Satellite Navigation Branch, ANG-E66
NSTB/WAAS T&E Team

WIDE AREA AUGMENTATION SYSTEM PERFORMANCE ANALYSIS REPORT

July 2022

Report #81
Reporting Period: April 01, 2022 to June 30, 2022
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Executive Summary

Since 1999, the Wide Area Augmentation System (WAAS) Test Team at the Federal Aviation Administration (FAA) William J. Hughes Technical Center has reported Global Positioning System (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. This current WAAS PAN Report #81 provides WAAS performance data from the April 01, 2022 through June 30, 2022 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 1.308 meters	Memphis 0.519 meters	Juneau 0.730 meters	Barrow 0.645 meters
95% Vertical Accuracy (VPL <= 50 meters)	Atlantic City 1.701 meters	Denver 0.801 meters	Barrow 1.449 meters	Juneau 1.124 meters
LP Availability (HPL <= 40 meters)	Multiple Sites 100%	Miami 99.92%	All Sites 100%	All Sites 100%
LPV Availability (HPL <= 40 meters & VPL <= 50 meters)	Multiple Sites 100%	Miami 99.92%	All Sites 100%	All Sites 100%
LPV200 Availability (HPL <= 40 meters & VPL <= 35 meters)	Multiple Sites 100%	Miami 99.88%	Anchorage 100%	Barrow 99.88%
99% HPL	Miami 17.387 meters	Denver 10.452 meters	Cold Bay 19.285 meters	Juneau 13.194 meters
99% VPL	Arcata 28.436 meters	Denver 19.550 meters	Barrow 30.948 meters	Juneau 22.141 meters

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1.0 INTRODUCTION

The Federal Aviation Administration (FAA) monitors the Wide Area Augmentation System (WAAS) and Global Positioning System (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), 133 (S15), and 138 (CRE). SM9, S15 and CRE 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	68	5878435
Atlantic City	89	7707472
Oklahoma City	79	6826921
WAAS:		
Albuquerque	91	7861673
Anchorage	91	7861100
Atlanta	91	7861727
Barrow	91	7851947
Bethel	91	7852090
Billings	91	7861633
Boston	91	7861764
Chicago	91	7861184
Cleveland	91	7853045
Cold Bay	91	7860230
Dallas	91	7860286
Denver	91	7854791
Fairbanks	91	7861445
Gander	91	7855747
Goose Bay	90	7774618
Houston	91	7853759
Iqaluit	90	7758569
Jacksonville	91	7853921
Juneau	91	7860053
Kansas City	91	7849688
Kotzebue	89	7680025
Los Angeles	91	7851846
Memphis	91	7861622
Merida	90	7735744
Mexico City	90	7741100
Miami	91	7860840
Minneapolis	91	7861324
New York	91	7861988
Oakland	91	7846699
Puerto Vallarta	90	7742649
Salt Lake City	89	7688866
San Jose Del Cabo	83	7167185
Seattle	91	7852002
Washington DC	91	7858846
Winnipeg	91	7861245

Table 1-3 NPA Evaluation Site

Location	Number of Days Evaluated	Number of Samples
Albuquerque	91	7862363
Anchorage	91	7862362
Atlanta	91	7862363
Barrow	91	7852448
Bethel	91	7852175
Billings	91	7859779
Boston	91	7862362
Cleveland	91	7862364
Cold Bay	91	7860608
Fairbanks	91	7862184
Gander	91	7862010
Honolulu	91	7862356
Houston	91	7862359
Iqaluit	90	7761796
Juneau	91	7862345
Kansas City	91	7862359
Kotzebue	90	7758330
Los Angeles	91	7862363
Merida	90	7763201
Miami	91	7862359
Minneapolis	91	7862359
Oakland	91	7862363
Salt Lake City	90	7767614
San Jose Del Cabo	85	7315159
San Juan	91	7862364
Seattle	91	7862320
Tapachula	87	7478864
Washington DC	91	7862364

This 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 < 556 m
Availability LNAV Alaska	99.9% availability with HPL < 556 m
Availability En Route OCONUS	99.9% availability with HPL < 2 nmi
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
04/01/2022	04/01/2022	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200 CONUS	Geomagnetic activity (Kp = 4) disturbed the ionosphere causing elevated GIVE values. This resulted in significant degradation of: (1) LPV200 service coverage in CONUS (FL, GA, SC) from 16:35 UTC to 18:40 UTC; and (2) LPV service coverage in CONUS from 16:35 UTC to 18:30 UTC. Please see plot(s): LPV_4/1/2022 LPV200_4/1/2022 Cov_vs_Time_Conus_4/1/2022
04/08/2022	04/08/2022		LPV200 Canada	Geomagnetic activity (Kp = 4) disturbed the ionosphere causing elevated GIVE values. This resulted in moderate degradation of: (1) LPV200 service coverage in Canada from 02:00 UTC to 02:10 UTC and from 06:45 UTC to 06:55 UTC; and (2) LPV service coverage in Canada from 06:45

Start Date	End Date	Location Satellite	Service Affected	Event Description
				UTC to 06:55 UTC. Please see plot(s): LPV200_4/8/2022 Cov_vs_Time_Conus_4/8/2022
04/14/2022	04/14/2022	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV Canada, LPV200 CONUS, LPV200 Canada	Geomagnetic activity (Kp = 6) disturbed the ionosphere causing elevated GIVE values. This resulted in significant degradation of LPV200 service coverage in Canada from 18:45 UTC to 20:25 UTC. The elevated GIVE values also caused moderate degradation of: (1) LPV200 service coverage in CONUS (WA, OR, and CA) from 19:55 UTC to 20:35 UTC; and (2) LPV service coverage in Canada from 19:30 UTC to 20:00 UTC. Please see plot(s): LPV200_4/14/2022 Cov_vs_Time_Canada_4/14/2022 Cov_vs_Time_Conus_4/14/2022
04/21/2022	04/21/2022	PRN17	LPV200 CONUS	The reduction in LPV200 service in CONUS was due to a GPS NANU on PRN17 (see NANU2022021) which was unusable from 16:13 UTC to 21:14 UTC. The NANU caused moderate degradation of LPV200 service coverage in CONUS (CA, OR) from 20:15 UTC to 20:35 UTC. Please see plot(s): LPV200_4/21/2022 Cov_vs_Time_Conus_4/21/2022
4/25/2022	4/25/2022	GEO135	None	SSM-WAAS-061: This system support modification (SSM) incorporates GEO 135 (G30) to the WAAS system at 15:50 UTC.
05/17/2022	05/17/2022	GEO138	None	SSM-061: This system support modification (SSM) decommissioned GEO 138 from WAAS service. This also decommissioned Brewster-B (BRE-B) and Woodbine (QWE) from WAAS service. This SSM also updates the ionospheric grid point (IGP) and PRN masks. TOW 225045
05/19/2022	05/20/2022	PRN18	LPV CONUS, LPV Canada, LPV200 CONUS, LPV200 Alaska, LPV200 Canada	The reduction in LPV200 service in CONUS, Alaska, and Canada was due to a GPS NANU on PRN18 (see NANU2022023), which was unusable from 20:19 UTC on 5/19 to 02:03 UTC on 5/20. The NANU caused moderate degradation of: (1) LPV200 service coverage in CONUS from 21:10 UTC to 21:55 UTC on 5/19, (2) LPV200 service coverage in Alaska from 00:00 UTC to 00:40 UTC on 5/20, and (3) LPV200 service coverage in Canada from 22:10 UTC to 22:15 UTC on 5/19, from 23:35 UTC to 23:59 UTC on 5/19. The NANU also caused minor degradation of: (1) LPV200 service coverage in Alaska from 23:40 UTC to 23:59 UTC on 5/19; (2) LPV service coverage in CONUS from 21:20 UTC to 21:30 UTC on 5/19; and (3)

Start Date	End Date	Location Satellite	Service Affected	Event Description
				LPV service coverage in Canada from 00:00 to 00:30 UTC on 5/20. Please see plot(s): LPV_5/19/2022 LPV200_5/19/2022 LPV200_5/20/2022 Cov_vs_Time_Alaska_5/20/2022 Cov_vs_Time_Canada_5/20/2022 Cov_vs_Time_Conus_5/20/2022
05/21/2022	05/21/2022	GEO133, Brewster (BR1)	LPV200 Canada	The uplink for the S15 GEO, PRN133 switched from the Brewster uplink site to the South Mountain uplink site at 09:13:53 UTC after Brewster faulted. This caused a 14-second outage of the GEO 133 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN133. The elevated UDREs on GEO 133 caused moderate degradation of LPV200 service coverage in Canada from 13:45 UTC 14:00 UTC, from 14:55 UTC to 15:00 UTC and from 15:25 UTC to 15:31 UTC. TOW 551651-551666
05/26/2022	05/27/2022	PRN12	LPV200 Alaska, LPV200 Canada	The reduction in LPV200 service in Alaska and Canada was due to a GPS NANU on PRN12 (see NANU2022026) which was unusable from 17:26 UTC on 5/26 to 00:07 UTC on 5/27. The NANU caused moderate degradation of (1) LPV200 service coverage in Alaska from 17:35 UTC to 18:30 UTC on 5/26, and (2) LPV200 service coverage in Canada from 18:00 UTC to 18:25 UTC on 5/26. Please see plot(s): LPV200_5/26/2022 Cov_vs_Time_Alaska_5/26/2022 Cov_vs_Time_Canada_5/26/2022
06/24/2022	06/24/2022	PRN9	LPV200 CONUS	The reduction in LPV200 service in CONUS was due to a GPS NANU on PRN9 (see NANU2022030) which was unusable from 08:15 UTC to 13:35 UTC. The NANU caused moderate degradation of LPV200 service coverage in CONUS (Gulf of Mexico to Missouri) from 09:00 UTC to 09:30 UTC. Please see plot(s): LPV200_6/24/2022 Cov_vs_Time_Conus_6/24/2022
6/26/2022	6/26/2022	Washington D.C. (CnV), Los Angeles (CnV), Atlanta (CnV)	LPV200 Canada	Geomagnetic activity (Kp = 5) disturbed the ionosphere causing elevated GIVE values. This resulted in significant degradation of LPV200 service coverage in Canada from 00:45 UTC to 00:55 UTC and from 01:25 UTC to 01:30 UTC. Please see plot(s): LPV200_6/26/2022 Cov_vs_Time_Canada_6/26/2022

Table 1-6. WAAS Upgrades

Start Date	End Date	Location Satellite	Event Description
N/A	N/A	N/A	N/A

Table 1-7. GUS Switchovers

Start Date	End Date	GUS Switch	Location Satellite	Service Affected	Event Description
04/07/2022	04/07/2022	Manual	GEO131, Santa_Paula (SZ1)	None	The uplink for the SM9 GEO, PRN131 switched from the Santa Paula uplink site to the Southbury uplink site 07:33:48 UTC. This caused a 3-second outage of the GEO 131 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN131. There was no impact on coverage. TOW 372846-372850
04/18/2022	04/18/2022	Manual	GEO133, South Mountain (CM1)	None	The uplink for the S15 GEO, PRN133 switched from the South Mountain uplink site to the Brewster uplink site at 07:03:07 UTC. This caused a 3-second outage of the GEO 133 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN133. There was no impact on coverage. TOW 111805-111809
04/20/2022	04/20/2022	Manual	GEO138, Woodbine (QWE)	None	The uplink for the CRE GEO, PRN138 switched from the Woodbine uplink site to the Brewster-B uplink site at 00:40:24 UTC. This caused a 4-second outage of the GEO 138 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN138. There was no impact on coverage. TOW 261642-261647
04/23/2022	04/23/2022	Manual	GEO133, Brewster (BR1)	None	The uplink for the S15 GEO, PRN133 switched from the Brewster uplink site to the South Mountain uplink site at 10:49:58 UTC. This caused a 4-second outage of the GEO 133 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN133. There was no impact on coverage. TOW 557416-557421
04/26/2022	04/26/2022	Manual	GEO131, Southbury (DX1)	None	The uplink for the SM9 GEO, PRN131 switched from the Southbury uplink site to the Santa Paula uplink site at 01:01:45 UTC. This caused a 4-second outage of the GEO 131 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN131. There was no impact on coverage. TOW 176523-176528
05/04/2022	05/04/2022	Manual	GEO138, Brewster-B (BRE-B)	None	The uplink for the CRE GEO, PRN138 switched from the Brewster-B uplink site to the Woodbine uplink site at 07:02:53 UTC. This caused a 3-second outage of the GEO 138 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize

Start Date	End Date	GUS Switch	Location Satellite	Service Affected	Event Description
					for PRN138. There was no impact on coverage. TOW 284591-284595
05/05/2022	05/05/2022	Manual	GEO131, Santa Paula (SZ1)	None	The uplink for the SM9 GEO, PRN131 switched from the Santa Paula uplink site to the Southbury uplink site 07:02:12 UTC. This caused a 3-second outage of the GEO 131 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN131. There was no impact on coverage. TOW 370950-370954
05/21/2022	05/21/2022	Manual	GEO133, South Mountain (CM1)	None	The uplink for the S15 GEO, PRN133 switched from the South Mountain uplink site to the Brewster uplink site at 07:11:30 UTC. This caused a 3-second outage of the GEO 133 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN133. There was no impact on coverage. TOW 544308-544312
05/21/2022	05/21/2022	Faulted	GEO133, Brewster (BR1)	LPV200 Canada	The uplink for the S15 GEO, PRN133 switched from the Brewster uplink site to the South Mountain uplink site at 09:13:53 UTC after Brewster faulted. This caused a 14-second outage of the GEO 133 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN133. The elevated UDREs on GEO 133 caused moderate degradation of LPV200 service coverage in Canada from 13:45 UTC 14:00 UTC, from 14:55 UTC to 15:00 UTC and from 15:25 UTC to 15:31 UTC. TOW 551651-551666
05/25/2022	05/25/2022	Manual	GEO131, Southbury (DX1)	None	The uplink for the SM9 GEO, PRN131 switched from the Southbury uplink site to the Santa Paula uplink site 07:52:35 UTC. This caused a 3-second outage of the GEO 131 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN131. There was no impact on coverage. TOW 287573-287577
05/26/2022	05/26/2022	Manual	GEO133, South Mountain (CM1)	None	The uplink for the S15 GEO, PRN133 switched from the South Mountain uplink site to the Brewster uplink site at 07:19:06 UTC. This caused a 3-second outage of the GEO 133 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN133. There was no impact on coverage. TOW 371964-371968
05/31/2022	05/31/2022	Manual	GEO131, Santa Paula (SZ1)	None	The uplink for the SM9 GEO, PRN131 switched from the Santa Paula uplink site to the Southbury uplink site 07:19:06 UTC. This caused a 3-second outage of the GEO 131 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize

Start Date	End Date	GUS Switch	Location Satellite	Service Affected	Event Description
					for PRN131. There was no impact on coverage. TOW 198061-198065
06/16/2022	06/16/2022	Manual	GEO133, Brewster (BR1)	None	The uplink for the S15 GEO, PRN133 switched from the Brewster uplink site to the South Mountain uplink site at 07:03:36 UTC. This caused a 3-second outage of the GEO 133 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN133. There was no impact on coverage. TOW 371034-371038

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 PA Evaluation Sites and NPA Evaluation Site). 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, SM9, and S15.

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, SM9, S15 and G30.

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 1.308 meters observed at Arcata.
- The maximum 95% CONUS vertical LPV error was 1.701 meters observed at Atlantic City.
- The minimum 95% CONUS horizontal LPV errors was 0.519 meters observed at Memphis.
- The minimum 95% CONUS vertical LPV error was 0.801 meters observed at Denver.

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	95% Vertical
Arcata	1.308	1.308	1.415	100	*	*
Atlantic City	1.211	1.211	1.701	100	*	*
Oklahoma City	1.273	1.273	1.436	100	*	*
Albuquerque	0.593	0.593	1.092	100	2.18	4.46
Anchorage	0.658	0.658	1.291	100	2.87	4.41
Atlanta	0.701	0.701	1.150	100	2.24	4.18
Barrow	0.645	0.645	1.449	100	2.79	4.13
Bethel	0.672	0.672	1.271	100	2.70	5.25
Billings	0.612	0.612	0.839	100	1.74	4.16
Boston	0.628	0.628	0.981	100	1.8	4.09
Chicago	0.706	0.706	0.960	100	*	*
Cleveland	0.643	0.643	0.988	100	1.72	4
Cold Bay	0.710	0.710	1.162	100	1.99	5.74
Dallas	0.563	0.563	1.289	100	*	*
Denver	0.561	0.561	0.801	100	*	*
Fairbanks	0.647	0.647	1.348	100	3.13	3.90
Gander	0.677	0.677	1.169	100	2.09	3.48
Goose Bay	0.667	0.667	1.222	100	*	*
Houston	0.586	0.586	1.493	100	2.76	3.95
Iqaluit	0.826	0.827	1.370	100	*	*
Jacksonville	0.654	0.655	1.124	100	*	*
Juneau	0.730	0.730	1.124	100	2.58	3.61
Kansas City	0.548	0.548	0.945	100	1.88	4.25
Kotzebue	0.650	0.650	1.438	100	3.16	4.48
Los Angeles	0.853	0.853	1.578	100	2.93	4.97
Memphis	0.519	0.519	1.088	100	*	*
Merida	0.863	0.863	1.859	99.999	3.79	4.79
Mexico City	0.847	0.847	2.533	100	*	*
Miami	0.904	0.905	1.497	100	3.39	4.46
Minneapolis	0.775	0.775	0.921	100	1.8	3.81
New York	0.615	0.615	1.004	100	*	*
Oakland	0.830	0.830	1.590	100	2.68	5.29
Puerto Vallarta	0.865	0.865	2.314	100	*	*
Salt Lake City	0.545	0.545	0.922	100	1.8	4.74
San Jose Del Cabo	0.958	0.958	2.400	100	4.37	4.70
Seattle	0.646	0.646	0.938	100	1.60	4.71
Washington DC	0.635	0.635	0.960	100	1.82	4
Winnipeg	0.631	0.631	1.005	100	*	*

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 5.334 meters observed at Honolulu.
- The maximum 99.999% horizontal error was 11.813 meters observed at Honolulu.
- The minimum 95% horizontal error was 1.270 meters observed at Salt Lake City.
- The minimum 99.999% horizontal error was 2.769 meters observed at Seattle.

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	1.579	4.103	100	4.350
Anchorage	3.107	5.265	100	5.416
Atlanta	1.869	4.156	100	4.371
Barrow	3.036	4.978	100	5.203
Bethel	2.927	5.575	100	5.923
Billings	1.461	4.724	100	4.885
Boston	1.797	4.544	100	4.728
Cleveland	1.536	3.687	100	3.855
Cold Bay	2.016	5.095	100	5.381
Fairbanks	3.351	5.668	100	5.847
Gander	1.980	5.511	100	5.837
Honolulu	5.334	11.813	100	11.969
Houston	2.331	4.424	100	4.661
Iqaluit	2.219	4.790	100	4.978
Juneau	2.458	4.824	100	4.956
Kansas City	1.419	3.419	100	5.836
Kotzebue	3.388	5.256	100	5.478
Los Angeles	2.210	4.128	100	4.395
Merida	2.951	5.229	100	5.406
Miami	2.785	5.378	100	5.629
Minneapolis	1.652	3.142	100	3.410
Oakland	2.110	3.918	100	4.193
Salt Lake City	1.270	4.310	100	4.523
San Jose Del Cabo	3.315	8.018	100	8.303
San Juan	2.750	11.618	100	12.316
Seattle	1.321	2.769	100	2.913
Tapachula	3.252	8.721	100	9.138
Washington DC	1.739	4.329	100	4.424

Table 2-3 shows the quarterly maximum LPV error statistics: (1) the 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 4.025 meters occurred at Gander and maximum vertical LPV error was 5.887 meters occurred at San Jose Del Cabo.

Table 2-3. Maximum LPV Error Statistics

Location	Horizontal Error (m)	Horizontal Error HPL	Horizontal Maximum Ratio	Vertical Error (m)	Vertical Error VPL	Vertical Maximum Ratio
Arcata	2.373	0.185	0.217	3.451	0.143	0.169
Atlantic City-a	2.228	0.202	0.203	3.842	0.198	0.201
Oklahoma City	2.282	0.203	0.220	3.506	0.191	0.191
Prescott	6.543	0.356	0.419	6.481	0.132	0.232
Albuquerque	1.513	0.152	0.152	3.253	0.104	0.146
Anchorage	2.185	0.137	0.155	2.958	0.144	0.161
Atlanta	1.610	0.102	0.157	3.470	0.170	0.175
Barrow	2.377	0.161	0.161	5.310	0.161	0.194
Bethel	2.084	0.139	0.148	3.183	0.115	0.150
Billings	1.720	0.154	0.171	2.637	0.129	0.152
Boston	1.493	0.136	0.139	2.489	0.096	0.162
Chicago	1.580	0.171	0.175	2.599	0.144	0.173
Cleveland	1.601	0.180	0.180	2.525	0.135	0.159
Cold Bay	1.868	0.095	0.114	2.914	0.152	0.157
Dallas	1.361	0.148	0.148	2.784	0.157	0.191
Denver	1.311	0.118	0.144	2.438	0.091	0.144
Fairbanks	2.199	0.094	0.139	4.902	0.163	0.211
Gander	4.025	0.126	0.150	5.240	0.124	0.142
Goose Bay	2.795	0.079	0.162	4.745	0.198	0.198
Houston	1.689	0.142	0.166	3.190	0.187	0.210
Iqaluit	2.619	0.134	0.149	5.428	0.210	0.210
Jacksonville	1.811	0.164	0.178	3.354	0.152	0.163
Juneau	1.925	0.150	0.156	4.168	0.186	0.186
Kansas City	1.512	0.152	0.154	2.865	0.120	0.182
Kotzebue	2.439	0.092	0.131	4.181	0.135	0.160
Los Angeles	2.030	0.157	0.157	3.401	0.151	0.177
Memphis	1.281	0.109	0.141	2.570	0.148	0.171
Merida	2.318	0.121	0.150	4.468	0.162	0.184
Mexico City	2.374	0.065	0.182	5.400	0.181	0.200
Miami	2.647	0.120	0.185	3.584	0.178	0.178
Minneapolis	1.901	0.205	0.209	3.658	0.159	0.189
New York	1.850	0.179	0.179	2.782	0.183	0.183
Oakland	1.942	0.148	0.148	3.499	0.150	0.186
Puerto Vallarta	2.293	0.061	0.156	4.648	0.122	0.173
Salt Lake City	1.366	0.129	0.140	2.680	0.112	0.147
San Jose Del Cabo	2.977	0.137	0.159	5.887	0.142	0.229
Seattle	1.832	0.155	0.155	2.416	0.159	0.159
Washington DC	1.520	0.167	0.167	2.706	0.130	0.159
Winnipeg	2.159	0.148	0.163	4.356	0.217	0.217

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.

- April 14, 2022—Position errors in CONUS, Alaska and Canada were elevated. The maximum 95% horizontal and vertical LPV errors were 1.515 meters and 2.808 meters at Gander and Iqaluit respectively. The Kp index was 6.
- June 17, 2022—Position errors in CONUS and Alaska were elevated. The maximum 95% horizontal and vertical LPV errors were 1.132 meters and 2.314 meters at Oakland. The Kp index was 4.

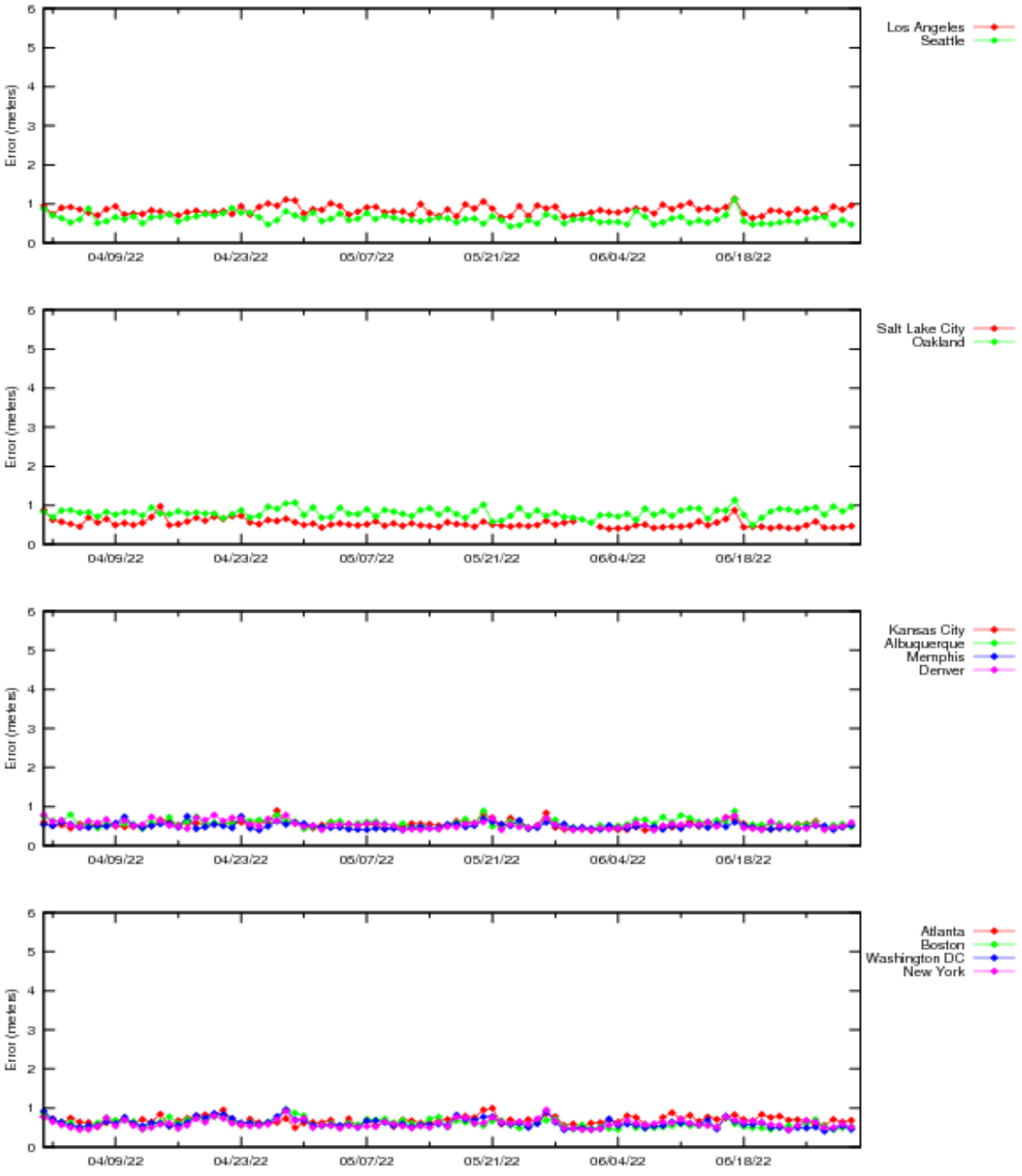

Figure 2-1. LPV 95% Horizontal Accuracy

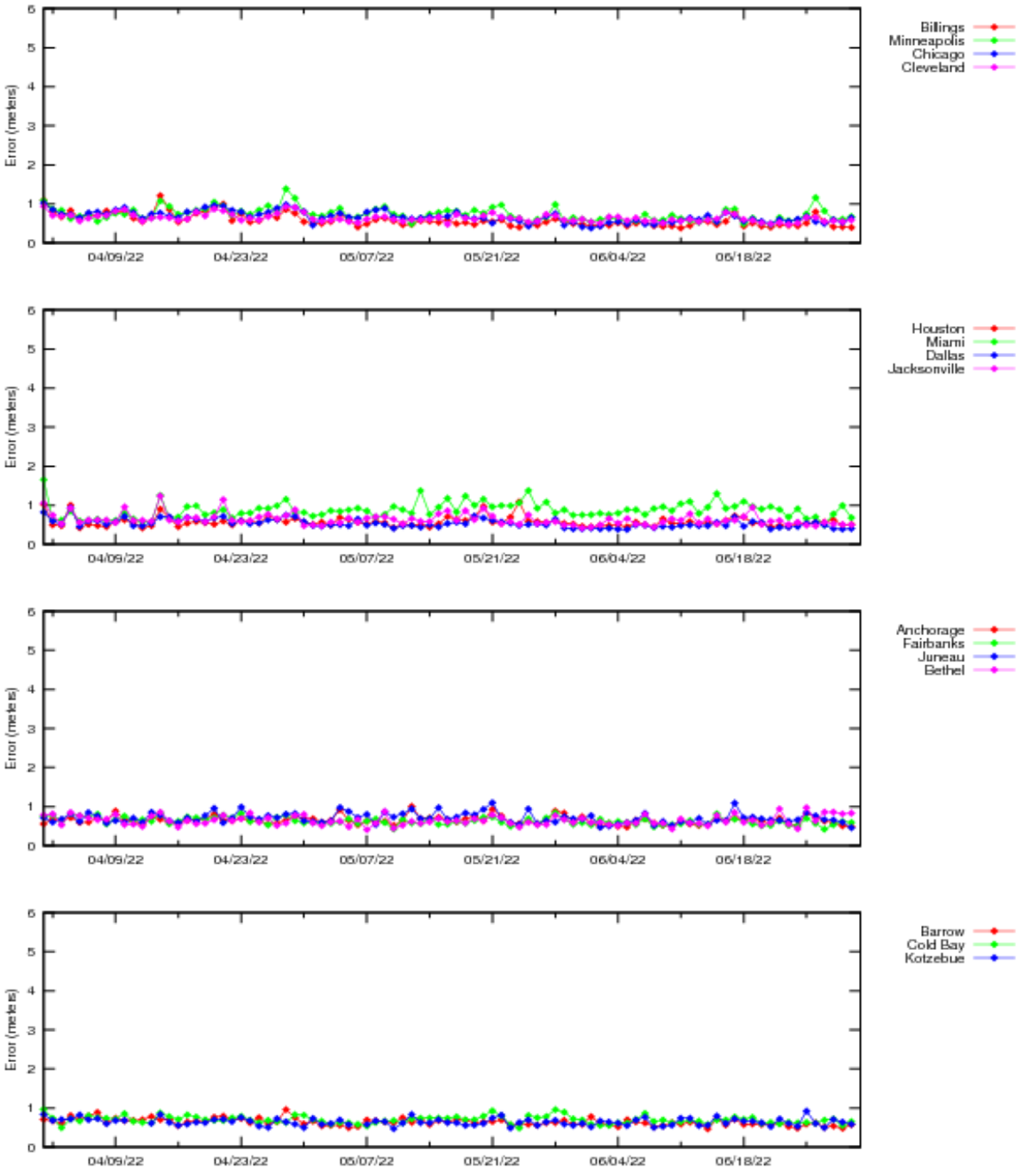

Figure 2-2. LPV 95% Horizontal Accuracy

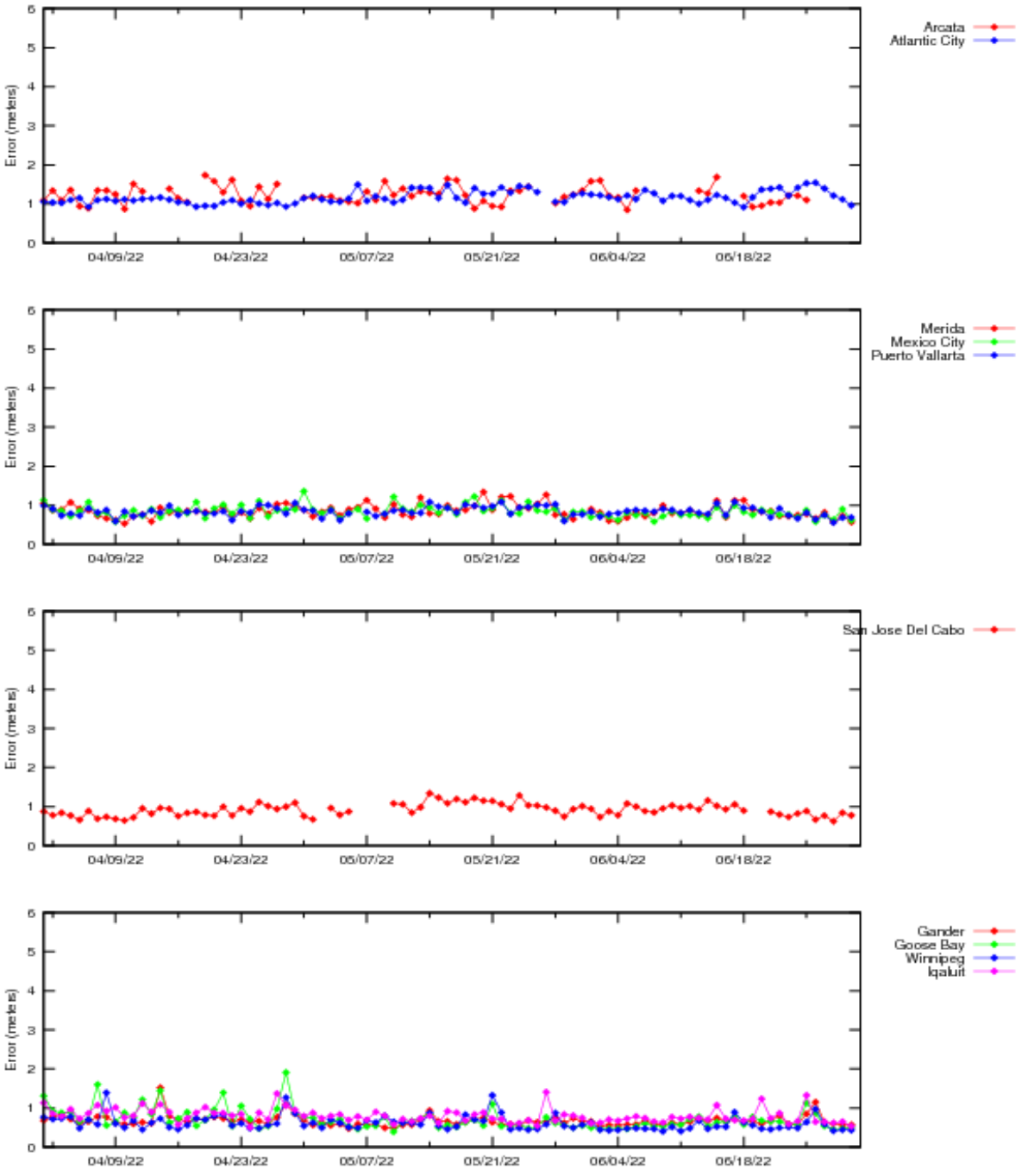

Figure 2-3. LPV 95% Horizontal Accuracy

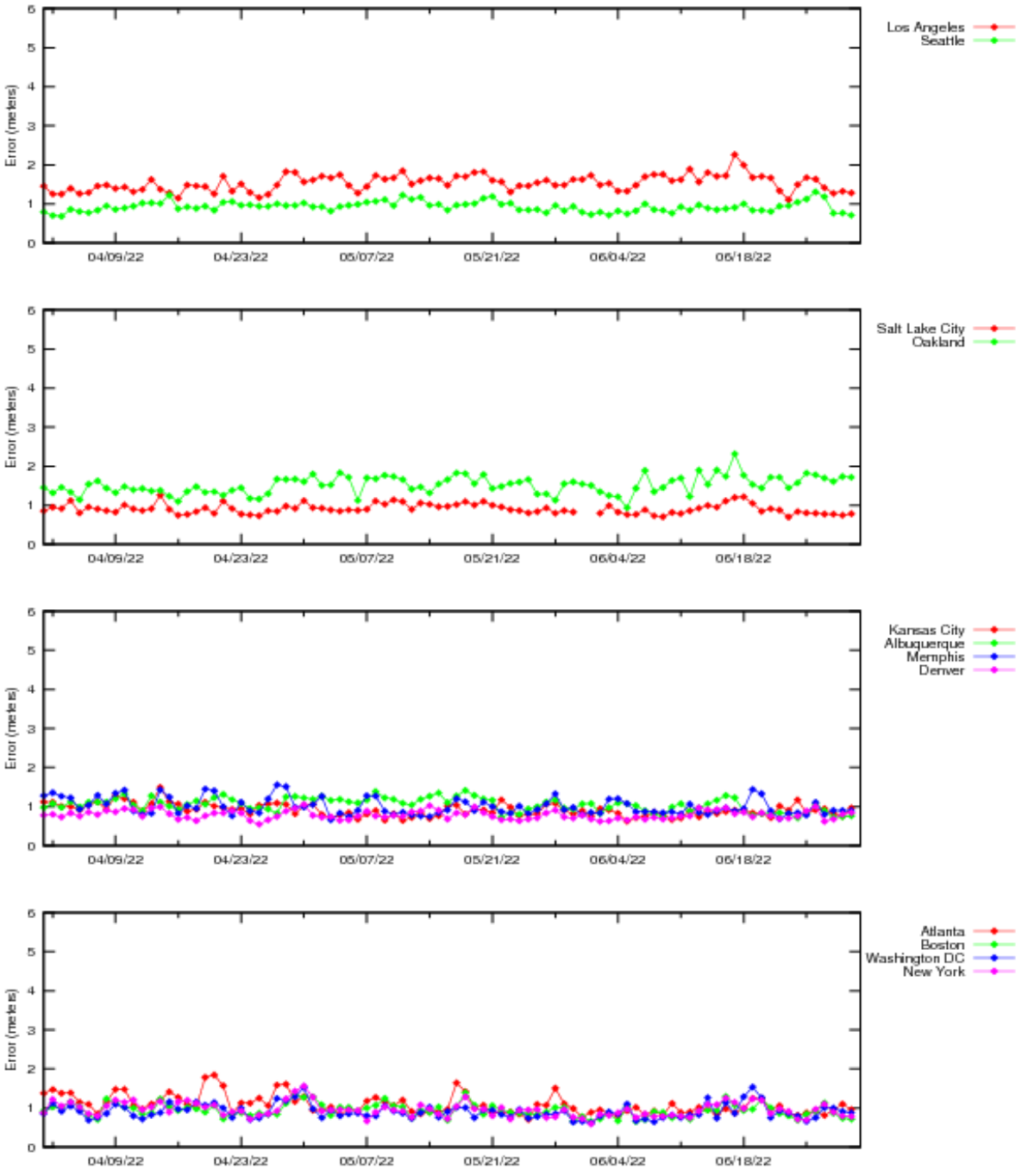

Figure 2-4. LPV 95% Vertical Accuracy

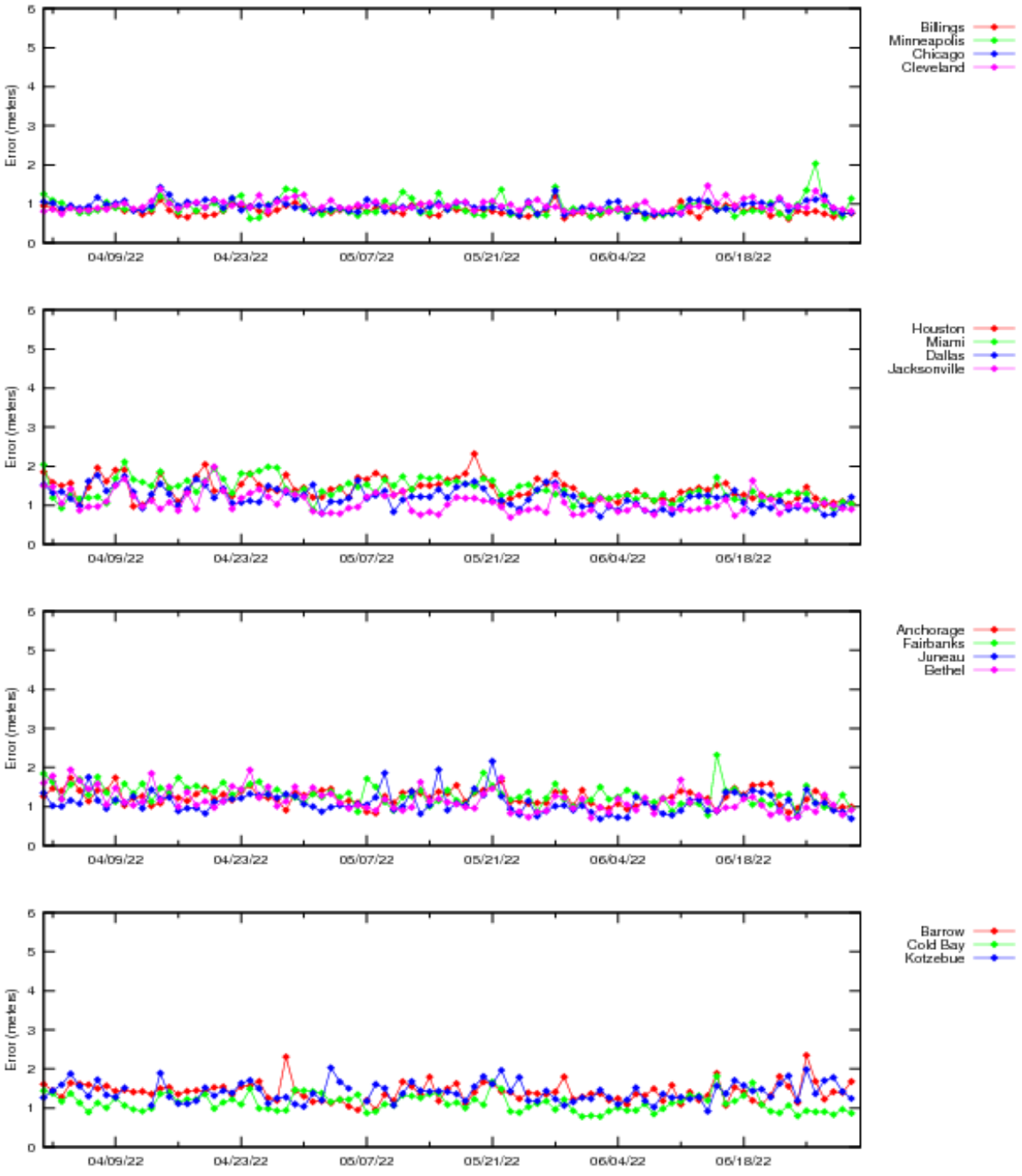

Figure 2-5. LPV 95% Vertical Accuracy

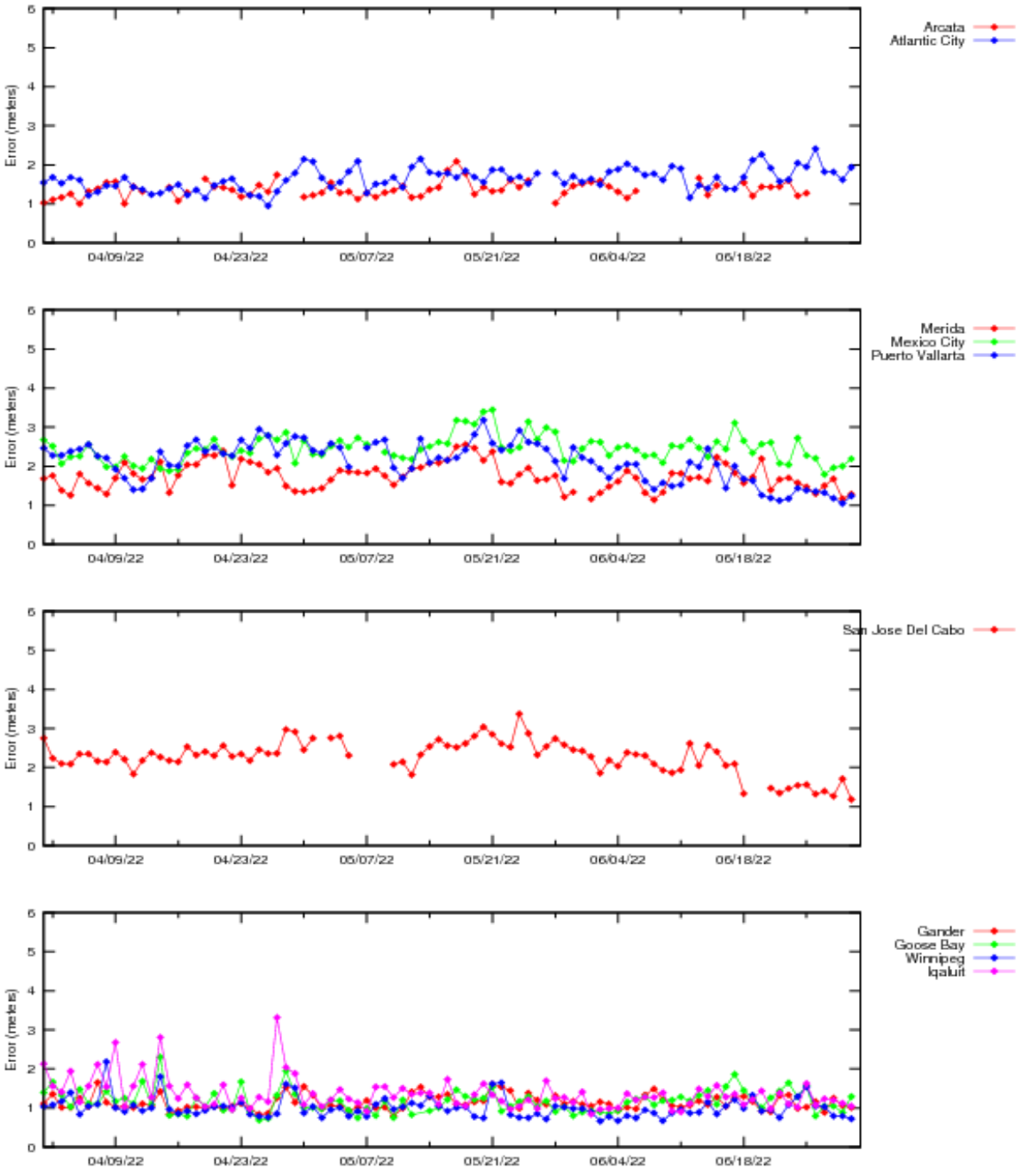

Figure 2-6. LPV 95% Vertical Accuracy

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 April 14, 2022.

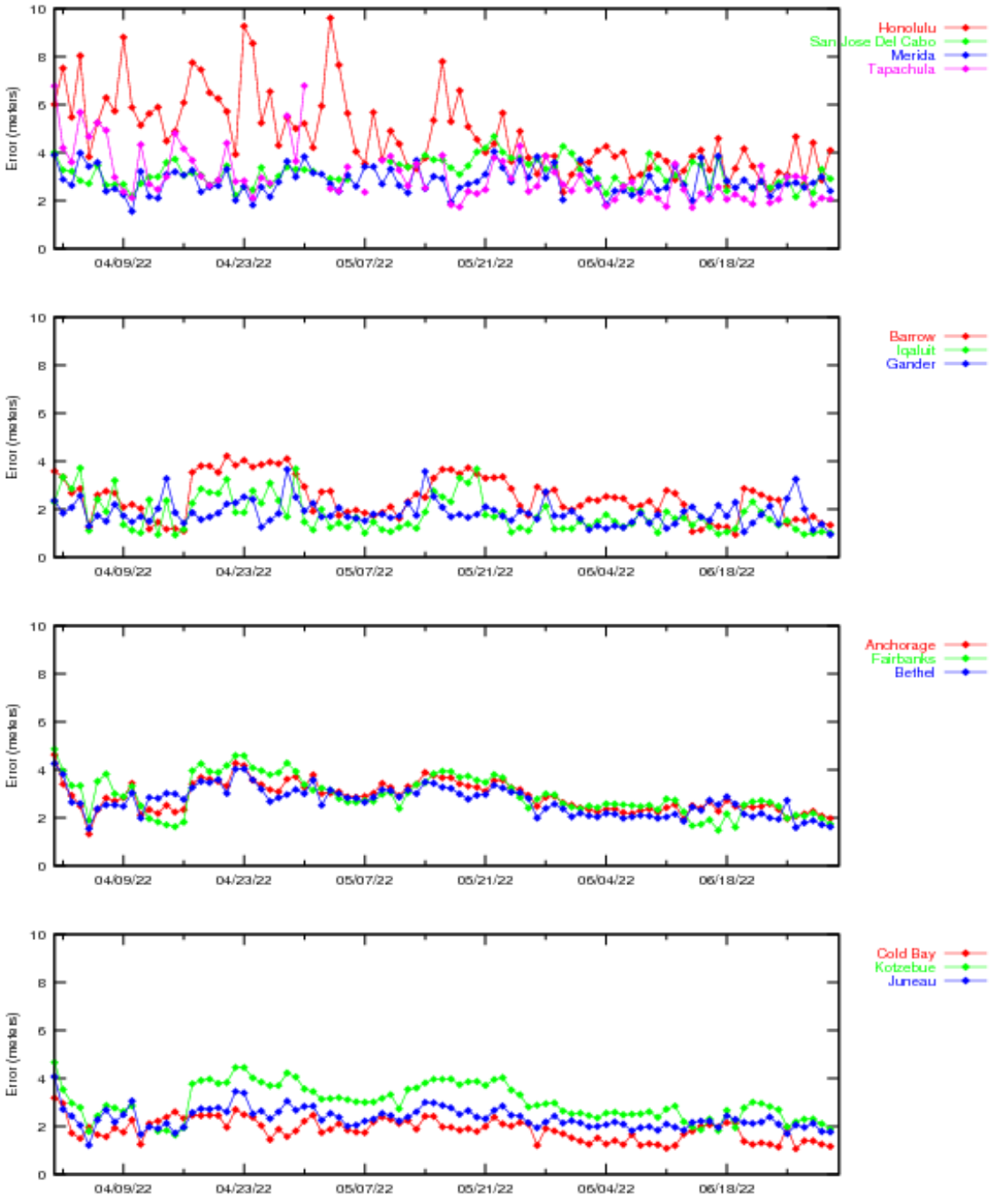

Figure 2-7. NPA 95% Horizontal Accuracy

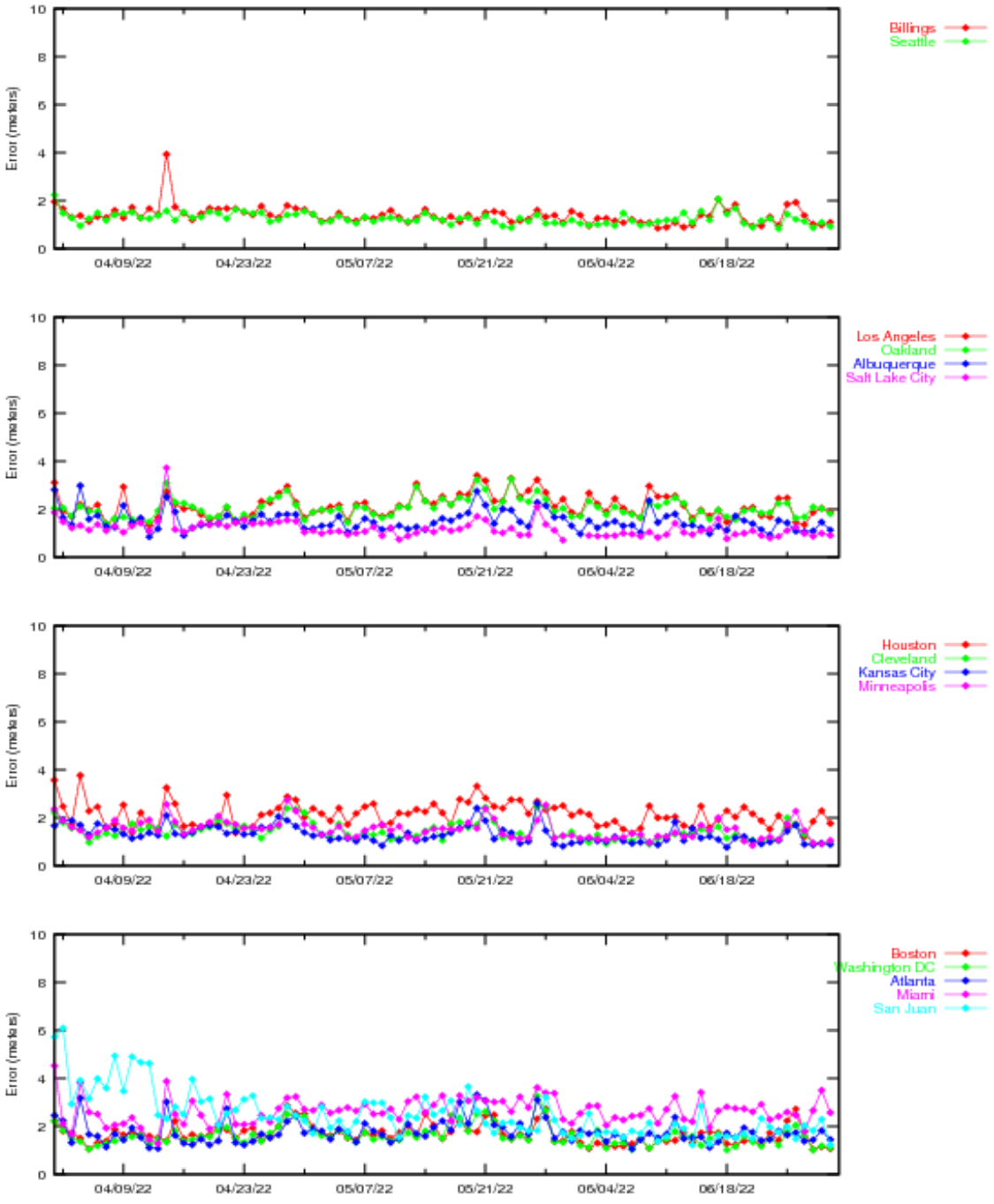

Figure 2-8. NPA 95% Horizontal Accuracy

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.

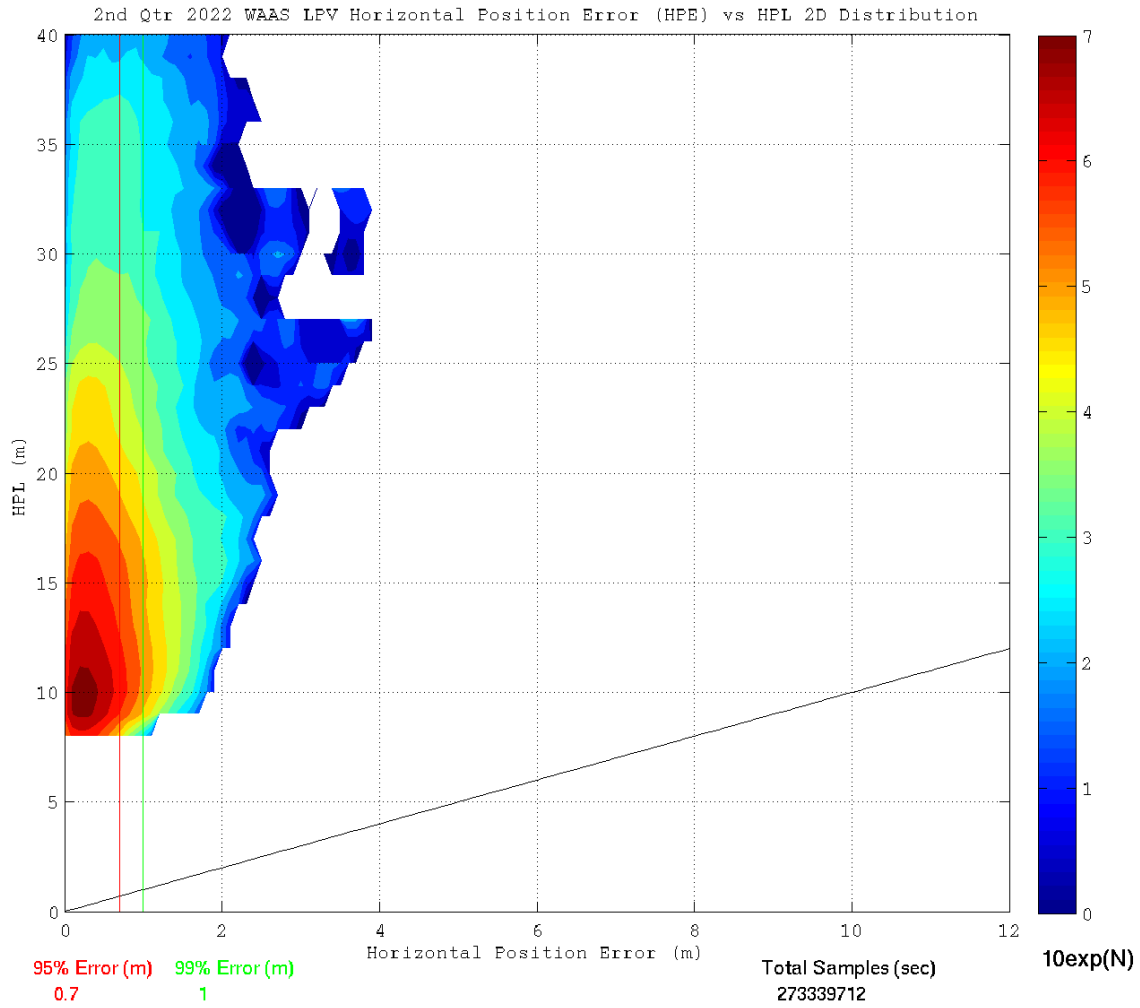

Figure 2-9. LPV Horizontal Error Bounding Triangle Chart

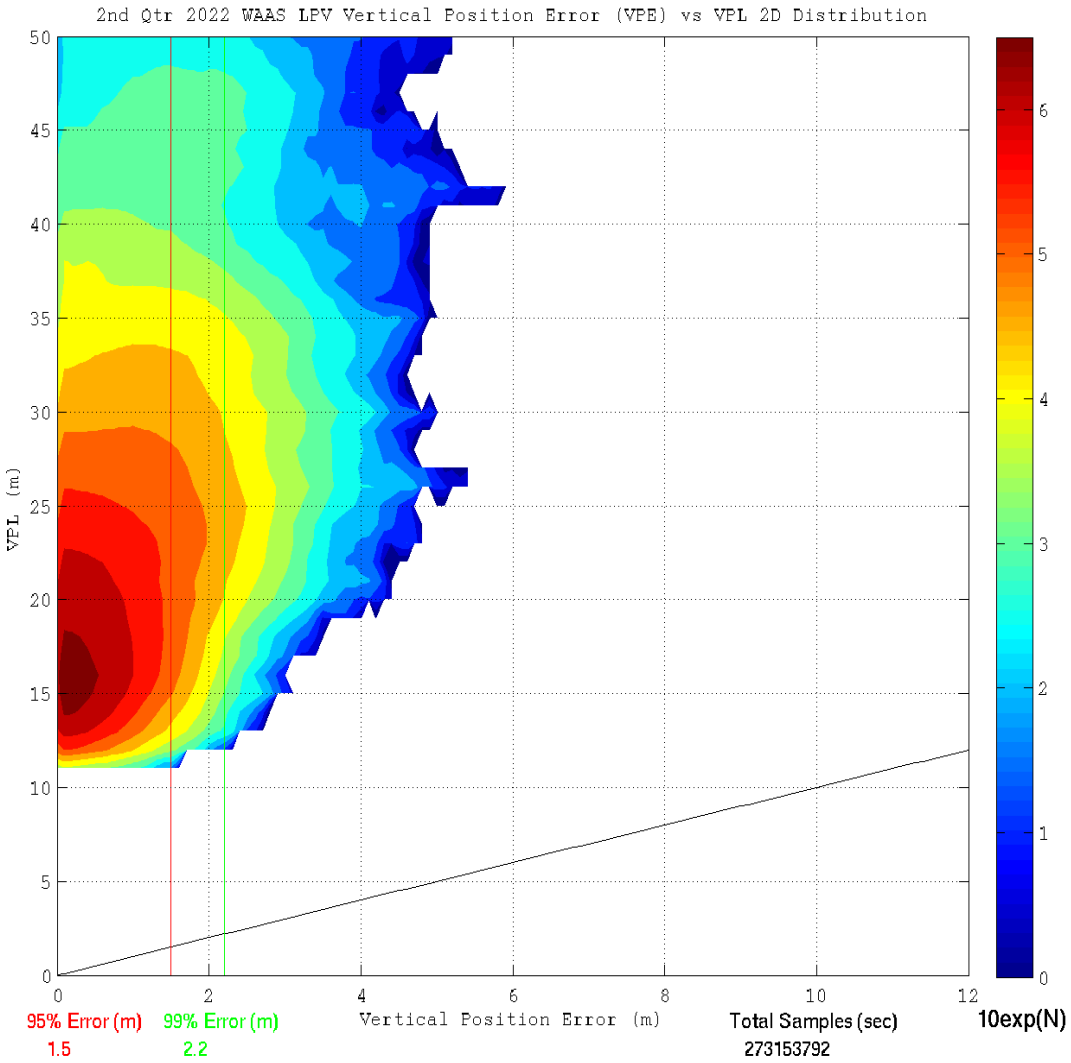

Figure 2-10. LPV Vertical Error Bounding Triangle Chart

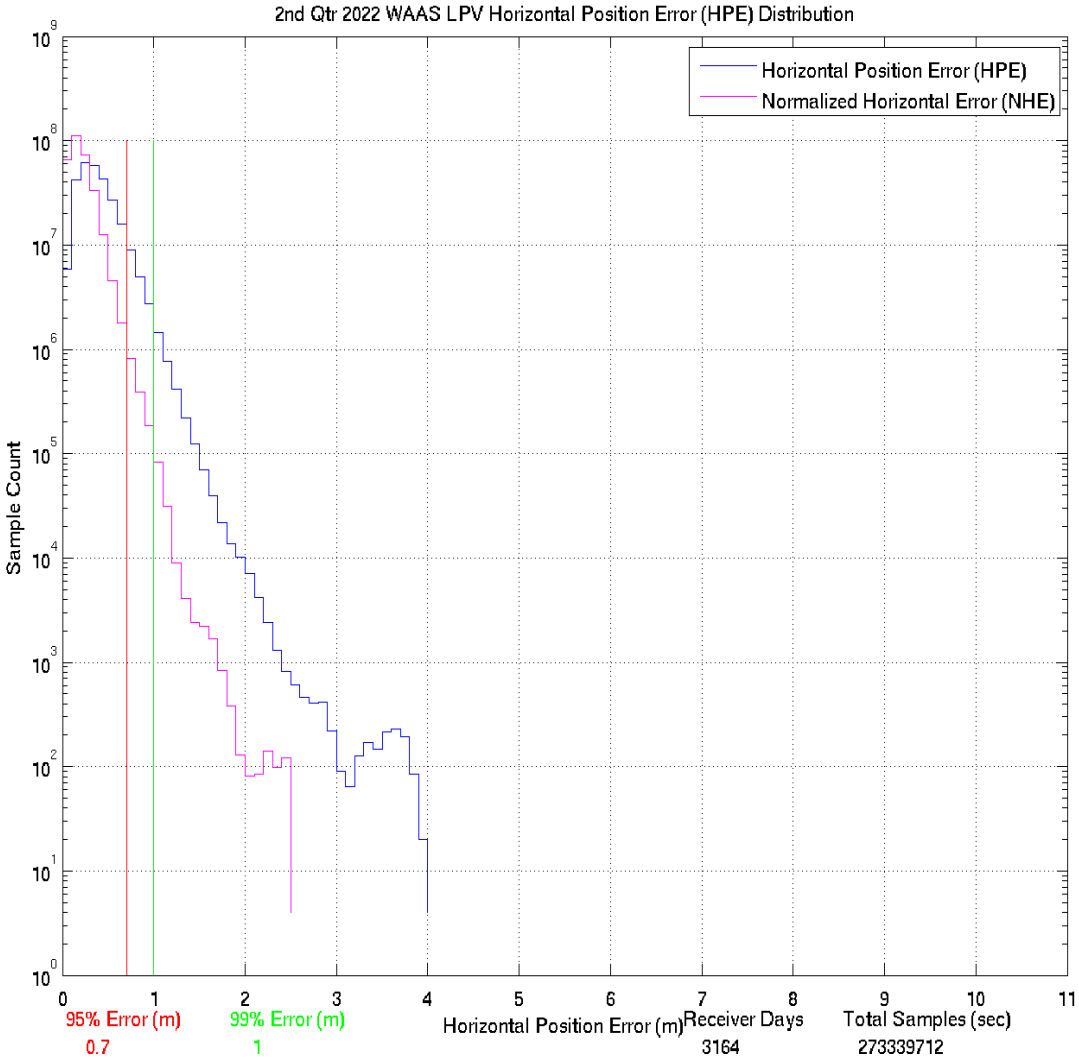

Figure 2-11. LPV 2-D Horizontal Error Distribution Histogram

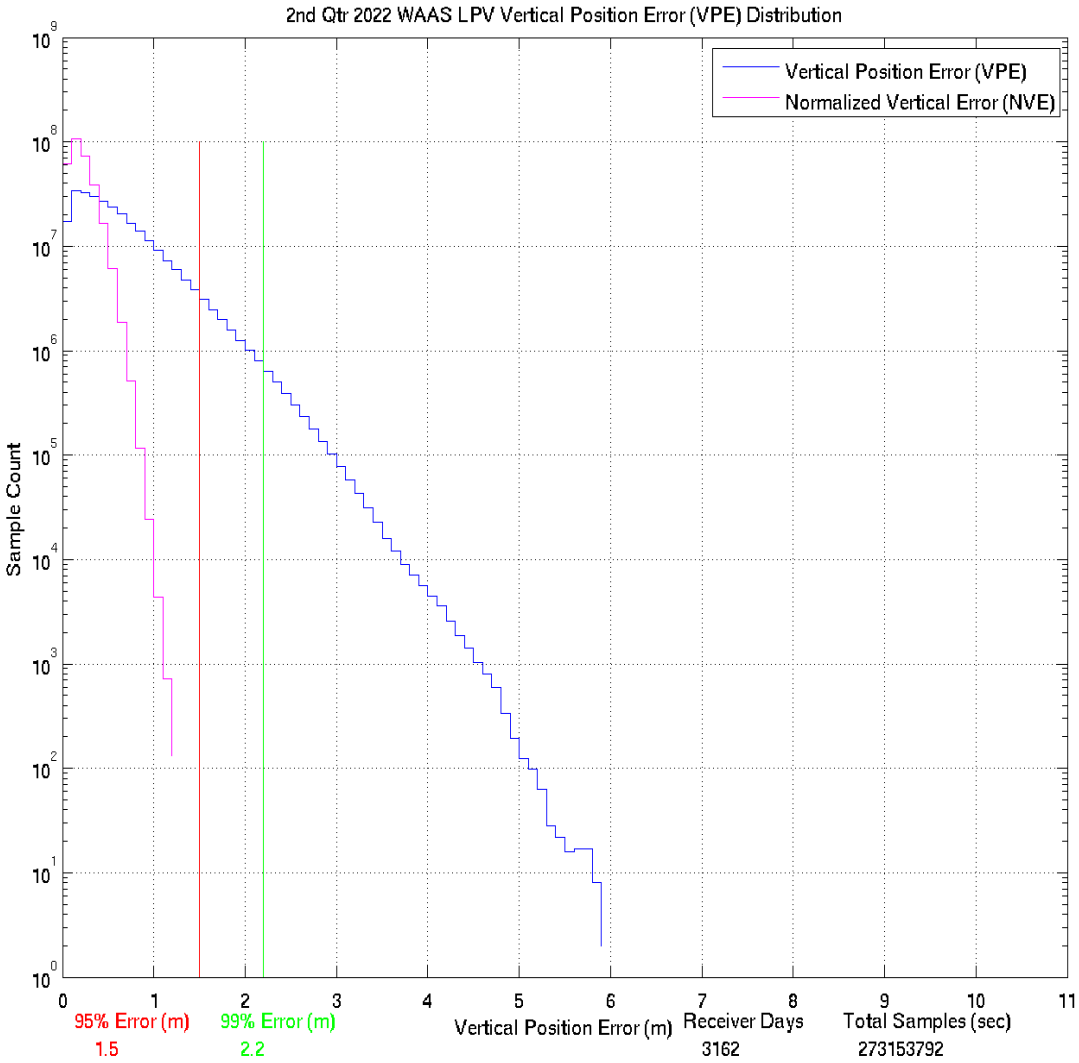

Figure 2-12. LPV 2-D Vertical Error Distribution Histogram

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. Table 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 17.387 meters observed at Miami.
- The maximum 99% CONUS VPL was 28.014 meters observed at Los Angeles.
- The minimum 99% CONUS HPL was 10.452 meters observed at Denver.
- The minimum 99% CONUS VPL was 19.550 meters observed at Denver.
- The maximum 99% Alaska HPL was 19.285 meters observed at Cold Bay.
- The maximum 99% Alaska VPL was 30.948 meters observed at Barrow.
- The minimum 99% Alaska HPL was 13.194 meters observed at Juneau.
- The minimum 99% Alaska VPL was 22.141 meters observed at Juneau.

Table 3-1. 99% Protection Level

Location	99% HPL (Meters)	99% VPL (Meters)	Percentage in PA Mode (%)
Arcata	14.173	28.436	100
Atlantic City	14.401	23.091	100
Oklahoma City	12.324	22.805	100
Albuquerque	11.448	24.798	100
Anchorage	13.886	22.368	100
Atlanta	11.883	22.267	100
Barrow	15.077	30.948	100
Bethel	15.388	25.500	100
Billings	12.255	19.661	100
Boston	15.487	21.994	100
Chicago	11.373	21.431	100
Cleveland	13.692	22.694	100
Cold Bay	19.285	27.818	100
Dallas	10.737	21.177	100
Denver	10.452	19.550	100
Fairbanks	13.304	23.850	100
Gander	21.208	29.097	100
Goose Bay	20.199	26.419	100
Houston	11.720	22.674	100
Iqaluit	24.391	32.730	100
Jacksonville	13.842	24.449	100
Juneau	13.194	22.141	100
Kansas City	10.494	23.158	100
Kotzebue	15.320	27.958	100
Los Angeles	12.768	28.014	100
Memphis	11.100	22.697	100
Merida	21.948	38.364	99.999
Mexico City	26.681	46.722	100
Miami	17.387	27.653	100
Minneapolis	11.460	20.524	100
New York	15.246	22.244	100
Oakland	13.008	27.896	100
Puerto Vallarta	28.050	51.681	100
Salt Lake City	10.942	21.422	100
San Jose Del Cabo	25.177	49.428	100
Seattle	12.753	22.642	100
Washington DC	12.830	23.065	100
Winnipeg	13.553	20.216	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	99.99
Atlantic City PP	100	100	100
Atlantic City-GA-LL	100	100	100
Atlantic City-GB-LL	100	100	100
Atlantic City-a	100	100	100
Oklahoma City	100	100	99.99
Prescott	99.97	99.97	98.48
Albuquerque	100	100	99.99
Anchorage	100	100	100
Atlanta	100	100	100
Barrow	100	100	99.88
Bethel	100	100	99.99
Billings	100	100	100
Boston	100	100	100
Chicago	100	100	100
Cleveland	100	100	100
Cold Bay	100	100	99.94
Dallas	100	100	99.99
Denver	100	100	100
Fairbanks	100	100	99.99
Gander	100	100	99.92
Goose Bay	100	100	99.94
Houston	100	100	99.99
Iqaluit	99.93	99.89	99.22
Jacksonville	99.99	99.98	99.97
Juneau	100	100	100
Kansas City	100	100	100
Kotzebue	100	100	99.95
Los Angeles	100	100	100
Memphis	100	100	100
Merida	99.97	99.91	97.02
Mexico City	99.93	99.38	93.75
Miami	99.92	99.92	99.88
Minneapolis	100	100	100
New York	100	100	100

Location	LP WAAS With 15-Minute Window (%)	LPV WAAS With 15-Minute Window (%)	LPV200 WAAS With 15-Minute Window (%)
Oakland	100	100	99.99
Puerto Vallarta	99.99	98.89	91.15
Salt Lake City	100	100	100
San Jose Del Cabo	100	98.84	94.28
Seattle	100	100	99.99
Washington DC	100	100	100
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	0.000000	0	0.000000	1	0.000026
Atlantic City-a	0	0.000000	0	0.000000	0	0.000000
Oklahoma City	0	0.000000	0	0.000000	1	0.000022
Albuquerque	0	0.000000	0	0.000000	4	0.000076
Anchorage	0	0.000000	0	0.000000	0	0.000000
Atlanta	0	0.000000	0	0.000000	0	0.000000
Barrow	1	0.000019	1	0.000019	25	0.000478
Bethel	0	0.000000	0	0.000000	1	0.000019
Billings	0	0.000000	0	0.000000	0	0.000000
Boston	0	0.000000	0	0.000000	0	0.000000
Chicago	0	0.000000	0	0.000000	0	0.000000
Cleveland	0	0.000000	0	0.000000	0	0.000000
Cold Bay	0	0.000000	0	0.000000	3	0.000057
Dallas	0	0.000000	0	0.000000	1	0.000019
Denver	0	0.000000	0	0.000000	0	0.000000
Fairbanks	1	0.000019	1	0.000019	7	0.000134
Gander	2	0.000038	3	0.000057	4	0.000076
Goose Bay	0	0.000000	1	0.000019	1	0.000019
Houston	0	0.000000	0	0.000000	1	0.000019
Iqaluit	19	0.000368	24	0.000465	201	0.003917
Jacksonville	1	0.000019	1	0.000019	1	0.000019
Juneau	0	0.000000	0	0.000000	0	0.000000
Kansas City	0	0.000000	0	0.000000	1	0.000019
Kotzebue	0	0.000000	0	0.000000	6	0.000117
Los Angeles	0	0.000000	0	0.000000	1	0.000019
Memphis	0	0.000000	0	0.000000	1	0.000019
Merida	3	0.000058	4	0.000078	248	0.004956
Mexico City	7	0.000136	84	0.001638	473	0.009777
Miami	1	0.000019	1	0.000019	8	0.000153
Minneapolis	0	0.000000	0	0.000000	0	0.000000
New York	0	0.000000	0	0.000000	0	0.000000
Oakland	0	0.000000	0	0.000000	1	0.000019

Location	LP Outages (Number)	LP Outage Rates	LPV Outages (Number)	LPV Outage Rates	LPV200 Outages (Number)	LPV200 Outage Rates
Puerto Vallarta	1	0.000019	192	0.003761	542	0.011520
Salt Lake City	0	0.000000	0	0.000000	0	0.000000
San Jose Del Cabo	1	0.000021	106	0.002244	376	0.008347
Seattle	0	0.000000	0	0.000000	2	0.000038
Washington DC	0	0.000000	0	0.000000	0	0.000000
Winnipeg	0	0.000000	0	0.000000	0	0.000000

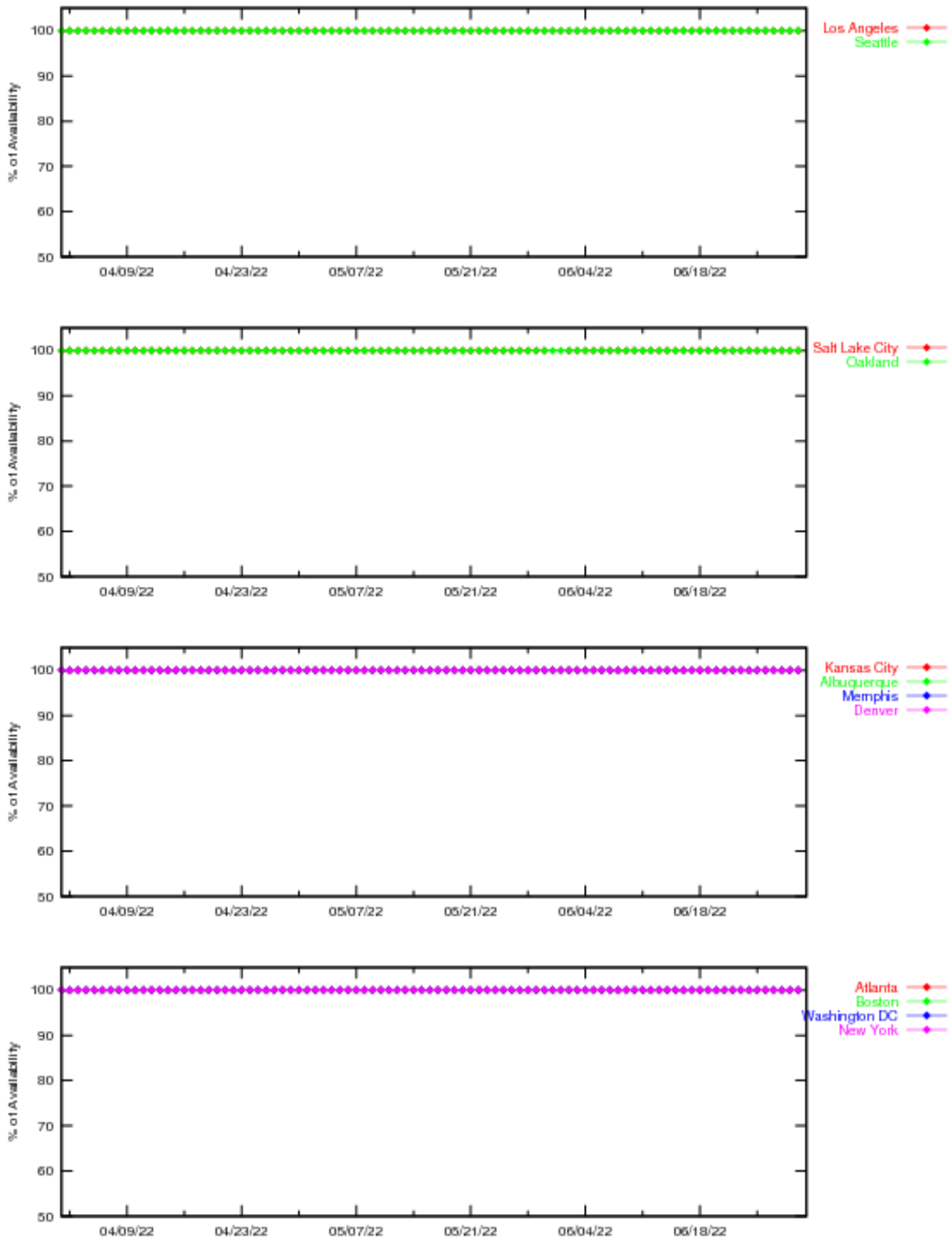

Figure 3-1. LPV Instantaneous Availability

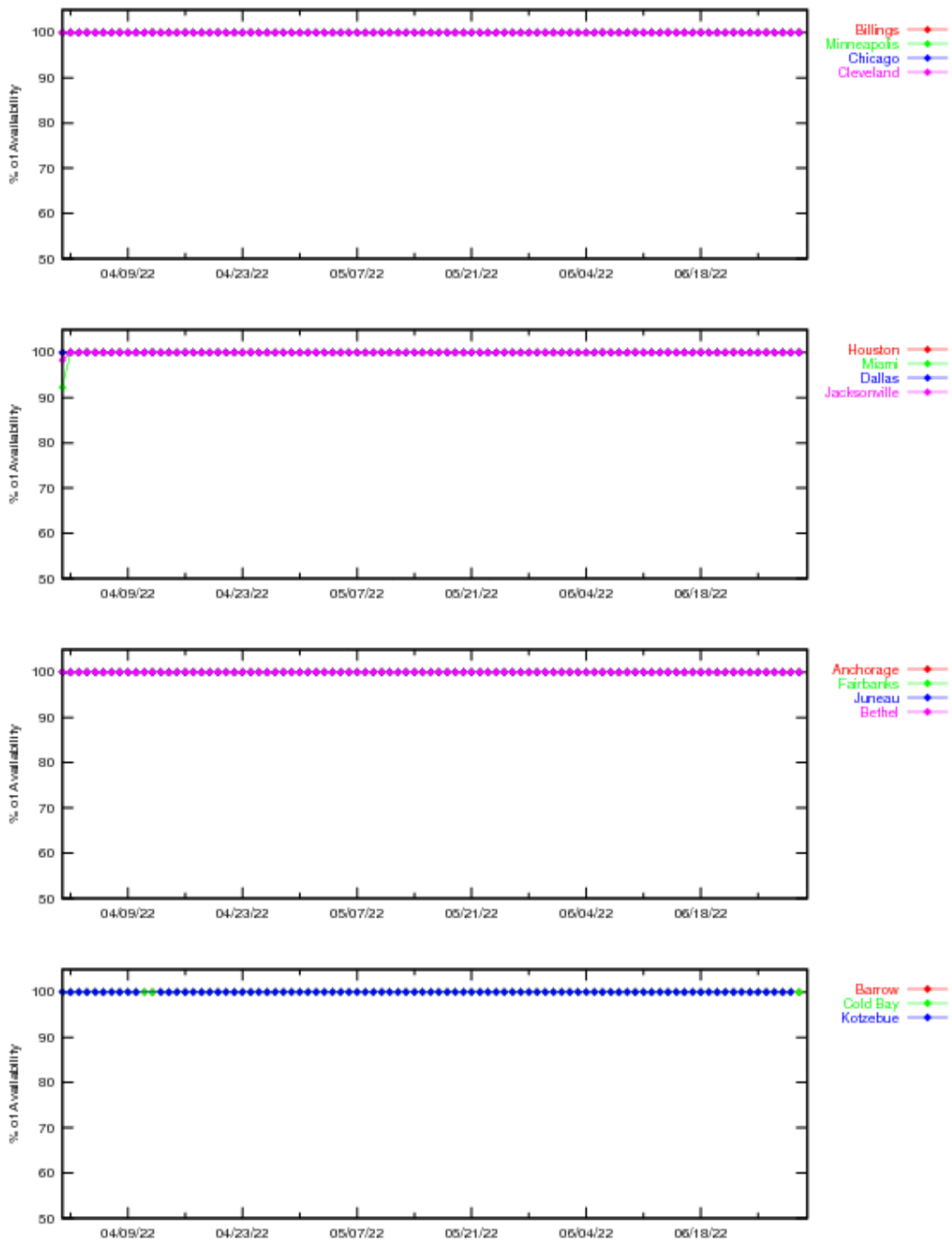

Figure 3-2. LPV Instantaneous Availability

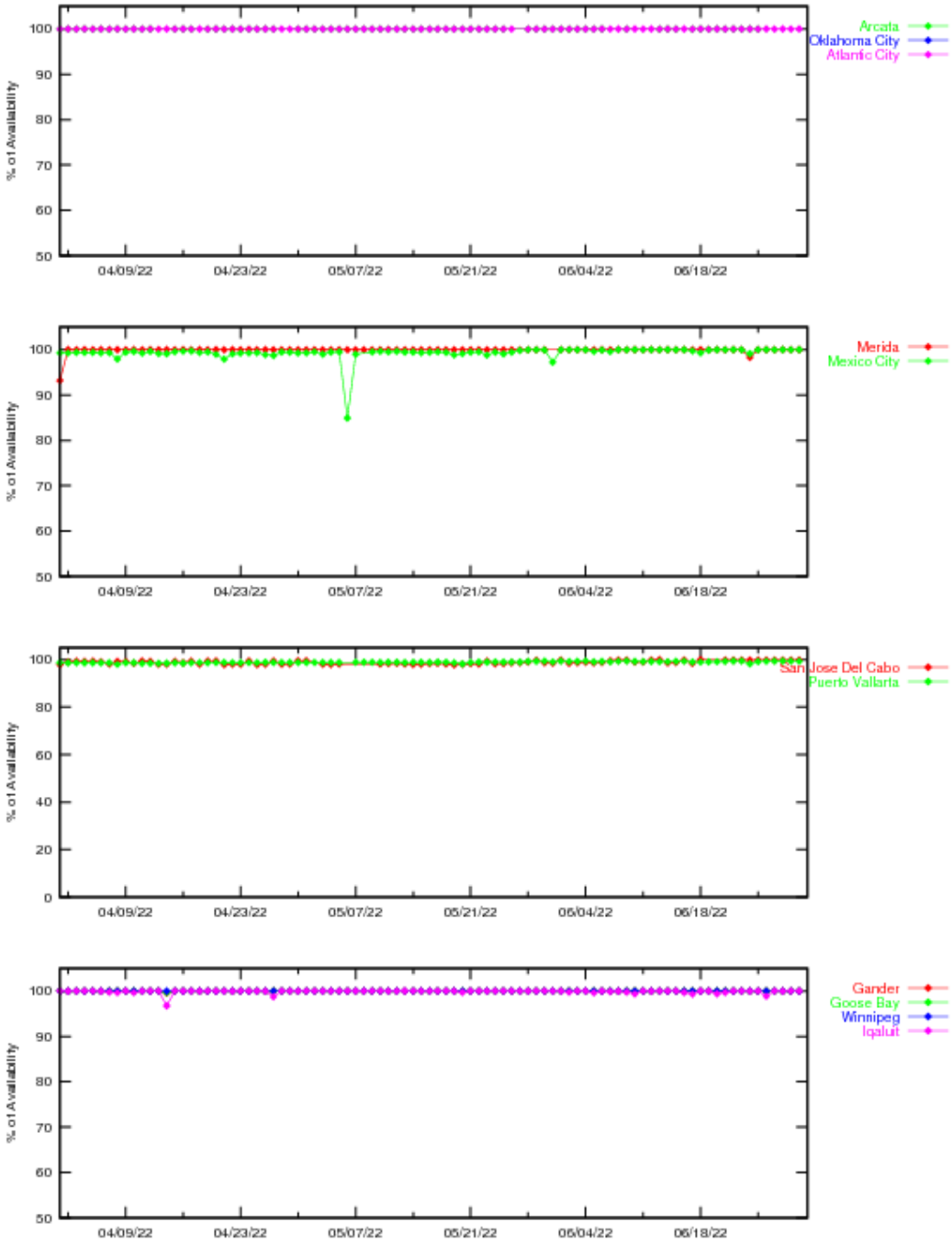

Figure 3-3. LPV Instantaneous Availability

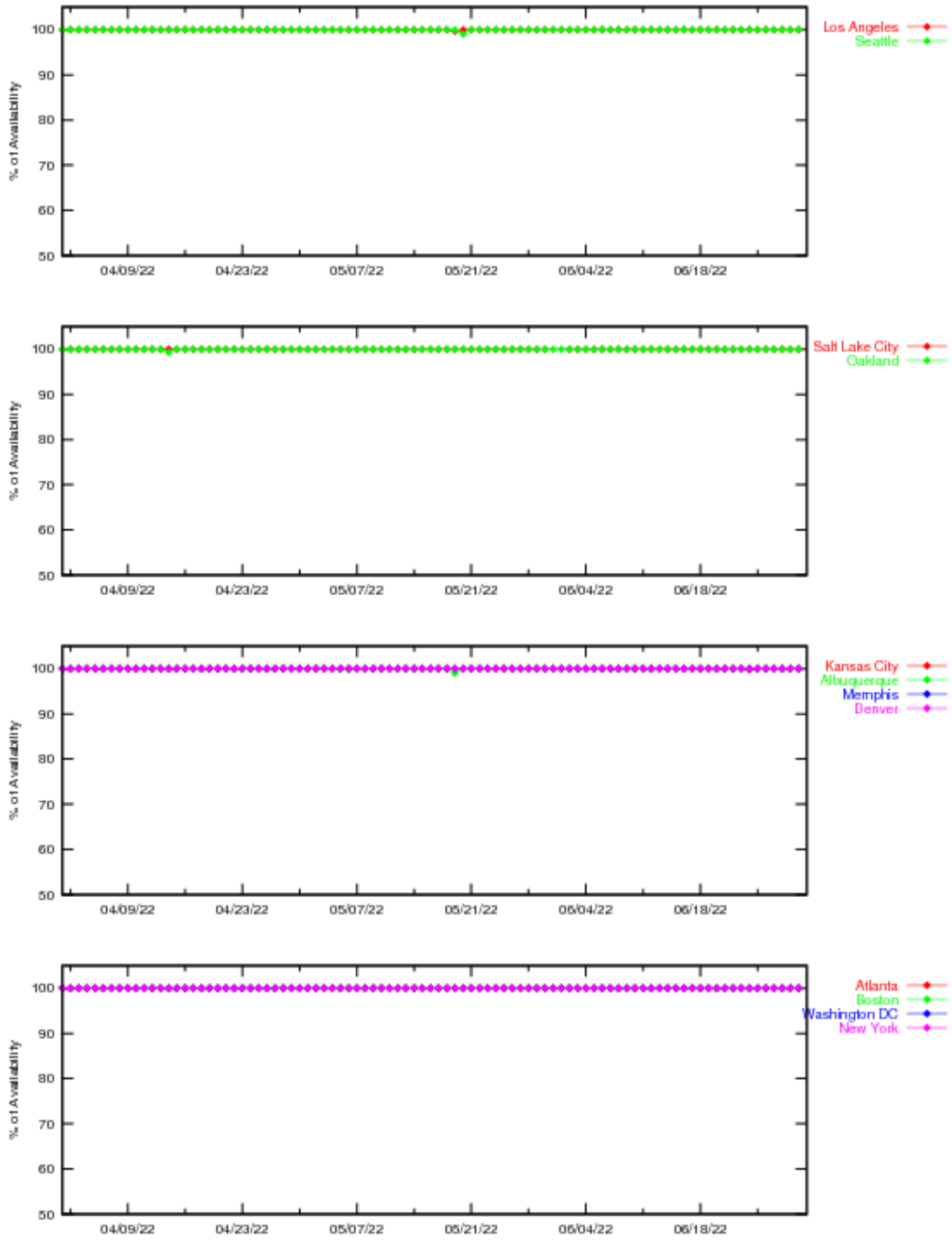

Figure 3-4. LPV200 Instantaneous Availability

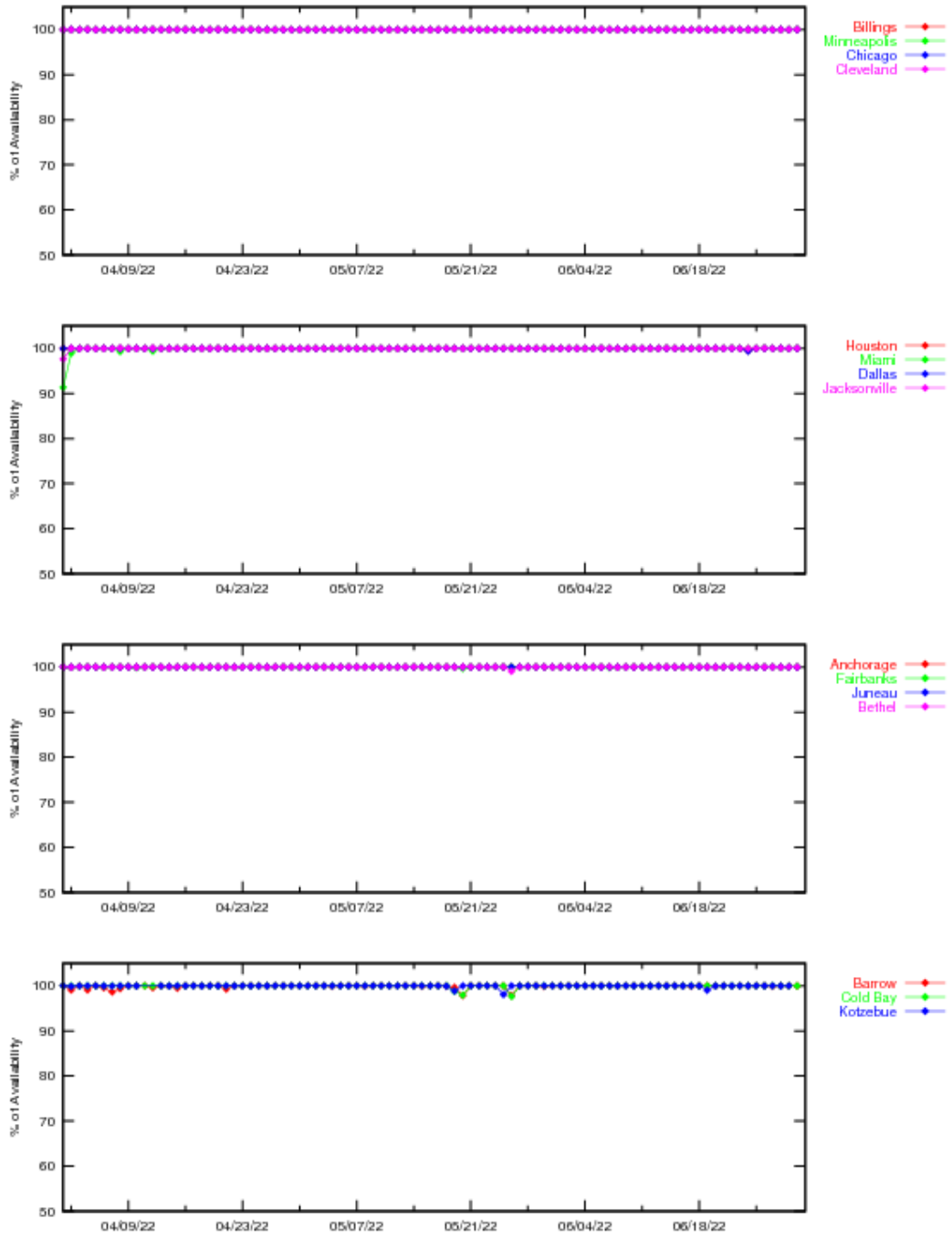

Figure 3-5. LPV200 Instantaneous Availability

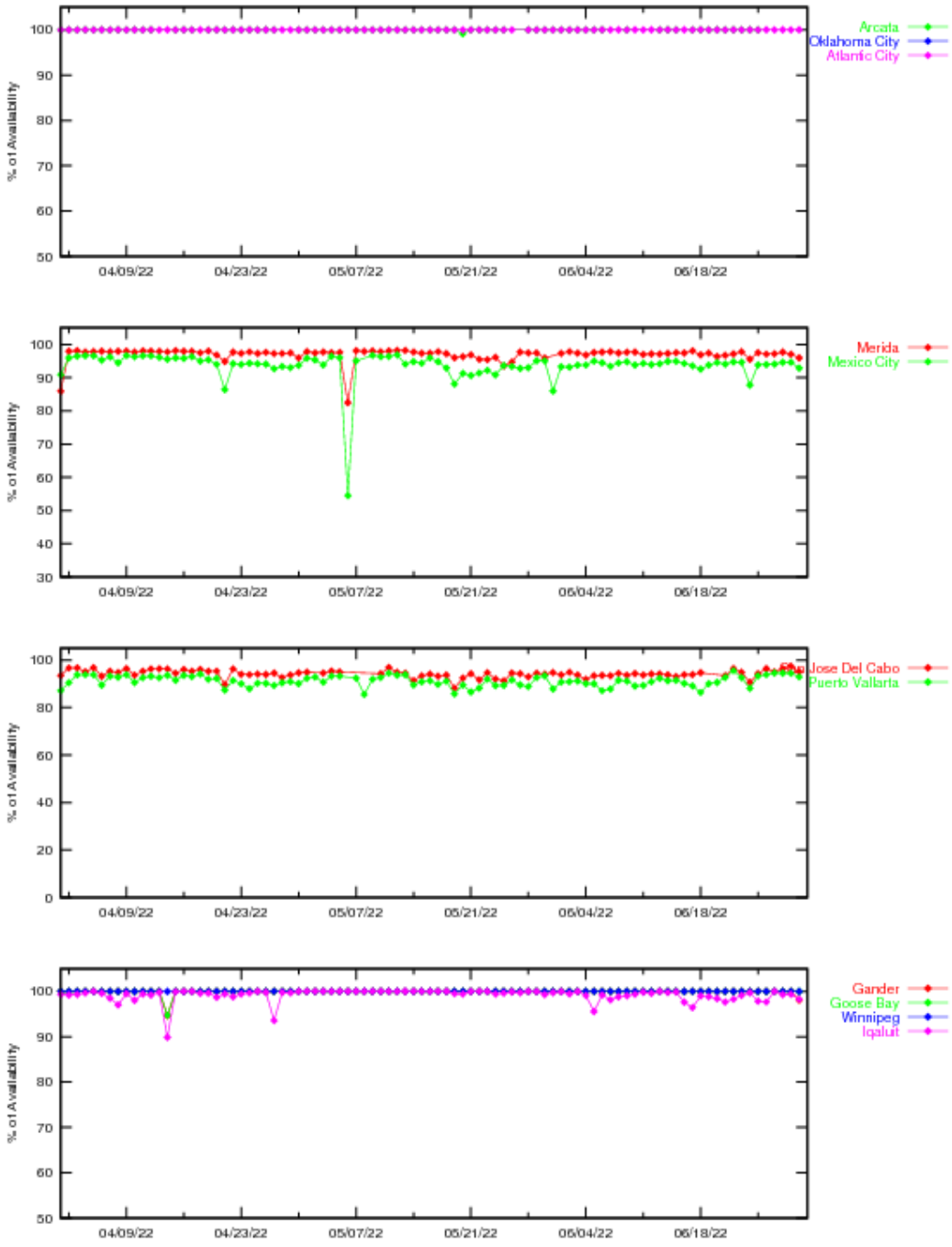

Figure 3-6. LPV200 Instantaneous Availability

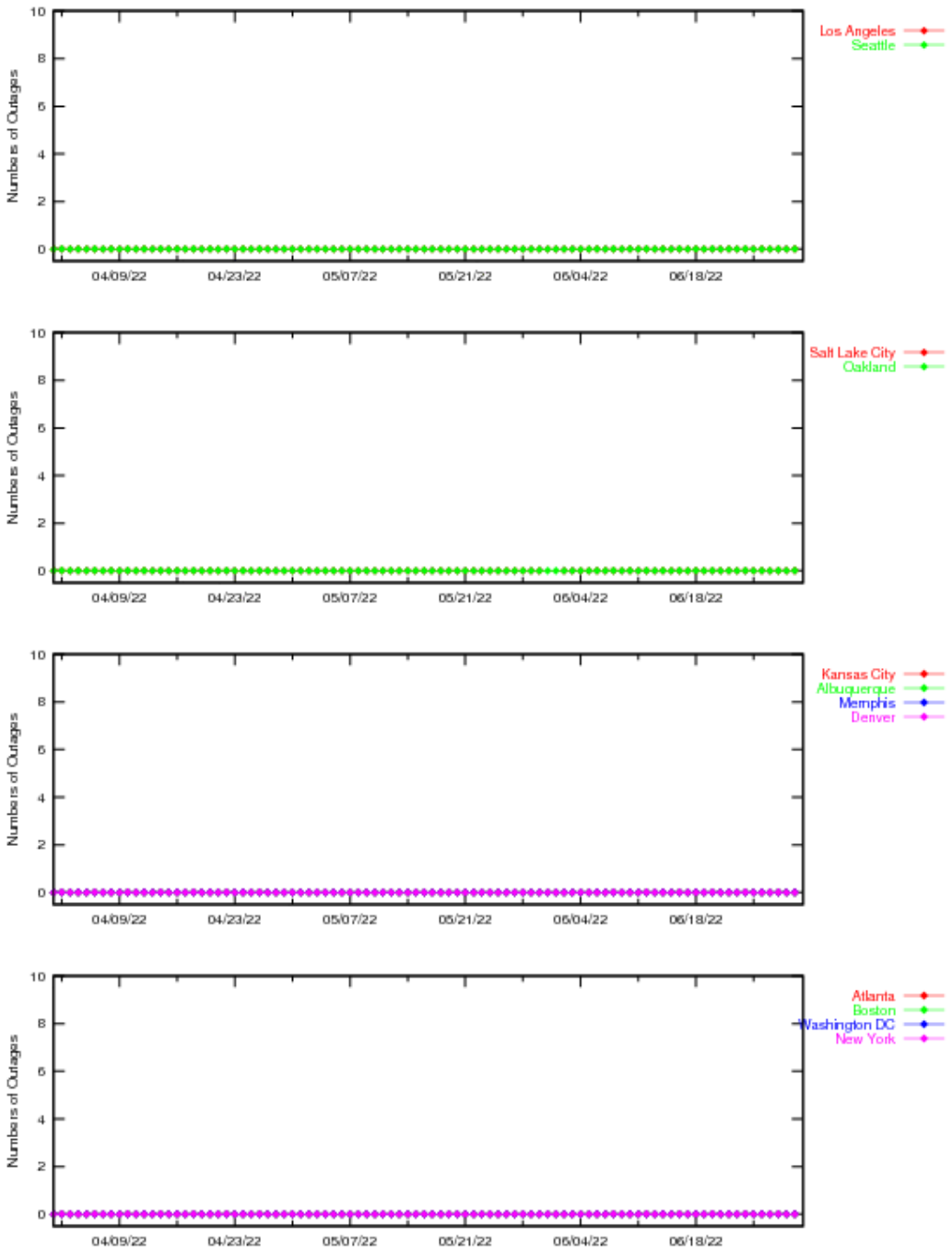

Figure 3-7. LPV Outages

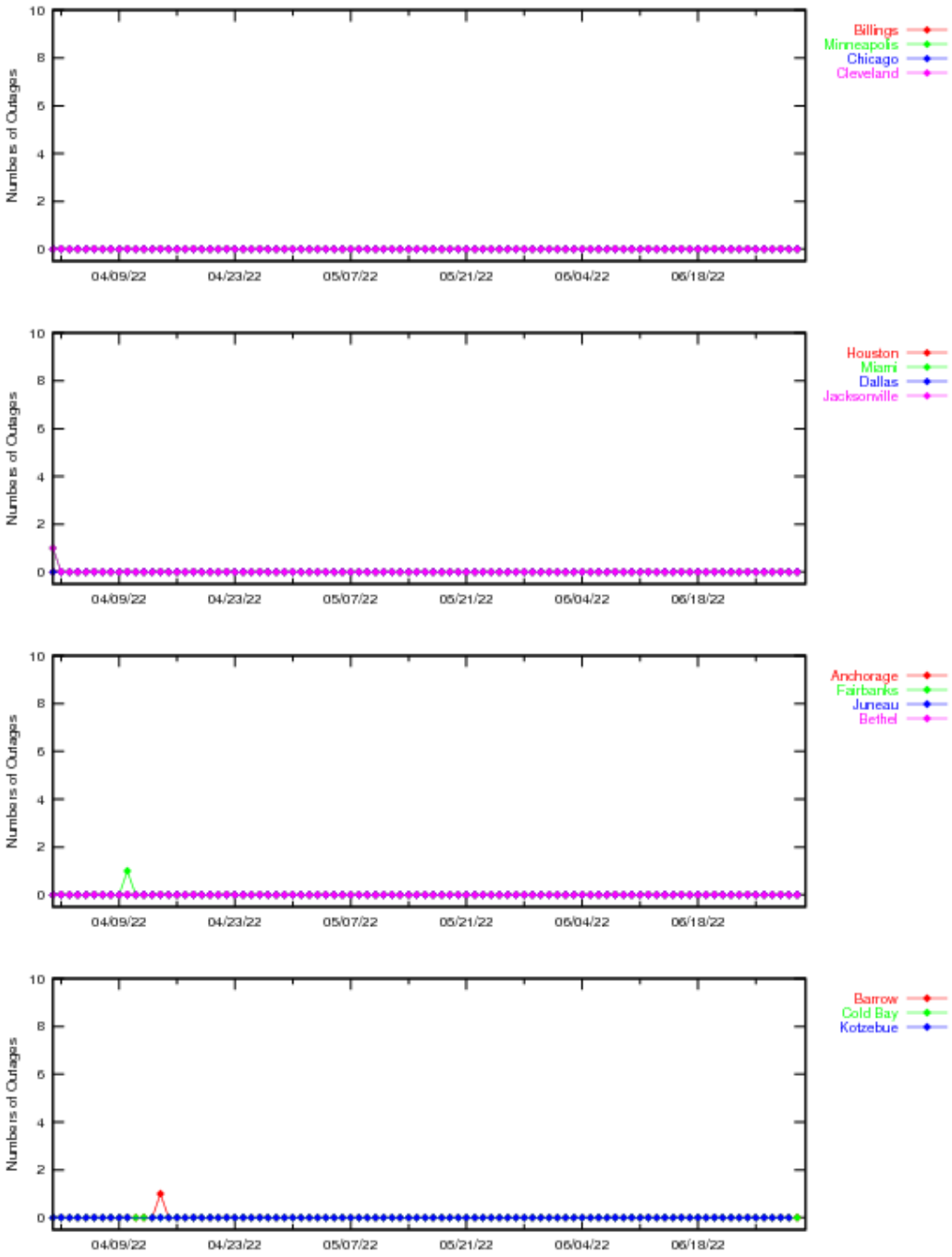

Figure 3-8. LPV Outages

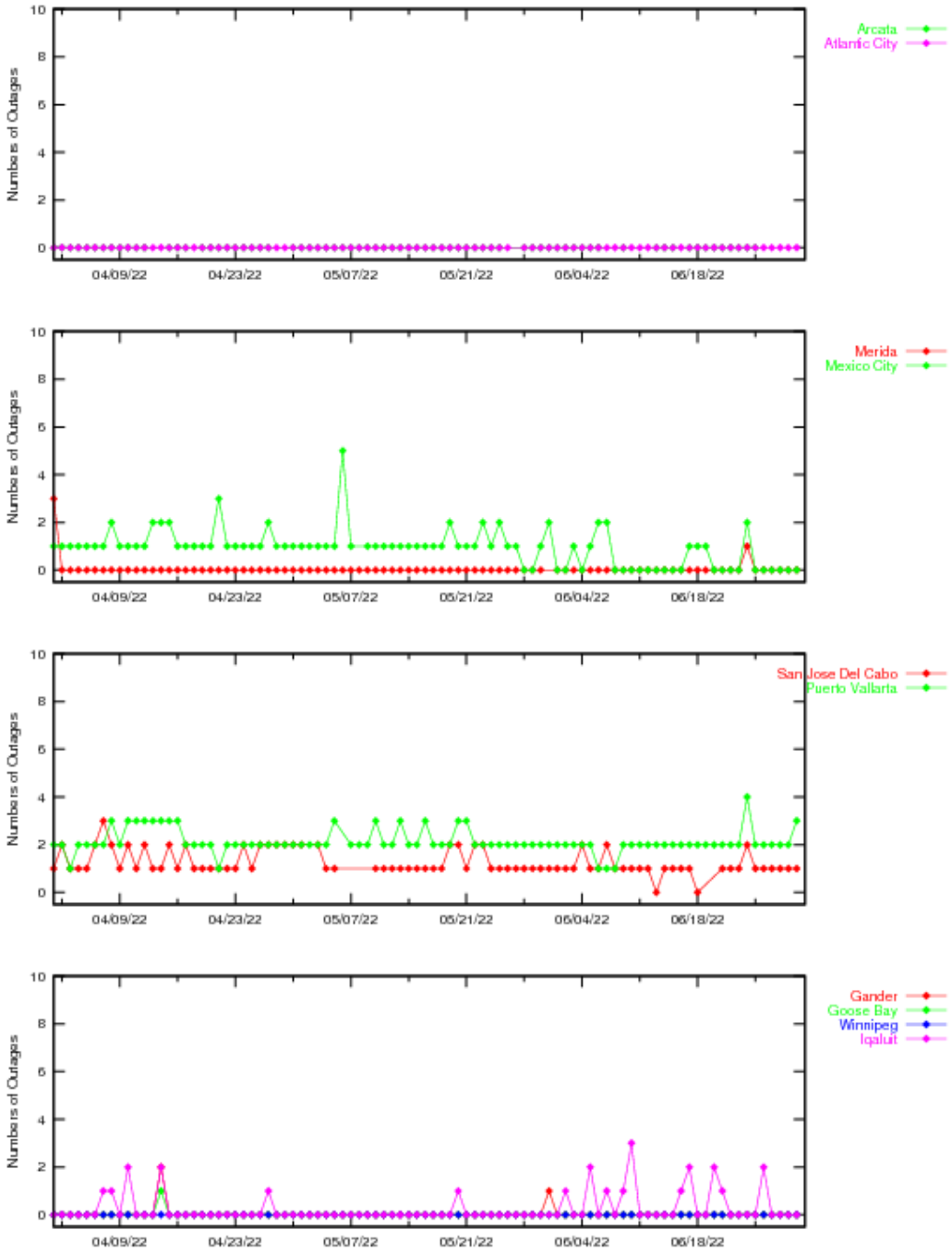

Figure 3-9. LPV Outages

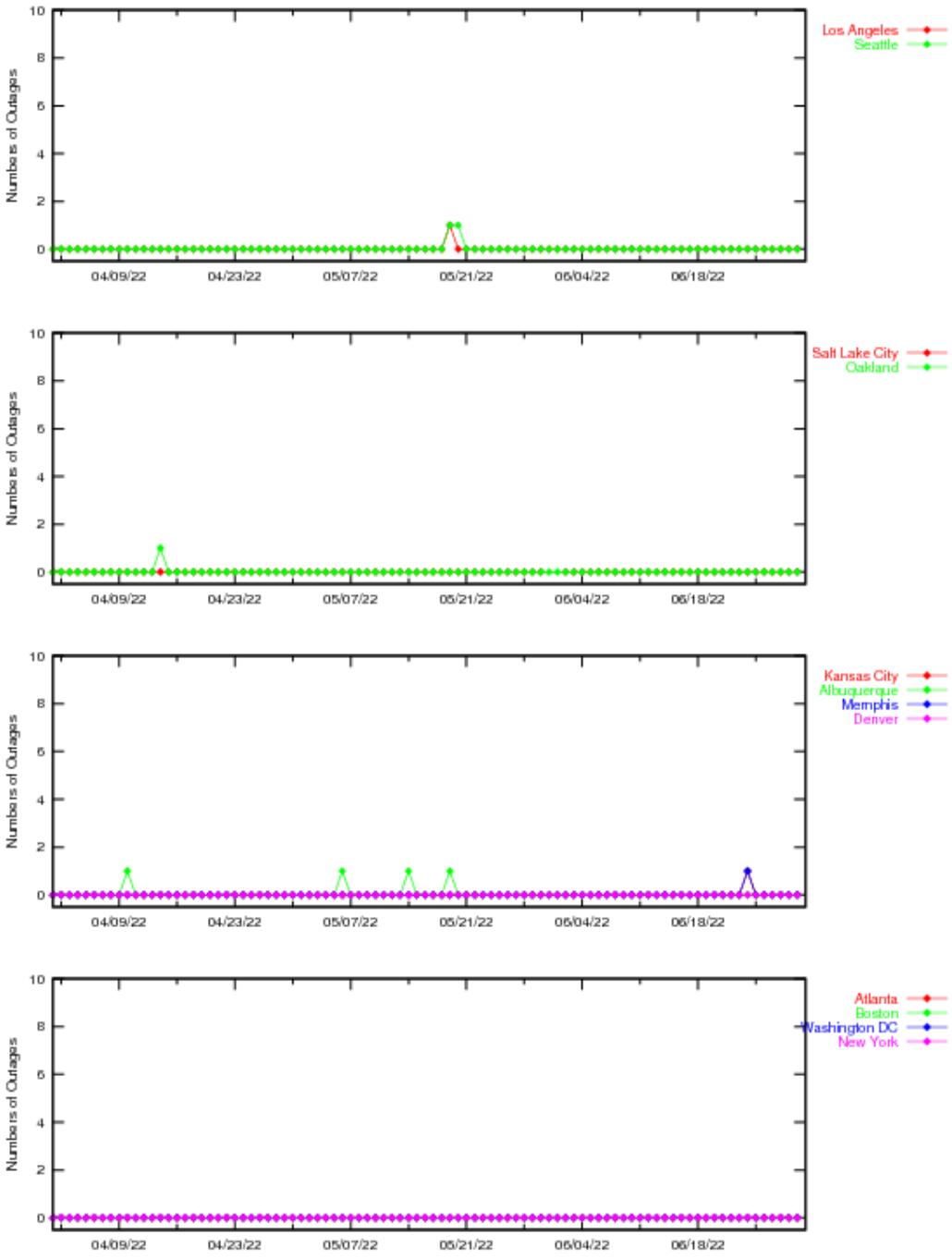

Figure 3-10. LPV200 Outages

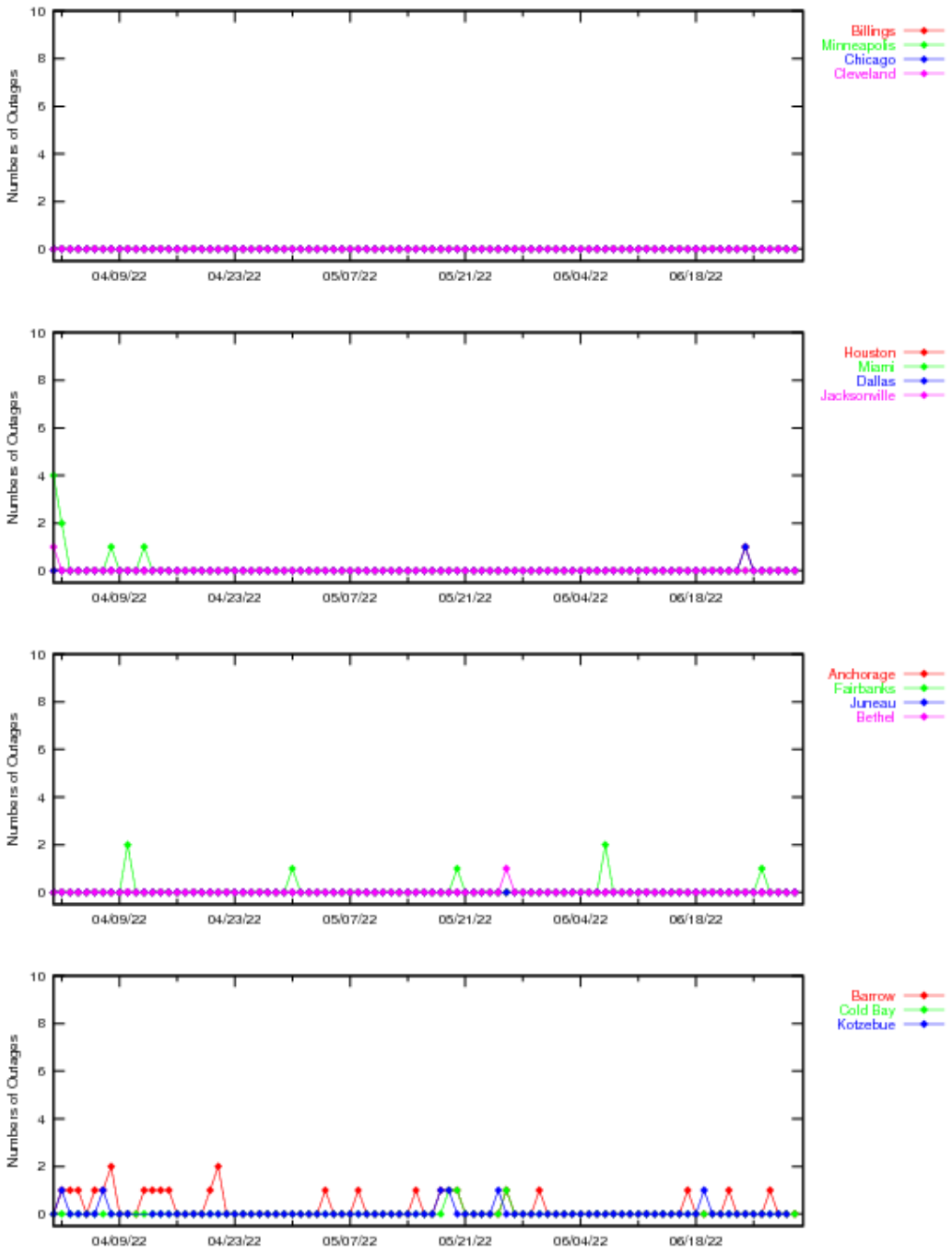

Figure 3-11. LPV200 Outages

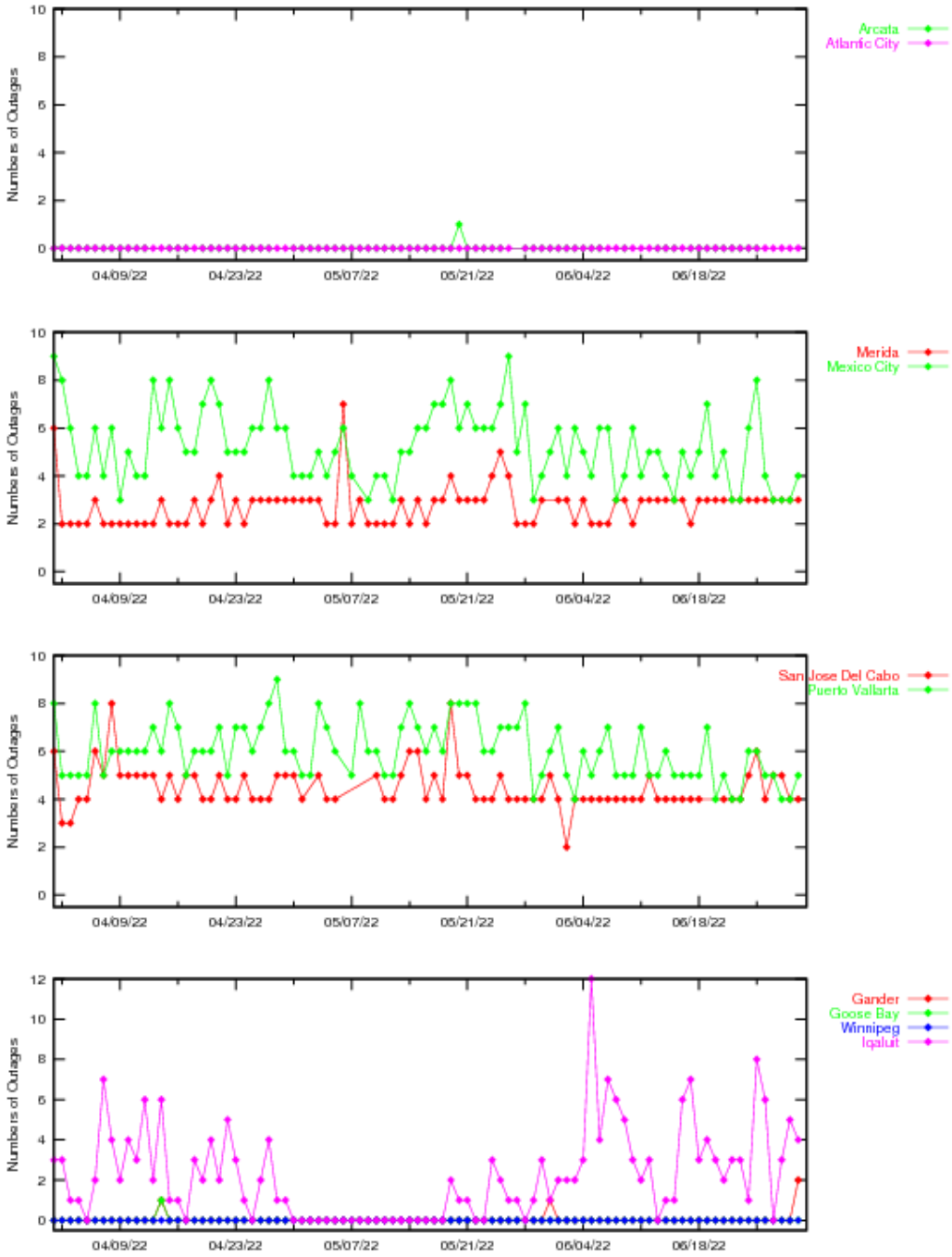

Figure 3-12. LPV200 Outages

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) (%)
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

Location	NPA Outages (Number)	NPA Outage Rates
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:

- Apr 1 – Geomagnetic activity increased IGP GIVEs and reduced LPV200 availability in CONUS.
- Apr 8 – Geomagnetic activity increased IGP GIVEs and reduced LPV200 availability in Canada.
- Apr 14 – Geomagnetic activity increased IGP GIVEs and reduced LPV availability in Canada. The elevated gives also reduced LPV200 availability in Canada and CONUS.
- Apr 21 – Satellite maintenance elevated UDREs on PRN17 and reduced LPV200 availability in CONUS.
- Apr 25 – GEO 135 was added to the WAAS System.
- May 17 – GEO 138 was removed from the WAAS System.
- May 19-20 – Satellite maintenance elevated UDREs on PRN18 and reduced LPV availability in CONUS and Canada. The elevated UDREs also reduced LPV200 availability in CONUS, Alaska, and Canada.
- May 21 – A GUS switchover on S15 caused a reduction of LPV200 availability in Canada.
- May 26 – Satellite maintenance elevated UDREs on PRN12 and reduced LPV200 availability in Alaska and Canada.
- Jun 24 – Satellite maintenance elevated UDREs on PRN9 and reduced LPV200 availability in CONUS.
- Jun 26 – Geomagnetic activity increased IGP GIVEs and reduced LPV200 availability in Canada.

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.

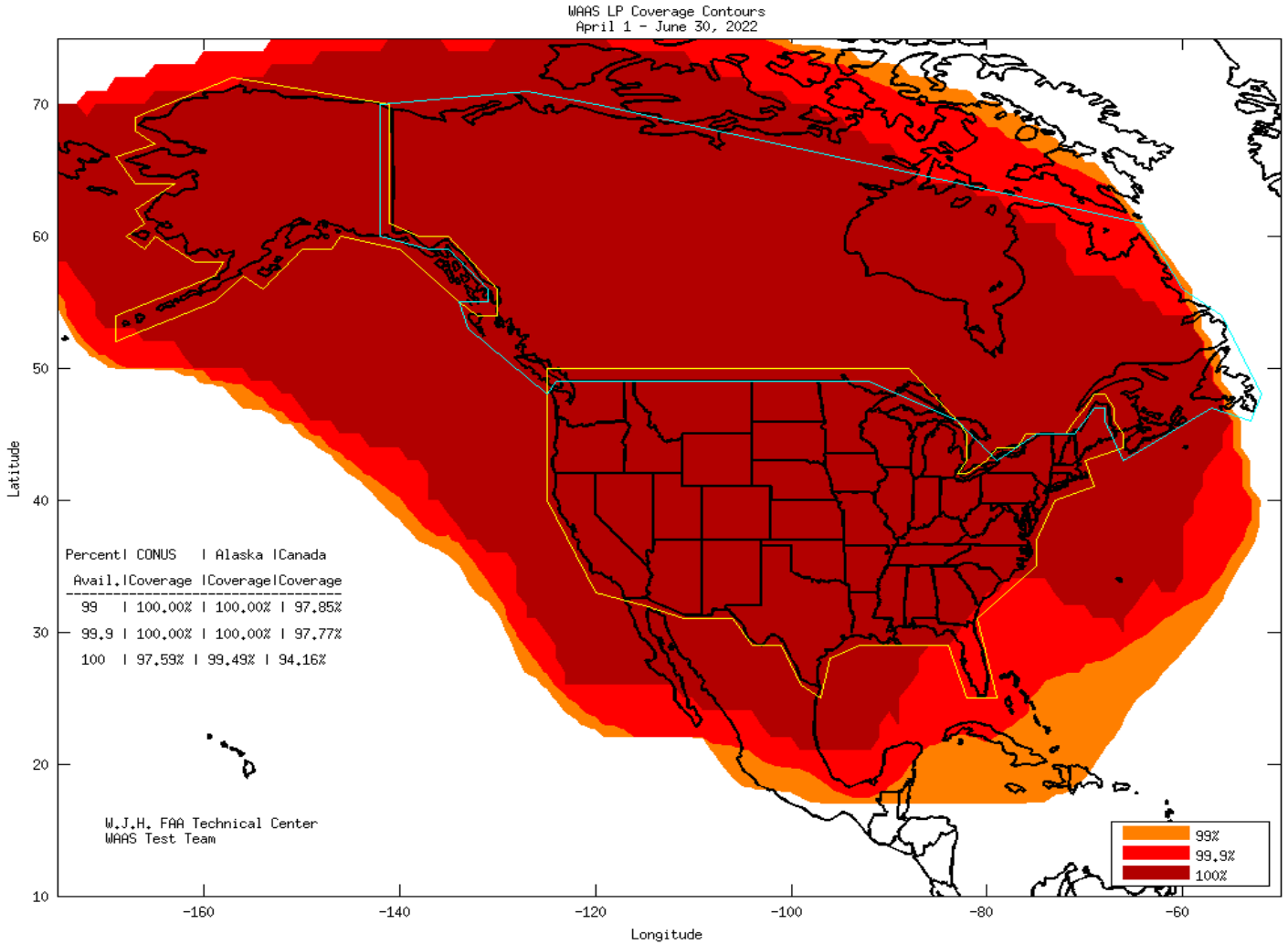

Figure 4-1. LP North America Coverage for the Quarter

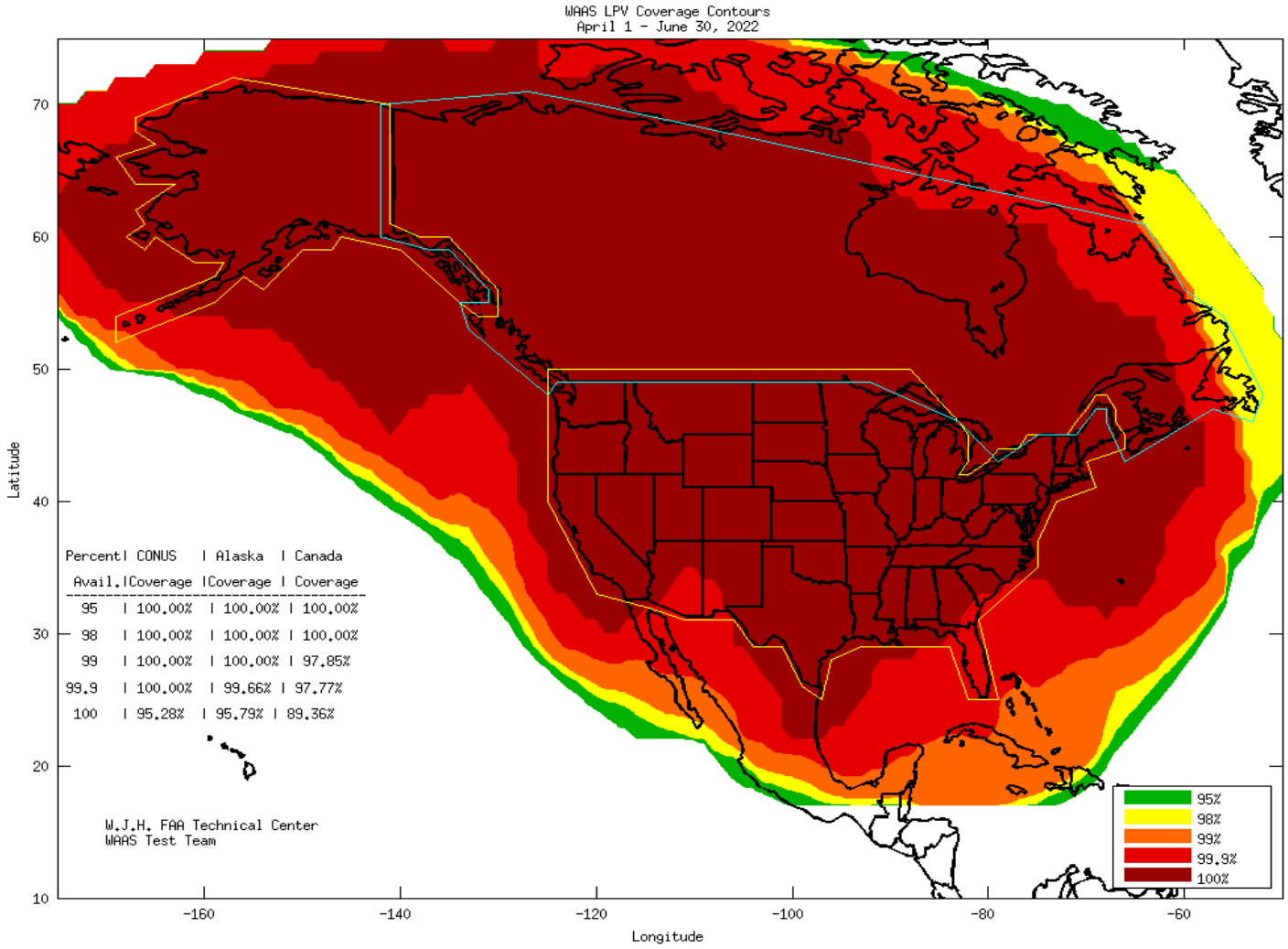

Figure 4-2. LPV North America Coverage for the Quarter

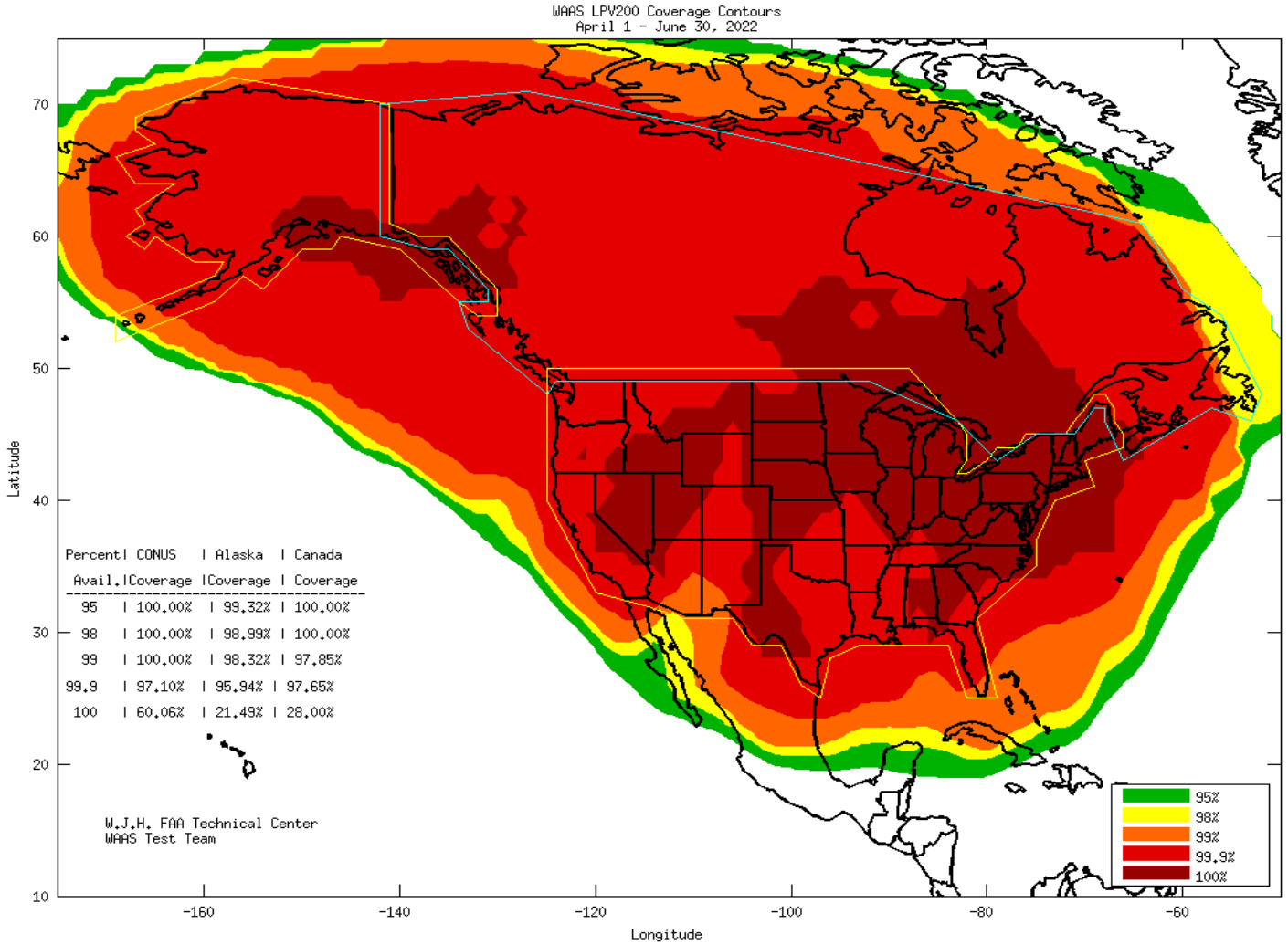

Figure 4-3. LPV200 North America Coverage for the Quarter

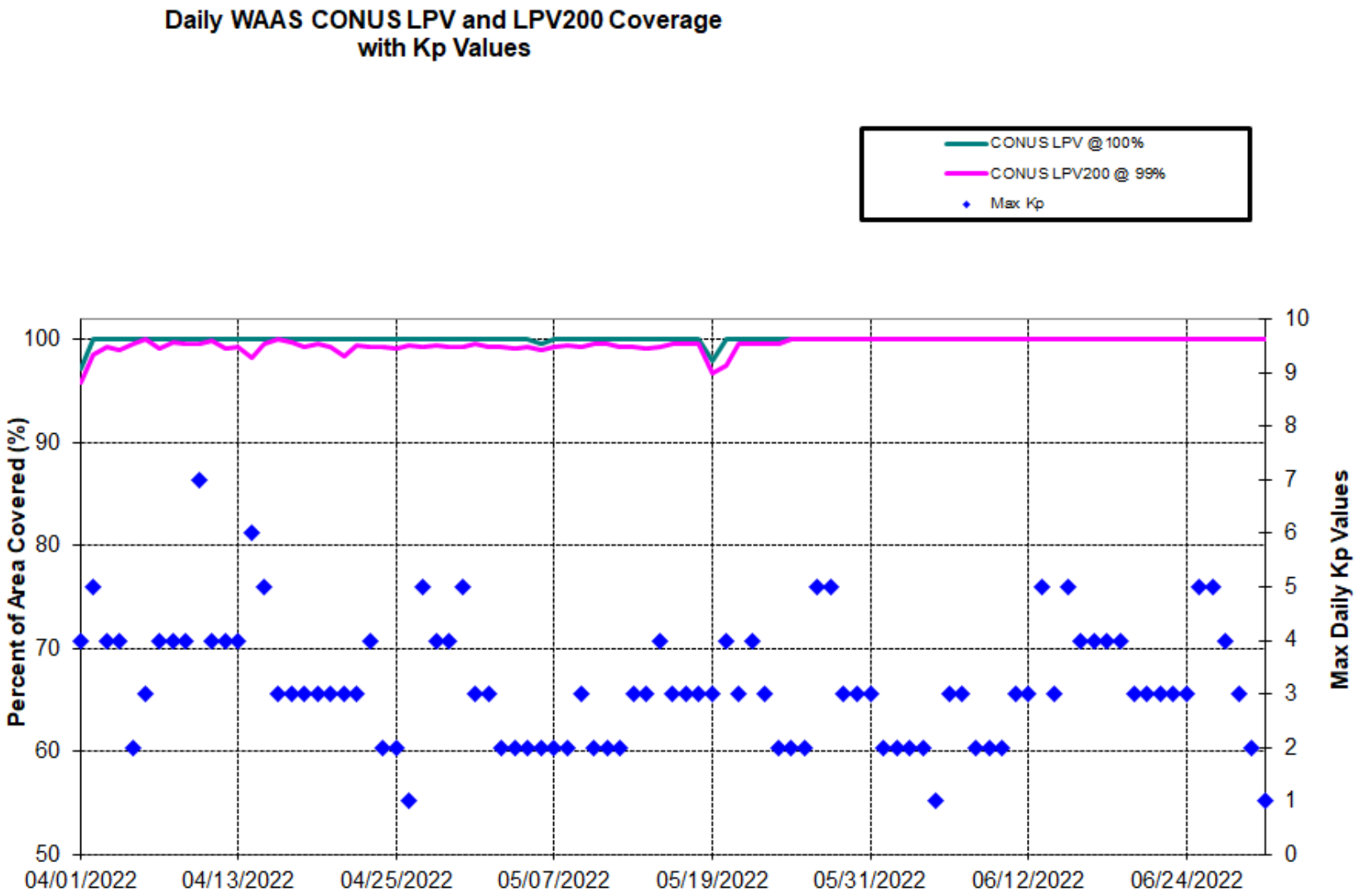

Figure 4-4. Daily LPV and LPV200 CONUS Coverage

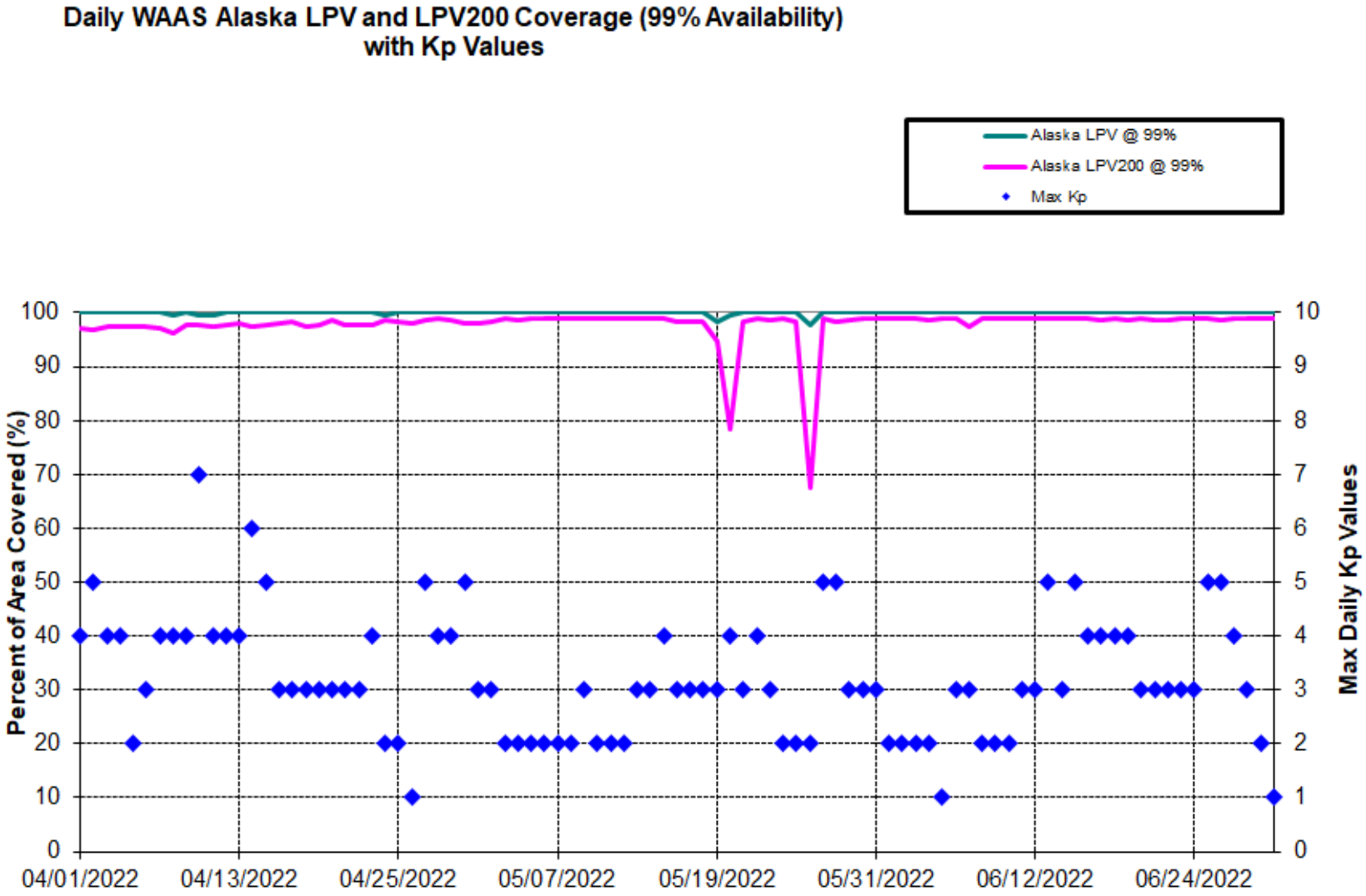

Figure 4-5. Daily LPV and LPV200 Alaska Coverage

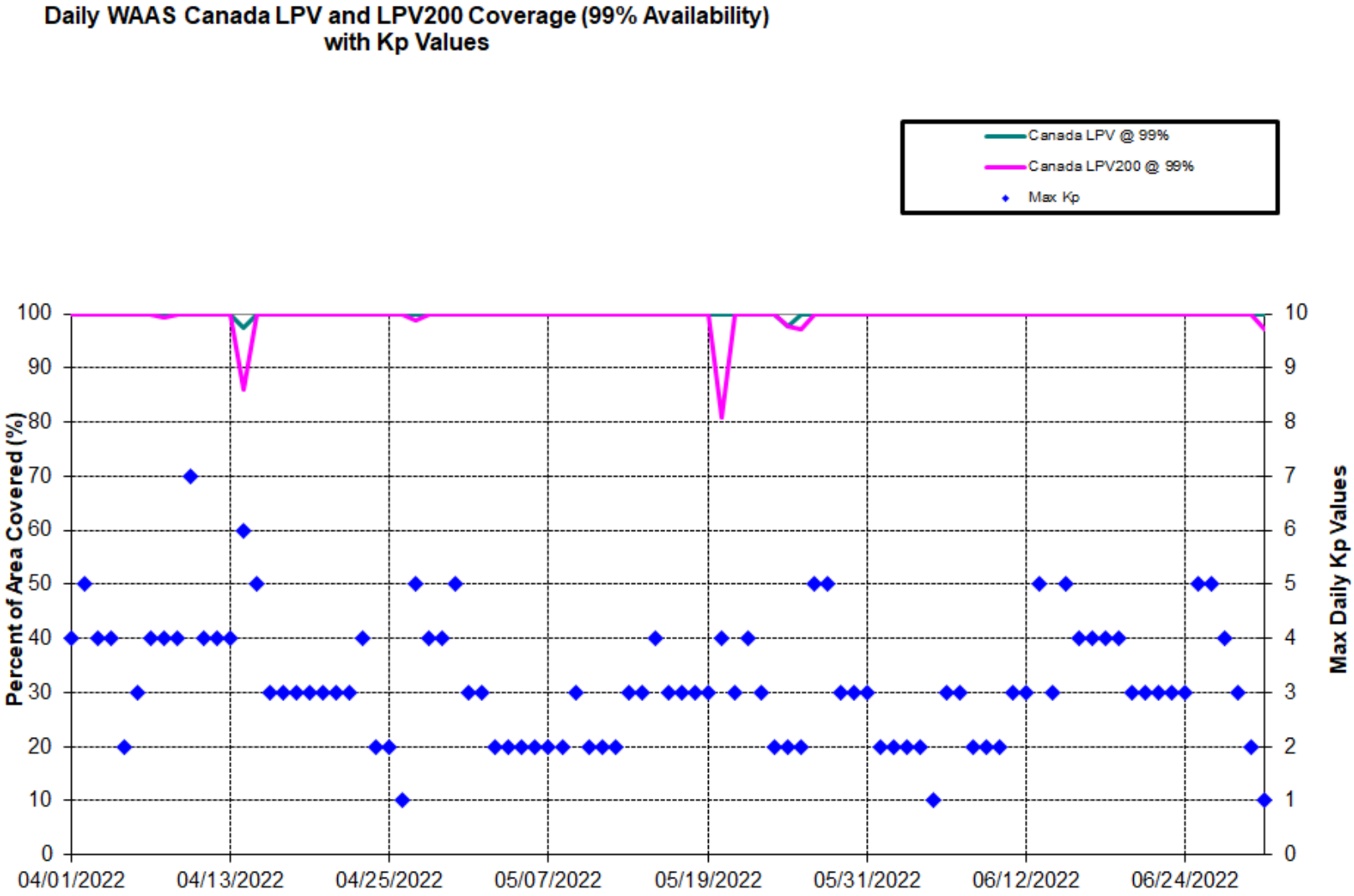

Figure 4-6. Daily LPV and LPV200 Canada Coverage

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.

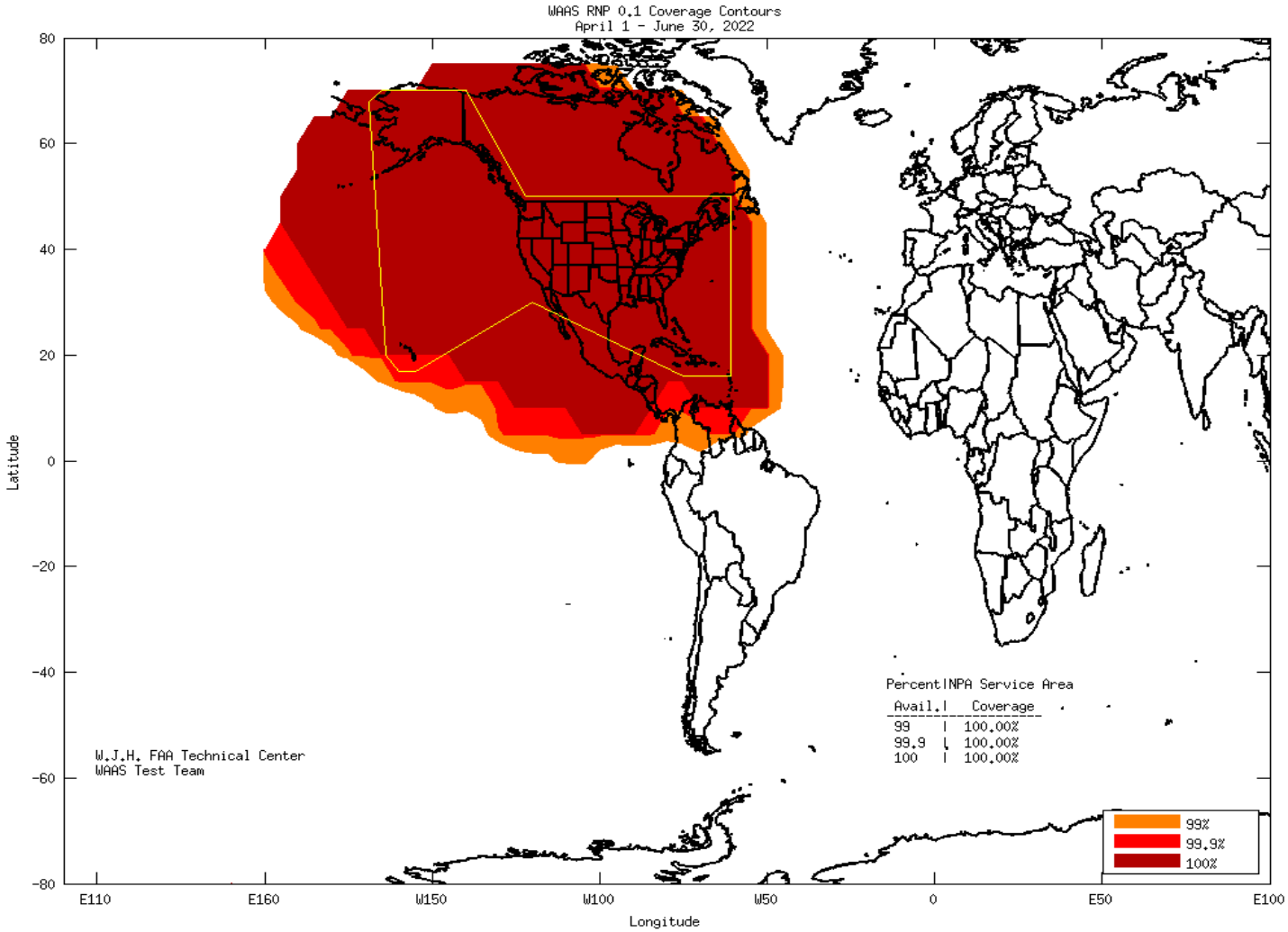

Figure 4-7. RNP 0.1 Coverage for the Quarter

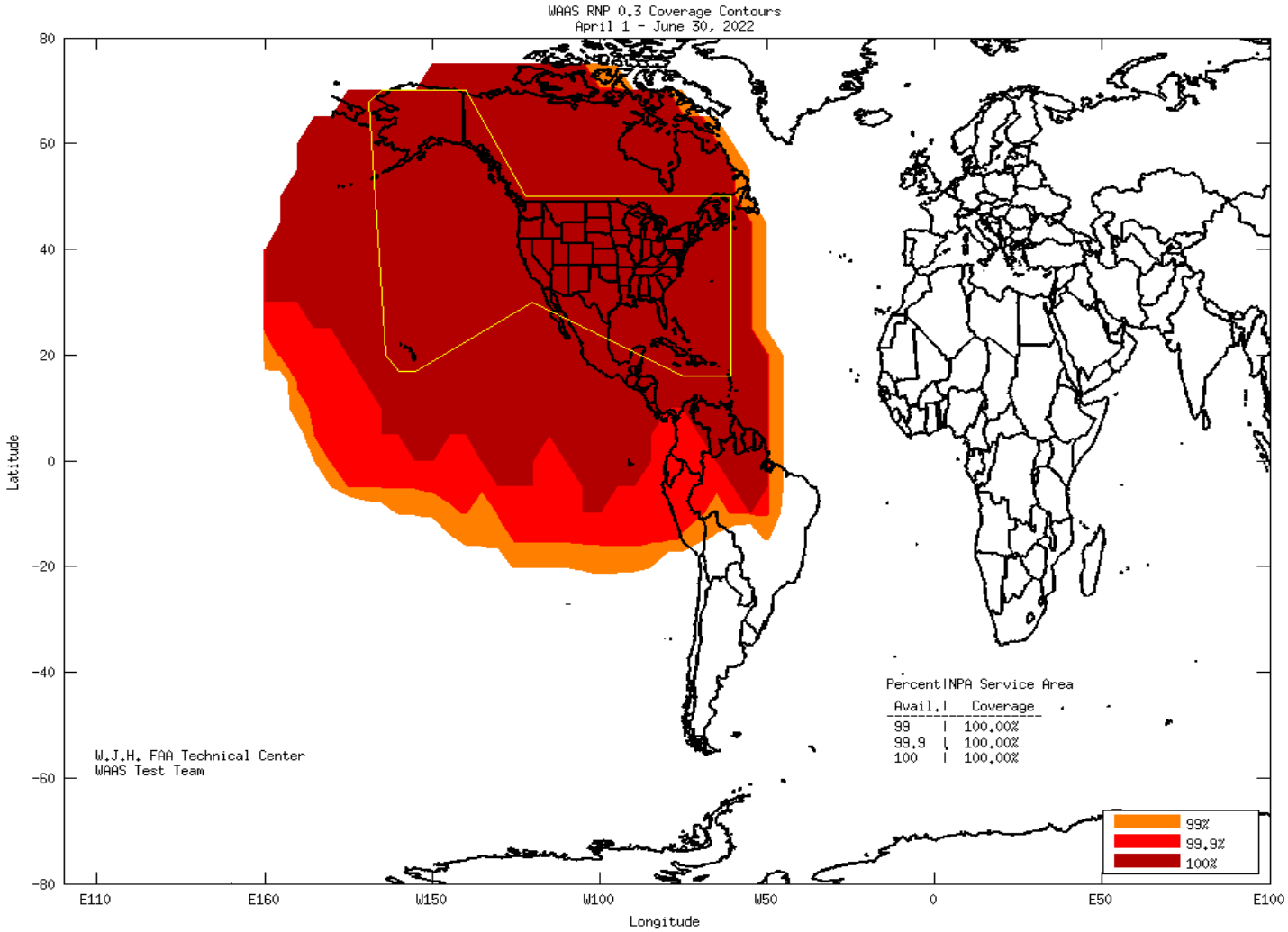

Figure 4-8. RNP 0.3 Coverage for the Quarter

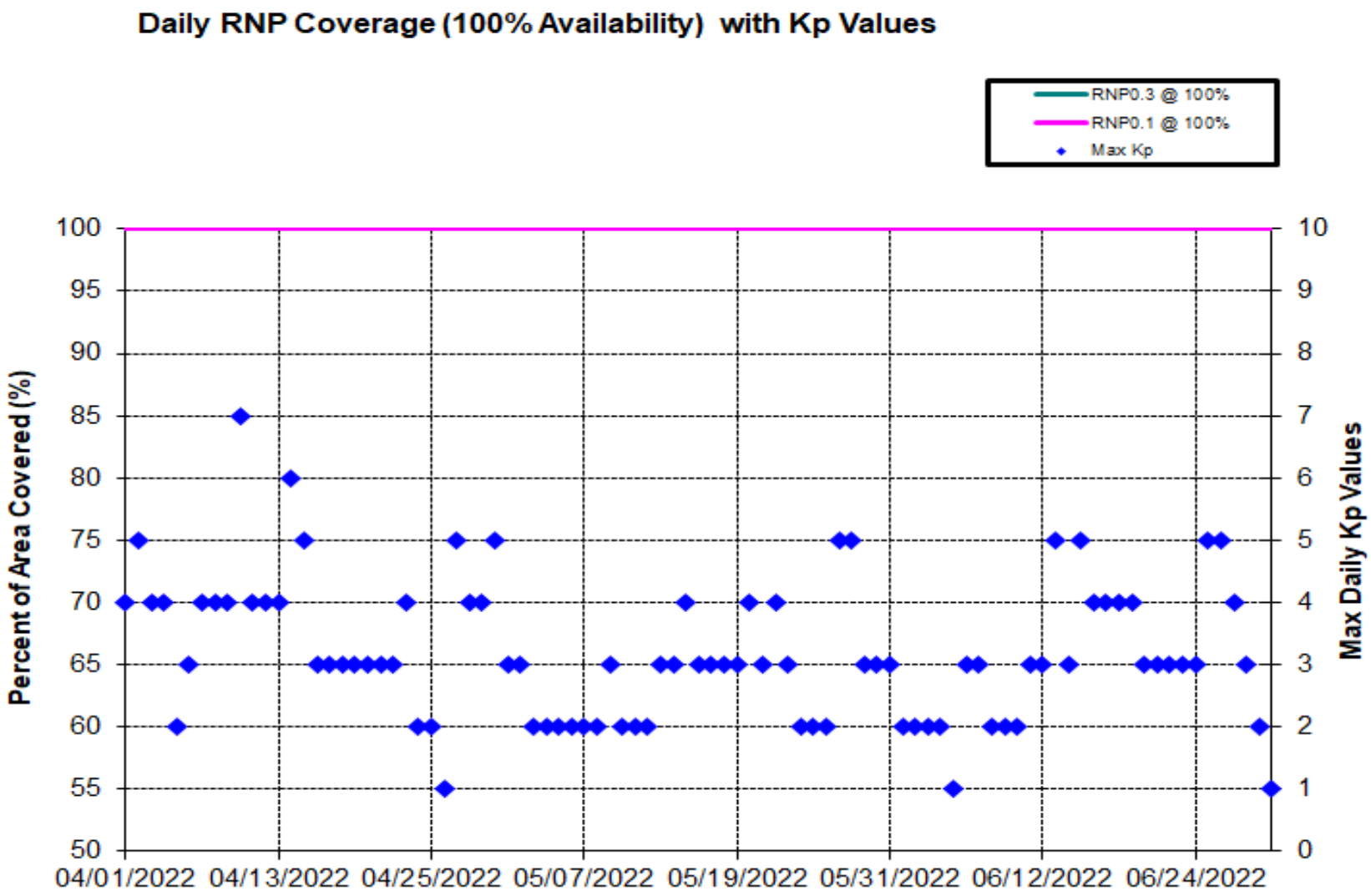

Figure 4-9. Daily RNP Coverage

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

- Apr 1 – Geomagnetic activity increased IGP GIVEs and reduced LPV200 availability in CONUS.
- Apr 8 – Geomagnetic activity increased IGP GIVEs and reduced LPV200 availability in Canada.
- Apr 14 – Geomagnetic activity increased IGP GIVEs and reduced LPV availability in Canada. The elevated gives also reduced LPV200 availability in Canada and CONUS.
- Apr 21 – Satellite maintenance elevated UDREs on PRN17 and reduced LPV200 availability in CONUS.
- Apr 25 – GEO 135 was added to the WAAS System.
- May 17 – GEO 138 was removed from the WAAS System.
- May 19-20 – Satellite maintenance elevated UDREs on PRN18 and reduced LPV availability in CONUS and Canada. The elevated UDREs also reduced LPV200 availability in CONUS, Alaska, and Canada.
- May 21 – A GUS switchover on S15 caused a reduction of LPV200 availability in Canada.
- May 26 – Satellite maintenance elevated UDREs on PRN12 and reduced LPV200 availability in Alaska and Canada.
- Jun 24 – Satellite maintenance elevated UDREs on PRN9 and reduced LPV200 availability in CONUS.
- Jun 26 – Geomagnetic activity increased IGP GIVEs and reduced LPV200 availability in Canada.

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 4.615 at Winnipeg 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 (meters)	Vertical Safety Index (meters)	Number of HMIs
Arcata	5.404	6.972	0
Atlantic City	4.940	5.047	0
Oklahoma City	4.916	5.247	0
Albuquerque	6.578	9.606	0
Anchorage	7.310	6.947	0
Atlanta	9.774	5.868	0
Barrow	6.199	6.200	0
Bethel	7.187	8.725	0
Billings	6.479	7.770	0

Location	Horizontal Safety Index (meters)	Vertical Safety Index (meters)	Number of HMIs
Boston	7.368	10.436	0
Chicago	5.858	6.930	0
Cleveland	5.564	7.398	0
Cold Bay	10.475	6.564	0
Dallas	6.741	6.378	0
Denver	8.461	10.931	0
Fairbanks	10.600	6.138	0
Gander	7.913	8.043	0
Goose Bay	12.721	5.042	0
Houston	7.044	5.355	0
Iqaluit	7.460	4.768	0
Jacksonville	6.105	6.581	0
Juneau	6.647	5.363	0
Kansas City	6.574	8.336	0
Kotzebue	10.836	7.394	0
Los Angeles	6.362	6.608	0
Memphis	9.197	6.779	0
Merida	8.269	6.180	0
Mexico City	15.276	5.531	0
Miami	8.363	5.604	0
Minneapolis	4.882	6.301	0
New York	5.597	5.478	0
Oakland	6.737	6.675	0
Puerto Vallarta	16.425	8.190	0
Salt Lake City	7.770	8.908	0
San Jose Del Cabo	7.280	7.037	0
Seattle	6.448	6.293	0
Washington DC	5.976	7.666	0
Winnipeg	6.744	4.615	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**	**S15**	**G30**	**CRE**	**SM9**	**S15**	**G30**	**CRE**
T2	11	11	9	5	0.1209	0.1209	0.1343	0.1064
T3	14	15	6	9	0.1538	0.1648	0.0896	0.1915
T4	21	19	12	10	0.2308	0.2088	0.1791	0.1493
T5	0	0	0	0	0	0	0	0
T6	0	0	0	0	0	0	0	0
T24	0	0	0	0	0	0	0	0
T26	0	0	1	0	0	0	0.0149	0
Total SV Alerts	46	45	28	24	0.5055	0.4945	0.4179	0.4471
Days in Service	91	91	67	47				

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.

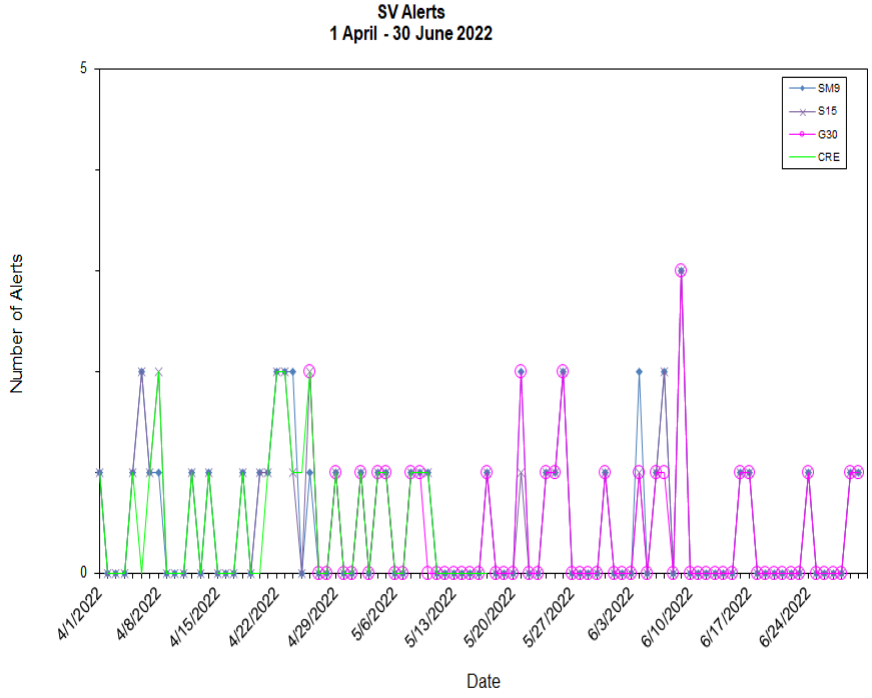

Figure 5-1. SV Daily Alert Trend

5.3 Availability of WAAS Messages (SM9, S15, G30, 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 S15 GEO. Table 5-14 through Table 5-18 show statistics for message rates broadcasted on G30 GEO, and Table 5-19 through Table 5-23 show statistics for messages broadcasted on CRE GEO.

SM9 and S15 GEOs were in service for the entire quarter. G30 GEO entered service April 26, 2002 and CRE GEO was decommissioned on May 17, 2022.

Table 5-4. WAAS Fast Correction and Degradation Message Rates–SM9

Message Type	On Time (number received)	Late (number received)	Max Late Length (seconds)
1	107270	9	180
2	1310357	59	14
3	1310327	76	13
4	1310398	58	12
7	99541	8	187
9	92139	0	0
10	99560	11	180
17	40052	1	329

Table 5-5. WAAS Long Correction Message Rates (Type 24 and 25)–SM9

PRN	On Time (number received)	Late (number received)	Max Late Length (seconds)
1	48162	4	184
2	47797	3	170
3	47372	0	0
4	46710	5	180
5	47258	1	163
6	47419	5	185
7	46882	3	180
8	47745	2	180
9	46652	1	186
10	46806	4	190
11	18864	0	0
12	46450	3	172
13	48564	2	172
14	45888	3	166
15	47223	3	166
16	47464	3	176
17	47011	3	170
18	46456	3	173
19	46001	3	180
20	47953	1	163
21	49781	2	163
22	46579	1	185
23	46588	3	185
24	48802	1	186
25	48564	3	176
26	47925	0	0
27	48448	1	167
29	47110	1	180
30	46818	2	166
31	47364	1	157
32	46122	3	167

Table 5-6. WAAS Ephemeris Covariance Message Rates (Type 28)–SM9

PRN	On Time (number received)	Late (number received)	Max Late Length (seconds)
1	39633	2	155
2	39257	2	210
3	38904	3	212
4	38386	5	206
5	38815	1	206
6	38948	2	203
7	38515	5	211
8	39188	3	208
9	38280	2	152

PRN	On Time (number received)	Late (number received)	Max Late Length (seconds)
10	38489	2	205
11	15463	0	0
12	38149	4	210
13	39957	2	210
14	37751	1	211
15	38737	2	144
16	38965	3	210
17	38645	2	159
18	38166	2	210
19	37838	4	209
20	39313	3	211
21	40994	4	206
22	38272	5	212
23	38231	2	209
24	40140	4	194
25	39929	1	145
26	39345	3	206
27	39858	6	216
29	38727	1	136
30	38498	2	205
31	38852	1	129
32	37920	4	211
131	75153	4	209
133	75321	3	209
135	54884	5	5528
138	38660	7	211

Table 5-7. WAAS Ionospheric Correction Message Rates (Type 26)–SM9

Band	Block	On Time (number received)	Late (number received)	Max Late Length (seconds)
0	0	27296	7	576
0	1	27296	6	576
0	2	27299	7	576
1	0	27283	7	518
1	1	27308	6	511
1	2	27294	7	576
1	3	27284	8	576
1	4	27300	7	576
2	0	27289	8	576
2	1	27294	3	576
2	2	27313	6	576
2	3	27282	8	480
2	4	27300	7	576
3	0	27280	9	482
3	1	27292	8	576

Band	Block	On Time (number received)	Late (number received)	Max Late Length (seconds)
3	2	27282	11	576
9	0	27295	11	576
9	1	27301	8	576
9	2	27288	10	477
9	3	27305	6	477
9	4	27288	10	575
9	5	27290	13	580
9	6	27295	7	576

Table 5-8. WAAS Ionospheric Mask Message Rates (Type 18)–SM9

Band	On Time (number received)	Late (number received)	Max Late Length (seconds)
0	35787	6	438
1	35752	7	708
2	35801	5	474
3	35804	4	438
9	35796	1	455

Table 5-9. WAAS Fast Correction and Degradation Message Rates–S15

Message Type	On Time (number received)	Late (number received)	Max Late Length (seconds)
1	104565	7	166
2	1310358	38	18
3	1310368	38	18
4	1310396	29	24
7	97211	14	182
9	92117	1	169
10	97057	9	192
17	39820	3	347

Table 5-10. WAAS Long Correction Message Rates (Type 24 and 25)–S15

PRN	On Time (number received)	Late (number received)	Max Late Length (seconds)
1	48149	1	159
2	47773	1	158
3	47375	0	0
4	46714	1	171
5	47219	0	0
6	47423	0	0
7	46846	2	180
8	47748	1	162
9	46630	2	166
10	46804	0	0
11	18864	0	0
12	46432	0	0

PRN	On Time (number received)	Late (number received)	Max Late Length (seconds)
13	48553	1	167
14	45893	0	0
15	47200	0	0
16	47445	3	167
17	47016	0	0
18	46432	1	158
19	46013	1	159
20	47931	0	0
21	49779	0	0
22	46573	1	180
23	46546	1	162
24	48826	0	0
25	48531	0	0
26	47897	1	166
27	48442	1	166
29	47076	1	177
30	46790	0	0
31	47349	0	0
32	46133	0	0

Table 5-11. WAAS Ephemeris Covariance Message Rates (Type 28)–S15

PRN	On Time (number received)	Late (number received)	Max Late Length (seconds)
1	39629	5	207
2	39234	0	0
3	38900	1	163
4	38387	0	0
5	38775	3	153
6	38963	2	207
7	38484	7	200
8	39168	5	186
9	38260	4	207
10	38475	5	190
11	15466	0	0
12	38138	0	0
13	39898	13	216
14	37712	9	192
15	38718	0	0
16	38955	2	210
17	38638	3	199
18	38133	10	192
19	37848	3	193
20	39274	2	209
21	40961	6	210
22	38275	5	159

PRN	On Time (number received)	Late (number received)	Max Late Length (seconds)
23	38208	2	184
24	40153	5	146
25	39908	0	0
26	39332	1	193
27	39865	6	200
29	38700	3	208
30	38479	1	144
31	38829	0	0
32	37902	1	121
131	75121	5	194
133	75293	8	194
135	54867	5	5526
138	38630	3	162

Table 5-12. WAAS Ionospheric Correction Message Rates (Type 26)–S15

Band	Block	On Time (number received)	Late (number received)	Max Late Length (seconds)
0	0	27274	5	417
0	1	27274	7	411
0	2	27294	6	576
1	0	27274	7	576
1	1	27287	4	528
1	2	27280	6	576
1	3	27280	6	416
1	4	27280	9	576
2	0	27270	5	468
2	1	27272	8	579
2	2	27284	8	471
2	3	27266	8	482
2	4	27277	7	487
3	0	27272	10	518
3	1	27270	11	542
3	2	27260	9	513
9	0	27264	14	508
9	1	27272	13	576
9	2	27275	15	544
9	3	27273	10	451
9	4	27274	10	582
9	5	27294	7	383
9	6	27271	7	429

Table 5-13. WAAS Ionospheric Mask Message Rates (Type 18)–S15

Band	On Time (number received)	Late (number received)	Max Late Length (seconds)
0	35428	2	364
1	35439	4	422
2	35393	1	321
3	35368	0	0
9	35380	3	371

Table 5-14. WAAS Fast Correction and Degradation Message Rates–G30

Message Type	On Time (number received)	Late (number received)	Max Late Length (seconds)
0	9631	1	8
1	75683	13	184
2	940521	234	18
3	950088	266	18
4	950199	238	18
7	70160	18	199
9	66824	10	185
10	70149	19	185
17	30078	0	0

Table 5-15. WAAS Long Correction Message Rates (Type 24 and 25)–G30

PRN	On Time (number received)	Late (number received)	Max Late Length (seconds)
1	34908	18	187
2	34616	12	186
3	34350	14	198
4	33793	22	186
5	34232	20	186
6	34328	15	182
7	34038	17	185
8	34541	17	186
9	33706	22	187
10	33966	12	186
11	18864	0	0
12	33543	10	182
13	35230	15	186
14	33219	15	186
15	34237	8	186
16	34433	11	187
17	34264	17	186
18	33611	20	186
19	33322	15	185
20	34734	19	187
21	36286	12	182

PRN	On Time (number received)	Late (number received)	Max Late Length (seconds)
22	33740	17	200
23	33824	17	186
24	35409	18	187
25	35173	8	186
26	34754	16	182
27	35184	16	181
29	34131	16	180
30	33982	12	186
31	34259	16	186
32	33484	13	182

Table 5-16. WAAS Ephemeris Covariance Message Rates (Type 28)–G30

PRN	On Time (number received)	Late (number received)	Max Late Length (seconds)
1	28698	14	211
2	28432	15	212
3	28164	23	212
4	27784	10	209
5	28128	13	211
6	28204	14	210
7	27915	19	210
8	28356	16	212
9	27641	27	211
10	27912	15	210
11	15462	1	122
12	27536	14	211
13	28967	23	212
14	27315	15	212
15	28084	11	210
16	28245	14	211
17	28176	12	211
18	27606	17	211
19	27398	17	211
20	28489	14	211
21	29836	20	212
22	27722	21	211
23	27783	11	211
24	29069	23	212
25	28918	15	210
26	28522	23	212
27	28947	14	210
29	28056	16	212
30	27941	18	210
31	28109	12	211
32	27524	9	212

PRN	On Time (number received)	Late (number received)	Max Late Length (seconds)
131	54601	23	212
133	54603	29	5514
135	54645	25	212
138	17845	34	212

Table 5-17. WAAS Ionospheric Correction Message Rates (Type 26)–G30

Band	Block	On Time (number received)	Late (number received)	Max Late Length (seconds)
0	0	19770	19	870
0	1	19795	17	576
0	2	19773	20	580
1	0	19790	12	576
1	1	19785	14	576
1	2	19787	13	587
1	3	19774	19	594
1	4	19784	11	577
2	0	19788	17	582
2	1	19801	14	576
2	2	19787	13	581
2	3	19794	7	576
2	4	19795	8	576
3	0	19787	10	582
3	1	19790	11	580
3	2	19783	16	577
9	0	19781	16	582
9	1	19782	12	576
9	2	19762	21	576
9	3	19772	16	576
9	4	19804	18	576
9	5	19787	13	577
9	6	19786	15	576

Table 5-18. WAAS Ionospheric Mask Message Rates (Type 18)–G30

Band	On Time (number received)	Late (number received)	Max Late Length (seconds)
0	25683	13	480
1	25658	17	480
2	25699	11	475
3	25679	8	480
9	25717	7	480

Table 5-19. WAAS Fast Correction and Degradation Message Rates–CRE

Message Type	On Time (number received)	Late (number received)	Max Late Length (seconds)
0	39	0	0
1	58499	2	169
2	714224	32	13
3	714255	41	12
4	714281	30	12
7	54540	2	156
9	50201	2	181
10	54499	3	150
17	25770	0	0

Table 5-20. WAAS Long Correction Message Rates (Type 24 and 25)–CRE

PRN	On Time (number received)	Late (number received)	Max Late Length (seconds)
1	26292	1	167
2	25969	0	0
3	25833	2	180
4	25531	2	180
5	25718	2	157
6	25786	1	162
7	25557	2	180
8	26248	1	180
9	25540	0	0
10	25545	2	168
12	25400	0	0
13	26417	0	0
14	25061	1	166
15	25723	2	166
16	25924	1	167
17	25413	1	182
18	25516	1	157
19	25001	1	180
20	26101	2	157
21	27042	1	162
22	25482	1	162
23	25351	1	168
24	26484	0	0
25	26453	2	168
26	26163	1	130
27	26454	0	0
29	25643	1	180
30	25462	2	166
31	25866	1	155
32	25104	1	182

Table 5-21. WAAS Ephemeris Covariance Message Rates (Type 28)–CRE

PRN	On Time (number received)	Late (number received)	Max Late Length (seconds)
1	21628	1	211
2	21330	1	152
3	21217	1	200
4	20991	0	0
5	21124	0	0
6	21184	0	0
7	20971	2	205
8	21540	1	208
9	20975	1	146
10	21004	1	122
12	20840	1	206
13	21691	1	208
14	20591	1	168
15	21098	3	206
16	21277	1	210
17	20899	2	198
18	20929	3	208
19	20552	0	0
20	21364	0	0
21	22241	0	0
22	20927	1	128
23	20827	2	210
24	21785	1	211
25	21740	1	206
26	21494	1	210
27	21783	1	144
29	21061	2	146
30	20934	0	0
31	21199	4	210
32	20620	2	210
131	40795	4	210
133	41101	4	210
135	17957	0	0
138	41133	0	0

Table 5-22. WAAS Ionospheric Correction Message Rates (Type 26)–CRE

Band	Block	On Time (number received)	Late (number received)	Max Late Length (seconds)
0	0	14863	4	393
0	1	14851	5	383
0	2	14857	8	577
1	0	14863	3	370
1	1	14862	6	344
1	2	14869	2	576

Band	Block	On Time (number received)	Late (number received)	Max Late Length (seconds)
1	3	14859	3	576
1	4	14859	3	358
2	0	14860	3	362
2	1	14863	2	352
2	2	14856	6	360
2	3	14852	5	576
2	4	14857	4	576
3	0	14854	3	576
3	1	14851	4	524
3	2	14860	6	576
9	0	14863	3	542
9	1	14860	4	519
9	2	14860	3	524
9	3	14857	5	576
9	4	14865	3	539
9	5	14864	3	513
9	6	14852	6	520

Table 5-23. WAAS Ionospheric Mask Message Rates (Type 18)–CRE

Band	On Time (number received)	Late (number received)	Max Late Length (seconds)
0	19492	1	352
1	19503	5	444
2	19493	1	326
3	19529	1	458
9	19479	1	302

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.

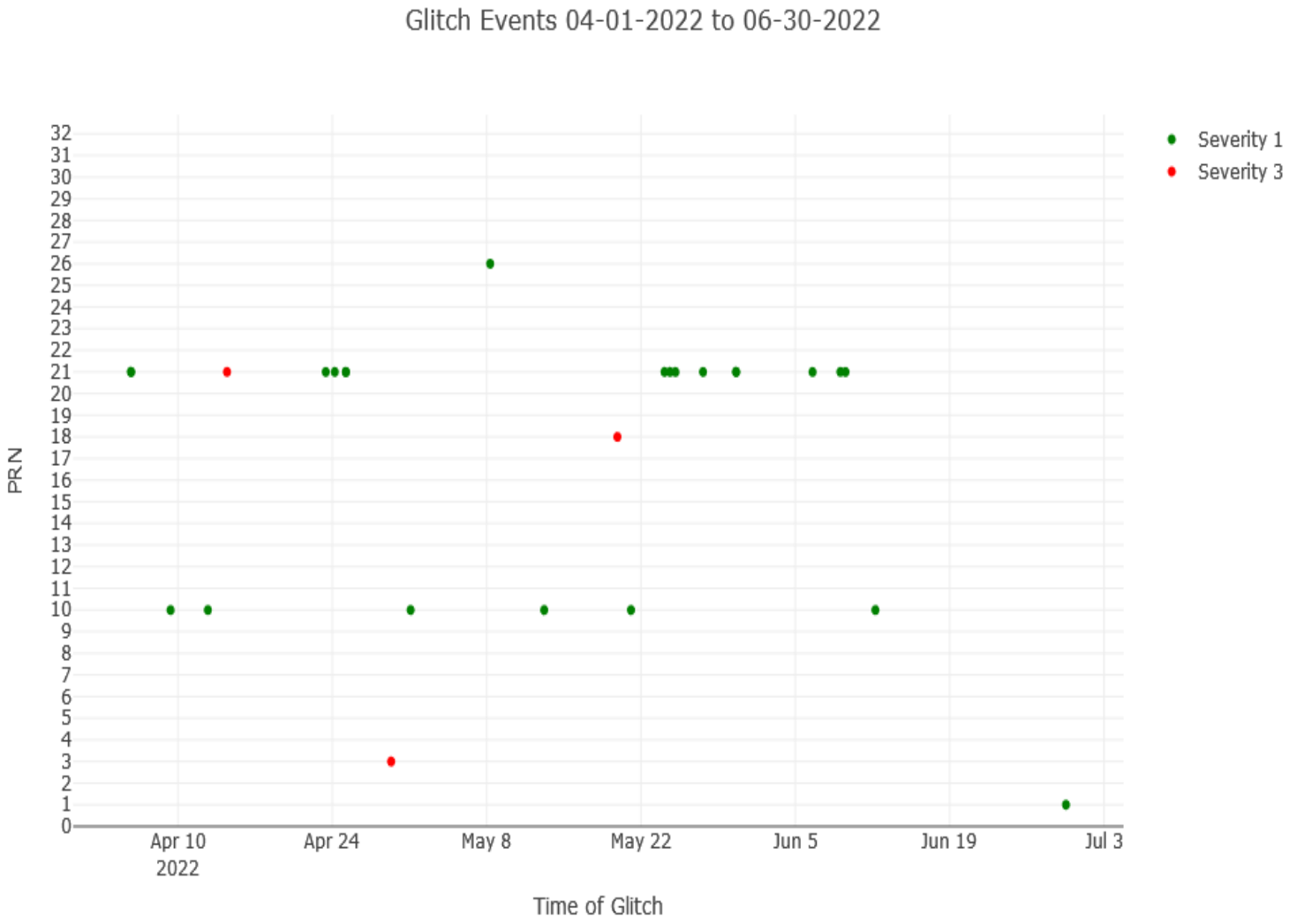

Figure 5-2. SV Glitch Trend

6.0 SV RANGE ACCURACY

WAAS transmits UDRE and GIVE values to support protection levels such that the position error is bounded 99.9999%. The position domain analysis in this report provides the information regarding how well the transmitted WAAS UDRE and GIVE values bound the position errors. A UDRE is broadcasted by the WAAS for each monitored satellite, and the 95% error bound and the maximum normalized value (divided by sigma_UDRE) 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 normalized 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, maximum range error, and maximum normalized value (divided by sigma_UDRE) at the time of the maximum range error. Figure 6-1 through Figure 6-3 show the 95% range error for each SV measured by the WAAS receivers at the Washington, DC 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)	Max Range Error (Meters)	Max Range Error Sigma	0.95 Range Error (Meters)	Max Range Error (Meters)	Max Range Error Sigma	0.95 Range Error (Meters)	Max Range Error (Meters)	Max Range Error Sigma	0.95 Range Error (Meters)	Max Range Error (Meters)	Max Range Error Sigma	0.95 Range Error (Meters)	Max Range Error (Meters)	Max Range Error Sigma	0.95 Range Error (Meters)	Max Range Error (Meters)	Max Range Error Sigma
1	0.955	3.384	1.168	1.085	2.618	0.770	1.143	3.006	0.929	1.168	3.805	1.240	1.139	3.201	1.393	0.946	3.345	0.882
2	0.838	2.263	0.742	0.973	2.171	0.777	0.904	1.975	0.767	1.397	2.529	0.783	1.641	3.990	1.702	1.080	3.190	1.014
3	0.927	3.059	1.007	1.205	6.467	1.908	1.350	2.937	1.386	1.232	2.716	0.909	1.457	3.973	1.219	1.293	4.000	1.188
4	1.213	3.107	1.065	1.413	4.113	1.272	1.029	2.115	0.864	1.400	2.808	0.789	1.063	1.960	0.825	1.045	2.302	0.749
5	0.802	2.040	1.374	0.920	1.965	0.886	0.843	1.881	1.306	1.178	3.516	1.118	1.480	3.684	1.488	1.135	2.279	0.863
6	0.925	2.371	0.927	0.954	2.431	1.021	1.103	2.851	0.986	1.594	2.936	0.988	1.136	2.632	0.841	0.971	3.584	1.050
7	1.766	3.700	1.162	1.013	2.700	0.826	1.578	3.229	1.008	1.353	3.270	1.013	1.246	2.174	1.322	1.038	2.848	0.882
8	1.911	4.210	1.311	1.129	2.752	0.955	0.908	2.165	0.681	1.329	2.885	2.094	1.072	2.397	0.785	0.934	2.723	0.832
9	1.089	2.437	0.966	1.216	3.749	1.123	1.096	2.506	0.957	1.286	2.515	1.524	1.488	2.927	0.891	0.900	3.306	1.130
10	0.997	2.385	1.148	1.108	2.982	1.006	1.009	2.345	1.022	1.192	2.765	0.981	1.293	2.306	1.449	0.857	2.954	1.028
11	1.286	2.134	0.700	1.134	3.421	1.147	1.455	2.477	1.227	1.562	2.967	1.336	1.498	5.227	1.445	1.531	3.196	1.385
12	0.806	1.809	0.781	0.934	2.943	1.081	1.189	3.947	0.729	1.222	2.789	1.028	1.617	3.372	1.086	1.201	2.586	1.022
13	1.482	4.745	1.421	1.149	2.259	0.699	1.347	3.884	1.123	1.447	4.455	1.458	1.047	2.500	1.006	0.928	4.795	1.330
14	1.233	3.203	1.029	1.287	3.588	1.216	1.108	2.368	0.829	1.487	2.880	0.956	1.558	3.746	1.363	1.150	2.634	1.077
15	1.606	3.407	1.107	0.851	2.694	0.818	1.053	3.165	1.040	1.136	2.502	1.025	1.048	2.667	1.197	0.879	2.338	0.687
16	1.199	2.352	0.879	0.832	2.494	0.984	1.032	2.440	0.744	1.362	2.608	0.902	1.207	2.624	0.918	0.942	2.147	0.630
17	1.145	3.181	1.245	1.229	3.006	1.018	1.285	2.431	0.787	1.407	3.884	1.316	2.090	11.187	4.146	1.179	2.549	0.980
18	1.188	2.424	0.809	1.090	2.697	0.463	0.950	2.038	0.647	1.295	3.408	0.964	1.374	2.779	1.082	0.947	2.401	0.802
19	1.238	3.493	1.113	0.892	1.743	0.749	1.281	2.762	0.882	1.560	3.443	1.731	1.305	4.756	1.313	1.282	5.702	1.693
20	1.713	3.135	1.262	0.967	2.778	1.014	1.075	2.762	0.955	1.503	3.693	1.156	1.460	3.467	1.695	1.225	2.908	0.859
21	1.431	6.146	1.810	0.894	2.309	0.733	1.140	2.832	0.827	1.420	3.124	1.867	1.393	5.877	1.975	1.146	3.611	1.153
22	0.966	2.746	0.891	1.228	2.506	1.012	0.890	2.038	1.194	1.539	3.081	1.301	1.513	3.546	0.569	0.956	3.266	1.264
23	1.025	2.578	0.818	0.805	2.081	0.673	0.857	2.311	1.739	1.231	2.996	0.875	1.370	2.315	1.595	0.898	2.138	0.878
24	1.129	2.595	0.791	0.930	2.194	0.742	0.941	3.173	0.939	1.453	3.519	1.327	1.111	2.290	0.679	1.522	4.186	1.129
25	0.973	2.292	1.304	0.853	2.045	0.937	1.031	2.232	1.058	1.519	3.391	1.375	1.477	3.109	1.079	1.428	3.717	1.085
26	1.088	2.553	0.967	1.217	3.605	1.101	0.926	2.871	0.865	1.129	2.878	0.992	1.201	2.160	0.842	1.034	2.753	0.921
27	0.910	2.388	0.761	0.938	2.963	0.963	1.073	3.058	0.917	1.148	2.470	0.959	1.142	3.924	1.233	0.765	1.988	0.561
28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	1.095	2.451	1.002	0.881	1.848	0.904	1.129	2.619	1.274	1.181	2.411	0.748	1.590	3.227	1.116	1.212	3.450	1.039
30	1.373	2.976	0.985	1.124	3.378	1.033	1.160	2.503	1.037	1.165	2.703	0.890	1.408	2.661	0.999	1.015	2.186	1.005
31	0.857	1.850	0.630	0.797	2.196	0.733	0.886	2.453	1.174	1.216	3.127	1.033	1.320	3.391	1.068	0.889	3.115	0.975
32	1.039	2.691	0.879	0.810	2.075	0.960	0.936	2.332	0.742	0.943	3.216	1.380	1.396	5.604	1.668	1.026	4.619	1.406
131	1.684	5.072	0.635	1.291	4.618	0.414	1.680	4.504	0.468	1.894	5.673	0.713	1.683	4.030	0.699	1.274	5.019	0.936
133	2.263	4.100	0.856	2.091	4.540	0.804	1.099	2.648	0.534	1.442	3.046	0.651	1.329	3.388	0.878	1.136	2.842	0.681
138	1.669	4.594	1.212	1.571	3.858	1.099	1.518	3.079	0.517	1.369	2.880	0.569	1.630	3.180	0.812	1.413	2.823	0.696

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)	Max Range Error (Meters)	Max Range Error Sigma	0.95 Range Error (Meters)	Max Range Error (Meters)	Max Range Error Sigma	0.95 Range Error (Meters)	Max Range Error (Meters)	Max Range Error Sigma	0.95 Range Error (Meters)	Max Range Error (Meters)	Max Range Error Sigma	0.95 Range Error (Meters)	Max Range Error (Meters)	Max Range Error Sigma	0.95 Range Error (Meters)	Max Range Error (Meters)	Max Range Error Sigma
1	1.125	2.243	0.977	1.080	2.638	1.492	1.231	4.742	1.456	0.933	2.726	1.067	1.364	3.742	1.131	1.085	2.375	0.788
2	1.130	2.467	1.028	1.300	4.276	1.235	0.891	2.290	0.637	1.219	2.398	0.748	1.090	2.739	1.103	0.816	1.738	0.900
3	1.038	2.323	1.059	1.156	2.282	1.059	0.987	2.861	0.870	0.970	3.717	1.254	1.424	3.355	0.997	1.899	3.388	1.697
4	0.843	2.167	0.655	1.094	2.157	1.376	0.879	2.157	0.781	0.801	2.611	1.104	1.238	2.687	0.965	0.762	1.746	0.782
5	1.137	2.721	0.876	2.812	8.822	1.580	0.994	2.213	1.659	2.071	5.031	1.916	1.136	2.204	1.365	0.823	1.970	1.285
6	1.468	3.980	1.475	2.101	8.651	2.653	0.896	2.042	1.487	2.150	3.891	1.210	1.313	3.628	1.138	0.857	2.651	0.890
7	1.067	2.392	0.814	1.244	3.796	1.182	0.758	1.626	0.597	1.045	2.045	1.334	1.254	2.384	0.825	1.061	2.828	1.007
8	1.135	2.572	0.816	1.106	3.000	1.817	1.591	4.339	1.349	1.264	4.482	1.957	1.924	4.418	1.488	0.990	2.036	1.430
9	1.143	2.936	1.245	1.072	3.151	1.820	0.840	2.979	0.938	1.093	5.613	2.031	1.226	2.970	0.828	0.917	1.902	0.878
10	1.171	3.661	1.116	1.050	2.736	0.987	0.797	2.026	0.588	1.518	3.503	1.074	1.009	2.032	1.096	0.914	1.985	1.470
11	1.386	2.674	1.137	1.815	4.230	1.279	1.502	2.367	0.646	1.495	3.438	1.049	1.406	2.494	0.730	1.227	2.351	0.914
12	1.115	2.609	0.830	1.354	3.467	1.151	1.007	2.862	0.861	1.380	4.521	1.477	1.194	2.917	0.841	0.779	2.572	0.802
13	1.023	2.407	0.947	1.255	3.891	1.384	0.876	2.454	0.733	1.300	2.446	0.808	1.228	4.291	1.260	0.845	1.794	0.560
14	0.970	2.249	1.277	1.396	3.160	0.991	0.802	2.088	0.374	1.131	2.621	1.040	1.029	2.387	0.773	0.839	1.952	1.223
15	1.311	4.026	1.293	1.217	2.573	0.980	1.042	2.788	0.939	1.700	4.026	1.260	1.316	4.745	1.342	0.786	1.751	1.042
16	1.630	4.130	1.576	1.330	2.801	0.962	1.495	2.618	0.892	1.776	4.390	1.646	1.264	2.312	1.010	0.860	1.878	0.569
17	1.370	3.421	1.043	1.218	2.750	1.157	1.135	2.875	0.775	1.404	2.857	1.455	1.294	2.727	1.425	1.094	2.707	0.869
18	0.902	1.919	1.107	1.882	4.906	1.548	0.939	2.187	0.625	0.855	1.751	0.703	1.253	3.395	0.671	0.805	1.750	0.643
19	1.329	4.056	1.221	1.162	2.885	0.759	1.379	3.421	0.968	1.305	4.953	1.742	1.057	2.660	1.366	0.892	1.855	1.097
20	1.212	2.907	1.066	1.226	3.312	1.082	1.310	3.167	1.670	1.298	5.342	1.899	1.293	2.506	0.735	0.982	2.186	0.693
21	1.315	2.605	0.770	1.075	3.005	1.873	1.100	3.565	1.106	1.503	3.700	1.137	1.146	3.213	1.091	0.858	2.230	0.410
22	1.030	3.384	1.035	1.193	2.484	0.787	1.207	3.020	0.940	0.960	3.157	1.082	1.436	2.657	0.851	0.848	1.616	0.966
23	0.888	2.986	1.157	1.113	3.772	1.420	0.831	1.976	0.587	1.304	2.982	1.129	0.911	2.552	0.961	0.850	1.807	1.384
24	1.041	2.234	0.984	1.129	2.322	1.394	0.889	1.993	0.627	1.015	2.301	0.940	1.161	2.503	0.775	0.877	2.474	0.652
25	1.229	2.630	0.845	1.098	2.163	1.298	1.175	2.296	1.692	1.115	3.345	1.208	1.310	2.614	0.897	1.110	2.456	0.969
26	1.132	4.131	1.301	1.184	3.890	1.404	1.171	3.230	1.087	1.092	4.436	1.457	1.452	3.783	1.166	0.860	2.069	1.363
27	1.220	2.628	0.885	1.093	2.187	1.137	1.549	3.576	1.052	0.826	2.691	1.021	1.158	4.510	1.366	1.020	2.107	1.119
28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	1.074	2.358	0.993	1.018	2.168	0.559	1.023	3.313	1.014	1.154	2.799	1.061	1.307	3.051	0.954	1.075	2.565	0.817
30	1.381	2.654	1.151	1.239	2.693	1.398	0.953	2.789	0.782	1.223	2.927	1.402	0.996	2.378	0.606	1.139	2.236	1.065
31	1.186	3.265	1.036	1.754	8.491	2.403	0.897	1.983	0.541	1.347	6.612	2.049	1.673	3.210	0.915	1.017	3.085	1.148
32	1.234	3.207	1.177	1.456	5.394	1.517	0.907	2.753	1.003	0.979	3.073	0.966	1.228	2.265	0.742	0.798	1.835	0.561
131	2.029	3.953	0.618	1.480	4.764	0.569	1.943	5.708	1.073	1.351	4.627	0.696	2.234	6.679	1.139	1.499	5.289	0.702
133	1.582	3.533	0.805	1.309	3.890	0.799	1.929	3.562	0.852	2.101	3.582	0.859	1.816	3.456	0.724	1.239	3.117	0.786
138	1.383	2.997	0.739	1.834	5.236	0.287	1.305	2.852	0.655	2.501	4.171	1.129	2.328	4.214	0.922	1.552	3.234	0.490

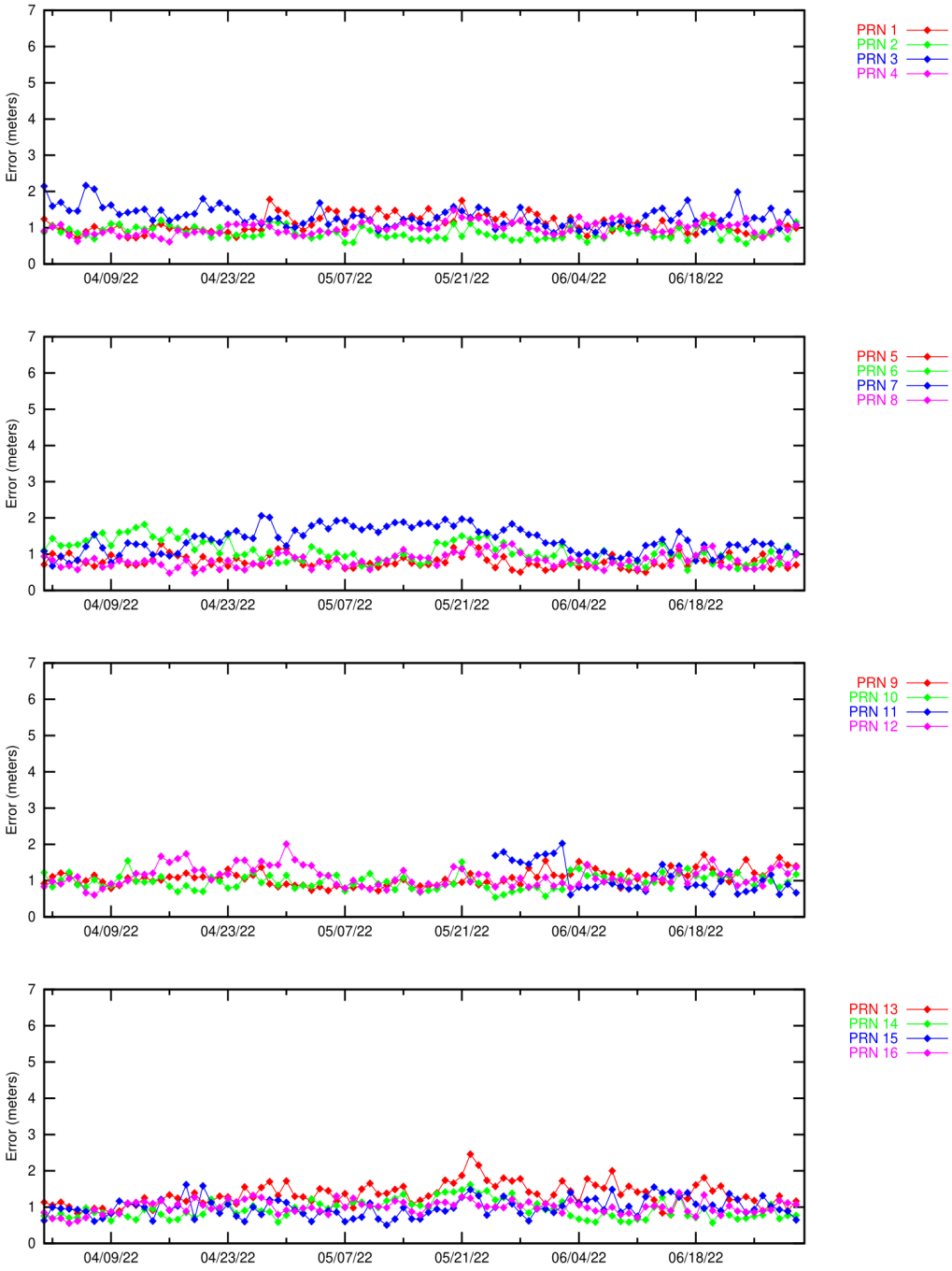

Figure 6-1. Range Error (PRN1 – PRN16) – Washington DC

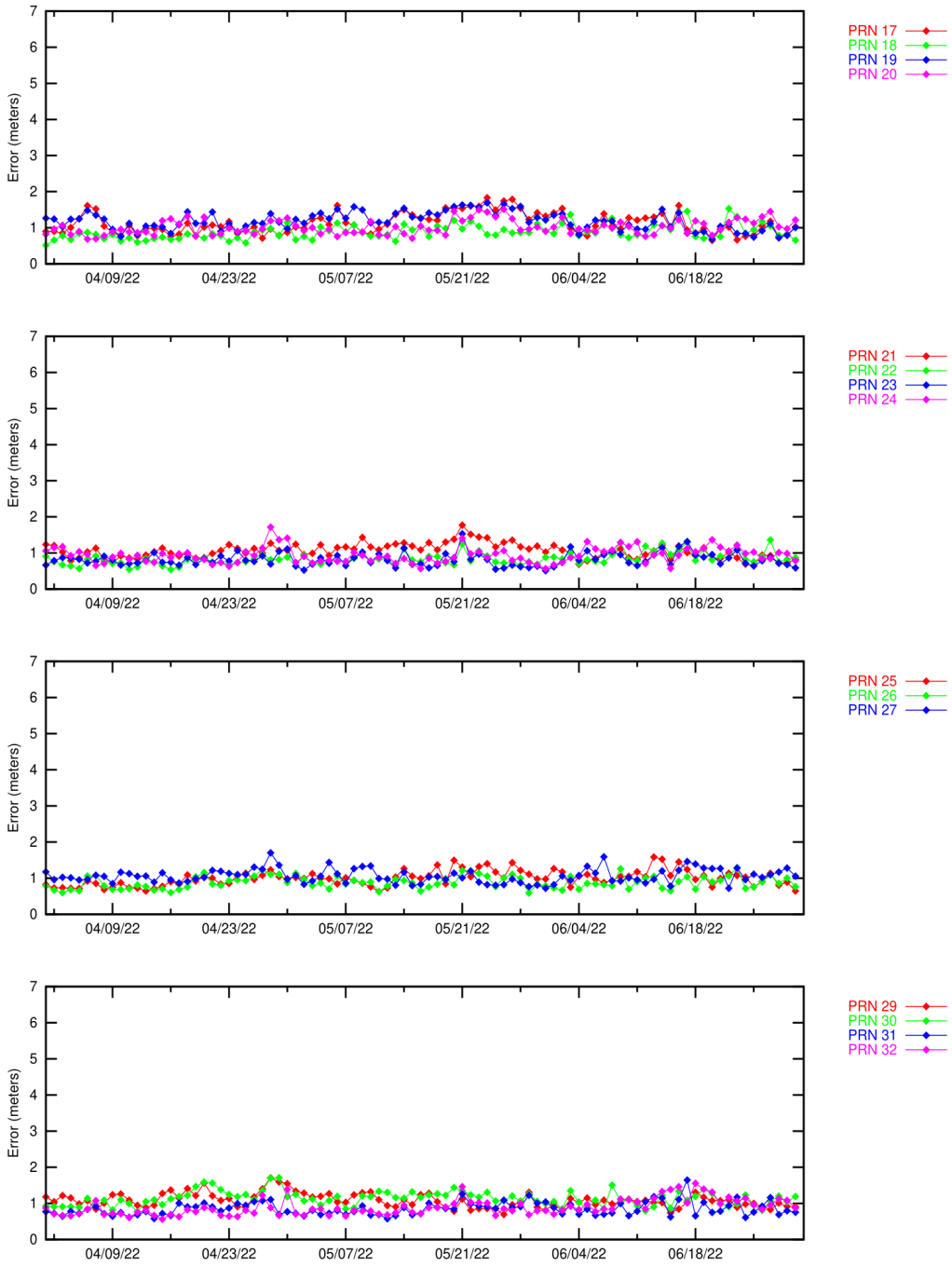

Figure 6-2. Range Error (PRN17 – PRN32) – Washington DC

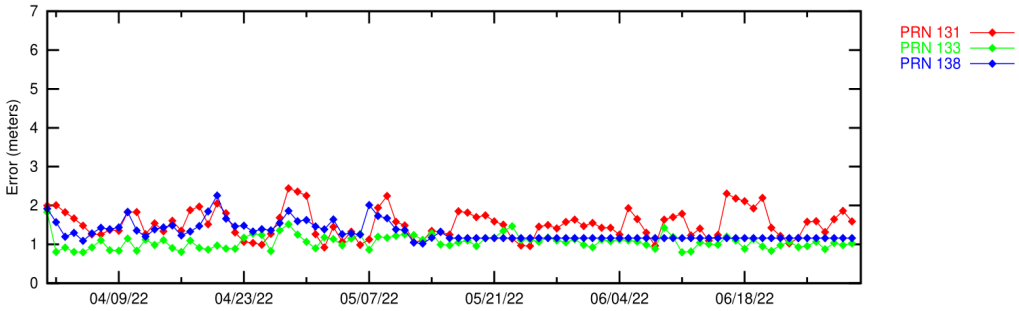

Figure 6-3. Range Error (PRN131, PRN133, and PRN138) – Washington DC

WAAS transmits UDRE and GIVE values to support protection levels such that the position error is bounded 99.9999%. The position domain analysis in this report provides the information regarding how well the transmitted WAAS UDRE and GIVE values bound the position errors. A UDRE is broadcasted by the WAAS for each monitored satellite, and the 95% error bound and the maximum normalized value (divided by sigma_UDRE) 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 normalized residual error.

A GIVE is broadcasted by the WAAS for each monitored IGP and the maximum normalized value (divided by sigma_UISE [User Ionospheric Slant Error]) of the ionospheric error after application of ionospheric corrections 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, maximum ionospheric error, and maximum normalized value (divided by sigma_UISE) for each SV at the selected locations. Figure 6-4 and Figure 6-5 show the 95% ionospheric error for each SV measured by the WAAS receiver at the Washington, DC 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 Iono Error (Meters)	Max Iono Error (Meters)	Max Iono Error Sigma	0.95 Iono Error (Meters)	Max Iono Error (Meters)	Max Iono Error Sigma	0.95 Iono Error (Meters)	Max Iono Error (Meters)	Max Iono Error Sigma	0.95 Iono Error (Meters)	Max Iono Error (Meters)	Max Iono Error Sigma	0.95 Iono Error (Meters)	Max Iono Error (Meters)	Max Iono Error Sigma	0.95 Iono Error (Meters)	Max Iono Error (Meters)	Max Iono Error Sigma
1	0.470	1.485	0.663	0.563	2.897	0.807	0.457	2.494	0.742	0.470	2.183	0.601	0.426	2.060	0.791	0.422	1.238	0.309
2	0.459	1.845	0.622	0.930	2.378	0.807	0.370	1.660	0.462	0.724	2.378	0.984	0.527	2.609	0.805	0.391	2.057	0.610
3	0.419	2.046	0.610	0.582	4.204	1.113	0.601	2.406	0.618	0.466	2.483	0.848	0.576	2.173	0.751	0.656	2.269	0.694
4	0.500	3.419	0.620	0.603	2.104	0.454	0.567	6.820	0.218	0.562	2.404	0.535	0.647	2.091	0.606	0.616	1.525	0.395
5	0.388	1.899	0.770	0.848	2.628	0.872	0.481	3.430	0.870	0.503	2.661	0.811	1.323	3.637	1.314	0.370	1.610	0.378
6	0.440	2.335	0.664	0.653	2.076	0.674	0.689	2.733	0.857	0.615	1.910	0.736	0.784	2.216	0.977	0.396	1.800	0.555
7	0.833	2.439	0.680	0.614	2.160	0.699	0.747	2.450	0.637	0.662	2.286	0.730	0.698	2.828	0.694	0.535	2.040	0.702
8	0.801	2.523	0.695	0.490	1.792	0.643	0.332	1.323	0.386	0.602	2.324	0.934	0.562	2.005	0.606	0.313	1.461	0.455
9	0.481	2.469	0.507	0.583	2.249	0.584	0.493	1.778	0.414	0.482	1.782	0.420	0.572	2.042	0.562	0.394	1.350	0.392
10	0.550	1.432	0.639	0.616	2.547	0.846	0.609	1.961	1.096	0.645	1.968	0.666	0.467	1.788	0.448	0.360	1.684	0.553
11	1.004	1.764	0.636	0.956	4.171	1.241	1.027	1.880	1.023	0.987	1.941	0.607	1.068	3.178	0.939	0.976	2.763	1.447
12	0.368	2.347	0.765	0.373	3.803	0.822	0.388	1.725	0.393	0.536	3.211	0.693	0.631	1.772	0.565	0.684	1.789	0.526
13	0.685	2.643	0.716	0.603	2.372	0.601	0.544	1.780	0.569	0.663	3.174	1.161	0.629	2.161	0.718	0.437	1.321	0.463
14	0.747	2.156	0.844	0.693	3.254	0.993	0.696	1.910	0.557	0.856	2.441	0.685	0.688	2.591	0.620	0.757	1.507	0.392
15	0.781	2.219	0.528	0.488	1.902	0.538	0.608	1.955	0.571	0.637	2.347	0.690	0.604	2.134	0.538	0.376	1.569	0.670
16	0.453	2.269	0.616	0.383	1.681	0.525	0.336	1.442	0.406	0.494	1.684	0.515	0.743	2.975	0.741	0.379	1.423	0.433
17	0.579	1.763	0.707	0.629	2.377	0.751	0.670	1.813	0.451	0.732	1.826	0.669	1.168	6.835	1.618	0.634	2.298	0.569
18	0.645	1.768	0.597	0.607	2.626	0.579	0.668	1.885	0.766	0.646	3.081	0.954	0.822	1.917	0.556	0.492	1.774	0.601
19	0.658	1.915	0.580	0.530	1.808	0.587	0.670	2.028	0.620	0.786	2.558	1.184	0.752	4.358	1.176	0.586	3.475	0.879
20	0.614	1.955	0.515	0.555	2.596	0.813	0.488	2.004	0.603	0.638	2.301	0.732	0.994	3.388	1.067	0.536	2.031	0.803
21	0.731	3.175	0.853	0.397	1.976	0.518	0.477	1.842	0.536	0.595	1.932	0.524	0.725	2.450	1.050	0.493	1.755	0.614
22	0.658	1.826	0.726	0.707	2.025	0.491	0.512	2.092	0.536	0.733	2.210	0.656	0.440	3.051	0.748	0.463	1.275	0.394
23	0.674	2.098	0.660	0.558	2.565	0.659	0.647	1.916	0.671	0.644	2.394	0.934	0.456	2.396	0.683	0.527	1.772	0.427
24	0.546	1.535	0.414	0.564	1.331	0.479	0.414	1.318	0.297	0.679	2.095	0.954	0.353	1.319	0.412	0.513	1.955	0.687
25	0.347	1.064	0.317	0.393	2.189	0.887	0.320	2.478	0.755	0.546	2.003	0.438	0.485	1.729	0.749	0.646	2.855	0.733
26	0.459	3.234	0.931	0.579	2.677	0.967	0.540	1.824	0.508	0.456	1.638	0.691	0.719	2.133	0.647	0.466	1.878	0.553
27	0.404	1.879	0.577	0.413	3.571	1.084	0.347	1.323	0.366	0.465	2.993	0.696	0.570	2.899	1.050	0.338	0.994	0.344
28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	0.409	1.365	0.378	0.471	1.912	0.474	0.505	1.943	0.515	0.523	1.551	0.395	0.763	2.262	0.643	0.476	2.083	0.477
30	0.596	2.710	0.781	0.482	1.974	0.463	0.557	1.766	0.442	0.625	2.903	0.625	0.629	2.636	0.929	0.605	1.428	0.549
31	0.367	1.326	0.422	0.339	1.864	0.654	0.558	1.682	0.763	0.607	2.403	0.613	0.701	2.538	0.715	0.467	1.835	0.500
32	0.718	1.816	0.807	0.475	1.726	0.448	0.522	1.721	0.470	0.565	1.639	0.792	1.043	3.735	0.846	0.618	3.483	0.819

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

Site	Billings			Miami			Albuquerque			Kansas City			Atlanta			Los Angeles		
PRN ↓	0.95 Iono Error (Meters)	Max Iono Error (Meters)	Max Iono Error Sigma	0.95 Iono Error (Meters)	Max Iono Error (Meters)	Max Iono Error Sigma	0.95 Iono Error (Meters)	Max Iono Error (Meters)	Max Iono Error Sigma	0.95 Iono Error (Meters)	Max Iono Error (Meters)	Max Iono Error Sigma	0.95 Iono Error (Meters)	Max Iono Error (Meters)	Max Iono Error Sigma	0.95 Iono Error (Meters)	Max Iono Error (Meters)	Max Iono Error Sigma
1	0.371	1.966	0.530	0.543	2.861	0.178	0.551	2.415	1.063	0.492	1.650	0.751	0.461	2.550	0.722	0.458	1.747	0.580
2	1.087	3.602	1.160	0.774	2.915	0.533	0.513	1.956	0.449	0.429	2.922	0.960	0.545	1.643	0.458	0.575	1.613	0.300
3	0.443	1.438	0.371	0.561	1.902	0.546	0.505	1.769	0.691	0.408	2.686	0.980	0.941	3.291	0.771	0.366	1.722	0.444
4	0.331	1.086	0.385	0.656	2.771	0.111	0.484	1.426	0.468	0.460	2.133	0.715	0.419	1.498	0.047	0.414	1.466	0.378
5	0.607	1.617	0.429	0.788	6.048	1.170	0.728	1.556	0.443	1.376	4.462	1.537	0.490	1.969	0.459	0.554	2.908	0.616
6	0.685	2.891	0.939	0.745	6.370	1.209	0.482	1.544	0.427	0.914	3.307	0.796	0.540	2.183	0.506	0.518	2.010	0.223
7	0.569	1.750	1.017	0.820	2.356	0.759	0.471	1.512	0.715	0.494	1.462	1.078	0.596	1.647	0.491	0.599	1.681	0.529
8	0.428	1.090	0.646	0.457	1.817	0.356	0.739	2.052	0.742	0.580	3.159	1.023	0.403	1.262	0.298	1.010	3.336	0.839
9	0.537	2.291	0.673	0.631	1.663	0.698	0.494	1.585	0.512	0.524	2.559	0.785	0.514	1.904	0.484	0.304	1.199	0.160
10	0.691	2.681	0.725	0.497	1.903	0.645	0.431	2.113	0.408	0.580	2.568	0.636	0.417	1.579	0.489	0.504	3.530	0.385
11	0.778	2.205	0.638	1.170	3.391	0.830	1.082	2.091	0.575	1.237	1.929	0.619	0.917	2.121	0.870	1.058	2.414	0.613
12	0.536	2.094	0.603	0.564	2.568	0.633	0.437	1.786	0.385	0.554	2.332	0.845	0.364	2.038	0.441	0.405	2.187	0.399
13	0.512	1.730	0.818	0.523	2.216	0.678	0.441	1.769	0.705	0.536	2.131	0.656	0.519	2.177	0.545	0.554	2.718	0.796
14	0.536	1.223	0.327	0.769	2.265	0.080	0.535	2.012	0.748	0.746	1.836	0.475	0.580	2.296	0.537	0.597	2.010	0.501
15	0.481	1.632	0.571	0.517	2.077	0.598	0.434	1.818	0.562	1.126	3.126	0.895	0.552	2.335	0.638	0.511	2.323	0.603
16	0.534	2.742	0.872	0.546	2.550	0.519	0.423	1.519	0.514	0.847	2.973	0.865	0.430	1.881	0.445	0.453	1.985	0.433
17	0.586	1.840	0.734	0.751	2.422	0.548	0.617	2.599	0.546	0.824	1.960	0.603	0.584	1.783	0.603	0.550	2.027	0.394
18	0.477	1.186	0.369	1.186	3.509	1.233	0.417	2.057	0.397	0.561	1.729	0.513	0.557	1.321	0.348	0.449	1.923	0.228
19	0.759	2.114	0.871	0.603	1.800	0.449	0.583	2.076	0.483	0.651	3.558	1.053	0.541	1.320	0.439	0.601	1.622	0.306
20	0.356	1.748	0.683	0.682	4.727	0.958	0.522	2.172	0.591	0.707	2.178	0.628	0.561	3.035	0.748	0.527	2.224	0.528
21	0.489	1.299	0.512	0.510	1.807	0.112	0.513	1.574	0.513	0.655	2.440	1.014	0.421	2.619	0.497	0.486	1.720	0.487
22	0.520	2.688	0.695	0.586	2.579	0.640	0.652	3.007	0.805	0.400	1.614	0.516	0.425	1.260	0.412	0.617	3.954	0.616
23	0.433	1.572	0.401	0.634	2.044	0.817	0.481	2.205	0.485	0.882	2.430	1.058	0.478	1.710	0.431	0.767	4.715	0.910
24	0.336	1.093	0.382	0.482	1.918	0.637	0.375	1.732	0.503	0.495	1.383	0.594	0.481	2.161	0.602	0.417	1.736	0.526
25	0.459	1.309	0.618	0.493	2.066	0.518	0.495	1.504	0.422	0.438	1.547	0.646	0.441	1.527	0.512	0.591	1.766	0.422
26	0.536	2.807	1.011	0.509	2.996	0.578	0.439	2.121	0.734	0.604	3.492	1.144	0.450	1.670	0.521	0.597	3.046	0.719
27	0.463	1.287	0.634	0.513	1.743	0.636	0.529	1.757	0.754	0.449	2.008	0.720	0.460	1.130	0.315	0.546	2.006	0.579
28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	0.467	1.899	0.387	0.557	1.933	0.497	0.464	2.470	0.560	0.478	1.819	0.623	0.465	1.434	0.373	0.488	2.055	0.227
30	0.814	2.113	0.644	0.682	2.080	0.490	0.553	1.658	0.434	0.726	2.170	0.617	0.563	2.424	0.725	0.537	1.658	0.439
31	0.525	2.457	0.719	1.040	3.951	0.759	0.420	1.521	0.372	0.824	3.247	0.928	0.488	2.681	0.645	0.507	2.422	0.603
32	0.770	3.071	0.914	0.646	6.909	1.303	0.658	2.321	0.547	0.777	1.784	0.854	0.589	1.597	0.565	0.717	5.357	0.595

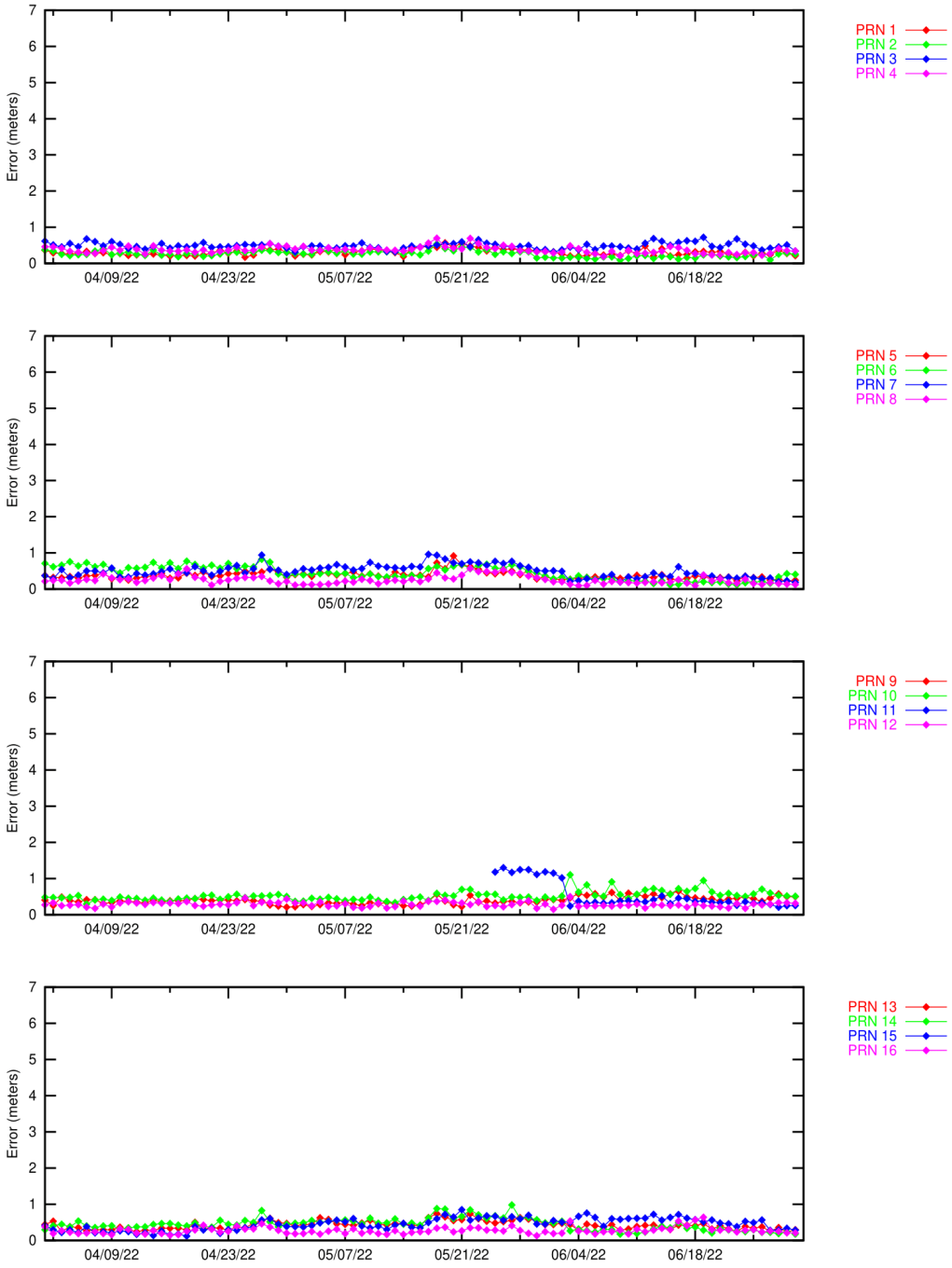

Figure 6-4. Ionospheric Error (PRN1 – PRN16) – Washington DC

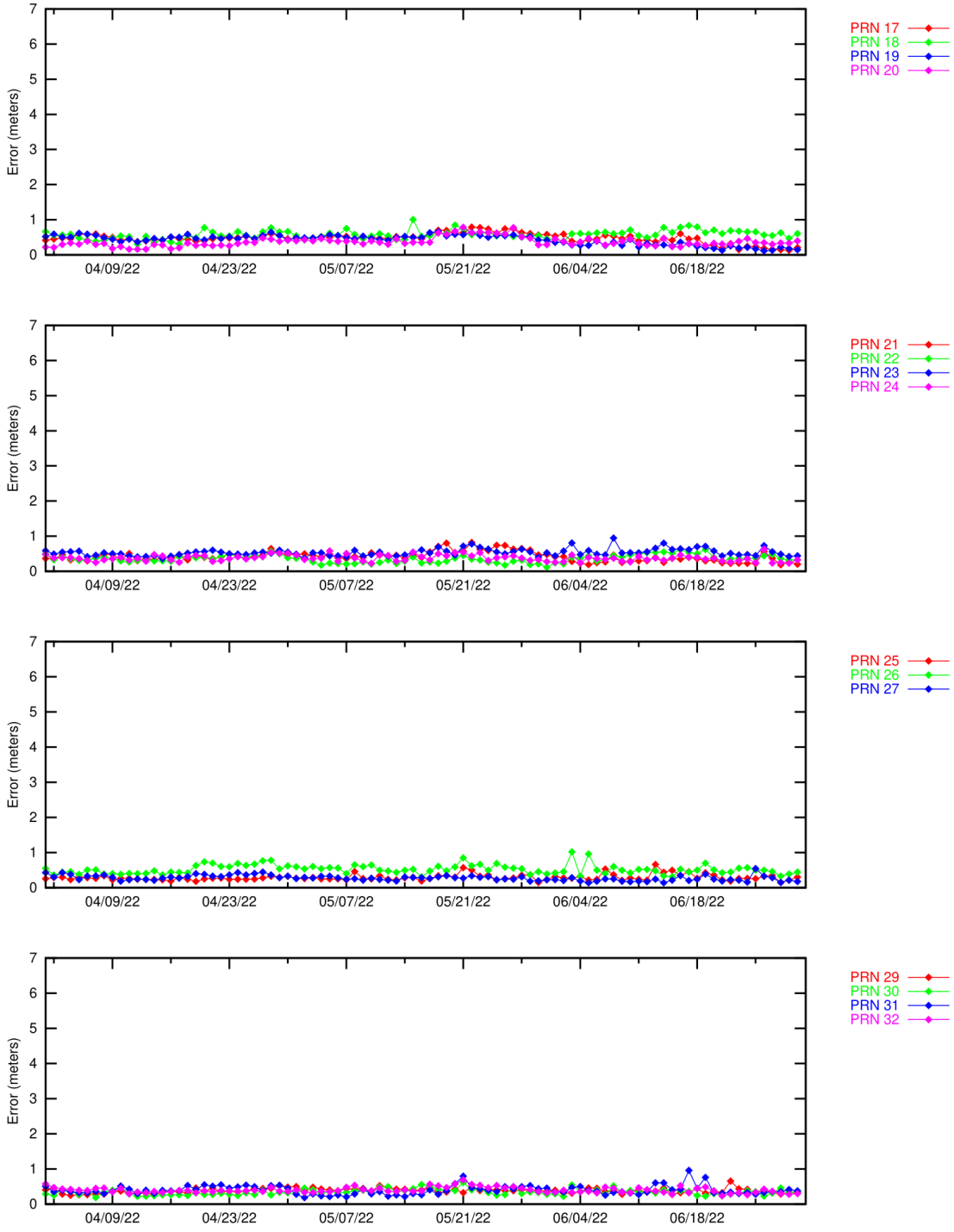

Figure 6-5. Ionospheric Error (PRN17 – PRN32) – Washington DC

For this reporting period, most satellite range errors were bounded at least 99.9% of the time by UDRE.

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 7-4 show the trend of SM9, S15, G30, and CRE GEO PA ranging availability, respectively.

The reductions in SM9 GEO PA, S15 GEO PA and CRE GEO PA ranging availability were due to GUS switchovers, G30 beginning service April 26, 2022 and CRE GEO decommission May 17, 2022 (see Figure 7-1 to Figure 7-4).

Table 7-1. GEO Ranging Availability

GEO Source	GEO	PA (%)	NPA (%)	Not Monitored (%)	Do Not Use (%)
SM9 131	SM9	99.26	0.06	0.59	0.09
SM9 131	S15	99.52	0.07	0.41	0
SM9 131	G30	73.3	0.02	23.17	3.51
SM9 131	CRE	62.73	0.02	37.25	0
S15 133	SM9	99.25	0.06	0.6	0.09
S15 133	S15	99.51	0.07	0.42	0
S15 133	G30	73.29	0.02	23.18	3.51
S15 133	CRE	50.5	0.02	49.48	0
G30 135	SM9	99.49	0.06	0.38	0.06
G30 135	S15	99.55	0.06	0.38	0
G30 135	G30	99.6	0.03	0.35	0.02
G30 135	CRE	32.62	0.02	67.36	0
CRE 138	SM9	98.94	0.07	0.99	0
CRE 138	S15	99.69	0.04	0.27	0
CRE 138	G30	43.5	0.04	50.09	6.36
CRE 138	CRE	99.69	0.04	0.28	0

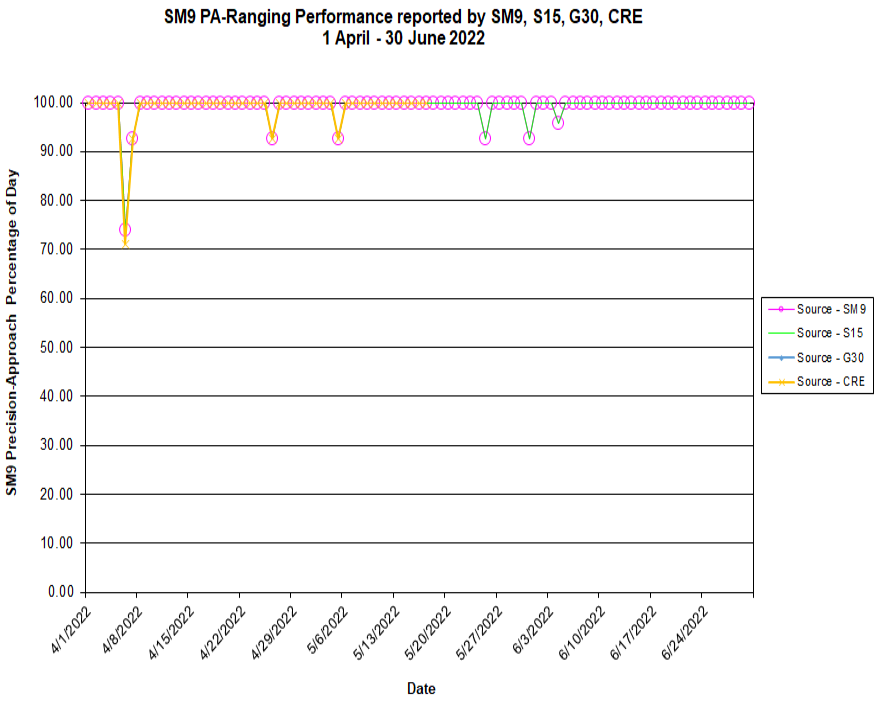

Figure 7-1. Daily PA SM9 GEO Ranging Availability Trend

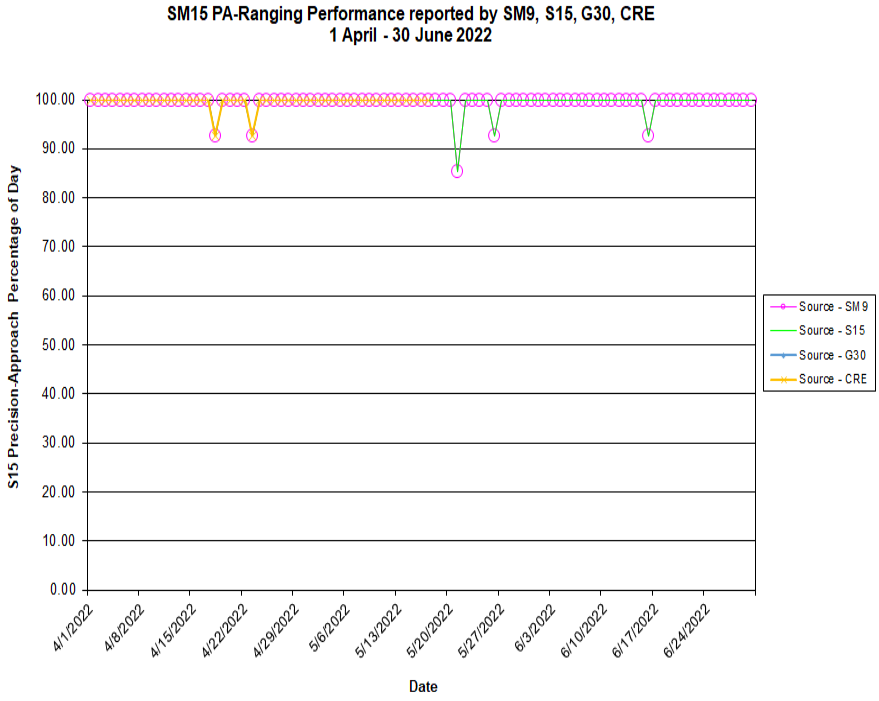

Figure 7-2. Daily PA S15 GEO Ranging Availability Trend

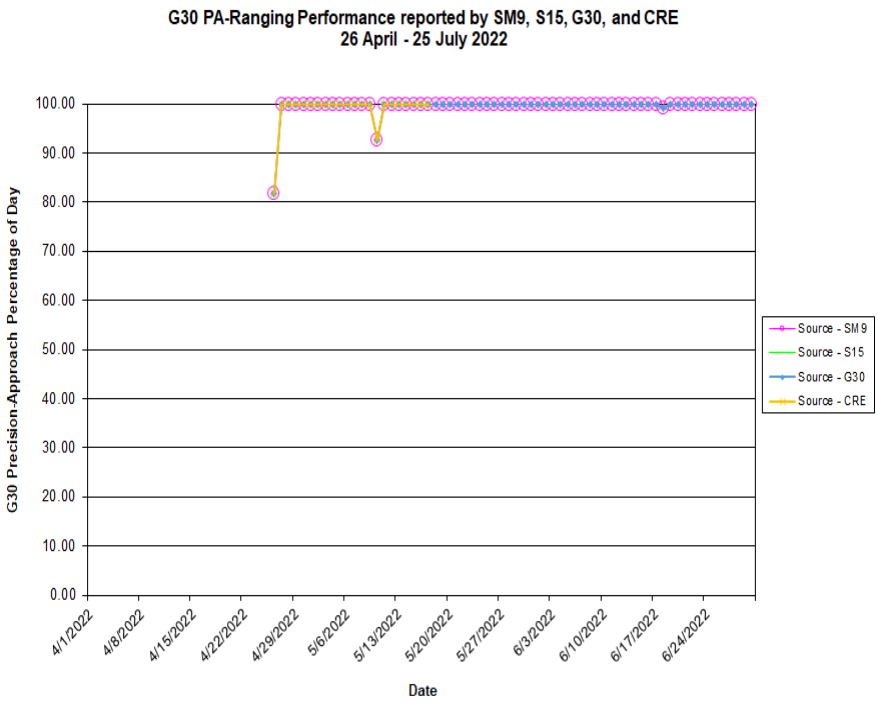

Figure 7-3. Daily PA G30 GEO Ranging Availability Trend

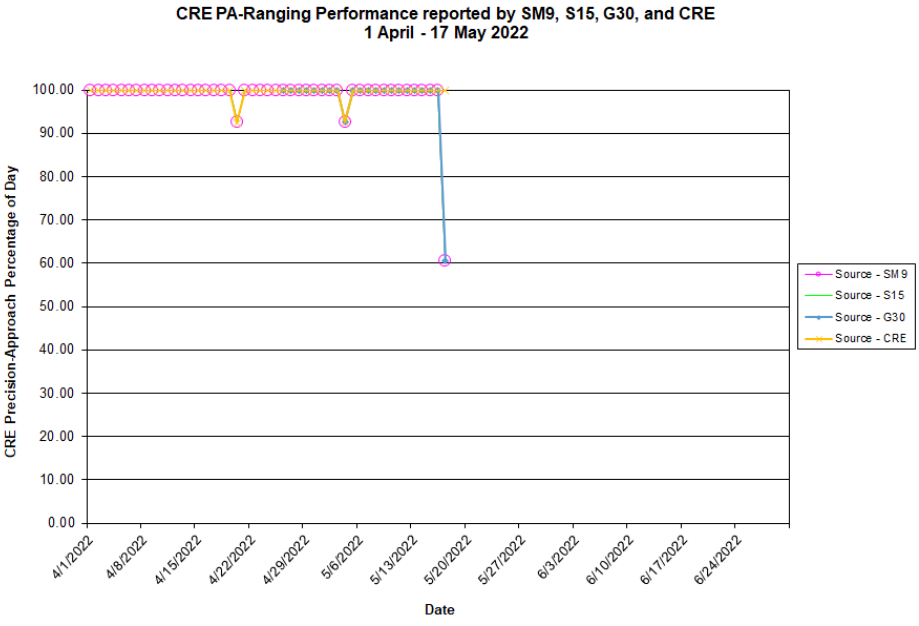

Figure 7-4. Daily PA CRE GEO Ranging Availability Trend

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 U.S. 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 U.S. 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 U.S. 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 (%)
2C7	SHAKTOOLIK	AK	LPV	0	100	0	100	2	99.987
6A8	ALLAKAKET	AK	LP	0	100	0	100	2	99.989
7KA	TATITLEK	AK	LP	0	100	0	100	0	100
9A3	CHUATHBALUK	AK	LPV	0	100	0	100	1	99.990
ADQ	KODIAK	AK	LPV	0	100	0	100	1	99.995
AFM	AMBLER	AK	LPV	0	100	0	100	2	99.984
AKN	KING SALMON	AK	LPV	0	100	0	100	1	99.991
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	1	99.990
AQH	QUINHAGAK	AK	LPV	0	100	0	100	1	99.987
AQT	NUIQSUT	AK	LPV	0	100	0	100	2	99.966
AWI	WAINWRIGHT	AK	LPV	0	100	0	100	13	99.900
BET	BETHEL	AK	LPV200	0	100	0	100	1	99.988
BRW	WILEY POST-WILL ROGERS MEMORIA	AK	LPV	0	100	0	100	13	99.903
BVK	BUCKLAND	AK	LPV	0	100	0	100	2	99.983
CDB	COLD BAY	AK	LPV200	0	100	0	100	2	99.940
CDV	MERLE K (MUDHOLE) SMITH	AK	LPV	0	100	0	100	0	100
CEM	CENTRAL	AK	LP	0	100	0	100	2	99.993
CLP	CLARKS POINT	AK	LPV	0	100	0	100	1	99.990
CXF	COLDFOOT	AK	LP	0	100	0	100	2	99.989
D76	ROBERT/BOB/CURTIS MEMORIAL	AK	LPV	0	100	0	100	4	99.979
DEE	DEERING	AK	LPV	0	100	0	100	2	99.980
DLG	DILLINGHAM	AK	LPV	0	100	0	100	1	99.990
ELI	ELIM	AK	LPV	0	100	0	100	2	99.986
ENA	KENAI MUNICIPAL	AK	LPV200	0	100	0	100	0	100
ENM	EMMONAK	AK	LPV	0	100	0	100	2	99.973
FAI	FAIRBANKS INTL	AK	LPV200	0	100	0	100	2	99.998
FYU	FORT YUKON	AK	LPV	0	100	0	100	2	99.993
GAL	EDWARD G PITKA SR	AK	LPV	0	100	0	100	2	99.989
GAM	GAMBELL	AK	LPV	0	100	0	100	15	99.894
GKN	GULKANA	AK	LPV	0	100	0	100	0	100
GST	GUSTAVUS	AK	LP	0	100	0	100	0	100
HLA	HUSLIA	AK	LPV	0	100	0	100	2	99.987
HOM	HOMER	AK	LPV	0	100	0	100	0	100

HPB	HOOPER BAY	AK	LP	0	100	0	100	2	99.962
HRR	HEALY RIVER	AK	LP	0	100	0	100	1	99.999
IIK	KIPNUK	AK	LPV	0	100	0	100	2	99.975
ILI	ILIAMNA	AK	LPV	0	100	0	100	1	99.995
IWK	WALES	AK	LP	0	100	0	100	3	99.961
IYS	WASILLA	AK	LPV	0	100	0	100	0	100
KAL	KALTAG	AK	LPV	0	100	0	100	2	99.988
KGX	GRAYLING	AK	LP	0	100	0	100	1	99.990
KSM	ST MARY'S	AK	LPV200	0	100	0	100	2	99.987
KTN	KETCHIKAN INTL	AK	LPV	0	100	0	100	0	100
KTS	BREVIG MISSION	AK	LPV	0	100	0	100	3	99.967
KWT	KWETHLUK	AK	LPV	0	100	0	100	1	99.989
KYU	KOYUKUK	AK	LPV	0	100	0	100	2	99.988
MCG	MC GRATH	AK	LP	0	100	0	100	1	99.993
MDM	MARSHALL DON HUNTER SR	AK	LP	0	100	0	100	1	99.989
MDO	MIDDLETON ISLAND	AK	LP	0	100	0	100	0	100
MLY	MANLEY HOT SPRINGS	AK	LP	0	100	0	100	2	99.993
OME	NOME	AK	LPV	0	100	0	100	2	99.976
OOK	TOKSOOK BAY	AK	LP	0	100	0	100	2	99.971
ORT	NORTHWAY	AK	LP	0	100	0	100	1	99.998
OTZ	RALPH WIEN MEMORIAL	AK	LPV	0	100	0	100	3	99.978
PAQ	WARREN “BUD” WOODS PALMER MUNICIPAL	AK	LP	0	100	0	100	0	100
PBV	ST GEORGE	AK	LPV	0	100	0	100	6	99.914
PHO	POINT HOPE	AK	LPV	0	100	0	100	9	99.947
PTU	PLATINUM	AK	LPV	0	100	0	100	2	99.983
RBY	RUBY	AK	LPV	0	100	0	100	2	99.991
RSH	RUSSIAN MISSION	AK	LP	0	100	0	100	1	99.990
SCC	DEADHORSE	AK	LPV200	0	100	0	100	3	99.961
SCM	SCAMMON BAY	AK	LP	0	100	0	100	2	99.970
SDP	SAND POINT	AK	LPV	0	100	0	100	2	99.948
SHG	SHUNGNAK	AK	LP	0	100	0	100	2	99.984
SHX	SHAGELUK	AK	LPV	0	100	0	100	1	99.990
SIT	SITKA ROCKY GUTIERREZ	AK	LP	0	100	0	100	0	100
SMK	ST MICHAEL	AK	LPV	0	100	0	100	2	99.979
SXQ	SOLDOTNA	AK	LP	0	100	0	100	0	100
TKA	TALKEETNA	AK	LPV	0	100	0	100	0	100
TOG	TOGIAK	AK	LP	0	100	0	100	2	99.989
WLK	SELAWIK	AK	LPV	0	100	0	100	2	99.982
WMO	WHITE MOUNTAIN	AK	LP	0	100	0	100	2	99.982
WNA	NAPAKIAK	AK	LPV	0	100	0	100	1	99.988

WSN	SOUTH NAKNEK NR 2	AK	LPV	0	100	0	100	1	99.991
WTK	NOATAK	AK	LPV	0	100	0	100	4	99.974
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
0J6	HEADLAND MUNICIPAL	AL	LPV	0	100	0	100	0	100
0R1	ATMORE MUNICIPAL	AL	LPV	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
1A9	PRATTVILLE - GROUBY FIELD	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	1	99.999
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	0	100
71J	OZARK-BLACKWELL FIELD	AL	LPV	0	100	0	100	0	100
79J	SOUTH ALABAMA RGNL AT BILL BEN	AL	LPV	0	100	0	100	1	99.999
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	0	100
DCU	PRYOR FIELD RGNL	AL	LPV200	0	100	0	100	0	100
DHN	DOTHAN RGNL	AL	LPV200	0	100	0	100	0	100
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	EVERGREEN RGNL/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
JFX	WALKER COUNTY-BEVILL FIELD	AL	LPV	0	100	0	100	0	100
JKA	JACK EDWARDS NATIONAL	AL	LPV200	0	100	0	100	0	100
M95	RICHARD ARTHUR FIELD	AL	LPV	0	100	0	100	0	100
MDQ	HUNTSVILLE EXECUTIVE TOM SHARP	AL	LPV200	0	100	0	100	1	99.999
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 AT N KENNETH CAMPBEL	AL	LPV	0	100	0	100	0	100
0M0	BILLY FREE MUNICIPAL	AR	LPV	0	100	0	100	1	99.993
42A	MELBOURNE MUNICIPAL - JOHN E MILLER	AR	LP	0	100	0	100	1	99.996
4A5	SEARCY COUNTY	AR	LPV	0	100	0	100	1	99.995
4M1	CARROLL COUNTY	AR	LP	0	100	0	100	1	99.993
4M3	CARLISLE MUNICIPAL	AR	LPV	0	100	0	100	1	99.995
6M7	MARIANNA/LEE COUNTY-STEVE EDWA	AR	LPV	0	100	0	100	1	99.996
7M1	MC GEHEE MUNICIPAL	AR	LP	0	100	0	100	1	99.993
9M8	SHERIDAN MUNICIPAL	AR	LPV	0	100	0	100	1	99.993
ADF	DEXTER B FLORENCE MEMORIAL FIE	AR	LPV	0	100	0	100	1	99.992
ARG	WALNUT RIDGE RGNL	AR	LPV200	0	100	0	100	1	99.998
ASG	SPRINGDALE MUNICIPAL	AR	LPV	0	100	0	100	1	99.993
AWM	WEST MEMPHIS MUNICIPAL	AR	LPV	0	100	0	100	1	99.998
BPK	BAXTER COUNTY	AR	LPV	0	100	0	100	1	99.995
BVX	BATESVILLE RGNL	AR	LPV	0	100	0	100	1	99.996
BYH	ARKANSAS INTL	AR	LPV200	0	100	0	100	1	99.999
CDH	HARRELL FIELD	AR	LPV	0	100	0	100	1	99.992
CXW	CANTRELL FLD	AR	LPV	0	100	0	100	1	99.994
DRP	DELTA RGNL	AR	LPV	0	100	0	100	1	99.997
ELD	SOUTH ARKANSAS RGNL AT GOODWIN	AR	LPV	0	100	0	100	1	99.991
FLP	MARION COUNTY RGNL	AR	LPV	0	100	0	100	1	99.995
FSM	FORT SMITH RGNL	AR	LPV200	0	100	0	100	1	99.992
FYV	DRAKE FIELD	AR	LPV	0	100	0	100	1	99.992
H34	HUNTSVILLE MUNICIPAL	AR	LPV	0	100	0	100	1	99.993

HEE	THOMPSON-ROBBINS	AR	LPV	0	100	0	100	1	99.996
HRO	BOONE COUNTY	AR	LPV	0	100	0	100	1	99.994
JBR	JONESBORO MUNICIPAL	AR	LPV200	0	100	0	100	1	99.998
LIT	BILL AND HILLARY CLINTON NATIO	AR	LPV200	0	100	0	100	1	99.994
LLQ	MONTICELLO MUNICIPAL/ELLIS FIELD	AR	LPV	0	100	0	100	1	99.993
M18	HOPE MUNICIPAL	AR	LP	0	100	0	100	1	99.992
M19	NEWPORT RGNL	AR	LPV	0	100	0	100	1	99.997
M32	LAKE VILLAGE MUNICIPAL	AR	LP	0	100	0	100	1	99.993
M70	POCAHONTAS MUNICIPAL	AR	LPV	0	100	0	100	1	99.998
M77	HOWARD COUNTY	AR	LP	0	100	0	100	1	99.992
MXA	MANILA MUNICIPAL	AR	LPV	0	100	0	100	1	99.999
ORK	NORTH LITTLE ROCK MUNICIPAL	AR	LPV	0	100	0	100	1	99.994
PBF	PINE BLUFF RGNL AIRPORT GRIDER	AR	LPV	0	100	0	100	1	99.993
ROG	ROGERS EXECUTIVE - CARTER FIEL	AR	LPV	0	100	0	100	1	99.993
RUE	RUSSELLVILLE RGNL	AR	LPV	0	100	0	100	1	99.993
SGT	STUTTGART MUNICIPAL CARL HUMPHREY F	AR	LPV	0	100	0	100	1	99.995
SLG	SMITH FIELD	AR	LPV	0	100	0	100	1	99.992
SRC	SEARCY MUNICIPAL	AR	LPV	0	100	0	100	1	99.995
SUZ	SALINE COUNTY RGNL	AR	LPV	0	100	0	100	1	99.993
TXK	TEXARKANA RGNL-WEBB FIELD	AR	LPV	0	100	0	100	1	99.992
VBT	BENTONVILLE MUNICIPAL/LOUISE M THAD	AR	LPV	0	100	0	100	1	99.993
XNA	NORTHWEST ARKANSAS RGNL	AR	LPV200	0	100	0	100	1	99.992
AVQ	MARANA RGNL	AZ	LP	0	100	1	99.990	73	99.350
AZC	COLORADO CITY MUNICIPAL	AZ	LPV	0	100	0	100	0	100
CGZ	CASA GRANDE MUNICIPAL	AZ	LPV	0	100	1	99.990	50	99.695
DVT	PHOENIX DEER VALLEY	AZ	LPV	0	100	0	100	2	99.996
FFZ	FALCON FLD	AZ	LP	0	100	0	100	2	99.979
FHU	SIERRA VISTA MUNICIPAL-LIBBY AAF	AZ	LPV200	0	100	1	99.990	77	99.240
FLG	FLAGSTAFF PULLIAM	AZ	LPV	0	100	0	100	1	99.997
GCN	GRAND CANYON NATIONAL PARK	AZ	LPV	0	100	0	100	0	100
GEU	GLENDALE MUNICIPAL	AZ	LPV	0	100	0	100	2	99.997
GYR	PHOENIX GOODYEAR	AZ	LP	0	100	0	100	2	99.996
HII	LAKE HAVASU CITY	AZ	LPV	0	100	0	100	0	100
IFP	LAUGHLIN/BULLHEAD INTL	AZ	LPV	0	100	0	100	0	100
IGM	KINGMAN	AZ	LPV	0	100	0	100	0	100
IWA	PHOENIX-MESA GATEWAY	AZ	LPV200	0	100	1	99.992	18	99.910
JTC	SPRINGERVILLE MUNICIPAL	AZ	LP	0	100	0	100	52	99.877
P20	AVI SUQUILLA	AZ	LPV	0	100	0	100	1	99.999
P33	COCHISE COUNTY	AZ	LPV	0	100	1	99.993	66	99.449
PGA	PAGE MUNICIPAL	AZ	LPV	0	100	0	100	0	100

PHX	PHOENIX SKY HARBOR INTL	AZ	LPV	0	100	0	100	2	99.992
PRC	PRESCOTT RGNL - ERNEST A LOVE	AZ	LPV200	0	100	0	100	0	100
RQE	WINDOW ROCK	AZ	LP	0	100	0	100	2	99.984
RYN	RYAN FIELD	AZ	LPV	0	100	1	99.990	72	99.296
SAD	SAFFORD RGNL	AZ	LPV	0	100	1	99.995	57	99.602
SJN	ST JOHNS INDUSTRIAL AIR PARK	AZ	LP	0	100	0	100	39	99.926
SOW	SHOW LOW RGNL	AZ	LPV200	0	100	1	99.999	51	99.843
TUS	TUCSON INTL	AZ	LPV	0	100	1	99.990	74	99.304
AAT	ALTURAS MUNICIPAL	CA	LPV	0	100	0	100	1	99.993
ACV	CALIFORNIA REDWOOD COAST-HUMBO	CA	LPV	0	100	0	100	3	99.974
APC	NAPA COUNTY	CA	LPV	0	100	0	100	4	99.991
APV	APPLE VALLEY	CA	LPV	0	100	0	100	1	99.996
AUN	AUBURN MUNICIPAL	CA	LPV	0	100	0	100	1	99.999
BFL	MEADOWS FIELD	CA	LPV	0	100	0	100	1	99.997
BLH	BLYTHE	CA	LP	0	100	0	100	1	99.993
BUR	BOB HOPE	CA	LP	0	100	0	100	1	99.987
C83	BYRON	CA	LPV	0	100	0	100	1	99.993
CCB	CABLE	CA	LP	0	100	0	100	1	99.990
CCR	BUCHANAN FIELD	CA	LPV	0	100	0	100	1	99.993
CEC	JACK MC NAMARA FIELD	CA	LPV	0	100	0	100	3	99.971
CIC	CHICO MUNICIPAL	CA	LPV	0	100	0	100	2	99.992
CMA	CAMARILLO	CA	LPV	0	100	0	100	1	99.984
CNO	CHINO	CA	LPV	0	100	0	100	1	99.990
CPU	CALAVERAS CO-MAURY RASMUSSEN F	CA	LP	0	100	0	100	0	100
CRQ	MC CLELLAN-PALOMAR	CA	LPV	0	100	0	100	1	99.984
CVH	HOLLISTER MUNICIPAL	CA	LPV	0	100	0	100	1	99.993
DAG	BARSTOW-DAGGETT	CA	LPV	0	100	0	100	1	99.997
DWA	YOLO COUNTY	CA	LPV	0	100	0	100	3	99.992
F70	FRENCH VALLEY	CA	LPV	0	100	0	100	1	99.989
FAT	FRESNO YOSEMITE INTL	CA	LPV200	0	100	0	100	0	100
GOO	NEVADA COUNTY	CA	LPV	0	100	0	100	1	99.999
HAF	HALF MOON BAY	CA	LPV	0	100	0	100	1	99.993
HHR	JACK NORTHROP FIELD/HAWTHORNE	CA	LPV	0	100	0	100	1	99.985
HJO	HANFORD MUNICIPAL	CA	LPV	0	100	0	100	0	100
HWD	HAYWARD EXECUTIVE	CA	LPV	0	100	0	100	1	99.993
L35	BIG BEAR CITY	CA	LP	0	100	0	100	1	99.996
LAX	LOS ANGELES INTL	CA	LPV200	0	100	0	100	1	99.985
LGB	LONG BEACH /DAUGHERTY FIELD/	CA	LPV	0	100	0	100	1	99.985
LHM	LINCOLN RGNL/KARL HARDER FIELD	CA	LPV200	0	100	0	100	2	99.997
LLR	LITTLE RIVER	CA	LP	0	100	0	100	4	99.978

LSN	LOS BANOS MUNICIPAL	CA	LPV	0	100	0	100	1	99.995
LVK	LIVERMORE MUNICIPAL	CA	LPV200	0	100	0	100	1	99.993
MAE	MADERA MUNICIPAL	CA	LPV	0	100	0	100	0	100
MCE	MERCED RGNL/MACREADY FIELD	CA	LPV	0	100	0	100	0	100
MER	CASTLE	CA	LPV200	0	100	0	100	1	99.999
MHR	SACRAMENTO MATHER	CA	LPV200	0	100	0	100	1	99.996
MIT	SHAFTER-MINTER FIELD	CA	LPV	0	100	0	100	1	99.997
MOD	MODESTO CITY-CO-HARRY SHAM FLD	CA	LPV	0	100	0	100	1	99.996
MRY	MONTEREY RGNL	CA	LPV	0	100	0	100	2	99.981
MYF	MONTGOMERY-GIBBS EXECUTIVE	CA	LPV200	0	100	0	100	1	99.982
MYV	YUBA COUNTY	CA	LPV200	0	100	0	100	2	99.995
NUQ	MOFFETT FEDERAL AFLD	CA	LPV200	0	100	0	100	1	99.993
O02	NERVINO	CA	LPV	0	100	0	100	1	99.998
O08	COLUSA COUNTY	CA	LPV	0	100	0	100	2	99.990
O27	OAKDALE	CA	LPV	0	100	0	100	1	99.999
O32	REEDLEY MUNICIPAL	CA	LPV	0	100	0	100	0	100
O69	PETALUMA MUNICIPAL	CA	LPV	0	100	0	100	4	99.989
O88	RIO VISTA MUNICIPAL	CA	LP	0	100	0	100	1	99.993
OAK	METROPOLITAN OAKLAND INTL	CA	LPV200	0	100	0	100	1	99.993
ONT	ONTARIO INTL	CA	LPV200	0	100	0	100	1	99.990
OVE	OROVILLE MUNICIPAL	CA	LPV	0	100	0	100	2	99.995
OXR	OXNARD	CA	LPV	0	100	0	100	1	99.981
PMD	PALMDALE USAF PLANT 42	CA	LPV200	0	100	0	100	1	99.996
POC	BRACKETT FIELD	CA	LPV	0	100	0	100	1	99.990
PRB	PASO ROBLES MUNICIPAL	CA	LPV	0	100	0	100	2	99.994
PVF	PLACERVILLE	CA	LPV	0	100	0	100	0	100
RAL	RIVERSIDE MUNICIPAL	CA	LPV	0	100	0	100	1	99.990
RBL	RED BLUFF MUNICIPAL	CA	LPV	0	100	0	100	2	99.988
RDD	REDDING MUNICIPAL	CA	LPV	0	100	0	100	2	99.988
RHV	REID-HILLVIEW OF SANTA CLARA C	CA	LPV	0	100	0	100	1	99.993
RIV	MARCH ARB	CA	LPV200	0	100	0	100	1	99.989
SAC	SACRAMENTO EXECUTIVE	CA	LPV	0	100	0	100	1	99.995
SAN	SAN DIEGO INTL	CA	LPV	0	100	0	100	1	99.982
SBA	SANTA BARBARA MUNICIPAL	CA	LPV	0	100	0	100	1	99.977
SBD	SAN BERNARDINO INTL	CA	LPV	0	100	0	100	1	99.990
SBP	SAN LUIS COUNTY RGNL	CA	LPV200	0	100	0	100	2	99.981
SCK	STOCKTON METROPOLITAN	CA	LPV200	0	100	0	100	1	99.993
SDM	BROWN FIELD MUNICIPAL	CA	LPV200	0	100	0	100	1	99.982
SEE	GILLESPIE FIELD	CA	LP	0	100	0	100	1	99.982
SFO	SAN FRANCISCO INTL	CA	LPV200	0	100	0	100	1	99.993

SJC	NORMAN Y MINETA SAN JOSE INTL	CA	LPV200	0	100	0	100	1	99.993
SMF	SACRAMENTO INTL	CA	LPV200	0	100	0	100	3	99.994
SMO	SANTA MONICA MUNICIPAL	CA	LPV	0	100	0	100	1	99.985
SMX	SANTA MARIA PUB/CAPT G ALLAN H	CA	LPV200	0	100	0	100	2	99.976
SNA	JOHN WAYNE AIRPORT-ORANGE COUN	CA	LPV200	0	100	0	100	1	99.985
SNS	SALINAS MUNICIPAL	CA	LPV200	0	100	0	100	1	99.993
STS	CHARLES M SCHULZ - SONOMA COUN	CA	LPV200	0	100	0	100	4	99.986
TCY	TRACY MUNICIPAL	CA	LPV	0	100	0	100	1	99.993
TNP	TWENTYNINE PALMS	CA	LP	0	100	0	100	1	99.996
TOA	ZAMPERINI FIELD	CA	LPV	0	100	0	100	1	99.985
TRK	TRUCKEE-TAHOE	CA	LP	0	100	0	100	0	100
TRM	JACQUELINE COCHRAN RGNL	CA	LPV	0	100	0	100	1	99.989
TVL	LAKE TAHOE	CA	LP	0	100	0	100	0	100
VCB	NUT TREE	CA	LPV	0	100	0	100	3	99.992
VCV	SOUTHERN CALIFORNIA LOGISTICS	CA	LPV	0	100	0	100	1	99.996
VIS	VISALIA MUNICIPAL	CA	LPV	0	100	0	100	0	100
WJF	GENERAL WM J FOX AIRFIELD	CA	LPV	0	100	0	100	1	99.996
WLW	WILLOWS-GLENN COUNTY	CA	LPV	0	100	0	100	3	99.988
WVI	WATSONVILLE MUNICIPAL	CA	LPV	0	100	0	100	1	99.993
1V6	FREMONT COUNTY	CO	LPV	0	100	0	100	1	99.998
20V	MC ELROY AIRFIELD	CO	LPV	0	100	0	100	1	99.998
2V5	WRAY MUNICIPAL	CO	LPV200	0	100	0	100	0	100
2V6	YUMA MUNICIPALCIPAL	CO	LPV200	0	100	0	100	0	100
4V0	RANGELY	CO	LPV	0	100	0	100	0	100
4V1	SPANISH PEAKS AIRFIELD	CO	LPV	0	100	0	100	1	99.998
AEJ	CENTRAL COLORADO RGNL	CO	LP	0	100	0	100	1	99.997
AJZ	BLAKE FIELD	CO	LPV	0	100	0	100	1	99.993
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	1	99.996
APA	CENTENNIAL	CO	LPV200	0	100	0	100	0	100
BJC	ROCKY MOUNTAIN METROPOLITAN	CO	LPV200	0	100	0	100	1	99.999
CAG	CRAIG-MOFFAT	CO	LP	0	100	0	100	1	99.997
CEZ	CORTEZ MUNICIPAL	CO	LPV	0	100	0	100	1	99.988
COS	CITY OF COLORADO SPRINGS MUNICIPAL	CO	LPV200	0	100	0	100	1	99.999
DEN	DENVER INTL	CO	LPV200	0	100	0	100	0	100
DRO	DURANGO-LA PLATA COUNTY	CO	LPV200	0	100	0	100	1	99.990
FMM	FORT MORGAN MUNICIPAL	CO	LPV	0	100	0	100	0	100
FNL	NORTHERN COLORADO RGNL	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	1	99.997

GXY	GREELEY-WELD COUNTY	CO	LPV200	0	100	0	100	0	100
HDN	YAMPA VALLEY	CO	LPV200	0	100	0	100	1	99.995
ITR	KIT CARSON COUNTY	CO	LPV	0	100	0	100	0	100
LAA	LAMAR MUNICIPAL	CO	LPV	0	100	0	100	0	100
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	1	99.992
MVI	MONTE VISTA MUNICIPAL	CO	LPV	0	100	0	100	1	99.994
PSO	STEVENS FIELD	CO	LP	0	100	0	100	1	99.992
PUB	PUEBLO MEMORIAL	CO	LPV200	0	100	0	100	1	99.999
RCV	ASTRONAUT KENT ROMINGER	CO	LPV	0	100	0	100	1	99.993
RIL	RIFLE GARFIELD COUNTY	CO	LPV	0	100	0	100	1	99.995
STK	STERLING MUNICIPAL	CO	LPV	0	100	0	100	0	100
TEX	TELLURIDE RGNL	CO	LP	0	100	0	100	1	99.991
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
DXR	DANBURY MUNICIPAL	CT	LP	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	0	100
HEF	MANASSAS RGNL/HARRY P DAVIS FI	DC	LPV	0	100	0	100	0	100
IAD	WASHINGTON DULLES INTL	DC	LPV200	0	100	0	100	0	100
33N	DELAWARE AIRPARK	DE	LP	0	100	0	100	0	100
DOV	DOVER AFB	DE	LPV200	0	100	0	100	0	100
EVY	SUMMIT	DE	LPV	0	100	0	100	0	100
GED	DELAWARE COASTAL	DE	LPV	0	100	0	100	0	100
ILG	NEW CASTLE	DE	LPV	0	100	0	100	0	100
1J0	TRI-COUNTY	FL	LP	0	100	0	100	0	100
24J	SUWANNEE COUNTY	FL	LPV	0	100	0	100	1	99.974
28J	PALATKA MUNICIPAL - LT KAY LARKIN F	FL	LPV	1	99.977	1	99.971	2	99.959
40J	PERRY-FOLEY	FL	LPV	0	100	0	100	1	99.990
54J	DEFUNIAK SPRINGS	FL	LP	0	100	0	100	0	100
AAF	APALACHICOLA RGNL-CLEVE RANDOL	FL	LPV	0	100	0	100	0	100
APF	NAPLES MUNICIPAL	FL	LPV	2	99.934	2	99.927	4	99.910
AVO	AVON PARK EXECUTIVE	FL	LPV	2	99.945	2	99.945	1	99.916
BCT	BOCA RATON	FL	LPV	1	99.919	1	99.916	5	99.891

BKV	BROOKSVILLE-TAMPA BAY RGNL	FL	LPV	1	99.965	1	99.965	2	99.938
BOW	BARTOW EXECUTIVE	FL	LPV	1	99.965	1	99.965	1	99.916
CEW	BOB SIKES	FL	LPV	0	100	0	100	1	99.999
CGC	CRYSTAL RIVER-CAPTAIN TOM DAVI	FL	LP	1	99.978	1	99.967	2	99.950
CHN	WAUCHULA MUNICIPAL	FL	LP	2	99.948	2	99.948	1	99.916
COI	MERRITT ISLAND	FL	LPV	2	99.953	2	99.953	2	99.915
CRG	JACKSONVILLE EXECUTIVE AT CRAI	FL	LPV200	1	99.982	1	99.974	1	99.972
CTY	CROSS CITY	FL	LPV	0	100	0	100	1	99.967
DAB	DAYTONA BEACH INTL	FL	LPV200	1	99.968	1	99.967	2	99.938
DED	DELAND MUNICIPAL-SIDNEY H TAYLOR FI	FL	LPV	1	99.966	1	99.963	2	99.938
DTS	DESTIN EXECUTIVE	FL	LPV	0	100	0	100	1	99.999
ECP	NORTHWEST FLORIDA BEACHES INTL	FL	LPV200	0	100	0	100	0	100
EVB	NEW SMYRNA BEACH MUNICIPAL	FL	LPV	1	99.964	1	99.963	2	99.936
EYW	KEY WEST INTL	FL	LPV	1	99.916	1	99.915	10	99.866
F45	NORTH PALM BEACH COUNTY GENERA	FL	LPV	2	99.934	2	99.928	5	99.902
FHB	FERNANDINA BEACH MUNICIPAL	FL	LPV	1	99.983	1	99.976	1	99.974
FIN	FLAGLER EXECUTIVE	FL	LPV	1	99.970	1	99.967	2	99.939
FLL	FORT LAUDERDALE/HOLLYWOOD INTL	FL	LPV200	1	99.919	1	99.916	6	99.885
FMY	PAGE FIELD	FL	LPV	2	99.938	2	99.934	3	99.913
FPR	TREASURE COAST INTL	FL	LPV	2	99.938	2	99.937	3	99.911
FXE	FORT LAUDERDALE EXECUTIVE	FL	LPV200	1	99.919	1	99.916	5	99.889
GIF	WINTER HAVEN RGNL	FL	LPV	1	99.964	1	99.964	1	99.916
GNV	GAINESVILLE RGNL	FL	LPV	1	99.986	1	99.974	1	99.963
HEG	HERLONG RECREATIONAL	FL	LPV	1	99.985	1	99.975	1	99.967
IMM	IMMOKALEE RGNL	FL	LPV	2	99.938	2	99.930	4	99.910
ISM	KISSIMMEE GATEWAY	FL	LPV200	1	99.964	1	99.964	1	99.916
JAX	JACKSONVILLE INTL	FL	LPV200	1	99.985	1	99.975	1	99.974
LAL	LAKELAND LINDER INTL	FL	LPV200	1	99.965	1	99.965	1	99.916
LCQ	LAKE CITY GATEWAY	FL	LPV	1	99.992	1	99.992	1	99.967
LEE	LEESBURG INTL	FL	LPV	1	99.963	1	99.963	2	99.939
LNA	PALM BEACH COUNTY PARK	FL	LP	1	99.919	1	99.916	5	99.897
MAI	MARIANNA MUNICIPAL	FL	LPV	0	100	0	100	0	100
MCO	ORLANDO INTL	FL	LPV200	1	99.963	1	99.963	1	99.920
MIA	MIAMI INTL	FL	LPV200	1	99.919	1	99.916	8	99.880
MKY	MARCO ISLAND EXECUTIVE	FL	LPV	2	99.934	1	99.915	5	99.907
MLB	MELBOURNE INTL	FL	LPV200	2	99.941	2	99.940	2	99.914
MTH	THE FLORIDA KEYS MARATHON INTL	FL	LPV	1	99.916	1	99.916	11	99.868
OBE	OKEECHOBEE COUNTY	FL	LPV	2	99.939	2	99.938	2	99.911
OCF	OCALA INTL-JIM TAYLOR FIELD	FL	LPV200	1	99.979	1	99.970	2	99.953
OMN	ORMOND BEACH MUNICIPAL	FL	LPV	1	99.969	1	99.967	2	99.938

OPF	MIAMI-OPA LOCKA EXECUTIVE	FL	LPV200	1	99.919	1	99.916	7	99.882
ORL	EXECUTIVE	FL	LPV200	1	99.963	1	99.963	1	99.921
PBI	PALM BEACH INTL	FL	LPV200	1	99.919	1	99.916	5	99.897
PCM	PLANT CITY	FL	LPV	1	99.965	1	99.965	1	99.917
PGD	PUNTA GORDA	FL	LPV200	2	99.941	2	99.938	2	99.915
PHK	PALM BEACH CO GLADES	FL	LPV	2	99.938	2	99.930	4	99.907
PIE	ST PETE-CLEARWATER INTL	FL	LPV200	1	99.966	1	99.966	1	99.918
PMP	POMPANO BEACH AIRPARK	FL	LPV	1	99.919	1	99.916	5	99.889
PNS	PENSACOLA INTL	FL	LPV200	0	100	0	100	1	99.999
RSW	SOUTHWEST FLORIDA INTL	FL	LPV	2	99.938	2	99.930	3	99.912
SEF	SEBRING RGNL	FL	LPV	2	99.942	2	99.940	2	99.915
SFB	ORLANDO SANFORD INTL	FL	LPV200	1	99.964	1	99.963	1	99.922
SGJ	NORTHEAST FLORIDA RGNL	FL	LPV	1	99.976	1	99.971	1	99.961
SRQ	SARASOTA/BRADENTON INTL	FL	LPV200	2	99.955	2	99.955	1	99.916
SUA	WITHAM FIELD	FL	LPV	2	99.938	2	99.933	5	99.905
TIX	SPACE COAST RGNL	FL	LPV200	2	99.963	2	99.963	1	99.919
TLH	TALLAHASSEE INTL	FL	LPV200	0	100	0	100	0	100
TMB	MIAMI EXECUTIVE	FL	LPV200	1	99.919	1	99.916	8	99.880
TNT	DADE-COLLIER TRAINING AND TRAN	FL	LPV200	1	99.918	1	99.916	6	99.892
TPA	TAMPA INTL	FL	LPV200	1	99.966	1	99.966	1	99.918
TPF	PETER O KNIGHT	FL	LP	1	99.966	1	99.966	1	99.916
TTS	NASA SHUTTLE LANDING FACILITY	FL	LPV200	1	99.963	1	99.963	1	99.920
VDF	TAMPA EXECUTIVE	FL	LPV	1	99.966	1	99.966	1	99.918
VNC	VENICE MUNICIPAL	FL	LP	2	99.946	2	99.938	1	99.915
VQQ	CECIL	FL	LPV200	1	99.985	1	99.974	1	99.967
VRB	VERO BEACH RGNL	FL	LPV200	2	99.938	2	99.938	2	99.913
X07	LAKE WALES MUNICIPAL	FL	LP	2	99.951	2	99.951	1	99.916
X14	LA BELLE MUNICIPAL	FL	LPV	2	99.938	2	99.932	3	99.911
X23	UMATILLA MUNICIPAL	FL	LP	1	99.963	1	99.963	2	99.939
X35	MARION COUNTY	FL	LP	1	99.980	1	99.970	2	99.954
X50	MASSEY RANCH AIRPARK	FL	LP	1	99.963	1	99.963	2	99.935
X51	MIAMI HOMESTEAD GENERAL AVIATI	FL	LPV	1	99.918	1	99.916	7	99.880
ZPH	ZEPHYRHILLS MUNICIPAL	FL	LPV	1	99.965	1	99.965	1	99.919
09J	JEKYLL ISLAND	GA	LPV200	1	99.988	1	99.980	1	99.974
15J	COOK COUNTY	GA	LPV	0	100	0	100	0	100
17J	DONALSONVILLE MUNICIPAL	GA	LPV	0	100	0	100	0	100
18A	FRANKLIN COUNTY	GA	LPV	0	100	0	100	0	100
19A	JACKSON COUNTY	GA	LPV	0	100	0	100	0	100
2J3	LOUISVILLE MUNICIPAL	GA	LPV	0	100	0	100	0	100
2J5	MILLEN	GA	LPV	0	100	0	100	0	100

3J7	GREENE COUNTY RGNL	GA	LPV	0	100	0	100	0	100
48A	COCHRAN	GA	LPV	0	100	0	100	0	100
49A	GILMER COUNTY	GA	LPV	0	100	0	100	0	100
4A4	POLK COUNTY AIRPORT- CORNELIUS	GA	LPV	0	100	0	100	0	100
4J1	BRANTLEY COUNTY	GA	LPV	0	100	1	99.988	1	99.974
4J2	BERRIEN CO	GA	LPV	0	100	0	100	1	99.996
4J5	QUITMAN BROOKS COUNTY	GA	LP	0	100	0	100	1	99.999
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	0	100
75J	TURNER COUNTY	GA	LP	0	100	0	100	0	100
9A5	BARWICK LAFAYETTE	GA	LP	0	100	0	100	0	100
ABY	SOUTHWEST GEORGIA RGNL	GA	LPV200	0	100	0	100	0	100
ACJ	JIMMY CARTER RGNL	GA	LPV	0	100	0	100	0	100
AGS	AUGUSTA RGNL AT BUSH FIELD	GA	LPV200	0	100	0	100	0	100
AHN	ATHENS/BEN EPPS	GA	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	99.974
ATL	HARTSFIELD - JACKSON ATLANTA I	GA	LPV200	0	100	0	100	0	100
AYS	WAYCROSS-WARE COUNTY	GA	LPV200	0	100	0	100	1	99.974
BGE	DECATUR COUNTY INDUSTRIAL AIR	GA	LPV200	0	100	0	100	0	100
BHC	BAXLEY MUNICIPAL	GA	LPV	0	100	0	100	1	99.974
BIJ	EARLY COUNTY	GA	LPV	0	100	0	100	0	100
BQK	BRUNSWICK GOLDEN ISLES	GA	LPV200	1	99.990	1	99.981	1	99.974
CCO	NEWNAN COWETA COUNTY	GA	LPV	0	100	0	100	0	100
CKF	CRISP COUNTY-CORDELE	GA	LPV	0	100	0	100	0	100
CNI	CHEROKEE COUNTY	GA	LPV	0	100	0	100	0	100
CSG	COLUMBUS	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	99.976
CXU	CAMILLA-MITCHELL COUNTY	GA	LPV	0	100	0	100	0	100
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	0	100
DNL	DANIEL FIELD	GA	LPV	0	100	0	100	0	100
DNN	DALTON MUNICIPAL	GA	LPV	0	100	0	100	0	100
DQH	DOUGLAS MUNICIPAL	GA	LPV200	0	100	0	100	1	99.977
EBA	ELBERT COUNTY-PATZ FIELD	GA	LP	0	100	0	100	0	100

EZM	HEART OF GEORGIA RGNL	GA	LPV200	0	100	0	100	0	100
FFC	ATLANTA RGNL FALCON FIELD	GA	LPV	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	0	100
GVL	LEE GILMER MEMORIAL	GA	LPV	0	100	0	100	0	100
HOE	HOMERVILLE	GA	LPV	0	100	0	100	1	99.974
HQU	THOMSON-MCDUFFIE COUNTY	GA	LPV	0	100	0	100	0	100
IIY	WASHINGTON-WILKES COUNTY	GA	LPV	0	100	0	100	0	100
JCA	JACKSON COUNTY	GA	LPV	0	100	0	100	0	100
JES	JESUP-WAYNE COUNTY	GA	LPV	0	100	0	100	1	99.974
JYL	PLANTATION ARPK	GA	LPV	0	100	0	100	1	99.987
JZP	PICKENS COUNTY	GA	LPV	0	100	0	100	0	100
LGC	LAGRANGE-CALLAWAY	GA	LPV200	0	100	0	100	0	100
LHW	WRIGHT AAF (FORT STEWART)/MIDC	GA	LPV	0	100	0	100	1	99.974
LZU	GWINNETT COUNTY - BRISCOE FIEL	GA	LPV200	0	100	0	100	0	100
MAC	MACON DOWNTOWN	GA	LPV	0	100	0	100	0	100
MCN	MIDDLE GEORGIA RGNL	GA	LPV200	0	100	0	100	0	100
MGR	MOULTRIE MUNICIPAL	GA	LPV200	0	100	0	100	0	100
MHP	METTER MUNICIPAL	GA	LPV	0	100	0	100	1	99.989
MLJ	BALDWIN COUNTY RGNL	GA	LPV	0	100	0	100	0	100
MQW	TELFAIR-WHEELER	GA	LPV	0	100	0	100	0	100
OKZ	KAOLIN FIELD	GA	LPV	0	100	0	100	0	100
OPN	THOMASTON-UPSON COUNTY	GA	LPV200	0	100	0	100	0	100
PIM	HARRIS COUNTY	GA	LPV	0	100	0	100	0	100
PUJ	PAULDING NORTHWEST ATLANTA	GA	LPV200	0	100	0	100	0	100
PXE	PERRY-HOUSTON COUNTY	GA	LPV	0	100	0	100	0	100
RMG	RICHARD B RUSSELL REGIONAL - J	GA	LPV	0	100	0	100	0	100
RVJ	SWINTON SMITH FLD AT REIDSVILL	GA	LP	0	100	0	100	1	99.976
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	99.974
SBO	EAST GEORGIA REGIONAL	GA	LPV	0	100	0	100	0	100
TBR	STATESBORO-BULLOCH COUNTY	GA	LPV	0	100	0	100	1	99.985
TMA	HENRY TIFT MYERS	GA	LPV	0	100	0	100	0	100
TOC	TOCCOA RG LETOURNEAU FIELD	GA	LPV	0	100	0	100	0	100
TVI	THOMASVILLE RGNL	GA	LPV	0	100	0	100	0	100
VDI	VIDALIA RGNL	GA	LPV200	0	100	0	100	1	99.990
VLD	VALDOSTA RGNL	GA	LPV	0	100	0	100	2	99.991
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	LPV200	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	LPV200	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
FSW	FORT MADISON MUNICIPAL	IA	LPV	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
GFZ	GREENFIELD MUNICIPAL	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
IIB	INDEPENDENCE MUNICIPAL	IA	LPV	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
RRQ	ROCK RAPIDS MUNICIPAL	IA	LP	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/BRIG GEN BUD DAY	IA	LPV200	0	100	0	100	0	100
SXK	SIOUX COUNTY RGNL	IA	LPV200	0	100	0	100	0	100
TNU	NEWTON MUNICIPAL-EARL JOHNSON FIELD	IA	LPV200	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
1U7	BEAR LAKE COUNTY	ID	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	1	99.996
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	1	99.997
MAN	NAMPA MUNICIPAL	ID	LPV	0	100	0	100	0	100
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
SZT	SANDPOINT	ID	LP	0	100	0	100	1	99.988

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	LPV	0	100	0	100	0	100
AJG	MOUNT CARMEL MUNICIPAL	IL	LPV	0	100	0	100	0	100
ALN	ST LOUIS RGNL	IL	LPV200	0	100	0	100	0	100
ARR	AURORA MUNICIPAL	IL	LPV200	0	100	0	100	0	100
BLV	SCOTT AFB/MIDAMERICA	IL	LPV200	0	100	0	100	0	100
BMI	CENTRAL IL 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
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	VETERANS AIRPORT OF SOUTHERN I	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
PPQ	PITTSFIELD PENSTONE 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	LPV200	0	100	0	100	0	100
TIP	RANTOUL NATL AVN CNTR-FRANK EL	IL	LPV	0	100	0	100	0	100
UGN	WAUKEGAN NATIONAL	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
50I	KENTLAND MUNICIPAL	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 RGNL	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
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	INDY SOUTH GREENWOOD	IN	LPV	0	100	0	100	0	100
HNB	HUNTINGBURG	IN	LPV	0	100	0	100	0	100
HUF	TERRE HAUTE RGNL	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	LPV200	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
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 COUNTY MARLAT	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	1	99.992
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
9K8	KINGMAN AIRPORT - CLYDE CESSNA	KS	LP	0	100	0	100	0	100
AAO	COLONEL JAMES JABARA	KS	LPV	0	100	0	100	1	99.995

ADT	ATWOOD-RAWLINS COUNTY CITY-COU	KS	LPV	0	100	0	100	0	100
ANY	ANTHONY MUNICIPAL	KS	LPV	0	100	0	100	1	99.996
BEC	BEECH FACTORY	KS	LPV	0	100	0	100	1	99.992
CBK	SHALZ FIELD	KS	LPV	0	100	0	100	0	100
CFV	COFFEYVILLE MUNICIPAL	KS	LPV	0	100	0	100	1	99.993
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	LPV200	0	100	0	100	1	99.992
EHA	ELKHART-MORTON COUNTY	KS	LPV	0	100	0	100	0	100
EMP	EMPORIA MUNICIPAL	KS	LPV	0	100	0	100	1	99.993
EQA	EL DORADO/CAPTAIN JACK THOMAS	KS	LPV200	0	100	0	100	1	99.992
EWK	NEWTON-CITY-COUNTY	KS	LPV	0	100	0	100	0	100
FOE	TOPEKA RGNL	KS	LPV	0	100	0	100	1	99.995
FSK	FORT SCOTT MUNICIPAL	KS	LPV	0	100	0	100	1	99.995
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	LPV200	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	1	99.996
IDP	INDEPENDENCE MUNICIPAL	KS	LPV200	0	100	0	100	1	99.992
IXD	NEW CENTURY AIRCENTER	KS	LPV	0	100	0	100	1	99.996
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	1	99.995
K82	SMITH CENTER MUNICIPAL	KS	LPV200	0	100	0	100	0	100
K88	ALLEN COUNTY	KS	LPV	0	100	0	100	1	99.994
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	1	99.996
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	1	99.996
OWI	OTTAWA MUNICIPAL	KS	LPV	0	100	0	100	1	99.995
PHG	PHILLIPSBURG MUNICIPAL	KS	LPV	0	100	0	100	0	100
PPF	TRI-CITY	KS	LPV	0	100	0	100	1	99.993
PTS	ATKINSON MUNICIPAL	KS	LPV	0	100	0	100	1	99.994
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	LPV	0	100	0	100	1	99.995
TQK	SCOTT CITY MUNICIPAL	KS	LPV	0	100	0	100	0	100
UKL	COFFEY COUNTY	KS	LPV	0	100	0	100	1	99.994
ULS	ULYSSES	KS	LPV	0	100	0	100	0	100
WLD	STROTHER FIELD	KS	LPV	0	100	0	100	1	99.992
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 RGNL	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	1	99.999
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
BRY	SAMUELS FIELD	KY	LPV	0	100	0	100	0	100
BWG	BOWLING GREEN-WARREN COUNTY RG	KY	LPV200	0	100	0	100	1	99.999
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
I93	BRECKINRIDGE 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
M20	LEITCHFIELD-GRAYSON CO	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 RGNL	KY	LPV200	0	100	0	100	0	100
PAH	BARKLEY RGNL	KY	LPV200	0	100	0	100	0	100
PBX	PIKE COUNTY-HATCHER FIELD	KY	LPV200	0	100	0	100	0	100
RGA	CENTRAL KENTUCKY RGNL	KY	LPV	0	100	0	100	0	100
SDF	LOUISVILLE MUHAMMAD ALI INTL	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	1	99.991
0R7	THE RED RIVER	LA	LPV	0	100	0	100	1	99.991
3R4	HART	LA	LPV	0	100	0	100	1	99.991
3R7	JENNINGS	LA	LPV	0	100	0	100	1	99.991
5R8	DE QUINCY INDUSTRIAL AIRPARK	LA	LPV	0	100	0	100	1	99.991
ACP	ALLEN PARISH	LA	LPV	0	100	0	100	1	99.991
AEX	ALEXANDRIA INTL	LA	LPV200	0	100	0	100	1	99.991
APS	PORT OF SOUTH LOUISIANA EXECUT	LA	LPV	0	100	0	100	1	99.995
ARA	ACADIANA RGNL	LA	LPV200	0	100	0	100	1	99.992
BQP	MOREHOUSE MEMORIAL	LA	LPV	0	100	0	100	1	99.991
BTR	BATON ROUGE METROPOLITAN` RYAN	LA	LPV200	0	100	0	100	1	99.993
BXA	GEORGE R CARR MEMORIAL AIR FLD	LA	LPV	0	100	0	100	1	99.997
CWF	CHENNAULT INTL	LA	LPV200	0	100	0	100	1	99.990
DTN	SHREVEPORT DOWNTOWN	LA	LPV	0	100	0	100	1	99.991
ESF	ESLER RGNL	LA	LPV200	0	100	0	100	1	99.991
F88	JONESBORO	LA	LP	0	100	0	100	1	99.991
GAO	SOUTH LAFOURCHE LEONARD MILLER	LA	LPV200	0	100	0	100	1	99.994

HDC	HAMMOND NORTHSHORE RGNL	LA	LPV200	0	100	0	100	1	99.995
HUM	HOUMA-TERREBONNE	LA	LPV200	0	100	0	100	1	99.994
HZR	FALSE RIVER RGNL	LA	LPV	0	100	0	100	1	99.992
IER	NATCHITOCHES RGNL	LA	LPV	0	100	0	100	1	99.991
IYA	ABBEVILLE CHRIS CRUSTA MEMORIA	LA	LPV	0	100	0	100	1	99.991
L39	LEESVILLE	LA	LPV	0	100	0	100	1	99.991
LCH	LAKE CHARLES RGNL	LA	LPV200	0	100	0	100	1	99.991
LFT	LAFAYETTE RGNL/PAUL FOURNET FI	LA	LPV200	0	100	0	100	1	99.991
M79	JOHN H HOOKS JR MEMORIAL	LA	LPV	0	100	0	100	1	99.991
MLU	MONROE RGNL	LA	LPV200	0	100	0	100	1	99.991
MSY	LOUIS ARMSTRONG NEW ORLEANS IN	LA	LPV200	0	100	0	100	1	99.995
NEW	LAKEFRONT	LA	LPV	0	100	0	100	1	99.996
OPL	ST LANDRY PARISH-AHART FIELD	LA	LPV	0	100	0	100	1	99.991
PTN	HARRY P WILLIAMS MEMORIAL	LA	LPV200	0	100	0	100	1	99.993
REG	LOUISIANA RGNL	LA	LPV	0	100	0	100	1	99.994
RSN	RUSTON RGNL	LA	LPV	0	100	0	100	1	99.991
SHV	SHREVEPORT RGNL	LA	LPV200	0	100	0	100	1	99.992
SPH	SPRINGHILL	LA	LPV	0	100	0	100	1	99.992
TVR	VICKSBURG TALLULAH RGNL	LA	LPV200	0	100	0	100	1	99.992
UXL	SOUTHLAND FIELD	LA	LPV	0	100	0	100	1	99.991
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
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	0	100

2W5	MARYLAND	MD	LP	0	100	0	100	0	100
2W6	ST MARY'S COUNTY RGNL	MD	LPV	0	100	0	100	0	100
BWI	BALTIMORE/WASHINGTON INTL THUR	MD	LPV200	0	100	0	100	0	100
CBE	GREATER CUMBERLAND RGNL	MD	LPV	0	100	0	100	0	100
CGE	CAMBRIDGE-DORCHESTER RGNL	MD	LPV	0	100	0	100	0	100
DMW	CARROLL COUNTY RGNL/JACK B POA	MD	LPV200	0	100	0	100	0	100
ESN	EASTON/NEWNAM FIELD	MD	LPV200	0	100	0	100	0	100
FDK	FREDERICK MUNICIPAL	MD	LPV	0	100	0	100	0	100
GAI	MONTGOMERY COUNTY AIRPARK	MD	LPV	0	100	0	100	0	100
HGR	HAGERSTOWN RGNL-RICHARD A HENS	MD	LPV200	0	100	0	100	0	100
MTN	MARTIN STATE	MD	LPV	0	100	0	100	0	100
OXB	OCEAN CITY MUNICIPAL	MD	LPV	0	100	0	100	0	100
SBY	SALISBURY-OCEAN CITY WICOMICO	MD	LPV200	0	100	0	100	0	100
W29	BAY BRIDGE	MD	LPV	0	100	0	100	0	100
1B0	DEXTER RGNL	ME	LP	0	100	0	100	0	100
2B7	PITTSFIELD MUNICIPAL	ME	LPV	0	100	0	100	0	100
3B1	GREENVILLE MUNICIPAL	ME	LPV	0	100	0	100	0	100
59B	NEWTON FIELD	ME	LP	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
BXM	BRUNSWICK EXECUTIVE	ME	LPV200	0	100	0	100	0	100
CAR	CARIBOU MUNICIPAL	ME	LPV	0	100	0	100	0	100
EPM	EASTPORT MUNICIPAL	ME	LPV	0	100	0	100	0	100
FVE	NORTHERN AROOSTOOK RGNL	ME	LPV200	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	PRESQUE ISLE INTL	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 TOWNSHIP	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	LPV200	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
C20	ANDREWS UNIVERSITY AIRPARK	MI	LP	0	100	0	100	0	100
CAD	WEXFORD COUNTY	MI	LPV200	0	100	0	100	0	100
CFS	TUSCOLA AREA	MI	LP	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
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	LPV200	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 RGNL	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
OGM	ONTONAGON COUNTY - SCHUSTER FI	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
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
Y31	WEST BRANCH COMMUNICIPALTY	MI	LP	0	100	0	100	0	100
YIP	WILLOW RUN	MI	LPV200	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 (JANES FIE	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-LIZ WALL STROHF	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
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-ANDERSON FIELD	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
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
MWM	WINDOM MUNICIPAL	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
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	LPV	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	1	99.997
2H2	JERRY SUMNERS SR AURORA MUNICIPAL	MO	LP	0	100	0	100	1	99.995
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	1	99.995
AIZ	LEE C FINE MEMORIAL	MO	LPV	0	100	0	100	1	99.999
BBG	BRANSON	MO	LPV200	0	100	0	100	1	99.995
BUM	BUTLER MEMORIAL	MO	LPV	0	100	0	100	1	99.996

CGI	CAPE GIRARDEAU RGNL	MO	LPV200	0	100	0	100	0	100
CHT	CHILLICOTHE MUNICIPAL	MO	LPV	0	100	0	100	1	99.999
COU	COLUMBIA RGNL	MO	LPV200	0	100	0	100	0	100
DMO	SEDALIA RGNL	MO	LPV	0	100	0	100	1	99.998
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	1	99.994
EVU	NORTHWEST MISSOURI RGNL	MO	LPV	0	100	0	100	0	100
EZZ	CAMERON MEMORIAL	MO	LPV	0	100	0	100	1	99.998
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	1	99.994
FYG	WASHINGTON RGNL	MO	LPV	0	100	0	100	0	100
GLY	CLINTON RGNL	MO	LPV	0	100	0	100	1	99.997
GPH	MIDWEST NATIONAL AIR CENTER	MO	LPV	0	100	0	100	1	99.998
H79	ELDON MODEL AIRPARK	MO	LP	0	100	0	100	1	99.999
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	1	99.995
HIG	HIGGINSVILLE INDUSTRIAL MUNICIPAL	MO	LPV	0	100	0	100	1	99.998
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	1	99.994
K15	GRAND GLAIZE-OSAGE BEACH	MO	LP	0	100	0	100	1	99.998
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	1	99.995
LRY	LAWRENCE SMITH MEMORIAL	MO	LPV	0	100	0	100	1	99.996
LXT	LEE'S SUMMIT MUNICIPAL	MO	LPV	0	100	0	100	1	99.997
M05	CARUTHERSVILLE MEMORIAL	MO	LPV	0	100	0	100	0	100
M12	STEELE MUNICIPAL	MO	LPV	0	100	0	100	1	99.999
M17	BOLIVAR MUNICIPAL	MO	LPV	0	100	0	100	1	99.997
M48	HOUSTON MEMORIAL	MO	LPV	0	100	0	100	1	99.999
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	1	99.997
MHL	MARSHALL MEMORIAL MUNICIPAL	MO	LPV	0	100	0	100	1	99.999
MKC	CHARLES B WHEELER DOWNTOWN	MO	LPV	0	100	0	100	1	99.997
MNF	MOUNTAIN VIEW	MO	LP	0	100	0	100	1	99.998
MO3	STOCKTON MUNICIPAL	MO	LP	0	100	0	100	1	99.996

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	1	99.995
OZS	CAMDENTON MEMORIAL-LAKE RGNL	MO	LPV	0	100	0	100	1	99.998
PCD	PERRYVILLE RGNL	MO	LPV	0	100	0	100	0	100
PLK	M GRAHAM CLARK DOWNTOWN	MO	LPV200	0	100	0	100	1	99.995
POF	POPLAR BLUFF MUNICIPAL	MO	LPV	0	100	0	100	1	99.999
RAW	WARSAW MUNICIPAL	MO	LPV200	0	100	0	100	1	99.998
RCM	SKYHAVEN	MO	LPV	0	100	0	100	1	99.998
SGF	SPRINGFIELD-BRANSON NATIONAL	MO	LPV	0	100	0	100	1	99.996
SIK	SIKESTON MEMORIAL MUNICIPAL	MO	LPV	0	100	0	100	0	100
STJ	ROSECRANS MEMORIAL	MO	LPV200	0	100	0	100	1	99.997
STL	ST LOUIS LAMBERT 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	1	99.999
TKX	KENNETT MEMORIAL	MO	LPV	0	100	0	100	1	99.999
TRX	TRENTON MUNICIPAL	MO	LPV	0	100	0	100	1	99.999
UBX	CUBA MUNICIPAL	MO	LPV	0	100	0	100	0	100
UNO	WEST PLAINS RGNL	MO	LPV	0	100	0	100	1	99.997
UUV	SULLIVAN RGNL	MO	LPV	0	100	0	100	0	100
VER	JESSE VIERTEL MEMORIAL	MO	LPV	0	100	0	100	1	99.999
VIH	ROLLA NATIONAL	MO	LPV	0	100	0	100	0	100
0R0	COLUMBIA-MARION COUNTY	MS	LPV	0	100	0	100	1	99.997
17M	MAGEE MUNICIPAL	MS	LP	0	100	0	100	1	99.996
5A4	OKOLONA MUNICIPAL-RICHARD STOVALL F	MS	LPV	0	100	0	100	1	99.999
5A6	WINONA-MONTGOMERY COUNTY	MS	LP	0	100	0	100	1	99.996
87I	YAZOO COUNTY	MS	LPV	0	100	0	100	1	99.993
8M1	BOONEVILLE/BALDWYN	MS	LPV	0	100	0	100	1	99.999
CKM	FLETCHER FIELD	MS	LPV	0	100	0	100	1	99.996
CRX	ROSCOE TURNER	MS	LPV200	0	100	0	100	0	100
GLH	GREENVILLE MID-DELTA	MS	LPV200	0	100	0	100	1	99.994
GNF	GRENADA MUNICIPAL	MS	LPV	0	100	0	100	1	99.996
GPT	GULFPORT-BILOXI INTL	MS	LPV200	0	100	0	100	1	99.998
GTR	GOLDEN TRIANGLE RGNL	MS	LPV200	0	100	0	100	1	99.998
GWO	GREENWOOD-LEFLORE	MS	LPV	0	100	0	100	1	99.996
HBG	HATTIESBURG BOBBY L CHAIN MUNICIPAL	MS	LPV200	0	100	0	100	1	99.999
HEZ	HARDY-ANDERS FIELD NATCHEZ-ADA	MS	LPV200	0	100	0	100	1	99.992
HKS	HAWKINS FIELD	MS	LPV	0	100	0	100	1	99.995
HSA	STENNIS INTL	MS	LPV200	0	100	0	100	1	99.997
IDL	INDIANOLA MUNICIPAL	MS	LPV	0	100	0	100	1	99.995

JAN	JACKSON-MEDGAR WILEY EVERS INT	MS	LPV200	0	100	0	100	1	99.995
JVW	JOHN BELL WILLIAMS	MS	LPV200	0	100	0	100	1	99.994
LMS	LOUISVILLE WINSTON COUNTY	MS	LPV	0	100	0	100	1	99.997
LUL	HESLER-NOBLE FIELD	MS	LPV	0	100	0	100	1	99.998
M11	COPIAH COUNTY	MS	LPV	0	100	0	100	1	99.995
M40	MONROE COUNTY	MS	LPV	0	100	0	100	1	99.999
M41	HOLLY SPRINGS-MARSHALL COUNTY	MS	LPV	0	100	0	100	1	99.999
M43	PRENTISS-JEFFERSON DAVIS COUNT	MS	LPV	0	100	0	100	1	99.996
MBO	BRUCE CAMPBELL FIELD	MS	LPV	0	100	0	100	1	99.995
MCB	MC COMB/PIKE COUNTY/JOHN E LEW	MS	LPV200	0	100	0	100	1	99.995
MEI	KEY FIELD	MS	LPV200	0	100	0	100	1	99.999
MJD	PICAYUNE MUNICIPAL	MS	LPV	0	100	0	100	1	99.997
MMS	SELFS	MS	LPV	0	100	0	100	1	99.996
MPE	PHILADELPHIA MUNICIPAL	MS	LPV	0	100	0	100	1	99.997
OLV	OLIVE BRANCH	MS	LPV200	0	100	0	100	1	99.998
PIB	HATTIESBURG-LAUREL RGNL	MS	LPV200	0	100	0	100	1	99.998
PMU	PANOLA COUNTY	MS	LPV	0	100	0	100	1	99.997
PQL	TRENT LOTT INTL	MS	LPV200	0	100	0	100	1	99.999
RNV	CLEVELAND MUNICIPAL	MS	LPV	0	100	0	100	1	99.995
STF	GEORGE M BRYAN	MS	LPV200	0	100	0	100	1	99.998
TUP	TUPELO RGNL	MS	LPV200	0	100	0	100	1	99.999
UBS	COLUMBUS-LOWNDES COUNTY	MS	LPV	0	100	0	100	1	99.999
UOX	UNIVERSITY-OXFORD	MS	LPV	0	100	0	100	1	99.998
UTA	TUNICA MUNICIPAL	MS	LPV200	0	100	0	100	1	99.997
VKS	VICKSBURG MUNICIPAL	MS	LP	0	100	0	100	1	99.992
1S3	TILLITT FIELD	MT	LPV	0	100	0	100	0	100
4U6	CIRCLE TOWN COUNTY	MT	LPV	0	100	0	100	0	100
6S0	BIG TIMBER	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
7S1	TWIN BRIDGES	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	1	99.995
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-VALLEY COU	MT	LPV200	0	100	0	100	0	100

GPI	GLACIER PARK INTL	MT	LPV	0	100	0	100	1	99.993
GTF	GREAT FALLS INTL	MT	LPV200	0	100	0	100	0	100
HLN	HELENA RGNL	MT	LPV	0	100	0	100	1	99.999
HVR	HAVRE CITY-COUNTY	MT	LPV	0	100	0	100	1	99.998
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	1	99.999
MLS	FRANK WILEY FIELD	MT	LPV	0	100	0	100	0	100
MSO	MISSOULA INTL	MT	LPV200	0	100	0	100	1	99.999
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
S01	CONRAD	MT	LPV	0	100	0	100	1	99.997
SBX	SHELBY	MT	LPV	0	100	0	100	1	99.995
SDY	SIDNEY-RICHLAND RGNL	MT	LPV	0	100	0	100	0	100
WYS	YELLOWSTONE	MT	LPV200	0	100	0	100	0	100
43A	MONTGOMERY COUNTY	NC	LP	0	100	0	100	0	100
7W6	HYDE COUNTY	NC	LP	0	100	0	100	0	100
ACZ	HENDERSON FIELD	NC	LPV	0	100	0	100	0	100
AFP	ANSON COUNTY - JEFF CLOUD FIEL	NC	LPV	0	100	0	100	0	100
AKH	GASTONIA MUNICIPAL	NC	LPV	0	100	0	100	0	100
ASJ	TRI-COUNTY	NC	LPV	0	100	0	100	0	100
AVL	ASHEVILLE RGNL	NC	LPV200	0	100	0	100	0	100
BUY	BURLINGTON-ALAMANCE RGNL	NC	LPV	0	100	0	100	0	100
CLT	CHARLOTTE/DOUGLAS INTL	NC	LPV200	0	100	0	100	0	100
CPC	COLUMBUS COUNTY MUNICIPAL	NC	LPV	0	100	0	100	0	100
CTZ	CLINTON-SAMPSON COUNTY	NC	LPV200	0	100	0	100	0	100
DPL	DUPLIN CO	NC	LPV200	0	100	0	100	0	100
ECG	ELIZABETH CITY CG AIR STATION/	NC	LPV	0	100	0	100	0	100
EDE	NORTHEASTERN RGNL	NC	LPV200	0	100	0	100	0	100
EHO	SHELBY-CLEVELAND COUNTY RGNL	NC	LPV	0	100	0	100	0	100
EQY	CHARLOTTE-MONROE EXECUTIVE	NC	LPV200	0	100	0	100	0	100
EWN	COASTAL CAROLINA REGIONAL	NC	LPV	0	100	0	100	0	100
EXX	DAVIDSON COUNTY	NC	LPV	0	100	0	100	0	100
EYF	CURTIS L BROWN JR FIELD	NC	LPV	0	100	0	100	0	100
FAY	FAYETTEVILLE RGNL/GRANNIS FIEL	NC	LPV200	0	100	0	100	0	100
FFA	FIRST FLIGHT	NC	LP	0	100	0	100	0	100
FQD	RUTHERFORD CO - MARCHMAN FIELD	NC	LPV	0	100	0	100	0	100
GEV	ASHE COUNTY	NC	LP	0	100	0	100	0	100

GSO	PIEDMONT TRIAD INTL	NC	LPV200	0	100	0	100	0	100
GWW	WAYNE EXECUTIVE JETPORT	NC	LPV200	0	100	0	100	0	100
HBI	ASHEBORO RGNL	NC	LPV	0	100	0	100	0	100
HKY	HICKORY RGNL	NC	LPV200	0	100	0	100	0	100
HNZ	HENDERSON-OXFORD	NC	LPV	0	100	0	100	0	100
HRJ	HARNETT RGNL JETPORT	NC	LPV	0	100	0	100	0	100
ILM	WILMINGTON INTL	NC	LPV200	0	100	0	100	0	100
INT	SMITH REYNOLDS	NC	LPV200	0	100	0	100	0	100
IPJ	LINCOLNTON-LINCOLN COUNTY RGNL	NC	LPV	0	100	0	100	0	100
ISO	KINSTON RGNL JETPORT AT STALLI	NC	LPV200	0	100	0	100	0	100
IXA	HALIFAX-NORTHAMPTON RGNL	NC	LPV200	0	100	0	100	0	100
JNX	JOHNSTON RGNL	NC	LPV	0	100	0	100	0	100
JQF	CONCORD-PADGETT RGNL	NC	LPV	0	100	0	100	0	100
LBT	LUMBERTON RGNL	NC	LPV	0	100	0	100	0	100
LHZ	TRIANGLE NORTH EXECUTIVE	NC	LPV200	0	100	0	100	0	100
MCZ	MARTIN COUNTY	NC	LPV	0	100	0	100	0	100
MEB	LAURINBURG-MAXTON	NC	LPV200	0	100	0	100	0	100
MQI	DARE COUNTY RGNL	NC	LPV	0	100	0	100	0	100
MRH	MICHAEL J SMITH FIELD	NC	LPV	0	100	0	100	0	100
MRN	FOOTHILLS REGIONAL	NC	LPV	0	100	0	100	0	100
MWK	MOUNT AIRY/SURRY COUNTY	NC	LPV	0	100	0	100	0	100
OAJ	ALBERT J ELLIS	NC	LPV200	0	100	0	100	0	100
OCW	WASHINGTON-WARREN	NC	LPV	0	100	0	100	0	100
ONX	CURRITUCK COUNTY RGNL	NC	LPV	0	100	0	100	0	100
PGV	PITT-GREENVILLE	NC	LPV	0	100	0	100	0	100
PMZ	PLYMOUTH MUNICIPAL	NC	LP	0	100	0	100	0	100
RCZ	RICHMOND COUNTY	NC	LPV	0	100	0	100	0	100
RDU	RALEIGH-DURHAM INTL	NC	LPV200	0	100	0	100	0	100
RHP	WESTERN CAROLINA RGNL	NC	LP	0	100	0	100	0	100
RUQ	MID-CAROLINA RGNL	NC	LPV200	0	100	0	100	0	100
RWI	ROCKY MOUNT-WILSON RGNL	NC	LPV	0	100	0	100	0	100
SCR	SILER CITY MUNICIPAL	NC	LPV	0	100	0	100	0	100
SOP	MOORE COUNTY	NC	LPV200	0	100	0	100	0	100
SUT	CAPE FEAR RGNL JETPORT/HOWIE F	NC	LPV	0	100	0	100	0	100
SVH	STATESVILLE RGNL	NC	LPV200	0	100	0	100	0	100
TDF	PERSON COUNTY	NC	LPV200	0	100	0	100	0	100
TTA	RALEIGH EXEC JETPORT AT SANFOR	NC	LPV200	0	100	0	100	0	100
UKF	WILKES COUNTY	NC	LPV200	0	100	0	100	0	100
VUJ	STANLY COUNTY	NC	LPV200	0	100	0	100	0	100
W03	WILSON INDUSTRIAL AIR CENTER	NC	LPV	0	100	0	100	0	100

W40	MOUNT OLIVE MUNICIPAL	NC	LPV	0	100	0	100	0	100
ZEF	ELKIN MUNICIPAL	NC	LP	0	100	0	100	0	100
06D	ROLLA MUNICIPAL	ND	LPV	0	100	0	100	0	100
20U	BEACH	ND	LPV	0	100	0	100	0	100
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
4E7	ELLENDALE 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
D05	GARRISON MUNICIPAL	ND	LPV	0	100	0	100	0	100
D09	BOTTINEAU MUNICIPAL	ND	LPV	0	100	0	100	1	99.998
D55	ROBERTSON FIELD	ND	LPV	0	100	0	100	0	100
D57	GLEN ULLIN RGNL	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	LPV	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	1	99.999
RUG	RUGBY MUNICIPAL	ND	LP	0	100	0	100	1	99.999
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
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
JYR	YORK MUNICIPAL	NE	LPV	0	100	0	100	0	100
K01	FARINGTON FIELD	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/KING RHILEY FIEL	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	0	100
4N1	GREENWOOD LAKE	NJ	LP	0	100	0	100	0	100
ACY	ATLANTIC CITY INTL	NJ	LPV200	0	100	0	100	0	100
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	0	100
MJX	OCEAN COUNTY	NJ	LPV	0	100	0	100	0	100

MMU	MORRISTOWN MUNICIPAL	NJ	LPV	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	0	100
N40	SKY MANOR	NJ	LP	0	100	0	100	0	100
TEB	TETERBORO	NJ	LPV	0	100	0	100	0	100
TTN	TRENTON MERCER	NJ	LPV	0	100	0	100	0	100
VAY	SOUTH JERSEY RGNL	NJ	LP	0	100	0	100	0	100
WWD	CAPE MAY COUNTY	NJ	LPV	0	100	0	100	0	100
LFVM	MIQUELON	NL	LPV	0	100	1	99.996	4	99.922
LFVP	ST PIERRE	NL	LPV	0	100	1	99.997	4	99.920
0E0	MORIARTY MUNICIPAL	NM	LPV	0	100	0	100	1	99.996
ABQ	ALBUQUERQUE INTL SUNPORT	NM	LPV200	0	100	0	100	1	99.994
AEG	DOUBLE EAGLE II	NM	LPV200	0	100	0	100	1	99.993
ALM	ALAMOGORDO-WHITE SANDS RGNL	NM	LPV	0	100	0	100	28	99.964
ATS	ARTESIA MUNICIPAL	NM	LPV200	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	1	99.999	55	99.698
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	99.988
HOB	LEA COUNTY RGNL	NM	LPV	0	100	0	100	0	100
LAM	LOS ALAMOS	NM	LP	0	100	0	100	1	99.995
LRU	LAS CRUCES INTL	NM	LPV200	0	100	0	100	55	99.808
ONM	SOCORRO MUNICIPAL	NM	LP	0	100	0	100	10	99.985
ROW	ROSWELL INTL AIR CENTER	NM	LPV	0	100	0	100	0	100
SAF	SANTA FE MUNICIPAL	NM	LPV200	0	100	0	100	1	99.995
SRR	SIERRA BLANCA RGNL	NM	LPV200	0	100	0	100	6	99.996
SVC	GRANT COUNTY	NM	LPV	0	100	1	99.999	55	99.713
05U	EUREKA	NV	LP	0	100	0	100	0	100
67L	MESQUITE	NV	LP	0	100	0	100	0	100
BAM	BATTLE MOUNTAIN	NV	LPV	0	100	0	100	0	100
CXP	CARSON	NV	LP	0	100	0	100	0	100
ELY	ELY ARPT /YELLAND FLD/	NV	LPV	0	100	0	100	0	100
HTH	HAWTHORNE INDUSTRIAL	NV	LP	0	100	0	100	0	100
LAS	MC CARRAN INTL	NV	LPV	0	100	0	100	0	100
LOL	DERBY FIELD	NV	LPV	0	100	0	100	0	100
RNO	RENO/TAHOE INTL	NV	LPV	0	100	0	100	0	100
RTS	RENO/STEAD	NV	LPV	0	100	0	100	0	100
SPZ	SILVER SPRINGS	NV	LPV	0	100	0	100	0	100

TPH	TONOPAH	NV	LP	0	100	0	100	0	100
WMC	WINNEMUCCA MUNICIPAL	NV	LPV	0	100	0	100	0	100
06N	RANDALL	NY	LP	0	100	0	100	0	100
0G7	FINGER LAKES RGNL	NY	LPV	0	100	0	100	0	100
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	0	100
9G0	BUFFALO AIRFIELD	NY	LP	0	100	0	100	0	100
9G3	AKRON/JESSON FIELD	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	0	100
BUF	BUFFALO NIAGARA INTL	NY	LPV200	0	100	0	100	0	100
ELM	ELMIRA/CORNING RGNL	NY	LPV200	0	100	0	100	0	100
ELZ	WELLSVILLE MUNICIPAL ARPT`TARANTINE	NY	LPV200	0	100	0	100	0	100
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	0	100
HPN	WESTCHESTER COUNTY	NY	LPV	0	100	0	100	0	100
HTF	HORNELL MUNICIPAL	NY	LPV	0	100	0	100	0	100
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	0	100
IUA	CANANDAIGUA	NY	LPV	0	100	0	100	0	100
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
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	0	100
PBG	PLATTSBURGH INTL	NY	LPV	0	100	0	100	0	100
PEO	PENN YAN	NY	LPV	0	100	0	100	0	100
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	0	100
SCH	SCHENECTADY COUNTY	NY	LPV200	0	100	0	100	0	100
SDC	WILLIAMSON-SODUS	NY	LPV	0	100	0	100	0	100
SLK	ADIRONDACK RGNL	NY	LPV200	0	100	0	100	0	100
SWF	NEW YORK 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
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	LPV200	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
I10	NOBLE COUNTY	OH	LP	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
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	LPV	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
VES	DARKE 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	1	99.992
1K8	SOUTH GRAND LAKE RGNL	OK	LPV	0	100	0	100	1	99.993
1O4	THOMAS MUNICIPAL	OK	LPV	0	100	0	100	1	99.992
2K4	SCOTT FIELD	OK	LPV	0	100	0	100	1	99.993
4O4	MC CURTAIN COUNTY RGNL	OK	LP	0	100	0	100	1	99.992
6K4	FAIRVIEW MUNICIPAL	OK	LPV	0	100	0	100	1	99.992
80F	ANTLERS MUNICIPAL	OK	LPV	0	100	0	100	1	99.992
ADH	ADA RGNL	OK	LPV	0	100	0	100	1	99.992
ADM	ARDMORE MUNICIPAL	OK	LPV	0	100	0	100	1	99.992
AVK	ALVA RGNL	OK	LPV	0	100	0	100	1	99.996
AXS	ALTUS/QUARTZ MOUNTAIN RGNL	OK	LPV	0	100	0	100	1	99.993
BKN	BLACKWELL-TONKAWA MUNICIPAL	OK	LPV	0	100	0	100	1	99.992
BVO	BARTLESVILLE MUNICIPAL	OK	LPV	0	100	0	100	1	99.992
CHK	CHICKASHA MUNICIPAL	OK	LPV200	0	100	0	100	1	99.992
CLK	CLINTON RGNL	OK	LPV	0	100	0	100	1	99.992
CSM	CLINTON-SHERMAN	OK	LPV200	0	100	0	100	1	99.992
CUH	CUSHING MUNICIPAL	OK	LPV	0	100	0	100	1	99.992
DUA	DURANT RGNL - EAKER FIELD	OK	LPV	0	100	0	100	1	99.992
DUC	HALLIBURTON FIELD	OK	LPV200	0	100	0	100	1	99.992
ELK	ELK CITY RGNL BUSINESS	OK	LPV	0	100	0	100	1	99.992
F22	PERRY MUNICIPAL	OK	LPV	0	100	0	100	1	99.992
FDR	FREDERICK RGNL	OK	LPV200	0	100	0	100	1	99.994
GCM	CLAREMORE RGNL	OK	LPV	0	100	0	100	1	99.992
GMJ	GROVE MUNICIPAL	OK	LPV	0	100	0	100	1	99.993
GOK	GUTHRIE-EDMOND RGNL	OK	LPV	0	100	0	100	1	99.992
GUY	GUYMON MUNICIPAL	OK	LPV	0	100	0	100	0	100
GZL	STIGLER RGNL	OK	LPV	0	100	0	100	1	99.992
H71	MID-AMERICA INDUSTRIAL	OK	LPV	0	100	0	100	1	99.992
HBR	HOBART RGNL	OK	LPV	0	100	0	100	1	99.992
HHW	STAN STAMPER MUNICIPAL	OK	LPV	0	100	0	100	1	99.992

HSD	SUNDANCE	OK	LPV	0	100	0	100	1	99.992
LAW	LAWTON-FORT SILL RGNL	OK	LPV200	0	100	0	100	1	99.992
MKO	MUSKOGEE-DAVIS RGNL	OK	LPV	0	100	0	100	1	99.992
MLC	MC ALESTER RGNL	OK	LPV	0	100	0	100	1	99.992
OJA	THOMAS P STAFFORD	OK	LPV	0	100	0	100	1	99.992
OKC	WILL ROGERS WORLD	OK	LPV200	0	100	0	100	1	99.992
OKM	OKMULGEE RGNL	OK	LPV200	0	100	0	100	1	99.992
OUN	UNIVERSITY OF OKLAHOMA WESTHEI	OK	LPV200	0	100	0	100	1	99.992
OWP	WILLIAM R POGUE MUNICIPAL	OK	LPV	0	100	0	100	1	99.992
PNC	PONCA CITY RGNL	OK	LPV	0	100	0	100	1	99.992
PVJ	PAULS VALLEY MUNICIPAL	OK	LPV200	0	100	0	100	1	99.992
PWA	WILEY POST	OK	LPV200	0	100	0	100	1	99.992
RCE	CLARENCE E PAGE MUNICIPAL	OK	LPV	0	100	0	100	1	99.992
RVS	RICHARD LLOYD JONES JR	OK	LPV200	0	100	0	100	1	99.992
SNL	SHAWNEE RGNL	OK	LPV200	0	100	0	100	1	99.992
SWO	STILLWATER RGNL	OK	LPV200	0	100	0	100	1	99.992
TQH	TAHLEQUAH MUNICIPAL	OK	LPV	0	100	0	100	1	99.992
TUL	TULSA INTL	OK	LPV200	0	100	0	100	1	99.992
WDG	ENID WOODRING RGNL	OK	LPV200	0	100	0	100	1	99.992
WWR	WEST WOODWARD	OK	LPV	0	100	0	100	1	99.998
3S8	GRANTS PASS	OR	LP	0	100	0	100	3	99.979
77S	HOBBY FIELD	OR	LPV	0	100	0	100	2	99.988
AST	ASTORIA RGNL	OR	LPV	0	100	0	100	2	99.972
BDN	BEND MUNICIPAL	OR	LPV	0	100	0	100	1	99.999
BKE	BAKER CITY MUNICIPAL	OR	LPV	0	100	0	100	1	99.998
CVO	CORVALLIS MUNICIPAL	OR	LPV200	0	100	0	100	2	99.990
EUG	MAHLON SWEET FIELD	OR	LPV200	0	100	0	100	2	99.988
GCD	GRANT CO RGNL/OGILVIE FIELD	OR	LPV	0	100	0	100	1	99.998
HIO	PORTLAND-HILLSBORO	OR	LPV200	0	100	0	100	3	99.992
LGD	LA GRANDE/UNION COUNTY	OR	LPV	0	100	0	100	1	99.997
LKV	LAKE COUNTY	OR	LPV	0	100	0	100	1	99.998
LMT	CRATER LAKE-KLAMATH RGNL	OR	LPV	0	100	0	100	1	99.992
MMV	MC MINNVILLE MUNICIPAL	OR	LPV	0	100	0	100	2	99.992
ONO	ONTARIO MUNICIPAL	OR	LPV	0	100	0	100	0	100
ONP	NEWPORT MUNICIPAL	OR	LPV	0	100	0	100	2	99.985
OTH	SOUTHWEST OREGON RGNL	OR	LPV	0	100	0	100	3	99.974
PDT	EASTERN OREGON RGNL AT PENDLET	OR	LPV200	0	100	0	100	1	99.998
PDX	PORTLAND INTL	OR	LPV200	0	100	0	100	3	99.995
RDM	ROBERTS FIELD	OR	LPV200	0	100	0	100	0	100
S33	MADRAS MUNICIPALCIPAL	OR	LPV	0	100	0	100	1	99.998

S39	PRINEVILLE	OR	LP	0	100	0	100	1	99.998
SLE	MCNARY FLD	OR	LPV200	0	100	0	100	2	99.993
SPB	SCAPPOOSE INDUSTRIAL AIRPARK	OR	LPV	0	100	0	100	3	99.993
UAO	AURORA STATE	OR	LPV	0	100	0	100	2	99.995
22N	JAKE ARNER MEMORIAL	PA	LP	0	100	0	100	0	100
29D	GROVE CITY	PA	LP	0	100	0	100	0	100
2G9	SOMERSET COUNTY	PA	LPV	0	100	0	100	0	100
6G1	TITUSVILLE	PA	LPV	0	100	0	100	0	100
6P7	MCVILLE	PA	LP	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	0	100
9D4	DECK	PA	LPV	0	100	0	100	0	100
ABE	LEHIGH VALLEY INTL	PA	LPV200	0	100	0	100	0	100
AFJ	WASHINGTON COUNTY	PA	LPV200	0	100	0	100	0	100
AGC	ALLEGHENY COUNTY	PA	LPV200	0	100	0	100	0	100
AOO	ALTOONA-BLAIR COUNTY	PA	LPV	0	100	0	100	0	100
AVP	WILKES-BARRE/SCRANTON INTL	PA	LPV200	0	100	0	100	0	100
AXQ	CLARION COUNTY	PA	LPV	0	100	0	100	0	100
BFD	BRADFORD RGNL	PA	LPV	0	100	0	100	0	100
BTP	PITTSBURGH/BUTLER RGNL	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	0	100
DUJ	DUBOIS RGNL	PA	LPV200	0	100	0	100	0	100
ERI	ERIE INTL/TOM RIDGE FIELD	PA	LPV	0	100	0	100	0	100
FIG	CLEARFIELD-LAWRENCE	PA	LPV	0	100	0	100	0	100
FKL	VENANGO RGNL	PA	LPV	0	100	0	100	0	100
FWQ	ROSTRAVER	PA	LPV	0	100	0	100	0	100
GKJ	PORT MEADVILLE	PA	LP	0	100	0	100	0	100
HMZ	BEDFORD COUNTY	PA	LPV	0	100	0	100	0	100
HZL	HAZLETON RGNL	PA	LPV	0	100	0	100	0	100
IDI	INDIANA COUNTY/JIMMY STEWART F	PA	LPV	0	100	0	100	0	100
IPT	WILLIAMSPORT RGNL	PA	LPV	0	100	0	100	0	100
JST	JOHN MURTHA JOHNSTOWN-CAMBRIA	PA	LPV200	0	100	0	100	0	100
LBE	ARNOLD PALMER RGNL	PA	LPV200	0	100	0	100	0	100
LNS	LANCASTER	PA	LPV200	0	100	0	100	0	100
LOM	WINGS FIELD	PA	LPV	0	100	0	100	0	100
MDT	HARRISBURG INTL	PA	LPV	0	100	0	100	0	100
MPO	POCONO MOUNTAINS MUNICIPAL	PA	LPV	0	100	0	100	0	100
MQS	CHESTER COUNTY G O CARLSON	PA	LPV	0	100	0	100	0	100
N38	WELLSBORO JOHNSTON	PA	LP	0	100	0	100	0	100

N79	NORTHUMBERLAND COUNTY	PA	LPV	0	100	0	100	0	100
N96	BELLEFONTE	PA	LPV	0	100	0	100	0	100
OQN	BRANDYWINE RGNL	PA	LP	0	100	0	100	0	100
OYM	ST MARYS MUNICIPAL	PA	LPV	0	100	0	100	0	100
PHL	PHILADELPHIA INTL	PA	LPV200	0	100	0	100	0	100
PIT	PITTSBURGH INTL	PA	LPV200	0	100	0	100	0	100
PNE	NORTHEAST PHILADELPHIA	PA	LPV200	0	100	0	100	0	100
PSB	MID-STATE	PA	LPV	0	100	0	100	0	100
PTW	HERITAGE FIELD	PA	LPV	0	100	0	100	0	100
RDG	READING RGNL/CARL A SPAATZ FIE	PA	LPV	0	100	0	100	0	100
RVL	MIFFLIN COUNTY	PA	LPV	0	100	0	100	0	100
SEG	PENN VALLEY	PA	LP	0	100	0	100	0	100
THV	YORK	PA	LP	0	100	0	100	0	100
UCP	NEW CASTLE MUNICIPAL	PA	LPV	0	100	0	100	0	100
UKT	QUAKERTOWN	PA	LP	0	100	0	100	0	100
UNV	UNIVERSITY PARK	PA	LPV200	0	100	0	100	0	100
VVS	JOSEPH A HARDY CONNELLSVILLE	PA	LPV	0	100	0	100	0	100
WAY	GREENE COUNTY	PA	LPV	0	100	0	100	0	100
WBW	WILKES-BARRE WYOMING VALLEY	PA	LPV	0	100	0	100	0	100
XLL	ALLENTOWN QUEEN CITY MUNICIPAL	PA	LP	0	100	0	100	0	100
ZER	SCHUYLKILL COUNTY/JOE ZERBEY	PA	LPV200	0	100	0	100	0	100
BID	BLOCK ISLAND STATE	RI	LPV	0	100	0	100	0	100
OQU	QUONSET STATE	RI	LPV200	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	0	100
6J0	LEXINGTON COUNTY	SC	LPV	0	100	0	100	0	100
AIK	AIKEN RGNL	SC	LPV200	0	100	0	100	0	100
AND	ANDERSON RGNL	SC	LPV200	0	100	0	100	0	100
AQX	ALLENDALE COUNTY	SC	LPV	0	100	0	100	0	100
ARW	BEAUFORT COUNTY	SC	LPV200	0	100	0	100	1	99.974
BBP	MARLBORO COUNTY JETPORT - H E	SC	LPV	0	100	0	100	0	100
BNL	BARNWELL RGNL	SC	LPV	0	100	0	100	0	100
CAE	COLUMBIA METROPOLITAN	SC	LPV200	0	100	0	100	0	100
CDN	WOODWARD FIELD	SC	LPV	0	100	0	100	0	100
CEU	OCONEE COUNTY RGNL	SC	LPV200	0	100	0	100	0	100
CHS	CHARLESTON AFB/INTL	SC	LPV200	0	100	0	100	1	99.977
CKI	WILLIAMSBURG RGNL	SC	LPV	0	100	0	100	0	100
CQW	CHERAW MUNICIPAL/LYNCH BELLINGER FI	SC	LPV	0	100	0	100	0	100
CRE	GRAND STRAND	SC	LPV200	0	100	0	100	0	100

CUB	JIM HAMILTON L B OWENS	SC	LPV	0	100	0	100	0	100
DCM	CHESTER CATAWBA RGNL	SC	LPV	0	100	0	100	0	100
DYB	SUMMERVILLE	SC	LPV200	0	100	0	100	0	100
FDW	FAIRFIELD COUNTY	SC	LPV	0	100	0	100	0	100
FLO	FLORENCE RGNL	SC	LPV	0	100	0	100	0	100
GGE	GEORGETOWN COUNTY	SC	LPV	0	100	0	100	0	100
GMU	GREENVILLE DOWNTOWN	SC	LPV200	0	100	0	100	0	100
GRD	GREENWOOD COUNTY	SC	LPV	0	100	0	100	0	100
GSP	GREENVILLE SPARTANBURG INTL	SC	LPV200	0	100	0	100	0	100
GYH	DONALDSON FIELD	SC	LPV	0	100	0	100	0	100
HVS	HARTSVILLE RGNL	SC	LPV	0	100	0	100	0	100
HXD	HILTON HEAD	SC	LPV	0	100	0	100	1	99.974
HYW	CONWAY-HORRY COUNTY	SC	LPV	0	100	0	100	0	100
JZI	CHARLESTON EXECUTIVE	SC	LPV200	0	100	0	100	1	99.974
LKR	LANCASTER COUNTY-MC WHIRTER FI	SC	LPV200	0	100	0	100	0	100
LQK	PICKENS COUNTY	SC	LPV	0	100	0	100	0	100
LRO	MT PLEASANT RGNL-FAISON FIELD	SC	LPV	0	100	0	100	1	99.977
LUX	LAURENS COUNTY	SC	LPV	0	100	0	100	0	100
MAO	MARION COUNTY	SC	LPV	0	100	0	100	0	100
MKS	BERKELEY COUNTY	SC	LPV	0	100	0	100	0	100
MYR	MYRTLE BEACH INTL	SC	LPV200	0	100	0	100	0	100
OGB	ORANGEBURG MUNICIPAL	SC	LPV	0	100	0	100	0	100
PYG	PAGELAND	SC	LPV	0	100	0	100	0	100
RBW	LOWCOUNTRY RGNL	SC	LPV200	0	100	0	100	1	99.980
SMS	SUMTER	SC	LPV200	0	100	0	100	0	100
SPA	SPARTANBURG DOWNTOWN MEMORIAL/	SC	LPV200	0	100	0	100	0	100
UDG	DARLINGTON COUNTY	SC	LPV	0	100	0	100	0	100
UZA	ROCK HILL/YORK CO/BRYANT FIELD	SC	LPV200	0	100	0	100	0	100
0D8	GETTYSBURG MUNICIPAL	SD	LP	0	100	0	100	0	100
49B	STURGIS MUNICIPAL	SD	LPV	0	100	0	100	0	100
4X4	WESSINGTON SPRINGS	SD	LP	0	100	0	100	0	100
8D3	SISSETON MUNICIPAL	SD	LPV	0	100	0	100	0	100
8D7	CLARK COUNTY	SD	LP	0	100	0	100	0	100
8V3	PARKSTON MUNICIPAL	SD	LPV	0	100	0	100	0	100
98D	ONIDA MUNICIPAL	SD	LP	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
9V9	CHAMBERLAIN MUNICIPAL	SD	LP	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
IEN	PINE RIDGE	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
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
SUO	ROSEBUD SIOUX TRIBAL	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
0A3	SMITHVILLE MUNICIPAL	TN	LPV	0	100	0	100	0	100
0M3	JOHN A BAKER FLD	TN	LP	0	100	0	100	1	99.999
0M4	BENTON COUNTY	TN	LPV	0	100	0	100	1	99.999
0M5	HUMPHREYS COUNTY	TN	LP	0	100	0	100	1	99.999
1A3	MARTIN CAMPBELL FIELD	TN	LP	0	100	0	100	0	100
1M5	PORTLAND MUNICIPAL	TN	LPV	0	100	0	100	1	99.999
2A0	MARK ANTON	TN	LPV	0	100	0	100	0	100
2M2	LAWRENCEBURG-LAWRENCE COUNTY	TN	LPV	0	100	0	100	1	99.999
2M8	CHARLES W BAKER	TN	LPV	0	100	0	100	1	99.998
3A2	NEW TAZEWELL MUNICIPAL	TN	LP	0	100	0	100	0	100
3M7	LAFAYETTE MUNICIPAL	TN	LPV	0	100	0	100	1	99.999
8A3	LIVINGSTON MUNICIPAL	TN	LP	0	100	0	100	0	100
BGF	WINCHESTER MUNICIPAL	TN	LPV	0	100	0	100	1	99.999
BNA	NASHVILLE INTL	TN	LPV200	0	100	0	100	1	99.999
CHA	LOVELL FIELD	TN	LPV200	0	100	0	100	0	100
CKV	OUTLAW FIELD	TN	LPV	0	100	0	100	1	99.999
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	1	99.999

FYM	FAYETTEVILLE MUNICIPAL	TN	LPV	0	100	0	100	1	99.999
GCY	GREENEVILLE-GREENE COUNTY MUNICIPAL	TN	LPV	0	100	0	100	0	100
GHM	CENTERVILLE MUNICIPAL	TN	LP	0	100	0	100	1	99.999
GKT	GATLINBURG-PIGEON FORGE	TN	LPV	0	100	0	100	0	100
GZS	ABERNATHY FIELD	TN	LPV	0	100	0	100	1	99.999
HZD	CARROLL COUNTY	TN	LPV	0	100	0	100	1	99.999
JAU	COLONEL TOMMY C STINER AIRFIEL	TN	LP	0	100	0	100	0	100
JWN	JOHN C TUNE	TN	LPV	0	100	0	100	1	99.999
LUG	ELLINGTON	TN	LPV	0	100	0	100	1	99.999
M01	GENERAL DEWITT SPAIN	TN	LPV	0	100	0	100	1	99.998
M08	WILLIAM L WHITEHURST FIELD	TN	LP	0	100	0	100	0	100
M53	HUMBOLDT MUNICIPAL	TN	LPV	0	100	0	100	1	99.999
M54	LEBANON MUNICIPAL	TN	LPV	0	100	0	100	1	99.999
M91	SPRINGFIELD ROBERTSON COUNTY	TN	LPV	0	100	0	100	1	99.999
MBT	MURFREESBORO MUNICIPAL	TN	LPV	0	100	0	100	1	99.999
MEM	MEMPHIS INTL	TN	LPV200	0	100	0	100	1	99.998
MKL	MC KELLAR-SIPES RGNL	TN	LPV200	0	100	0	100	1	99.999
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	1	99.999
MRC	MAURY COUNTY	TN	LPV	0	100	0	100	1	99.999
NQA	MILLINGTON-MEMPHIS	TN	LPV200	0	100	0	100	1	99.999
PHT	HENRY COUNTY	TN	LPV200	0	100	0	100	0	100
PVE	BEECH RIVER RGNL	TN	LPV	0	100	0	100	1	99.999
RKW	ROCKWOOD MUNICIPAL	TN	LPV	0	100	0	100	0	100
RNC	WARREN COUNTY MEMORIAL	TN	LPV	0	100	0	100	0	100
RVN	HAWKINS COUNTY	TN	LP	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	1	99.999
SRB	UPPER CUMBERLAND RGNL	TN	LPV	0	100	0	100	0	100
SYI	BOMAR FIELD-SHELBYVILLE MUNICIPAL	TN	LPV	0	100	0	100	1	99.999
SZY	ROBERT SIBLEY	TN	LPV	0	100	0	100	1	99.999
TGC	GIBSON COUNTY	TN	LP	0	100	0	100	0	100
THA	TULLAHOMA RGNL ARPT/WM NORTHER	TN	LPV	0	100	0	100	1	99.999
TRI	TRI-CITIES	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
XNX	SUMNER COUNTY RGNL	TN	LPV	0	100	0	100	1	99.999

0F2	BOWIE MUNICIPAL	TX	LPV	0	100	0	100	1	99.994
11R	BRENHAM MUNICIPAL	TX	LPV	0	100	0	100	1	99.996
2R9	KENEDY RGNL	TX	LP	0	100	0	100	0	100
3R9	LAKEWAY AIRPARK	TX	LP	0	100	0	100	1	99.999
3T5	FAYETTE RGNL AIR CENTER	TX	LPV	0	100	0	100	1	99.998
41F	FLOYDADA MUNICIPAL	TX	LP	0	100	0	100	1	99.999
45R	HAWTHORNE FIELD	TX	LP	0	100	0	100	1	99.992
4T2	KENNETH COPELAND	TX	LPV	0	100	0	100	1	99.995
50R	LOCKHART MUNICIPAL	TX	LPV	0	100	0	100	1	99.999
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	1	99.996
6R3	CLEVELAND MUNICIPAL	TX	LPV	0	100	0	100	1	99.993
77F	WINTERS MUNICIPAL	TX	LP	0	100	0	100	0	100
8F3	CROSBYTON MUNICIPAL	TX	LP	0	100	0	100	1	99.999
ABI	ABILENE RGNL	TX	LPV200	0	100	0	100	1	99.999
ACT	WACO RGNL	TX	LPV200	0	100	0	100	1	99.996
ADS	ADDISON	TX	LPV	0	100	0	100	1	99.993
AFW	FORT WORTH ALLIANCE	TX	LPV200	0	100	0	100	1	99.994
ALI	ALICE INTL	TX	LPV	0	100	0	100	1	99.999
AMA	RICK HUSBAND AMARILLO INTL	TX	LPV200	0	100	0	100	0	100
ARM	WHARTON RGNL	TX	LPV	0	100	0	100	1	99.997
ASL	HARRISON COUNTY	TX	LPV	0	100	0	100	1	99.992
AUS	AUSTIN-BERGSTROM INTL	TX	LPV200	0	100	0	100	1	99.999
AXH	HOUSTON-SOUTHWEST	TX	LPV	0	100	0	100	1	99.996
BAZ	NEW BRAUNFELS RGNL	TX	LPV	0	100	0	100	0	100
BBD	CURTIS FIELD	TX	LPV	0	100	0	100	0	100
BEA	BEEVILLE MUNICIPAL	TX	LPV	0	100	0	100	0	100
BFE	TERRY COUNTY	TX	LPV	0	100	0	100	0	100
BGD	HUTCHINSON COUNTY	TX	LPV	0	100	0	100	0	100
BKD	STEPHENS COUNTY	TX	LP	0	100	0	100	1	99.997
BKS	BROOKS COUNTY	TX	LPV	0	100	0	100	1	99.998
BMT	BEAUMONT MUNICIPAL	TX	LPV	0	100	0	100	1	99.992
BPG	BIG SPRING MC MAHON-WRINKLE	TX	LPV200	0	100	0	100	0	100
BPT	JACK BROOKS RGNL	TX	LPV200	0	100	0	100	1	99.992
BRO	BROWNSVILLE/SOUTH PADRE ISLAND	TX	LPV200	0	100	0	100	2	99.994
BWD	BROWNWOOD RGNL	TX	LPV	0	100	0	100	1	99.999
BYY	BAY CITY RGNL	TX	LPV	0	100	0	100	1	99.997
CDS	CHILDRESS MUNICIPAL	TX	LPV200	0	100	0	100	1	99.996
CFD	COULTER FIELD	TX	LPV	0	100	0	100	1	99.996

CLL	EASTERWOOD FIELD	TX	LPV200	0	100	0	100	1	99.996
CNW	TSTC WACO	TX	LPV200	0	100	0	100	1	99.996
COM	COLEMAN MUNICIPAL	TX	LPV	0	100	0	100	1	99.999
COT	COTULLA-LA SALLE COUNTY	TX	LPV	0	100	0	100	0	100
CPT	CLEBURNE RGNL	TX	LPV	0	100	0	100	1	99.995
CRP	CORPUS CHRISTI INTL	TX	LPV200	0	100	0	100	1	99.999
CVB	CASTROVILLE MUNICIPAL	TX	LPV	0	100	0	100	0	100
CWC	KICKAPOO DOWNTOWN	TX	LPV	0	100	0	100	1	99.995
CXO	CONROE-NORTH HOUSTON RGNL	TX	LPV200	0	100	0	100	1	99.994
CZT	DIMMIT COUNTY	TX	LPV	0	100	0	100	0	100
DAL	DALLAS LOVE FIELD	TX	LPV200	0	100	0	100	1	99.994
DFW	DALLAS-FORT WORTH INTL	TX	LPV200	0	100	0	100	1	99.994
DHT	DALHART MUNICIPAL	TX	LPV	0	100	0	100	0	100
DKR	HOUSTON COUNTY	TX	LP	0	100	0	100	1	99.993
DRT	DEL RIO INTL	TX	LPV	0	100	0	100	0	100
DTO	DENTON ENTERPRISE	TX	LPV200	0	100	0	100	1	99.994
DUX	MOORE COUNTY	TX	LPV200	0	100	0	100	0	100
DWH	DAVID WAYNE HOOKS MEMORIAL	TX	LPV	0	100	0	100	1	99.995
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	LPV	0	100	0	100	0	100
EBG	SOUTH TEXAS INTL AT EDINBURG	TX	LPV	0	100	0	100	2	99.996
EDC	AUSTIN EXECUTIVE	TX	LPV200	0	100	0	100	1	99.998
EFD	ELLINGTON	TX	LPV200	0	100	0	100	1	99.995
ELA	EAGLE LAKE	TX	LP	0	100	0	100	1	99.997
ELP	EL PASO INTL	TX	LP	0	100	0	100	54	99.872
ERV	KERRVILLE MUNICIPAL/LOUIS SCHREINER	TX	LPV	0	100	0	100	0	100
ETN	EASTLAND MUNICIPAL	TX	LP	0	100	0	100	1	99.998
F00	JONES FIELD	TX	LPV	0	100	0	100	1	99.992
F05	WILBARGER COUNTY	TX	LPV	0	100	0	100	1	99.995
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	1	99.995
FWS	FORT WORTH SPINKS	TX	LPV200	0	100	0	100	1	99.995
GDJ	GRANBURY RGNL	TX	LPV	0	100	0	100	1	99.996
GGG	EAST TEXAS RGNL	TX	LPV	0	100	0	100	1	99.992
GKY	ARLINGTON MUNICIPAL	TX	LPV200	0	100	0	100	1	99.994

GLE	GAINESVILLE MUNICIPAL	TX	LPV	0	100	0	100	1	99.993
GLS	SCHOLES INTL AT GALVESTON	TX	LPV200	0	100	0	100	1	99.995
GNC	GAINES COUNTY	TX	LPV	0	100	0	100	0	100
GRK	ROBERT GRAY AAF	TX	LPV200	0	100	0	100	1	99.998
GTU	GEORGETOWN MUNICIPAL	TX	LPV	0	100	0	100	1	99.998
GVT	MAJORS	TX	LPV200	0	100	0	100	1	99.992
GYI	NORTH TEXAS RGNL/PERRIN FIELD	TX	LPV200	0	100	0	100	1	99.992
HBV	JIM HOGG COUNTY	TX	LPV	0	100	0	100	1	99.998
HDO	SOUTH TEXAS RGNL AT HONDO	TX	LPV	0	100	0	100	0	100
HHF	HEMPHILL COUNTY	TX	LPV	0	100	0	100	1	99.997
HOU	WILLIAM P HOBBY	TX	LPV200	0	100	0	100	1	99.995
HQZ	MESQUITE METRO	TX	LPV	0	100	0	100	1	99.993
HRL	VALLEY INTL	TX	LPV200	0	100	0	100	2	99.996
HRX	HEREFORD MUNICIPAL	TX	LPV200	0	100	0	100	0	100
HYI	SAN MARCOS RGNL	TX	LPV200	0	100	0	100	1	99.999
IAH	GEORGE BUSH INTERCONTINENTAL/H	TX	LPV200	0	100	0	100	1	99.995
IKG	KLEBERG COUNTY	TX	LPV	0	100	0	100	1	99.999
ILE	SKYLARK FIELD	TX	LPV200	0	100	0	100	1	99.998
INJ	HILLSBORO MUNICIPAL	TX	LPV	0	100	0	100	1	99.995
INK	WINKLER COUNTY	TX	LPV200	0	100	0	100	0	100
IWS	WEST HOUSTON	TX	LP	0	100	0	100	1	99.996
JAS	JASPER COUNTY-BELL FIELD	TX	LPV	0	100	0	100	1	99.991
JSO	CHEROKEE COUNTY	TX	LPV	0	100	0	100	1	99.992
JWY	MID-WAY RGNL	TX	LPV200	0	100	0	100	1	99.994
JXI	FOX STEPHENS FIELD - GILMER MU	TX	LP	0	100	0	100	1	99.992
LBB	LUBBOCK PRESTON SMITH INTL	TX	LPV200	0	100	0	100	0	100
LBX	TEXAS GULF COAST RGNL	TX	LPV	0	100	0	100	1	99.996
LFK	ANGELINA COUNTY	TX	LPV	0	100	0	100	1	99.992
LHB	HEARNE MUNICIPAL	TX	LPV200	0	100	0	100	1	99.996
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	1	99.994
LRD	LAREDO INTL	TX	LPV200	0	100	0	100	1	99.999
LUD	DECATUR MUNICIPAL	TX	LPV	0	100	0	100	1	99.994
LUV	LAMESA MUNICIPAL	TX	LPV200	0	100	0	100	0	100
LVJ	PEARLAND RGNL	TX	LPV	0	100	0	100	1	99.995
LXY	MEXIA-LIMESTONE CO	TX	LP	0	100	0	100	1	99.995
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	2	99.996

MKN	COMANCHE COUNTY-CITY	TX	LPV	0	100	0	100	1	99.998
MNZ	HAMILTON MUNICIPAL	TX	LPV	0	100	0	100	1	99.997
MWL	MINERAL WELLS	TX	LPV200	0	100	0	100	1	99.996
OCH	NACOGDOCHES A L MANGHAM JR RGN	TX	LPV200	0	100	0	100	1	99.992
ODO	ODESSA-SCHLEMEYER FIELD	TX	LPV200	0	100	0	100	0	100
ONY	OLNEY MUNICIPAL	TX	LPV	0	100	0	100	1	99.996
ORG	ORANGE COUNTY	TX	LPV	0	100	0	100	1	99.992
PEQ	PECOS MUNICIPAL	TX	LPV200	0	100	0	100	0	100
PIL	PORT ISABEL-CAMERON COUNTY	TX	LPV	0	100	0	100	2	99.994
PKV	CALHOUN COUNTY	TX	LPV	0	100	0	100	1	99.999
PPA	PERRY LEFORS FIELD	TX	LPV	0	100	0	100	1	99.998
PRX	COX FIELD	TX	LPV	0	100	0	100	1	99.992
PSX	PALACIOS MUNICIPAL	TX	LPV	0	100	0	100	1	99.998
PVW	HALE COUNTY	TX	LPV	0	100	0	100	1	99.999
PWG	MC GREGOR EXECUTIVE	TX	LPV	0	100	0	100	1	99.996
PYX	PERRYTON OCHILTREE COUNTY	TX	LPV	0	100	0	100	0	100
RAS	MUSTANG BEACH	TX	LPV	0	100	0	100	1	99.999
RBD	DALLAS EXECUTIVE	TX	LPV200	0	100	0	100	1	99.994
RBO	NUECES COUNTY	TX	LPV	0	100	0	100	1	99.999
RKP	ARANSAS CO	TX	LPV	0	100	0	100	1	99.999
RYW	LAGO VISTA TX - RUSTY ALLEN	TX	LPV	0	100	0	100	1	99.999
SAT	SAN ANTONIO INTL	TX	LPV200	0	100	0	100	0	100
SGR	SUGAR LAND RGNL	TX	LPV200	0	100	0	100	1	99.996
SJT	SAN ANGELO RGNL/MATHIS FIELD	TX	LPV	0	100	0	100	0	100
SLR	SULPHUR SPRINGS MUNICIPAL	TX	LPV	0	100	0	100	1	99.992
SNK	WINSTON FIELD	TX	LPV200	0	100	0	100	0	100
SWI	SHERMAN MUNICIPAL	TX	LP	0	100	0	100	1	99.992
SWW	AVENGER FIELD	TX	LPV	0	100	0	100	0	100
T23	ALBANY MUNICIPAL	TX	LPV	0	100	0	100	1	99.998
T41	LA PORTE MUNICIPAL	TX	LPV	0	100	0	100	1	99.995
T74	TAYLOR MUNICIPAL	TX	LPV	0	100	0	100	1	99.998
T78	LIBERTY MUNICIPAL	TX	LP	0	100	0	100	1	99.993
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	1	99.999
TKI	MCKINNEY NATIONAL	TX	LPV200	0	100	0	100	1	99.993
TME	HOUSTON EXECUTIVE	TX	LPV	0	100	0	100	1	99.996
TPL	DRAUGHON-MILLER CENTRAL TEXAS	TX	LPV200	0	100	0	100	1	99.997
TRL	TERRELL MUNICIPAL	TX	LPV	0	100	0	100	1	99.993
TX2	CHASE FIELD INDUSTRIAL	TX	LPV	0	100	0	100	0	100

TXW	MID VALLEY	TX	LPV	0	100	0	100	2	99.996
TYR	TYLER POUNDS RGNL	TX	LPV200	0	100	0	100	1	99.992
UTS	HUNTSVILLE MUNICIPAL	TX	LPV	0	100	0	100	1	99.994
VCT	VICTORIA RGNL	TX	LPV200	0	100	0	100	1	99.999
XBP	BRIDGEPORT MUNICIPAL	TX	LPV	0	100	0	100	1	99.995
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	99.995
BMC	BRIGHAM CITY RGNL	UT	LP	0	100	0	100	0	100
CDC	CEDAR CITY RGNL	UT	LPV	0	100	0	100	0	100
CNY	CANYONLANDS FIELD	UT	LP	0	100	0	100	0	100
DTA	DELTA MUNICIPAL	UT	LP	0	100	0	100	0	100
ENV	WENDOVER	UT	LPV	0	100	0	100	0	100
FOM	FILLMORE MUNICIPAL	UT	LPV	0	100	0	100	0	100
LGU	LOGAN-CACHE	UT	LPV	0	100	0	100	0	100
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	0	100
SLC	SALT LAKE CITY INTL	UT	LPV200	0	100	0	100	0	100
SPK	SPANISH FORK ARPT SPRINGVILLE-	UT	LP	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
U42	SOUTH VALLEY RGNL	UT	LPV	0	100	0	100	0	100
U55	PANGUITCH MUNICIPAL	UT	LPV200	0	100	0	100	0	100
VEL	VERNAL RGNL	UT	LPV	0	100	0	100	0	100
0V4	BROOKNEAL/CAMPBELL COUNTY	VA	LPV	0	100	0	100	0	100
0VG	LEE COUNTY	VA	LPV	0	100	0	100	0	100
AVC	MECKLENBURG-BRUNSWICK RGNL	VA	LPV	0	100	0	100	0	100
BCB	VIRGINIA TECH/MONTGOMERY EXECU	VA	LPV	0	100	0	100	0	100
BKT	ALLEN C PERKINSON BLACKSTONE A	VA	LPV	0	100	0	100	0	100
CHO	CHARLOTTESVILLE-ALBEMARLE	VA	LPV200	0	100	0	100	0	100
CJR	CULPEPER RGNL	VA	LPV	0	100	0	100	0	100
CPK	CHESAPEAKE RGNL	VA	LPV200	0	100	0	100	0	100
DAN	DANVILLE RGNL	VA	LPV200	0	100	0	100	0	100
EMV	EMPORIA-GREENSVILLE RGNL	VA	LPV	0	100	0	100	0	100
FCI	RICHMOND EXECUTIVE-CHESTERFIEL	VA	LPV	0	100	0	100	0	100
FKN	FRANKLIN RGNL	VA	LPV	0	100	0	100	0	100

FVX	FARMVILLE RGNL	VA	LPV	0	100	0	100	0	100
FYJ	MIDDLE PENINSULA RGNL	VA	LPV	0	100	0	100	0	100
HLX	TWIN COUNTY	VA	LPV	0	100	0	100	0	100
HSP	INGALLS FIELD	VA	LPV	0	100	0	100	0	100
HWY	WARRENTON-FAUQUIER	VA	LPV200	0	100	0	100	0	100
JFZ	TAZEWELL COUNTY	VA	LPV	0	100	0	100	0	100
JYO	LEESBURG EXECUTIVE	VA	LPV	0	100	0	100	0	100
LKU	LOUISA COUNTY/FREEMAN FIELD	VA	LPV	0	100	0	100	0	100
LNP	LONESOME PINE	VA	LPV	0	100	0	100	0	100
LUA	LURAY CAVERNS	VA	LP	0	100	0	100	0	100
LYH	LYNCHBURG RGNL/PRESTON GLENN F	VA	LPV	0	100	0	100	0	100
MFV	ACCOMACK COUNTY	VA	LPV	0	100	0	100	0	100
MKJ	MOUNTAIN EMPIRE	VA	LPV	0	100	0	100	0	100
MTV	BLUE RIDGE	VA	LPV	0	100	0	100	0	100
OFP	HANOVER COUNTY MUNICIPAL	VA	LPV	0	100	0	100	0	100
OKV	WINCHESTER RGNL	VA	LPV200	0	100	0	100	0	100
ORF	NORFOLK INTL	VA	LPV200	0	100	0	100	0	100
PHF	NEWPORT NEWS/WILLIAMSBURG INTL	VA	LPV200	0	100	0	100	0	100
PSK	NEW RIVER VALLEY	VA	LPV200	0	100	0	100	0	100
PTB	DINWIDDIE COUNTY	VA	LPV	0	100	0	100	0	100
PVG	HAMPTON ROADS EXECUTIVE	VA	LPV200	0	100	0	100	0	100
RIC	RICHMOND INTL	VA	LPV200	0	100	0	100	0	100
RMN	STAFFORD RGNL	VA	LPV	0	100	0	100	0	100
ROA	ROANOKE-BLACKSBURG RGNL/WOODRU	VA	LPV	0	100	0	100	0	100
SFQ	SUFFOLK EXECUTIVE	VA	LPV	0	100	0	100	0	100
SHD	SHENANDOAH VALLEY RGNL	VA	LPV200	0	100	0	100	0	100
VJI	VIRGINIA HIGHLANDS	VA	LPV	0	100	0	100	0	100
W78	WILLIAM M TUCK	VA	LPV	0	100	0	100	0	100
W96	NEW KENT COUNTY	VA	LP	0	100	0	100	0	100
WAL	WALLOPS FLIGHT FACILITY	VA	LPV	0	100	0	100	0	100
XSA	TAPPAHANNOCK-ESSEX COUNTY	VA	LPV	0	100	0	100	0	100
BTV	BURLINGTON INTL	VT	LPV200	0	100	0	100	0	100
EFK	NORTHEAST KINGDOM INTL	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	1	99.998
AWO	ARLINGTON MUNICIPAL	WA	LPV200	0	100	0	100	2	99.986
BLI	BELLINGHAM INTL	WA	LPV200	0	100	0	100	1	99.986

BVS	SKAGIT RGNL	WA	LPV	0	100	0	100	1	99.987
CLM	WILLIAM R FAIRCHILD INTL	WA	LPV	0	100	0	100	2	99.987
CLS	CHEHALIS-CENTRALIA	WA	LPV	0	100	0	100	2	99.977
DEW	DEER PARK	WA	LPV	0	100	0	100	1	99.989
EPH	EPHRATA MUNICIPAL	WA	LPV	0	100	0	100	1	99.985
FHR	FRIDAY HARBOR	WA	LPV	0	100	0	100	1	99.987
GEG	SPOKANE INTL	WA	LPV200	0	100	0	100	1	99.996
HQM	BOWERMAN	WA	LPV200	0	100	0	100	2	99.972
MWH	GRANT CO INTL	WA	LPV200	0	100	0	100	1	99.987
OLM	OLYMPIA RGNL	WA	LPV200	0	100	0	100	2	99.979
ORS	ORCAS ISLAND	WA	LP	0	100	0	100	1	99.986
PAE	SNOHOMISH COUNTY (PAINE FLD)	WA	LPV200	0	100	0	100	2	99.985
PLU	PIERCE COUNTY - THUN FIELD	WA	LPV	0	100	0	100	1	99.980
PSC	TRI-CITIES	WA	LPV200	0	100	0	100	1	99.999
PWT	BREMERTON NATIONAL	WA	LPV200	0	100	0	100	2	99.979
RLD	RICHLAND	WA	LPV	0	100	0	100	1	99.998
RNT	RENTON MUNICIPAL	WA	LPV	0	100	0	100	2	99.979
SEA	SEATTLE-TACOMA INTL	WA	LPV200	0	100	0	100	2	99.979
SFF	FELTS FIELD	WA	LPV	0	100	0	100	1	99.996
SHN	SANDERSON FIELD	WA	LPV	0	100	0	100	2	99.977
TDO	ED CARLSON MEMORIAL FIELD - SO	WA	LPV	0	100	0	100	3	99.992
TIW	TACOMA NARROWS	WA	LPV	0	100	0	100	1	99.980
YKM	YAKIMA AIR TERMINAL/MCALLISTER	WA	LPV200	0	100	0	100	2	99.998
3T3	BOYCEVILLE MUNICIPAL	WI	LPV	0	100	0	100	0	100
57C	EAST TROY MUNICIPAL	WI	LPV	0	100	0	100	0	100
61C	FORT ATKINSON MUNICIPAL	WI	LP	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
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 RGNL	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
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	LPV200	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	0	100
BLF	MERCER COUNTY	WV	LPV	0	100	0	100	0	100
CKB	NORTH CENTRAL WEST VIRGINIA	WV	LPV200	0	100	0	100	0	100
CRW	YEAGER	WV	LPV200	0	100	0	100	0	100
HLG	WHEELING OHIO CO	WV	LPV200	0	100	0	100	0	100
HTS	TRI-STATE/MILTON J FERGUSON 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	0	100
MGW	MORGANTOWN MUNICIPAL-WALTER L BILL	WV	LPV200	0	100	0	100	0	100
MRB	EASTERN WV RGNL/SHEPHERD FLD	WV	LPV	0	100	0	100	0	100
PKB	MID-OHIO VALLEY RGNL	WV	LPV	0	100	0	100	0	100
USW	BOGGS FIELD	WV	LPV	0	100	0	100	0	100
W22	UPSHUR COUNTY RGNL	WV	LPV	0	100	0	100	0	100
W35	POTOMAC AIRPARK	WV	LP	0	100	0	100	0	100
W99	GRANT COUNTY	WV	LPV	0	100	0	100	0	100
BYG	JOHNSON COUNTY	WY	LPV	0	100	0	100	0	100
COD	YELLOWSTONE RGNL	WY	LPV	0	100	0	100	0	100
CPR	CASPER/NATRONA COUNTY INTL	WY	LPV	0	100	0	100	1	99.999
CYS	CHEYENNE RGNL/JERRY OLSON FIEL	WY	LPV200	0	100	0	100	0	100
DGW	CONVERSE COUNTY	WY	LPV200	0	100	0	100	0	100
DWX	DIXON	WY	LP	0	100	0	100	1	99.999
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	LPV	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	SOUTHWEST WYOMING RGNL	WY	LPV200	0	100	0	100	0	100
RWL	RAWLINS MUNICIPAL/HARVEY FIELD	WY	LPV	0	100	0	100	1	99.999
SAA	SHIVELY FIELD	WY	LPV	0	100	0	100	1	99.997
SHR	SHERIDAN COUNTY	WY	LPV	0	100	0	100	0	100
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
CAJ4	ANAHIM LAKE		LPV	0	100	0	100	1	99.981
CAL4	ALBIAN		LPV	0	100	0	100	1	99.999
CAU4	VANDERHOOF		LPV	0	100	0	100	1	99.983
CBN9	TSAY KEH		LP	0	100	0	100	1	99.994
CCN2	GRAND MANAN		LPV	0	100	0	100	0	100
CDJ4	CLEARWATER		LPV	0	100	0	100	1	99.998
CDK2	DIAVIK		LPV	0	100	0	100	1	99.980
CEB5	FAIRVIEW		LPV	0	100	0	100	1	99.997
CEC4	JASPER-HINTON		LP	0	100	0	100	1	99.989
CEL8	ELEONORE		LPV	0	100	0	100	0	100
CEQ3	CAMROSE		LPV	0	100	0	100	2	99.990
CET2	CONKLIN (LEISMER)		LPV	0	100	0	100	1	99.998
CEV3	VEGREVILLE		LPV	0	100	0	100	2	99.995
CEW3	ST. PAUL		LPV	0	100	0	100	0	100
CEZ3	COOKING LAKE		LPV	0	100	0	100	2	99.992
CFB6	JOSEPHBURG		LPV	0	100	0	100	2	99.995
CFM4	DONNELLY		LPV	0	100	0	100	1	99.998
CFX5	RENARD		LPV	0	100	0	100	1	99.992
CGK2	GAHCHO KUE		LPV	0	100	0	100	1	99.980
CJA3	MORDEN REGIONAL		LPV	0	100	0	100	0	100
CJC5	SHAUNAVON		LPV	0	100	0	100	1	99.997
CJE3	WEYBURN		LPV	0	100	0	100	1	99.999
CJH3	MAIDSTONE		LPV	0	100	0	100	1	99.995
CJP9	CHARLOT RIVER		LP	0	100	0	100	1	99.992
CJQ4	MAPLE CREEK		LPV	0	100	0	100	1	99.996
CJW7	CIGAR LAKE		LPV	0	100	0	100	1	99.994
CJY3	TISDALE		LPV	0	100	0	100	0	100

CJZ3	MELFORT (MILLER FIELD)		LPV	0	100	0	100	0	100
CKQ8	MCARTHUR RIVER		LPV	0	100	0	100	1	99.995
CKZ7	WINKLER		LPV	0	100	0	100	0	100
CMB2	MEADOWBANK		LPV	0	100	0	100	3	99.964
CNV8	EDENVALE		LPV	0	100	0	100	0	100
CNY3	COLLINGWOOD		LPV	0	100	0	100	0	100
CSC3	DRUMMONDVILLE		LPV	0	100	0	100	0	100
CSD4	MONT-LAURIER		LPV	0	100	0	100	0	100
CSH4	LEBEL-SUR-QUEVILLON		LPV	0	100	0	100	0	100
CSK6	SNAP LAKE		LPV	0	100	0	100	1	99.981
CSR3	VICTORIAVILLE		LPV	0	100	0	100	0	100
CTP9	DONALDSON		LPV	1	99.998	1	99.998	12	99.939
CTT5	LA ROMAINE		LPV	0	100	1	99.996	2	99.948
CTU2	FONTANGES		LPV	0	100	0	100	1	99.965
CVB2	VOISEY'S BAY		LPV	1	99.997	1	99.974	1	99.941
CYAC	CAT LAKE		LPV	0	100	0	100	0	100
CYAD	LA GRANDE-3		LPV	0	100	0	100	0	100
CYAH	LA GRANDE-4		LPV	0	100	0	100	1	99.992
CYAS	KANGIRSUK		LPV	1	99.997	1	99.997	4	99.953
CYBE	URANIUM CITY		LPV	0	100	0	100	1	99.992
CYBF	BONNYVILLE		LPV	0	100	0	100	1	99.999
CYBK	BAKER LAKE		LPV	0	100	0	100	2	99.969
CYBL	CAMPBELL RIVER		LPV	0	100	0	100	1	99.982
CYBR	BRANDON MUNICIPALCIPALITY		LPV	0	100	0	100	0	100
CYBU	NIPAWIN		LPV	0	100	0	100	0	100
CYBW	SPRINGBANK		LPV	0	100	0	100	1	99.990
CYBX	LOURDES-DE-BLANC-SABLON		LPV	1	98.901	3	98.895	4	98.832
CYCD	NANAIMO		LPV	0	100	0	100	1	99.984
CYCH	MIRAMICHI		LPV	0	100	0	100	1	99.996
CYCK	CHATHAM-KENT		LPV	0	100	0	100	0	100
CYCL	CHARLO		LPV	0	100	0	100	1	99.996
CYCS	CHESTERFIELD INLET		LPV	0	100	0	100	3	99.979
CYCZ	FAIRMONT HOT SPRINGS		LPV	0	100	0	100	1	99.989
CYDF	DEER LAKE		LPV200	0	100	1	99.996	2	99.947
CYDQ	DAWSON CREEK		LPV	0	100	0	100	1	99.993
CYEE	HURONIA		LPV	0	100	0	100	0	100
CYEG	EDMONTON INTL		LPV200	0	100	0	100	2	99.991
CYEK	ARVIAT		LPV	0	100	0	100	2	99.985
CYEN	ESTEVAN REGIONAL		LPV	0	100	0	100	1	99.999
CYES	EDMUNDSTON		LPV	0	100	0	100	1	99.999

CYEV	INUVIK (MIKE ZUBKO)		LPV	0	100	0	100	2	99.971
CYEY	MAGNY		LPV	0	100	0	100	0	100
CYFA	FORT ALBANY		LPV	0	100	0	100	0	100
CYFB	IQALUIT		LPV	22	99.924	28	99.910	185	99.329
CYFC	FREDERICTON INTL		LPV	0	100	0	100	0	100
CYFI	FIREBAG		LPV	0	100	0	100	1	99.999
CYFO	FLIN FLON		LPV	0	100	0	100	1	99.999
CYFS	FORT SIMPSON		LPV	0	100	0	100	1	99.998
CYGH	FORT GOOD HOPE		LPV	0	100	0	100	2	99.983
CYGK	KINGSTON		LPV	0	100	0	100	0	100
CYGL	LA GRANDE RIVIERE		LPV	0	100	0	100	0	100
CYGR	ILES-DE-LA-MADELEINE		LPV	0	100	0	100	1	99.993
CYGV	HAVRE ST-PIERRE		LPV	0	100	0	100	1	99.992
CYGW	KUUJJUARAPIK		LPV	0	100	0	100	0	100
CYGX	GILLAM		LPV	0	100	0	100	0	100
CYHA	QUAQTAQ		LPV	1	99.997	1	99.997	8	99.952
CYHD	DRYDEN REGIONAL		LPV	0	100	0	100	0	100
CYHH	NEMISCAU		LPV	0	100	0	100	0	100
CYHM	HAMILTON		LPV	0	100	0	100	0	100
CYHR	CHEVERY		LPV	0	100	1	99.996	2	99.945
CYHU	ST-HUBERT		LPV	0	100	0	100	0	100
CYHZ	STANFIELD INTL		LPV200	0	100	0	100	1	99.996
CYIF	ST-AUGUSTIN		LPV	0	100	1	99.996	2	99.948
CYIK	IVUJIVIK		LPV	0	100	1	99.997	16	99.932
CYIV	ISLAND LAKE		LPV	0	100	0	100	0	100
CYJT	STEPHENVILLE		LPV	0	100	1	99.996	3	99.946
CYKA	KAMLOOPS		LPV	0	100	0	100	1	99.984
CYKC	COLLINS BAY		LPV	0	100	0	100	1	99.993
CYKF	WATERLOO		LPV200	0	100	0	100	0	100
CYKG	KANGIQSUJUAQ (WAKEHAM BAY)		LPV	2	99.996	2	99.996	13	99.941
CYKJ	KEY LAKE		LPV	0	100	0	100	1	99.995
CYKM	KINCARDINE		LPV	0	100	0	100	0	100
CYKO	AKULIVIK		LPV	0	100	0	100	7	99.959
CYKQ	WASKAGANISH		LPV	0	100	0	100	0	100
CYLB	LAC LA BICHE		LPV	0	100	0	100	1	99.999
CYLL	LLOYDMINSTER		LPV	0	100	0	100	1	99.998
CYLS	LAKE SIMCOE		LPV	0	100	0	100	0	100
CYLU	KANGIQSUALUJJUAQ (GEORGES RIVER)		LPV	1	99.976	1	99.974	2	99.925
CYLW	KELOWNA		LPV	0	100	0	100	1	99.985
CYMJ	AIR VICE MARSHAL C.M. MCEWEN		LP	0	100	0	100	2	99.998

CYMM	FORT MCMURRAY		LPV	0	100	0	100	0	100
CYMT	CHAPAIS		LPV	0	100	0	100	0	100
CYMU	UMIUJAQ		LPV	0	100	0	100	1	99.993
CYMX	MONTREAL INTL (MIRABEL)		LPV200	0	100	0	100	0	100
CYNC	WEMINDJI		LPV	0	100	0	100	0	100
CYND	GATINEAU		LPV	0	100	0	100	0	100
CYNL	POINTS NORTH LANDING		LPV	0	100	0	100	1	99.993
CYNR	HORIZON		LPV	0	100	0	100	1	99.999
CYOA	EKATI		LPV	0	100	0	100	1	99.980
CYOC	OLD CROW		LPV	0	100	0	100	2	99.985
CYOD	GROUP CAPTAIN R.W. MCNAIR		LP	0	100	0	100	1	99.998
CYOO	OSHAWA EXECUTIVE AIRPORT		LPV	0	100	0	100	0	100
CYOP	RAINBOW LAKE		LPV	0	100	0	100	1	99.998
CYOS	BILLY BISHOP REGIONAL		LPV	0	100	0	100	0	100
CYOW	MACDONALD-CARTIER INTL		LPV200	0	100	0	100	0	100
CYPA	PRINCE ALBERT (GLASS FIELD)		LPV	0	100	0	100	0	100
CYPE	PEACE RIVER		LPV	0	100	0	100	0	100
CYPK	PITT MEADOWS		LPV	0	100	0	100	1	99.984
CYPL	PICKLE LAKE		LPV	0	100	0	100	0	100
CYPQ	PETERBOROUGH		LPV	0	100	0	100	0	100
CYPR	PRINCE RUPERT		LPV	0	100	0	100	1	99.990
CYPX	PUVIRNITUQ		LPV	0	100	0	100	4	99.965
CYQB	JEAN LESAGE INTL		LPV200	0	100	0	100	0	100
CYQD	THE PAS		LPV	0	100	0	100	0	100
CYQF	RED DEER REGIONAL		LPV	0	100	0	100	2	99.991
CYQH	WATSON LAKE		LPV	0	100	0	100	0	100
CYQI	YARMOUTH		LPV	0	100	0	100	0	100
CYQL	LETHBRIDGE		LPV200	0	100	0	100	1	99.993
CYQM	GREATER MONCTON ROMEO LEBLANC INTL		LPV	0	100	0	100	1	99.996
CYQR	REGINA INTL		LPV200	0	100	0	100	1	99.997
CYQS	ST. THOMAS MUNICIPALCIPALITY		LPV	0	100	0	100	0	100
CYQT	THUNDER BAY		LPV200	0	100	0	100	0	100
CYQU	GRANDE PRAIRIE		LPV	0	100	0	100	1	99.993
CYQW	NORTH BATTLEFORD		LPV	0	100	0	100	1	99.994
CYQX	GANDER INTL		LPV200	2	98.901	3	98.896	4	98.825
CYQY	J.A. DOUGLAS MCCURDY		LPV	0	100	0	100	2	99.987
CYQZ	QUESNEL		LPV	0	100	0	100	1	99.984
CYRB	RESOLUTE BAY		LPV	417	97.004	521	96.035	1322	77.184
CYRI	RIVIERE-DU-LOUP		LPV	0	100	0	100	0	100
CYRJ	ROBERVAL		LPV	0	100	0	100	0	100

CYRL	RED LAKE		LPV	0	100	0	100	0	100
CYRQ	TROIS-RIVIERES		LPV200	0	100	0	100	0	100
CYRT	RANKIN INLET		LPV	0	100	0	100	2	99.980
CYSA	STRATFORD MUNICIPALCIPALITY		LPV	0	100	0	100	0	100
CYSB	SUDBURY		LPV	0	100	0	100	0	100
CYSC	SHERBROOKE		LPV	0	100	0	100	0	100
CYSG	ST-GEORGES		LPV	0	100	0	100	0	100
CYSJ	SAINT JOHN		LPV200	0	100	0	100	0	100
CYSK	SANIKILUAQ		LPV	0	100	0	100	0	100
CYSM	FORT SMITH		LPV	0	100	0	100	1	99.995
CYSN	NIAGARA DISTRICT		LPV	0	100	0	100	0	100
CYTF	ALMA		LPV	0	100	0	100	0	100
CYTH	THOMPSON		LPV200	0	100	0	100	0	100
CYTL	BIG TROUT LAKE		LPV	0	100	0	100	0	100
CYTQ	TASIUJAQ		LPV	1	99.996	1	99.996	1	99.974
CYTS	TIMMINS (VICTOR M. POWER)		LPV	0	100	0	100	0	100
CYTZ	BILLY BISHOP TORONTO CITY AIRPORT		LPV	0	100	0	100	0	100
CYUL	PIERRE-ELLIOTT-TRUDEAU INTL		LPV200	0	100	0	100	0	100
CYUY	ROUYN-NORANDA		LPV200	0	100	0	100	0	100
CYVB	BONAVENTURE		LPV	0	100	0	100	1	99.996
CYVO	VAL-DOR		LPV200	0	100	0	100	0	100
CYVQ	NORMAN WELLS		LPV	0	100	0	100	2	99.993
CYVR	VANCOUVER INTL		LPV200	0	100	0	100	1	99.984
CYVV	WIARTON		LPV	0	100	0	100	0	100
CYWG	JAMES ARMSTRONG RICHARDSON INTL		LPV200	0	100	0	100	0	100
CYWK	WABUSH		LPV	0	100	0	100	1	99.977
CYWL	WILLIAMS LAKE		LPV	0	100	0	100	1	99.984
CYWM	ATHABASCA		LPV	0	100	0	100	0	100
CYWP	WEBEQUIE		LPV	0	100	0	100	0	100
CYXE	JOHN G. DIEFENBAKER INTL		LPV200	0	100	0	100	1	99.994
CYXH	MEDICINE HAT		LPV	0	100	0	100	1	99.995
CYXJ	FORT ST. JOHN		LPV	0	100	0	100	1	99.993
CYXL	SIOUX LOOKOUT		LPV	0	100	0	100	0	100
CYXS	PRINCE GEORGE		LPV200	0	100	0	100	1	99.984
CYXT	TERRACE		LPV	0	100	0	100	1	99.993
CYXU	LONDON		LPV200	0	100	0	100	0	100
CYXX	ABBOTSFORD		LPV	0	100	0	100	1	99.985
CYXY	ERIK NIELSEN INTL		LPV200	0	100	0	100	0	100
CYYB	NORTH BAY		LPV200	0	100	0	100	0	100
CYYC	YYC CALGARY INTL		LPV200	0	100	0	100	1	99.991

CYYD	SMITHERS		LPV	0	100	0	100	1	99.998
CYYF	PENTICTON		LPV	0	100	0	100	1	99.985
CYYG	CHARLOTTETOWN		LPV	0	100	0	100	1	99.993
CYYH	TALOYOAK		LPV	1	99.997	1	99.997	63	99.727
CYYJ	VICTORIA INTL		LPV200	0	100	0	100	1	99.985
CYYQ	CHURCHILL		LPV	0	100	0	100	3	99.993
CYYR	GOOSE BAY		LP	0	100	1	99.996	2	99.942
CYYT	ST. JOHN'S INTL		LPV	2	98.899	4	98.893	12	98.793
CYYW	ARMSTRONG		LPV	0	100	0	100	0	100
CYYY	MONT-JOLI		LPV	0	100	0	100	1	99.996
CYYZ	LESTER B. PEARSON INTL		LPV200	0	100	0	100	0	100
CYZD	DOWNSVIEW		LPV	0	100	0	100	0	100
CYZF	YELLOWKNIFE		LPV	0	100	0	100	1	99.991
CYZG	SALLUIT		LPV	1	99.999	2	99.998	16	99.932
CYZP	SANDSPIT		LPV	0	100	0	100	1	99.984
CYZR	SARNIA (CHRIS HADFIELD)		LPV	0	100	0	100	0	100
CYZT	PORT HARDY		LPV	0	100	0	100	1	99.982
CYZU	WHITECOURT		LPV	0	100	0	100	1	99.990
CYZV	SEPT-ILES		LPV200	0	100	0	100	1	99.992
CYZX	GREENWOOD		LP	0	100	0	100	0	100
CZBB	BOUNDARY BAY		LPV	0	100	0	100	1	99.984
CZBF	BATHURST		LPV	0	100	0	100	1	99.996
CZJG	JENPEG		LPV	0	100	0	100	0	100
CZPB	SACHIGO LAKE		LP	0	100	0	100	1	99.998
CZPC	PINCHER CREEK		LPV	0	100	0	100	1	99.992
CZVL	VILLENEUVE		LPV	0	100	0	100	2	99.993

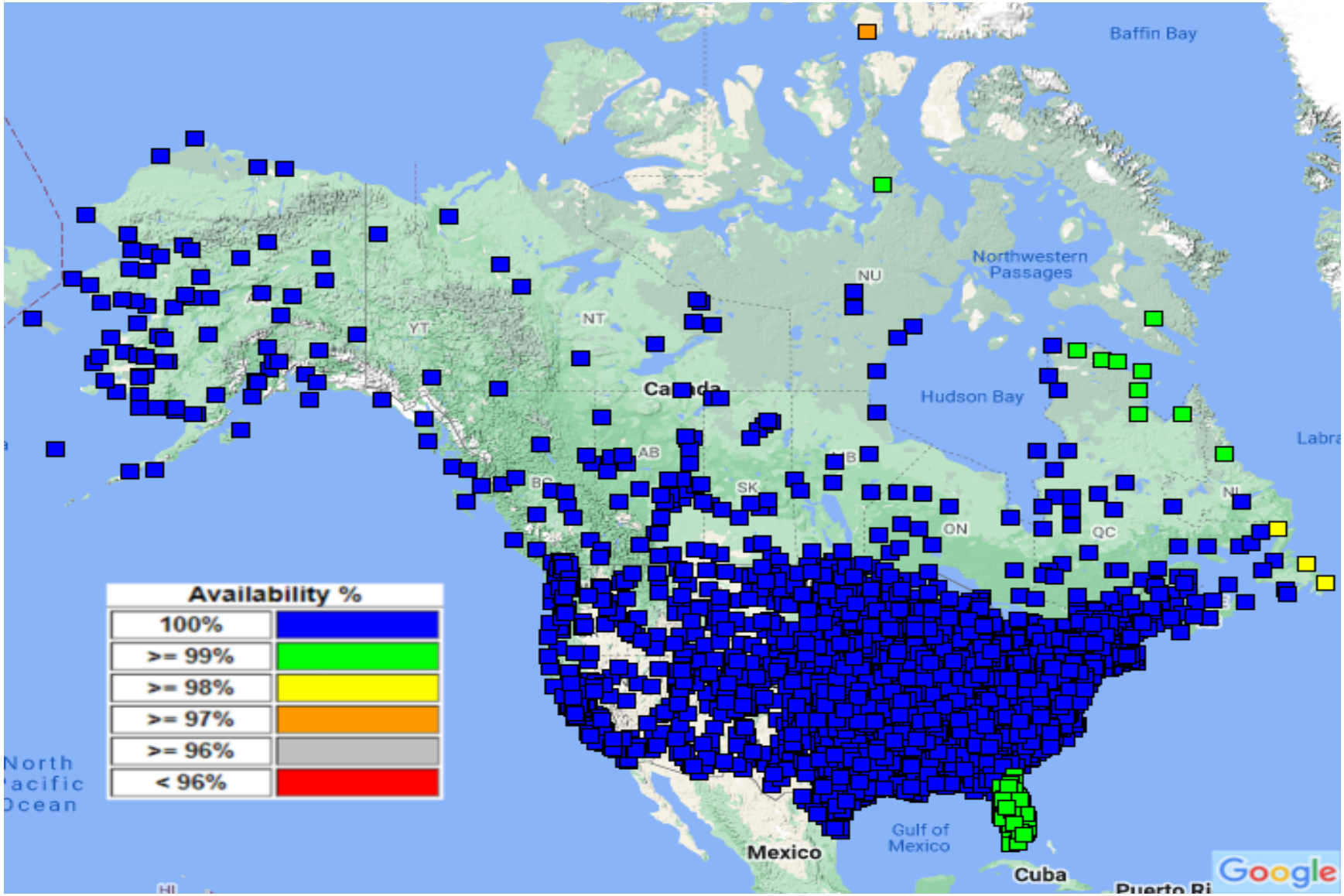

Figure 8-1. WAAS LP Availability at Airports in the U.S. and Canada With GPS RNAV IAPs

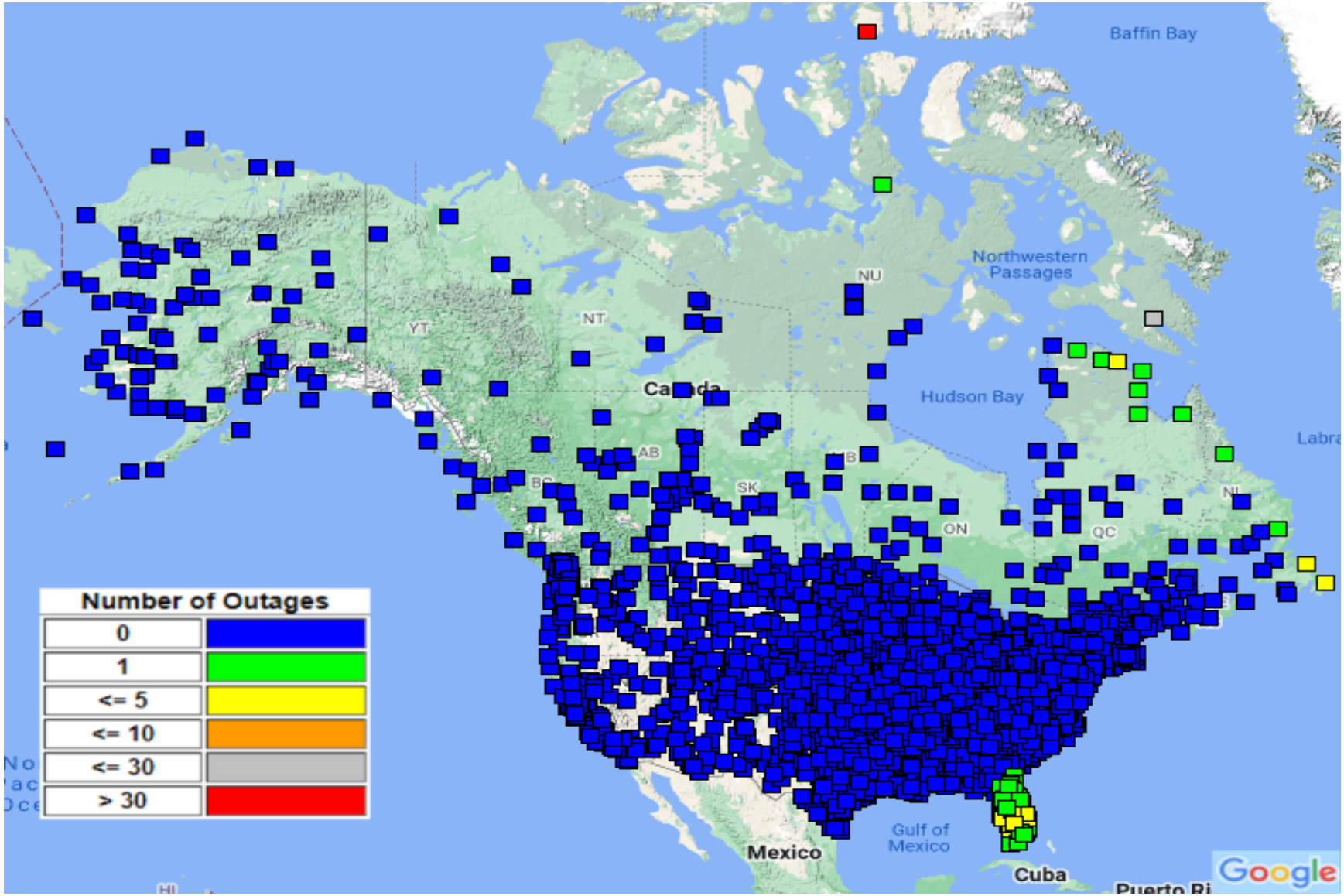

Figure 8-2. WAAS LP Outages at Airports in the U.S. and Canada With GPS RNAV IAPs

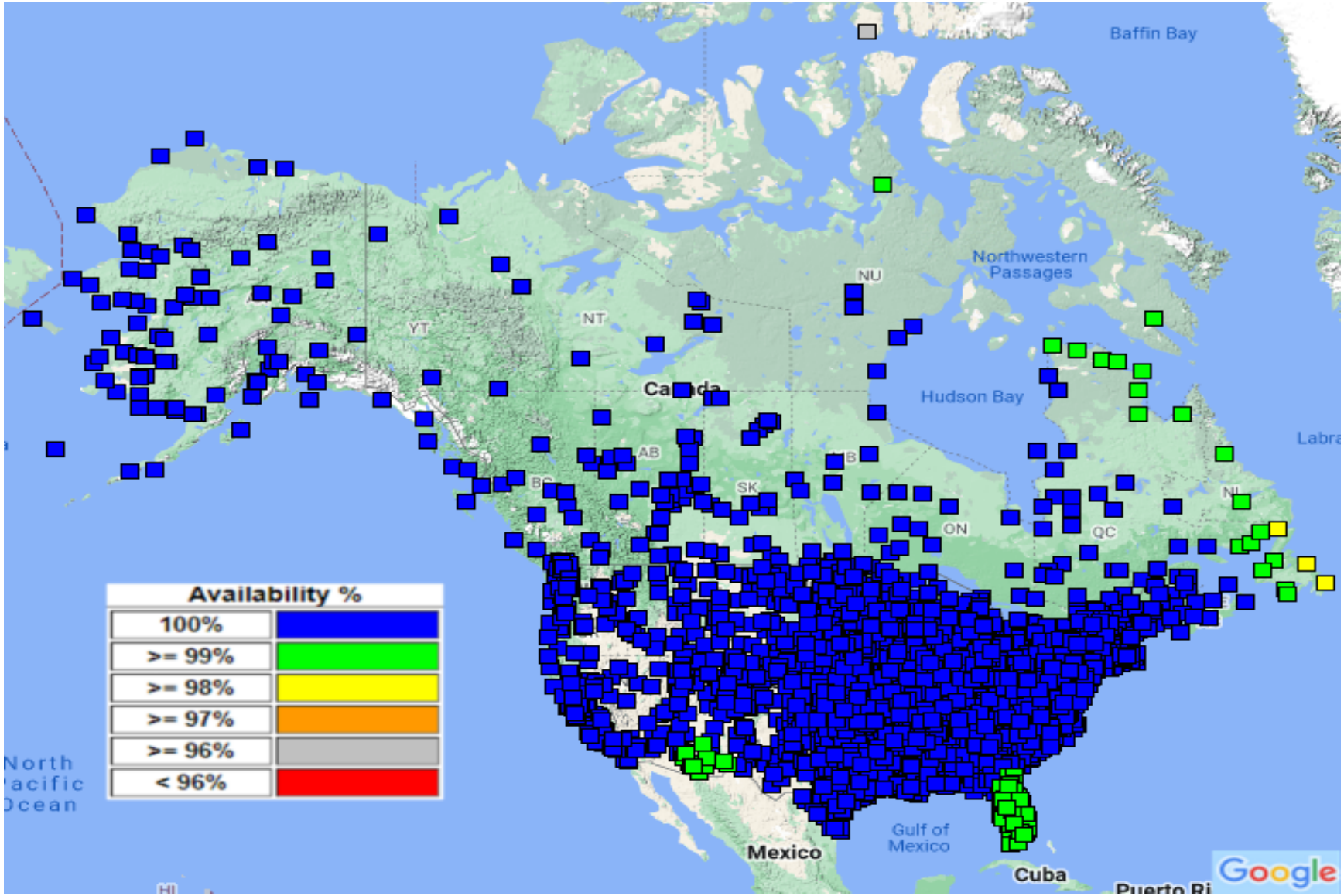

Figure 8-3. WAAS LPV Availability Airports in the U.S. and Canada With GPS RNAV IAPs

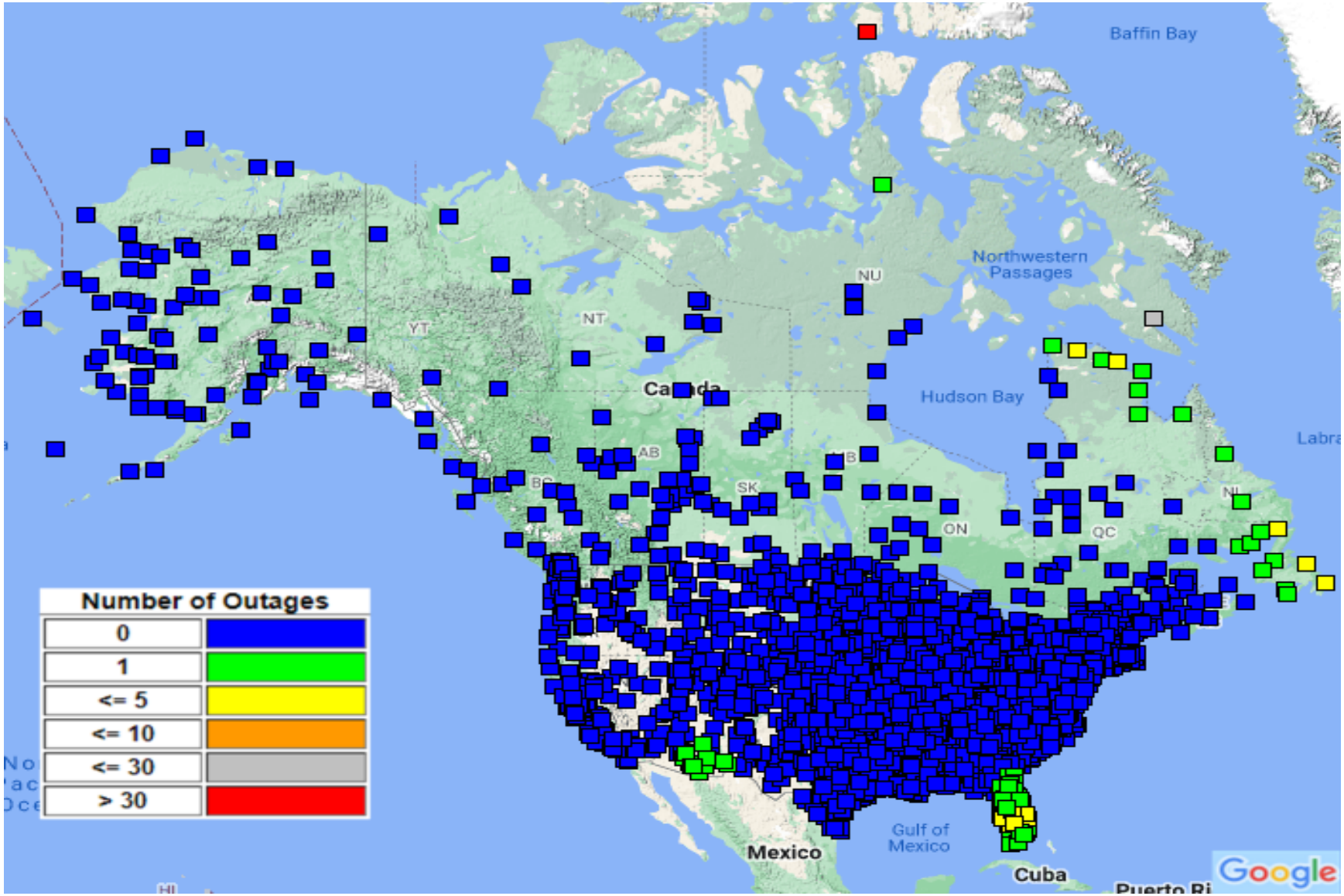

Figure 8-4. WAAS LPV Outages at Airports in the U.S. and Canada With GPS RNAV IAPs

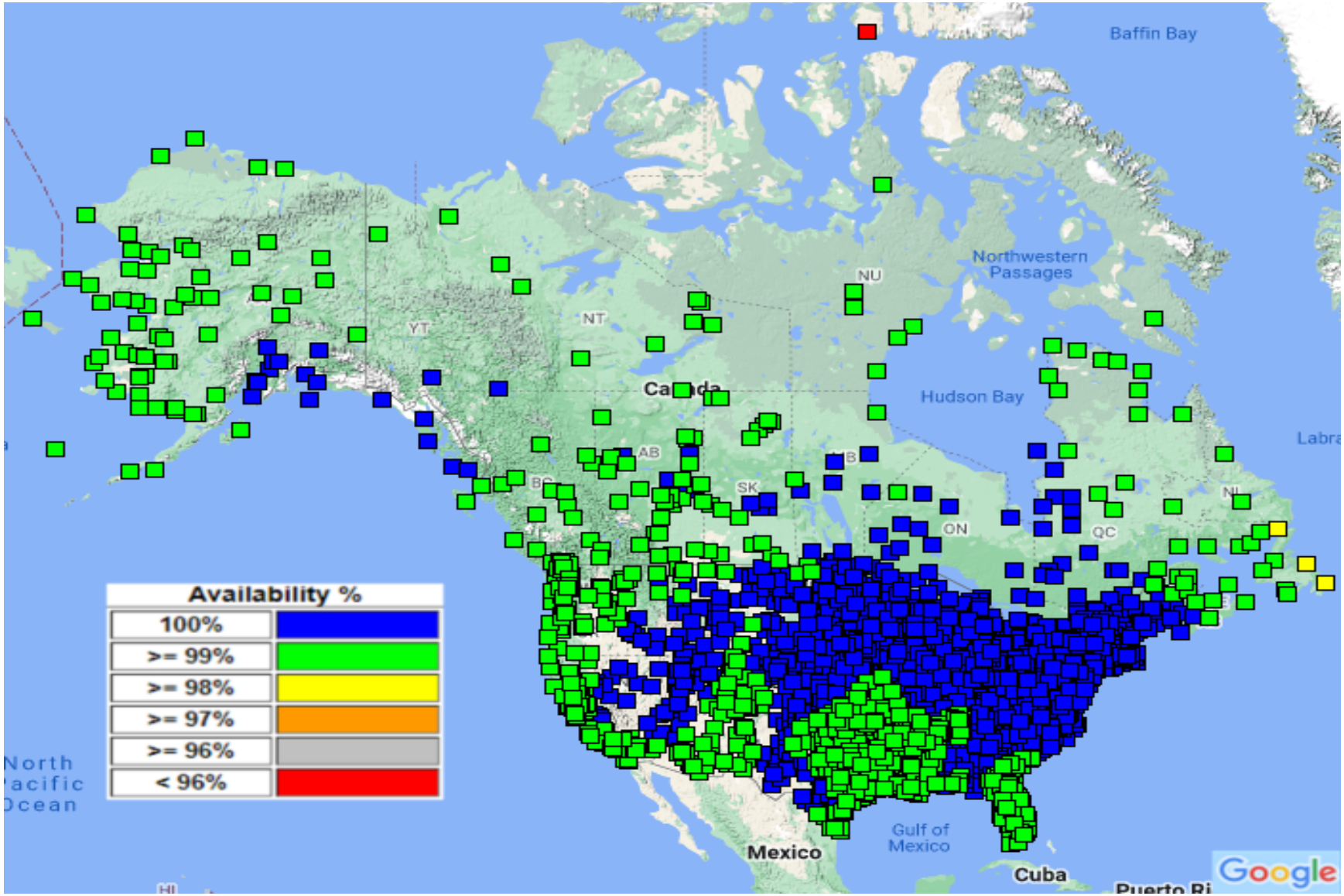

Figure 8-5. WAAS LPV200 Availability at Airports in the U.S. and Canada With GPS RNAV IAPs

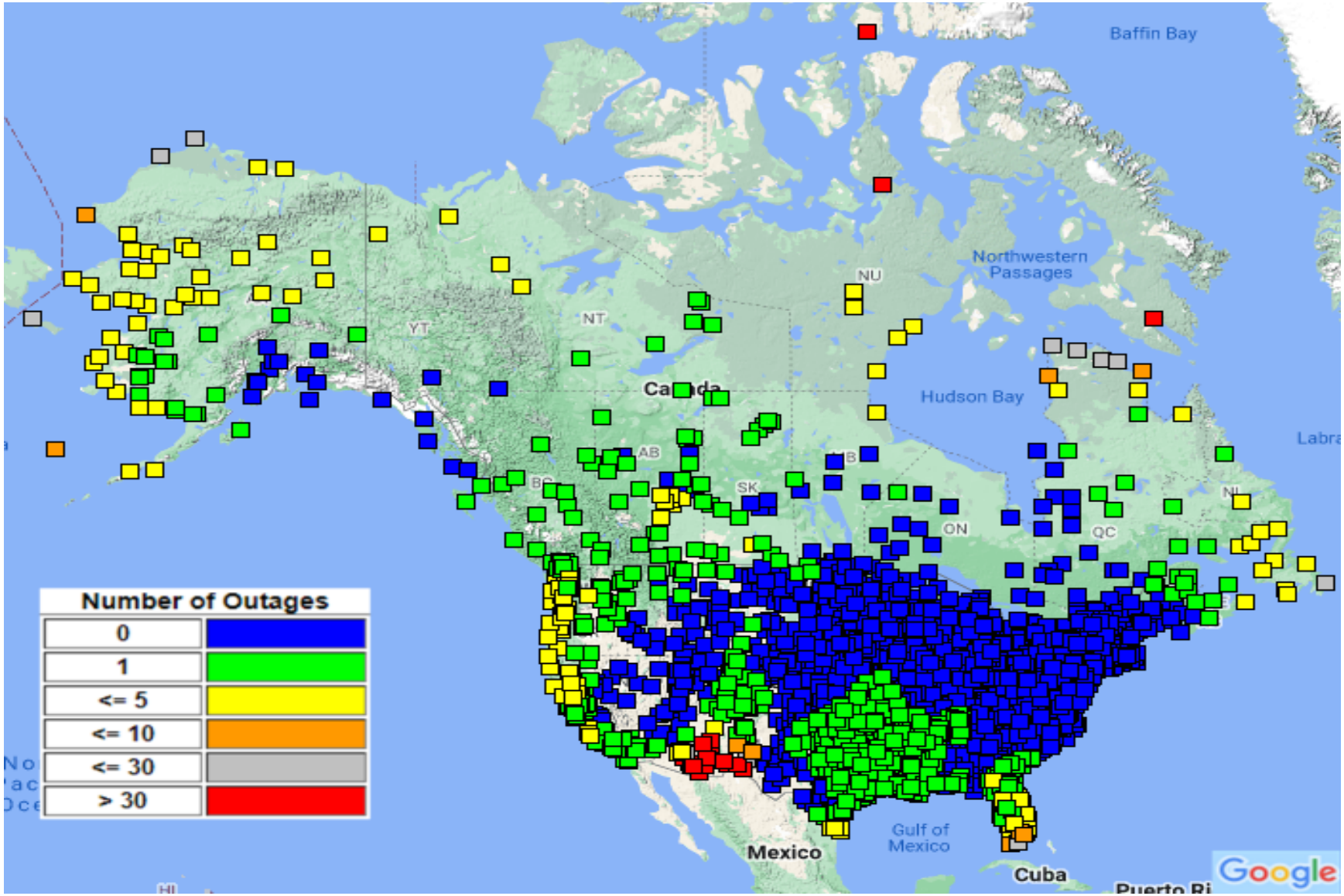

Figure 8-6. WAAS LPV200 Outages at Airports in the U.S. and Canada With GPS RNAV IAPs

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. Table 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.

Table 9-1. CNMP Bounding Statistics

WAAS Site	WRE	Jul 21	Aug 21	Sep 21	Oct 21	Nov 21	Dec 21	Jan 22	Feb 22	Mar 22	Apr 22	May 22	Jun 22
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	Jul 21	Aug 21	Sep 21	Oct 21	Nov 21	Dec 21	Jan 22	Feb 22	Mar 22	Apr 22	May 22	Jun 22
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 07/01/2022. Mexico City Thread B (MMX2), Puerto Vallarta Thread B (MPR2), Goose Bay Thread A (YYR1), and Salt Lake City Thread B (ZLC2) are excluded from this since they were out of service within a week of the surveyed date. 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 National Geodetic Survey (NGS) Online Positioning User Service (OPUS) and the Canadian Spatial Reference System (CSRS) Precise Point Positioning (PPP) service. The IGS08 reference frame is used for the OPUS solutions. A value of -0.4445 meters was used for the antenna reference point (ARP) to antenna phase center (APC) offset for the MicroPulse MPL-WAAS-2225W WAAS antennas in the processing of the data.

The OPUS-reported RMS quality metrics were 25cm or less. The CSRS surveys' RSSs of the reported ECEF sigmas were 11.9 mm or less. The OPUS and CSRS surveys agreed to an average of 8.8mm with a standard deviation of 5.0 mm. The maximum of difference was 2.4 cm at Bethel Thread A (BET1).

The OPUS positions were compared to the positions computed by the WAAS C&Vs. The survey was completed on July 1, 2022. The OPUS surveys agree with the calculated positions to better or equal to 1.6cm for most sites. The maximum difference was 4.5 cm at Cold Bay Thread C (CDB3).

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

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 C&V computed positions. Figure 10-4 to Figure 10-6 show the OPUS surveys overall RMS quality indications.

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

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.

Table 10-1. WAAS Antenna Positions (OPUS IGS08) as of 04/02/2017

WRE	X(m)	Y(m)	Z(m)	LATITUDE	LONGITUDE	H(m)
BET1	-2965385.237	-972576.64	5543892.792	60.7879135	161.8417257	52.182
BET2	-2965386.0	-972580.364	5543891.723	60.7878941	161.8416651	52.169
BET3	-2965388.576	-972577.51	5543890.865	60.7878781	161.8417296	52.181
BIL1	-1416446.01	-4223577.022	4550862.08	45.8037061	108.5397246	1112.224
BIL2	-1416450.091	-4223574.879	4550862.805	45.8037154	108.5397831	1112.232
BIL3	-1416441.71	-4223574.276	4550865.941	45.8037559	108.5396834	1112.224
BRW1	-1886759.114	-809058.699	6018494.401	71.2827631	156.7899259	15.561
BRW2	-1886756.52	-809055.966	6018495.569	71.2827958	156.7899675	15.557
BRW3	-1886755.437	-809059.74	6018495.405	71.2827912	156.7898588	15.559
CDB1	-3484099.236	-1084748.812	5213678.51	55.1923722	162.7064051	49.704
CDB2	-3484105.869	-1084741.617	5213675.56	55.1923261	162.7065439	49.676
CDB3	-3484112.153	-1084734.841	5213672.813	55.1922826	162.7066748	49.696
FAI1	-2304742.014	-1448715.346	5748843.672	64.8096283	147.8473419	150.012
FAI2	-2304741.555	-1448706.536	5748846.071	64.8096786	147.8474938	150.022
FAI3	-2304733.028	-1448707.471	5748849.228	64.8097453	147.8473816	150.018
JNU1	-2354255.132	-2388549.706	5407043.174	58.3625733	134.5857092	16.26
JNU2	-2354253.048	-2388565.823	5407037.01	58.3624677	134.5854906	16.266
JNU3	-2354239.829	-2388568.673	5407041.467	58.3625441	134.5852956	16.258
MMD1	35070.336	-5959686.64	2264365.758	20.9319093	89.6628415	29.09
MMD2	35065.412	-5959687.028	2264364.985	20.9319016	89.6628888	29.15
MMD3	35065.075	-5959685.24	2264369.645	20.9319467	89.662892	29.143
MMX1	-948700.755	-5943932.985	2109211.814	19.4316539	99.0683904	2232.807
MMX2						
MMX3	-948705.184	-5943933.171	2109209.398	19.4316306	99.0684317	2232.834
MPR1	-1570142.289	-5759530.578	2238184.735	20.6790032	105.2492039	10.964
MPR2						
MPR3	-1570143.571	-5759527.97	2238190.55	20.6790593	105.2492223	10.979
MSD1	-1979520.178	-5523222.806	2493106.997	23.1604489	109.7176531	104.294
MSD2	-1979521.745	-5523225.133	2493100.591	23.1603861	109.7176598	104.275
MSD3	-1979526.192	-5523221.873	2493104.269	23.1604222	109.7177115	104.279
MTP1	-254854.394	-6162909.12	1617805.079	14.7913662	92.3679996	54.902
MTP2	-254850.77	-6162910.167	1617801.649	14.7913342	92.3679655	54.893

WRE	X(m)	Y(m)	Z(m)	LATITUDE	LONGITUDE	H(m)
MTP3	-254855.547	-6162910.277	1617800.129	14.7913202	92.3680098	54.802
OTZ1	-2396056.213	-750356.212	5843502.408	66.8873302	162.6113731	10.865
OTZ2	-2396053.039	-750354.382	5843503.929	66.887365	162.6113913	10.86
OTZ3	-2396053.02	-750358.323	5843503.443	66.8873537	162.6113054	10.868
YFB1	1035381.267	-2634289.673	5696539.597	63.731491	68.5431871	10.062
YFB2	1035372.05	-2634296.09	5696538.233	63.7314647	68.5434082	9.99
YFB3	1035365.975	-2634306.852	5696534.461	63.731387	68.5436024	10.057
YQX1	2430424.486	-3419640.421	4788223.913	48.9664909	54.597634	146.899
YQX2	2430432.43	-3419639.073	4788220.86	48.9664491	54.5975349	146.895
YQX3	2430440.337	-3419637.712	4788217.859	48.9664079	54.5974362	146.911
YWG1	-520164.566	-4083475.985	4855842.995	49.9005736	97.2594002	222.11
YWG2	-520150.692	-4083468.919	4855850.387	49.9006767	97.259221	222.121
YWG3	-520152.565	-4083478.039	4855842.562	49.9005675	97.2592308	222.115
YYR1						
YYR2	1885344.221	-3321419.908	5091176.155	53.3087143	60.4193692	37.887
YYR3	1885339.94	-3321413.096	5091182.159	53.3088044	60.4193746	37.899
ZAB1	-1488636.97	-5003946.534	3654557.663	35.1735749	106.5673512	1620.125
ZAB2	-1488631.632	-5003948.218	3654557.637	35.1735742	106.5672897	1620.185
ZAB3	-1488632.414	-5003950.807	3654553.782	35.1735318	106.5672899	1620.175
ZAN1	-2659536.781	-1549114.689	5567750.729	61.2292011	149.7802535	80.706
ZAN2	-2659548.539	-1549110.736	5567746.238	61.2291174	149.7804273	80.702
ZAN3	-2659541.493	-1549106.62	5567750.706	61.2292009	149.7804274	80.691
ZAU1	138703.966	-4761244.128	4227763.922	41.7826581	88.3313385	195.868
ZAU2	138704.232	-4761248.746	4227758.756	41.7825957	88.3313369	195.874
ZAU3	138710.938	-4761248.484	4227758.84	41.7825966	88.3312562	195.88
ZBW1	1490299.071	-4448983.184	4306010.529	42.7357209	71.4804276	39.111
ZBW2	1490304.182	-4448981.166	4306010.871	42.735725	71.4803606	39.13
ZBW3	1490305.893	-4448984.798	4306006.564	42.7356721	71.4803549	39.136
ZDC1	1069125.619	-4839598.987	4001126.522	39.1015962	77.5427482	80.049
ZDC2	1069128.015	-4839603.614	4001120.315	39.1015242	77.5427326	80.041
ZDC3	1069123.916	-4839602.7	4001122.514	39.1015496	77.5427766	80.049
ZDV1	-1273628.75	-4711375.572	4094890.069	40.1873028	105.127226	1541.354
ZDV2	-1273623.047	-4711377.088	4094890.082	40.187303	105.1271567	1541.344

WRE	X(m)	Y(m)	Z(m)	LATITUDE	LONGITUDE	H(m)
ZDV3	-1273625.06	-4711380.282	4094885.793	40.1872525	105.1271697	1541.333
ZFW1	-659983.315	-5324060.776	3438276.449	32.8306495	97.066473	155.618
ZFW2	-659988.589	-5324063.326	3438271.451	32.8305961	97.0665256	155.58
ZFW3	-659983.613	-5324063.849	3438271.652	32.8305981	97.0664721	155.61
ZHN1	-5508637.219	-2234492.695	2303722.523	21.3129934	157.9208335	24.677
ZHN2	-5508656.387	-2234483.01	2303687.274	21.3126505	157.9209894	25.021
ZHN3	-5508647.793	-2234496.949	2303694.367	21.3127191	157.9208338	25.061
ZHU1	-513864.57	-5506451.625	3166720.421	29.9618963	95.3314274	10.762
ZHU2	-513867.219	-5506455.029	3166714.259	29.9618317	95.3314514	10.834
ZHU3	-513873.505	-5506457.67	3166708.664	29.9617735	95.3315137	10.824
ZJX1	772646.332	-5434462.193	3237231.757	30.6988598	81.9081863	2.133
ZJX2	772649.663	-5434463.751	3237228.364	30.6988242	81.9081541	2.131
ZJX3	772645.598	-5434466.169	3237225.251	30.6987917	81.9081997	2.108
ZKC1	-415247.648	-4954556.378	3982161.099	38.8801593	94.7908354	305.887
ZKC2	-415231.254	-4954557.698	3982161.152	38.88016	94.7906458	305.879
ZKC3	-415237.375	-4954561.045	3982155.955	38.8801018	94.7907129	305.611
ZLA1	-2474410.139	-4637294.487	3602183.593	34.603519	118.0838981	763.506
ZLA2	-2474404.857	-4637297.285	3602183.597	34.6035191	118.083833	763.494
ZLA3	-2474411.466	-4637296.975	3602179.617	34.603475	118.0838981	763.569
ZLC1	-1808273.366	-4486410.818	4145302.973	40.7860427	111.9521792	1287.442
ZLC2						
ZLC3	-1808270.547	-4486416.147	4145298.475	40.7859891	111.9521247	1287.448
ZMA1	966042.198	-5662999.814	2761581.529	25.8246125	80.3191908	-7.598
ZMA2	966029.223	-5662999.111	2761586.014	25.8246603	80.3193172	-8.232
ZMA3	966037.3	-5662997.938	2761586.362	25.8246623	80.3192358	-7.899
ZME1	4070.768	-5226189.288	3644028.415	35.0673941	89.9553713	68.591
ZME2	4070.797	-5226186.737	3644032.531	35.0674377	89.955371	68.868
ZME3	4064.603	-5226186.608	3644032.684	35.0674395	89.9554389	68.846
ZMP1	-249978.521	-4539297.483	4458955.017	44.6374631	93.1520872	262.623
ZMP2	-249972.72	-4539297.825	4458955.014	44.6374629	93.152014	262.637
ZMP3	-249973.819	-4539302.1	4458950.533	44.6374069	93.1520249	262.569
ZNY1	1406144.488	-4627343.971	4144322.109	40.7843293	73.0971673	6.442
ZNY2	1406146.291	-4627347.022	4144317.306	40.7842763	73.0971574	5.912

WRE	X(m)	Y(m)	Z(m)	LATITUDE	LONGITUDE	H(m)
ZNY3	1406140.73	-4627348.679	4144317.344	40.7842767	73.0972261	5.913
ZOA1	-2684437.08	-4293337.202	3865351.938	37.5430548	122.015951	-3.505
ZOA2	-2684434.07	-4293341.28	3865349.512	37.5430272	122.0158977	-3.507
ZOA3	-2684438.448	-4293342.168	3865345.662	37.5429828	122.0159343	-3.416
ZOB1	650770.038	-4754715.654	4187420.743	41.2971546	82.2064464	223.648
ZOB2	650777.72	-4754714.834	4187422.766	41.297167	82.2063542	225.156
ZOB3	650776.048	-4754719.657	4187414.973	41.2970872	82.2063818	223.432
ZSE1	-2308930.366	-3668169.66	4663526.416	47.2869926	122.188374	82.08
ZSE2	-2308934.758	-3668175.21	4663520.008	47.286907	122.188384	82.144
ZSE3	-2308935.822	-3668179.487	4663516.068	47.2868553	122.1883658	82.089
ZSU1	2462589.485	-5529372.05	2003724.59	18.4313369	65.9934761	-28.105
ZSU2	2462587.55	-5529377.42	2003712.297	18.4312198	65.9935135	-28.084
ZSU3	2462594.177	-5529375.161	2003710.217	18.4312001	65.9934475	-28.142
ZTL1	529840.286	-5305248.807	3489342.858	33.3796887	84.2967273	261.127
ZTL2	529846.664	-5305247.968	3489343.141	33.3796918	84.2966582	261.115
ZTL3	529847.348	-5305251.412	3489337.909	33.3796351	84.2966545	261.155

Figure 10-1 through Figure 10-3 show the RSS of the ECEF differences between the OPUS survey antenna phase center locations and the locations in the Build WE7.164c software. Figure 10-4 through Figure 10-6 shows the OPUS surveys overall RMS quality indications.

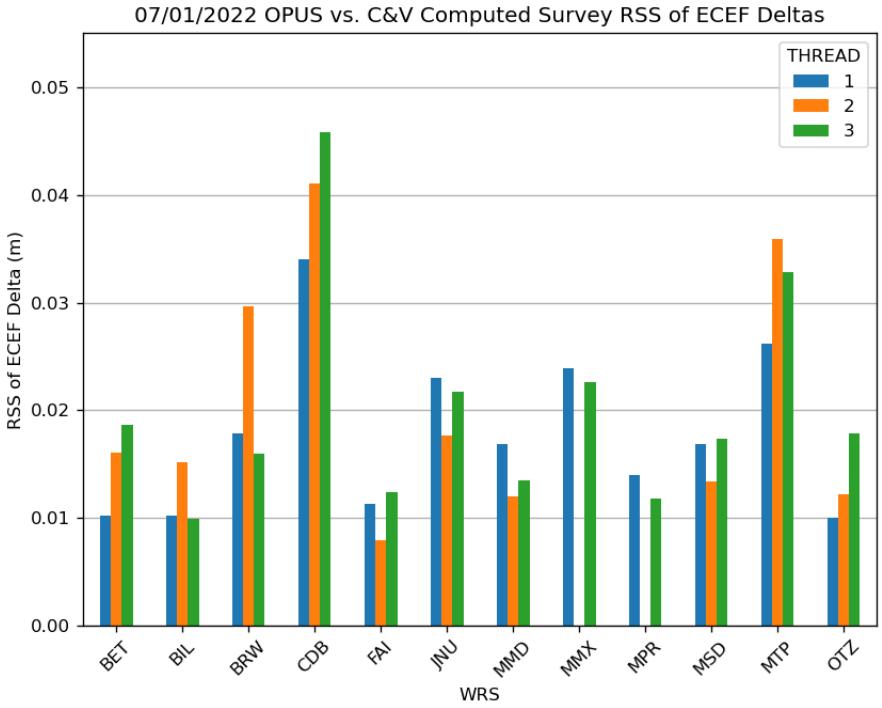

Figure 10-1. Build WE7.164c Antenna Positions Deltas OPUS Survey

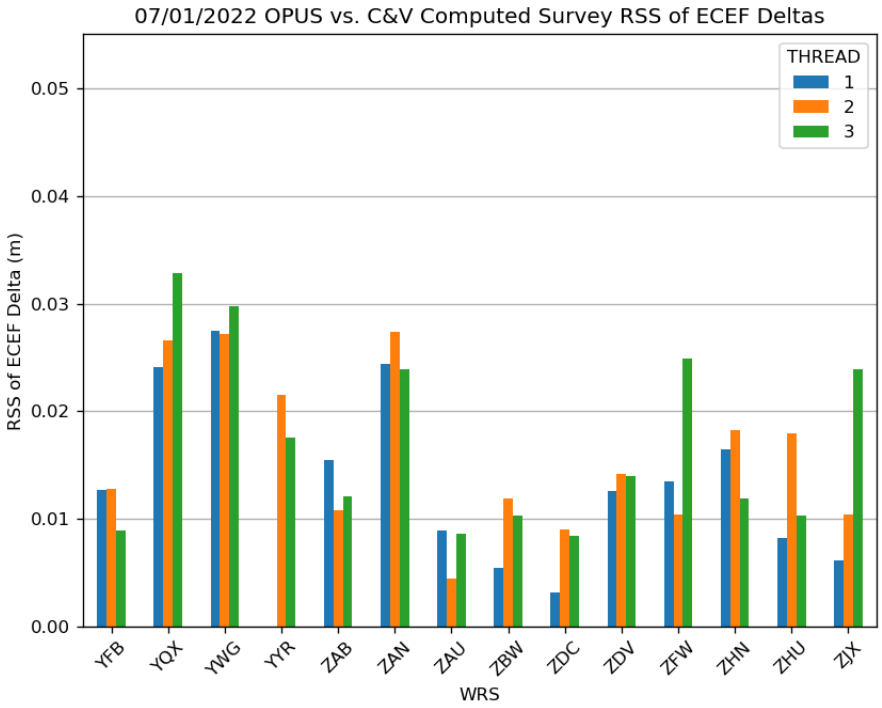

Figure 10-2. Build WE7.164c Antenna Positions Deltas OPUS Survey

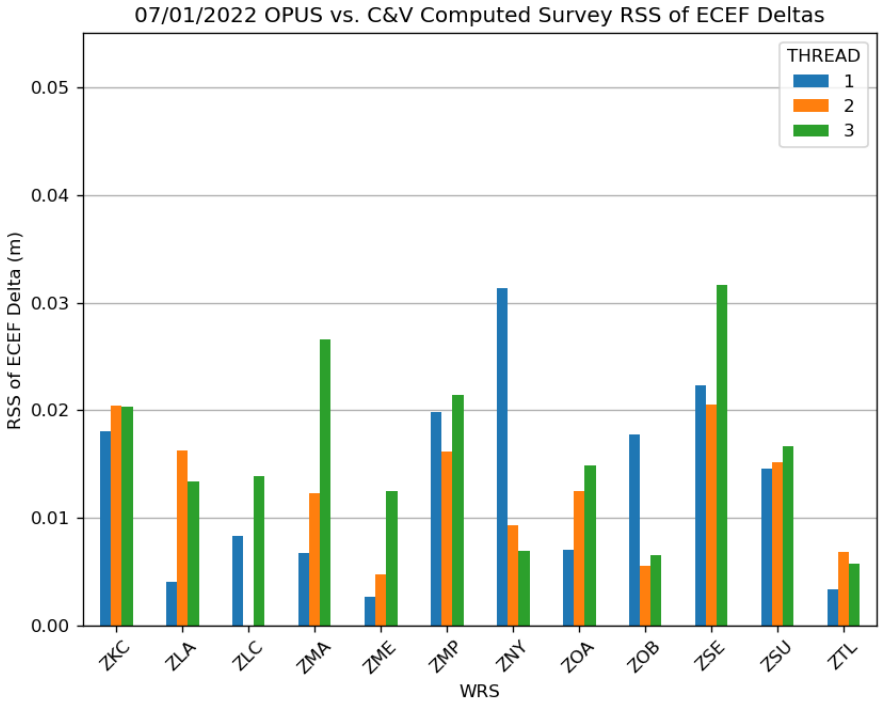

Figure 10-3. Build WE7.164c Antenna Positions Deltas OPUS Survey

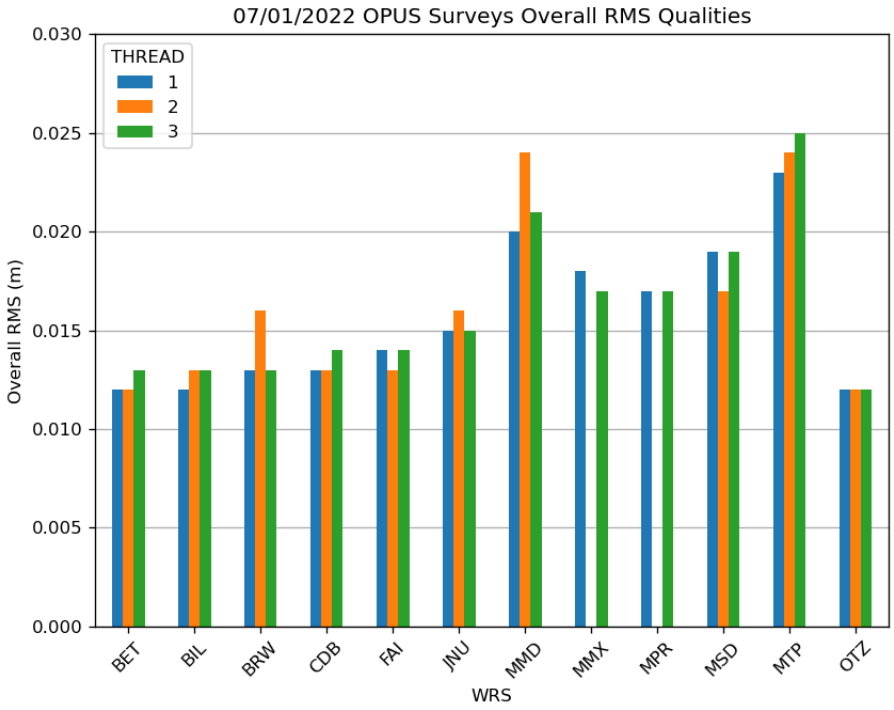

Figure 10-4. OPUS Survey Overall RMS Qualities

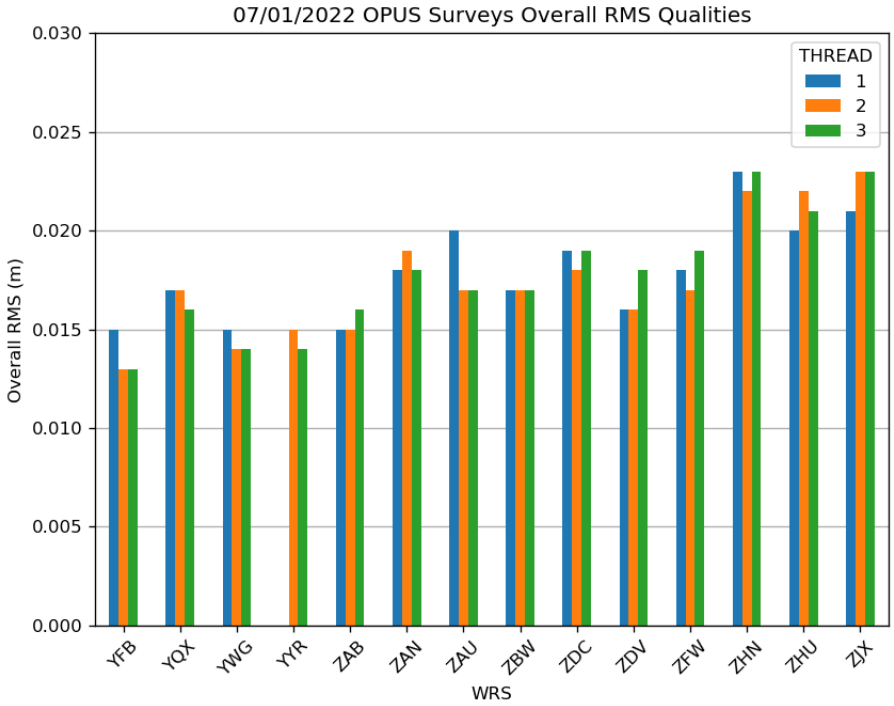

Figure 10-5. OPUS Survey Overall RMS Qualities

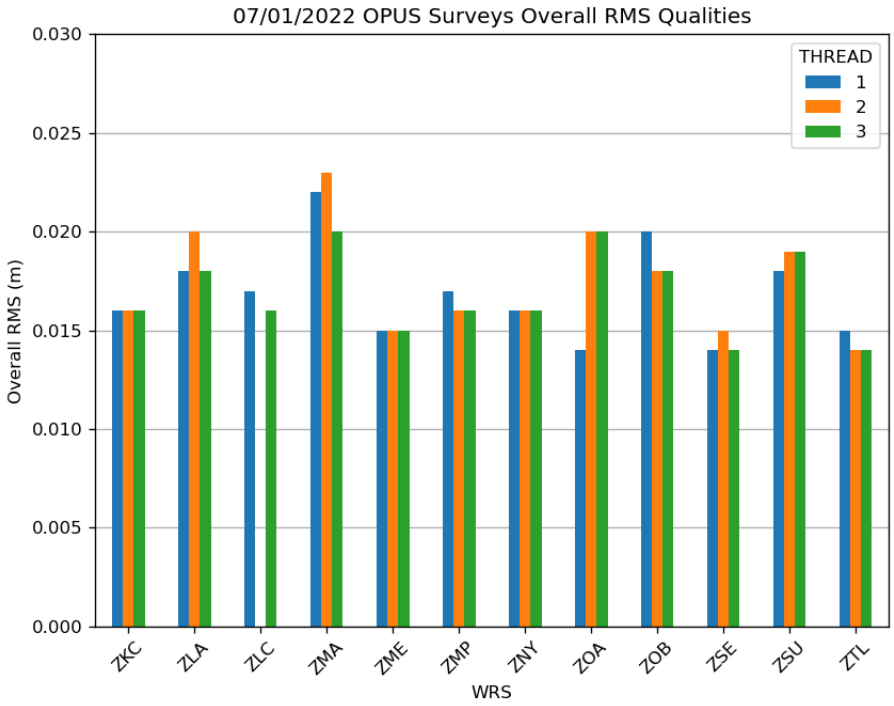

Figure 10-6. OPUS Survey Overall RMS Qualities

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 through 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.

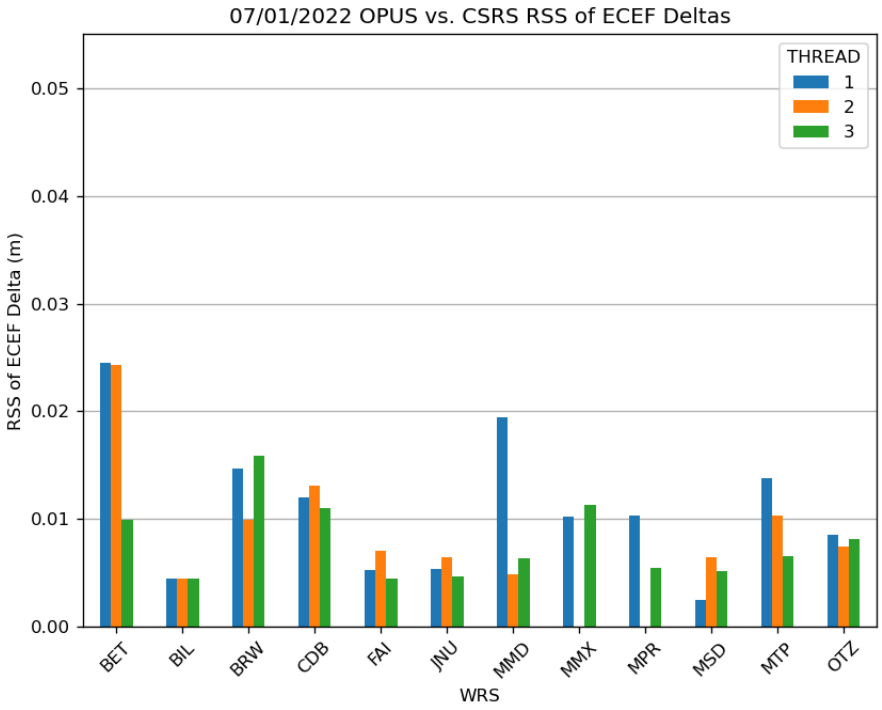

Figure 10-7. OPUS vs. CSRS RSS ECEF Deltas

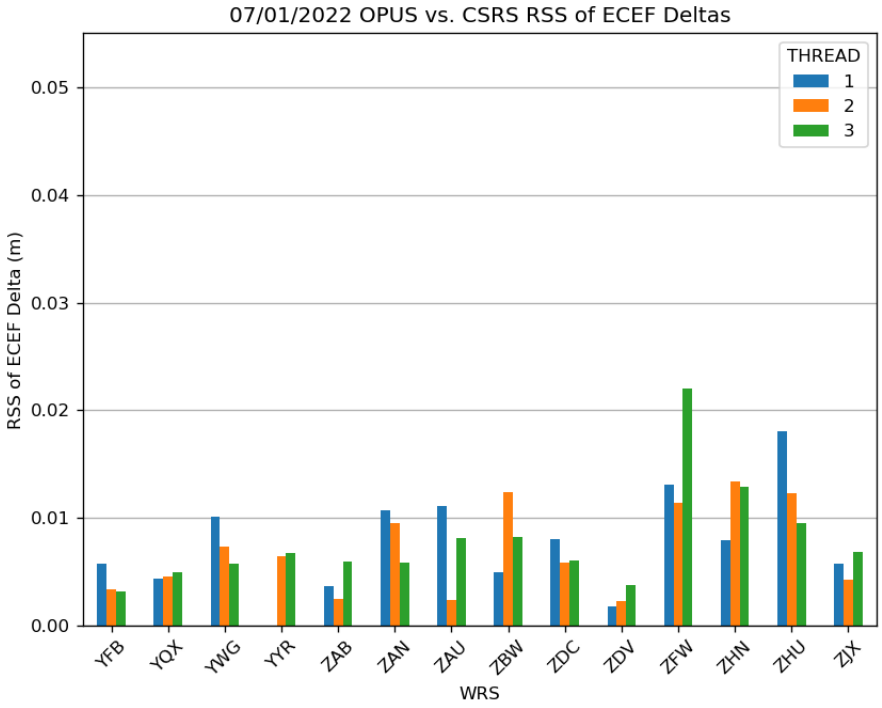

Figure 10-8. OPUS vs. CSRS RSS ECEF Deltas

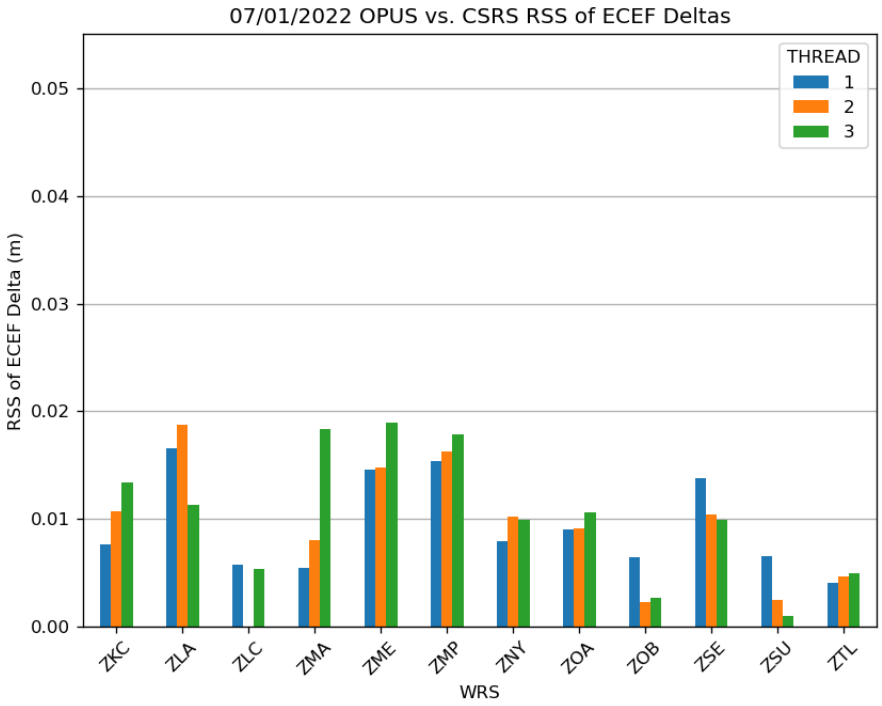

Figure 10-9. OPUS vs. CSRS RSS ECEF Deltas

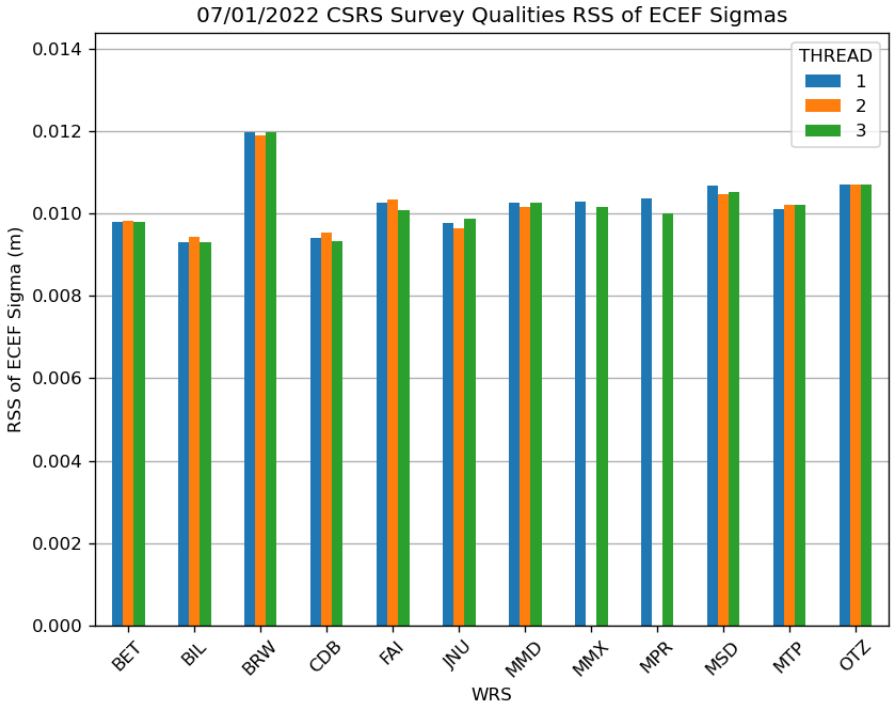

Figure 10-10. CSRS Survey Qualities

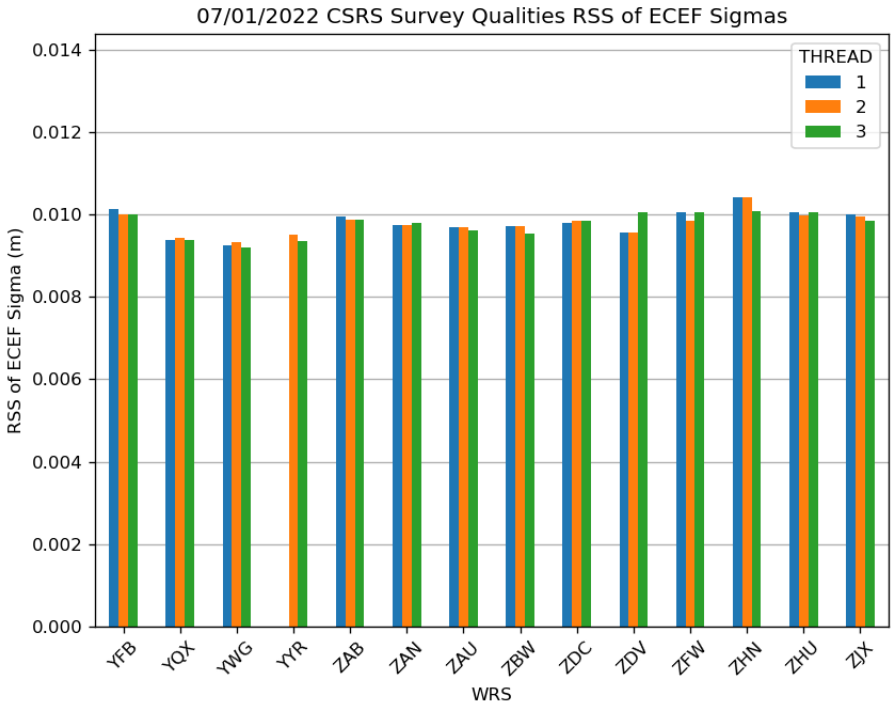

Figure 10-11. CSRS Survey Qualities

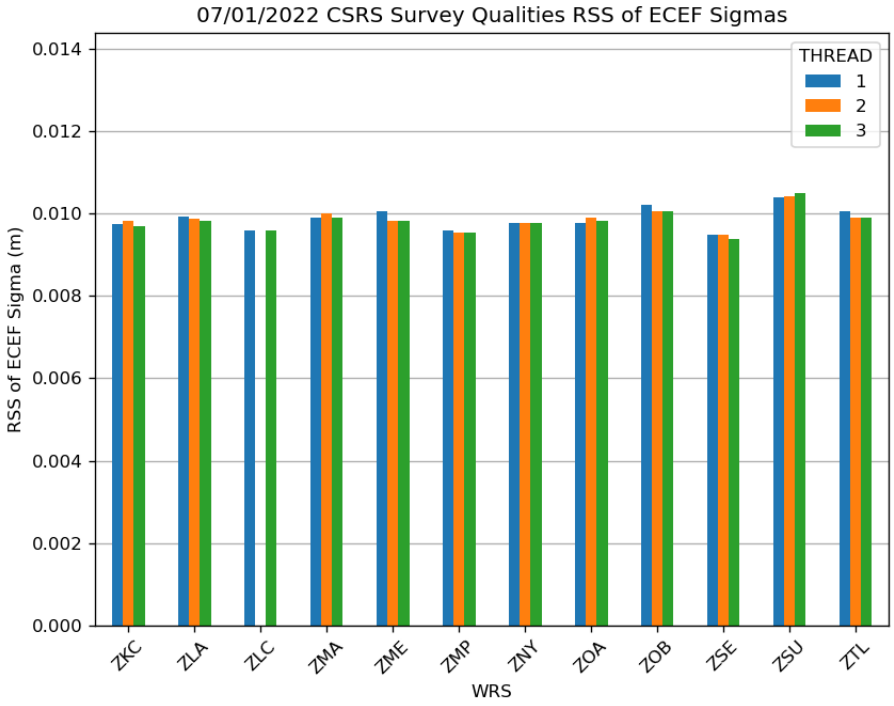

Figure 10-12. CSRS Survey Qualities

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.

There were no noticeable changes in type bias observed during this quarter.

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	1.31746	1.31934	1.32132
DM 2	0.243294	0.246369	0.249493
DM 3	0.972678	0.973152	0.973793
DM 4	-0.188092	-0.189922	-0.191909

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

Detection Metric	Type 0	Type 1	Type 2
DM 1	1.31918	1.32139	1.32313
DM 2	0.241931	0.245132	0.248269
DM 3	0.972983	0.973482	0.974054
DM 4	-0.187224	-0.188886	-0.1909

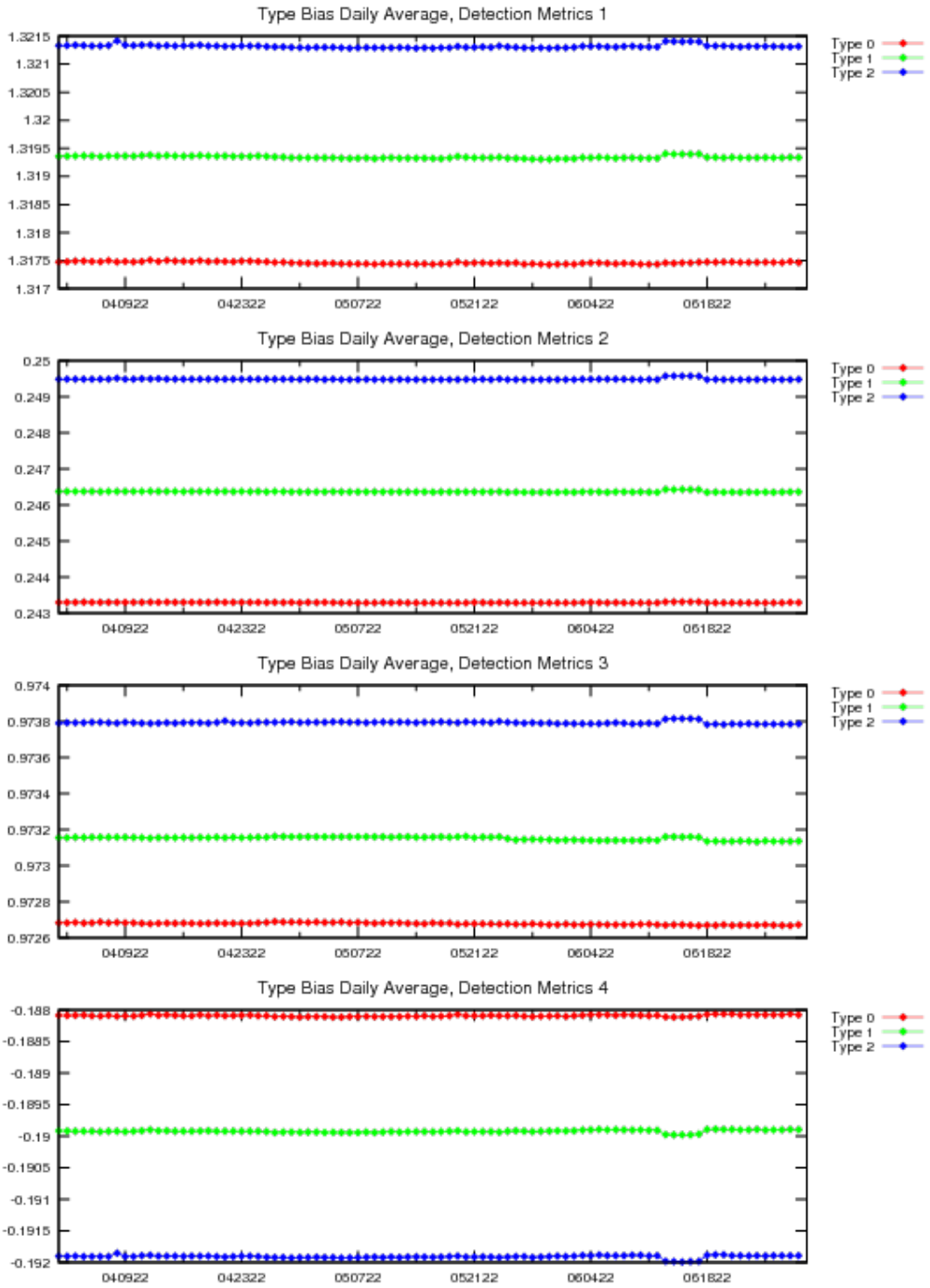

Figure 11-1. Type Bias Average Trend

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 follows: (1) the maximum average for DM1 is 0.0008494 observed on PRN22; (2) the maximum average for DM2 is 0.0002041 observed on PRN19; (3) the maximum average for DM3 is 0.0004566 observed on PRN18; (4) the maximum average for DM4 is 0.0004700 observed on PRN22.

Table 11-4. PRN Bias Average for the Quarter

PRN	DM 1	DM 2	DM 3	DM 4
1	0.000210709	9.04767e-05	4.46922e-05	0.000143206
2	0.000214597	6.01767e-05	9.98656e-05	0.000107842
3	0.000197902	5.734e-05	9.49778e-05	0.000134298
4	0.000722972	0.000262191	0.0003995	0.000253317
5	0.000171857	7.55278e-05	0.000110624	0.000112387
6	0.000614242	0.000100437	5.70978e-05	0.000230334
7	0.000164072	0.000118729	4.83733e-05	0.000121093
8	0.000353016	9.98711e-05	0.000117513	0.000170527
9	0.000231491	3.93222e-05	0.000160221	0.000178411
10	0.000187066	5.08956e-05	7.76544e-05	0.000173311
11	0.000333853	0.000147719	0.00038795	0.00033565
12	0.000311677	0.000102439	8.85267e-05	8.62522e-05
13	0.000632474	5.91433e-05	5.52756e-05	0.000275914
14	0.000480147	0.00019756	0.00040128	0.000272998
15	0.000351157	0.000115853	4.89656e-05	0.000101773
16	0.000223134	4.66044e-05	0.000118198	0.00020019
17	0.000386093	0.000111322	5.357e-05	8.40656e-05
18	0.000653198	0.000188317	0.000456608	0.000276771
19	0.000716473	0.000204084	8.46689e-05	0.000134854
20	0.000170017	6.64278e-05	4.67467e-05	0.000147908
21	0.00021822	8.94633e-05	0.000108071	0.000461252
22	0.000849368	7.50389e-05	5.86267e-05	0.000470038
23	0.000380037	0.000167414	0.000381433	0.000275019
24	0.000210837	8.49789e-05	0.000188738	0.000247346
25	0.000489481	9.12489e-05	4.25111e-05	0.000201086
26	0.000228891	0.000107731	0.000112484	0.000166859
27	0.000378839	0.000176671	0.000184132	0.000332182
28				
29	0.000298296	0.000118886	0.000159298	0.000272822
30	0.00033003	7.276e-05	0.000105404	9.69144e-05
31	0.00025836	8.59967e-05	8.50922e-05	0.000188728
32	0.000255004	5.16722e-05	5.93367e-05	0.000200536

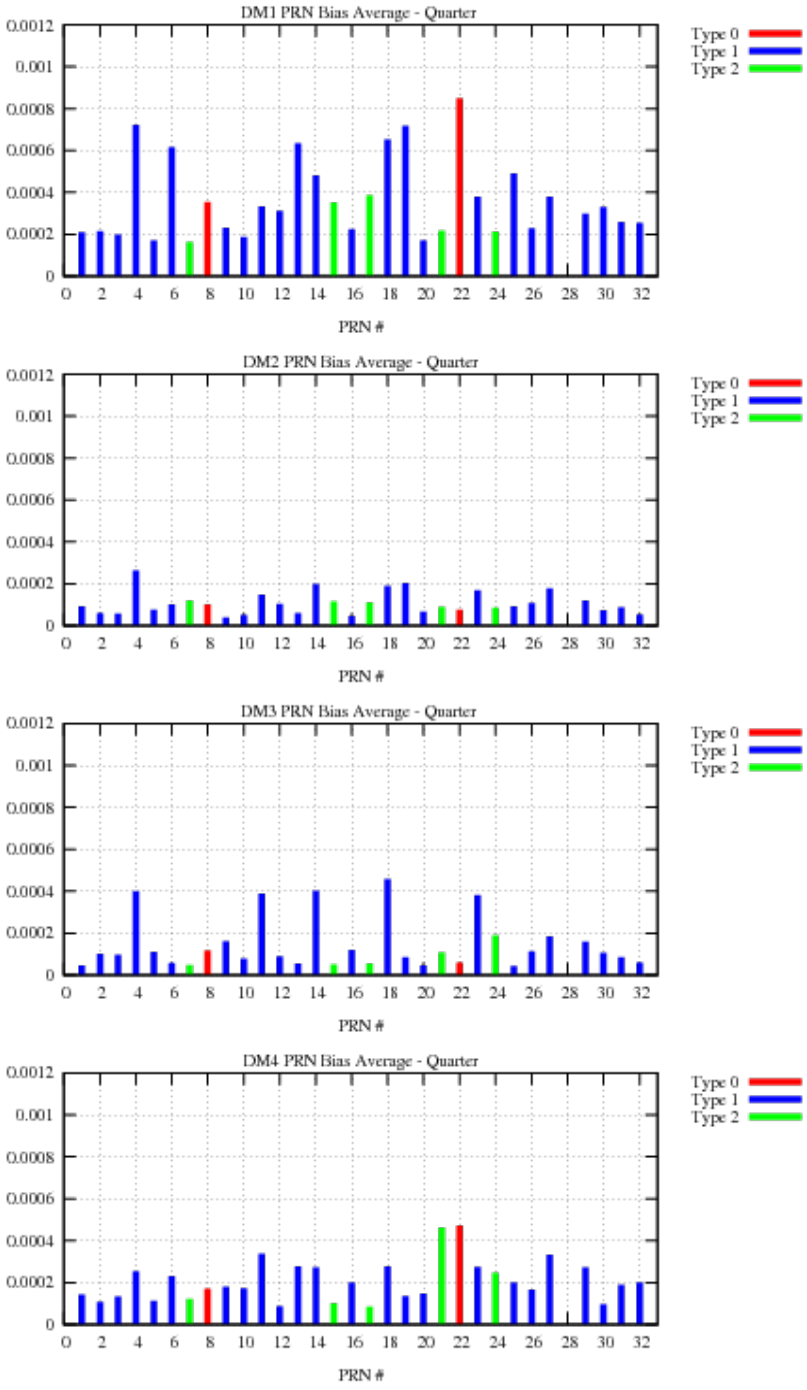

Figure 11-2. PRN Bias Average for the Quarter

Figure 11-3 to Figure 11-10 show the daily PRN bias for each PRN, for four detection metrics. Slight shifts in trend were likely due to the median metrics (taken across all SVs) shifting a bit more significantly with the addition of the GPS-III satellites. The median metrics are removed from the metrics of each satellite in the PRN bias computation, and the median metrics were fairly stable with the older GPS SVs but may differ a bit more with the addition of the GPS-IIIs satellites.

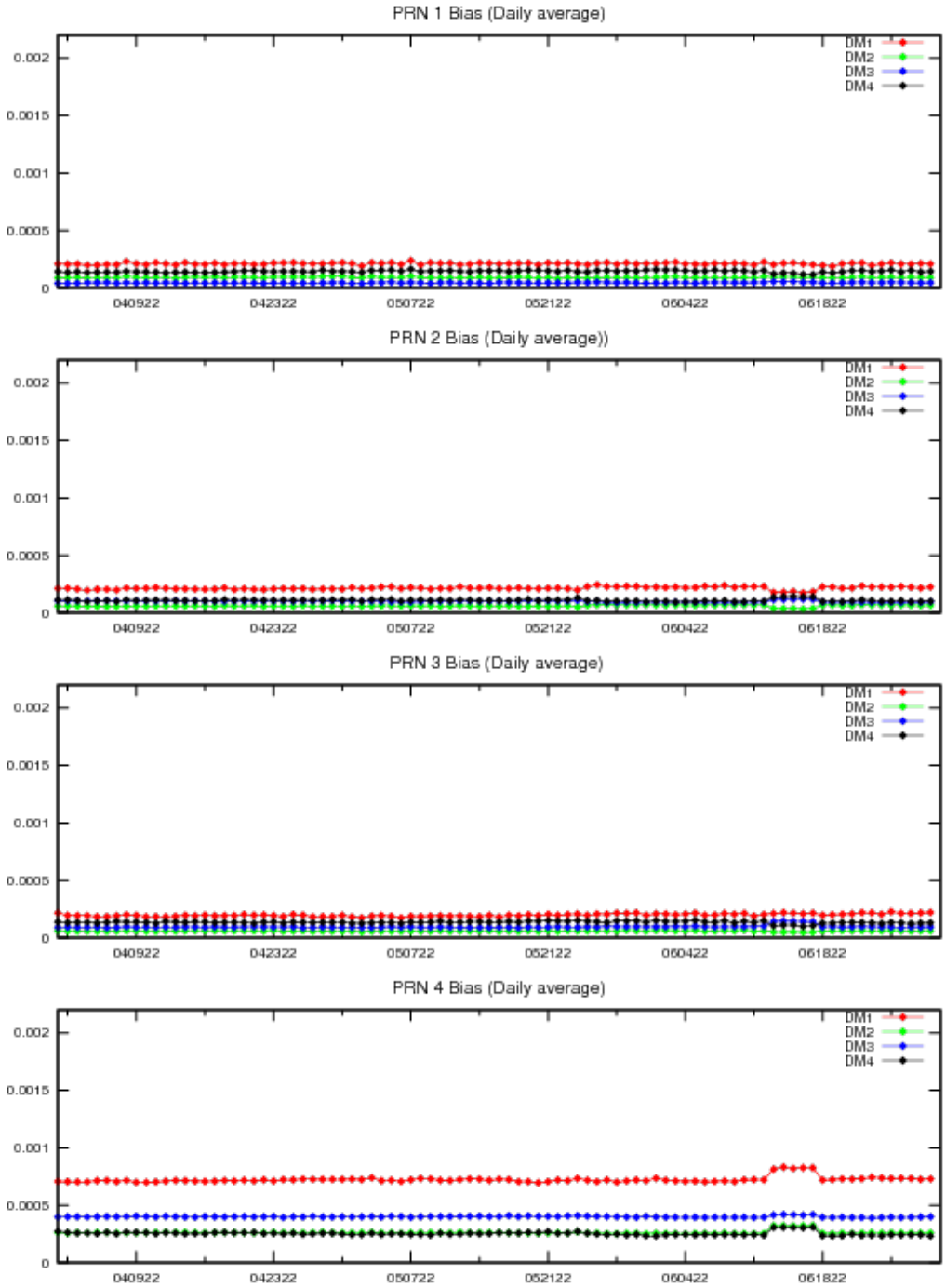

Figure 11-3. PRN Bias Average Trend (PRN1 – PRN4)

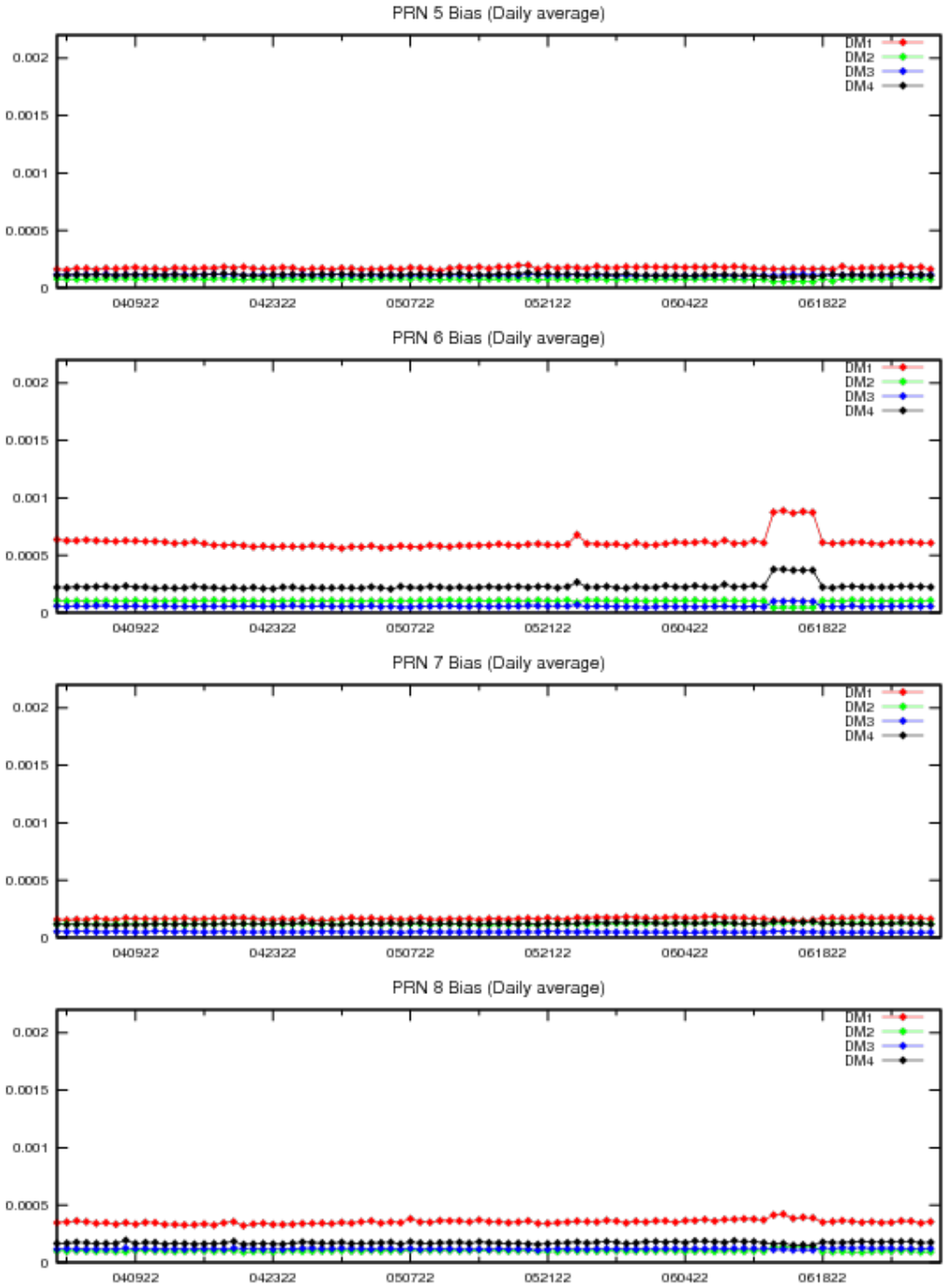

Figure 11-4. PRN Bias Average Trend (PRN5 – PRN8)

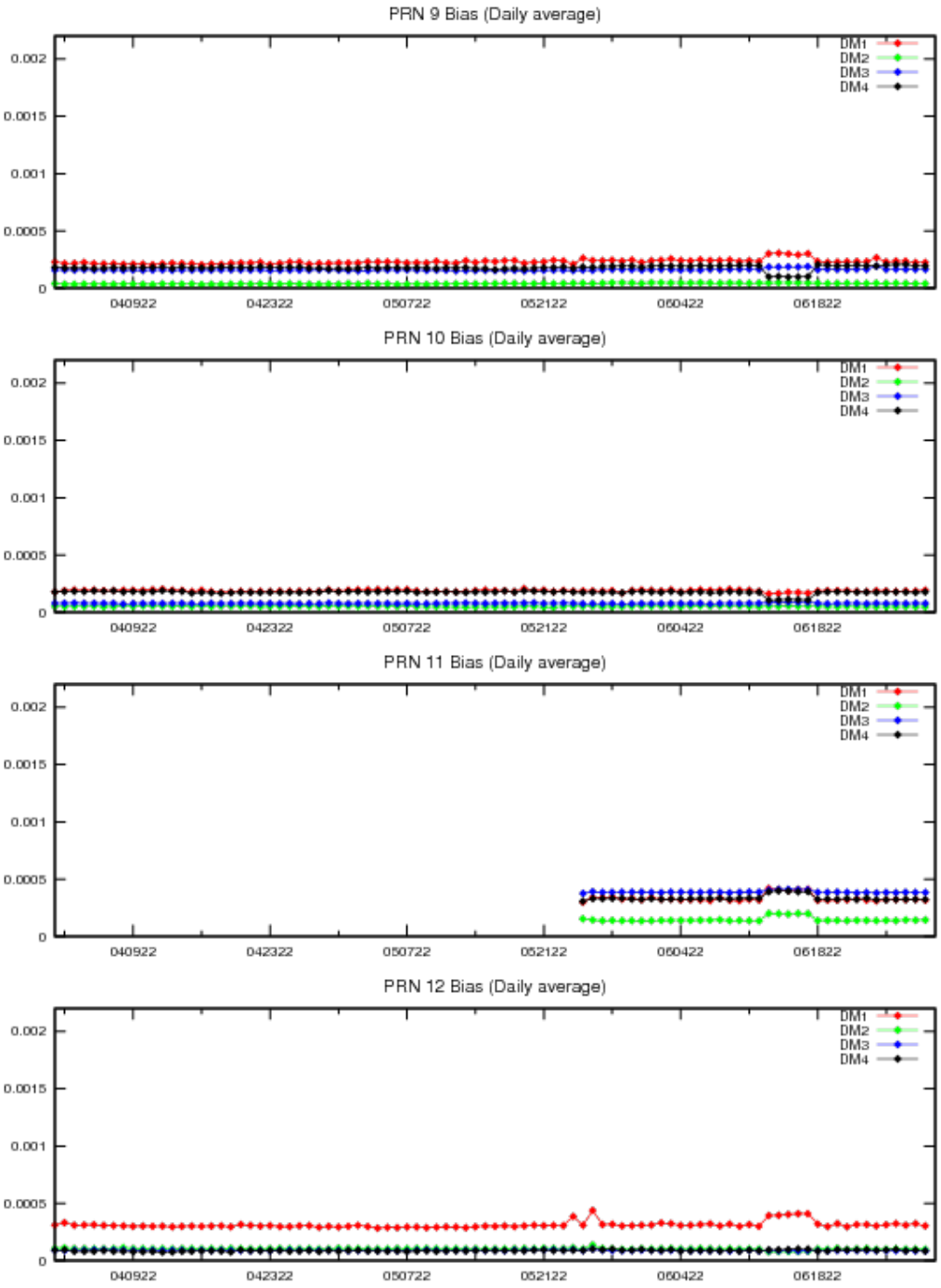

Figure 11-5. PRN Bias Average Trend (PRN9 – PRN12)

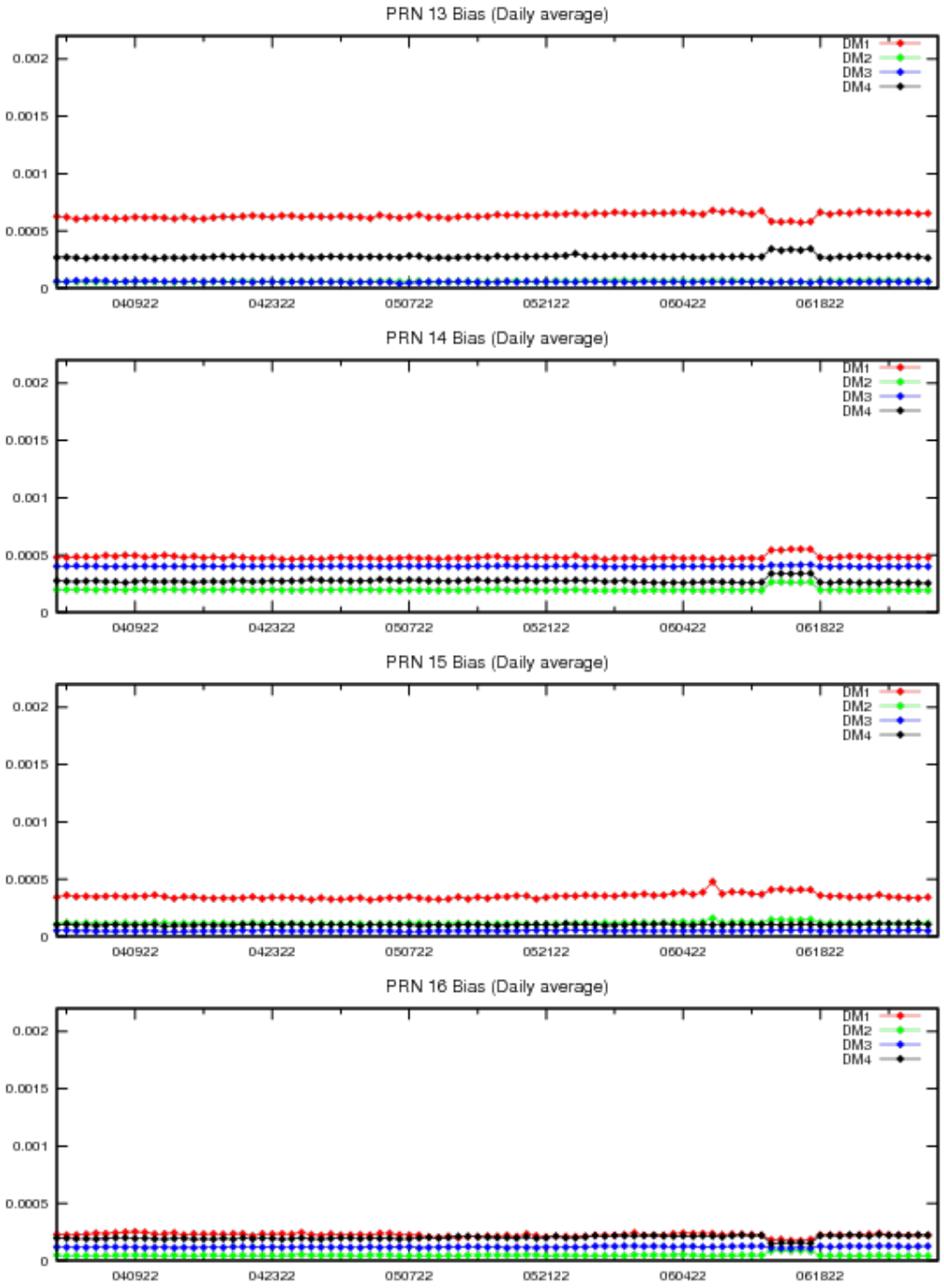

Figure 11-6. PRN Bias Average Trend (PRN13 – PRN16)

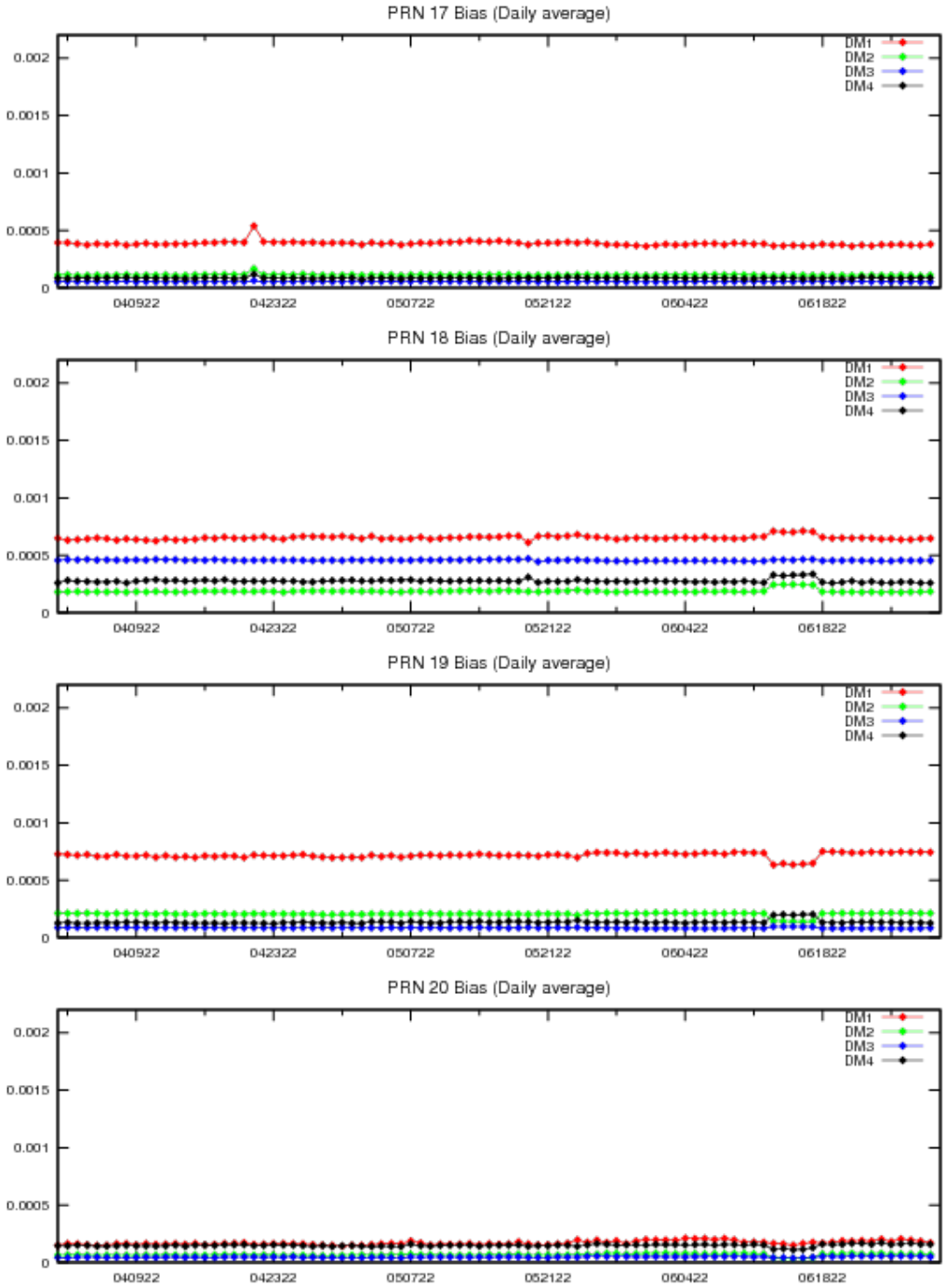

Figure 11-7. PRN Bias Average Trend (PRN17 – PRN20)

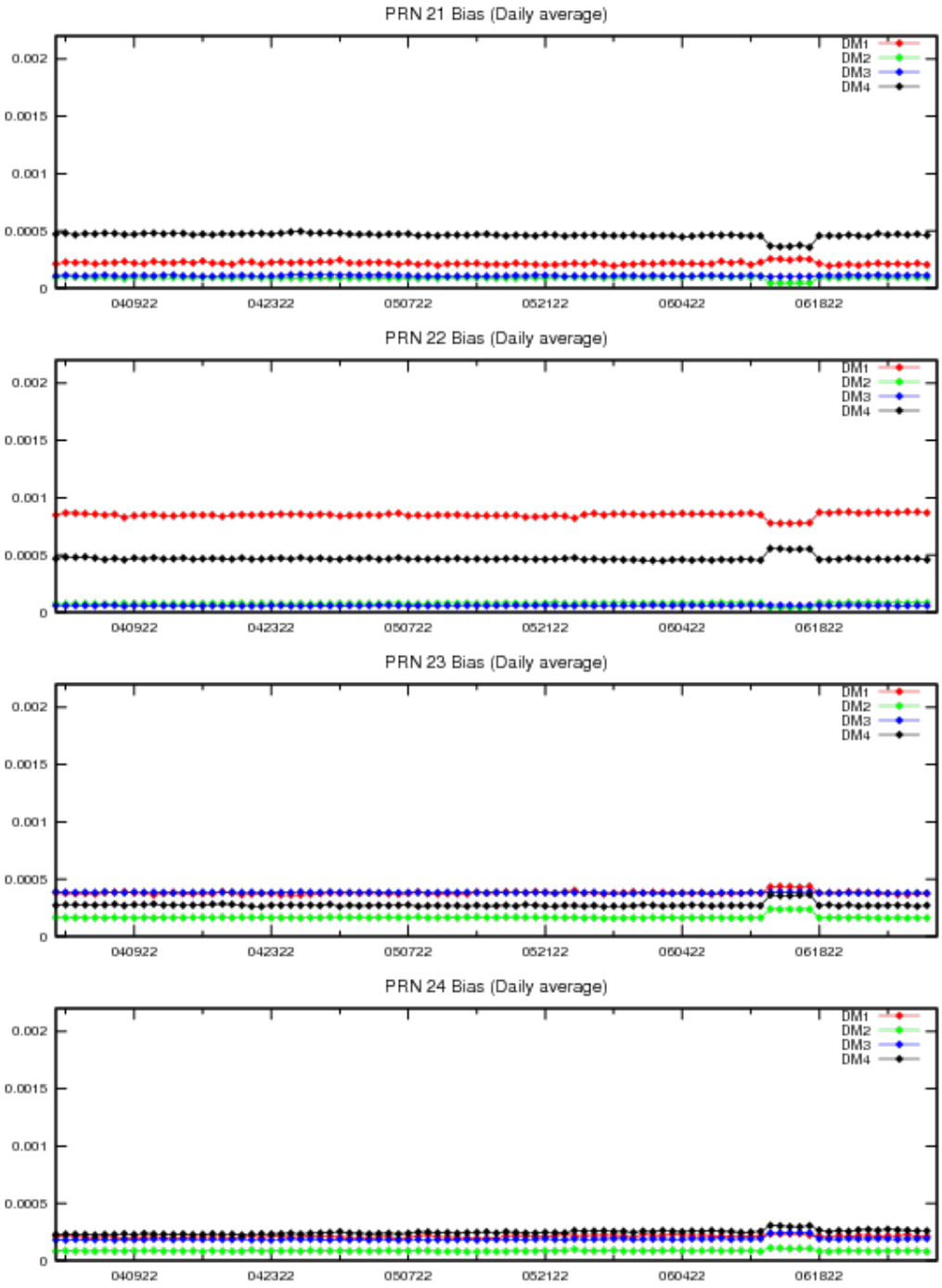

Figure 11-8. PRN Bias Average Trend (PRN21 – PRN24)

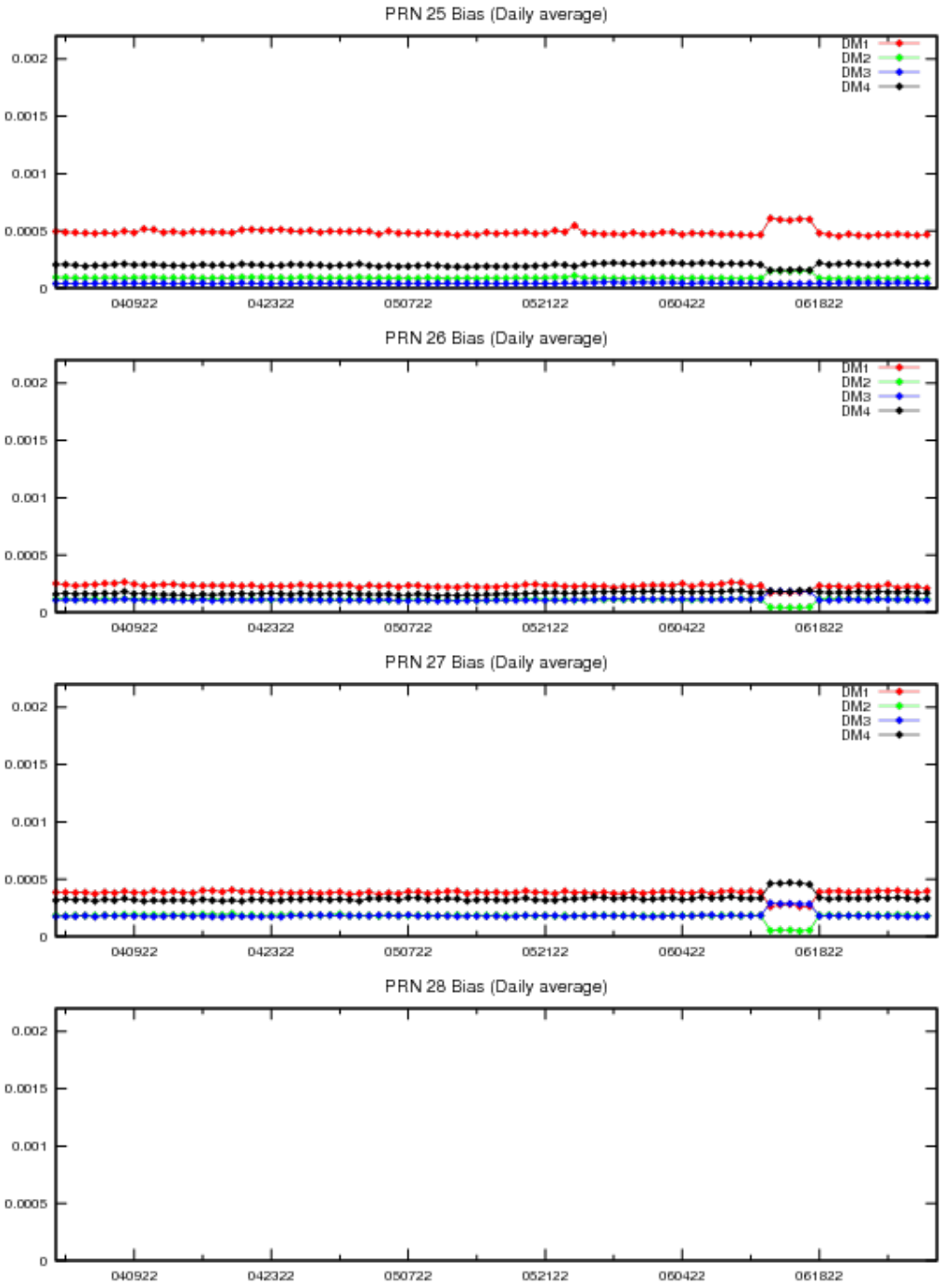

Figure 11-9. PRN Bias Average Trend (PRN25 – PRN28)

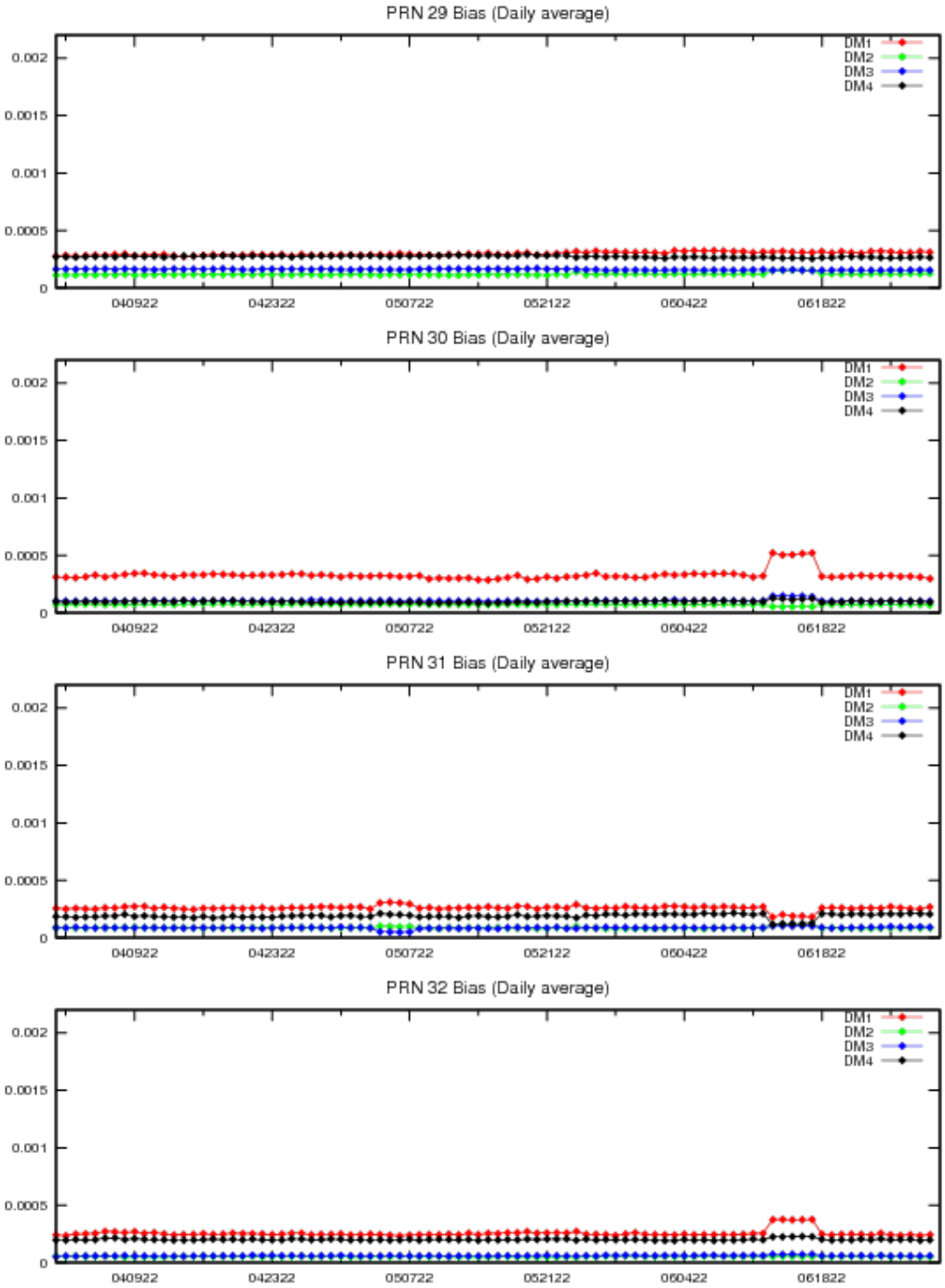

Figure 11-10. PRN Bias Average Trend (PRN29 – PRN32)

11.4 SQM Trips

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

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.

G30. GEO 135

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.

S15. GEO PRN133

SBAS. Space Based Augmentation System

SIS. Signal in space

SM9. GEO PRN131

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.

UISE. User Ionospheric Slant Error

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.

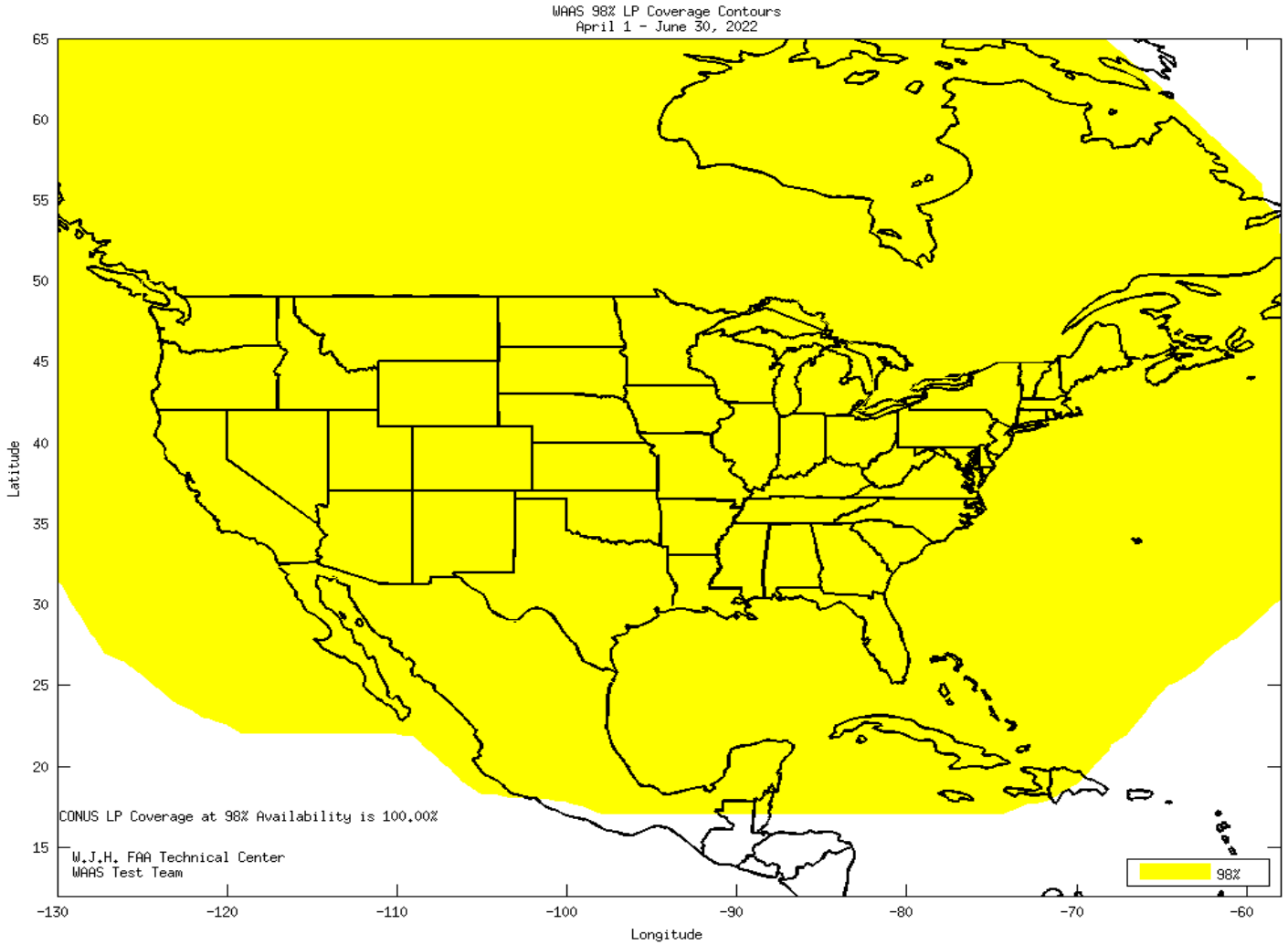

Figure B-1. 98% CONUS LP Availability Contour

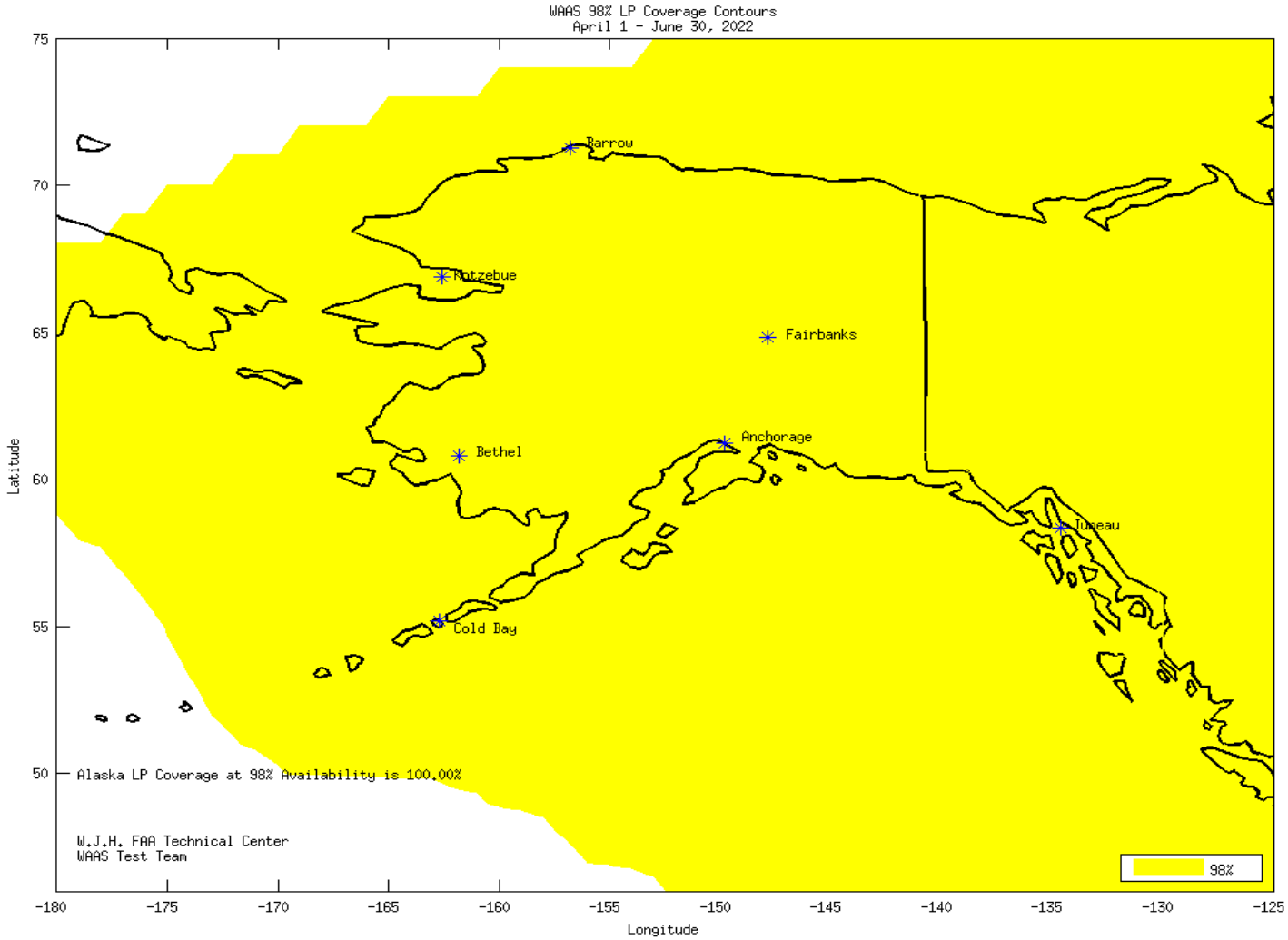

Figure B-2. 98% Alaska LP Availability Contour

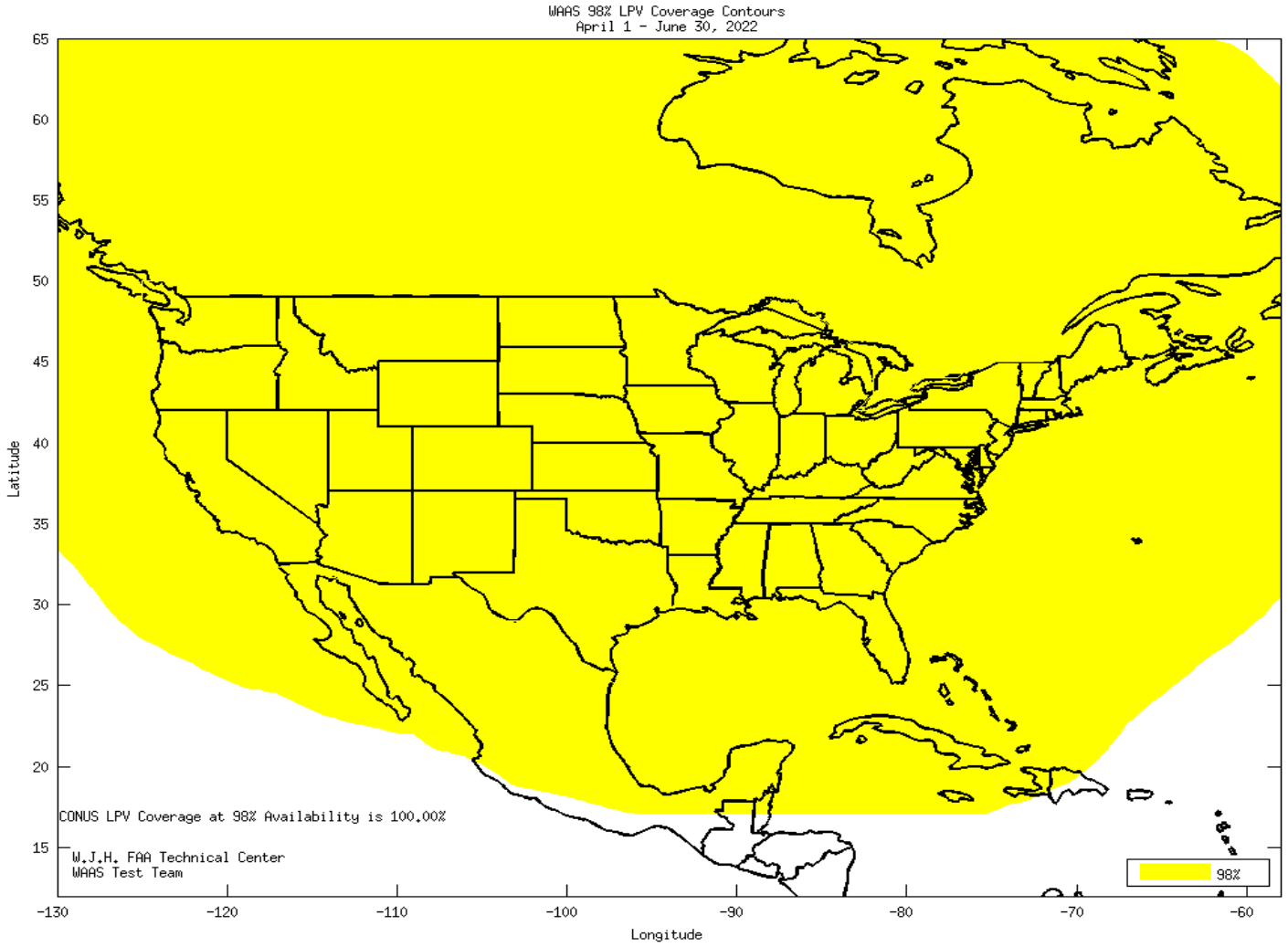

Figure B-3. 98% CONUS LPV Availability Contour

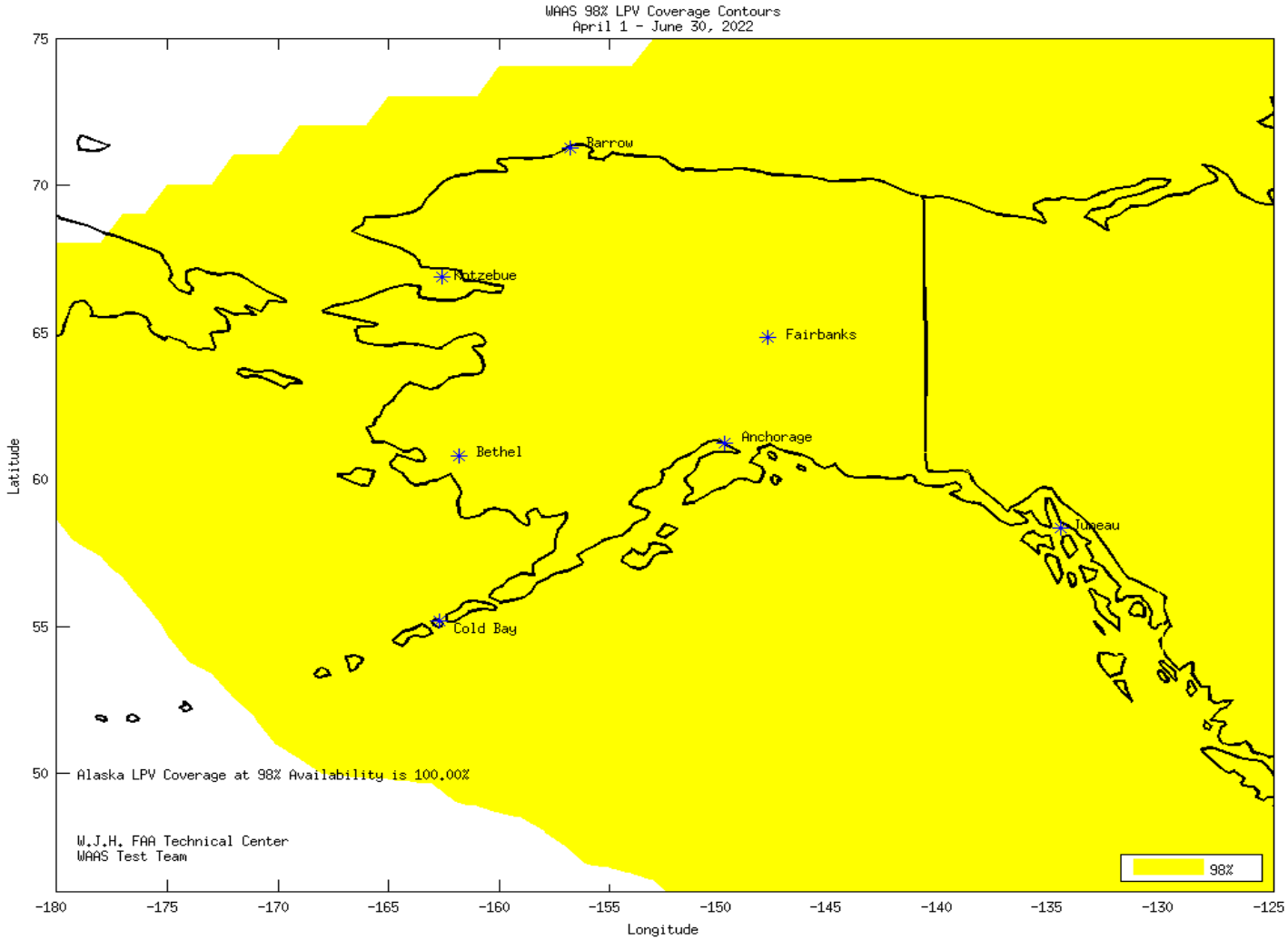

Figure B-4. 98% Alaska LPV Availability Contour

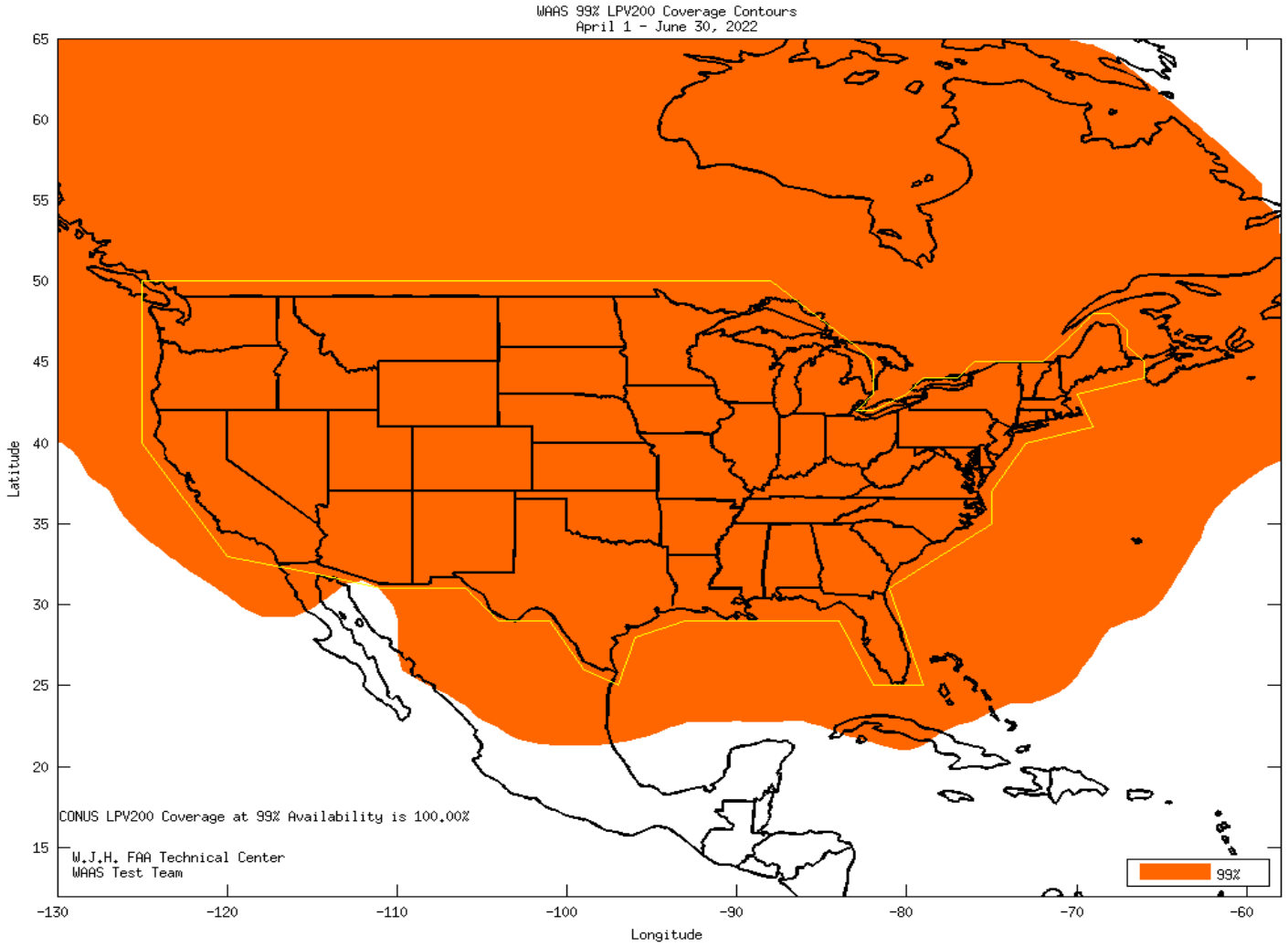

Figure B-5. 99% CONUS LPV200 Availability Contour

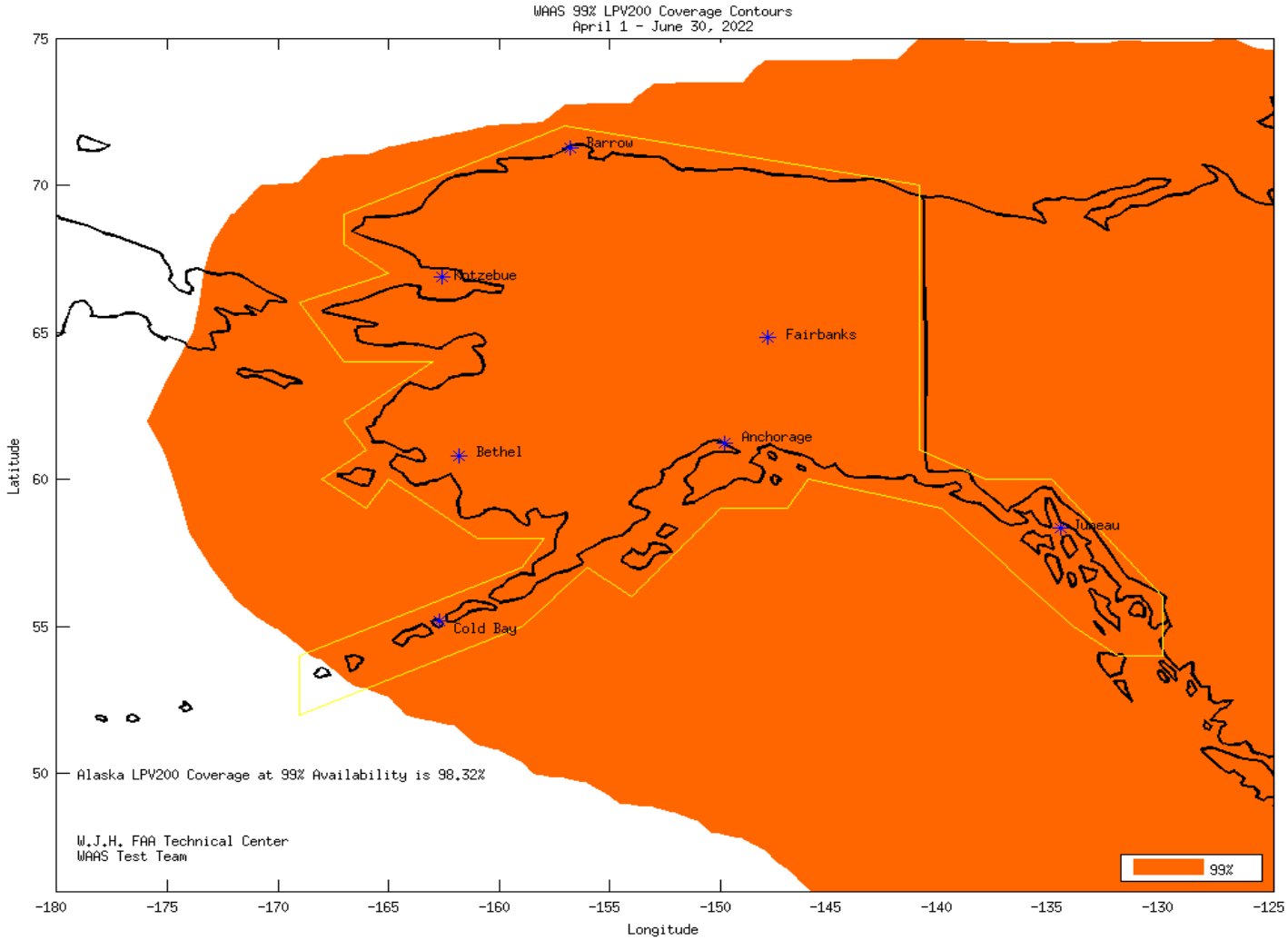

Figure B-6. 99% Alaska LPV200 Availability Contour