	100	0	100	2	99.9779
RNO	RENO/TAHOE INTL	NV	LPV	0	100	0	100	2	99.9527
RTS	RENO/STEAD	NV	LPV	0	100	0	100	2	99.9481
TPH	TONOPAH	NV	LP	0	100	0	100	2	99.9844
WMC	WINNEMUCCA MUNICIPAL	NV	LPV	0	100	0	100	1	99.9977
06N	RANDALL	NY	LP	0	100	0	100	1	99.9657
1B1	COLUMBIA COUNTY	NY	LPV	0	100	1	99.9973	1	99.9638
44N	SKY ACRES	NY	LPV	0	100	1	99.9973	1	99.9645
4B6	TICONDEROGA MUNICIPAL	NY	LPV	2	99.9977	2	99.9966	1	99.9561
5B2	SARATOGA COUNTY	NY	LPV	0	100	1	99.9981	1	99.9626
5G0	LE ROY	NY	LP	0	100	0	100	1	99.9950
7G0	LEDGEDALE AIRPARK	NY	LPV	0	100	0	100	1	99.9950
9G0	BUFFALO AIRFIELD	NY	LP	0	100	0	100	1	99.9966
ALB	ALBANY INTL	NY	LPV200	0	100	1	99.9977	1	99.9630
ART	WATERTOWN INTL	NY	LPV200	0	100	1	99.9973	1	99.9599
BGM	GREATER BINGHAMTON/EDWIN A LINK FIELD	NY	LPV200	0	100	0	100	1	99.9786
BUF	BUFFALO NIAGARA INTL	NY	LPV200	0	100	0	100	1	99.9966
D38	CANANDAIGUA	NY	LP	0	100	0	100	1	99.9874
ELM	ELMIRA/CORNING RGNL	NY	LPV200	0	100	0	100	1	99.9981
ELZ	WELLSVILLE MUNICIPAL ARPT	NY	LPV	0	100	0	100	1	99.9966
FOK	FRANCIS S. GABRESKI	NY	LPV200	0	100	1	99.9969	1	99.9599
FRG	REPUBLIC	NY	LPV200	0	100	0	100	1	99.9767
FZY	OSWEGO COUNTY	NY	LPV	0	100	0	100	1	99.9638
GFL	FLOYD BENNETT MEMORIAL	NY	LPV	0	100	1	99.9977	1	99.9561
GVQ	BATAVIA	NY	LPV200	0	100	0	100	1	99.9966
HPN	WESTCHESTER COUNTY	NY	LPV	0	100	0	100	1	99.9763
HTF	HORNELL MUNICIPAL	NY	LPV	0	100	0	100	1	99.9966
HTO	EAST HAMPTON	NY	LPV	0	100	1	99.9943	1	99.9599
HWV	BROOKHAVEN	NY	LPV	0	100	1	99.9977	1	99.9607
IAG	NIAGARA FALLS INTL	NY	LPV	0	100	0	100	1	99.9966
ISP	LONG ISLAND MAC ARTHUR	NY	LPV200	0	100	0	100	1	99.9638
ITH	ITHACA TOMPKINS RGNL	NY	LPV	0	100	0	100	1	99.9786
JFK	JOHN F KENNEDY INTL	NY	LPV	0	100	0	100	1	99.9771
JHW	CHAUTAUQUA COUNTY/JAMESTOWN	NY	LPV200	0	100	0	100	1	99.9966
K09	PISECO	NY	LP	0	100	2	99.9985	1	99.9622
LGA	LA GUARDIA	NY	LPV200	0	100	0	100	1	99.9767
MAL	MALONE-DUFORT	NY	LPV	2	99.9966	2	99.9855	1	99.9584
MGJ	ORANGE COUNTY	NY	LPV	0	100	0	100	1	99.9653
MSS	MASSENA INTL-RICHARDS FIELD	NY	LPV	1	99.9969	1	99.9859	1	99.9599
MSV	SULLIVAN COUNTY INTL	NY	LPV	0	100	0	100	1	99.9710
N66	ONEONTA MUNICIPAL	NY	LPV	0	100	0	100	1	99.9783

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
NY0	FULTON COUNTY	NY	LPV	0	100	1	99.9992	1	99.9630
OGS	OGDENSBURG INTL	NY	LPV	0	100	1	99.9931	1	99.9599
OLE	CATTARAUGUS COUNTY-OLEAN	NY	LPV	0	100	0	100	1	99.9966
PBG	PLATTSBURGH INTL	NY	LPV	2	99.9874	2	99.9836	1	99.9561
PEO	PENN YAN	NY	LPV	0	100	0	100	1	99.9878
POU	DUTCHESS COUNTY	NY	LPV	0	100	1	99.9977	1	99.9649
RME	GRIFFISS INTL	NY	LPV200	0	100	0	100	1	99.9634
ROC	GREATER ROCHESTER INTL	NY	LPV200	0	100	0	100	1	99.9950
SCH	SCHENECTADY COUNTY	NY	LPV200	0	100	1	99.9981	1	99.9630
SDC	WILLIAMSON-SODUS	NY	LPV	0	100	0	100	2	99.9779
SLK	ADIRONDACK RGNL	NY	LPV200	1	99.9977	2	99.9931	1	99.9599
SWF	STEWART INTL	NY	LPV200	0	100	0	100	1	99.9653
SYR	SYRACUSE HANCOCK INTL	NY	LPV200	0	100	0	100	1	99.9641
VGC	HAMILTON MUNICIPAL	NY	LPV	0	100	0	100	1	99.9641
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	0	100
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

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
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
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

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
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
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	1	99.9985
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	1	99.9996
CNS7	KINCARDINE	ON	LPV	0	100	0	100	1	99.9996
CYHD	DRYDEN REGIONAL	ON	LPV	0	100	0	100	2	99.9470
CYKF	KITCHENER / WATERLOO	ON	LPV	0	100	0	100	1	99.9966
CYOW	OTTAWA / MACDONALDCARTIER INTL	ON	LPV	1	99.9977	1	99.9859	1	99.9596
CYQT	THUNDER BAY	ON	LPV	0	100	0	100	3	99.9618
CYTS	TIMMINS / VICTOR M POWER	ON	LPV	0	100	0	100	2	99.9344
CYXL	SIOUX LOOKOUT	ON	LPV	0	100	1	99.9977	2	99.9485
AST	ASTORIA RGNL	OR	LPV	0	100	0	100	1	99.9805
BDN	BEND MUNICIPAL	OR	LPV	0	100	0	100	2	99.9748
CVO	CORVALLIS MUNICIPAL	OR	LPV200	0	100	0	100	1	99.9783
EUG	MAHLON SWEET FIELD	OR	LPV200	0	100	0	100	1	99.9786

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
GCD	GRANT CO RGNL/OGILVIE FIELD	OR	LPV	0	100	0	100	2	99.9977
HIO	PORTLAND-HILLSBORO	OR	LPV200	0	100	0	100	1	99.9790
LGD	LA GRANDE/UNION COUNTY	OR	LPV	0	100	0	100	2	99.9981
LMT	KLAMATH FALLS	OR	LPV	0	100	0	100	4	99.9653
MMV	MCMINNVILLE MUNICIPAL	OR	LPV	0	100	0	100	1	99.9779
ONO	ONTARIO MUNICIPAL	OR	LPV	0	100	0	100	0	100
PDT	EASTERN OREGON RGNL AT PENDLETON	OR	LPV200	0	100	0	100	3	99.9973
PDX	PORTLAND INTL	OR	LPV200	0	100	0	100	1	99.9794
RDM	ROBERTS FIELD	OR	LPV200	0	100	0	100	2	99.9748
S33	MADRAS MUNICIPALCIPAL	OR	LPV	0	100	0	100	1	99.9802
SLE	MCNARY FLD	OR	LPV200	0	100	0	100	1	99.9779
SPB	SCAPPOOSE INDUSTRIAL AIRPARK	OR	LPV	0	100	0	100	1	99.9794
UAO	AURORA STATE	OR	LPV	0	100	0	100	1	99.9786
22N	JAKE ARNER MEMORIAL	PA	LP	0	100	0	100	0	100
2G9	SOMERSET COUNTY	PA	LPV	0	100	0	100	0	100
8G2	CORRY-LAWRENCE	PA	LPV	0	100	0	100	1	99.9969
8N8	DANVILLE	PA	LP	0	100	0	100	0	100
9D4	DECK	PA	LPV	0	100	0	100	0	100
ABE	LEHIGH VALLEY INTL	PA	LPV	0	100	0	100	0	100
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	0	100
AXQ	CLARION COUNTY	PA	LPV	0	100	0	100	0	100
BFD	BRADFORD RGNL	PA	LPV200	0	100	0	100	1	99.9969
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	1	99.9996
ERI	ERIE INTL/TOM RIDGE FIELD	PA	LPV	0	100	0	100	1	99.9969
FIG	CLEARFIELD-LAWRENCE	PA	LPV	0	100	0	100	1	99.9981
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
HZL	HAZLETON MUNICIPAL	PA	LPV	0	100	0	100	0	100
IPT	WILLIAMSPORT RGNL	PA	LPV	0	100	0	100	1	99.9996
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	0	100

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
LOM	WINGS FIELD	PA	LPV	0	100	0	100	0	100
MDT	HARRISBURG INTL	PA	LPV	0	100	0	100	0	100
MPO	POCONO MOUNTAINS MUNICIPAL	PA	LPV	0	100	0	100	0	100
MQS	CHESTER COUNTY G O CARLSON	PA	LPV	0	100	0	100	0	100
N38	WELLSBORO JOHNSTON	PA	LP	0	100	0	100	1	99.9981
N79	NORTHUMBERLAND COUNTY	PA	LPV	0	100	0	100	0	100
OYM	ST MARYS MUNICIPAL	PA	LPV	0	100	0	100	1	99.9973
PHL	PHILADELPHIA INTL	PA	LPV	0	100	0	100	0	100
PIT	PITTSBURGH INTL	PA	LPV200	0	100	0	100	0	100
PNE	NORTHEAST PHILADELPHIA	PA	LPV	0	100	0	100	0	100
PSB	MID STATE	PA	LPV	0	100	0	100	1	99.9989
RDG	READING RGNL/CARL A SPAATZ FLD	PA	LPV	0	100	0	100	0	100
RVL	MIFFLIN COUNTY	PA	LPV	0	100	0	100	1	99.9996
THV	YORK	PA	LP	0	100	0	100	0	100
UCP	NEW CASTLE MUNICIPAL	PA	LPV	0	100	0	100	0	100
UKT	QUAKERTOWN	PA	LP	0	100	0	100	0	100
UNV	UNIVERSITY PARK	PA	LPV200	0	100	0	100	1	99.9992
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	0	100
XLL	ALLENTOWN-QUEEN CITY MUNICIPAL	PA	LP	0	100	0	100	0	100
ZER	SCHUYLKILL COUNTY/JOE ZERBEY	PA	LPV200	0	100	0	100	0	100
CPN8	OPINACA	QC	LPV	1	99.9966	1	99.9641	3	99.9519
CSR3	VICTORIAVILLE	QC	LPV	1	99.9710	1	99.9561	1	99.9466
CTP9	KATTINIQ / DONALDSON	QC	LPV	1	99.9962	2	99.9931	32	99.3758
CYEY	AMOS	QC	LPV	0	100	2	99.9928	2	99.9412
CYHU	MONTREAL / STHUBERT	QC	LPV	1	99.9710	1	99.9599	1	99.9554
CYIF	STAUGUSTIN	QC	LPV	1	99.9458	2	99.9355	15	99.5261
CYMX	MONTREAL (MIRABEL INTL)	QC	LPV	1	99.9744	1	99.9599	1	99.9546
CYQB	QUEBEC / JEAN LESAGE INTL	QC	LPV	1	99.9599	1	99.9561	1	99.9481
CYRI	RIVIEREDULOUP	QC	LPV	1	99.9561	1	99.9523	1	99.9458
CYRQ	TROISRIVIERES	QC	LPV	1	99.9710	1	99.9599	1	99.9470
CYVB	BONAVENTURE	QC	LPV	1	99.9523	1	99.9523	2	99.9206
CYVP	KUUJJUAQ	QC	LPV	2	99.9718	2	99.9718	33	99.4036
CYYY	MONTJOLI	QC	LPV	1	99.9561	1	99.9561	2	99.9298
BID	BLOCK ISLAND STATE	RI	LPV	0	100	1	99.9912	1	99.9596
OQU	QUONSET STATE	RI	LPV	0	100	1	99.9912	1	99.9596

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
PVD	THEODORE FRANCIS GREEN STATE	RI	LPV200	0	100	1	99.9912	1	99.9561
6J0	LEXINGTON COUNTY AT PELION	SC	LPV	0	100	0	100	1	99.9950
AIK	AIKEN MUNICIPAL	SC	LPV200	0	100	0	100	1	99.9954
AND	ANDERSON RGNL	SC	LPV200	0	100	0	100	1	99.9985
ARW	BEAUFORT COUNTY	SC	LPV200	0	100	0	100	1	99.9981
BBP	MARLBORO COUNTY JETPORT-H E AVENT FIELD	SC	LPV	0	100	0	100	1	99.9958
BNL	BARNWELL RGNL	SC	LPV	0	100	0	100	1	99.9962
CAE	COLUMBIA METROPOLITAN	SC	LPV200	0	100	0	100	1	99.9947
CDN	WOODWARD FIELD	SC	LPV	0	100	0	100	1	99.9943
CEU	OCONEE COUNTY RGNL	SC	LPV200	0	100	0	100	0	100
CHS	CHARLESTON AFB/INTL	SC	LPV200	0	100	0	100	1	99.9969
CRE	GRAND STRAND	SC	LPV200	0	100	0	100	18	99.9889
DCM	CHESTER CATAWBA RGNL	SC	LPV	0	100	0	100	1	99.9943
DYB	SUMMERVILLE	SC	LPV200	0	100	0	100	1	99.9966
FDW	FAIRFIELD COUNTY	SC	LPV	0	100	0	100	1	99.9939
FLO	FLORENCE RGNL	SC	LPV	0	100	0	100	1	99.9954
GGE	GEORGETOWN COUNTY	SC	LPV200	0	100	0	100	1	99.9962
GMU	GREENVILLE DOWNTOWN	SC	LPV200	0	100	0	100	1	99.9985
GSP	GREENVILLE-SPARTANBURG INTL - ROGER MILLIKEN	SC	LPV200	0	100	0	100	1	99.9958
GYH	DONALDSON CENTER	SC	LPV	0	100	0	100	1	99.9985
HYW	CONWAY-HORRY COUNTY	SC	LPV	0	100	0	100	1	99.9962
JZI	CHARLESTON EXECUTIVE	SC	LPV200	0	100	0	100	1	99.9973
LKR	LANCASTER COUNTY-MC WHIRTER FIELD	SC	LPV200	0	100	0	100	1	99.9943
LQK	PICKENS COUNTY	SC	LPV	0	100	0	100	0	100
LRO	MT PLEASANT RGNL-FAISON FIELD	SC	LPV	0	100	0	100	1	99.9969
MKS	BERKELEY COUNTY	SC	LPV	0	100	0	100	1	99.9966
MYR	MYRTLE BEACH INTL	SC	LPV200	0	100	0	100	2	99.9962
OGB	ORANGEBURG MUNICIPAL	SC	LPV200	0	100	0	100	1	99.9958
RBW	LOWCOUNTRY RGNL	SC	LPV200	0	100	0	100	1	99.9969
SMS	SUMTER	SC	LPV200	0	100	0	100	1	99.9947
SPA	SPARTANBURG DOWNTOWN MEMORIAL	SC	LPV200	0	100	0	100	1	99.9947
UDG	DARLINGTON COUNTY JETPORT	SC	LPV	0	100	0	100	1	99.9954
UZA	ROCK HILL/YORK CO/BRYANT FIELD	SC	LPV200	0	100	0	100	1	99.9950
0D8	GETTYSBURG MUNICIPAL	SD	LPV200	0	100	0	100	1	99.9905
49B	STURGIS MUNICIPAL	SD	LPV	0	100	0	100	1	99.9920
9D1	GREGORY MUNICIPAL - FLYNN FIELD	SD	LPV	0	100	0	100	0	100

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
ABR	ABERDEEN RGNL	SD	LPV200	0	100	0	100	1	99.9920
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	1	99.9920
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	1	99.9931
ICR	WINNER RGNL	SD	LPV	0	100	0	100	1	99.9969
MBG	MOBRIDGE MUNICIPAL	SD	LPV	0	100	0	100	1	99.9893
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	1	99.9947
PIR	PIERRE RGNL	SD	LPV	0	100	0	100	1	99.9920
RAP	RAPID CITY RGNL	SD	LPV200	0	100	0	100	1	99.9920
SPF	BLACK HILLS-CLYDE ICE FIELD	SD	LPV	0	100	0	100	1	99.9924
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	2	99.9893	4	99.8825
CYKJ	KEY LAKE	SK	LPV	0	100	2	99.9821	3	99.8916
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
DKX	KNOXVILLE DOWNTOWN ISLAND	TN	LPV	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

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
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
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	1	99.9962
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	1	99.9931
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	1	99.9901

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
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	4	99.9763
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
CRP	CORPUS CHRISTI INTL	TX	LPV200	0	100	0	100	1	99.9908
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	1	99.9954
DTO	DENTON MUNICIPAL	TX	LPV	0	100	0	100	0	100
DUX	MOORE COUNTY	TX	LPV200	0	100	0	100	1	99.9992
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	1	99.9989
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	3	99.9783
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

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
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	2	99.9866
HDO	HONDO MUNICIPAL	TX	LPV	0	100	0	100	1	99.9996
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	3	99.9783
HRX	HEREFORD MUNICIPAL	TX	LPV200	0	100	0	100	0	100
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	TX	LPV200	0	100	0	100	0	100
IKG	KLEBERG COUNTY	TX	LPV	0	100	0	100	1	99.9901
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	2	99.9863
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	4	99.9771
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

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
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	3	99.9821
PPA	PERRY LEFORS FIELD	TX	LPV	0	100	0	100	1	99.9996
PRX	COX FIELD	TX	LPV	0	100	0	100	0	100
PSX	PALACIOS MUNICIPAL	TX	LPV	0	100	0	100	1	99.9981
PVW	HALE COUNTY	TX	LPV	0	100	0	100	0	100
RAS	MUSTANG BEACH	TX	LPV	0	100	0	100	1	99.9916
RBD	DALLAS EXECUTIVE	TX	LPV	0	100	0	100	0	100
RBO	NUECES COUNTY	TX	LP	0	100	0	100	1	99.9905
RKP	ARANSAS COUNTY	TX	LPV	0	100	0	100	1	99.9928
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
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	1	99.9996
T78	LIBERTY MUNICIPAL	TX	LP	0	100	0	100	0	100
T82	GILLESPIE COUNTY	TX	LPV	0	100	0	100	0	100
TFP	T P MC CAMPBELL	TX	LPV	0	100	0	100	1	99.9920
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	1	99.9973
XBP	BRIDGEPORT MUNICIPAL	TX	LPV	0	100	0	100	0	100
BCE	BRYCE CANYON	UT	LPV	0	100	0	100	1	99.9985
BDG	BLANDING MUNICIPAL	UT	LPV	0	100	0	100	0	100
BMC	BRIGHAM CITY	UT	LP	0	100	0	100	0	100
DTA	DELTA MUNICIPAL	UT	LP	0	100	0	100	0	100
ENV	WENDOVER	UT	LPV	0	100	0	100	0	100
FOM	FILLMORE MUNICIPAL	UT	LPV	0	100	0	100	0	100
LGU	LOGAN-CACHE	UT	LPV	0	100	0	100	0	100

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
OGD	OGDEN-HINCKLEY	UT	LPV	0	100	0	100	0	100
PUC	CARBON COUNTY RGNL/BUCK DAVIS FIELD	UT	LP	0	100	0	100	0	100
PVU	PROVO MUNICIPAL	UT	LPV200	0	100	0	100	0	100
SGU	ST GEORGE MUNICIPAL	UT	LPV	0	100	0	100	1	99.9905
SLC	SALT LAKE CITY INTL	UT	LP	0	100	0	100	0	100
U14	NEPHI MUNICIPAL	UT	LPV	0	100	0	100	0	100
U55	PANGUITCH MUNICIPAL	UT	LPV200	0	100	0	100	1	99.9977
VEL	VERNAL	UT	LP	0	100	0	100	0	100
0VG	LEE COUNTY	VA	LPV	0	100	0	100	0	100
8W2	NEW MARKET	VA	LP	0	100	0	100	0	100
AVC	MECKLENBURG-BRUNSWICK RGNL	VA	LPV	0	100	0	100	21	99.9306
BCB	VIRGINIA TECH/MONTGOMERY EXECUTIVE	VA	LPV	0	100	0	100	1	99.9996
CHO	CHARLOTTESVILLE-ALBEMARLE	VA	LPV	0	100	0	100	0	100
CJR	CULPEPER RGNL	VA	LPV	0	100	0	100	11	99.9916
CPK	CHESAPEAKE RGNL	VA	LPV200	0	100	0	100	20	99.8928
DAN	DANVILLE RGNL	VA	LPV200	0	100	0	100	1	99.9981
EMV	EMPORIA-GREENSVILLE RGNL	VA	LPV200	0	100	0	100	21	99.8687
FCI	CHESTERFIELD COUNTY	VA	LPV	0	100	0	100	20	99.8813
FKN	FRANKLIN MUN-JOHN BEVERLY ROSE	VA	LPV	0	100	0	100	21	99.8645
FVX	FARMVILLE RGNL	VA	LPV	0	100	0	100	18	99.9897
FYJ	MIDDLE PENINSULA RGNL	VA	LPV	0	100	0	100	20	99.9241
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	5	99.9966
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	20	99.9748
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	1	99.9996
MFV	ACCOMACK COUNTY	VA	LPV	0	100	0	100	0	100
MKJ	MOUNTAIN EMPIRE	VA	LPV	0	100	0	100	0	100
MTV	BLUE RIDGE	VA	LPV	0	100	0	100	1	99.9985
OFP	HANOVER COUNTY MUNICIPAL	VA	LPV	0	100	0	100	20	99.8882
OKV	WINCHESTER RGNL	VA	LPV200	0	100	0	100	0	100
ORF	NORFOLK INTL	VA	LPV200	0	100	0	100	20	99.9210

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
PHF	NEWPORT NEWS/WILLIAMSBURG INTL	VA	LPV200	0	100	0	100	20	99.9065
PSK	NEW RIVER VALLEY	VA	LPV200	0	100	0	100	0	100
PTB	DINWIDDIE COUNTY	VA	LPV	0	100	0	100	21	99.8745
RIC	RICHMOND INTL	VA	LPV200	0	100	0	100	20	99.86000
RMN	STAFFORD RGNL	VA	LPV	0	100	0	100	7	99.9931
ROA	ROANOKE RGNL/WOODRUM FIELD	VA	LPV	0	100	0	100	1	99.9996
SFQ	SUFFOLK EXECUTIVE	VA	LP	0	100	0	100	20	99.8787
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	21	99.9821
W78	WILLIAM M TUCK	VA	LPV	0	100	0	100	1	99.9989
XSA	TAPPAHANNOCK-ESSEX COUNTY	VA	LPV	0	100	0	100	16	99.9645
BTV	BURLINGTON INTL	VT	LPV200	2	99.9866	2	99.9828	1	99.9561
FSO	FRANKLIN COUNTY STATE	VT	LPV	2	99.9863	1	99.9710	1	99.9557
MPV	EDWARD F KNAPP STATE	VT	LPV	1	99.9748	1	99.9710	1	99.9561
RUT	RUTLAND-SOUTHERN VERMONT RGNL	VT	LPV	0	100	2	99.9958	1	99.9561
ALW	WALLA WALLA RGNL	WA	LPV	0	100	0	100	2	99.9985
AWO	ARLINGTON MUNICIPAL	WA	LPV200	0	100	0	100	1	99.9840
BLI	BELLINGHAM INTL	WA	LPV200	0	100	0	100	1	99.9840
BVS	SKAGIT RGNL	WA	LPV	0	100	0	100	1	99.9840
CLM	WILLIAM R FAIRCHILD INTL	WA	LPV	0	100	0	100	1	99.9836
CLS	CHEHALIS-CENTRALIA	WA	LPV	0	100	0	100	1	99.9824
DEW	DEER PARK	WA	LPV	0	100	0	100	1	99.9954
EPH	EPHRATA MUNICIPAL	WA	LPV	0	100	0	100	1	99.9966
FHR	FRIDAY HARBOR	WA	LPV	0	100	0	100	1	99.9840
GEG	SPOKANE INTL	WA	LPV200	0	100	0	100	1	99.9958
HQM	BOWERMAN	WA	LPV200	0	100	0	100	1	99.9832
MWH	GRANT CO INTL	WA	LPV200	0	100	0	100	1	99.9962
OLM	OLYMPIA RGNL	WA	LPV	0	100	0	100	1	99.9832
OTH	SOUTHWEST OREGON RGNL	WA	LPV	0	100	0	100	2	99.9638
PAE	SNOHOMISH COUNTY (PAINE FLD)	WA	LPV200	0	100	0	100	1	99.9840
PSC	TRI-CITIES	WA	LPV200	0	100	0	100	2	99.9985
PWT	BREMERTON NATIONAL	WA	LPV	0	100	0	100	1	99.9840
RLD	RICHLAND	WA	LPV	0	100	0	100	1	99.9836
RNT	RENTON MUNICIPAL	WA	LPV	0	100	0	100	1	99.9840
SEA	SEATTLE-TACOMA INTL	WA	LPV200	0	100	0	100	1	99.9840
TDO	ED CARLSON MEMORIAL - SOUTH LEWIS CO	WA	LPV	0	100	0	100	1	99.9821
TIW	TACOMA NARROWS	WA	LPV	0	100	0	100	1	99.9840

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
YKM	YAKIMA AIR TERMINAL/MCALLISTER FIELD	WA	LPV200	0	100	0	100	1	99.9836
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	2	99.9714
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
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

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
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	2	99.9672
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
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
7V6	CAMP GUERNSEY	WY	LP	0	100	0	100	1	99.9962
COD	YELLOWSTONE RGNL	WY	LPV	0	100	0	100	1	99.9958
CPR	NATRONA COUNTY INTL	WY	LPV	0	100	0	100	1	99.9962
CYS	CHEYENNE RGNL/JERRY OLSON FIELD	WY	LPV	0	100	0	100	1	99.9973
DGW	CONVERSE COUNTY	WY	LPV200	0	100	0	100	1	99.9958

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
ECS	MONDELL FIELD	WY	LPV	0	100	0	100	1	99.9935
EVW	EVANSTON-UINTA COUNTY BURNS FIELD	WY	LPV	0	100	0	100	0	100
GCC	GILLETTE-CAMPBELL COUNTY	WY	LPV	0	100	0	100	1	99.9935
JAC	JACKSON HOLE	WY	LPV	0	100	0	100	1	99.9985
LAR	LARAMIE RGNL	WY	LPV	0	100	0	100	1	99.9973
PNA	RALPH WENZ FIELD	WY	LPV	0	100	0	100	1	99.9985
RIW	RIVERTON RGNL	WY	LPV200	0	100	0	100	1	99.9977
RKS	ROCK SPRINGS-SWEETWATER COUNTY	WY	LPV200	0	100	0	100	0	100
RWL	RAWLINS MUNICIPAL/HARVEY FIELD	WY	LPV	0	100	0	100	1	99.9985
SAA	SHIVELY FIELD	WY	LPV	0	100	0	100	1	99.9985
SHR	SHERIDAN COUNTY	WY	LPV	0	100	0	100	1	99.9935
WRL	WORLAND MUNICIPAL	WY	LPV	0	100	0	100	1	99.9958
CYQH	WATSON LAKE	YT	LPV	0	100	0	100	2	99.9924
CYXY	WHITEHORSE / ERIK NIELSEN INTL	YT	LPV	0	100	0	100	1	99.9996

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

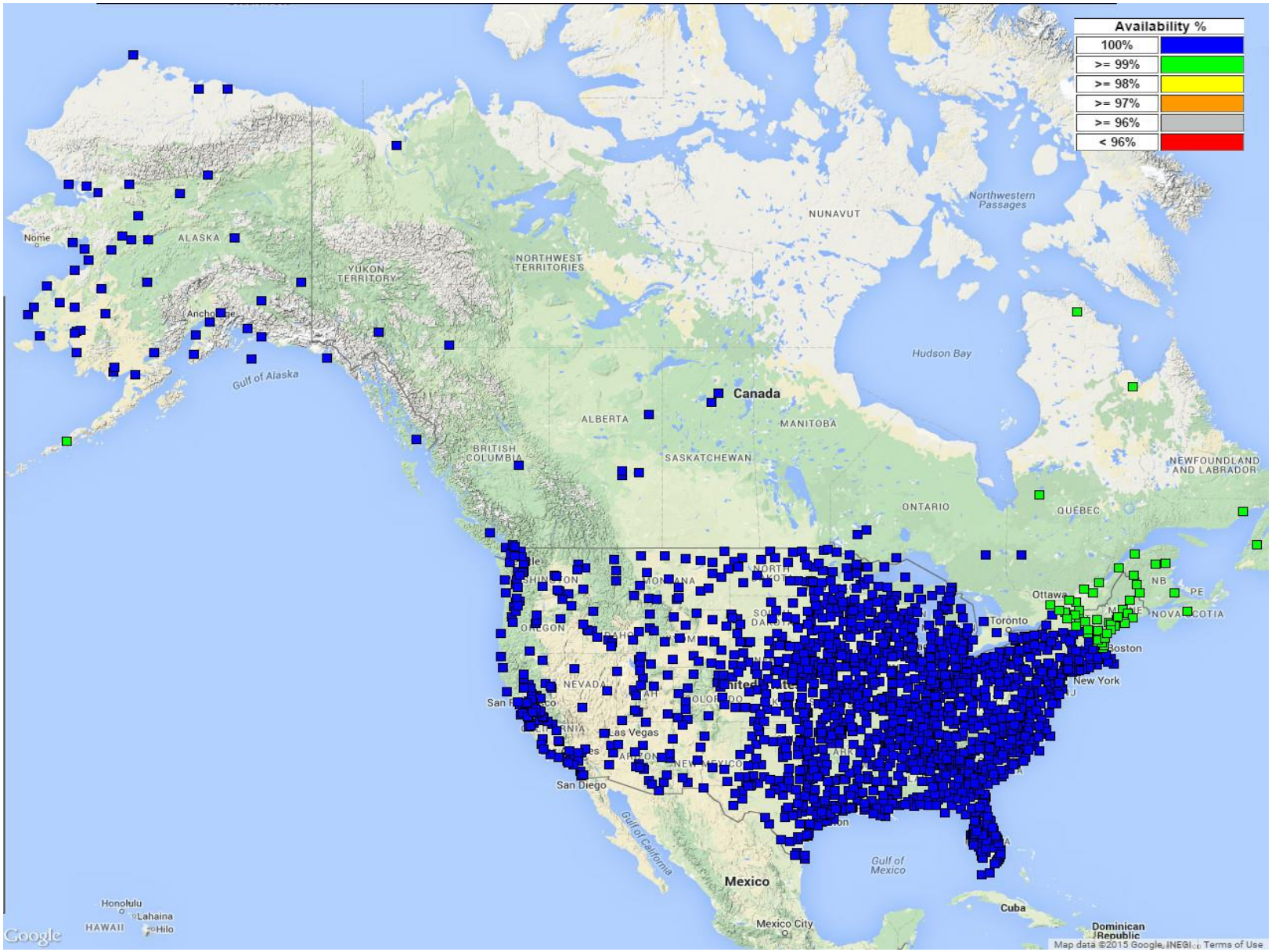


Figure 8-2 WAAS LP Outages at Airports in the US and Canada with GPS RNAV Instrument Approach Procedures

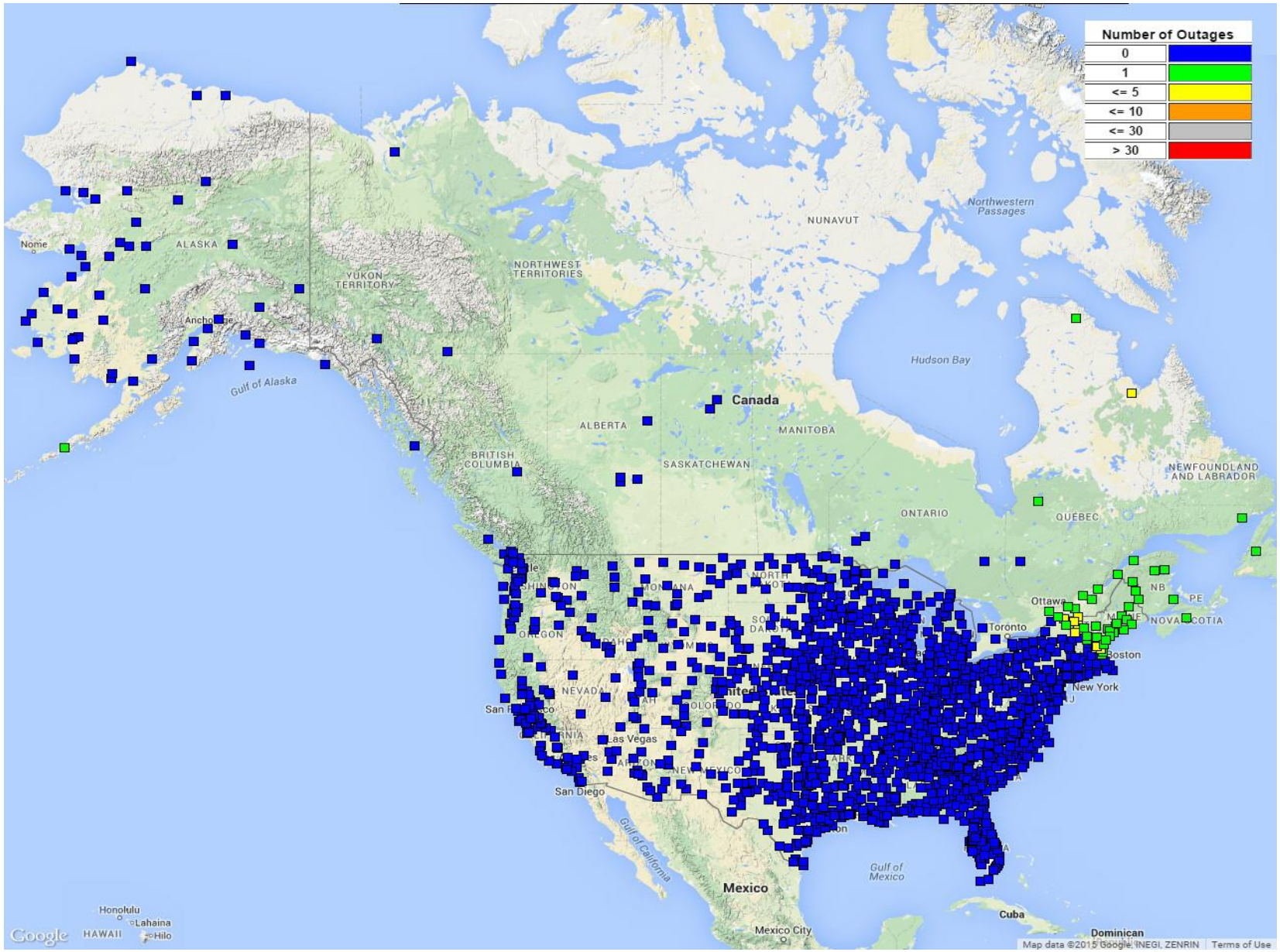


Figure 8-3 WAAS LPV Availability Airports in the US and Canada with GPS RNAV Instrument Approach Procedures

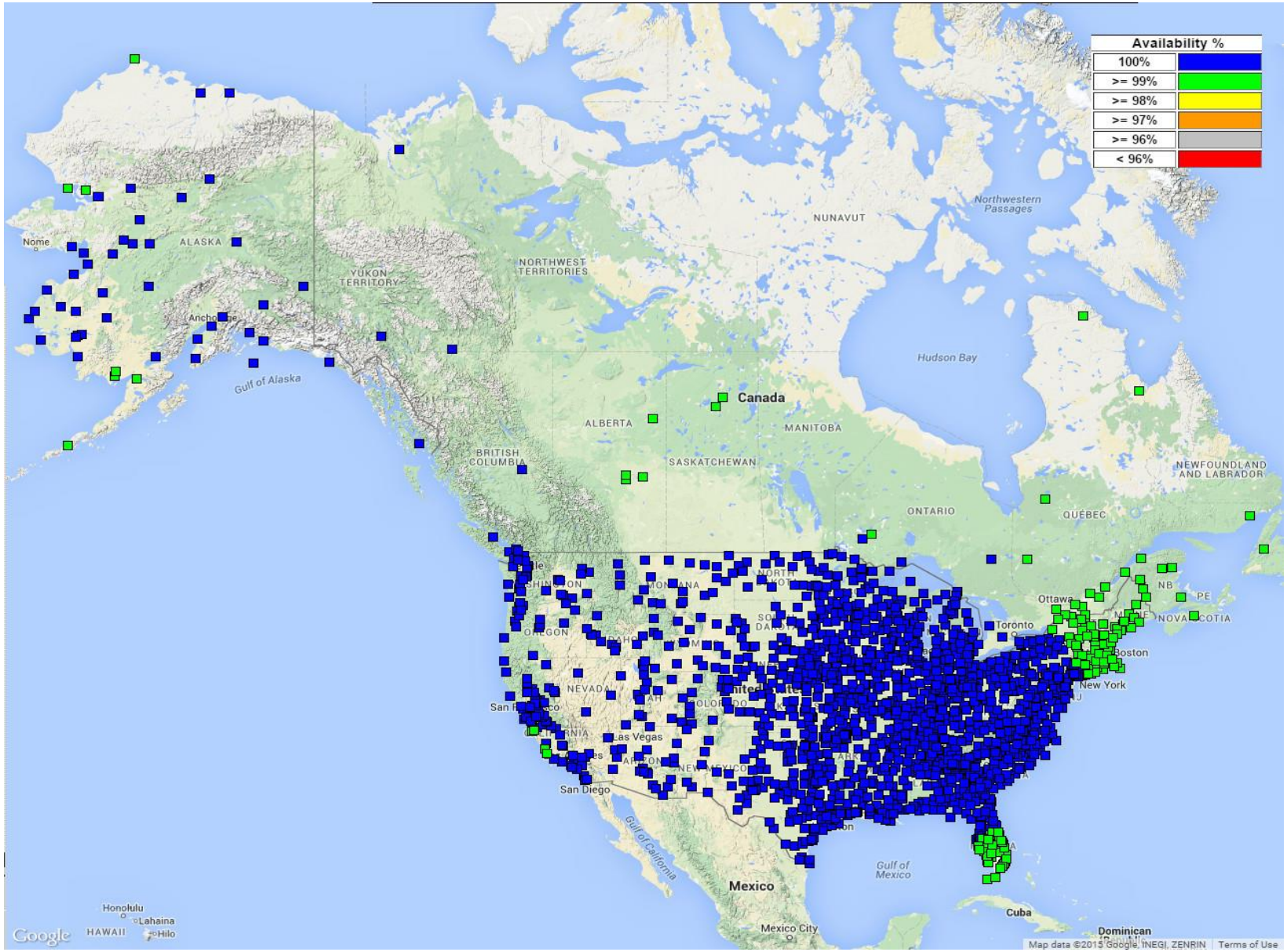


Figure 8-4 WAAS LPV Outages at Airports in the US and Canada with GPS RNAV Instrument Approach Procedures

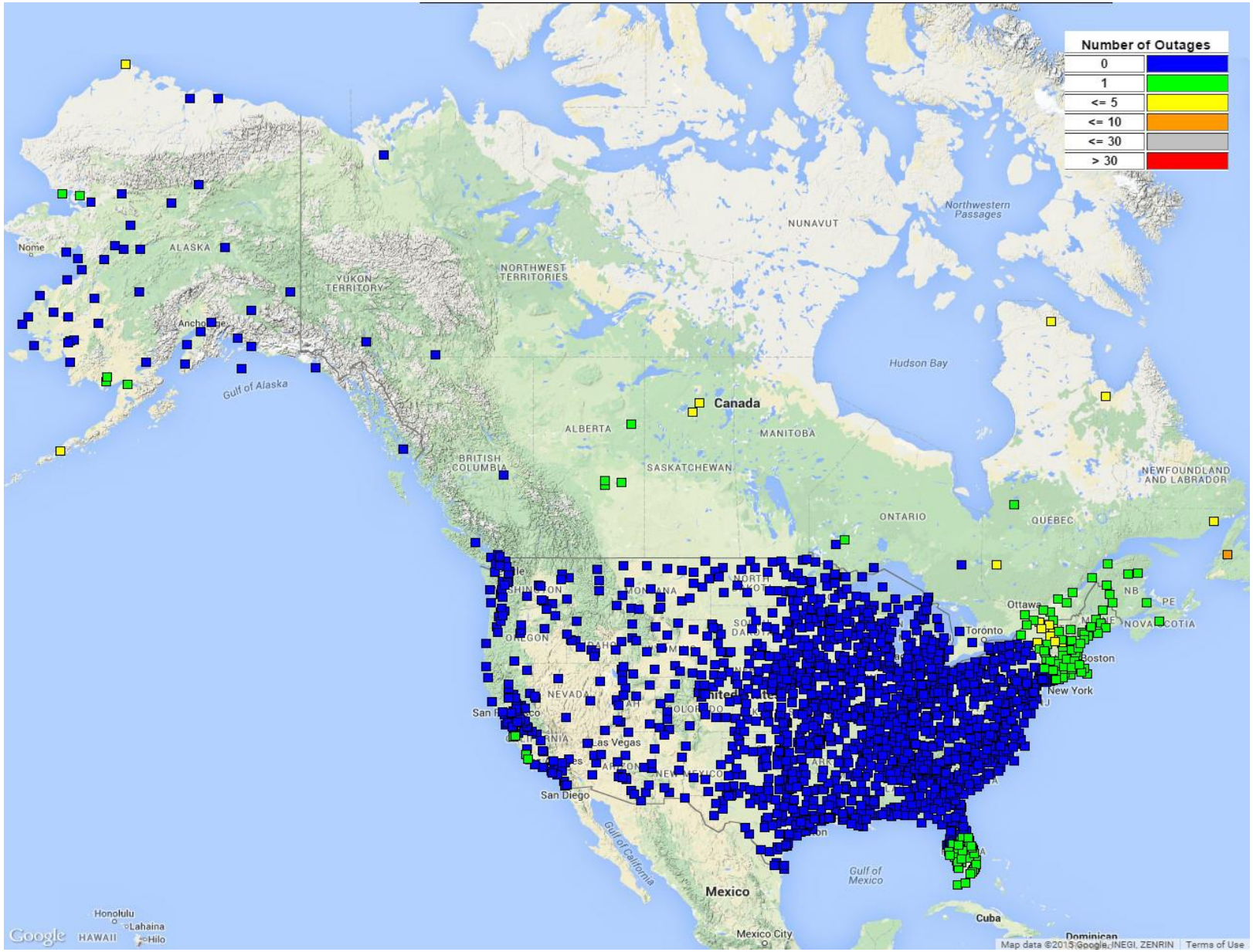


Figure 8-5 WAAS LPV 200 Availability at Airports in the US and Canada with GPS RNAV Instrument Approach Procedures

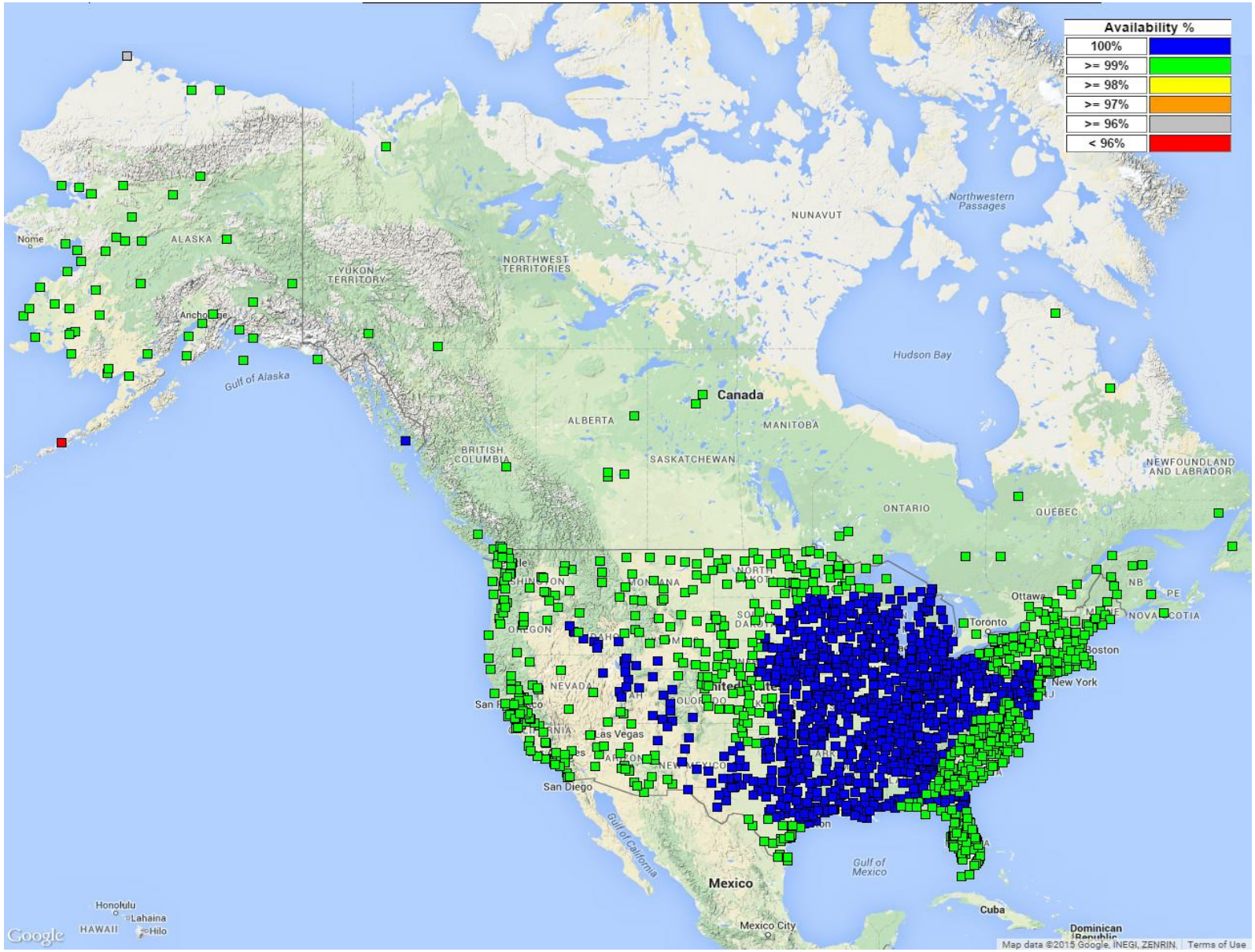
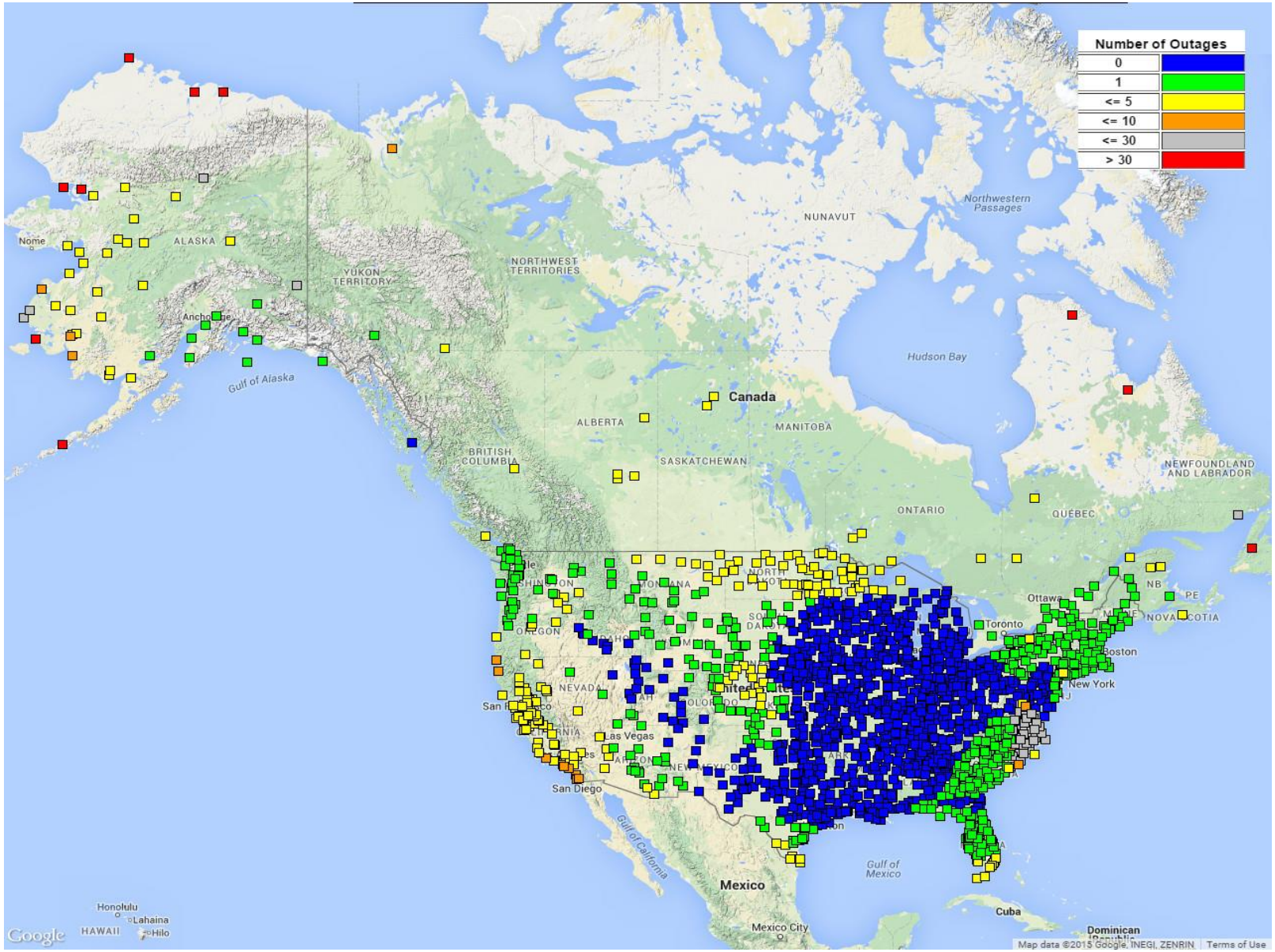


Figure 8-6 WAAS LPV 200 Outages at Airports in the US and Canada with GPS RNAV Instrument Approach Procedures



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

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

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

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

Table 9-1 CNMP Bounding Statistics

WAAS Site	WRE	Jul 14	Aug 14	Sep 14	Oct 14	Nov 14	Dec 14	Jan 15	Feb 15	Mar 15	Apr 15	May 15	Jun 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	Jul 14	Aug 14	Sep 14	Oct 14	Nov 14	Dec 14	Jan 15	Feb 15	Mar 15	Apr 15	May 15	Jun 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 except MTP2 using 24 hour sets of data from 00:00 on 6/29/15 to 23:59:30 on 629/15. MTP2, Tapachula Mexico thread B, has been offline since the middle of April. The MTP2 position from the prior report is used in this report.

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 <= 2.6 cm. The CSRS surveys' RSSs of the reported ECEF sigmas for the 6/29/15 data set were all <= 10 mm. The OPUS and CSRS surveys for the 6/29/15 data set agreed to an average of 1.6 cm. with a standard deviation of 8 mm. The maximum of difference was 5.8 cm. for thread 3 at Huston TX. Threads A and B at ZHU were also outliers at 4.8 cm and 5.2 cm.

The OPUS positions were compared to the positions in the currently fielded WAAS software Build W7.012 which was fielded in August 2014 and Build W7.126 which will be fielded starting in August 2015. The OPUS surveys agree with the Build W7.012 positions to better or equal than 4.8 cm for all sites. The maximum was 4.8 cm at Mexico City thread C (MMX3). For Build W7.126 the maximum differences were at Mexico City (21 cm) and Hawaii (8.5 cm). The antenna positions are interpolated forward in time. The Build W7.012 differences are smaller because we are near the midpoint of the interpolation useable period whereas the Build W7.126 positions are just after to the beginning of the interpolation useable period.

Table 10-1 lists the WAAS antenna L1 phase center positions as of 6/29/15 using the OPUS data.

Figures 10-1 to 10-3 show the RSS of the ECEF differences between the 6/29/15 OPUS survey antenna phase center locations and the locations in the Build W7.012 software. Each reference station has three independent strings of WAAS receiving equipment (WRE). A surveyed antenna phase center location is required for each WRE. All three strings of a reference station are shown in the three figures. For example, BET1 identifies the RSS of the ECEF deltas for the Bethel WRE string 1(A). The next two bars in the chart are Bethel string 2(B) and Bethel string 3(C). Figures 10-4 to 10-6 show the OPUS surveys overall RMS quality indications.

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

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

Table 10-1 WAAS Antenna Positions (OPUS IGS08) as of 6/29//15

WRE	X(m)	Y(m)	Z(m)	Latitude	Longitude	H(m)
BET1	-2965385.090	-972576.624	5543892.873	60.7879150277778	-161.8417251888890	52.182
BET2	-2965385.863	-972580.350	5543891.823	60.7878955805556	-161.8416646111110	52.191
BET3	-2965388.429	-972577.480	5543890.950	60.7878796638889	-161.8417293611110	52.182
BIL1	-1416445.904	-4223577.013	4550862.147	45.8037067916667	-108.5397233777780	1112.243
BIL2	-1416449.983	-4223574.885	4550862.868	45.8037159583333	-108.5397818194440	1112.257
BIL3	-1416441.600	-4223574.279	4550866.001	45.8037565027778	-108.5396820750000	1112.245
BRW1	-1886758.954	-809058.658	6018494.463	71.2827646583333	-156.7899252416670	15.568
BRW2	-1886756.367	-809055.915	6018495.648	71.2827974250000	-156.7899671472220	15.580
BRW3	-1886755.284	-809059.705	6018495.458	71.2827926500000	-156.7898580166670	15.560
CDB1	-3484099.079	-1084748.791	5213678.610	55.1923738361111	-162.7064046833330	49.697
CDB2	-3484105.726	-1084741.580	5213675.660	55.1923277138889	-162.7065438138890	49.674
CDB3	-3484112.004	-1084734.812	5213672.914	55.1922842611111	-162.7066745805560	49.693
FAI1	-2304741.847	-1448715.275	5748843.647	64.8096296333333	-147.8473413472220	149.913
FAI2	-2304741.378	-1448706.471	5748846.051	64.8096800611111	-147.8474929750000	149.925
FAI3	-2304732.842	-1448707.408	5748849.195	64.8097466722222	-147.8473806694440	149.906
HNL1	-5508637.136	-2234493.129	2303722.295	21.3129912500000	-157.9208292583330	24.674
HNL2	-5508656.303	-2234483.457	2303687.046	21.3126482944444	-157.9209850861110	25.022
HNL3	-5508647.714	-2234497.389	2303694.140	21.3127169194444	-157.9208295333330	25.065
JNU1	-2354254.936	-2388549.654	5407043.109	58.3625743333333	-134.5857075027780	16.114
JNU2	-2354252.849	-2388565.766	5407036.940	58.3624687694444	-134.5854888861110	16.112
JNU3	-2354239.631	-2388568.616	5407041.405	58.3625452055556	-134.5852938805560	16.111
MMD1	35070.397	-5959686.654	2264365.768	20.9319093166667	-89.6628409083333	29.107
MMD2	35065.486	-5959687.040	2264364.993	20.9319016250000	-89.6628881416667	29.164
MMD3	35065.143	-5959685.244	2264369.639	20.9319466194444	-89.6628913388889	29.145
MMX1	-948700.991	-5943934.796	2109212.447	19.4316537805556	-99.0683898527778	2234.739
MMX2	-948696.558	-5943934.616	2109214.862	19.4316769805556	-99.0683484527778	2234.716
MMX3	-948705.422	-5943934.976	2109210.006	19.4316303611111	-99.0684312333333	2234.753
MPR1	-1570142.236	-5759530.603	2238184.740	20.6790031805556	-105.2492033555560	10.975
MPR2	-1570139.411	-5759530.105	2238188.784	20.6790412555556	-105.2491784555560	11.259
MPR3	-1570143.517	-5759527.988	2238190.562	20.6790593500000	-105.2492218194440	10.986
MSD1	-1979519.869	-5523222.954	2493106.863	23.1604476583333	-109.7176497472220	104.274
MSD2	-1979521.436	-5523225.291	2493100.461	23.1603848194444	-109.7176564527780	104.265
MSD3	-1979525.885	-5523222.029	2493104.136	23.1604209027778	-109.7177080972220	104.267
MTP1	-254854.378	-6162909.136	1617805.059	14.7913660055556	-92.3679994222222	54.912
MTP2	-254850.758	-6162910.173	1617801.631	14.7913340055556	-92.3679654277778	54.894
MTP3	-254855.512	-6162910.293	1617800.092	14.7913198277778	-92.3680095027778	54.807
OTZ1	-2396056.060	-750356.168	5843502.488	66.8873317416667	-162.6113730361110	10.876
OTZ2	-2396052.890	-750354.339	5843504.014	66.8873665694445	-162.6113912472220	10.877
OTZ3	-2396052.871	-750358.282	5843503.533	66.8873553083333	-162.6113052527780	10.890
YFB1	1035381.399	-2634289.655	5696539.543	63.7314905666667	-68.5431844444444	10.028
YFB2	1035372.198	-2634296.058	5696538.188	63.7314643250000	-68.5434052000000	9.961
YFB3	1035366.114	-2634306.813	5696534.398	63.7313866583333	-68.5435994555556	10.007

WRE	X(m)	Y(m)	Z(m)	Latitude	Longitude	H(m)
YQX1	2430424.592	-3419640.393	4788223.838	48.9664902027778	-54.5976326361111	146.867
YQX2	2430432.555	-3419639.052	4788220.787	48.9664483166667	-54.5975333833333	146.877
YQX3	2430440.461	-3419637.692	4788217.783	48.9664070361111	-54.5974346138889	146.890
YWG1	-520164.418	-4083475.952	4855843.036	49.9005742000000	-97.2593981805556	222.109
YWG2	-520150.538	-4083468.890	4855850.436	49.9006772888889	-97.2592189583333	222.127
YWG3	-520152.414	-4083478.014	4855842.608	49.9005680861111	-97.2592288138889	222.122
YYR1	1885341.388	-3321428.370	5091171.670	53.3086472500000	-60.4194688444444	37.852
YYR2	1885344.348	-3321419.888	5091176.085	53.3087135722222	-60.4193674111111	37.858
YYR3	1885340.065	-3321413.071	5091182.090	53.3088037583333	-60.4193728055556	37.868
ZAB1	-1488636.868	-5003946.542	3654557.703	35.1735753055556	-106.5673500333330	1620.130
ZAB2	-1488631.538	-5003948.220	3654557.679	35.1735746694444	-106.5672887166670	1620.189
ZAB3	-1488632.313	-5003950.801	3654553.822	35.1735322722222	-106.5672887916670	1620.170
ZAN1	-2659536.685	-1549114.766	5567750.751	61.2292015250000	-149.7802513277780	80.704
ZAN2	-2659548.441	-1549110.812	5567746.265	61.2291178972222	-149.7804250805560	80.704
ZAN3	-2659541.388	-1549106.685	5567750.735	61.2292014833333	-149.7804253833330	80.689
ZAU1	138704.083	-4761244.131	4227763.930	41.7826581111111	-88.3313370805556	195.878
ZAU2	138704.349	-4761248.753	4227758.775	41.7825957416667	-88.3313355000000	195.894
ZAU3	138711.050	-4761248.494	4227758.853	41.7825966472222	-88.3312548388889	195.899
ZBW1	1490299.189	-4448983.179	4306010.503	42.7357205583333	-71.4804262527778	39.118
ZBW2	1490304.300	-4448981.167	4306010.849	42.7357245833333	-71.4803592694444	39.143
ZBW3	1490306.010	-4448984.789	4306006.537	42.7356717750000	-71.4803535166667	39.139
ZDC1	1069125.731	-4839598.985	4001126.514	39.1015959944444	-77.5427468861111	80.061
ZDC2	1069128.125	-4839603.618	4001120.306	39.1015239666667	-77.5427314166667	80.057
ZDC3	1069124.025	-4839602.704	4001122.502	39.1015494111111	-77.5427754166667	80.063
ZDV1	-1273628.640	-4711375.573	4094890.109	40.1873032222222	-105.1272246777780	1541.359
ZDV2	-1273622.931	-4711377.081	4094890.119	40.1873034888889	-105.1271553583330	1541.339
ZDV3	-1273624.944	-4711380.280	4094885.828	40.1872529805555	-105.1271683694440	1541.331
ZFW1	-659983.217	-5324060.776	3438276.471	32.8306497166667	-97.0664719833333	155.620
ZFW2	-659988.486	-5324063.337	3438271.477	32.8305962861111	-97.0665244638889	155.592
ZFW3	-659983.511	-5324063.860	3438271.687	32.8305983305556	-97.0664710472222	155.628
ZHU1	-513864.496	-5506451.716	3166720.482	29.9618963666667	-95.3314265166667	10.865
ZHU2	-513867.141	-5506455.118	3166714.322	29.9618318555556	-95.3314505250000	10.936
ZHU3	-513873.417	-5506457.763	3166708.727	29.9617736333333	-95.3315127194444	10.929
ZJX1	772646.424	-5434462.200	3237231.750	30.6988596750000	-81.9081853305556	2.147
ZJX2	772649.739	-5434463.724	3237228.339	30.6988241222222	-81.9081533138889	2.104
ZJX3	772645.687	-5434466.171	3237225.240	30.6987915555556	-81.9081987833333	2.115
ZKC1	-415247.544	-4954556.389	3982161.111	38.8801593611111	-94.7908341444444	305.897
ZKC2	-415231.152	-4954557.724	3982161.180	38.8801600638889	-94.7906446194444	305.910
ZKC3	-415237.272	-4954561.063	3982155.978	38.8801018861111	-94.7907116861111	305.633
ZLA1	-2474409.983	-4637294.606	3602183.547	34.6035184833333	-118.0838960500000	763.506
ZLA2	-2474404.704	-4637297.412	3602183.552	34.6035185694444	-118.0838308805560	763.501
ZLA3	-2474411.313	-4637297.094	3602179.569	34.6034745305556	-118.0838960722220	763.569
ZLC1	-1808273.242	-4486410.811	4145303.008	40.7860432166667	-111.9521779138890	1287.425
ZLC2	-1808274.644	-4486414.433	4145298.521	40.7859897916667	-111.9521772777780	1287.434

WRE	X(m)	Y(m)	Z(m)	Latitude	Longitude	H(m)
ZLC3	-1808270.431	-4486416.133	4145298.511	40.7859897138889	-111.9521234666670	1287.429
ZMA1	966042.287	-5662999.803	2761581.500	25.8246122888889	-80.3191898916667	-7.607
ZMA2	966029.305	-5662999.106	2761585.988	25.8246600388889	-80.3193163555556	-8.235
ZMA3	966037.391	-5662997.948	2761586.346	25.8246620916667	-80.3192349166667	-7.883
ZME1	4070.870	-5226189.297	3644028.426	35.0673941333333	-89.9553702305556	68.605
ZME2	4070.897	-5226186.740	3644032.542	35.0674377416667	-89.9553699138889	68.877
ZME3	4064.706	-5226186.606	3644032.692	35.0674395666667	-89.9554377861111	68.849
ZMP1	-249978.404	-4539297.512	4458955.058	44.6374632194444	-93.1520857583333	262.668
ZMP2	-249972.608	-4539297.853	4458955.064	44.6374631194444	-93.1520125861111	262.688
ZMP3	-249973.706	-4539302.128	4458950.580	44.6374070388889	-93.1520234388889	262.618
ZNY1	1406144.599	-4627343.989	4144322.060	40.7843286361111	-73.0971661138889	6.447
ZNY2	1406146.401	-4627347.019	4144317.286	40.7842759500000	-73.0971561250000	5.921
ZNY3	1406140.841	-4627348.684	4144317.322	40.7842763333333	-73.0972248833333	5.926
ZOA1	-2684436.911	-4293337.356	3865351.877	37.5430540944444	-122.0159484611110	-3.510
ZOA2	-2684433.905	-4293341.443	3865349.461	37.5430265583333	-122.0158951027780	-3.498
ZOA3	-2684438.279	-4293342.325	3865345.602	37.5429821527778	-122.0159317777780	-3.418
ZOB1	650770.156	-4754715.672	4187420.755	41.2971545055556	-82.2064450583333	223.682
ZOB2	650777.833	-4754714.845	4187422.771	41.2971668250000	-82.2063529111111	225.179
ZOB3	650776.166	-4754719.669	4187414.981	41.2970870722222	-82.2063804388889	223.458
ZSE1	-2308930.286	-3668169.676	4663526.466	47.2869931388889	-122.1883730027780	82.097
ZSE2	-2308934.680	-3668175.209	4663520.053	47.2869075944444	-122.1883831972220	82.149
ZSE3	-2308935.738	-3668179.491	4663516.114	47.2868558861111	-122.1883648805560	82.095
ZSU1	2462589.446	-5529372.105	2003724.495	18.4313359777778	-65.9934766416667	-28.102
ZSU2	2462587.513	-5529377.472	2003712.205	18.4312188805556	-65.9935140222222	-28.083
ZSU3	2462594.143	-5529375.211	2003710.125	18.4311992472222	-65.9934479861111	-28.141
ZTL1	529840.374	-5305248.816	3489342.857	33.3796886305556	-84.2967263277778	261.141
ZTL2	529846.752	-5305247.973	3489343.141	33.3796917833333	-84.2966572250000	261.126
ZTL3	529847.434	-5305251.406	3489337.903	33.3796350694444	-84.2966536000000	261.154

Figure 10-1 Build W7.012 Antenna Positions Deltas from 6/29/15 OPUS Survey

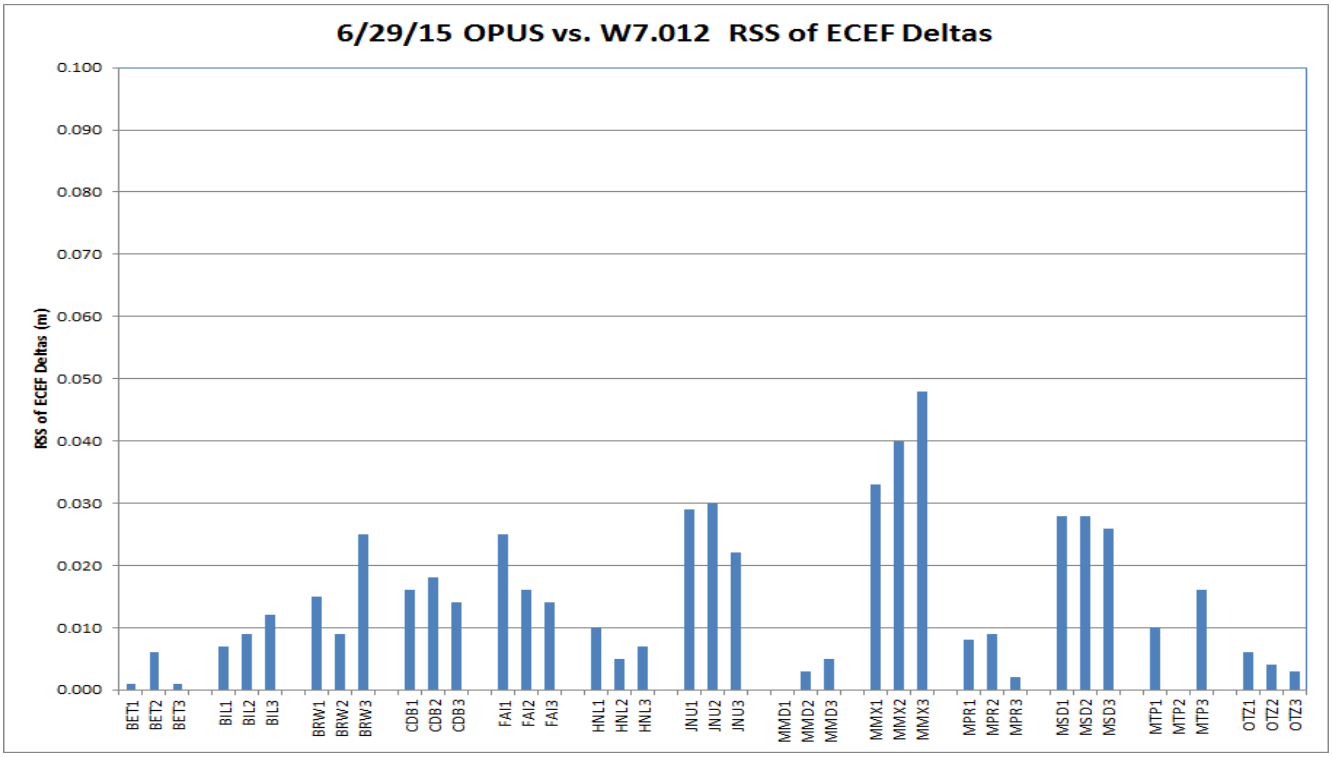


Figure 10-2 Build W7.012 Antenna Positions Deltas from 6/29/15 OPUS Survey

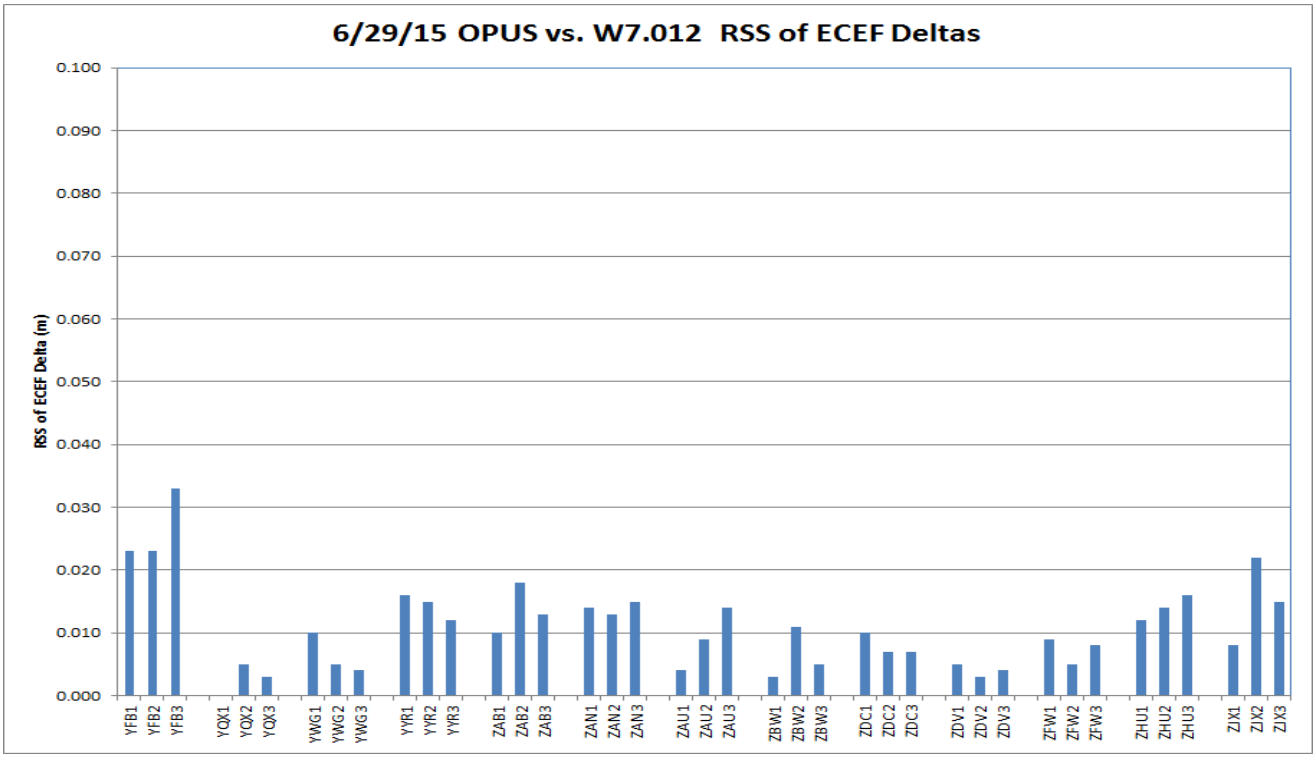


Figure 10-3 Build W7.012 Antenna Positions Deltas from 6/29/15 OPUS Survey

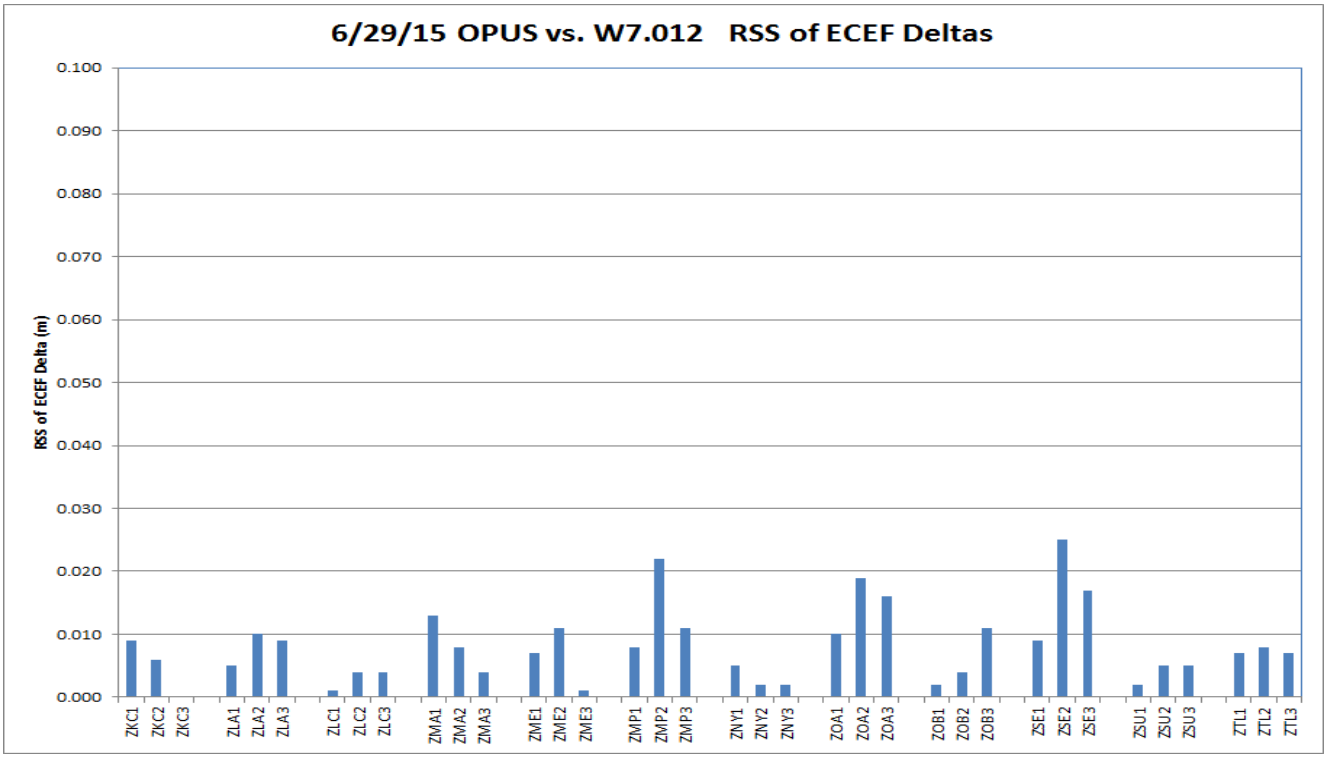


Figure 10-4 6/29/15 OPUS Survey Overall RMS Qualities

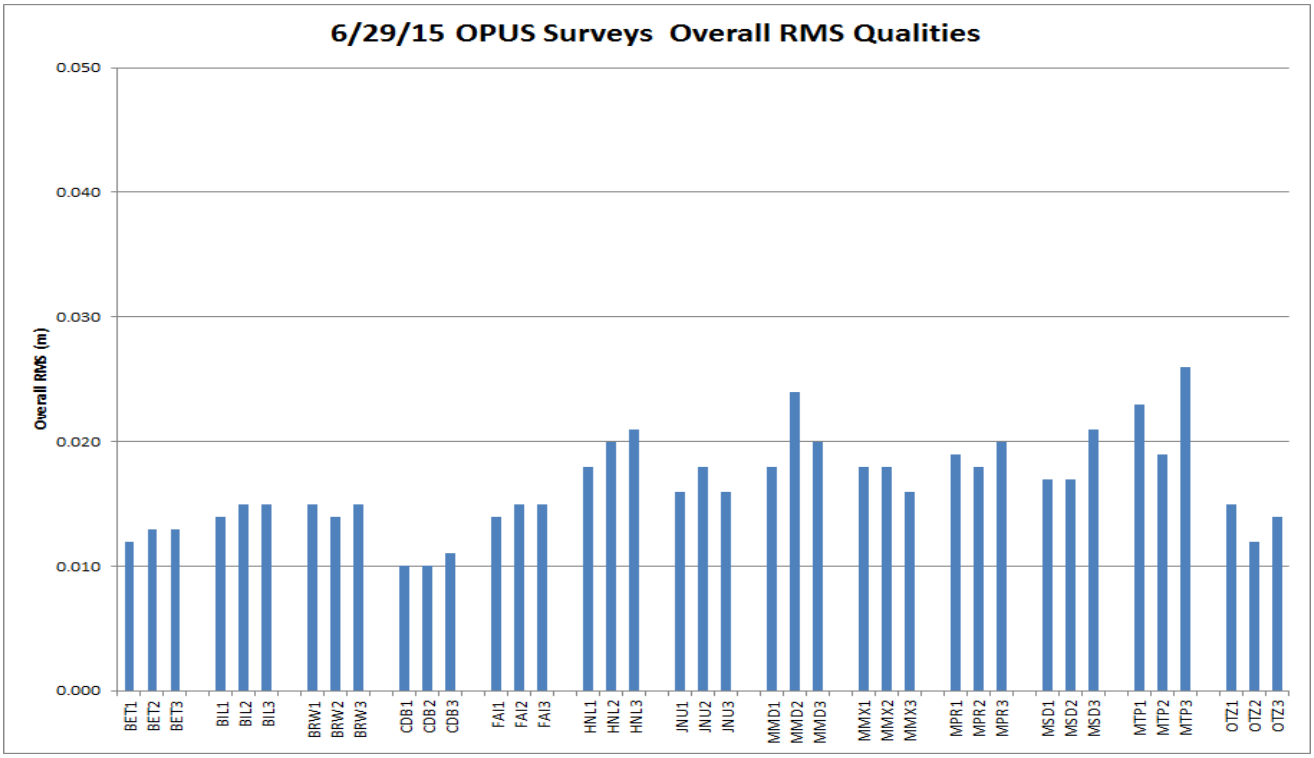


Figure 10-5 6/29/15 OPUS Survey Overall RMS Qualities

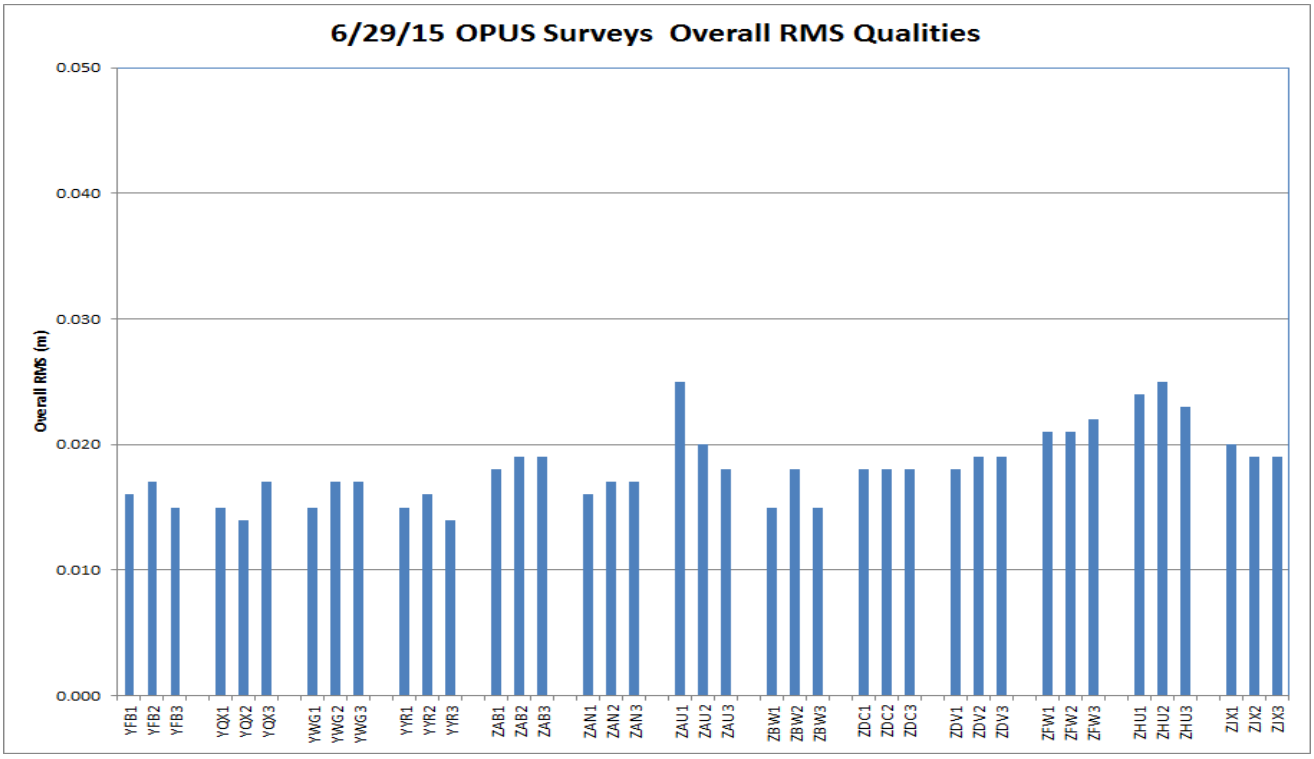


Figure 10-6 6/29/15 OPUS Survey Overall RMS Qualities

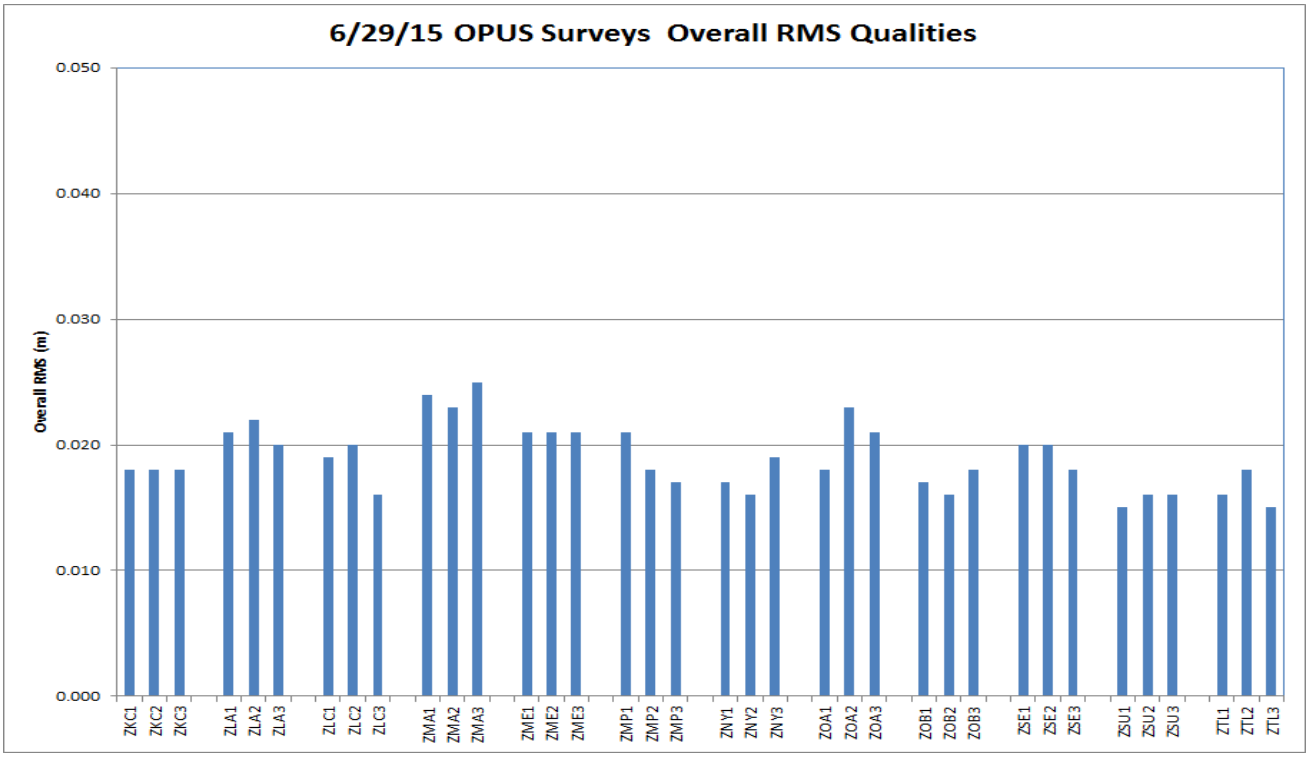


Figure 10-7 6/29/15 OPUS vs. CSRS RSS ECEF Deltas

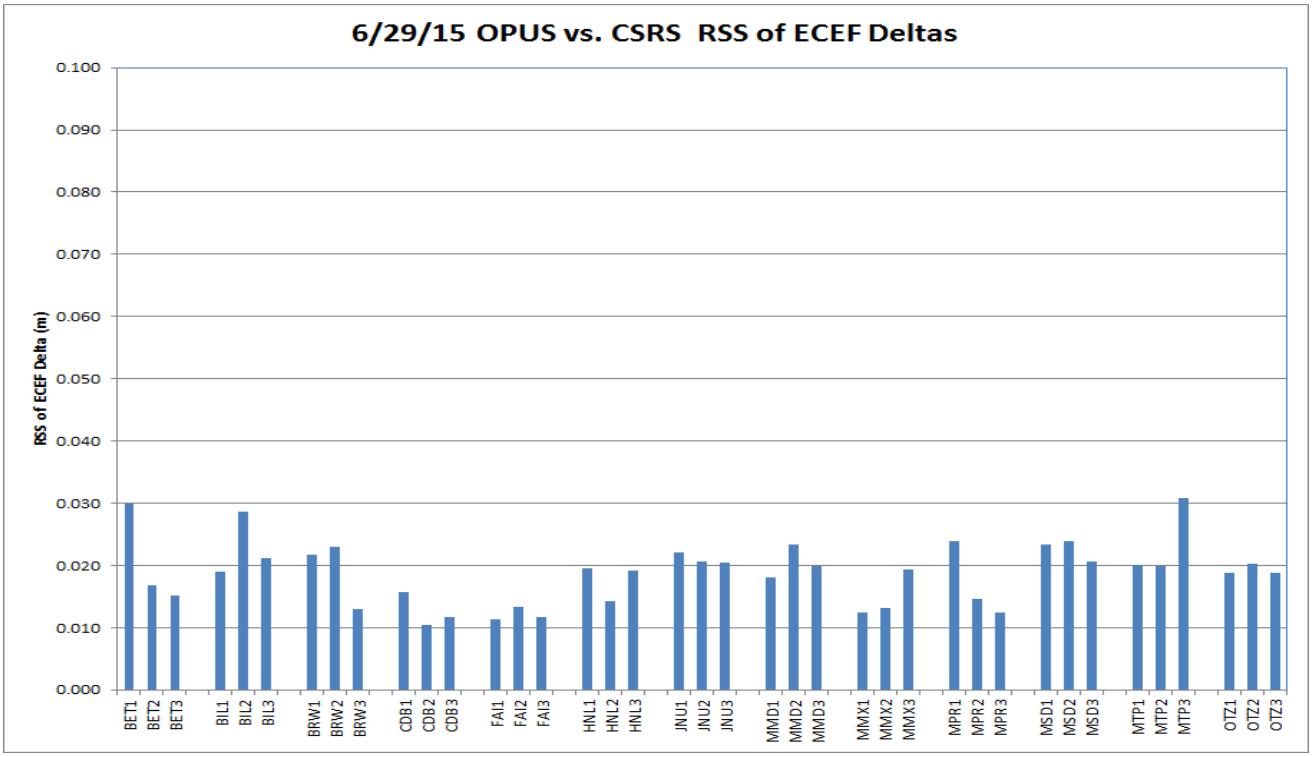


Figure 10-8 6/29/15 OPUS vs. CSRS RSS ECEF Deltas

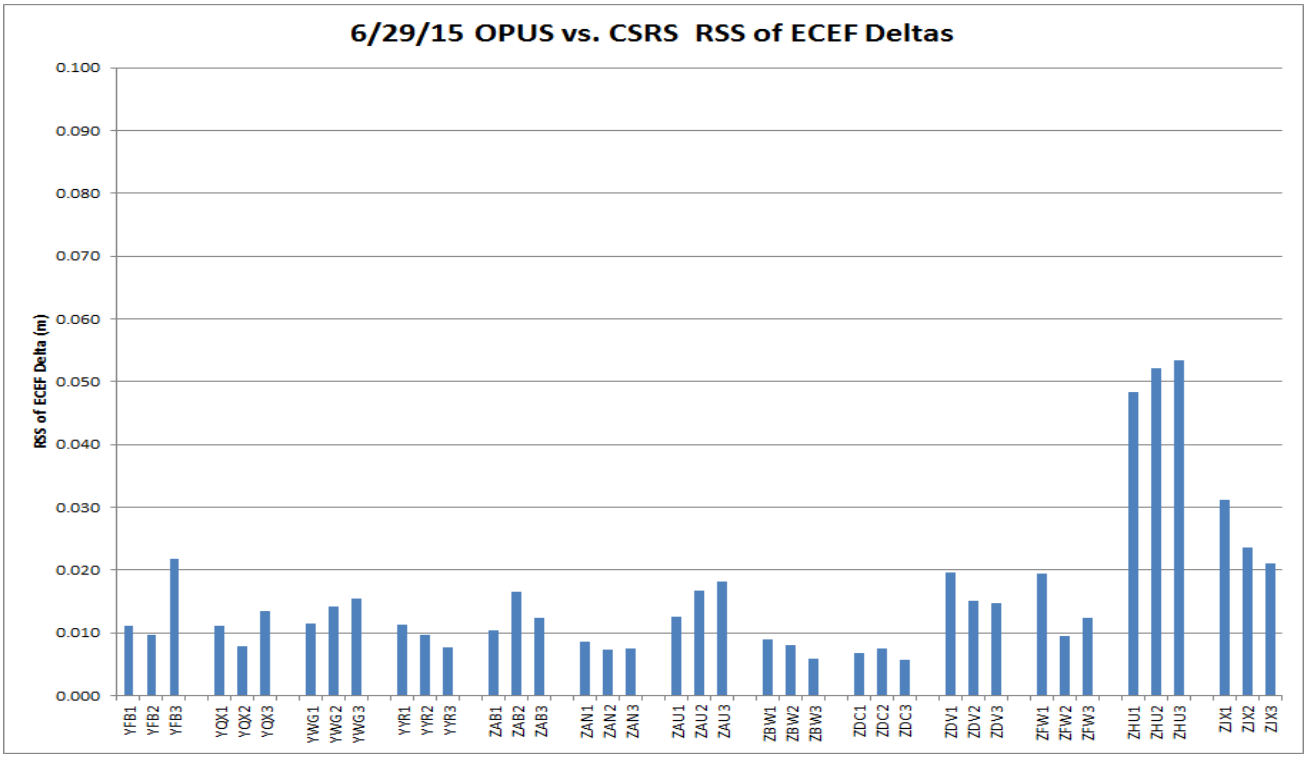


Figure 10-9 6/29/15 OPUS vs. CSRS RSS ECEF Deltas

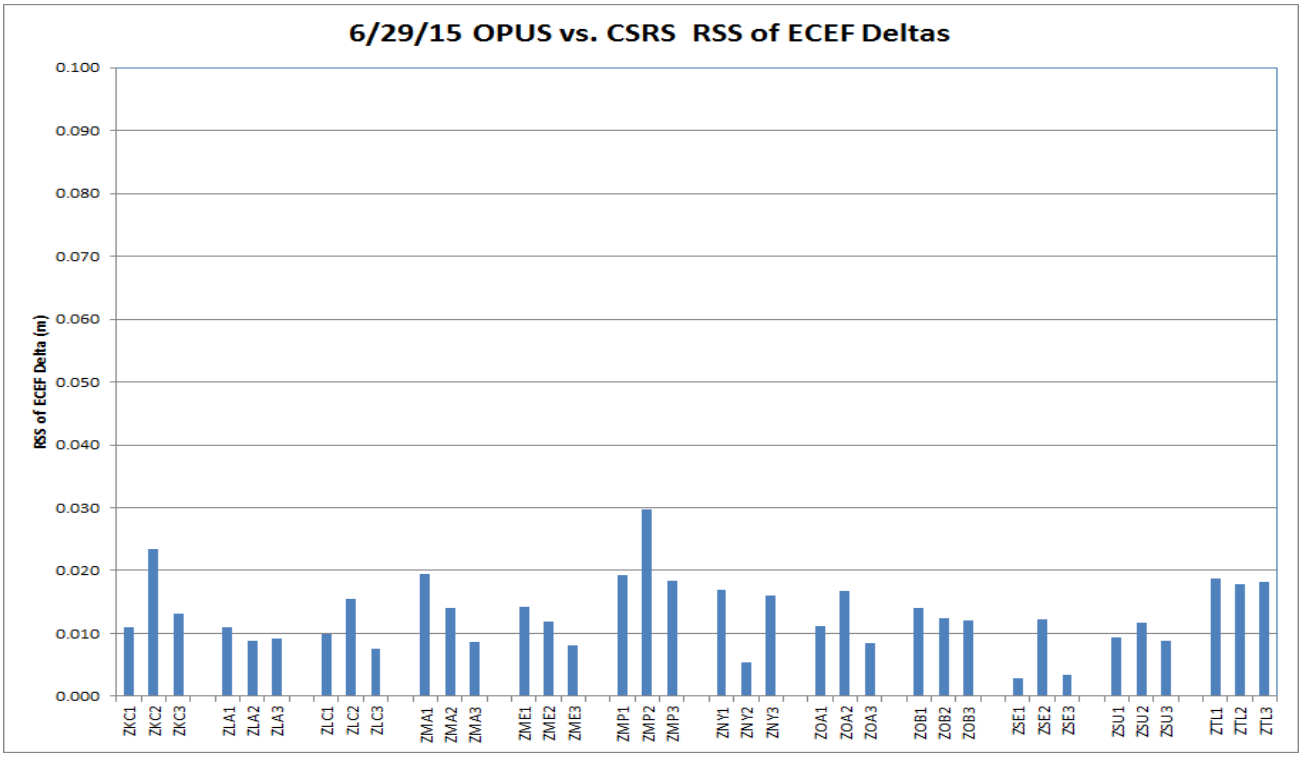


Figure 10-10 6/29/15 CSRS Survey Qualities

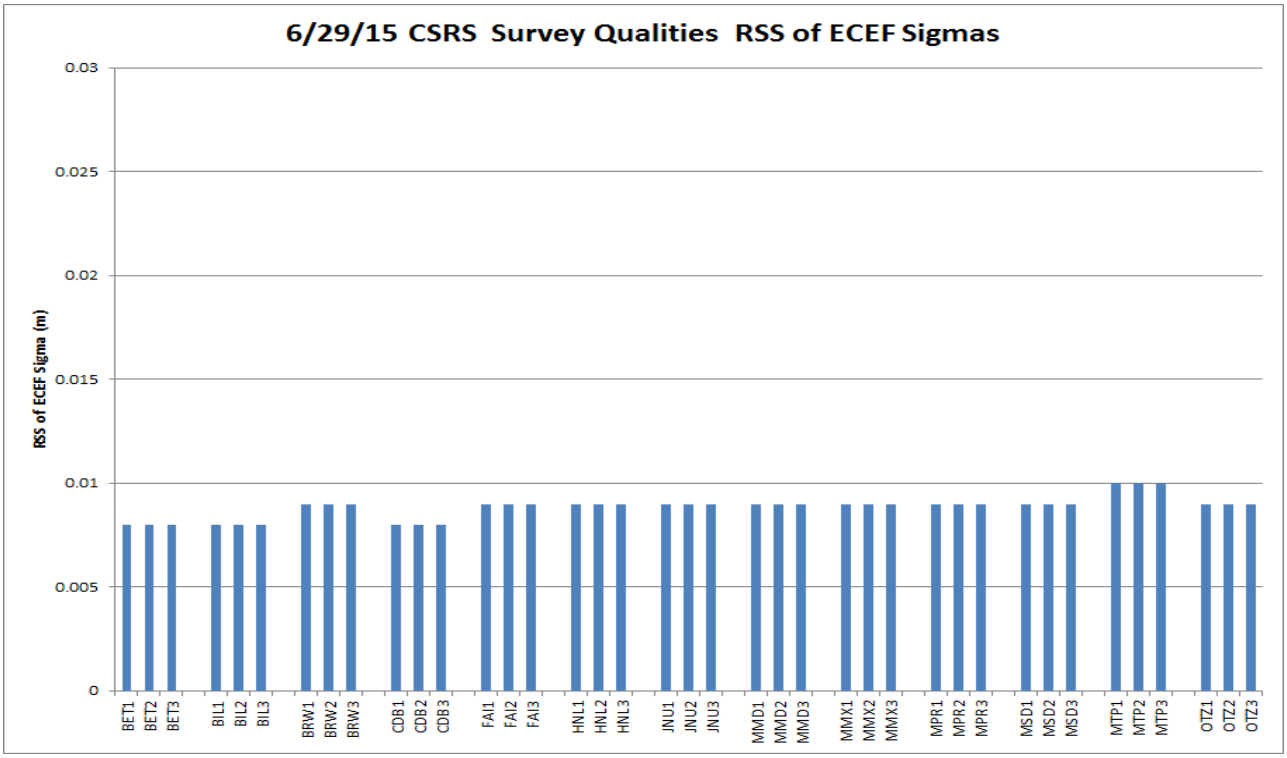


Figure 10-11 6/29/15 CSRS Survey Qualities

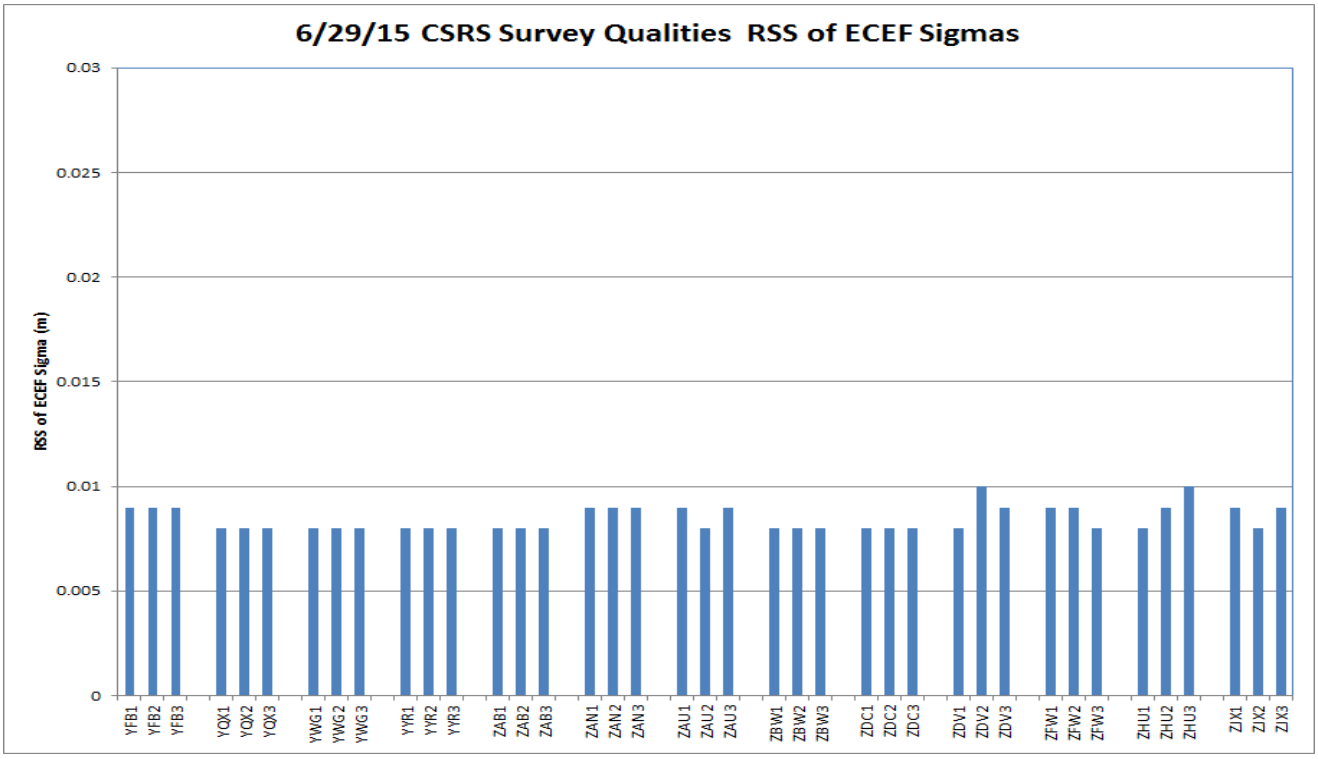
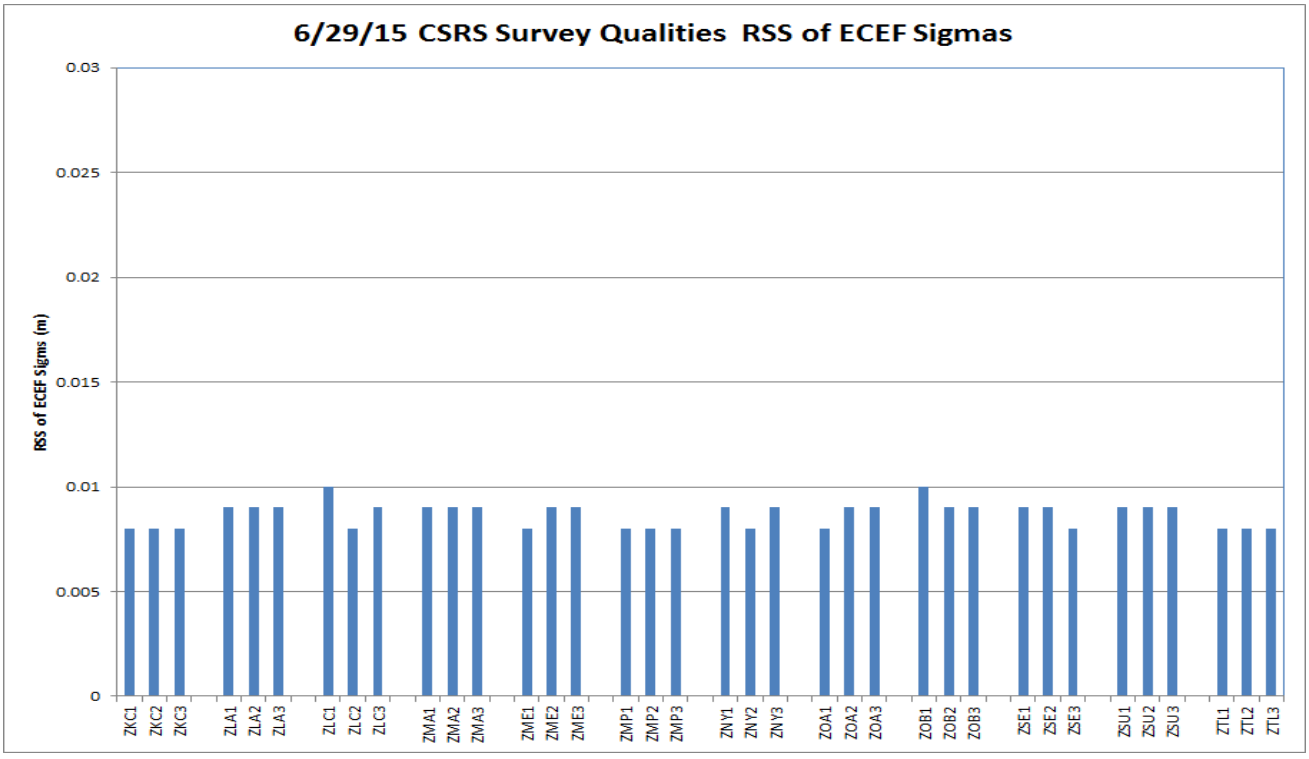


Figure 10-12 6/29/15 CSRS Survey Qualities



11.0 SIGNAL QUALITY MONITOR (SQM)

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

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

11.1 Alpha Metrics

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

Table 11-1 Alpha Metrics

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

11.2 Type Bias

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

For this reporting period, geostationary satellites type biases are not evaluated. Table11-3 shows the rollup average for the quarter. Table 11-4 shows the rollup average since January 1, 2008. Figure 11-1 shows the daily average for the four detection metrics for the quarter.

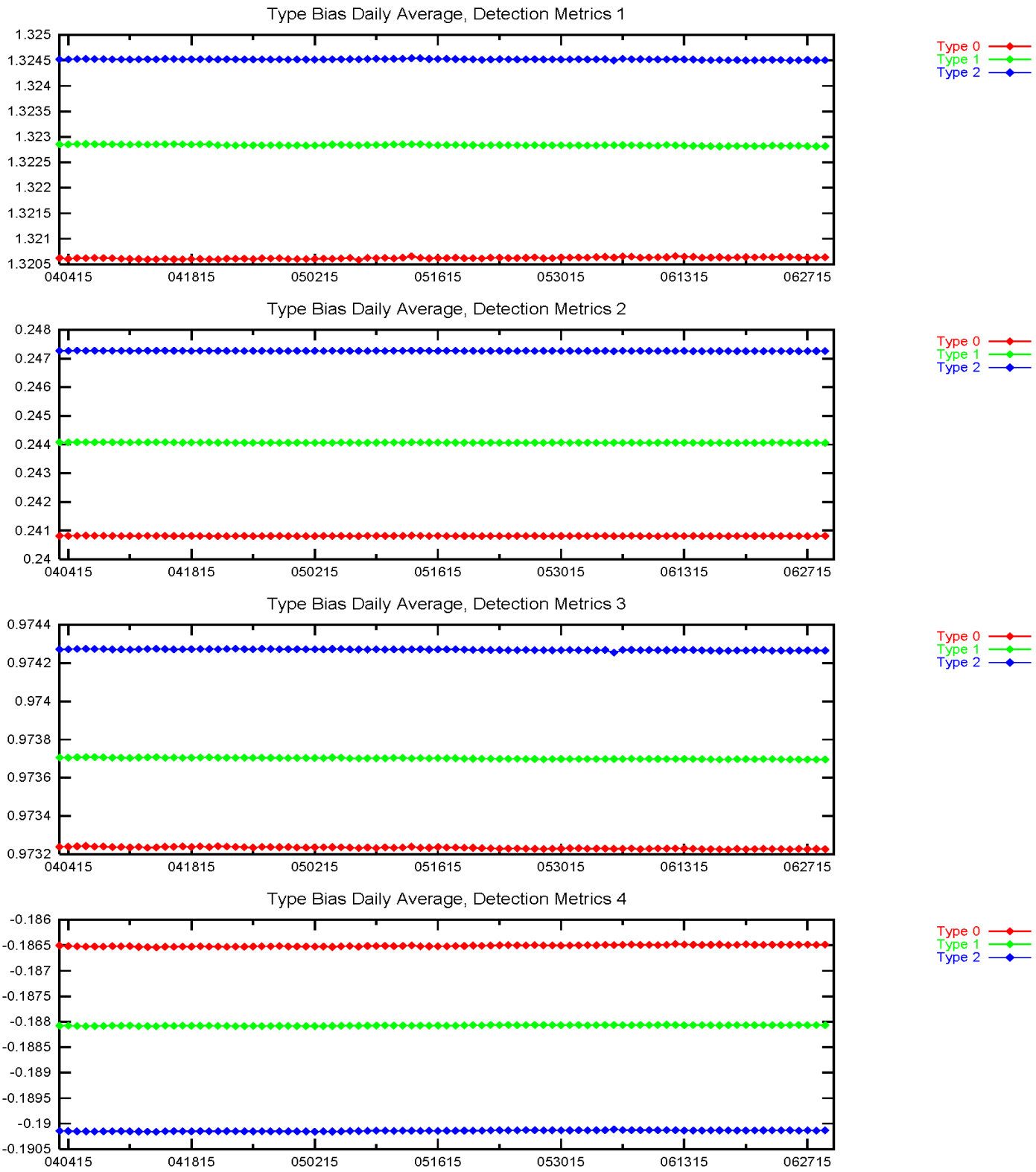
Table 11-2 Type Bias Average for the Quarter

Detection Metric	Type 0	Type 1	Type 2
DM 1	1.3206200	1.3228400	1.3245200
DM 2	0.2408120	0.2440670	0.2472630
DM 3	0.9732330	0.9737010	0.9742700
DM 4	-0.1865090	-0.1880740	-0.1901390

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

Detection Metric	Type 0	Type 1	Type 2
DM 1	1.3206200	1.3228400	1.3245200
DM 2	0.2408120	0.2440670	0.2472630
DM 3	0.9732330	0.9737010	0.9742700
DM 4	-0.1865090	-0.1880740	-0.1901390

Figure 11-1 Type Bias Average Trend



11.3 PRN Bias

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

Table 11-4 and Figure 11-2 show the rollup PRN bias average for the quarter. Figures 11-3 to 11-10 show the PRN bias average trend for each SV. The maximum average for DM1 for this quarter is PRN 23 at 0.0010834. The maximum average for DM2 is PRN 11 at 0.0002245. The maximum average for DM3 is PRN 10 at 0.0002884 and the maximum average for DM4 is PRN 23 at 0.0004429.

For this reporting period, geostationary satellite biases are not evaluated. Please refer to Table 1-5 for events that may have an impact on PRN bias statistics. The small spikes in PRN bias daily averages are due to satellite outages. On the days of satellite maintenance, partial data resulted in a slightly varied PRN bias daily average compared to full day data average. PRN-8 (SVN-38) was unavailable for this entire quarter; PRN-26 (SVN-71) went online on April 20, 2015.

Table 11-4 PRN Bias Average for the Quarter

PRN	SVN	DM1	DM2	DM3	DM4
1	63	0.0001392	0.0000855	0.0000719	0.0000886
2	61	0.0005846	0.0001352	0.0000949	0.0001167
3	69	0.0001159	0.0000479	0.0000721	0.0000957
4	34	0.0001978	0.0000515	0.0000638	0.0001522
5	50	0.0001191	0.0001108	0.0000586	0.0001245
6	67	0.0001801	0.0002038	0.0001428	0.0001440
7	48	0.0001329	0.0000648	0.0000337	0.0001371
8	38	Offline	Offline	Offline	Offline
9	39	0.0001551	0.0000705	0.0000926	0.0003540
10	40	0.0006917	0.0000493	0.0002884	0.0001021
11	46	0.0009989	0.0002245	0.0000666	0.0002565
12	58	0.0001302	0.0000670	0.0000859	0.0000777
13	43	0.0005591	0.0000482	0.0000705	0.0001735
14	41	0.0007105	0.0001373	0.0001324	0.0001188
15	55	0.0001390	0.0000511	0.0000254	0.0001518
16	56	0.0001410	0.0000556	0.0001340	0.0003205
17	53	0.0001715	0.0000639	0.0000449	0.0001139
18	54	0.0007234	0.0001462	0.0000565	0.0002461
19	59	0.0004755	0.0001844	0.0000547	0.0000952
20	51	0.0001431	0.0000478	0.0000273	0.0001585
21	45	0.0003869	0.0001315	0.0001740	0.0001114
22	47	0.0003516	0.0000566	0.0001029	0.0003293
23	60	0.0010834	0.0001782	0.0000396	0.0004429
24	65	0.0002275	0.0000497	0.0000378	0.0001149
25	62	0.0002962	0.0001822	0.0000725	0.0001295
26	71	0.0002847	0.0001115	0.0000589	0.0001349
27	66	0.0006007	0.0001737	0.0000675	0.0003020
28	44	0.0002967	0.0000478	0.0000311	0.0000884
29	57	0.0003218	0.0000525	0.0000876	0.0002945
30	64	0.0002091	0.0000568	0.0000474	0.0001411
31	52	0.0003292	0.0001304	0.0000294	0.0002436
32	23	0.0001827	0.0000672	0.0000865	0.0000971

Figure 11-2 PRN Bias Average for the Quarter

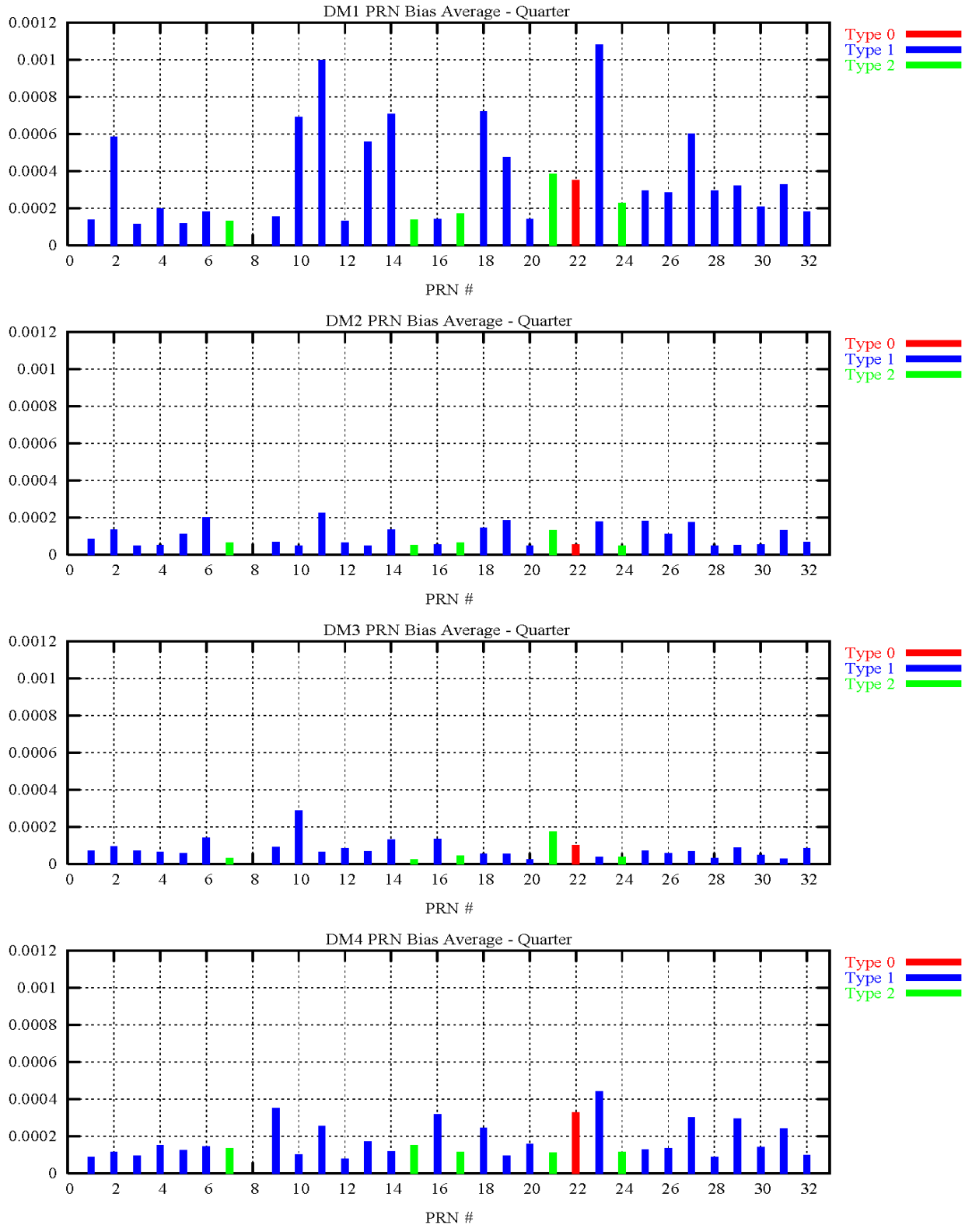


Figure 11-3 PRN Bias Average Trend (PRN 1 – PRN 4)

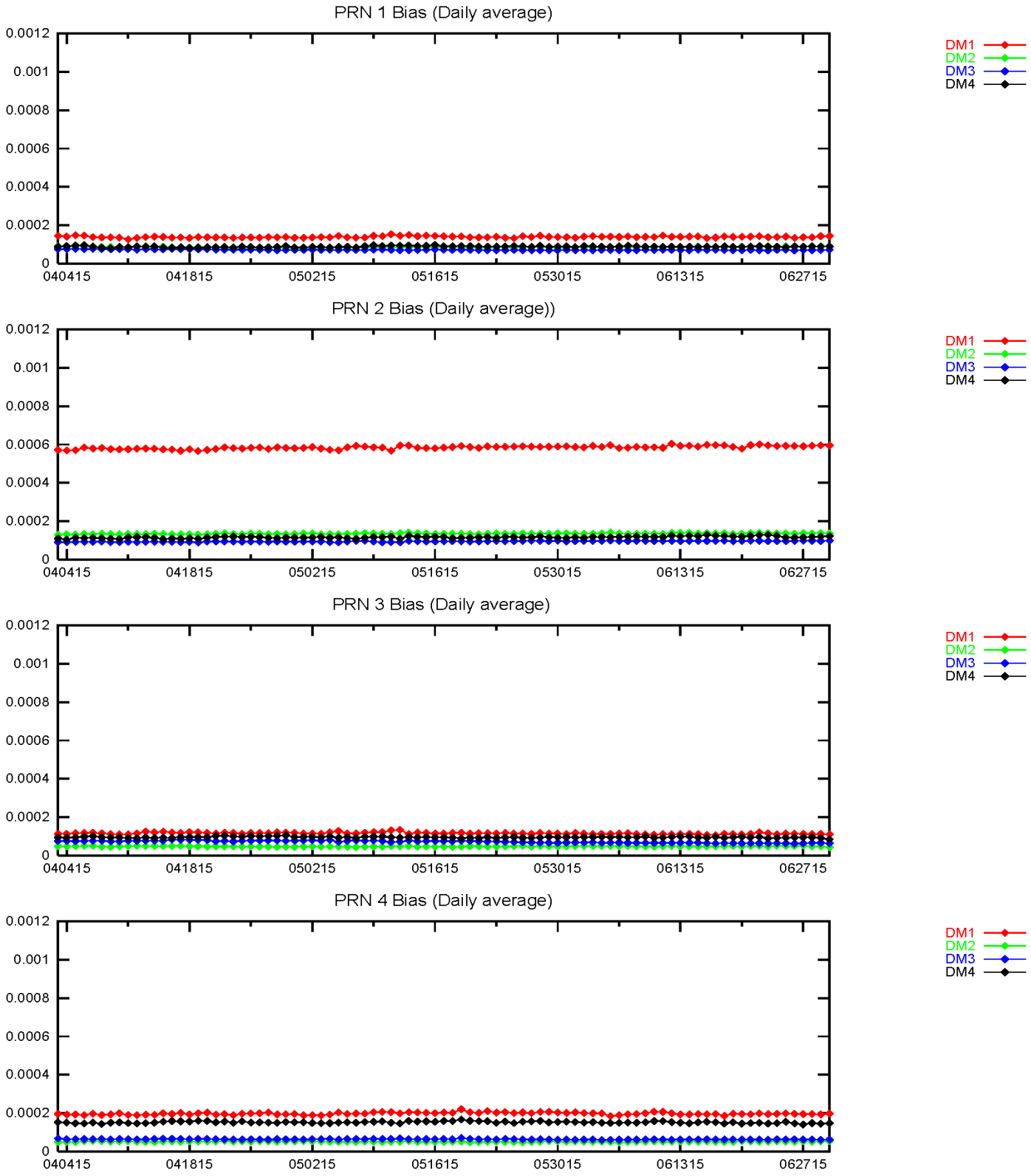


Figure 11-4 PRN Bias Average Trend (PRN 5 – PRN 8)

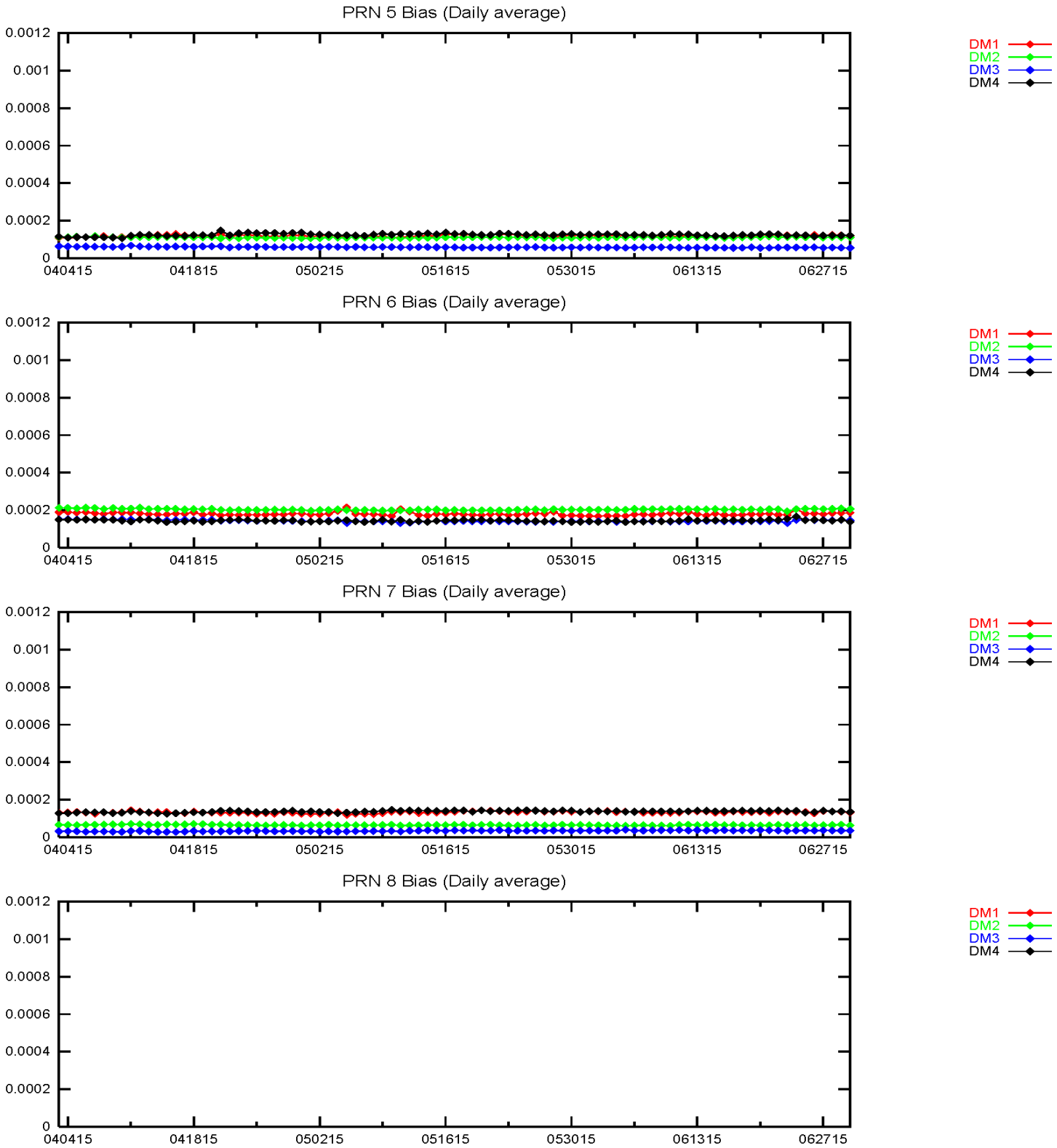


Figure 11-5 PRN Bias Average Trend (PRN 9 – PRN 12)

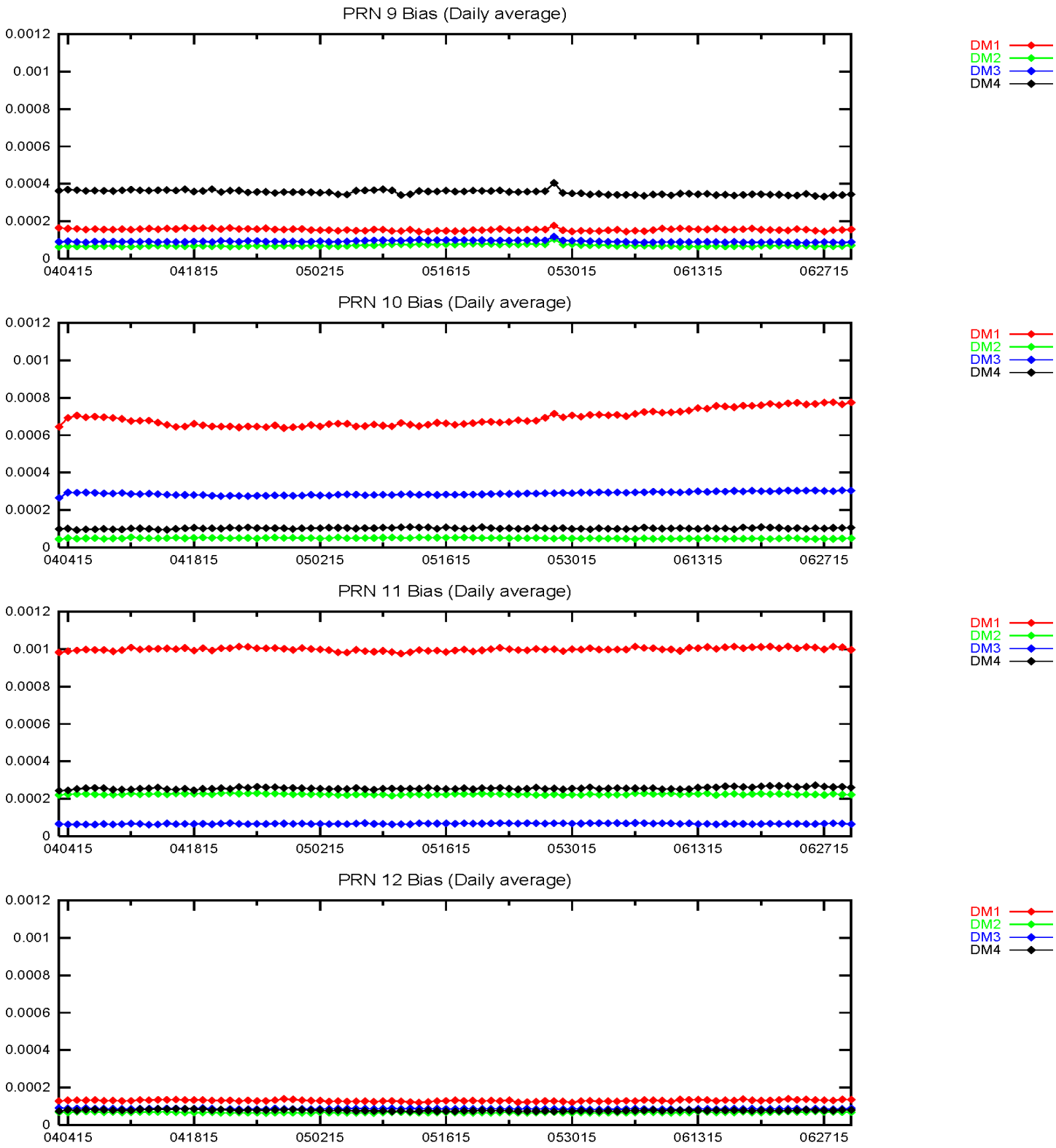


Figure 11-6 PRN Bias Average Trend (PRN 13 – PRN 16)

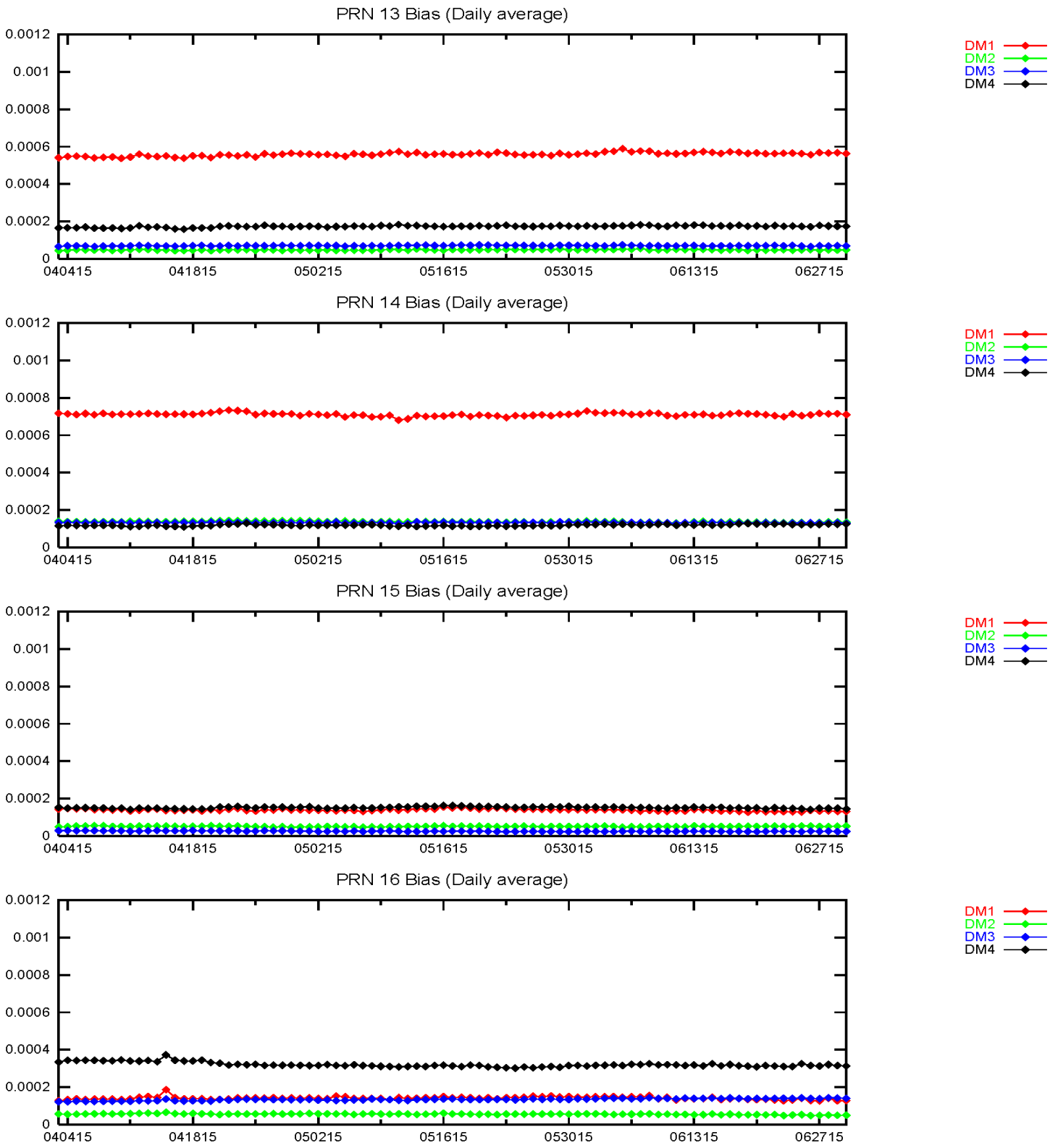


Figure 11-7 PRN Bias Average Trend (PRN 17 – PRN 20)

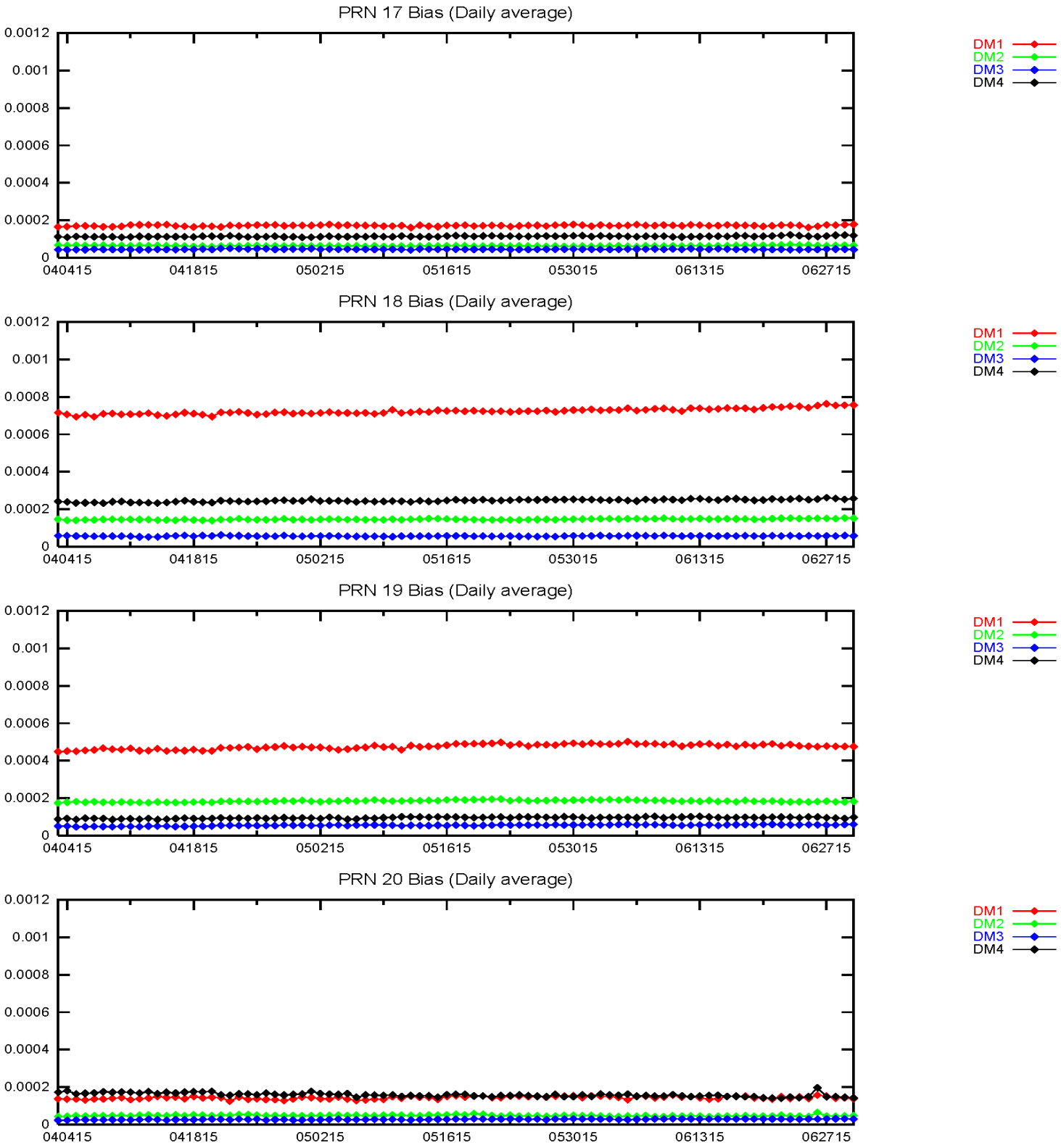


Figure 11-8 PRN Bias Average Trend (PRN 21 – PRN 24)

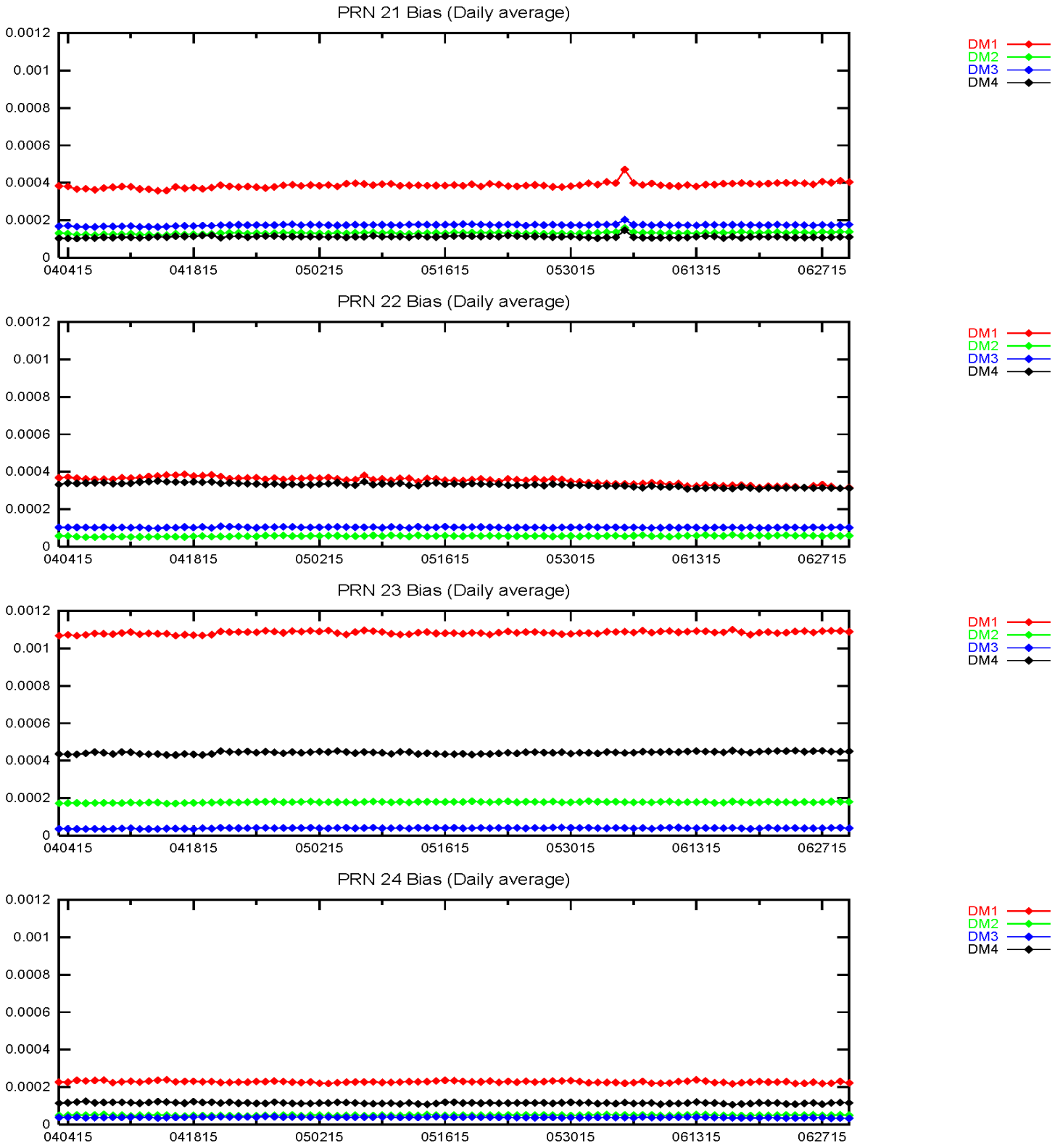


Figure 11-9 PRN Bias Average Trend (PRN 25 – PRN 28)

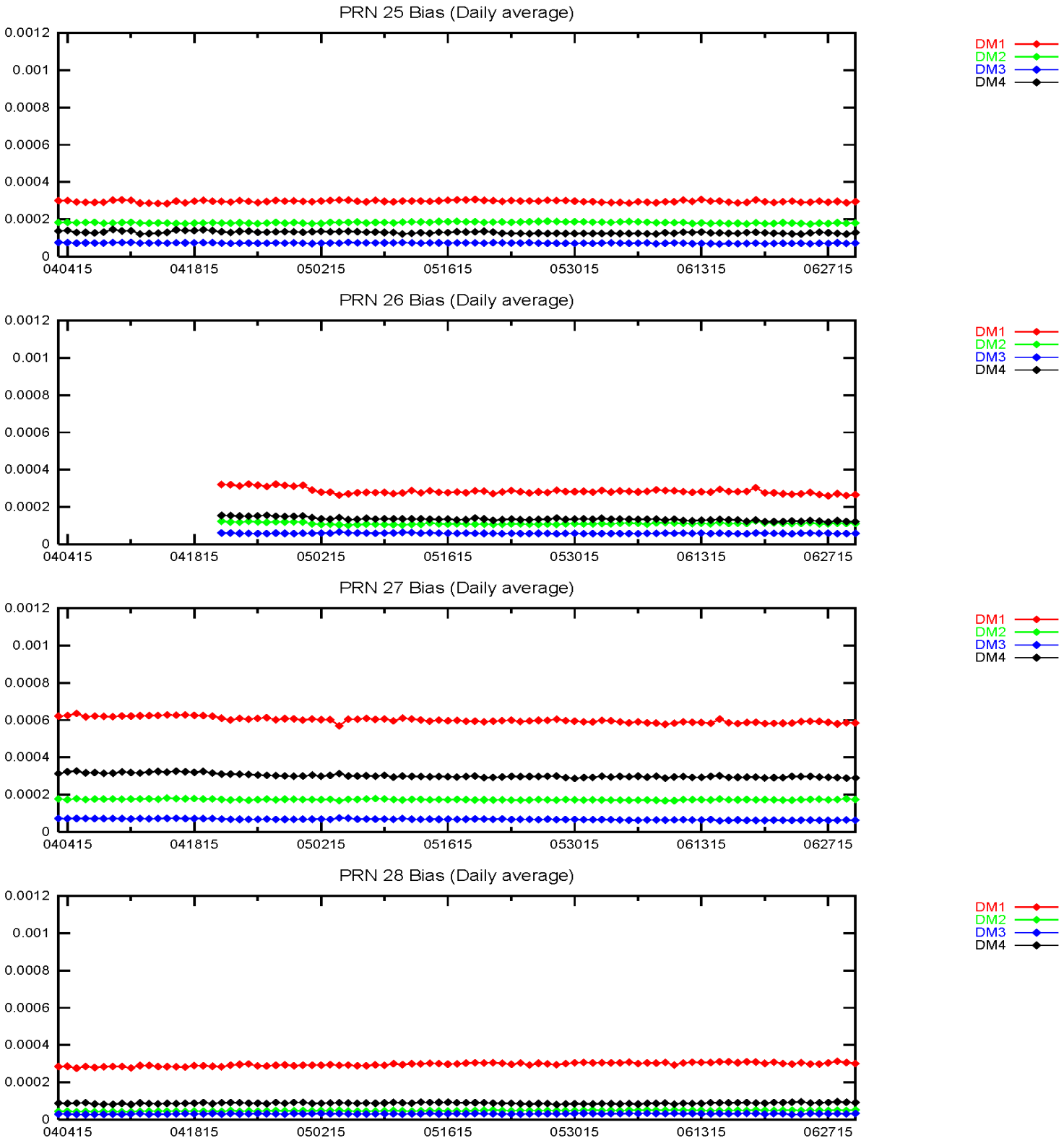
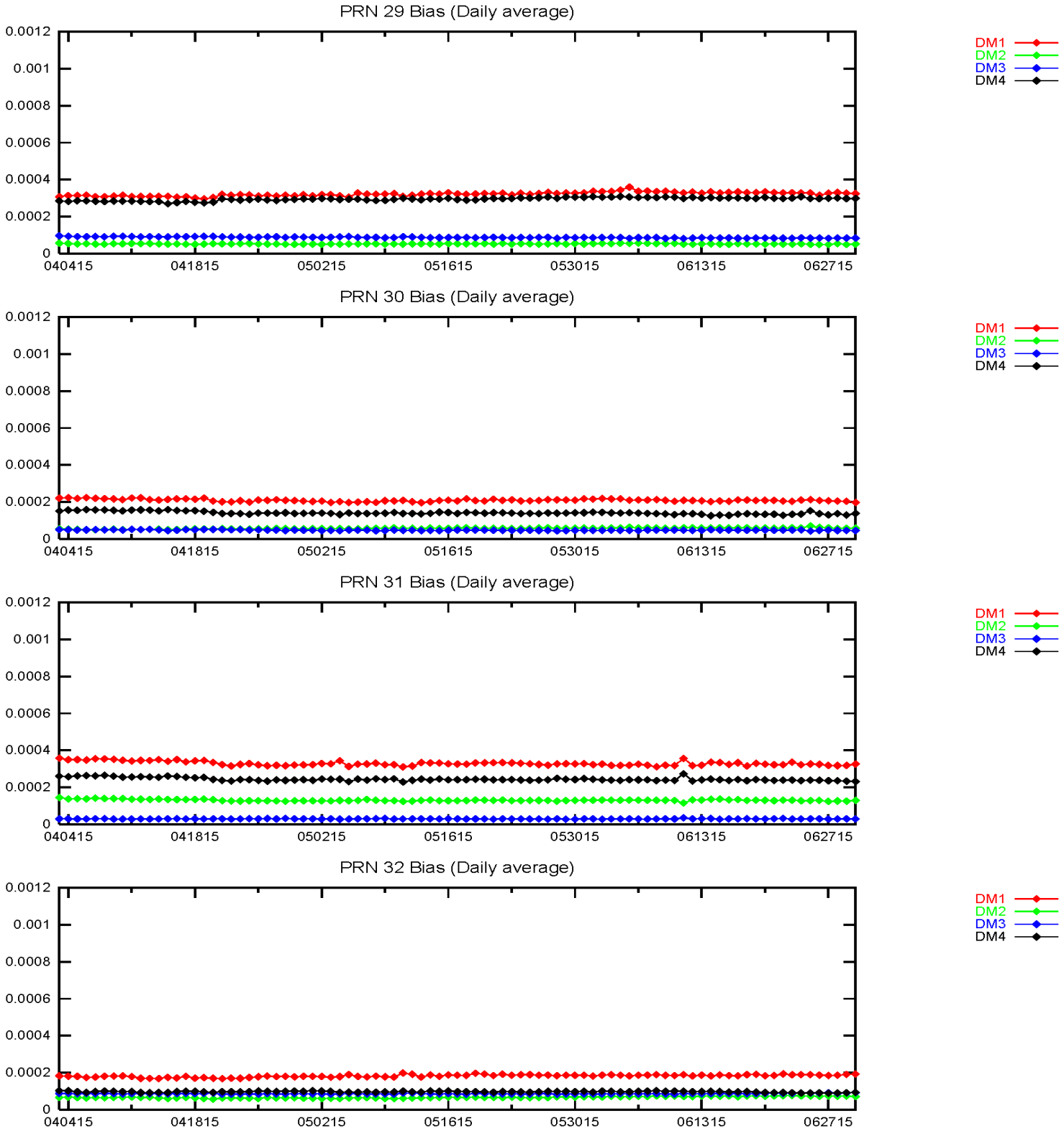


Figure 11-10 PRN Bias Average Trend (PRN 29 – PRN 32)



11.4 SQM Trips

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

12.0 G3 RECEIVER ANALYSIS

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

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

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

12.1 G3 Position Accuracy

Table 12-1 lists the receivers used in the PA analysis. Table 12-2 shows PA horizontal and vertical position accuracy maintained for 95% of the time at LP, LPV and LNAV/VNAV operational service levels for the quarter. Figures 12-1 to 12-4 show the daily horizontal and vertical 95% accuracy for LPV operational service level for the reporting period. Note that WAAS accuracy statistics presented are compiled only when all WAAS corrections (fast, long term, and ionospheric) for at least 4 satellites are available. This is referred to as PA navigation mode. The percentage of time that PA navigation mode was supported by WAAS at each receiver is also shown in Table 12-2. The Honolulu site is an exception to the rule because it so far outside CONUS. Honolulu was evaluated solely in NPA mode for all position results.

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

For this reporting period, the maximum 95% horizontal and vertical LPV errors are 0.995 meters at Miami-A and 1.74 meters at Fairbanks-A, respectively. The minimum 95% horizontal and vertical LPV errors are 0.618 meters at Chicago-B and 0.968 meters at Seattle-A, respectively.

Table 12-1 PA Evaluation Sites for G3 Receivers

Location	Days Evaluated	Samples
Boston-A	86	7426786
Boston-B	87	7519842
Chicago-A	90	7763704
Chicago-B	79	6841399
Fairbanks-A	83	7138431
Fairbanks-B	83	7139074
Honolulu-A	90	7815823
Honolulu-B	90	7814790
Miami-A	90	7792137
Miami-B	90	7794052
Seattle-A	72	6243281
Seattle-B	79	6853925

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

Location	Horizontal (HAL = 40m) (Meters)	Horizontal (HAL=556m) (Meters)	Vertical (VAL=50m) (Meters)	Percentage in PA mode (%)
Boston-A	0.845	0.845	1.132	100
Boston-B	0.79	0.79	1.063	100
Chicago-A	0.899	0.899	1.041	100
Chicago-B	0.618	0.618	1.026	100
Fairbanks-A	0.952	0.952	1.74	100
Fairbanks-B	0.762	0.762	1.363	100
Miami-A	0.995	0.995	1.496	100
Miami-B	0.993	0.993	1.338	100
Seattle-A	0.681	0.681	0.968	100
Seattle-B	0.926	0.926	0.993	100
Honolulu-A *	7.748	16.988	-	99.4076
Honolulu-B *	7.819	17.204	-	99.3945

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

Table 12-3 Maximum LPV Error Statistics for G3 Receivers

Location	Horizontal Error (m)	Horizontal Error/HPL	Horizontal Maximum Ratio	Vertical Error (m)	Vertical Error/VPL	Vertical Maximum Ratio
Boston-A	4.28	0.113	0.218	7.955	0.171	0.258
Boston-B	3.346	0.088	0.193	7.074	0.152	0.256
Chicago-A	2.593	0.118	0.24	3.591	0.177	0.213
Chicago-B	1.882	0.187	0.187	3.492	0.172	0.178
Fairbanks-A	2.294	0.122	0.173	6.621	0.153	0.2
Fairbanks-B	2.456	0.226	0.226	5.82	0.174	0.211
Miami-A	2.354	0.085	0.182	3.961	0.084	0.191
Miami-B	2.269	0.082	0.191	4.375	0.14	0.179
Seattle-A	2.294	0.201	0.201	3.507	0.189	0.19
Seattle-B	2.009	0.152	0.179	3.042	0.156	0.167
Honolulu-A *	17.972	0.176	-	32.449	0.417	-
Honolulu-B *	17.86	0.175	-	32.751	0.426	-

* 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

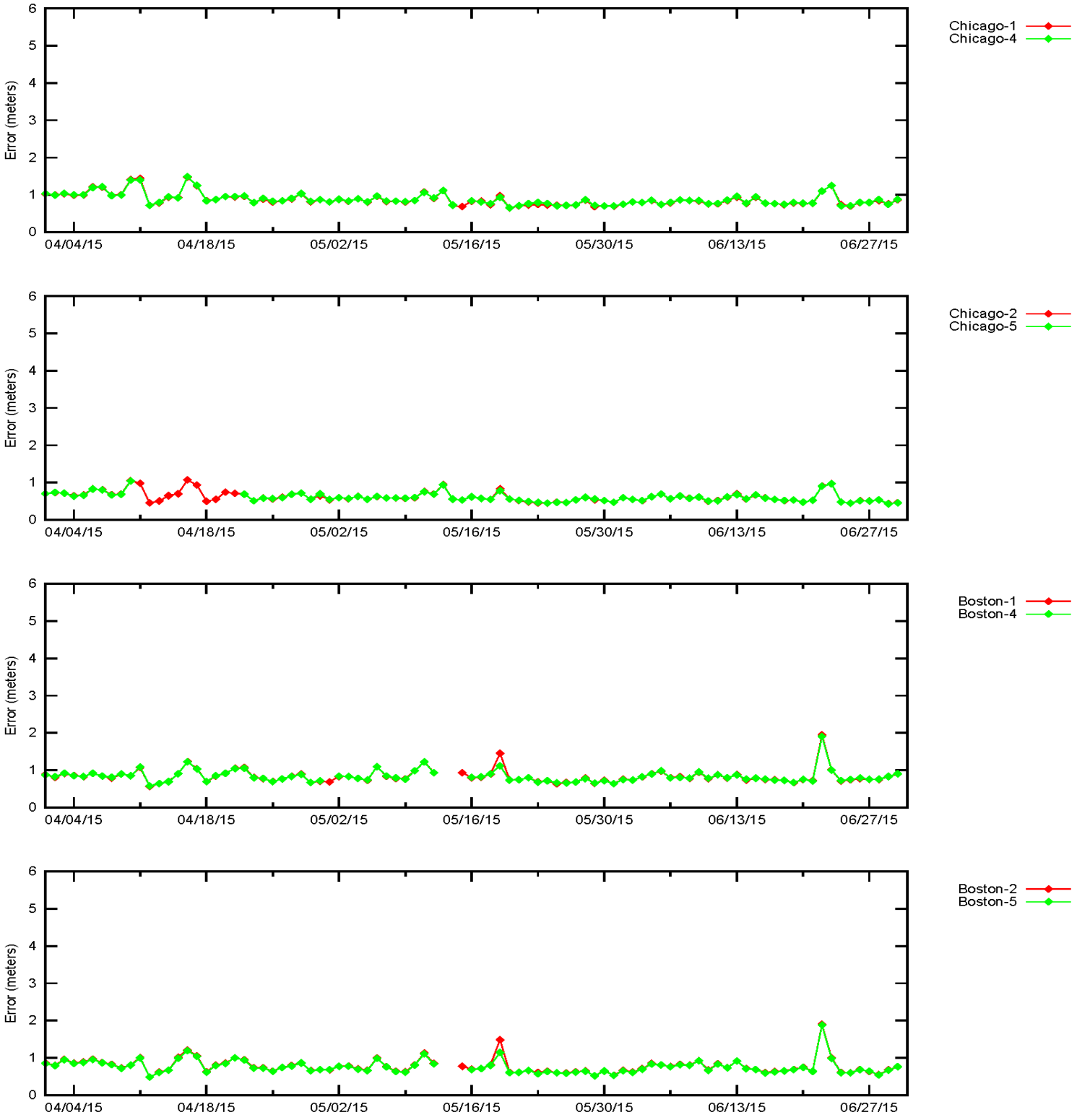


Figure 12-2 LPV 95% Horizontal Accuracy

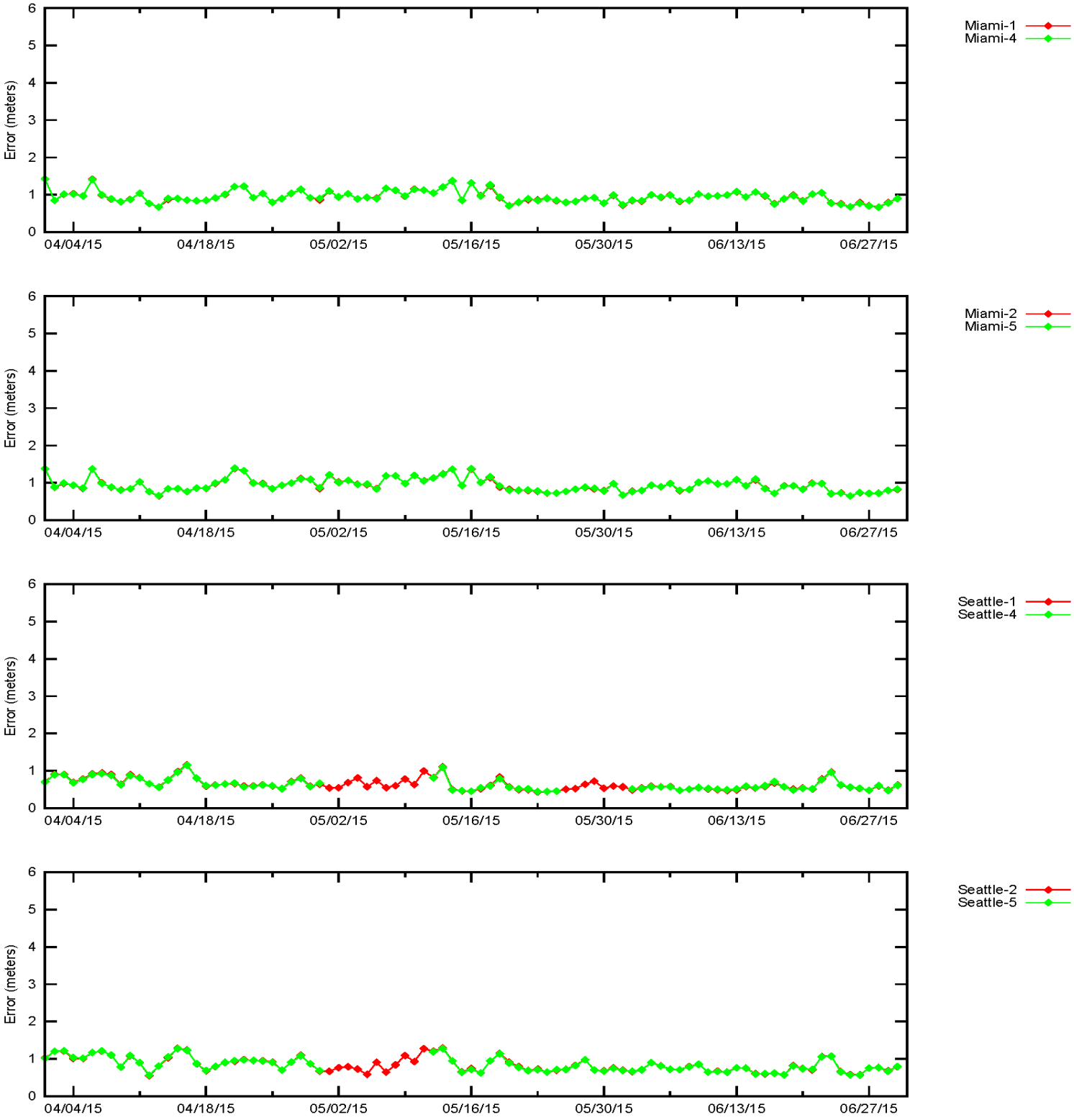


Figure 12-3 LPV 95% Horizontal Accuracy

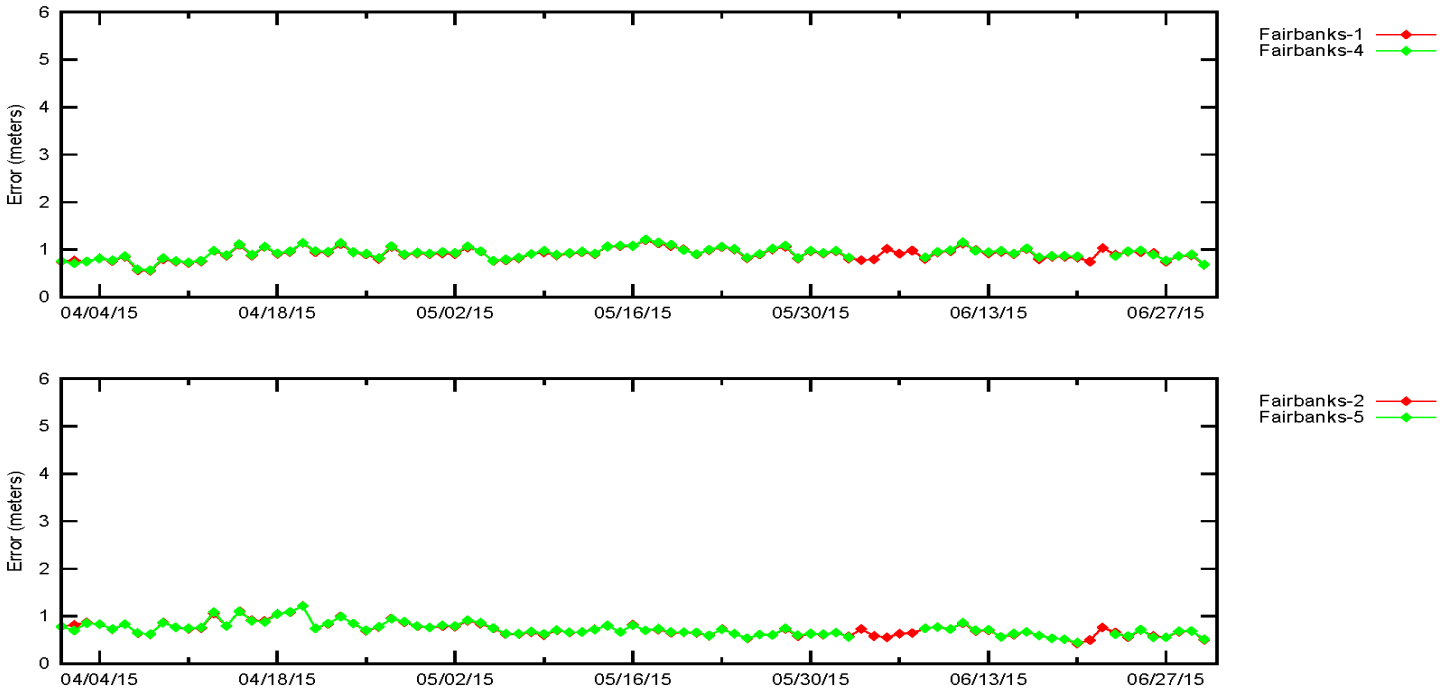


Figure 12-4 LPV 95% Vertical Accuracy

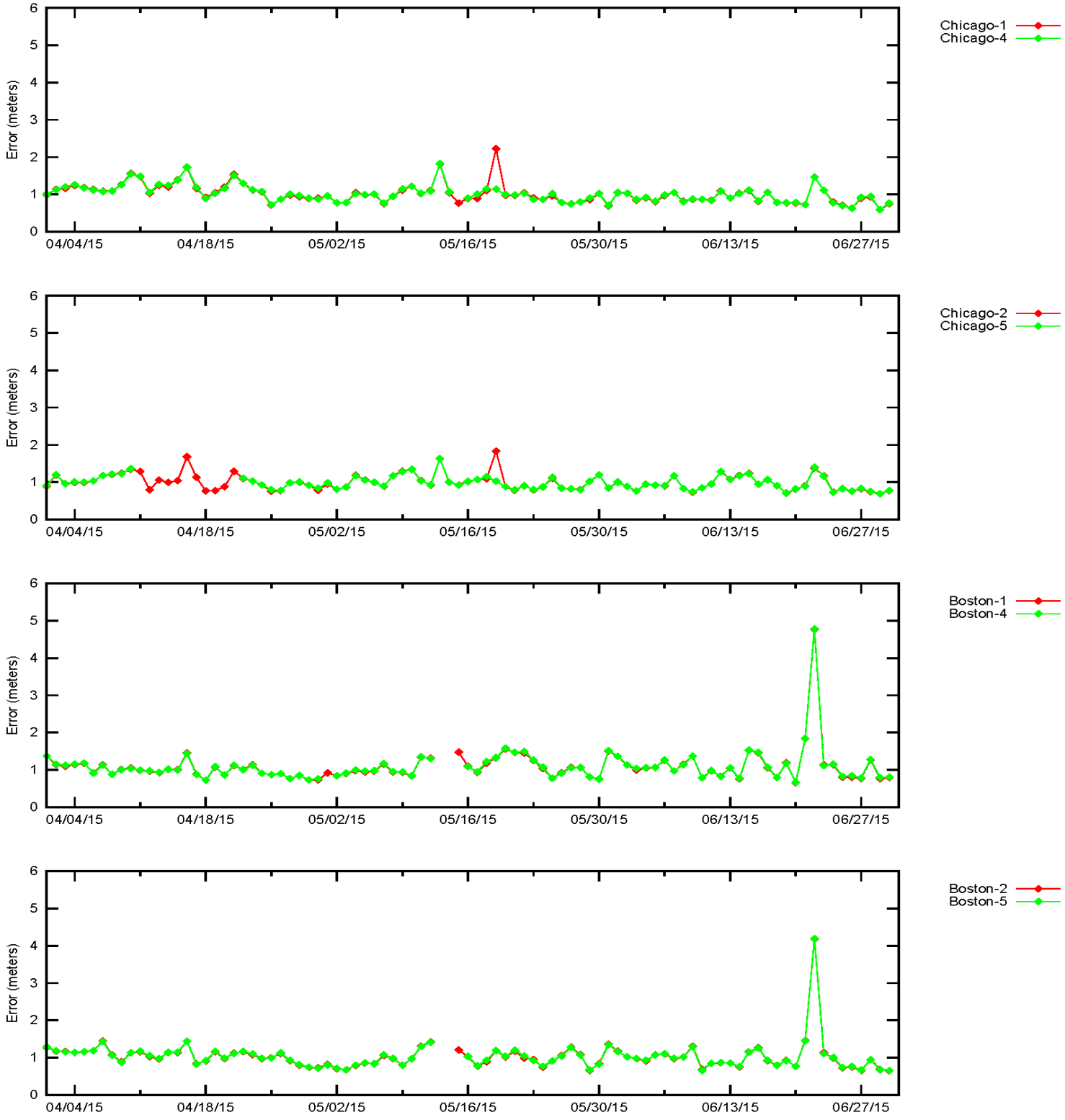


Figure 12-5 LPV 95% Vertical Accuracy

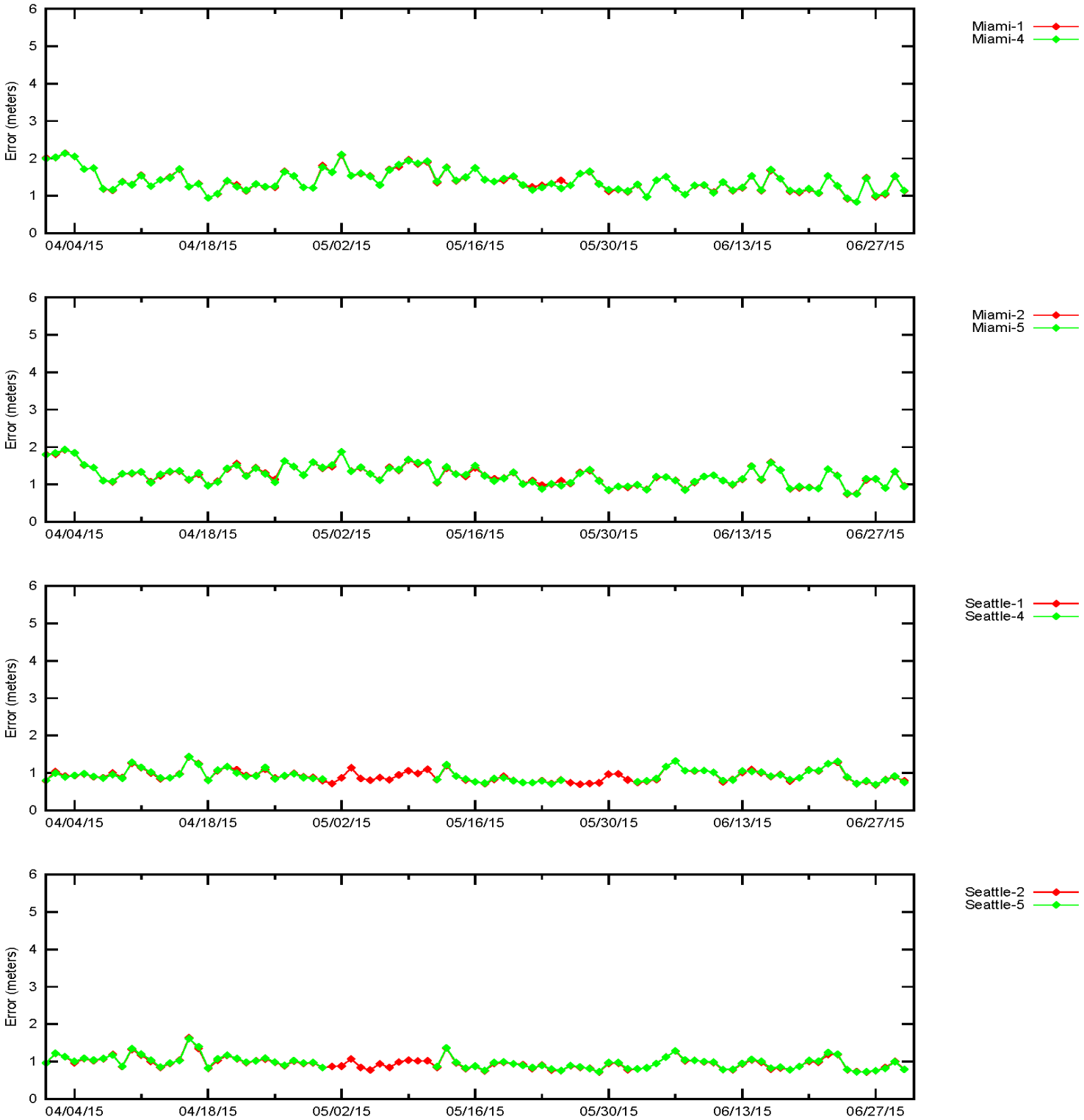


Figure 12-6 LPV 95% Vertical Accuracy

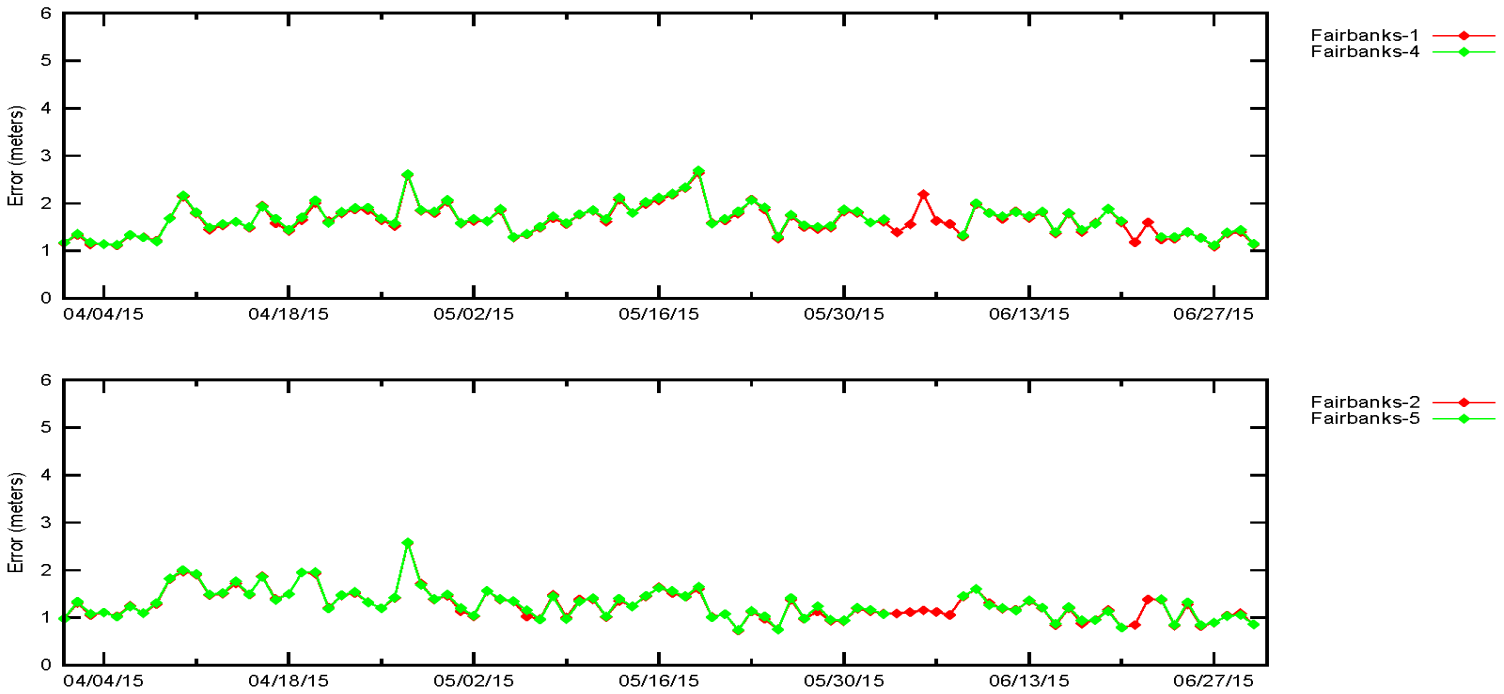


Figure 12-7 LPV Horizontal Error Distribution Histogram

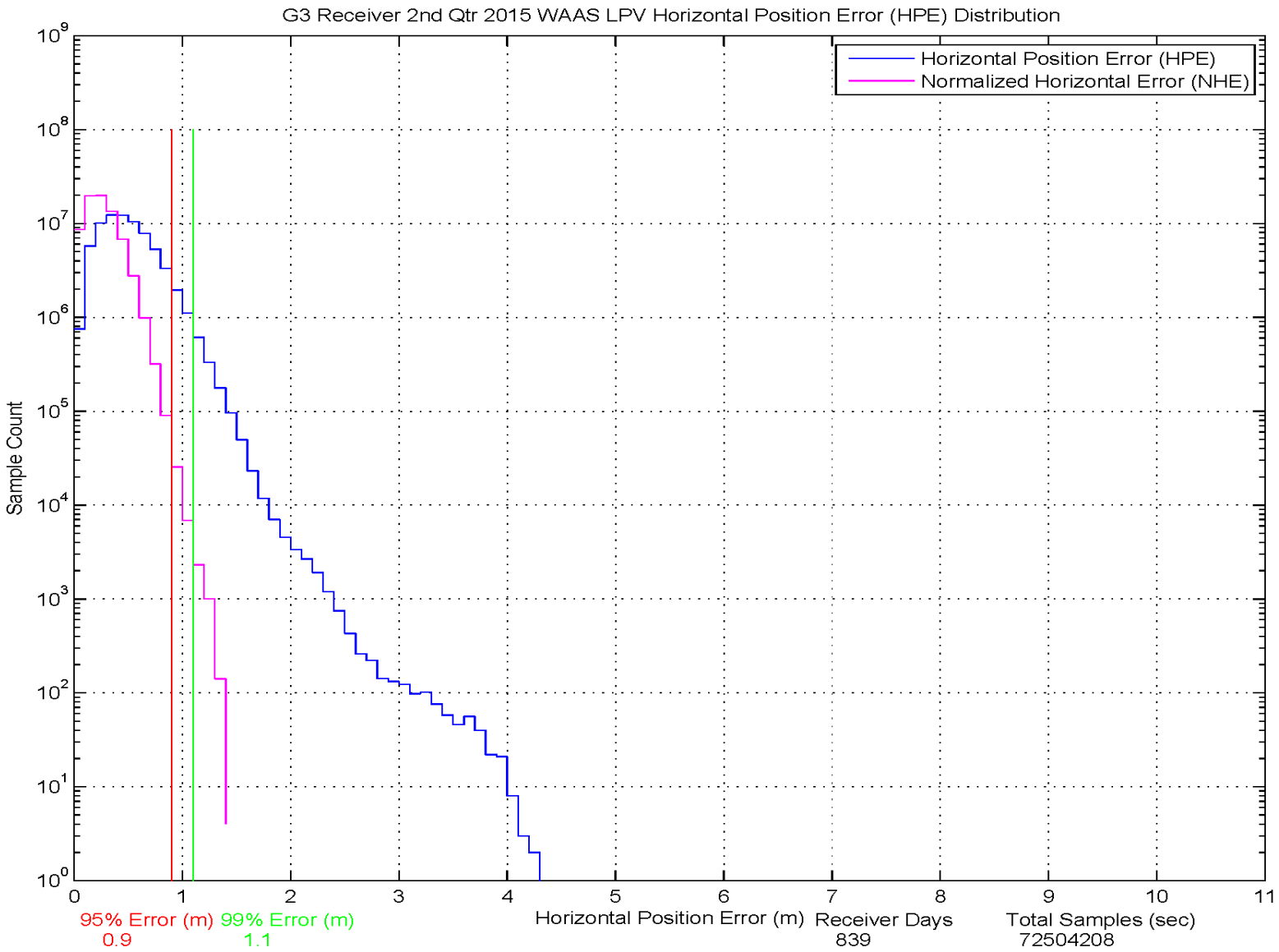


Figure 12-8 LPV Vertical Error Distribution Histogram

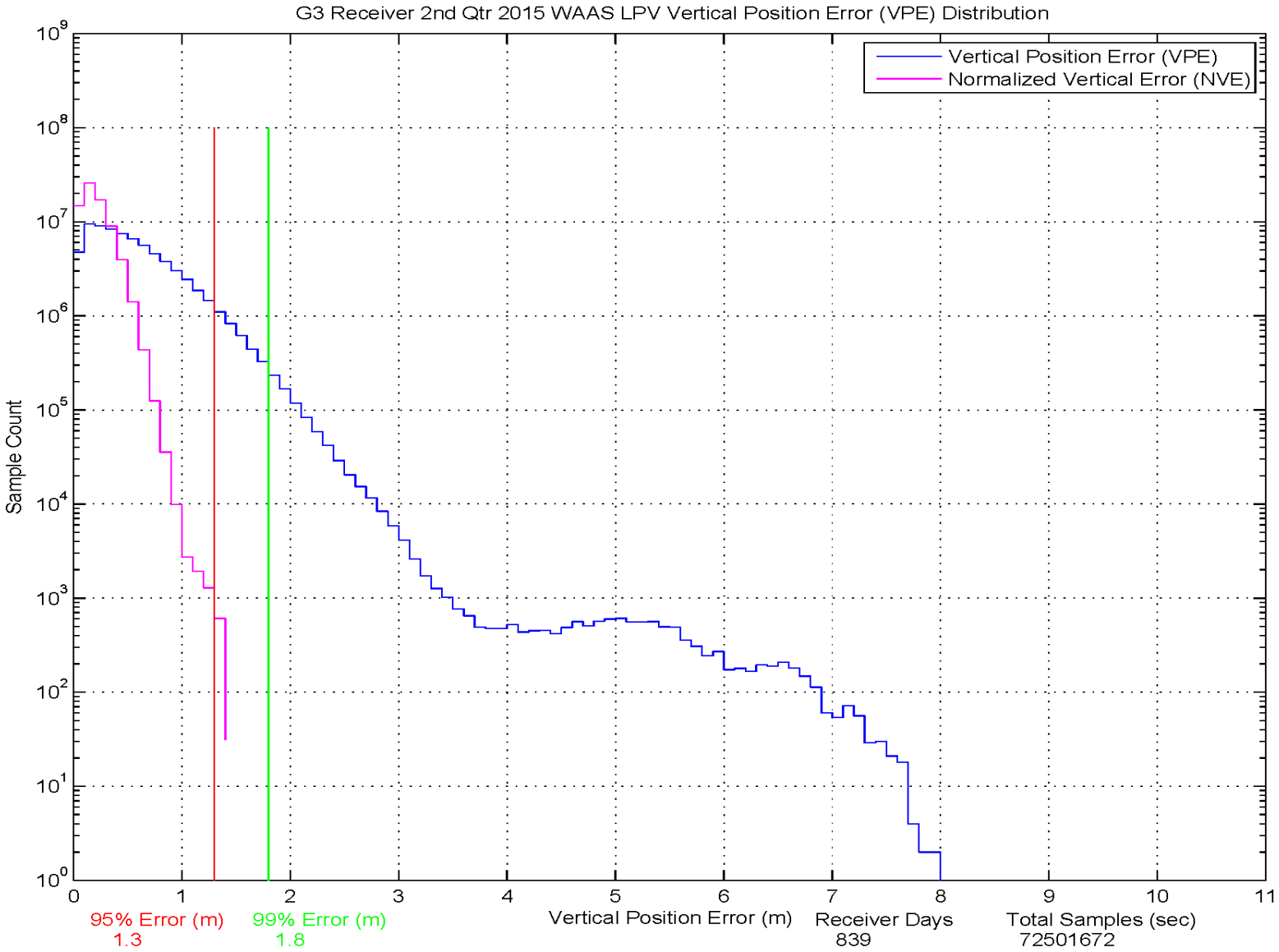


Figure 12-9 LPV 95% Horizontal Error Bounding Triangle Chart

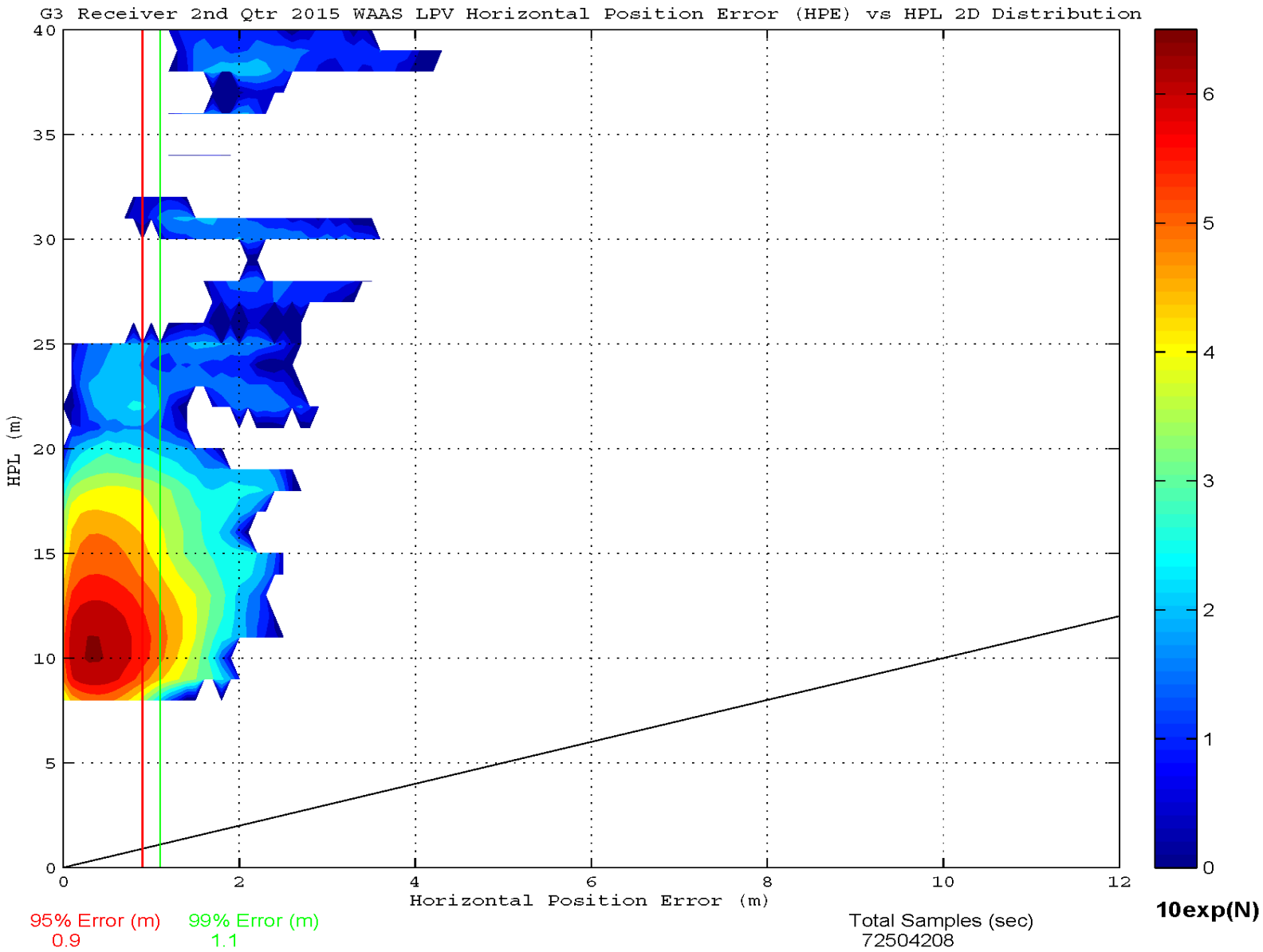
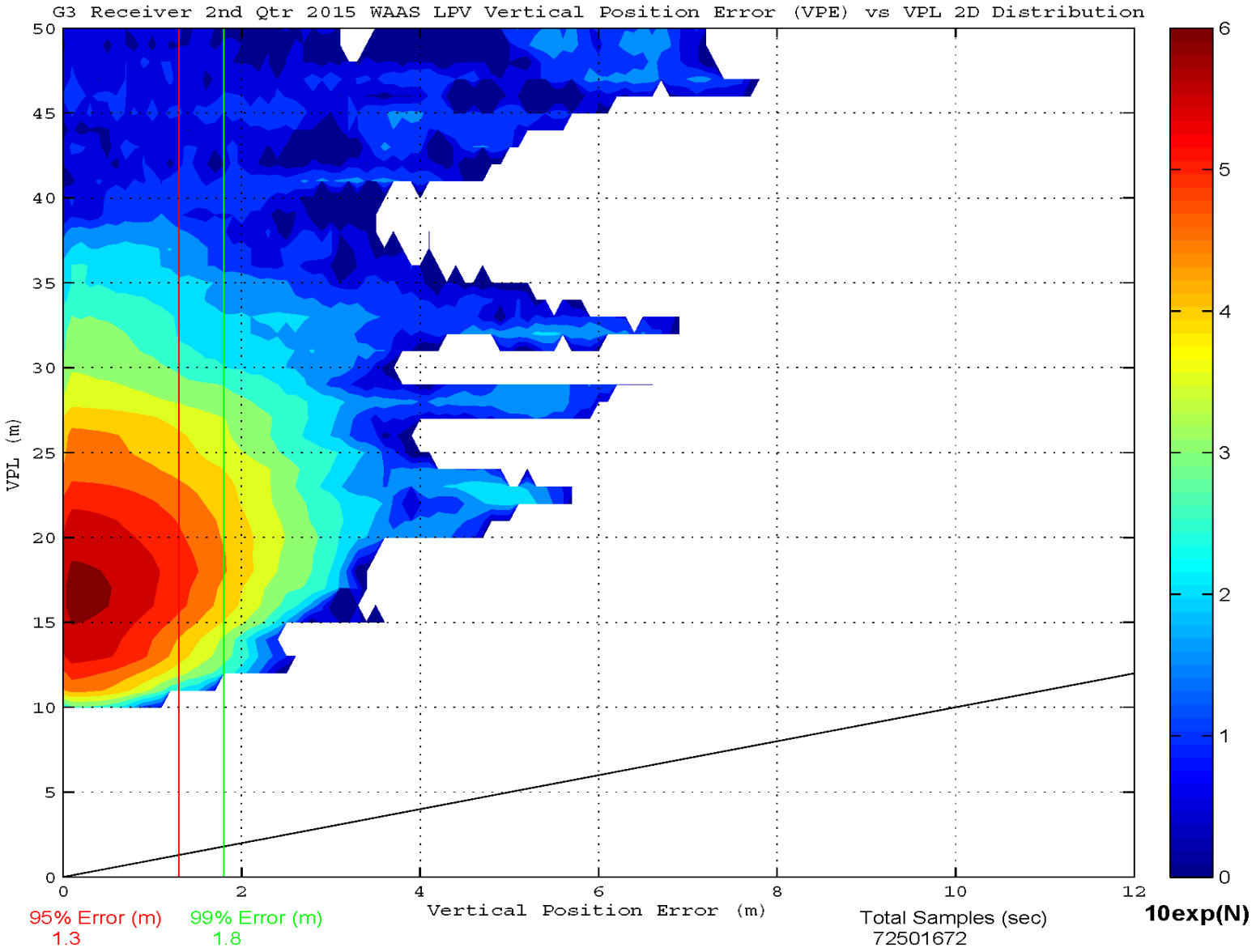


Figure 12-10 LPV 95% Vertical Error Bounding Triangle Chart



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 12-5 show the range error 95% index and 99.9% (3.29 sigma) bounding statistics for each SV at the selected locations. A GIVE is broadcast by the WAAS for each IGP that is monitored by the system and the 99.9% (3.29 sigma) bound of the ionospheric error is checked. The WAAS broadcasts the ionospheric model using IGP's at predefined geographic locations. Each IGP contains the vertical ionospheric delay and the error in that delay in the form of the GIVE. The ionospheric error is determined by taking the difference between the WAAS vertical ionospheric delay interpolated from the IGP's and GPS dual frequency measurement at that GPS satellite. GPS satellite ionospheric errors were calculated for the twelve test receivers during the period. Table 12-6 and 12-7 show the ionospheric error 95% index and 99.9% (3.29 sigma) bounding statistics for each SV at the test locations.

For this reporting period, PRN-8 (SVN-38) was unavailable for the entire quarter, and PRN-26 (SVN-71) became available on April 20th.

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

Site →	Chicago 4		Chicago 5		Boston 4		Boston 5		Seattle 4		Seattle 5	
SV ↓	95% Range Error	3.29 Sigma Bounding(%)	95% Range Error	3.29 Sigma Bounding(%)	95% Range Error	3.29 Sigma Bounding(%)	95% Range Error	3.29 Sigma Bounding(%)	95% Range Error	3.29 Sigma Bounding(%)	95% Range Error	3.29 Sigma Bounding(%)
1	3.185	100	3.009	100	2.963	100	2.789	100	2.549	100	3.431	99.995
2	2.244	100	2.423	100	2.42	100	2.233	100	2.261	100	2.476	100
3	2.726	100	3.112	100	2.421	100	3.015	100	2.77	100	2.889	100
4	1.915	100	1.566	100	1.452	99.994	1.382	100	1.256	100	1.401	100
5	1.547	100	2.051	100	1.83	100	1.682	100	1.47	100	1.737	100
6	3.207	99.922	3.307	99.424	3.355	99.982	3.306	99.901	3.526	100	3.485	100
7	1.338	100	1.643	100	1.175	100	1.085	100	1.395	100	1.265	100
8	Ofline	Offline	Offline	Offline	Offline	Offline	Offline	Offline	Offline	Offline	Offline	Offline
9	2.323	100	2.547	100	2.818	100	2.353	100	1.854	100	2.102	100
10	1.333	100	0.983	100	0.974	100	0.937	100	1.997	100	1.444	100
11	1.540	100	1.316	100	1.533	99.956	1.313	100	2.008	100	1.714	100
12	1.885	100	1.236	100	1.253	100	2.28	100	1.318	100	1.111	100
13	1.396	100	1.309	100	1.364	100	1.578	100	1.272	100	0.89	100
14	0.932	100	0.991	100	1.599	100	0.869	100	1.072	100	1.04	100
15	1.295	100	2.013	100	1.537	100	1.871	100	1.033	100	1.203	100
16	2.320	100	1.321	100	1.361	100	1.027	100	1.267	100	1.709	100
17	1.159	100	1.14	100	1.454	100	1.085	100	0.957	100	1.307	100
18	1.515	100	1.053	100	1.173	100	1.253	100	1.557	100	1.735	100
19	2.721	100	2.309	100	2.706	99.928	2.247	99.997	2.68	100	2.579	100
20	1.770	100	1.307	100	1.279	100	1.158	100	1.43	100	1.48	100
21	0.972	100	1.171	100	1.47	100	1.226	100	1.45	100	1.275	100
22	2.297	100	2.088	100	2.135	100	2.217	100	2.604	100	2.628	100
23	1.740	100	1.477	100	2.511	100	1.699	100	2.208	100	2.093	100
24	2.878	100	3.052	99.999	3.045	100	3.354	100	2.671	100	2.428	100
25	2.753	100	2.278	100	2.296	100	2.276	100	1.907	100	2.005	100
26	3.160	100	2.884	100	2.867	100	3.215	100	2.442	100	2.868	100
27	2.368	100	2.459	100	2.08	100	2.212	100	2.065	100	2.052	100
28	1.197	100	1.185	100	1.299	100	1.279	100	1.348	100	1.839	100
29	1.636	100	1.55	100	1.697	100	1.932	100	1.182	100	1.649	100
30	2.286	100	2.646	100	2.469	100	2.429	100	1.82	100	1.969	100
31	0.926	100	2.229	100	1.171	100	1.215	100	0.913	100	0.933	100
32	1.120	100	0.916	100	1.151	100	1.028	100	0.95	100	0.973	100
135	2.364	100	1.75	100	2.958	100	1.817	100	1.497	100	2.075	100
138	2.427	100	1.745	100	1.386	100	1.51	100	1.627	100	1.46	100

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

Site →	Miami 4		Miami 5		Fairbanks 4		Fairbanks 5	
SV ↓	95% Range Error	3.29 Sigma Bounding (%)	95% Range Error	3.29 Sigma Bounding (%)	95% Range Error	3.29 Sigma Bounding (%)	95% Range Error	3.29 Sigma Bounding (%)
1	2.765	100	3.635	100	2.815	100	2.78	100
2	2.83	100	2.881	100	2.644	100	2.442	100
3	2.709	100	3.58	100	2.54	100	2.972	100
4	1.484	100	1.491	100	1.212	100	1.484	100
5	1.515	100	1.783	100	1.171	100	1.65	100
6	3.159	100	3.968	99.989	3.128	100	3.204	99.999
7	1.244	100	1.023	100	1.391	100	1.373	100
8	Offline	Offline	Offline	Offline	Offline	Offline	Offline	Offline
9	2.486	100	2.991	100	2.17	100	2.203	100
10	1.405	100	2.397	100	1.558	100	1.14	100
11	1.413	100	1.801	100	1.525	100	1.737	100
12	1.009	100	1.155	100	1.159	100	1.174	100
13	1.139	100	1.013	100	1.243	100	1.023	100
14	1.614	100	1.087	100	1.256	100	1.312	100
15	1.407	100	1.467	100	1.098	100	1.416	100
16	1.093	100	1.31	100	1.572	100	1.497	100
17	1.479	100	1.177	100	0.923	100	1.03	100
18	1.623	100	1.351	100	1.847	100	1.809	100
19	2.525	100	3.412	100	2.754	100	2.894	100
20	1.802	100	1.753	100	1.7	100	1.453	100
21	2.349	100	2.122	100	1.59	100	1.743	100
22	2.185	100	2.517	100	2.648	100	2.706	100
23	1.991	100	2.009	100	2.302	100	2.157	100
24	2.621	100	2.78	99.999	2.623	100	2.972	100
25	2.259	100	2.114	100	2.238	100	2.397	100
26	2.85	100	3.058	100	2.759	100	2.915	100
27	2.341	100	2.472	100	1.979	100	2.398	100
28	2.158	100	1.589	100	1.43	100	1.548	100
29	1.492	100	1.275	100	1.483	100	1.599	100
30	1.794	100	2.051	100	1.954	100	2.256	100
31	1.454	100	1.355	100	1.088	100	1.317	100
32	1.361	100	1.42	100	1.237	100	1.184	100
135	1.643	100	1.819	100	3.845	100	1.900	100
138	1.801	100	1.496	100	2.000	100	1.527	100

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

Site →	Chicago 4		Chicago 5		Boston 4		Boston 5		Seattle 4		Seattle 5	
SV ↓	95% Iono Error	3.29 Sigma Bounding(%)	95% Iono Error	3.29 Sigma Bounding(%)	95% Iono Error	3.29 Sigma Bounding(%)	95% Iono Error	3.29 Sigma Bounding(%)	95% Iono Error	3.29 Sigma Bounding(%)	95% Iono Error	3.29 Sigma Bounding(%)
1	2.144	100	2.066	100	2.242	100	2.165	100	1.922	100	2.145	100
2	1.456	100	1.666	100	1.660	100	1.571	100	1.734	100	1.818	100
3	1.565	100	1.766	100	1.788	100	2.138	100	1.971	100	1.936	100
4	0.882	100	0.779	100	0.847	100	0.904	100	0.723	100	0.776	100
5	0.805	100	1.483	100	1.236	100	0.963	100	0.934	100	0.974	100
6	2.726	100	2.737	99.942826	2.721	100	2.792	100	2.731	100	2.670	100
7	0.648	100	0.796	100	0.624	100	0.696	100	0.654	100	0.584	100
8	Offline	Offline	Offline	Offline	Offline	Offline	Offline	Offline	Offline	Offline	Offline	Offline
9	1.420	100	1.562	100	1.774	100	1.619	100	1.282	100	1.457	100
10	0.405	100	0.483	100	0.378	100	0.464	100	0.854	100	0.656	100
11	0.437	100	0.410	100	0.461	100	0.395	100	1.079	100	0.820	100
12	0.775	100	0.669	100	0.638	100	1.182	100	0.704	100	0.599	100
13	0.598	100	0.579	100	0.633	100	0.799	100	0.683	100	0.459	100
14	0.550	100	0.538	100	0.788	100	0.413	100	0.686	100	0.688	100
15	0.808	100	1.241	100	0.872	100	1.064	100	0.583	100	0.751	100
16	0.984	100	0.552	100	0.645	100	0.523	100	0.806	100	0.970	100
17	0.893	100	0.844	100	1.181	100	0.746	100	0.676	100	0.708	100
18	0.929	100	0.713	100	0.890	100	1.004	100	0.926	100	1.201	100
19	1.607	100	1.459	100	1.694	100	1.435	100	1.836	100	1.777	100
20	0.846	100	0.694	100	0.687	100	0.627	100	0.990	100	1.049	100
21	0.676	100	0.817	100	0.872	100	0.872	100	0.897	100	0.883	100
22	1.920	100	1.688	100	1.759	100	1.813	100	1.941	100	1.969	100
23	1.300	100	1.196	100	1.693	100	1.276	100	1.623	100	1.503	100
24	1.916	100	2.002	100	2.034	100	2.210	100	1.864	100	1.745	100
25	1.365	100	1.208	100	1.344	100	1.510	100	1.366	100	1.324	100
26	2.057	100	2.098	100	1.926	100	2.015	100	1.828	100	1.936	100
27	1.521	100	1.625	100	1.334	100	1.456	100	1.440	100	1.402	100
28	0.449	100	0.528	100	0.615	100	0.610	100	0.586	100	0.756	100
29	0.812	100	0.840	100	0.817	100	0.938	100	0.630	100	0.725	100
30	1.536	100	1.721	100	1.703	100	1.718	100	1.339	100	1.352	100
31	0.514	100	1.278	100	0.359	100	0.593	100	0.552	100	0.584	100
32	0.500	100	0.465	100	0.439	100	0.461	100	0.380	100	0.474	100

*No data available due to receiver in maintenance

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

Site →	Miami 4		Miami 5		Fairbanks 4		Fairbanks 5	
SV ↓	95% Iono Error	3.29 Sigma Bounding(%)	95% Iono Error	3.29 Sigma Bounding(%)	95% Iono Error	3.29 Sigma Bounding(%)	95% Iono Error	3.29 Sigma Bounding(%)
1	2.093	100	2.438	100	2.296	100	2.182	100
2	1.673	100	1.800	100	1.357	100	1.492	100
3	1.652	100	1.875	100	2.276	100	2.431	100
4	0.820	100	0.739	100	1.009	100	0.984	100
5	1.364	100	1.447	100	0.780	100	0.822	100
6	2.918	99.979	3.276	99.989	2.270	100	2.067	100
7	0.846	100	0.738	100	0.947	100	0.743	100
8	Offline	Offline	Offline	Offline	Offline	Offline	Offline	Offline
9	1.594	100	1.724	100	1.775	100	1.703	100
10	0.447	100	0.657	100	0.493	100	0.571	100
11	0.556	100	0.705	100	0.563	100	0.640	100
12	0.637	100	0.634	100	0.526	100	0.547	100
13	0.537	100	0.741	100	0.476	100	0.448	100
14	0.898	100	0.636	100	0.429	100	0.487	100
15	1.010	100	0.899	100	0.668	100	0.669	100
16	0.689	100	0.801	100	0.616	100	0.573	100
17	0.772	100	0.675	100	0.671	100	0.614	100
18	0.865	100	0.730	100	0.862	100	1.033	100
19	1.655	100	1.760	100	1.520	100	1.631	100
20	0.731	100	0.780	100	0.670	100	0.753	100
21	1.391	100	1.347	100	0.841	100	1.064	100
22	1.423	100	1.944	100	1.581	100	1.579	100
23	1.474	100	1.582	100	1.482	100	1.437	100
24	1.768	100	1.747	100	2.099	100	2.058	100
25	1.300	100	1.136	100	1.673	100	1.546	100
26	2.117	100	2.197	100	1.909	100	1.872	100
27	1.492	100	1.536	100	1.587	100	1.495	100
28	1.267	100	0.958	100	0.486	100	0.598	100
29	1.040	100	0.828	100	0.896	100	0.730	100
30	1.562	100	1.623	100	1.682	100	1.613	100
31	0.931	100	0.829	100	0.662	100	0.578	100
32	0.783	100	0.707	100	0.775	100	0.597	100

*No data available due to receiver in maintenance

12.3 G3 SQM

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

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

Appendix A: Glossary

General Terms and Definitions

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

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

C&V. The Correction and Verification Subsystem.

CONUS. Continental United States.

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

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

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

DR. Discrepancy Report

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

GEO. Geostationary Satellite.

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

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

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

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

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

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

IGS. International GPS Service.

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

LNAV. Lateral Navigation.

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

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

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

MOPS. Minimum Operational Performance Standards.

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

Navigation Message. Message structure designed to carry navigation data.

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

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

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

RFI. Radio Frequency Interference.

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

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

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

SV. Space Vehicle.

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

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

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

VNAV. Vertical Navigation.

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

Appendix B: Additional Coverage Plots

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

Figure B-1 98% CONUS LP Availability Contour

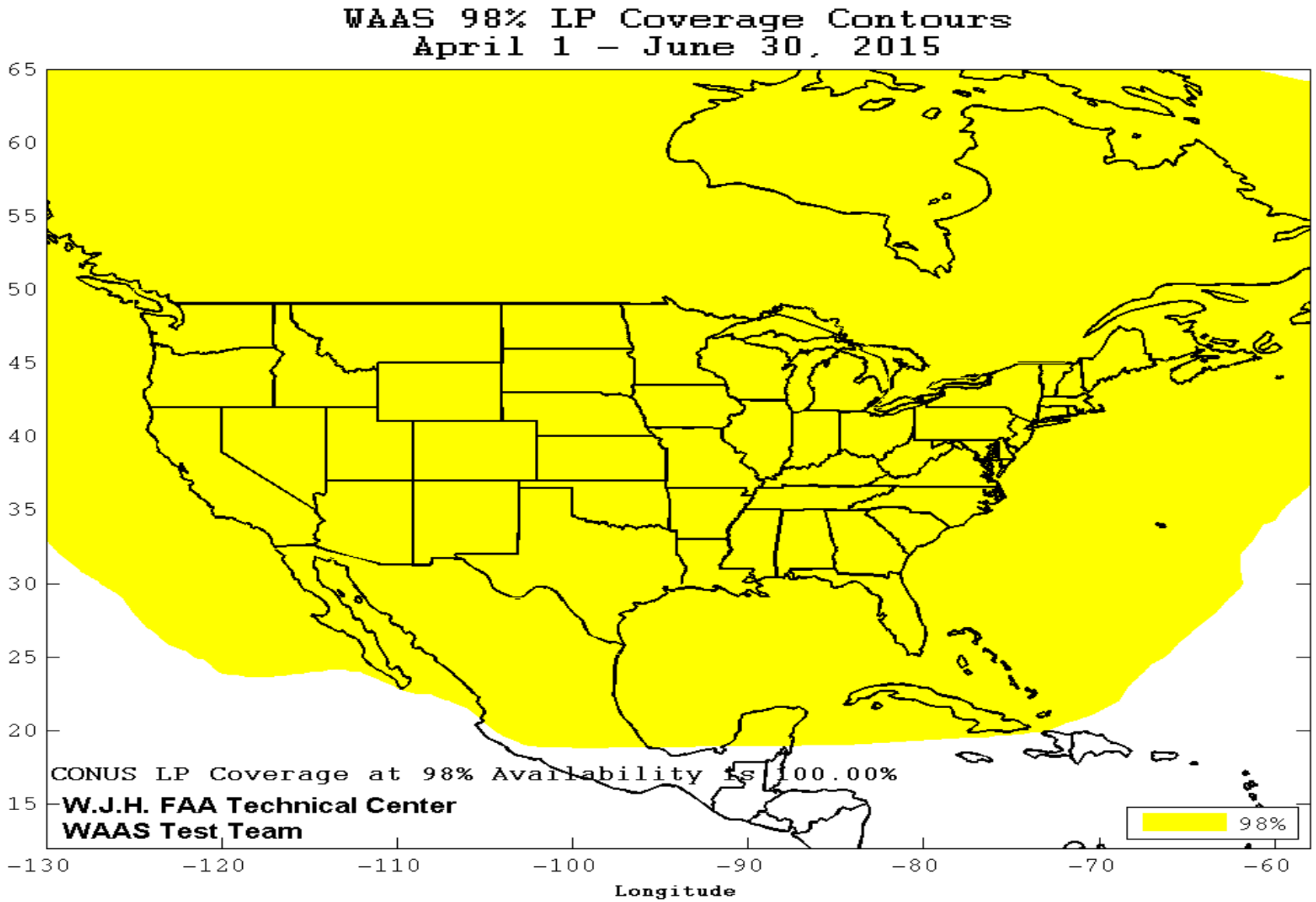


Figure B-2 98% Alaska LP Availability Contour

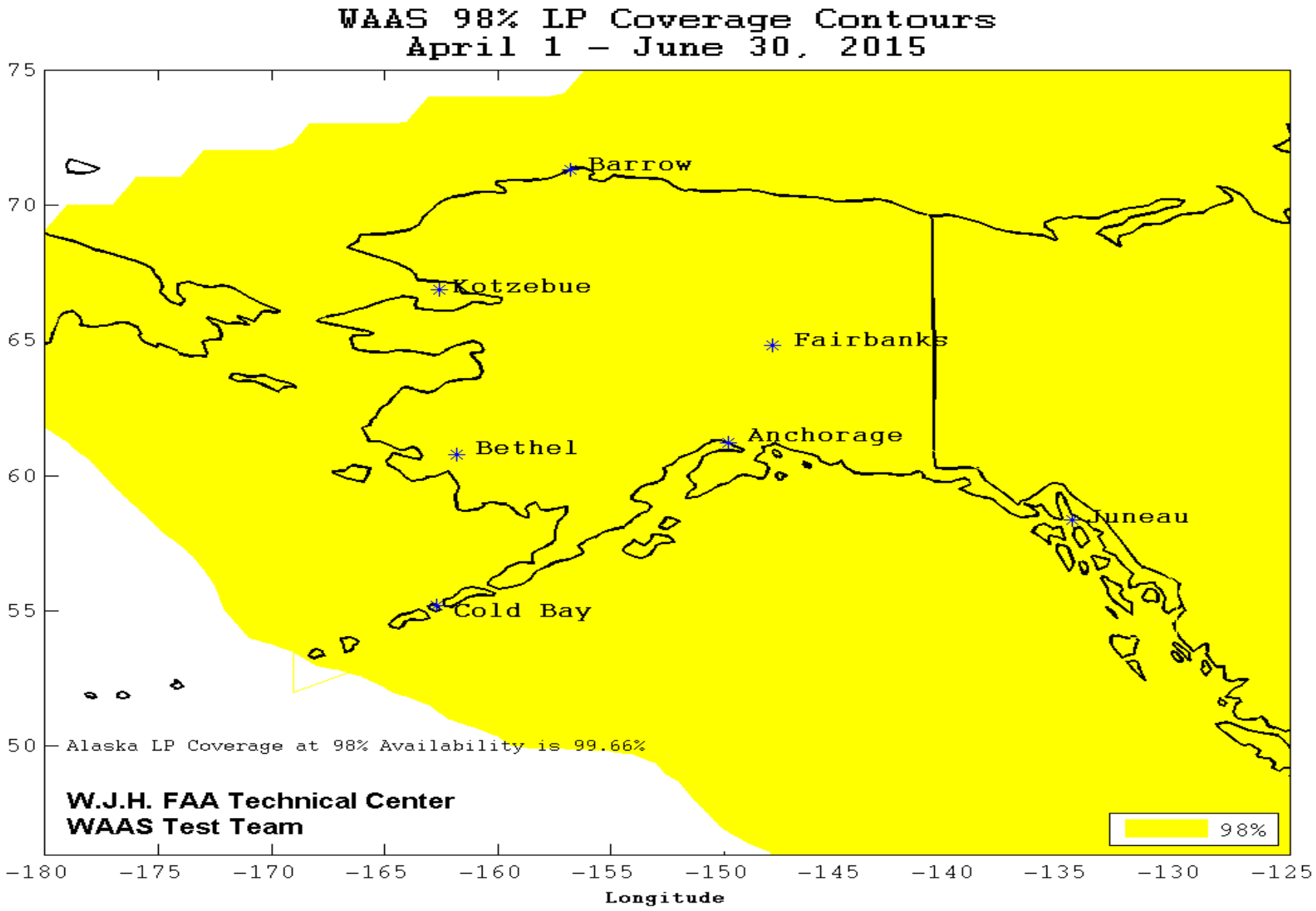


Figure B-3 98% CONUS LPV Availability Contour

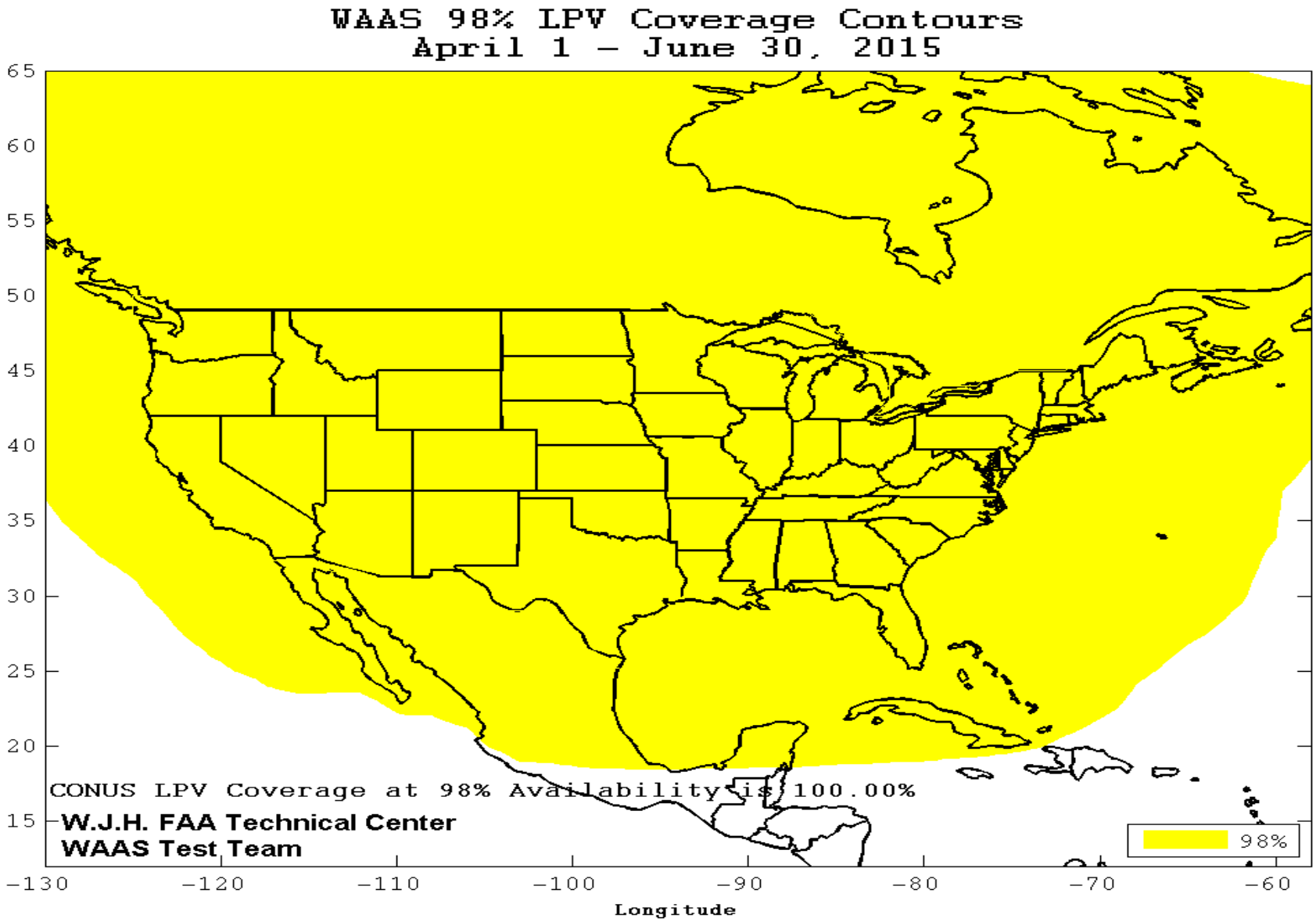


Figure B-4 98% Alaska LPV Availability Contour

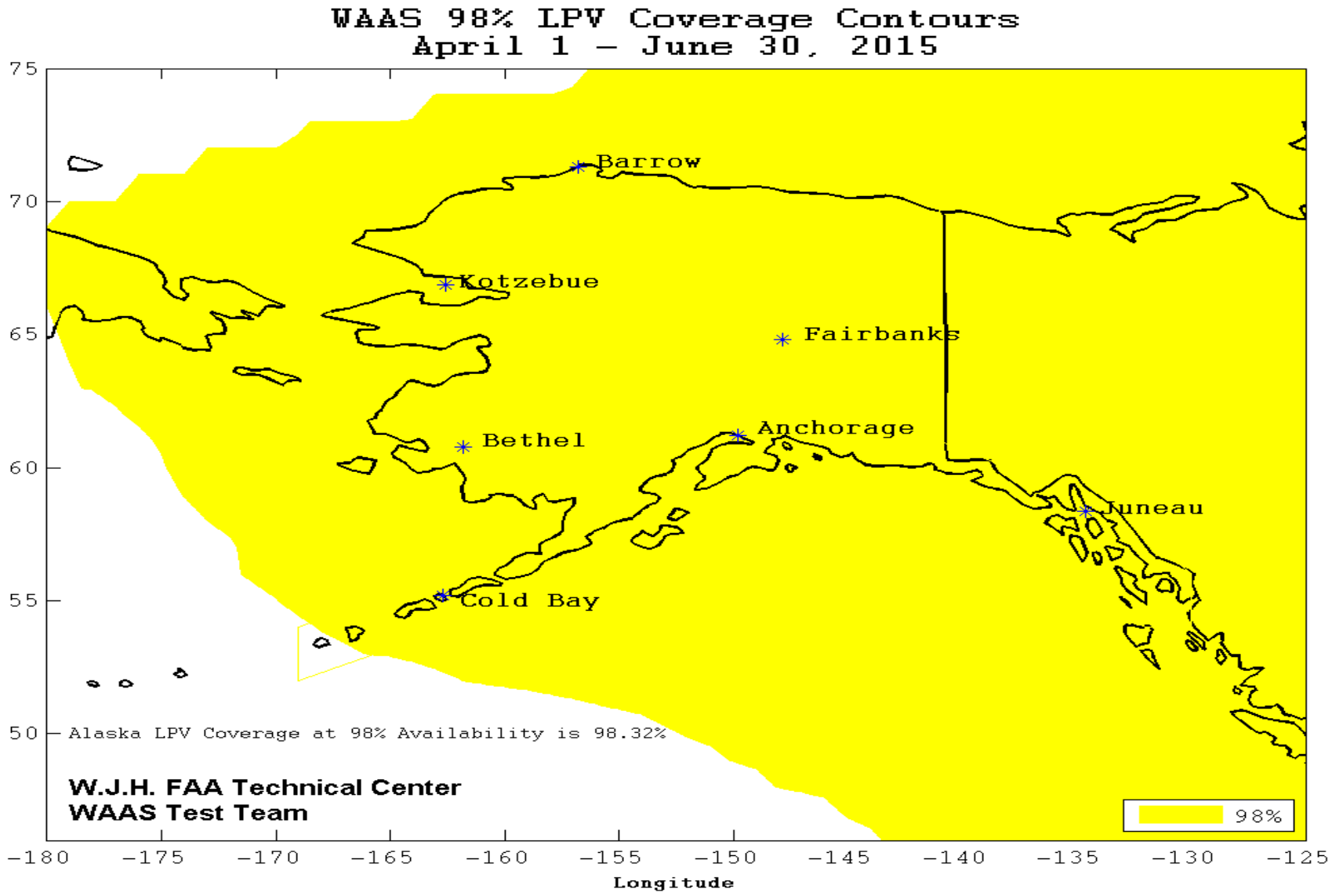


Figure B-5 99% CONUS LPV 200 Availability Contour

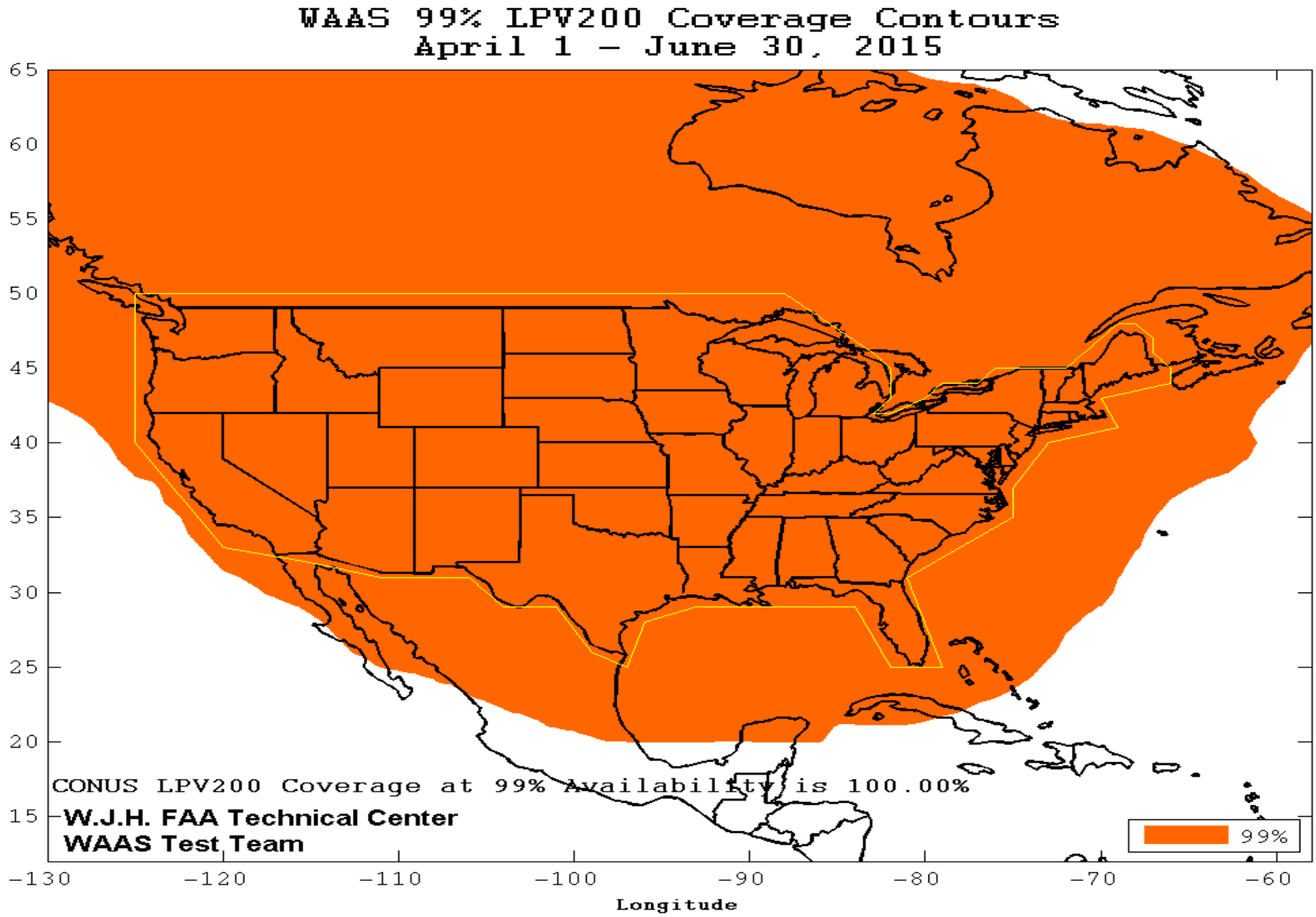


Figure B-6 99% Alaska LPV 200 Availability Contour