

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

**Report #42**

**Reporting Period: July 1 to September 30, 2012**

**October 2012**

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**Executive Summary**

Since 1999 the WAAS Test Team at the William J. Hughes Technical Center has reported GPS performance as measured against the GPS Standard Positioning Service (SPS) Signal Specification. These quarterly reports are known as the 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, #42, covers WAAS performance during the period from July 1, 2012 to September 30, 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. The NSTB sites, Grand Forks and Arcata, are outliers due to receiver quality issues, not the WAAS signal in space quality.

<b>Parameter</b>	<b>CONUS Site/Maximum</b>	<b>CONUS Site/Minimum</b>	<b>Alaska Site/Maximum</b>	<b>Alaska Site/Minimum</b>
95% Horizontal Accuracy (HPL <= 40 meters)	Grand Forks 1.46 meters	Denver 0.504 meters	Fairbanks 0.692 meters	Bethel .579 meters
95% Vertical Accuracy (VPL <= 50 meters)	Grand Forks 1.7 meters	Salt Lake City 0.819 meters	Fairbanks 1.494 meters	Bethel 0.978 meters
LP Availability (HPL <= 40 meters)	Multiple Sites 100%	Bangor 99.95%	Multiple Sites 100%	Cold Bay 99.99%
LPV Availability (HPL <= 40 meters & VPL <= 50 meters)	Multiple Sites100%	Oakland 99.70%	Multiple Sites 100%	Cold Bay 99.98%
LPV 200 Availability (HPL <= 40 meters & VPL <=35 meters)	Multiple Sites 100%	Arcata 97.11%	Anchorage 99.98%	Cold Bay 96.21%
99% HPL	Miami 19.327 meters	Denver 10.816 meters	Cold Bay 29.06 meters	Fairbanks 13.365 meters
99% VPL	Arcata 41.41 meters	Chicago 18.768 meters	Cold Bay 37.76 meters	Juneau 22.93 meters

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**1.0 INTRODUCTION**

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

Objectives of this report are:

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

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

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

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

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

**Table 1-1 WAAS Service Levels**

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

**Table 1-2 PA Evaluation Sites**

	<b>Number of Days Evaluated</b>	<b>Number of Samples</b>
<b>NSTB:</b>		
Arcata	82	7056916
Atlantic City	92	7948040
Grand Forks	89	7685024
Oklahoma City	82	7052458
<b>WAAS:</b>		
Albuquerque	92	7944629
Anchorage	92	7940852
Atlanta	92	7945858
Barrow	92	7944968
Bethel	92	7944441
Billings	92	7946632
Boston	92	7946560
Chicago	92	7946928
Cleveland	92	7943129
Cold Bay	92	7946155
Dallas	92	7946525
Denver	92	7945157
Fairbanks	92	7943942
Gander	92	7942369
Goose Bay	92	7942284
Houston	92	7946099
Iqaluit	92	7946354
Jacksonville	92	7946798
Juneau	92	7941679
Kansas City	92	7939954
Kotzebue	92	7945727
Los Angeles	92	7945427
Memphis	92	7941833
Merida	92	7939590
Mexico City	92	7944412
Miami	92	7936399
Minneapolis	92	7946275
New York	92	7945271
Oakland	92	7946669
Puerto Vallarta	91	7858157
Salt Lake City	92	7946758
San Jose Del Cabo	92	7945100
Seattle	92	7945702
Washington DC	92	7944055
Winnipeg*	47	4060700
San Juan**	N/A	N/A

\*Winnipeg offline for site construction

\*\*San Juan offline for roof reconstruction



**Table 1-3 NPA Evaluation Sites**

<b>Location</b>	<b>Number of Days Evaluated</b>	<b>Number of Samples</b>
Albuquerque	92	7945907
Anchorage	92	7916278
Atlanta	92	7941817
Barrow	92	7944233
Bethel	92	7945104
Billings	92	7942701
Boston	92	7944067
Cleveland	92	7946317
Cold Bay	92	7944081
Fairbanks	92	7934114
Gander	92	7941922
Honolulu	92	7946408
Houston	92	7945671
Iqaluit	92	7945722
Juneau	92	7938638
Kansas City	92	7935407
Kotzebue	92	7944018
Los Angeles	92	7943741
Merida	92	7937099
Miami	92	7935726
Minneapolis	92	7941599
Oakland	92	7945196
Salt Lake City	92	7946250
San Jose Del Cabo	92	7943118
Seattle	92	7943587
Tapachula	92	7940463
Washington DC	92	7940471

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

### 1.1 Event Summary

Table 1.5 lists events noted 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.

**Table 1-5 Events**

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
07/05/12	07/05/12	PRN7	LPV200 CONUS, LPV200 Alaska	NANU 2012046, planned maintenance on PRN 7 caused short LPV200 outages in Alaska and Miami.
07/05/12	08/17/12	PRN4	LPV200 CONUS	SV Alerts on multiple days due to carrier phase jumps on the satellite. This event occurred on 12 days over the course of the time period. <a href="#">See DR 110 PRN4 Carrier Phase Anomalies Cause WAAS SV Alerts.</a>
07/10/12	07/10/12	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200 CONUS, LPV200 Alaska	Geomagnetic activity affected coverage in Alaska and northwest CONUS. Kp = 5.
07/14/12	07/15/12	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200 CONUS, LPV200 Alaska	Geomagnetic activity affected Alaska LPV200 service on both days and CONUS LPV200 service on July 15 <sup>th</sup>

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
				only. Kp = 5 on July 14 <sup>th</sup> . Kp = 6 on July 15 <sup>th</sup> .
07/16/12	07/16/12	PRN21	LPV Alaska, LPV200 CONUS, LPV200 Alaska	Carrier Phase anomaly on PRN 21 caused an SV alert.
07/17/12	07/18/12	Miami (ZMA1), Miami (ZMA2), Miami (ZMA3)	Local	Local RFI at Miami caused an LPV200 outage on July 17 <sup>th</sup> . On July 18 <sup>th</sup> , Miami experienced a UDRE external threshold trip at the same time as the RFI.
07/20/12	07/21/12	GEO138	LPV200 Alaska	GUS manual switchover, Brewster to Woodbine. Increased UDRE value on the PRN138 continued into July 21st affecting LPV200 service coverage in Alaska. TOW 511670-511682.
07/24/12	07/25/12	GEO135, Los Angeles (CnV)	LPV200 Alaska	CRW selected source switched to ZLA C&V after software upgrade on July 23 <sup>rd</sup> . ZLA C&V had not completely reached optimum performance at the time of the switch resulting in Alaska coverage degradation.
07/29/12	07/29/12	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200 CONUS, LPV200 Alaska	Increased GIVE values caused a loss of coverage in northwestern CONUS and Alaska.
07/31/12	07/31/12	GEO135, Littleton (APA)	LPV Alaska, LPV200 CONUS, LPV200 Alaska	GUS manual switchover, Littleton to Napa at TOW 201627-201632.
07/31/12	08/10/12	Miami (ZMA1), Miami (ZMA2), Miami (ZMA3)	Local	RFI at Miami caused a loss of local service over the course of two weeks.  July 31 <sup>st</sup> : 14:08:27 to 14:56:51 August 1 <sup>st</sup> : 16:28:19 to 16:57:32 21:14:09 to 21:14:50 August 2 <sup>nd</sup> : 14:52:40 to 15:16:13 August 3 <sup>rd</sup> : 16:06:59 to 16:34:34 August 6 <sup>th</sup> : 16:25:13 to 16:50:08 August 7 <sup>th</sup> : 13:19:01 to 13:40:32 August 8 <sup>th</sup> : 16:49:12 to 17:13:00 August 10 <sup>th</sup> : 14:26:29 to 14:34:12  The jammers were identified and addressed which ended the long duration RFI events.
07/30/12	08/04/12	GEO133, Pamalu (HDH)	None	Failing up-converter in Pamalu caused several WAAS user messages (WUMs) to have bad CRCs over the event time period 7/30/12 4 corrupted WUMs 7/31/12 1 corrupted WUM

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
				8/1/12 0 corrupted WUMs 8/2/12 5 corrupted WUMs 8/3/12 15 corrupted WUMs 8/4/12 4 corrupted WUMs 8/5/12 0 corrupted WUMs
08/01/12	08/01/12	GEO138, Woodbine (QWE)	LPV Alaska, LPV200 CONUS, LPV200 Alaska	GUS manual switchover, Woodbine to Brewster. TOW 288028-288033.
08/05/12	08/05/12	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200 Alaska	Data outages up to 264 sec at Barrow, Bethel, Fairbanks, and Kotzebue caused an increase in GIVE values affecting Alaska LPV200 service.
08/09/12	08/09/12	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV Alaska, LPV200 Alaska	Data outages at Alaska sites caused an increase in GIVE values affecting LPV200 service.
05/02/12	08/15/12	Winnipeg (YWG1) Winnipeg (YWG2) Winnipeg (YWG3)	None	Winnipeg WRS was taken out of WAAS service due to a roof replacement at the site.
08/15/12	08/15/12	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200 CONUS	High GIVE values due to Oakland site being down for maintenance caused LPV200 outage in CONUS.
08/15/12	08/15/12	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200 Alaska	High GIVE values caused a drop in coverage over Alaska.
08/17/12	08/17/12	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200 Alaska	Software upgrade at Barrow caused an increase in GIVE values due to lack of observations affecting LPV200 service.
08/18/12	08/18/12	Albuquerque (ZAB1), Albuquerque (ZAB2), Albuquerque (ZAB3)	Local	Local RFI event caused LPV/LPV200 outage.
08/24/12	08/25/12	GEO135, NAPA (APC)	LPV200 Alaska	GUS manual switchover, Napa to Littleton. APC GUS was switched to Backup mode to support Diversity Improvements at APC. TOW 460956-460961.
08/28/12	08/29/12	PRN21	LPV Alaska, LPV Canada, LPV Mexico, LPV200 CONUS, LPV200 Alaska, LPV200_Canada	NANU 2012052. PRN 21 returned from maintenance. However, 84 out of 110 receivers did not track the satellite after it turned healthy causing significant drop in LPV200 service.
09/03/12	09/03/12	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200 CONUS	Geomagnetic activity with Kp = 6 caused a loss of CONUS LPV200 on the northwestern coast. Elevated GIVE value at IGP (45,-135) and a few other IGPs at 50 degrees latitude caused inflated protection levels for a longer period than usual.

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
09/04/12	09/04/12	Barrow, Bethel, Fairbanks, Kotzebue,	LPV200 Alaska	Communication outage for approximately 10 seconds to the northern Alaska sites caused elevated UDRE values on GPS satellites critical to northern Alaska coverage, affecting LPV200 service in Alaska.
09/05/12	09/05/12	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200 CONUS, LPV200 Alaska	Geomagnetic activity with Kp=6 caused increased GIVEs. LPV200 coverage was affected in CONUS and Alaska.
09/05/12	09/05/12	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV), PRN135	LPV200 Alaska	Elevated UDRE values on PRN135 caused a loss of LPV200 coverage in Alaska towards the end of the day. This occurred at the same time that there was a loss of communication with the reference stations in Alaska.
09/06/12	09/06/12	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV), PRN135	LPV200 Alaska	Alaska LPV200 service had reduced coverage due to high UDRE values on PRN135.
09/07/12	09/07/12	PRN21	LPV Mexico, LPV200 Mexico	SV Alert on PRN21 caused short LPV and LPV200 service outages in Mexico.
09/10/12	09/14/12	PRN30	LPV200 All	NANU 2012054, planned maintenance on PRN 30 affected LPV200 coverage on the edges of the WAAS service.
09/13/12	09/13/12	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV), PRN135	LPV Mexico, LPV200 Alaska, LPV200 Mexico	High UDRE value on GEO135 caused LPV service outages in Mexico and LPV200 service outages in Mexico and Alaska.
09/14/12	09/14/12	PRN21, PRN30	LP CONUS, LPV CONUS, LPV Mexico, LPV200 All	SV Alert on PRN21 coupled with scheduled maintenance on PRN30 caused LP, LPV, and LPV200 service outages.
09/19/12	09/19/12	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV Canada, LPV200 Canada	High GIVE values in Canada caused a loss of LPV and LPV200 coverage in Canada.  Most of the GIVE values in parts of Canada (not in the Arctic circle) were elevated to 6 or 15 meters. The elevated GIVE values raised protection levels in Canada and were primarily responsible for the coverage drop.
09/19/12	09/19/12	Dallas (ZFW1), Dallas (ZFW2), Dallas (ZFW3), Winnipeg (YWG1), Winnipeg (YWG2), Winnipeg (YWG3)	None	Elevated position errors and protection bounding ratios. ZFW was due to site multipath YWG was due to aurora activity

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
09/20/12	09/20/12	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200 Canada	High GIVE values caused a loss of LPV200 service in northern Canada.  Kp = 3. GIVE values in Canada were elevated; several IGP's were set to 15 meters. This increased the protection levels in Canada and caused coverage drops for LPV200 service.
09/22/12	09/22/12	Washington DC (ZDC1), Washington DC (ZDC2), Washington DC (ZDC3)	Local	RFI event at Washington DC caused a local LPV200 service outage on all three threads.
09/23/12	09/23/12	Barrow (BRW1), Bethel (BET1), Kotzebue (OTZ1),	LPV200 Alaska	Communication outages in Alaska receivers caused increased UDRE values and protection levels affecting LPV200 service in Alaska.  Data outages occurred simultaneously at Bethel, Barrow, and Kotzebue on both ring 1 and ring 2 from GPS TOW 77571 to 77575. There was another outage at Bethel and Kotzebue from GPS TOW 77578 to 77582.  At 21:32:56 GMT, GIVE values were increased from 4.5 to 15 meters for IGP's from (75,-160) to (75,-130). The elevated GIVE values persisted until about 21:47 GMT.  Airport LPV200 service outages began in northwestern Alaska starting at 21:33 and went to about 21:48.
09/24/12	09/24/12	PRN4	LPV Canada, LPV Mexico, LPV200 CONUS, LPV200_Canada, LPV200_Mexico, RNP1_All	NANU 2012058, PRN4 planned maintenance caused a loss of LPV service in Mexico and Canada, a loss of LPV200 service in CONUS, Mexico, Canada.  WAAS only RNP 0.1 service was lost

Start Date	End Date	Location/ Satellite	Service Affected	Event Description
				near Hawaii. Combined WAAS/GPS FD/FDE RNP 0.1 service was not impacted
09/25/12	09/26/12	Boston (ZBW1), Boston (ZBW2), Boston (ZBW3)	Local	RFI event caused LPV200 outages on both days.
09/28/12	09/28/12	Boston (ZBW1), Boston (ZBW2), Boston (ZBW3)	Local	RFI event caused LPV200 service outage.
09/30/12	10/01/12	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV_CONUS, LPV Alaska, LPV_Canada, LPV200 CONUS, LPV200 Alaska, LPV200_Canada	Geomagnetic activity with Kp = 7 on October 1 <sup>st</sup> caused increased GIVE values which resulted in degraded coverage for the LPV and LPV200 services in CONUS, Alaska, and Canada

**Table 1-6 WAAS Upgrades**

START DATE	END DATE	LOCATION	EVENT DESCRIPTION
07/17/2012	07/17/2012	Gander (YQX1), Gander (YQX2), Gander (YQX3)	SSM-WAAS-031 Modification performed. G-II WAAS Receiver Firmware Upgrade to Version 2.005/3.005
07/19/2012	07/19/2012	Atlanta (CnV)	SSM-WAAS-030 Upgrade C&V software to build W6.140L.
07/20/2012	07/20/2012	Washington D.C. (CnV)	SSM-WAAS-030 Upgrade C&V software to build W6.140L.
07/23/2012	07/25/2012	GEO135, Los Angeles (CnV)	SSM-WAAS-030 Upgrade C&V software to build W6.140L. CRW source was switched back to ZLA C&V after software upgrade on July 23 <sup>rd</sup> . ZLA C&V had not completely reached optimum performance at the time of the switch.
08/04/2012	08/04/2012	Iqaluit (YFB1), Iqaluit (YFB2), Iqaluit (YFB3)	SSM-WAAS-030 Upgrade WRS software to build W6.140L.
08/04/2012	08/04/2012	Merida (Q9C1), Merida (Q9C2), Merida (Q9C3)	SSM-WAAS-030 Upgrade WRS software to build W6.140L.
08/05/2012	08/05/2012	Mexico City (Q9A1), Mexico City (Q9A2), Mexico City (Q9A3)	SSM-WAAS-030 Upgrade WRS software to build W6.140L.
08/06/2012	08/06/2012	Bethel (BET1), Bethel (BET2), Bethel (BET3)	SSM-WAAS-030 Upgrade WRS software to build W6.140L.
08/06/2012	08/06/2012	Kansas City (ZKC1), Kansas City (ZKC2), Kansas City (ZKC3)	SSM-WAAS-030 Upgrade WRS software to build W6.140L.

START DATE	END DATE	LOCATION	EVENT DESCRIPTION
08/07/2012	08/07/2012	Salt Lake City (ZLC1), Salt Lake City (ZLC2), Salt Lake City (ZLC3)	SSM-WAAS-030 Upgrade WRS software to build W6.140L.
08/07/2012	08/07/2012	Atlanta (ZTL1), Atlanta (ZTL2), Atlanta (ZTL3)	SSM-WAAS-030 Upgrade WRS software to build W6.140L.
08/08/2012	08/08/2012	Jacksonville (ZJX1), Jacksonville (ZJX2), Jacksonville (ZJX3)	SSM-WAAS-030 Upgrade WRS software to build W6.140L.
08/08/2012	08/08/2012	Honolulu (HNL1), Honolulu (HNL2), Honolulu (HNL3)	SSM-WAAS-030 Upgrade WRS software to build W6.140L.
08/09/2012	08/09/2012	Cold Bay (CDB1), Cold Bay (CDB2), Cold Bay (CDB3)	SSM-WAAS-030 Upgrade WRS software to build W6.140L.
08/09/2012	08/09/2012	Boston (ZBW1), Boston (ZBW2), Boston (ZBW3)	SSM-WAAS-030 Upgrade WRS software to build W6.140L.
08/10/2012	08/10/2012	Los Angeles (ZLA1), Los Angeles (ZLA2), Los Angeles (ZLA3)	SSM-WAAS-030 Upgrade WRS software to build W6.140L.
08/10/2012	08/10/2012	Barrow (BRW1), Barrow (BRW2), Barrow (BRW3)	SSM-WAAS-030 Upgrade WRS software to build W6.140L.
08/10/2012	08/10/2012	Gander (YQX1), Gander (YQX2), Gander (YQX3)	SSM-WAAS-030 Upgrade WRS software to build W6.140L.
08/11/2012	08/11/2012	Goose Bay (YYR1), Goose Bay (YYR2), Goose Bay (YYR3)	SSM-WAAS-030 Upgrade WRS software to build W6.140L.
08/11/2012	08/11/2012	San Jose Del Cabo (Q9E1), San Jose Del Cabo (Q9E2), San Jose Del Cabo (Q9E3)	SSM-WAAS-030 Upgrade WRS software to build W6.140L.
08/12/2012	08/12/2012	Tapachula (Q9D1), Tapachula (Q9D2), Tapachula (Q9D3)	SSM-WAAS-030 Upgrade WRS software to build W6.140L.
08/13/2012	08/13/2012	Cleveland (ZOB1), Cleveland (ZOB2), Cleveland (ZOB3)	SSM-WAAS-030 Upgrade WRS software to build W6.140L.
08/14/2012	08/14/2012	Washington DC (ZDC1), Washington DC (ZDC2), Washington DC (ZDC3)	SSM-WAAS-030 Upgrade WRS software to build W6.140L.
08/14/2012	08/14/2012	Kotzebue (OTZ1), Kotzebue (OTZ2), Kotzebue (OTZ3)	SSM-WAAS-030 Upgrade WRS software to build W6.140L.
08/14/2012	08/14/2012	Winnipeg (YWG1), Winnipeg (YWG2), Winnipeg (YWG3)	SSM-WAAS-030 Upgrade WRS software to build W6.140L.



START DATE	END DATE	LOCATION	EVENT DESCRIPTION
08/15/2012	08/15/2012	Oakland (ZOA1), Oakland (ZOA2), Oakland (ZOA3)	SSM-WAAS-030 Upgrade WRS software to build W6.140L.
08/15/2012	08/15/2012	New York (ZNY1), New York (ZNY2), New York (ZNY3)	SSM-WAAS-030 Upgrade WRS software to build W6.140L.
08/16/2012	08/16/2012	Miami (ZMA1), Miami (ZMA2), Miami (ZMA3)	SSM-WAAS-030 Upgrade WRS software to build W6.140L.
08/16/2012	08/16/2012	Seattle (ZSE1), Seattle (ZSE2), Seattle (ZSE3)	SSM-WAAS-030 Upgrade WRS software to build W6.140L.
08/17/2012	08/17/2012	Anchorage (ZAN1), Anchorage (ZAN2), Anchorage (ZAN3)	SSM-WAAS-030 Upgrade WRS software to build W6.140L.
08/17/2012	08/17/2012	Minneapolis (ZMP1), Minneapolis (ZMP2), Minneapolis (ZMP3)	SSM-WAAS-030 Upgrade WRS software to build W6.140L.
08/18/2012	08/18/2012	Puerto Vallarta (Q9B1), Puerto Vallarta (Q9B2), Puerto Vallarta (Q9B3)	SSM-WAAS-030 Upgrade WRS software to build W6.140L.
08/20/2012	08/20/2012	Memphis (ZME1), Memphis (ZME2), Memphis (ZME3)	SSM-WAAS-030 Upgrade WRS software to build W6.140L.
08/20/2012	08/20/2012	Billings (BIL1), Billings (BIL2), Billings (BIL3)	SSM-WAAS-030 Upgrade WRS software to build W6.140L.
08/21/2012	08/21/2012	Dallas (ZFW1), Dallas (ZFW2), Dallas (ZFW3)	SSM-WAAS-030 Upgrade WRS software to build W6.140L.
08/21/2012	08/21/2012	Fairbanks (FAI1), Fairbanks (FAI2), Fairbanks (FAI3)	SSM-WAAS-030 Upgrade WRS software to build W6.140L.
08/22/2012	08/22/2012	Juneau (JNU1), Juneau (JNU2), Juneau (JNU3)	SSM-WAAS-030 Upgrade WRS software to build W6.140L.
08/22/2012	08/22/2012	Denver (ZDV1), Denver (ZDV2), Denver (ZDV3)	SSM-WAAS-030 Upgrade WRS software to build W6.140L.
08/23/2012	08/23/2012	Chicago (ZAU1), Chicago (ZAU2), Chicago (ZAU3)	SSM-WAAS-030 Upgrade WRS software to build W6.140L.
08/24/2012	08/24/2012	Albuquerque (ZAB1), Albuquerque (ZAB2), Albuquerque (ZAB3)	SSM-WAAS-030 Upgrade WRS software to build W6.140L.
08/27/2012	08/27/2012	Houston (ZHU1), Houston (ZHU2), Houston (ZHU3)	SSM-WAAS-030 Upgrade WRS software to build W6.140L.

Table 1-7 GUS Switchovers

Start Date	End Date	GUS Switch	Location/ Satellite	Service Affected	Event Description
07/20/12	07/21/12	Manual	GEO138	LPV200 Alaska	GUS manual switchover, Brewster to Woodbine. Increased UDRE value on the PRN138 continued into the next day effecting coverage. TOW 511670-511682.
07/30/12	07/30/12	Manual	GEO133, Pamalu (HDH)	None	GUS manual switchover, HDH to SZP. TOW 115224-115229.
07/31/12	07/31/12	Manual	GEO135, Littleton (APA)	LPV Alaska, LPV200 CONUS, LPV200 Alaska	GUS manual switchover, Littleton to Napa. TOW 201627-201632.
08/01/12	08/01/12	Manual	GEO138, Woodbine (QWE)	LPV Alaska, LPV200 CONUS, LPV200 Alaska	GUS manual switchover, Woodbine to Brewster. TOW 288028-288033.
08/02/12	08/02/12	Manual	GEO133, Santa Paula (SZP)	None	GUS manual switchover, SZP to HDH. TOW 374427-374432
08/03/12	08/03/12	Manual	GEO138, Brewster (BRE-B)	None	GUS manual switchover, Brewster to Woodbine. TOW 460851-460856.
08/04/12	08/04/12	Manual	GEO133, Pamalu (HDH)	None	GUS manual switchover, HDH to SZP. TOW 547257-547264. Manual GUS Switchover from Pamalu (HDH) in order to replace failing up-converter.
08/24/12	08/25/12	Manual	GEO135, NAPA (APC)	LPV200 Alaska	GUS manual switchover, Napa to Littleton. Switched APC GUS to Backup mode per first Level Engineering to support Diversity Improvements at APC. TOW 460956-460961
09/19/12	09/19/12	Faulted	GEO138, Woodbine (QWE)	None	GUS switchover, Woodbine faulted. TOW 269035-269047
07/16/12	07/16/12	Manual	GEO133		GUS switchover to HDH after SZP missed 8 consecutive messages. TOW 152233-152255

## 1.2 Report Overview

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

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

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

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

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

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

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

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

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

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

## **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 1.46 meters at Grand Forks and 1.722 meters, respectively. The minimum 95% CONUS horizontal and vertical LPV errors are 0.504 meters at Denver and 0.819 meters at Salt Lake City, respectively. The maximum 95% and 99.999% NPA horizontal errors are 4.596 meters at Honolulu and 15.525 meters at Tapachula, respectively. The minimum 95% and 99.999% horizontal errors are 1.094 meters and 2.472 meters, both at Kansas City.

Table 2-1 shows Albuquerque and Miami were not in PA mode 100% of the reporting period. This was due to localized radio frequency interference (RFI) for both sites, which interrupted PA mode service.

The increases in 95% position errors on 7/15/12 and 7/16/12 in Figure 2.1 to 2.8 are due to geomagnetic activity. The increases in CONUS PA and NPA 95% position errors on 9/2/12 in Figure 2.1 to 2.8 are due to geomagnetic activity. The increase in Alaska NPA 95% position errors starting on 9/1/12 for the duration of the reporting period is due to geomagnetic activity.

Figures 2.9 to 2.12 show the distributions of the vertical and horizontal errors at all 38 WAAS receiver locations combined in triangle charts and 2-D histogram plots for the quarter. The triangle charts in 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	1.111	1.111	1.664	100	*	*
Atlantic City	1.318	1.318	1.577	100	*	*
Grand Forks	1.460	1.460	1.700	100	*	*
Oklahoma City	0.693	0.693	1.230	100	*	*
Albuquerque	0.604	0.604	0.880	99.99987	2.455	3.879
Anchorage	0.614	0.614	1.248	100	*	*
Atlanta	0.556	0.556	1.021	100	2.265	3.793
Barrow	0.619	0.619	1.274	100	*	*
Bethel	0.579	0.579	0.978	100	2.515	4.004
Billings	0.771	0.771	0.867	100	1.898	3.796
Boston	0.651	0.651	0.999	100	1.923	3.576
Chicago	0.774	0.774	0.951	100	*	*
Cleveland	0.634	0.634	1.065	100	1.794	3.704
Cold Bay	0.620	0.620	1.048	100	*	*
Dallas	0.608	0.608	1.158	100	*	*
Denver	0.504	0.504	0.865	100	*	*
Fairbanks	0.692	0.692	1.494	100	2.726	3.801
Gander	0.785	0.786	1.079	100	*	*
Goose Bay	0.838	0.840	1.142	100	*	*
Houston	0.688	0.688	1.181	100	3.020	4.085
Iqaluit	0.761	0.762	1.335	100	*	*
Jacksonville	0.663	0.663	1.025	100	*	*
Juneau	0.668	0.668	1.099	100	*	*
Kansas City	0.537	0.537	0.965	100	1.930	3.723
Kotzebue	0.644	0.644	1.283	100	2.728	3.878
Los Angeles	0.765	0.765	1.342	100	2.776	4.156
Memphis	0.619	0.619	0.990	100	*	*
Merida	0.759	0.759	1.359	100	*	*
Mexico City	0.818	0.818	1.722	100	*	*
Miami	0.817	0.817	1.277	99.99962	3.365	4.470
Minneapolis	0.682	0.682	0.961	100	1.813	3.665
New York	0.697	0.697	0.975	100	*	*
Oakland	0.652	0.652	1.538	100	2.502	4.434
Puerto Vallarta	0.845	0.845	1.412	100	*	*
Salt Lake City	0.611	0.611	0.819	100	1.937	3.928
San Jose Del Cabo	0.863	0.863	1.421	100	*	*
Seattle	0.698	0.698	0.893	100	1.954	3.853
Washington DC	0.613	0.613	1.025	100	1.923	3.789
Winnipeg	0.793	0.793	1.004	100	*	*

\* = SPS Data not processed.

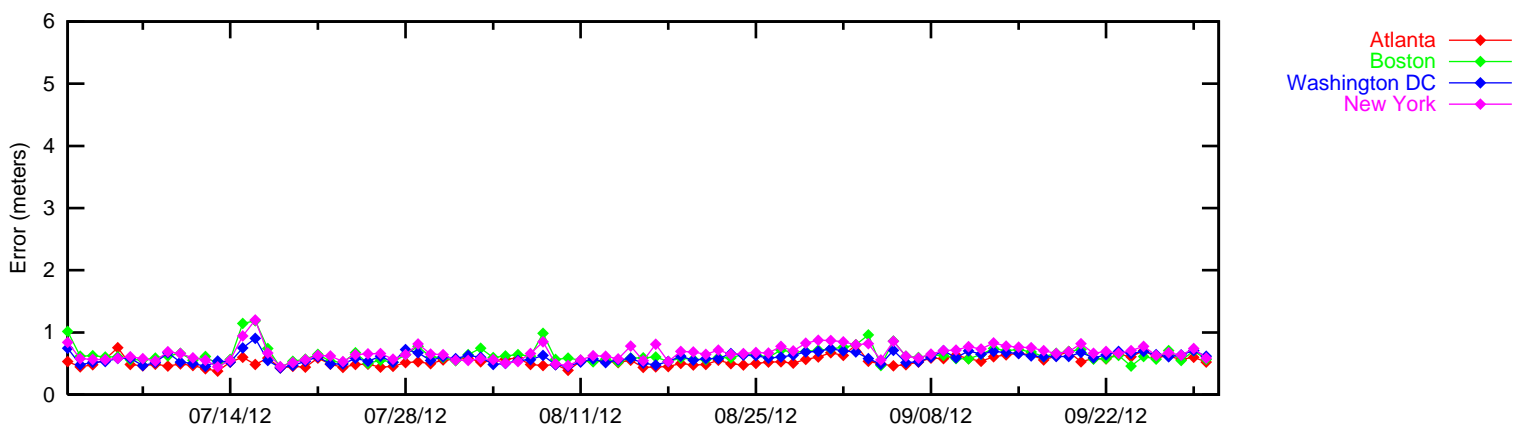
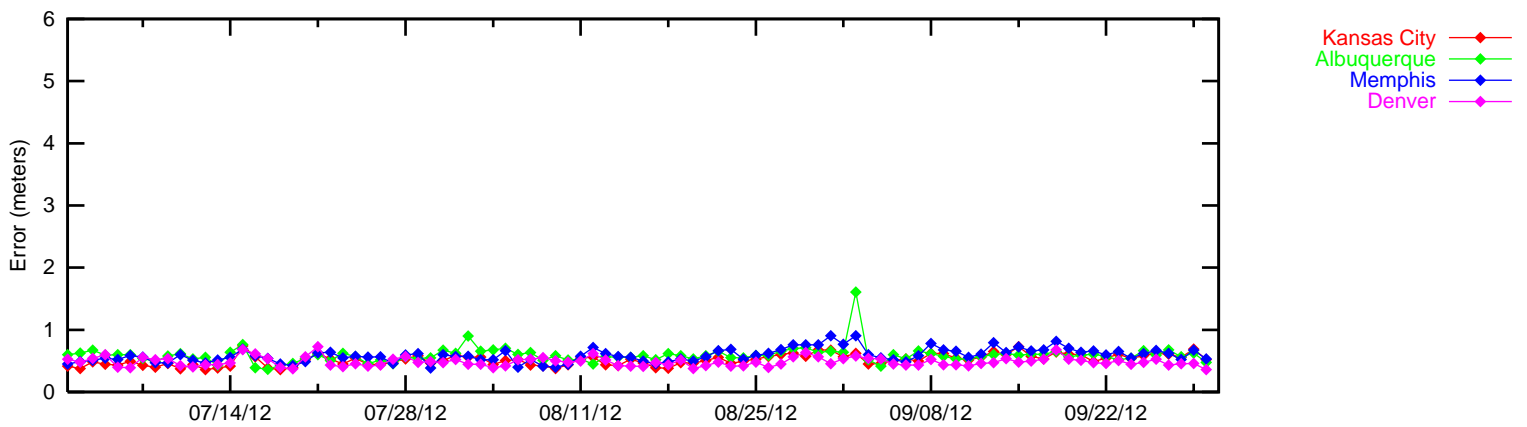
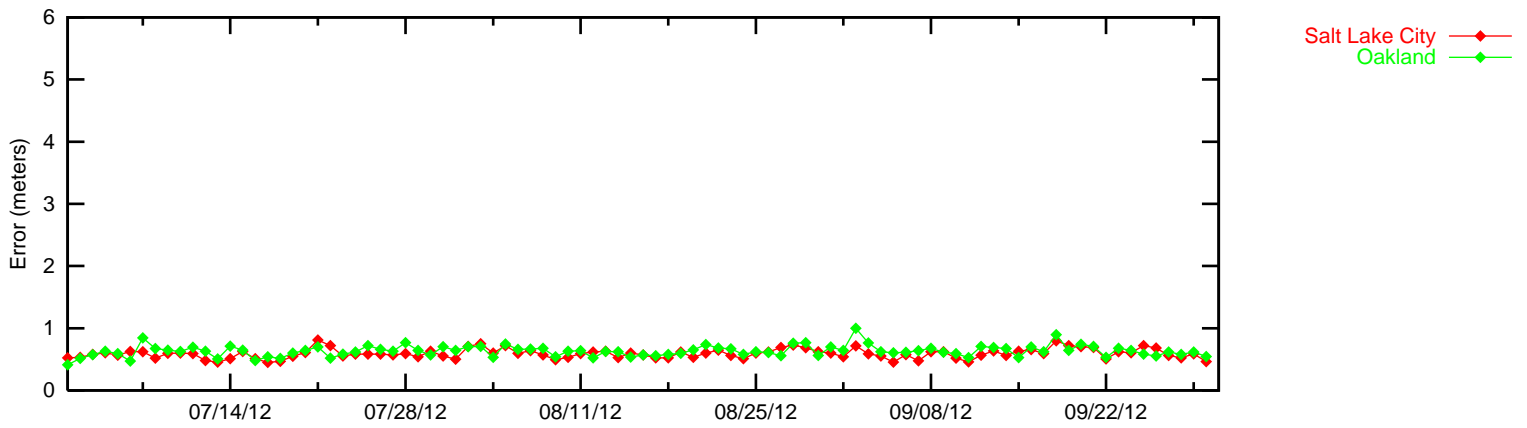
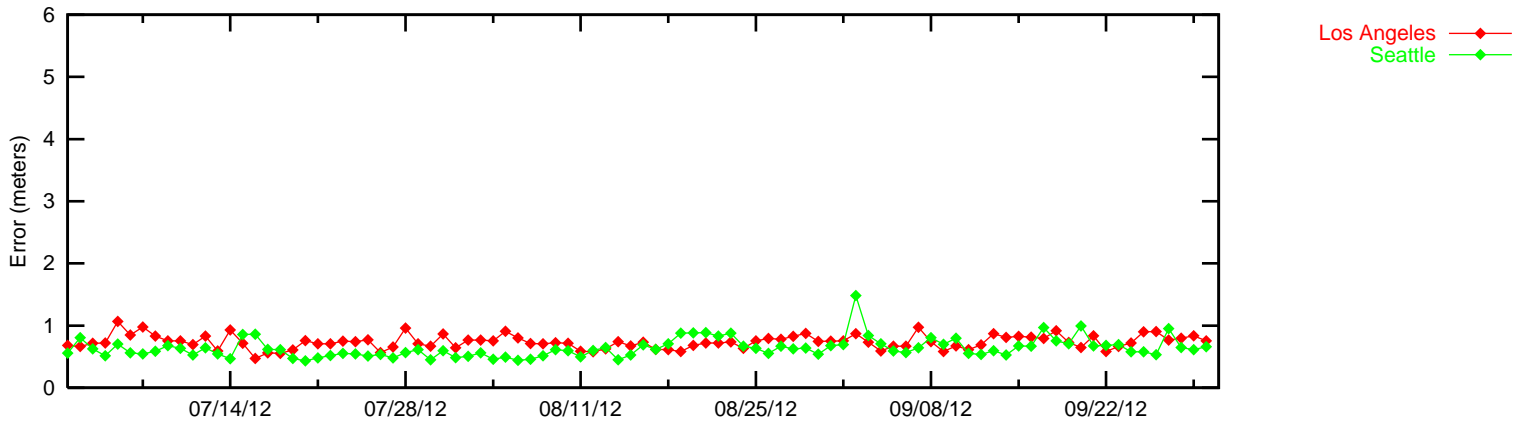
**Table 2-2 NPA 95% and 99.999% Horizontal Accuracy**

<b>Location</b>	<b>95% Horizontal (meters)</b>	<b>99.999% Horizontal (meters)</b>	<b>Percentage in NPA mode (%)</b>	<b>Maximum Horizontal Error</b>
Albuquerque	1.348	4.997	100	5.223
Anchorage	2.464	4.821	100	4.938
Atlanta	1.472	4.059	100	4.263
Barrow	2.213	4.393	100	4.797
Bethel	2.179	4.529	100	4.725
Billings	1.564	2.788	100	3.003
Boston	1.476	3.990	100	4.166
Cleveland	1.282	2.792	100	2.982
Cold Bay	1.544	3.728	100	4.016
Fairbanks	2.995	4.962	100	5.162
Gander	1.930	4.340	100	4.479
Honolulu	4.596	11.047	100	11.158
Houston	2.426	5.392	100	5.623
Iqaluit	1.954	4.336	100	4.454
Juneau	2.129	3.907	100	4.172
Kansas City	1.094	2.472	100	2.702
Kotzebue	2.375	4.340	100	4.511
Los Angeles	1.947	3.774	100	3.953
Merida	3.069	7.110	100	7.282
Miami	2.574	5.978	100	6.124
Minneapolis	1.404	2.754	100	2.943
Oakland	1.577	3.449	100	3.699
Salt Lake City	1.323	3.377	100	4.016
San Jose Del Cabo	3.250	9.538	100	9.763
Seattle	1.386	3.447	100	3.631
Tapachula	3.846	15.525	100	15.681
Washington DC	1.432	3.616	100	4.007

Table 2-3 Maximum LPV Error Statistics

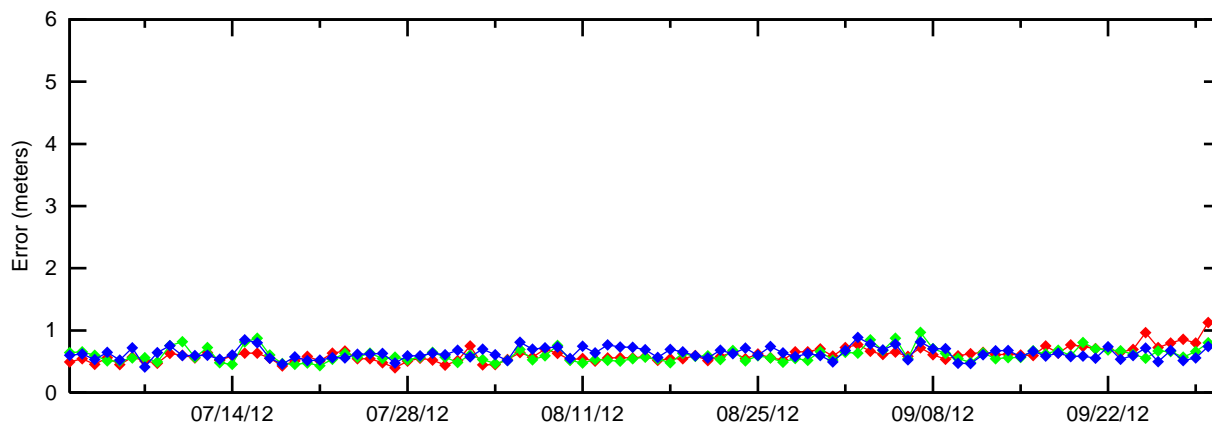
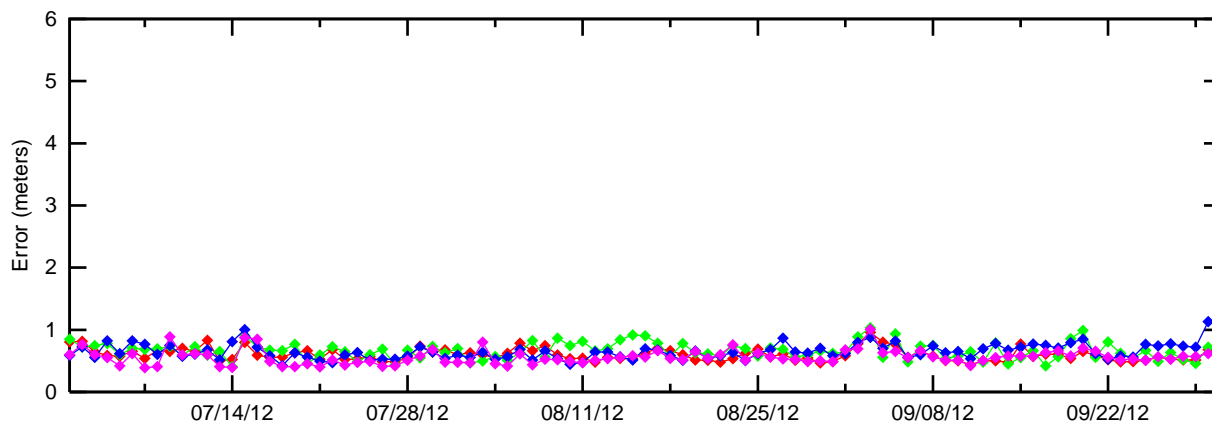
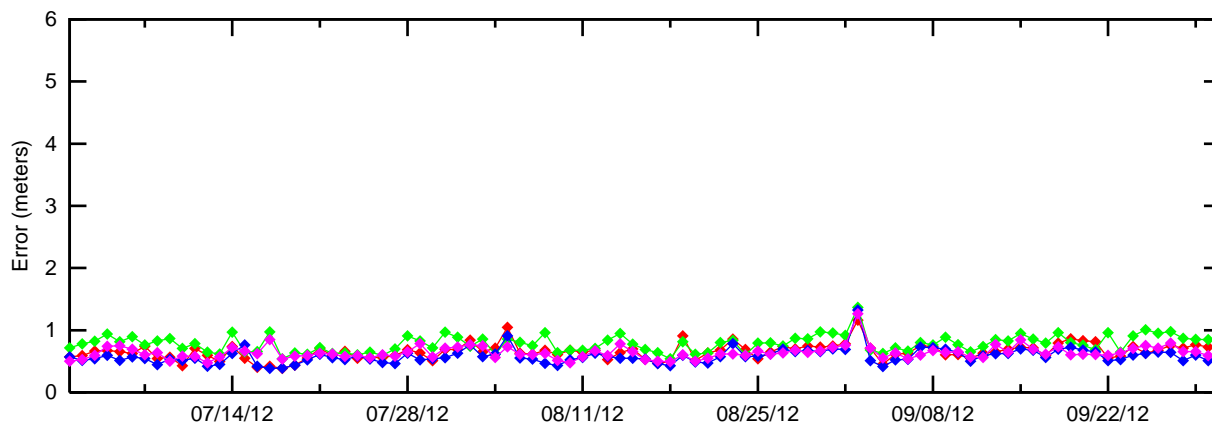
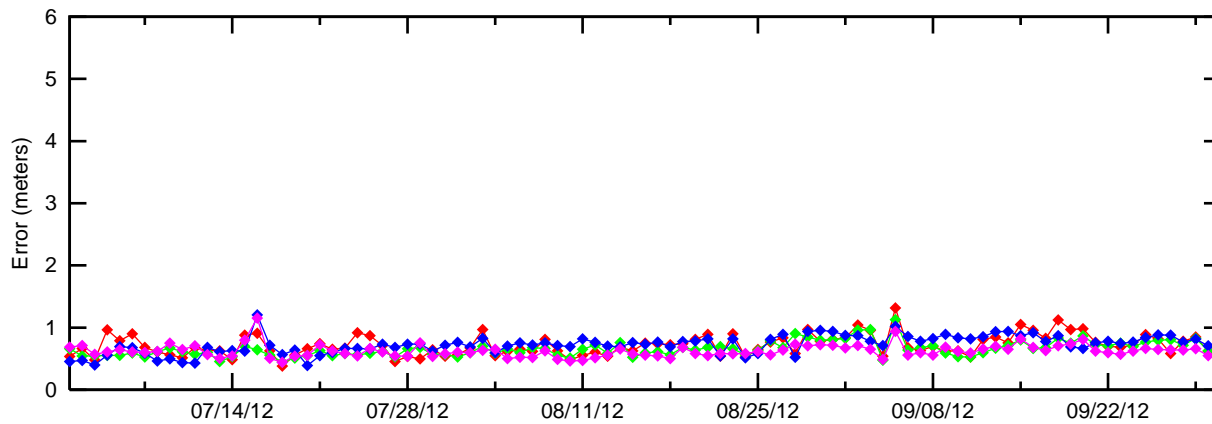
Location	Horizontal Error (m)	Horizontal Error/HPL	Horizontal Maximum Ratio	Vertical Error (m)	Vertical Error/VPL	Vertical Maximum Ratio
Arcata	2.366	0.194	0.194	4.071	0.086	0.208
Atlantic City	2.874	0.275	0.283	4.279	0.256	0.256
Grand Forks	4.587	0.414	0.422	4.934	0.238	0.242
Oklahoma City	2.352	0.180	0.195	4.660	0.214	0.236
Albuquerque	2.228	0.212	0.220	4.646	0.107	0.162
Anchorage	1.980	0.164	0.198	3.267	0.175	0.182
Atlanta	1.427	0.137	0.146	2.550	0.162	0.162
Barrow	2.568	0.122	0.174	4.695	0.185	0.185
Bethel	1.936	0.120	0.161	3.607	0.173	0.173
Billings	1.839	0.186	0.186	3.541	0.101	0.149
Boston	1.843	0.116	0.158	3.409	0.208	0.208
Chicago	1.937	0.166	0.169	2.850	0.154	0.177
Cleveland	1.910	0.149	0.168	3.396	0.190	0.196
Cold Bay	2.033	0.075	0.105	2.807	0.085	0.117
Dallas	1.979	0.225	0.225	3.365	0.228	0.245
Denver	1.359	0.136	0.167	3.602	0.170	0.196
Fairbanks	2.878	0.353	0.353	4.153	0.234	0.234
Gander	2.597	0.153	0.153	3.731	0.106	0.142
Goose Bay	4.201	0.160	0.262	4.070	0.136	0.194
Houston	1.696	0.207	0.211	2.849	0.198	0.227
Iqaluit	2.757	0.104	0.159	4.608	0.154	0.169
Jacksonville	1.851	0.120	0.174	2.370	0.127	0.158
Juneau	2.043	0.084	0.192	5.400	0.301	0.348
Kansas City	1.386	0.048	0.157	2.925	0.131	0.180
Kotzebue	2.083	0.121	0.161	5.397	0.153	0.173
Los Angeles	1.655	0.178	0.178	3.963	0.147	0.196
Memphis	1.520	0.166	0.167	2.390	0.146	0.163
Merida	1.757	0.074	0.145	3.063	0.133	0.145
Mexico City	2.390	0.086	0.137	3.763	0.109	0.160
Miami	2.418	0.177	0.177	4.977	0.101	0.147
Minneapolis	2.017	0.167	0.167	2.887	0.127	0.173
New York	1.802	0.148	0.160	3.067	0.095	0.182
Oakland	1.917	0.175	0.175	3.945	0.108	0.178
Puerto Vallarta	2.389	0.133	0.133	4.196	0.146	0.170
Salt Lake City	1.846	0.130	0.154	2.565	0.141	0.161
San Jose Del Cabo	2.783	0.123	0.141	5.270	0.158	0.160
Seattle	2.387	0.193	0.201	3.262	0.098	0.182
Tapachula	3.210	0.082	0.085	5.800	0.120	0.158
Washington DC	2.182	0.092	0.134	2.578	0.152	0.152
Winnipeg	2.312	0.162	0.186	5.518	0.198	0.206

# Figure 2-1 LPV 95% Horizontal Accuracy

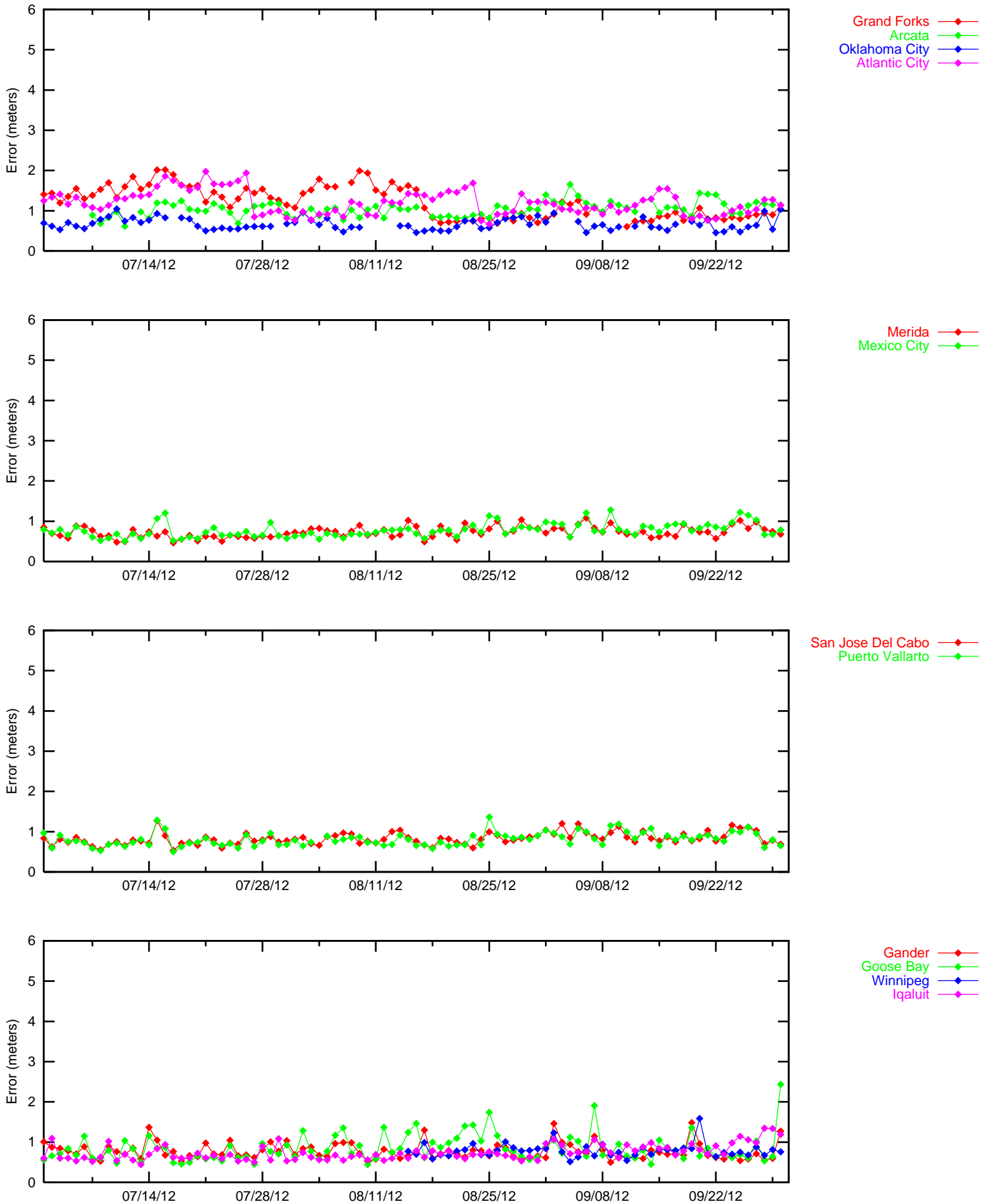




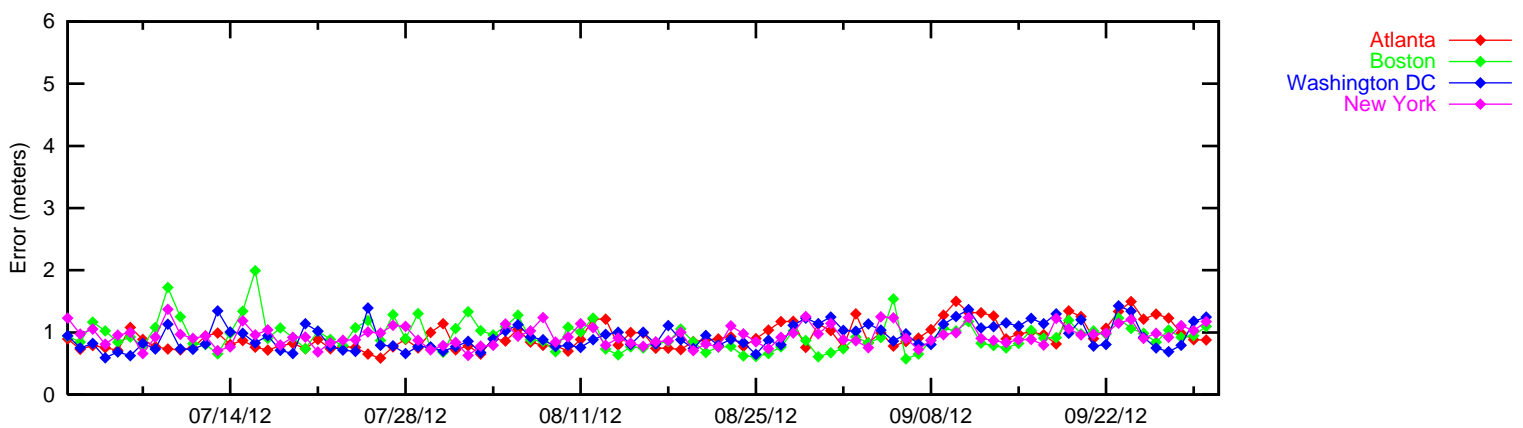
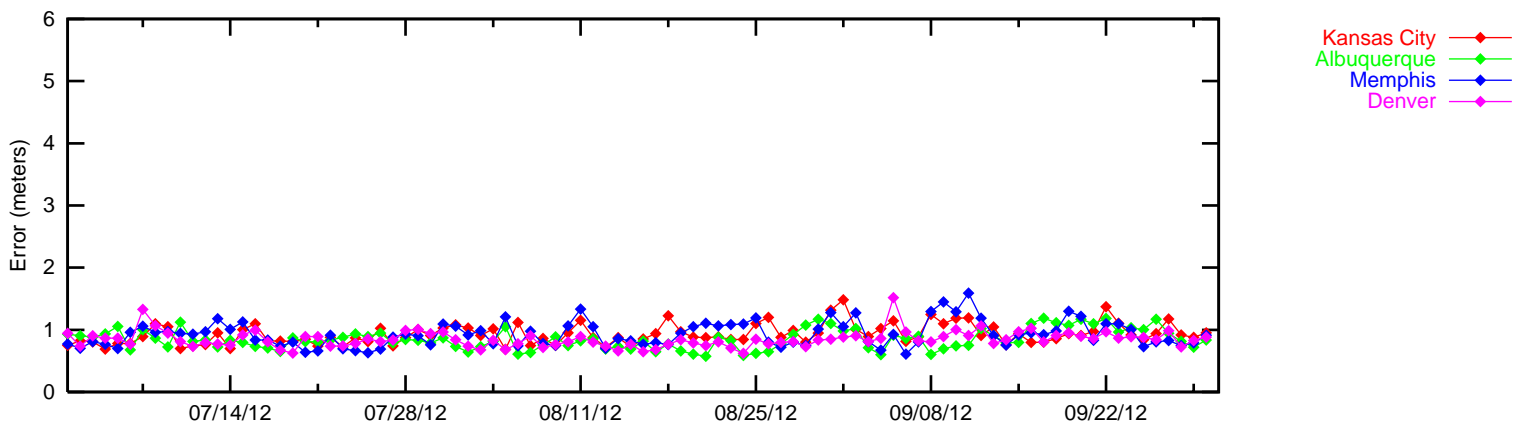
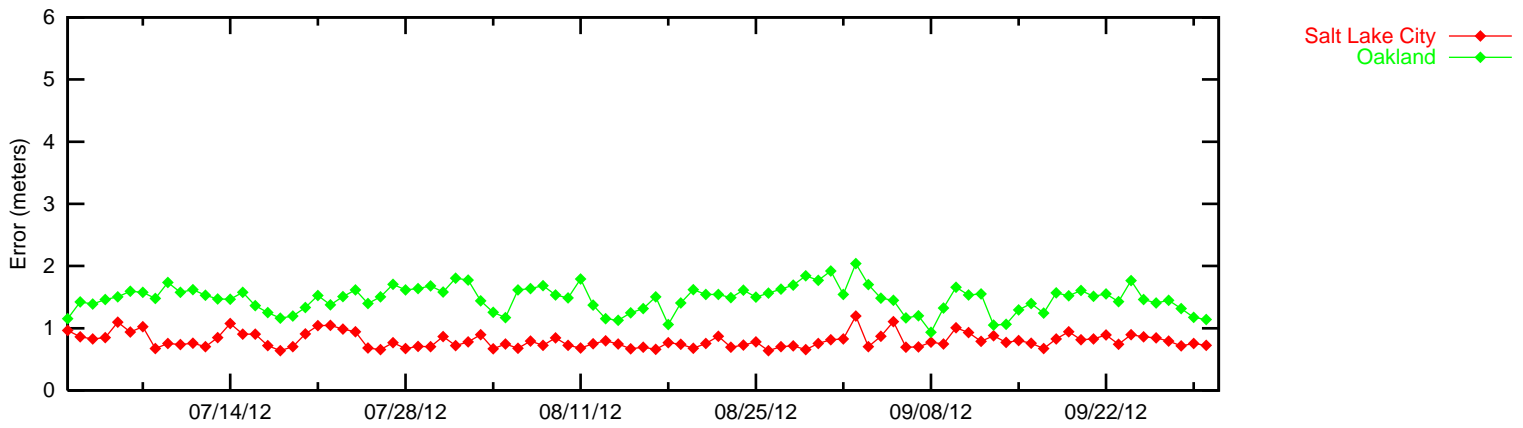
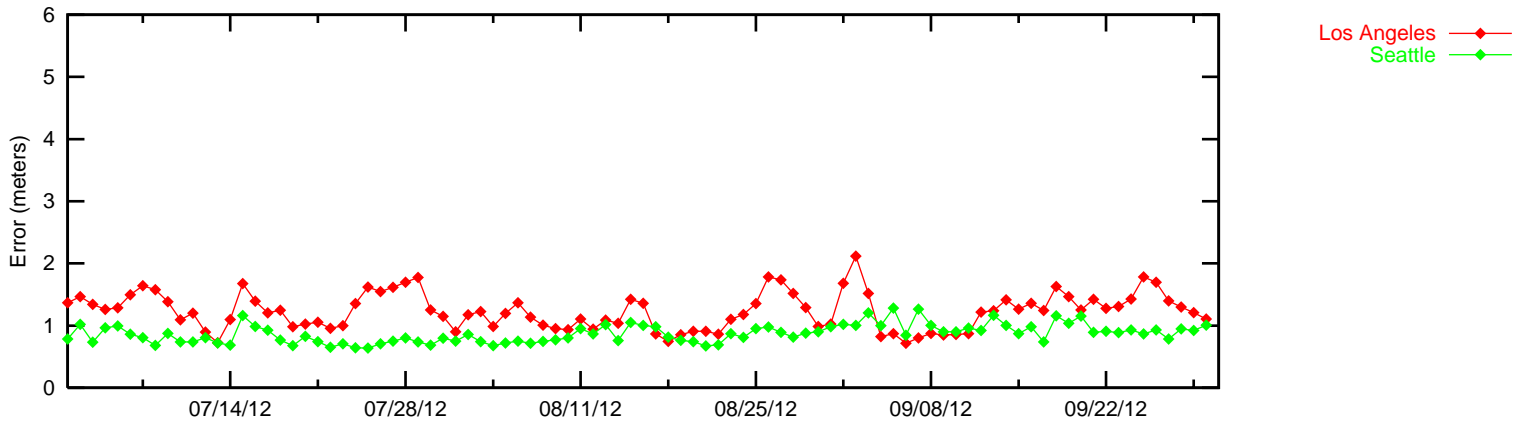
# Figure 2-2 LPV 95% Horizontal Accuracy



### Figure 2-3 LPV 95% Horizontal Accuracy



# Figure 2-4 LPV 95% Vertical Accuracy



# Figure 2-5 LPV 95% Vertical Accuracy

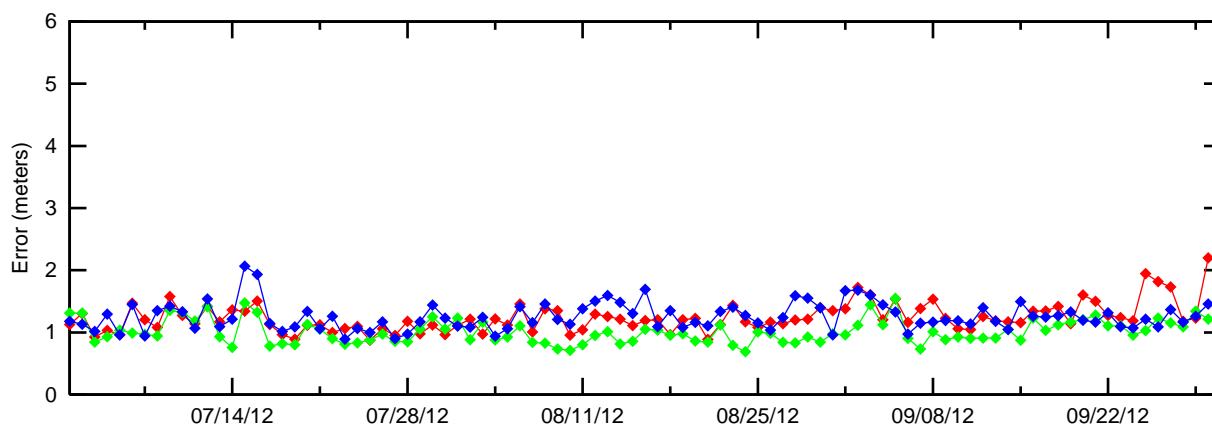
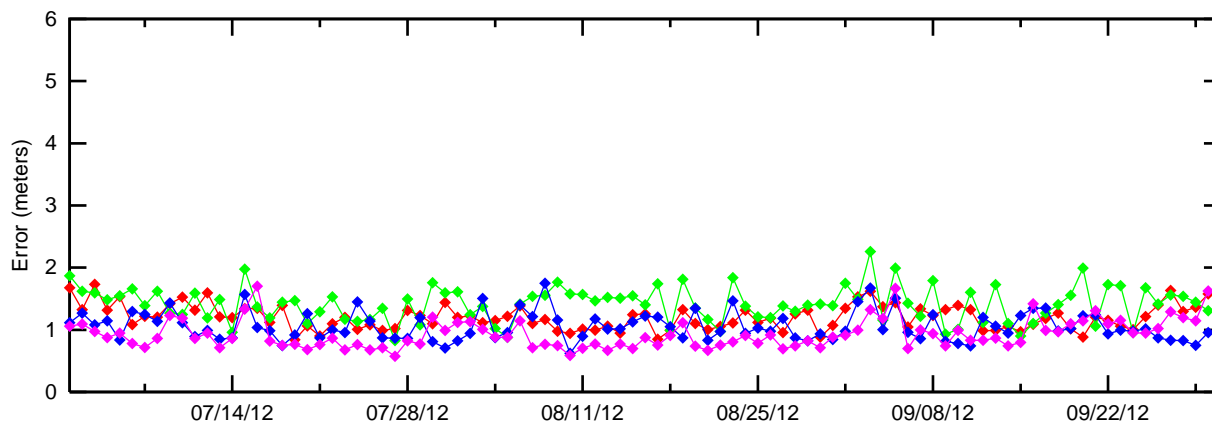
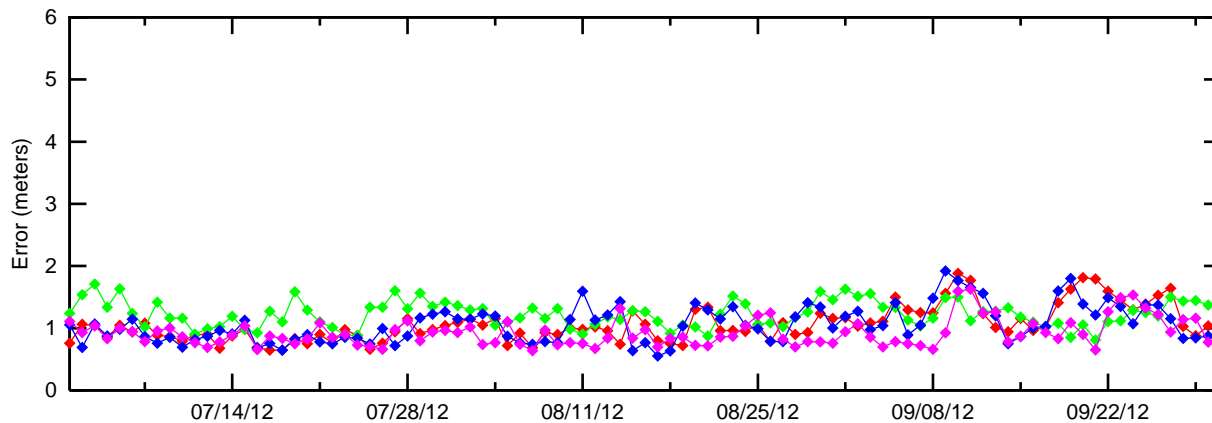
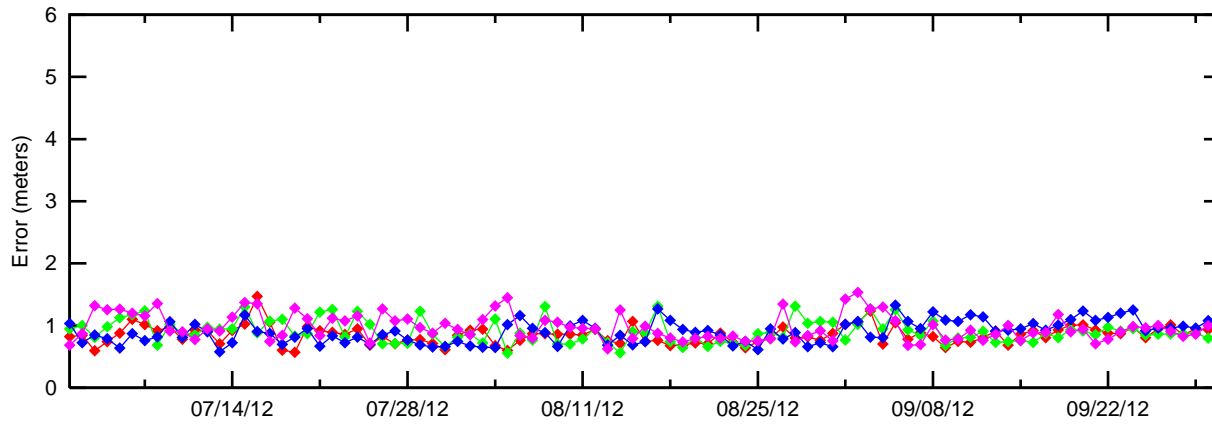


Figure 2-6 LPV 95% Vertical Accuracy

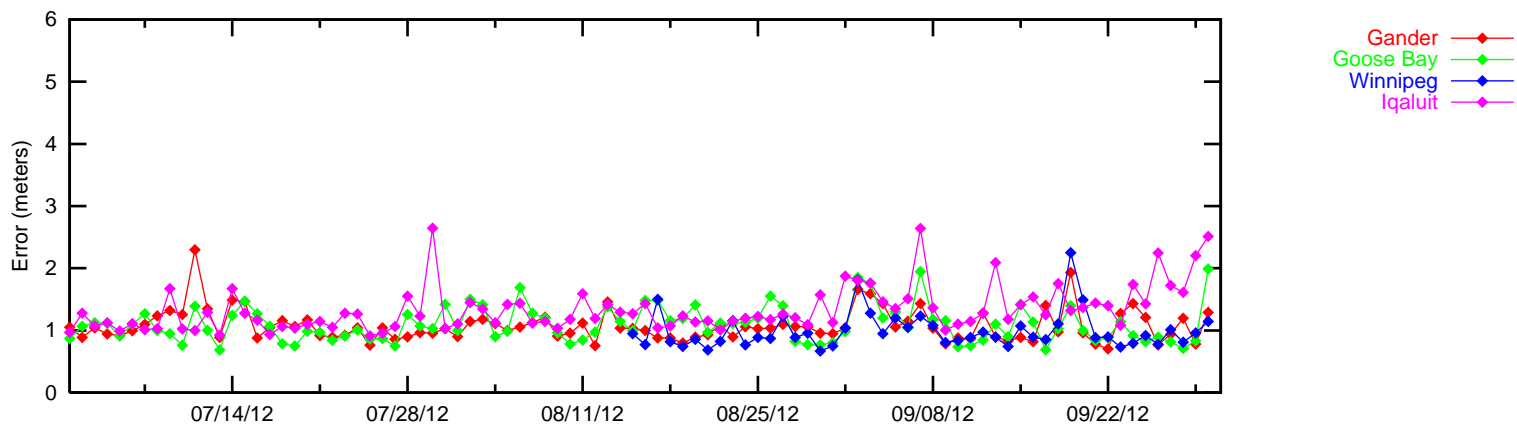
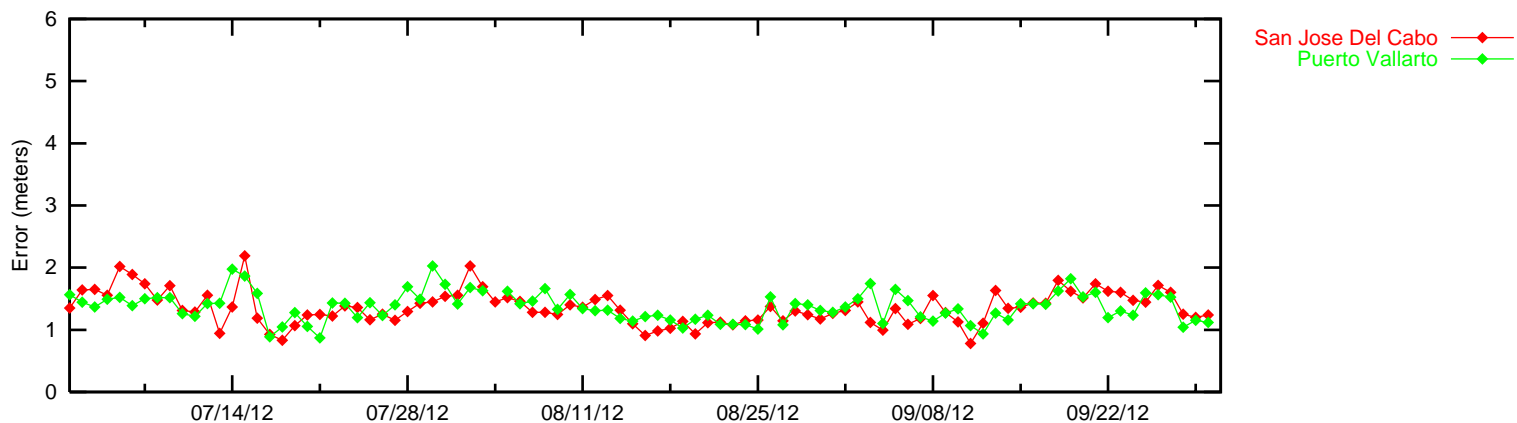
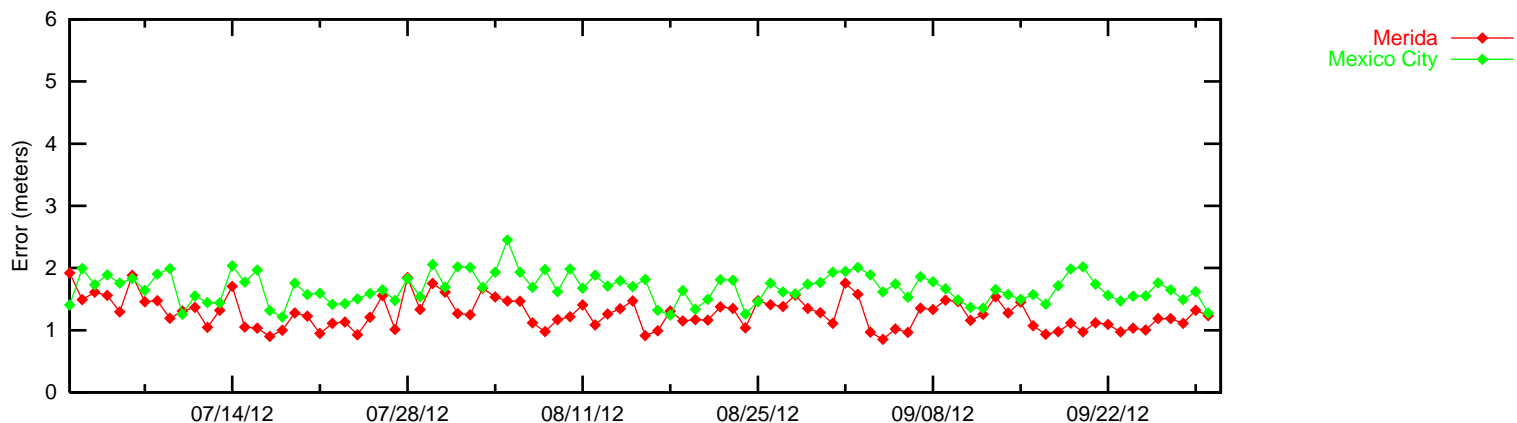
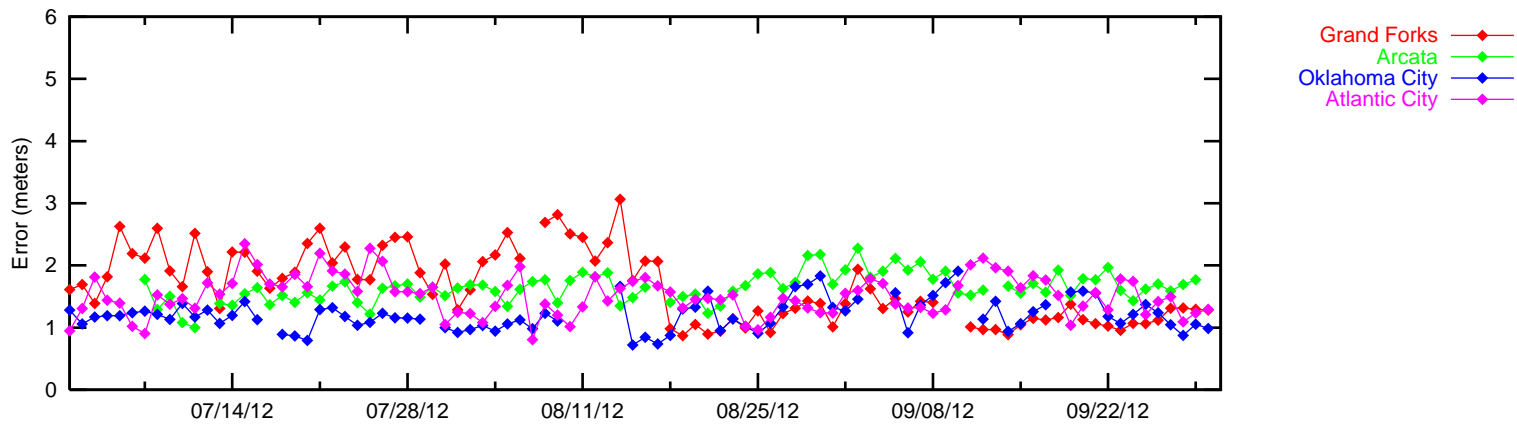
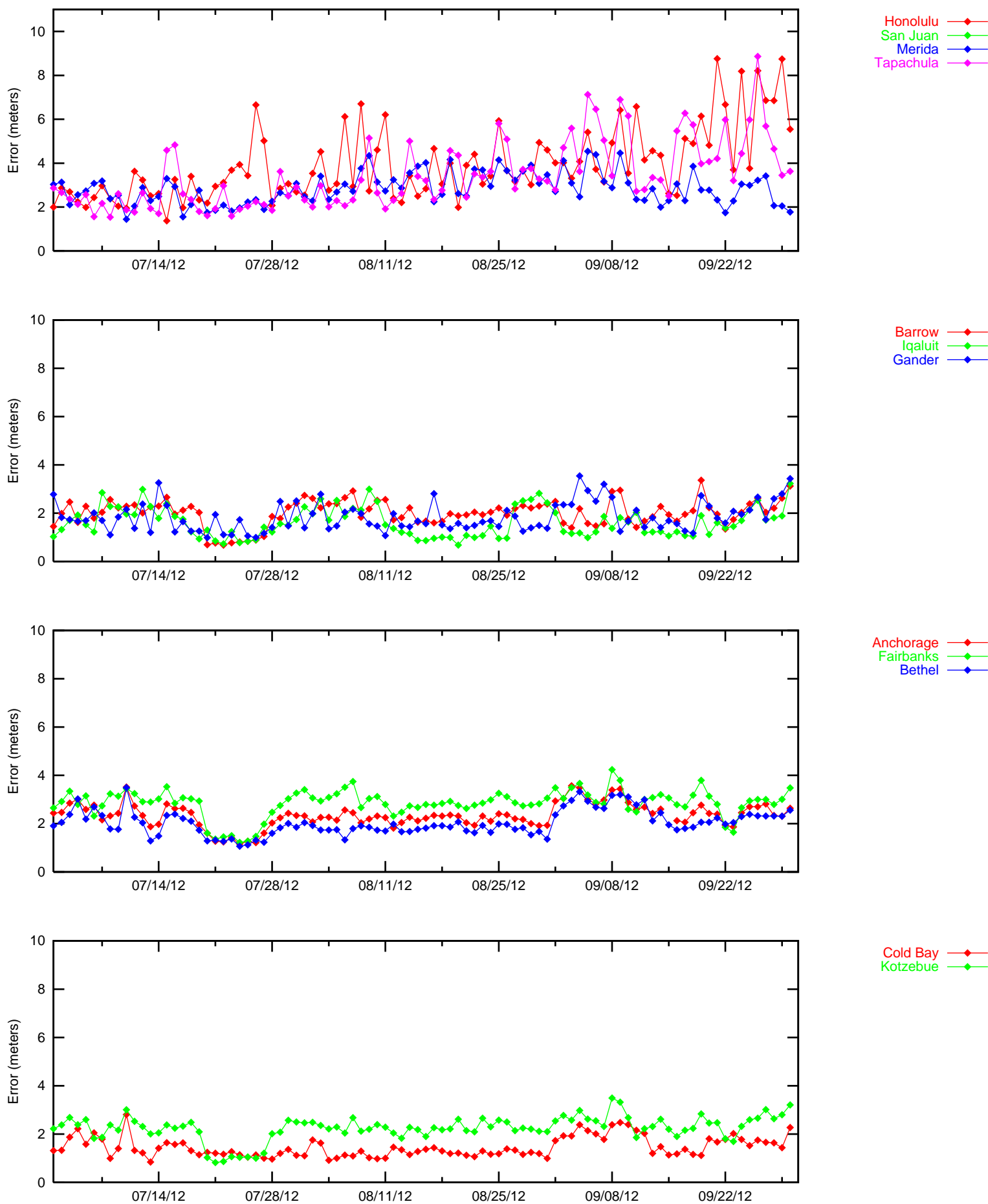
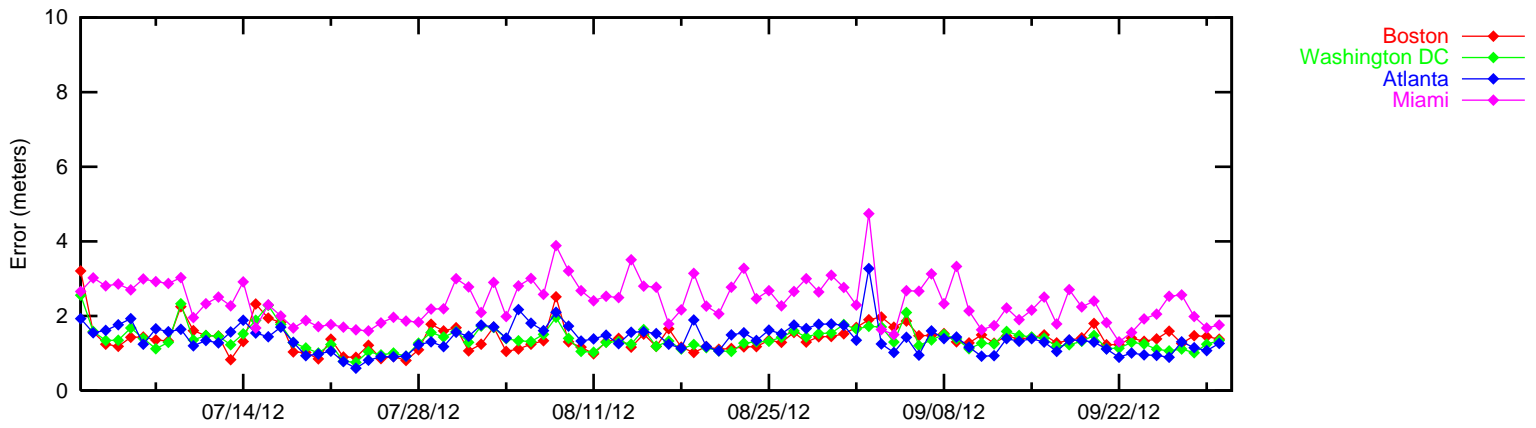
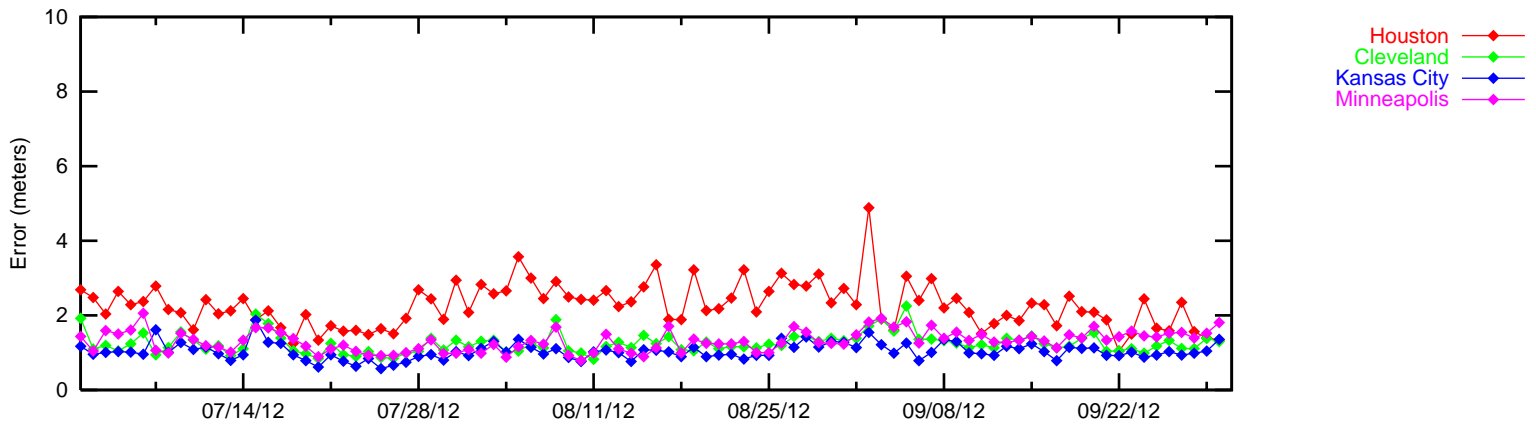
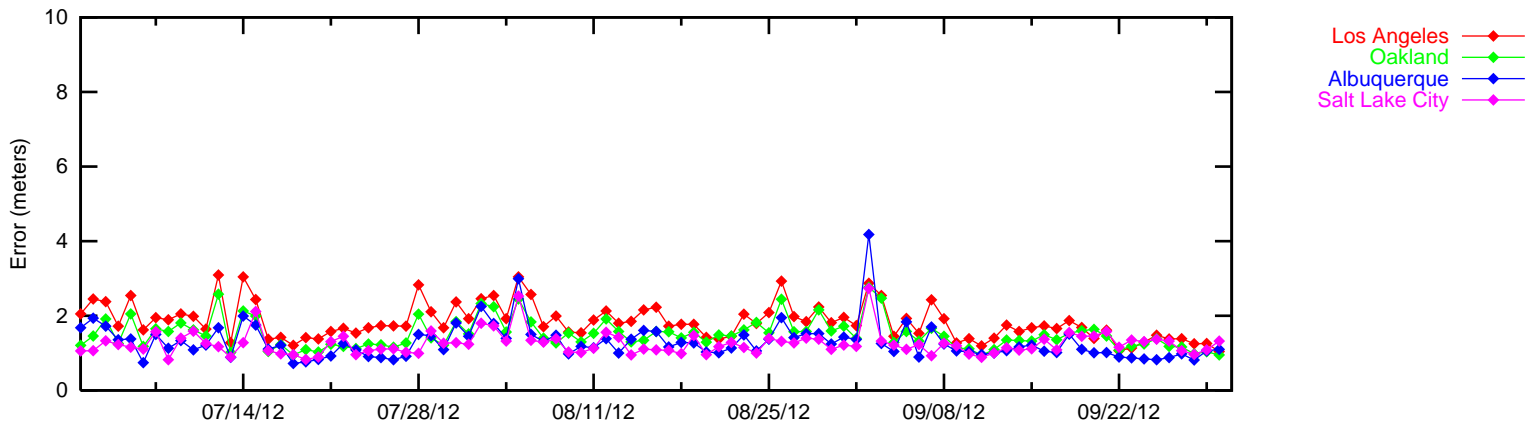
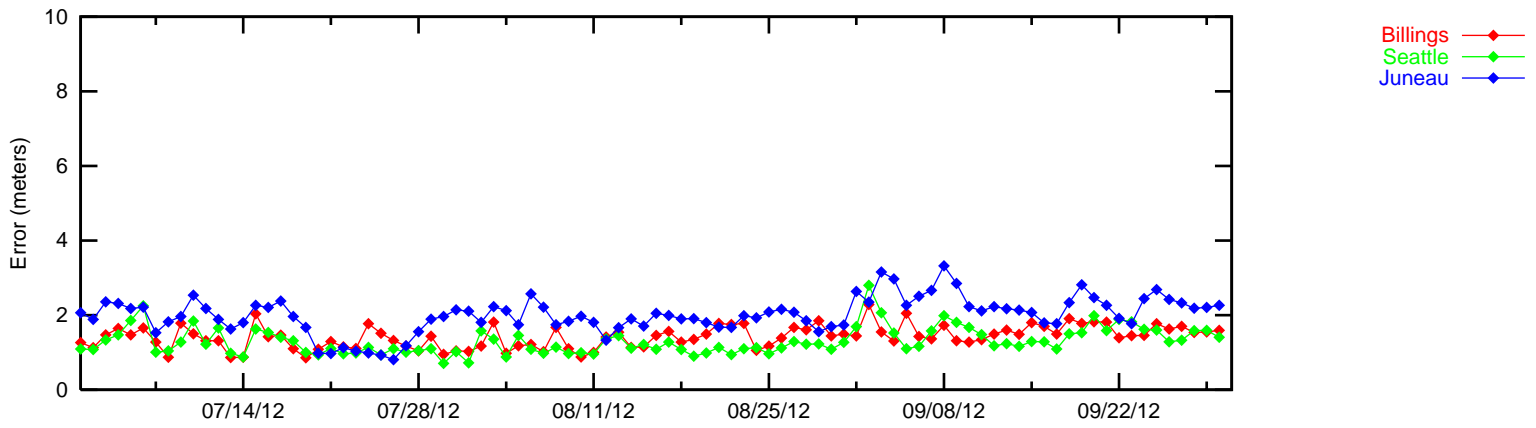
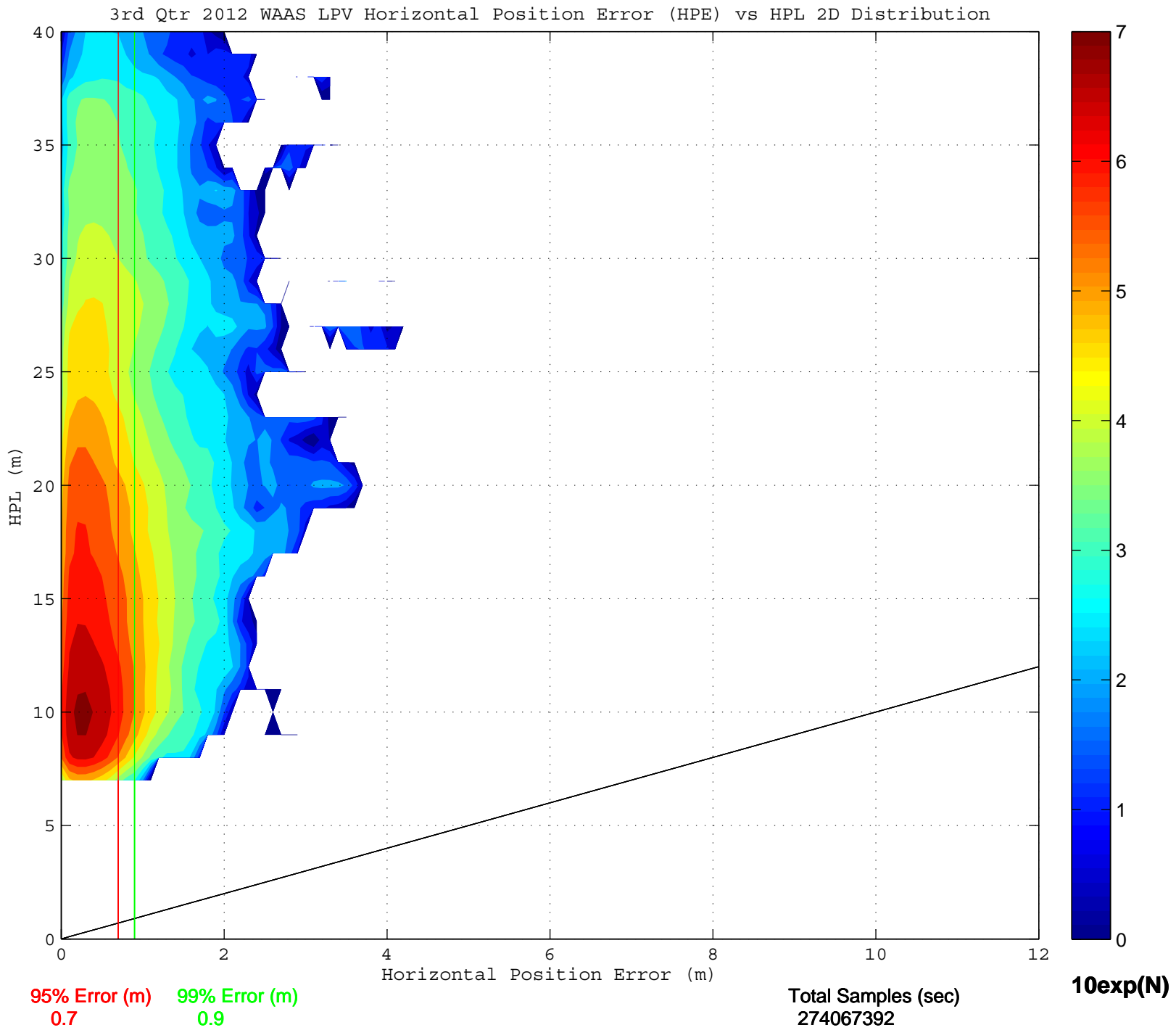


Figure 2-7 NPA 95% Horizontal Accuracy

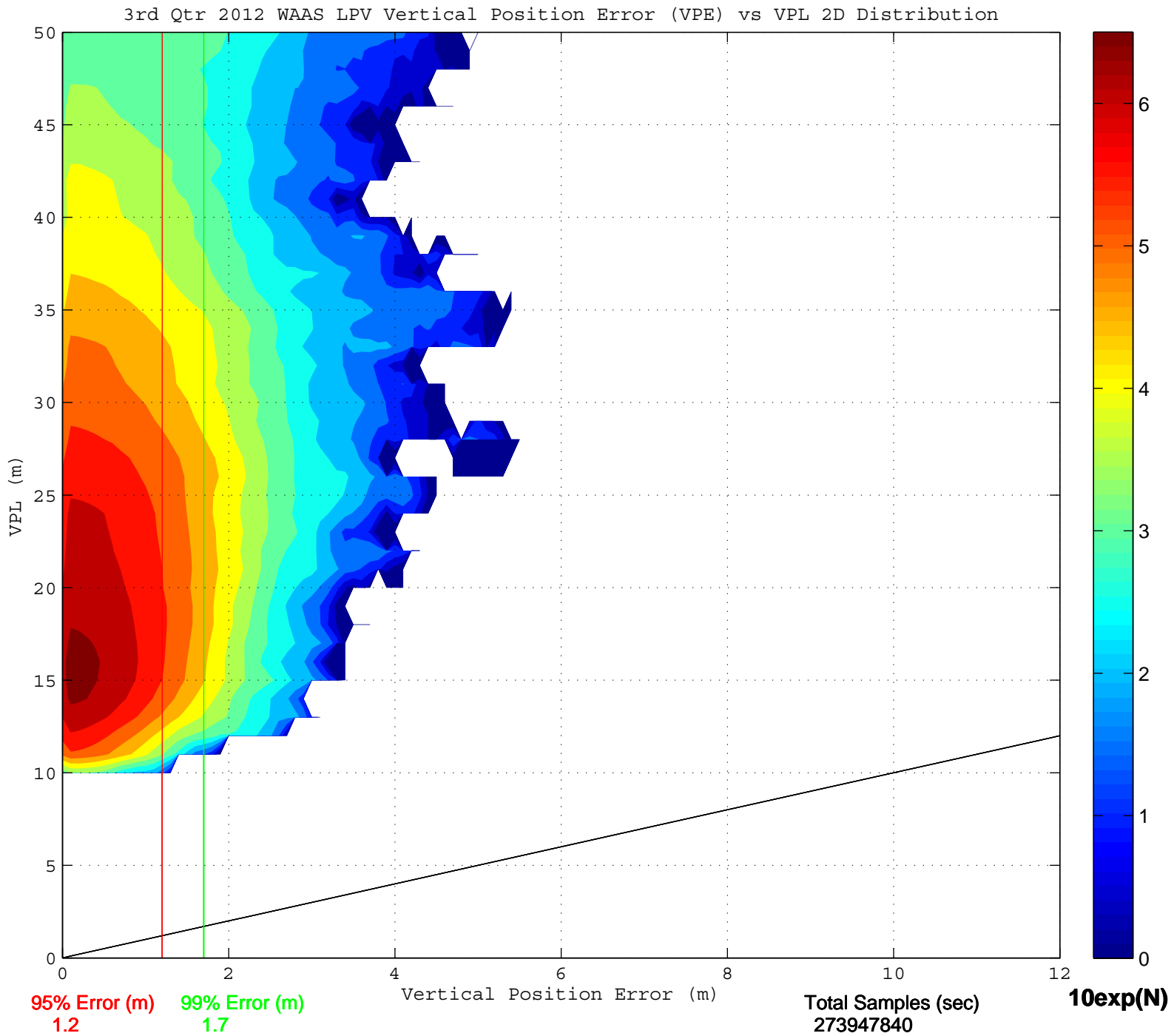


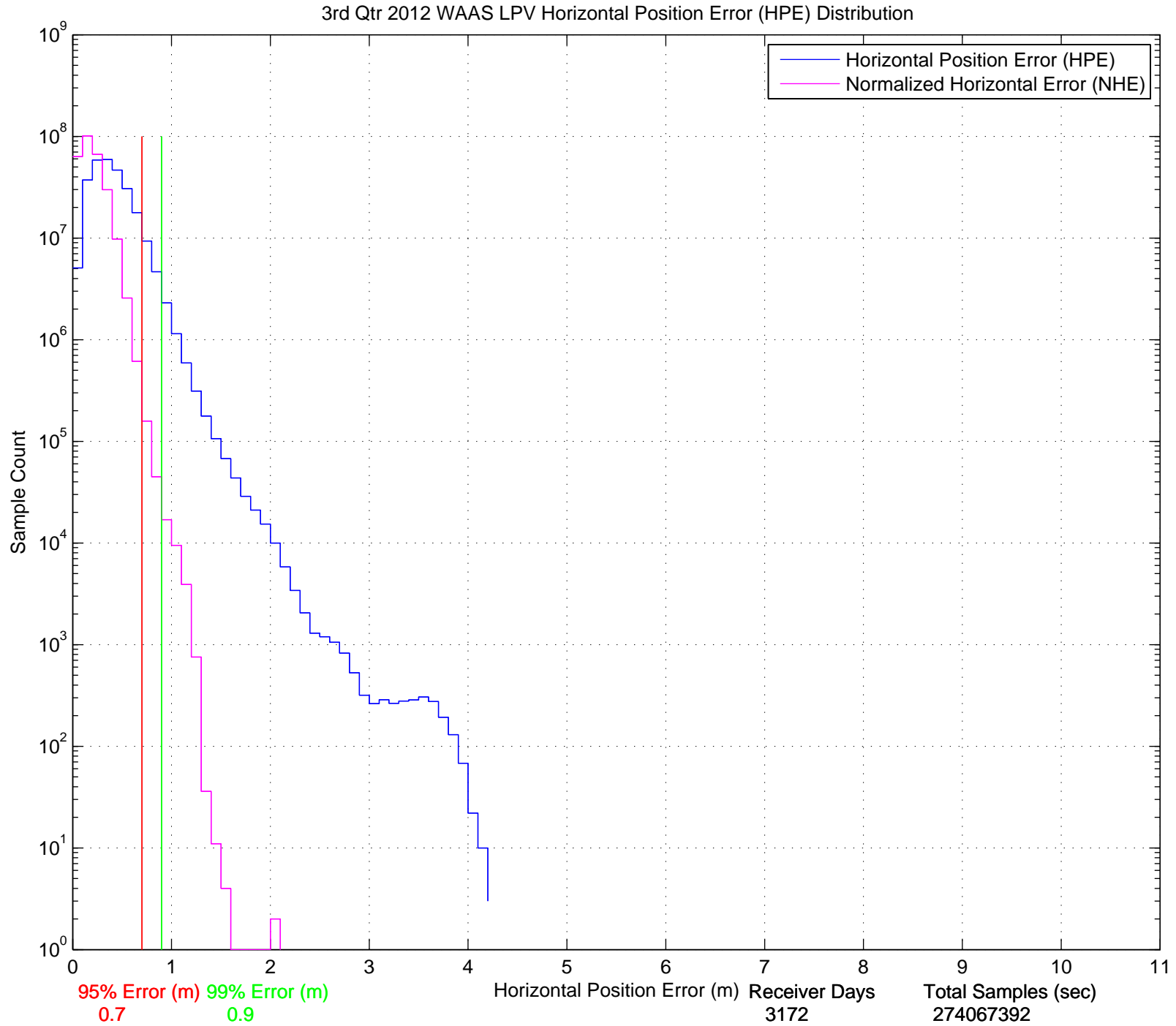
# Figure 2-8 NPA 95% Horizontal Accuracy

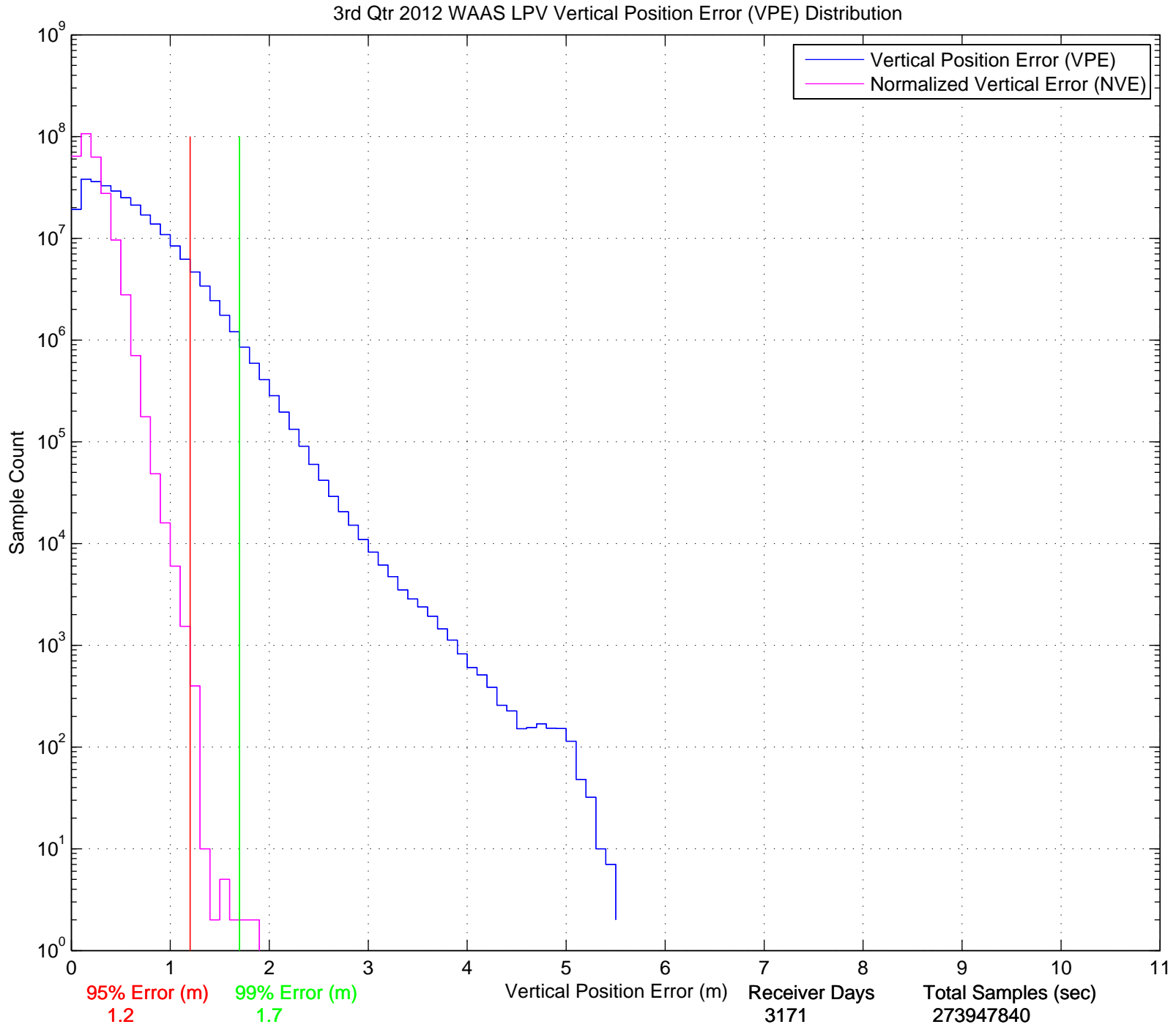












### 3.0 AVAILABILITY

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 19.32 meters at Miami and 41.41 meters, at Arcata, respectively. The minimum 99% CONUS HPL and VPL are 10.81 meters at Denver and 18.76 meters at Chicago, respectively. The maximum 99% Alaska HPL and VPL are 29.06 meters and 37.76 meters, both at Cold Bay, respectively. The minimum 99% Alaska HPL and VPL are 13.365 meters at Fairbanks and 22.93 meters at Juneau, 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.

Winnipeg receivers were out of service for an extended period of time due to site construction. Upon the receivers' return to service on August 15<sup>th</sup>, Canada availability increased at Iqaluit and vicinity.

WAAS communication outage to the northern Alaska sites on September 5<sup>th</sup> caused elevated UDRE values on GPS satellites critical to northern Alaska region reducing Alaska availability.

Geomagnetic activity on July 10<sup>th</sup> and September 30<sup>th</sup> elevated GIVE and UDRE values and reduced Alaska availability. Geomagnetic activity on September 19<sup>th</sup>-20<sup>th</sup> elevated GIVE values and reduced Canada availability. Elevated UDRE value PRN 135 on September 13<sup>th</sup> reduced Alaska and Mexico availability.

SV alert on PRN 21 on July 16<sup>th</sup> and September 14<sup>th</sup> reduced CONUS and Alaska availability. SV alert on PRN 21 on September 7<sup>th</sup> reduced Mexico availability. SV alert on PRN 4 on August 9<sup>th</sup> slightly reduced CONUS, Alaska and Mexico availability; [see DR 110 PRN4 Carrier Phase Anomalies Cause WAAS SV Alerts.](#)

Planned maintenance on PRN 7 on July 5<sup>th</sup> reduced CONUS and Alaska availability. Planned maintenance on PRN 21 on August 28-29<sup>th</sup> significantly reduced CONUS, Alaska and Canada availability. Planned maintenance on PRN 4 on September 24<sup>th</sup> significantly reduced CONUS, Canada and Mexico availability.

Manual GUS switchover on July 20<sup>th</sup> and August 24<sup>th</sup> reduced Alaska PA availability. Manual GUS switchover on July 31<sup>st</sup> and August 1<sup>st</sup> reduced CONUS and Alaska PA availability.

Radio frequency interference (RFI) caused localized loss of LPV and LPV200 availability at Miami, Boston, and Albuquerque on the dates listed in Table 1.5. The local RFI had no effect on WAAS service.

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

<b>Location</b>	<b>99% HPL (meters)</b>	<b>99% VPL (meters)</b>	<b>Percentage in PA mode</b>
Arcata	14.883	41.412	100
Atlantic City	14.123	22.379	100
Grand Forks	13.316	23.441	100
Oklahoma City	12.159	22.270	100
Albuquerque	12.145	24.965	99.999870
Anchorage	14.308	23.457	100
Atlanta	12.020	19.595	100
Barrow	17.386	34.347	100
Bethel	18.776	29.690	100
Billings	11.532	21.482	100
Boston	14.946	22.508	100
Chicago	11.720	18.768	100
Cleveland	12.658	20.370	100
Cold Bay	29.060	37.766	100
Dallas	12.706	23.114	100
Denver	10.816	21.305	100
Fairbanks	13.365	24.134	100
Gander	24.183	37.935	100
Goose Bay	19.444	28.938	100
Houston	11.632	23.532	100
Iqaluit	28.044	40.397	100
Jacksonville	14.047	21.236	100
Juneau	13.804	22.937	100
Kansas City	11.405	19.509	100
Kotzebue	16.461	32.087	100
Los Angeles	14.906	27.177	100
Memphis	11.318	19.004	100
Merida	21.310	33.012	100
Mexico City	31.457	39.851	100
Miami	19.327	29.025	99.999620
Minneapolis	11.937	21.573	100
New York	14.577	22.353	100
Oakland	14.907	39.837	100
Puerto Vallarta	33.179	47.507	100
Salt Lake City	11.560	21.283	100
San Jose Del Cabo	28.285	43.391	100
Seattle	14.525	29.843	100
Washington DC	12.854	20.683	100
Winnipeg	13.384	22.116	100

**Table 3-2 Quarterly Availability Statistics**

<b>Location</b>	<b>LP WAAS With 15 minute window</b>	<b>LPV WAAS With 15 minute window</b>	<b>LPV 200 WAAS With 15 minute window</b>
Arcata	1	0.999968	0.971177
Atlantic City	1	1	1
Grand Forks	1	0.999971	0.999799
Oklahoma City	1	1	1
Albuquerque	0.999996	0.999996	0.999918
Anchorage	1	1	0.99983
Atlanta	1	1	1
Bangor	0.999555	0.999555	0.996389
Barrow	1	0.999917	0.990308
Bethel	1	1	0.99943
Billings	1	0.999925	0.999799
Boston	1	1	0.999918
Chicago	1	1	1
Cleveland	1	1	1
Cold Bay	0.999996	0.999819	0.962107
Dallas	1	1	1
Denver	1	1	0.999942
Fairbanks	1	1	0.999739
Gander	0.999837	0.999321	0.962422
Goose Bay	0.999708	0.999674	0.998746
Honolulu	0	0	0
Houston	1	1	1
Iqaluit	0.999173	0.997496	0.947693
Jacksonville	1	1	1
Juneau	1	1	0.999549
Kansas City	1	1	0.999919
Kotzebue	1	1	0.996375
Los Angeles	1	1	0.999602
Memphis	1	1	1
Merida	1	0.999865	0.995275
Mexico City	0.999826	0.996264	0.951818
Miami	0.999971	0.999467	0.996943
Minneapolis	1	1	0.999934
New York	1	1	1
Oakland	1	0.997082	0.980422
Puerto Vallarta	0.999469	0.994338	0.913197
Salt Lake City	1	1	0.999995
San Jose Del Cabo	0.999805	0.994477	0.932125
Seattle	1	0.999995	0.999223
Tapachula	0.023438	0.023438	0.016844
Washington DC	1	1	0.999986
Winnipeg	1	1	0.999651

**Table 3-3 NPA Availability**

<b>Location</b>	<b>NPA Availability (Excluding RAIM/FDE)</b>
Albuquerque	1
Anchorage	1
Atlanta	1
Barrow	1
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	1
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	6	0.000128	88	0.001926
Atlantic City	0	0	0	0	0	0
Grand Forks	0	0	1	0.00002	2	0.000039
Oklahoma City	0	0	0	0	0	0
Albuquerque	3	0.000057	3	0.000057	7	0.000132
Anchorage	0	0	0	0	2	0.000038
Atlanta	0	0	0	0	0	0
Bangor	16	0.000303	16	0.000303	49	0.00093
Barrow	0	0	4	0.000076	135	0.002574
Bethel	0	0	0	0	4	0.000076
Billings	0	0	1	0.000019	3	0.000057
Boston	0	0	0	0	12	0.000227
Chicago	0	0	0	0	0	0
Cleveland	0	0	0	0	0	0
Cold Bay	1	0.000019	3	0.000057	246	0.004827
Dallas	0	0	0	0	0	0
Denver	0	0	0	0	1	0.000019
Fairbanks	0	0	0	0	4	0.000076
Gander	1	0.000019	8	0.000151	220	0.004317
Goose Bay	1	0.000019	1	0.000019	7	0.000132
Houston	0	0	0	0	0	0
Iqaluit	7	0.000132	21	0.000397	468	0.009322
Jacksonville	0	0	0	0	0	0
Juneau	0	0	0	0	3	0.000057
Kansas City	0	0	0	0	1	0.000019
Kotzebue	0	0	1	0.000019	69	0.001307
Los Angeles	0	0	0	0	34	0.000642
Memphis	0	0	0	0	0	0
Merida	0	0	3	0.000057	112	0.002126
Mexico City	5	0.000094	103	0.001952	577	0.011446
Miami	4	0.000076	6	0.000113	74	0.001403
Minneapolis	0	0	0	0	1	0.000019
New York	0	0	0	0	0	0
Oakland	0	0	90	0.001704	97	0.001868
Puerto Vallarta	9	0.000172	104	0.001997	759	0.015865
Salt Lake City	0	0	0	0	1	0.000019
San Jose Del Cabo	1	0.000019	107	0.002031	367	0.007433
Seattle	0	0	1	0.000019	26	0.000491
Tapachula	211	0.170058	211	0.170058	186	0.208603
Washington DC	0	0	0	0	2	0.000038
Winnipeg	0	0	0	0	1	0.000037

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

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

Figure 3-1 LPV Instantaneous Availability

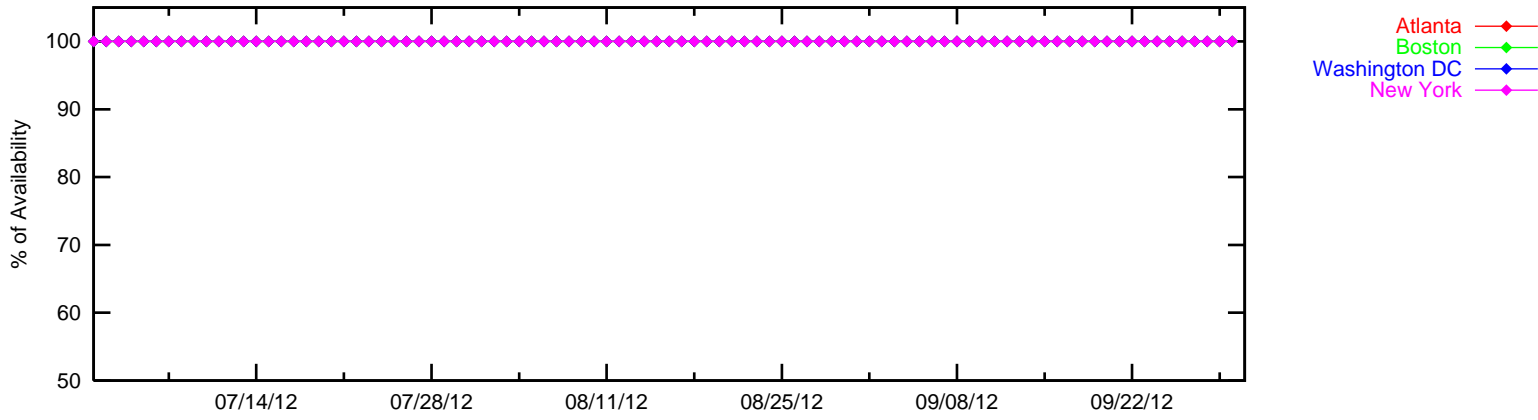
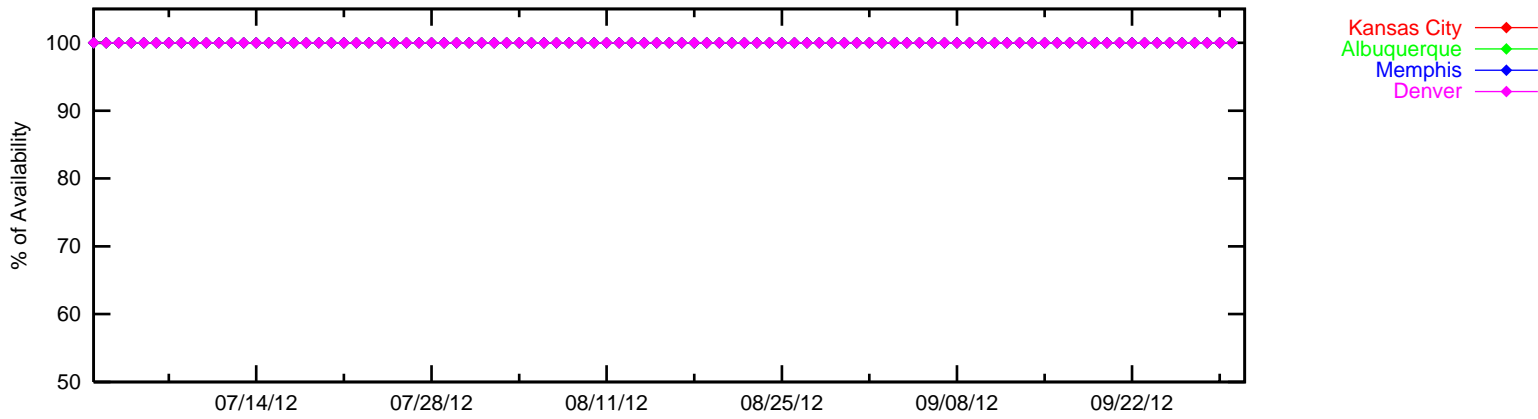
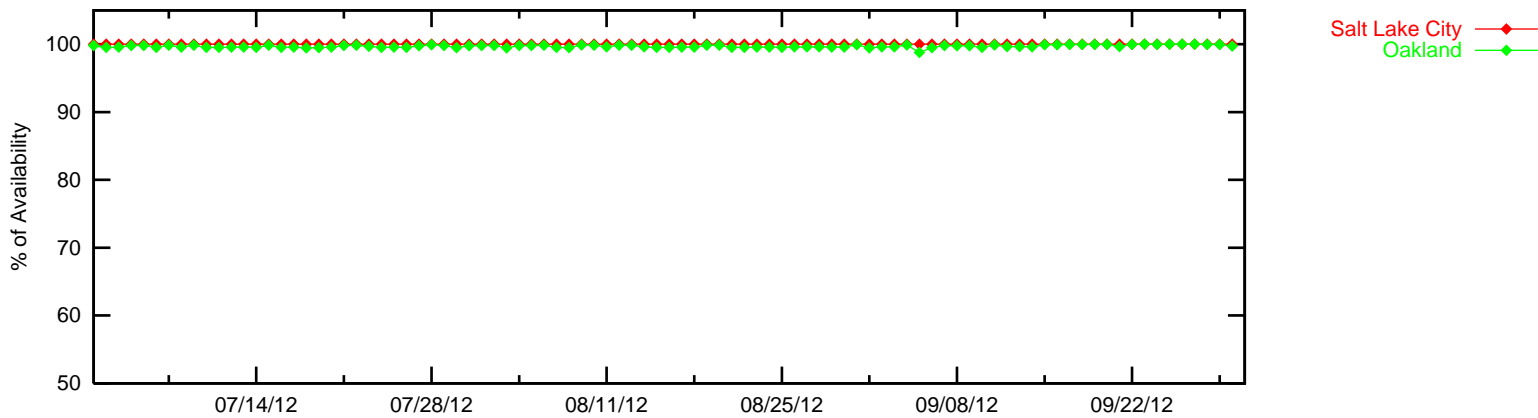
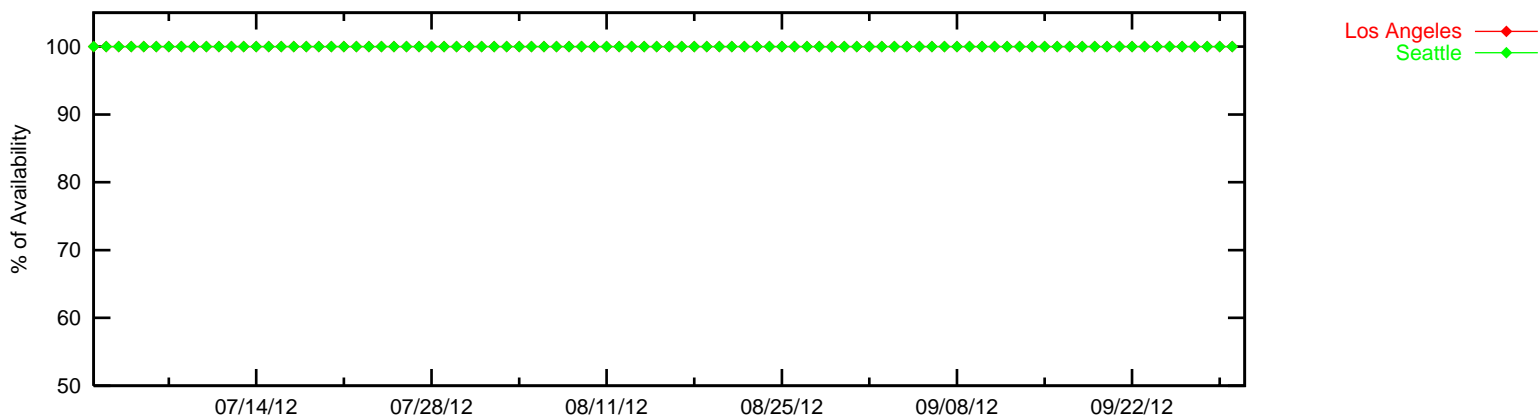


Figure 3-2 LPV Instantaneous Availability

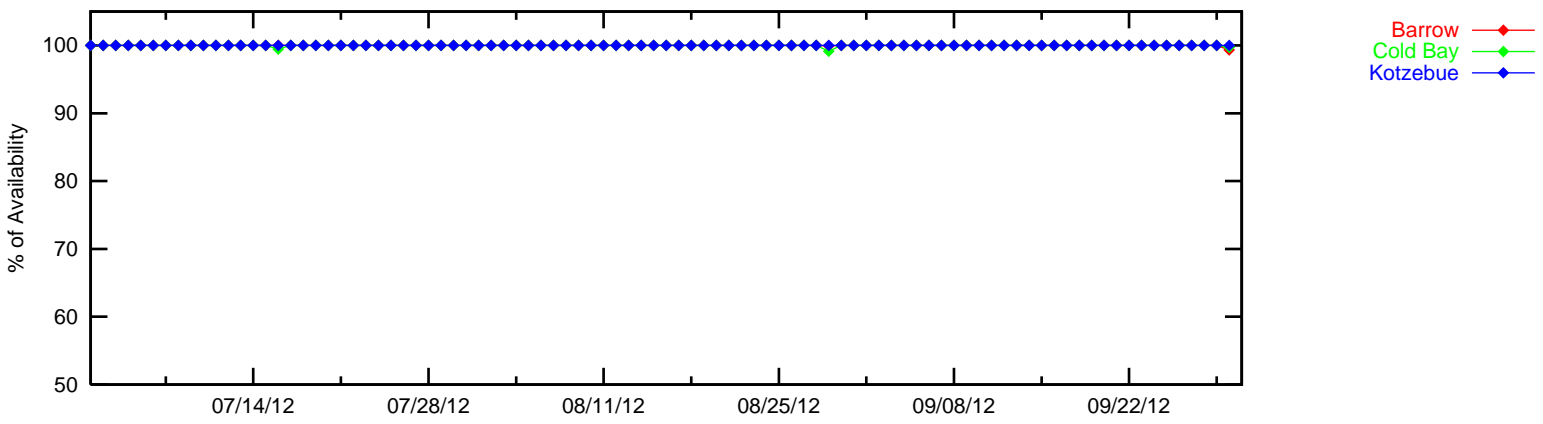
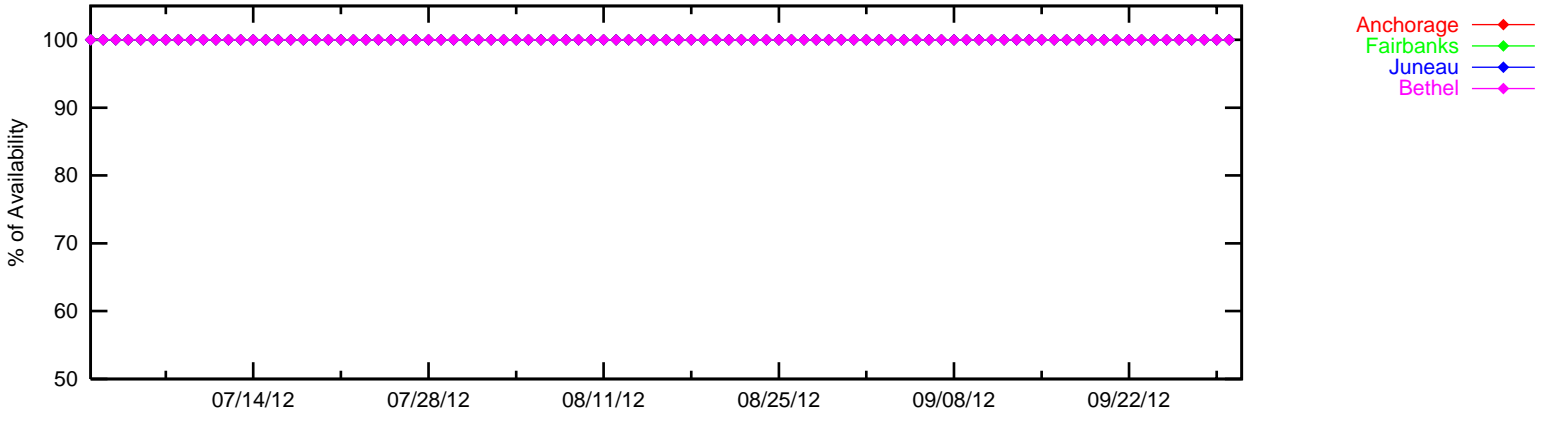
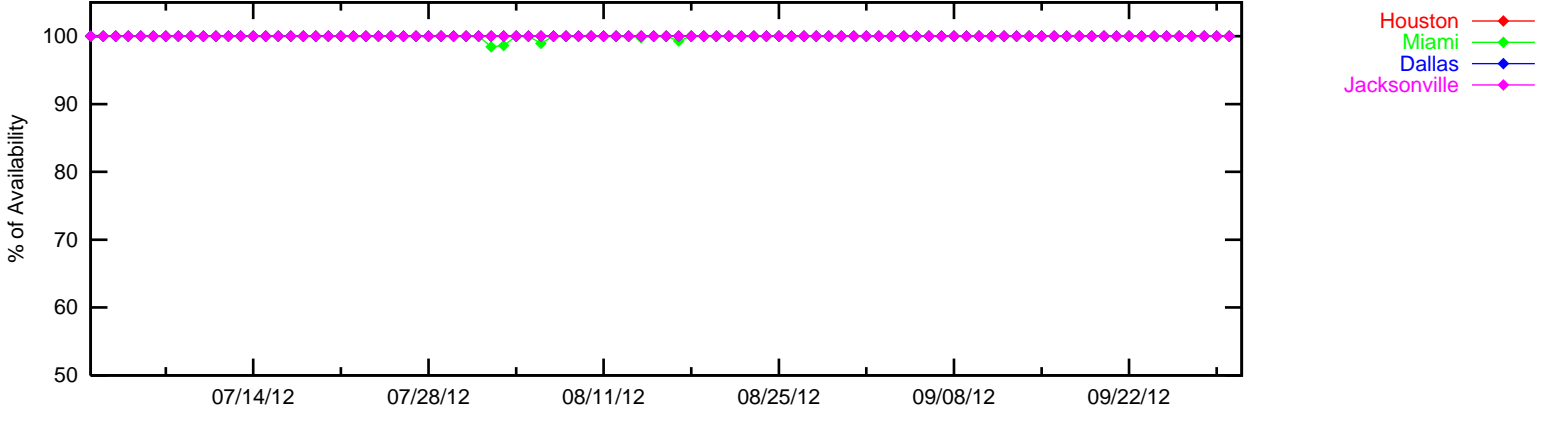
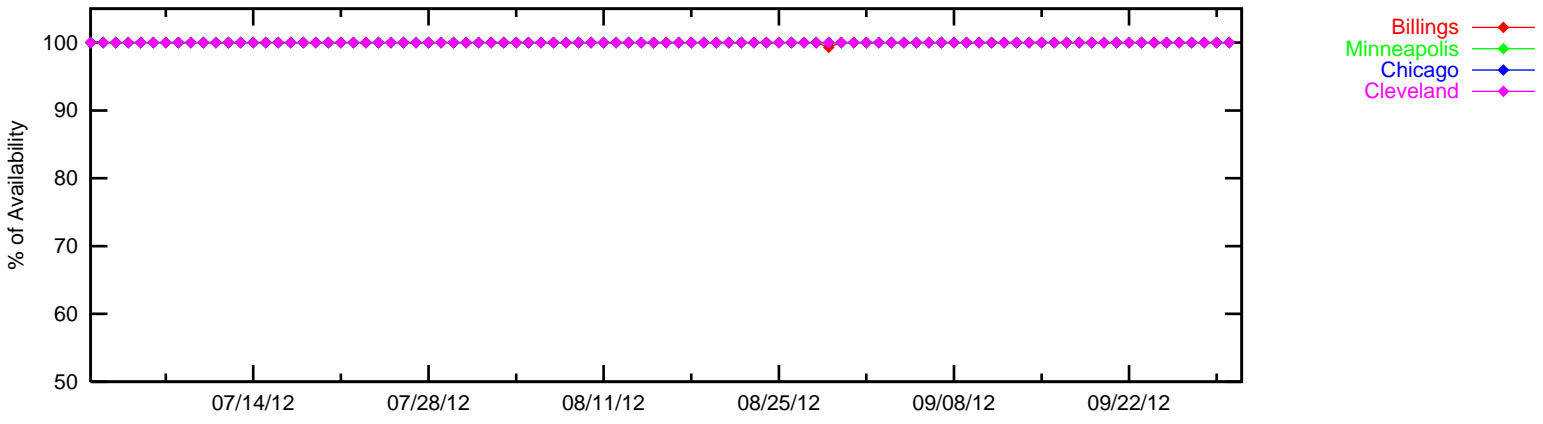


Figure 3-3 LPV Instantaneous Availability

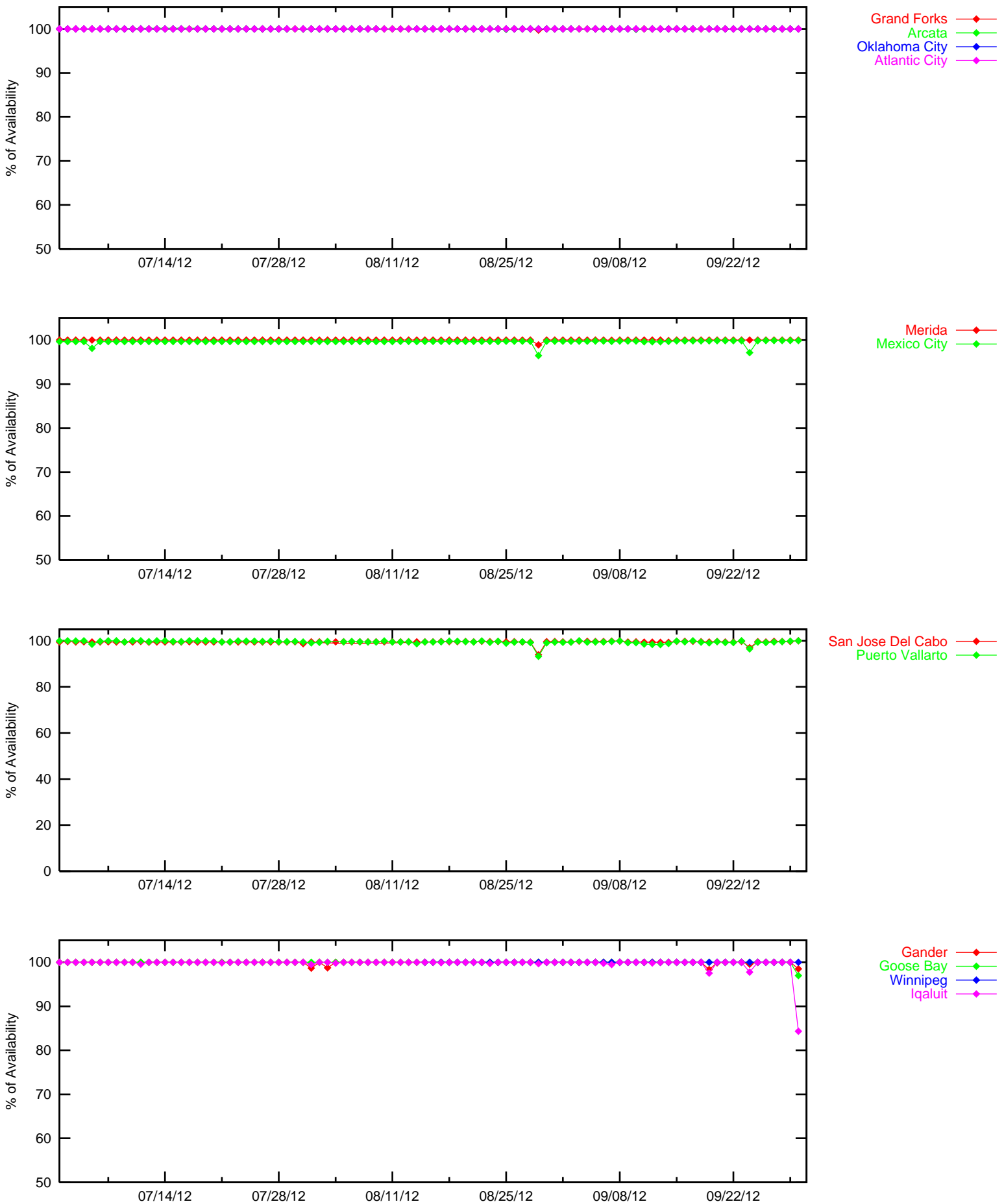


Figure 3-4 LPV 200 Instantaneous Availability

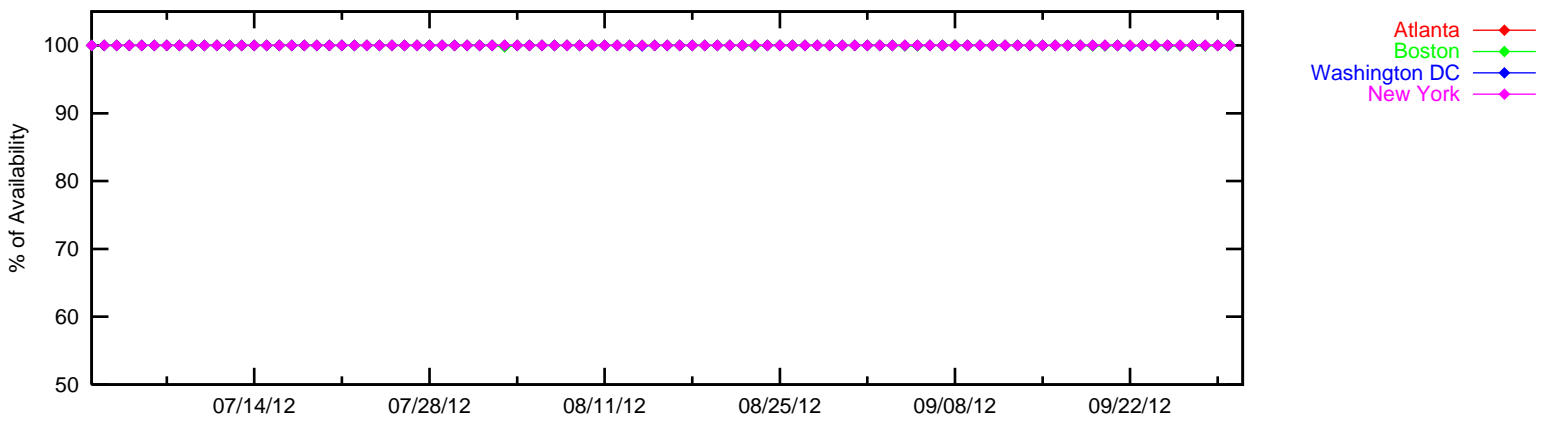
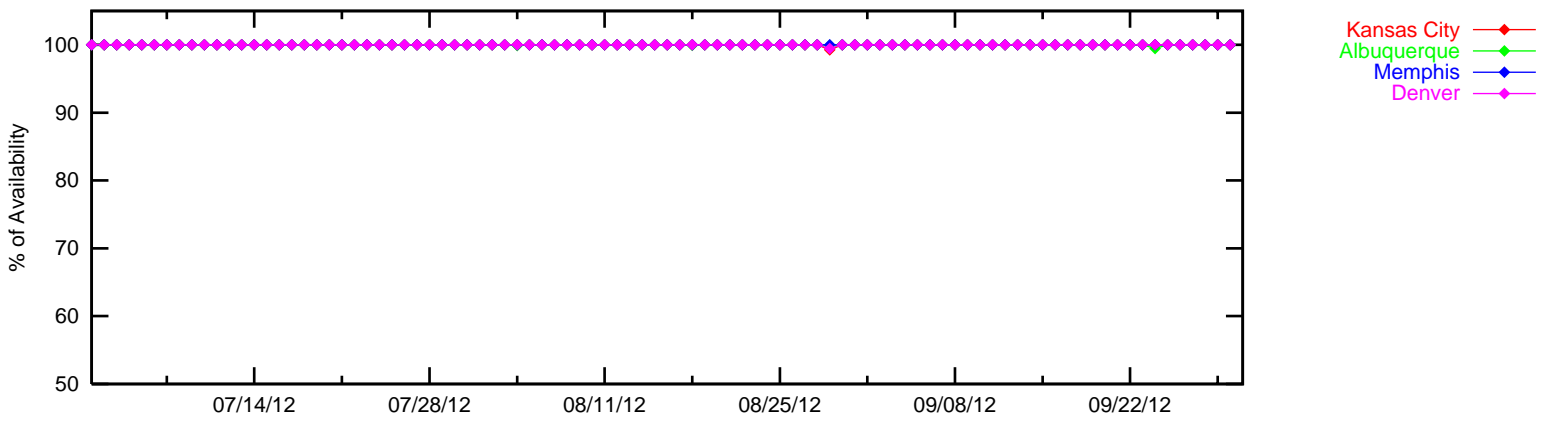
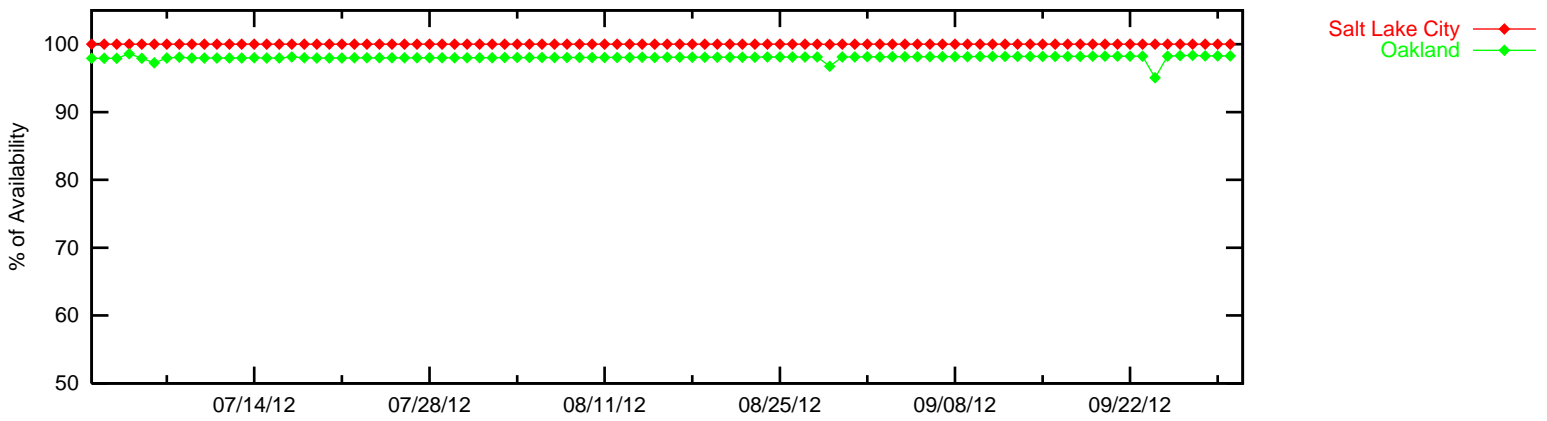
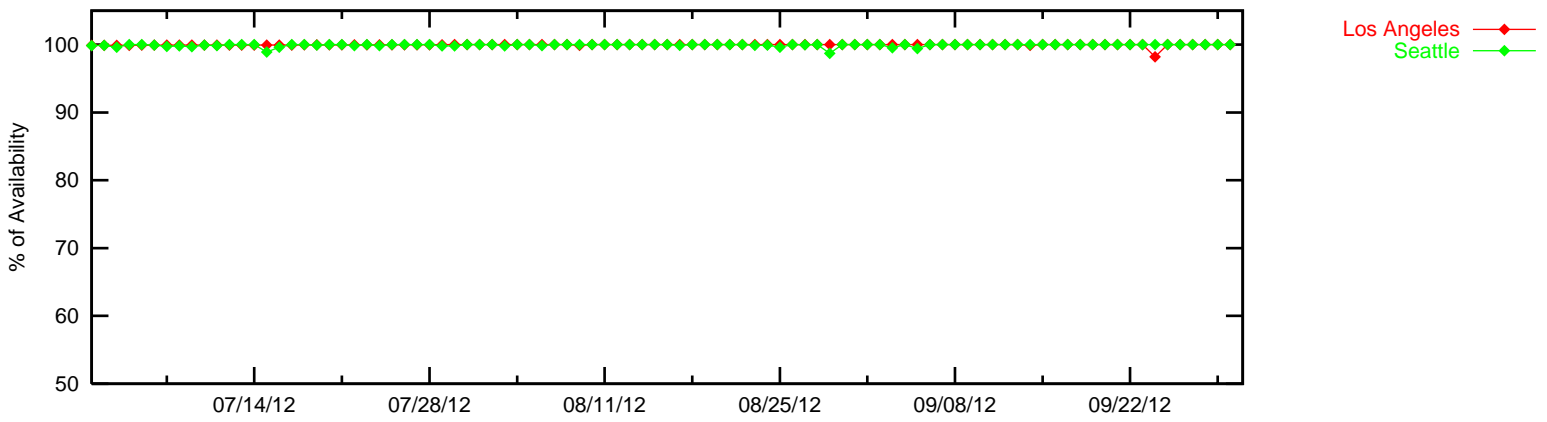


Figure 3-5 LPV 200 Instantaneous Availability

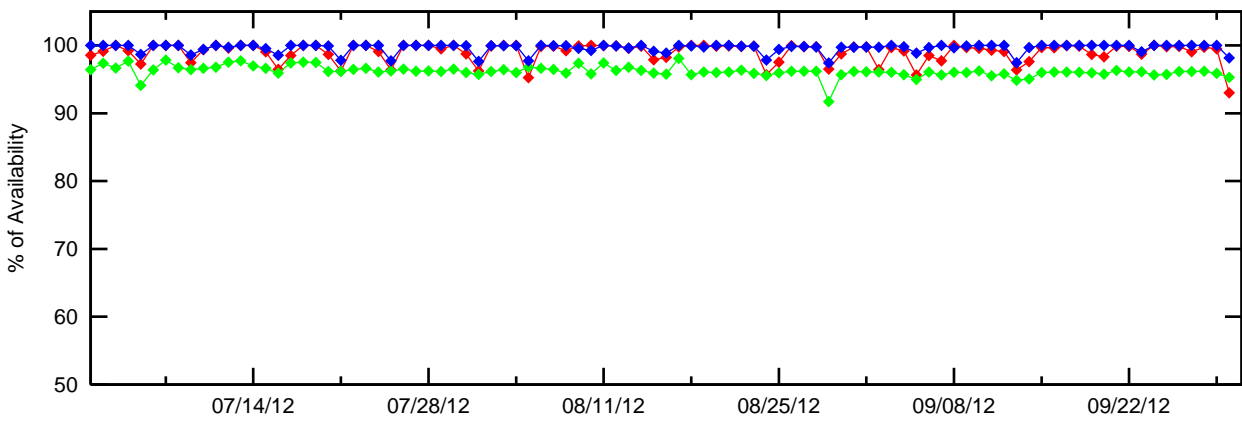
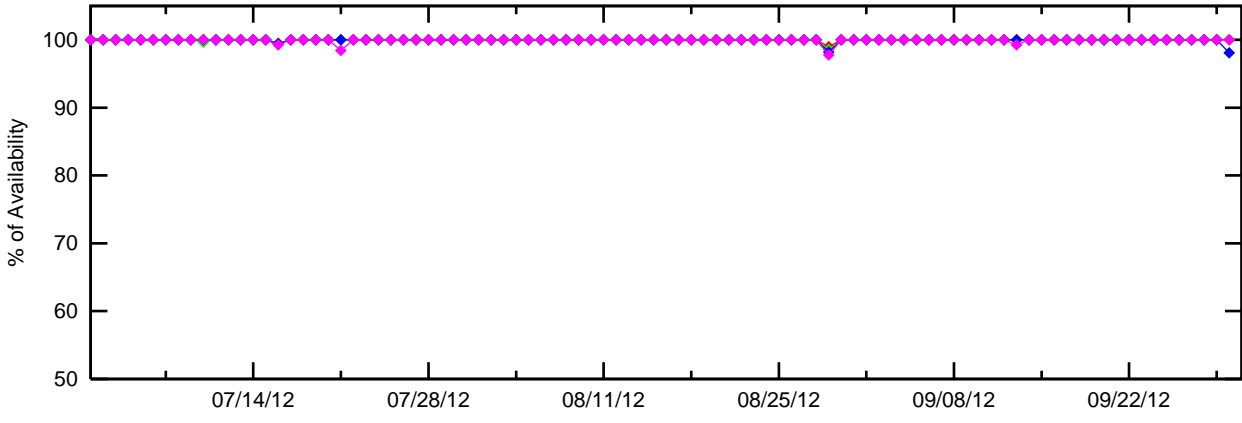
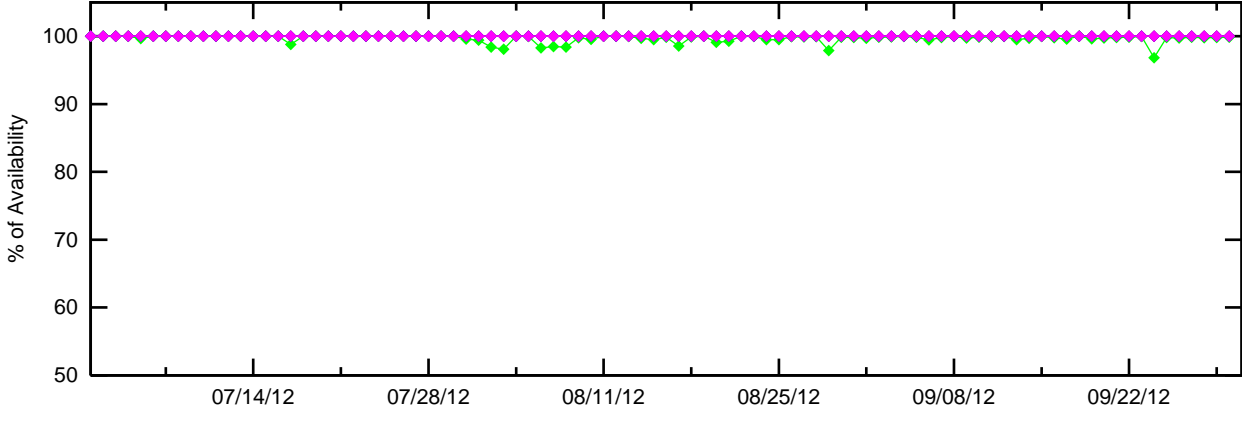
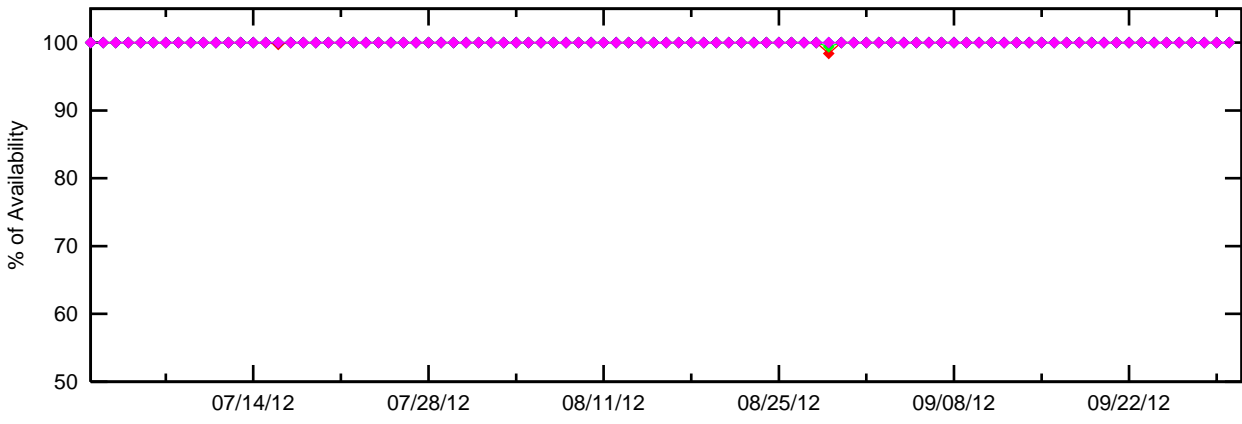


Figure 3-6 LPV 200 Instantaneous Availability

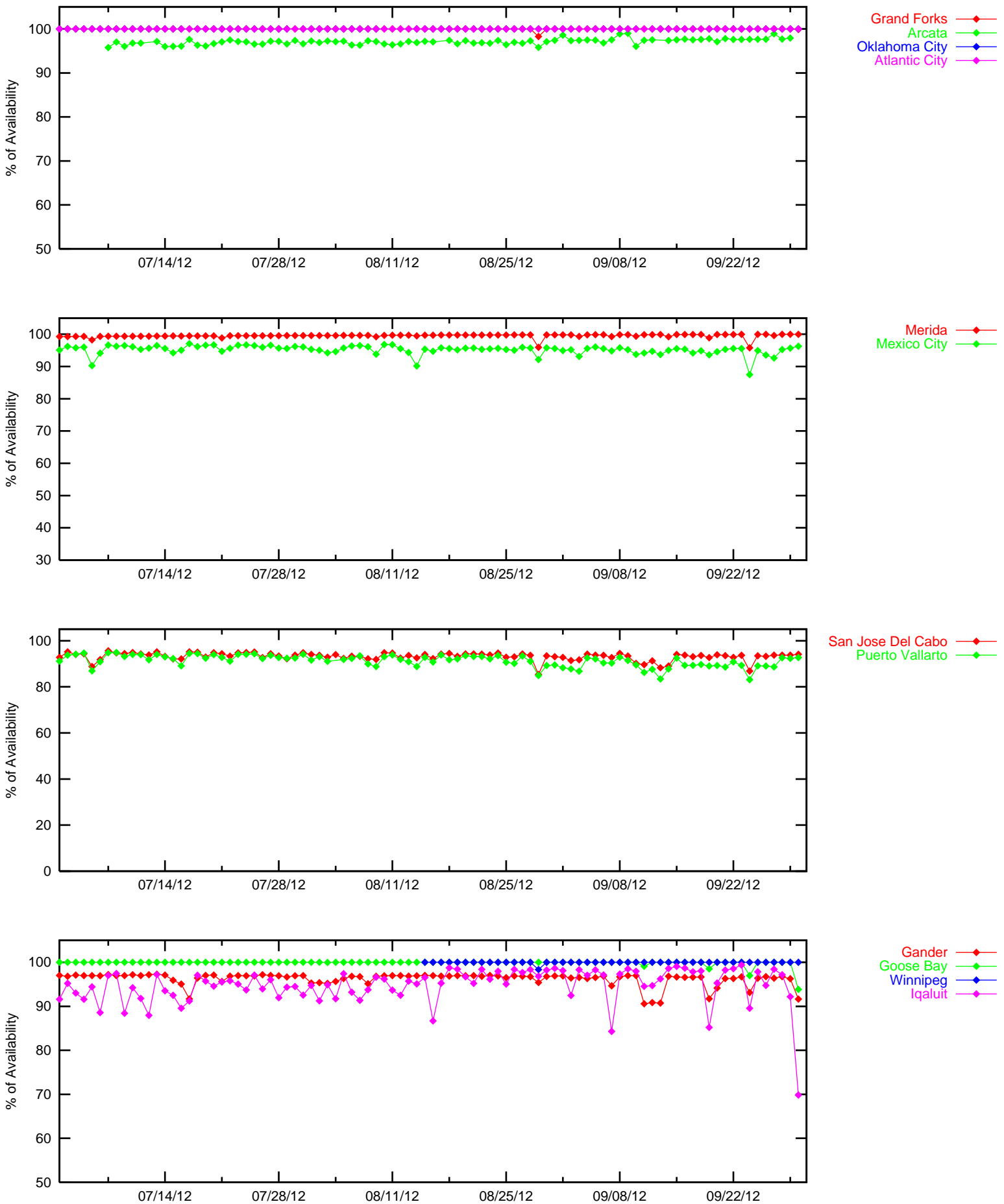
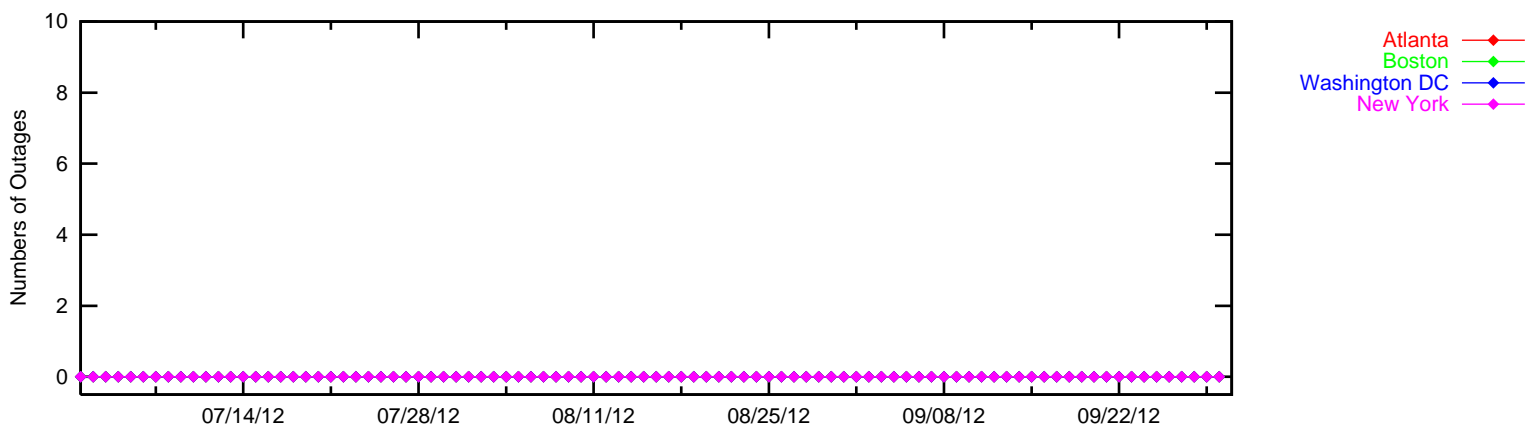
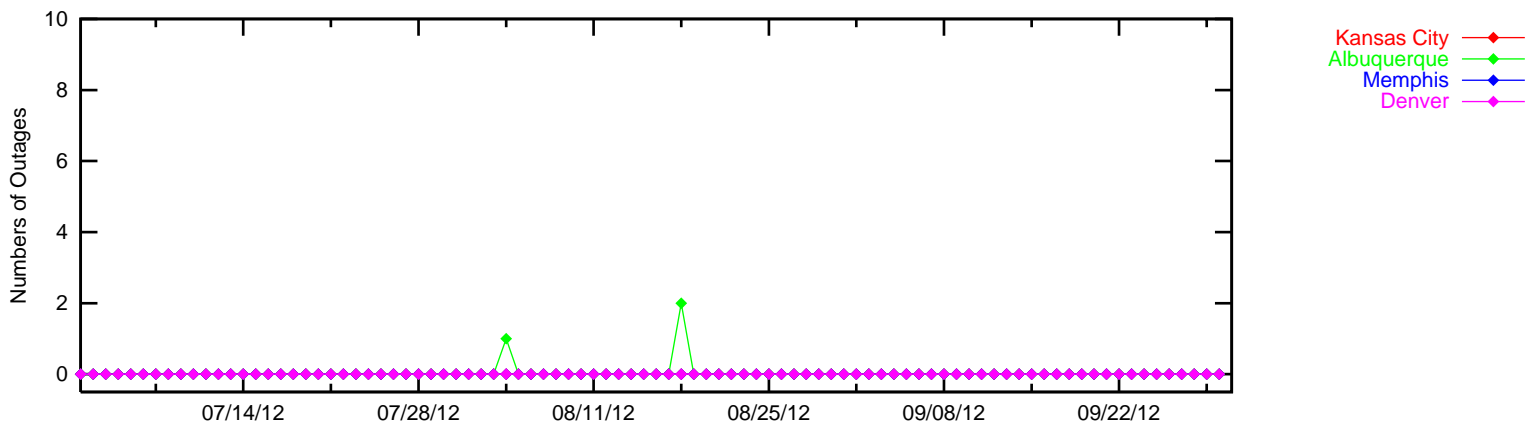
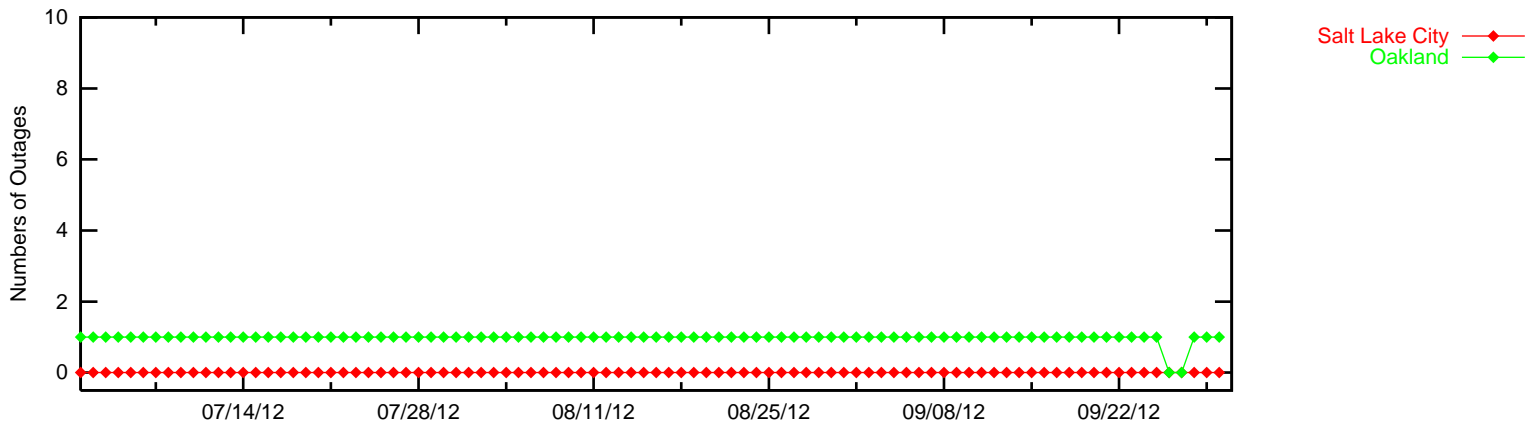
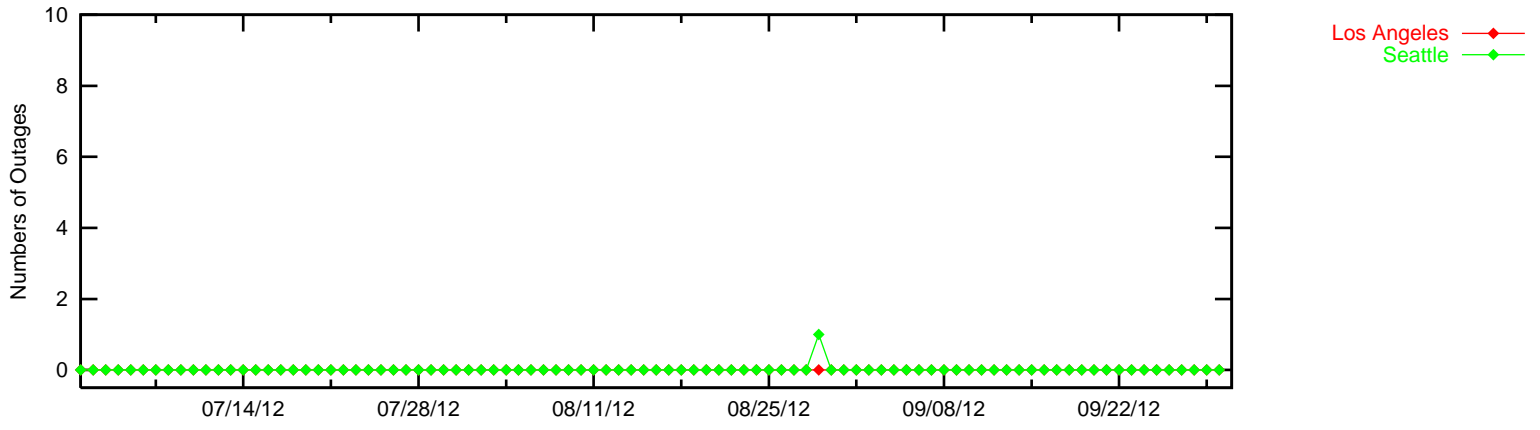




Figure 3-7 LPV Outages



### Figure 3-8 LPV Outages

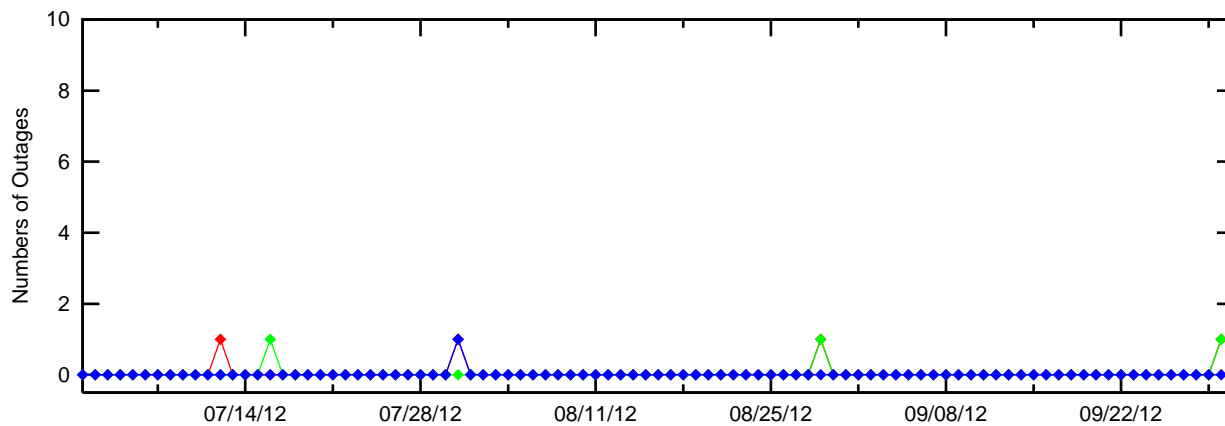
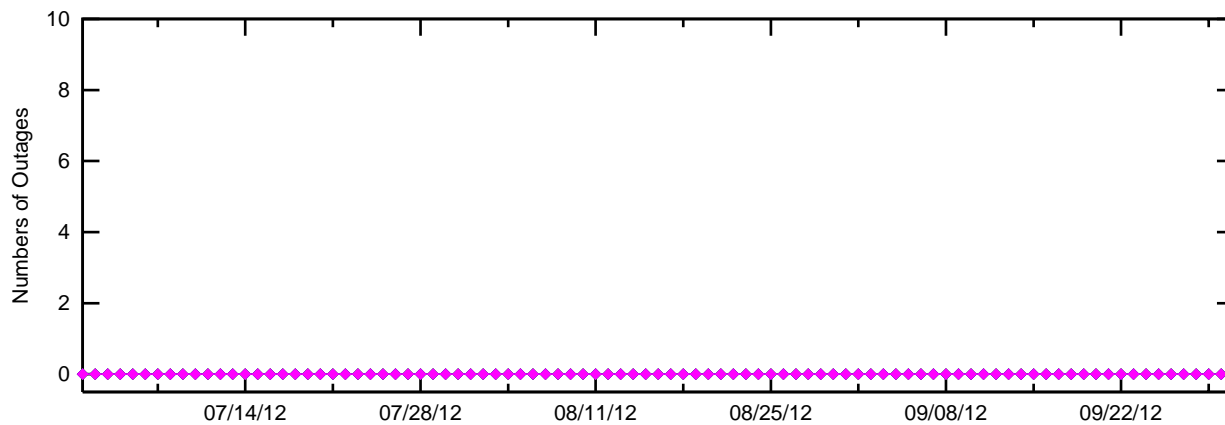
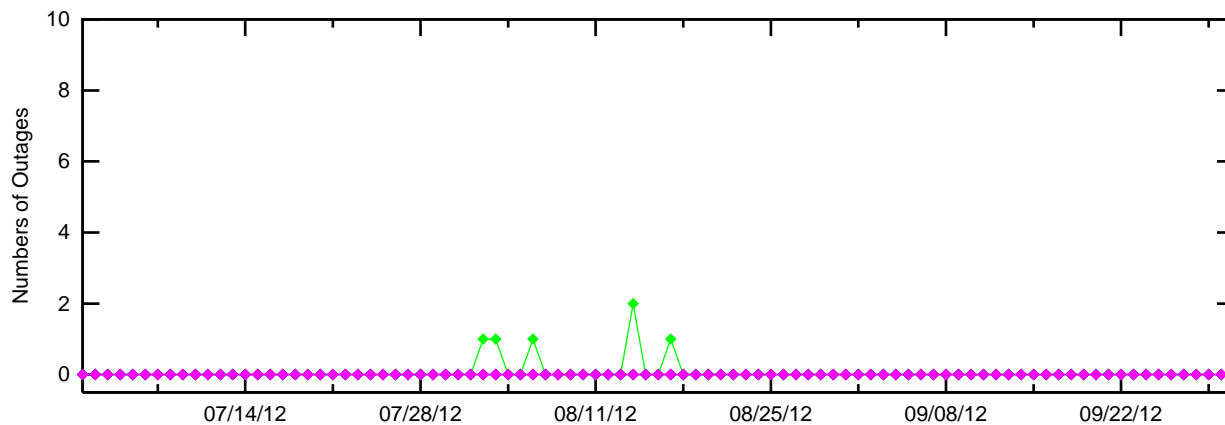
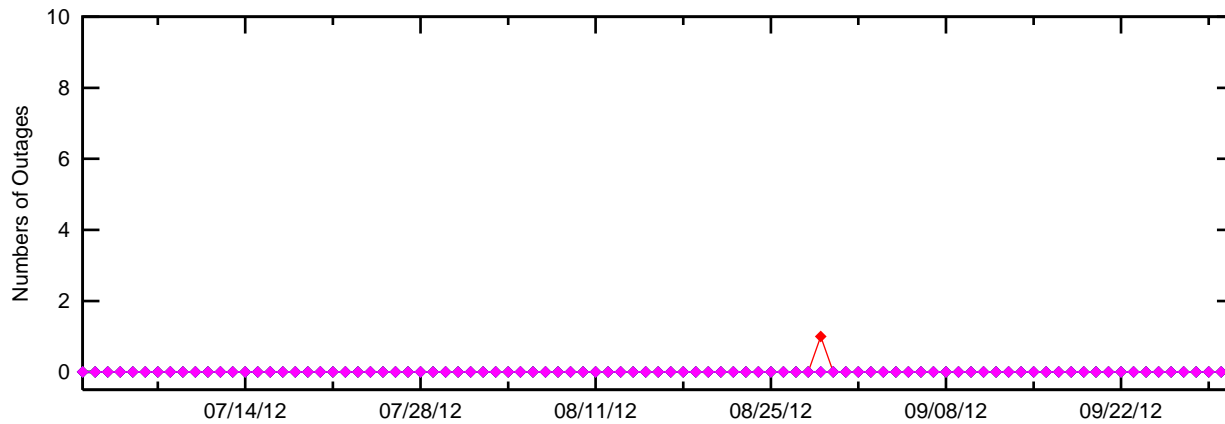
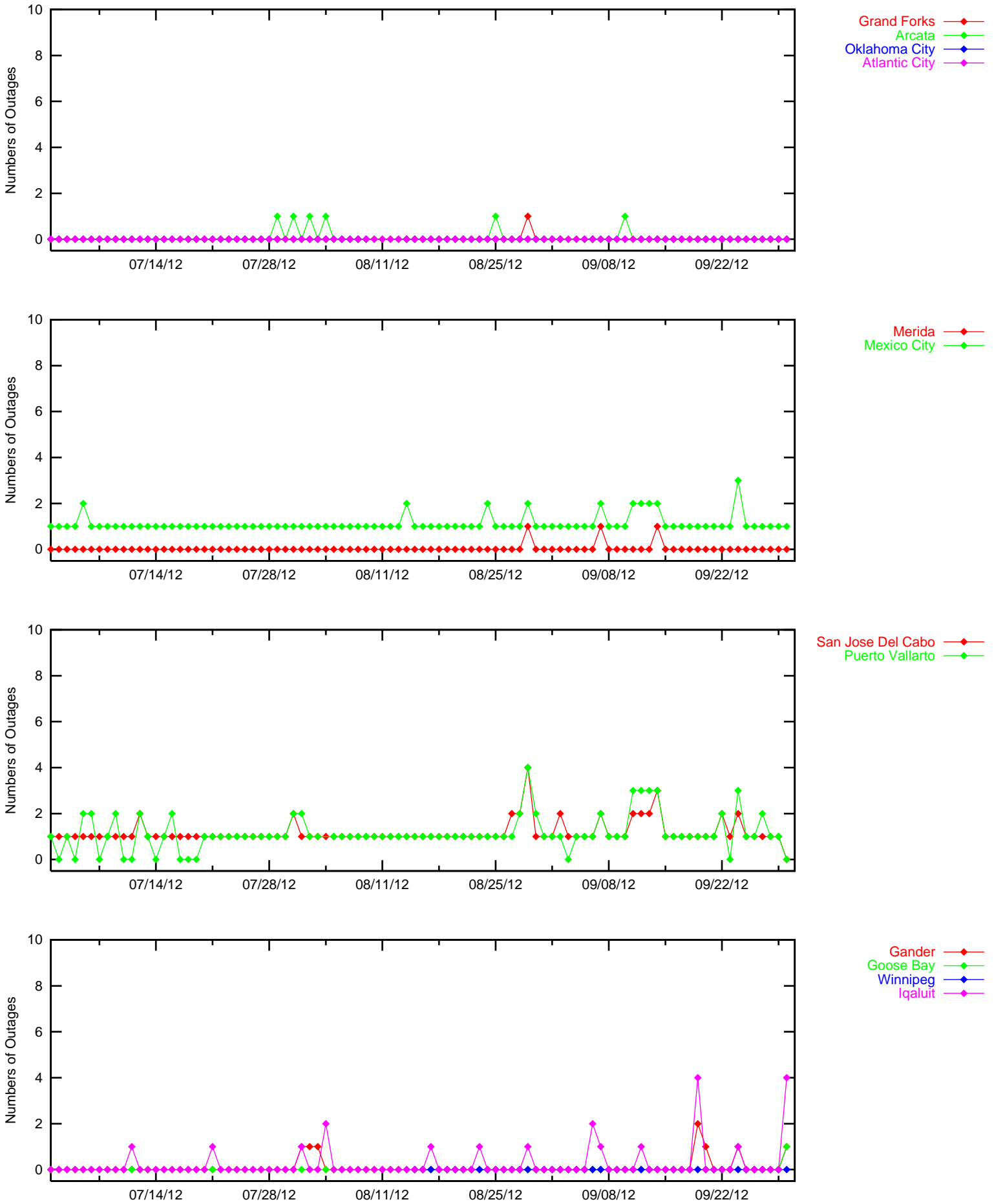


Figure 3-9 LPV Outages



# Figure 3-10 LPV 200 Outages

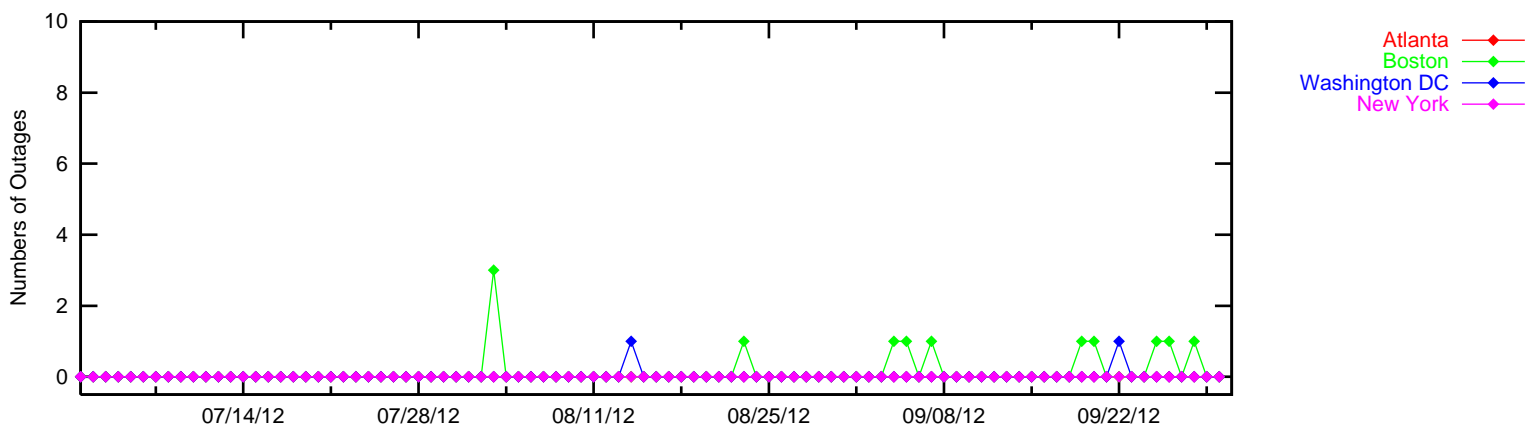
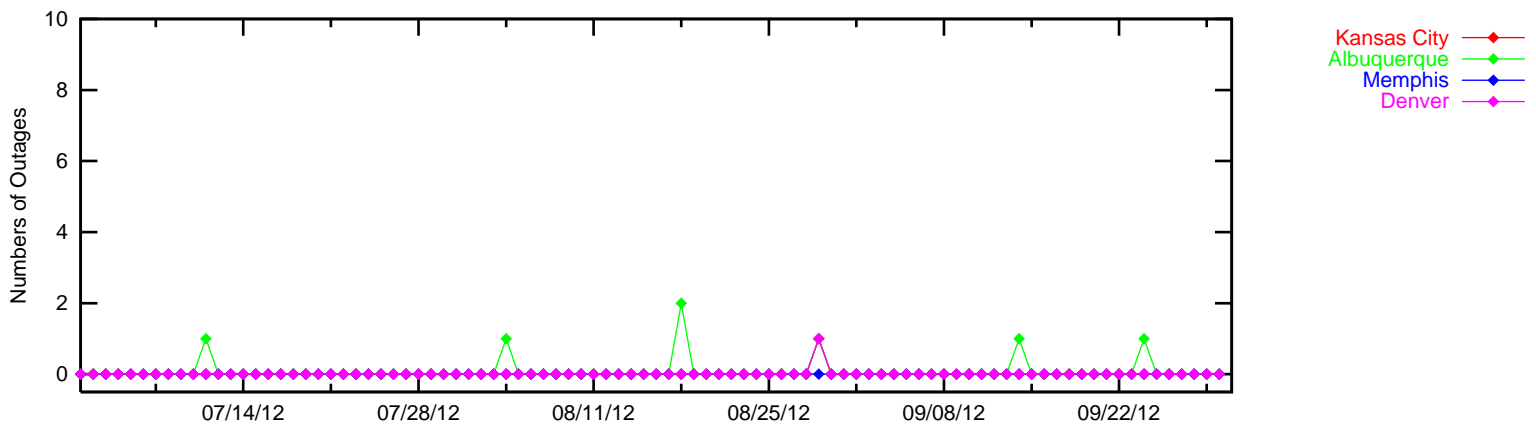
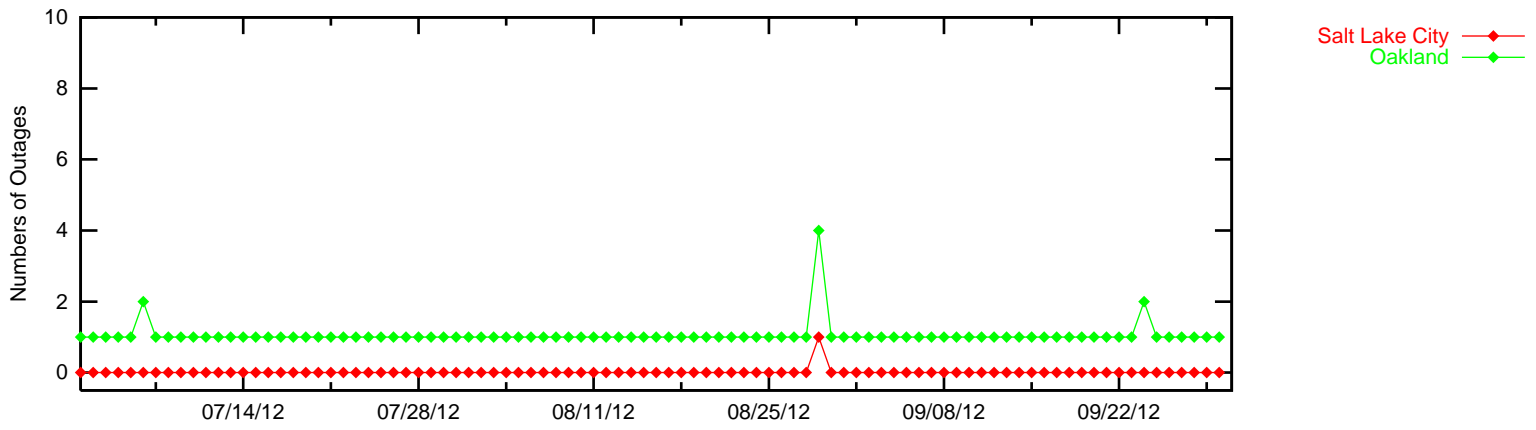
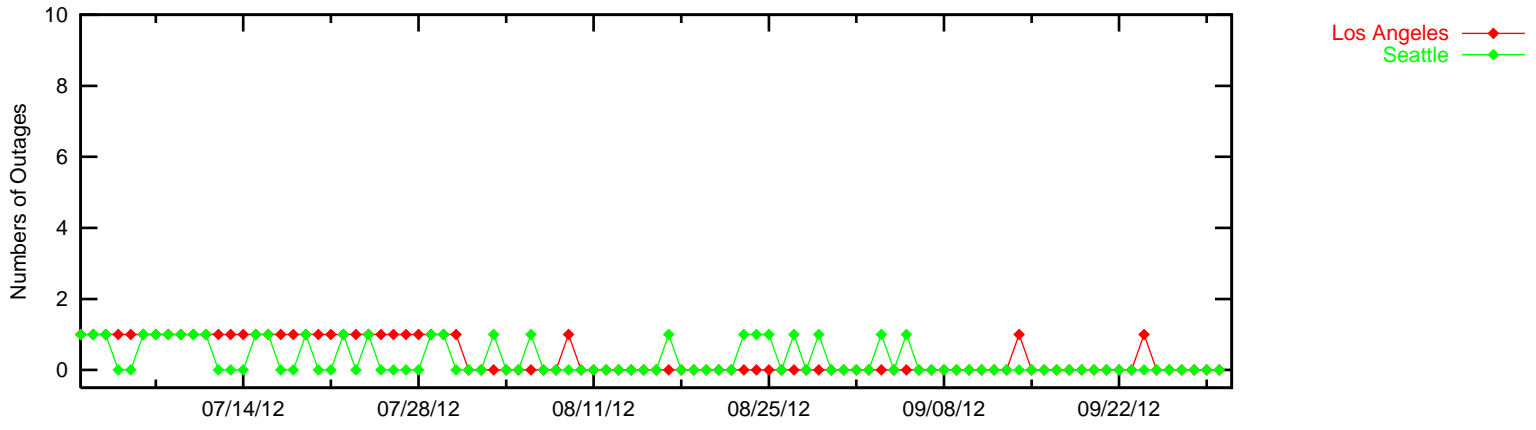


Figure 3-11 LPV 200 Outages

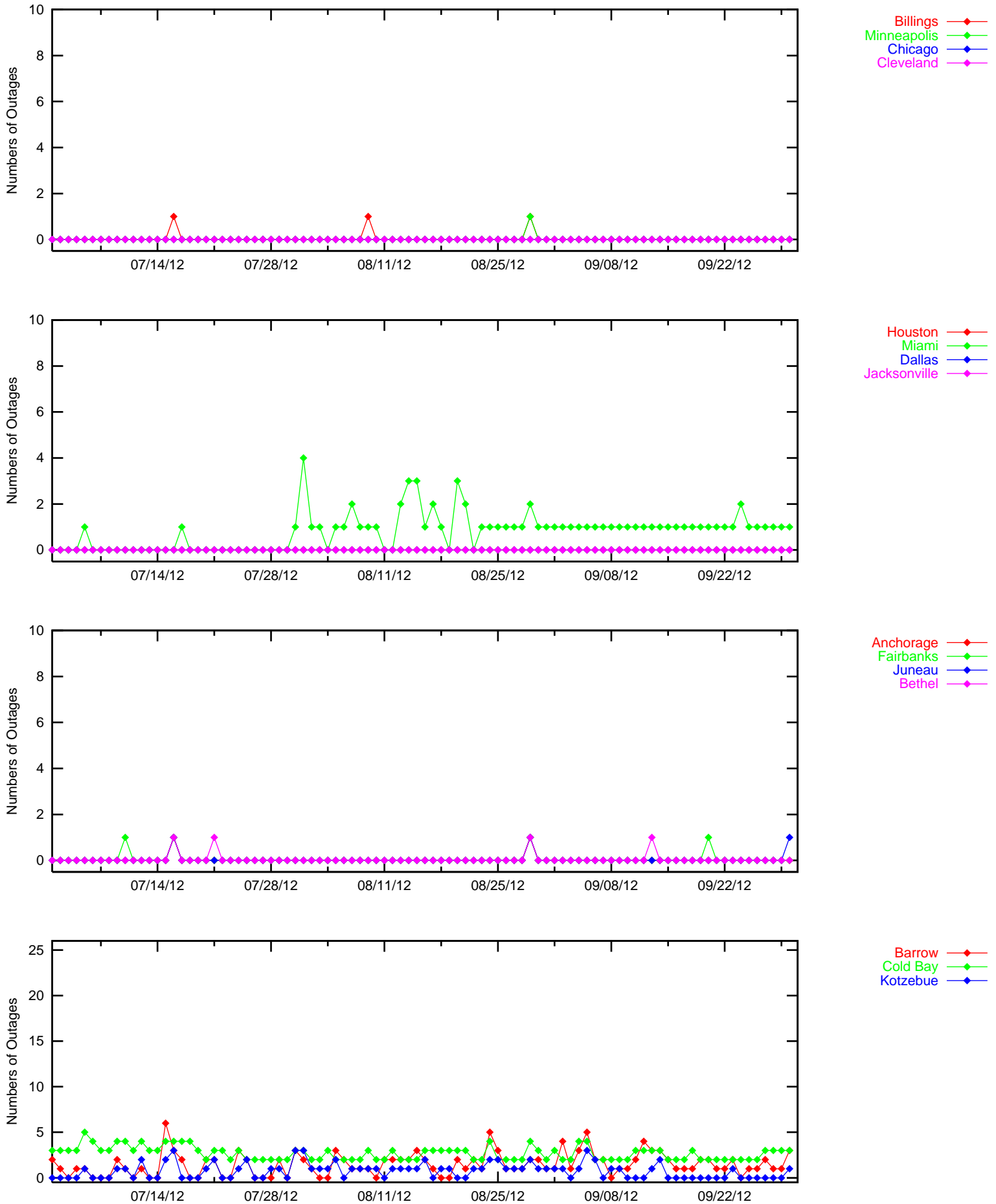
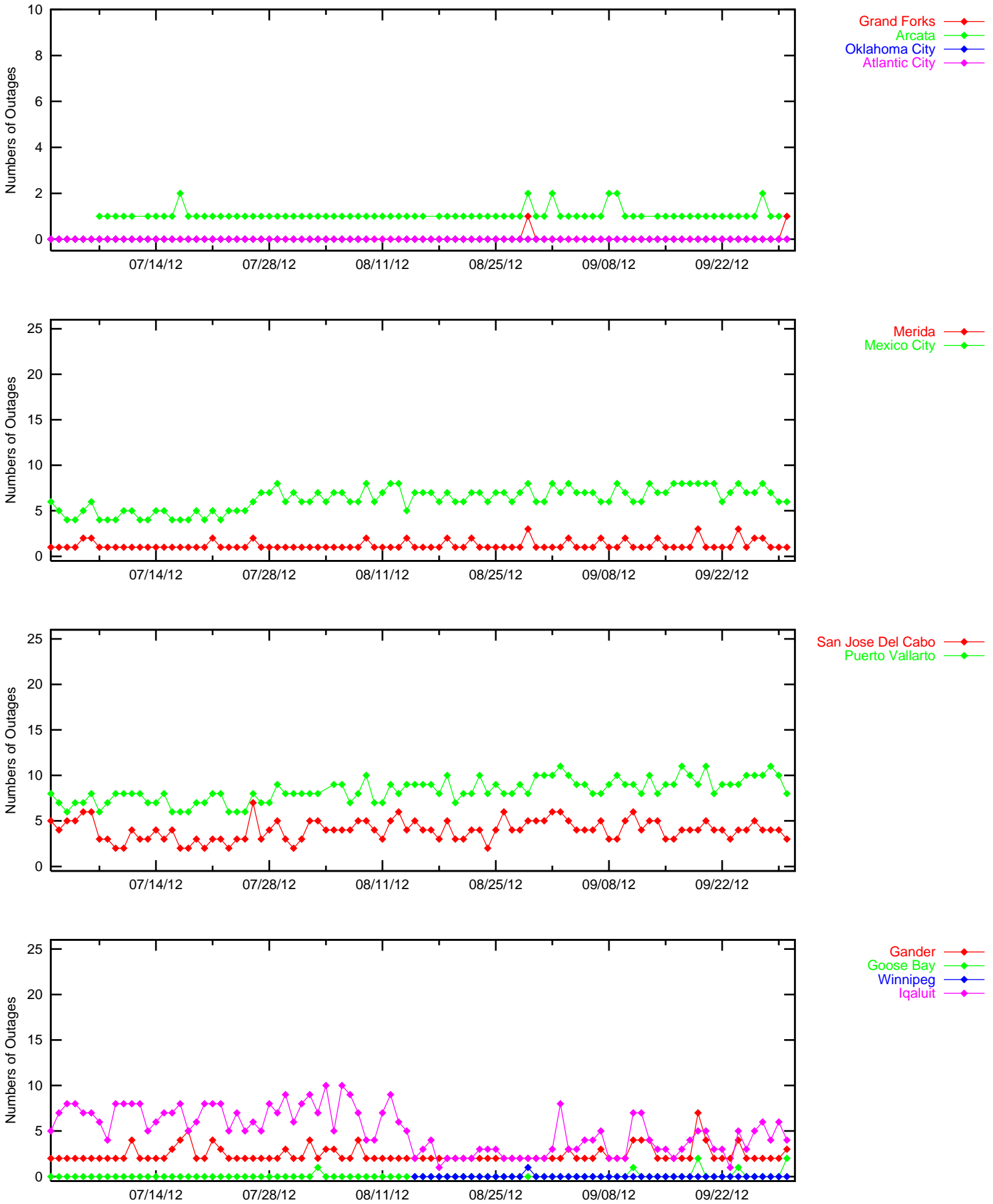


Figure 3-12 LPV 200 Outages



#### 4.0 COVERAGE

The WAAS coverage area evaluation estimates the percent of service volume where WAAS provided service for the operational service levels defined in Table 1.1. The WAAS message and the GPS/GEO satellite status are used to determine WAAS availability across North America. For PA coverage, protection levels were calculated at 30-sec intervals at one degree spacing over the PA service volume, while NPA coverage were calculated at 30-sec intervals at five degree spacing over the NPA service volume.

Daily analysis for PA was conducted for LP, LPV and LPV 200 service levels. The coverage plots provide 100, 99.9, 99, 98 and 95% availability contours. Figure 4.1 shows the rollup LP North America coverage. Figure 4.2 shows the rollup LPV North America coverage. Figure 4.3 shows the rollup LPV 200 North America coverage. Figure 4.6 shows the daily LPV and LPV 200 CONUS coverage, and Figure 4.7 shows the daily LPV Alaska coverage at 99% availability and ionosphere Kp index values for this quarter. Figure 4.8 shows the daily LPV and LPV 200 Canada coverage at 99% availability and ionosphere Kp index values for this quarter. Please see Appendix B for coverage plots of 98% LP and LPV availability contour, and 99% LPV 200 availability contour. Kp quantifies the disturbance in the earth's magnetic field and is an indicator of solar storms causing geomagnetic disturbances that can cause the ionosphere to become unpredictable. WAAS increases GIVE values making PA service unavailable when WAAS detects that the ionosphere is disturbed.

Daily analysis for NPA was conducted for RNP 0.1 and RNP 0.3 service levels based on a 100% availability requirement. RNP 0.1 service is asserted to be available when HPL is less than 185 meters and RNP 0.3 service is asserted to be available when HPL is less than 556 meters. The NPA coverage plots provide 100, 99.9 and 99% availability contours. Figure 4.4 shows the rollup RNP 0.1 coverage and Figure 4.5 shows the rollup RNP 0.3 coverage for the quarter. Figure 4.9 shows the daily RNP coverage at 100% availability and ionosphere Kp index values for this quarter.

The coverage decreases for this quarter 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.

Winnipeg receivers were out of service for an extended period of time due to site construction. Upon the receivers' return to service on August 15<sup>th</sup>, Canada coverage is increased.

WAAS communication outage to the northern Alaska sites on September 5<sup>th</sup> and September 23<sup>rd</sup> caused elevated UDRE values on GPS satellites critical to northern Alaska region reducing Alaska coverage.

Geomagnetic activity on July 10<sup>th</sup>, July 14<sup>th</sup>, July 15<sup>th</sup>, and September 30<sup>th</sup> elevated GIVE and UDRE values and reduced Alaska coverage. Geomagnetic activity on September 19<sup>th</sup>, 20<sup>th</sup>, and September 30<sup>th</sup> elevated GIVE values and reduced Canada coverage. Elevated UDRE value on PRN 135 on September 13<sup>th</sup> reduced Alaska and Mexico coverage.

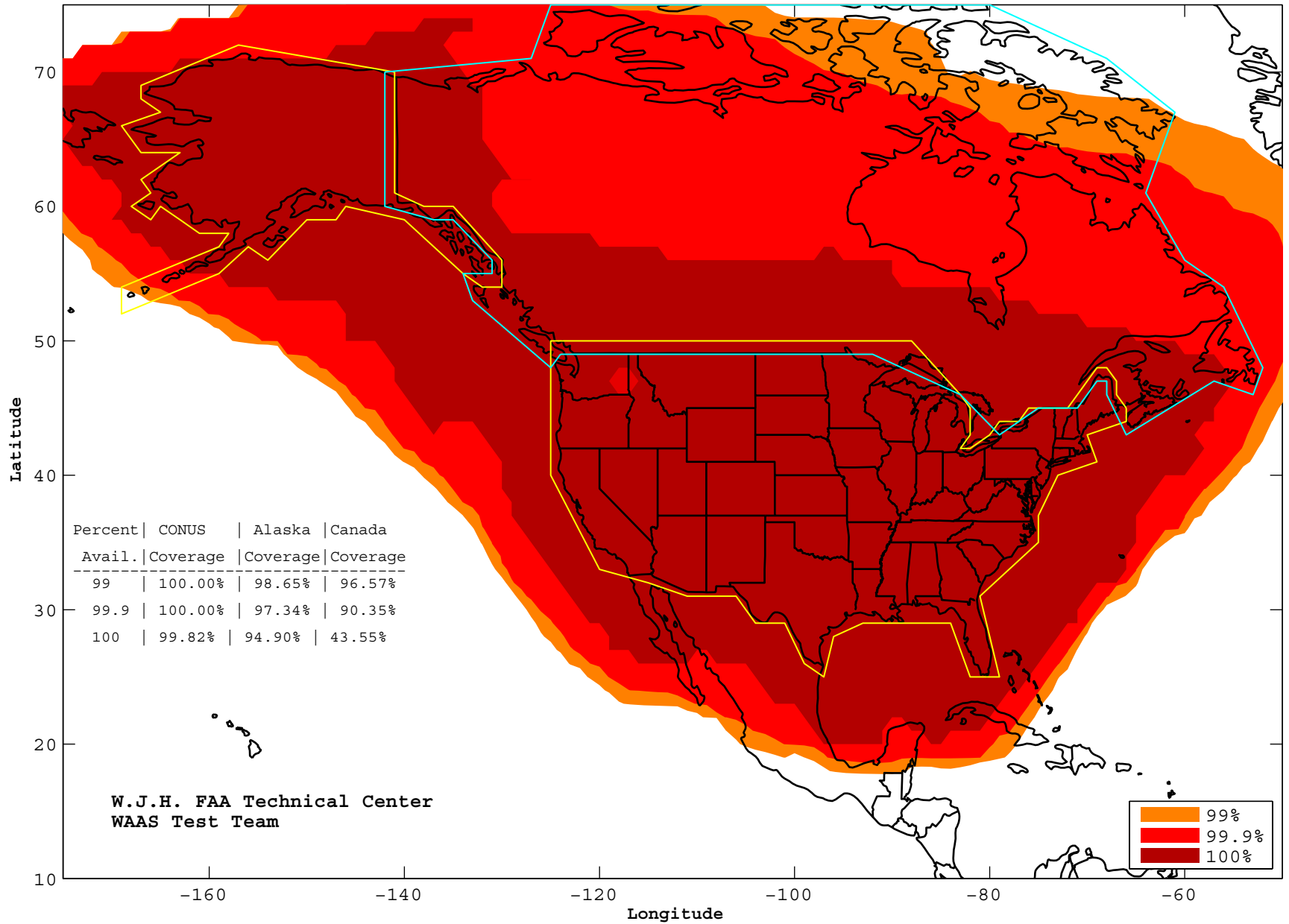
SV alert on PRN 21 on July 16<sup>th</sup> and September 14<sup>th</sup> reduced CONUS and Alaska coverage. SV alert on PRN 21 on September 7<sup>th</sup> reduced Mexico coverage. SV alert on PRN 4 on August 9<sup>th</sup> slightly reduced CONUS, Alaska and Mexico coverage; see [DR 110 PRN4 Carrier Phase Anomalies Cause WAAS SV Alerts](#).

Planned maintenance on PRN 7 on July 5<sup>th</sup> reduced CONUS and Alaska coverage. Planned maintenance on PRN 21 on August 28<sup>th</sup> and August 29<sup>th</sup> significantly reduced CONUS, Alaska, and Canada coverage. Planned maintenance on PRN 4 on September 24<sup>th</sup> significantly reduced CONUS, Canada and Mexico coverage.

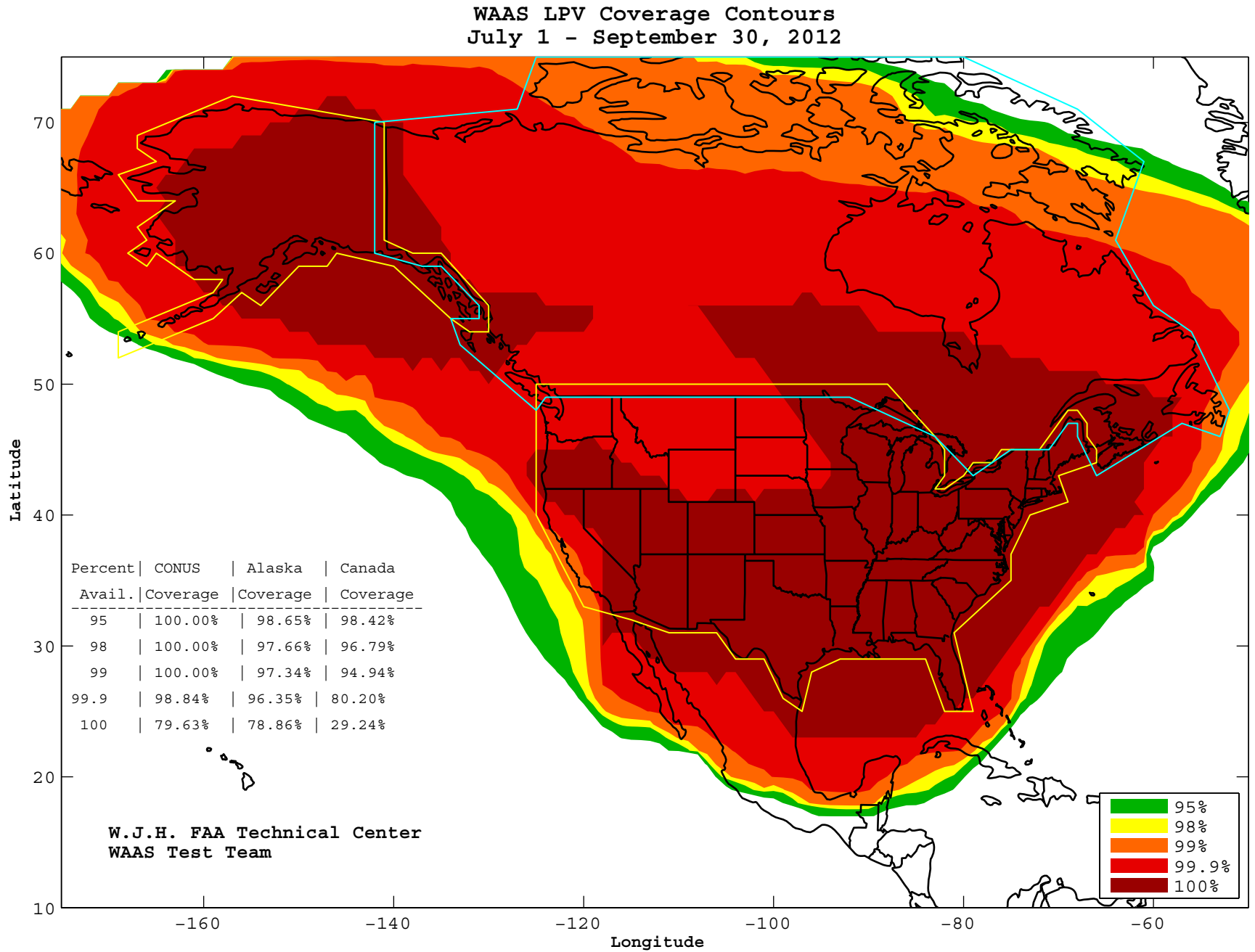
Manual GUS switchover on July 20<sup>th</sup> and August 24<sup>th</sup> reduced Alaska PA coverage. Manual GUS switchover on July 31<sup>st</sup> and August 1<sup>st</sup> reduced CONUS and Alaska PA coverage.

Radio frequency interference (RFI) caused localized loss of LPV and LPV200 availability at Miami, Boston, and Albuquerque on the dates listed in Table 1.5. The local RFI had no effect on WAAS coverage.

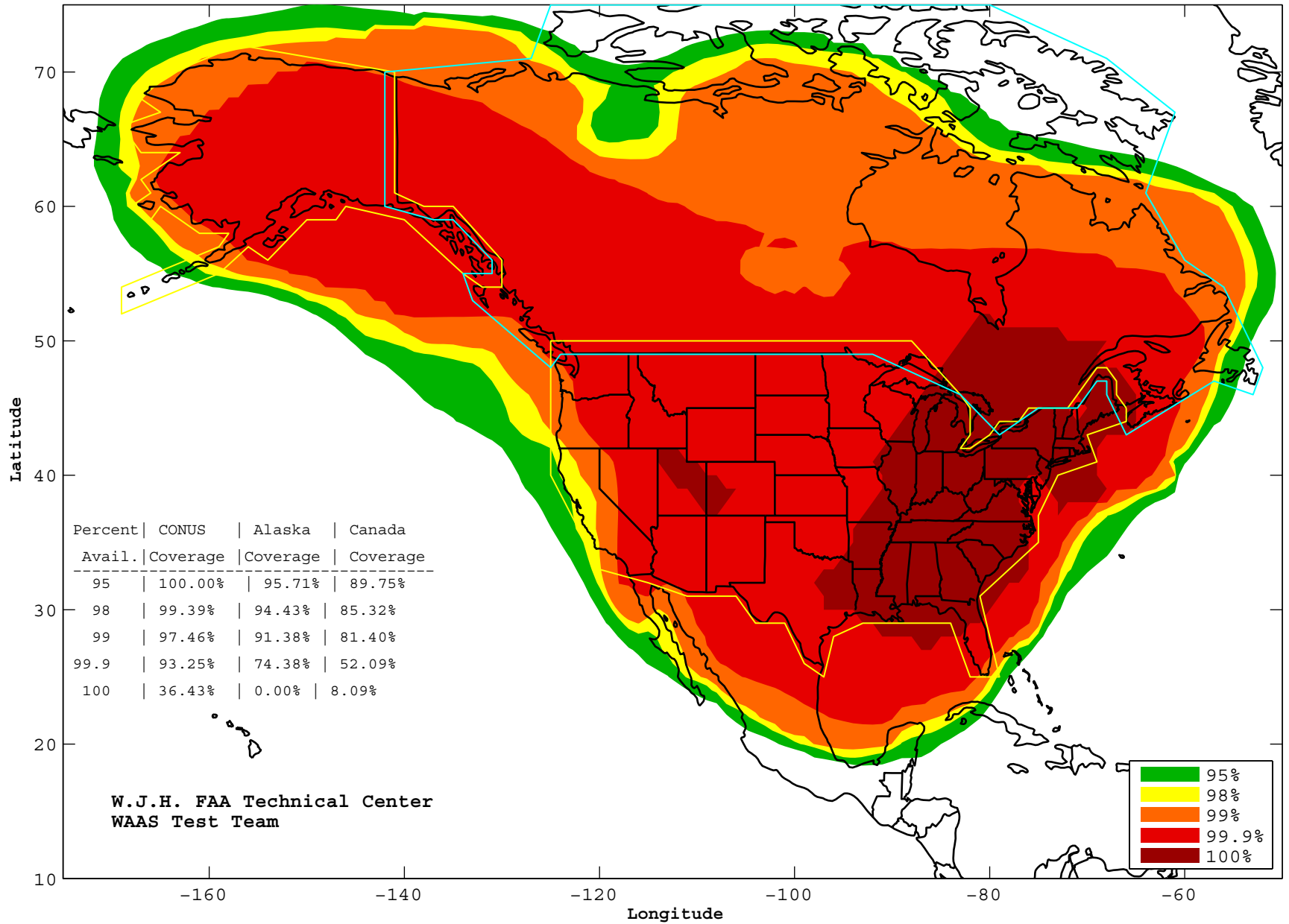
WAAS LP Coverage Contours  
July 1 - September 30, 2012

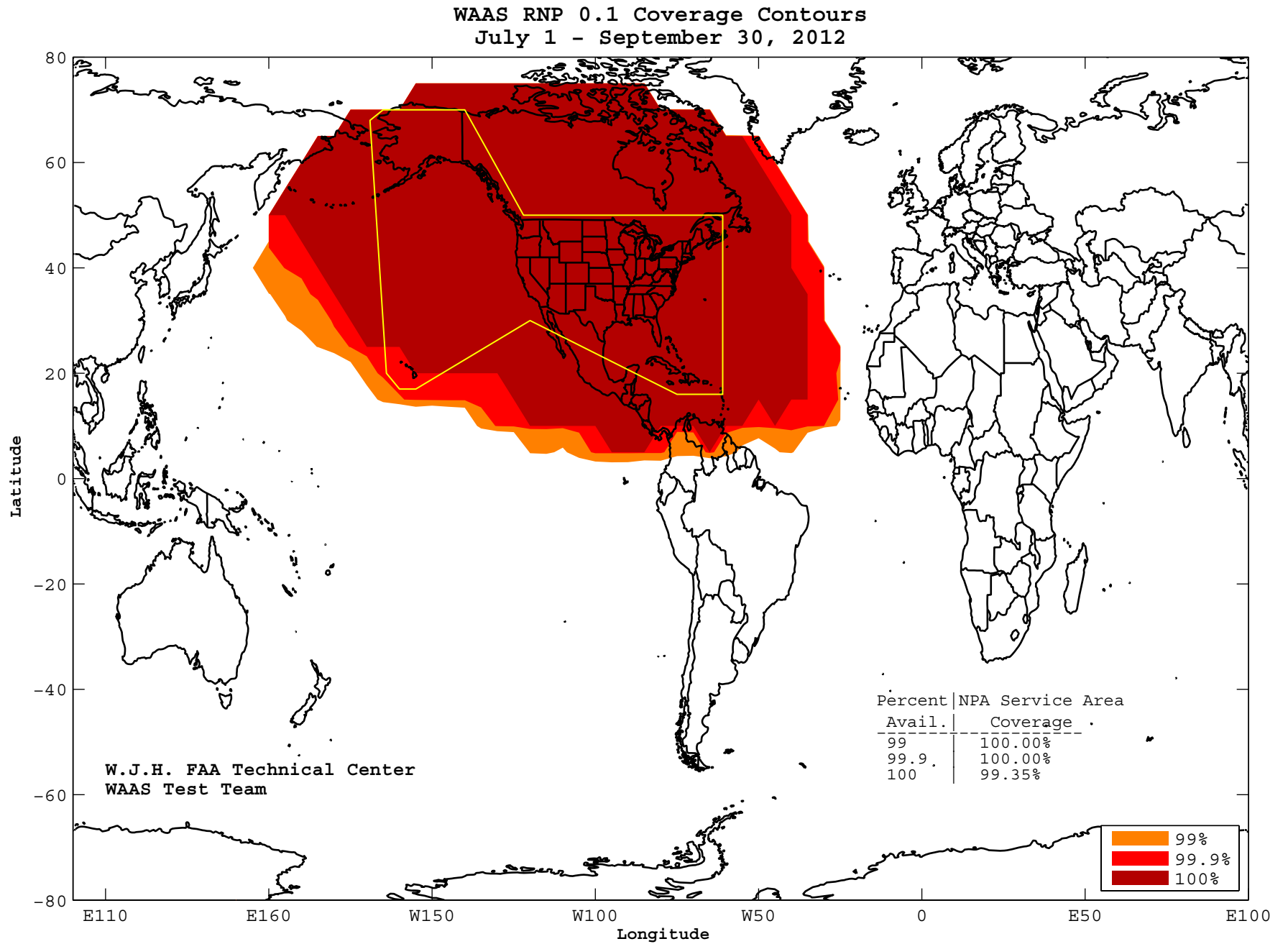






WAAS LPV200 Coverage Contours  
July 1 - September 30, 2012





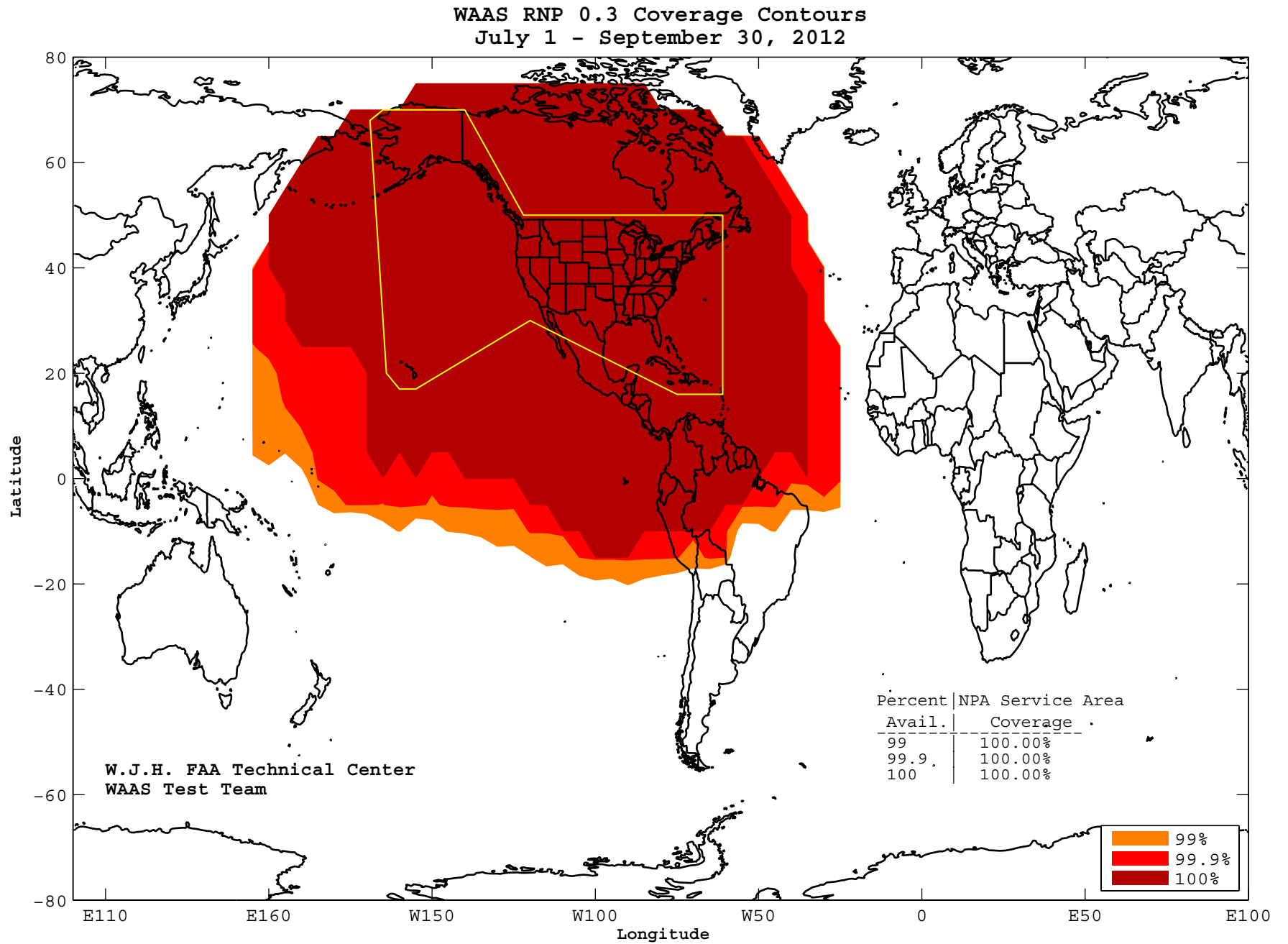


Figure 4-6 Daily LPV and LPV 200 CONUS Coverage

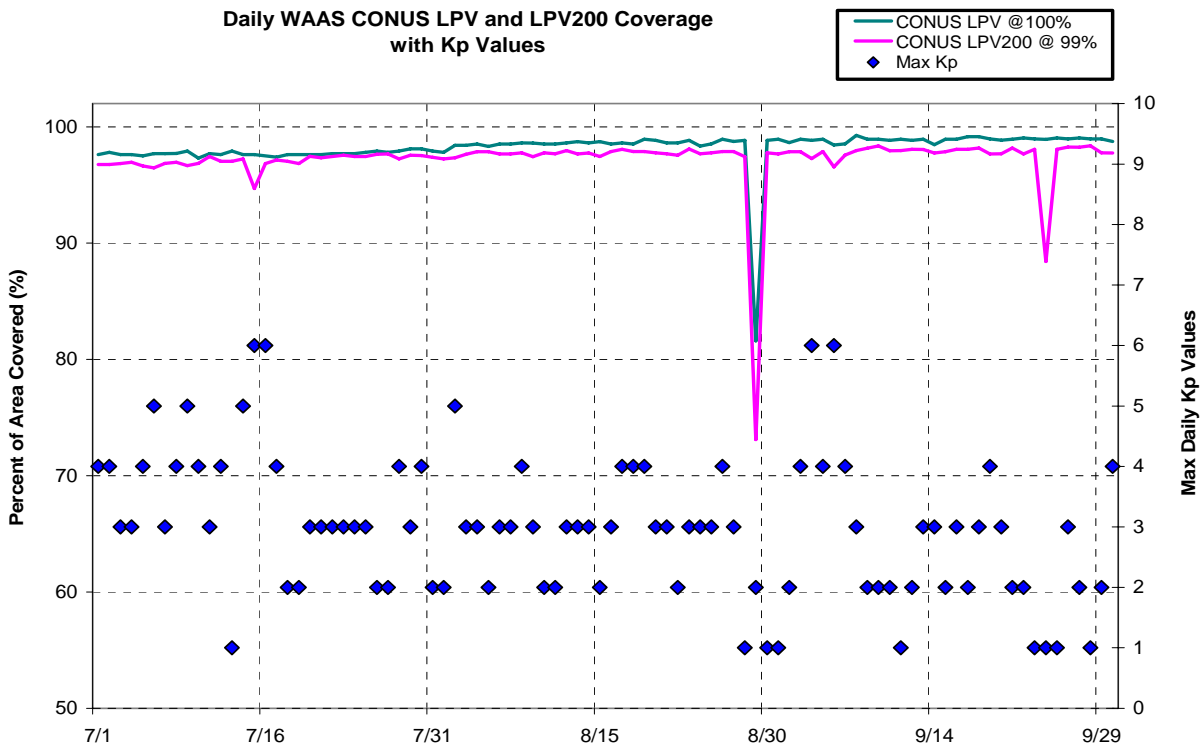


Figure 4-7 Daily LPV and LPV 200 Alaska Coverage

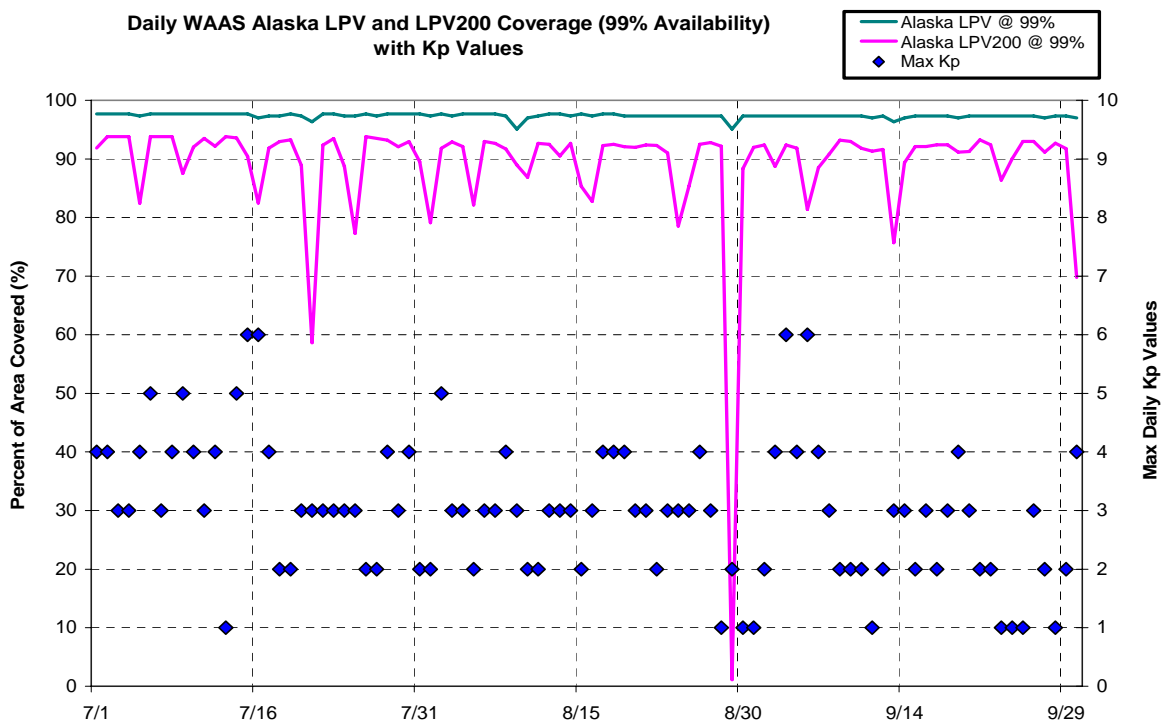


Figure 4-8 Daily LPV and LPV 200 Canada Coverage

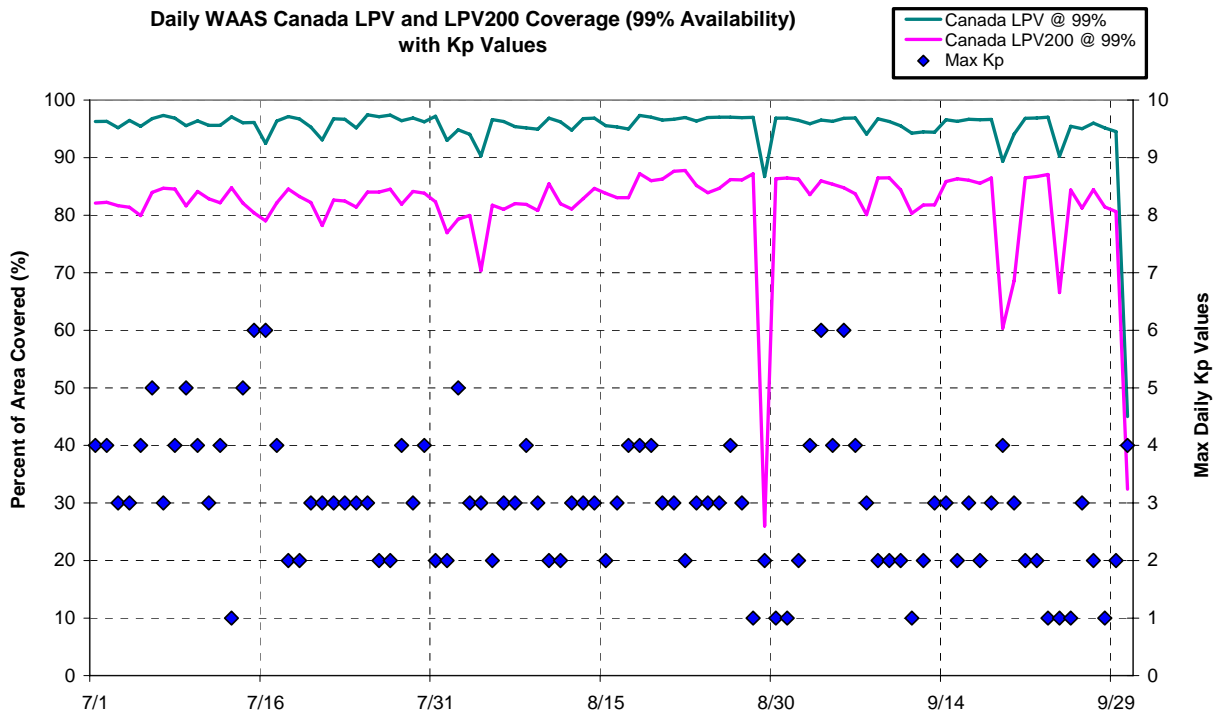
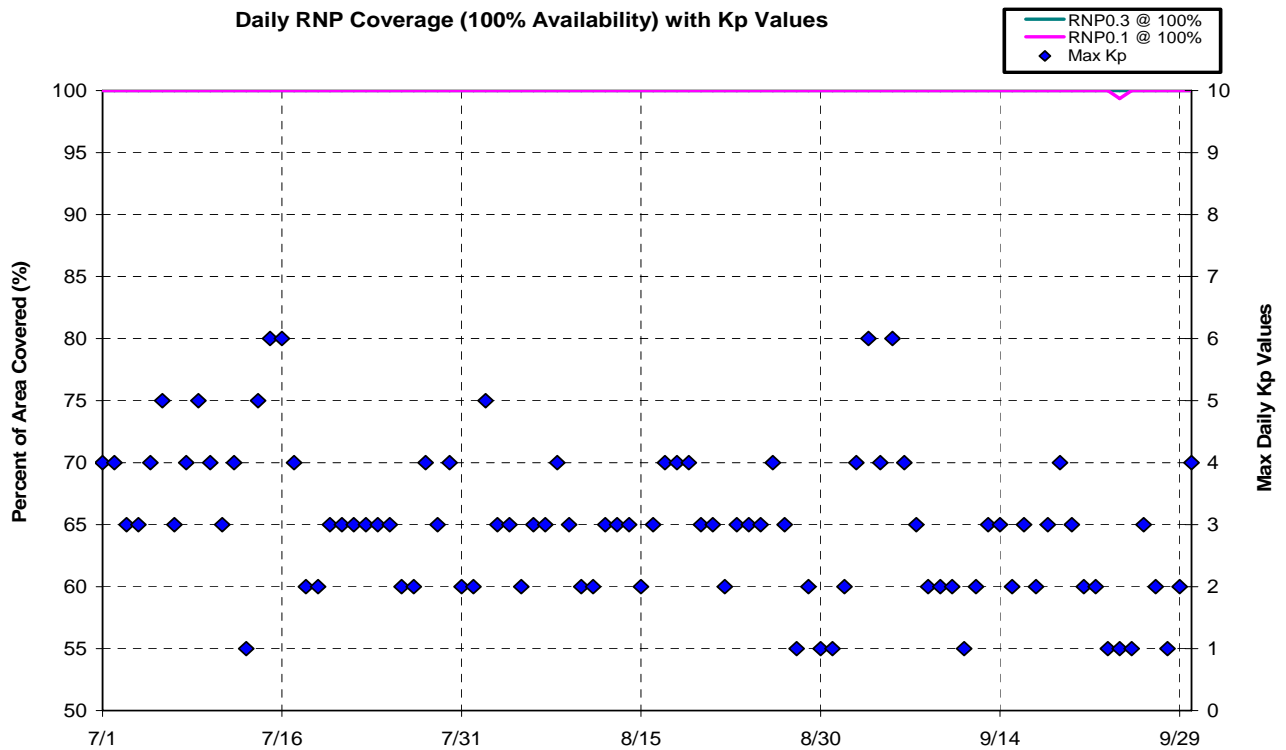


Figure 4-9 Daily RNP Coverage



## 5.0 **INTEGRITY**

### 5.1 **HMI Analysis**

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

Table 5.1 lists the safety index and the number of HMI events. For this evaluation period, the lowest safety margin index is 2.41 at Grand Forks. 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		Number of HMIs
	Horizontal	Vertical	
Arcata	5.16	11.66	0
Atlantic City	3.64	3.90	0
Grand Forks	2.41	4.95	0
Oklahoma City	5.56	4.68	0
Albuquerque	4.71	9.31	0
Anchorage	6.10	5.71	0
Atlanta	7.31	6.16	0
Barrow	8.17	5.39	0
Bethel	8.34	5.80	0
Billings	5.39	9.86	0
Boston	8.62	4.80	0
Chicago	6.01	6.47	0
Cleveland	6.72	5.27	0
Cold Bay	13.41	11.78	0
Dallas	4.44	4.39	0
Denver	7.35	5.90	0
Fairbanks	2.83	4.27	0
Gander	6.55	9.41	0
Goose Bay	6.23	7.38	0
Houston	4.84	5.06	0
Iqaluit	9.59	6.51	0
Jacksonville	8.35	7.89	0
Juneau	11.90	3.33	0
Kansas City	20.84	7.65	0
Kotzebue	8.25	6.51	0
Los Angeles	5.63	6.79	0
Memphis	6.02	6.84	0
Merida	13.46	7.51	0
Mexico City	11.57	9.13	0
Miami	5.65	9.86	0
Minneapolis	5.97	7.86	0
New York	6.77	10.53	0
Oakland	5.73	9.24	0
Puerto Vallarta	7.54	6.83	0
Salt Lake City	7.71	7.12	0
San Jose Del Cabo	8.14	6.31	0
Seattle	5.17	10.17	0
Washington DC	10.86	6.57	0
Winnipeg	6.19	5.04	0



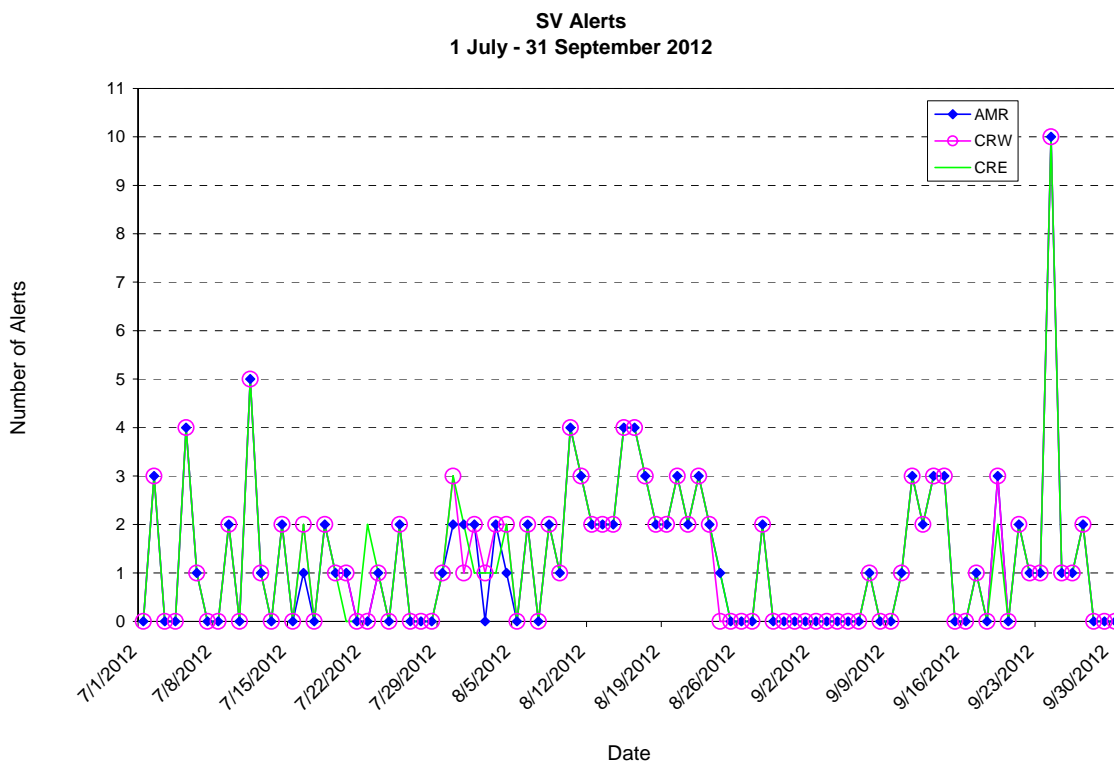
## 5.2 Broadcast Alerts

The WAAS transmits alert messages to protect the users if the active WAAS corrections are no longer bound by the UDREs. Alerts increase the User Differential Range Error (UDRE) for one or more PRNs, which can reduce the weighting of the satellite in the navigation solution, or completely exclude the satellite from the navigation solution. An increase in UDRE's after an alert effectively increases the user protection levels (HPL and VPL), which affects the availability. Additionally, if an alert message sequence lasts for more than 12 seconds, WAAS fast corrections can time out, causing a loss of continuity. Table 5.2 shows the total number of alerts and the average number of alerts per day. Figure 5.1 shows the number of SV alerts that occurred daily during the reporting period. Often the number of alerts on one GEO is the same as the number of alerts on the other GEO. Therefore, lines tend to overlap in most points on this plot.

**Table 5-2 WAAS SV Alert**

Message Type	Number of Alerts			Average Alerts Per Day		
	AMR	CRW	CRE	AMR	CRW	CRE
2	39	39	39	0.4239	0.4239	0.4239
3	49	49	49	0.5326	0.5326	0.5326
4	29	31	31	0.3152	0.3370	0.3370
5	0	0	0	0.0000	0.0000	0.0000
6	0	0	0	0.0000	0.0000	0.0000
24	0	0	0	0.0000	0.0000	0.0000
26	0	0	0	0.0000	0.0000	0.0000
<b>Total Alerts</b>	<b>117</b>	<b>119</b>	<b>119</b>	<b>1.2717</b>	<b>1.2935</b>	<b>1.2935</b>
<b>Days in Service</b>	<b>92</b>	<b>92</b>	<b>92</b>			

**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**

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

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

<b>Message Type</b>	<b>On Time</b>	<b>Late</b>	<b>Max Late Length (seconds)</b>
0	14	3	464556
1	105121	4	161
2	1324830	53	39
3	1324853	57	36
4	1324809	53	33
7	97748	16	158
9	93149	1	187
10	97829	14	148
17	31483	5	512

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

<b>SV</b>	<b>On Time</b>	<b>Late</b>	<b>Max Late Length (seconds)</b>
1	49714	0	0
2	47442	0	0
3	48717	2	166
4	47545	1	171
5	48263	0	0
6	49962	3	186
7	47121	0	0
8	47624	0	0
9	48350	0	0
10	49039	0	0
11	50027	2	180
12	48034	1	200
13	47356	0	0
14	47394	1	168
15	48485	0	0
16	48337	0	0
17	47349	0	0
18	46724	2	166
19	48892	0	0
20	49097	0	0
21	47308	3	186
22	47362	0	0
23	47522	0	0
25	49665	1	166
26	48426	0	0
27	50489	0	0
28	47911	1	168
29	47401	0	0
30	46010	0	0
31	48421	0	0
32	47524	0	0

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

<b>SV</b>	<b>On Time</b>	<b>Late</b>	<b>Max Late Length (seconds)</b>
1	40841	3	128
2	38948	0	0
3	40027	2	180
4	39054	1	210
5	39550	0	0
6	41045	2	193
7	38660	1	125
8	39096	1	136
9	39680	1	129
10	40291	4	180
11	41135	3	147
12	39473	3	210
13	38885	1	193
14	38953	1	123
15	39790	0	0
16	39696	1	121
17	38882	2	185
18	38368	3	192
19	40159	1	136
20	40286	1	128
21	38862	1	128
22	38903	3	227
23	38963	1	123
25	40830	4	170
26	39733	4	192
27	41493	0	0
28	39374	10	240
29	38918	0	0
30	37744	2	141
31	39672	1	141
32	38996	1	157
133	76220	1	143
135	76400	3	156
138	76348	1	135

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

<b>Band</b>	<b>Block</b>	<b>On Time</b>	<b>Late</b>	<b>Max Late Length (seconds)</b>
0	0	27576	14	412
0	1	27594	8	411
0	2	27602	13	358
1	0	27587	11	576
1	1	27593	14	576
1	2	27587	13	382
1	3	27593	12	383
1	4	27601	16	372
2	0	27587	13	395
2	1	27570	21	581
2	2	27591	16	369
2	3	27587	19	392
2	4	27586	11	388
3	0	27589	12	409
3	1	27591	12	404
3	2	27571	19	576
9	0	27595	10	429
9	1	27598	14	400
9	2	27595	16	576
9	3	27584	11	576
9	4	27588	15	410
9	5	27579	19	417
9	6	27587	23	417

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

<b>Band</b>	<b>On Time</b>	<b>Late</b>	<b>Max Late Length (seconds)</b>
0	35796	2	450
1	35772	3	480
2	35824	2	338
3	35787	0	0
9	35826	2	426

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

<b>Message Type</b>	<b>On Time</b>	<b>Late</b>	<b>Max Late Length (seconds)</b>
1	104322	2	134
2	1324850	45	13
3	1324871	49	13
4	1324831	45	10
7	97066	16	136
9	93150	0	0
10	97038	10	129
17	31384	2	324

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

<b>SV</b>	<b>On Time</b>	<b>Late</b>	<b>Max Late Length (seconds)</b>
1	49715	0	0
2	47458	0	0
3	48720	0	0
4	47549	0	0
5	48264	0	0
6	49967	0	0
7	47130	0	0
8	47618	0	0
9	48353	0	0
10	49040	0	0
11	50026	0	0
12	48041	0	0
13	47364	0	0
14	47390	0	0
15	48489	0	0
16	48327	0	0
17	47347	1	170
18	46715	0	0
19	48900	0	0
20	49091	0	0
21	47301	0	0
22	47362	0	0
23	47514	0	0
25	49660	0	0
26	48434	0	0
27	50497	0	0
28	47916	0	0
29	47396	0	0
30	46014	0	0
31	48425	0	0
32	47534	1	170

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

<b>SV</b>	<b>On Time</b>	<b>Late</b>	<b>Max Late Length (seconds)</b>
1	40836	1	160
2	38938	1	209
3	40007	0	0
4	39047	0	0
5	39550	0	0
6	41050	0	0
7	38671	0	0
8	39108	1	163
9	39686	1	131
10	40295	1	168
11	41114	3	192
12	39466	1	149
13	38899	0	0
14	38945	0	0
15	39800	0	0
16	39679	1	124
17	38884	0	0
18	38374	1	148
19	40168	0	0
20	40263	0	0
21	38875	0	0
22	38899	2	144
23	38971	1	129
25	40845	1	148
26	39740	0	0
27	41513	0	0
28	39401	4	264
29	38919	0	0
30	37729	2	168
31	39684	1	149
32	39002	1	149
133	76255	1	142
135	76375	1	142
138	76316	3	4352

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

<b>Band</b>	<b>Block</b>	<b>On Time</b>	<b>Late</b>	<b>Max Late Length (seconds)</b>
0	0	27598	10	344
0	1	27601	11	368
0	2	27593	8	306
1	0	27591	6	306
1	1	27599	10	306
1	2	27597	12	309
1	3	27594	11	307
1	4	27580	16	377
2	0	27586	18	398
2	1	27579	21	388
2	2	27597	15	376
2	3	27577	14	376
2	4	27587	12	383
3	0	27599	11	392
3	1	27585	13	383
3	2	27600	10	369
9	0	27586	13	376
9	1	27591	12	368
9	2	27592	11	372
9	3	27593	10	346
9	4	27599	12	334
9	5	27587	12	315
9	6	27588	11	310

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

<b>Band</b>	<b>On Time</b>	<b>Late</b>	<b>Max Late Length (seconds)</b>
0	35664	0	0
1	35677	1	374
2	35707	0	0
3	35656	0	0
9	35734	0	0



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

<b>Message Type</b>	<b>On Time</b>	<b>Late</b>	<b>Max Late Length (seconds)</b>
0	10	2	482816
1	105364	2	125
2	1324841	48	29
3	1324860	52	25
4	1324828	49	24
7	98035	18	136
9	93151	0	0
10	98030	16	132

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

<b>SV</b>	<b>On Time</b>	<b>Late</b>	<b>Max Late Length (seconds)</b>
1	49713	0	0
2	47455	0	0
3	48727	0	0
4	47548	0	0
5	48256	0	0
6	49967	0	0
7	47124	1	162
8	47617	1	161
9	48344	0	0
10	49043	0	0
11	50032	0	0
12	48041	0	0
13	47367	0	0
14	47397	0	0
15	48484	0	0
16	48335	0	0
17	47352	0	0
18	46721	0	0
19	48906	0	0
20	49092	0	0
21	47306	0	0
22	47369	1	162
23	47515	1	161
25	49663	0	0
26	48437	0	0
27	50482	1	181
28	47921	0	0
29	47408	0	0
30	46020	0	0
31	48423	0	0
32	47523	0	0

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

<b>SV</b>	<b>On Time</b>	<b>Late</b>	<b>Max Late Length (seconds)</b>
1	40846	3	155
2	38947	0	0
3	40030	2	207
4	39046	1	210
5	39546	3	209
6	41041	2	212
7	38661	0	0
8	39120	3	155
9	39685	0	0
10	40279	4	186
11	41107	3	206
12	39470	1	210
13	38885	1	143
14	38939	0	0
15	39788	1	150
16	39686	2	209
17	38875	1	133
18	38391	0	0
19	40171	0	0
20	40272	0	0
21	38886	1	130
22	38906	2	184
23	38951	1	130
25	40827	0	0
26	39754	0	0
27	41516	0	0
28	39379	5	208
29	38923	0	0
30	37729	1	161
31	39685	0	0
32	38992	0	0
133	76249	2	212
135	76401	0	0
138	76310	1	149

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

<b>Band</b>	<b>Block</b>	<b>On Time</b>	<b>Late</b>	<b>Max Late Length (seconds)</b>
0	0	27585	13	416
0	1	27587	10	585
0	2	27592	10	427
1	0	27581	17	418
1	1	27581	13	429
1	2	27614	15	432
1	3	27576	16	576
1	4	27575	18	411
2	0	27578	15	416
2	1	27584	18	416
2	2	27594	20	412
2	3	27588	14	417
2	4	27596	10	431
3	0	27595	12	427
3	1	27585	14	427
3	2	27576	15	410
9	0	27597	18	414
9	1	27594	10	306
9	2	27583	13	305
9	3	27577	14	315
9	4	27609	14	306
9	5	27583	13	312
9	6	27602	5	411

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

<b>Band</b>	<b>On Time</b>	<b>Late</b>	<b>Max Late Length (seconds)</b>
0	35806	1	314
1	35802	0	0
2	35807	1	350
3	35762	1	440
9	35798	2	400

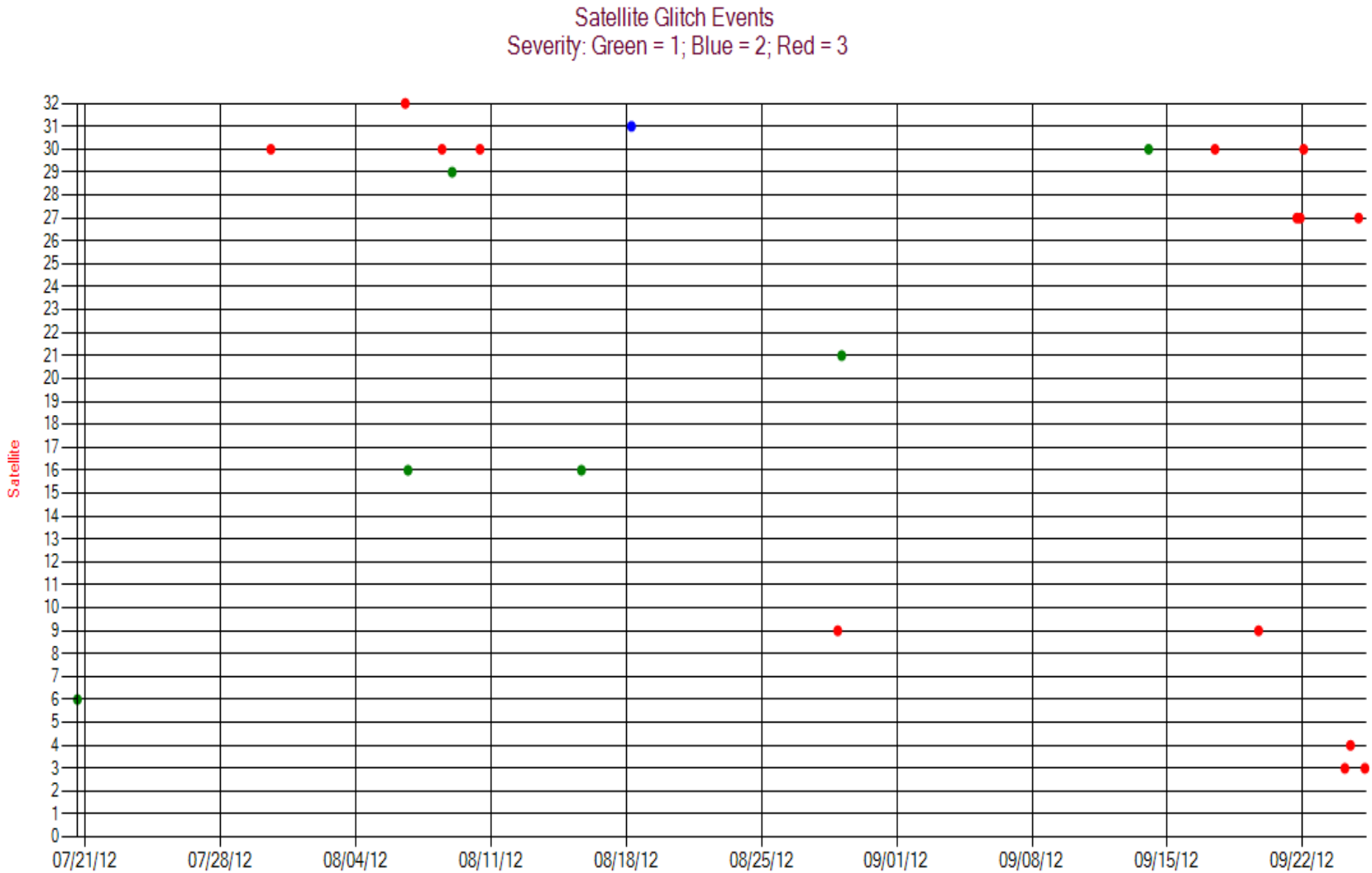
#### 5.4 Satellite Glitches

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 shows a decrease in SV glitches for this reporting period. The firmware upgrades at the receivers eliminated most of the Severity 1 glitches which were the majority of the glitches that we’ve seen in the past.

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.

For this reporting period, most satellites range errors were bounded 99.9% of the time by UDRE except for PRN 25 at Albuquerque. The unbounded range errors occurred during periods of high geomagnetic activity.

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

Site → SV ↓	Billings		Albuquerque		Boston		Washington DC		Houston		Kansas City	
	95% Range Error	3.29 Sigma Bounding(%)	95% Range Error	3.29 Sigma Bounding(%)	95% Range Error	3.29 Sigma Bounding(%)	95% Range Error	3.29 Sigma Bounding(%)	95% Range Error	3.29 Sigma Bounding(%)	95% Range Error	3.29 Sigma Bounding(%)
1	2.608	100	2.576	100	2.366	100	2.131	100	2.457	100	2.626	100
2	1.731	100	1.590	100	1.668	100	1.909	100	1.965	100	2.342	100
3	1.125	100	1.105	100	1.134	100	1.209	100	1.402	100	1.264	100
4	1.545	100	1.468	100	1.782	100	1.035	100	1.800	100	2.427	100
5	1.633	100	1.732	100	1.693	100	1.165	100	1.027	100	1.344	100
6	1.510	100	1.290	100	1.498	100	0.936	100	1.233	100	1.109	100
7	1.523	100	1.043	100	1.310	100	1.319	100	0.816	100	1.291	100
8	1.356	100	0.995	100	0.949	100	0.964	100	1.026	100	1.113	100
9	0.888	100	1.035	100	1.381	100	0.784	100	0.937	100	1.900	100
10	0.863	100	0.983	100	1.202	100	1.290	100	2.073	100	1.248	100
11	0.879	100	0.812	100	1.009	100	1.161	100	2.309	100	0.809	100
12	1.195	100	1.119	100	1.722	100	0.858	100	0.916	100	1.245	100
13	1.645	100	1.583	100	1.380	100	1.155	100	1.226	100	1.109	100
14	1.277	100	0.810	100	1.063	100	1.086	100	1.894	100	0.976	100
15	1.169	100	1.546	100	1.730	100	1.231	100	1.312	100	1.449	100
16	1.217	100	1.068	100	0.940	100	0.928	100	1.450	100	1.600	100
17	1.967	100	1.153	100	1.453	100	0.791	100	1.209	100	1.214	100
18	0.963	100	1.108	100	1.374	100	1.504	100	1.846	100	1.171	100
19	2.879	100	1.724	100	2.679	100	2.434	100	3.075	100	2.635	100
20	0.786	100	1.015	100	1.211	100	1.271	100	1.455	100	1.167	100
21	1.327	100	1.364	100	1.279	100	1.619	100	1.688	100	1.468	100
22	2.276	100	1.729	100	2.072	100	2.487	100	2.767	100	1.936	100
23	1.254	100	1.519	100	1.808	100	1.764	100	2.592	100	1.416	100
24	-	-	-	-	-	-	-	-	-	-	-	-
25	2.465	100	3.296	99.9852	2.400	100	2.351	100	2.656	100	2.531	100
26	1.461	100	1.306	100	1.579	100	1.101	100	1.227	100	1.256	100
27	1.267	100	1.375	100	1.619	100	0.755	100	1.093	100	1.535	100
28	0.874	100	0.809	100	1.005	100	1.344	100	1.590	100	1.011	100
29	1.298	100	1.555	100	1.526	100	1.519	100	0.977	100	1.585	100
30	1.036	100	0.861	100	0.928	100	0.806	100	1.232	100	0.945	100
31	1.145	100	1.171	100	0.974	100	0.759	100	1.018	100	2.068	100
32	1.160	100	1.081	100	1.060	100	0.897	100	1.457	100	1.255	100
135	1.946	100	2.215	100	2.187	100	2.096	100	1.873	100	1.221	100
138	1.542	100	1.179	100	1.186	100	1.390	100	1.795	100	1.706	100

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

Site → SV ↓	Los Angeles		Salt Lake City		Miami		Minneapolis		Atlanta		Juneau	
	95% Range Error	3.29 Sigma Bounding(%)	95% Range Error	3.29 Sigma Bounding(%)	95% Range Error	3.29 Sigma Bounding(%)	95% Range Error	3.29 Sigma Bounding(%)	95% Range Error	3.29 Sigma Bounding(%)	95% Range Error	3.29 Sigma Bounding(%)
1	2.117	100	2.906	100	2.162	100	2.687	100	2.318	100	2.733	100
2	1.689	100	1.385	100	2.262	100	1.605	100	1.773	100	1.271	100
3	1.016	100	1.183	100	1.030	100	1.364	100	1.085	100	1.666	100
4	1.096	100	1.874	100	0.984	100	1.278	100	1.145	100	1.672	100
5	1.261	100	1.601	100	1.233	100	1.780	100	1.023	100	1.814	100
6	0.880	100	1.710	100	1.026	100	1.455	100	1.195	100	1.721	100
7	1.212	100	1.296	100	1.582	100	1.261	100	1.023	100	1.758	100
8	0.910	100	0.898	100	1.229	100	1.135	100	0.735	100	1.442	100
9	0.871	100	1.376	100	1.046	100	1.563	100	0.818	100	1.450	100
10	1.039	100	0.813	100	1.403	100	1.107	100	1.145	100	1.064	100
11	1.488	100	0.929	100	2.045	100	0.739	100	0.975	100	1.093	100
12	0.860	100	1.200	100	1.232	100	1.588	100	1.302	100	1.367	100
13	0.995	100	2.430	100	1.006	100	1.111	100	1.026	100	1.562	100
14	1.104	100	1.062	100	0.916	100	0.773	100	0.797	100	0.983	100
15	1.610	100	1.284	100	0.958	100	1.566	100	1.034	100	1.578	100
16	1.770	100	1.116	100	1.198	100	1.132	100	1.076	100	0.874	100
17	0.996	100	1.501	100	1.064	100	1.107	100	0.737	100	1.409	100
18	1.431	100	1.690	100	1.728	100	1.054	100	1.559	100	1.095	100
19	2.419	100	2.113	100	2.361	100	1.870	100	2.333	100	2.250	100
20	1.275	100	1.070	100	1.392	100	1.066	100	1.231	100	0.773	100
21	1.240	100	0.843	100	3.121	100	1.248	100	1.584	100	0.915	100
22	2.443	100	1.842	100	2.572	100	1.889	100	2.369	100	1.967	100
23	2.030	100	1.585	99.9953	1.796	100	1.305	100	1.755	100	1.513	100
24	-	-	-	-	-	-	-	-	-	-	-	-
25	1.994	100	2.160	100	2.250	100	2.458	100	2.151	100	2.743	100
26	1.807	100	1.576	100	0.885	100	1.179	100	0.858	100	1.538	100
27	1.017	100	1.252	100	0.930	100	1.096	100	1.013	100	1.329	100
28	1.144	100	0.991	100	2.214	100	0.872	100	1.186	100	1.066	100
29	1.011	100	2.832	100	1.418	100	1.682	100	1.253	100	1.939	100
30	1.351	100	0.812	100	1.533	100	0.878	100	0.965	100	1.138	100
31	1.198	100	1.304	100	2.485	100	1.017	100	0.809	100	1.231	100
32	1.013	100	1.231	100	1.254	100	1.119	100	1.024	100	1.227	100
135	1.740	100	1.684	100	1.481	100	1.701	100	2.013	100	1.563	100
138	2.509	100	1.404	100	1.786	100	1.698	100	1.510	100	1.378	100



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

Site → SV ↓	Billings		Albuquerque		Boston		Washington DC		Houston		Kansas City	
	95% Iono Error	3.29 Sigma Bounding(%)	95% Iono Error	3.29 Sigma Bounding(%)	95% Iono Error	3.29 Sigma Bounding(%)	95% Iono Error	3.29 Sigma Bounding(%)	95% Iono Error	3.29 Sigma Bounding(%)	95% Iono Error	3.29 Sigma Bounding(%)
1	1.565	100	1.657	100	1.585	100	1.294	100	1.425	100	1.471	100
2	1.210	100	0.889	100	0.894	100	0.998	100	1.143	100	1.149	100
3	0.478	100	0.618	100	0.491	100	0.527	100	0.808	100	0.525	100
4	1.115	100	1.174	100	1.329	100	0.929	100	1.744	100	1.919	100
5	1.103	100	1.129	100	0.954	100	0.592	100	1.042	100	1.010	100
6	0.771	100	0.710	100	0.767	100	0.378	100	0.637	100	0.460	100
7	0.826	100	0.682	100	0.666	100	0.821	100	0.646	100	0.649	100
8	0.469	100	0.551	100	0.435	100	0.473	100	0.589	100	0.497	100
9	0.397	100	0.550	100	0.606	100	0.311	100	0.442	100	0.611	100
10	0.453	100	0.353	100	0.433	100	0.459	100	0.946	100	0.499	100
11	0.528	100	0.352	100	0.362	100	0.421	100	0.988	100	0.390	100
12	0.503	100	0.702	100	0.852	100	0.414	100	0.470	100	0.540	100
13	0.766	100	0.892	100	0.663	100	0.485	100	0.631	100	0.515	100
14	0.832	100	0.590	100	0.617	100	0.384	100	0.734	100	0.535	100
15	0.521	100	0.912	100	0.812	100	0.794	100	0.946	100	0.863	100
16	0.703	100	0.513	100	0.365	100	0.585	100	0.773	100	0.780	100
17	1.115	100	0.778	100	1.069	100	0.511	100	0.860	100	0.591	100
18	0.692	100	0.508	100	0.902	100	0.839	100	0.908	100	0.626	100
19	1.620	100	1.216	100	1.590	100	1.653	100	2.074	100	1.691	100
20	0.450	100	0.502	100	0.596	100	0.579	100	0.714	100	0.616	100
21	0.827	100	0.643	100	0.766	100	0.925	100	0.958	100	0.820	100
22	1.783	100	1.270	100	1.547	100	1.841	100	1.978	100	1.583	100
23	1.064	100	1.094	100	1.283	100	1.352	100	1.843	100	1.076	100
24	-	-	-	-	-	-	-	-	-	-	-	-
25	1.540	100	1.944	100	1.474	100	1.303	100	1.394	100	1.419	100
26	0.755	100	0.742	100	0.752	100	0.575	100	0.681	100	0.621	100
27	0.669	100	0.639	100	0.720	100	0.391	100	0.522	100	0.643	100
28	0.579	100	0.452	100	0.418	100	0.648	100	0.883	100	0.495	100
29	0.803	100	1.090	100	0.924	100	0.836	100	0.817	100	0.967	100
30	0.488	100	0.511	100	0.355	100	0.342	100	0.834	100	0.444	100
31	0.562	100	0.818	100	0.553	100	0.444	100	0.909	100	1.200	100
32	0.575	100	0.682	100	0.508	100	0.313	100	0.456	100	0.542	100

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

Site → SV ↓	Los Angeles		Salt Lake City		Miami		Minneapolis		Atlanta		Juneau	
	95% Iono Error	3.29 Sigma Bounding(%)	95% Iono Error	3.29 Sigma Bounding(%)	95% Iono Error	3.29 Sigma Bounding(%)	95% Iono Error	3.29 Sigma Bounding(%)	95% Iono Error	3.29 Sigma Bounding(%)	95% Iono Error	3.29 Sigma Bounding(%)
1	1.514	100	1.783	100	1.344	100	1.742	100	1.371	100	1.711	100
2	1.002	100	0.833	100	1.238	100	0.902	100	1.098	100	0.805	100
3	0.545	100	0.616	100	0.513	100	0.703	100	0.350	100	0.807	100
4	0.896	100	1.204	100	0.963	100	1.087	100	0.804	100	1.111	100
5	0.889	100	1.053	100	1.037	100	0.999	100	0.723	100	1.170	100
6	0.528	100	0.818	100	0.375	100	0.700	100	0.406	100	0.855	100
7	0.791	100	0.748	100	0.688	100	0.668	100	0.395	100	0.948	100
8	0.513	100	0.520	100	0.702	100	0.555	100	0.360	100	0.699	100
9	0.460	100	0.596	100	0.381	100	0.650	100	0.384	100	0.722	100
10	0.391	100	0.380	100	0.594	100	0.475	100	0.594	100	0.425	100
11	0.635	100	0.352	100	0.709	100	0.359	100	0.606	100	0.430	100
12	0.572	100	0.625	100	0.609	100	0.791	100	0.626	100	0.781	100
13	0.625	100	1.124	100	0.578	100	0.592	100	0.464	100	0.757	100
14	0.427	100	0.512	100	0.479	100	0.417	100	0.414	100	0.459	100
15	0.810	100	0.728	100	0.749	100	0.889	100	0.559	100	0.988	100
16	0.921	100	0.514	100	0.627	100	0.655	100	0.696	100	0.426	100
17	0.726	100	0.987	100	0.594	100	0.773	100	0.409	100	0.932	100
18	0.688	100	1.015	100	0.794	100	0.658	100	1.047	100	0.832	100
19	1.453	100	1.407	100	1.583	100	1.365	100	1.792	100	1.443	100
20	0.412	100	0.424	100	0.902	100	0.683	100	0.774	100	0.496	100
21	0.599	100	0.431	100	1.934	100	0.687	100	1.025	100	0.724	100
22	1.502	100	1.386	100	1.901	100	1.574	100	1.957	100	1.625	100
23	1.120	100	1.162	100	1.362	100	1.096	100	1.514	100	1.210	100
24	-	-	-	-	-	-	-	-	-	-	-	-
25	1.513	100	1.505	100	1.505	100	1.564	100	1.205	100	1.745	100
26	0.910	100	0.812	100	0.505	100	0.640	100	0.409	100	0.854	100
27	0.545	100	0.608	100	0.465	100	0.580	100	0.446	100	0.714	100
28	0.544	100	0.467	100	1.230	100	0.462	100	0.879	100	0.546	100
29	0.782	100	1.442	100	0.775	100	0.975	100	0.576	100	1.135	100
30	0.517	100	0.343	100	0.531	100	0.412	100	0.509	100	0.453	100
31	0.623	100	0.770	100	0.990	100	0.552	100	0.331	100	0.656	100
32	0.478	100	0.625	100	0.553	100	0.507	100	0.452	100	0.622	100

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

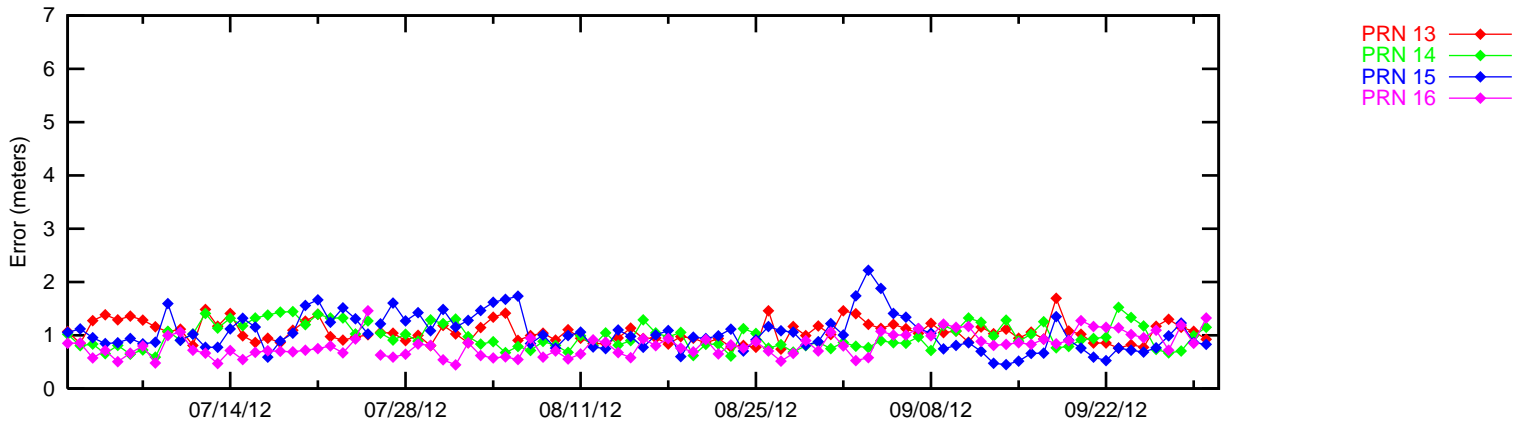
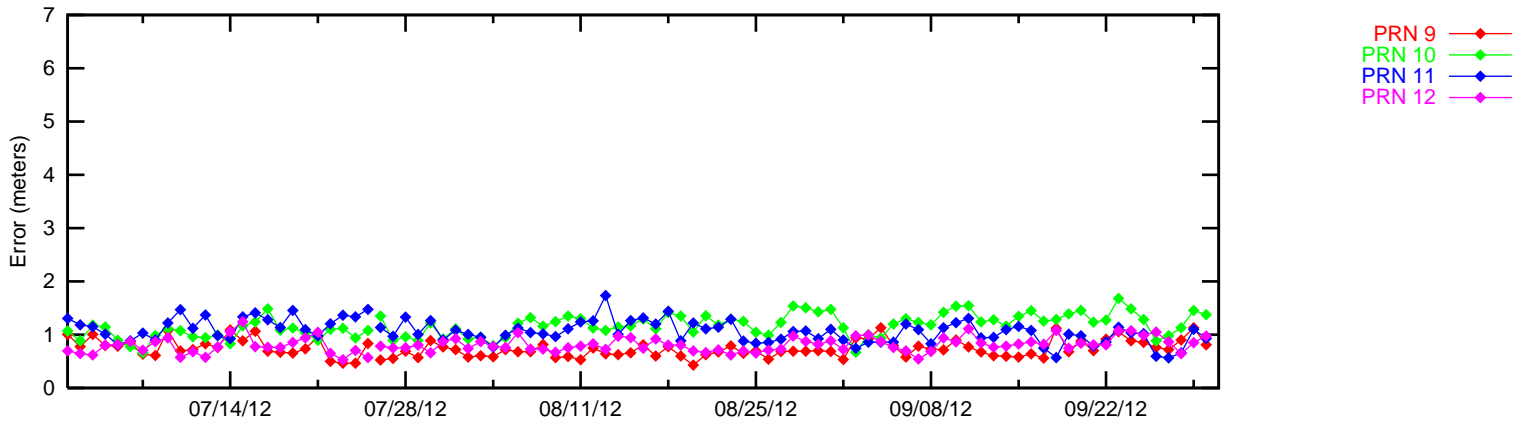
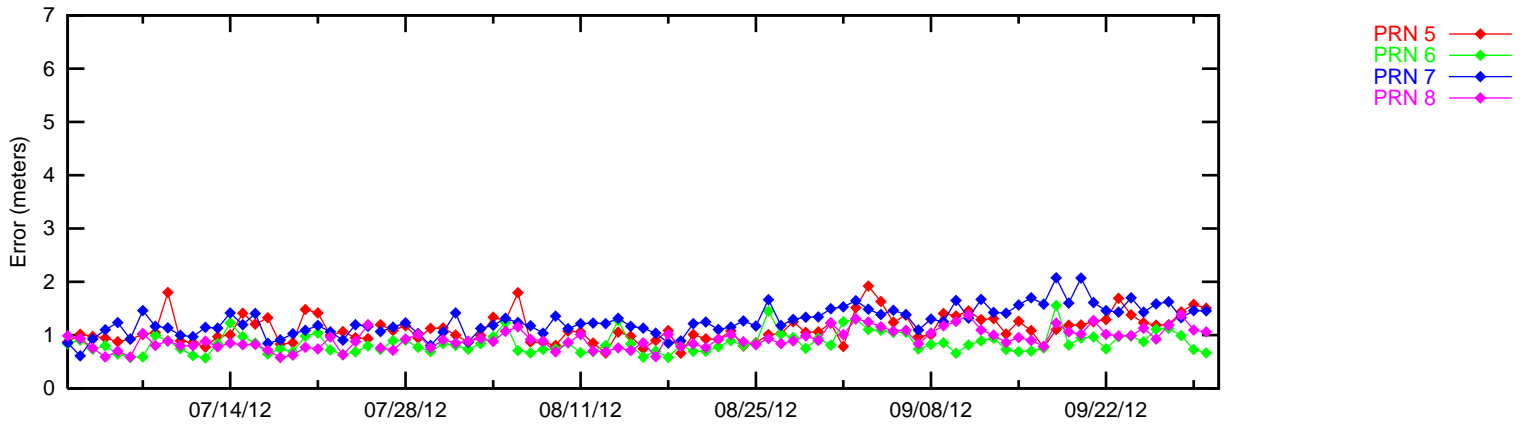
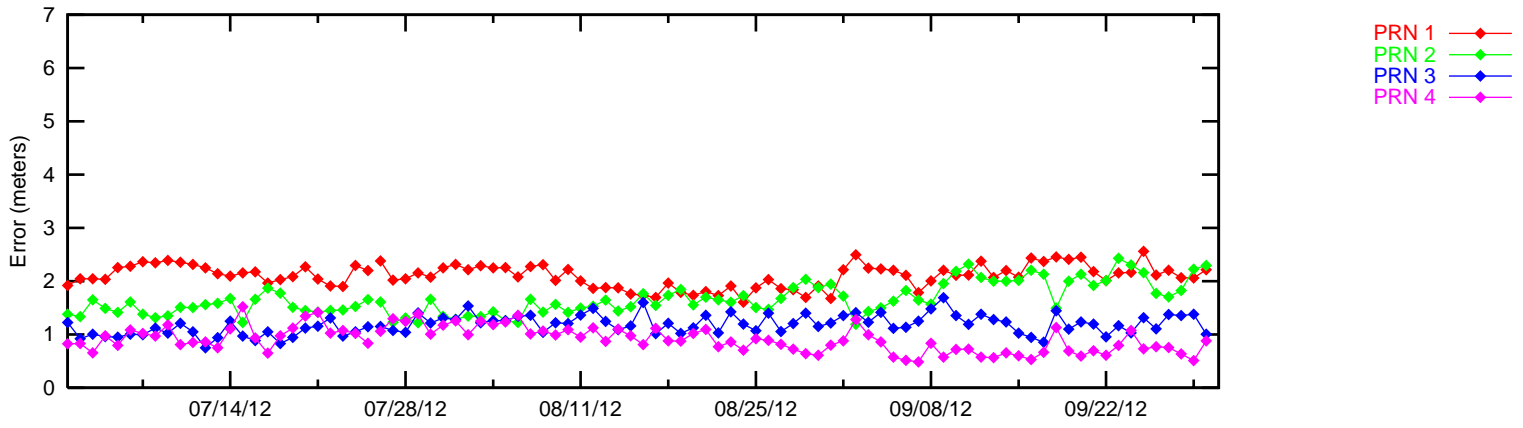
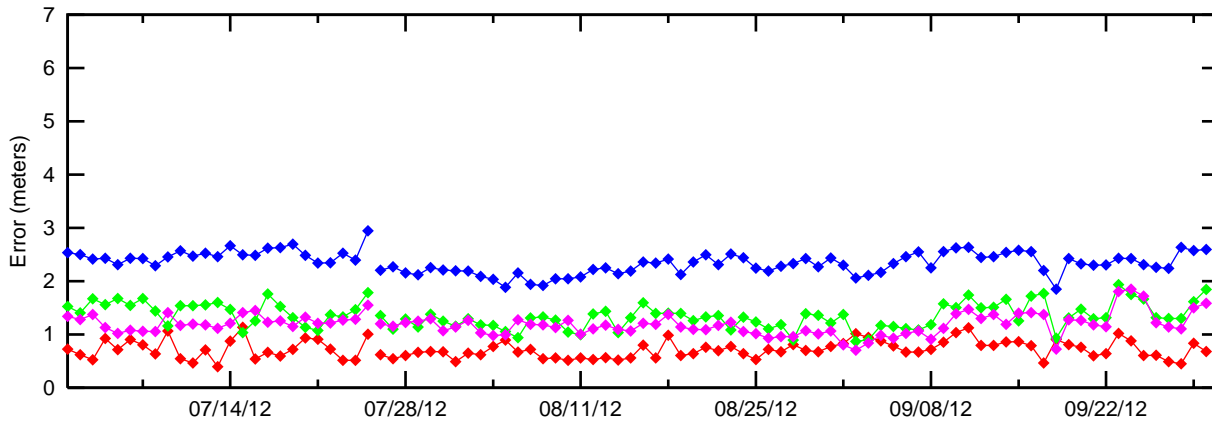
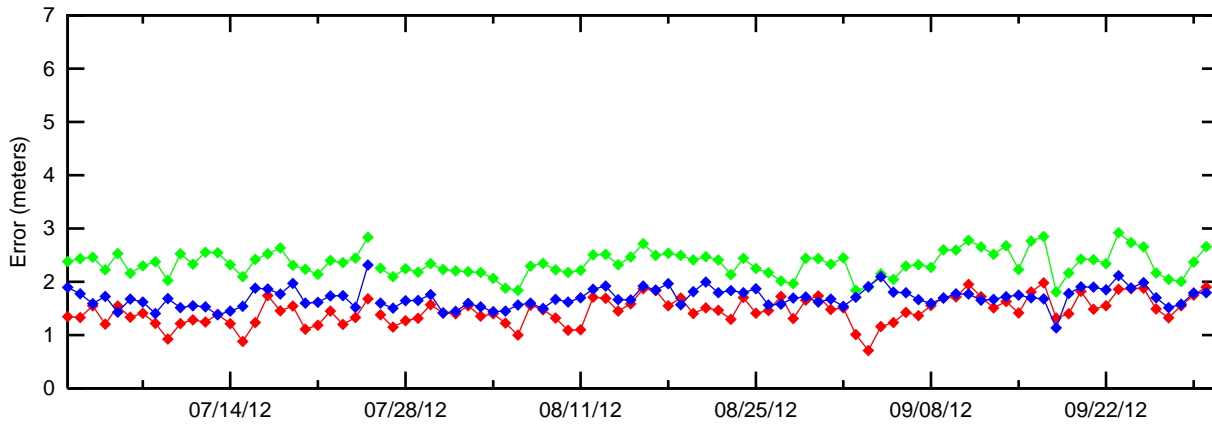


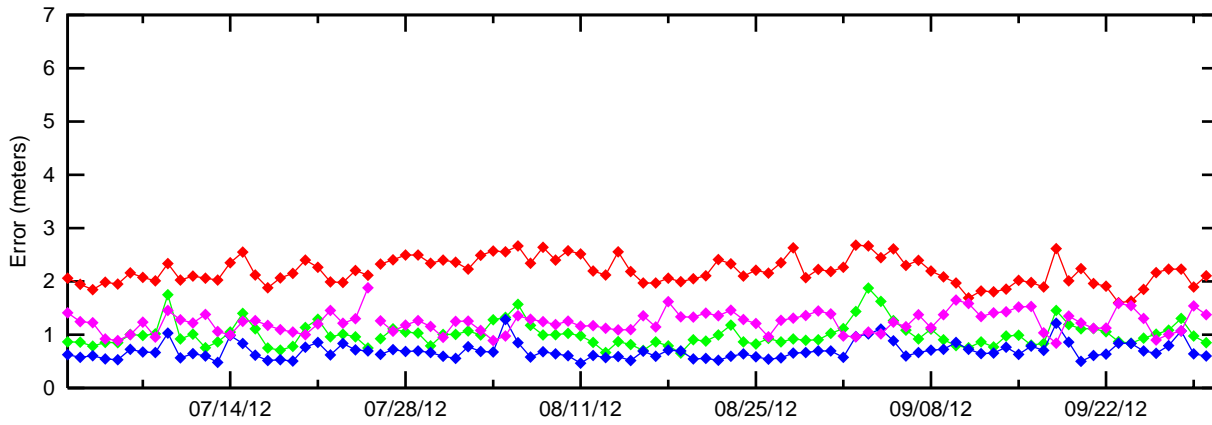
Figure 6-2 95% Range Error (PRN 17 - PRN 32) - Washington DC



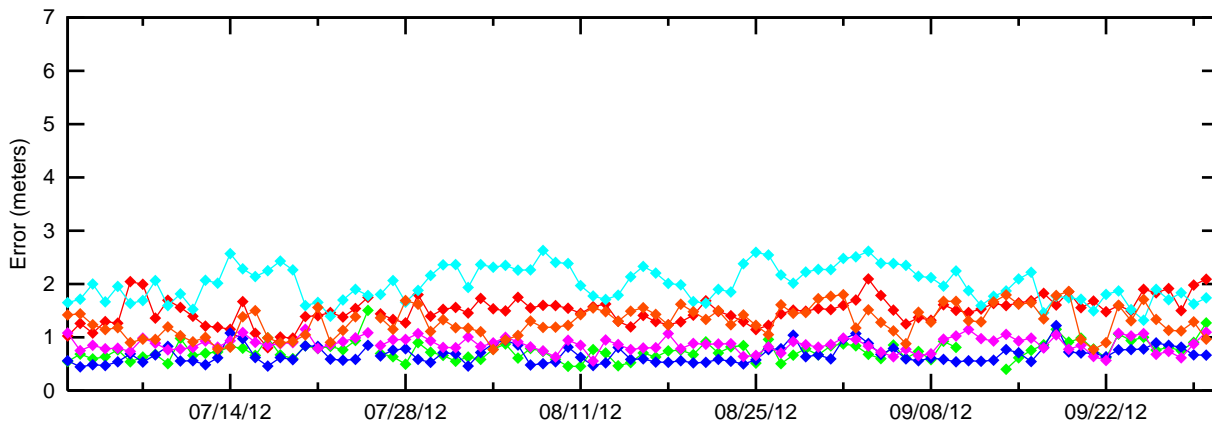
PRN 17 —◆—  
PRN 18 —◆—  
PRN 19 —◆—  
PRN 20 —◆—



PRN 21 —◆—  
PRN 22 —◆—  
PRN 23 —◆—  
PRN 24 —◆—

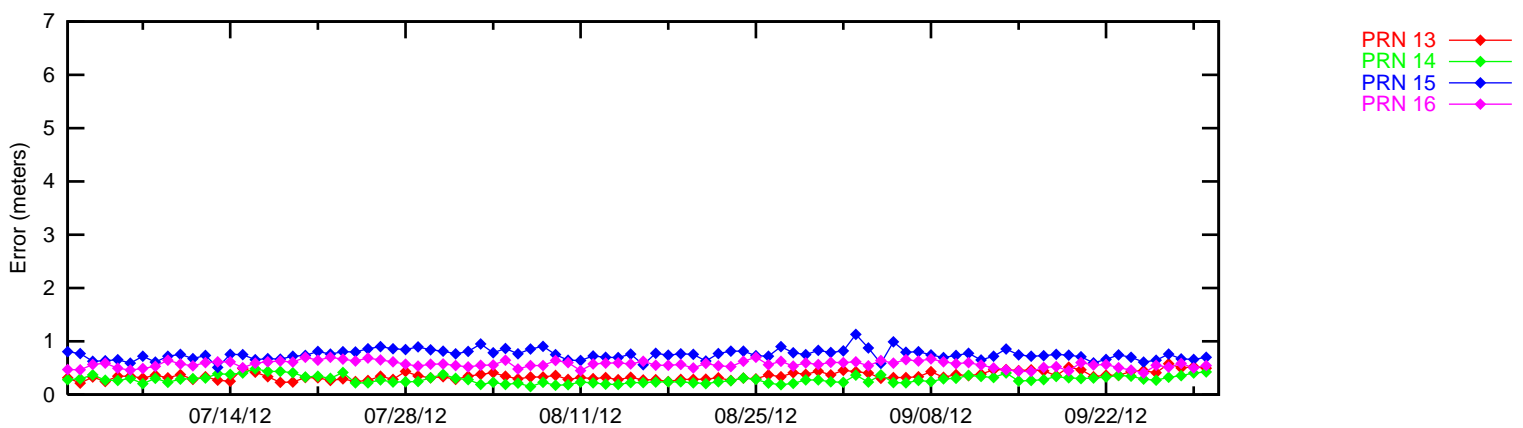
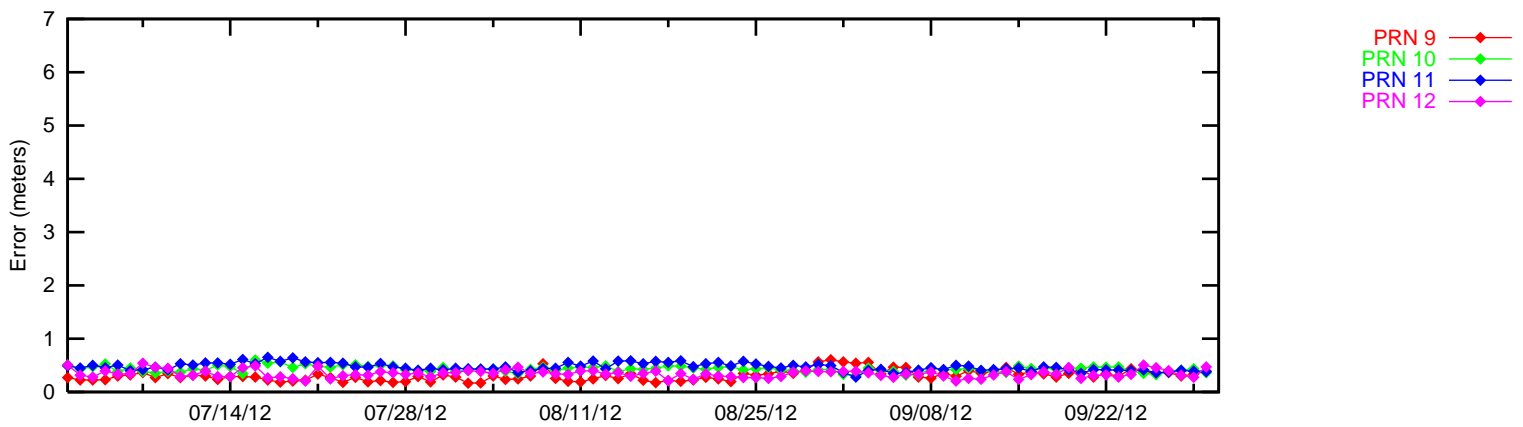
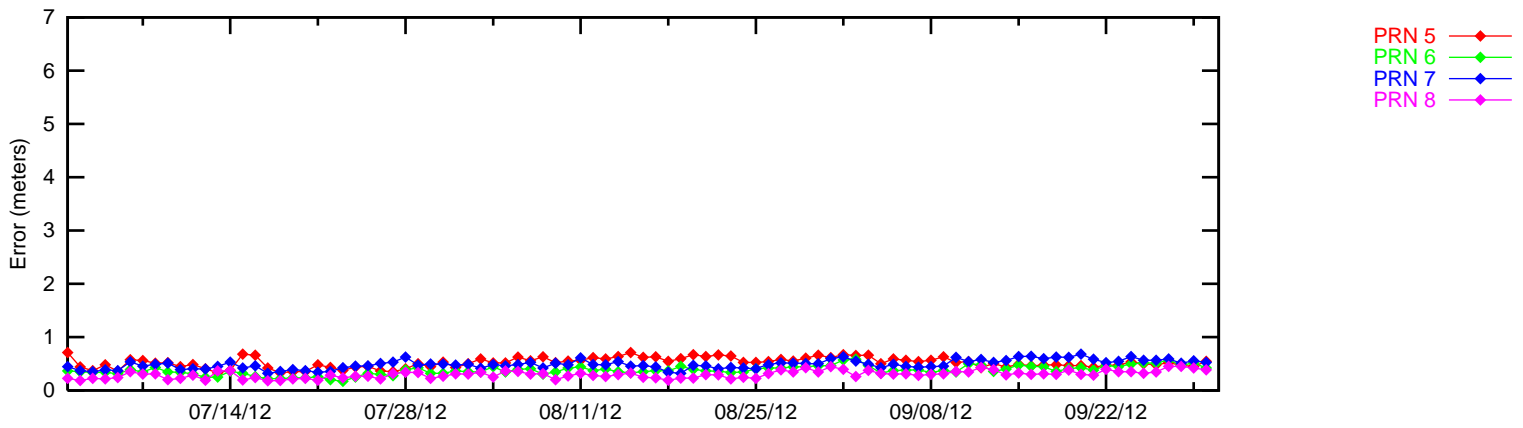
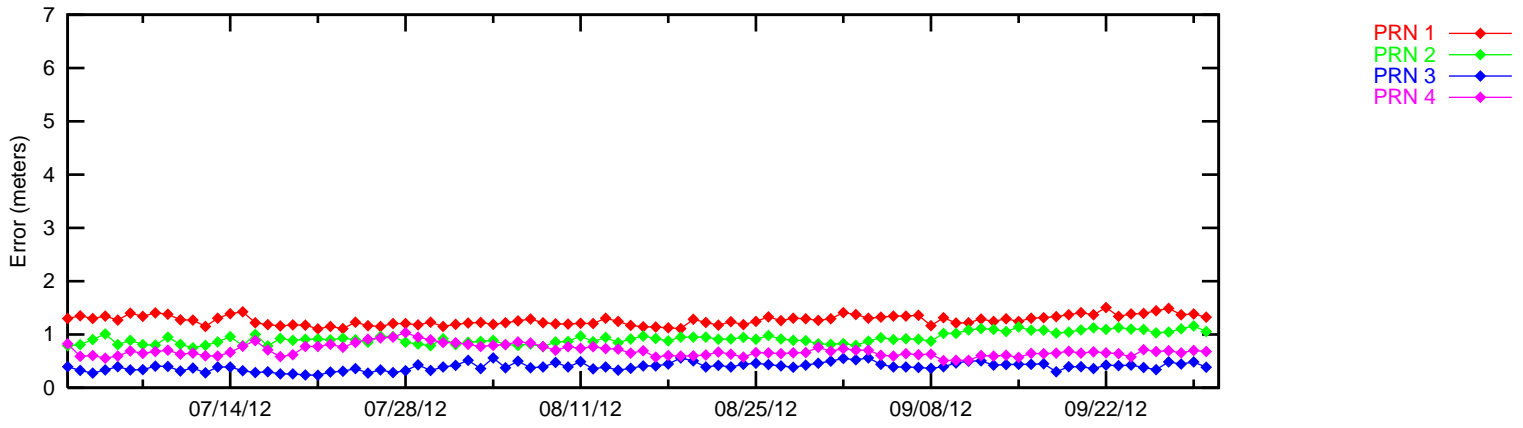


PRN 25 —◆—  
PRN 26 —◆—  
PRN 27 —◆—  
PRN 28 —◆—

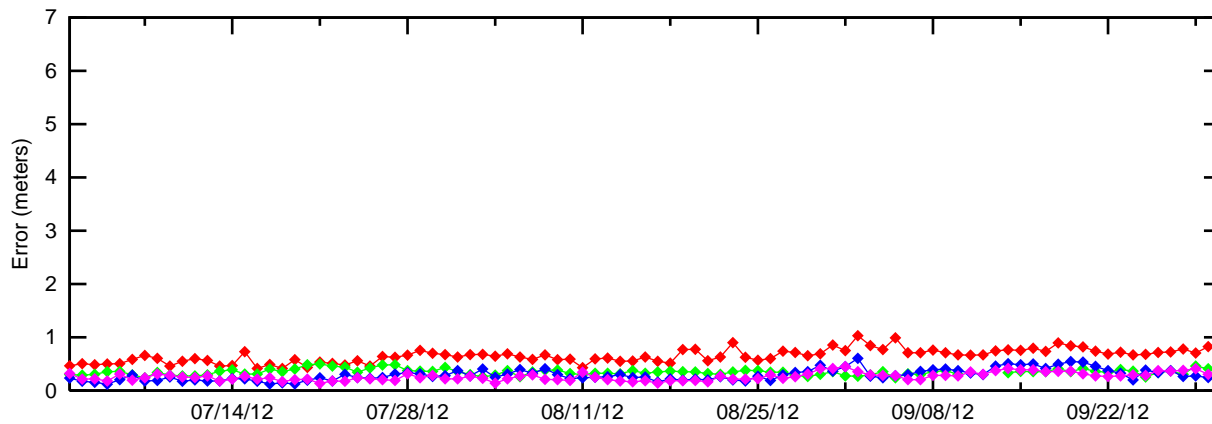
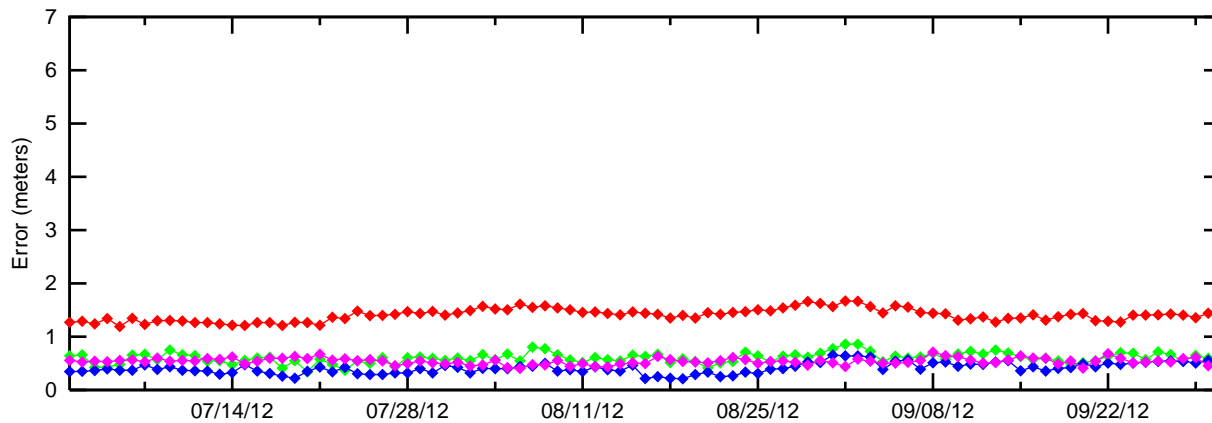
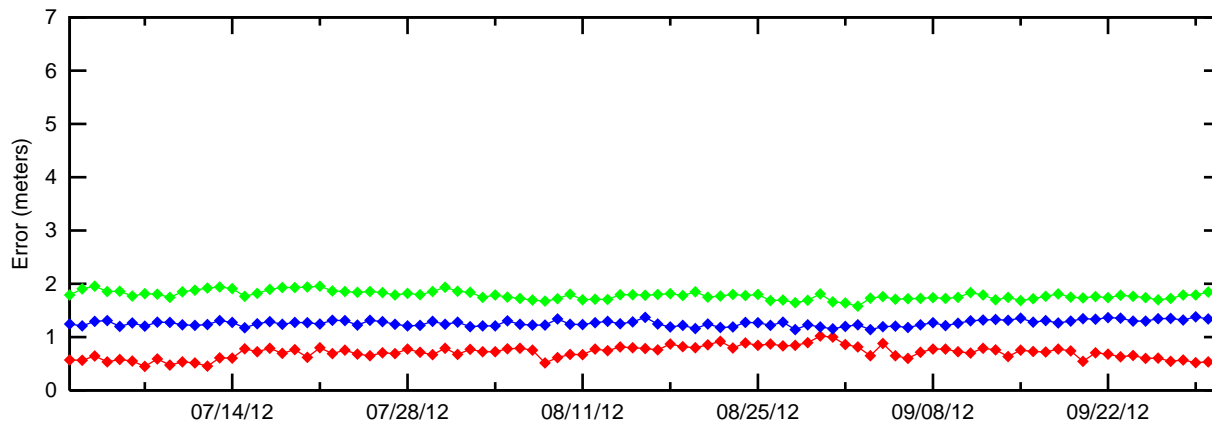
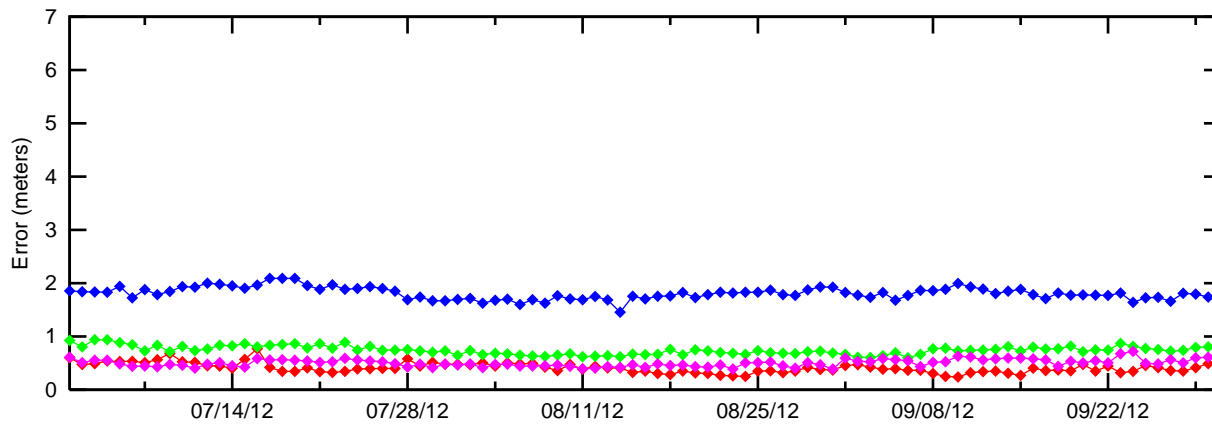


PRN 29 —◆—  
PRN 30 —◆—  
PRN 31 —◆—  
PRN 32 —◆—  
PRN 135 —◆—  
PRN 138 —◆—

### 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.

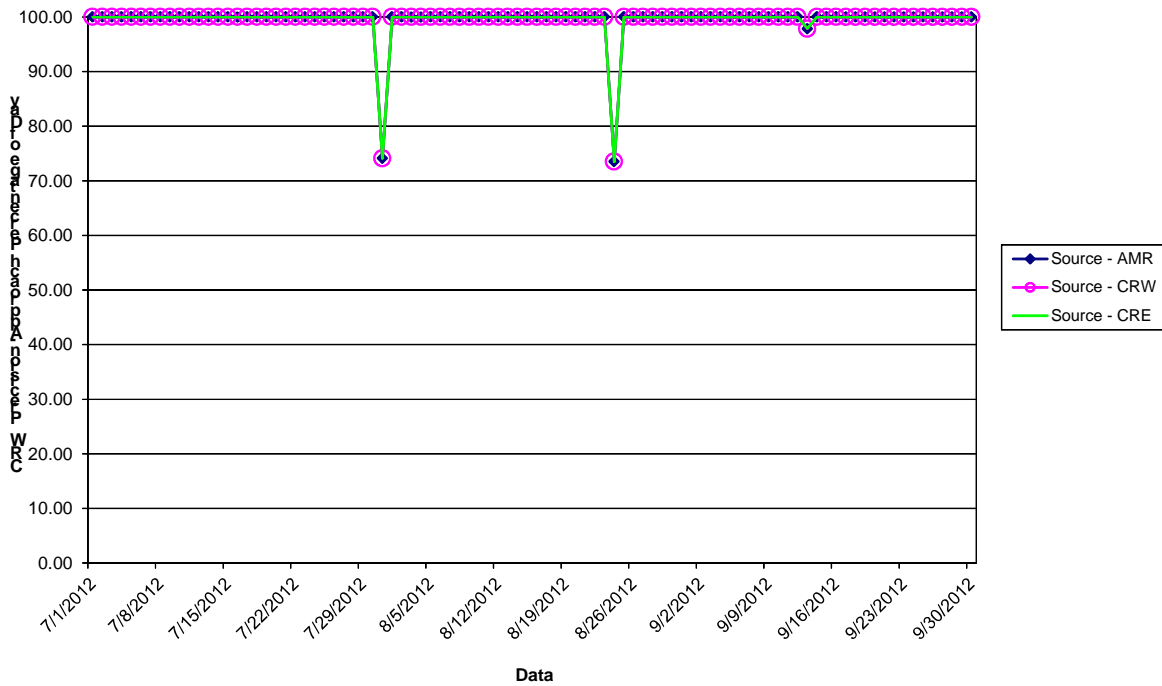
Table 7.1 shows the GEO-Ranging performance. Figure 7.1 shows the trend of CRW GEO PA Ranging Availability. Figure 7.2 shows the trend of CRE GEO PA Ranging Availability. Figure 7.3 shows the trend of AMR GEO NPA Ranging Availability.

Low ranging availability due to orbit mismatch did not occur during this reporting period. This issue was fixed by an update to the WAAS software (Build 6.140L) implemented July 2012.

**Table 7-1 GEO Ranging Availability**

<b>GEO Source</b>	<b>GEO</b>	<b>PA (%)</b>	<b>NPA (%)</b>	<b>Not Monitored (%)</b>	<b>Do Not Use (%)</b>
AMR 133	CRW	99.41	0.46	0.13	0
AMR 133	CRE	98.87	0.88	0.22	0.03
AMR 133	AMR	0	99.67	0.33	0
CRW 135	CRW	99.41	0.46	0.13	0
CRW 135	CRE	98.87	0.88	0.21	0.03
CRW 135	AMR	0	99.67	0.33	0
CRE 138	CRW	99.41	0.46	0.13	0
CRE 138	CRE	98.87	0.88	0.22	0.03
CRE 138	AMR	0	99.67	0.33	0

**Figure 7-1 Daily PA CRW GEO Ranging Availability Trend**  
 CRW PA-Ranging Performance reported by AMR, CRW, and CRE  
 1 July - 30 September 2012



**Figure 7-2 Daily PA CRE GEO Ranging Availability Trend**  
 CRE PA-Ranging Performance reported by AMR, CRW, and CRE  
 1 July - 30 September 2012

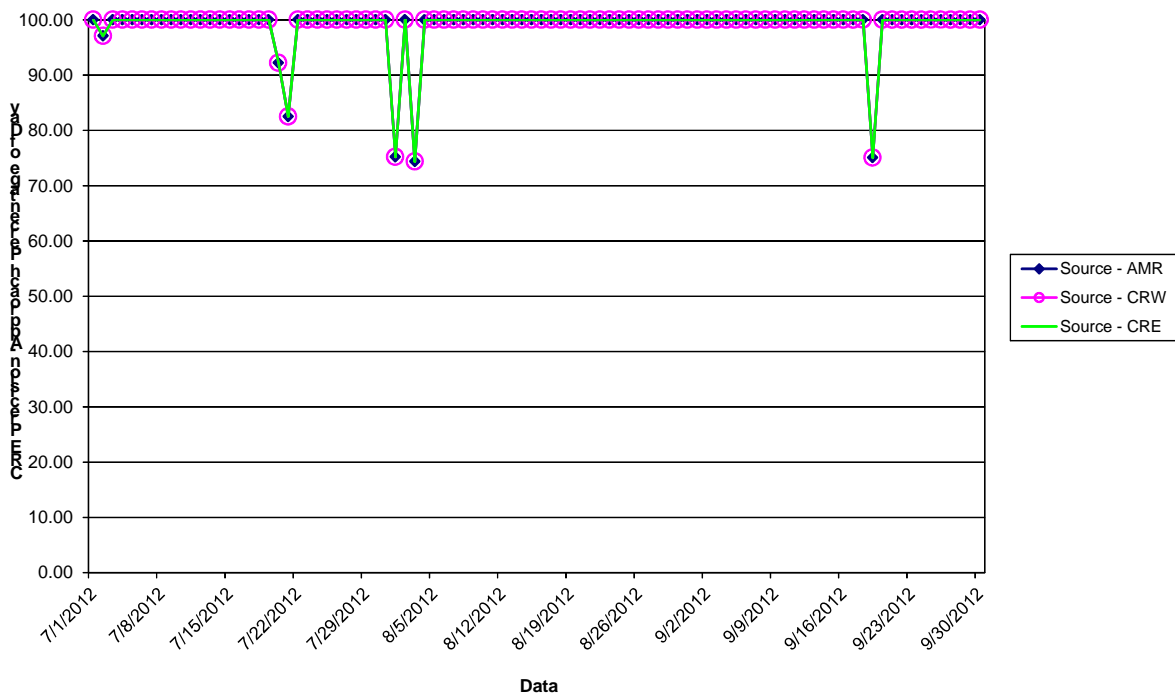
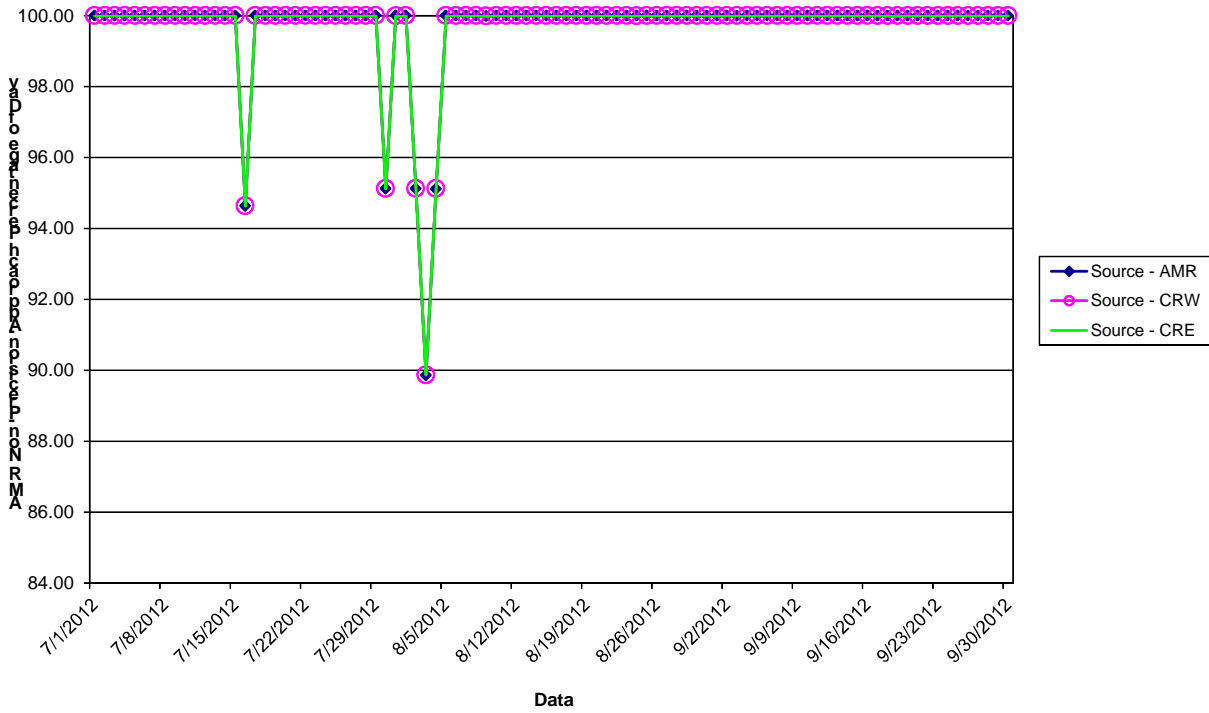




Figure 7-3 Daily NPA AMR GEO Ranging Availability Trend

AMR NPA-Ranging Performance reported by AMR, CRW, and CRE  
1 July - 30 September 2012



**8.0 WAAS AIRPORT AVAILABILITY**

The WAAS airport availability evaluation determines the number and length LPV service outages at selected airports from the transmitted WAAS navigation message. The navigation messages transmitted from all GEO satellites are processed simultaneously, and WAAS protection levels (VPL and HPL) are computed at each airport once every 30 second in accordance with the RTCA DO-229D. Once the protection levels have been produced at each airport an LPV service evaluation is conducted to identify outages in service (i.e. when protection levels exceed alert limits). WAAS LPV service is available for a user when the vertical protection level (VPL) is less than or equal to vertical alert limit (VAL) of 50 meters and the horizontal protection level (HPL) is less than or equal to horizontal alert limit (HAL) of 40 meters. If both conditions are met at a specified airport location then WAAS LPV service is available at that airport. If either one of the conditions are not met at a specified airport location then WAAS LPV service at that airport is unavailable and an outage in LPV service is recorded with its duration. When the LPV service becomes unavailable it is not considered available again until protection levels are below or equal to alert limits for at least 15 minutes. Although this will reduce LPV service availability minimally, it substantially reduces the number of service outages and prevents excessive switching in and out of service availability. Similar service analysis is completed for LP and LPV 200 services in accordance with HAL and VAL shown in Table 1.1. The number of WAAS LPV service outages and the availability at selected airports in the US and Canada for this evaluation period of WAAS operation is presented in Table 8-1. 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/Prov	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
CYEG	EDMONTON / JOSEPHBURG	AB	LPV	0	1	1	0.9999	2	0.9997
CYXD	EDMONTON CITY CTR	AB	LPV	0	1	1	1	2	0.9997
CAL4	FORT MACKAY ALBIAN AERODROME	AB	LPV	0	1	1	1	4	0.9994
CEV3	VEGREVILLE	AB	LPV	0	1	1	0.9999	2	0.9997
6A8	ALLAKAKET	AK	LP	0	1	0	1	4	0.9996
BET	BETHEL	AK	LPV200	0	1	0	1	4	0.9995
9A3	CHUATHBALUK	AK	LPV	0	1	0	1	3	0.9997
CLP	CLARKS POINT	AK	LPV	0	1	0	1	6	0.9995
CDB	COLD BAY	AK	LPV	1	1	4	0.9998	225	0.9625
CXF	COLDFOOT	AK	LP	0	1	0	1	5	0.9996
SCC	DEADHORSE	AK	LPV	0	1	0	1	13	0.9991
DLG	DILLINGHAM	AK	LPV	0	1	0	1	6	0.9995
GAL	EDWARD G. PITKA	AK	LPV	0	1	0	1	4	0.9997
ELI	ELIM	AK	LPV	0	1	0	1	5	0.9995
ENM	EMMONAK	AK	LPV	0	1	0	1	11	0.9992
FAI	FAIRBANKS INTL	AK	LPV200	0	1	0	1	3	0.9997
GKN	GULKANA	AK	LPV	0	1	0	1	2	0.9999
HOM	HOMER	AK	LPV	0	1	0	1	2	0.9998

Airport Id	Airport Name	State/Prov	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
HPB	HOOPER BAY	AK	LP	0	1	2	1	19	0.9984
HLA	HUSLIA	AK	LPV	0	1	0	1	4	0.9996
ILI	ILIAMNA	AK	LPV	0	1	0	1	2	0.9998
KAL	KALTAG	AK	LPV	0	1	0	1	4	0.9996
ENA	KENAI MUNI	AK	LPV200	0	1	0	1	2	0.9998
KTN	KETCHIKAN INTL	AK	LPV	0	1	0	1	2	0.9998
AKN	KING SALMON	AK	LPV	0	1	0	1	4	0.9997
KYU	KOYUKUK	AK	LPV	0	1	0	1	4	0.9996
KWT	KWETHLUK	AK	LPV	0	1	0	1	4	0.9995
MDM	MARSHALL DON HUNTER SR	AK	LP	0	1	0	1	5	0.9995
MCG	MCGRATH	AK	LP	0	1	0	1	3	0.9998
MDO	MIDDLETON ISLAND	AK	LP	0	1	0	1	2	0.9999
WNA	NAPAKIAK	AK	LPV	0	1	0	1	4	0.9994
ORT	NORTHWAY	AK	LP	0	1	0	1	2	0.9998
AQT	NUIQSUT	AK	LPV	0	1	0	1	15	0.9991
PAQ	PALMER MUNI	AK	LP	0	1	0	1	2	0.9999
AQH	QUINHAGAK	AK	LPV	0	1	0	1	12	0.9992
OTZ	RALPH WIEN MEMORIAL	AK	LPV200	0	1	0	1	57	0.9967
D76	ROBERT/BOB/CURTIS MEMORIAL	AK	LPV	0	1	0	1	33	0.9975
RBY	RUBY	AK	LPV	0	1	0	1	4	0.9997
SCM	SCAMMON BAY	AK	LP	0	1	1	1	15	0.9988
WLK	SELAWIK	AK	LPV	0	1	0	1	6	0.9994
SHX	SHAGELUK	AK	LPV	0	1	0	1	3	0.9997
2C7	SHAKTOOLIK	AK	LPV	0	1	0	1	4	0.9995
SHG	SHUNGNAK	AK	LP	0	1	0	1	6	0.9995
KSM	ST MARY'S	AK	LPV200	0	1	0	1	5	0.9994
SMK	ST MICHAEL	AK	LPV	0	1	0	1	4	0.9995
7KA	TATITLEK	AK	LP	0	1	0	1	2	0.9999
ANC	TED STEVENS ANCHORAGE INTL	AK	LPV200	0	1	0	1	2	0.9999
OOK	TOKSOOK BAY	AK	LP	0	1	2	1	28	0.9984
UNK	UNALAKLEET	AK	LP	0	1	0	1	4	0.9996
BRW	WILEY POST-WILL ROGERS MEM	AK	LPV	1	1	3	0.9999	113	0.9915
YAK	YAKUTAT	AK	LPV200	0	1	0	1	1	0.9999
8A0	ALBERTVILLE MUNI T. J. BRUMLIK FIELD	AL	LPV	0	1	0	1	0	1
ANB	ANNISTON METROPOLITAN	AL	LPV	0	1	0	1	0	1
AUO	AUBURN-OPELIKA ROBERT G PITTS	AL	LPV	0	1	0	1	0	1
1R8	BAY MINETTE MUNI	AL	LPV	0	1	0	1	0	1
EKY	BESSEMER	AL	LPV	0	1	0	1	0	1
BHM	BIRMINGHAM INTL	AL	LPV200	0	1	0	1	0	1
12J	BREWTON MUNI	AL	LPV	0	1	0	1	0	1
PYP	CENTRE-PIEDMONT CHEROKEE COUNTY RGNL	AL	LPV	0	1	0	1	0	1
SEM	CRAIG FIELD	AL	LPV	0	1	0	1	0	1
DHN	DOTHAN REGIONAL	AL	LPV	0	1	0	1	0	1
EDN	ENTERPRISE MUNI	AL	LPV	0	1	0	1	0	1
5R4	FOLEY MUNI	AL	LPV	0	1	0	1	0	1

Airport Id	Airport Name	State/Prov	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
3A1	FOLSOM FIELD	AL	LPV	0	1	0	1	0	1
CQF	H L SONNY CALLAHAN	AL	LPV200	0	1	0	1	0	1
0J6	HEADLAND MUNI	AL	LPV	0	1	0	1	0	1
HSV	HUNTSVILLE INTL-CARL T JONES FLD	AL	LPV200	0	1	0	1	0	1
4A9	ISBELL FIELD	AL	LPV	0	1	0	1	0	1
JKA	JACK EDWARDS	AL	LPV200	0	1	0	1	0	1
MDQ	MADISON COUNTY EXECUTIVE TOM SHARP JR FLD	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 MUNI	AL	LPV	0	1	0	1	0	1
BFM	MOBILE DOWNTOWN	AL	LPV200	0	1	0	1	0	1
MOB	MOBILE REGIONAL	AL	LPV	0	1	0	1	0	1
MGM	MONTGOMERY REGIONAL (DANNELLY FIELD)	AL	LPV200	0	1	0	1	0	1
06A	MOTON FIELD MUNI	AL	LPV	0	1	0	1	0	1
GAD	NORTHEAST ALABAMA REGIONAL	AL	LPV200	0	1	0	1	0	1
MSL	NORTHWEST ALABAMA RGNL	AL	LPV200	0	1	0	1	0	1
1M4	POSEY FIELD	AL	LPV	0	1	0	1	0	1
DCU	PRYOR FIELD REGIONAL	AL	LPV200	0	1	0	1	0	1
M95	RICHARD ARTHUR FIELD	AL	LPV	0	1	0	1	0	1
EET	SHELBY COUNTY	AL	LPV	0	1	0	1	0	1
79J	SOUTH ALABAMA RGNL AT BILL BENTON FIELD	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	LPV200	0	1	0	1	0	1
TOI	TROY MUNI	AL	LPV	0	1	0	1	0	1
TCL	TUSCALOOSA REGIONAL	AL	LPV	0	1	0	1	0	1
JFX	WALKER COUNTY-BEVILL FIELD	AL	LPV	0	1	0	1	0	1
EUF	WEEDON FIELD	AL	LPV	0	1	0	1	0	1
LIT	ADAMS FIELD	AR	LPV200	0	1	0	1	0	1
BYH	ARKANSAS INTERNATIONAL	AR	LPV200	0	1	0	1	0	1
BVX	BATESVILLE REGIONAL	AR	LPV	0	1	0	1	0	1
HRO	BOONE COUNTY	AR	LPV	0	1	0	1	0	1
4M3	CARLISLE MUNI	AR	LPV	0	1	0	1	0	1
FSM	FORT SMITH RGNL	AR	LPV200	0	1	0	1	0	1
PBF	GRIDER FIELD	AR	LPV	0	1	0	1	0	1
CDH	HARRELL FIELD	AR	LPV	0	1	0	1	0	1
M77	HOWARD COUNTY	AR	LP	0	1	0	1	0	1
JBR	JONESBORO MUNI	AR	LPV	0	1	0	1	0	1
7M1	MC GEHEE MUNI	AR	LP	0	1	0	1	0	1
M19	NEWPORT MUNI	AR	LPV	0	1	0	1	0	1
ORK	NORTH LITTLE ROCK MUNI	AR	LPV	0	1	0	1	0	1
XNA	NORTHWEST ARKANSAS RGNL	AR	LPV200	0	1	0	1	1	1
BPK	OZARK REGIONAL	AR	LPV	0	1	0	1	0	1
ROG	ROGERS MUNI-CARTER FIELD	AR	LPV	0	1	0	1	1	1
RUE	RUSSELLVILLE REGIONAL	AR	LPV	0	1	0	1	0	1

Airport Id	Airport Name	State/Prov	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
SUZ	SALINE COUNTY REGIONAL	AR	LPV	0	1	0	1	0	1
SRC	SEARCY MUNI	AR	LPV	0	1	0	1	0	1
SLG	SMITH FIELD	AR	LPV	0	1	0	1	1	1
ELD	SOUTH ARKANSAS RGNL AT GOODWIN FIELD	AR	LPV	0	1	0	1	0	1
ASG	SPRINGDALE MUNI	AR	LPV	0	1	0	1	1	1
SGT	STUTTGART MUNI	AR	LPV	0	1	0	1	0	1
TXK	TEXARKANA REGIONAL WEBB FIELD	AR	LPV	0	1	0	1	0	1
ARG	WALNUT RIDGE REGIONAL	AR	LPV200	0	1	0	1	0	1
AWM	WEST MEMPHIS MUNI	AR	LPV200	0	1	0	1	0	1
P33	COCHISE COUNTY	AZ	LPV	0	1	0	1	7	0.9996
PRC	ERNEST A. LOVE FIELD	AZ	LPV	0	1	0	1	4	0.9998
FFZ	FALCON FLD	AZ	LP	0	1	0	1	5	0.9998
FLG	FLAGSTAFF PULLIAM	AZ	LPV	0	1	0	1	4	0.9999
GEU	GLENDALE MUNI	AZ	LPV	0	1	0	1	5	0.9998
IGM	KINGMAN	AZ	LPV	0	1	0	1	4	0.9998
HII	LAKE HAVASU CITY	AZ	LPV	0	1	0	1	4	0.9998
IFP	LAUGHLIN/BULLHEAD INTL	AZ	LPV	0	1	0	1	4	0.9998
AVQ	MARANA REGIONAL	AZ	LP	0	1	0	1	7	0.9995
PGA	PAGE MUNI	AZ	LPV	0	1	0	1	3	0.9999
DVT	PHOENIX DEER VALLEY	AZ	LPV	0	1	0	1	5	0.9998
PHX	PHOENIX SKY HARBOR INTL	AZ	LPV	0	1	0	1	5	0.9997
IWA	PHOENIX-MESA GATEWAY	AZ	LPV200	0	1	0	1	5	0.9997
SAD	SAFFORD REGIONAL	AZ	LPV	0	1	0	1	7	0.9997
SOW	SHOW LOW REGIONAL	AZ	LPV	0	1	0	1	7	0.9998
FHU	SIERRA VISTA MUNI-LIBBY AAF	AZ	LPV200	0	1	0	1	7	0.9995
D68	SPRINGERVILLE MUNI	AZ	LP	0	1	0	1	7	0.9998
SJN	ST JOHNS INDUSTRIAL AIR PARK	AZ	LP	0	1	0	1	7	0.9998
TUS	TUCSON INTL	AZ	LPV	0	1	0	1	7	0.9995
RQE	WINDOW ROCK	AZ	LP	0	1	0	1	4	1
CYBL	CAMPBELL RIVER	BC	LPV	0	1	1	1	7	0.9995
CYCD	NANAIMO	BC	LPV	0	1	1	1	7	0.9994
CYXS	PRINCE GEORGE	BC	LPV	0	1	0	1	2	0.9998
CZBB	VANCOUVER / BOUNDARY BAY	BC	LPV	0	1	1	1	7	0.9995
CYVR	VANCOUVER INTL	BC	LPV	0	1	1	1	7	0.9995
CYYJ	VICTORIA INTL	BC	LPV	0	1	1	1	7	0.9995
AAT	ALTURAS MUNI	CA	LPV	0	1	0	1	94	0.9960
APV	APPLE VALLEY	CA	LPV	0	1	0	1	3	0.9998
ACV	ARCATA	CA	LPV200	0	1	0	1	98	0.9746
AUN	AUBURN MUNI	CA	LPV	0	1	1	1	95	0.9887
DAG	BARSTOW-DAGGETT	CA	LPV	0	1	0	1	3	0.9998
BLH	BLYTHE	CA	LP	0	1	0	1	4	0.9998
POC	BRACKETT FIELD	CA	LPV	0	1	0	1	3	0.9998
CCR	BUCHANAN FIELD	CA	LPV	0	1	69	0.9988	98	0.9807
C83	BYRON	CA	LPV	0	1	59	0.9991	95	0.9839
CMA	CAMARILLO	CA	LPV	0	1	54	0.9990	97	0.9951
MER	CASTLE	CA	LPV200	0	1	35	0.9996	94	0.9890

Airport Id	Airport Name	State/Prov	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
STS	CHARLES M. SCHULZ SONOMA COUNTY	CA	LPV	0	1	47	0.9992	98	0.9769
CIC	CHICO MUNI	CA	LPV	0	1	0	1	95	0.9889
CNO	CHINO	CA	LPV	0	1	0	1	4	0.9997
FAT	FRESNO YOSEMITE INTL	CA	LPV	0	1	34	0.9996	95	0.9919
WJF	GENERAL WM J FOX AIRFIELD	CA	LPV	0	1	0	1	50	0.9993
SEE	GILLESPIE FIELD	CA	LP	0	1	0	1	6	0.9995
HAF	HALF MOON BAY	CA	LPV	0	1	92	0.9942	100	0.9777
HHR	HAWTHORNE JACK NORTHROP FIELD	CA	LPV	0	1	0	1	59	0.9990
HWD	HAYWARD EXECUTIVE	CA	LPV	0	1	86	0.9973	98	0.9798
CVH	HOLLISTER MUNI	CA	LPV	0	1	88	0.9969	96	0.9846
CEC	JACK MC NAMARA FIELD	CA	LPV	0	1	0	1	97	0.9747
SNA	JOHN WAYNE-ORANGE COUNTY	CA	LPV	0	1	0	1	5	0.9997
LHM	LINCOLN REGIONAL KARL HARDER FIELD	CA	LPV200	0	1	2	1	95	0.9878
LVK	LIVERMORE MUNI	CA	LPV	0	1	72	0.9983	96	0.9820
LGB	LONG BEACH/DAUGHERTY FIELD	CA	LPV	0	1	0	1	32	0.9995
LAX	LOS ANGELES INTL	CA	LPV	0	1	2	1	68	0.9987
LSN	LOS BANOS MUNI	CA	LPV	0	1	63	0.9990	94	0.9879
MAE	MADERA MUNI	CA	LPV	0	1	33	0.9996	94	0.9905
CRQ	MC CLELLAN-PALOMAR	CA	LPV	0	1	0	1	6	0.9995
BFL	MEADOWS FIELD	CA	LPV200	0	1	44	0.9993	95	0.9953
MCE	MERCED RGNL/MACREADY FIELD	CA	LPV	0	1	38	0.9995	94	0.9892
OAK	METROPOLITAN OAKLAND INTL	CA	LPV	0	1	87	0.9972	99	0.9793
MOD	MODESTO CITY CO HARRY SHAM FLD	CA	LPV	0	1	38	0.9995	94	0.9876
MRY	MONTEREY PENINSULA	CA	LPV	0	1	92	0.9944	101	0.9807
MYF	MONTGOMERY FIELD	CA	LPV200	0	1	0	1	6	0.9995
APC	NAPA COUNTY	CA	LPV	0	1	65	0.9991	97	0.9797
O02	NERVINO	CA	LPV	0	1	0	1	95	0.9941
SJC	NORMAN Y. MINETA SAN JOSE INTERNATIONAL	CA	LPV	0	1	92	0.9966	98	0.9809
VCB	NUT TREE	CA	LPV	0	1	33	0.9996	95	0.9822
O27	OAKDALE	CA	LPV	0	1	32	0.9996	94	0.9882
ONT	ONTARIO INTL	CA	LPV	0	1	0	1	4	0.9997
OVE	OROVILLE MUNI	CA	LPV	0	1	0	1	95	0.9892
OXR	OXNARD	CA	LPV	0	1	53	0.9990	97	0.9945
PMD	PALMDALE REGIONAL USAF PLANT 42	CA	LPV200	0	1	0	1	30	0.9996
PRB	PASO ROBLES MUNICIPAL	CA	LPV200	0	1	91	0.9972	97	0.9887
O69	PETALUMA MUNI	CA	LPV	0	1	77	0.9986	99	0.9777
PVF	PLACERVILLE	CA	LPV	0	1	1	1	95	0.9891
RBL	RED BLUFF MUNI	CA	LPV	0	1	0	1	94	0.9857
RDD	REDDING MUNI	CA	LPV	0	1	0	1	95	0.9877
RHV	REID-HILLVIEW OF SANTA CLARA	CA	LPV	0	1	88	0.9970	98	0.9814

Airport Id	Airport Name	State/Prov	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
O88	RIO VISTA MUNI	CA	LP	0	1	38	0.9995	95	0.9841
RAL	RIVERSIDE MUNI	CA	LPV	0	1	0	1	3	0.9997
SAC	SACRAMENTO EXECUTIVE	CA	LPV200	0	1	12	0.9999	95	0.9859
SMF	SACRAMENTO INTL	CA	LPV200	0	1	5	1	95	0.9859
MHR	SACRAMENTO MATHER	CA	LPV200	0	1	9	0.9999	95	0.9870
SNS	SALINAS MUNI	CA	LPV200	0	1	92	0.9955	98	0.9825
SAN	SAN DIEGO INTL	CA	LP	0	1	0	1	6	0.9995
SFO	SAN FRANCISCO INTERNATIONAL	CA	LPV	0	1	92	0.9957	99	0.9784
SBP	SAN LUIS COUNTY REGIONAL	CA	LPV200	0	1	92	0.9965	100	0.9878
SBA	SANTA BARBARA MUNI	CA	LPV	0	1	82	0.9984	98	0.9909
SMX	SANTA MARIA PUBLIC/CAPT G ALLAN HANCOCK FIELD	CA	LPV200	0	1	92	0.9966	101	0.9874
MIT	SHAFTER-MINTER FIELD	CA	LPV	0	1	44	0.9993	96	0.9946
VCV	SOUTHERN CALIFORNIA LOGISTICS	CA	LPV	0	1	0	1	3	0.9998
SCK	STOCKTON METROPOLITAN	CA	LPV	0	1	37	0.9995	95	0.9864
TCY	TRACY MUNI	CA	LPV	0	1	55	0.9991	95	0.9850
VIS	VISALIA MUNI	CA	LPV200	0	1	38	0.9995	96	0.9934
WLW	WILLOWS-GLENN COUNTY	CA	LPV	0	1	1	1	95	0.9836
DWA	YOLO COUNTY-DAVIS/WOODLAND/WINTERS	CA	LPV	0	1	13	0.9999	95	0.9835
MYV	YUBA COUNTY	CA	LPV200	0	1	2	1	95	0.9876
APA	CENTENNIAL	CO	LPV	0	1	0	1	1	1
COS	CITY OF COLORADO SPRINGS MUNI	CO	LPV200	0	1	0	1	2	0.9999
CEZ	CORTEZ MUNI	CO	LPV	0	1	0	1	0	1
DEN	DENVER INTERNATIONAL	CO	LPV200	0	1	0	1	1	0.9999
DRO	DURANGO-LA PLATA COUNTY	CO	LPV200	0	1	0	1	0	1
FNL	FORT COLLINS-LOVELAND MUNI	CO	LPV200	0	1	0	1	1	0.9999
FTG	FRONT RANGE	CO	LPV	0	1	0	1	2	0.9999
RIL	GARFIELD COUNTY REGIONAL	CO	LPV	0	1	0	1	0	1
GJT	GRAND JUNCTION RGNL	CO	LPV200	0	1	0	1	0	1
GXY	GREELEY-WELD COUNTY	CO	LPV	0	1	0	1	1	0.9999
ITR	KIT CARSON COUNTY	CO	LPV	0	1	0	1	2	0.9998
LHX	LA JUNTA MUNI	CO	LPV	0	1	0	1	2	0.9999
LAA	LAMAR MUNI	CO	LPV	0	1	0	1	2	0.9999
MTJ	MONTROSE REGIONAL	CO	LPV	0	1	0	1	0	1
PUB	PUEBLO MEMORIAL	CO	LPV200	0	1	0	1	2	0.9999
BJC	ROCKY MOUNTAIN METROPOLITAN	CO	LPV200	0	1	0	1	1	1
ALS	SAN LUIS VALLEY REGIONAL BERGMAN FIELD	CO	LPV200	0	1	0	1	1	0.9999
TEX	TELLURIDE REGIONAL	CO	LP	0	1	0	1	0	1
HDN	YAMPA VALLEY	CO	LPV	0	1	0	1	1	1
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
IJD	WINDHAM	CT	LP	0	1	0	1	0	1

Airport Id	Airport Name	State/Prov	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
DCA	RONALD REAGAN WASHINGTON NATL	DC	LPV	0	1	0	1	0	1
IAD	WASHINGTON DULLES INTL	DC	LPV200	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	3	0.9999
AAF	APALACHICOLA MUNI	FL	LPV	0	1	0	1	0	1
AVO	AVON PARK EXECUTIVE	FL	LPV	0	1	0	1	2	0.9999
BOW	BARTOW MUNI	FL	LPV	0	1	0	1	1	1
CEW	BOB SIKES	FL	LPV	0	1	0	1	0	1
BCT	BOCA RATON	FL	LPV	0	1	0	1	11	0.9994
VQQ	CECIL FIELD	FL	LPV	0	1	0	1	0	1
PGD	CHARLOTTE COUNTY	FL	LPV200	0	1	0	1	2	0.9999
CRG	CRAIG MUNI	FL	LPV200	0	1	0	1	0	1
CTY	CROSS CITY	FL	LPV	0	1	0	1	0	1
DAB	DAYTONA BEACH INTL	FL	LPV200	0	1	0	1	0	1
54J	DEFUNIAK SPRINGS	FL	LP	0	1	0	1	0	1
DED	DELAND MUNI SIDNEY H TAYLOR FLD	FL	LPV	0	1	0	1	0	1
DTS	DESTIN-FORT WALTON BEACH	FL	LP	0	1	0	1	0	1
FHB	FERNANDINA BEACH MUNI	FL	LPV	0	1	0	1	0	1
XFL	FLAGLER COUNTY	FL	LPV	0	1	0	1	0	1
FLL	FORT LAUDERDALE HOLLYWOOD INTL	FL	LPV	0	1	0	1	39	0.9989
FXE	FT LAUDERDALE EXECUTIVE	FL	LPV200	0	1	0	1	20	0.9993
GNV	GAINESVILLE RGNL	FL	LPV	0	1	0	1	0	1
HEG	HERLONG RECREATIONAL	FL	LP	0	1	0	1	0	1
BKV	HERNANDO COUNTY	FL	LPV	0	1	0	1	0	1
X51	HOMESTEAD GENERAL AVIATION	FL	LPV	0	1	0	1	61	0.9980
IMM	IMMOKALEE RGNL	FL	LPV	0	1	0	1	3	0.9997
JAX	JACKSONVILLE INTL	FL	LPV200	0	1	0	1	0	1
TMB	KENDALL-TAMIAMI EXECUTIVE	FL	LPV200	0	1	0	1	60	0.9981
EYW	KEY WEST INTL	FL	LPV	0	1	0	1	15	0.9992
ISM	KISSIMMEE GATEWAY	FL	LPV200	0	1	0	1	1	1
X14	LA BELLE MUNI	FL	LPV	0	1	0	1	2	0.9998
LCQ	LAKE CITY MUNI	FL	LPV	0	1	0	1	0	1
X07	LAKE WALES MUNI	FL	LP	0	1	0	1	1	1
LAL	LAKELAND LINDER REGIONAL	FL	LPV200	0	1	0	1	1	1
LEE	LEESBURG INTL	FL	LPV	0	1	0	1	0	1
MKY	MARCO ISLAND	FL	LPV	0	1	0	1	5	0.9997
X35	MARION CO & PARK OF COMMERCE	FL	LP	0	1	0	1	0	1
MLB	MELBOURNE INTL	FL	LPV	0	1	0	1	2	0.9999
COI	MERRITT ISLAND	FL	LPV	0	1	0	1	2	1
MIA	MIAMI INTL	FL	LPV	0	1	0	1	58	0.9982
APF	NAPLES MUNI	FL	LPV	0	1	0	1	2	0.9997
EVB	NEW SMYRNA BEACH MUNI	FL	LPV	0	1	0	1	0	1
F45	NORTH PALM BEACH COUNTY GENERAL AVIATION	FL	LPV	0	1	0	1	5	0.9997



Airport Id	Airport Name	State/Prov	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
ECP	NORTHWEST FLORIDA BEACHES INTL	FL	LPV200	0	1	0	1	0	1
OCF	OCALA INTL-JIM TAYLOR FLD	FL	LPV200	0	1	0	1	0	1
OBE	OKEECHOBEE COUNTY	FL	LPV	0	1	0	1	2	0.9998
OPF	OPA LOCKA	FL	LPV200	0	1	0	1	46	0.9986
ORL	ORLANDO EXECUTIVE	FL	LPV200	0	1	0	1	0	1
MCO	ORLANDO INTL	FL	LPV200	0	1	0	1	0	1
SFB	ORLANDO SANFORD INTL	FL	LPV200	0	1	0	1	0	1
FMY	PAGE FIELD	FL	LPV	0	1	0	1	2	0.9998
28J	PALATKA MUNICIPAL ARPT	FL	LPV	0	1	0	1	0	1
PHK	PALM BEACH COUNTY GLADES	FL	LPV	0	1	0	1	2	0.9997
PBI	PALM BEACH INTL	FL	LPV200	0	1	0	1	8	0.9996
PNS	PENSACOLA 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	1	1
PCM	PLANT CITY MUNI	FL	LPV	0	1	0	1	1	1
PMP	POMPANO BEACH AIRPARK	FL	LPV	0	1	0	1	21	0.9993
SRQ	SARASOTA/BRADENTON INTL	FL	LPV200	0	1	0	1	1	1
SEF	SEBRING REGIONAL	FL	LPV	0	1	0	1	2	0.9999
RSW	SOUTHWEST FLORIDA INTL	FL	LPV	0	1	0	1	2	0.9998
TIX	SPACE COAST REGIONAL	FL	LPV200	0	1	0	1	2	1
SGJ	ST AUGUSTINE	FL	LPV	0	1	0	1	0	1
FPR	ST LUCIE COUNTY INTL	FL	LPV	0	1	0	1	2	0.9998
PIE	ST PETERSBURG CLEARWATER INTL	FL	LPV200	0	1	0	1	1	1
TLH	TALLAHASSEE REGIONAL	FL	LPV	0	1	0	1	0	1
VDF	TAMPA EXECUTIVE	FL	LPV	0	1	0	1	1	1
TPA	TAMPA INTL	FL	LPV200	0	1	0	1	1	1
MTH	THE FLORIDA KEYS MARATHON	FL	LPV	0	1	0	1	56	0.9979
1J0	TRI-COUNTY	FL	LP	0	1	0	1	0	1
VNC	VENICE MUNI	FL	LP	0	1	0	1	1	1
VRB	VERO BEACH MUNI	FL	LPV	0	1	0	1	2	0.9998
GIF	WINTER HAVEN'S GILBERT	FL	LPV	0	1	0	1	1	1
SUA	WITHAM FIELD	FL	LPV	0	1	0	1	2	0.9997
ZPH	ZEPHYRHILLS MUNI	FL	LPV	0	1	0	1	0	1
AHN	ATHENS/BEN EPPS	GA	LPV	0	1	0	1	0	1
AGS	AUGUSTA REGIONAL AT BUSH FIELD	GA	LPV	0	1	0	1	0	1
MLJ	BALDWIN COUNTY	GA	LPV	0	1	0	1	0	1
BHC	BAXLEY MUNI	GA	LPV	0	1	0	1	0	1
4J1	BRANTLEY COUNTY	GA	LPV	0	1	0	1	0	1
BQK	BRUNSWICK GOLDEN ISLES	GA	LPV200	0	1	0	1	0	1
70J	CAIRO-GRADY COUNTY	GA	LPV	0	1	0	1	0	1
VPC	CARTERSVILLE	GA	LPV	0	1	0	1	0	1
CNI	CHEROKEE COUNTY	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

Airport Id	Airport Name	State/Prov	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
15J	COOK COUNTY	GA	LPV	0	1	0	1	0	1
9A1	COVINGTON MUNI	GA	LPV	0	1	0	1	0	1
CKF	CRISP COUNTY-CORDELE	GA	LPV	0	1	0	1	0	1
DNN	DALTON MUNI	GA	LPV	0	1	0	1	0	1
BGE	DECATUR COUNTY INDUSTRIAL AIR PARK	GA	LPV200	0	1	0	1	0	1
17J	DONALSONVILLE MUNI	GA	LPV	0	1	0	1	0	1
DQH	DOUGLAS MUNI	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
FZG	FITZGERALD MUNI	GA	LPV	0	1	0	1	0	1
18A	FRANKLIN COUNTY	GA	LPV	0	1	0	1	0	1
FTY	FULTON COUNTY ARPT BROWN FIELD	GA	LPV	0	1	0	1	0	1
3J7	GREENE COUNTY REGIONAL	GA	LPV	0	1	0	1	0	1
LZU	GWINNETT COUNTY BRISCOE FIELD	GA	LPV200	0	1	0	1	0	1
AJR	HABERSHAM COUNTY	GA	LPV	0	1	0	1	0	1
PIM	HARRIS COUNTY	GA	LPV	0	1	0	1	0	1
ATL	HARTSFIELD JACKSON ATLANTA INTL	GA	LPV200	0	1	0	1	0	1
EZM	HEART OF GEORGIA REGIONAL	GA	LPV	0	1	0	1	0	1
TMA	HENRY TIFTON 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
09J	JEKYLL ISLAND	GA	LPV200	0	1	0	1	0	1
JES	JESUP-WAYNE COUNTY	GA	LPV	0	1	0	1	0	1
ACJ	JIMMY CARTER RGNL	GA	LPV	0	1	0	1	0	1
OKZ	KAOLIN FIELD	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
MAC	MACON DOWNTOWN	GA	LP	0	1	0	1	0	1
52A	MADISON MUNI	GA	LP	0	1	0	1	0	1
MCN	MIDDLE GEORGIA REGIONAL	GA	LPV	0	1	0	1	0	1
2J5	MILLEN	GA	LPV	0	1	0	1	0	1
D73	MONROE-WALTON COUNTY	GA	LP	0	1	0	1	0	1
MGR	MOULTRIE MUNI	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
FFC	PEACHTREE CITY-FALCON FIELD	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
JYL	PLANTATION ARPK	GA	LPV	0	1	0	1	0	1
4A4	POLK COUNTY AIRPORT CORNELIUS MOORE FIELD	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

Airport Id	Airport Name	State/Prov	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
ABY	SOUTHWEST GEORGIA REGIONAL	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 REGIONAL	GA	LPV	0	1	0	1	0	1
HQU	THOMSON-MCDUFFIE COUNTY	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
IYY	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 REGIONAL O V GRAY FIELD	GA	LPV	0	1	0	1	0	1
WDR	WINDER-BARROW	GA	LPV	0	1	0	1	0	1
AMW	AMES MUNI	IA	LPV	0	1	0	1	1	1
IKV	ANKENY REGIONAL	IA	LPV	0	1	0	1	1	1
AIO	ATLANTIC MUNI	IA	LPV	0	1	0	1	1	0.9999
TZT	BELLE PLAINE MUNI	IA	LPV	0	1	0	1	1	1
TVK	CENTERVILLE MUNI	IA	LPV	0	1	0	1	1	0.9999
CKP	CHEROKEE COUNTY RGNL	IA	LPV	0	1	1	1	1	0.9999
CWI	CLINTON MUNI	IA	LPV200	0	1	0	1	0	1
CBF	COUNCIL BLUFFS MUNI	IA	LPV200	0	1	0	1	1	0.9999
CSQ	CRESTON MUNI	IA	LPV	0	1	0	1	1	0.9999
DVN	DAVENPORT MUNI	IA	LPV200	0	1	0	1	0	1
DEH	DECORAH MUNI	IA	LPV	0	1	0	1	1	1
DNS	DENISON MUNI	IA	LPV	0	1	0	1	1	0.9999
DSM	DES MOINES INTL	IA	LPV	0	1	0	1	1	0.9999
DBQ	DUBUQUE REGIONAL	IA	LPV200	0	1	0	1	0	1
EST	ESTHERVILLE MUNI	IA	LPV	0	1	1	1	1	0.9999
FFL	FAIRFIELD MUNI	IA	LPV	0	1	0	1	0	1
FXY	FOREST CITY MUNI	IA	LPV	0	1	0	1	1	0.9999
FOD	FORT DODGE REGIONAL	IA	LPV200	0	1	1	1	1	0.9999
GGI	GRINNELL REGIONAL	IA	LPV	0	1	0	1	1	1
IIB	INDEPENDENCE MUNI	IA	LP	0	1	0	1	1	1
IOW	IOWA CITY MUNI	IA	LPV	0	1	0	1	0	1
EFW	JEFFERSON MUNI	IA	LPV	0	1	0	1	1	0.9999
EOK	KEOKUK MUNI	IA	LPV	0	1	0	1	0	1
OXV	KNOXVILLE MUNI	IA	LPV	0	1	0	1	1	1
LRJ	LE MARS MUNI	IA	LPV	0	1	1	1	1	0.9999
MCW	MASON CITY MUNI	IA	LPV200	0	1	0	1	1	0.9999
MXO	MONTICELLO REGIONAL	IA	LP	0	1	0	1	0	1
MPZ	MOUNT PLEASANT MUNICIPAL	IA	LPV	0	1	0	1	0	1
MUT	MUSCATINE MUNI	IA	LPV	0	1	0	1	0	1
TNU	NEWTON MUNI	IA	LPV	0	1	0	1	1	1
I75	OSCEOLA MUNI	IA	LPV	0	1	0	1	1	0.9999
OOA	OSKALOOSA MUNI	IA	LPV	0	1	0	1	1	1

Airport Id	Airport Name	State/Prov	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
OTM	OTTUMWA REGIONAL	IA	LPV	0	1	0	1	1	1
PEA	PELLA MUNI	IA	LPV	0	1	0	1	1	1
PRO	PERRY MUNI	IA	LPV200	0	1	0	1	1	0.9999
POH	POCAHONTAS MUNI	IA	LPV	0	1	1	1	1	0.9999
RDK	RED OAK MUNI	IA	LPV	0	1	0	1	1	0.9999
SKI	SAC CITY MUNI	IA	LPV	0	1	1	1	1	0.9999
ICL	SCHENCK FIELD	IA	LPV	0	1	0	1	1	0.9999
SHL	SHELDON MUNI	IA	LPV	0	1	1	1	1	0.9999
SDA	SHENANDOAH MUNI	IA	LPV	0	1	0	1	1	0.9999
SUX	SIOUX GATEWAY COL BUD DAY FIELD	IA	LPV200	0	1	1	1	1	0.9999
BRL	SOUTHEAST IOWA REGIONAL	IA	LPV200	0	1	0	1	0	1
SPW	SPENCER MUNI	IA	LPV200	0	1	1	1	1	0.9999
SLB	STORM LAKE MUNI	IA	LPV	0	1	1	1	1	0.9999
CID	THE EASTERN IOWA	IA	LPV200	0	1	0	1	0	1
VTI	VINTON VETERANS MEML ARPK	IA	LPV	0	1	0	1	1	1
AWG	WASHINGTON MUNI	IA	LPV200	0	1	0	1	0	1
ALO	WATERLOO REGIONAL	IA	LPV	0	1	0	1	1	1
EBS	WEBSTER CITY MUNI	IA	LPV	0	1	1	1	1	0.9999
BOI	BOISE AIR TERMINAL/GOWEN FLD	ID	LPV	0	1	0	1	2	1
EUL	CALDWELL INDUSTRIAL	ID	LPV	0	1	0	1	3	1
DIJ	DRIGGS-REED MEMORIAL	ID	LP	0	1	1	1	2	0.9999
GNG	GOODING MUNI	ID	LPV	0	1	0	1	2	1
IDA	IDAHO FALLS REGIONAL	ID	LPV200	0	1	1	1	1	1
JER	JEROME COUNTY	ID	LPV	0	1	0	1	2	1
TWF	JOSLIN FIELD MAGIC VALLEY RGNL	ID	LPV200	0	1	0	1	2	1
LWS	LEWISTON-NEZ PERCE COUNTY	ID	LPV200	0	1	1	1	3	0.9999
MYL	MC CALL MUNICIPAL	ID	LPV	0	1	1	1	3	0.9999
U76	MOUNTAIN HOME MUNI	ID	LPV	0	1	0	1	2	1
MAN	NAMPA MUNI	ID	LPV	0	1	0	1	2	1
COE	PAPPY BOYINGTON FIELD	ID	LPV200	0	1	1	0.9999	2	0.9998
PIH	POCATELLO REGIONAL	ID	LPV200	0	1	0	1	1	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 MUNI	IL	LPV200	0	1	0	1	0	1
CUL	CARMI MUNI	IL	LP	0	1	0	1	0	1
BMI	CENTRAL IL REGL ARPT AT BLOOMINGTON-NORMAL	IL	LPV	0	1	0	1	0	1
ENL	CENTRALIA MUNI	IL	LPV	0	1	0	1	0	1
PWK	CHICAGO EXECUTIVE	IL	LPV	0	1	0	1	0	1
MDW	CHICAGO MIDWAY INTL	IL	LPV	0	1	0	1	0	1
RFD	CHICAGO/ROCKFORD INTL	IL	LPV200	0	1	0	1	0	1
ORD	CHICAGO-O'HARE INTL	IL	LPV200	0	1	0	1	0	1
MTO	COLES COUNTY MEMORIAL	IL	LPV	0	1	0	1	0	1
DKB	DE KALB TAYLOR MUNI	IL	LPV	0	1	0	1	0	1
DEC	DECATUR	IL	LPV200	0	1	0	1	0	1

Airport Id	Airport Name	State/Prov	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
C73	DIXON MUNI CHARLES R. WALGREEN FLD	IL	LPV	0	1	0	1	0	1
DPA	DUPAGE	IL	LPV200	0	1	0	1	0	1
FOA	FLORA MUNI	IL	LPV	0	1	0	1	0	1
IKK	GREATER KANKAKEE	IL	LPV	0	1	0	1	0	1
PIA	GREATER PEORIA REGIONAL	IL	LPV	0	1	0	1	0	1
HSB	HARRISBURG-RALEIGH	IL	LPV	0	1	0	1	0	1
IGQ	LANSING MUNI	IL	LPV	0	1	0	1	0	1
LOT	LEWIS UNIVERSITY	IL	LPV200	0	1	0	1	0	1
3LF	LITCHFIELD MUNI	IL	LPV	0	1	0	1	0	1
AJG	MOUNT CARMEL MUNI	IL	LPV	0	1	0	1	0	1
3MY	MOUNT HAWLEY AUXILIARY	IL	LPV	0	1	0	1	0	1
I63	MOUNT STERLING MUNI	IL	LPV	0	1	0	1	0	1
MVN	MOUNT VERNON	IL	LPV	0	1	0	1	0	1
C15	PEKIN MUNI	IL	LPV	0	1	0	1	0	1
PNT	PONTIAC MUNI	IL	LPV	0	1	0	1	0	1
MLI	QUAD CITY INTL	IL	LPV200	0	1	0	1	0	1
UIN	QUINCY RGNL-BALDWIN FIELD	IL	LPV200	0	1	0	1	0	1
RSV	ROBINSON MUNI	IL	LPV	0	1	0	1	0	1
RPJ	ROCHELLE MUNI-KORITZ FIELD	IL	LPV200	0	1	0	1	0	1
BLV	SCOTT AFB/MIDAMERICA	IL	LPV200	0	1	0	1	0	1
CPS	ST LOUIS DOWNTOWN	IL	LPV200	0	1	0	1	0	1
ALN	ST LOUIS REGIONAL	IL	LPV200	0	1	0	1	0	1
SFY	TRI-TOWNSHIP	IL	LP	0	1	0	1	0	1
CMI	UNIVERSITY OF ILLINOIS WILLARD	IL	LPV200	0	1	0	1	0	1
DNV	VERMILION COUNTY	IL	LPV	0	1	0	1	0	1
UGN	WAUKEGAN REGIONAL	IL	LPV	0	1	0	1	0	1
SQI	WHITESIDE COUNTY-JOS J BITTORF FLD	IL	LPV	0	1	0	1	0	1
MWA	WILLIAMSON COUNTY REGIONAL	IL	LPV	0	1	0	1	0	1
AID	ANDERSON MUNI DARLINGTON FIELD	IN	LPV	0	1	0	1	0	1
JVY	CLARK RGNL	IN	LPV200	0	1	0	1	0	1
BAK	COLUMBUS MUNI	IN	LPV	0	1	0	1	0	1
GWB	DE KALB COUNTY	IN	LPV	0	1	0	1	0	1
MIE	DELAWARE COUNTY JOHNSON FIELD	IN	LPV	0	1	0	1	0	1
EYE	EAGLE CREEK AIRPARK	IN	LPV	0	1	0	1	0	1
EKM	ELKHART MUNI	IN	LPV	0	1	0	1	0	1
EVV	EVANSVILLE RGNL	IN	LPV200	0	1	0	1	0	1
FWA	FORT WAYNE INTERNATIONAL	IN	LPV200	0	1	0	1	0	1
SER	FREEMAN MUNI	IN	LPV	0	1	0	1	0	1
FRH	FRENCH LICK MUNI	IN	LPV	0	1	0	1	0	1
RCR	FULTON COUNTY	IN	LPV	0	1	0	1	0	1
GYG	GARY/CHICAGO INTERNATIONAL	IN	LPV200	0	1	0	1	0	1
GSH	GOSHEN MUNI	IN	LPV	0	1	0	1	0	1
HFY	GREENWOOD MUNI	IN	LPV	0	1	0	1	0	1

Airport Id	Airport Name	State/Prov	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
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
RZL	JASPER COUNTY	IN	LPV	0	1	0	1	0	1
OKK	KOKOMO MUNI	IN	LPV200	0	1	0	1	0	1
GGP	LOGANSPOUT/CASS COUNTY	IN	LPV200	0	1	0	1	0	1
IMS	MADISON MUNI	IN	LPV	0	1	0	1	0	1
MZZ	MARION MUNI	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
TEL	PERRY COUNTY MUNI	IN	LP	0	1	0	1	0	1
VPZ	PORTER COUNTY MUNI	IN	LPV	0	1	0	1	0	1
PLD	PORTLAND MUNI	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 MUNI	IN	LPV200	0	1	0	1	0	1
GEZ	SHELBYVILLE MUNI	IN	LPV	0	1	0	1	0	1
SMD	SMITH FIELD	IN	LPV	0	1	0	1	0	1
SBN	SOUTH BEND REGIONAL	IN	LPV	0	1	0	1	0	1
OXI	STARKE COUNTY	IN	LPV	0	1	0	1	0	1
HUF	TERRE HAUTE INTERNATIONAL HULMAN FIELD	IN	LPV200	0	1	0	1	0	1
BFR	VIRGIL I GRISSOM MUNI	IN	LP	0	1	0	1	0	1
ASW	WARSAW MUNICIPAL	IN	LPV	0	1	0	1	0	1
MCX	WHITE COUNTY	IN	LP	0	1	0	1	0	1
K88	ALLEN COUNTY	KS	LPV	0	1	0	1	1	0.9999
ANY	ANTHONY MUNI	KS	LP	0	1	0	1	1	0.9999
PTS	ATKINSON MUNI	KS	LPV	0	1	0	1	1	0.9999
ADT	ATWOOD-RAWLINS COUNTY	KS	LPV	0	1	0	1	1	0.9999
3AU	AUGUSTA MUNI	KS	LP	0	1	0	1	1	0.9999
RPB	BELLEVILLE MUNI	KS	LPV	0	1	0	1	1	0.9999
CNK	BLOSSER MUNI	KS	LP	0	1	0	1	1	0.9999
UKL	COFFEY COUNTY	KS	LPV	0	1	0	1	1	0.9999
AAO	COLONEL JAMES JABARA	KS	LPV	0	1	0	1	1	0.9999
DDC	DODGE CITY REGIONAL	KS	LPV	0	1	0	1	2	0.9999
EHA	ELKHART-MORTON COUNTY	KS	LPV	0	1	0	1	2	0.9999
EMP	EMPORIA MUNI	KS	LPV	0	1	0	1	1	0.9999
FOE	FORBES FIELD	KS	LPV	0	1	0	1	1	0.9999
FSK	FORT SCOTT MUNI	KS	LPV	0	1	0	1	1	0.9999
GCK	GARDEN CITY REGIONAL	KS	LPV	0	1	0	1	2	0.9999
GBD	GREAT BEND MUNI	KS	LPV200	0	1	0	1	1	0.9999
HYS	HAYS REGIONAL	KS	LPV200	0	1	0	1	1	0.9999
HQG	HUGOTON MUNI	KS	LPV	0	1	0	1	2	0.9999
HUT	HUTCHINSON MUNI	KS	LPV	0	1	0	1	1	0.9999
IDP	INDEPENDENCE MUNI	KS	LPV	0	1	0	1	1	0.9999
OJC	JOHNSON COUNTY EXECUTIVE	KS	LPV	0	1	0	1	1	0.9999
LQR	LARNED PAWNEE CO	KS	LPV	0	1	0	1	1	0.9999

Airport Id	Airport Name	State/Prov	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
LWC	LAWRENCE MUNI	KS	LPV200	0	1	0	1	1	0.9999
LBL	LIBERAL MID-AMERICA RGNL	KS	LPV	0	1	0	1	2	0.9999
MHK	MANHATTAN REGIONAL	KS	LPV200	0	1	0	1	1	0.9999
MYZ	MARYSVILLE MUNI	KS	LPV	0	1	0	1	1	0.9999
MPR	MCPHERSON	KS	LPV	0	1	0	1	1	0.9999
IXD	NEW CENTURY AIRCENTER	KS	LPV	0	1	0	1	1	0.9999
EWK	NEWTON-CITY-COUNTY	KS	LPV	0	1	0	1	1	0.9999
NRN	NORTON MUNI	KS	LPV	0	1	0	1	1	0.9998
OEL	OAKLEY MUNI	KS	LPV	0	1	0	1	1	0.9999
OWI	OTTAWA MUNI	KS	LP	0	1	0	1	1	0.9999
TOP	PHILIP BILLARD MUNI	KS	LPV200	0	1	0	1	1	0.9999
PTT	PRATT INDUSTRIAL	KS	LPV	0	1	0	1	1	0.9999
GLD	RENNER FLD/GOODLAND MUNI/	KS	LPV200	0	1	0	1	2	0.9999
RSL	RUSSELL MUNI	KS	LPV	0	1	0	1	1	0.9999
SLN	SALINA MUNI	KS	LPV	0	1	0	1	1	0.9999
TQK	SCOTT CITY MUNI	KS	LPV	0	1	0	1	2	0.9999
CBK	SHALZ FIELD	KS	LPV	0	1	0	1	1	0.9999
3K3	SYRACUSE HAMILTON COUNTY MUNICIPAL	KS	LPV	0	1	0	1	2	0.9999
PPF	TRI-CITY	KS	LPV	0	1	0	1	1	0.9999
ULS	ULYSSES	KS	LPV	0	1	0	1	2	0.9999
EGT	WELLINGTON MUNI	KS	LPV	0	1	0	1	1	0.9999
ICT	WICHITA MID-CONTINENT	KS	LPV200	0	1	0	1	1	0.9999
EKX	ADDINGTON FIELD	KY	LPV	0	1	0	1	0	1
DWU	ASHLAND REGIONAL	KY	LP	0	1	0	1	0	1
PAH	BARKLEY REGIONAL	KY	LPV	0	1	0	1	0	1
K22	BIG SANDY REGIONAL	KY	LPV	0	1	0	1	0	1
LEX	BLUE GRASS	KY	LPV	0	1	0	1	0	1
BWG	BOWLING GREEN WARREN CTY RGNL	KY	LPV	0	1	0	1	0	1
LOU	BOWMAN FIELD	KY	LP	0	1	0	1	0	1
CVG	CINCINNATI NORTHERN KENTUCKY INTL	KY	LPV200	0	1	0	1	0	1
FGX	FLEMING-MASON	KY	LPV	0	1	0	1	0	1
27K	GEORGETOWN SCOTT CO MARSHALL FLD	KY	LPV200	0	1	0	1	0	1
GLW	GLASGOW MUNI	KY	LPV	0	1	0	1	0	1
KY8	HANCOCK CO-RON LEWIS FIELD	KY	LPV	0	1	0	1	0	1
EHR	HENDERSON CITY-COUNTY	KY	LPV	0	1	0	1	0	1
HVC	HOPKINSVILLE CHRISTIAN COUNTY	KY	LPV	0	1	0	1	0	1
CEY	KYLE-OAKLEY FIELD	KY	LPV	0	1	0	1	0	1
SME	LAKE CUMBERLAND REGIONAL	KY	LPV	0	1	0	1	0	1
6I2	LEBANON-SPRINGFIELD	KY	LP	0	1	0	1	0	1
LOZ	LONDON-CORBIN ARPT MAGEE FLD	KY	LPV	0	1	0	1	0	1

Airport Id	Airport Name	State/Prov	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
SDF	LOUISVILLE INTL STANDIFORD FLD	KY	LPV200	0	1	0	1	0	1
I39	MADISON	KY	LPV	0	1	0	1	0	1
2I0	MADISONVILLE MUNI	KY	LPV	0	1	0	1	0	1
M97	MOREHEAD-ROWAN COUNTY CLYDE A THOMAS RGNL	KY	LPV	0	1	0	1	0	1
M21	MUHLENBERG COUNTY	KY	LP	0	1	0	1	0	1
7K4	OHIO COUNTY	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 MUNI	KY	LPV	0	1	0	1	0	1
AAS	TAYLOR COUNTY	KY	LP	0	1	0	1	0	1
TZV	TOMPKINSVILLE MONROE COUNTY	KY	LPV	0	1	0	1	0	1
K20	WENDELL H FORD	KY	LPV200	0	1	0	1	0	1
W38	WILLIAMSBURG WHITLEY COUNTY	KY	LPV	0	1	0	1	0	1
IYA	ABBEVILLE CHRIS CRUSTA MEML	LA	LPV	0	1	0	1	0	1
ARA	ACADIANA REGIONAL	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 METRO	LA	LPV200	0	1	0	1	0	1
CWF	CHENNAULT INTL	LA	LPV200	0	1	0	1	0	1
ESF	ESLER REGIONAL	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 NORTHSORE RGNL	LA	LPV200	0	1	0	1	0	1
PTN	HARRY P WILLIAMS MEMORIAL	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
M79	JOHN H HOOKS JR MEMORIAL	LA	LPV	0	1	0	1	0	1
F88	JONESBORO	LA	LP	0	1	0	1	0	1
LFT	LAFAYETTE REGIONAL	LA	LPV	0	1	0	1	0	1
LCH	LAKE CHARLES REGIONAL	LA	LPV	0	1	0	1	0	1
NEW	LAKEFRONT	LA	LPV	0	1	0	1	0	1
L39	LEESVILLE	LA	LPV	0	1	0	1	0	1
MSY	LOUIS ARMSTRONG NEW ORLEANS INTL	LA	LPV200	0	1	0	1	0	1
MLU	MONROE REGIONAL	LA	LPV200	0	1	0	1	0	1
BQP	MOREHOUSE MEMORIAL	LA	LPV	0	1	0	1	0	1
IER	NATCHITOCHE REGIONAL	LA	LPV	0	1	0	1	0	1
RSN	RUSTON RGNL AIRPORT	LA	LPV	0	1	0	1	0	1
DTN	SHREVEPORT DOWNTOWN	LA	LPV	0	1	0	1	0	1
SHV	SHREVEPORT REGIONAL	LA	LPV200	0	1	0	1	0	1



Airport Id	Airport Name	State/Prov	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
GAO	SOUTH LAFOURCHE LEONARD MILLER JR	LA	LPV	0	1	0	1	0	1
UXL	SOUTHLAND FIELD	LA	LPV	0	1	0	1	0	1
SPH	SPRINGHILL	LA	LPV	0	1	0	1	0	1
IL0	ST JOHN THE BAPTIST PARISH	LA	LPV	0	1	0	1	0	1
OPL	ST LANDRY PARISH-AHART FIELD	LA	LPV	0	1	0	1	0	1
TVR	VICKSBURG TALLULAH REGIONAL	LA	LPV	0	1	0	1	0	1
BAF	BARNES MUNI	MA	LPV	0	1	0	1	0	1
HYA	BARNSTABLE MUNI-BOARDMAN/POLANDO FIELD	MA	LPV200	0	1	0	1	0	1
BVY	BEVERLY MUNI	MA	LPV	0	1	0	1	0	1
BOS	GEN EDWARD LAWRENCE LOGAN INTL	MA	LPV200	0	1	0	1	0	1
BED	LAURENCE G HANSCOM FLD	MA	LPV200	0	1	0	1	0	1
LWM	LAWRENCE MUNI	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
EWB	NEW BEDFORD REGIONAL	MA	LP	0	1	0	1	0	1
OWD	NORWOOD MEMORIAL	MA	LPV	0	1	0	1	0	1
ORE	ORANGE MUNI	MA	LPV	0	1	0	1	0	1
PYM	PLYMOUTH MUNI	MA	LPV200	0	1	0	1	0	1
3B0	SOUTHBRIDGE MUNI	MA	LPV	0	1	0	1	0	1
GBR	WALTER J KOLADZA	MA	LP	0	1	0	1	0	1
ORH	WORCESTER REGIONAL	MA	LPV200	0	1	0	1	0	1
BWI	BALTIMORE-WASHINGTON INTL THURGOOD MARSHALL	MD	LPV200	0	1	0	1	0	1
DMW	CARROLL COUNTY REGNL JACK B POAGE FIELD	MD	LPV200	0	1	0	1	0	1
ESN	EASTON/NEWNAM FIELD	MD	LPV	0	1	0	1	1	1
FDK	FREDERICK MUNI	MD	LPV	0	1	0	1	0	1
2G4	GARRETT COUNTY	MD	LPV	0	1	0	1	0	1
CBE	GREATER CUMBERLAND RGNL	MD	LP	0	1	0	1	0	1
HGR	HAGERSTOWN RGNL RICHARD A HENSON FIELD	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 MUNI	MD	LPV	0	1	0	1	3	0.9999
SBY	SALISBURY-OCEAN CITY WICOMICO REGIONAL	MD	LPV200	0	1	0	1	3	1
2W6	ST. MARY'S COUNTY RGNL	MD	LPV	0	1	0	1	0	1
LEW	AUBURN/LEWISTON MUNI	ME	LPV200	0	1	0	1	0	1
AUG	AUGUSTA STATE	ME	LPV200	0	1	0	1	0	1
BGR	BANGOR INTL	ME	LPV	0	1	0	1	0	1
BXM	BRUNSWICK EXECUTIVE	ME	LPV	0	1	0	1	0	1
1B0	DEXTER REGIONAL	ME	LP	0	1	0	1	0	1
BHB	HANCOCK COUNTY-BAR HARBOR	ME	LPV200	0	1	0	1	0	1
HUL	HOULTON INTL	ME	LP	0	1	0	1	0	1

Airport Id	Airport Name	State/Prov	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
RKD	KNOX COUNTY REGIONAL	ME	LPV	0	1	0	1	0	1
MLT	MILLINOCKET MUNI	ME	LPV	0	1	0	1	0	1
FVE	NORTHERN AROOSTOOK RGNL	ME	LPV	0	1	0	1	0	1
PQI	NORTHERN MAINE REGIONAL ARPT AT PRESQUE IS	ME	LPV200	0	1	0	1	0	1
PWM	PORTLAND INTL JETPORT	ME	LPV200	0	1	0	1	0	1
SFM	SANFORD REGIONAL	ME	LPV200	0	1	0	1	0	1
WVL	WATERVILLE ROBERT LAFLEUR	ME	LPV200	0	1	0	1	0	1
APN	ALPENA COUNTY REGIONAL	MI	LPV	0	1	0	1	0	1
ARB	ANN ARBOR MUNI	MI	LPV	0	1	0	1	0	1
ACB	ANTRIM COUNTY	MI	LPV	0	1	0	1	0	1
FNT	BISHOP INTERNATIONAL	MI	LPV200	0	1	0	1	0	1
N98	BOYNE CITY MUNI	MI	LP	0	1	0	1	0	1
OEB	BRANCH COUNTY MEMORIAL	MI	LPV	0	1	0	1	0	1
LAN	CAPITAL CITY	MI	LPV200	0	1	0	1	0	1
CVX	CHARLEVOIX MUNI	MI	LPV	0	1	0	1	0	1
SLH	CHEBOYGAN COUNTY	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 MUNI	MI	LPV	0	1	0	1	0	1
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	LPV200	0	1	0	1	0	1
IMT	FORD	MI	LPV	0	1	0	1	0	1
FFX	FREMONT MUNI	MI	LPV	0	1	0	1	0	1
GLR	GAYLORD RGNL	MI	LPV	0	1	0	1	0	1
GRR	GERALD R. FORD INTL	MI	LPV200	0	1	0	1	0	1
GDW	GLADWIN ZETTEL MEMORIAL	MI	LP	0	1	0	1	0	1
IWD	GOGEBIC-IRON COUNTY	MI	LPV200	0	1	0	1	1	0.9999
AMN	GRATIOT COMMUNITY	MI	LPV	0	1	0	1	0	1
9D9	HASTINGS	MI	LP	0	1	0	1	0	1
CMX	HOUGHTON COUNTY MEMORIAL	MI	LPV	0	1	0	1	1	1
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 MUNI	MI	LPV	0	1	0	1	0	1
ADG	LENAWEE COUNTY	MI	LPV	0	1	0	1	0	1
OZW	LIVINGSTON COUNTY SPENCER J HARDY	MI	LPV200	0	1	0	1	0	1
ERY	LUCE COUNTY	MI	LPV	0	1	0	1	0	1
77G	MARLETTE	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

Airport Id	Airport Name	State/Prov	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
MOP	MOUNT PLEASANT MUNI	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 ARPT OF EMMET COUNTY	MI	LPV200	0	1	0	1	0	1
HYX	SAGINAW COUNTY H.W. BROWNE	MI	LPV	0	1	0	1	0	1
PHN	SAINT CLAIR COUNTY INTL	MI	LPV200	0	1	0	1	0	1
ANJ	SAULT STE MARIE MUNI SANDERSON FIELD	MI	LPV	0	1	0	1	0	1
SAW	SAWYER INTERNATIONAL	MI	LPV200	0	1	0	1	0	1
ISQ	SCHOOLCRAFT COUNTY	MI	LP	0	1	0	1	0	1
LWA	SOUTH HAVEN AREA REGIONAL	MI	LP	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	LPV200	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	LPV200	0	1	0	1	1	0.9999
AEL	ALBERT LEA MUNI	MN	LPV	0	1	0	1	1	0.9999
ANE	ANOKA COUNTY BLAINE ARPT (JANES FIELD)	MN	LPV	0	1	0	1	1	0.9999
AUM	AUSTIN MUNI	MN	LPV200	0	1	0	1	1	0.9999
BDE	BAUDETTE INTL	MN	LPV	0	1	0	1	1	0.9999
BJI	BEMIDJI REGIONAL	MN	LPV200	0	1	0	1	1	0.9999
BBB	BENSON MUNI	MN	LPV	0	1	0	1	2	0.9999
FOZ	BIGFORK MUNICIPAL	MN	LP	0	1	0	1	1	0.9999
BRD	BRAINERD LAKES RGNL	MN	LPV200	0	1	0	1	1	0.9999
CBG	CAMBRIDGE MUNI	MN	LPV	0	1	0	1	1	0.9999
AXN	CHANDLER FIELD	MN	LPV	0	1	0	1	1	0.9999
HIB	CHISHOLM-HIBBING	MN	LPV200	0	1	0	1	1	0.9999
CQM	COOK MUNI	MN	LP	0	1	0	1	1	0.9999
CKN	CROOKSTON MUNI KIRKWOOD FLD	MN	LPV	0	1	0	1	1	0.9998
DTL	DETROIT LAKES-WETHING FIELD	MN	LPV	0	1	0	1	1	0.9999
DLH	DULUTH INTL	MN	LPV200	0	1	0	1	1	0.9999
ELO	ELY MUNI	MN	LPV200	0	1	0	1	1	0.9999
FRM	FAIRMONT MUNI	MN	LPV	0	1	0	1	1	0.9999
INL	FALLS INTL	MN	LPV	0	1	0	1	1	0.9999
FFM	FERGUS FALLS MUNI EINAR MICKELSON FLD	MN	LPV200	0	1	0	1	2	0.9998
FCM	FLYING CLOUD	MN	LPV200	0	1	0	1	1	0.9999
FSE	FOSSTON MUNI	MN	LP	0	1	0	1	1	0.9999
CKC	GRAND MARAIS/COOK COUNTY	MN	LPV	0	1	0	1	1	0.9999
GPZ	GRAND RAPIDS/ITASCA CO GORDON NEWSTROM	MN	LPV	0	1	0	1	1	0.9999

Airport Id	Airport Name	State/Prov	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
HCD	HUTCHINSON MUNI-BUTLER FIELD	MN	LPV	0	1	0	1	1	0.9999
LJF	LITCHFIELD MUNICIPAL	MN	LPV	0	1	0	1	1	0.9999
LXL	LITTLE FALLS/MORRISON CO LINDBERGH FLD	MN	LPV	0	1	0	1	1	0.9999
MKT	MANKATO REGIONAL	MN	LPV200	0	1	0	1	1	0.9999
MGG	MAPLE LAKE MUNI	MN	LP	0	1	0	1	1	0.9999
MSP	MINNEAPOLIS-ST PAUL INTL WOLD-CHAMBERLAIN	MN	LPV200	0	1	0	1	1	0.9999
CNB	MYERS FIELD	MN	LPV	0	1	1	1	2	0.9999
ORB	ORR REGIONAL	MN	LP	0	1	0	1	1	0.9999
VVV	ORTONVILLE MUNI MARTINSON FIELD	MN	LP	0	1	1	1	2	0.9999
OWA	OWATONNA DEGNER RNGL	MN	LPV200	0	1	0	1	1	0.9999
PKD	PARK RAPIDS MUNI KONSHOK FIELD	MN	LPV200	0	1	0	1	1	0.9999
LYV	QUENTIN AANENSON FIELD	MN	LPV200	0	1	1	1	2	0.9999
RGK	RED WING RGNL	MN	LPV200	0	1	0	1	1	0.9999
RWF	REDWOOD FALLS MUNI	MN	LPV	0	1	0	1	1	0.9999
TWM	RICHARD B HELGESON	MN	LPV	0	1	0	1	1	0.9999
RST	ROCHESTER INTERNATIONAL	MN	LPV200	0	1	0	1	1	1
ROX	ROSEAU MUNI RUDY BILLBERG FIELD	MN	LPV	0	1	0	1	1	0.9998
ROS	RUSH CITY REGIONAL	MN	LPV	0	1	0	1	1	0.9999
D39	SAUK CENTRE MUNI	MN	LP	0	1	0	1	1	0.9999
MML	SOUTHWEST MINNESOTA RGNL MARSHALL/RYAN FIELD	MN	LPV200	0	1	1	1	2	0.9999
STC	ST CLOUD REGIONAL	MN	LPV200	0	1	0	1	1	0.9999
STP	ST PAUL DOWNTOWN HOLMAN FLD	MN	LPV	0	1	0	1	1	0.9999
SAZ	STAPLES MUNI	MN	LPV	0	1	0	1	1	0.9999
TVF	THIEF RIVER FALLS	MN	LPV	0	1	0	1	1	0.9998
RRT	WARROAD INTL MEMORIAL	MN	LPV	0	1	0	1	1	0.9998
BDH	WILLMAR MUNI JOHN L RICE FIELD	MN	LPV	0	1	0	1	1	0.9999
M17	BOLIVAR MUNI	MO	LPV	0	1	0	1	1	1
BBG	BRANSON	MO	LPV200	0	1	0	1	0	1
FWB	BRANSON WEST MUNI EMERSON FIELD	MO	LP	0	1	0	1	0	1
H21	CAMDENTON MEMORIAL	MO	LPV	0	1	0	1	1	1
EZZ	CAMERON MEMORIAL	MO	LPV	0	1	0	1	1	0.9999
CGI	CAPE GIRARDEAU RGNL	MO	LPV	0	1	0	1	0	1
M05	CARUTHERSVILLE MEM	MO	LPV	0	1	0	1	0	1
MKC	CHARLES B. WHEELER	MO	LPV200	0	1	0	1	1	0.9999
CHT	CHILLICOTHE MUNI	MO	LPV	0	1	0	1	1	0.9999
COU	COLUMBIA REGIONAL	MO	LPV	0	1	0	1	1	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 MUNI	MO	LPV	0	1	0	1	0	1
DXE	DEXTER MUNI	MO	LPV	0	1	0	1	0	1
FTT	ELTON HENSLEY MEMORIAL	MO	LPV	0	1	0	1	1	1

Airport Id	Airport Name	State/Prov	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
FAM	FARMINGTON REGIONAL	MO	LPV	0	1	0	1	0	1
K57	GOULD PETERSON MUNI	MO	LPV	0	1	0	1	1	0.9999
HAE	HANNIBAL RGNL	MO	LPV	0	1	0	1	1	1
HIG	HIGGINSVILLE INDUSTRIAL MUNI	MO	LPV	0	1	0	1	1	0.9999
JEF	JEFFERSON CITY MEMORIAL	MO	LPV	0	1	0	1	1	1
2H2	JERRY SUMNERS SR AURORA MUNICIPAL	MO	LP	0	1	0	1	1	1
VER	JESSE VIERTEL MEMORIAL	MO	LPV	0	1	0	1	1	1
JLN	JOPLIN REGIONAL	MO	LPV	0	1	0	1	1	1
MCI	KANSAS CITY INTL	MO	LPV	0	1	0	1	1	0.9999
IRK	KIRKSVILLE RGNL	MO	LPV200	0	1	0	1	1	0.9999
STL	LAMBERT-ST LOUIS INTL	MO	LPV200	0	1	0	1	0	1
LRV	LAWRENCE SMITH MEMORIAL	MO	LPV	0	1	0	1	1	0.9999
AIZ	LEE C FINE MEMORIAL	MO	LPV	0	1	0	1	1	1
LXT	LEE'S SUMMIT MUNI	MO	LPV	0	1	0	1	1	0.9999
6M6	LEWIS COUNTY REGIONAL	MO	LPV	0	1	0	1	1	1
PLK	M. GRAHAM CLARK TANEY COUNTY	MO	LPV200	0	1	0	1	0	1
MAW	MALDEN MUNI	MO	LPV	0	1	0	1	0	1
MHL	MARSHALL MEML MUNI	MO	LPV	0	1	0	1	1	0.9999
MYJ	MEXICO MEMORIAL	MO	LPV	0	1	0	1	1	1
GPH	MIDWEST NATIONAL AIR CENTER	MO	LPV	0	1	0	1	1	0.9999
HFJ	MONETT MUNI	MO	LPV	0	1	0	1	1	1
EOS	NEOSHO HUGH ROBINSON	MO	LPV	0	1	0	1	1	1
NVD	NEVADA MUNICIPAL	MO	LPV200	0	1	0	1	1	0.9999
MO8	NORTH CENTRAL MISSOURI REGIONAL	MO	LPV	0	1	0	1	1	0.9999
EVU	NORTHWEST MISSOURI RGNL	MO	LPV	0	1	0	1	1	0.9999
MBY	OMAR N BRADLEY	MO	LPV	0	1	0	1	1	1
K02	PERRYVILLE MUNI	MO	LPV	0	1	0	1	0	1
POF	POPLAR BLUFF MUNI	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	1	0.9999
DMO	SEDALIA MEMORIAL	MO	LPV	0	1	0	1	1	1
SIK	SIKESTON MEML MUNI	MO	LPV	0	1	0	1	0	1
RCM	SKYHAVEN	MO	LPV	0	1	0	1	1	0.9999
SUS	SPIRIT OF ST LOUIS	MO	LPV200	0	1	0	1	0	1
SGF	SPRINGFIELD BRANSON NATIONAL	MO	LPV	0	1	0	1	1	1
UUV	SULLIVAN REGIONAL	MO	LPV	0	1	0	1	0	1
8WC	WASHINGTON COUNTY AIRPORT	MO	LPV	0	1	0	1	0	1
FYG	WASHINGTON RGNL	MO	LPV	0	1	0	1	0	1
TBN	WAYNESVILLE-ST ROBERT RGNL FORNEY AAF	MO	LPV	0	1	0	1	0	1
UNO	WEST PLAINS MUNI	MO	LPV	0	1	0	1	0	1
RNV	CLEVELAND MUNI	MS	LPV	0	1	0	1	0	1
CKM	FLETCHER FIELD	MS	LPV	0	1	0	1	0	1
STF	GEORGE M BRYAN	MS	LPV200	0	1	0	1	0	1

Airport Id	Airport Name	State/Prov	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
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 MUNI	MS	LPV	0	1	0	1	0	1
GPT	GULFPORT-BILOXI INTL	MS	LPV200	0	1	0	1	0	1
HEZ	HARDY-ANDERS FLD NATCHEZ ADAMS COUNTY	MS	LPV	0	1	0	1	0	1
HBG	HATTIESBURG BOBBY L. CHAIN MUNI	MS	LPV200	0	1	0	1	0	1
PIB	HATTIESBURG-LAUREL REGIONAL	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 MUNI	MS	LPV	0	1	0	1	0	1
JAN	JACKSON-EVERS INTL	MS	LPV200	0	1	0	1	0	1
JVW	JOHN BELL WILLIAMS	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 LEWIS FIELD	MS	LPV	0	1	0	1	0	1
GLH	MID DELTA REGIONAL	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 MUNI	MS	LPV	0	1	0	1	0	1
MJD	PICAYUNE MUNI	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	LPV200	0	1	0	1	0	1
PQL	TRENT LOTT INTL	MS	LPV200	0	1	0	1	0	1
UTA	TUNICA MUNI	MS	LPV200	0	1	0	1	0	1
TUP	TUPELO REGIONAL	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	1	0.9999	3	0.9998
BIL	BILLINGS LOGAN INTL	MT	LPV200	0	1	1	0.9999	3	0.9998
GDV	DAWSON COMMUNITY	MT	LPV	0	1	1	0.9999	3	0.9997
MLS	FRANK WILEY FIELD	MT	LPV	0	1	1	0.9999	3	0.9997
BZN	GALLATIN FIELD	MT	LPV	0	1	1	0.9999	3	0.9998
GPI	GLACIER PARK INTL	MT	LPV	0	1	1	0.9999	2	0.9998
GTF	GREAT FALLS INTL	MT	LPV200	0	1	1	0.9999	2	0.9998
HVR	HAVRE CITY-COUNTY	MT	LPV	0	1	1	0.9999	2	0.9997
HLN	HELENA REGIONAL	MT	LPV	0	1	1	0.9999	3	0.9998
6S8	LAUREL MUNICIPAL	MT	LPV	0	1	1	0.9999	3	0.9998
LWT	LEWISTOWN MUNI	MT	LPV	0	1	1	0.9999	4	0.9997
M75	MALTA	MT	LP	0	1	1	0.9999	4	0.9997
LVM	MISSION FIELD	MT	LP	0	1	1	0.9999	4	0.9998
MSO	MISSOULA INTERNATIONAL	MT	LPV	0	1	1	0.9999	2	0.9998
7S0	RONAN	MT	LPV	0	1	1	0.9999	2	0.9998
SBX	SHELBY	MT	LP	0	1	1	0.9999	2	0.9998
SDY	SIDNEY-RICHLAND MUNI	MT	LPV	0	1	1	0.9999	3	0.9997
1S3	TILLITT FIELD	MT	LPV	0	1	1	0.9999	3	0.9997
GGW	WOKAL FIELD/GLASGOW INTL	MT	LPV200	0	1	1	0.9999	4	0.9997
WYS	YELLOWSTONE	MT	LPV200	0	1	1	1	3	0.9999

Airport Id	Airport Name	State/Prov	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
CYCL	CHARLO	NB	LPV	0	1	0	1	1	1
CYQM	MONCTON INTL	NB	LPV	0	1	0	1	1	1
OAJ	ALBERT J ELLIS	NC	LPV200	0	1	0	1	0	1
AFP	ANSON COUNTY-JEFF CLOUD FLD	NC	LPV	0	1	0	1	0	1
AVL	ASHEVILLE REGIONAL	NC	LPV	0	1	0	1	0	1
BUY	BURLINGTON ALAMANCE REGIONAL	NC	LPV200	0	1	0	1	0	1
SUT	CAPE FEAR RGNL JETPORT HOWIE FRANKLIN FLD	NC	LPV	0	1	0	1	0	1
CLT	CHARLOTTE/DOUGLAS INTL	NC	LPV200	0	1	0	1	0	1
CTZ	CLINTON-SAMPSON COUNTY	NC	LPV200	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
MQI	DARE COUNTY REGIONAL	NC	LPV	0	1	0	1	0	1
DPL	DUPLIN COUNTY	NC	LPV200	0	1	0	1	0	1
ECG	ELIZABETH CITY CG AIR STATION REGIONAL	NC	LPV	0	1	0	1	0	1
FAY	FAYETTEVILLE REGIONAL GRANNIS FIELD	NC	LPV200	0	1	0	1	0	1
MRN	FOOTHILLS REGIONAL	NC	LPV200	0	1	0	1	0	1
LHZ	FRANKLIN COUNTY	NC	LPV200	0	1	0	1	0	1
AKH	GASTONIA MUNI	NC	LPV	0	1	0	1	0	1
GWW	GOLDSBORO-WAYNE MUNI	NC	LPV200	0	1	0	1	0	1
IXA	HALIFAX NORTHAMPTON REGIONAL	NC	LPV200	0	1	0	1	0	1
HRJ	HARNETT COUNTY	NC	LPV	0	1	0	1	0	1
HNZ	HENDERSON-OXFORD	NC	LPV	0	1	0	1	0	1
HKY	HICKORY REGIONAL	NC	LPV200	0	1	0	1	0	1
JNX	JOHNSTON COUNTY	NC	LPV200	0	1	0	1	0	1
ISO	KINSTON REGL JETPORT AT STALLINGS FLD	NC	LPV	0	1	0	1	0	1
MEB	LAURINBURG-MAXTON	NC	LPV200	0	1	0	1	0	1
IPJ	LINCOLNTON LINCOLN COUNTY REGIONAL	NC	LPV	0	1	0	1	0	1
LBT	LUMBERTON MUNI	NC	LPV	0	1	0	1	0	1
MRH	MICHAEL J. SMITH FIELD	NC	LPV	0	1	0	1	0	1
EQY	MONROE REGIONAL	NC	LPV	0	1	0	1	0	1
SOP	MOORE COUNTY	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	LPV200	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
PMZ	PLYMOUTH MUNI	NC	LP	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

Airport Id	Airport Name	State/Prov	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
RWI	ROCKY MOUNT WILSON REGIONAL	NC	LPV	0	1	0	1	0	1
RUQ	ROWAN COUNTY	NC	LPV200	0	1	0	1	0	1
FQD	RUTHERFORD CO MARCHMAN FIELD	NC	LPV	0	1	0	1	0	1
TTA	SANFORD-LEE COUNTY REGIONAL	NC	LPV200	0	1	0	1	0	1
EHO	SHELBY-CLEVELAND COUNTY RGNL	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 REGIONAL	NC	LPV	0	1	0	1	0	1
OCW	WARREN FIELD	NC	LPV	0	1	0	1	0	1
ILM	WILMINGTON INTL	NC	LPV200	0	1	0	1	0	1
BAC	BARNES COUNTY MUNI	ND	LPV	0	1	1	1	2	0.9998
BIS	BISMARCK MUNI	ND	LPV200	0	1	1	0.9999	2	0.9997
D09	BOTTINEAU MUNI	ND	LPV	0	1	1	1	2	0.9997
5N8	CASSELTON ROBERT MILLER RGNL	ND	LPV	0	1	0	1	2	0.9998
DVL	DEVILS LAKE RGNL	ND	LPV	0	1	1	1	2	0.9997
DIK	DICKINSON-THEODORE ROOSEVELT REGIONAL	ND	LPV200	0	1	1	0.9999	2	0.9997
GFK	GRAND FORKS INTL	ND	LPV	0	1	0	1	2	0.9998
GWR	GWINNER-ROGER MELROE FIELD	ND	LPV200	0	1	1	1	2	0.9998
FAR	HECTOR INTL	ND	LPV200	0	1	0	1	2	0.9998
GAF	HUTSON FIELD	ND	LPV	0	1	0	1	2	0.9998
JMS	JAMESTOWN REGIONAL	ND	LPV200	0	1	1	1	2	0.9998
HZE	MERCER COUNTY REGIONAL	ND	LPV	0	1	1	0.9999	2	0.9997
MOT	MINOT INTL	ND	LPV	0	1	1	0.9999	2	0.9997
D55	ROBERTSON FIELD	ND	LPV	0	1	0	1	2	0.9998
RUG	RUGBY MUNI	ND	LP	0	1	1	1	2	0.9997
ISN	SLOULIN FLD INTL	ND	LPV200	0	1	1	0.9999	3	0.9997
S25	WATFORD CITY MUNI	ND	LPV	0	1	1	0.9999	2	0.9997
ANW	AINSWORTH MUNI	NE	LPV200	0	1	1	1	2	0.9998
BVN	ALBION MUNI	NE	LPV	0	1	0	1	1	0.9998
AIA	ALLIANCE MUNI	NE	LPV200	0	1	0	1	2	0.9998
4V9	ANTELOPE COUNTY	NE	LPV	0	1	0	1	2	0.9998
AUH	AURORA MUNICIPAL AL POTTER FIELD	NE	LPV	0	1	0	1	1	0.9998
BIE	BEATRICE MUNI	NE	LPV200	0	1	0	1	1	0.9999
FNB	BRENNER FIELD	NE	LPV	0	1	0	1	1	0.9999
HDE	BREWSTER FIELD	NE	LPV	0	1	0	1	1	0.9998
BBW	BROKEN BOW MUNI	NE	LPV	0	1	0	1	1	0.9998
07K	CENTRAL CITY MUNI LARRY REINEKE FIELD	NE	LPV	0	1	0	1	1	0.9998
GRI	CENTRAL NEBRASKA REGIONAL	NE	LPV	0	1	0	1	1	0.9998
CDR	CHADRON MUNI	NE	LPV200	0	1	1	1	2	0.9998
OLU	COLUMBUS MUNI	NE	LPV	0	1	0	1	1	0.9999
CZD	COZAD MUNI	NE	LPV	0	1	0	1	1	0.9998



Airport Id	Airport Name	State/Prov	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
6K3	CREIGHTON MUNI	NE	LPV	0	1	1	1	2	0.9998
CEK	CRETE MUNICIPAL	NE	LPV	0	1	0	1	1	0.9999
93Y	DAVID CITY MUNI	NE	LPV	0	1	0	1	1	0.9999
OMA	EPPLEY AIRFIELD	NE	LPV	0	1	0	1	1	0.9999
ODX	EVELYN SHARP FIELD	NE	LPV	0	1	0	1	1	0.9998
FBY	FAIRBURY MUNI	NE	LPV	0	1	0	1	1	0.9999
FMZ	FAIRMONT STATE AIRFIELD	NE	LPV	0	1	0	1	1	0.9999
FET	FREMONT MUNI	NE	LPV	0	1	0	1	1	0.9999
OKS	GARDEN COUNTY	NE	LPV	0	1	0	1	1	0.9998
GRN	GORDON MUNI	NE	LPV	0	1	1	1	2	0.9998
GGF	GRANT MUNI	NE	LPV	0	1	0	1	1	0.9998
0B4	HARTINGTON MUNI	NE	LPV	0	1	1	1	2	0.9998
HSI	HASTINGS MUNI	NE	LPV	0	1	0	1	1	0.9998
IML	IMPERIAL MUNI	NE	LPV	0	1	0	1	1	0.9999
LXN	JIM KELLY FIELD	NE	LPV	0	1	0	1	1	0.9998
OFK	KARL STEFAN MEMORIAL	NE	LPV	0	1	0	1	1	0.9998
EAR	KEARNEY RGNL	NE	LPV	0	1	0	1	1	0.9998
IBM	KIMBALL MUNI ROBERT E ARRAJ FI	NE	LPV	0	1	0	1	1	0.9999
LNK	LINCOLN	NE	LPV	0	1	0	1	1	0.9999
MCK	MCCOOK REGIONAL	NE	LPV	0	1	0	1	1	0.9998
MLE	MILLARD	NE	LPV	0	1	0	1	1	0.9999
VTN	MILLER FIELD	NE	LPV	0	1	1	1	2	0.9998
9V5	MODISSETT	NE	LPV	0	1	1	1	2	0.9998
AFK	NEBRASKA CITY MUNI	NE	LPV	0	1	0	1	1	0.9999
LBF	NORTH PLATTE RGNL AIRPORT LEE BIRD FIELD	NE	LPV	0	1	0	1	1	0.9998
0V3	PIONEER VILLAGE FIELD	NE	LPV	0	1	0	1	1	0.9998
PMV	PLATTSMOUTH MUNI	NE	LPV	0	1	0	1	1	0.9999
RBE	ROCK COUNTY	NE	LPV	0	1	1	1	2	0.9998
OGA	SEARLE FIELD	NE	LPV	0	1	0	1	1	0.9998
SWT	SEWARD MUNICIPAL	NE	LPV	0	1	0	1	1	0.9999
SNY	SIDNEY MUNI LLOYD W. CARR FIELD	NE	LPV	0	1	0	1	1	0.9999
8V2	STUART-ATKINSON MUNI	NE	LPV	0	1	1	1	2	0.9998
12K	SUPERIOR MUNI	NE	LPV	0	1	0	1	1	0.9999
ONL	THE O'NEILL MUNI JOHN L BAKER FIELD	NE	LPV	0	1	1	1	2	0.9998
TIF	THOMAS COUNTY	NE	LPV	0	1	0	1	1	0.9998
AHQ	WAHOO MUNI	NE	LPV	0	1	0	1	1	0.9999
LCG	WAYNE MUNI	NE	LPV	0	1	1	1	2	0.9999
BFF	WESTERN NEB. RGNL WILLIAM B. HEILIG FIELD	NE	LPV	0	1	0	1	2	0.9998
JYR	YORK MUNICIPAL	NE	LPV	0	1	0	1	1	0.9999
CON	CONCORD MUNI	NH	LPV	0	1	0	1	0	1
EEN	DILLANT-HOPKINS	NH	LPV	0	1	0	1	0	1
LCI	LACONIA MUNI	NH	LPV	0	1	0	1	0	1
LEB	LEBANON MUNI	NH	LPV	0	1	0	1	0	1
MHT	MANCHESTER	NH	LPV200	0	1	0	1	0	1
HIE	MOUNT WASHINGTON REGIONAL	NH	LPV	0	1	0	1	0	1

Airport Id	Airport Name	State/Prov	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
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 INTERNATIONAL	NJ	LPV200	0	1	0	1	0	1
WWD	CAPE MAY COUNTY	NJ	LPV	0	1	0	1	1	1
47N	CENTRAL JERSEY REGIONAL	NJ	LP	0	1	0	1	0	1
CDW	ESSEX COUNTY	NJ	LPV	0	1	0	1	0	1
4N1	GREENWOOD LAKE	NJ	LP	0	1	0	1	0	1
MIV	MILLVILLE MUNI	NJ	LPV200	0	1	0	1	0	1
MMU	MORRISTOWN MUNI	NJ	LPV200	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
N40	SKY MANOR	NJ	LP	0	1	0	1	0	1
VAY	SOUTH JERSEY REGIONAL	NJ	LP	0	1	0	1	0	1
TEB	TETERBORO	NJ	LPV	0	1	0	1	0	1
CYDF	DEER LAKE	NL	LPV	0	1	0	1	25	0.9977
ABQ	ALBUQUERQUE INTL SUNPORT	NM	LPV	0	1	0	1	1	0.9999
CNM	CAVERN CITY AIR TRML	NM	LP	0	1	0	1	2	0.9999
CVN	CLOVIS MUNI	NM	LPV	0	1	0	1	2	0.9999
DMN	DEMING MUNI	NM	LPV	0	1	0	1	7	0.9997
FMN	FOUR CORNERS RGNL	NM	LPV200	0	1	0	1	0	1
SVC	GRANT COUNTY	NM	LPV	0	1	0	1	7	0.9997
HOB	LEA COUNTY REGIONAL	NM	LPV200	0	1	0	1	2	0.9999
LAM	LOS ALAMOS	NM	LP	0	1	0	1	1	0.9999
ROW	ROSWELL INTL AIR CENTER	NM	LPV	0	1	0	1	2	0.9999
SRR	SIERRA BLANCA REGIONAL	NM	LPV200	0	1	0	1	2	0.9999
ONM	SOCORRO MUNI	NM	LP	0	1	0	1	3	0.9999
CYHZ	HALIFAX / STANFIELD INTL	NS	LPV	0	1	0	1	1	1
CYEV	INUVIK	NT	LPV	0	1	1	0.9998	6	0.9986
ELY	ELY ARPT-YELLAND FLD	NV	LPV	0	1	0	1	3	0.9999
LAS	MC CARRAN INTL	NV	LPV	0	1	0	1	3	0.9998
RTS	RENO/STEAD	NV	LPV	0	1	0	1	94	0.9954
RNO	RENO/TAHOE INTL	NV	LPV	0	1	0	1	94	0.9954
TPH	TONOPAH	NV	LP	0	1	0	1	3	0.9998
WMC	WINNEMUCCA MUNI	NV	LPV	0	1	0	1	24	0.9997
ALB	ALBANY INTL	NY	LPV200	0	1	0	1	0	1
GVQ	BATAVIA	NY	LPV200	0	1	0	1	0	1
HWV	BROOKHAVEN	NY	LPV	0	1	0	1	0	1
9G0	BUFFALO AIRFIELD	NY	LP	0	1	0	1	0	1
BUF	BUFFALO NIAGARA INTL	NY	LPV	0	1	0	1	0	1
D38	CANANDAIGUA	NY	LP	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
ELM	ELMIRA/CORNING REGIONAL	NY	LPV200	0	1	0	1	0	1
GFL	FLOYD BENNETT MEMORIAL	NY	LPV	0	1	0	1	0	1
FOK	FRANCIS S. GABRESKI	NY	LPV200	0	1	0	1	0	1

Airport Id	Airport Name	State/Prov	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
NY0	FULTON COUNTY	NY	LPV	0	1	0	1	0	1
BGM	GREATER BINGHAMTON EDWIN A LINK FIELD	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 MUNI	NY	LPV	0	1	0	1	0	1
HTF	HORNELL MUNI	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	LPV200	0	1	0	1	0	1
7G0	LEDGEDALE AIRPARK	NY	LPV	0	1	0	1	0	1
ISP	LONG ISLAND MAC ARTHUR	NY	LPV200	0	1	0	1	0	1
MSS	MASSENA INTL-RICHARDS FIELD	NY	LPV	0	1	0	1	0	1
OGS	OGDENSBURG INTL	NY	LPV	0	1	0	1	0	1
N66	ONEONTA MUNI	NY	LPV	0	1	0	1	0	1
MGJ	ORANGE COUNTY	NY	LPV	0	1	0	1	0	1
FZY	OSWEGO 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
SCH	SCHENECTADY COUNTY	NY	LPV200	0	1	0	1	0	1
44N	SKY ACRES	NY	LPV	0	1	0	1	0	1
SWF	STEWART INTERNATIONAL	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 MUNI	NY	LPV	0	1	0	1	0	1
ART	WATERTOWN INTL	NY	LPV200	0	1	0	1	0	1
ELZ	WELLSVILLE MUNI ARPT	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
6G5	BARNESVILLE-BRADFIELD	OH	LP	0	1	0	1	0	1
EDJ	BELLEFONTAINE REGIONAL	OH	LPV	0	1	0	1	0	1
TZR	BOLTON FIELD	OH	LPV200	0	1	0	1	0	1
BKL	BROOKHAVEN	OH	LPV	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 MUNI AIRPORT LUNKEN FIELD	OH	LPV	0	1	0	1	0	1
I69	CLERMONT COUNTY	OH	LP	0	1	0	1	0	1
CLE	CLEVELAND-HOPKINS INTL	OH	LPV200	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 MUNI	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

Airport Id	Airport Name	State/Prov	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
FZI	FOSTORIA METROPOLITAN	OH	LPV	0	1	0	1	0	1
USE	FULTON COUNTY	OH	LPV	0	1	0	1	0	1
GQQ	GALION MUNI	OH	LP	0	1	0	1	0	1
PMH	GREATER PORTSMOUTH RGNL	OH	LPV	0	1	0	1	0	1
I19	GREENE COUNTY LEWIS A JACKSON REGIONAL	OH	LPV	0	1	0	1	0	1
I74	GRIMES FIELD	OH	LPV	0	1	0	1	0	1
PHD	HARRY CLEVER FIELD	OH	LP	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
4I3	KNOX COUNTY	OH	LPV200	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 REGIONAL	OH	LPV200	0	1	0	1	0	1
MNN	MARION MUNI	OH	LPV	0	1	0	1	0	1
OXD	MIAMI UNIVERSITY	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
RZT	ROSS COUNTY	OH	LPV	0	1	0	1	0	1
S24	SANDUSKY COUNTY REGIONAL	OH	LPV	0	1	0	1	0	1
16G	SENECA COUNTY	OH	LPV	0	1	0	1	0	1
SGH	SPRINGFIELD-BECKLEY MUNI	OH	LPV200	0	1	0	1	0	1
TDZ	TOLEDO EXECUTIVE	OH	LP	0	1	0	1	0	1
TOL	TOLEDO EXPRESS	OH	LPV200	0	1	0	1	0	1
MRT	UNION COUNTY	OH	LP	0	1	0	1	0	1
BJJ	WAYNE COUNTY	OH	LPV	0	1	0	1	0	1
0G6	WILLIAMS COUNTY	OH	LPV	0	1	0	1	0	1
LNN	WILLOUGHBY	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 MUNI	OK	LPV	0	1	0	1	1	0.9999
AXS	ALTUS/QUARTZ MOUNTAIN RGNL	OK	LPV	0	1	0	1	2	0.9999
1F0	ARDMORE DOWNTOWN EXECUTIVE	OK	LP	0	1	0	1	1	1
ADM	ARDMORE MUNI	OK	LPV200	0	1	0	1	1	1
BVO	BARTLESVILLE MUNI	OK	LPV	0	1	0	1	1	0.9999
BKN	BLACKWELL-TONKAWA MUNI	OK	LPV	0	1	0	1	1	0.9999
GCM	CLAREMORE RGNL	OK	LPV	0	1	0	1	1	0.9999
RCE	CLARENCE E. PAGE MUNI	OK	LPV	0	1	0	1	1	0.9999
CLK	CLINTON REGIONAL	OK	LPV200	0	1	0	1	2	0.9999
CSM	CLINTON-SHERMAN	OK	LPV200	0	1	0	1	2	0.9999
MKO	DAVIS FIELD	OK	LPV	0	1	0	1	1	1

Airport Id	Airport Name	State/Prov	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
DUA	EAKER FIELD	OK	LPV	0	1	0	1	1	1
ELK	ELK CITY RGNL BUSINESS	OK	LPV	0	1	0	1	2	0.9999
WDG	ENID WOODRING REGIONAL	OK	LPV200	0	1	0	1	1	0.9999
FDR	FREDERICK REGIONAL	OK	LPV200	0	1	0	1	2	0.9999
GMJ	GROVE MUNI	OK	LPV	0	1	0	1	1	1
GOK	GUTHRIE-EDMOND RGNL	OK	LPV	0	1	0	1	1	0.9999
GUY	GUYMON MUNI	OK	LPV	0	1	0	1	2	0.9999
DUC	HALLIBURTON FIELD	OK	LPV	0	1	0	1	1	1
HBR	HOBART MUNI	OK	LPV	0	1	0	1	2	0.9999
MLC	MC ALESTER REGIONAL	OK	LPV	0	1	0	1	1	1
OKM	OKMULGEE REGIONAL	OK	LPV	0	1	0	1	1	0.9999
PVJ	PAULS VALLEY MUNI	OK	LPV200	0	1	0	1	1	0.9999
F22	PERRY MUNI	OK	LPV	0	1	0	1	1	0.9999
PNC	PONCA CITY REGIONAL	OK	LPV	0	1	0	1	1	0.9999
RVS	RICHARD LLOYD JONES JR	OK	LPV	0	1	0	1	1	0.9999
SNL	SHAWNEE REGIONAL	OK	LPV200	0	1	0	1	1	0.9999
GZL	STIGLER REGIONAL	OK	LPV	0	1	0	1	1	1
SWO	STILLWATER REGIONAL	OK	LPV	0	1	0	1	1	0.9999
HSD	SUNDANCE AIRPARK	OK	LPV	0	1	0	1	1	0.9999
TQH	TAHLEQUAH MUNI	OK	LPV	0	1	0	1	1	1
TUL	TULSA INTL	OK	LPV200	0	1	0	1	1	0.9999
OUN	UNIVERSITY OF OKLAHOMA WESTHEIMER	OK	LPV200	0	1	0	1	1	0.9999
WWR	WEST WOODWARD	OK	LPV	0	1	0	1	2	0.9999
PWA	WILEY POST	OK	LPV200	0	1	0	1	1	0.9999
OKC	WILL ROGERS WORLD	OK	LPV200	0	1	0	1	1	0.9999
OWP	WILLIAM R. POGUE MUNI	OK	LPV	0	1	0	1	1	0.9999
CYHD	DRYDEN REGIONAL	ON	LPV	0	1	0	1	1	0.9999
CNS7	KINCARDINE	ON	LPV	0	1	0	1	0	1
CYKF	KITCHENER / WATERLOO	ON	LPV	0	1	0	1	0	1
CYOW	OTTAWA MACDONALDCARTIER INTL	ON	LPV	0	1	0	1	0	1
CYXL	SIOUX LOOKOUT	ON	LPV	0	1	0	1	1	0.9999
CYQT	THUNDER BAY	ON	LPV	0	1	0	1	1	0.9999
CYTS	TIMMINS / VICTOR M POWER	ON	LPV	0	1	0	1	0	1
AST	ASTORIA REGIONAL	OR	LPV	0	1	1	1	44	0.9981
UAO	AURORA STATE	OR	LPV	0	1	0	1	37	0.9989
BDN	BEND MUNI	OR	LPV	0	1	0	1	21	0.9995
CVO	CORVALLIS MUNI	OR	LPV200	0	1	0	1	83	0.9975
PDT	EASTERN OREGON RGNL AT PENDLETON	OR	LPV200	1	1	1	1	5	0.9998
GCD	GRANT CO RGNL/OGILVIE FIELD	OR	LPV	0	1	0	1	4	0.9999
LMT	KLAMATH FALLS	OR	LPV	0	1	0	1	93	0.9963
LGD	LA GRANDE/UNION COUNTY	OR	LPV	0	1	0	1	4	0.9999
S33	MADRAS MUNICIPAL	OR	LPV	0	1	0	1	15	0.9996
EUG	MAHLON SWEET FIELD	OR	LPV200	0	1	0	1	92	0.9971
MMV	MCMINNVILLE MUNI	OR	LPV	0	1	0	1	46	0.9984
SLE	MCNARY FLD	OR	LPV200	0	1	0	1	48	0.9984
ONO	ONTARIO MUNI	OR	LPV	0	1	0	1	2	1
PDX	PORTLAND INTL	OR	LPV200	0	1	1	1	29	0.9990

Airport Id	Airport Name	State/Prov	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
HIO	PORTLAND-HILLSBORO	OR	LPV200	0	1	1	1	36	0.9988
RDM	ROBERTS FIELD	OR	LPV200	0	1	0	1	20	0.9995
SPB	SCAPPOOSE INDUSTRIAL AIRPARK	OR	LPV	0	1	1	1	32	0.9989
AGC	ALLEGHENY COUNTY	PA	LPV	0	1	0	1	0	1
XLL	ALLENTOWN-QUEEN CITY MUNI	PA	LP	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
BVI	BEAVER FALLS MUNI	PA	LPV	0	1	0	1	0	1
HMZ	BEDFORD COUNTY	PA	LPV	0	1	0	1	0	1
BFD	BRADFORD REGIONAL	PA	LPV200	0	1	0	1	0	1
BTP	BUTLER COUNTY K W SCHOLTER FLD	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
8N8	DANVILLE	PA	LP	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 FLD	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 MUNI	PA	LPV	0	1	0	1	0	1
22N	JAKE ARNER MEMORIAL	PA	LP	0	1	0	1	0	1
JST	JOHN MURTHA JOHNSTOWN CAMBRIA COUNTY	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
PSB	MID STATE	PA	LPV	0	1	0	1	0	1
RVL	MIFFLIN COUNTY	PA	LPV	0	1	0	1	0	1
UCP	NEW CASTLE MUNI	PA	LPV	0	1	0	1	0	1
PNE	NORTHEAST PHILADELPHIA	PA	LPV	0	1	0	1	0	1
N79	NORTHUMBERLAND COUNTY	PA	LPV	0	1	0	1	0	1
PHL	PHILADELPHIA INTL	PA	LPV	0	1	0	1	0	1
PIT	PITTSBURGH INTERNATIONAL	PA	LPV200	0	1	0	1	0	1
MPO	POCONO MOUNTAINS MUNI	PA	LPV	0	1	0	1	0	1
GKJ	PORT MEADVILLE	PA	LP	0	1	0	1	0	1
UKT	QUAKERTOWN	PA	LP	0	1	0	1	0	1
RDG	READING RGNL CARL A SPAATZ FLD	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 MUNI	PA	LPV	0	1	0	1	0	1
UNV	UNIVERSITY PARK	PA	LPV200	0	1	0	1	0	1
FKL	VENANGO REGIONAL	PA	LPV	0	1	0	1	0	1
AFJ	WASHINGTON COUNTY	PA	LPV	0	1	0	1	0	1

Airport Id	Airport Name	State/Prov	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
AVP	WILKES-BARRE/SCRANTON INTL	PA	LPV	0	1	0	1	0	1
IPT	WILLIAMSPORT RGNL	PA	LPV	0	1	0	1	0	1
LOM	WINGS FIELD	PA	LPV	0	1	0	1	0	1
THV	YORK	PA	LP	0	1	0	1	0	1
CYFY	AMOS	QC	LPV	0	1	0	1	0	1
CYVB	BONAVENTURE	QC	LPV	0	1	0	1	1	1
CTP9	KATTINIQU / DONALDSON	QC	LPV	1	0.9996	3	0.9995	37	0.9958
CYVP	KUUJJUAQ	QC	LPV	1	0.9996	2	0.9996	10	0.9975
CYYY	MONTJOLI	QC	LPV	0	1	0	1	1	1
CYMX	MONTREAL (MIRABEL INTL)	QC	LPV	0	1	0	1	0	1
CYHU	MONTREAL / STHUBERT	QC	LPV	0	1	0	1	0	1
CPN8	OPINACA	QC	LPV	0	1	0	1	1	0.9999
CYQB	QUEBEC / JEAN LESAGE INTL	QC	LPV	0	1	0	1	0	1
CYRI	RIVIEREDULOUP	QC	LPV	0	1	0	1	0	1
CYIF	STAUGUSTIN	QC	LPV	1	0.9997	1	0.9997	8	0.9990
CYRQ	TROISRIVIERES	QC	LPV	0	1	0	1	0	1
CSR3	VICTORIAVILLE	QC	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	LPV200	0	1	0	1	0	1
AIK	AIKEN MUNI	SC	LPV200	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 CO	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 REGIONAL	SC	LPV	0	1	0	1	0	1
CAE	COLUMBIA METROPOLITAN	SC	LPV200	0	1	0	1	0	1
HYW	CONWAY-HORRY COUNTY	SC	LPV	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 REGIONAL	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 ROGER MILLIKEN	SC	LPV200	0	1	0	1	0	1
LKR	LANCASTER COUNTY MC WHIRTER FIELD	SC	LPV200	0	1	0	1	0	1
6J0	LEXINGTON COUNTY AT PELION	SC	LPV	0	1	0	1	0	1
RBW	LOWCOUNTRY REGIONAL	SC	LPV200	0	1	0	1	0	1
BBP	MARLBORO COUNTY JETPORT H E AVENT FIELD	SC	LPV	0	1	0	1	0	1
LRO	MT PLEASANT RGNL FAISON FIELD	SC	LPV	0	1	0	1	0	1

Airport Id	Airport Name	State/Prov	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
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 MUNI	SC	LPV200	0	1	0	1	0	1
LQK	PICKENS COUNTY	SC	LPV	0	1	0	1	0	1
UZA	ROCK HILL YORK CO BRYANT FIELD	SC	LPV200	0	1	0	1	0	1
SPA	SPARTANBURG DOWNTOWN MEMORIAL	SC	LPV200	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 REGIONAL	SD	LPV200	0	1	1	0.9999	2	0.9998
SPF	BLACK HILLS-CLYDE ICE FIELD	SD	LPV	0	1	1	0.9999	2	0.9997
BKX	BROOKINGS REGIONAL	SD	LPV	0	1	1	0.9999	2	0.9999
YKN	CHAN GURNEY MUNI	SD	LPV200	0	1	1	1	2	0.9998
0D8	GETTYSBURG MUNI	SD	LPV200	0	1	1	0.9999	2	0.9997
VMR	HAROLD DAVIDSON FLD	SD	LPV	0	1	1	1	2	0.9998
HSR	HOT SPRINGS MUNI	SD	LP	0	1	1	1	2	0.9998
HON	HURON REGIONAL	SD	LPV200	0	1	1	0.9999	2	0.9998
FSD	JOE FOSS FIELD	SD	LPV200	0	1	1	1	2	0.9998
MDS	MADISON MUNI	SD	LPV	0	1	1	0.9999	2	0.9998
MKA	MILLER MUNI	SD	LPV200	0	1	1	0.9999	2	0.9998
MHE	MITCHELL MUNI	SD	LPV	0	1	1	1	2	0.9998
MBG	MOBRIDGE MUNI	SD	LPV	0	1	1	0.9999	2	0.9997
PIR	PIERRE REGIONAL	SD	LPV	0	1	1	0.9999	2	0.9997
RAP	RAPID CITY REGIONAL	SD	LPV200	0	1	1	1	2	0.9998
49B	STURGIS MUNI	SD	LPV	0	1	1	0.9999	2	0.9997
ATY	WATERTOWN REGIONAL	SD	LPV200	0	1	1	0.9999	2	0.9998
ICR	WINNER RGNL	SD	LPV	0	1	1	1	2	0.9998
CYKJ	KEY LAKE	SK	LPV	1	1	1	1	14	0.9991
CKQ8	MCARTHUR RIVER	SK	LPV	1	0.9999	1	0.9999	8	0.9990
GZS	ABERNATHY FIELD	TN	LPV	0	1	0	1	0	1
PVE	BEECH RIVER REGIONAL	TN	LPV	0	1	0	1	0	1
0M4	BENTON COUNTY	TN	LPV	0	1	0	1	0	1
SYI	BOMAR FIELD-SHELBYVILLE MUNI	TN	LPV	0	1	0	1	0	1
HZD	CARROLL COUNTY	TN	LPV	0	1	0	1	0	1
2M8	CHARLES W. BAKER	TN	LPV	0	1	0	1	0	1
CSV	CROSSVILLE MEMORIAL WHITSON FIELD	TN	LPV200	0	1	0	1	0	1
DYR	DYERSBURG REGIONAL	TN	LPV	0	1	0	1	0	1
LUG	ELLINGTON	TN	LPV	0	1	0	1	0	1
UCY	EVERETT-STEWART	TN	LPV200	0	1	0	1	0	1
FYE	FAYETTE CO	TN	LPV	0	1	0	1	0	1
FYM	FAYETTEVILLE MUNI	TN	LPV	0	1	0	1	0	1
GKT	GATLINBURG-PIGEON FORGE	TN	LPV	0	1	0	1	0	1
M01	GENERAL DEWITT SPAIN	TN	LPV	0	1	0	1	0	1
PHT	HENRY COUNTY	TN	LPV200	0	1	0	1	0	1
0M5	HUMPHREYS COUNTY	TN	LP	0	1	0	1	0	1
0M3	JOHN A BAKER	TN	LP	0	1	0	1	0	1



Airport Id	Airport Name	State/Prov	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
JWN	JOHN C. TUNE	TN	LPV	0	1	0	1	0	1
DKX	KNOXVILLE DOWNTOWN ISLAND	TN	LPV	0	1	0	1	0	1
3M7	LAFAYETTE MUNI	TN	LPV	0	1	0	1	0	1
M54	LEBANON MUNI	TN	LPV	0	1	0	1	0	1
CHA	LOVELL FIELD	TN	LPV200	0	1	0	1	0	1
2A0	MARK ANTON	TN	LPV	0	1	0	1	0	1
1A3	MARTIN CAMPBELL FIELD	TN	LP	0	1	0	1	0	1
MRC	MAURY COUNTY	TN	LPV	0	1	0	1	0	1
MKL	MC KELLAR-SIPES REGIONAL	TN	LPV200	0	1	0	1	0	1
TYS	MCGHEE-TYSON	TN	LPV	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 REGIONAL JETPORT	TN	LPV	0	1	0	1	0	1
MOR	MOORE-MURRELL	TN	LPV	0	1	0	1	0	1
MBT	MURFREESBORO MUNI	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
1M5	PORTLAND MUNI	TN	LPV	0	1	0	1	0	1
SZY	ROBERT SIBLEY	TN	LPV	0	1	0	1	0	1
RKW	ROCKWOOD MUNI	TN	LPV	0	1	0	1	0	1
SNH	SAVANNAH-HARDIN COUNTY	TN	LPV	0	1	0	1	0	1
0A3	SMITHVILLE MUNI	TN	LP	0	1	0	1	0	1
MQY	SMYRNA	TN	LPV	0	1	0	1	0	1
M91	SPRINGFIELD ROBERTSON COUNTY	TN	LPV	0	1	0	1	0	1
M33	SUMNER COUNTY REGIONAL	TN	LP	0	1	0	1	0	1
TRI	TRI-CITIES RGNL TN/VA	TN	LPV200	0	1	0	1	0	1
THA	TULLAHOMA REGIONAL WM NORTHERN FLD	TN	LPV	0	1	0	1	0	1
SRB	UPPER CUMBERLAND REGIONAL	TN	LPV200	0	1	0	1	0	1
BGF	WINCHESTER MUNI	TN	LPV	0	1	0	1	0	1
OCH	A L MANGHAM JR REGIONAL	TX	LPV200	0	1	0	1	0	1
ABI	ABILENE REGIONAL	TX	LPV200	0	1	0	1	1	1
ADS	ADDISON	TX	LPV	0	1	0	1	0	1
ALI	ALICE INTERNATIONAL	TX	LPV	0	1	0	1	3	0.9999
E38	ALPINE-CASPARIS MUNICIPAL	TX	LP	0	1	0	1	4	0.9998
E11	ANDREWS COUNTY	TX	LPV	0	1	0	1	2	0.9999
LFK	ANGELINA COUNTY	TX	LPV	0	1	0	1	0	1
RKP	ARANSAS COUNTY	TX	LPV	0	1	0	1	2	1
GKY	ARLINGTON MUNI	TX	LPV200	0	1	0	1	0	1
EDC	AUSTIN EXECUTIVE	TX	LPV200	0	1	0	1	0	1
AUS	AUSTIN-BERGSTROM INTL	TX	LPV200	0	1	0	1	0	1
SWW	AVENGER FIELD	TX	LPV	0	1	0	1	2	0.9999
BYY	BAY CITY MUNI	TX	LPV	0	1	0	1	1	1
BPG	BIG SPRING MC MAHON-WRINKLE	TX	LPV	0	1	0	1	2	0.9999
5C1	BOERNE STAGE FIELD	TX	LP	0	1	0	1	1	1
LBX	BRAZORIA COUNTY	TX	LPV	0	1	0	1	1	1

Airport Id	Airport Name	State/Prov	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
I1R	BREHAM MUNI	TX	LPV	0	1	0	1	0	1
XBP	BRIDGEPORT MUNI	TX	LPV	0	1	0	1	1	1
BRO	BROWNSVILLE SOUTH PADRE ISLAND INTL	TX	LP	0	1	0	1	7	0.9998
BWD	BROWNWOOD RGNL	TX	LPV	0	1	0	1	1	1
E30	BRUCE FIELD	TX	LPV	0	1	0	1	2	0.9999
6R3	CLEVELAND MUNI	TX	LPV	0	1	0	1	0	1
TKI	COLLIN COUNTY REGIONAL AT MC KINNEY	TX	LPV200	0	1	0	1	0	1
CRP	CORPUS CHRISTI INTL	TX	LPV200	0	1	0	1	3	0.9999
CFD	COULTER FIELD	TX	LPV	0	1	0	1	0	1
PRX	COX FIELD	TX	LPV	0	1	0	1	0	1
8F3	CROSBYTON MUNICIPAL	TX	LP	0	1	0	1	2	0.9999
BBD	CURTIS FIELD	TX	LPV	0	1	0	1	2	1
RBD	DALLAS EXECUTIVE	TX	LPV	0	1	0	1	0	1
DAL	DALLAS LOVE FIELD	TX	LPV200	0	1	0	1	0	1
DFW	DALLAS-FT 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 MUNI	TX	LPV	0	1	0	1	0	1
DRT	DEL RIO INTL	TX	LPV	0	1	0	1	4	0.9999
DTO	DENTON MUNI	TX	LPV	0	1	0	1	0	1
TPL	DRAUGHON-MILLER CENTRAL TEXAS REGIONAL	TX	LPV200	0	1	0	1	0	1
GGG	EAST TEXAS REGIONAL	TX	LPV	0	1	0	1	0	1
CLL	EASTERWOOD FIELD	TX	LPV200	0	1	0	1	0	1
ETN	EASTLAND MUNI	TX	LP	0	1	0	1	1	1
EBG	EDINBURG INTL	TX	LPV	0	1	0	1	5	0.9998
ELP	EL PASO INTL	TX	LP	0	1	0	1	6	0.9998
EFD	ELLINGTON FIELD	TX	LPV200	0	1	0	1	0	1
AFW	FORT WORTH ALLIANCE	TX	LPV200	0	1	0	1	0	1
FWS	FORT WORTH SPINKS	TX	LPV200	0	1	0	1	0	1
FTW	FORT WORTH/MEACHAM	TX	LPV200	0	1	0	1	0	1
FST	FT. STOCKTON-PECOS COUNTY	TX	LPV	0	1	0	1	3	0.9999
GNC	GAINES COUNTY	TX	LPV	0	1	0	1	2	0.9999
GLE	GAINESVILLE MUNI	TX	LPV	0	1	0	1	1	1
IAH	GEORGE BUSH INTERCONTINENTAL/HOUSTON	TX	LPV200	0	1	0	1	0	1
GDJ	GRANBURY RGNL	TX	LPV	0	1	0	1	1	1
E19	GRUVER MUNI	TX	LP	0	1	0	1	2	0.9999
PVW	HALE COUNTY	TX	LPV	0	1	0	1	2	0.9999
ASL	HARRISON COUNTY	TX	LPV	0	1	0	1	0	1
LHB	HEARNE MUNI	TX	LPV200	0	1	0	1	0	1
HRX	HEREFORD MUNI	TX	LPV200	0	1	0	1	1	0.9999
INJ	HILLSBORO MUNI	TX	LPV	0	1	0	1	0	1
HDO	HONDO MUNI	TX	LPV	0	1	0	1	2	1
DKR	HOUSTON COUNTY	TX	LP	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 MUNI	TX	LPV	0	1	0	1	0	1
JAS	JASPER COUNTY-BELL FIELD	TX	LPV	0	1	0	1	0	1

Airport Id	Airport Name	State/Prov	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
HBV	JIM HOGG COUNTY	TX	LPV	0	1	0	1	5	0.9998
F00	JONES FIELD	TX	LPV	0	1	0	1	1	1
2R9	KARNES COUNTY	TX	LP	0	1	0	1	1	1
ERV	KERRVILLE MUNI LOUIS SCHREINER FLD	TX	LPV	0	1	0	1	2	1
IKG	KLEBERG COUNTY	TX	LPV	0	1	0	1	4	0.9999
2F5	LAMESA MUNI	TX	LP	0	1	0	1	2	0.9999
LNC	LANCASTER	TX	LPV200	0	1	0	1	0	1
LRD	LAREDO INTL	TX	LPV200	0	1	0	1	5	0.9998
LLN	LEVELLAND MUNI	TX	LPV	0	1	0	1	2	0.9999
50R	LOCKHART MUNI	TX	LPV	0	1	0	1	1	1
CXO	LONE STAR EXECUTIVE	TX	LPV200	0	1	0	1	0	1
LBB	LUBBOCK PRESTON SMITH INTL	TX	LPV200	0	1	0	1	2	0.9999
GVT	MAJORS	TX	LPV	0	1	0	1	0	1
5T9	MAVERICK COUNTY MEMORIAL INTL	TX	LPV	0	1	0	1	5	0.9999
MFE	MC ALLEN MILLER INTL	TX	LPV	0	1	0	1	7	0.9997
HQZ	MESQUITE METRO	TX	LPV	0	1	0	1	0	1
LXY	MEXIA-LIMESTONE CO	TX	LP	0	1	0	1	0	1
MDD	MIDLAND AIRPARK	TX	LPV	0	1	0	1	2	0.9999
MAF	MIDLAND INTERNATIONAL	TX	LPV	0	1	0	1	2	0.9999
JWY	MID-WAY RGNL	TX	LPV200	0	1	0	1	0	1
DUX	MOORE COUNTY	TX	LPV200	0	1	0	1	1	0.9999
RAS	MUSTANG BEACH	TX	LPV	0	1	0	1	2	1
BAZ	NEW BRAUNFELS MUNI	TX	LPV	0	1	0	1	1	1
GYI	NORTH TEXAS RGNL/PERRIN FIELD	TX	LPV200	0	1	0	1	1	1
ODO	ODESSA-SCHLEMEYER FIELD	TX	LPV200	0	1	0	1	2	0.9999
ORG	ORANGE COUNTY	TX	LPV	0	1	0	1	0	1
LVJ	PEARLAND RGNL	TX	LPV	0	1	0	1	0	1
PIL	PORT ISABEL-CAMERON COUNTY	TX	LPV	0	1	0	1	6	0.9998
AMA	RICK HUSBAND AMARILLO INTL	TX	LPV200	0	1	0	1	1	0.9999
GRK	ROBERT GRAY AAF	TX	LPV200	0	1	0	1	0	1
E01	ROY HURD MEMORIAL	TX	LP	0	1	0	1	2	0.9999
SJT	SAN ANGELO REGIONAL MATHIS FLD	TX	LPV	0	1	0	1	2	0.9999
SAT	SAN ANTONIO INTL	TX	LPV200	0	1	0	1	1	1
GLS	SCHOLES INTL AT GALVESTON	TX	LPV	0	1	0	1	1	1
BPT	SOUTHEAST TEXAS REGIONAL	TX	LPV200	0	1	0	1	0	1
SGR	SUGAR LAND RGNL	TX	LPV200	0	1	0	1	0	1
SLR	SULPHUR SPRINGS MUNI	TX	LPV200	0	1	0	1	0	1
TFP	T P MC CAMPBELL	TX	LPV	0	1	0	1	2	1
TRL	TERRELL MUNI	TX	LPV	0	1	0	1	0	1
CNW	TSTC WACO	TX	LPV200	0	1	0	1	0	1
TYR	TYLER POUNDS RGNL	TX	LPV	0	1	0	1	0	1
VCT	VICTORIA	TX	LPV200	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	1	1

Airport Id	Airport Name	State/Prov	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
T59	WHEELER MUNI	TX	LP	0	1	0	1	2	0.9999
F05	WILBARGER COUNTY	TX	LPV	0	1	0	1	1	0.9999
HOU	WILLIAM P HOBBY	TX	LPV200	0	1	0	1	0	1
77F	WINTERS MUNI	TX	LP	0	1	0	1	2	0.9999
BDG	BLANDING MUNI	UT	LPV	0	1	0	1	0	1
BMC	BRIGHAM CITY	UT	LP	0	1	0	1	0	1
BCE	BRYCE CANYON	UT	LPV	0	1	0	1	3	0.9999
PUC	CARBON COUNTY REGIONAL BUCK DAVIS FIELD	UT	LP	0	1	0	1	0	1
DTA	DELTA MUNI	UT	LP	0	1	0	1	0	1
FOM	FILLMORE MUNI	UT	LPV	0	1	0	1	1	1
LGU	LOGAN-CACHE	UT	LPV	0	1	0	1	0	1
U14	NEPHI MUNI	UT	LPV	0	1	0	1	0	1
OGD	OGDEN-HINCKLEY	UT	LPV	0	1	0	1	0	1
U55	PANGUITCH MUNI	UT	LPV200	0	1	0	1	3	0.9999
PVU	PROVO MUNI	UT	LPV200	0	1	0	1	0	1
SLC	SALT LAKE CITY INTL	UT	LP	0	1	0	1	0	1
SGU	ST GEORGE MUNI	UT	LPV	0	1	0	1	3	0.9999
VEL	VERNAL	UT	LP	0	1	0	1	0	1
ENV	WENDOVER	UT	LPV	0	1	0	1	0	1
MFV	ACCOMACK COUNTY	VA	LPV	0	1	0	1	1	1
MTV	BLUE RIDGE	VA	LPV	0	1	0	1	0	1
CHO	CHARLOTTESVILLE- ALBEMARLE	VA	LPV	0	1	0	1	0	1
CPK	CHESAPEAKE REGIONAL	VA	LPV200	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 REGIONAL	VA	LPV200	0	1	0	1	0	1
PTB	DINWIDDIE COUNTY	VA	LPV	0	1	0	1	0	1
EMV	EMPORIA GREENSVILLE REGIONAL	VA	LPV200	0	1	0	1	0	1
FVX	FARMVILLE REGIONAL	VA	LPV	0	1	0	1	0	1
FKN	FRANKLIN MUN JOHN BEVERLY ROSE	VA	LPV	0	1	0	1	0	1
OFP	HANOVER COUNTY MUNI	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
LUA	LURAY CAVERNS	VA	LP	0	1	0	1	0	1
LYH	LYNCHBURG RGNL PRESTON GLENN FLD	VA	LPV	0	1	0	1	0	1
HEF	MANASSAS RGNL HARRY P DAVIS FL	VA	LPV	0	1	0	1	0	1
W63	MARKS MUNI	VA	LP	0	1	0	1	0	1
AVC	MECKLENBURG BRUNSWICK REGIONAL	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

Airport Id	Airport Name	State/Prov	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
PSK	NEW RIVER VALLEY	VA	LPV200	0	1	0	1	0	1
PHF	NEWPORT NEWS WILLIAMSBURG INTL	VA	LPV200	0	1	0	1	0	1
ORF	NORFOLK INTL	VA	LPV200	0	1	0	1	0	1
RIC	RICHMOND INTL	VA	LPV200	0	1	0	1	0	1
ROA	ROANOKE REGIONAL WOODRUM FIELD	VA	LPV	0	1	0	1	0	1
SHD	SHENANDOAH VALLEY REGIONAL	VA	LPV200	0	1	0	1	0	1
RMN	STAFFORD REGIONAL	VA	LPV	0	1	0	1	0	1
SFQ	SUFFOLK EXECUTIVE	VA	LP	0	1	0	1	0	1
XSA	TAPPAHANNOCK-ESSEX COUNTY	VA	LPV	0	1	0	1	0	1
JFZ	TAZEWELL COUNTY	VA	LPV	0	1	0	1	0	1
HLX	TWIN 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
HWY	WARRENTON-FAUQUIER	VA	LPV200	0	1	0	1	0	1
W78	WILLIAM M TUCK	VA	LPV	0	1	0	1	0	1
OKV	WINCHESTER REGIONAL	VA	LPV200	0	1	0	1	0	1
BTV	BURLINGTON INTL	VT	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
AWO	ARLINGTON MUNI	WA	LPV200	0	1	1	1	7	0.9996
BLI	BELLINGHAM INTL	WA	LPV	0	1	1	1	6	0.9995
HQM	BOWERMAN	WA	LPV200	0	1	1	1	35	0.9983
PWT	BREMERTON NATIONAL	WA	LPV	0	1	1	1	27	0.9991
DEW	DEER PARK	WA	LPV	0	1	1	0.9999	2	0.9998
TDO	ED CARLSON MEMORIAL SOUTH LEWIS CO	WA	LPV	0	1	1	1	27	0.9989
EPH	EPHRATA MUNI	WA	LPV	0	1	1	1	4	0.9998
FHR	FRIDAY HARBOR	WA	LPV	0	1	1	1	6	0.9995
MWH	GRANT COUNTY INTL	WA	LPV200	0	1	1	1	4	0.9998
OLM	OLYMPIA RGNL	WA	LPV	0	1	1	1	28	0.9989
PUW	PULLMAN/MOSCOW REGIONAL	WA	LPV	0	1	1	1	3	0.9998
RNT	RENTON MUNI	WA	LPV	0	1	1	1	24	0.9993
RLD	RICHLAND	WA	LPV	0	1	1	1	4	0.9998
SEA	SEATTLE-TACOMA INTL	WA	LPV200	0	1	1	1	25	0.9993
BVS	SKAGIT REGIONAL	WA	LPV	0	1	1	1	6	0.9996
PAE	SNOHOMISH COUNTY (PAINE FLD)	WA	LPV	0	1	1	1	10	0.9995
OTH	SOUTHWEST OREGON RGNL	WA	LPV	0	1	0	1	97	0.9924
GEG	SPOKANE INTL	WA	LPV200	0	1	1	1	2	0.9998
TIW	TACOMA NARROWS	WA	LPV	0	1	1	1	26	0.9991
PSC	TRI-CITIES	WA	LPV200	0	1	1	1	4	0.9998
ALW	WALLA WALLA REGIONAL	WA	LPV	1	1	2	1	4	0.9999
CLM	WILLIAM R FAIRCHILD INTL	WA	LPV	0	1	1	1	25	0.9992
YKM	YAKIMA AIR TERMINAL MCALLISTER FIELD	WA	LPV200	0	1	1	1	8	0.9997
GRB	AUSTIN STRAUBEL INTL	WI	LPV200	0	1	0	1	0	1

Airport Id	Airport Name	State/Prov	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
DLL	BARABOO WISCONSIN DELLS	WI	LPV	0	1	0	1	0	1
OVS	BOSCOBEL	WI	LPV	0	1	0	1	0	1
CWA	CENTRAL WISCONSIN	WI	LPV200	0	1	0	1	1	1
EAU	CHIPPEWA VALLEY REGIONAL	WI	LPV200	0	1	0	1	1	1
CLI	CLINTONVILLE MUNI	WI	LPV	0	1	0	1	0	1
MSN	DANE COUNTY REGIONAL TRUAX FIELD	WI	LPV200	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	1	1
57C	EAST TROY MUNI	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
HXF	HARTFORD MUNI	WI	LPV	0	1	0	1	0	1
ASX	JOHN F. KENNEDY MEMORIAL	WI	LPV	0	1	0	1	1	0.9999
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 MUNI	WI	LPV	0	1	0	1	1	1
ARV	LAKELAND NOBLE F. LEE MEMORIAL FIELD	WI	LPV	0	1	0	1	1	1
MWC	LAWRENCE J TIMMERMAN	WI	LPV	0	1	0	1	0	1
MTW	MANITOWOC COUNTY	WI	LPV200	0	1	0	1	0	1
MFI	MARSHFIELD MUNI	WI	LPV	0	1	0	1	1	1
LUM	MENOMONIE MUNICIPAL SCORE FIELD	WI	LPV	0	1	0	1	1	1
RRL	MERRILL MUNI	WI	LPV	0	1	0	1	1	1
C29	MIDDLETON MUNI-MOREY FIELD	WI	LPV	0	1	0	1	0	1
8D1	NEW HOLSTEIN MUNI	WI	LPV	0	1	0	1	0	1
RNH	NEW RICHMOND REGIONAL	WI	LPV	0	1	0	1	1	0.9999
ATW	OUTAGAMIE COUNTY REGIONAL	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	1	1
C35	REEDSBURG MUNI	WI	LP	0	1	0	1	0	1
RHI	RHINELANDER-ONEIDA COUNTY	WI	LPV200	0	1	0	1	1	1
RPD	RICE LAKE REGIONAL CARL'S FIELD	WI	LPV	0	1	0	1	1	0.9999
RCX	RUSK COUNTY	WI	LPV	0	1	0	1	1	1
HYR	SAWYER COUNTY	WI	LPV	0	1	0	1	1	0.9999
SBM	SHEBOYGAN COUNTY MEMORIAL	WI	LPV	0	1	0	1	0	1
JVL	SOUTHERN WISCONSIN REGIONAL	WI	LPV200	0	1	0	1	0	1
CMY	SPARTA/FORT MC COY	WI	LPV	0	1	0	1	1	1
STE	STEVENS POINT MUNI	WI	LPV200	0	1	0	1	1	1
MDZ	TAYLOR COUNTY	WI	LPV	0	1	0	1	1	1
TKV	TOMAHAWK RGNL	WI	LP	0	1	0	1	1	1
LNR	TRI-COUNTY REGIONAL	WI	LPV	0	1	0	1	0	1

Airport Id	Airport Name	State/Prov	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
UES	WAUKESHA COUNTY	WI	LPV200	0	1	0	1	0	1
PCZ	WAUPACA MUNI	WI	LPV	0	1	0	1	0	1
ETB	WEST BEND MUNI	WI	LPV	0	1	0	1	0	1
OSH	WITTMAN RGNL	WI	LPV	0	1	0	1	0	1
MRB	EASTERN WV REGIONAL SHEPHERD	WV	LPV	0	1	0	1	0	1
LWB	GREENBRIER VALLEY	WV	LPV	0	1	0	1	0	1
I18	JACKSON COUNTY	WV	LPV200	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 REGIONAL	WV	LPV	0	1	0	1	0	1
MGW	MORGANTOWN MUNI WLB HART FIELD	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
SXL	SUMMERSVILLE	WV	LP	0	1	0	1	0	1
HTS	TRI-STATE/MILTON J. FERGUSON	WV	LPV	0	1	0	1	0	1
W22	UPSHUR COUNTY REGIONAL	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
7V6	CAMP GUERNSEY	WY	LP	0	1	1	1	2	0.9999
CYS	CHEYENNE RGNL JERRY OLSON FIELD	WY	LPV	0	1	0	1	1	0.9999
DGW	CONVERSE COUNTY	WY	LPV200	0	1	1	1	2	0.9998
EVW	EVANSTON-UINTA COUNTY BURNS FIELD	WY	LPV	0	1	0	1	0	1
GCC	GILLETTE-CAMPBELL COUNTY	WY	LPV	0	1	1	0.9999	2	0.9998
JAC	JACKSON HOLE	WY	LPV	0	1	1	1	2	0.9999
LAR	LARAMIE REGIONAL	WY	LPV	0	1	0	1	1	0.9999
ECS	MONDELL FIELD	WY	LPV	0	1	1	1	2	0.9998
CPR	NATRONA COUNTY INTL	WY	LPV	0	1	1	1	2	0.9999
RWL	RAWLINS MUNI/HARVEY FIELD	WY	LPV	0	1	0	1	1	0.9999
RIW	RIVERTON REGIONAL	WY	LPV200	0	1	1	1	2	0.9999
RKS	ROCK SPRINGS SWEETWATER COUNTY	WY	LPV200	0	1	0	1	1	1
SHR	SHERIDAN COUNTY	WY	LPV	0	1	1	0.9999	2	0.9998
SAA	SHIVELY FIELD	WY	LPV	0	1	0	1	1	0.9999
COD	YELLOWSTONE REGIONAL	WY	LPV	0	1	1	0.9999	2	0.9999
CYQH	WATSON LAKE	YT	LPV	1	1	1	0.9997	3	0.9995
CYXY	WHITEHORSE / ERIK NIELSEN INTL	YT	LPV	0	1	0	1	3	0.9995

Figure 8.1 WAAS LP Availability at Airports in the US and Canada with GPS RNAV Instrument Approach Procedures

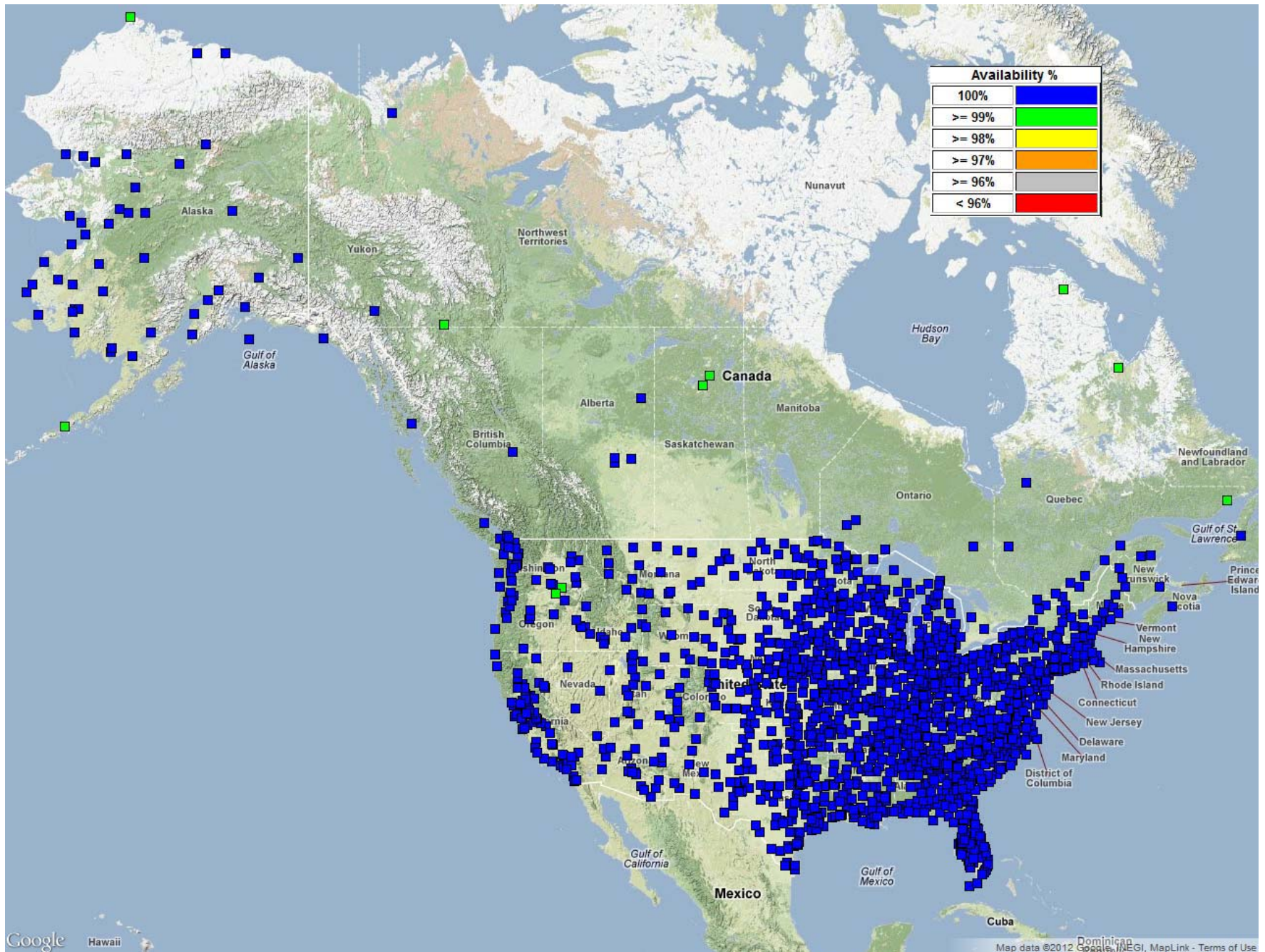




Figure 8.2 WAAS LP Outages at Airports in the US and Canada with GPS RNAV Instrument Approach Procedures

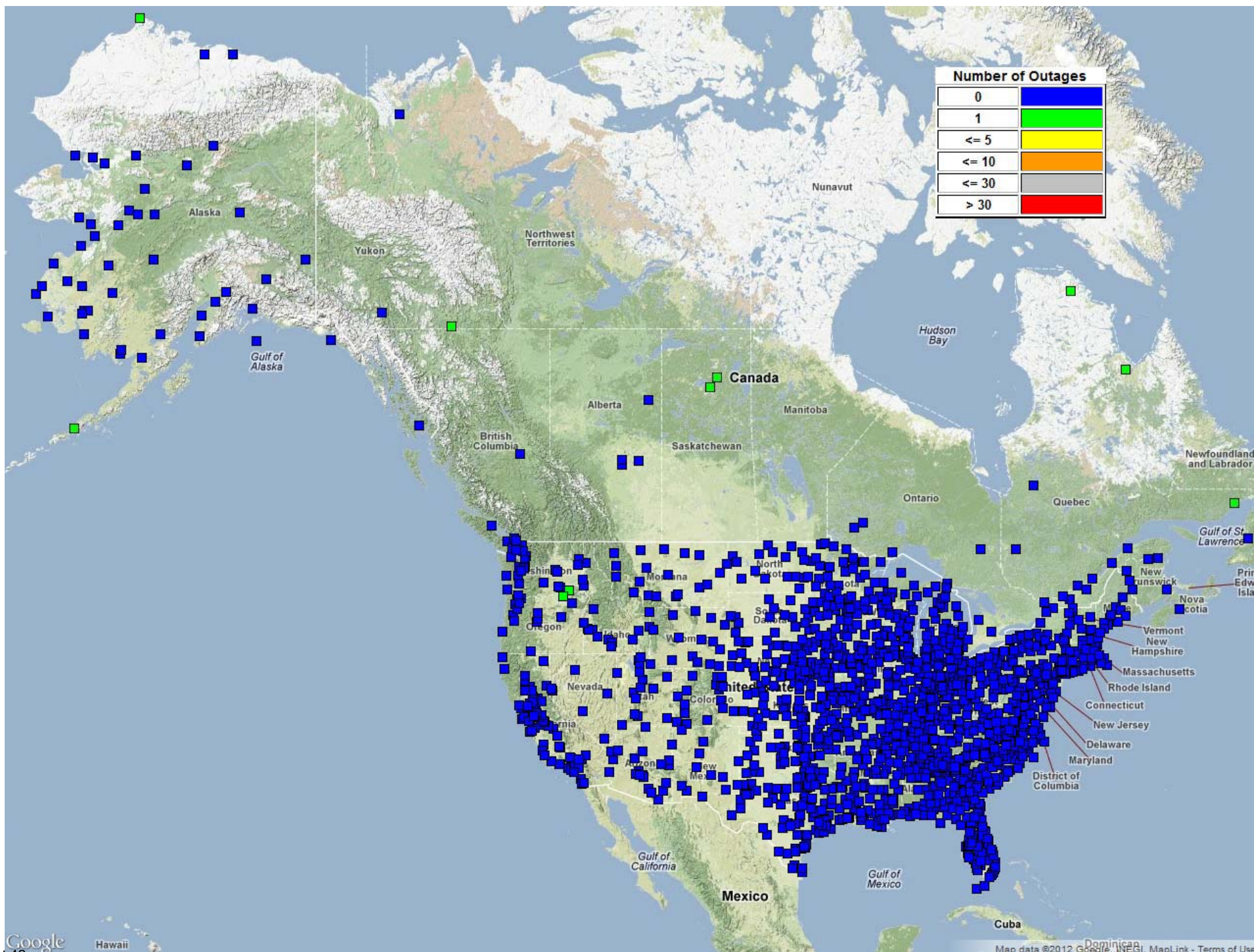


Figure 8.3 WAAS LPV Availability Airports in the US and Canada with GPS RNAV Instrument Approach Procedures

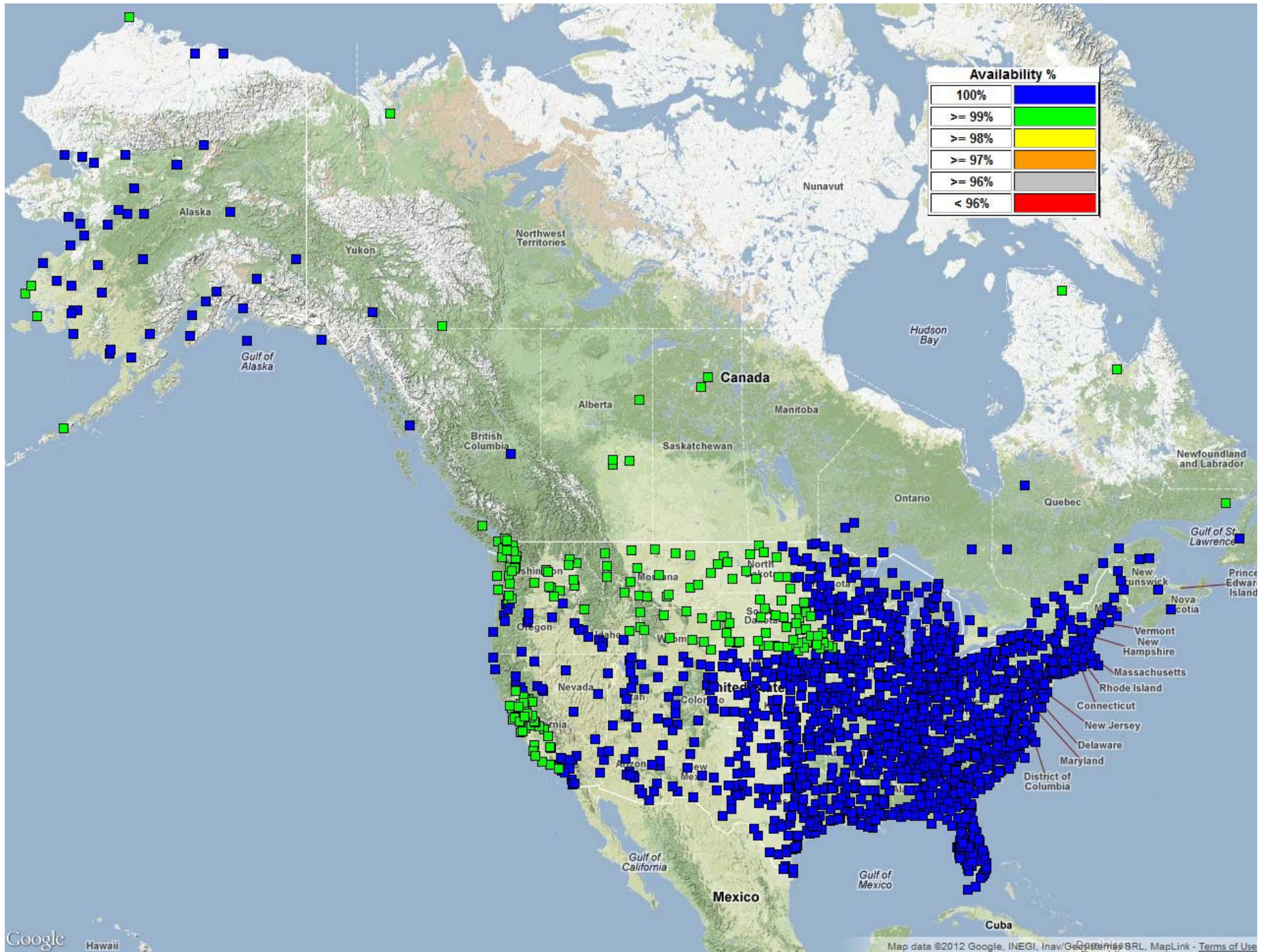


Figure 8.4 WAAS LPV Outages at Airports in the US and Canada with GPS RNAV Instrument Approach Procedures

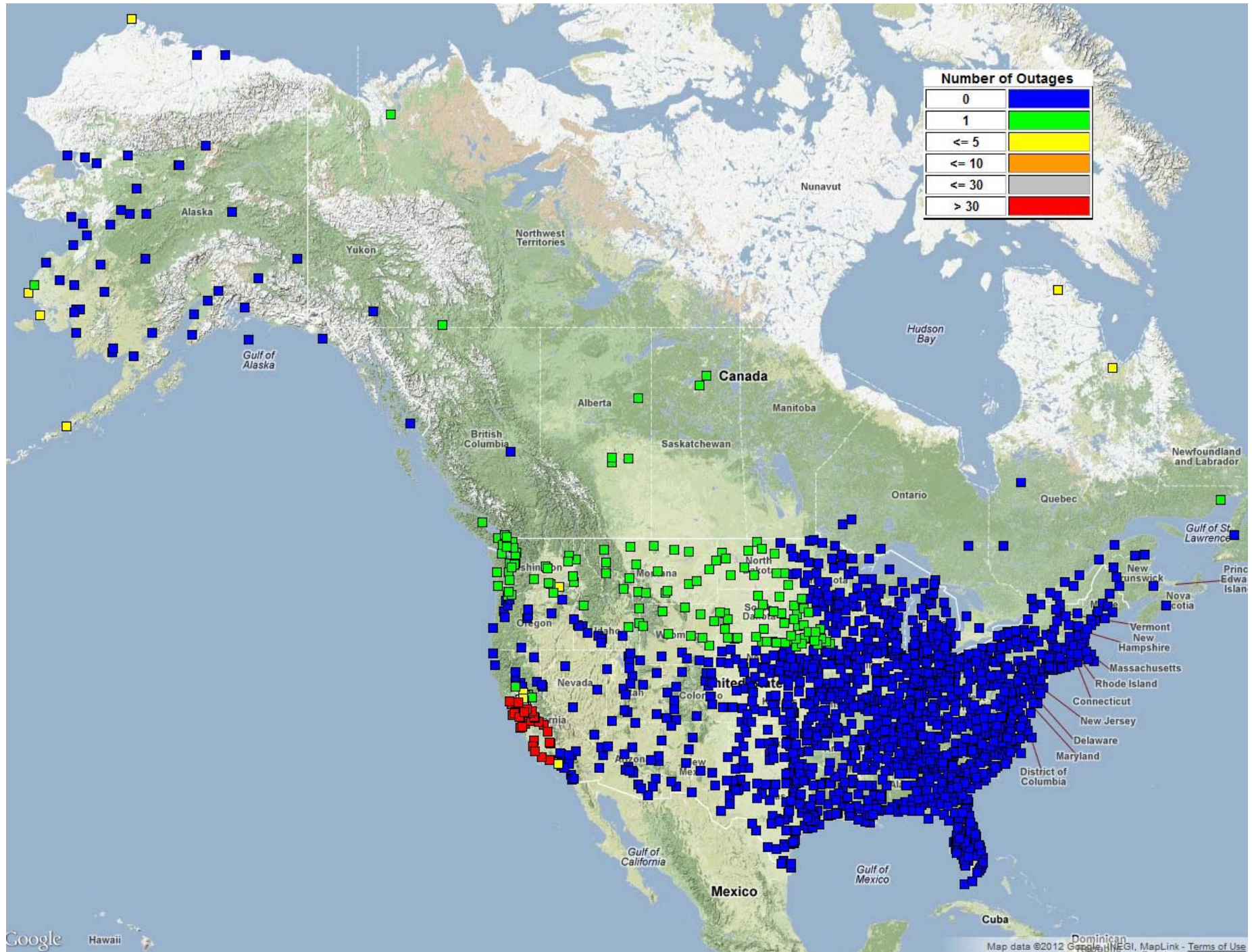


Figure 8.5 WAAS LPV 200 Availability at Airports in the US and Canada with GPS RNAV Instrument Approach Procedures October 2012

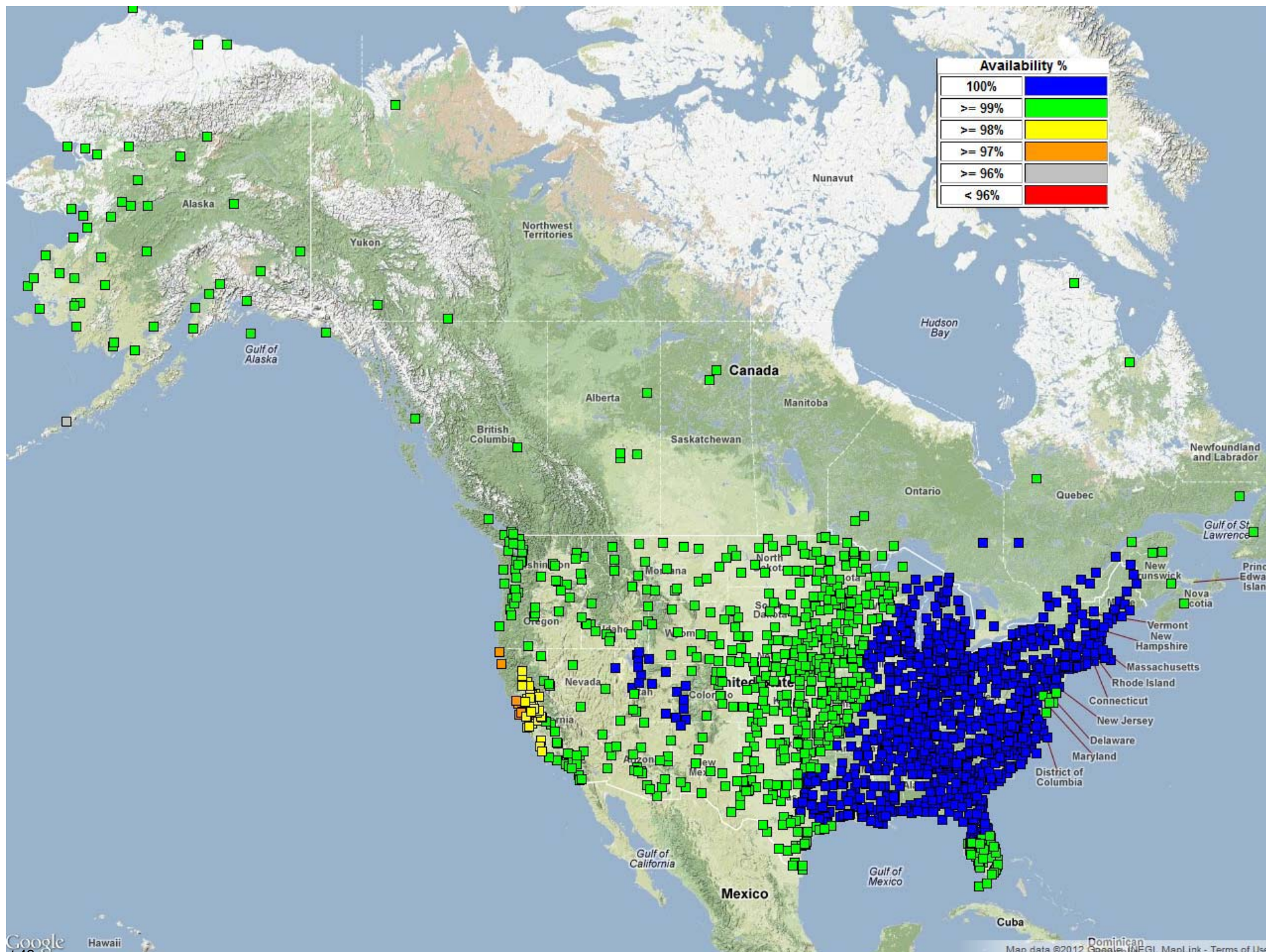
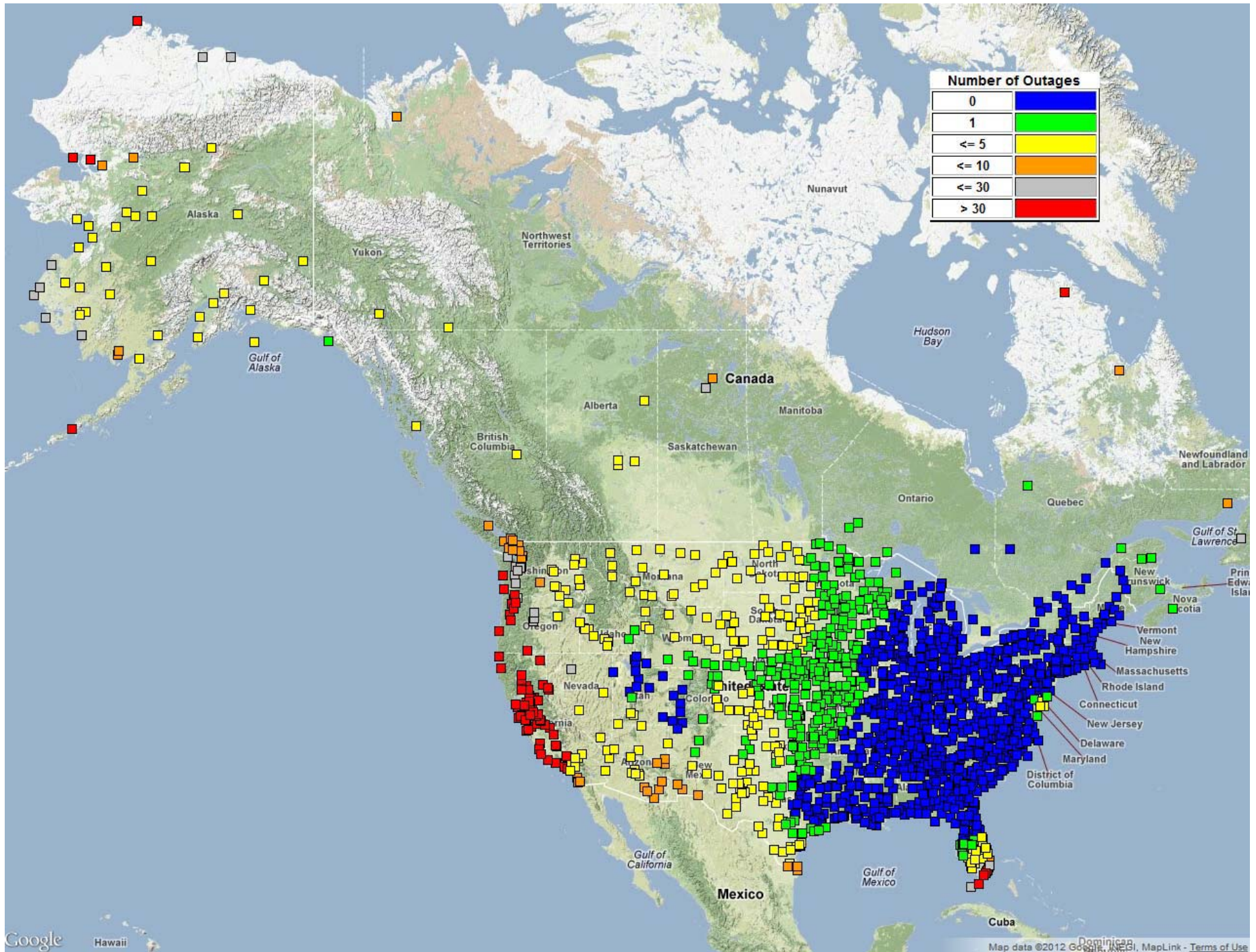


Figure 8.6 WAAS LPV 200 Outages at Airports in the US and Canada with GPS RNAV Instrument Approach Procedures



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

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

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

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

**Table 9.1 CNMP Bounding Statistics**

WAAS Site	WRE	Oct 11	Nov 11	Dec 11	Jan 12	Feb 12	Mar 12	Apr 12	May 12	Jun 12	Jul 12	Aug 12	Sep 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	Oct 11	Nov 11	Dec 11	Jan 12	Feb 12	Mar 12	Apr 12	May 12	Jun 12	Jul 12	Aug 12	Sep 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 9/28/12 to 23:59:30 on 9/29/12 for all of the WAAS receivers except the exceptions noted below.

Duplicate surveys were performed using both the National Geodetic Survey (NGS) Online Positioning User Service (OPUS) and the Canadian Spatial Reference System (CSRS) Precise Point Positioning (PPP) service. The IGS08 reference frame was selected for the OPUS solutions.

The following are the data set exceptions:

1. ZSU (San Juan, Puerto Rico) 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.

The overall RMS quality metrics reported by OPUS were all  $\leq 2.3$  cm. The CSRS surveys' RSSs of the reported ECEF sigmas were all less than equal to 0.9 cm. The OPUS IGS08 and CSRS surveys agreed to an average of 1.3 cm, with a standard deviation of 6 mm. The maximum of difference was 3.0 cm for ZLA2 (Los Angeles 2).

The OPUS IGS08 positions were compared to the positions in WAAS software release 3B which was installed starting in July 2012. With the exceptions of YWG (Winnipeg) and MMX (Mexico City), the OPUS IGS08 surveys agree with the release 3B positions to better or equal to 8.7 cm (maximum was YZR3, Goose Bay 3). The average difference excluding YWG and MMX was 4.3 cm. The YWG deltas were YWG1 = 12.8 cm, YWG2 = 15.0 cm, and YWG3 = 13.8 cm. The MMX deltas were MMX1 = 11.6 cm, MMX2 = 10.9 cm, and MMX3 = 12.3 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. A software release for antenna position updates is scheduled for this fall, pending the completion of the antenna reinstallation at San Juan.

Table 10.1 lists the WAAS antenna L1 phase center positions as of 9/29/12. The positions are the OPUS IGS08 estimated positions. The values for ZSU are the WAAS software release 3B positions.

Figure 10.1 to 10.3 show the RSS of the ECEF differences between the 9/29/12 OPUS survey antenna phase center locations and the locations in the WAAS release 3B software which was fielded starting July 2012. 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 10.4 to 10.6 show the OPUS surveys overall RMS quality indications.

Figure 10.7 to 10.9 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 10.10 to 10.12 show the RSS of the ECEF sigma's survey qualities reported by CSRS.

**Table 10-1 WAAS Antenna Positions (OPUS IGS08) as of 9/29/12**

WRE	X(m)	Y(m)	Z(m)	Latitude	Longitude	H(m)
BET1	-2965385.035	-972576.618	5543892.926	60.7879156833333	-161.8417249777780	52.202
BET2	-2965385.804	-972580.337	5543891.873	60.7878962694444	-161.8416645000000	52.205
BET3	-2965388.371	-972577.470	5543891.002	60.7878803472222	-161.8417292027780	52.199
BIL1	-1416445.868	-4223577.012	4550862.177	45.8037070583333	-108.5397229416670	1112.255
BIL2	-1416449.931	-4223574.882	4550862.901	45.8037162916667	-108.5397811972220	1112.267
BIL3	-1416441.562	-4223574.276	4550866.026	45.8037567555556	-108.5396816222220	1112.252
BRW1	-1886758.905	-809058.663	6018494.491	71.2827651055556	-156.7899245750000	15.580
BRW2	-1886756.318	-809055.919	6018495.679	71.2827978833333	-156.7899665055560	15.595
BRW3	-1886755.225	-809059.700	6018495.490	71.2827932194444	-156.7898574972220	15.572
CDB1	-3484099.044	-1084748.792	5213678.665	55.1923743611111	-162.7064045027780	49.723
CDB2	-3484105.680	-1084741.591	5213675.717	55.1923283055555	-162.7065434333330	49.698
CDB3	-3484111.952	-1084734.820	5213672.975	55.1922849250000	-162.7066742166670	49.716
FAI1	-2304741.796	-1448715.270	5748843.700	64.8096302083333	-147.8473408666670	149.941
FAI2	-2304741.317	-1448706.468	5748846.090	64.8096806416667	-147.8474923472220	149.938
FAI3	-2304732.788	-1448707.399	5748849.237	64.8097472416667	-147.8473802250000	149.923
HNL1	-5508637.109	-2234493.306	2303722.212	21.3129904138889	-157.9208275805560	24.683
HNL2	-5508656.284	-2234483.627	2303686.967	21.3126474777778	-157.9209834972220	25.037
HNL3	-5508647.690	-2234497.561	2303694.061	21.3127161166667	-157.9208279111110	25.075
JNU1	-2354254.878	-2388549.658	5407043.139	58.3625747638889	-134.5857067500000	16.119
JNU2	-2354252.795	-2388565.772	5407036.973	58.3624691833333	-134.5854881583330	16.122
JNU3	-2354239.580	-2388568.610	5407041.424	58.3625456000000	-134.5852933305560	16.106
MMD1	35070.416	-5959686.680	2264365.775	20.9319092916667	-89.6628407277778	29.134
MMD2	35065.492	-5959687.048	2264364.990	20.9319015750000	-89.6628880861111	29.171
MMD3	35065.153	-5959685.267	2264369.651	20.9319466472222	-89.6628912444445	29.170
MMX1	-948701.069	-5943935.520	2109212.684	19.4316536138889	-99.0683895000000	2235.503
MMX2	-948696.658	-5943935.346	2109215.102	19.4316768111111	-99.0683482972222	2235.490
MMX3	-948705.504	-5943935.699	2109210.255	19.4316302972222	-99.0684309194444	2235.521
MPR1	-1570142.218	-5759530.629	2238184.774	20.6790034027778	-105.2492031250000	11.006
MPR2	-1570139.394	-5759530.131	2238188.825	20.6790415361111	-105.2491782305560	11.292
MPR3	-1570143.501	-5759528.010	2238190.592	20.6790595500000	-105.2492216166670	11.012
MSD1	-1979519.746	-5523223.062	2493106.811	23.1604470111111	-109.7176482611110	104.309
MSD2	-1979521.309	-5523225.390	2493100.412	23.1603842333333	-109.7176549583330	104.292
MSD3	-1979525.760	-5523222.119	2493104.080	23.1604202861111	-109.7177066527780	104.284
MTP1	-254854.346	-6162909.189	1617805.117	14.7913663944444	-92.3679991055556	54.977
MTP2	-254850.728	-6162910.215	1617801.682	14.7913343583333	-92.3679651333333	54.947
MTP3	-254855.487	-6162910.324	1617800.154	14.7913203000000	-92.3680092583333	54.852

WRE	X(m)	Y(m)	Z(m)	Latitude	Longitude	H(m)
OTZ1	-2396056.010	-750356.162	5843502.540	66.8873323333333	-162.6113728277780	10.904
OTZ2	-2396052.839	-750354.335	5843504.070	66.8873671777778	-162.6113909888890	10.909
OTZ3	-2396052.820	-750358.275	5843503.580	66.8873558916667	-162.6113050583330	10.914
YFB1	1035381.469	-2634289.656	5696539.547	63.7314903694444	-68.5431831333333	10.043
YFB2	1035372.257	-2634296.069	5696538.200	63.7314641166667	-68.5434041694444	9.986
YFB3	1035366.175	-2634306.812	5696534.402	63.7313865027778	-68.5435983000000	10.020
YQX1	2430424.642	-3419640.389	4788223.834	48.9664900055556	-54.5976320472222	146.881
YQX2	2430432.610	-3419639.045	4788220.783	48.9664481138889	-54.5975327138889	146.891
YQX3	2430440.517	-3419637.686	4788217.786	48.9664068666667	-54.5974339444444	146.910
YWG1	-520164.351	-4083475.938	4855843.072	49.9005745638889	-97.2593972805556	222.122
YWG2	-520150.478	-4083468.881	4855850.471	49.9006776055556	-97.2592181444444	222.143
YWG3	-520152.354	-4083477.998	4855842.640	49.9005684333333	-97.2592280138889	222.131
YYR1	1885341.442	-3321428.364	5091171.666	53.3086470722222	-60.4194680944444	37.862
YYR2	1885344.404	-3321419.888	5091176.082	53.3087133555556	-60.4193666805556	37.872
YYR3	1885340.115	-3321413.066	5091182.089	53.3088036083333	-60.4193721166667	37.879
ZAB1	-1488636.838	-5003946.552	3654557.719	35.1735754194444	-106.5673496861110	1620.140
ZAB2	-1488631.503	-5003948.244	3654557.703	35.1735747805556	-106.5672882722220	1620.213
ZAB3	-1488632.274	-5003950.815	3654553.841	35.1735324000000	-106.5672883361110	1620.183
ZAN1	-2659536.635	-1549114.789	5567750.774	61.2292018722222	-149.7802504888890	80.709
ZAN2	-2659548.397	-1549110.837	5567746.295	61.2291182250000	-149.7804242666670	80.718
ZAN3	-2659541.349	-1549106.710	5567750.772	61.2292018083333	-149.7804246166670	80.711
ZAU1	138704.128	-4761244.156	4227763.945	41.7826580527778	-88.3313365472222	195.908
ZAU2	138704.397	-4761248.770	4227758.785	41.7825956972222	-88.3313349305556	195.915
ZAU3	138711.091	-4761248.516	4227758.867	41.7825966027778	-88.3312543555556	195.925
ZBW1	1490299.230	-4448983.176	4306010.511	42.7357205500000	-71.4804257666667	39.130
ZBW2	1490304.346	-4448981.169	4306010.870	42.7357246222222	-71.4803587444444	39.170
ZBW3	1490306.059	-4448984.794	4306006.549	42.7356717305556	-71.4803529694444	39.162
ZDC1	1069125.775	-4839598.997	4001126.518	39.1015959027778	-77.5427464194444	80.080
ZDC2	1069128.178	-4839603.634	4001120.313	39.1015238638889	-77.5427308583333	80.082
ZDC3	1069124.076	-4839602.723	4001122.507	39.1015492777778	-77.5427748888889	80.089
ZDV1	-1273628.604	-4711375.580	4094890.132	40.1873033972222	-105.1272242472220	1541.372
ZDV2	-1273622.901	-4711377.091	4094890.141	40.1873036305556	-105.1271549861110	1541.355
ZDV3	-1273624.902	-4711380.284	4094885.858	40.1872532277778	-105.1271678833330	1541.345
ZFW1	-659983.182	-5324060.802	3438276.490	32.8306497555556	-97.0664715777778	155.648
ZFW2	-659988.449	-5324063.354	3438271.495	32.8305963611111	-97.0665240500000	155.612
ZFW3	-659983.479	-5324063.871	3438271.696	32.8305983666667	-97.0664706944444	155.639
ZHU1	-513864.456	-5506451.720	3166720.499	29.9618964972222	-95.3314261000000	10.874
ZHU2	-513867.105	-5506455.132	3166714.332	29.9618318861111	-95.3314501416667	10.950
ZHU3	-513873.381	-5506457.760	3166708.740	29.9617737638889	-95.3315123500000	10.930

WRE	X(m)	Y(m)	Z(m)	Latitude	Longitude	H(m)
ZJX1	772646.456	-5434462.215	3237231.759	30.6988596555556	-81.9081850222222	2.168
ZJX2	772649.786	-5434463.762	3237228.357	30.6988240583333	-81.9081528833333	2.151
ZJX3	772645.725	-5434466.199	3237225.256	30.6987915277778	-81.9081984305556	2.151
ZKC1	-415247.508	-4954556.411	3982161.133	38.8801594083333	-94.7908337083333	305.925
ZKC2	-415231.119	-4954557.726	3982161.196	38.8801601805556	-94.7906442388889	305.919
ZKC3	-415237.228	-4954561.080	3982156.003	38.8801019861111	-94.7907111638889	305.659
ZLA1	-2474409.935	-4637294.679	3602183.551	34.6035182972222	-118.0838952138890	763.543
ZLA2	-2474404.652	-4637297.487	3602183.559	34.6035184083333	-118.0838299944440	763.539
ZLA3	-2474411.251	-4637297.154	3602179.568	34.6034744000000	-118.0838951694440	763.588
ZLC1	-1808273.205	-4486410.818	4145303.025	40.7860433777778	-111.9521774750000	1287.430
ZLC2	-1808274.604	-4486414.440	4145298.542	40.7859899833333	-111.9521768083330	1287.441
ZLC3	-1808270.404	-4486416.145	4145298.537	40.7859898833333	-111.9521231166670	1287.447
ZMA1	966042.317	-5662999.847	2761581.513	25.8246122055556	-80.3191896722222	-7.558
ZMA2	966029.339	-5662999.141	2761585.995	25.8246599388889	-80.3193160805556	-8.196
ZMA3	966037.424	-5662997.986	2761586.343	25.8246618972222	-80.3192346555555	-7.846
ZME1	4070.907	-5226189.327	3644028.445	35.0673941194445	-89.9553698250000	68.640
ZME2	4070.943	-5226186.761	3644032.552	35.0674377055556	-89.9553694083333	68.900
ZME3	4064.746	-5226186.632	3644032.707	35.0674395444444	-89.9554373472222	68.879
ZMP1	-249978.375	-4539297.516	4458955.064	44.6374632416667	-93.1520853916667	262.674
ZMP2	-249972.567	-4539297.855	4458955.068	44.6374631472222	-93.1520120666667	262.691
ZMP3	-249973.667	-4539302.134	4458950.590	44.6374070777778	-93.1520229444445	262.627
ZNY1	1406144.644	-4627343.998	4144322.070	40.7843285777778	-73.0971656333333	6.470
ZNY2	1406146.451	-4627347.035	4144317.292	40.7842758166667	-73.0971556111111	5.947
ZNY3	1406140.886	-4627348.681	4144317.321	40.7842762666667	-73.0972243638889	5.933
ZOA1	-2684436.849	-4293337.440	3865351.864	37.5430537916667	-122.0159473611110	-3.487
ZOA2	-2684433.848	-4293341.511	3865349.425	37.5430261500000	-122.0158941472220	-3.498
ZOA3	-2684438.230	-4293342.413	3865345.584	37.5429817555556	-122.0159307777780	-3.390
ZOB1	650770.199	-4754715.684	4187420.764	41.2971544611111	-82.2064445694444	223.701
ZOB2	650777.873	-4754714.858	4187422.781	41.2971667833333	-82.2063524583333	225.199
ZOB3	650776.209	-4754719.682	4187414.992	41.2970870361111	-82.2063799527778	223.480
ZSE1	-2308930.261	-3668169.679	4663526.501	47.2869934222222	-122.1883727027780	82.115
ZSE2	-2308934.655	-3668175.229	4663520.092	47.2869078083333	-122.1883827777780	82.180
ZSE3	-2308935.715	-3668179.503	4663516.146	47.2868560944444	-122.1883645388890	82.117
ZSU1	2462589.358	-5529371.530	2003724.621	18.4313386600000	-65.9934751900000	-28.594
ZSU2	2462587.270	-5529377.291	2003711.630	18.4312147100000	-65.9935154300000	-28.516
ZSU3	2462593.912	-5529375.081	2003709.572	18.4311951100000	-65.9934494900000	-28.518
ZTL1	529840.427	-5305248.831	3489342.861	33.3796885583333	-84.2967257777778	261.160
ZTL2	529846.798	-5305247.994	3489343.153	33.3796917472222	-84.2966567555556	261.154
ZTL3	529847.483	-5305251.431	3489337.917	33.3796350277778	-84.2966531027778	261.186

Figure 10-1 WAAS Release 3B Software Antenna Positions Deltas from 6/30/12 OPUS Survey

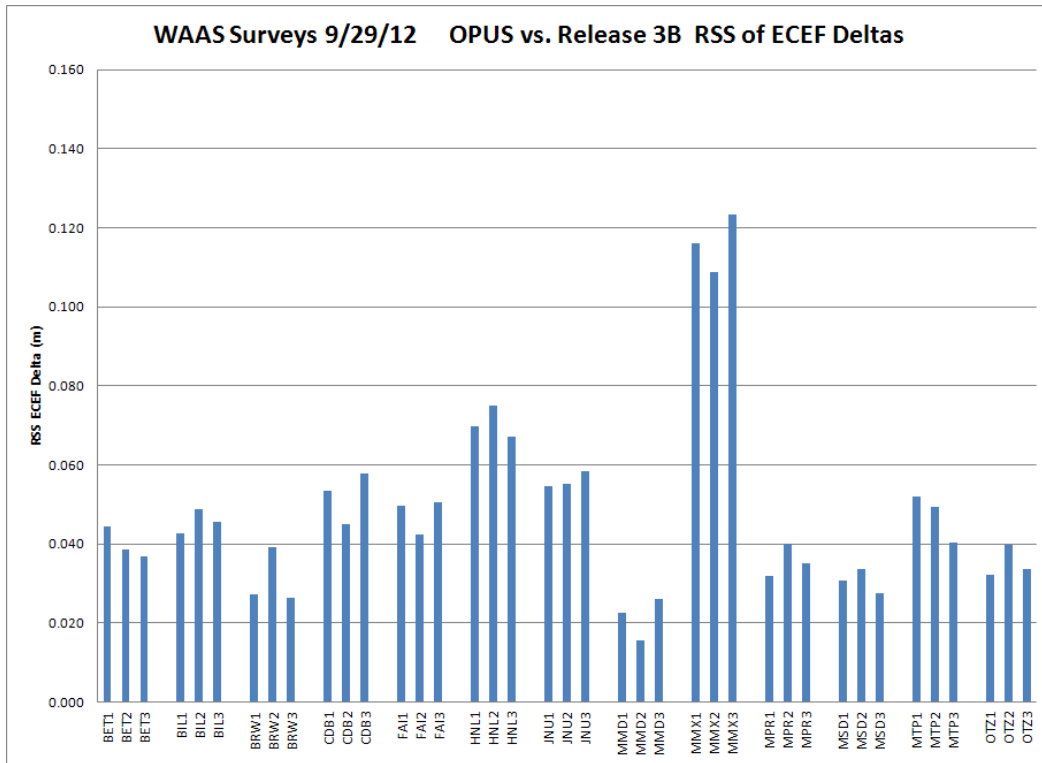


Figure 10-2 WAAS Release 3B Software Antenna Positions Deltas from 6/30/12 OPUS Survey

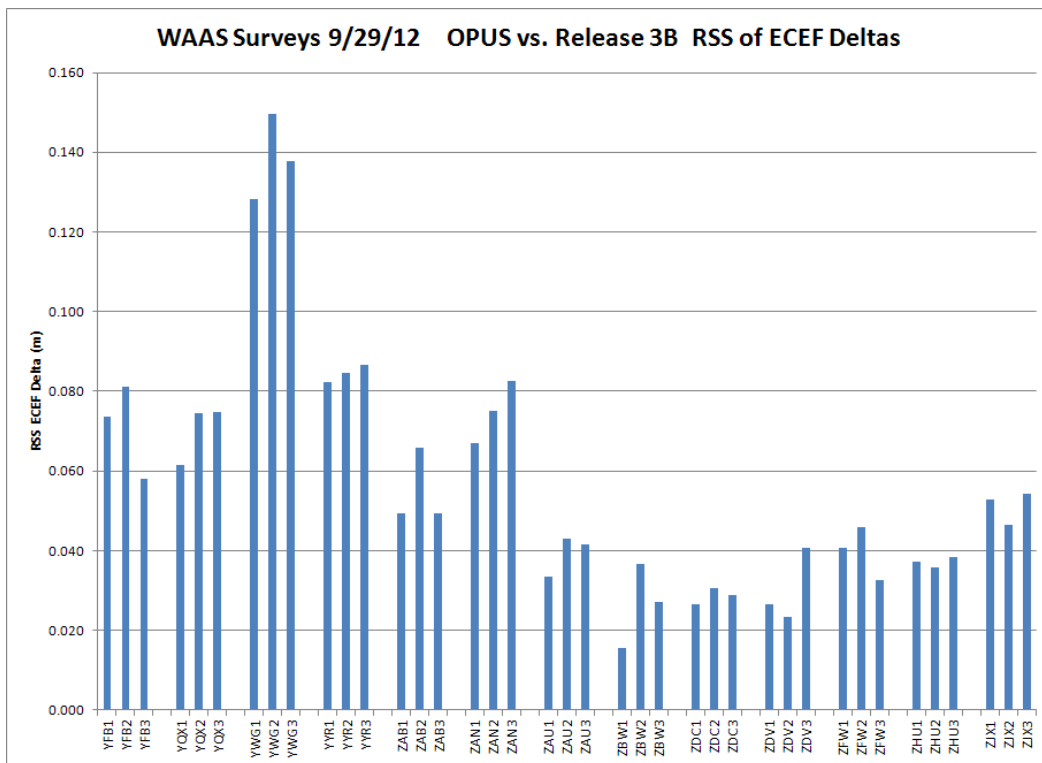


Figure 10-3 WAAS Release 3B Software Antenna Positions Deltas from 6/30/12 OPUS Survey

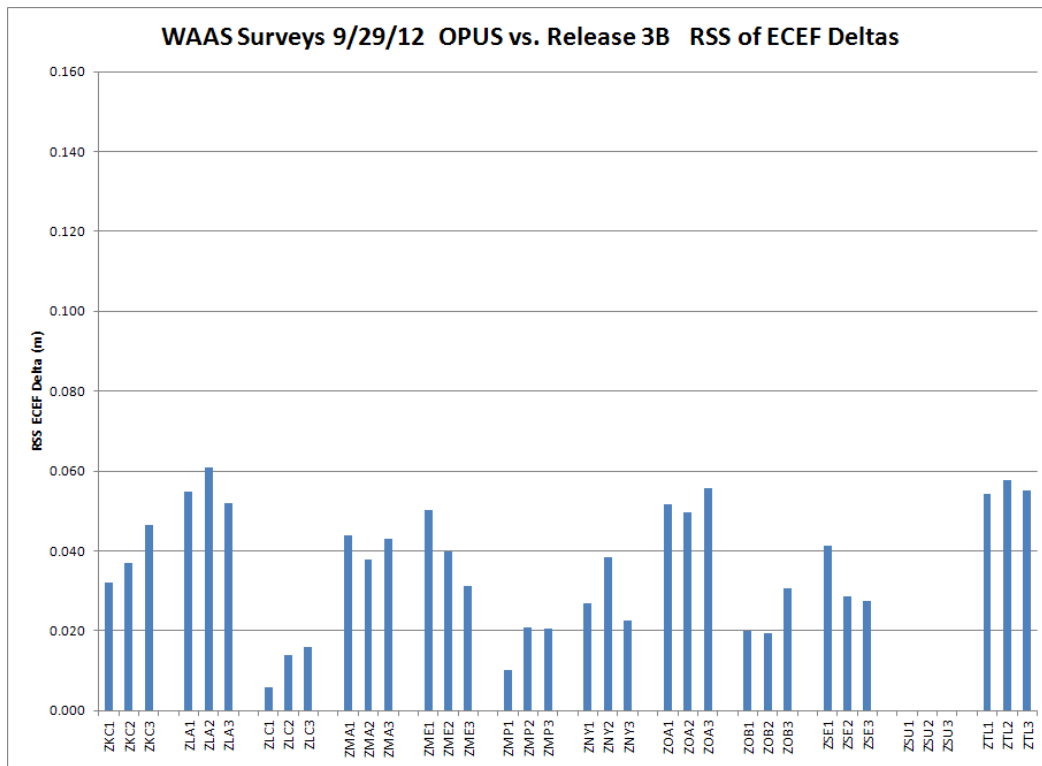


Figure 10-4 6/30/12 OPUS Survey Overall RMS Qualities

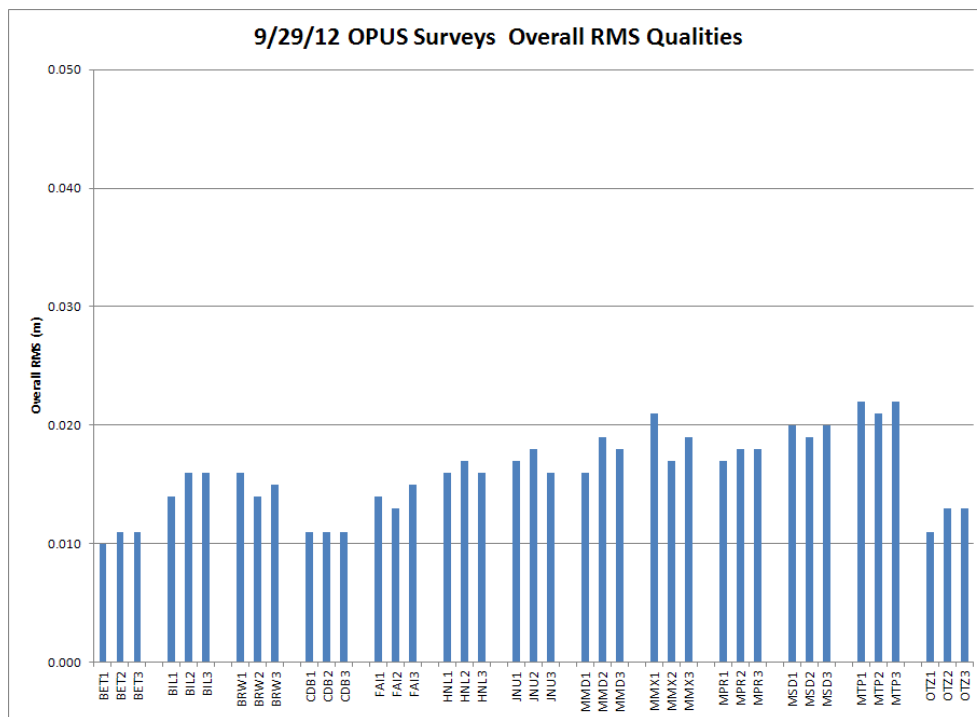


Figure 10-5 6/30/12 OPUS Survey Overall RMS Qualities

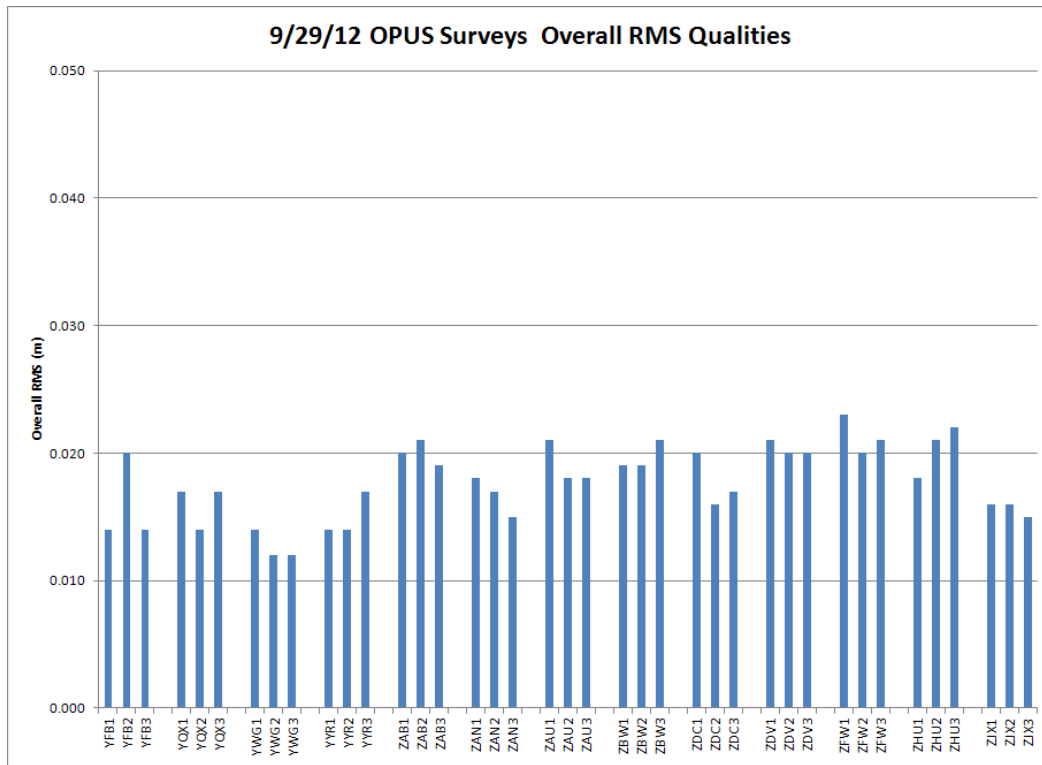


Figure 10-6 6/30/12 OPUS Survey Overall RMS Qualities

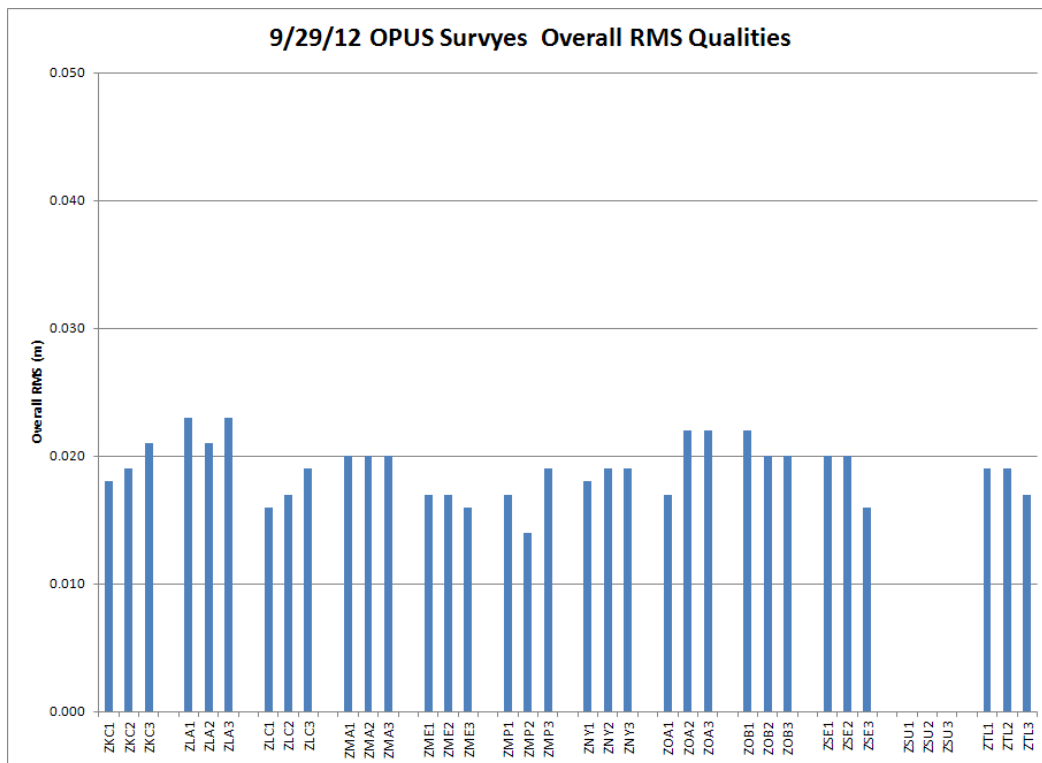


Figure 10-7 6/30/12 OPUS vs. CSRS RSS ECEF Deltas

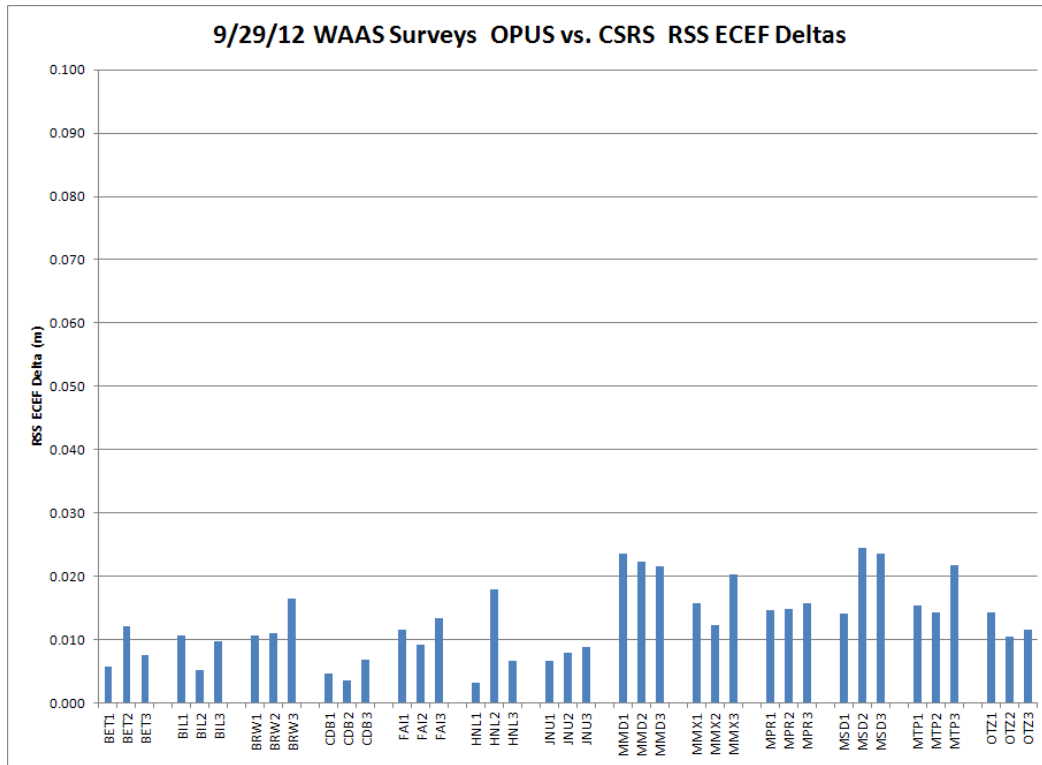
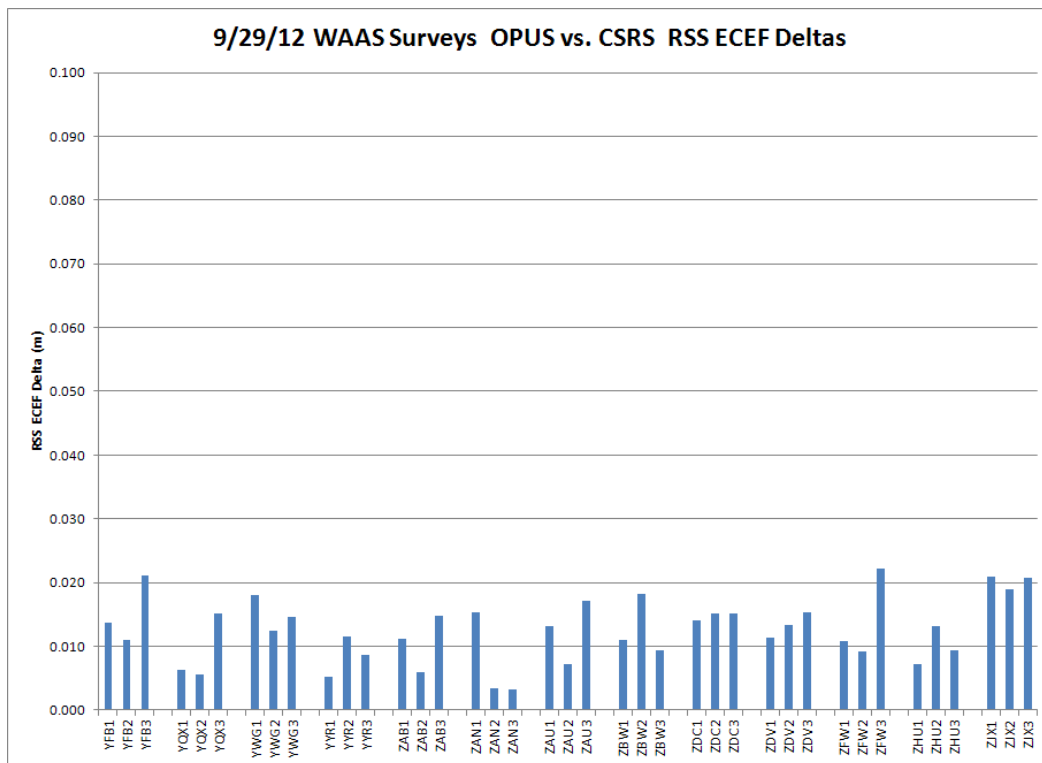
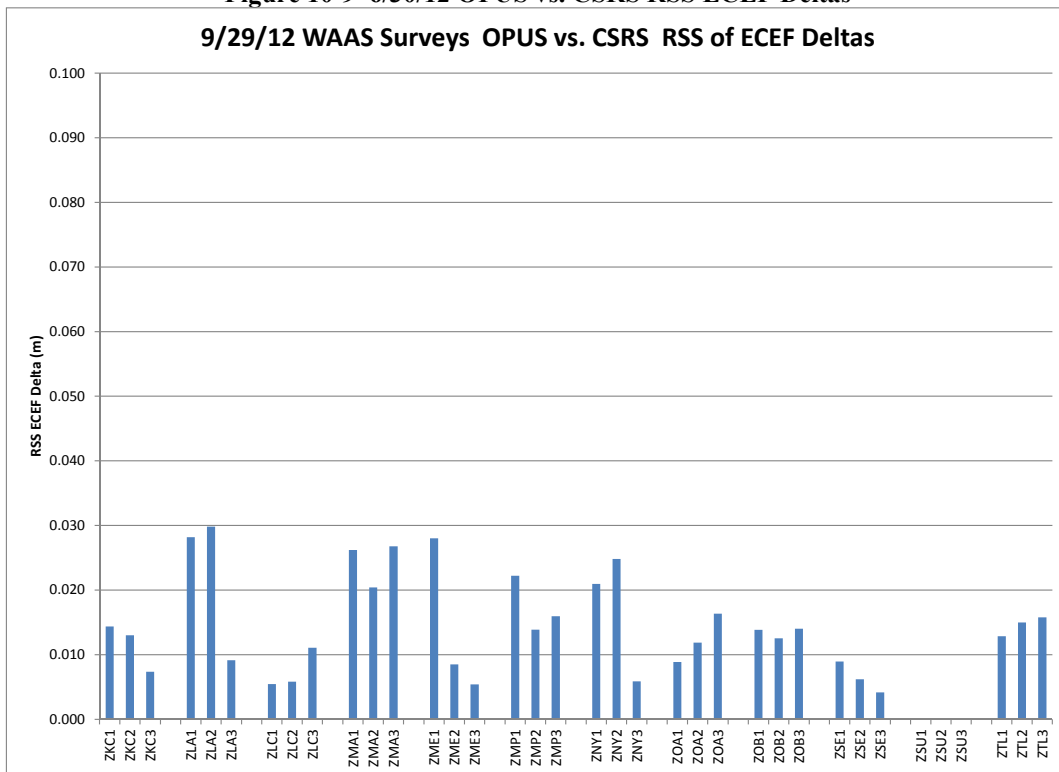


Figure 10-8 6/30/12 OPUS vs. CSRS RSS ECEF Deltas





**Figure 10-9 6/30/12 OPUS vs. CSRS RSS ECEF Deltas**  
**9/29/12 WAAS Surveys OPUS vs. CSRS RSS of ECEF Deltas**



**Figure 10-10 6/30/12 CSRS Survey Qualities**

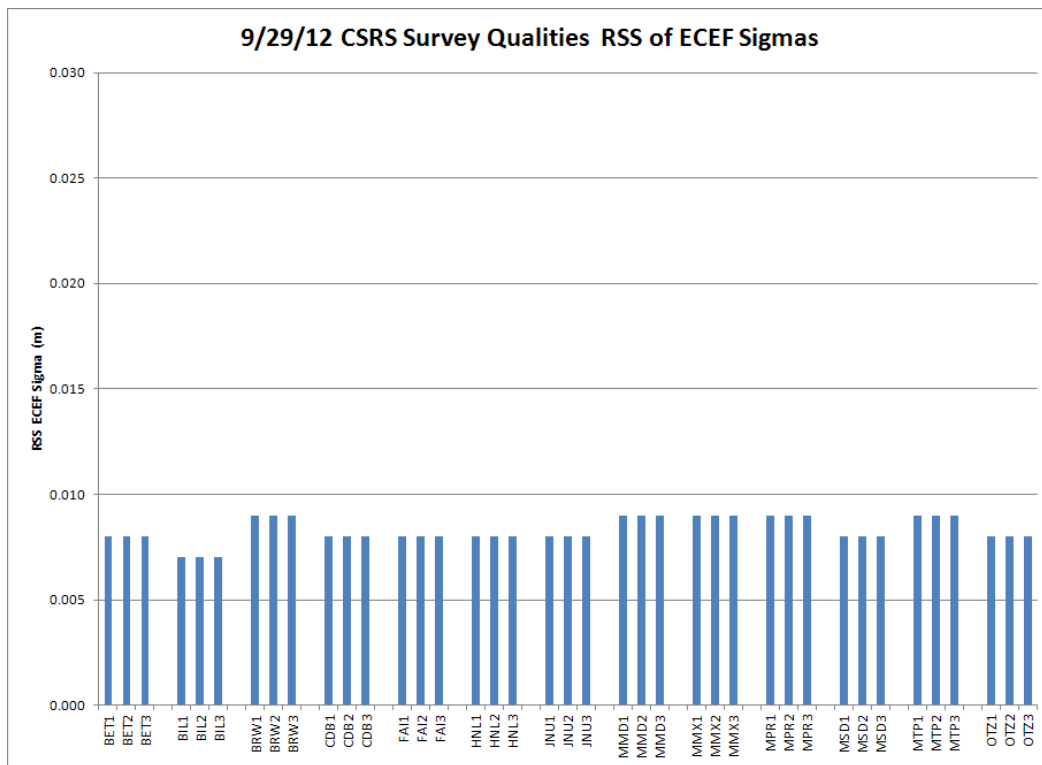


Figure 10-11 6/30/12 CSRS Survey Qualities

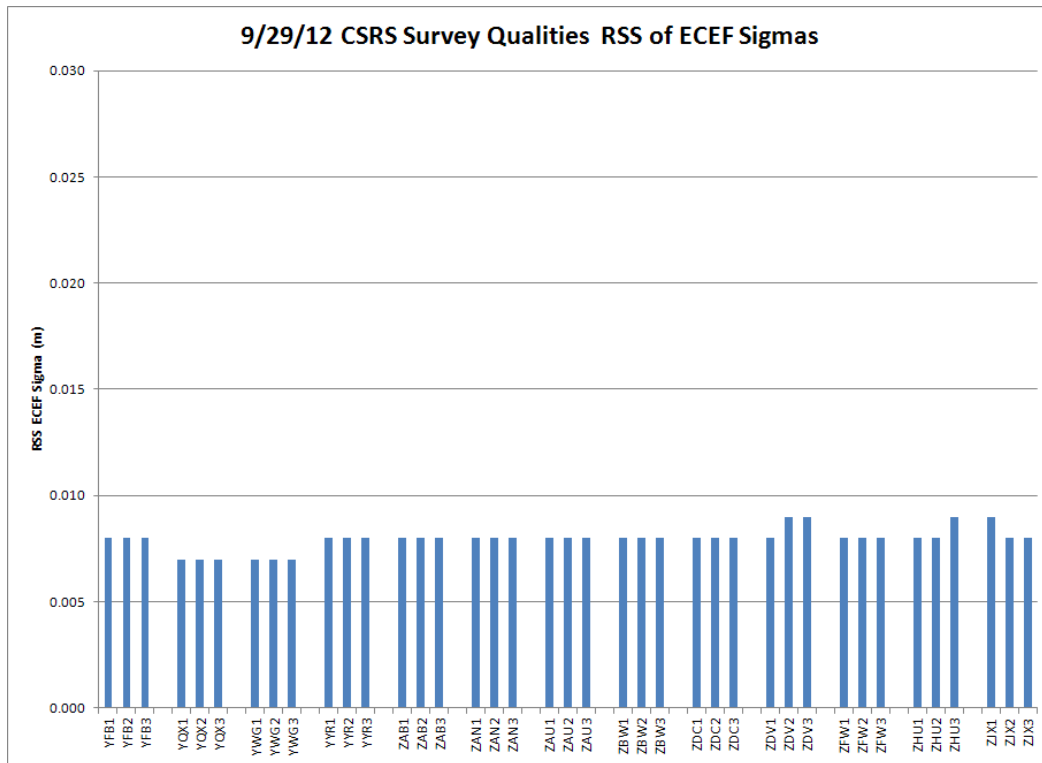
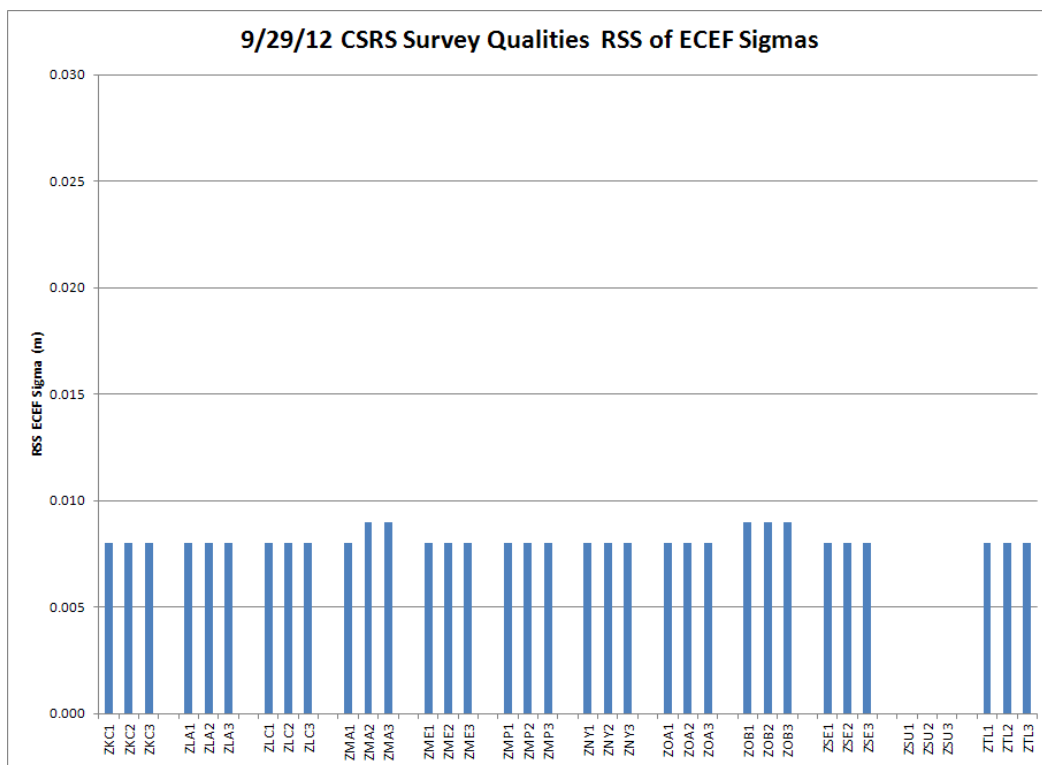


Figure 10-12 6/30/12 CSRS Survey Qualities



**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**

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

**11.2 Type Bias**

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

For this reporting period, geostationary satellites type biases are not evaluated. Table11.3 shows the rollup average for the quarter. Table 11.4 shows the rollup average since January 1, 2008. Figure 11.1 shows the daily average for the four detection metrics for the quarter.

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

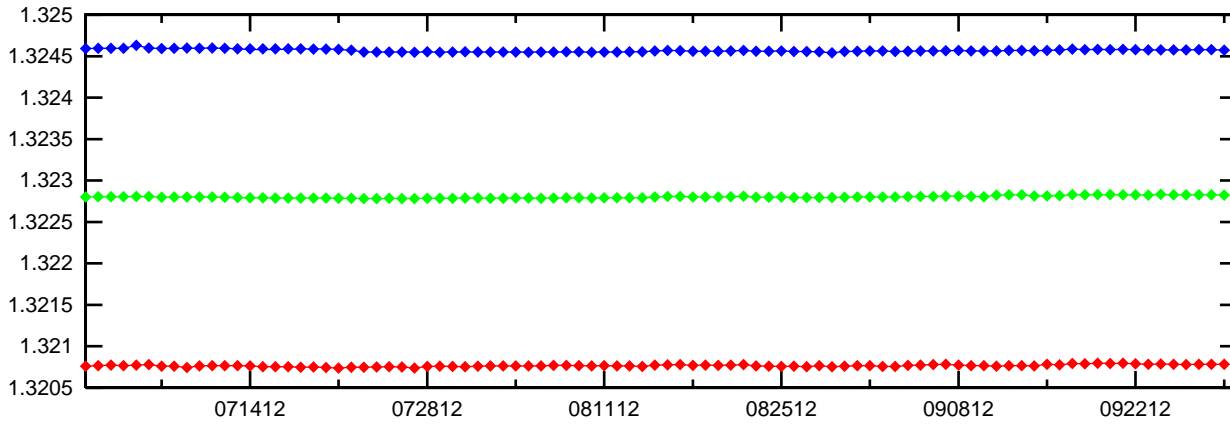
<b>Detection Metric</b>	<b>Type 0</b>	<b>Type 1</b>	<b>Type 2</b>
DM 1	1.320770	1.322800	1.324570
DM 2	0.240850	0.244071	0.247253
DM 3	0.973164	0.973697	0.974276
DM 4	-0.186286	-0.188086	-0.190107

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

<b>Detection Metric</b>	<b>Type 0</b>	<b>Type 1</b>	<b>Type 2</b>
DM 1	1.320940	1.322890	1.324610
DM 2	0.240846	0.244099	0.247280
DM 3	0.973175	0.973710	0.974277
DM 4	-0.186194	-0.188064	-0.190094

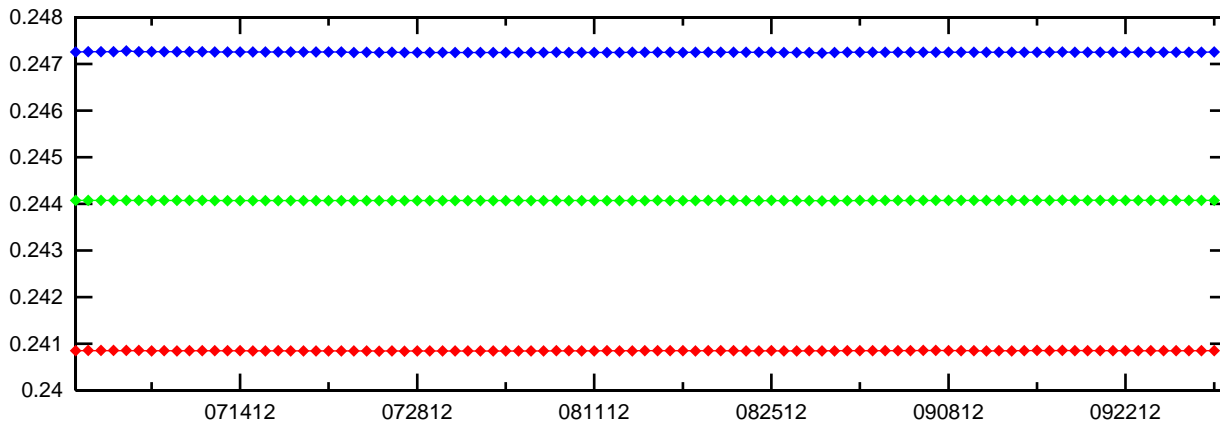
### Figure 11-1 PRN Type Bias Average Trend

Type Bias Daily Average, Detection Metrics 1



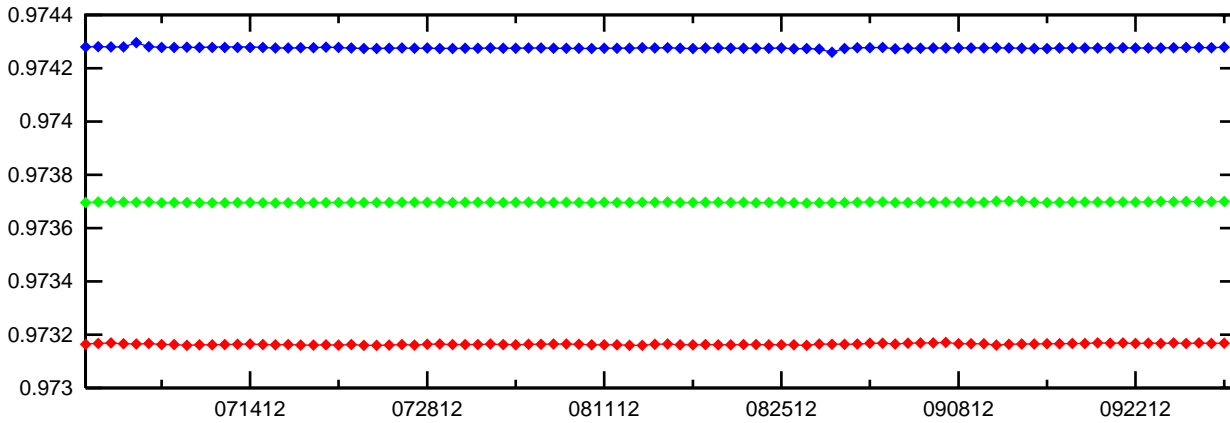
Type 0 —◆—  
Type 1 —◆—  
Type 2 —◆—

Type Bias Daily Average, Detection Metrics 2



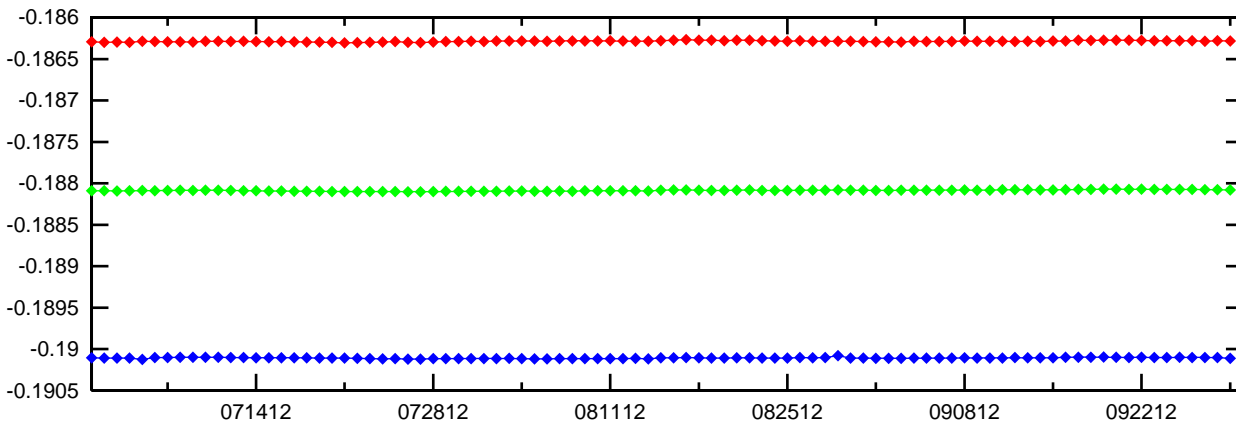
Type 0 —◆—  
Type 1 —◆—  
Type 2 —◆—

Type Bias Daily Average, Detection Metrics 3



Type 0 —◆—  
Type 1 —◆—  
Type 2 —◆—

Type Bias Daily Average, Detection Metrics 4



Type 0 —◆—  
Type 1 —◆—  
Type 2 —◆—

### 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 0.009787. The maximum average for DM2 is PRN 25 at 0.0002214. The maximum average for DM3 is PRN 10 at 0.0002709 and the maximum average for DM4 is PRN 23 at 0.0004278.

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. On the days of satellite maintenance, partial data resulted in a slightly varied PRN bias daily average compared to full day data average. PRN 24 was offline for the entire reporting period. PRN 30 was offline due to planned maintenance from 9/11/12 to 9/15/12.

Table 11-4 PRN Bias Average for the Quarter

PRN	SVN	DM1	DM2	DM3	DM4
1	63	0.0002256	0.0001427	0.0000851	0.0001008
2	61	0.0002418	0.0000460	0.0000303	0.0001033
3	33	0.0001826	0.0000681	0.0001058	0.0003444
4	34	0.0001696	0.0000464	0.0000596	0.0001184
5	50	0.0001244	0.0001207	0.0000569	0.0001109
6	36	0.0001665	0.0000609	0.0000600	0.0001250
7	34	0.0001191	0.0000784	0.0000353	0.0001325
8	38	0.0001563	0.0001258	0.0000468	0.0001070
9	39	0.0001581	0.0000522	0.0000634	0.0000982
10	40	0.0007452	0.0000476	0.0002834	0.0001063
11	46	0.0009493	0.0001930	0.0000609	0.0002608
12	58	0.0001376	0.0000769	0.0000877	0.0000761
13	43	0.0005833	0.0000523	0.0000787	0.0001708
14	41	0.0007104	0.0001211	0.0001197	0.0001417
15	55	0.0001340	0.0000680	0.0000297	0.0001501
16	56	0.0001337	0.0000703	0.0001249	0.0003215
17	53	0.0001751	0.0000766	0.0000444	0.0001414
18	54	0.0006947	0.0001143	0.0000471	0.0002371
19	59	0.0004456	0.0001499	0.0000462	0.0000879
20	51	0.0001250	0.0000469	0.0000364	0.0001458
21	45	0.0003528	0.0001067	0.0001630	0.0001200
22	47	0.0003461	0.0000551	0.0000903	0.0003205
23	60	0.0010561	0.0001651	0.0000391	0.0004577
24	24				
25	62	0.0003042	0.0001892	0.0000772	0.0001125
26	26	0.0002180	0.0000730	0.0001382	0.0001000
27	27	0.0004131	0.0000981	0.0000588	0.0003199
28	44	0.0002844	0.0000508	0.0000380	0.0000969
29	57	0.0002897	0.0000611	0.0000939	0.0003113
30	30	0.0003629	0.0000651	0.0001285	0.0001153
31	52	0.0003850	0.0001484	0.0000385	0.0002364
32	23	0.0001948	0.0000555	0.0000985	0.0000835

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

PRN	SVN	DM1	DM2	DM3	DM4
1	32	0.0002174	0.0001265	0.0000840	0.0000965
2	61	0.0002002	0.0000537	0.0000256	0.0000949
3	33	0.0002095	0.0000601	0.0000940	0.0003519
4	34	0.0002178	0.0000447	0.0000693	0.0001285
5	35	0.0004283	0.0000655	0.0001190	0.0001572
5	50	0.0001389	0.0001270	0.0000606	0.0001013
6	36	0.0001617	0.0000586	0.0000497	0.0001260
7	34	0.0001297	0.0000868	0.0000348	0.0001247
8	38	0.0001626	0.0001288	0.0000437	0.0001015
9	39	0.0002038	0.0000528	0.0000670	0.0001090
10	40	0.0006841	0.0000610	0.0002709	0.0000974
11	46	0.0009116	0.0001851	0.0000571	0.0002442
12	58	0.0002037	0.0000838	0.0001003	0.0000796
13	43	0.0005303	0.0000544	0.0000654	0.0001597
14	41	0.0006613	0.0001201	0.0001142	0.0001271
15	55	0.0001264	0.0000662	0.0000280	0.0001369
16	56	0.0001575	0.0000727	0.0001131	0.0003390
17	53	0.0001508	0.0000740	0.0000388	0.0001289
18	54	0.0006295	0.0001059	0.0000428	0.0002192
19	59	0.0003961	0.0001398	0.0000379	0.0000854
20	51	0.0001488	0.0000477	0.0000384	0.0001388
21	45	0.0005585	0.0001686	0.0001932	0.0000954
22	47	0.0002462	0.0000783	0.0000962	0.0002005
23	60	0.0009787	0.0001498	0.0000363	0.0004278
24	24	0.0002973	0.0000492	0.0000356	0.0001077
25	25	0.0001583	0.0001133	0.0000814	0.0003055
25	62	0.0003550	0.0002214	0.0000704	0.0001217
26	26	0.0002593	0.0000843	0.0001484	0.0000916
27	27	0.0004675	0.0000851	0.0000626	0.0003296
28	44	0.0002543	0.0000529	0.0000339	0.0000925
29	57	0.0002408	0.0000640	0.0001024	0.0002931
30	30	0.0003181	0.0000875	0.0000531	0.0001165
31	52	0.0004419	0.0001536	0.0000384	0.0002509
32	23	0.0002575	0.0000510	0.0001060	0.0000948



Figure 11-2 PRN Bias Average for the Quarter

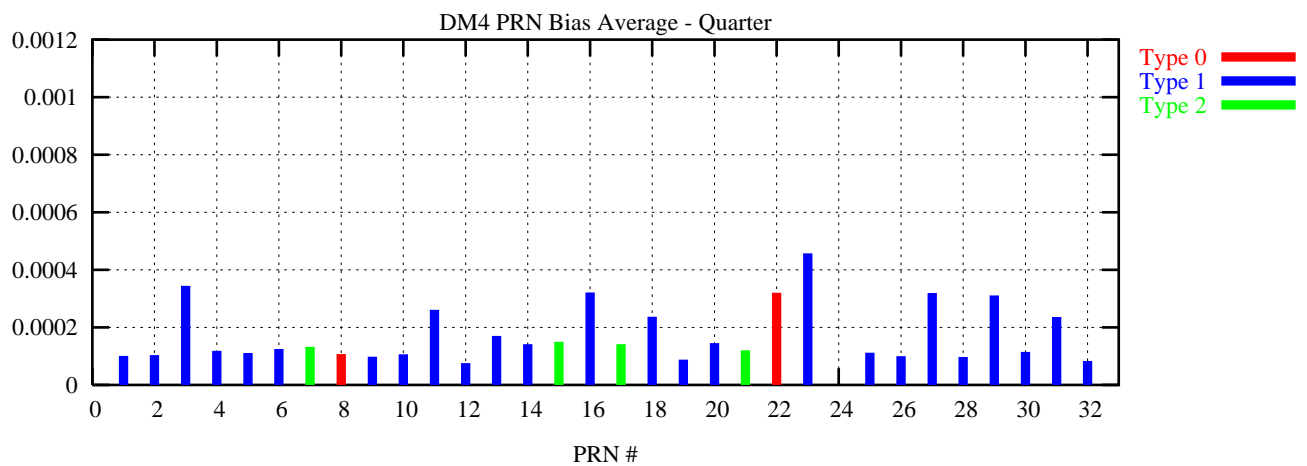
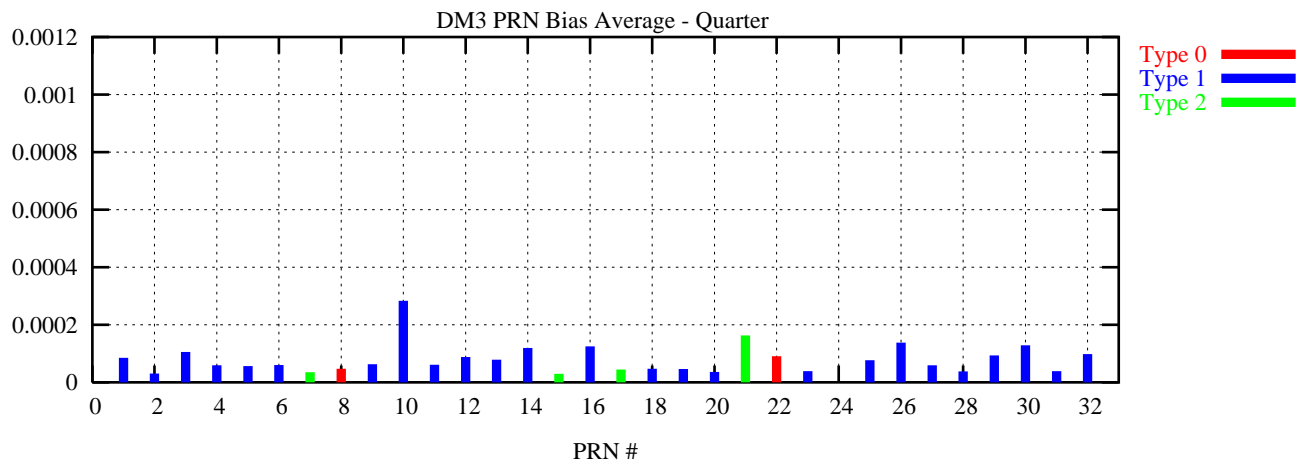
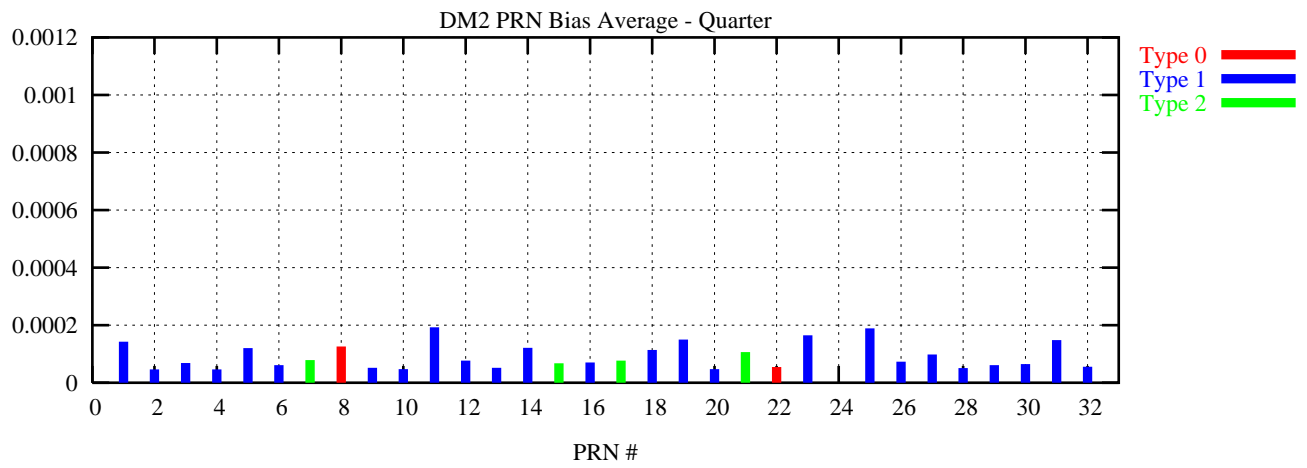
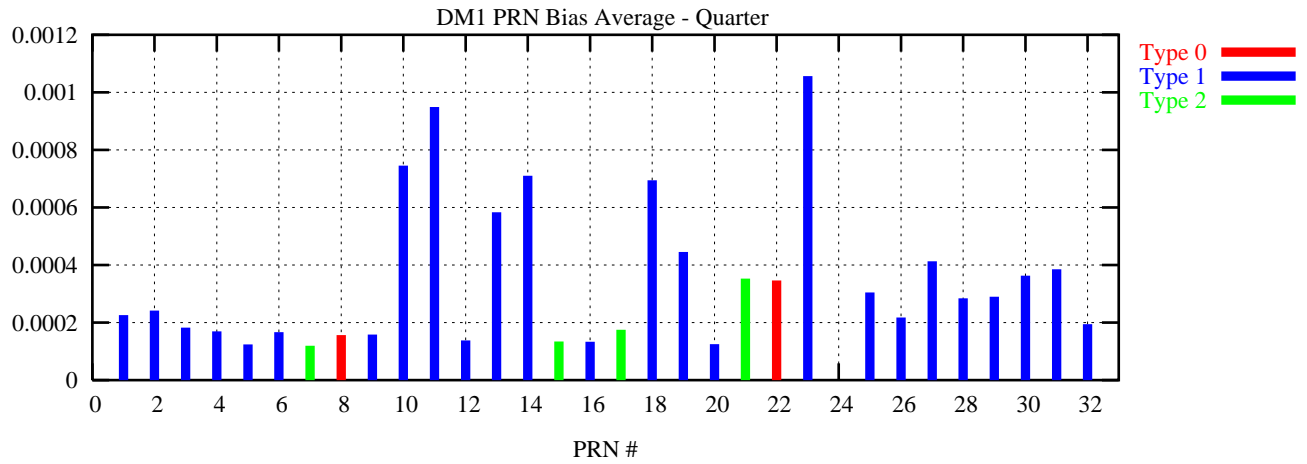
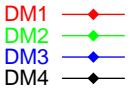
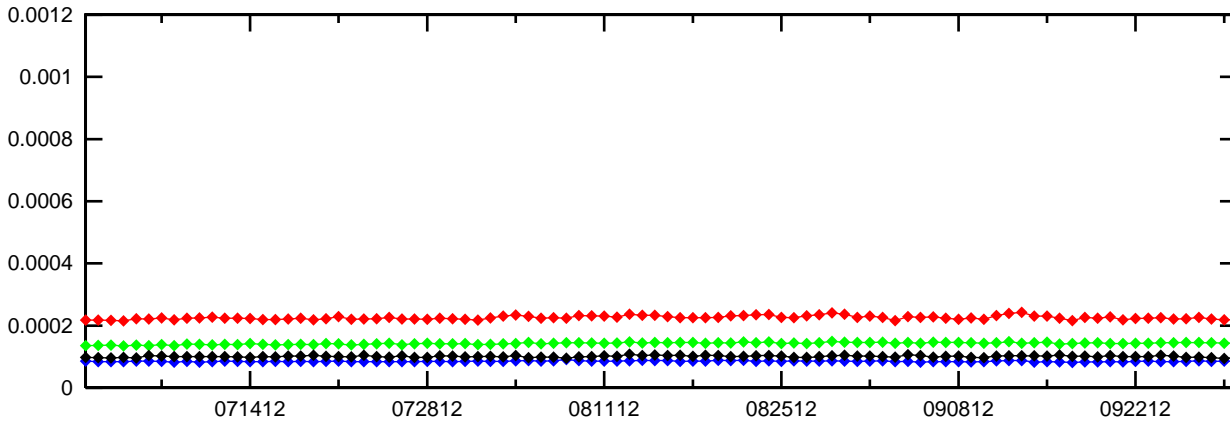
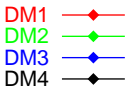
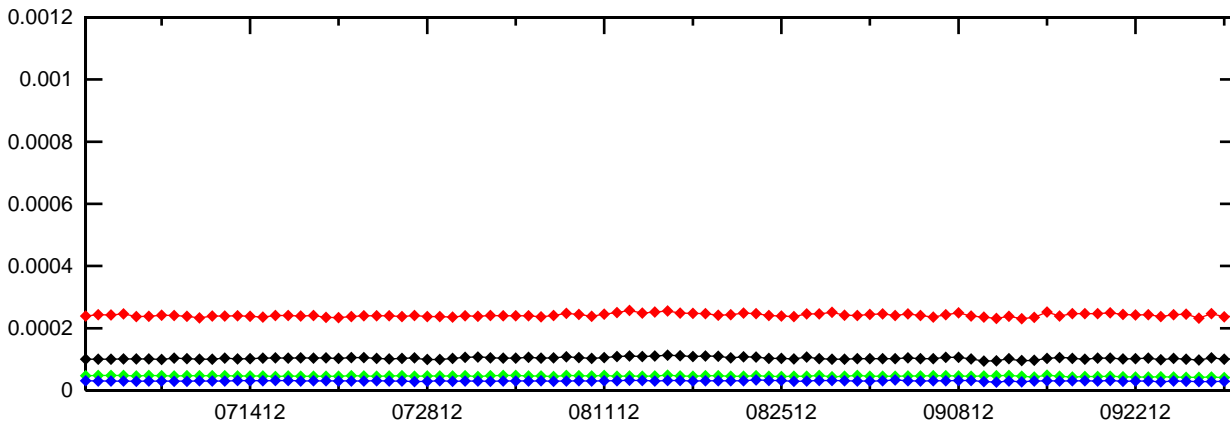


Figure 11-3 PRN Bias Average Trend (PRN 1 - PRN 4)

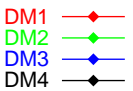
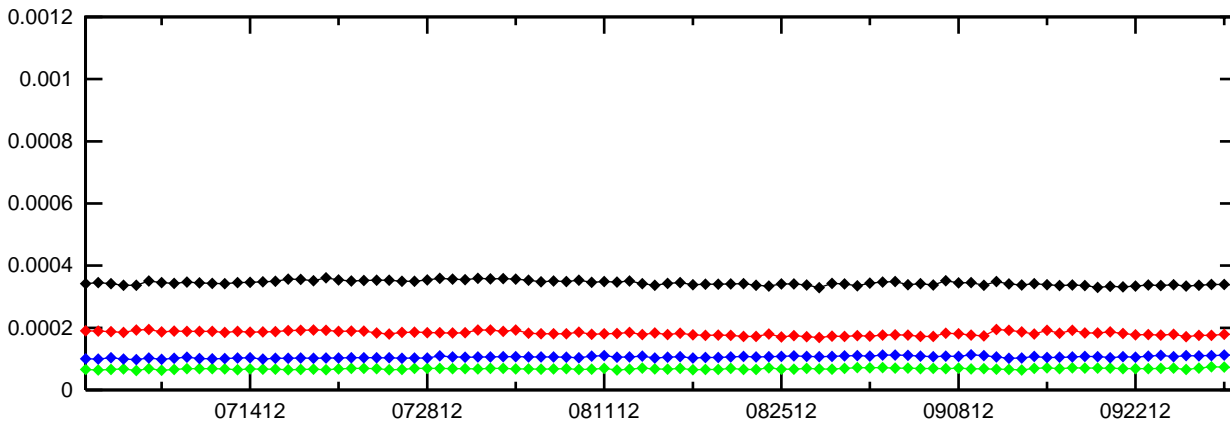
PRN 1 Bias (Daily average)



PRN 2 Bias (Daily average)



PRN 3 Bias (Daily average)



PRN 4 Bias (Daily average)

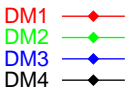
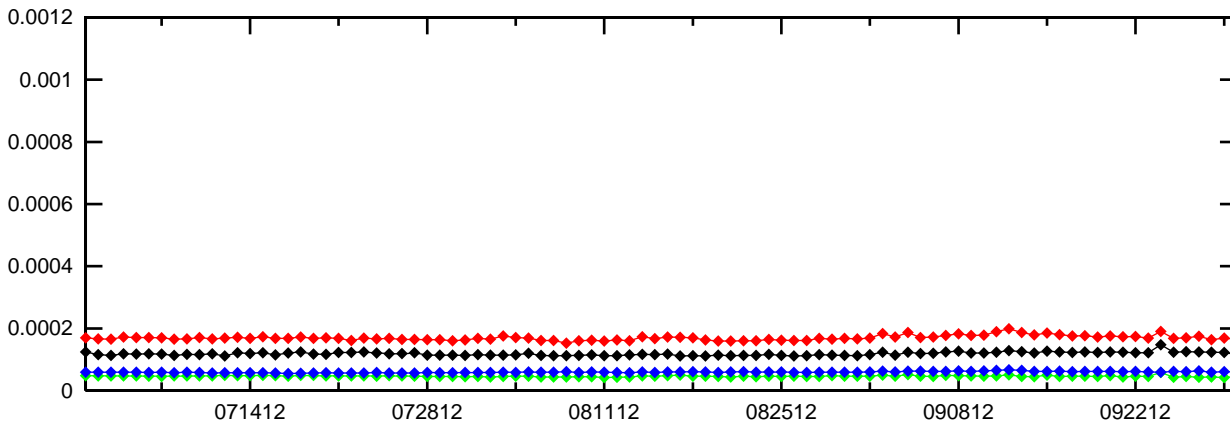
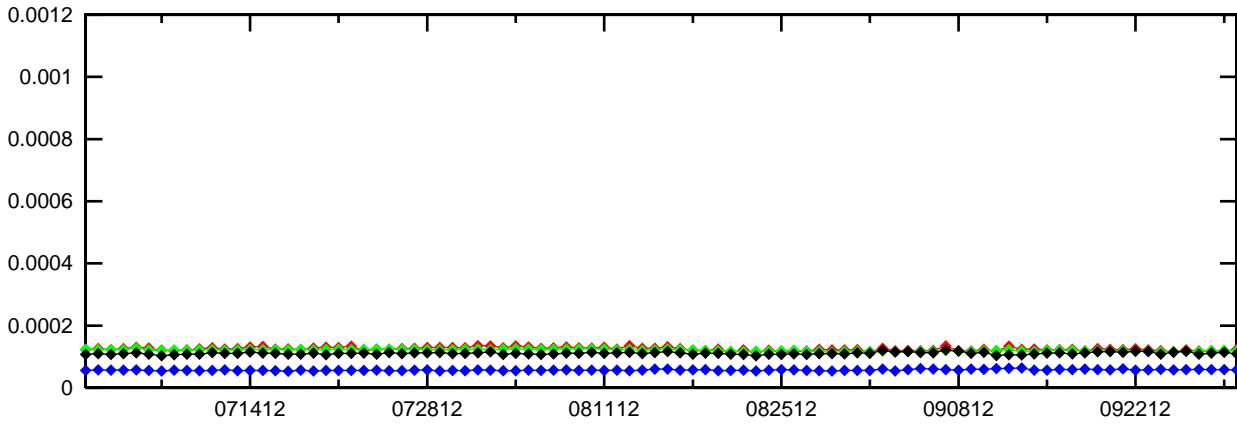


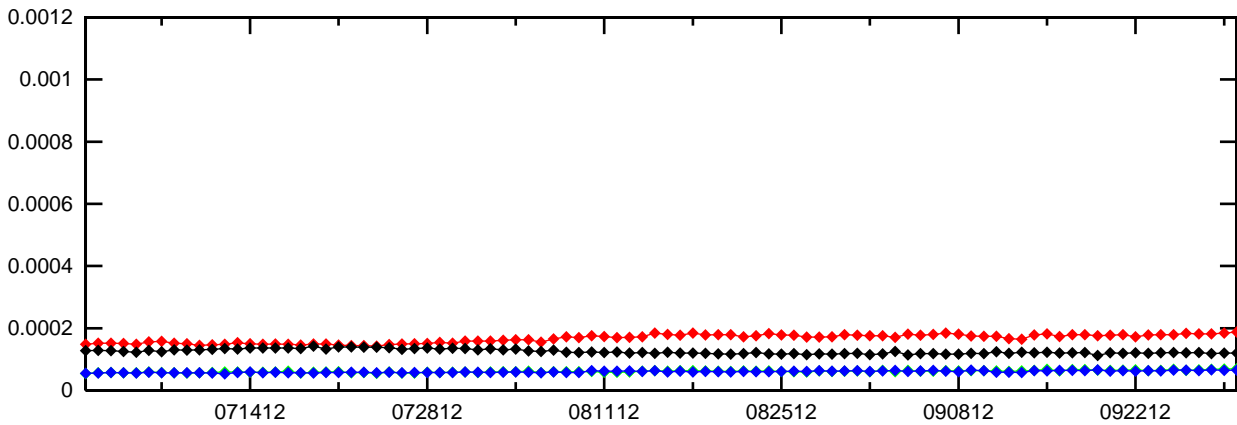
Figure 11-4 PRN Bias Average Trend (PRN 5 - PRN 8)

PRN 5 Bias (Daily average)



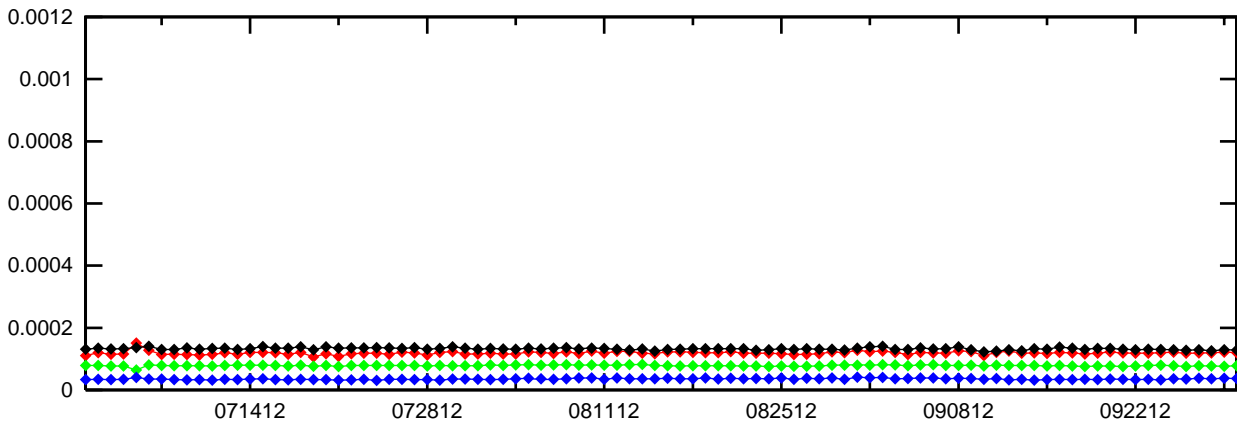
DM1 —◆—  
DM2 —◆—  
DM3 —◆—  
DM4 —◆—

PRN 6 Bias (Daily average)



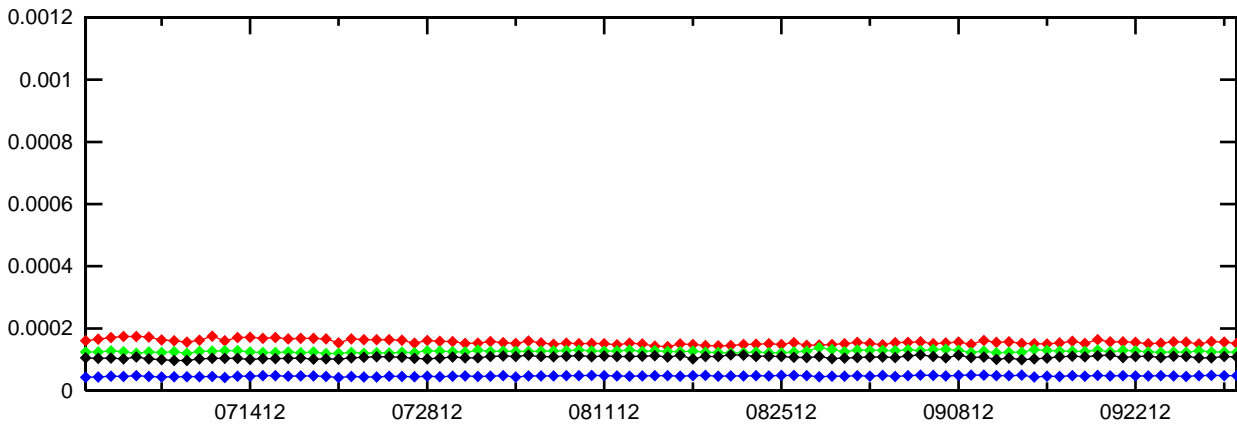
DM1 —◆—  
DM2 —◆—  
DM3 —◆—  
DM4 —◆—

PRN 7 Bias (Daily average)



DM1 —◆—  
DM2 —◆—  
DM3 —◆—  
DM4 —◆—

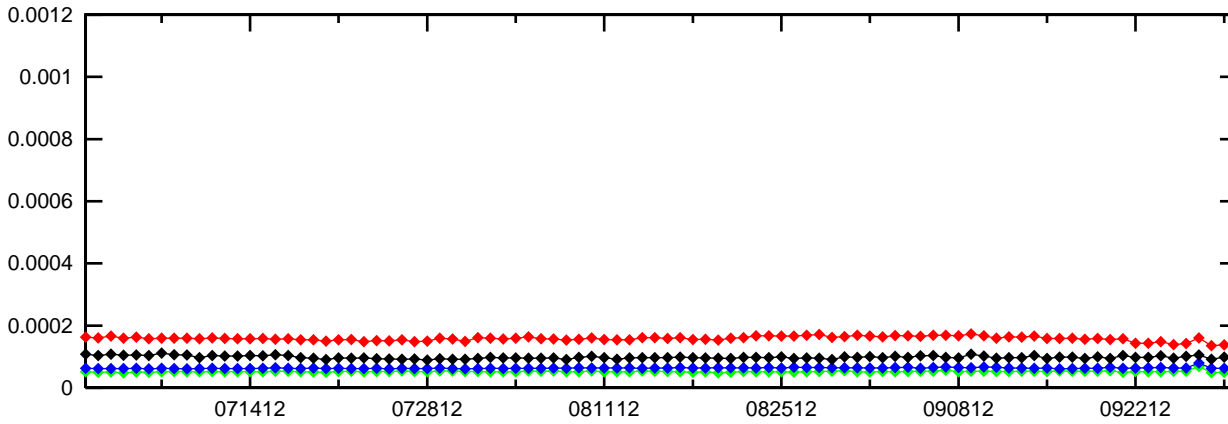
PRN 8 Bias (Daily average)



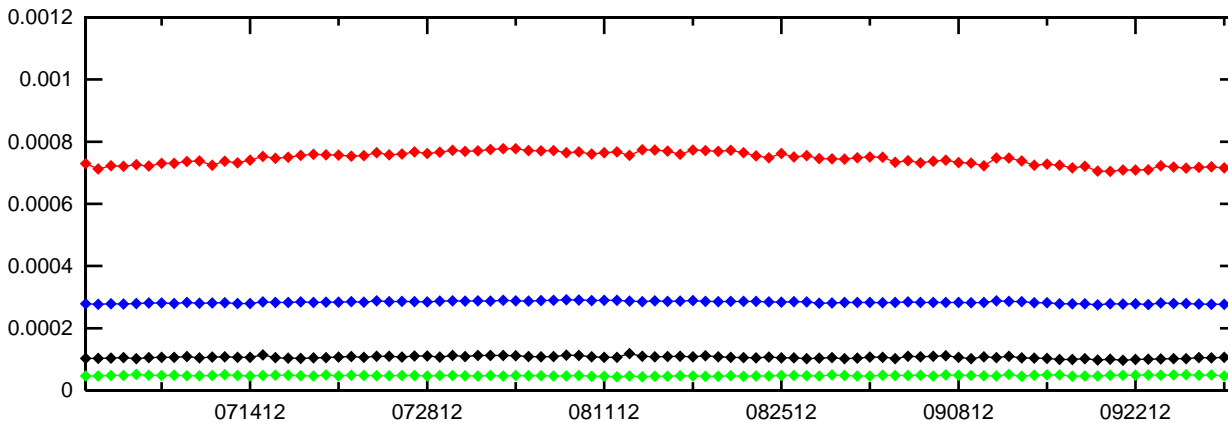
DM1 —◆—  
DM2 —◆—  
DM3 —◆—  
DM4 —◆—

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

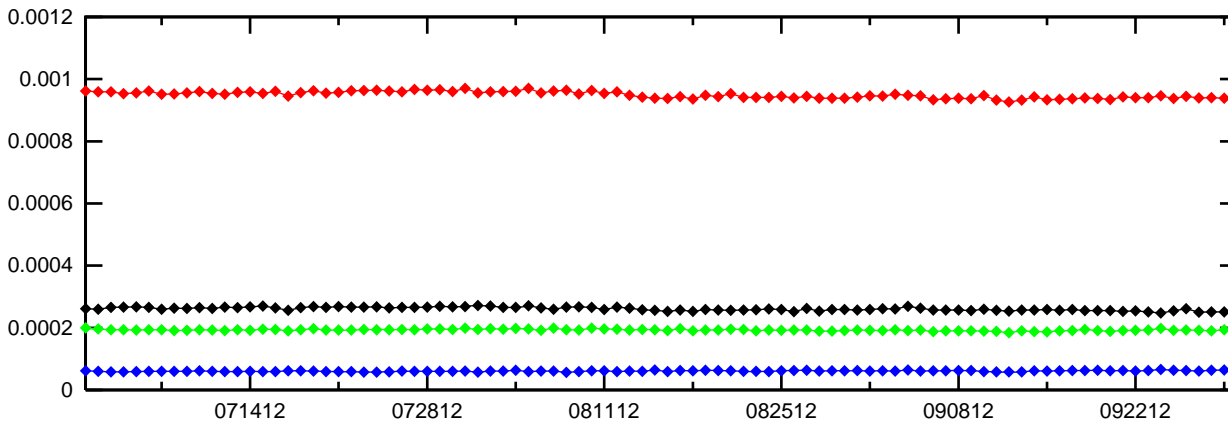
### PRN 9 Bias (Daily average)



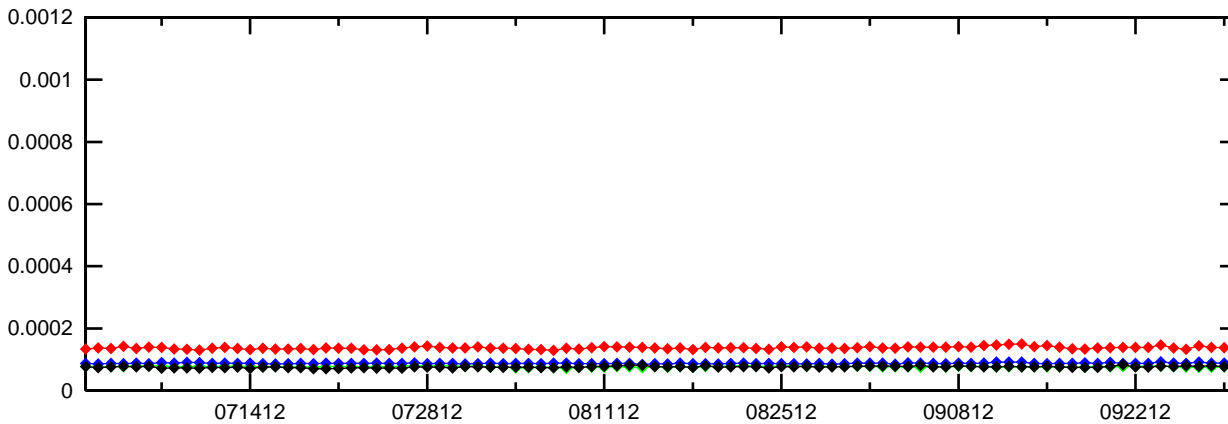
### PRN 10 Bias (Daily average)



### PRN 11 Bias (Daily average)

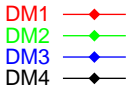
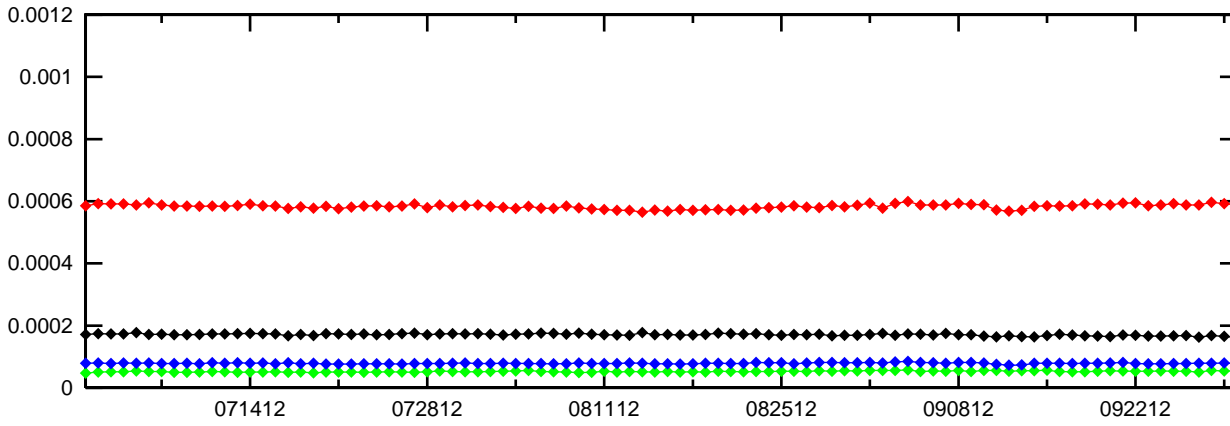


### PRN 12 Bias (Daily average)

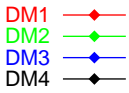
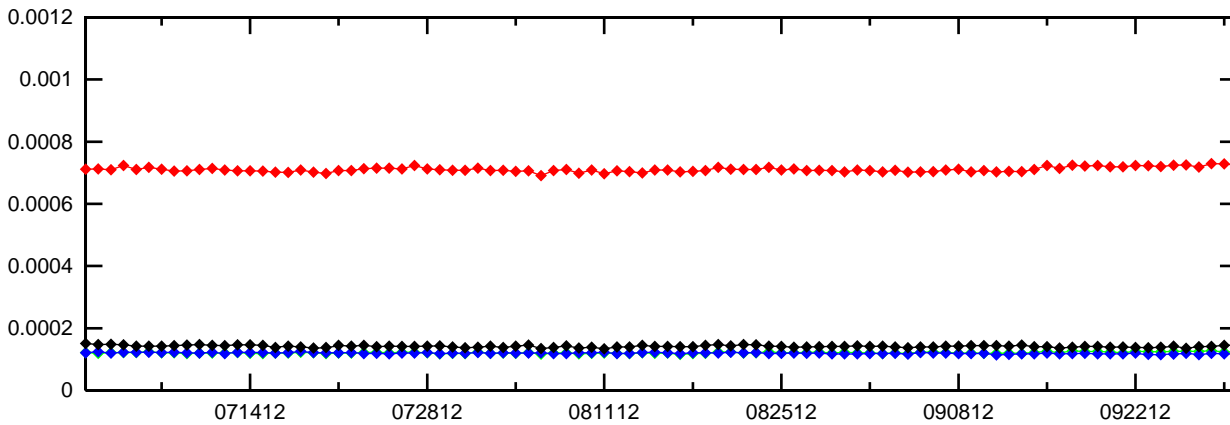


# Figure 11-6 PRN Bias Average Trend (PRN 13 - PRN 16)

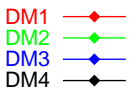
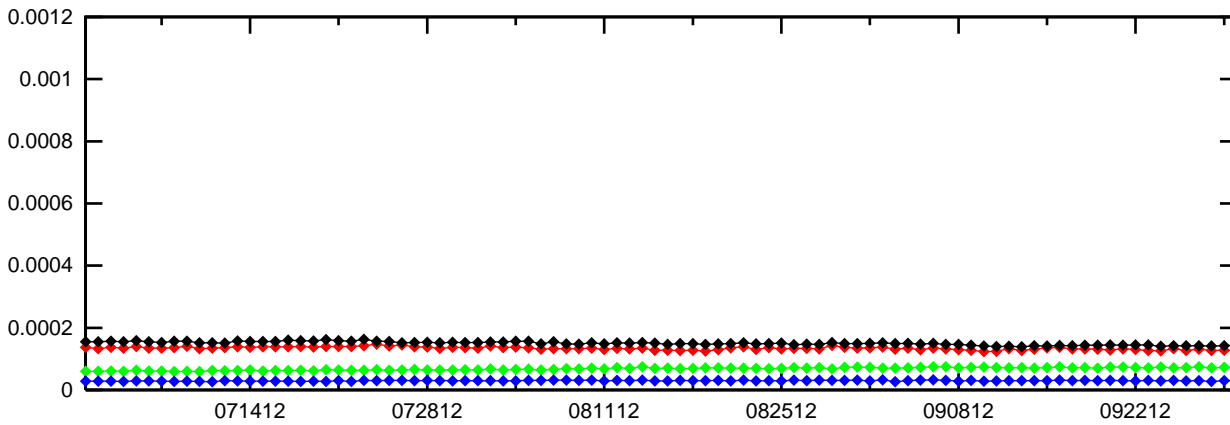
### PRN 13 Bias (Daily average)



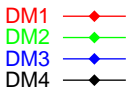
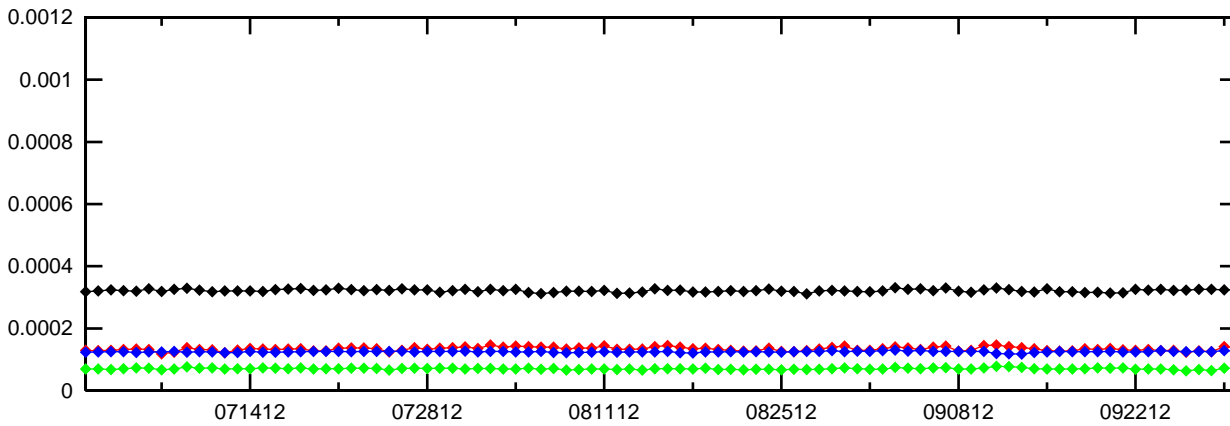
### PRN 14 Bias (Daily average)



### PRN 15 Bias (Daily average)

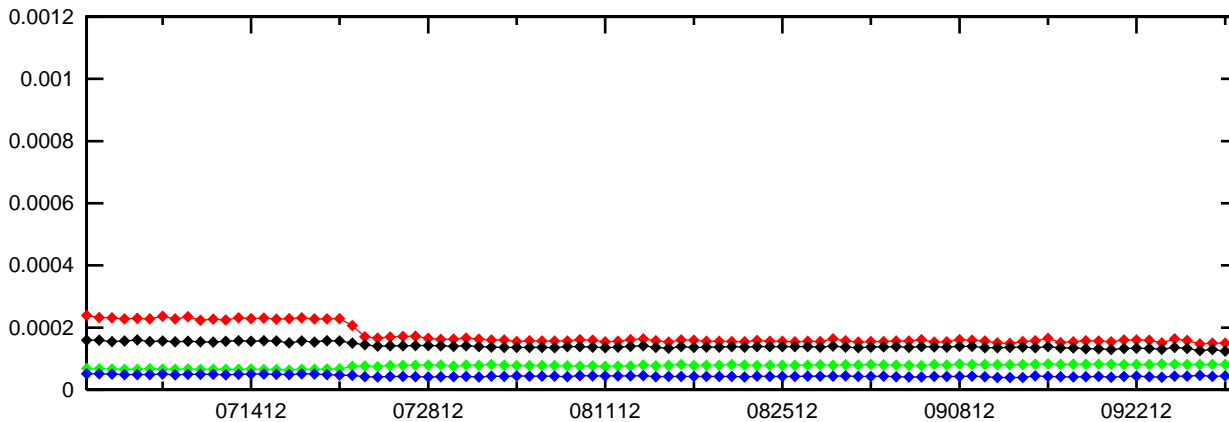


### PRN 16 Bias (Daily average)



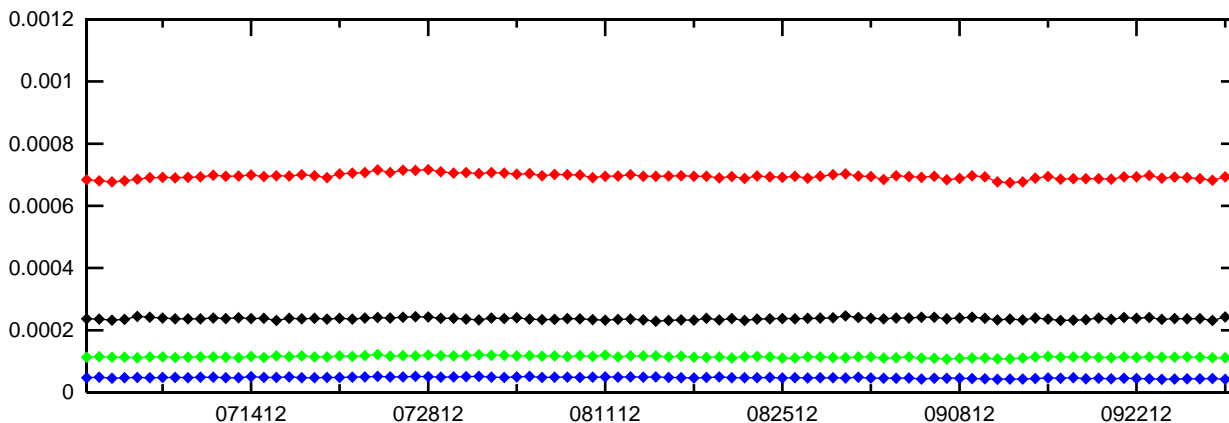
# Figure 11-7 PRN Bias Average Trend (PRN 17 - PRN 20)

### PRN 17 Bias (Daily average)



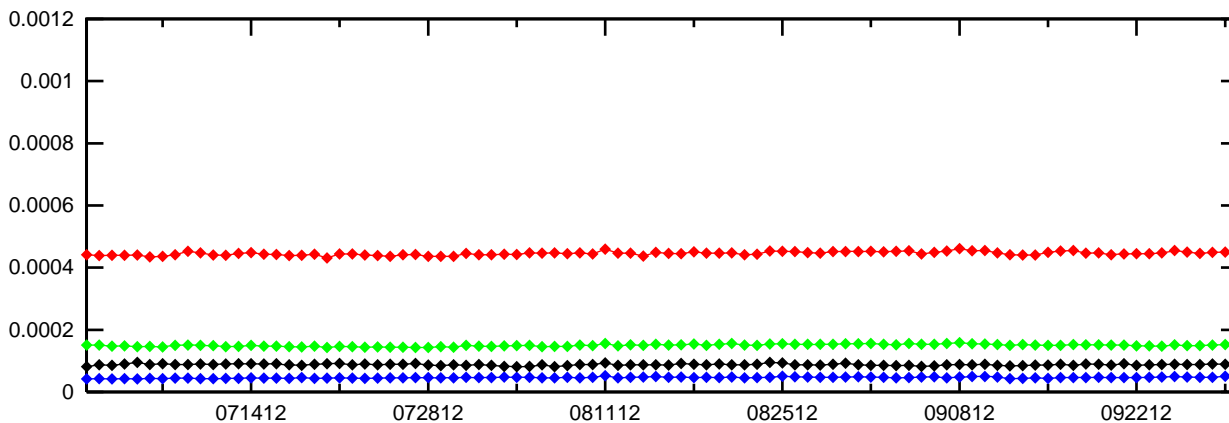
DM1  
DM2  
DM3  
DM4

### PRN 18 Bias (Daily average)



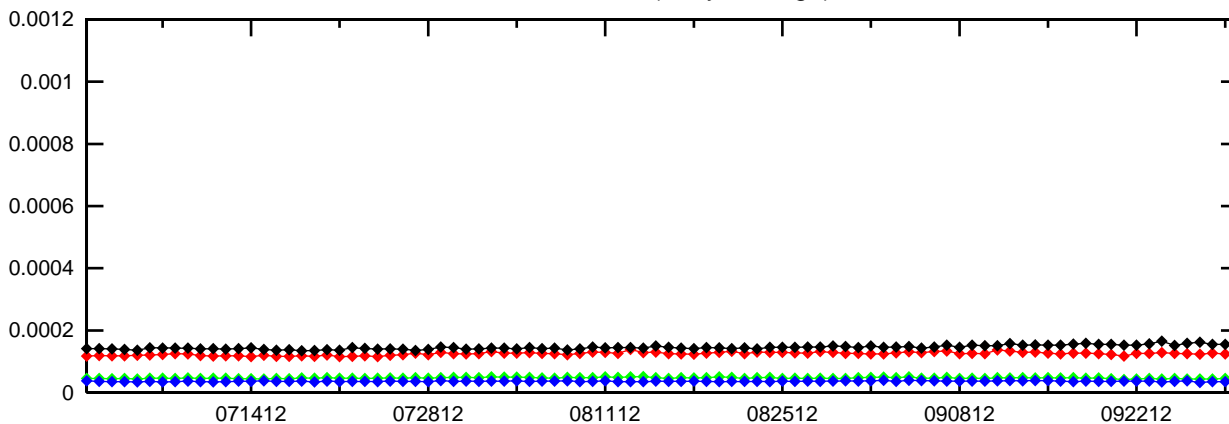
DM1  
DM2  
DM3  
DM4

### PRN 19 Bias (Daily average)



DM1  
DM2  
DM3  
DM4

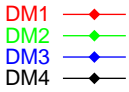
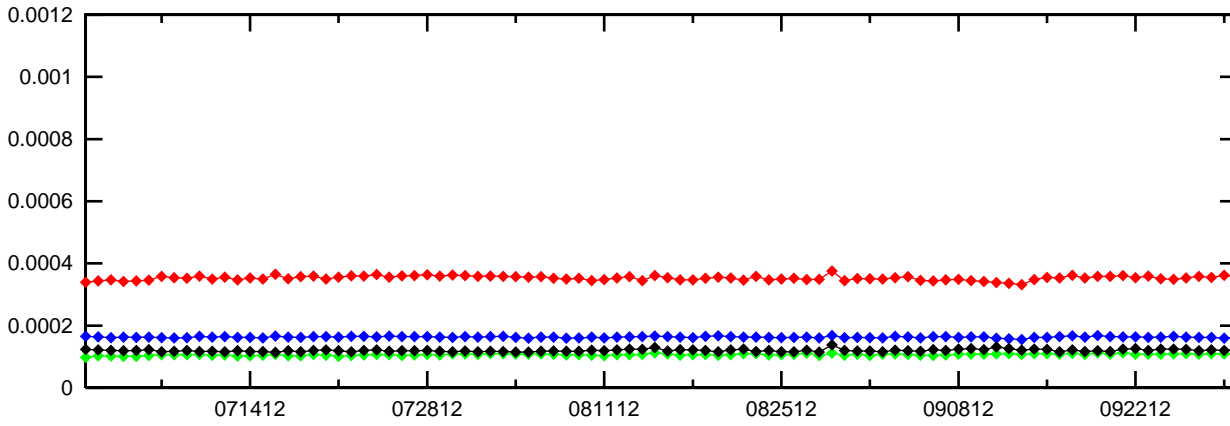
### PRN 20 Bias (Daily average)



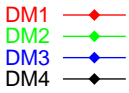
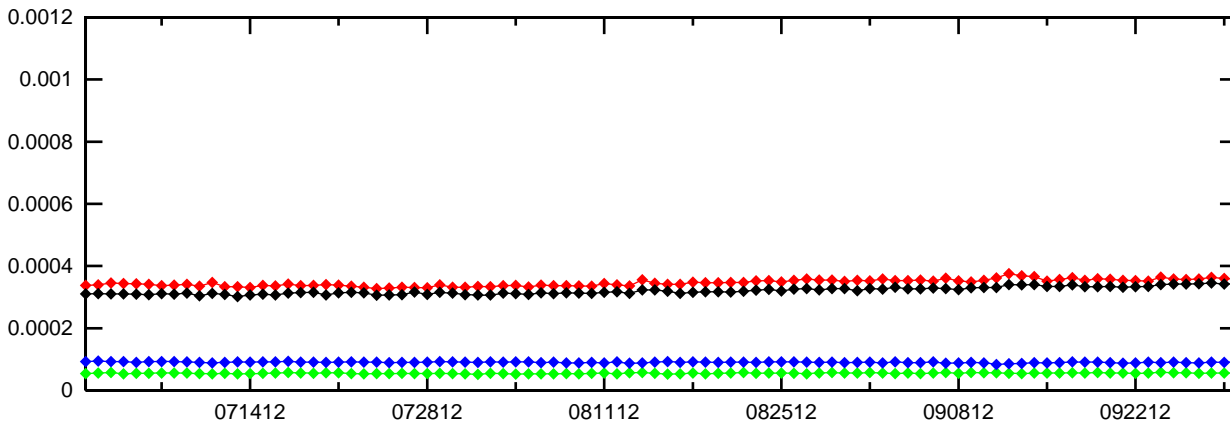
DM1  
DM2  
DM3  
DM4

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

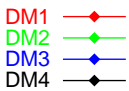
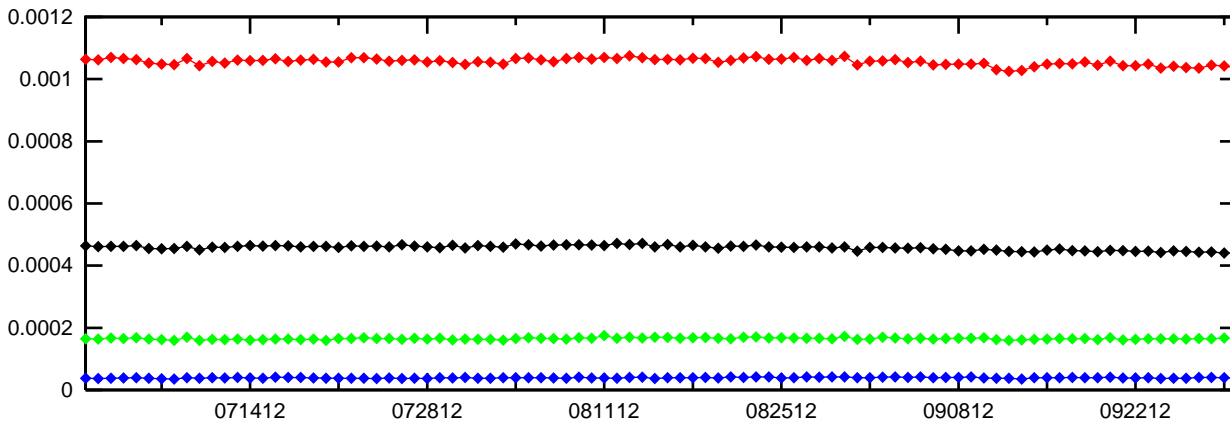
### PRN 21 Bias (Daily average)



### PRN 22 Bias (Daily average)



### PRN 23 Bias (Daily average)



### PRN 24 Bias (Daily average)

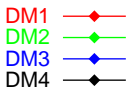
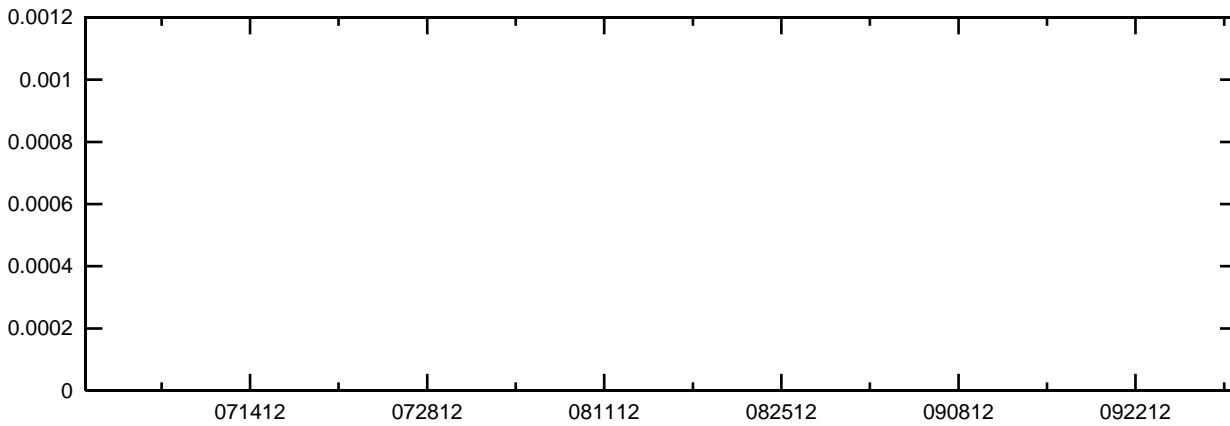
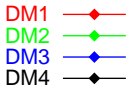
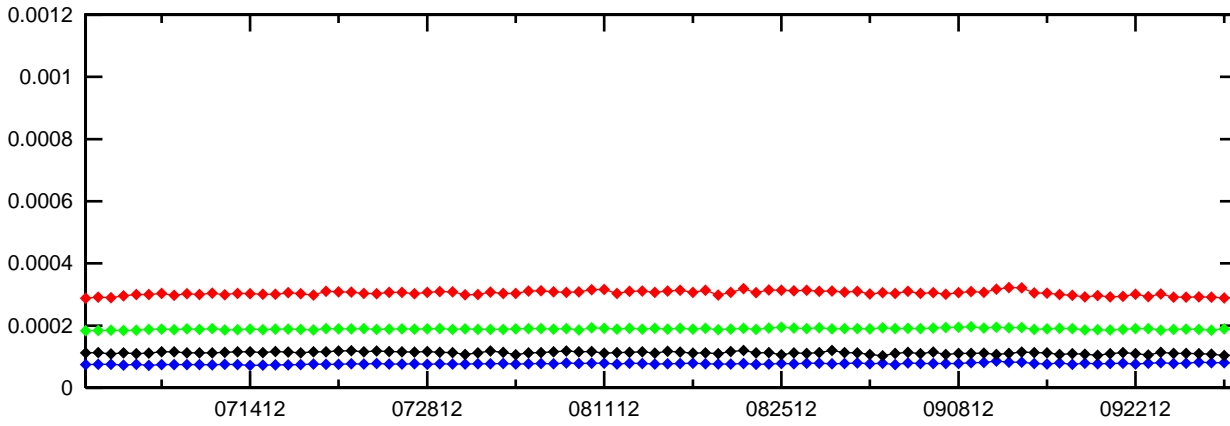
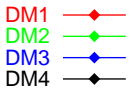
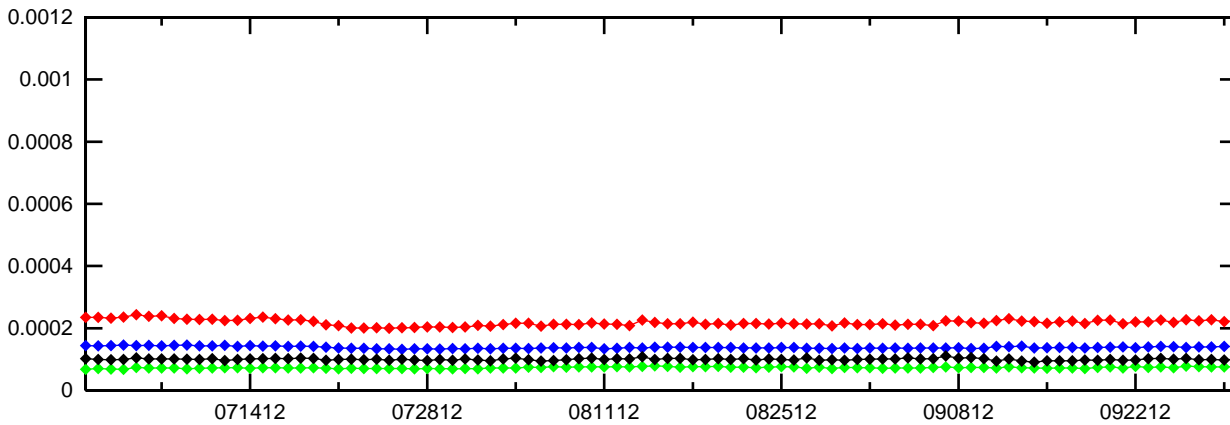


Figure 11-9 PRN Bias Average Trend (PRN 25 - PRN 28)

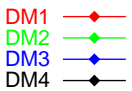
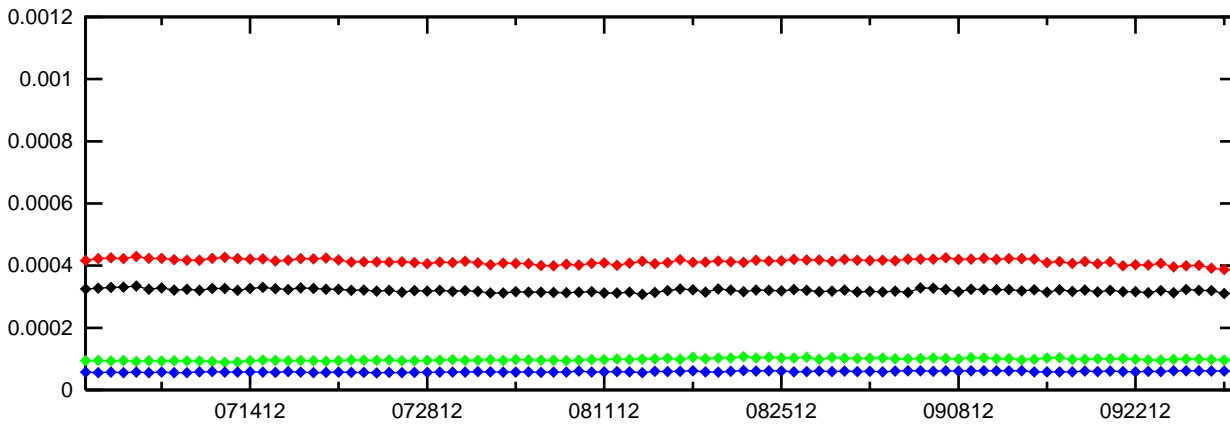
PRN 25 Bias (Daily average)



PRN 26 Bias (Daily average)



PRN 27 Bias (Daily average)



PRN 28 Bias (Daily average)

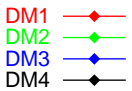
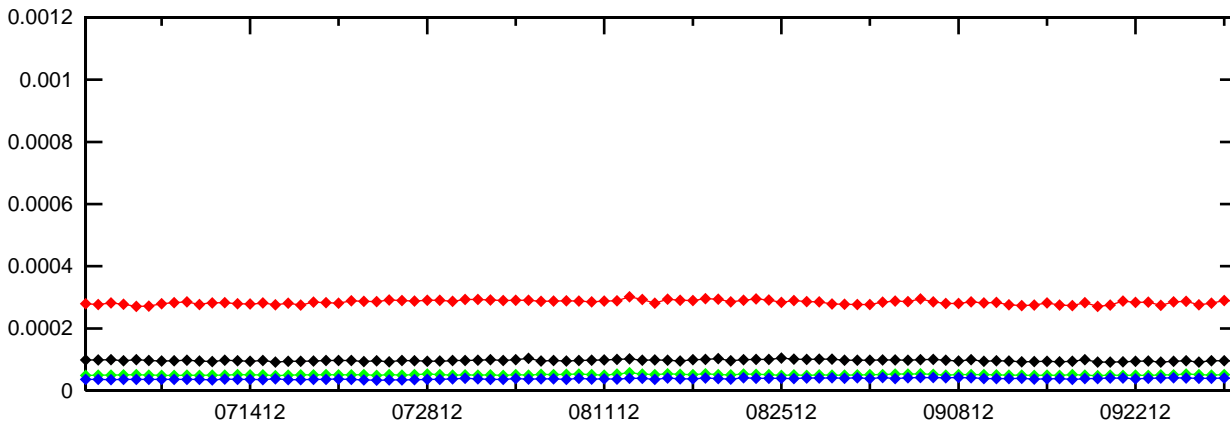
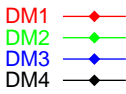
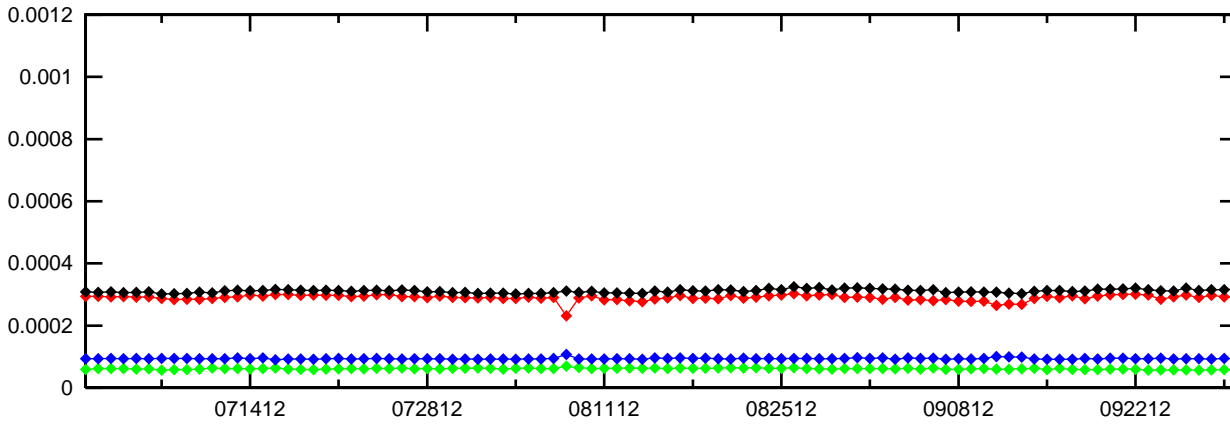


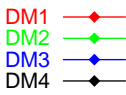
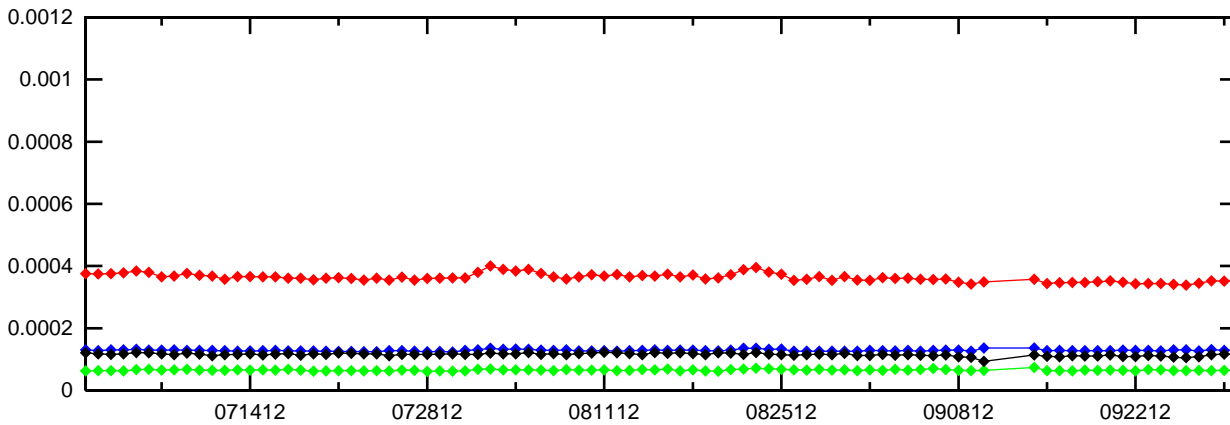


Figure 11-10 PRN Bias Average Trend (PRN 29 - PRN 32)

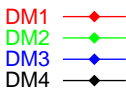
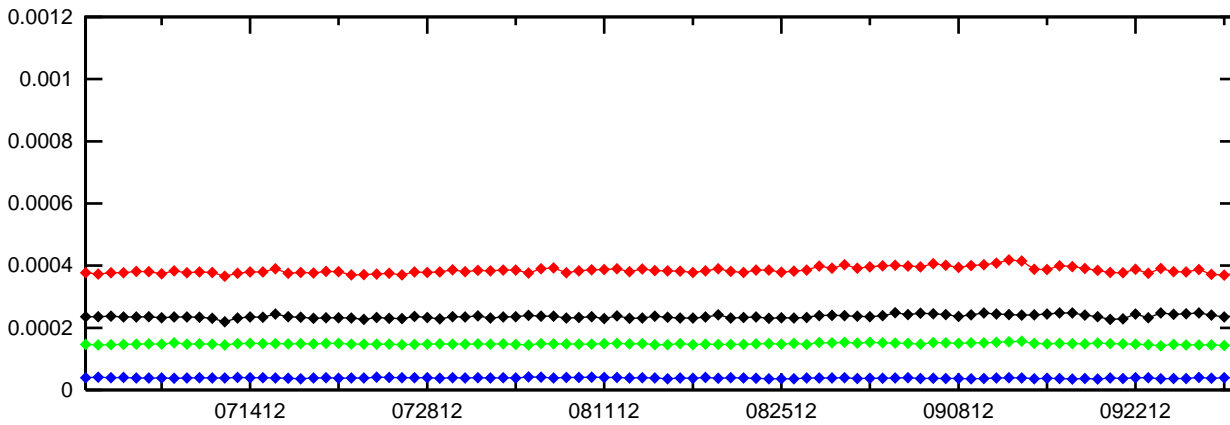
PRN 29 Bias (Daily average)



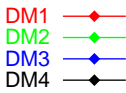
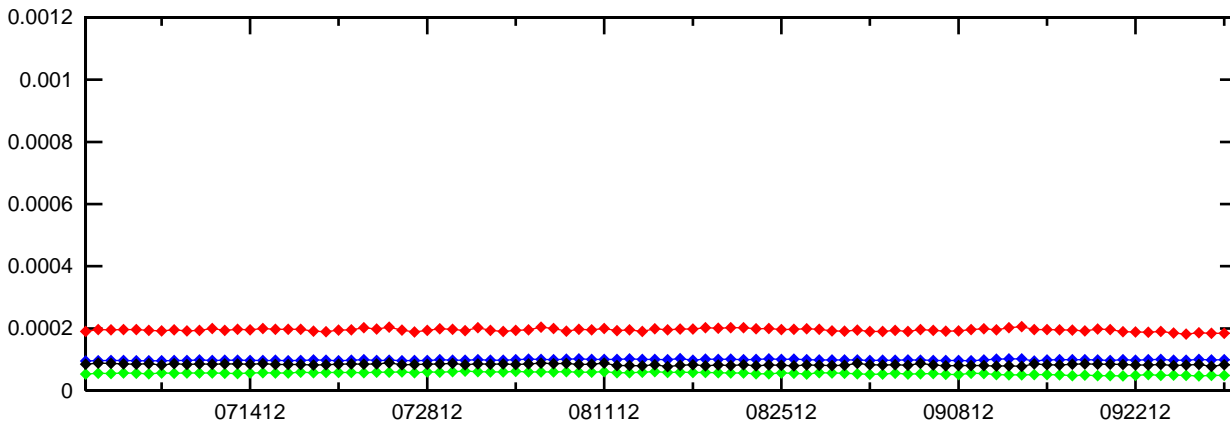
PRN 30 Bias (Daily average)



PRN 31 Bias (Daily average)



PRN 32 Bias (Daily average)



#### **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  $1-10^{-7}$  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  $1-10^{-7}$  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

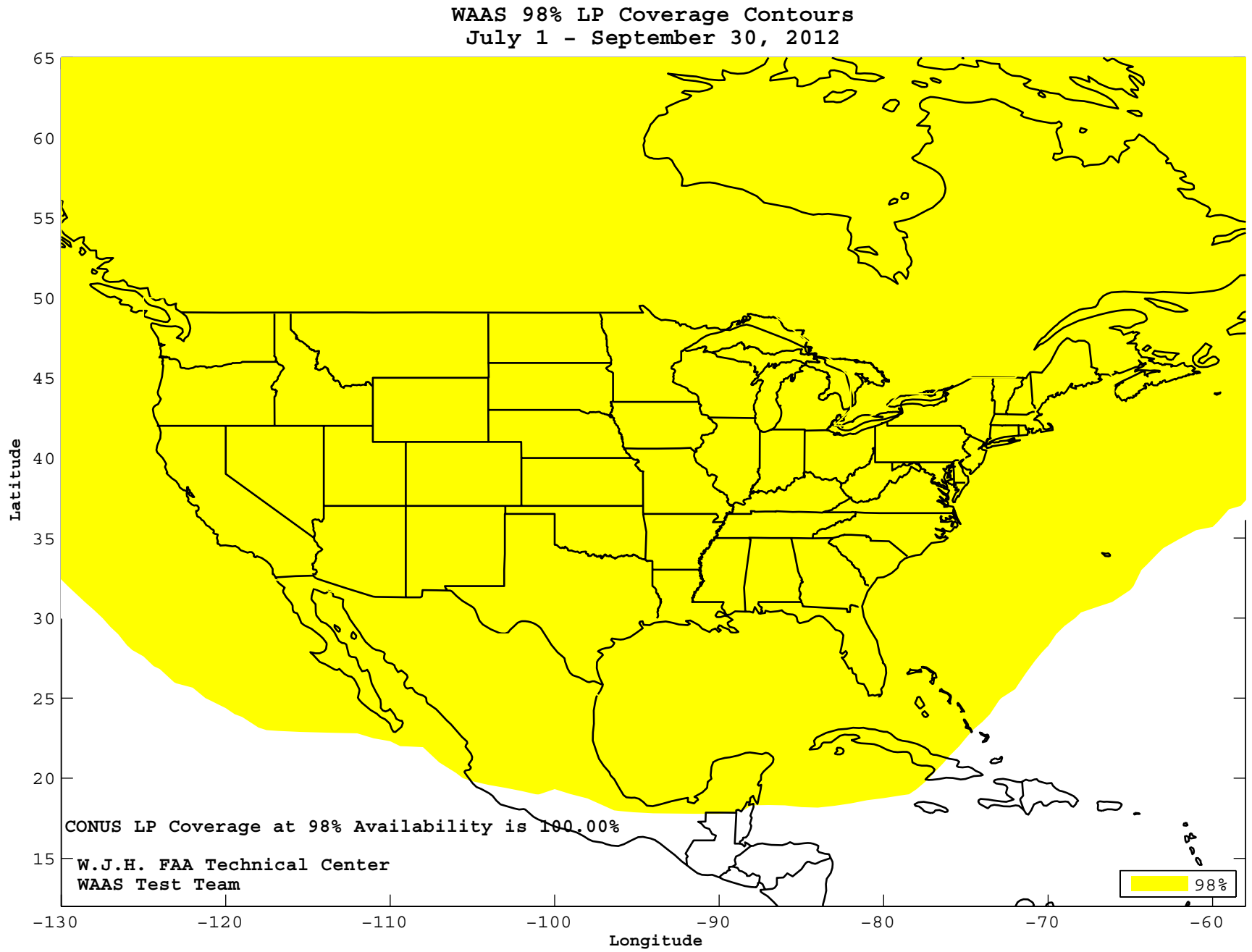
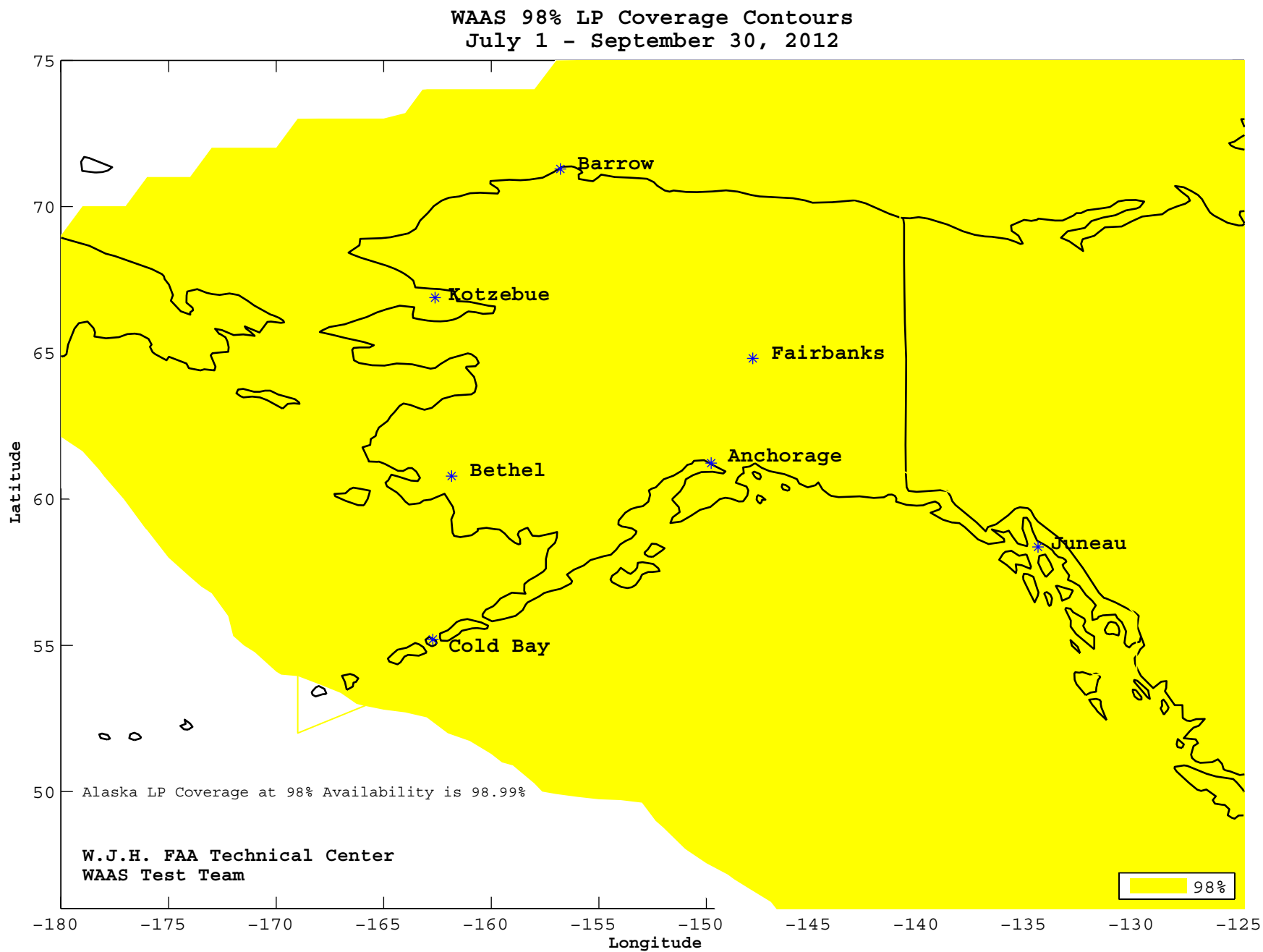
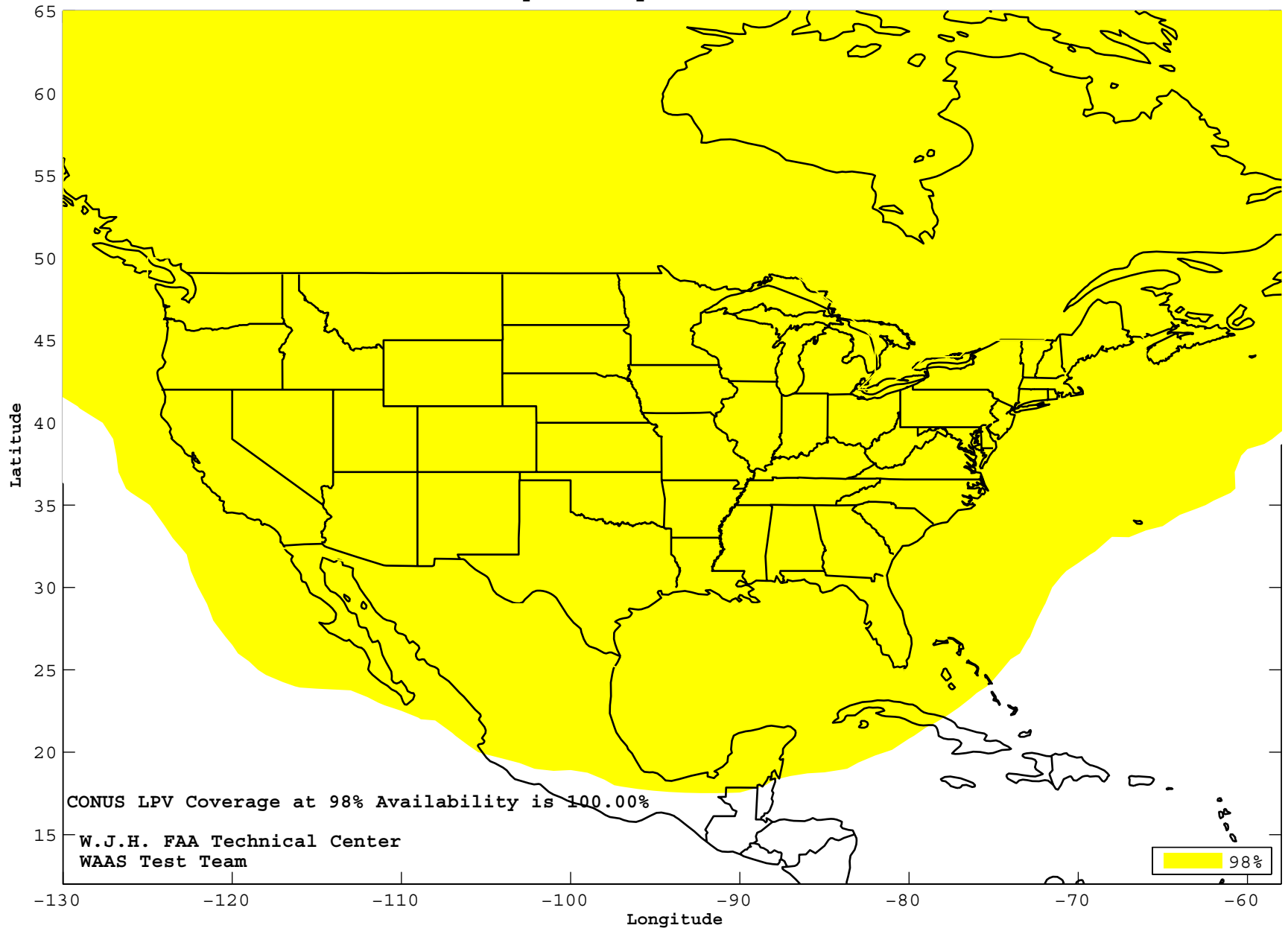


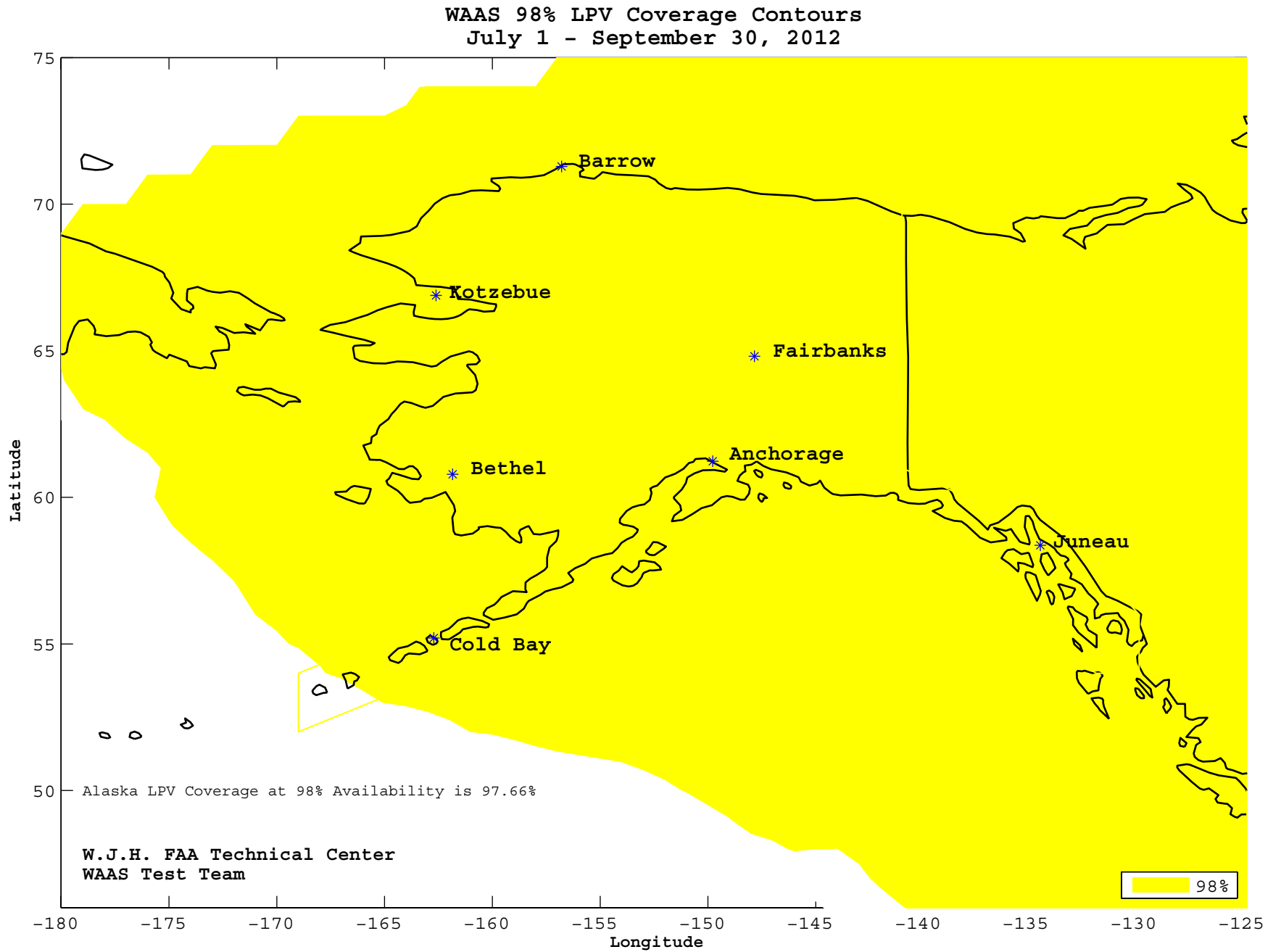
Figure B-2 98% Alaska LP Availability Contour for the Quarter

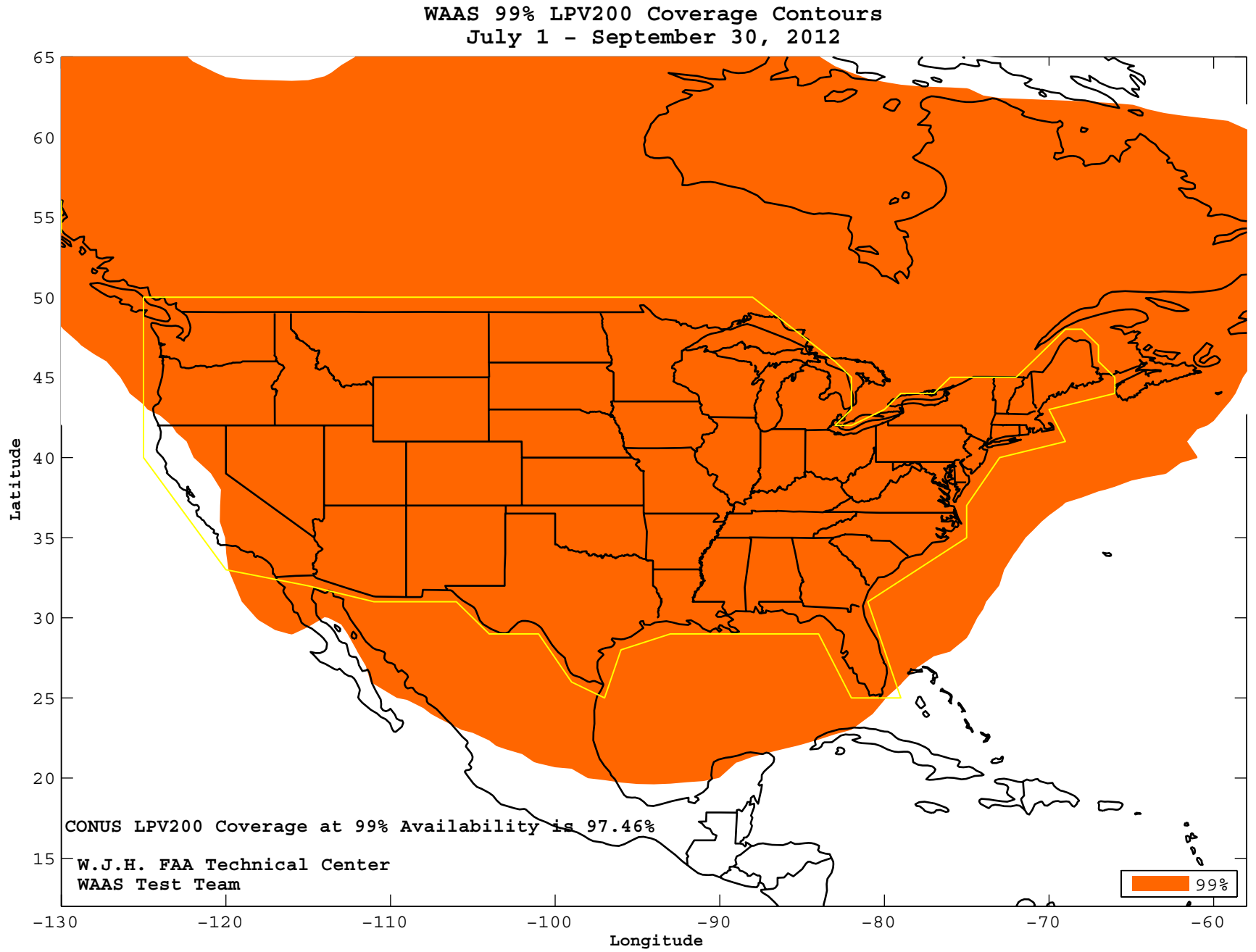




WAAS 98% LPV Coverage Contours  
July 1 - September 30, 2012







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

