WIDE AREA AUGMENTATION SYSTEM PERFORMANCE ANALYSIS REPORT

Report #67

Reporting Period: October 01 to December 31, 2018

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http://www.nstb.tc.faa.gov/

Executive Summary

Since 1999, the Wide Area Augmentation System (WAAS) Test Team at the FAA William J. Hughes Technical Center has reported GPS performance as measured against the GPS Standard Positioning Service (SPS) Signal Specification in quarterly GPS Performance Analysis Network (PAN) Reports. In addition to the GPS PAN reports, the WAAS Test Team has provided quarterly reports on WAAS performance. The current WAAS PAN Report #67 provides WAAS performance data from the October 01 through December 31, 2018 reporting period.

This report provides the following results: accuracy, availability, coverage, safety index, range accuracy, WAAS broadcast message rates, geostationary satellite ranging availability, WAAS airport availability, WAAS Code Noise and Multipath analysis, WAAS reference station survey validation, and WAAS Signal Quality Monitoring.

The following table shows observations for accuracy and availability made during the reporting period for Continental United States (CONUS) and Alaska sites (the international sites are presented in the body of this report). Localizer Performance (LP) service is available when the calculated horizontal protection level (HPL) is less than 40 meters. Localizer Performance with Vertical Guidance (LPV) service is available when the calculated HPL is less than 40 meters and the Vertical Protection Level (VPL) is less than 50 meters. Localizer Performance with Vertical Guidance to 200-foot decision height (LPV200) service is available when the calculated HPL is less than 40 meters and the VPL is less than 35 meters. The FAA's National Satellite Test Bed sites—Grand Forks, North Dakota, Atlantic City, New Jersey, and Arcata, California—are outliers due to receiver quality issues, and not because of the WAAS signal in space quality.

Parameter	CONUS Site/Maximum	CONUS Site/Minimum	Alaska Site/Maximum	Alaska Site/Minimum
95% Horizontal Accuracy (HPL <= 40 meters)	Arcata 1.416 meters	Oakland 0.528 meters	Fairbanks 0.684 meters	Bethel 0.566 meters
95% Vertical Accuracy (VPL <= 50 meters)	Miami 1.667 meters	Salt Lake City 0.820 meters	Anchorage 1.289 meters	Bethel 0.953 meters
LP Availability (HPL <= 40 meters)	All Sites 100%	All Sites 100%	All Sites 100%	All Sites 100%
LPV Availability (HPL <= 40 meters & VPL <= 50 meters)	All Sites 100%	All Sites 100%	Multiple Sites 100%	Barrow 99.97%
LPV200 Availability (HPL <= 40 meters & VPL <= 35 meters)	Multiple Sites 100%	Arcata 99.97%	Multiple Sites 100%	Barrow 99.21%
99% HPL	Cleveland 16.772 meters	Dallas 10.729 meters	Cold Bay 19.744 meters	Juneau 12.982 meters
99% VPL	Oakland 28.774 meters	Kansas City 20.043 meters	Barrow 32.283 meters	Anchorage 22.433 meters

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1.0 INTRODUCTION

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

The objectives of this report are:

1. To evaluate and monitor the WAAS ability to augment GPS by characterizing important performance parameters.
2. To analyze the effects of GPS satellite operation and maintenance as well as ionospheric activity on WAAS performance.
3. To investigate GPS and WAAS anomalies and determine potential user impact.
4. To archive GPS and WAAS performance for future evaluations.

The evaluation uses the WAAS data transmitted from geostationary satellites (GEOs) pseudo-random noise (PRN) 131 (SM9), 135 (CRW), and PRN138 (CRE). SM9, CRE, and CRW GEOs provide a precision approach (PA) ranging capability that supports all levels of WAAS service.

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

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

The receivers in PA mode are required to: (1) use all WAAS corrections, (2) use only corrected satellites, (3) never mix corrections from multiple GEOs, (4) exclusively use the designated Space Based Augmentation System (SBAS) for the published approach procedure, and (5) never use ranging from a GPS or GEO satellite with a User Differential Range Error (UDRE) status of greater than 15 meters. The receivers in NPA mode are allowed to: (1) mix corrected and uncorrected satellites, (2) mix corrections from different GEOs or SBASs, (3) use either the WAAS ionosphere corrections or the GPS Klobuchar model for ionosphere corrections, and (4) use ranging from a GPS or GEO satellite with a UDRE status of greater than 15 meters. The receivers in NPA mode can also operate using Fault Detection/Fault Detection Exclusion (FD/FDE) in the absence of an SBAS. The data presented in this report does not take credit for the additional NPA mode availability and continuity through use of either full or partial FD/FDE, which allowed the mixing of corrected and uncorrected satellites. To remain conservative, the NPA accuracy data presented in this report uses Klobuchar ionosphere corrections.

The results in this report are based on the application of the WAAS corrections to receiver data from the WAAS network and the FAA's National Satellite Test Bed (NSTB) network, and from analyses based on the WAAS-broadcasted correction data. Table 1-2 lists the receivers used in the PA analyses, and Table 1-3 lists the receivers used in the NPA analyses.

Table 1-2 PA Evaluation Sites

Location	Number of Days Evaluated	Number of Samples
NSTB:		
Arcata	88	7608647
Atlantic City	90	7769729
Oklahoma City	88	7585780
WAAS:		
Albuquerque	92	7947198
Anchorage	92	7944571
Atlanta	92	7947711
Barrow	92	7944357
Bethel	92	7947344
Billings	91	7839817
Boston	92	7942869
Chicago	92	7940872
Cleveland	92	7919789
Cold Bay	92	7937501
Dallas	92	7936148
Denver	92	7937240
Fairbanks	92	7946141
Gander	92	7946700
Goose Bay	92	7947641
Houston	92	7925595
Iqaluit	92	7941874
Jacksonville	92	7942653
Juneau	91	7840310
Kansas City	92	7946913
Kotzebue	92	7934204
Los Angeles	92	7940084
Memphis	92	7939775
Merida	92	7944747
Mexico City	90	7751307
Miami	92	7942744
Minneapolis	92	7945985
New York	92	7944301
Oakland	92	7943569
Puerto Vallarta	92	7942413
Salt Lake City	92	7937235
San Jose Del Cabo	92	7922464
Seattle	92	7933297
Washington DC	92	7931310
Winnipeg	92	7942751

Table 1-3 NPA Evaluation Site

Location	Number of Days Evaluated	Number of Samples
Albuquerque	92	7943757
Anchorage	92	7933951
Atlanta	92	7942623
Barrow	92	7942510
Bethel	92	7944756
Billings	91	7895119
Boston	92	7937219
Cleveland	92	7937942
Cold Bay	92	7935735
Fairbanks	92	7944722
Gander	92	7943421
Honolulu	92	7922836
Houston	92	7944861
Iqaluit	92	7938555
Juneau	91	7897869
Kansas City	85	7333586
Kotzebue	92	7934577
Los Angeles	92	7944096
Merida	92	7943593
Miami	92	7946170
Minneapolis	92	7944748
Oakland	92	7945336
Salt Lake City	92	7944370
San Jose Del Cabo	92	7925873
San Juan	92	7940759
Seattle	92	7944418
Tapachula	92	7913122
Washington DC	92	7930022

The report is divided by the performance category:

1. WAAS Position Accuracy
2. WAAS Operational Service Availability
3. WAAS Coverage
4. WAAS Integrity
5. WAAS Range Domain Accuracy
6. WAAS GEO Ranging Performance
7. WAAS Airport Availability
8. WAAS Code Noise and Multipath (CNMP) Analysis
9. WAAS Antenna Survey Validation
10. WAAS Signal Quality Monitor (SQM) Analysis

Table 1-4 lists the evaluated WAAS performance parameters for this report. Note that these are the performance parameters associated with the WAAS system, and that these requirements are extracted from FAA Specifications FAA-E-2892C and 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 Hazardous Misleading Information	<10e-7 per approach

1.1 Event Summary

Table 1-5 lists events that affected WAAS performance or the ability to determine the WAAS performance during the reporting period. The events include GPS or WAAS anomalies, relevant receiver malfunctions, receiver maintenance, and ionospheric activity. The reporting of ionospheric activity includes reference to the planetary index (Kp) for the event time period. The Kp index quantifies the disturbance in the Earth's magnetic field and is an indicator of solar storms causing geomagnetic disturbances resulting in an unpredictable ionosphere. The detection of an ionospheric disturbance causes the WAAS to increase Grid Ionospheric Vertical Error (GIVE) values, making PA service unavailable.

Analyses of events that merit more detailed investigations are documented in the Discrepancy Reports (DRs). The DRs are available at http://www.nstb.tc.faa.gov under "WAAS Technical Reports" and also accessible via hyperlink in Table 1-5. Note that "TOW" is the time of GPS week, which is the cumulative number of seconds beginning 00:00:00 Sunday (GMT without leap seconds). Table 1-6 lists events related to WAAS upgrades during this reporting period, and Table 1-7 lists events related to ground uplink station (GUS) switchovers, which are transitions from one GEO uplink site to another GEO uplink site.

Table 1-5 Events

Start Date	End Date	Location Satellite	Service Affected	Event Description
10/03/2018	10/03/2018	Kotzebue (OTZ1), Kotzebue (OTZ2), Kotzebue (OTZ3)	LPV200_Alaska	The Kotzebue WRS came offline at 15:37 GMT and returned to normal mode at 19:11 GMT. During this time, the lack of observations from the WRS elevated GIVE values in the region. The elevated GIVEs caused minor degradation of LPV200 service coverage in Alaska from 17:39 GMT to 18:01 GMT. Please see plot(s): LPV200_10/3/2018 Cov_vs_Time_Alaska_10/3/2018.

Start Date	End Date	Location Satellite	Service Affected	Event Description
10/04/2018	10/04/2018	PRN9	LPV200_Alaska	The reduction in LPV200 service in Alaska was due to a GPS NANU on PRN9 (see NANU2018043), which was unusable from 02:04:00 GMT to 07:46:00 GMT. The NANU caused minor degradation of LPV200 service coverage in Alaska from 04:29:00 GMT to 05:23:00 GMT. Please see plot(s): LPV200_10/4/2018.
10/06/2018	10/09/2018	Southbury (DX1)	LPV200_Alaska	There was a CCC Trip on PRN131 that lasted from 04:17:00 GMT on 10/6 to 06:49:00 GMT on 10/9. This is caused by an L5 pseudorange jump on the GUS receiver. During this time, PRN131 was set to Do Not Use. As a result of the Do Not Use on PRN131, there was minor degradation of LPV200 service coverage in Alaska from 17:32:00 GMT to 17:41:00 GMT on 10/6 and from 17:24:00 GMT to 17:31:00 GMT on 10/8. This, along with a NANU on PRN27 (see Event 14662), caused moderate degradation of LPV200 service coverage in Alaska on October 7th from 17:25:00 GMT to 17:47:00 GMT. Please see plot(s): LPV200_10/6/2018 Cov_vs_Time_Alaska_10/6/2018.
10/06/2018	10/06/2018	PRN6	LPV200_CONUS	PRN6 spiked to Not Monitored on October 6th at 12:57:00 GMT. The loss of ranging on PRN6 and PRN131(due to CCC trip) caused minor LPV200 outages in CONUS (California - north of LA and east of San Diego) at 12:57:00 GMT. Please see plot(s): LPV200_10/6/2018.
10/07/2018	10/07/2018	PRN27	LPV200_Alaska	The reduction in LPV200 service in Alaska was due to a GPS NANU on PRN27 (see NANU2018045) which was Unusable Until Further Notice from 08:07:00 GMT to 18:13:00 GMT. The NANU along with a CCC Trip on PRN131 (see Event 14695) caused minor degradation of LPV200 service coverage in Alaska from 17:25:00 GMT to 17:47:00 GMT. Please see plot(s): LPV200_10/7/2018 Cov_vs_Time_Alaska_10/7/2018.
10/08/2018	10/08/2018	PRN6	LPV200_CONUS	There was an SV alert on PRN6 at 16:55:00 GMT. This elevated the UDREs on PRN6 until 17:03:00 GMT. The elevated UDREs caused moderate degradation of LPV200 service coverage in CONUS (East Coast) from 16:56:00 GMT to 17:04:00 GMT. There was also very minor degradation of LPV service coverage in CONUS (Florida Panhandle). Please see plot(s): LPV_10/8/2018 LPV200_10/8/2018 Cov_vs_Time_Conus_10/8/2018.

Start Date	End Date	Location Satellite	Service Affected	Event Description
10/09/2018	10/09/2018	GEO131,Southbury (DX1)	LPV200_Alaska	The uplink for the SM9 GEO, PRN131 switched from the Southbury uplink site to the Santa Paula uplink site at 19:29:09 GMT. This caused a 9-second outage of the GEO 131 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN131. The elevated UDREs on GEO 131 caused minor degradation of LPV200 service coverage in Alaska from 17:15:00 GMT to 17:25:00 GMT. TOW 242949-242959. Please see plot(s): LPV200_10/9/2018 Cov_vs_Time_Alaska_10/9/2018.
10/10/2018	10/10/2018	GEO131,Santa_Paula (SZ1)	LPV200_Alaska	The uplink for the SM9 GEO, PRN131 switched from the Santa Paula uplink site to the Southbury uplink site at 08:02:00 GMT. This caused a 7-second outage of the GEO 131 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN131. The elevated UDREs on GEO 131 caused minor degradation of LPV200 service coverage in Alaska from 17:15:00 GMT to 17:25:00 GMT. TOW 288125-288133. Please see plot(s): LPV200_10/10/2018 Cov_vs_Time_Alaska_10/10/2018.
10/16/2018	10/16/2018	PRN5	LPV200_CONUS, LPV200_Canada	The reduction in LPV200 service in CONUS and Canada was due to a GPS NANU on PRN5 (see NANU2018047) which was unusable from 14:00:00 GMT to 19:30:00 GMT. The NANU caused moderate degradation of LPV200 service coverage in Canada from 15:54:00 GMT to 17:29:00 GMT. The NANU also caused minor degradation of LPV200 service coverage in CONUS from 15:05:00 GMT to 15:19:00 GMT. Please see plot(s): LPV200_10/16/2018 Cov_vs_Time_Canada_10/16/2018.
11/26/2018	11/27/2018	GEO131,Southbury (DX1)	LPV200_Alaska	The uplink for the SM9 GEO, PRN131 switched from the Southbury uplink site to the Santa Paula uplink site at 13:23:00 GMT. This caused an 8-second outage of the GEO 131 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN131. The elevated UDREs on GEO 131 caused minor degradation of LPV200 service coverage in Alaska from 14:00:00 GMT to 14:10:00 GMT on 11/26 and 11/27. TOW 134581-134590. Please see plot(s): LPV200_11/26/2018 LPV200_11/27/2018.

Start Date	End Date	Location Satellite	Service Affected	Event Description
12/04/2018	12/04/2018	GEO131,Santa_Paula (SZ1)	LPV200_Alaska	The uplink for the SM9 GEO, PRN131 switched from the Santa Paula uplink site to the Southbury uplink site at 06:17:00 GMT. This caused a 7-second outage of the GEO 131 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN131. The elevated UDREs on GEO 131 caused minor degradation of LPV200 service coverage in Alaska from 13:29:00 GMT to 13:35:00 GMT. TOW 195455-195463
12/07/2018	12/07/2018	PRN24	LPV200_Alaska	The reduction in LPV200 service in Alaska was due to a GPS NANU on PRN24 (see NANU2018058) which was Unusable from 04:50:00 GMT to 11:14:00 GMT. The NANU caused moderate degradation of LPV200 service coverage in Alaska from 06:09:00 GMT to 06:56:00 GMT. Please see plot(s): LPV200_12/7/2018 Cov_vs_Time_Alaska_12/7/2018.
12/10/2018	12/10/2018	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200_CONUS	Geomagnetic activity (Kp = 3) disturbed the ionosphere causing elevated GIVE values. This resulted in minor degradation of LPV200 service coverage in CONUS (AZ) from 11:31:00 GMT to 11:41:00 GMT.
12/14/2018	12/14/2018	PRN25	LPV200_CONUS, LPV200_Alaska	The reduction in LPV200 service in CONUS and Alaska was due to a GPS NANU on PRN25 (see NANU2018064), which was unusable from 05:15:00 GMT to 17:15:00 GMT. The NANU caused severe degradation of LPV200 service coverage in CONUS from 08:10:00 GMT to 08:30:00 GMT (CA), from 09:48:00 GMT to 10:07:00 GMT (So. FL) and from 10:54:00 GMT to 11:24:00 GMT (CA, AZ). The NANU also caused minor degradation of LPV200 service coverage in Alaska from 09:38:00 GMT to 10:00:00 GMT. Please see plot(s): LPV200_12/14/2018 Cov_vs_Time_Conus_12/14/2018.
12/18/2018	12/18/2018	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV), PRN9	LPV200_Alaska	WAAS increased the fast correction for PRN9 at low elevation to the WRSs at an earlier time than expected. The elevated UDREs caused very minor degradation in Alaska from 12:36:00 GMT to 12:40:00 GMT. Please see plot(s): LPV200_12/18/2018.

Table 1-6 WAAS Upgrades

Start Date	End Date	Location Satellite	Event Description
10/01/2018	10/03/2018	Denver (ZDV1), Denver (ZDV2), Denver (ZDV3)	SSM-50/51: These system support modifications (SSMs) support the cutover to CY18. SSM-50 Upgrades the receiver firmware at the ZDV WRS. SSM-51 updates the software of the WAAS components at the ZDV WRS.
10/01/2018	10/04/2018	Jacksonville (ZJX1), Jacksonville (ZJX2), Jacksonville (ZJX3)	SSM-50/51: These system support modifications (SSMs) support the cutover to CY18. SSM-50 Upgrades the receiver firmware at the ZJX WRS. SSM-51 updates the software of the WAAS components at the ZJX WRS.
10/01/2018	10/02/2018	Washington DC (ZDC1), Washington DC (ZDC2), Washington DC (ZDC3)	SSM-50/51: These system support modifications (SSMs) support the cutover to CY18. SSM-50 Upgrades the receiver firmware at the ZDC WRS. SSM-51 updates the software of the WAAS components at the ZDC WRS.
10/02/2018	10/03/2018	Seattle (ZSE1), Seattle (ZSE2), Seattle (ZSE3)	SSM-50/51: These system support modifications (SSMs) support the cutover to CY18. SSM-50 Upgrades the receiver firmware at the ZSE WRS. SSM-51 updates the software of the WAAS components at the ZSE WRS.
10/04/2018	10/09/2018	Oakland (ZOA1), Oakland (ZOA2), Oakland (ZOA3)	SSM-50/51: These system support modifications (SSMs) support the cutover to CY18. SSM-50 Upgrades the receiver firmware at the ZOA WRS. SSM-51 updates the software of the WAAS components at the ZOA WRS.
10/09/2018	10/11/2018	Cleveland (ZOB1), Cleveland (ZOB2), Cleveland (ZOB3)	SSM-50/51: These system support modifications (SSMs) support the cutover to CY18. SSM-50 Upgrades the receiver firmware at the ZOB WRS. SSM-51 updates the software of the WAAS components at the ZOB WRS.
10/10/2018	10/11/2018	Albuquerque (ZAB1), Albuquerque (ZAB2), Albuquerque (ZAB3)	SSM-50/51: These system support modifications (SSMs) support the cutover to CY18. SSM-50 Upgrades the receiver firmware at the ZAB WRS. SSM-51 updates the software of the WAAS components at the ZAB WRS.
10/11/2018	10/12/2018	Juneau (JNU1), Juneau (JNU2), Juneau (JNU3)	SSM-50/51: These system support modifications (SSMs) support the cutover to CY18. SSM-50 Upgrades the receiver firmware at the JNU WRS. SSM-51 updates the software of the WAAS components at the JNU WRS.
10/12/2018	10/17/2018	Atlanta (ZTL1), Atlanta (ZTL2), Atlanta (ZTL3)	SSM-50/51: These system support modifications (SSMs) support the cutover to CY18. SSM-50 Upgrades the receiver firmware at the ZTL WRS. SSM-51 updates the software of the WAAS components at the ZTL WRS.
10/15/2018	10/16/2018	Minneapolis (ZMP1), Minneapolis (ZMP2), Minneapolis (ZMP3)	SSM-50/51: These system support modifications (SSMs) support the cutover to CY18. SSM-50 Upgrades the receiver firmware at the ZMP WRS. SSM-51 updates the software of the WAAS components at the ZMP WRS.
10/15/2018	10/16/2018	Bethel (BET1), Bethel (BET2), Bethel (BET3)	SSM-50/51: These system support modifications (SSMs) support the cutover to CY18. SSM-50 Upgrades the receiver firmware at the BET WRS. SSM-51 updates the software of the WAAS components at the BET WRS.
10/16/2018	10/17/2018	Salt Lake City (ZLC1), Salt Lake City (ZLC2), Salt Lake City (ZLC3)	SSM-50/51: These system support modifications (SSMs) support the cutover to CY18. SSM-50 Upgrades the receiver firmware at the ZLC WRS. SSM-51 updates the software of the WAAS components at the ZLC WRS.
10/17/2018	10/18/2018	Barrow (BRW1), Barrow (BRW2), Barrow (BRW3)	SSM-50/51: These system support modifications (SSMs) support the cutover to CY18. SSM-50 Upgrades the receiver firmware at the BRW WRS. SSM-51 updates the software of the WAAS components at the BRW WRS.

Start Date	End Date	Location Satellite	Event Description
10/19/2018	10/19/2018	Los Angeles (ZLA1), Los Angeles (ZLA2), Los Angeles (ZLA3)	SSM-50/51: These system support modifications (SSMs) support the cutover to CY18. SSM-50 Upgrades the receiver firmware at the ZLA WRS. SSM-51 updates the software of the WAAS components at the ZLA WRS.
10/24/2018	10/25/2018	Dallas (ZFW1), Dallas (ZFW2), Dallas (ZFW3)	SSM-50/51: These system support modifications (SSMs) support the cutover to CY18. SSM-50 Upgrades the receiver firmware at the ZFW WRS. SSM-51 updates the software of the WAAS components at the ZFW WRS.
10/30/2018	10/31/2018	Chicago (ZAU1), Chicago (ZAU2), Chicago (ZAU3)	SSM-50/51: These system support modifications (SSMs) support the cutover to CY18. SSM-50 Upgrades the receiver firmware at the ZAU WRS. SSM-51 updates the software of the WAAS components at the ZAU WRS.
10/30/2018	11/01/2018	Miami (ZMA1), Miami (ZMA2), Miami (ZMA3)	SSM-50/51: These system support modifications (SSMs) support the cutover to CY18. SSM-50 Upgrades the receiver firmware at the ZMA WRS. SSM-51 updates the software of the WAAS components at the ZMA WRS.
10/31/2018	11/01/2018	New York (ZNY1), New York (ZNY2), New York (ZNY3)	SSM-50/51: These system support modifications (SSMs) support the cutover to CY18. SSM-50 Upgrades the receiver firmware at the ZNY WRS. SSM-51 updates the software of the WAAS components at the ZNY WRS.
10/31/2018	11/01/2018	Houston (ZHU1), Houston (ZHU2), Houston (ZHU3)	SSM-50/51: These system support modifications (SSMs) support the cutover to CY18. SSM-50 Upgrades the receiver firmware at the ZHU WRS. SSM-51 updates the software of the WAAS components at the ZHU WRS.
10/31/2018	11/01/2018	Billings (BIL1), Billings (BIL2), Billings (BIL3)	SSM-50/51: These system support modifications (SSMs) support the cutover to CY18. SSM-50 Upgrades the receiver firmware at the BIL WRS. SSM-51 updates the software of the WAAS components at the BIL WRS.
11/05/2018	11/07/2018	Anchorage (ZAN1), Anchorage (ZAN2), Anchorage (ZAN3)	SSM-50/51: These system support modifications (SSMs) support the cutover to CY18. SSM-50 Upgrades the receiver firmware at the ZAN WRS. SSM-51 updates the software of the WAAS components at the ZAN WRS.
11/06/2018	11/14/2018	Kansas City (ZKC1), Kansas City (ZKC2), Kansas City (ZKC3)	SSM-50/51: These system support modifications (SSMs) support the cutover to CY18. SSM-50 Upgrades the receiver firmware at the ZKC WRS. SSM-51 updates the software of the WAAS components at the ZKC WRS.
11/06/2018	11/07/2018	Boston (ZBW1), Boston (ZBW2), Boston (ZBW3)	SSM-50/51: These system support modifications (SSMs) support the cutover to CY18. SSM-50 Upgrades the receiver firmware at the ZBW WRS. SSM-51 updates the software of the WAAS components at the ZBW WRS.
11/07/2018	11/08/2018	Cold Bay (CDB1), Cold Bay (CDB2), Cold Bay (CDB3)	SSM-50/51: These system support modifications (SSMs) support the cutover to CY18. SSM-50 Upgrades the receiver firmware at the CDB WRS. SSM-51 updates the software of the WAAS components at the CDB WRS.
11/07/2018	11/08/2018	Kotzebue (OTZ1), Kotzebue (OTZ2), Kotzebue (OTZ3)	SSM-50/51: These system support modifications (SSMs) support the cutover to CY18. SSM-50 Upgrades the receiver firmware at the OTZ WRS. SSM-51 updates the software of the WAAS components at the OTZ WRS.
11/07/2018	11/08/2018	Memphis (ZME1), Memphis (ZME2), Memphis (ZME3)	SSM-50/51: These system support modifications (SSMs) support the cutover to CY18. SSM-50 Upgrades the receiver firmware at the ZME WRS. SSM-51 updates the software of the WAAS components at the ZME WRS.

Start Date	End Date	Location Satellite	Event Description
11/07/2018	11/08/2018	Winnipeg (YWG1), Winnipeg (YWG2), Winnipeg (YWG3)	SSM-50/51: These system support modifications (SSMs) support the cutover to CY18. SSM-50 Upgrades the receiver firmware at the YWG WRS. SSM-51 updates the software of the WAAS components at the YWG WRS.
11/08/2018	11/09/2018	Puerto Vallarta (MPR1), Puerto Vallarta (MPR2), Puerto Vallarta (MPR3)	SSM-50/51: These system support modifications (SSMs) support the cutover to CY18. SSM-50 Upgrades the receiver firmware at the MPR WRS. SSM-51 updates the software of the WAAS components at the MPR WRS.
11/14/2018	11/15/2018	San Jose Del Cabo (MSD1), San Jose Del Cabo (MSD2), San Jose Del Cabo (MSD3)	SSM-50/51: These system support modifications (SSMs) support the cutover to CY18. SSM-50 Upgrades the receiver firmware at the MSD WRS. SSM-51 updates the software of the WAAS components at the MSD WRS.
11/14/2018	11/15/2018	San Juan (ZSU1), San Juan (ZSU2), San Juan (ZSU3)	SSM-50/51: These system support modifications (SSMs) support the cutover to CY18. SSM-50 Upgrades the receiver firmware at the ZSU WRS. SSM-51 updates the software of the WAAS components at the ZSU WRS.
11/28/2018	11/29/2018	Gander (YQX1), Gander (YQX2), Gander (YQX3)	SSM-50/51: These system support modifications (SSMs) support the cutover to CY18. SSM-50 Upgrades the receiver firmware at the YQX WRS. SSM-51 updates the software of the WAAS components at the YQX WRS.
11/29/2018	11/30/2018	Mexico City (MMX1), Mexico City (MMX2), Mexico City (MMX3)	SSM-50/51: These system support modifications (SSMs) support the cutover to CY18. SSM-50 Upgrades the receiver firmware at the MMX WRS. SSM-51 updates the software of the WAAS components at the MMX WRS.
12/03/2018	12/04/2018	Merida (MMD1), Merida (MMD2), Merida (MMD3)	SSM-50/51: These system support modifications (SSMs) support the cutover to CY18. SSM-50 Upgrades the receiver firmware at the MMD WRS. SSM-51 updates the software of the WAAS components at the MMD WRS.
12/04/2018	12/05/2018	Iqaluit (YFB1), Iqaluit (YFB2), Iqaluit (YFB3)	SSM-50/51: These system support modifications (SSMs) support the cutover to CY18. SSM-50 Upgrades the receiver firmware at the YFB WRS. SSM-51 updates the software of the WAAS components at the YFB WRS.
12/05/2018	12/06/2018	Goose Bay (YYR1), Goose Bay (YYR2), Goose Bay (YYR3)	SSM-50/51: These system support modifications (SSMs) support the cutover to CY18. SSM-50 Upgrades the receiver firmware at the YYR WRS. SSM-51 updates the software of the WAAS components at the YYR WRS.
12/06/2018	12/07/2018	Tapachula (MTP1), Tapachula (MTP2), Tapachula (MTP3)	SSM-50/51: These system support modifications (SSMs) support the cutover to CY18. SSM-50 Upgrades the receiver firmware at the MTP WRS. SSM-51 updates the software of the WAAS components at the MTP WRS.
12/11/2018	12/12/2018	Fairbanks (FAI1), Fairbanks (FAI2), Fairbanks (FAI3)	SSM-50/51: These system support modifications (SSMs) support the cutover to CY18. SSM-50 Upgrades the receiver firmware at the FAI WRS. SSM-51 updates the software of the WAAS components at the FAI WRS.
12/14/2018	12/14/2018		SSM-50: These system support modifications (SSMs) support the cutover to CY18. SSM-50 installs a new USB Extension Cable at the POCC O&M as well as upgrades the firmware to build AW3MM0002RN0000.
12/14/2018	12/14/2018		SSM-50: These system support modifications (SSMs) support the cutover to CY18. SSM-50 installs a new USB Extension Cable at the NOCC O&M as well as upgrades the firmware to build AW3MM0002RN0000.

Table 1-7 GUS Switchovers

Start Date	End Date	GUS Switch	Location Satellite	Service Affected	Event Description
10/09/2018	10/09/2018	Manual	GEO131, Southbury (DX1)	LPV200_Alaska	The uplink for the SM9 GEO, PRN131 switched from the Southbury uplink site to the Santa Paula uplink site at 19:29:09 GMT. This caused a 9-second outage of the GEO 131 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN131. The elevated UDREs on GEO 131 caused minor degradation of LPV200 service coverage in Alaska from 17:15:00 GMT to 17:25:00 GMT. TOW 242949-242959.
10/10/2018	10/10/2018	Manual	GEO131, Santa_Paula (SZ1)	LPV200_Alaska	The uplink for the SM9 GEO, PRN131 switched from the Santa Paula uplink site to the Southbury uplink site at 08:02:00 GMT. This caused a 7-second outage of the GEO 131 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN131. The elevated UDREs on GEO 131 caused minor degradation of LPV200 service coverage in Alaska from 17:15:00 GMT to 17:25:00 GMT. TOW 288125-288133.
10/27/2018	10/28/2018	Faulted	GEO131, Southbury (DX1)	None	The uplink for the SM9 GEO, PRN131 switched from the Southbury uplink site to the Santa Paula uplink site at 13:23:00 GMT. This caused a 16-second outage of the GEO 131 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN131. TOW 520110-520127.
11/23/2018	11/23/2018	Faulted	GEO131, Santa_Paula (SZ1)	None	The uplink for the SM9 GEO, PRN131 switched from the Santa Paula uplink site to the Southbury uplink site at 22:46:00 GMT. This caused a 16-second outage of the GEO 131 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN131. The elevated UDREs on GEO 131 caused a brief LPV200 service outage in Alaska from 14:10:00 GMT to 14:15:00 GMT on 11/24. TOW 513983-514000.

Start Date	End Date	GUS Switch	Location Satellite	Service Affected	Event Description
11/26/2018	11/27/2018	Manual	GEO131, Southbury (DX1)	LPV200_Alaska	The uplink for the SM9 GEO, PRN131 switched from the Southbury uplink site to the Santa Paula uplink site at 13:23:00 GMT. This caused an 8-second outage of the GEO 131 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN131. The elevated UDREs on GEO 131 caused minor degradation of LPV200 service coverage in Alaska from 14:00:00 GMT to 14:10:00 GMT on 11/26 and 11/27. TOW 134581-134590.
12/04/2018	12/04/2018	Manual	GEO131, Santa_Paula (SZ1)	LPV200_Alaska	The uplink for the SM9 GEO, PRN131 switched from the Santa Paula uplink site to the Southbury uplink site at 06:17:00 GMT. This caused a 7-second outage of the GEO 131 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN131. The elevated UDREs on GEO 131 caused minor degradation of LPV200 service coverage in Alaska from 13:29:00 GMT to 13:35:00 GMT. TOW 195455-195463.

1.2 Report Overview

Section 2.0 provides the observed Localizer Performance with Vertical Guidance (LPV) and NPA performance for the evaluated receiver locations (see Table 1-2 and Table 1-3). This section also shows tabulated data for the 95% accuracy and the maximum inaccuracy. In addition, the daily 95% accuracy for each receiver and the histograms of vertical and horizontal error are shown.

Section 3.0 provides the summary of the WAAS instantaneous availability performance at each receiver for three operational service levels. In addition, the daily availability, number of outages, and outage rate for each evaluated receiver are also reported.

Section 4.0 provides geographic plots of the WAAS service availability. Also shown in this section are plots of the percentage of the Continental United States (CONUS) and Alaska service areas covered by various levels of service availability.

Section 5.0 provides the summary of the Hazardous Misleading Information (HMI) analysis as well as a safety margin index for each receiver. This section also shows update rates of WAAS messages transmitted from CRE, CRW, and AMR.

Section 6.0 provides the UDRE and GIVE bounding percentages and the 95% index of the range and ionospheric accuracy for each satellite tracked by the WAAS receiver at 12 locations.

Section 7.0 provides the GEO ranging performance for CRE and CRW.

Section 8.0 provides the WAAS LPV availability and outages at selected airports.

Section 9.0 provides the assessment of WAAS CNMP bounding for 114 WAAS receivers.

Section 10.0 provides surveyed positions of all Wide-Area Reference Equipment (WRE) and the difference between the WRE survey positions and the survey positions using both the National Geodetic Survey (NGS) Online Positioning Use Server (OPUS) and the Canadian Spatial Reference System (CSRS) Precise Point Positioning (PPP) service.

Section 11.0 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 using the GPS/WAAS position solution tool to compute a RTCA DO-229D-weighted least squares user navigation solution and WAAS horizontal protection level (HPL) and vertical protection level (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 signal in space (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 lateral navigation (LNAV)/vertical navigation (VNAV) operational service levels as well as 95% SPS accuracy for certain locations. Note that WAAS accuracy statistics presented are compiled only when all WAAS corrections (i.e., fast, long term, and ionospheric corrections) for at least four satellites are available; this is referred to as PA navigation mode. Table 2-1 also shows the percentage of time PA navigation mode was supported by WAAS at each receiver. The maximum and minimum LPV errors for this reporting period are:

- The maximum 95% CONUS horizontal LPV error was 1.416 meters observed at Arcata.
- The maximum 95% CONUS vertical LPV error was 1.667 meters observed at Miami.
- The minimum 95% CONUS horizontal LPV errors was 0.528 meters observed at Oakland.
- The minimum 95% CONUS vertical LPV error was 0.820 meters observed at Salt Lake City.

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	1.416	1.416	1.368	100	*	*
Atlantic City	1.172	1.172	1.608	100	*	*
Oklahoma City	0.832	0.832	1.115	100	*	*
Albuquerque	0.632	0.632	0.859	100	1.46	4.32
Anchorage	0.674	0.674	1.289	100	*	*
Atlanta	0.869	0.869	1.305	100	1.75	4.14
Barrow	0.624	0.624	1.181	100	*	*
Bethel	0.566	0.566	0.953	100	1.39	4.28
Billings	0.680	0.680	0.878	100	1.67	3.83
Boston	0.996	0.996	1.037	100	1.96	3.69
Chicago	0.998	0.998	0.954	100	*	*
Cleveland	0.842	0.842	0.896	100	1.94	3.90
Cold Bay	0.610	0.610	1.079	100	*	*
Dallas	0.658	0.658	1.269	100	*	*
Denver	0.607	0.607	0.867	100	*	*
Fairbanks	0.684	0.684	1.139	100	1.36	4.13
Gander	1.000	1.000	1.084	100	*	*
Goose Bay	0.881	0.881	0.950	100	*	*
Houston	0.663	0.663	1.411	100	*	*
Iqaluit	0.932	0.932	1.291	100	*	*
Jacksonville	0.812	0.812	1.455	100	*	*
Juneau	0.673	0.673	1.256	100	*	*
Kansas City	0.690	0.690	1.014	100	1.78	4.09
Kotzebue	0.597	0.597	1.205	100	1.41	4.31
Los Angeles	0.779	0.779	1.106	100	1.60	4.62
Memphis	0.682	0.682	1.129	100	*	*
Merida	0.678	0.678	1.639	100	*	*
Mexico City	0.595	0.595	1.744	100	*	*
Miami	0.902	0.902	1.667	100	1.57	4.32
Minneapolis	0.814	0.814	0.893	100	1.87	3.99
New York	0.950	0.950	1.040	100	*	*
Oakland	0.528	0.528	1.164	100	1.65	4.62
Puerto Vallarta	0.633	0.633	1.565	100	*	*
Salt Lake City	0.621	0.621	0.820	100	1.52	4.08
San Jose Del Cabo	0.623	0.623	1.722	100	*	*
Seattle	0.685	0.685	0.880	100	1.58	3.97
Washington DC	1.077	1.077	1.063	100	1.96	3.88
Winnipeg	0.677	0.677	0.906	100	*	*

* SPS data not available.

NPA navigation mode is when only WAAS fast and long term corrections are available to a user (i.e., no ionospheric corrections). Table 2-2 shows the 95%, 99.999%, and maximum NPA horizontal position accuracy. The maximum and minimum NPA errors for this reporting period are as below:

- The maximum 95% horizontal error was 2.943 meters observed at Honolulu.
- The maximum 99.999% horizontal error was 7.333 meters observed at Anchorage.
- The minimum 95% horizontal error was 0.837 meters observed at Barrow.
- The minimum 99.999% horizontal error was 1.765 meters observed at Albuquerque.

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

Location	95% Horizontal (Meters)	99.999% Horizontal (Meters)	Percentage in NPA Mode (%)	Maximum Horizontal Error (Meters)
Albuquerque	0.978	1.765	100	2.558
Anchorage	0.983	2.068	100	2.674
Atlanta	1.407	2.471	100	2.716
Barrow	0.837	1.814	100	2.181
Bethel	1.141	2.015	100	2.151
Billings	1.347	2.799	100	2.960
Boston	1.847	2.839	100	3.000
Cleveland	1.644	3.096	100	3.339
Cold Bay	1.284	2.348	100	2.630
Fairbanks	1.072	2.026	100	2.724
Gander	1.758	2.655	100	2.752
Honolulu	2.943	6.782	100	6.975
Houston	1.310	2.364	100	2.630
Iqaluit	1.023	2.176	100	3.477
Juneau	1.067	2.154	100	2.284
Kansas City	1.327	2.327	100	2.511
Kotzebue	0.886	2.180	100	2.929
Los Angeles	1.221	2.463	100	2.580
Merida	1.135	3.926	100	4.115
Miami	1.369	3.308	100	3.491
Minneapolis	1.447	2.591	100	2.812
Oakland	1.076	2.042	100	2.217
Salt Lake City	1.098	2.046	100	2.264
San Jose Del Cabo	1.280	2.600	100	2.809
San Juan	1.062	3.808	100	4.045
Seattle	1.212	2.529	100	2.945
Tapachula	1.256	6.444	100	6.812
Washington DC	1.948	3.399	100	3.538

Table 2-3 shows the quarterly maximum LPV error statistics: (1) the column Horizontal Error column shows the maximum position errors while the calculated HPL meets the LPV service level defined in Table 1-1, (2) the Vertical Error column shows the maximum position errors while the calculated VPL meets the LPV service level, (3) the Horizontal Error/HPL column and the Vertical Error/VPL column show the ratio of position error to protection level at the time the maximum error occurred, (4) the Horizontal Maximum Ratio column and the Vertical Maximum Ratio column show the maximum position error to protection level ratio for the quarter. During this reporting period, the maximum LPV horizontal error was 2.625 meters occurred at Arcata and maximum vertical LPV error was 5.406 meters occurred at San Jose Del Cabo.

Table 2-3 Maximum LPV Error Statistics

Location	Horizontal Error (m)	Horizontal Error/HPL Ratio	Horizontal Maximum Ratio	Vertical Error (m)	Vertical Error/VPL Ratio	Vertical Maximum Ratio
Arcata	2.625	0.261	0.263	3.531	0.120	0.186
Atlantic City	2.373	0.155	0.224	3.945	0.174	0.198
Oklahoma City	1.773	0.106	0.188	2.600	0.178	0.191
Albuquerque	1.392	0.145	0.145	2.542	0.084	0.131
Anchorage	1.736	0.140	0.142	2.842	0.101	0.155
Atlanta	1.837	0.182	0.192	2.581	0.101	0.186
Barrow	1.993	0.162	0.162	4.974	0.164	0.183
Bethel	1.518	0.065	0.093	2.521	0.112	0.116
Billings	1.553	0.156	0.159	2.163	0.145	0.145
Boston	1.792	0.144	0.157	2.816	0.158	0.158
Chicago	1.725	0.190	0.195	2.676	0.115	0.160
Cleveland	1.942	0.110	0.188	2.333	0.095	0.150
Cold Bay	1.621	0.096	0.097	2.807	0.094	0.117
Dallas	1.322	0.170	0.170	2.835	0.166	0.186
Denver	1.475	0.126	0.149	2.336	0.097	0.138
Fairbanks	1.792	0.112	0.150	3.895	0.122	0.198
Gander	1.877	0.117	0.123	2.798	0.116	0.121
Goose Bay	1.845	0.081	0.146	2.595	0.125	0.125
Houston	1.529	0.121	0.169	3.083	0.177	0.214
Iqaluit	2.609	0.153	0.200	4.617	0.175	0.175
Jacksonville	1.553	0.150	0.176	2.889	0.169	0.191
Juneau	1.469	0.131	0.144	3.067	0.179	0.179
Kansas City	1.389	0.115	0.159	2.783	0.130	0.155
Kotzebue	2.122	0.111	0.132	4.965	0.184	0.187
Los Angeles	1.678	0.101	0.134	3.008	0.108	0.137
Memphis	1.567	0.095	0.176	2.678	0.114	0.166
Merida	1.943	0.157	0.157	4.067	0.159	0.185
Mexico City	1.547	0.064	0.114	3.395	0.108	0.149
Miami	1.746	0.110	0.163	3.418	0.156	0.185
Minneapolis	1.593	0.177	0.179	2.959	0.145	0.151
New York	1.856	0.161	0.161	2.001	0.136	0.136
Oakland	1.378	0.121	0.121	2.466	0.082	0.139
Puerto Vallarta	1.608	0.084	0.129	3.595	0.123	0.163
Salt Lake City	1.521	0.146	0.160	1.970	0.138	0.149
San Jose Del Cabo	1.767	0.089	0.108	5.406	0.122	0.148
Seattle	1.579	0.147	0.164	2.220	0.111	0.132
Washington DC	2.175	0.203	0.203	2.734	0.139	0.151
Winnipeg	1.325	0.129	0.135	2.361	0.111	0.138

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

- November 4–5, 2018—Position errors in CONUS, and Alaska were elevated. The maximum 95% horizontal and vertical LPV errors were 1.374 meters and 2.292 meters at Atlantic City and Barrow, respectively. The Kp index was 5 and 6, respectively.
- December 28, 2018—Position errors in Canada, and Mexico were elevated. The maximum 95% horizontal and vertical LPV errors were 1.105 meters and 2.400 meters at Gander and Mexico City, respectively. The Kp index range was 5.

Figure 2-1 LPV 95% Horizontal Accuracy

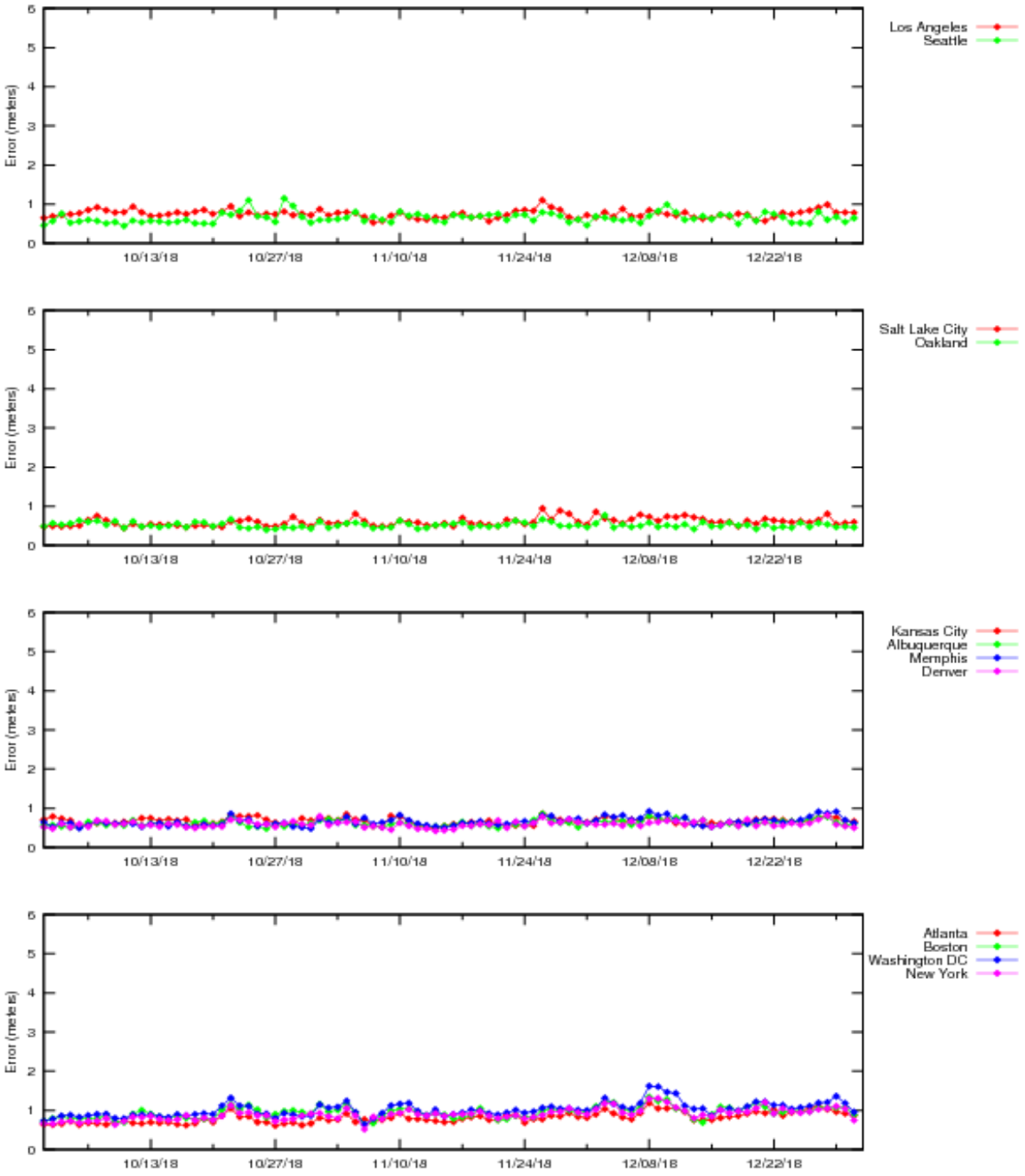


Figure 2-2 LPV 95% Horizontal Accuracy

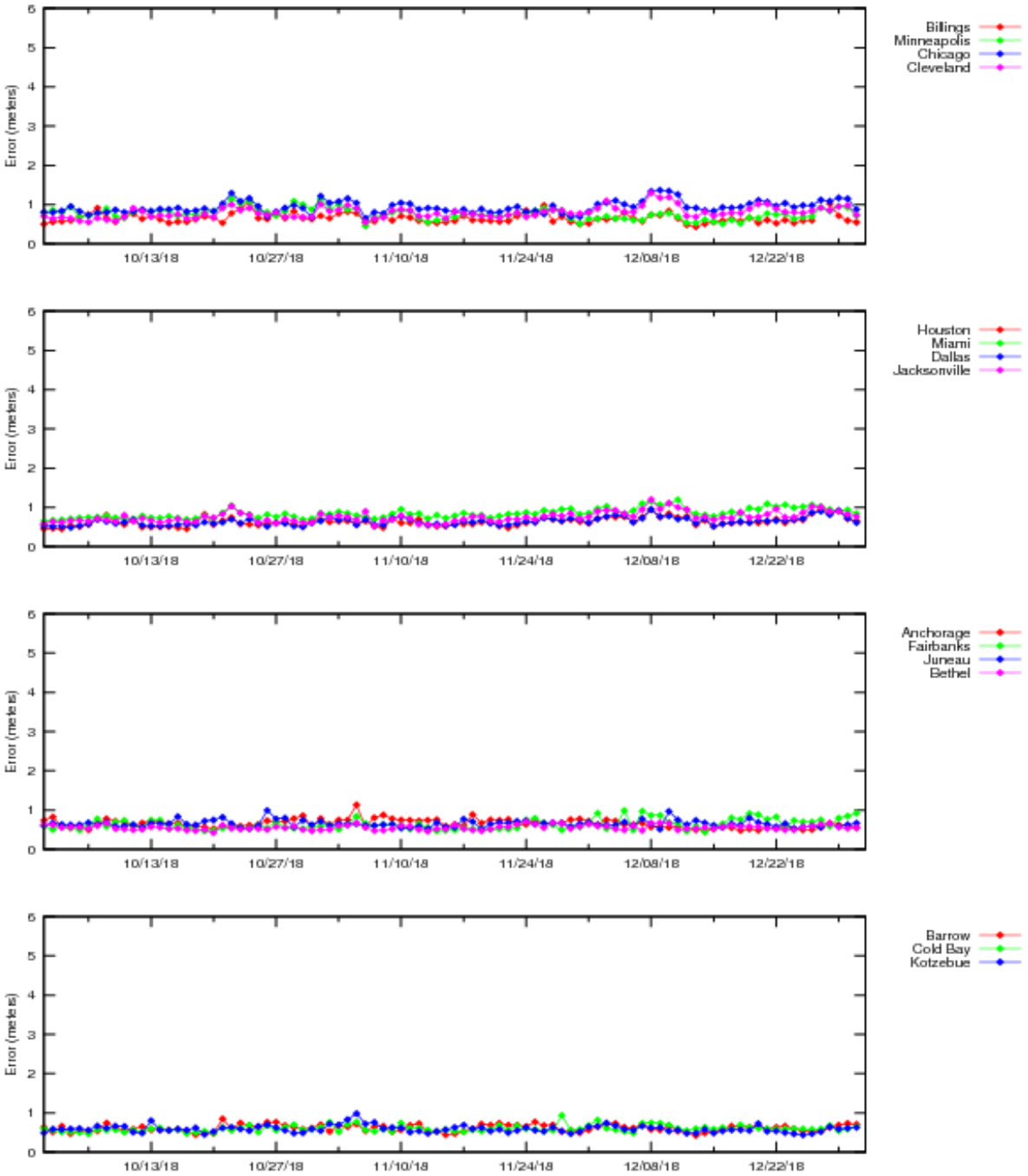


Figure 2-3 LPV 95% Horizontal Accuracy

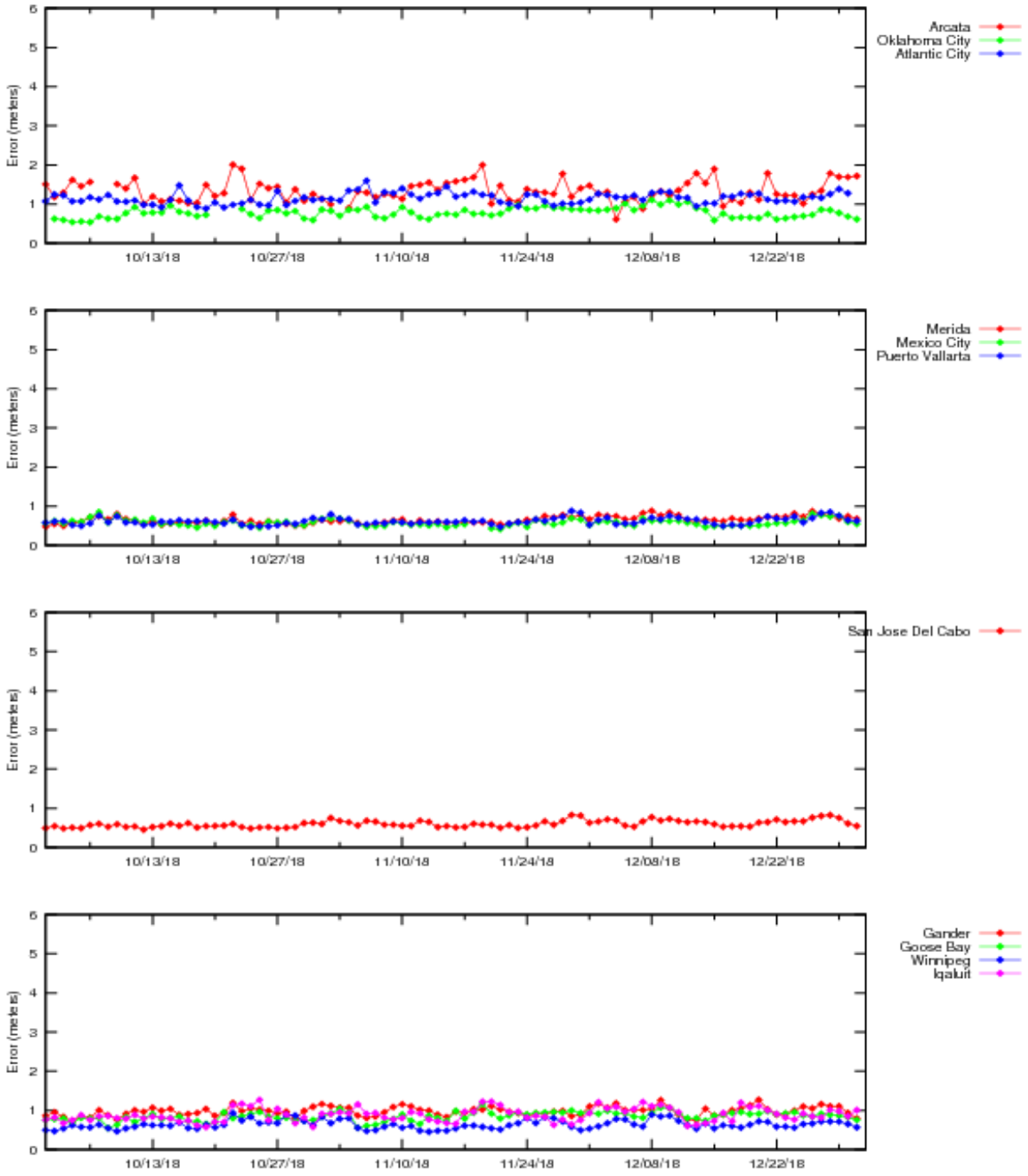


Figure 2-4 LPV 95% Vertical Accuracy

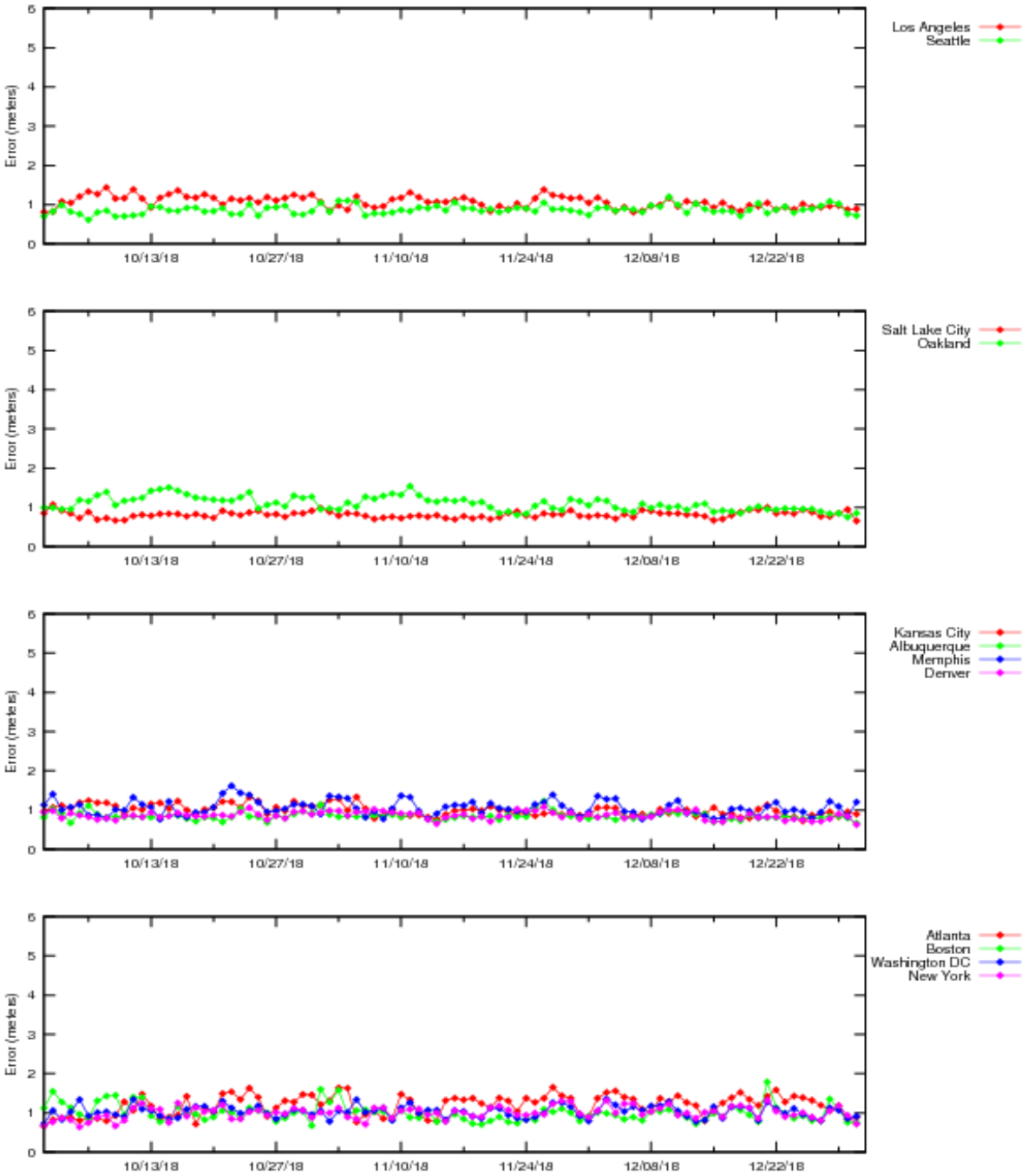


Figure 2-5 LPV 95% Vertical Accuracy

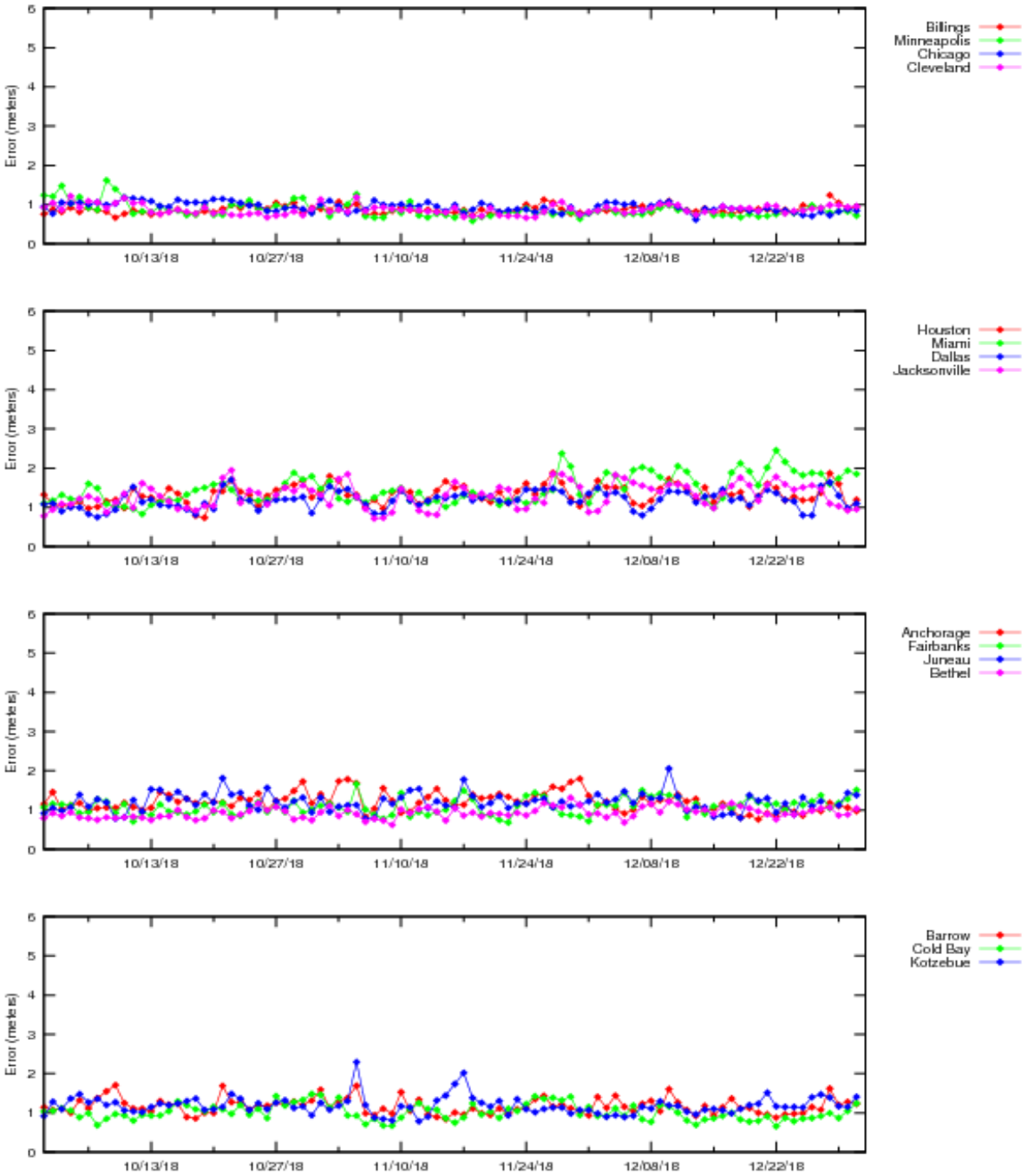


Figure 2-6 LPV 95% Vertical Accuracy

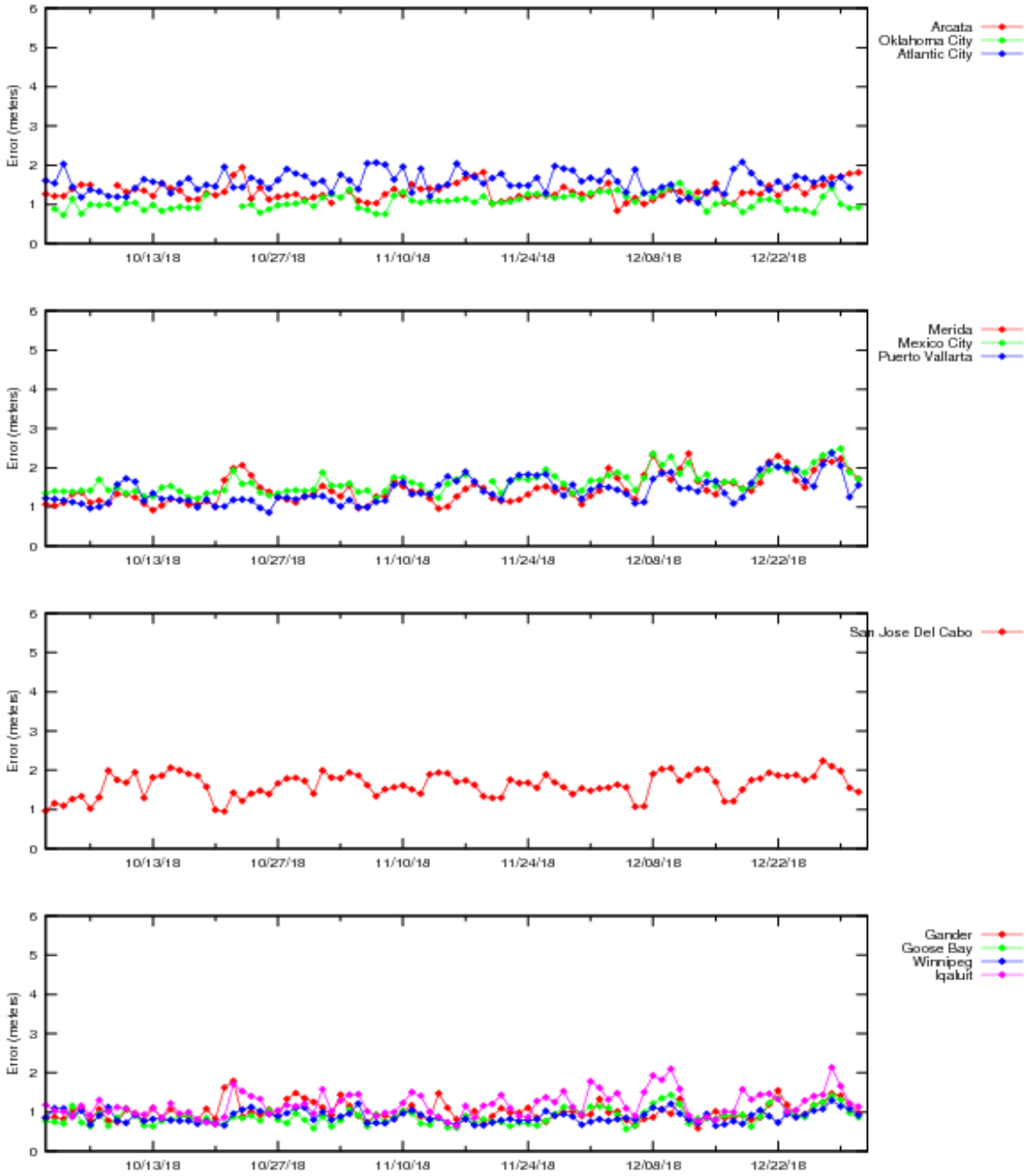


Figure 2-7 and Figure 2-8 show the daily NPA 95% horizontal accuracy at the NPA evaluation sites for the reporting period. The increases in 95% NPA position errors due to geomagnetic activity occurred on October 7 and December 2, 2018.

Figure 2-7 NPA 95% Horizontal Accuracy

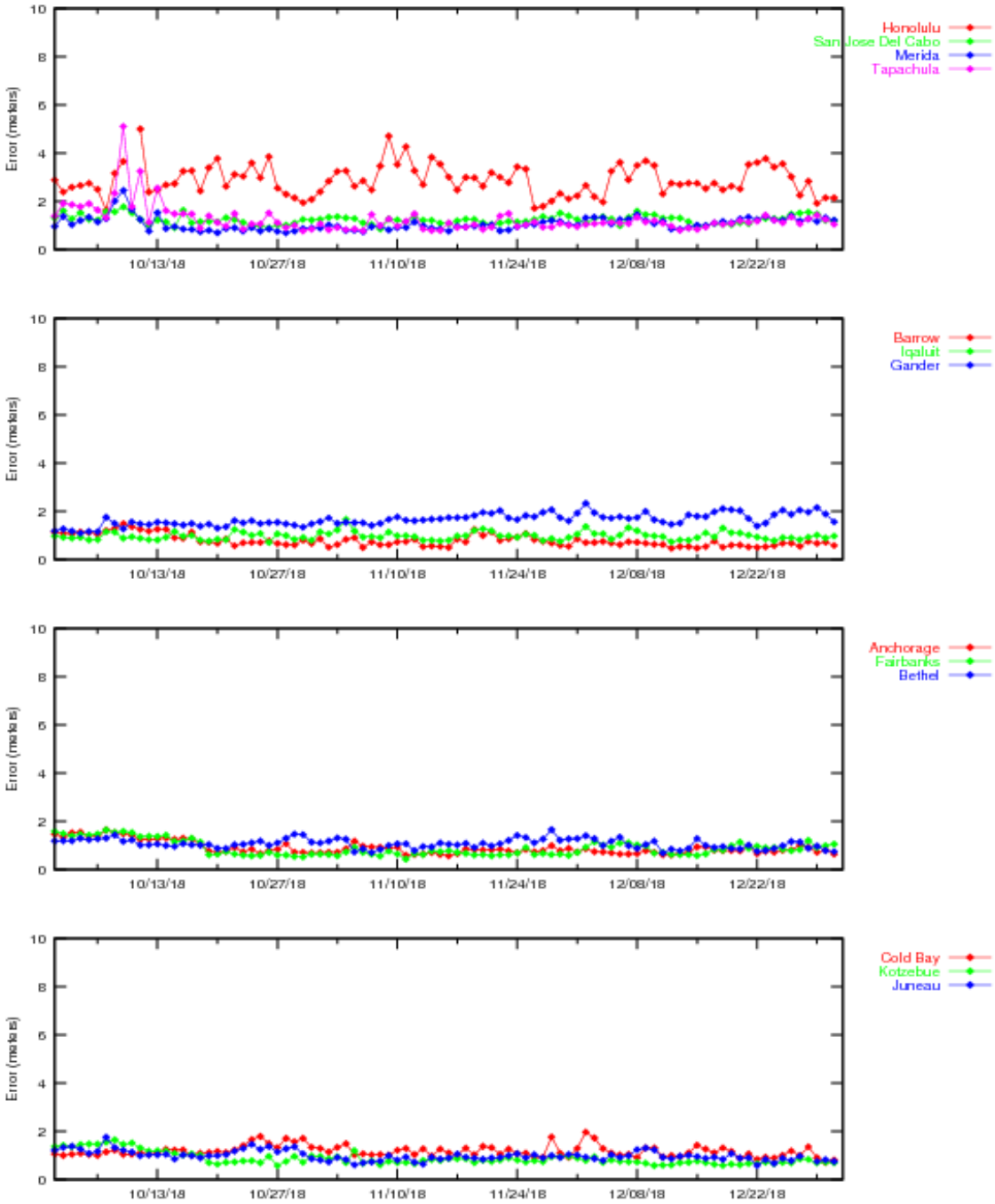


Figure 2-8 NPA 95% Horizontal Accuracy

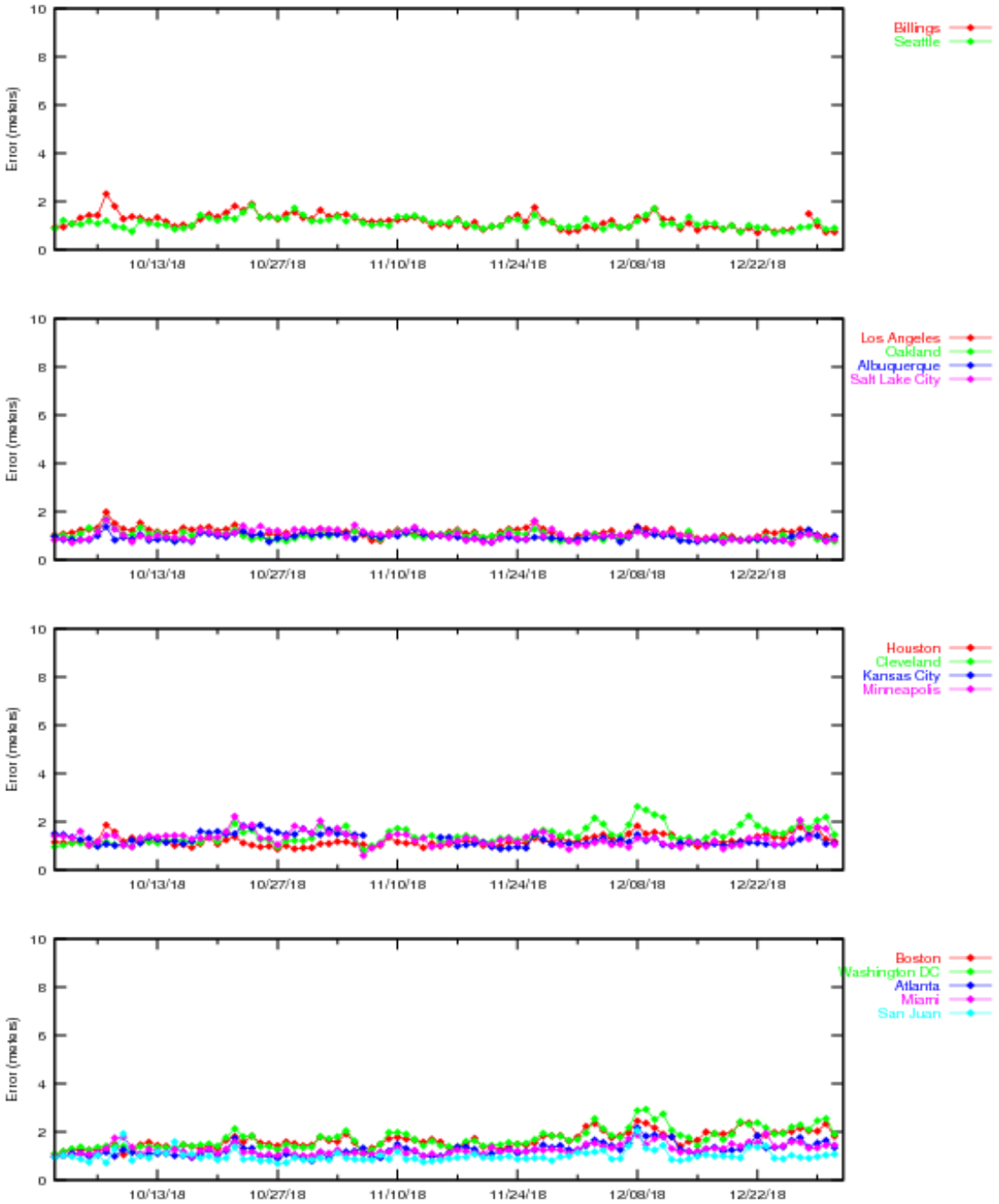


Figure 2-9 through Figure 2-12 show the distributions of the vertical and horizontal errors at all 38 WAAS receiver for the quarter. Figure 2-9 and Figure 2-10 show the triangular distributions of vertical position error (VPE) versus VPL and horizontal position error (HPE) versus HPL: (1) the horizontal axis is the position error, (2) the vertical axis is the WAAS protection level where lower protection levels equate to better availability, (3) the diagonal line shows the point where error equals protection level, (4) above and to the left of the diagonal line show where errors are bounded (WAAS is providing integrity in the position domain), and (5) below and to the right show where errors are not bounded (HMI could be present). Figure 2-11 and Figure 2-12 show the 2-D histograms of HPE, VPE, and normalized position errors: (1) the blue trace shows the distributions of the actual HPE and VPE; (2) 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; (3)

the magenta trace shows the distributions of the actual horizontal and vertical errors normalized by one-sigma value of the protection level: horizontal protection level (HPL/6.0) and vertical protection level (VPL/5.33); (4) 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. The narrowness of the normalized error distributions indicates good safety performance.

Figure 2-9 LPV Horizontal Error Bounding Triangle Chart

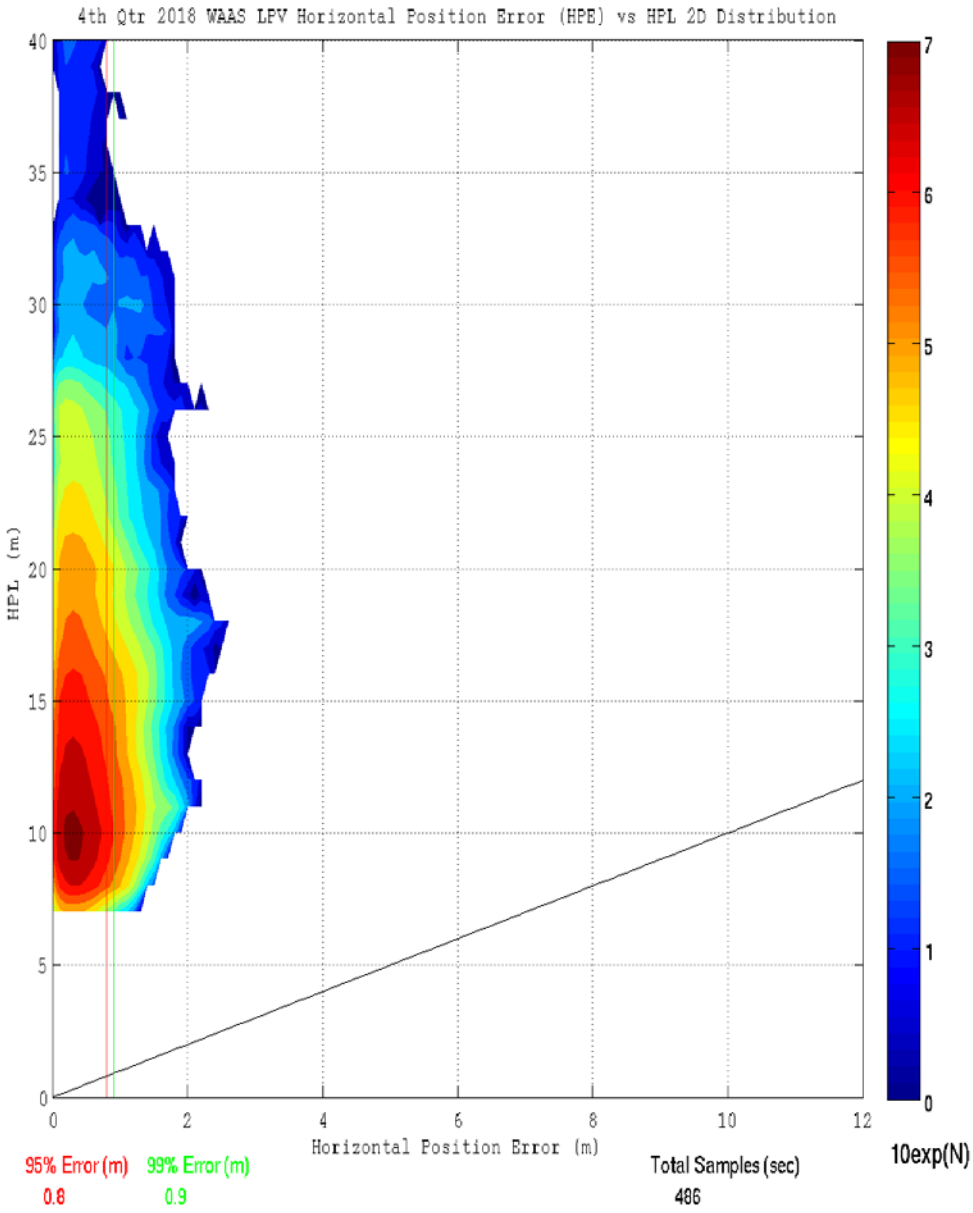


Figure 2-10 LPV Vertical Error Bounding Triangle Chart

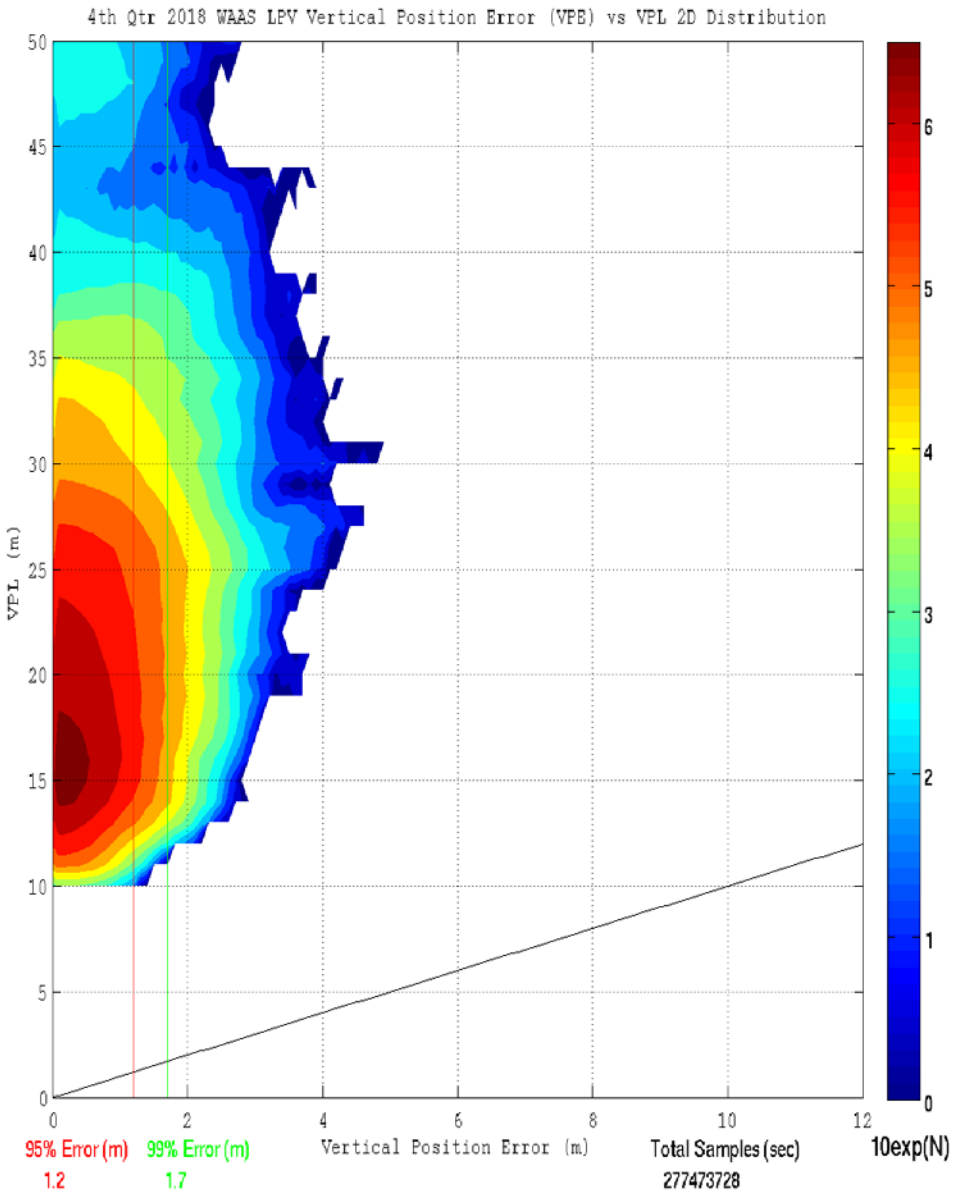


Figure 2-11 LPV 2-D Horizontal Error Distribution Histogram

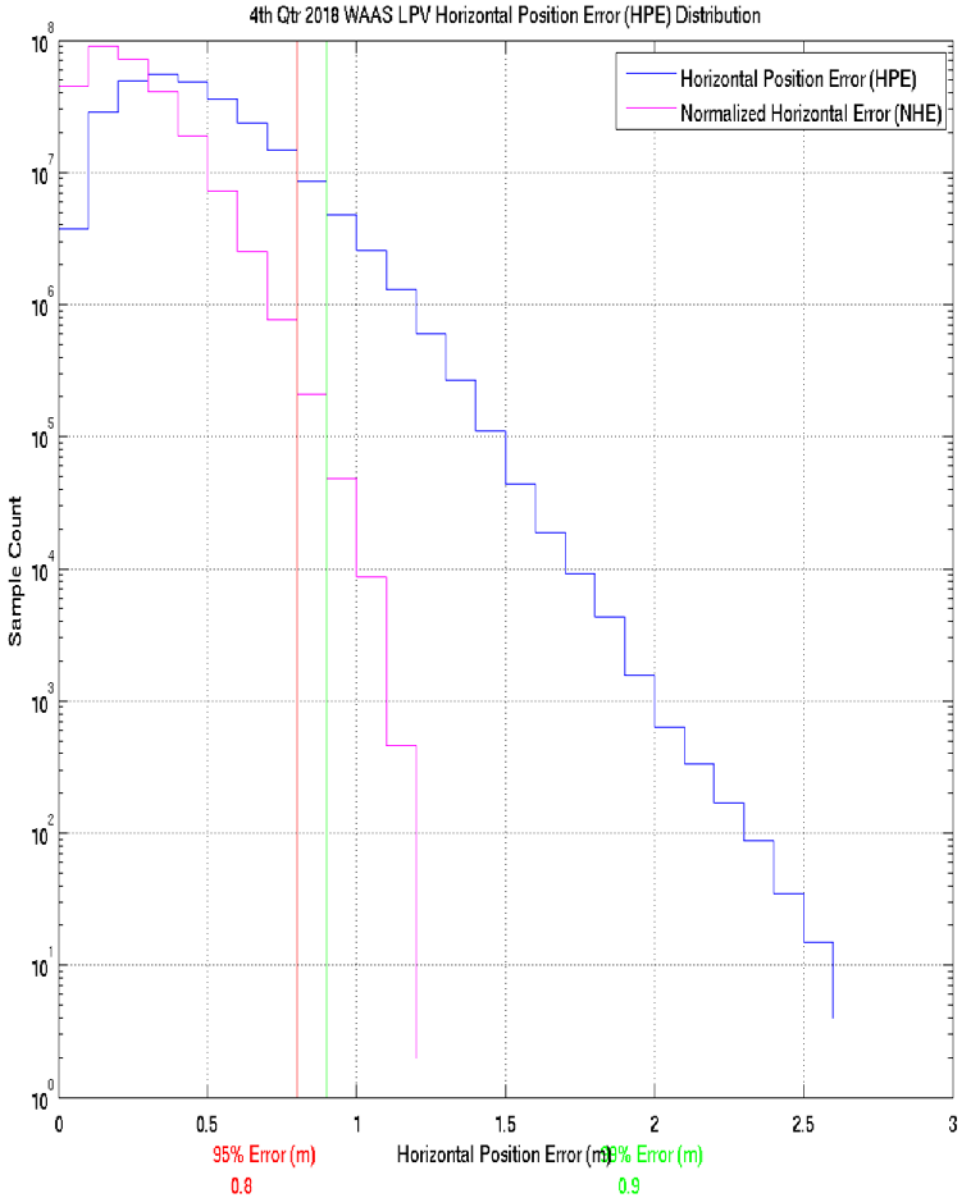
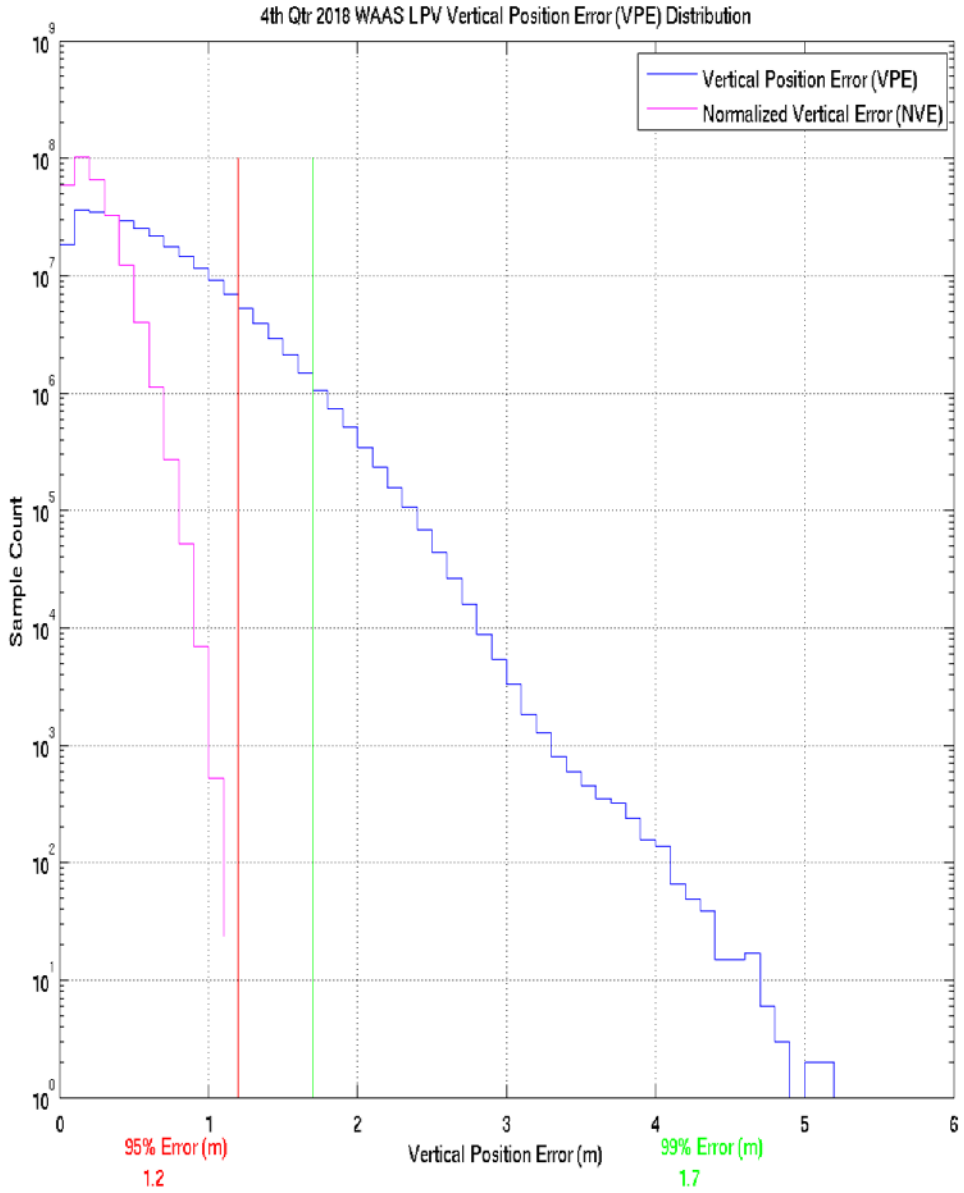


Figure 2-12 LPV 2-D Vertical Error Distribution Histogram



3.0 AVAILABILITY

The WAAS availability evaluation documents the percentage of time the WAAS provided service for the operational service levels defined in Table 1-1. The RTCA DO-229D VPL and HPL were computed for each evaluated receiver. Figure 3-1 shows the evaluated receivers, the 99% maintained protection levels, and the percentage in PA mode (described in Section 2.0). The maximum and minimum VPL and HPL for this reporting period are listed as:

- The maximum 99% CONUS HPL was 16.772 meters observed at Cleveland.
- The maximum 99% CONUS VPL was 28.774 meters observed at Oakland.
- The minimum 99% CONUS HPL was 10.729 meters observed at Dallas.
- The minimum 99% CONUS VPL was 20.043 meters observed at Kansas City.
- The maximum 99% Alaska HPL was 19.744 meters observed at Cold Bay.
- The maximum 99% Alaska VPL was 32.283 meters observed at Barrow.

- The minimum 99% Alaska HPL was 12.982 meters observed at Juneau.
- The minimum 99% Alaska VPL was 22.433 meters observed at Anchorage.

Table 3-1 99% Protection Level

Location	99% HPL (Meters)	99% VPL (Meters)	Percentage in PA mode
Arcata	13.357	28.589	100
Atlantic City	16.593	23.434	100
Oklahoma City	11.206	22.707	100
Albuquerque	11.353	20.818	100
Anchorage	13.782	22.433	100
Atlanta	12.286	23.586	100
Barrow	16.187	32.283	100
Bethel	15.384	23.781	100
Billings	12.511	20.450	100
Boston	15.688	21.474	100
Chicago	12.711	20.443	100
Cleveland	16.772	24.075	100
Cold Bay	19.744	26.370	100
Dallas	10.729	23.054	100
Denver	11.100	20.148	100
Fairbanks	13.398	23.186	100
Gander	24.265	29.602	100
Goose Bay	17.254	27.342	100
Houston	11.164	24.341	100
Iqaluit	18.729	28.928	100
Jacksonville	13.162	24.638	100
Juneau	12.982	23.501	100
Kansas City	11.576	20.043	100
Kotzebue	15.396	26.796	100
Los Angeles	14.288	27.951	100
Memphis	11.335	23.205	100
Merida	18.876	36.373	100
Mexico City	21.703	33.643	100
Miami	16.046	26.724	100
Minneapolis	12.504	20.597	100
New York	14.946	21.594	100
Oakland	14.050	28.774	100
Puerto Vallarta	24.138	35.119	100
Salt Lake City	11.157	21.719	100
San Jose Del Cabo	21.430	32.514	100
Seattle	12.573	22.108	100
Washington DC	15.626	23.130	100
Winnipeg	13.993	21.347	100

Availability of LP, LPV, and LPV200 services are evaluated by monitoring the WAAS protection levels at receiver locations. Service is available when the VPL is less than the vertical alert limit (VAL) and the HPL is less than the horizontal alert limit (HAL). When the protection level exceeds the alert limit, the service is unavailable and an outage in service is recorded along with its duration. The operational service is not available again until both protection levels are within the alert limits for at least 15 minutes. Although this will cause minimal reduction in operational service availability, it will substantially reduce the number of service outages and prevent excessive switching in/out of service availability.

Table 3-2 shows the percentage of time LP, LPV, and LPV200 service is available using the 15-minute window criteria. Table 3-3 shows LP, LPV, and LPV200 service outages and associated outage rates. The outage rate is the

percentage of theoretically interrupted approaches through a loss of operational service once the approach had started. Figure 3-1 through Figure 3-6 show the daily availability of LPV and LPV200 service levels. Figure 3-7 through Figure 3-12 show the daily interruptions of LPV and LPV200 service levels.

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

Location	LP WAAS With 15 Minute Window (%)	LPV WAAS With 15 Minute Window (%)	LPV200 WAAS With 15 Minute Window (%)
Arcata	100	100	99.97
Atlantic City	100	100	100
Oklahoma City	100	100	100
Albuquerque	100	100	100
Anchorage	100	100	100
Atlanta	100	100	100
Barrow	100	99.97	99.21
Bethel	100	100	100
Billings	100	100	100
Boston	100	100	100
Chicago	100	100	100
Cleveland	100	100	100
Cold Bay	100	100	99.99
Dallas	100	100	100
Denver	100	100	100
Fairbanks	100	100	99.94
Gander	100	100	99.96
Goose Bay	100	100	99.99
Houston	100	100	100
Iqaluit	100	100	99.95
Jacksonville	100	100	99.99
Juneau	100	100	100
Kansas City	100	100	100
Kotzebue	100	100	99.94
Los Angeles	100	100	99.98
Memphis	100	100	100
Merida	100	99.44	98.09
Mexico City	100	99.98	99.41
Miami	100	100	99.97
Minneapolis	100	100	100
New York	100	100	100
Oakland	100	100	99.98
Puerto Vallarta	99.99	99.98	98.62
Salt Lake City	100	100	100
San Jose Del Cabo	100	100	99.62
Seattle	100	100	100
Washington DC	100	100	99.99
Winnipeg	100	100	100

Table 3-3 LPV and LPV200 Outage Rate (Per 150 sec approach)

Location	LP Outages (Number)	LP Outage Rates	LPV Outages (Number)	LPV Outage Rates	LPV200 Outages (Number)	LPV200 Outage Rates
Arcata	0	0	1	0.000020	3	0.000059
Atlantic City	0	0	0	0	0	0
Oklahoma City	0	0	0	0	0	0
Albuquerque	0	0	0	0	2	0.000038
Anchorage	0	0	0	0	1	0.000019
Atlanta	0	0	0	0	0	0
Barrow	0	0	10	0.000189	110	0.002094
Bethel	0	0	0	0	1	0.000019
Billings	0	0	0	0	1	0.000019
Boston	0	0	0	0	0	0
Chicago	0	0	0	0	0	0
Cleveland	0	0	0	0	0	0
Cold Bay	1	0.000019	1	0.000019	3	0.000057
Dallas	0	0	0	0	0	0
Denver	0	0	0	0	1	0.000019
Fairbanks	0	0	0	0	23	0.000434
Gander	0	0	0	0	5	0.000094
Goose Bay	0	0	0	0	1	0.000019
Houston	0	0	0	0	0	0
Iqaluit	0	0	2	0.000038	16	0.000302
Jacksonville	0	0	0	0	1	0.000019
Juneau	0	0	1	0.000019	1	0.000019
Kansas City	0	0	0	0	0	0
Kotzebue	0	0	1	0.000019	27	0.000511
Los Angeles	0	0	1	0.000019	3	0.000057
Memphis	0	0	0	0	0	0
Merida	0	0	83	0.001576	236	0.004543
Mexico City	0	0	9	0.000174	115	0.002239
Miami	0	0	1	0.000019	2	0.000038
Minneapolis	0	0	0	0	0	0
New York	0	0	0	0	0	0
Oakland	0	0	1	0.000019	3	0.000057
Puerto Vallarta	1	0.000019	3	0.000057	173	0.003313
Salt Lake City	0	0	0	0	1	0.000019
San Jose Del Cabo	0	0	3	0.000057	69	0.001311
Seattle	0	0	1	0.000019	1	0.000019
Washington DC	0	0	1	0.000019	2	0.000038
Winnipeg	0	0	0	0	1	0.000019

Figure 3-1 LPV Instantaneous Availability

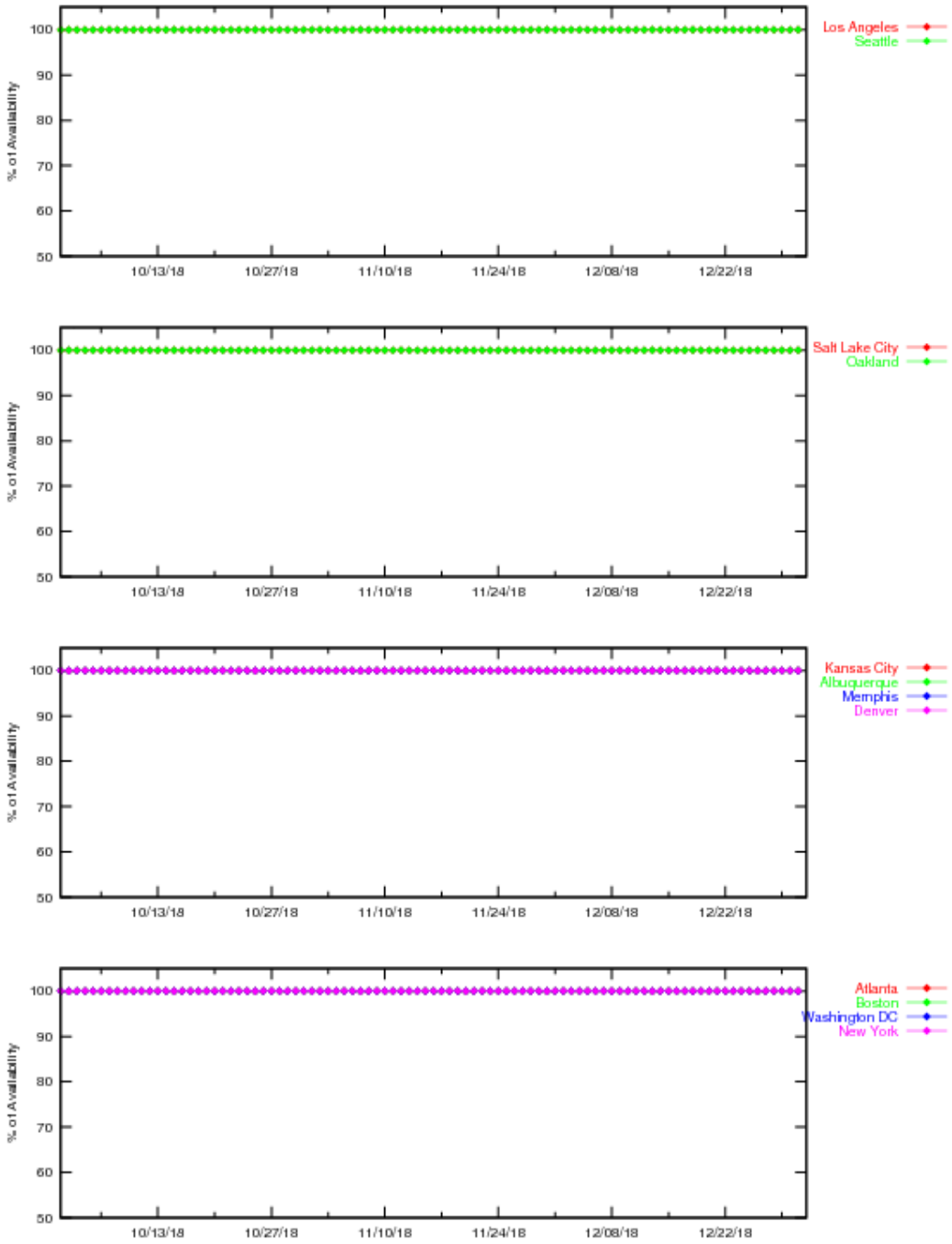


Figure 3-2 LPV Instantaneous Availability

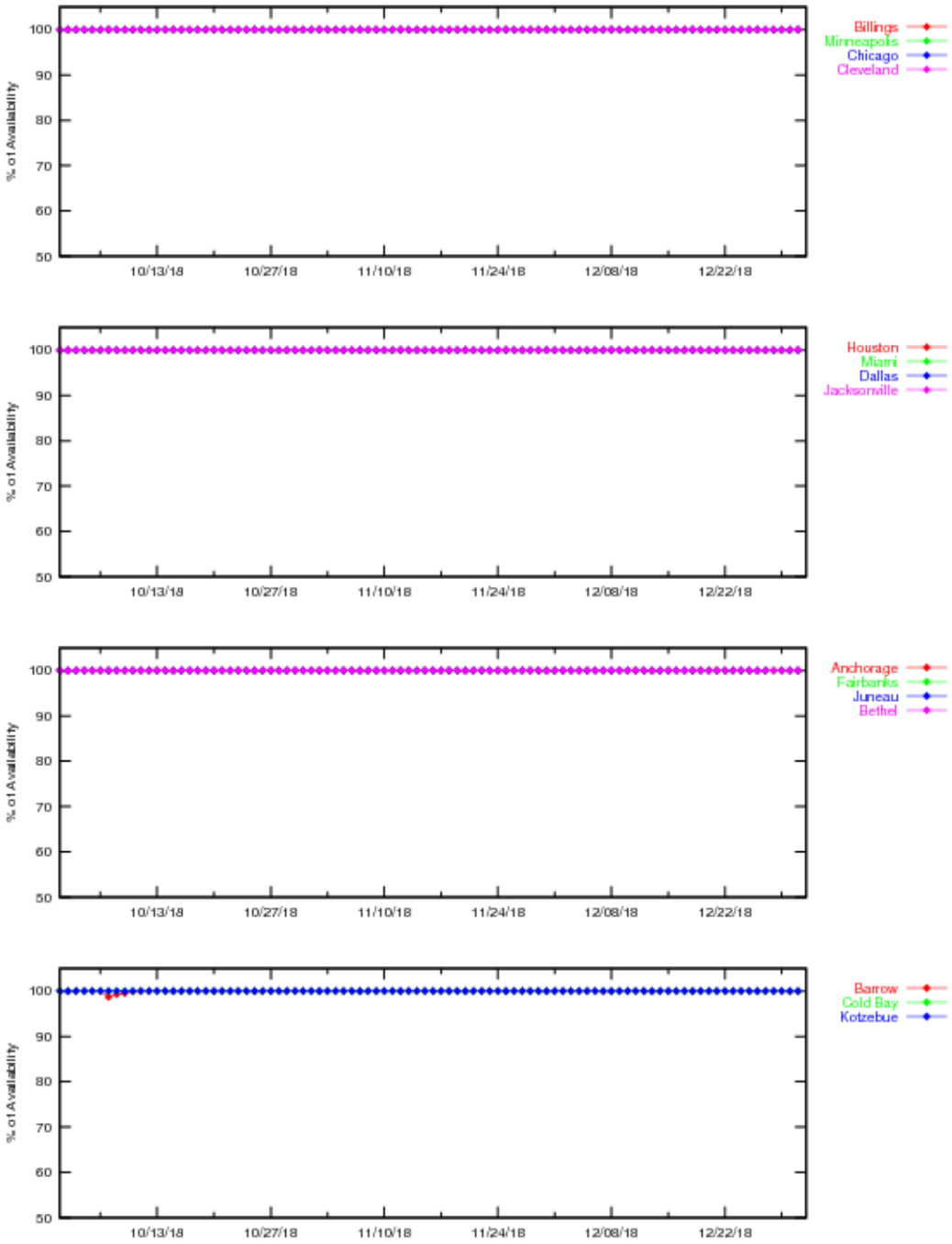


Figure 3-3 LPV Instantaneous Availability

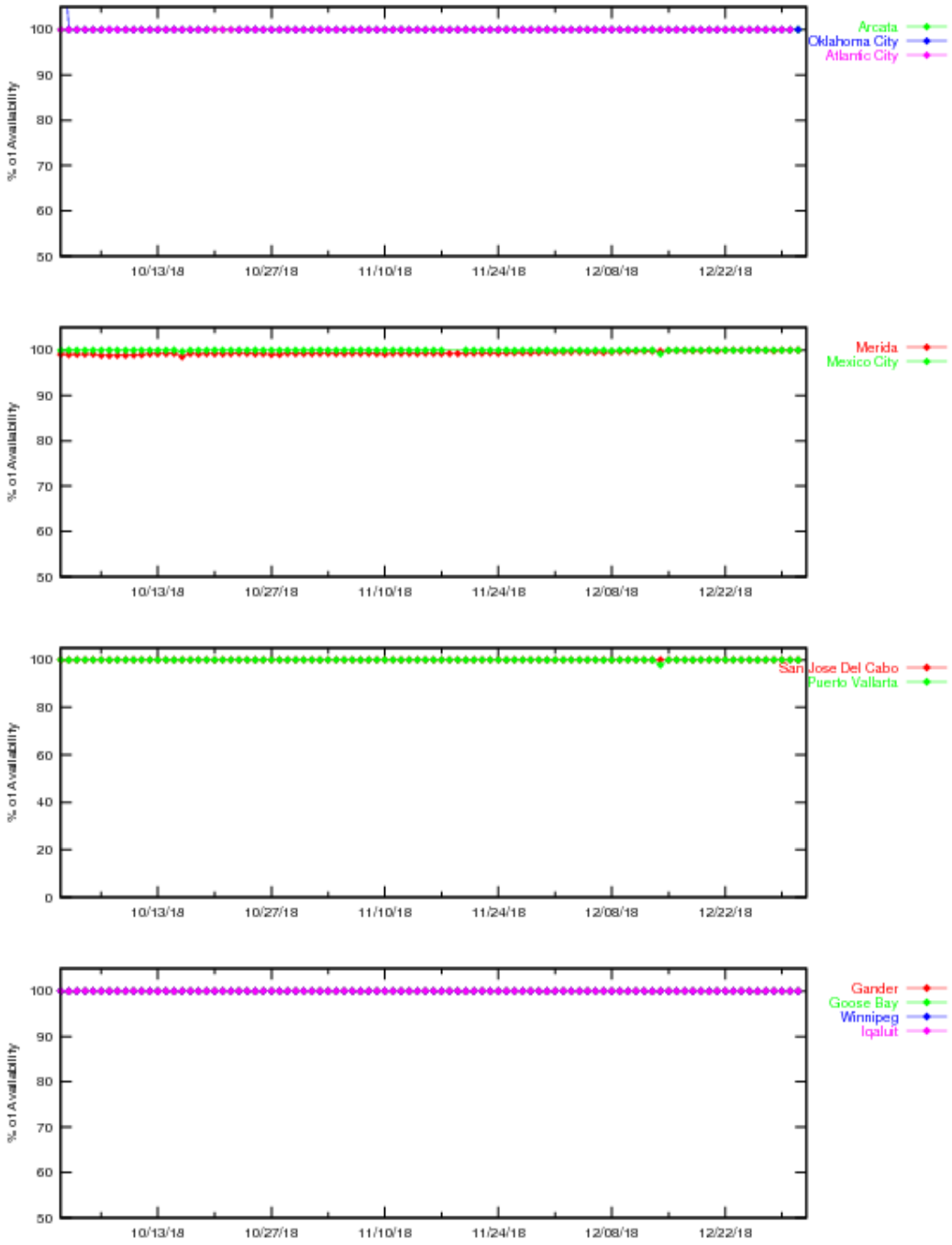


Figure 3-4 LPV200 Instantaneous Availability

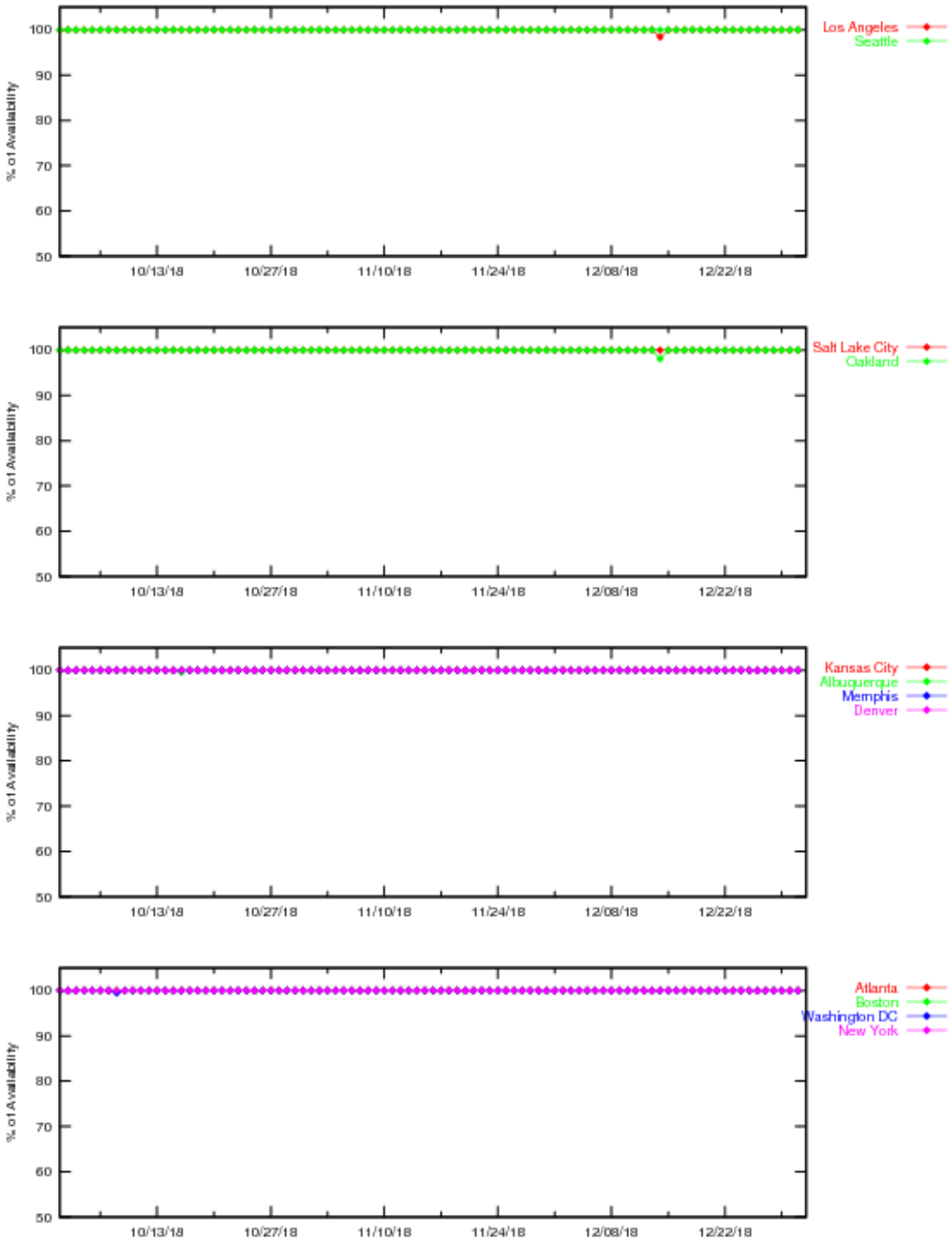


Figure 3-5 LPV200 Instantaneous Availability

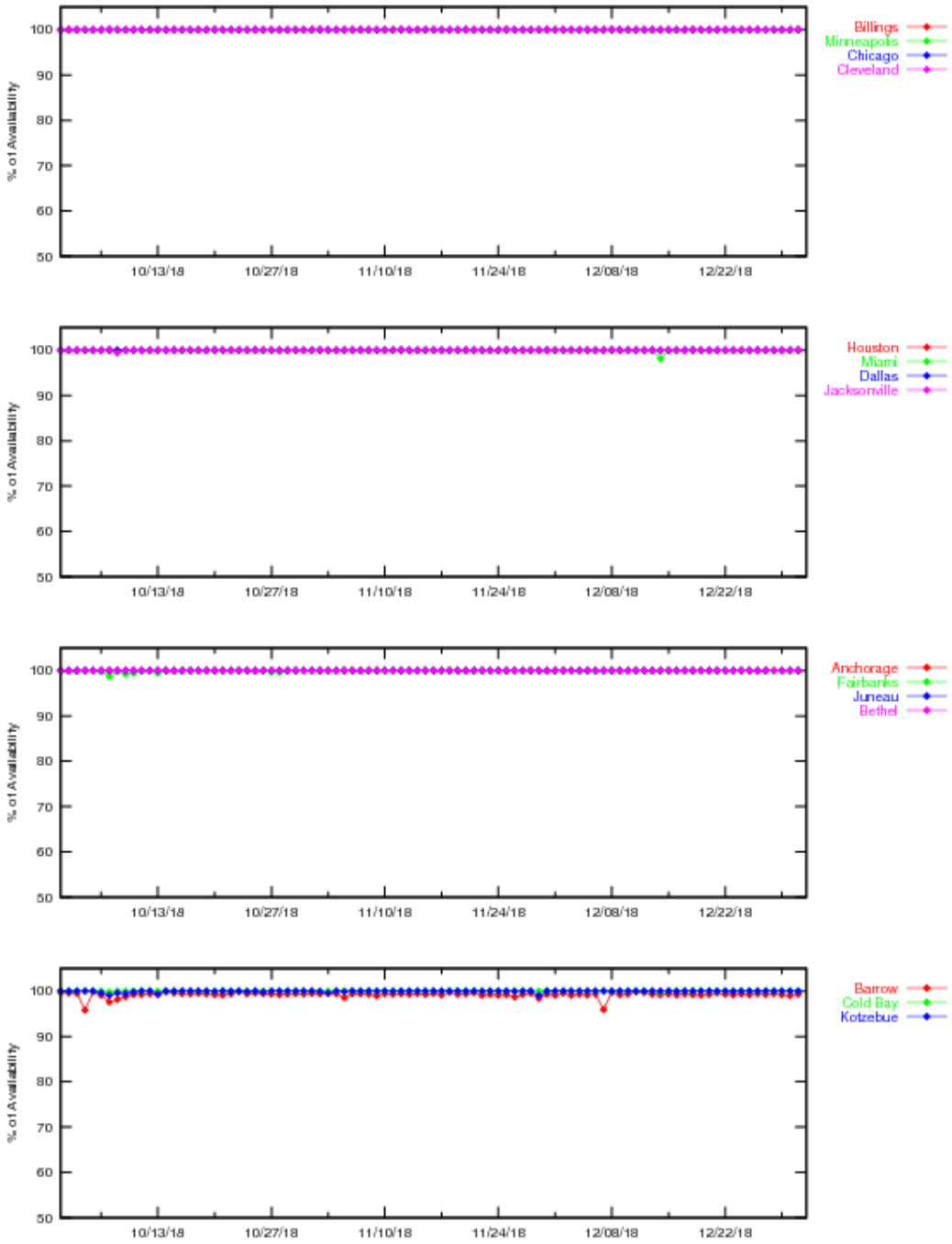


Figure 3-6 LPV200 Instantaneous Availability

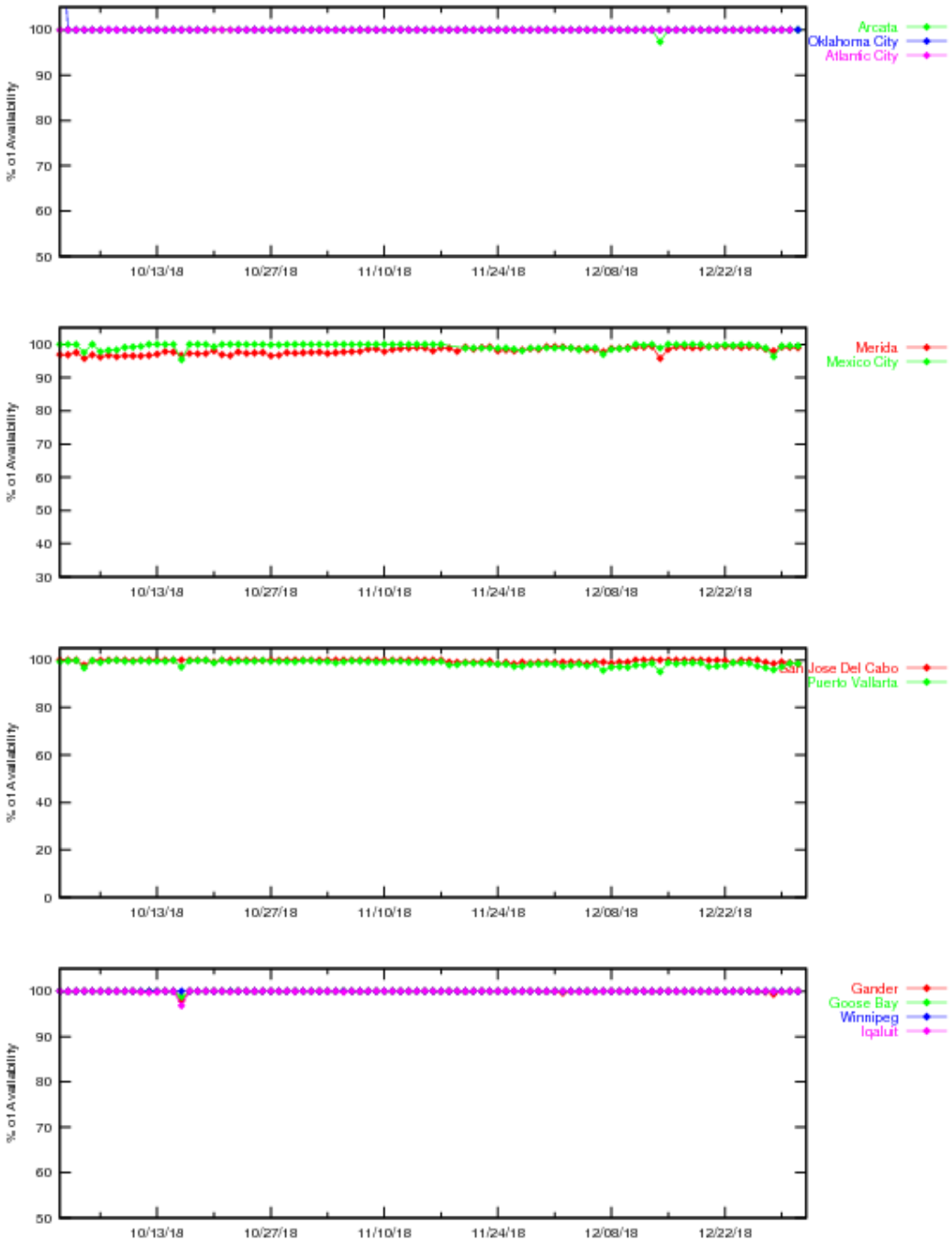


Figure 3-7 LPV Outages

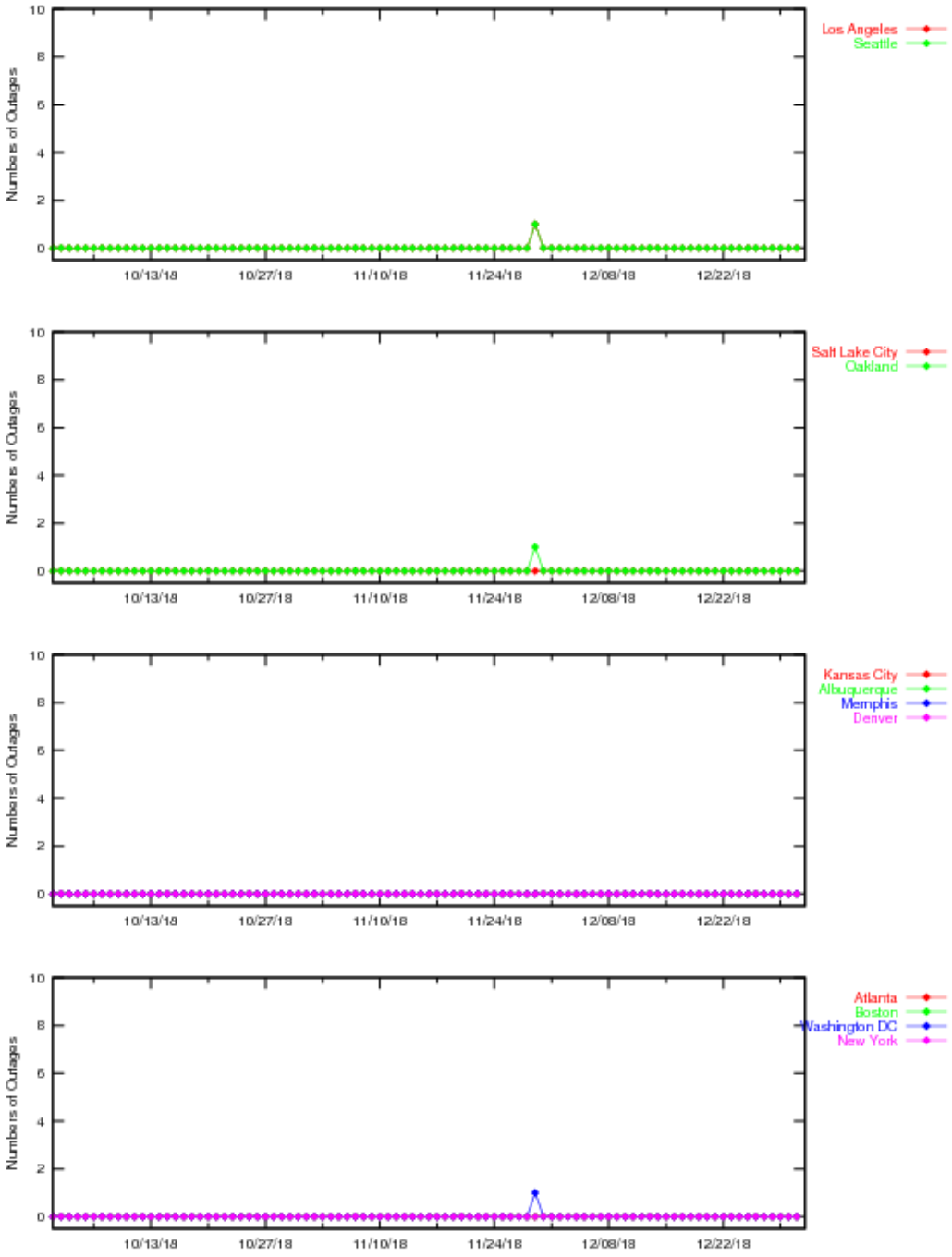


Figure 3-8 LPV Outages

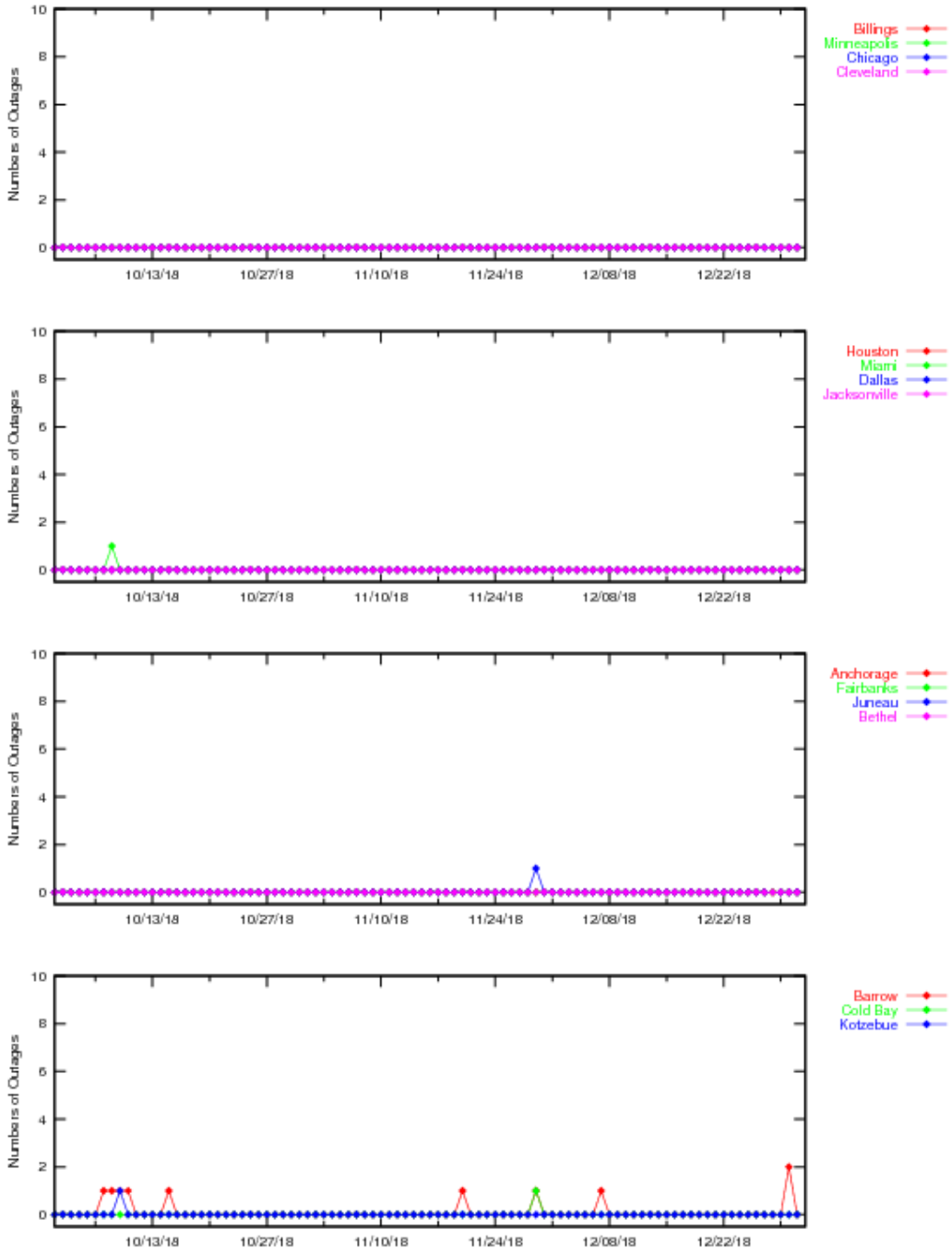


Figure 3-9 LPV Outages

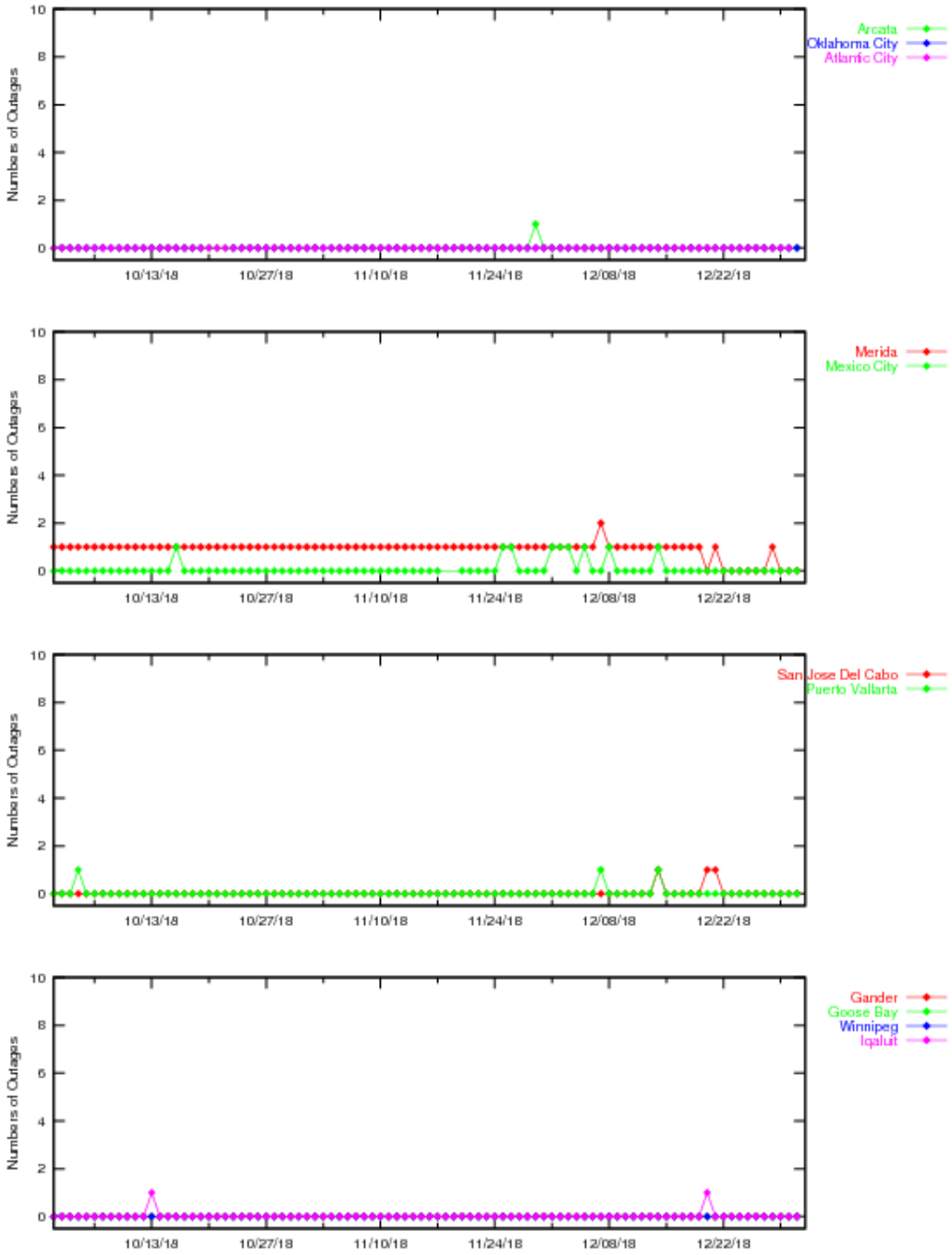


Figure 3-10 LPV200 Outages

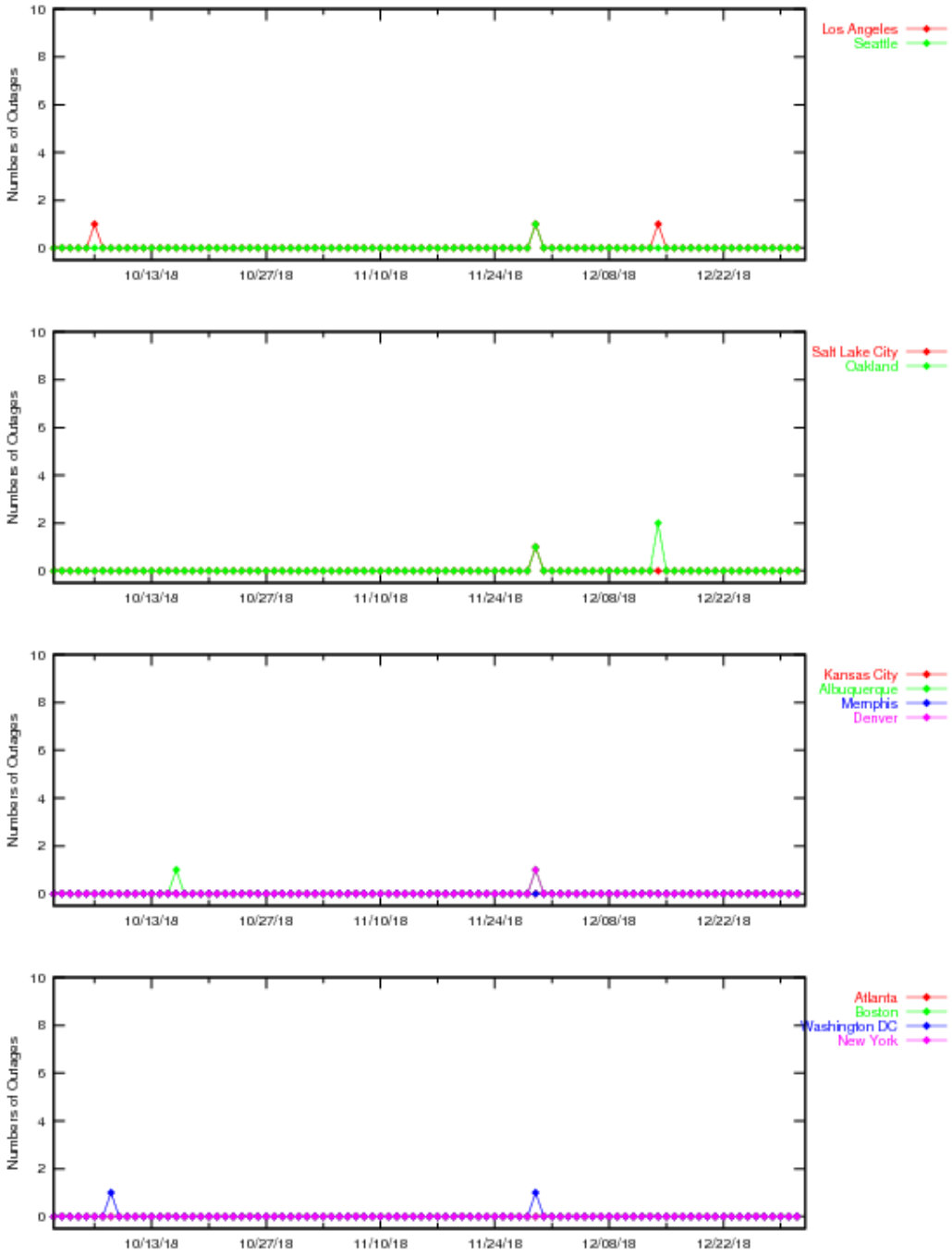


Figure 3-11 LPV200 Outages

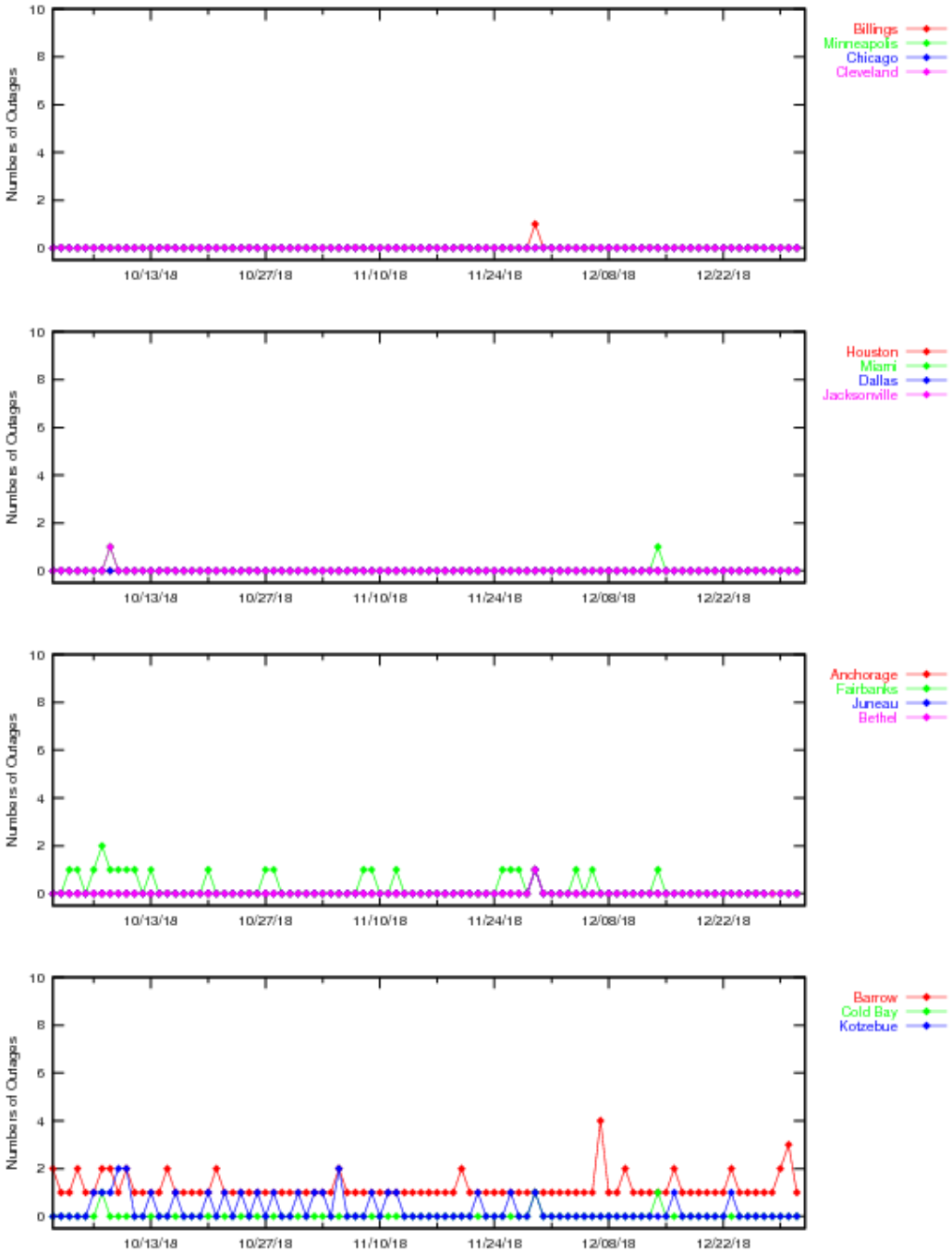
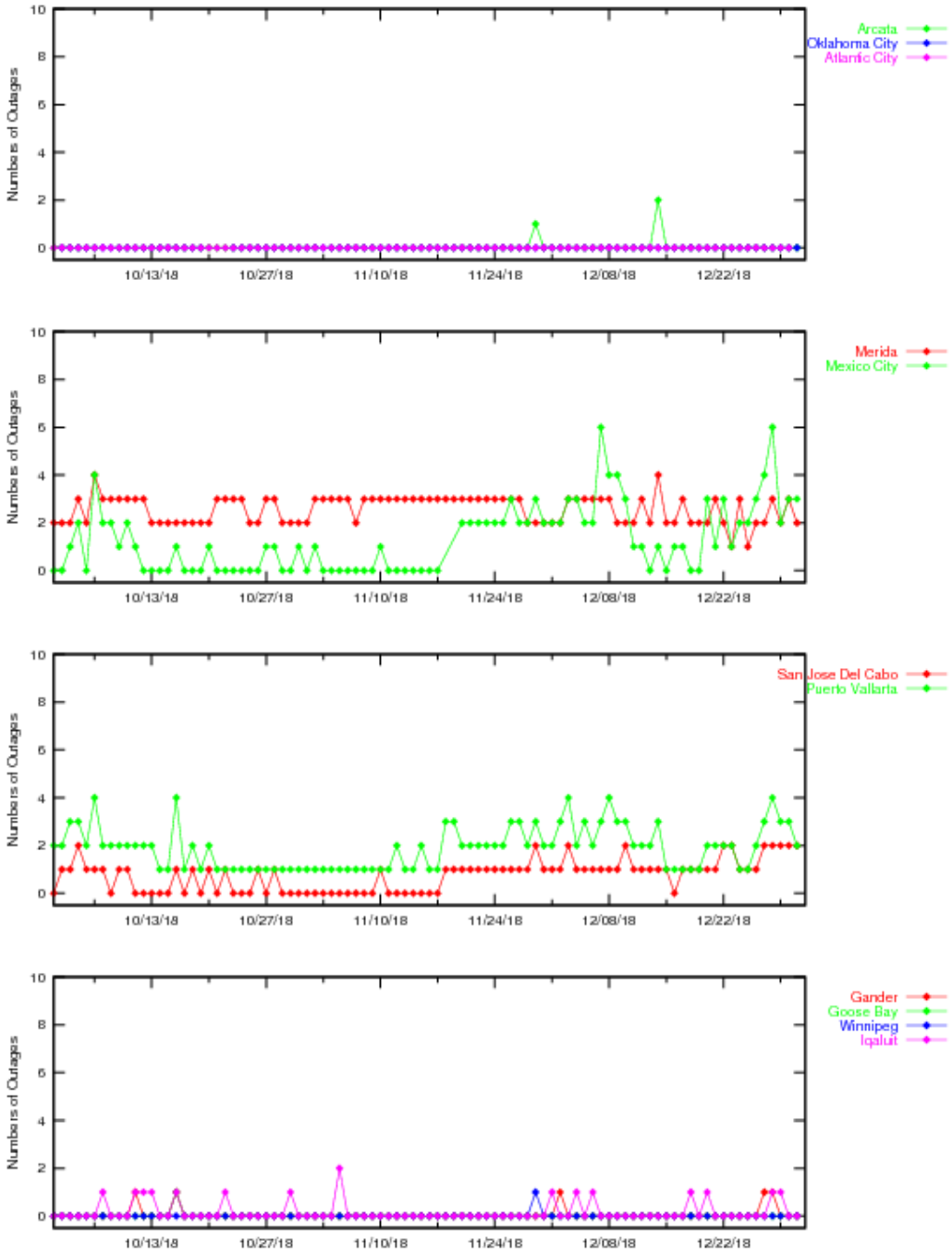


Figure 3-12 LPV200 Outages



Availability of NPA service is evaluated by monitoring the WAAS HPL at receiver locations. Service is available when the HPL is less than a HAL of 556 meters. The service is unavailable when HPL exceeds the HAL or when a WAAS navigation message is not received, and the service outage and its duration are recorded. NPA service is not available again until the HPL is within the HAL for at least 15 minutes. Table 3-4 shows the percentage of time that NPA service is available using the 15-minute window criteria. Table 3-5 shows the NPA service outages and associated outage rates. The outage rate is the percentage of theoretically interrupted NPA approaches through a loss of operational service once the approach had started.

Table 3-4 NPA Availability (15-minute window)

Location	NPA Availability (Excluding RAIM/FDE) (%)
Arcata	100
Oklahoma City	100
Albuquerque	100
Anchorage	100
Atlanta	100
Barrow	100
Bethel	100
Billings	100
Boston	100
Cleveland	100
Cold Bay	100
Fairbanks	100
Gander	100
Honolulu	100
Houston	100
Iqaluit	100
Juneau	100
Kansas City	100
Kotzebue	100
Los Angeles	100
Merida	100
Miami	100
Minneapolis	100
Oakland	100
Salt Lake City	100
San Jose Del Cabo	100
San Juan	100
Seattle	100
Tapachula	100
Washington DC	100

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

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

The availability decreases for this quarter were due to satellite outages, geomagnetic activity, communication outages, radio frequency interference (RFI), and elevated UDRE and GIVE values. Noteworthy events that affected availability are:

- October 3–The Kotzebue WRS went offline. The lack of observations from OTZ reduced LPV200 availability in Alaska.
- October 4–Satellite maintenance elevated UDREs on PRN9 and reduced LPV200 availability in Alaska.
- October 6–Elevated UDREs on PRN6 reduced LPV200 availability in CONUS.
- October 6–9–There was a CCC Trip on PRN131 caused by an L5 pseudorange jump on the GUS receiver. As a result, PRN131 was not available for ranging and reduced LPV200 availability in Alaska.
- October 7–Satellite maintenance elevated UDREs on PRN27 and reduced LPV200 availability in Alaska.
- October 8–An SV alert on PRN6 elevated UDREs and reduced LPV and LPV200 availability in CONUS.
- October 9–A GUS switchover on DX1 caused a reduction of LPV200 availability in Alaska.
- October 10–A GUS switchover on SZ1 caused a reduction of LPV200 availability in Alaska.
- October 15–Local RFI at Miami caused a reduction and eventual loss of SV tracking. The outage occurred from 20:57:50 GMT to 20:58:42 GMT.
- October 16–Satellite maintenance elevated UDREs on PRN5 and reduced LPV200 availability in CONUS and Canada.
- October 24–Local RFI at Miami caused a reduction and eventual loss of SV tracking. The outage occurred from 13:09:45 GMT to 13:21:12 GMT.

- October 31–Local RFI at Miami caused a reduction and eventual loss of SV tracking. The outage occurred from 21:59:38 GMT to 22:01:00 GMT.
- November 15–Local RFI at Denver caused a reduction and eventual loss of SV tracking. The outage occurred from 17:58:00 GMT to 17:58:04 GMT.
- November 26–A GUS switchover on DX1 caused a reduction of LPV200 availability in Alaska.
- December 4–A GUS switchover on SZ1 caused a reduction of LPV200 availability in Alaska.
- December 7–Satellite maintenance elevated UDREs on PRN24 and reduced LPV200 availability in Alaska.
- December 10–Geomagnetic activity elevated GIVE values which reduced LPV200 availability in CONUS.
- December 11–Local RFI at Miami caused a reduction and eventual loss of SV tracking. The outage occurred from 13:07:04 GMT to 13:09:18 GMT.
- December 14–Satellite maintenance elevated UDREs on PRN25 and reduced LPV200 availability in CONUS and Alaska.
- December 18–Elevated UDREs on PRN9 reduced LPV200 availability in Alaska.
- December 18–Local RFI at Denver caused a reduction and eventual loss of SV tracking. The outage occurred from 22:15:12 GMT to 22:17:12 GMT.

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 GPS/GEO satellite status are used to determine WAAS availability across North America. For PA coverage, protection levels were calculated at 30-second intervals at 1-degree spacing over the PA service volume, whereas for NPA coverage, the protection levels were calculated at 30-second intervals at 5-degree spacing over the NPA service volume.

Daily PA analysis was conducted for LP, LPV, and LPV200 service levels. The PA coverage plots provide 100%, 99.9%, 99%, 98%, and 95% availability contours. Figure 4-1 shows the rollup LP North America coverage, Figure 4-2 shows the rollup LPV North America coverage, Figure 4-3 shows the rollup LPV200 North America coverage, Figure 4-4 shows the daily LPV and LPV200 CONUS coverage, Figure 4-5 shows the daily LPV Alaska coverage at 99% availability and ionosphere Kp index values, and Figure 4-6 shows the daily LPV and LPV200 Canada coverage at 99% availability and ionosphere Kp index values. See Appendix B: Additional Coverage Plots for coverage plots of 98% LP and LPV availability contour and 99% LPV200 availability contour. Kp quantifies the disturbance in the Earth's magnetic field and is an indicator of solar storms causing geomagnetic disturbances, which can cause an unpredictable ionosphere. When the WAAS detects a disturbed ionosphere, it increases GIVE values that may result in unavailable PA service.

Figure 4-1 LP North America Coverage for the Quarter

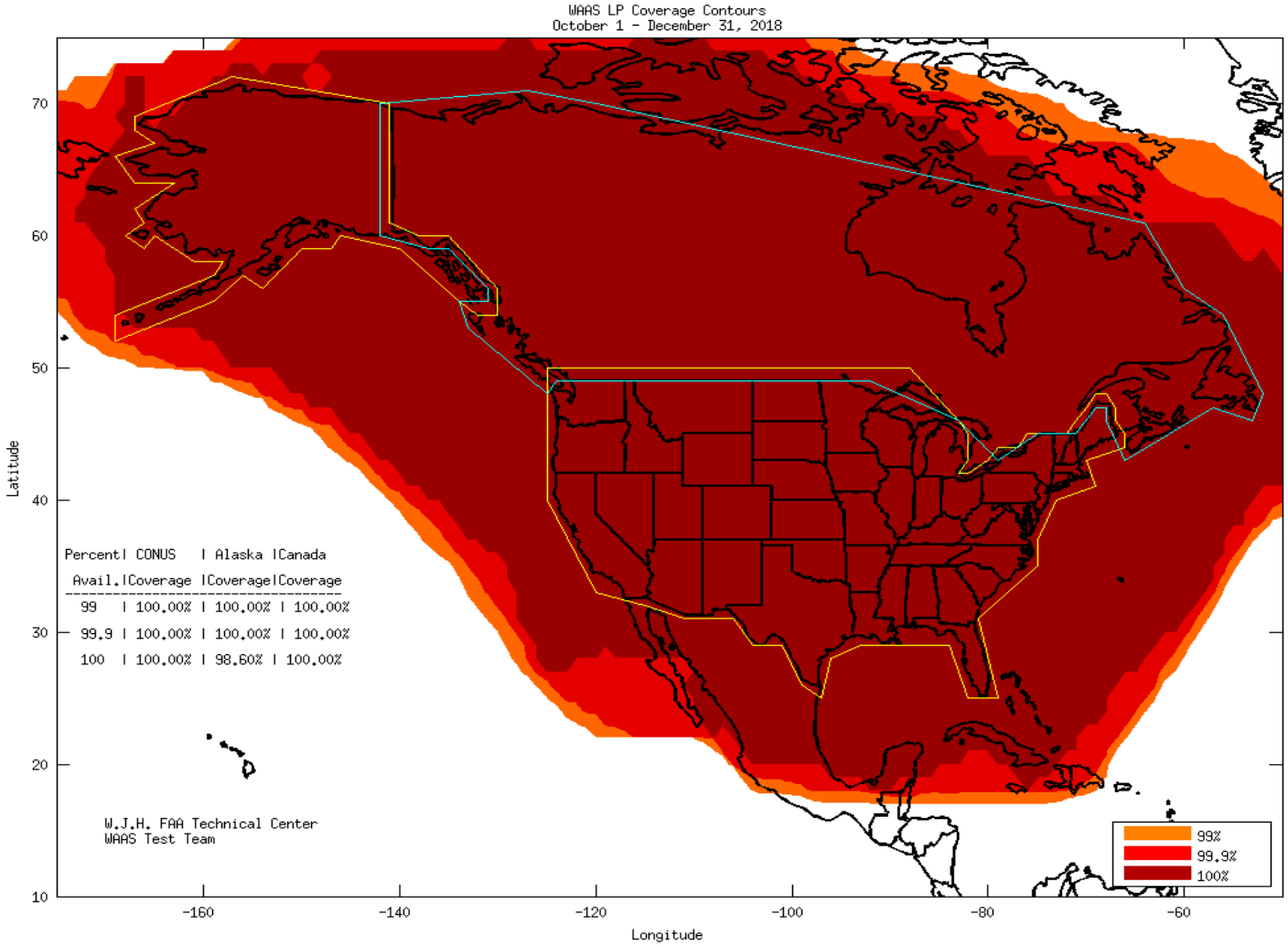


Figure 4-2 LPV North America Coverage for the Quarter

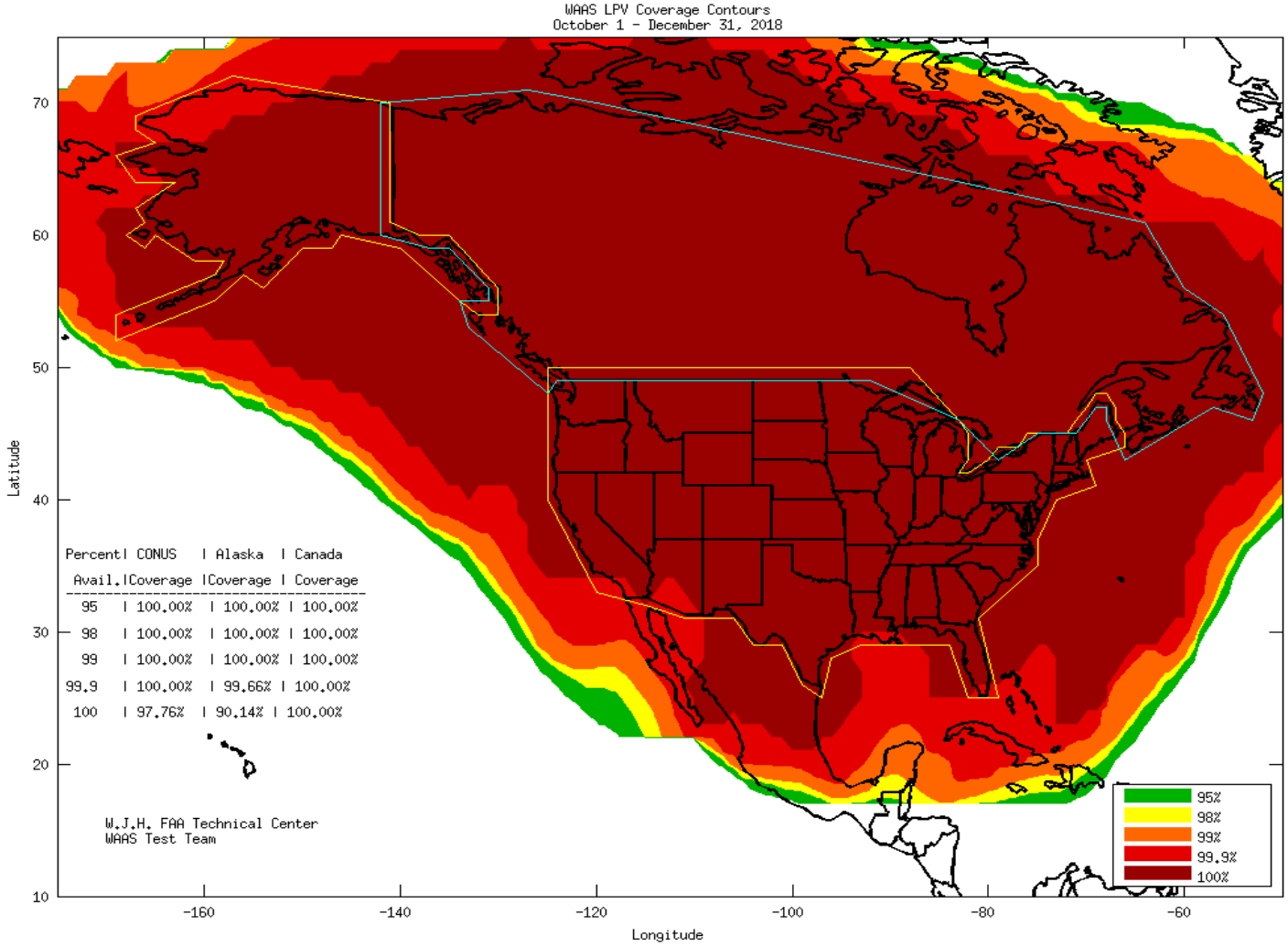


Figure 4-3 LPV200 North America Coverage for the Quarter

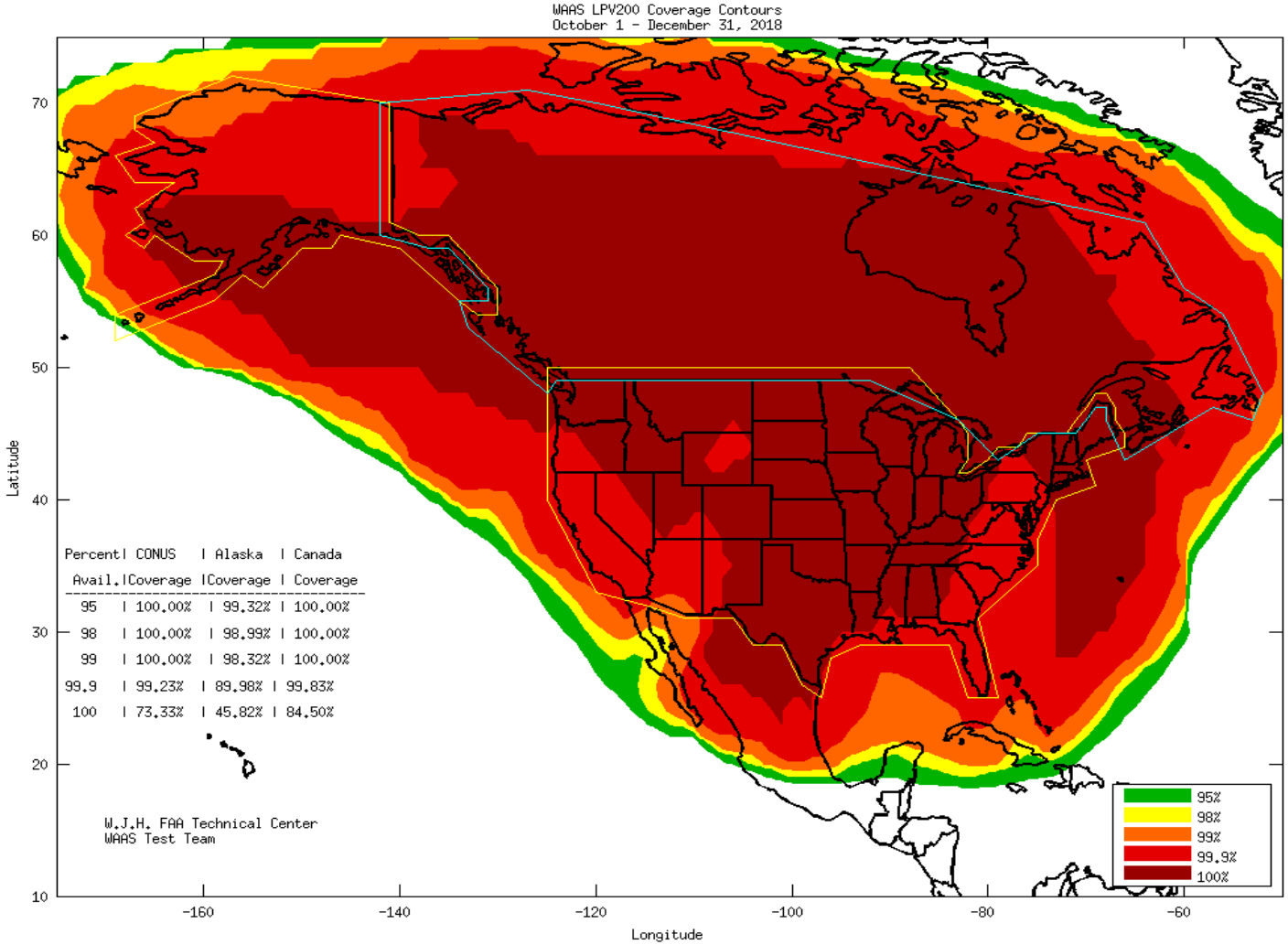


Figure 4-4 Daily LPV and LPV200 CONUS Coverage

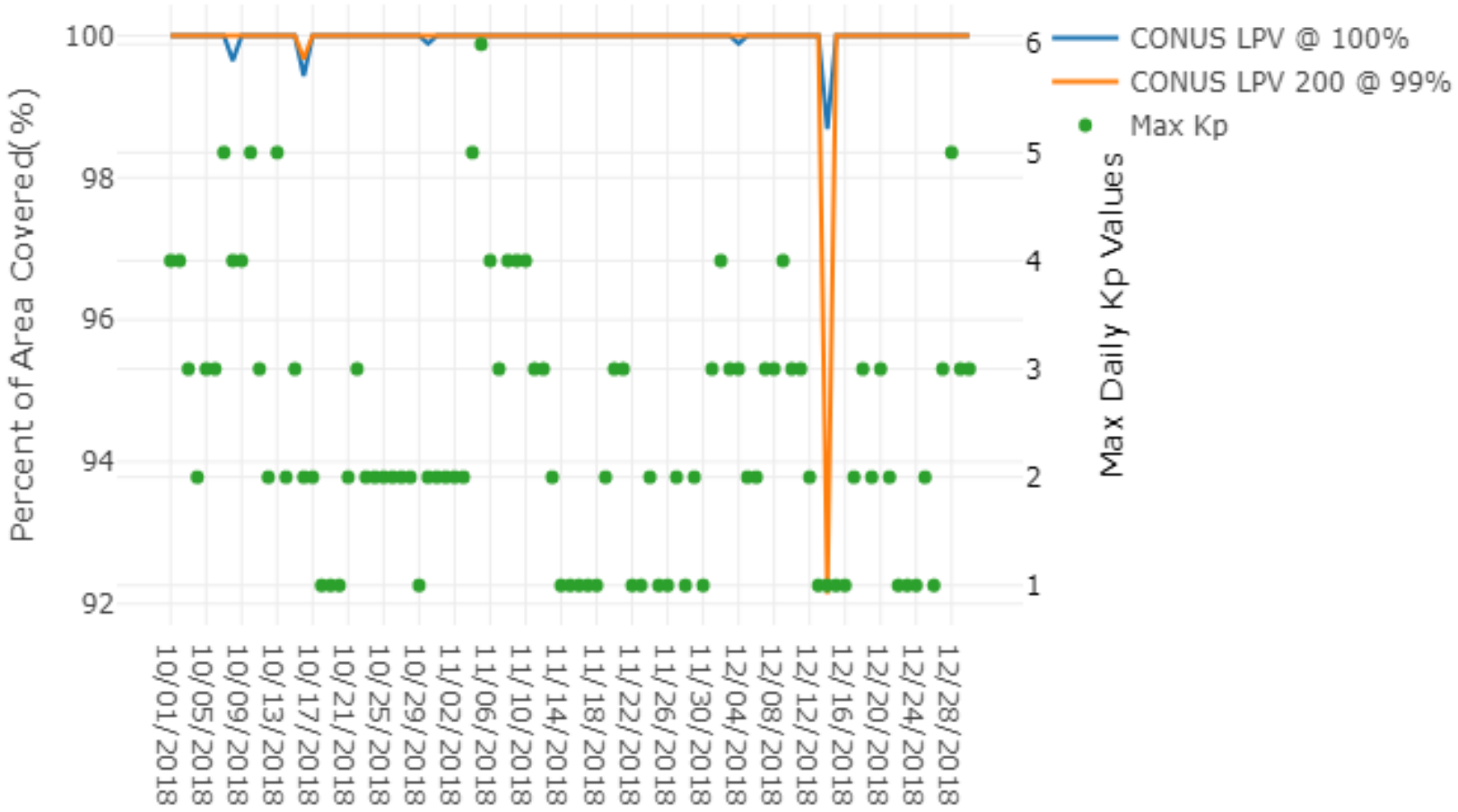
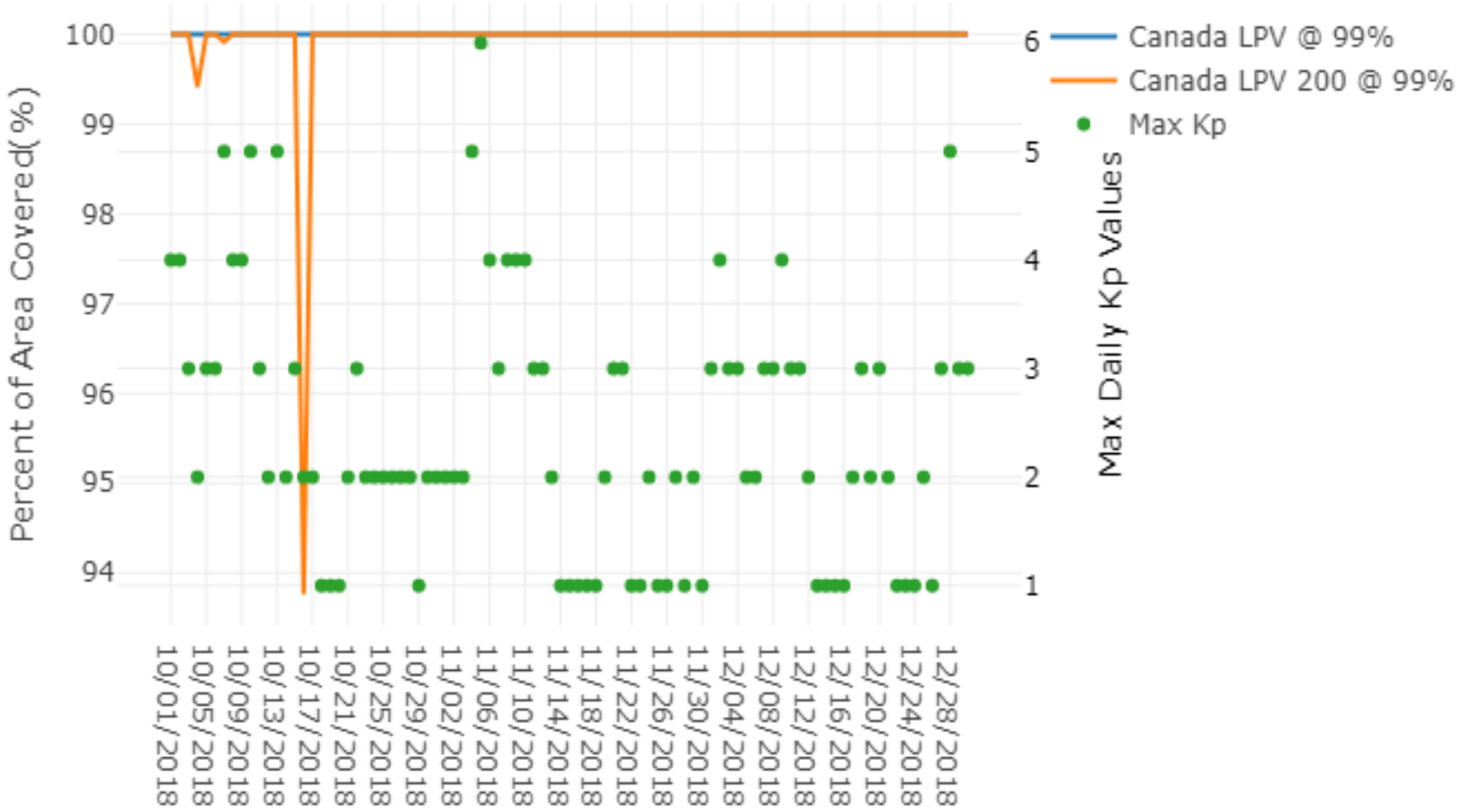


Figure 4-5 Daily LPV and LPV200 Alaska Coverage

Figure 4-6 Daily LPV and LPV200 Canada Coverage



Daily analysis for NPA was conducted for the Required Navigation Performance (RNP) 0.1 and RNP 0.3 service levels based on a 100% availability requirement. The NPA coverage plots provide 100%, 99.9%, and 99% availability contours. Figure 4-7 shows the rollup RNP 0.1 coverage and Figure 4-8 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.

Figure 4-7 RNP 0.1 Coverage for the Quarter

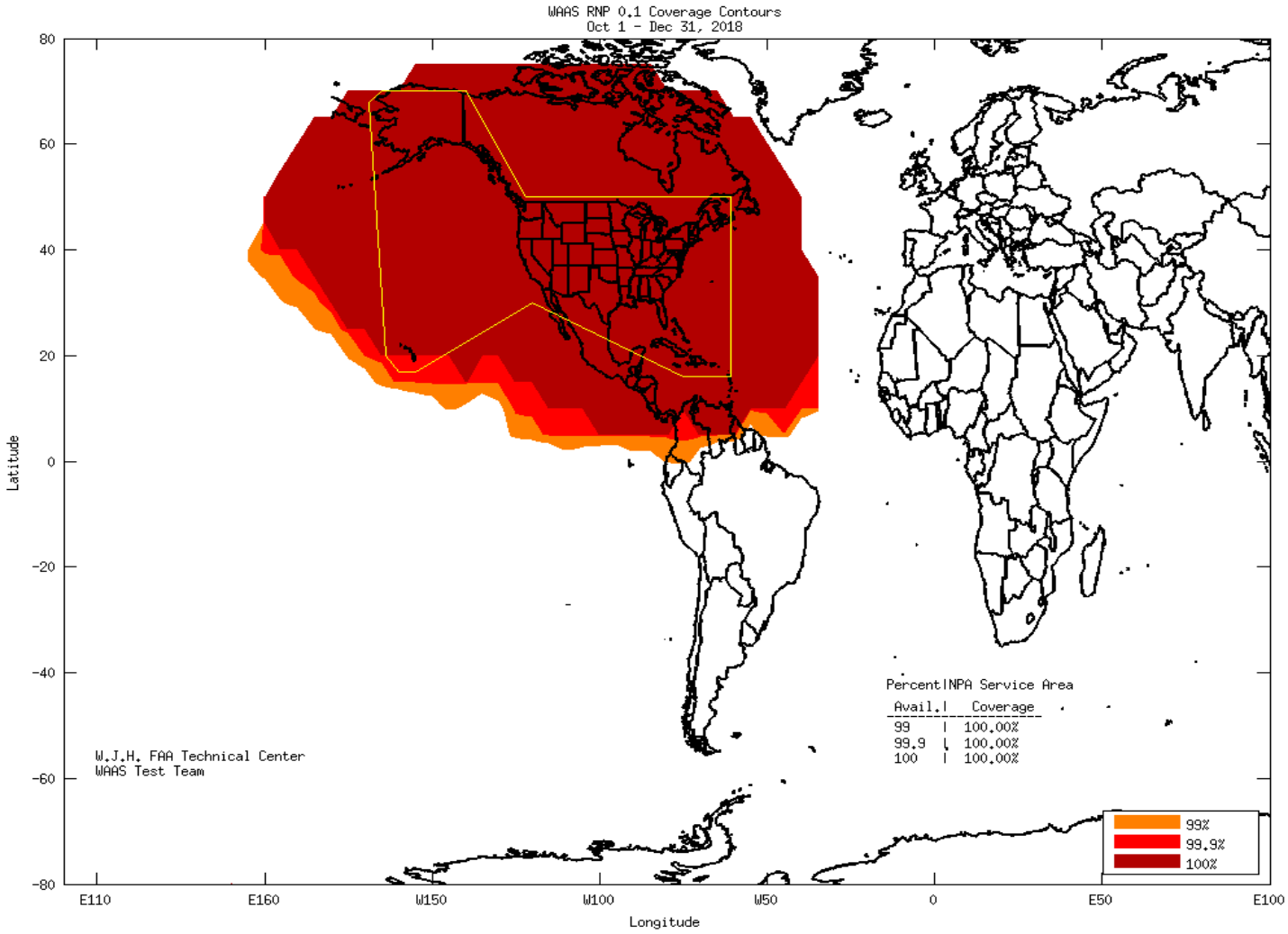


Figure 4-8 RNP 0.3 Coverage for the Quarter

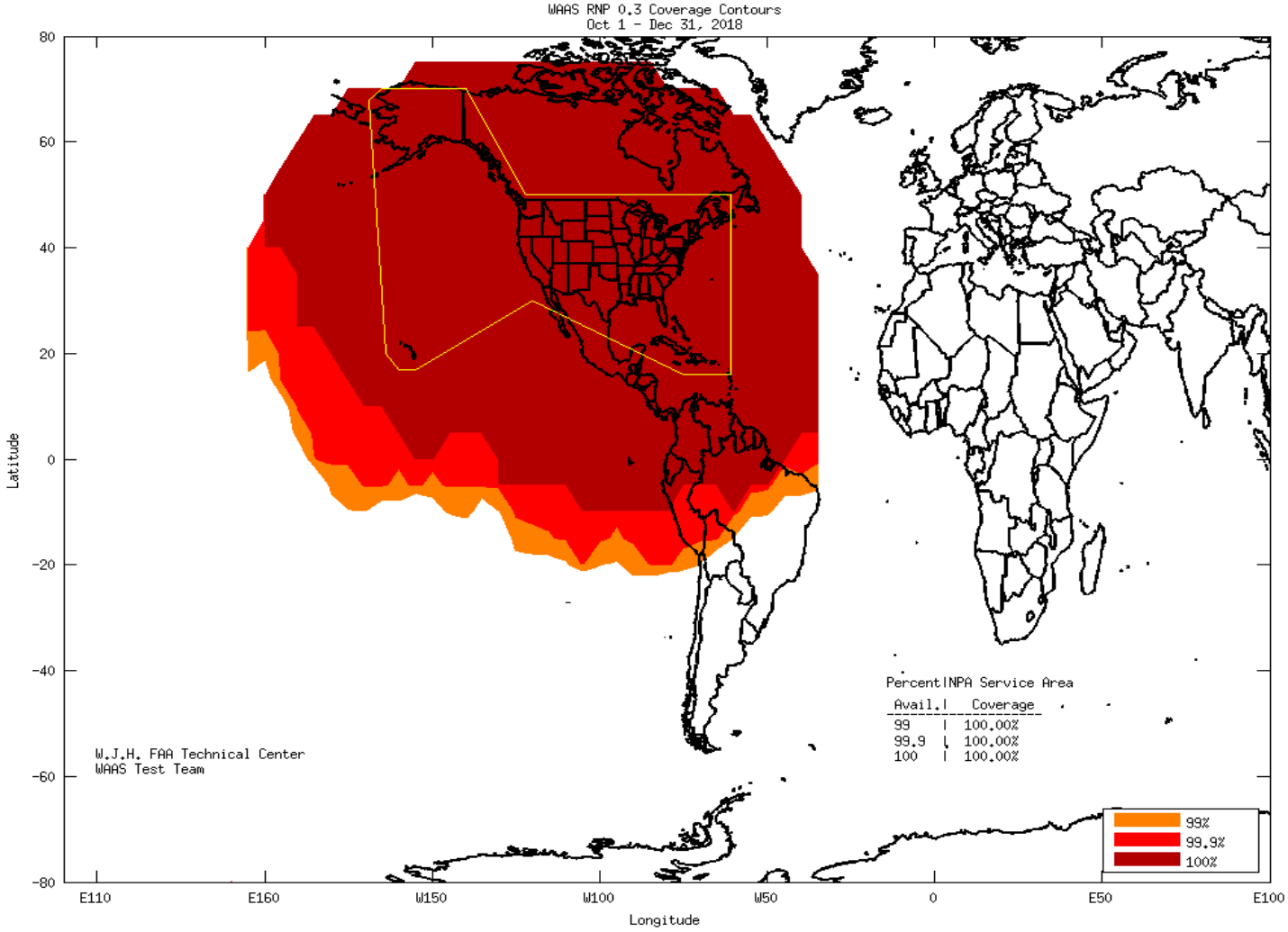
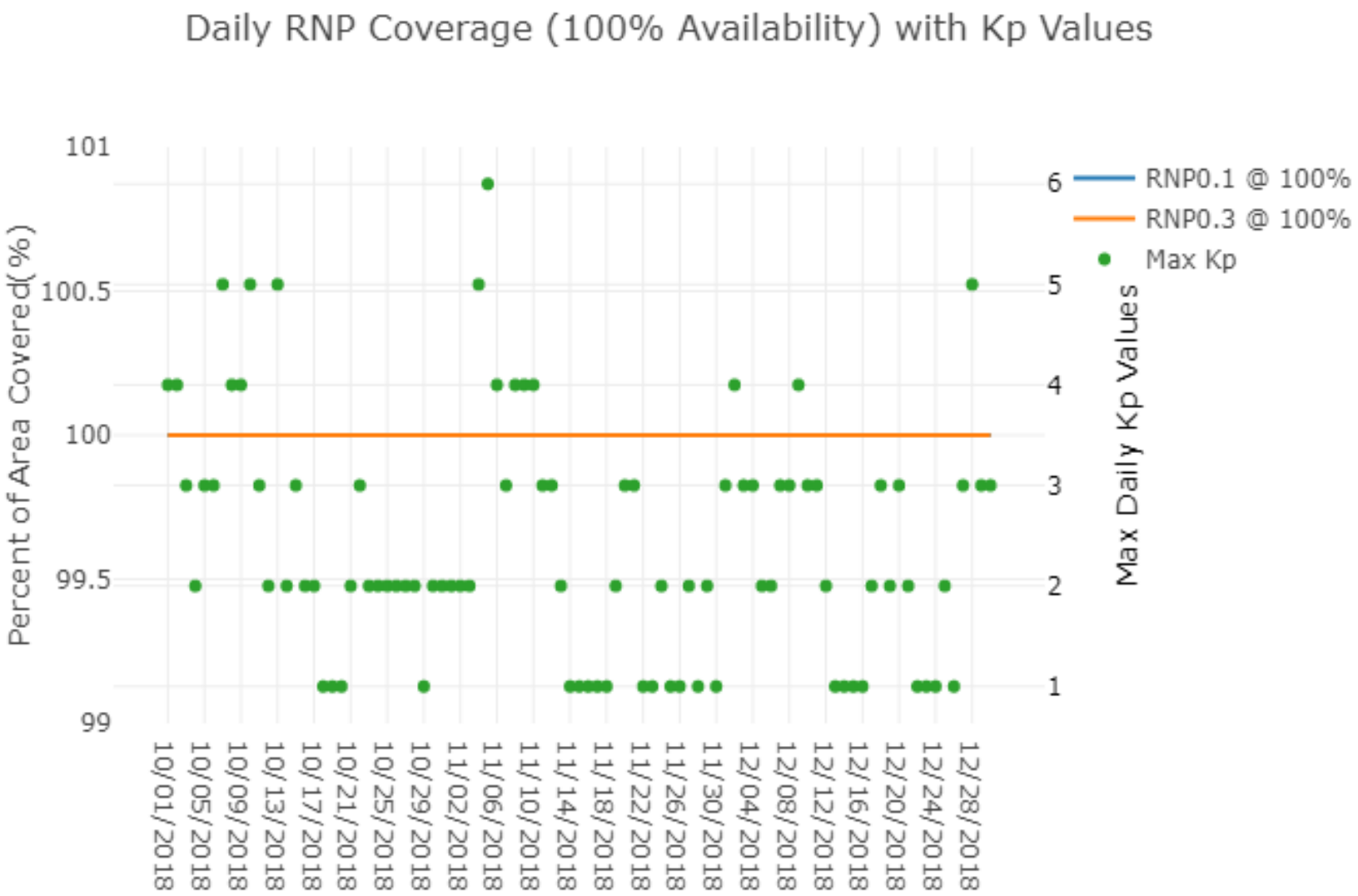


Figure 4-9 Daily RNP Coverage



The coverage decreases for this quarter were due to satellite outages, geomagnetic activity, communication outages, GUS switchovers, and elevated UDRE and GIVE values. Noteworthy events that affected coverage are:

- October 3–The Kotzebue WRS went offline. The lack of observations from OTZ reduced LPV200 coverage in Alaska.
- October 4–Satellite maintenance elevated UDREs on PRN9 and reduced LPV200 coverage in Alaska.
- October 6–Elevated UDREs on PRN6 reduced LPV200 coverage in CONUS.
- October 6–9–There was a CCC Trip on PRN131 caused by an L5 pseudorange jump on the GUS receiver. As a result, PRN131 was not available for ranging and reduced LPV200 coverage in Alaska.
- October 7–Satellite maintenance elevated UDREs on PRN27 and reduced LPV200 coverage in Alaska.
- October 8–An SV alert on PRN6 elevated UDREs and reduced LPV and LPV200 coverage in CONUS.
- October 9–A GUS switchover on DX1 caused a reduction of LPV200 coverage in Alaska.
- October 10–A GUS switchover on SZ1 caused a reduction of LPV200 coverage in Alaska.
- October 16–Satellite maintenance elevated UDREs on PRN5 and reduced LPV200 coverage in CONUS and Canada.
- November 26–A GUS switchover on DX1 caused a reduction of LPV200 coverage in Alaska.
- December 4–A GUS switchover on SZ1 caused a reduction of LPV200 coverage in Alaska.
- December 7–Satellite maintenance elevated UDREs on PRN24 and reduced LPV200 coverage in Alaska.
- December 10–Geomagnetic activity elevated GIVE values which reduced LPV200 coverage in CONUS.
- December 14–Satellite maintenance elevated UDREs on PRN25 and reduced LPV200 coverage in CONUS and Alaska.
- December 18–Elevated UDREs on PRN9 reduced LPV200 coverage in Alaska.

5.0 INTEGRITY

5.1 HMI Analysis

Integrity analysis includes the identification and evaluation of HMI as well as the generation of the safety index to illustrate the safety margin provided by WAAS protection levels. The safety index is a metric that shows how well the protection levels are bounding the maximum observed error when LPV service is available. The horizontal and vertical safety margin index is the ratio of HPL/HPE and VPL/VPE, respectively, at the time the maximum position error occurred. Section 2.0 provides a detailed description of the methodology for computing HPL, VPL, and position errors.

A computed safety margin index of greater than one indicates safe bounding of the greatest observed error, less than one indicates that the maximum error was not bounded, and a result equal to one means that the maximum position error was equal to the protection level. An HMI event occurs if the position error exceeds the protection level in the vertical or horizontal dimensions at any time and coupled with the passage of 6.2 seconds before this event is corrected by WAAS.

Table 5-1 lists the safety margin index and the number of HMI events. For this reporting period, the lowest safety margin index is 3.831 at Arcata and there were no HMI events. There has not been an HMI event since WAAS was made available to the public in August 2000. In July 2003, WAAS was commissioned by the FAA for safety of life services.

Table 5-1 Minimum Safety Margin Index and HMI Statistics

Location	Horizontal Safety Index	Vertical Safety Index	Number of HMIs
Arcata	3.831	8.362	0
Atlantic City	6.431	5.758	0
Oklahoma City	9.431	5.605	0
Albuquerque	6.883	11.972	0
Anchorage	7.138	9.875	0
Atlanta	5.504	9.902	0
Barrow	6.158	6.109	0
Bethel	15.364	8.889	0
Billings	6.390	6.899	0
Boston	6.924	6.343	0
Chicago	5.263	8.729	0
Cleveland	9.099	10.489	0
Cold Bay	10.402	10.649	0
Dallas	5.873	6.019	0
Denver	7.911	10.336	0
Fairbanks	8.939	8.198	0
Gander	8.562	8.641	0
Goose Bay	12.276	7.987	0
Houston	8.258	5.647	0
Iqaluit	6.540	5.727	0
Jacksonville	6.678	5.903	0
Juneau	7.656	5.599	0
Kansas City	8.686	7.674	0
Kotzebue	9.022	5.449	0
Los Angeles	9.884	9.289	0
Memphis	10.480	8.809	0
Merida	6.380	6.304	0
Mexico City	15.608	9.272	0
Miami	9.079	6.397	0
Minneapolis	5.637	6.890	0
New York	6.205	7.335	0
Oakland	8.261	12.166	0
Puerto Vallarta	11.889	8.114	0
Salt Lake City	6.857	7.261	0
San Jose Del Cabo	11.250	8.226	0
Seattle	6.799	8.988	0
Washington DC	4.933	7.210	0
Winnipeg	7.762	8.985	0

5.2 Broadcast Alerts

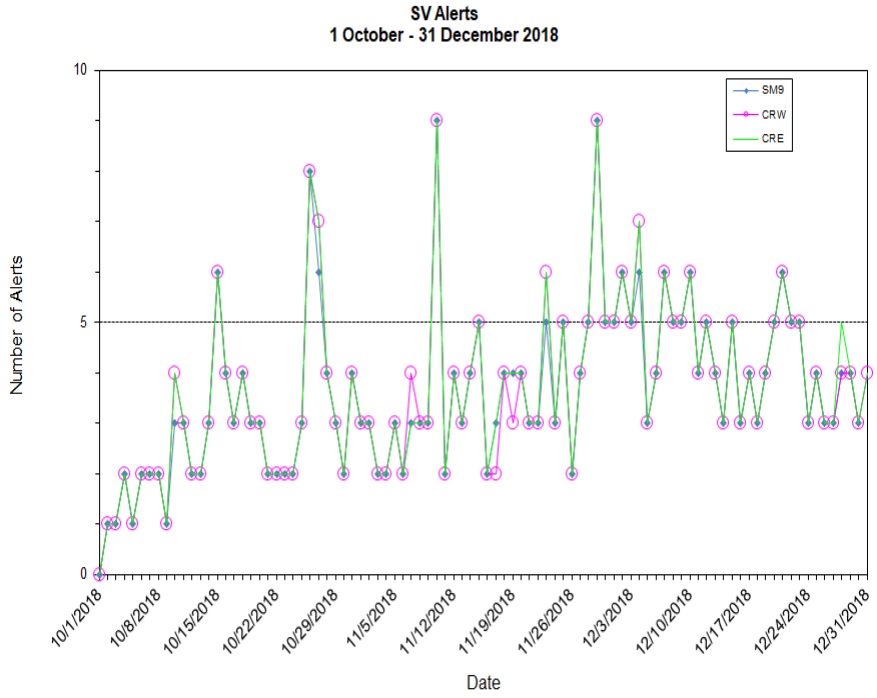
The WAAS transmits alert messages for user protection when the active WAAS corrections are no longer bound by the UDREs. Alerts increase the UDRE for one or more PRNs, which can reduce the weighting of the satellite or exclude the satellite from the navigation solution. An increase in UDREs after an 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, the WAAS fast corrections can time out and cause a loss of continuity. Table 5-2 shows the total number of alerts and the average number of alerts per day.

Table 5-2 WAAS SV Alert

	Number of Alerts			Average Alerts Per Day		
Message Type	**SM9**	**CRW**	**CRE**	**SM9**	**CRW**	**CRE**
T2	246	247	247	2.6739	2.6848	2.6848
T3	71	69	71	0.7717	0.7500	0.7717
T4	9	13	13	0.0978	0.1413	0.1413
T5	0	0	0	0.0000	0.0000	0.0000
T6	0	0	0	0.0000	0.0000	0.0000
T24	0	0	0	0.0000	0.0000	0.0000
T26	0	0	0	0.0000	0.0000	0.0000
Total SV Alerts	326	329	331	3.5435	3.5761	3.5978
Days in Service	92	92	92			

Figure 5-1 provides the daily SV alerts. The number of alerts on one GEO is often the same as the number of alerts on the other GEO, therefore, lines tend to overlap in most points on this plot.

Figure 5-1 SV Daily Alert Trend



5.3 Availability of WAAS Messages (SM9, CRW, and CRE)

Accurate and current calculations of user position are dependent on the broadcast and receipt of the WAAS message 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 expected worst-case broadcast interval. Table 5-3 lists the maximum intervals at which each message must broadcast to meet system requirements.

Table 5-3 Update Rates for WAAS Messages

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

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

For this quarter, statistics reported for late messages were mainly caused by GEO SIS outages, GUS switchovers, and SV alerts; excluding message type 7 and 10. Furthermore, the delay of message types 7 and 10 had little or no impact on user performance and safety, and were not caused by GEO SIS outages, GUS switchovers, or SV alerts. Table 5-4 through Table 5-8 show statistics for fast correction, long correction, ephemeris covariance, ionosphere correction, and ionospheric mask message rates broadcasted on SM9 GEO. Table 5-9 through Table 5-13 show statistics for message rates broadcasted on CRW GEO. Table 5-14 through Table 5-18 show statistics for message rates broadcasted on CRE GEO.

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

Message Type	On Time (number received)	Late (number received)	Max Late Length (seconds)
1	96210	1	121
2	1267805	76	25
3	1267298	73	25
4	1267039	118	22
7	90022	10	130
9	89094	1	178
10	89977	6	174
17	29764	0	0

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

PRN	On Time (number received)	Late (number received)	Max Late Length (seconds)
1	47049	1	144
2	45948	0	0
3	46638	1	173
5	45565	0	0
6	45955	2	167
7	45437	0	0
8	46638	1	178
9	44688	2	175
10	45061	1	149
11	46927	1	138
12	45221	0	0
13	47042	1	182
14	45065	0	0
15	45926	0	0
16	45937	1	179
17	45664	0	0
18	34795	0	0
19	44384	1	173
20	44189	0	0
21	45989	1	167
22	46704	1	151
23	45688	2	178
24	47350	0	0
25	46658	1	149
26	46473	1	138
27	46856	0	0
28	45831	0	0
29	45530	1	182
30	45244	0	0
31	46196	1	179
32	44543	0	0

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

PRN	On Time (number received)	Late (number received)	Max Late Length (seconds)
1	38649	0	0
2	37739	0	0
3	38275	1	210
5	37366	0	0
6	37674	1	208
7	37316	0	0
8	38300	0	0
9	36666	1	179
10	36990	2	230
11	38550	0	0
12	37172	0	0
13	38620	2	192
14	37042	0	0
15	37686	1	208
16	37717	2	209
17	37523	1	210
18	28586	0	0
19	36412	0	0
20	36298	1	207
21	37791	1	208
22	38404	0	0
23	37523	1	209
24	38870	0	0
25	38326	0	0
26	38147	0	0
27	38486	1	169
28	37623	1	239
29	37424	0	0
30	37171	0	0
31	37871	0	0
32	36565	1	209
131	69678	4	5057
135	73125	0	0
138	73082	0	0

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

Band	Block	On Time (number received)	Late (number received)	Max Late Length (seconds)
0	0	26399	3	588
0	1	26392	3	305
0	2	26389	5	584
1	0	26389	2	306
1	1	26384	3	306
1	2	26389	6	307
1	3	26401	6	316
1	4	26389	6	305
2	0	26395	4	304
2	1	26393	2	304
2	2	26389	2	305
2	3	26394	5	301
2	4	26387	4	304
3	0	26406	1	305
3	1	26401	5	306
3	2	26391	2	307
9	0	26396	5	306
9	1	26400	5	302
9	2	26385	4	312
9	3	26388	6	305
9	4	26401	9	308
9	5	26393	5	312
9	6	26397	2	306

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

Band	On Time (number received)	Late (number received)	Max Late Length (seconds)
0	33747	0	0
1	33748	0	0
2	33724	0	0
3	33732	0	0
9	33697	0	0

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

Message Type	On Time (number received)	Late (number received)	Max Late Length (seconds)
1	100044	1	121
2	1267818	69	10
3	1267293	71	10
4	1267057	113	13
7	93262	6	126
9	89085	0	0
10	93224	9	182
17	30073	1	346

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

PRN	On Time (number received)	Late (number received)	Max Late Length (seconds)
1	47043	1	144
2	45943	0	0
3	46622	0	0
5	45555	0	0
6	45958	0	0
7	45430	0	0
8	46642	0	0
9	44686	0	0
10	45053	0	0
11	46925	1	138
12	45211	0	0
13	47044	0	0
14	45056	0	0
15	45920	0	0
16	45942	0	0
17	45654	0	0
18	34786	0	0
19	44369	0	0
20	44189	0	0
21	45988	0	0
22	46700	0	0
23	45669	0	0
24	47342	0	0
25	46671	0	0
26	46478	1	138
27	46866	0	0
28	45829	0	0
29	45518	0	0
30	45242	0	0
31	46191	0	0
32	44522	0	0

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

PRN	On Time (number received)	Late (number received)	Max Late Length (seconds)
1	38646	0	0
2	37737	0	0
3	38268	0	0
5	37367	0	0
6	37669	0	0
7	37305	1	124
8	38288	1	185
9	36657	0	0
10	36993	0	0
11	38546	0	0
12	37165	0	0
13	38621	0	0
14	37028	0	0
15	37678	0	0
16	37702	0	0
17	37518	0	0
18	28578	2	178
19	36420	0	0
20	36294	1	128
21	37785	0	0
22	38401	0	0
23	37516	0	0
24	38857	0	0
25	38335	0	0
26	38152	1	182
27	38483	1	124
28	37618	2	178
29	37405	0	0
30	37166	0	0
31	37864	0	0
32	36560	0	0
131	69586	4	5003
135	73126	0	0
138	73069	0	0

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

Band	Block	On Time (number received)	Late (number received)	Max Late Length (seconds)
0	0	26379	5	415
0	1	26382	5	415
0	2	26383	4	416
1	0	26375	4	429
1	1	26379	4	427
1	2	26378	5	420
1	3	26399	8	398
1	4	26370	9	398
2	0	26374	11	410
2	1	26378	11	415
2	2	26373	7	398
2	3	26387	7	404
2	4	26383	8	403
3	0	26382	6	301
3	1	26375	5	308
3	2	26382	3	304
9	0	26387	2	302
9	1	26380	5	302
9	2	26380	12	375
9	3	26362	10	383
9	4	26392	4	363
9	5	26381	6	402
9	6	26377	6	434

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

Band	On Time (number received)	Late (number received)	Max Late Length (seconds)
0	34210	0	0
1	34237	0	0
2	34265	1	309
3	34232	0	0
9	34219	0	0

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

Message Type	On Time (number received)	Late (number received)	Max Late Length (seconds)
1	95726	3	145
2	1224463	40	21
3	1224006	51	26
4	1223887	82	25
7	89355	13	134
9	86045	2	177
10	89259	14	131
17	28988	3	351

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

PRN	On Time (number received)	Late (number received)	Max Late Length (seconds)
1	45337	0	0
2	43893	0	0
3	44819	0	0
5	44285	1	169
6	44200	1	169
7	43814	0	0
8	44998	0	0
9	42866	0	0
10	42781	0	0
11	45197	0	0
12	43371	0	0
13	45559	0	0
14	43462	0	0
15	44452	0	0
16	44398	0	0
17	44009	0	0
18	45696	0	0
19	42516	0	0
20	42698	1	169
21	44555	0	0
22	44852	1	169
23	43911	0	0
24	45981	0	0
25	45263	0	0
26	44786	0	0
27	45553	0	0
28	44192	0	0
29	43917	0	0
30	43776	0	0
31	44374	0	0
32	43099	0	0

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

PRN	On Time (number received)	Late (number received)	Max Late Length (seconds)
1	37258	1	128
2	36057	0	0
3	36811	0	0
5	36347	0	0
6	36240	1	121
7	35967	3	168
8	36936	2	190
9	35175	0	0
10	35093	11	205
11	37107	2	190
12	35624	1	199
13	37426	1	187
14	35737	0	0
15	36470	0	0
16	36416	1	121
17	36135	0	0
18	37493	4	144
19	34903	1	160
20	35064	7	206
21	36631	0	0
22	36900	1	145
23	36080	2	186
24	37798	2	205
25	37192	1	168
26	36776	0	0
27	37434	4	202
28	36285	2	129
29	36082	1	208
30	35969	0	0
31	36408	1	199
32	35346	2	144
131	70475	3	4691
135	70565	1	168
138	70561	2	4256

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

Band	Block	On Time (number received)	Late (number received)	Max Late Length (seconds)
0	0	25480	5	464
0	1	25484	5	449
0	2	25482	6	445
1	0	25482	4	305
1	1	25476	6	305
1	2	25490	7	464
1	3	25476	5	477
1	4	25479	6	483
2	0	25494	7	504
2	1	25482	6	578
2	2	25472	7	583
2	3	25485	7	484
2	4	25474	14	480
3	0	25476	8	464
3	1	25480	8	431
3	2	25472	5	432
9	0	25475	6	445
9	1	25484	8	476
9	2	25488	7	530
9	3	25478	9	547
9	4	25471	9	548
9	5	25486	7	451
9	6	25481	4	451

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

Band	On Time (number received)	Late (number received)	Max Late Length (seconds)
0	32918	0	0
1	32983	0	0
2	32969	1	361
3	33010	2	354
9	32971	2	379

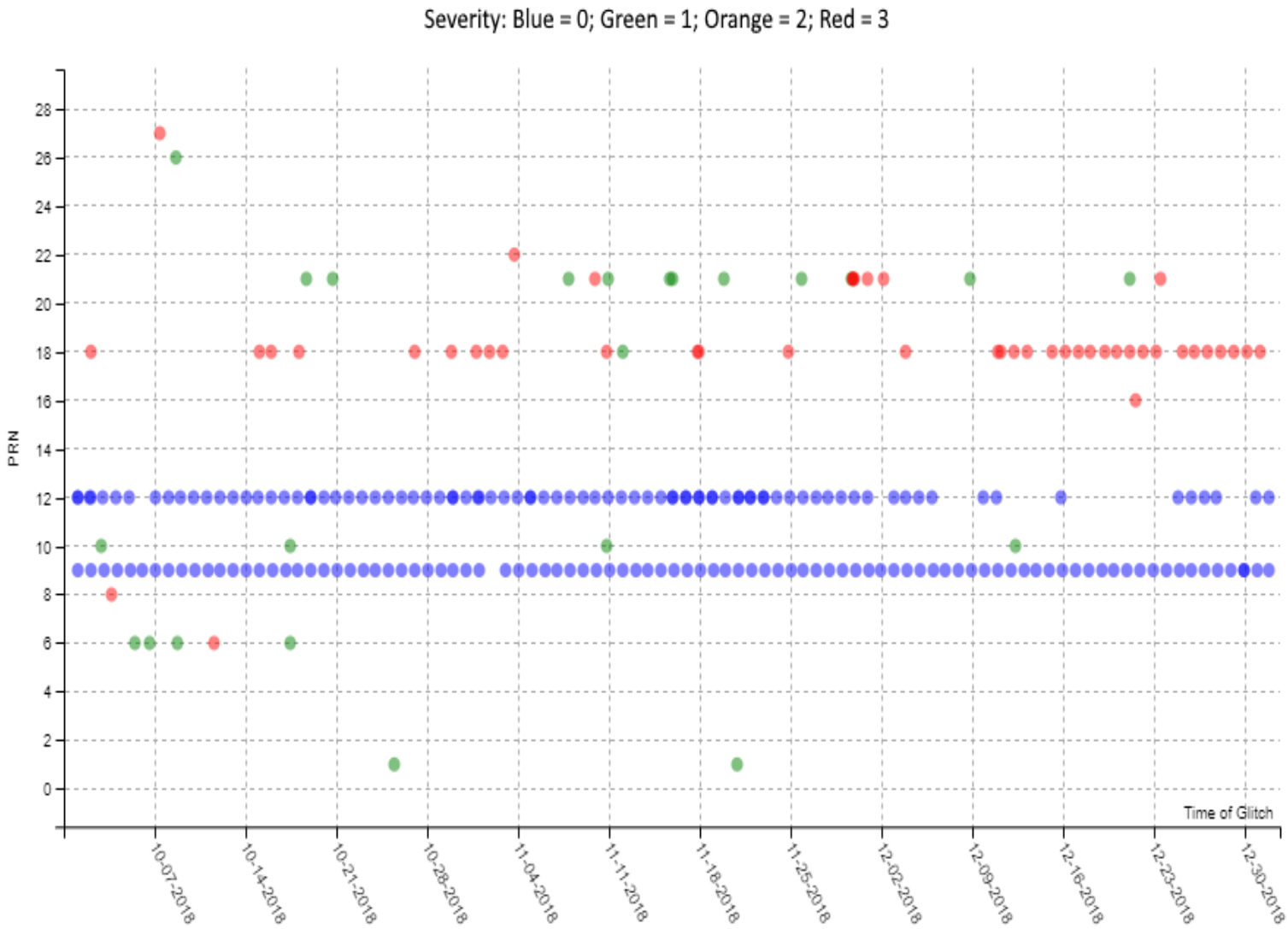
5.4 Satellite Glitches

The GPS satellites will occasionally experience periods of signal carrier stability glitches of varying magnitude. These glitches are short degradations in the signal, which in severe cases may 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 to increase to "Not Monitor" and result in an alert.

Figure 5-2 shows satellite glitches visible to WAAS for the quarter. Glitches are categorized into four severity levels. Severity zero glitches occur when a WAAS reference station receiver tracks more than 14 satellites. The WAAS reference station software is limited to sending data for no more than 14 satellites. Severity one glitches cause a significant number of the receivers to report bad subframe parity data, cycle slips, or when the receivers lose track of L1 and/or L2. Severity two glitches cause all of the receivers to report bad subframe parity data and no SQM data. Severity three glitches cause all of the receivers to lose track of both L1 and L2. For this reporting period, severity zero glitches were observed for a short period of time daily on PRN9 and PRN12 when more than 14 GPS satellites were visible to the Alaska region.

An unusually high number of severity three glitches were observed on PRN18; however, PRN18 occupies a redundant slot in the constellation and had no impact on WAAS performance.

Figure 5-2 SV Glitch Trend



6.0 SV RANGE ACCURACY

Range accuracy evaluation computes the probability that the WAAS UDRE and GIVE statistically bound 99.9% of the range residuals for each satellite tracked by the receiver. A UDRE is broadcasted by the WAAS for each monitored satellite and the 99.9% bound (3.29 sigma) of the pseudorange residual error 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 (i.e., WAAS fast clock, WAAS long-term clock, WAAS ionospheric delay, tropospheric delay, receiver clock bias, and multipath). Because the true ionospheric delay and multipath error are not precisely known, the estimated variance in these error sources are added to the UDRE before comparing it to the residual error.

The GPS satellite range residual errors were calculated for 12 WAAS receivers during the quarter. Table 6-1 and Table 6-2 show the range error 95% index and 99.9% bounding statistics for each SV at the selected locations. Figure 6-1 and Figure 6-2 show the 95% range error for each SV measured by the WAAS receivers at the Chicago reference station.

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

Site	Minneapolis		Chicago		Boston		Juneau		Honolulu		Salt Lake City	
PRN ↓	0.95 Range Error (Meters)	3.29 Sigma Bounding (%)	0.95 Range Error (Meters)	3.29 Sigma Bounding (%)	0.95 Range Error (Meters)	3.29 Sigma Bounding (%)	0.95 Range Error (Meters)	3.29 Sigma Bounding (%)	0.95 Range Error (Meters)	3.29 Sigma Bounding (%)	0.95 Range Error (Meters)	3.29 Sigma Bounding (%)
1*	1.273	100	1.153	100	1.183	100	0.788	100	1.435	100	0.989	100
2	1.105	100	1.324	100	0.876	100	1.380	100	2.127	100	1.203	100
3*	1.241	100	2.259	100	1.472	100	0.820	100	1.631	100	1.553	100
4	-	-	-	-	-	-	-	-	-	-	-	-
5	1.311	100	1.367	100	0.882	100	1.542	100	1.029	100	1.052	100
6*	1.121	100	1.055	100	0.907	100	1.162	100	1.142	100	1.094	100
7	1.734	100	1.188	100	1.121	100	1.503	100	1.645	100	0.842	100
8*	1.704	100	1.294	100	1.073	100	1.265	100	1.035	100	0.971	100
9*	1.665	100	1.215	100	1.045	100	1.106	100	1.623	100	0.807	100
10	1.290	100	1.079	100	1.090	100	1.376	100	0.997	100	0.969	100
11	1.496	100	1.341	100	1.423	100	1.165	100	1.278	100	1.216	100
12	1.681	100	1.534	100	2.086	100	1.723	100	1.042	100	1.078	100
13	1.683	100	0.927	100	1.503	100	1.412	100	0.985	100	0.833	100
14	1.376	100	1.264	100	0.940	100	1.356	100	0.969	100	1.388	100
15	1.579	100	0.965	100	0.916	100	1.394	100	1.008	100	0.842	100
16	1.300	100	0.935	100	1.213	100	1.320	100	1.137	100	0.830	100
17	1.574	100	1.186	100	1.019	100	1.160	100	1.371	100	0.838	100
18	2.026	100	1.141	100	1.141	100	1.271	100	0.948	100	0.945	100
19	1.419	100	1.788	100	1.067	100	1.502	100	1.166	100	1.496	100
20	1.364	100	1.081	100	1.019	100	1.468	100	1.147	100	1.059	100
21	1.325	100	1.448	100	1.171	100	1.236	100	1.123	100	0.877	100
22	1.392	100	1.158	100	1.040	100	1.433	100	1.504	100	0.942	100
23	1.279	100	1.141	100	1.342	100	1.177	100	1.796	100	0.862	100
24*	1.288	100	1.065	100	1.002	100	1.387	100	1.601	100	1.077	100
25*	1.565	100	1.400	100	1.242	100	1.798	100	1.142	100	1.343	100
26*	1.709	100	1.130	100	0.979	100	1.125	100	1.143	100	0.887	100
27*	1.561	100	1.114	100	1.432	100	1.121	100	1.194	100	0.988	100
28	1.680	100	1.656	100	1.162	100	1.945	100	1.152	100	0.926	100
29	1.404	100	0.841	100	0.987	100	1.733	100	1.209	100	1.526	100
30*	1.692	100	1.133	100	1.109	100	1.220	100	1.621	100	0.780	100
31	1.161	100	1.096	100	1.022	100	1.588	100	1.281	100	1.247	100
32	1.650	100	0.872	100	1.050	100	1.545	100	1.246	100	1.203	100
131	2.352	100	2.632	100	2.175	100	2.424	100	2.448	100	3.212	100
135	2.969	100	2.278	100	1.569	100	1.552	100	1.996	100	1.830	100
138	2.536	100	1.728	100	2.207	100	1.410	100	1.454	100	1.343	100

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

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

Site	Billings		Miami		Albuquerque		Kansas City		Los Angeles		Atlanta	
PRN ↓	0.95 Range Error (Meters)	3.29 Sigma Bounding (%)	0.95 Range Error (Meters)	3.29 Sigma Bounding (%)	0.95 Range Error (Meters)	3.29 Sigma Bounding (%)	0.95 Range Error (Meters)	3.29 Sigma Bounding (%)	0.95 Range Error (Meters)	3.29 Sigma Bounding (%)	0.95 Range Error (Meters)	3.29 Sigma Bounding (%)
1*	0.868	100	1.572	100	0.993	100	1.658	100	1.175	100	1.000	100
2	1.357	100	1.315	100	0.907	100	1.559	100	0.873	100	0.945	100
3*	0.999	100	1.769	100	1.180	100	1.576	100	0.921	100	1.608	100
4	-	-	-	-	-	-	-	-	-	-	-	-
5	1.128	100	1.051	100	1.087	100	2.043	100	0.870	100	0.944	100
6*	1.006	100	2.217	100	1.149	100	1.293	100	0.957	100	1.090	100
7	0.750	100	2.081	100	0.809	100	0.897	100	0.801	100	0.785	100
8*	1.152	100	1.133	100	0.980	100	0.915	100	1.090	100	0.875	100
9*	1.144	100	1.463	100	0.821	100	1.098	100	0.964	100	0.969	100
10	2.553	100	1.176	100	0.774	100	0.929	100	1.324	100	0.837	100
11	1.133	100	1.516	100	0.763	100	1.717	100	1.382	100	1.187	100
12	1.497	100	1.254	100	0.848	100	1.103	100	1.311	100	0.904	100
13	1.257	100	1.261	100	0.651	100	1.020	100	0.960	100	0.751	100
14	1.010	100	1.360	100	1.047	100	1.311	100	1.081	100	1.024	100
15	1.175	100	1.363	100	0.832	100	1.087	100	1.319	100	0.820	100
16	1.893	100	1.535	100	1.248	100	1.274	100	1.113	100	1.095	100
17	2.030	100	1.582	100	0.829	100	0.796	100	0.835	100	0.814	100
18	1.041	100	1.126	100	0.724	100	0.989	100	0.967	100	0.867	100
19	1.033	100	1.254	100	1.025	100	1.217	100	0.979	100	0.958	100
20	0.819	100	1.989	100	0.917	100	1.221	100	0.912	100	1.204	100
21	0.963	100	0.827	100	0.825	100	0.946	100	0.991	100	0.837	100
22	1.016	100	1.132	100	0.808	100	1.101	100	0.905	100	1.333	100
23	0.890	100	1.631	100	0.806	100	0.920	100	0.871	100	0.930	100
24*	1.186	100	1.047	100	0.958	100	1.068	100	0.997	100	0.902	100
25*	1.382	100	1.272	100	1.111	100	1.332	100	1.048	100	0.906	100
26*	1.341	100	1.300	100	1.016	100	1.115	100	1.286	100	1.033	100
27*	0.952	100	1.380	100	0.908	100	1.179	100	0.910	100	1.116	100
28	1.057	100	1.772	100	0.941	100	1.167	100	1.013	100	0.894	100
29	1.250	100	1.030	100	1.062	100	1.262	100	0.844	100	0.976	100
30*	1.545	100	1.320	100	0.667	100	0.854	100	1.028	100	0.955	100
31	1.852	100	1.881	100	1.072	100	1.694	100	1.141	100	1.309	100
32	1.289	100	1.103	100	1.073	100	0.770	100	1.140	100	0.779	100
131	2.929	100	2.461	100	1.621	100	3.240	100	2.141	100	1.760	100
135	1.977	100	1.616	100	1.474	100	1.910	100	1.696	100	1.640	100
138	1.412	100	2.402	100	1.292	100	1.699	100	2.838	100	1.450	100

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

Figure 6-1 Range Error (PRN1 – PRN16) – Washington D.C.

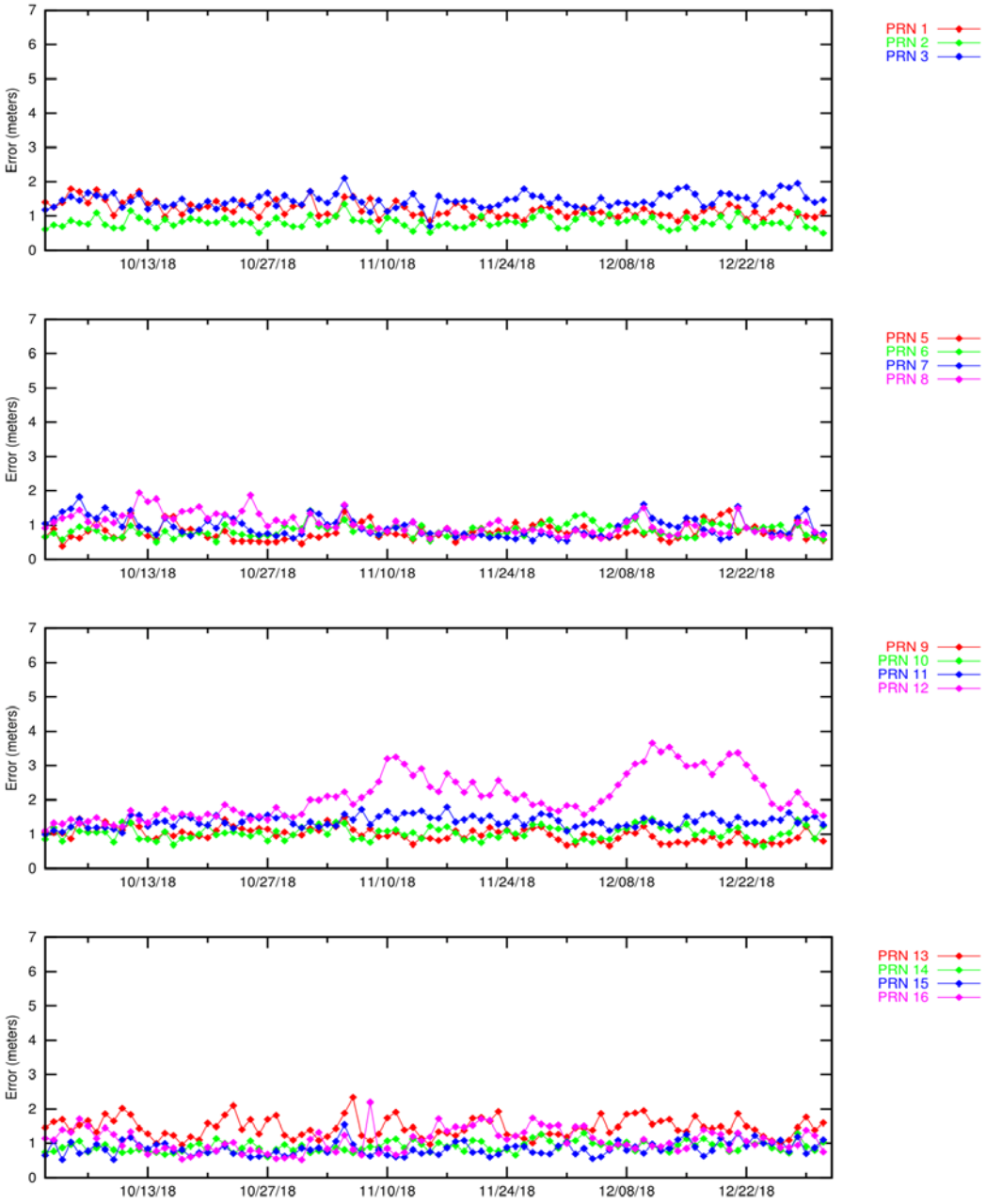
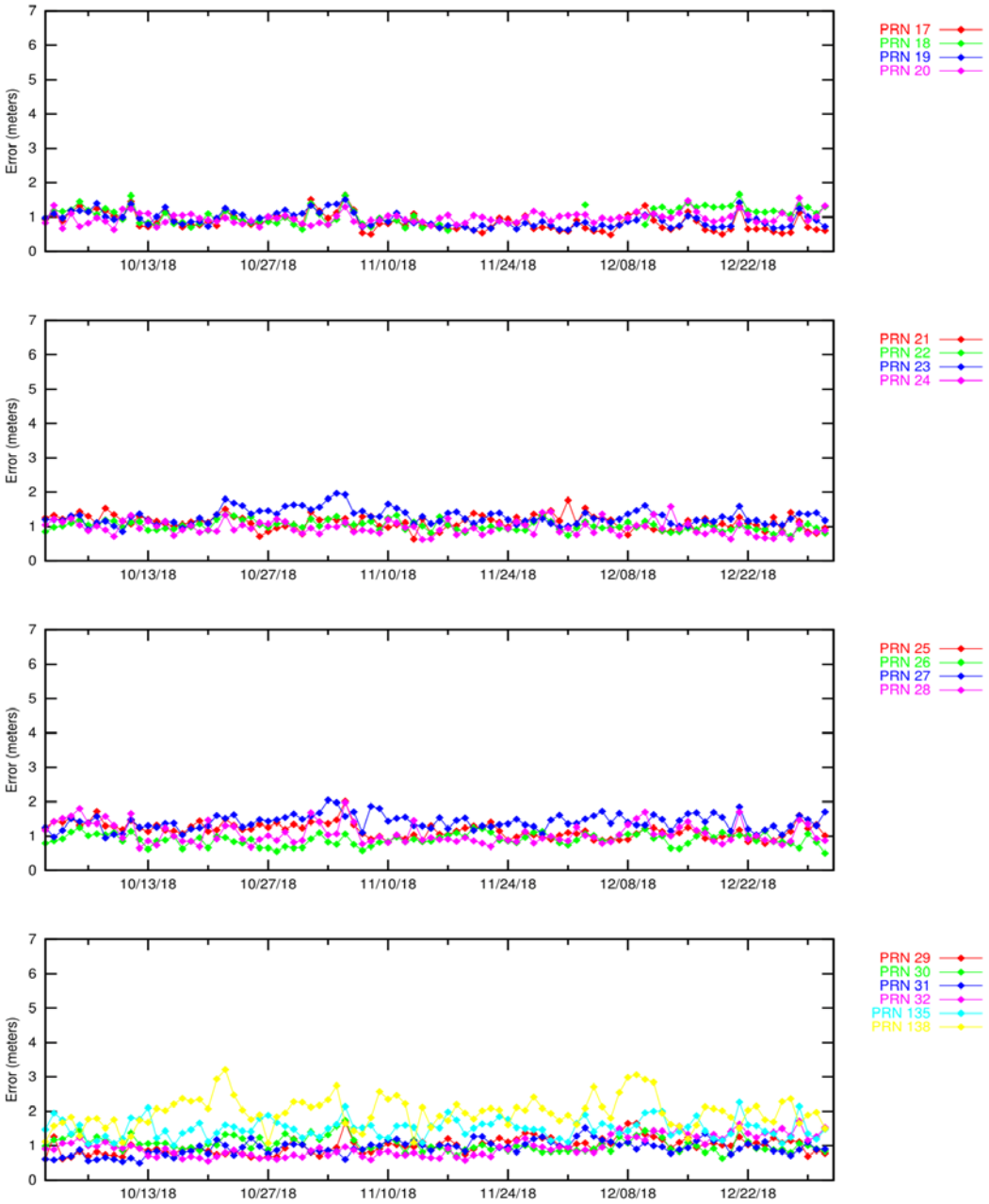


Figure 6-2 Range Error (PRN17 – PRN32) – Washington D.C.



A GIVE is broadcasted by the WAAS for each monitored ionospheric grid point (IGP) and the 99.9% bound of the ionospheric error is checked. The WAAS broadcasts the ionospheric model using IGPs at predefined geographic locations. Each IGP contains the vertical ionospheric delay and the delay error 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 and GPS dual frequency measurement at that GPS satellite.

The GPS satellite ionospheric errors were calculated for 12 WAAS receivers during the quarter Table 6-3 and Table 6-4 show the ionospheric error 95% index and 99.9% bounding statistics for each SV at the selected locations. Figure 6-3 and Figure 6-4 show the 95% ionospheric error for each SV measured by the WAAS receiver at the Chicago reference station.

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

Site	Minneapolis		Chicago		Boston		Juneau		Honolulu		Salt Lake City	
PRN ↓	0.95 Range Error (Meters)	3.29 Sigma Bounding (%)	0.95 Range Error (Meters)	3.29 Sigma Bounding (%)	0.95 Range Error (Meters)	3.29 Sigma Bounding (%)	0.95 Range Error (Meters)	3.29 Sigma Bounding (%)	0.95 Range Error (Meters)	3.29 Sigma Bounding (%)	0.95 Range Error (Meters)	3.29 Sigma Bounding (%)
1	0.510	100	0.586	100	0.419	100	0.525	100	0.547	100	0.382	100
2	0.608	100	0.851	100	0.399	100	0.409	100	0.944	100	0.575	100
3	0.572	100	1.048	100	0.508	100	0.291	100	0.599	100	0.541	100
4	-	-	-	-	-	-	-	-	-	-	-	-
5	0.675	100	0.751	100	0.340	100	0.504	100	0.493	100	0.467	100
6	0.547	100	0.640	100	0.432	100	0.303	100	0.636	100	0.582	100
7	0.771	100	0.548	100	0.584	100	0.501	100	0.754	100	0.416	100
8	0.776	100	0.615	100	0.402	100	0.438	100	0.711	100	0.415	100
9	0.754	100	0.479	100	0.416	100	0.459	100	0.616	100	0.330	100
10	0.862	100	0.618	100	0.730	100	0.595	100	0.587	100	0.498	100
11	0.565	100	0.658	100	0.364	100	0.357	100	0.492	100	0.284	100
12	0.732	100	0.631	100	0.722	100	0.621	100	0.443	100	0.604	100
13	0.640	100	0.455	100	0.457	100	0.420	100	0.468	100	0.375	100
14	0.929	100	0.919	100	0.505	100	0.481	100	0.589	100	0.910	100
15	0.647	100	0.406	100	0.480	100	0.462	100	0.406	100	0.301	100
16	0.593	100	0.380	100	0.477	100	0.489	100	0.630	100	0.285	100
17	0.809	100	0.581	100	0.497	100	0.370	100	0.749	100	0.434	100
18	0.878	100	0.454	100	0.467	100	0.484	100	0.398	100	0.373	100
19	0.814	100	1.158	100	0.576	100	0.504	100	0.508	100	0.988	100
20	0.690	100	0.481	100	0.378	100	0.441	100	0.532	100	0.291	100
21	0.769	100	0.658	100	0.580	100	0.502	100	0.545	100	0.472	100
22	0.601	100	0.420	100	0.380	100	0.607	100	0.555	100	0.404	100
23	0.583	100	0.540	100	0.565	100	0.505	100	0.962	100	0.431	100
24	0.570	100	0.411	100	0.368	100	0.337	100	0.384	100	0.391	100
25	0.676	100	0.496	100	0.450	100	0.517	100	0.312	100	0.544	100
26	0.694	100	0.516	100	0.553	100	0.374	100	0.475	100	0.356	100
27	0.616	100	0.525	100	0.502	100	0.460	100	0.382	100	0.365	100
28	0.837	100	0.407	100	0.480	100	0.530	100	0.410	100	0.511	100
29	0.643	100	0.444	100	0.455	100	0.550	100	0.654	100	0.666	100
30	0.718	100	0.669	100	0.509	100	0.395	100	0.968	100	0.341	100
31	0.595	100	0.269	100	0.370	100	0.479	100	0.615	100	0.440	100
32	1.109	100	0.582	100	0.725	100	0.707	100	0.806	100	0.575	100

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

Site_	Billings		Miami		Albuquerque		Kansas City		Atlanta		Los Angeles	
PRN ↓	0.95 Range Error (Meters)	3.29 Sigma Bounding (%)	0.95 Range Error (Meters)	3.29 Sigma Bounding (%)	0.95 Range Error (Meters)	3.29 Sigma Bounding (%)	0.95 Range Error (Meters)	3.29 Sigma Bounding (%)	0.95 Range Error (Meters)	3.29 Sigma Bounding (%)	0.95 Range Error (Meters)	3.29 Sigma Bounding (%)
1	0.437	0.437	0.657	0.657	0.337	0.337	0.641	0.641	0.477	0.477	0.359	0.359
2	0.727	0.727	0.660	0.660	0.449	0.449	0.562	0.562	0.327	0.327	0.454	0.454
3	0.399	0.399	0.760	0.760	0.497	0.497	0.606	0.606	0.785	0.785	0.379	0.379
4	-	-	-	-	-	-	-	-	-	-	-	-
5	0.534	0.534	0.607	0.607	0.438	0.438	1.150	1.150	0.386	0.386	0.574	0.574
6	0.543	0.543	1.118	1.118	0.519	0.519	0.566	0.566	0.551	0.551	0.384	0.384
7	0.465	0.465	1.134	1.134	0.408	0.408	0.469	0.469	0.431	0.431	0.385	0.385
8	0.456	0.456	0.602	0.602	0.414	0.414	0.381	0.381	0.467	0.467	0.603	0.603
9	0.617	0.617	0.773	0.773	0.422	0.422	0.386	0.386	0.461	0.461	0.406	0.406
10	1.289	1.289	0.382	0.382	0.398	0.398	0.521	0.521	0.385	0.385	0.753	0.753
11	0.223	0.223	0.369	0.369	0.341	0.341	0.388	0.388	0.461	0.461	0.500	0.500
12	0.589	0.589	0.487	0.487	0.491	0.491	0.465	0.465	0.447	0.447	0.551	0.551
13	0.448	0.448	0.564	0.564	0.257	0.257	0.358	0.358	0.354	0.354	0.476	0.476
14	0.506	0.506	0.471	0.471	0.479	0.479	0.416	0.416	0.269	0.269	0.740	0.740
15	0.377	0.377	0.348	0.348	0.386	0.386	0.431	0.431	0.299	0.299	0.590	0.590
16	0.658	0.658	0.368	0.368	0.377	0.377	0.504	0.504	0.358	0.358	0.528	0.528
17	1.295	1.295	0.639	0.639	0.520	0.520	0.334	0.334	0.282	0.282	0.418	0.418
18	0.335	0.335	0.485	0.485	0.299	0.299	0.421	0.421	0.361	0.361	0.445	0.445
19	0.576	0.576	0.574	0.574	0.580	0.580	0.438	0.438	0.328	0.328	0.640	0.640
20	0.536	0.536	1.080	1.080	0.278	0.278	0.609	0.609	0.428	0.428	0.440	0.440
21	0.504	0.504	0.490	0.490	0.407	0.407	0.342	0.342	0.416	0.416	0.471	0.471
22	0.471	0.471	0.377	0.377	0.405	0.405	0.361	0.361	0.477	0.477	0.448	0.448
23	0.368	0.368	0.939	0.939	0.489	0.489	0.360	0.360	0.458	0.458	0.351	0.351
24	0.511	0.511	0.462	0.462	0.339	0.339	0.352	0.352	0.396	0.396	0.414	0.414
25	0.423	0.423	0.432	0.432	0.427	0.427	0.351	0.351	0.321	0.321	0.446	0.446
26	0.462	0.462	0.365	0.365	0.299	0.299	0.410	0.410	0.332	0.332	0.595	0.595
27	0.339	0.339	0.650	0.650	0.287	0.287	0.339	0.339	0.377	0.377	0.446	0.446
28	0.851	0.851	0.865	0.865	0.451	0.451	0.459	0.459	0.419	0.419	0.512	0.512
29	0.443	0.443	0.502	0.502	0.521	0.521	0.426	0.426	0.466	0.466	0.452	0.452
30	0.715	0.715	0.641	0.641	0.430	0.430	0.342	0.342	0.554	0.554	0.364	0.364
31	0.933	0.933	0.805	0.805	0.363	0.363	0.850	0.850	0.463	0.463	0.478	0.478
32	0.748	0.748	0.504	0.504	0.689	0.689	0.507	0.507	0.410	0.410	0.840	0.840

Figure 6-3 Ionospheric Error (PRN1 – PRN16) – Washington D.C.

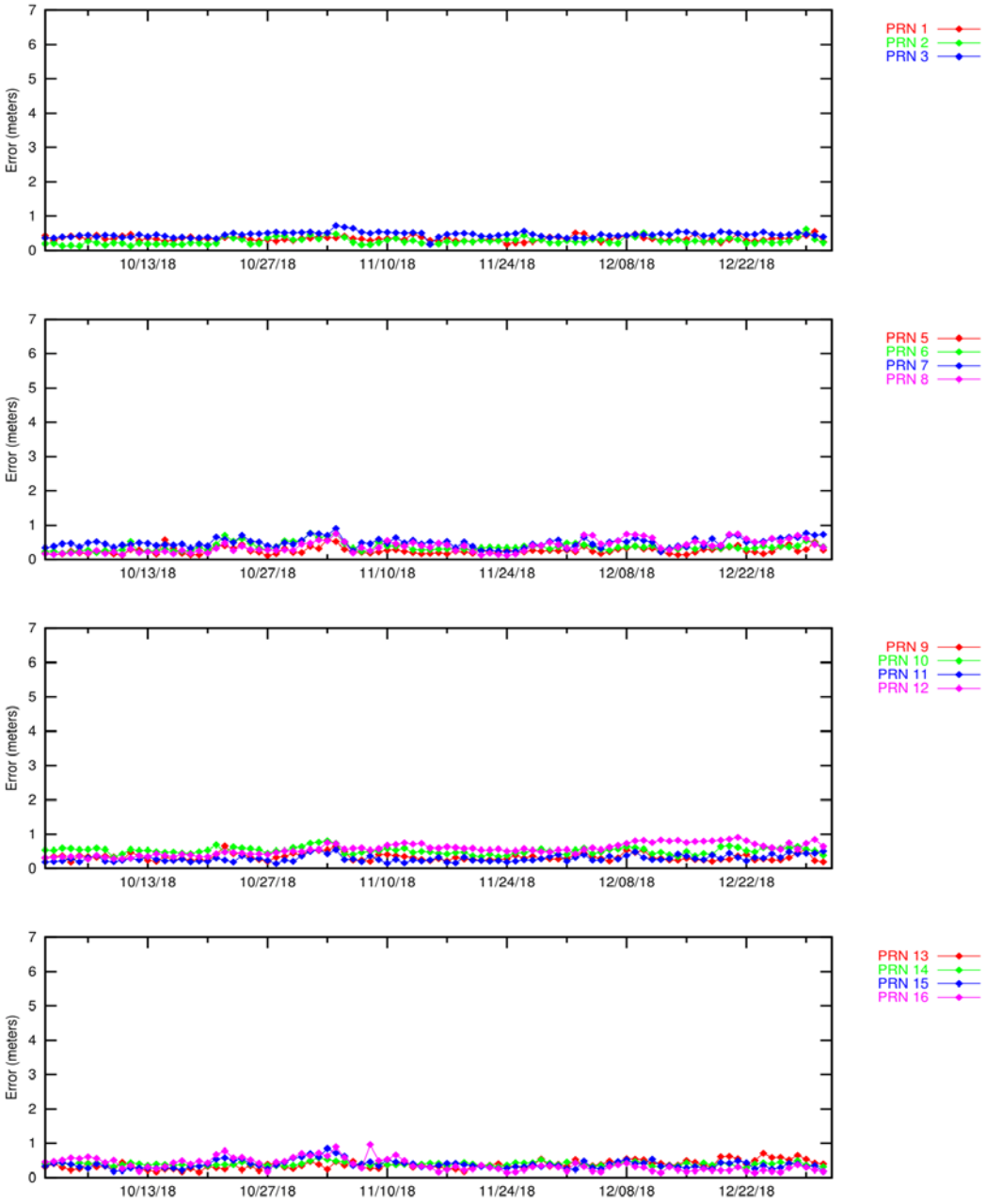
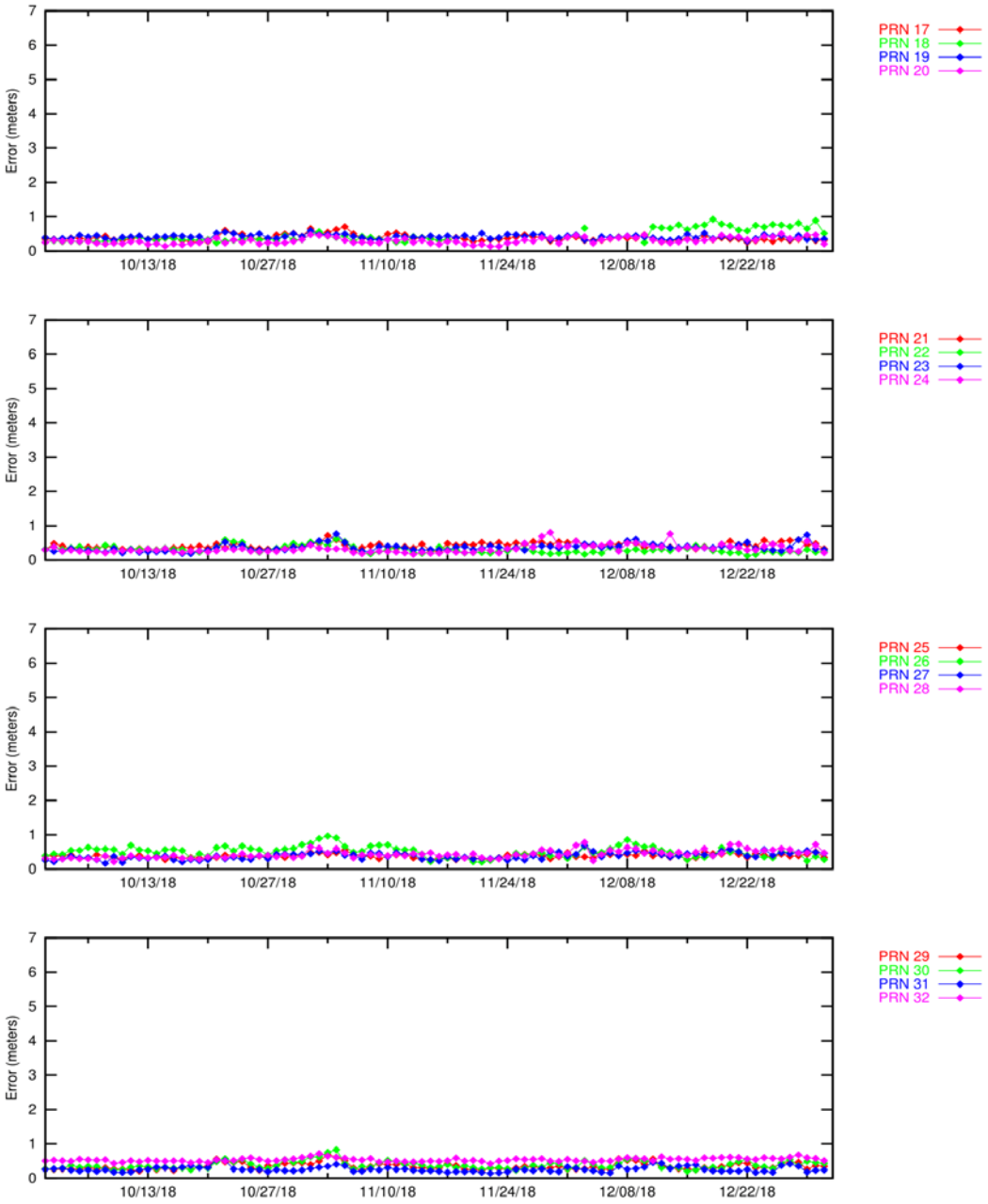


Figure 6-4 Ionospheric Error (PRN17 – PRN32) – Washington D.C.



For this reporting period, most satellite range errors were bounded at least 99.9% of the time by UDRE. Other unbounded errors (i.e., errors bounded less than 100% of the time) were due to geomagnetic activity, noise, and/or multipath. PRN4 was unavailable for the quarter.

7.0 GEO RANGING PERFORMANCE

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

Table 7-1 shows the GEO PA and NPA ranging availability as well as the percentage of time the GEO UDRE was set to "Not Monitored" and "Do Not Use." Figure 7-1 to Figure 7-3 show the trend of SM9, CRW and CRE GEO PA ranging availability, respectively.

The reductions in CRW GEO PA and CRE GEO PA ranging availability were due to GUS switchovers (see Figure 7-1 to Figure 7-3). Refer to Table 1-7 for detailed information on the GUS switchovers for this reporting period.

Table 7-1 GEO Ranging Availability

GEO Source	GEO	PA (%)	NPA (%)	Not Monitored (%)	Do Not Use (%)
SM9 131	SM9	93.68	1.54	0.74	4.04
SM9 131	CRW	100	0	0	0
SM9 131	CRE	99.92	0	0.02	0.06
CRW 135	SM9	93.59	1.54	0.81	4.07
CRW 135	CRW	99.99	0	0.01	0
CRW 135	CRE	99.9	0	0.03	0.08
CRE 138	SM9	93.78	1.54	0.64	4.04
CRE 138	CRW	99.99	0	0.01	0
CRE 138	CRE	99.91	0	0.02	0.06

Figure 7-1 Daily PA SM9 GEO Ranging Availability Trend

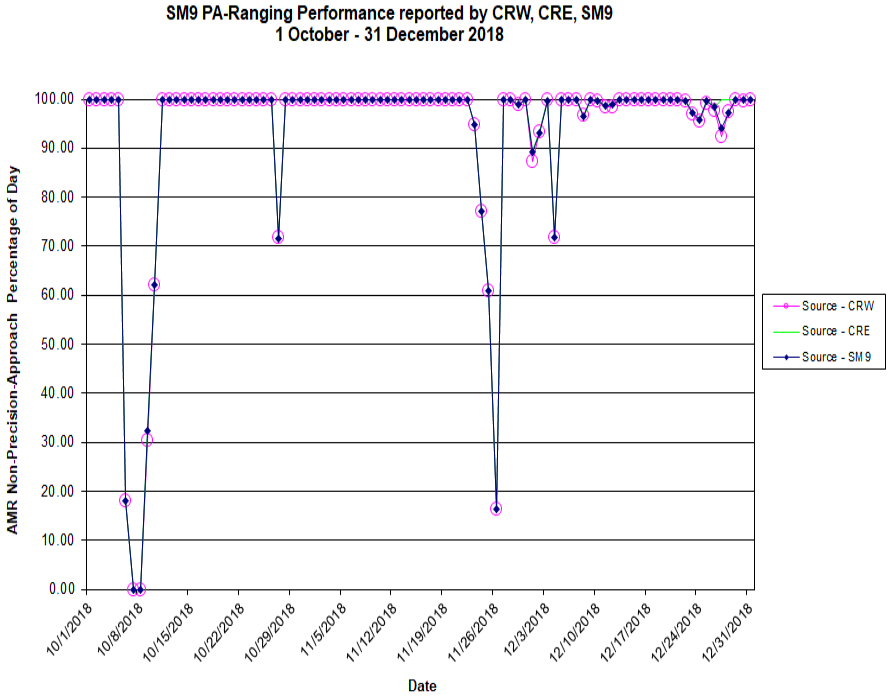


Figure 7-2 Daily PA CRW GEO Ranging Availability Trend

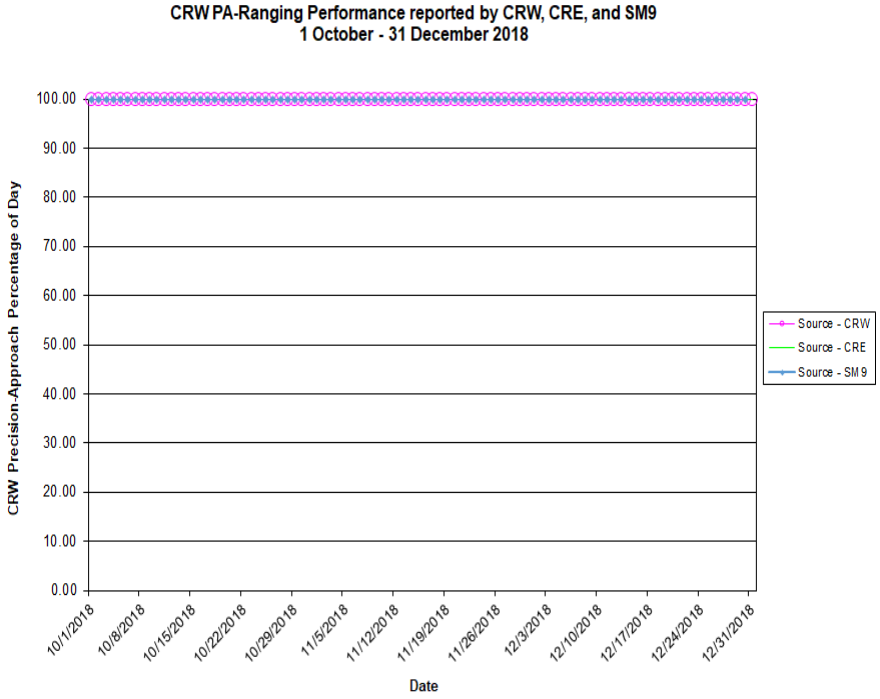
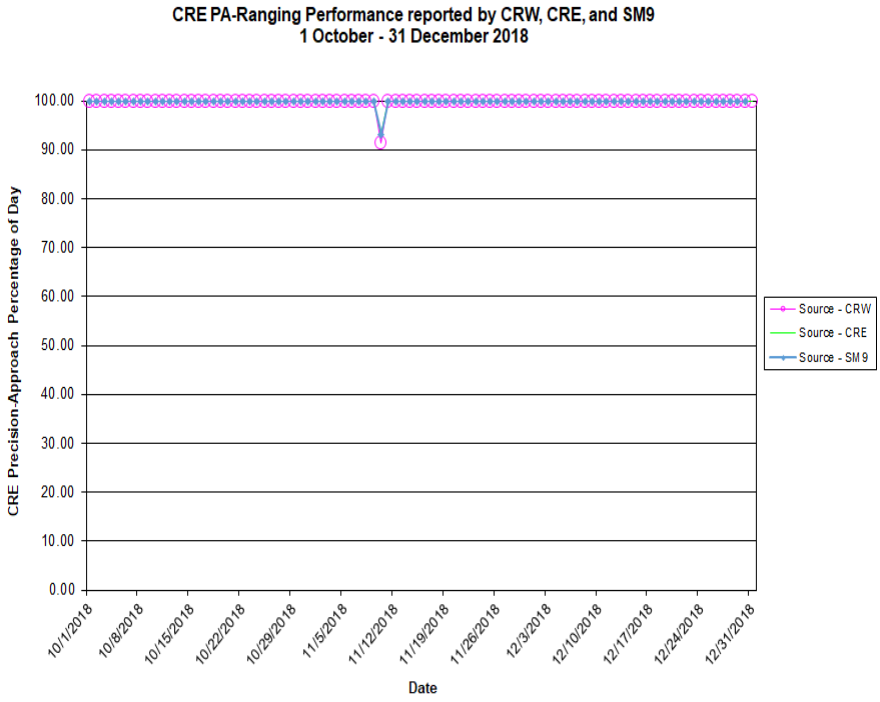


Figure 7-3 Daily PA CRE GEO Ranging Availability Trend



8.0 WAAS AIRPORT AVAILABILITY

The WAAS airport availability evaluation determines the number and length of LPV service outages at selected airports using 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 seconds in accordance with the RTCA DO-229D. The WAAS LPV service is available for a user when the VPL is less than or equal to the VAL of 50 meters and the HPL is less than or equal to the HAL of 40 meters. If both conditions are met, WAAS LPV service is available at that airport. Consequently, if either one of the conditions are not met, the WAAS LPV service outage and its duration is recorded.

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 minimally reduce LPV service availability, it substantially reduces the number of service outages and prevents excessive switching in and out of service availability. Similar service analyses are computed for the LP and LPV200 services in accordance with HAL and VAL shown in Table 1-1. Table 8-1 shows the WAAS LPV service availability and outages at selected airports in the US and Canada. Figure 8-1 through Figure 8-6 provide graphical representation of the LP, LPV, and LPV200 availability and outage counts at airports in the US and Canada that have published GPS area navigation (RNAV) Instrument Approach Procedures (IAPs). These results are geographically depicted on an interactive web page and are accessible at http://www.nstb.tc.faa.gov/AirportOutages/.

To use the interactive web page, select the current quarter from the dropdown menu in the upper left corner, and click “Submit Request”. The WAAS LPV airport layer will appear providing color-coded availability results, as shown in Figure 8-1 and Figure 8-2. Rolling the cursor over any airport will display the LPV availability and outages for the reporting period. The “WAAS Layer” menu in the upper right of the display allows the user to select WAAS LP or LPV200 availability and outage results, as shown in Figure 8-3 through Figure 8-6. Selecting “Show All Airports” displays WAAS availability for US airports with GPS RNAV IAPs; not selecting “Show All Airports” displays only airports with approved LPV approaches, as shown in Table 8-1.

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

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
CAL4	FORT MACKAY / ALBIAN AERODROME	AB	LPV	0	100	0	100	0	100
CEV3	VEGREVILLE	AB	LPV	0	100	0	100	0	100
CYEG	EDMONTON / JOSEPHBURG	AB	LPV	0	100	0	100	0	100
CYXD	EDMONTON CITY CTR	AB	LPV	0	100	0	100	0	100
2C7	SHAKTOOLIK	AK	LPV	0	100	0	100	1	99.998
6A8	ALLAKAKET	AK	LP	0	100	0	100	7	99.977
7KA	TATITLEK	AK	LP	0	100	0	100	0	100
9A3	CHUATHBALUK	AK	LPV	0	100	0	100	0	100
AFM	AMBLER	AK	LPV	0	100	0	100	10	99.975
AKN	KING SALMON	AK	LPV	0	100	0	100	0	100
AKW	KLAWOCK	AK	LP	0	100	0	100	0	100
ANC	TED STEVENS ANCHORAGE INTL	AK	LPV200	0	100	0	100	0	100
ANI	ANIAK	AK	LPV	0	100	0	100	0	100
AQH	QUINHAGAK	AK	LPV	0	100	0	100	0	100
AQT	NUIQSUT	AK	LPV	0	100	0	100	17	99.955
BET	BETHEL	AK	LPV200	0	100	0	100	0	100
BRW	WILEY POST-WILL ROGERS MEMORIA	AK	LPV	0	100	2	99.983	94	99.296
CDB	COLD BAY	AK	LPV200	0	100	0	100	3	99.984
CDV	MERLE K (MUDHOLE) SMITH	AK	LPV	0	100	0	100	0	100
CEM	CENTRAL	AK	LP	0	100	0	100	4	99.986
CLP	CLARKS POINT	AK	LPV	0	100	0	100	0	100
CXF	COLDFOOT	AK	LP	0	100	0	100	7	99.971
D76	ROBERT/BOB/CURTIS MEMORIAL	AK	LPV	0	100	0	100	13	99.972
DEE	DEERING	AK	LPV	0	100	0	100	9	99.982
DLG	DILLINGHAM	AK	LPV	0	100	0	100	0	100
ELI	ELIM	AK	LPV	0	100	0	100	2	99.997
ENA	KENAI MUNICIPAL	AK	LPV200	0	100	0	100	0	100
ENM	EMMONAK	AK	LPV	0	100	0	100	0	100
FAI	FAIRBANKS INTL	AK	LPV200	0	100	0	100	9	99.978
FYU	FORT YUKON	AK	LPV	0	100	0	100	5	99.985
GAL	EDWARD G PITKA SR	AK	LPV	0	100	0	100	3	99.997
GAM	GAMBELL	AK	LPV	0	100	1	99.996	53	99.847
GKN	GULKANA	AK	LPV	0	100	0	100	4	99.994
GST	GUSTAVUS	AK	LP	0	100	0	100	0	100
HLA	HUSLIA	AK	LPV	0	100	0	100	7	99.985

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
HOM	HOMER	AK	LPV	0	100	0	100	0	100
HPB	HOOPER BAY	AK	LP	0	100	0	100	0	100
HRR	HEALY RIVER	AK	LP	0	100	0	100	13	99.973
ILI	ILIAMNA	AK	LPV	0	100	0	100	0	100
IYS	WASILLA	AK	LPV	0	100	0	100	0	100
KAL	KALTAG	AK	LPV	0	100	0	100	2	99.998
KSM	ST MARY'S	AK	LPV200	0	100	0	100	0	100
KTN	KETCHIKAN INTL	AK	LPV	0	100	0	100	0	100
KTS	BREVIG MISSION	AK	LPV	0	100	0	100	15	99.964
KWT	KWETHLUK	AK	LPV	0	100	0	100	0	100
KYU	KOYUKUK	AK	LPV	0	100	0	100	3	99.996
MCG	MC GRATH	AK	LP	0	100	0	100	0	100
MDM	MARSHALL DON HUNTER SR	AK	LP	0	100	0	100	0	100
MDO	MIDDLETON ISLAND	AK	LP	0	100	0	100	0	100
OME	NOME	AK	LPV	0	100	0	100	14	99.984
OOK	TOKSOOK BAY	AK	LP	0	100	0	100	0	100
ORT	NORTHWAY	AK	LP	0	100	0	100	5	99.986
OTZ	RALPH WIEN MEMORIAL	AK	LPV	0	100	0	100	12	99.975
PAQ	PALMER MUNICIPAL	AK	LP	0	100	0	100	0	100
PHO	POINT HOPE	AK	LPV	0	100	1	99.995	17	99.898
RBY	RUBY	AK	LPV	0	100	0	100	4	99.995
SCC	DEADHORSE	AK	LPV	0	100	0	100	15	99.959
SCM	SCAMMON BAY	AK	LP	0	100	0	100	0	100
SHG	SHUNGNAK	AK	LP	0	100	0	100	10	99.976
SHX	SHAGELUK	AK	LPV	0	100	0	100	0	100
SIT	SITKA ROCKY GUTIERREZ	AK	LP	0	100	0	100	0	100
SMK	ST MICHAEL	AK	LPV	0	100	0	100	1	99.999
SXQ	SOLDOTNA	AK	LP	0	100	0	100	0	100
UNK	UNALAKLEET	AK	LP	0	100	0	100	2	99.998
WLK	SELAWIK	AK	LPV	0	100	0	100	5	99.988
WMO	WHITE MOUNTAIN	AK	LP	0	100	0	100	2	99.996
WNA	NAPAKIAK	AK	LPV	0	100	0	100	0	100
WSN	SOUTH NAKNEK NR 2	AK	LPV	0	100	0	100	0	100
YAK	YAKUTAT	AK	LPV200	0	100	0	100	0	100
02A	CHILTON COUNTY	AL	LP	0	100	0	100	0	100
06A	MOTON FIELD MUNICIPAL	AL	LPV	0	100	0	100	0	100
09A	BUTLER-CHOCTAW COUNTY	AL	LPV	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
0J6	HEADLAND MUNICIPAL	AL	LPV	0	100	0	100	0	100
0R1	ATMORE MUNICIPAL	AL	LP	0	100	0	100	0	100
11A	CLAYTON MUNICIPAL	AL	LPV	0	100	0	100	0	100
12J	BREWTON MUNICIPAL	AL	LPV	0	100	0	100	0	100
1M4	POSEY FIELD	AL	LPV	0	100	0	100	0	100
1R8	BAY MINETTE MUNICIPAL	AL	LPV	0	100	0	100	0	100
2R5	ST ELMO	AL	LPV	0	100	0	100	3	99.998
33J	GENEVA MUNICIPAL	AL	LP	0	100	0	100	0	100
3M8	NORTH PICKENS	AL	LP	0	100	0	100	0	100
4A9	ISBELL FIELD	AL	LPV	0	100	0	100	0	100
5R1	ROY WILCOX	AL	LP	0	100	0	100	0	100
5R4	FOLEY MUNICIPAL	AL	LPV	0	100	0	100	1	99.999
71J	BLACKWELL FIELD	AL	LPV	0	100	0	100	0	100
79J	SOUTH ALABAMA RGNL AT BILL BEN	AL	LPV	0	100	0	100	0	100
8A0	ALBERTVILLE RGNL-THOMAS J BRUM	AL	LPV	0	100	0	100	0	100
8A1	GUNTERSVILLE MUNICIPAL - JOE STARNE	AL	LPV	0	100	0	100	0	100
9A4	COURTLAND	AL	LPV200	0	100	0	100	0	100
A08	VAIDEN FIELD	AL	LPV	0	100	0	100	0	100
ALX	THOMAS C RUSSELL FLD	AL	LPV	0	100	0	100	0	100
ANB	ANNISTON RGNL	AL	LPV	0	100	0	100	0	100
ASN	TALLADEGA MUNICIPAL	AL	LPV200	0	100	0	100	0	100
AUO	AUBURN UNIVERSITY RGNL	AL	LPV200	0	100	0	100	0	100
BFM	MOBILE DOWNTOWN	AL	LPV200	0	100	0	100	0	100
BHM	BIRMINGHAM-SHUTTLESWORTH INTL	AL	LPV200	0	100	0	100	0	100
CMD	CULLMAN RGNL-FOLSOM FIELD	AL	LPV	0	100	0	100	0	100
CQF	H L SONNY CALLAHAN	AL	LPV200	0	100	0	100	2	99.999
DCU	PRYOR FIELD RGNL	AL	LPV200	0	100	0	100	0	100
DHN	DOTHAN RGNL	AL	LPV200	0	100	0	100	0	100
DYA	DEMOPOLIS RGNL	AL	LPV	0	100	0	100	0	100
EDN	ENTERPRISE MUNICIPAL	AL	LPV	0	100	0	100	0	100
EET	SHELBY COUNTY	AL	LPV	0	100	0	100	0	100
EKY	BESSEMER	AL	LPV	0	100	0	100	0	100
EUF	WEEDON FIELD	AL	LPV	0	100	0	100	0	100
GAD	NORTHEAST ALABAMA RGNL	AL	LPV200	0	100	0	100	0	100
GZH	MIDDLETON FIELD	AL	LP	0	100	0	100	0	100
HAB	MARION COUNTY-RANKIN FITE	AL	LPV	0	100	0	100	0	100
HSV	HUNTSVILLE INTL-CARL T JONES F	AL	LPV200	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
JFX	WALKER COUNTY-BEVILL FIELD	AL	LPV	0	100	0	100	0	100
JKA	JACK EDWARDS	AL	LPV200	0	100	0	100	2	99.999
M95	RICHARD ARTHUR FIELD	AL	LPV	0	100	0	100	0	100
MDQ	HUNTSVILLE EXECUTIVE AIRPORT T	AL	LPV200	0	100	0	100	0	100
MGM	MONTGOMERY RGNL (DANNELLY FIEL	AL	LPV200	0	100	0	100	0	100
MOB	MOBILE RGNL	AL	LPV200	0	100	0	100	0	100
MSL	NORTHWEST ALABAMA RGNL	AL	LPV200	0	100	0	100	0	100
PLR	ST CLAIR COUNTY	AL	LPV	0	100	0	100	0	100
PYP	CENTRE-PIEDMONT-CHEROKEE COUNT	AL	LPV	0	100	0	100	0	100
SCD	MERKEL FIELD SYLACAUGA MUNICIPAL	AL	LPV	0	100	0	100	0	100
SEM	CRAIG FIELD	AL	LPV200	0	100	0	100	0	100
TCL	TUSCALOOSA RGNL	AL	LPV	0	100	0	100	0	100
TOI	TROY MUNICIPAL AIRPORT AT N KENNETH	AL	LPV	0	100	0	100	0	100
0M0	BILLY FREE MUNICIPAL	AR	LPV	0	100	0	100	0	100
42A	MELBOURNE MUNICIPAL - JOHN E MILLER	AR	LP	0	100	0	100	0	100
4A5	SEARCY COUNTY	AR	LPV	0	100	0	100	0	100
4M3	CARLISLE MUNICIPAL	AR	LPV	0	100	0	100	0	100
6M7	MARIANNA/LEE COUNTY-STEVE EDWA	AR	LPV	0	100	0	100	0	100
7M1	MC GEHEE MUNICIPAL	AR	LP	0	100	0	100	0	100
9M8	SHERIDAN MUNICIPAL	AR	LPV	0	100	0	100	0	100
ADF	DEXTER B FLORENCE MEMORIAL FIE	AR	LPV	0	100	0	100	0	100
ARG	WALNUT RIDGE RGNL	AR	LPV200	0	100	0	100	0	100
ASG	SPRINGDALE MUNICIPAL	AR	LPV	0	100	0	100	0	100
AWM	WEST MEMPHIS MUNICIPAL	AR	LPV200	0	100	0	100	0	100
BPK	BAXTER COUNTY	AR	LPV	0	100	0	100	0	100
BVX	BATESVILLE RGNL	AR	LPV	0	100	0	100	0	100
BYH	ARKANSAS INTL	AR	LPV200	0	100	0	100	0	100
CDH	HARRELL FIELD	AR	LPV	0	100	0	100	0	100
CXW	CANTRELL FLD	AR	LPV	0	100	0	100	0	100
DRP	DELTA RGNL	AR	LPV	0	100	0	100	0	100
ELD	SOUTH ARKANSAS RGNL AT GOODWIN	AR	LPV	0	100	0	100	0	100
FLP	MARION COUNTY RGNL	AR	LPV	0	100	0	100	0	100
FSM	FORT SMITH RGNL	AR	LPV200	0	100	0	100	0	100
FYV	DRAKE FIELD	AR	LPV	0	100	0	100	0	100
H34	HUNTSVILLE MUNICIPAL	AR	LPV	0	100	0	100	0	100
HRO	BOONE COUNTY	AR	LPV	0	100	0	100	0	100
JBR	JONESBORO MUNICIPAL	AR	LPV200	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
LIT	BILL AND HILLARY CLINTON NATIO	AR	LPV200	0	100	0	100	0	100
M18	HOPE MUNICIPAL	AR	LP	0	100	0	100	0	100
M19	NEWPORT MUNICIPAL	AR	LPV	0	100	0	100	0	100
M32	LAKE VILLAGE MUNICIPAL	AR	LP	0	100	0	100	0	100
M77	HOWARD COUNTY	AR	LP	0	100	0	100	0	100
MXA	MANILA MUNICIPAL	AR	LPV	0	100	0	100	0	100
ORK	NORTH LITTLE ROCK MUNICIPAL	AR	LPV	0	100	0	100	0	100
PBF	GRIDER FIELD	AR	LPV	0	100	0	100	0	100
ROG	ROGERS EXECUTIVE - CARTER FIEL	AR	LPV	0	100	0	100	0	100
RUE	RUSSELLVILLE RGNL	AR	LPV	0	100	0	100	0	100
SGT	STUTTGART MUNICIPAL CARL HUMPHREY F	AR	LPV	0	100	0	100	0	100
SLG	SMITH FIELD	AR	LPV	0	100	0	100	0	100
SRC	SEARCY MUNICIPAL	AR	LPV	0	100	0	100	0	100
SUZ	SALINE COUNTY RGNL	AR	LPV	0	100	0	100	0	100
TXK	TEXARKANA RGNL-WEBB FIELD	AR	LPV	0	100	0	100	0	100
VBT	BENTONVILLE MUNICIPAL/LOUISE M THAD	AR	LPV	0	100	0	100	0	100
XNA	NORTHWEST ARKANSAS RGNL	AR	LPV200	0	100	0	100	0	100
AVQ	MARANA RGNL	AZ	LP	0	100	1	99.999	65	99.875
DVT	PHOENIX DEER VALLEY	AZ	LPV	0	100	0	100	3	99.983
FFZ	FALCON FLD	AZ	LP	0	100	0	100	8	99.975
FHU	SIERRA VISTA MUNICIPAL-LIBBY AAF	AZ	LPV200	0	100	1	99.998	68	99.830
FLG	FLAGSTAFF PULLIAM	AZ	LPV	0	100	0	100	1	99.987
GCN	GRAND CANYON NATIONAL PARK	AZ	LPV	0	100	0	100	1	99.987
GEU	GLENDALE MUNICIPAL	AZ	LPV	0	100	0	100	7	99.978
GYR	PHOENIX GOODYEAR	AZ	LP	0	100	0	100	7	99.970
HII	LAKE HAVASU CITY	AZ	LPV	0	100	0	100	1	99.988
IFP	LAUGHLIN/BULLHEAD INTL	AZ	LPV	0	100	0	100	1	99.989
IGM	KINGMAN	AZ	LPV	0	100	0	100	1	99.990
IWA	PHOENIX-MESA GATEWAY	AZ	LPV200	0	100	0	100	24	99.962
JTC	SPRINGERVILLE MUNICIPAL	AZ	LP	0	100	0	100	2	99.990
P20	AVI SUQUILLA	AZ	LPV	0	100	0	100	1	99.987
P33	COCHISE COUNTY	AZ	LPV	0	100	0	100	29	99.963
PGA	PAGE MUNICIPAL	AZ	LPV	0	100	0	100	0	100
PHX	PHOENIX SKY HARBOR INTL	AZ	LPV	0	100	0	100	10	99.980
PRC	ERNEST A LOVE FIELD	AZ	LPV200	0	100	0	100	1	99.984
RQE	WINDOW ROCK	AZ	LP	0	100	0	100	2	99.995
SAD	SAFFORD RGNL	AZ	LPV	0	100	0	100	6	99.986

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
SJN	ST JOHNS INDUSTRIAL AIR PARK	AZ	LP	0	100	0	100	2	99.990
SOW	SHOW LOW RGNL	AZ	LPV	0	100	0	100	2	99.987
TUS	TUCSON INTL	AZ	LPV	0	100	1	99.998	64	99.859
CYBL	CAMPBELL RIVER	BC	LPV	0	100	0	100	0	100
CYCD	NANAIMO	BC	LPV	0	100	0	100	0	100
CYVR	VANCOUVER INTL	BC	LPV	0	100	0	100	0	100
CYXS	PRINCE GEORGE	BC	LPV	0	100	0	100	0	100
CYYJ	VICTORIA INTL	BC	LPV	0	100	0	100	0	100
CZBB	VANCOUVER / BOUNDARY BAY	BC	LPV	0	100	0	100	0	100
AAT	ALTURAS MUNICIPAL	CA	LPV	0	100	0	100	2	99.991
ACV	ARCATA	CA	LPV	0	100	0	100	2	99.972
APC	NAPA COUNTY	CA	LPV	0	100	0	100	2	99.977
APV	APPLE VALLEY	CA	LPV	0	100	0	100	1	99.983
AUN	AUBURN MUNICIPAL	CA	LPV	0	100	0	100	2	99.984
BFL	MEADOWS FIELD	CA	LPV200	0	100	0	100	2	99.980
BLH	BLYTHE	CA	LP	0	100	0	100	1	99.984
BUR	BOB HOPE	CA	LP	0	100	0	100	2	99.980
C83	BYRON	CA	LPV	0	100	0	100	2	99.981
CCB	CABLE	CA	LP	0	100	0	100	2	99.980
CCR	BUCHANAN FIELD	CA	LPV	0	100	0	100	2	99.977
CEC	JACK MC NAMARA FIELD	CA	LPV	0	100	0	100	2	99.972
CIC	CHICO MUNICIPAL	CA	LPV	0	100	0	100	2	99.983
CMA	CAMARILLO	CA	LPV	0	100	0	100	5	99.975
CNO	CHINO	CA	LPV	0	100	0	100	2	99.980
CRQ	MC CLELLAN-PALOMAR	CA	LPV	0	100	1	99.998	3	99.977
CVH	HOLLISTER MUNICIPAL	CA	LPV	0	100	0	100	2	99.976
DAG	BARSTOW-DAGGETT	CA	LPV	0	100	0	100	1	99.984
DWA	YOLO COUNTY	CA	LPV	0	100	0	100	2	99.982
F70	FRENCH VALLEY	CA	LPV	0	100	0	100	2	99.979
FAT	FRESNO YOSEMITE INTL	CA	LPV200	0	100	0	100	2	99.984
GOO	NEVADA COUNTY AIR PARK	CA	LPV	0	100	0	100	2	99.985
HAF	HALF MOON BAY	CA	LPV	0	100	0	100	2	99.974
HHR	JACK NORTHROP FIELD/HAWTHORNE	CA	LPV	0	100	0	100	5	99.978
HWD	HAYWARD EXECUTIVE	CA	LPV	0	100	0	100	2	99.977
L35	BIG BEAR CITY	CA	LP	0	100	0	100	1	99.983
LAX	LOS ANGELES INTL	CA	LPV200	0	100	0	100	5	99.978
LGB	LONG BEACH /DAUGHERTY FIELD/	CA	LPV	0	100	0	100	4	99.978

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
LHM	LINCOLN RGNL/KARL HARDER FIELD	CA	LPV200	0	100	0	100	2	99.984
LLR	LITTLE RIVER	CA	LP	0	100	0	100	2	99.972
LSN	LOS BANOS MUNICIPAL	CA	LPV	0	100	0	100	2	99.981
LVK	LIVERMORE MUNICIPAL	CA	LPV200	0	100	0	100	2	99.978
MAE	MADERA MUNICIPAL	CA	LPV	0	100	0	100	2	99.984
MCE	MERCED RGNL/MACREADY FIELD	CA	LPV	0	100	0	100	2	99.983
MER	CASTLE	CA	LPV200	0	100	0	100	2	99.983
MHR	SACRAMENTO MATHER	CA	LPV200	0	100	0	100	2	99.984
MIT	SHAFTER-MINTER FIELD	CA	LPV	0	100	0	100	2	99.980
MOD	MODESTO CITY-CO-HARRY SHAM FLD	CA	LPV	0	100	0	100	2	99.983
MRY	MONTEREY RGNL	CA	LPV	0	100	0	100	2	99.973
MYF	MONTGOMERY-GIBBS EXECUTIVE	CA	LPV200	0	100	1	99.998	5	99.976
MYV	YUBA COUNTY	CA	LPV200	0	100	0	100	2	99.983
O02	NERVINO	CA	LPV	0	100	0	100	2	99.990
O27	OAKDALE	CA	LPV	0	100	0	100	2	99.983
O69	PETALUMA MUNICIPAL	CA	LPV	0	100	0	100	2	99.976
O88	RIO VISTA MUNICIPAL	CA	LP	0	100	0	100	2	99.981
OAK	METROPOLITAN OAKLAND INTL	CA	LPV200	0	100	0	100	2	99.977
ONT	ONTARIO INTL	CA	LPV200	0	100	0	100	2	99.980
OVE	OROVILLE MUNICIPAL	CA	LPV	0	100	0	100	2	99.983
OXR	OXNARD	CA	LPV	0	100	0	100	6	99.975
PMD	PALMDALE USAF PLANT 42	CA	LPV200	0	100	0	100	1	99.982
POC	BRACKETT FIELD	CA	LPV	0	100	0	100	2	99.980
PRB	PASO ROBLES MUNICIPAL	CA	LPV	0	100	0	100	2	99.975
PVF	PLACERVILLE	CA	LPV	0	100	0	100	2	99.986
RAL	RIVERSIDE MUNICIPAL	CA	LPV	0	100	0	100	2	99.981
RBL	RED BLUFF MUNICIPAL	CA	LPV	0	100	0	100	2	99.981
RDD	REDDING MUNICIPAL	CA	LPV	0	100	0	100	2	99.981
RHV	REID-HILLVIEW OF SANTA CLARA C	CA	LPV	0	100	0	100	2	99.977
SAC	SACRAMENTO EXECUTIVE	CA	LPV	0	100	0	100	2	99.983
SAN	SAN DIEGO INTL	CA	LPV	0	100	1	99.997	9	99.974
SBA	SANTA BARBARA MUNICIPAL	CA	LPV	0	100	0	100	4	99.973
SBP	SAN LUIS COUNTY RGNL	CA	LPV200	0	100	0	100	3	99.972
SCK	STOCKTON METROPOLITAN	CA	LPV200	0	100	0	100	2	99.982
SDM	BROWN FIELD MUNICIPAL	CA	LPV200	0	100	1	99.997	9	99.973
SEE	GILLESPIE FIELD	CA	LP	0	100	1	99.998	3	99.977
SFO	SAN FRANCISCO INTL	CA	LPV200	0	100	0	100	2	99.975

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
SJC	NORMAN Y MINETA SAN JOSE INTL	CA	LPV200	0	100	0	100	2	99.976
SMF	SACRAMENTO INTL	CA	LPV200	0	100	0	100	2	99.982
SMO	SANTA MONICA MUNICIPAL	CA	LPV	0	100	0	100	3	99.998
SMX	SANTA MARIA PUB/CAPT G ALLAN H	CA	LPV200	0	100	0	100	4	99.972
SNA	JOHN WAYNE AIRPORT-ORANGE COUN	CA	LPV200	0	100	0	100	3	99.979
SNS	SALINAS MUNICIPAL	CA	LPV200	0	100	0	100	2	99.975
STS	CHARLES M SCHULZ - SONOMA COUN	CA	LPV200	0	100	0	100	2	99.976
TCY	TRACY MUNICIPAL	CA	LPV	0	100	0	100	2	99.981
TNP	TWENTYNINE PALMS	CA	LP	0	100	0	100	1	99.984
TOA	ZAMPERINI FIELD	CA	LPV	0	100	0	100	6	99.977
TRK	TRUCKEE-TAHOE	CA	LP	0	100	0	100	2	99.991
VCV	SOUTHERN CALIFORNIA LOGISTICS	CA	LPV	0	100	0	100	1	99.983
VIS	VISALIA MUNICIPAL	CA	LPV200	0	100	0	100	2	99.983
WJF	GENERAL WM J FOX AIRFIELD	CA	LPV	0	100	0	100	2	99.981
WLW	WILLOWS-GLENN COUNTY	CA	LPV	0	100	0	100	2	99.981
WVI	WATSONVILLE MUNICIPAL	CA	LPV	0	100	0	100	2	99.975
1V6	FREMONT COUNTY	CO	LPV	0	100	0	100	0	100
20V	MC ELROY AIRFIELD	CO	LPV	0	100	0	100	0	100
4V1	SPANISH PEAKS AIRFIELD	CO	LPV	0	100	0	100	0	100
AEJ	CENTRAL COLORADO RGNL	CO	LP	0	100	0	100	0	100
AJZ	BLAKE FIELD	CO	LPV	0	100	0	100	0	100
AKO	COLORADO PLAINS RGNL	CO	LPV	0	100	0	100	0	100
ALS	SAN LUIS VALLEY RGNL/BERGMAN F	CO	LPV200	0	100	0	100	0	100
APA	CENTENNIAL	CO	LPV200	0	100	0	100	0	100
BJC	ROCKY MOUNTAIN METROPOLITAN	CO	LPV200	0	100	0	100	0	100
CEZ	CORTEZ MUNICIPAL	CO	LPV	0	100	0	100	1	99.998
COS	CITY OF COLORADO SPRINGS MUNICIPAL	CO	LPV200	0	100	0	100	0	100
DEN	DENVER INTL	CO	LPV200	0	100	0	100	0	100
DRO	DURANGO-LA PLATA COUNTY	CO	LPV200	0	100	0	100	0	100
FMM	FORT MORGAN MUNICIPAL	CO	LPV	0	100	0	100	0	100
FNL	FORT COLLINS-LOVELAND MUNICIPAL	CO	LPV200	0	100	0	100	0	100
FTG	FRONT RANGE	CO	LPV200	0	100	0	100	0	100
GJT	GRAND JUNCTION REGIONAL	CO	LPV200	0	100	0	100	0	100
GXY	GREELEY-WELD COUNTY	CO	LPV200	0	100	0	100	0	100
HDN	YAMPA VALLEY	CO	LPV200	0	100	0	100	0	100
ITR	KIT CARSON COUNTY	CO	LPV	0	100	0	100	0	100
LAA	LAMAR MUNICIPAL	CO	LPV	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
LHX	LA JUNTA MUNICIPAL	CO	LPV	0	100	0	100	0	100
LMO	VANCE BRAND	CO	LPV	0	100	0	100	0	100
MTJ	MONTROSE RGNL	CO	LPV	0	100	0	100	0	100
PSO	STEVENS FIELD	CO	LP	0	100	0	100	0	100
PUB	PUEBLO MEMORIAL	CO	LPV200	0	100	0	100	0	100
RIL	GARFIELD COUNTY RGNL	CO	LPV	0	100	0	100	0	100
STK	STERLING MUNICIPAL	CO	LPV	0	100	0	100	0	100
TEX	TELLURIDE RGNL	CO	LP	0	100	0	100	0	100
4B8	ROBERTSON FIELD	CT	LP	0	100	0	100	0	100
BDL	BRADLEY INTL	CT	LPV200	0	100	0	100	0	100
BDR	IGOR I SIKORSKY MEMORIAL	CT	LPV	0	100	0	100	0	100
GON	GROTON-NEW LONDON	CT	LPV	0	100	0	100	0	100
HVN	TWEED-NEW HAVEN	CT	LPV	0	100	0	100	0	100
IJD	WINDHAM	CT	LP	0	100	0	100	0	100
MMK	MERIDEN MARKHAM MUNICIPAL	CT	LP	0	100	0	100	0	100
OXC	WATERBURY-OXFORD	CT	LPV	0	100	0	100	0	100
DCA	RONALD REAGAN WASHINGTON NATIO	DC	LPV	0	100	0	100	1	99.994
HEF	MANASSAS RGNL/HARRY P DAVIS FI	DC	LPV	0	100	0	100	1	99.994
IAD	WASHINGTON DULLES INTL	DC	LPV200	0	100	0	100	1	99.994
33N	DELAWARE AIRPARK	DE	LP	0	100	0	100	1	99.994
EVY	SUMMIT	DE	LPV	0	100	0	100	1	99.994
GED	DELAWARE COASTAL	DE	LPV	0	100	0	100	1	99.995
ILG	NEW CASTLE	DE	LPV	0	100	0	100	1	99.994
1J0	TRI-COUNTY	FL	LP	0	100	0	100	0	100
24J	SUWANNEE COUNTY	FL	LPV	0	100	0	100	1	99.995
28J	PALATKA MUNICIPAL - LT KAY LARKIN F	FL	LPV	0	100	0	100	1	99.994
40J	PERRY-FOLEY	FL	LPV	0	100	0	100	1	99.996
54J	DEFUNIAK SPRINGS	FL	LP	0	100	0	100	0	100
AAF	APALACHICOLA RGNL-CLEVE RANDOL	FL	LPV	0	100	0	100	1	99.999
APF	NAPLES MUNICIPAL	FL	LPV	0	100	0	100	15	99.968
AVO	AVON PARK EXECUTIVE	FL	LPV	0	100	0	100	4	99.984
BCT	BOCA RATON	FL	LPV	0	100	0	100	2	99.976
BKV	BROOKSVILLE-TAMPA BAY RGNL	FL	LPV	0	100	0	100	1	99.994
BOW	BARTOW MUNICIPAL	FL	LPV	0	100	0	100	2	99.988
CEW	BOB SIKES	FL	LPV	0	100	0	100	0	100
CGC	CRYSTAL RIVER-CAPTAIN TOM DAVI	FL	LP	0	100	0	100	1	99.994
CHN	WAUCHULA MUNICIPAL	FL	LP	0	100	0	100	5	99.985

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
COI	MERRITT ISLAND	FL	LPV	0	100	0	100	2	99.991
CRG	JACKSONVILLE EXECUTIVE AT CRAI	FL	LPV200	0	100	0	100	1	99.994
CTY	CROSS CITY	FL	LPV	0	100	0	100	1	99.995
DAB	DAYTONA BEACH INTL	FL	LPV200	0	100	0	100	1	99.994
DED	DELAND MUNICIPAL-SIDNEY H TAYLOR FI	FL	LPV	0	100	0	100	1	99.994
DTS	DESTIN EXECUTIVE	FL	LPV	0	100	0	100	0	100
ECP	NORTHWEST FLORIDA BEACHES INTL	FL	LPV200	0	100	0	100	0	100
EVB	NEW SMYRNA BEACH MUNICIPAL	FL	LPV	0	100	0	100	1	99.994
EYW	KEY WEST INTL	FL	LPV	0	100	1	99.999	19	99.958
F45	NORTH PALM BEACH COUNTY GENERA	FL	LPV	0	100	0	100	2	99.977
FHB	FERNANDINA BEACH MUNICIPAL	FL	LPV	0	100	0	100	1	99.994
FIN	FLAGLER EXECUTIVE	FL	LPV	0	100	0	100	1	99.994
FLL	FORT LAUDERDALE/HOLLYWOOD INTL	FL	LPV200	0	100	0	100	2	99.975
FMY	PAGE FIELD	FL	LPV	0	100	0	100	11	99.972
FPR	TREASURE COAST INTL	FL	LPV	0	100	0	100	2	99.984
FXE	FORT LAUDERDALE EXECUTIVE	FL	LPV200	0	100	0	100	2	99.976
GIF	WINTER HAVEN'S GILBERT	FL	LPV	0	100	0	100	2	99.987
GNV	GAINESVILLE RGNL	FL	LPV	0	100	0	100	1	99.994
HEG	HERLONG RECREATIONAL	FL	LPV	0	100	0	100	1	99.994
IMM	IMMOKALEE RGNL	FL	LPV	0	100	0	100	9	99.980
ISM	KISSIMMEE GATEWAY	FL	LPV200	0	100	0	100	2	99.986
JAX	JACKSONVILLE INTL	FL	LPV200	0	100	0	100	1	99.994
LAL	LAKELAND LINDER RGNL	FL	LPV200	0	100	0	100	3	99.988
LCQ	LAKE CITY GATEWAY	FL	LPV	0	100	0	100	1	99.994
LEE	LEESBURG INTL	FL	LPV	0	100	0	100	2	99.993
LNA	PALM BEACH COUNTY PARK	FL	LP	0	100	0	100	2	99.975
MAI	MARIANNA MUNICIPAL	FL	LPV	0	100	0	100	0	100
MCO	ORLANDO INTL	FL	LPV200	0	100	0	100	2	99.989
MIA	MIAMI INTL	FL	LPV200	0	100	0	100	2	99.975
MKY	MARCO ISLAND	FL	LPV	0	100	0	100	15	99.966
MLB	MELBOURNE INTL	FL	LPV200	0	100	0	100	2	99.987
MTH	THE FLORIDA KEYS MARATHON INTL	FL	LPV	0	100	1	99.999	4	99.976
OBE	OKEECHOBEE COUNTY	FL	LPV	0	100	0	100	2	99.983
OCF	OCALA INTL-JIM TAYLOR FIELD	FL	LPV200	0	100	0	100	1	99.994
OMN	ORMOND BEACH MUNICIPAL	FL	LPV	0	100	0	100	1	99.994
OPF	OPA-LOCKA EXECUTIVE	FL	LPV200	0	100	0	100	2	99.976
ORL	EXECUTIVE	FL	LPV200	0	100	0	100	2	99.990

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
PBI	PALM BEACH INTL	FL	LPV200	0	100	0	100	2	99.977
PCM	PLANT CITY	FL	LPV	0	100	0	100	3	99.989
PGD	PUNTA GORDA	FL	LPV200	0	100	0	100	10	99.983
PHK	PALM BEACH CO GLADES	FL	LPV	0	100	0	100	2	99.980
PIE	ST PETE-CLEARWATER INTL	FL	LPV200	0	100	0	100	6	99.992
PMP	POMPANO BEACH AIRPARK	FL	LPV	0	100	0	100	2	99.976
PNS	PENSACOLA INTL	FL	LPV200	0	100	0	100	1	99.999
RSW	SOUTHWEST FLORIDA INTL	FL	LPV	0	100	0	100	11	99.973
SEF	SEBRING RGNL	FL	LPV	0	100	0	100	3	99.984
SFB	ORLANDO SANFORD INTL	FL	LPV200	0	100	0	100	2	99.994
SGJ	NORTHEAST FLORIDA RGNL	FL	LPV	0	100	0	100	1	99.994
SRQ	SARASOTA/BRADENTON INTL	FL	LPV200	0	100	0	100	9	99.982
SUA	WITHAM FIELD	FL	LPV	0	100	0	100	2	99.982
TIX	SPACE COAST RGNL	FL	LPV200	0	100	0	100	2	99.992
TLH	TALLAHASSEE INTL	FL	LPV200	0	100	0	100	1	99.998
TMB	MIAMI EXECUTIVE	FL	LPV200	0	100	0	100	2	99.975
TNT	DADE-COLLIER TRAINING AND TRAN	FL	LPV200	0	100	0	100	3	99.978
TPA	TAMPA INTL	FL	LPV200	0	100	0	100	5	99.993
TPF	PETER O KNIGHT	FL	LP	0	100	0	100	5	99.989
TTS	NASA SHUTTLE LANDING FACILITY	FL	LPV200	0	100	0	100	2	99.994
VDF	TAMPA EXECUTIVE	FL	LPV	0	100	0	100	4	99.989
VNC	VENICE MUNICIPAL	FL	LP	0	100	0	100	10	99.980
VQQ	CECIL	FL	LPV200	0	100	0	100	1	99.994
VRB	VERO BEACH MUNICIPAL	FL	LPV200	0	100	0	100	2	99.986
X07	LAKE WALES MUNICIPAL	FL	LP	0	100	0	100	2	99.985
X14	LA BELLE MUNICIPAL	FL	LPV	0	100	0	100	8	99.974
X23	UMATILLA MUNICIPAL	FL	LP	0	100	0	100	2	99.993
X26	SEBASTIAN MUNICIPAL	FL	LP	0	100	0	100	2	99.987
X35	MARION COUNTY	FL	LP	0	100	0	100	1	99.994
X50	MASSEY RANCH AIRPARK	FL	LP	0	100	0	100	1	99.994
X51	MIAMI HOMESTEAD GENERAL AVIATI	FL	LPV	0	100	0	100	2	99.976
ZPH	ZEPHYRHILLS MUNICIPAL	FL	LPV	0	100	0	100	2	99.992
09J	JEKYLL ISLAND	GA	LPV200	0	100	0	100	1	99.994
15J	COOK COUNTY	GA	LPV	0	100	0	100	1	99.997
17J	DONALSONVILLE MUNICIPAL	GA	LPV	0	100	0	100	0	100
18A	FRANKLIN COUNTY	GA	LPV	0	100	0	100	0	100
19A	JACKSON COUNTY	GA	LPV	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
2J5	MILLEN	GA	LPV	0	100	0	100	1	99.996
3J7	GREENE COUNTY RGNL	GA	LPV	0	100	0	100	1	99.999
48A	COCHRAN	GA	LPV	0	100	0	100	1	99.998
4A4	POLK COUNTY AIRPORT- CORNELIUS	GA	LPV	0	100	0	100	0	100
4J1	BRANTLEY COUNTY	GA	LPV	0	100	0	100	1	99.994
4J2	BERRIEN CO	GA	LPV	0	100	0	100	1	99.997
4J5	QUITMAN BROOKS COUNTY	GA	LP	0	100	0	100	1	99.997
52A	MADISON MUNICIPAL	GA	LP	0	100	0	100	0	100
6A1	BUTLER MUNICIPAL	GA	LPV	0	100	0	100	0	100
6A2	GRIFFIN-SPALDING COUNTY	GA	LPV	0	100	0	100	0	100
70J	CAIRO-GRADY COUNTY	GA	LPV	0	100	0	100	1	99.998
9A5	BARWICK LAFAYETTE	GA	LP	0	100	0	100	0	100
ABY	SOUTHWEST GEORGIA RGNL	GA	LPV200	0	100	0	100	1	99.999
ACJ	JIMMY CARTER RGNL	GA	LPV	0	100	0	100	0	100
AGS	AUGUSTA RGNL AT BUSH FIELD	GA	LPV200	0	100	0	100	1	99.997
AHN	ATHENS/BEN EPPS	GA	LPV200	0	100	0	100	0	100
AJR	HABERSHAM COUNTY	GA	LPV	0	100	0	100	0	100
AMG	BACON COUNTY	GA	LPV	0	100	0	100	1	99.995
ATL	HARTSFIELD - JACKSON ATLANTA I	GA	LPV200	0	100	0	100	0	100
AYS	WAYCROSS-WARE COUNTY	GA	LPV200	0	100	0	100	1	99.995
BGE	DECATUR COUNTY INDUSTRIAL AIR	GA	LPV200	0	100	0	100	1	99.999
BHC	BAXLEY MUNICIPAL	GA	LPV	0	100	0	100	1	99.995
BIJ	EARLY COUNTY	GA	LPV	0	100	0	100	0	100
BQK	BRUNSWICK GOLDEN ISLES	GA	LPV200	0	100	0	100	1	99.994
CCO	NEWNAN COWETA COUNTY	GA	LPV	0	100	0	100	0	100
CKF	CRISP COUNTY-CORDELE	GA	LPV	0	100	0	100	1	99.999
CNI	CHEROKEE COUNTY	GA	LPV	0	100	0	100	0	100
CSG	COLUMBUS	GA	LPV	0	100	0	100	0	100
CTJ	WEST GEORGIA RGNL - O V GRAY F	GA	LPV	0	100	0	100	0	100
CVC	COVINGTON MUNICIPAL	GA	LPV	0	100	0	100	0	100
CWV	CLAXTON-EVANS COUNTY	GA	LPV	0	100	0	100	1	99.995
CXU	CAMILLA-MITCHELL COUNTY	GA	LPV	0	100	0	100	1	99.999
CZL	TOM B DAVID FLD	GA	LPV	0	100	0	100	0	100
D73	MONROE-WALTON COUNTY	GA	LP	0	100	0	100	0	100
DBN	W H 'BUD' BARRON	GA	LPV200	0	100	0	100	1	99.998
DNN	DALTON MUNICIPAL	GA	LPV	0	100	0	100	0	100
DQH	DOUGLAS MUNICIPAL	GA	LPV200	0	100	0	100	1	99.996

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
EBA	ELBERT COUNTY-PATZ FIELD	GA	LP	0	100	0	100	1	99.999
EZM	HEART OF GEORGIA RGNL	GA	LPV200	0	100	0	100	1	99.998
FFC	ATLANTA RGNL FALCON FIELD	GA	LPV200	0	100	0	100	0	100
FTY	FULTON COUNTY AIRPORT-BROWN FI	GA	LPV	0	100	0	100	0	100
FZG	FITZGERALD MUNICIPAL	GA	LPV	0	100	0	100	1	99.997
GVL	LEE GILMER MEMORIAL	GA	LPV	0	100	0	100	0	100
HOE	HOMERVILLE	GA	LPV	0	100	0	100	1	99.995
HQU	THOMSON-MCDUFFIE COUNTY	GA	LPV	0	100	0	100	1	99.998
IIY	WASHINGTON-WILKES COUNTY	GA	LPV	0	100	0	100	1	99.999
JCA	JACKSON COUNTY	GA	LPV	0	100	0	100	0	100
JES	JESUP-WAYNE COUNTY	GA	LPV	0	100	0	100	1	99.994
JYL	PLANTATION ARPK	GA	LPV	0	100	0	100	1	99.995
JZP	PICKENS COUNTY	GA	LPV	0	100	0	100	0	100
LGC	LAGRANGE-CALLAWAY	GA	LPV200	0	100	0	100	0	100
LZU	GWINNETT COUNTY - BRISCOE FIEL	GA	LPV200	0	100	0	100	0	100
MAC	MACON DOWNTOWN	GA	LPV	0	100	0	100	1	99.999
MCN	MIDDLE GEORGIA RGNL	GA	LPV200	0	100	0	100	1	99.999
MGR	MOULTRIE MUNICIPAL	GA	LPV200	0	100	0	100	1	99.998
MHP	METTER MUNICIPAL	GA	LPV	0	100	0	100	1	99.996
MLJ	BALDWIN COUNTY	GA	LPV	0	100	0	100	1	99.999
MQW	TELFAIR-WHEELER	GA	LPV	0	100	0	100	1	99.997
OKZ	KAOLIN FIELD	GA	LPV	0	100	0	100	1	99.998
OPN	THOMASTON-UPSON COUNTY	GA	LPV200	0	100	0	100	0	100
PIM	HARRIS COUNTY	GA	LPV	0	100	0	100	0	100
PUJ	PAULDING NORTHWEST ATLANTA	GA	LPV200	0	100	0	100	0	100
PXE	PERRY-HOUSTON COUNTY	GA	LPV	0	100	0	100	1	99.999
RMG	RICHARD B RUSSELL REGIONAL - J	GA	LPV	0	100	0	100	0	100
RVJ	SWINTON SMITH FLD AT REIDSVILL	GA	LP	0	100	0	100	1	99.995
RYY	COBB COUNTY INTL-MCCOLLUM FIEL	GA	LPV200	0	100	0	100	0	100
SAV	SAVANNAH/HILTON HEAD INTL	GA	LPV200	0	100	0	100	1	99.994
SBO	EAST GEORGIA REGIONAL	GA	LPV	0	100	0	100	1	99.997
TBR	STATESBORO-BULLOCH COUNTY	GA	LPV	0	100	0	100	1	99.995
TMA	HENRY TIFT MYERS	GA	LPV	0	100	0	100	1	99.998
TOC	TOCCOA RG LETOURNEAU FIELD	GA	LPV	0	100	0	100	0	100
TVI	THOMASVILLE RGNL	GA	LPV	0	100	0	100	1	99.998
VDI	VIDALIA RGNL	GA	LPV200	0	100	0	100	1	99.996
VLD	VALDOSTA RGNL	GA	LPV	0	100	0	100	1	99.996

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
VPC	CARTERSVILLE	GA	LPV	0	100	0	100	0	100
WDR	BARROW COUNTY	GA	LPV	0	100	0	100	0	100
3Y2	GEORGE L SCOTT MUNICIPAL	IA	LPV	0	100	0	100	0	100
4C8	ALBIA MUNICIPAL	IA	LPV	0	100	0	100	0	100
AIO	ATLANTIC MUNICIPAL	IA	LPV	0	100	0	100	0	100
ALO	WATERLOO RGNL	IA	LPV	0	100	0	100	0	100
AMW	AMES MUNICIPAL	IA	LPV	0	100	0	100	0	100
AWG	WASHINGTON MUNICIPAL	IA	LPV200	0	100	0	100	0	100
BNW	BOONE MUNICIPAL	IA	LPV	0	100	0	100	0	100
BRL	SOUTHEAST IOWA RGNL	IA	LPV200	0	100	0	100	0	100
CAV	CLARION MUNICIPAL	IA	LPV	0	100	0	100	0	100
CBF	COUNCIL BLUFFS MUNICIPAL	IA	LPV200	0	100	0	100	0	100
CCY	NORTHEAST IOWA RGNL	IA	LPV	0	100	0	100	0	100
CID	THE EASTERN IOWA	IA	LPV200	0	100	0	100	0	100
CIN	ARTHUR N NEU	IA	LPV	0	100	0	100	0	100
CKP	CHEROKEE COUNTY RGNL	IA	LPV	0	100	0	100	0	100
CSQ	CRESTON MUNICIPAL	IA	LPV	0	100	0	100	0	100
CWI	CLINTON MUNICIPAL	IA	LPV200	0	100	0	100	0	100
DBQ	DUBUQUE RGNL	IA	LPV200	0	100	0	100	0	100
DEH	DECORAH MUNICIPAL	IA	LPV	0	100	0	100	0	100
DNS	DENISON MUNICIPAL	IA	LPV	0	100	0	100	0	100
DSM	DES MOINES INTL	IA	LPV	0	100	0	100	0	100
DVN	DAVENPORT MUNICIPAL	IA	LPV200	0	100	0	100	0	100
EAG	EAGLE GROVE MUNICIPAL	IA	LPV	0	100	0	100	0	100
EBS	WEBSTER CITY MUNICIPAL	IA	LPV	0	100	0	100	0	100
EFW	JEFFERSON MUNICIPAL	IA	LPV	0	100	0	100	0	100
EOK	KEOKUK MUNICIPAL	IA	LPV	0	100	0	100	0	100
EST	ESTHERVILLE MUNICIPAL	IA	LPV	0	100	0	100	0	100
FFL	FAIRFIELD MUNICIPAL	IA	LPV	0	100	0	100	0	100
FOD	FORT DODGE RGNL	IA	LPV200	0	100	0	100	0	100
FXY	FOREST CITY MUNICIPAL	IA	LPV	0	100	0	100	0	100
GCT	GUTHRIE COUNTY RGNL	IA	LPV	0	100	0	100	0	100
GGI	GRINNELL RGNL	IA	LPV	0	100	0	100	0	100
HPT	HAMPTON MUNICIPAL	IA	LPV	0	100	0	100	0	100
I75	OSCEOLA MUNICIPAL	IA	LPV	0	100	0	100	0	100
ICL	SCHENCK FIELD	IA	LPV	0	100	0	100	0	100
IFA	IOWA FALLS MUNICIPAL	IA	LPV	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
IIB	INDEPENDENCE MUNICIPAL	IA	LP	0	100	0	100	0	100
IKV	ANKENY RGNL	IA	LPV200	0	100	0	100	0	100
IOW	IOWA CITY MUNICIPAL	IA	LPV	0	100	0	100	0	100
LRJ	LE MARS MUNICIPAL	IA	LPV	0	100	0	100	0	100
MCW	MASON CITY MUNICIPAL	IA	LPV200	0	100	0	100	0	100
MIW	MARSHALLTOWN MUNICIPAL	IA	LPV	0	100	0	100	0	100
MPZ	MOUNT PLEASANT MUNICIPAL	IA	LPV	0	100	0	100	0	100
MUT	MUSCATINE MUNICIPAL	IA	LPV200	0	100	0	100	0	100
MXO	MONTICELLO RGNL	IA	LP	0	100	0	100	0	100
OOA	OSKALOOSA MUNICIPAL	IA	LPV	0	100	0	100	0	100
OQW	MAQUOKETA MUNICIPAL	IA	LPV	0	100	0	100	0	100
ORC	ORANGE CITY MUNICIPAL	IA	LPV	0	100	0	100	0	100
OTM	OTTUMWA RGNL	IA	LPV	0	100	0	100	0	100
OXV	KNOXVILLE MUNICIPAL	IA	LPV	0	100	0	100	0	100
PEA	PELLA MUNICIPAL	IA	LPV	0	100	0	100	0	100
POH	POCAHONTAS MUNICIPAL	IA	LPV	0	100	0	100	0	100
PRO	PERRY MUNICIPAL	IA	LPV200	0	100	0	100	0	100
RDK	RED OAK MUNICIPAL	IA	LPV	0	100	0	100	0	100
SDA	SHENANDOAH MUNICIPAL	IA	LPV	0	100	0	100	0	100
SHL	SHELDON RGNL	IA	LPV	0	100	0	100	0	100
SKI	SAC CITY MUNICIPAL	IA	LPV	0	100	0	100	0	100
SLB	STORM LAKE MUNICIPAL	IA	LPV	0	100	0	100	0	100
SPW	SPENCER MUNICIPAL	IA	LPV200	0	100	0	100	0	100
SUX	SIOUX GATEWAY/COL BUD DAY FIEL	IA	LPV200	0	100	0	100	0	100
TNU	NEWTON MUNICIPAL-EARL JOHNSON FIELD	IA	LPV	0	100	0	100	0	100
TVK	CENTERVILLE MUNICIPAL	IA	LPV	0	100	0	100	0	100
TZT	BELLE PLAINE MUNICIPAL	IA	LPV	0	100	0	100	0	100
VTI	VINTON VETERANS MEMORIAL ARPK	IA	LPV	0	100	0	100	0	100
BOI	BOISE AIR TERMINAL/GOWEN FLD	ID	LPV200	0	100	0	100	0	100
COE	COEUR D'ALENE - PAPPY BOYINGTO	ID	LPV200	0	100	0	100	0	100
DIJ	DRIGGS-REED MEMORIAL	ID	LP	0	100	0	100	0	100
EUL	CALDWELL INDUSTRIAL	ID	LPV	0	100	0	100	0	100
GNG	GOODING MUNICIPAL	ID	LPV	0	100	0	100	0	100
IDA	IDAHO FALLS RGNL	ID	LPV200	0	100	0	100	0	100
JER	JEROME COUNTY	ID	LPV	0	100	0	100	0	100
LWS	LEWISTON-NEZ PERCE COUNTY	ID	LPV200	0	100	0	100	0	100
MAN	NAMPA MUNICIPAL	ID	LPV	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
MYL	MC CALL MUNICIPAL	ID	LPV	0	100	0	100	0	100
PIH	POCATELLO RGNL	ID	LPV200	0	100	0	100	0	100
SUN	FRIEDMAN MEMORIAL	ID	LP	0	100	0	100	0	100
TWF	JOSLIN FIELD - MAGIC VALLEY RG	ID	LPV200	0	100	0	100	0	100
U76	MOUNTAIN HOME MUNICIPAL	ID	LPV	0	100	0	100	0	100
1H2	EFFINGHAM COUNTY MEMORIAL	IL	LPV	0	100	0	100	0	100
3LF	LITCHFIELD MUNICIPAL	IL	LPV	0	100	0	100	0	100
3MY	MOUNT HAWLEY AUXILIARY	IL	LP	0	100	0	100	0	100
AJG	MOUNT CARMEL MUNICIPAL	IL	LPV	0	100	0	100	0	100
ALN	ST LOUIS RGNL	IL	LPV200	0	100	0	100	0	100
ARR	AURORA MUNICIPAL	IL	LPV200	0	100	0	100	0	100
BLV	SCOTT AFB/MIDAMERICA	IL	LPV200	0	100	0	100	0	100
BMI	CENTRAL IL RGNL ARPT AT BLOOMI	IL	LPV	0	100	0	100	0	100
C15	PEKIN MUNICIPAL	IL	LPV	0	100	0	100	0	100
C73	DIXON MUNICIPAL-CHARLES R WALGREEN	IL	LPV	0	100	0	100	0	100
C75	MARSHALL COUNTY	IL	LP	0	100	0	100	0	100
CIR	CAIRO RGNL	IL	LP	0	100	0	100	0	100
CMI	UNIVERSITY OF ILLINOIS-WILLARD	IL	LPV200	0	100	0	100	0	100
CPS	ST LOUIS DOWNTOWN	IL	LPV200	0	100	0	100	0	100
CTK	INGERSOLL	IL	LPV	0	100	0	100	0	100
CUL	CARMI MUNICIPAL	IL	LP	0	100	0	100	0	100
DEC	DECATUR	IL	LPV200	0	100	0	100	0	100
DKB	DE KALB TAYLOR MUNICIPAL	IL	LPV	0	100	0	100	0	100
DNV	VERMILION REGIONAL	IL	LPV	0	100	0	100	0	100
DPA	DUPAGE	IL	LPV200	0	100	0	100	0	100
ENL	CENTRALIA MUNICIPAL	IL	LPV	0	100	0	100	0	100
EZI	KEWANEE MUNICIPAL	IL	LPV	0	100	0	100	0	100
FEP	ALBERTUS	IL	LPV	0	100	0	100	0	100
FOA	FLORA MUNICIPAL	IL	LPV	0	100	0	100	0	100
GBG	GALESBURG MUNICIPAL	IL	LPV200	0	100	0	100	0	100
GRE	GREENVILLE	IL	LPV	0	100	0	100	0	100
HSB	HARRISBURG-RALEIGH	IL	LPV	0	100	0	100	0	100
I63	MOUNT STERLING MUNICIPAL	IL	LPV	0	100	0	100	0	100
IGQ	LANSING MUNICIPAL	IL	LPV	0	100	0	100	0	100
IKK	GREATER KANKAKEE	IL	LPV200	0	100	0	100	0	100
LOT	LEWIS UNIVERSITY	IL	LPV200	0	100	0	100	0	100
LWV	LAWRENCEVILLE-VINCENNES INTL	IL	LPV200	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
MDW	CHICAGO MIDWAY INTL	IL	LPV	0	100	0	100	0	100
MLI	QUAD CITY INTL	IL	LPV200	0	100	0	100	0	100
MQB	MACOMB MUNICIPAL	IL	LPV200	0	100	0	100	0	100
MTO	COLES COUNTY MEMORIAL	IL	LPV200	0	100	0	100	0	100
MVN	MOUNT VERNON	IL	LPV	0	100	0	100	0	100
MWA	WILLIAMSON COUNTY RGNL	IL	LPV200	0	100	0	100	0	100
OLY	OLNEY-NOBLE	IL	LPV	0	100	0	100	0	100
ORD	CHICAGO O'HARE INTL	IL	LPV200	0	100	0	100	0	100
PIA	GENERAL DOWNING - PEORIA INTL	IL	LPV	0	100	0	100	0	100
PJY	PINCKNEYVILLE-DU QUOIN	IL	LPV	0	100	0	100	0	100
PNT	PONTIAC MUNICIPAL	IL	LPV	0	100	0	100	0	100
PRG	EDGAR COUNTY	IL	LPV	0	100	0	100	0	100
PWK	CHICAGO EXECUTIVE	IL	LPV	0	100	0	100	0	100
RFD	CHICAGO/ROCKFORD INTL	IL	LPV200	0	100	0	100	0	100
RPJ	ROCHELLE MUNICIPAL AIRPORT-KORITZ F	IL	LPV	0	100	0	100	0	100
RSV	CRAWFORD CO	IL	LPV	0	100	0	100	0	100
SAR	SPARTA COMMUNICIPALTY-HUNTER FIELD	IL	LPV	0	100	0	100	0	100
SFY	TRI-TOWNSHIP	IL	LP	0	100	0	100	0	100
SLO	SALEM-LECKRONE	IL	LPV200	0	100	0	100	0	100
SPI	ABRAHAM LINCOLN CAPITAL	IL	LPV	0	100	0	100	0	100
SQI	WHITESIDE CO ARPT-JOS H BITTOR	IL	LPV	0	100	0	100	0	100
TIP	RANTOUL NATL AVN CNTR-FRANK EL	IL	LPV	0	100	0	100	0	100
UGN	WAUKEGAN RGNL	IL	LPV	0	100	0	100	0	100
UIN	QUINCY RGNL-BALDWIN FIELD	IL	LPV200	0	100	0	100	0	100
VYS	ILLINOIS VALLEY RGNL-WALTER A	IL	LPV	0	100	0	100	0	100
2R2	HENDRICKS COUNTY-GORDON GRAHAM	IN	LPV	0	100	0	100	0	100
AID	ANDERSON MUNICIPAL-DARLINGTON FIELD	IN	LPV	0	100	0	100	0	100
ASW	WARSAW MUNICIPAL	IN	LPV	0	100	0	100	0	100
BAK	COLUMBUS MUNICIPAL	IN	LPV	0	100	0	100	0	100
BFR	VIRGIL I GRISSOM MUNICIPAL	IN	LP	0	100	0	100	0	100
BMG	MONROE COUNTY	IN	LPV200	0	100	0	100	0	100
C62	KENDALLVILLE MUNICIPAL	IN	LPV	0	100	0	100	0	100
C65	PLYMOUTH MUNICIPAL	IN	LPV	0	100	0	100	0	100
CEV	METTEL FIELD	IN	LPV	0	100	0	100	0	100
CFJ	CRAWFORDSVILLE MUNICIPAL	IN	LPV	0	100	0	100	0	100
DCY	DAVIESS COUNTY	IN	LPV	0	100	0	100	0	100
EKM	ELKHART MUNICIPAL	IN	LPV	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
EVV	EVANSVILLE RGNL	IN	LPV200	0	100	0	100	0	100
EYE	EAGLE CREEK AIRPARK	IN	LPV	0	100	0	100	0	100
FKR	FRANKFORT MUNICIPAL	IN	LPV	0	100	0	100	0	100
FRH	FRENCH LICK MUNICIPAL	IN	LPV	0	100	0	100	0	100
FWA	FORT WAYNE INTL	IN	LPV200	0	100	0	100	0	100
GEZ	SHELBYVILLE MUNICIPAL	IN	LPV	0	100	0	100	0	100
GGP	LOGANSPORT/CASS COUNTY	IN	LPV200	0	100	0	100	0	100
GPC	PUTNAM COUNTY RGNL	IN	LPV	0	100	0	100	0	100
GSH	GOSHEN MUNICIPAL	IN	LPV	0	100	0	100	0	100
GWB	DE KALB COUNTY	IN	LPV	0	100	0	100	0	100
GYY	GARY/CHICAGO INTL	IN	LPV200	0	100	0	100	0	100
HFY	GREENWOOD MUNICIPAL	IN	LPV	0	100	0	100	0	100
HNB	HUNTINGBURG	IN	LPV	0	100	0	100	0	100
HUF	TERRE HAUTE INTL-HULMAN FIELD	IN	LPV200	0	100	0	100	0	100
I22	RANDOLPH COUNTY	IN	LPV	0	100	0	100	0	100
I76	PERU MUNICIPAL	IN	LPV	0	100	0	100	0	100
IMS	MADISON MUNICIPAL	IN	LPV	0	100	0	100	0	100
IND	INDIANAPOLIS INTL	IN	LPV200	0	100	0	100	0	100
JVY	CLARK RGNL	IN	LPV200	0	100	0	100	0	100
LAF	PURDUE UNIVERSITY	IN	LPV	0	100	0	100	0	100
MCX	WHITE COUNTY	IN	LP	0	100	0	100	0	100
MIE	DELAWARE COUNTY RGNL	IN	LPV	0	100	0	100	0	100
MQJ	INDIANAPOLIS RGNL	IN	LPV200	0	100	0	100	0	100
MZZ	MARION MUNICIPAL	IN	LPV	0	100	0	100	0	100
OKK	KOKOMO MUNICIPAL	IN	LPV200	0	100	0	100	0	100
OVO	NORTH VERNON	IN	LPV	0	100	0	100	0	100
OXI	STARKE COUNTY	IN	LPV	0	100	0	100	0	100
PLD	PORTLAND MUNICIPAL	IN	LPV	0	100	0	100	0	100
PPO	LA PORTE MUNICIPAL	IN	LPV	0	100	0	100	0	100
RCR	FULTON COUNTY	IN	LPV	0	100	0	100	0	100
RID	RICHMOND MUNICIPAL	IN	LPV200	0	100	0	100	0	100
RWN	ARENS FIELD	IN	LPV	0	100	0	100	0	100
RZL	JASPER COUNTY	IN	LPV	0	100	0	100	0	100
SBN	SOUTH BEND INTL	IN	LPV	0	100	0	100	0	100
SER	FREEMAN MUNICIPAL	IN	LPV	0	100	0	100	0	100
SIV	SULLIVAN COUNTY	IN	LPV	0	100	0	100	0	100
SMD	SMITH FIELD	IN	LPV	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
TEL	PERRY COUNTY MUNICIPAL	IN	LP	0	100	0	100	0	100
TYQ	INDIANAPOLIS EXECUTIVE	IN	LPV	0	100	0	100	0	100
UWL	NEW CASTLE-HENRY CO MUNICIPAL	IN	LPV	0	100	0	100	0	100
VPZ	PORTER COUNTY RGNL	IN	LPV	0	100	0	100	0	100
3AU	AUGUSTA MUNICIPAL	KS	LP	0	100	0	100	0	100
3K3	SYRACUSE-HAMILTON COUNTY MUNICIPAL	KS	LPV	0	100	0	100	0	100
3K8	COMANCHE COUNTY	KS	LPV	0	100	0	100	0	100
5K2	TRIBUNE MUNICIPAL	KS	LPV	0	100	0	100	0	100
AAO	COLONEL JAMES JABARA	KS	LPV	0	100	0	100	0	100
ADT	ATWOOD-RAWLINS COUNTY CITY-COU	KS	LPV	0	100	0	100	0	100
ANY	ANTHONY MUNICIPAL	KS	LPV	0	100	0	100	0	100
BEC	BEECH FACTORY	KS	LPV	0	100	0	100	0	100
CBK	SHALZ FIELD	KS	LPV	0	100	0	100	0	100
CNK	BLOSSER MUNICIPAL	KS	LP	0	100	0	100	0	100
DDC	DODGE CITY RGNL	KS	LPV200	0	100	0	100	0	100
EGT	WELLINGTON MUNICIPAL	KS	LPV	0	100	0	100	0	100
EHA	ELKHART-MORTON COUNTY	KS	LPV	0	100	0	100	0	100
EMP	EMPORIA MUNICIPAL	KS	LPV	0	100	0	100	0	100
EQA	EL DORADO/CAPTAIN JACK THOMAS	KS	LPV200	0	100	0	100	0	100
EWK	NEWTON-CITY-COUNTY	KS	LPV	0	100	0	100	0	100
FOE	TOPEKA RGNL	KS	LPV	0	100	0	100	0	100
FSK	FORT SCOTT MUNICIPAL	KS	LPV	0	100	0	100	0	100
GBD	GREAT BEND MUNICIPAL	KS	LPV200	0	100	0	100	0	100
GCK	GARDEN CITY RGNL	KS	LPV	0	100	0	100	0	100
GLD	RENNER FLD /GOODLAND MUNICIPAL/	KS	LPV200	0	100	0	100	0	100
HLC	HILL CITY MUNICIPAL	KS	LPV	0	100	0	100	0	100
HQG	HUGOTON MUNICIPAL	KS	LPV	0	100	0	100	0	100
HRU	HERINGTON RGNL	KS	LPV	0	100	0	100	0	100
HUT	HUTCHINSON RGNL	KS	LPV	0	100	0	100	0	100
HYS	HAYS RGNL	KS	LPV200	0	100	0	100	0	100
ICT	WICHITA DWIGHT D EISENHOWER NA	KS	LPV200	0	100	0	100	0	100
IDP	INDEPENDENCE MUNICIPAL	KS	LPV	0	100	0	100	0	100
IXD	NEW CENTURY AIRCENTER	KS	LPV	0	100	0	100	0	100
K38	WASHINGTON COUNTY VETERAN'S ME	KS	LPV	0	100	0	100	0	100
K78	ABILENE MUNICIPAL	KS	LPV	0	100	0	100	0	100
K79	JETMORE MUNICIPAL	KS	LPV	0	100	0	100	0	100
K81	MIAMI COUNTY	KS	LPV	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
K82	SMITH CENTER MUNICIPAL	KS	LPV200	0	100	0	100	0	100
K88	ALLEN COUNTY	KS	LPV	0	100	0	100	0	100
LBL	LIBERAL MID-AMERICA RGNL	KS	LPV200	0	100	0	100	0	100
LQR	LARNED-PAWNEE COUNTY	KS	LPV	0	100	0	100	0	100
LWC	LAWRENCE MUNICIPAL	KS	LPV200	0	100	0	100	0	100
LYO	LYONS-RICE COUNTY MUNICIPAL	KS	LPV	0	100	0	100	0	100
MHK	MANHATTAN RGNL	KS	LPV200	0	100	0	100	0	100
MPR	MC PHERSON	KS	LPV	0	100	0	100	0	100
MYZ	MARYSVILLE MUNICIPAL	KS	LPV	0	100	0	100	0	100
NRN	NORTON MUNICIPAL	KS	LPV	0	100	0	100	0	100
OEL	OAKLEY MUNICIPAL	KS	LPV	0	100	0	100	0	100
OIN	OBERLIN MUNICIPAL	KS	LPV	0	100	0	100	0	100
OJC	JOHNSON COUNTY EXECUTIVE	KS	LPV	0	100	0	100	0	100
OWI	OTTAWA MUNICIPAL	KS	LPV	0	100	0	100	0	100
PHG	PHILLIPSBURG MUNICIPAL	KS	LPV	0	100	0	100	0	100
PPF	TRI-CITY	KS	LPV	0	100	0	100	0	100
PTS	ATKINSON MUNICIPAL	KS	LPV	0	100	0	100	0	100
PTT	PRATT RGNL	KS	LPV	0	100	0	100	0	100
RCP	ROOKS COUNTY RGNL	KS	LPV	0	100	0	100	0	100
RPB	BELLEVILLE MUNICIPAL	KS	LPV	0	100	0	100	0	100
RSL	RUSSELL MUNICIPAL	KS	LPV	0	100	0	100	0	100
SLN	SALINA RGNL	KS	LPV	0	100	0	100	0	100
SYF	CHEYENNE COUNTY MUNICIPAL	KS	LPV	0	100	0	100	0	100
TOP	PHILIP BILLARD MUNICIPAL	KS	LPV200	0	100	0	100	0	100
TQK	SCOTT CITY MUNICIPAL	KS	LPV	0	100	0	100	0	100
UKL	COFFEY COUNTY	KS	LPV	0	100	0	100	0	100
ULS	ULYSSES	KS	LPV	0	100	0	100	0	100
WLD	STROTHER FIELD	KS	LPV	0	100	0	100	0	100
0I8	CYNTHIANA-HARRISON COUNTY	KY	LP	0	100	0	100	0	100
18I	MC CREARY COUNTY	KY	LP	0	100	0	100	0	100
27K	GEORGETOWN SCOTT COUNTY - MARS	KY	LPV200	0	100	0	100	0	100
2I0	MADISONVILLE RGNL	KY	LPV	0	100	0	100	0	100
2M0	PRINCETON-CALDWELL COUNTY	KY	LPV	0	100	0	100	0	100
4M7	RUSSELLVILLE-LOGAN COUNTY	KY	LPV	0	100	0	100	0	100
5M9	MARION-CRITTENDEN COUNTY	KY	LPV	0	100	0	100	0	100
6I2	LEBANON SPRINGFIELD-GEORGE HOE	KY	LPV	0	100	0	100	0	100
AAS	TAYLOR COUNTY	KY	LPV	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
BRY	SAMUELS FIELD	KY	LPV	0	100	0	100	0	100
BWG	BOWLING GREEN-WARREN COUNTY RG	KY	LPV200	0	100	0	100	0	100
BYL	WILLIAMSBURG-WHITLEY COUNTY	KY	LPV	0	100	0	100	0	100
CEY	KYLE-OAKLEY FIELD	KY	LPV	0	100	0	100	0	100
CPF	WENDELL H FORD	KY	LPV200	0	100	0	100	0	100
CVG	CINCINNATI/NORTHERN KENTUCKY I	KY	LPV200	0	100	0	100	0	100
DVK	STUART POWELL FIELD	KY	LPV	0	100	0	100	0	100
DWU	ASHLAND RGNL	KY	LP	0	100	0	100	0	100
EHR	HENDERSON CITY-COUNTY	KY	LPV	0	100	0	100	0	100
EKQ	WAYNE COUNTY	KY	LPV	0	100	0	100	0	100
EKX	ADDINGTON FIELD	KY	LPV	0	100	0	100	0	100
FFT	CAPITAL CITY	KY	LPV	0	100	0	100	0	100
FGX	FLEMING-MASON	KY	LPV	0	100	0	100	0	100
GLW	GLASGOW MUNICIPAL	KY	LPV	0	100	0	100	0	100
HVC	HOPKINSVILLE-CHRISTIAN COUNTY	KY	LPV	0	100	0	100	0	100
IOB	MOUNT STERLING-MONTGOMERY COUN	KY	LPV	0	100	0	100	0	100
JQD	OHIO COUNTY	KY	LPV	0	100	0	100	0	100
K24	RUSSELL COUNTY	KY	LPV	0	100	0	100	0	100
K62	GENE SNYDER	KY	LP	0	100	0	100	0	100
KY8	HANCOCK CO-RON LEWIS FIELD	KY	LPV	0	100	0	100	0	100
LEX	BLUE GRASS	KY	LPV	0	100	0	100	0	100
LOU	BOWMAN FIELD	KY	LPV	0	100	0	100	0	100
LOZ	LONDON-CORBIN ARPT-MAGEE FIELD	KY	LPV	0	100	0	100	0	100
M21	MUHLENBERG COUNTY	KY	LP	0	100	0	100	0	100
M25	MAYFIELD GRAVES COUNTY	KY	LPV	0	100	0	100	0	100
OWB	OWENSBORO-DAVIESS COUNTY	KY	LPV200	0	100	0	100	0	100
PAH	BARKLEY RGNL	KY	LPV	0	100	0	100	0	100
RGA	CENTRAL KENTUCKY RGNL	KY	LPV	0	100	0	100	0	100
SDF	LOUISVILLE INTL-STANDIFORD FIE	KY	LPV200	0	100	0	100	0	100
SJS	BIG SANDY RGNL	KY	LPV	0	100	0	100	0	100
SME	LAKE CUMBERLAND RGNL	KY	LPV	0	100	0	100	0	100
SYM	MOREHEAD-ROWAN COUNTY CLYDE A	KY	LPV200	0	100	0	100	0	100
TWT	STURGIS MUNICIPAL	KY	LPV	0	100	0	100	0	100
TZV	TOMPKINSVILLE-MONROE COUNTY	KY	LPV	0	100	0	100	0	100
0R4	CONCORDIA PARISH	LA	LPV	0	100	0	100	0	100
3R4	HART	LA	LPV	0	100	0	100	0	100
3R7	JENNINGS	LA	LPV	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
5R8	DE QUINCY INDUSTRIAL AIRPARK	LA	LPV	0	100	0	100	0	100
ACP	ALLEN PARISH	LA	LPV	0	100	0	100	0	100
AEX	ALEXANDRIA INTL	LA	LPV200	0	100	0	100	0	100
APS	PORT OF SOUTH LOUISIANA EXECUT	LA	LPV	0	100	0	100	7	99.997
ARA	ACADIANA RGNL	LA	LPV200	0	100	0	100	0	100
BQP	MOREHOUSE MEMORIAL	LA	LPV	0	100	0	100	0	100
BTR	BATON ROUGE METROPOLITAN` RYAN	LA	LPV200	0	100	0	100	0	100
BXA	GEORGE R CARR MEMORIAL AIR FLD	LA	LPV	0	100	0	100	1	99.999
CWF	CHENNAULT INTL	LA	LPV200	0	100	0	100	0	100
DTN	SHREVEPORT DOWNTOWN	LA	LPV	0	100	0	100	0	100
ESF	ESLER RGNL	LA	LPV200	0	100	0	100	0	100
F88	JONESBORO	LA	LP	0	100	0	100	0	100
GAO	SOUTH LAFOURCHE LEONARD MILLER	LA	LPV200	0	100	1	99.999	16	99.986
HDC	HAMMOND NORTHSHORE RGNL	LA	LPV200	0	100	0	100	5	99.998
HUM	HOUMA-TERREBONNE	LA	LPV200	0	100	1	99.999	13	99.992
HZR	FALSE RIVER RGNL	LA	LPV	0	100	0	100	0	100
IER	NATCHITOCHES RGNL	LA	LPV	0	100	0	100	0	100
IYA	ABBEVILLE CHRIS CRUSTA MEMORIA	LA	LPV	0	100	0	100	0	100
L39	LEESVILLE	LA	LPV	0	100	0	100	0	100
LCH	LAKE CHARLES RGNL	LA	LPV200	0	100	0	100	0	100
LFT	LAFAYETTE RGNL/PAUL FOURNET FI	LA	LPV	0	100	0	100	0	100
M79	JOHN H HOOKS JR MEMORIAL	LA	LPV	0	100	0	100	0	100
MLU	MONROE RGNL	LA	LPV200	0	100	0	100	0	100
MSY	LOUIS ARMSTRONG NEW ORLEANS IN	LA	LPV200	0	100	0	100	10	99.994
NEW	LAKEFRONT	LA	LPV	0	100	0	100	9	99.994
OPL	ST LANDRY PARISH-AHART FIELD	LA	LPV	0	100	0	100	0	100
PTN	HARRY P WILLIAMS MEMORIAL	LA	LPV200	0	100	0	100	2	99.999
REG	LOUISIANA RGNL	LA	LPV	0	100	0	100	3	99.998
RSN	RUSTON RGNL	LA	LPV	0	100	0	100	0	100
SHV	SHREVEPORT RGNL	LA	LPV200	0	100	0	100	0	100
SPH	SPRINGHILL	LA	LPV	0	100	0	100	0	100
TVR	VICKSBURG TALLULAH RGNL	LA	LPV200	0	100	0	100	0	100
UXL	SOUTHLAND FIELD	LA	LPV	0	100	0	100	0	100
3B0	SOUTHBRIDGE MUNICIPAL	MA	LPV	0	100	0	100	0	100
ACK	NANTUCKET MEMORIAL	MA	LPV200	0	100	0	100	0	100
BAF	WESTFIELD-BARNES RGNL	MA	LPV	0	100	0	100	0	100
BED	LAURENCE G HANSCOM FLD	MA	LPV200	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
BOS	GENERAL EDWARD LAWRENCE LOGAN	MA	LPV200	0	100	0	100	0	100
BVY	BEVERLY RGNL	MA	LPV	0	100	0	100	0	100
EWB	NEW BEDFORD RGNL	MA	LPV200	0	100	0	100	0	100
GBR	WALTER J KOLADZA	MA	LP	0	100	0	100	0	100
GHG	MARSHFIELD MUNICIPAL - GEORGE HARLO	MA	LPV	0	100	0	100	0	100
HYA	BARNSTABLE MUNICIPAL-BOARDMAN/POLAN	MA	LPV200	0	100	0	100	0	100
LWM	LAWRENCE MUNICIPAL	MA	LPV200	0	100	0	100	0	100
MVY	MARTHA'S VINEYARD	MA	LPV200	0	100	0	100	0	100
ORE	ORANGE MUNICIPAL	MA	LPV	0	100	0	100	0	100
ORH	WORCESTER RGNL	MA	LPV200	0	100	0	100	0	100
OWD	NORWOOD MEMORIAL	MA	LPV	0	100	0	100	0	100
PSF	PITTSFIELD MUNICIPAL	MA	LPV	0	100	0	100	0	100
PVC	PROVINCETOWN MUNICIPAL	MA	LPV200	0	100	0	100	0	100
PYM	PLYMOUTH MUNICIPAL	MA	LPV200	0	100	0	100	0	100
TAN	TAUNTON MUNICIPAL - KING FIELD	MA	LPV	0	100	0	100	0	100
2G4	GARRETT COUNTY	MD	LPV	0	100	0	100	1	99.998
2W5	MARYLAND	MD	LP	0	100	0	100	1	99.993
2W6	ST MARY'S COUNTY RGNL	MD	LPV	0	100	0	100	1	99.992
BWI	BALTIMORE/WASHINGTON INTL THUR	MD	LPV200	0	100	0	100	1	99.993
CBE	GREATER CUMBERLAND RGNL	MD	LPV	0	100	0	100	1	99.997
CGE	CAMBRIDGE-DORCHESTER RGNL	MD	LPV	0	100	0	100	1	99.993
DMW	CARROLL COUNTY RGNL/JACK B POA	MD	LPV200	0	100	0	100	1	99.994
ESN	EASTON/NEWNAM FIELD	MD	LPV200	0	100	0	100	1	99.993
FDK	FREDERICK MUNICIPAL	MD	LPV	0	100	0	100	1	99.995
GAI	MONTGOMERY COUNTY AIRPARK	MD	LPV	0	100	0	100	1	99.994
HGR	HAGERSTOWN RGNL-RICHARD A HENS	MD	LPV200	0	100	0	100	1	99.995
MTN	MARTIN STATE	MD	LPV	0	100	0	100	1	99.993
OXB	OCEAN CITY MUNICIPAL	MD	LPV	0	100	0	100	1	99.995
SBY	SALISBURY-OCEAN CITY WICOMICO	MD	LPV200	0	100	0	100	1	99.994
W29	BAY BRIDGE	MD	LPV	0	100	0	100	1	99.992
1B0	DEXTER RGNL	ME	LP	0	100	0	100	0	100
3B1	GREENVILLE MUNICIPAL	ME	LPV	0	100	0	100	0	100
81B	OXFORD COUNTY RGNL	ME	LP	0	100	0	100	0	100
AUG	AUGUSTA STATE	ME	LPV200	0	100	0	100	0	100
BGR	BANGOR INTL	ME	LPV200	0	100	0	100	0	100
BHB	HANCOCK COUNTY-BAR HARBOR	ME	LPV200	0	100	0	100	0	100
BST	BELFAST MUNICIPAL	ME	LPV	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
BXM	BRUNSWICK EXECUTIVE	ME	LPV200	0	100	0	100	0	100
CAR	CARIBOU MUNICIPAL	ME	LPV	0	100	0	100	0	100
FVE	NORTHERN AROOSTOOK RGNL	ME	LPV	0	100	0	100	0	100
HUL	HOULTON INTL	ME	LP	0	100	0	100	0	100
IZG	EASTERN SLOPES RGNL	ME	LPV	0	100	0	100	0	100
LEW	AUBURN/LEWISTON MUNICIPAL	ME	LPV200	0	100	0	100	0	100
LRG	LINCOLN RGNL	ME	LP	0	100	0	100	0	100
MLT	MILLINOCKET MUNICIPAL	ME	LPV	0	100	0	100	0	100
OWK	CENTRAL MAINE ARPT OF NORRIDGE	ME	LPV	0	100	0	100	0	100
PQI	NORTHERN MAINE RGNL ARPT AT PR	ME	LPV200	0	100	0	100	0	100
PWM	PORTLAND INTL JETPORT	ME	LPV200	0	100	0	100	0	100
RKD	KNOX COUNTY RGNL	ME	LPV200	0	100	0	100	0	100
SFM	SANFORD SEACOAST RGNL	ME	LPV200	0	100	0	100	0	100
WVL	WATERVILLE ROBERT LAFLEUR	ME	LPV200	0	100	0	100	0	100
48D	CLARE MUNICIPAL	MI	LP	0	100	0	100	0	100
4D0	ABRAMS MUNICIPAL	MI	LP	0	100	0	100	0	100
6Y1	BOIS BLANC ISLAND	MI	LP	0	100	0	100	0	100
77G	MARLETTE	MI	LPV	0	100	0	100	0	100
9D9	HASTINGS	MI	LPV	0	100	0	100	0	100
ACB	ANTRIM COUNTY	MI	LPV	0	100	0	100	0	100
ADG	LENAWEE COUNTY	MI	LPV	0	100	0	100	0	100
AMN	GRATIOT COMMUNICIPALTY	MI	LPV	0	100	0	100	0	100
ANJ	SAULT STE MARIE MUNICIPAL/SANDERSON	MI	LPV	0	100	0	100	0	100
APN	ALPENA COUNTY RGNL	MI	LPV	0	100	0	100	0	100
ARB	ANN ARBOR MUNICIPAL	MI	LPV	0	100	0	100	0	100
AZO	KALAMAZOO/BATTLE CREEK INTL	MI	LPV	0	100	0	100	0	100
BAX	HURON COUNTY MEMORIAL	MI	LPV	0	100	0	100	0	100
BEH	SOUTHWEST MICHIGAN RGNL	MI	LPV200	0	100	0	100	0	100
BIV	WEST MICHIGAN RGNL	MI	LPV	0	100	0	100	0	100
BTL	W K KELLOGG	MI	LPV200	0	100	0	100	0	100
C04	OCEANA COUNTY	MI	LPV	0	100	0	100	0	100
CAD	WEXFORD COUNTY	MI	LPV200	0	100	0	100	0	100
CIU	CHIPPEWA COUNTY INTL	MI	LPV	0	100	0	100	0	100
CMX	HOUGHTON COUNTY MEMORIAL	MI	LPV	0	100	0	100	0	100
CVX	CHARLEVOIX MUNICIPAL	MI	LPV	0	100	0	100	0	100
D95	DUPONT-LAPEER	MI	LP	0	100	0	100	0	100
DET	COLEMAN A YOUNG MUNICIPAL	MI	LPV	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
DTW	DETROIT METROPOLITAN WAYNE COU	MI	LPV200	0	100	0	100	0	100
ERY	LUCE COUNTY	MI	LPV	0	100	0	100	0	100
ESC	DELTA COUNTY	MI	LPV200	0	100	0	100	0	100
FFX	FREMONT MUNICIPAL	MI	LPV	0	100	0	100	0	100
FNT	BISHOP INTL	MI	LPV200	0	100	0	100	0	100
GDW	GLADWIN ZETTEL MEMORIAL	MI	LP	0	100	0	100	0	100
GLR	GAYLORD RGNL	MI	LPV	0	100	0	100	0	100
GRR	GERALD R FORD INTL	MI	LPV200	0	100	0	100	0	100
HTL	ROSCOMMON COUNTY - BLODGETT ME	MI	LP	0	100	0	100	0	100
HYX	SAGINAW COUNTY H W BROWNE	MI	LPV	0	100	0	100	0	100
IKW	JACK BARSTOW	MI	LPV	0	100	0	100	0	100
IMT	FORD	MI	LPV	0	100	0	100	0	100
IRS	KIRSCH MUNICIPAL	MI	LPV	0	100	0	100	0	100
ISQ	SCHOOLCRAFT COUNTY	MI	LP	0	100	0	100	0	100
IWD	GOGEBIC-IRON COUNTY	MI	LPV200	0	100	0	100	0	100
JXN	JACKSON COUNTY-REYNOLDS FIELD	MI	LPV200	0	100	0	100	0	100
JYM	HILLSDALE MUNICIPAL	MI	LPV	0	100	0	100	0	100
LAN	CAPITAL REGION INTL	MI	LPV200	0	100	0	100	0	100
LDM	MASON COUNTY	MI	LPV	0	100	0	100	0	100
MBL	MANISTEE CO-BLACKER	MI	LPV200	0	100	0	100	0	100
MBS	MBS INTL	MI	LPV200	0	100	0	100	0	100
MCD	MACKINAC ISLAND	MI	LPV	0	100	0	100	0	100
MKG	MUSKEGON COUNTY	MI	LPV200	0	100	0	100	0	100
MNM	MENOMINEE-MARINETTE TWIN COUNT	MI	LPV200	0	100	0	100	0	100
MOP	MOUNT PLEASANT MUNICIPAL	MI	LPV	0	100	0	100	0	100
N98	BOYNE CITY MUNICIPAL	MI	LP	0	100	0	100	0	100
OEB	BRANCH COUNTY MEMORIAL	MI	LPV	0	100	0	100	0	100
OSC	OSCODA-WURTSMITH	MI	LPV200	0	100	0	100	0	100
OZW	LIVINGSTON COUNTY SPENCER J HA	MI	LPV200	0	100	0	100	0	100
PHN	ST CLAIR COUNTY INTL	MI	LPV200	0	100	0	100	0	100
PLN	PELLSTON RGNL AIRPORT OF EMMET	MI	LPV200	0	100	0	100	0	100
PTK	OAKLAND COUNTY INTL	MI	LPV200	0	100	0	100	0	100
RMY	BROOKS FIELD	MI	LP	0	100	0	100	0	100
RNP	OWOSSO COMMUNICIPALTY	MI	LPV	0	100	0	100	0	100
RQB	ROBEN-HOOD	MI	LPV200	0	100	0	100	0	100
SAW	SAWYER INTL	MI	LPV200	0	100	0	100	0	100
SLH	CHEBOYGAN COUNTY	MI	LPV	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
TEW	MASON JEWETT FIELD	MI	LP	0	100	0	100	0	100
TTF	CUSTER	MI	LPV	0	100	0	100	0	100
TVC	CHERRY CAPITAL	MI	LPV200	0	100	0	100	0	100
YIP	WILLOW RUN	MI	LPV	0	100	0	100	0	100
16D	PERHAM MUNICIPAL	MN	LPV	0	100	0	100	0	100
3N8	MAHNOMEN COUNTY	MN	LPV	0	100	0	100	0	100
ACQ	WASECA MUNICIPAL	MN	LPV	0	100	0	100	0	100
ADC	WADENA MUNICIPAL	MN	LPV	0	100	0	100	0	100
AEL	ALBERT LEA MUNICIPAL	MN	LPV	0	100	0	100	0	100
AIT	AITKIN MUNICIPAL-STEVE KURTZ FIELD	MN	LPV	0	100	0	100	0	100
ANE	ANOKA COUNTY-BLAINE ARPT (JANE	MN	LPV	0	100	0	100	0	100
AUM	AUSTIN MUNICIPAL	MN	LPV200	0	100	0	100	0	100
AXN	CHANDLER FIELD	MN	LPV	0	100	0	100	0	100
BBB	BENSON MUNICIPAL	MN	LPV	0	100	0	100	0	100
BDE	BAUDETTE INTL	MN	LPV	0	100	0	100	0	100
BDH	WILLMAR MUNICIPAL-JOHN L RICE FIELD	MN	LPV200	0	100	0	100	0	100
BJI	BEMIDJI RGNL	MN	LPV200	0	100	0	100	0	100
BRD	BRAINERD LAKES RGNL	MN	LPV200	0	100	0	100	0	100
CBG	CAMBRIDGE MUNICIPAL	MN	LPV	0	100	0	100	0	100
CFE	BUFFALO MUNICIPAL	MN	LPV	0	100	0	100	0	100
CKC	GRAND MARAIS/COOK COUNTY	MN	LPV	0	100	0	100	0	100
CKN	CROOKSTON MUNICIPAL KIRKWOOD FLD	MN	LPV	0	100	0	100	0	100
CNB	MYERS FIELD	MN	LPV	0	100	0	100	0	100
COQ	CLOQUET CARLTON COUNTY	MN	LPV	0	100	0	100	0	100
CQM	COOK MUNICIPAL	MN	LP	0	100	0	100	0	100
D39	SAUK CENTRE MUNICIPAL	MN	LPV	0	100	0	100	0	100
D42	SPRINGFIELD MUNICIPAL	MN	LP	0	100	0	100	0	100
DLH	DULUTH INTL	MN	LPV200	0	100	0	100	0	100
DTL	DETROIT LAKES-WETHING FIELD	MN	LPV	0	100	0	100	0	100
DVP	SLAYTON MUNICIPAL	MN	LP	0	100	0	100	0	100
DXX	LAC QUI PARLE COUNTY	MN	LPV200	0	100	0	100	0	100
ELO	ELY MUNICIPAL	MN	LPV200	0	100	0	100	0	100
ETH	WHEATON MUNICIPAL	MN	LP	0	100	0	100	0	100
EVM	EVELETH-VIRGINIA MUNICIPAL	MN	LPV	0	100	0	100	0	100
FBL	FARIBAULT MUNICIPAL	MN	LPV	0	100	0	100	0	100
FCM	FLYING CLOUD	MN	LPV200	0	100	0	100	0	100
FFM	FERGUS FALLS MUNICIPAL-EINAR MICKEL	MN	LPV200	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
FKA	FILLMORE COUNTY	MN	LPV	0	100	0	100	0	100
FOZ	BIGFORK MUNICIPAL	MN	LP	0	100	0	100	0	100
FRM	FAIRMONT MUNICIPAL	MN	LPV	0	100	0	100	0	100
FSE	FOSSTON MUNICIPAL	MN	LP	0	100	0	100	0	100
GHW	GLENWOOD MUNICIPAL	MN	LPV	0	100	0	100	0	100
GPZ	GRAND RAPIDS/ITASCA CO-GORDON	MN	LPV	0	100	0	100	0	100
GYL	GLENCOE MUNICIPAL	MN	LPV	0	100	0	100	0	100
HCD	HUTCHINSON MUNICIPAL-BUTLER FIELD	MN	LPV	0	100	0	100	0	100
HCO	HALLOCK MUNICIPAL	MN	LPV	0	100	0	100	0	100
HIB	RANGE RGNL	MN	LPV200	0	100	0	100	0	100
INL	FALLS INTL-EINARSON FIELD	MN	LPV	0	100	0	100	0	100
JKJ	MOORHEAD MUNICIPAL	MN	LPV	0	100	0	100	0	100
JMR	MORA MUNICIPAL	MN	LPV	0	100	0	100	0	100
JYG	ST JAMES MUNICIPAL	MN	LPV	0	100	0	100	0	100
LJF	LITCHFIELD MUNICIPAL	MN	LPV	0	100	0	100	0	100
LVN	AIRLAKE	MN	LPV200	0	100	0	100	0	100
LXL	LITTLE FALLS/MORRISON COUNTY-L	MN	LPV	0	100	0	100	0	100
LYV	QUENTIN AANENSON FIELD	MN	LPV200	0	100	0	100	0	100
MGG	MAPLE LAKE MUNICIPAL-BILL MAVENCAMP	MN	LP	0	100	0	100	0	100
MJQ	JACKSON MUNICIPAL	MN	LPV	0	100	0	100	0	100
MKT	MANKATO RGNL	MN	LPV200	0	100	0	100	0	100
MML	SOUTHWEST MINNESOTA RGNL MARSH	MN	LPV200	0	100	0	100	0	100
MOX	MORRIS MUNICIPAL - CHARLIE SCHMIDT	MN	LPV	0	100	0	100	0	100
MSP	MINNEAPOLIS-ST PAUL INTL/WOLD-	MN	LPV200	0	100	0	100	0	100
MVE	MONTEVIDEO-CHIPPEWA COUNTY	MN	LPV	0	100	0	100	0	100
MZH	MOOSE LAKE CARLTON COUNTY	MN	LPV	0	100	0	100	0	100
ONA	WINONA MUNICIPAL-MAX CONRAD FLD	MN	LPV	0	100	0	100	0	100
ORB	ORR RGNL	MN	LP	0	100	0	100	0	100
OTG	WORTHINGTON MUNICIPAL	MN	LPV200	0	100	0	100	0	100
OWA	OWATONNA DEGNER RGNL	MN	LPV200	0	100	0	100	0	100
PEX	PAYNESVILLE MUNICIPAL	MN	LPV200	0	100	0	100	0	100
PKD	PARK RAPIDS MUNICIPAL-KONSHOK FIELD	MN	LPV200	0	100	0	100	0	100
PQN	PIPESTONE MUNICIPAL	MN	LPV200	0	100	0	100	0	100
RGK	RED WING RGNL	MN	LPV200	0	100	0	100	0	100
ROS	RUSH CITY RGNL	MN	LPV	0	100	0	100	0	100
ROX	ROSEAU MUNICIPAL/RUDY BILLBERG FIEL	MN	LPV	0	100	0	100	0	100
RRT	WARROAD INTL MEMORIAL	MN	LPV200	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
RST	ROCHESTER INTL	MN	LPV200	0	100	0	100	0	100
RWF	REDWOOD FALLS MUNICIPAL	MN	LPV	0	100	0	100	0	100
SAZ	STAPLES MUNICIPAL	MN	LPV	0	100	0	100	0	100
SBU	BLUE EARTH MUNICIPAL	MN	LPV	0	100	0	100	0	100
SGS	SOUTH ST PAUL MUNICIPAL-RICHARD E F	MN	LP	0	100	0	100	0	100
STC	ST CLOUD RGNL	MN	LPV200	0	100	0	100	0	100
STP	ST PAUL DOWNTOWN HOLMAN FLD	MN	LPV	0	100	0	100	0	100
TOB	DODGE CENTER	MN	LPV	0	100	0	100	0	100
TVF	THIEF RIVER FALLS RGNL	MN	LPV	0	100	0	100	0	100
TWM	RICHARD B HELGESON	MN	LPV	0	100	0	100	0	100
ULM	NEW ULM MUNICIPAL	MN	LPV200	0	100	0	100	0	100
VVV	ORTONVILLE MUNICIPAL-MARTINSON FIEL	MN	LP	0	100	0	100	0	100
Y49	WALKER MUNICIPAL	MN	LP	0	100	0	100	0	100
Y63	ELBOW LAKE MUNICIPAL - PRIDE OF THE	MN	LPV	0	100	0	100	0	100
03D	MEMPHIS MEMORIAL	MO	LPV	0	100	0	100	0	100
1H0	CREVE COEUR	MO	LPV	0	100	0	100	0	100
1MO	MOUNTAIN GROVE MEMORIAL	MO	LP	0	100	0	100	0	100
2H2	JERRY SUMNERS SR AURORA MUNICIPAL	MO	LP	0	100	0	100	0	100
6M6	LEWIS COUNTY RGNL	MO	LPV	0	100	0	100	0	100
8WC	WASHINGTON COUNTY	MO	LPV	0	100	0	100	0	100
94K	CASSVILLE MUNICIPAL	MO	LPV	0	100	0	100	0	100
AIZ	LEE C FINE MEMORIAL	MO	LPV	0	100	0	100	0	100
BBG	BRANSON	MO	LPV200	0	100	0	100	0	100
BUM	BUTLER MEMORIAL	MO	LPV	0	100	0	100	0	100
CGI	CAPE GIRARDEAU RGNL	MO	LPV200	0	100	0	100	0	100
CHT	CHILLICOTHE MUNICIPAL	MO	LPV	0	100	0	100	0	100
COU	COLUMBIA RGNL	MO	LPV	0	100	0	100	0	100
DMO	SEDALIA RGNL	MO	LPV	0	100	0	100	0	100
DXE	DEXTER MUNICIPAL	MO	LPV	0	100	0	100	0	100
EIW	COUNTY MEMORIAL	MO	LPV	0	100	0	100	0	100
EOS	NEOSHO HUGH ROBINSON	MO	LPV	0	100	0	100	0	100
EVU	NORTHWEST MISSOURI RGNL	MO	LPV	0	100	0	100	0	100
EZZ	CAMERON MEMORIAL	MO	LPV	0	100	0	100	0	100
FAM	FARMINGTON RGNL	MO	LPV	0	100	0	100	0	100
FTT	ELTON HENSLEY MEMORIAL	MO	LPV	0	100	0	100	0	100
FWB	BRANSON WEST MUNICIPAL - EMERSON FI	MO	LPV200	0	100	0	100	0	100
FYG	WASHINGTON RGNL	MO	LPV	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
GLY	CLINTON RGNL	MO	LPV	0	100	0	100	0	100
GPH	MIDWEST NATIONAL AIR CENTER	MO	LPV	0	100	0	100	0	100
H79	ELDON MODEL AIRPARK	MO	LP	0	100	0	100	0	100
H88	A PAUL VANCE FREDERICKTOWN RGN	MO	LPV	0	100	0	100	0	100
HAE	HANNIBAL RGNL	MO	LPV	0	100	0	100	0	100
HFJ	MONETT RGNL	MO	LPV	0	100	0	100	0	100
HIG	HIGGINSVILLE INDUSTRIAL MUNICIPAL	MO	LPV	0	100	0	100	0	100
IRK	KIRKSVILLE RGNL	MO	LPV200	0	100	0	100	0	100
JEF	JEFFERSON CITY MEMORIAL	MO	LPV	0	100	0	100	0	100
JLN	JOPLIN RGNL	MO	LPV	0	100	0	100	0	100
K15	GRAND GLAIZE-OSAGE BEACH	MO	LP	0	100	0	100	0	100
K57	GOULD PETERSON MUNICIPAL	MO	LPV	0	100	0	100	0	100
K89	MACON-FOWER MEMORIAL	MO	LPV	0	100	0	100	0	100
LLU	LAMAR MUNICIPAL	MO	LPV	0	100	0	100	0	100
LRY	LAWRENCE SMITH MEMORIAL	MO	LPV	0	100	0	100	0	100
LXT	LEE'S SUMMIT MUNICIPAL	MO	LPV	0	100	0	100	0	100
M05	CARUTHERSVILLE MEMORIAL	MO	LPV	0	100	0	100	0	100
M12	STEELE MUNICIPAL	MO	LPV	0	100	0	100	0	100
M17	BOLIVAR MUNICIPAL	MO	LPV	0	100	0	100	0	100
M48	HOUSTON MEMORIAL	MO	LPV	0	100	0	100	0	100
MAW	MALDEN RGNL	MO	LPV	0	100	0	100	0	100
MBY	OMAR N BRADLEY	MO	LPV	0	100	0	100	0	100
MCI	KANSAS CITY INTL	MO	LPV200	0	100	0	100	0	100
MHL	MARSHALL MEMORIAL MUNICIPAL	MO	LPV	0	100	0	100	0	100
MKC	CHARLES B WHEELER DOWNTOWN	MO	LPV200	0	100	0	100	0	100
MNF	MOUNTAIN VIEW	MO	LP	0	100	0	100	0	100
MO3	STOCKTON MUNICIPAL	MO	LP	0	100	0	100	0	100
MO8	NORTH CENTRAL MISSOURI RGNL	MO	LPV	0	100	0	100	0	100
MYJ	MEXICO MEMORIAL	MO	LPV	0	100	0	100	0	100
NVD	NEVADA MUNICIPAL	MO	LPV200	0	100	0	100	0	100
OZS	CAMDENTON MEMORIAL-LAKE RGNL	MO	LPV	0	100	0	100	0	100
PCD	PERRYVILLE RGNL	MO	LPV	0	100	0	100	0	100
PLK	M GRAHAM CLARK DOWNTOWN	MO	LPV200	0	100	0	100	0	100
POF	POPLAR BLUFF MUNICIPAL	MO	LPV	0	100	0	100	0	100
RAW	WARSAW MUNICIPAL	MO	LPV200	0	100	0	100	0	100
RCM	SKYHAVEN	MO	LPV	0	100	0	100	0	100
SGF	SPRINGFIELD-BRANSON NATIONAL	MO	LPV	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
SIK	SIKESTON MEMORIAL MUNICIPAL	MO	LPV	0	100	0	100	0	100
STJ	ROSECRANS MEMORIAL	MO	LPV200	0	100	0	100	0	100
STL	LAMBERT-ST LOUIS INTL	MO	LPV200	0	100	0	100	0	100
SUS	SPIRIT OF ST LOUIS	MO	LPV200	0	100	0	100	0	100
TBN	WAYNESVILLE-ST ROBERT RGNL FOR	MO	LPV	0	100	0	100	0	100
TKX	KENNETT MEMORIAL	MO	LPV	0	100	0	100	0	100
TRX	TRENTON MUNICIPAL	MO	LPV	0	100	0	100	0	100
UBX	CUBA MUNICIPAL	MO	LPV	0	100	0	100	0	100
UNO	WEST PLAINS RGNL	MO	LPV	0	100	0	100	0	100
UUV	SULLIVAN RGNL	MO	LPV	0	100	0	100	0	100
VER	JESSE VIERTEL MEMORIAL	MO	LPV	0	100	0	100	0	100
VIH	ROLLA NATIONAL	MO	LPV200	0	100	0	100	0	100
0R0	COLUMBIA-MARION COUNTY	MS	LPV	0	100	0	100	0	100
17M	MAGEE MUNICIPAL	MS	LP	0	100	0	100	0	100
5A4	OKOLONA MUNICIPAL-RICHARD STOVALL F	MS	LPV	0	100	0	100	0	100
5A6	WINONA-MONTGOMERY COUNTY	MS	LP	0	100	0	100	0	100
87I	YAZOO COUNTY	MS	LPV	0	100	0	100	0	100
8M1	BOONEVILLE/BALDWYN	MS	LPV	0	100	0	100	0	100
CKM	FLETCHER FIELD	MS	LPV	0	100	0	100	0	100
CRX	ROSCOE TURNER	MS	LPV200	0	100	0	100	0	100
GLH	GREENVILLE MID-DELTA	MS	LPV200	0	100	0	100	0	100
GNF	GRENADA MUNICIPAL	MS	LPV200	0	100	0	100	0	100
GPT	GULFPORT-BILOXI INTL	MS	LPV200	0	100	0	100	5	99.998
GTR	GOLDEN TRIANGLE RGNL	MS	LPV200	0	100	0	100	0	100
GWO	GREENWOOD-LEFLORE	MS	LPV	0	100	0	100	0	100
HBG	HATTIESBURG BOBBY L CHAIN MUNICIPAL	MS	LPV200	0	100	0	100	0	100
HEZ	HARDY-ANDERS FIELD NATCHEZ-ADA	MS	LPV200	0	100	0	100	0	100
HKS	HAWKINS FIELD	MS	LPV	0	100	0	100	0	100
HSA	STENNIS INTL	MS	LPV200	0	100	0	100	7	99.997
IDL	INDIANOLA MUNICIPAL	MS	LPV	0	100	0	100	0	100
JAN	JACKSON-MEDGAR WILEY EVERS INT	MS	LPV200	0	100	0	100	0	100
JVW	JOHN BELL WILLIAMS	MS	LPV200	0	100	0	100	0	100
LMS	LOUISVILLE WINSTON COUNTY	MS	LPV	0	100	0	100	0	100
LUL	HESLER-NOBLE FIELD	MS	LPV	0	100	0	100	0	100
M40	MONROE COUNTY	MS	LPV	0	100	0	100	0	100
M41	HOLLY SPRINGS-MARSHALL COUNTY	MS	LPV	0	100	0	100	0	100
M43	PRENTISS-JEFFERSON DAVIS COUNT	MS	LPV	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
MBO	BRUCE CAMPBELL FIELD	MS	LP	0	100	0	100	0	100
MCB	MC COMB/PIKE COUNTY/JOHN E LEW	MS	LPV	0	100	0	100	0	100
MEI	KEY FIELD	MS	LPV200	0	100	0	100	0	100
MJD	PICAYUNE MUNICIPAL	MS	LPV	0	100	0	100	5	99.998
MMS	SELFS	MS	LPV	0	100	0	100	0	100
MPE	PHILADELPHIA MUNICIPAL	MS	LPV	0	100	0	100	0	100
OLV	OLIVE BRANCH	MS	LPV200	0	100	0	100	0	100
PIB	HATTIESBURG-LAUREL RGNL	MS	LPV200	0	100	0	100	0	100
PMU	PANOLA COUNTY	MS	LPV	0	100	0	100	0	100
PQL	TRENT LOTT INTL	MS	LPV200	0	100	0	100	4	99.998
RNV	CLEVELAND MUNICIPAL	MS	LPV	0	100	0	100	0	100
STF	GEORGE M BRYAN	MS	LPV200	0	100	0	100	0	100
TUP	TUPELO RGNL	MS	LPV200	0	100	0	100	0	100
UOX	UNIVERSITY-OXFORD	MS	LPV	0	100	0	100	0	100
UTA	TUNICA MUNICIPAL	MS	LPV200	0	100	0	100	0	100
VKS	VICKSBURG MUNICIPAL	MS	LP	0	100	0	100	0	100
1S3	TILLITT FIELD	MT	LPV	0	100	0	100	0	100
4U6	CIRCLE TOWN COUNTY	MT	LPV	0	100	0	100	0	100
6S8	LAUREL MUNICIPAL	MT	LPV	0	100	0	100	0	100
7S0	RONAN	MT	LPV	0	100	0	100	0	100
BHK	BAKER MUNICIPAL	MT	LPV	0	100	0	100	0	100
BIL	BILLINGS LOGAN INTL	MT	LPV200	0	100	0	100	0	100
BTM	BERT MOONEY	MT	LPV	0	100	0	100	0	100
BZN	BOZEMAN YELLOWSTONE INTL	MT	LPV	0	100	0	100	0	100
CTB	CUT BANK INTL	MT	LPV200	0	100	0	100	0	100
DLN	DILLON	MT	LPV	0	100	0	100	0	100
EKS	ENNIS - BIG SKY	MT	LPV	0	100	0	100	0	100
GDV	DAWSON COMMUNICIPALTY	MT	LPV	0	100	0	100	0	100
GGW	WOKAL FIELD/GLASGOW INTL	MT	LPV200	0	100	0	100	0	100
GPI	GLACIER PARK INTL	MT	LPV	0	100	0	100	0	100
GTF	GREAT FALLS INTL	MT	LPV200	0	100	0	100	0	100
HLN	HELENA RGNL	MT	LPV	0	100	0	100	0	100
HVR	HAVRE CITY-COUNTY	MT	LPV	0	100	0	100	0	100
LVM	MISSION FIELD	MT	LP	0	100	0	100	0	100
LWT	LEWISTOWN MUNICIPAL	MT	LPV200	0	100	0	100	0	100
M75	MALTA	MT	LP	0	100	0	100	0	100
MLS	FRANK WILEY FIELD	MT	LPV	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
MSO	MISSOULA INTL	MT	LPV	0	100	0	100	0	100
OLF	L M CLAYTON	MT	LPV200	0	100	0	100	0	100
PO1	POPLAR MUNICIPAL	MT	LPV200	0	100	0	100	0	100
PWD	SHER-WOOD	MT	LPV200	0	100	0	100	0	100
RPX	ROUNDUP	MT	LPV	0	100	0	100	0	100
SBX	SHELBY	MT	LPV	0	100	0	100	0	100
SDY	SIDNEY-RICHLAND MUNICIPAL	MT	LPV	0	100	0	100	0	100
WYS	YELLOWSTONE	MT	LPV200	0	100	0	100	0	100
CYCL	CHARLO	NB	LPV	0	100	0	100	0	100
CYQM	MONCTON INTL	NB	LPV	0	100	0	100	0	100
43A	MONTGOMERY COUNTY	NC	LP	0	100	0	100	1	99.995
ACZ	HENDERSON FIELD	NC	LPV	0	100	0	100	1	99.994
AFP	ANSON COUNTY - JEFF CLOUD FIEL	NC	LPV	0	100	0	100	1	99.995
AKH	GASTONIA MUNICIPAL	NC	LPV	0	100	0	100	1	99.997
ASJ	TRI-COUNTY	NC	LPV	0	100	0	100	1	99.994
AVL	ASHEVILLE RGNL	NC	LPV200	0	100	0	100	0	100
BUY	BURLINGTON-ALAMANCE RGNL	NC	LPV	0	100	0	100	1	99.995
CLT	CHARLOTTE/DOUGLAS INTL	NC	LPV200	0	100	0	100	1	99.997
CPC	COLUMBUS COUNTY MUNICIPAL	NC	LPV	0	100	0	100	1	99.994
CTZ	CLINTON-SAMPSON COUNTY	NC	LPV200	0	100	0	100	1	99.994
DPL	DUPLIN CO	NC	LPV200	0	100	0	100	1	99.994
ECG	ELIZABETH CITY CG AIR STATION/	NC	LPV	0	100	0	100	1	99.991
EDE	NORTHEASTERN RGNL	NC	LPV200	0	100	0	100	1	99.994
EHO	SHELBY-CLEVELAND COUNTY RGNL	NC	LPV	0	100	0	100	1	99.998
EQY	CHARLOTTE-MONROE EXECUTIVE	NC	LPV200	0	100	0	100	1	99.996
EWN	COASTAL CAROLINA REGIONAL	NC	LPV	0	100	0	100	1	99.994
EXX	DAVIDSON COUNTY	NC	LPV	0	100	0	100	1	99.996
EYF	CURTIS L BROWN JR FIELD	NC	LPV200	0	100	0	100	1	99.994
FAY	FAYETTEVILLE RGNL/GRANNIS FIEL	NC	LPV200	0	100	0	100	1	99.994
FFA	FIRST FLIGHT	NC	LP	0	100	0	100	1	99.994
FQD	RUTHERFORD CO - MARCHMAN FIELD	NC	LPV	0	100	0	100	1	99.999
GEV	ASHE COUNTY	NC	LP	0	100	0	100	1	99.999
GSO	PIEDMONT TRIAD INTL	NC	LPV200	0	100	0	100	1	99.996
GWW	WAYNE EXECUTIVE JETPORT	NC	LPV200	0	100	0	100	1	99.994
HBI	ASHEBORO RGNL	NC	LPV	0	100	0	100	1	99.995
HKY	HICKORY RGNL	NC	LPV200	0	100	0	100	1	99.998
HNZ	HENDERSON-OXFORD	NC	LPV	0	100	0	100	1	99.994

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
HRJ	HARNETT RGNL JETPORT	NC	LPV	0	100	0	100	1	99.994
ILM	WILMINGTON INTL	NC	LPV200	0	100	0	100	1	99.994
INT	SMITH REYNOLDS	NC	LPV200	0	100	0	100	1	99.996
IPJ	LINCOLNTON-LINCOLN COUNTY RGNL	NC	LPV	0	100	0	100	1	99.997
ISO	KINSTON RGNL JETPORT AT STALLI	NC	LPV200	0	100	0	100	1	99.994
IXA	HALIFAX-NORTHAMPTON RGNL	NC	LPV200	0	100	0	100	1	99.994
JNX	JOHNSTON REGIONAL	NC	LPV	0	100	0	100	1	99.994
JQF	CONCORD RGNL	NC	LPV	0	100	0	100	1	99.996
LBT	LUMBERTON RGNL	NC	LPV	0	100	0	100	1	99.994
LHZ	TRIANGLE NORTH EXECUTIVE	NC	LPV200	0	100	0	100	1	99.994
MCZ	MARTIN COUNTY	NC	LPV	0	100	0	100	1	99.994
MEB	LAURINBURG-MAXTON	NC	LPV200	0	100	0	100	1	99.994
MQI	DARE COUNTY RGNL	NC	LPV	0	100	0	100	1	99.994
MRH	MICHAEL J SMITH FIELD	NC	LPV	0	100	0	100	1	99.994
MRN	FOOTHILLS REGIONAL	NC	LPV	0	100	0	100	1	99.998
MWK	MOUNT AIRY/SURRY COUNTY	NC	LPV	0	100	0	100	1	99.997
OAJ	ALBERT J ELLIS	NC	LPV200	0	100	0	100	1	99.994
OCW	WASHINGTON-WARREN	NC	LPV	0	100	0	100	1	99.994
ONX	CURRITUCK COUNTY RGNL	NC	LPV	0	100	0	100	1	99.992
PGV	PITT-GREENVILLE	NC	LPV	0	100	0	100	1	99.994
PMZ	PLYMOUTH MUNICIPAL	NC	LP	0	100	0	100	1	99.994
RCZ	RICHMOND COUNTY	NC	LPV	0	100	0	100	1	99.994
RDU	RALEIGH-DURHAM INTL	NC	LPV200	0	100	0	100	1	99.994
RHP	WESTERN CAROLINA RGNL	NC	LP	0	100	0	100	0	100
RUQ	ROWAN COUNTY	NC	LPV200	0	100	0	100	1	99.996
RWI	ROCKY MOUNT-WILSON RGNL	NC	LPV	0	100	0	100	1	99.994
SCR	SILER CITY MUNICIPAL	NC	LPV	0	100	0	100	1	99.994
SOP	MOORE COUNTY	NC	LPV200	0	100	0	100	1	99.994
SUT	CAPE FEAR RGNL JETPORT/HOWIE F	NC	LPV	0	100	0	100	1	99.994
SVH	STATESVILLE RGNL	NC	LPV200	0	100	0	100	1	99.997
TDF	PERSON COUNTY	NC	LPV200	0	100	0	100	1	99.994
TTA	RALEIGH EXEC JETPORT AT SANFOR	NC	LPV200	0	100	0	100	1	99.994
VUJ	STANLY COUNTY	NC	LPV200	0	100	0	100	1	99.995
W40	MOUNT OLIVE MUNICIPAL	NC	LPV	0	100	0	100	1	99.994
ZEF	ELKIN MUNICIPAL	NC	LP	0	100	0	100	1	99.997
06D	ROLLA MUNICIPAL	ND	LPV	0	100	0	100	0	100
20U	BEACH	ND	LPV	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
2C8	CAVALIER MUNICIPAL	ND	LPV	0	100	0	100	0	100
3H4	HILLSBORO MUNICIPAL	ND	LPV	0	100	0	100	0	100
46D	CARRINGTON MUNICIPAL	ND	LPV	0	100	0	100	0	100
51D	EDGELEY MUNICIPAL	ND	LPV	0	100	0	100	0	100
5L0	LAKOTA MUNICIPAL	ND	LPV	0	100	0	100	0	100
5N8	CASSELTON ROBERT MILLER RGNL	ND	LPV	0	100	0	100	0	100
6L3	LISBON MUNICIPAL	ND	LPV	0	100	0	100	0	100
7L2	LINTON MUNICIPAL	ND	LPV	0	100	0	100	0	100
9D7	CANDO MUNICIPAL	ND	LPV	0	100	0	100	0	100
BAC	BARNES COUNTY MUNICIPAL	ND	LPV	0	100	0	100	0	100
BIS	BISMARCK MUNICIPAL	ND	LPV200	0	100	0	100	0	100
BWP	HARRY STERN	ND	LPV	0	100	0	100	0	100
BWW	BOWMAN RGNL	ND	LPV	0	100	0	100	0	100
D09	BOTTINEAU MUNICIPAL	ND	LPV	0	100	0	100	0	100
D55	ROBERTSON FIELD	ND	LPV	0	100	0	100	0	100
D60	TIOGA MUNICIPAL	ND	LPV	0	100	0	100	0	100
DIK	DICKINSON - THEODORE ROOSEVELT	ND	LPV200	0	100	0	100	0	100
DVL	DEVILS LAKE RGNL	ND	LPV200	0	100	0	100	0	100
FAR	HECTOR INTL	ND	LPV200	0	100	0	100	0	100
GAF	HUTSON FIELD	ND	LPV	0	100	0	100	0	100
GFK	GRAND FORKS INTL	ND	LPV	0	100	0	100	0	100
GWR	GWINNER-ROGER MELROE FIELD	ND	LPV200	0	100	0	100	0	100
HEI	HETTINGER MUNICIPAL	ND	LPV	0	100	0	100	0	100
HZE	MERCER COUNTY RGNL	ND	LPV	0	100	0	100	0	100
ISN	SLOULIN FLD INTL	ND	LPV200	0	100	0	100	0	100
JMS	JAMESTOWN RGNL	ND	LPV200	0	100	0	100	0	100
K74	ROBERT ODEGAARD FIELD	ND	LP	0	100	0	100	0	100
MOT	MINOT INTL	ND	LPV	0	100	0	100	0	100
RUG	RUGBY MUNICIPAL	ND	LP	0	100	0	100	0	100
S25	WATFORD CITY MUNICIPAL	ND	LPV	0	100	0	100	0	100
Y19	MANDAN MUNICIPAL	ND	LPV	0	100	0	100	0	100
07K	CENTRAL CITY MUNICIPAL - LARRY REIN	NE	LPV	0	100	0	100	0	100
08K	HARVARD STATE	NE	LPV	0	100	0	100	0	100
0B4	HARTINGTON MUNICIPAL/ BUD BECKER FL	NE	LPV	0	100	0	100	0	100
0C4	PENDER MUNICIPAL	NE	LPV	0	100	0	100	0	100
0F4	LOUP CITY MUNICIPAL	NE	LPV	0	100	0	100	0	100
0G3	TECUMSEH MUNICIPAL	NE	LPV	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
0V3	PIONEER VILLAGE FIELD	NE	LPV	0	100	0	100	0	100
12K	SUPERIOR MUNICIPAL	NE	LPV	0	100	0	100	0	100
47V	CURTIS MUNICIPAL	NE	LPV	0	100	0	100	0	100
4D9	ALMA MUNICIPAL	NE	LPV	0	100	0	100	0	100
4V9	ANTELOPE COUNTY	NE	LPV	0	100	0	100	0	100
6K3	CREIGHTON MUNICIPAL	NE	LPV	0	100	0	100	0	100
7V7	RED CLOUD MUNICIPAL	NE	LPV	0	100	0	100	0	100
8V2	STUART-ATKINSON MUNICIPAL	NE	LPV	0	100	0	100	0	100
93Y	DAVID CITY MUNICIPAL	NE	LPV	0	100	0	100	0	100
9V5	MODISETT	NE	LPV	0	100	0	100	0	100
AFK	NEBRASKA CITY MUNICIPAL	NE	LPV	0	100	0	100	0	100
AHQ	WAHOO MUNICIPAL	NE	LPV	0	100	0	100	0	100
AIA	ALLIANCE MUNICIPAL	NE	LPV200	0	100	0	100	0	100
ANW	AINSWORTH RGNL	NE	LPV200	0	100	0	100	0	100
AUH	AURORA MUNICIPAL - AL POTTER FIELD	NE	LPV	0	100	0	100	0	100
BBW	BROKEN BOW MUNICIPAL/KEITH GLAZE FL	NE	LPV	0	100	0	100	0	100
BFF	WESTERN NEBRASKA RGNL/WILLIAM	NE	LPV	0	100	0	100	0	100
BIE	BEATRICE MUNICIPAL	NE	LPV200	0	100	0	100	0	100
BTA	BLAIR MUNICIPAL	NE	LPV	0	100	0	100	0	100
BUB	CRAM FIELD	NE	LPV	0	100	0	100	0	100
BVN	ALBION MUNICIPAL	NE	LPV	0	100	0	100	0	100
CDR	CHADRON MUNICIPAL	NE	LPV200	0	100	0	100	0	100
CEK	CRETE MUNICIPAL	NE	LPV	0	100	0	100	0	100
CSB	CAMBRIDGE MUNICIPAL	NE	LPV	0	100	0	100	0	100
CZD	COZAD MUNICIPAL	NE	LPV	0	100	0	100	0	100
EAR	KEARNEY RGNL	NE	LPV200	0	100	0	100	0	100
FBY	FAIRBURY MUNICIPAL	NE	LPV	0	100	0	100	0	100
FET	FREMONT MUNICIPAL	NE	LPV	0	100	0	100	0	100
FMZ	FAIRMONT STATE AIRFIELD	NE	LPV	0	100	0	100	0	100
FNB	BRENNER FIELD	NE	LPV	0	100	0	100	0	100
GGF	GRANT MUNICIPAL	NE	LPV	0	100	0	100	0	100
GRI	CENTRAL NEBRASKA RGNL	NE	LPV	0	100	0	100	0	100
GRN	GORDON MUNICIPAL	NE	LPV	0	100	0	100	0	100
HDE	BREWSTER FIELD	NE	LPV	0	100	0	100	0	100
HSI	HASTINGS MUNICIPAL	NE	LPV	0	100	0	100	0	100
IBM	KIMBALL MUNICIPAL/ROBERT E ARRAJ FI	NE	LPV	0	100	0	100	0	100
IML	IMPERIAL MUNICIPAL	NE	LPV	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
JYR	YORK MUNICIPAL	NE	LPV	0	100	0	100	0	100
LBF	NORTH PLATTE RGNL AIRPORT LEE	NE	LPV200	0	100	0	100	0	100
LCG	WAYNE MUNICIPAL/ STAN MORRIS FLD	NE	LPV	0	100	0	100	0	100
LNK	LINCOLN	NE	LPV200	0	100	0	100	0	100
LXN	JIM KELLY FIELD	NE	LPV	0	100	0	100	0	100
MCK	MC COOK BEN NELSON RGNL	NE	LPV	0	100	0	100	0	100
MLE	MILLARD	NE	LPV	0	100	0	100	0	100
ODX	EVELYN SHARP FIELD	NE	LPV	0	100	0	100	0	100
OFK	NORFOLK RGNL/KARL STEFAN MEMOR	NE	LPV	0	100	0	100	0	100
OGA	SEARLE FIELD	NE	LPV	0	100	0	100	0	100
OKS	GARDEN COUNTY	NE	LPV	0	100	0	100	0	100
OLU	COLUMBUS MUNICIPAL	NE	LPV	0	100	0	100	0	100
OMA	EPPLEY AIRFIELD	NE	LPV200	0	100	0	100	0	100
ONL	THE O'NEILL MUNICIPAL-JOHN L BAKER	NE	LPV	0	100	0	100	0	100
PMV	PLATTSMOUTH MUNICIPAL	NE	LPV	0	100	0	100	0	100
RBE	ROCK COUNTY	NE	LPV	0	100	0	100	0	100
SCB	SCRIBNER STATE	NE	LPV	0	100	0	100	0	100
SNY	SIDNEY MUNICIPAL/LLOYD W CARR FIELD	NE	LPV	0	100	0	100	0	100
SWT	SEWARD MUNICIPAL	NE	LPV	0	100	0	100	0	100
TIF	THOMAS COUNTY	NE	LPV	0	100	0	100	0	100
TQE	TEKAMAH MUNICIPAL	NE	LPV	0	100	0	100	0	100
VTN	MILLER FIELD	NE	LPV	0	100	0	100	0	100
ASH	BOIRE FIELD	NH	LPV200	0	100	0	100	0	100
CON	CONCORD MUNICIPAL	NH	LPV	0	100	0	100	0	100
DAW	SKYHAVEN	NH	LPV	0	100	0	100	0	100
EEN	DILLANT-HOPKINS	NH	LPV	0	100	0	100	0	100
HIE	MOUNT WASHINGTON RGNL	NH	LPV	0	100	0	100	0	100
LCI	LACONIA MUNICIPAL	NH	LPV	0	100	0	100	0	100
LEB	LEBANON MUNICIPAL	NH	LPV	0	100	0	100	0	100
MHT	MANCHESTER	NH	LPV200	0	100	0	100	0	100
PSM	PORTSMOUTH INTL AT PEASE	NH	LPV200	0	100	0	100	0	100
47N	CENTRAL JERSEY RGNL	NJ	LP	0	100	0	100	1	99.999
4N1	GREENWOOD LAKE	NJ	LP	0	100	0	100	0	100
ACY	ATLANTIC CITY INTL	NJ	LPV200	0	100	0	100	1	99.997
CDW	ESSEX COUNTY	NJ	LPV	0	100	0	100	0	100
EWR	NEWARK LIBERTY INTL	NJ	LPV200	0	100	0	100	0	100
MIV	MILLVILLE MUNICIPAL	NJ	LPV200	0	100	0	100	1	99.996

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
MJX	OCEAN COUNTY	NJ	LPV	0	100	0	100	1	99.999
MMU	MORRISTOWN MUNICIPAL	NJ	LPV200	0	100	0	100	0	100
N12	LAKEWOOD	NJ	LP	0	100	0	100	0	100
N14	FLYING W	NJ	LPV	0	100	0	100	1	99.997
N40	SKY MANOR	NJ	LP	0	100	0	100	1	99.998
TEB	TETERBORO	NJ	LPV	0	100	0	100	0	100
TTN	TRENTON MERCER	NJ	LPV	0	100	0	100	1	99.998
VAY	SOUTH JERSEY RGNL	NJ	LP	0	100	0	100	1	99.997
WWD	CAPE MAY COUNTY	NJ	LPV	0	100	0	100	1	99.996
CYDF	DEER LAKE	NL	LPV	0	100	0	100	1	99.985
0E0	MORIARTY	NM	LPV	0	100	0	100	0	100
ABQ	ALBUQUERQUE INTL SUNPORT	NM	LPV200	0	100	0	100	0	100
AEG	DOUBLE EAGLE II	NM	LPV200	0	100	0	100	0	100
ALM	ALAMOGORDO-WHITE SANDS RGNL	NM	LPV	0	100	0	100	0	100
ATS	ARTESIA MUNICIPAL	NM	LPV	0	100	0	100	0	100
CAO	CLAYTON MUNICIPAL ARPK	NM	LPV	0	100	0	100	0	100
CNM	CAVERN CITY AIR TRML	NM	LPV200	0	100	0	100	0	100
CVN	CLOVIS MUNICIPAL	NM	LPV200	0	100	0	100	0	100
DMN	DEMING MUNICIPAL	NM	LPV	0	100	0	100	2	99.999
E06	LEA COUNTY-ZIP FRANKLIN MEMORI	NM	LPV	0	100	0	100	0	100
FMN	FOUR CORNERS RGNL	NM	LPV200	0	100	0	100	1	99.998
HOB	LEA COUNTY RGNL	NM	LPV	0	100	0	100	0	100
LAM	LOS ALAMOS	NM	LP	0	100	0	100	0	100
LRU	LAS CRUCES INTL	NM	LPV200	0	100	0	100	0	100
ONM	SOCORRO MUNICIPAL	NM	LP	0	100	0	100	0	100
ROW	ROSWELL INTL AIR CENTER	NM	LPV	0	100	0	100	0	100
SAF	SANTA FE MUNICIPAL	NM	LPV200	0	100	0	100	0	100
SRR	SIERRA BLANCA RGNL	NM	LPV200	0	100	0	100	0	100
SVC	GRANT COUNTY	NM	LPV	0	100	0	100	2	99.997
CYHZ	HALIFAX / STANFIELD INTL	NS	LPV	0	100	0	100	0	100
CYEV	INUVIK	NT	LPV	0	100	0	100	0	100
05U	EUREKA	NV	LP	0	100	0	100	1	99.999
CXP	CARSON	NV	LP	0	100	0	100	1	99.994
ELY	ELY ARPT /YELLAND FLD/	NV	LPV	0	100	0	100	0	100
LAS	MC CARRAN INTL	NV	LPV	0	100	0	100	1	99.991
RNO	RENO/TAHOE INTL	NV	LPV	0	100	0	100	2	99.994
RTS	RENO/STEAD	NV	LPV	0	100	0	100	2	99.994

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
SPZ	SILVER SPRINGS	NV	LPV	0	100	0	100	0	100
TPH	TONOPAH	NV	LP	0	100	0	100	1	99.995
WMC	WINNEMUCCA MUNICIPAL	NV	LPV	0	100	0	100	1	99.999
06N	RANDALL	NY	LP	0	100	0	100	0	100
0G7	FINGER LAKES RGNL	NY	LPV	0	100	0	100	1	99.998
1B1	COLUMBIA COUNTY	NY	LPV	0	100	0	100	0	100
20N	KINGSTON-ULSTER	NY	LPV	0	100	0	100	0	100
44N	SKY ACRES	NY	LPV	0	100	0	100	0	100
4B6	TICONDEROGA MUNICIPAL	NY	LPV	0	100	0	100	0	100
5B2	SARATOGA COUNTY	NY	LPV	0	100	0	100	0	100
5G0	LE ROY	NY	LP	0	100	0	100	1	99.999
9G0	BUFFALO AIRFIELD	NY	LP	0	100	0	100	0	100
9G3	AKRON	NY	LP	0	100	0	100	0	100
ALB	ALBANY INTL	NY	LPV200	0	100	0	100	0	100
ART	WATERTOWN INTL	NY	LPV200	0	100	0	100	0	100
BGM	GREATER BINGHAMTON/EDWIN A LIN	NY	LPV200	0	100	0	100	1	99.999
BUF	BUFFALO NIAGARA INTL	NY	LPV200	0	100	0	100	0	100
D38	CANANDAIGUA	NY	LPV	0	100	0	100	1	99.998
ELM	ELMIRA/CORNING RGNL	NY	LPV200	0	100	0	100	1	99.997
ELZ	WELLSVILLE MUNICIPAL ARPT`TARANTINE	NY	LPV	0	100	0	100	1	99.998
FOK	FRANCIS S GABRESKI	NY	LPV200	0	100	0	100	0	100
FRG	REPUBLIC	NY	LPV200	0	100	0	100	0	100
FZY	OSWEGO COUNTY	NY	LPV	0	100	0	100	0	100
GFL	FLOYD BENNETT MEMORIAL	NY	LPV200	0	100	0	100	0	100
GVQ	GENESEE COUNTY	NY	LPV200	0	100	0	100	1	99.999
HPN	WESTCHESTER COUNTY	NY	LPV	0	100	0	100	0	100
HTF	HORNELL MUNICIPAL	NY	LPV	0	100	0	100	1	99.998
HTO	EAST HAMPTON	NY	LPV	0	100	0	100	0	100
HWV	BROOKHAVEN	NY	LPV	0	100	0	100	0	100
IAG	NIAGARA FALLS INTL	NY	LPV	0	100	0	100	0	100
ISP	LONG ISLAND MAC ARTHUR	NY	LPV200	0	100	0	100	0	100
ITH	ITHACA TOMPKINS RGNL	NY	LPV	0	100	0	100	1	99.998
JFK	JOHN F KENNEDY INTL	NY	LPV200	0	100	0	100	0	100
JHW	CHAUTAUQUA COUNTY/JAMESTOWN	NY	LPV200	0	100	0	100	0	100
K09	PISECO	NY	LP	0	100	0	100	0	100
LGA	LAGUARDIA	NY	LPV	0	100	0	100	0	100
MAL	MALONE-DUFORT	NY	LPV	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
MGJ	ORANGE COUNTY	NY	LPV	0	100	0	100	0	100
MSS	MASSENA INTL-RICHARDS FIELD	NY	LPV	0	100	0	100	0	100
MSV	SULLIVAN COUNTY INTL	NY	LPV	0	100	0	100	0	100
N23	SIDNEY MUNICIPAL	NY	LP	0	100	0	100	0	100
N66	ONEONTA MUNICIPAL	NY	LPV	0	100	0	100	0	100
NY0	FULTON COUNTY	NY	LPV	0	100	0	100	0	100
OGS	OGDENSBURG INTL	NY	LPV	0	100	0	100	0	100
OIC	LT WARREN EATON	NY	LP	0	100	0	100	0	100
OLE	CATTARAUGUS COUNTY-OLEAN	NY	LPV	0	100	0	100	1	99.999
PBG	PLATTSBURGH INTL	NY	LPV	0	100	0	100	0	100
PEO	PENN YAN	NY	LPV	0	100	0	100	1	99.997
POU	HUDSON VALLEY RGNL	NY	LPV	0	100	0	100	0	100
RME	GRIFFISS INTL	NY	LPV200	0	100	0	100	0	100
ROC	GREATER ROCHESTER INTL	NY	LPV200	0	100	0	100	1	99.999
SCH	SCHENECTADY COUNTY	NY	LPV200	0	100	0	100	0	100
SDC	WILLIAMSON-SODUS	NY	LPV	0	100	0	100	1	99.998
SLK	ADIRONDACK RGNL	NY	LPV200	0	100	0	100	0	100
SWF	STEWART INTL	NY	LPV200	0	100	0	100	0	100
SYR	SYRACUSE HANCOCK INTL	NY	LPV200	0	100	0	100	0	100
VGC	HAMILTON MUNICIPAL	NY	LPV	0	100	0	100	0	100
0G6	WILLIAMS COUNTY	OH	LPV	0	100	0	100	0	100
10G	HOLMES COUNTY	OH	LP	0	100	0	100	0	100
16G	SENECA COUNTY	OH	LPV	0	100	0	100	0	100
17G	PORT BUCYRUS-CRAWFORD COUNTY	OH	LP	0	100	0	100	0	100
1G0	WOOD COUNTY	OH	LPV	0	100	0	100	0	100
1G3	KENT STATE UNIV	OH	LPV	0	100	0	100	0	100
2G2	JEFFERSON COUNTY AIRPARK	OH	LPV	0	100	0	100	0	100
4G5	MONROE COUNTY	OH	LP	0	100	0	100	0	100
4I3	KNOX COUNTY	OH	LPV200	0	100	0	100	0	100
5A1	NORWALK-HURON COUNTY	OH	LP	0	100	0	100	0	100
6G5	BARNESVILLE-BRADFIELD	OH	LP	0	100	0	100	0	100
7G8	GEAUGA COUNTY	OH	LP	0	100	0	100	0	100
AKR	AKRON FULTON INTL	OH	LP	0	100	0	100	0	100
AOH	LIMA ALLEN COUNTY	OH	LPV200	0	100	0	100	0	100
AXV	NEIL ARMSTRONG	OH	LPV	0	100	0	100	0	100
BJJ	WAYNE COUNTY	OH	LPV	0	100	0	100	0	100
BKL	BURKE LAKEFRONT	OH	LPV	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
CAK	AKRON-CANTON RGNL	OH	LPV200	0	100	0	100	0	100
CDI	CAMBRIDGE MUNICIPAL	OH	LP	0	100	0	100	0	100
CGF	CUYAHOGA COUNTY	OH	LPV	0	100	0	100	0	100
CLE	CLEVELAND-HOPKINS INTL	OH	LPV200	0	100	0	100	0	100
CMH	JOHN GLENN COLUMBUS INTL	OH	LPV200	0	100	0	100	0	100
CQA	LAKEFIELD	OH	LPV	0	100	0	100	0	100
CYO	PICKAWAY COUNTY MEMORIAL	OH	LPV	0	100	0	100	0	100
DAY	JAMES M COX DAYTON INTL	OH	LPV200	0	100	0	100	0	100
DLZ	DELAWARE MUNICIPAL - JIM MOORE FIEL	OH	LPV	0	100	0	100	0	100
EDJ	BELLEFONTAINE RGNL	OH	LPV	0	100	0	100	0	100
EOP	PIKE COUNTY	OH	LP	0	100	0	100	0	100
FDY	FINDLAY	OH	LPV	0	100	0	100	0	100
FZI	FOSTORIA METROPOLITAN	OH	LPV	0	100	0	100	0	100
GQQ	GALION MUNICIPAL	OH	LP	0	100	0	100	0	100
HAO	BUTLER CO RGNL-HOGAN FIELD	OH	LPV	0	100	0	100	0	100
HOC	HIGHLAND COUNTY	OH	LP	0	100	0	100	0	100
HZY	NORTHEAST OHIO RGNL	OH	LPV	0	100	0	100	0	100
I19	GREENE COUNTY-LEWIS A JACKSON	OH	LPV	0	100	0	100	0	100
I40	RICHARD DOWNING	OH	LPV	0	100	0	100	0	100
I66	CLINTON FIELD	OH	LPV	0	100	0	100	0	100
I68	WARREN COUNTY/JOHN LANE FIELD	OH	LPV	0	100	0	100	0	100
I69	CLERMONT COUNTY	OH	LP	0	100	0	100	0	100
I74	GRIMES FIELD	OH	LPV	0	100	0	100	0	100
ILN	WILMINGTON AIR PARK	OH	LPV200	0	100	0	100	0	100
LCK	RICKENBACKER INTL	OH	LPV200	0	100	0	100	0	100
LHQ	FAIRFIELD COUNTY	OH	LPV200	0	100	0	100	0	100
LNN	WILLOUGHBY LOST NATION MUNICIPAL	OH	LPV	0	100	0	100	0	100
LPR	LORAIN COUNTY RGNL	OH	LPV200	0	100	0	100	0	100
LUK	CINCINNATI MUNICIPAL AIRPORT LUNKEN	OH	LPV	0	100	0	100	0	100
MFD	MANSFIELD LAHM RGNL	OH	LPV200	0	100	0	100	0	100
MGY	DAYTON-WRIGHT BROTHERS	OH	LPV	0	100	0	100	0	100
MNN	MARION MUNICIPAL	OH	LPV	0	100	0	100	0	100
MRT	UNION COUNTY	OH	LP	0	100	0	100	0	100
MWO	MIDDLETOWN REGIONAL/HOOK FIELD	OH	LPV	0	100	0	100	0	100
OSU	OHIO STATE UNIVERSITY	OH	LPV200	0	100	0	100	0	100
OWX	PUTNAM COUNTY	OH	LPV	0	100	0	100	0	100
OXD	MIAMI UNIVERSITY	OH	LPV	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
PCW	ERIE-OTTAWA INTL	OH	LPV	0	100	0	100	0	100
PHD	HARRY CLEVER FIELD	OH	LP	0	100	0	100	0	100
PMH	GREATER PORTSMOUTH RGNL	OH	LPV	0	100	0	100	0	100
POV	PORTAGE COUNTY	OH	LPV	0	100	0	100	0	100
RZT	ROSS COUNTY	OH	LPV	0	100	0	100	0	100
S24	SANDUSKY COUNTY RGNL	OH	LPV	0	100	0	100	0	100
SCA	SIDNEY MUNICIPAL	OH	LPV	0	100	0	100	0	100
SGH	SPRINGFIELD-BECKLEY MUNICIPAL	OH	LPV200	0	100	0	100	0	100
TDZ	TOLEDO EXECUTIVE	OH	LPV	0	100	0	100	0	100
TOL	TOLEDO EXPRESS	OH	LPV200	0	100	0	100	0	100
TSO	CARROLL COUNTY-TOLSON	OH	LP	0	100	0	100	0	100
TZR	BOLTON FIELD	OH	LPV200	0	100	0	100	0	100
UNI	OHIO UNIVERSITY	OH	LPV200	0	100	0	100	0	100
USE	FULTON COUNTY	OH	LPV	0	100	0	100	0	100
UYF	MADISON COUNTY	OH	LPV	0	100	0	100	0	100
VTA	NEWARK-HEATH	OH	LP	0	100	0	100	0	100
YNG	YOUNGSTOWN-WARREN RGNL	OH	LPV	0	100	0	100	0	100
ZZV	ZANESVILLE MUNICIPAL	OH	LPV200	0	100	0	100	0	100
1F0	ARDMORE DOWNTOWN EXECUTIVE	OK	LP	0	100	0	100	0	100
1K8	SOUTH GRAND LAKE RGNL	OK	LPV	0	100	0	100	0	100
1O4	THOMAS MUNICIPAL	OK	LPV	0	100	0	100	0	100
2K4	SCOTT FIELD	OK	LPV	0	100	0	100	0	100
80F	ANTLERS MUNICIPAL	OK	LPV	0	100	0	100	0	100
ADH	ADA MUNICIPAL	OK	LPV	0	100	0	100	0	100
ADM	ARDMORE MUNICIPAL	OK	LPV200	0	100	0	100	0	100
AVK	ALVA RGNL	OK	LPV	0	100	0	100	0	100
AXS	ALTUS/QUARTZ MOUNTAIN RGNL	OK	LPV	0	100	0	100	0	100
BKN	BLACKWELL-TONKAWA MUNICIPAL	OK	LPV	0	100	0	100	0	100
BVO	BARTLESVILLE MUNICIPAL	OK	LPV	0	100	0	100	0	100
CHK	CHICKASHA MUNICIPAL	OK	LPV200	0	100	0	100	0	100
CLK	CLINTON RGNL	OK	LPV	0	100	0	100	0	100
CSM	CLINTON-SHERMAN	OK	LPV200	0	100	0	100	0	100
DUA	DURANT RGNL - EAKER FIELD	OK	LPV	0	100	0	100	0	100
DUC	HALLIBURTON FIELD	OK	LPV	0	100	0	100	0	100
ELK	ELK CITY RGNL BUSINESS	OK	LPV	0	100	0	100	0	100
F22	PERRY MUNICIPAL	OK	LPV	0	100	0	100	0	100
FDR	FREDERICK RGNL	OK	LPV200	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
GCM	CLAREMORE RGNL	OK	LPV	0	100	0	100	0	100
GMJ	GROVE MUNICIPAL	OK	LPV	0	100	0	100	0	100
GOK	GUTHRIE-EDMOND RGNL	OK	LPV	0	100	0	100	0	100
GUY	GUYMON MUNICIPAL	OK	LPV	0	100	0	100	0	100
GZL	STIGLER RGNL	OK	LPV	0	100	0	100	0	100
H71	MID-AMERICA INDUSTRIAL	OK	LPV	0	100	0	100	0	100
HBR	HOBART RGNL	OK	LPV	0	100	0	100	0	100
HHW	STAN STAMPER MUNICIPAL	OK	LPV	0	100	0	100	0	100
HSD	SUNDANCE	OK	LPV	0	100	0	100	0	100
MKO	DAVIS FIELD	OK	LPV	0	100	0	100	0	100
MLC	MC ALESTER RGNL	OK	LPV	0	100	0	100	0	100
OJA	THOMAS P STAFFORD	OK	LPV	0	100	0	100	0	100
OKC	WILL ROGERS WORLD	OK	LPV200	0	100	0	100	0	100
OKM	OKMULGEE RGNL	OK	LPV	0	100	0	100	0	100
OUN	UNIVERSITY OF OKLAHOMA WESTHEI	OK	LPV200	0	100	0	100	0	100
OWP	WILLIAM R POGUE MUNICIPAL	OK	LPV	0	100	0	100	0	100
PNC	PONCA CITY RGNL	OK	LPV	0	100	0	100	0	100
PVJ	PAULS VALLEY MUNICIPAL	OK	LPV200	0	100	0	100	0	100
PWA	WILEY POST	OK	LPV200	0	100	0	100	0	100
RCE	CLARENCE E PAGE MUNICIPAL	OK	LPV	0	100	0	100	0	100
RVS	RICHARD LLOYD JONES JR	OK	LPV200	0	100	0	100	0	100
SNL	SHAWNEE RGNL	OK	LPV200	0	100	0	100	0	100
SWO	STILLWATER RGNL	OK	LPV200	0	100	0	100	0	100
TQH	TAHLEQUAH MUNICIPAL	OK	LPV	0	100	0	100	0	100
TUL	TULSA INTL	OK	LPV200	0	100	0	100	0	100
WDG	ENID WOODRING RGNL	OK	LPV200	0	100	0	100	0	100
WWR	WEST WOODWARD	OK	LPV	0	100	0	100	0	100
CNS7	KINCARDINE	ON	LPV	0	100	0	100	0	100
CYHD	DRYDEN REGIONAL	ON	LPV	0	100	0	100	0	100
CYKF	KITCHENER / WATERLOO	ON	LPV	0	100	0	100	0	100
CYOW	OTTAWA / MACDONALDCARTIER INTL	ON	LPV	0	100	0	100	0	100
CYQT	THUNDER BAY	ON	LPV	0	100	0	100	0	100
CYTS	TIMMINS / VICTOR M POWER	ON	LPV	0	100	0	100	0	100
CYXL	SIOUX LOOKOUT	ON	LPV	0	100	0	100	0	100
AST	ASTORIA RGNL	OR	LPV	0	100	0	100	0	100
BDN	BEND MUNICIPAL	OR	LPV	0	100	0	100	0	100
BKE	BAKER CITY MUNICIPAL	OR	LPV	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
CVO	CORVALLIS MUNICIPAL	OR	LPV200	0	100	0	100	1	99.995
EUG	MAHLON SWEET FIELD	OR	LPV200	0	100	0	100	2	99.993
GCD	GRANT CO RGNL/OGILVIE FIELD	OR	LPV	0	100	0	100	0	100
HIO	PORTLAND-HILLSBORO	OR	LPV200	0	100	0	100	0	100
LGD	LA GRANDE/UNION COUNTY	OR	LPV	0	100	0	100	0	100
LKV	LAKE COUNTY	OR	LPV	0	100	0	100	2	99.994
LMT	CRATER LAKE-KLAMATH RGNL	OR	LPV	0	100	0	100	2	99.985
MMV	MC MINNVILLE MUNICIPAL	OR	LPV	0	100	0	100	0	100
ONO	ONTARIO MUNICIPAL	OR	LPV	0	100	0	100	0	100
ONP	NEWPORT MUNICIPAL	OR	LPV	0	100	0	100	2	99.994
OTH	SOUTHWEST OREGON RGNL	OR	LPV	0	100	0	100	2	99.976
PDT	EASTERN OREGON RGNL AT PENDLET	OR	LPV200	0	100	0	100	0	100
PDX	PORTLAND INTL	OR	LPV200	0	100	0	100	0	100
RDM	ROBERTS FIELD	OR	LPV200	0	100	0	100	0	100
S33	MADRAS MUNICIPALCIPAL	OR	LPV	0	100	0	100	0	100
S39	PRINEVILLE	OR	LP	0	100	0	100	0	100
SLE	MCNARY FLD	OR	LPV200	0	100	0	100	1	99.999
SPB	SCAPPOOSE INDUSTRIAL AIRPARK	OR	LPV	0	100	0	100	0	100
UAO	AURORA STATE	OR	LPV	0	100	0	100	0	100
22N	JAKE ARNER MEMORIAL	PA	LP	0	100	0	100	1	99.995
29D	GROVE CITY	PA	LP	0	100	0	100	0	100
2G9	SOMERSET COUNTY	PA	LPV	0	100	0	100	1	99.998
6G1	TITUSVILLE	PA	LPV	0	100	0	100	0	100
8G2	CORRY-LAWRENCE	PA	LPV	0	100	0	100	0	100
8N8	DANVILLE	PA	LP	0	100	0	100	1	99.995
9D4	DECK	PA	LPV	0	100	0	100	1	99.994
ABE	LEHIGH VALLEY INTL	PA	LPV200	0	100	0	100	1	99.996
AFJ	WASHINGTON COUNTY	PA	LPV200	0	100	0	100	0	100
AGC	ALLEGHENY COUNTY	PA	LPV200	0	100	0	100	0	100
AOO	ALTOONA-BLAIR COUNTY	PA	LPV	0	100	0	100	1	99.997
AVP	WILKES-BARRE/SCRANTON INTL	PA	LPV200	0	100	0	100	1	99.997
AXQ	CLARION COUNTY	PA	LPV	0	100	0	100	0	100
BFD	BRADFORD RGNL	PA	LPV	0	100	0	100	1	99.999
BTP	BUTLER COUNTY/K W SCHOLTER FIE	PA	LPV	0	100	0	100	0	100
BVI	BEAVER COUNTY	PA	LPV	0	100	0	100	0	100
CXY	CAPITAL CITY	PA	LPV	0	100	0	100	1	99.995
DUJ	DUBOIS RGNL	PA	LPV200	0	100	0	100	1	99.999

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
ERI	ERIE INTL/TOM RIDGE FIELD	PA	LPV	0	100	0	100	0	100
FIG	CLEARFIELD-LAWRENCE	PA	LPV	0	100	0	100	1	99.998
FKL	VENANGO RGNL	PA	LPV	0	100	0	100	0	100
FWQ	ROSTRAVER	PA	LPV	0	100	0	100	1	99.999
GKJ	PORT MEADVILLE	PA	LP	0	100	0	100	0	100
HMZ	BEDFORD COUNTY	PA	LPV	0	100	0	100	1	99.997
HZL	HAZLETON RGNL	PA	LPV	0	100	0	100	1	99.995
IDI	INDIANA COUNTY/JIMMY STEWART F	PA	LPV	0	100	0	100	1	99.999
IPT	WILLIAMSPORT RGNL	PA	LPV	0	100	0	100	1	99.996
JST	JOHN MURTHA JOHNSTOWN-CAMBRIA	PA	LPV200	0	100	0	100	1	99.998
LBE	ARNOLD PALMER RGNL	PA	LPV200	0	100	0	100	1	99.999
LNS	LANCASTER	PA	LPV200	0	100	0	100	1	99.994
LOM	WINGS FIELD	PA	LPV	0	100	0	100	1	99.995
MDT	HARRISBURG INTL	PA	LPV	0	100	0	100	1	99.994
MPO	POCONO MOUNTAINS MUNICIPAL	PA	LPV	0	100	0	100	1	99.998
MQS	CHESTER COUNTY G O CARLSON	PA	LPV	0	100	0	100	1	99.994
N38	WELLSBORO JOHNSTON	PA	LP	0	100	0	100	1	99.997
N79	NORTHUMBERLAND COUNTY	PA	LPV	0	100	0	100	1	99.995
N96	BELLEFONTE	PA	LPV	0	100	0	100	1	99.997
OQN	BRANDYWINE	PA	LP	0	100	0	100	1	99.994
OYM	ST MARYS MUNICIPAL	PA	LPV	0	100	0	100	1	99.998
PHL	PHILADELPHIA INTL	PA	LPV200	0	100	0	100	1	99.995
PIT	PITTSBURGH INTL	PA	LPV200	0	100	0	100	0	100
PNE	NORTHEAST PHILADELPHIA	PA	LPV	0	100	0	100	1	99.996
PSB	MID-STATE	PA	LPV	0	100	0	100	1	99.997
PTW	HERITAGE FIELD	PA	LPV	0	100	0	100	1	99.995
RDG	READING RGNL/CARL A SPAATZ FIE	PA	LPV	0	100	0	100	1	99.994
RVL	MIFFLIN COUNTY	PA	LPV	0	100	0	100	1	99.997
THV	YORK	PA	LP	0	100	0	100	1	99.994
UCP	NEW CASTLE MUNICIPAL	PA	LPV	0	100	0	100	0	100
UKT	QUAKERTOWN	PA	LP	0	100	0	100	1	99.995
UNV	UNIVERSITY PARK	PA	LPV200	0	100	0	100	1	99.997
VVS	JOSEPH A HARDY CONNELLSVILLE	PA	LPV	0	100	0	100	1	99.999
WAY	GREENE COUNTY	PA	LPV	0	100	0	100	0	100
WBW	WILKES-BARRE WYOMING VALLEY	PA	LPV	0	100	0	100	1	99.997
XLL	ALLENTOWN QUEEN CITY MUNICIPAL	PA	LP	0	100	0	100	1	99.995
ZER	SCHUYLKILL COUNTY /JOE ZERBEY/	PA	LPV200	0	100	0	100	1	99.994

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
CPN8	OPINACA	QC	LPV	0	100	0	100	0	100
CSR3	VICTORIAVILLE	QC	LPV	0	100	0	100	0	100
CTP9	KATTINIQ / DONALDSON	QC	LPV	0	100	0	100	0	100
CYEY	AMOS	QC	LPV	0	100	0	100	0	100
CYHU	MONTREAL / STHUBERT	QC	LPV	0	100	0	100	0	100
CYIF	STAUGUSTIN	QC	LPV	0	100	0	100	1	99.985
CYMX	MONTREAL (MIRABEL INTL)	QC	LPV	0	100	0	100	0	100
CYQB	QUEBEC / JEAN LESAGE INTL	QC	LPV	0	100	0	100	0	100
CYRI	RIVIEREDULOUP	QC	LPV	0	100	0	100	0	100
CYRQ	TROISRIVIERES	QC	LPV	0	100	0	100	0	100
CYVB	BONAVENTURE	QC	LPV	0	100	0	100	0	100
CYVP	KUUJJUAQ	QC	LPV	0	100	0	100	1	99.994
CYYY	MONTJOLI	QC	LPV	0	100	0	100	0	100
BID	BLOCK ISLAND STATE	RI	LPV	0	100	0	100	0	100
OQU	QUONSET STATE	RI	LPV	0	100	0	100	0	100
PVD	THEODORE FRANCIS GREEN STATE	RI	LPV200	0	100	0	100	0	100
SFZ	NORTH CENTRAL STATE	RI	LPV	0	100	0	100	0	100
35A	UNION COUNTY` TROY SHELTON FIE	SC	LP	0	100	0	100	1	99.997
6J0	LEXINGTON COUNTY AT PELION	SC	LPV	0	100	0	100	1	99.996
AIK	AIKEN MUNICIPAL	SC	LPV200	0	100	0	100	1	99.996
AND	ANDERSON RGNL	SC	LPV200	0	100	0	100	1	99.999
AQX	ALLENDALE COUNTY	SC	LPV	0	100	0	100	1	99.995
ARW	BEAUFORT COUNTY	SC	LPV200	0	100	0	100	1	99.994
BBP	MARLBORO COUNTY JETPORT - H E	SC	LPV	0	100	0	100	1	99.994
BNL	BARNWELL RGNL	SC	LPV	0	100	0	100	1	99.995
CAE	COLUMBIA METROPOLITAN	SC	LPV200	0	100	0	100	1	99.995
CDN	WOODWARD FIELD	SC	LPV	0	100	0	100	1	99.995
CEU	OCONEE COUNTY RGNL	SC	LPV200	0	100	0	100	0	100
CHS	CHARLESTON AFB/INTL	SC	LPV200	0	100	0	100	1	99.994
CQW	CHERAW MUNICIPAL/LYNCH BELLINGER FI	SC	LPV	0	100	0	100	1	99.994
CRE	GRAND STRAND	SC	LPV200	0	100	0	100	1	99.994
DCM	CHESTER CATAWBA RGNL	SC	LPV	0	100	0	100	1	99.997
DYB	SUMMERVILLE	SC	LPV200	0	100	0	100	1	99.994
FDW	FAIRFIELD COUNTY	SC	LPV	0	100	0	100	1	99.996
FLO	FLORENCE RGNL	SC	LPV	0	100	0	100	1	99.994
GGE	GEORGETOWN COUNTY	SC	LPV	0	100	0	100	1	99.994
GMU	GREENVILLE DOWNTOWN	SC	LPV200	0	100	0	100	1	99.999

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
GRD	GREENWOOD COUNTY	SC	LPV	0	100	0	100	1	99.998
GSP	GREENVILLE SPARTANBURG INTL	SC	LPV200	0	100	0	100	1	99.999
GYH	DONALDSON FIELD	SC	LPV	0	100	0	100	1	99.999
HYW	CONWAY-HORRY COUNTY	SC	LPV	0	100	0	100	1	99.994
JZI	CHARLESTON EXECUTIVE	SC	LPV200	0	100	0	100	1	99.994
LKR	LANCASTER COUNTY-MC WHIRTER FI	SC	LPV200	0	100	0	100	1	99.996
LQK	PICKENS COUNTY	SC	LPV	0	100	0	100	1	99.999
LRO	MT PLEASANT RGNL-FAISON FIELD	SC	LPV	0	100	0	100	1	99.994
LUX	LAURENS COUNTY	SC	LPV	0	100	0	100	1	99.998
MAO	MARION COUNTY	SC	LPV	0	100	0	100	1	99.994
MKS	BERKELEY COUNTY	SC	LPV	0	100	0	100	1	99.994
MYR	MYRTLE BEACH INTL	SC	LPV200	0	100	0	100	1	99.994
OGB	ORANGEBURG MUNICIPAL	SC	LPV200	0	100	0	100	1	99.994
PYG	PAGELAND	SC	LPV	0	100	0	100	1	99.995
RBW	LOWCOUNTRY RGNL	SC	LPV200	0	100	0	100	1	99.994
SMS	SUMTER	SC	LPV200	0	100	0	100	1	99.994
SPA	SPARTANBURG DOWNTOWN MEMORIAL	SC	LPV200	0	100	0	100	1	99.998
UDG	DARLINGTON COUNTY	SC	LPV	0	100	0	100	1	99.994
UZA	ROCK HILL/YORK CO/BRYANT FIELD	SC	LPV200	0	100	0	100	1	99.997
0D8	GETTYSBURG MUNICIPAL	SD	LP	0	100	0	100	0	100
49B	STURGIS MUNICIPAL	SD	LPV	0	100	0	100	0	100
8D3	SISSETON MUNICIPAL	SD	LPV	0	100	0	100	0	100
8V3	PARKSTON MUNICIPAL	SD	LPV	0	100	0	100	0	100
9D0	HIGHMORE MUNICIPAL	SD	LPV	0	100	0	100	0	100
9D1	GREGORY MUNICIPAL - FLYNN FLD	SD	LPV	0	100	0	100	0	100
9V6	MARTIN MUNICIPAL	SD	LPV	0	100	0	100	0	100
ABR	ABERDEEN RGNL	SD	LPV200	0	100	0	100	0	100
AGZ	WAGNER MUNICIPAL	SD	LPV	0	100	0	100	0	100
ATY	WATERTOWN RGNL	SD	LPV200	0	100	0	100	0	100
BKX	BROOKINGS RGNL	SD	LPV200	0	100	0	100	0	100
EFC	BELLE FOURCHE MUNICIPAL	SD	LPV	0	100	0	100	0	100
FSD	JOE FOSS FIELD	SD	LPV200	0	100	0	100	0	100
HON	HURON RGNL	SD	LPV200	0	100	0	100	0	100
HSR	HOT SPRINGS MUNICIPAL	SD	LP	0	100	0	100	0	100
ICR	WINNER RGNL	SD	LPV	0	100	0	100	0	100
LEM	LEMMON MUNICIPAL	SD	LPV	0	100	0	100	0	100
MBG	MOBRIDGE MUNICIPAL	SD	LPV	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
MDS	MADISON MUNICIPAL	SD	LPV	0	100	0	100	0	100
MHE	MITCHELL MUNICIPAL	SD	LPV	0	100	0	100	0	100
MKA	MILLER MUNICIPAL	SD	LPV	0	100	0	100	0	100
PHP	PHILIP	SD	LPV	0	100	0	100	0	100
PIR	PIERRE RGNL	SD	LPV	0	100	0	100	0	100
RAP	RAPID CITY RGNL	SD	LPV200	0	100	0	100	0	100
SPF	BLACK HILLS-CLYDE ICE FIELD	SD	LPV	0	100	0	100	0	100
VMR	HAROLD DAVIDSON FIELD	SD	LPV	0	100	0	100	0	100
YKN	CHAN GURNEY MUNICIPAL	SD	LPV200	0	100	0	100	0	100
CKQ8	MCARTHUR RIVER	SK	LPV	0	100	0	100	0	100
CYKJ	KEY LAKE	SK	LPV	0	100	0	100	0	100
0A3	SMITHVILLE MUNICIPAL	TN	LPV	0	100	0	100	0	100
0M3	JOHN A BAKER FLD	TN	LP	0	100	0	100	0	100
0M4	BENTON COUNTY	TN	LPV	0	100	0	100	0	100
0M5	HUMPHREYS COUNTY	TN	LP	0	100	0	100	0	100
1A3	MARTIN CAMPBELL FIELD	TN	LP	0	100	0	100	0	100
1M5	PORTLAND MUNICIPAL	TN	LPV	0	100	0	100	0	100
2A0	MARK ANTON	TN	LPV	0	100	0	100	0	100
2M2	LAWRENCEBURG-LAWRENCE COUNTY	TN	LPV	0	100	0	100	0	100
2M8	CHARLES W BAKER	TN	LPV	0	100	0	100	0	100
3A2	NEW TAZEWELL MUNICIPAL	TN	LP	0	100	0	100	0	100
3M7	LAFAYETTE MUNICIPAL	TN	LPV	0	100	0	100	0	100
8A3	LIVINGSTON MUNICIPAL	TN	LP	0	100	0	100	0	100
BGF	WINCHESTER MUNICIPAL	TN	LPV	0	100	0	100	0	100
BNA	NASHVILLE INTL	TN	LPV200	0	100	0	100	0	100
CHA	LOVELL FIELD	TN	LPV200	0	100	0	100	0	100
CKV	OUTLAW FIELD	TN	LPV	0	100	0	100	0	100
CSV	CROSSVILLE MEMORIAL-WHITSON FI	TN	LPV200	0	100	0	100	0	100
DYR	DYERSBURG RGNL	TN	LPV	0	100	0	100	0	100
FYE	FAYETTE COUNTY	TN	LPV	0	100	0	100	0	100
FYM	FAYETTEVILLE MUNICIPAL	TN	LPV	0	100	0	100	0	100
GCY	GREENEVILLE-GREENE COUNTY MUNICIPAL	TN	LPV	0	100	0	100	0	100
GHM	CENTERVILLE MUNICIPAL	TN	LP	0	100	0	100	0	100
GKT	GATLINBURG-PIGEON FORGE	TN	LPV	0	100	0	100	0	100
GZS	ABERNATHY FIELD	TN	LPV	0	100	0	100	0	100
HZD	CARROLL COUNTY	TN	LPV	0	100	0	100	0	100
JAU	CAMPBELL COUNTY	TN	LP	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
JWN	JOHN C TUNE	TN	LPV	0	100	0	100	0	100
LUG	ELLINGTON	TN	LPV	0	100	0	100	0	100
M01	GENERAL DEWITT SPAIN	TN	LPV	0	100	0	100	0	100
M08	WILLIAM L WHITEHURST FIELD	TN	LP	0	100	0	100	0	100
M33	SUMNER COUNTY RGNL	TN	LPV	0	100	0	100	0	100
M53	HUMBOLDT MUNICIPAL	TN	LPV	0	100	0	100	0	100
M54	LEBANON MUNICIPAL	TN	LPV	0	100	0	100	0	100
M91	SPRINGFIELD ROBERTSON COUNTY	TN	LPV	0	100	0	100	0	100
MBT	MURFREESBORO MUNICIPAL	TN	LPV	0	100	0	100	0	100
MEM	MEMPHIS INTL	TN	LPV200	0	100	0	100	0	100
MKL	MC KELLAR-SIPES RGNL	TN	LPV200	0	100	0	100	0	100
MMI	MCMINN COUNTY	TN	LPV	0	100	0	100	0	100
MNV	MONROE COUNTY	TN	LPV	0	100	0	100	0	100
MOR	MOORE-MURRELL	TN	LPV	0	100	0	100	0	100
MQY	SMYRNA	TN	LPV200	0	100	0	100	0	100
MRC	MAURY COUNTY	TN	LPV	0	100	0	100	0	100
NQA	MILLINGTON RGNL JETPORT	TN	LPV200	0	100	0	100	0	100
PHT	HENRY COUNTY	TN	LPV200	0	100	0	100	0	100
PVE	BEECH RIVER RGNL	TN	LPV	0	100	0	100	0	100
RKW	ROCKWOOD MUNICIPAL	TN	LPV	0	100	0	100	0	100
RNC	WARREN COUNTY MEMORIAL	TN	LPV	0	100	0	100	0	100
RZR	CLEVELAND RGNL JETPORT	TN	LPV200	0	100	0	100	0	100
SCX	SCOTT MUNICIPAL	TN	LPV	0	100	0	100	0	100
SNH	SAVANNAH-HARDIN COUNTY	TN	LPV	0	100	0	100	0	100
SRB	UPPER CUMBERLAND RGNL	TN	LPV	0	100	0	100	0	100
SYI	BOMAR FIELD-SHELBYVILLE MUNICIPAL	TN	LPV	0	100	0	100	0	100
SZY	ROBERT SIBLEY	TN	LPV	0	100	0	100	0	100
TGC	GIBSON COUNTY	TN	LP	0	100	0	100	0	100
THA	TULLAHOMA RGNL ARPT/WM NORTHER	TN	LPV	0	100	0	100	0	100
TRI	TRI-CITIES RGNL TN/VA	TN	LPV200	0	100	0	100	0	100
TYS	MC GHEE TYSON	TN	LPV200	0	100	0	100	0	100
UCY	EVERETT-STEWART RGNL	TN	LPV200	0	100	0	100	0	100
11R	BRENHAM MUNICIPAL	TX	LPV	0	100	0	100	0	100
2F5	LAMESA MUNICIPAL	TX	LPV	0	100	0	100	0	100
2R9	KARNES COUNTY	TX	LP	0	100	0	100	0	100
3R9	LAKEWAY AIRPARK	TX	LP	0	100	0	100	0	100
3T5	FAYETTE RGNL AIR CENTER	TX	LPV	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
45R	HAWTHORNE FIELD	TX	LP	0	100	0	100	0	100
4T2	KENNETH COPELAND	TX	LPV	0	100	0	100	0	100
50R	LOCKHART MUNICIPAL	TX	LPV	0	100	0	100	0	100
5C1	BOERNE STAGE FIELD	TX	LP	0	100	0	100	0	100
5T9	MAVERICK COUNTY MEMORIAL INTL	TX	LPV	0	100	0	100	0	100
60R	NAVASOTA MUNICIPAL	TX	LPV	0	100	0	100	0	100
6R3	CLEVELAND MUNICIPAL	TX	LPV	0	100	0	100	0	100
77F	WINTERS MUNICIPAL	TX	LP	0	100	0	100	0	100
8F3	CROSBYTON MUNICIPAL	TX	LP	0	100	0	100	0	100
ABI	ABILENE RGNL	TX	LPV200	0	100	0	100	0	100
ACT	WACO RGNL	TX	LPV200	0	100	0	100	0	100
ADS	ADDISON	TX	LPV	0	100	0	100	0	100
AFW	FORT WORTH ALLIANCE	TX	LPV200	0	100	0	100	0	100
ALI	ALICE INTL	TX	LPV	0	100	0	100	0	100
AMA	RICK HUSBAND AMARILLO INTL	TX	LPV200	0	100	0	100	0	100
ARM	WHARTON RGNL	TX	LPV	0	100	0	100	0	100
ASL	HARRISON COUNTY	TX	LPV	0	100	0	100	0	100
AUS	AUSTIN-BERGSTROM INTL	TX	LPV200	0	100	0	100	0	100
AXH	HOUSTON-SOUTHWEST	TX	LPV	0	100	0	100	0	100
BAZ	NEW BRAUNFELS RGNL	TX	LPV	0	100	0	100	0	100
BBD	CURTIS FIELD	TX	LPV	0	100	0	100	0	100
BKD	STEPHENS COUNTY	TX	LP	0	100	0	100	0	100
BPG	BIG SPRING MC MAHON-WRINKLE	TX	LPV200	0	100	0	100	0	100
BPT	JACK BROOKS RGNL	TX	LPV200	0	100	0	100	0	100
BRO	BROWNSVILLE/SOUTH PADRE ISLAND	TX	LPV200	0	100	0	100	0	100
BWD	BROWNWOOD RGNL	TX	LPV	0	100	0	100	0	100
BYY	BAY CITY RGNL	TX	LPV	0	100	0	100	0	100
CDS	CHILDRESS MUNICIPAL	TX	LPV200	0	100	0	100	0	100
CFD	COULTER FIELD	TX	LPV	0	100	0	100	0	100
CLL	EASTERWOOD FIELD	TX	LPV200	0	100	0	100	0	100
CNW	TSTC WACO	TX	LPV200	0	100	0	100	0	100
COM	COLEMAN MUNICIPAL	TX	LPV	0	100	0	100	0	100
COT	COTULLA-LA SALLE COUNTY	TX	LPV	0	100	0	100	0	100
CPT	CLEBURNE RGNL	TX	LPV	0	100	0	100	0	100
CRP	CORPUS CHRISTI INTL	TX	LPV200	0	100	0	100	0	100
CVB	CASTROVILLE MUNICIPAL	TX	LPV	0	100	0	100	0	100
CWC	KICKAPOO DOWNTOWN	TX	LPV	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
CXO	CONROE-NORTH HOUSTON RGNL	TX	LPV200	0	100	0	100	0	100
CZT	DIMMIT COUNTY	TX	LPV	0	100	0	100	0	100
DAL	DALLAS LOVE FIELD	TX	LPV200	0	100	0	100	0	100
DFW	DALLAS-FORT WORTH INTL	TX	LPV200	0	100	0	100	0	100
DHT	DALHART MUNICIPAL	TX	LPV	0	100	0	100	0	100
DKR	HOUSTON COUNTY	TX	LP	0	100	0	100	0	100
DRT	DEL RIO INTL	TX	LPV	0	100	0	100	0	100
DTO	DENTON ENTERPRISE	TX	LPV200	0	100	0	100	0	100
DUX	MOORE COUNTY	TX	LPV200	0	100	0	100	0	100
DWH	DAVID WAYNE HOOKS MEMORIAL	TX	LPV	0	100	0	100	0	100
E01	ROY HURD MEMORIAL	TX	LP	0	100	0	100	0	100
E11	ANDREWS COUNTY	TX	LPV	0	100	0	100	0	100
E19	GRUVER MUNICIPAL	TX	LP	0	100	0	100	0	100
E30	BRUCE FIELD	TX	LPV	0	100	0	100	0	100
E38	ALPINE-CASPARIS MUNICIPAL	TX	LP	0	100	0	100	0	100
EBG	SOUTH TEXAS INTL AT EDINBURG	TX	LPV	0	100	0	100	0	100
EDC	AUSTIN EXECUTIVE	TX	LPV200	0	100	0	100	0	100
EFD	ELLINGTON	TX	LPV200	0	100	0	100	1	99.999
ELA	EAGLE LAKE	TX	LP	0	100	0	100	0	100
ELP	EL PASO INTL	TX	LP	0	100	0	100	0	100
ERV	KERRVILLE MUNICIPAL/LOUIS SCHREINER	TX	LPV	0	100	0	100	0	100
ETN	EASTLAND MUNICIPAL	TX	LP	0	100	0	100	0	100
F00	JONES FIELD	TX	LPV	0	100	0	100	0	100
F05	WILBARGER COUNTY	TX	LPV	0	100	0	100	0	100
F49	SLATON MUNICIPAL	TX	LPV	0	100	0	100	0	100
F98	YOAKUM COUNTY	TX	LPV	0	100	0	100	0	100
FST	FORT STOCKTON-PECOS COUNTY	TX	LPV	0	100	0	100	0	100
FTW	FORT WORTH MEACHAM INTL	TX	LPV200	0	100	0	100	0	100
FWS	FORT WORTH SPINKS	TX	LPV200	0	100	0	100	0	100
GDJ	GRANBURY RGNL	TX	LPV	0	100	0	100	0	100
GGG	EAST TEXAS RGNL	TX	LPV	0	100	0	100	0	100
GKY	ARLINGTON MUNICIPAL	TX	LPV200	0	100	0	100	0	100
GLE	GAINESVILLE MUNICIPAL	TX	LPV	0	100	0	100	0	100
GLS	SCHOLES INTL AT GALVESTON	TX	LPV200	0	100	0	100	1	99.999
GNC	GAINES COUNTY	TX	LPV	0	100	0	100	0	100
GRK	ROBERT GRAY AAF	TX	LPV200	0	100	0	100	0	100
GTU	GEORGETOWN MUNICIPAL	TX	LPV	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
GVT	MAJORS	TX	LPV200	0	100	0	100	0	100
GYI	NORTH TEXAS RGNL/PERRIN FIELD	TX	LPV200	0	100	0	100	0	100
HBV	JIM HOGG COUNTY	TX	LPV	0	100	0	100	0	100
HDO	SOUTH TEXAS RGNL AT HONDO	TX	LPV	0	100	0	100	0	100
HHF	HEMPHILL COUNTY	TX	LPV	0	100	0	100	0	100
HOU	WILLIAM P HOBBY	TX	LPV200	0	100	0	100	0	100
HQZ	MESQUITE METRO	TX	LPV	0	100	0	100	0	100
HRL	VALLEY INTL	TX	LPV200	0	100	0	100	0	100
HRX	HEREFORD MUNICIPAL	TX	LPV200	0	100	0	100	0	100
HYI	SAN MARCOS REGIONAL	TX	LPV200	0	100	0	100	0	100
IAH	GEORGE BUSH INTERCONTINENTAL/H	TX	LPV200	0	100	0	100	0	100
IKG	KLEBERG COUNTY	TX	LPV	0	100	0	100	0	100
ILE	SKYLARK FIELD	TX	LPV200	0	100	0	100	0	100
INJ	HILLSBORO MUNICIPAL	TX	LPV	0	100	0	100	0	100
INK	WINKLER COUNTY	TX	LPV200	0	100	0	100	0	100
IWS	WEST HOUSTON	TX	LP	0	100	0	100	0	100
JAS	JASPER COUNTY-BELL FIELD	TX	LPV	0	100	0	100	0	100
JSO	CHEROKEE COUNTY	TX	LPV200	0	100	0	100	0	100
JWY	MID-WAY RGNL	TX	LPV200	0	100	0	100	0	100
JXI	FOX STEPHENS FIELD - GILMER MU	TX	LP	0	100	0	100	0	100
LBB	LUBBOCK PRESTON SMITH INTL	TX	LPV200	0	100	0	100	0	100
LBX	TEXAS GULF COAST RGNL	TX	LPV	0	100	0	100	0	100
LFK	ANGELINA COUNTY	TX	LPV	0	100	0	100	0	100
LHB	HEARNE MUNICIPAL	TX	LPV200	0	100	0	100	0	100
LIU	LITTLEFIELD TAYLOR BROWN MUNICIPAL	TX	LPV	0	100	0	100	0	100
LLN	LEVELLAND MUNICIPAL	TX	LPV	0	100	0	100	0	100
LNC	LANCASTER RGNL	TX	LPV200	0	100	0	100	0	100
LRD	LAREDO INTL	TX	LPV200	0	100	0	100	0	100
LUD	DECATUR MUNICIPAL	TX	LPV	0	100	0	100	0	100
LVJ	PEARLAND RGNL	TX	LPV	0	100	0	100	0	100
LXY	MEXIA-LIMESTONE CO	TX	LP	0	100	0	100	0	100
MAF	MIDLAND INTL AIR AND SPACE POR	TX	LPV200	0	100	0	100	0	100
MDD	MIDLAND AIRPARK	TX	LPV	0	100	0	100	0	100
MFE	MC ALLEN MILLER INTL	TX	LPV200	0	100	0	100	0	100
MKN	COMANCHE COUNTY-CITY	TX	LPV	0	100	0	100	0	100
MNZ	HAMILTON MUNICIPAL	TX	LPV	0	100	0	100	0	100
MWL	MINERAL WELLS	TX	LPV200	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
OCH	NACOGDOCHES A L MANGHAM JR RGN	TX	LPV200	0	100	0	100	0	100
ODO	ODESSA-SCHLEMEYER FIELD	TX	LPV200	0	100	0	100	0	100
ONY	OLNEY MUNICIPAL	TX	LPV	0	100	0	100	0	100
ORG	ORANGE COUNTY	TX	LPV	0	100	0	100	0	100
PEQ	PECOS MUNICIPAL	TX	LPV200	0	100	0	100	0	100
PIL	PORT ISABEL-CAMERON COUNTY	TX	LPV	0	100	0	100	0	100
PKV	CALHOUN COUNTY	TX	LPV	0	100	0	100	0	100
PPA	PERRY LEFORS FIELD	TX	LPV	0	100	0	100	0	100
PRX	COX FIELD	TX	LPV	0	100	0	100	0	100
PSX	PALACIOS MUNICIPAL	TX	LPV	0	100	0	100	0	100
PVW	HALE COUNTY	TX	LPV	0	100	0	100	0	100
PWG	MC GREGOR EXECUTIVE	TX	LPV	0	100	0	100	0	100
PYX	PERRYTON OCHILTREE COUNTY	TX	LPV	0	100	0	100	0	100
RAS	MUSTANG BEACH	TX	LPV	0	100	0	100	0	100
RBD	DALLAS EXECUTIVE	TX	LPV	0	100	0	100	0	100
RBO	NUECES COUNTY	TX	LPV	0	100	0	100	0	100
RKP	ARANSAS CO	TX	LPV	0	100	0	100	0	100
RYW	LAGO VISTA TX - RUSTY ALLEN	TX	LPV	0	100	0	100	0	100
SAT	SAN ANTONIO INTL	TX	LPV200	0	100	0	100	0	100
SGR	SUGAR LAND RGNL	TX	LPV200	0	100	0	100	0	100
SJT	SAN ANGELO RGNL/MATHIS FIELD	TX	LPV	0	100	0	100	0	100
SLR	SULPHUR SPRINGS MUNICIPAL	TX	LPV200	0	100	0	100	0	100
SNK	WINSTON FIELD	TX	LPV200	0	100	0	100	0	100
SWI	SHERMAN MUNICIPAL	TX	LP	0	100	0	100	0	100
SWW	AVENGER FIELD	TX	LPV	0	100	0	100	0	100
T23	ALBANY MUNICIPAL	TX	LPV	0	100	0	100	0	100
T41	LA PORTE MUNICIPAL	TX	LPV	0	100	0	100	1	99.999
T65	MID VALLEY	TX	LPV	0	100	0	100	0	100
T74	TAYLOR MUNICIPAL	TX	LPV	0	100	0	100	0	100
T78	LIBERTY MUNICIPAL	TX	LP	0	100	0	100	0	100
T82	GILLESPIE COUNTY	TX	LPV	0	100	0	100	0	100
TDW	TRADEWIND	TX	LPV	0	100	0	100	0	100
TFP	MCCAMPBELL-PORTER	TX	LPV	0	100	0	100	0	100
TKI	MCKINNEY NATIONAL	TX	LPV200	0	100	0	100	0	100
TME	HOUSTON EXECUTIVE	TX	LPV	0	100	0	100	0	100
TPL	DRAUGHON-MILLER CENTRAL TEXAS	TX	LPV200	0	100	0	100	0	100
TRL	TERRELL MUNICIPAL	TX	LPV	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
TYR	TYLER POUNDS RGNL	TX	LPV200	0	100	0	100	0	100
UTS	HUNTSVILLE MUNICIPAL	TX	LPV	0	100	0	100	0	100
VCT	VICTORIA RGNL	TX	LPV200	0	100	0	100	0	100
XBP	BRIDGEPORT MUNICIPAL	TX	LPV	0	100	0	100	0	100
41U	MANTI-EPHRAIM	UT	LPV	0	100	0	100	0	100
74V	ROOSEVELT MUNICIPAL	UT	LPV	0	100	0	100	0	100
BCE	BRYCE CANYON	UT	LPV	0	100	0	100	0	100
BDG	BLANDING MUNICIPAL	UT	LPV	0	100	0	100	1	99.997
BMC	BRIGHAM CITY	UT	LP	0	100	0	100	0	100
CDC	CEDAR CITY RGNL	UT	LPV	0	100	0	100	0	100
DTA	DELTA MUNICIPAL	UT	LP	0	100	0	100	0	100
ENV	WENDOVER	UT	LPV	0	100	0	100	0	100
FOM	FILLMORE MUNICIPAL	UT	LPV	0	100	0	100	0	100
LGU	LOGAN-CACHE	UT	LPV	0	100	0	100	0	100
OGD	OGDEN-HINCKLEY	UT	LPV	0	100	0	100	0	100
PUC	CARBON COUNTY RGNL/BUCK DAVIS	UT	LP	0	100	0	100	0	100
PVU	PROVO MUNICIPAL	UT	LPV200	0	100	0	100	0	100
RIF	RICHFIELD MUNICIPAL	UT	LP	0	100	0	100	0	100
SGU	ST GEORGE RGNL	UT	LPV	0	100	0	100	1	99.999
SLC	SALT LAKE CITY INTL	UT	LPV200	0	100	0	100	0	100
TVY	BOLINDER FIELD-TOOELE VALLEY	UT	LPV200	0	100	0	100	0	100
U14	NEPHI MUNICIPAL	UT	LPV	0	100	0	100	0	100
U55	PANGUITCH MUNICIPAL	UT	LPV200	0	100	0	100	0	100
VEL	VERNAL RGNL	UT	LP	0	100	0	100	0	100
0V4	BROOKNEAL/CAMPBELL COUNTY	VA	LPV	0	100	0	100	1	99.995
0VG	LEE COUNTY	VA	LPV	0	100	0	100	0	100
AVC	MECKLENBURG-BRUNSWICK RGNL	VA	LPV	0	100	0	100	1	99.994
BCB	VIRGINIA TECH/MONTGOMERY EXECU	VA	LPV	0	100	0	100	1	99.998
BKT	ALLEN C PERKINSON BLACKSTONE A	VA	LPV	0	100	0	100	1	99.994
CHO	CHARLOTTESVILLE-ALBEMARLE	VA	LPV200	0	100	0	100	1	99.995
CJR	CULPEPER RGNL	VA	LPV	0	100	0	100	1	99.995
CPK	CHESAPEAKE RGNL	VA	LPV200	0	100	0	100	1	99.991
DAN	DANVILLE RGNL	VA	LPV200	0	100	0	100	1	99.995
EMV	EMPORIA-GREENSVILLE RGNL	VA	LPV	0	100	0	100	1	99.992
FCI	RICHMOND EXECUTIVE-CHESTERFIEL	VA	LPV	0	100	0	100	1	99.993
FKN	FRANKLIN MUNICIPAL-JOHN BEVERLY ROS	VA	LPV	0	100	0	100	1	99.991
FVX	FARMVILLE RGNL	VA	LPV	0	100	0	100	1	99.994

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
FYJ	MIDDLE PENINSULA RGNL	VA	LPV	0	100	0	100	1	99.992
HLX	TWIN COUNTY	VA	LPV	0	100	0	100	1	99.998
HSP	INGALLS FIELD	VA	LPV	0	100	0	100	1	99.997
HWY	WARRENTON-FAUQUIER	VA	LPV200	0	100	0	100	1	99.994
JFZ	TAZEWELL COUNTY	VA	LPV	0	100	0	100	0	100
JYO	LEESBURG EXECUTIVE	VA	LPV	0	100	0	100	1	99.995
LKU	LOUISA COUNTY/FREEMAN FIELD	VA	LPV	0	100	0	100	1	99.994
LNP	LONESOME PINE	VA	LPV	0	100	0	100	0	100
LUA	LURAY CAVERNS	VA	LP	0	100	0	100	1	99.996
LYH	LYNCHBURG RGNL/PRESTON GLENN F	VA	LPV	0	100	0	100	1	99.996
MFV	ACCOMACK COUNTY	VA	LPV	0	100	0	100	1	99.993
MKJ	MOUNTAIN EMPIRE	VA	LPV	0	100	0	100	1	99.999
MTV	BLUE RIDGE	VA	LPV	0	100	0	100	1	99.997
OFP	HANOVER COUNTY MUNICIPAL	VA	LPV	0	100	0	100	1	99.993
OKV	WINCHESTER RGNL	VA	LPV200	0	100	0	100	1	99.996
ORF	NORFOLK INTL	VA	LPV200	0	100	0	100	1	99.992
PHF	NEWPORT NEWS/WILLIAMSBURG INTL	VA	LPV200	0	100	0	100	1	99.991
PSK	NEW RIVER VALLEY	VA	LPV200	0	100	0	100	1	99.998
PTB	DINWIDDIE COUNTY	VA	LPV	0	100	0	100	1	99.992
PVG	HAMPTON ROADS EXECUTIVE	VA	LPV200	0	100	0	100	1	99.991
RIC	RICHMOND INTL	VA	LPV200	0	100	0	100	1	99.992
RMN	STAFFORD RGNL	VA	LPV	0	100	0	100	1	99.994
ROA	ROANOKE-BLACKSBURG RGNL/WOODRU	VA	LPV	0	100	0	100	1	99.997
SFQ	SUFFOLK EXECUTIVE	VA	LPV	0	100	0	100	1	99.991
SHD	SHENANDOAH VALLEY RGNL	VA	LPV200	0	100	0	100	1	99.996
VJI	VIRGINIA HIGHLANDS	VA	LPV	0	100	0	100	0	100
W78	WILLIAM M TUCK	VA	LPV	0	100	0	100	1	99.994
W96	NEW KENT COUNTY	VA	LP	0	100	0	100	1	99.992
WAL	WALLOPS FLIGHT FACILITY	VA	LPV	0	100	0	100	1	99.994
XSA	TAPPAHANNOCK-ESSEX COUNTY	VA	LPV	0	100	0	100	1	99.992
BTV	BURLINGTON INTL	VT	LPV200	0	100	0	100	0	100
EFK	NEWPORT STATE	VT	LP	0	100	0	100	0	100
FSO	FRANKLIN COUNTY STATE	VT	LPV	0	100	0	100	0	100
MPV	EDWARD F KNAPP STATE	VT	LPV	0	100	0	100	0	100
MVL	MORRISVILLE-STOWE STATE	VT	LPV	0	100	0	100	0	100
RUT	RUTLAND - SOUTHERN VERMONT RGN	VT	LPV	0	100	0	100	0	100
ALW	WALLA WALLA RGNL	WA	LPV200	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
AWO	ARLINGTON MUNICIPAL	WA	LPV200	0	100	0	100	0	100
BLI	BELLINGHAM INTL	WA	LPV200	0	100	0	100	0	100
BVS	SKAGIT RGNL	WA	LPV	0	100	0	100	0	100
CLM	WILLIAM R FAIRCHILD INTL	WA	LPV	0	100	0	100	0	100
CLS	CHEHALIS-CENTRALIA	WA	LPV	0	100	0	100	0	100
DEW	DEER PARK	WA	LPV	0	100	0	100	0	100
EPH	EPHRATA MUNICIPAL	WA	LPV	0	100	0	100	0	100
FHR	FRIDAY HARBOR	WA	LPV	0	100	0	100	0	100
GEG	SPOKANE INTL	WA	LPV200	0	100	0	100	0	100
HQM	BOWERMAN	WA	LPV200	0	100	0	100	0	100
MWH	GRANT CO INTL	WA	LPV200	0	100	0	100	0	100
OLM	OLYMPIA RGNL	WA	LPV	0	100	0	100	0	100
ORS	ORCAS ISLAND	WA	LP	0	100	0	100	0	100
PAE	SNOHOMISH COUNTY (PAINE FLD)	WA	LPV200	0	100	0	100	0	100
PLU	PIERCE COUNTY - THUN FIELD	WA	LPV	0	100	0	100	0	100
PSC	TRI-CITIES	WA	LPV200	0	100	0	100	0	100
PWT	BREMERTON NATIONAL	WA	LPV200	0	100	0	100	0	100
RLD	RICHLAND	WA	LPV	0	100	0	100	0	100
RNT	RENTON MUNICIPAL	WA	LPV	0	100	0	100	0	100
SEA	SEATTLE-TACOMA INTL	WA	LPV200	0	100	0	100	0	100
SFF	FELTS FIELD	WA	LPV	0	100	0	100	0	100
SHN	SANDERSON FIELD	WA	LPV	0	100	0	100	0	100
TDO	ED CARLSON MEMORIAL FIELD - SO	WA	LPV	0	100	0	100	0	100
TIW	TACOMA NARROWS	WA	LPV	0	100	0	100	0	100
YKM	YAKIMA AIR TERMINAL/MCALLISTER	WA	LPV200	0	100	0	100	0	100
3T3	BOYCEVILLE MUNICIPAL	WI	LPV	0	100	0	100	0	100
57C	EAST TROY MUNICIPAL	WI	LPV	0	100	0	100	0	100
82C	MAUSTON-NEW LISBON UNION	WI	LP	0	100	0	100	0	100
8D1	NEW HOLSTEIN MUNICIPAL	WI	LPV	0	100	0	100	0	100
AHH	AMERY MUNICIPAL	WI	LP	0	100	0	100	0	100
AIG	LANGLADE COUNTY	WI	LPV	0	100	0	100	0	100
ARV	LAKELAND/NOBLE F LEE MEMORIAL	WI	LPV	0	100	0	100	0	100
ASX	JOHN F KENNEDY MEMORIAL	WI	LPV	0	100	0	100	0	100
ATW	APPLETON INTL	WI	LPV200	0	100	0	100	0	100
AUW	WAUSAU DOWNTOWN	WI	LPV200	0	100	0	100	0	100
BCK	BLACK RIVER FALLS AREA	WI	LPV	0	100	0	100	0	100
BUU	BURLINGTON MUNICIPAL	WI	LP	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
C29	MIDDLETON MUNICIPAL - MOREY FIELD	WI	LPV	0	100	0	100	0	100
C35	REEDSBURG MUNICIPAL	WI	LP	0	100	0	100	0	100
C47	PORTAGE MUNICIPAL	WI	LP	0	100	0	100	0	100
CLI	CLINTONVILLE MUNICIPAL	WI	LPV	0	100	0	100	0	100
CMY	SPARTA/FORT MC COY	WI	LPV	0	100	0	100	0	100
CWA	CENTRAL WISCONSIN	WI	LPV200	0	100	0	100	0	100
DLL	BARABOO WISCONSIN DELLS	WI	LPV	0	100	0	100	0	100
EAU	CHIPPEWA VALLEY RGNL	WI	LPV200	0	100	0	100	0	100
EGV	EAGLE RIVER UNION	WI	LPV	0	100	0	100	0	100
ENW	KENOSHA RGNL	WI	LPV200	0	100	0	100	0	100
ETB	WEST BEND MUNICIPAL	WI	LPV	0	100	0	100	0	100
EZS	SHAWANO MUNICIPAL	WI	LPV	0	100	0	100	0	100
FLD	FOND DU LAC COUNTY	WI	LPV	0	100	0	100	0	100
GRB	GREEN BAY-AUSTIN STRAUBEL INTL	WI	LPV200	0	100	0	100	0	100
GTG	GRANTSBURG MUNICIPAL	WI	LP	0	100	0	100	0	100
HXF	HARTFORD MUNICIPAL	WI	LPV	0	100	0	100	0	100
HYR	SAWYER COUNTY	WI	LPV	0	100	0	100	0	100
ISW	ALEXANDER FIELD SOUTH WOOD COU	WI	LPV	0	100	0	100	0	100
JVL	SOUTHERN WISCONSIN RGNL	WI	LPV200	0	100	0	100	0	100
LNR	TRI-COUNTY RGNL	WI	LPV	0	100	0	100	0	100
LSE	LA CROSSE RGNL	WI	LPV	0	100	0	100	0	100
LUM	MENOMONIE MUNICIPAL-SCORE FIELD	WI	LPV	0	100	0	100	0	100
MDZ	TAYLOR COUNTY	WI	LPV	0	100	0	100	0	100
MFI	MARSHFIELD MUNICIPAL	WI	LPV	0	100	0	100	0	100
MKE	GENERAL MITCHELL INTL	WI	LPV200	0	100	0	100	0	100
MRJ	IOWA COUNTY	WI	LPV200	0	100	0	100	0	100
MSN	DANE COUNTY RGNL-TRUAX FIELD	WI	LPV200	0	100	0	100	0	100
MTW	MANITOWOC COUNTY	WI	LPV200	0	100	0	100	0	100
MWC	LAWRENCE J TIMMERMAN	WI	LPV	0	100	0	100	0	100
OCQ	OCONTO-J DOUGLAS BAKE MUNICIPAL	WI	LP	0	100	0	100	0	100
OEO	L O SIMENSTAD MUNICIPAL	WI	LPV200	0	100	0	100	0	100
OSH	WITTMAN RGNL	WI	LPV200	0	100	0	100	0	100
OVS	BOSCOBEL	WI	LPV	0	100	0	100	0	100
PBH	PRICE COUNTY	WI	LPV	0	100	0	100	0	100
PCZ	WAUPACA MUNICIPAL	WI	LPV	0	100	0	100	0	100
PVB	PLATTEVILLE MUNICIPAL	WI	LPV	0	100	0	100	0	100
RAC	BATTEN INTL	WI	LPV	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
RCX	RUSK COUNTY	WI	LPV	0	100	0	100	0	100
RHI	RHINELANDER-ONEIDA COUNTY	WI	LPV200	0	100	0	100	0	100
RNH	NEW RICHMOND RGNL	WI	LPV	0	100	0	100	0	100
RPD	RICE LAKE RGNL - CARL'S FIELD	WI	LPV	0	100	0	100	0	100
RRL	MERRILL MUNICIPAL	WI	LPV	0	100	0	100	0	100
SBM	SHEBOYGAN COUNTY MEMORIAL	WI	LPV200	0	100	0	100	0	100
STE	STEVENS POINT MUNICIPAL	WI	LPV	0	100	0	100	0	100
SUE	DOOR COUNTY CHERRYLAND	WI	LPV	0	100	0	100	0	100
SUW	RICHARD I BONG	WI	LP	0	100	0	100	0	100
TKV	TOMAHAWK RGNL	WI	LP	0	100	0	100	0	100
UBE	CUMBERLAND MUNICIPAL	WI	LPV	0	100	0	100	0	100
UES	WAUKESHA COUNTY	WI	LPV200	0	100	0	100	0	100
UNU	DODGE COUNTY	WI	LPV	0	100	0	100	0	100
VIQ	NEILLSVILLE MUNICIPAL	WI	LPV	0	100	0	100	0	100
Y50	WAUTOMA MUNICIPAL	WI	LP	0	100	0	100	0	100
Y55	CRANDON/STEVE CONWAY MUNICIPAL	WI	LPV	0	100	0	100	0	100
Y72	BLOYER FIELD	WI	LP	0	100	0	100	0	100
3I2	MASON COUNTY	WV	LPV	0	100	0	100	0	100
6L4	LOGAN COUNTY	WV	LPV	0	100	0	100	0	100
BKW	RALEIGH COUNTY MEMORIAL	WV	LPV200	0	100	0	100	1	99.999
BLF	MERCER COUNTY	WV	LPV	0	100	0	100	1	99.999
CKB	NORTH CENTRAL WEST VIRGINIA	WV	LPV200	0	100	0	100	1	99.999
CRW	YEAGER	WV	LPV200	0	100	0	100	0	100
HLG	WHEELING OHIO CO	WV	LPV200	0	100	0	100	0	100
HTS	TRI-STATE/MILTON J FERGUSON FI	WV	LPV200	0	100	0	100	0	100
I18	JACKSON COUNTY	WV	LPV200	0	100	0	100	0	100
LWB	GREENBRIER VALLEY	WV	LPV	0	100	0	100	1	99.998
MGW	MORGANTOWN MUNICIPAL-WALTER L BILL	WV	LPV200	0	100	0	100	1	99.999
MRB	EASTERN WV RGNL/SHEPHERD FLD	WV	LPV	0	100	0	100	1	99.996
PKB	MID-OHIO VALLEY RGNL	WV	LPV	0	100	0	100	0	100
SXL	SUMMERSVILLE	WV	LP	0	100	0	100	1	99.999
USW	BOGGS FIELD	WV	LPV	0	100	0	100	0	100
W22	UPSHUR COUNTY RGNL	WV	LPV	0	100	0	100	1	99.999
W35	POTOMAC AIRPARK	WV	LP	0	100	0	100	1	99.996
W99	GRANT COUNTY	WV	LPV	0	100	0	100	1	99.997
BYG	JOHNSON COUNTY	WY	LPV	0	100	0	100	1	99.999
COD	YELLOWSTONE RGNL	WY	LPV	0	100	0	100	0	100

Airport	Airport Name	State/ Provence	Service	LP Outages	LP Avail (%)	LPV Outages	LPV Avail (%)	LPV200 Outages	LPV200 Avail (%)
CPR	CASPER/NATRONA COUNTY INTL	WY	LPV	0	100	0	100	0	100
CYS	CHEYENNE RGNL/JERRY OLSON FIEL	WY	LPV	0	100	0	100	0	100
DGW	CONVERSE COUNTY	WY	LPV200	0	100	0	100	0	100
ECS	MONDELL FIELD	WY	LPV	0	100	0	100	0	100
EMM	KEMMERER MUNICIPAL	WY	LPV	0	100	0	100	0	100
EVW	EVANSTON-UINTA COUNTY BURNS FI	WY	LPV	0	100	0	100	0	100
FBR	FORT BRIDGER	WY	LP	0	100	0	100	0	100
GCC	GILLETTE-CAMPBELL COUNTY	WY	LPV	0	100	0	100	1	99.999
GEY	SOUTH BIG HORN COUNTY	WY	LP	0	100	0	100	0	100
GUR	CAMP GUERNSEY	WY	LP	0	100	0	100	0	100
HSG	HOT SPRINGS COUNTY	WY	LPV	0	100	0	100	0	100
JAC	JACKSON HOLE	WY	LPV200	0	100	0	100	0	100
LAR	LARAMIE RGNL	WY	LPV	0	100	0	100	0	100
PNA	RALPH WENZ FIELD	WY	LPV	0	100	0	100	0	100
POY	POWELL MUNICIPAL	WY	LPV	0	100	0	100	0	100
RIW	RIVERTON RGNL	WY	LPV200	0	100	0	100	0	100
RKS	ROCK SPRINGS-SWEETWATER COUNTY	WY	LPV200	0	100	0	100	0	100
RWL	RAWLINS MUNICIPAL/HARVEY FIELD	WY	LPV	0	100	0	100	0	100
SAA	SHIVELY FIELD	WY	LPV	0	100	0	100	0	100
SHR	SHERIDAN COUNTY	WY	LPV	0	100	0	100	1	99.999
U68	NORTH BIG HORN COUNTY	WY	LPV	0	100	0	100	0	100
W43	HULETT MUNICIPAL	WY	LPV	0	100	0	100	0	100
WRL	WORLAND MUNICIPAL	WY	LPV	0	100	0	100	0	100
CYQH	WATSON LAKE	YT	LPV	0	100	0	100	0	100
CYXY	WHITEHORSE / ERIK NIELSEN INTL	YT	LPV	0	100	0	100	0	100

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

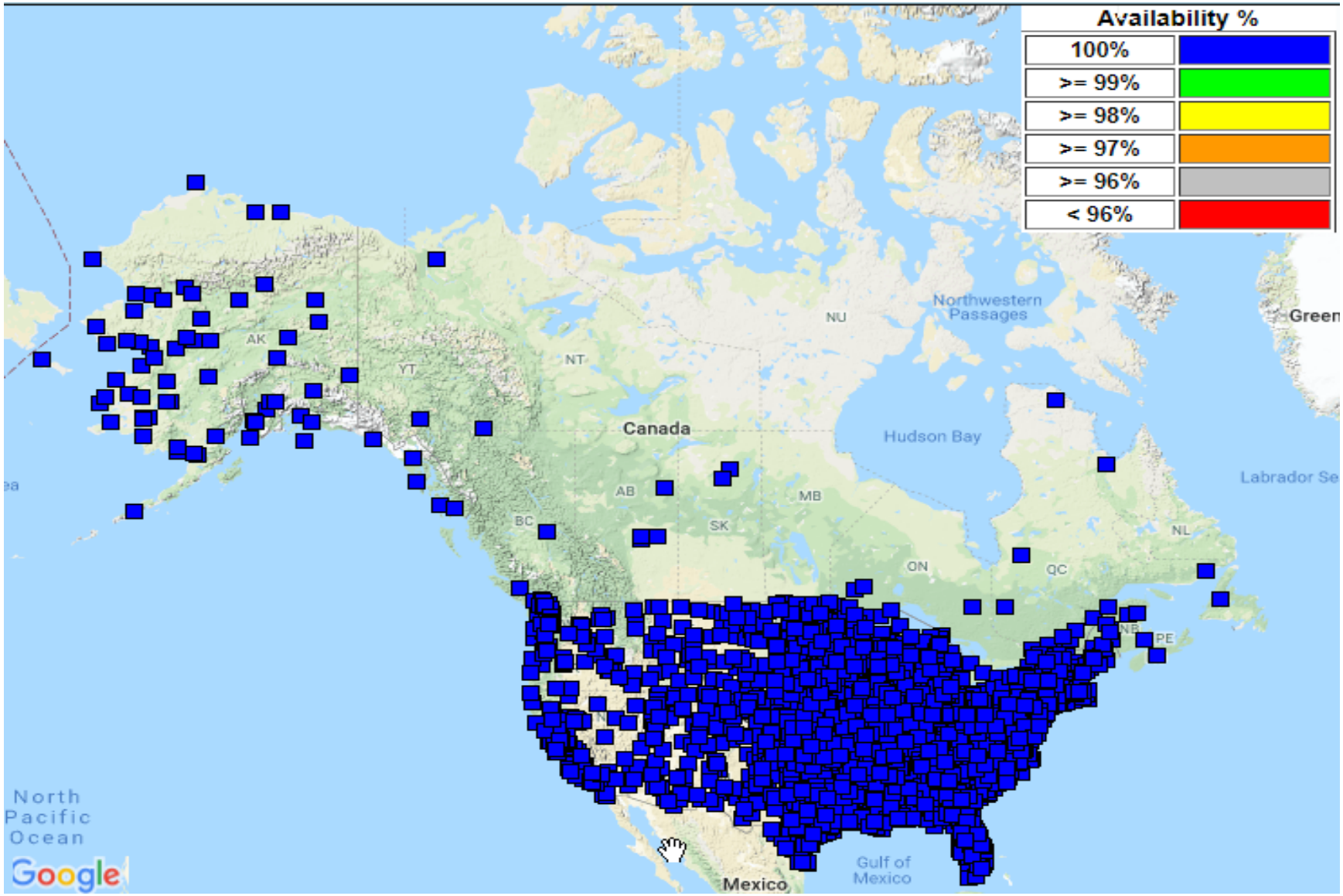


Figure 8-2 WAAS LP Outages at Airports in the US and Canada with GPS RNAV IAPs

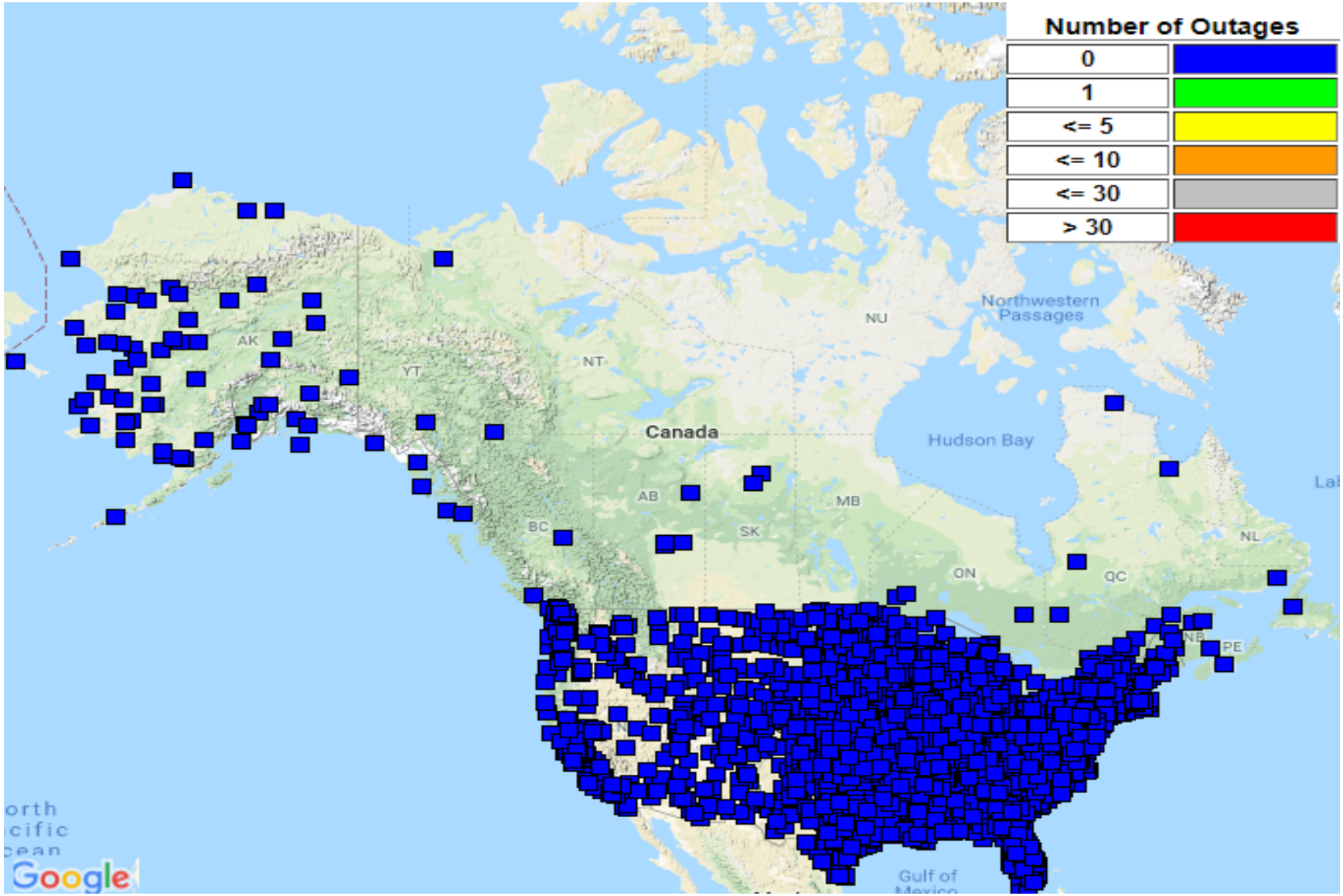


Figure 8-3 WAAS LPV Availability Airports in the US and Canada with GPS RNAV IAPs

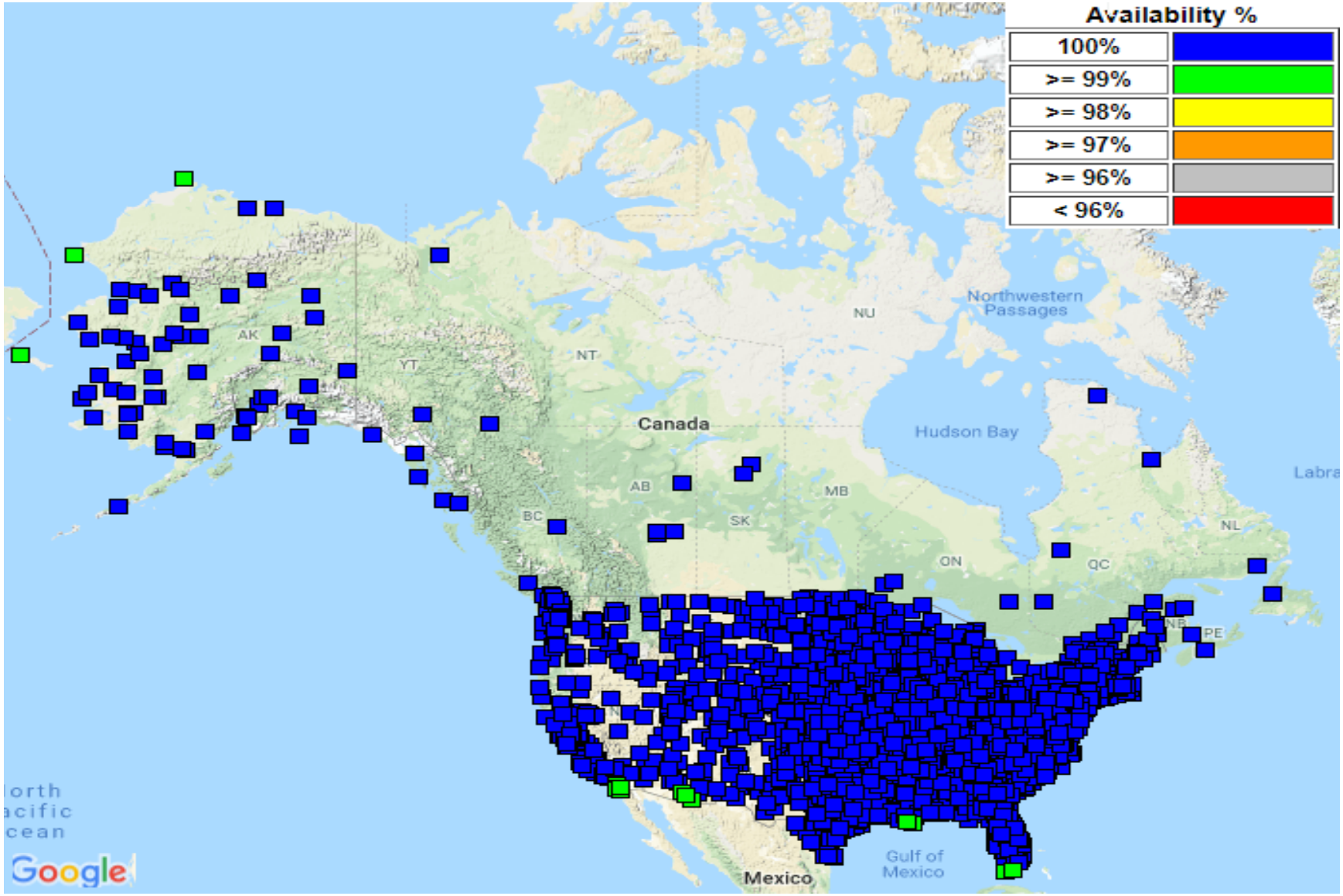


Figure 8-4 WAAS LPV Outages at Airports in the US and Canada with GPS RNAV IAPs

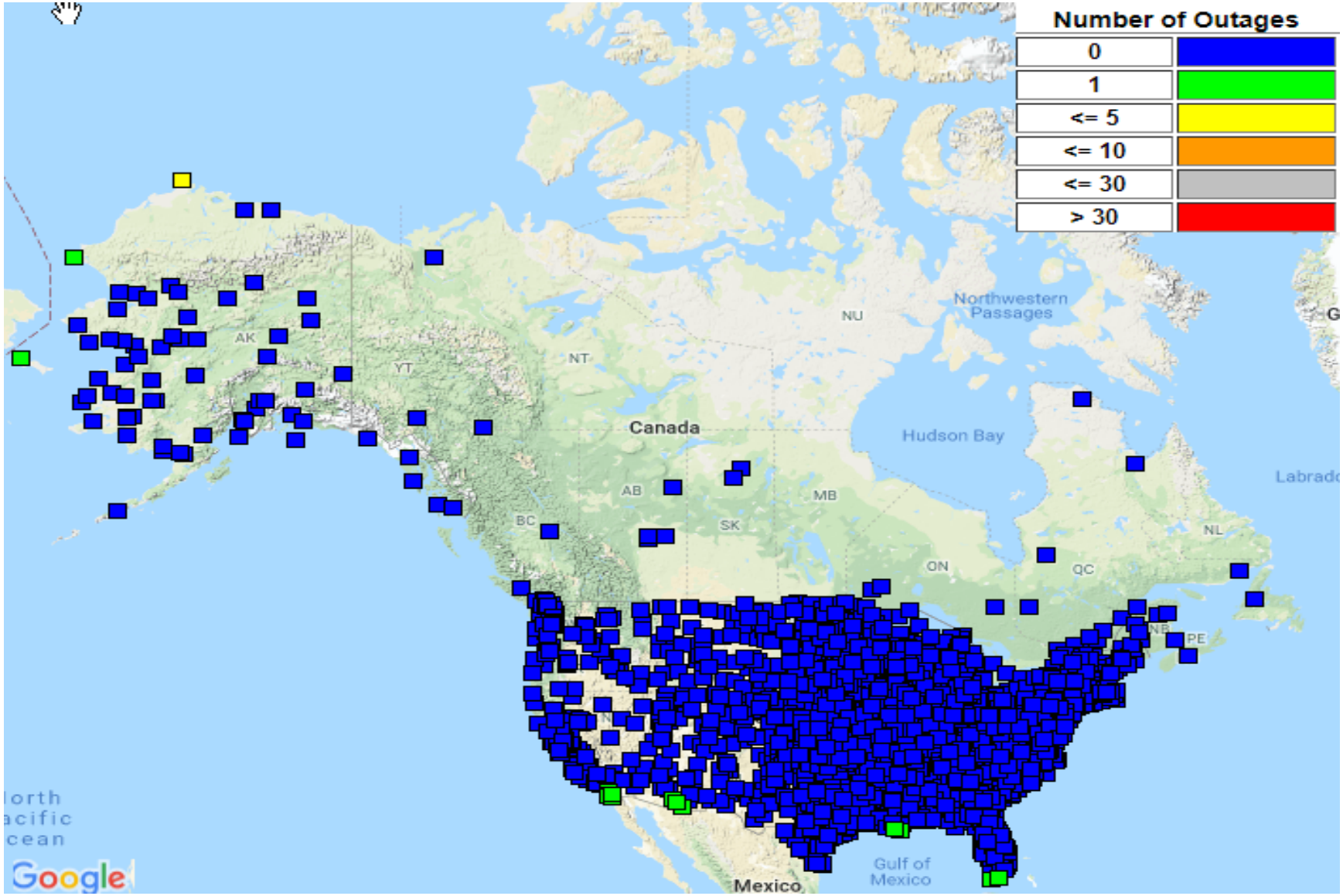


Figure 8-5 WAAS LPV200 Availability at Airports in the US and Canada with GPS RNAV IAPs

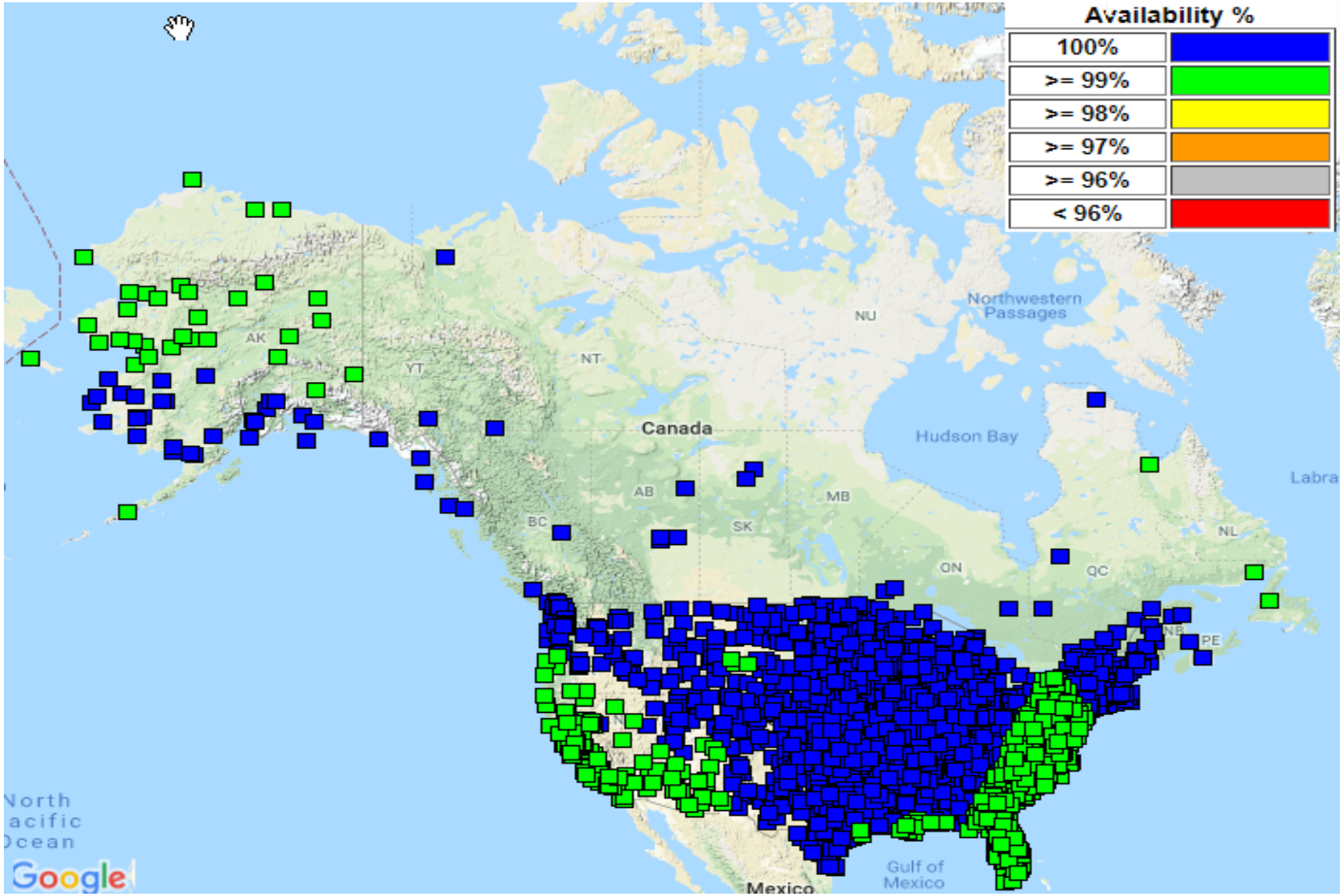
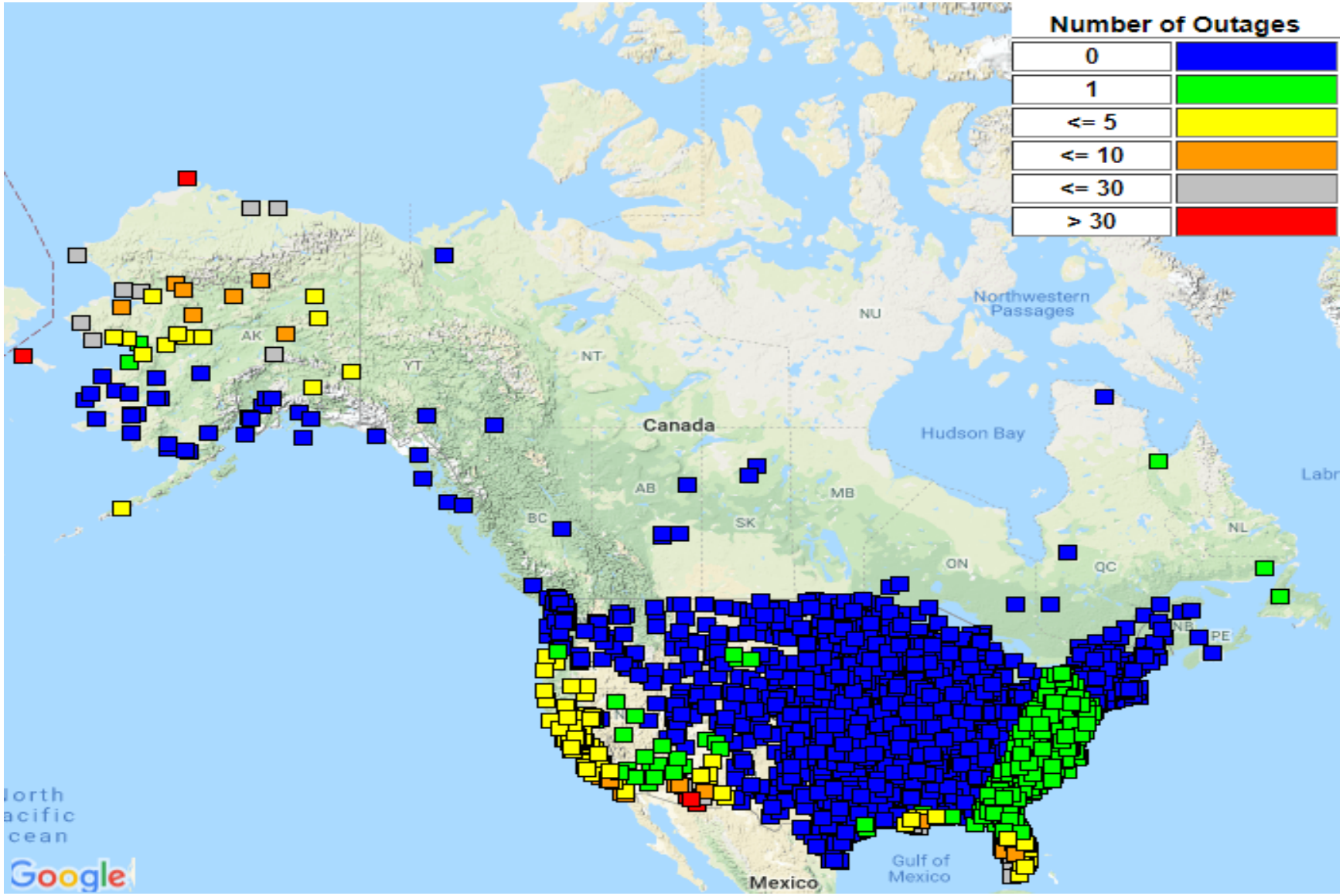


Figure 8-6 WAAS LPV200 Outages at Airports in the US and Canada with GPS RNAV IAPs



9.0 WAAS CNMP BOUNDING ANALYSIS

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

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

The measurement data from the offline analysis is post-processed to estimate the carrier phase ambiguity of each entire arc of measurements for each satellite pass. The ambiguity estimate is used to level the carrier measurement, which is then used as a multipath-free truth estimate. The WAAS real-time CNMP smoothing algorithm is then applied to the original measurements, and the difference between the smoothed measurements and the multipath-free truth estimates is the observed residual error. To minimize the impacts of non-zero mean multipath biasing the truth estimates, only arcs with a continuous carrier phase greater than 7200 seconds are used for this analysis. The WAAS dual frequency cycle slip detector algorithm is used to detect any discontinuities in the carrier phase.

Statistics are calculated based on how well Gaussian distributions with 0.1 multiples of the CNMP standard deviation bound the observed residual error. Subsequently, these statistics are compared to a theoretical Gaussian distribution and an extensive set of plots are generated and manually reviewed. Figure 9-1 shows the analysis results for the previous 12 months for all three threads of WRE at each WAAS reference station. The color coding represents four levels of performance based on the magnitude and probability distribution of the residual error and the bounding performance of the CNMP algorithm.

Figure 9-1 CNMP Bounding Statistics

WAAS Site	WRE	Jan 18	Feb 18	Mar 18	Apr 18	May 18	Jun 18	Jul 18	Aug 18	Sep 18	Oct 18	Nov 18	Dec 18
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												

WAAS Site	WRE	Jan 18	Feb 18	Mar 18	Apr 18	May 18	Jun 18	Jul 18	Aug 18	Sep 18	Oct 18	Nov 18	Dec 18
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
- **N/A** - No data available

10.0 WRS ANTENNA SURVEY VALIDATION

Antenna L1 phase center position surveys were performed for all the WAAS Reference Station antennas using 24 hour sets on 01/01/19. Each WAAS WRS has three independent threads of WRE: (1) Thread A is also referred to as Thread 1, (2) Thread B is also referred to as Thread 2, and (3) Thread C is referred to as Thread 3.

Duplicate surveys were performed using both the NGS OPUS and the CSRS PPP services. The International GPS Service (IGS) 08 reference frame is used for the OPUS solutions. A value of -0.4445 meters was used for the antenna reference point (ARP) to antenna phase center (APC) offset for the MicroPulse MPL-WAAS-2225W WAAS antennas in the processing of the data.

The OPUS-reported RMS quality metrics were 2.2 cm or less. The CSRS surveys' RSSs of the reported ECEF sigmas were 14mm or less. The OPUS and CSRS surveys agreed to an average of 3.9 cm with a standard deviation of 8.7 mm. The maximum of difference was 3.99 cm for Kotzebue Thread A (OTZ1).

The OPUS positions were compared to the WAAS Release 53 Field Coordinates. The OPUS surveys agree with the WAAS Release 53 Field Coordinates to better or equal to 9.62 cm. The maximum difference was excluding outliers was 9.62 cm at Honolulu Thread C (ZHU3).

Table 10-1 lists the WAAS antenna L1 phase center positions using the OPUS data.

Table 10-1 WAAS Antenna Positions (OPUS IGS08)

WRE	X(m)	Y(m)	Z(m)	LATITUDE	LONGITUDE	H(m)
BET1	-2965385.145	-972576.632	5543892.823	60.7879144	161.8417253	52.165
BET2	-2965385.914	-972580.355	5543891.766	60.7878949	161.8416648	52.165
BET3	-2965388.478	-972577.482	5543890.895	60.787879	161.8417296	52.157
BIL1	-1416445.962	-4223577.006	4550862.106	45.8037065	108.5397241	1112.221
BIL2	-1416450.044	-4223574.861	4550862.833	45.8037158	108.5397826	1112.23
BIL3	-1416441.663	-4223574.262	4550865.964	45.8037562	108.5396829	1112.221
BRW1	-1886759.032	-809058.669	6018494.449	71.282764	156.7899258	15.579
BRW2	-1886756.449	-809055.928	6018495.628	71.2827967	156.7899677	15.587
BRW3	-1886755.355	-809059.708	6018495.448	71.2827921	156.7898587	15.572
CDB1	-3484099.171	-1084748.777	5213678.566	55.192373	162.7064053	49.709
CDB2	-3484105.804	-1084741.577	5213675.619	55.192327	162.7065442	49.682
CDB3	-3484112.084	-1084734.804	5213672.872	55.1922835	162.7066751	49.7
FAI1	-2304741.936	-1448715.317	5748843.696	64.809629	147.8473416	149.999
FAI2	-2304741.477	-1448706.509	5748846.091	64.8096794	147.8474934	150.006
FAI3	-2304732.959	-1448707.448	5748849.251	64.8097459	147.8473812	150.008
JNU1	-2354255.04	-2388549.671	5407043.17	58.362574	134.5857085	16.21
JNU2	-2354252.948	-2388565.793	5407036.989	58.3624683	134.5854897	16.2
JNU3	-2354239.732	-2388568.647	5407041.453	58.3625447	134.5852947	16.201
MMD1	35070.374	-5959686.678	2264365.778	20.9319093	89.6628411	29.133
MMD2	35065.45	-5959687.049	2264364.999	20.9319016	89.6628885	29.174
MMD3	35065.113	-5959685.254	2264369.649	20.9319467	89.6628916	29.157
MMX1	-948700.86	-5943933.873	2109212.148	19.431654	99.06839	2233.76
MMX2	-948696.426	-5943933.698	2109214.573	19.4316773	99.0683486	2233.745
MMX3	-948705.289	-5943934.06	2109209.726	19.4316308	99.0684314	2233.787
MPR1	-1570142.257	-5759530.579	2238184.747	20.6790033	105.2492036	10.961
MPR2	-1570139.435	-5759530.095	2238188.793	20.6790413	105.2491787	11.259
MPR3	-1570143.542	-5759527.972	2238190.56	20.6790594	105.2492221	10.977
MSD1	-1979520.021	-5523222.885	2493106.939	23.1604483	109.7176514	104.291
MSD2	-1979521.586	-5523225.217	2493100.536	23.1603855	109.7176581	104.277
MSD3	-1979526.033	-5523221.949	2493104.205	23.1604216	109.7177098	104.271
MTP1	-254854.377	-6162909.14	1617805.097	14.7913663	92.3679994	54.926
MTP2	-254850.778	-6162910.172	1617801.64	14.7913341	92.3679656	54.896
MTP3	-254855.549	-6162910.281	1617800.118	14.7913201	92.3680099	54.804
OTZ1	-2396056.119	-750356.176	5843502.46	66.8873312	162.6113733	10.873
OTZ2	-2396052.947	-750354.346	5843503.98	66.887366	162.6113915	10.868
OTZ3	-2396052.936	-750358.283	5843503.479	66.8873546	162.6113057	10.865
YFB1	1035381.327	-2634289.654	5696539.574	63.7314909	68.5431858	10.044
YFB2	1035372.119	-2634296.073	5696538.211	63.7314645	68.5434068	9.975
YFB3	1035366.044	-2634306.831	5696534.435	63.7313869	68.5436009	10.036
YQX1	2430424.557	-3419640.42	4788223.89	48.9664905	54.5976332	146.908
YQX2	2430432.499	-3419639.07	4788220.833	48.9664487	54.5975342	146.9
YQX3	2430440.398	-3419637.713	4788217.84	48.9664075	54.5974355	146.92
YWG1	-520164.497	-4083475.966	4855843.023	49.900574	97.2593992	222.114
YWG2	-520150.627	-4083468.906	4855850.409	49.900677	97.2592202	222.124
YWG3	-520152.499	-4083478.024	4855842.59	49.9005678	97.25923	222.121
YYR1	1885341.33	-3321428.389	5091171.722	53.3086476	60.4194697	37.887
YYR2	1885344.291	-3321419.904	5091176.134	53.3087139	60.4193683	37.889
YYR3	1885340.003	-3321413.084	5091182.121	53.3088041	60.4193737	37.881
ZAB1	-1488636.919	-5003946.534	3654557.686	35.1735752	106.5673506	1620.126
ZAB2	-1488631.585	-5003948.216	3654557.659	35.1735745	106.5672893	1620.185
ZAB3	-1488632.365	-5003950.803	3654553.812	35.1735321	106.5672894	1620.178
ZAN1	-2659536.716	-1549114.725	5567750.734	61.2292014	149.7802523	80.692
ZAN2	-2659548.475	-1549110.768	5567746.246	61.2291178	149.7804261	80.69

WRE	X(m)	Y(m)	Z(m)	LATITUDE	LONGITUDE	H(m)
ZAN3	-2659541.429	-1549106.645	5567750.723	61.2292013	149.7804264	80.685
ZAU1	138704.031	-4761244.14	4227763.929	41.7826581	88.3313377	195.883
ZAU2	138704.292	-4761248.76	4227758.769	41.7825957	88.3313362	195.894
ZAU3	138710.997	-4761248.492	4227758.847	41.7825966	88.3312555	195.892
ZBW1	1490299.131	-4448983.176	4306010.51	42.7357207	71.4804269	39.107
ZBW2	1490304.245	-4448981.167	4306010.856	42.7357247	71.4803599	39.135
ZBW3	1490305.954	-4448984.793	4306006.547	42.7356719	71.4803542	39.135
ZDC1	1069125.677	-4839598.98	4001126.515	39.1015961	77.5427475	80.049
ZDC2	1069128.073	-4839603.611	4001120.311	39.1015241	77.542732	80.046
ZDC3	1069123.974	-4839602.699	4001122.508	39.1015495	77.542776	80.055
ZDV1	-1273628.691	-4711375.568	4094890.084	40.187303	105.1272253	1541.349
ZDV2	-1273622.987	-4711377.082	4094890.098	40.1873032	105.127156	1541.338
ZDV3	-1273624.998	-4711380.274	4094885.809	40.1872528	105.127169	1541.325
ZFW1	-659983.267	-5324060.763	3438276.456	32.8306496	97.0664725	155.606
ZFW2	-659988.54	-5324063.313	3438271.461	32.8305962	97.0665251	155.569
ZFW3	-659983.565	-5324063.843	3438271.669	32.8305982	97.0664716	155.61
ZHN1	-5508637.181	-2234492.913	2303722.406	21.3129923	157.9208314	24.678
ZHN2	-5508656.349	-2234483.23	2303687.17	21.3126495	157.9209873	25.028
ZHN3	-5508647.758	-2234497.165	2303694.263	21.3127181	157.9208317	25.069
ZHU1	-513864.532	-5506451.681	3166720.45	29.9618963	95.3314269	10.822
ZHU2	-513867.178	-5506455.074	3166714.285	29.9618318	95.331451	10.883
ZHU3	-513873.458	-5506457.715	3166708.687	29.9617735	95.3315132	10.871
ZJX1	772646.376	-5434462.18	3237231.752	30.6988598	81.9081858	2.125
ZJX2	772649.701	-5434463.739	3237228.355	30.6988242	81.9081537	2.12
ZJX3	772645.636	-5434466.168	3237225.246	30.6987916	81.9081993	2.109
ZKC1	-415247.595	-4954556.39	3982161.105	38.8801593	94.7908347	305.897
ZKC2	-415231.203	-4954557.712	3982161.159	38.88016	94.7906452	305.891
ZKC3	-415237.321	-4954561.059	3982155.965	38.8801018	94.7907122	305.624
ZLA1	-2474410.064	-4637294.552	3602183.583	34.6035188	118.0838971	763.519
ZLA2	-2474404.787	-4637297.353	3602183.588	34.6035189	118.0838319	763.511
ZLA3	-2474411.391	-4637297.038	3602179.609	34.6034749	118.0838971	763.581
ZLC1	-1808273.303	-4486410.791	4145302.98	40.786043	111.9521787	1287.41
ZLC2	-1808274.694	-4486414.426	4145298.49	40.7859895	111.9521779	1287.423
ZLC3	-1808270.49	-4486416.125	4145298.491	40.7859895	111.9521242	1287.427
ZMA1	966042.24	-5662999.806	2761581.512	25.8246124	80.3191904	-7.606
ZMA2	966029.269	-5662999.117	2761585.995	25.8246601	80.3193167	-8.228
ZMA3	966037.348	-5662997.959	2761586.349	25.8246621	80.3192354	-7.878
ZME1	4070.819	-5226189.303	3644028.424	35.0673941	89.9553708	68.608
ZME2	4070.849	-5226186.751	3644032.538	35.0674377	89.9553704	68.883
ZME3	4064.655	-5226186.622	3644032.69	35.0674395	89.9554383	68.861
ZMP1	-249978.473	-4539297.5	4458955.045	44.6374632	93.1520866	262.653
ZMP2	-249972.669	-4539297.843	4458955.05	44.6374631	93.1520134	262.673
ZMP3	-249973.767	-4539302.121	4458950.572	44.637407	93.1520242	262.609
ZNY1	1406144.545	-4627343.996	4144322.087	40.7843289	73.0971668	6.458
ZNY2	1406146.344	-4627347.029	4144317.298	40.7842761	73.0971568	5.923
ZNY3	1406140.785	-4627348.689	4144317.339	40.7842765	73.0972255	5.929
ZOA1	-2684436.994	-4293337.278	3865351.924	37.5430546	122.0159497	-3.498
ZOA2	-2684433.985	-4293341.352	3865349.491	37.543027	122.0158964	-3.507
ZOA3	-2684438.358	-4293342.235	3865345.638	37.5429826	122.0159331	-3.423
ZOB1	650770.103	-4754715.675	4187420.758	41.2971546	82.2064457	223.68
ZOB2	650777.783	-4754714.85	4187422.777	41.2971669	82.2063535	225.181
ZOB3	650776.111	-4754719.675	4187414.985	41.2970871	82.2063811	223.46
ZSE1	-2308930.328	-3668169.67	4663526.452	47.2869929	122.1883735	82.098
ZSE2	-2308934.714	-3668175.216	4663520.043	47.2869074	122.1883835	82.158
ZSE3	-2308935.776	-3668179.494	4663516.102	47.2868557	122.1883652	82.102

WRE	X(m)	Y(m)	Z(m)	LATITUDE	LONGITUDE	H(m)
ZSU1	2462589.482	-5529372.082	2003724.537	18.4313364	65.9934762	-28.095
ZSU2	2462587.548	-5529377.456	2003712.25	18.4312193	65.9935137	-28.069
ZSU3	2462594.18	-5529375.191	2003710.166	18.4311996	65.9934476	-28.131
ZTL1	529840.338	-5305248.817	3489342.863	33.3796887	84.2967267	261.142

Figure 10-1 to Figure 10-3 show the RSS of the ECEF differences between the OPUS survey antenna phase center locations and the locations in the WAAS Release 53 Field Coordinates. Figure 10-4 to Figure 10-6 show the OPUS surveys overall RMS quality indications.

Figure 10-1 Build WE.7164c Antenna Positions Deltas OPUS Survey

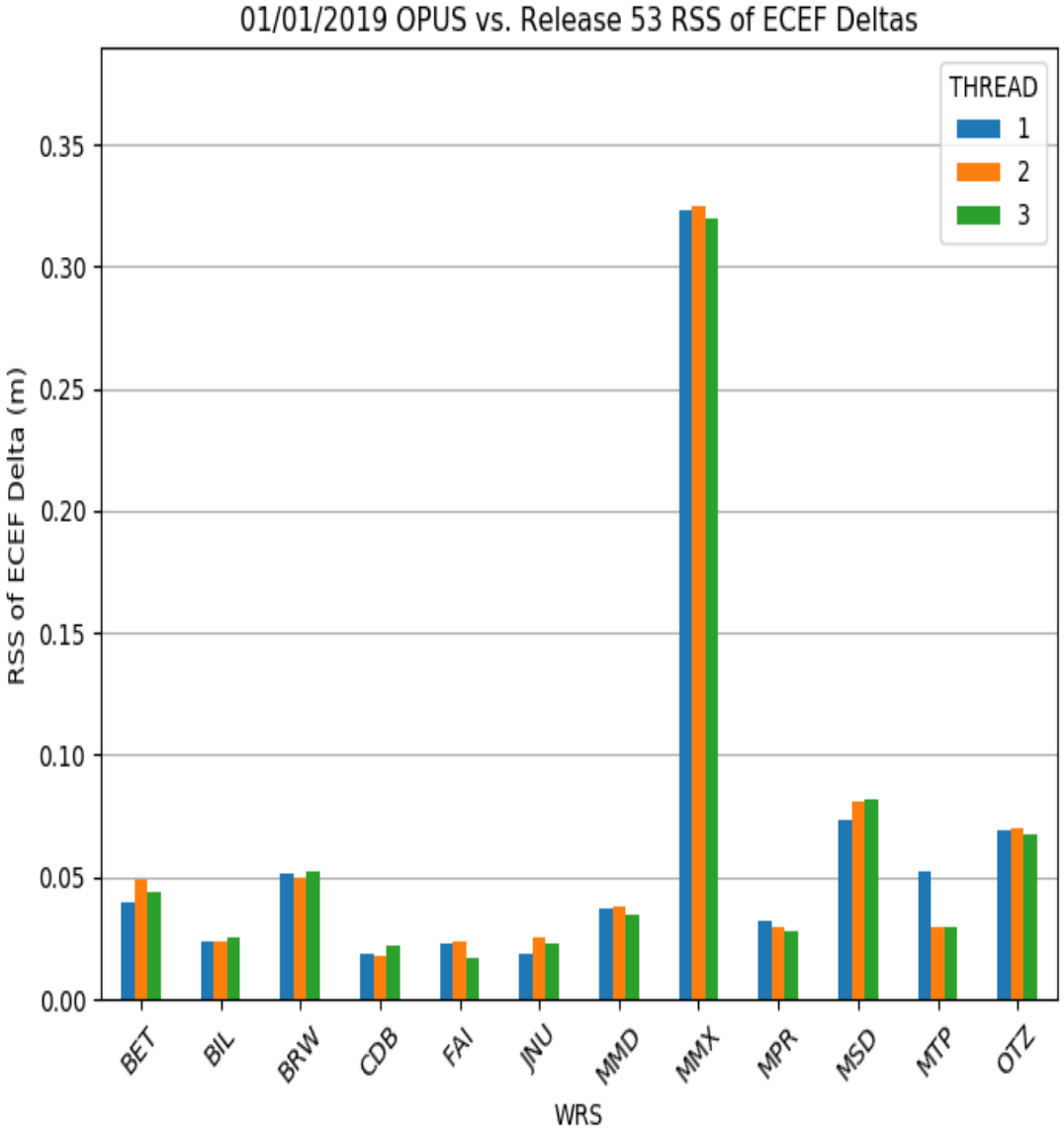


Figure 10-2 Build WE7.164c Antenna Positions Deltas OPUS Survey

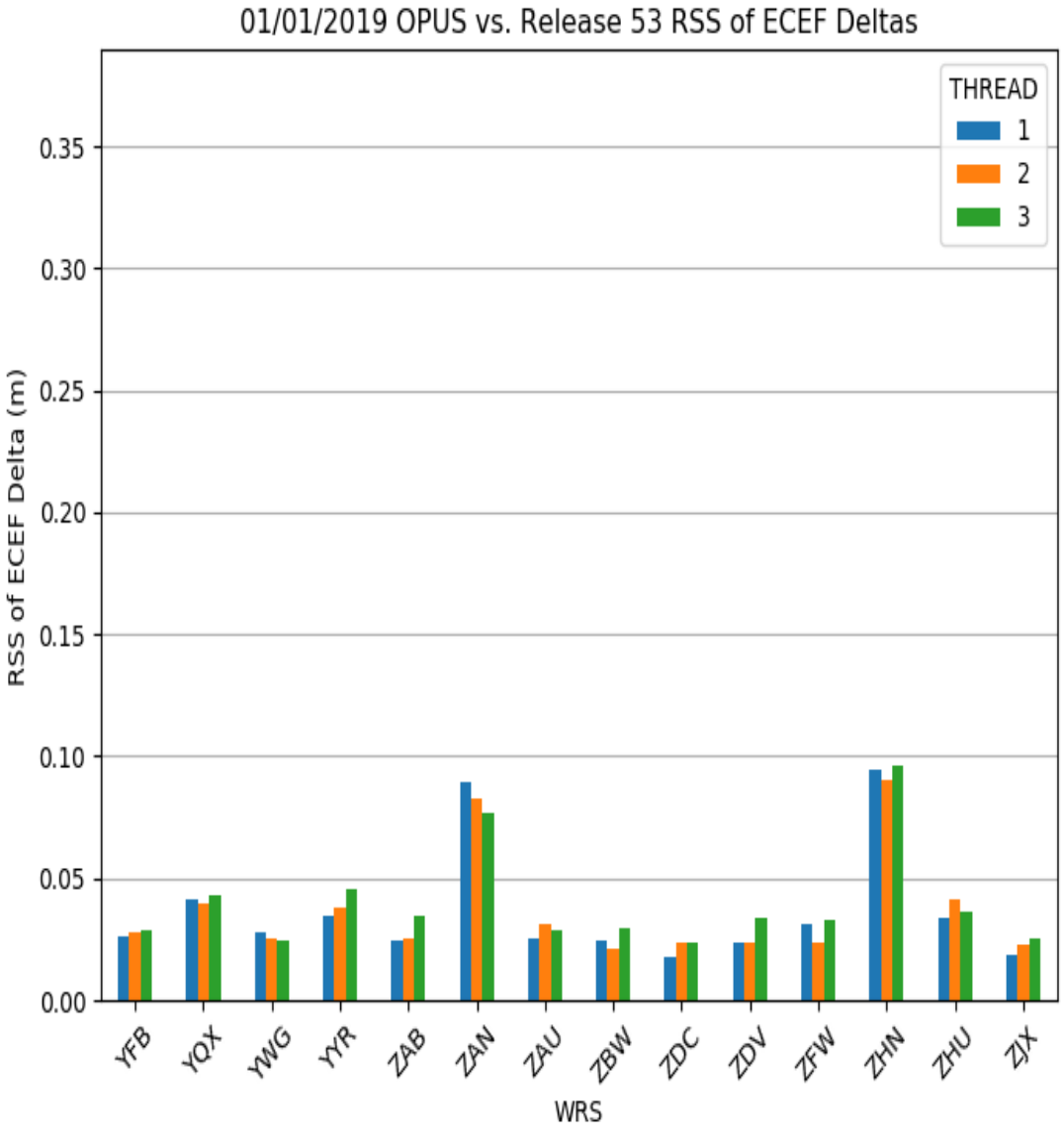


Figure 10-3 Build WE7.164c Antenna Positions Deltas OPUS Survey

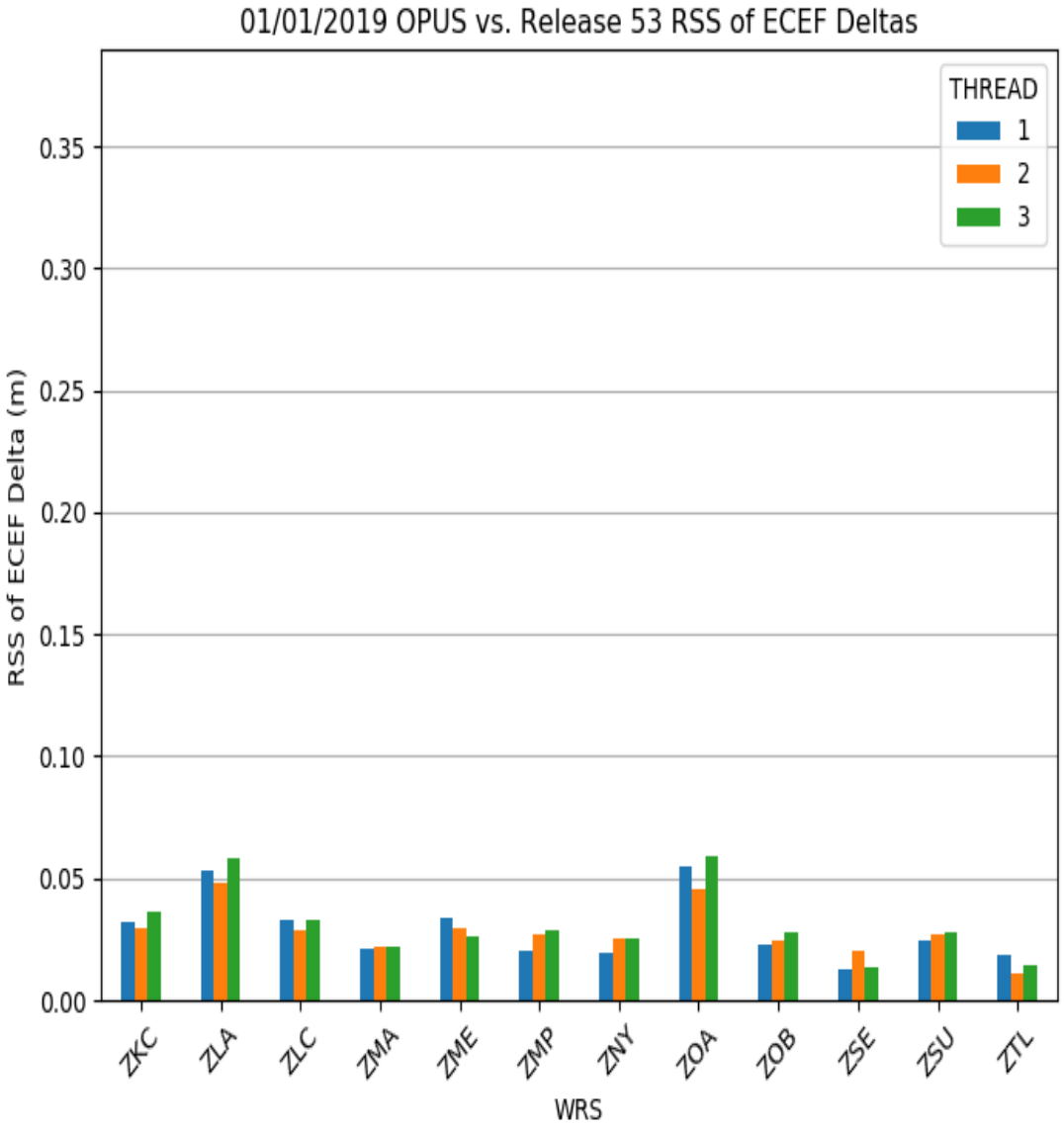


Figure 10-4 OPUS Survey Overall RMS Qualities

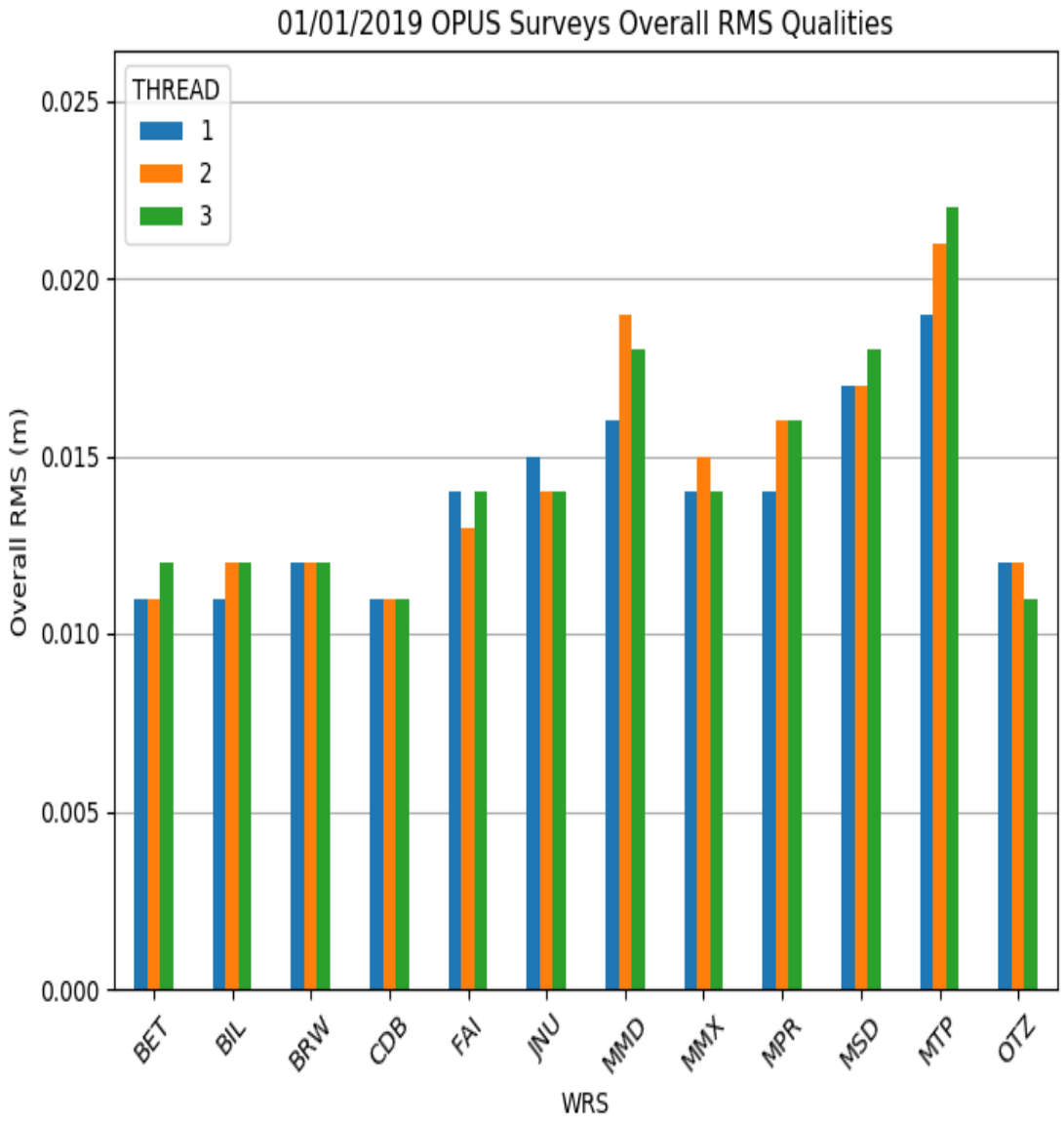


Figure 10-5 OPUS Survey Overall RMS Qualities

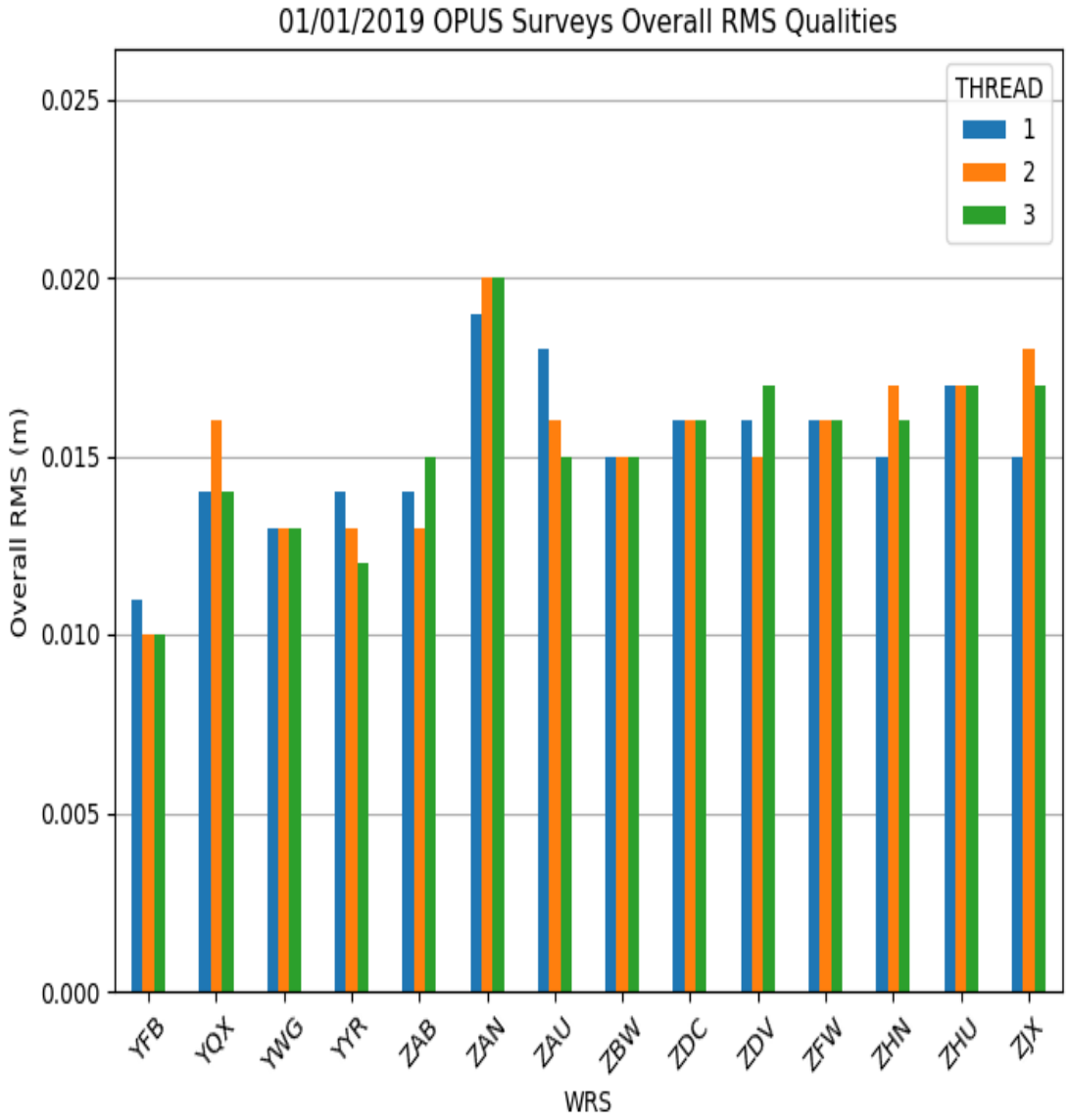
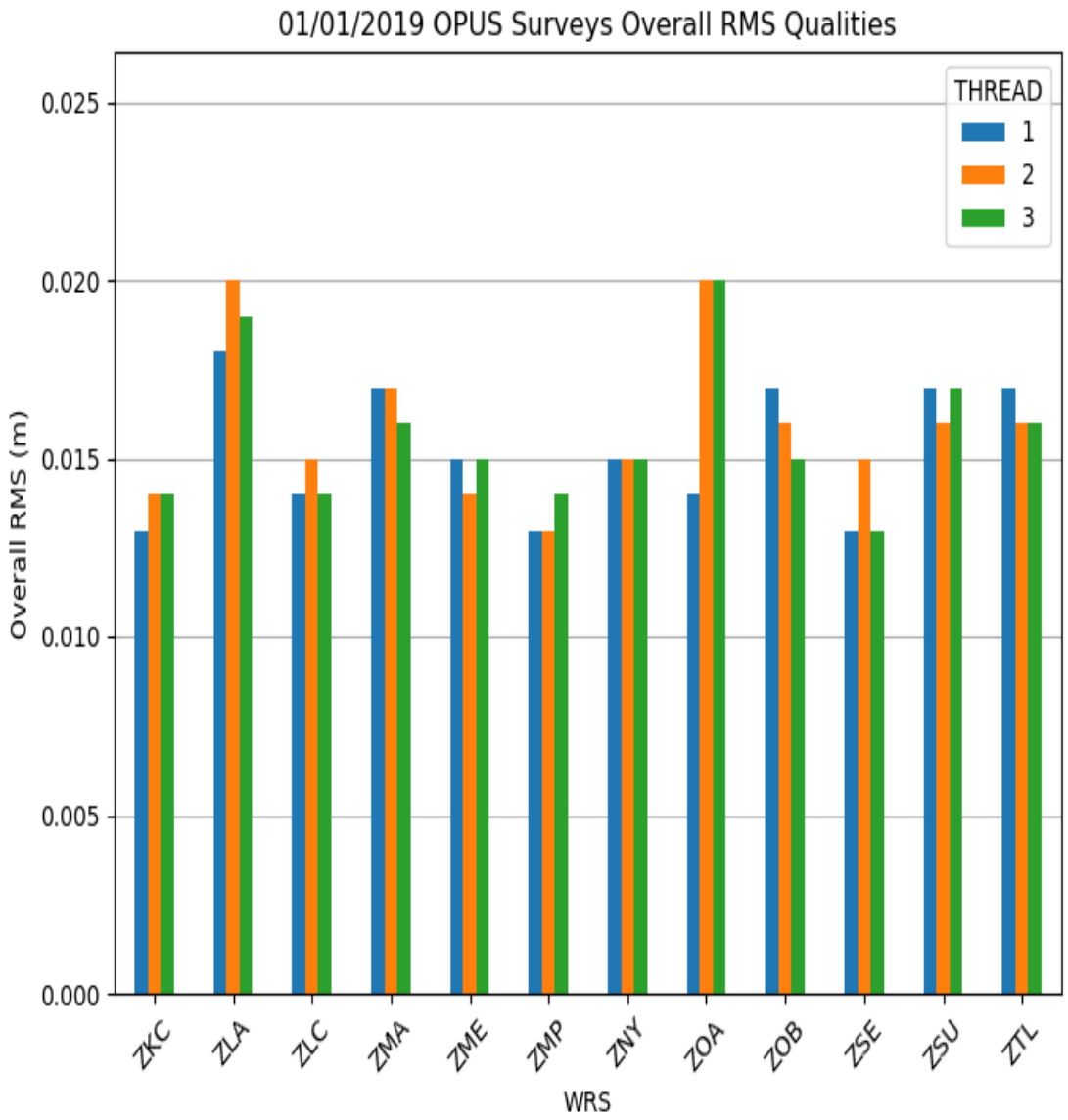


Figure 10-6 OPUS Survey Overall RMS Qualities



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

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

Figure 10-7 OPUS vs. CSRS RSS ECEF Deltas

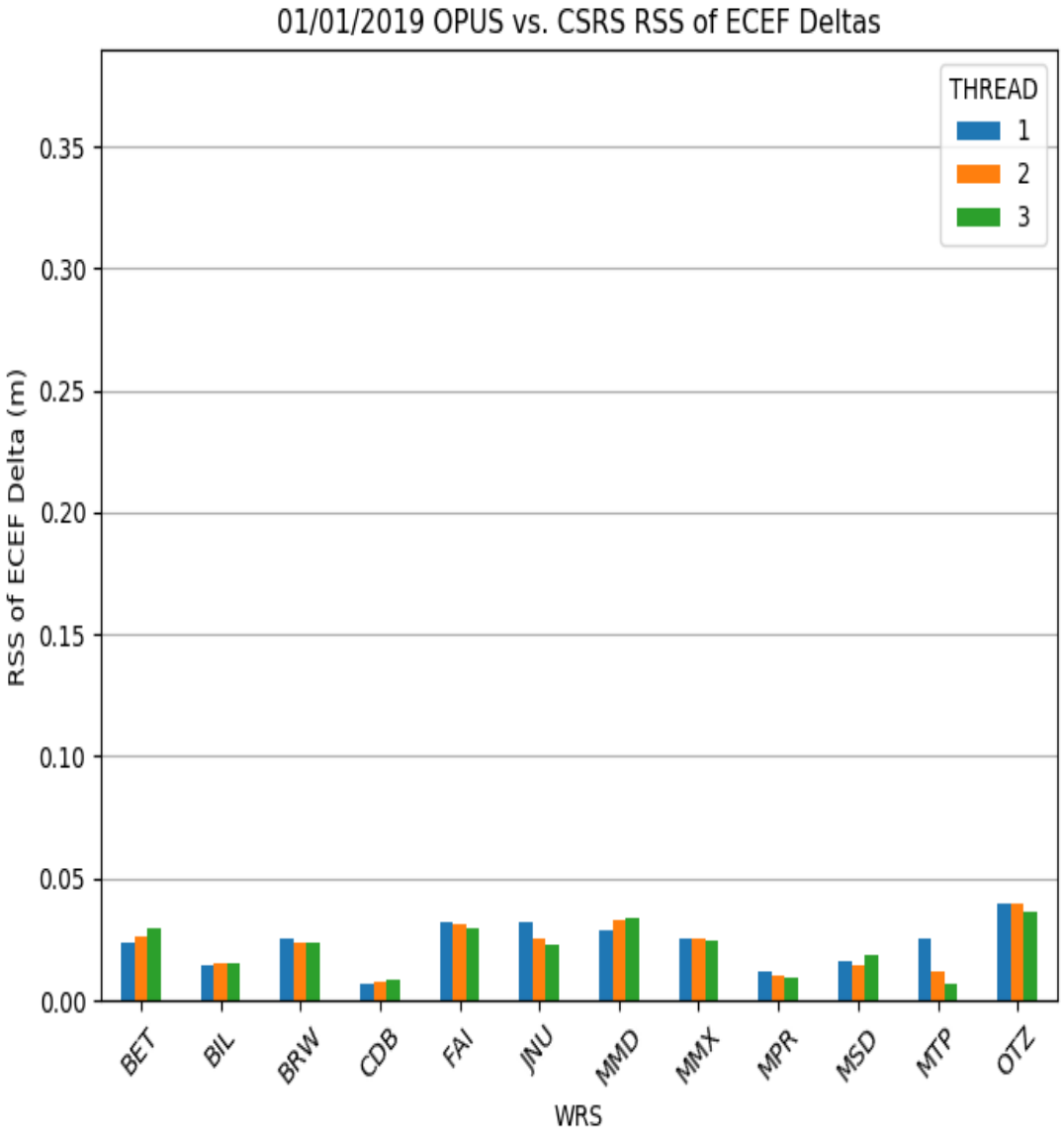


Figure 10-8 OPUS vs. CSRS RSS ECEF Deltas

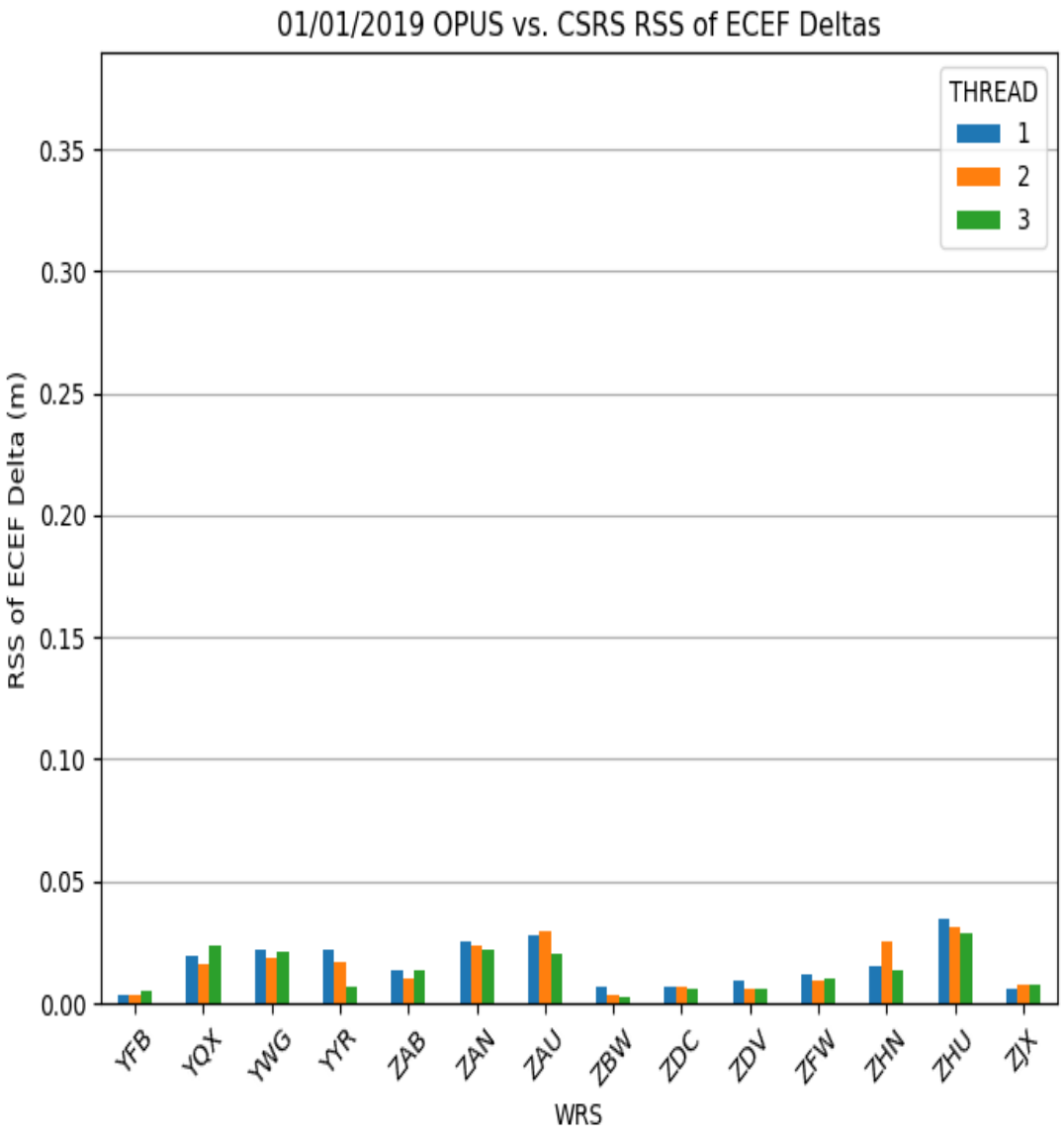


Figure 10-9 OPUS vs. CSRS RSS ECEF Deltas

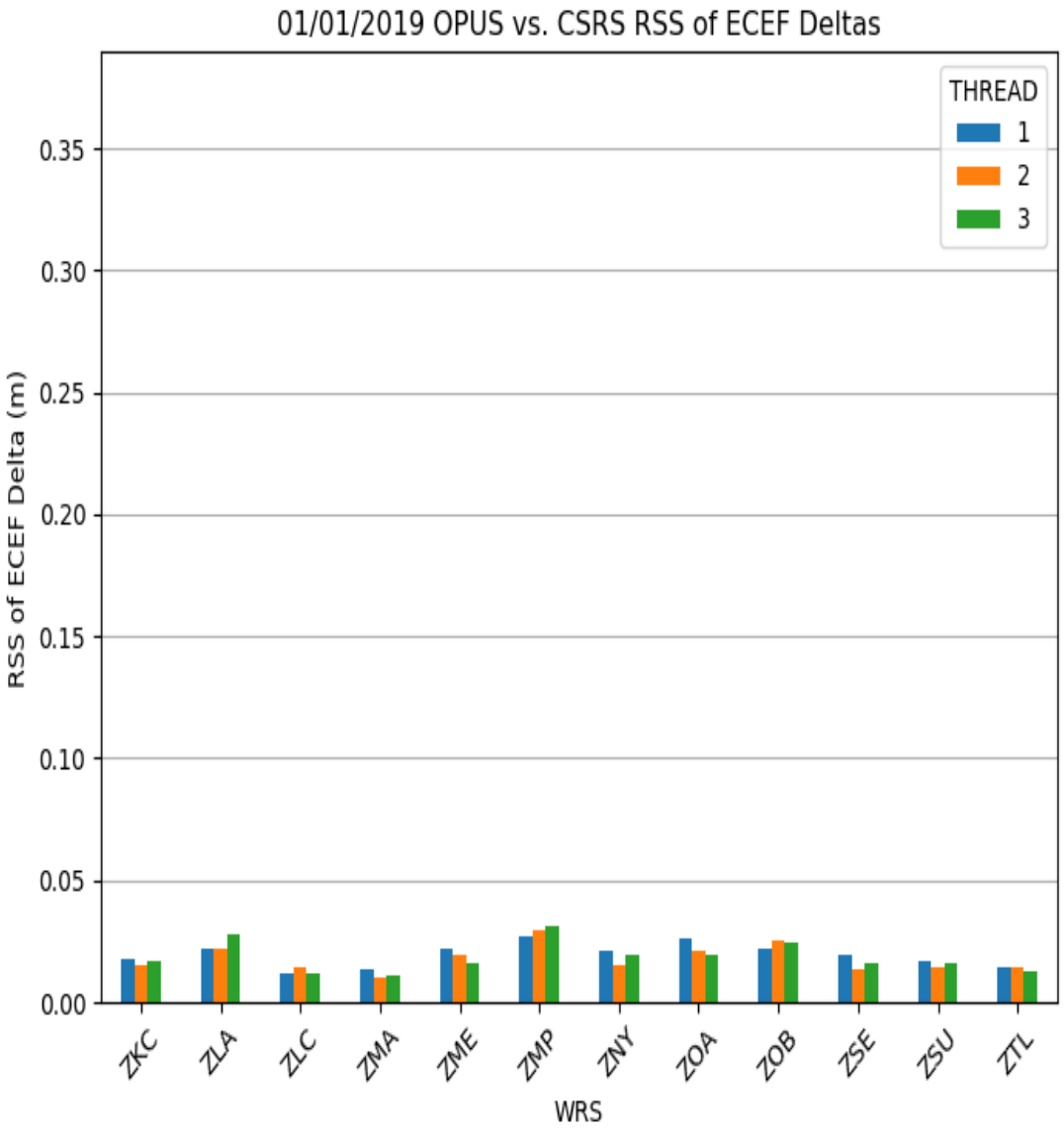


Figure 10-10 CSRS Survey Qualities

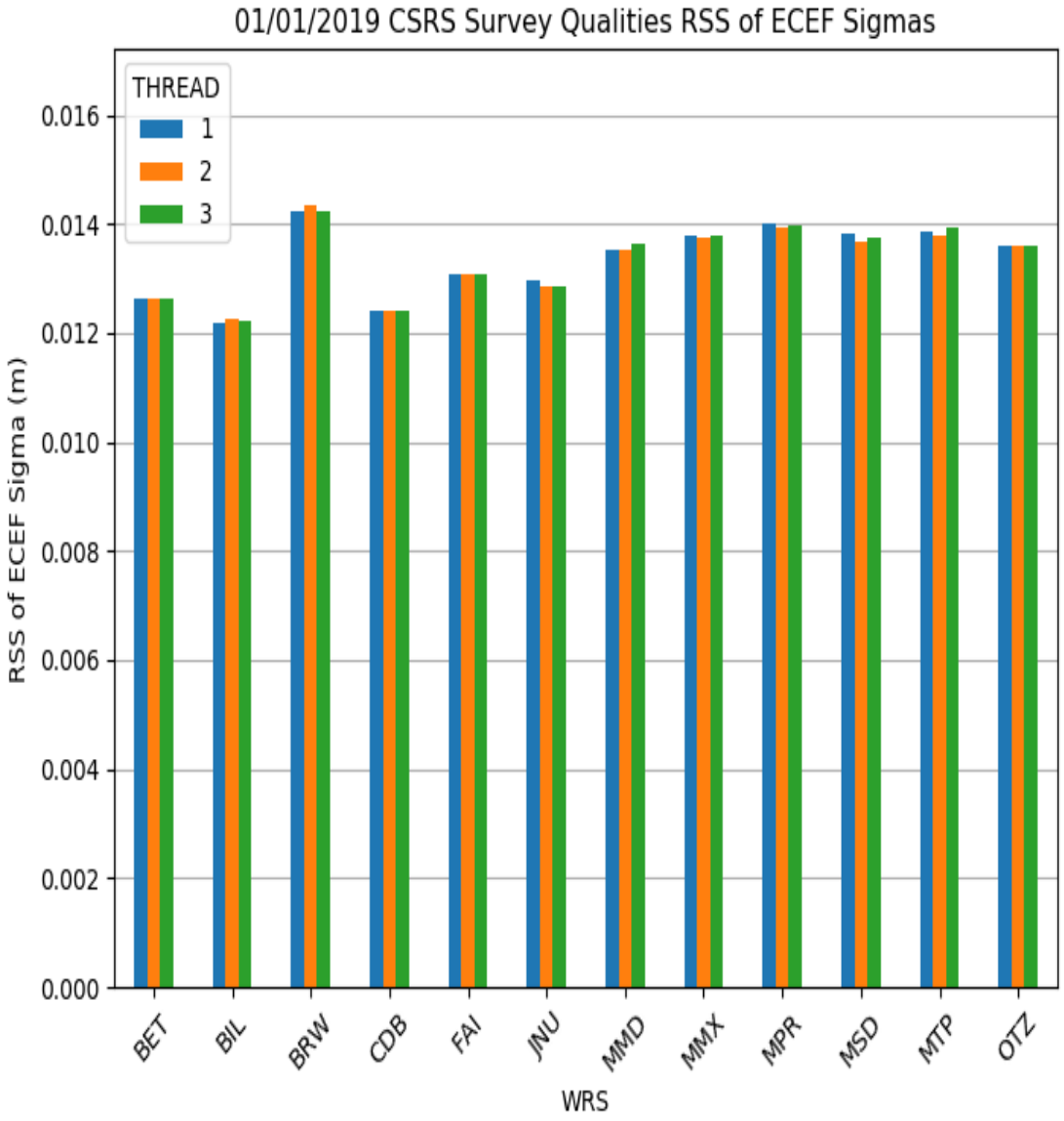


Figure 10-11 CSRS Survey Qualities

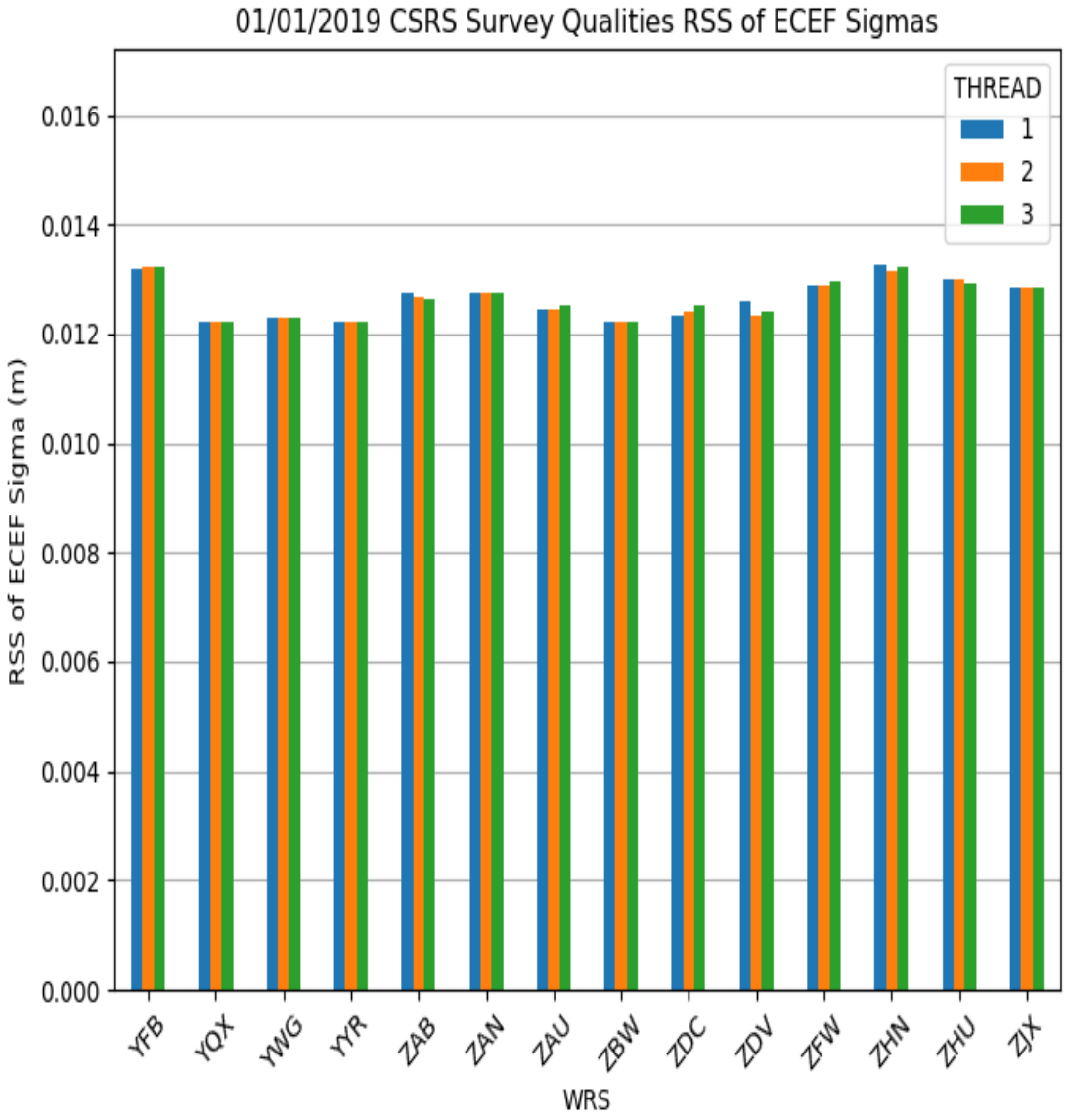
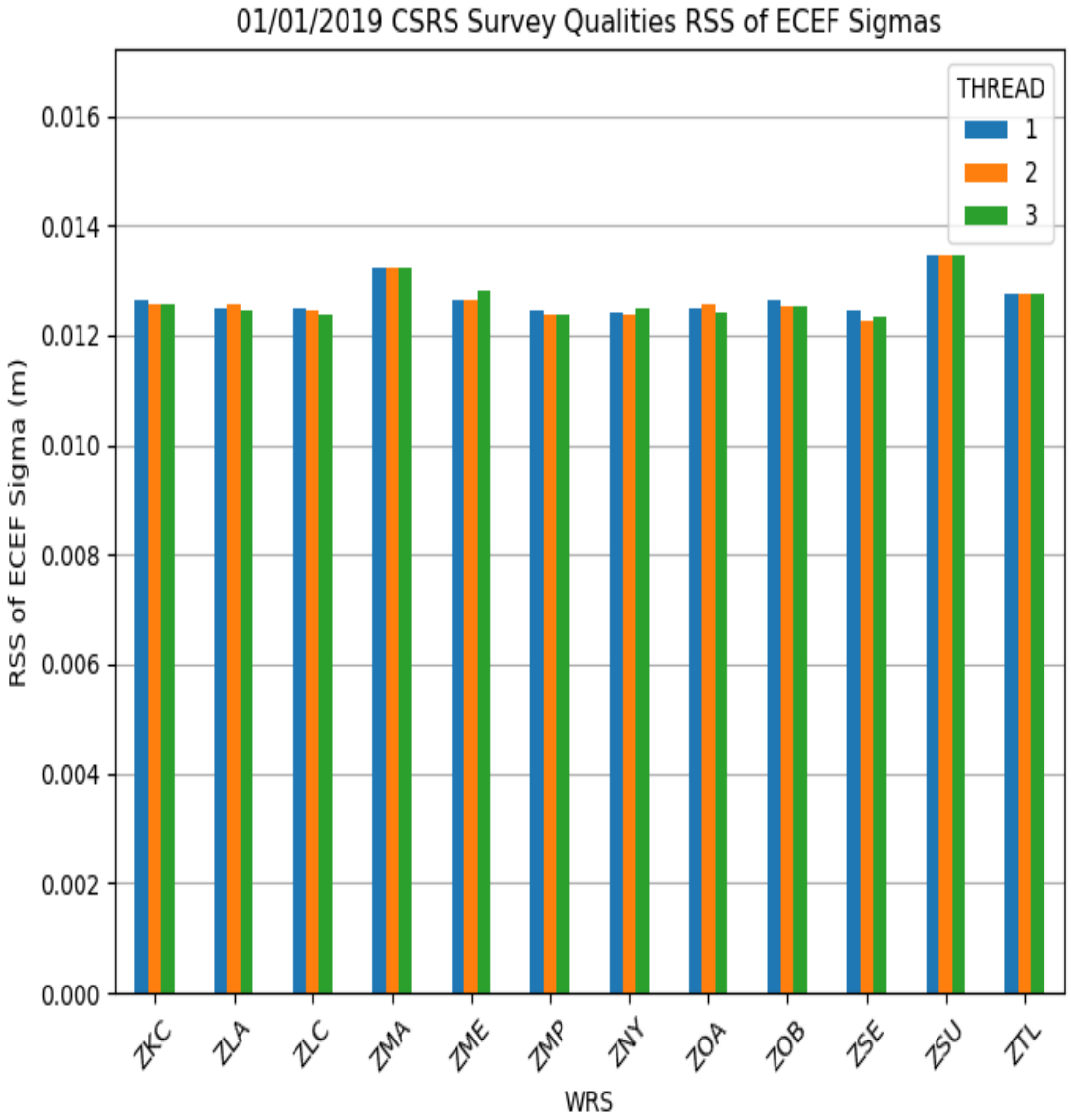


Figure 10-12 CSRS Survey Qualities



11.0 SQM

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

The WAAS SQM offline monitoring effort includes the monitoring of the PRN type biases, trips, and the estimated deformation for each satellite (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 four 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 (DM) will be referred to as: DM1, DM2, DM3, and DM4.

Table 11-1 Alpha Metrics

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

11.2 Type Bias

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

For this reporting period, the GEO-type biases were not evaluated. Table 11-2 shows the rollup averages for the quarter. Table 11-3 shows the rollup averages since January 1, 2008. Figure 11-1 shows the daily averages of the four detection metrics for the quarter.

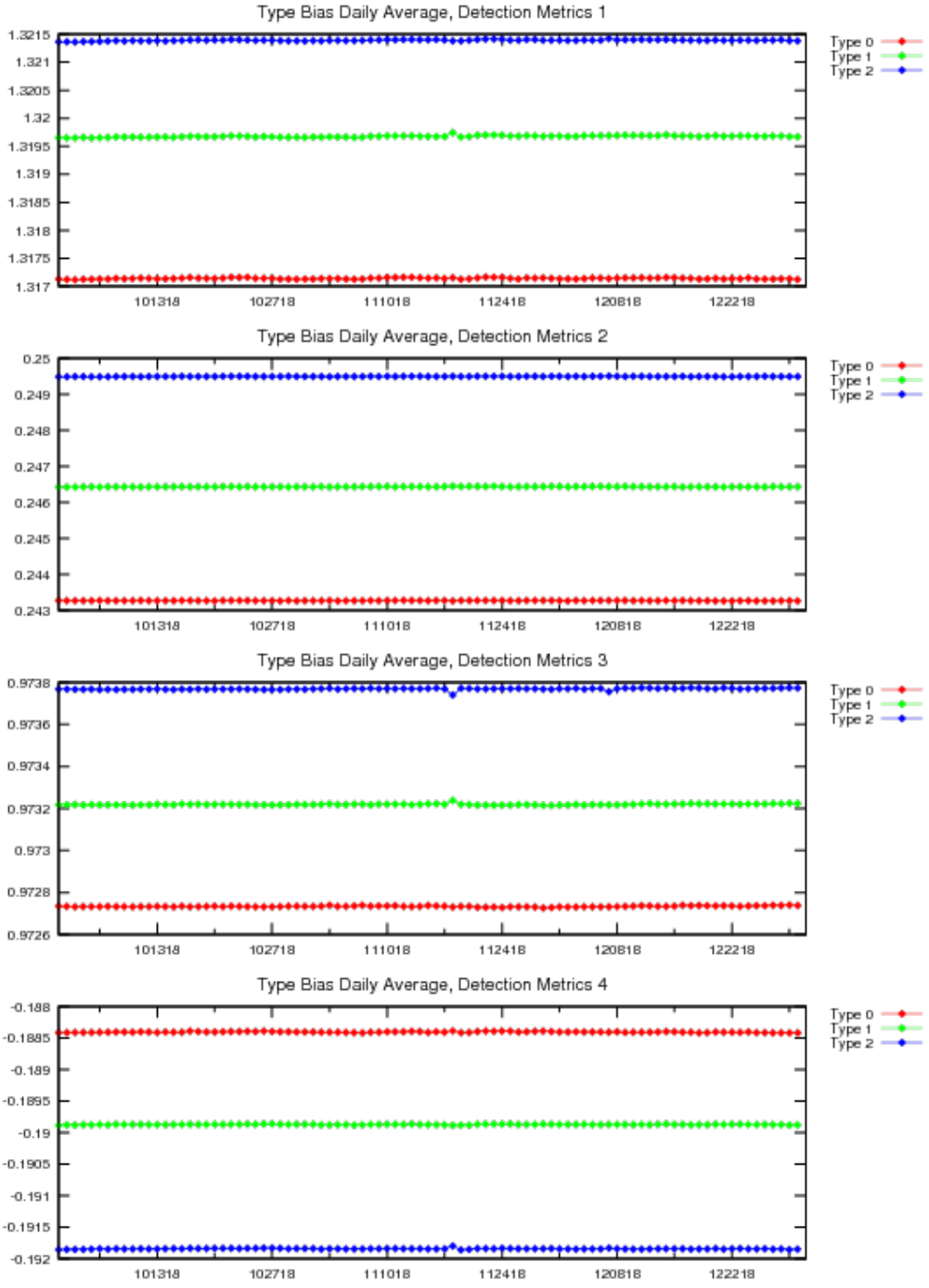
Table 11-2 Type Bias Average for the Quarter

Detection Metric	Type 0	Type 1	Type 2
DM 1	1.31714	1.31968	1.32139
DM 2	0.243271	0.246436	0.2495
DM 3	0.972734	0.973219	0.973769
DM 4	-0.188404	-0.189872	-0.191843

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

Detection Metric	Type 0	Type 1	Type 2
DM 1	1.31983	1.32199	1.32369
DM 2	0.241514	0.244738	0.247886
DM 3	0.973059	0.973573	0.974137
DM 4	-0.186855	-0.188563	-0.19059

Figure 11-1 Type Bias Average Trend



11.3 PRN Bias

The PRN biases are evaluated as part of the WAAS SQM offline monitoring effort. A 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 orbiting satellites, which results 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 averages for the quarter with the maximum values for each detection metrics as followed: (1) the maximum average for DM1 is 0.0011567 observed on PRN11, (2) the maximum average for DM2 is 0.0001997 observed on PRN23, (3) the maximum average for DM3 is 0.0002059 observed on PRN29, (4) the maximum average for DM4 is 0.0004806 observed on PRN23.

Table 11-4 PRN Bias Average for the Quarter

PRN	DM 1	DM 2	DM 3	DM 4
1	0.000261431	6.63879e-05	5.98319e-05	0.000113304
2	0.000527302	0.000150353	6.85396e-05	0.000152256
3	0.000164776	4.60637e-05	5.70912e-05	0.000108542
4				
5	0.000205103	5.45253e-05	0.000136846	0.000128115
6	0.000556267	0.000104459	8.72681e-05	0.000113701
7	0.000165565	0.000106341	6.09198e-05	9.25692e-05
8	0.000451288	0.000125593	9.50429e-05	0.000144982
9	0.000192524	5.12978e-05	0.000127659	0.000217309
10	0.00017121	4.94099e-05	8.5322e-05	0.0001866
11	0.00114828	0.000188534	0.000106813	0.000271751
12	0.000161219	4.41835e-05	8.78022e-05	9.68374e-05
13	0.000500852	4.07527e-05	6.1156e-05	0.000256021
14	0.000768012	0.00014126	4.90308e-05	0.000183614
15	0.000276974	8.15868e-05	5.19857e-05	0.000109015
16	0.00016066	5.61593e-05	0.000114467	0.000225508
17	0.000224667	6.10802e-05	4.90473e-05	8.7733e-05
18	0.000181338	8.26391e-05	6.30652e-05	0.000104145
19	0.000604312	0.000197167	0.000100975	0.000114352
20	0.000174467	5.5733e-05	6.84011e-05	0.000142378
21	0.000330831	6.68527e-05	8.44308e-05	0.000431198
22	0.000151437	4.24e-05	9.1511e-05	0.000256892
23	0.00105599	0.000197252	0.000122922	0.000478609
24	0.000223278	6.29176e-05	0.000148618	0.000230178
25	0.000587746	0.000105642	4.95538e-05	0.000214651
26	0.000252968	0.000103942	5.53637e-05	0.000138076
27	0.000441862	0.000183681	0.000125638	0.000252675
28	0.000328918	4.19934e-05	7.53923e-05	0.000147123
29	0.000258815	8.68242e-05	0.000203303	0.000342482
30	0.000221166	6.89099e-05	6.94516e-05	9.62297e-05
31	0.000344724	0.000120103	5.60253e-05	0.000165919
32	0.000184862	5.05286e-05	8.19582e-05	0.000117618

Figure 11-2 PRN Bias Average for the Quarter

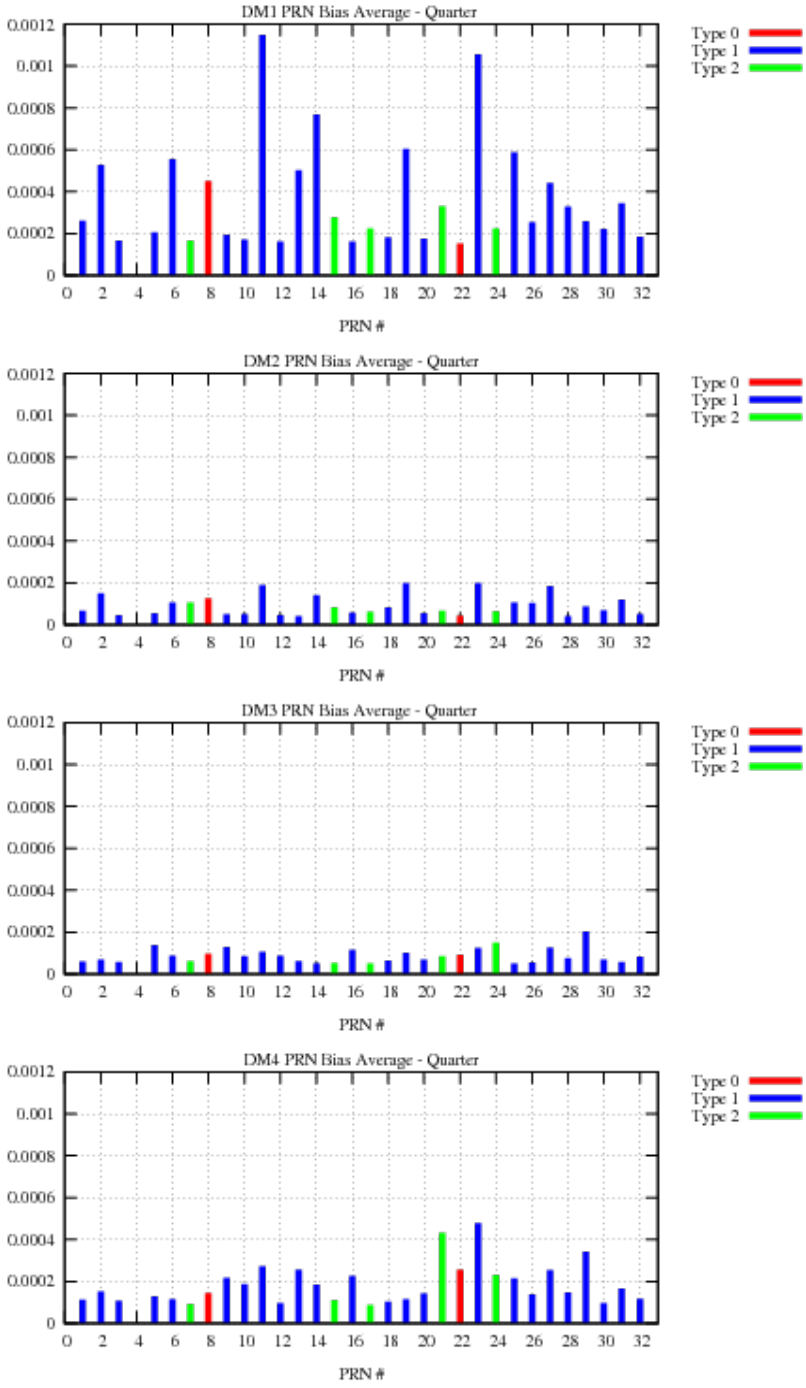


Figure 11-3 to Figure 11-10 show the daily PRN bias for each PRN, for four detection metrics. Small bumps were due to NANUs. PRN18 was not evaluated from 11/18/18 to 12/09/18 due to NANUs. PRN18 occupies a redundant slot in the constellation, and the NANUs had no impact on WAAS performance.

Figure 11-3 PRN Bias Average Trend (PRN1 – PRN4)

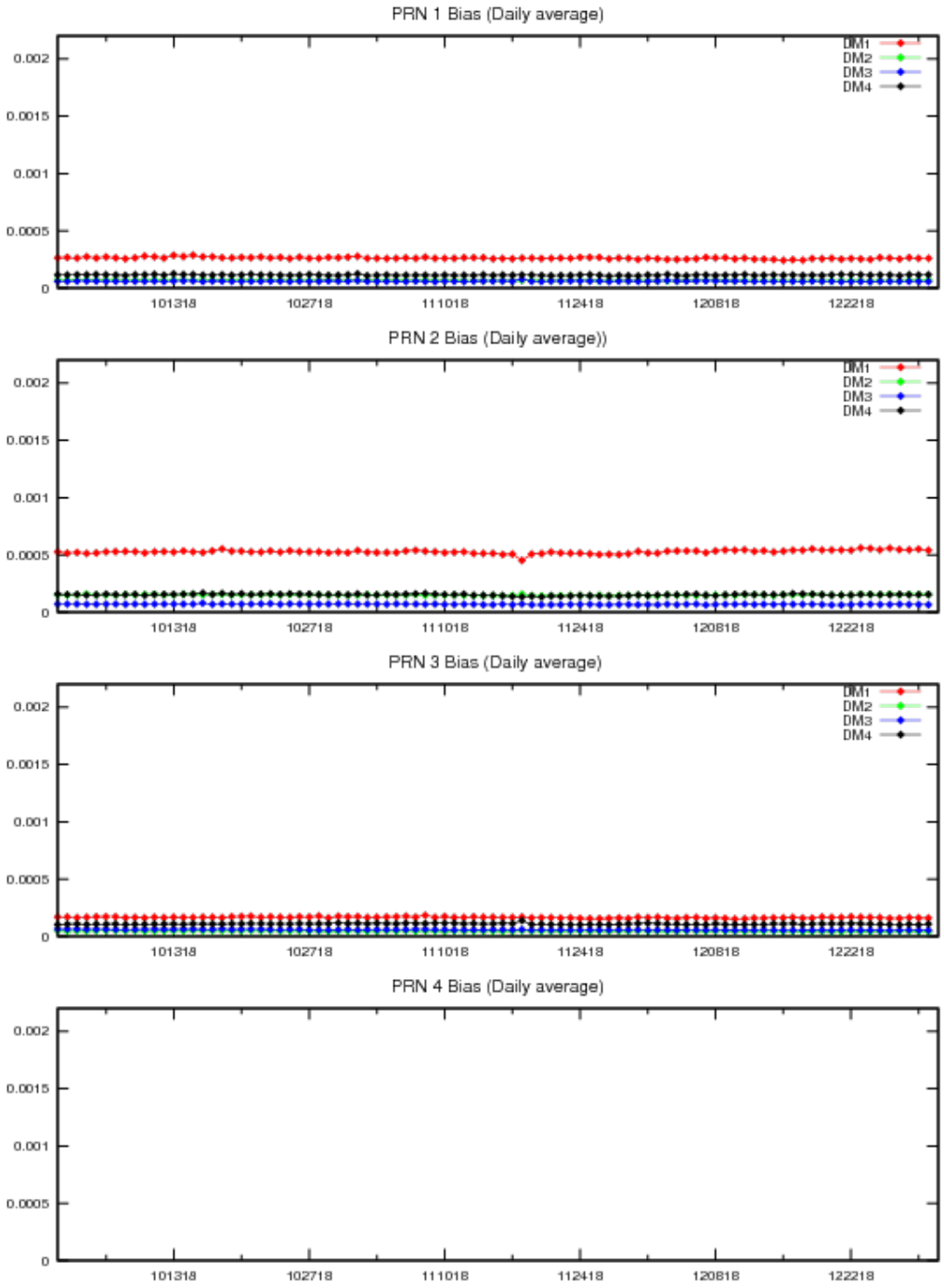


Figure 11-4 PRN Bias Average Trend (PRN5 – PRN8)

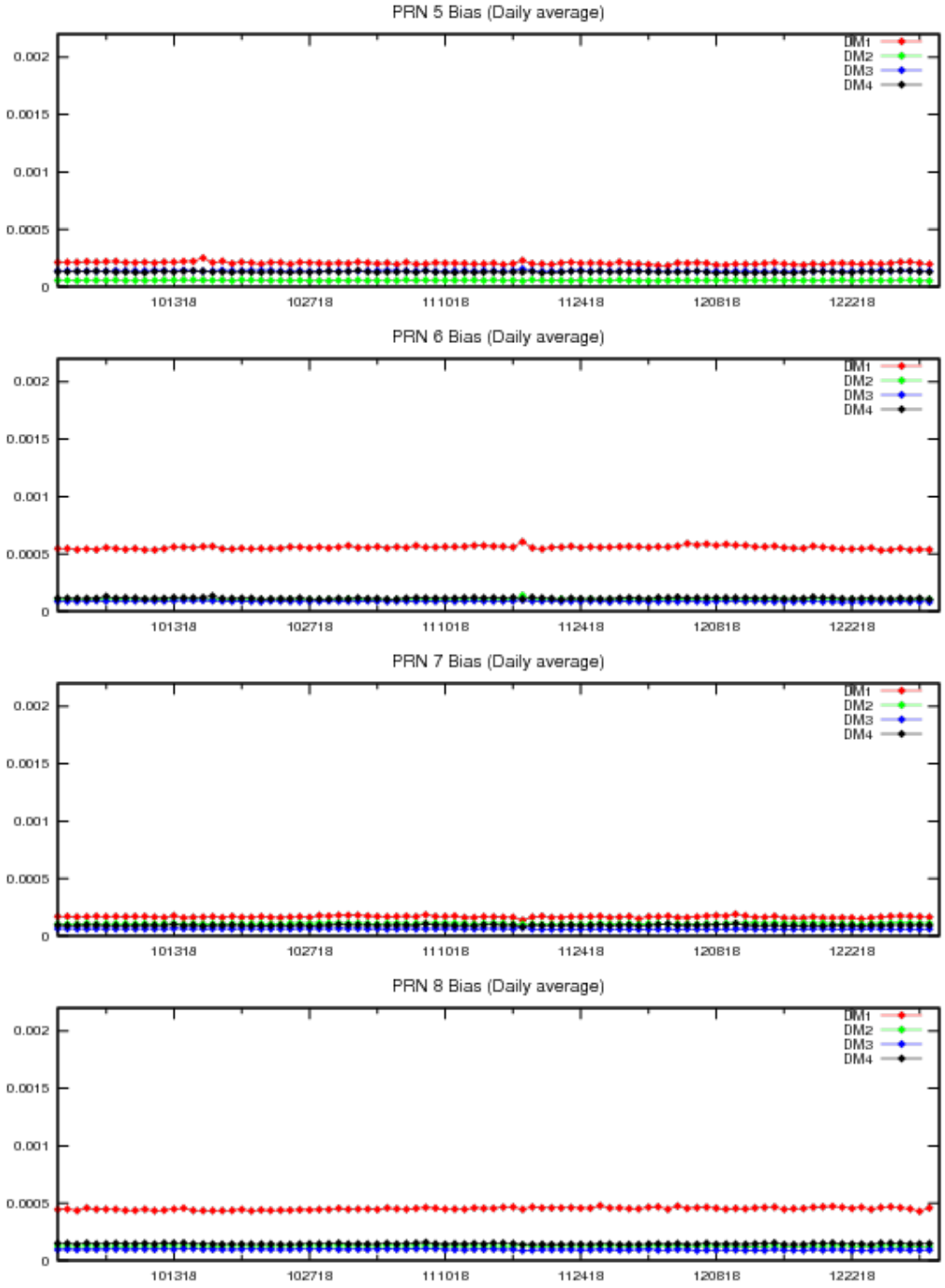


Figure 11-5 PRN Bias Average Trend (PRN9 – PRN12)

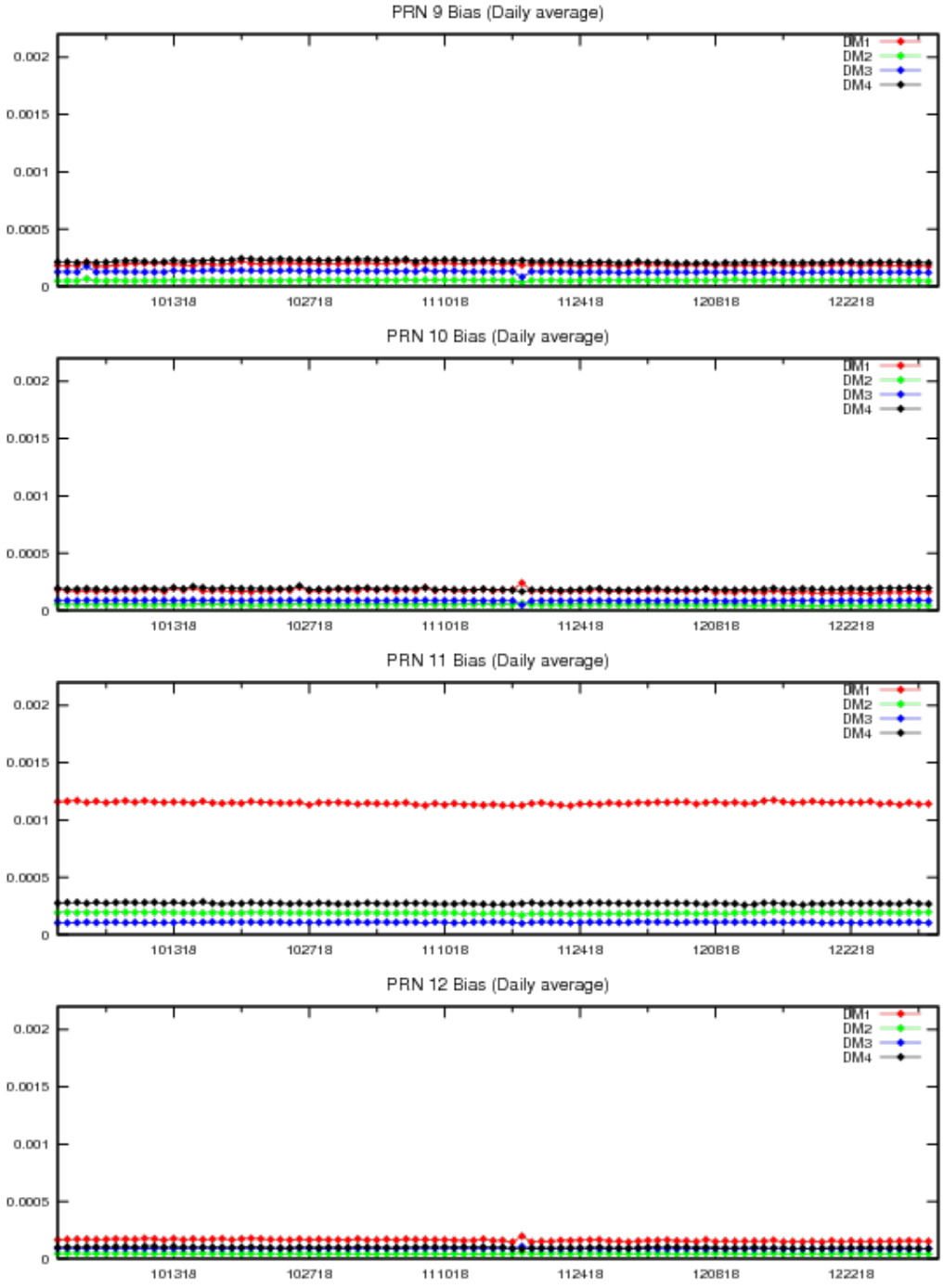


Figure 11-6 PRN Bias Average Trend (PRN13 – PRN16)

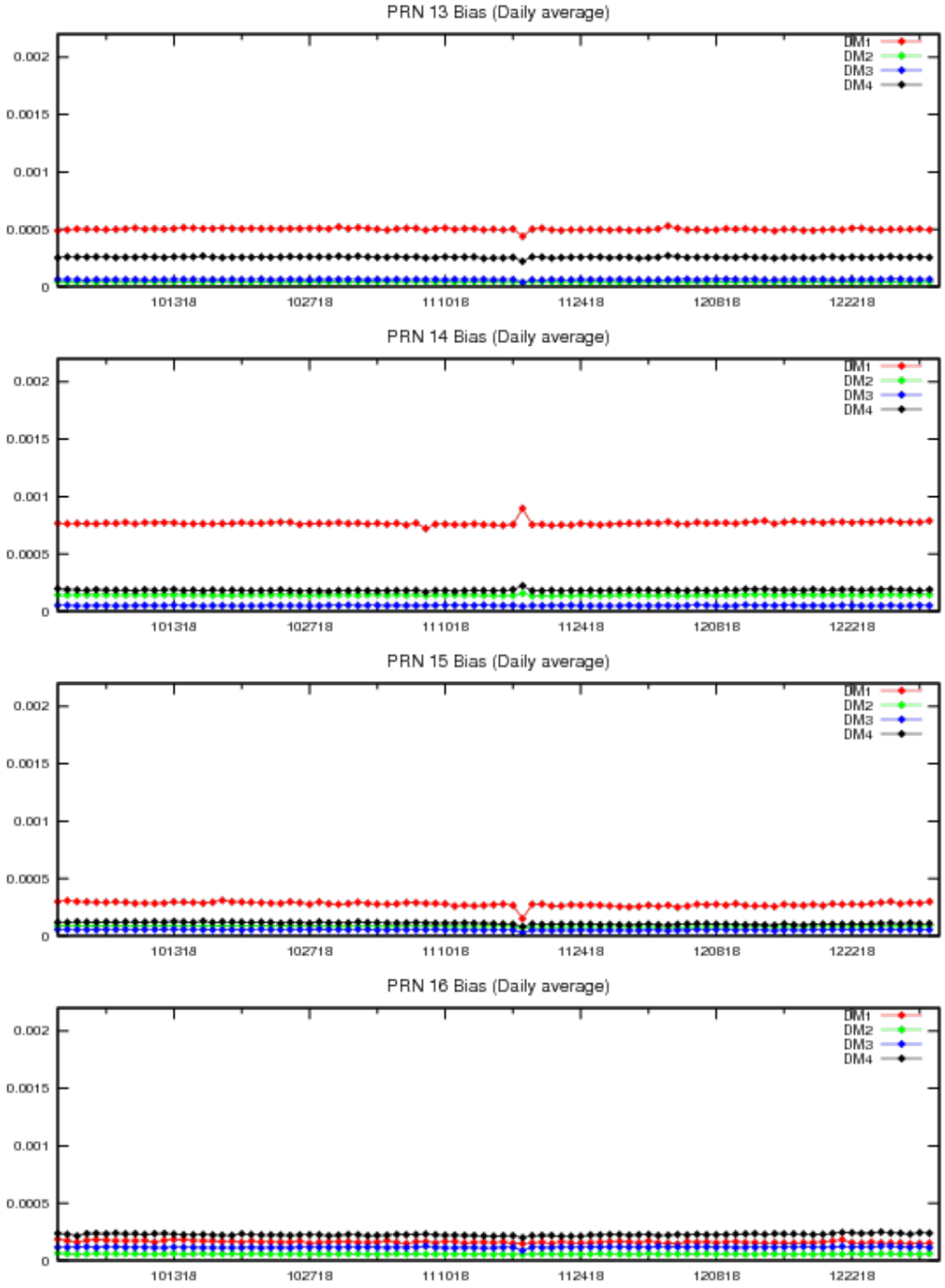


Figure 11-7 PRN Bias Average Trend (PRN17 – PRN20)

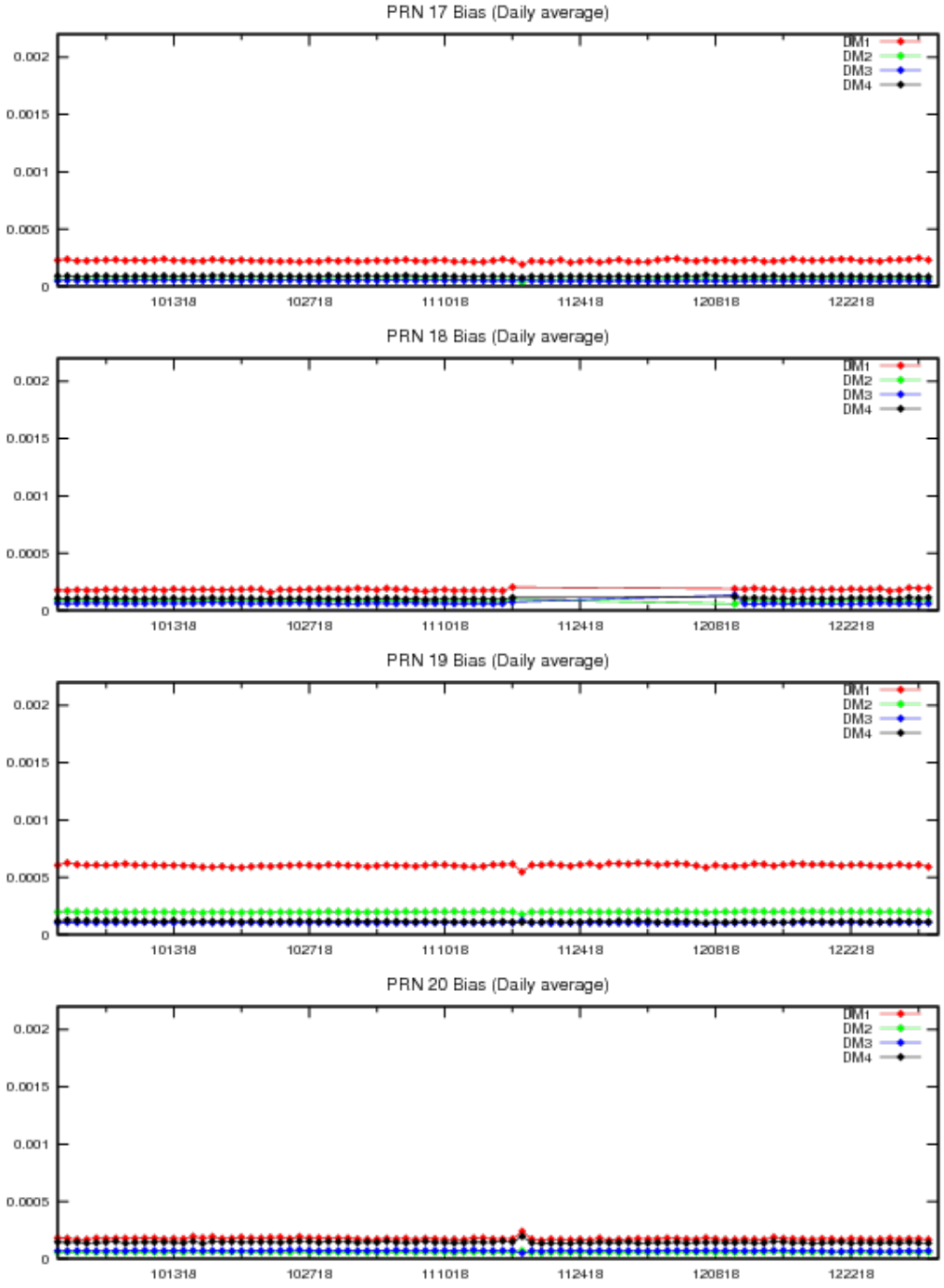


Figure 11-8 PRN Bias Average Trend (PRN21 – PRN24)

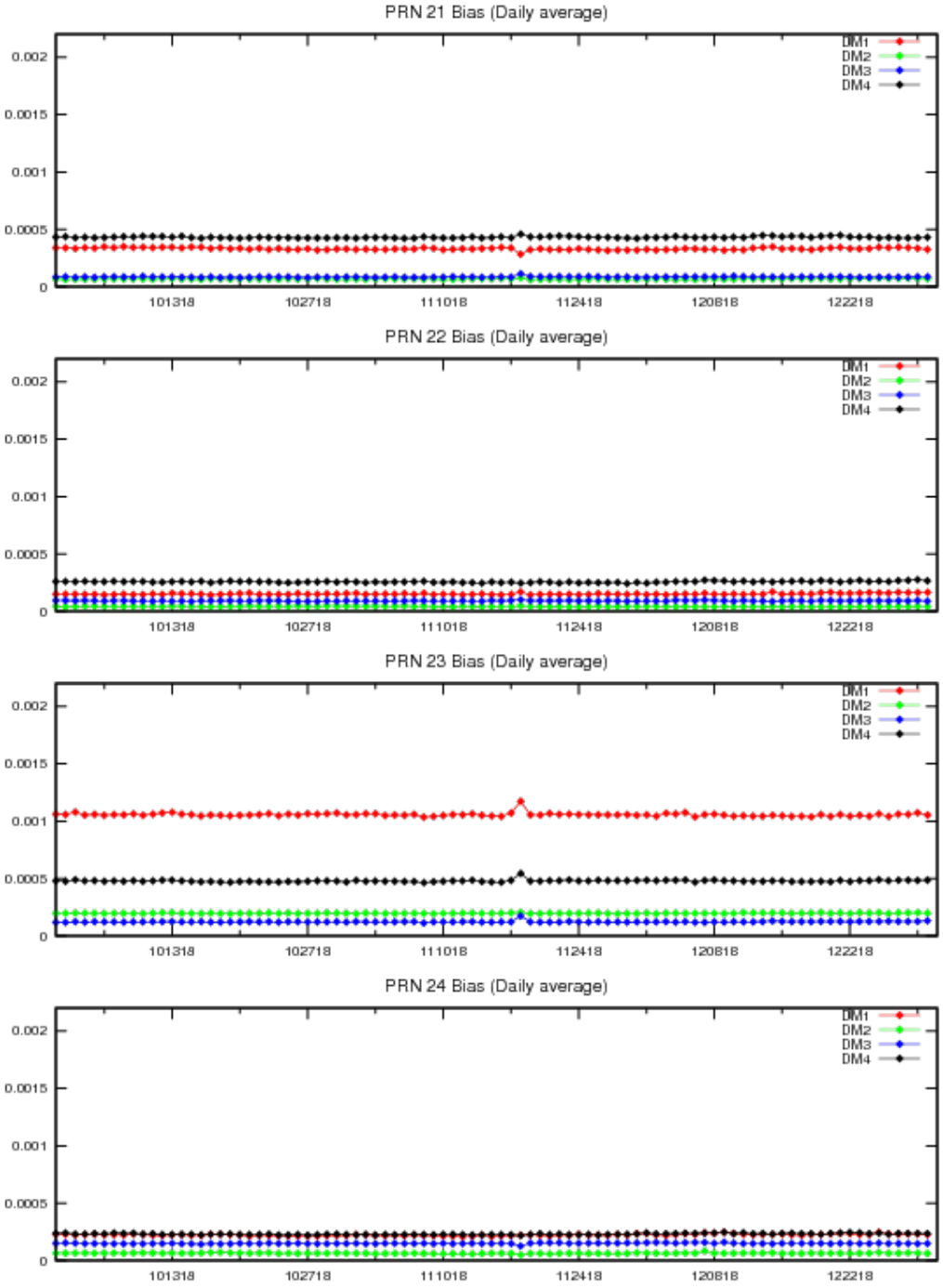


Figure 11-9 PRN Bias Average Trend (PRN25 – PRN28)

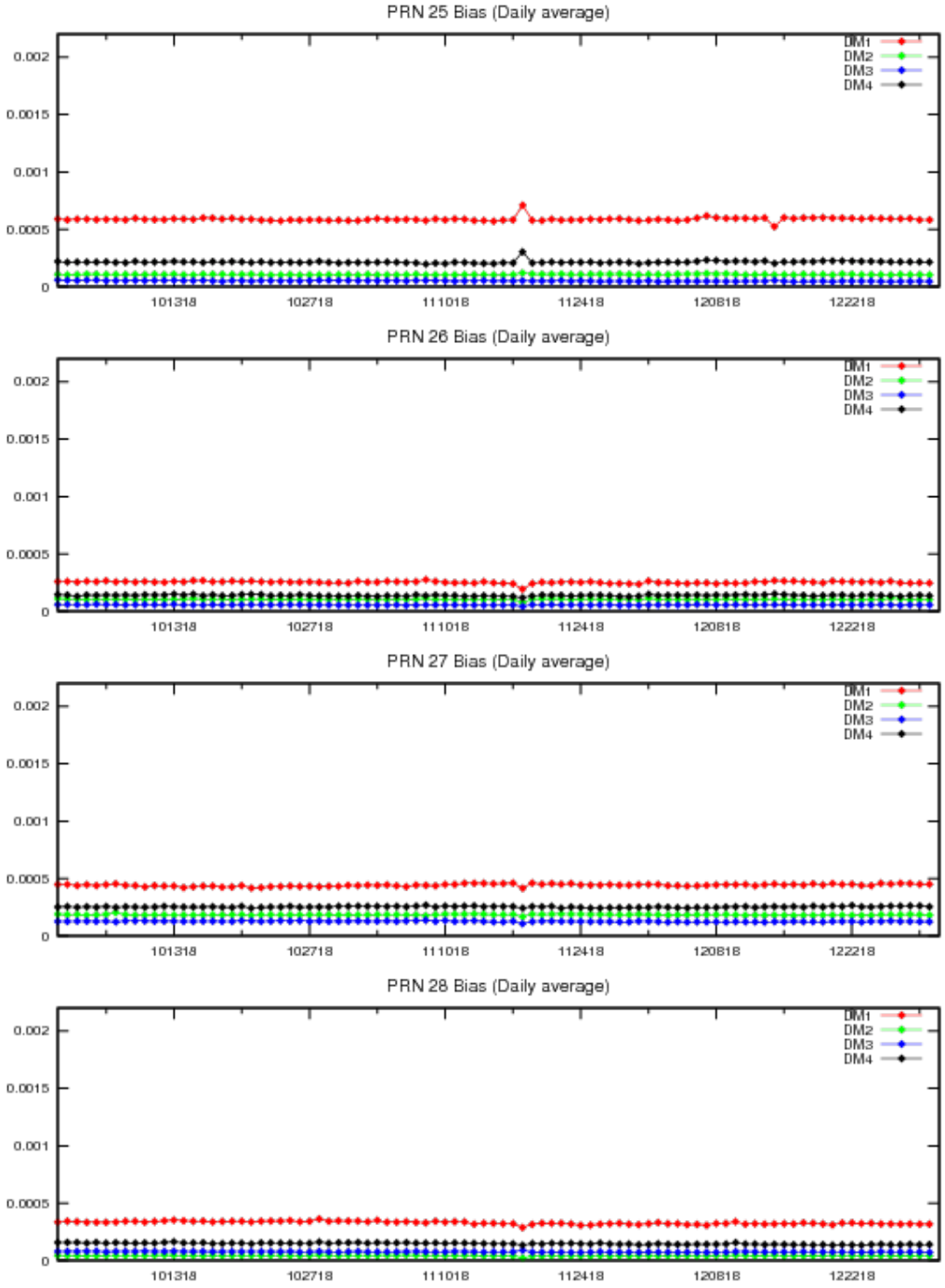
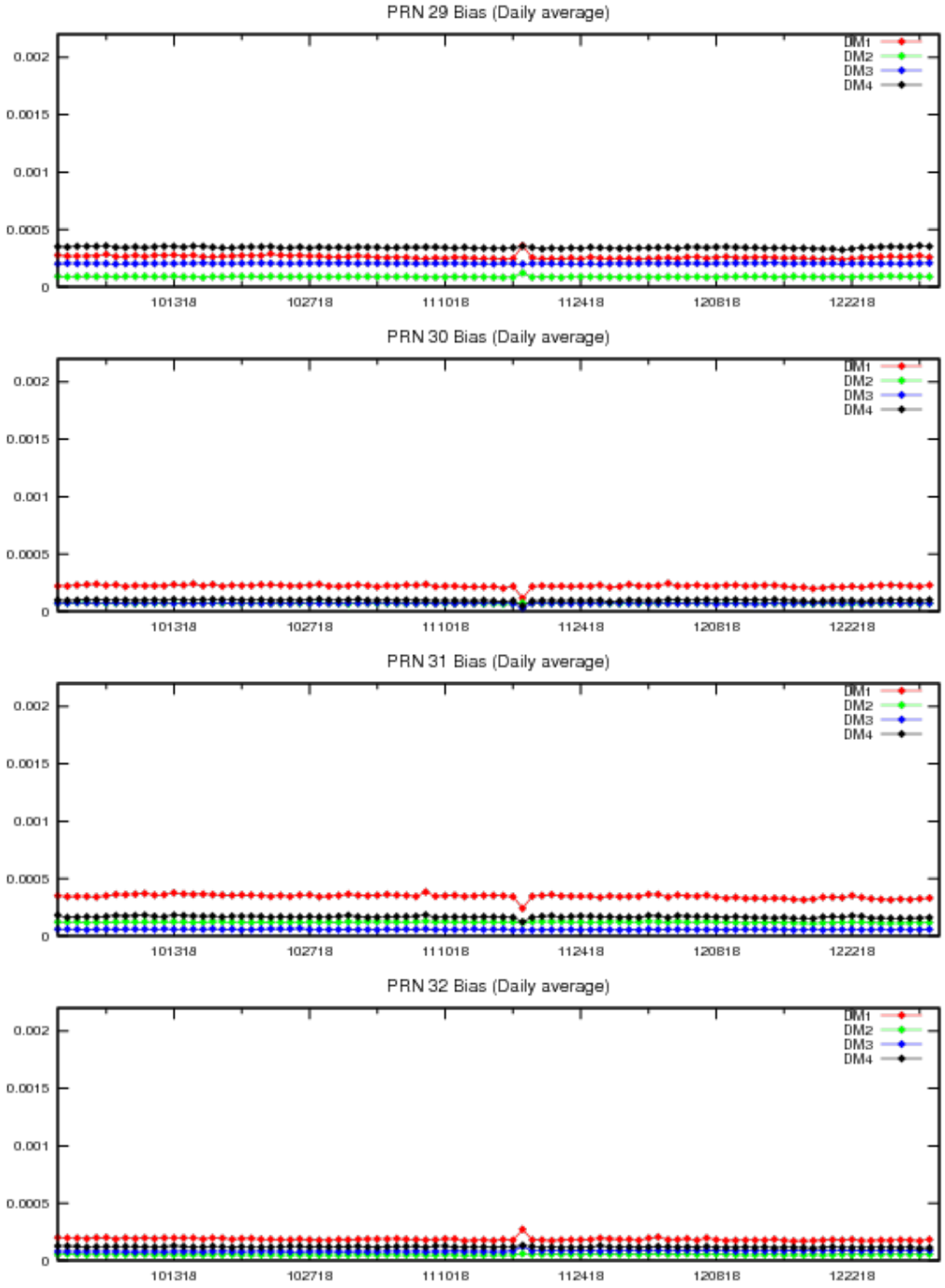


Figure 11-10 PRN Bias Average Trend (PRN29 – PRN32)



11.4 SQM Trips

A SQM trip occurs when the estimated deformation exceeds threshold. For this reporting quarter, there were no trips reported.

Appendix A: Glossary and Acronyms

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.

AMR. GEO PRN133

APC. Antenna phase center

ARP. Antenna reference point

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

CNMP. Code noise and multipath

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 the 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.

CRE. GEO PRN138

CRW. GEO PRN135

CSRS. Canadian Spatial Reference System

DM. Detection metrics

DR. Discrepancy Report.

ECEF. Earth-centered, Earth-fixed.

FAA. Federal Aviation Administration

FD. Fault Detection

FDE. Fault Detection and Exclusion. 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

GMT. Greenwich Mean Time

GPS. Global Positioning System. 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.

GIVE. Grid Ionospheric Vertical Error. Indicate the accuracy of ionospheric vertical delay correction at a geographically defined IGP. WAAS transmits one GIVE for each IGP in the mask.

GUS. Ground uplink station

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

HAL. Horizontal alert limit. The radius of a circle in the horizontal plane (the local plane tangent to the WGS-84 ellipsoid), with its center being at the true position, which describes the region that is required to contain the indicated horizontal position with a probability of $1\text{-}10^{-7}$ per flight hour, for a particular navigation mode, assuming the probability of a GPS satellite integrity failure being included in the position solution is less than or equal to 10^{-4} per hour.

HPE. Horizontal position error

HPL. Horizontal protection level. 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 on the error estimates provided by WAAS.

IAP. Instrument Approach Procedures

IGS. International GPS Service.

IGP. Ionsopheric grid point. A geographically defined point for which the WAAS provides the vertical ionospheric delay.

Kp. Planetary index

LNAV. Lateral navigation

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

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

LPV200. Localizer Performance with Vertical Guidance to 200 ft decision height. A WAAS operational service level with a HAL equal to 40 meters and a VAL equal to 35 meters.

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

NAS. National Airspace System

Navigation Message. Message structure designed to carry navigation data.

NGS. National Geodetic Survey

NPA Navigation Mode. 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.

NTSB. National Satellite Test Bed

OCONUS. Outside Contiguous United States

OPUS. Online Positioning Use Server

PAN. Performance Analysis Network

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.

PPP. Precise Point Positioning.

PA Navigation Mode. 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.

PRN. Pseudo-random noise

RAIM. Receiver autonomous integrity monitoring

RFI. Radio frequency interference

RNAV. Area navigation

RNP. Required Navigation Performance

RSS. Residual sum of squares.

SBAS. Space Based Augmentation System

SIS. Signal in space

SQM. Signal quality monitor. 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.

SSM. System support modification

SPS. Standard positioning service. 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.

SVN. Space Vehicle Number.

TOW. Time of GPS week

UDRE. User differential range error. Indicates the accuracy of combined fast and slow error corrections. WAAS transmits one UDRE for each satellite in the mask.

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

VPE. Vertical position error

VPL. Vertical protection level. 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

WAAS. Wide Area Augmentation System. 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 and 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 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.

WIPP. WAAS Integrity Performance Panel

WJHTC. William J. Hughes Technical Center

WRE. Wide-Area Reference Equipment

WRS. WAAS reference station

Appendix B: Additional Coverage Plots

Appendix B includes the coverage plots with 99% LPV200 availability contour, 98% LPV availability contours, and 98% LP availability contours for the quarter. Figure B-1 shows CONUS coverage with 98% LP availability contour. Figure B-2 shows Alaska coverage with 98% LP availability contour. Figure B-3 shows CONUS coverage with 98% LPV availability contour. Figure B-4 shows Alaska coverage with 98% LPV availability contour. Figure B-5 shows CONUS coverage with 99% LPV200 availability contour. Figure B-6 shows Alaska coverage with 99% LPV200 availability contour.

Figure B-1 98% CONUS LP Availability Contour

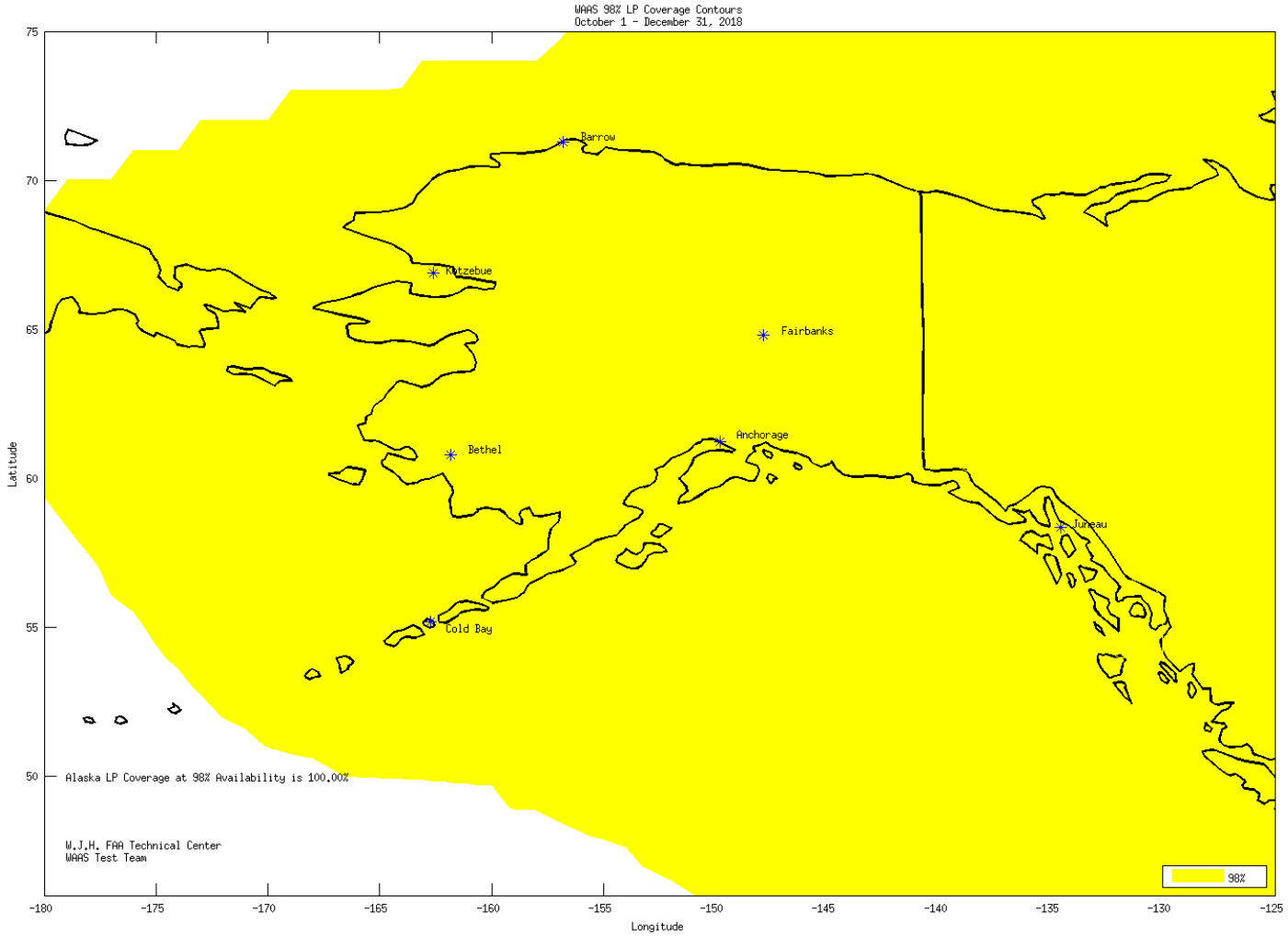


Figure B-2 98% Alaska LP Availability Contour

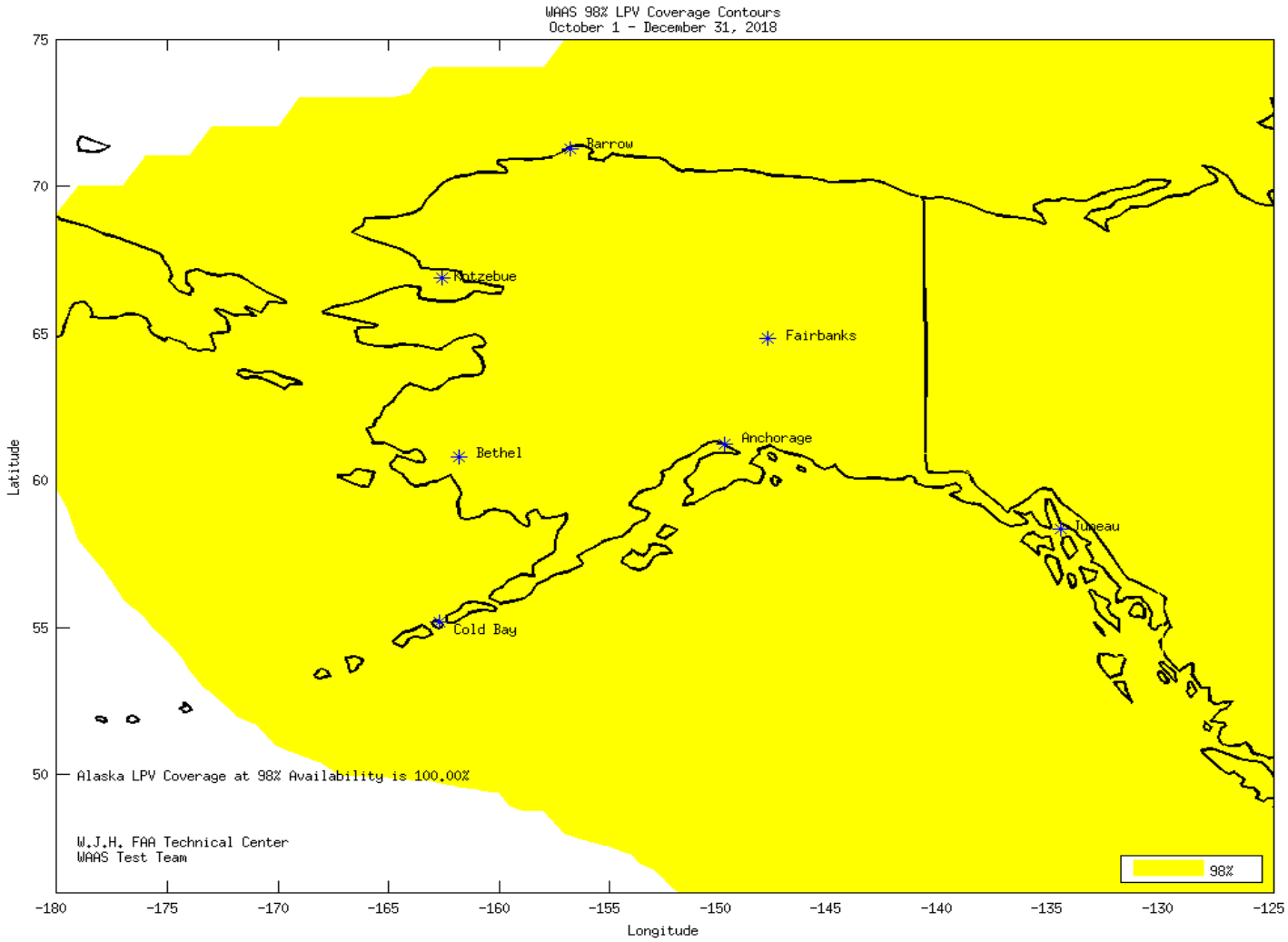


Figure B-3 98% CONUS LPV Availability Contour

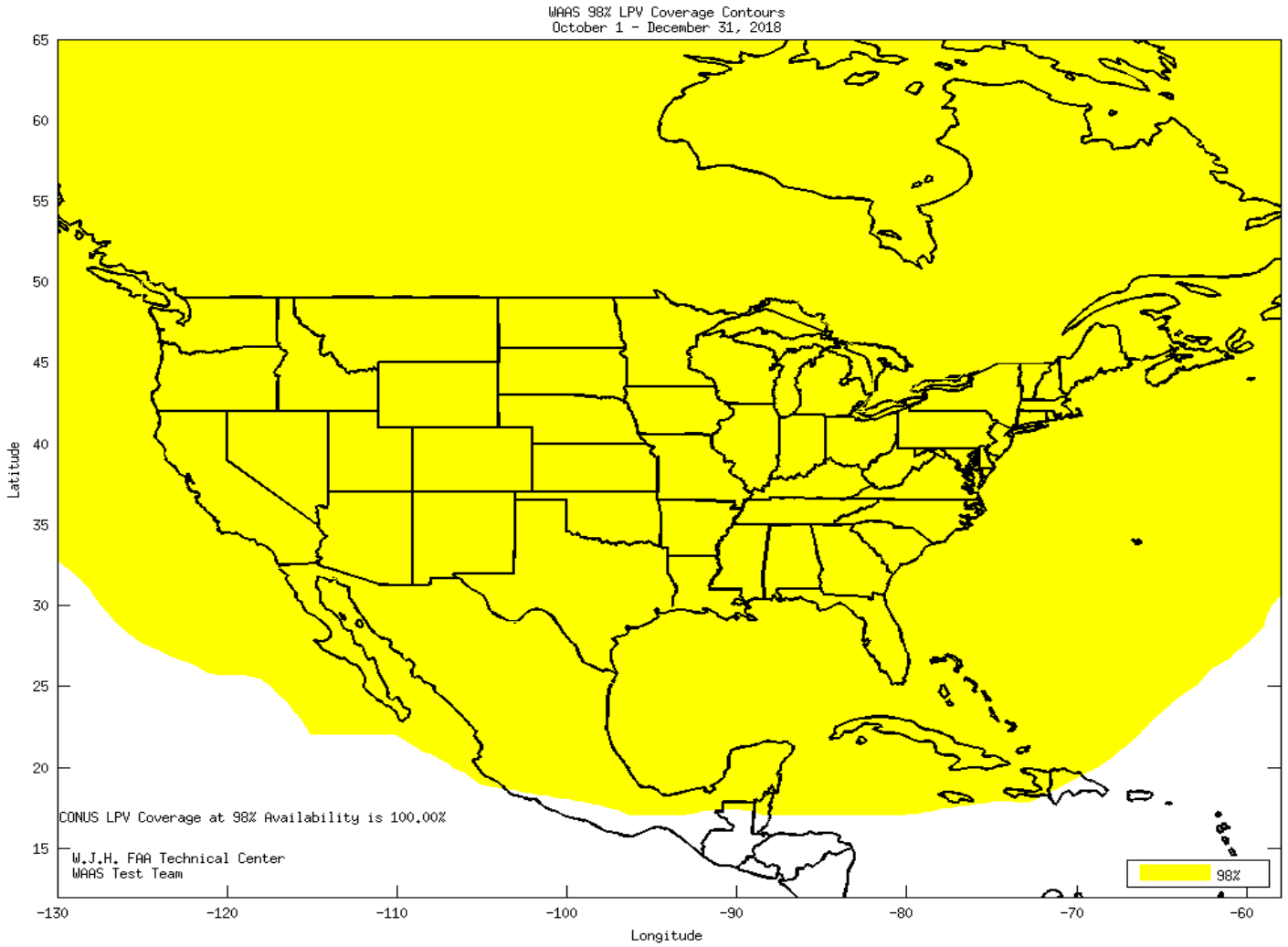


Figure B-4 98% Alaska LPV Availability Contour

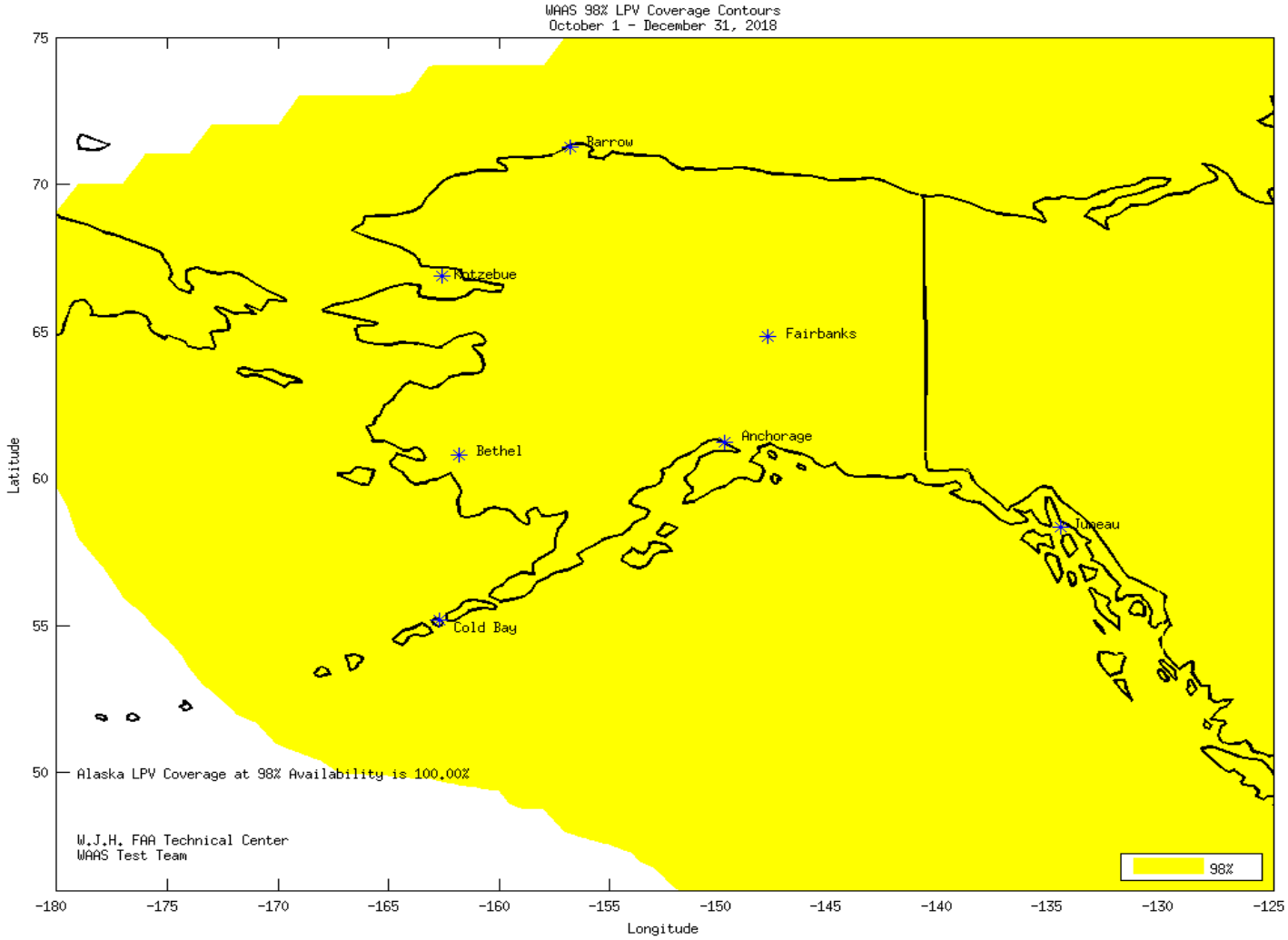


Figure B-5 98% CONUS LPV200 Availability Contour

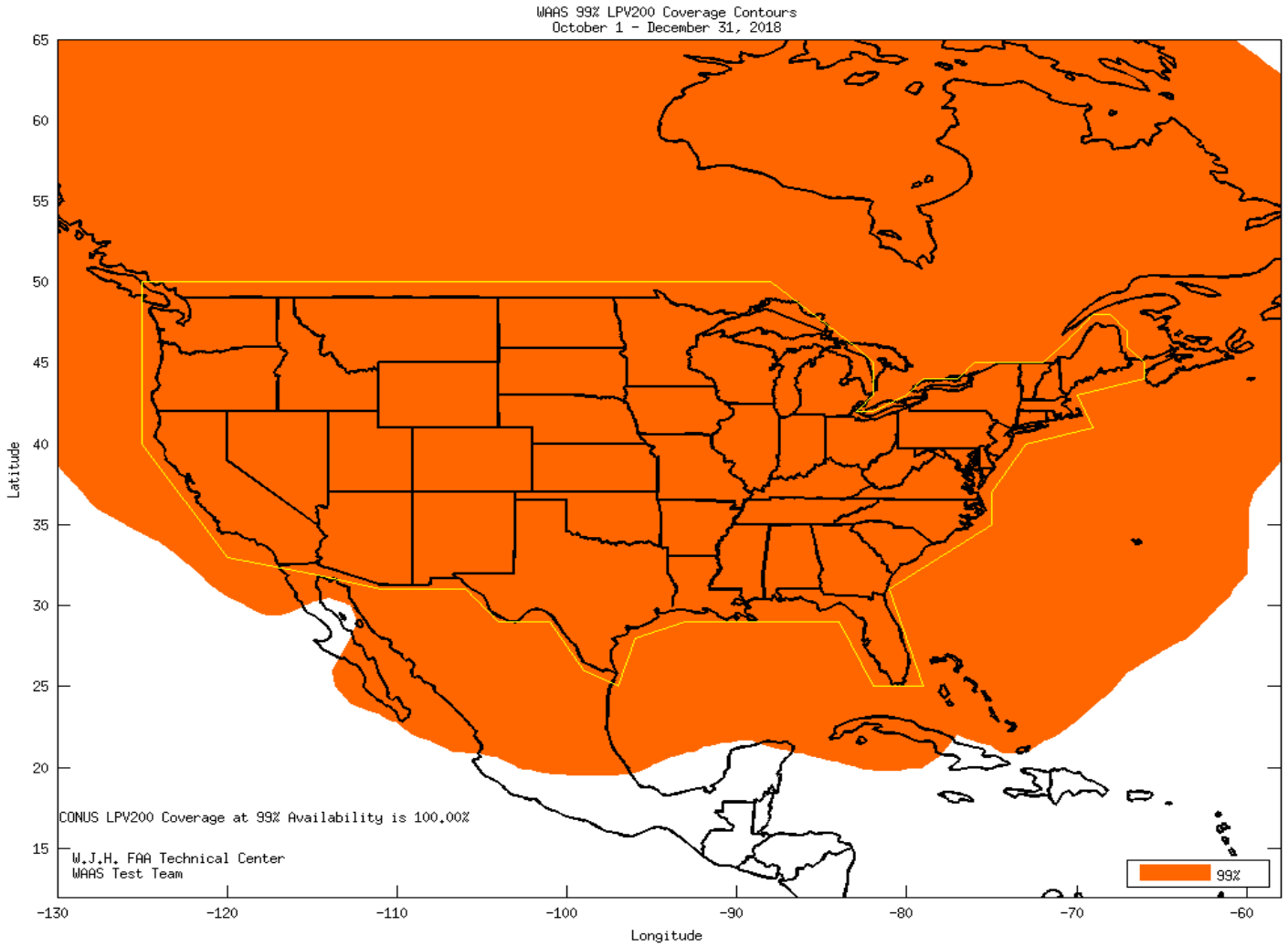


Figure B-6 98% Alaska LPV200 Availability Contour