WIDE-AREA AUGMENTATION SYSTEM PERFORMANCE ANALYSIS REPORT

Report #40

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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 PAN (Performance Analysis Network) Report. In addition to that report, the WAAS Test Team reports on the performance of the Wide-Area Augmentation System (WAAS). This report is the fortieth such WAAS quarterly report. This report covers WAAS performance during the period from January 1, 2012 to March 31, 2012.

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. See the body of the report for additional results in accuracy, availability, safety index, range accuracy, WAAS broadcast message rates, and GEO ranging availability. 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.

Parameter	CONUS Site/Maximum	CONUS Site/Minimum	Alaska Site/Maximum	Alaska Site/Minimum
95% Horizontal Accuracy (HPL <= 40 meters)	Grand Forks 1.443 meters	Denver 0.587 meters	Barrow 0.711 meters	Bethel .577 meters
95% Vertical Accuracy (VPL <= 50 meters)	Miami 1.742 meters	Salt Lake City 0.834 meters	Anchorage 1.44 meters	Bethel 1.014 meters
LP Availability (HPL <= 40 meters)	Seattle 100%	Washington DC 99.99%	Fairbanks 100%	Kotzebue 99.94%
LPV Availability (HPL <= 40 meters & VPL <= 50 meters)	Seattle 100%	Arcata 99.96%	Juneau 99.99%	Barrow 99.90%
LPV 200 Availability (HPL <= 40 meters & VPL < =35 meters)	Salt Lake City 100%	Arcata 97.70%	Anchorage 99.99%	Cold Bay 96.75%
99% HPL	Miami 19.29 meters	Denver 11.29 meters	Cold Bay 27.91 meters	Fairbanks 13.74 meters
99% VPL	Arcata 38.51 meters	Chicago 19.05 meters	Cold Bay 37.85 meters	Anchorage 22.34 meters

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDIX

1.0 INTRODUCTION

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

Objectives of this report are:

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

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

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

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

The results in this report are based on the application of the WAAS corrections to receiver data from the WAAS receiver network and receivers of the FAA's National Satellite Test Bed (NSTB) network and from analysis based on the correction data broadcast by WAAS. Table 1.2 lists the receivers used in the PA analyses. Table 1.3 lists the receivers used in the NPA analyses.

Table 1-1 WAAS Service Levels

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

Table 1-2 PA Sites

	Number of Days Evaluated	Number of Samples
NSTB:		
Arcata	85	7332306
Grand Forks	83	7200489
Oklahoma City	82	7082681
WAAS:		
Albuquerque	91	7862136
Anchorage	91	7862393
Atlanta	91	7857309
Barrow	91	7860588
Bethel	91	7860302
Billings	91	7862338
Boston	91	7862297
Chicago	91	7862283
Cleveland	91	7861420
Cold Bay	91	7856472
Dallas	91	7862367
Denver	91	7861820
Fairbanks	91	7862297
Gander	91	7860572
Goose Bay	91	7862397
Houston	91	7862142
Iqaluit	91	7860465
Jacksonville	91	7862385
Juneau	91	7856665
Kansas City	91	7862116
Kotzebue	91	7859225
Los Angeles	91	7862398
Memphis	91	7862394
Merida	91	7862262
Mexico City	91	7847210
Miami	91	7862351
Minneapolis	91	7862393
New York	91	7862141
Oakland	91	7861829
Puerto Vallarta	91	7860272
Salt Lake City	91	7861984
San Jose Del Cabo	91	7860686
Seattle	91	7861894
Tapachula	65	5638232
Washington DC	91	7861967
Winnipeg	91	7862378
San Juan*	N/A	N/A

*Offline for roof reconstruction

Table 1-3 NPA Sites

Location	Number of Days Evaluated	Number of Samples
Albuquerque	91	7859380
Anchorage	91	7859661
Atlanta	91	7854307
Barrow	91	7856970
Bethel	91	7856053
Billings	91	7833459
Boston	91	7859402
Cleveland	91	7859661
Cold Bay	91	7853225
Fairbanks	91	7859604
Gander	91	7857729
Honolulu	91	7856675
Houston	91	7859664
Iqaluit	91	7858291
Juneau	91	7853854
Kansas City	91	7854879
Kotzebue	91	7856925
Los Angeles	91	7859668
Merida	91	7850374
Miami	91	7857853
Minneapolis	91	7836061
Oakland	91	7856157
Salt Lake City	91	7859658
San Jose Del Cabo	91	7856135
Seattle	91	7859611
Tapachula	89	7661213
Washington DC	91	7852973

The report is divided in the performance categories listed below.

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

* Instantaneous availability (i.e. Availability is calculated every second.)

1.1 Event Summary

Table 1.5 lists events that occurred during the reporting period that affected WAAS performance or the ability to determine the WAAS performance. 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. The switchovers result in an approximately 14 second gap in data and require the users to reacquire the set of corrections from that GEO. Re-collecting the set of corrections can take up to 5 minutes depending on where the switch occurs in the 5 minute ionosphere corrections update cycle.

Table 1-5 Events

Start Date	End Date	Location Satellite	Service Affected	Event Description
12/29/11	01/06/12	GEO135	Alaska	Daily instances where LPV-200 service in Alaska was impacted by degradation of the CRW GEO signal (PRN-135) caused by a noisy oscillator onboard the GEO. Continuous observation of the problem started on 12/29/11. Maintenance was started on 1/5/12 and completed on 1/6/12 to switch to a backup oscillator. That maintenance caused the temporary full outage of CRW navigation signal which resulted in a temporary loss of all WAAS service in NW Alaska where there is only single GEO coverage provided by CRW.

Start Date	End Date	Location Satellite	Service Affected	Event Description
				See DR#107 CRW Oscillator Failure.
01/05/12	01/05/12	Washington DC (ZDC1)	Local	Radio Frequency Interference (RFI) event caused local service outage.
01/16/12	01/16/12	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200_Alaska	Elevated uncertainty in the WAAS ionosphere corrections (Increased Grid Ionosphere Vertical Error values) caused decreased coverage in the Alaska region.
01/21/12	01/21/12	GEO135	LPV200_Alaska	Napa C&V Source Select - ZLA to ZTL Napa C&V Source Select - ZLA to ZTL TOW 552671-552673.
01/21/12	01/21/12	PRN138	LPV200_CONUS, LPV200_Alaska	TOW 561095-599644 (10-15)
01/22/12	01/23/12	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	All	A coronal mass ejection (CME) from a solar flare on Jan. 19th arrived on Jan. 22nd causing disturbances to Earth's geomagnetic field (increased planetary magnetic index – Kp) which resulted in disturbances to the ionosphere which caused decreased WAAS coverage in northern CONUS, Alaska, and Canada.
01/25/12	01/25/12	Albuquerque (ZAB1), (ZAB2), (ZAB3)	Local	Loss of service due to Radio Frequency Interference (RFI).
01/30/12	01/30/12	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_CONUS, LPV200_CONUS	High UDREs on PRNs 14, 22 and 31. On Jan. 30th at approximately 22:18 GMT, an unexpected 2 minutes LPV and 2-8 minutes LPV200 outages occurred on the West coast of CONUS (California, Oregon, and Washington). Increase of VPL (up to 41 m) was caused by elevated UDRE values on PRNs 14, 22, 31, 135, and 138. This is a reoccurrence of events observed in 3rd quarter of 2011 that are linked to the solar equinoxes and the increasing solar activity as we move into the impending peak of the sun spot cycle. Large post correction ionosphere delay range errors at the southern Mexico sites degrades the WAAS Range Domain Monitor's (RDM) instantaneous receiver clock estimate which results in increased range uncertainties (high UDREs) on multiple satellites in view of the impacted Mexican site. This results in temporary loss of availability anywhere those satellites are critical. WAAS software upgrade Release 3a1 removed the southern Ionosphere Grid Points (IGPs) from the WAAS ionosphere correction grid to mitigate this

Start Date	End Date	Location Satellite	Service Affected	Event Description
				problem. See table 1- 6.
02/03/12	02/03/12	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200_Alaska	Reduced Alaska LPV200 coverage due to one IGP (75,-160) GIVE value increased from 4.5m to 15m.
02/04/12	02/04/12	Billings (BIL1), (BIL2), (BIL3)	Local	Radio Frequency Interference (RFI) event caused loss of service.
02/07/12	02/07/12	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200_CONUS, LPV200_Alaska	High GIVE values and increased Planetary magnetic index (Kp) caused loss of LPV200 in CONUS and Alaska.
02/09/12	02/09/12	Washington DC (ZDC1), DC (ZDC2), DC (ZDC3)	Local	Radio Frequency Interference (RFI) event caused loss of service.
02/09/12	02/23/12	PRN26	LPV_Mexico, LPV200_CONUS, LPV200_Canada	Unscheduled GPS satellite outage, see SAT NANU 2012006 (UNUSUFN) out until further notice. NANU 2012012
02/10/12	02/25/12	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV), PRN14, RN18, PRN22	LPV_CONUS, LPV200_CONUS	UDRE spikes possibly RDM Bumping issue (see 1/30/12 event above). W1675D4 & 1676D1 additional occurrence for SAT 14 & 22. W1676D6 SAT 14, 22, 135, and 138.
02/13/12	02/13/12	Washington DC (ZDC1), DC (ZDC2), DC (ZDC3)	Local	Radio Frequency Interference (RFI) event caused LPV 200 outage at Boston.
02/15/12	02/15/12	GEO135	LPV200_CONUS, LPV200_Alaska	Napa/ZTL Primary, no GUS switchover or source select. Phase/frequency "pops" on SGS clock (PNE). Napa/ZTL Primary, no GUS switchover or source select. TOW 283576-283579.
02/16/12	02/18/12	Boston (ZBW1), (ZBW2), (ZBW3)	Local	Radio Frequency Interference (RFI) event caused LPV 200 outage at Boston.
02/19/12	02/19/12	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200_Alaska	Planetary magnetic index – Kp=5, caused LPV 200 outage in Alaska.
02/21/12	02/21/12	Los Angeles (CnV), PRN133	None	Elevated VPE was observed when the AMR GEO sourced by the ZLA master station was selected as the corrections source for Miami. Miss matching of the GEO orbit estimates across the 3 WAAS master stations occasionally results in

Start Date	End Date	Location Satellite	Service Affected	Event Description
				elevated UDREs and increased ranging error for GEO ranging depending on which GEO data stream is utilized for the WAAS fast corrections. The issue occasionally occurs when the master station source of the GEO navigation data (MT-9s) is different from the master station source of the fast corrections. This problem is being fixed in WAAS software Release 3B.
02/21/12	02/22/12	PRN27	LPV200_Alaska	GPS satellite outage, see NANU 2012009. For 2 hours after PRN 27 came back from a Delta-V planned maintenance, UDRE values were elevated and an SV Glitch was also observed, see section 5.4.
02/27/12	02/28/12	PRN25	LPV200_CONUS, LPV200_Alaska	Unscheduled GPS satellite outage. PRN-25 may have been set to non-standard code. See NANU 2012015.
02/27/12	02/28/12	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	Alaska, Canada, LPV200_CONUS	Planetary magnetic index – Kp = 5. 225 GIVE monitor trips.
02/29/12	02/29/12	PRN1	LPV_CONUS, LPV200_CONUS	NANU 2012016.
03/01/12	03/02/12	GEO138	LPV200_CONUS	GUS switchover, QWE faulted, BRE to primary at 426788. TOW 426779-426786. Elevated UDRE values caused LPV200 outages.
03/01/12	03/01/12	Washington DC (ZDC1), DC (ZDC2), DC (ZDC3)	Local	Radio Frequency Interference (RFI) event at Washington D.C. caused loss of LPV service.
03/07/12	03/07/12	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_Alaska, LPV_Canada, LPV200_Alaska, LPV200_Canada	Disturbances to the ionosphere from solar event related geomagnetic activity caused increased GIVE values for IGPs in western Canada and eastern Alaska, resulting in a drop in coverage. Kp=6.
03/07/12	03/07/12	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	None	WAAS Software upgrade to release 3A1. Removed all IGPs at 10 degrees north latitude and the 3 western most IGPs at 15 degrees north latitude.
03/08/12	03/09/12	Los Angeles (CnV)	None	WAAS CnV software upgraded to Build W6.098L. ZLA CnV was out of service from 426765 to 434075. Source selection for GEO 133 (AMR) changed from ZLA to ZDC at 426564.
03/09/12	03/09/12	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV), PRN4	LPV200_CONUS, LPV200_Mexico	Glitch event observed on PRN-4 (see section 5.4) that caused an alarm to "Not Monitored". The temporary loss of service from PRN-4 negatively impacted coverage.
03/09/12	03/09/12	Washington D.C. (CnV),	LPV_Alaska, LPV_Canada,	Disturbances to the ionosphere from solar event related geomagnetic activity caused increased

Start Date	End Date	Location Satellite	Service Affected	Event Description
		Los Angeles (CnV), Atlanta (CnV)	LPV200_CONUS, LPV200_Alaska, LPV200_Canada	GIVEs in the Alaska and Canada regions to be set to the solar storm state of 45 meters (GIVEs tripped) resulting in a loss of coverage. Kp= 7 and Kp = 8.
03/10/12	03/10/12	Washington D.C. (CnV)	None	WAAS CnV software upgraded to Build W6.098L. ZDC CnV was out of service from TOW 521976 to 528329. Source selection for GEO 133 (AMR) changed from ZDC to ZLA at 521202. Source selection for GEO 138 (CRE) changed from ZDC to ZLA at 521294.
03/12/12	03/14/12	Boston (ZBW1), (ZBW2), (ZBW3)	Local	Radio Frequency Interference (RFI) over the course of three days caused local LPV200 service outage on Mar. 14th from 14:04:02 - 14:04:48.
03/12/12	03/12/12	Atlanta (CnV)	None	WAAS CnV software upgraded to Build W6.098L. ZTL CnV was out of service from TOW 137976 to 142831. Source selection for GEO 135 (CRW) changed from ZTL to ZDC at 137848.
03/15/12	03/15/12	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_CONUS, LPV200_CONUS	Disturbances to the ionosphere from solar event related geomagnetic activity caused increased GIVE values for IGPs in western Canada. Kp=6.
03/17/12	03/18/12	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV), PRN135	LPV_Alaska, LPV200_Alaska	On Mar. 17th, there was an SV alert on PRN 135 at TOW 582260 (17:44:05 GMT). UDREi was set to 12 causing ~3 minute LPV200 outage in Florida and raised protection levels over a greater area than normal in California. High UDREi of 11 on the next day affected LPV and LPV200 coverage in Alaska. Missed Messages on CRW caused by PNE at APC. Switched to LTN as primary on 3/20. PNE was replaced on 3/22.
03/19/12	03/19/12	PRN135	LPV_Alaska, LPV200_Alaska	High UDRE on GEO 135 cause a loss of service in Alaska
03/20/12	03/21/12	GEO135, NAPA (APC)	Alaska	GUS manual switchover, Napa to Littleton. TOW 201887-201893. Event spanned the day rollover. Missed Messages on CRW caused by PNE at APC. Switched to LTN as primary on 3/20. PNE was replaced on 3/22.
03/27/12	03/28/12	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	Canada, LPV200_CONUS	Disturbances to the ionosphere from solar event related geomagnetic activity caused increased GIVE values for IGPs in northeastern CONUS and Canada. Kp=4.
03/28/12	04/02/12	Washington DC (ZDC1), DC (ZDC2), DC (ZDC3)	Local	Continuing RFI events affected all 3 threads causing loss of service. Localized LPV200 Outage on 3/28/12 and LPV & LPV200 Outage on 4/212.
03/31/12	03/31/12	Washington D.C. (CnV),	LPV200_CONUS	High GIVE values caused loss of service for LPV200 CONUS for approximately 4 min in the

Start Date	End Date	Location Satellite	Service Affected	Event Description
		Los Angeles (CnV), Atlanta (CnV)		northwestern coast.

Table 1-6 WAAS Upgrades

State Date	End Date	Event Description
03/07/2012	03/07/2012	WAAS Software upgrade to release 3A1. Removed all IGPs at 10 degrees north latitude and the 3 western most IGPs at 15 degrees north latitude.
03/08/2012	03/09/2012	WAAS CnV software upgraded to Build W6.098L. ZLA CnV was out of service from 426765 to 434075. Source selection for GEO 133 (AMR) changed from ZLA to ZDC at 426564.
03/10/2012	03/10/2012	WAAS CnV software upgraded to Build W6.098L. ZDC CnV was out of service from 521976 to 528329. Source selection for GEO 133 (AMR) changed from ZDC to ZLA at 521202. Source selection for GEO 138 (CRE) changed from ZDC to ZLA at 521294.
03/12/2012	03/12/2012	WAAS CnV software upgraded to Build W6.098L. ZTL CnV was out of service from 137976 to 142831. Source selection for GEO 135 (CRW) changed from ZTL to ZDC at 137848.

Table 1-7 GUS Switchovers

Start Date	End Date	GUS Switch	Location Satellite	Service Affected	Event Description
01/25/12	01/25/12	Faulted	GEO133, Santa Paula (SZP)	None	GUS switchover, SZP faulted. TOW 332461-332478.
01/28/12	01/28/12	Manual	GEO133, Pamalu (HDH)	None	GUS manual switchover, HDH to SZP, TOW 552673-552694.
03/01/12	03/02/12	Faulted	GEO138	LPV200_CONUS	GUS switchover, QWE faulted, BRE to primary at TOW 426788. TOW 426779-426786. Elevated UDREis caused LPV200 outages day 5.
03/16/12	03/16/12	Manual	GEO138	None	Manual GUS switchover - Brewster to Woodbine. TOW 459242-459247.
03/20/12	03/21/12	Manual	GEO135, NAPA (APC)	Alaska	GUS manual switchover, Napa to Littleton. TOW 201887-201893. Event spanned the day rollover. Missed Messages on CRW caused by PNE at APC. Switched to LTN as primary on 3/20. PNE was replaced on 3/22.

1.2 Report Overview

Section 2 provides the vertical and horizontal position accuracies from data collected, on a daily basis, at one-second intervals. The 95% accuracy index and the maximum accuracy for the reporting period are tabulated. The daily 95% accuracy index is plotted graphically for each receiver. Histograms of the vertical and horizontal error distribution are provided for the combined WAAS receiver locations (see Table 1-2) within the WAAS service area.

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 the percent of coverage provided by WAAS on a daily basis. Quarterly roll-up graphs presented indicate the portions of service volume covered, and the percentage of time that WAAS was available.

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.

2.0 WAAS POSITION ACCURACY

Navigation error data, collected from WAAS and NSTB reference stations, was processed to determine position accuracy at each location. This was accomplished by utilizing the GPS/WAAS position solution tool to compute a RTCA DO-229D weighted least squares user navigation solution, and WAAS horizontal and vertical protection levels (HPL & VPL), once every second. The user position calculated for each receiver was compared to the surveyed position of the antenna to assess position error associated with the WAAS SIS over time. The position errors were analyzed and statistics were generated for the operational service levels shown in Table 1.1.

Table 2.1 shows PA horizontal and vertical position accuracy maintained for 95% of the time at LP, LPV and LNAV/VNAV operational service levels for the quarter. The table also includes 95% SPS accuracy for certain locations. Figures 2.1 to 2.6 show the daily horizontal and vertical 95% accuracy for LPV operational service level for the period. Note that WAAS accuracy statistics presented are compiled only when all WAAS corrections (fast, long term, and ionospheric) for at least 4 satellites are available. This is referred to as PA navigation mode. The percentage of time that PA navigation mode was supported by WAAS at each receiver is also shown in Table 2.1. A user is considered to be in NPA navigation mode if only WAAS fast and long term corrections are available to a user (i.e. no ionospheric corrections). Table 2.2 shows NPA horizontal position accuracy for 95% and 99.999% of the time. This table also shows the maximum NPA horizontal position error for the quarter. Figures 2.7 to 2.8 show the daily horizontal 95% accuracy for NPA.

Table 2.3 shows the maximum LPV error statistics. The column marked ‘Horizontal Error’ shows the maximum position errors while the calculated HPL meets the LPV service level defined in Table 1.1. The column marked

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

During this reporting period, the maximum 95% CONUS horizontal and vertical LPV errors are 1.443 meters at Grand Forks and 1.742 meters at Miami, respectively. The minimum 95% CONUS horizontal and vertical LPV errors are 0.587 meters at Denver and 0.834 meters at Salt Lake City, respectively. The maximum 95% and 99.999% NPA horizontal errors are 6.364 meters and 11.732 meters both at Honolulu, respectively. The minimum 95% and 99.999% horizontal errors are 1.25 meters at Albuquerque and 3.585 meters at Washington DC, respectively.

The decreases in 95% accuracy on 1/22/12, 3/9/12 and 3/15/22 in Figure 2.1 to 2.8 are due to geomagnetic activity. WAAS Software upgraded to Release 3A1 on 3/7/12 significantly reduced Tapachula availability. As a result, Tapachula is no longer evaluated for the PAN report beginning 3/8/12.

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 Figure 2.9 and 2.10 show the distributions of vertical position errors (VPE) versus vertical protection levels (VPL) and horizontal position errors (HPE) versus horizontal protection levels (HPL). The horizontal axis is the position error and the vertical axis is the WAAS protection levels. Lower protection levels equate to better availability. The diagonal line shows the point where error equals protection level. Above and to the left of the diagonal line in the chart, errors are bounded (WAAS is providing integrity in the position domain); below and to the right, errors are not bounded (HMI could be present). The 2-D histogram plots in Figure 2.11 and 2.12 show the distributions of vertical and horizontal position errors and normalized position errors. The blue trace shows the distributions of the actual vertical and horizontal errors. The horizontal axis is the position errors and the vertical axis is the total count of data samples (log scale) in each 0.1-meter bin. The magenta trace show the distributions of the actual vertical and horizontal errors normalized by one-sigma value of the protection level; vertical - (VPL/5.33) and horizontal - (HPL/6.0). The horizontal axis is the standard units and vertical axis is the observed distribution of normalized errors data samples in each 0.1-sigma bin. Narrowness of the normalized error distributions shows very good observed safety performance.

Table 2-1 PA 95% Horizontal and Vertical Accuracy

Location	Horizontal (HAL=40m) (Meters)	Horizontal (HAL=556m) (Meters)	Vertical (VAL=50m) (Meters)	Percentage in PA mode (%)	SPS Accuracy	
					95% Horizontal (Meters)	95% Vertical (Meters)
Arcata	1.23700	1.23700	1.30700	100	*	*
Grand Forks	1.44300	1.44300	1.57500	100	*	*
Oklahoma City	0.76300	0.76300	1.35200	100	*	*
Albuquerque	0.60600	0.60600	0.87800	99.99999	1.961	4.462
Anchorage	0.64600	0.64600	1.44000	100	*	*
Atlanta	0.70900	0.70900	1.23200	100	2.305	4.459
Barrow	0.71100	0.71100	1.38600	99.94751	*	*
Bethel	0.57700	0.57700	1.01400	100	1.972	6.326
Billings	0.81500	0.81500	0.96900	100	1.970	4.473
Boston	0.81900	0.81900	1.00100	100	2.411	4.271
Chicago	0.86900	0.86900	0.91900	100	*	*
Cleveland	0.72700	0.72700	1.09300	100	2.241	4.230
Cold Bay	0.66700	0.66700	1.14500	100	*	*
Dallas	0.70100	0.70100	1.29100	100	*	*
Denver	0.58700	0.58700	0.83800	100	*	*
Fairbanks	0.60000	0.60000	1.24400	100	2.057	6.159
Gander	0.81900	0.82000	1.21500	100	*	*
Goose Bay	0.80500	0.80800	1.16600	100	*	*
Houston	0.71500	0.71500	1.51600	100	2.361	4.611
Iqaluit	0.99500	0.99800	1.80900	100	*	*
Jacksonville	0.79100	0.79100	1.35800	100	*	*
Juneau	0.68800	0.68800	1.05000	100	*	*
Kansas City	0.63800	0.63800	0.90100	100	2.131	4.355
Kotzebue	0.65300	0.65300	1.15600	99.94750	2.082	6.296
Los Angeles	0.72100	0.72100	1.05000	100	2.018	5.354
Memphis	0.73400	0.73400	1.05100	100	*	*
Merida	0.72100	0.72100	1.90700	100	*	*
Mexico City	0.80000	0.80000	1.86700	100	*	*
Miami	0.89700	0.89700	1.74200	100	2.737	4.712
Minneapolis	0.79200	0.79200	0.88700	100	2.132	4.383
New York	0.82900	0.82900	0.99100	100	*	*
Oakland	0.60900	0.60900	0.92400	100	2.021	5.422
Puerto Vallarta	0.83400	0.83400	2.06000	100	*	*
Salt Lake City	0.64100	0.64100	0.83400	100	1.936	4.808
San Jose Del Cabo	0.75500	0.75500	2.05000	100	*	*
Seattle	0.74800	0.74800	0.88600	100	1.983	5.193
Tapachula	1.17800	1.18800	2.28200	99.89475	*	*
Washington DC	0.79900	0.79900	1.06000	99.99999	2.415	4.379
Winnipeg	0.64400	0.64400	1.07300	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	1.250	3.750	100	4.026
Anchorage	1.928	3.821	100	4.136
Atlanta	1.560	4.023	100	4.239
Barrow	1.978	4.365	99.950	4.520
Bethel	1.788	3.736	100	4.079
Billings	1.662	7.206	100	7.469
Boston	1.713	6.193	100	6.395
Cleveland	1.449	3.878	100	4.117
Cold Bay	1.470	4.977	100	5.130
Fairbanks	1.965	4.563	100	4.691
Gander	1.796	6.101	100	6.225
Honolulu	6.364	11.732	100	11.943
Houston	1.819	5.703	100	5.964
Iqaluit	2.416	5.156	100	6.635
Juneau	1.721	3.525	100	3.844
Kansas City	1.348	4.561	100	4.741
Kotzebue	1.858	3.963	99.950	4.267
Los Angeles	1.531	3.823	100	4.025
Merida	2.425	6.421	100	6.628
Miami	2.025	4.663	100	4.787
Minneapolis	1.677	5.508	100	5.824
Oakland	1.309	4.932	100	5.142
Salt Lake City	1.326	5.641	100	5.854
San Jose Del Cabo	2.438	6.758	100	7.103
Seattle	1.376	5.914	100	6.103
Tapachula	3.363	8.779	100	9.473
Washington DC	1.726	3.585	100	3.711

Table 2-3 Maximum LPV Error Statistics

Location	Horizontal Error (m)	Horizontal Error/HPL	Horizontal Maximum Ratio	Vertical Error (m)	Vertical Error/VPL	Vertical Maximum Ratio
Arcata	4.031	0.185	0.214	5.303	0.124	0.201
Grand Forks	4.105	0.215	0.309	7.049	0.161	0.264
Oklahoma City	2.328	0.164	0.229	4.897	0.207	0.270
Albuquerque	1.638	0.135	0.156	3.732	0.080	0.156
Anchorage	3.116	0.206	0.207	4.938	0.164	0.216
Atlanta	1.845	0.171	0.175	4.086	0.188	0.203
Barrow	2.163	0.110	0.181	4.964	0.182	0.202
Bethel	2.516	0.136	0.172	3.736	0.191	0.195
Billings	2.783	0.198	0.229	3.952	0.091	0.197
Boston	2.635	0.200	0.199	3.264	0.158	0.177
Chicago	2.046	0.219	0.222	2.899	0.151	0.179
Cleveland	2.149	0.210	0.213	3.103	0.169	0.199
Cold Bay	2.648	0.097	0.108	2.794	0.087	0.121
Dallas	1.922	0.142	0.187	2.729	0.111	0.213
Denver	1.677	0.168	0.199	3.746	0.141	0.163
Fairbanks	2.597	0.088	0.160	4.863	0.202	0.202
Gander	3.786	0.113	0.145	4.336	0.108	0.136
Goose Bay	3.632	0.193	0.193	6.727	0.143	0.171
Houston	2.003	0.129	0.176	3.738	0.125	0.222
Iqaluit	4.040	0.113	0.193	8.636	0.201	0.232
Jacksonville	2.117	0.205	0.205	3.816	0.182	0.190
Juneau	3.242	0.254	0.254	5.974	0.150	0.213
Kansas City	1.540	0.158	0.185	2.659	0.159	0.176
Kotzebue	2.564	0.174	0.175	5.714	0.169	0.193
Los Angeles	1.943	0.124	0.134	2.958	0.118	0.143
Memphis	1.876	0.144	0.184	2.867	0.150	0.157
Merida	1.998	0.117	0.134	4.484	0.132	0.198
Mexico City	4.122	0.184	0.197	3.872	0.123	0.187
Miami	2.049	0.107	0.142	4.805	0.172	0.180
Minneapolis	2.374	0.221	0.243	2.984	0.120	0.193
New York	1.982	0.164	0.164	2.990	0.156	0.156
Oakland	2.284	0.136	0.192	2.815	0.066	0.149
Puerto Vallarta	3.748	0.201	0.201	4.197	0.132	0.178
Salt Lake City	2.637	0.237	0.237	2.930	0.178	0.178
San Jose Del Cabo	2.645	0.145	0.154	4.158	0.149	0.179
Seattle	2.352	0.191	0.191	3.168	0.187	0.187
Tapachula	4.552	0.274	0.275	6.661	0.138	0.196
Washington DC	1.952	0.179	0.208	2.740	0.165	0.165
Winnipeg	3.139	0.111	0.184	4.670	0.214	0.216

Figure 2-1 LPV 95% Horizontal Accuracy

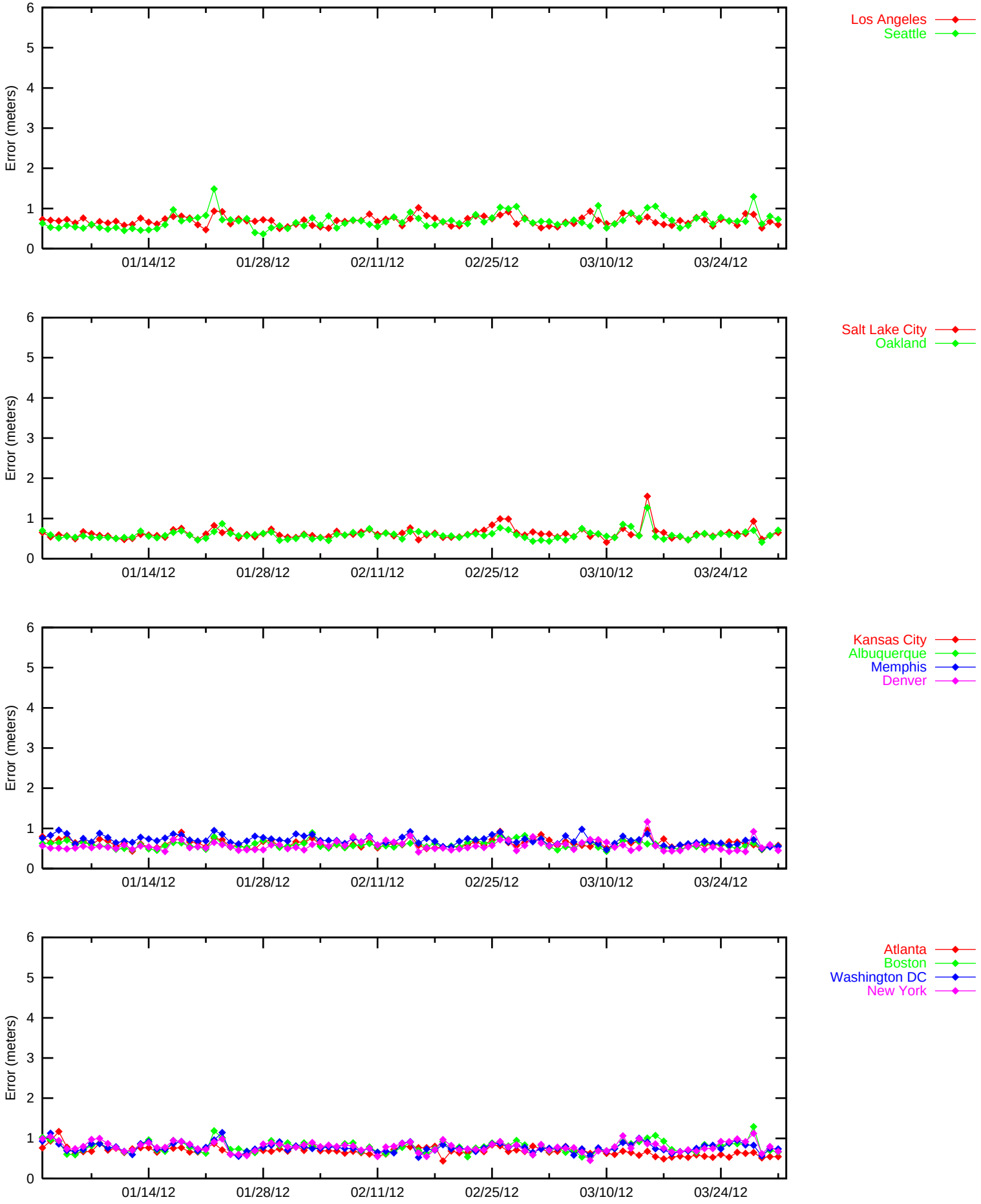


Figure 2-2 LPV 95% Horizontal Accuracy

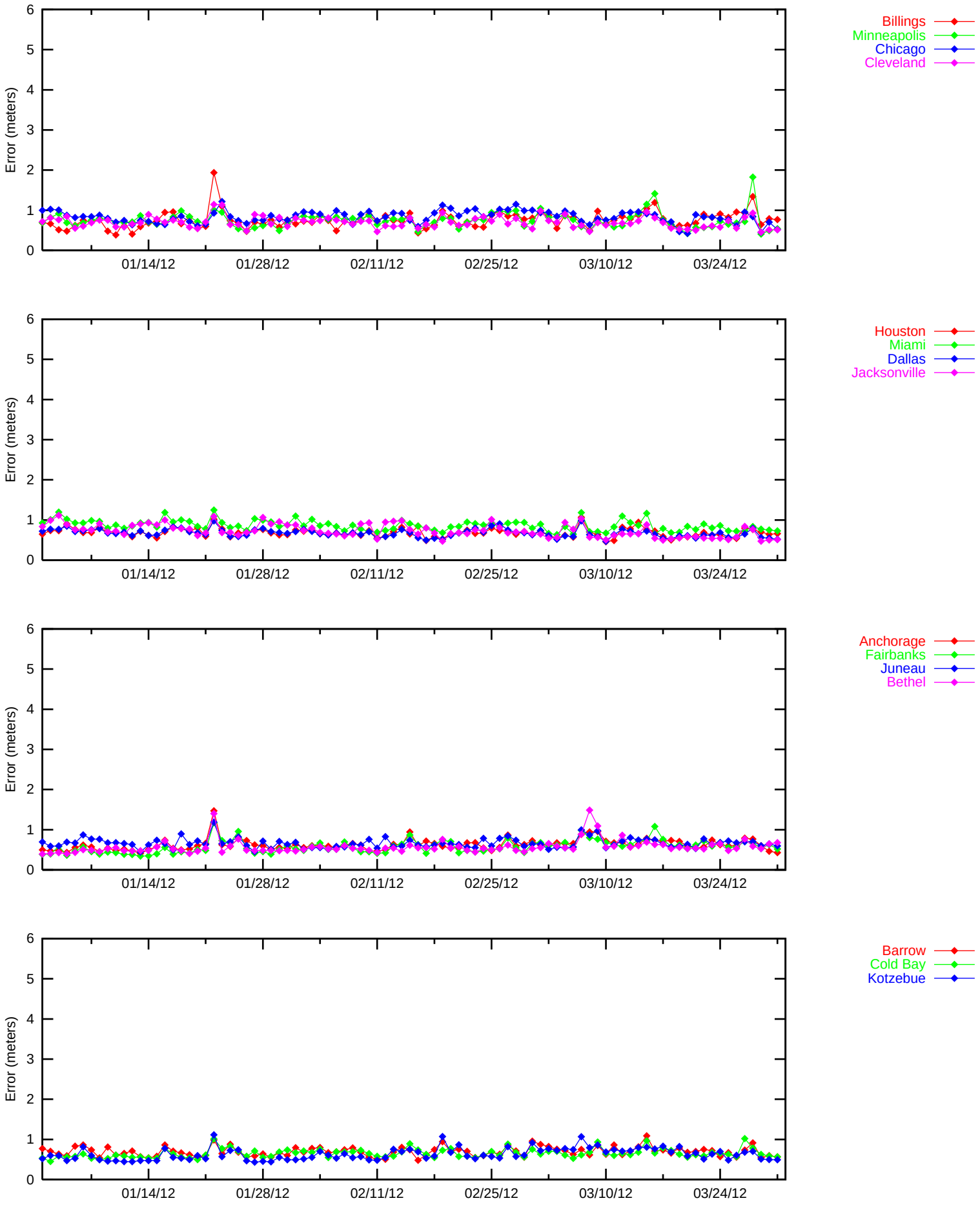


Figure 2-3 LPV 95% Horizontal Accuracy

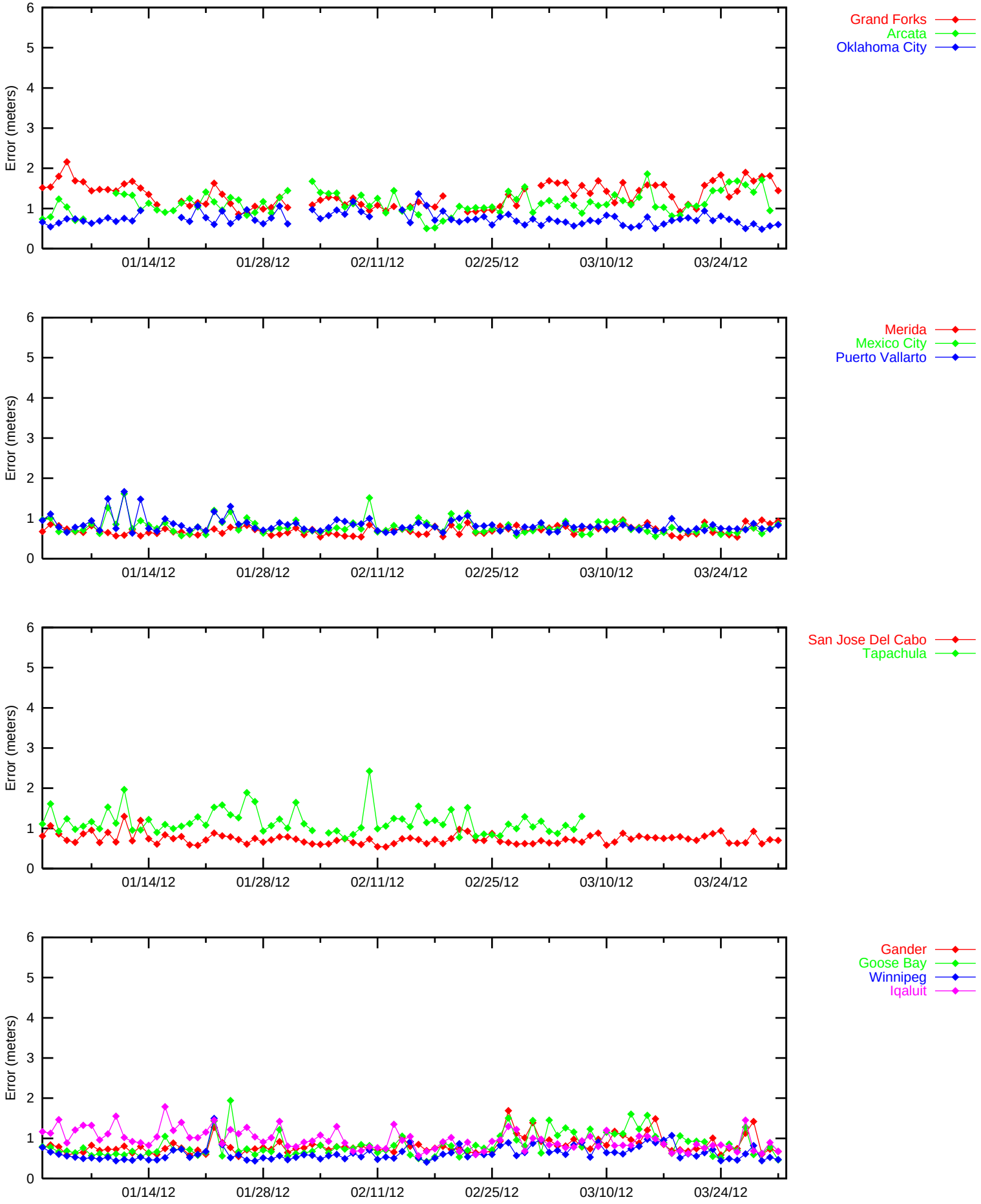


Figure 2-4 LPV 95% Vertical Accuracy

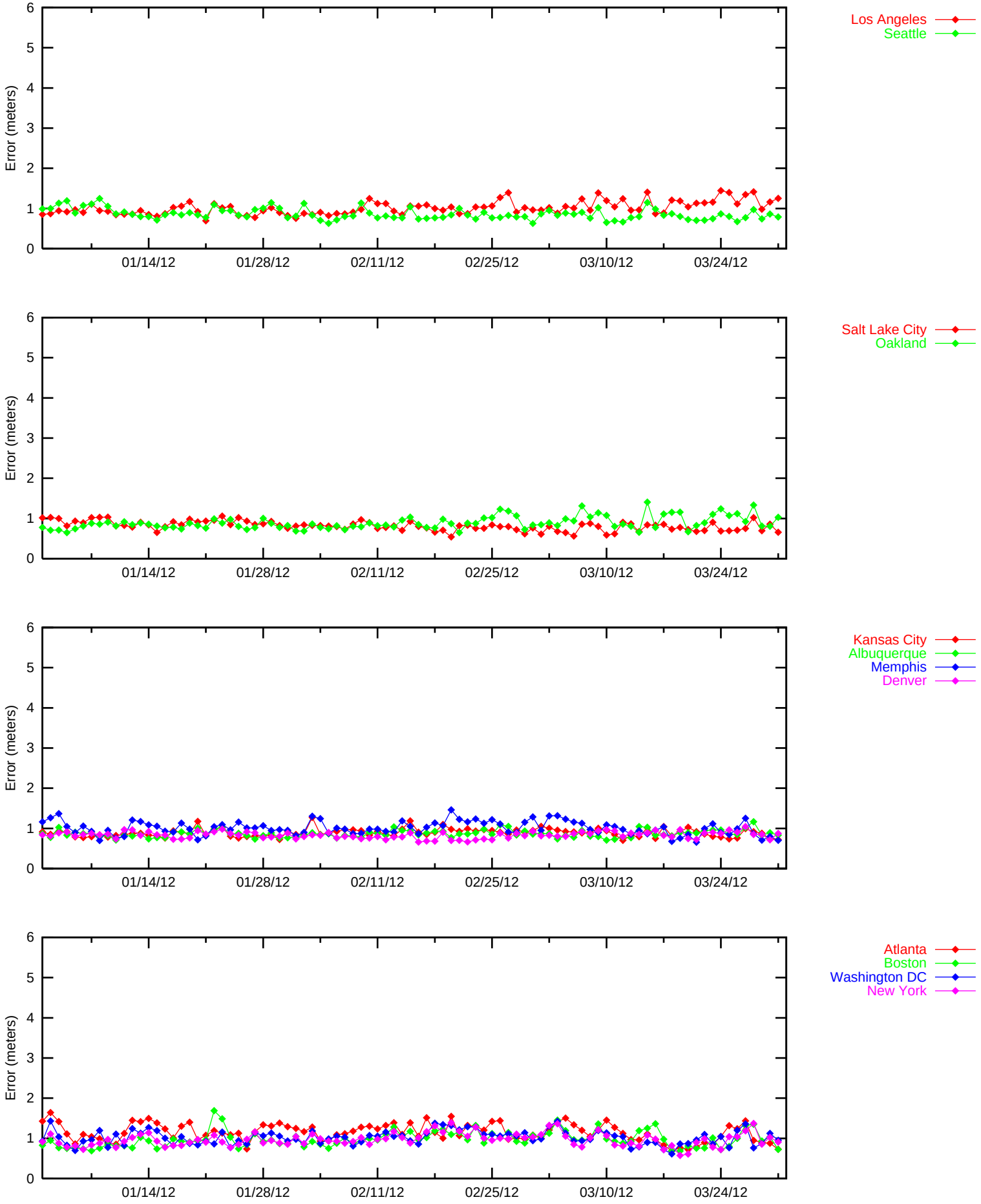


Figure 2-5 LPV 95% Vertical Accuracy

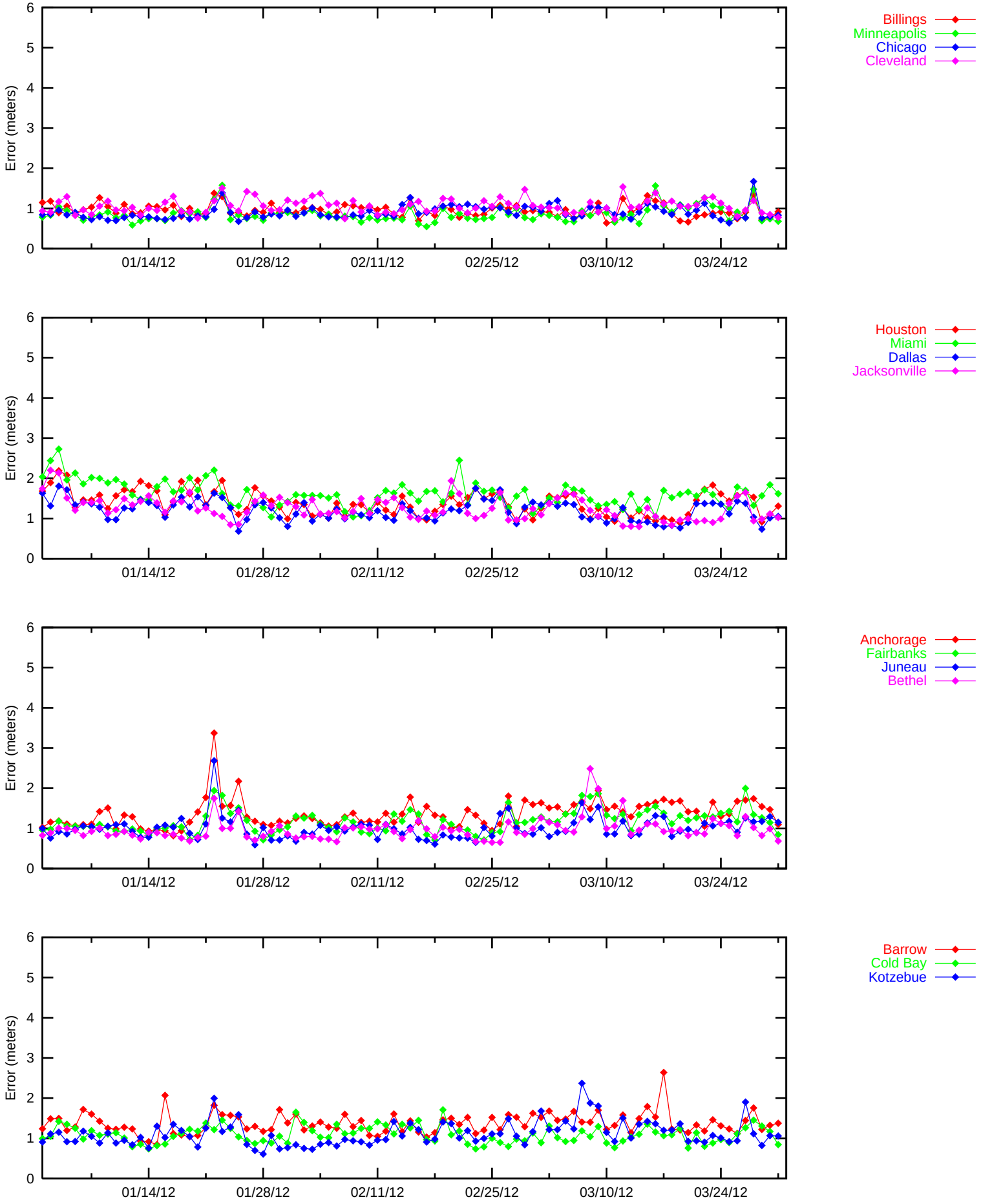


Figure 2-6 LPV 95% Vertical Accuracy

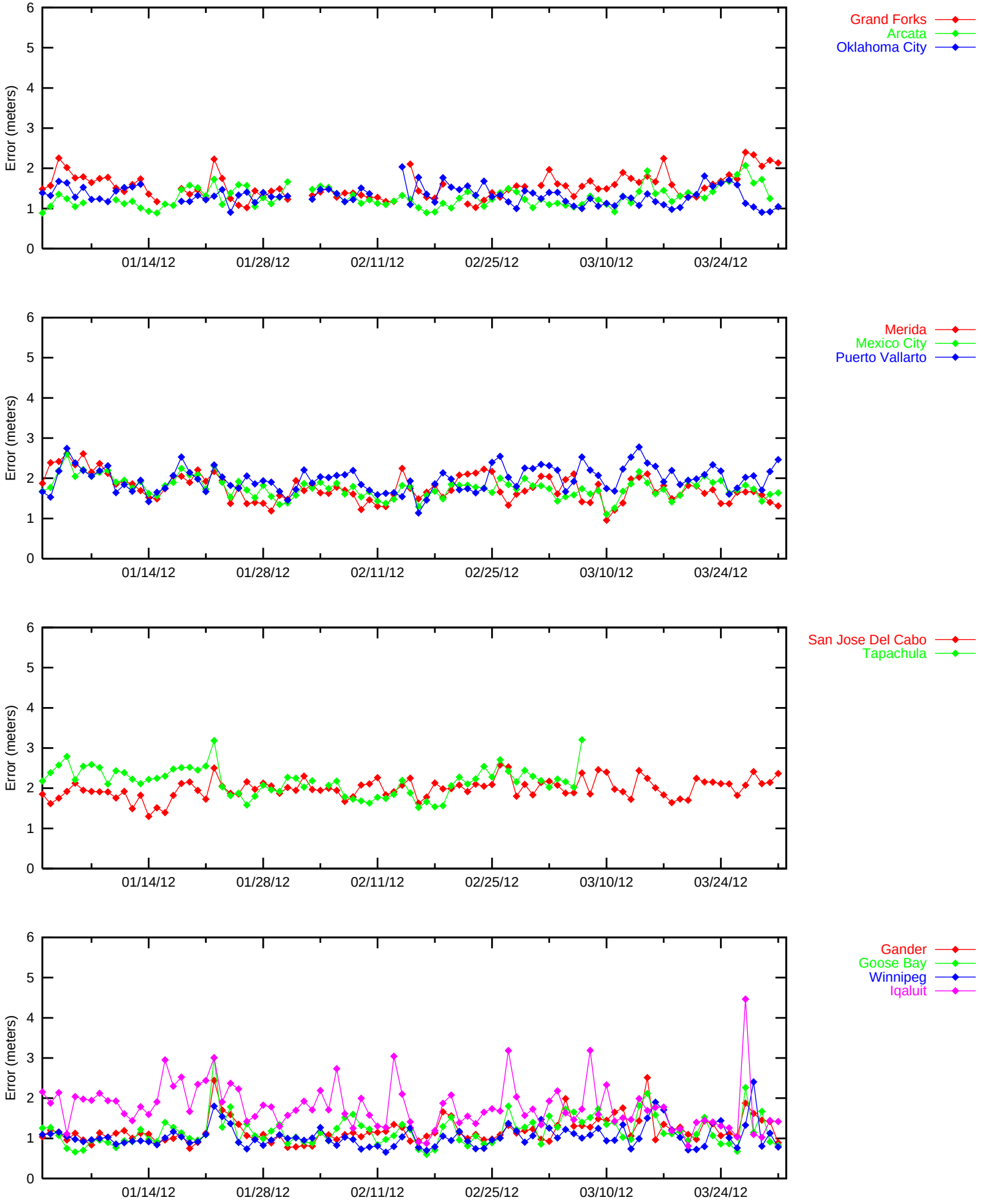


Figure 2-7 NPA 95% Horizontal Accuracy

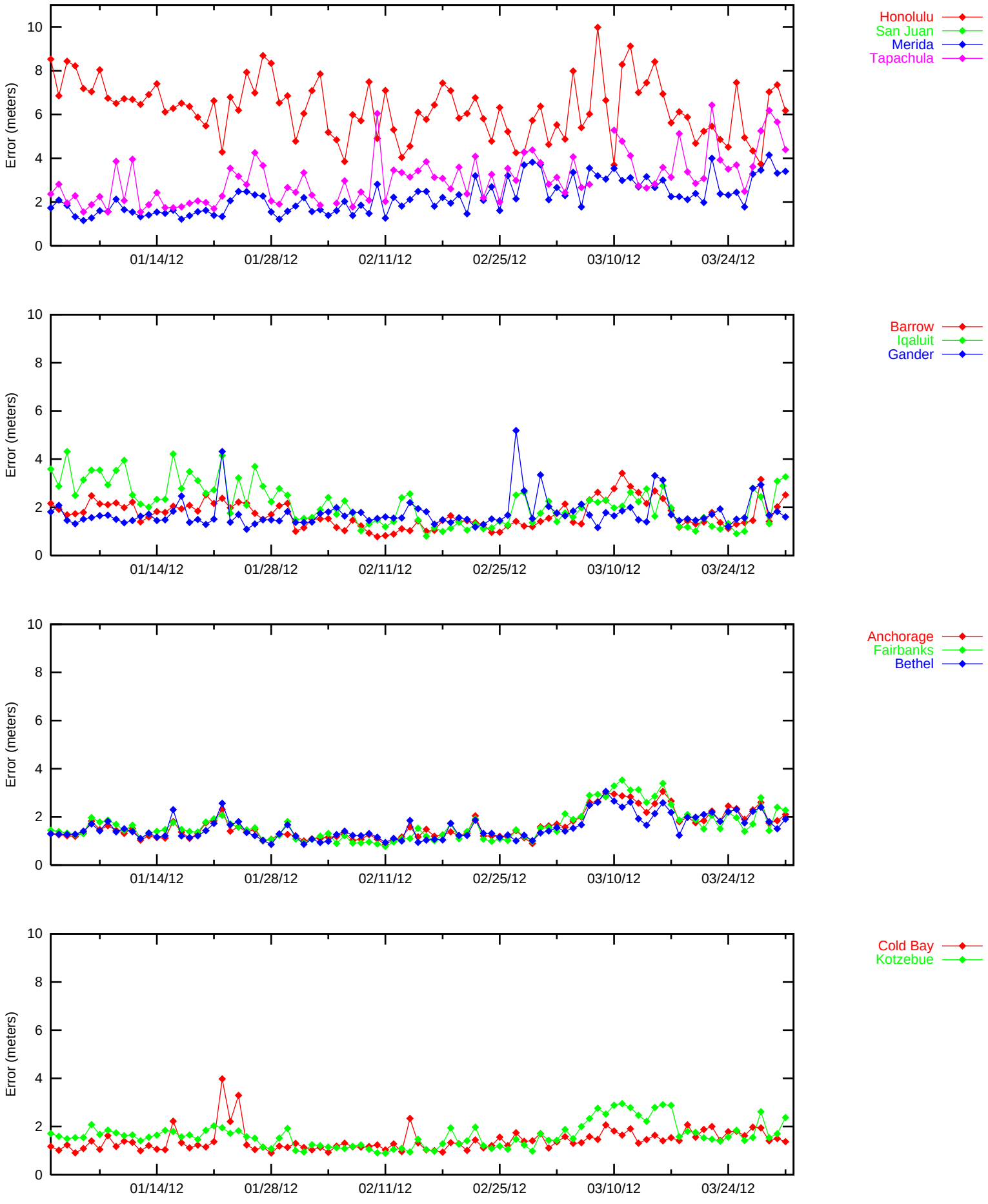


Figure 2-8 NPA 95% Horizontal Accuracy

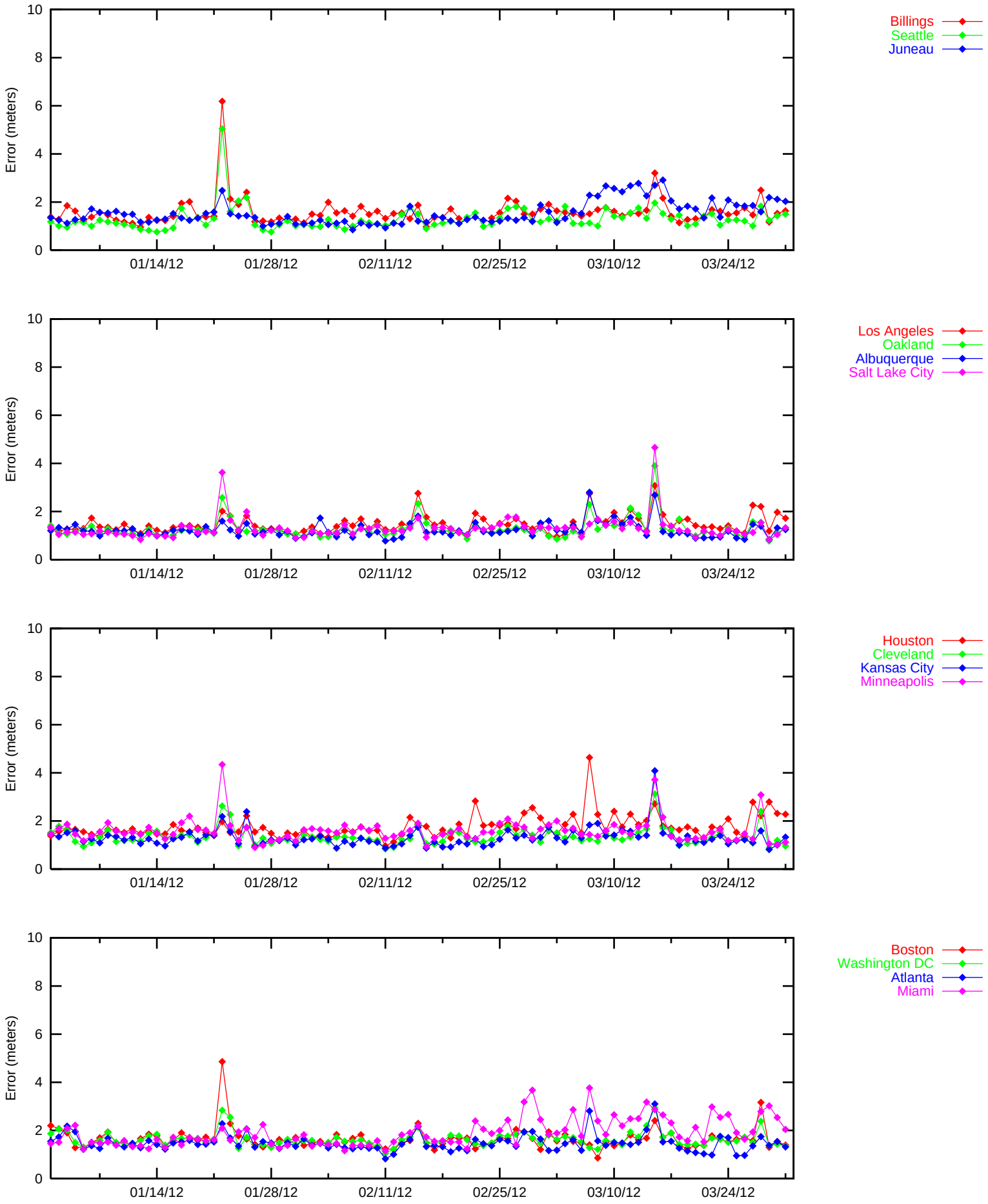


Figure 2-9 LPV Horizontal Error Bounding Triangle Chart

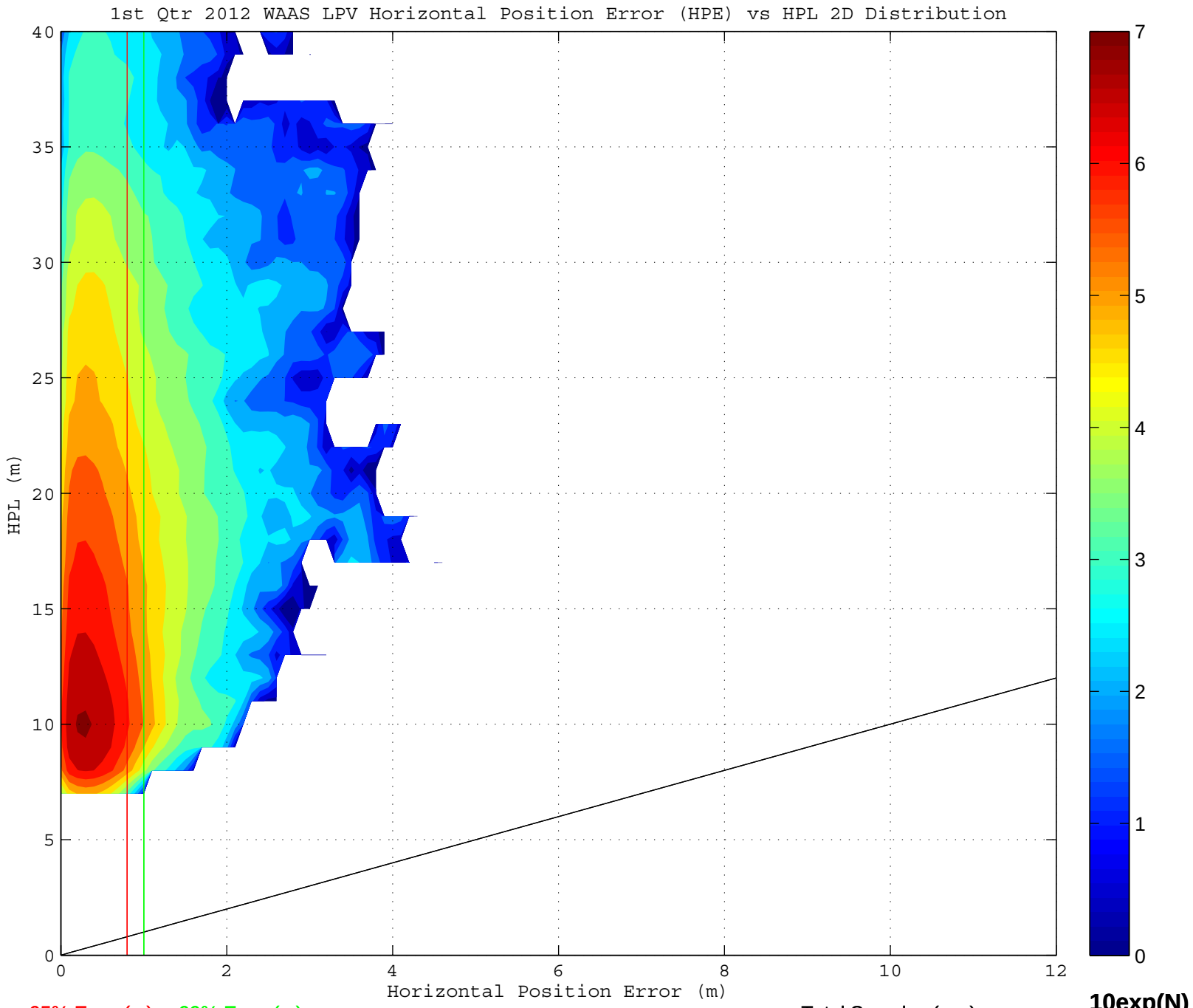


Figure 2-10 LPV Vertical Error Bounding Triangle Chart

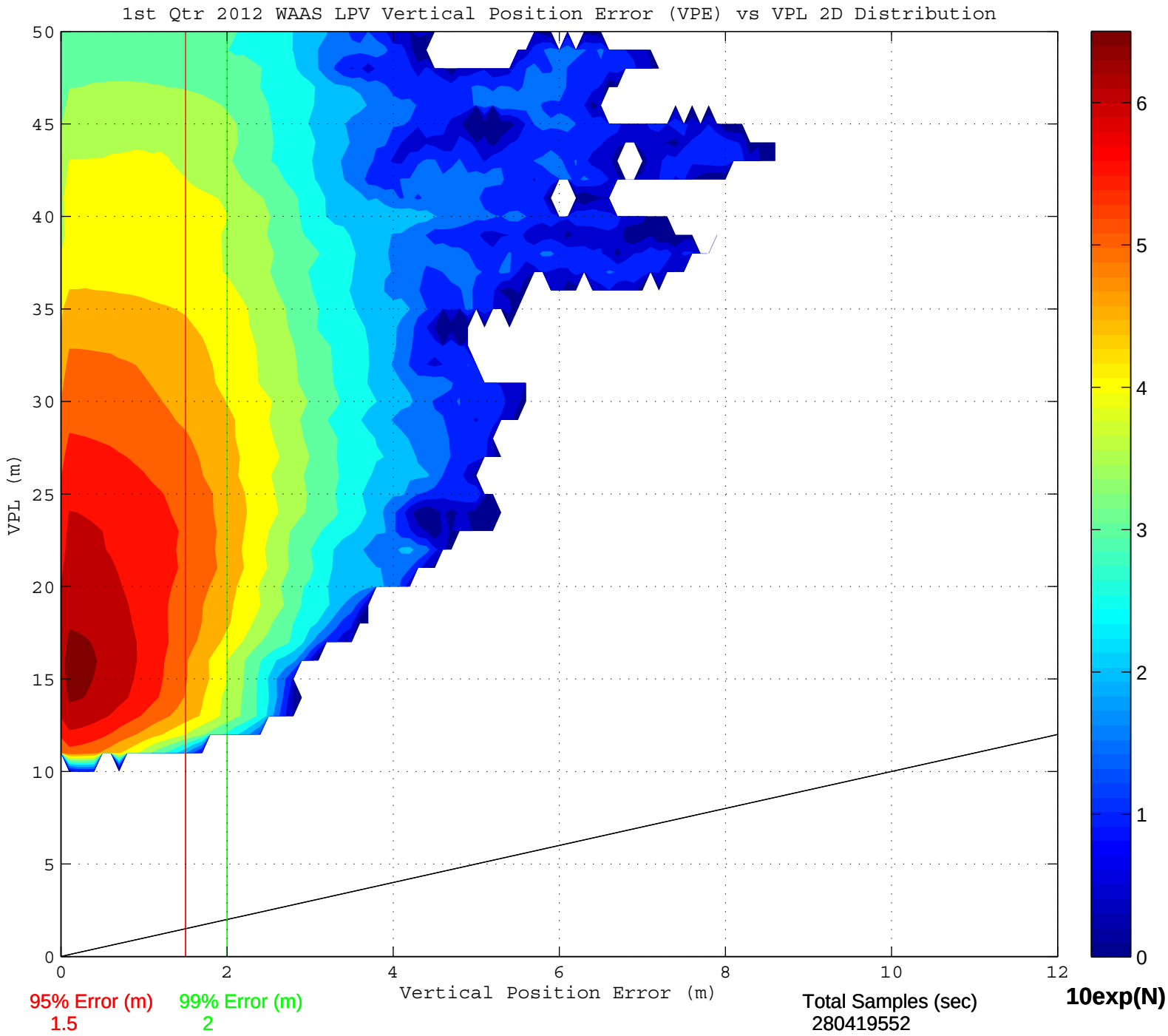


Figure 2-11 LPV 2-D Horizontal Error Distribution Histogram

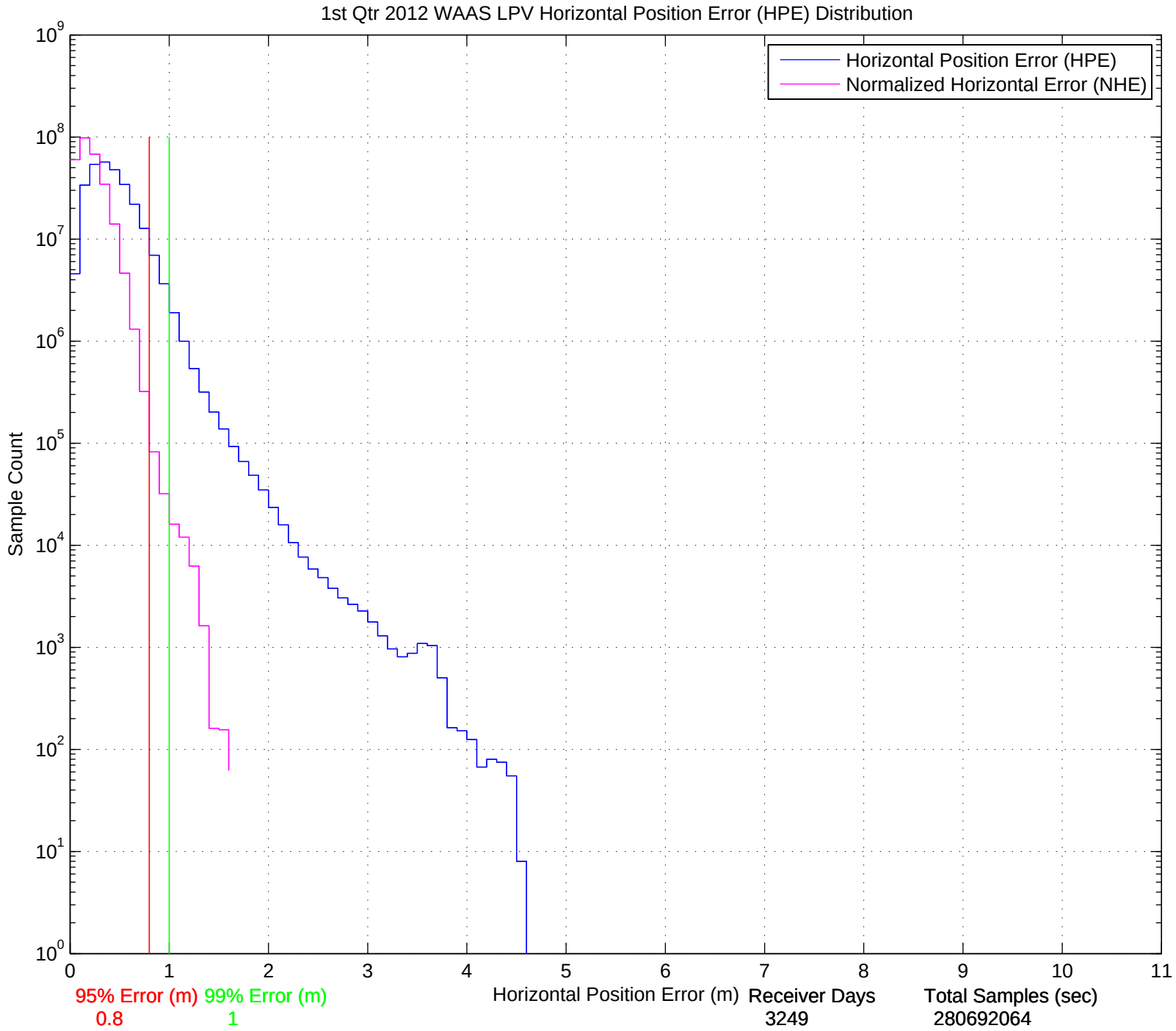
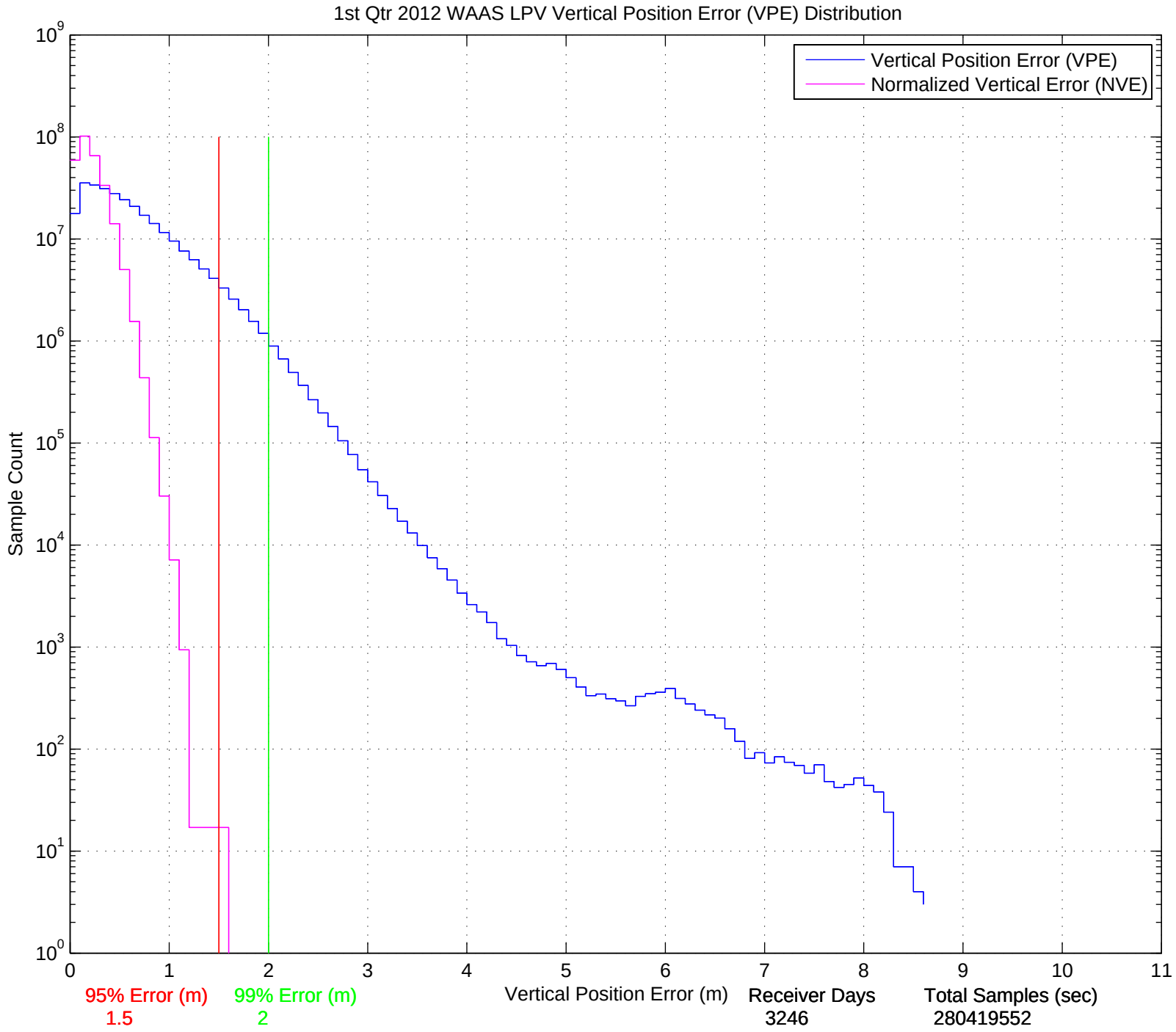


Figure 2-12 LPV 2-D Vertical Error Distribution Histogram



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 19.29 meters at Miami and 38.51 meters, at Arcata, respectively. The minimum 99% CONUS HPL and VPL are 11.29 meters at Denver and 19.05 meters at Chicago, respectively. The maximum 99% Alaska HPL and VPL are 27.91 meters and 37.85 meters, both at Cold Bay, respectively. The minimum 99% Alaska HPL and VPL are 13.74 meters at Fairbanks and 22.34 meters at Anchorage, respectively.

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 through 3.6 show the daily availability of LPV and LPV 200 service levels, and Figures 3.7 through 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 are due to GPS satellite outages, GUS switchovers, geomagnetic activity, and elevated GIVE and UDRE values. Please refer to Table 1.5 for the events that affected availability.

PRN 26 outage from 2/9/12 to 2/23 reduced Mexico availability. Geomagnetic activity on 1/22/12, 3/9/22, and 3/15/22 elevated GIVE values and reduced CONUS, Alaska and Canada availability. WAAS Software upgraded to Release 3A1 on 3/7/12 significantly reduced Tapachula availability. As a result, Tapachula is no longer evaluated for the PAN report beginning 3/8/12. Low Alaska availability at the beginning of January is due to a hardware failure on CRW that caused elevated UDRE values; see DR#107 CRW Oscillator Failure.

Radio frequency interference (RFI) caused localized loss of LPV availability at Washington DC, Boston, and Albuquerque on the dates listed in Table 1.5. The local RFI had no effect on WAAS service. See DR #98 WAAS LPV200 Service Outage at Washington DC and DR #99 Boston LPV outage caused by RFI.

Table 3-1 99% Protection Level

Location	99% HPL (meters)	99% VPL (meters)	Percentage in PA mode
Arcata	15.76	38.51	100
Grand Forks	13.49	22.97	100
Oklahoma City	13.22	23.30	100
Albuquerque	12.88	26.27	99.999990
Anchorage	14.20	23.34	100
Atlanta	12.76	20.48	100
Barrow	17.55	35.39	99.947510
Bethel	17.53	29.43	100
Billings	11.71	21.85	100
Boston	15.89	23.10	100
Chicago	12.38	19.05	100
Cleveland	13.56	20.48	100
Cold Bay	27.92	37.86	100
Dallas	13.47	24.00	100
Denver	11.29	25.00	100
Fairbanks	13.75	24.14	100
Gander	23.66	36.79	100
Goose Bay	18.83	29.20	100
Houston	12.53	24.14	100
Iqaluit	29.55	44.17	100
Jacksonville	14.90	21.71	100
Juneau	14.13	23.42	100
Kansas City	12.23	20.20	100
Kotzebue	16.51	32.77	99.947500
Los Angeles	15.41	27.49	100
Memphis	12.86	20.49	100
Merida	20.15	36.77	100
Mexico City	28.61	36.64	100
Miami	19.30	30.52	100
Minneapolis	12.09	20.70	100
New York	15.58	23.26	100
Oakland	16.07	37.51	100
Puerto Vallarta	27.18	40.40	100
Salt Lake City	11.56	21.89	100
San Jose Del Cabo	25.26	37.99	100
Seattle	15.37	28.58	100
Tapachula	38.39	64.43	99.894750
Washington DC	14.07	21.36	99.999990
Winnipeg	13.52	23.02	100

Table 3-2 Quarterly Availability Statistics

Location	LP WAAS With 15 minute window	LPV WAAS *With 15 minute window*	LPV 200 WAAS *With 15 minute window*
Arcata	1	0.999611	0.977075
Grand Forks	1	0.999802	0.999217
Oklahoma City	1	1	0.999971
Albuquerque	1	0.999952	0.999944
Anchorage	0.999963	0.999780	0.999631
Atlanta	1	1	1
Barrow	0.999475	0.999020	0.985492
Bethel	1	0.999780	0.998751
Billings	1	1	0.999976
Boston	0.999993	0.999993	0.999971
Chicago	1	1	1
Cleveland	1	1	1
Cold Bay	0.999807	0.999572	0.967544
Dallas	1	1	1
Denver	1	1	1
Fairbanks	1	0.999812	0.999375
Gander	0.999379	0.999276	0.967087
Goose Bay	0.999459	0.999442	0.997607
Houston	1	1	1
Iqaluit	0.998569	0.996422	0.928871
Jacksonville	1	1	1
Juneau	1	0.999964	0.999610
Kansas City	1	1	1
Kotzebue	0.999470	0.999208	0.993587
Los Angeles	1	0.999966	0.996407
Memphis	1	1	1
Merida	1	0.999898	0.986151
Mexico City	1	0.999993	0.973533
Miami	1	1	0.997819
Minneapolis	1	1	1
New York	1	1	1
Oakland	1	0.999718	0.979118
Puerto Vallarta	1	0.998372	0.951720
Salt Lake City	1	1	1
San Jose Del Cabo	1	0.999965	0.968479
Seattle	1	1	0.999783
Tapachula	0.730444	0.691649	0.431075
Washington DC	0.999988	0.999983	0.999946
Winnipeg	1	0.999216	0.999169

Table 3-3 NPA Availability

Location	NPA Availability (Excluding RAIM/FDE)
Albuquerque	1
Anchorage	1
Atlanta	1
Barrow	0.99558323
Bethel	1
Billings	1
Boston	1
Cleveland	1
Cold Bay	1
Fairbanks	1
Gander	1
Honolulu	1
Houston	1
Iqaluit	1
Juneau	1
Kansas City	1
Kotzebue	0.99558298
Los Angeles	1
Merida	1
Miami	1
Minneapolis	1
Oakland	1
Salt Lake City	1
San Jose Del Cabo	1
Seattle	1
Tapachula	1
Washington DC	1

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
Arcata	0	0	3	0.000061	167	0.003497
Grand Forks	0	0	1	0.000021	4	0.000083
Oklahoma City	0	0	0	0	2	0.000042
Albuquerque	1	0.000019	1	0.000019	1	0.000019
Anchorage	1	0.000019	1	0.000019	5	0.000095
Atlanta	0	0	0	0	0	0
Barrow	2	0.000038	10	0.000191	137	0.002653
Bethel	0	0	1	0.000019	14	0.000267
Billings	0	0	0	0	3	0.000057
Boston	1	0.000019	1	0.000019	4	0.000076
Chicago	0	0	0	0	0	0
Cleveland	0	0	0	0	0	0
Cold Bay	2	0.000038	4	0.000076	323	0.006374
Dallas	0	0	0	0	0	0
Denver	0	0	0	0	0	0
Fairbanks	0	0	2	0.000038	5	0.000095
Gander	2	0.000038	3	0.000057	213	0.004203
Goose Bay	2	0.000038	2	0.000038	10	0.000191
Houston	0	0	0	0	0	0
Iqaluit	8	0.000153	37	0.000709	465	0.009553
Jacksonville	0	0	0	0	0	0
Juneau	0	0	2	0.000038	5	0.000095
Kansas City	0	0	0	0	0	0
Kotzebue	3	0.000057	8	0.000153	66	0.001268
Los Angeles	0	0	1	0.000019	96	0.001838
Memphis	0	0	0	0	0	0
Merida	0	0	6	0.000114	148	0.002863
Mexico City	0	0	1	0.000019	291	0.005714
Miami	0	0	0	0	59	0.001128
Minneapolis	0	0	0	0	0	0
New York	0	0	0	0	0	0
Oakland	0	0	4	0.000076	102	0.001988
Puerto Vallarta	0	0	25	0.000478	336	0.006737
Salt Lake City	0	0	0	0	0	0
San Jose Del Cabo	0	0	2	0.000038	244	0.004808
Seattle	0	0	0	0	4	0.000076
Tapachula	77	0.002053	381	0.010726	1009	0.045575
Washington DC	3	0.000057	4	0.000076	6	0.000114
Winnipeg	0	0	2	0.000038	2	0.000038

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

Location	NPA Outages	NPA Outage Rate
Albuquerque	0	0
Anchorage	0	0
Atlanta	0	0
Barrow	1	0.000175
Bethel	0	0
Billings	0	0
Boston	0	0
Cleveland	0	0
Cold Bay	0	0
Fairbanks	0	0
Gander	0	0
Honolulu	0	0
Houston	0	0
Iqaluit	0	0
Juneau	0	0
Kansas City	0	0
Kotzebue	1	0.000175
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
Seattle	0	0
Tapachula	0	0
Washington DC	0	0

Figure 3-1 LPV Instantaneous Availability

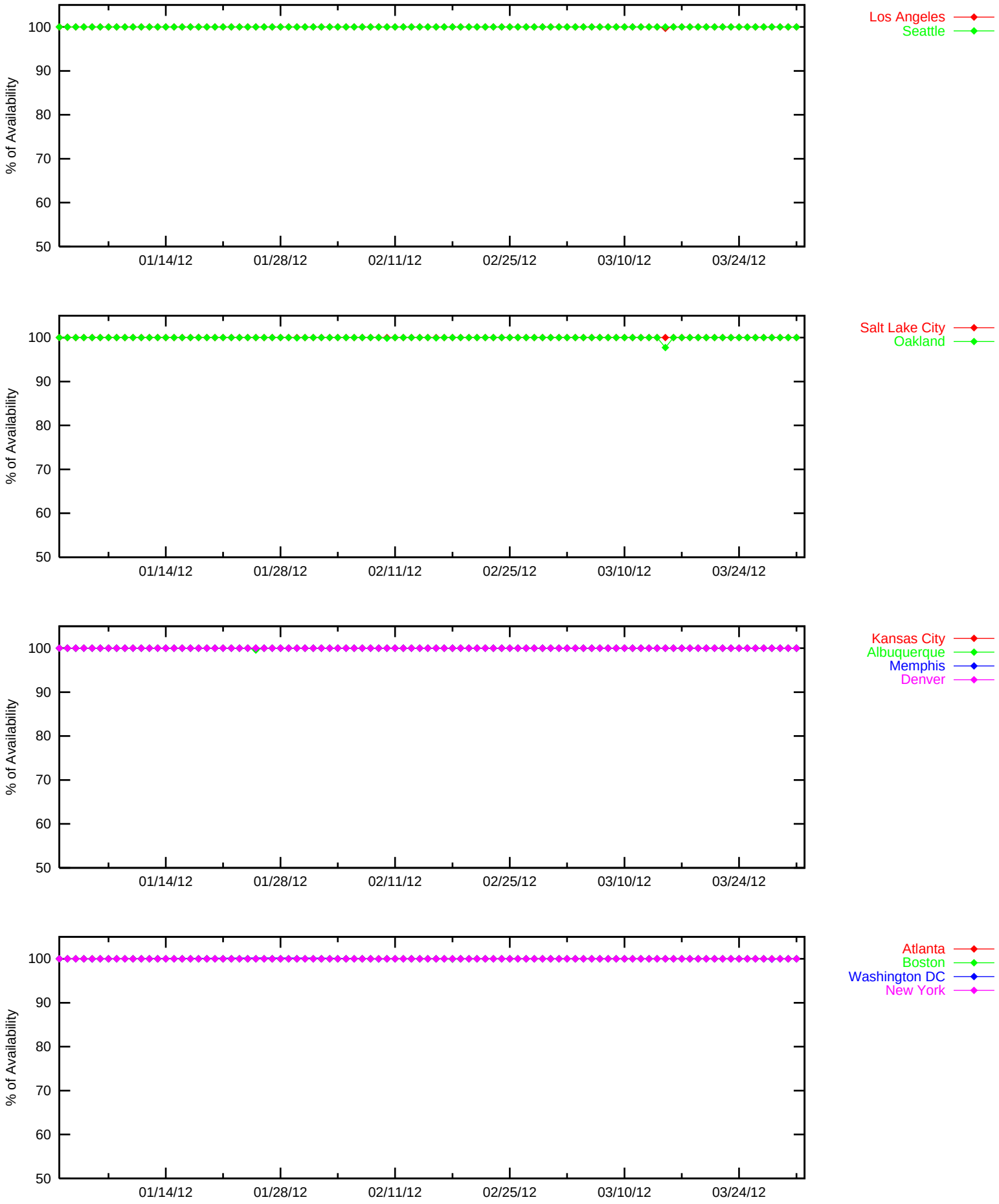


Figure 3-2 LPV Instantaneous Availability

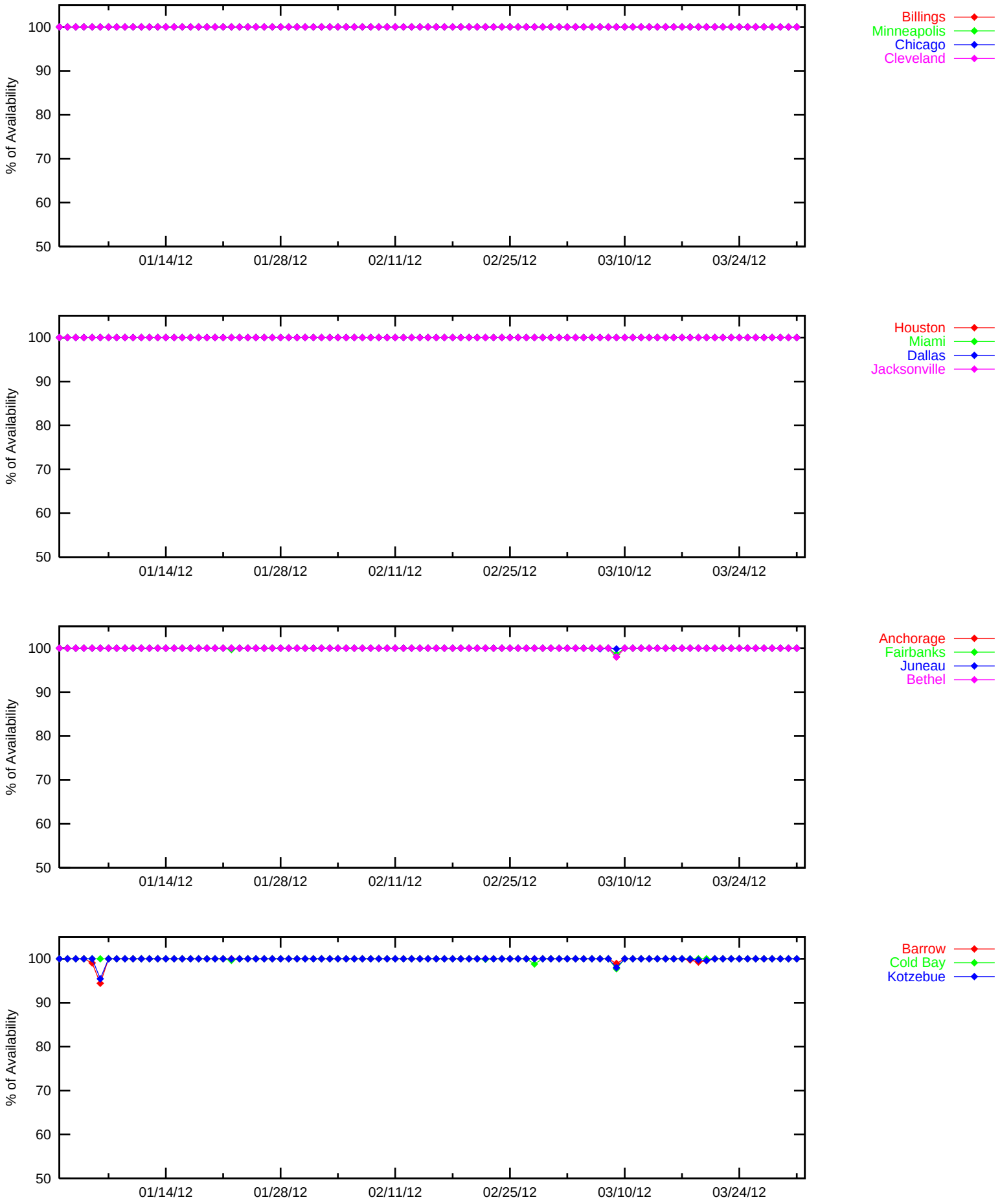


Figure 3-3 LPV Instantaneous Availability

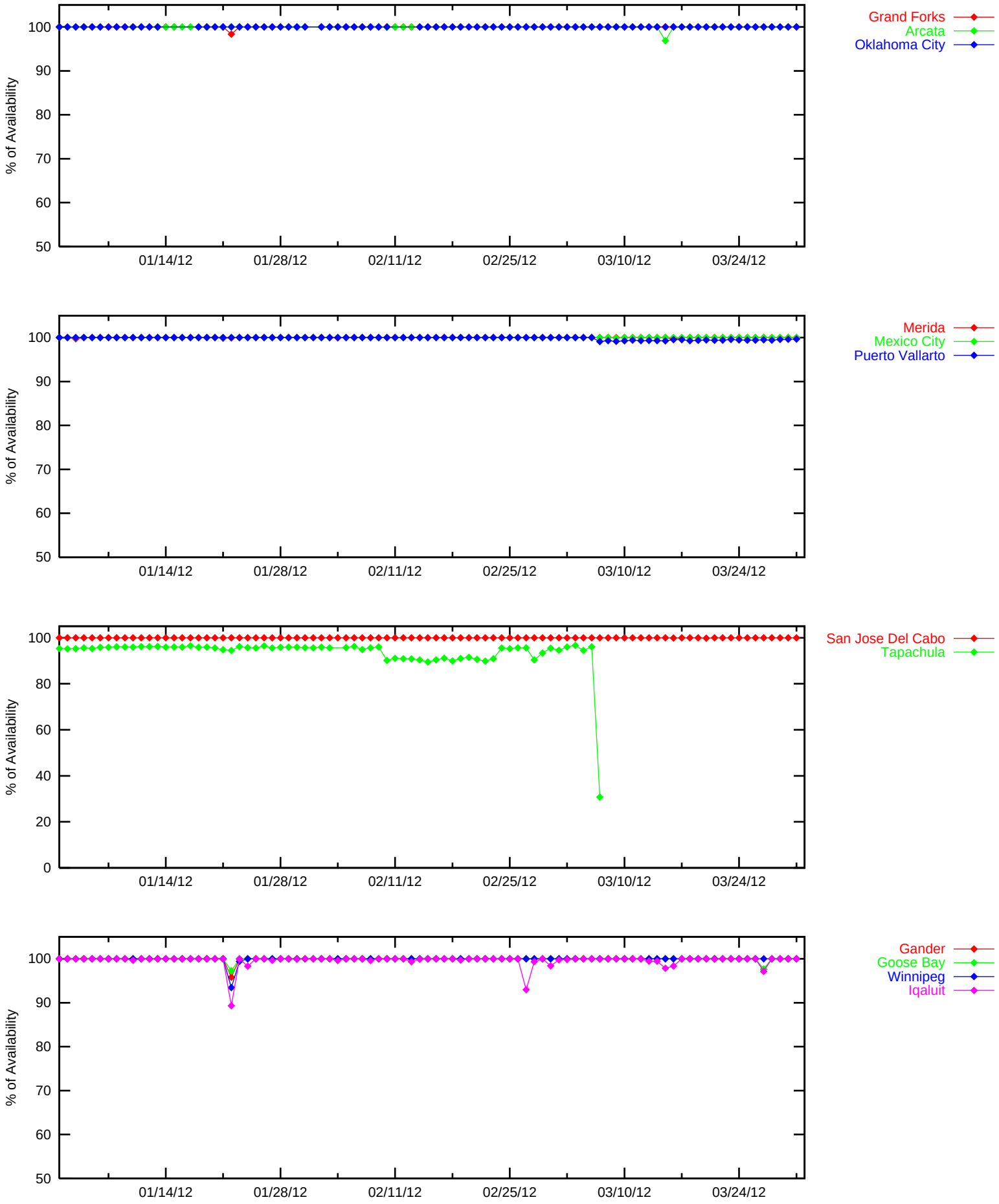


Figure 3-4 LPV 200 Instantaneous Availability

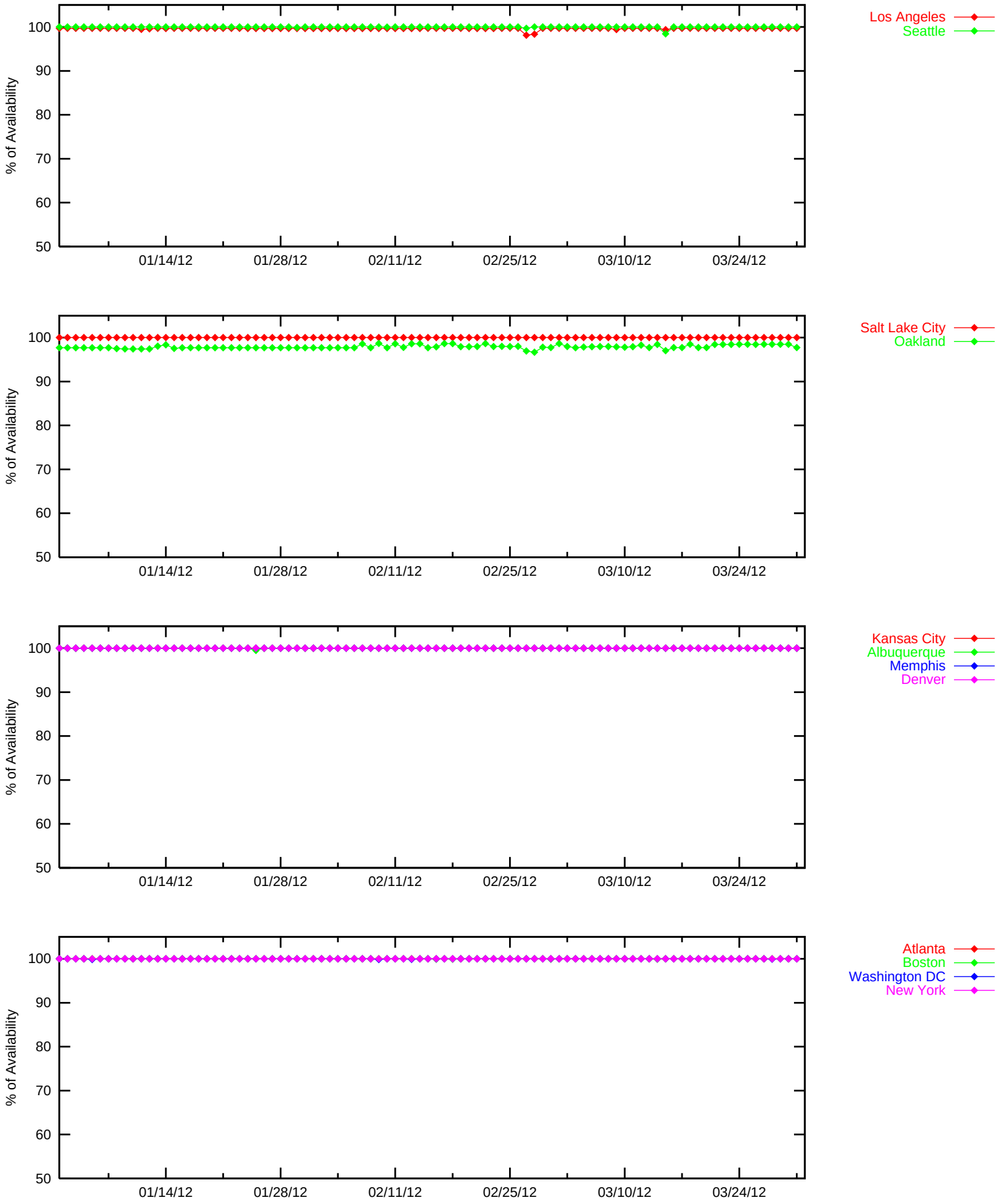


Figure 3-5 LPV 200 Instantaneous Availability

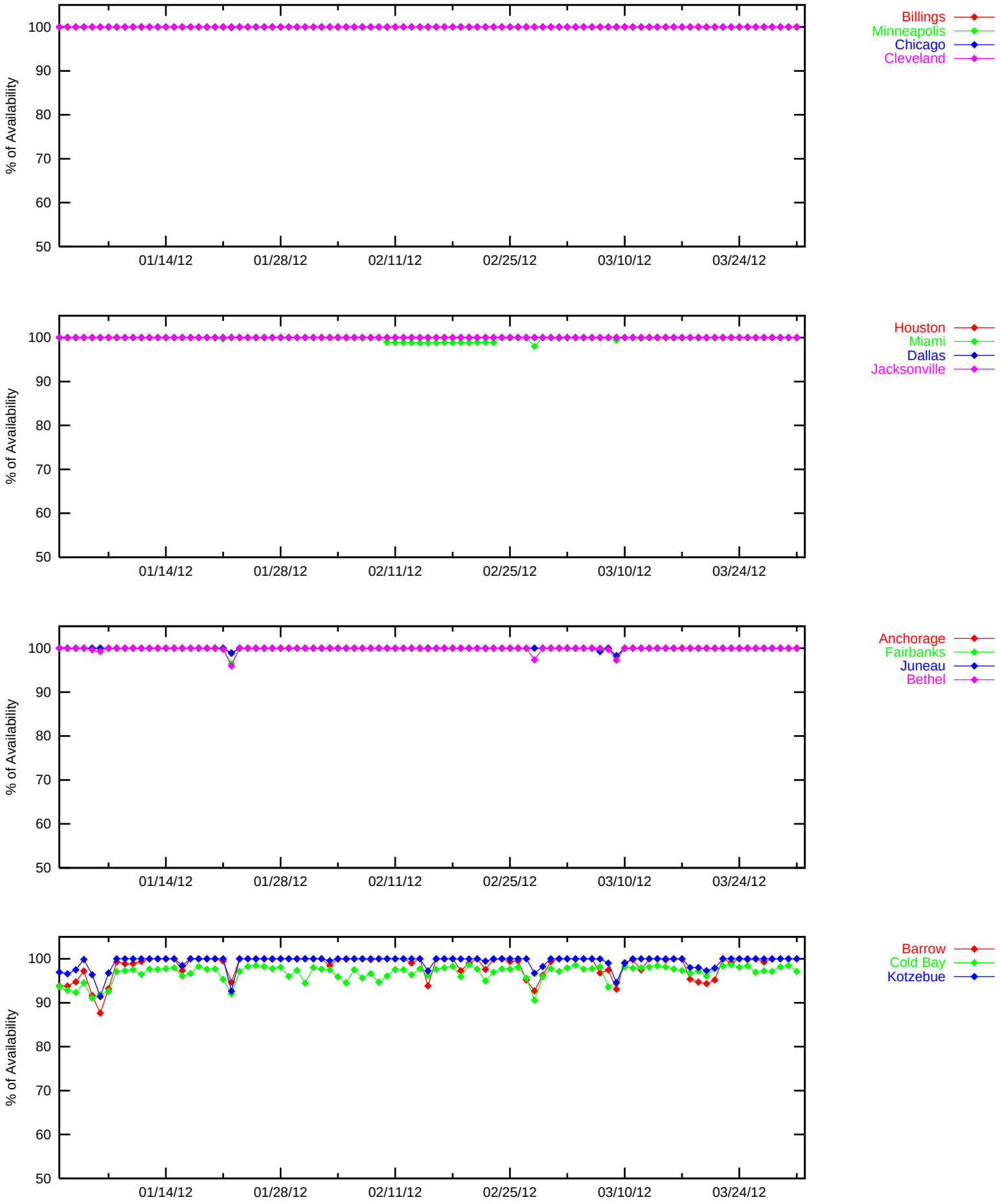


Figure 3-6 LPV 200 Instantaneous Availability

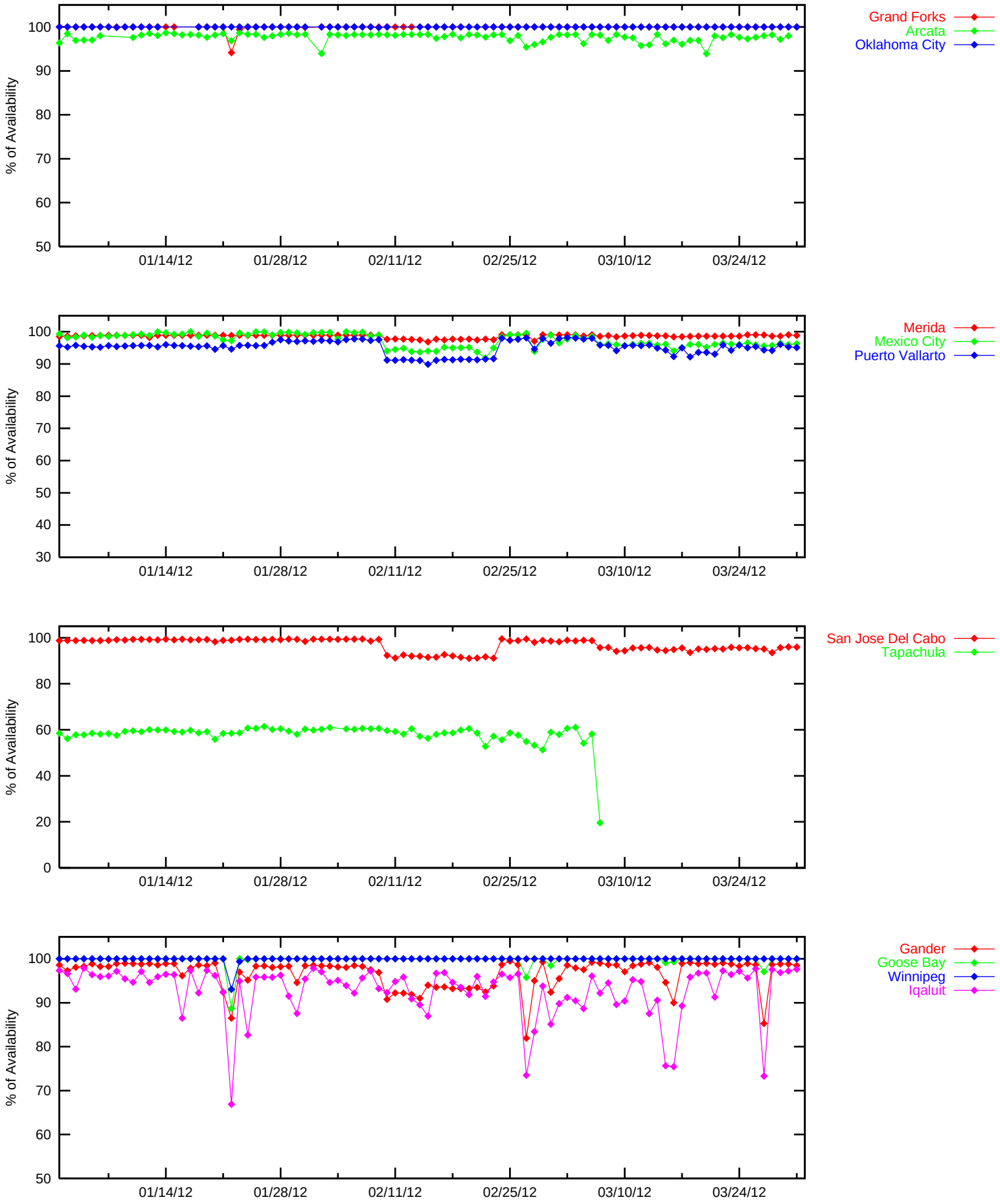


Figure 3-7 LPV Outages

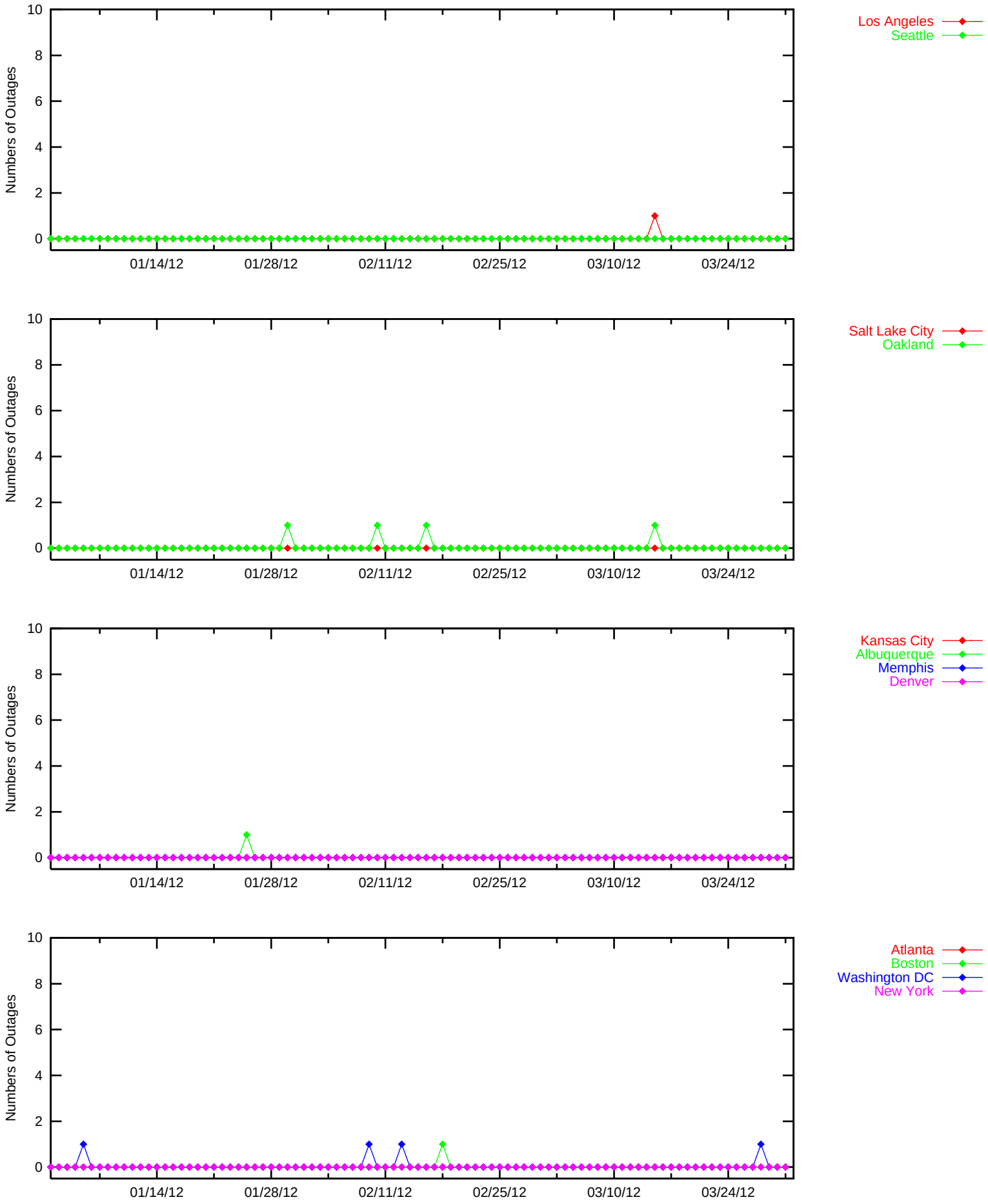


Figure 3-8 LPV Outages

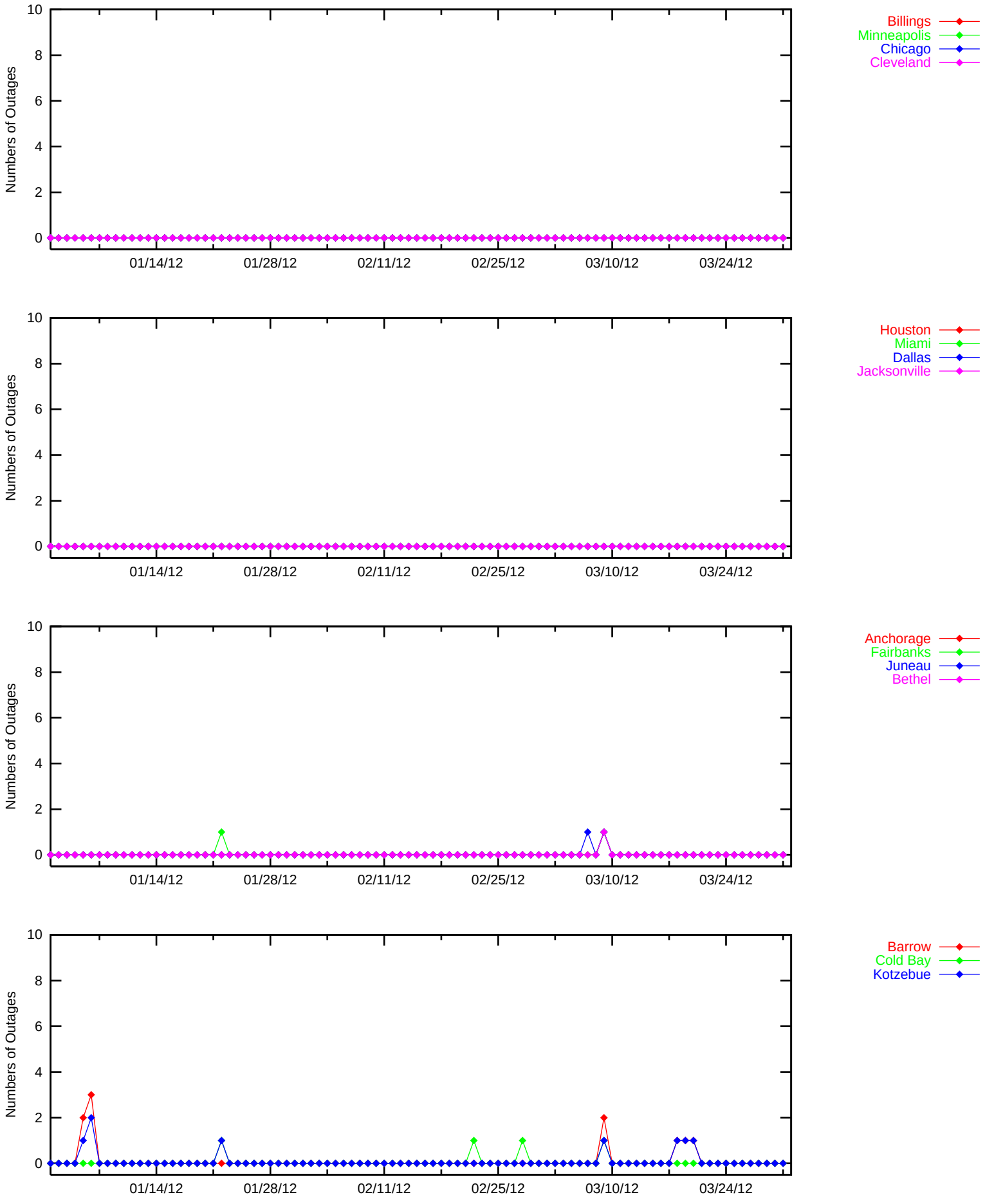


Figure 3-9 LPV Outages

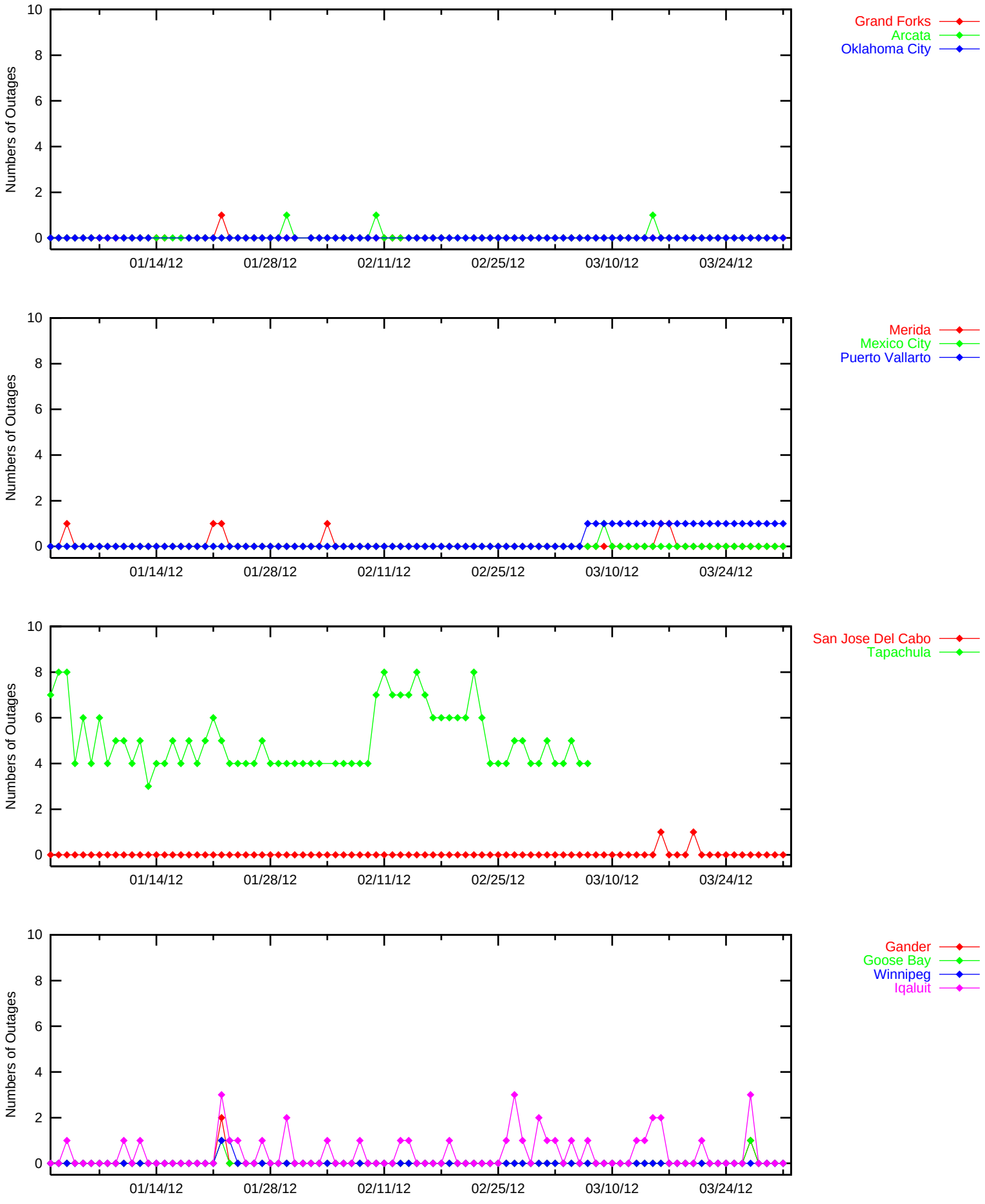


Figure 3-10 LPV 200 Outages

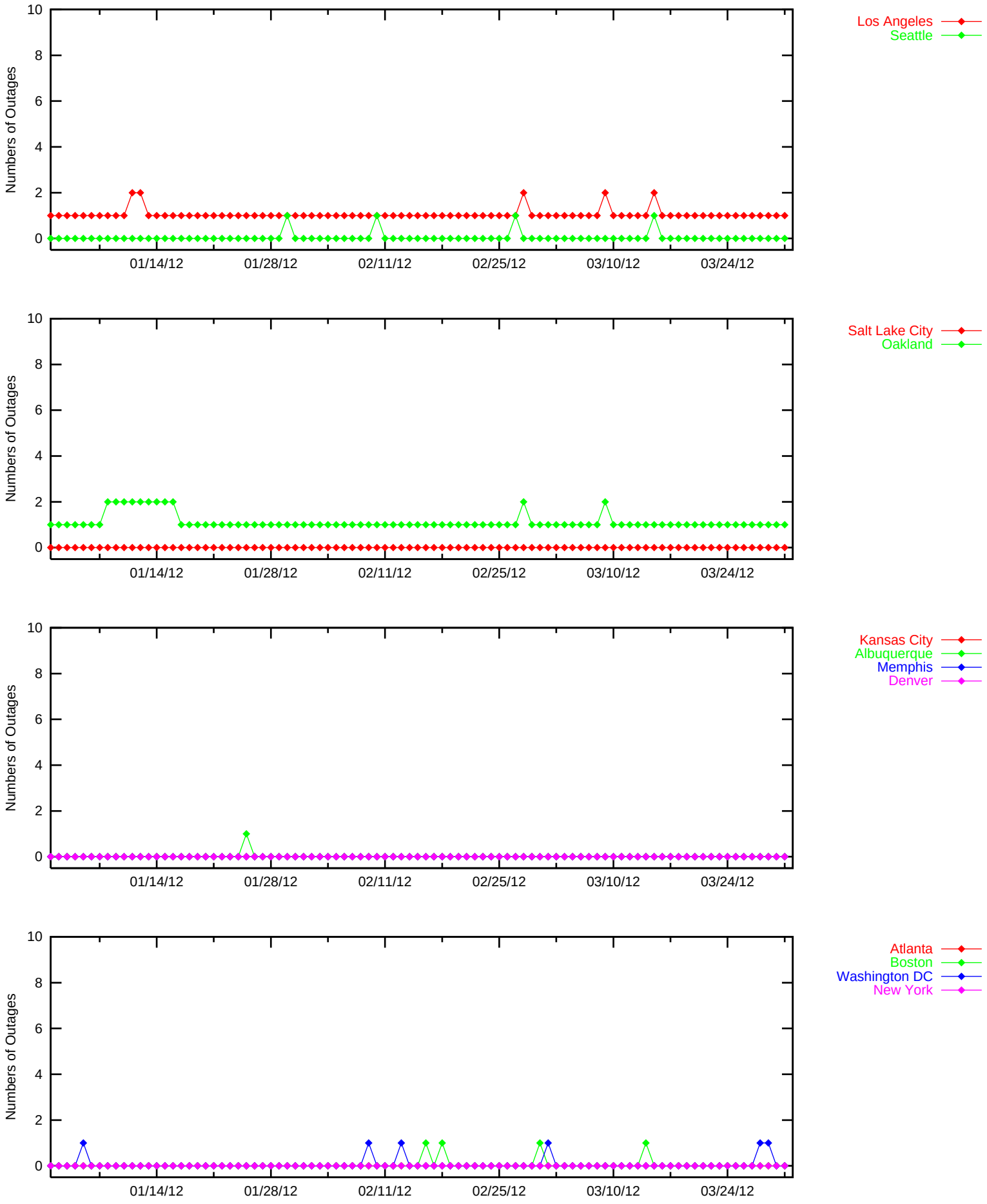


Figure 3-11 LPV 200 Outages

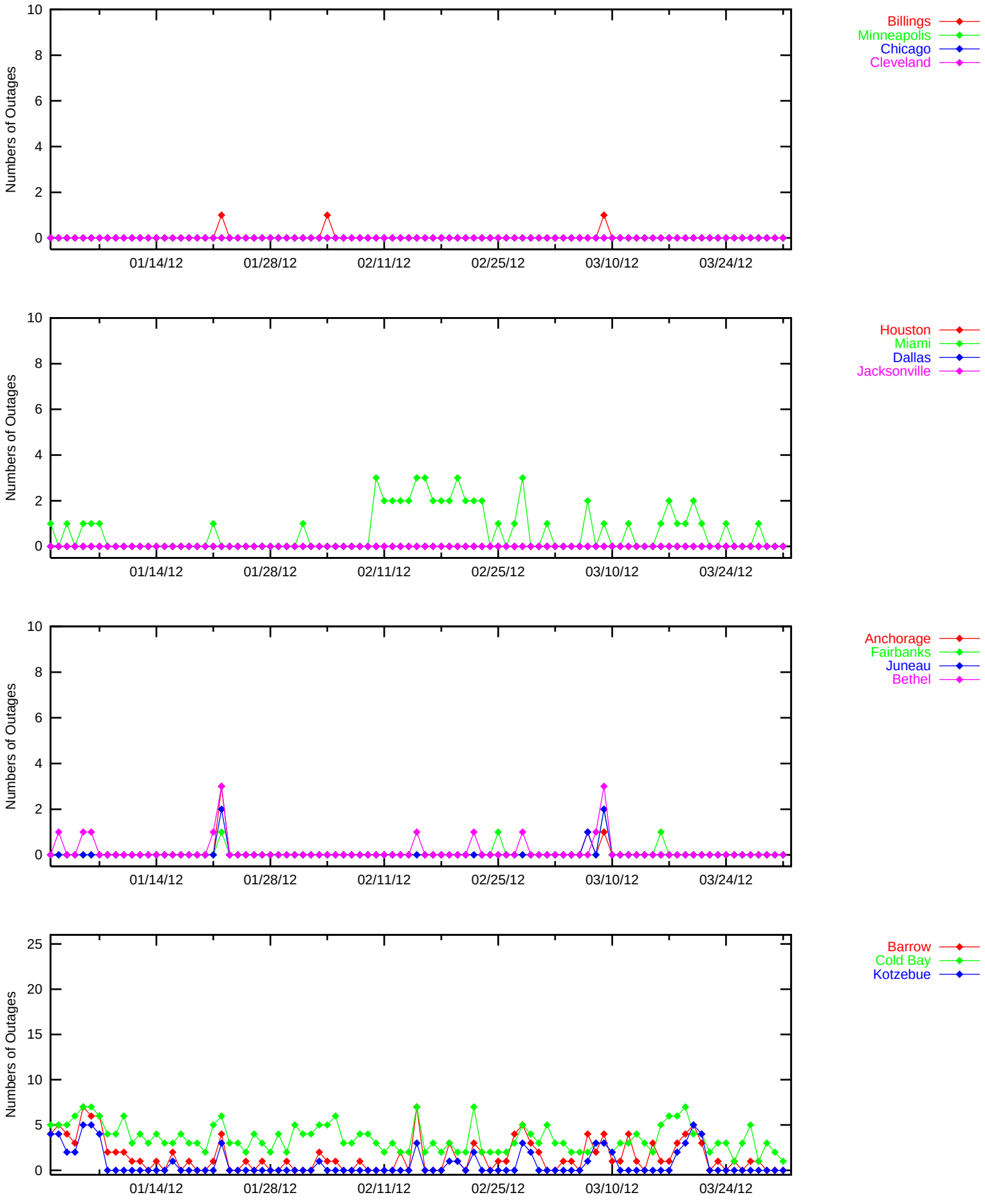
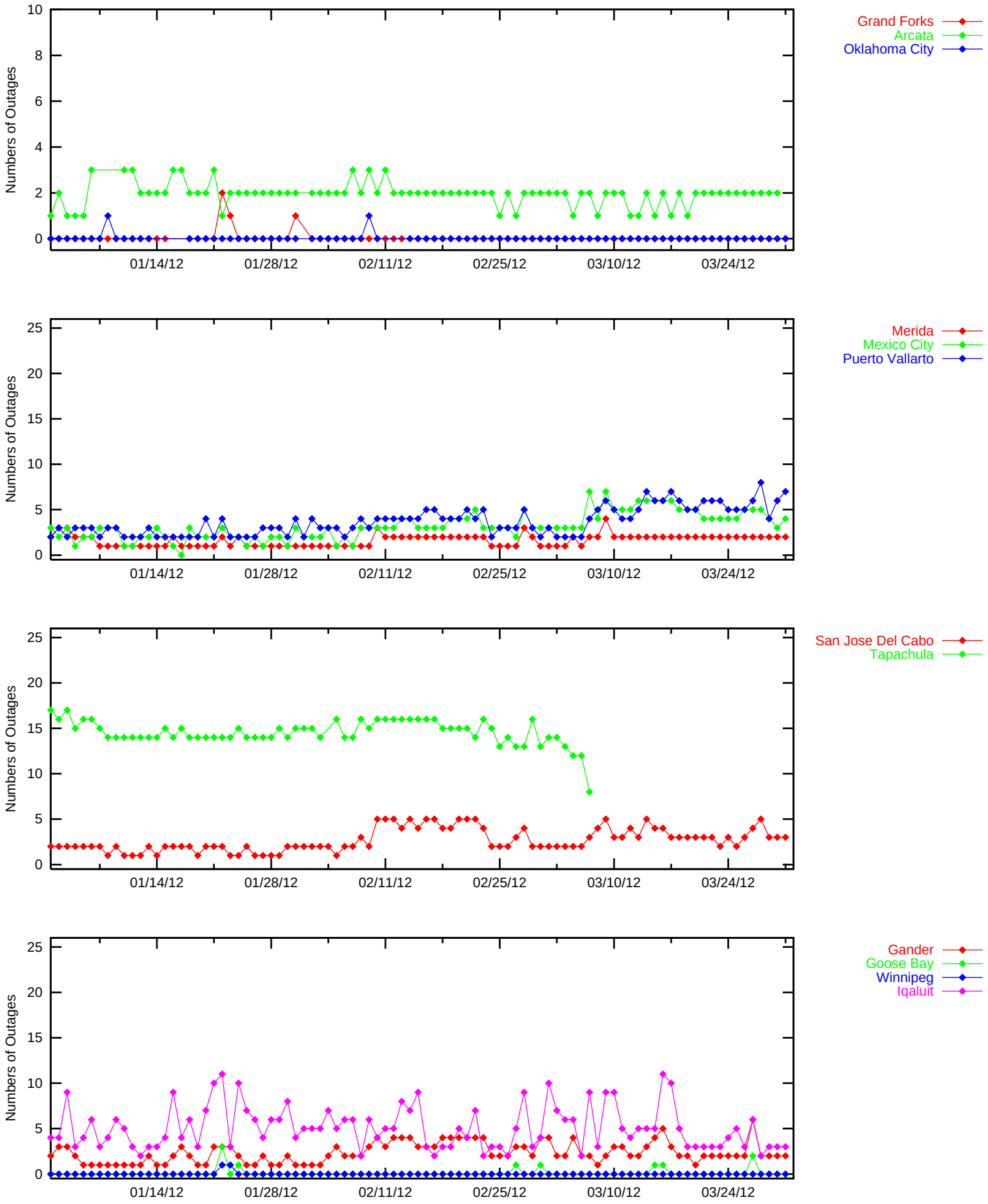


Figure 3-12 LPV 200 Outages



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. 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 4.8 shows the daily RNP coverage at 100% availability and ionosphere Kp index values for this quarter.

The coverage decreases for this quarter are due to GUS switchovers, satellite outages, geomagnetic activity, and elevated UDRE and GIVE values. Please refer to Table 1.5 for the events that affected coverage.

PRN 26 outage from 2/9/12 to 2/23 reduced Mexico coverage. Geomagnetic activity on 1/22/12 and 2/27/12 elevated GIVE values and reduced CONUS, Alaska and Canada coverage. Geomagnetic activity on 3/15/12 affected CONUS coverage only. Geomagnetic activity on 2/25/12 and 3/9/12 affected Alaska and Canada coverage. Low Alaska coverage at the beginning of January is due to a hardware failure on CRW that elevated UDRE values; see DR#107 CRW Oscillator Failure.

The small decrease in RNP coverage on 1/6/12 is due to a hardware switch on the satellite. The small RNP and Alaska coverage decreases on 3/20/12 are due to missed messages on CRW GEO caused by PNE at Napa.

Radio frequency interference (RFI) caused localized loss of LPV availability at Washington DC, Boston, and Albuquerque on the dates listed in Table 1.5 but had no impact on the WAAS coverage.

Figure 4-1 LP North America Coverage for the Quarater

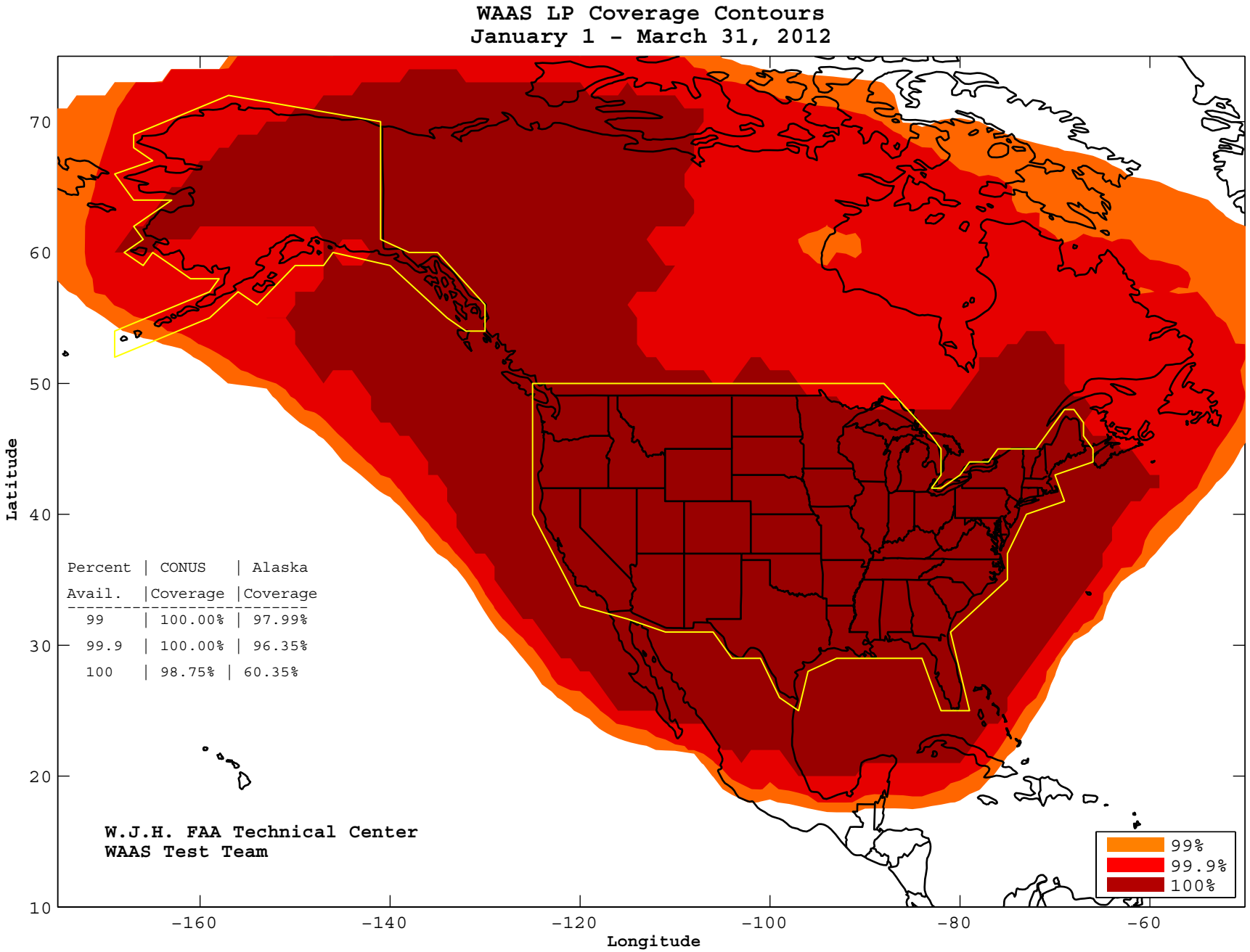


Figure 4-2 LPV North America Coverage for the Quarter

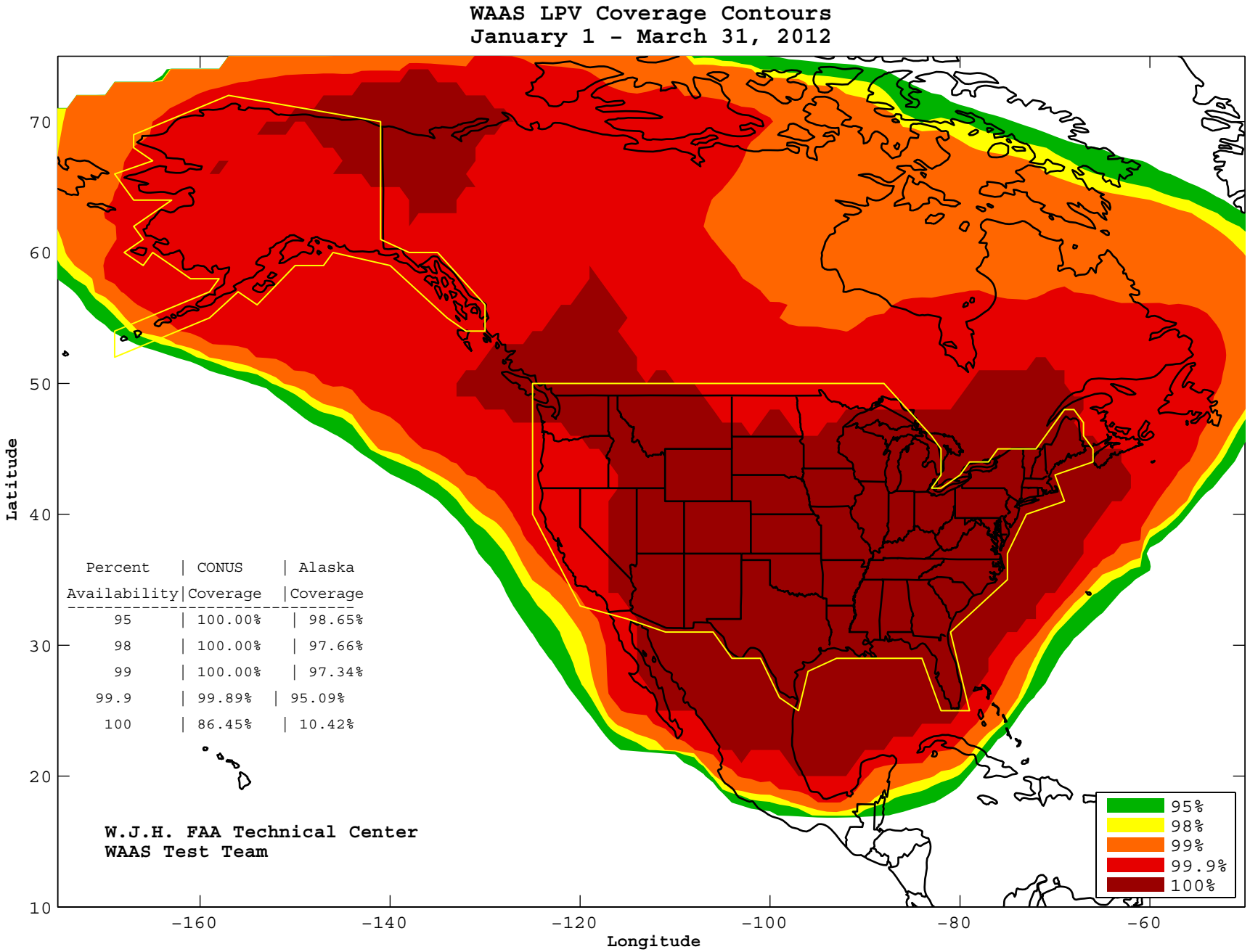


Figure 4-3 LPV 200 North America Coverage for the Quarter

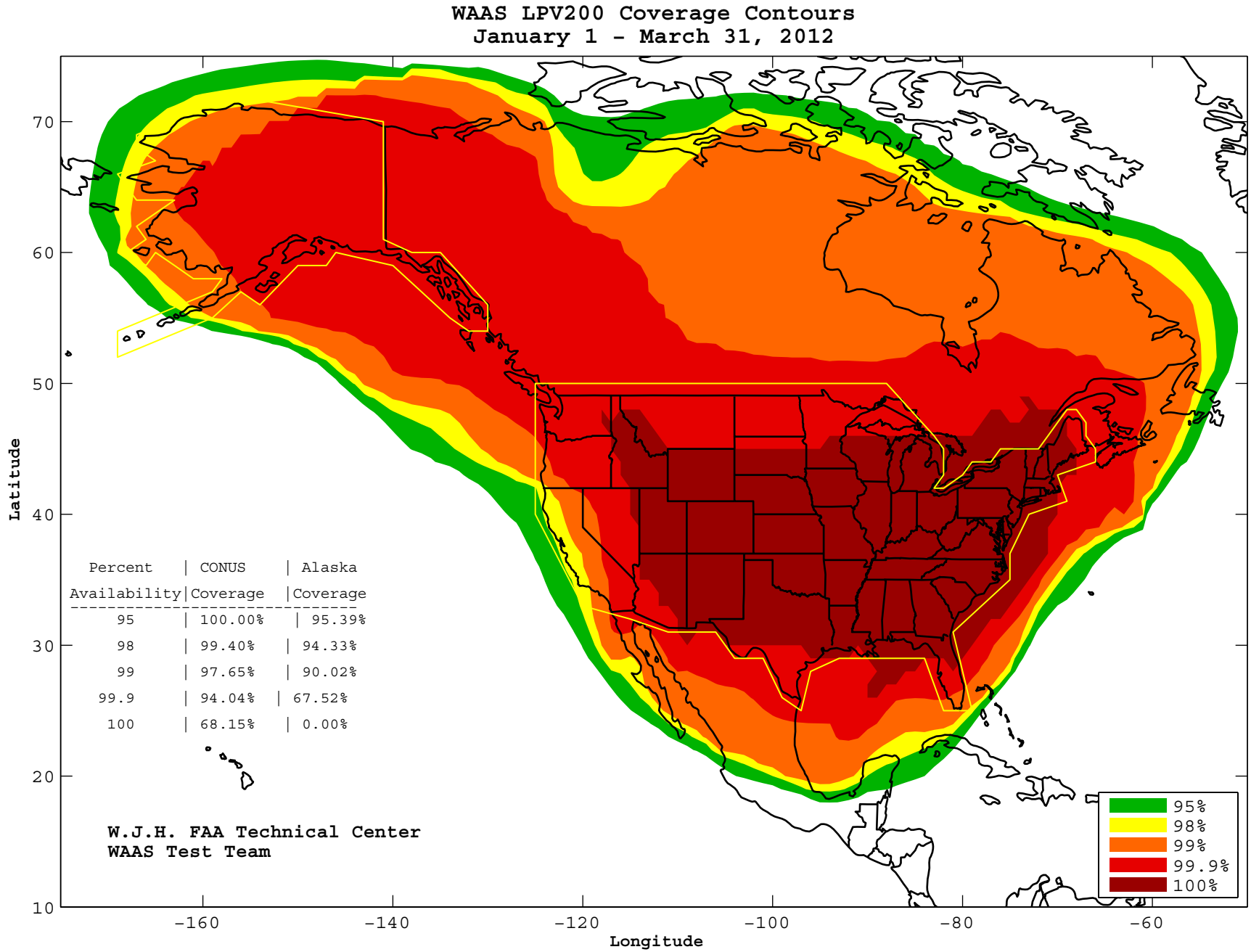


Figure 4-4 RNP 0.1 World Coverage for the Quarter

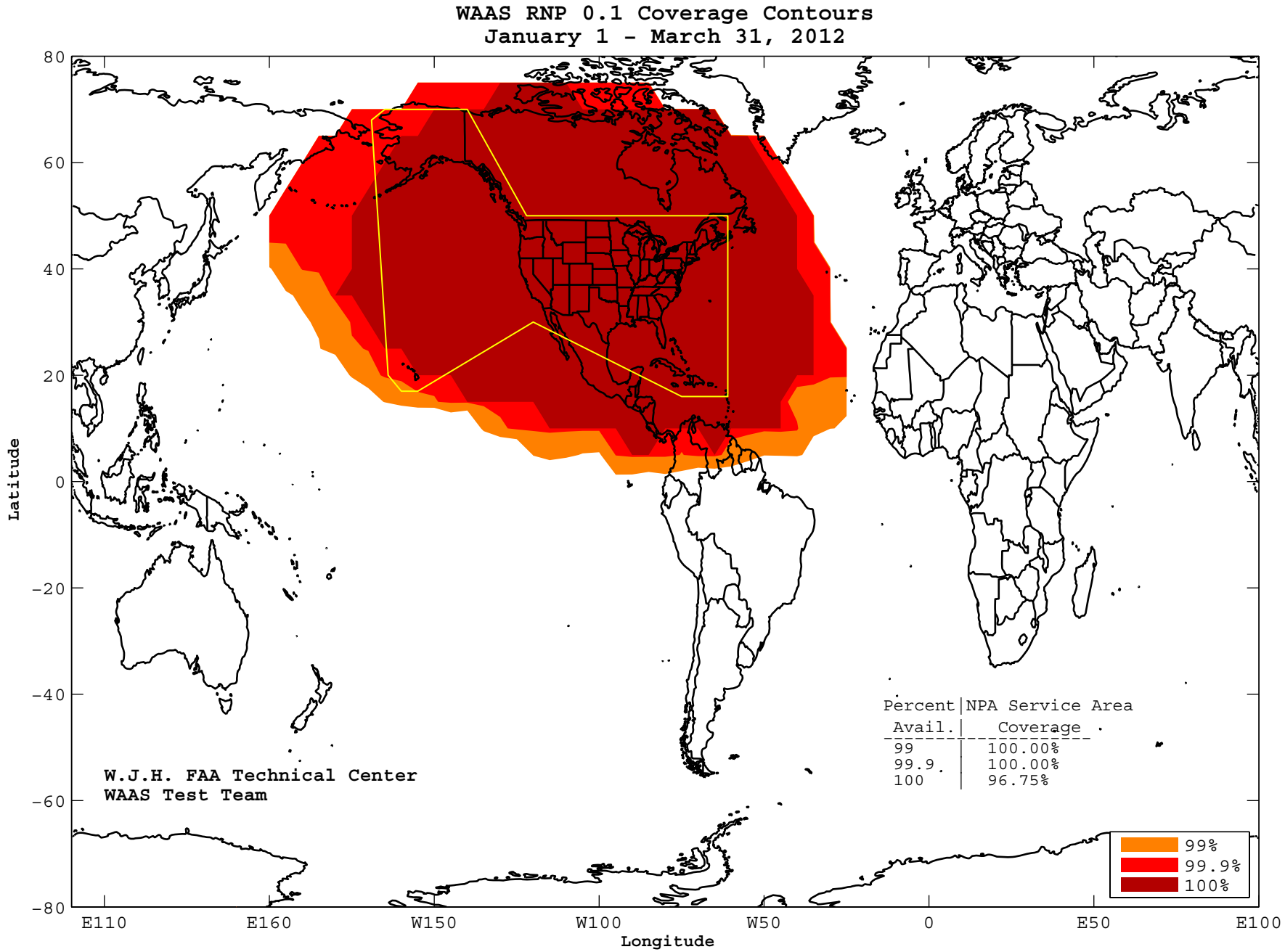


Figure 4-5 RNP 0.3 World Coverage for the Quarter

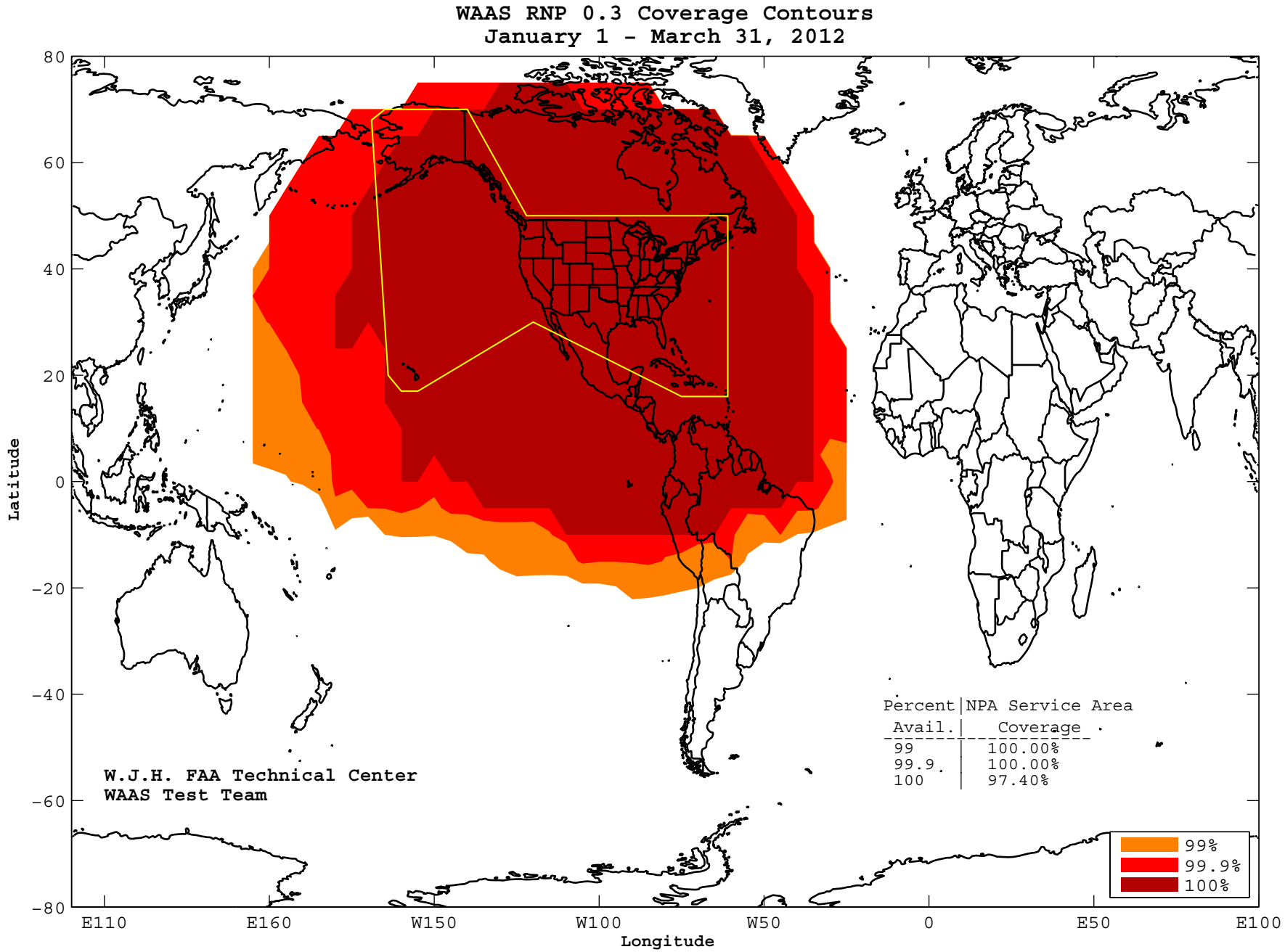


Figure 4-6 Daily LPV and LPV 200 CONUS Coverage

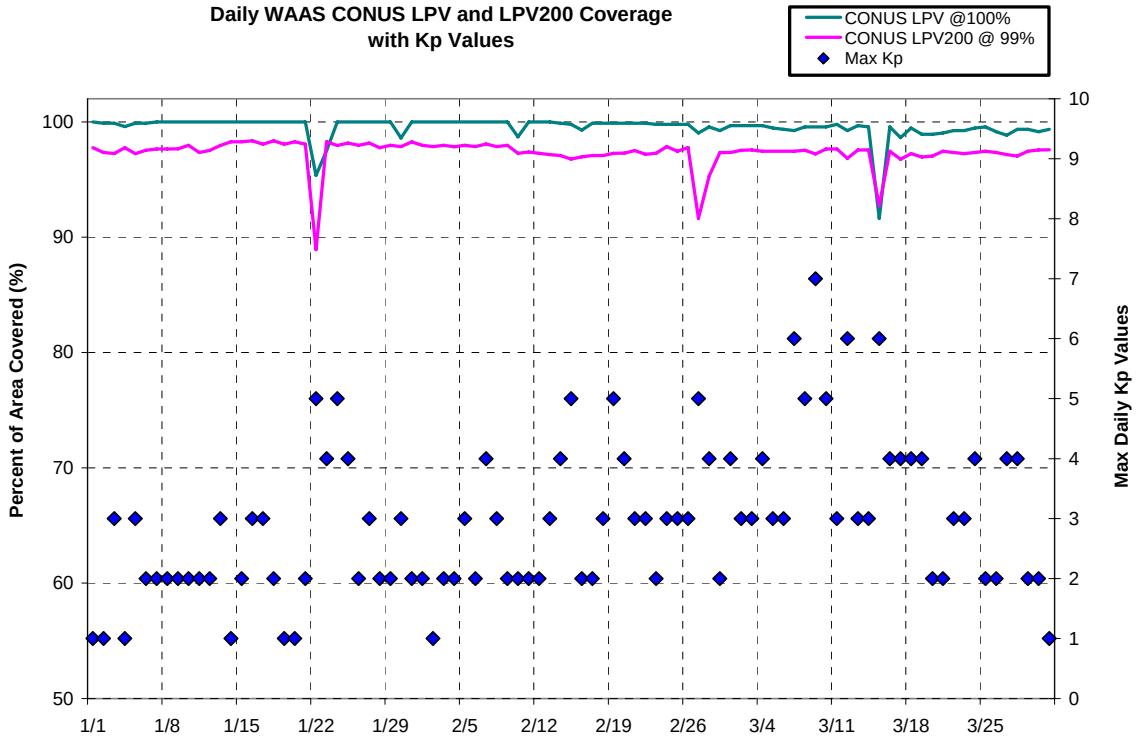


Figure 4-7 Daily LPV Alaska Coverage

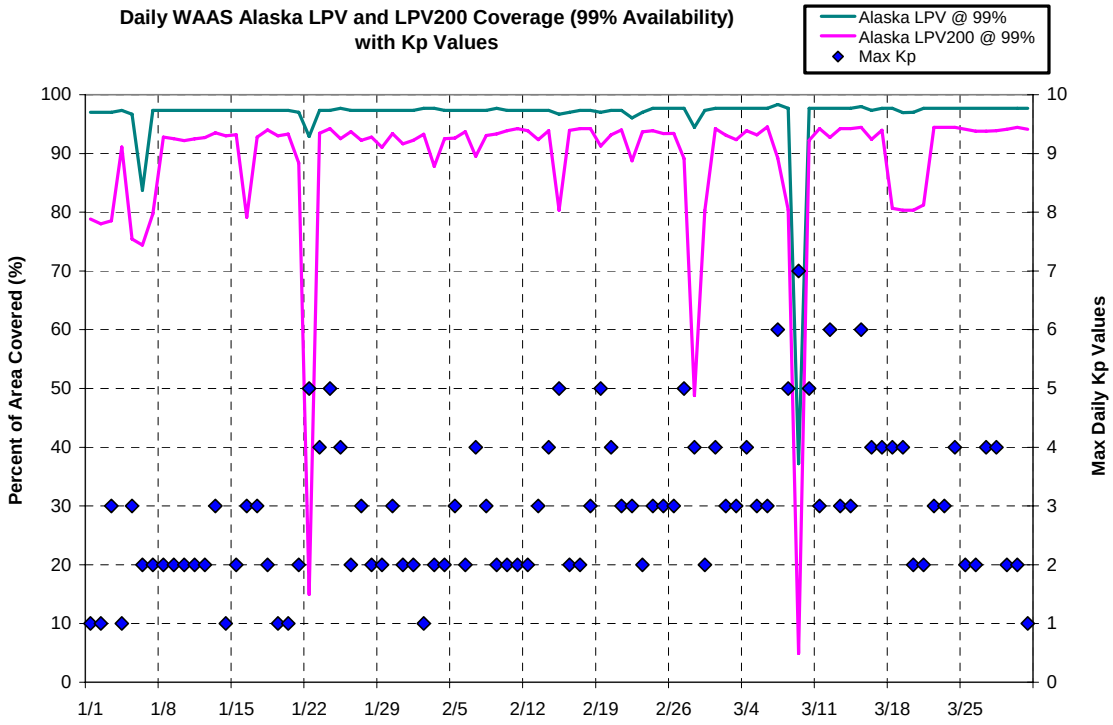
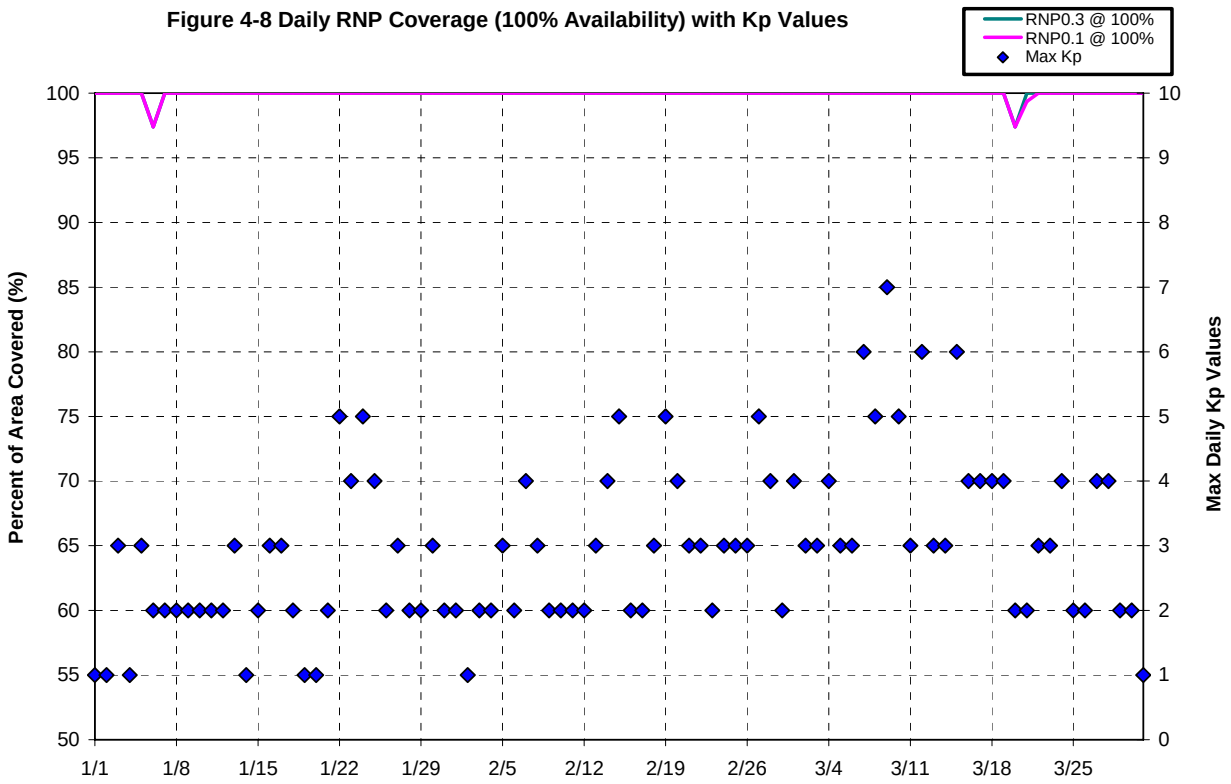


Figure 4-8 Daily RNP Coverage



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 3.64 at Tapachula. 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 Safety Margin Index and HMI Statistics

Location	Safety Index		
	Horizontal	Vertical	Number of HMIs
Arcata	5.42	8.04	0
Grand Forks	4.66	6.19	0
Oklahoma City	6.10	4.82	0
Albuquerque	7.43	12.51	0
Anchorage	4.84	6.08	0
Atlanta	5.84	5.31	0
Barrow	9.09	5.49	0
Bethel	7.35	5.23	0
Billings	5.05	11.02	0
Boston	5.01	6.32	0
Chicago	4.56	6.64	0
Cleveland	4.75	5.90	0
Cold Bay	10.30	11.52	0
Dallas	7.03	8.98	0
Denver	5.96	7.09	0
Fairbanks	11.41	4.95	0
Gander	8.88	9.22	0
Goose Bay	5.18	6.98	0
Houston	7.73	7.98	0
Iqaluit	8.81	4.97	0
Jacksonville	4.87	5.50	0
Juneau	3.94	6.65	0
Kansas City	6.31	6.31	0
Kotzebue	5.74	5.91	0
Los Angeles	8.05	8.47	0
Memphis	6.95	6.68	0
Merida	8.56	7.58	0
Mexico City	5.44	8.15	0
Miami	9.38	5.83	0
Minneapolis	4.53	8.32	0
New York	6.11	6.40	0
Oakland	7.33	15.26	0
Puerto Vallarta	4.99	7.57	0
Salt Lake City	4.22	5.62	0
San Jose Del Cabo	6.88	6.70	0
Seattle	5.23	5.35	0
Tapachula	3.64	7.25	0
Washington DC	5.59	6.07	0
Winnipeg	8.97	4.66	0

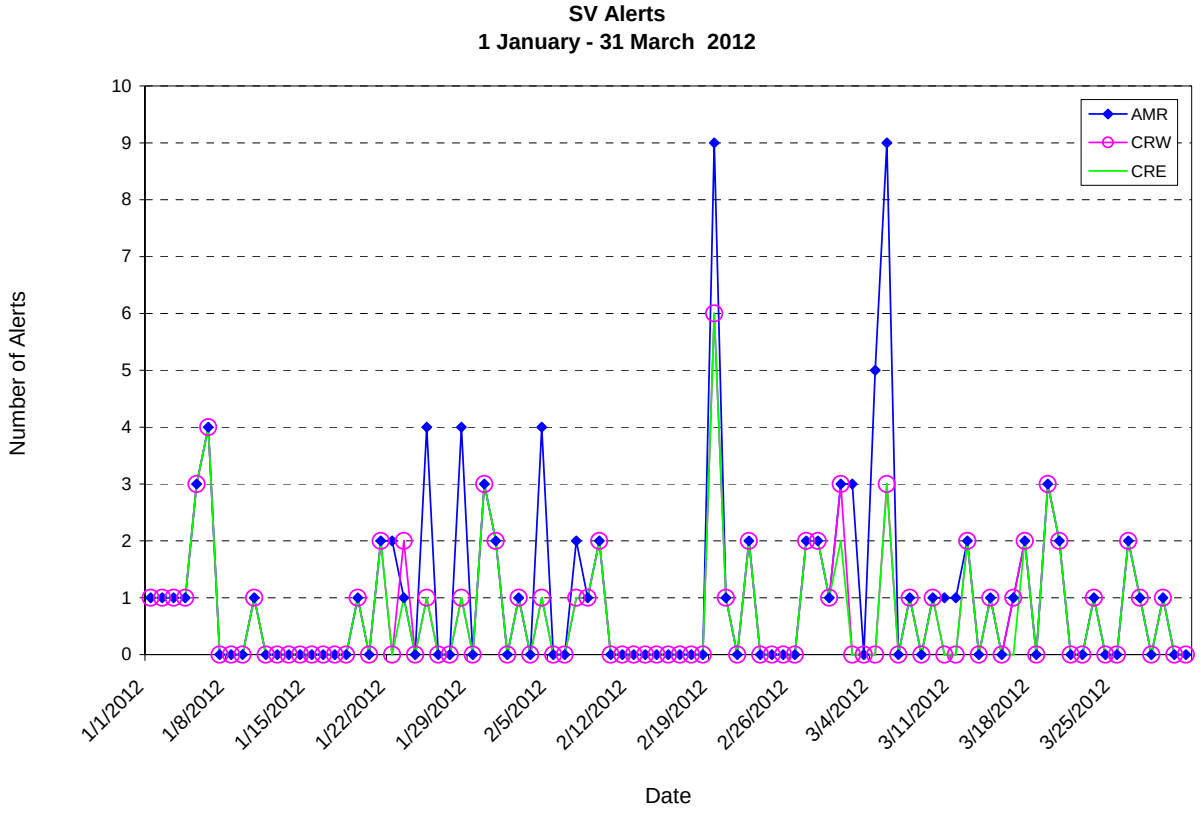
5.2 Broadcast Alerts

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	16	16	16	0.1758	0.1758	0.1758
3	21	21	21	0.2308	0.2308	0.2308
4	61	31	28	0.6703	0.3407	0.3077
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	98	68	65	1.0769	0.7473	0.7143
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. Table 5.9 to 5.13 show message rates statistics broadcasted on CRW. Table 5.14 to 5.18 show message rates statistics on CRE.

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)
0	19	1	220209
1	106155	1	126
2	1310342	62	39
3	1310354	62	33
4	1310517	31	39
7	98828	12	142
9	92129	0	0
10	98644	11	158
17	31320	1	338

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

SV	On Time	Late	Max Late Length (seconds)
1	50449	0	0
2	47563	1	167
3	50116	0	0
4	48063	0	0
5	48357	0	0
6	51021	0	0
7	47749	0	0
8	47244	0	0
9	49249	0	0
10	50119	0	0
11	51448	0	0
12	48507	1	121
13	47559	0	0
14	47561	0	0
15	48870	0	0
16	48776	0	0
17	47724	0	0
18	47224	0	0
19	50219	0	0
20	50293	0	0
21	47186	0	0
22	48331	0	0
23	47416	0	0
25	49947	0	0
26	41451	0	0
27	51310	1	121
28	48652	0	0
29	47664	0	0
30	48279	0	0
31	48744	0	0
32	48020	1	167

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

SV	On Time	Late	Max Late Length (seconds)
1	41417	2	153
2	39070	1	185
3	41154	0	0
4	39433	1	209
5	39699	0	0
6	41934	0	0
7	39170	1	128
8	38771	0	0
9	40460	2	133
10	41157	1	140
11	42315	3	201
12	39839	0	0
13	39054	0	0
14	39051	0	0
15	40101	2	129
16	40056	1	152
17	39189	0	0
18	38775	1	129
19	41244	2	175
20	41312	1	131
21	38711	5	217
22	39733	2	208
23	38863	1	144
25	40994	1	178
26	34003	2	144
27	42141	1	129
28	39948	2	211
29	39143	2	122
30	39616	0	0
31	40024	0	0
32	39395	1	208
133	75587	1	145
135	48598	0	0
138	74964	1	151

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

Band	Block	On Time	Late	Max Late Length (seconds)
0	0	27289	6	323
0	1	27277	6	328
0	2	27289	9	579
1	0	27290	10	328
1	1	27289	8	311
1	2	27278	10	324
1	3	27284	7	440
1	4	27275	7	580
2	0	27291	4	440
2	1	27296	7	451
2	2	27279	4	451
2	3	27279	12	452
2	4	27286	9	454
2	5	19890	6	459
3	0	27285	6	439
3	1	27282	5	451
3	2	27283	8	450
9	0	27292	3	434
9	1	27292	3	305
9	2	27298	8	542
9	3	27289	6	306
9	4	27278	9	306
9	5	27282	12	560
9	6	27309	6	306

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

Band	On Time	Late	Max Late Length (seconds)
0	35642	2	387
1	35701	1	354
2	35699	0	0
3	35629	1	337
9	35641	0	0

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

Message Type	On Time	Late	Max Late Length (seconds)
0	556	3	494526
1	108539	3	586
2	1309716	55	3816
3	1310265	61	450
4	1310312	51	450
7	100712	8	599
9	92121	2	595
10	100704	8	635
17	31492	3	960

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

SV	On Time	Late	Max Late Length (seconds)
1	50444	5	186
2	47548	2	181
3	50117	1	180
4	48045	1	174
5	48346	0	0
6	51024	1	167
7	47746	4	185
8	47239	2	178
9	49240	2	158
10	50125	0	0
11	51448	0	0
12	48498	3	166
13	47553	3	169
14	47549	3	511
15	48863	2	180
16	48776	3	186
17	47708	2	178
18	47216	0	0
19	50208	0	0
20	50282	1	167
21	47180	0	0
22	48327	5	185
23	47407	2	178
25	49932	2	158
26	41452	1	164
27	51301	1	163
28	48641	2	169
29	47654	3	511
30	48277	3	167
31	48742	2	168
32	48019	2	169

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

SV	On Time	Late	Max Late Length (seconds)
1	41430	2	205
2	39057	0	0
3	41143	1	206
4	39443	2	624
5	39687	2	207
6	41921	2	208
7	39177	0	0
8	38769	1	146
9	40446	1	206
10	41147	2	624
11	42319	0	0
12	39821	0	0
13	39048	2	210
14	39044	0	0
15	40096	0	0
16	40056	2	210
17	39176	0	0
18	38778	0	0
19	41247	2	208
20	41326	1	205
21	38739	0	0
22	39732	1	206
23	38844	0	0
25	40979	1	147
26	34002	3	209
27	42140	1	136
28	39947	3	209
29	39131	0	0
30	39605	2	208
31	40001	1	207
32	39384	0	0
133	75025	3	624
135	74327	0	0
138	74952	4	624

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

Band	Block	On Time	Late	Max Late Length (seconds)
0	0	27281	6	578
0	1	27281	6	581
0	2	27290	5	576
1	0	27288	6	864
1	1	27292	7	866
1	2	27277	10	868
1	3	27275	15	864
1	4	27295	9	864
2	0	27271	9	864
2	1	27276	12	864
2	2	27297	9	864
2	3	27276	12	864
2	4	27289	6	864
2	5	19871	7	864
3	0	27295	10	864
3	1	27266	10	864
3	2	27287	10	864
9	0	27280	9	864
9	1	27295	5	864
9	2	27290	7	576
9	3	27285	5	576
9	4	27279	7	576
9	5	27293	9	576
9	6	27279	8	581

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

Band	On Time	Late	Max Late Length (seconds)
0	35931	2	786
1	35947	1	671
2	35961	3	702
3	35932	1	702
9	35902	4	668

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

Message Type	On Time	Late	Max Late Length (seconds)
0	15	0	0
1	108361	3	127
2	1310377	40	30
3	1310393	38	25
4	1310416	36	23
7	100355	7	146
9	92130	0	0
10	100452	14	154
17	31480	3	322

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

SV	On Time	Late	Max Late Length (seconds)
1	50443	0	0
2	47560	0	0
3	50119	0	0
4	48055	0	0
5	48352	0	0
6	51020	0	0
7	47760	0	0
8	47250	0	0
9	49245	0	0
10	50119	0	0
11	51449	0	0
12	48517	0	0
13	47569	0	0
14	47561	0	0
15	48864	0	0
16	48785	0	0
17	47724	0	0
18	47241	0	0
19	50215	0	0
20	50284	0	0
21	47186	0	0
22	48330	0	0
23	47403	0	0
25	49940	0	0
26	41448	0	0
27	51303	0	0
28	48651	0	0
29	47671	0	0
30	48294	0	0
31	48753	0	0
32	48021	0	0

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

SV	On Time	Late	Max Late Length (seconds)
1	41431	1	121
2	39072	1	190
3	41152	1	149
4	39442	0	0
5	39711	0	0
6	41934	0	0
7	39168	0	0
8	38780	0	0
9	40463	0	0
10	41158	1	149
11	42314	1	121
12	39843	0	0
13	39055	0	0
14	39063	1	211
15	40103	1	184
16	40055	0	0
17	39192	0	0
18	38776	0	0
19	41244	0	0
20	41308	0	0
21	38739	1	184
22	39743	0	0
23	38868	0	0
25	40987	1	125
26	34010	0	0
27	42161	0	0
28	39954	1	141
29	39151	0	0
30	39591	3	190
31	40011	0	0
32	39406	0	0
133	74244	1	211
135	72686	0	0
138	74960	0	0

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

Band	Block	On Time	Late	Max Late Length (seconds)
0	0	27286	8	356
0	1	27290	8	352
0	2	27287	7	386
1	0	27279	11	489
1	1	27296	9	525
1	2	27278	7	536
1	3	27287	7	485
1	4	27281	5	495
2	0	27282	4	477
2	1	27285	13	476
2	2	27291	7	477
2	3	27288	4	307
2	4	27278	6	305
2	5	19883	5	304
3	0	27294	10	306
3	1	27276	8	305
3	2	27297	7	304
9	0	27288	7	306
9	1	27281	9	357
9	2	27271	7	368
9	3	27294	7	576
9	4	27298	4	367
9	5	27295	3	356
9	6	27281	9	370

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

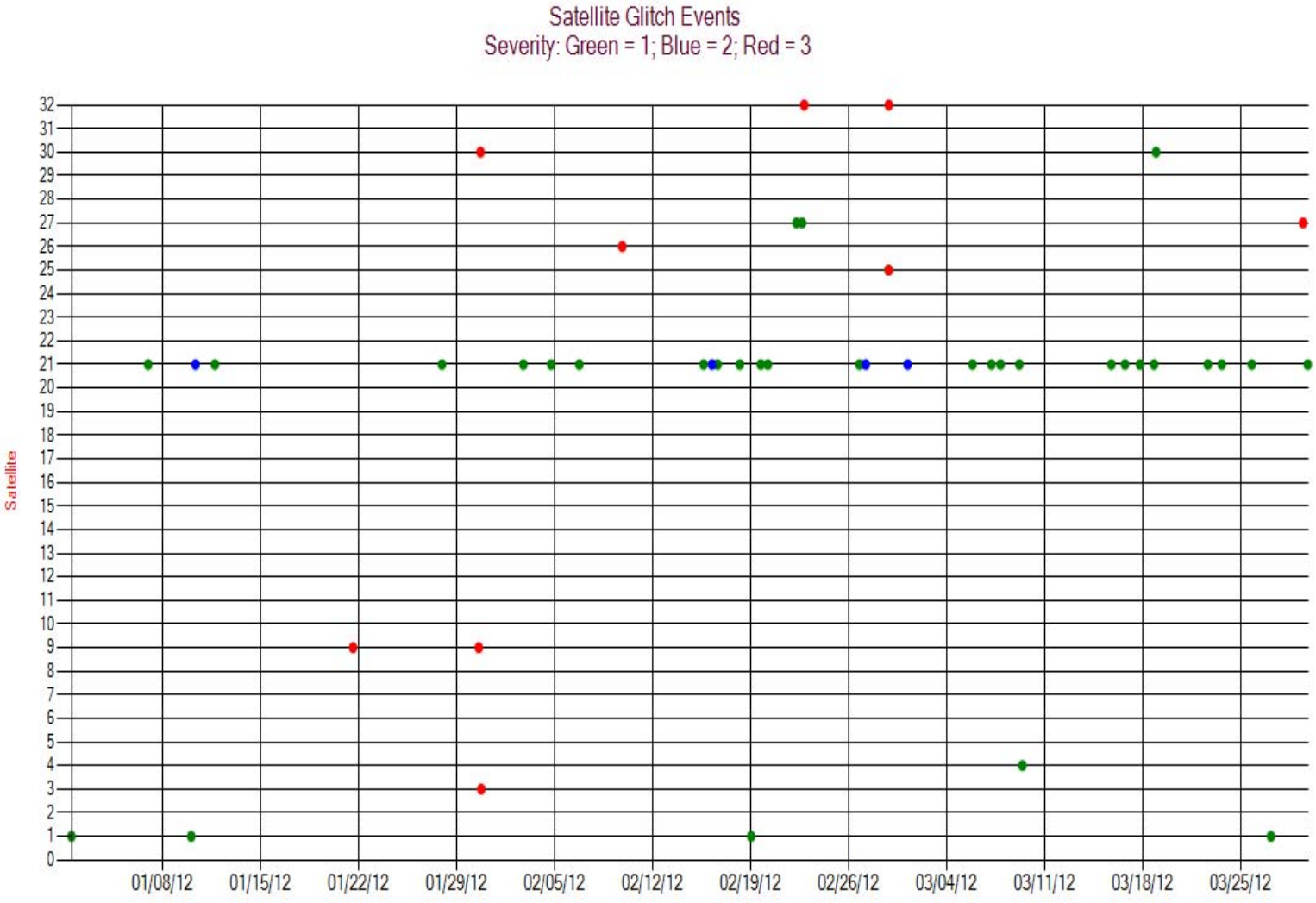
Band	On Time	Late	Max Late Length (seconds)
0	35900	0	0
1	35864	0	0
2	35889	2	333
3	35860	2	455
9	35891	1	385

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.

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 and 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 and 6.4 show the ionospheric error for each SV as measured by the WAAS receiver at the Washington DC reference station.

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	2.248	100	2.200	100	2.897	100	2.247	100	2.295	100	2.267	100
2	1.444	100	1.406	100	1.447	100	1.321	100	2.472	100	1.495	100
3	1.253	100	1.104	100	1.196	100	0.967	100	1.293	100	0.969	100
4	2.356	100	1.486	100	1.601	100	1.435	100	1.628	100	1.479	100
5	2.196	100	1.500	100	1.672	100	1.352	100	1.649	100	1.632	100
6	1.416	100	1.442	100	1.592	100	0.998	100	1.131	100	0.931	100
7	1.392	100	0.960	100	1.342	100	1.134	100	0.808	100	0.993	100
8	0.960	100	0.724	100	1.006	100	1.346	100	1.104	100	1.120	100
9	1.154	100	1.546	100	0.922	100	1.064	100	1.606	100	1.144	100
10	0.871	100	0.863	100	0.930	100	0.866	100	1.766	100	0.971	100
11	0.991	100	1.284	100	0.950	100	1.046	100	1.978	100	0.974	100
12	1.293	100	1.215	100	1.601	100	1.300	100	1.135	100	1.322	100
13	1.622	100	1.016	100	1.356	100	1.460	100	0.963	100	1.107	100
14	1.976	100	0.896	100	1.083	100	1.170	100	1.147	100	1.586	100
15	1.168	100	1.485	100	1.449	100	1.389	100	1.576	100	1.300	100
16	1.210	100	1.241	100	1.252	100	1.360	100	1.482	100	1.363	100
17	1.642	100	0.923	100	1.406	100	0.892	100	1.163	100	1.210	100
18	1.088	100	1.183	100	1.484	100	1.525	100	1.517	100	1.398	100
19	2.554	100	2.400	100	2.630	100	2.566	100	2.838	100	2.596	100
20	0.923	100	1.370	100	1.037	100	1.440	100	1.316	100	1.221	100
21	1.352	100	1.057	100	1.249	100	1.654	100	1.232	100	1.245	100
22	2.324	100	2.100	100	2.615	100	2.789	100	2.508	100	2.289	100
23	1.459	100	1.839	100	2.075	100	1.790	100	2.769	100	1.871	100
24	-	-	-	-	-	-	-	-	-	-	-	-
25	2.218	100	2.254	100	2.018	100	2.313	100	2.693	100	2.182	100
26	1.587	100	1.525	100	1.395	100	1.307	100	1.644	100	1.390	100
27	1.711	100	1.450	100	1.716	100	1.006	100	1.489	100	1.132	100
28	1.076	100	1.160	100	0.834	100	1.040	100	1.766	100	1.375	100
29	1.769	100	1.538	100	1.111	100	2.018	100	0.995	100	1.226	100
30	0.887	100	0.920	100	1.127	100	1.356	100	1.424	100	1.197	100
31	1.490	100	1.310	100	0.956	100	0.793	100	1.460	100	1.869	100
32	1.115	100	0.921	100	1.131	100	0.909	100	1.467	100	1.078	100
135	2.380	100	2.141	100	3.009	100	2.789	100	2.505	100	2.062	100
138	1.511	100	1.360	100	1.587	100	1.853	100	1.811	100	1.774	100

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	1.931	100	2.585	100	1.658	100	2.845	100	1.846	100	2.389	100
2	1.658	100	1.347	100	2.797	100	1.442	100	1.801	100	1.396	100
3	1.120	100	1.069	100	1.152	100	1.462	100	0.865	100	1.149	100
4	1.588	100	1.958	100	1.569	100	1.526	100	1.429	100	1.642	100
5	1.467	100	1.785	100	1.201	100	1.605	100	1.391	100	1.594	100
6	0.927	100	1.930	100	0.997	100	1.091	100	0.885	100	1.456	100
7	0.953	100	1.366	100	1.713	100	1.230	100	0.732	100	1.478	100
8	0.760	100	0.777	100	1.383	100	1.296	100	1.223	100	1.151	100
9	1.036	100	1.071	100	1.285	100	1.258	100	0.983	100	1.506	100
10	0.832	100	1.051	100	1.494	100	1.004	100	1.265	100	0.846	100
11	1.168	100	1.287	100	2.831	100	0.868	100	1.491	100	1.036	100
12	0.956	100	1.120	100	1.307	100	1.632	100	1.183	100	1.293	100
13	0.954	100	2.416	100	1.033	100	1.264	100	0.856	100	1.216	100
14	0.962	100	0.968	100	1.859	100	1.112	100	1.460	100	1.053	100
15	1.535	100	1.518	100	1.190	100	1.551	100	1.106	100	1.626	100
16	1.331	100	1.034	100	1.897	100	1.030	100	1.663	100	1.050	100
17	0.882	100	1.207	100	1.373	100	1.030	100	1.038	100	1.119	100
18	1.121	100	1.180	100	2.086	100	1.381	100	1.722	100	1.439	100
19	2.411	100	2.158	100	3.178	100	2.435	100	2.938	100	2.359	100
20	1.090	100	1.260	100	1.977	100	1.124	100	1.792	100	1.179	100
21	1.076	100	0.880	100	2.350	100	1.052	100	1.563	100	1.148	100
22	2.169	100	2.128	100	3.300	99.9751	2.457	100	2.962	99.9870	2.526	100
23	1.666	100	1.560	100	2.540	100	1.526	100	2.088	100	1.698	100
24	-	-	-	-	-	-	-	-	-	-	-	-
25	2.094	100	2.052	100	1.872	100	2.066	100	1.822	100	2.221	100
26	1.653	100	1.468	100	0.896	100	2.125	100	1.085	100	1.440	100
27	1.144	100	1.774	100	0.953	100	1.446	100	1.019	100	1.374	100
28	1.021	100	0.918	100	2.736	100	0.958	100	1.603	100	0.907	100
29	1.095	100	2.092	100	1.428	100	1.126	100	1.057	100	1.445	100
30	1.052	100	0.789	100	1.589	100	1.136	100	1.482	100	0.903	100
31	1.413	100	1.131	100	1.785	100	0.740	100	1.145	100	1.299	100
32	0.847	100	1.127	100	1.249	100	0.826	100	1.236	100	0.968	100
135	1.649	100	1.789	100	2.320	100	2.372	100	3.132	100	1.803	100
138	2.254	100	1.602	100	2.420	100	1.794	100	1.498	100	1.864	100

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	1.445	100	1.432	100	1.800	100	1.425	100	1.606	100	1.361	100
2	1.207	100	0.931	100	0.958	100	0.877	100	1.261	100	1.026	100
3	0.439	100	0.526	100	0.595	100	0.552	100	0.824	100	0.409	100
4	1.747	100	1.177	100	1.101	100	1.178	100	1.482	100	0.960	100
5	1.365	100	1.035	100	1.112	100	0.778	100	1.292	100	1.098	100
6	0.611	100	0.618	100	0.889	100	0.513	100	0.764	100	0.396	100
7	0.954	100	0.766	100	0.924	100	0.916	100	0.894	100	0.665	100
8	0.480	100	0.513	100	0.631	100	0.739	100	0.701	100	0.688	100
9	0.583	100	0.714	100	0.506	100	0.470	100	0.825	100	0.478	100
10	0.465	100	0.350	100	0.515	100	0.369	100	0.814	100	0.424	100
11	0.671	100	0.495	100	0.456	100	0.376	100	0.953	100	0.471	100
12	0.642	100	0.706	100	0.769	100	0.685	100	0.641	100	0.595	100
13	0.829	100	0.770	100	0.770	100	0.789	100	0.814	100	0.624	100
14	1.032	100	0.489	100	0.532	100	0.326	100	0.515	100	0.706	100
15	0.677	100	0.957	100	0.912	100	0.985	100	1.085	100	0.730	100
16	0.664	100	0.563	100	0.459	100	0.522	100	0.749	100	0.642	100
17	0.999	100	0.728	100	1.000	100	0.592	100	0.913	100	0.711	100
18	0.849	100	0.804	100	0.817	100	0.815	100	0.892	100	1.016	100
19	1.731	100	1.608	100	1.603	100	1.640	100	2.128	100	1.804	100
20	0.617	100	0.631	100	0.546	100	0.556	100	0.686	100	0.657	100
21	1.079	100	0.637	100	1.058	100	1.002	100	0.769	100	0.884	100
22	1.987	100	1.623	100	1.749	100	1.960	100	1.840	100	1.745	100
23	1.207	100	1.313	100	1.307	100	1.251	100	1.856	100	1.289	100
24	-	-	-	-	-	-	-	-	-	-	-	-
25	1.217	100	1.363	100	1.237	100	1.269	100	1.400	100	1.192	100
26	0.841	100	0.917	100	0.794	100	0.731	100	0.995	100	0.716	100
27	0.753	100	0.769	100	0.764	100	0.520	100	0.730	100	0.627	100
28	0.746	100	0.413	100	0.390	100	0.536	100	0.753	100	0.657	100
29	0.874	100	0.962	100	0.714	100	0.807	100	0.871	100	0.674	100
30	0.594	100	0.477	100	0.367	100	0.415	100	0.536	100	0.527	100
31	0.827	100	0.834	100	0.432	100	0.549	100	1.182	100	1.178	100
32	0.563	100	0.493	100	0.427	100	0.351	100	0.490	100	0.386	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	1.363	100	1.625	100	1.405	100	1.646	100	1.210	100	1.560	100
2	1.042	100	0.941	100	1.538	100	1.071	100	1.348	100	0.948	100
3	0.483	100	0.494	100	0.442	100	0.603	100	0.394	100	0.491	100
4	1.078	100	1.312	100	0.928	100	1.089	100	0.692	100	1.023	100
5	0.912	100	1.068	100	0.937	100	0.950	100	0.620	100	0.997	100
6	0.496	100	0.780	100	0.479	100	0.522	100	0.427	100	0.689	100
7	0.761	100	0.847	100	0.835	100	0.785	100	0.495	100	0.844	100
8	0.497	100	0.513	100	0.779	100	0.709	100	0.596	100	0.647	100
9	0.531	100	0.566	100	0.425	100	0.593	100	0.409	100	0.731	100
10	0.314	100	0.501	100	0.531	100	0.477	100	0.728	100	0.381	100
11	0.541	100	0.464	100	1.106	100	0.491	100	0.841	100	0.435	100
12	0.659	100	0.663	100	0.684	100	0.713	100	0.651	100	0.704	100
13	0.781	100	1.124	100	0.669	100	0.613	100	0.568	100	0.665	100
14	0.461	100	0.456	100	0.705	100	0.529	100	0.740	100	0.488	100
15	0.937	100	0.863	100	0.684	100	0.832	100	0.520	100	0.989	100
16	0.641	100	0.458	100	0.688	100	0.574	100	0.849	100	0.522	100
17	0.675	100	0.779	100	0.649	100	0.607	100	0.388	100	0.591	100
18	0.679	100	0.773	100	1.110	100	0.782	100	1.293	100	0.903	100
19	1.612	100	1.530	100	1.680	100	1.732	100	2.050	100	1.579	100
20	0.504	100	0.736	100	1.145	100	0.696	100	1.002	100	0.579	100
21	0.624	100	0.640	100	1.396	100	0.796	100	1.171	100	0.782	100
22	1.611	100	1.672	100	2.244	100	1.846	100	2.234	100	1.760	100
23	1.263	100	1.207	100	1.740	100	1.135	100	1.631	100	1.111	100
24	-	-	-	-	-	-	-	-	-	-	-	-
25	1.402	100	1.310	100	1.159	100	1.291	100	0.880	100	1.428	100
26	0.949	100	0.917	100	0.609	100	1.056	100	0.456	100	0.870	100
27	0.681	100	0.882	100	0.492	100	0.688	100	0.412	100	0.797	100
28	0.370	100	0.514	100	1.511	100	0.574	100	1.078	100	0.527	100
29	0.707	100	1.079	100	0.732	100	0.653	100	0.491	100	0.787	100
30	0.475	100	0.399	100	0.522	100	0.511	100	0.709	100	0.446	100
31	0.627	100	0.676	100	0.530	100	0.446	100	0.460	100	0.587	100
32	0.406	100	0.563	100	0.552	100	0.383	100	0.651	100	0.500	100

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

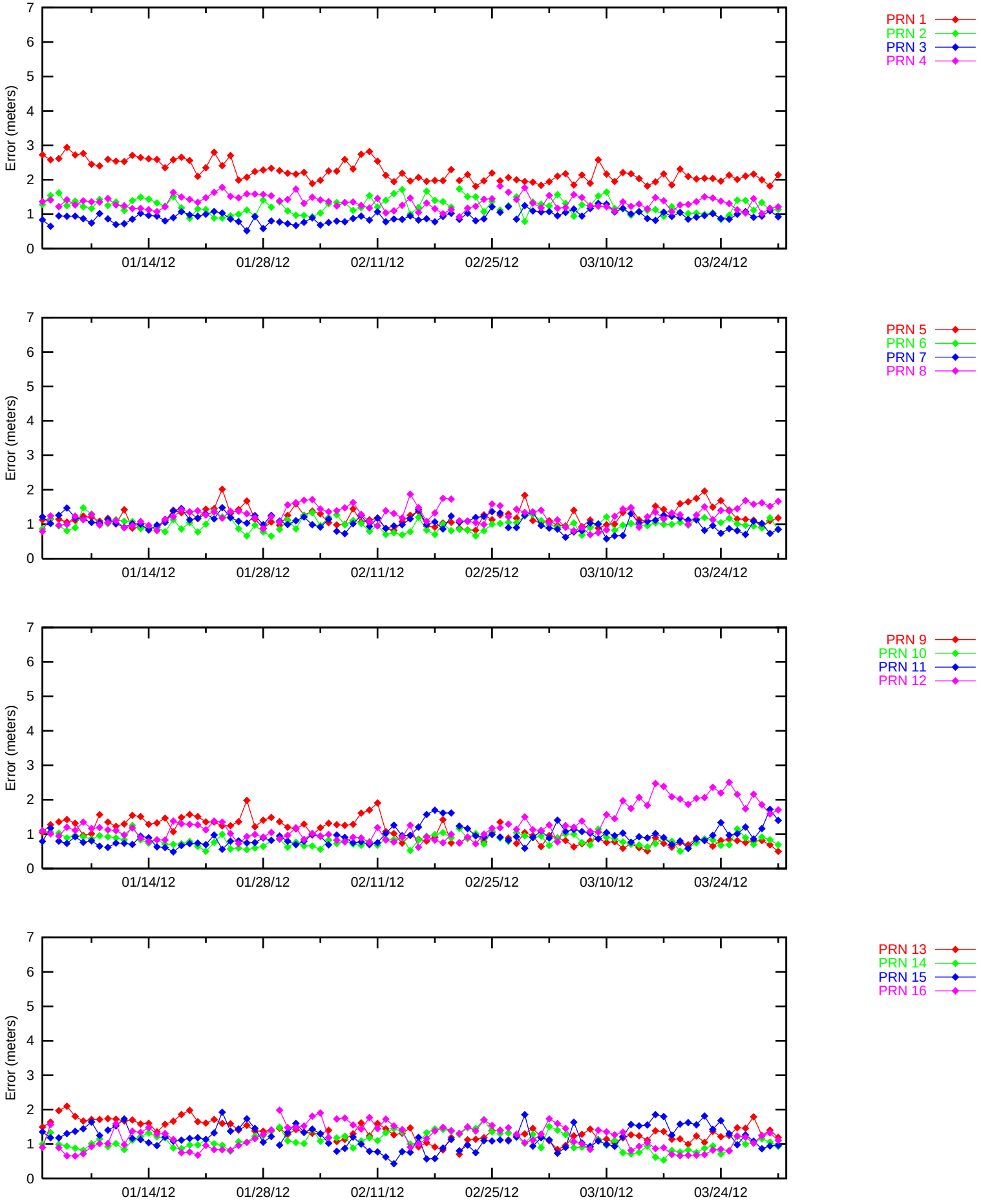


Figure 6-2 95% Range Error (PRN 17 - PRN 32) - Washington DC

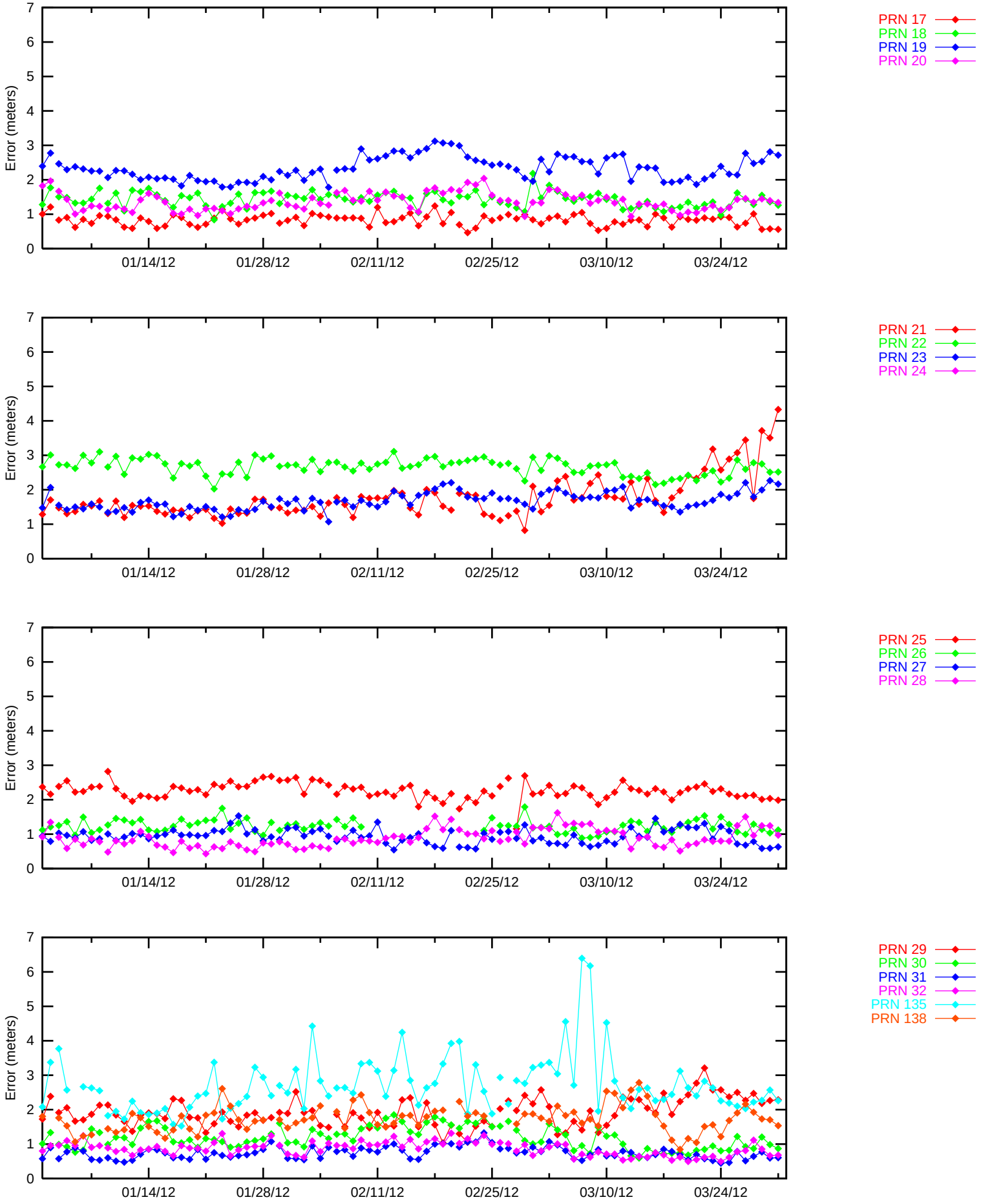


Figure 6-3 95% Ionospheric (PRN 1 - PRN 16) - Washington DC

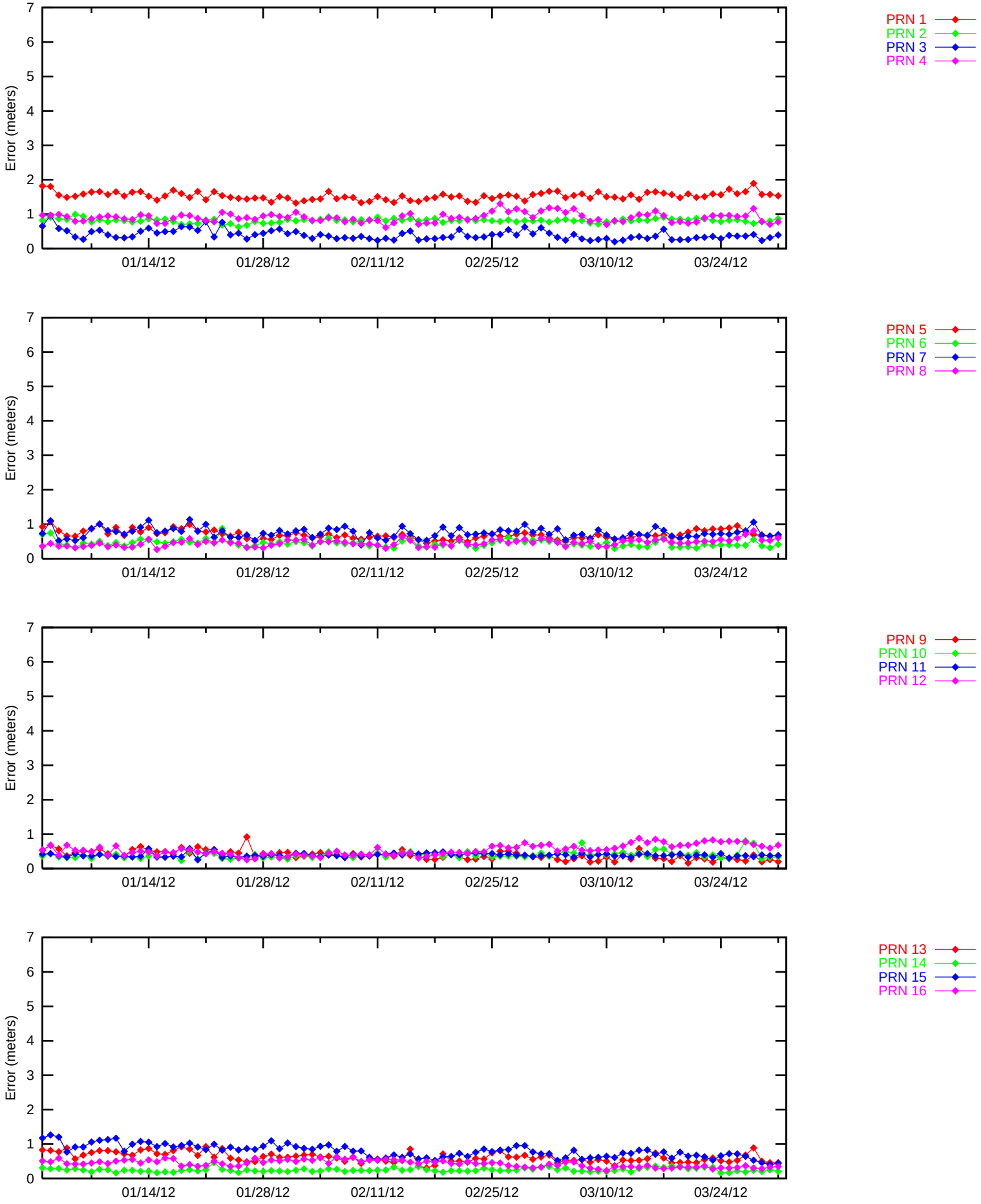
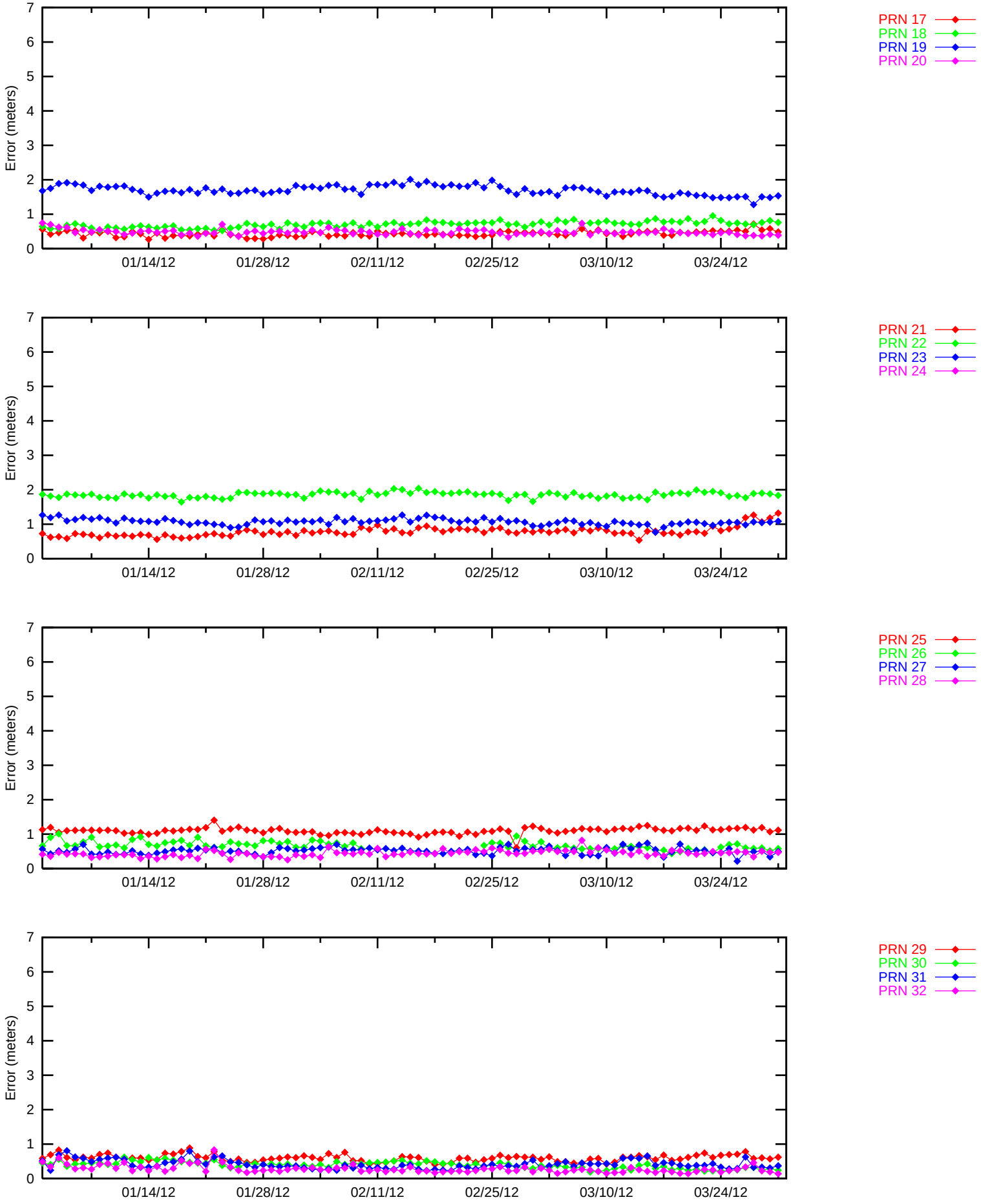


Figure 6-4 95% Ionospheric (PRN 17 - PRN 32) - Washington DC



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 CRW PA Ranging availability on 1/5/12 and 1/6/12 were due to the operator failure to enter CRW maneuver data prior to the Delta-V on the GEO. SGS clock at Napa caused low CRW PA availability from 3/17/12 to 3/20/12.

The low CRW PA Ranging availability reported by only AMR from 1/21/12 to 3/12/12 was due to an orbit mismatch. On 1/21/12, when the ZLA C&V returned to service after maintenance mode, there was an orbit mismatch among the three C&Vs. From 1/22/12 to 3/13/12, the three GEOs broadcast different UDRE values for CRW. C&V ZLA was the selected source for AMR. ZTL was the selected source for CRW, and C&V ZDC was the selected source for CRE. The CRW UDRE values reported by AMR were set to Not Monitored for most of the period causing low CRW PA ranging availability.

The low AMR NPA Ranging availability reported by CRE from 3/8/12 to 3/21/12 was also due to an orbit mismatch. On 3/8/12 the C&Vs were restarted as part of the IGP Mask Update (SSM-WAAS-033). After the update, C&V ZLA was the selected source for AMR, C&V ZDC was the selected source for CRW, and C&V ZTL was the selected source for CRE. The orbit mismatch between C&V ZLA and ZDC caused AMR and CRE to broadcast different UDRE values for AMR. The AMR UDRE values reported by CRE were set to Not Monitored for most of the period lowering NPA Availability on 3/16/12 and 3/18/12.

Table 7-1 GEO Ranging Availability

GEO Source	GEO	PA (%)	NPA (%)	Not Monitored (%)	Do Not Use (%)
AMR 133	CRW	62.61	1.60	34.12	1.67
AMR 133	CRE	98.63	0.44	0.13	0.80
AMR 133	AMR	0.00	99.88	0.12	0.00
CRW 135	CRW	96.65	1.60	0.08	1.66
CRW 135	CRE	98.57	0.44	0.19	0.80
CRW 135	AMR	0.00	99.19	0.80	0.00
CRE 138	CRW	94.50	1.60	2.24	1.67
CRE 138	CRE	98.64	0.44	0.12	0.80
CRE 138	AMR	0.00	98.15	1.85	0.00

Figure 7-1 Daily PA CRW GEO Ranging Availability Trend

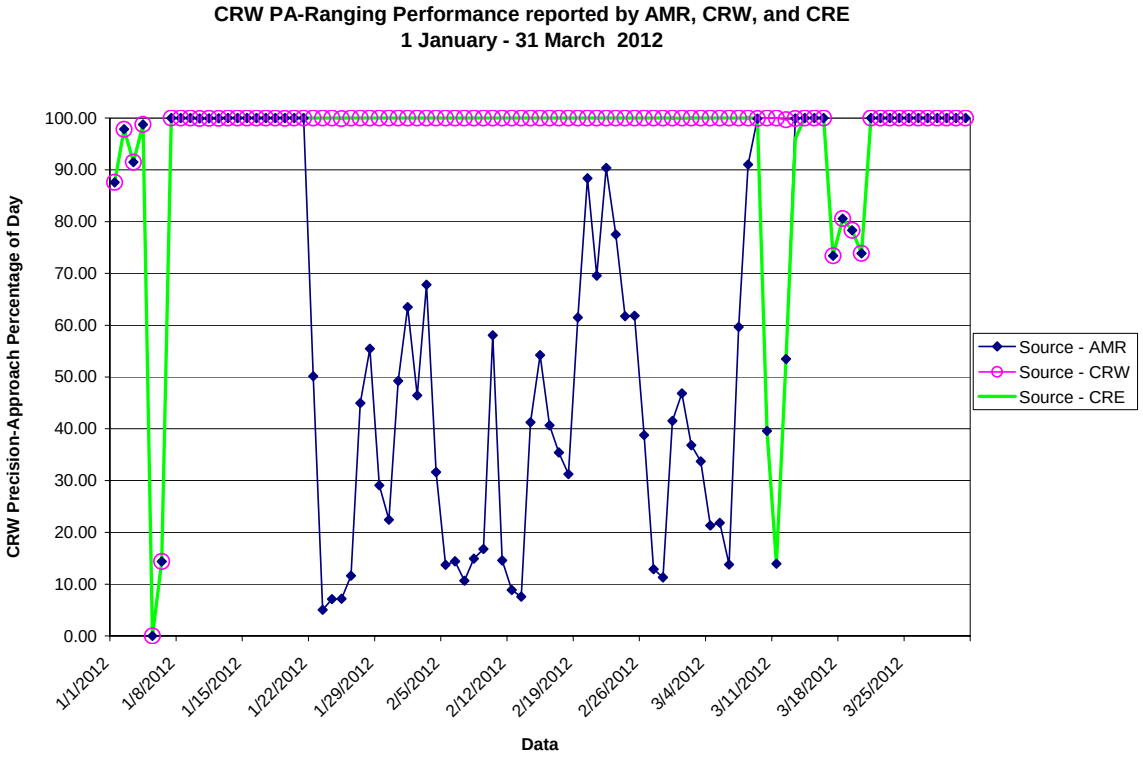


Figure 7-2 Daily PA CRE GEO Ranging Availability Trend

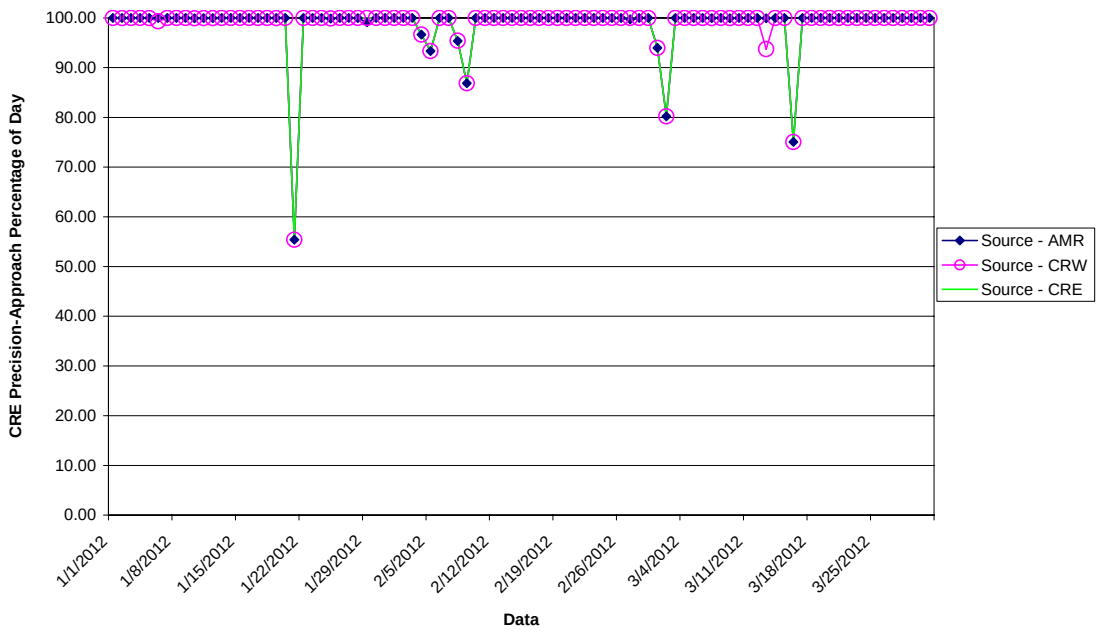
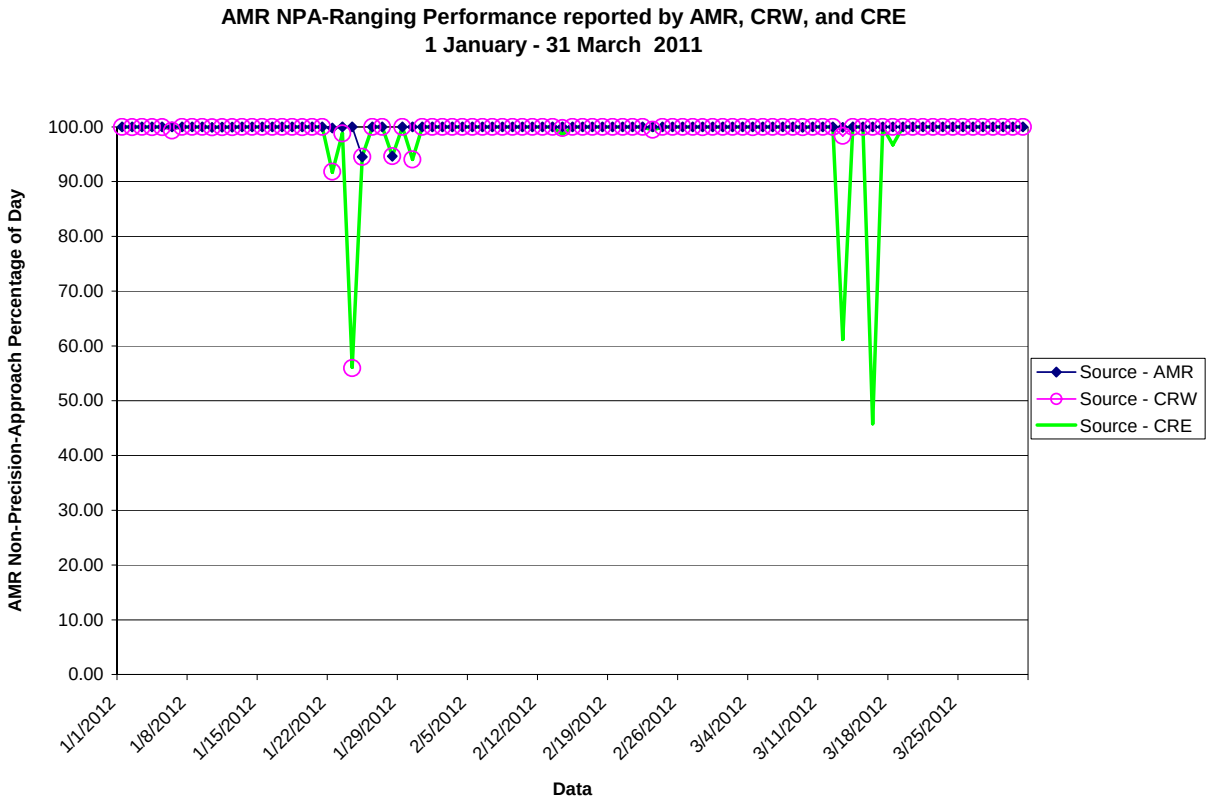


Figure 7-3 Daily NPA AMR GEO Ranging Availability Trend



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 for this evaluation period of WAAS operation is presented in Table 8-1. Figure 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 Figure 8.1 and 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 Figure 8.3 to 8.6. The user can review WAAS availability performance for US airports with GPS RNAV instrument approach procedures by selecting “Show all Airports”, or limit airports displayed to those with approved LPV approaches as provided in Table 8.1.

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

Airport Id	Airport Name	State	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
BET	BETHEL	AK	LPV	0	1	1	0.9998	14	0.9988
9A3	CHUATHBALUK	AK	LPV	0	1	1	0.9998	8	0.9991
CLP	CLARKS POINT	AK	LPV	1	0.9999	2	0.9998	12	0.9988
CDB	COLD BAY	AK	LPV	2	0.9998	4	0.9996	307	0.9703
SCC	DEADHORSE	AK	LPV	0	1	0	1	7	0.9994
GAL	EDWARD G. PITKA SR	AK	LPV	0	1	1	0.9998	6	0.9990
ELI	ELIM	AK	LPV	0	1	1	0.9998	10	0.9989
ENM	EMMONAK	AK	LPV	0	1	1	0.9998	10	0.9985
FAI	FAIRBANKS INTL	AK	LPV200	0	1	2	0.9998	2	0.9994
GKN	GULKANA	AK	LPV	0	1	1	0.9998	6	0.9996
HOM	HOMER	AK	LPV	1	1.0000	1	0.9998	5	0.9996
HLA	HUSLIA	AK	LPV	0	1	2	1	6	0.9990
ILI	ILIAMNA	AK	LPV	1	0.9998	1	0.9998	7	0.9992
KAL	KALTAG	AK	LPV	0	1	1	0.9998	8	0.9992
ENA	KENAI MUNICIPAL	AK	LPV	1	0.9999	1	0.9998	5	0.9996
KTN	KETCHIKAN INTL	AK	LPV	0	1	1	1.0000	2	0.9998
AKN	KING SALMON	AK	LPV	1	0.9999	1	0.9998	10	0.9990
KYU	KOYUKUK	AK	LPV	0	1	1	0.9998	7	0.9990
KWT	KWETHLUK	AK	LPV	0	1	1	0.9998	13	0.9988
WNA	NAPAKIAK	AK	LPV	1	1.0000	1	0.9998	15	0.9987
AQH	QUINHAGAK	AK	LPV	1	0.9999	1	0.9998	21	0.9983

Airport Id	Airport Name	State	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
OTZ	RALPH WIEN MEMORIAL	AK	LPV200	2	0.9995	4	0.9992	54	0.9940
D76	ROBERT/BOB/CURTIS MEMORIAL	AK	LPV	2	0.9995	4	0.9992	42	0.9947
RBY	RUBY	AK	LPV	0	1	3	0.9997	6	0.9990
WLK	SELAWIK	AK	LPV	0	1	1	1	7	0.9988
SHX	SHAGELUK	AK	LPV	0	1	1	0.9998	7	0.9992
2C7	SHAKTOOLIK	AK	LPV	0	1	1	0.9998	7	0.9990
KSM	ST MARY'S	AK	LPV	0	1	1	0.9998	10	0.9985
SMK	ST MICHAEL	AK	LPV	0	1	1	0.9998	8	0.9990
ANC	TED STEVENS ANCHORAGE INTL	AK	LPV	1	1.0000	1	0.9998	4	0.9996
BRW	WILEY POST- WILL ROGERS MEMORIAL	AK	LPV	2	0.9995	6	0.9993	93	0.9881
YAK	YAKUTAT	AK	LPV200	0	1	1	0.9999	5	0.9995
8A0	ALBERTVILLE RGNL- THOMAS J BRUM	AL	LPV	0	1	0	1	0	1
ANB	ANNISTON METROPOLITAN	AL	LPV	0	1	0	1	0	1
AUO	AUBURN UNIVERSITY RGNL	AL	LPV	0	1	0	1	0	1
EKY	BESSEMER	AL	LPV	0	1	0	1	0	1
BHM	BIRMINGHAM- SHUTTLESWORTH INTL	AL	LPV200	0	1	0	1	0	1
12J	BREWTON MUNICIPAL	AL	LPV	0	1	0	1	0	1
SEM	CRAIG FIELD	AL	LPV	0	1	0	1	0	1
DHN	DOTHAN RGNL	AL	LPV	0	1	0	1	0	1
EDN	ENTERPRISE MUNICIPAL	AL	LPV	0	1	0	1	0	1
5R4	FOLEY MUNICIPAL	AL	LPV	0	1	0	1	0	1
3A1	FOLSOM FIELD	AL	LPV	0	1	0	1	0	1
HSV	HUNTSVILLE INTL- CARL T JONES FIELD	AL	LPV200	0	1	0	1	0	1
4A9	ISBELL FIELD	AL	LPV	0	1	0	1	0	1
JKA	JACK EDWARDS	AL	LPV	0	1	0	1	0	1
MDQ	MADISON COUNTY EXECUTIVE	AL	LPV	0	1	0	1	0	1
HAB	MARION COUNTY-RANKIN FITE	AL	LPV	0	1	0	1	0	1
SCD	MERKEL FIELD SYLACAUGA MUNICIPAL	AL	LPV	0	1	0	1	0	1
BFM	MOBILE DOWNTOWN	AL	LPV200	0	1	0	1	0	1
MOB	MOBILE RGNL	AL	LPV	0	1	0	1	0	1
MGM	MONTGOMERY RGNL DANNELLY FIELD	AL	LPV	0	1	0	1	0	1
GAD	NORTHEAST ALABAMA RGNL	AL	LPV	0	1	0	1	0	1
MSL	NORTHWEST ALABAMA RGNL	AL	LPV200	0	1	0	1	0	1
DCU	PRYOR FIELD RGNL	AL	LPV200	0	1	0	1	0	1
EET	SHELBY COUNTY	AL	LPV	0	1	0	1	0	1
79J	SOUTH ALABAMA RGNL	AL	LPV	0	1	0	1	0	1
PLR	ST CLAIR COUNTY	AL	LPV	0	1	0	1	0	1
2R5	ST ELMO	AL	LPV	0	1	0	1	0	1
ASN	TALLADEGA MUNICIPAL	AL	LPV	0	1	0	1	0	1
TOI	TROY MUNICIPAL	AL	LPV	0	1	0	1	0	1
TCL	TUSCALOOSA RGNL	AL	LPV	0	1	0	1	0	1
LIT	ADAMS FIELD	AR	LPV200	0	1	0	1	0	1
BYH	ARKANSAS INTL	AR	LPV200	0	1	0	1	0	1
BVX	BATESVILLE RGNL	AR	LPV	0	1	0	1	0	1
HRO	BOONE COUNTY	AR	LPV	0	1	0	1	0	1
4M3	CARLISLE MUNICIPAL	AR	LPV	0	1	0	1	0	1
FSM	FORT SMITH RGNL	AR	LPV200	0	1	0	1	0	1
JBR	JONESBORO MUNICIPAL	AR	LPV	0	1	0	1	0	1
M19	NEWPORT MUNICIPAL	AR	LPV	0	1	0	1	0	1
ORK	NORTH LITTLE ROCK MUNICIPAL	AR	LPV	0	1	0	1	0	1
XNA	NORTHWEST ARKANSAS RGNL	AR	LPV	0	1	0	1	0	1

Airport Id	Airport Name	State	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
BPK	OZARK RGNL	AR	LPV	0	1	0	1	0	1
ROG	ROGERS MUNICIPAL-CARTER FIELD	AR	LPV	0	1	0	1	0	1
RUE	RUSSELLVILLE RGNL	AR	LPV	0	1	0	1	0	1
SUZ	SALINE COUNTY RGNL	AR	LPV	0	1	0	1	0	1
SRC	SEARCY MUNICIPAL	AR	LPV	0	1	0	1	0	1
SLG	SMITH FIELD	AR	LPV	0	1	0	1	0	1
ELD	SOUTH ARKANSAS RGNL AT GOODWIN	AR	LPV	0	1	0	1	0	1
ASG	SPRINGDALE MUNICIPAL	AR	LPV	0	1	0	1	0	1
SGT	STUTTGART MUNICIPAL	AR	LPV	0	1	0	1	0	1
TXK	TEXARKANA RGNL-WEBB FIELD	AR	LPV	0	1	0	1	0	1
AWM	WEST MEMPHIS MUNICIPAL	AR	LPV200	0	1	0	1	0	1
P33	COCHISE COUNTY	AZ	LPV	0	1	0	1	0	1
PRC	ERNEST A. LOVE FIELD	AZ	LPV	0	1	0	1	0	1
FLG	FLAGSTAFF PULLIAM	AZ	LPV	0	1	0	1	0	1
GEU	GLENDALE MUNICIPAL	AZ	LPV	0	1	0	1	1	1
IGM	KINGMAN	AZ	LPV	0	1	0	1	0	1
HII	LAKE HAVASU CITY	AZ	LPV	0	1	0	1	1	0.9999
IFP	LAUGHLIN/BULLHEAD INTL	AZ	LPV	0	1	0	1	0	1
PGA	PAGE MUNICIPAL	AZ	LPV	0	1	0	1	0	1
DVT	PHOENIX DEER VALLEY	AZ	LPV	0	1	0	1	0	1
PHX	PHOENIX SKY HARBOR INTL	AZ	LPV	0	1	0	1	0	1
IWA	PHOENIX-MESA GATEWAY	AZ	LPV	0	1	0	1	0	1
SAD	SAFFORD RGNL	AZ	LPV	0	1	0	1	0	1
SOW	SHOW LOW RGNL	AZ	LPV	0	1	0	1	0	1
TUS	TUCSON INTL	AZ	LPV	0	1	0	1	0	1
APV	APPLE VALLEY	CA	LPV	0	1	0	1	3	0.9997
ACV	ARCATA	CA	LPV	0	1	3	0.9997	171	0.9804
AUN	AUBURN MUNICIPAL	CA	LPV	0	1	1	0.9998	92	0.9915
DAG	BARSTOW-DAGGETT	CA	LPV	0	1	0	1	3	0.9998
C83	BYRON	CA	LPV	0	1	2	0.9998	96	0.9825
CMA	CAMARILLO	CA	LPV	0	1	24	0.9996	95	0.9907
MER	CASTLE	CA	LPV200	0	1	1	0.9998	93	0.9887
STS	CHARLES M. SCHULZ – SONOMA COUNTY	CA	LPV	0	1	3	0.9997	124	0.9792
CIC	CHICO MUNICIPAL	CA	LPV	0	1	3	0.9998	93	0.9903
CNO	CHINO	CA	LPV	0	1	1	1	95	0.9989
FAT	FRESNO YOSEMITE INTL	CA	LPV	0	1	1	0.9999	93	0.9905
WJF	GENERAL WM J FOX AIRFIELD	CA	LPV	0	1	1	1	95	0.9956
HAF	HALF MOON BAY	CA	LPV	0	1	4	0.9997	95	0.9744
HWD	HAYWARD EXECUTIVE	CA	LPV	0	1	4	0.9997	93	0.9784
CVH	HOLLISTER MUNICIPAL	CA	LPV	0	1	1	0.9998	93	0.9809
CEC	JACK MC NAMARA FIELD	CA	LPV	0	1	1	0.9997	162	0.9821
SNA	JOHN WAYNE AIRPORT-ORANGE COUNTY	CA	LPV	0	1	1	1	95	0.9975
LHM	LINCOLN RGNL/ KARL HARDER FIELD	CA	LPV200	0	1	2	0.9998	92	0.9905
LVK	LIVERMORE MUNICIPAL	CA	LPV	0	1	3	0.9997	93	0.9807
LGB	LONG BEACH / DAUGHERTY FIELD	CA	LPV	0	1	1	1	95	0.9959
LAX	LOS ANGELES INTL	CA	LPV	0	1	1	1	95	0.9945
LSN	LOS BANOS MUNICIPAL	CA	LPV	0	1	1	0.9998	93	0.9873
MAE	MADERA MUNICIPAL	CA	LPV	0	1	1	0.9999	93	0.9896
CRQ	MC CLELLAN-PALOMAR	CA	LPV	0	1	1	1	5	0.9996
BFL	MEADOWS FIELD	CA	LPV200	0	1	7	0.9999	95	0.9919

Airport Id	Airport Name	State	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
MCE	MERCED RGNL// MACREADY FIELD	CA	LPV	0	1	1	0.9998	93	0.9887
OAK	METROPOLITAN OAKLAND INTL	CA	LPV	0	1	4	0.9997	93	0.9778
MOD	MODESTO CITY-CO-HARRY SHAM FIELD	CA	LPV	0	1	1	0.9998	93	0.9881
MRY	MONTEREY PENINSULA	CA	LPV	0	1	5	0.9997	97	0.9768
MYF	MONTGOMERY FIELD	CA	LPV200	0	1	1	1	4	0.9996
APC	NAPA COUNTY	CA	LPV	0	1	3	0.9997	100	0.9810
O02	NERVINO	CA	LPV	0	1	1	0.9998	93	0.9953
SJC	NORMAN Y. MINETA SAN JOSE INTL	CA	LPV	0	1	5	0.9997	93	0.9784
VCB	NUT TREE	CA	LPV	0	1	4	0.9997	110	0.9849
ONT	ONTARIO INTL	CA	LPV	0	1	1	1.0000	94	0.9990
OXR	OXNARD	CA	LPV	0	1	26	0.9995	96	0.9900
28J	PALATKA MUNICIPAL – LT. KAY LARKIN	CA	LPV	0	1	0	1	0	1
PRB	PASO ROBLES MUNICIPAL	CA	LPV200	0	1	5	0.9998	94	0.9863
RBL	RED BLUFF MUNICIPAL	CA	LPV	0	1	3	0.9997	103	0.9894
RDD	REDDING MUNICIPAL	CA	LPV	0	1	3	0.9997	96	0.9897
RHV	REID-HILLVIEW OF SANTA CLARA	CA	LPV	0	1	5	0.9997	93	0.9794
RAL	RIVERSIDE MUNICIPAL	CA	LPV	0	1	0	1	5	0.9996
SAC	SACRAMENTO EXECUTIVE	CA	LPV200	0	1	2	0.9998	94	0.9892
SMF	SACRAMENTO INTL	CA	LPV	0	1	3	0.9998	97	0.9887
MHR	SACRAMENTO MATHER	CA	LPV	0	1	2	0.9998	93	0.9902
SNS	SALINAS MUNICIPAL	CA	LPV200	0	1	2	0.9998	94	0.9795
SFO	SAN FRANCISCO INTL	CA	LPV	0	1	4	0.9997	95	0.9756
SBA	SANTA BARBARA MUNICIPAL	CA	LPV	0	1	31	0.9994	96	0.9862
MIT	SHAFTER-MINTER FIELD	CA	LPV	0	1	11	0.9998	95	0.9915
VCV	SOUTHERN CALIFORNIA LOGISTICS	CA	LPV	0	1	0	1	4	0.9996
SCK	STOCKTON METROPOLITAN	CA	LPV	0	1	1	0.9998	93	0.9878
TCY	TRACY MUNICIPAL	CA	LPV	0	1	2	0.9998	93	0.9837
DWA	YOLO COUNTY	CA	LPV	0	1	4	0.9997	114	0.9870
MYV	YUBA COUNTY	CA	LPV200	0	1	3	0.9998	92	0.9901
APA	CENTENNIAL	CO	LPV	0	1	0	1	0	1
COS	CITY OF COLORADO SPRINGS MUNICIPAL	CO	LPV200	0	1	0	1	0	1
CEZ	CORTEZ MUNICIPAL	CO	LPV	0	1	0	1	0	1
DEN	DENVER INTL	CO	LPV200	0	1	0	1	0	1
DRO	DURANGO-LA PLATA COUNTY	CO	LPV200	0	1	0	1	0	1
FNL	FORT COLLINS-LOVELAND MUNICIPAL	CO	LPV200	0	1	0	1	0	1
FTG	FRONT RANGE	CO	LPV	0	1	0	1	0	1
RIL	GARFIELD COUNTY RGNL	CO	LPV	0	1	0	1	0	1
GJT	GRAND JUNCTION REGIONAL	CO	LPV200	0	1	0	1	0	1
GXY	GREELEY-WELD COUNTY	CO	LPV	0	1	0	1	0	1
ITR	KIT CARSON COUNTY	CO	LPV	0	1	0	1	0	1
LHX	LA JUNTA MUNICIPAL	CO	LPV	0	1	0	1	0	1
LAA	LAMAR MUNICIPAL	CO	LPV	0	1	0	1	0	1
MTJ	MONTROSE RGNL	CO	LPV	0	1	0	1	0	1
PUB	PUEBLO MEMORIAL	CO	LPV200	0	1	0	1	0	1
BJC	ROCKY MOUNTAIN METROPOLITAN	CO	LPV200	0	1	0	1	0	1
ALS	SAN LUIS VALLEY RGNL/ BERGMAN F	CO	LPV200	0	1	0	1	0	1
HDN	YAMPA VALLEY	CO	LPV	0	1	0	1	0	1

Airport Id	Airport Name	State	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
BDL	BRADLEY INTL	CT	LPV200	0	1	0	1	0	1
GON	GROTON-NEW LONDON	CT	LPV	0	1	0	1	0	1
HVN	TWEED-NEW HAVEN	CT	LPV	0	1	0	1	0	1
OXC	WATERBURY-OXFORD	CT	LPV	0	1	0	1	0	1
DCA	RONALD REAGAN WASHINGTON NATIONAL	DC	LPV	0	1	0	1	0	1
ILG	NEW CASTLE	DE	LPV	0	1	0	1	0	1
EVY	SUMMIT	DE	LPV	0	1	0	1	0	1
GED	SUSSEX COUNTY	DE	LPV	0	1	0	1	0	1
AAF	APALACHICOLA REGIONAL	FL	LPV	0	1	0	1	0	1
AVO	AVON PARK EXECUTIVE	FL	LPV	0	1	0	1	6	0.9999
BOW	BARTOW MUNICIPAL	FL	LPV	0	1	0	1	6	1
CEW	BOB SIKES	FL	LPV	0	1	0	1	0	1
BCT	BOCA RATON	FL	LPV	0	1	0	1	29	0.9987
VQQ	CECIL FIELD	FL	LPV	0	1	0	1	0	1
PGD	CHARLOTTE COUNTY	FL	LPV	0	1	0	1	8	0.9998
CRG	CRAIG MUNICIPAL	FL	LPV200	0	1	0	1	0	1
CTY	CROSS CITY	FL	LPV	0	1	0	1	0	1
DAB	DAYTONA BEACH INTL	FL	LPV	0	1	0	1	0	1
DED	DELAND MUNICIPAL-SIDNEY H TAYLOR FIELD	FL	LPV	0	1	0	1	0	1
FHB	FERNANDINA BEACH MUNICIPAL	FL	LPV	0	1	0	1	0	1
XFL	FLAGLER COUNTY	FL	LPV	0	1	0	1	0	1
FXE	FORT LAUDERDALE EXECUTIVE	FL	LPV200	0	1	0	1	32	0.9983
FLL	FORT LAUDERDALE/ HOLLYWOOD INTL	FL	LPV	0	1	0	1	36	0.9982
GNV	GAINESVILLE RGNL	FL	LPV	0	1	0	1	0	1
BKV	HERNANDO COUNTY	FL	LPV	0	1	0	1	0	1
IMM	IMMOKALEE RGNL	FL	LPV	0	1	0	1	12	0.9997
JAX	JACKSONVILLE INTL	FL	LPV	0	1	0	1	0	1
TMB	KENDALL-TAMIAMI EXECUTIVE	FL	LPV200	0	1	0	1	68	0.9975
EYW	KEY WEST INTL	FL	LPV	0	1	0	1	104	0.9953
ISM	KISSIMMEE GATEWAY	FL	LPV200	0	1	0	1	0	1
X14	LA BELLE MUNICIPAL	FL	LPV	0	1	0	1	8	0.9998
LCQ	LAKE CITY MUNICIPAL	FL	LPV	0	1	0	1	0	1
LAL	LAKELAND LINDER RGNL	FL	LPV200	0	1	0	1	6	1
LEE	LEESBURG INTL	FL	LPV	0	1	0	1	0	1
MKY	MARCO ISLAND	FL	LPV	0	1	0	1	20	0.9987
MLB	MELBOURNE INTL	FL	LPV	0	1	0	1	0	1
COI	MERRITT ISLAND	FL	LPV	0	1	0	1	0	1
MIA	MIAMI INTL	FL	LPV	0	1	0	1	53	0.9977
APF	NAPLES MUNICIPAL	FL	LPV	0	1	0	1	20	0.9990
EVB	NEW SMYRNA BEACH MUNICIPAL	FL	LPV	0	1	0	1	0	1
F45	NORTH PALM BEACH COUNTY	FL	LPV	0	1	0	1	15	0.9995
ECP	NORTHWEST FLORIDA BEACHES INTL	FL	LPV200	0	1	0	1	0	1
OCF	OCALA INTL-JIM TAYLOR FIELD	FL	LPV200	0	1	0	1	0	1
OBE	OKEECHOBEE COUNTY	FL	LPV	0	1	0	1	4	1
MCO	ORLANDO INTL	FL	LPV200	0	1	0	1	0	1
SFB	ORLANDO SANFORD INTL	FL	LPV200	0	1	0	1	0	1
PHK	PALM BEACH CO GLADES	FL	LPV	0	1	0	1	11	0.9998
PBI	PALM BEACH INTL	FL	LPV	0	1	0	1	19	0.9992
PNS	PENSACOLA GULF COAST RGNL	FL	LPV	0	1	0	1	0	1
40J	PERRY-FOLEY	FL	LPV	0	1	0	1	0	1
TPF	PETER O KNIGHT	FL	LP	0	1	0	1	6	0.9999
PMP	POMPANO BEACH AIRPARK	FL	LPV	0	1	0	1	30	0.9984

Airport Id	Airport Name	State	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
SRQ	SARASOTA/BRADENTON INTL	FL	LPV200	0	1	0	1	9	0.9998
SEF	SEBRING RGNL	FL	LPV	0	1	0	1	6	1
RSW	SOUTHWEST FLORIDA INTL	FL	LPV	0	1	0	1	11	0.9998
TIX	SPACE COAST RGNL	FL	LPV200	0	1	0	1	0	1
SGJ	ST AUGUSTINE	FL	LPV	0	1	0	1	0	1
FPR	ST LUCIE COUNTY INTL	FL	LPV	0	1	0	1	1	1
PIE	ST PETERSBURG-CLEARWATER INTL	FL	LPV200	0	1	0	1	6	0.9999
TLH	TALLAHASSEE RGNL	FL	LPV	0	1	0	1	0	1
VDF	TAMPA EXECUTIVE	FL	LPV	0	1	0	1	6	0.9999
TPA	TAMPA INTL	FL	LPV200	0	1	0	1	6	0.9999
MTH	THE FLORIDA KEYS MARATHON	FL	LPV	0	1	0	1	107	0.9949
VRB	VERO BEACH MUNICIPAL	FL	LPV	0	1	0	1	1	1
GIF	WINTER HAVEN'S GILBERT	FL	LPV	0	1	0	1	5	1
SUA	WITHAM FIELD	FL	LPV	0	1	0	1	3	0.9999
ZPH	ZEPHYRHILLS MUNICIPAL	FL	LPV	0	1	0	1	4	1
AHN	ATHENS/BEN EPPS	GA	LPV	0	1	0	1	0	1
FFC	ATLANTA RGNL FALCON FIELD	GA	LPV200	0	1	0	1	0	1
AGS	AUGUSTA RGNL AT BUSH FIELD	GA	LPV	0	1	0	1	0	1
MLJ	BALDWIN COUNTY	GA	LPV	0	1	0	1	0	1
WDR	BARROW COUNTY	GA	LPV	0	1	0	1	0	1
BQK	BRUNSWICK GOLDEN ISLES	GA	LPV200	0	1	0	1	0	1
VPC	CARTERSVILLE	GA	LPV	0	1	0	1	0	1
CWV	CLAXTON-EVANS COUNTY	GA	LPV	0	1	0	1	0	1
RYY	COBB COUNTY-MC COLLUM FIELD	GA	LPV200	0	1	0	1	0	1
48A	COCHRAN	GA	LPV	0	1	0	1	0	1
CSG	COLUMBUS METROPOLITAN	GA	LPV	0	1	0	1	0	1
15J	COOK COUNTY	GA	LPV	0	1	0	1	0	1
9A1	COVINGTON MUNICIPAL	GA	LPV	0	1	0	1	0	1
CKF	CRISP COUNTY-CORDELE	GA	LPV	0	1	0	1	0	1
DNN	DALTON MUNICIPAL	GA	LPV	0	1	0	1	0	1
BGE	DECATUR COUNTY INDUSTRIAL	GA	LPV200	0	1	0	1	0	1
BIJ	EARLY COUNTY	GA	LPV	0	1	0	1	0	1
SBO	EMANUEL COUNTY	GA	LPV	0	1	0	1	0	1
18A	FRANKLIN COUNTY	GA	LPV	0	1	0	1	0	1
FTY	FULTON COUNTY AIRPORT-BROWN FIELD	GA	LPV	0	1	0	1	0	1
3J7	GREENE COUNTY RGNL	GA	LPV	0	1	0	1	0	1
PIM	HARRIS COUNTY	GA	LPV	0	1	0	1	0	1
ATL	HARTSFIELD – JACKSON ATLANTA	GA	LPV200	0	1	0	1	0	1
EZM	HEART OF GEORGIA RGNL	GA	LPV	0	1	0	1	0	1
TMA	HENRY TIFT MYERS	GA	LPV	0	1	0	1	0	1
HOE	HOMERVILLE	GA	LPV	0	1	0	1	0	1
19A	JACKSON COUNTY	GA	LPV	0	1	0	1	0	1
JES	JESUP-WAYNE COUNTY	GA	LPV	0	1	0	1	0	1
LGC	LAGRANGE-CALLAWAY	GA	LPV200	0	1	0	1	0	1
GVL	LEE GILMER MEMORIAL	GA	LPV	0	1	0	1	0	1
MCN	MIDDLE GEORGIA RGNL	GA	LPV	0	1	0	1	0	1
2J5	MILLEN	GA	LPV	0	1	0	1	0	1
MGR	MOULTRIE MUNICIPAL	GA	LPV	0	1	0	1	0	1
CCO	NEWNAN COWETA COUNTY	GA	LPV	0	1	0	1	0	1
PUJ	PAULDING NORTHWEST ATLANTA	GA	LPV200	0	1	0	1	0	1
PXE	PERRY-HOUSTON COUNTY	GA	LPV	0	1	0	1	0	1
JZP	PICKENS COUNTY	GA	LPV	0	1	0	1	0	1

Airport Id	Airport Name	State	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
JYL	PLANTATION ARPK	GA	LPV	0	1	0	1	0	1
RMG	RICHARD B RUSSELL	GA	LPV	0	1	0	1	0	1
SAV	SAVANNAH/HILTON HEAD INTL	GA	LPV200	0	1	0	1	0	1
ABY	SOUTHWEST GEORGIA RGNL	GA	LPV200	0	1	0	1	0	1
4J6	ST MARYS	GA	LPV	0	1	0	1	0	1
TBR	STATESBORO-BULLOCH COUNTY	GA	LPV	0	1	0	1	0	1
MQW	TELFAIR-WHEELER	GA	LPV	0	1	0	1	0	1
OPN	THOMASTON-UPSON COUNTY	GA	LPV200	0	1	0	1	0	1
TVI	THOMASVILLE RGNL	GA	LPV	0	1	0	1	0	1
TOC	TOCCOA RG LETOURNEAU FIELD	GA	LPV	0	1	0	1	0	1
VLD	VALDOSTA RGNL	GA	LPV	0	1	0	1	0	1
VDI	VIDALIA RGNL	GA	LPV	0	1	0	1	0	1
IIY	WASHINGTON-WILKES COUNTY	GA	LPV	0	1	0	1	0	1
AYS	WAYCROSS-WARE COUNTY	GA	LPV	0	1	0	1	0	1
CTJ	WEST GEORGIA RGNL – O V GRAY FIELD	GA	LPV	0	1	0	1	0	1
AMW	AMES MUNICIPAL	IA	LPV	0	1	0	1	0	1
IKV	ANKENY RGNL	IA	LPV	0	1	0	1	0	1
TVK	CENTERVILLE MUNICIPAL	IA	LPV	0	1	0	1	0	1
CKP	CHEROKEE COUNTY RGNL	IA	LPV	0	1	0	1	0	1
CWI	CLINTON MUNICIPAL	IA	LPV200	0	1	0	1	0	1
CBF	COUNCIL BLUFFS MUNICIPAL	IA	LPV200	0	1	0	1	0	1
DVN	DAVENPORT MUNICIPAL	IA	LPV200	0	1	0	1	0	1
DNS	DENISON MUNICIPAL	IA	LPV	0	1	0	1	0	1
DSM	DES MOINES INTL	IA	LPV	0	1	0	1	0	1
DBQ	DUBUQUE RGNL	IA	LPV200	0	1	0	1	0	1
EST	ESTHERVILLE MUNICIPAL	IA	LPV	0	1	0	1	0	1
FFL	FAIRFIELD MUNICIPAL	IA	LPV	0	1	0	1	0	1
FXY	FOREST CITY MUNICIPAL	IA	LPV	0	1	0	1	0	1
FOD	FORT DODGE RGNL	IA	LPV200	0	1	0	1	0	1
GGI	GRINNELL RGNL	IA	LPV	0	1	0	1	0	1
IOW	IOWA CITY MUNICIPAL	IA	LPV	0	1	0	1	0	1
EFW	JEFFERSON MUNICIPAL	IA	LPV	0	1	0	1	0	1
EOK	KEOKUK MUNICIPAL	IA	LPV	0	1	0	1	0	1
OXV	KNOXVILLE MUNICIPAL	IA	LPV	0	1	0	1	0	1
LRJ	LE MARS MUNICIPAL	IA	LPV	0	1	0	1	0	1
MPZ	MOUNT PLEASANT MUNICIPAL	IA	LPV	0	1	0	1	0	1
MUT	MUSCATINE MUNICIPAL	IA	LPV	0	1	0	1	0	1
TNU	NEWTON MUNICIPAL	IA	LPV	0	1	0	1	0	1
OOA	OSKALOOSA MUNICIPAL	IA	LPV	0	1	0	1	0	1
OTM	OTTUMWA RGNL	IA	LPV	0	1	0	1	0	1
PEA	PELLA MUNICIPAL	IA	LPV	0	1	0	1	0	1
PRO	PERRY MUNICIPAL	IA	LPV	0	1	0	1	0	1
ICL	SCHENCK FIELD	IA	LPV	0	1	0	1	0	1
SDA	SHENANDOAH MUNICIPAL	IA	LPV	0	1	0	1	0	1
SUX	SIOUX GATEWAY/ COL. BUD DAY FIELD	IA	LPV200	0	1	0	1	0	1
BRL	SOUTHEAST IOWA RGNL	IA	LPV200	0	1	0	1	0	1
SPW	SPENCER MUNICIPAL	IA	LPV200	0	1	0	1	0	1
SLB	STORM LAKE MUNICIPAL	IA	LPV	0	1	0	1	0	1
CID	THE EASTERN IOWA	IA	LPV200	0	1	0	1	0	1
VTI	VINTON VETERANS MEMORIAL ARPK	IA	LPV	0	1	0	1	0	1
AWG	WASHINGTON MUNICIPAL	IA	LPV200	0	1	0	1	0	1
ALO	WATERLOO RGNL	IA	LPV	0	1	0	1	0	1
EBS	WEBSTER CITY MUNICIPAL	IA	LPV	0	1	0	1	0	1

Airport Id	Airport Name	State	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
BOI	BOISE AIR TERMINAL/ GOWEN FIELD	ID	LPV	0	1	0	1	0	1
EUL	CALDWELL INDUSTRIAL	ID	LPV	0	1	0	1	2	1
COE	COEUR D'ALENE – PAPPY BOYINGTO	ID	LPV200	0	1	0	1	0	1
GNG	GOODING MUNICIPAL	ID	LPV	0	1	0	1	0	1
IDA	IDAHO FALLS RGNL	ID	LPV200	0	1	0	1	0	1
JER	JEROME COUNTY	ID	LPV	0	1	0	1	0	1
TWF	JOSLIN FIELD – MAGIC VALLEY RG	ID	LPV200	0	1	0	1	0	1
LWS	LEWISTON-NEZ PERCE COUNTY	ID	LPV200	0	1	0	1	0	1
MYL	MC CALL MUNICIPAL	ID	LPV	0	1	0	1	0	1
U76	MOUNTAIN HOME MUNICIPAL	ID	LPV	0	1	0	1	0	1
MAN	NAMPA MUNICIPAL	ID	LPV	0	1	0	1	1	1
PIH	POCATELLO RGNL	ID	LPV200	0	1	0	1	0	1
SPI	ABRAHAM LINCOLN CAPITAL	IL	LPV	0	1	0	1	0	1
FEP	ALBERTUS	IL	LPV	0	1	0	1	0	1
ARR	AURORA MUNICIPAL	IL	LPV	0	1	0	1	0	1
BMI	CENTRAL IL RGNL ARPT	IL	LPV	0	1	0	1	0	1
MDW	CHICAGO MIDWAY INTL	IL	LPV	0	1	0	1	0	1
ORD	CHICAGO O'HARE INTL	IL	LPV200	0	1	0	1	0	1
RFD	CHICAGO/ROCKFORD INTL	IL	LPV200	0	1	0	1	0	1
MTO	COLES COUNTY MEMORIAL	IL	LPV	0	1	0	1	0	1
RSV	CRAWFORD CO	IL	LPV	0	1	0	1	0	1
DKB	DE KALB TAYLOR MUNICIPAL	IL	LPV	0	1	0	1	0	1
DEC	DECATUR	IL	LPV	0	1	0	1	0	1
C73	DIXON MUNICIPAL- CHARLES R. WALGREEN	IL	LPV	0	1	0	1	0	1
DPA	DUPAGE	IL	LPV200	0	1	0	1	0	1
PIA	GENERAL DOWNING – PEORIA INTL	IL	LPV	0	1	0	1	0	1
IKK	GREATER KANKAKEE	IL	LPV	0	1	0	1	0	1
HSB	HARRISBURG-RALEIGH	IL	LPV	0	1	0	1	0	1
IGQ	LANSING MUNICIPAL	IL	LPV	0	1	0	1	0	1
LOT	LEWIS UNIVERSITY	IL	LPV200	0	1	0	1	0	1
3LF	LITCHFIELD MUNICIPAL	IL	LPV	0	1	0	1	0	1
AJG	MOUNT CARMEL MUNICIPAL	IL	LPV	0	1	0	1	0	1
3MY	MOUNT HAWLEY AUXILIARY	IL	LPV	0	1	0	1	0	1
I63	MOUNT STERLING MUNICIPAL	IL	LPV	0	1	0	1	0	1
MVN	MOUNT VERNON	IL	LPV	0	1	0	1	0	1
C15	PEKIN MUNICIPAL	IL	LPV	0	1	0	1	0	1
PNT	PONTIAC MUNICIPAL	IL	LPV	0	1	0	1	0	1
MLI	QUAD CITY INTL	IL	LPV	0	1	0	1	0	1
UIN	QUINCY RGNL-BALDWIN FIELD	IL	LPV200	0	1	0	1	0	1
BLV	SCOTT AFB/MIDAMERICA	IL	LPV200	0	1	0	1	0	1
ALN	ST LOUIS RGNL	IL	LPV	0	1	0	1	0	1
CMI	UNIVERSITY OF ILLINOIS- WILLARD	IL	LPV200	0	1	0	1	0	1
DNV	VERMILION REGIONAL	IL	LPV	0	1	0	1	0	1
UGN	WAUKEGAN RGNL	IL	LPV	0	1	0	1	0	1
SQI	WHITESIDE CO ARPT- JOS H BITTOR	IL	LPV	0	1	0	1	0	1
MWA	WILLIAMSON COUNTY RGNL	IL	LPV	0	1	0	1	0	1
AID	ANDERSON MUNICIPAL- DARLINGTON FIELD	IN	LPV	0	1	0	1	0	1
BAK	COLUMBUS MUNICIPAL	IN	LPV	0	1	0	1	0	1
GWB	DE KALB COUNTY	IN	LPV	0	1	0	1	0	1

Airport Id	Airport Name	State	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
MIE	DELAWARE COUNTY RGNL	IN	LPV	0	1	0	1	0	1
EYE	EAGLE CREEK AIRPARK	IN	LPV	0	1	0	1	0	1
EKM	ELKHART MUNICIPAL	IN	LPV	0	1	0	1	0	1
EVV	EVANSVILLE RGNL	IN	LPV200	0	1	0	1	0	1
FWA	FORT WAYNE INTL	IN	LPV200	0	1	0	1	0	1
SER	FREEMAN MUNICIPAL	IN	LPV	0	1	0	1	0	1
FRH	FRENCH LICK MUNICIPAL	IN	LPV	0	1	0	1	0	1
RCR	FULTON COUNTY	IN	LPV	0	1	0	1	0	1
GSH	GOSHEN MUNICIPAL	IN	LPV	0	1	0	1	0	1
HFY	GREENWOOD MUNICIPAL	IN	LPV	0	1	0	1	0	1
HNB	HUNTINGBURG	IN	LPV	0	1	0	1	0	1
TYQ	INDIANAPOLIS EXECUTIVE	IN	LPV	0	1	0	1	0	1
IND	INDIANAPOLIS INTL	IN	LPV	0	1	0	1	0	1
OKK	KOKOMO MUNICIPAL	IN	LPV	0	1	0	1	0	1
GGP	LOGANSPORT/CASS COUNTY	IN	LPV	0	1	0	1	0	1
IMS	MADISON MUNICIPAL	IN	LPV	0	1	0	1	0	1
MZZ	MARION MUNICIPAL	IN	LPV	0	1	0	1	0	1
CEV	METTEL FIELD	IN	LPV	0	1	0	1	0	1
BMG	MONROE COUNTY	IN	LPV200	0	1	0	1	0	1
MQJ	MOUNT COMFORT	IN	LPV	0	1	0	1	0	1
OVO	NORTH VERNON	IN	LPV	0	1	0	1	0	1
VPZ	PORTER COUNTY MUNICIPAL	IN	LPV	0	1	0	1	0	1
LAF	PURDUE UNIVERSITY	IN	LPV	0	1	0	1	0	1
4I7	PUTNAM COUNTY	IN	LPV	0	1	0	1	0	1
I22	RANDOLPH COUNTY	IN	LPV	0	1	0	1	0	1
RID	RICHMOND MUNICIPAL	IN	LPV200	0	1	0	1	0	1
GEZ	SHELBYVILLE MUNICIPAL	IN	LPV	0	1	0	1	0	1
SMD	SMITH FIELD	IN	LPV	0	1	0	1	0	1
SBN	SOUTH BEND RGNL	IN	LPV	0	1	0	1	0	1
OXI	STARKE COUNTY	IN	LPV	0	1	0	1	0	1
HUF	TERRE HAUTE INTL-HULMAN FIELD	IN	LPV	0	1	0	1	0	1
ASW	WARSAW MUNICIPAL	IN	LPV	0	1	0	1	0	1
PTS	ATKINSON MUNICIPAL	KS	LPV	0	1	0	1	0	1
ADT	ATWOOD-RAWLINS COUNTY	KS	LPV	0	1	0	1	0	1
AAO	COLONEL JAMES JABARA	KS	LPV	0	1	0	1	0	1
DDC	DODGE CITY RGNL	KS	LPV	0	1	0	1	0	1
EHA	ELKHART-MORTON COUNTY	KS	LPV	0	1	0	1	0	1
EMP	EMPORIA MUNICIPAL	KS	LPV	0	1	0	1	0	1
FOE	FORBES FIELD	KS	LPV	0	1	0	1	0	1
FSK	FORT SCOTT MUNICIPAL	KS	LPV	0	1	0	1	0	1
GCK	GARDEN CITY RGNL	KS	LPV	0	1	0	1	0	1
GBD	GREAT BEND MUNICIPAL	KS	LPV200	0	1	0	1	0	1
HYS	HAYS RGNL	KS	LPV200	0	1	0	1	0	1
HQG	HUGOTON MUNICIPAL	KS	LPV	0	1	0	1	0	1
HUT	HUTCHINSON MUNICIPAL	KS	LPV	0	1	0	1	0	1
IDP	INDEPENDENCE MUNICIPAL	KS	LPV	0	1	0	1	0	1
OJC	JOHNSON COUNTY EXECUTIVE	KS	LPV	0	1	0	1	0	1
LWC	LAWRENCE MUNICIPAL	KS	LPV200	0	1	0	1	0	1
LBL	LIBERAL MID-AMERICA RGNL	KS	LPV	0	1	0	1	0	1
MHK	MANHATTAN RGNL	KS	LPV200	0	1	0	1	0	1
MYZ	MARYSVILLE MUNICIPAL	KS	LPV	0	1	0	1	0	1
MPR	MC PHERSON	KS	LPV	0	1	0	1	0	1
IXD	NEW CENTURY AIRCENTER	KS	LPV	0	1	0	1	0	1
EWK	NEWTON-CITY-COUNTY	KS	LPV	0	1	0	1	0	1
NRN	NORTON MUNICIPAL	KS	LPV	0	1	0	1	0	1

Airport Id	Airport Name	State	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
OEL	OAKLEY MUNICIPAL	KS	LPV	0	1	0	1	0	1
PTT	PRATT RGNL	KS	LPV	0	1	0	1	0	1
GLD	RENNER FLD / GOODLAND MUNICIPAL	KS	LPV200	0	1	0	1	0	1
RSL	RUSSELL MUNICIPAL	KS	LPV	0	1	0	1	0	1
SLN	SALINA MUNICIPAL	KS	LPV	0	1	0	1	0	1
TQK	SCOTT CITY MUNICIPAL	KS	LPV	0	1	0	1	0	1
CBK	SHALZ FIELD	KS	LPV	0	1	0	1	0	1
3K3	SYRACUSE-HAMILTON COUNTY MUNICIPAL	KS	LPV	0	1	0	1	0	1
PPF	TRI-CITY	KS	LPV	0	1	0	1	0	1
ULS	ULYSSES	KS	LPV	0	1	0	1	0	1
EGT	WELLINGTON MUNICIPAL	KS	LPV	0	1	0	1	0	1
ICT	WICHITA MID-CONTINENT	KS	LPV200	0	1	0	1	0	1
EKX	ADDINGTON FIELD	KY	LPV	0	1	0	1	0	1
PAH	BARKLEY RGNL	KY	LPV	0	1	0	1	0	1
K22	BIG SANDY RGNL	KY	LPV	0	1	0	1	0	1
LEX	BLUE GRASS	KY	LPV	0	1	0	1	0	1
BWG	BOWLING GREEN-WARREN COUNTY RG	KY	LPV	0	1	0	1	0	1
LOU	BOWMAN FIELD	KY	LPV	0	1	0	1	0	1
CVG	CINCINNATI/ NORTHERN KENTUCKY	KY	LPV200	0	1	0	1	0	1
FGX	FLEMING-MASON	KY	LPV	0	1	0	1	0	1
27K	GEORGETOWN SCOTT COUNTY - MARS	KY	LPV200	0	1	0	1	0	1
GLW	GLASGOW MUNICIPAL	KY	LPV	0	1	0	1	0	1
EHR	HENDERSON CITY-COUNTY	KY	LPV	0	1	0	1	0	1
SME	LAKE CUMBERLAND RGNL	KY	LPV	0	1	0	1	0	1
LOZ	LONDON-CORBIN ARPT-MAGEE FLD	KY	LPV	0	1	0	1	0	1
SDF	LOUISVILLE INTL-STANDIFORD FIELD	KY	LPV200	0	1	0	1	0	1
I39	MADISON	KY	LPV	0	1	0	1	0	1
2I0	MADISONVILLE MUNICIPAL	KY	LPV	0	1	0	1	0	1
M97	MOREHEAD-ROWAN COUNTY CLYDE A.	KY	LPV	0	1	0	1	0	1
OWB	OWENSBORO-DAVIESS COUNTY	KY	LPV200	0	1	0	1	0	1
BRY	SAMUELS FIELD	KY	LPV	0	1	0	1	0	1
DVK	STUART POWELL FIELD	KY	LPV	0	1	0	1	0	1
TWT	STURGIS MUNICIPAL	KY	LPV	0	1	0	1	0	1
TZV	TOMPKINSVILLE-MONROE COUNTY	KY	LPV	0	1	0	1	0	1
W38	WILLIAMSBURG-WHITLEY COUNTY	KY	LPV	0	1	0	1	0	1
ARA	ACADIANA RGNL	LA	LPV	0	1	0	1	0	1
AEX	ALEXANDRIA INTL	LA	LPV200	0	1	0	1	0	1
ACP	ALLEN PARISH	LA	LPV	0	1	0	1	0	1
BTR	BATON ROUGE METROPOLITAN	LA	LPV200	0	1	0	1	0	1
CWF	CHENNAULT INTL	LA	LPV200	0	1	0	1	0	1
ESF	ESLER RGNL	LA	LPV200	0	1	0	1	0	1
HZR	FALSE RIVER RGNL	LA	LPV	0	1	0	1	0	1
BXA	GEORGE R CARR MEMORIAL AIR FIELD	LA	LPV	0	1	0	1	0	1
HDC	HAMMOND NORTHSHORE RGNL	LA	LPV200	0	1	0	1	0	1
3R4	HART	LA	LPV	0	1	0	1	0	1
HUM	HOUMA-TERREBONNE	LA	LPV200	0	1	0	1	0	1

Airport Id	Airport Name	State	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
M79	JOHN H HOOKS JR MEMORIAL	LA	LPV	0	1	0	1	0	1
LFT	LAFAYETTE RGNL	LA	LPV	0	1	0	1	0	1
LCH	LAKE CHARLES RGNL	LA	LPV	0	1	0	1	0	1
NEW	LAKEFRONT	LA	LPV	0	1	0	1	0	1
MSY	LOUIS ARMSTRONG NEW ORLEANS	LA	LPV200	0	1	0	1	0	1
MLU	MONROE RGNL	LA	LPV200	0	1	0	1	0	1
BQP	MOREHOUSE MEMORIAL	LA	LPV	0	1	0	1	0	1
IER	NATCHITOCHES RGNL	LA	LPV	0	1	0	1	0	1
DTN	SHREVEPORT DOWNTOWN	LA	LPV	0	1	0	1	0	1
SHV	SHREVEPORT RGNL	LA	LPV200	0	1	0	1	0	1
GAO	SOUTH LAFOURCHE LEONARD MILLER	LA	LPV	0	1	0	1	0	1
UXL	SOUTHLAND FIELD	LA	LPV	0	1	0	1	0	1
1L0	ST JOHN THE BAPTIST PARISH	LA	LPV	0	1	0	1	0	1
TVR	VICKSBURG TALLULAH RGNL	LA	LPV	0	1	0	1	0	1
BAF	BARNES MUNICIPAL	MA	LPV	0	1	0	1	0	1
HYA	BARNSTABLE MUNICIPAL-BOARDMAN/POLAN	MA	LPV200	0	1	0	1	0	1
BED	LAURENCE G HANSCOM FLD	MA	LPV200	0	1	0	1	0	1
MVY	MARTHAS VINEYARD	MA	LPV200	0	1	0	1	0	1
ACK	NANTUCKET MEMORIAL	MA	LPV200	0	1	0	1	0	1
OWD	NORWOOD MEMORIAL	MA	LPV	0	1	0	1	0	1
3B0	SOUTHBRIDGE MUNICIPAL	MA	LPV	0	1	0	1	0	1
ORH	WORCESTER RGNL	MA	LPV	0	1	0	1	0	1
BWI	BALTIMORE/WASHINGTON INTL	MD	LPV200	0	1	0	1	0	1
DMW	CARROLL COUNTY RGNL	MD	LPV200	0	1	0	1	0	1
ESN	EASTON/NEWNAM FIELD	MD	LPV	0	1	0	1	0	1
FDK	FREDERICK MUNICIPAL	MD	LPV	0	1	0	1	0	1
HGR	HAGERSTOWN RGNL RICHARD A HENS	MD	LPV200	0	1	0	1	0	1
MTN	MARTIN STATE	MD	LPV	0	1	0	1	0	1
GAI	MONTGOMERY COUNTY AIRPARK	MD	LPV	0	1	0	1	0	1
OXB	OCEAN CITY MUNICIPAL	MD	LPV	0	1	0	1	0	1
SBY	SALISBURY-OCEAN CITY WICOMICO	MD	LPV200	0	1	0	1	0	1
2W6	ST. MARY'S COUNTY RGNL	MD	LPV	0	1	0	1	0	1
LEW	AUBURN/LEWISTON MUNICIPAL	ME	LPV200	0	1	0	1	0	1
AUG	AUGUSTA STATE	ME	LPV	0	1	0	1	0	1
BGR	BANGOR INTL	ME	LPV	0	1	0	1	0	1
BHB	HANCOCK COUNTY-BAR HARBOR	ME	LPV200	0	1	0	1	0	1
RKD	KNOX COUNTY RGNL	ME	LPV	0	1	0	1	0	1
FVE	NORTHERN AROOSTOOK RGNL	ME	LPV	0	1	0	1	1	0.9999
PQI	NORTHERN MAINE RGNL ARPT	ME	LPV200	0	1	0	1	2	1
PWM	PORTLAND INTL JETPORT	ME	LPV	0	1	0	1	0	1
WVL	WATERVILLE ROBERT LAFLEUR	ME	LPV200	0	1	0	1	0	1
APN	ALPENA COUNTY RGNL	MI	LPV	0	1	0	1	0	1
ARB	ANN ARBOR MUNICIPAL	MI	LPV	0	1	0	1	0	1
ACB	ANTRIM COUNTY	MI	LPV	0	1	0	1	0	1
FNT	BISHOP INTL	MI	LPV200	0	1	0	1	0	1
OEB	BRANCH COUNTY MEMORIAL	MI	LPV	0	1	0	1	0	1
LAN	CAPITAL REGION INTL	MI	LPV200	0	1	0	1	0	1
CVX	CHARLEVOIX MUNICIPAL	MI	LPV	0	1	0	1	0	1
TVC	CHERRY CAPITAL	MI	LPV	0	1	0	1	0	1
CIU	CHIPPEWA COUNTY INTL	MI	LPV	0	1	0	1	0	1
DET	COLEMAN A. YOUNG MUNICIPAL	MI	LPV	0	1	0	1	0	1

Airport Id	Airport Name	State	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
TTF	CUSTER	MI	LPV	0	1	0	1	0	1
ESC	DELTA COUNTY	MI	LPV200	0	1	0	1	0	1
DTW	DETROIT METROPOLITAN WAYNE COUNTY	MI	LPV	0	1	0	1	0	1
IMT	FORD	MI	LPV	0	1	0	1	0	1
FFX	FREMONT MUNICIPAL	MI	LPV	0	1	0	1	0	1
GRR	GERALD R. FORD INTL	MI	LPV200	0	1	0	1	0	1
IWD	GOGEBIC-IRON COUNTY	MI	LPV200	0	1	0	1	1	1
CMX	HOUGHTON COUNTY MEMORIAL	MI	LPV	0	1	0	1	2	0.9998
BAX	HURON COUNTY MEMORIAL	MI	LPV	0	1	0	1	0	1
IKW	JACK BARSTOW	MI	LPV	0	1	0	1	0	1
JXN	JACKSON COUNTY-REYNOLDS FIELD	MI	LPV200	0	1	0	1	0	1
AZO	KALAMAZOO/ BATTLE CREEK INTL	MI	LPV	0	1	0	1	0	1
IRS	KIRSCH MUNICIPAL	MI	LPV	0	1	0	1	0	1
ADG	LENAWEE COUNTY	MI	LPV	0	1	0	1	0	1
OZW	LIVINGSTON COUNTY SPENCER J. H	MI	LPV	0	1	0	1	0	1
ERY	LUCE COUNTY	MI	LPV	0	1	0	1	0	1
LDM	MASON COUNTY	MI	LPV	0	1	0	1	0	1
MBS	MBS INTL	MI	LPV200	0	1	0	1	0	1
MNM	MENOMINEE-MARINETTE TWIN COUNTY	MI	LPV200	0	1	0	1	0	1
MOP	MOUNT PLEASANT MUNICIPAL	MI	LPV	0	1	0	1	0	1
MKG	MUSKEGON COUNTY	MI	LPV200	0	1	0	1	0	1
PTK	OAKLAND COUNTY INTL	MI	LPV200	0	1	0	1	0	1
OSC	OSCODA-WURTSMITH	MI	LPV200	0	1	0	1	0	1
RNP	OWOSSO COMMUNITY	MI	LPV	0	1	0	1	0	1
PLN	PELLSTON RGNL AIRPORT OF EMMET	MI	LPV200	0	1	0	1	0	1
HYX	SAGINAW COUNTY H.W. BROWNE	MI	LPV	0	1	0	1	0	1
SAW	SAWYER INTL	MI	LPV200	0	1	0	1	0	1
BEH	SOUTHWEST MICHIGAN RGNL	MI	LPV	0	1	0	1	0	1
BIV	TULIP CITY	MI	LPV	0	1	0	1	0	1
BTL	W K KELLOGG	MI	LPV	0	1	0	1	0	1
CAD	WEXFORD COUNTY	MI	LPV200	0	1	0	1	0	1
YIP	WILLOW RUN	MI	LPV	0	1	0	1	0	1
LVN	AIRLAKE	MN	LPV	0	1	0	1	0	1
AEL	ALBERT LEA MUNICIPAL	MN	LPV	0	1	0	1	0	1
ANE	ANOKA COUNTY-BLAINE ARPT	MN	LPV	0	1	0	1	0	1
AUM	AUSTIN MUNICIPAL	MN	LPV	0	1	0	1	0	1
BDE	BAUDETTE INTL	MN	LPV	0	1	1	0.9997	1	0.9993
BJI	BEMIDJI RGNL	MN	LPV200	0	1	1	0.9998	1	0.9993
BBB	BENSON MUNICIPAL	MN	LPV	0	1	0	1	0	1
BRD	BRAINERD LAKES RGNL	MN	LPV200	0	1	0	1	1	0.9998
AXN	CHANDLER FIELD	MN	LPV	0	1	0	1	0	1
CKN	CROOKSTON MUNICIPAL KIRKWOOD FIELD	MN	LPV	0	1	1	0.9998	1	0.9993
DTL	DETROIT LAKES-WETHING FIELD	MN	LPV	0	1	0	1	2	0.9995
DLH	DULUTH INTL	MN	LPV200	0	1	0	1	1	0.9998
FRM	FAIRMONT MUNICIPAL	MN	LPV	0	1	0	1	0	1
INL	FALLS INTL	MN	LPV	0	1	1	0.9998	1	0.9993
FFM	FERGUS FALLS MUNICIPAL-EINAR MICKEL	MN	LPV200	0	1	0	1	2	0.9998
FCM	FLYING CLOUD	MN	LPV200	0	1	0	1	0	1

Airport Id	Airport Name	State	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
GPZ	GRAND RAPIDS/ ITASCA CO-GORDON	MN	LPV	0	1	0	1	2	0.9995
LJF	LITCHFIELD MUNICIPAL	MN	LPV	0	1	0	1	0	1
MKT	MANKATO RGNL	MN	LPV200	0	1	0	1	0	1
MSP	MINNEAPOLIS- ST PAUL INTL	MN	LPV	0	1	0	1	0	1
CNB	MYERS FIELD	MN	LPV	0	1	0	1	0	1
LYV	QUENTIN AANENSON FIELD	MN	LPV200	0	1	0	1	0	1
RWF	REDWOOD FALLS MUNICIPAL	MN	LPV	0	1	0	1	0	1
RST	ROCHESTER INTL	MN	LPV	0	1	0	1	0	1
ROX	ROSEAU MUNICIPAL/ RUDY BILLBERG FIELD	MN	LPV	0	1	2	0.9997	1	0.9993
ROS	RUSH CITY RGNL	MN	LPV	0	1	0	1	0	1
MML	SOUTHWEST MINNESOTA RGNL MARSH	MN	LPV	0	1	0	1	0	1
STC	ST CLOUD RGNL	MN	LPV200	0	1	0	1	0	1
STP	ST PAUL DOWNTOWN HOLMAN FIELD	MN	LPV	0	1	0	1	0	1
TVF	THIEF RIVER FALLS RGNL	MN	LPV	0	1	1	0.9998	1	0.9993
RRT	WARROAD INTL MEMORIAL	MN	LPV	0	1	2	0.9997	1	0.9993
BDH	WILLMAR MUNICIPAL- JOHN L RICE FIELD	MN	LPV	0	1	0	1	0	1
M17	BOLIVAR MUNICIPAL	MO	LPV	0	1	0	1	0	1
BBG	BRANSON	MO	LPV200	0	1	0	1	0	1
H21	CAMDENTON MEMORIAL	MO	LPV	0	1	0	1	0	1
EZZ	CAMERON MEMORIAL	MO	LPV	0	1	0	1	0	1
CGI	CAPE GIRARDEAU RGNL	MO	LPV	0	1	0	1	0	1
M05	CARUTHERSVILLE MEMORIAL	MO	LPV	0	1	0	1	0	1
MKC	CHARLES B. WHEELER DOWNTOWN	MO	LPV	0	1	0	1	0	1
CHT	CHILLICOTHE MUNICIPAL	MO	LPV	0	1	0	1	0	1
COU	COLUMBIA RGNL	MO	LPV	0	1	0	1	0	1
EIW	COUNTY MEMORIAL	MO	LPV	0	1	0	1	0	1
1H0	CREVE COEUR	MO	LPV	0	1	0	1	0	1
UBX	CUBA MUNICIPAL	MO	LPV	0	1	0	1	0	1
DXE	DEXTER MUNICIPAL	MO	LPV	0	1	0	1	0	1
FTT	ELTON HENSLEY MEMORIAL	MO	LPV	0	1	0	1	0	1
FAM	FARMINGTON RGNL	MO	LPV	0	1	0	1	0	1
K57	GOULD PETERSON MUNICIPAL	MO	LPV	0	1	0	1	0	1
HAE	HANNIBAL RGNL	MO	LPV	0	1	0	1	0	1
HIG	HIGGINSVILLE INDUSTRIAL MUNICIPAL	MO	LPV	0	1	0	1	0	1
JEF	JEFFERSON CITY MEMORIAL	MO	LPV	0	1	0	1	0	1
VER	JESSE VIERTEL MEMORIAL	MO	LPV	0	1	0	1	0	1
JLN	JOPLIN RGNL	MO	LPV	0	1	0	1	0	1
MCI	KANSAS CITY INTL	MO	LPV	0	1	0	1	0	1
IRK	KIRKSVILLE RGNL	MO	LPV200	0	1	0	1	0	1
STL	LAMBERT-ST LOUIS INTL	MO	LPV	0	1	0	1	0	1
LRY	LAWRENCE SMITH MEMORIAL	MO	LPV	0	1	0	1	0	1
AIZ	LEE C FINE MEMORIAL	MO	LPV	0	1	0	1	0	1
LXT	LEE'S SUMMIT MUNICIPAL	MO	LPV	0	1	0	1	0	1
6M6	LEWIS COUNTY RGNL	MO	LPV	0	1	0	1	0	1
PLK	M. GRAHAM CLARK – TANEY COUNTY	MO	LPV200	0	1	0	1	0	1
MAW	MALDEN RGNL	MO	LPV	0	1	0	1	0	1
MHL	MARSHALL MEMORIAL MUNICIPAL	MO	LPV	0	1	0	1	0	1

Airport Id	Airport Name	State	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
MYJ	MEXICO MEMORIAL	MO	LPV	0	1	0	1	0	1
GPH	MIDWEST NATIONAL AIR CENTER	MO	LPV	0	1	0	1	0	1
HFJ	MONETT MUNICIPAL	MO	LPV	0	1	0	1	0	1
EOS	NEOSHO HUGH ROBINSON	MO	LPV	0	1	0	1	0	1
NVD	NEVADA MUNICIPAL	MO	LPV200	0	1	0	1	0	1
MO8	NORTH CENTRAL MISSOURI RGNL	MO	LPV	0	1	0	1	0	1
EVU	NORTHWEST MISSOURI RGNL	MO	LPV	0	1	0	1	0	1
K02	PERRYVILLE MUNICIPAL	MO	LPV	0	1	0	1	0	1
POF	POPLAR BLUFF MUNICIPAL	MO	LPV	0	1	0	1	0	1
VIH	ROLLA NATIONAL	MO	LPV200	0	1	0	1	0	1
STJ	ROSECRANS MEMORIAL	MO	LPV200	0	1	0	1	0	1
DMO	SEDALIA MEMORIAL	MO	LPV	0	1	0	1	0	1
SIK	SIKESTON MEMORIAL MUNICIPAL	MO	LPV	0	1	0	1	0	1
RCM	SKYHAVEN	MO	LPV	0	1	0	1	0	1
SUS	SPIRIT OF ST LOUIS	MO	LPV200	0	1	0	1	0	1
SGF	SPRINGFIELD-BRANSON NATIONAL	MO	LPV	0	1	0	1	0	1
UUV	SULLIVAN RGNL	MO	LPV	0	1	0	1	0	1
8WC	WASHINGTON COUNTY	MO	LPV	0	1	0	1	0	1
FYG	WASHINGTON RGNL	MO	LPV	0	1	0	1	0	1
TBN	WAYNESVILLE-ST. ROBERT RGNL	MO	LPV	0	1	0	1	0	1
UNO	WEST PLAINS RGNL	MO	LPV	0	1	0	1	0	1
STF	GEORGE M BRYAN	MS	LPV200	0	1	0	1	0	1
GTR	GOLDEN TRIANGLE RGNL	MS	LPV	0	1	0	1	0	1
GWO	GREENWOOD-LEFLORE	MS	LPV	0	1	0	1	0	1
GNF	GRENADA MUNICIPAL	MS	LPV	0	1	0	1	0	1
GPT	GULFPORT-BILOXI INTL	MS	LPV200	0	1	0	1	0	1
HEZ	HARDY-ANDERS FIELD NATCHEZ-ADA	MS	LPV	0	1	0	1	0	1
HBG	HATTIESBURG BOBBY L CHAIN MUNICIPAL	MS	LPV200	0	1	0	1	0	1
PIB	HATTIESBURG-LAUREL RGNL	MS	LPV200	0	1	0	1	0	1
HKS	HAWKINS FIELD	MS	LPV200	0	1	0	1	0	1
LUL	HESLER-NOBLE FIELD	MS	LPV	0	1	0	1	0	1
IDL	INDIANOLA MUNICIPAL	MS	LPV	0	1	0	1	0	1
JAN	JACKSON-EVERS INTL	MS	LPV200	0	1	0	1	0	1
MEI	KEY FIELD	MS	LPV200	0	1	0	1	0	1
MCB	MC COMB/PIKE COUNTY/JOHN E LEW	MS	LPV	0	1	0	1	0	1
GLH	MID DELTA RGNL	MS	LPV200	0	1	0	1	0	1
M40	MONROE COUNTY	MS	LPV	0	1	0	1	0	1
OLV	OLIVE BRANCH	MS	LPV	0	1	0	1	0	1
MPE	PHILADELPHIA MUNICIPAL	MS	LPV	0	1	0	1	0	1
MJD	PICAYUNE MUNICIPAL	MS	LPV	0	1	0	1	0	1
M43	PRENTISS-JEFFERSON DAVIS COUNTY	MS	LPV	0	1	0	1	0	1
CRX	ROSCOE TURNER	MS	LPV200	0	1	0	1	0	1
HSA	STENNIS INTL	MS	LPV	0	1	0	1	0	1
PQL	TRENT LOTT INTL	MS	LPV200	0	1	0	1	0	1
UTA	TUNICA MUNICIPAL	MS	LPV200	0	1	0	1	0	1
TUP	TUPELO RGNL	MS	LPV200	0	1	0	1	0	1
UOX	UNIVERSITY-OXFORD	MS	LPV	0	1	0	1	0	1
BTM	BERT MOONEY	MT	LPV	0	1	0	1	0	1
BIL	BILLINGS LOGAN INTL	MT	LPV	0	1	0	1	1	1
MLS	FRANK WILEY FIELD	MT	LPV	0	1	0	1	1	0.9998
BZN	GALLATIN FIELD	MT	LPV	0	1	0	1	0	1

Airport Id	Airport Name	State	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
GPI	GLACIER PARK INTL	MT	LPV	0	1	0	1	0	1
GTF	GREAT FALLS INTL	MT	LPV	0	1	0	1	1	0.9998
HVR	HAVRE CITY-COUNTY	MT	LPV	0	1	0	1	1	0.9997
HLN	HELENA RGNL	MT	LPV	0	1	0	1	1	1
LWT	LEWISTOWN MUNICIPAL	MT	LPV	0	1	0	1	1	0.9999
MSO	MISSOULA INTL	MT	LPV	0	1	0	1	0	1
7S0	RONAN	MT	LPV	0	1	0	1	0	1
SDY	SIDNEY-RICHLAND MUNICIPAL	MT	LPV	0	1	1	1	1	0.9997
WYS	YELLOWSTONE	MT	LPV200	0	1	0	1	0	1
OAJ	ALBERT J ELLIS	NC	LPV	0	1	0	1	0	1
AFP	ANSON COUNTY – JEFF CLOUD FIELD	NC	LPV	0	1	0	1	0	1
AVL	ASHEVILLE RGNL	NC	LPV	0	1	0	1	0	1
BUY	BURLINGTON-ALAMANCE RGNL	NC	LPV200	0	1	0	1	0	1
SUT	CAPE FEAR RGNL JETPORT	NC	LPV	0	1	0	1	0	1
CLT	CHARLOTTE/DOUGLAS INTL	NC	LPV200	0	1	0	1	0	1
EQY	CHARLOTTE-MONROE EXECUTIVE	NC	LPV	0	1	0	1	0	1
EWN	COASTAL CAROLINA REGIONAL	NC	LPV	0	1	0	1	0	1
JQF	CONCORD RGNL	NC	LPV	0	1	0	1	0	1
ONX	CURRITUCK COUNTY RGNL	NC	LPV	0	1	0	1	0	1
EYF	CURTIS L BROWN JR FIELD	NC	LPV200	0	1	0	1	0	1
ECG	ELIZABETH CITY CG AIR STATION	NC	LPV	0	1	0	1	0	1
FAY	FAYETTEVILLE RGNL/ GRANNIS FIELD	NC	LPV	0	1	0	1	0	1
AKH	GASTONIA MUNICIPAL	NC	LPV	0	1	0	1	0	1
GWW	GOLDSBORO-WAYNE MUNICIPAL	NC	LPV	0	1	0	1	0	1
HRJ	HARNETT RGNL JETPORT	NC	LPV	0	1	0	1	0	1
HNZ	HENDERSON-OXFORD	NC	LPV	0	1	0	1	0	1
JNX	JOHNSTON COUNTY	NC	LPV200	0	1	0	1	0	1
ISO	KINSTON RGNL JETPORT AT STALLI	NC	LPV	0	1	0	1	0	1
IPJ	LINCOLNTON-LINCOLN COUNTY RGNL	NC	LPV	0	1	0	1	0	1
MRH	MICHAEL J. SMITH FIELD	NC	LPV	0	1	0	1	0	1
MWK	MOUNT AIRY/SURRY COUNTY	NC	LPV	0	1	0	1	0	1
EDE	NORTHEASTERN RGNL	NC	LPV	0	1	0	1	0	1
TDF	PERSON COUNTY	NC	LPV200	0	1	0	1	0	1
GSO	PIEDMONT TRIAD INTL	NC	LPV200	0	1	0	1	0	1
PGV	PITT-GREENVILLE	NC	LPV	0	1	0	1	0	1
RDU	RALEIGH-DURHAM INTL	NC	LPV200	0	1	0	1	0	1
RCZ	RICHMOND COUNTY	NC	LPV	0	1	0	1	0	1
RWI	ROCKY MOUNT-WILSON RGNL	NC	LPV200	0	1	0	1	0	1
FQD	RUTHERFORD CO – MARCHMAN FIELD	NC	LPV	0	1	0	1	0	1
INT	SMITH REYNOLDS	NC	LPV200	0	1	0	1	0	1
VUJ	STANLY COUNTY	NC	LPV200	0	1	0	1	0	1
SVH	STATESVILLE RGNL	NC	LPV	0	1	0	1	0	1
LHZ	TRIANGLE NORTH EXECUTIVE	NC	LPV	0	1	0	1	0	1
OCW	WARREN FIELD	NC	LPV	0	1	0	1	0	1
ILM	WILMINGTON INTL	NC	LPV	0	1	0	1	0	1
BAC	BARNES COUNTY MUNICIPAL	ND	LPV	0	1	0	1	1	0.9992
BIS	BISMARCK MUNICIPAL	ND	LPV	0	1	0	1	2	0.9995
D09	BOTTINEAU MUNICIPAL	ND	LPV	0	1	2	0.9997	1	0.9992
5N8	CASSELTON ROBERT MILLER RGNL	ND	LPV	0	1	0	1	1	0.9993
DVL	DEVILS LAKE RGNL	ND	LPV	0	1	0	1	1	0.9992

Airport Id	Airport Name	State	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
DIK	DICKINSON – THEODORE ROOSEVELT	ND	LPV200	0	1	0	1	1	0.9998
GFK	GRAND FORKS INTL	ND	LPV	0	1	1	0.9998	1	0.9992
GWR	GWINNER-ROGER MELROE FIELD	ND	LPV200	0	1	0	1	2	0.9999
FAR	HECTOR INTL	ND	LPV200	0	1	1	1	1	0.9993
GAF	HUTSON FIELD	ND	LPV	0	1	1	0.9998	1	0.9992
JMS	JAMESTOWN RGNL	ND	LPV200	0	1	0	1	1	0.9992
HZE	MERCER COUNTY RGNL	ND	LPV	0	1	0	1	2	0.9995
MOT	MINOT INTL	ND	LPV	0	1	1	0.9999	2	0.9994
D55	ROBERTSON FIELD	ND	LPV	0	1	2	0.9997	1	0.9992
ISN	SLOULIN FLD INTL	ND	LPV200	0	1	1	1	2	0.9997
S25	WATFORD CITY MUNICIPAL	ND	LPV	0	1	1	1	2	0.9996
ANW	AINSWORTH RGNL	NE	LPV200	0	1	0	1	0	1
BVN	ALBION MUNICIPAL	NE	LPV	0	1	0	1	0	1
AIA	ALLIANCE MUNICIPAL	NE	LPV200	0	1	0	1	0	1
4V9	ANTELOPE COUNTY	NE	LPV	0	1	0	1	0	1
AUH	AURORA MUNICIPAL – AL POTTER FIELD	NE	LPV	0	1	0	1	0	1
BIE	BEATRICE MUNICIPAL	NE	LPV	0	1	0	1	0	1
FNB	BRENNER FIELD	NE	LPV	0	1	0	1	0	1
HDE	BREWSTER FIELD	NE	LPV	0	1	0	1	0	1
BBW	BROKEN BOW MUNICIPAL	NE	LPV	0	1	0	1	0	1
GRI	CENTRAL NEBRASKA RGNL	NE	LPV	0	1	0	1	0	1
CDR	CHADRON MUNICIPAL	NE	LPV	0	1	0	1	0	1
OLU	COLUMBUS MUNICIPAL	NE	LPV	0	1	0	1	0	1
CZD	COZAD MUNICIPAL	NE	LPV	0	1	0	1	0	1
CEK	CRETE MUNICIPAL	NE	LPV	0	1	0	1	0	1
93Y	DAVID CITY MUNICIPAL	NE	LPV	0	1	0	1	0	1
OMA	EPPLEY AIRFIELD	NE	LPV	0	1	0	1	0	1
ODX	EVELYN SHARP FIELD	NE	LPV	0	1	0	1	0	1
FBY	FAIRBURY MUNICIPAL	NE	LPV	0	1	0	1	0	1
FMZ	FAIRMONT STATE AIRFIELD	NE	LPV	0	1	0	1	0	1
FET	FREMONT MUNICIPAL	NE	LPV	0	1	0	1	0	1
OKS	GARDEN COUNTY	NE	LPV	0	1	0	1	0	1
GRN	GORDON MUNICIPAL	NE	LPV	0	1	0	1	0	1
GGF	GRANT MUNICIPAL	NE	LPV	0	1	0	1	0	1
HSI	HASTINGS MUNICIPAL	NE	LPV	0	1	0	1	0	1
IML	IMPERIAL MUNICIPAL	NE	LPV	0	1	0	1	0	1
LXN	JIM KELLY FIELD	NE	LPV	0	1	0	1	0	1
EAR	KEARNEY RGNL	NE	LPV	0	1	0	1	0	1
IBM	KIMBALL MUNICIPAL/ ROBERT E ARRAJ FIELD	NE	LPV	0	1	0	1	0	1
LNK	LINCOLN	NE	LPV	0	1	0	1	0	1
MCK	MC COOK BEN NELSON RGNL	NE	LPV	0	1	0	1	0	1
MLE	MILLARD	NE	LPV	0	1	0	1	0	1
VTN	MILLER FIELD	NE	LPV	0	1	0	1	0	1
9V5	MODISETT	NE	LPV	0	1	0	1	0	1
AFK	NEBRASKA CITY MUNICIPAL	NE	LPV	0	1	0	1	0	1
OFK	NORFOLK RGNL/ KARL STEFAN MEMORIAL	NE	LPV	0	1	0	1	0	1
LBF	NORTH PLATTE RGNL AIRPORT	NE	LPV	0	1	0	1	0	1
0V3	PIONEER VILLAGE FIELD	NE	LPV	0	1	0	1	0	1
PMV	PLATTSMOUTH MUNICIPAL	NE	LPV	0	1	0	1	0	1
RBE	ROCK COUNTY	NE	LPV	0	1	0	1	0	1
OGA	SEARLE FIELD	NE	LPV	0	1	0	1	0	1
SWT	SEWARD MUNICIPAL	NE	LPV	0	1	0	1	0	1

Airport Id	Airport Name	State	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	1	0	1	0	1
ONL	THE O'NEILL MUNICIPAL- JOHN L BAKER	NE	LPV	0	1	0	1	0	1
TIF	THOMAS COUNTY	NE	LPV	0	1	0	1	0	1
AHQ	WAHOO MUNICIPAL	NE	LPV	0	1	0	1	0	1
LCG	WAYNE MUNICIPAL	NE	LPV	0	1	0	1	0	1
BFF	WESTERN NEB. RGNL/ WILLIAM B. H	NE	LPV	0	1	0	1	0	1
JYR	YORK MUNICIPAL	NE	LPV	0	1	0	1	0	1
CON	CONCORD MUNICIPAL	NH	LPV	0	1	0	1	0	1
EEN	DILLANT-HOPKINS	NH	LPV	0	1	0	1	0	1
LCI	LACONIA MUNICIPAL	NH	LPV	0	1	0	1	0	1
LEB	LEBANON MUNICIPAL	NH	LPV	0	1	0	1	0	1
MHT	MANCHESTER	NH	LPV200	0	1	0	1	0	1
HIE	MOUNT WASHINGTON RGNL	NH	LPV	0	1	0	1	0	1
PSM	PORTSMOUTH INTL AT PEASE	NH	LPV200	0	1	0	1	0	1
DAW	SKYHAVEN	NH	LPV	0	1	0	1	0	1
ACY	ATLANTIC CITY INTL	NJ	LPV200	0	1	0	1	0	1
WWD	CAPE MAY COUNTY	NJ	LPV	0	1	0	1	0	1
MIV	MILLVILLE MUNICIPAL	NJ	LPV	0	1	0	1	0	1
EWR	NEWARK LIBERTY INTL	NJ	LPV	0	1	0	1	0	1
39N	PRINCETON	NJ	LPV	0	1	0	1	0	1
TEB	TETERBORO	NJ	LPV	0	1	0	1	0	1
ABQ	ALBUQUERQUE INTL SUNPORT	NM	LPV	0	1	0	1	0	1
CVN	CLOVIS MUNICIPAL	NM	LPV	0	1	0	1	0	1
DMN	DEMING MUNICIPAL	NM	LPV	0	1	0	1	0	1
FMN	FOUR CORNERS RGNL	NM	LPV200	0	1	0	1	0	1
SVC	GRANT COUNTY	NM	LPV	0	1	0	1	0	1
HOB	LEA COUNTY RGNL	NM	LPV200	0	1	0	1	0	1
ROW	ROSWELL INTL AIR CENTER	NM	LPV	0	1	0	1	0	1
LAS	MC CARRAN INTL	NV	LPV	0	1	0	1	1	1
RTS	RENO/STEAD	NV	LPV	0	1	1	0.9999	91	0.9963
RNO	RENO/TAHOE INTL	NV	LPV	0	1	1	0.9999	87	0.9965
WMC	WINNEMUCCA MUNICIPAL	NV	LPV	0	1	1	1	4	0.9999
ALB	ALBANY INTL	NY	LPV	0	1	0	1	0	1
HWV	BROOKHAVEN	NY	LPV	0	1	0	1	0	1
BUF	BUFFALO NIAGARA INTL	NY	LPV	0	1	0	1	0	1
OLE	CATTARAUGUS COUNTY-OLEAN	NY	LPV	0	1	0	1	0	1
JHW	CHAUTAUQUA COUNTY/ JAMESTOWN	NY	LPV200	0	1	0	1	0	1
1B1	COLUMBIA COUNTY	NY	LPV	0	1	0	1	0	1
POU	DUTCHESS COUNTY	NY	LPV	0	1	0	1	0	1
HTO	EAST HAMPTON	NY	LPV	0	1	0	1	0	1
GFL	FLOYD BENNETT MEMORIAL	NY	LPV	0	1	0	1	0	1
FOK	FRANCIS S GABRESKI	NY	LPV	0	1	0	1	0	1
NY0	FULTON COUNTY	NY	LPV	0	1	0	1	0	1
GVQ	GENESEE COUNTY	NY	LPV	0	1	0	1	0	1
BGM	GREATER BINGHAMTON	NY	LPV200	0	1	0	1	0	1
ROC	GREATER ROCHESTER INTL	NY	LPV200	0	1	0	1	0	1
RME	GRIFFISS INTL	NY	LPV200	0	1	0	1	0	1
VGC	HAMILTON MUNICIPAL	NY	LPV	0	1	0	1	0	1
ITH	ITHACA TOMPKINS RGNL	NY	LPV	0	1	0	1	0	1
JFK	JOHN F KENNEDY INTL	NY	LPV	0	1	0	1	0	1
LGA	LA GUARDIA	NY	LPV	0	1	0	1	0	1
ISP	LONG ISLAND MAC ARTHUR	NY	LPV200	0	1	0	1	0	1

Airport Id	Airport Name	State	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
MSS	MASSENA INTL-RICHARDS FIELD	NY	LPV	0	1	0	1	0	1
N66	ONEONTA MUNICIPAL	NY	LPV	0	1	0	1	0	1
MGJ	ORANGE COUNTY	NY	LPV	0	1	0	1	0	1
PEO	PENN YAN	NY	LPV	0	1	0	1	0	1
PBG	PLATTSBURGH INTL	NY	LPV	0	1	0	1	0	1
FRG	REPUBLIC	NY	LPV200	0	1	0	1	0	1
5B2	SARATOGA COUNTY	NY	LPV	0	1	0	1	0	1
44N	SKY ACRES	NY	LPV	0	1	0	1	0	1
SWF	STEWART INTL	NY	LPV200	0	1	0	1	0	1
MSV	SULLIVAN COUNTY INTL	NY	LPV	0	1	0	1	0	1
SYR	SYRACUSE HANCOCK INTL	NY	LPV200	0	1	0	1	0	1
4B6	TICONDEROGA MUNICIPAL	NY	LPV	0	1	0	1	0	1
ART	WATERTOWN INTL	NY	LPV	0	1	0	1	0	1
ELZ	WELLSVILLE MUNICIPAL ARPT TARANTINE	NY	LPV	0	1	0	1	0	1
HPN	WESTCHESTER COUNTY	NY	LPV	0	1	0	1	0	1
SDC	WILLIAMSON-SODUS	NY	LPV	0	1	0	1	0	1
ILN	AIRBORNE AIRPARK	OH	LPV200	0	1	0	1	0	1
CAK	AKRON-CANTON RGNL	OH	LPV200	0	1	0	1	0	1
HZY	ASHTABULA COUNTY	OH	LPV	0	1	0	1	0	1
TZR	BOLTON FIELD	OH	LPV200	0	1	0	1	0	1
HAO	BUTLER CO RGNL	OH	LPV	0	1	0	1	0	1
CXY	CAPITAL CITY	OH	LPV	0	1	0	1	0	1
PCW	CARL R KELLER FIELD	OH	LPV	0	1	0	1	0	1
LUK	CINCINNATI MUNICIPAL AIRPORT LUNKEN	OH	LPV	0	1	0	1	0	1
CLE	CLEVELAND-HOPKINS INTL	OH	LPV	0	1	0	1	0	1
I66	CLINTON FIELD	OH	LPV	0	1	0	1	0	1
MGY	DAYTON-WRIGHT BROTHERS	OH	LPV	0	1	0	1	0	1
DLZ	DELAWARE MUNICIPAL	OH	LPV	0	1	0	1	0	1
LHQ	FAIRFIELD COUNTY	OH	LPV	0	1	0	1	0	1
FDY	FINDLAY	OH	LPV	0	1	0	1	0	1
FZI	FOSTORIA METROPOLITAN	OH	LPV	0	1	0	1	0	1
PMH	GREATER PORTSMOUTH RGNL	OH	LPV	0	1	0	1	0	1
I19	GREENE COUNTY-LEWIS A. JACKSON	OH	LPV	0	1	0	1	0	1
I74	GRIMES FIELD	OH	LPV	0	1	0	1	0	1
DAY	JAMES M COX DAYTON INTL	OH	LPV200	0	1	0	1	0	1
1G3	KENT STATE UNIV	OH	LPV	0	1	0	1	0	1
CQA	LAKEFIELD	OH	LPV	0	1	0	1	0	1
AOH	LIMA ALLEN COUNTY	OH	LPV	0	1	0	1	0	1
LPR	LORAIN COUNTY RGNL	OH	LPV200	0	1	0	1	0	1
UYF	MADISON COUNTY	OH	LPV	0	1	0	1	0	1
MFD	MANSFIELD LAHM RGNL	OH	LPV200	0	1	0	1	0	1
MNN	MARION MUNICIPAL	OH	LPV	0	1	0	1	0	1
AXV	NEIL ARMSTRONG	OH	LPV	0	1	0	1	0	1
OSU	OHIO STATE UNIVERSITY	OH	LPV200	0	1	0	1	0	1
UNI	OHIO UNIVERSITY SNYDER FIELD	OH	LPV200	0	1	0	1	0	1
CMH	PORT COLUMBUS INTL	OH	LPV200	0	1	0	1	0	1
OWX	PUTNAM COUNTY	OH	LPV	0	1	0	1	0	1
LCK	RICKENBACKER INTL	OH	LPV200	0	1	0	1	0	1
16G	SENECA COUNTY	OH	LPV	0	1	0	1	0	1
SGH	SPRINGFIELD-BECKLEY MUNICIPAL	OH	LPV200	0	1	0	1	0	1
TOL	TOLEDO EXPRESS	OH	LPV200	0	1	0	1	0	1
BJJ	WAYNE COUNTY	OH	LPV	0	1	0	1	0	1

Airport Id	Airport Name	State	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
LNN	WILLOUGHBY LOST NATION MUNICIPAL	OH	LPV	0	1	0	1	0	1
1G0	WOOD COUNTY	OH	LPV	0	1	0	1	0	1
YNG	YOUNGSTOWN-WARREN RGNL	OH	LPV	0	1	0	1	0	1
ADH	ADA MUNICIPAL	OK	LPV	0	1	0	1	0	1
AXS	ALTUS/QUARTZ MOUNTAIN RGNL	OK	LPV	0	1	0	1	0	1
BVO	BARTLESVILLE MUNICIPAL	OK	LPV	0	1	0	1	0	1
BKN	BLACKWELL-TONKAWA MUNICIPAL	OK	LPV	0	1	0	1	0	1
GCM	CLAREMORE RGNL	OK	LPV	0	1	0	1	0	1
RCE	CLARENCE E PAGE MUNICIPAL	OK	LPV	0	1	0	1	0	1
CSM	CLINTON-SHERMAN	OK	LPV200	0	1	0	1	0	1
MKO	DAVIS FIELD	OK	LPV	0	1	0	1	0	1
DUA	DURANT RGNL - EAKER FIELD	OK	LPV	0	1	0	1	0	1
ELK	ELK CITY RGNL BUSINESS	OK	LPV	0	1	0	1	0	1
WDG	ENID WOODRING RGNL	OK	LPV200	0	1	0	1	0	1
FDR	FREDERICK RGNL	OK	LPV200	0	1	0	1	0	1
GMJ	GROVE MUNICIPAL	OK	LPV	0	1	0	1	0	1
GOK	GUTHRIE-EDMOND RGNL	OK	LPV	0	1	0	1	0	1
DUC	HALLIBURTON FIELD	OK	LPV	0	1	0	1	0	1
HBR	HOBART RGNL	OK	LPV	0	1	0	1	0	1
MLC	MC ALESTER RGNL	OK	LPV	0	1	0	1	0	1
OKM	OKMULGEE RGNL	OK	LPV	0	1	0	1	0	1
PVJ	PAULS VALLEY MUNICIPAL	OK	LPV200	0	1	0	1	0	1
PNC	PONCA CITY RGNL	OK	LPV	0	1	0	1	0	1
RVS	RICHARD LLOYD JONES JR	OK	LPV	0	1	0	1	0	1
SNL	SHAWNEE RGNL	OK	LPV200	0	1	0	1	0	1
SWO	STILLWATER RGNL	OK	LPV	0	1	0	1	0	1
TQH	TAHLEQUAH MUNICIPAL	OK	LPV	0	1	0	1	0	1
TUL	TULSA INTL	OK	LPV200	0	1	0	1	0	1
OUN	UNIVERSITY OF OKLAHOMA WESTHEI	OK	LPV	0	1	0	1	0	1
WWR	WEST WOODWARD	OK	LPV	0	1	0	1	0	1
PWA	WILEY POST	OK	LPV200	0	1	0	1	0	1
OKC	WILL ROGERS WORLD	OK	LPV200	0	1	0	1	0	1
OWP	WILLIAM R. POGUE MUNICIPAL	OK	LPV	0	1	0	1	0	1
AST	ASTORIA RGNL	OR	LPV	0	1	1	1	9	0.9994
UAO	AURORA STATE	OR	LPV	0	1	1	0.9998	8	0.9993
BDN	BEND MUNICIPAL	OR	LPV	0	1	1	0.9998	7	0.9996
CVO	CORVALLIS MUNICIPAL	OR	LPV200	0	1	1	0.9998	11	0.9991
PDT	EASTERN OREGON RGNL AT PENDLET	OR	LPV200	0	1	0	1	2	0.9999
GCD	GRANT CO RGNL/OGILVIE FIELD	OR	LPV	0	1	1	0.9999	2	0.9998
LMT	KLAMATH FALLS	OR	LPV	0	1	1	0.9998	24	0.9989
LGD	LA GRANDE/UNION COUNTY	OR	LPV	0	1	0	1	2	0.9999
S33	MADRAS MUNICIPAL	OR	LPV	0	1	1	0.9999	5	0.9995
EUG	MAHLON SWEET FIELD	OR	LPV200	0	1	1	0.9998	13	0.9991
MMV	MC MINNVILLE MUNICIPAL	OR	LPV	0	1	1	0.9998	9	0.9993
SLE	MCNARY FLD	OR	LPV200	0	1	1	0.9998	9	0.9992
ONO	ONTARIO MUNICIPAL	OR	LPV	0	1	0	1	2	1
PDX	PORTLAND INTL	OR	LPV200	0	1	1	0.9999	6	0.9994
HIO	PORTLAND-HILLSBORO	OR	LPV200	0	1	1	0.9998	8	0.9993
RDM	ROBERTS FIELD	OR	LPV200	0	1	1	0.9999	7	0.9996
AGC	ALLEGHENY COUNTY	PA	LPV	0	1	0	1	0	1
AOO	ALTOONA-BLAIR COUNTY	PA	LPV	0	1	0	1	0	1
LBE	ARNOLD PALMER RGNL	PA	LPV	0	1	0	1	0	1

Airport Id	Airport Name	State	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
HMZ	BEDFORD COUNTY	PA	LPV	0	1	0	1	0	1
BFD	BRADFORD RGNL	PA	LPV200	0	1	0	1	0	1
BTP	BUTLER COUNTY/ K W SCHOLTER FIELD	PA	LPV	0	1	0	1	0	1
MQS	CHESTER COUNTY G O CARLSON	PA	LPV	0	1	0	1	0	1
AXQ	CLARION COUNTY	PA	LPV	0	1	0	1	0	1
8G2	CORRY-LAWRENCE	PA	LPV	0	1	0	1	0	1
9D4	DECK	PA	LPV	0	1	0	1	0	1
DUJ	DUBOIS RGNL	PA	LPV200	0	1	0	1	0	1
ERI	ERIE INTL/TOM RIDGE FIELD	PA	LPV	0	1	0	1	0	1
WAY	GREENE COUNTY	PA	LPV	0	1	0	1	0	1
MDT	HARRISBURG INTL	PA	LPV	0	1	0	1	0	1
HZL	HAZLETON MUNICIPAL	PA	LPV	0	1	0	1	0	1
JST	JOHN MURTHA JOHNSTOWN-CAMBRIA	PA	LPV200	0	1	0	1	0	1
LNS	LANCASTER	PA	LPV	0	1	0	1	0	1
ABE	LEHIGH VALLEY INTL	PA	LPV	0	1	0	1	0	1
RVL	MIFFLIN COUNTY	PA	LPV	0	1	0	1	0	1
UCP	NEW CASTLE MUNICIPAL	PA	LPV	0	1	0	1	0	1
PNE	NORTHEAST PHILADELPHIA	PA	LPV	0	1	0	1	0	1
PHL	PHILADELPHIA INTL	PA	LPV	0	1	0	1	0	1
PIT	PITTSBURGH INTL	PA	LPV200	0	1	0	1	0	1
MPO	POCONO MOUNTAINS MUNICIPAL	PA	LPV	0	1	0	1	0	1
RDG	READING RGNL/ CARL A SPAATZ FIELD	PA	LPV	0	1	0	1	0	1
FWQ	ROSTRAVER	PA	LPV	0	1	0	1	0	1
ZER	SCHUYLKILL COUNTY /JOE ZERBEY/	PA	LPV200	0	1	0	1	0	1
2G9	SOMERSET COUNTY	PA	LPV	0	1	0	1	0	1
OYM	ST MARYS MUNICIPAL	PA	LPV	0	1	0	1	0	1
UNV	UNIVERSITY PARK	PA	LPV200	0	1	0	1	0	1
FKL	VENANGO RGNL	PA	LPV	0	1	0	1	0	1
AFJ	WASHINGTON COUNTY	PA	LPV	0	1	0	1	0	1
AVP	WILKES-BARRE/SCRANTON INTL	PA	LPV	0	1	0	1	0	1
LOM	WINGS FIELD	PA	LPV	0	1	0	1	0	1
BID	BLOCK ISLAND STATE	RI	LPV	0	1	0	1	0	1
OQU	QUONSET STATE	RI	LPV	0	1	0	1	0	1
PVD	THEODORE FRANCIS GREEN STATE	RI	LPV	0	1	0	1	0	1
AIK	AIKEN MUNICIPAL	SC	LPV	0	1	0	1	0	1
AND	ANDERSON RGNL	SC	LPV200	0	1	0	1	0	1
BNL	BARNWELL RGNL	SC	LPV	0	1	0	1	0	1
ARW	BEAUFORT COUNTY	SC	LPV200	0	1	0	1	0	1
MKS	BERKELEY COUNTY	SC	LPV	0	1	0	1	0	1
CHS	CHARLESTON AFB/INTL	SC	LPV200	0	1	0	1	0	1
JZI	CHARLESTON EXECUTIVE	SC	LPV200	0	1	0	1	0	1
DCM	CHESTER CATAWBA RGNL	SC	LPV	0	1	0	1	0	1
CAE	COLUMBIA METROPOLITAN	SC	LPV200	0	1	0	1	0	1
UDG	DARLINGTON COUNTY JETPORT	SC	LPV	0	1	0	1	0	1
GYH	DONALDSON CENTER	SC	LPV	0	1	0	1	0	1
FLO	FLORENCE RGNL	SC	LPV	0	1	0	1	0	1
GGE	GEORGETOWN COUNTY	SC	LPV200	0	1	0	1	0	1
CRE	GRAND STRAND	SC	LPV200	0	1	0	1	0	1
GMU	GREENVILLE DOWNTOWN	SC	LPV200	0	1	0	1	0	1
GSP	GREENVILLE SPARTANBURG INTL	SC	LPV200	0	1	0	1	0	1
LKR	LANCASTER COUNTY-MC WHIRTER FIELD	SC	LPV200	0	1	0	1	0	1
RBW	LOWCOUNTRY RGNL	SC	LPV200	0	1	0	1	0	1

Airport Id	Airport Name	State	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
BBP	MARLBORO COUNTY JETPORT	SC	LPV	0	1	0	1	0	1
LRO	MT PLEASANT RGNL-FAISON FIELD	SC	LPV	0	1	0	1	0	1
MYR	MYRTLE BEACH INTL	SC	LPV200	0	1	0	1	0	1
CEU	OCONEE COUNTY RGNL	SC	LPV	0	1	0	1	0	1
OGB	ORANGEBURG MUNICIPAL	SC	LPV200	0	1	0	1	0	1
LQK	PICKENS COUNTY	SC	LPV	0	1	0	1	0	1
DYB	SUMMERVILLE	SC	LPV200	0	1	0	1	0	1
SMS	SUMTER	SC	LPV200	0	1	0	1	0	1
CDN	WOODWARD FIELD	SC	LPV	0	1	0	1	0	1
ABR	ABERDEEN RGNL	SD	LPV200	0	1	0	1	0	1
BKX	BROOKINGS RGNL	SD	LPV	0	1	0	1	0	1
YKN	CHAN GURNEY MUNICIPAL	SD	LPV	0	1	0	1	0	1
VMR	HAROLD DAVIDSON FIELD	SD	LPV	0	1	0	1	0	1
HON	HURON RGNL	SD	LPV200	0	1	0	1	0	1
MHE	MITCHELL MUNICIPAL	SD	LPV	0	1	0	1	0	1
PIR	PIERRE RGNL	SD	LPV	0	1	0	1	0	1
RAP	RAPID CITY RGNL	SD	LPV200	0	1	0	1	0	1
ATY	WATERTOWN RGNL	SD	LPV200	0	1	0	1	0	1
ICR	WINNER RGNL	SD	LPV	0	1	0	1	0	1
PVE	BEECH RIVER RGNL	TN	LPV	0	1	0	1	0	1
0M4	BENTON COUNTY	TN	LPV	0	1	0	1	0	1
SYI	BOMAR FIELD-SHELBYVILLE MUNICIPAL	TN	LPV	0	1	0	1	0	1
HZD	CARROLL COUNTY	TN	LPV	0	1	0	1	0	1
CSV	CROSSVILLE MEMORIAL-WHITSON FIELD	TN	LPV200	0	1	0	1	0	1
LUG	ELLINGTON	TN	LPV	0	1	0	1	0	1
UCY	EVERETT-STEWART RGNL	TN	LPV	0	1	0	1	0	1
FYM	FAYETTEVILLE MUNICIPAL	TN	LPV	0	1	0	1	0	1
GKT	GATLINBURG-PIGEON FORGE	TN	LPV	0	1	0	1	0	1
PHT	HENRY COUNTY	TN	LPV200	0	1	0	1	0	1
DKX	KNOXVILLE DOWNTOWN ISLAND	TN	LPV	0	1	0	1	0	1
3M7	LAFAYETTE MUNICIPAL	TN	LPV	0	1	0	1	0	1
M54	LEBANON MUNICIPAL	TN	LPV	0	1	0	1	0	1
CHA	LOVELL FIELD	TN	LPV200	0	1	0	1	0	1
MRC	MAURY COUNTY	TN	LPV	0	1	0	1	0	1
TYS	MC GHEE TYSON	TN	LPV	0	1	0	1	0	1
MKL	MC KELLAR-SIPES RGNL	TN	LPV200	0	1	0	1	0	1
MMI	MCMINN COUNTY	TN	LPV	0	1	0	1	0	1
MEM	MEMPHIS INTL	TN	LPV200	0	1	0	1	0	1
NQA	MILLINGTON RGNL JETPORT	TN	LPV	0	1	0	1	0	1
MBT	MURFREESBORO MUNICIPAL	TN	LPV	0	1	0	1	0	1
BNA	NASHVILLE INTL	TN	LPV200	0	1	0	1	0	1
CKV	OUTLAW FIELD	TN	LPV	0	1	0	1	0	1
SZY	ROBERT SIBLEY	TN	LPV	0	1	0	1	0	1
SNH	SAVANNAH-HARDIN COUNTY	TN	LPV	0	1	0	1	0	1
MQY	SMYRNA	TN	LPV	0	1	0	1	0	1
SRB	UPPER CUMBERLAND RGNL	TN	LPV200	0	1	0	1	0	1
BGF	WINCHESTER MUNICIPAL	TN	LPV	0	1	0	1	0	1
ABI	ABILENE RGNL	TX	LPV200	0	1	0	1	0	1
ADS	ADDISON	TX	LPV	0	1	0	1	0	1
ALI	ALICE INTL	TX	LPV	0	1	0	1	1	0.9999
E11	ANDREWS COUNTY	TX	LPV	0	1	0	1	0	1
LFK	ANGELINA COUNTY	TX	LPV	0	1	0	1	0	1
RKP	ARANSAS CO	TX	LPV	0	1	0	1	1	1

Airport Id	Airport Name	State	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
GKY	ARLINGTON MUNICIPAL	TX	LPV200	0	1	0	1	0	1
EDC	AUSTIN EXECUTIVE	TX	LPV200	0	1	0	1	0	1
BPG	BIG SPRING MC MAHON-WRINKLE	TX	LPV	0	1	0	1	0	1
11R	BRENHAM MUNICIPAL	TX	LPV	0	1	0	1	0	1
XBP	BRIDGEPORT MUNICIPAL	TX	LPV	0	1	0	1	0	1
BWD	BROWNWOOD RGNL	TX	LPV	0	1	0	1	0	1
E30	BRUCE FIELD	TX	LPV	0	1	0	1	0	1
TKI	COLLIN COUNTY RGNL AT MC KINNE	TX	LPV200	0	1	0	1	0	1
CRP	CORPUS CHRISTI INTL	TX	LPV200	0	1	0	1	1	0.9999
CFD	COULTER FIELD	TX	LPV	0	1	0	1	0	1
PRX	COX FIELD	TX	LPV	0	1	0	1	0	1
BBD	CURTIS FIELD	TX	LPV	0	1	0	1	0	1
RBD	DALLAS EXECUTIVE	TX	LPV	0	1	0	1	0	1
DAL	DALLAS LOVE FIELD	TX	LPV	0	1	0	1	0	1
DFW	DALLAS/FORT WORTH INTL	TX	LPV200	0	1	0	1	0	1
DWH	DAVID WAYNE HOOKS MEMORIAL	TX	LPV	0	1	0	1	0	1
LUD	DECATUR MUNICIPAL	TX	LPV	0	1	0	1	0	1
DRT	DEL RIO INTL	TX	LPV	0	1	0	1	0	1
DTO	DENTON MUNICIPAL	TX	LPV	0	1	0	1	0	1
TPL	DRAUGHON-MILLER CENTRAL TEXAS	TX	LPV200	0	1	0	1	0	1
GGG	EAST TEXAS RGNL	TX	LPV	0	1	0	1	0	1
EFD	ELLINGTON FIELD	TX	LPV	0	1	0	1	0	1
FST	FORT STOCKTON-PECOS COUNTY	TX	LPV	0	1	0	1	0	1
FTW	FORT WORTH MEACHAM INTL	TX	LPV200	0	1	0	1	0	1
FWS	FORT WORTH SPINKS	TX	LPV	0	1	0	1	0	1
GNC	GAINES COUNTY	TX	LPV	0	1	0	1	0	1
GLE	GAINESVILLE MUNICIPAL	TX	LPV	0	1	0	1	0	1
IAH	GEORGE BUSH INTERCONTINENTAL	TX	LPV	0	1	0	1	0	1
GDJ	GRANBURY RGNL	TX	LPV	0	1	0	1	0	1
PVW	HALE COUNTY	TX	LPV	0	1	0	1	0	1
HRX	HEREFORD MUNICIPAL	TX	LPV200	0	1	0	1	0	1
INJ	HILLSBORO MUNICIPAL	TX	LPV	0	1	0	1	0	1
HDO	HONDO MUNICIPAL	TX	LPV	0	1	0	1	0	1
TME	HOUSTON EXECUTIVE	TX	LPV	0	1	0	1	0	1
AXH	HOUSTON-SOUTHWEST	TX	LPV	0	1	0	1	0	1
UTS	HUNTSVILLE MUNICIPAL	TX	LPV	0	1	0	1	0	1
BPT	JACK BROOKS RGNL	TX	LPV200	0	1	0	1	0	1
JAS	JASPER COUNTY-BELL FIELD	TX	LPV	0	1	0	1	0	1
HBV	JIM HOGG COUNTY	TX	LPV	0	1	0	1	1	0.9999
ERV	KERRVILLE MUNICIPAL/ LOUIS SCHREINER	TX	LPV	0	1	0	1	0	1
IKG	KLEBERG COUNTY	TX	LPV	0	1	0	1	2	0.9999
LNC	LANCASTER RGNL	TX	LPV200	0	1	0	1	0	1
LRD	LAREDO INTL	TX	LPV	0	1	0	1	2	0.9999
LLN	LEVELLAND MUNICIPAL	TX	LPV	0	1	0	1	0	1
CXO	LONE STAR EXECUTIVE	TX	LPV200	0	1	0	1	0	1
LBB	LUBBOCK PRESTON SMITH INTL	TX	LPV200	0	1	0	1	0	1
GVT	MAJORS	TX	LPV	0	1	0	1	0	1
5T9	MAVERICK COUNTY MEMORIAL INTL	TX	LPV	0	1	0	1	1	1
MFE	MC ALLEN MILLER INTL	TX	LPV	0	1	0	1	10	0.9998
HQZ	MESQUITE METRO	TX	LPV	0	1	0	1	0	1
MAF	MIDLAND INTL	TX	LPV	0	1	0	1	0	1
JWY	MID-WAY RGNL	TX	LPV200	0	1	0	1	0	1

Airport Id	Airport Name	State	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
DUX	MOORE COUNTY	TX	LPV200	0	1	0	1	0	1
RAS	MUSTANG BEACH	TX	LPV	0	1	0	1	1	0.9999
BAZ	NEW BRAUNFELS MUNICIPAL	TX	LPV	0	1	0	1	0	1
ODO	ODESSA-SCHLEMEYER FIELD	TX	LPV200	0	1	0	1	0	1
ORG	ORANGE COUNTY	TX	LPV	0	1	0	1	0	1
PIL	PORT ISABEL-CAMERON COUNTY	TX	LPV	0	1	0	1	7	0.9999
AMA	RICK HUSBAND AMARILLO INTL	TX	LPV200	0	1	0	1	0	1
GRK	ROBERT GRAY AAF	TX	LPV200	0	1	0	1	0	1
SJT	SAN ANGELO RGNL/ MATHIS FIELD	TX	LPV	0	1	0	1	0	1
SAT	SAN ANTONIO INTL	TX	LPV200	0	1	0	1	0	1
GLS	SCHOLES INTL AT GALVESTON	TX	LPV	0	1	0	1	0	1
EBG	SOUTH TEXAS INTL AT EDINBURG	TX	LPV	0	1	0	1	6	0.9999
SGR	SUGAR LAND RGNL	TX	LPV	0	1	0	1	0	1
TFP	T P MC CAMPBELL	TX	LPV	0	1	0	1	1	0.9999
TRL	TERRELL MUNICIPAL	TX	LPV	0	1	0	1	0	1
LBX	TEXAS GULF COAST RGNL	TX	LPV	0	1	0	1	0	1
TYR	TYLER POUNDS RGNL	TX	LPV	0	1	0	1	0	1
VCT	VICTORIA RGNL	TX	LPV	0	1	0	1	1	1
ACT	WACO RGNL	TX	LPV200	0	1	0	1	0	1
ARM	WHARTON RGNL	TX	LPV	0	1	0	1	0	1
F05	WILBARGER COUNTY	TX	LPV	0	1	0	1	0	1
HOU	WILLIAM P HOBBY	TX	LPV	0	1	0	1	0	1
BCE	BRYCE CANYON	UT	LPV	0	1	0	1	0	1
FOM	FILLMORE MUNICIPAL	UT	LPV	0	1	0	1	0	1
LGU	LOGAN-CACHE	UT	LPV	0	1	0	1	0	1
OGD	OGDEN-HINCKLEY	UT	LPV	0	1	0	1	0	1
PVU	PROVO MUNICIPAL	UT	LPV	0	1	0	1	0	1
DXZ	ST GEORGE MUNICIPAL	UT	LPV	0	1	0	1	0	1
MFV	ACCOMACK COUNTY	VA	LPV	0	1	0	1	0	1
MTV	BLUE RIDGE	VA	LPV	0	1	0	1	0	1
CHO	CHARLOTTESVILLE-ALBEMARLE	VA	LPV	0	1	0	1	0	1
FCI	CHESTERFIELD COUNTY	VA	LPV	0	1	0	1	0	1
CJR	CULPEPER RGNL	VA	LPV	0	1	0	1	0	1
DAN	DANVILLE RGNL	VA	LPV200	0	1	0	1	0	1
PTB	DINWIDDIE COUNTY	VA	LPV	0	1	0	1	0	1
FVX	FARMVILLE RGNL	VA	LPV	0	1	0	1	0	1
OFP	HANOVER COUNTY MUNICIPAL	VA	LPV	0	1	0	1	0	1
HSP	INGALLS FIELD	VA	LPV	0	1	0	1	0	1
0VG	LEE COUNTY	VA	LPV	0	1	0	1	0	1
JYO	LEESBURG EXECUTIVE	VA	LPV	0	1	0	1	0	1
LNP	LONESOME PINE	VA	LPV	0	1	0	1	0	1
LKU	LOUISA COUNTY/ FREEMAN FIELD	VA	LPV	0	1	0	1	0	1
LYH	LYNCHBURG RGNL/ PRESTON GLENN FIELD	VA	LPV	0	1	0	1	0	1
HEF	MANASSAS RGNL/ HARRY P. DAVIS FIELD	VA	LPV	0	1	0	1	0	1
AVC	MECKLENBURG-BRUNSWICK RGNL	VA	LPV	0	1	0	1	0	1
FYJ	MIDDLE PENINSULA RGNL	VA	LPV	0	1	0	1	0	1
MKJ	MOUNTAIN EMPIRE	VA	LPV	0	1	0	1	0	1
PSK	NEW RIVER VALLEY	VA	LPV	0	1	0	1	0	1
PHF	NEWPORT NEWS/ WILLIAMSBURG INTL	VA	LPV200	0	1	0	1	0	1
RIC	RICHMOND INTL	VA	LPV200	0	1	0	1	0	1
SHD	SHENANDOAH VALLEY RGNL	VA	LPV200	0	1	0	1	0	1

Airport Id	Airport Name	State	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
RMN	STAFFORD RGNL	VA	LPV	0	1	0	1	0	1
XSA	TAPPAHANNOCK-ESSEX COUNTY	VA	LPV	0	1	0	1	0	1
VJI	VIRGINIA HIGHLANDS	VA	LPV	0	1	0	1	0	1
BCB	VIRGINIA TECH/ MONTGOMERY EXECUTIVE	VA	LPV	0	1	0	1	0	1
IAD	WASHINGTON DULLES INTL	VA	LPV200	0	1	0	1	0	1
W78	WILLIAM M TUCK	VA	LPV	0	1	0	1	0	1
OKV	WINCHESTER RGNL	VA	LPV200	0	1	0	1	0	1
MPV	EDWARD F KNAPP STATE	VT	LPV	0	1	0	1	0	1
FSO	FRANKLIN COUNTY STATE	VT	LPV	0	1	0	1	0	1
BLI	BELLINGHAM INTL	WA	LPV	0	1	0	1	2	0.9999
HQM	BOWERMAN	WA	LPV200	0	1	0	1	8	0.9995
PWT	BREMERTON NATIONAL	WA	LPV	0	1	0	1	4	0.9997
DEW	DEER PARK	WA	LPV	0	1	0	1	0	1
TDO	ED CARLSON MEMORIAL FIELD	WA	LPV	0	1	1	1	6	0.9995
EPH	EPHRATA MUNICIPAL	WA	LPV	0	1	0	1	2	0.9999
FHR	FRIDAY HARBOR	WA	LPV	0	1	0	1	3	0.9999
MWH	GRANT CO INTL	WA	LPV200	0	1	0	1	2	1
OLM	OLYMPIA RGNL	WA	LPV	0	1	0	1	5	0.9996
PUW	PULLMAN/MOSCOW RGNL	WA	LPV	0	1	0	1	0	1
RNT	RENTON MUNICIPAL	WA	LPV	0	1	0	1	4	0.9998
RLD	RICHLAND	WA	LPV	0	1	0	1	2	0.9999
SEA	SEATTLE-TACOMA INTL	WA	LPV200	0	1	0	1	4	0.9997
BVS	SKAGIT RGNL	WA	LPV	0	1	0	1	3	0.9999
PAE	SNOHOMISH COUNTY (PAINE FLD)	WA	LPV	0	1	0	1	3	0.9998
OTH	SOUTHWEST OREGON RGNL	WA	LPV	0	1	1	0.9997	39	0.9981
GEG	SPOKANE INTL	WA	LPV200	0	1	0	1	0	1
TIW	TACOMA NARROWS	WA	LPV	0	1	0	1	4	0.9997
PSC	TRI-CITIES	WA	LPV200	0	1	0	1	2	0.9999
ALW	WALLA WALLA RGNL	WA	LPV	0	1	0	1	2	1
CLM	WILLIAM R FAIRCHILD INTL	WA	LPV	0	1	0	1	3	0.9998
YKM	YAKIMA AIR TERMINAL/ MCALLISTER	WA	LPV	0	1	0	1	4	0.9997
GRB	AUSTIN STRAUBEL INTL	WI	LPV200	0	1	0	1	0	1
DLL	BARABOO WISCONSIN DELLS	WI	LPV	0	1	0	1	0	1
OVS	BOSCOBEL	WI	LPV	0	1	0	1	0	1
EAU	CHIPPEWA VALLEY RGNL	WI	LPV200	0	1	0	1	0	1
CLI	CLINTONVILLE MUNICIPAL	WI	LPV	0	1	0	1	0	1
UNU	DODGE COUNTY	WI	LPV	0	1	0	1	0	1
SUE	DOOR COUNTY CHERRYLAND	WI	LPV	0	1	0	1	0	1
EGV	EAGLE RIVER UNION	WI	LPV	0	1	0	1	0	1
FLD	FOND DU LAC COUNTY	WI	LPV	0	1	0	1	0	1
MKE	GENERAL MITCHELL INTL	WI	LPV200	0	1	0	1	0	1
ASX	JOHN F KENNEDY MEMORIAL	WI	LPV	0	1	0	1	1	1
RAC	JOHN H BATTEN	WI	LPV	0	1	0	1	0	1
ENW	KENOSHA RGNL	WI	LPV200	0	1	0	1	0	1
LSE	LA CROSSE MUNICIPAL	WI	LPV	0	1	0	1	0	1
ARV	LAKELAND/NOBLE F. LEE MEMORIAL	WI	LPV	0	1	0	1	0	1
MTW	MANITOWOC COUNTY	WI	LPV200	0	1	0	1	0	1
MFI	MARSHFIELD MUNICIPAL	WI	LPV	0	1	0	1	0	1
LUM	MENOMONIE MUNICIPAL-SCORE FIELD	WI	LPV	0	1	0	1	0	1
RRL	MERRILL MUNICIPAL	WI	LPV	0	1	0	1	0	1
C29	MIDDLETON MUNICIPAL - MOREY FIELD	WI	LPV	0	1	0	1	0	1

Airport Id	Airport Name	State	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
ATW	OUTAGAMIE COUNTY RGNL	WI	LPV200	0	1	0	1	0	1
PVB	PLATTEVILLE MUNICIPAL	WI	LPV	0	1	0	1	0	1
PBH	PRICE COUNTY	WI	LPV	0	1	0	1	0	1
RHI	RHINELANDER-ONEIDA COUNTY	WI	LPV200	0	1	0	1	0	1
RPD	RICE LAKE RGNL - CARL'S FIELD	WI	LPV	0	1	0	1	0	1
HYR	SAWYER COUNTY	WI	LPV	0	1	0	1	0	1
SBM	SHEBOYGAN COUNTY MEMORIAL	WI	LPV	0	1	0	1	0	1
JVL	SOUTHERN WISCONSIN RGNL	WI	LPV200	0	1	0	1	0	1
STE	STEVENS POINT MUNICIPAL	WI	LPV200	0	1	0	1	0	1
MDZ	TAYLOR COUNTY	WI	LPV	0	1	0	1	0	1
TKV	TOMAHAWK RGNL	WI	LPV	0	1	0	1	0	1
LNR	TRI-COUNTY RGNL	WI	LPV	0	1	0	1	0	1
UES	WAUKESHA COUNTY	WI	LPV200	0	1	0	1	0	1
ETB	WEST BEND MUNICIPAL	WI	LPV	0	1	0	1	0	1
OSH	WITTMAN RGNL	WI	LPV	0	1	0	1	0	1
MRB	EASTERN WV RGNL/ SHEPHERD FIELD	WV	LPV	0	1	0	1	0	1
LWB	GREENBRIER VALLEY	WV	LPV	0	1	0	1	0	1
3I2	MASON COUNTY	WV	LPV	0	1	0	1	0	1
BLF	MERCER COUNTY	WV	LPV	0	1	0	1	0	1
PKB	MID-OHIO VALLEY RGNL	WV	LPV	0	1	0	1	0	1
MGW	MORGANTOWN MUNICIPAL- WALTER L. BILL	WV	LPV200	0	1	0	1	0	1
CKB	NORTH CENTRAL WEST VIRGINIA	WV	LPV200	0	1	0	1	0	1
BKW	RALEIGH COUNTY MEMORIAL	WV	LPV200	0	1	0	1	0	1
HTS	TRI-STATE/ MILTON J. FERGUSON FIELD	WV	LPV	0	1	0	1	0	1
HLG	WHEELING OHIO CO	WV	LPV200	0	1	0	1	0	1
CRW	YEAGER	WV	LPV200	0	1	0	1	0	1
CPR	CASPER/NATRONA COUNTY INTL	WY	LPV	0	1	0	1	0	1
CYS	CHEYENNE RGNL/ JERRY OLSON FIELD	WY	LPV	0	1	0	1	0	1
DGW	CONVERSE COUNTY	WY	LPV200	0	1	0	1	0	1
EVW	EVANSTON-UINTA COUNTY BURNS FIELD	WY	LPV	0	1	0	1	0	1
GCC	GILLETTE-CAMPBELL COUNTY	WY	LPV	0	1	0	1	0	1
JAC	JACKSON HOLE	WY	LPV	0	1	0	1	0	1
LAR	LARAMIE RGNL	WY	LPV	0	1	0	1	0	1
RWL	RAWLINS MUNICIPAL/ HARVEY FIELD	WY	LPV	0	1	0	1	0	1
RIW	RIVERTON RGNL	WY	LPV200	0	1	0	1	0	1
RKS	ROCK SPRINGS- SWEETWATER COUNTY	WY	LPV200	0	1	0	1	0	1
SHR	SHERIDAN COUNTY	WY	LPV	0	1	0	1	0	1
COD	YELLOWSTONE RGNL	WY	LPV	0	1	0	1	0	1

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

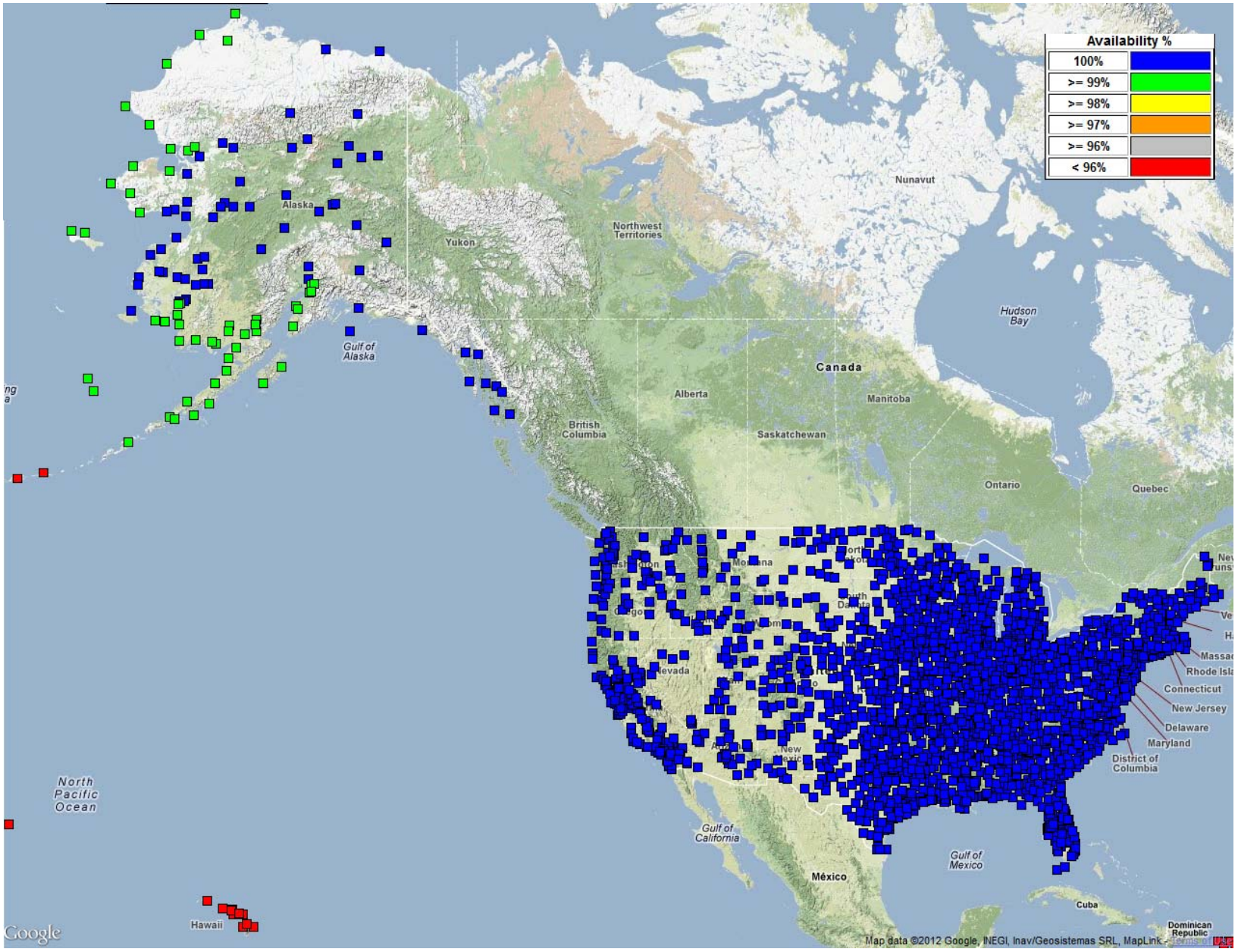


Figure 8-2 WAAS LP Outages at US Airports with GPS RNAV Instrument Approach Procedures

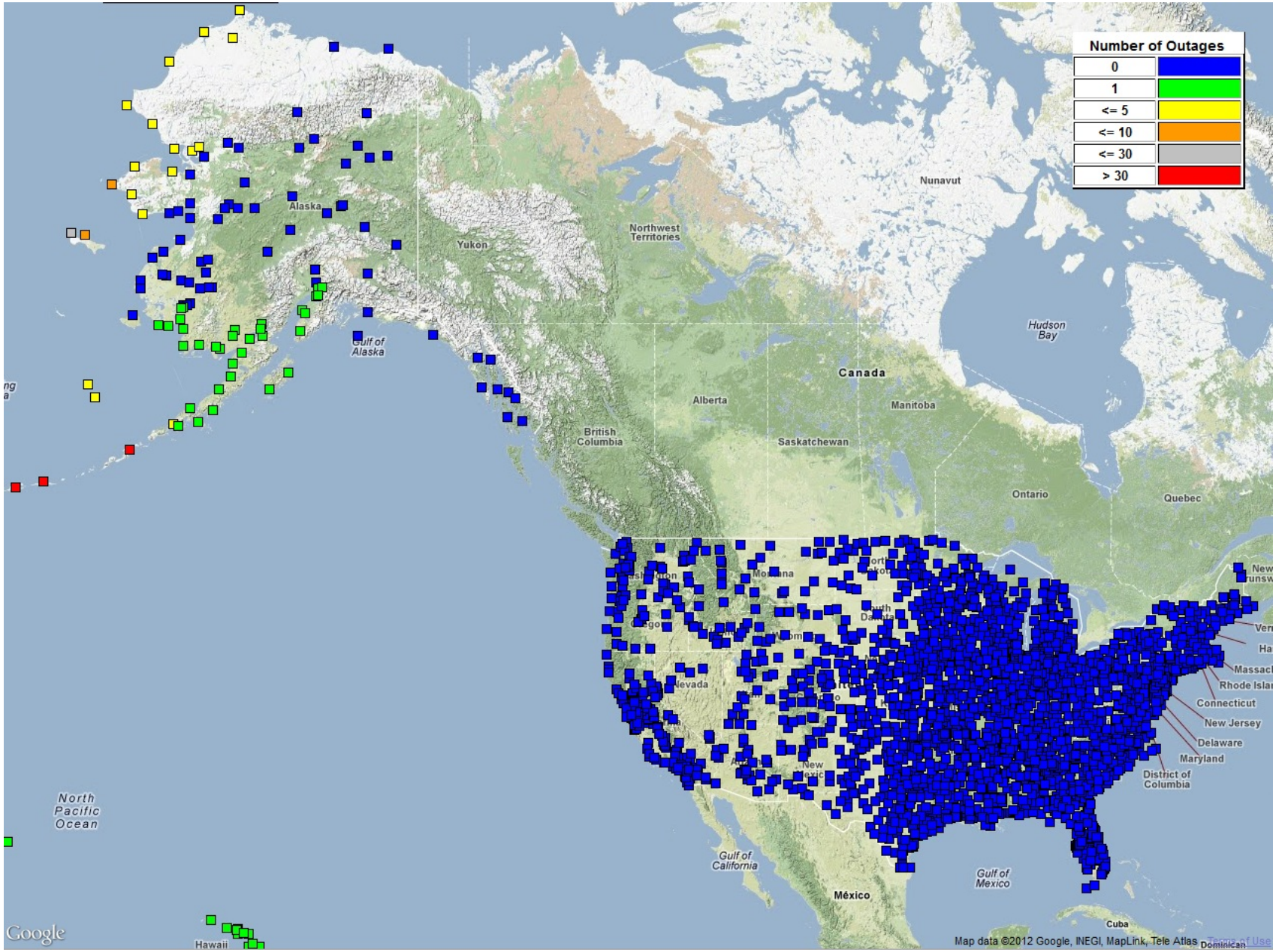


Figure 8-3 WAAS LPV Availability at US Airports with GPS RNAV Instrument Approach Procedures

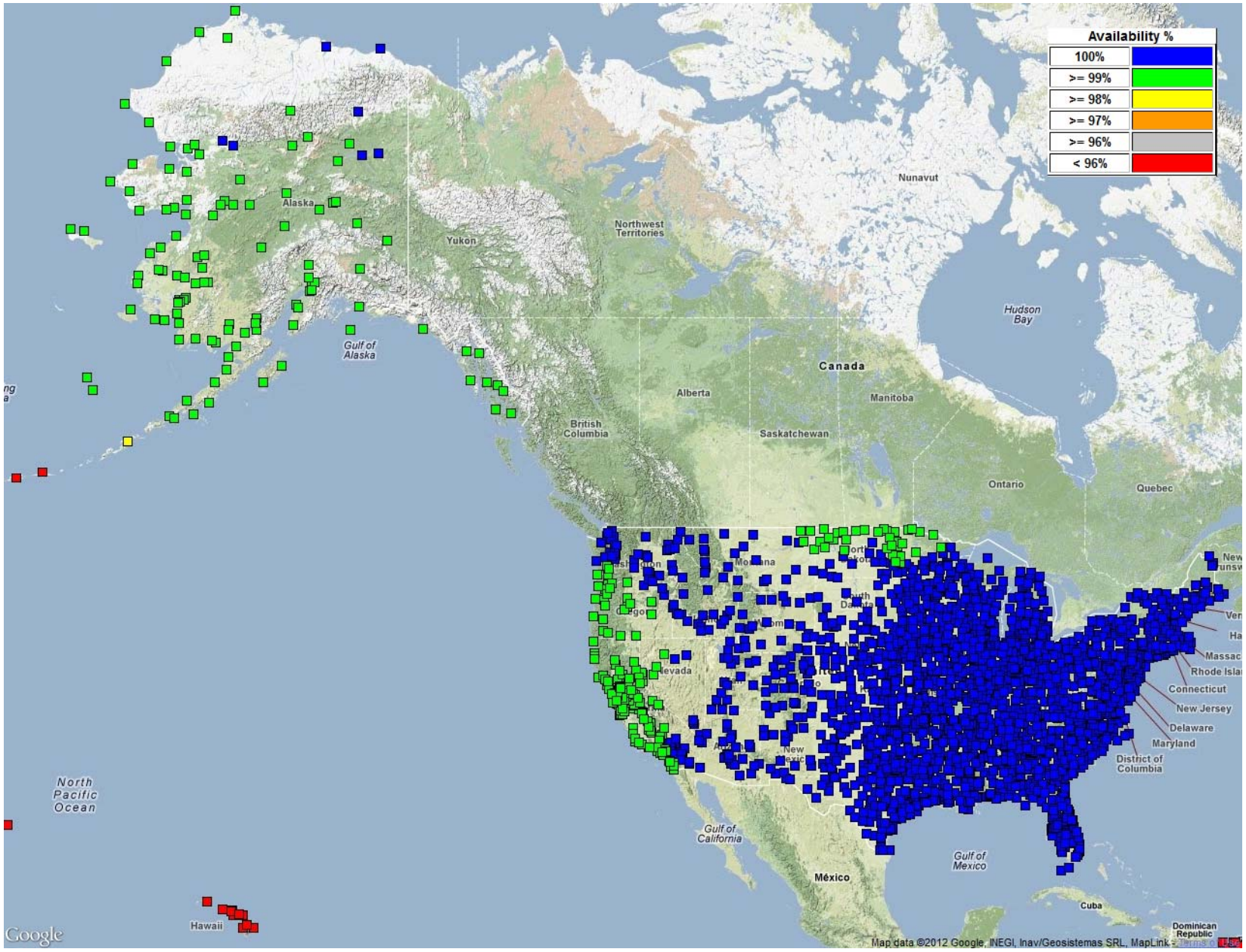


Figure 8-4 WAAS LPV Outages at US Airports with GPS RNAV Instrument Approach Procedures

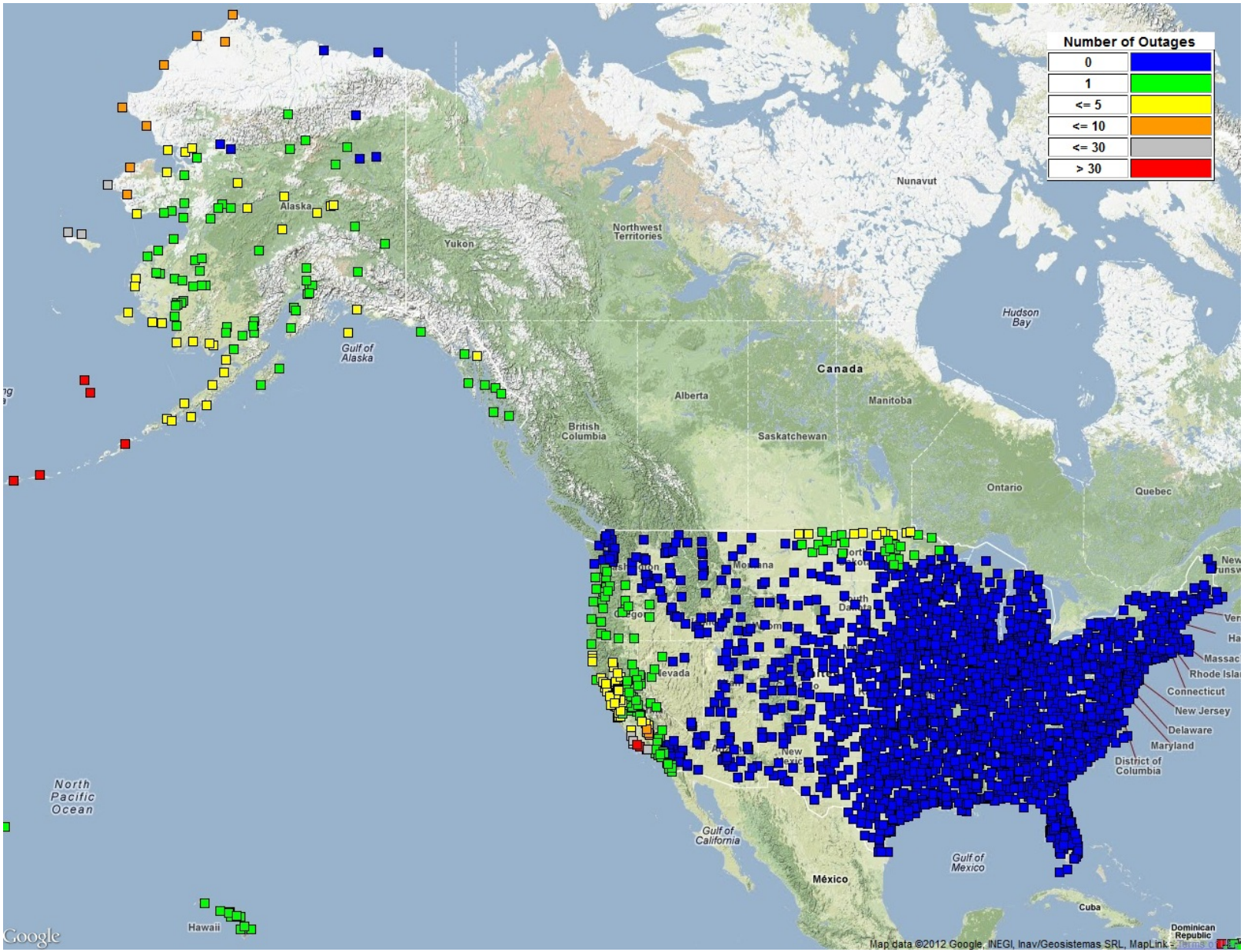


Figure 8-5 WAAS LPV 200 Availability at US Airports with GPS RNAV Instrument Approach Procedures

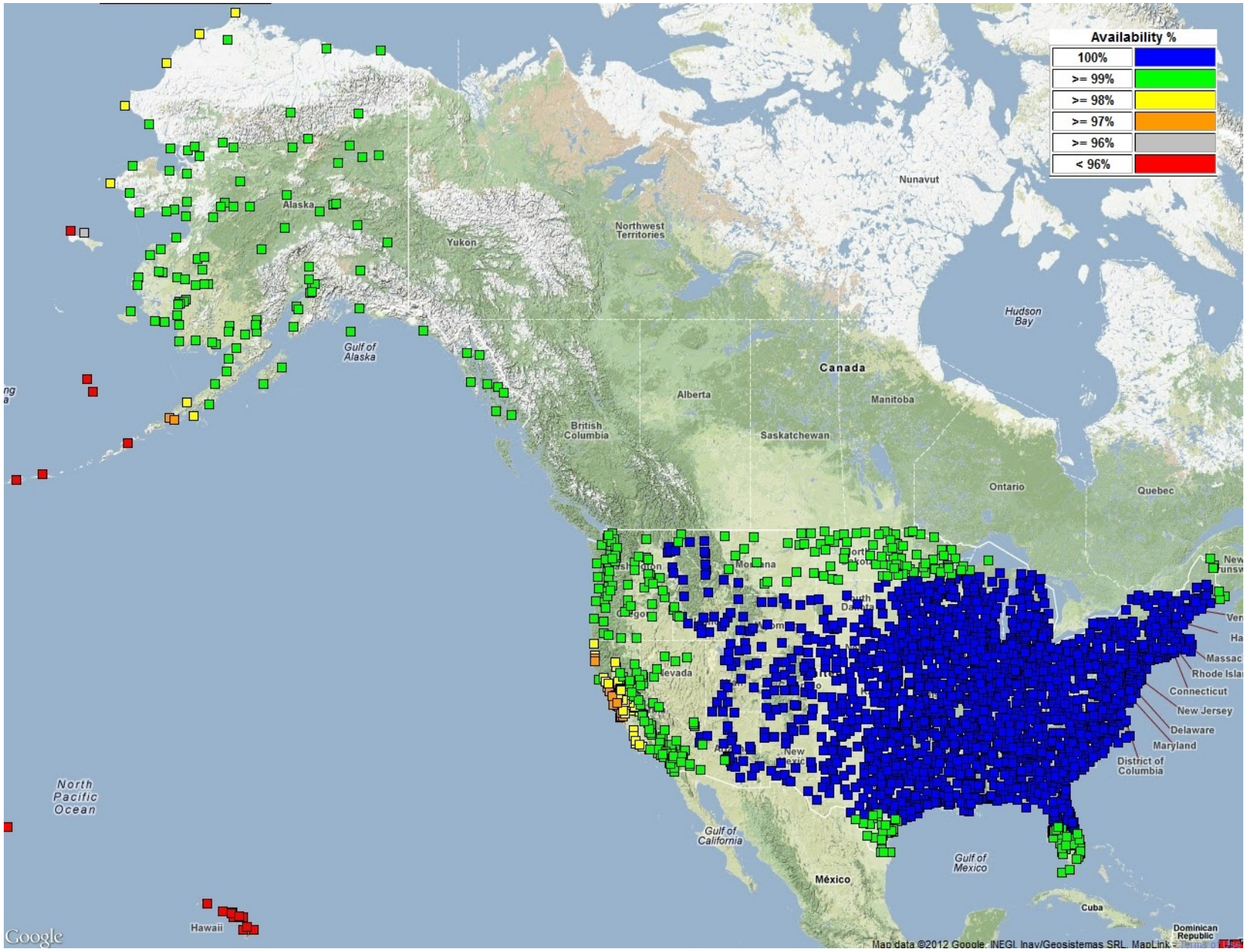
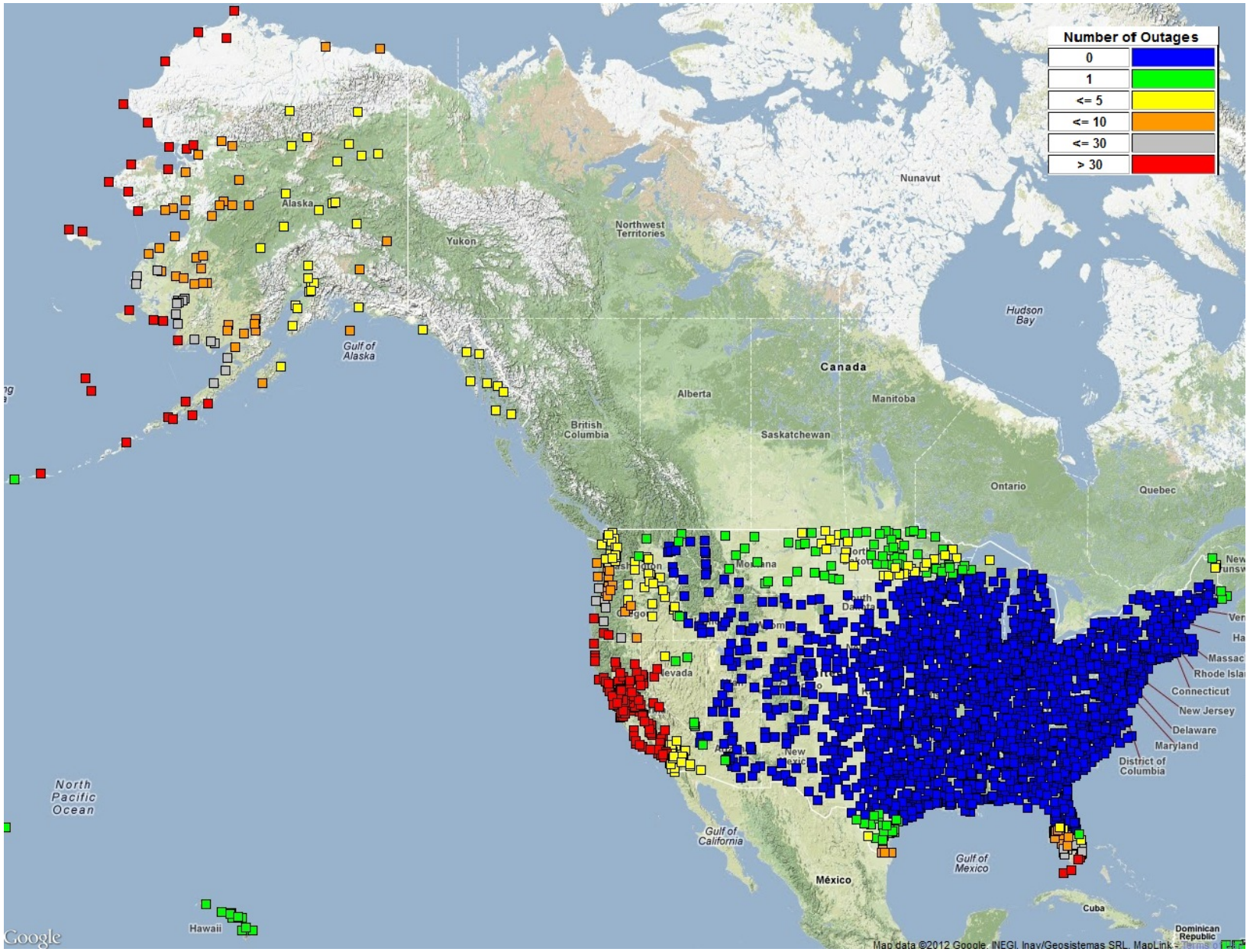


Figure 8-6 WAAS LPV 200 Outages at US Airports with GPS RNAV Instrument Approach Procedures



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

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

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

Statistics are calculated on how well the 0.1 multiples of the deterministically estimated standard deviation bounds the difference between the leveled truth and the real time smoothed measurements. Those statistics are then compared to a theoretical Gaussian distribution and an extensive set of plots are generated and manually reviewed. Table 9.1 recaps the results of that manual analysis.

Table 9-1 CNMP Bounding Statistics

WAAS Site	WRE	Apr 11	May 11	Jun 11	Jul 11	Aug 11	Sep 11	Oct 11	Nov 11	Dec 11	Jan 12	Feb 12	Mar 12
Albuquerque	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Anchorage	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Atlanta	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Barrow	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Bethel	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Billings	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Boston	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Chicago	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Cleveland	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Cold Bay	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Dallas	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Denver	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Fairbanks	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Gander	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Goose Bay	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Honolulu	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Houston	A	●	●	●	●	●	●	–	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Iqaluit	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Jacksonville	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●

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

WAAS Site	WRE	Apr 11	May 11	Jun 11	Jul 11	Aug 11	Sep 11	Oct 11	Nov 11	Dec 11	Jan 12	Feb 12	Mar 12
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 the WAAS antennas using a 25 hour set of data from 23:00 on 3/30/12 to 23:59:30 on 3/31/12 for all of the WAAS receivers except the exceptions noted below. Surveys were performed using 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 was selected for the OPUS solutions.

The following are the data set exceptions:

1. ZSU (San Juan) was not processed because ZSU has been temporarily turned off because roof construction required the removal of its antennas. ZSU will need a completely new survey and an update to the WAAS software before it is reintroduced into WAAS when the construction is completed.
2. MMX3 (Mexico City 3) was not processed because it has been offline for the entire quarter awaiting repair.
3. ZFW (Dallas Fort Worth) used a 24 hour data set from just 3/31/12
4. ZMA1 and ZMA3 (Miami 1 and 3) and ZOA3 (Oakland 3) used 21 hour data sets starting at 00:00:00 on 3/31
5. ZHU3 (Houston 3) used a 19 hour data set starting at 00:00:00 on 3/31/12

The overall RMS quality metrics reported by OPUS were all <= 2.4 cm. The CSRS surveys' RSSs of the reported ECEF sigmas were all less than equal to 1.0 cm. The OPUS IGS08 and CSRS surveys agreed to an average of 1.3 cm with a maximum of 2.7 cm for MSD2 (San Jose del Cabo 2).

The OPUS IGS08 positions were compared to the positions in the current WAAS software build 6.097 that was fielded in October 2011. The OPUS IGS08 surveys agree with the build 6.097 positions to better or equal to 8.2 cm (maximum was YQX2 Gander 2). The average difference was 4.4 cm. 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.

Table 11.1 lists the WAAS antenna L1 phase center positions as of 3/31/12. The positions are the OPUS IGS08 estimated positions. The values for ZSU are the WAAS software build 6.097 positions. The values for MMX3 are from the prior report

Figure 11.1 to 11.3 show the RSS of the ECEF differences between the 3/31/12 OPUS survey antenna phase center locations and the locations in the WAAS build 6.097 software which was fielded during October 2011. 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 delta for the Bethel WRE string 1(A). The next two bars in the chart are Bethel string 2(B) and Bethel string 3(C). Figure 11.4 to 11.6 shows the OPUS surveys overall RMS quality indications.

Figure 11.7 to 11.9 show the RSS of the ECEF difference between the positions obtained from OPUS and the positions obtained from the Canadian Spatial Reference System (CSRS). Note that that OPUS positions are in IGS08 and the CSRS positions are in ITRF-2008. Figures 11.10 to 11.12 show the RSS of the ECEF sigmas survey qualities reported by CSRS.

Table 10-1 WAAS Antenna Positions (OPUS IGS08) as of 12/27/11

WRE	X(m)	Y(m)	Z(m)	Latitude	Longitude	H(m)
BET1	-2965385.024	-972576.616	5543892.928	60.7879157805556	-161.8417249500000	52.198
BET2	-2965385.796	-972580.340	5543891.875	60.7878963305556	-161.8416644027780	52.203
BET3	-2965388.358	-972577.468	5543891.003	60.7878804527778	-161.8417291638890	52.194
BIL1	-1416445.858	-4223577.017	4550862.181	45.8037070750000	-108.5397228000000	1112.259
BIL2	-1416449.925	-4223574.882	4550862.895	45.8037162666667	-108.5397811250000	1112.262
BIL3	-1416441.559	-4223574.281	4550866.021	45.8037567000000	-108.5396815666670	1112.251
BRW1	-1886758.903	-809058.654	6018494.498	71.2827651722222	-156.7899247833330	15.585
BRW2	-1886756.315	-809055.910	6018495.670	71.2827979111111	-156.7899667027780	15.585
BRW3	-1886755.223	-809059.691	6018495.495	71.2827932777778	-156.7898577055560	15.575
CDB1	-3484099.032	-1084748.808	5213678.668	55.1923744277778	-162.7064042083330	49.722
CDB2	-3484105.679	-1084741.600	5213675.735	55.1923283833333	-162.7065432944440	49.713
CDB3	-3484111.955	-1084734.813	5213672.974	55.1922849138889	-162.7066743361110	49.715
FAI1	-2304741.781	-1448715.272	5748843.701	64.8096303055556	-147.8473406611110	149.937
FAI2	-2304741.306	-1448706.466	5748846.095	64.8096807444444	-147.8474922583330	149.938
FAI3	-2304732.774	-1448707.405	5748849.237	64.8097473111111	-147.8473799611110	149.919
HNL1	-5508637.120	-2234493.353	2303722.196	21.3129901888889	-157.9208272000000	24.703
HNL2	-5508656.273	-2234483.670	2303686.955	21.3126473583333	-157.9209830750000	25.038
HNL3	-5508647.692	-2234497.599	2303694.053	21.3127159972222	-157.9208275777780	25.088
JNU1	-2354254.871	-2388549.655	5407043.129	58.3625747722222	-134.5857067000000	16.107
JNU2	-2354252.791	-2388565.766	5407036.959	58.3624691694444	-134.5854881805560	16.107
JNU3	-2354239.569	-2388568.617	5407041.422	58.3625456111111	-134.5852931138890	16.103
MMD1	35070.429	-5959686.686	2264365.783	20.9319093388889	-89.6628406027778	29.143
MMD2	35065.510	-5959687.040	2264364.991	20.9319016083333	-89.6628879111111	29.163
MMD3	35065.179	-5959685.254	2264369.649	20.9319466722222	-89.6628909916667	29.158
MMX1	-948701.106	-5943935.641	2109212.725	19.4316535888889	-99.0683896666667	2235.635
MMX2	-948696.681	-5943935.472	2109215.148	19.4316768194444	-99.0683483250000	2235.626
MMX3	-948705.545	-5943935.898	2109210.322	19.4316302583333	-99.0684310055556	2235.735
MPR1	-1570142.218	-5759530.619	2238184.772	20.6790034166667	-105.2492031500000	10.996
MPR2	-1570139.397	-5759530.128	2238188.818	20.6790414833333	-105.2491782666670	11.288
MPR3	-1570143.501	-5759528.012	2238190.583	20.6790594666667	-105.2492216111110	11.011
MSD1	-1979519.719	-5523223.057	2493106.796	23.1604469361111	-109.7176480277780	104.290
MSD2	-1979521.287	-5523225.385	2493100.394	23.1603841277778	-109.7176547722220	104.273
MSD3	-1979525.733	-5523222.135	2493104.067	23.1604201583333	-109.7177063527780	104.284
MTP1	-254854.335	-6162909.178	1617805.115	14.7913664027778	-92.3679990083333	54.965
MTP2	-254850.729	-6162910.219	1617801.684	14.7913343666667	-92.3679651416667	54.951
MTP3	-254855.496	-6162910.317	1617800.149	14.7913202722222	-92.3680093444444	54.844
OTZ1	-2396055.998	-750356.164	5843502.543	66.8873324333333	-162.6113727027780	10.903
OTZ2	-2396052.834	-750354.330	5843504.069	66.8873672277778	-162.6113910638890	10.906
OTZ3	-2396052.814	-750358.268	5843503.582	66.8873559638889	-162.6113051694440	10.912

WRE	X(m)	Y(m)	Z(m)	Latitude	Longitude	H(m)
YFB1	1035381.470	-2634289.647	5696539.538	63.7314904000000	-68.5431830472222	10.032
YFB2	1035372.260	-2634296.050	5696538.175	63.7314641500000	-68.5434039722222	9.956
YFB3	1035366.192	-2634306.802	5696534.400	63.7313865194444	-68.5435979055556	10.017
YQX1	2430424.654	-3419640.396	4788223.837	48.9664899361111	-54.5976319694445	146.892
YQX2	2430432.619	-3419639.058	4788220.783	48.9664480083333	-54.5975327166667	146.901
YQX3	2430440.520	-3419637.684	4788217.780	48.9664068305556	-54.5974338944445	146.906
YWG1	-520164.345	-4083475.892	4855843.002	49.9005744777778	-97.2593972777778	222.038
YWG2	-520150.481	-4083468.835	4855850.382	49.9006774027778	-97.2592182666667	222.046
YWG3	-520152.343	-4083477.949	4855842.581	49.9005684361111	-97.2592279472222	222.054
YYR1	1885341.448	-3321428.358	5091171.654	53.3086470250000	-60.4194679722222	37.851
YYR2	1885344.405	-3321419.882	5091176.072	53.3087133361111	-60.4193666222222	37.862
YYR3	1885340.123	-3321413.066	5091182.074	53.3088034972222	-60.4193720111111	37.870
ZAB1	-1488636.821	-5003946.550	3654557.721	35.1735754694444	-106.5673495138890	1620.136
ZAB2	-1488631.486	-5003948.247	3654557.705	35.1735748055556	-106.5672880833330	1620.213
ZAB3	-1488632.265	-5003950.817	3654553.848	35.1735324527778	-106.5672882361110	1620.186
ZAN1	-2659536.616	-1549114.786	5567750.760	61.2292019527778	-149.7802503611110	80.688
ZAN2	-2659548.372	-1549110.830	5567746.273	61.2291183277778	-149.7804241444440	80.686
ZAN3	-2659541.323	-1549106.710	5567750.752	61.2292019000000	-149.7804243722220	80.683
ZAU1	138704.135	-4761244.149	4227763.941	41.7826580666667	-88.3313364611111	195.900
ZAU2	138704.401	-4761248.769	4227758.785	41.7825957027778	-88.3313348805555	195.914
ZAU3	138711.105	-4761248.509	4227758.867	41.7825966416667	-88.3312541833333	195.921
ZBW1	1490299.243	-4448983.190	4306010.509	42.7357204305556	-71.4804256722222	39.142
ZBW2	1490304.353	-4448981.166	4306010.846	42.7357244666667	-71.4803586527778	39.153
ZBW3	1490306.059	-4448984.800	4306006.543	42.7356716555556	-71.4803529916667	39.162
ZDC1	1069125.777	-4839598.991	4001126.516	39.1015959194444	-77.5427463833333	80.074
ZDC2	1069128.173	-4839603.628	4001120.309	39.1015238750000	-77.5427309000000	80.075
ZDC3	1069124.069	-4839602.714	4001122.503	39.1015493083333	-77.5427749472222	80.079
ZDV1	-1273628.589	-4711375.580	4094890.140	40.1873034750000	-105.1272240777780	1541.374
ZDV2	-1273622.895	-4711377.104	4094890.156	40.1873036694444	-105.1271548777780	1541.373
ZDV3	-1273624.898	-4711380.292	4094885.865	40.1872532361111	-105.1271678111110	1541.354
ZFW1	-659983.182	-5324060.799	3438276.482	32.8306497083333	-97.0664715833333	155.641
ZFW2	-659988.449	-5324063.359	3438271.490	32.8305963000000	-97.0665240416667	155.614
ZFW3	-659983.479	-5324063.870	3438271.695	32.8305983638889	-97.0664706944444	155.637
ZHU1	-513864.450	-5506451.731	3166720.497	29.9618964361111	-95.3314260277778	10.882
ZHU2	-513867.106	-5506455.137	3166714.332	29.9618318611111	-95.3314501472222	10.955
ZHU3	-513873.378	-5506457.780	3166708.735	29.9617736361111	-95.3315123000000	10.944
ZJX1	772646.467	-5434462.218	3237231.754	30.6988595944444	-81.9081849138889	2.169
ZJX2	772649.790	-5434463.759	3237228.353	30.6988240361111	-81.9081528361111	2.147
ZJX3	772645.732	-5434466.196	3237225.253	30.69879151	-81.90819835	2.148

WRE	X(m)	Y(m)	Z(m)	Latitude	Longitude	H(m)
ZKC1	-415247.493	-4954556.407	3982161.145	38.8801595222222	-94.7908335416667	305.928
ZKC2	-415231.100	-4954557.730	3982161.193	38.8801601472222	-94.7906440166667	305.919
ZKC3	-415237.228	-4954561.073	3982155.998	38.8801019916667	-94.7907111722222	305.650
ZLA1	-2474409.917	-4637294.672	3602183.535	34.6035182555556	-118.0838950750000	763.522
ZLA2	-2474404.637	-4637297.476	3602183.556	34.6035184694444	-118.0838299083330	763.524
ZLA3	-2474411.252	-4637297.167	3602179.580	34.6034744277778	-118.0838951111110	763.605
ZLC1	-1808273.204	-4486410.844	4145303.053	40.7860434277778	-111.9521773500000	1287.467
ZLC2	-1808274.590	-4486414.443	4145298.561	40.7859901277778	-111.9521766416670	1287.452
ZLC3	-1808270.383	-4486416.144	4145298.541	40.7859899638889	-111.9521228888890	1287.443
ZMA1	966042.318	-5662999.851	2761581.515	25.8246122055556	-80.3191896666667	-7.553
ZMA2	966029.344	-5662999.143	2761585.996	25.8246599361111	-80.3193160333333	-8.193
ZMA3	966037.423	-5662997.982	2761586.348	25.8246619555556	-80.3192346583333	-7.847
ZME1	4070.921	-5226189.310	3644028.439	35.0673941638889	-89.9553696722222	68.623
ZME2	4070.945	-5226186.764	3644032.551	35.0674376833333	-89.9553693861111	68.902
ZME3	4064.752	-5226186.642	3644032.717	35.0674395666667	-89.9554372805556	68.893
ZMP1	-249978.358	-4539297.527	4458955.076	44.6374632555556	-93.1520851694444	262.690
ZMP2	-249972.558	-4539297.863	4458955.072	44.6374631250000	-93.1520119500000	262.699
ZMP3	-249973.661	-4539302.138	4458950.596	44.6374070944444	-93.1520228666667	262.634
ZNY1	1406144.655	-4627343.991	4144322.063	40.7843285500000	-73.0971654861111	6.463
ZNY2	1406146.452	-4627347.030	4144317.286	40.7842758000000	-73.0971555833333	5.940
ZNY3	1406140.898	-4627348.687	4144317.324	40.7842762333333	-73.0972242472222	5.942
ZOA1	-2684436.849	-4293337.452	3865351.868	37.5430537638889	-122.0159472888890	-3.477
ZOA2	-2684433.840	-4293341.513	3865349.436	37.5430262416667	-122.0158940583330	-3.493
ZOA3	-2684438.219	-4293342.427	3865345.591	37.5429817722222	-122.0159305888890	-3.381
ZOB1	650770.212	-4754715.680	4187420.763	41.2971544666667	-82.2064444111111	223.698
ZOB2	650777.883	-4754714.850	4187422.775	41.2971667833333	-82.2063523277778	225.190
ZOB3	650776.215	-4754719.679	4187414.987	41.2970870138889	-82.2063798777778	223.475
ZSE1	-2308930.254	-3668169.684	4663526.507	47.2869934555556	-122.1883725888890	82.120
ZSE2	-2308934.657	-3668175.242	4663520.095	47.2869077472222	-122.1883827083330	82.190
ZSE3	-2308935.714	-3668179.514	4663516.157	47.2868561055556	-122.1883644500000	82.131
ZSU1	2462589.390	-5529371.537	2003724.624	18.4313386305556	-65.9934749361111	-28.575
ZSU2	2462587.306	-5529377.300	2003711.635	18.4312146833333	-65.9935151500000	-28.492
ZSU3	2462593.940	-5529375.092	2003709.581	18.4311951305556	-65.9934492833333	-28.494
ZTL1	529840.431	-5305248.826	3489342.860	33.3796885750000	-84.2967257277778	261.156
ZTL2	529846.804	-5305247.977	3489343.148	33.3796917916667	-84.2966566750000	261.138
ZTL3	529847.492	-5305251.423	3489337.917	33.3796350611111	-84.2966529972222	261.180

Figure 10-1 WAAS Build 6.097 Software Antenna Positions Deltas from 3/31/12 OPUS Survey

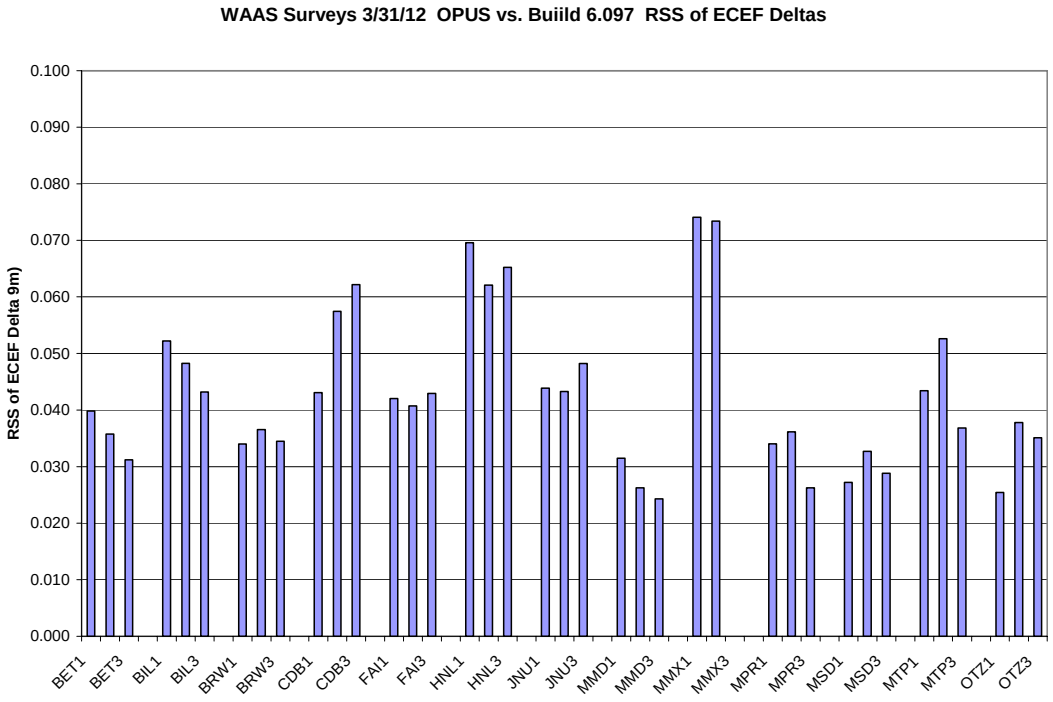


Figure 10-2 WAAS Build 6.097 Software Antenna Positions Deltas from 3/31/12 OPUS Survey

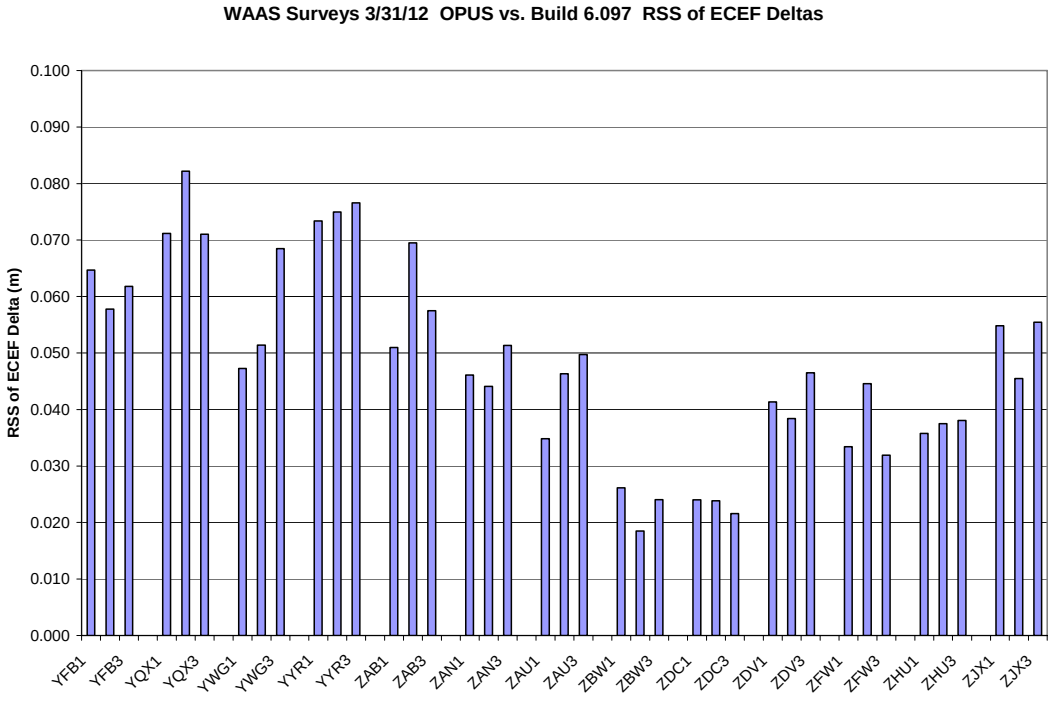


Figure 10-3 WAAS Build 6.097 Software Antenna Positions Deltas from 3/31/12 OPUS Survey

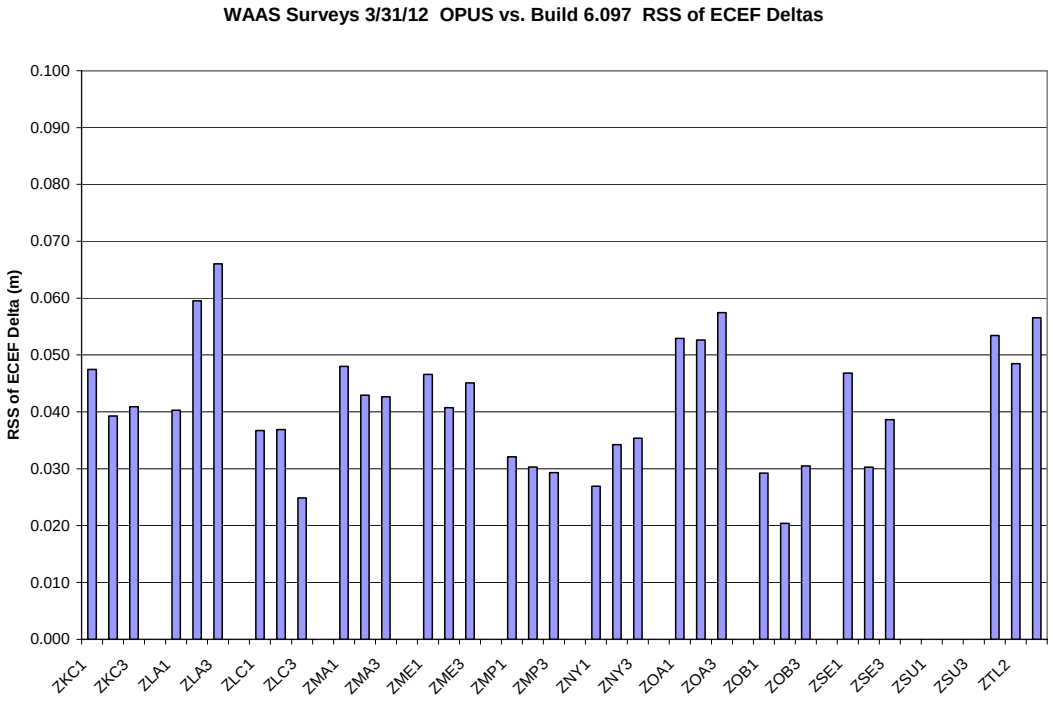


Figure 10-4 3/31/12 OPUS Survey Overall RMS Qualities

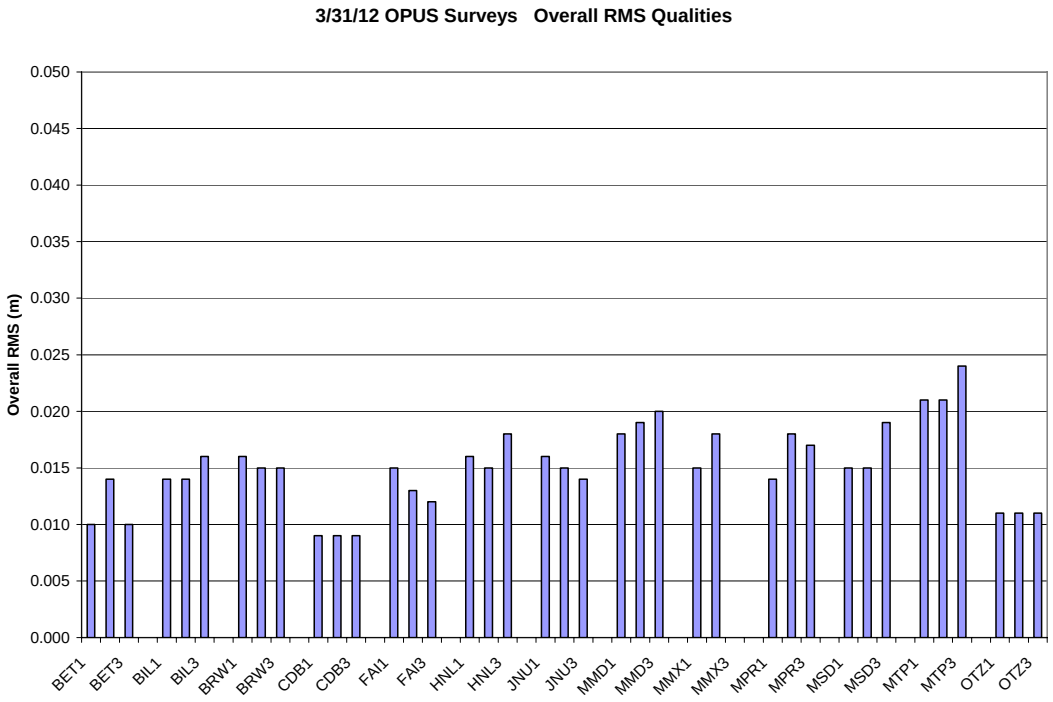


Figure 10-5 3/31/12 OPUS Survey Overall RMS Qualities

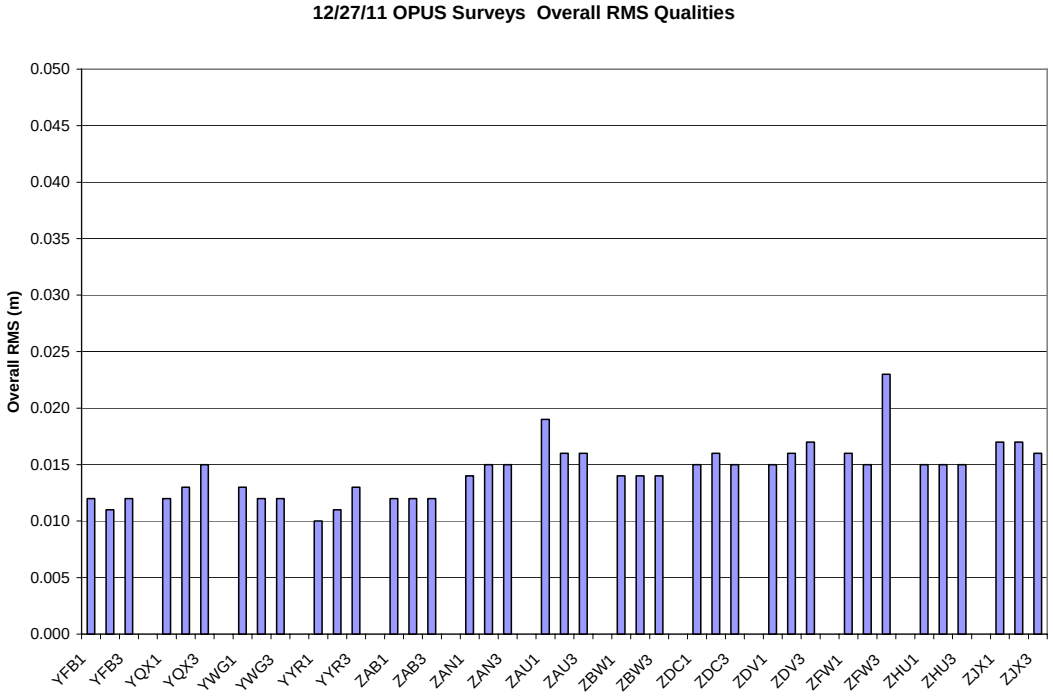


Figure 10-6 3/31/12 OPUS Survey Overall RMS Qualities

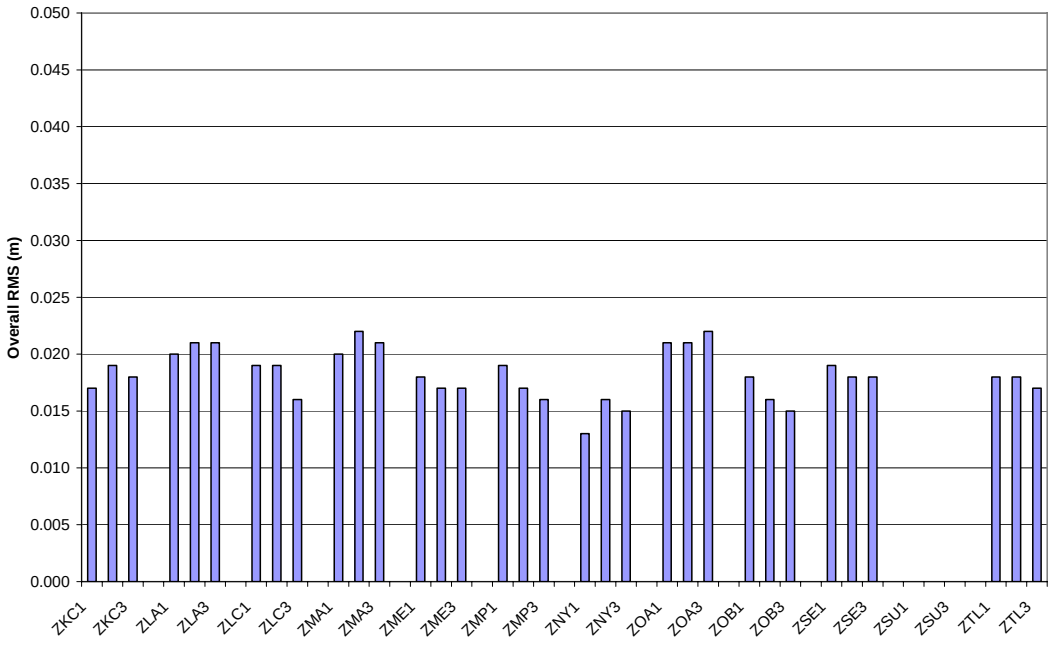


Figure 10-7 3/31/12 OPUS vs. CSRS RSS ECEF Deltas

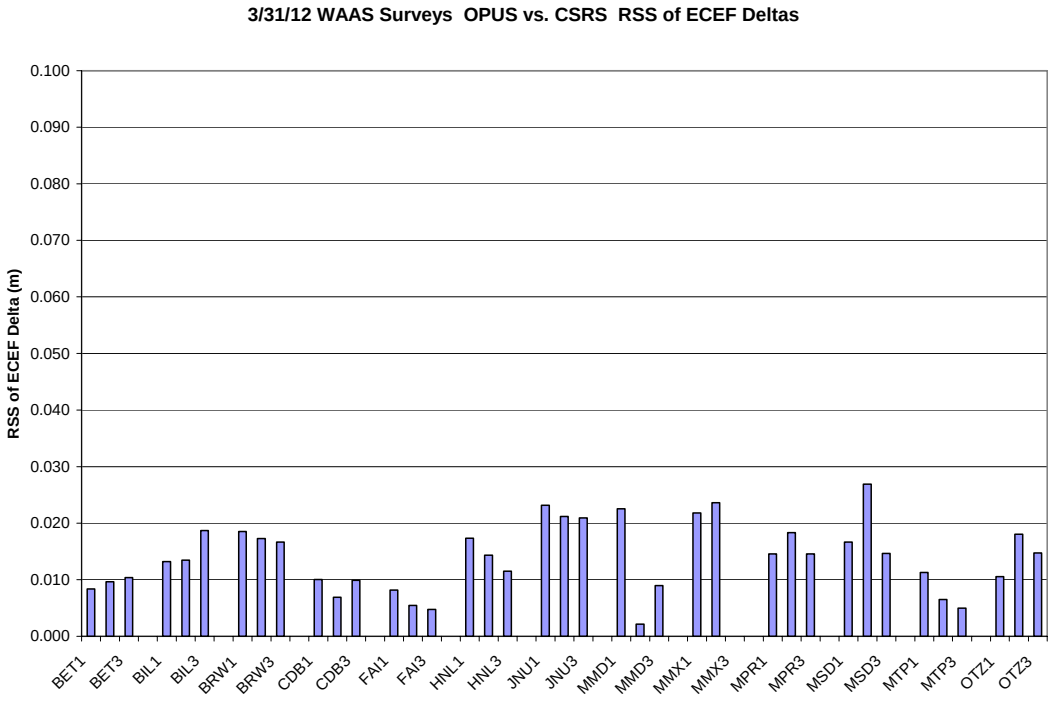


Figure 10-8 3/31/12 OPUS vs. CSRS RSS ECEF Deltas

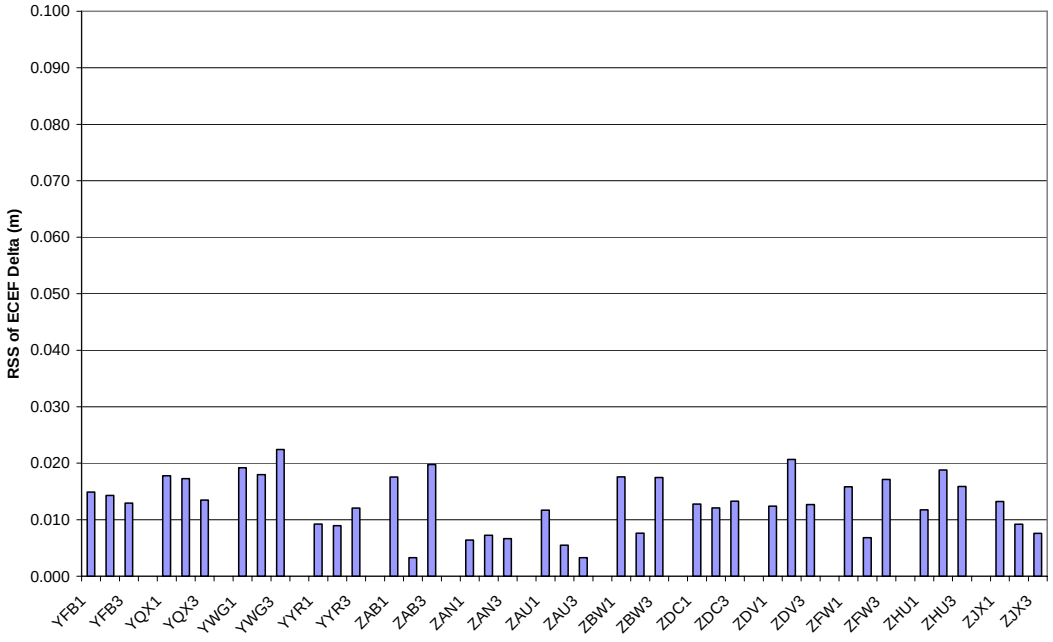


Figure 10-9 3/31/12 OPUS vs. CSRS RSS ECEF Deltas

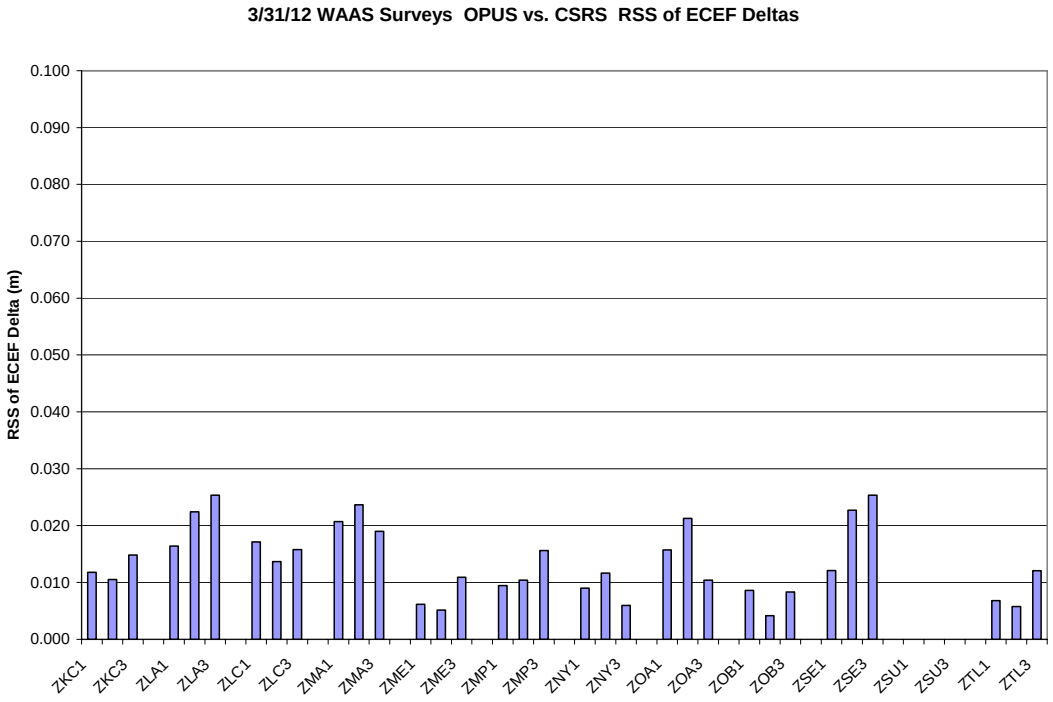


Figure 10-10 3/31/12 CSRS Survey Qualities

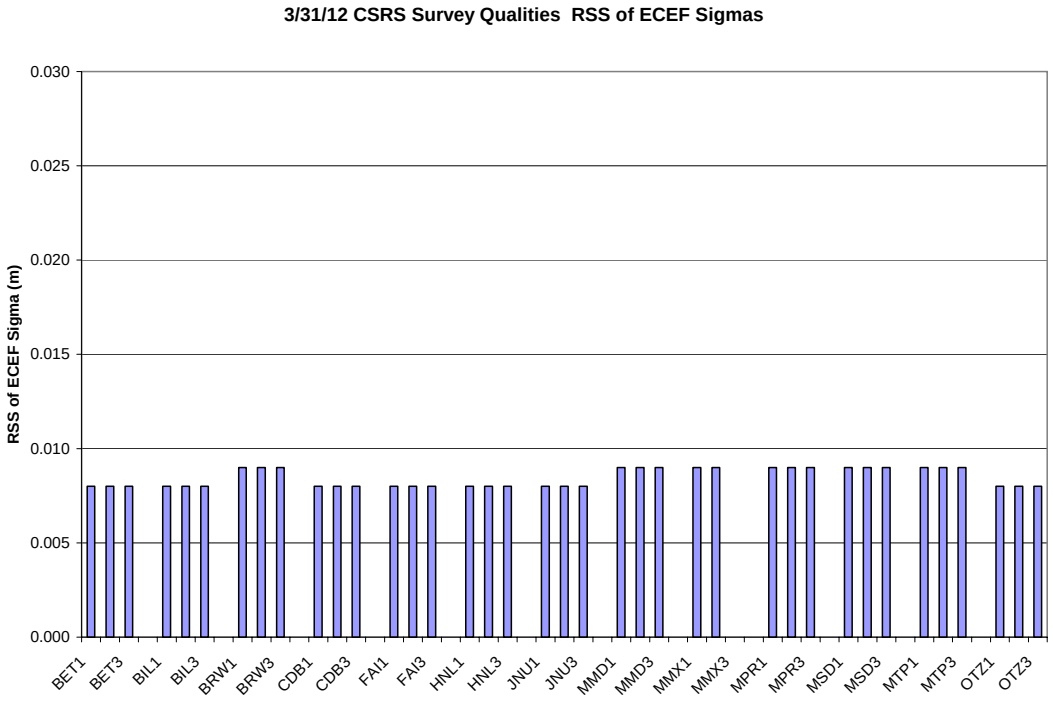


Figure 10-11 3/31/12 CSRS Survey Qualities

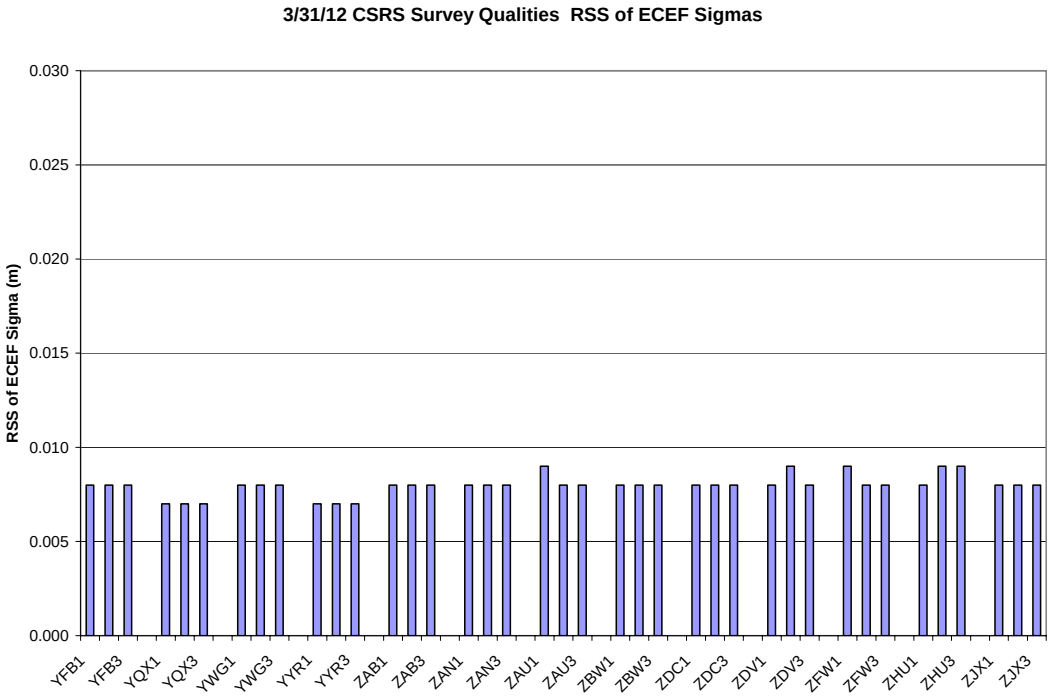
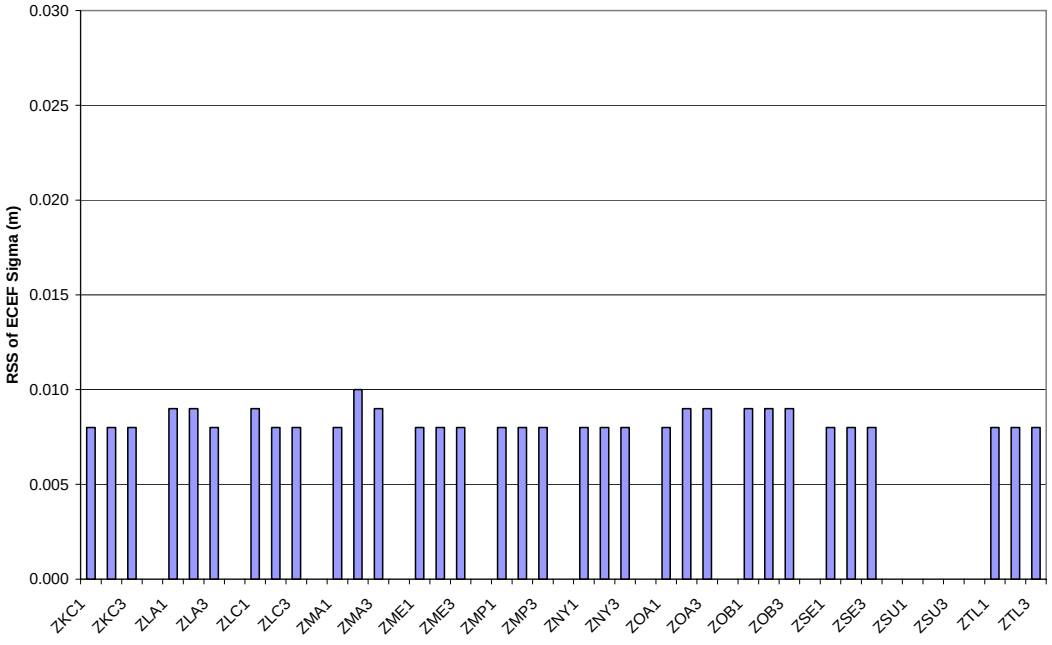


Figure 10-12 3/31/12 CSRS Survey Qualities



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.

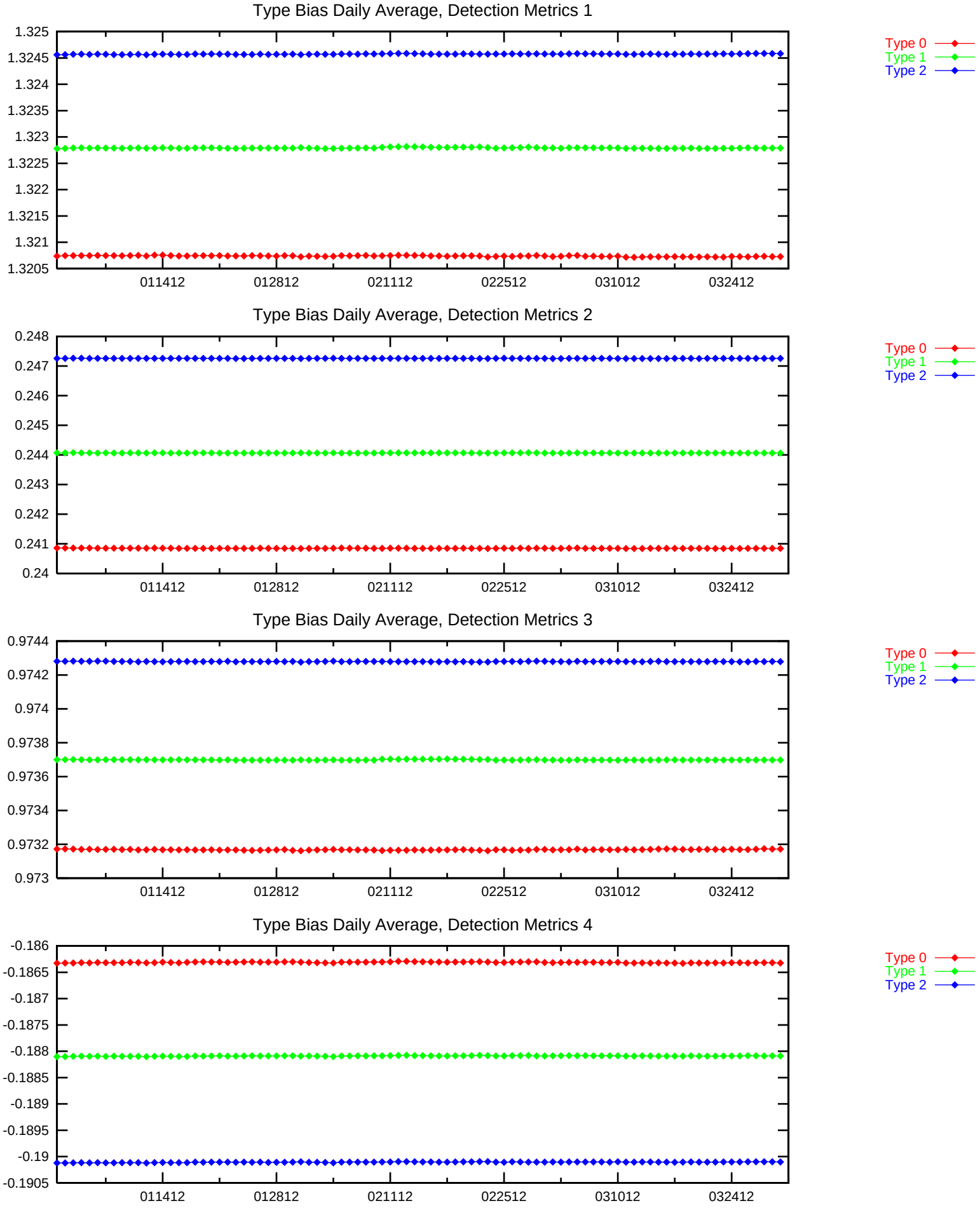
Table 11-2 Type Bias Average for the Quarter

Detection Metric	Type 0	Type 1	Type 2
DM 1	1.32074000	1.32279000	1.32457000
DM 2	0.24084700	0.24406500	0.24725600
DM 3	0.97316800	0.97369900	0.97427900
DM 4	-0.18631300	-0.18809000	-0.19010600

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

Detection Metric	Type 0	Type 1	Type 2
DM 1	1.32096000	1.32290000	1.32461000
DM 2	0.24084500	0.24410200	0.24728200
DM 3	0.97317500	0.97371200	0.97427700
DM 4	-0.18618100	-0.18806100	-0.19009300

Figure 11-1 PRN 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. Figure 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 0.00102095. The maximum average for DM2 is PRN 25 at 0.00025039. The maximum average for DM3 is PRN 10 at 0.00027090 and the maximum average for DM4 is PRN 23 at 0.00043093.

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 average are due to satellite outages. PRN 24 (SVN 24) went offline on 9/30/2011. PRN 26 (SVN 26) went offline from 2/9/2012 to 2/23/2012.

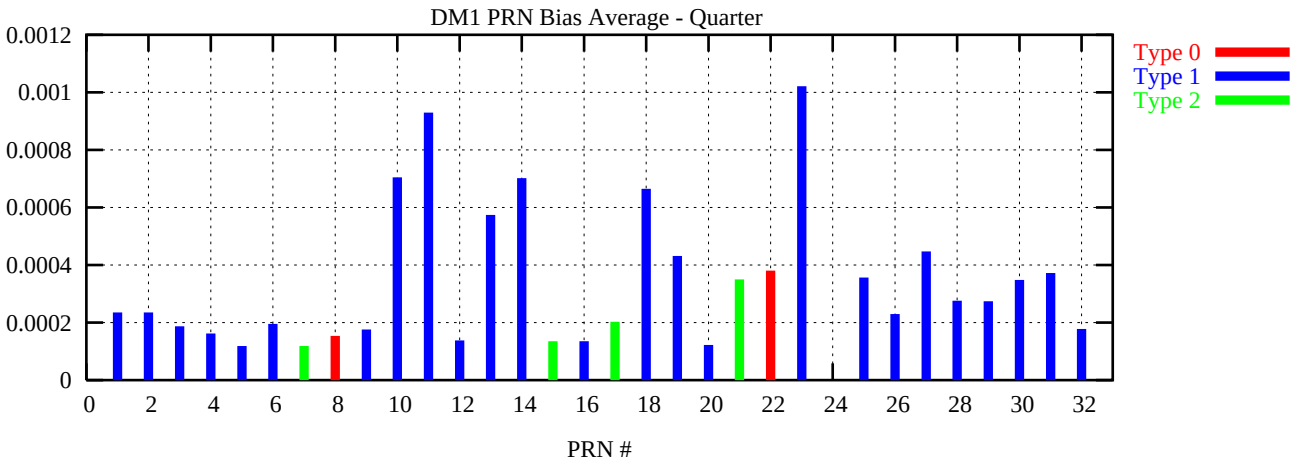
Table 11-4 PRN Bias Average for the Quarter

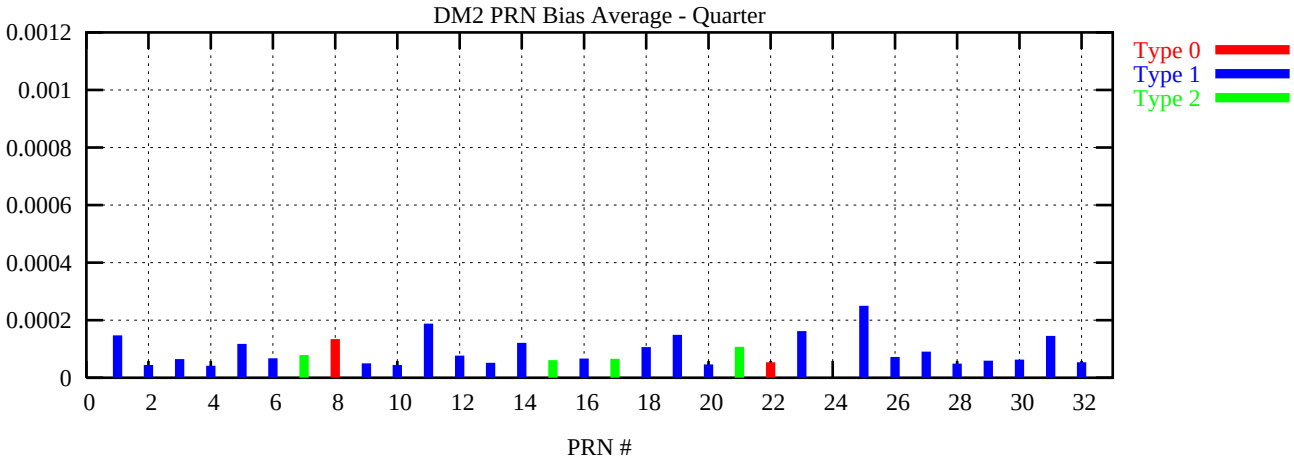
PRN	SVN	DM1	DM2	DM3	DM4
1	63	0.00023523	0.00014723	0.00008609	0.00009703
2	61	0.00023557	0.00004448	0.00003255	0.00009761
3	33	0.00018694	0.00006512	0.00010249	0.00033343
4	34	0.00016216	0.00004172	0.00005584	0.00010944
5	50	0.00011809	0.00011724	0.00005546	0.00010304
6	36	0.00019512	0.00006745	0.00005911	0.00010472
7	34	0.00011881	0.00007884	0.00003028	0.00012973
8	38	0.00015326	0.00013469	0.00003879	0.00009651
9	39	0.00017571	0.00004974	0.00006251	0.00010670
10	40	0.00070442	0.00004417	0.00027090	0.00009552
11	46	0.00092920	0.00018810	0.00006191	0.00026122
12	58	0.00013813	0.00007693	0.00008904	0.00007431
13	43	0.00057376	0.00005196	0.00007456	0.00016539
14	41	0.00070185	0.00012116	0.00012093	0.00013476
15	55	0.00013493	0.00006121	0.00002870	0.00015060
16	56	0.00013547	0.00006702	0.00011707	0.00032956
17	53	0.00020287	0.00006563	0.00005105	0.00014635
18	54	0.00066514	0.00010662	0.00004895	0.00023568
19	59	0.00043107	0.00014899	0.00004338	0.00009093
20	51	0.00012217	0.00004607	0.00003847	0.00014492
21	45	0.00034974	0.00010731	0.00016243	0.00010504
22	47	0.00038067	0.00005395	0.00009185	0.00033317
23	60	0.00102095	0.00016195	0.00003883	0.00043093
24	24				
25	62	0.00035693	0.00025039	0.00005761	0.00011795
26	26	0.00022983	0.00007180	0.00013661	0.00009658
27	27	0.00044703	0.00009084	0.00005689	0.00033372
28	44	0.00027601	0.00004878	0.00003404	0.00009343
29	57	0.00027409	0.00005968	0.00009544	0.00031224
30	30	0.00034845	0.00006275	0.00013190	0.00010889
31	52	0.00037201	0.00014530	0.00003867	0.00023341
32	23	0.00017817	0.00005391	0.00009369	0.00008557

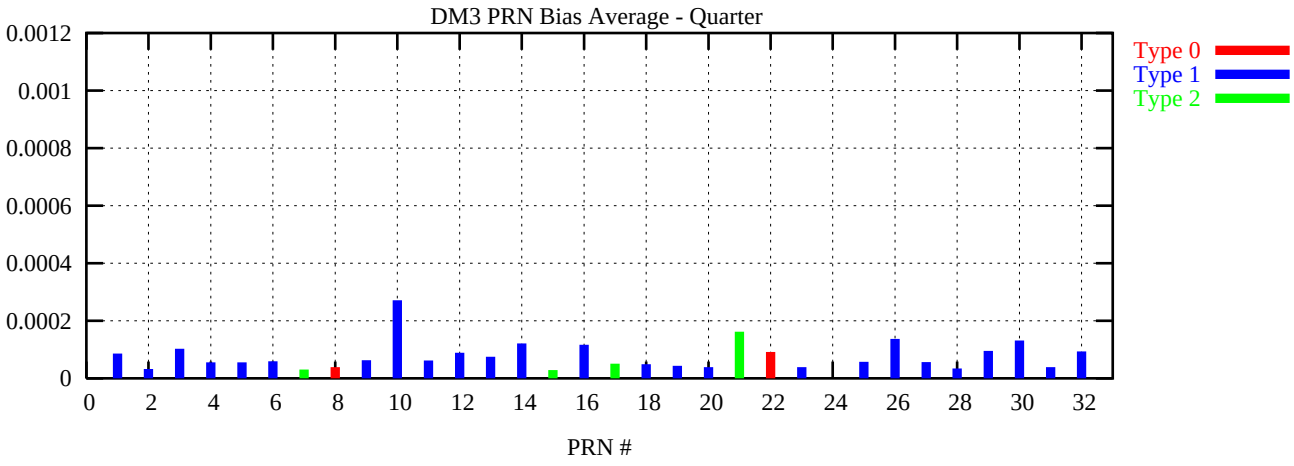
Table 11-5 PRN Bias Average Since January 1, 2008

PRN	SVN	DM1	DM2	DM3	DM4
1	32	0.00020950	0.00011453	0.00008300	0.00009281
2	61	0.00019551	0.00005458	0.00002494	0.00009409
3	33	0.00021239	0.00005901	0.00009275	0.00035262
4	34	0.00022353	0.00004466	0.00007049	0.00012964
5	35	0.0004283	0.0000655	0.0001190	0.0001572
5	50	0.00022278	0.00011053	0.00007784	0.00011590
6	36	0.00016162	0.00005834	0.00004874	0.00012613
7	34	0.00013128	0.00008786	0.00003488	0.00012366
8	38	0.00016340	0.00012848	0.00004387	0.00010131
9	39	0.00020863	0.00005286	0.00006738	0.00010985
10	40	0.00067849	0.00006267	0.00026999	0.00009673
11	46	0.00090691	0.00018397	0.00005668	0.00024196
12	58	0.00021158	0.00008449	0.00010186	0.00007997
13	43	0.00052382	0.00005474	0.00006383	0.00015804
14	41	0.00065572	0.00012016	0.00011332	0.00012533
15	55	0.00012539	0.00006623	0.00002770	0.00013496
16	56	0.00016042	0.00007307	0.00011199	0.00034108
17	53	0.00014483	0.00007429	0.00003770	0.00012676
18	54	0.00062228	0.00010497	0.00004215	0.00021683
19	59	0.00039093	0.00013874	0.00003709	0.00008510
20	51	0.00015192	0.00004786	0.00003864	0.00013822
21	45	0.00058332	0.00017604	0.00019684	0.00009291
22	47	0.00023275	0.00008102	0.00009679	0.00018609
23	60	0.00097072	0.00014841	0.00003596	0.00042474
24	24	0.00029732	0.00004919	0.00003560	0.00010768
25	25	0.0001583	0.0001133	0.0000814	0.0003055
25	62	0.00025680	0.00016666	0.00007623	0.00021779
26	26	0.00026387	0.00008564	0.00014964	0.00009037
27	27	0.00047309	0.00008380	0.00006326	0.00032994
28	44	0.00025047	0.00005313	0.00003357	0.00009186
29	57	0.00023471	0.00006446	0.00010341	0.00029097
30	30	0.00031137	0.00009031	0.00004342	0.00011648
31	52	0.00044919	0.00015421	0.00003834	0.00025288
32	23	0.00026619	0.00005056	0.00010724	0.00009592

Figure 11-2 PRN Bias Average for the Quarter







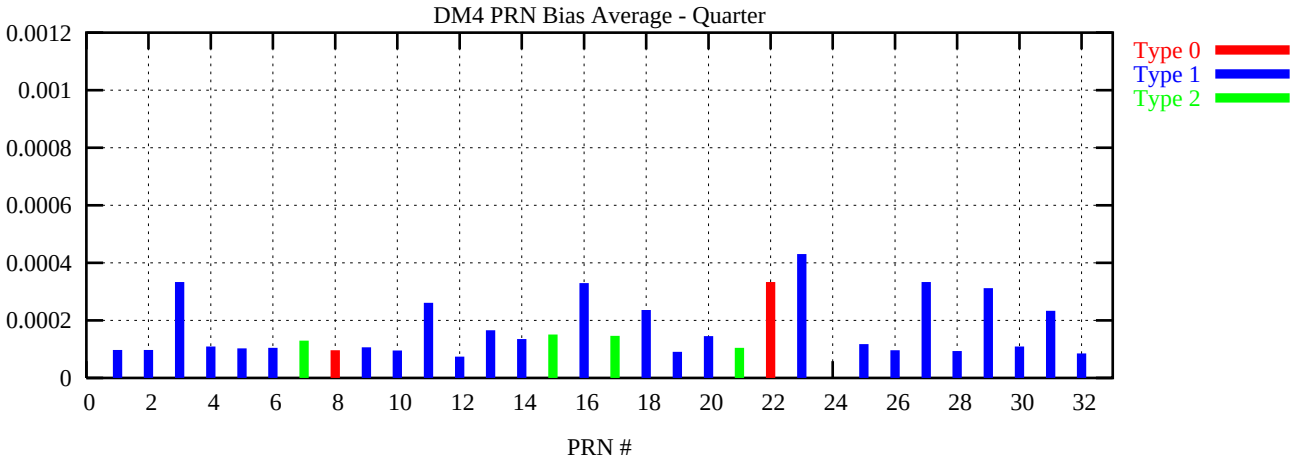


Figure 11-3 PRN Bias Average Trend (PRN 1 - PRN 4)

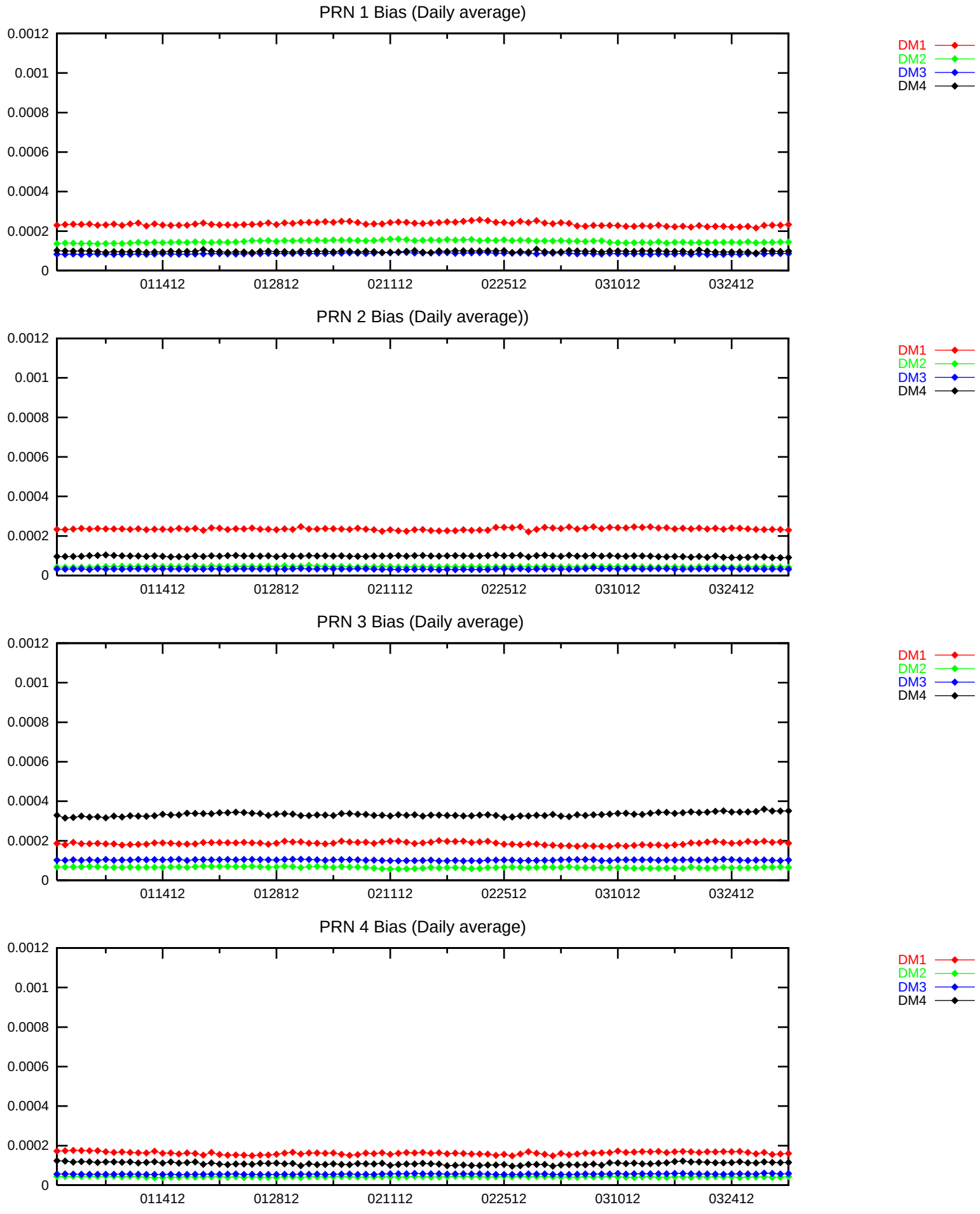


Figure 11-4 PRN Bias Average Trend (PRN 5 - PRN 8)

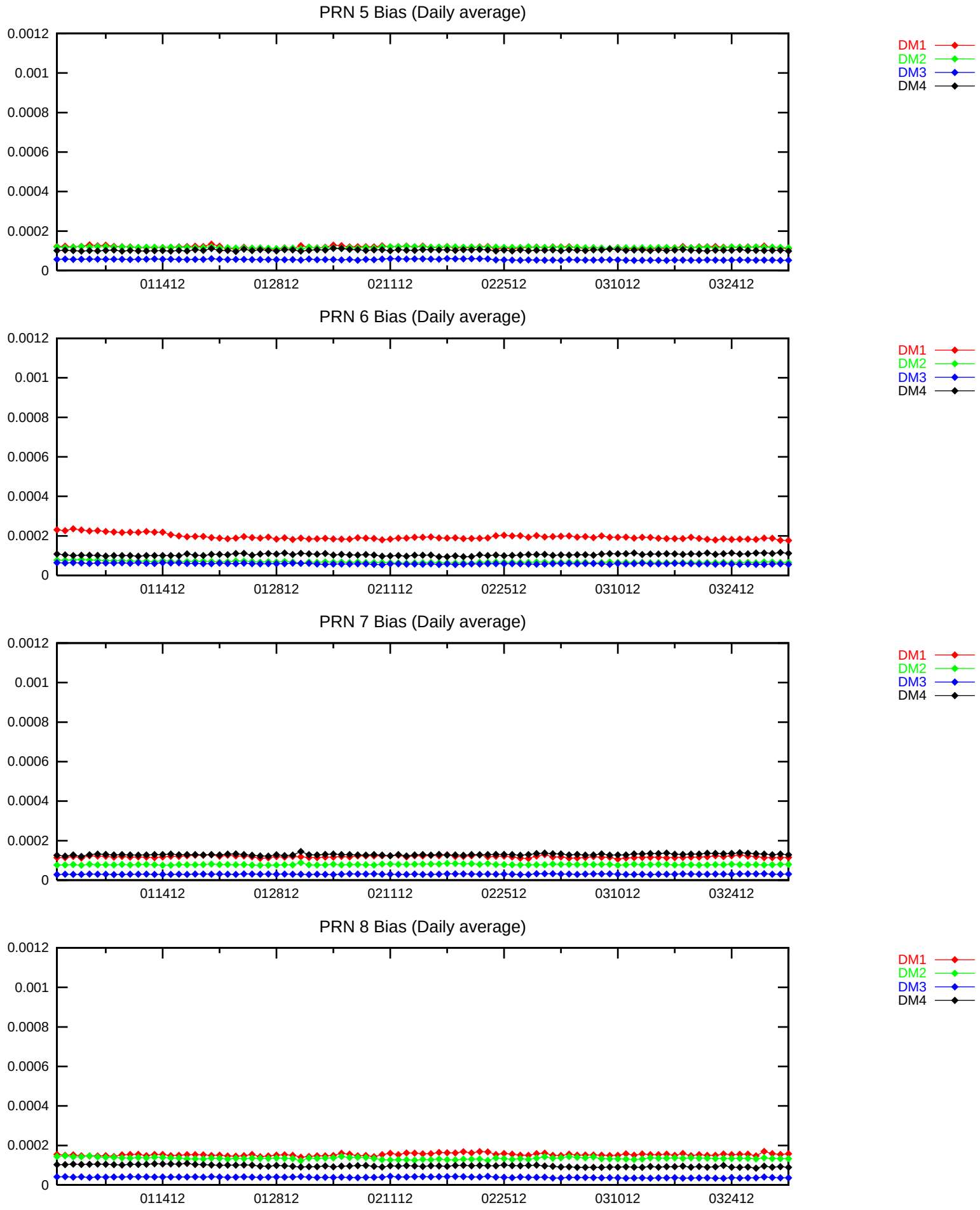


Figure 11-5 PRN Bias Average Trend (PRN 9 - PRN 12)

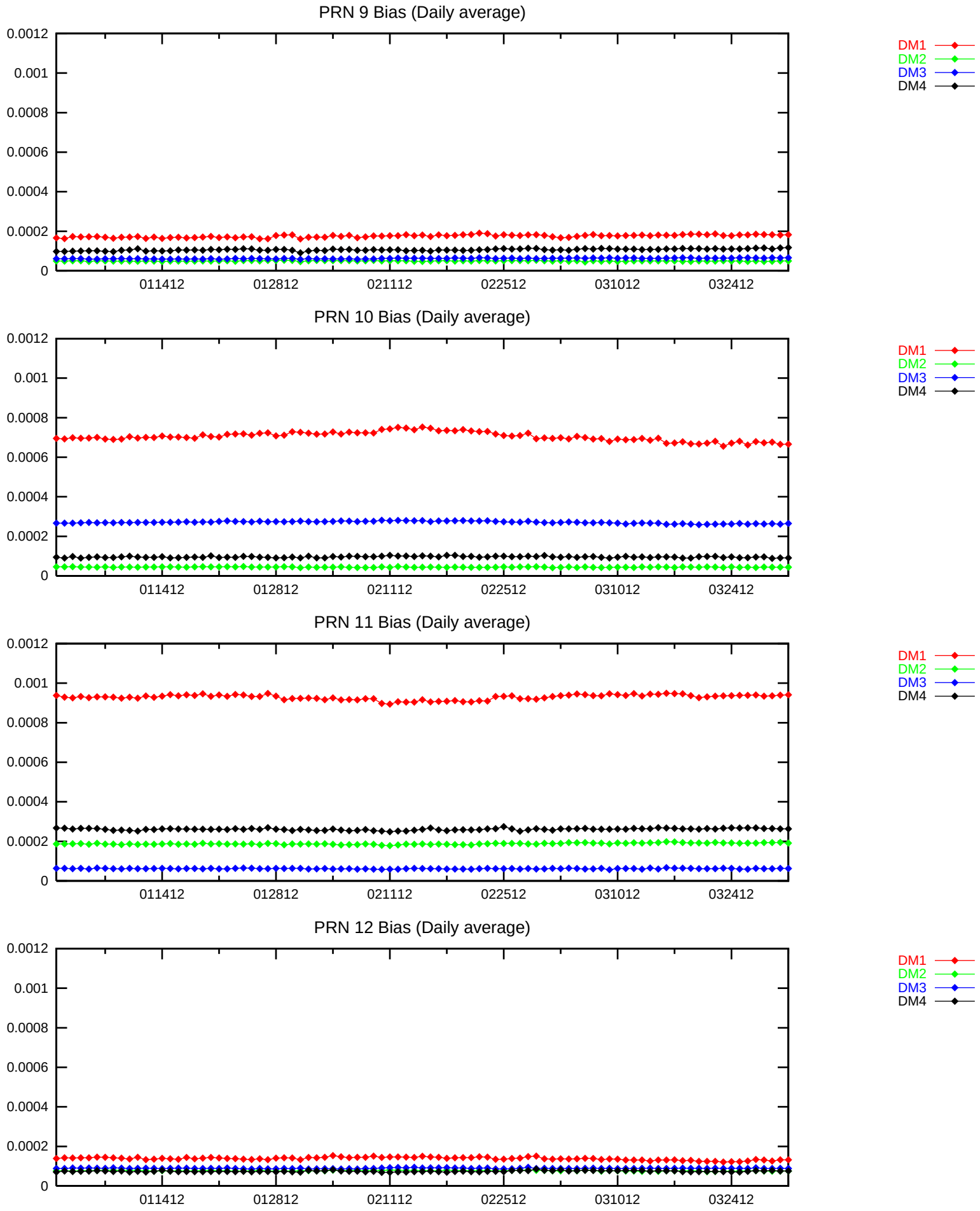


Figure 11-6 PRN Bias Average Trend (PRN 13 - PRN 16)

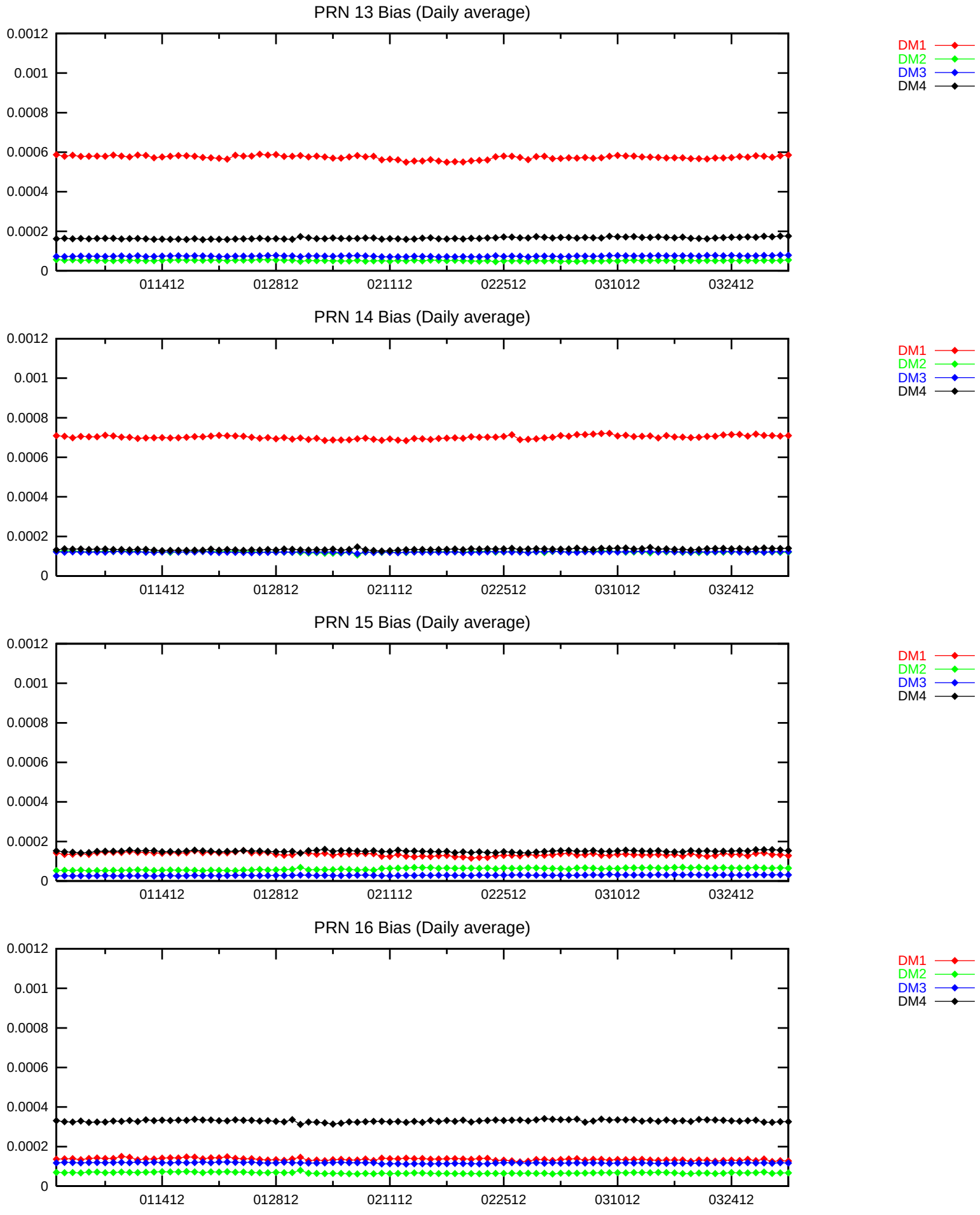


Figure 11-7 PRN Bias Average Trend (PRN 17 - PRN 20)

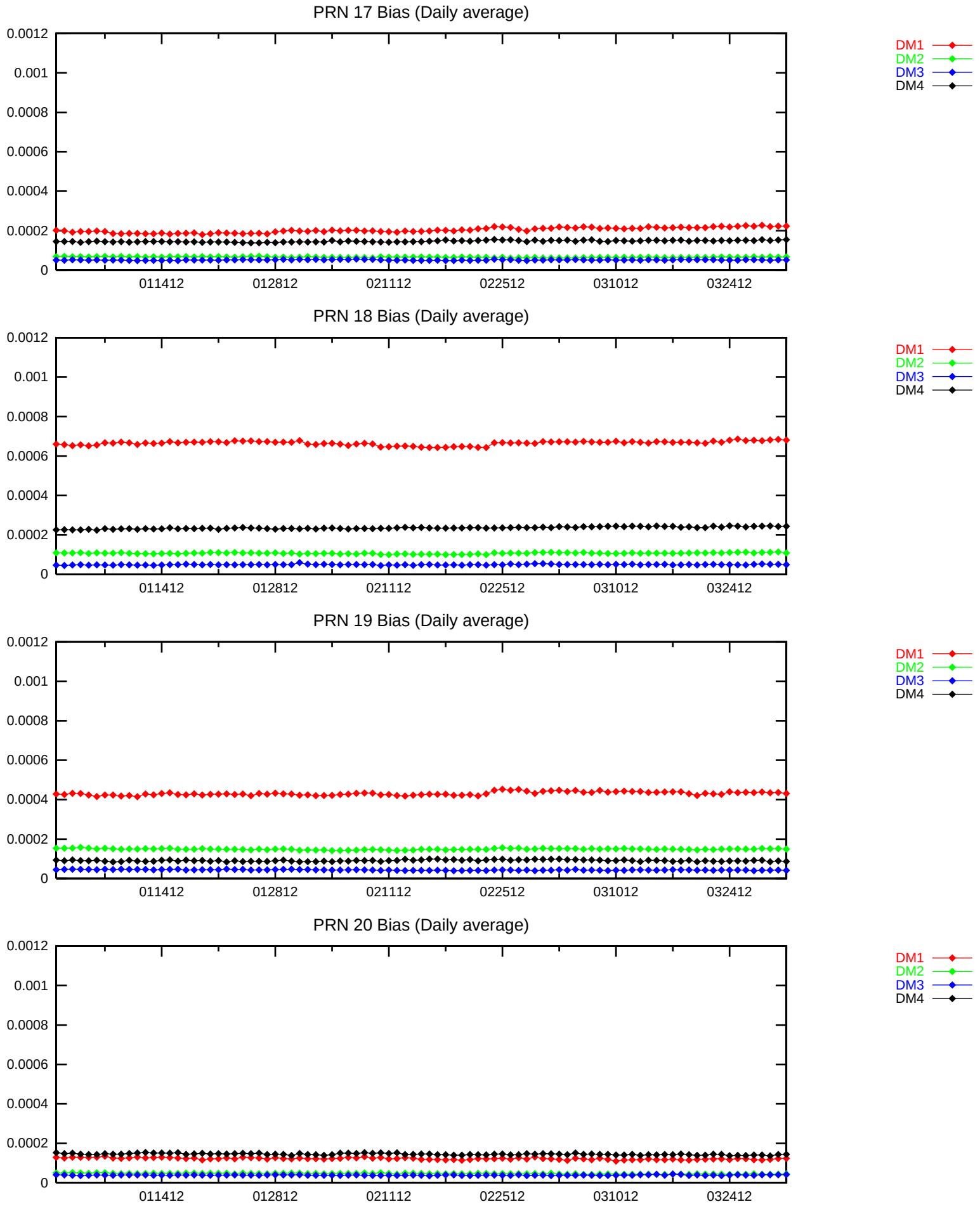


Figure 11-8 PRN Bias Average Trend (PRN 21 - PRN 24)

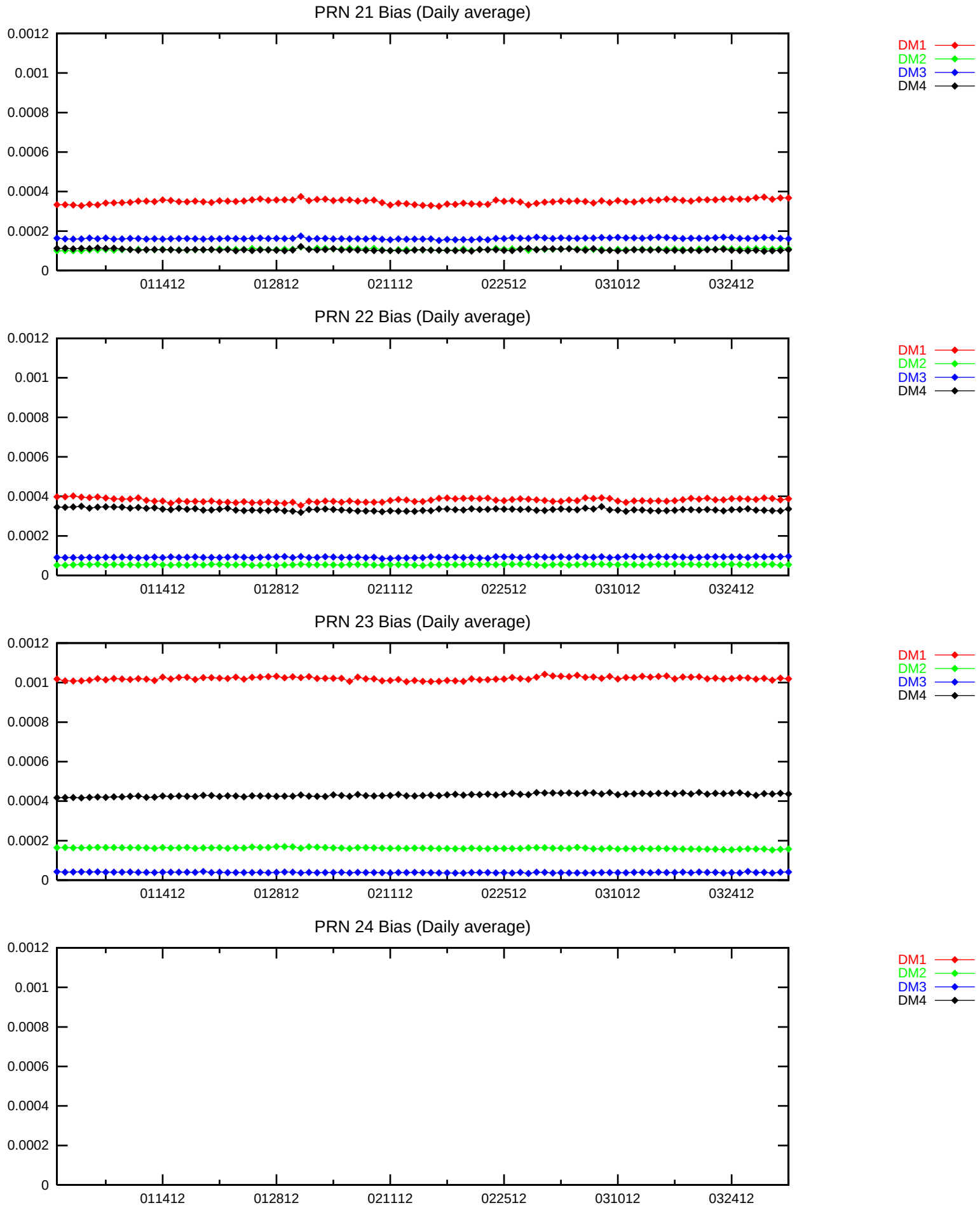


Figure 11-9 PRN Bias Average Trend (PRN 25 - PRN 28)

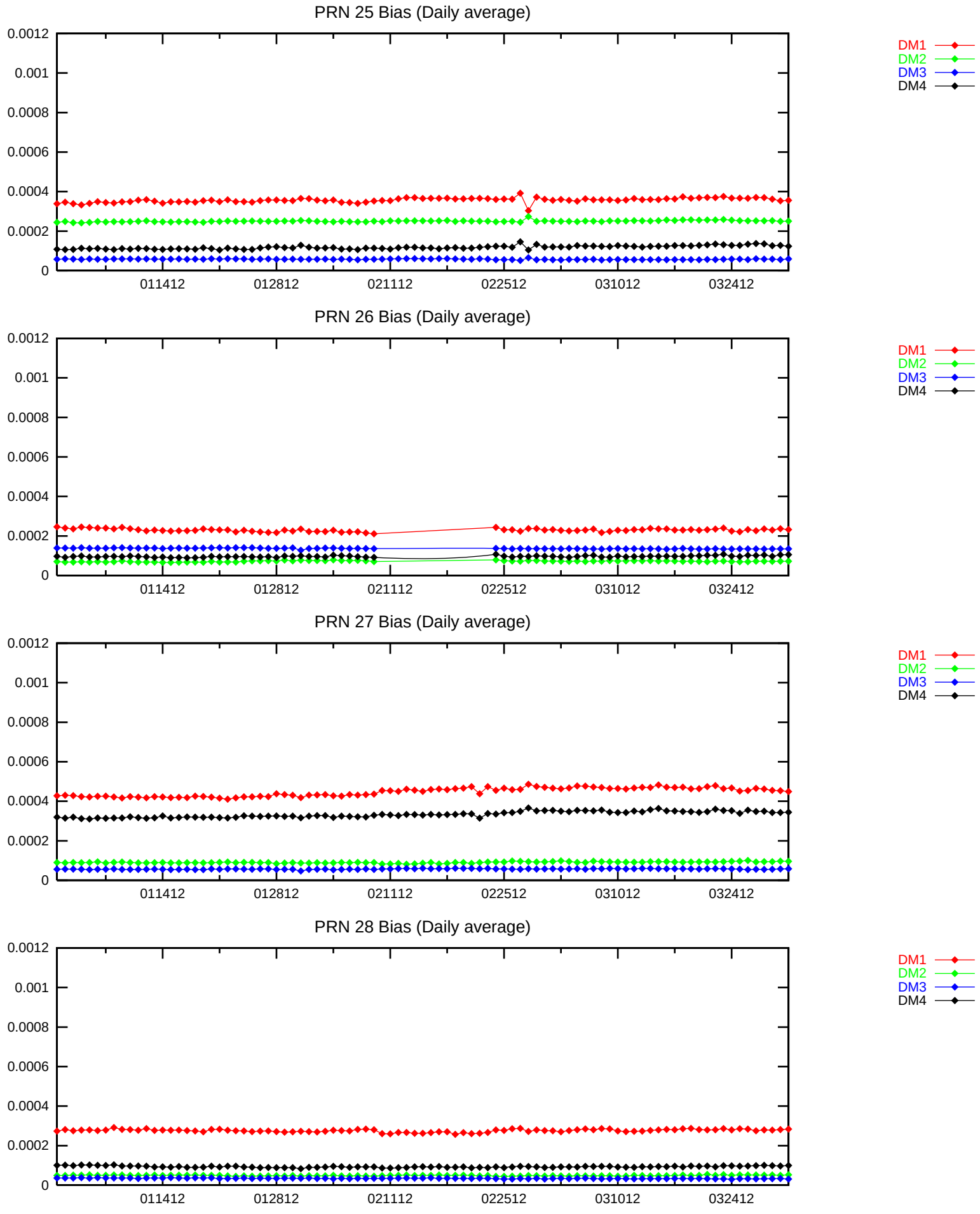
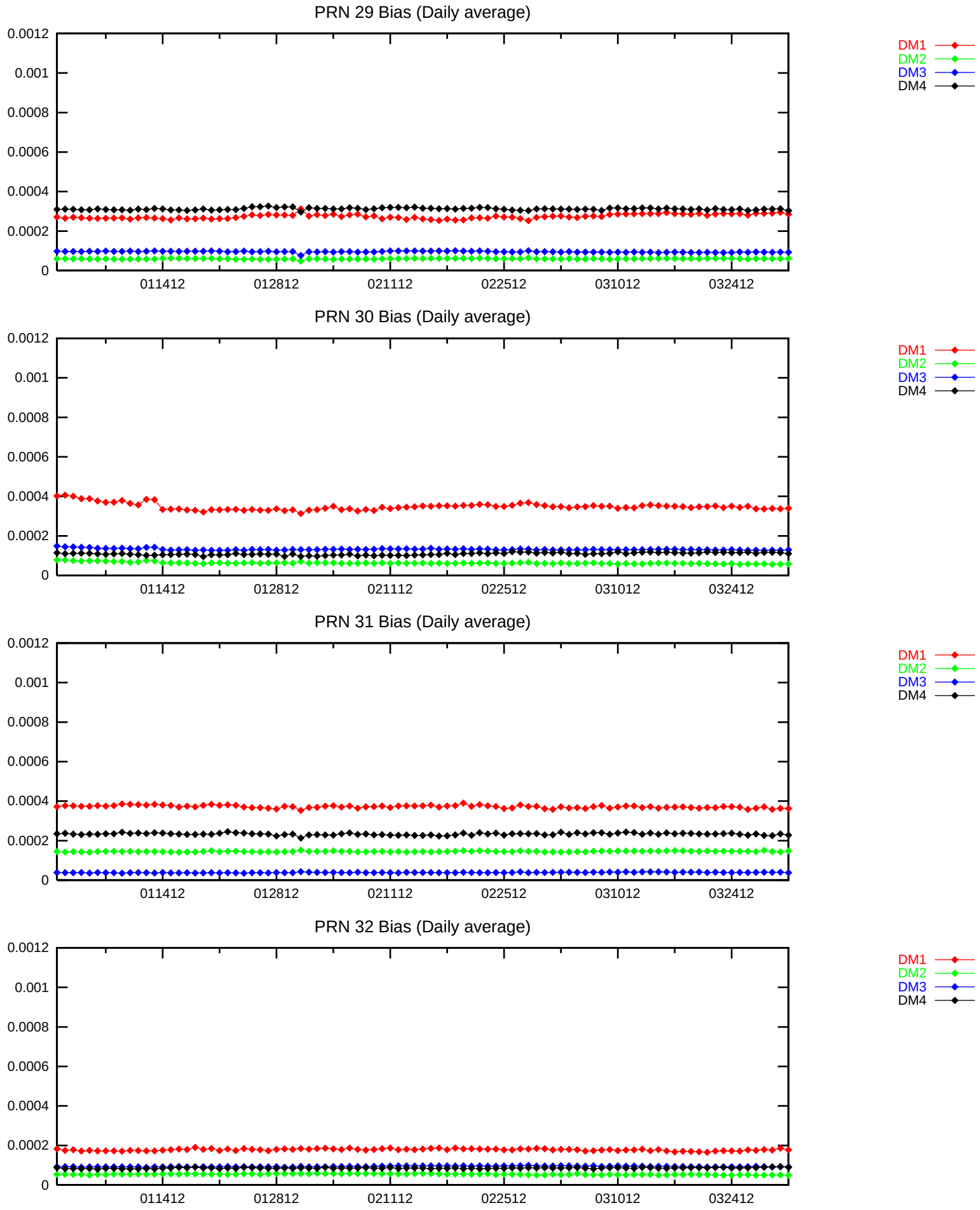


Figure 11-10 PRN Bias Average Trend (PRN 29 - PRN 32)



11.4 SQM Trips

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

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 Precision 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.

Navigation Message. Message structure designed to carry navigation data.

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

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

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

RFI. Radio Frequency Interference.

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

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

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

SV. Space Vehicle.

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

Vertical Alert Limit (VAL). The Vertical Alert Limit is half the length of a segment on the vertical axis (perpendicular to the horizontal plane of WGS-84 ellipsoid), with its center being at the true position, which describes the region that is required to contain the indicated vertical position with a probability of $1\text{-}10^{-7}$ 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 for the Quarter

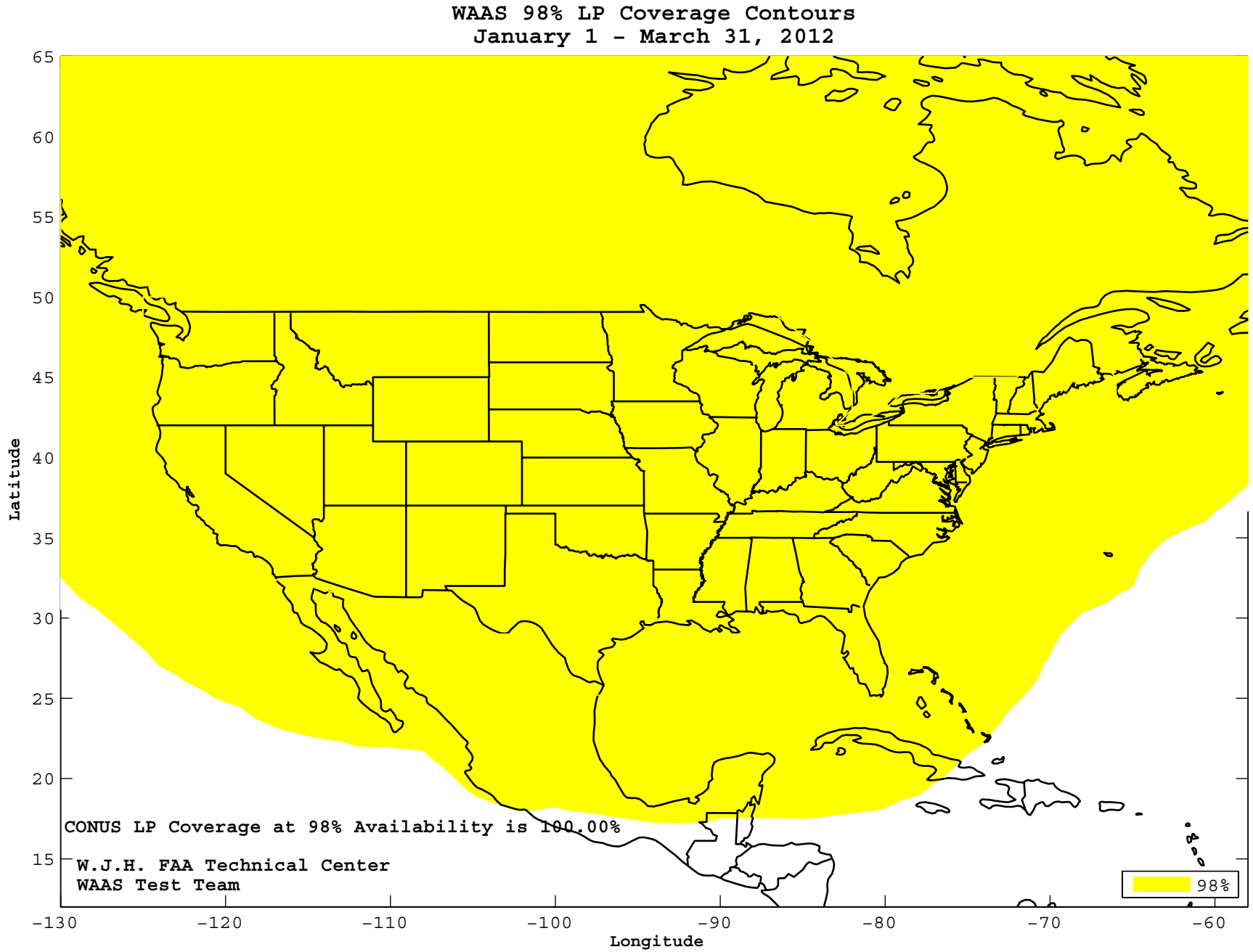


Figure B-2 98% Alaska LP Availability Contour for the Quarter

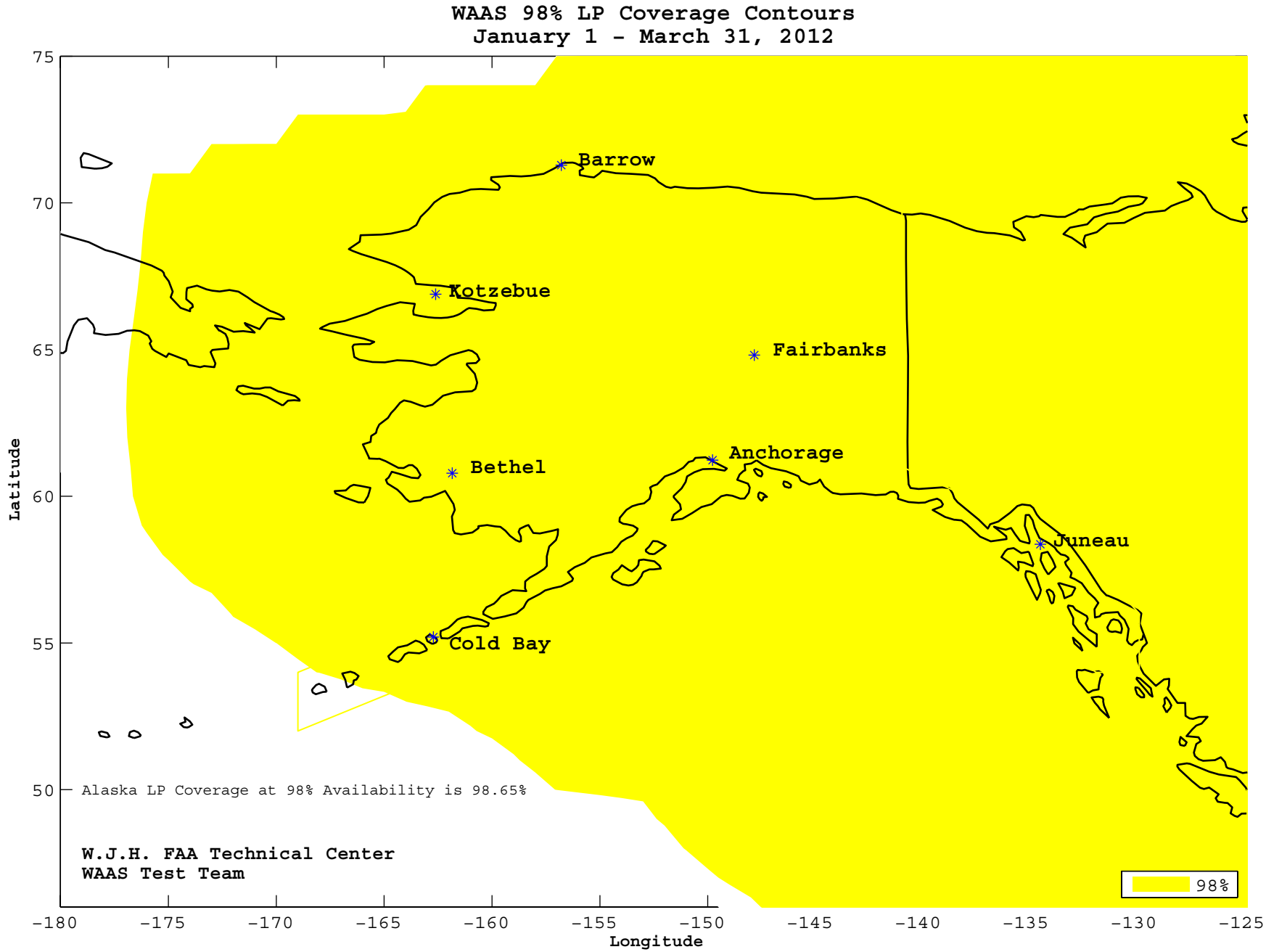


Figure B-3 98% CONUS LPV Availability Contour for the Quarter

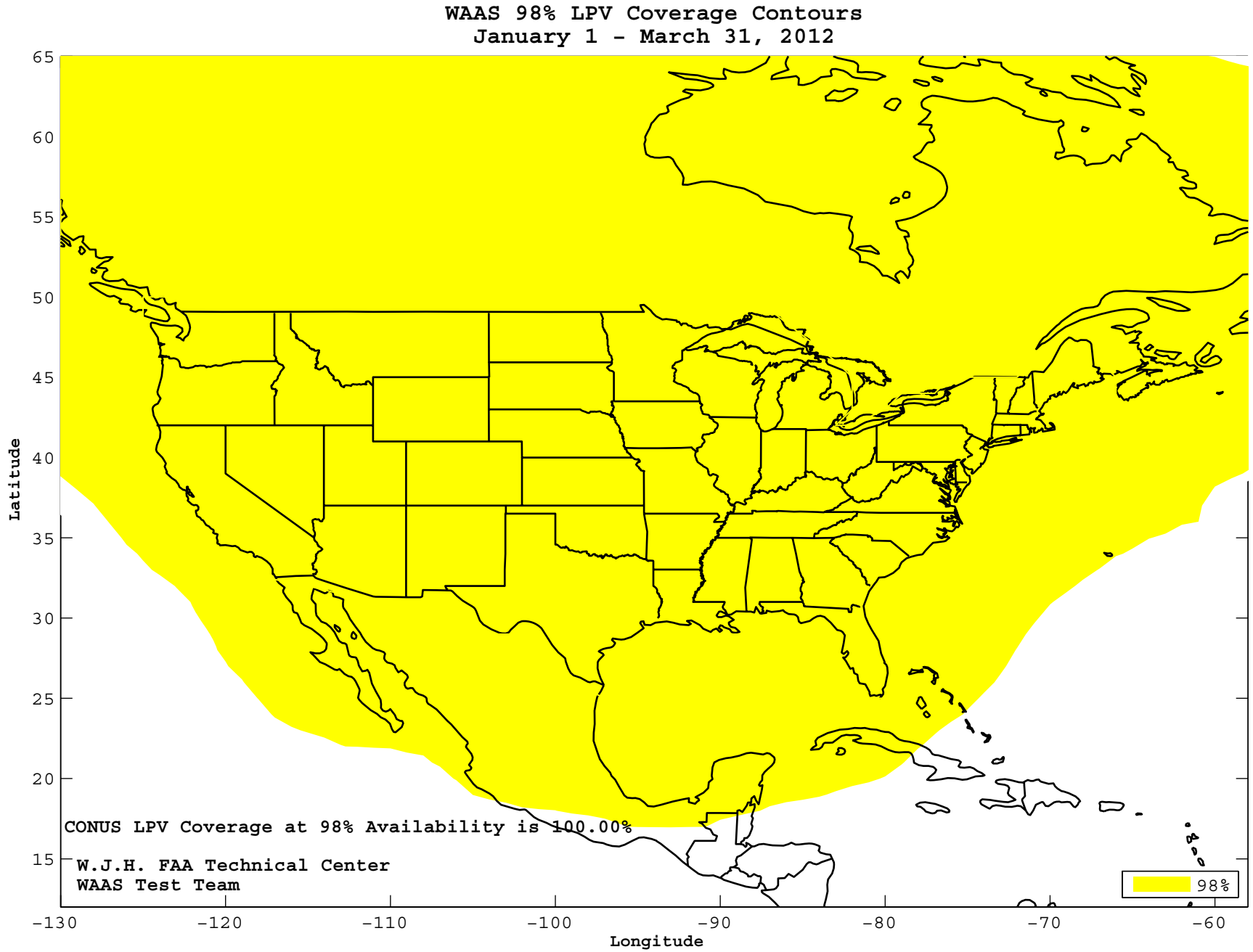


Figure B-4 98% Alaska LPV Availability Contour for the Quarter

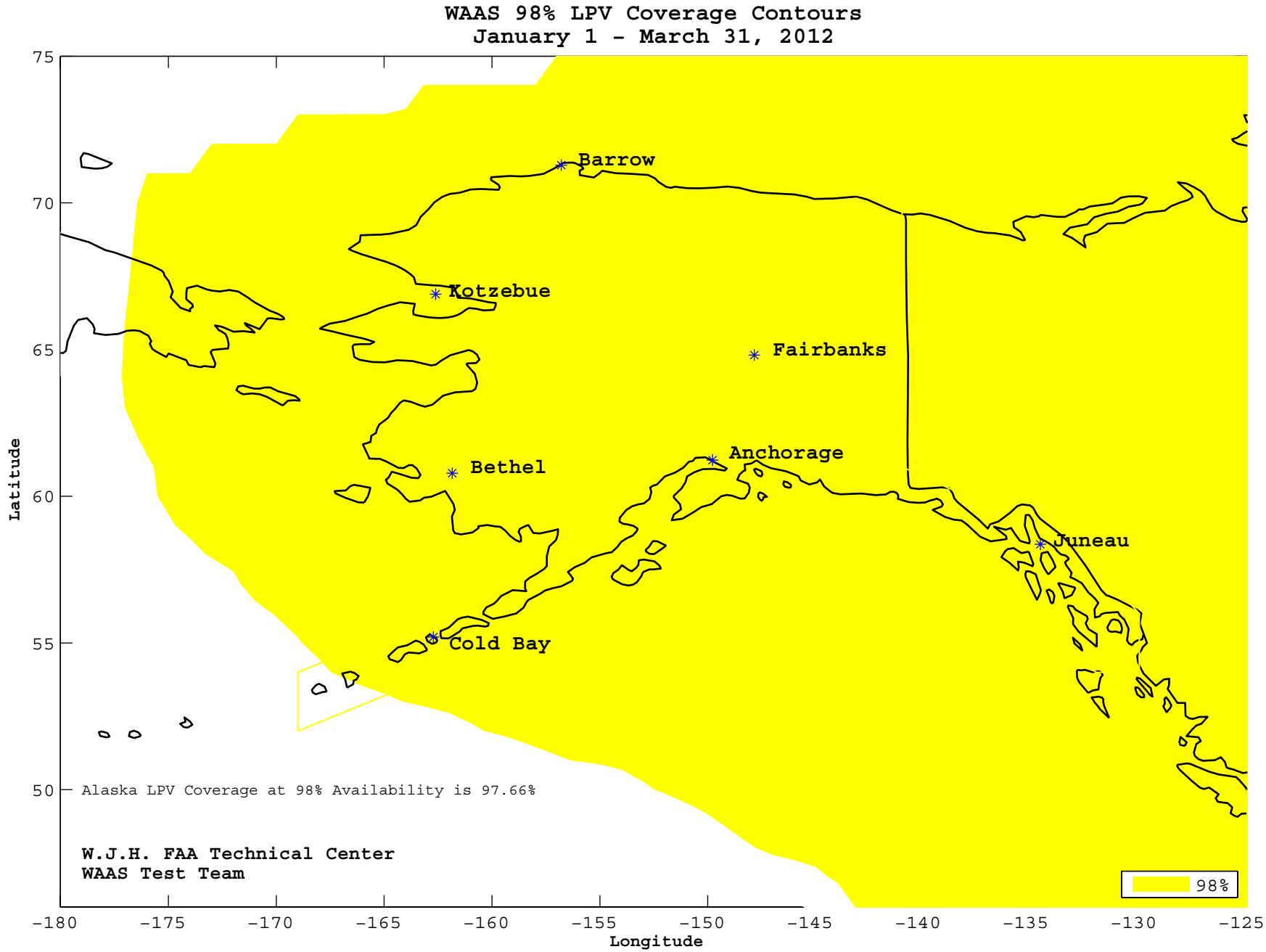


Figure B-5 99% CONUS LPV 200 Availability Contour for the Quarter

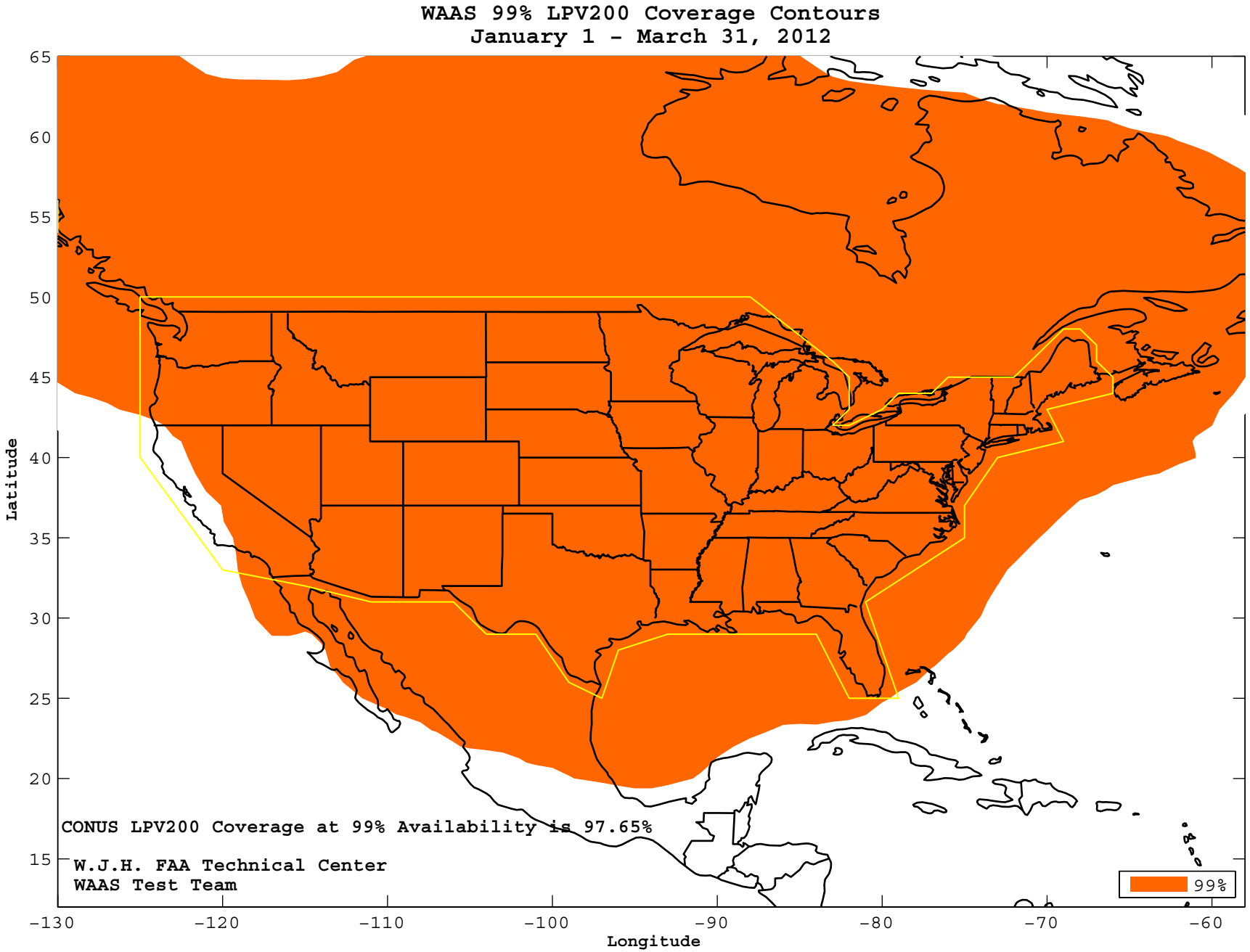


Figure B-6 99% Alaska LPV 200 Availability Contour for the Quarter