This document was revised on December 14, 2017 to correct figure captions 4-6 through 4-9.

WIDE AREA AUGMENTATION SYSTEM PERFORMANCE ANALYSIS REPORT

Report #60

Reporting Period: January 1 to March 31, 2017

April 2017

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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. The current WAAS PAN Report #60 provides WAAS-performance data from the January 1 through March 31, 2017 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 WAAS system support modification cutover began August 2015 with the first WAAS system upgrade to G3 receivers on September 4, 2015 in Seattle, WA. This was done in preparation for a full constellation of dual civil frequency GPS satellites (L1/L5). The WAAS system upgrade to G3 receivers was completed on May 17, 2016.

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, Atlantic City, and Arcata—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)	Atlantic City 1.322 meters	Salt Lake City 0.582 meters	Anchorage 0.738 meters	Bethel 0.575 meters
95% Vertical Accuracy (VPL <= 50 meters)	Miami 1.662 meters	Denver 0.744 meters	Barrow 1.362 meters	Bethel 0.987 meters
LP Availability (HPL <= 40 meters)	All Sites 100%	All Sites 100%	All Sites 100%	All Sites 100%
LPV Availability (HPL <= 40 meters & VPL <= 50 meters)	All Sites 100%	All Sites 100%	Multiple Sites 99.98%	Barrow 99.98%
LPV200 Availability (HPL <= 40 meters & VPL <= 35 meters)	Multiple Sites 100%	Oakland 99.33%	Multiple Sites 100%	Kotzebue 99.99%
99% HPL	Cleveland 15.57 meters	Denver 10.97 meters	Cold Bay 20.60 meters	Juneau 13.09 meters
99% VPL	Oakland 32.50 meters	Kansas 18.52 meters	Barrow 34.847	Juneau 22.53 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 as well as improves GPS position accuracy and availability within the WAAS coverage area.

The objectives of this report are as listed below:

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 the 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 utilizes the WAAS data transmitted from geostationary satellites (GEOs) pseudo-random noise (PRN)-135 (CRW), PRN-138 (CRE), and PRN-133 (AMR). CRE and CRW GEOs provide a precision approach (PA) ranging capability that supports all levels of WAAS service. As of January 18, 2015, the AMR GEO indefinitely discontinued non-precision approach (NPA) ranging 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.

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 receiver 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 1-1 WAAS Service Levels

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

Table 1-2 PA Evaluation Sites

	Number of Days Evaluated	Number of Samples
NSTB:		
Arcata	89	7651232
Atlantic City	89	7724297
Grand Forks	22	1871075
Oklahoma City	85	7320746
WAAS:		
Albuquerque	90	7742244
Anchorage	90	7757291
Atlanta	90	7759063
Barrow	89	7685416
Bethel	89	7689245
Billings	90	7748180
Boston	90	7748480
Chicago	90	7755897
Cleveland	89	7732657
Cold Bay	89	7689057
Dallas	90	7752316
Denver	90	7736009
Fairbanks	89	7688690
Gander	90	7759269
Goose Bay	89	7685972
Houston	90	7748751
Iqaluit	90	7758593
Jacksonville	90	7752489
Juneau	89	7688298
Kansas City	90	7746981
Kotzebue	89	7684906
Los Angeles	90	7758277
Memphis	90	7745448
Merida	90	7752155
Mexico City	90	7753942
Miami	90	7755375
Minneapolis	90	7749144
New York	90	7749885
Oakland	90	7748190
Puerto Vallarta	89	7674446
Salt Lake City	90	7752505
San Jose Del Cabo	90	7756578
Seattle	89	7727271
Washington DC	90	7759404
Winnipeg	90	7751526

Table 1-3 NPA Evaluation Sites

Location	Number of Days Evaluated	Number of Samples
Albuquerque	90	7751902
Anchorage	90	7750126
Atlanta	90	7759572
Barrow	90	7755477
Bethel	90	7753737
Billings	90	7746854
Boston	90	7748475
Cleveland	90	7754958
Cold Bay	90	7755443
Fairbanks	90	7758219
Gander	90	7756212
Honolulu	90	7752365
Houston	90	7752486
Iqaluit	90	7747460
Juneau	90	7754446
Kansas City	90	7749650
Kotzebue	90	7756282
Los Angeles	90	7757618
Merida	90	7748200
Miami	90	7754983
Minneapolis	90	7748948
Oakland	90	7751042
Salt Lake City	90	7750998
San Jose Del Cabo	90	7752222
San Juan	90	7756123
Seattle	90	7739495
Tapachula	90	7756433
Washington DC	90	7759509

The report is divided by the performance category, as listed below:

1. WAAS Position Accuracy
2. WAAS Operational Service Availability
3. WAAS Coverage
4. WAAS Integrity
5. WAAS Range Domain Accuracy
6. WAAS GEO Ranging Performance
7. WAAS Airport Availability
8. WAAS 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 these requirements are extracted from the FAA Specification FAA-E-2892C and FAA Specification FAA-E-2976, as applicable.

Table 1-4 WAAS Performance Parameters

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

1.1 Event Summary

Table 1-5 lists events that affected WAAS performance, or the ability to determine the WAAS performance, during the reporting period. 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 (Kp) index 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 GEO uplink subsystem (GUS) switchovers, which are transitions from one GEO uplink site to the other GEO uplink site.

Table 1-5 Events

Start Date	End Date	Location/Satellites	Service Affected	Event Description
1/4/2017	1/9/2017	PRN138	None	From 1/4 through 1/9, Telesat performed a switching of the propellant tanks on-board the satellite in order to clear propellant lines. Bubbles in the lines were causing maneuvers to be aborted by on-board sensors. This caused multiple aborted maneuvers and Do Not Use conditions on CRE. On 1/9, maneuvers resumed without interruption. This resulted in PRN138 Alerting to Not-Monitored several times per day between 1/4 and 1/9. See DR 136
1/4/2017	1/5/2017	PRN138	LPV200_Canada	SV Alert on PRN138 from 21:44 GMT to 21:52 GMT. UDREI remained at 11 until 02:52GMT. The elevated UDREI along with elevated IGPs caused minor degradation of LPV200 service coverage in Canada from 00:40 GMT to 01:06 GMT, from 01:24 GMT to 01:43 GMT, and from 02:25 GMT to 02:33 GMT on 1/5. TOW 337504-337939 Please see plot(s): Cov_vs_Time_Canada_1/4/2017 LPV200_1/5/2017
1/6/2017	1/6/2017	PRN138	LPV200_CONUS	PRN 138 had three missed maneuvers. This elevated the UDREs on PRN 138. The elevated UDREs caused minor degradation of LPV200 service in CONUS from 08:36 GMT to 08:41 GMT. TOW 448781-451859 (12-15)
1/7/2017	1/7/2017	PRN138	LPV200_CONUS	PRN 138 had three missed maneuvers. This elevated the UDREs on PRN 138. The elevated UDREs caused minor degradation of LPV200 service in CONUS from 08:35 GMT to 08:43 GMT. TOW 535525-538602 (12-15)
1/8/2017	1/8/2017	PRN6	LPV200_CONUS	PRN6 SV Alert to Not-Monitored, which caused moderate degradation of the LPV200 service coverage in CONUS from 12:34 GMT to 12:41 GMT.
1/18/2017	1/18/2017	PRN138	LPV200_Canada	A missed maneuver caused PRN 138 to alert to not monitored from 05:49 GMT to 06:31 GMT. The elevated UDREs caused minor degradation of LPV200 service coverage in Canada from 05:53 GMT to 06:06 GMT. TOW 280354-282703 (14-15)
1/18/2017	1/18/2017	Washington DC (CnV) Los Angeles (CnV) Atlanta (CnV)	LPV200_Alaska	Geomagnetic activity (Kp = 4) disturbed the ionosphere causing elevated GIVE values. This resulted in minor degradation of LPV200 service coverage in Alaska from 12:02 GMT to 12:24 GMT. Please see plot(s): LPV200_1/18/2017 Cov_vs_Time_Alaska_1/18/2017
1/19/2017	1/19/2017	GEO138 Brewster-B (BRE-B)	LPV200_CONUS	The uplink for the CRE GEO, PRN 138 switched from the Brewster-B uplink site to the Woodbine uplink site at 06:24:22 GMT. This caused a 4 second outage of the GEO 138 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN138. This caused the UDRE for

Start Date	End Date	Location/Satellites	Service Affected	Event Description
				GEO 138 to be elevated. The elevated UDRE for GEO 138 caused minor degradation of LPV200 service coverage in CONUS from 07:33 GMT to 07:53 GMT. TOW 368679-368684
1/25/2017	1/25/2017	PRN17	LPV200_Canada	The reduction in LPV200 service coverage in Canada was due to a GPS NANU on PRN9 (see NANU2017009) which was unusable from 04:49:00 GMT to 06:18:00 GMT. The NANU resulted in minor degradation of LPV200 service coverage in Canada from 04:54 to 05:05 GMT and from 05:22 to 05:37 GMT.
1/25/2017	3/31/2017	PRN27	LPV200_CONUS	GPS Flex Power tests begin. The FAA Tech Center, as part of daily GPS and WAAS performance monitoring, observed several events linked to the increased power test on GPS L1. On 1/28, there was a WAAS Signal Quality Monitor (SQM) trip for PRN27. There were also UDRE Spikes observed on several GPS satellites for the duration of this testing. See DR 135
1/28/2017	1/28/2017	PRN27	LPV200_Canada	There was a Signal Quality Monitor (SQM) on PRN 27. The alarm lasted from 00:16 GMT until it was cleared at 02:04 GMT. During that time, UDREs of PRN27 were set to "Do Not Use". This caused minor degradation of LPV200 service coverage in Canada from 00:17 GMT to 00:38 GMT. See DR 135 Please see plot(s): LPV200_1/28/2017 Cov_vs_Time_Canada_1/28/2017
2/7/2017	2/7/2017	PRN5	LPV200_Alaska	The reduction in LPV200 service coverage in Alaska was due to a GPS NANU on PRN5 (see NANU2017015) which was unusable from 11:04 GMT to 11:29 GMT on 2/7. The NANU resulted in minor degradation of LPV200 service in Alaska from 11:04 GMT to 11:09 GMT. Please see plot(s): LPV200_2/7/2017 Cov_vs_Time_Alaska_2/7/2017
2/7/2017	2/7/2017	PRN31	LPV200_Canada	The reduction in LPV200 service coverage in Canada was due to a GPS NANU on PRN 31 (see NANU2017021) which was unusable from 19:30 GMT to 20:09 GMT. The NANU resulted in minor degradation of LPV200 service coverage in Canada from 20:01 GMT to 20:16 GMT.
2/7/2017	2/7/2017	PRN7	LPV200_Alaska	The reduction in LPV200 service coverage in Alaska was due to a GPS NANU on PRN7 (see NANU2017022) which was unusable from 22:30 GMT to 22:59 GMT on 2/7. The NANU caused minor degradation of LPV200 service coverage in Alaska from 22:58 GMT to 23:16 GMT. Please see plot(s): LPV200_2/7/2017 Cov_vs_Time_Alaska_2/7/2017
2/10/2017	2/10/2017	ALL Satellites	None	Updated Tech Center SQM tool to use G3 type biases OSP. The OSP G3 type biases are the same ones used by OKC.

Start Date	End Date	Location/Satellites	Service Affected	Event Description
2/15/2017	2/15/2017	GEO135 Littleton (APA)	LPV200_Alaska	The uplink for the CRW GEO, GEO 135, switched from the Littleton uplink site to the Napa uplink site at 08:01:02. This caused a 4 second outage of the GEO 135 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN135. This also caused the UDRE for GEO 135 to be elevated. The elevated UDRE for GEO 135 caused minor degradation of LPV200 service coverage in Alaska from 10:25 GMT to 10:42 GMT. TOW 288079-288084 Please see plot(s): LPV200_2/15/2017 Cov_vs_Time_Alaska_2/15/2017
2/15/2017	2/15/2017	PRN21	LPV200_CONUS	Carrier Phase Anomaly on PRN 21 resulted in SV Alert to not monitored, which caused LPV200 outage in CONUS (Ohio) at about 10:07:00 GMT for less than 1 minute.
2/18/2017	2/19/2017	GEO135 Napa (APC)	LPV200_Alaska	GEO 135, manual switchover from Napa to Littleton. The uplink for the CRW GEO, GEO 135, switched from the Napa uplink site to the Littleton uplink site at 22:34:44. This caused a 4 second outage of the GEO 135 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN135. This also caused the UDRE for GEO 135 to be elevated. The elevated UDRE for GEO 135 caused minor degradation of LPV200 service coverage in Alaska from 02:45 GMT to 03:01 GMT on 2/19. TOW 599701-599706 Please see plot(s): LPV200_2/18/2017
2/25/2017	2/26/2017	GEO135 Littleton (APA)	LPV200_Alaska	The uplink for the CRW GEO, GEO 135, switched from the Littleton uplink site to the Napa uplink site at 20:54:43. This caused a 7 second outage of the GEO 135 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN135. This also caused the UDRE for GEO 135 to be elevated. The elevated UDRE for GEO 135 caused minor degradation of LPV200 service coverage in Alaska from 02:17 GMT to 02:36 GMT on 2/26. TOW 593700-593708 Please see plot(s): LPV200_2/25/2017
3/2/2017	4/4/2017	PRN1 PRN6 PRN8 PRN25 PRN26	LPV200_CONUS LPV200_Alaska LPV200_Canada	During times of increased ionospheric activity, mulitple receivers have experienced loss of L2 tracking on satellites causing WAAS GPS UDRE internal threshold trips to increase the UDREi to Not Monitored. The UDREi bumps on those satellites have caused minor loss of WAAS coverage. See DR 137
3/8/2017	3/8/2017	GEO138 Woodbine (QWE)	LPV200_Canada	The uplink for the CRE GEO, PRN 138 switched from the Woodbine uplink site to the Brewster-B uplink site at 21:16:00 GMT. This caused a 7 second outage of the GEO 138 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN138. This caused the UDRE for GEO 138 to be elevated. The elevated UDRE for GEO 138 caused minor degradation of LPV200

Start Date	End Date	Location/Satellites	Service Affected	Event Description
				service coverage in Canada from 21:16 GMT to 21:36 GMT. TOW 335777-335785 Please see plot(s): Cov_vs_Time_Canada_3/8/2017
3/8/2017	3/8/2017	PRN30	LPV200_Canada	The reduction in LPV200 service coverage in Canada was due to a GPS NANU on PRN30 (see NANU2017025) which was unusable from 9:20 GMT to 11:19 GMT. The NANU caused minor degradation of LPV200 service coverage in Alaska from 09:41 GMT to 09:59 GMT.
3/14/2017	3/14/2017	GEO135 Napa (APC)	LPV200_Alaska	The uplink for the CRW GEO, GEO 135, switched from the Napa uplink site to the Littleton uplink site at 07:33:37 GMT. This caused an 18 second outage of the GEO 135 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN135. This also caused the UDRE for GEO 135 to be elevated. The elevated UDRE for GEO 135 caused minor degradation of LPV200 service coverage in Alaska from 08:25 GMT to 08:48 GMT. TOW 200034-200053 Please see plot(s): LPV200_3/14/2017 Cov_vs_Time_Alaska_3/14/2017
3/16/2017	3/16/2017	GEO138 Brewster-B (BRE-B)	LPV200_Alaska	The uplink for the CRE GEO, PRN 138 switched from the Brewster-B uplink site to the Woodbine uplink site at 07:34:07 GMT. This caused a 4 second outage of the GEO 138 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN138. This caused the UDRE for GEO 138 to be elevated. The elevated UDRE for GEO 138 caused minor degradation of LPV200 service coverage in Alaska from 08:17 GMT to 08:40 GMT. TOW 372864-372869 Please see plot(s): LPV200_3/16/2017 Cov_vs_Time_Alaska_3/16/2017
3/23/2017	3/23/2017	PRN7	LPV200_Alaska LPV200_Canada	The reduction in LPV200 service coverage in Alaska was due to a GPS NANU on PRN7 (see NANU2017029) which was unusable from 14:56 GMT to 21:32 GMT. The NANU caused moderate degradation of: (1) LPV200 service coverage in Alaska from 19:48 GMT to 20:58 GMT; and (2) LPV200 service coverage in Canada from 20:26 GMT to 21:03 GMT. Please see plot(s): LPV200_3/23/2017 Cov_vs_Time_Alaska_3/23/2017 Cov_vs_Time_Canada_3/23/2017
3/27/2017	3/27/2017	GEO138 Woodbine (QWE)	LPV200_Canada	The uplink for the CRE GEO, PRN 138 switched from the Woodbine uplink site to the Brewster-B uplink site at 15:45:24 GMT. This caused a 14 second outage of the GEO 138 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN138. This caused the UDRE for GEO 138 to be elevated. The elevated UDRE for GEO 138 caused moderate degradation of LPV200 service coverage in Canada from 18:07 GMT to 18:31 GMT and from 19:48 GMT to 20:05 GMT.

Start Date	End Date	Location/Satellites	Service Affected	Event Description
				TOW 143141-143156 Please see plot(s): LPV200_3/27/2017 Cov_vs_Time_Canada_3/27/2017

Table 1-6 WAAS Upgrades

Start Date	End Date	Location	Event Description
01/04/2017	01/04/2017	Jacksonville (ZJX1) Jacksonville (ZJX2) Jacksonville (ZJX3)	SSM-47: This system support modification (SSM) upgrades the processors at the ZJX WRS. This upgrade supports the cutover to WAAS Release 1. This upgrade caused a 6733 second outage from the ZJX WRS from 14:35 GMT to 16:28 GMT
01/10/2017	01/10/2017	Anchorage (ZAN1) Anchorage (ZAN2) Anchorage (ZAN3)	SSM-47: This system support modification (SSM) upgrades the processors at the ZAN WRS. This upgrade supports the cutover to WAAS Release 1.
01/12/2017	01/12/2017	Billings (BIL1) Billings (BIL2) Billings (BIL3)	SSM-47: This system support modification (SSM) upgrades the processors at the BIL WRS. This upgrade supports the cutover to WAAS Release 1. This upgrade caused a 10764 second outage from the BIL WRS from 00:28 GMT to 03:27 GMT
01/18/2017	01/18/2017	Winnipeg (YWG1) Winnipeg (YWG2) Winnipeg (YWG3)	SSM-47: This system support modification (SSM) upgrades the processors at the YWG WRS. This upgrade supports the cutover to WAAS Release 1. This upgrade caused a 6909 second outage from the YWG WRS from 16:14 GMT to 18:09 GMT
01/18/2017	01/18/2017	Kansas City (ZKC1) Kansas City (ZKC2) Kansas City (ZKC3)	SSM-47: This system support modification (SSM) upgrades the processors at the ZKC WRS. This upgrade supports the cutover to WAAS Release 1. This upgrade caused a 7335 second outage from the ZKC WRS from 14:52 GMT to 16:54 GMT
01/24/2017	01/24/2017	Denver (ZDV1) Denver (ZDV2) Denver (ZDV3)	SSM-47: This system support modification (SSM) upgrades the processors at the ZDV WRS. This upgrade supports the cutover to WAAS Release 1. This upgrade caused a 18853 second outage from the ZDV WRS from 15:56 GMT to 21:10:15 GMT. ZDV-C experienced a 28978 second outage, 10125 seconds longer than either ZDV-A or ZDV-B.
01/24/2017	01/25/2017	Juneau (JNU1) Juneau (JNU2) Juneau (JNU3)	SSM-47: This system support modification (SSM) upgrades the processors at the JNU WRS. This upgrade supports the cutover to WAAS Release 1.
01/25/2017	01/26/2017	Cold Bay (CDB1) Cold Bay (CDB2)	SSM-47: This system support modification (SSM) upgrades the processors at the CDB WRS. This upgrade supports the cutover to WAAS Release 1.

Start Date	End Date	Location	Event Description
		Cold Bay (CDB3)	
01/31/2017	01/31/2017	Goose Bay (YYR1) Goose Bay (YYR2) Goose Bay (YYR3)	SSM-47: This system support modification (SSM) upgrades the processors at the YYR WRS. This upgrade supports the cutover to WAAS Release 1. This upgrade caused a 3296 second outage from the YYR WRS from 14:46:12 GMT to 15:41:09 GMT.
02/02/2017	02/02/2017	Oakland (ZOA1) Oakland (ZOA2) Oakland (ZOA3)	SSM-47: This system support modification (SSM) upgrades the processors at the ZOA WRS. This upgrade supports the cutover to WAAS Release 1. This upgrade caused a 7329 second outage from the ZOA WRS from 16:42:59 GMT to 18:45:09 GMT.
02/06/2017	02/07/2017	Gander (YQX1) Gander (YQX2) Gander (YQX3)	SSM-47: This system support modification (SSM) upgrades the processors at the YQX WRS. This upgrade supports the cutover to WAAS Release 1.
02/08/2017	02/09/2017	Honolulu (HNL1) Honolulu (HNL2) Honolulu (HNL3)	SSM-47: This system support modification (SSM) upgrades the processors at the HNL WRS. This upgrade supports the cutover to WAAS Release 1.
02/08/2017	02/08/2017	Cleveland (ZOB1) Cleveland (ZOB2) Cleveland (ZOB3)	SSM-47: This system support modification (SSM) upgrades the processors at the ZOB WRS. This upgrade supports the cutover to WAAS Release 1. This upgrade caused a 4579 second outage from the ZOB WRS from 14:19:43 GMT to 15:36:03 GMT.
02/15/2017	02/15/2017	Albuquerque (ZAB1) Albuquerque (ZAB2) Albuquerque (ZAB3)	SSM-47: This system support modification (SSM) upgrades the processors at the ZAB WRS. This upgrade supports the cutover to WAAS Release 1. This upgrade caused a 6152 second outage from the ZAB WRS from 16:19:36 GMT to 18:02:09 GMT.
02/22/2017	02/22/2017	Houston (ZHU1) Houston (ZHU2) Houston (ZHU3)	SSM-47: This system support modification (SSM) upgrades the processors at the ZHU WRS. This upgrade supports the cutover to WAAS Release 1. This upgrade caused a 4192 second outage from the ZHU WRS from 14:59:46 GMT to 16:09:39 GMT.

Table 1-7 GUS Switchovers

Start Date	End Date	GUS Switch	Location/Satellites	Service Affected	Event Description
1/10/2017	1/10/2017	Missed Navigation Message	GEO138 Brewster-B (BRE-B) Washington DC (CnV)		The Brewster-B uplink station for the CRE GEO had a C&V source select switch from Washington DC to Atlanta at TIME GMT. TOW 179788-179790
1/19/2017	1/19/2017	Manual	GEO138 Brewster-B (BRE-B)	LPV200_CONUS	The uplink for the CRE GEO, PRN 138 switched from the Brewster-B uplink site to the Woodbine uplink site at 06:24:22 GMT.

Start Date	End Date	GUS Switch	Location/Satellites	Service Affected	Event Description
					This caused a 4 second outage of the GEO 138 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN138. This caused the UDRE for GEO 138 to be elevated. The elevated UDRE for GEO 138 caused minor degradation of LPV200 service coverage in CONUS from 07:33 GMT to 07:53 GMT. TOW 368679-368684
2/15/2017	2/15/2017	Manual	GEO135 Littleton (APA)	LPV200_Alaska	The uplink for the CRW GEO, GEO 135, switched from the Littleton uplink site to the Napa uplink site at 08:01:02. This caused a 4 second outage of the GEO 135 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN135. This also caused the UDRE for GEO 135 to be elevated. The elevated UDRE for GEO 135 caused minor degradation of LPV200 service coverage in Alaska from 10:25 GMT to 10:42 GMT. TOW 288079-288084 Please see plot(s): LPV200_2/15/2017 Cov_vs_Time_Alaska_2/15/2017
2/17/2017	2/17/2017	Faulted	GEO133 Santa Paula (SZP)	None	GEO 133 switched to Paumalu, Santa Paula faulted. The uplink for the AMR GEO, GEO 133, switched from the Santa Paula uplink site to the Paumalu uplink site at 03:06:54 GMT. This caused a 4 second outage of the GEO 133 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN133. This also caused the UDRE for GEO 133 to be elevated. TOW 443231-443236
2/18/2017	2/19/2017	Manual	GEO135 Napa (APC)	LPV200_Alaska	GEO 135, manual switchover from Napa to Littleton. The uplink for the CRW GEO, GEO 135, switched from the Napa uplink site to the Littleton uplink site at 22:34:44. This caused a 4 second outage of the GEO 135 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN135. This also caused the UDRE for GEO 135 to be elevated. The elevated UDRE for GEO 135 caused minor degradation of LPV200 service coverage in Alaska from 02:45 GMT to 03:01 GMT on 2/19. TOW 599701-599706 Please see plot(s): LPV200_2/18/2017
2/25/2017	2/26/2017	Manual	GEO135 Littleton (APA)	LPV200_Alaska	The uplink for the CRW GEO, GEO 135, switched from the Littleton uplink site to the Napa uplink site at 20:54:43. This caused a 7 second outage of the GEO 135 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN135. This also caused the UDRE for GEO 135 to be elevated. The elevated UDRE for GEO 135 caused minor degradation of LPV200 service coverage in Alaska from 02:17 GMT to 02:36 GMT on 2/26. TOW 593700-593708

Start Date	End Date	GUS Switch	Location/Satellites	Service Affected	Event Description
					Please see plot(s): LPV200_2/25/2017
3/1/2017	3/1/2017	Faulted	GEO133 Paumalu (HDH)	None	GEO 133 switched to Santa Paula, Paumalu faulted. The uplink for the AMR GEO, GEO 133, switched from the Paumalu uplink site to the Santa Paula uplink site at 03:45:19 GMT. This caused a 3552 second outage of the GEO 133 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN133. This also caused the UDRE for GEO 133 to be elevated. TOW 272736-276289
3/8/2017	3/8/2017	Manual	GEO138 Woodbine (QWE)	LPV200_Canada	The uplink for the CRE GEO, PRN 138 switched from the Woodbine uplink site to the Brewster-B uplink site at 21:16:00 GMT. This caused a 7 second outage of the GEO 138 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN138. This caused the UDRE for GEO 138 to be elevated. The elevated UDRE for GEO 138 caused minor degradation of LPV200 service coverage in Canada from 21:16 GMT to 21:36 GMT. TOW 335777-335785 Please see plot(s): Cov_vs_Time_Canada_3/8/2017
3/14/2017	3/14/2017	Faulted	GEO135 Napa (APC)	LPV200_Alaska	The uplink for the CRW GEO, GEO 135, switched from the Napa uplink site to the Littleton uplink site at 07:33:37 GMT. This caused an 18 second outage of the GEO 135 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN135. This also caused the UDRE for GEO 135 to be elevated. The elevated UDRE for GEO 135 caused minor degradation of LPV200 service coverage in Alaska from 08:25 GMT to 08:48 GMT. TOW 200034-200053 Please see plot(s): LPV200_3/14/2017 Cov_vs_Time_Alaska_3/14/2017
3/16/2017	3/16/2017	Manual	GEO138 Brewster-B (BRE-B)	LPV200_Alaska	The uplink for the CRE GEO, PRN 138 switched from the Brewster-B uplink site to the Woodbine uplink site at 07:34:07 GMT. This caused a 4 second outage of the GEO 138 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN138. This caused the UDRE for GEO 138 to be elevated. The elevated UDRE for GEO 138 caused minor degradation of LPV200 service coverage in Alaska from 08:17 GMT to 08:40 GMT. TOW 372864-372869 Please see plot(s): LPV200_3/16/2017 Cov_vs_Time_Alaska_3/16/2017
3/21/2017	3/21/2017	Faulted	GEO133 Santa Paula (SZP)	None	GEO 133 switched to Paumalu, Santa Paula faulted. The uplink for the AMR GEO, GEO 133, switched from the Santa Paula uplink site to the Paumalu uplink site at 19:17:17 GMT.

Start Date	End Date	GUS Switch	Location/Satellites	Service Affected	Event Description
					This caused a 21 second outage of the GEO 133 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN133. This also caused the UDRE for GEO 133 to be elevated. TOW 242254-242276
3/27/2017	3/27/2017	Faulted	GEO138 Woodbine (QWE)	LPV200_Canada	The uplink for the CRE GEO, PRN 138 switched from the Woodbine uplink site to the Brewster-B uplink site at 15:45:24 GMT. This caused a 14 second outage of the GEO 138 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN138. This caused the UDRE for GEO 138 to be elevated. The elevated UDRE for GEO 138 caused moderate degradation of LPV200 service coverage in Canada from 18:07 GMT to 18:31 GMT and from 19:48 GMT to 20:05 GMT. TOW 143141-143156 Please see plot(s): LPV200_3/27/2017 Cov_vs_Time_Canada_3/27/2017
3/28/2017	3/28/2017	Manual	GEO138 Brewster-B (BRE-B)	None	The uplink for the CRE GEO, PRN 138 switched from the Brewster-B uplink site to the Woodbine uplink site at 08:00:27 GMT. This caused a 4 second outage of the GEO 138 broadcast and also caused the WAAS carrier smoothing algorithm to reinitialize for PRN138. This caused the UDRE for GEO 138 to be elevated. TOW 201644-201649

1.2 Report Overview

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

Section 3 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 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 provides the summary of the Hazardous Misleading Information (HMI) analysis as well as a safety margin index for each receiver. This section also shows update rates of WAAS messages transmitted from CRE, CRW, and AMR.

Section 6 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 provides the GEO ranging performance for CRE and CRW.

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

Section 9 provides the assessment of WAAS code noise and multipath (CNMP) bounding for 114 WAAS receivers.

Section 10 provides surveyed positions of all Wide-Area Reference Equipment (WRE) as well as 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 provides the daily and quarterly average of SQM PRN type biases and PRN biases.

2.0 WAAS POSITION ACCURACY

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

Table 2-1 shows PA horizontal and vertical position accuracy maintained for 95% of the time at LP, LPV and LNAV/VNAV operational service levels 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 as below:

- The maximum 95% CONUS horizontal LPV error was 1.322 meters observed at Atlantic City.
- The maximum 95% CONUS vertical LPV error was 1.622 meters observed at Miami.
- The minimum 95% CONUS horizontal LPV errors was 0.575 meters observed at Salt Lake City.
- The minimum 95% CONUS vertical LPV error was 0.774 meters observed at Denver.

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 3.223 meters observed at Honolulu.
- The maximum 99.999% horizontal error was 7.843 meters observed at Honolulu.
- The minimum 95% horizontal error was 0.940 meters observed at Albuquerque.
- The minimum 99.999% horizontal error was 1.987 meters observed at Cold Bay.

Table 2-3 shows the quarterly maximum LPV error statistics: (1) the column Horizontal Error column shows the maximum position errors while the calculated HPL meets the LPV service level defined in Table 1-1, (2) the Vertical Error column shows the maximum position errors while the calculated VPL meets the LPV service level, (3) the Horizontal Error/HPL column and the Vertical Error/VPL column show the ratio of position error to protection level at the time the maximum error occurred, (4) the Horizontal Maximum Ratio column and the Vertical Maximum Ratio column show the maximum position error to protection level ratio for the quarter. During this reporting period, the maximum LPV horizontal error was 2.881 meters occurred at Fairbanks and maximum vertical LPV error was 6.472 meters occurred at Barrow.

Figure 2-1 through 2-3 show the daily LPV 95% horizontal accuracy at the PA evaluation sites, and Figure 2-4 through 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 2-6 are listed below.

- January 4, 2017—Position errors in CONUS and Mexico were elevated. The maximum 95% horizontal and vertical LPV errors were 1.226 meters and 3.385 meters at Atlantic City and Mexico City, respectively. The Kp index range was 4.
- January 19-22, 2017—Position errors in CONUS and Canada were elevated. The maximum 95% horizontal and vertical LPV errors were 1.577 meters and 2.361 meters at Atlantic City and Miami, respectively. The Kp index was 4.
- January 31, 2017—Position errors in Canada were elevated. The maximum 95% horizontal and vertical LPV errors were 1.300 meters and 1.798 meters at Iqaluit. The Kp index range was 5.
- February 17-18, 2017—Position errors in CONUS, and Canada were elevated. The maximum 95% horizontal and vertical LPV errors were 1.339 meters and 2.276 meters at Atlantic City and Miami, respectively. The Kp index was 4.

- March 1, 2017—Position errors in Alaska, Canada, and Mexico were elevated. The maximum 95% horizontal and vertical LPV errors were 1.411 meters and 3.010 meters at San Jose Del Cabo and Mexico City, respectively. The Kp index was 6.
- March 2, 2017—Position errors in CONUS and Canada, and were elevated. The maximum 95% horizontal and vertical LPV errors were 1.341 meters and 3.318 meters at Atlantic City and Houston, respectively. The Kp index was 5.
- March 27, 2017—Position errors in Canada Mexico were elevated. The maximum 95% horizontal and vertical LPV errors were 1.184 meters and 1.628 meters at Iqaluit. The Kp index was 5.

Figure 2-7 and 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 January 18, 19, and 31; February 1, 2, 17, and 18; and March 1-4, 21 and 22.

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 VPE versus VPL and 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 2D 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 - (HPL/6.0) and vertical - (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.

Table 2-1 PA 95% Horizontal and Vertical Accuracy

Location	Horizontal (HAL=40m) (Meters)	Horizontal (HAL=556m) (Meters)	Vertical (VAL=50m) (Meters)	Percentage in PA mode (%)	SPS Accuracy	
					95% Horizontal (Meters)	95% Vertical (Meters)
Arcata	1.172	1.172	1.009	100	*	*
Atlantic City	1.322	1.322	1.362	100	*	*
Grand Forks	0.920	0.920	1.232	100	*	*
Oklahoma City	0.749	0.749	0.971	100	*	*
Albuquerque	0.615	0.615	0.859	100	1.653	3.911
Anchorage	0.738	0.738	1.362	100	*	*
Atlanta	0.769	0.769	1.073	100	1.949	3.896
Barrow	0.598	0.598	1.291	99.99934	*	*
Bethel	0.575	0.575	0.987	100	1.429	3.777
Billings	0.679	0.679	0.933	100	1.747	3.822
Boston	0.855	0.855	1.004	100	2.179	3.611
Chicago	0.910	0.910	0.879	100	*	*
Cleveland	0.810	0.810	0.930	100	2.234	3.815
Cold Bay	0.658	0.658	1.092	100	*	*
Dallas	0.705	0.705	1.271	100	*	*
Denver	0.626	0.626	0.774	100	*	*
Fairbanks	0.591	0.591	1.018	100	1.432	3.821
Gander	0.877	0.877	1.127	100	*	*
Goose Bay	0.758	0.758	0.970	100	*	*
Houston	0.775	0.775	1.375	100	*	*
Iqaluit	0.916	0.916	1.266	100	*	*
Jacksonville	0.779	0.779	1.311	100	*	*
Juneau	0.602	0.602	1.133	100	*	*
Kansas City	0.597	0.597	0.853	100	1.893	3.857
Kotzebue	0.622	0.622	1.169	99.99934	1.494	3.775
Los Angeles	0.831	0.831	1.049	100	1.794	4.184
Memphis	0.671	0.671	0.959	100	*	*
Merida	0.718	0.718	1.795	100	*	*
Mexico City	0.619	0.619	2.991	100	*	*
Miami	0.859	0.859	1.662	100	1.843	4.072
Minneapolis	0.751	0.751	0.845	100	1.972	3.718
New York	0.842	0.842	0.905	100	*	*
Oakland	0.636	0.636	1.032	100	1.826	4.338
Puerto Vallarta	0.659	0.659	1.879	100	*	*
Salt Lake City	0.582	0.582	0.781	100	1.715	3.830
San Jose Del Cabo	0.902	0.902	1.906	100	*	*
Seattle	0.651	0.651	0.823	100	1.625	3.876
Washington DC	0.856	0.856	1.023	100	2.187	3.772
Winnipeg	0.660	0.660	1.075	100	*	*

* = SPS Data not processed

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

Location	95% Horizontal (meters)	99.999% Horizontal (meters)	Percentage in NPA mode (%)	Maximum Horizontal Error
Albuquerque	0.940	2.088	100	2.267
Anchorage	1.384	3.030	100	3.201
Atlanta	1.294	2.226	100	3.779
Barrow	0.970	2.299	99.9999	7.549
Bethel	1.090	2.339	100	2.522
Billings	1.446	2.314	100	2.508
Boston	1.713	2.789	100	2.972
Cleveland	1.536	2.701	100	3.160
Cold Bay	1.068	1.987	100	2.193
Fairbanks	1.303	2.838	100	3.128
Gander	1.574	3.411	100	3.611
Honolulu	3.223	7.843	100	8.059
Houston	1.429	2.990	100	3.240
Iqaluit	0.967	2.955	100	3.080
Juneau	1.150	2.733	100	2.869
Kansas City	1.062	2.334	100	2.622
Kotzebue	1.156	2.564	99.9999	2.927
Los Angeles	1.365	2.530	100	2.754
Merida	1.465	4.072	100	4.705
Miami	1.385	3.201	100	3.808
Minneapolis	1.552	3.212	100	3.407
Oakland	0.994	2.424	100	2.937
Salt Lake City	1.074	2.102	100	2.377
San Jose Del Cabo	1.456	4.269	100	4.527
San Juan	1.436	4.249	100	4.412
Seattle	1.130	4.148	100	5.908
Tapachula	1.942	7.389	100	7.622
Washington DC	1.674	2.876	100	3.141

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	2.864	0.223	0.225	4.723	0.143	0.155
Atlantic City	2.535	0.184	0.230	3.231	0.179	0.187
Grand Forks	2.040	0.170	0.176	2.616	0.163	0.163
Oklahoma City	1.488	0.182	0.182	2.818	0.138	0.165
Albuquerque	1.230	0.096	0.128	2.005	0.069	0.142
Anchorage	2.195	0.162	0.162	2.949	0.147	0.157
Atlanta	1.560	0.157	0.167	2.507	0.104	0.172
Barrow	2.678	0.140	0.167	6.472	0.276	0.278
Bethel	1.639	0.150	0.152	2.682	0.143	0.143
Billings	1.468	0.125	0.155	2.436	0.124	0.151
Boston	1.778	0.126	0.150	2.701	0.128	0.142
Chicago	1.719	0.099	0.171	2.785	0.116	0.134
Cleveland	1.664	0.127	0.154	2.426	0.119	0.153
Cold Bay	1.486	0.085	0.099	2.470	0.103	0.113
Dallas	1.458	0.142	0.157	2.586	0.188	0.208
Denver	1.398	0.136	0.161	2.101	0.121	0.146
Fairbanks	2.881	0.108	0.162	4.317	0.220	0.220
Gander	1.912	0.096	0.117	2.994	0.120	0.120
Goose Bay	1.936	0.127	0.131	2.416	0.085	0.116
Houston	1.509	0.156	0.178	2.823	0.195	0.197
Iqaluit	2.645	0.153	0.172	4.703	0.197	0.197
Jacksonville	1.684	0.126	0.167	3.193	0.196	0.197
Juneau	2.043	0.166	0.166	3.466	0.182	0.182
Kansas City	1.315	0.142	0.150	2.149	0.114	0.146
Kotzebue	2.163	0.188	0.188	4.835	0.201	0.201
Los Angeles	1.840	0.117	0.150	2.294	0.107	0.144
Memphis	1.449	0.158	0.157	2.474	0.105	0.154
Merida	1.670	0.161	0.161	4.050	0.109	0.183
Mexico City	1.545	0.072	0.099	5.466	0.182	0.194
Miami	1.615	0.124	0.152	3.608	0.177	0.177
Minneapolis	1.749	0.199	0.199	2.385	0.102	0.139
New York	1.641	0.148	0.154	2.002	0.093	0.144
Oakland	1.295	0.088	0.121	2.252	0.067	0.139
Puerto Vallarta	1.631	0.069	0.094	3.654	0.125	0.169
Salt Lake City	1.287	0.105	0.151	2.063	0.092	0.122
San Jose Del Cabo	2.014	0.094	0.176	4.714	0.201	0.201
Seattle	1.551	0.136	0.147	2.274	0.108	0.135
Washington DC	1.690	0.134	0.160	2.620	0.126	0.146
Winnipeg	1.379	0.153	0.153	2.419	0.138	0.157

Figure 2-1 LPV 95% Horizontal Accuracy

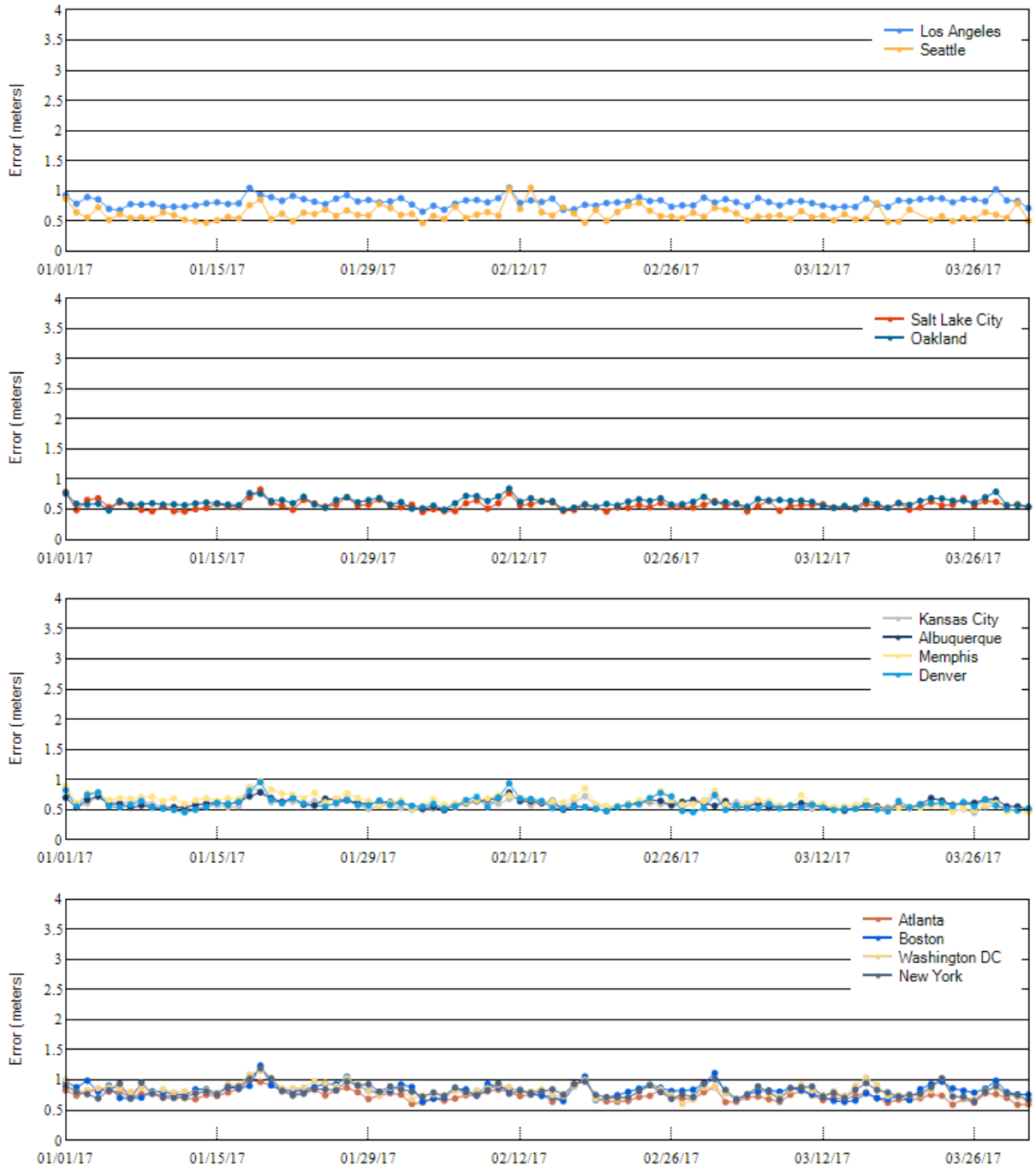


Figure 2-2 LPV 95% Horizontal Accuracy

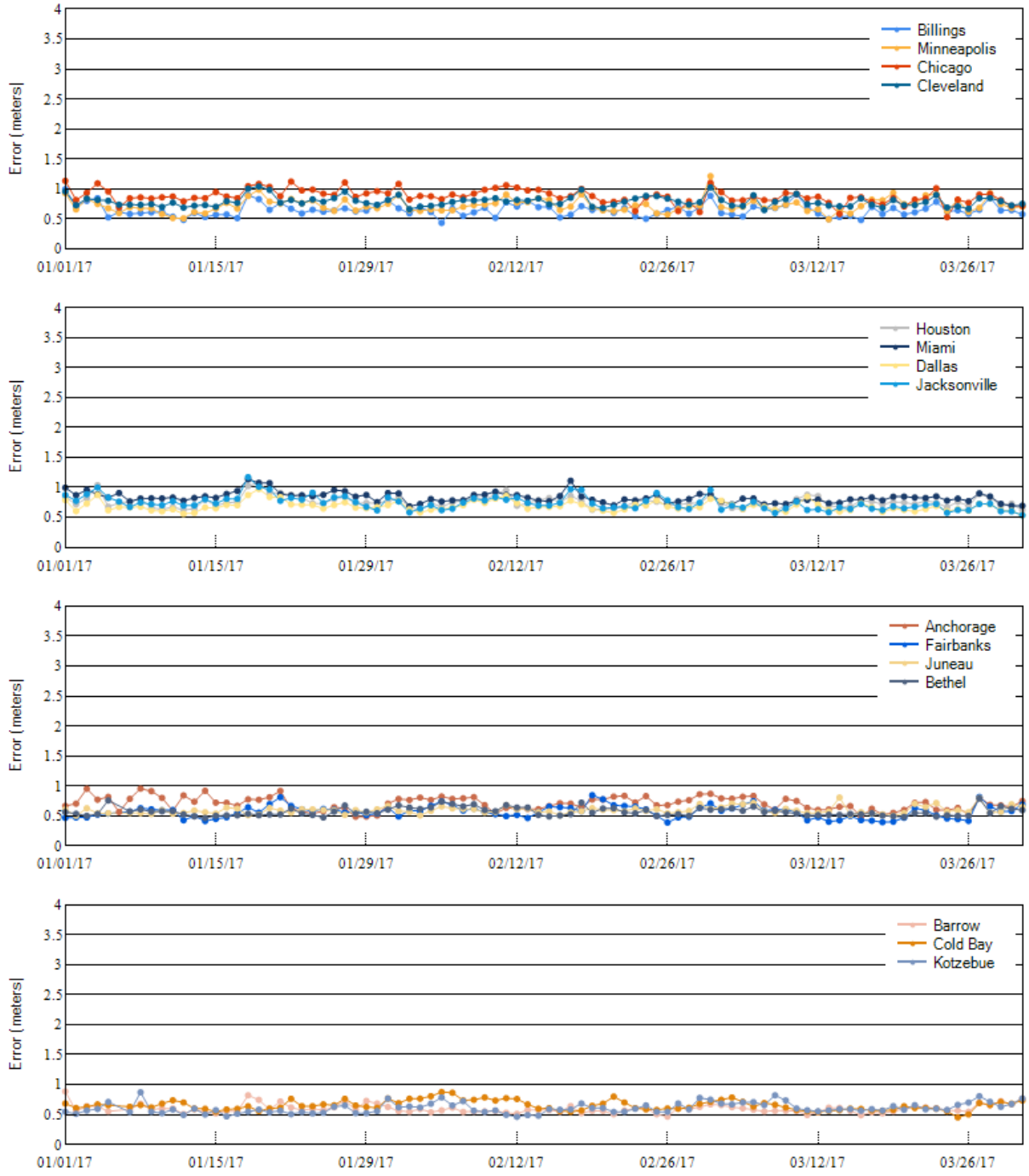


Figure 2-3 LPV 95% Horizontal Accuracy

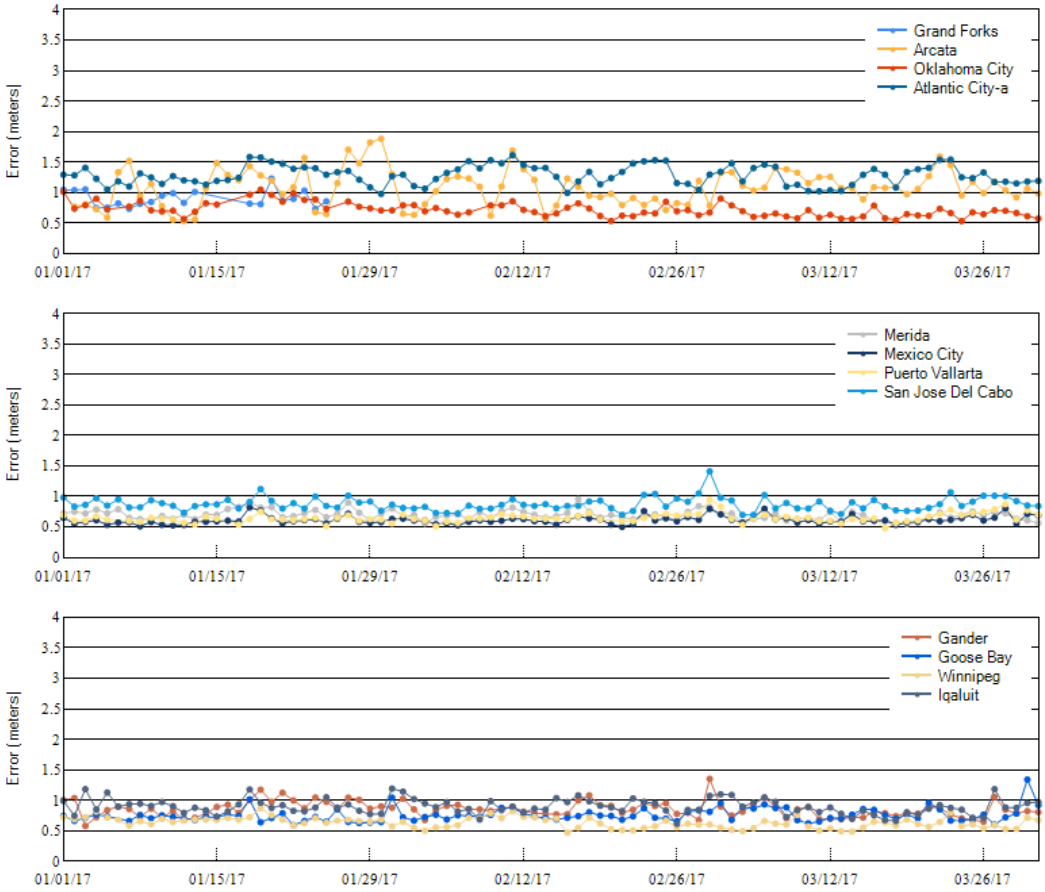


Figure 2-4 LPV 95% Vertical Accuracy

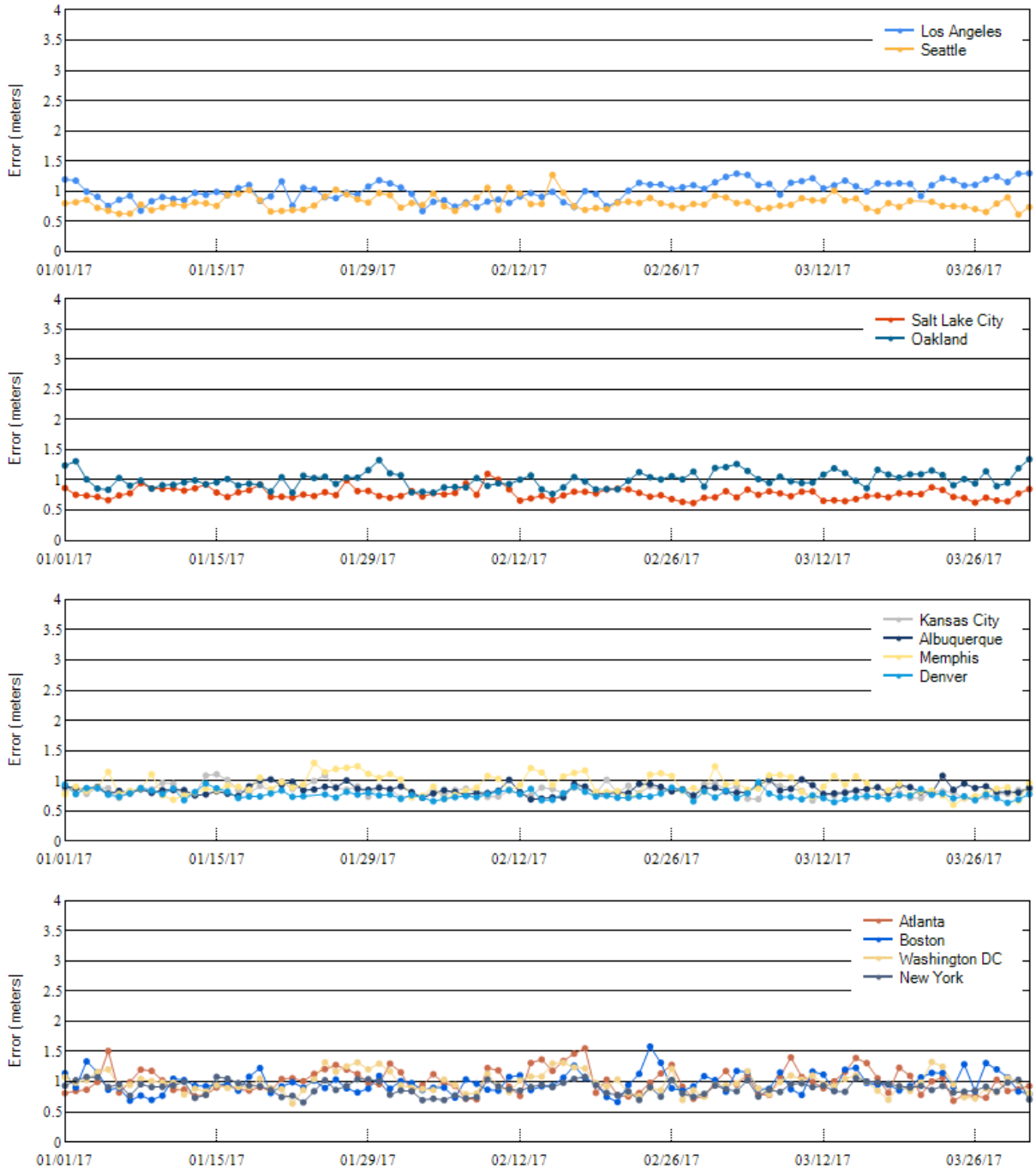


Figure 2-5 LPV 95% Vertical Accuracy

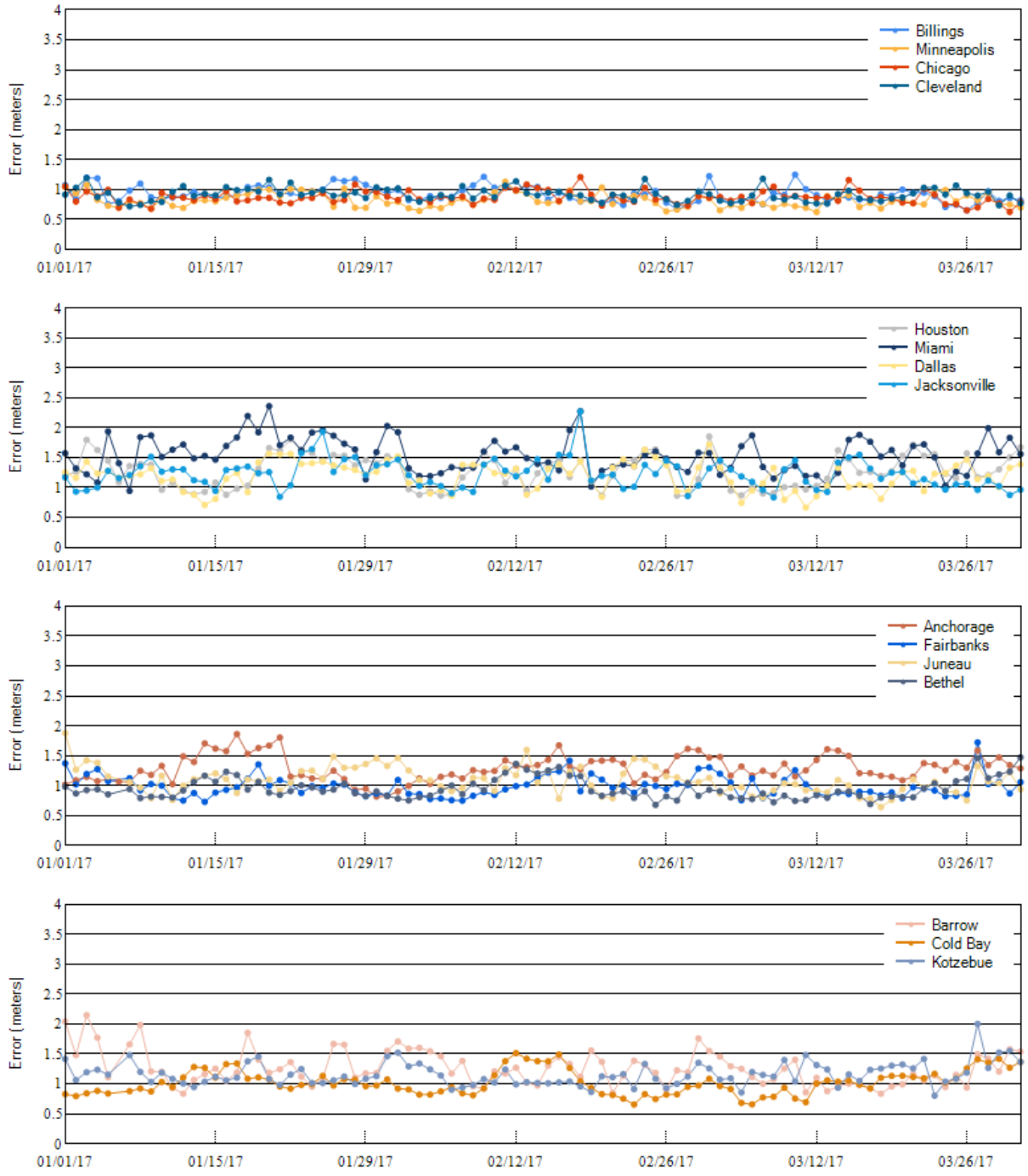


Figure 2-6 LPV 95% Vertical Accuracy

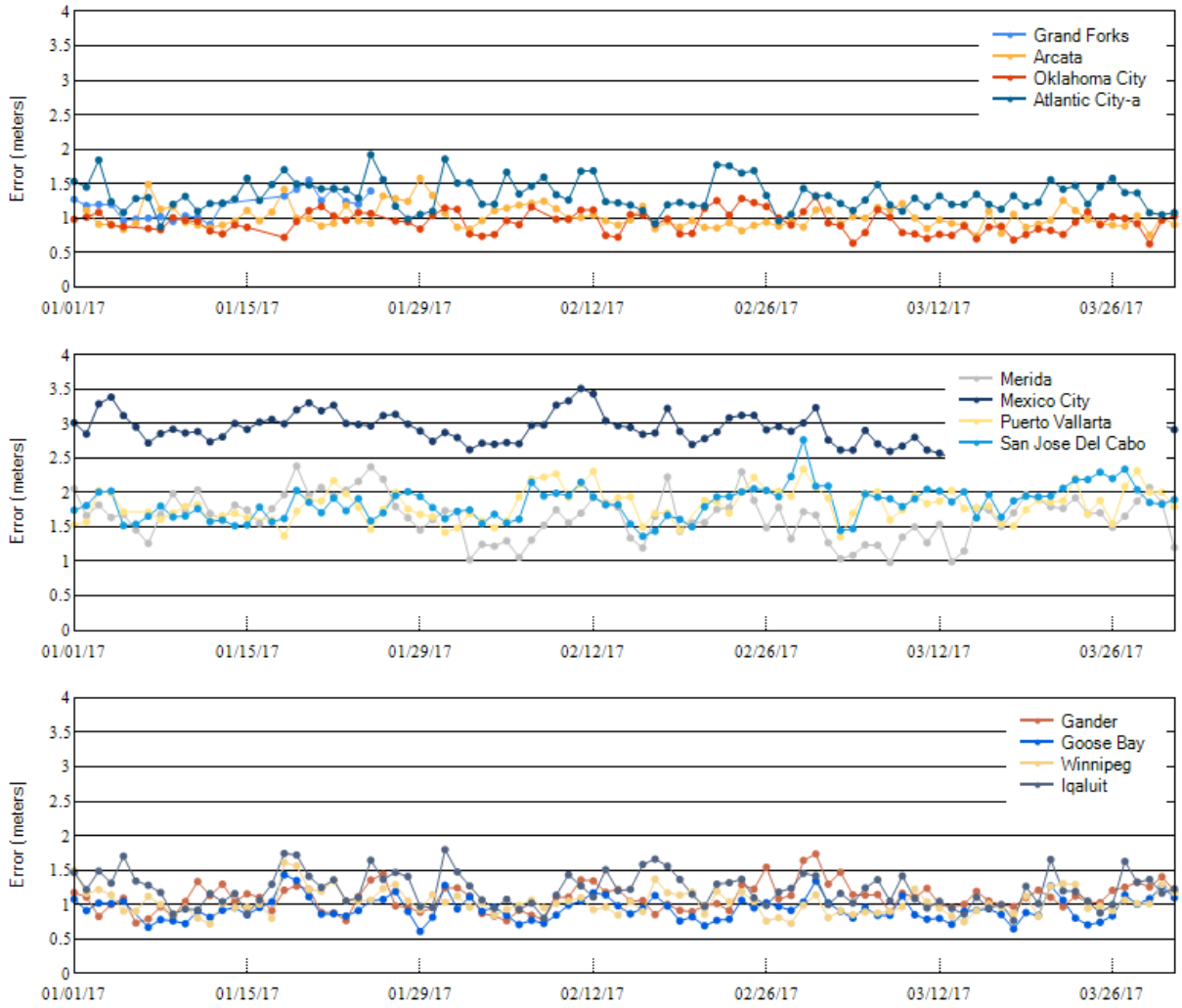


Figure 2-7 NPA 95% Horizontal Accuracy

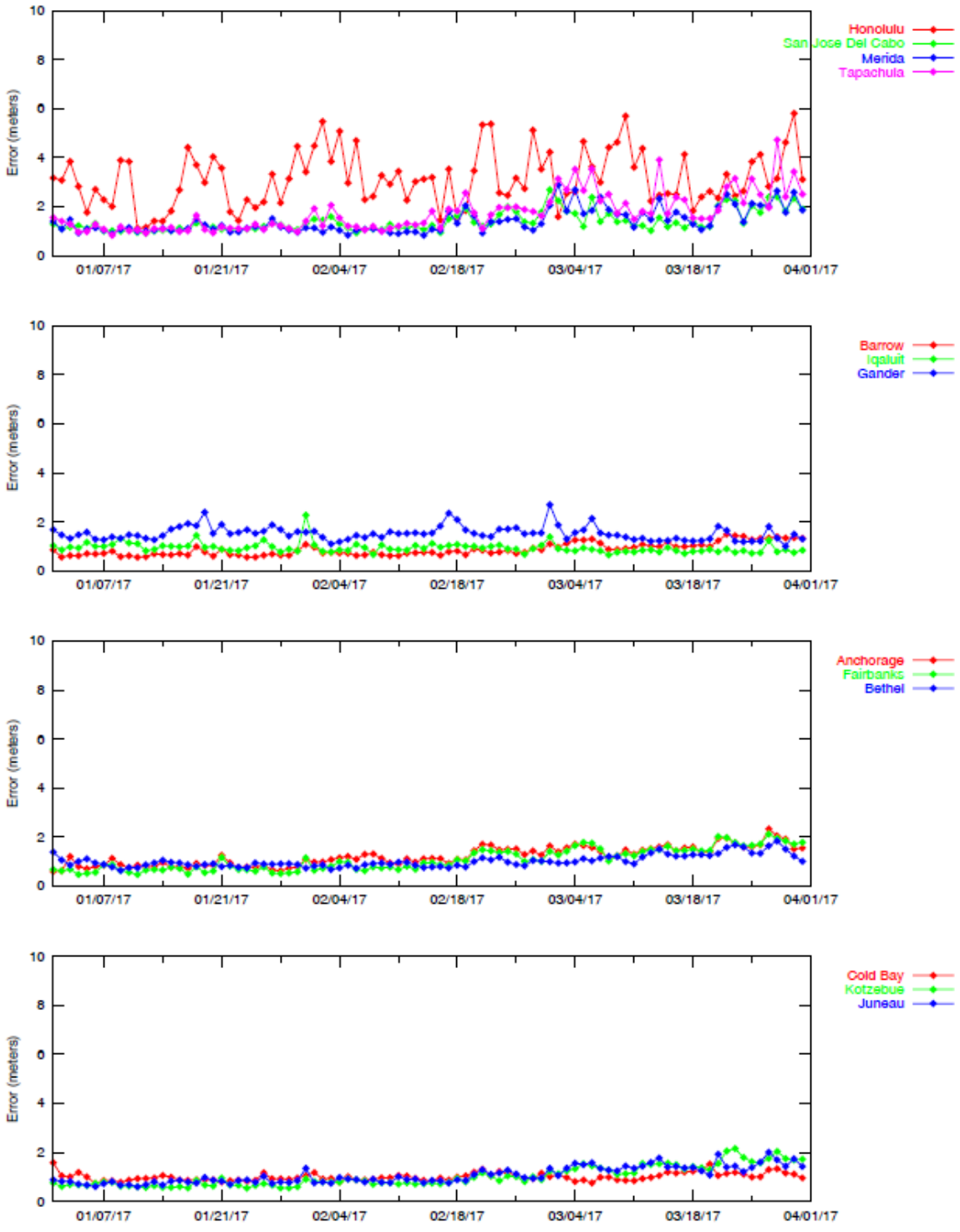


Figure 2-8 NPA 95% Horizontal Accuracy

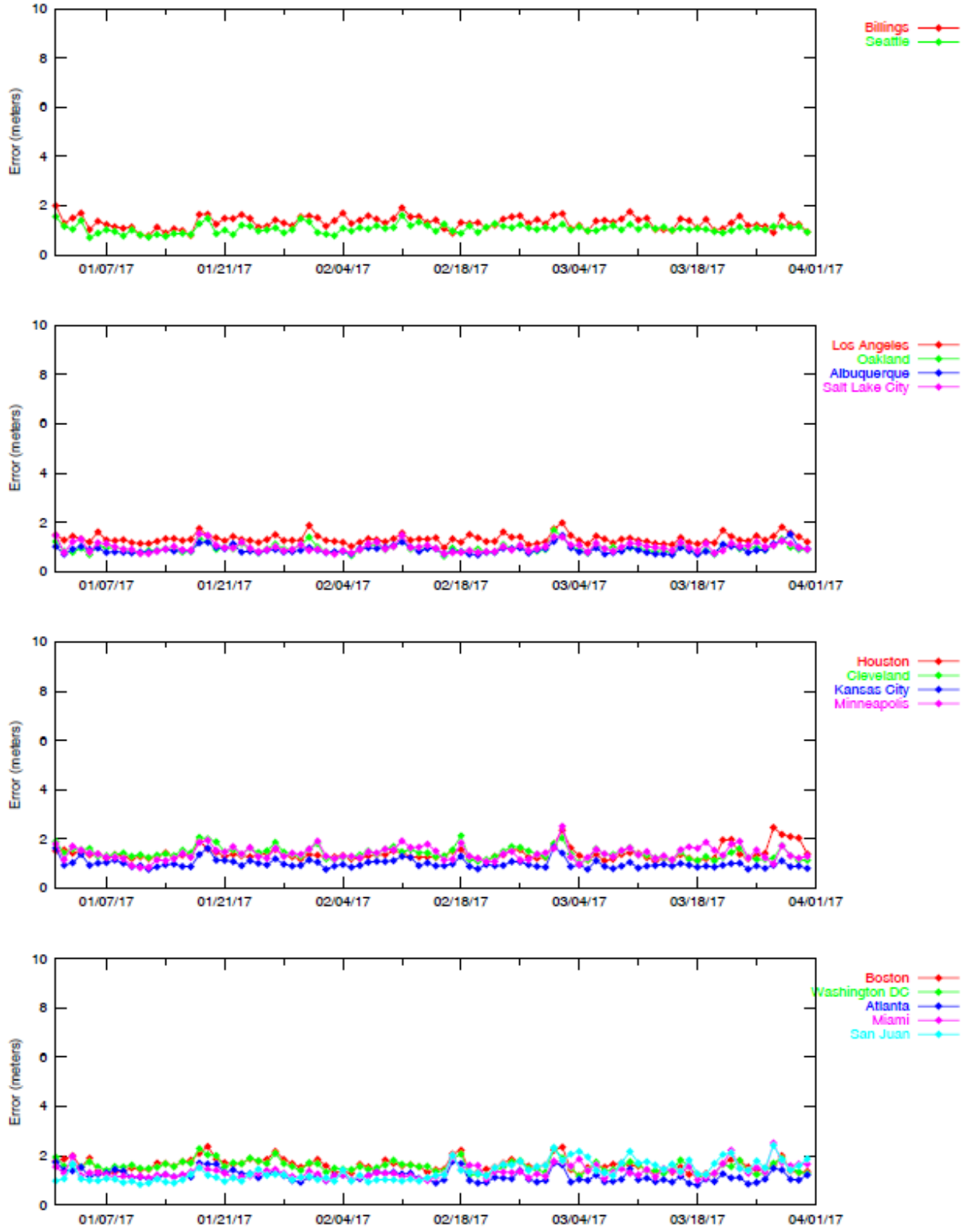


Figure 2-9 LPV Horizontal Error Bounding Triangle Chart

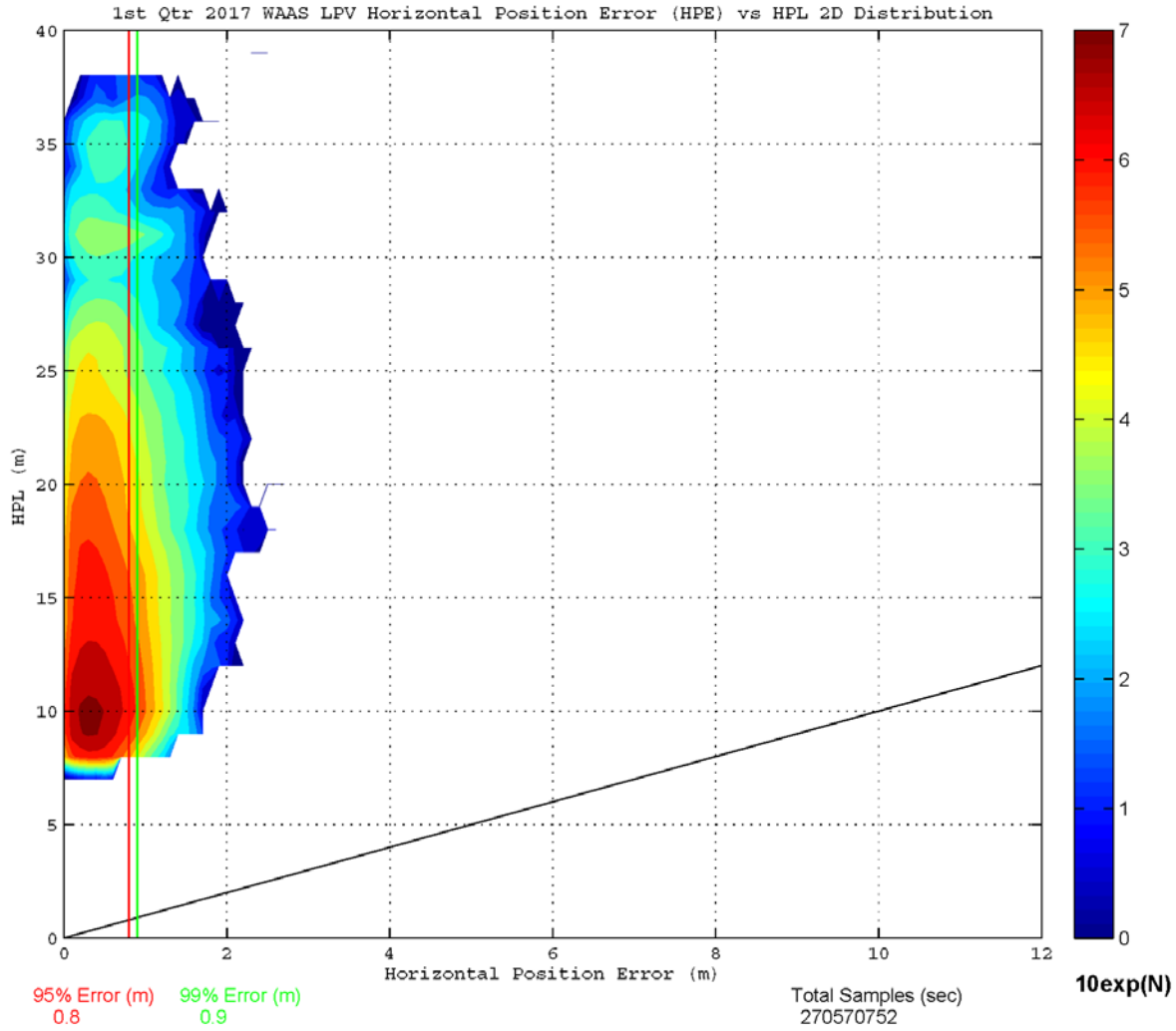


Figure 2-10 LPV Vertical Error Bounding Triangle Chart

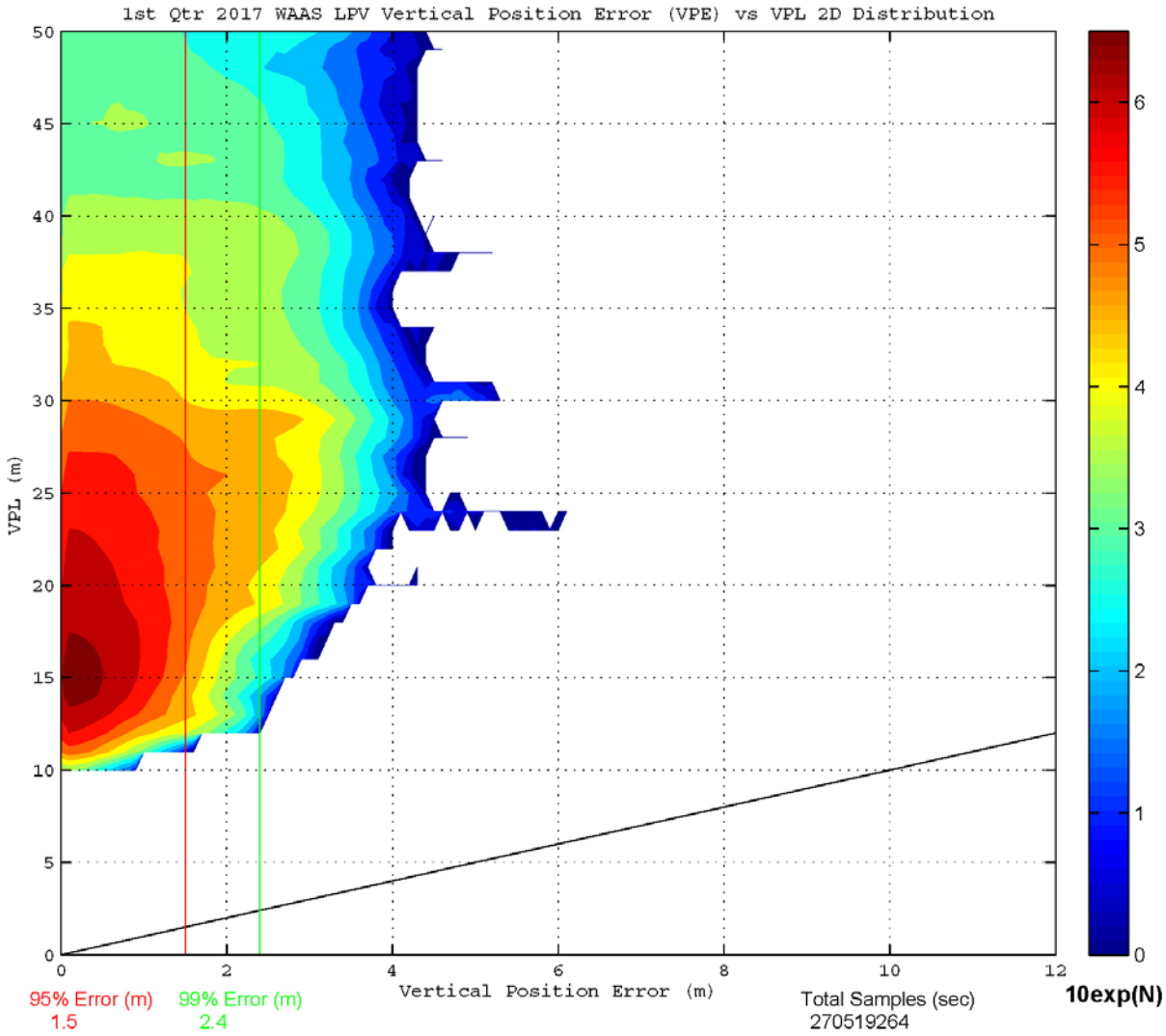


Figure 2-11 LPV 2-D Horizontal Error Distribution Histogram

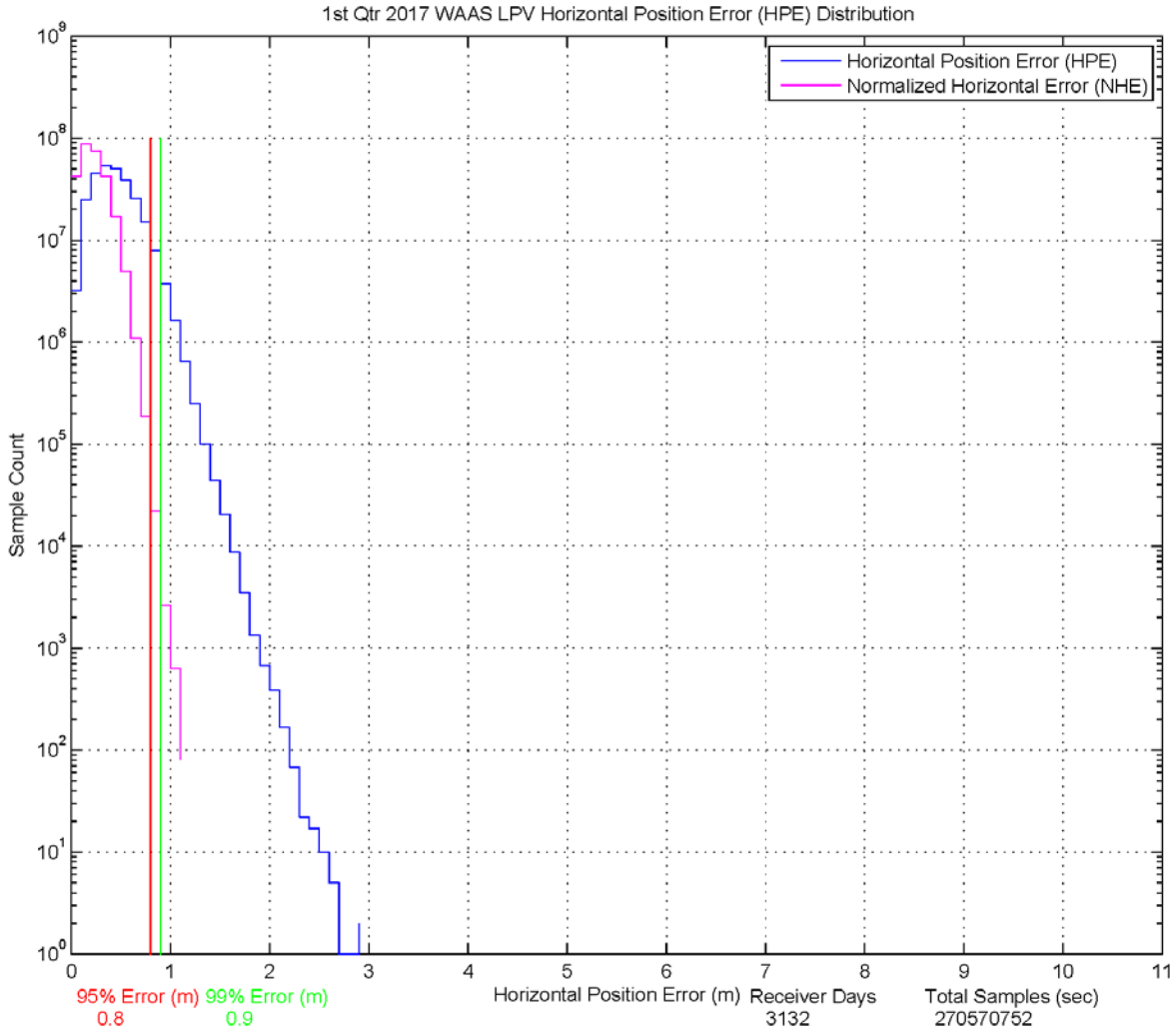
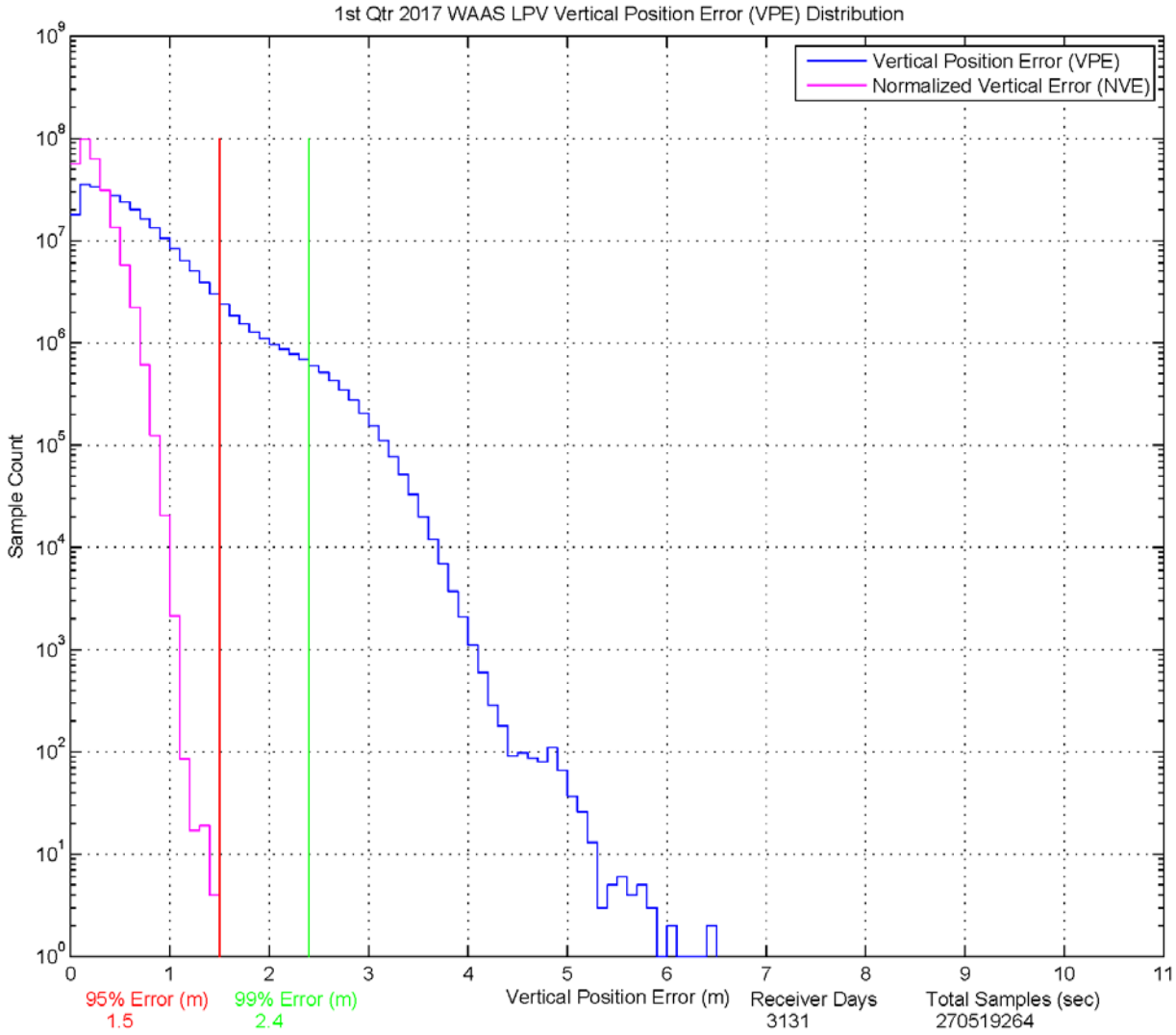


Figure 2-12 LPV 2-D Vertical Error Distribution Histogram



3.0 AVAILABILITY

The WAAS availability evaluation documents the percentage of time 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). The maximum and minimum VPL and HPL for this reporting period are listed as below:

- The maximum 99% CONUS HPL was 15.566 meters observed at Cleveland
- The maximum 99% CONUS VPL was 32.498 meters observed at Oakland
- The minimum 99% CONUS HPL was 10.966 meters observed at Denver
- The minimum 99% CONUS VPL was 18.525 meters observed at Kansas City
- The maximum 99% Alaska HPL was 20.604 meters observed at Cold Bay
- The maximum 99% Alaska VPL was 34.847 meters observed at Barrow
- The minimum 99% Alaska HPL was 13.086 meters observed at Juneau
- The minimum 99% Alaska VPL was 22.527 meters observed at Juneau

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 3-4 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.

Availability of NPA service is evaluated by monitoring the WAAS HPL at receiver locations. Service is available when the HPL is less than HAL of 556 meters. The service is unavailable when HPL exceeds the HAL or when 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 3-3 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.

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 listed below.

- January 4 – Telesat performed a switching of the propellant tanks on-board the satellite in order to clear propellant lines. Bubbles in the lines were causing maneuvers to be aborted by on-board sensors. This caused multiple aborted maneuvers and Do Not Use conditions on CRE. See ***DR 136***
- January 6 – Missed Maneuvers caused an alert to Not-Monitored and raised UDRE on PRN 138 causing a reduction in the LPV200 availability in CONUS.
- January 7 – Missed maneuvers caused an alert to Not-Monitored and raised UDRE on PRN 138 causing a reduction in the LPV200 availability in CONUS.
- January 8 – PRN 6 alerted to Not-Monitored which caused a reduction in LPV200 availability in CONUS.
- January 18 – A missed maneuver caused an alert to Not-Monitored and raised UDRE on PRN 138 causing a reduction in LPV200 availability in Canada.
- January 18 – Geomagnetic activity caused elevated GIVE values, which reduced LPV200 availability in Alaska.

- January 19 – A GUS Switchover on CRE caused a reduction in LPV200 availability in CONUS.
- January 19 – Local RFI at Washington DC caused a reduction and eventual loss of space vehicle (SV) tracking. The outage occurred from 13:00 GMT to 13:01 GMT
- January 19 – Local RFI at Miami caused a reduction and eventual loss of space vehicle (SV) tracking. The outage occurred from 18:57 GMT to 18:58 GMT.
- January 24 – Local RFI at Miami caused a reduction and eventual loss of space vehicle (SV) tracking. The outage occurred from 08:42 to 08:48 GMT.
- January 25 – Satellite maintenance caused elevated UDREs on PRN-17 and reduced LPV200 availability in Canada.
- January 25 – GPS Flex Power tests begin. The FAA Tech Center, as part of daily GPS and WAAS performance monitoring, observed several events linked to the increased power test on GPS L1. On 1/28, there was a WAAS Signal Quality Monitor(SQM) trip for PRN27. There were also UDRE Spikes observed on several GPS satellites for the duration of this testing. See ***DR 135***
- January 28 – There was a Signal Quality Monitor(SQM) on PRN 27. The alarm lasted from 00:16 GMT until it was cleared at 02:04 GMT. During that time, UDREs of PRN27 were set to "Do Not Use". This caused minor degradation of LPV200 service coverage in Canada from 00:17 GMT to 00:38 GMT. See ***DR 135***
- January 31 – Local RFI at Miami caused a reduction and eventual loss of space vehicle (SV) tracking. The outage occurred from 18:37 GMT to 18:39 GMT.
- February 2 – Local RFI at Miami caused a reduction and eventual loss of space vehicle (SV) tracking. The outage occurred from 23:14 GMT to 23:15 GMT.
- February 4 – Local RFI at Miami caused a reduction and eventual loss of space vehicle (SV) tracking. The outage occurred from 08:54 GMT to 08:56 GMT.
- February 6 – Local RFI at Miami caused a reduction and eventual loss of space vehicle (SV) tracking. The outage occurred from 11:09 GMT to 11:11 GMT.
- February 7 – Satellite maintenance caused elevated UDRES on PRN-7, PRN-5, and PRN-31 and reduced LPV200 availability in Alaska and Canada.
- February 9 - Local RFI at Washington DC caused a reduction and eventual loss of space vehicle (SV) tracking. The outage occurred from 13:29 GMT to 13:31 GMT.
- February 15 – A GUS Switchover on CRW caused a reduction in LPV200 availability in Alaska.
- February 18 – A GUS Switchover on CRW caused a reduction in LPV200 availability in Alaska.
- February 24 – Local RFI at Miami caused a reduction and eventual loss of space vehicle (SV) tracking. The outage occurred from 16:52 GMT to 16:53 GMT.
- February 25 – A GUS Switchover on CRW caused a reduction in LPV200 availability in Alaska.
- February 27 – Local RFI at Washington DC caused a reduction and eventual loss of space vehicle (SV) tracking. The outage occurred from 19:50 GMT to 19:51 GMT.
- March 2 – L2 Carrier Phase Scintillation. During times of increased ionospheric activity, receivers have experienced GPS UDRE internal threshold trips on satellites where they receive bad L2 measurements. The UDREi bumps on those satellites have caused minor loss of WAAS coverage. See ***DR 137***
- March 8 – A GUS Switchover on CRE caused a reduction in LPV200 availability in Canada.
- March 8 – Satellite maintenance caused elevated UDRES on PRN-30 and reduced LPV200 availability in Alaska.
- March 14 – A GUS Switchover on CRW caused a reduction in LPV200 availability in Alaska.
- March 16 – A GUS Switchover on CRE caused a reduction in LPV200 availability in Alaska.
- March 21 - Local RFI at Miami caused a reduction and eventual loss of space vehicle (SV) tracking. The outage occurred from 15:41 to 15:42 GMT.
- March 23 – Satellite maintenance caused elevated UDRES on PRN-7 and reduced LPV200 availability in Alaska and Canada.
- March 27 – A GUS Switchover on CRE caused a reduction in LPV200 availability in Canada.

Table 3-1 99% Protection Level

Location	99% HPL (meters)	99% VPL (meters)	Percentage in PA mode
Arcata	15.557	29.930	100
Atlantic City	15.409	23.072	100
Grand Forks	14.324	21.780	100
Oklahoma City	11.121	19.011	100
Albuquerque	11.118	20.639	100
Anchorage	13.535	22.663	100
Atlanta	12.959	22.760	100
Barrow	15.940	34.847	99.999340
Bethel	15.788	25.773	100
Billings	12.365	19.205	100
Boston	14.345	20.938	100
Chicago	12.577	21.401	100
Cleveland	15.566	22.438	100
Cold Bay	20.604	29.069	100
Dallas	11.193	19.111	100
Denver	10.966	19.252	100
Fairbanks	13.348	24.135	100
Gander	24.910	35.699	100
Goose Bay	22.103	26.785	100
Houston	11.400	21.188	100
Iqaluit	30.179	37.646	100
Jacksonville	12.734	23.561	100
Juneau	13.086	22.527	100
Kansas City	11.100	18.525	100
Kotzebue	15.638	29.980	99.999340
Los Angeles	14.561	28.040	100
Memphis	12.081	20.672	100
Merida	20.908	39.035	100
Mexico City	24.798	43.165	100
Miami	13.201	26.736	100
Minneapolis	12.820	20.205	100
New York	13.567	21.070	100
Oakland	14.543	32.498	100
Puerto Vallarta	23.154	47.849	100
Salt Lake City	11.731	21.176	100
San Jose Del Cabo	23.111	45.215	100
Seattle	13.333	21.914	100
Washington DC	14.807	23.313	100
Winnipeg	13.633	21.148	100

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	99.98
Atlantic City	100	100	100
Grand Forks	100	100	100
Oklahoma City	100	100	100
Albuquerque	100	100	100
Anchorage	100	100	100
Atlanta	100	100	100
Barrow	100	99.98	98.76
Bethel	100	100	100
Billings	100	100	100
Boston	100	100	100
Chicago	100	100	100
Cleveland	100	100	100
Cold Bay	100	100	99.95
Dallas	100	100	100
Denver	100	100	100
Fairbanks	100	100	99.99
Gander	100	99.99	98.1
Goose Bay	100	100	99.99
Houston	100	100	100
Iqaluit	100	99.98	96.03
Jacksonville	100	100	100
Juneau	100	100	100
Kansas City	100	100	100
Kotzebue	100	100	99.95
Los Angeles	100	100	100
Memphis	100	100	100
Merida	100	100	97.12
Mexico City	100	99.54	93.57
Miami	100	100	99.98
Minneapolis	100	100	100
New York	100	100	100
Oakland	100	100	99.33
Puerto Vallarta	100	99.21	94.39
Salt Lake City	100	100	100
San Jose Del Cabo	100	99.98	94.18
Seattle	100	100	100
Washington DC	100	100	100
Winnipeg	100	100	100

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

Location	NPA Availability (Excluding RAIM/FDE)
Albuquerque	1
Anchorage	1
Atlanta	1
Barrow	0.99999858
Bethel	1
Billings	1
Boston	1
Cleveland	1
Cold Bay	1
Fairbanks	1
Gander	1
Honolulu	1
Houston	1
Iqaluit	1
Juneau	1
Kansas City	1
Kotzebue	0.99999858
Los Angeles	1
Merida	1
Miami	1
Minneapolis	1
Oakland	1
Salt Lake City	1
San Jose Del Cabo	1
San Juan	1
Seattle	1
Tapachula	1
Washington DC	1

Table 3-4 LPV and LPV200 Outage Rate (Per 150 sec approach)

Location	LP Outages	LP Outage Rates	LPV Outages	LPV Outage Rates	LPV 200 Outages	LPV 200 Outage Rates
Arcata	0	0	0	0	37	0.000725
Atlantic City	0	0	0	0	0	0
Grand Forks	0	0	0	0	0	0
Oklahoma City	0	0	0	0	0	0
Albuquerque	0	0	0	0	1	0.000019
Anchorage	0	0	1	0.000019	1	0.000019
Atlanta	0	0	0	0	0	0
Barrow	2	0.000039	10	0.000195	165	0.003261
Bethel	0	0	0	0	0	0
Billings	0	0	0	0	0	0
Boston	0	0	0	0	0	0
Chicago	0	0	0	0	0	0
Cleveland	0	0	0	0	0	0
Cold Bay	0	0	0	0	3	0.000059
Dallas	0	0	0	0	0	0
Denver	0	0	0	0	1	0.000019
Fairbanks	0	0	0	0	7	0.000137
Gander	0	0	1	0.000019	194	0.003823
Goose Bay	0	0	0	0	2	0.000039
Houston	0	0	0	0	0	0
Iqaluit	5	0.000097	12	0.000232	372	0.007489
Jacksonville	0	0	0	0	0	0
Juneau	0	0	0	0	0	0
Kansas City	0	0	0	0	0	0
Kotzebue	3	0.000059	4	0.000078	41	0.000801
Los Angeles	0	0	0	0	1	0.000019
Memphis	0	0	0	0	0	0
Merida	0	0	2	0.000039	245	0.004881
Mexico City	0	0	102	0.001982	469	0.009697
Miami	0	0	3	0.000058	10	0.000193
Minneapolis	0	0	0	0	0	0
New York	0	0	1	0.000019	1	0.000019
Oakland	0	0	0	0	91	0.001774
Puerto Vallarta	0	0	144	0.002837	491	0.010167
Salt Lake City	0	0	0	0	0	0
San Jose Del Cabo	0	0	18	0.000348	327	0.006714
Seattle	0	0	0	0	0	0
Washington DC	1	0.000019	1	0.000019	2	0.000039
Winnipeg	0	0	0	0	0	0

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

Location	NPA Outages	NPA Outage Rate
Albuquerque	0	0
Anchorage	0	0
Atlanta	0	0
Barrow	1	0.000019
Bethel	0	0
Billings	0	0
Boston	0	0
Cleveland	0	0
Cold Bay	0	0
Fairbanks	0	0
Gander	0	0
Honolulu	0	0
Houston	0	0
Iqaluit	0	0
Juneau	0	0
Kansas City	0	0
Kotzebue	1	0.000019
Los Angeles	0	0
Merida	0	0
Miami	0	0
Minneapolis	0	0
Oakland	0	0
Salt Lake City	0	0
San Jose Del Cabo	0	0
San Juan	0	0
Seattle	0	0
Tapachula	0	0
Washington DC	0	0

Figure 3-1 LPV Instantaneous Availability

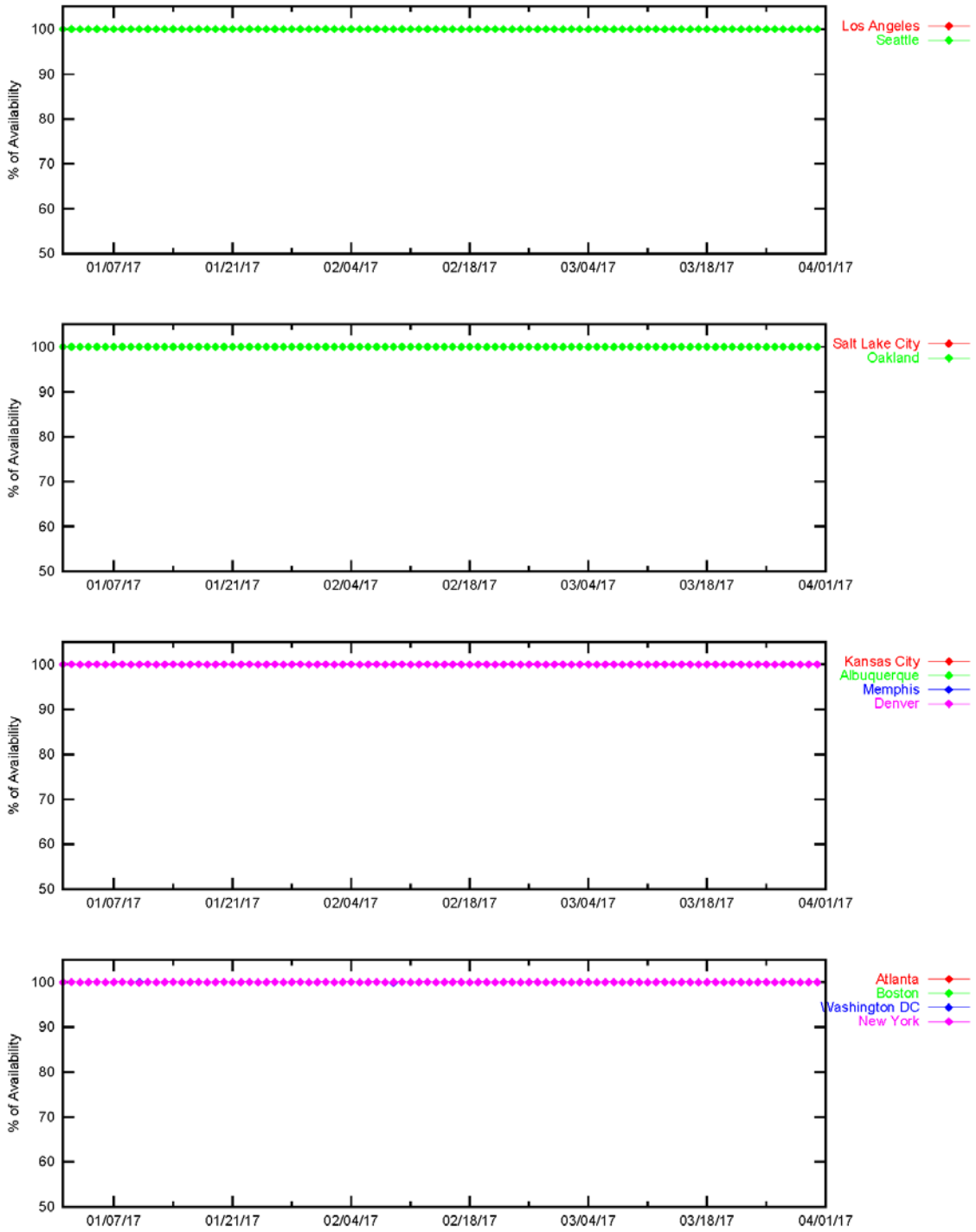


Figure 3-2 LPV Instantaneous Availability

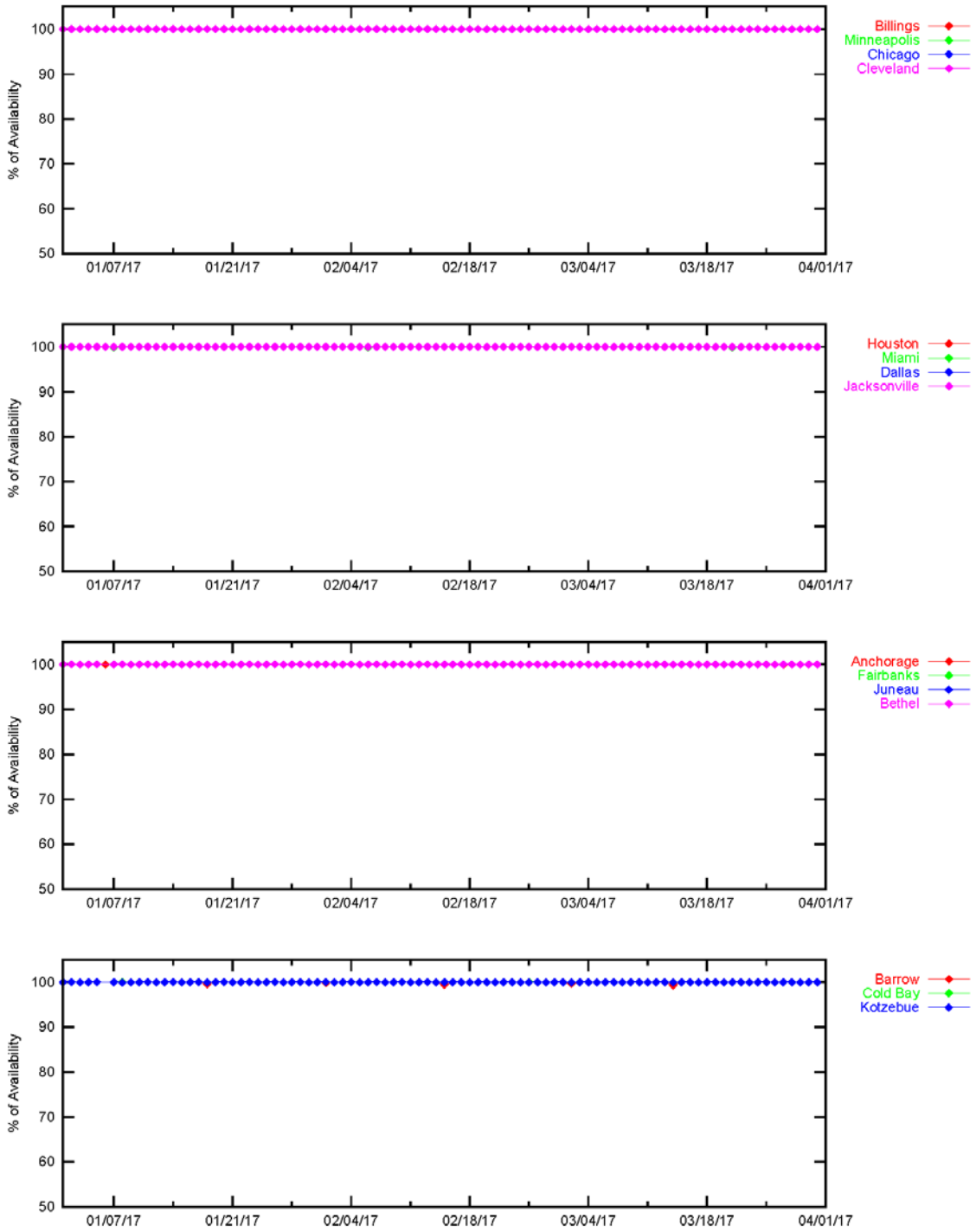


Figure 3-3 LPV Instantaneous Availability

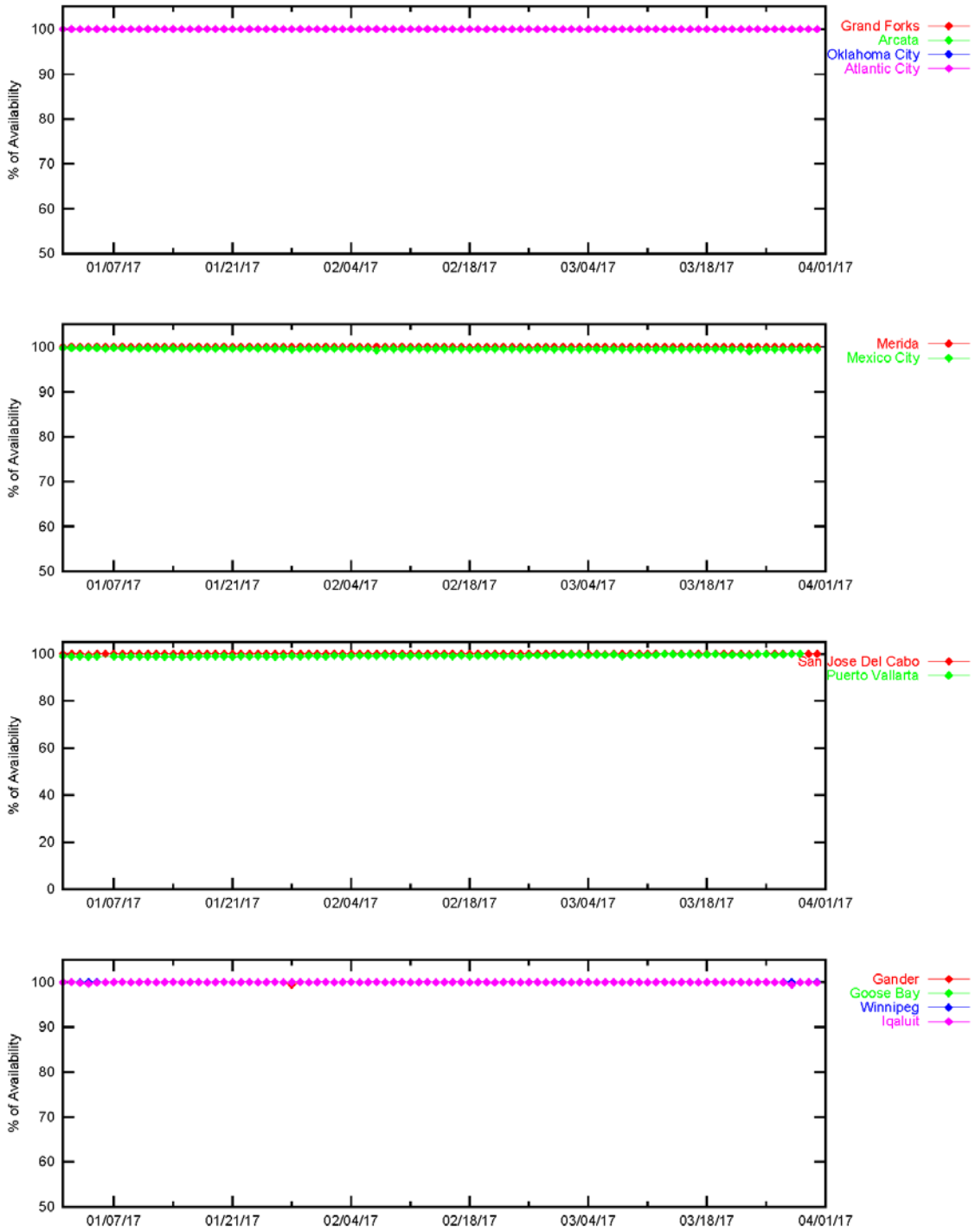


Figure 3-4 LPV200 Instantaneous Availability

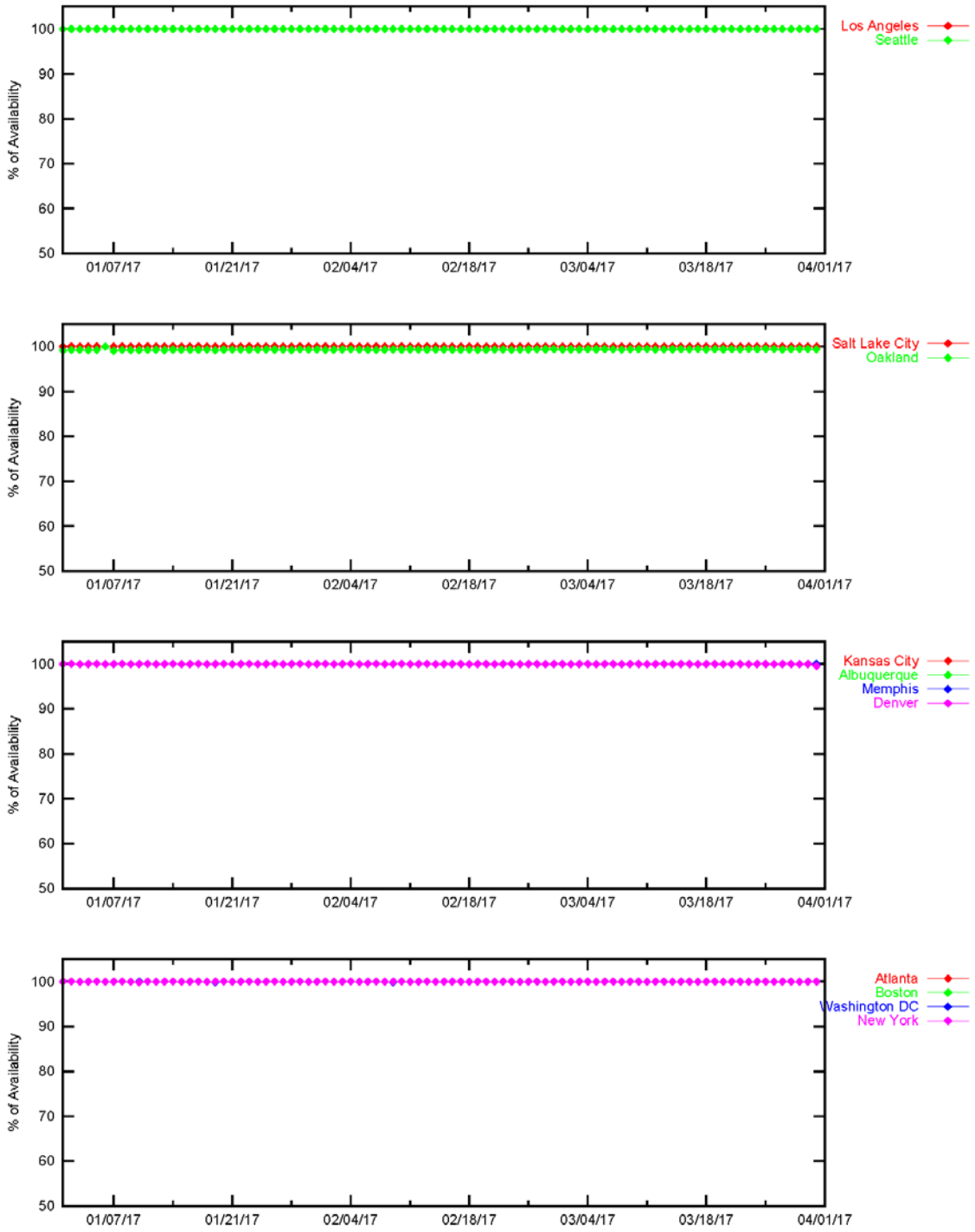


Figure 3-5 LPV200 Instantaneous Availability

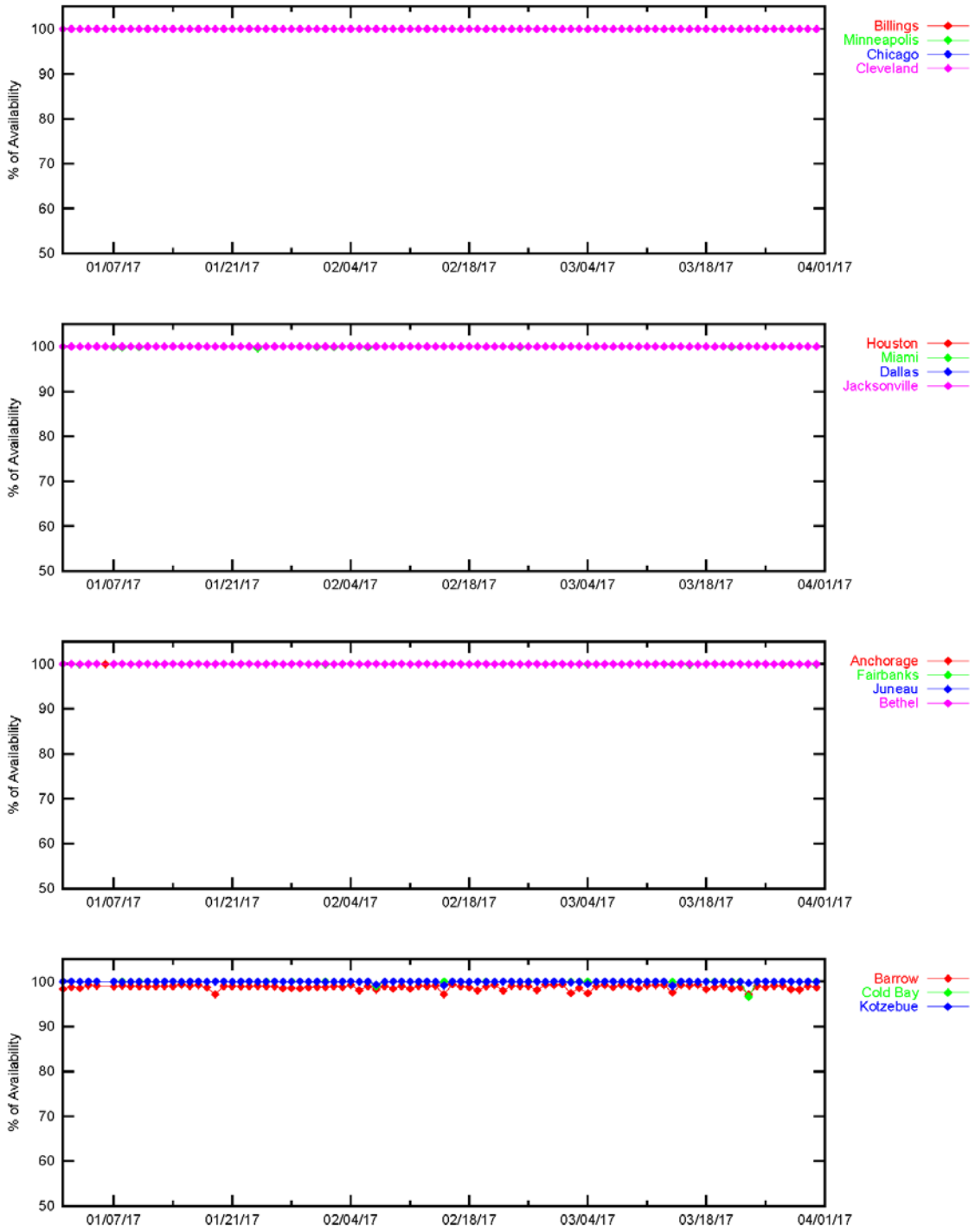


Figure 3-6 LPV200 Instantaneous Availability

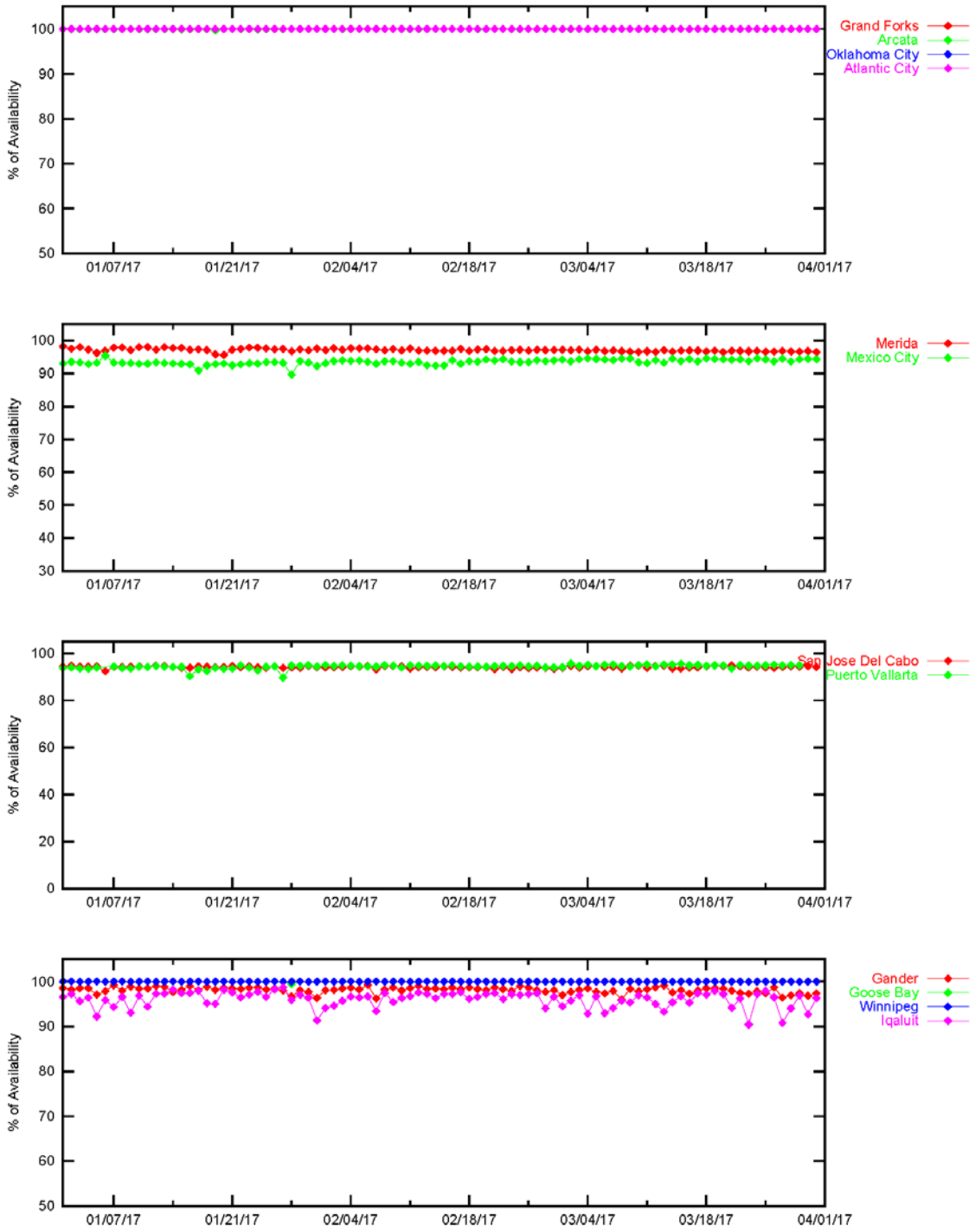


Figure 3-7 LPV Outages

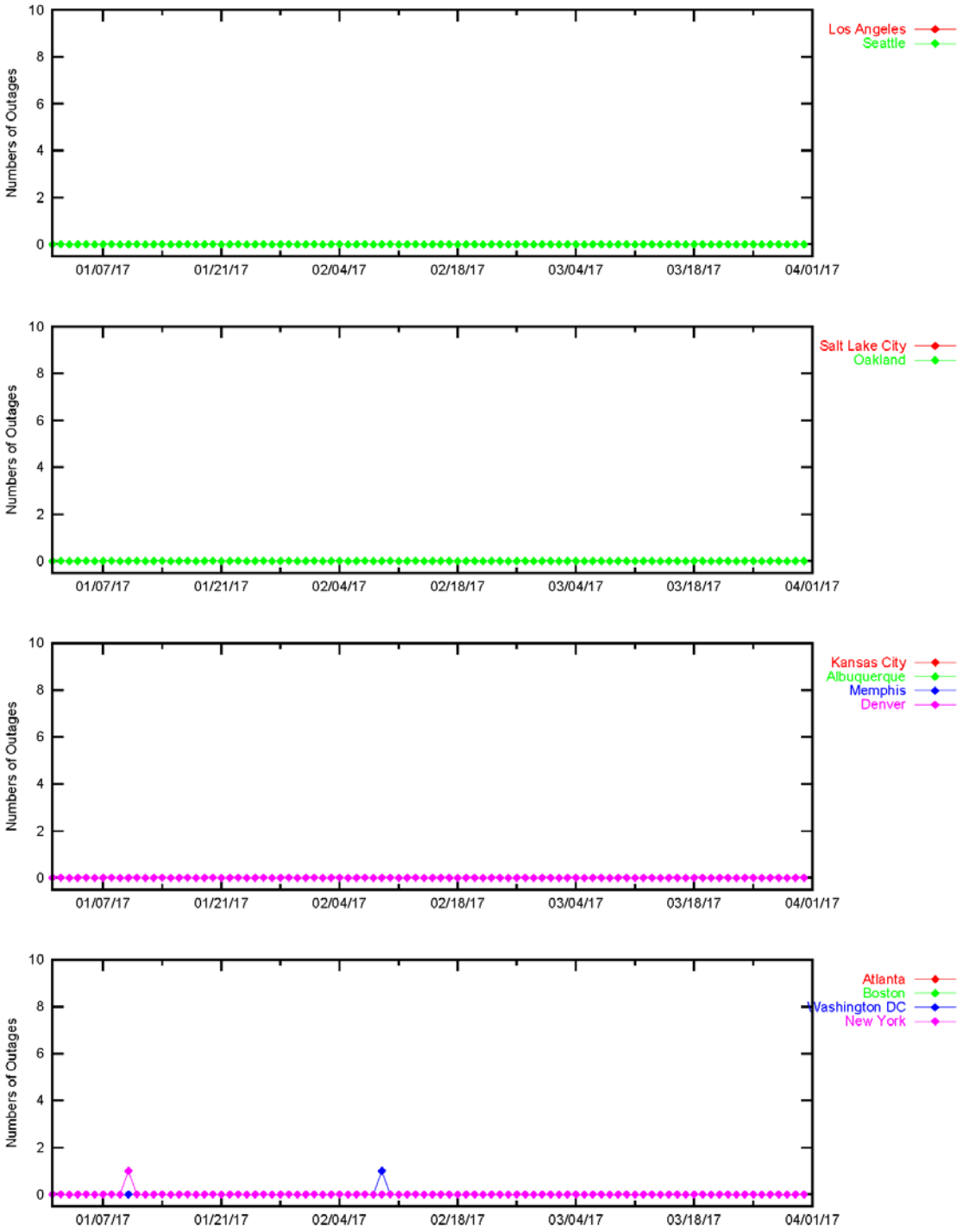


Figure 3-8 LPV Outages

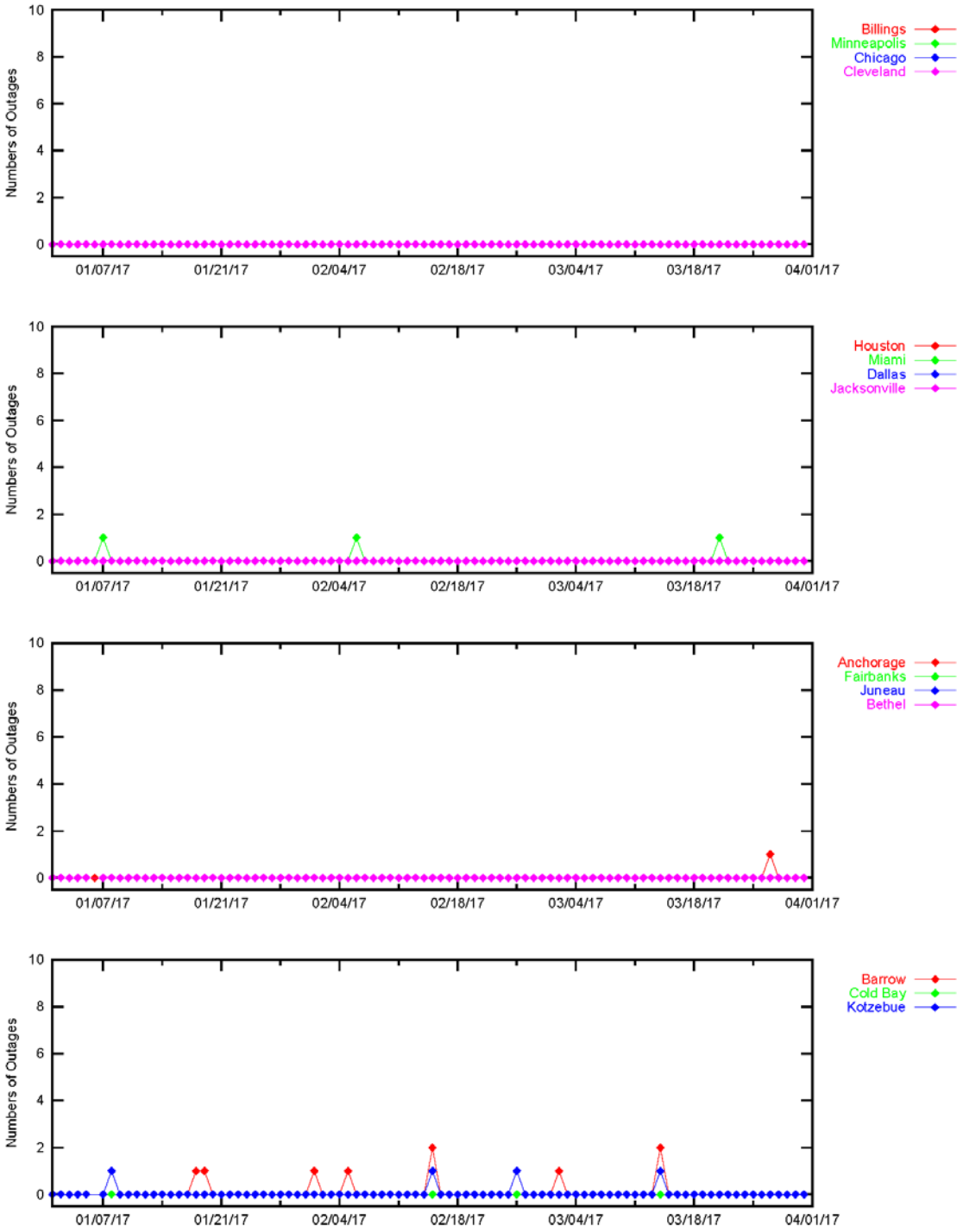


Figure 3-9 LPV Outages

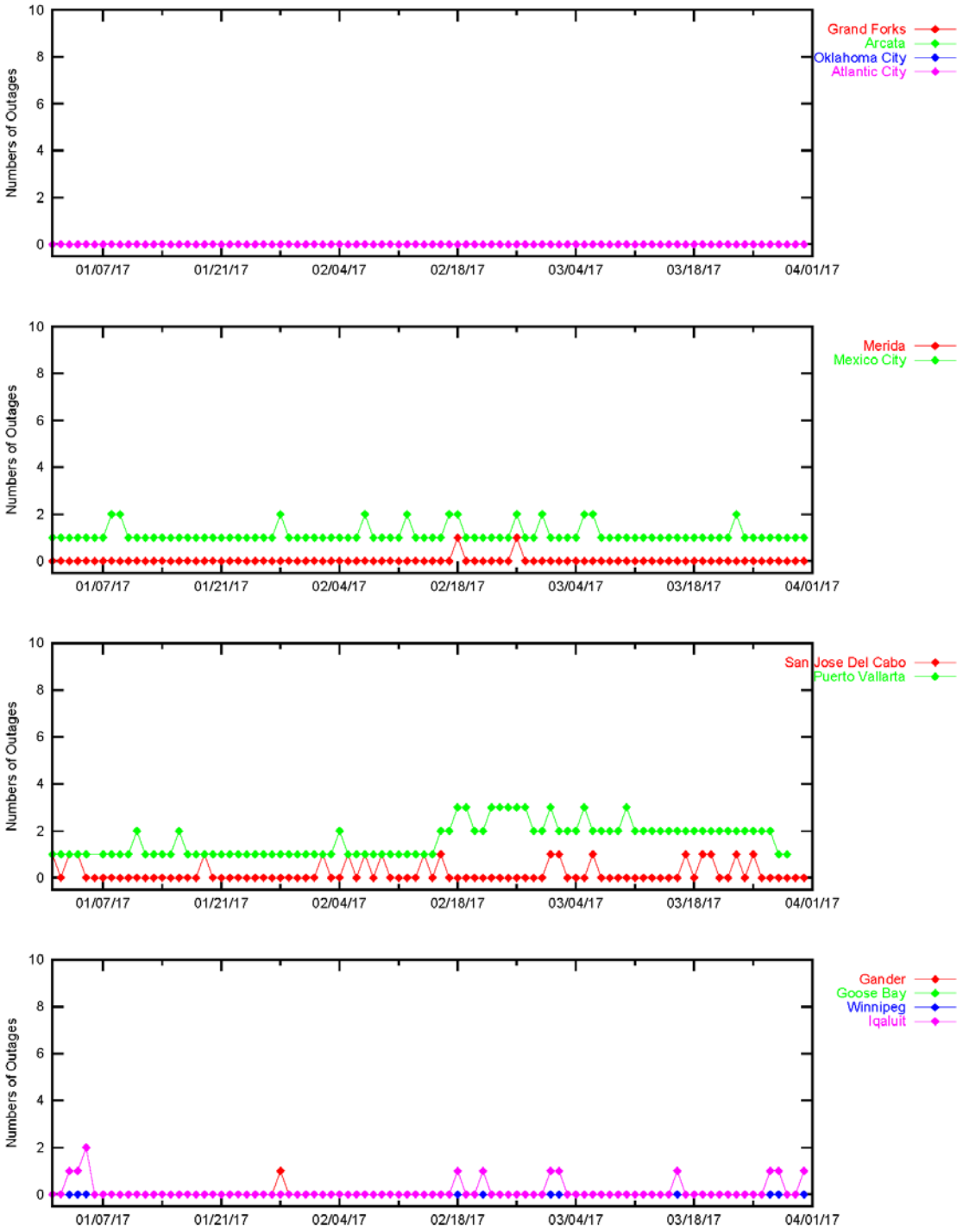


Figure 3-10 LPV200 Outages

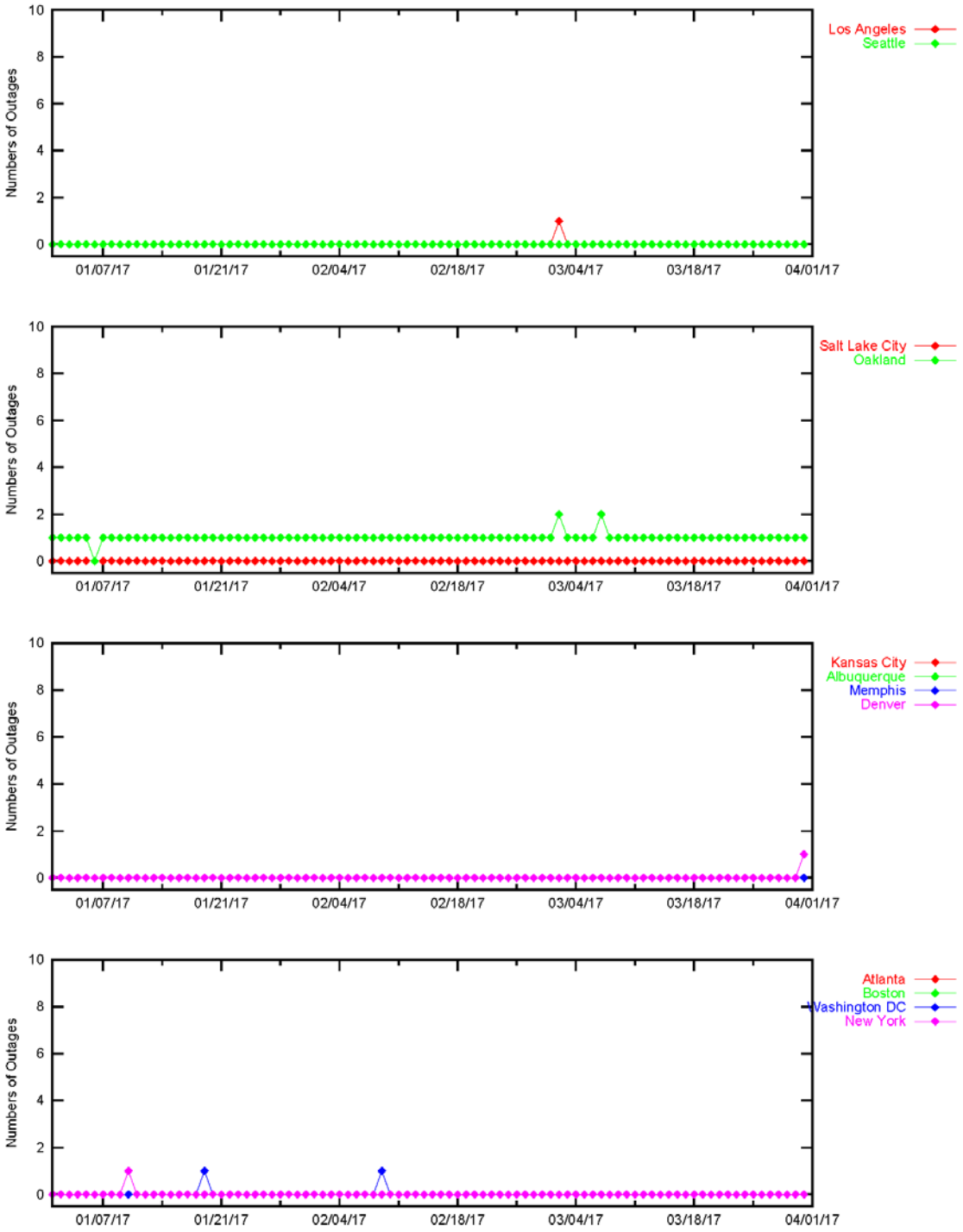


Figure 3-11 LPV200 Outages

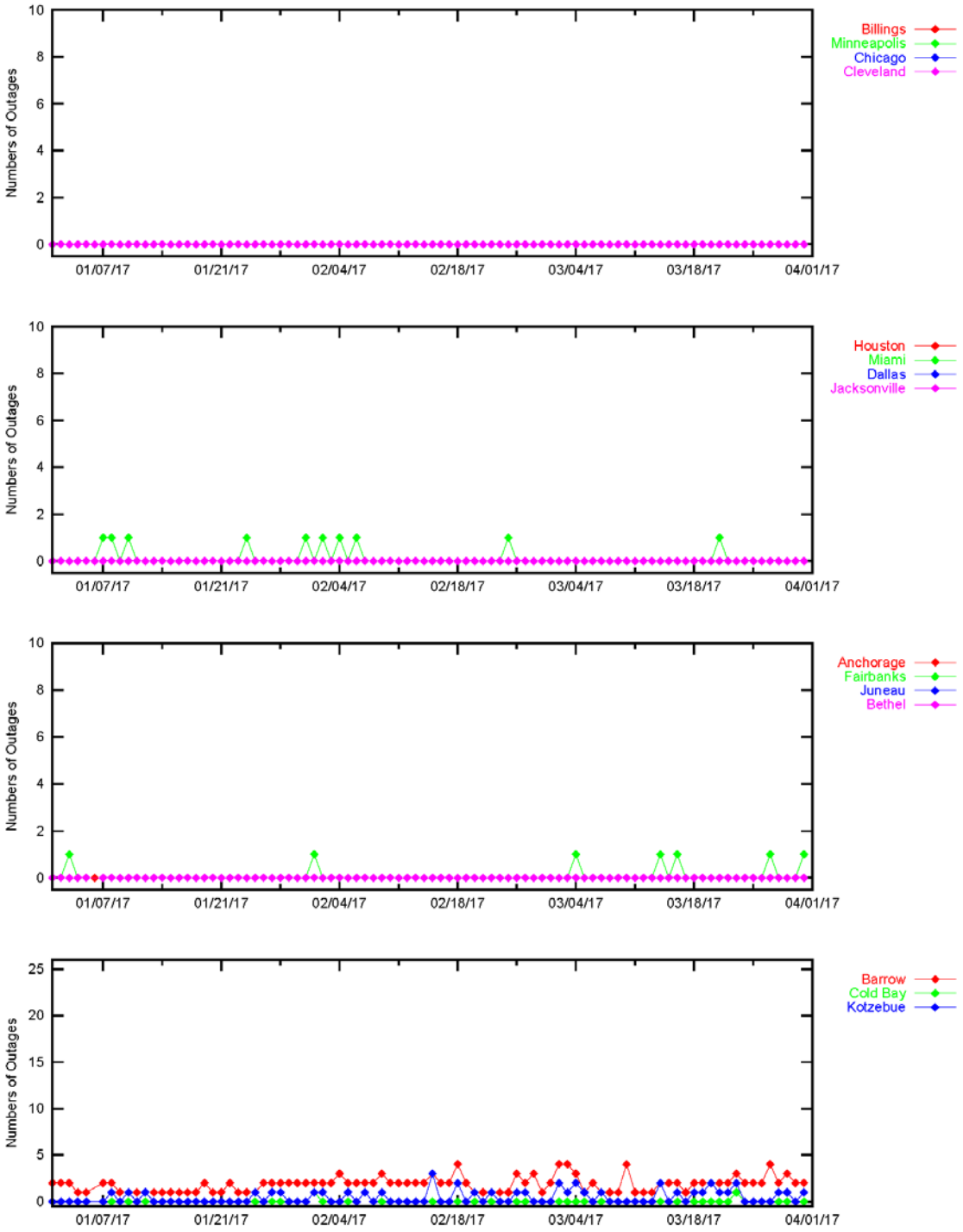
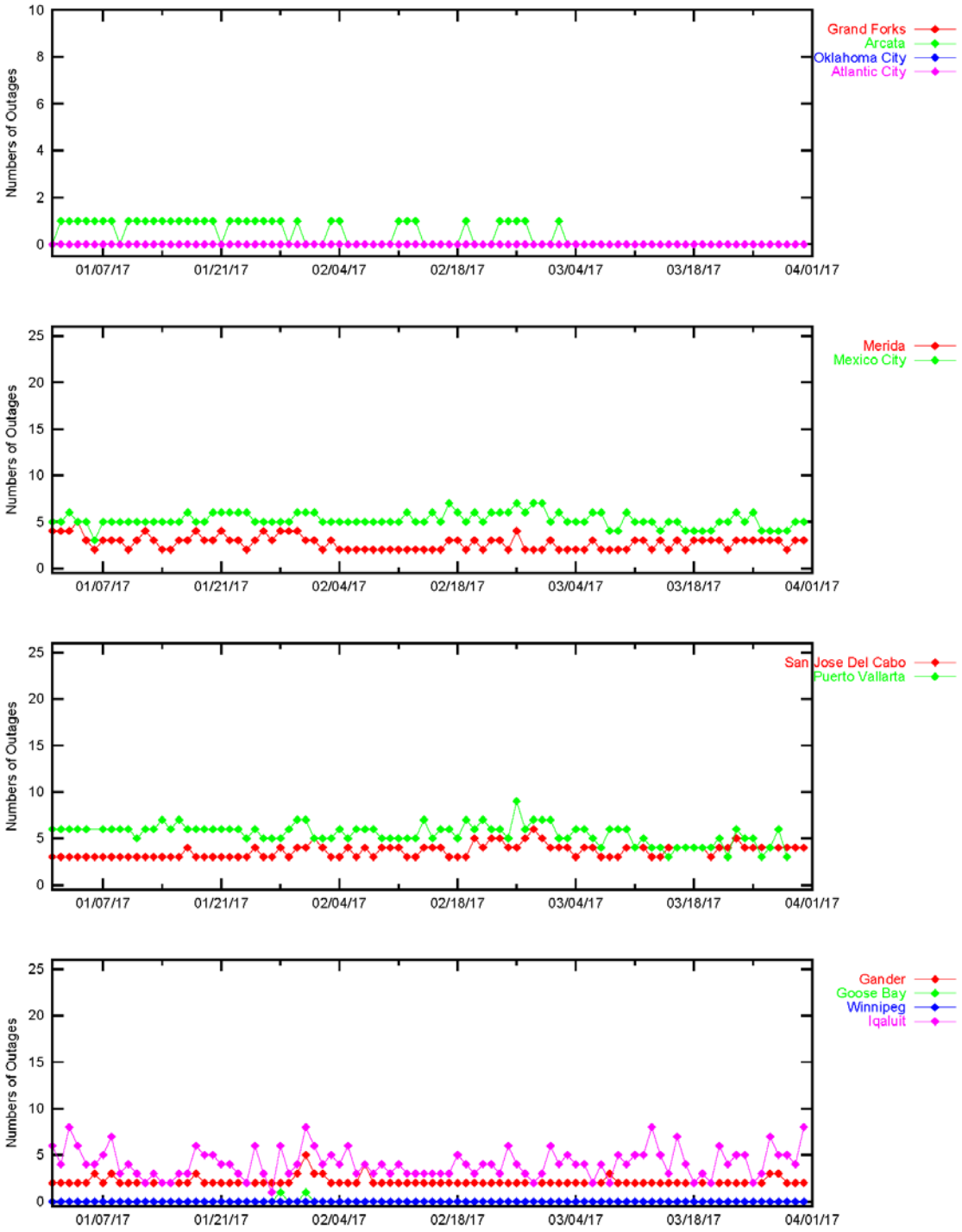


Figure 3-12 LPV200 Outages



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 one-degree spacing over the PA service volume, while for NPA coverage, the protection levels were calculated at 30-second intervals at five-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 4-6 shows the daily LPV and LPV200 CONUS coverage, Figure 4-7 shows the daily LPV Alaska coverage at 99% availability and ionosphere Kp index values, and Figure 4-8 shows the daily LPV and LPV200 Canada coverage at 99% availability and ionosphere Kp index values. See Appendix B 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.

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 4-4 shows the rollup RNP 0.1 coverage and Figure 4-5 shows the rollup RNP 0.3 coverage for the quarter. Figure 4-9 shows the daily RNP coverage at 100% availability and ionosphere Kp index values for this quarter.

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

- January 4 – Telesat performed a switching of the propellant tanks on-board the satellite in order to clear propellant lines. Bubbles in the lines were causing maneuvers to be aborted by on-board sensors. This caused multiple aborted maneuvers and Do Not Use conditions on CRE. See ***DR 136***
- January 6 – Missed Maneuvers caused an alert to Not-Monitored and raised UDRE on PRN 138 causing a reduction in the LPV200 coverage in CONUS.
- January 7 – Missed maneuvers caused an alert to Not-Monitored and raised UDRE on PRN 138 causing a reduction in the LPV200 coverage in CONUS.
- January 8 – PRN 6 alerted to Not-Monitored which caused a reduction in LPV200 coverage in CONUS.
- January 18 – A missed maneuver caused an alert to Not-Monitored and raised UDRE on PRN 138 causing a reduction in LPV200 coverage in Canada.
- January 18 – Geomagnetic activity caused elevated GIVE values, which reduced LPV200 coverage in Alaska.
- January 19 – A GUS Switchover on CRE caused a reduction in LPV200 coverage in CONUS.
- January 25 – Satellite maintenance caused elevated UDREs on PRN-17 and reduced LPV200 coverage in Canada.
- January 25 – GPS Flex Power tests begin. The FAA Tech Center, as part of daily GPS and WAAS performance monitoring, observed several events linked to the increased power test on GPS L1. On 1/28, there was a WAAS Signal Quality Monitor(SQM) trip for PRN27. There were also UDRE Spikes observed on several GPS satellites for the duration of this testing. See ***DR 135***
- January 28 – There was a Signal Quality Monitor(SQM) on PRN 27. The alarm lasted from 00:16 GMT until it was cleared at 02:04 GMT. During that time, UDREs of PRN27 were set to "Do Not Use". This caused minor degradation of LPV200 service coverage in Canada from 00:17 GMT to 00:38 GMT. See ***DR 135***
- February 7 – Satellite maintenance caused elevated UDRES on PRN-7, PRN-5, and PRN-31 and reduced LPV200 coverage in Alaska and Canada.
- February 15 – A GUS Switchover on CRW caused a reduction in LPV200 coverage in Alaska.
- February 18 – A GUS Switchover on CRW caused a reduction in LPV200 coverage in Alaska.

- February 25 – A GUS Switchover on CRW caused a reduction in LPV200 coverage in Alaska.
- March 2 – L2 Carrier Phase Scintillation. During times of increased ionospheric activity, receivers have experienced GPS UDRE internal threshold trips on satellites where they receive bad L2 measurements. The UDREi bumps on those satellites have caused minor loss of WAAS coverage. See ***DR 137***
- March 8 – A GUS Switchover on CRE caused a reduction in LPV200 coverage in Canada.
- March 8 – Satellite maintenance caused elevated UDRES on PRN-30 and reduced LPV200 coverage in Alaska.
- March 14 – A GUS Switchover on CRW caused a reduction in LPV200 coverage in Alaska.
- March 16 – A GUS Switchover on CRE caused a reduction in LPV200 coverage in Alaska.
- March 23 – Satellite maintenance caused elevated UDRES on PRN-7 and reduced LPV200 availability in Alaska and Canada.
- March 27 – A GUS Switchover on CRE caused a reduction in LPV200 coverage in Canada.

Figure 4-1 LP North America Coverage for the Quarter

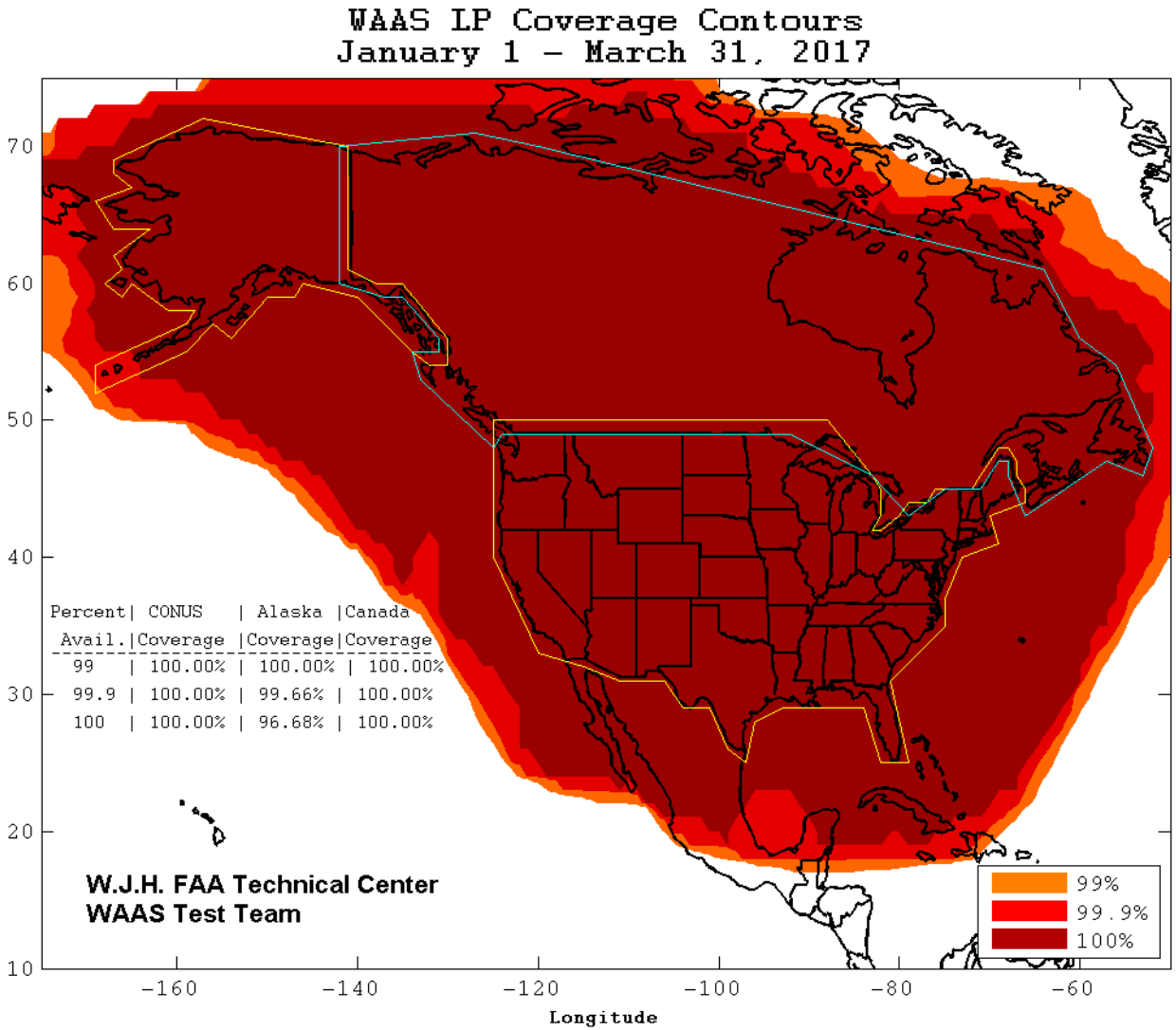


Figure 4-2 LPV North America Coverage for the Quarter

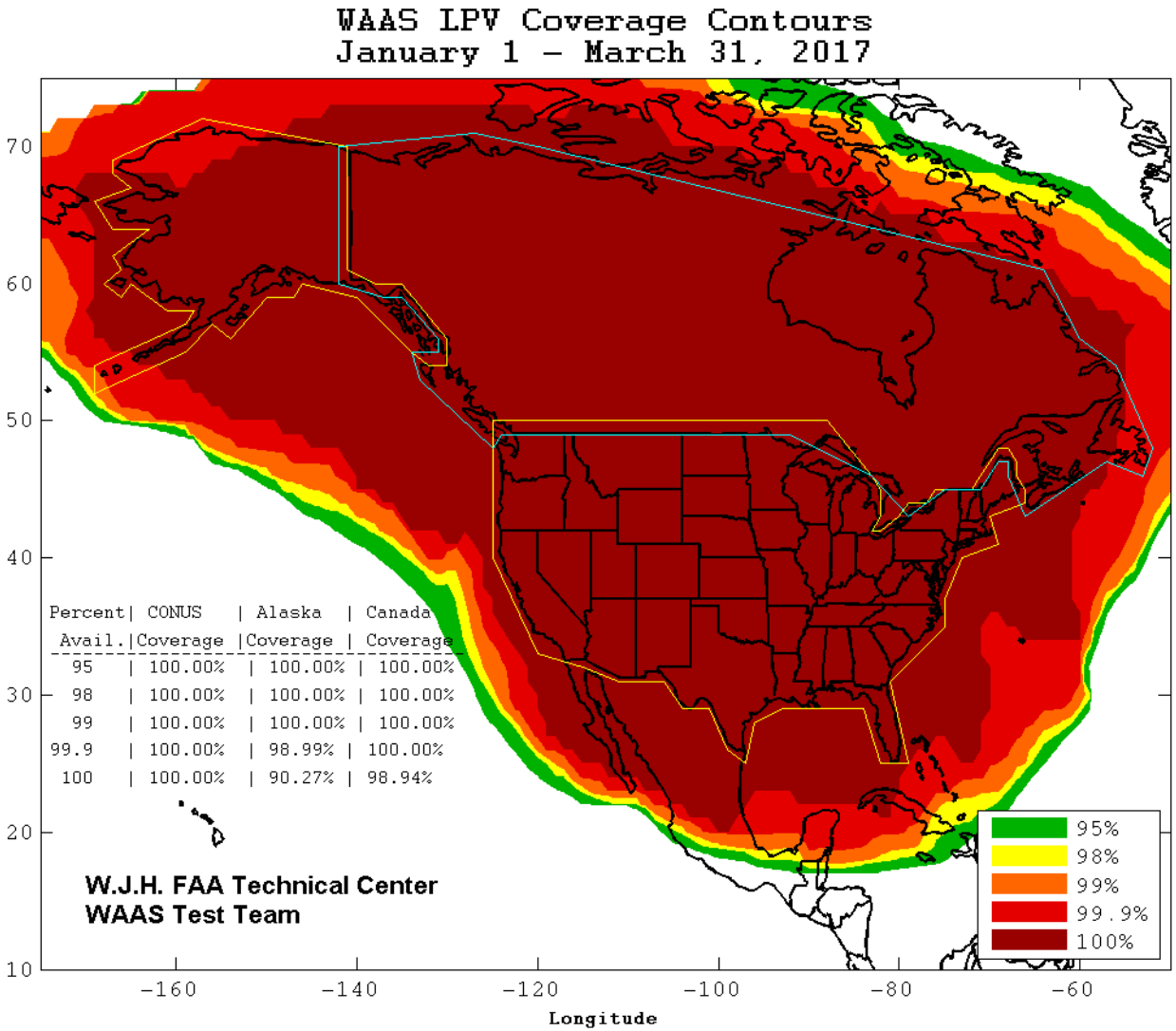


Figure 4-3 LPV200 North America Coverage for the Quarter

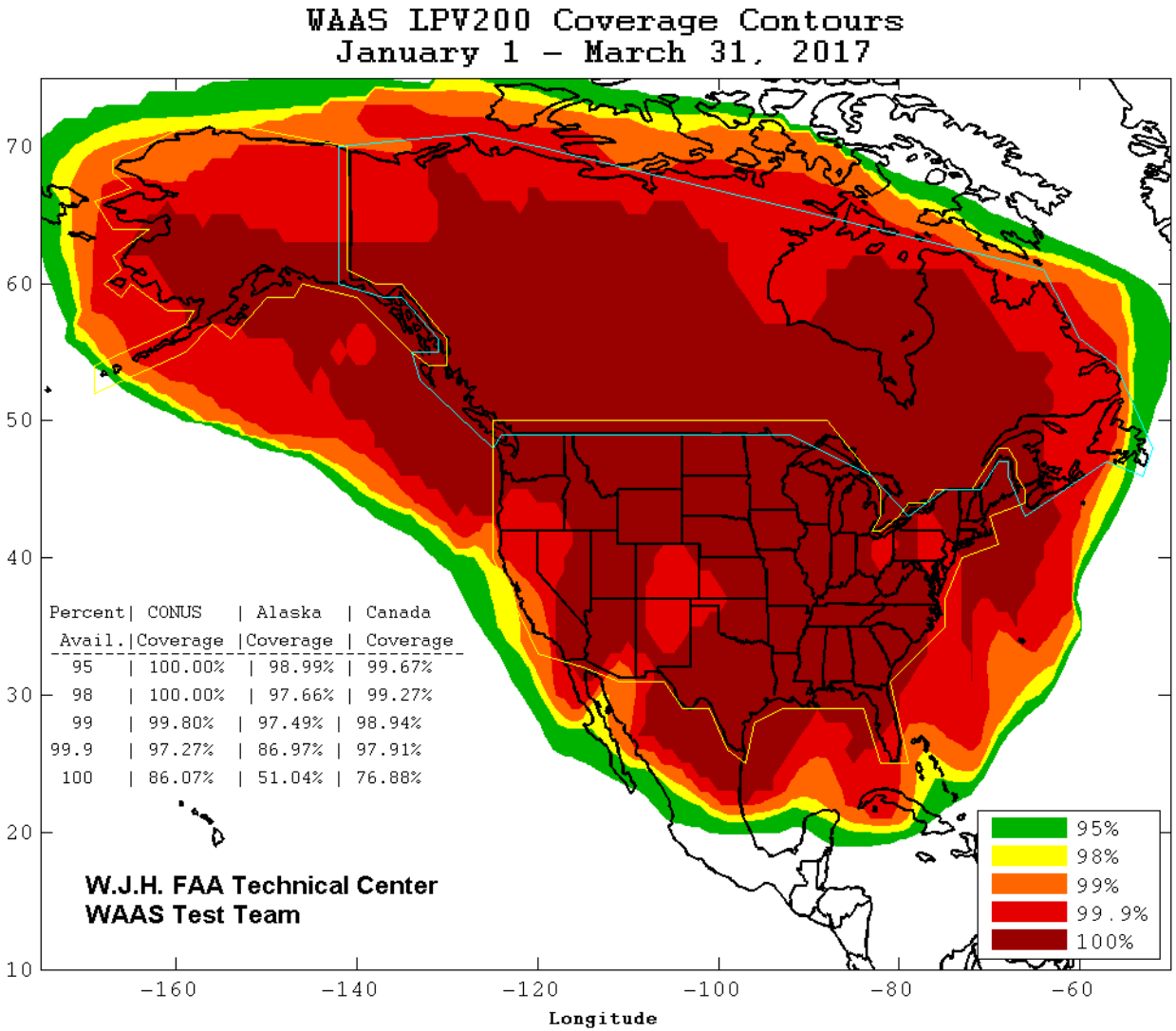


Figure 4-4 RNP 0.1 Coverage for the Quarter

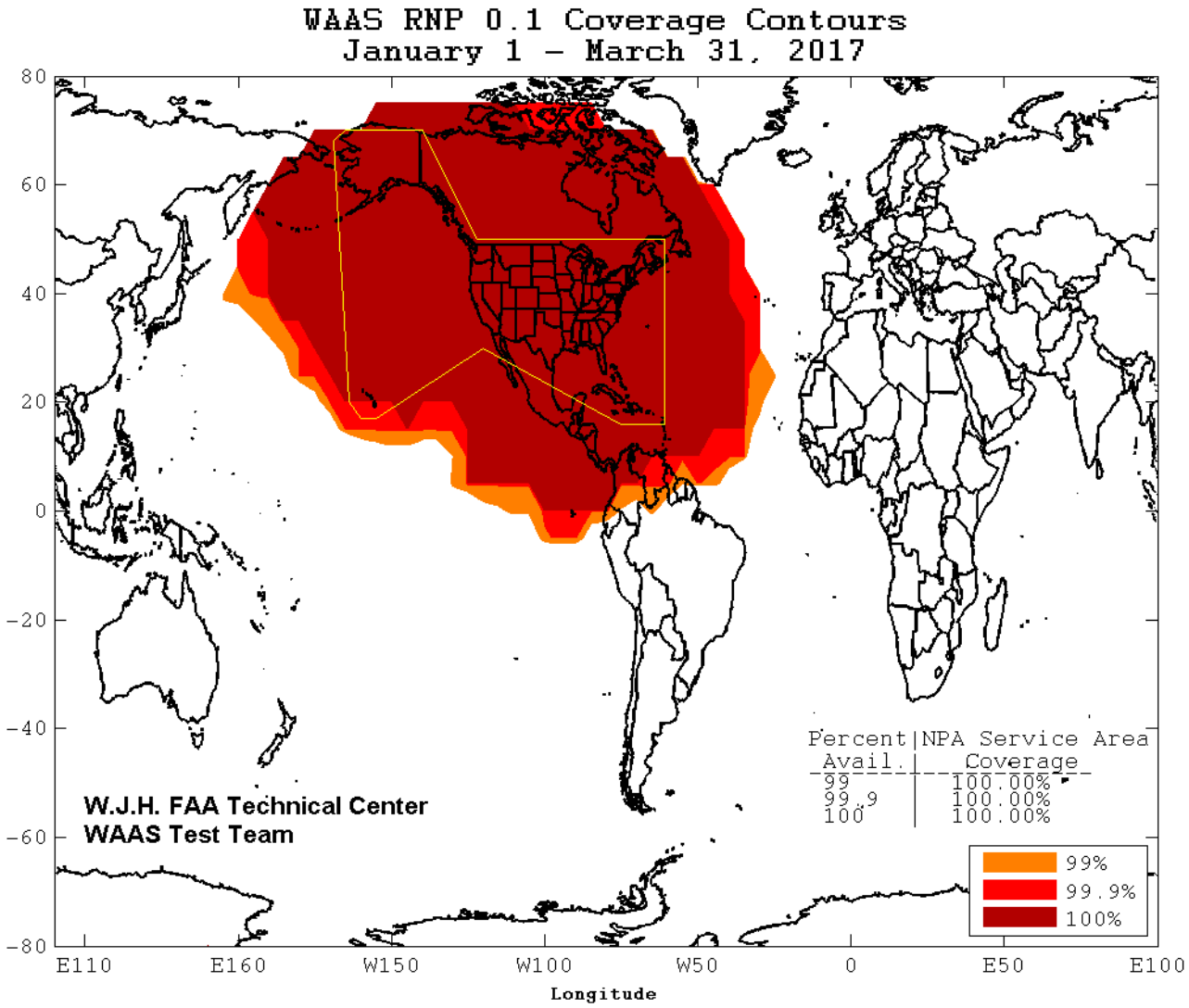


Figure 4-5 RNP 0.3 Coverage for the Quarter

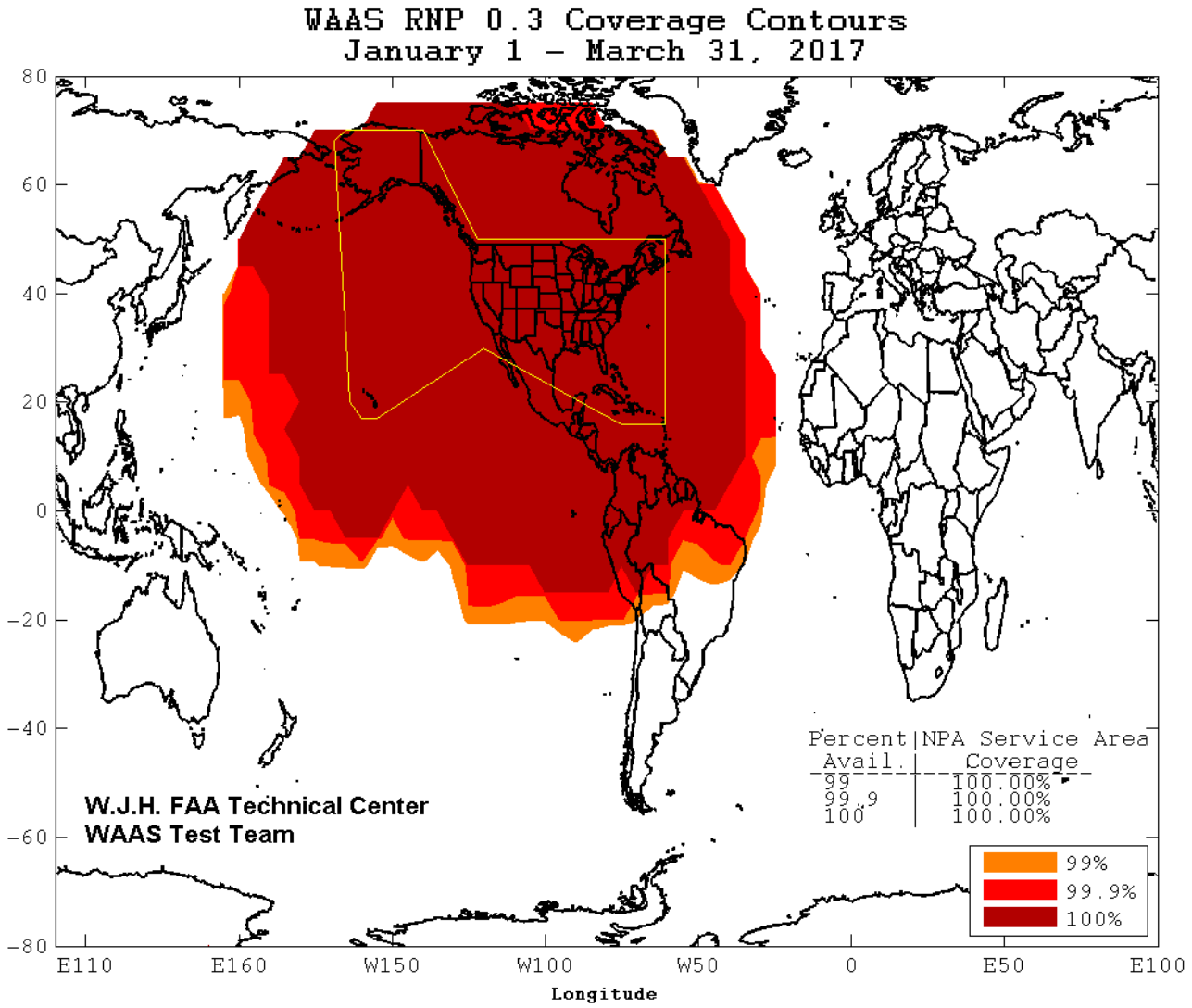


Figure 4-6 Daily LPV and LPV200 CONUS Coverage

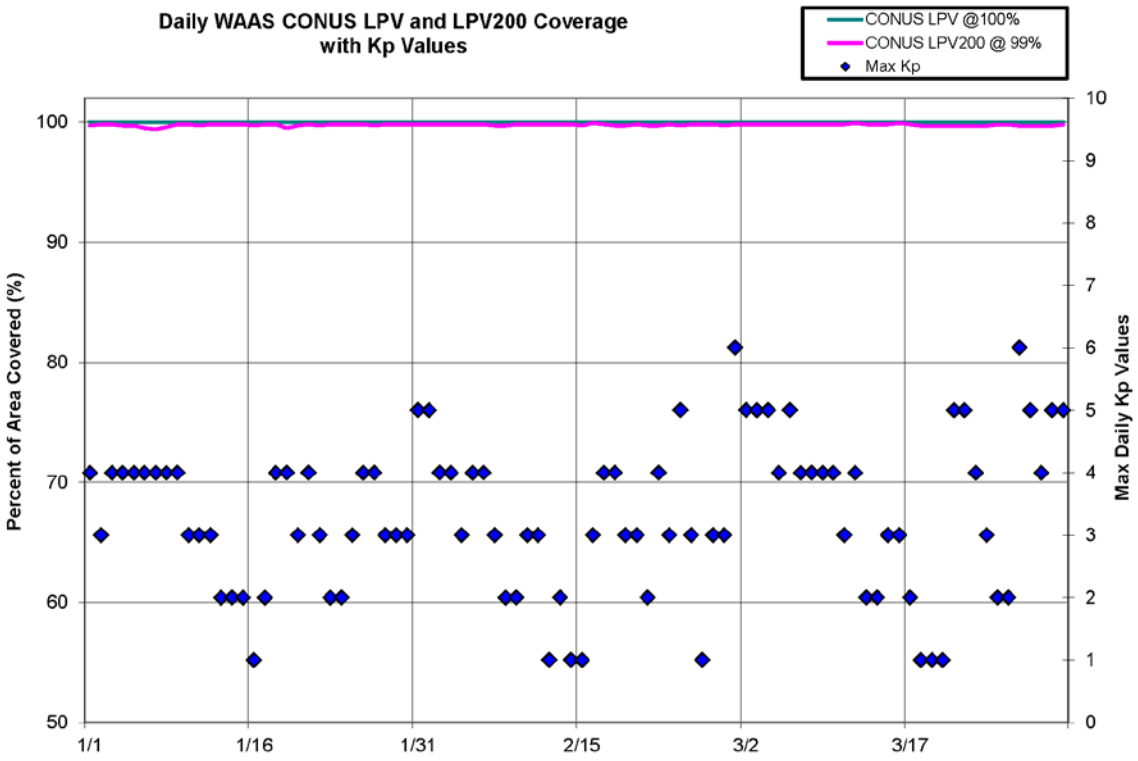


Figure 4-7 Daily LPV and LPV200 Alaska Coverage

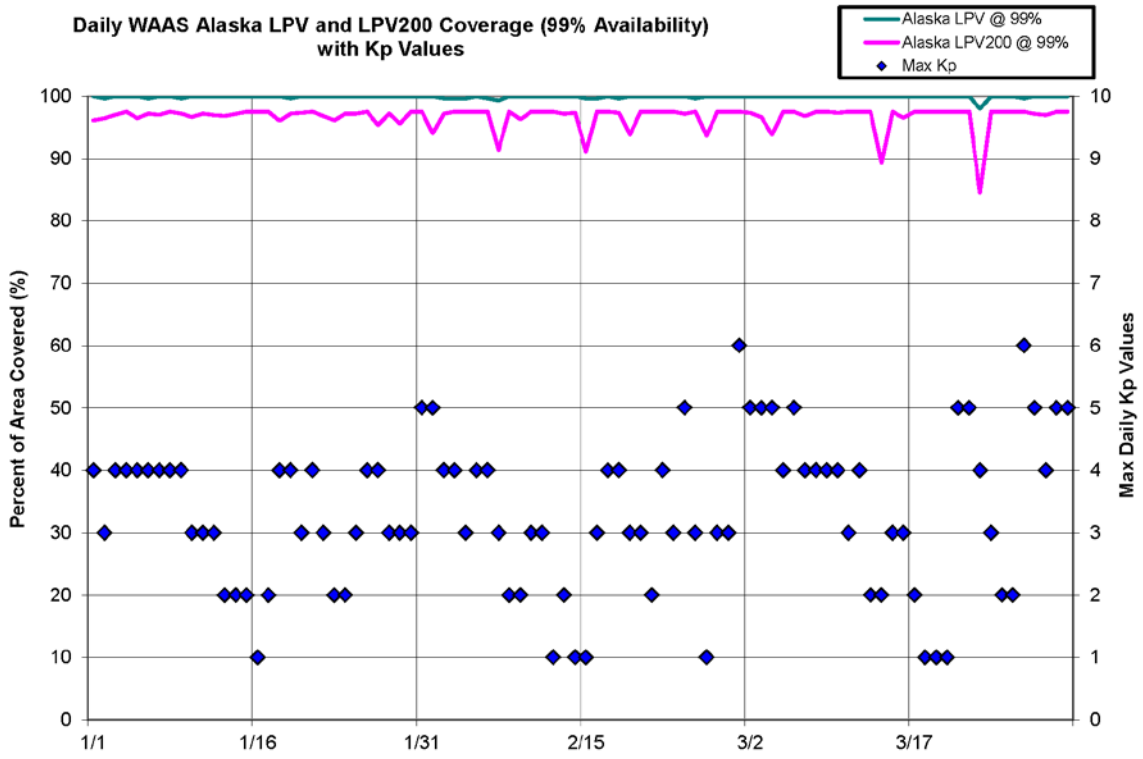


Figure 4-8 Daily LPV and LPV200 Canada Coverage

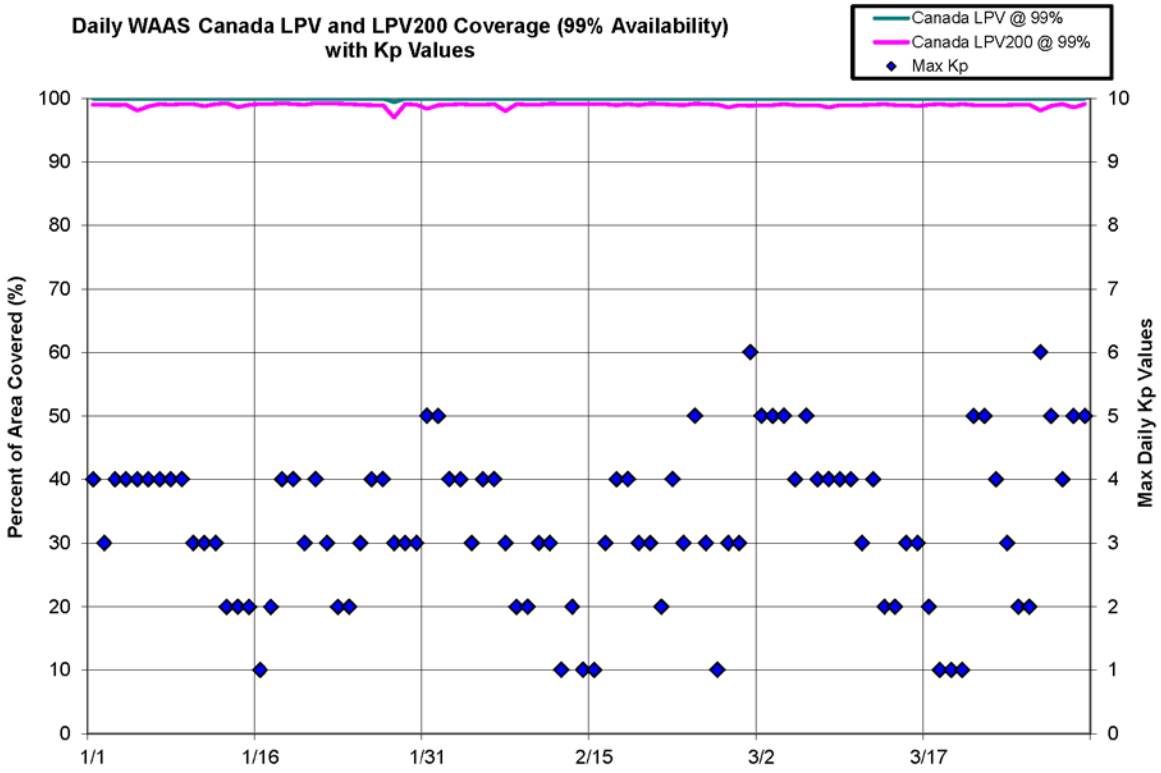
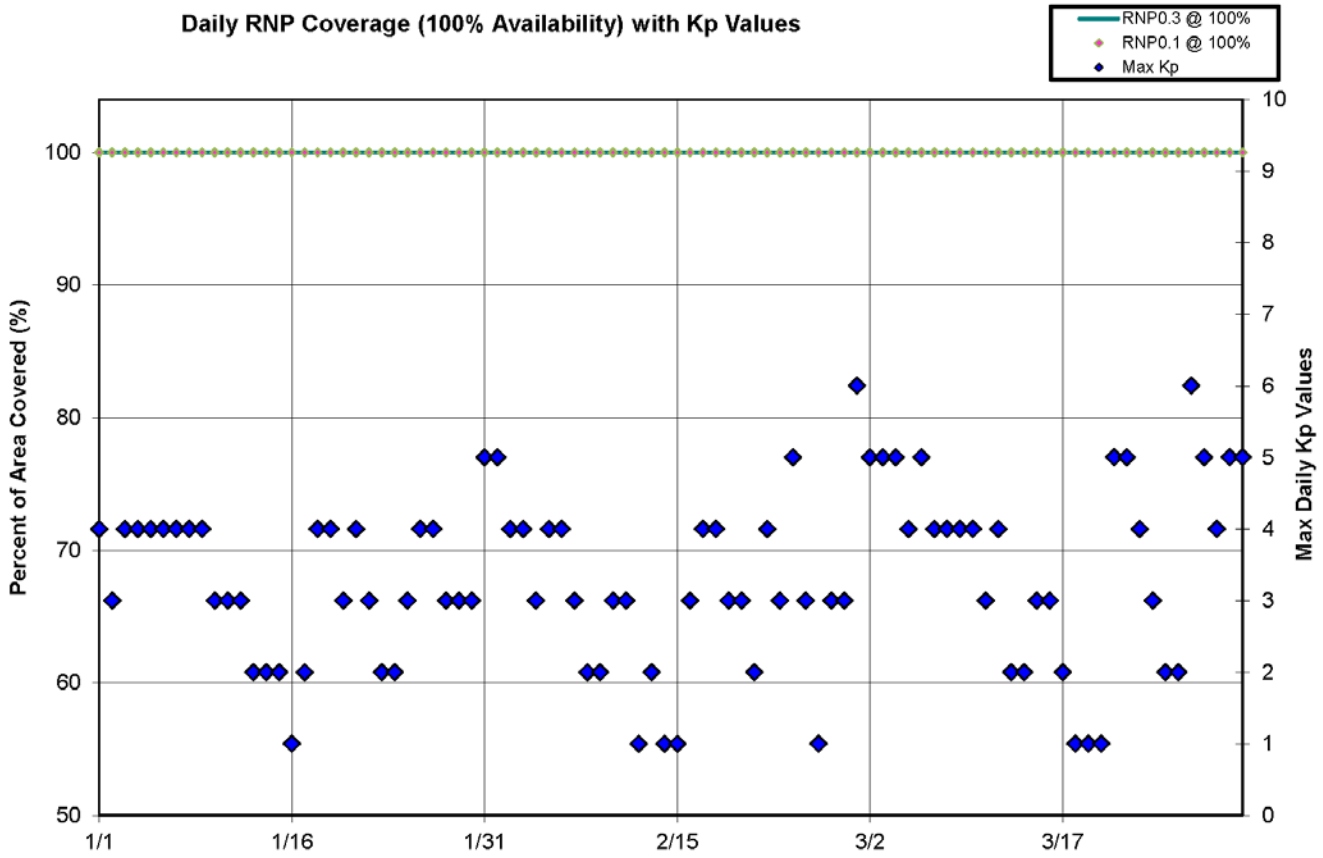


Figure 4-9 Daily RNP Coverage



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.

Figure 5-1 lists the safety margin index and the number of HMI events. For this reporting period, the lowest safety margin index is 3.97 at Anchorage 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	Safety Index		
	Horizontal	Vertical	Number of HMIs
Arcata	4.48	7.00	0
Atlantic City	5.42	5.59	0
Grand Forks	5.87	6.14	0
Oklahoma City	5.50	7.27	0
Albuquerque	10.41	14.46	0
Anchorage	6.17	6.82	0
Atlanta	6.36	9.63	0
Barrow	7.15	3.62	0
Bethel	6.67	6.97	0
Billings	7.97	8.10	0
Boston	7.94	7.83	0
Chicago	10.12	8.59	0
Cleveland	7.89	8.41	0
Cold Bay	11.81	9.67	0
Dallas	7.02	5.32	0
Denver	7.37	8.30	0
Fairbanks	9.25	4.54	0
Gander	10.40	8.30	0
Goose Bay	7.86	11.79	0
Houston	6.39	6.16	0
Iqaluit	6.52	5.09	0
Jacksonville	7.91	5.11	0
Juneau	6.04	5.51	0
Kansas City	7.07	8.76	0
Kotzebue	5.33	4.97	0
Los Angeles	8.58	9.36	0
Memphis	6.35	9.48	0
Merida	6.43	9.15	0
Mexico City	13.98	5.50	0
Miami	8.06	5.65	0
Minneapolis	5.02	9.76	0
New York	6.78	10.71	0
Oakland	11.31	15.02	0
Puerto Vallarta	14.50	8.02	0
Salt Lake City	9.53	10.83	0
San Jose Del Cabo	10.65	4.96	0
Seattle	7.38	9.24	0
Washington DC	7.45	7.93	0
Winnipeg	6.54	7.22	0

5.2 Broadcast Alerts

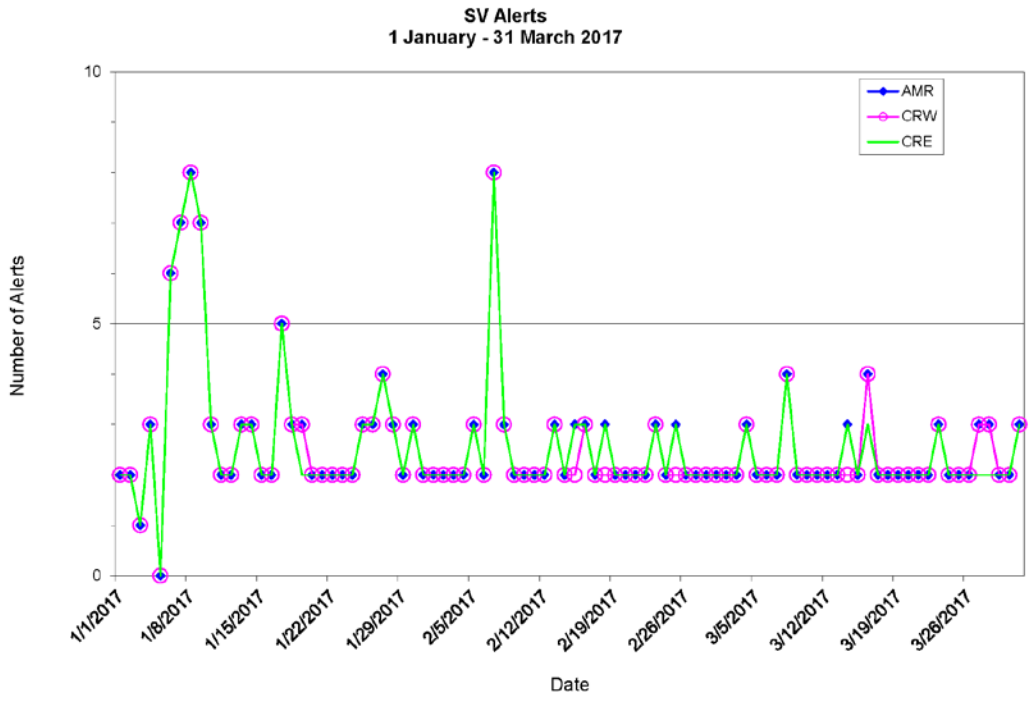
The WAAS transmits alert messages for user protection when the active WAAS corrections are no longer bound by the UDREs. Alerts increase the UDRE for one or more PRNs, which can reduce the weighting of the satellite or exclude the satellite from the navigation solution. An increase in UDREs after an 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.

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.

Table 5-2 WAAS SV Alert

	Number of Alerts			Average Alerts Per Day		
Message Type	**AMR**	**CRW**	**CRE**	**AMR**	**CRW**	**CRE**
2	188	188	188	2.0889	2.0889	2.0889
3	8	8	8	0.0889	0.0889	0.0889
4	40	36	36	0.4444	0.4000	0.4000
5	0	0	0	0.0000	0.0000	0.0000
6	0	0	0	0.0000	0.0000	0.0000
24	0	0	0	0.0000	0.0000	0.0000
26	0	0	0	0.0000	0.0000	0.0000
Total Alerts	236	232	232	2.6222	2.5778	2.5778
Days in Service	90	90	90			

Figure 5-1 SV Daily Alert Trend



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

Accurate and current calculations of user position are dependent upon 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.

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 AMR GEO. Table 5-9 through Table 5-13 show statistics for message rates broadcasted on CRW GEO. Table 5-14 through Table 5-18 show statistics for message rates broadcasted on CRE GEO.

Table 5-3 Update Rates for WAAS Messages

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

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

Message Type	**On Time**	**Late**	**Max Late Length (seconds)**
1	104797	1	3632
2	1295902	45	3560
3	1295331	66	3559
4	1295467	39	3561
7	98088	8	3603
9	91079	2	3664
10	98042	7	3675
17	31032	2	3950

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

SV	On Time	Late	Max Late Length (seconds)
1	48397	0	0
2	46709	0	0
3	47198	0	0
5	47033	1	180
6	46852	1	174
7	46386	0	0
8	47915	0	0
9	46849	0	0
10	46479	0	0
11	48294	0	0
12	46193	0	0
13	48243	0	0
14	45838	0	0
15	47153	0	0
16	47155	1	181
17	46395	0	0
18	46086	0	0
19	45391	0	0
20	46271	0	0
21	47024	1	174
22	47556	0	0
23	46353	0	0
24	48594	1	180
25	47830	0	0
26	47463	1	180
27	48330	0	0
28	47374	0	0
29	46383	0	0
30	46337	2	179
31	47059	1	181
32	45436	0	0

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

SV	On Time	Late	Max Late Length (seconds)
1	39768	0	0
2	38376	1	3642
3	38807	3	3670
5	38600	1	144
6	38428	0	0
7	38094	1	206
8	39336	0	0
9	38445	0	0
10	38163	0	0
11	39757	0	0
12	37935	0	0
13	39629	0	0
14	37663	1	131
15	38678	0	0
16	38709	0	0
17	38110	0	0
18	37833	0	0
19	37274	0	0
20	37982	1	157
21	38621	0	0
22	39086	0	0
23	38117	0	0
24	39911	1	179
25	39301	1	176
26	38990	0	0
27	39699	1	152
28	38886	0	0
29	38105	0	0
30	38076	0	0
31	38622	0	0
32	37327	0	0
135	74636	2	3672
138	74241	1	3690

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

Band	Block	On Time	Late	Max Late Length (seconds)
0	0	26986	7	3872
0	1	26988	6	3872
0	2	26988	10	3878
1	0	26980	10	3890
1	1	26986	8	3906
1	2	26977	5	3902
1	3	26981	2	3919
1	4	26979	8	3907
2	0	27004	7	3907
2	1	26988	7	3885
2	2	26982	4	3885
2	3	26986	8	3889
2	4	26973	8	3896
3	0	26983	3	3873
3	1	26976	6	3888
3	2	26987	3	3877
9	0	26987	4	3890
9	1	26982	5	3585
9	2	26989	6	3596
9	3	26981	6	3589
9	4	26970	7	3602
9	5	26982	7	3884
9	6	26982	7	3872

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

Band	On Time	Late	Max Late Length (seconds)
0	35442	1	3764
1	35361	1	3711
2	35391	1	3834
3	35398	1	3751
9	35416	1	3681

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

Message Type	On Time	Late	Max Late Length (seconds)
1	97628	1	121
2	1296491	43	34
3	1295922	62	34
4	1296042	40	31
7	91566	7	192
9	91122	1	174
10	91511	15	128
17	30418	0	0

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

SV	On Time	Late	Max Late Length (seconds)
1	48438	0	0
2	46751	1	178
3	47239	0	0
5	47039	1	169
6	46885	0	0
7	46388	2	171
8	47919	1	176
9	46849	0	0
10	46495	0	0
11	48323	0	0
12	46240	0	0
13	48250	0	0
14	45877	1	162
15	47172	0	0
16	47160	0	0
17	46432	0	0
18	46082	0	0
19	45430	0	0
20	46272	1	169
21	47026	0	0
22	47592	1	166
23	46345	2	176
24	48639	0	0
25	47880	0	0
26	47458	0	0
27	48333	1	169
28	47418	0	0
29	46384	1	162
30	46362	1	179
31	47063	0	0
32	45476	0	0

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

SV	On Time	Late	Max Late Length (seconds)
1	39815	0	0
2	38405	0	0
3	38832	0	0
5	38587	0	0
6	38451	1	209
7	38085	6	212
8	39350	0	0
9	38449	2	211
10	38164	2	176
11	39744	3	154
12	37960	0	0
13	39629	2	208
14	37697	1	124
15	38695	0	0
16	38693	1	208
17	38146	0	0
18	37832	0	0
19	37296	8	211
20	37993	0	0
21	38620	1	206
22	39121	4	212
23	38105	1	134
24	39947	0	0
25	39325	1	138
26	38983	0	0
27	39700	0	0
28	38883	2	167
29	38111	1	209
30	38105	1	206
31	38624	1	208
32	37363	0	0
135	74692	2	4296
138	74291	2	4264

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

Band	Block	On Time	Late	Max Late Length (seconds)
0	0	27003	2	305
0	1	27002	3	302
0	2	27005	4	302
1	0	27000	1	301
1	1	27013	0	0
1	2	27000	1	301
1	3	27003	2	306
1	4	26995	2	301
2	0	26994	6	581
2	1	26996	4	576
2	2	27016	1	301
2	3	26994	3	305
2	4	27000	1	301
3	0	27001	4	304
3	1	26994	3	301
3	2	27007	6	301
9	0	27000	1	301
9	1	27004	1	301
9	2	27013	0	0
9	3	26998	2	577
9	4	27007	1	579
9	5	27001	4	304
9	6	26998	3	302

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

Band	On Time	Late	Max Late Length (seconds)
0	34428	0	0
1	34429	0	0
2	34413	1	463
3	34490	1	477
9	34440	2	483

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

Message Type	On Time	Late	Max Late Length (seconds)
1	104120	0	0
2	1296492	45	25
3	1295923	65	22
4	1296056	37	22
7	97559	4	130
9	91116	4	185
10	97602	7	126
17	30998	1	311

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

SV	On Time	Late	Max Late Length (seconds)
1	48437	0	0
2	46753	0	0
3	47238	0	0
5	47036	0	0
6	46891	0	0
7	46385	0	0
8	47917	0	0
9	46835	1	160
10	46489	0	0
11	48323	0	0
12	46240	0	0
13	48250	0	0
14	45877	0	0
15	47164	0	0
16	47156	0	0
17	46429	0	0
18	46079	0	0
19	45434	1	167
20	46280	0	0
21	47028	1	170
22	47596	0	0
23	46351	0	0
24	48642	0	0
25	47876	0	0
26	47469	0	0
27	48331	0	0
28	47411	0	0
29	46385	0	0
30	46369	1	179
31	47059	0	0
32	45477	0	0

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

SV	On Time	Late	Max Late Length (seconds)
1	39799	0	0
2	38399	1	121
3	38831	0	0
5	38598	1	125
6	38450	0	0
7	38096	1	212
8	39361	0	0
9	38457	0	0
10	38167	0	0
11	39749	0	0
12	37967	0	0
13	39665	0	0
14	37706	0	0
15	38688	0	0
16	38692	0	0
17	38151	0	0
18	37828	0	0
19	37312	1	209
20	38006	0	0
21	38627	0	0
22	39117	0	0
23	38117	1	200
24	39933	0	0
25	39339	0	0
26	39006	1	209
27	39710	0	0
28	38906	1	200
29	38129	0	0
30	38089	0	0
31	38627	0	0
32	37344	0	0
135	74684	2	208
138	74285	1	164

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

Band	Block	On Time	Late	Max Late Length (seconds)
0	0	27003	3	437
0	1	26998	4	438
0	2	26998	4	432
1	0	26999	3	427
1	1	26993	6	426
1	2	27000	7	431
1	3	26995	4	421
1	4	26997	2	431
2	0	27002	5	397
2	1	26989	6	400
2	2	26990	4	579
2	3	26995	3	397
2	4	27009	2	301
3	0	27012	3	306
3	1	26987	4	305
3	2	26999	4	301
9	0	26993	2	301
9	1	27005	2	301
9	2	27009	2	305
9	3	26993	2	306
9	4	27000	3	305
9	5	27010	5	302
9	6	26990	5	306

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

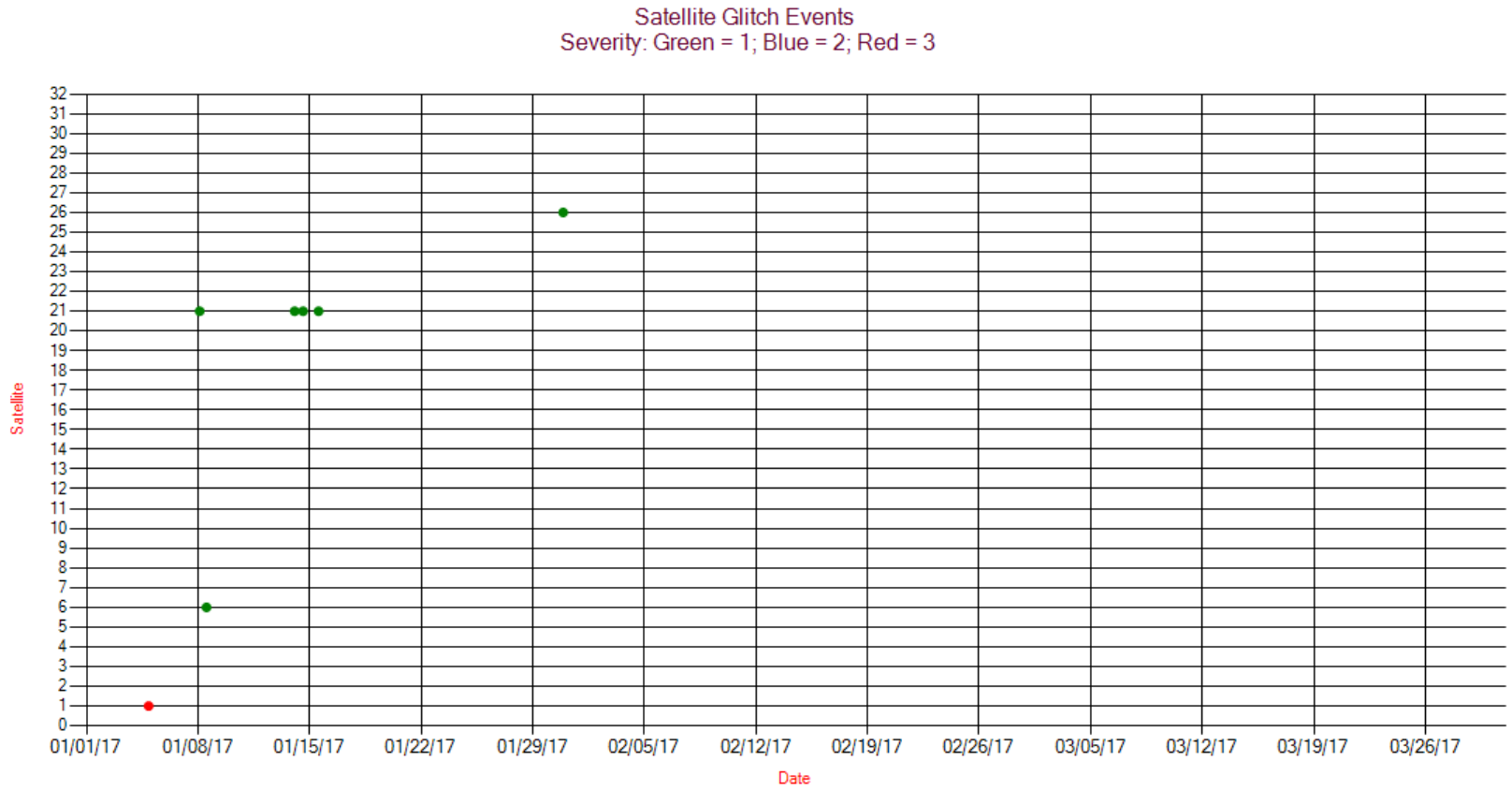
Band	On Time	Late	Max Late Length (seconds)
0	35349	0	0
1	35355	1	312
2	35367	0	0
3	35335	0	0
9	35367	1	348

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 the satellite glitches visible to WAAS during the quarter. Glitches are categorized into three severity levels: (1) Severity One glitches cause a significant number of the receivers to simultaneously report bad subframe parity, (2) Severity Two glitches cause all of the receivers to report bad subframe parity data and some receivers to also have cycle slips and/or lose tracking of L2 and/or L1, and (3) Severity Three glitches cause all of the receivers to lose track of both L1 and L2 data. Note, the tool used to perform this Satellite Glitch Analysis also reports times when more than 14 GPS satellites are in view for some of the WAAS reference stations. The NovAtel WAAS G3 receiver is only capable of tracking 14 GPS satellites at a given time, and GPS users may also experience this condition.

Figure 5-2 SV Glitch Trend



6.0 SV RANGE ACCURACY

Range accuracy evaluation computes the probability that the WAAS UDRE and GIVE statistically bound 99.9% of the range residuals for each satellite tracked by the receiver. A UDRE is broadcasted by the WAAS for each monitored satellite and the 99.9% bound (3.29 sigma) of the pseudorange residual error after application of fast and long-term corrections is checked. The pseudorange residual error is determined by taking the difference between the raw pseudorange and a calculated reference range. The reference range is equal to the true range between the corrected satellite position and surveyed user antenna plus all corrections (i.e., WAAS fast clock, WAAS long-term clock, WAAS ionospheric delay, tropospheric delay, receiver clock bias, and multipath). Because the true ionospheric delay and multipath error are not precisely known, the estimated variance in these error sources are added to the UDRE before comparing it to the residual error.

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

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

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

For this reporting period, most satellite range errors were bounded at least 99.9% of the time by UDRE. Other unbounded errors (i.e., errors bounded less than 100% of the time) were due to geomagnetic activity, noise, and/or multipath. PRN-4 was unavailable for the quarter.

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

Site →	Billings		Albuquerque		Boston		Washington DC		Houston		Kansas City	
SV ↓	95% Range Error	3.29 Sigma Bounding(%)	95% Range Error	3.29 Sigma Bounding(%)	95% Range Error	3.29 Sigma Bounding(%)	95% Range Error	3.29 Sigma Bounding(%)	95% Range Error	3.29 Sigma Bounding(%)	95% Range Error	3.29 Sigma Bounding(%)
1*	0.751	100	1.136	100	0.985	100	1.479	100	1.171	100	1.245	100
2	2.200	100	1.408	100	0.932	100	1.183	100	1.835	100	1.122	100
3*	0.876	100	1.292	100	0.928	100	1.402	100	1.498	100	1.777	100
4	-	-	-	-	-	-	-	-	-	-	-	-
5	1.132	100	0.954	100	1.395	100	1.405	100	1.002	100	1.043	100
6*	1.013	100	1.626	100	1.082	100	1.261	100	1.336	100	1.258	100
7	1.239	100	1.182	100	1.152	100	1.088	100	1.096	100	1.354	100
8*	0.993	100	1.241	100	1.216	100	1.314	100	1.094	100	1.293	100
9*	1.033	100	0.948	100	1.068	100	1.329	100	1.256	100	1.250	100
10	1.323	100	0.743	100	1.577	100	0.873	100	0.931	100	0.761	100
11	1.037	100	1.559	100	1.053	100	1.785	100	0.955	100	1.288	100
12	1.377	100	1.228	100	1.531	100	1.164	100	1.335	100	1.025	100
13	1.090	100	1.464	100	1.159	100	0.957	100	1.019	100	1.059	100
14	0.798	100	1.278	100	1.652	100	1.098	100	1.537	100	1.240	100
15	0.965	100	1.347	100	1.107	100	1.208	100	1.536	100	1.273	100
16	1.749	100	1.459	100	1.023	100	1.402	100	1.182	100	1.321	100
17	1.485	100	1.002	100	1.489	100	1.154	100	1.398	100	2.054	100
18	0.766	100	1.181	100	1.095	100	1.112	100	1.153	100	1.421	100
19	1.302	100	1.843	100	1.334	100	0.960	100	1.164	100	1.364	100
20	1.805	100	1.265	100	1.254	100	0.863	100	1.581	100	1.302	100
21	0.760	100	1.175	100	1.278	100	1.470	100	1.319	100	1.278	100
22	1.378	100	1.164	100	0.934	100	1.526	100	1.449	100	1.171	100
23	0.860	100	1.247	100	1.150	100	1.308	100	1.248	100	1.123	100
24*	1.024	100	1.521	100	1.209	100	1.038	100	1.026	100	1.417	100
25*	1.286	100	0.854	100	1.218	100	0.804	100	1.680	100	0.936	100
26*	0.856	100	1.050	100	1.753	100	1.386	100	1.168	100	1.330	100
27*	1.046	100	2.057	100	0.936	100	1.163	100	0.876	100	1.046	100
28	1.052	100	1.294	100	1.040	100	1.050	100	1.055	100	1.413	100
29	1.496	100	1.014	100	0.919	100	0.928	100	1.571	100	1.416	100
30*	0.900	100	1.091	100	0.980	100	1.191	100	1.305	100	1.215	100
31	0.968	100	1.399	100	1.073	100	1.366	100	1.460	100	1.340	100
32	1.287	100	0.629	100	1.001	100	0.916	100	1.939	100	0.899	100
135	2.029	100	1.542	100	2.447	100	2.079	100	2.216	100	1.832	100
138	1.244	100	1.153	100	1.431	100	1.579	100	1.557	100	2.101	100

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

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

Site →	Los Angeles		Salt Lake City		Miami		Minneapolis		Atlanta		Juneau	
SV ↓	95% Range Error	3.29 Sigma Bounding(%)	95% Range Error	3.29 Sigma Bounding(%)	95% Range Error	3.29 Sigma Bounding(%)	95% Range Error	3.29 Sigma Bounding(%)	95% Range Error	3.29 Sigma Bounding(%)	95% Range Error	3.29 Sigma Bounding(%)
1*	1.509	100	0.953	100	1.247	100	1.507	100	1.202	100	0.799	100
2	1.247	100	1.106	100	1.286	100	0.793	100	1.182	100	1.087	100
3*	1.245	100	1.269	100	1.486	100	0.710	100	1.339	100	0.849	100
4	-	-	-	-	-	-	-	-	-	-	-	-
5	1.392	100	0.799	100	1.054	100	0.906	100	1.173	100	1.270	100
6*	1.367	100	0.860	100	1.593	100	0.916	100	1.307	100	0.997	100
7	1.285	100	0.841	100	2.266	100	0.785	100	1.168	100	1.235	100
8*	1.545	100	1.023	100	1.092	100	1.370	100	1.050	100	1.309	100
9*	1.401	100	0.792	100	1.166	100	0.901	100	1.306	100	0.945	100
10	0.864	100	0.963	100	1.059	100	0.838	100	0.759	100	1.140	100
11	1.647	100	0.944	100	1.240	100	0.927	100	1.556	100	0.872	100
12	1.154	100	0.966	100	1.213	100	1.400	100	1.100	100	1.383	100
13	0.983	100	0.766	100	1.412	100	1.077	100	1.098	100	1.034	100
14	0.832	100	1.120	100	1.025	100	0.905	100	0.976	100	1.027	100
15	1.477	100	0.768	100	1.146	100	1.043	100	1.229	100	0.896	100
16	1.559	100	0.879	100	1.203	100	0.841	100	1.242	100	1.052	100
17	1.309	100	1.086	100	1.894	100	1.019	100	1.151	100	0.954	100
18	1.064	100	0.813	100	1.059	100	1.165	100	0.984	100	1.398	100
19	1.217	100	1.232	100	1.287	100	0.935	100	1.191	100	1.055	100
20	1.113	100	1.324	100	1.419	100	0.991	100	1.042	100	1.068	100
21	0.878	100	0.815	100	0.904	100	0.826	100	1.218	100	1.144	100
22	1.309	100	1.098	100	0.951	100	1.263	100	1.202	100	1.068	100
23	1.395	100	0.753	100	0.855	100	0.918	100	1.340	100	1.043	100
24*	1.198	100	1.474	100	1.157	100	0.926	100	1.220	100	1.298	100
25*	1.165	100	1.173	100	1.035	100	1.060	100	1.306	100	1.561	100
26*	1.839	100	0.943	100	1.231	100	1.122	100	1.338	100	1.351	100
27*	1.193	100	0.727	100	1.091	100	1.617	100	0.928	100	0.864	100
28	1.278	100	0.821	100	1.349	100	1.238	100	1.052	100	1.282	100
29	1.034	100	1.438	100	1.014	100	1.145	100	1.282	100	1.772	100
30*	1.329	100	0.730	100	1.002	100	0.884	100	1.008	100	0.801	100
31	1.232	100	0.765	100	1.296	100	0.704	100	1.243	100	1.559	100
32	0.912	100	1.131	100	1.082	100	1.298	100	0.675	100	1.293	100
135	1.495	100	1.575	100	1.452	100	2.004	100	1.881	100	1.486	100
138	2.495	100	1.627	100	2.128	100	1.571	100	1.415	100	1.575	100

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

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

Site →	Billings		Albuquerque		Boston		Washington DC		Houston		Kansas City	
SV ↓	95% Iono Error	3.29 Sigma Bounding(%)	95% Iono Error	3.29 Sigma Bounding(%)	95% Iono Error	3.29 Sigma Bounding(%)	95% Iono Error	3.29 Sigma Bounding(%)	95% Iono Error	3.29 Sigma Bounding(%)	95% Iono Error	3.29 Sigma Bounding(%)
1	0.407	100	0.549	100	0.587	100	0.623	100	0.384	100	0.536	100
2	1.225	100	0.847	100	0.410	100	0.572	100	0.909	100	0.584	100
3	0.329	100	0.790	100	0.328	100	0.531	100	0.534	100	0.815	100
4	-	-	-	-	-	-	-	-	-	-	-	-
5	0.563	100	0.502	100	1.013	100	0.511	100	1.059	100	0.502	100
6	0.527	100	0.767	100	0.724	100	0.541	100	1.004	100	0.661	100
7	0.596	100	0.784	100	0.575	100	0.434	100	0.609	100	0.644	100
8	0.413	100	0.575	100	0.603	100	0.402	100	0.685	100	0.485	100
9	0.665	100	0.536	100	0.394	100	0.620	100	0.524	100	0.539	100
10	0.740	100	0.366	100	0.622	100	0.406	100	0.579	100	0.324	100
11	0.332	100	0.682	100	0.567	100	0.513	100	0.505	100	0.529	100
12	0.547	100	0.675	100	0.652	100	0.424	100	0.491	100	0.452	100
13	0.347	100	0.646	100	0.471	100	0.352	100	0.487	100	0.448	100
14	0.454	100	0.661	100	1.171	100	0.316	100	0.846	100	0.582	100
15	0.444	100	0.712	100	0.401	100	0.492	100	1.018	100	0.712	100
16	0.587	100	0.761	100	0.315	100	0.459	100	0.478	100	0.567	100
17	0.901	100	0.707	100	0.905	100	0.502	100	0.612	100	0.896	100
18	0.515	100	0.653	100	0.353	100	0.415	100	0.589	100	0.415	100
19	0.863	100	0.872	100	0.812	100	0.339	100	0.933	100	0.533	100
20	0.747	100	0.683	100	0.810	100	0.399	100	0.900	100	0.595	100
21	0.321	100	0.642	100	0.446	100	0.852	100	0.635	100	0.550	100
22	0.659	100	0.413	100	0.294	100	0.639	100	0.568	100	0.453	100
23	0.422	100	0.777	100	0.552	100	0.598	100	0.580	100	0.427	100
24	0.329	100	0.731	100	0.491	100	0.376	100	0.429	100	0.531	100
25	0.455	100	0.489	100	0.455	100	0.237	100	0.674	100	0.274	100
26	0.304	100	0.468	100	0.411	100	0.426	100	1.061	100	0.536	100
27	0.347	100	0.818	100	0.415	100	0.390	100	0.441	100	0.343	100
28	0.915	100	0.828	100	0.445	100	0.393	100	0.501	100	0.754	100
29	0.663	100	0.393	100	0.513	100	0.436	100	0.781	100	0.566	100
30	0.332	100	0.748	100	0.613	100	0.792	100	0.660	100	0.549	100
31	0.466	100	0.661	100	0.609	100	0.496	100	1.005	100	0.593	100
32	0.882	100	0.388	100	0.577	100	0.341	100	1.115	100	0.409	100

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

Site →	Los Angeles		Salt Lake City		Miami		Minneapolis		Atlanta		Juneau	
SV ↓	95% Iono Error	3.29 Sigma Bounding(%)	95% Iono Error	3.29 Sigma Bounding(%)	95% Iono Error	3.29 Sigma Bounding(%)	95% Iono Error	3.29 Sigma Bounding(%)	95% Iono Error	3.29 Sigma Bounding(%)	95% Iono Error	3.29 Sigma Bounding(%)
1	0.729	100	0.303	100	0.464	100	0.472	100	0.723	100	0.401	100
2	0.618	100	0.500	100	0.604	100	0.379	100	0.657	100	0.388	100
3	0.422	100	0.475	100	0.462	100	0.335	100	0.743	100	0.319	100
4	-	-	-	-	-	-	-	-	-	-	-	-
5	0.933	100	0.454	100	0.657	100	0.402	100	0.576	100	0.492	100
6	0.609	100	0.388	100	1.009	100	0.411	100	0.709	100	0.353	100
7	0.419	100	0.379	100	1.125	100	0.409	100	0.688	100	0.532	100
8	0.647	100	0.442	100	0.599	100	0.681	100	0.424	100	0.579	100
9	0.583	100	0.381	100	0.532	100	0.387	100	0.740	100	0.427	100
10	0.337	100	0.597	100	0.659	100	0.575	100	0.449	100	0.484	100
11	0.745	100	0.286	100	0.400	100	0.390	100	0.577	100	0.318	100
12	0.395	100	0.552	100	0.610	100	0.503	100	0.648	100	0.520	100
13	0.430	100	0.237	100	0.615	100	0.397	100	0.744	100	0.472	100
14	0.338	100	0.750	100	0.594	100	0.550	100	0.510	100	0.502	100
15	0.789	100	0.344	100	0.479	100	0.388	100	0.584	100	0.309	100
16	0.832	100	0.325	100	0.353	100	0.389	100	0.590	100	0.470	100
17	0.564	100	0.491	100	0.800	100	0.384	100	0.597	100	0.431	100
18	0.525	100	0.499	100	0.627	100	0.468	100	0.610	100	0.470	100
19	0.423	100	0.847	100	0.701	100	0.534	100	0.499	100	0.463	100
20	0.584	100	0.543	100	0.657	100	0.390	100	0.526	100	0.453	100
21	0.327	100	0.397	100	0.638	100	0.468	100	0.745	100	0.406	100
22	0.499	100	0.482	100	0.401	100	0.427	100	0.661	100	0.449	100
23	0.560	100	0.395	100	0.619	100	0.502	100	0.766	100	0.512	100
24	0.620	100	0.514	100	0.571	100	0.404	100	0.665	100	0.488	100
25	0.422	100	0.506	100	0.552	100	0.384	100	0.685	100	0.471	100
26	0.883	100	0.335	100	0.446	100	0.427	100	0.612	100	0.448	100
27	0.493	100	0.267	100	0.360	100	0.591	100	0.441	100	0.466	100
28	0.405	100	0.467	100	0.704	100	0.524	100	0.598	100	0.507	100
29	0.486	100	0.574	100	0.703	100	0.604	100	0.647	100	0.564	100
30	0.489	100	0.297	100	0.585	100	0.429	100	0.727	100	0.370	100
31	0.583	100	0.381	100	0.467	100	0.416	100	0.608	100	0.481	100
32	0.381	100	0.640	100	0.731	100	0.949	100	0.377	100	0.706	100

Figure 6-1 95% Range Error (PRN-1 – PRN-16) – Washington D.C.

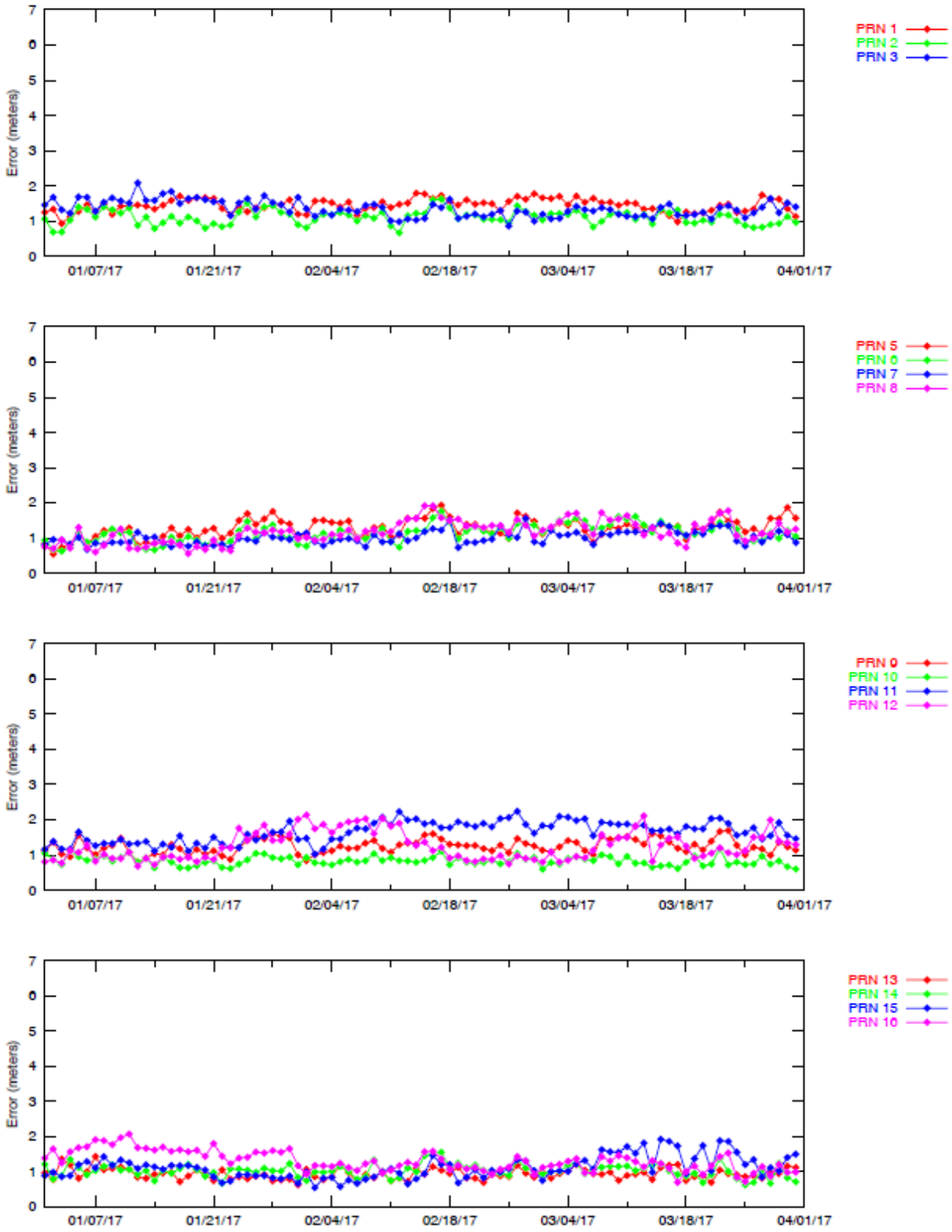


Figure 6-2 95% Range Error (PRN-17 – PRN-32) – Washington D.C.

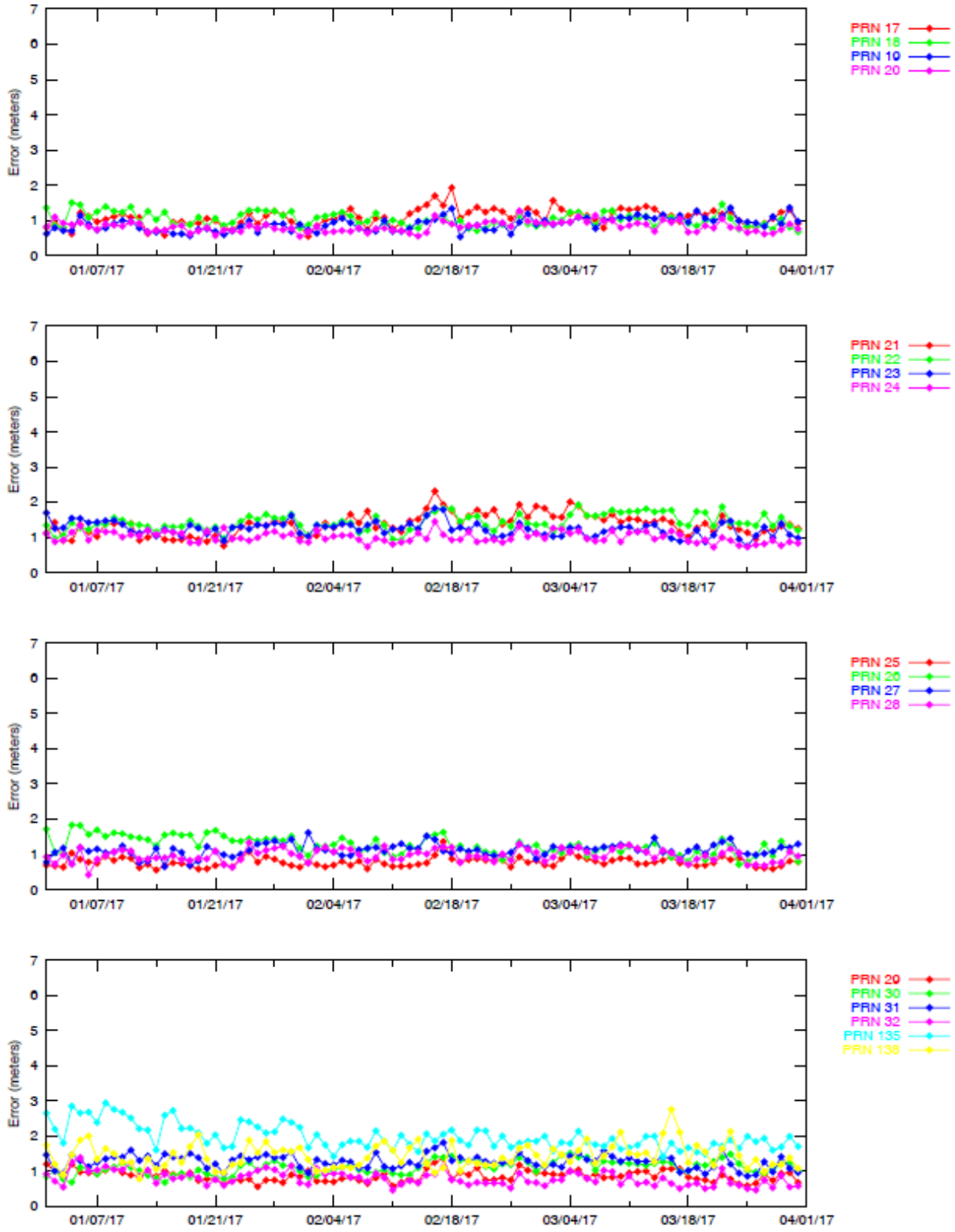


Figure 6-3 95% Ionospheric Error (PRN-1 – PRN-16) – Washington D.C.

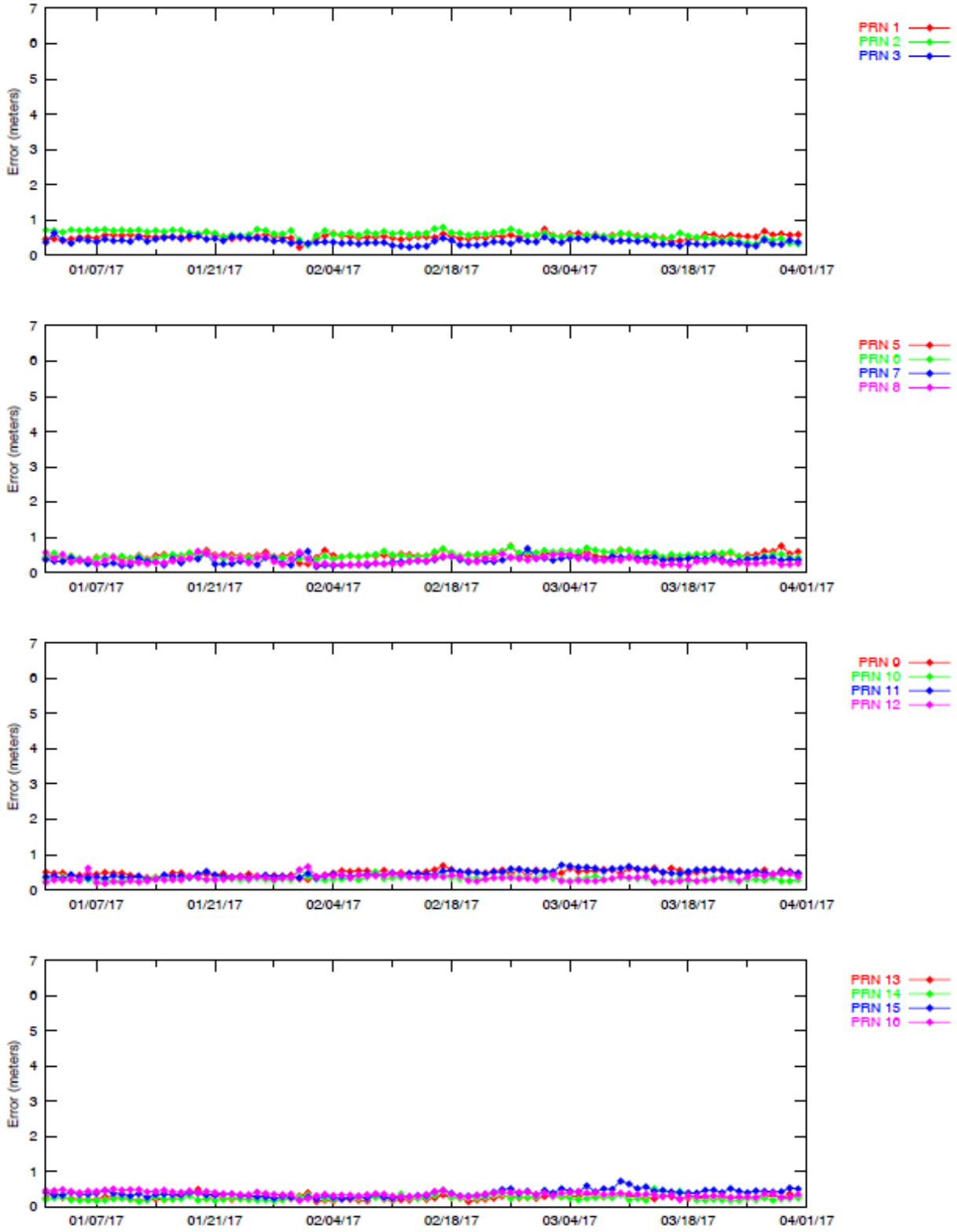
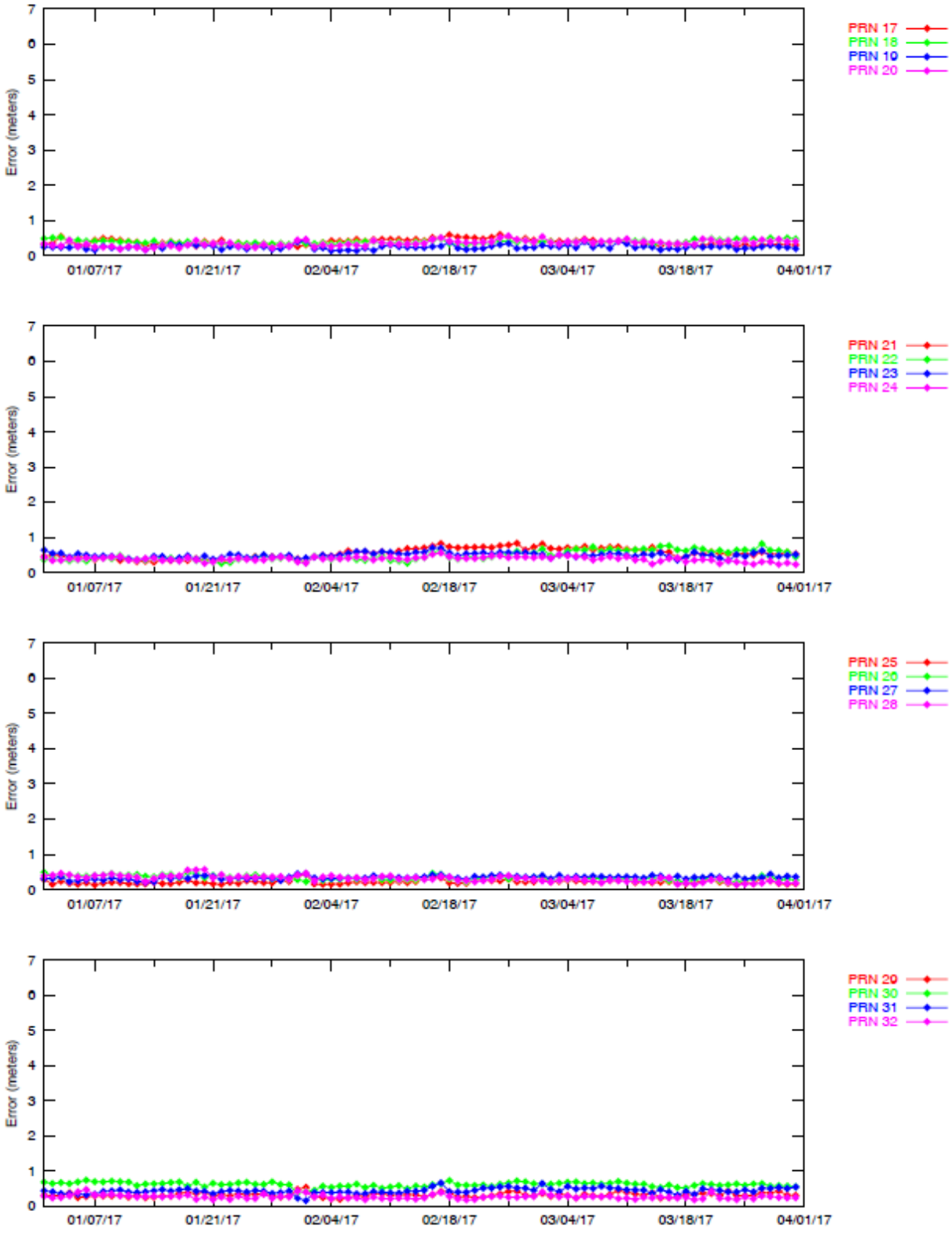


Figure 6-4 95% Ionospheric Error (PRN-17 - PRN-32) – Washington D.C.



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 and Figure 7-2 show the trend of CRW GEO PA and CRE GEO PA ranging availability, respectively. Figure 7-3 shows the trend of AMR GEO NPA ranging availability.

The reductions in CRW GEO PA and CRE GEO PA ranging availability were due to GUS switchovers (see Figure 7-1 and Figure 7-2). Refer to Table 1-7 for detailed information on the GUS switchovers for this reporting period. Figure 7-3 shows AMR GEO NPA ranging was unavailable for this quarter. On July 18, 2015, the UDRE for AMR was indefinitely set to "Not Monitored," which meant users can use WAAS corrections without the ranging capabilities. On March 1, 2017 AMR reported CRW and CRE ranging availability approximately 4.5% lower than availability reported by CRW and CRE due to AMR GUS switchover with 3552 missed messages.

Table 7-1 GEO Ranging Availability

GEO Source	GEO	PA (%)	NPA (%)	Not Monitored (%)	Do Not Use (%)
CRW 135	CRW	99.73	0.05	0.22	0.00
CRW 135	CRE	99.13	0.09	0.30	0.48
CRW 135	AMR	0.00	0.00	99.96	0.04
CRE 138	CRW	99.73	0.05	0.22	0.00
CRE 138	CRE	99.13	0.09	0.30	0.48
CRE 138	AMR	0.00	0.00	99.96	0.04
AMR 133	CRW	99.69	0.05	0.22	0.00
AMR 133	CRE	99.08	0.09	0.30	0.48
AMR 133	AMR	0.00	0.00	99.91	0.04

Figure 7-1 Daily PA CRW GEO Ranging Availability Trend

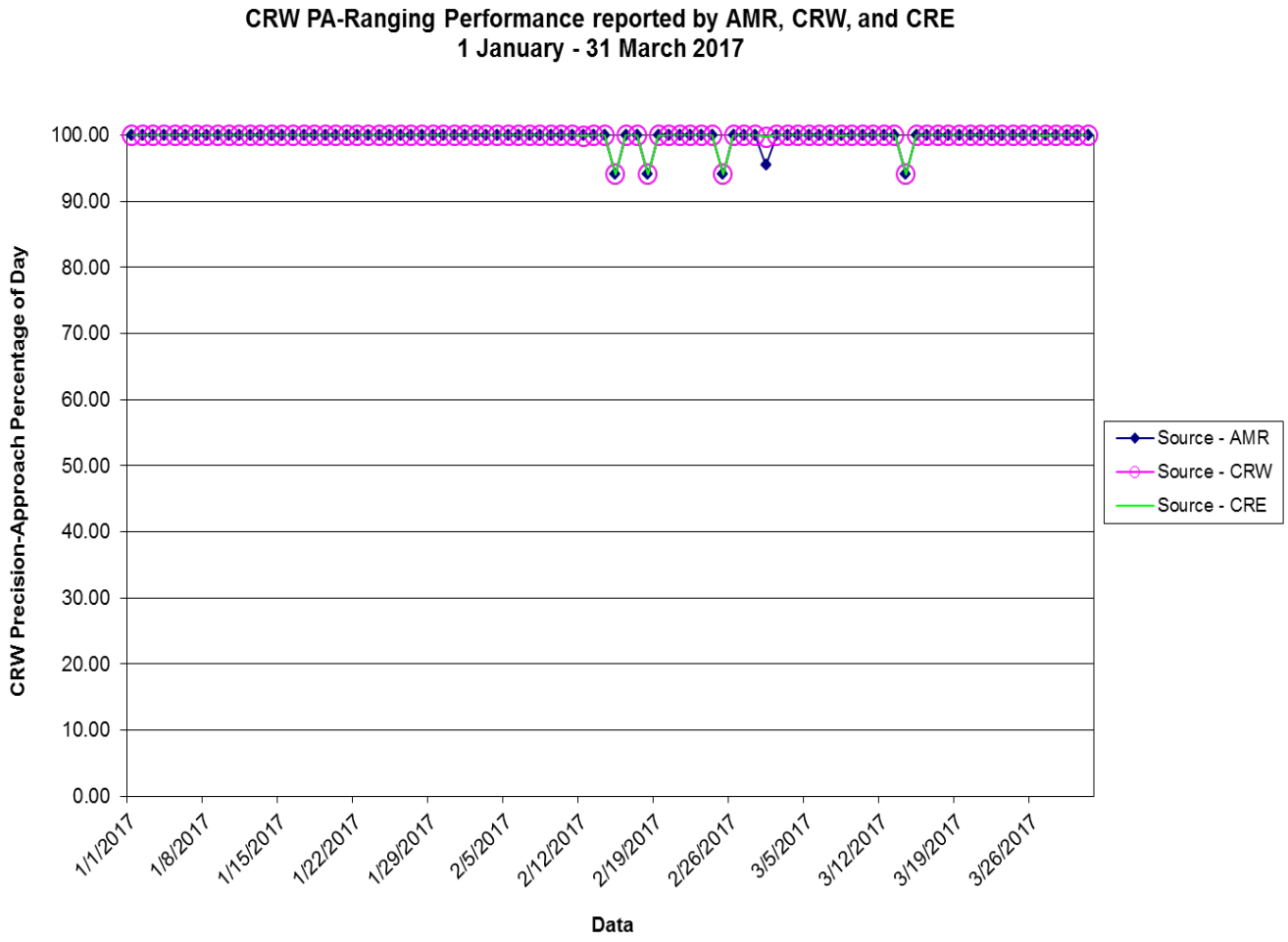


Figure 7-2 Daily PA CRE GEO Ranging Availability Trend

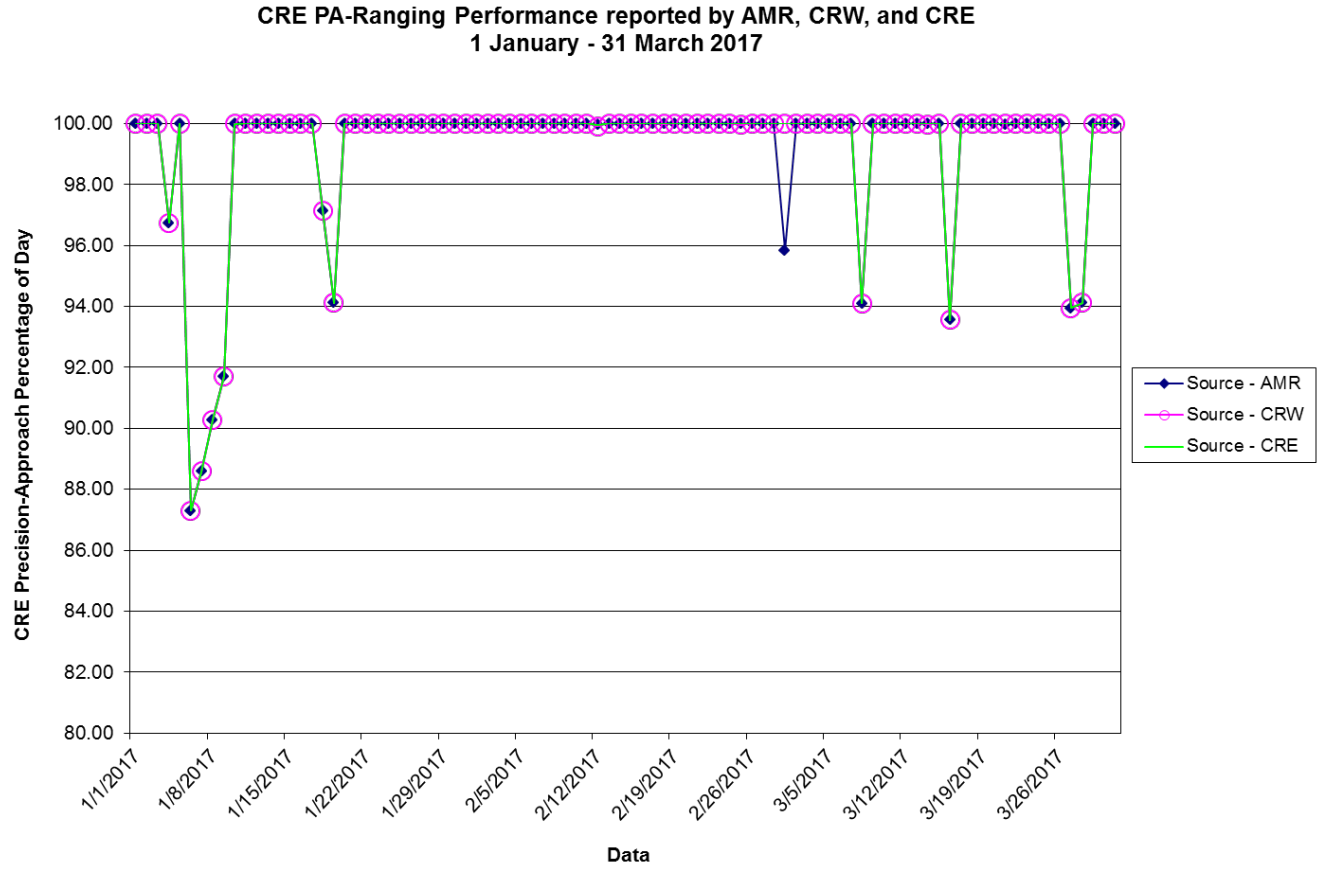
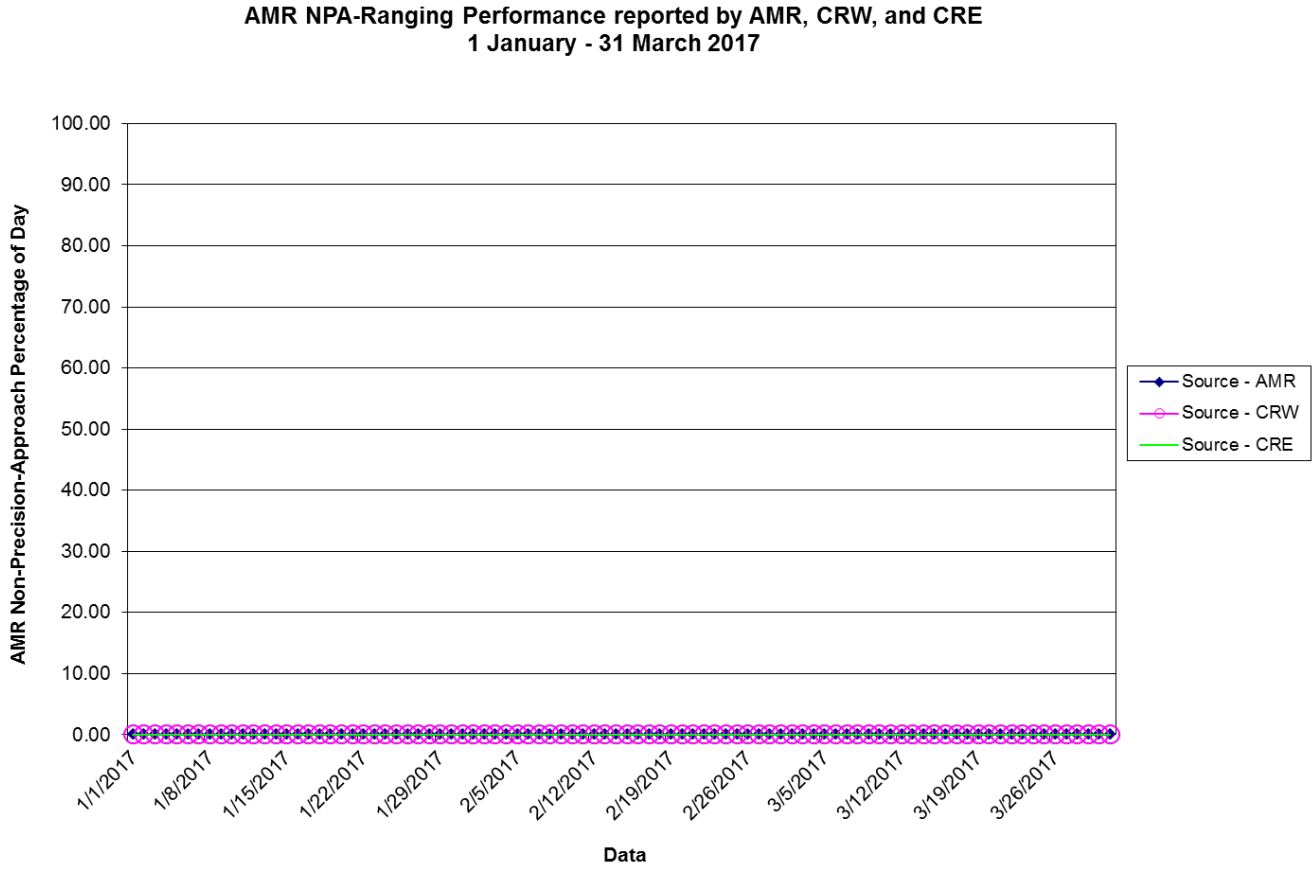


Figure 7-3 Daily NPA AMR GEO Ranging Availability Trend



8.0 WAAS AIRPORT AVAILABILITY

The WAAS airport availability evaluation determines the number and length of LPV service outages at selected airports using the transmitted WAAS navigation message. The navigation messages transmitted from all GEO satellites are processed simultaneously, and WAAS protection levels (VPL and HPL) are computed at each airport once every 30 seconds in accordance with the RTCA DO-229D. The WAAS LPV service is available for a user when the VPL is less than or equal to the VAL of 50 meters and the HPL is less than or equal to the HAL of 40 meters. If both conditions are met, WAAS LPV service is available at that airport. Consequently, if either one of the conditions are not met the WAAS LPV service outage and its duration is recorded.

When the LPV service becomes unavailable, it is not considered available again until protection levels are below or equal to alert limits for at least 15 minutes. Although this will minimally reduce LPV service availability, it substantially reduces the number of service outages and prevents excessive switching in and out of service availability. Similar service analyses are computed for the LP and LPV200 services in accordance with HAL and VAL shown in Table 1-1. Table 8-1 shows the WAAS LPV service availability and outages at selected airports in the US and Canada. Figure 8-1 through Figure 8-6 provide graphical representation of the LP, LPV, and LPV200 availability and outage counts at airports in the US and Canada that have published GPS 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/.

The interactive web page can be accessed by entering the web address into an Internet browser, selecting the current quarter from the drop-down menu on the upper left corner, and clicking “Submit Request”. The WAAS LPV airport layer will appear providing color-coded availability results, as shown in Figure 8-1 and 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” display WAAS availability for US airports with GPS RNAV IAPs; not selecting “Show all Airports” display only airports with approved LPV approaches are displayed, as shown in Table 8-1.

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

Airport Id	Airport Name	State/ Provence	Service	LP Outages	LP Avail	LPV Outages	LPV Avail	LPV 200 Outages	LPV 200 Avail
CAL4	FORT MACKAY / ALBIAN AERODROME	AB	LPV	0	100	0	100	0	100
CEV3	VEGREVILLE	AB	LPV	0	100	0	100	0	100
CYEG	EDMONTON / JOSEPHBURG	AB	LPV	0	100	0	100	0	100
CYXD	EDMONTON CITY CTR	AB	LPV	0	100	0	100	0	100
2C7	SHAKTOOLIK	AK	LPV	0	100	0	100	0	100
6A8	ALLAKAKET	AK	LP	0	100	0	100	4	99.9919
7KA	TATITLEK	AK	LP	0	100	0	100	0	100
9A3	CHUATHBALUK	AK	LPV	0	100	0	100	0	100
AKN	KING SALMON	AK	LPV	0	100	0	100	0	100
AKW	KLAWOCK	AK	LP	0	100	0	100	0	100
ANC	TED STEVENS ANCHORAGE INTL	AK	LPV200	0	100	0	100	0	100
AQH	QUINHAGAK	AK	LPV	0	100	0	100	1	99.9992
AQT	NUIQSUT	AK	LPV	0	100	0	100	26	99.9236
BET	BETHEL	AK	LPV200	0	100	0	100	0	100
BRW	WILEY POST-WILL	AK	LPV	0	100	4	99.9838	148	98.9336

	ROGERS MEMORIA								
CDB	COLD BAY	AK	LPV200	0	100	0	100	2	99.9495
CDV	MERLE K (MUDHOLE) SMITH	AK	LPV	0	100	0	100	0	100
CEM	CENTRAL	AK	LP	0	100	0	100	4	99.9919
CLP	CLARKS POINT	AK	LPV	0	100	0	100	0	100
CXF	COLDFOOT	AK	LP	0	100	0	100	5	99.9807
D76	ROBERT/BOB/CURTIS MEMORIAL	AK	LPV	0	100	0	100	35	99.9603
DLG	DILLINGHAM	AK	LPV	0	100	0	100	0	100
ELI	ELIM	AK	LPV	0	100	0	100	0	100
ENA	KENAI MUNICIPAL	AK	LPV200	0	100	0	100	0	100
ENM	EMMONAK	AK	LPV	0	100	0	100	0	100
FAI	FAIRBANKS INTL	AK	LPV200	0	100	0	100	2	99.9981
GAL	EDWARD G PITKA SR	AK	LPV	0	100	0	100	0	100
GAM	GAMBELL	AK	LPV	1	99.9996	2	99.9954	199	98.4483
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	1	99.9988
HOM	HOMER	AK	LPV	0	100	0	100	0	100
HPB	HOOPER BAY	AK	LP	0	100	0	100	1	99.9969
ILI	ILIAMNA	AK	LPV	0	100	0	100	0	100
IYS	WASILLA	AK	LPV	0	100	0	100	0	100
KAL	KALTAG	AK	LPV	0	100	0	100	0	100
KSM	ST MARY'S	AK	LPV200	0	100	0	100	0	100
KTN	KETCHIKAN INTL	AK	LPV	0	100	0	100	0	100
KTS	BREVIG MISSION	AK	LPV	0	100	0	100	26	99.9510
KWT	KWETHLUK	AK	LPV	0	100	0	100	0	100
KYU	KOYUKUK	AK	LPV	0	100	0	100	0	100
MCG	MC GRATH	AK	LP	0	100	0	100	0	100
MDM	MARSHALL DON HUNTER SR	AK	LP	0	100	0	100	0	100
MDO	MIDDLETON ISLAND	AK	LP	0	100	0	100	0	100
OME	NOME	AK	LPV	0	100	0	100	10	99.9757
OOK	TOKSOOK BAY	AK	LP	0	100	0	100	1	99.9946
ORT	NORTHWAY	AK	LP	0	100	0	100	0	100
OTZ	RALPH WIEN MEMORIAL	AK	LPV	0	100	0	100	30	99.9579
PAQ	PALMER MUNICIPAL	AK	LP	0	100	0	100	0	100
PHO	POINT HOPE	AK	LPV	0	100	0	100	73	99.8183
RBY	RUBY	AK	LPV	0	100	0	100	0	100
SCC	DEADHORSE	AK	LPV	0	100	0	100	44	99.8989
SCM	SCAMMON BAY	AK	LP	0	100	0	100	0	100
SHG	SHUNGNAK	AK	LP	0	100	0	100	2	99.9969
SHX	SHAGELUK	AK	LPV	0	100	0	100	0	100
SIT	SITKA ROCKY GUTIERREZ	AK	LP	0	100	0	100	0	100
SMK	ST MICHAEL	AK	LPV	0	100	0	100	0	100
SXQ	SOLDOTNA	AK	LP	0	100	0	100	0	100

UNK	UNALAKLEET	AK	LP	0	100	0	100	0	100
WLK	SELAWIK	AK	LPV	0	100	0	100	1	99.9988
WMO	WHITE MOUNTAIN	AK	LP	0	100	0	100	0	100
WNA	NAPAKIAK	AK	LPV	0	100	0	100	0	100
YAK	YAKUTAT	AK	LPV200	0	100	0	100	0	100
06A	MOTON FIELD MUNICIPAL	AL	LPV	0	100	0	100	0	100
0J6	HEADLAND MUNICIPAL	AL	LPV	0	100	0	100	0	100
0R1	ATMORE MUNICIPAL	AL	LP	0	100	0	100	0	100
11A	CLAYTON MUNICIPAL	AL	LPV	0	100	0	100	0	100
12J	BREWTON MUNICIPAL	AL	LPV	0	100	0	100	0	100
1M4	POSEY FIELD	AL	LPV	0	100	0	100	0	100
1R8	BAY MINETTE MUNICIPAL	AL	LPV	0	100	0	100	0	100
2R5	ST ELMO	AL	LPV	0	100	0	100	0	100
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	BLACKWELL FIELD	AL	LPV	0	100	0	100	0	100
79J	SOUTH ALABAMA RGNL AT BILL BEN	AL	LPV	0	100	0	100	0	100
8A0	ALBERTVILLE RGNL-THOMAS J BRUM	AL	LPV	0	100	0	100	0	100
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	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	AL	LPV200	0	100	0	100	0	100
M95	RICHARD ARTHUR FIELD	AL	LPV	0	100	0	100	0	100
MDQ	HUNTSVILLE EXECUTIVE AIRPORT T	AL	LPV200	0	100	0	100	0	100
MGM	MONTGOMERY RGNL (DANNELLY FIEL	AL	LPV200	0	100	0	100	0	100
MOB	MOBILE RGNL	AL	LPV200	0	100	0	100	0	100
MSL	NORTHWEST ALABAMA RGNL	AL	LPV200	0	100	0	100	0	100
PLR	ST CLAIR COUNTY	AL	LPV	0	100	0	100	0	100
PYP	CENTRE-PIEDMONT-CHEROKEE COUNT	AL	LPV	0	100	0	100	0	100
SCD	MERKEL FIELD SYLACAUGA MUNICIPAL	AL	LPV	0	100	0	100	0	100
SEM	CRAIG FIELD	AL	LPV200	0	100	0	100	0	100
TCL	TUSCALOOSA RGNL	AL	LPV	0	100	0	100	0	100
TOI	TROY MUNICIPAL AIRPORT AT N KENNETH	AL	LPV	0	100	0	100	0	100
0M0	BILLY FREE MUNICIPAL	AR	LPV	0	100	0	100	0	100
42A	MELBOURNE MUNICIPAL - JOHN E MILLER	AR	LP	0	100	0	100	0	100
4M3	CARLISLE MUNICIPAL	AR	LPV	0	100	0	100	0	100
6M7	MARIANNA/LEE COUNTY-STEVE EDWA	AR	LPV	0	100	0	100	0	100
7M1	MC GEHEE MUNICIPAL	AR	LP	0	100	0	100	0	100
ADF	DEXTER B FLORENCE MEMORIAL FIE	AR	LPV	0	100	0	100	0	100
ARG	WALNUT RIDGE RGNL	AR	LPV200	0	100	0	100	0	100
ASG	SPRINGDALE MUNICIPAL	AR	LPV	0	100	0	100	0	100
AWM	WEST MEMPHIS MUNICIPAL	AR	LPV200	0	100	0	100	0	100
BPK	BAXTER COUNTY	AR	LPV	0	100	0	100	0	100
BVX	BATESVILLE RGNL	AR	LPV	0	100	0	100	0	100
BYH	ARKANSAS INTL	AR	LPV200	0	100	0	100	0	100
CDH	HARRELL FIELD	AR	LPV	0	100	0	100	0	100
CXW	CANTRELL FLD	AR	LPV	0	100	0	100	0	100
DRP	DELTA RGNL	AR	LPV	0	100	0	100	0	100
ELD	SOUTH ARKANSAS RGNL AT GOODWIN	AR	LPV	0	100	0	100	0	100
FSM	FORT SMITH RGNL	AR	LPV200	0	100	0	100	0	100
FYV	DRAKE FIELD	AR	LPV	0	100	0	100	0	100
H34	HUNTSVILLE MUNICIPAL	AR	LPV	0	100	0	100	0	100
HRO	BOONE COUNTY	AR	LPV	0	100	0	100	0	100
JBR	JONESBORO MUNICIPAL	AR	LPV200	0	100	0	100	0	100
LIT	BILL AND HILLARY	AR	LPV200	0	100	0	100	0	100

	CLINTON NATIO								
M18	HOPE MUNICIPAL	AR	LP	0	100	0	100	0	100
M19	NEWPORT MUNICIPAL	AR	LPV	0	100	0	100	0	100
M77	HOWARD COUNTY	AR	LP	0	100	0	100	0	100
MXA	MANILA MUNICIPAL	AR	LPV	0	100	0	100	0	100
ORK	NORTH LITTLE ROCK MUNICIPAL	AR	LPV	0	100	0	100	0	100
PBF	GRIDER FIELD	AR	LPV	0	100	0	100	0	100
ROG	ROGERS EXECUTIVE - CARTER FIEL	AR	LPV	0	100	0	100	0	100
RUE	RUSSELLVILLE RGNL	AR	LPV	0	100	0	100	0	100
SGT	STUTTGART MUNICIPAL	AR	LPV	0	100	0	100	0	100
SLG	SMITH FIELD	AR	LPV	0	100	0	100	0	100
SRC	SEARCY MUNICIPAL	AR	LPV	0	100	0	100	0	100
SUZ	SALINE COUNTY RGNL	AR	LPV	0	100	0	100	0	100
TXK	TEXARKANA RGNL-WEBB FIELD	AR	LPV	0	100	0	100	0	100
VBT	BENTONVILLE MUNICIPAL/LOUISE M THAD	AR	LPV	0	100	0	100	0	100
XNA	NORTHWEST ARKANSAS RGNL	AR	LPV200	0	100	0	100	0	100
AVQ	MARANA RGNL	AZ	LP	0	100	0	100	29	99.8465
DVT	PHOENIX DEER VALLEY	AZ	LPV	0	100	0	100	0	100
FFZ	FALCON FLD	AZ	LP	0	100	0	100	0	100
FHU	SIERRA VISTA MUNICIPAL-LIBBY AAF	AZ	LPV200	0	100	0	100	48	99.7195
FLG	FLAGSTAFF PULLIAM	AZ	LPV	0	100	0	100	0	100
GEU	GLENDALE MUNICIPAL	AZ	LPV	0	100	0	100	0	100
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	0	100	0	100
JTC	SPRINGERVILLE MUNICIPAL	AZ	LP	0	100	0	100	0	100
P20	AVI SUQUILLA	AZ	LPV	0	100	0	100	0	100
P33	COCHISE COUNTY	AZ	LPV	0	100	0	100	23	99.9302
PGA	PAGE MUNICIPAL	AZ	LPV	0	100	0	100	0	100
PHX	PHOENIX SKY HARBOR INTL	AZ	LPV	0	100	0	100	0	100
PRC	ERNEST A LOVE FIELD	AZ	LPV200	0	100	0	100	0	100
RQE	WINDOW ROCK	AZ	LP	0	100	0	100	0	100
SAD	SAFFORD RGNL	AZ	LPV	0	100	0	100	0	100
SJN	ST JOHNS INDUSTRIAL AIR PARK	AZ	LP	0	100	0	100	0	100
SOW	SHOW LOW RGNL	AZ	LPV	0	100	0	100	0	100
TUS	TUCSON INTL	AZ	LPV	0	100	0	100	34	99.7967

CYBL	CAMPBELL RIVER	BC	LPV	0	100	0	100	0	100
CYCD	NANAIMO	BC	LPV	0	100	0	100	0	100
CYVR	VANCOUVER INTL	BC	LPV	0	100	0	100	0	100
CYXS	PRINCE GEORGE	BC	LPV	0	100	0	100	0	100
CYYJ	VICTORIA INTL	BC	LPV	0	100	0	100	0	100
CZBB	VANCOUVER / BOUNDARY BAY	BC	LPV	0	100	0	100	0	100
AAT	ALTURAS MUNICIPAL	CA	LPV	0	100	0	100	1	99.9996
ACV	ARCATA	CA	LPV200	0	100	0	100	37	99.9745
APC	NAPA COUNTY	CA	LPV	0	100	0	100	90	99.2874
APV	APPLE VALLEY	CA	LPV	0	100	0	100	0	100
AUN	AUBURN MUNICIPAL	CA	LPV	0	100	0	100	1	99.9996
BFL	MEADOWS FIELD	CA	LPV200	0	100	0	100	82	99.9163
BLH	BLYTHE	CA	LP	0	100	0	100	0	100
C83	BYRON	CA	LPV	0	100	0	100	90	99.4506
CCB	CABLE	CA	LP	0	100	0	100	0	100
CCR	BUCHANAN FIELD	CA	LPV	0	100	0	100	90	99.3129
CEC	JACK MC NAMARA FIELD	CA	LPV	0	100	0	100	62	99.9703
CIC	CHICO MUNICIPAL	CA	LPV	0	100	0	100	1	99.9996
CMA	CAMARILLO	CA	LPV	0	100	0	100	90	99.8337
CNO	CHINO	CA	LPV	0	100	0	100	0	100
CRQ	MC CLELLAN-PALOMAR	CA	LPV	0	100	0	100	0	100
CVH	HOLLISTER MUNICIPAL	CA	LPV	0	100	0	100	90	99.3573
DAG	BARSTOW-DAGGETT	CA	LPV	0	100	0	100	0	100
DWA	YOLO COUNTY	CA	LPV	0	100	0	100	35	99.88000
F70	FRENCH VALLEY	CA	LPV	0	100	0	100	0	100
FAT	FRESNO YOSEMITE INTL	CA	LPV200	0	100	0	100	83	99.9005
HAF	HALF MOON BAY	CA	LPV	0	100	0	100	90	99.0586
HHR	JACK NORTHROP FIELD/HAWTHORNE	CA	LPV	0	100	0	100	12	99.9954
HWD	HAYWARD EXECUTIVE	CA	LPV	0	100	0	100	90	99.2153
L35	BIG BEAR CITY	CA	LP	0	100	0	100	0	100
LAX	LOS ANGELES INTL	CA	LPV	0	100	0	100	20	99.9919
LGB	LONG BEACH /DAUGHERTY FIELD/	CA	LPV	0	100	0	100	3	99.9988
LHM	LINCOLN RGNL/KARL HARDER FIELD	CA	LPV200	0	100	0	100	1	99.9996
LLR	LITTLE RIVER	CA	LP	0	100	0	100	90	99.3113
LSN	LOS BANOS MUNICIPAL	CA	LPV	0	100	0	100	90	99.5502
LVK	LIVERMORE MUNICIPAL	CA	LPV	0	100	0	100	90	99.3380
MAE	MADERA MUNICIPAL	CA	LPV	0	100	0	100	89	99.8102
MCE	MERCED RGNL/MACREADY FIELD	CA	LPV	0	100	0	100	90	99.7388
MER	CASTLE	CA	LPV200	0	100	0	100	90	99.7434
MHR	SACRAMENTO MATHER	CA	LPV200	0	100	0	100	5	99.9823
MIT	SHAFTER-MINTER FIELD	CA	LPV	0	100	0	100	90	99.89000
MOD	MODESTO CITY-CO-HARRY SHAM FLD	CA	LPV	0	100	0	100	90	99.6617

MRY	MONTEREY RGNL	CA	LPV	0	100	0	100	90	99.1732
MYF	MONTGOMERY FIELD	CA	LPV200	0	100	0	100	0	100
MYV	YUBA COUNTY	CA	LPV200	0	100	0	100	1	99.9996
O02	NERVINO	CA	LPV	0	100	0	100	1	99.9996
O27	OAKDALE	CA	LPV	0	100	0	100	90	99.7855
O69	PETALUMA MUNICIPAL	CA	LPV	0	100	0	100	90	99.1651
O88	RIO VISTA MUNICIPAL	CA	LP	0	100	0	100	90	99.5540
OAK	METROPOLITAN OAKLAND INTL	CA	LPV200	0	100	0	100	90	99.1921
ONT	ONTARIO INTL	CA	LPV	0	100	0	100	0	100
OVE	OROVILLE MUNICIPAL	CA	LPV	0	100	0	100	1	99.9996
OXR	OXNARD	CA	LPV	0	100	0	100	90	99.7975
PMD	PALMDALE USAF PLANT 42	CA	LPV200	0	100	0	100	1	99.9996
POC	BRACKETT FIELD	CA	LPV	0	100	0	100	0	100
PRB	PASO ROBLES MUNICIPAL	CA	LPV200	0	100	0	100	90	99.4549
PVF	PLACERVILLE	CA	LPV	0	100	0	100	1	99.9996
RAL	RIVERSIDE MUNICIPAL	CA	LPV	0	100	0	100	0	100
RBL	RED BLUFF MUNICIPAL	CA	LPV	0	100	0	100	1	99.9996
RDD	REDDING MUNICIPAL	CA	LPV	0	100	0	100	1	99.9996
RHV	REID-HILLVIEW OF SANTA CLARA C	CA	LPV	0	100	0	100	90	99.2728
SAC	SACRAMENTO EXECUTIVE	CA	LPV	0	100	0	100	16	99.9560
SAN	SAN DIEGO INTL	CA	LPV	0	100	0	100	0	100
SBA	SANTA BARBARA MUNICIPAL	CA	LPV	0	100	0	100	91	99.6061
SBP	SAN LUIS COUNTY RGNL	CA	LPV200	0	100	0	100	90	99.4124
SCK	STOCKTON METROPOLITAN	CA	LPV	0	100	0	100	90	99.6416
SDM	BROWN FIELD MUNICIPAL	CA	LPV200	0	100	0	100	0	100
SEE	GILLESPIE FIELD	CA	LP	0	100	0	100	0	100
SFO	SAN FRANCISCO INTL	CA	LPV200	0	100	0	100	90	99.12000
SJC	NORMAN Y MINETA SAN JOSE INTL	CA	LPV200	0	100	0	100	90	99.2396
SMF	SACRAMENTO INTL	CA	LPV200	0	100	0	100	5	99.9850
SMX	SANTA MARIA PUB/CAPT G ALLAN H	CA	LPV200	0	100	0	100	91	99.4495
SNA	JOHN WAYNE AIRPORT-ORANGE COUN	CA	LPV200	0	100	0	100	0	100
SNS	SALINAS MUNICIPAL	CA	LPV200	0	100	0	100	90	99.2643
STS	CHARLES M SCHULZ - SONOMA COUN	CA	LPV200	0	100	0	100	90	99.1539
TCY	TRACY MUNICIPAL	CA	LPV	0	100	0	100	90	99.4826
TNP	TWENTYNINE PALMS	CA	LP	0	100	0	100	0	100
TOA	ZAMPERINI FIELD	CA	LPV	0	100	0	100	14	99.9946
TRK	TRUCKEE-TAHOE	CA	LP	0	100	0	100	1	99.9996
VCB	NUT TREE	CA	LPV	0	100	0	100	90	99.5455

VCV	SOUTHERN CALIFORNIA LOGISTICS	CA	LPV	0	100	0	100	0	100
VIS	VISALIA MUNICIPAL	CA	LPV200	0	100	0	100	79	99.9186
WJF	GENERAL WM J FOX AIRFIELD	CA	LPV	0	100	0	100	2	99.9992
WLW	WILLOWS-GLENN COUNTY	CA	LPV	0	100	0	100	1	99.9996
WVI	WATSONVILLE MUNICIPAL	CA	LPV	0	100	0	100	90	99.2357
1V6	FREMONT COUNTY	CO	LPV	0	100	0	100	1	99.9961
4V1	SPANISH PEAKS AIRFIELD	CO	LPV	0	100	0	100	1	99.9961
AEJ	CENTRAL COLORADO RGNL	CO	LP	0	100	0	100	1	99.9961
ALS	SAN LUIS VALLEY RGNL/BERGMAN F	CO	LPV200	0	100	0	100	1	99.9961
APA	CENTENNIAL	CO	LPV200	0	100	0	100	1	99.9961
BJC	ROCKY MOUNTAIN METROPOLITAN	CO	LPV200	0	100	0	100	1	99.9961
CEZ	CORTEZ MUNICIPAL	CO	LPV	0	100	0	100	0	100
COS	CITY OF COLORADO SPRINGS MUNICIPAL	CO	LPV200	0	100	0	100	1	99.9961
DEN	DENVER INTL	CO	LPV200	0	100	0	100	1	99.9961
DRO	DURANGO-LA PLATA COUNTY	CO	LPV200	0	100	0	100	0	100
FMM	FORT MORGAN MUNICIPAL	CO	LP	0	100	0	100	0	100
FNL	FORT COLLINS-LOVELAND MUNICIPAL	CO	LPV200	0	100	0	100	1	99.9985
FTG	FRONT RANGE	CO	LPV200	0	100	0	100	1	99.9961
GJT	GRAND JUNCTION REGIONAL	CO	LPV200	0	100	0	100	0	100
GXY	GREELEY-WELD COUNTY	CO	LPV200	0	100	0	100	1	99.9996
HDN	YAMPA VALLEY	CO	LPV200	0	100	0	100	0	100
ITR	KIT CARSON COUNTY	CO	LPV	0	100	0	100	0	100
LAA	LAMAR MUNICIPAL	CO	LPV	0	100	0	100	1	99.9961
LHX	LA JUNTA MUNICIPAL	CO	LPV	0	100	0	100	1	99.9961
LMO	VANCE BRAND	CO	LPV	0	100	0	100	1	99.9961
MTJ	MONTROSE RGNL	CO	LPV	0	100	0	100	0	100
PUB	PUEBLO MEMORIAL	CO	LPV200	0	100	0	100	1	99.9961
RIL	GARFIELD COUNTY RGNL	CO	LPV	0	100	0	100	0	100
STK	STERLING MUNICIPAL	CO	LPV	0	100	0	100	0	100
TEX	TELLURIDE RGNL	CO	LP	0	100	0	100	0	100
4B8	ROBERTSON FIELD	CT	LP	0	100	0	100	0	100
BDL	BRADLEY INTL	CT	LPV200	0	100	0	100	0	100
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	1	99.9954
EVY	SUMMIT	DE	LPV	0	100	0	100	1	99.9954
GED	DELAWARE COASTAL	DE	LPV	0	100	0	100	1	99.9954
ILG	NEW CASTLE	DE	LPV	0	100	0	100	1	99.9954
1J0	TRI-COUNTY	FL	LP	0	100	0	100	0	100
24J	SUWANNEE COUNTY	FL	LPV	0	100	0	100	0	100
28J	PALATKA MUNICIPAL - LT KAY LARKIN F	FL	LPV	0	100	0	100	0	100
40J	PERRY-FOLEY	FL	LPV	0	100	0	100	0	100
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	0	100	0	100	1	99.9996
AVO	AVON PARK EXECUTIVE	FL	LPV	0	100	0	100	0	100
BCT	BOCA RATON	FL	LPV	0	100	0	100	1	99.9988
BKV	BROOKSVILLE-TAMPA BAY RGNL	FL	LPV	0	100	0	100	0	100
BOW	BARTOW MUNICIPAL	FL	LPV	0	100	0	100	0	100
CEW	BOB SIKES	FL	LPV	0	100	0	100	0	100
CGC	CRYSTAL RIVER-CAPTAIN TOM DAVI	FL	LP	0	100	0	100	0	100
CHN	WAUCHULA MUNICIPAL	FL	LP	0	100	0	100	0	100
COI	MERRITT ISLAND	FL	LPV	0	100	0	100	0	100
CRG	JACKSONVILLE EXECUTIVE AT CRAI	FL	LPV200	0	100	0	100	0	100
CTY	CROSS CITY	FL	LPV	0	100	0	100	0	100
DAB	DAYTONA BEACH INTL	FL	LPV200	0	100	0	100	0	100
DED	DELAND MUNICIPAL-SIDNEY H TAYLOR FI	FL	LPV	0	100	0	100	0	100
DTS	DESTIN EXECUTIVE	FL	LPV	0	100	0	100	0	100
ECP	NORTHWEST FLORIDA BEACHES INTL	FL	LPV200	0	100	0	100	0	100
EVB	NEW SMYRNA BEACH MUNICIPAL	FL	LPV	0	100	0	100	0	100
EYW	KEY WEST INTL	FL	LPV	0	100	0	100	1	99.9977
F45	NORTH PALM BEACH COUNTY GENERA	FL	LPV	0	100	0	100	1	99.9992
FHB	FERNANDINA BEACH MUNICIPAL	FL	LPV	0	100	0	100	0	100
FIN	FLAGLER COUNTY	FL	LPV	0	100	0	100	0	100
FLL	FORT LAUDERDALE/HOLLYWO	FL	LPV	0	100	0	100	1	99.9981

	OD INTL								
FMY	PAGE FIELD	FL	LPV	0	100	0	100	0	100
FPR	ST LUCIE COUNTY INTL	FL	LPV	0	100	0	100	1	99.9996
FXE	FORT LAUDERDALE EXECUTIVE	FL	LPV200	0	100	0	100	1	99.9981
GIF	WINTER HAVEN'S GILBERT	FL	LPV	0	100	0	100	0	100
GNV	GAINESVILLE RGNL	FL	LPV	0	100	0	100	0	100
HEG	HERLONG RECREATIONAL	FL	LPV	0	100	0	100	0	100
IMM	IMMOKALEE RGNL	FL	LPV	0	100	0	100	1	99.9996
ISM	KISSIMMEE GATEWAY	FL	LPV200	0	100	0	100	0	100
JAX	JACKSONVILLE INTL	FL	LPV200	0	100	0	100	0	100
LAL	LAKELAND LINDER RGNL	FL	LPV200	0	100	0	100	0	100
LCQ	LAKE CITY GATEWAY	FL	LPV	0	100	0	100	0	100
LEE	LEESBURG INTL	FL	LPV	0	100	0	100	0	100
LNA	PALM BEACH COUNTY PARK	FL	LP	0	100	0	100	1	99.9988
MCO	ORLANDO INTL	FL	LPV200	0	100	0	100	0	100
MIA	MIAMI INTL	FL	LPV200	0	100	0	100	1	99.9977
MKY	MARCO ISLAND	FL	LPV	0	100	0	100	1	99.9992
MLB	MELBOURNE INTL	FL	LPV200	0	100	0	100	0	100
MTH	THE FLORIDA KEYS MARATHON	FL	LPV	0	100	0	100	2	99.9965
OBE	OKEECHOBEE COUNTY	FL	LPV	0	100	0	100	1	99.9996
OCF	OCALA INTL-JIM TAYLOR FIELD	FL	LPV200	0	100	0	100	0	100
OMN	ORMOND BEACH MUNICIPAL	FL	LPV	0	100	0	100	0	100
OPF	OPA-LOCKA EXECUTIVE	FL	LPV200	0	100	0	100	1	99.9981
ORL	EXECUTIVE	FL	LPV200	0	100	0	100	0	100
PBI	PALM BEACH INTL	FL	LPV200	0	100	0	100	1	99.9988
PCM	PLANT CITY	FL	LPV	0	100	0	100	0	100
PGD	PUNTA GORDA	FL	LPV200	0	100	0	100	0	100
PHK	PALM BEACH CO GLADES	FL	LPV	0	100	0	100	1	99.9992
PIE	ST PETE-CLEARWATER INTL	FL	LPV200	0	100	0	100	0	100
PMP	POMPANO BEACH AIRPARK	FL	LPV	0	100	0	100	1	99.9981
PNS	PENSACOLA INTL	FL	LPV200	0	100	0	100	0	100
RSW	SOUTHWEST FLORIDA INTL	FL	LPV	0	100	0	100	1	99.9996
SEF	SEBRING RGNL	FL	LPV	0	100	0	100	0	100
SFB	ORLANDO SANFORD INTL	FL	LPV200	0	100	0	100	0	100
SGJ	NORTHEAST FLORIDA RGNL	FL	LPV	0	100	0	100	0	100
SRQ	SARASOTA/BRADENTON INTL	FL	LPV200	0	100	0	100	0	100
SUA	WITHAM FIELD	FL	LPV	0	100	0	100	1	99.9992

TIX	SPACE COAST RGNL	FL	LPV200	0	100	0	100	0	100
TLH	TALLAHASSEE INTL	FL	LPV200	0	100	0	100	0	100
TMB	MIAMI EXECUTIVE	FL	LPV200	0	100	0	100	1	99.9977
TNT	DADE-COLLIER TRAINING AND TRAN	FL	LPV200	0	100	0	100	1	99.9988
TPA	TAMPA INTL	FL	LPV200	0	100	0	100	0	100
TPF	PETER O KNIGHT	FL	LP	0	100	0	100	0	100
TTS	NASA SHUTTLE LANDING FACILITY	FL	LPV200	0	100	0	100	0	100
VDF	TAMPA EXECUTIVE	FL	LPV	0	100	0	100	0	100
VNC	VENICE MUNICIPAL	FL	LP	0	100	0	100	0	100
VQQ	CECIL	FL	LPV200	0	100	0	100	0	100
VRB	VERO BEACH MUNICIPAL	FL	LPV200	0	100	0	100	1	99.9996
X07	LAKE WALES MUNICIPAL	FL	LP	0	100	0	100	0	100
X14	LA BELLE MUNICIPAL	FL	LPV	0	100	0	100	1	99.9996
X23	UMATILLA MUNICIPAL	FL	LP	0	100	0	100	0	100
X26	SEBASTIAN MUNICIPAL	FL	LP	0	100	0	100	1	99.9996
X35	MARION COUNTY	FL	LP	0	100	0	100	0	100
X50	MASSEY RANCH AIRPARK	FL	LP	0	100	0	100	0	100
X51	HOMESTEAD GENERAL AVIATION	FL	LPV	0	100	0	100	1	99.9977
ZPH	ZEPHYRHILLS MUNICIPAL	FL	LPV	0	100	0	100	0	100
09J	JEKYLL ISLAND	GA	LPV200	0	100	0	100	0	100
15J	COOK COUNTY	GA	LPV	0	100	0	100	0	100
17J	DONALSONVILLE MUNICIPAL	GA	LPV	0	100	0	100	0	100
18A	FRANKLIN COUNTY	GA	LPV	0	100	0	100	0	100
19A	JACKSON COUNTY	GA	LPV	0	100	0	100	0	100
2J5	MILLEN	GA	LPV	0	100	0	100	0	100
3J7	GREENE COUNTY RGNL	GA	LPV	0	100	0	100	0	100
48A	COCHRAN	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	0	100	0	100
4J5	QUITMAN BROOKS COUNTY	GA	LP	0	100	0	100	0	100
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
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	0	100
ATL	HARTSFIELD - JACKSON ATLANTA I	GA	LPV200	0	100	0	100	0	100
AYS	WAYCROSS-WARE COUNTY	GA	LPV200	0	100	0	100	0	100
BGE	DECATUR COUNTY INDUSTRIAL AIR	GA	LPV200	0	100	0	100	0	100
BHC	BAXLEY MUNICIPAL	GA	LPV	0	100	0	100	0	100
BIJ	EARLY COUNTY	GA	LPV	0	100	0	100	0	100
BQK	BRUNSWICK GOLDEN ISLES	GA	LPV200	0	100	0	100	0	100
CCO	NEWNAN COWETA COUNTY	GA	LPV	0	100	0	100	0	100
CKF	CRISP COUNTY-CORDELE	GA	LPV	0	100	0	100	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	0	100
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
DNN	DALTON MUNICIPAL	GA	LPV	0	100	0	100	0	100
DQH	DOUGLAS MUNICIPAL	GA	LPV200	0	100	0	100	0	100
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	LPV200	0	100	0	100	0	100
FTY	FULTON COUNTY AIRPORT-BROWN FI	GA	LPV	0	100	0	100	0	100
FZG	FITZGERALD MUNICIPAL	GA	LPV	0	100	0	100	0	100
GVL	LEE GILMER MEMORIAL	GA	LPV	0	100	0	100	0	100
HOE	HOMERVILLE	GA	LPV	0	100	0	100	0	100
HQU	THOMSON-MCDUFFIE COUNTY	GA	LPV	0	100	0	100	0	100
IIY	WASHINGTON-WILKES COUNTY	GA	LPV	0	100	0	100	0	100
JES	JESUP-WAYNE COUNTY	GA	LPV	0	100	0	100	0	100
JYL	PLANTATION ARPK	GA	LPV	0	100	0	100	0	100
JZP	PICKENS COUNTY	GA	LPV	0	100	0	100	0	100
LGC	LAGRANGE-CALLAWAY	GA	LPV200	0	100	0	100	0	100
LZU	GWINNETT COUNTY - BRISCOE FIEL	GA	LPV200	0	100	0	100	0	100
MAC	MACON DOWNTOWN	GA	LP	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
MLJ	BALDWIN COUNTY	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	0	100
RYY	COBB COUNTY-MC COLLUM FIELD	GA	LPV200	0	100	0	100	0	100
SAV	SAVANNAH/HILTON HEAD INTL	GA	LPV200	0	100	0	100	0	100
SBO	EAST GEORGIA REGIONAL	GA	LPV	0	100	0	100	0	100
TBR	STATESBORO-BULLOCH COUNTY	GA	LPV	0	100	0	100	0	100
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	0	100
VLD	VALDOSTA RGNL	GA	LPV	0	100	0	100	0	100
VPC	CARTERSVILLE	GA	LPV	0	100	0	100	0	100
WDR	BARROW COUNTY	GA	LPV	0	100	0	100	0	100
4C8	ALBIA MUNICIPAL	IA	LPV	0	100	0	100	0	100
AIO	ATLANTIC MUNICIPAL	IA	LPV	0	100	0	100	0	100
ALO	WATERLOO RGNL	IA	LPV	0	100	0	100	0	100
AMW	AMES MUNICIPAL	IA	LPV	0	100	0	100	0	100
AWG	WASHINGTON MUNICIPAL	IA	LPV200	0	100	0	100	0	100
BNW	BOONE MUNICIPAL	IA	LPV	0	100	0	100	0	100
BRL	SOUTHEAST IOWA RGNL	IA	LPV200	0	100	0	100	0	100
CBF	COUNCIL BLUFFS MUNICIPAL	IA	LPV200	0	100	0	100	0	100
CID	THE EASTERN IOWA	IA	LPV200	0	100	0	100	0	100
CIN	ARTHUR N NEU	IA	LPV	0	100	0	100	0	100
CKP	CHEROKEE COUNTY RGNL	IA	LPV	0	100	0	100	0	100
CSQ	CRESTON MUNICIPAL	IA	LPV	0	100	0	100	0	100
CWI	CLINTON MUNICIPAL	IA	LPV200	0	100	0	100	0	100
DBQ	DUBUQUE RGNL	IA	LPV200	0	100	0	100	0	100
DEH	DECORAH MUNICIPAL	IA	LPV	0	100	0	100	0	100

DNS	DENISON MUNICIPAL	IA	LPV	0	100	0	100	0	100
DSM	DES MOINES INTL	IA	LPV	0	100	0	100	0	100
DVN	DAVENPORT MUNICIPAL	IA	LPV200	0	100	0	100	0	100
EAG	EAGLE GROVE MUNICIPAL	IA	LPV	0	100	0	100	0	100
EBS	WEBSTER CITY MUNICIPAL	IA	LPV	0	100	0	100	0	100
EFW	JEFFERSON MUNICIPAL	IA	LPV	0	100	0	100	0	100
EOK	KEOKUK MUNICIPAL	IA	LPV	0	100	0	100	0	100
EST	ESTHERVILLE MUNICIPAL	IA	LPV	0	100	0	100	0	100
FFL	FAIRFIELD MUNICIPAL	IA	LPV	0	100	0	100	0	100
FOD	FORT DODGE RGNL	IA	LPV200	0	100	0	100	0	100
FXY	FOREST CITY MUNICIPAL	IA	LPV	0	100	0	100	0	100
GCT	GUTHRIE COUNTY RGNL	IA	LPV	0	100	0	100	0	100
GGI	GRINNELL RGNL	IA	LPV	0	100	0	100	0	100
HPT	HAMPTON MUNICIPAL	IA	LPV	0	100	0	100	0	100
I75	OSCEOLA MUNICIPAL	IA	LPV	0	100	0	100	0	100
ICL	SCHENCK FIELD	IA	LPV	0	100	0	100	0	100
IFA	IOWA FALLS MUNICIPAL	IA	LPV	0	100	0	100	0	100
IIB	INDEPENDENCE MUNICIPAL	IA	LP	0	100	0	100	0	100
IKV	ANKENY RGNL	IA	LPV	0	100	0	100	0	100
IOW	IOWA CITY MUNICIPAL	IA	LPV	0	100	0	100	0	100
LRJ	LE MARS MUNICIPAL	IA	LPV	0	100	0	100	0	100
MCW	MASON CITY MUNICIPAL	IA	LPV200	0	100	0	100	0	100
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
OTM	OTTUMWA RGNL	IA	LPV	0	100	0	100	0	100
OXV	KNOXVILLE MUNICIPAL	IA	LPV	0	100	0	100	0	100
PEA	PELLA MUNICIPAL	IA	LPV	0	100	0	100	0	100
POH	POCAHONTAS MUNICIPAL	IA	LPV	0	100	0	100	0	100
PRO	PERRY MUNICIPAL	IA	LPV200	0	100	0	100	0	100
RDK	RED OAK MUNICIPAL	IA	LPV	0	100	0	100	0	100
SDA	SHENANDOAH MUNICIPAL	IA	LPV	0	100	0	100	0	100
SHL	SHELDON MUNICIPAL	IA	LPV	0	100	0	100	0	100
SKI	SAC CITY MUNICIPAL	IA	LPV	0	100	0	100	0	100
SLB	STORM LAKE MUNICIPAL	IA	LPV	0	100	0	100	0	100
SPW	SPENCER MUNICIPAL	IA	LPV200	0	100	0	100	0	100
SUX	SIOUX GATEWAY/COL BUD DAY FIEL	IA	LPV200	0	100	0	100	0	100
TNU	NEWTON MUNICIPAL-	IA	LPV	0	100	0	100	0	100

	EARL JOHNSON FIELD								
TVK	CENTERVILLE MUNICIPAL	IA	LPV	0	100	0	100	0	100
TZT	BELLE PLAINE MUNICIPAL	IA	LPV	0	100	0	100	0	100
VTI	VINTON VETERANS MEMORIAL ARPK	IA	LPV	0	100	0	100	0	100
BOI	BOISE AIR TERMINAL/GOWEN FLD	ID	LPV	0	100	0	100	0	100
COE	COEUR D'ALENE - PAPPY BOYINGTO	ID	LPV200	0	100	0	100	0	100
DIJ	DRIGGS-REED MEMORIAL	ID	LP	0	100	0	100	0	100
EUL	CALDWELL INDUSTRIAL	ID	LPV	0	100	0	100	0	100
GNG	GOODING MUNICIPAL	ID	LPV	0	100	0	100	0	100
IDA	IDAHO FALLS RGNL	ID	LPV200	0	100	0	100	0	100
JER	JEROME COUNTY	ID	LPV	0	100	0	100	0	100
LWS	LEWISTON-NEZ PERCE COUNTY	ID	LPV200	0	100	0	100	0	100
MAN	NAMPA MUNICIPAL	ID	LPV	0	100	0	100	0	100
MYL	MC CALL MUNICIPAL	ID	LPV	0	100	0	100	0	100
PIH	POCATELLO RGNL	ID	LPV200	0	100	0	100	0	100
TWF	JOSLIN FIELD - MAGIC VALLEY RG	ID	LPV200	0	100	0	100	0	100
U76	MOUNTAIN HOME MUNICIPAL	ID	LPV	0	100	0	100	0	100
1H2	EFFINGHAM COUNTY MEMORIAL	IL	LPV	0	100	0	100	0	100
3LF	LITCHFIELD MUNICIPAL	IL	LPV	0	100	0	100	0	100
3MY	MOUNT HAWLEY AUXILIARY	IL	LP	0	100	0	100	0	100
AJG	MOUNT CARMEL MUNICIPAL	IL	LPV	0	100	0	100	0	100
ALN	ST LOUIS RGNL	IL	LPV200	0	100	0	100	0	100
ARR	AURORA MUNICIPAL	IL	LPV200	0	100	0	100	0	100
BLV	SCOTT AFB/MIDAMERICA	IL	LPV200	0	100	0	100	0	100
BMI	CENTRAL IL RGNL ARPT AT BLOOMI	IL	LPV	0	100	0	100	0	100
C15	PEKIN MUNICIPAL	IL	LPV	0	100	0	100	0	100
C73	DIXON MUNICIPAL-CHARLES R WALGREEN	IL	LPV	0	100	0	100	0	100
C75	MARSHALL COUNTY	IL	LP	0	100	0	100	0	100
CIR	CAIRO RGNL	IL	LP	0	100	0	100	0	100
CMI	UNIVERSITY OF ILLINOIS-WILLARD	IL	LPV200	0	100	0	100	0	100
CPS	ST LOUIS DOWNTOWN	IL	LPV200	0	100	0	100	0	100
CTK	INGERSOLL	IL	LPV	0	100	0	100	0	100
CUL	CARMI MUNICIPAL	IL	LP	0	100	0	100	0	100
DEC	DECATUR	IL	LPV200	0	100	0	100	0	100
DKB	DE KALB TAYLOR MUNICIPAL	IL	LPV	0	100	0	100	0	100

DNV	VERMILION REGIONAL	IL	LPV	0	100	0	100	0	100
DPA	DUPAGE	IL	LPV200	0	100	0	100	0	100
ENL	CENTRALIA MUNICIPAL	IL	LPV	0	100	0	100	0	100
EZI	KEWANEE MUNICIPAL	IL	LPV	0	100	0	100	0	100
FEP	ALBERTUS	IL	LPV	0	100	0	100	0	100
FOA	FLORA MUNICIPAL	IL	LPV	0	100	0	100	0	100
GBG	GALESBURG MUNICIPAL	IL	LPV200	0	100	0	100	0	100
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	LPV	0	100	0	100	0	100
MVN	MOUNT VERNON	IL	LPV	0	100	0	100	0	100
MWA	WILLIAMSON COUNTY RGNL	IL	LPV200	0	100	0	100	0	100
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
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	LPV200	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-JOSH BITTOR	IL	LPV	0	100	0	100	0	100
TIP	RANTOUL NATL AVN CNTR-FRANK EL	IL	LPV	0	100	0	100	0	100
UGN	WAUKEGAN RGNL	IL	LPV	0	100	0	100	0	100
UIN	QUINCY RGNL-BALDWIN	IL	LPV200	0	100	0	100	0	100

	FIELD								
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
4I7	PUTNAM COUNTY RGNL	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
CEV	METTEL FIELD	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
GSH	GOSHEN MUNICIPAL	IN	LPV	0	100	0	100	0	100
GWB	DE KALB COUNTY	IN	LPV	0	100	0	100	0	100
GYY	GARY/CHICAGO INTL	IN	LPV200	0	100	0	100	0	100
HFY	GREENWOOD MUNICIPAL	IN	LPV	0	100	0	100	0	100
HNB	HUNTINGBURG	IN	LPV	0	100	0	100	0	100
HUF	TERRE HAUTE INTL-HULMAN FIELD	IN	LPV200	0	100	0	100	0	100
I22	RANDOLPH COUNTY	IN	LPV	0	100	0	100	0	100
IMS	MADISON MUNICIPAL	IN	LPV	0	100	0	100	0	100
IND	INDIANAPOLIS INTL	IN	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
RZL	JASPER COUNTY	IN	LPV	0	100	0	100	0	100
SBN	SOUTH BEND INTL	IN	LPV	0	100	0	100	0	100
SER	FREEMAN MUNICIPAL	IN	LPV	0	100	0	100	0	100
SIV	SULLIVAN COUNTY	IN	LPV	0	100	0	100	0	100
SMD	SMITH FIELD	IN	LPV	0	100	0	100	0	100
TEL	PERRY COUNTY MUNICIPAL	IN	LP	0	100	0	100	0	100
TYQ	INDIANAPOLIS EXECUTIVE	IN	LPV	0	100	0	100	0	100
UWL	NEW CASTLE-HENRY CO MUNICIPAL	IN	LPV	0	100	0	100	0	100
VPZ	PORTER COUNTY RGNL	IN	LPV	0	100	0	100	0	100
3AU	AUGUSTA MUNICIPAL	KS	LP	0	100	0	100	0	100
3K3	SYRACUSE-HAMILTON COUNTY MUNICIPAL	KS	LPV	0	100	0	100	1	99.9961
5K2	TRIBUNE MUNICIPAL	KS	LPV	0	100	0	100	1	99.9985
AAO	COLONEL JAMES JABARA	KS	LPV	0	100	0	100	0	100
ADT	ATWOOD-RAWLINS COUNTY CITY-COU	KS	LPV	0	100	0	100	0	100
ANY	ANTHONY MUNICIPAL	KS	LPV	0	100	0	100	0	100
BEC	BEECH FACTORY	KS	LPV	0	100	0	100	0	100
CBK	SHALZ FIELD	KS	LPV	0	100	0	100	0	100
CNK	BLOSSER MUNICIPAL	KS	LP	0	100	0	100	0	100
DDC	DODGE CITY RGNL	KS	LPV	0	100	0	100	0	100
EGT	WELLINGTON MUNICIPAL	KS	LPV	0	100	0	100	0	100
EHA	ELKHART-MORTON COUNTY	KS	LPV	0	100	0	100	1	99.9973
EMP	EMPORIA MUNICIPAL	KS	LPV	0	100	0	100	0	100
EQA	EL DORADO/CAPTAIN JACK THOMAS	KS	LPV200	0	100	0	100	0	100
EWK	NEWTON-CITY-COUNTY	KS	LPV	0	100	0	100	0	100
FOE	FORBES FIELD	KS	LPV	0	100	0	100	0	100
FSK	FORT SCOTT MUNICIPAL	KS	LPV	0	100	0	100	0	100
GBD	GREAT BEND MUNICIPAL	KS	LPV200	0	100	0	100	0	100
GCK	GARDEN CITY RGNL	KS	LPV	0	100	0	100	1	99.9996
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	1	99.9973
HRU	HERINGTON RGNL	KS	LPV	0	100	0	100	0	100
HUT	HUTCHINSON RGNL	KS	LPV	0	100	0	100	0	100
HYS	HAYS RGNL	KS	LPV200	0	100	0	100	0	100
ICT	WICHITA DWIGHT D EISENHOWER NA	KS	LPV200	0	100	0	100	0	100
IDP	INDEPENDENCE MUNICIPAL	KS	LPV	0	100	0	100	0	100

IXD	NEW CENTURY AIRCENTER	KS	LPV	0	100	0	100	0	100
K38	WASHINGTON COUNTY VETERAN'S ME	KS	LPV	0	100	0	100	0	100
K78	ABILENE MUNICIPAL	KS	LPV	0	100	0	100	0	100
K81	MIAMI COUNTY	KS	LPV	0	100	0	100	0	100
K82	SMITH CENTER MUNICIPAL	KS	LPV200	0	100	0	100	0	100
K88	ALLEN COUNTY	KS	LPV	0	100	0	100	0	100
LBL	LIBERAL MID-AMERICA RGNL	KS	LPV200	0	100	0	100	1	99.9981
LQR	LARNED-PAWNEE COUNTY	KS	LPV	0	100	0	100	0	100
LWC	LAWRENCE MUNICIPAL	KS	LPV200	0	100	0	100	0	100
MHK	MANHATTAN RGNL	KS	LPV200	0	100	0	100	0	100
MPR	MC PHERSON	KS	LPV	0	100	0	100	0	100
MYZ	MARYSVILLE MUNICIPAL	KS	LPV	0	100	0	100	0	100
NRN	NORTON MUNICIPAL	KS	LPV	0	100	0	100	0	100
OEL	OAKLEY MUNICIPAL	KS	LPV	0	100	0	100	0	100
OIN	OBERLIN MUNICIPAL	KS	LPV	0	100	0	100	0	100
OJC	JOHNSON COUNTY EXECUTIVE	KS	LPV	0	100	0	100	0	100
OWI	OTTAWA MUNICIPAL	KS	LPV	0	100	0	100	0	100
PPF	TRI-CITY	KS	LPV	0	100	0	100	0	100
PTS	ATKINSON MUNICIPAL	KS	LPV	0	100	0	100	0	100
PTT	PRATT RGNL	KS	LPV	0	100	0	100	0	100
RCP	ROOKS COUNTY RGNL	KS	LPV	0	100	0	100	0	100
RPB	BELLEVILLE MUNICIPAL	KS	LPV	0	100	0	100	0	100
RSL	RUSSELL MUNICIPAL	KS	LPV	0	100	0	100	0	100
SLN	SALINA RGNL	KS	LPV	0	100	0	100	0	100
TOP	PHILIP BILLARD MUNICIPAL	KS	LPV200	0	100	0	100	0	100
TQK	SCOTT CITY MUNICIPAL	KS	LPV	0	100	0	100	0	100
UKL	COFFEY COUNTY	KS	LPV	0	100	0	100	0	100
ULS	ULYSSES	KS	LPV	0	100	0	100	1	99.9965
WLD	STROTHER FIELD	KS	LPV	0	100	0	100	0	100
0I8	CYNTHIANA-HARRISON COUNTY	KY	LP	0	100	0	100	0	100
18I	MC CREARY COUNTY	KY	LP	0	100	0	100	0	100
27K	GEORGETOWN SCOTT COUNTY - MARS	KY	LPV200	0	100	0	100	0	100
2I0	MADISONVILLE RGNL	KY	LPV	0	100	0	100	0	100
2M0	PRINCETON-CALDWELL COUNTY	KY	LPV	0	100	0	100	0	100
4M7	RUSSELLVILLE-LOGAN COUNTY	KY	LPV	0	100	0	100	0	100
5M9	MARION-CRITTENDEN COUNTY	KY	LPV	0	100	0	100	0	100
6I2	LEBANON SPRINGFIELD-	KY	LP	0	100	0	100	0	100

	GEORGE HOE								
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	0	100
BYL	WILLIAMSBURG-WHITLEY COUNTY	KY	LPV	0	100	0	100	0	100
CEY	KYLE-OAKLEY FIELD	KY	LPV	0	100	0	100	0	100
CPF	WENDELL H FORD	KY	LPV200	0	100	0	100	0	100
CVG	CINCINNATI/NORTHERN KENTUCKY I	KY	LPV200	0	100	0	100	0	100
DVK	STUART POWELL FIELD	KY	LPV	0	100	0	100	0	100
DWU	ASHLAND RGNL	KY	LP	0	100	0	100	0	100
EHR	HENDERSON CITY-COUNTY	KY	LPV	0	100	0	100	0	100
EKQ	WAYNE COUNTY	KY	LPV	0	100	0	100	0	100
EKX	ADDINGTON FIELD	KY	LPV	0	100	0	100	0	100
FFT	CAPITAL CITY	KY	LPV	0	100	0	100	0	100
FGX	FLEMING-MASON	KY	LPV	0	100	0	100	0	100
GLW	GLASGOW MUNICIPAL	KY	LPV	0	100	0	100	0	100
HVC	HOPKINSVILLE-CHRISTIAN COUNTY	KY	LPV	0	100	0	100	0	100
I39	MADISON	KY	LPV200	0	100	0	100	0	100
IOB	MOUNT STERLING-MONTGOMERY COUN	KY	LPV	0	100	0	100	0	100
JQD	OHIO COUNTY	KY	LPV	0	100	0	100	0	100
K24	RUSSELL COUNTY	KY	LPV	0	100	0	100	0	100
K62	GENE SNYDER	KY	LP	0	100	0	100	0	100
KY8	HANCOCK CO-RON LEWIS FIELD	KY	LPV	0	100	0	100	0	100
LEX	BLUE GRASS	KY	LPV	0	100	0	100	0	100
LOU	BOWMAN FIELD	KY	LPV	0	100	0	100	0	100
LOZ	LONDON-CORBIN ARPT-MAGEE FIELD	KY	LPV	0	100	0	100	0	100
M21	MUHLENBERG COUNTY	KY	LP	0	100	0	100	0	100
M25	MAYFIELD GRAVES COUNTY	KY	LPV	0	100	0	100	0	100
OWB	OWENSBORO-DAVIESS COUNTY	KY	LPV200	0	100	0	100	0	100
PAH	BARKLEY RGNL	KY	LPV	0	100	0	100	0	100
SDF	LOUISVILLE INTL-STANDIFORD FIE	KY	LPV200	0	100	0	100	0	100
SJS	BIG SANDY RGNL	KY	LPV	0	100	0	100	0	100
SME	LAKE CUMBERLAND RGNL	KY	LPV	0	100	0	100	0	100
SYM	MOREHEAD-ROWAN COUNTY CLYDE A	KY	LPV200	0	100	0	100	0	100
TWT	STURGIS MUNICIPAL	KY	LPV	0	100	0	100	0	100
TZV	TOMPKINSVILLE-MONROE	KY	LPV	0	100	0	100	0	100

	COUNTY								
1L0	ST JOHN THE BAPTIST PARISH	LA	LPV	0	100	0	100	0	100
3R4	HART	LA	LPV	0	100	0	100	0	100
3R7	JENNINGS	LA	LPV	0	100	0	100	0	100
5R8	DE QUINCY INDUSTRIAL AIRPARK	LA	LPV	0	100	0	100	0	100
ACP	ALLEN PARISH	LA	LPV	0	100	0	100	0	100
AEX	ALEXANDRIA INTL	LA	LPV200	0	100	0	100	0	100
ARA	ACADIANA RGNL	LA	LPV	0	100	0	100	0	100
BQP	MOREHOUSE MEMORIAL	LA	LPV	0	100	0	100	0	100
BTR	BATON ROUGE METROPOLITAN` RYAN	LA	LPV200	0	100	0	100	0	100
BXA	GEORGE R CARR MEMORIAL AIR FLD	LA	LPV	0	100	0	100	0	100
CWF	CHENNAULT INTL	LA	LPV200	0	100	0	100	0	100
DTN	SHREVEPORT DOWNTOWN	LA	LPV	0	100	0	100	0	100
ESF	ESLER RGNL	LA	LPV200	0	100	0	100	0	100
F88	JONESBORO	LA	LP	0	100	0	100	0	100
GAO	SOUTH LAFOURCHE LEONARD MILLER	LA	LPV200	0	100	0	100	0	100
HDC	HAMMOND NORTHSHORE RGNL	LA	LPV200	0	100	0	100	0	100
HUM	HOUMA-TERREBONNE	LA	LPV200	0	100	0	100	0	100
HZR	FALSE RIVER RGNL	LA	LPV	0	100	0	100	0	100
IER	NATCHITOCHES RGNL	LA	LPV	0	100	0	100	0	100
IYA	ABBEVILLE CHRIS CRUSTA MEMORIA	LA	LPV	0	100	0	100	0	100
L38	LOUISIANA RGNL	LA	LPV	0	100	0	100	0	100
L39	LEESVILLE	LA	LPV	0	100	0	100	0	100
LCH	LAKE CHARLES RGNL	LA	LPV200	0	100	0	100	0	100
LFT	LAFAYETTE RGNL/PAUL FOURNET FI	LA	LPV	0	100	0	100	0	100
M79	JOHN H HOOKS JR MEMORIAL	LA	LPV	0	100	0	100	0	100
MLU	MONROE RGNL	LA	LPV200	0	100	0	100	0	100
MSY	LOUIS ARMSTRONG NEW ORLEANS IN	LA	LPV200	0	100	0	100	0	100
NEW	LAKEFRONT	LA	LPV	0	100	0	100	0	100
OPL	ST LANDRY PARISH-AHART FIELD	LA	LPV	0	100	0	100	0	100
PTN	HARRY P WILLIAMS MEMORIAL	LA	LPV200	0	100	0	100	0	100
RSN	RUSTON RGNL	LA	LPV	0	100	0	100	0	100
SHV	SHREVEPORT RGNL	LA	LPV200	0	100	0	100	0	100
SPH	SPRINGHILL	LA	LPV	0	100	0	100	0	100
TVR	VICKSBURG TALLULAH RGNL	LA	LPV	0	100	0	100	0	100

UXL	SOUTHLAND FIELD	LA	LPV	0	100	0	100	0	100
3B0	SOUTHBRIDGE MUNICIPAL	MA	LPV	0	100	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 MUNICIPAL	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
PYM	PLYMOUTH MUNICIPAL	MA	LPV200	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	1	99.9996
CBE	GREATER CUMBERLAND RGNL	MD	LP	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	LPV	0	100	0	100	1	99.9996
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	1	99.9992
OXB	OCEAN CITY MUNICIPAL	MD	LPV	0	100	0	100	1	99.9954
SBY	SALISBURY-OCEAN CITY WICOMICO	MD	LPV200	0	100	0	100	1	99.9996
1B0	DEXTER RGNL	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	LPV	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	LPV	0	100	0	100	0	100
FVE	NORTHERN AROOSTOOK RGNL	ME	LPV	0	100	0	100	0	100
HUL	HOULTON INTL	ME	LP	0	100	0	100	0	100
IZG	EASTERN SLOPES RGNL	ME	LPV	0	100	0	100	0	100
LEW	AUBURN/LEWISTON MUNICIPAL	ME	LPV200	0	100	0	100	0	100
LRG	LINCOLN RGNL	ME	LP	0	100	0	100	0	100
MLT	MILLINOCKET MUNICIPAL	ME	LPV	0	100	0	100	0	100
PQI	NORTHERN MAINE RGNL ARPT AT PR	ME	LPV200	0	100	0	100	0	100
PWM	PORTLAND INTL JETPORT	ME	LPV200	0	100	0	100	0	100
RKD	KNOX COUNTY RGNL	ME	LPV	0	100	0	100	0	100
SFM	SANFORD SEACOAST RGNL	ME	LPV200	0	100	0	100	0	100
WVL	WATERVILLE ROBERT LAFLEUR	ME	LPV200	0	100	0	100	0	100
48D	CLARE MUNICIPAL	MI	LP	0	100	0	100	0	100
4D0	ABRAMS MUNICIPAL	MI	LP	0	100	0	100	0	100
6Y1	BOIS BLANC ISLAND	MI	LP	0	100	0	100	0	100
77G	MARLETTE	MI	LPV	0	100	0	100	0	100
9D9	HASTINGS	MI	LPV	0	100	0	100	0	100
ACB	ANTRIM COUNTY	MI	LPV	0	100	0	100	0	100
ADG	LENAWEE COUNTY	MI	LPV	0	100	0	100	0	100
AMN	GRATIOT COMMUNICIPALTY	MI	LPV	0	100	0	100	0	100
ANJ	SAULT STE MARIE MUNICIPAL/SANDERSON	MI	LPV	0	100	0	100	0	100
APN	ALPENA COUNTY RGNL	MI	LPV	0	100	0	100	0	100
ARB	ANN ARBOR MUNICIPAL	MI	LPV	0	100	0	100	0	100
AZO	KALAMAZOO/BATTLE CREEK INTL	MI	LPV	0	100	0	100	0	100
BAX	HURON COUNTY MEMORIAL	MI	LPV	0	100	0	100	0	100
BEH	SOUTHWEST MICHIGAN RGNL	MI	LPV200	0	100	0	100	0	100
BIV	WEST MICHIGAN RGNL	MI	LPV	0	100	0	100	0	100
BTL	W K KELLOGG	MI	LPV200	0	100	0	100	0	100
CAD	WEXFORD COUNTY	MI	LPV200	0	100	0	100	0	100
CIU	CHIPPEWA COUNTY INTL	MI	LPV	0	100	0	100	0	100
CMX	HOUGHTON COUNTY MEMORIAL	MI	LPV	0	100	0	100	0	100
CVX	CHARLEVOIX MUNICIPAL	MI	LPV	0	100	0	100	0	100
D95	DUPONT-LAPEER	MI	LP	0	100	0	100	0	100
DET	COLEMAN A YOUNG MUNICIPAL	MI	LPV	0	100	0	100	0	100
DTW	DETROIT METROPOLITAN WAYNE COU	MI	LPV200	0	100	0	100	0	100

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

TVC	CHERRY CAPITAL	MI	LPV200	0	100	0	100	0	100
YIP	WILLOW RUN	MI	LPV	0	100	0	100	0	100
16D	PERHAM MUNICIPAL	MN	LPV	0	100	0	100	0	100
3N8	MAHNOMEN COUNTY	MN	LPV	0	100	0	100	0	100
ACQ	WASECA MUNICIPAL	MN	LPV	0	100	0	100	0	100
ADC	WADENA MUNICIPAL	MN	LPV	0	100	0	100	0	100
AEL	ALBERT LEA MUNICIPAL	MN	LPV	0	100	0	100	0	100
AIT	AITKIN MUNICIPAL-STEVE KURTZ FIELD	MN	LPV	0	100	0	100	0	100
ANE	ANOKA COUNTY-BLAINE ARPT(JANES	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
CKC	GRAND MARAIS/COOK COUNTY	MN	LPV	0	100	0	100	0	100
CKN	CROOKSTON MUNICIPAL KIRKWOOD FLD	MN	LPV	0	100	0	100	0	100
CNB	MYERS FIELD	MN	LPV	0	100	0	100	0	100
COQ	CLOQUET CARLTON COUNTY	MN	LPV	0	100	0	100	0	100
CQM	COOK MUNICIPAL	MN	LP	0	100	0	100	0	100
D39	SAUK CENTRE MUNICIPAL	MN	LPV	0	100	0	100	0	100
D42	SPRINGFIELD MUNICIPAL	MN	LP	0	100	0	100	0	100
DLH	DULUTH INTL	MN	LPV200	0	100	0	100	0	100
DTL	DETROIT LAKES-WETHING FIELD	MN	LPV	0	100	0	100	0	100
DVP	SLAYTON MUNICIPAL	MN	LP	0	100	0	100	0	100
DXX	LAC QUI PARLE COUNTY	MN	LPV200	0	100	0	100	0	100
ELO	ELY MUNICIPAL	MN	LPV200	0	100	0	100	0	100
ETH	WHEATON MUNICIPAL	MN	LP	0	100	0	100	0	100
EVM	EVELETH-VIRGINIA MUNICIPAL	MN	LPV	0	100	0	100	0	100
FBL	FARIBAULT MUNICIPAL	MN	LPV	0	100	0	100	0	100
FCM	FLYING CLOUD	MN	LPV200	0	100	0	100	0	100
FFM	FERGUS FALLS MUNICIPAL-EINAR MICKEL	MN	LPV200	0	100	0	100	0	100
FKA	FILLMORE COUNTY	MN	LPV	0	100	0	100	0	100
FOZ	BIGFORK MUNICIPAL	MN	LP	0	100	0	100	0	100
FRM	FAIRMONT MUNICIPAL	MN	LPV	0	100	0	100	0	100
FSE	FOSSTON MUNICIPAL	MN	LP	0	100	0	100	0	100

GHW	GLENWOOD MUNICIPAL	MN	LPV	0	100	0	100	0	100
GPZ	GRAND RAPIDS/ITASCA CO-GORDON	MN	LPV	0	100	0	100	0	100
GYL	GLENCOE MUNICIPAL	MN	LPV	0	100	0	100	0	100
HCD	HUTCHINSON MUNICIPAL-BUTLER FIELD	MN	LPV	0	100	0	100	0	100
HCO	HALLOCK MUNICIPAL	MN	LPV	0	100	0	100	0	100
HIB	RANGE RGNL	MN	LPV200	0	100	0	100	0	100
INL	FALLS INTL-EINARSON FIELD	MN	LPV	0	100	0	100	0	100
JKJ	MOORHEAD MUNICIPAL	MN	LPV	0	100	0	100	0	100
JMR	MORA MUNICIPAL	MN	LPV	0	100	0	100	0	100
LJF	LITCHFIELD MUNICIPAL	MN	LPV	0	100	0	100	0	100
LVN	AIRLAKE	MN	LPV200	0	100	0	100	0	100
LXL	LITTLE FALLS/MORRISON COUNTY-L	MN	LPV	0	100	0	100	0	100
LYV	QUENTIN AANENSON FIELD	MN	LPV200	0	100	0	100	0	100
MGG	MAPLE LAKE MUNICIPAL	MN	LP	0	100	0	100	0	100
MJQ	JACKSON MUNICIPAL	MN	LPV	0	100	0	100	0	100
MKT	MANKATO RGNL	MN	LPV200	0	100	0	100	0	100
MML	SOUTHWEST MINNESOTA RGNL MARSH	MN	LPV200	0	100	0	100	0	100
MOX	MORRIS MUNICIPAL - CHARLIE SCHMIDT	MN	LPV	0	100	0	100	0	100
MSP	MINNEAPOLIS-ST PAUL INTL/WOLD-	MN	LPV200	0	100	0	100	0	100
MVE	MONTEVIDEO-CHIPPEWA COUNTY	MN	LPV	0	100	0	100	0	100
MZH	MOOSE LAKE CARLTON COUNTY	MN	LPV	0	100	0	100	0	100
ONA	WINONA MUNICIPAL-MAX CONRAD FLD	MN	LPV	0	100	0	100	0	100
ORB	ORR RGNL	MN	LP	0	100	0	100	0	100
OTG	WORTHINGTON MUNICIPAL	MN	LPV200	0	100	0	100	0	100
OWA	OWATONNA DEGNER RGNL	MN	LPV200	0	100	0	100	0	100
PEX	PAYNESVILLE MUNICIPAL	MN	LPV200	0	100	0	100	0	100
PKD	PARK RAPIDS MUNICIPAL-KONSHOK FIELD	MN	LPV200	0	100	0	100	0	100
PQN	PIPESTONE MUNICIPAL	MN	LPV200	0	100	0	100	0	100
RGK	RED WING RGNL	MN	LPV200	0	100	0	100	0	100
ROS	RUSH CITY RGNL	MN	LPV	0	100	0	100	0	100
ROX	ROSEAU MUNICIPAL/RUDY BILLBERG FIEL	MN	LPV	0	100	0	100	0	100
RRT	WARROAD INTL MEMORIAL	MN	LPV	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
SGS	SOUTH ST PAUL MUNICIPAL-RICHARD E F	MN	LP	0	100	0	100	0	100
STC	ST CLOUD RGNL	MN	LPV200	0	100	0	100	0	100
STP	ST PAUL DOWNTOWN HOLMAN FLD	MN	LPV	0	100	0	100	0	100
TOB	DODGE CENTER	MN	LPV	0	100	0	100	0	100
TVF	THIEF RIVER FALLS RGNL	MN	LPV	0	100	0	100	0	100
TWM	RICHARD B HELGESON	MN	LPV	0	100	0	100	0	100
ULM	NEW ULM MUNICIPAL	MN	LPV200	0	100	0	100	0	100
VVV	ORTONVILLE MUNICIPAL-MARTINSON FIEL	MN	LP	0	100	0	100	0	100
Y49	WALKER MUNICIPAL	MN	LP	0	100	0	100	0	100
Y63	ELBOW LAKE MUNICIPAL - PRIDE OF THE	MN	LPV	0	100	0	100	0	100
03D	MEMPHIS MEMORIAL	MO	LPV	0	100	0	100	0	100
1H0	CREVE COEUR	MO	LPV	0	100	0	100	0	100
1MO	MOUNTAIN GROVE MEMORIAL	MO	LP	0	100	0	100	0	100
2H2	JERRY SUMNERS SR AURORA MUNICIPAL	MO	LP	0	100	0	100	0	100
6M6	LEWIS COUNTY RGNL	MO	LPV	0	100	0	100	0	100
8WC	WASHINGTON COUNTY	MO	LPV	0	100	0	100	0	100
94K	CASSVILLE MUNICIPAL	MO	LPV	0	100	0	100	0	100
AIZ	LEE C FINE MEMORIAL	MO	LPV	0	100	0	100	0	100
BBG	BRANSON	MO	LPV200	0	100	0	100	0	100
BUM	BUTLER MEMORIAL	MO	LPV	0	100	0	100	0	100
CGI	CAPE GIRARDEAU RGNL	MO	LPV200	0	100	0	100	0	100
CHT	CHILLICOTHE MUNICIPAL	MO	LPV	0	100	0	100	0	100
COU	COLUMBIA RGNL	MO	LPV	0	100	0	100	0	100
DMO	SEDALIA RGNL	MO	LPV	0	100	0	100	0	100
DXE	DEXTER MUNICIPAL	MO	LPV	0	100	0	100	0	100
EIW	COUNTY MEMORIAL	MO	LPV	0	100	0	100	0	100
EOS	NEOSHO HUGH ROBINSON	MO	LPV	0	100	0	100	0	100
EVU	NORTHWEST MISSOURI RGNL	MO	LPV	0	100	0	100	0	100
EZZ	CAMERON MEMORIAL	MO	LPV	0	100	0	100	0	100
FAM	FARMINGTON RGNL	MO	LPV	0	100	0	100	0	100
FTT	ELTON HENSLEY MEMORIAL	MO	LPV	0	100	0	100	0	100
FWB	BRANSON WEST MUNICIPAL - EMERSON FI	MO	LPV200	0	100	0	100	0	100
FYG	WASHINGTON RGNL	MO	LPV	0	100	0	100	0	100
GLY	CLINTON RGNL	MO	LPV	0	100	0	100	0	100
GPH	MIDWEST NATIONAL AIR	MO	LPV	0	100	0	100	0	100

	CENTER								
H79	ELDON MODEL AIRPARK	MO	LP	0	100	0	100	0	100
H88	A PAUL VANCE FREDERICKTOWN RGN	MO	LPV	0	100	0	100	0	100
HAE	HANNIBAL RGNL	MO	LPV	0	100	0	100	0	100
HFJ	MONETT RGNL	MO	LPV	0	100	0	100	0	100
HIG	HIGGINSVILLE INDUSTRIAL MUNICIPAL	MO	LPV	0	100	0	100	0	100
IRK	KIRKSVILLE RGNL	MO	LPV200	0	100	0	100	0	100
JEF	JEFFERSON CITY MEMORIAL	MO	LPV	0	100	0	100	0	100
JLN	JOPLIN RGNL	MO	LPV	0	100	0	100	0	100
K02	PERRYVILLE MUNICIPAL	MO	LPV	0	100	0	100	0	100
K15	GRAND GLAIZE-OSAGE BEACH	MO	LP	0	100	0	100	0	100
K57	GOULD PETERSON MUNICIPAL	MO	LPV	0	100	0	100	0	100
K89	MACON-FOWER MEMORIAL	MO	LPV	0	100	0	100	0	100
LLU	LAMAR MUNICIPAL	MO	LPV	0	100	0	100	0	100
LRY	LAWRENCE SMITH MEMORIAL	MO	LPV	0	100	0	100	0	100
LXT	LEE'S SUMMIT MUNICIPAL	MO	LPV	0	100	0	100	0	100
M05	CARUTHERSVILLE MEMORIAL	MO	LPV	0	100	0	100	0	100
M12	STEELE MUNICIPAL	MO	LPV	0	100	0	100	0	100
M17	BOLIVAR MUNICIPAL	MO	LPV	0	100	0	100	0	100
M48	HOUSTON MEMORIAL	MO	LPV	0	100	0	100	0	100
MAW	MALDEN RGNL	MO	LPV	0	100	0	100	0	100
MBY	OMAR N BRADLEY	MO	LPV	0	100	0	100	0	100
MCI	KANSAS CITY INTL	MO	LPV200	0	100	0	100	0	100
MHL	MARSHALL MEMORIAL MUNICIPAL	MO	LPV	0	100	0	100	0	100
MKC	CHARLES B WHEELER DOWNTOWN	MO	LPV200	0	100	0	100	0	100
MNF	MOUNTAIN VIEW	MO	LP	0	100	0	100	0	100
MO3	STOCKTON MUNICIPAL	MO	LP	0	100	0	100	0	100
MO8	NORTH CENTRAL MISSOURI RGNL	MO	LPV	0	100	0	100	0	100
MYJ	MEXICO MEMORIAL	MO	LPV	0	100	0	100	0	100
NVD	NEVADA MUNICIPAL	MO	LPV200	0	100	0	100	0	100
OZS	CAMDENTON MEMORIAL-LAKE RGNL	MO	LPV	0	100	0	100	0	100
PLK	M GRAHAM CLARK DOWNTOWN	MO	LPV200	0	100	0	100	0	100
POF	POPLAR BLUFF MUNICIPAL	MO	LPV	0	100	0	100	0	100
RAW	WARSAW MUNICIPAL	MO	LPV200	0	100	0	100	0	100
RCM	SKYHAVEN	MO	LPV	0	100	0	100	0	100

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

MBO	BRUCE CAMPBELL FIELD	MS	LP	0	100	0	100	0	100
MCB	MC COMB/PIKE COUNTY/JOHN E LEW	MS	LPV	0	100	0	100	0	100
MEI	KEY FIELD	MS	LPV200	0	100	0	100	0	100
MJD	PICAYUNE MUNICIPAL	MS	LPV	0	100	0	100	0	100
MMS	SELFS	MS	LPV	0	100	0	100	0	100
MPE	PHILADELPHIA MUNICIPAL	MS	LPV	0	100	0	100	0	100
OLV	OLIVE BRANCH	MS	LPV200	0	100	0	100	0	100
PIB	HATTIESBURG-LAUREL RGNL	MS	LPV200	0	100	0	100	0	100
PMU	PANOLA COUNTY	MS	LPV	0	100	0	100	0	100
PQL	TRENT LOTT INTL	MS	LPV200	0	100	0	100	0	100
RNV	CLEVELAND MUNICIPAL	MS	LPV	0	100	0	100	0	100
STF	GEORGE M BRYAN	MS	LPV200	0	100	0	100	0	100
TUP	TUPELO RGNL	MS	LPV200	0	100	0	100	0	100
UOX	UNIVERSITY-OXFORD	MS	LPV	0	100	0	100	0	100
UTA	TUNICA MUNICIPAL	MS	LPV200	0	100	0	100	0	100
VKS	VICKSBURG MUNICIPAL	MS	LP	0	100	0	100	0	100
1S3	TILLITT FIELD	MT	LPV	0	100	0	100	0	100
4U6	CIRCLE TOWN COUNTY	MT	LPV	0	100	0	100	0	100
6S8	LAUREL MUNICIPAL	MT	LPV	0	100	0	100	0	100
7S0	RONAN	MT	LPV	0	100	0	100	0	100
BHK	BAKER MUNICIPAL	MT	LPV	0	100	0	100	0	100
BIL	BILLINGS LOGAN INTL	MT	LPV200	0	100	0	100	0	100
BTM	BERT MOONEY	MT	LPV	0	100	0	100	0	100
BZN	BOZEMAN YELLOWSTONE INTL	MT	LPV	0	100	0	100	0	100
CTB	CUT BANK INTL	MT	LPV200	0	100	0	100	0	100
DLN	DILLON	MT	LPV	0	100	0	100	0	100
EKS	ENNIS - BIG SKY	MT	LPV	0	100	0	100	0	100
GDV	DAWSON COMMUNICIPALTY	MT	LPV	0	100	0	100	0	100
GGW	WOKAL FIELD/GLASGOW INTL	MT	LPV200	0	100	0	100	0	100
GPI	GLACIER PARK INTL	MT	LPV	0	100	0	100	0	100
GTF	GREAT FALLS INTL	MT	LPV200	0	100	0	100	0	100
HLN	HELENA RGNL	MT	LPV	0	100	0	100	0	100
HVR	HAVRE CITY-COUNTY	MT	LPV	0	100	0	100	0	100
LVM	MISSION FIELD	MT	LP	0	100	0	100	0	100
LWT	LEWISTOWN MUNICIPAL	MT	LPV200	0	100	0	100	0	100
M75	MALTA	MT	LP	0	100	0	100	0	100
MLS	FRANK WILEY FIELD	MT	LPV	0	100	0	100	0	100
MSO	MISSOULA INTL	MT	LPV	0	100	0	100	0	100
OLF	L M CLAYTON	MT	LPV200	0	100	0	100	0	100
PO1	POPLAR MUNICIPAL	MT	LPV200	0	100	0	100	0	100
PWD	SHER-WOOD	MT	LPV200	0	100	0	100	0	100
RPX	ROUNDUP	MT	LPV	0	100	0	100	0	100

SBX	SHELBY	MT	LPV	0	100	0	100	0	100
SDY	SIDNEY-RICHLAND MUNICIPAL	MT	LPV	0	100	0	100	0	100
WYS	YELLOWSTONE	MT	LPV200	0	100	0	100	0	100
CYCL	CHARLO	NB	LPV	0	100	0	100	0	100
CYQM	MONCTON INTL	NB	LPV	0	100	0	100	0	100
43A	MONTGOMERY COUNTY	NC	LP	0	100	0	100	0	100
ACZ	HENDERSON FIELD	NC	LPV	0	100	0	100	0	100
AFP	ANSON COUNTY -JEFF CLOUD FIE	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	LPV	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
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	LPV	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	LPV200	0	100	0	100	0	100
FAY	FAYETTEVILLE RGNL/GRANNIS FIEL	NC	LPV200	0	100	0	100	0	100
FQD	RUTHERFORD CO - MARCHMAN FIELD	NC	LPV	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
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	NC	LPV200	0	100	0	100	0	100

	RGNL								
JNX	JOHNSTON REGIONAL	NC	LPV	0	100	0	100	0	100
JQF	CONCORD 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	1	99.9996
MRH	MICHAEL J SMITH FIELD	NC	LP	0	100	0	100	0	100
MRN	FOOTHILLS REGIONAL	NC	LPV200	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
RUQ	ROWAN COUNTY	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
VUJ	STANLY COUNTY	NC	LPV200	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
2C8	CAVALIER MUNICIPAL	ND	LPV	0	100	0	100	0	100
3H4	HILLSBORO MUNICIPAL	ND	LPV	0	100	0	100	0	100
46D	CARRINGTON MUNICIPAL	ND	LPV	0	100	0	100	0	100
51D	EDGELEY MUNICIPAL	ND	LPV	0	100	0	100	0	100
5N8	CASSELTON ROBERT MILLER RGNL	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
D09	BOTTINEAU MUNICIPAL	ND	LPV	0	100	0	100	0	100
D55	ROBERTSON FIELD	ND	LPV	0	100	0	100	0	100
D60	TIOGA MUNICIPAL	ND	LPV	0	100	0	100	0	100
DIK	DICKINSON - THEODORE ROOSEVELT	ND	LPV200	0	100	0	100	0	100
DVL	DEVILS LAKE RGNL	ND	LPV200	0	100	0	100	0	100
FAR	HECTOR INTL	ND	LPV200	0	100	0	100	0	100
GAF	HUTSON FIELD	ND	LPV	0	100	0	100	0	100
GFK	GRAND FORKS INTL	ND	LPV	0	100	0	100	0	100
GWR	GWINNER-ROGER MELROE FIELD	ND	LPV200	0	100	0	100	0	100
HZE	MERCER COUNTY RGNL	ND	LPV	0	100	0	100	0	100
ISN	SLOULIN FLD INTL	ND	LPV200	0	100	0	100	0	100
JMS	JAMESTOWN RGNL	ND	LPV200	0	100	0	100	0	100
K74	ROBERT ODEGAARD FIELD	ND	LP	0	100	0	100	0	100
MOT	MINOT INTL	ND	LPV	0	100	0	100	0	100
RUG	RUGBY MUNICIPAL	ND	LP	0	100	0	100	0	100
S25	WATFORD CITY MUNICIPAL	ND	LPV	0	100	0	100	0	100
Y19	MANDAN MUNICIPAL	ND	LPV	0	100	0	100	0	100
07K	CENTRAL CITY MUNICIPAL - LARRY REIN	NE	LPV	0	100	0	100	0	100
08K	HARVARD STATE	NE	LPV	0	100	0	100	0	100
0B4	HARTINGTON MUNICIPAL/ BUD BECKER FL	NE	LPV	0	100	0	100	0	100
0C4	PENDER MUNICIPAL	NE	LPV	0	100	0	100	0	100
0F4	LOUP CITY MUNICIPAL	NE	LPV	0	100	0	100	0	100
0G3	TECUMSEH MUNICIPAL	NE	LPV	0	100	0	100	0	100
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
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
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
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	LPV	0	100	0	100	0	100
LXN	JIM KELLY FIELD	NE	LPV	0	100	0	100	0	100
MCK	MC COOK BEN NELSON RGNL	NE	LPV	0	100	0	100	0	100
MLE	MILLARD	NE	LPV	0	100	0	100	0	100
ODX	EVELYN SHARP FIELD	NE	LPV	0	100	0	100	0	100
OFK	NORFOLK RGNL/KARL STEFAN MEMOR	NE	LPV	0	100	0	100	0	100
OGA	SEARLE FIELD	NE	LPV	0	100	0	100	0	100
OKS	GARDEN COUNTY	NE	LPV	0	100	0	100	0	100
OLU	COLUMBUS MUNICIPAL	NE	LPV	0	100	0	100	0	100
OMA	EPPLEY AIRFIELD	NE	LPV200	0	100	0	100	0	100
ONL	THE O'NEILL MUNICIPAL-JOHN L BAKER	NE	LPV	0	100	0	100	0	100
PMV	PLATTSMOUTH MUNICIPAL	NE	LPV	0	100	0	100	0	100
RBE	ROCK COUNTY	NE	LPV	0	100	0	100	0	100

SCB	SCRIBNER STATE	NE	LPV	0	100	0	100	0	100
SNY	SIDNEY MUNICIPAL/LLOYD W CARR FIELD	NE	LPV	0	100	0	100	0	100
SWT	SEWARD MUNICIPAL	NE	LPV	0	100	0	100	0	100
TIF	THOMAS COUNTY	NE	LPV	0	100	0	100	0	100
VTN	MILLER FIELD	NE	LPV	0	100	0	100	0	100
ASH	BOIRE FIELD	NH	LPV200	0	100	0	100	0	100
CON	CONCORD MUNICIPAL	NH	LPV	0	100	0	100	0	100
DAW	SKYHAVEN	NH	LPV	0	100	0	100	0	100
EEN	DILLANT-HOPKINS	NH	LPV	0	100	0	100	0	100
HIE	MOUNT WASHINGTON RGNL	NH	LPV	0	100	0	100	0	100
LCI	LACONIA MUNICIPAL	NH	LPV	0	100	0	100	0	100
LEB	LEBANON MUNICIPAL	NH	LPV	0	100	0	100	0	100
MHT	MANCHESTER	NH	LPV200	0	100	0	100	0	100
PSM	PORTSMOUTH INTL AT PEASE	NH	LPV200	0	100	0	100	0	100
47N	CENTRAL JERSEY RGNL	NJ	LP	0	100	0	100	1	99.9977
4N1	GREENWOOD LAKE	NJ	LP	0	100	0	100	0	100
ACY	ATLANTIC CITY INTL	NJ	LPV200	0	100	0	100	1	99.9958
CDW	ESSEX COUNTY	NJ	LPV	0	100	0	100	0	100
EWR	NEWARK LIBERTY INTL	NJ	LPV	0	100	0	100	0	100
MIV	MILLVILLE MUNICIPAL	NJ	LPV200	0	100	0	100	1	99.9954
MJX	OCEAN COUNTY	NJ	LPV	0	100	0	100	1	99.9965
MMU	MORRISTOWN MUNICIPAL	NJ	LPV200	0	100	0	100	1	99.9996
N14	FLYING W	NJ	LPV	0	100	0	100	1	99.9954
N40	SKY MANOR	NJ	LP	0	100	0	100	1	99.9958
TEB	TETERBORO	NJ	LPV	0	100	0	100	0	100
TTN	TRENTON MERCER	NJ	LPV200	0	100	0	100	1	99.9954
VAY	SOUTH JERSEY RGNL	NJ	LP	0	100	0	100	1	99.9954
WWD	CAPE MAY COUNTY	NJ	LPV	0	100	0	100	1	99.9954
CYDF	DEER LAKE	NL	LPV	0	100	0	100	3	99.9788
ATS	ARTESIA MUNICIPAL	NM	LPV	0	100	0	100	0	100
CAO	CLAYTON MUNICIPAL ARPK	NM	LPV	0	100	0	100	1	99.9969
CNM	CAVERN CITY AIR TRML	NM	LPV200	0	100	0	100	0	100
CVN	CLOVIS MUNICIPAL	NM	LPV200	0	100	0	100	0	100
DMN	DEMING MUNICIPAL	NM	LPV	0	100	0	100	0	100
E06	LEA COUNTY-ZIP FRANKLIN MEMORI	NM	LPV	0	100	0	100	0	100
FMN	FOUR CORNERS RGNL	NM	LPV200	0	100	0	100	0	100
HOB	LEA COUNTY RGNL	NM	LPV	0	100	0	100	0	100
LAM	LOS ALAMOS	NM	LP	0	100	0	100	1	99.9981
LRU	LAS CRUCES INTL	NM	LPV	0	100	0	100	0	100
ONM	SOCORRO MUNICIPAL	NM	LP	0	100	0	100	0	100
ROW	ROSWELL INTL AIR CENTER	NM	LPV	0	100	0	100	0	100

SRR	SIERRA BLANCA RGNL	NM	LPV200	0	100	0	100	0	100
SVC	GRANT COUNTY	NM	LPV	0	100	0	100	0	100
CYHZ	HALIFAX / STANFIELD INTL	NS	LPV	0	100	0	100	0	100
CYEV	INUVIK	NT	LPV	0	100	0	100	5	99.9969
05U	EUREKA	NV	LP	0	100	0	100	0	100
CXP	CARSON	NV	LP	0	100	0	100	1	99.9996
ELY	ELY ARPT /YELLAND FLD/	NV	LPV	0	100	0	100	0	100
LAS	MC CARRAN INTL	NV	LPV	0	100	0	100	0	100
RNO	RENO/TAHOE INTL	NV	LPV	0	100	0	100	1	99.9996
RTS	RENO/STEAD	NV	LPV	0	100	0	100	1	99.9996
TPH	TONOPAH	NV	LP	0	100	0	100	0	100
WMC	WINNEMUCCA MUNICIPAL	NV	LPV	0	100	0	100	1	99.9996
06N	RANDALL	NY	LP	0	100	0	100	0	100
0G7	FINGER LAKES RGNL	NY	LPV	0	100	0	100	1	99.9996
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	NY	LP	0	100	0	100	0	100
ALB	ALBANY INTL	NY	LPV200	0	100	0	100	0	100
ART	WATERTOWN INTL	NY	LPV200	0	100	0	100	0	100
BGM	GREATER BINGHAMTON/EDWIN A LIN	NY	LPV200	0	100	0	100	1	99.9981
BUF	BUFFALO NIAGARA INTL	NY	LPV200	0	100	0	100	0	100
D38	CANANDAIGUA	NY	LPV	0	100	0	100	0	100
DKK	CHAUTAUQUA COUNTY/DUNKIRK	NY	LP	0	100	0	100	0	100
ELM	ELMIRA/CORNING RGNL	NY	LPV200	0	100	0	100	1	99.9988
ELZ	WELLSVILLE MUNICIPAL ARPT`TARANTINE	NY	LPV	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	LPV	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	1	99.9985
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	1	99.9996
POU	DUTCHESS COUNTY	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	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	2	99.9992
16G	SENECA COUNTY	OH	LPV	0	100	0	100	0	100
1G0	WOOD COUNTY	OH	LPV	0	100	0	100	0	100
1G3	KENT STATE UNIV	OH	LPV	0	100	0	100	2	99.9992
4G5	MONROE COUNTY	OH	LP	0	100	0	100	0	100
4I3	KNOX COUNTY	OH	LPV200	0	100	0	100	1	99.9996
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	1	99.9996
AKR	AKRON FULTON INTL	OH	LP	0	100	0	100	2	99.9992
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	3	99.9988
BKL	BURKE LAKEFRONT	OH	LPV	0	100	0	100	0	100
CAK	AKRON-CANTON RGNL	OH	LPV200	0	100	0	100	2	99.9992
CDI	CAMBRIDGE MUNICIPAL	OH	LP	0	100	0	100	1	99.9996
CGF	CUYAHOGA COUNTY	OH	LPV	0	100	0	100	0	100
CLE	CLEVELAND-HOPKINS INTL	OH	LPV200	0	100	0	100	0	100
CMH	PORT COLUMBUS INTL	OH	LPV200	0	100	0	100	0	100
CQA	LAKEFIELD	OH	LPV	0	100	0	100	0	100
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	1	99.9996
EDJ	BELLEFONTAINE RGNL	OH	LPV	0	100	0	100	0	100
EOP	PIKE COUNTY	OH	LP	0	100	0	100	0	100
FDY	FINDLAY	OH	LPV	0	100	0	100	0	100
FZI	FOSTORIA METROPOLITAN	OH	LPV	0	100	0	100	0	100
GQQ	GALION MUNICIPAL	OH	LP	0	100	0	100	0	100
HAO	BUTLER CO RGNL-HOGAN FIELD	OH	LPV	0	100	0	100	0	100
HOC	HIGHLAND COUNTY	OH	LP	0	100	0	100	0	100
HZY	NORTHEAST OHIO RGNL	OH	LPV	0	100	0	100	0	100
I19	GREENE COUNTY-LEWIS A JACKSON	OH	LPV	0	100	0	100	0	100
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	1	99.9996
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	1	99.9996
PMH	GREATER PORTSMOUTH RGNL	OH	LPV	0	100	0	100	0	100
POV	PORTAGE COUNTY	OH	LPV	0	100	0	100	2	99.9992
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	LP	0	100	0	100	0	100
TOL	TOLEDO EXPRESS	OH	LPV200	0	100	0	100	0	100
TSO	CARROLL COUNTY-TOLSON	OH	LP	0	100	0	100	1	99.9996
TZR	BOLTON FIELD	OH	LPV200	0	100	0	100	0	100
UNI	OHIO UNIVERSITY	OH	LPV200	0	100	0	100	0	100
USE	FULTON COUNTY	OH	LPV	0	100	0	100	0	100
UYF	MADISON COUNTY	OH	LPV	0	100	0	100	0	100
YNG	YOUNGSTOWN-WARREN RGNL	OH	LPV	0	100	0	100	0	100
1F0	ARDMORE DOWNTOWN EXECUTIVE	OK	LP	0	100	0	100	0	100
1O4	THOMAS MUNICIPAL	OK	LPV	0	100	0	100	0	100
80F	ANTLERS MUNICIPAL	OK	LPV	0	100	0	100	0	100
ADH	ADA MUNICIPAL	OK	LPV	0	100	0	100	0	100
ADM	ARDMORE MUNICIPAL	OK	LPV200	0	100	0	100	0	100
AVK	ALVA RGNL	OK	LPV	0	100	0	100	0	100
AXS	ALTUS/QUARTZ MOUNTAIN RGNL	OK	LPV	0	100	0	100	0	100
BKN	BLACKWELL-TONKAWA MUNICIPAL	OK	LPV	0	100	0	100	0	100
BVO	BARTLESVILLE MUNICIPAL	OK	LPV	0	100	0	100	0	100
CHK	CHICKASHA MUNICIPAL	OK	LPV200	0	100	0	100	0	100
CLK	CLINTON RGNL	OK	LPV200	0	100	0	100	0	100
CSM	CLINTON-SHERMAN	OK	LPV200	0	100	0	100	0	100
DUA	DURANT RGNL - EAKER FIELD	OK	LPV	0	100	0	100	0	100
DUC	HALLIBURTON FIELD	OK	LPV	0	100	0	100	0	100
ELK	ELK CITY RGNL BUSINESS	OK	LPV	0	100	0	100	0	100
F22	PERRY MUNICIPAL	OK	LPV	0	100	0	100	0	100
FDR	FREDERICK RGNL	OK	LPV200	0	100	0	100	0	100
GCM	CLAREMORE RGNL	OK	LPV	0	100	0	100	0	100
GMJ	GROVE MUNICIPAL	OK	LPV	0	100	0	100	0	100
GOK	GUTHRIE-EDMOND RGNL	OK	LPV	0	100	0	100	0	100
GUY	GUYMON MUNICIPAL	OK	LPV	0	100	0	100	1	99.9985
GZL	STIGLER RGNL	OK	LPV	0	100	0	100	0	100

HBR	HOBART RGNL	OK	LPV	0	100	0	100	0	100
HSD	SUNDANCE	OK	LPV	0	100	0	100	0	100
MKO	DAVIS FIELD	OK	LPV	0	100	0	100	0	100
MLC	MC ALESTER RGNL	OK	LPV	0	100	0	100	0	100
OJA	THOMAS P STAFFORD	OK	LPV	0	100	0	100	0	100
OKC	WILL ROGERS WORLD	OK	LPV200	0	100	0	100	0	100
OKM	OKMULGEE RGNL	OK	LPV	0	100	0	100	0	100
OUN	UNIVERSITY OF OKLAHOMA WESTHEI	OK	LPV200	0	100	0	100	0	100
OWP	WILLIAM R POGUE MUNICIPAL	OK	LPV	0	100	0	100	0	100
PNC	PONCA CITY RGNL	OK	LPV	0	100	0	100	0	100
PVJ	PAULS VALLEY MUNICIPAL	OK	LPV200	0	100	0	100	0	100
PWA	WILEY POST	OK	LPV200	0	100	0	100	0	100
RCE	CLARENCE E PAGE MUNICIPAL	OK	LPV	0	100	0	100	0	100
RVS	RICHARD LLOYD JONES JR	OK	LPV	0	100	0	100	0	100
SNL	SHAWNEE RGNL	OK	LPV200	0	100	0	100	0	100
SWO	STILLWATER RGNL	OK	LPV200	0	100	0	100	0	100
TQH	TAHLEQUAH MUNICIPAL	OK	LPV	0	100	0	100	0	100
TUL	TULSA INTL	OK	LPV200	0	100	0	100	0	100
WDG	ENID WOODRING RGNL	OK	LPV200	0	100	0	100	0	100
WWR	WEST WOODWARD	OK	LPV	0	100	0	100	0	100
CNS7	KINCARDINE	ON	LPV	0	100	0	100	0	100
CYHD	DRYDEN REGIONAL	ON	LPV	0	100	0	100	0	100
CYKF	KITCHENER / WATERLOO	ON	LPV	0	100	0	100	0	100
CYOW	OTTAWA / MACDONALDCARTIER INTL	ON	LPV	0	100	0	100	0	100
CYQT	THUNDER BAY	ON	LPV	0	100	0	100	0	100
CYTS	TIMMINS / VICTOR M POWER	ON	LPV	0	100	0	100	0	100
CYXL	SIOUX LOOKOUT	ON	LPV	0	100	0	100	0	100
AST	ASTORIA RGNL	OR	LPV	0	100	0	100	0	100
BDN	BEND MUNICIPAL	OR	LPV	0	100	0	100	1	99.9996
BKE	BAKER CITY MUNICIPAL	OR	LPV	0	100	0	100	0	100
CVO	CORVALLIS MUNICIPAL	OR	LPV200	0	100	0	100	0	100
EUG	MAHLON SWEET FIELD	OR	LPV200	0	100	0	100	1	99.9996
GCD	GRANT CO RGNL/OGILVIE FIELD	OR	LPV	0	100	0	100	0	100
HIO	PORTLAND-HILLSBORO	OR	LPV200	0	100	0	100	0	100
LGD	LA GRANDE/UNION COUNTY	OR	LPV	0	100	0	100	0	100
LKV	LAKE COUNTY	OR	LPV	0	100	0	100	1	99.9996
LMT	KLAMATH FALLS	OR	LPV	0	100	0	100	1	99.9996
MMV	MC MINNVILLE MUNICIPAL	OR	LPV	0	100	0	100	0	100

ONO	ONTARIO MUNICIPAL	OR	LPV	0	100	0	100	0	100
OTH	SOUTHWEST OREGON RGNL	OR	LPV	0	100	0	100	1	99.9996
PDT	EASTERN OREGON RGNL AT PENDLET	OR	LPV200	0	100	0	100	0	100
PDX	PORTLAND INTL	OR	LPV200	0	100	0	100	0	100
RDM	ROBERTS FIELD	OR	LPV200	0	100	0	100	1	99.9996
S33	MADRAS MUNICIPALCIPAL	OR	LPV	0	100	0	100	0	100
S39	PRINEVILLE	OR	LP	0	100	0	100	1	99.9996
SLE	MCNARY FLD	OR	LPV200	0	100	0	100	0	100
SPB	SCAPPOOSE INDUSTRIAL AIRPARK	OR	LPV	0	100	0	100	0	100
UAO	AURORA STATE	OR	LPV	0	100	0	100	0	100
22N	JAKE ARNER MEMORIAL	PA	LP	0	100	0	100	1	99.9958
29D	GROVE CITY	PA	LP	0	100	0	100	0	100
2G9	SOMERSET COUNTY	PA	LPV	0	100	0	100	0	100
8G2	CORRY-LAWRENCE	PA	LPV	0	100	0	100	0	100
8N8	DANVILLE	PA	LP	0	100	0	100	1	99.9981
9D4	DECK	PA	LPV	0	100	0	100	1	99.9977
ABE	LEHIGH VALLEY INTL	PA	LPV200	0	100	0	100	1	99.9954
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	1	99.9961
AXQ	CLARION COUNTY	PA	LPV	0	100	0	100	0	100
BFD	BRADFORD RGNL	PA	LPV	0	100	0	100	0	100
BTP	BUTLER COUNTY/K W SCHOLTER FIE	PA	LPV	0	100	0	100	0	100
BVI	BEAVER COUNTY	PA	LPV	0	100	0	100	0	100
CXY	CAPITAL CITY	PA	LPV	0	100	0	100	1	99.9992
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
IPT	WILLIAMSPORT RGNL	PA	LPV	0	100	0	100	1	99.9985
JST	JOHN MURTHA JOHNSTOWN-CAMBRIA	PA	LPV200	0	100	0	100	0	100
LBE	ARNOLD PALMER RGNL	PA	LPV	0	100	0	100	0	100
LNS	LANCASTER	PA	LPV200	0	100	0	100	1	99.9977
LOM	WINGS FIELD	PA	LPV	0	100	0	100	1	99.9954
MDT	HARRISBURG INTL	PA	LPV	0	100	0	100	1	99.9988
MPO	POCONO MOUNTAINS	PA	LPV	0	100	0	100	1	99.9965

	MUNICIPAL								
MQS	CHESTER COUNTY G O CARLSON	PA	LPV	0	100	0	100	1	99.9954
N38	WELLSBORO JOHNSTON	PA	LP	0	100	0	100	1	99.9992
N79	NORTHUMBERLAND COUNTY	PA	LPV	0	100	0	100	1	99.9977
N96	BELLEFONTE	PA	LPV	0	100	0	100	0	100
OQN	BRANDYWINE	PA	LP	0	100	0	100	1	99.9954
OYM	ST MARYS MUNICIPAL	PA	LPV	0	100	0	100	0	100
PHL	PHILADELPHIA INTL	PA	LPV	0	100	0	100	1	99.9954
PIT	PITTSBURGH INTL	PA	LPV200	0	100	0	100	0	100
PNE	NORTHEAST PHILADELPHIA	PA	LPV	0	100	0	100	1	99.9954
PSB	MID-STATE	PA	LPV	0	100	0	100	0	100
PTW	HERITAGE FIELD	PA	LPV	0	100	0	100	1	99.9954
RDG	READING RGNL/CARL A SPAATZ FIE	PA	LPV	0	100	0	100	1	99.9954
RVL	MIFFLIN COUNTY	PA	LPV	0	100	0	100	0	100
THV	YORK	PA	LP	0	100	0	100	1	99.9996
UCP	NEW CASTLE MUNICIPAL	PA	LPV	0	100	0	100	0	100
UKT	QUAKERTOWN	PA	LP	0	100	0	100	1	99.9954
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	1	99.9961
XLL	ALLENTOWN QUEEN CITY MUNICIPAL	PA	LP	0	100	0	100	1	99.9954
ZER	SCHUYLKILL COUNTY /JOE ZERBEY/	PA	LPV200	0	100	0	100	1	99.9965
CPN8	OPINACA	QC	LPV	0	100	0	100	0	100
CSR3	VICTORIAVILLE	QC	LPV	0	100	0	100	0	100
CTP9	KATTINIQ / DONALDSON	QC	LPV	0	100	0	100	0	100
CYEY	AMOS	QC	LPV	0	100	0	100	0	100
CYHU	MONTREAL / STHUBERT	QC	LPV	0	100	0	100	0	100
CYIF	STAUGUSTIN	QC	LPV	0	100	0	100	1	99.99000
CYMX	MONTREAL (MIRABEL INTL)	QC	LPV	0	100	0	100	0	100
CYQB	QUEBEC / JEAN LESAGE INTL	QC	LPV	0	100	0	100	0	100
CYRI	RIVIEREDULOUP	QC	LPV	0	100	0	100	0	100
CYRQ	TROISRIVIERES	QC	LPV	0	100	0	100	0	100
CYVB	BONAVENTURE	QC	LPV	0	100	0	100	0	100
CYVP	KUUJJUAQ	QC	LPV	0	100	0	100	1	99.9954
CYYY	MONTJOLI	QC	LPV	0	100	0	100	0	100
BID	BLOCK ISLAND STATE	RI	LPV	0	100	0	100	0	100
OQU	QUONSET STATE	RI	LPV	0	100	0	100	0	100

PVD	THEODORE FRANCIS GREEN STATE	RI	LPV200	0	100	0	100	0	100
SFZ	NORTH CENTRAL STATE	RI	LPV	0	100	0	100	0	100
35A	UNION COUNTY` TROY SHELTON FIE	SC	LP	0	100	0	100	0	100
6J0	LEXINGTON COUNTY AT PELION	SC	LPV	0	100	0	100	0	100
AIK	AIKEN MUNICIPAL	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	0	100
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	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
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
GSP	GREENVILLE SPARTANBURG INTL	SC	LPV200	0	100	0	100	0	100
GYH	DONALDSON FIELD	SC	LPV	0	100	0	100	0	100
HYW	CONWAY-HORRY COUNTY	SC	LPV	0	100	0	100	0	100
JZI	CHARLESTON EXECUTIVE	SC	LPV200	0	100	0	100	0	100
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	0	100
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	LPV200	0	100	0	100	0	100
RBW	LOWCOUNTRY RGNL	SC	LPV	0	100	0	100	0	100
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 JETPORT	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
8V3	PARKSTON MUNICIPAL	SD	LPV	0	100	0	100	0	100
9D1	GREGORY MUNICIPAL - FLYNN FLD	SD	LPV	0	100	0	100	0	100
ABR	ABERDEEN RGNL	SD	LPV200	0	100	0	100	0	100
AGZ	WAGNER MUNICIPAL	SD	LPV	0	100	0	100	0	100
ATY	WATERTOWN RGNL	SD	LPV200	0	100	0	100	0	100
BKX	BROOKINGS RGNL	SD	LPV200	0	100	0	100	0	100
EFC	BELLE FOURCHE MUNICIPAL	SD	LPV	0	100	0	100	0	100
FSD	JOE FOSS FIELD	SD	LPV200	0	100	0	100	0	100
HON	HURON RGNL	SD	LPV200	0	100	0	100	0	100
HSR	HOT SPRINGS MUNICIPAL	SD	LP	0	100	0	100	0	100
ICR	WINNER RGNL	SD	LPV	0	100	0	100	0	100
LEM	LEMMON MUNICIPAL	SD	LPV	0	100	0	100	0	100
MBG	MOBRIDGE MUNICIPAL	SD	LPV	0	100	0	100	0	100
MDS	MADISON MUNICIPAL	SD	LPV	0	100	0	100	0	100
MHE	MITCHELL MUNICIPAL	SD	LPV	0	100	0	100	0	100
MKA	MILLER MUNICIPAL	SD	LPV	0	100	0	100	0	100
PHP	PHILIP	SD	LPV	0	100	0	100	0	100
PIR	PIERRE RGNL	SD	LPV	0	100	0	100	0	100
RAP	RAPID CITY RGNL	SD	LPV200	0	100	0	100	0	100
SPF	BLACK HILLS-CLYDE ICE FIELD	SD	LPV	0	100	0	100	0	100
VMR	HAROLD DAVIDSON FIELD	SD	LPV	0	100	0	100	0	100
YKN	CHAN GURNEY MUNICIPAL	SD	LPV200	0	100	0	100	0	100
CKQ8	MCARTHUR RIVER	SK	LPV	0	100	0	100	0	100
CYKJ	KEY LAKE	SK	LPV	0	100	0	100	0	100
0A3	SMITHVILLE MUNICIPAL	TN	LPV	0	100	0	100	0	100
0M3	JOHN A BAKER FLD	TN	LP	0	100	0	100	0	100
0M4	BENTON COUNTY	TN	LPV	0	100	0	100	0	100
0M5	HUMPHREYS COUNTY	TN	LP	0	100	0	100	0	100
1A3	MARTIN CAMPBELL FIELD	TN	LP	0	100	0	100	0	100
1M5	PORTLAND MUNICIPAL	TN	LPV	0	100	0	100	0	100
2A0	MARK ANTON	TN	LPV	0	100	0	100	0	100
2M2	LAWRENCEBURG-LAWRENCE COUNTY	TN	LPV	0	100	0	100	0	100
2M8	CHARLES W BAKER	TN	LPV	0	100	0	100	0	100
3A2	NEW TAZEWELL	TN	LP	0	100	0	100	0	100

	MUNICIPAL								
3M7	LAFAYETTE MUNICIPAL	TN	LPV	0	100	0	100	0	100
8A3	LIVINGSTON MUNICIPAL	TN	LP	0	100	0	100	0	100
BGF	WINCHESTER MUNICIPAL	TN	LPV	0	100	0	100	0	100
BNA	NASHVILLE INTL	TN	LPV200	0	100	0	100	0	100
CHA	LOVELL FIELD	TN	LPV200	0	100	0	100	0	100
CKV	OUTLAW FIELD	TN	LPV	0	100	0	100	0	100
CSV	CROSSVILLE MEMORIAL-WHITSON FI	TN	LPV200	0	100	0	100	0	100
DYR	DYERSBURG RGNL	TN	LPV	0	100	0	100	0	100
FYE	FAYETTE COUNTY	TN	LPV	0	100	0	100	0	100
FYM	FAYETTEVILLE MUNICIPAL	TN	LPV	0	100	0	100	0	100
GCY	GREENEVILLE-GREENE COUNTY MUNICIPAL	TN	LPV	0	100	0	100	0	100
GKT	GATLINBURG-PIGEON FORGE	TN	LPV	0	100	0	100	0	100
GZS	ABERNATHY FIELD	TN	LPV	0	100	0	100	0	100
HZD	CARROLL COUNTY	TN	LPV	0	100	0	100	0	100
JAU	CAMPBELL COUNTY	TN	LP	0	100	0	100	0	100
JWN	JOHN C TUNE	TN	LPV	0	100	0	100	0	100
LUG	ELLINGTON	TN	LPV	0	100	0	100	0	100
M01	GENERAL DEWITT SPAIN	TN	LPV	0	100	0	100	0	100
M08	WILLIAM L WHITEHURST FIELD	TN	LP	0	100	0	100	0	100
M33	SUMNER COUNTY RGNL	TN	LPV	0	100	0	100	0	100
M54	LEBANON MUNICIPAL	TN	LPV	0	100	0	100	0	100
M91	SPRINGFIELD ROBERTSON COUNTY	TN	LPV	0	100	0	100	0	100
MBT	MURFREESBORO MUNICIPAL	TN	LPV	0	100	0	100	0	100
MEM	MEMPHIS INTL	TN	LPV200	0	100	0	100	0	100
MKL	MC KELLAR-SIPES RGNL	TN	LPV200	0	100	0	100	0	100
MMI	MCMINN COUNTY	TN	LPV	0	100	0	100	0	100
MNV	MONROE COUNTY	TN	LPV	0	100	0	100	0	100
MOR	MOORE-MURRELL	TN	LPV	0	100	0	100	0	100
MQY	SMYRNA	TN	LPV200	0	100	0	100	0	100
MRC	MAURY COUNTY	TN	LPV	0	100	0	100	0	100
NQA	MILLINGTON RGNL JETPORT	TN	LPV200	0	100	0	100	0	100
PHT	HENRY COUNTY	TN	LPV200	0	100	0	100	0	100
PVE	BEECH RIVER RGNL	TN	LPV	0	100	0	100	0	100
RKW	ROCKWOOD MUNICIPAL	TN	LPV	0	100	0	100	0	100
RNC	WARREN COUNTY MEMORIAL	TN	LPV	0	100	0	100	0	100
RZR	CLEVELAND RGNL JETPORT	TN	LPV200	0	100	0	100	0	100
SCX	SCOTT MUNICIPAL	TN	LPV	0	100	0	100	0	100

SNH	SAVANNAH-HARDIN COUNTY	TN	LPV	0	100	0	100	0	100
SRB	UPPER CUMBERLAND RGNL	TN	LPV200	0	100	0	100	0	100
SYI	BOMAR FIELD-SHELBYVILLE MUNICIPAL	TN	LPV	0	100	0	100	0	100
SZY	ROBERT SIBLEY	TN	LPV	0	100	0	100	0	100
THA	TULLAHOMA RGNL ARPT/WM NORTHER	TN	LPV	0	100	0	100	0	100
TRI	TRI-CITIES RGNL TN/VA	TN	LPV200	0	100	0	100	0	100
TYS	MC GHEE TYSON	TN	LPV200	0	100	0	100	0	100
UCY	EVERETT-STEWART RGNL	TN	LPV200	0	100	0	100	0	100
11R	BRENHAM MUNICIPAL	TX	LPV	0	100	0	100	0	100
2F5	LAMESA MUNICIPAL	TX	LP	0	100	0	100	0	100
2R9	KARNES COUNTY	TX	LP	0	100	0	100	0	100
3R9	LAKEWAY AIRPARK	TX	LP	0	100	0	100	0	100
3T5	FAYETTE RGNL AIR CENTER	TX	LPV	0	100	0	100	0	100
45R	HAWTHORNE FIELD	TX	LP	0	100	0	100	0	100
50R	LOCKHART MUNICIPAL	TX	LPV	0	100	0	100	0	100
5C1	BOERNE STAGE FIELD	TX	LP	0	100	0	100	0	100
5T9	MAVERICK COUNTY MEMORIAL INTL	TX	LPV	0	100	0	100	0	100
60R	NAVASOTA MUNICIPAL	TX	LPV	0	100	0	100	0	100
6R3	CLEVELAND MUNICIPAL	TX	LPV	0	100	0	100	0	100
77F	WINTERS MUNICIPAL	TX	LP	0	100	0	100	0	100
8F3	CROSBYTON MUNICIPAL	TX	LP	0	100	0	100	0	100
ABI	ABILENE RGNL	TX	LPV200	0	100	0	100	0	100
ACT	WACO RGNL	TX	LPV200	0	100	0	100	0	100
ADS	ADDISON	TX	LPV	0	100	0	100	0	100
AFW	FORT WORTH ALLIANCE	TX	LPV200	0	100	0	100	0	100
ALI	ALICE INTL	TX	LPV	0	100	0	100	0	100
AMA	RICK HUSBAND AMARILLO INTL	TX	LPV200	0	100	0	100	0	100
ARM	WHARTON RGNL	TX	LPV	0	100	0	100	0	100
ASL	HARRISON COUNTY	TX	LPV	0	100	0	100	0	100
AUS	AUSTIN-BERGSTROM INTL	TX	LPV200	0	100	0	100	0	100
AXH	HOUSTON-SOUTHWEST	TX	LPV	0	100	0	100	0	100
BAZ	NEW BRAUNFELS RGNL	TX	LPV	0	100	0	100	0	100
BBD	CURTIS FIELD	TX	LPV	0	100	0	100	0	100
BKD	STEPHENS COUNTY	TX	LP	0	100	0	100	0	100
BPG	BIG SPRING MC MAHON-WRINKLE	TX	LPV200	0	100	0	100	0	100
BPT	JACK BROOKS RGNL	TX	LPV200	0	100	0	100	0	100
BRO	BROWNSVILLE/SOUTH PADRE ISLAND	TX	LPV200	0	100	0	100	0	100
BWD	BROWNWOOD RGNL	TX	LPV	0	100	0	100	0	100
BYY	BAY CITY MUNICIPAL	TX	LPV	0	100	0	100	0	100

CDS	CHILDRESS MUNICIPAL	TX	LPV200	0	100	0	100	0	100
CFD	COULTER FIELD	TX	LPV	0	100	0	100	0	100
CLL	EASTERWOOD FIELD	TX	LPV200	0	100	0	100	0	100
CNW	TSTC WACO	TX	LPV200	0	100	0	100	0	100
COM	COLEMAN MUNICIPAL	TX	LPV	0	100	0	100	0	100
COT	COTULLA-LA SALLE COUNTY	TX	LPV	0	100	0	100	0	100
CPT	CLEBURNE RGNL	TX	LPV	0	100	0	100	0	100
CRP	CORPUS CHRISTI INTL	TX	LPV200	0	100	0	100	0	100
CVB	CASTROVILLE MUNICIPAL	TX	LPV	0	100	0	100	0	100
CXO	LONE STAR EXECUTIVE	TX	LPV200	0	100	0	100	0	100
CZT	DIMMIT COUNTY	TX	LPV	0	100	0	100	0	100
DAL	DALLAS LOVE FIELD	TX	LPV200	0	100	0	100	0	100
DFW	DALLAS/FORT WORTH INTL	TX	LPV200	0	100	0	100	0	100
DHT	DALHART MUNICIPAL	TX	LPV	0	100	0	100	1	99.9985
DKR	HOUSTON COUNTY	TX	LP	0	100	0	100	0	100
DRT	DEL RIO INTL	TX	LPV	0	100	0	100	0	100
DTO	DENTON ENTERPRISE	TX	LPV200	0	100	0	100	0	100
DUX	MOORE COUNTY	TX	LPV200	0	100	0	100	1	99.9996
DWH	DAVID WAYNE HOOKS MEMORIAL	TX	LPV	0	100	0	100	0	100
E01	ROY HURD MEMORIAL	TX	LP	0	100	0	100	0	100
E11	ANDREWS COUNTY	TX	LPV	0	100	0	100	0	100
E19	GRUVER MUNICIPAL	TX	LP	0	100	0	100	1	99.9996
E30	BRUCE FIELD	TX	LPV	0	100	0	100	0	100
E38	ALPINE-CASPARIS MUNICIPAL	TX	LP	0	100	0	100	0	100
EBG	SOUTH TEXAS INTL AT EDINBURG	TX	LPV	0	100	0	100	0	100
EDC	AUSTIN EXECUTIVE	TX	LPV200	0	100	0	100	0	100
EFD	ELLINGTON	TX	LPV200	0	100	0	100	0	100
ELA	EAGLE LAKE	TX	LP	0	100	0	100	0	100
ELP	EL PASO INTL	TX	LP	0	100	0	100	0	100
ERV	KERRVILLE MUNICIPAL/LOUIS SCHREINER	TX	LPV	0	100	0	100	0	100
ETN	EASTLAND MUNICIPAL	TX	LP	0	100	0	100	0	100
F00	JONES FIELD	TX	LPV	0	100	0	100	0	100
F05	WILBARGER COUNTY	TX	LPV	0	100	0	100	0	100
F98	YOAKUM COUNTY	TX	LPV	0	100	0	100	0	100
FST	FORT STOCKTON-PECOS COUNTY	TX	LPV	0	100	0	100	0	100
FTW	FORT WORTH MEACHAM INTL	TX	LPV200	0	100	0	100	0	100
FWS	FORT WORTH SPINKS	TX	LPV200	0	100	0	100	0	100
GDJ	GRANBURY RGNL	TX	LPV	0	100	0	100	0	100
GGG	EAST TEXAS RGNL	TX	LPV	0	100	0	100	0	100

GKY	ARLINGTON MUNICIPAL	TX	LPV200	0	100	0	100	0	100
GLE	GAINESVILLE MUNICIPAL	TX	LPV	0	100	0	100	0	100
GLS	SCHOLES INTL AT GALVESTON	TX	LPV200	0	100	0	100	0	100
GNC	GAINES COUNTY	TX	LPV	0	100	0	100	0	100
GRK	ROBERT GRAY AAF	TX	LPV200	0	100	0	100	0	100
GVT	MAJORS	TX	LPV200	0	100	0	100	0	100
GYI	NORTH TEXAS RGNL/PERRIN FIELD	TX	LPV200	0	100	0	100	0	100
HBV	JIM HOGG COUNTY	TX	LPV	0	100	0	100	0	100
HDO	SOUTH TEXAS RGNL AT HONDO	TX	LPV	0	100	0	100	0	100
HHF	HEMPHILL COUNTY	TX	LPV	0	100	0	100	0	100
HOU	WILLIAM P HOBBY	TX	LPV200	0	100	0	100	0	100
HQZ	MESQUITE METRO	TX	LPV	0	100	0	100	0	100
HRL	VALLEY INTL	TX	LPV200	0	100	0	100	0	100
HRX	HEREFORD MUNICIPAL	TX	LPV200	0	100	0	100	0	100
HYI	SAN MARCOS REGIONAL	TX	LPV200	0	100	0	100	0	100
IAH	GEORGE BUSH INTERCONTINENTAL/H	TX	LPV200	0	100	0	100	0	100
IKG	KLEBERG COUNTY	TX	LPV	0	100	0	100	0	100
INJ	HILLSBORO MUNICIPAL	TX	LPV	0	100	0	100	0	100
INK	WINKLER COUNTY	TX	LPV200	0	100	0	100	0	100
IWS	WEST HOUSTON	TX	LP	0	100	0	100	0	100
JAS	JASPER COUNTY-BELL FIELD	TX	LPV	0	100	0	100	0	100
JSO	CHEROKEE COUNTY	TX	LPV200	0	100	0	100	0	100
JWY	MID-WAY RGNL	TX	LPV200	0	100	0	100	0	100
JXI	FOX STEPHENS FIELD - GILMER MU	TX	LP	0	100	0	100	0	100
LBB	LUBBOCK PRESTON SMITH INTL	TX	LPV200	0	100	0	100	0	100
LBX	TEXAS GULF COAST RGNL	TX	LPV	0	100	0	100	0	100
LFK	ANGELINA COUNTY	TX	LPV	0	100	0	100	0	100
LHB	HEARNE MUNICIPAL	TX	LPV200	0	100	0	100	0	100
LIU	LITTLEFIELD TAYLOR BROWN MUNICIPAL	TX	LPV	0	100	0	100	0	100
LLN	LEVELLAND MUNICIPAL	TX	LPV	0	100	0	100	0	100
LNC	LANCASTER RGNL	TX	LPV200	0	100	0	100	0	100
LRD	LAREDO INTL	TX	LPV200	0	100	0	100	0	100
LUD	DECATUR MUNICIPAL	TX	LPV	0	100	0	100	0	100
LVJ	PEARLAND RGNL	TX	LPV	0	100	0	100	0	100
LXY	MEXIA-LIMESTONE CO	TX	LP	0	100	0	100	0	100
MAF	MIDLAND INTL	TX	LPV200	0	100	0	100	0	100
MDD	MIDLAND AIRPARK	TX	LPV	0	100	0	100	0	100
MFE	MC ALLEN MILLER INTL	TX	LPV	0	100	0	100	0	100
MKN	COMANCHE COUNTY-CITY	TX	LPV	0	100	0	100	0	100

MNZ	HAMILTON MUNICIPAL	TX	LPV	0	100	0	100	0	100
OCH	A L MANGHAM JR RGNL	TX	LPV200	0	100	0	100	0	100
ODO	ODESSA-SCHLEMEYER FIELD	TX	LPV200	0	100	0	100	0	100
ONY	OLNEY MUNICIPAL	TX	LPV	0	100	0	100	0	100
ORG	ORANGE COUNTY	TX	LPV	0	100	0	100	0	100
PEQ	PECOS MUNICIPAL	TX	LPV200	0	100	0	100	0	100
PIL	PORT ISABEL-CAMERON COUNTY	TX	LPV	0	100	0	100	0	100
PKV	CALHOUN COUNTY	TX	LPV	0	100	0	100	0	100
PPA	PERRY LEFORS FIELD	TX	LPV	0	100	0	100	0	100
PRX	COX FIELD	TX	LPV	0	100	0	100	0	100
PSX	PALACIOS MUNICIPAL	TX	LPV	0	100	0	100	0	100
PVW	HALE COUNTY	TX	LPV	0	100	0	100	0	100
PWG	MC GREGOR EXECUTIVE	TX	LPV	0	100	0	100	0	100
PYX	PERRYTON OCHILTREE COUNTY	TX	LPV	0	100	0	100	1	99.9996
RAS	MUSTANG BEACH	TX	LPV	0	100	0	100	0	100
RBD	DALLAS EXECUTIVE	TX	LPV	0	100	0	100	0	100
RBO	NUECES COUNTY	TX	LP	0	100	0	100	0	100
RKP	ARANSAS CO	TX	LPV	0	100	0	100	0	100
RYW	LAGO VISTA TX - RUSTY ALLEN	TX	LP	0	100	0	100	0	100
SAT	SAN ANTONIO INTL	TX	LPV200	0	100	0	100	0	100
SGR	SUGAR LAND RGNL	TX	LPV200	0	100	0	100	0	100
SJT	SAN ANGELO RGNL/MATHIS FIELD	TX	LPV	0	100	0	100	0	100
SLR	SULPHUR SPRINGS MUNICIPAL	TX	LPV200	0	100	0	100	0	100
SNK	WINSTON FIELD	TX	LPV200	0	100	0	100	0	100
SWI	SHERMAN MUNICIPAL	TX	LP	0	100	0	100	0	100
SWW	AVENGER FIELD	TX	LPV	0	100	0	100	0	100
T23	ALBANY MUNICIPAL	TX	LPV	0	100	0	100	0	100
T41	LA PORTE MUNICIPAL	TX	LPV	0	100	0	100	0	100
T59	WHEELER MUNICIPAL	TX	LP	0	100	0	100	0	100
T74	TAYLOR MUNICIPAL	TX	LPV	0	100	0	100	0	100
T78	LIBERTY MUNICIPAL	TX	LP	0	100	0	100	0	100
T82	GILLESPIE COUNTY	TX	LPV	0	100	0	100	0	100
TDW	TRADEWIND	TX	LPV	0	100	0	100	0	100
TFP	MCCAMPBELL-PORTER	TX	LPV	0	100	0	100	0	100
TKI	MCKINNEY NATIONAL	TX	LPV200	0	100	0	100	0	100
TME	HOUSTON EXECUTIVE	TX	LPV	0	100	0	100	0	100
TPL	DRAUGHON-MILLER CENTRAL TEXAS	TX	LPV200	0	100	0	100	0	100
TRL	TERRELL MUNICIPAL	TX	LPV	0	100	0	100	0	100
TYR	TYLER POUNDS RGNL	TX	LPV200	0	100	0	100	0	100
UTS	HUNTSVILLE MUNICIPAL	TX	LPV	0	100	0	100	0	100
VCT	VICTORIA RGNL	TX	LPV200	0	100	0	100	0	100

XBP	BRIDGEPORT MUNICIPAL	TX	LPV	0	100	0	100	0	100
BCE	BRYCE CANYON	UT	LPV	0	100	0	100	0	100
BDG	BLANDING MUNICIPAL	UT	LPV	0	100	0	100	0	100
BMC	BRIGHAM CITY	UT	LP	0	100	0	100	0	100
DTA	DELTA MUNICIPAL	UT	LP	0	100	0	100	0	100
ENV	WENDOVER	UT	LPV	0	100	0	100	0	100
FOM	FILLMORE MUNICIPAL	UT	LPV	0	100	0	100	0	100
LGU	LOGAN-CACHE	UT	LPV	0	100	0	100	0	100
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
TVY	BOLINDER FIELD-TOOELE VALLEY	UT	LPV200	0	100	0	100	0	100
U14	NEPHI MUNICIPAL	UT	LPV	0	100	0	100	0	100
U55	PANGUITCH MUNICIPAL	UT	LPV200	0	100	0	100	0	100
VEL	VERNAL RGNL	UT	LP	0	100	0	100	0	100
0V4	BROOKNEAL/CAMPBELL COUNTY	VA	LPV	0	100	0	100	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	LPV200	0	100	0	100	0	100
FCI	RICHMOND EXECUTIVE-CHESTERFIEL	VA	LPV	0	100	0	100	0	100
FKN	FRANKLIN MUNICIPAL-JOHN BEVERLY ROS	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	1	99.9996
XSA	TAPPAHANNOCK-ESSEX COUNTY	VA	LPV	0	100	0	100	0	100
BTV	BURLINGTON INTL	VT	LPV200	0	100	0	100	0	100
EFK	NEWPORT STATE	VT	LP	0	100	0	100	0	100
FSO	FRANKLIN COUNTY STATE	VT	LPV	0	100	0	100	0	100
MPV	EDWARD F KNAPP STATE	VT	LPV	0	100	0	100	0	100
MVL	MORRISVILLE-STOWE STATE	VT	LP	0	100	0	100	0	100
RUT	RUTLAND - SOUTHERN VERMONT RGN	VT	LPV	0	100	0	100	0	100
ALW	WALLA WALLA RGNL	WA	LPV200	0	100	0	100	0	100
AWO	ARLINGTON MUNICIPAL	WA	LPV200	0	100	0	100	0	100
BLI	BELLINGHAM INTL	WA	LPV200	0	100	0	100	0	100
BVS	SKAGIT RGNL	WA	LPV	0	100	0	100	0	100
CLM	WILLIAM R FAIRCHILD INTL	WA	LPV	0	100	0	100	0	100

CLS	CHEHALIS-CENTRALIA	WA	LPV	0	100	0	100	0	100
DEW	DEER PARK	WA	LPV	0	100	0	100	0	100
EPH	EPHRATA MUNICIPAL	WA	LPV	0	100	0	100	0	100
FHR	FRIDAY HARBOR	WA	LPV	0	100	0	100	0	100
GEG	SPOKANE INTL	WA	LPV200	0	100	0	100	0	100
HQM	BOWERMAN	WA	LPV200	0	100	0	100	0	100
MWH	GRANT CO INTL	WA	LPV200	0	100	0	100	0	100
OLM	OLYMPIA RGNL	WA	LPV	0	100	0	100	0	100
ORS	ORCAS ISLAND	WA	LP	0	100	0	100	0	100
PAE	SNOHOMISH COUNTY (PAINE FLD)	WA	LPV200	0	100	0	100	0	100
PLU	PIERCE COUNTY - THUN FIELD	WA	LPV	0	100	0	100	0	100
PSC	TRI-CITIES	WA	LPV200	0	100	0	100	0	100
PWT	BREMERTON NATIONAL	WA	LPV200	0	100	0	100	0	100
RLD	RICHLAND	WA	LPV	0	100	0	100	0	100
RNT	RENTON MUNICIPAL	WA	LPV	0	100	0	100	0	100
SEA	SEATTLE-TACOMA INTL	WA	LPV200	0	100	0	100	0	100
SFF	FELTS FIELD	WA	LPV	0	100	0	100	0	100
SHN	SANDERSON FIELD	WA	LPV	0	100	0	100	0	100
TDO	ED CARLSON MEMORIAL FIELD - SO	WA	LPV	0	100	0	100	0	100
TIW	TACOMA NARROWS	WA	LPV	0	100	0	100	0	100
YKM	YAKIMA AIR TERMINAL/MCALLISTER	WA	LPV200	0	100	0	100	0	100
3T3	BOYCEVILLE MUNICIPAL	WI	LPV	0	100	0	100	0	100
57C	EAST TROY MUNICIPAL	WI	LPV	0	100	0	100	0	100
82C	MAUSTON-NEW LISBON UNION	WI	LP	0	100	0	100	0	100
8D1	NEW HOLSTEIN MUNICIPAL	WI	LPV	0	100	0	100	0	100
AHH	AMERY MUNICIPAL	WI	LP	0	100	0	100	0	100
AIG	LANGLADE COUNTY	WI	LPV	0	100	0	100	0	100
ARV	LAKELAND/NOBLE F LEE MEMORIAL	WI	LPV	0	100	0	100	0	100
ASX	JOHN F KENNEDY MEMORIAL	WI	LPV	0	100	0	100	0	100
ATW	APPLETON INTL	WI	LPV200	0	100	0	100	0	100
AUW	WAUSAU DOWNTOWN	WI	LPV200	0	100	0	100	0	100
BCK	BLACK RIVER FALLS AREA	WI	LPV	0	100	0	100	0	100
BUU	BURLINGTON MUNICIPAL	WI	LP	0	100	0	100	0	100
C29	MIDDLETON MUNICIPAL - MOREY FIELD	WI	LPV	0	100	0	100	0	100
C35	REEDSBURG MUNICIPAL	WI	LP	0	100	0	100	0	100
CLI	CLINTONVILLE MUNICIPAL	WI	LPV	0	100	0	100	0	100
CMY	SPARTA/FORT MC COY	WI	LPV	0	100	0	100	0	100

CWA	CENTRAL WISCONSIN	WI	LPV200	0	100	0	100	0	100
DLL	BARABOO WISCONSIN DELLS	WI	LPV	0	100	0	100	0	100
EAU	CHIPPEWA VALLEY RGNL	WI	LPV200	0	100	0	100	0	100
EGV	EAGLE RIVER UNION	WI	LPV	0	100	0	100	0	100
ENW	KENOSHA RGNL	WI	LPV200	0	100	0	100	0	100
ETB	WEST BEND MUNICIPAL	WI	LPV	0	100	0	100	0	100
EZS	SHAWANO MUNICIPAL	WI	LPV	0	100	0	100	0	100
FLD	FOND DU LAC COUNTY	WI	LPV	0	100	0	100	0	100
GRB	AUSTIN STRAUBEL INTL	WI	LPV200	0	100	0	100	0	100
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	JOHN H BATTEN	WI	LPV	0	100	0	100	0	100
RCX	RUSK COUNTY	WI	LPV	0	100	0	100	0	100
RHI	RHINELANDER-ONEIDA COUNTY	WI	LPV200	0	100	0	100	0	100
RNH	NEW RICHMOND RGNL	WI	LPV	0	100	0	100	0	100
RPD	RICE LAKE RGNL - CARL'S FIELD	WI	LPV	0	100	0	100	0	100
RRL	MERRILL MUNICIPAL	WI	LPV	0	100	0	100	0	100
SBM	SHEBOYGAN COUNTY	WI	LPV200	0	100	0	100	0	100

	MEMORIAL								
STE	STEVENS POINT MUNICIPAL	WI	LPV200	0	100	0	100	0	100
SUE	DOOR COUNTY CHERRYLAND	WI	LPV	0	100	0	100	0	100
SUW	RICHARD I BONG	WI	LP	0	100	0	100	0	100
TKV	TOMAHAWK RGNL	WI	LP	0	100	0	100	0	100
UES	WAUKESHA COUNTY	WI	LPV200	0	100	0	100	0	100
UNU	DODGE COUNTY	WI	LPV	0	100	0	100	0	100
VIQ	NEILLSVILLE MUNICIPAL	WI	LPV	0	100	0	100	0	100
Y50	WAUTOMA MUNICIPAL	WI	LP	0	100	0	100	0	100
Y55	CRANDON/STEVE CONWAY MUNICIPAL	WI	LPV	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
SXL	SUMMERSVILLE	WV	LP	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
W99	GRANT COUNTY	WV	LP	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	0	100
CYS	CHEYENNE RGNL/JERRY OLSON FIEL	WY	LPV	0	100	0	100	0	100
DGW	CONVERSE COUNTY	WY	LPV200	0	100	0	100	0	100
ECS	MONDELL FIELD	WY	LPV	0	100	0	100	0	100
EMM	KEMMERER MUNICIPAL	WY	LPV	0	100	0	100	0	100
EVW	EVANSTON-UINTA COUNTY BURNS FI	WY	LPV	0	100	0	100	0	100
FBR	FORT BRIDGER	WY	LP	0	100	0	100	0	100
GCC	GILLETTE-CAMPBELL	WY	LPV	0	100	0	100	0	100

	COUNTY								
GEY	SOUTH BIG HORN COUNTY	WY	LP	0	100	0	100	0	100
GUR	CAMP GUERNSEY	WY	LP	0	100	0	100	0	100
JAC	JACKSON HOLE	WY	LPV200	0	100	0	100	0	100
LAR	LARAMIE RGNL	WY	LPV	0	100	0	100	0	100
PNA	RALPH WENZ FIELD	WY	LPV	0	100	0	100	0	100
POY	POWELL MUNICIPAL	WY	LPV	0	100	0	100	0	100
RIW	RIVERTON RGNL	WY	LPV200	0	100	0	100	0	100
RKS	ROCK SPRINGS-SWEETWATER COUNTY	WY	LPV200	0	100	0	100	0	100
RWL	RAWLINS MUNICIPAL/HARVEY FIELD	WY	LPV	0	100	0	100	0	100
SAA	SHIVELY FIELD	WY	LPV	0	100	0	100	0	100
SHR	SHERIDAN COUNTY	WY	LPV	0	100	0	100	0	100
U68	NORTH BIG HORN COUNTY	WY	LPV	0	100	0	100	0	100
WRL	WORLAND MUNICIPAL	WY	LPV	0	100	0	100	0	100
CYQH	WATSON LAKE	YT	LPV	0	100	0	100	0	100
CYXY	WHITEHORSE / ERIK NIELSEN INTL	YT	LPV	0	100	0	100	0	100

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

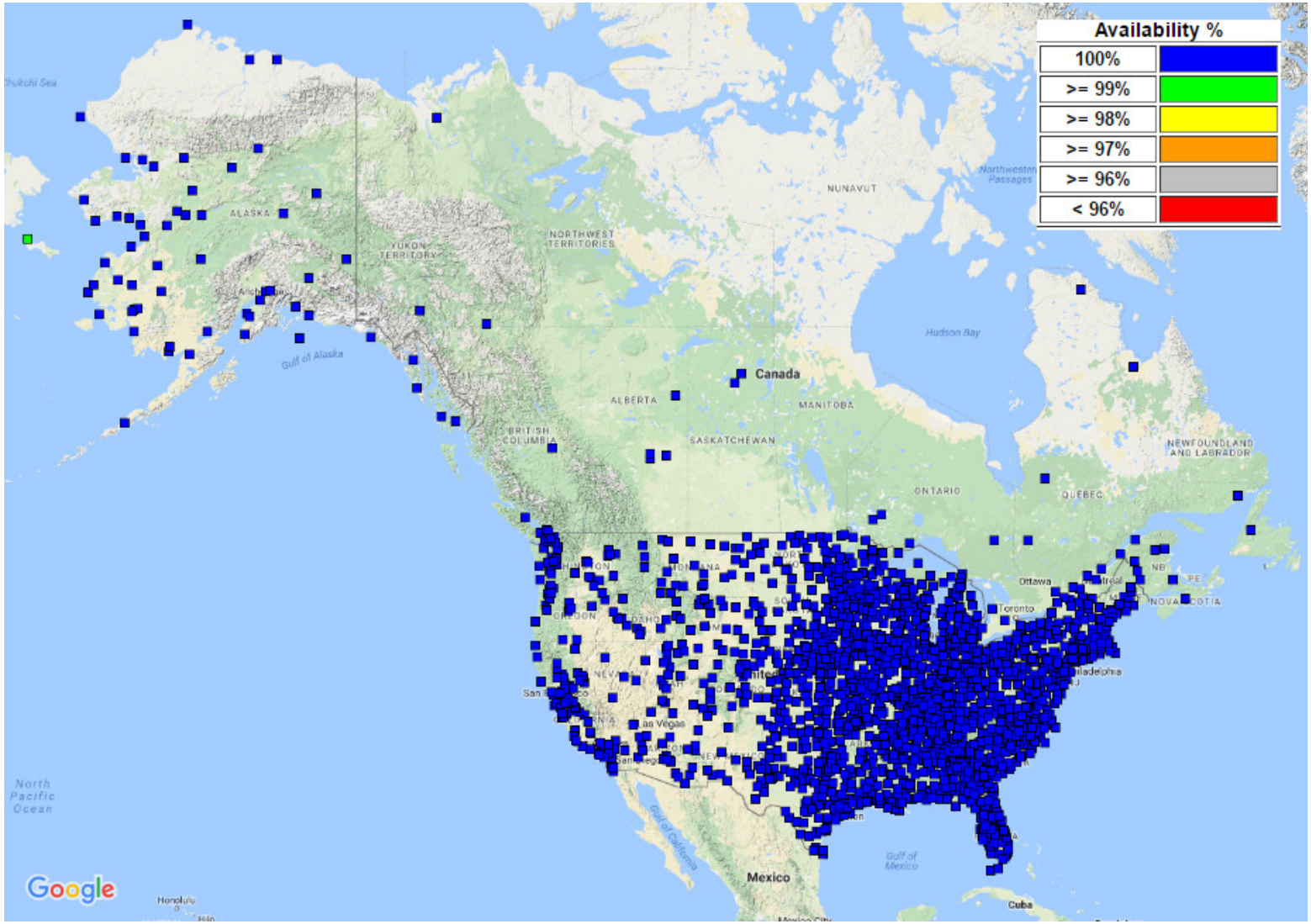


Figure 8-2 WAAS LP Outages at Airports in the US and Canada with GPS RNAV IAPs

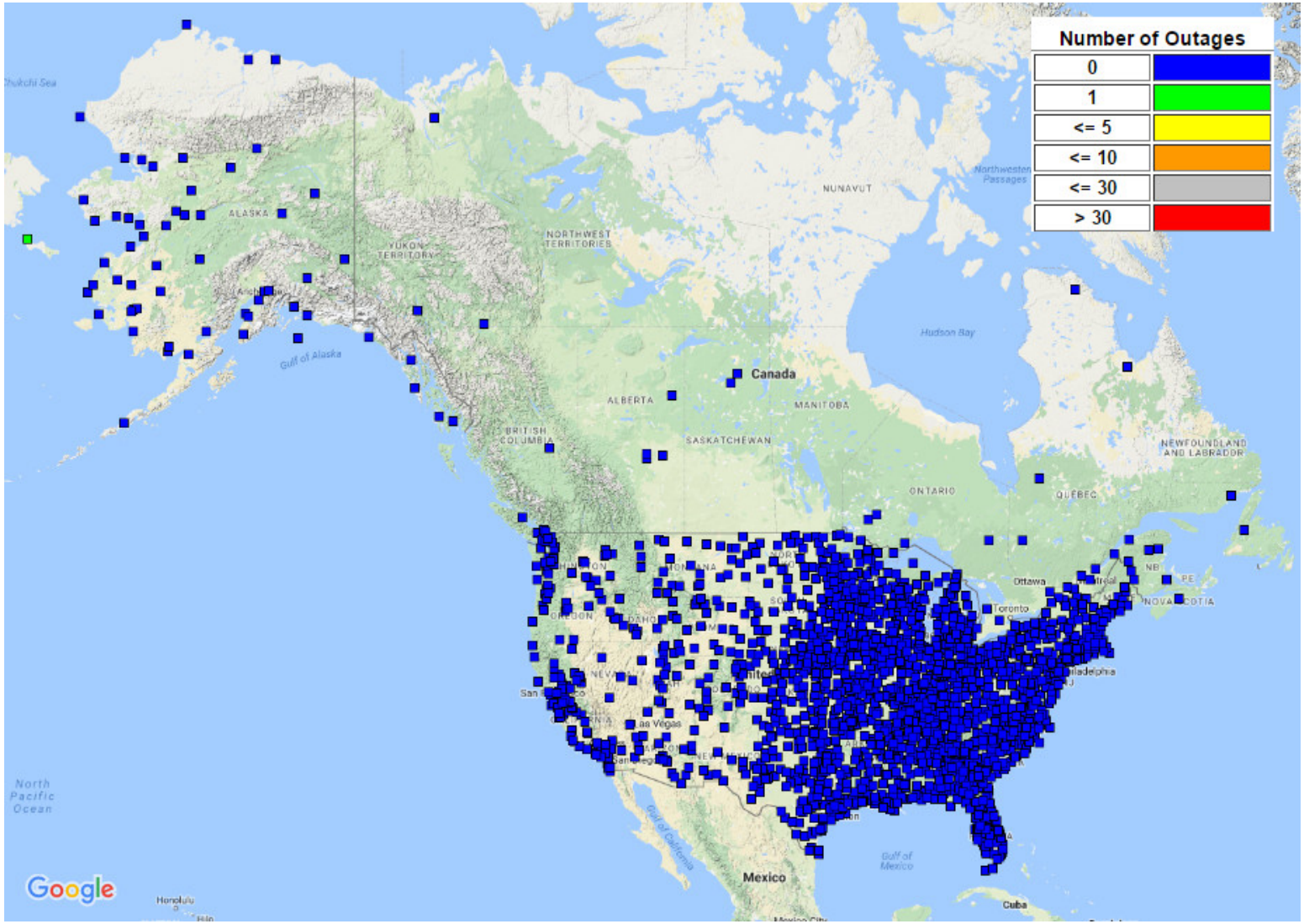


Figure 8-3 WAAS LPV Availability Airports in the US and Canada with GPS RNAV IAPs

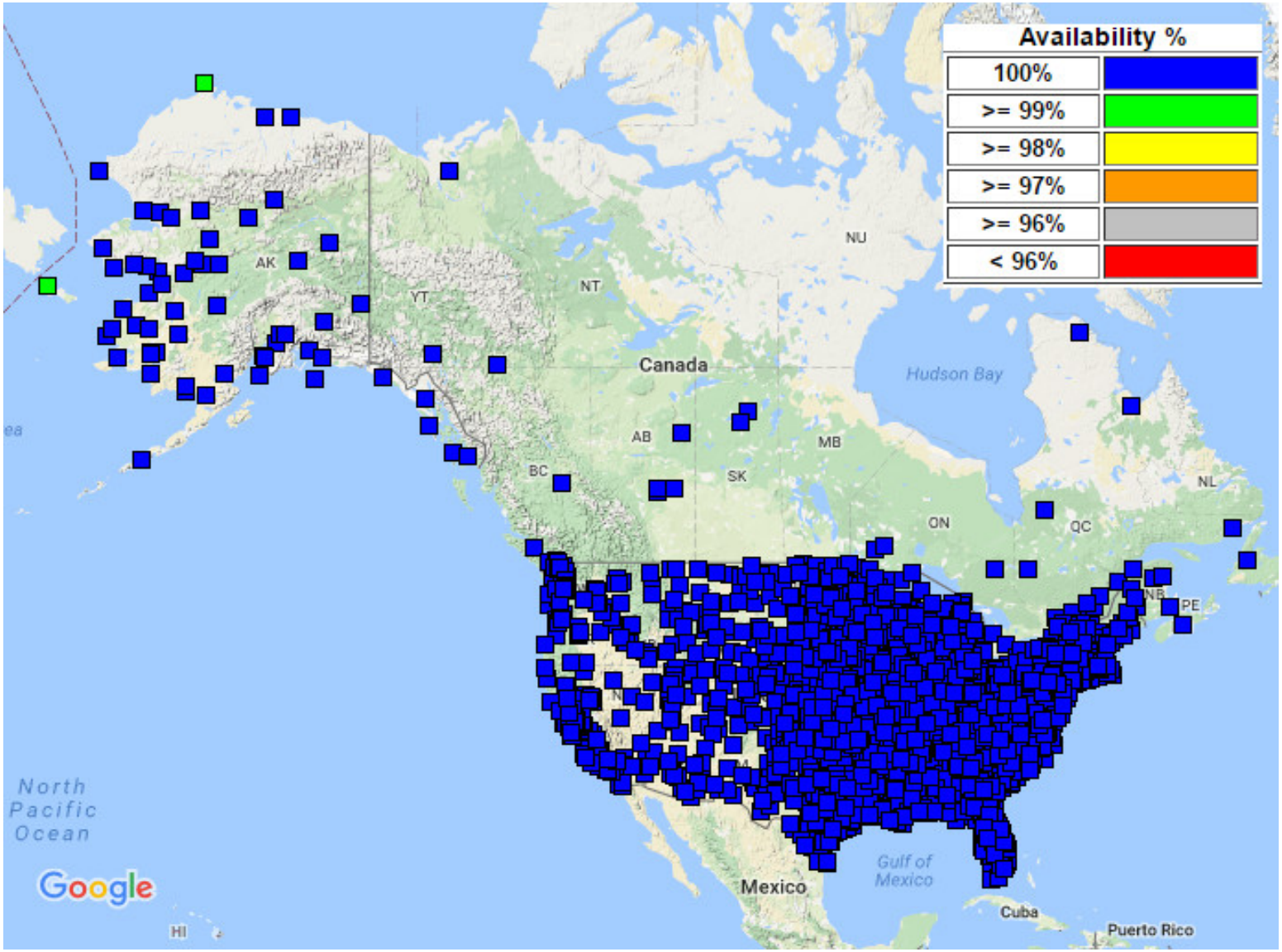


Figure 8-4 WAAS LPV Outages at Airports in the US and Canada with GPS RNAV IAPs

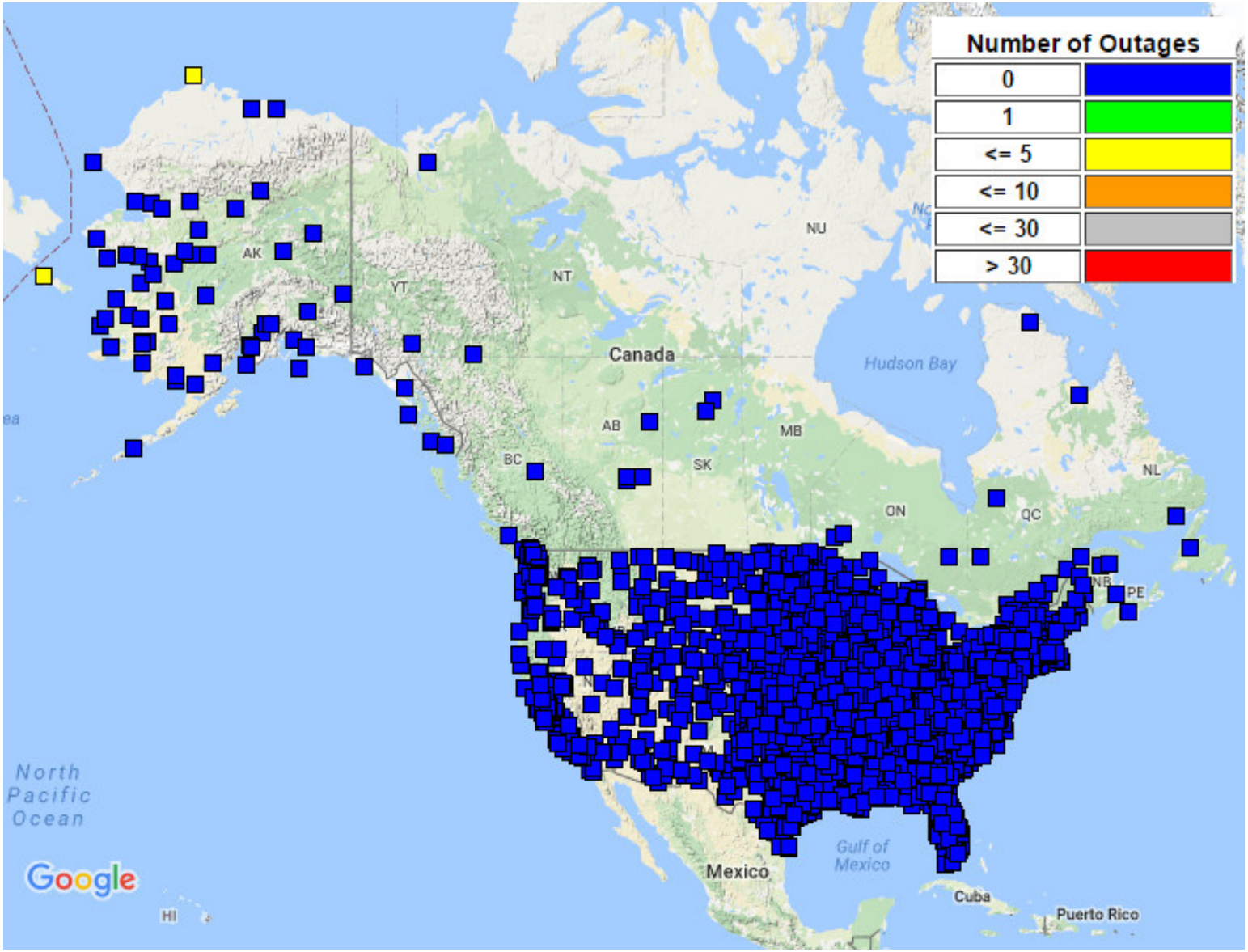


Figure 8-5 WAAS LPV200 Availability at Airports in the US and Canada with GPS RNAV IAPs

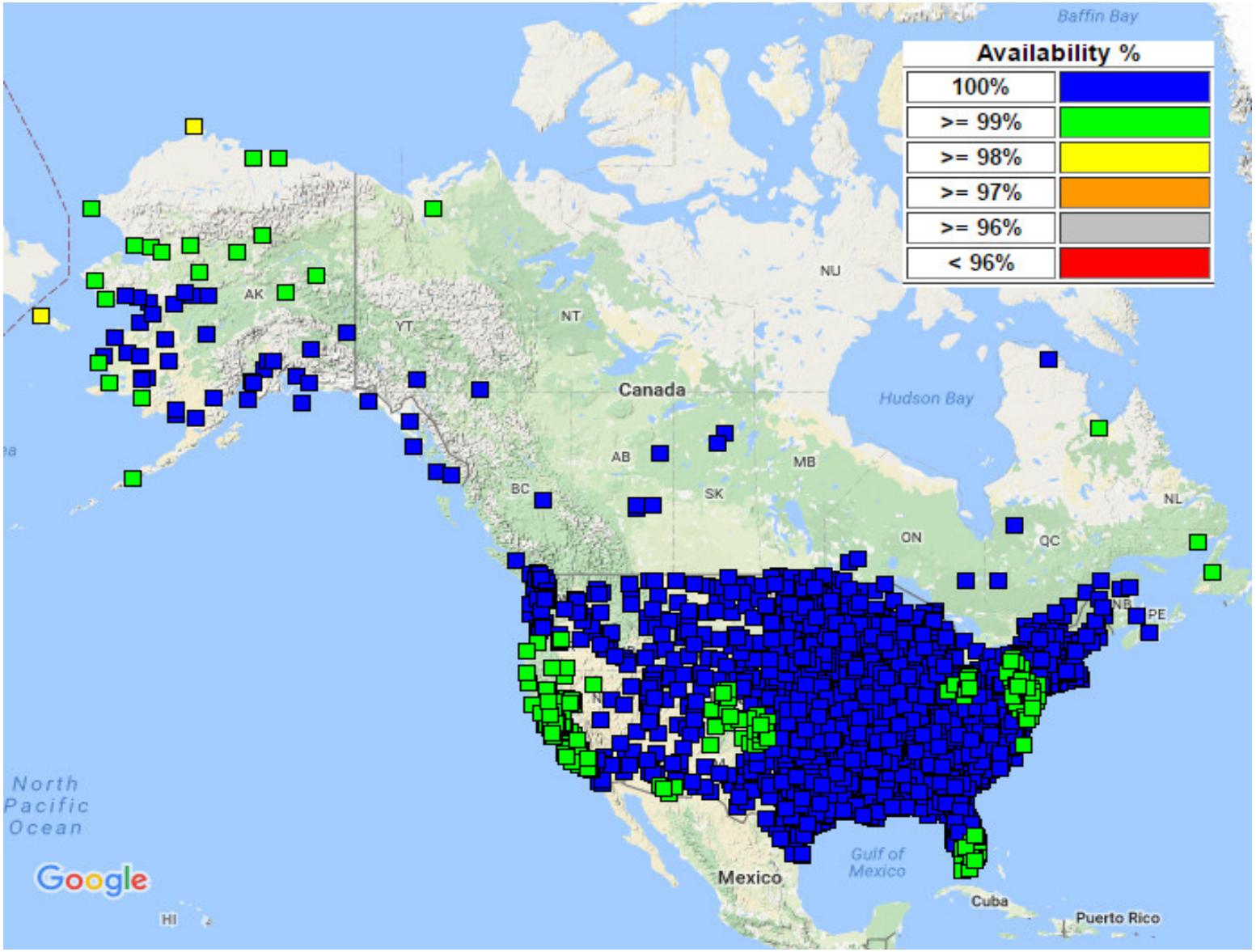
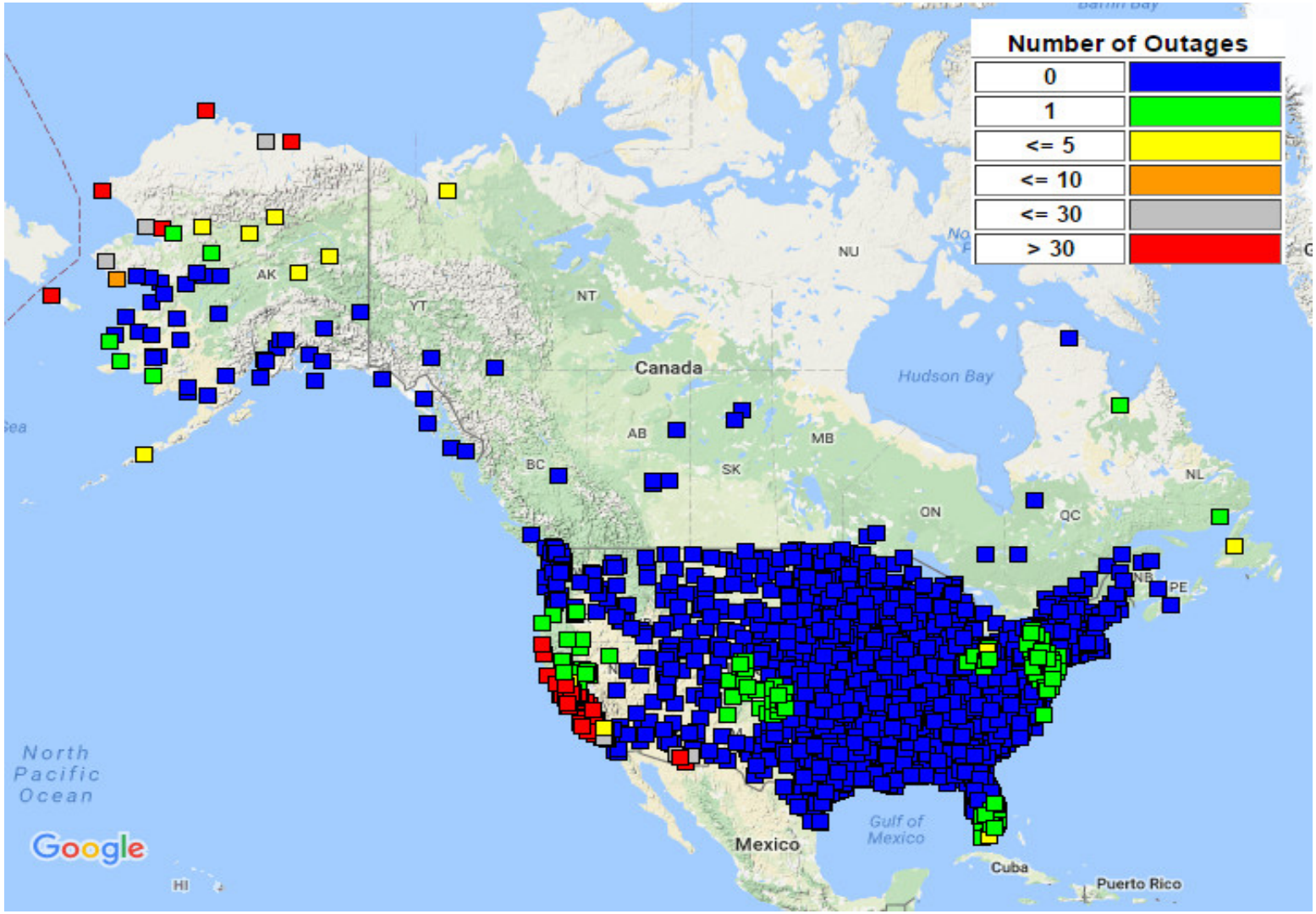


Figure 8-6 WAAS LPV200 Outages at Airports in the US and Canada with GPS RNAV IAPs



9.0 WAAS CODE NOISE AND MULTIPATH 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 in order 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 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 in length 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	Apr 16	May 16	Jun 16	Jul 16	Aug 16	Sep 16	Oct 16	Nov 16	Dec 16	Jan 17	Feb 17	Mar 17
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	Apr 16	May 16	Jun 16	Jul 16	Aug 16	Sep 16	Oct 16	Nov 16	Dec 16	Jan 17	Feb 17	Mar 17
Juneau	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Kansas City	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Kotzebue	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Los Angeles	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Memphis	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Merida	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Mexico City	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Miami	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Minneapolis	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
New York	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Oakland	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Puerto Vallarta	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Salt Lake City	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
San Jose Del Cabo	A	–	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
San Juan	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Seattle	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Tapachula	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Washington, DC	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●
Winnipeg	A	●	●	●	●	●	●	●	●	●	●	●	●
	B	●	●	●	●	●	●	●	●	●	●	●	●
	C	●	●	●	●	●	●	●	●	●	●	●	●

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

10.0 WAAS REFERENCE STATION (WRS) ANTENNA SURVEY VALIDATION

Antenna L1 phase center position surveys were performed for all the WAAS Reference Station antennas using 24 hour sets on 01/02/17. 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 less than 2.3cm. The CSRS surveys' RSSs of the reported ECEF sigmas were less than 10 mm. The OPUS and CSRS surveys agreed to an average of 1.6 cm with a standard deviation of 7.7 mm. The maximum of difference was 3.63 cm for Barrow Thread C (BRW3). The OPUS positions were compared to the positions in the currently fielded WAAS software Build WE7.164c which was fielded starting in September 2016. The OPUS surveys agree with the Build WE7.164c to better or equal to 5.0 cm for most sites. Outliers include Fairbanks, which after undergoing roof repairs had antennas remounted saw a maximum difference of 8.8 cm on Thread C (FAI3). Removing outliers, the maximum difference was 5.0 cm at Barrow Thread C (BRW3).The antenna positions are interpolated forward in time.

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 Build WE7.164c software. Figure 10-4 to Figure 10-6 shows 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	-2965385.13	-972576.621	5543892.852	60.78791464	-161.8417255	52.182
BET2	-2965385.898	-972580.344	5543891.794	60.78789521	-161.8416649	52.181
BET3	-2965388.465	-972577.475	5543890.927	60.78787931	-161.8417297	52.178
BIL1	-1416445.934	-4223577.017	4550862.126	45.80370657	-108.5397237	1112.237
BIL2	-1416450.02	-4223574.876	4550862.845	45.80371579	-108.5397823	1112.243
BIL3	-1416441.632	-4223574.274	4550865.978	45.80375632	-108.5396825	1112.232
BRW1	-1886758.987	-809058.66	6018494.453	71.28276437	-156.7899256	15.568
BRW2	-1886756.401	-809055.92	6018495.631	71.28279709	-156.7899674	15.575
BRW3	-1886755.306	-809059.699	6018495.449	71.28279247	-156.7898584	15.557
CDB1	-3484099.112	-1084748.79	5213678.583	55.19237347	-162.7064049	49.693
CDB2	-3484105.754	-1084741.6	5213675.632	55.19232733	-162.7065436	49.67
CDB3	-3484112.042	-1084734.811	5213672.879	55.19228382	-162.7066748	49.684
FAI1	-2304741.892	-1448715.31	5748843.718	64.80962944	-147.8473412	150.001
FAI2	-2304741.434	-1448706.501	5748846.111	64.80967978	-147.8474931	150.006
FAI3	-2304732.919	-1448707.449	5748849.271	64.80974626	-147.8473808	150.012
HNL1	-5508637.154	-2234493.019	2303722.346	21.31299176	-157.9208303	24.67
HNL2	-5508656.32	-2234483.345	2303687.109	21.31264891	-157.9209861	25.021
HNL3	-5508647.737	-2234497.262	2303694.2	21.31271751	-157.9208308	25.062
JNU1	-2354254.991	-2388549.67	5407043.129	58.36257405	-134.585708	16.157
JNU2	-2354252.904	-2388565.781	5407036.962	58.3624685	-134.5854894	16.157
JNU3	-2354239.686	-2388568.633	5407041.419	58.36254488	-134.5852943	16.15
MMD1	35070.375	-5959686.652	2264365.768	20.93190932	-89.66284112	29.105
MMD2	35065.451	-5959687.027	2264364.989	20.93190163	-89.66288848	29.15
MMD3	35065.111	-5959685.234	2264369.642	20.93194668	-89.66289164	29.136
MMX1	-948700.938	-5943934.362	2109212.303	19.43165387	-99.06839001	2234.279
MMX2	-948696.506	-5943934.192	2109214.727	19.43167711	-99.0683486	2234.268
MMX3	-948705.374	-5943934.564	2109209.882	19.43163055	-99.0684314	2234.321
MPR1	-1570142.247	-5759530.59	2238184.755	20.67900334	-105.2492035	10.971
MPR2	-1570139.423	-5759530.109	2238188.811	20.67904146	-105.2491786	11.275
MPR3	-1570143.53	-5759527.983	2238190.577	20.67905948	-105.249222	10.99
MSD1	-1979519.943	-5523222.901	2493106.895	23.16044801	-109.7176506	104.263
MSD2	-1979521.511	-5523225.241	2493100.496	23.16038519	-109.7176573	104.258
MSD3	-1979525.956	-5523221.972	2493104.165	23.16042125	-109.7177089	104.251
MTP1	-254854.379	-6162909.162	1617805.068	14.79136603	-92.36799942	54.94
MTP2	-254850.759	-6162910.185	1617801.634	14.79133401	-92.36796543	54.907
MTP3	-254855.531	-6162910.288	1617800.107	14.79131997	-92.36800968	54.807
OTZ1	-2396056.09	-750356.169	5843502.478	66.88733147	-162.6113732	10.878
OTZ2	-2396052.919	-750354.343	5843504.005	66.8873663	-162.6113914	10.88
OTZ3	-2396052.902	-750358.281	5843503.515	66.887355	-162.6113055	10.885

WRE	X(m)	Y(m)	Z(m)	Latitude	Longitude	H(m)
YFB1	1035381.36	-2634289.648	5696539.557	63.73149079	-68.54318513	10.031
YFB2	1035372.158	-2634296.062	5696538.195	63.73146444	-68.54340598	9.962
YFB3	1035366.084	-2634306.82	5696534.421	63.73138679	-68.54360007	10.026
YQX1	2430424.566	-3419640.402	4788223.845	48.9664903	-54.59763299	146.867
YQX2	2430432.511	-3419639.05	4788220.787	48.9664485	-54.59753386	146.859
YQX3	2430440.424	-3419637.697	4788217.791	48.9664072	-54.59743507	146.884
YWG1	-520164.458	-4083475.957	4855843.029	49.90057409	-97.25939873	222.11
YWG2	-520150.585	-4083468.894	4855850.424	49.90067715	-97.2592196	222.124
YWG3	-520152.458	-4083478.015	4855842.602	49.90056801	-97.25922942	222.121
YYR1	1885341.357	-3321428.377	5091171.694	53.30864744	-60.4194693	37.866
YYR2	1885344.318	-3321419.891	5091176.106	53.30871377	-60.41936783	37.868
YYR3	1885340.033	-3321413.075	5091182.108	53.30880394	-60.41937325	37.875
ZAB1	-1488636.893	-5003946.533	3654557.695	35.17357526	-106.5673503	1620.125
ZAB2	-1488631.557	-5003948.218	3654557.664	35.17357454	-106.5672889	1620.183
ZAB3	-1488632.338	-5003950.803	3654553.813	35.17353216	-106.567289	1620.172
ZAN1	-2659536.722	-1549114.746	5567750.725	61.22920124	-149.780252	80.692
ZAN2	-2659548.48	-1549110.794	5567746.241	61.2291176	-149.7804257	80.694
ZAN3	-2659541.428	-1549106.667	5567750.709	61.22920117	-149.7804261	80.678
ZAU1	138704.059	-4761244.142	4227763.931	41.78265806	-88.33133737	195.887
ZAU2	138704.318	-4761248.76	4227758.771	41.78259568	-88.33133588	195.896
ZAU3	138711.021	-4761248.495	4227758.851	41.78259663	-88.33125519	195.898
ZBW1	1490299.162	-4448983.176	4306010.511	42.73572068	-71.48042656	39.115
ZBW2	1490304.274	-4448981.167	4306010.857	42.73572469	-71.48035957	39.143
ZBW3	1490305.983	-4448984.792	4306006.544	42.73567186	-71.48035384	39.139
ZDC1	1069125.71	-4839598.997	4001126.521	39.101596	-77.54274715	80.071
ZDC2	1069128.105	-4839603.627	4001120.315	39.10152401	-77.54273166	80.066
ZDV1	-1273628.664	-4711375.565	4094890.094	40.18730313	-105.127225	1541.348
ZDV2	-1273622.963	-4711377.085	4094890.111	40.18730336	-105.1271557	1541.344
ZDV3	0	0	0	0	0	0
ZFW1	-659983.236	-5324060.769	3438276.461	32.83064966	-97.06647219	155.61
ZFW2	-659988.509	-5324063.318	3438271.464	32.83059627	-97.06652473	155.572
ZFW3	-659983.535	-5324063.851	3438271.677	32.83059829	-97.06647131	155.618
ZHU1	-513864.51	-5506451.681	3166720.461	29.96189635	-95.33142669	10.826
ZHU2	-513867.152	-5506455.088	3166714.296	29.96183178	-95.33145067	10.898
ZHU3	-513873.435	-5506457.739	3166708.7	29.96177353	-95.33151293	10.896
ZJX1	772646.397	-5434462.183	3237231.748	30.69885975	-81.90818559	2.128
ZJX2	772649.721	-5434463.733	3237228.349	30.69882417	-81.90815351	2.115
ZJX3	772645.66	-5434466.163	3237225.238	30.69879159	-81.90819905	2.104
ZKC1	-415247.57	-4954556.386	3982161.107	38.88015934	-94.79083444	305.893
ZKC2	-415231.177	-4954557.706	3982161.161	38.88016002	-94.79064493	305.885

WRE	X(m)	Y(m)	Z(m)	Latitude	Longitude	H(m)
ZKC3	-415237.297	-4954561.059	3982155.968	38.88010183	-94.79071198	305.625
ZLA1	-2474410.024	-4637294.582	3602183.564	34.60351862	-118.0838966	763.514
ZLA2	-2474404.746	-4637297.385	3602183.57	34.60351872	-118.0838314	763.508
ZLA3	-2474411.35	-4637297.066	3602179.589	34.60347472	-118.0838966	763.574
ZLC1	-1808273.273	-4486410.814	4145302.995	40.78604304	-111.9521782	1287.427
ZLC2	-1808274.672	-4486414.432	4145298.512	40.78598968	-111.9521776	1287.435
ZLC3	-1808270.457	-4486416.13	4145298.5	40.7859896	-111.9521238	1287.427
ZMA1	966042.263	-5662999.82	2761581.505	25.82461228	-80.31919016	-7.593
ZMA2	966029.283	-5662999.097	2761585.985	25.82466007	-80.31931656	-8.248
ZMA3	966037.359	-5662997.942	2761586.342	25.8246621	-80.31923522	-7.895
ZME1	4070.84	-5226189.298	3644028.425	35.06739412	-89.95537056	68.605
ZME2	4070.87	-5226186.746	3644032.538	35.06743768	-89.95537021	68.879
ZME3	4064.677	-5226186.618	3644032.693	35.06743951	-89.9554381	68.86
ZMP1	-249978.445	-4539297.498	4458955.048	44.63746323	-93.15208628	262.653
ZMP2	-249972.639	-4539297.836	4458955.046	44.6374631	-93.15201299	262.664
ZMP3	-249973.739	-4539302.122	4458950.576	44.63740704	-93.15202386	262.612
ZNY1	1406144.572	-4627343.985	4144322.062	40.78432872	-73.09716641	6.44
ZNY2	1406146.375	-4627347.022	4144317.293	40.78427603	-73.09715643	5.922
ZNY3	1406140.813	-4627348.675	4144317.319	40.78427641	-73.09722517	5.912
ZOA1	-2684436.955	-4293337.324	3865351.904	37.54305431	-122.0159491	-3.496
ZOA2	-2684433.944	-4293341.403	3865349.478	37.54302675	-122.0158957	-3.498
ZOA3	-2684438.314	-4293342.271	3865345.618	37.54298242	-122.0159324	-3.429
ZOB1	650770.131	-4754715.675	4187420.762	41.29715456	-82.20644536	223.686
ZOB2	650777.808	-4754714.843	4187422.776	41.29716689	-82.2063532	225.178
ZOB3	650776.139	-4754719.672	4187414.988	41.29708713	-82.20638076	223.463
ZSE1	-2308930.305	-3668169.678	4663526.463	47.28699304	-122.1883732	82.102
ZSE2	-2308934.702	-3668175.226	4663520.06	47.28690746	-122.1883833	82.171
ZSE3	-2308935.758	-3668179.495	4663516.105	47.28685574	-122.1883651	82.098
ZSU1	2462589.47	-5529372.1	2003724.524	18.43133621	-65.99347641	-28.088
ZSU2	2462587.54	-5529377.469	2003712.223	18.43121901	-65.99351378	-28.069
ZSU3	2462594.17	-5529375.21	2003710.143	18.43119937	-65.99344775	-28.126
ZTL1	529840.348	-5305248.817	3489342.858	33.37968864	-84.29672661	261.141
ZTL2	529846.725	-5305247.974	3489343.143	33.37969181	-84.29665752	261.126
ZTL3	529847.409	-5305251.416	3489337.911	33.37963509	-84.29665388	261.164

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

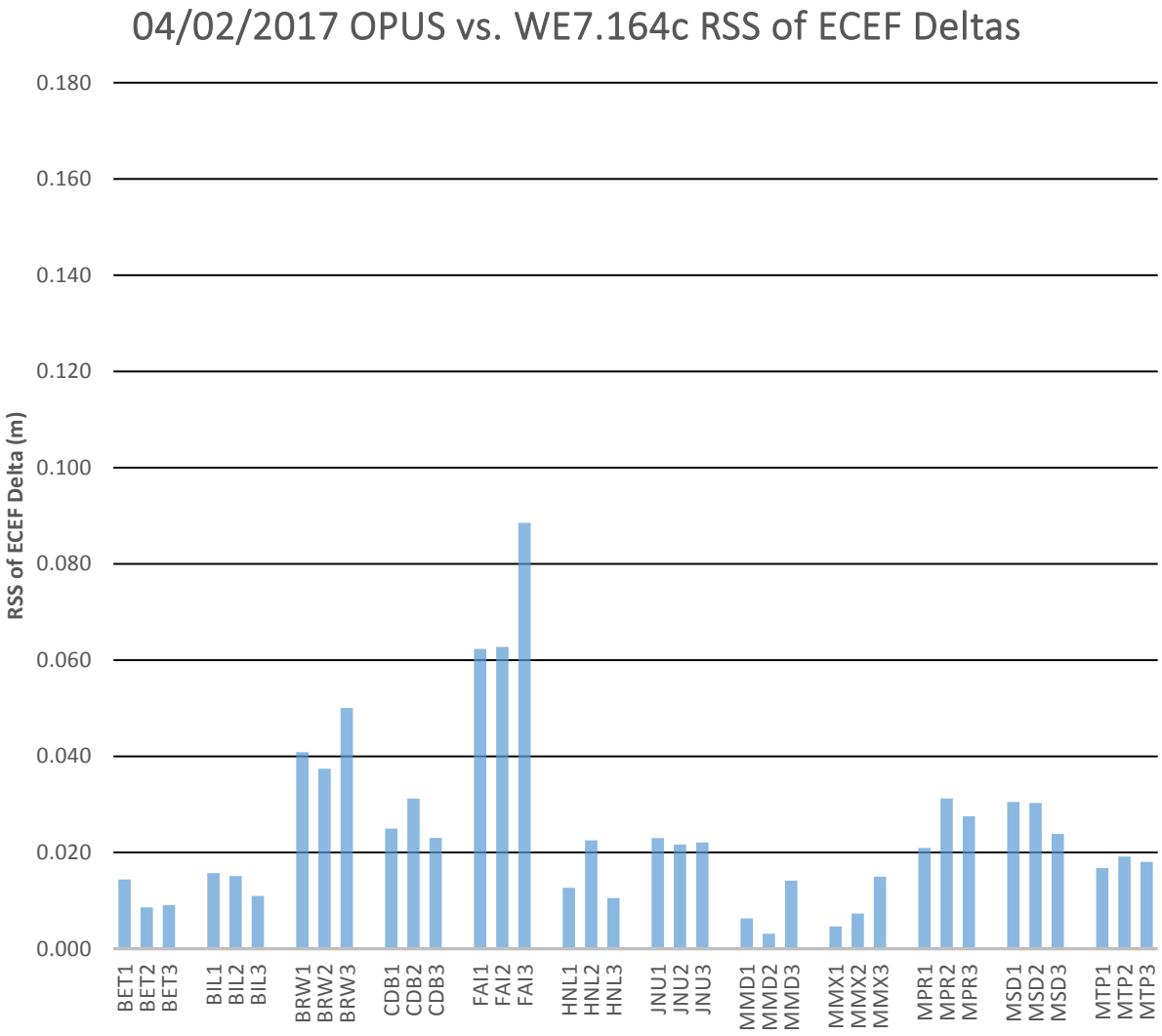


Figure 10-2 Build WE7.164c Antenna Positions Deltas OPUS Survey

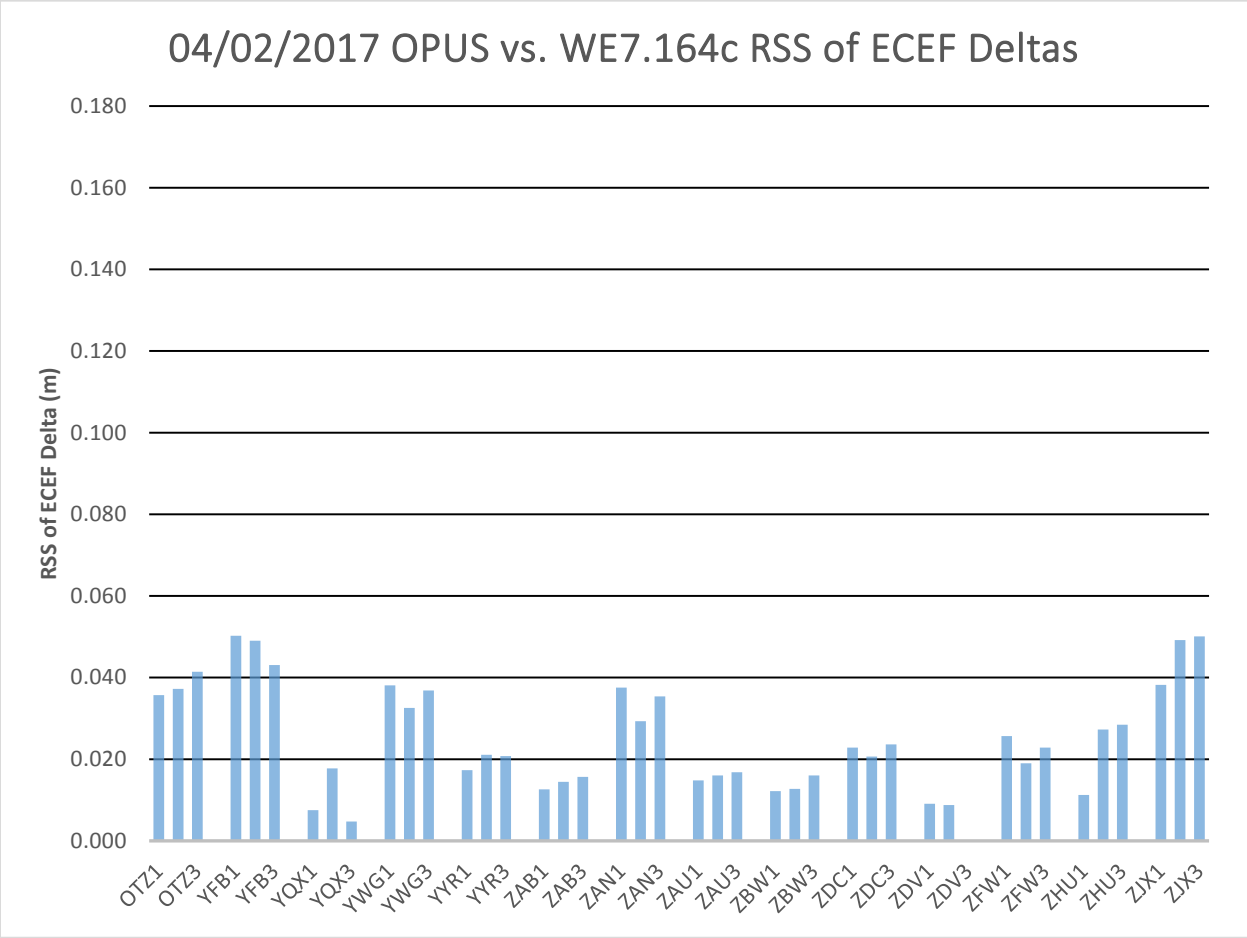


Figure 10-3 Build WE7.164c Antenna Positions Deltas OPUS Survey

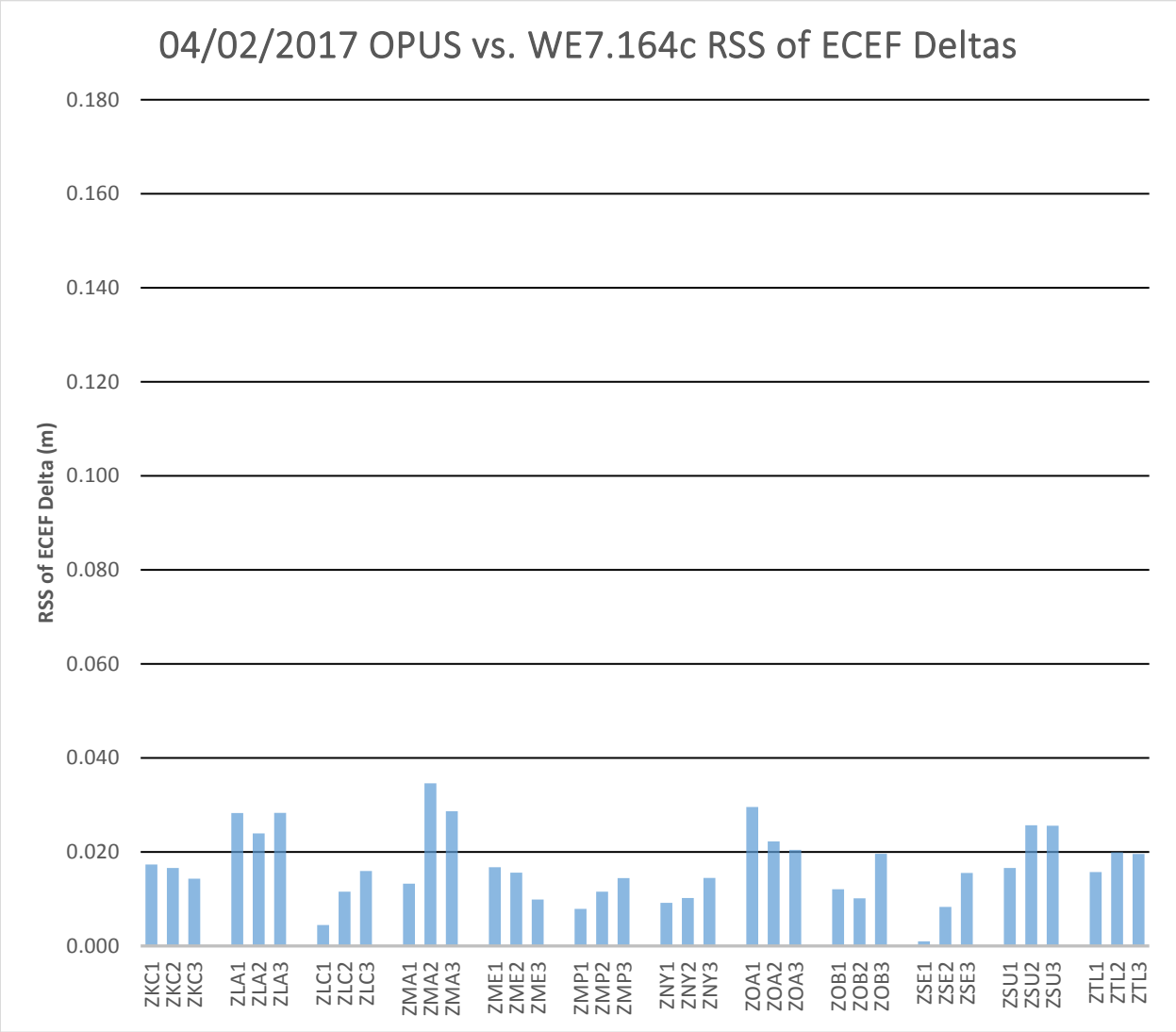


Figure 10-4 OPUS Survey Overall RMS Qualities

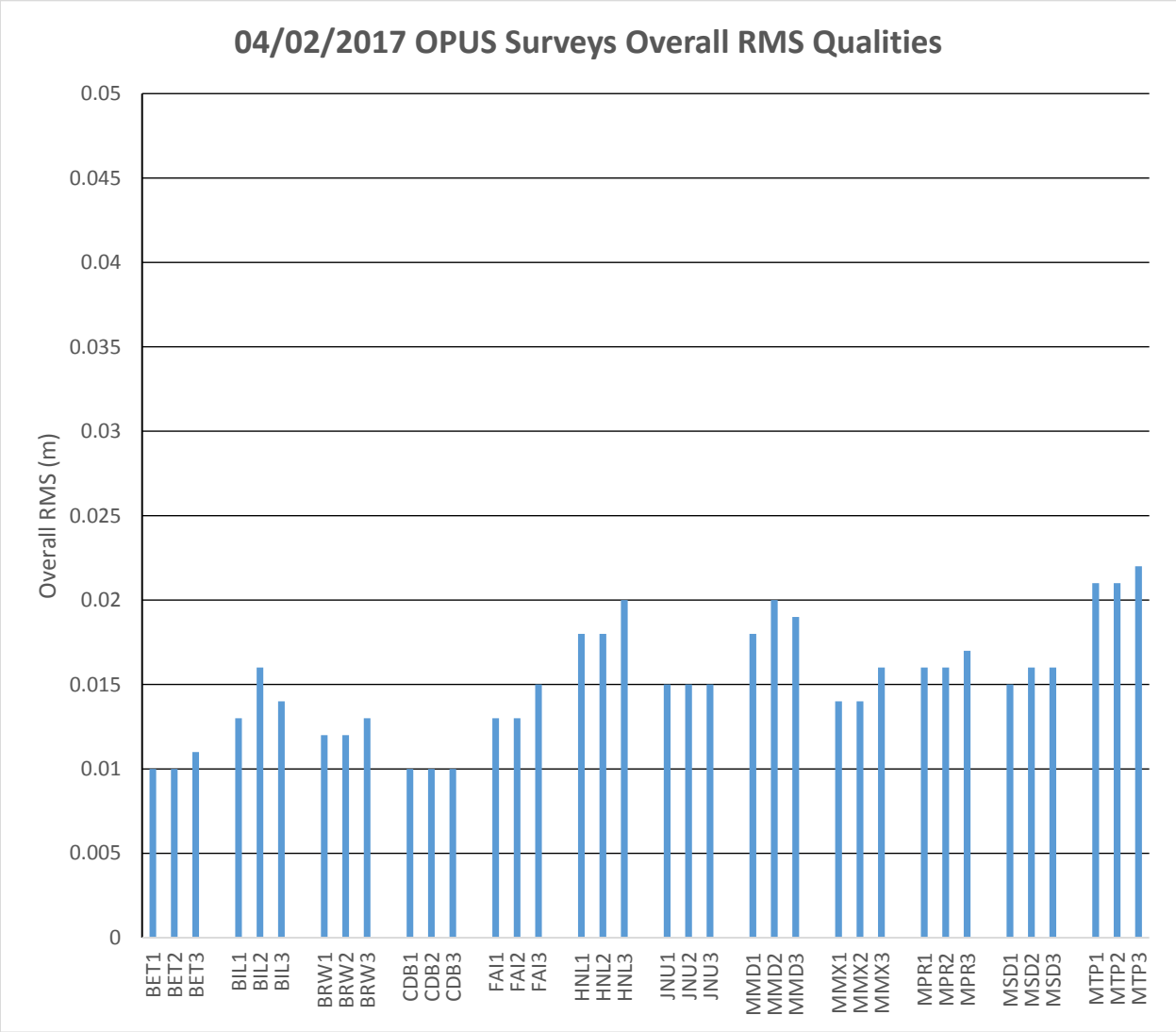


Figure 10-5 OPUS Survey Overall RMS Qualities

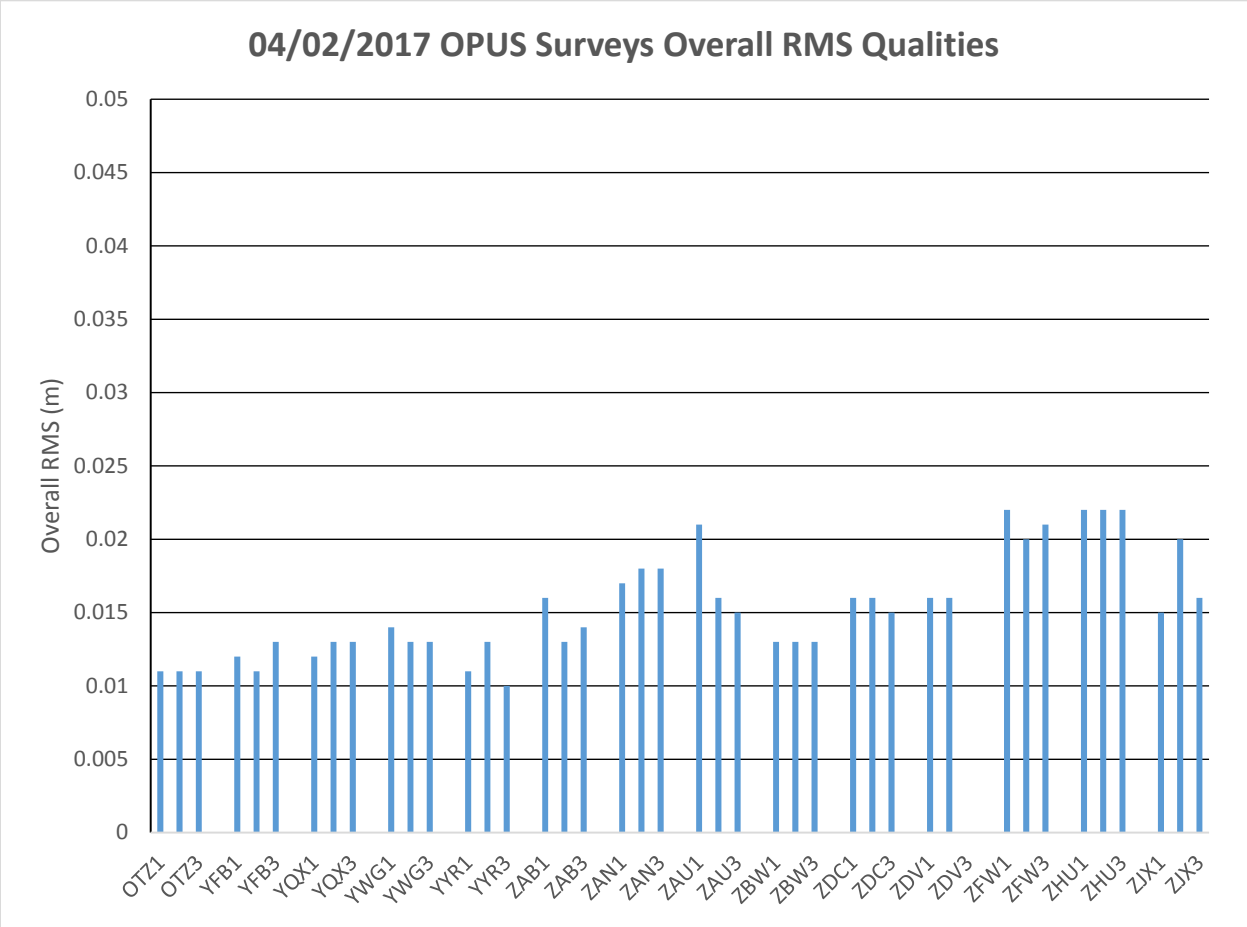


Figure 10-6 OPUS Survey Overall RMS Qualities

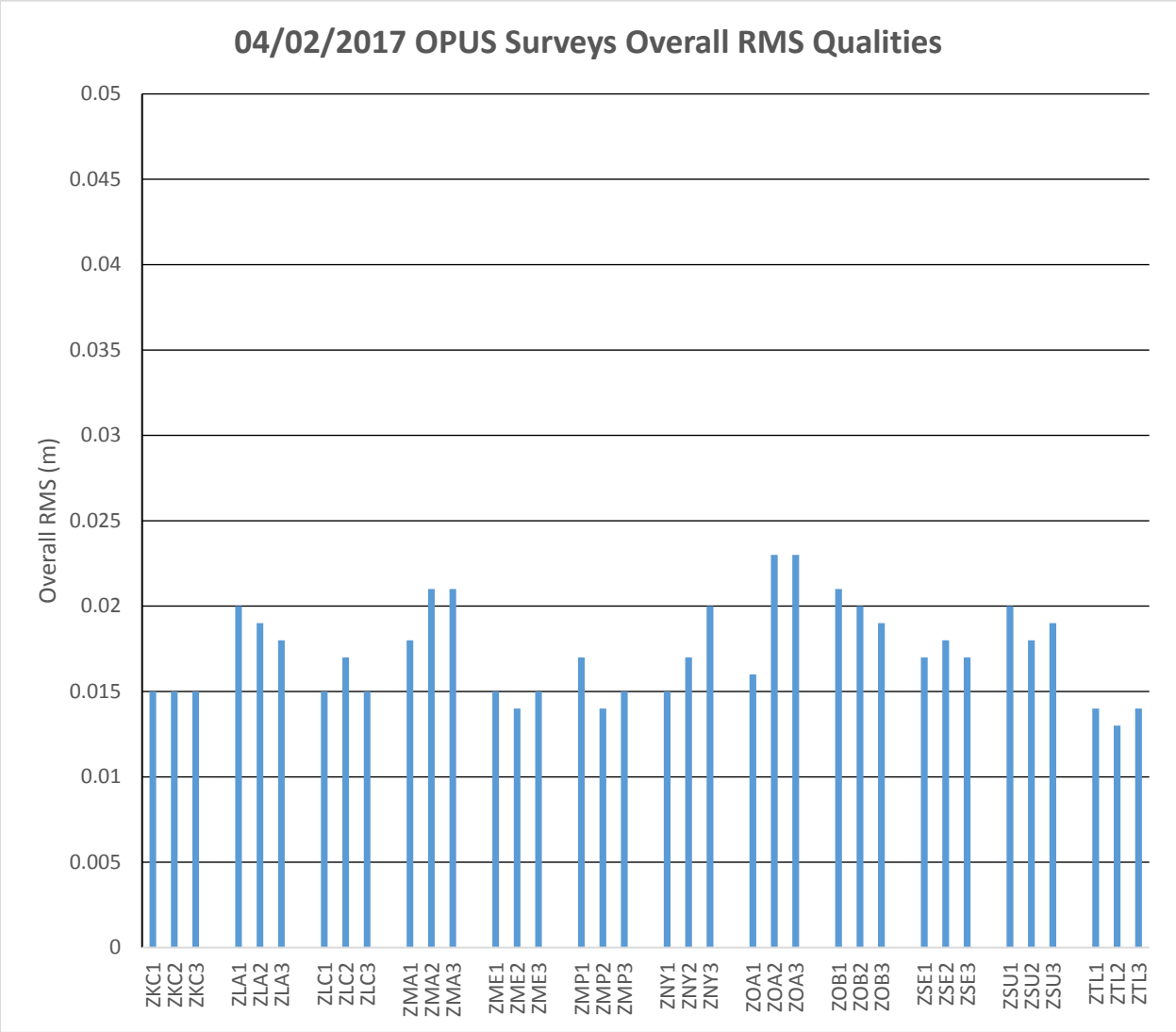


Figure 10-7 OPUS vs. CSRS RSS ECEF Deltas

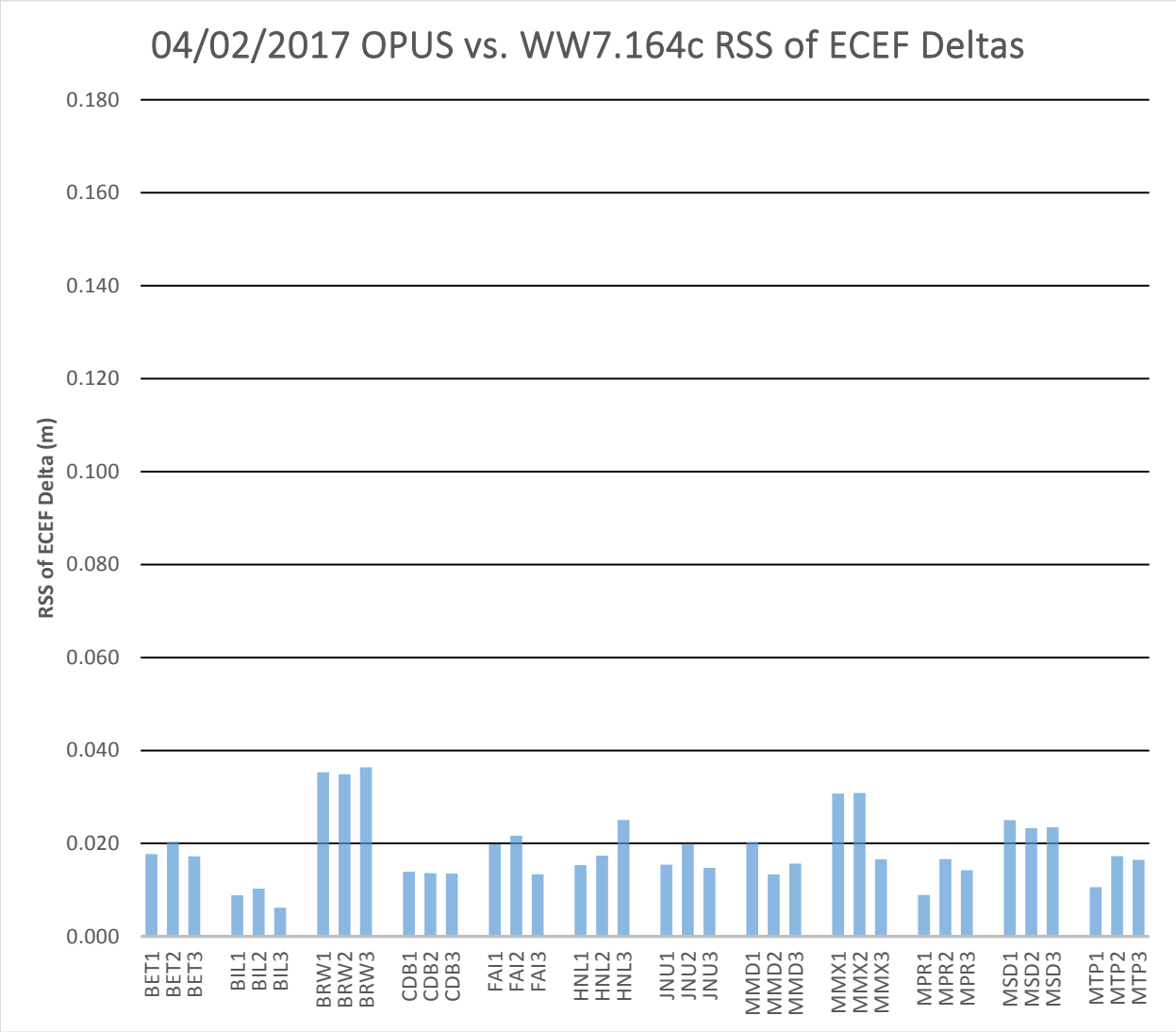


Figure 10-8 OPUS vs. CSRS RSS ECEF Deltas

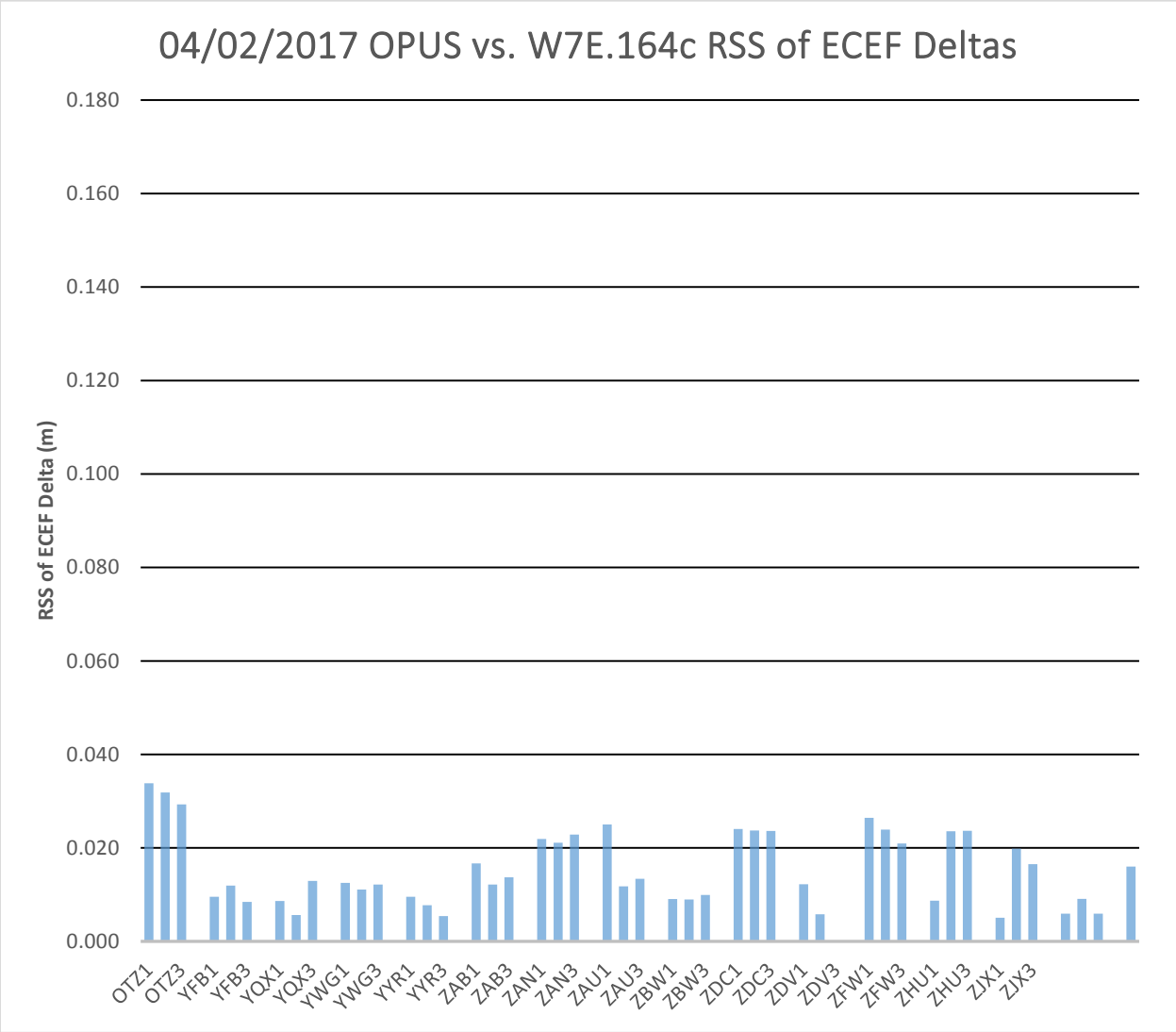


Figure 10-9 OPUS vs. CSRS RSS ECEF Deltas

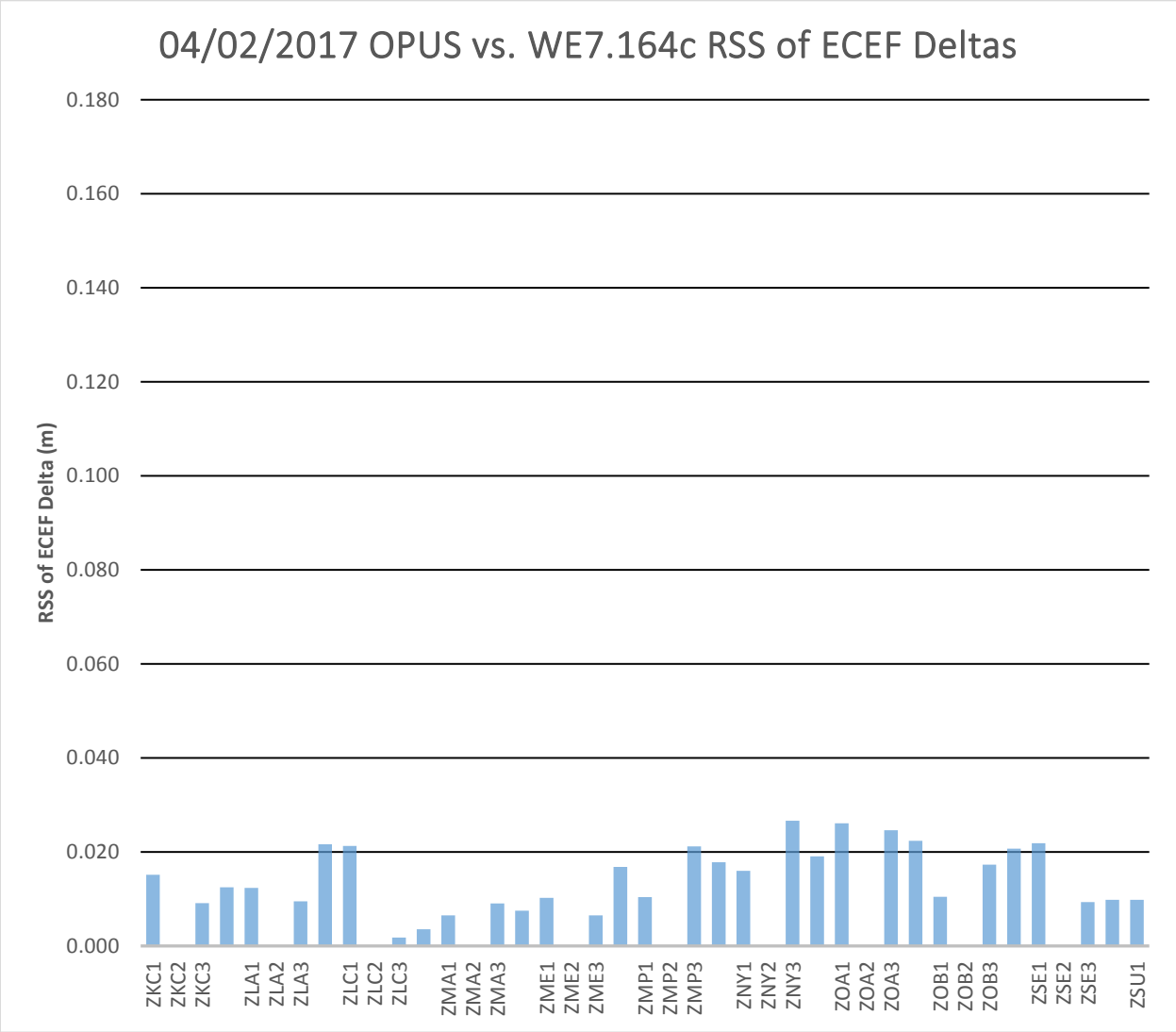


Figure 10-10 CSRS Survey Qualities

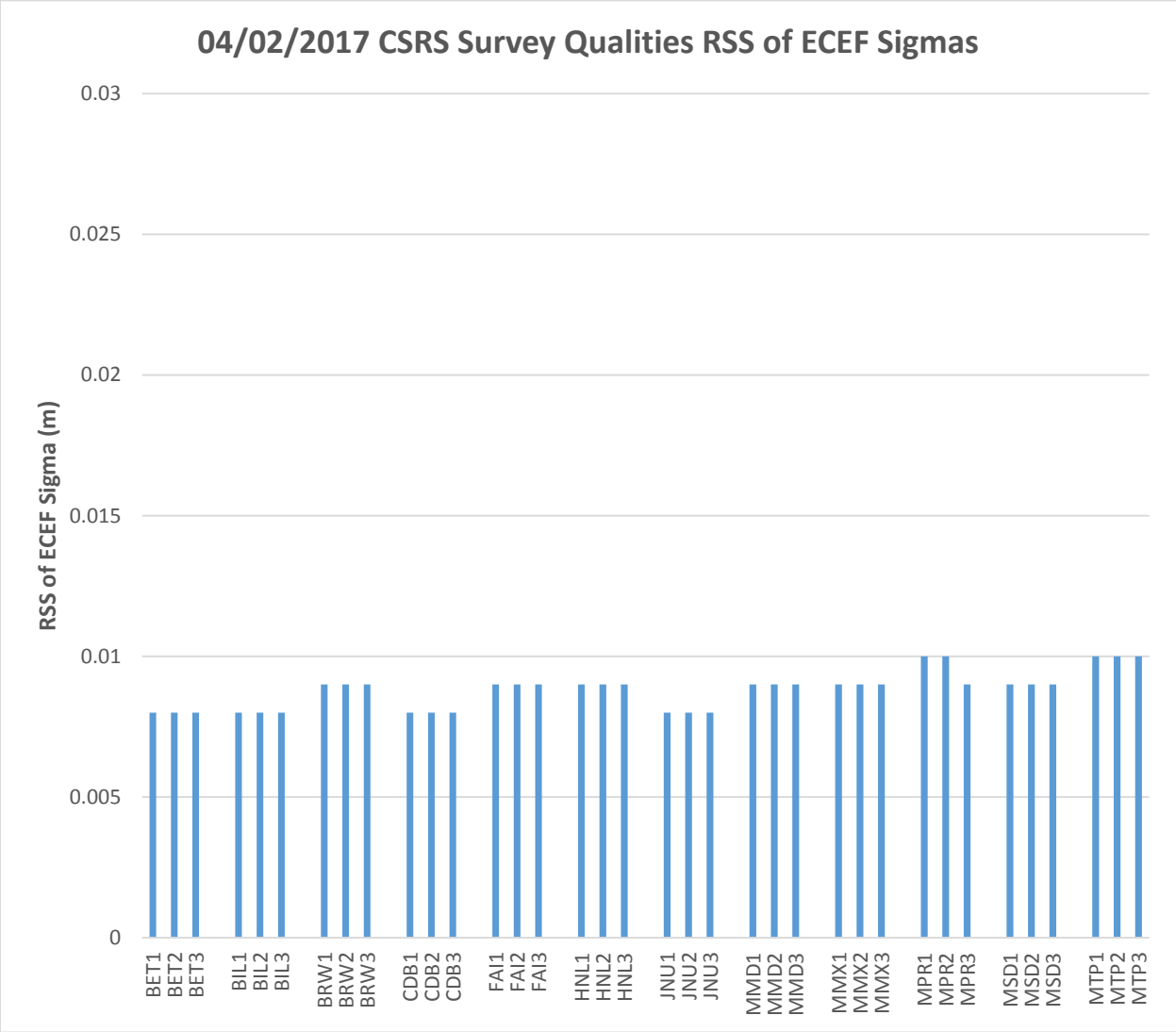


Figure 10-11 CSRS Survey Qualities

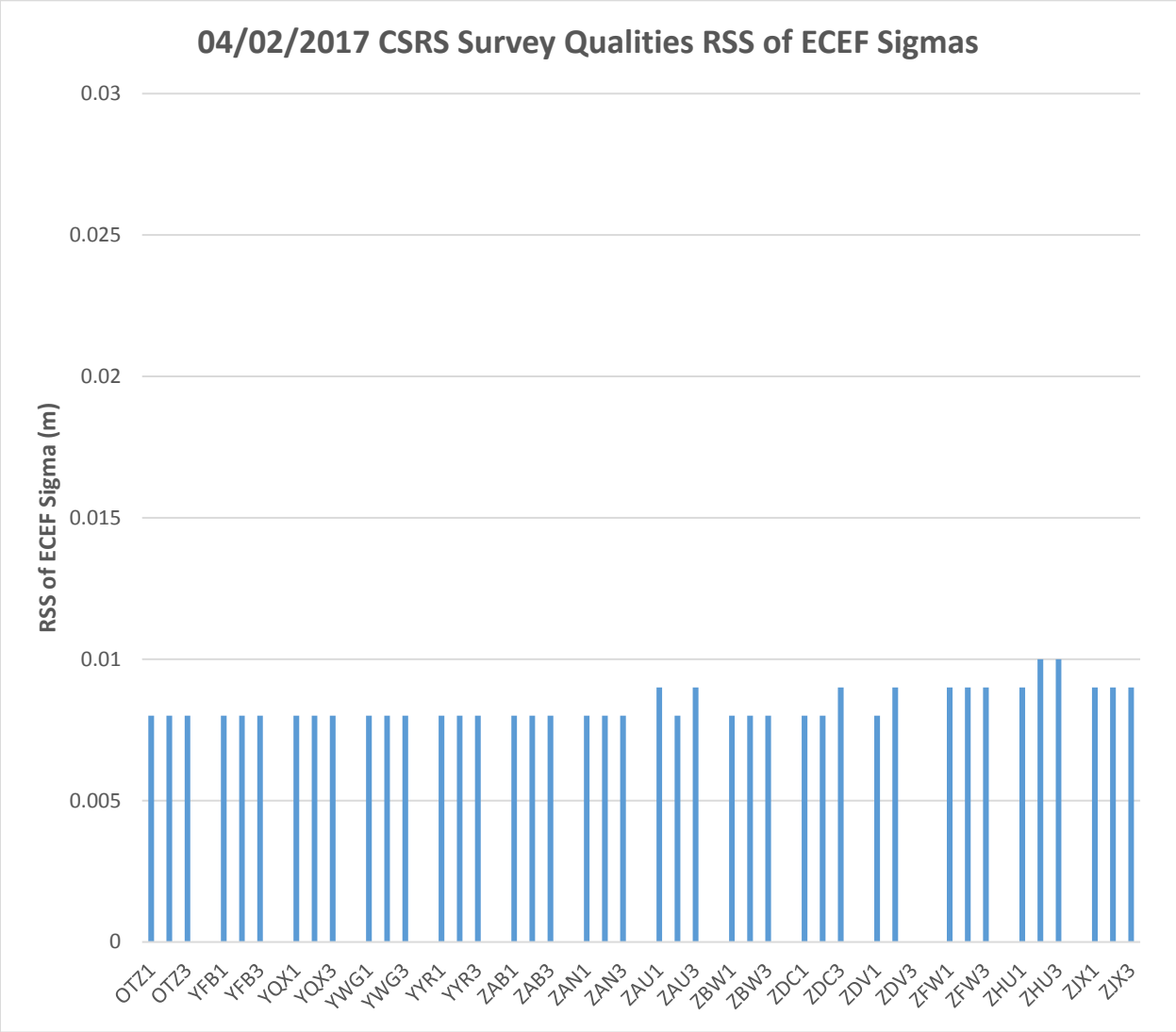
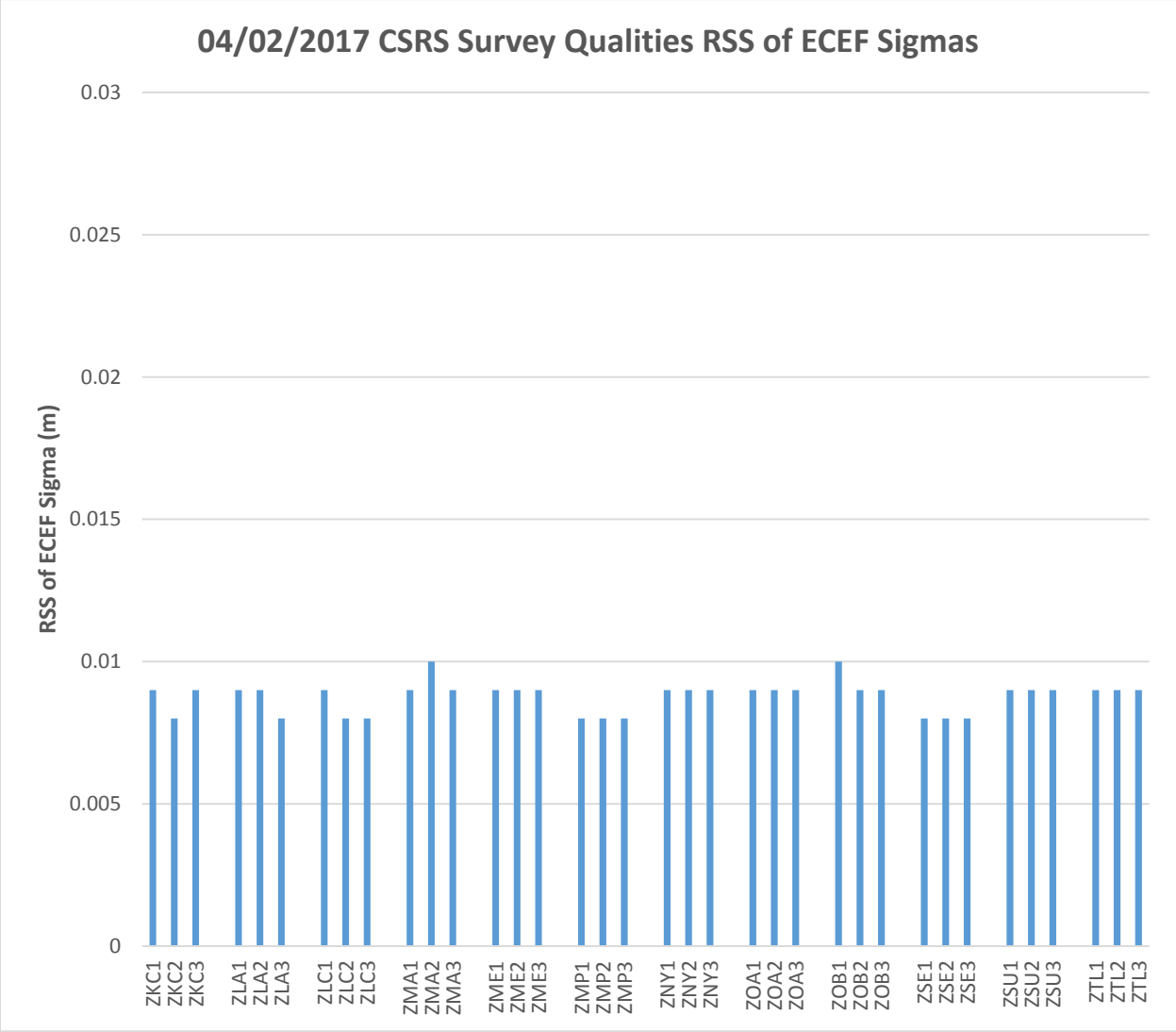


Figure 10-12 CSRS Survey Qualities



11.0 SIGNAL QUALITY MONITOR (SQM)

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

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

11.1 Alpha Metrics

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

Table 11-1 Alpha Metrics

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

11.2 Type Bias

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

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

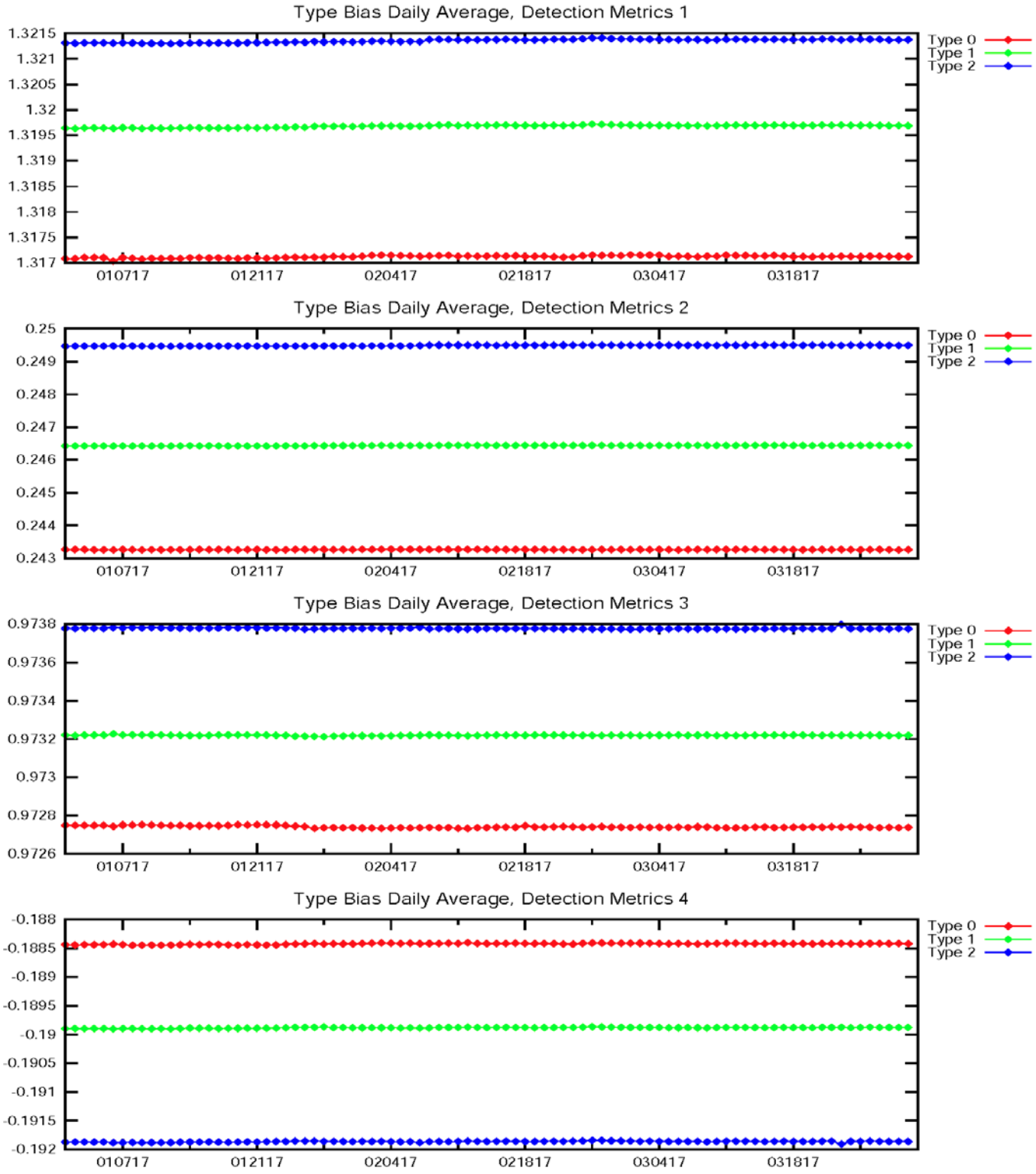
Table 11-2 Type Bias Average for the Quarter

Detection Metric	Type 0	Type 1	Type 2
DM 1	1.31712	1.31968	1.32135
DM 2	0.24327	0.246439	0.249488
DM 3	0.972742	0.973219	0.973777
DM 4	-0.18842	-0.18988	-0.19187

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

Detection Metric	Type 0	Type 1	Type 2
DM 1	1.32039	1.32247	1.32417
DM 2	0.241148	0.244384	0.24755
DM 3	0.973127	0.973647	0.974213
DM 4	-0.18653	-0.18829	-0.19033

Figure 11-1 Type Bias Average Trend



11.3 PRN Bias

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

Table 11-4 and Figure 11-2 show the rollup PRN bias averages for the quarter with the maximum values for each detection metrics as followed: (1) the maximum average for DM1 is 0.0011513 observed on PRN-11, (2) the maximum average for DM2 is 0.0002095 observed on PRN-23, (3) the maximum average for DM3 is 0.0001931 observed on PRN-29, (4) the maximum average for DM4 is 0.0004771 observed on PRN-23.

Figure 11-3 to 11-10 show the daily PRN bias for each PRN, for four detection metrics. The jumps on several PRN's on 2/8/17 were due to an update on the WAAS Test Team SQM offline monitoring software—G2 type bias OSP's were updated to G3 type bias OSP's. Other small bumps were due to NANU's.

Table 11-4 PRN Bias Average for the Quarter

PRN	DM1	DM2	DM3	DM4
1	0.0002610	0.0000583	0.0000537	0.0001010
2	0.0005490	0.0001630	0.0000676	0.0001392
3	0.0001565	0.0000467	0.0000546	0.0001015
4	Offline	Offline	Offline	Offline
5	0.0001934	0.0000490	0.0001298	0.0001257
6	0.0005454	0.0001026	0.0000814	0.0001011
7	0.0001655	0.0001018	0.0000575	0.0001552
8	0.0006042	0.0001219	0.0000976	0.0002438
9	0.0001860	0.0000463	0.0001322	0.0002461
10	0.0001681	0.0000433	0.0000844	0.0001616
11	0.0011513	0.0001961	0.0001052	0.0002533
12	0.0001520	0.0000427	0.0000928	0.0000945
13	0.0005103	0.0000464	0.0000506	0.0002339
14	0.0007602	0.0001433	0.0000469	0.0001623
15	0.0002569	0.0000938	0.0000442	0.0001619
16	0.0001489	0.0000503	0.0001164	0.0002396
17	0.0002229	0.0000888	0.0000467	0.0001352
18	0.0007045	0.0001553	0.0001053	0.0002739
19	0.0005904	0.0002028	0.0000993	0.0000946
20	0.0001564	0.0000558	0.0000504	0.0001481
21	0.0002873	0.0000801	0.0000884	0.0003352
22	0.0002609	0.0001146	0.0000964	0.0003696
23	0.0010888	0.0002095	0.0001257	0.0004771
24	0.0002022	0.0001102	0.0001512	0.0001768
25	0.0005665	0.0000954	0.0000487	0.0002402
26	0.0002494	0.0001076	0.0000567	0.0001516
27	0.0004738	0.0002011	0.0001309	0.0002794
28	0.0003127	0.0000462	0.0000736	0.0001213
29	0.0002262	0.0000804	0.0001931	0.0003061
30	0.0002147	0.0000685	0.0000695	0.0001107
31	0.0003527	0.0001085	0.0000522	0.0001944
32	0.0001671	0.0000416	0.0000907	0.0001034

Figure 11-2 PRN Bias Average for the Quarter

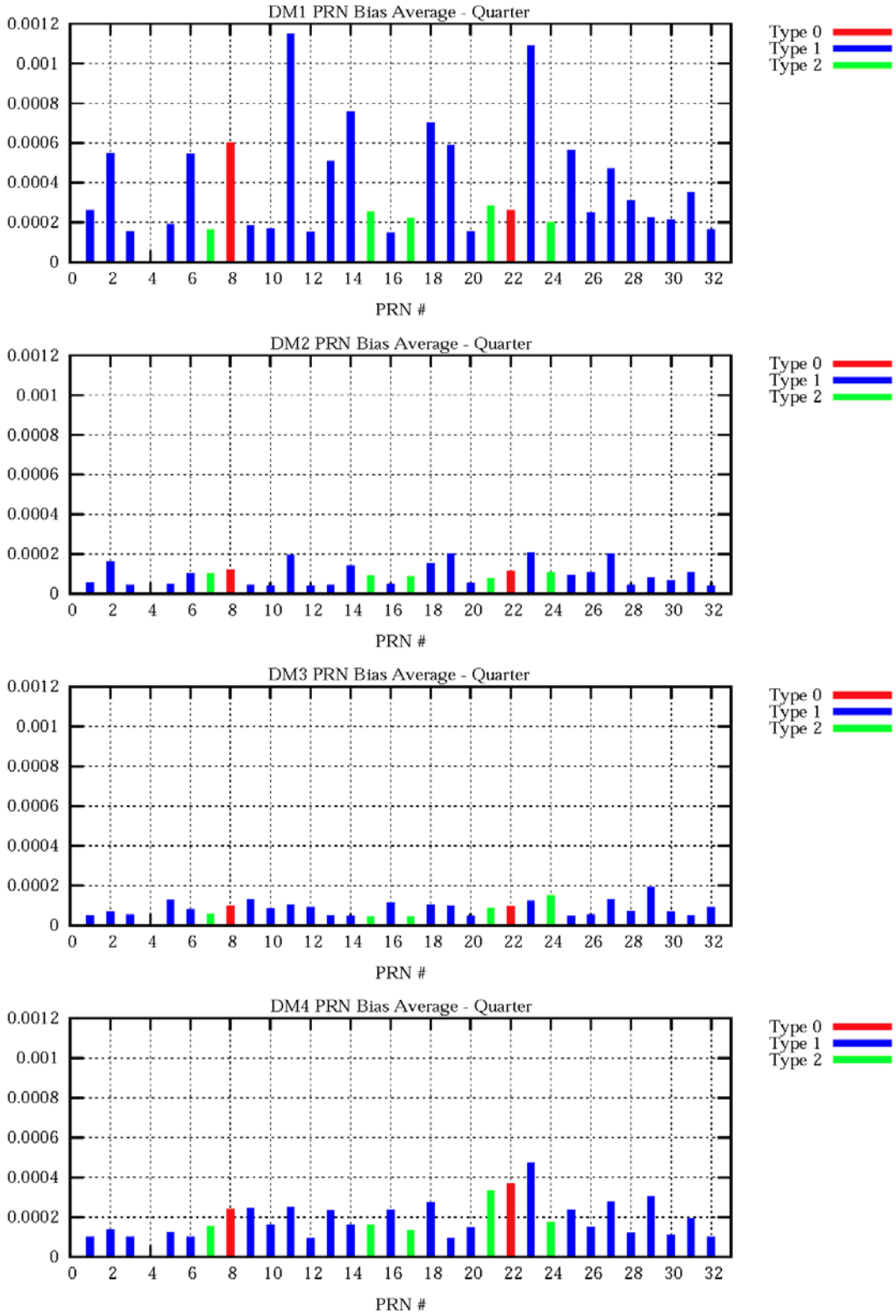


Figure 11-3 PRN Bias Average Trend (PRN-1 – PRN-4)

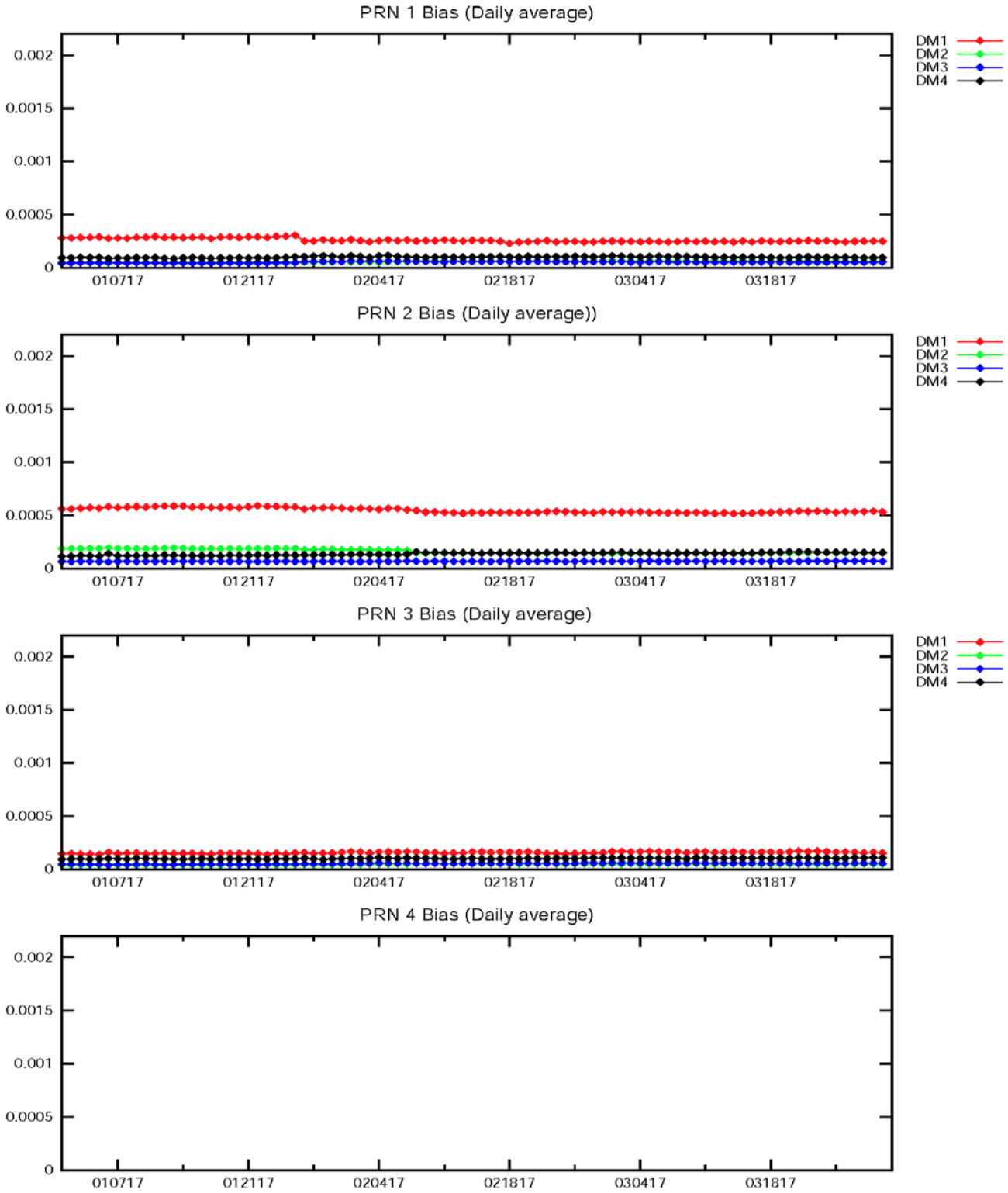


Figure 11-4 PRN Bias Average Trend (PRN-5 – PRN-8)

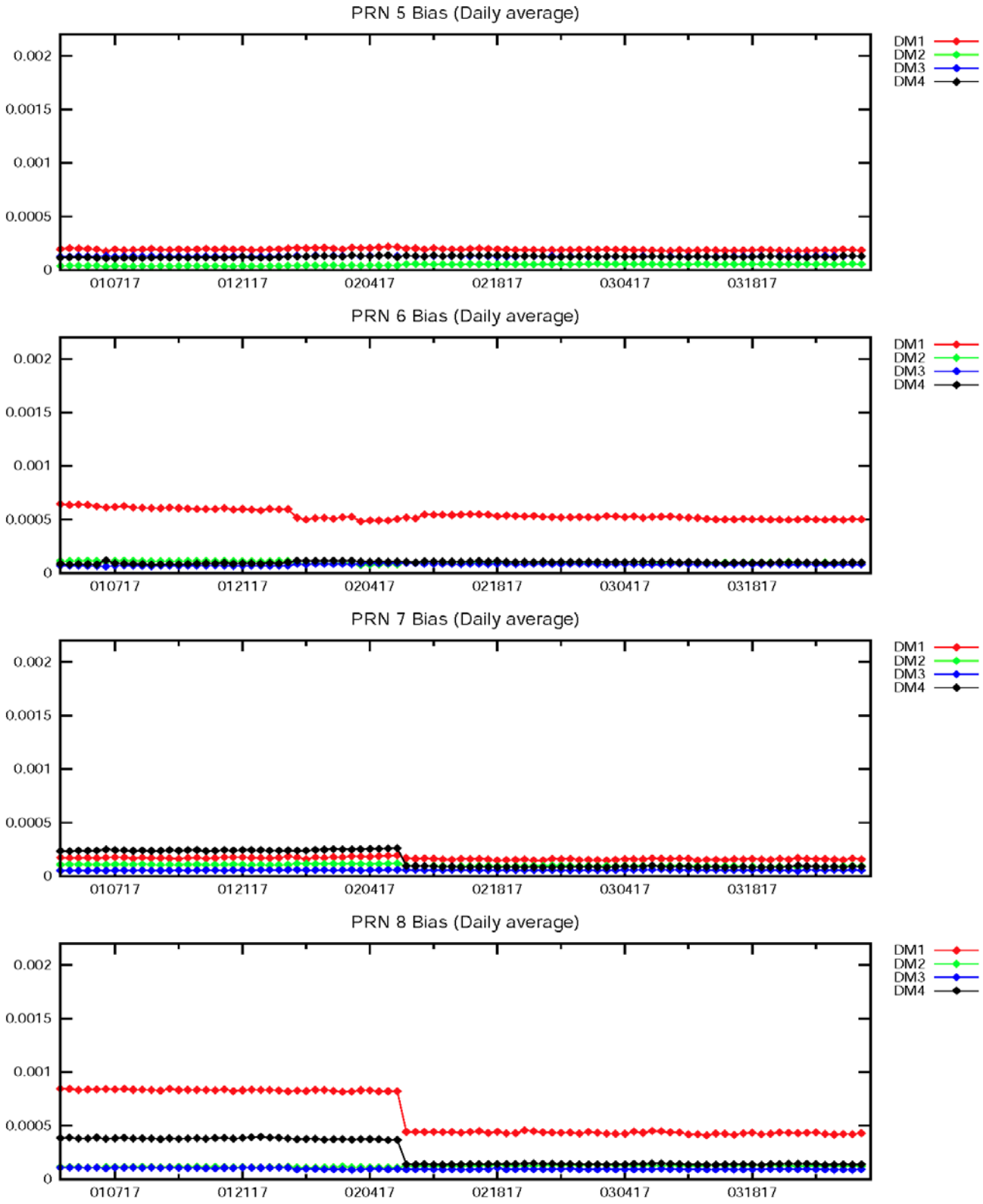


Figure 11-5 PRN Bias Average Trend (PRN-9 – PRN-12)

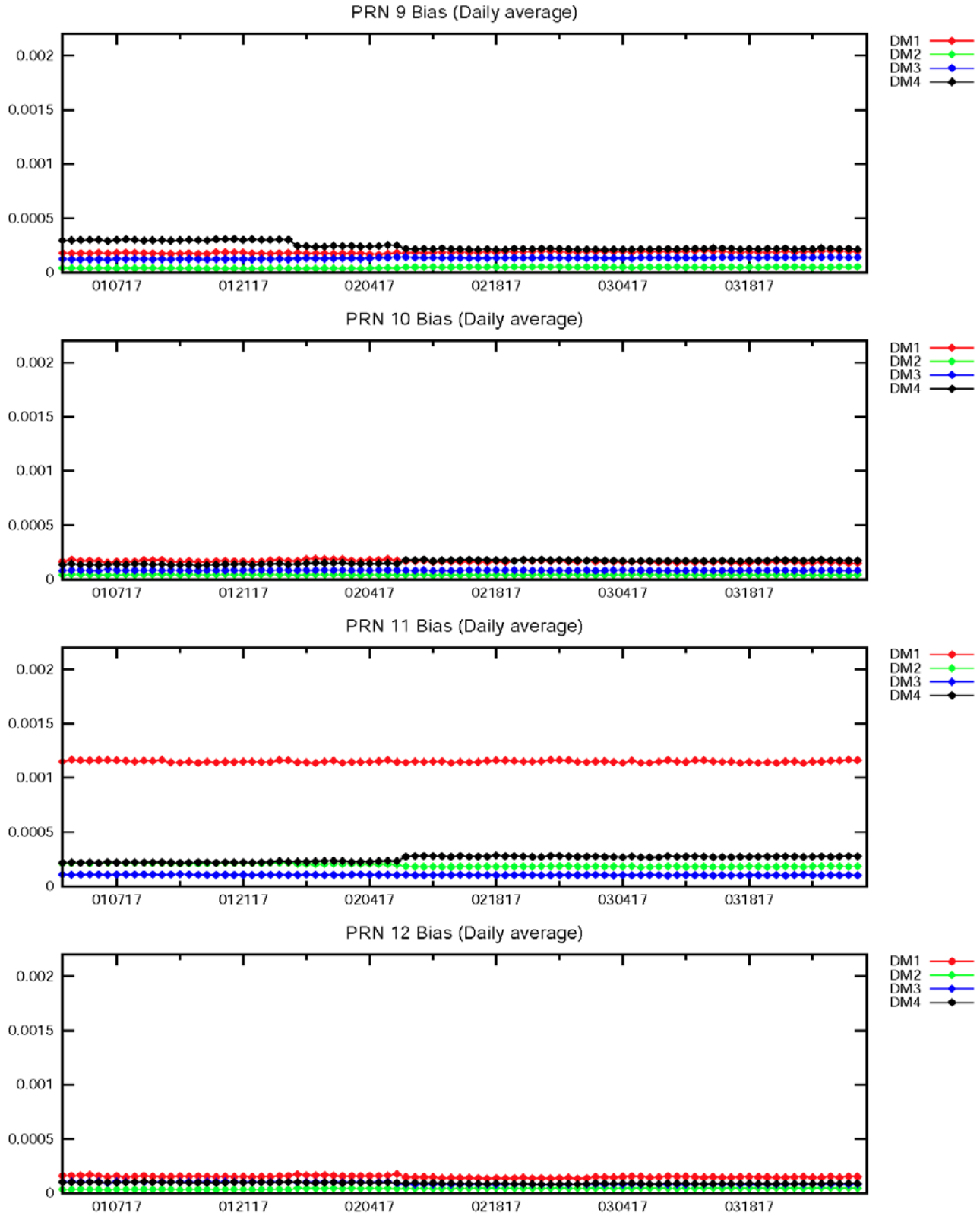


Figure 11-6 PRN Bias Average Trend (PRN-13 – PRN-16)

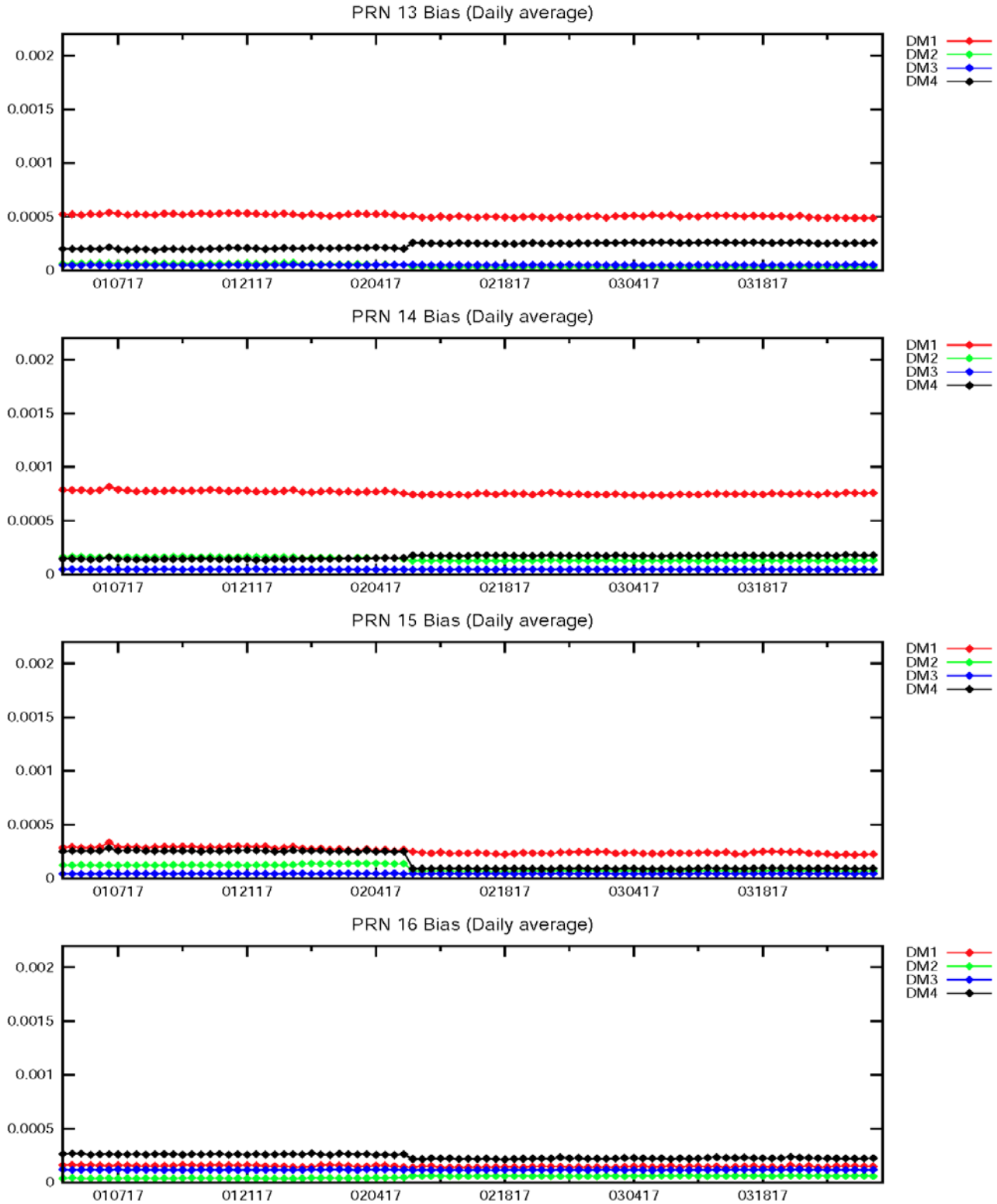


Figure 11-7 PRN Bias Average Trend (PRN-17 – PRN-20)

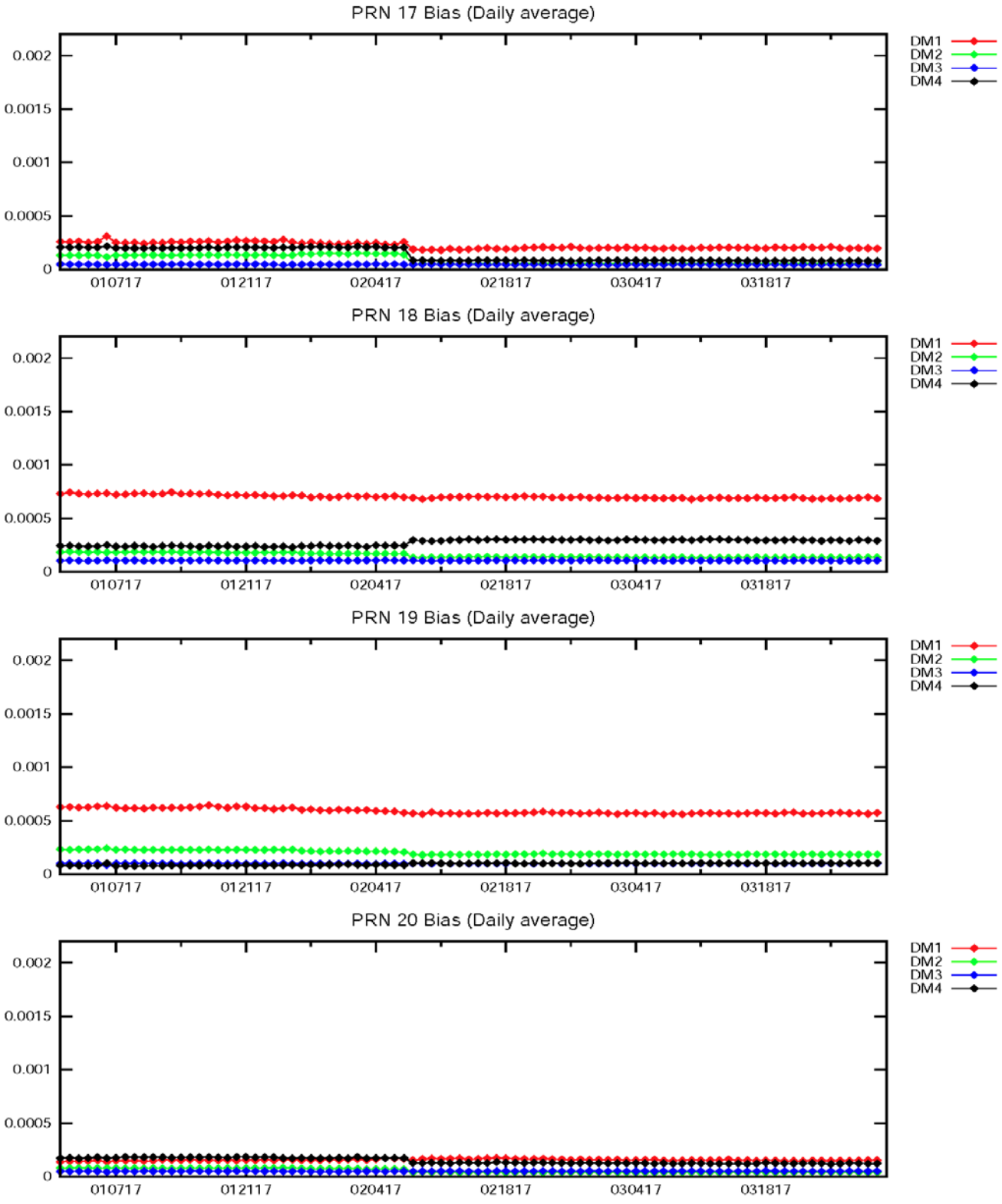


Figure 11-8 PRN Bias Average Trend (PRN-21 – PRN-24)

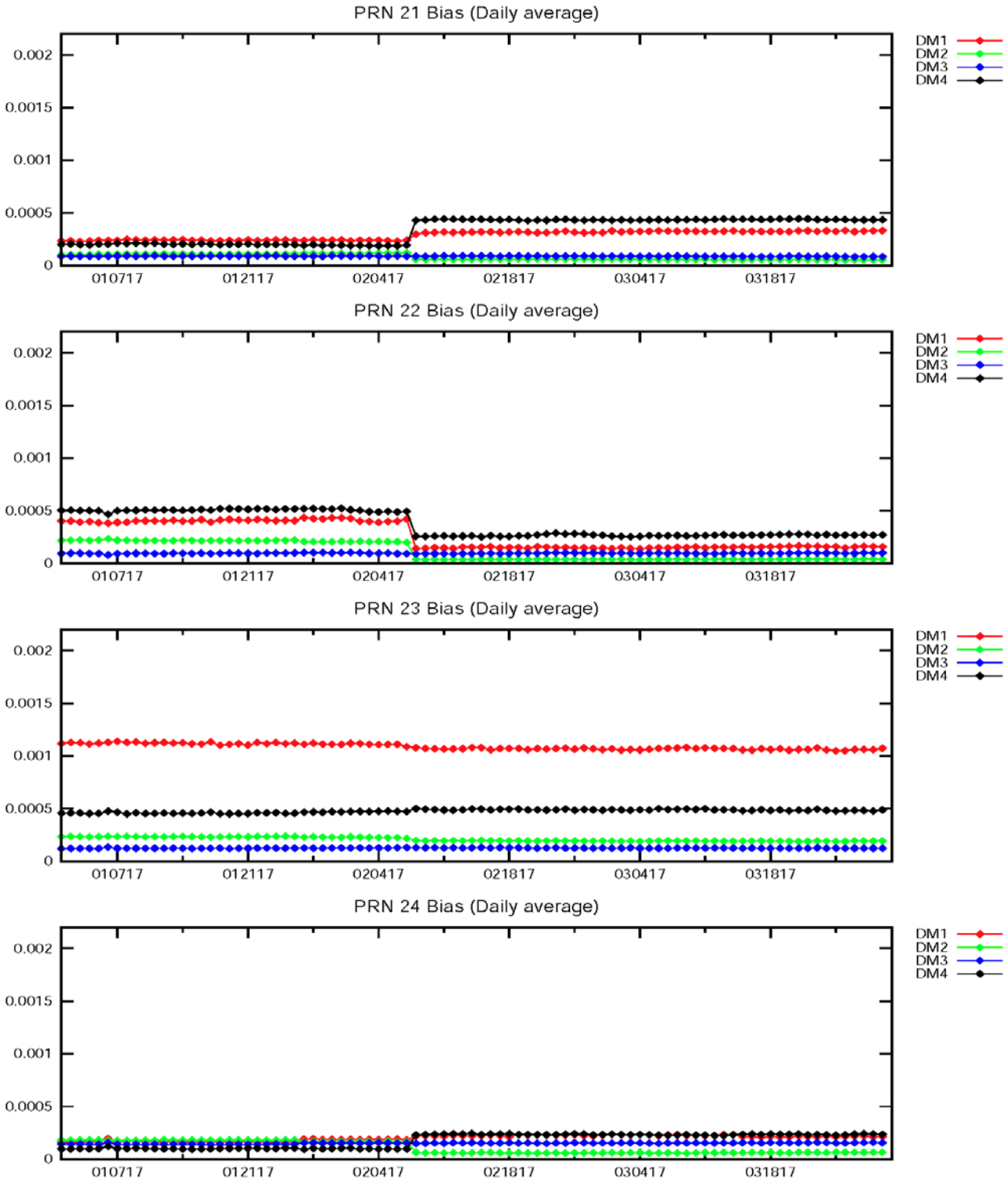


Figure 11-9 PRN Bias Average Trend (PRN-25 – PRN-28)

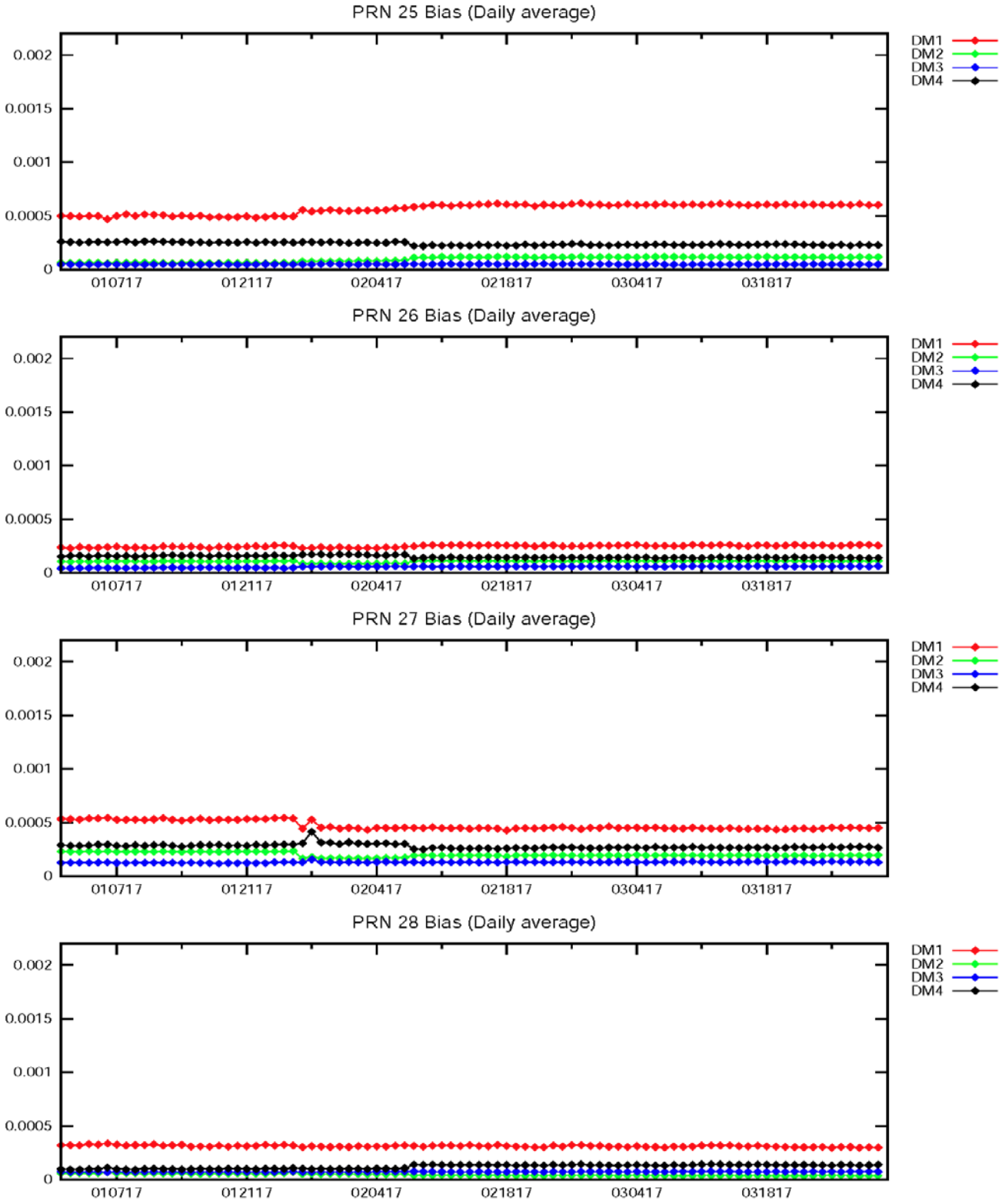
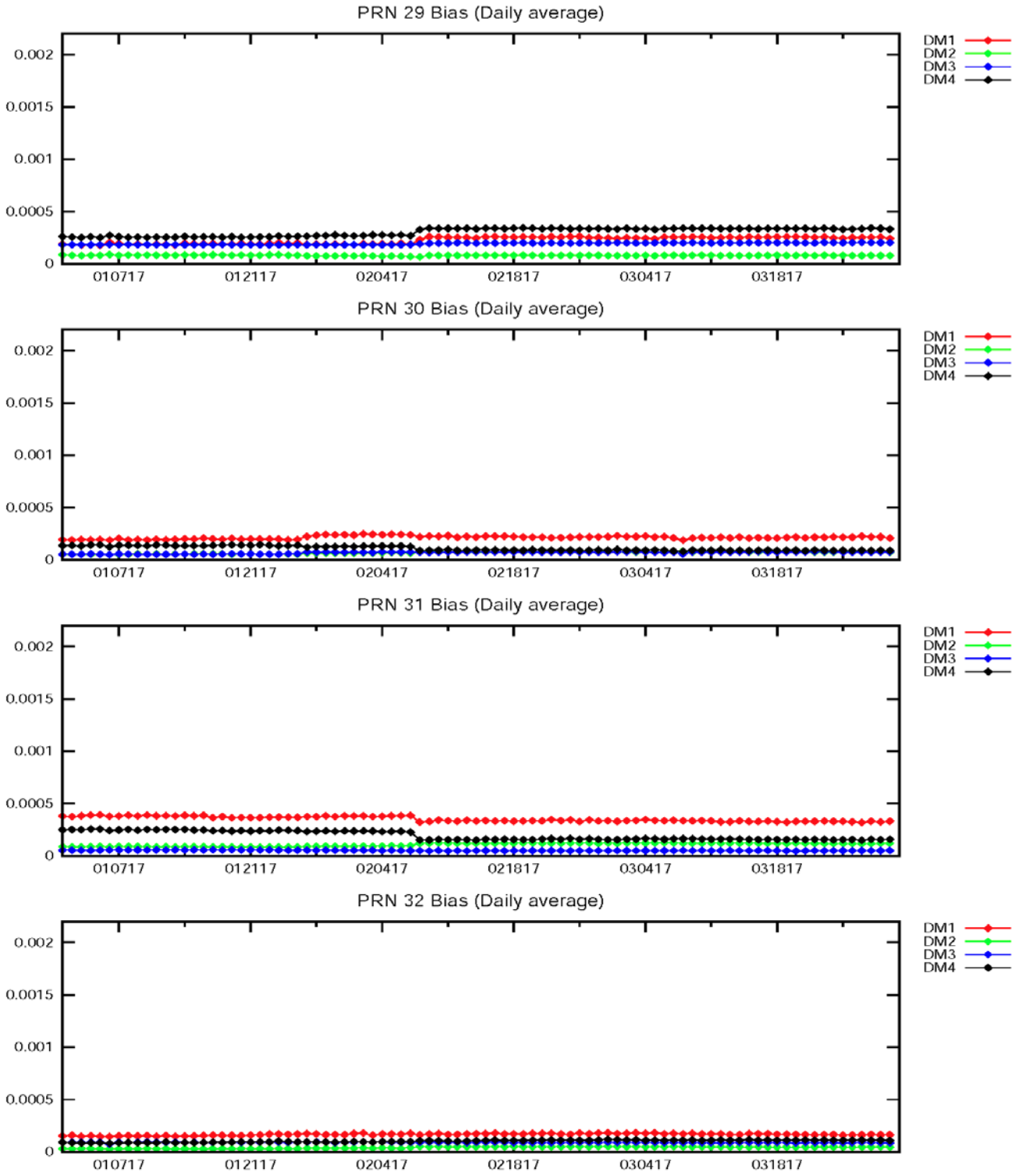


Figure 11-10 PRN Bias Average Trend (PRN-29 – PRN-32)



11.4 SQM Trips

A SQM trip occurs when the estimated deformation exceeds threshold. For this reporting quarter, there was a SQM trip on PRN-27 that occurred on 1/28/2017 due to power tests performed by the U.S. Air Force. The power tests, which increased the power of the GPS L1 C/A signal for the Block IIRM and IIF satellites, began on 1/25/2017 and still ongoing at the end of the quarter. See DR 135 for more details.

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 PRN-133.

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

CRE. GEO PRN-138.

CRW. GEO PRN-135.

CSRS. Canadian Spatial Reference System.

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

DM. Detection Metrics.

DR. Discrepancy Report.

ECEF. Earth-Centered, Earth-Fixed.

FAA. Federal Aviation Administration.

FD. Fault Detection.

Fault Detection and Exclusion (FDE). Fault detection and exclusion is a receiver processing scheme that autonomously provides integrity monitoring for the position solution, using redundant range measurements. The FDE

consists of two distinct parts: fault detection and fault exclusion. The fault detection part detects the presence of an unacceptably large position error for a given mode of flight. Upon the detection, fault exclusion follows and excludes the source of the unacceptably large position error, thereby allowing navigation to return to normal performance without an interruption in service.

GEO. Geostationary Satellite.

GMT. Greenwich Mean Time.

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

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

GUS. GEO Uplink System.

Hazardous Misleading Information (HMI). Hazardous misleading information is 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).

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

HPE. Horizontal Position Error.

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

IAP. Instrument Approach Procedures

IGS. International GPS Service.

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

Kp. Planetary Index.

LNAV. Lateral Navigation.

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

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

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

MOPS. Minimum Operational Performance Standards.

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

NAS. National Airspace System.

Navigation Message. Message structure designed to carry navigation data.

NGS. National Geodetic Survey.

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

NTSB. National Satellite Test Bed.

OCONUS. Outside Contiguous United States.

OPUS. Online Positioning Use Server.

PAN. Performance Analysis Report.

PID. Programmable Indicator Data.

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.

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

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.

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

SBAS. Space Based Augmentation System.

SIS. Signal in Space

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

SSM. System Support Modification.

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

SV. Space Vehicle.

SVN. Space Vehicle Number.

TCS. Terrestrial Communications Subsystem.

TOW. Time of GPS Week.

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

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

VPE. Vertical Position Error.

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

VNAV. Vertical Navigation.

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

WIPP. WAAS Integrity Performance Panel.

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

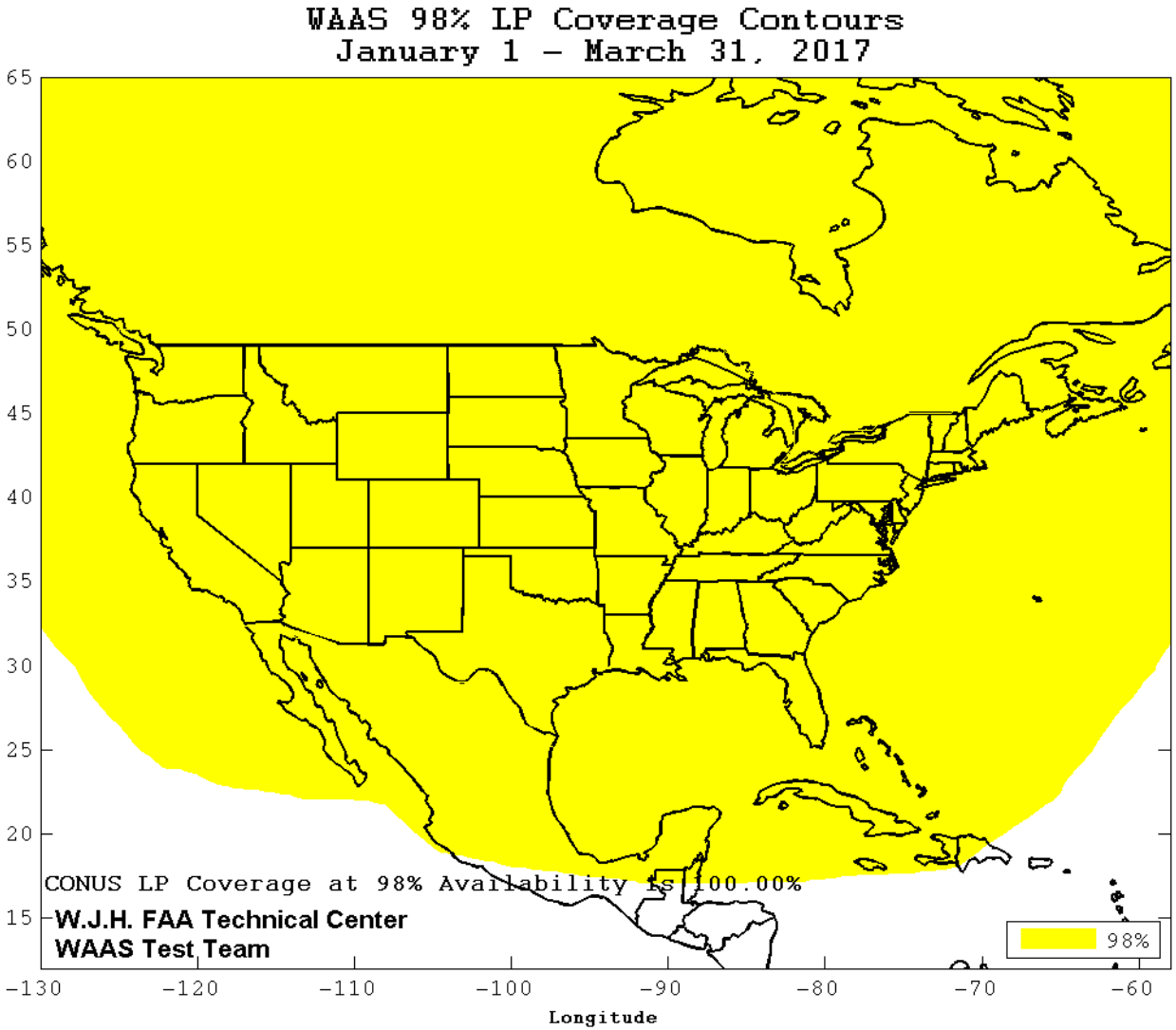


Figure B-2. 98% Alaska LP Availability Contour

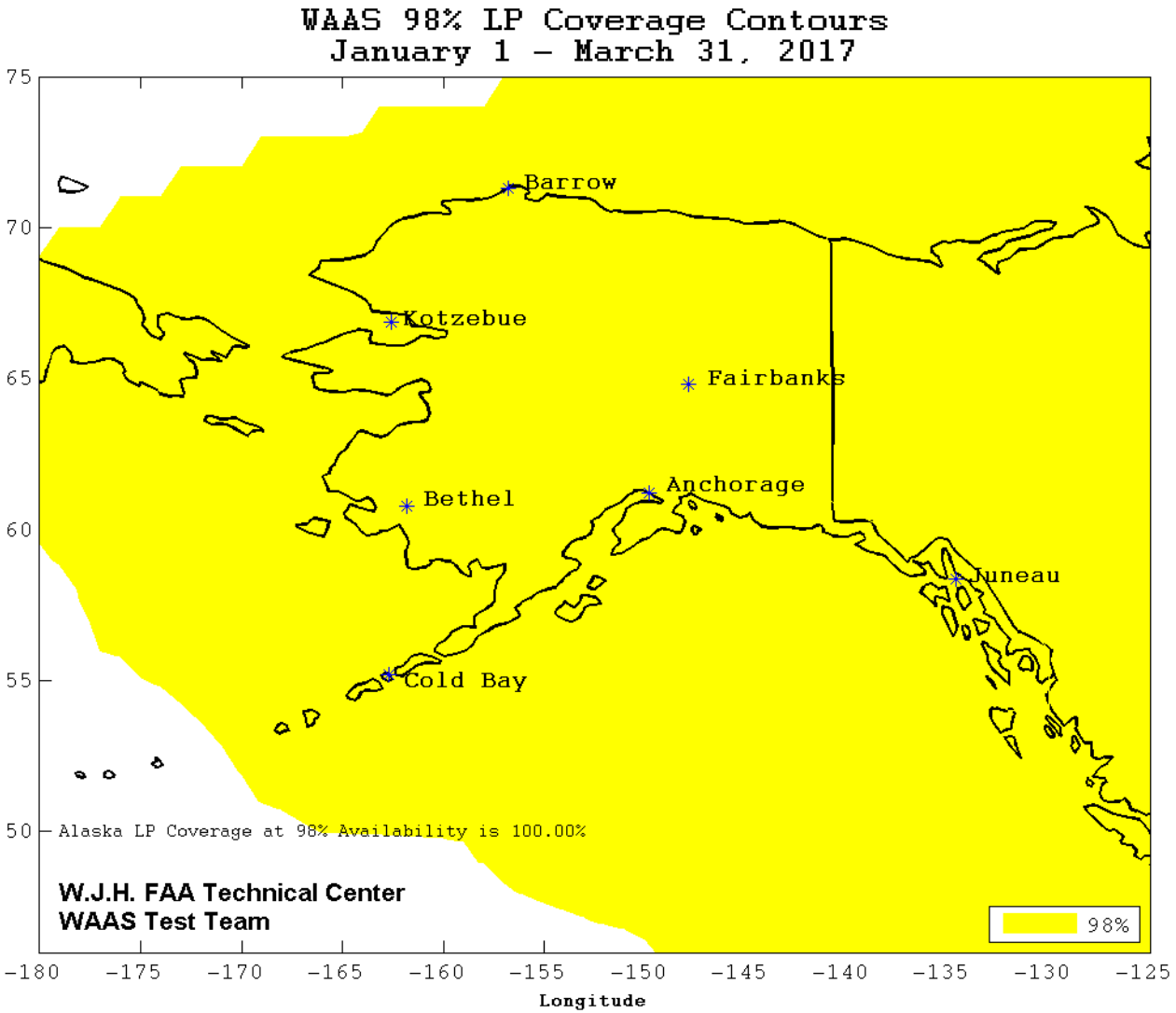


Figure B-3. 98% CONUS LPV Availability Contour

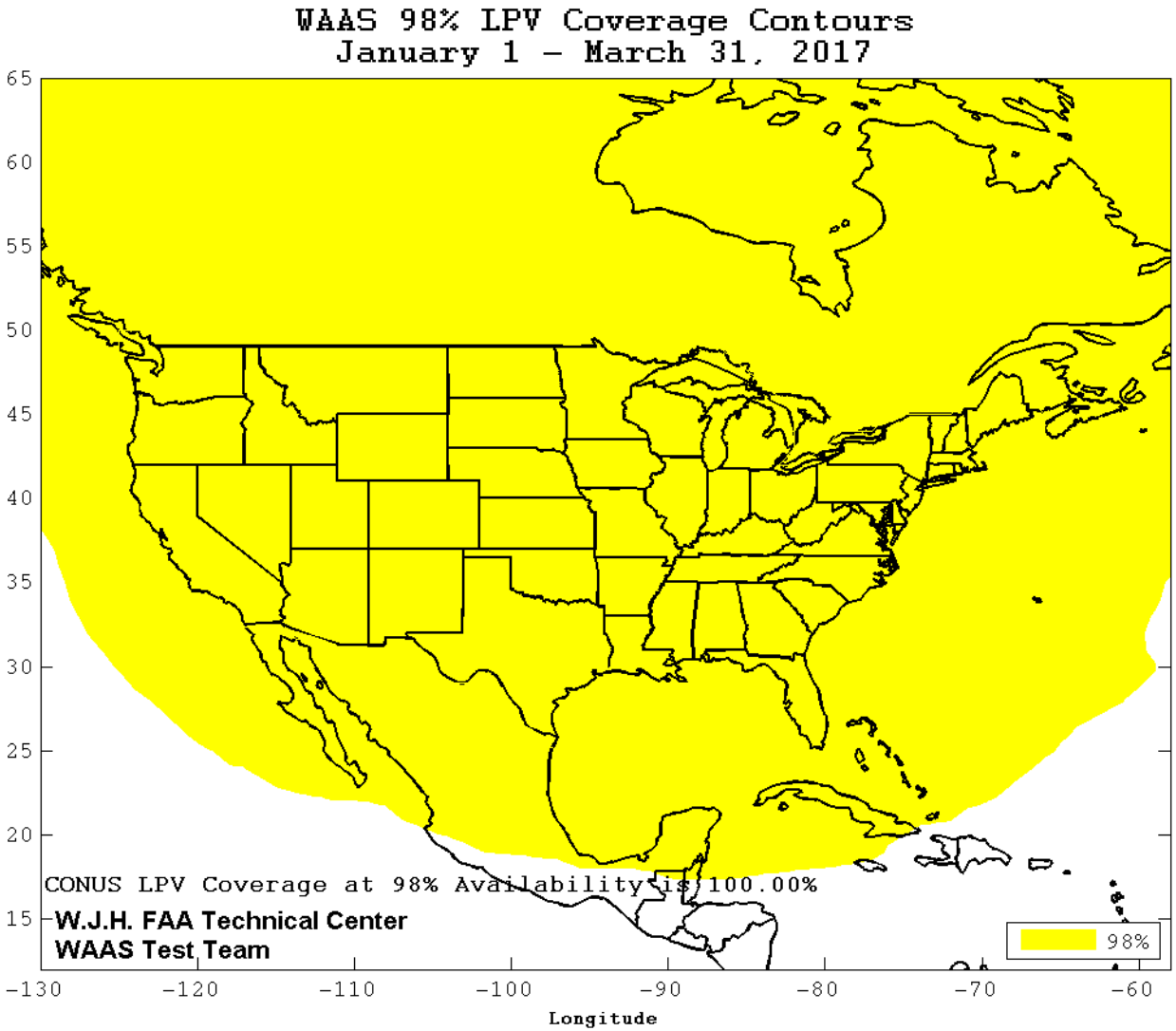


Figure B-4. 98% Alaska LPV Availability Contour

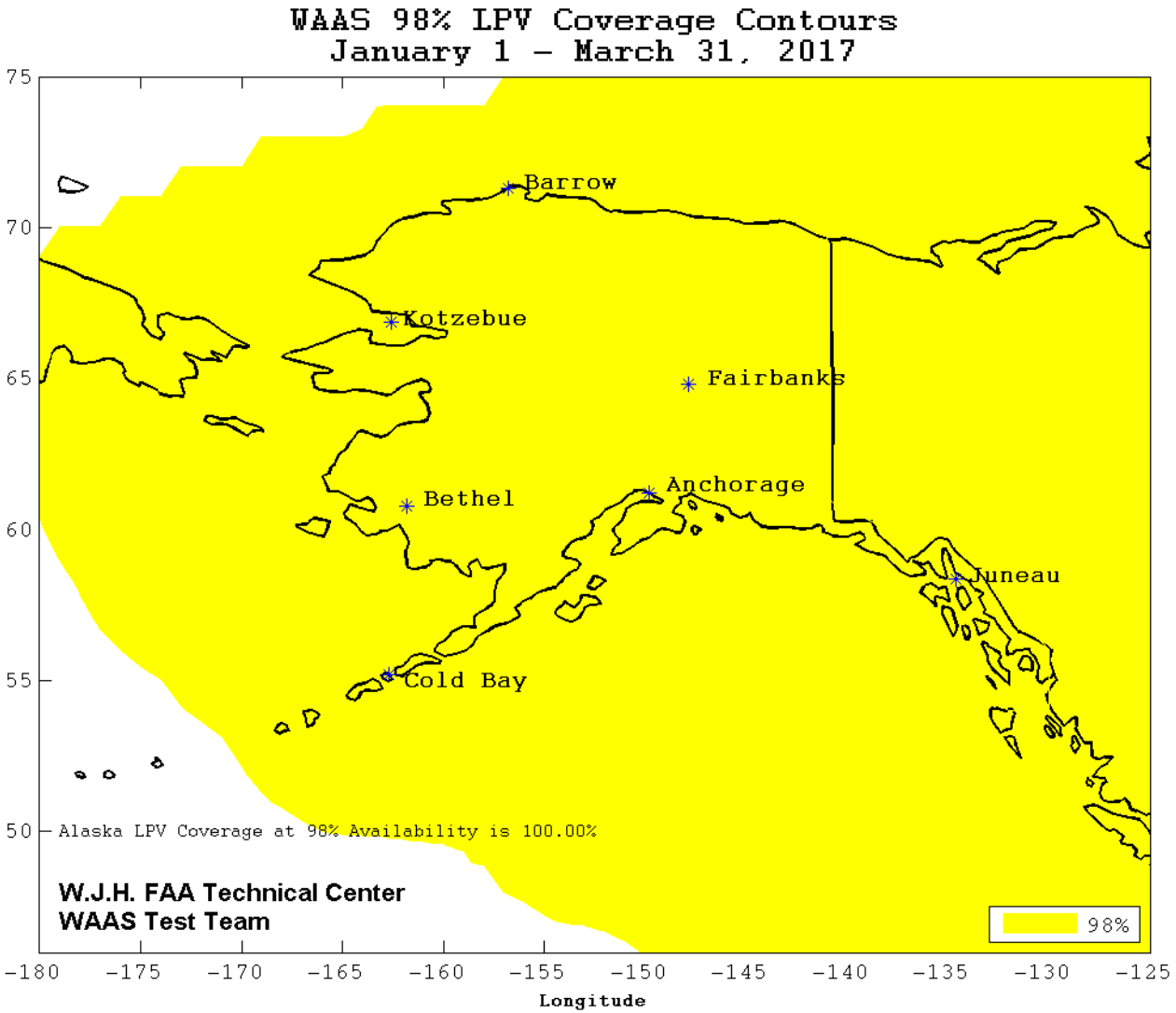


Figure B-5. 99% CONUS LPV200 Availability Contour

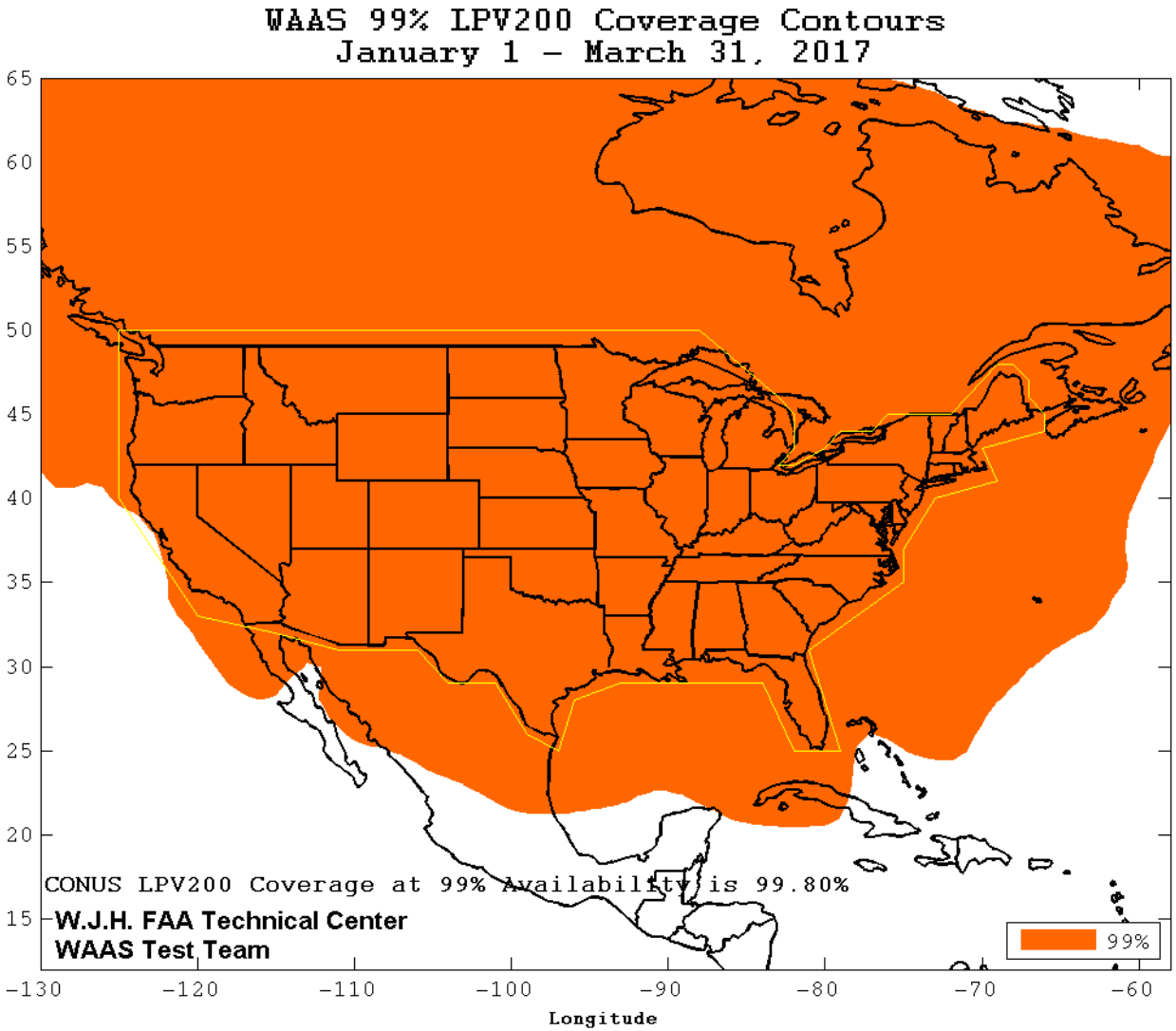


Figure B-6. 99% Alaska LPV200 Availability Contour