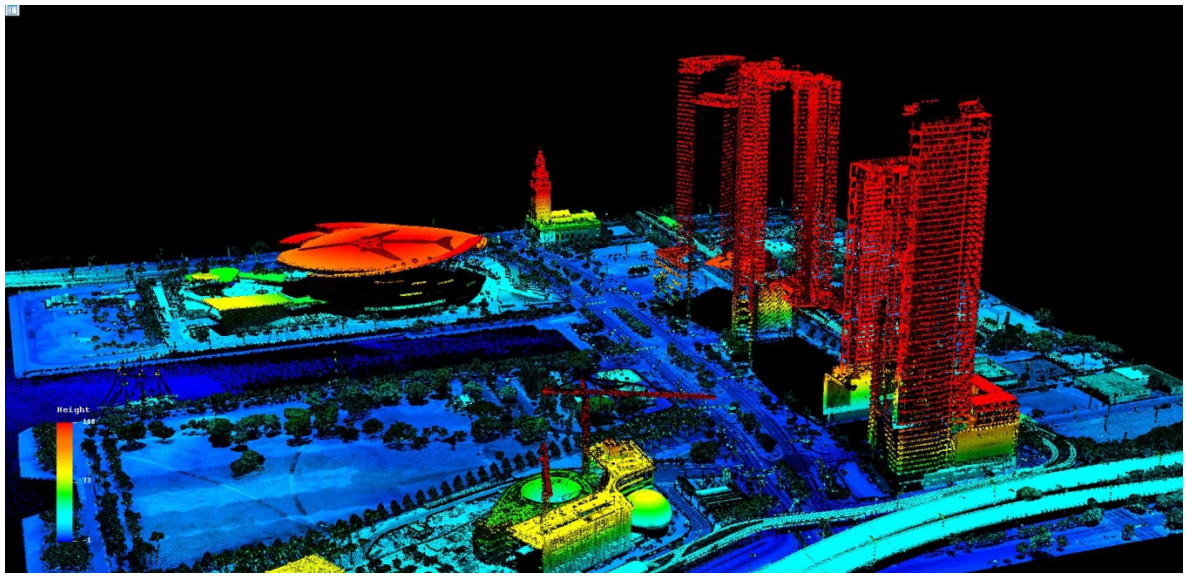
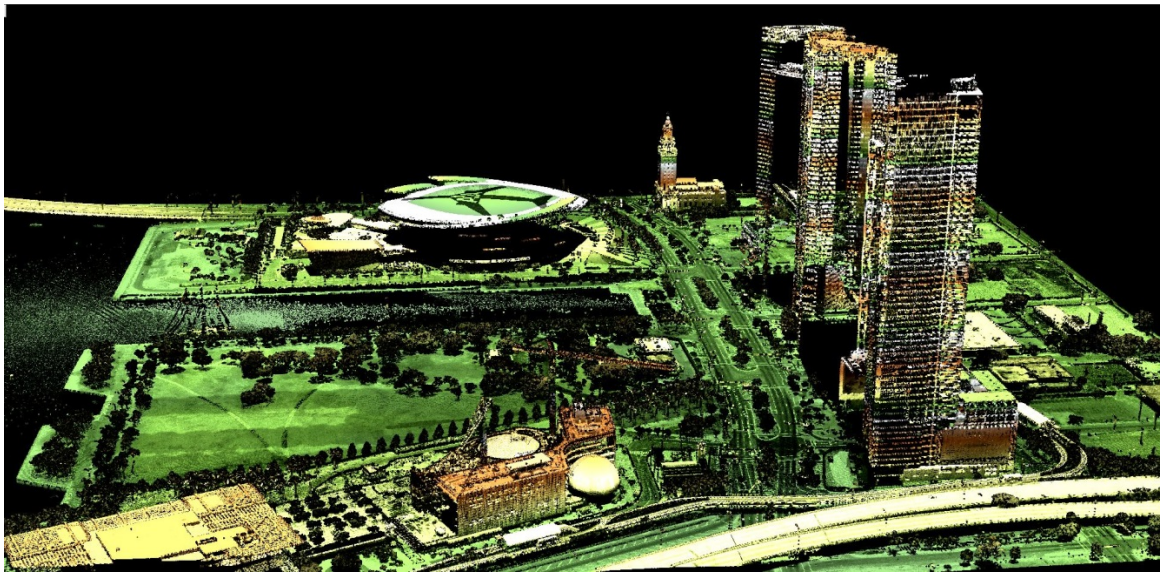


AERIAL CARTOGRAPHICS OF AMERICA

SURVEYOR AND MAPPER REPORT FOR THE 2015 AERIAL LIDAR SPECIFIC PURPOSE SURVEY OF MIAMI-DADE COUNTY

AUGUST 31, 2015



SURVEYOR'S REPORT FOR THE 2015 AERIAL LiDAR SPECIFIC PURPOSE SURVEY OF MIAMI-DADE COUNTY

Prepared for: Miami-Dade County Information Technology Department
Project No.: E10-MDAD-03
Resolution: R-762-11
Date: 10/19/11
Title: 2015 ACA Lidar and Large buildings planimetric update (Height attribute)
ITD WO No.: 4
Date: 3/10/15
Contract contact: Martha Guerra, GISP. Phone: 305-596-8389

INTRODUCTION

Aerial Cartographics of America, Inc. (ACA) LB 6748, operating under the authority of Miami-Dade County Aviation Department, as per contract number E10-MDAD-03, has been tasked by Miami Dade County's Information Technology Department (ITD) to provide LiDAR data (including its classification) for 1612 square miles, as designated in a shapefile provided by ITD; corresponding DEM files, and to extract building roof elevation, added to the provided geodatabase containing existing large building footprints, as a Height field. This survey report meets the requirements set forth for Specific Purpose Survey, as defined in Chapter 5J-17.051-.052 (Standards of Practice) of the Florida Administrative Code (F.A.C.), pursuant to Section 472.022 of the Florida Statutes.

GENERAL NOTES

This is a SPECIFIC PURPOSE SURVEY. The purpose of this survey is to provide LiDAR data (including its classification) for 1,612 square miles, as designated in a shapefile provided by ITD (1,798 tiles of 5,000x5,000) on January 3, 2014, called FINAL_FroACA_2014_HighAndLowResolution.zip (the smaller tiles (1,200x1,200) contained in this shapefile were converted to 5,000x5,000); corresponding DEM files, and to extract building roof elevation, added to the provided geodatabase containing existing large building footprints, as a Height field.

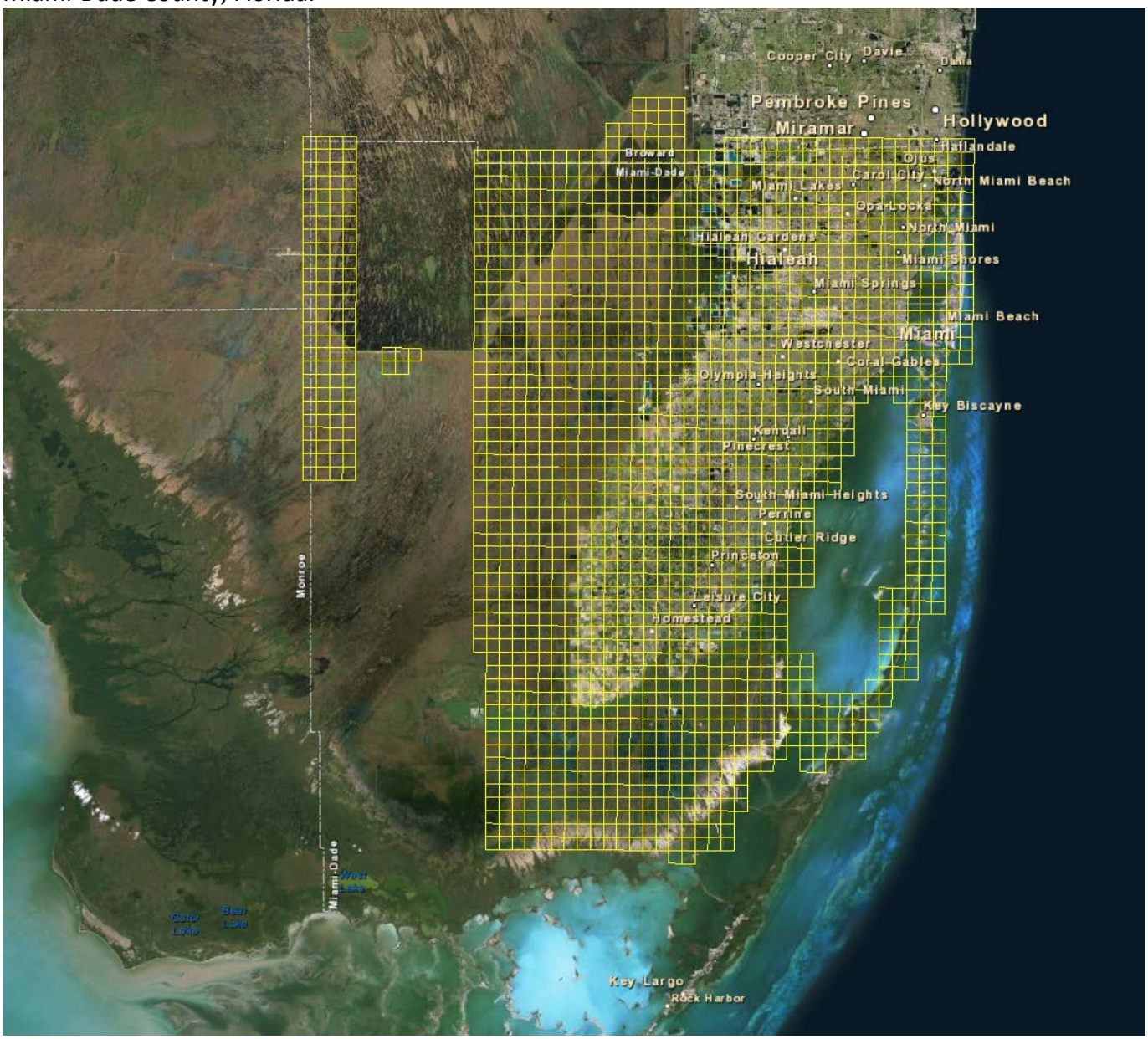
All measurements are in US Survey feet.

The features were collected using aerial LiDAR methods.

The LargeBuilding.gdb Height field was populated in the *BuildingPlanimetrics_fromPDE3.gdb* using the data from the LiDAR files using LP360 extensions running on ArcMap 10.1 or 10.2.2.

PROJECT LOCATION

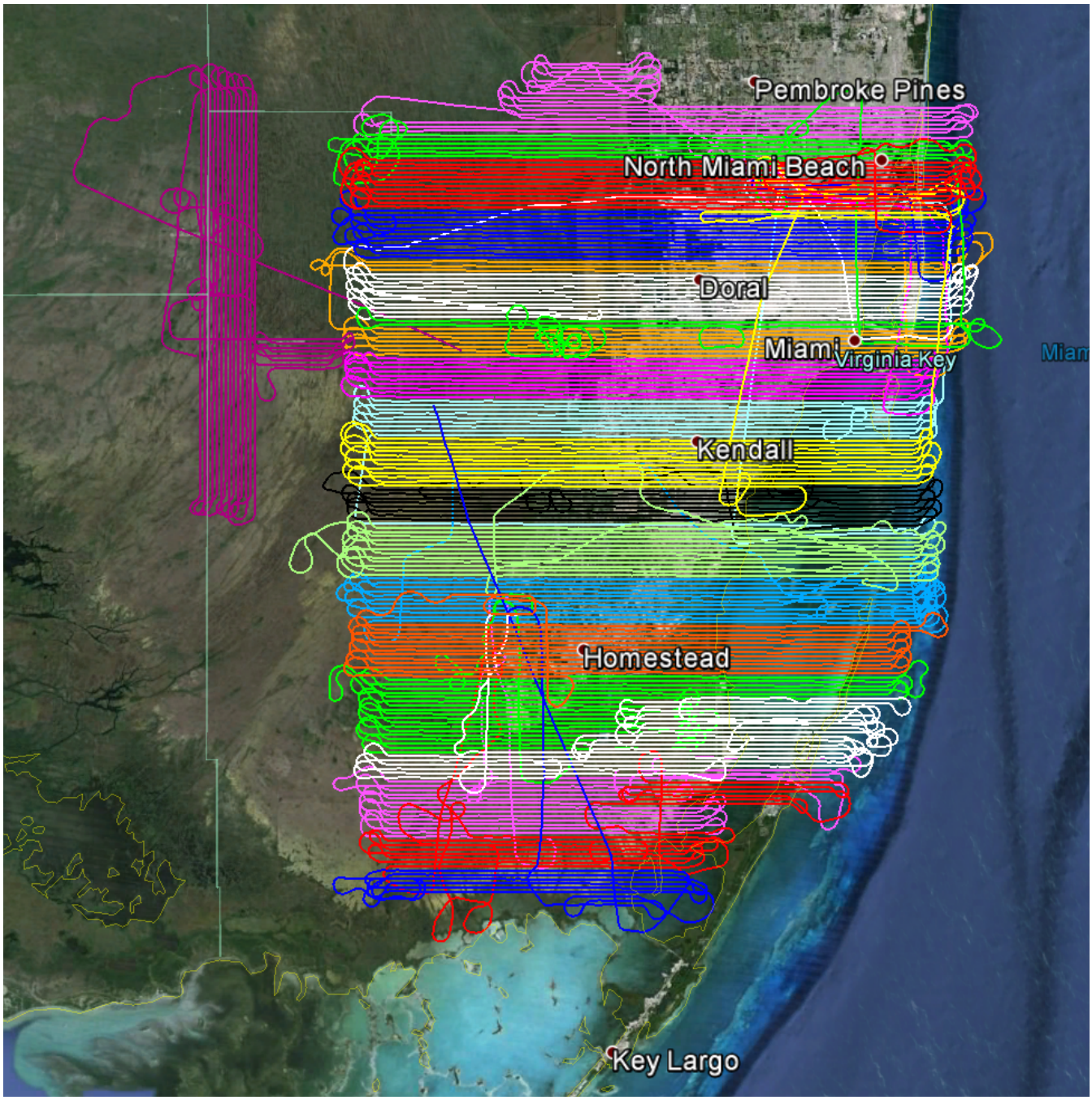
Miami-Dade County, Florida.



FLIGHT DATES

Collection Dates: 2/15/15, 2/17/15, 2/18/15, 2/19/15, 2/20/15, 2/21/15, 4/2/15, 4/3/15, 4/11/15/, 4/12/15, 4/13/15. 366 flight lines of data were collected.

FLIGHT LINES



BASE STATIONS USED FOR AIRBORNE GPS PROCESSING

The LiDAR data was adjusted to the control placed as part of the first work order for the Miami-Dade County Information Technology Department (ITD). The surveyor and mapper report named "SURVEYOR'S REPORT for PHOTOGRAMMETRIC CONTROL Digital Orthophotography and Planimetric mapping Phase 1" delivered with that work order number 1, is hereby attached by reference. See Appendix C for values for these points.

***The values for these points can be found on NGS' http://www.ngs.noaa.gov/cgi-bin/ds_pid.prl**

NGS DESIGNATION	PERMANENT IDENTIFIER
MTNT	PID#DF7050
PBCH	PID#DG9798
LAUD	PID#DH3834
FLC6	PID#DL2758
FLC5	PID#DL2756
ZMA1	PID#DF9225
KYW6	PID#DJ3675
A 274	PID#AC0464
FLF1	PID#DP6859

See Appendix A for Horizontal and Vertical Accuracy reports for each flight mission. They can also be found inside the 2015_ITD_LiDAR\Deliverables\Final\SurveyorAndMapperReport\Appendix\A.
See Appendix B for National Geodetic Survey (NGS) Datasheets. They can also be found inside the 2015_ITD_LiDAR\Deliverables\Final\SurveyorAndMapperReport\Appendix\B.
These locations on the delivered hard drive are hereby incorporated to this document by reference.

PROJECT APPROACH & EXECUTION

The project was divided in two phases: Collection and classification of LiDAR data; and building height extraction.

The LiDAR data was collected utilizing a Riegl LMS-Q680i in a Cessna 206 from an approximate altitude of 1,800 feet above ground level, an approximate ground speed of 110 knots at a pulse rate repetition of 400kH, resulting in a minimum of 8.2 points per square meter. The sensor used a 60 degree field of view. The project was flown to have 50 percent overlap between swaths. The Global Positioning System (GPS) data were processed using Applanix POSPac Mapping Suite version 7.8 using Smart Base method and single base methods. A fixed bias carrier phase solution was computed in forward and reverse directions. The LiDAR collection took place when Positional Dilution of Precision (PDOP) was at or below 3. Occasionally, the PDOP rose slightly above 3. This had no effect on the data. The GPS trajectory was combined with the IMU data using the Applanix POSPac software. The resulting

Smoothed Best Estimate of Trajectory (SBET) was exported and used in Riegl RiProcess software to compute the laser mass point positions in Northing, Easting, and Elevations coordinates. The raw laser data were merged with the SBET using Riegl RiProcess software. The data set was processed using RiProcess, RiAnalyze, and RiWorld software where each flight line was processed to a point cloud.

The data was adjusted flight line to flight line using Riegl's Scan Data Adjustment tool to ensure a proper relative calibration match between flight lines. Each flight was checked for project coverage, data gaps between overlapping flight lines, point density and then exported in LAS 1.3 format. The entire project was collected without gaps.

The LAS files were projected to the NAD_1983_HARN_StatePlane_Florida_East_FIPS_0901_Feet and North American Vertical Datum of 1988 (NAVD88). Ellipsoidal heights were converted to orthometric heights using the current Geiod12A. The LAS files were imported to TerraSolid, LTD TerraScan software to be classified to bare earth ground and later feature coded to USGS specifications. The LAS files contain 8 classifications: 1 = unclassified; 2 = ground; 7 = noise points; 9 = water; 10 = buffered ground points surrounding breaklines; 12 = overlap; 15 = overpass and bridges.

The tiles dataset was imported to Digital Transfer Solutions EarthShaper® software to collect breaklines from LiDAR data. The single and double line linear hydrographic features were hydro-enforced with downhill constraints to model correct flow patterns. Water bodies were hydro-flattened to ensure uniform elevation across the feature.

The data were adjusted flight line to flight line using Riegl's Scan Data Adjustment tool to ensure a proper relative calibration match between flight lines. Each flight was checked for project coverage, data gaps between overlapping flight lines, point density and then exported in LAS 1.3 format.

The LAS files were imported to TerraSolid, LTD TerraScan software to be classified to bare earth ground and later feature coded to USGS specifications. The LAS files contain 8 classifications: 1 = unclassified; 2 = ground; 7 = noise points; 9 = water; 10 = buffered ground points surrounding breaklines; 12 = overlap; 15 = overpass and bridges.

DEMs were created using QCoherent LP360 software. The bare-earth LAS data was loaded into the software along with the tile layout and hydro shapefile collected from the LAS data set. DEMS were produced at a 5ft cell size and hydro-flattened. To QC the DEMs Global Mapper was used to check for completeness of the tiles and that the hydro features were flattened and represented correct elevations. Once the QC was complete the files were exported out of ArcGIS to create Arc DEMS.

The LiDAR data was ran through an automated ground and building classification using terrascan software. A manual check of the building classification was done in LP360 and terrascan. The provided building shapefile was loaded and data cross sections were taking to check the classification of the outlined buildings. Once the manual check was completed the building LAS points were loaded into LP360 along with the building polygon shapefile supplied by ITD. In LP360 a confliction was ran to drape each building polygon to the max Z value of LAS data found in each polygon. To QC the auto

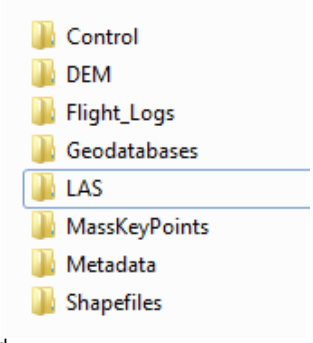
process the building polygon shapefile was brought into ArcGIS using LP360 to take cross sections of the data to check the building polygon Z value.

After all the building data was quality controlled and assured we joined the field height to complete the geodatabase *BuildingPlanimetrics_from PSDE3.gdb* provided by the county. Any building with a height value of 0 represents a building that did not exist in the LiDAR dataset. One case, as an example, could be that the building was demolished. These buildings contained in the feature class are a compilation of buildings that have been collected from imagery from different sources since 1999. As explained in the feature metadata: *"A collection of vector polygon features for large buildings within the Urban Development Boundary (UDB) and outside the UDB, approximately 938 square miles. Large buildings are defined as structures in an apparently commercial, industrial or other non-residential area. Any other structures located in residential areas of large size exceeding eight thousand (8,000) square feet, with the exception of detached single family residences (SFR), were digitized as large buildings, i.e. condos, townhomes, etc. Individual structures such as sheds, small barns, or other small indistinguishable structures that can be identified as part of a large building were not digitized. The planimetric layer for Miami-Dade County was previously updated in 2005 by Woolpert. Aerial Cartographics of America's update is comprised of two individual updates: inside the UDB (542 square miles) performed using a combination of on-screen/2D digitizing and 3D/stereo compilation technique of the 2013 orthophotography captured by Aerial Cartographics of America; and outside of the UDB (396 square miles) using on-screen/2D digitizing of the 2012 orthophotography captured by PhotoScience. Personnel that collected this data are either photogrammetrists trained in stereo collection or editors trained in ortho-photography based collection. Stereo 3D collection was used to make sure the tops of very tall building were in the correct location. Items included in the feature class: New buildings, updated buildings, and buildings that no longer exist were deleted. Definition of particular fields in the Large Buildings feature class: Source=P, where P=Planimetric, Year_UPD = Year when the feature was last updated. Revision; Date: March, 2014 By: M. Avila Reason: Add LargeBuilding2013 planimetric layer to production. Revision; Date: August, 2015 By: Aerial Cartographics of America, Inc. Reason: Add Height field to LargeBuilding Feature class with NAVD88 building elevation extracted from LiDAR data acquired in February and April of 2015."*

The building geodatabase remained as ITD provided it projected horizontally to the NAD_1983_ StatePlane_Florida_East_FIPS_0901_Feet, and vertically to the North American Vertical Datum of 1988 (NAVD88).

PILOT

ACA_2015_LiDAR



A pilot project was delivered on June 2nd, 2015, to ensure that our product was meeting the requirements for the project. Tile 318155 was used as it contained all the items required for the classification and deliverables.

We utilized LP360 on ArcMap to manually extract the height of the building. In order to meet the tight and critical schedule, this solution was replaced by an automated process after all the tiles had all the buildings properly calibrated and QC'd. This gave us the results required as tested satisfactorily in 20% of the data.

ACA held a meeting on June 11th, 2015 with ITD to go over the findings. ITD and ACA needed to clarify some items. ACA clarified and corrected the items that were clarified by ITD. Many were pending. ACA moved forward with the project as discussed in the meeting and with the files as they were delivered for the pilot, and discussed in the meeting. Items that were not clarified by ITD remained as they were presented during the pilot.

ISSUES AND PROBLEMS

Weather delayed the collection more than anticipated. We had a system maintenance issue and we lost 2 weeks on acquisition. The classification and the QC of said data was delayed. To achieve the accuracy required for building elevation extraction (nearest foot), to meet the planned schedule, and the amount of points in dense urban areas (8 points per square meter=high laser pulse repetition rate), we planned the collection to maximize point density in dense areas. The swamp areas on the western parts of the project have abnormal intensity returns at the nadir location of the swaths do to the high pulse rate of the sensor. This issue does not affect the overall accuracy of the data and we only found it on the Everglades portions of the project where dense, swampy vegetation is found.

ACA didn't provide a shapefile or a feature class for the masspoints. The reason is that the file size of a combined set for the entire county would have been an unmanageable file. The masspoints have been delivered as individual .las and .shp tiles labeled as per the county's footprint. ITD further clarified and added that that was their preference as well.

QUALITY ASSURANCE (QA) / QUALITY CONTROL (QC)

The project's progress was closely monitored throughout the entire period of work by ACA's professional Surveyors and Mappers and photogrammetrists.

The final QA/QC was done on data sampling on more than 20% (19,070) of the total 95,348 buildings. We found that about 1% had between 3-5 feet difference from the LiDAR data. They were corrected. For the LAS files and derivatives, we final QC'd 10% of each set.

This project underwent many levels of QC throughout the ACA workflow. After flight acquisition the data was coverage checked for completeness of project AOI and making sure there were no gaps or void areas. After calibration the data was ran against control and DZ ortho-rasters were ran to check line to line calibration. Once the data was edited an initial QC was done to check for artifacts and other misclassifications. The hydro features collected where ran through Arc-Hydro to check the topology and insure monotonic flow throughout the project area. The final QC of the LAS data came when checking the DEMS to make sure no artifacts were left in the bare-earth class and that all hydro elevations were correct. The final QA/QC was performed on the data by our QC manager to insure all products are on the delivery drive.

DELIVERABLES

ACA created a file geodatabase named *ACA_LIDAR_2015_GDB*. This geodatabase contains the feature classes indicated below. The rest of the deliverables are provided in the format otherwise specified:

1. LAS files follow the following:
   - Fully compliant with LAS v1.3
   - Georeference information included in LAS header
   - Intensity values (rescaled to 8-bit)
   - Tiled delivery, without overlap, following FDOR tiling grid.
   - GPS times are to be recorded as Adjusted GPS Time, at a precision sufficient to allow unique timestamps for each return
   - Classified following ASPRS Standards LIDAR Point Classes:
     - 0 Created, never classified
     - 1 Unclassified, non-ground
     - 2 Ground (or Bare Earth)
     - 3 Low Vegetation (0-5ft)
     - 4 Medium Vegetation (5-10ft)
     - 5 High Vegetation (10ft-above)
     - 6 Building
     - 7 Low Point (noise)

- 8 Model Key-point (mass point) – Not included. All points are in Ground Class 2
- 9 Water
- 10 Reserved for ASPRS Definition
- 11 Reserved for ASPRS Definition
- 12 Overlap Points – No overlap was taken out of the ground data. All data is usable.
- 13-31 Reserved for ASPRS Definition

2. Extracted Bare Terrain in NAVD88, HARN delivered as mass points in point feature class format, part of ACA_LIDAR_2015_GDB.
3. Extracted terrain break lines in NAVD88, HARN delivered in line feature class, part of ACA_LIDAR_2015_GDB.
4. Vertical accuracy Check Points in point feature class format, part of ACA_LIDAR_2015_GDB.
5. Project Tiling Footprint in polygon feature class format, part of ACA_LIDAR_2015_GDB.
6. Bare-earth 5-foot DEM as 32-bit floating point raster format in ARCGIS GRID Raster format in compliance with USGS LIDAR Base Specifications such as: georeferencing information accompanying each raster file, tiles delivered without overlap and with no edge artifacts or mismatched, "NODATA" value for void areas, bridges removed from the surface, etc. Tiles delivered to follow FDOR tiling scheme. Later, it was required by ITD that ACA delivered ONE file for the DEM for the entire coverage area instead of using the county tiling grid.

The *Height* attribute has been populated with the maximum height of the corresponding building feature. Antennas were not considered in this analysis.

Updated File Geodatabase, *BuildingPlanimetrics_from PSDE3.gdb*, which contains the Large Building planimetric layer with the Height attribute field defined as data-type: float.

Digital and paper copies of Surveyor's Report signed and sealed.

All deliverables are accompanied by metadata files in XML format that meet the current FGDC standards.

ACCURACY EXHIBITS

CONTROL REPORT – ALL POINTS MINUS OUTLIERS

Number	Easting	Northing	Known Z	Laser Z	Dz
101	709684.6	599451.2	17.32	17.15	-0.17
102	697136.1	535702.3	9.12	9.09	-0.03
103	740042.1	519234.8	13.08	13.18	0.1
104	842367.6	614162.5	9.79	outside	*
105	780864.8	383942.6	5.9	5.88	-0.02

106	894861.6	359362.9	3.85	3.68	-0.17
107	820927.1	394651.5	4.65	4.81	0.16
108	759910.5	519324.2	13.22	13.42	0.2
109	933580	490174	5.42	5.33	-0.09
110	850442.4	416286.6	2.05	1.88	-0.17
111	827319.3	506884.2	9.23	9.14	-0.09
112	866413.3	600324.4	4.7	4.84	0.14
113	942228.1	526550.2	6	6.15	0.15
114	945243.8	599905.2	2.08	2.25	0.17
115	843475.8	328161.5	4.43	4.43	0
116	899646.9	548464.4	5.84	6.19	0.35
201	709256.1	573176.4	16.3	16.39	0.09
202	701700.6	530906	9.36	9.23	-0.13
203	718503.4	518782	9.03	outside	*
204	731504.8	518837	9.04	9.09	0.05
205	841860.5	610934.3	5.74	outside	*
206	839826.6	584150.2	7.9	7.86	-0.04
207	855904	595748.6	7.27	7.04	-0.23
208	887241.2	590797.5	6.02	5.95	-0.07
209	903504.4	596082.9	5.67	5.7	0.03
210	936189.8	594058	8.51	8.48	-0.03
211	867890.1	569543.5	5.73	5.35	-0.38
212	896889.3	571099	5.39	5.62	0.23
213	915654.9	574933.8	4.15	4.18	0.03
214	944045.3	568403.9	3.11	3.03	-0.08
215	858529.4	543037.6	5.12	5.13	0.01
216	916195.5	558141.8	8.37	8.78	0.41
217	945042.6	545683.2	2.86	3.17	0.31
218	853640.6	532218	6.87	6.76	-0.11
219	881852.6	529843.4	8.31	8.34	0.03
220	909218.3	524731.6	9.12	9.23	0.11
221	928244.1	527704.3	5.25	5.71	0.46
222	939442.7	518193.5	4.35	4.77	0.42
223	931805.5	492514.8	4.82	4.61	-0.21
224	935505.4	502809.9	3.67	3.35	-0.32
225	847005.6	519056	7.08	7.27	0.19
226	903827.7	499141.2	2.27	2.25	-0.02
227	916987.5	541258.7	9.22	9.51	0.29
228	827151.1	482883.4	8.5	8.47	-0.03
229	854815.2	497340.1	7.07	7.07	0
230	881653.9	492462.7	8.52	8.5	-0.02

231	882312.1	468285.8	6.49	6.52	0.03
232	860390.9	453752.2	7.58	7.41	-0.17
233	844381.5	442264.7	10.45	10.51	0.06
234	813001.9	418977.4	6.64	6.48	-0.16
235	850980.2	408242	5.11	5.26	0.15
236	858019.3	427122.7	6.42	6.61	0.19
237	876837.7	447391.5	4.97	4.8	-0.17
238	894649.1	357293.3	5.55	outside	*
239	841125.3	339828.5	3.63	3.79	0.16
240	838271	354254.8	3.69	3.88	0.19
241	796794.5	388165.6	3.23	3.27	0.04
242	833875.8	381497	2.9	3.03	0.13
243	801426.3	425516.9	4.83	5.16	0.33
244	796260.6	447641.4	7.35	7.28	-0.07
245	827015.9	449279	8.68	8.58	-0.1
246	795740.8	476324.5	7.43	7.25	-0.18
247	826719.8	519214.8	10.22	10.63	0.41
248	795450	519053.4	7.78	removed	*
249	857718.7	552513.8	5.98	6.44	0.46
250	868830.6	587340.2	6.71	6.55	-0.16
251	873412.6	558304.4	9.83	10.1	0.27
252	824567.6	493036.8	6.81	6.86	0.05
253	791665.9	394908.1	13.16	13.02	-0.14
254	868321.2	345872.4	5.74	outside	*
255	858400.2	352584.5	3.62	3.52	-0.1
256	802206.1	359194.6	8.28	8.18	-0.1
257	835611	394734.3	1.56	1.73	0.17
258	823641.4	405399.4	5.63	5.84	0.21
259	780908.8	545665.9	11.5	11.58	0.08
260	800140.2	574079.1	11.74	11.5	-0.24
261	821505.8	605807.4	11.5	11.59	0.09
262	772711.9	533513	10.59	10.64	0.05
263	768136.4	526755	11.18	11.57	0.39
264	779959.7	519211.3	9.26	9.49	0.23
265	706255.2	526071.1	9.9	10.02	0.12
266	708102.5	560663.5	16.44	16.39	-0.05
267	706238.5	544928.7	16.57	16.72	0.15
268	696297.6	534822.9	7.92	7.81	-0.11
269	809035.5	519275.4	7.16	7.6	0.44
270	825570.7	566234.1	8.97	9.13	0.16
271	855909.1	572060.9	7.61	outside	*

272	835255.6	591801.7	12.34	12.09	-0.25
273	882376.1	599865.6	6.99	7	0.01
274	845220.9	580544.4	7.2	7.25	0.05
275	844028.6	534992.4	11.06	11.23	0.17
276	826128.8	546828.2	6.57	7.19	0.62
277	871802.1	411084.6	5.74	5.45	-0.29
278	860929.4	405665.3	5.55	5.64	0.09
279	871593.8	421957.7	6.53	6.57	0.04
280	835410.6	472850.5	6.47	6.48	0.01
281	872656.3	437460.5	6.1	6.1	0
282	897832.5	480093	4.61	4.68	0.07
283	921143.7	408030.8	2.13	slope	*
284	930059.1	440027.3	2.45	removed	*
285	933387.8	485597.7	7.24	7.36	0.12
286	931987.4	509769.6	6.26	6.82	0.56
287	833333.9	458825.8	8.9	8.81	-0.09
288	880923.6	455025.7	6.97	6.94	-0.03
289	839798.9	437518.9	12.21	12.1	-0.11
290	823669.1	431946.9	8.01	7.57	-0.44
Average dz	0.05				
Minimum dz	-0.44				
Maximum dz	0.62				
Average magnitude	0.161				
Root mean square (RMS)	**0.21**				
Std deviation	0.205				

The horizontal accuracy exceeds the 3.8 foot required by USGS (United States Geological Survey) standards. The Vertical Accuracy achieved is RMSx1.96 = 0.21x1.96 = 0.41. This exceeds the required 0.6 foot fundamental vertical accuracy required.

The bare earth LiDAR dataset was tested to meet a Fundamental Vertical Accuracy (FVA) of 0.60' at the 95% confidence level using the formula RMSEz x 1.9600 as defined by the National Standard for Spatial Data Accuracy (NSSDA) in open, well defined terrain. The vertical accuracy for LiDAR data over well-defined surfaces will meet or exceed requirements as set forth in the Federal Geographic Data Committee's (FGDC) Geospatial Positioning Accuracy Standards, Part 3: National Standard for Spatial Data Accuracy (NSSDA).

CONTROL REPORT - CHECKPOINTS

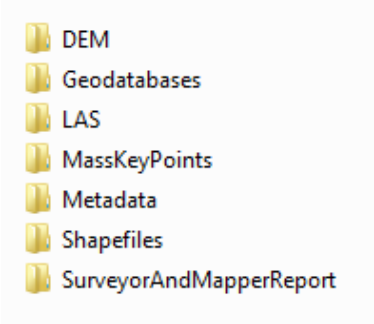
Number	Easting	Northing	Known Z	Laser Z	Dz
101	709684.61	599451.22	17.32	17.15	-0.17
102	697136.09	535702.28	9.12	9.09	-0.03
103	740042.08	519234.77	13.08	13.18	0.1

104	842367.64	614162.53	9.79	outside	*
105	780864.81	383942.61	5.9	5.88	-0.02
106	894861.64	359362.9	3.85	3.68	-0.17
107	820927.14	394651.51	4.65	4.81	0.16
108	759910.46	519324.17	13.22	13.42	0.2
109	933580.02	490174.02	5.42	5.33	-0.09
110	850442.42	416286.63	2.05	1.88	-0.17
111	827319.34	506884.19	9.23	9.14	-0.09
112	866413.32	600324.41	4.7	4.84	0.14
113	942228.06	526550.21	6	6.15	0.15
114	945243.81	599905.19	2.08	2.25	0.17
115	843475.82	328161.51	4.43	4.43	0
116	899646.9	548464.42	5.84	6.19	0.35
209	903504.36	596082.87	5.67	5.7	0.03
211	867890.11	569543.49	5.73	5.35	-0.38
215	858529.42	543037.57	5.12	5.13	0.01
219	881852.576	529843.413	8.31	8.34	0.03
232	860390.87	453752.15	7.58	7.41	-0.17
244	796260.59	447641.44	7.35	7.28	-0.07
260	800140.23	574079.13	11.74	11.5	-0.24
282	897832.47	480093.01	4.61	4.68	0.07
287	833333.89	458825.79	8.9	8.81	-0.09
Average dz	-0.012				
Minimum dz	-0.38				
Maximum dz	0.35				
Average magnitude	0.129				
Root mean square	**0.161**				
Std deviation	0.164				

The accuracy of the project from check points was tested to meet a Horizontal Accuracy of 3.8’ at the 95% confidence.

HARD DRIVE STRUCTURE

ACA_2015_LiDAR



CERTIFICATION

This Specific Purpose Survey meets all applicable requirements of the Florida Board of Surveyors Standards of Practice as contained in Chapter 5J-17 of Florida's Administrative Code, pursuant to section 472.072 of the Florida Statues. (2) This report is not valid without the signature and the original raised seal of the Florida Surveyor and Mapper in responsible charge. (3) Additions or deletions to this data by anyone other than the signing party are prohibited without written consent of the signing party. (4) This report is not valid without the electronic deliverables in a hard drive titled ACA_LiDAR_2015 and the geodatabases, information and data files contained in it.

Surveyor and Mapper in Responsible Charge:

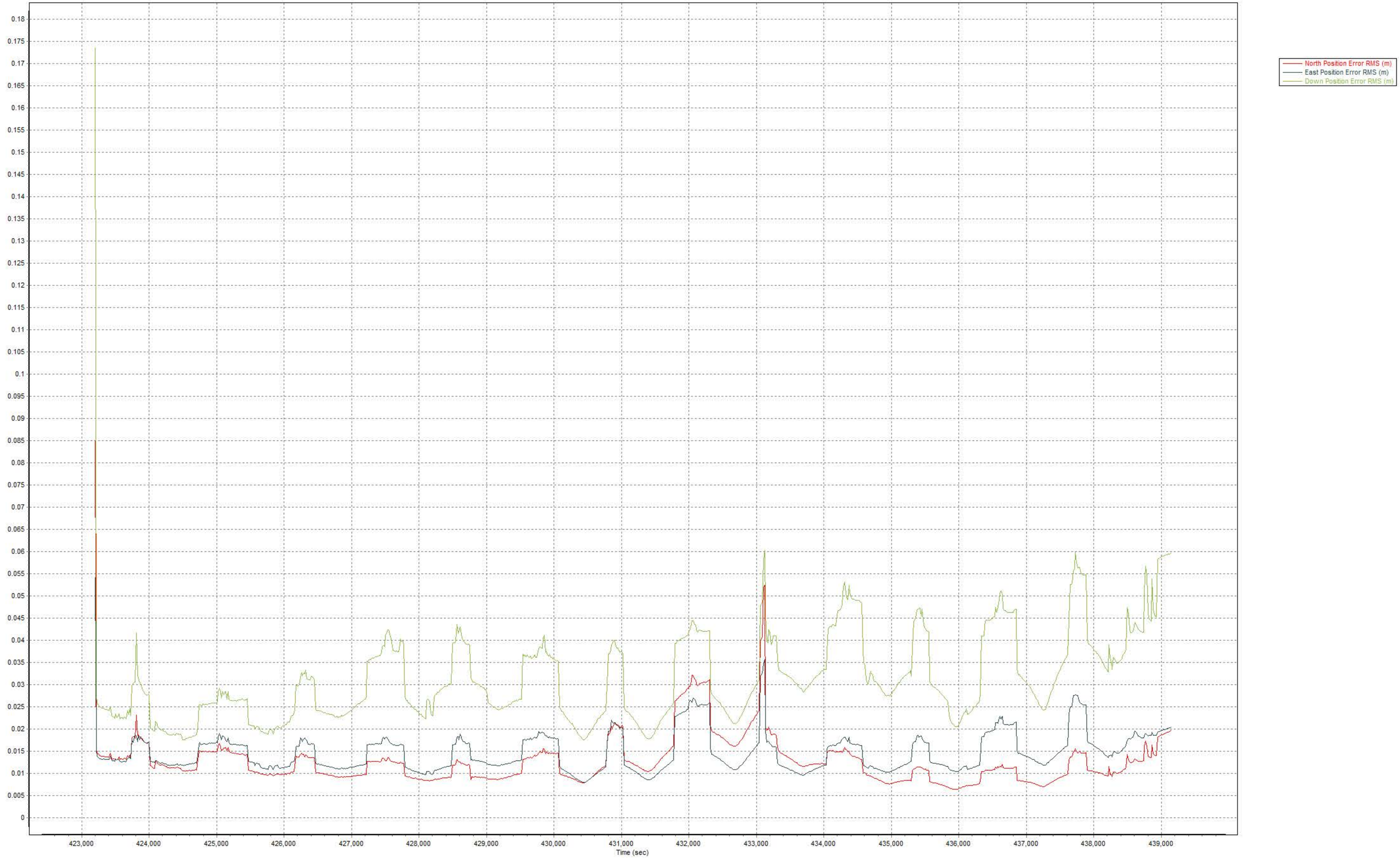
Iarelis Diaz Hall
Florida Professional Surveyor and Mapper
License No. 6631

For the Firm of:
Aerial Cartographics of America, LB 6748
7735 NW 48th Street, Suite #110
Miami, Florida 33166

Signed: _____

Date: _____

APPENDIX A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East Position Error RMS (m)
Down Position Error RMS (m)
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0.17
0.165
0.16
0.155
0.15
0.145
0.14
0.135
0.13
0.125
0.12
0.115
0.11
0.105
0.1
0.095
0.09
0.085
0.08
0.075
0.07
0.065
0.06
0.055
0.05
0.045
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
423,000
424,000
425,000
426,000
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Time (sec)

From: opus <opus@ngs.noaa.gov>
Sent: Tuesday, April 14, 2015 7:05 AM
To: Stonerock, Mike
Subject: OPUS solution : flc50970.15o OP1429009454821

FILE: flc50970.15o OP1429009454821

1008 NOTE: Antenna offsets supplied by the user were zero. Coordinates
1008 returned will be for the antenna reference point (ARP).
1008

NGS OPUS SOLUTION REPORT
==========

All computed coordinate accuracies are listed as peak-to-peak values.
For additional information: http://www.ngs.noaa.gov/OPUS/about.jsp#accuracy

USER: mstonerock@aca-net.com DATE: April 14, 2015
RINEX FILE: flc50970.15o TIME: 11:05:00 UTC

SOFTWARE: page5 1209.04 master53.pl 022814 START: 2015/04/07 00:00:00
EPHEMERIS: igr18392.eph [rapid] STOP: 2015/04/07 23:59:00
NAV FILE: brdc0970.15n OBS USED: 47082 / 51906 : 91%
ANT NAME: TRM41249USCG SCIT # FIXED AMB: 220 / 254 : 87%
ARP HEIGHT: 0.000 OVERALL RMS: 0.018(m)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2015.2644)

X:	954551.438(m)	0.006(m)	954550.675(m)	0.006(m)
Y:	-5684034.927(m)	0.006(m)	-5684033.320(m)	0.006(m)
Z:	2722324.461(m)	0.016(m)	2722324.280(m)	0.016(m)

LAT:	25 25 53.83984	0.017(m)	25 25 53.85841	0.017(m)
E LON:	279 31 58.95643	0.006(m)	279 31 58.93902	0.006(m)
W LON:	80 28 1.04357	0.006(m)	80 28 1.06098	0.006(m)
EL HGT:	-16.677(m)	0.002(m)	-18.300(m)	0.002(m)
ORTHO HGT:	8.201(m)	0.014(m)	[NAVD88 (Computed using GEOID12A)]	

	UTM COORDINATES (UTM (Zone 17))	STATE PLANE COORDINATES (SPC (0901 FL E))
Northing (Y) [meters]	2812849.123	121758.685
Easting (X) [meters]	553600.319	253618.614
Convergence [degrees]	0.22891226	0.22891226
Point Scale	0.99963548	0.99997666
Combined Factor	0.99963810	0.99997928

US NATIONAL GRID DESIGNATOR: 17RNJ5360012849(NAD 83)

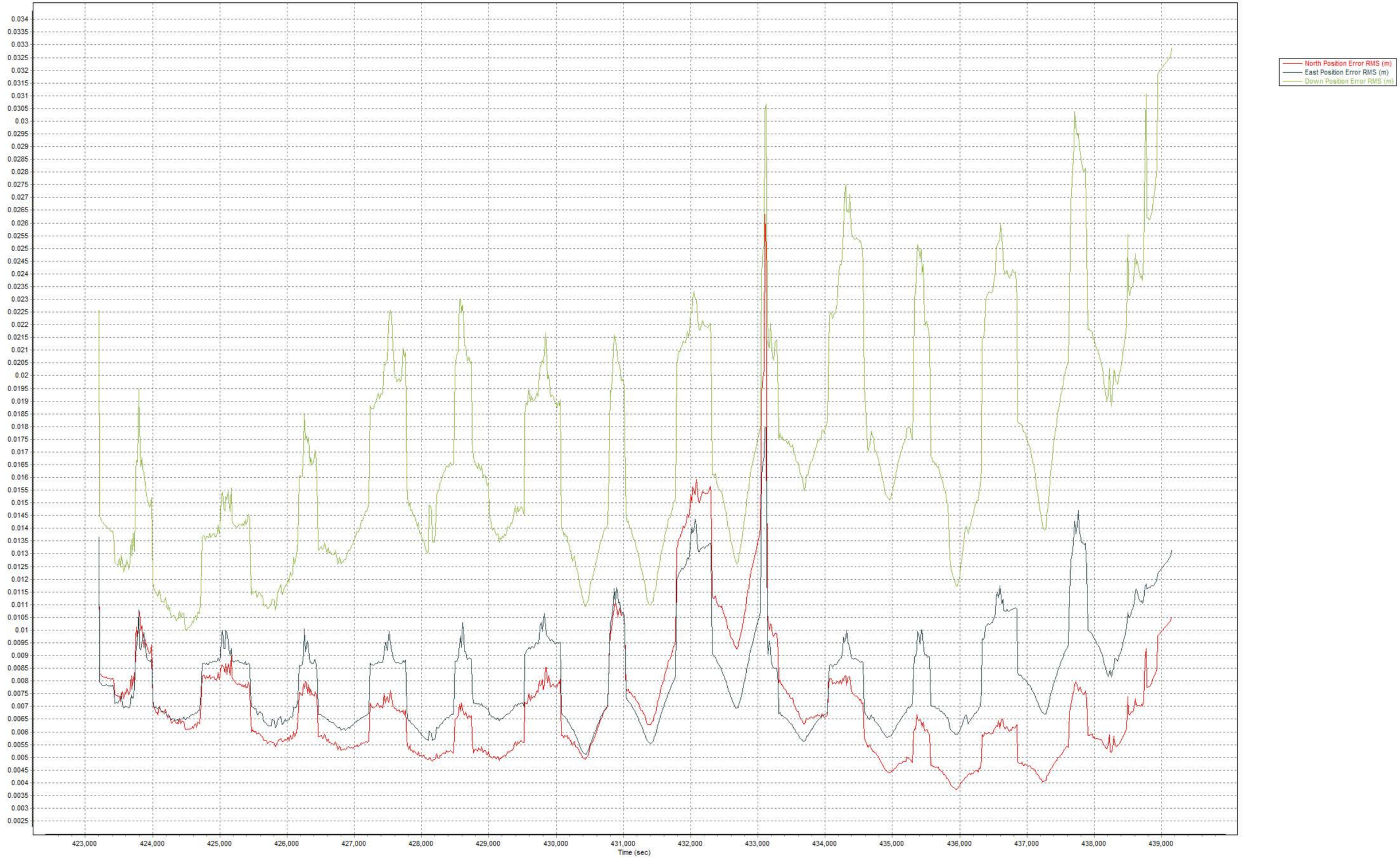
BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DF9225	ZMA1 MIAMI WAAS 1 CORS ARP	N254928.585	W0801909.066	45995.6

DP6859 FLF1 FL FOUNDATION 1 CORS ARP N253655.240 W0802309.912 21916.1
DF7050 MTNT MIAMI TNT CORS ARP N255156.760 W0805425.186 65310.9

NEAREST NGS PUBLISHED CONTROL POINT
DL2756 CARD SOUND 5 CORS ARP N252553.839 W0802801.043 0.0

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.


North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
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0.031
0.0305
0.03
0.0295
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0.0285
0.028
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0.0245
0.024
0.0235
0.023
0.0225
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0.0215
0.021
0.0205
0.02
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0.019
0.0185
0.018
0.0175
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0.0165
0.016
0.0155
0.015
0.0145
0.014
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0.013
0.0125
0.012
0.0115
0.011
0.0105
0.01
0.0095
0.009
0.0085
0.008
0.0075
0.007
0.0065
0.006
0.0055
0.005
0.0045
0.004
0.0035
0.003
0.0025
423,000
424,000
425,000
426,000
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428,000
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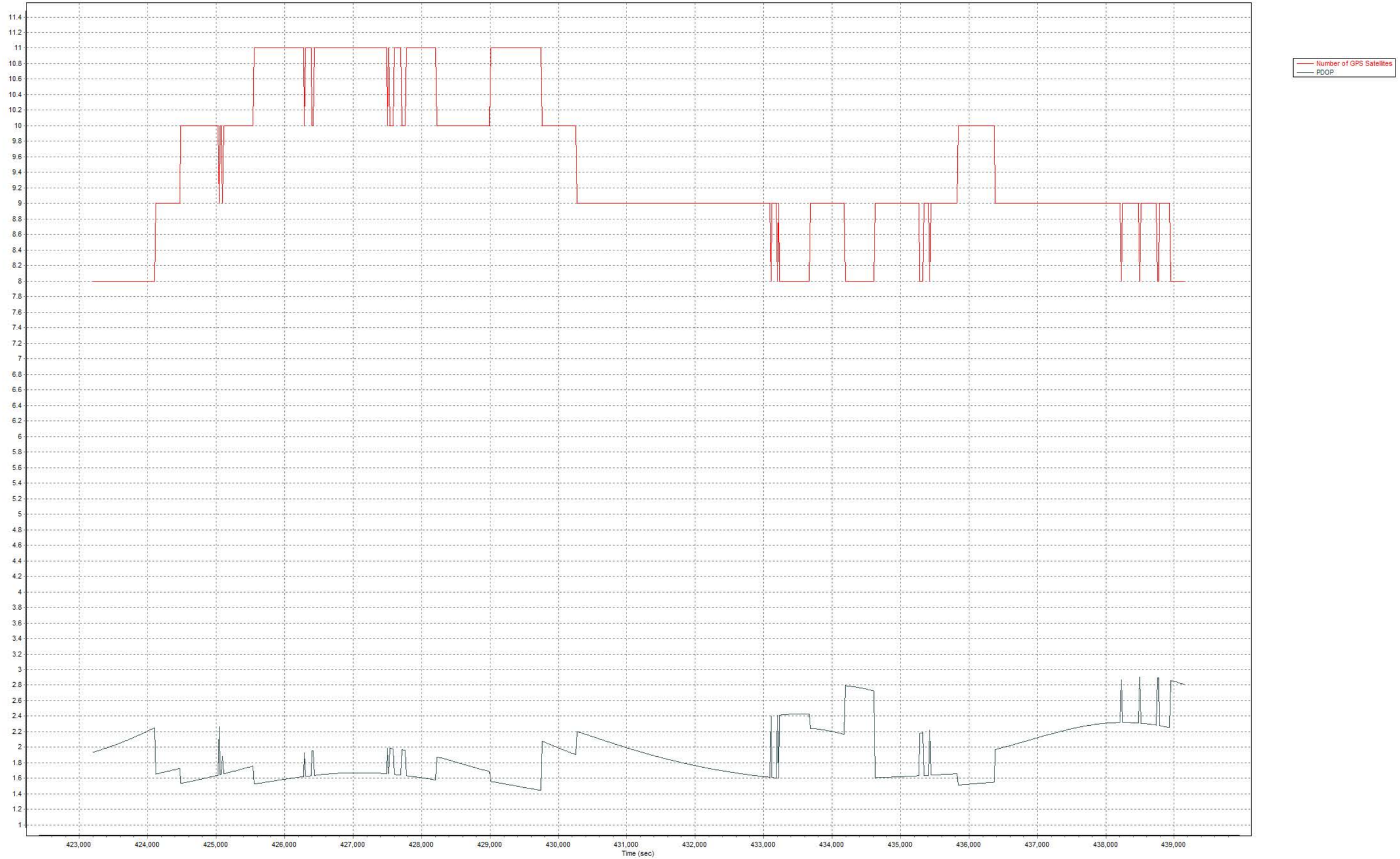
Time (sec)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PDOP
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11.2
11
10.8
10.6
10.4
10.2
10
9.8
9.6
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9.2
9
8.8
8.6
8.4
8.2
8
7.8
7.6
7.4
7.2
7
6.8
6.6
6.4
6.2
6
5.8
5.6
5.4
5.2
5
4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
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1.6
1.4
1.2
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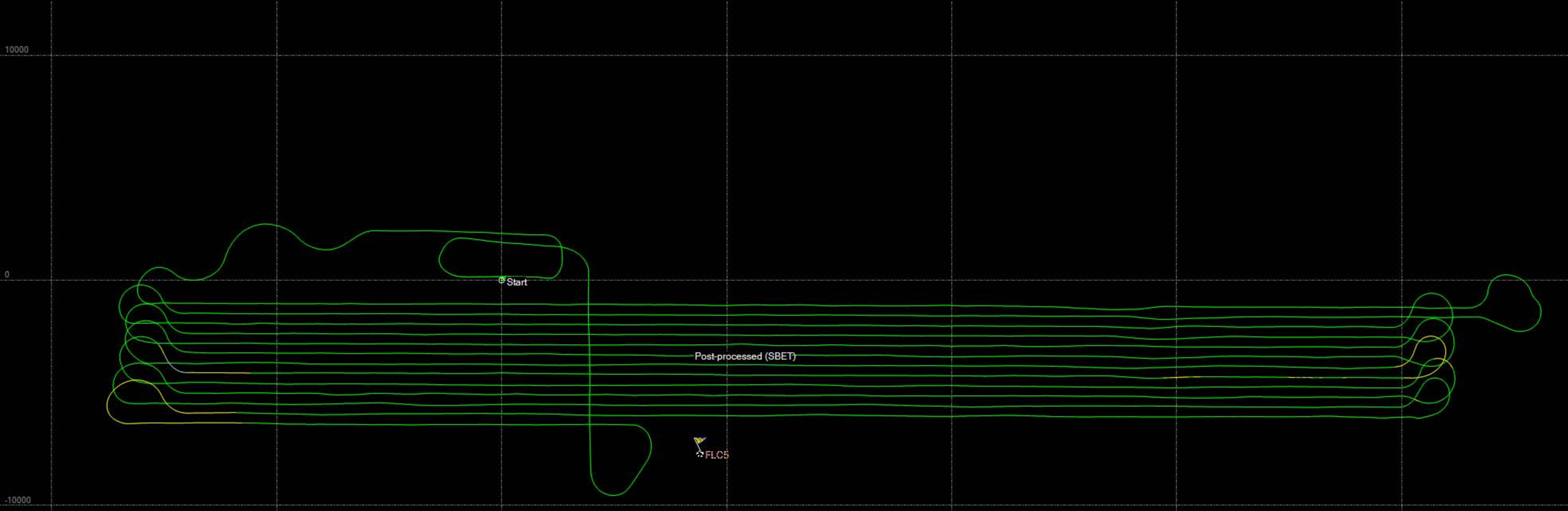
Time (sec)



View Filter Manager

View Filters

Filter Name	Type	Active
Baselines	User Defined	
Post-processed	User Defined	Active
Processed Vectors	User Defined	
Real-time	User Defined	
All	Dynamic	
CAD Only	Dynamic	
Raw Data Only	Dynamic	

New
Copy
Rename
Delete

View Filter - Post-processed

- Raw Data
- CAD
- Flag
- Layers
- Display Styles
  - Point
  - Observations
  - Trajectory

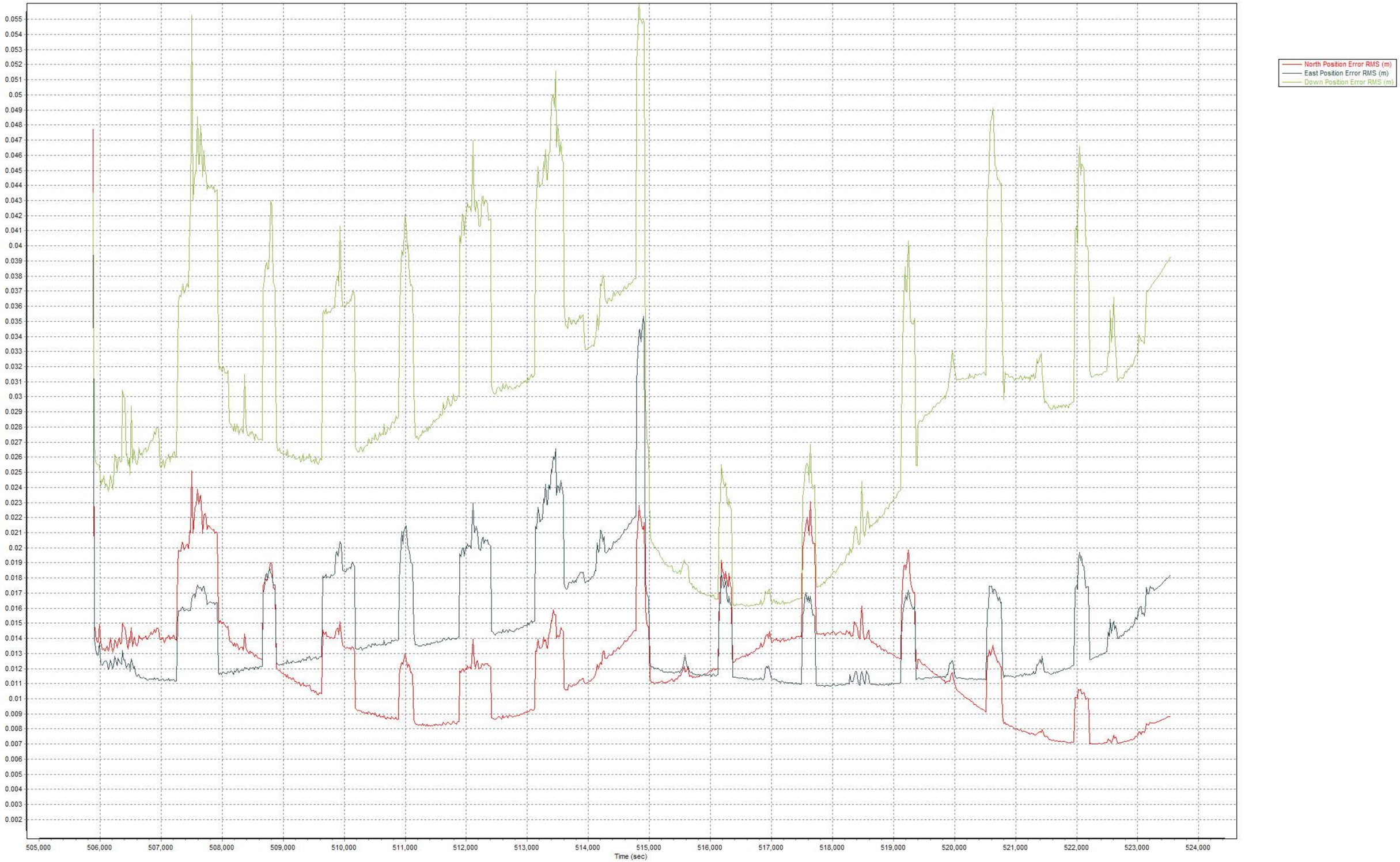
Colour code by: Position RMS

Lower bound	Lime	<=	0.030 m
Intermediate 1	Yellow	<=	0.040 m
Intermediate 2	LightBlue	<=	1.000 m
Intermediate 3	Orange	<=	3.000 m
Intermediate 4	Red	<=	6.000 m
Intermediate 5	Brown	<=	10.000 m
Intermediate 6	Purple	<=	15.000 m
Intermediate 7	Blue	<=	20.000 m
Upper bound	Gray	>	20.000 m

Restore Defaults

Apply to graphics view on Apply or OK

Apply | OK | Cancel


North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
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0.053
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0.048
0.047
0.046
0.045
0.044
0.043
0.042
0.041
0.04
0.039
0.038
0.037
0.036
0.035
0.034
0.033
0.032
0.031
0.03
0.029
0.028
0.027
0.026
0.025
0.024
0.023
0.022
0.021
0.02
0.019
0.018
0.017
0.016
0.015
0.014
0.013
0.012
0.011
0.01
0.009
0.008
0.007
0.006
0.005
0.004
0.003
0.002
505,000
506,000
507,000
508,000
509,000
510,000
511,000
512,000
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516,000
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519,000
520,000
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523,000
524,000
Time (sec)

From: opus <opus@ngs.noaa.gov>
Sent: Tuesday, April 14, 2015 7:05 AM
To: Stonerock, Mike
Subject: OPUS solution : flc50970.15o OP1429009454821

FILE: flc50970.15o OP1429009454821

1008 NOTE: Antenna offsets supplied by the user were zero. Coordinates
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NGS OPUS SOLUTION REPORT
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For additional information: http://www.ngs.noaa.gov/OPUS/about.jsp#accuracy

USER: mstonerock@aca-net.com DATE: April 14, 2015
RINEX FILE: flc50970.15o TIME: 11:05:00 UTC

SOFTWARE: page5 1209.04 master53.pl 022814 START: 2015/04/07 00:00:00
EPHEMERIS: igr18392.eph [rapid] STOP: 2015/04/07 23:59:00
NAV FILE: brdc0970.15n OBS USED: 47082 / 51906 : 91%
ANT NAME: TRM41249USCG SCIT # FIXED AMB: 220 / 254 : 87%
ARP HEIGHT: 0.000 OVERALL RMS: 0.018(m)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2015.2644)

X:	954551.438(m)	0.006(m)	954550.675(m)	0.006(m)
Y:	-5684034.927(m)	0.006(m)	-5684033.320(m)	0.006(m)
Z:	2722324.461(m)	0.016(m)	2722324.280(m)	0.016(m)

LAT:	25 25 53.83984	0.017(m)	25 25 53.85841	0.017(m)
E LON:	279 31 58.95643	0.006(m)	279 31 58.93902	0.006(m)
W LON:	80 28 1.04357	0.006(m)	80 28 1.06098	0.006(m)
EL HGT:	-16.677(m)	0.002(m)	-18.300(m)	0.002(m)
ORTHO HGT:	8.201(m)	0.014(m)	[NAVD88 (Computed using GEOID12A)]	

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Easting (X) [meters]	553600.319	253618.614
Convergence [degrees]	0.22891226	0.22891226
Point Scale	0.99963548	0.99997666
Combined Factor	0.99963810	0.99997928

US NATIONAL GRID DESIGNATOR: 17RNJ5360012849(NAD 83)

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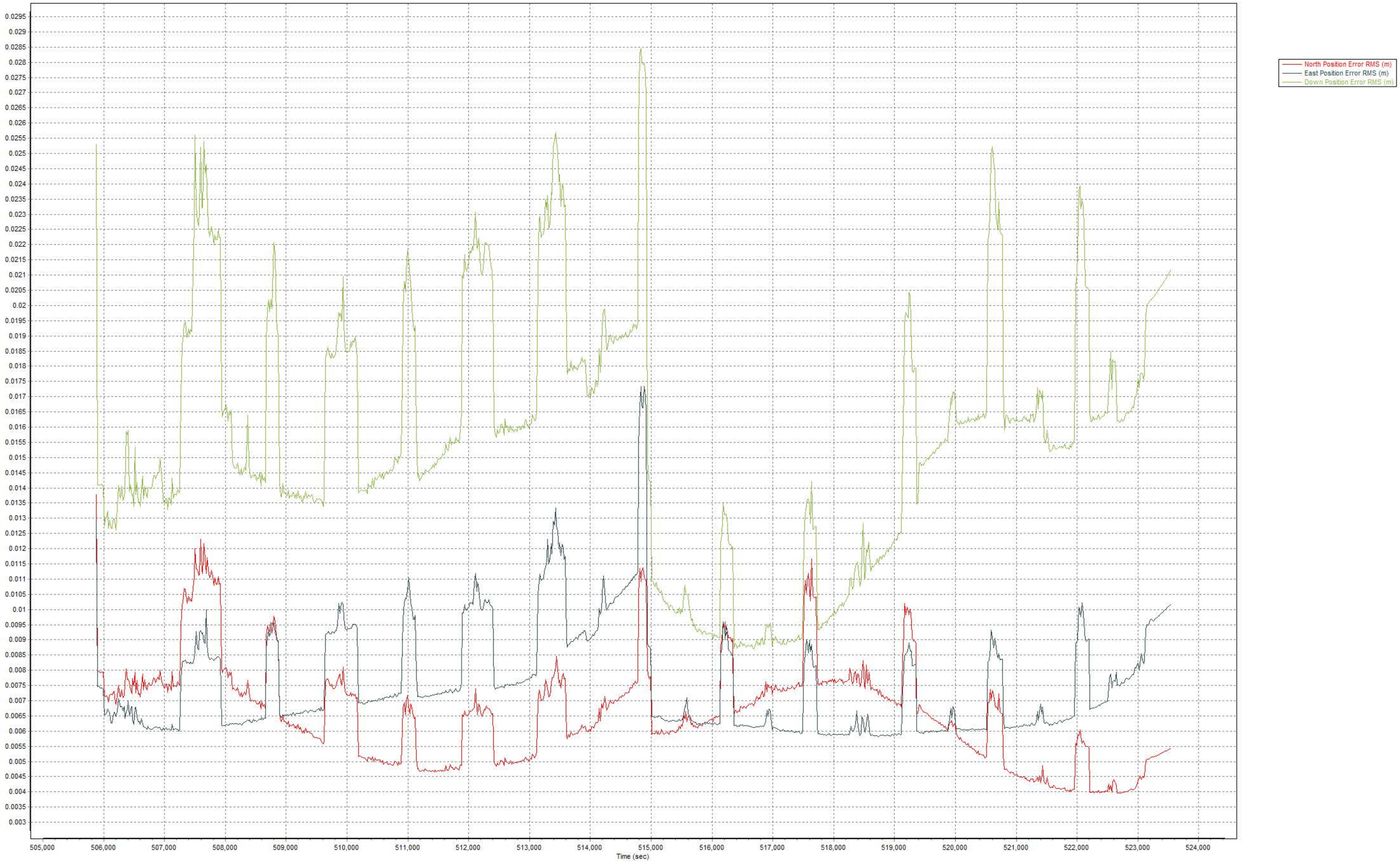
DP6859 FLF1 FL FOUNDATION 1 CORS ARP N253655.240 W0802309.912 21916.1
DF7050 MTNT MIAMI TNT CORS ARP N255156.760 W0805425.186 65310.9

NEAREST NGS PUBLISHED CONTROL POINT
DL2756 CARD SOUND 5 CORS ARP N252553.839 W0802801.043 0.0

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.


North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
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0.0285
0.028
0.0275
0.027
0.0265
0.026
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0.0235
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0.019
0.0185
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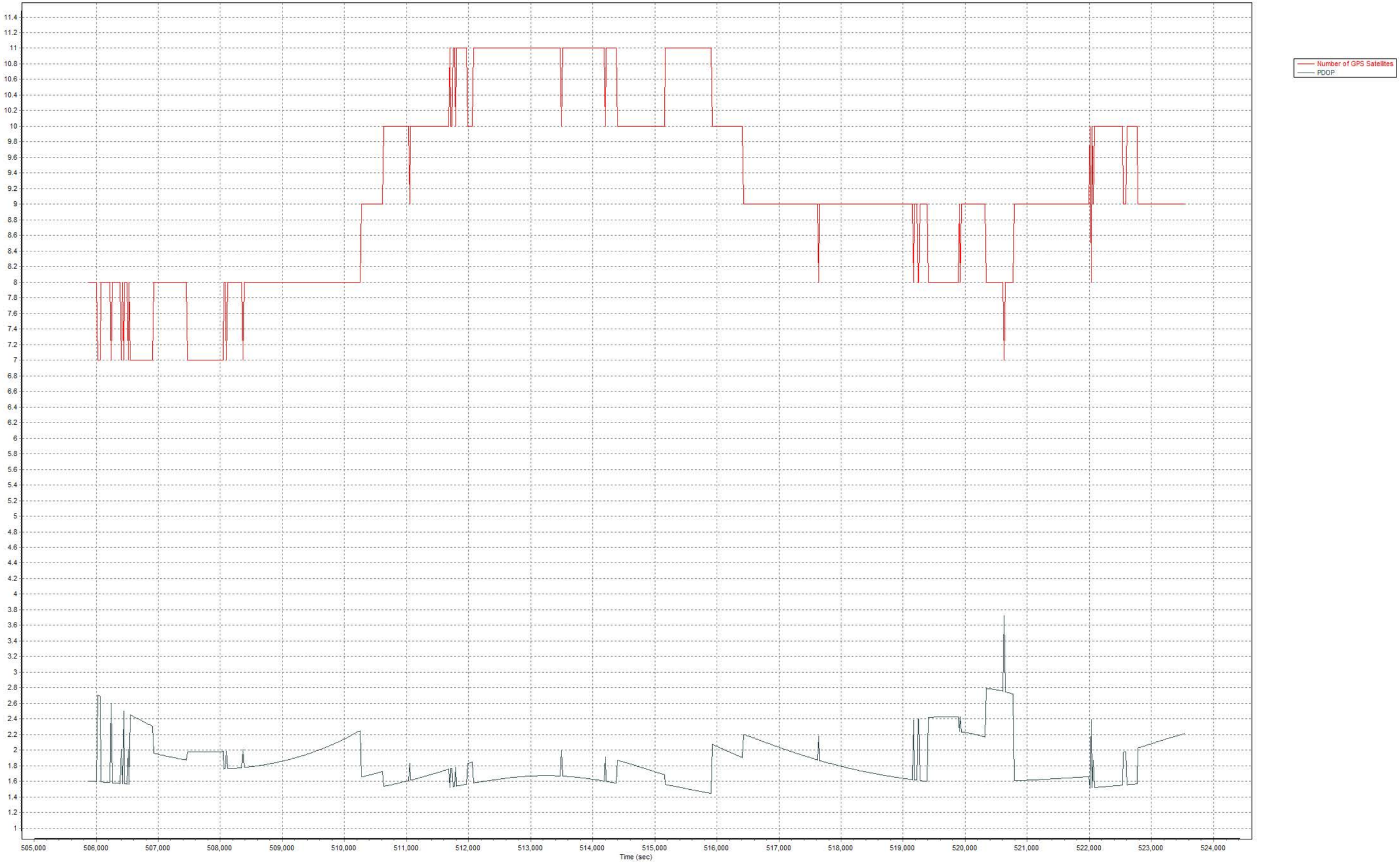
Number of GPS Satellites
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11.2
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10.6
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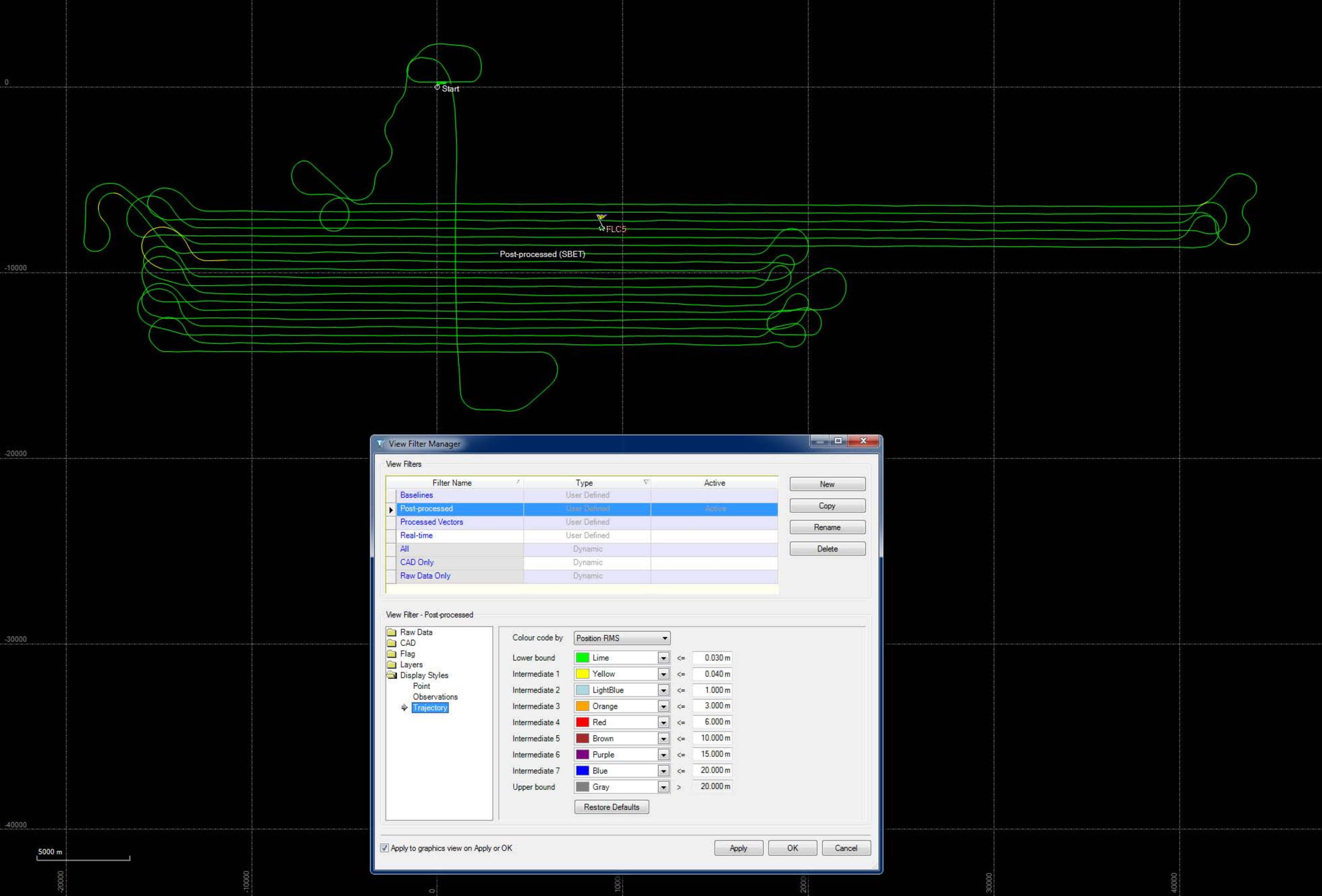
Time (sec)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-30000
-40000
Start
FLC5
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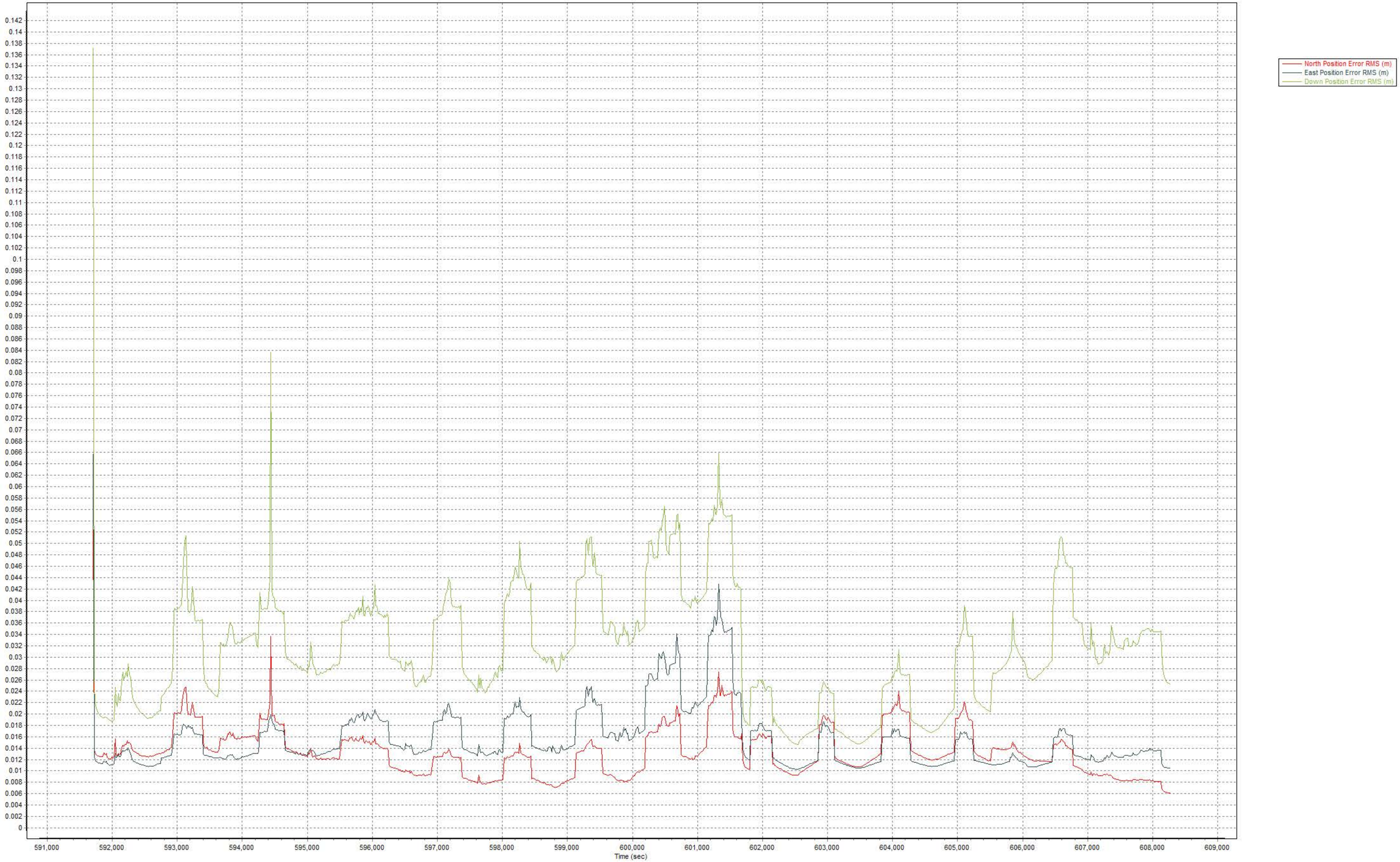
-10000
0
10000
20000
30000
40000
View Filter Manager
View Filters
Filter Name
Type
Active
Baselines
User Defined
Post-processed
User Defined
Active
Processed Vectors
User Defined
Real-time
User Defined
All
Dynamic
CAD Only
Dynamic
Raw Data Only
Dynamic
New
Copy
Rename
Delete
View Filter - Post-processed
Raw Data
CAD
Flag
Layers
Display Styles
Point
Observations
Trajectory
Colour code by
Position RMS
Lower bound
Lime
<=
0.030 m
Intermediate 1
Yellow
<=
0.040 m
Intermediate 2
LightBlue
<=
1.000 m
Intermediate 3
Orange
<=
3.000 m
Intermediate 4
Red
<=
6.000 m
Intermediate 5
Brown
<=
10.000 m
Intermediate 6
Purple
<=
15.000 m
Intermediate 7
Blue
<=
20.000 m
Upper bound
Gray
>
20.000 m
Restore Defaults
Apply to graphics view on Apply or OK
Apply
OK
Cancel


North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
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609,000
Time (sec)

From: opus <opus@ngs.noaa.gov>
Sent: Tuesday, April 14, 2015 7:05 AM
To: Stonerock, Mike
Subject: OPUS solution : flc50970.15o OP1429009454821

FILE: flc50970.15o OP1429009454821

1008 NOTE: Antenna offsets supplied by the user were zero. Coordinates
1008 returned will be for the antenna reference point (ARP).
1008

NGS OPUS SOLUTION REPORT
==========

All computed coordinate accuracies are listed as peak-to-peak values.
For additional information: http://www.ngs.noaa.gov/OPUS/about.jsp#accuracy

USER: mstonerock@aca-net.com DATE: April 14, 2015
RINEX FILE: flc50970.15o TIME: 11:05:00 UTC

SOFTWARE: page5 1209.04 master53.pl 022814 START: 2015/04/07 00:00:00
EPHEMERIS: igr18392.eph [rapid] STOP: 2015/04/07 23:59:00
NAV FILE: brdc0970.15n OBS USED: 47082 / 51906 : 91%
ANT NAME: TRM41249USCG SCIT # FIXED AMB: 220 / 254 : 87%
ARP HEIGHT: 0.000 OVERALL RMS: 0.018(m)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2015.2644)

X:	954551.438(m)	0.006(m)	954550.675(m)	0.006(m)
Y:	-5684034.927(m)	0.006(m)	-5684033.320(m)	0.006(m)
Z:	2722324.461(m)	0.016(m)	2722324.280(m)	0.016(m)

LAT:	25 25 53.83984	0.017(m)	25 25 53.85841	0.017(m)
E LON:	279 31 58.95643	0.006(m)	279 31 58.93902	0.006(m)
W LON:	80 28 1.04357	0.006(m)	80 28 1.06098	0.006(m)
EL HGT:	-16.677(m)	0.002(m)	-18.300(m)	0.002(m)
ORTHO HGT:	8.201(m)	0.014(m)	[NAVD88 (Computed using GEOID12A)]	

	UTM COORDINATES (UTM (Zone 17))	STATE PLANE COORDINATES (SPC (0901 FL E))
Northing (Y) [meters]	2812849.123	121758.685
Easting (X) [meters]	553600.319	253618.614
Convergence [degrees]	0.22891226	0.22891226
Point Scale	0.99963548	0.99997666
Combined Factor	0.99963810	0.99997928

US NATIONAL GRID DESIGNATOR: 17RNJ5360012849(NAD 83)

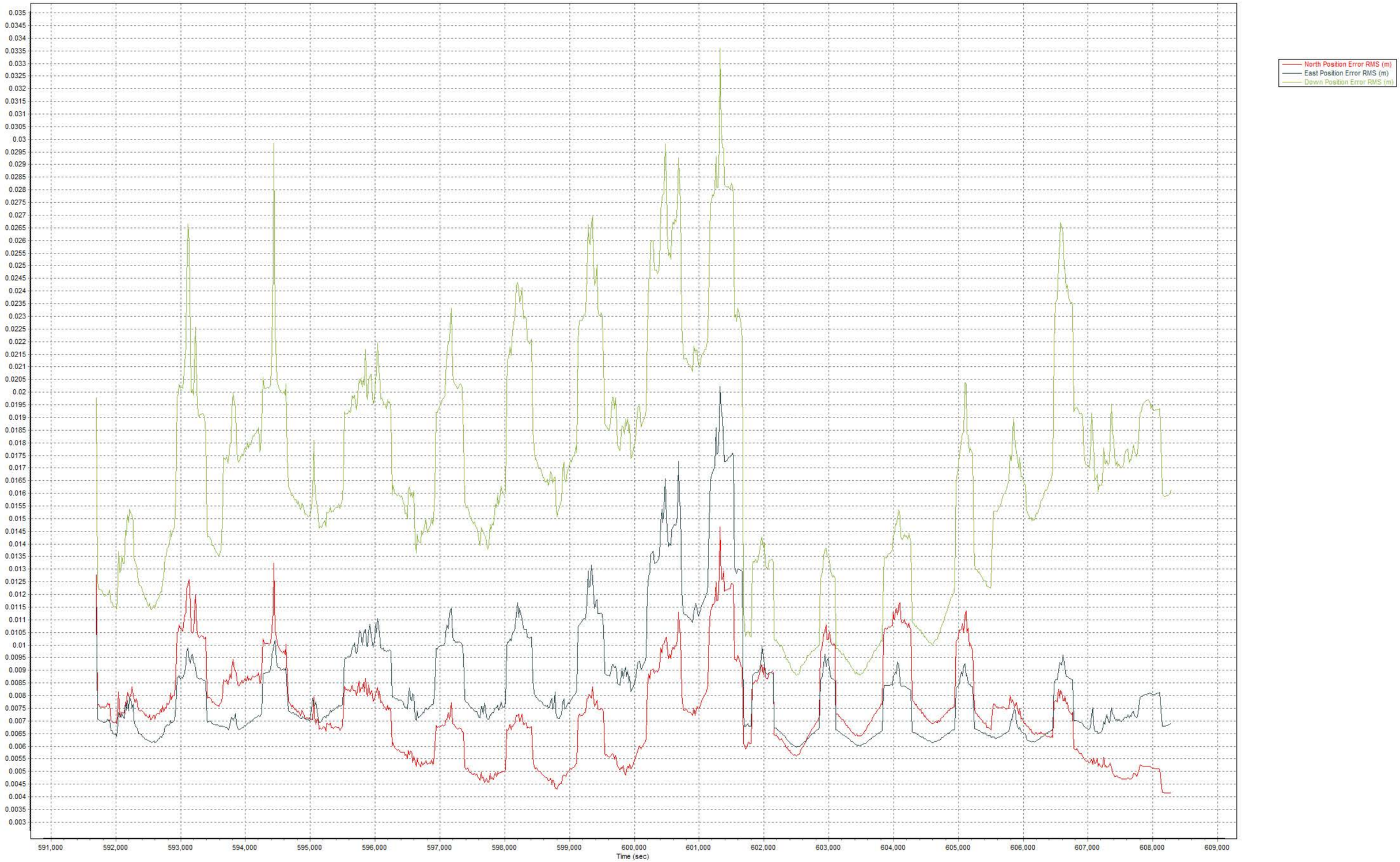
BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DF9225	ZMA1 MIAMI WAAS 1 CORS ARP	N254928.585	W0801909.066	45995.6

DP6859 FLF1 FL FOUNDATION 1 CORS ARP N253655.240 W0802309.912 21916.1
DF7050 MTNT MIAMI TNT CORS ARP N255156.760 W0805425.186 65310.9

NEAREST NGS PUBLISHED CONTROL POINT
DL2756 CARD SOUND 5 CORS ARP N252553.839 W0802801.043 0.0

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.


North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
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0.034
0.0335
0.033
0.0325
0.032
0.0315
0.031
0.0305
0.03
0.0295
0.029
0.0285
0.028
0.0275
0.027
0.0265
0.026
0.0255
0.025
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0.0225
0.022
0.0215
0.021
0.0205
0.02
0.0195
0.019
0.0185
0.018
0.0175
0.017
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0.0155
0.015
0.0145
0.014
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0.013
0.0125
0.012
0.0115
0.011
0.0105
0.01
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0.008
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0.007
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0.006
0.0055
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0.0045
0.004
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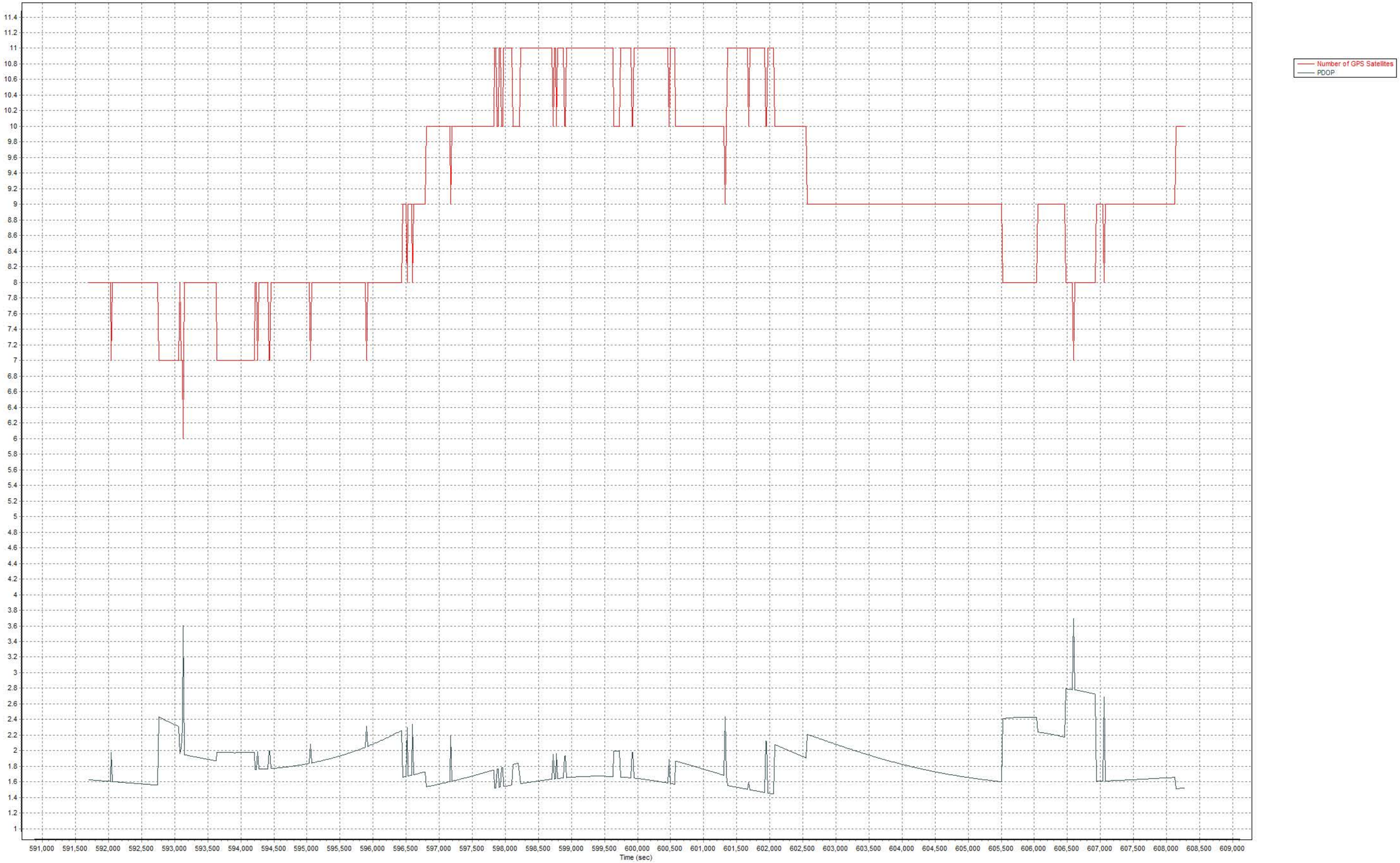
Time (sec)


Number of GPS Satellites
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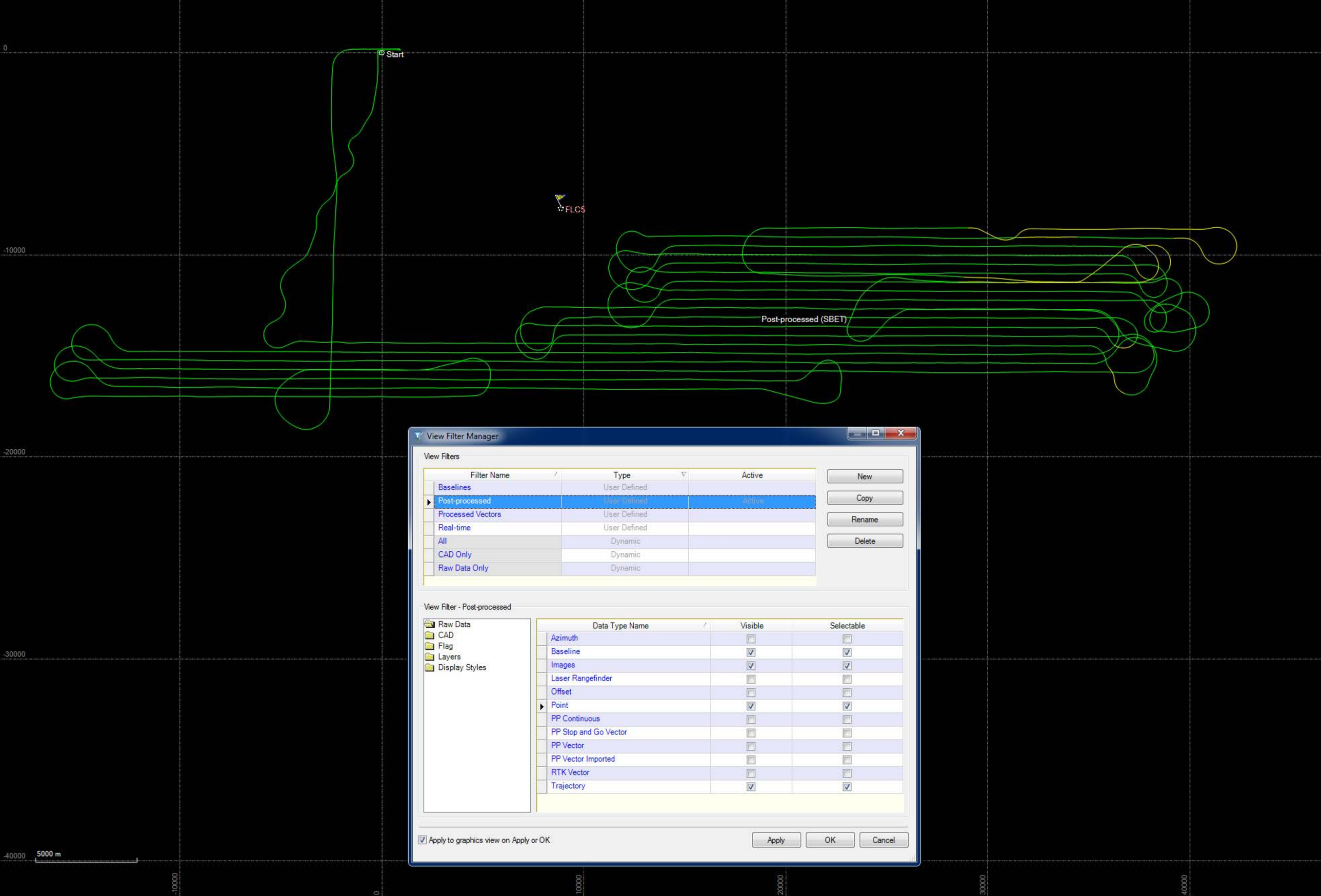
Time (sec)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-30000
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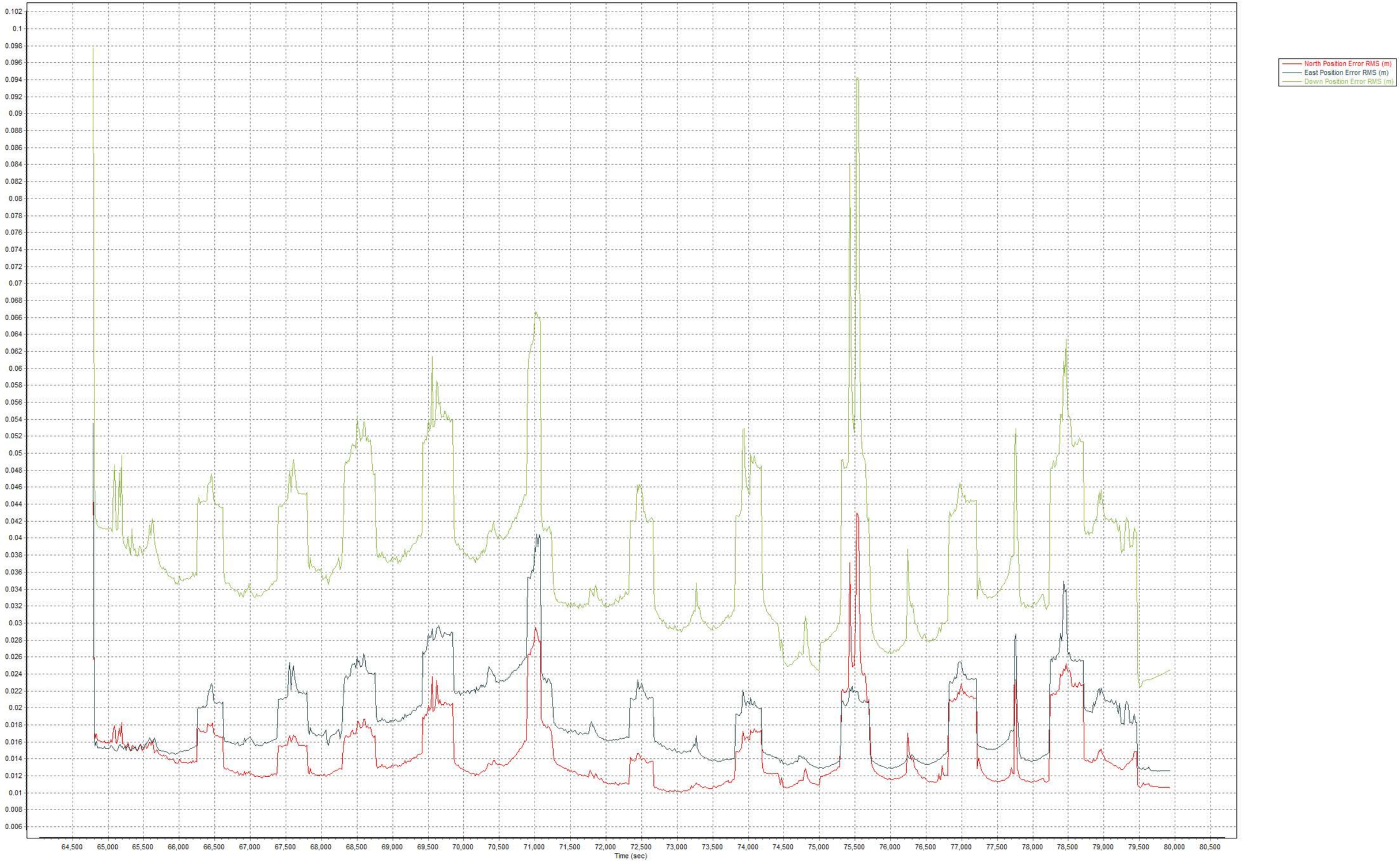
Start
FLC5
Post-processed (SBET)
View Filter Manager
View Filters
Filter Name
Type
Active
Baselines
User Defined
Post-processed
User Defined
Active
Processed Vectors
User Defined
Real-time
User Defined
All
Dynamic
CAD Only
Dynamic
Raw Data Only
Dynamic
New
Copy
Rename
Delete
View Filter - Post-processed
Raw Data
CAD
Flag
Layers
Display Styles
Data Type Name
Visible
Selectable
Azimuth
Baseline
Images
Laser Rangefinder
Offset
Point
PP Continuous
PP Stop and Go Vector
PP Vector
PP Vector Imported
RTK Vector
Trajectory
Apply to graphics view on Apply or OK
Apply
OK
Cancel


North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
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0.088
0.086
0.084
0.082
0.08
0.078
0.076
0.074
0.072
0.07
0.068
0.066
0.064
0.062
0.06
0.058
0.056
0.054
0.052
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0.048
0.046
0.044
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0.04
0.038
0.036
0.034
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0.024
0.022
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0.018
0.016
0.014
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0.008
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Time (sec)

From: opus <opus@ngs.noaa.gov>
Sent: Tuesday, April 14, 2015 7:05 AM
To: Stonerock, Mike
Subject: OPUS solution : flc50970.15o OP1429009454821

FILE: flc50970.15o OP1429009454821

1008 NOTE: Antenna offsets supplied by the user were zero. Coordinates
1008 returned will be for the antenna reference point (ARP).
1008

NGS OPUS SOLUTION REPORT
==========

All computed coordinate accuracies are listed as peak-to-peak values.
For additional information: http://www.ngs.noaa.gov/OPUS/about.jsp#accuracy

USER: mstonerock@aca-net.com DATE: April 14, 2015
RINEX FILE: flc50970.15o TIME: 11:05:00 UTC

SOFTWARE: page5 1209.04 master53.pl 022814 START: 2015/04/07 00:00:00
EPHEMERIS: igr18392.eph [rapid] STOP: 2015/04/07 23:59:00
NAV FILE: brdc0970.15n OBS USED: 47082 / 51906 : 91%
ANT NAME: TRM41249USCG SCIT # FIXED AMB: 220 / 254 : 87%
ARP HEIGHT: 0.000 OVERALL RMS: 0.018(m)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2015.2644)

X:	954551.438(m)	0.006(m)	954550.675(m)	0.006(m)
Y:	-5684034.927(m)	0.006(m)	-5684033.320(m)	0.006(m)
Z:	2722324.461(m)	0.016(m)	2722324.280(m)	0.016(m)

LAT:	25 25 53.83984	0.017(m)	25 25 53.85841	0.017(m)
E LON:	279 31 58.95643	0.006(m)	279 31 58.93902	0.006(m)
W LON:	80 28 1.04357	0.006(m)	80 28 1.06098	0.006(m)
EL HGT:	-16.677(m)	0.002(m)	-18.300(m)	0.002(m)
ORTHO HGT:	8.201(m)	0.014(m)	[NAVD88 (Computed using GEOID12A)]	

	UTM COORDINATES (UTM (Zone 17))	STATE PLANE COORDINATES (SPC (0901 FL E))
Northing (Y) [meters]	2812849.123	121758.685
Easting (X) [meters]	553600.319	253618.614
Convergence [degrees]	0.22891226	0.22891226
Point Scale	0.99963548	0.99997666
Combined Factor	0.99963810	0.99997928

US NATIONAL GRID DESIGNATOR: 17RNJ5360012849(NAD 83)

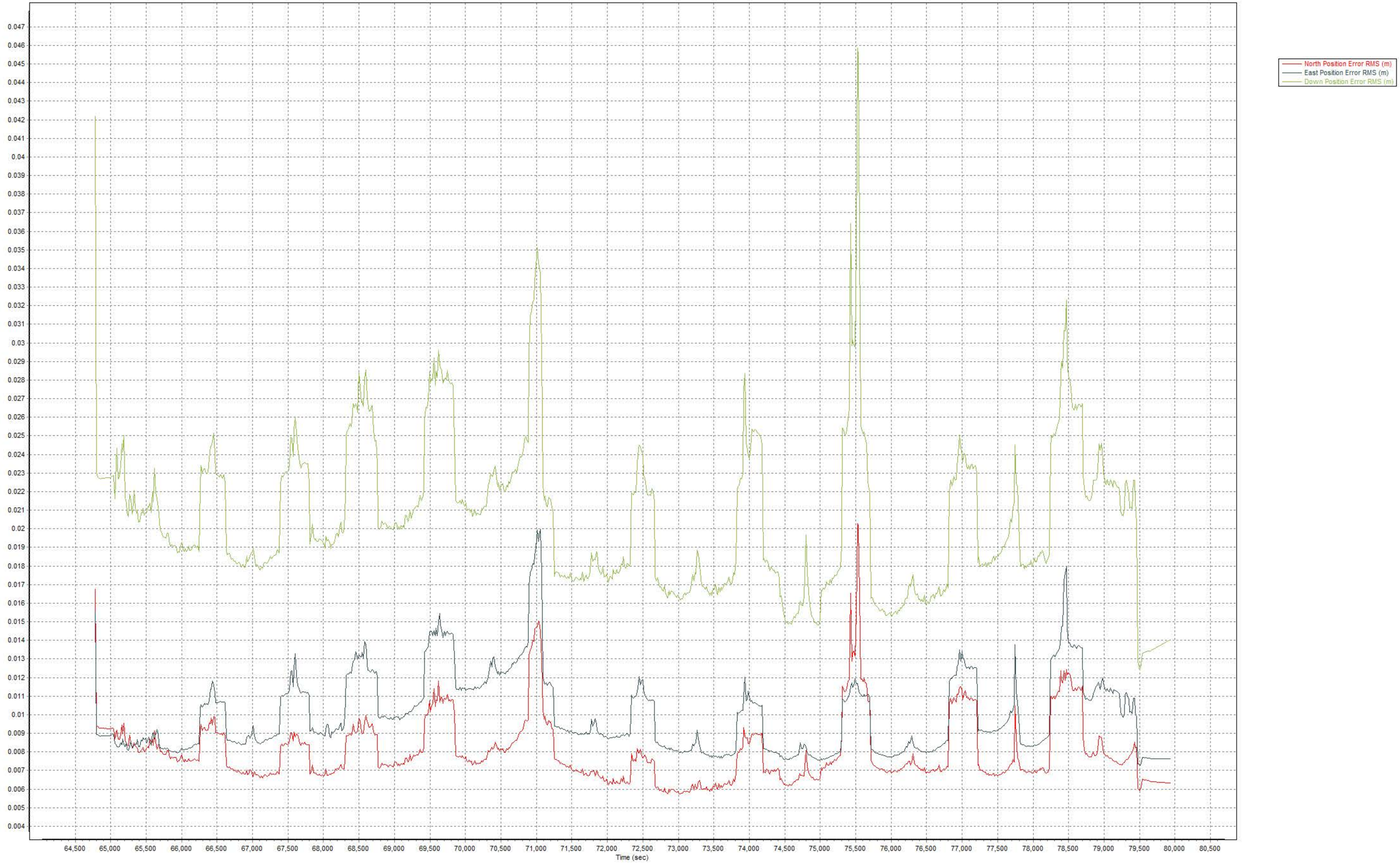
BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DF9225	ZMA1 MIAMI WAAS 1 CORS ARP	N254928.585	W0801909.066	45995.6

DP6859 FLF1 FL FOUNDATION 1 CORS ARP N253655.240 W0802309.912 21916.1
DF7050 MTNT MIAMI TNT CORS ARP N255156.760 W0805425.186 65310.9

NEAREST NGS PUBLISHED CONTROL POINT
DL2756 CARD SOUND 5 CORS ARP N252553.839 W0802801.043 0.0

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.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East Position Error RMS (m)
Down Position Error RMS (m)
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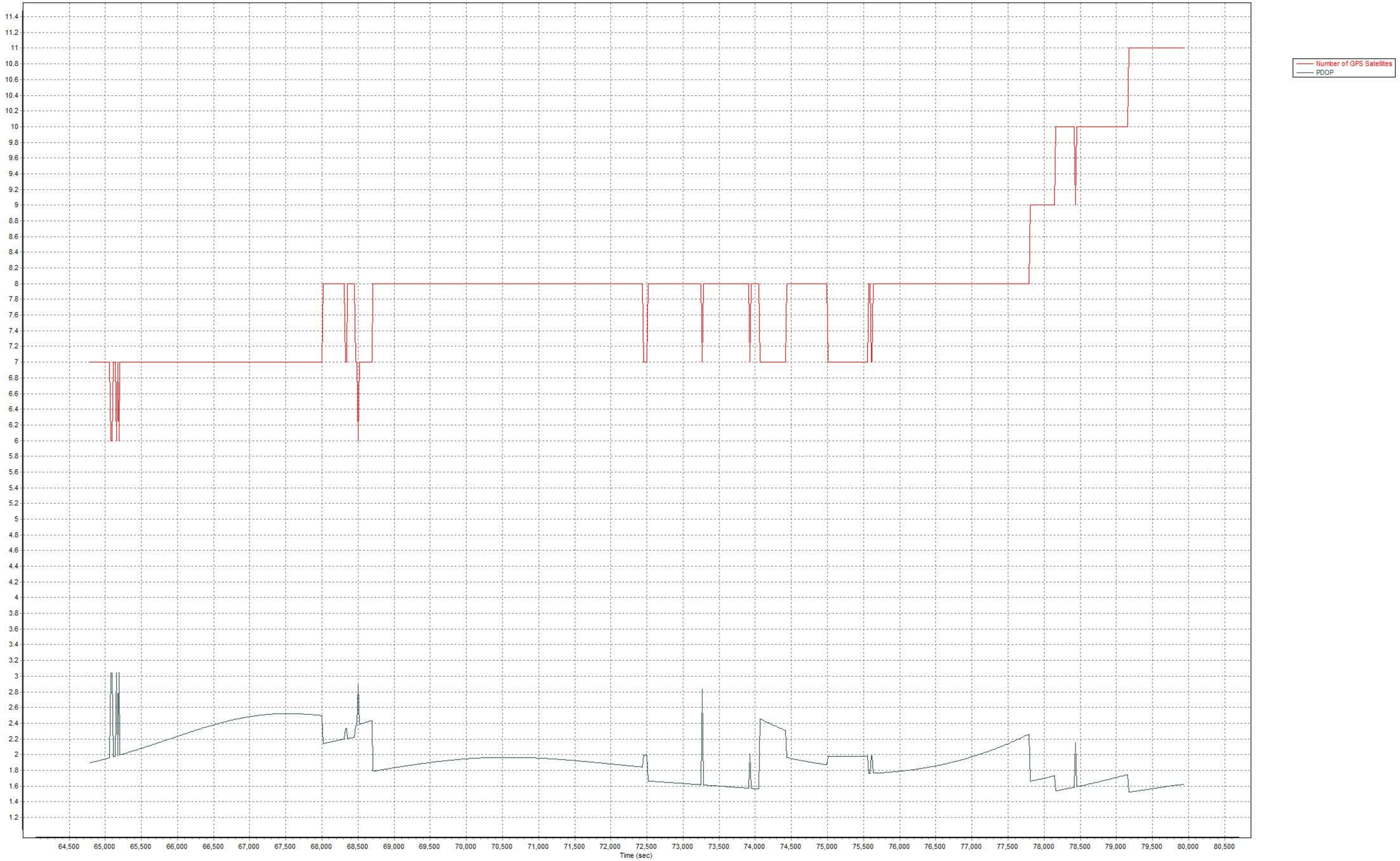
Time (sec)


Number of GPS Satellites
PDOP
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80,500
Time (sec)

View Filter Manager

View Filters

Filter Name	Type	Active
Baselines	User Defined	
Post-processed	User Defined	Active
Processed Vectors	User Defined	
Real-time	User Defined	
All	Dynamic	
CAD Only	Dynamic	
Raw Data Only	Dynamic	

New
Copy
Rename
Delete

View Filter - Post-processed

- Raw Data
- CAD
- Flag
- Layers
- Display Styles
  - Point
  - Observations
  - Trajectory

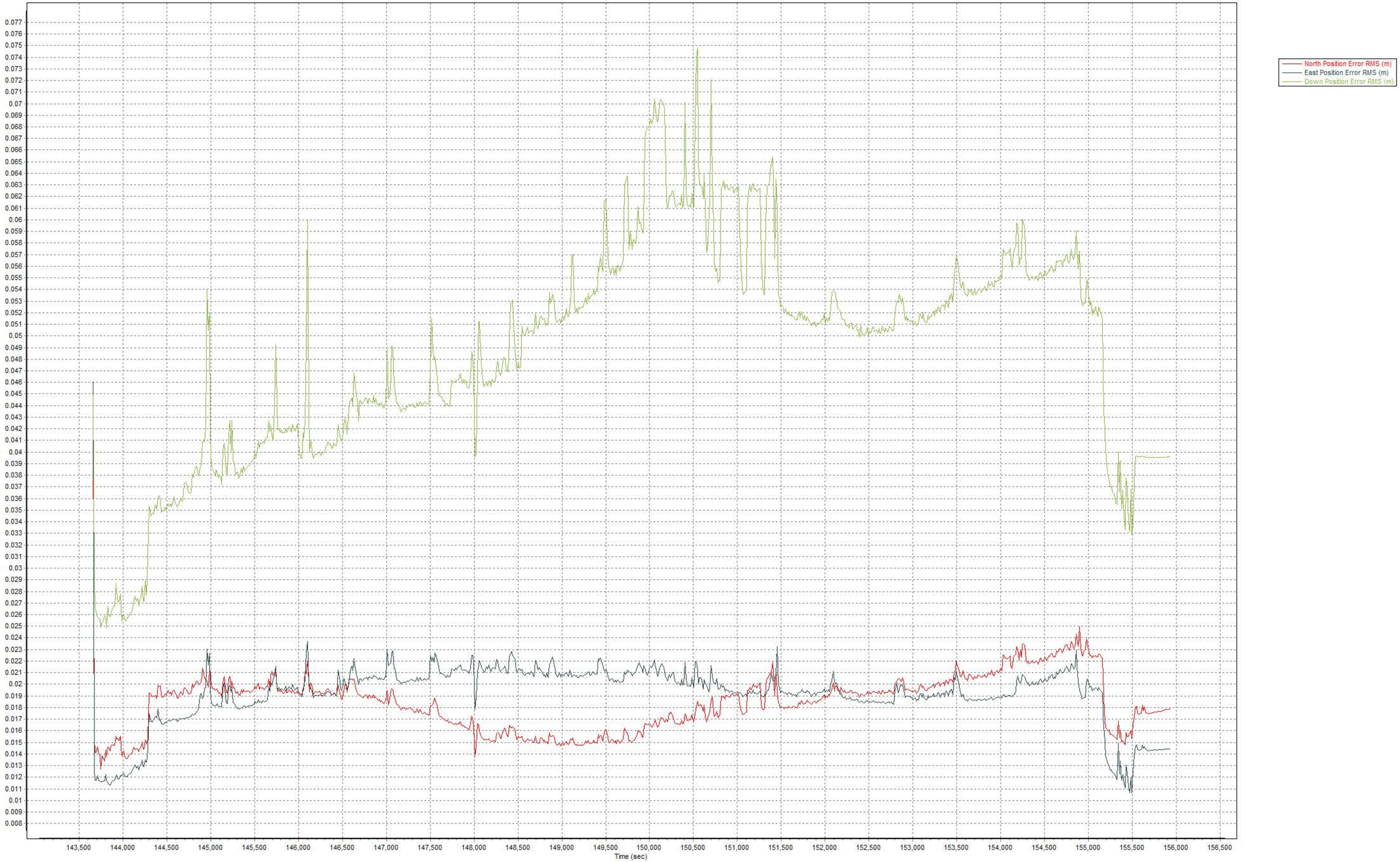
Colour code by: Position RMS

Lower bound	Lime	<=	0.030 m
Intermediate 1	Yellow	<=	0.040 m
Intermediate 2	LightBlue	<=	0.050 m
Intermediate 3	Orange	<=	0.060 m
Intermediate 4	Red	<=	6.000 m
Intermediate 5	Brown	<=	10.000 m
Intermediate 6	Purple	<=	15.000 m
Intermediate 7	Blue	<=	20.000 m
Upper bound	Gray	>	20.000 m

Restore Defaults

Apply to graphics view on Apply or OK

Apply | OK | Cancel


North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
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0.07
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0.062
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Time (sec)

From: opus <opus@ngs.noaa.gov>
Sent: Thursday, February 19, 2015 1:13 PM
To: Stonerock, Mike
Subject: OPUS solution : home0460.15o OP1424369519684

FILE: home0460.15o OP1424369519684

1008 NOTE: Antenna offsets supplied by the user were zero. Coordinates
1008 returned will be for the antenna reference point (ARP).
1008

NGS OPUS SOLUTION REPORT
==========

All computed coordinate accuracies are listed as peak-to-peak values.
For additional information: http://www.ngs.noaa.gov/OPUS/about.jsp#accuracy

USER: mstonerock@aca-net.com DATE: February 19, 2015
RINEX FILE: home0460.15o TIME: 18:12:48 UTC

SOFTWARE: page5 1209.04 master93.pl 022814 START: 2015/02/15 00:00:00
EPHEMERIS: igr18320.eph [rapid] STOP: 2015/02/15 23:59:00
NAV FILE: brdc0460.15n OBS USED: 54909 / 58984 : 93%
ANT NAME: LEIAR20 NONE # FIXED AMB: 205 / 251 : 82%
ARP HEIGHT: 0.000 OVERALL RMS: 0.014(m)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2015.1245)

X:	945756.819(m)	0.008(m)	945756.058(m)	0.008(m)
Y:	-5682149.876(m)	0.011(m)	-5682148.270(m)	0.011(m)
Z:	2729267.733(m)	0.005(m)	2729267.552(m)	0.005(m)

LAT:	25 30 3.79564	0.007(m)	25 30 3.81424	0.007(m)
E LON:	279 26 59.56768	0.008(m)	279 26 59.55024	0.008(m)
W LON:	80 33 0.43232	0.008(m)	80 33 0.44976	0.008(m)
EL HGT:	-19.132(m)	0.010(m)	-20.753(m)	0.010(m)
ORTHO HGT:	5.530(m)	0.021(m)	[NAVD88 (Computed using GEOID12A)]	

	UTM COORDINATES (Zone 17)	STATE PLANE COORDINATES SPC (0901 FL E)
Northing (Y) [meters]	2820507.079	129419.254
Easting (X) [meters]	545211.710	245227.141
Convergence [degrees]	0.19368906	0.19368906
Point Scale	0.99962524	0.99996643
Combined Factor	0.99962824	0.99996944

US NATIONAL GRID DESIGNATOR: 17RNJ4521120507(NAD 83)

BASE STATIONS USED

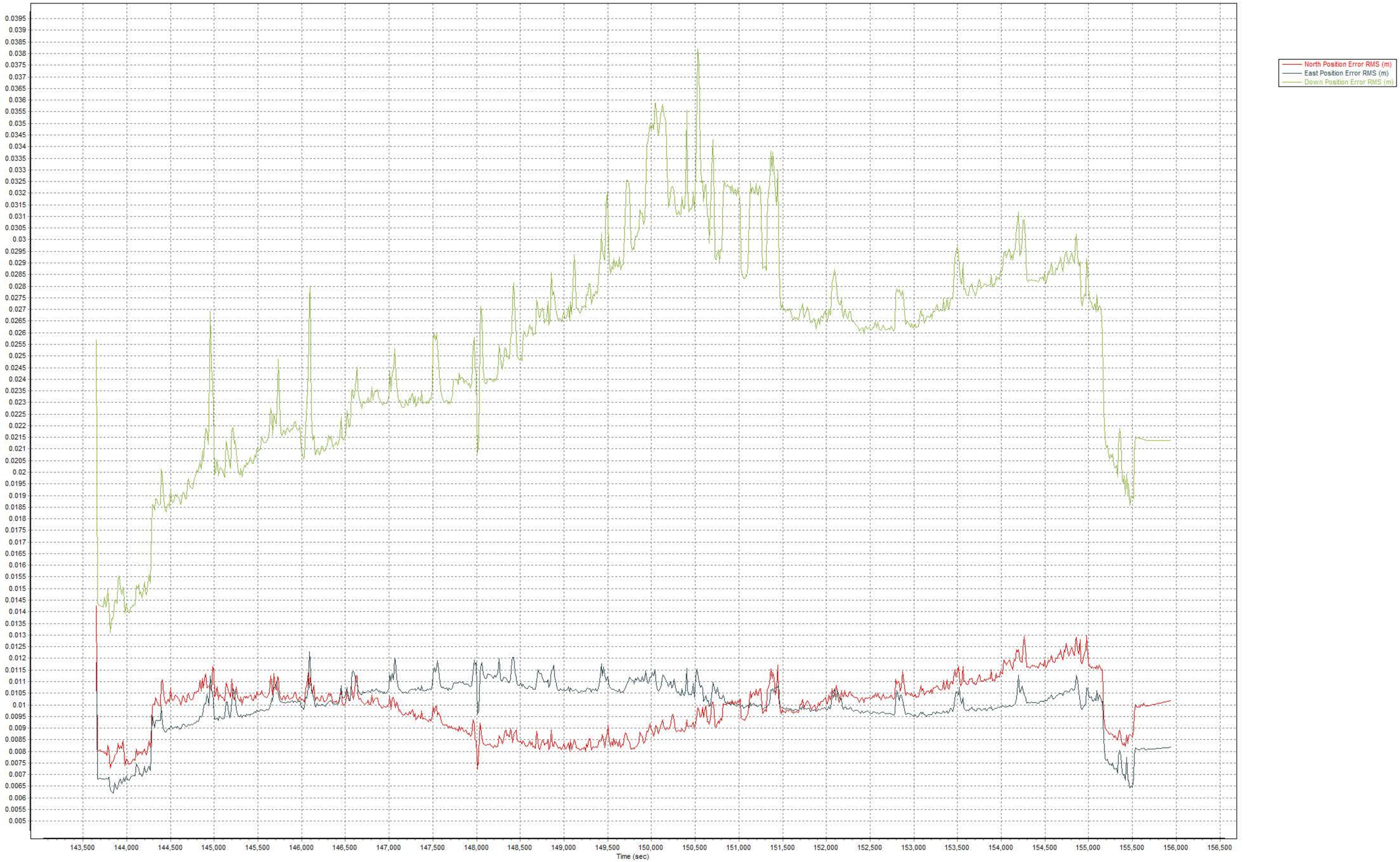
PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DJ3675	KYW6 KEY WEST 6 CORS ARP	N243456.291	W0813910.049	150793.7

DF9225	ZMA1 MIAMI WAAS 1 CORS ARP	N254928.585 W0801909.066	42689.4
DL2758	FLC6 CARD SOUND 6 CORS ARP	N252552.982 W0802801.178	11377.7

NEAREST NGS PUBLISHED CONTROL POINT

AC0464	A 274	N253000.	W0803302.	125.3

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.


North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
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0.038
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0.036
0.0355
0.035
0.0345
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0.0335
0.033
0.0325
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0.0315
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0.029
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0.0235
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0.0215
0.021
0.0205
0.02
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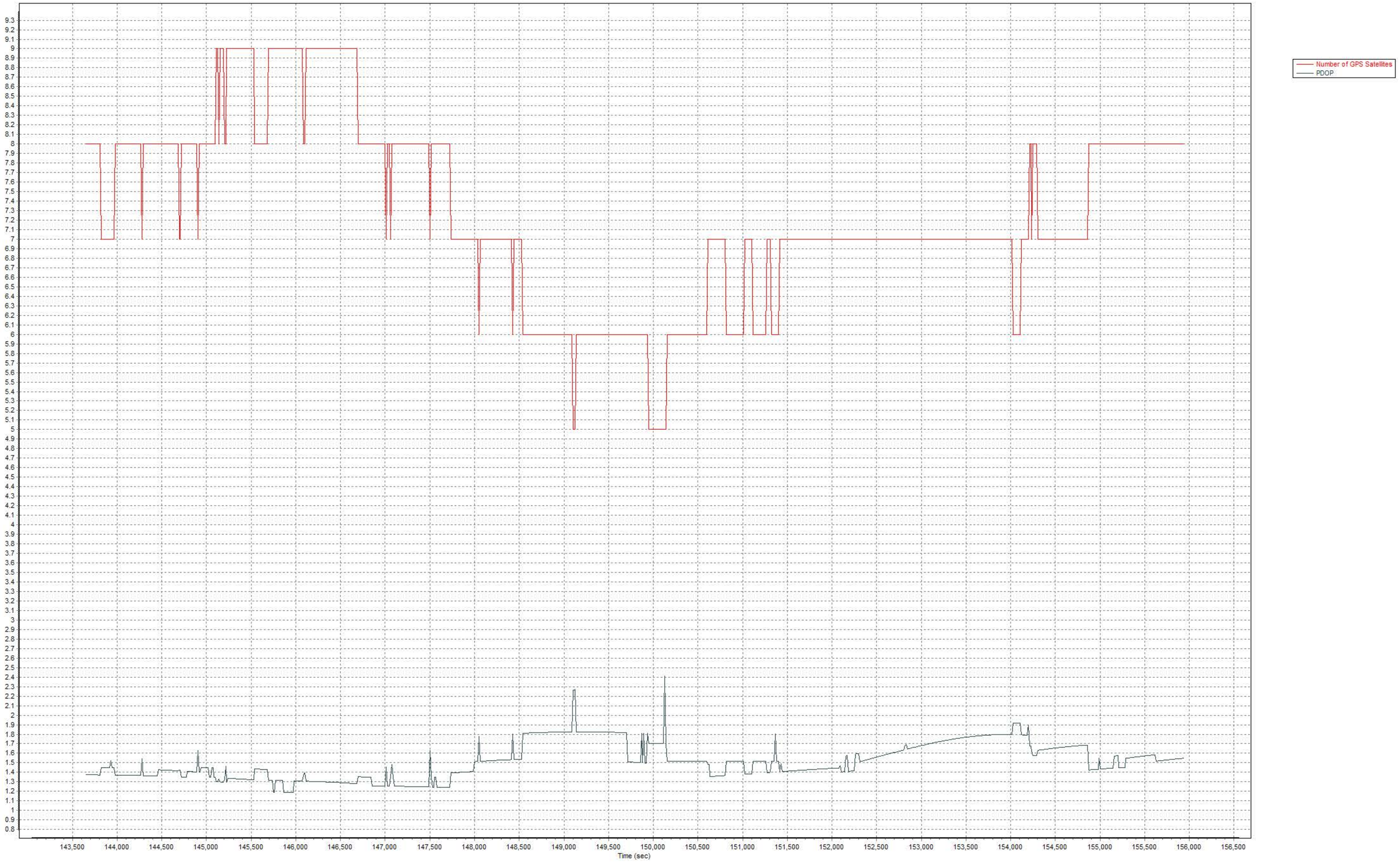
Time (sec)


Number of GPS Satellites
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-20000

Post-processed (SBET)

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-40000

-50000

5000 m

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View Filter Manager

View Filters

Filter Name	Type	Active
Baselines	User Defined	
Post-processed	User Defined	Active
Processed Vectors	User Defined	
Real-time	User Defined	
All	Dynamic	
CAD Only	Dynamic	
Raw Data Only	Dynamic	

New
Copy
Rename
Delete

View Filter - Post-processed

- Raw Data
- CAD
- Flag
- Layers
- Display Styles
  - Point
  - Observations
  - Trajectory

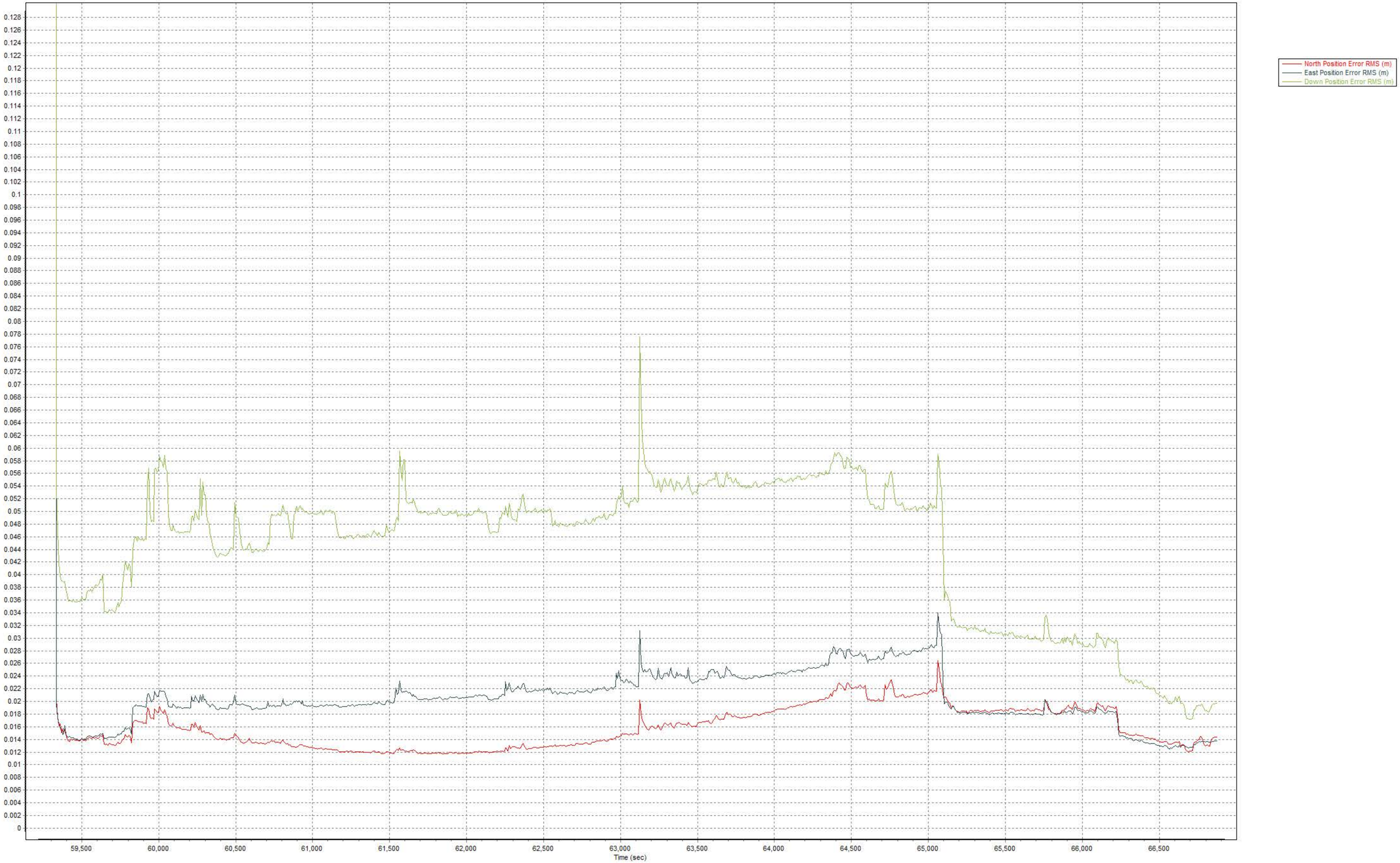
Colour code by: Position RMS

Lower bound	0, 255, 0	<=	0.100 m
Intermediate 1	255, 255, 0	<=	0.300 m
Intermediate 2	173, 216, 230	<=	1.000 m
Intermediate 3	255, 165, 0	<=	3.000 m
Intermediate 4	255, 0, 0	<=	6.000 m
Intermediate 5	165, 42, 42	<=	10.000 m
Intermediate 6	128, 0, 128	<=	15.000 m
Intermediate 7	0, 0, 255	<=	20.000 m
Upper bound	128, 128, 128	>	20.000 m

Restore Defaults

Apply to graphics view on Apply or OK

Apply | OK | Cancel


North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
0.128
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0.124
0.122
0.12
0.118
0.116
0.114
0.112
0.11
0.108
0.106
0.104
0.102
0.1
0.098
0.096
0.094
0.092
0.09
0.088
0.086
0.084
0.082
0.08
0.078
0.076
0.074
0.072
0.07
0.068
0.066
0.064
0.062
0.06
0.058
0.056
0.054
0.052
0.05
0.048
0.046
0.044
0.042
0.04
0.038
0.036
0.034
0.032
0.03
0.028
0.026
0.024
0.022
0.02
0.018
0.016
0.014
0.012
0.01
0.008
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62,500
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64,500
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65,500
66,000
66,500
Time (sec)

From: opus <opus@ngs.noaa.gov>
Sent: Thursday, February 19, 2015 1:13 PM
To: Stonerock, Mike
Subject: OPUS solution : home0460.15o OP1424369519684

FILE: home0460.15o OP1424369519684

1008 NOTE: Antenna offsets supplied by the user were zero. Coordinates
1008 returned will be for the antenna reference point (ARP).
1008

NGS OPUS SOLUTION REPORT
==========

All computed coordinate accuracies are listed as peak-to-peak values.
For additional information: http://www.ngs.noaa.gov/OPUS/about.jsp#accuracy

USER: mstonerock@aca-net.com DATE: February 19, 2015
RINEX FILE: home0460.15o TIME: 18:12:48 UTC

SOFTWARE: page5 1209.04 master93.pl 022814 START: 2015/02/15 00:00:00
EPHEMERIS: igr18320.eph [rapid] STOP: 2015/02/15 23:59:00
NAV FILE: brdc0460.15n OBS USED: 54909 / 58984 : 93%
ANT NAME: LEIAR20 NONE # FIXED AMB: 205 / 251 : 82%
ARP HEIGHT: 0.000 OVERALL RMS: 0.014(m)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2015.1245)

X:	945756.819(m)	0.008(m)	945756.058(m)	0.008(m)
Y:	-5682149.876(m)	0.011(m)	-5682148.270(m)	0.011(m)
Z:	2729267.733(m)	0.005(m)	2729267.552(m)	0.005(m)

LAT:	25 30 3.79564	0.007(m)	25 30 3.81424	0.007(m)
E LON:	279 26 59.56768	0.008(m)	279 26 59.55024	0.008(m)
W LON:	80 33 0.43232	0.008(m)	80 33 0.44976	0.008(m)
EL HGT:	-19.132(m)	0.010(m)	-20.753(m)	0.010(m)
ORTHO HGT:	5.530(m)	0.021(m)	[NAVD88 (Computed using GEOID12A)]	

	UTM COORDINATES (Zone 17)	STATE PLANE COORDINATES SPC (0901 FL E)
Northing (Y) [meters]	2820507.079	129419.254
Easting (X) [meters]	545211.710	245227.141
Convergence [degrees]	0.19368906	0.19368906
Point Scale	0.99962524	0.99996643
Combined Factor	0.99962824	0.99996944

US NATIONAL GRID DESIGNATOR: 17RNJ4521120507(NAD 83)

BASE STATIONS USED

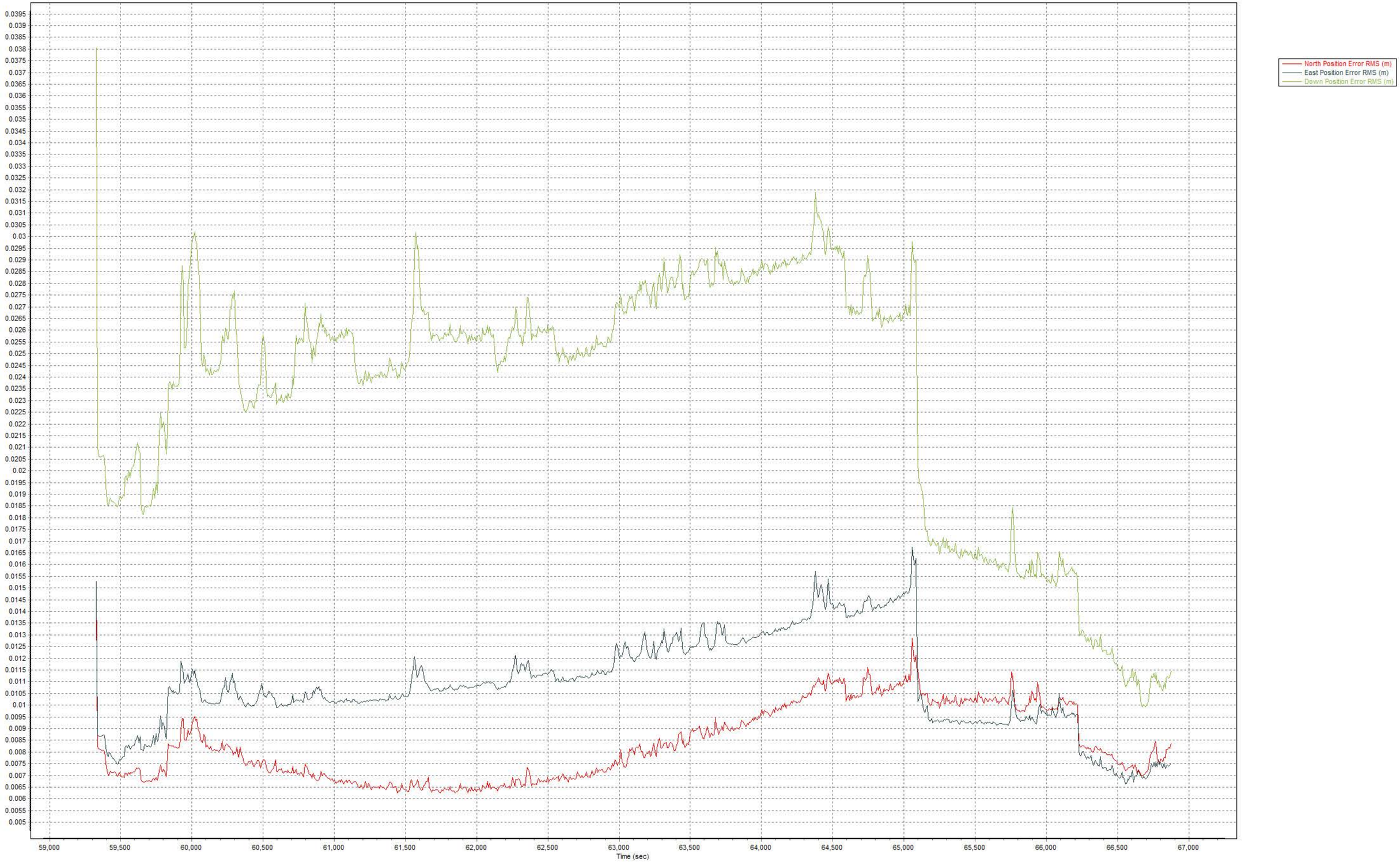
PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DJ3675	KYW6 KEY WEST 6 CORS ARP	N243456.291	W0813910.049	150793.7

DF9225	ZMA1 MIAMI WAAS 1 CORS ARP	N254928.585 W0801909.066	42689.4
DL2758	FLC6 CARD SOUND 6 CORS ARP	N252552.982 W0802801.178	11377.7

NEAREST NGS PUBLISHED CONTROL POINT

AC0464	A 274	N253000.	W0803302.	125.3

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.


North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
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0.0385
0.038
0.0375
0.037
0.0365
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0.0355
0.035
0.0345
0.034
0.0335
0.033
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0.0295
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0.0285
0.028
0.0275
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0.0265
0.026
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0.024
0.0235
0.023
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0.022
0.0215
0.021
0.0205
0.02
0.0195
0.019
0.0185
0.018
0.0175
0.017
0.0165
0.016
0.0155
0.015
0.0145
0.014
0.0135
0.013
0.0125
0.012
0.0115
0.011
0.0105
0.01
0.0095
0.009
0.0085
0.008
0.0075
0.007
0.0065
0.006
0.0055
0.005
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59,500
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61,000
61,500
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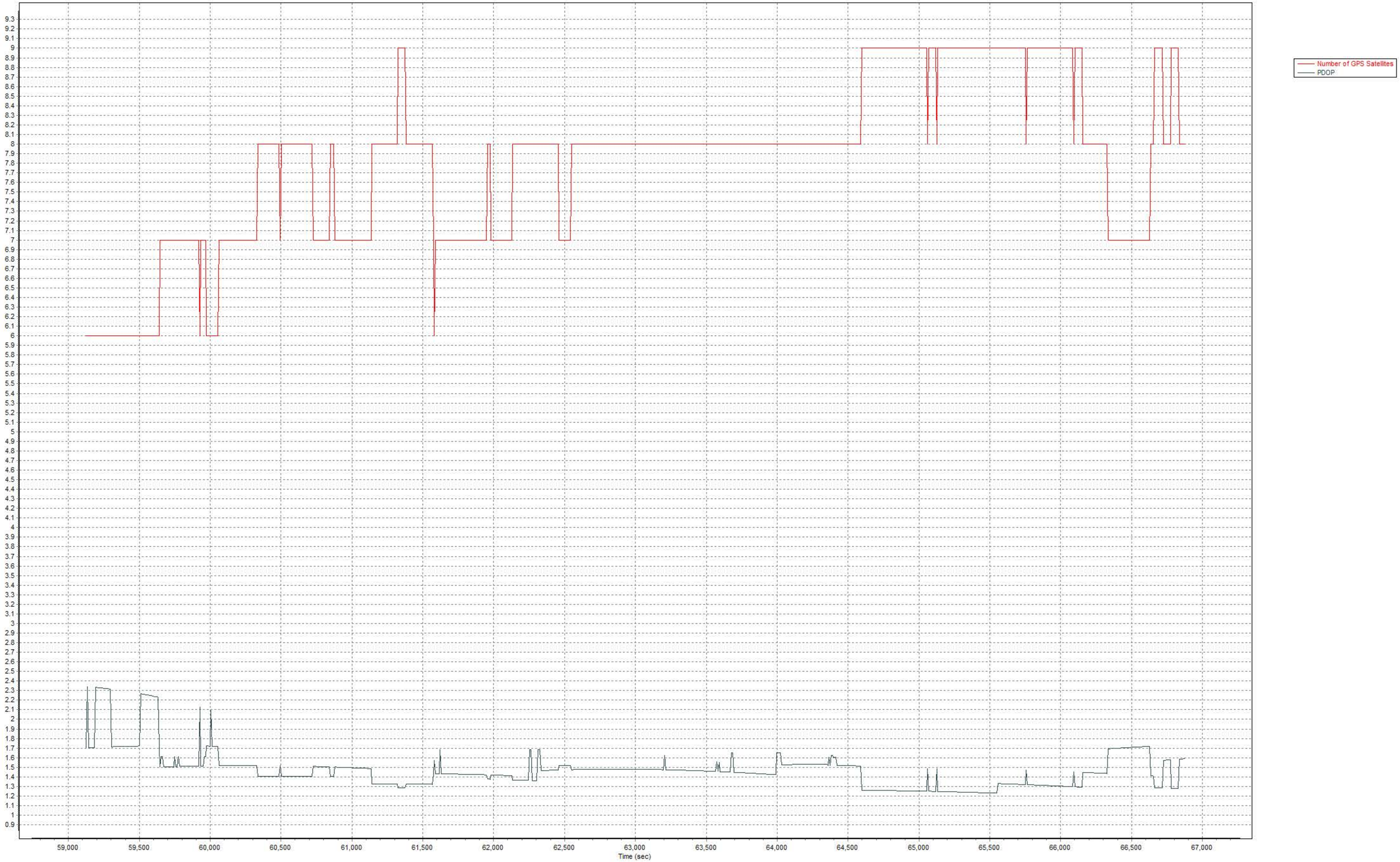
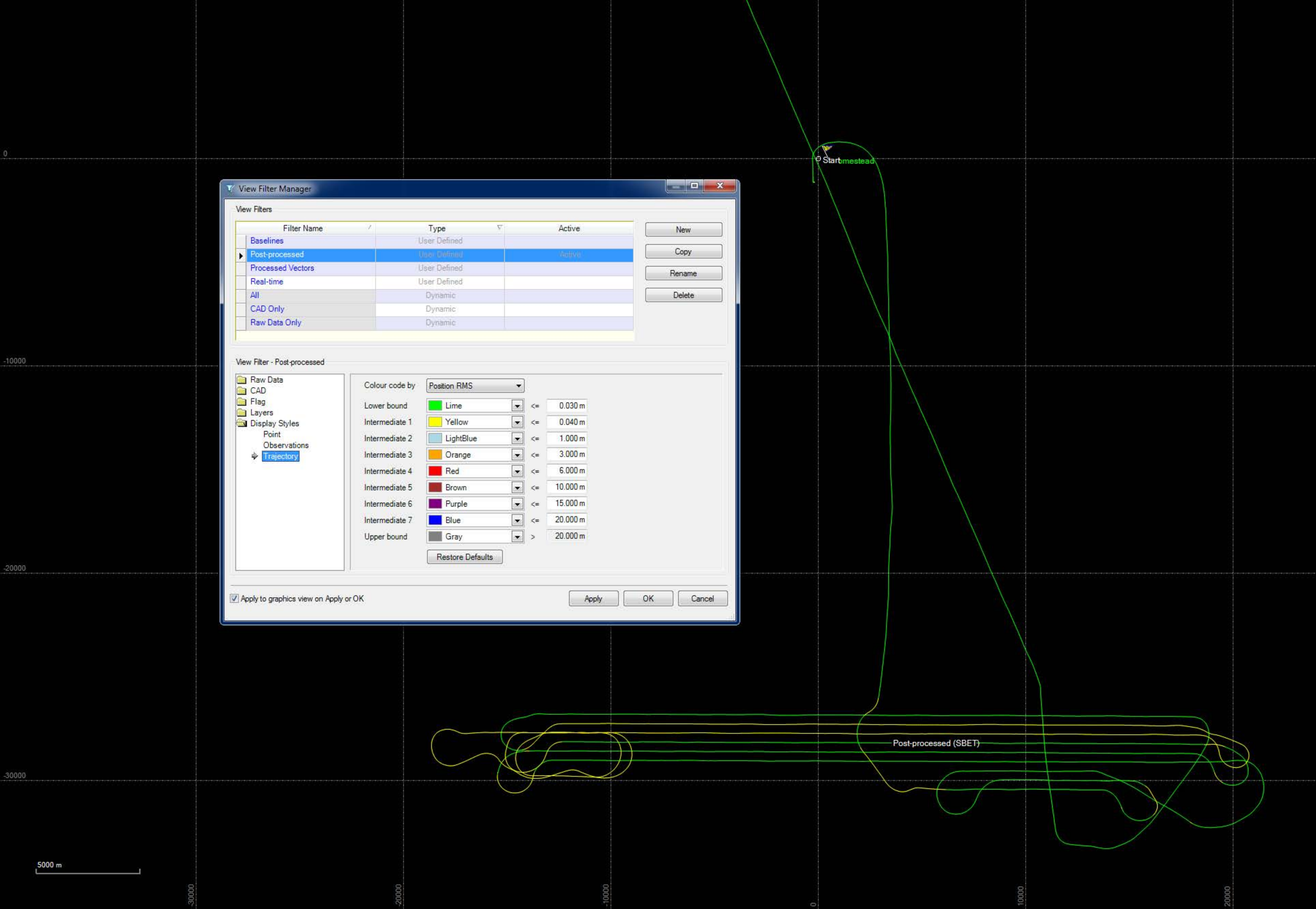
66,500
67,000
Time (sec)


Number of GPS Satellites
PDOP
Time (sec)



View Filter Manager

View Filters

Filter Name	Type	Active
Baselines	User Defined	
Post-processed	User Defined	Active
Processed Vectors	User Defined	
Real-time	User Defined	
All	Dynamic	
CAD Only	Dynamic	
Raw Data Only	Dynamic	

New
Copy
Rename
Delete

View Filter - Post-processed

- Raw Data
- CAD
- Flag
- Layers
- Display Styles
  - Point
  - Observations
  - Trajectory

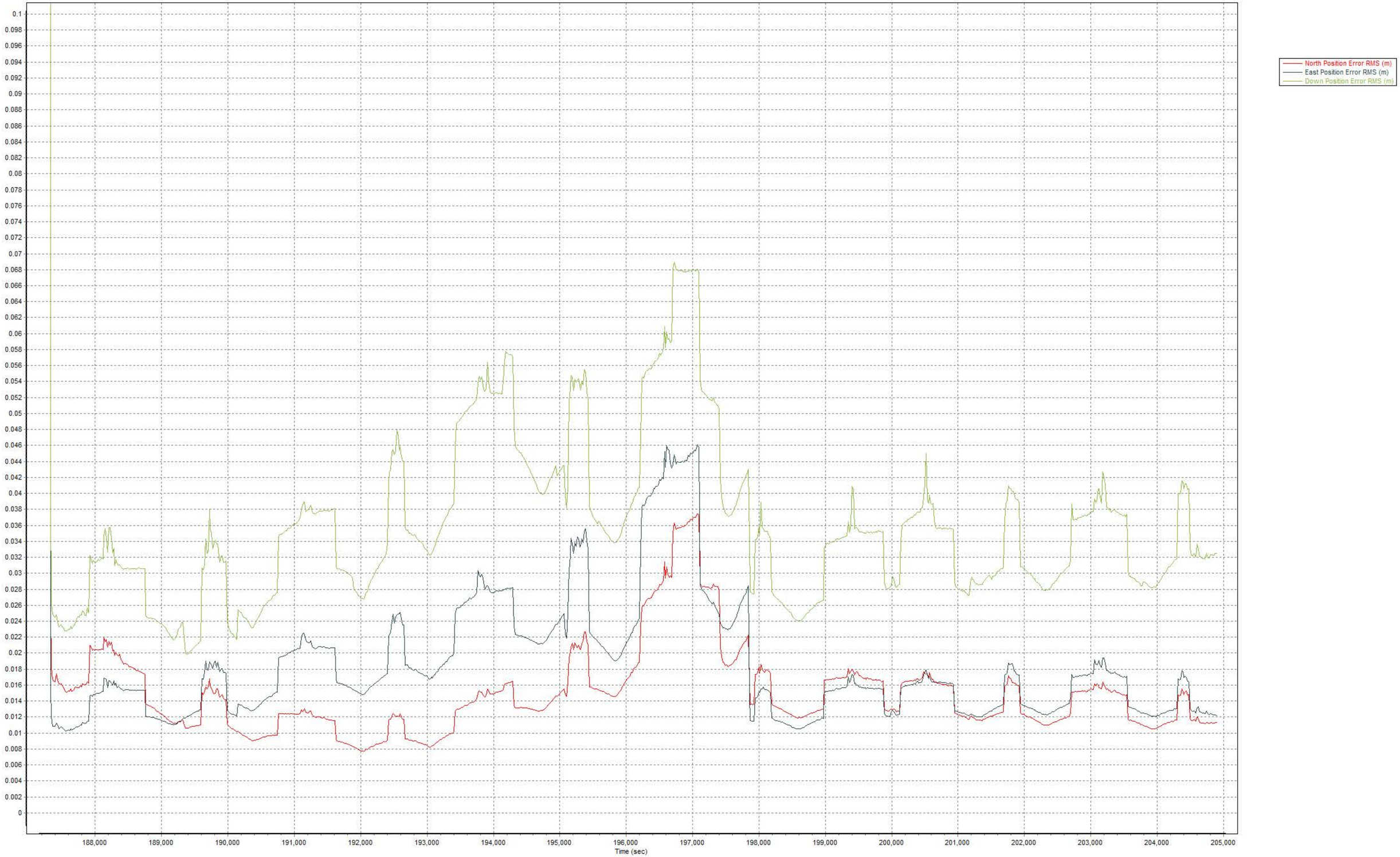
Colour code by: Position RMS

Lower bound	Lime	<=	0.030 m
Intermediate 1	Yellow	<=	0.040 m
Intermediate 2	LightBlue	<=	1.000 m
Intermediate 3	Orange	<=	3.000 m
Intermediate 4	Red	<=	6.000 m
Intermediate 5	Brown	<=	10.000 m
Intermediate 6	Purple	<=	15.000 m
Intermediate 7	Blue	<=	20.000 m
Upper bound	Gray	>	20.000 m

Restore Defaults

Apply to graphics view on Apply or OK

Apply | OK | Cancel


North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
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0.096
0.094
0.092
0.09
0.088
0.086
0.084
0.082
0.08
0.078
0.076
0.074
0.072
0.07
0.068
0.066
0.064
0.062
0.06
0.058
0.056
0.054
0.052
0.05
0.048
0.046
0.044
0.042
0.04
0.038
0.036
0.034
0.032
0.03
0.028
0.026
0.024
0.022
0.02
0.018
0.016
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
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189,000
190,000
191,000
192,000
193,000
194,000
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205,000
Time (sec)

From: opus <opus@ngs.noaa.gov>
Sent: Thursday, February 19, 2015 1:57 PM
To: Stonerock, Mike
Subject: OPUS solution : zma10480.15o OP1424372169010

FILE: zma10480.15o OP1424372169010

1008 NOTE: Antenna offsets supplied by the user were zero. Coordinates
1008 returned will be for the antenna reference point (ARP).
1008

NGS OPUS SOLUTION REPORT
==========

All computed coordinate accuracies are listed as peak-to-peak values.
For additional information: http://www.ngs.noaa.gov/OPUS/about.jsp#accuracy

USER: mstonerock@aca-net.com DATE: February 19, 2015
RINEX FILE: zma10480.15o TIME: 18:56:53 UTC

SOFTWARE: page5 1209.04 master91.pl 022814 START: 2015/02/17 00:00:00
EPHEMERIS: igr18322.eph [rapid] STOP: 2015/02/17 23:59:00
NAV FILE: brdc0480.15n OBS USED: 55557 / 60061 : 93%
ANT NAME: MPL_WAAS_2225NW NONE # FIXED AMB: 252 / 274 : 92%
ARP HEIGHT: 0.000 OVERALL RMS: 0.015(m)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2015.1301)

X:	966042.985(m)	0.011(m)	966042.221(m)	0.011(m)
Y:	-5663001.018(m)	0.016(m)	-5662999.415(m)	0.016(m)
Z:	2761581.489(m)	0.001(m)	2761581.310(m)	0.001(m)
LAT:	25 49 28.58531	0.007(m)	25 49 28.60426	0.007(m)
E LON:	279 40 50.93376	0.013(m)	279 40 50.91640	0.013(m)
W LON:	80 19 9.06624	0.013(m)	80 19 9.08360	0.013(m)
EL HGT:	-6.428(m)	0.012(m)	-8.044(m)	0.012(m)
ORTHO HGT:	18.646(m)	0.025(m)	[NAVD88 (Computed using GEOID12A)]	

	UTM COORDINATES (UTM (Zone 17))	STATE PLANE COORDINATES (SPC (0901 FL E))
Northing (Y) [meters]	2856437.019	165361.458
Easting (X) [meters]	568236.232	268259.521
Convergence [degrees]	0.29658655	0.29658655
Point Scale	0.99965749	0.99999869
Combined Factor	0.99965850	0.99999970

US NATIONAL GRID DESIGNATOR: 17RNJ6823656437(NAD 83)

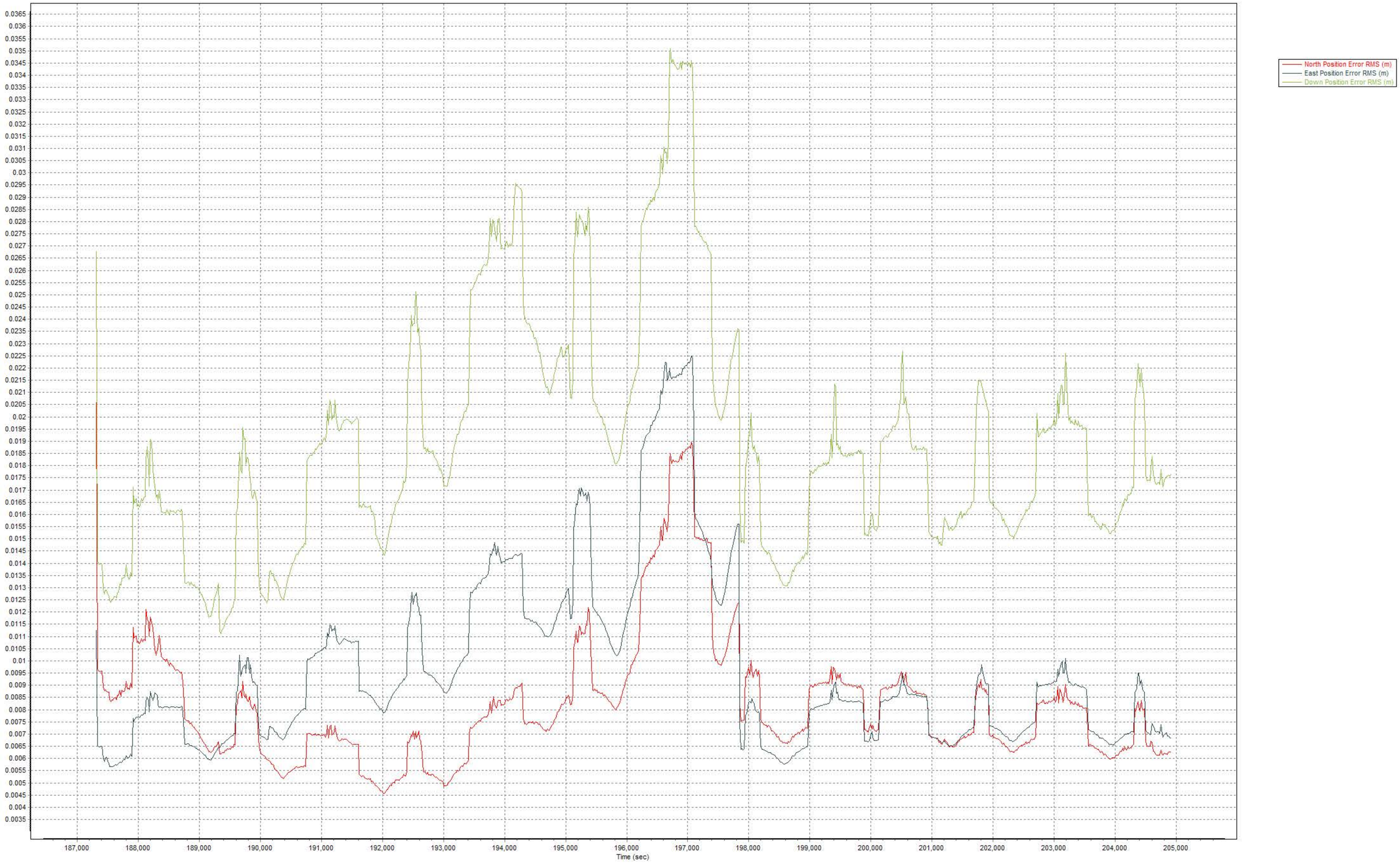
BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DF7050	MTNT MIAMI TNT CORS ARP	N255156.760	W0805425.186	59103.0

DG9798 PBCH WEST PALM CORS ARP N265046.638 W0801309.299 113632.4
DH3834 LAUD LAUDERDALE CORS ARP N261146.341 W0801023.014 43690.3

NEAREST NGS PUBLISHED CONTROL POINT
DF9225 MIAMI WAAS 1 CORS ARP N254928.585 W0801909.066 0.0

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.


North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
0.0365
0.036
0.0355
0.035
0.0345
0.034
0.0335
0.033
0.0325
0.032
0.0315
0.031
0.0305
0.03
0.0295
0.029
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0.0235
0.023
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0.0215
0.021
0.0205
0.02
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0.019
0.0185
0.018
0.0175
0.017
0.0165
0.016
0.0155
0.015
0.0145
0.014
0.0135
0.013
0.0125
0.012
0.0115
0.011
0.0105
0.01
0.0095
0.009
0.0085
0.008
0.0075
0.007
0.0065
0.006
0.0055
0.005
0.0045
0.004
0.0035
187,000
188,000
189,000
190,000
191,000
192,000
193,000
194,000
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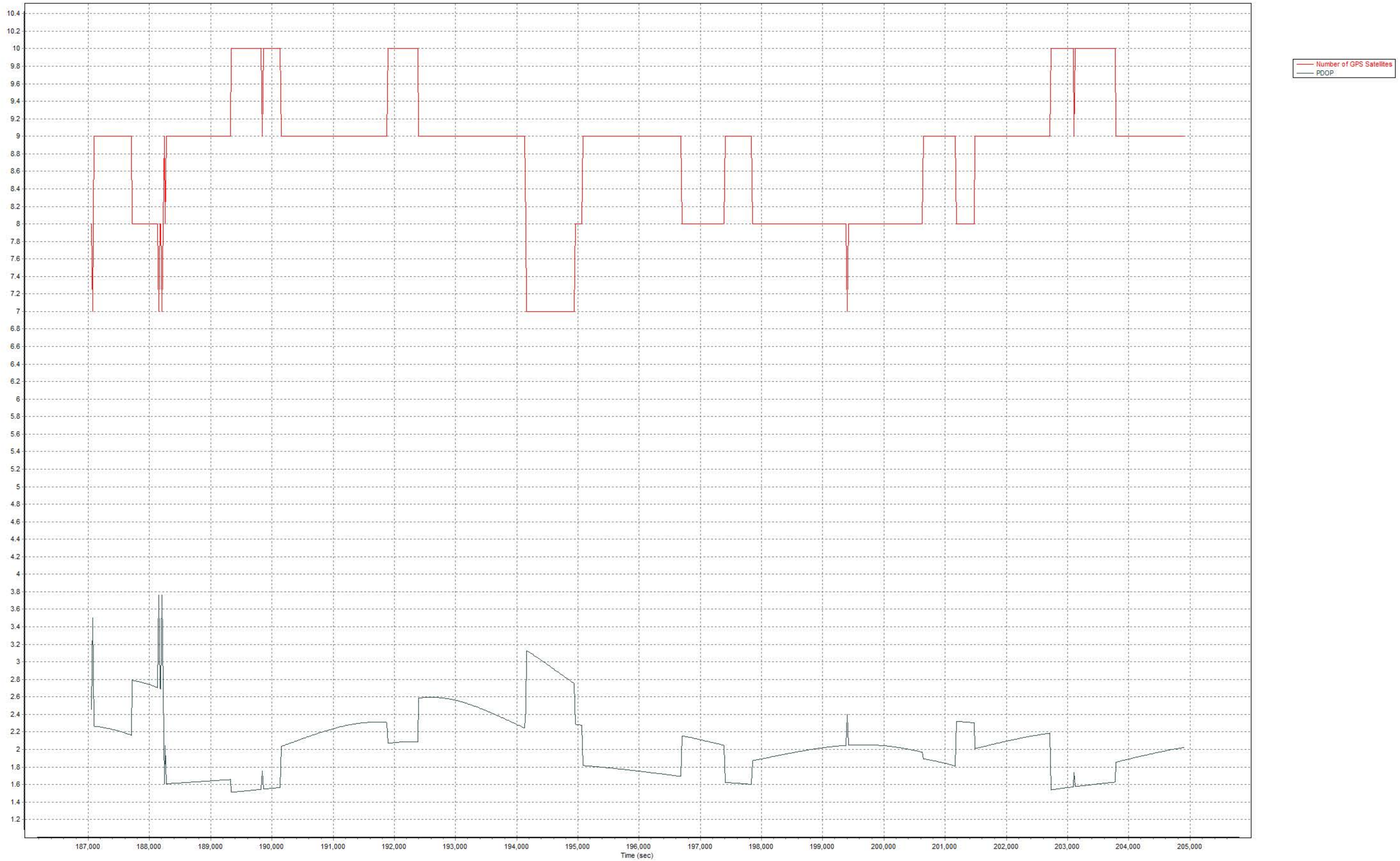
Time (sec)


Number of GPS Satellites
PDOP
10.4
10.2
10
9.8
9.6
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8.6
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7.6
7.4
7.2
7
6.8
6.6
6.4
6.2
6
5.8
5.6
5.4
5.2
5
4.8
4.6
4.4
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3.6
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2.4
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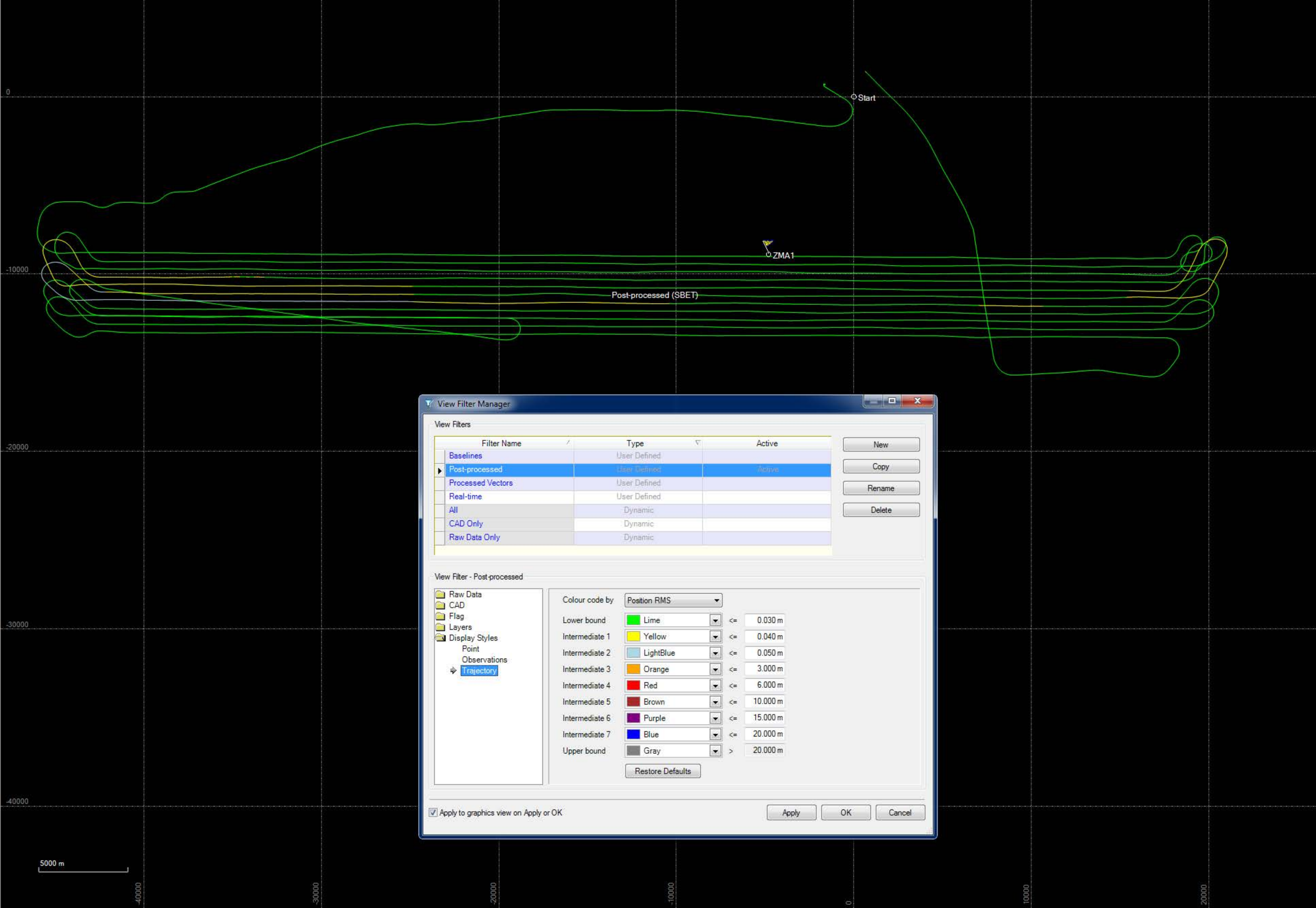
Time (sec)



View Filter Manager

View Filters

Filter Name	Type	Active
Baselines	User Defined	
Post-processed	User Defined	Active
Processed Vectors	User Defined	
Real-time	User Defined	
All	Dynamic	
CAD Only	Dynamic	
Raw Data Only	Dynamic	

New
Copy
Rename
Delete

View Filter - Post-processed

- Raw Data
- CAD
- Flag
- Layers
- Display Styles
  - Point
  - Observations
  - Trajectory

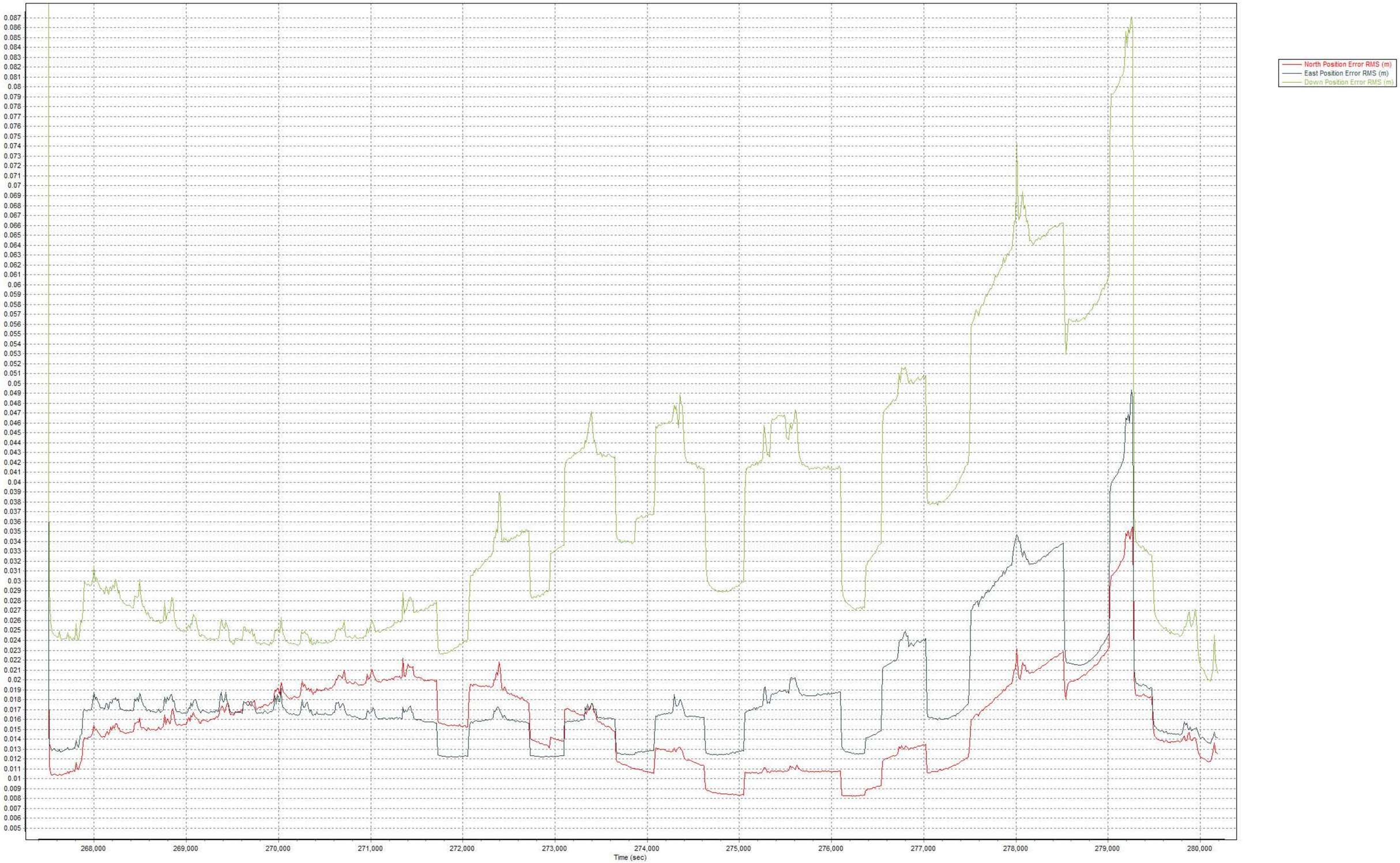
Colour code by: Position RMS

Lower bound	Lime	<=	0.030 m
Intermediate 1	Yellow	<=	0.040 m
Intermediate 2	LightBlue	<=	0.050 m
Intermediate 3	Orange	<=	3.000 m
Intermediate 4	Red	<=	6.000 m
Intermediate 5	Brown	<=	10.000 m
Intermediate 6	Purple	<=	15.000 m
Intermediate 7	Blue	<=	20.000 m
Upper bound	Gray	>	20.000 m

Restore Defaults

Apply to graphics view on Apply or OK

Apply | OK | Cancel


North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
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0.082
0.081
0.08
0.079
0.078
0.077
0.076
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0.073
0.072
0.071
0.07
0.069
0.068
0.067
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0.065
0.064
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0.062
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0.017
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0.008
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0.006
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279,000
280,000
Time (sec)

From: opus <opus@ngs.noaa.gov>
Sent: Thursday, February 19, 2015 1:57 PM
To: Stonerock, Mike
Subject: OPUS solution : zma10480.15o OP1424372169010

FILE: zma10480.15o OP1424372169010

1008 NOTE: Antenna offsets supplied by the user were zero. Coordinates
1008 returned will be for the antenna reference point (ARP).
1008

NGS OPUS SOLUTION REPORT
==========

All computed coordinate accuracies are listed as peak-to-peak values.
For additional information: http://www.ngs.noaa.gov/OPUS/about.jsp#accuracy

USER: mstonerock@aca-net.com DATE: February 19, 2015
RINEX FILE: zma10480.15o TIME: 18:56:53 UTC

SOFTWARE: page5 1209.04 master91.pl 022814 START: 2015/02/17 00:00:00
EPHEMERIS: igr18322.eph [rapid] STOP: 2015/02/17 23:59:00
NAV FILE: brdc0480.15n OBS USED: 55557 / 60061 : 93%
ANT NAME: MPL_WAAS_2225NW NONE # FIXED AMB: 252 / 274 : 92%
ARP HEIGHT: 0.000 OVERALL RMS: 0.015(m)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2015.1301)

X:	966042.985(m)	0.011(m)	966042.221(m)	0.011(m)
Y:	-5663001.018(m)	0.016(m)	-5662999.415(m)	0.016(m)
Z:	2761581.489(m)	0.001(m)	2761581.310(m)	0.001(m)
LAT:	25 49 28.58531	0.007(m)	25 49 28.60426	0.007(m)
E LON:	279 40 50.93376	0.013(m)	279 40 50.91640	0.013(m)
W LON:	80 19 9.06624	0.013(m)	80 19 9.08360	0.013(m)
EL HGT:	-6.428(m)	0.012(m)	-8.044(m)	0.012(m)
ORTHO HGT:	18.646(m)	0.025(m)	[NAVD88 (Computed using GEOID12A)]	

	UTM COORDINATES (UTM (Zone 17))	STATE PLANE COORDINATES (SPC (0901 FL E))
Northing (Y) [meters]	2856437.019	165361.458
Easting (X) [meters]	568236.232	268259.521
Convergence [degrees]	0.29658655	0.29658655
Point Scale	0.99965749	0.99999869
Combined Factor	0.99965850	0.99999970

US NATIONAL GRID DESIGNATOR: 17RNJ6823656437(NAD 83)

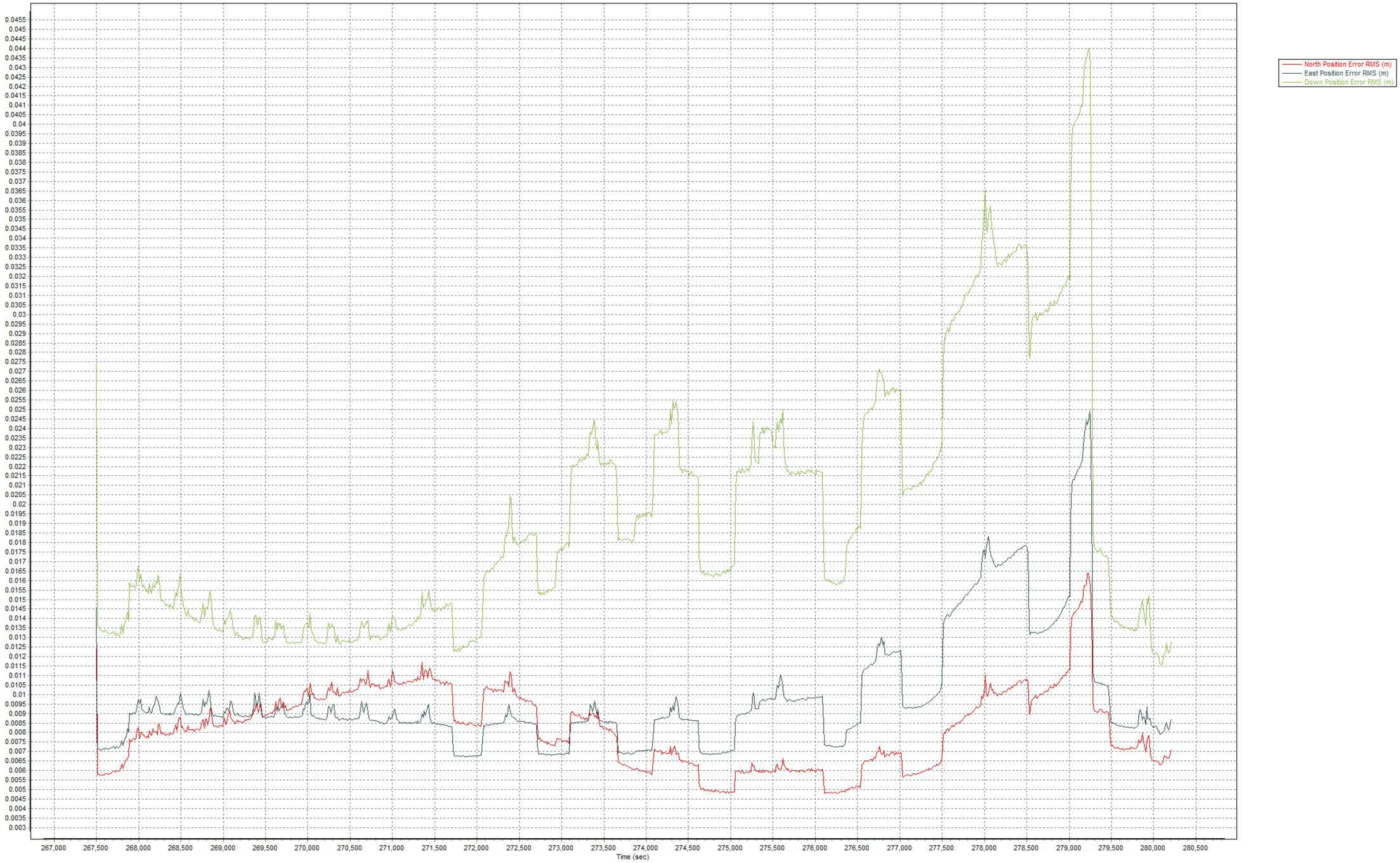
BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DF7050	MTNT MIAMI TNT CORS ARP	N255156.760	W0805425.186	59103.0

DG9798 PBCH WEST PALM CORS ARP N265046.638 W0801309.299 113632.4
DH3834 LAUD LAUDERDALE CORS ARP N261146.341 W0801023.014 43690.3

NEAREST NGS PUBLISHED CONTROL POINT
DF9225 MIAMI WAAS 1 CORS ARP N254928.585 W0801909.066 0.0

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.


North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
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0.044
0.0435
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0.0395
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0.0155
0.015
0.0145
0.014
0.0135
0.013
0.0125
0.012
0.0115
0.011
0.0105
0.01
0.0095
0.009
0.0085
0.008
0.0075
0.007
0.0065
0.006
0.0055
0.005
0.0045
0.004
0.0035
0.003
267,000
267,500
268,000
268,500
269,000
269,500
270,000
270,500
271,000
271,500
272,000
272,500
273,000
273,500
274,000
274,500
275,000
275,500
276,000
276,500
277,000
277,500
278,000
278,500
279,000
279,500
280,000
280,500
Time (sec)


Number of GPS Satellites
PDOP
11.4
11.2
11
10.8
10.6
10.4
10.2
10
9.8
9.6
9.4
9.2
9
8.8
8.6
8.4
8.2
8
7.8
7.6
7.4
7.2
7
6.8
6.6
6.4
6.2
6
5.8
5.6
5.4
5.2
5
4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
267,000
267,500
268,000
268,500
269,000
269,500
270,000
270,500
271,000
271,500
272,000
272,500
273,000
273,500
274,000
274,500
275,000
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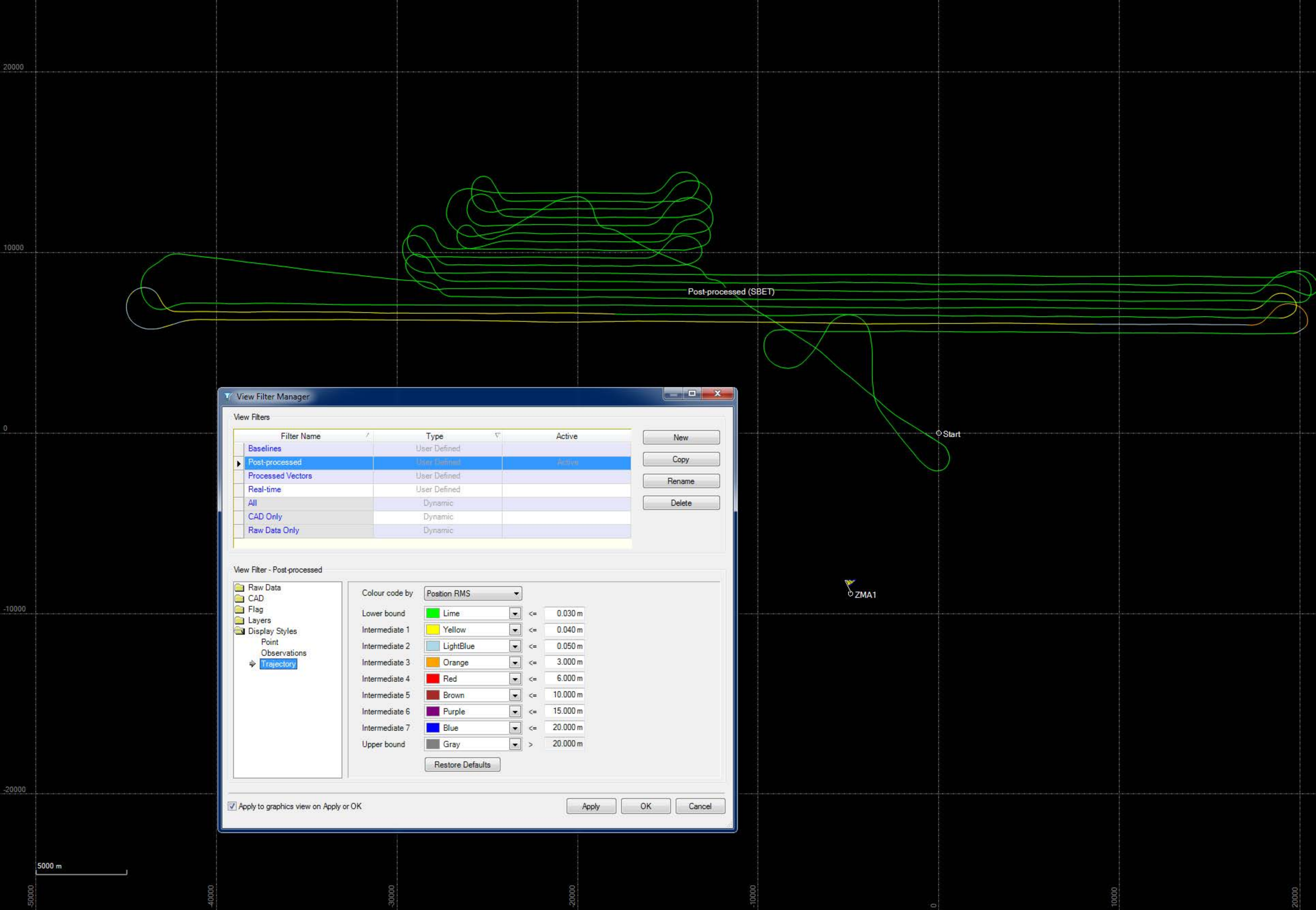
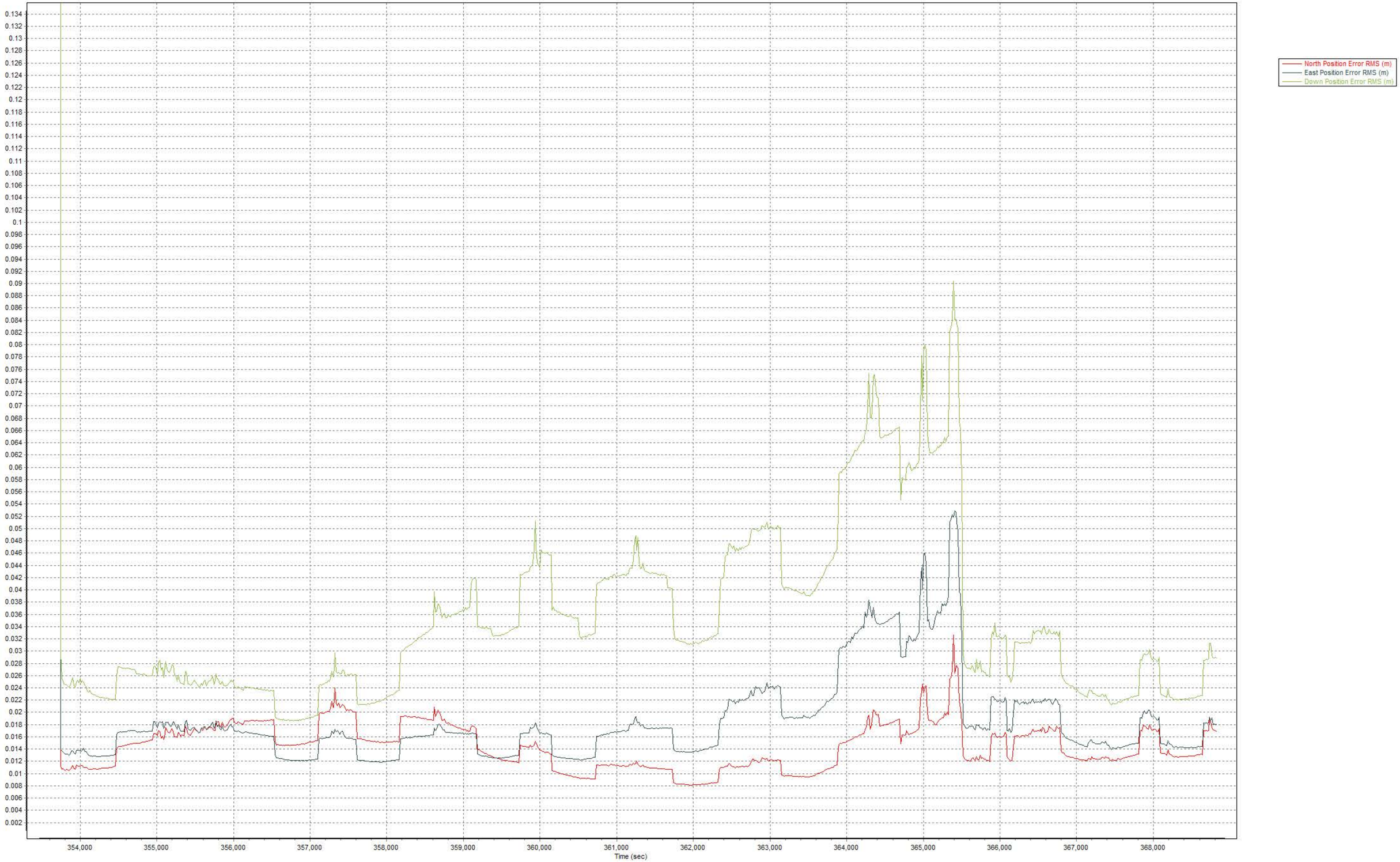
277,500
278,000
278,500
279,000
279,500
280,000
280,500
Time (sec)


20000
10000
0
-10000
-20000
-50000
-40000
-30000
-20000
-10000
0
10000
20000
Post-processed (SBET)
Start
ZMA1
5000 m
View Filter Manager
View Filters
Filter Name
Type
Active
Baselines
User Defined
Post-processed
User Defined
Active
Processed Vectors
User Defined
Real-time
User Defined
All
Dynamic
CAD Only
Dynamic
Raw Data Only
Dynamic
New
Copy
Rename
Delete
View Filter - Post-processed
Raw Data
CAD
Flag
Layers
Display Styles
Point
Observations
Trajectory
Colour code by
Position RMS
Lower bound
Lime
<=
0.030 m
Intermediate 1
Yellow
<=
0.040 m
Intermediate 2
LightBlue
<=
0.050 m
Intermediate 3
Orange
<=
3.000 m
Intermediate 4
Red
<=
6.000 m
Intermediate 5
Brown
<=
10.000 m
Intermediate 6
Purple
<=
15.000 m
Intermediate 7
Blue
<=
20.000 m
Upper bound
Gray
>
20.000 m
Restore Defaults
Apply to graphics view on Apply or OK
Apply
OK
Cancel


North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
0.134
0.132
0.13
0.128
0.126
0.124
0.122
0.12
0.118
0.116
0.114
0.112
0.11
0.108
0.106
0.104
0.102
0.1
0.098
0.096
0.094
0.092
0.09
0.088
0.086
0.084
0.082
0.08
0.078
0.076
0.074
0.072
0.07
0.068
0.066
0.064
0.062
0.06
0.058
0.056
0.054
0.052
0.05
0.048
0.046
0.044
0.042
0.04
0.038
0.036
0.034
0.032
0.03
0.028
0.026
0.024
0.022
0.02
0.018
0.016
0.014
0.012
0.01
0.008
0.006
0.004
0.002
354,000
355,000
356,000
357,000
358,000
359,000
360,000
361,000
362,000
363,000
364,000
365,000
366,000
367,000
368,000
Time (sec)

From: opus <opus@ngs.noaa.gov>
Sent: Thursday, February 19, 2015 1:57 PM
To: Stonerock, Mike
Subject: OPUS solution : zma10480.15o OP1424372169010

FILE: zma10480.15o OP1424372169010

1008 NOTE: Antenna offsets supplied by the user were zero. Coordinates
1008 returned will be for the antenna reference point (ARP).
1008

NGS OPUS SOLUTION REPORT
==========

All computed coordinate accuracies are listed as peak-to-peak values.
For additional information: http://www.ngs.noaa.gov/OPUS/about.jsp#accuracy

USER: mstonerock@aca-net.com DATE: February 19, 2015
RINEX FILE: zma10480.15o TIME: 18:56:53 UTC

SOFTWARE: page5 1209.04 master91.pl 022814 START: 2015/02/17 00:00:00
EPHEMERIS: igr18322.eph [rapid] STOP: 2015/02/17 23:59:00
NAV FILE: brdc0480.15n OBS USED: 55557 / 60061 : 93%
ANT NAME: MPL_WAAS_2225NW NONE # FIXED AMB: 252 / 274 : 92%
ARP HEIGHT: 0.000 OVERALL RMS: 0.015(m)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2015.1301)

X:	966042.985(m)	0.011(m)	966042.221(m)	0.011(m)
Y:	-5663001.018(m)	0.016(m)	-5662999.415(m)	0.016(m)
Z:	2761581.489(m)	0.001(m)	2761581.310(m)	0.001(m)
LAT:	25 49 28.58531	0.007(m)	25 49 28.60426	0.007(m)
E LON:	279 40 50.93376	0.013(m)	279 40 50.91640	0.013(m)
W LON:	80 19 9.06624	0.013(m)	80 19 9.08360	0.013(m)
EL HGT:	-6.428(m)	0.012(m)	-8.044(m)	0.012(m)
ORTHO HGT:	18.646(m)	0.025(m)	[NAVD88 (Computed using GEOID12A)]	

	UTM COORDINATES (UTM (Zone 17))	STATE PLANE COORDINATES (SPC (0901 FL E))
Northing (Y) [meters]	2856437.019	165361.458
Easting (X) [meters]	568236.232	268259.521
Convergence [degrees]	0.29658655	0.29658655
Point Scale	0.99965749	0.99999869
Combined Factor	0.99965850	0.99999970

US NATIONAL GRID DESIGNATOR: 17RNJ6823656437(NAD 83)

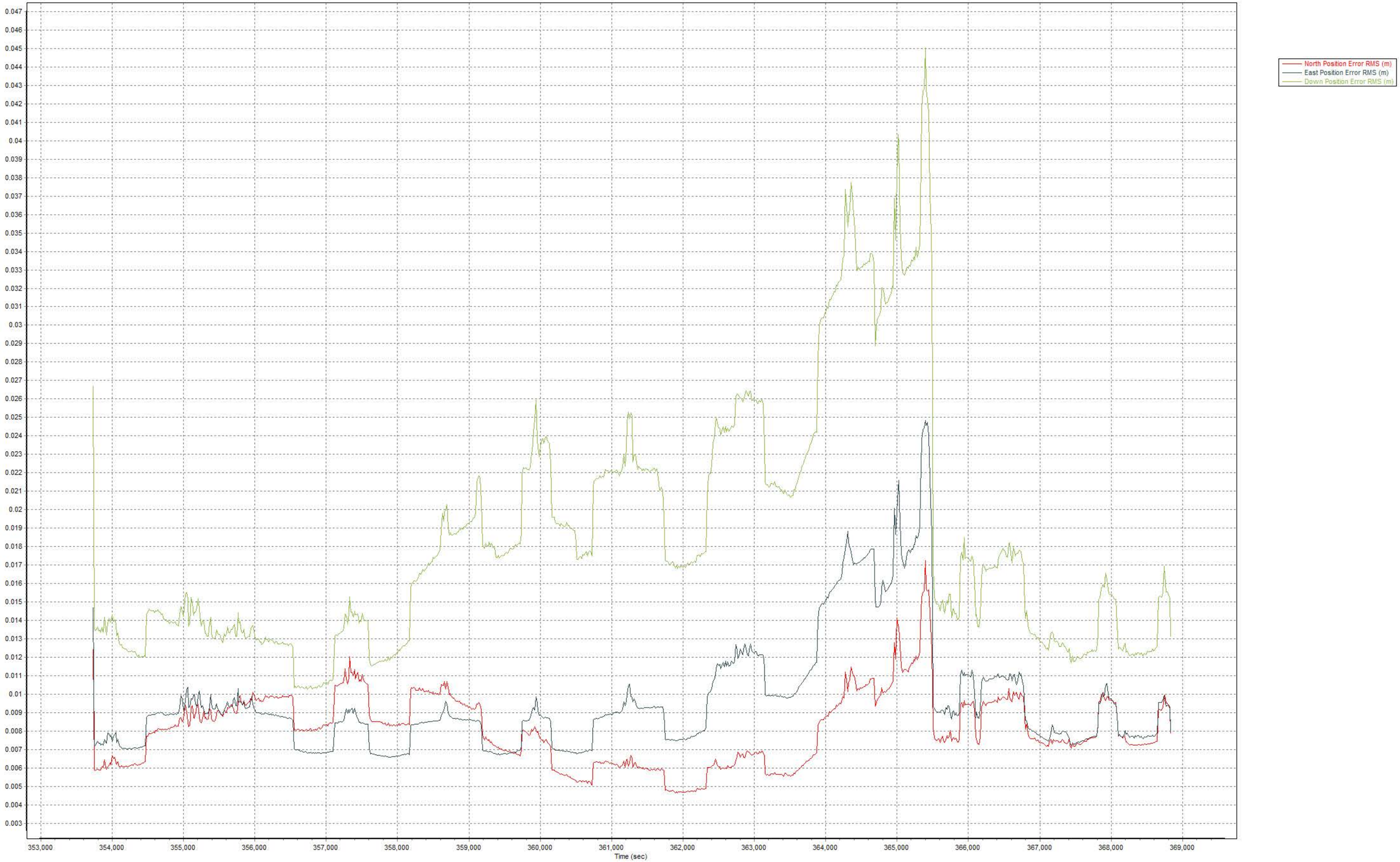
BASE STATIONS USED

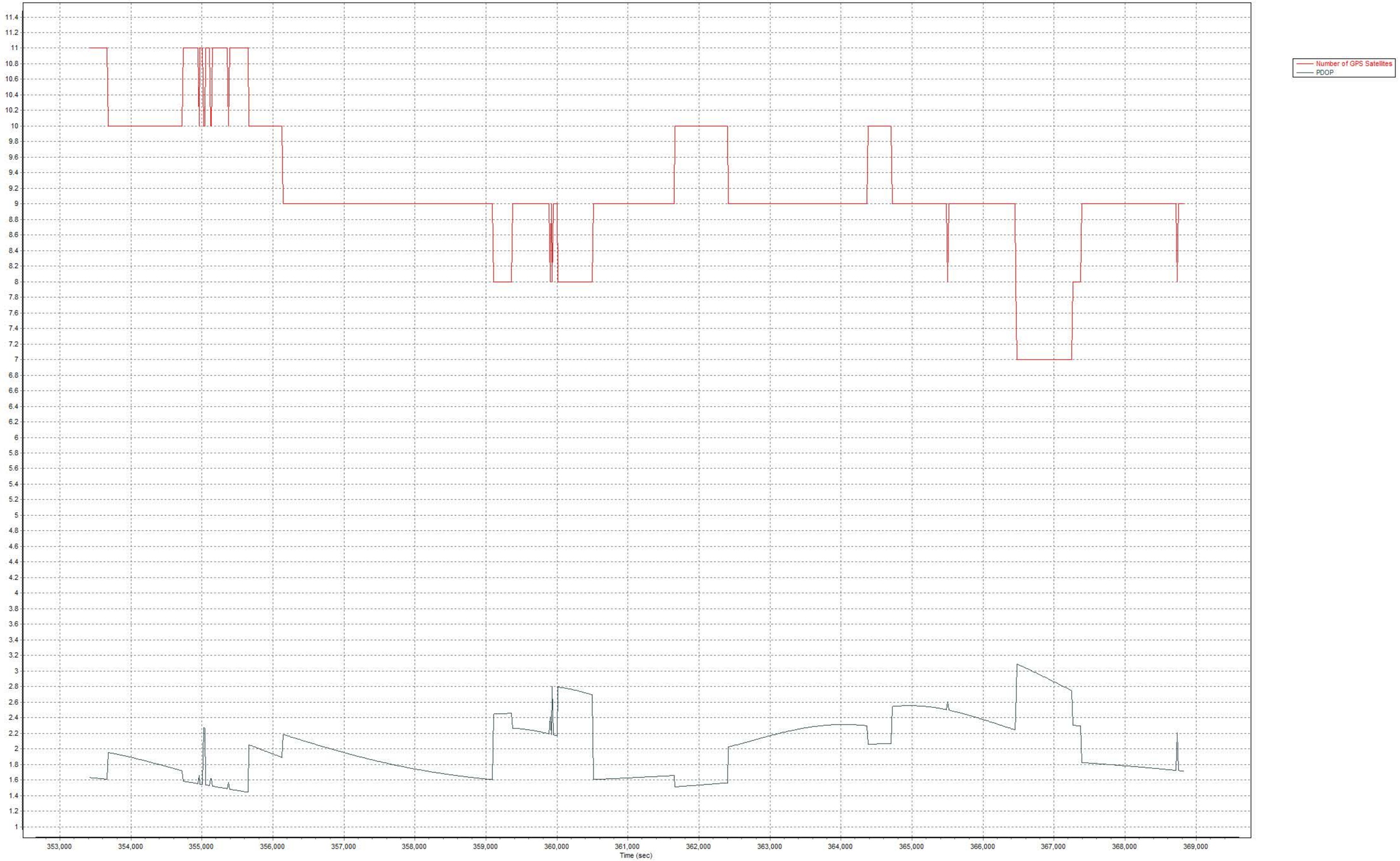
PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DF7050	MTNT MIAMI TNT CORS ARP	N255156.760	W0805425.186	59103.0

DG9798 PBCH WEST PALM CORS ARP N265046.638 W0801309.299 113632.4
DH3834 LAUD LAUDERDALE CORS ARP N261146.341 W0801023.014 43690.3

NEAREST NGS PUBLISHED CONTROL POINT
DF9225 MIAMI WAAS 1 CORS ARP N254928.585 W0801909.066 0.0

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.


North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
0.047
0.046
0.045
0.044
0.043
0.042
0.041
0.04
0.039
0.038
0.037
0.036
0.035
0.034
0.033
0.032
0.031
0.03
0.029
0.028
0.027
0.026
0.025
0.024
0.023
0.022
0.021
0.02
0.019
0.018
0.017
0.016
0.015
0.014
0.013
0.012
0.011
0.01
0.009
0.008
0.007
0.006
0.005
0.004
0.003
353,000
354,000
355,000
356,000
357,000
358,000
359,000
360,000
361,000
362,000
363,000
364,000
365,000
366,000
367,000
368,000
369,000
Time (sec)


Number of GPS Satellites
PDOP
11.4
11.2
11
10.8
10.6
10.4
10.2
10
9.8
9.6
9.4
9.2
9
8.8
8.6
8.4
8.2
8
7.8
7.6
7.4
7.2
7
6.8
6.6
6.4
6.2
6
5.8
5.6
5.4
5.2
5
4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
353,000
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355,000
356,000
357,000
358,000
359,000
360,000
361,000
362,000
363,000
364,000
365,000
366,000
367,000
368,000
369,000
Time (sec)

10000

0

-10000

-20000

-30000

-40000

-50000

-40000

0

10000

20000

Post-processed (SBET)

Start

ZMA1

5000 m

View Filter Manager

View Filters

Filter Name	Type	Active
Baselines	User Defined	
Post-processed	User Defined	Active
Processed Vectors	User Defined	
Real-time	User Defined	
All	Dynamic	
CAD Only	Dynamic	
Raw Data Only	Dynamic	

New

Copy

Rename

Delete

View Filter - Post-processed

- Raw Data
- CAD
- Flag
- Layers
- Display Styles
  - Point
  - Observations
  - Trajectory

Colour code by: Position RMS

Lower bound	Lime	<=	0.030 m
Intermediate 1	Yellow	<=	0.040 m
Intermediate 2	LightBlue	<=	0.050 m
Intermediate 3	Orange	<=	3.000 m
Intermediate 4	Red	<=	6.000 m
Intermediate 5	Brown	<=	10.000 m
Intermediate 6	Purple	<=	15.000 m
Intermediate 7	Blue	<=	20.000 m
Upper bound	Gray	>	20.000 m

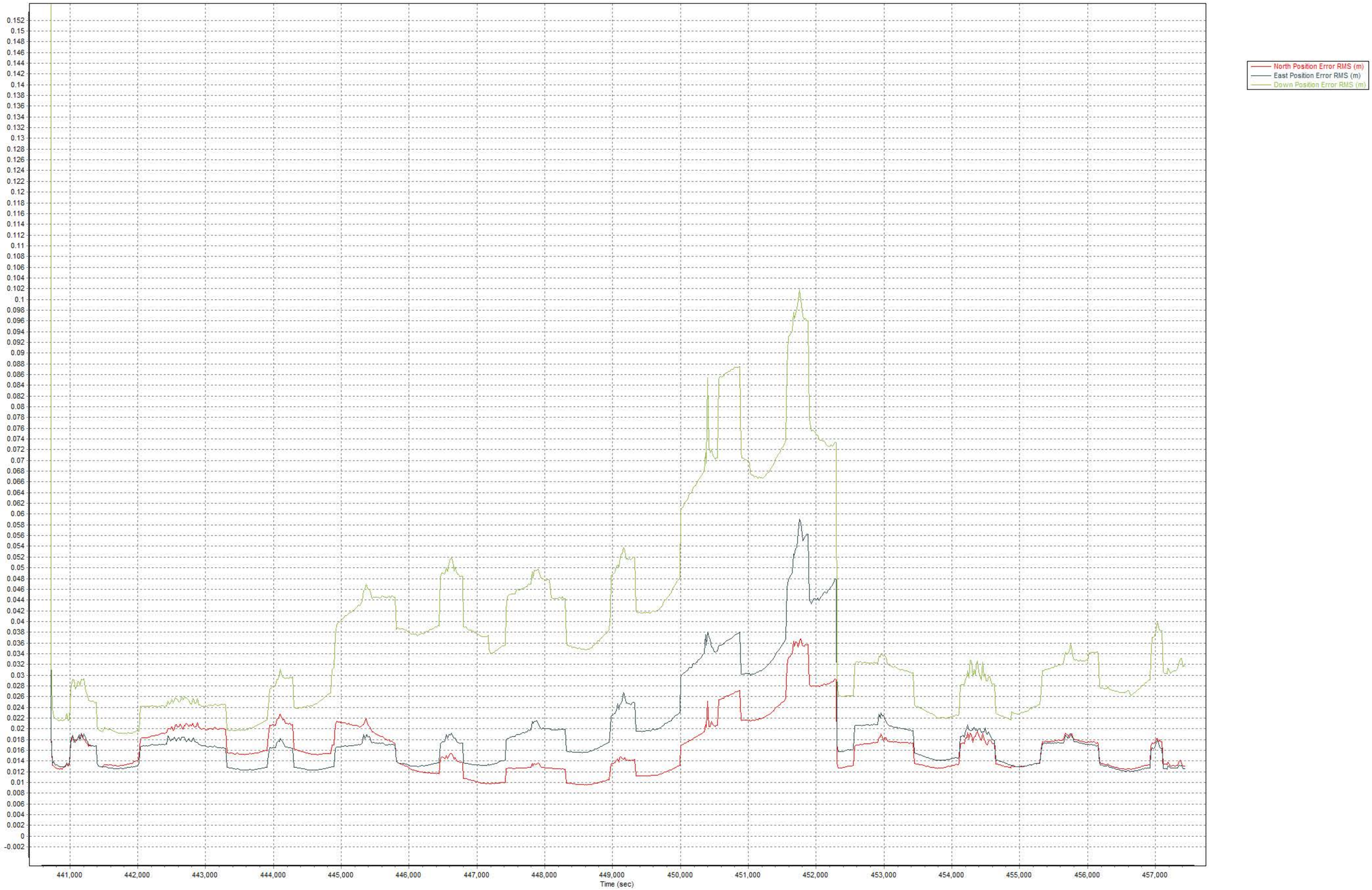
Restore Defaults

Apply to graphics view on Apply or OK

Apply

OK

Cancel


North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
0.152
0.15
0.148
0.146
0.144
0.142
0.14
0.138
0.136
0.134
0.132
0.13
0.128
0.126
0.124
0.122
0.12
0.118
0.116
0.114
0.112
0.11
0.108
0.106
0.104
0.102
0.1
0.098
0.096
0.094
0.092
0.09
0.088
0.086
0.084
0.082
0.08
0.078
0.076
0.074
0.072
0.07
0.068
0.066
0.064
0.062
0.06
0.058
0.056
0.054
0.052
0.05
0.048
0.046
0.044
0.042
0.04
0.038
0.036
0.034
0.032
0.03
0.028
0.026
0.024
0.022
0.02
0.018
0.016
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
-0.002
441,000
442,000
443,000
444,000
445,000
446,000
447,000
448,000
449,000
450,000
451,000
452,000
453,000
454,000
455,000
456,000
457,000
Time (sec)

From: opus <opus@ngs.noaa.gov>
Sent: Thursday, February 19, 2015 1:57 PM
To: Stonerock, Mike
Subject: OPUS solution : zma10480.15o OP1424372169010

FILE: zma10480.15o OP1424372169010

1008 NOTE: Antenna offsets supplied by the user were zero. Coordinates
1008 returned will be for the antenna reference point (ARP).
1008

NGS OPUS SOLUTION REPORT
==========

All computed coordinate accuracies are listed as peak-to-peak values.
For additional information: http://www.ngs.noaa.gov/OPUS/about.jsp#accuracy

USER: mstonerock@aca-net.com DATE: February 19, 2015
RINEX FILE: zma10480.15o TIME: 18:56:53 UTC

SOFTWARE: page5 1209.04 master91.pl 022814 START: 2015/02/17 00:00:00
EPHEMERIS: igr18322.eph [rapid] STOP: 2015/02/17 23:59:00
NAV FILE: brdc0480.15n OBS USED: 55557 / 60061 : 93%
ANT NAME: MPL_WAAS_2225NW NONE # FIXED AMB: 252 / 274 : 92%
ARP HEIGHT: 0.000 OVERALL RMS: 0.015(m)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2015.1301)

X:	966042.985(m)	0.011(m)	966042.221(m)	0.011(m)
Y:	-5663001.018(m)	0.016(m)	-5662999.415(m)	0.016(m)
Z:	2761581.489(m)	0.001(m)	2761581.310(m)	0.001(m)
LAT:	25 49 28.58531	0.007(m)	25 49 28.60426	0.007(m)
E LON:	279 40 50.93376	0.013(m)	279 40 50.91640	0.013(m)
W LON:	80 19 9.06624	0.013(m)	80 19 9.08360	0.013(m)
EL HGT:	-6.428(m)	0.012(m)	-8.044(m)	0.012(m)
ORTHO HGT:	18.646(m)	0.025(m)	[NAVD88 (Computed using GEOID12A)]	

	UTM COORDINATES (UTM (Zone 17))	STATE PLANE COORDINATES (SPC (0901 FL E))
Northing (Y) [meters]	2856437.019	165361.458
Easting (X) [meters]	568236.232	268259.521
Convergence [degrees]	0.29658655	0.29658655
Point Scale	0.99965749	0.99999869
Combined Factor	0.99965850	0.99999970

US NATIONAL GRID DESIGNATOR: 17RNJ6823656437(NAD 83)

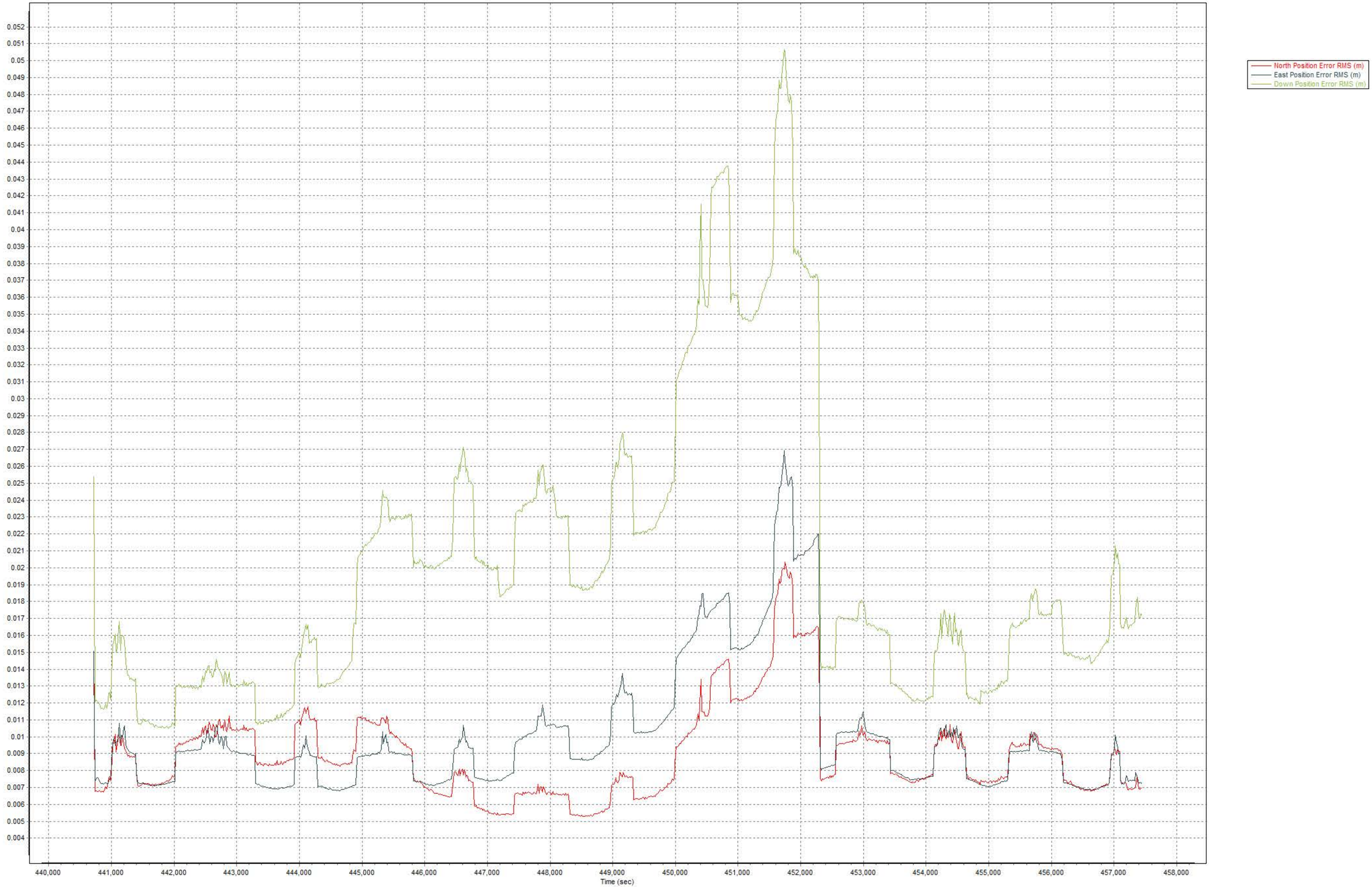
BASE STATIONS USED

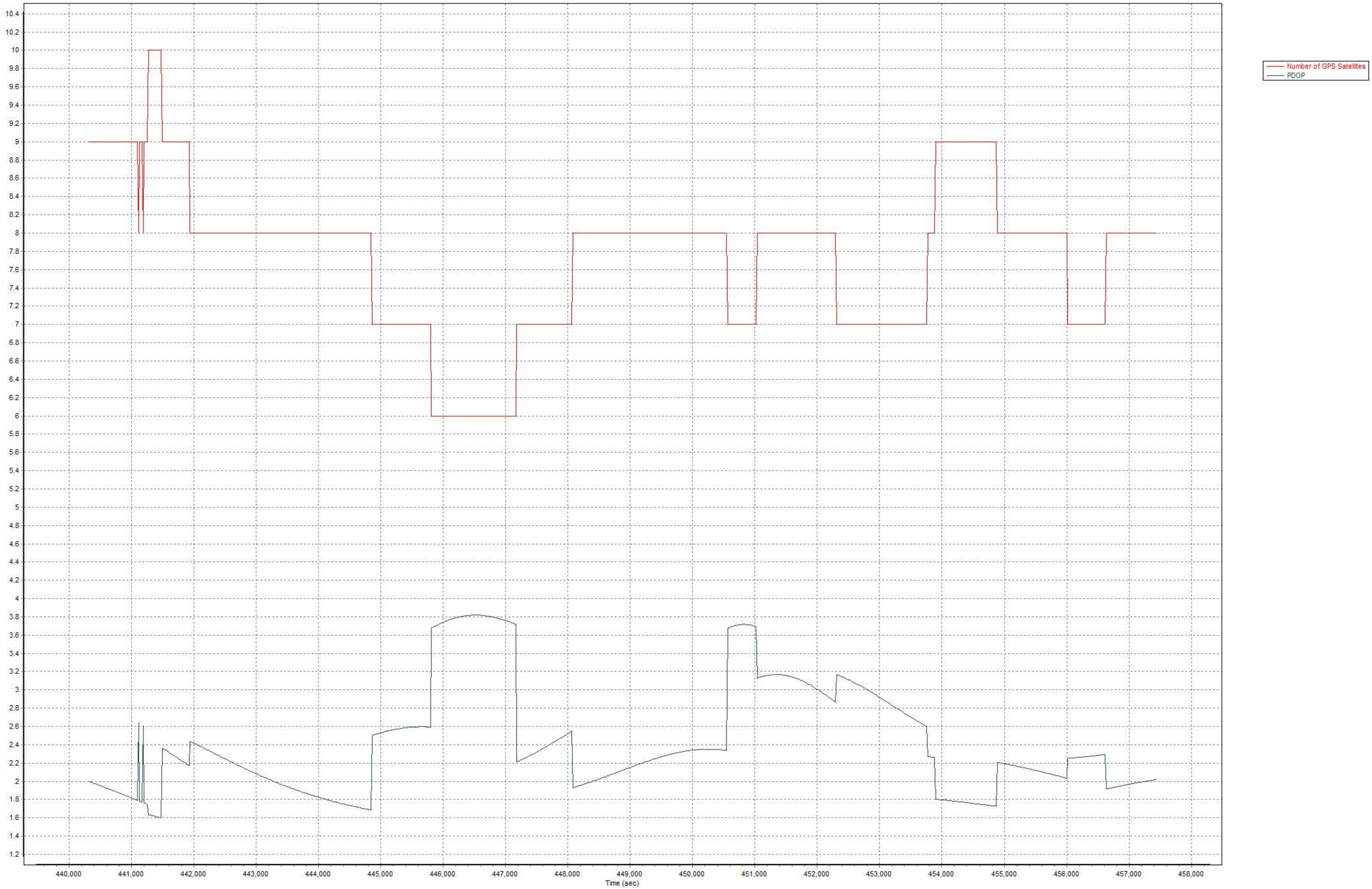
PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DF7050	MTNT MIAMI TNT CORS ARP	N255156.760	W0805425.186	59103.0

DG9798 PBCH WEST PALM CORS ARP N265046.638 W0801309.299 113632.4
DH3834 LAUD LAUDERDALE CORS ARP N261146.341 W0801023.014 43690.3

NEAREST NGS PUBLISHED CONTROL POINT
DF9225 MIAMI WAAS 1 CORS ARP N254928.585 W0801909.066 0.0

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.


North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
0.052
0.051
0.05
0.049
0.048
0.047
0.046
0.045
0.044
0.043
0.042
0.041
0.04
0.039
0.038
0.037
0.036
0.035
0.034
0.033
0.032
0.031
0.03
0.029
0.028
0.027
0.026
0.025
0.024
0.023
0.022
0.021
0.02
0.019
0.018
0.017
0.016
0.015
0.014
0.013
0.012
0.011
0.01
0.009
0.008
0.007
0.006
0.005
0.004
440,000
441,000
442,000
443,000
444,000
445,000
446,000
447,000
448,000
449,000
450,000
451,000
452,000
453,000
454,000
455,000
456,000
457,000
458,000
Time (sec)


Number of GPS Satellites
PDOP
10.4
10.2
10
9.8
9.6
9.4
9.2
9
8.8
8.6
8.4
8.2
8
7.8
7.6
7.4
7.2
7
6.8
6.6
6.4
6.2
6
5.8
5.6
5.4
5.2
5
4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
440,000
441,000
442,000
443,000
444,000
445,000
446,000
447,000
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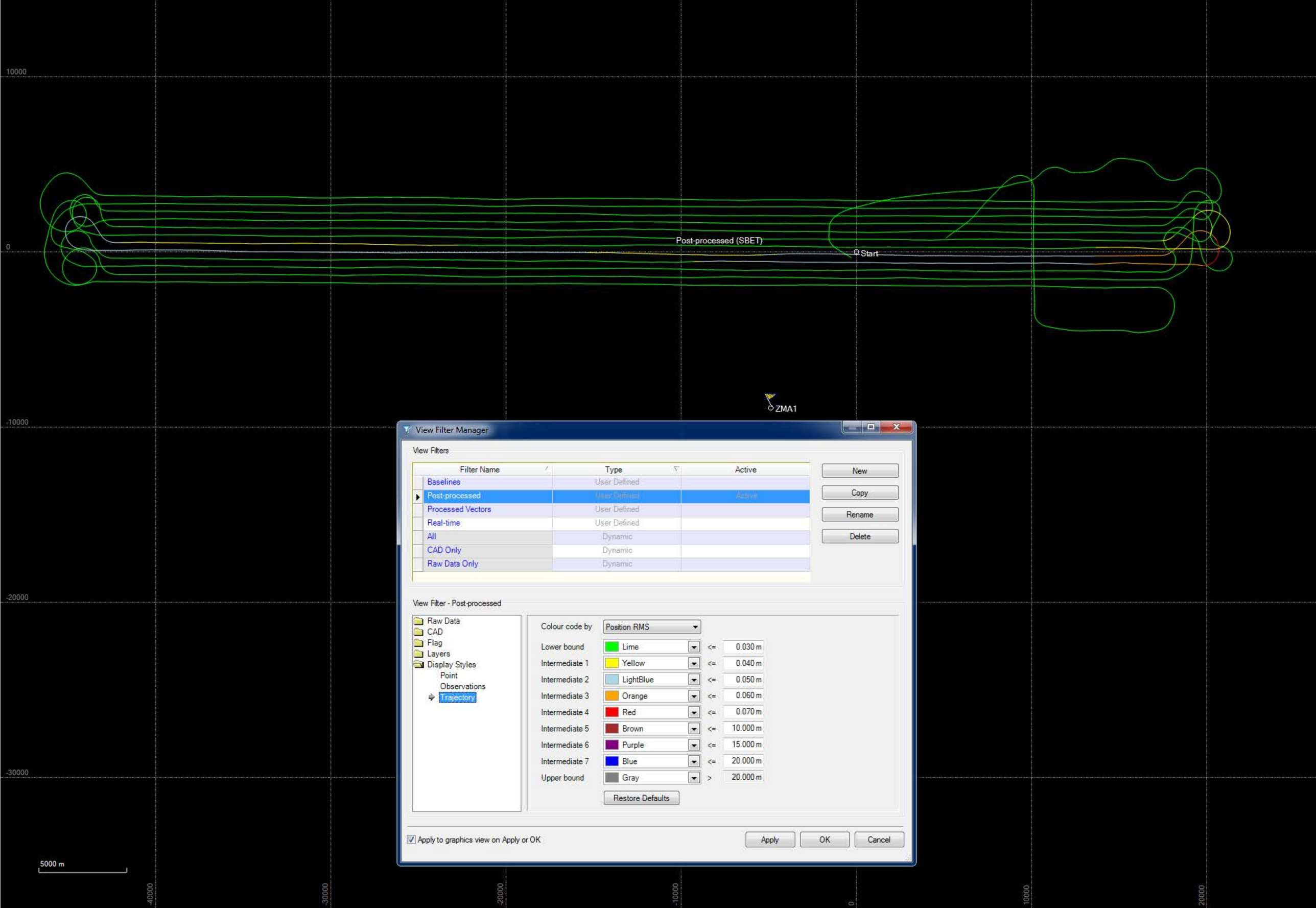
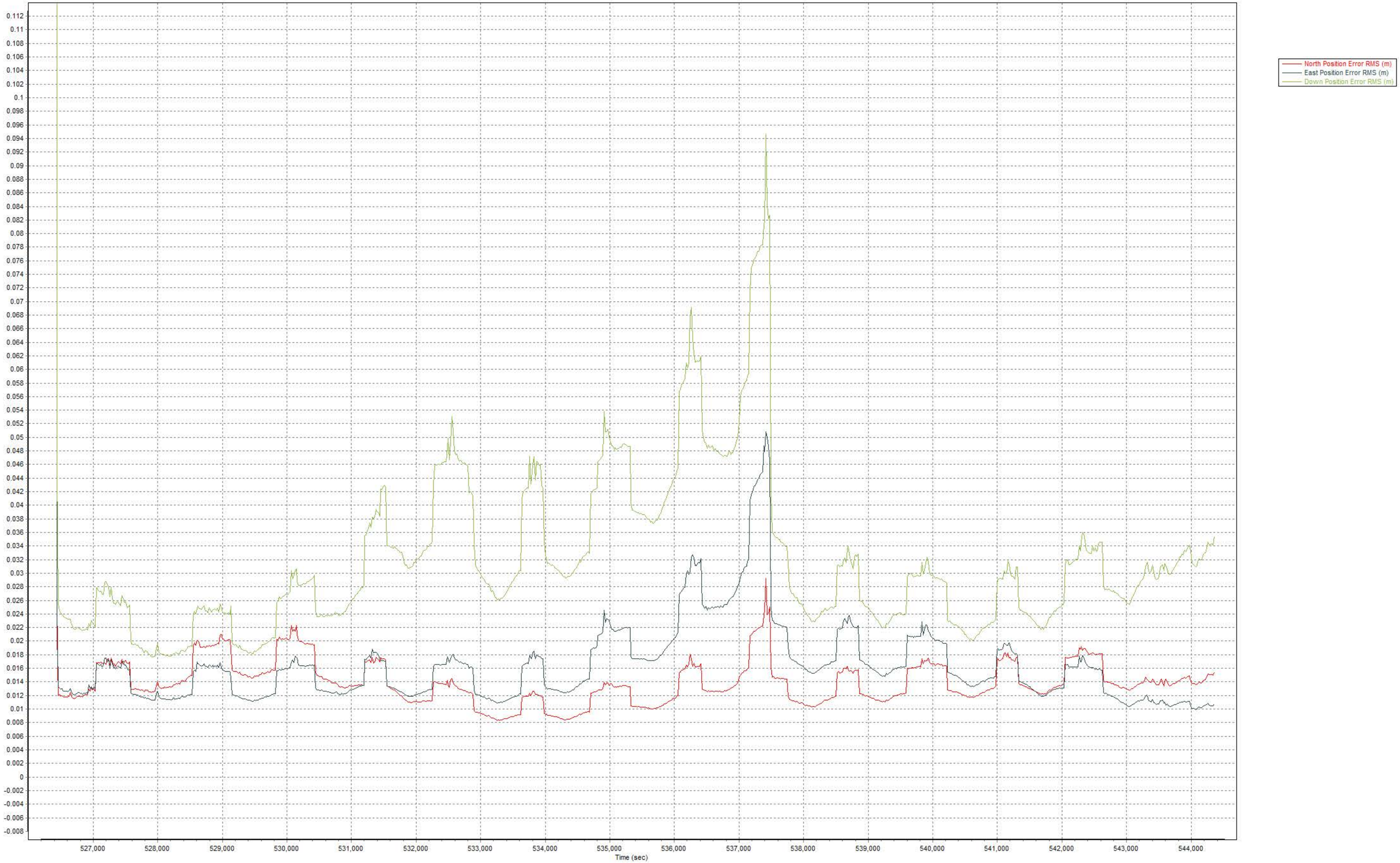
455,000
456,000
457,000
458,000
Time (sec)


10000
0
-10000
-20000
-30000
-40000
Post-processed (SBET)
Start
ZMA1
5000 m
View Filter Manager
View Filters
Filter Name
Type
Active
Baselines
User Defined
Post-processed
User Defined
Active
Processed Vectors
User Defined
Real-time
User Defined
All
Dynamic
CAD Only
Dynamic
Raw Data Only
Dynamic
New
Copy
Rename
Delete
View Filter - Post-processed
Raw Data
CAD
Flag
Layers
Display Styles
Point
Observations
Trajectory
Colour code by
Position RMS
Lower bound
Lime
<=
0.030 m
Intermediate 1
Yellow
<=
0.040 m
Intermediate 2
LightBlue
<=
0.050 m
Intermediate 3
Orange
<=
0.060 m
Intermediate 4
Red
<=
0.070 m
Intermediate 5
Brown
<=
10.000 m
Intermediate 6
Purple
<=
15.000 m
Intermediate 7
Blue
<=
20.000 m
Upper bound
Gray
>
20.000 m
Restore Defaults
Apply to graphics view on Apply or OK
Apply
OK
Cancel


North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
0.112
0.11
0.108
0.106
0.104
0.102
0.1
0.098
0.096
0.094
0.092
0.09
0.088
0.086
0.084
0.082
0.08
0.078
0.076
0.074
0.072
0.07
0.068
0.066
0.064
0.062
0.06
0.058
0.056
0.054
0.052
0.05
0.048
0.046
0.044
0.042
0.04
0.038
0.036
0.034
0.032
0.03
0.028
0.026
0.024
0.022
0.02
0.018
0.016
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
-0.002
-0.004
-0.006
-0.008
527,000
528,000
529,000
530,000
531,000
532,000
533,000
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536,000
537,000
538,000
539,000
540,000
541,000
542,000
543,000
544,000
Time (sec)

From: opus <opus@ngs.noaa.gov>
Sent: Thursday, February 26, 2015 10:13 AM
To: Stonerock, Mike
Subject: OPUS solution : rmnd0520.15o OP1424963544212

FILE: rmnd0520.15o OP1424963544212

1008 NOTE: Antenna offsets supplied by the user were zero. Coordinates
1008 returned will be for the antenna reference point (ARP).
1008

NGS OPUS SOLUTION REPORT
==========

All computed coordinate accuracies are listed as peak-to-peak values.
For additional information: http://www.ngs.noaa.gov/OPUS/about.jsp#accuracy

USER: mstonerock@aca-net.com DATE: February 26, 2015
RINEX FILE: rmnd0520.15o TIME: 15:13:07 UTC

SOFTWARE: page5 1209.04 master91.pl 022814 START: 2015/02/21 00:00:00
EPHEMERIS: igr18326.eph [rapid] STOP: 2015/02/21 23:59:00
NAV FILE: brdc0520.15n OBS USED: 58547 / 61885 : 95%
ANT NAME: LEIAR20 NONE # FIXED AMB: 206 / 224 : 92%
ARP HEIGHT: 0.000 OVERALL RMS: 0.012(m)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2015.1410)

X:	961335.331(m)	0.005(m)	961334.569(m)	0.005(m)
Y:	-5674075.787(m)	0.010(m)	-5674074.182(m)	0.010(m)
Z:	2740535.393(m)	0.010(m)	2740535.213(m)	0.010(m)

LAT:	25 36 49.58917	0.007(m)	25 36 49.60791	0.007(m)
E LON:	279 36 57.85939	0.003(m)	279 36 57.84208	0.003(m)
W LON:	80 23 2.14061	0.003(m)	80 23 2.15792	0.003(m)
EL HGT:	-13.982(m)	0.013(m)	-15.602(m)	0.013(m)
ORTHO HGT:	11.128(m)	0.026(m)	[NAVD88 (Computed using GEOID12A)]	

	UTM COORDINATES (UTM (Zone 17))	STATE PLANE COORDINATES (SPC (0901 FL E))
Northing (Y) [meters]	2833056.742	141973.201
Easting (X) [meters]	561856.015	261877.127
Convergence [degrees]	0.26633800	0.26633800
Point Scale	0.99964724	0.99998844
Combined Factor	0.99964944	0.99999064

US NATIONAL GRID DESIGNATOR: 17RNJ6185633056(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DL2756	FLC5 CARD SOUND 5 CORS ARP	N252553.839	W0802801.043	21836.8

DF9225 ZMA1 MIAMI WAAS 1 CORS ARP N254928.585 W0801909.066 24243.6
DF7050 MTNT MIAMI TNT CORS ARP N255156.760 W0805425.186 59445.6

NEAREST NGS PUBLISHED CONTROL POINT
AF9577 RICHMOND 6 CORS ARP N253649.589 W0802302.140 0.0

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

From: opus <opus@ngs.noaa.gov>
Sent: Thursday, February 19, 2015 1:57 PM
To: Stonerock, Mike
Subject: OPUS solution : zma10480.15o OP1424372169010

FILE: zma10480.15o OP1424372169010

1008 NOTE: Antenna offsets supplied by the user were zero. Coordinates
1008 returned will be for the antenna reference point (ARP).
1008

NGS OPUS SOLUTION REPORT
==========

All computed coordinate accuracies are listed as peak-to-peak values.
For additional information: http://www.ngs.noaa.gov/OPUS/about.jsp#accuracy

USER: mstonerock@aca-net.com DATE: February 19, 2015
RINEX FILE: zma10480.15o TIME: 18:56:53 UTC

SOFTWARE: page5 1209.04 master91.pl 022814 START: 2015/02/17 00:00:00
EPHEMERIS: igr18322.eph [rapid] STOP: 2015/02/17 23:59:00
NAV FILE: brdc0480.15n OBS USED: 55557 / 60061 : 93%
ANT NAME: MPL_WAAS_2225NW NONE # FIXED AMB: 252 / 274 : 92%
ARP HEIGHT: 0.000 OVERALL RMS: 0.015(m)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2015.1301)

X:	966042.985(m)	0.011(m)	966042.221(m)	0.011(m)
Y:	-5663001.018(m)	0.016(m)	-5662999.415(m)	0.016(m)
Z:	2761581.489(m)	0.001(m)	2761581.310(m)	0.001(m)
LAT:	25 49 28.58531	0.007(m)	25 49 28.60426	0.007(m)
E LON:	279 40 50.93376	0.013(m)	279 40 50.91640	0.013(m)
W LON:	80 19 9.06624	0.013(m)	80 19 9.08360	0.013(m)
EL HGT:	-6.428(m)	0.012(m)	-8.044(m)	0.012(m)
ORTHO HGT:	18.646(m)	0.025(m)	[NAVD88 (Computed using GEOID12A)]	

	UTM COORDINATES (UTM (Zone 17))	STATE PLANE COORDINATES (SPC (0901 FL E))
Northing (Y) [meters]	2856437.019	165361.458
Easting (X) [meters]	568236.232	268259.521
Convergence [degrees]	0.29658655	0.29658655
Point Scale	0.99965749	0.99999869
Combined Factor	0.99965850	0.99999970

US NATIONAL GRID DESIGNATOR: 17RNJ6823656437(NAD 83)

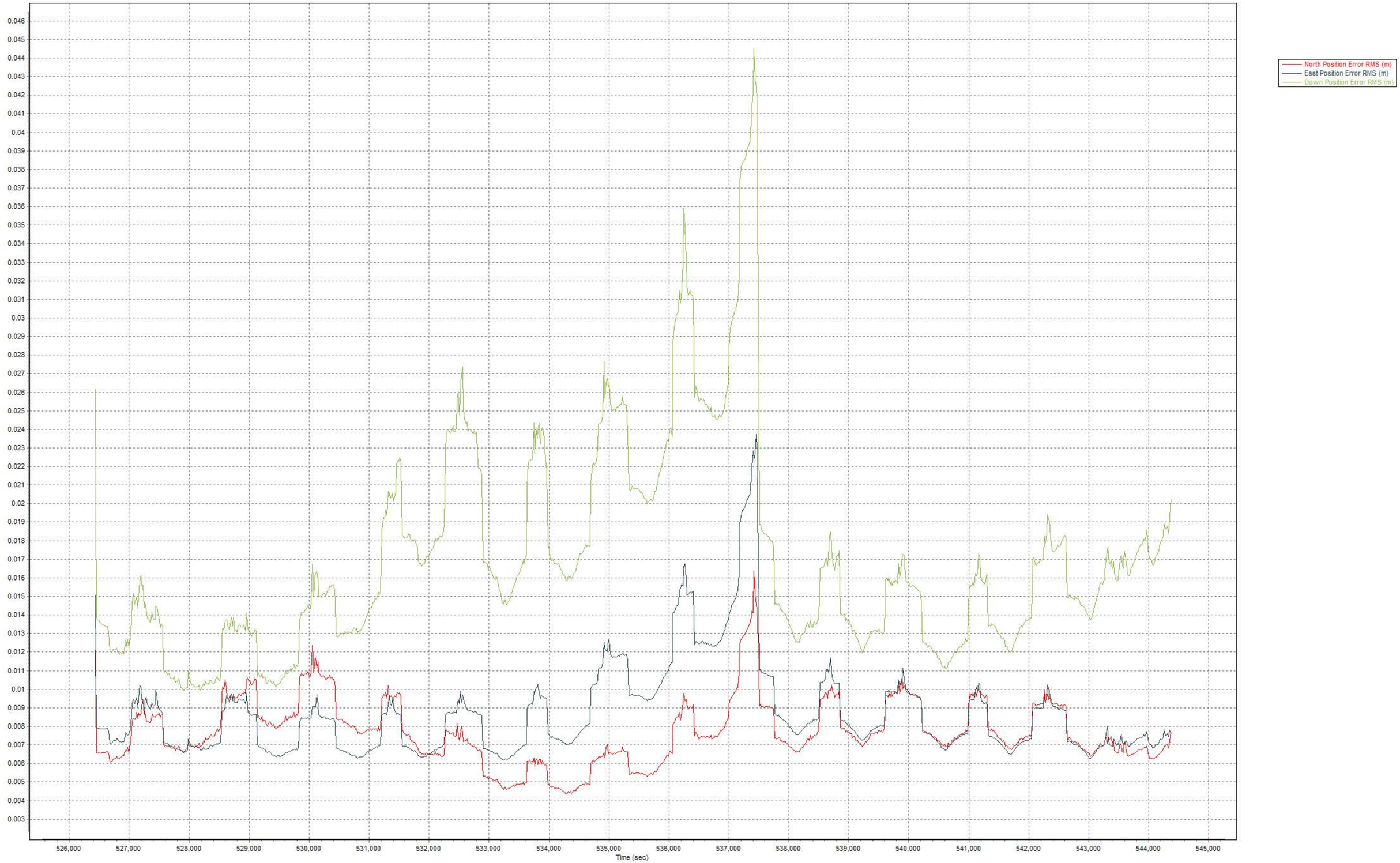
BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DF7050	MTNT MIAMI TNT CORS ARP	N255156.760	W0805425.186	59103.0

DG9798 PBCH WEST PALM CORS ARP N265046.638 W0801309.299 113632.4
DH3834 LAUD LAUDERDALE CORS ARP N261146.341 W0801023.014 43690.3

NEAREST NGS PUBLISHED CONTROL POINT
DF9225 MIAMI WAAS 1 CORS ARP N254928.585 W0801909.066 0.0

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.


North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
0.046
0.045
0.044
0.043
0.042
0.041
0.04
0.039
0.038
0.037
0.036
0.035
0.034
0.033
0.032
0.031
0.03
0.029
0.028
0.027
0.026
0.025
0.024
0.023
0.022
0.021
0.02
0.019
0.018
0.017
0.016
0.015
0.014
0.013
0.012
0.011
0.01
0.009
0.008
0.007
0.006
0.005
0.004
0.003
526,000
527,000
528,000
529,000
530,000
531,000
532,000
533,000
534,000
535,000
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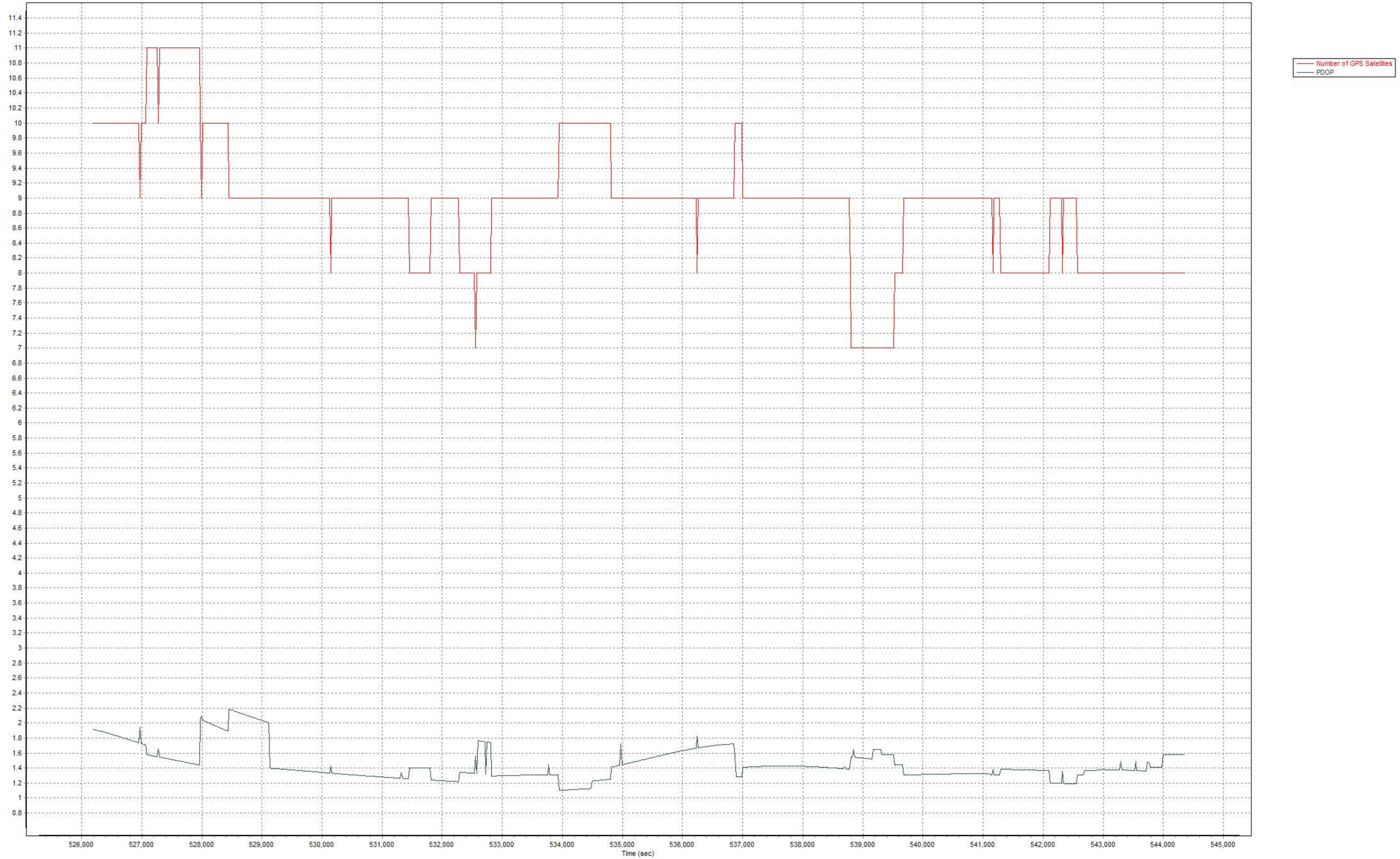
544,000
545,000
Time (sec)


Number of GPS Satellites
PDOP
11.4
11.2
11
10.8
10.6
10.4
10.2
10
9.8
9.6
9.4
9.2
9
8.8
8.6
8.4
8.2
8
7.8
7.6
7.4
7.2
7
6.8
6.6
6.4
6.2
6
5.8
5.6
5.4
5.2
5
4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
526,000
527,000
528,000
529,000
530,000
531,000
532,000
533,000
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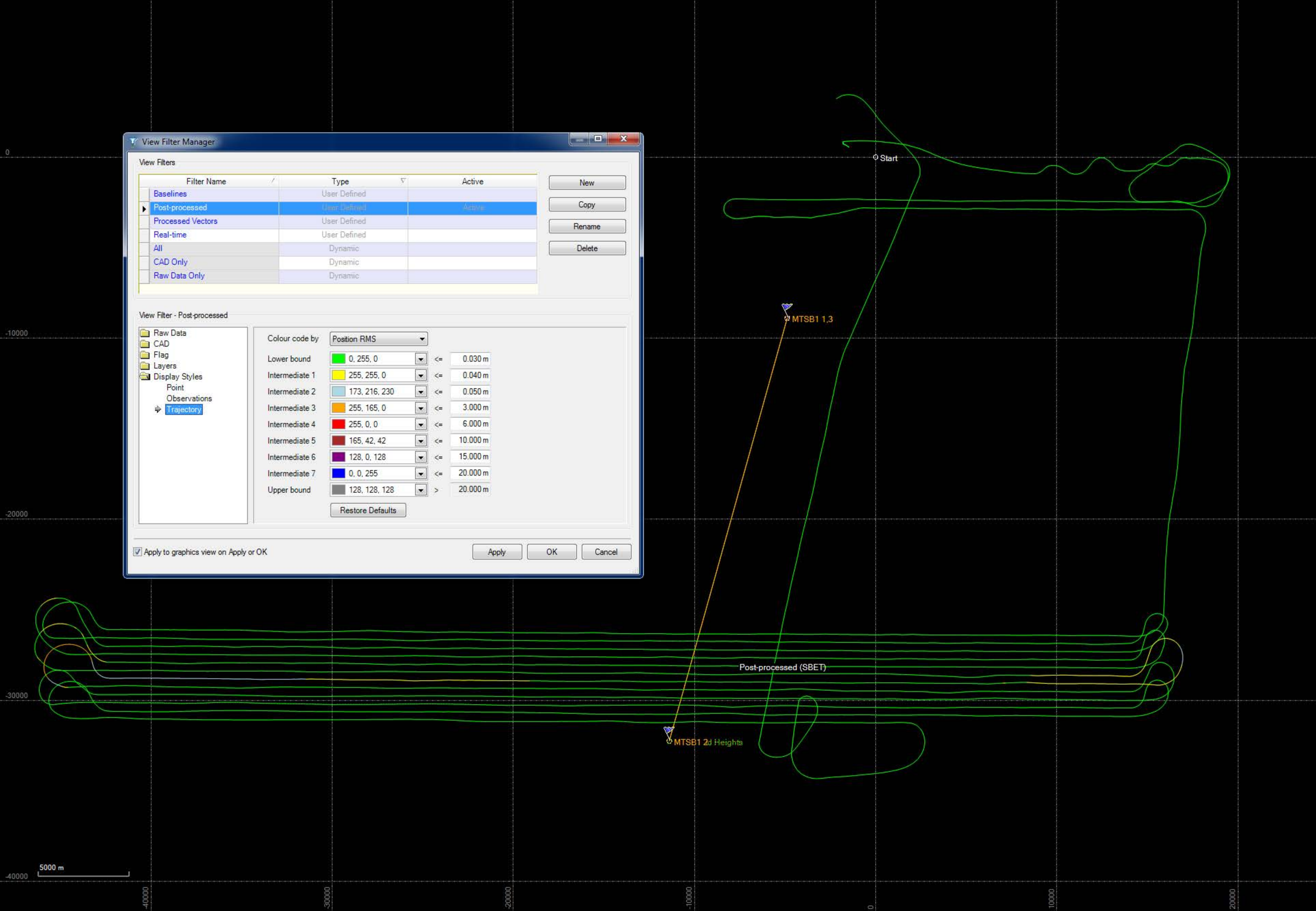
544,000
545,000
Time (sec)


View Filter Manager
View Filters
Filter Name
Type
Active
Baselines
User Defined
Post-processed
User Defined
Active
Processed Vectors
User Defined
Real-time
User Defined
All
Dynamic
CAD Only
Dynamic
Raw Data Only
Dynamic
New
Copy
Rename
Delete
View Filter - Post-processed
Raw Data
CAD
Flag
Layers
Display Styles
Point
Observations
Trajectory
Colour code by
Position RMS
Lower bound
0, 255, 0
<=
0.030 m
Intermediate 1
255, 255, 0
<=
0.040 m
Intermediate 2
173, 216, 230
<=
0.050 m
Intermediate 3
255, 165, 0
<=
3.000 m
Intermediate 4
255, 0, 0
<=
6.000 m
Intermediate 5
165, 42, 42
<=
10.000 m
Intermediate 6
128, 0, 128
<=
15.000 m
Intermediate 7
0, 0, 255
<=
20.000 m
Upper bound
128, 128, 128
>
20.000 m
Restore Defaults
Apply to graphics view on Apply or OK
Apply
OK
Cancel
Start
MTSB1 1,3
Post-processed (SBET)
MTSB1 2d Heights
5000 m
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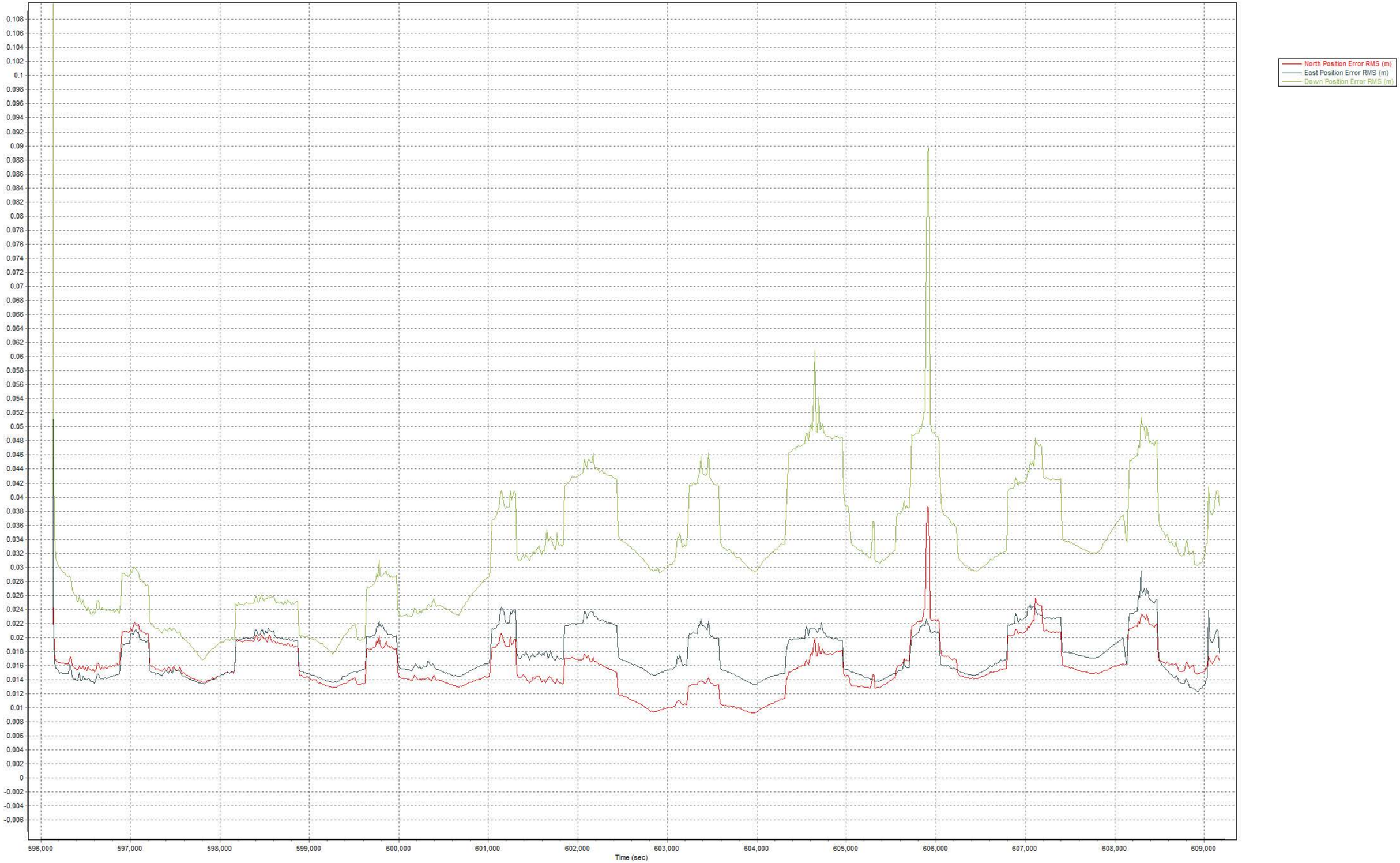
-10000
-20000
-30000
-40000
-40000
-30000
-20000
-10000
0
10000
20000


North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
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0.106
0.104
0.102
0.1
0.098
0.096
0.094
0.092
0.09
0.088
0.086
0.084
0.082
0.08
0.078
0.076
0.074
0.072
0.07
0.068
0.066
0.064
0.062
0.06
0.058
0.056
0.054
0.052
0.05
0.048
0.046
0.044
0.042
0.04
0.038
0.036
0.034
0.032
0.03
0.028
0.026
0.024
0.022
0.02
0.018
0.016
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
-0.002
-0.004
-0.006
596,000
597,000
598,000
599,000
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605,000
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609,000
Time (sec)

From: opus <opus@ngs.noaa.gov>
Sent: Thursday, February 26, 2015 10:13 AM
To: Stonerock, Mike
Subject: OPUS solution : rmnd0520.15o OP1424963544212

FILE: rmnd0520.15o OP1424963544212

1008 NOTE: Antenna offsets supplied by the user were zero. Coordinates
1008 returned will be for the antenna reference point (ARP).
1008

NGS OPUS SOLUTION REPORT
==========

All computed coordinate accuracies are listed as peak-to-peak values.
For additional information: http://www.ngs.noaa.gov/OPUS/about.jsp#accuracy

USER: mstonerock@aca-net.com DATE: February 26, 2015
RINEX FILE: rmnd0520.15o TIME: 15:13:07 UTC

SOFTWARE: page5 1209.04 master91.pl 022814 START: 2015/02/21 00:00:00
EPHEMERIS: igr18326.eph [rapid] STOP: 2015/02/21 23:59:00
NAV FILE: brdc0520.15n OBS USED: 58547 / 61885 : 95%
ANT NAME: LEIAR20 NONE # FIXED AMB: 206 / 224 : 92%
ARP HEIGHT: 0.000 OVERALL RMS: 0.012(m)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2015.1410)

X:	961335.331(m)	0.005(m)	961334.569(m)	0.005(m)
Y:	-5674075.787(m)	0.010(m)	-5674074.182(m)	0.010(m)
Z:	2740535.393(m)	0.010(m)	2740535.213(m)	0.010(m)

LAT:	25 36 49.58917	0.007(m)	25 36 49.60791	0.007(m)
E LON:	279 36 57.85939	0.003(m)	279 36 57.84208	0.003(m)
W LON:	80 23 2.14061	0.003(m)	80 23 2.15792	0.003(m)
EL HGT:	-13.982(m)	0.013(m)	-15.602(m)	0.013(m)
ORTHO HGT:	11.128(m)	0.026(m)	[NAVD88 (Computed using GEOID12A)]	

	UTM COORDINATES (UTM (Zone 17))	STATE PLANE COORDINATES (SPC (0901 FL E))
Northing (Y) [meters]	2833056.742	141973.201
Easting (X) [meters]	561856.015	261877.127
Convergence [degrees]	0.26633800	0.26633800
Point Scale	0.99964724	0.99998844
Combined Factor	0.99964944	0.99999064

US NATIONAL GRID DESIGNATOR: 17RNJ6185633056(NAD 83)

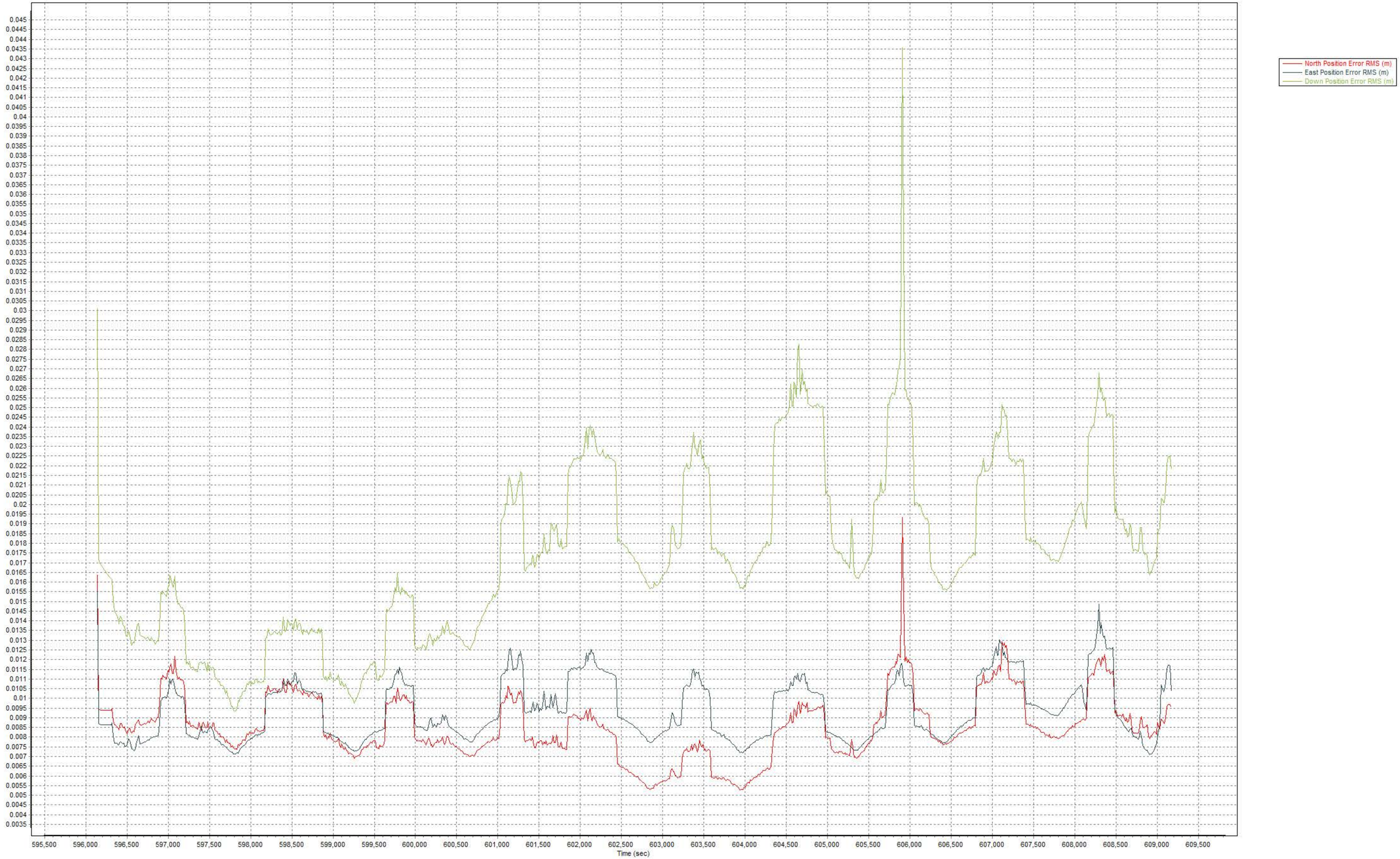
BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DL2756	FLC5 CARD SOUND 5 CORS ARP	N252553.839	W0802801.043	21836.8

DF9225 ZMA1 MIAMI WAAS 1 CORS ARP N254928.585 W0801909.066 24243.6
DF7050 MTNT MIAMI TNT CORS ARP N255156.760 W0805425.186 59445.6

NEAREST NGS PUBLISHED CONTROL POINT
AF9577 RICHMOND 6 CORS ARP N253649.589 W0802302.140 0.0

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.


North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
0.045
0.0445
0.044
0.0435
0.043
0.0425
0.042
0.0415
0.041
0.0405
0.04
0.0395
0.039
0.0385
0.038
0.0375
0.037
0.0365
0.036
0.0355
0.035
0.0345
0.034
0.0335
0.033
0.0325
0.032
0.0315
0.031
0.0305
0.03
0.0295
0.029
0.0285
0.028
0.0275
0.027
0.0265
0.026
0.0255
0.025
0.0245
0.024
0.0235
0.023
0.0225
0.022
0.0215
0.021
0.0205
0.02
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0.019
0.0185
0.018
0.0175
0.017
0.0165
0.016
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0.013
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0.012
0.0115
0.011
0.0105
0.01
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0.009
0.0085
0.008
0.0075
0.007
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0.006
0.0055
0.005
0.0045
0.004
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595,500
596,000
596,500
597,000
597,500
598,000
598,500
599,000
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601,500
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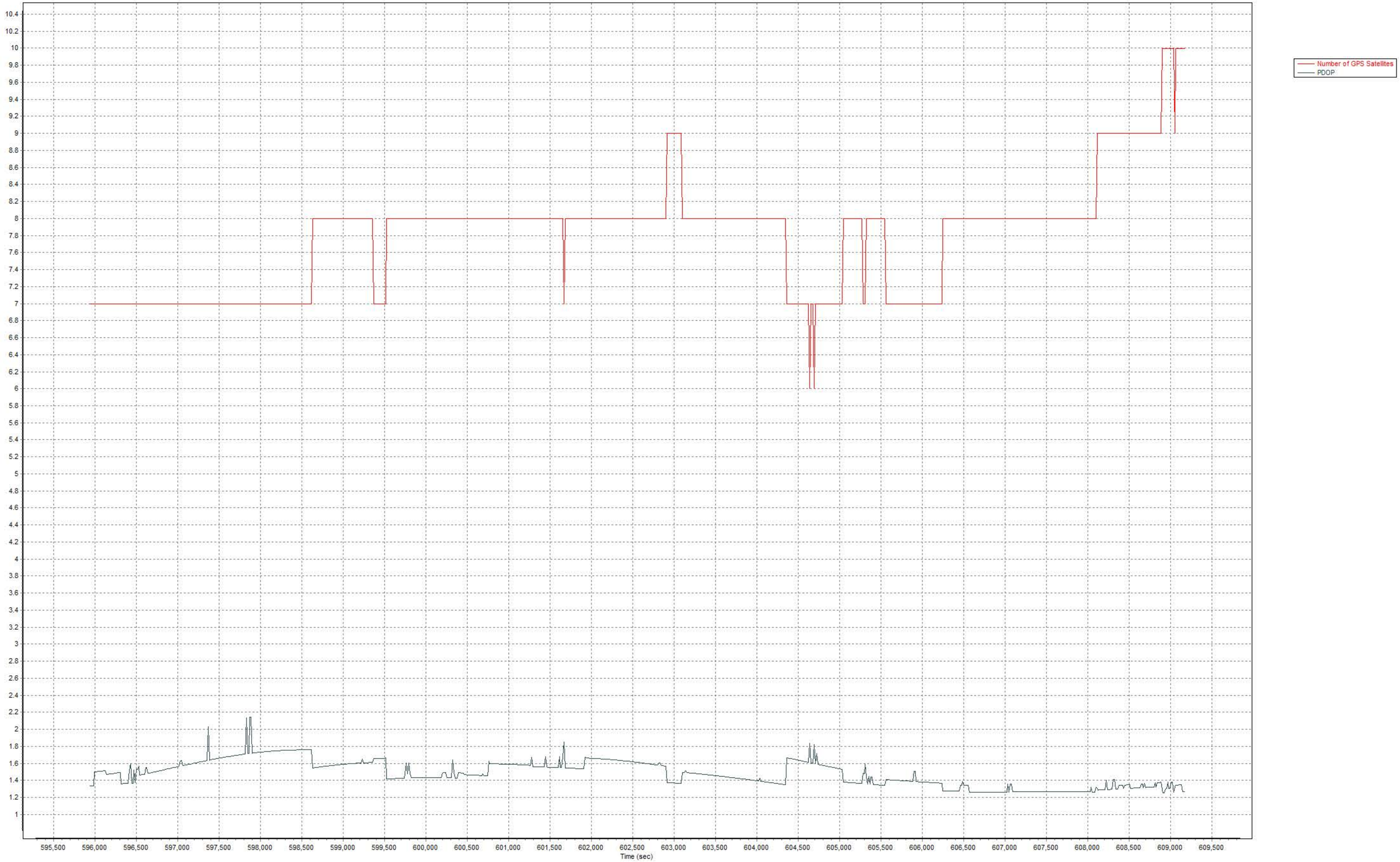
Time (sec)


Number of GPS Satellites
PDOP
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10.2
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9.8
9.6
9.4
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8.8
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606,000
606,500
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607,500
608,000
608,500
609,000
609,500
Time (sec)

10000

0

Start

Richmond Heights

Post-processed (SBET)

-10000

-20000

-30000

5000 m

-30000 -20000 -10000 0 10000 20000 30000

View Filter Manager

View Filters

Filter Name	Type	Active
Baselines	User Defined	
Post-processed	User Defined	Active
Processed Vectors	User Defined	
Real-time	User Defined	
All	Dynamic	
CAD Only	Dynamic	
Raw Data Only	Dynamic	

New

Copy

Rename

Delete

View Filter - Post-processed

- Raw Data
- CAD
- Flag
- Layers
- Display Styles
  - Point
  - Observations
  - Trajectory

Colour code by: Position RMS

Lower bound	Lime	<=	0.030 m
Intermediate 1	Yellow	<=	0.040 m
Intermediate 2	LightBlue	<=	1.000 m
Intermediate 3	Orange	<=	3.000 m
Intermediate 4	Red	<=	6.000 m
Intermediate 5	Brown	<=	10.000 m
Intermediate 6	Purple	<=	15.000 m
Intermediate 7	Blue	<=	20.000 m
Upper bound	Gray	>	20.000 m

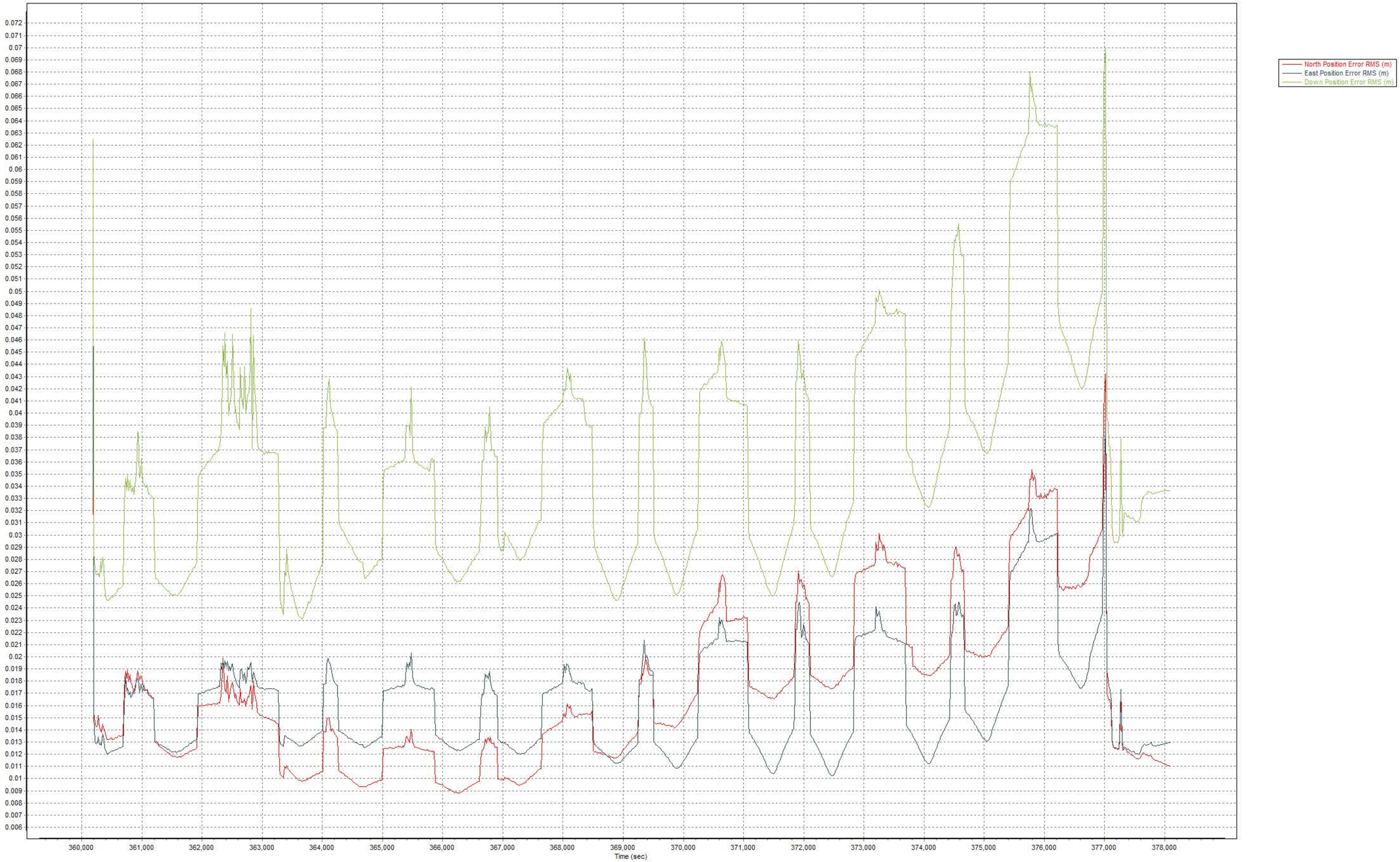
Restore Defaults

Apply to graphics view on Apply or OK

Apply

OK

Cancel


North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
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0.069
0.068
0.067
0.066
0.065
0.064
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0.062
0.061
0.06
0.059
0.058
0.057
0.056
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0.054
0.053
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0.051
0.05
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0.045
0.044
0.043
0.042
0.041
0.04
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0.006
360,000
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377,000
378,000
Time (sec)

From: opus <opus@ngs.noaa.gov>
Sent: Thursday, February 19, 2015 1:57 PM
To: Stonerock, Mike
Subject: OPUS solution : zma10480.15o OP1424372169010

FILE: zma10480.15o OP1424372169010

1008 NOTE: Antenna offsets supplied by the user were zero. Coordinates
1008 returned will be for the antenna reference point (ARP).
1008

NGS OPUS SOLUTION REPORT
==========

All computed coordinate accuracies are listed as peak-to-peak values.
For additional information: http://www.ngs.noaa.gov/OPUS/about.jsp#accuracy

USER: mstonerock@aca-net.com DATE: February 19, 2015
RINEX FILE: zma10480.15o TIME: 18:56:53 UTC

SOFTWARE: page5 1209.04 master91.pl 022814 START: 2015/02/17 00:00:00
EPHEMERIS: igr18322.eph [rapid] STOP: 2015/02/17 23:59:00
NAV FILE: brdc0480.15n OBS USED: 55557 / 60061 : 93%
ANT NAME: MPL_WAAS_2225NW NONE # FIXED AMB: 252 / 274 : 92%
ARP HEIGHT: 0.000 OVERALL RMS: 0.015(m)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2015.1301)

X:	966042.985(m)	0.011(m)	966042.221(m)	0.011(m)
Y:	-5663001.018(m)	0.016(m)	-5662999.415(m)	0.016(m)
Z:	2761581.489(m)	0.001(m)	2761581.310(m)	0.001(m)
LAT:	25 49 28.58531	0.007(m)	25 49 28.60426	0.007(m)
E LON:	279 40 50.93376	0.013(m)	279 40 50.91640	0.013(m)
W LON:	80 19 9.06624	0.013(m)	80 19 9.08360	0.013(m)
EL HGT:	-6.428(m)	0.012(m)	-8.044(m)	0.012(m)
ORTHO HGT:	18.646(m)	0.025(m)	[NAVD88 (Computed using GEOID12A)]	

	UTM COORDINATES (UTM (Zone 17))	STATE PLANE COORDINATES (SPC (0901 FL E))
Northing (Y) [meters]	2856437.019	165361.458
Easting (X) [meters]	568236.232	268259.521
Convergence [degrees]	0.29658655	0.29658655
Point Scale	0.99965749	0.99999869
Combined Factor	0.99965850	0.99999970

US NATIONAL GRID DESIGNATOR: 17RNJ6823656437(NAD 83)

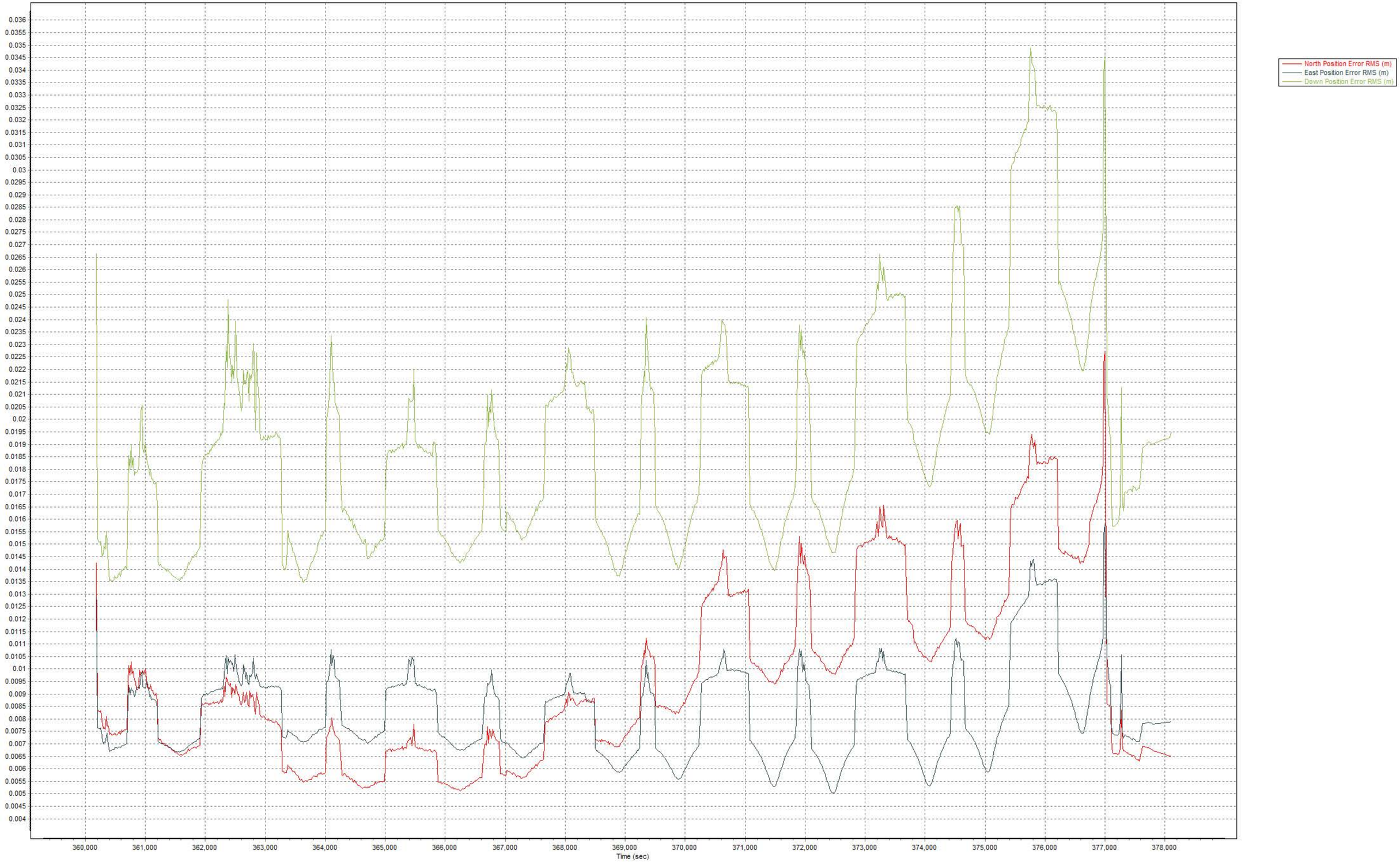
BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DF7050	MTNT MIAMI TNT CORS ARP	N255156.760	W0805425.186	59103.0

DG9798 PBCH WEST PALM CORS ARP N265046.638 W0801309.299 113632.4
DH3834 LAUD LAUDERDALE CORS ARP N261146.341 W0801023.014 43690.3

NEAREST NGS PUBLISHED CONTROL POINT
DF9225 MIAMI WAAS 1 CORS ARP N254928.585 W0801909.066 0.0

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.


North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
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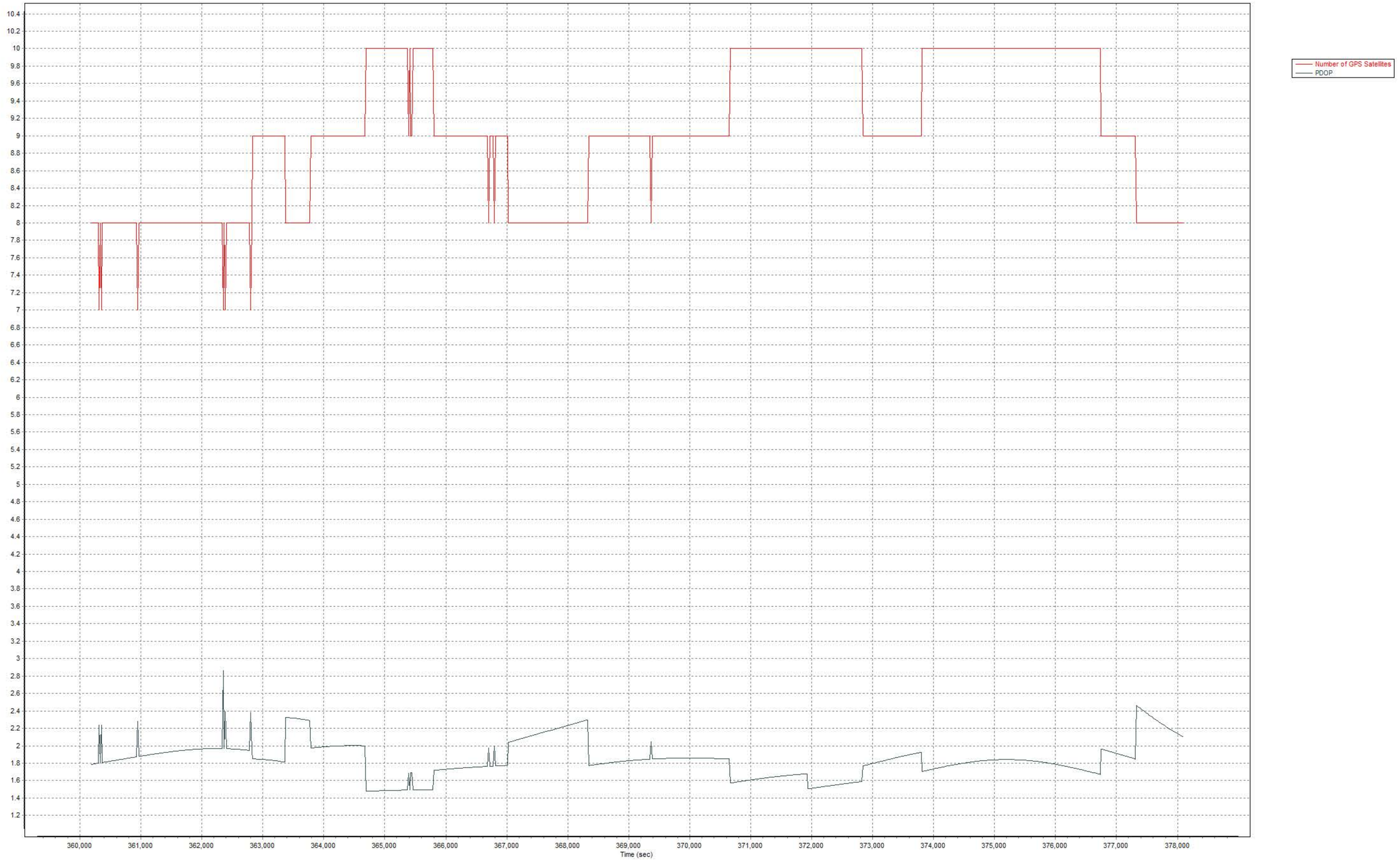
Time (sec)


Number of GPS Satellites
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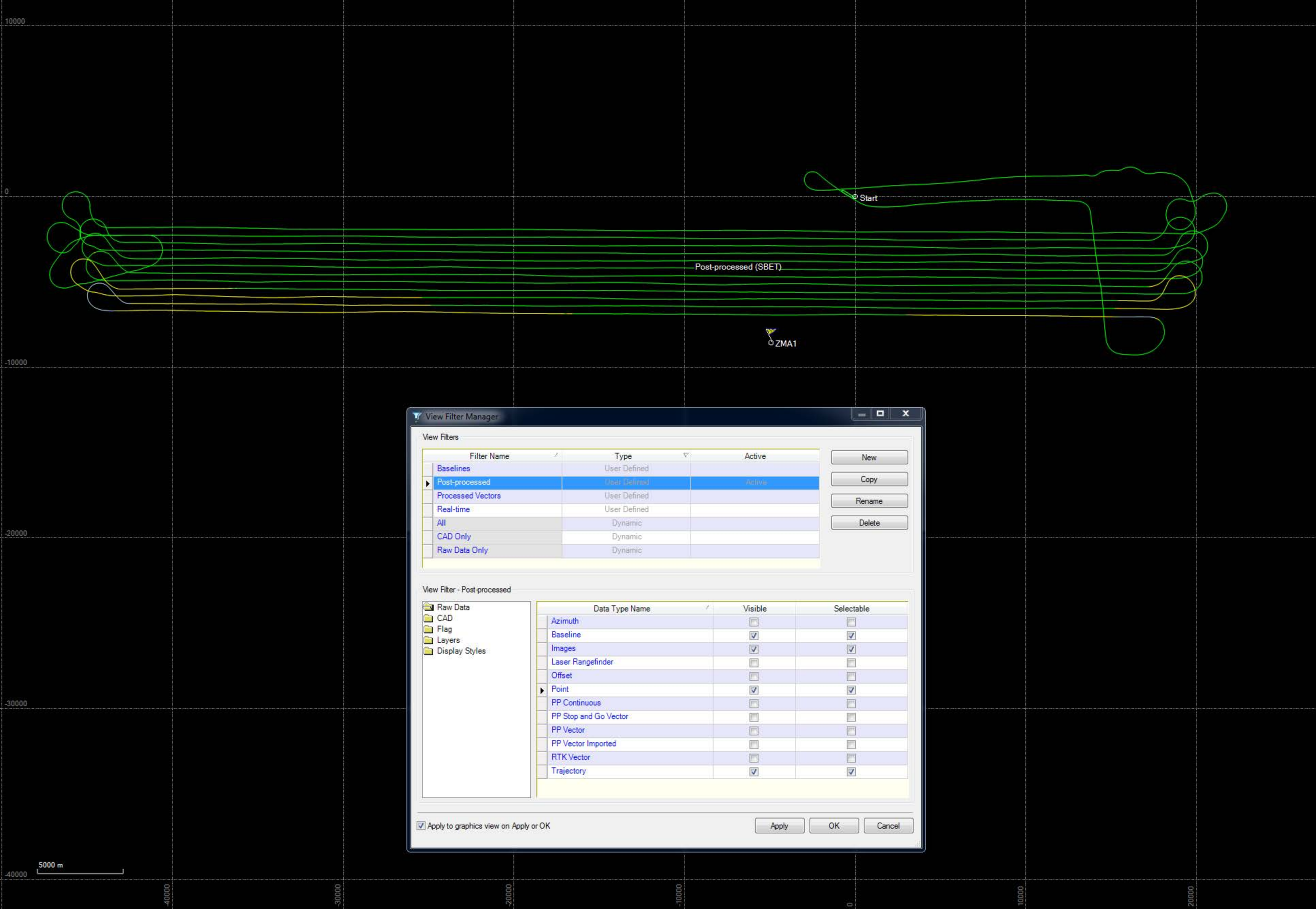
Time (sec)



View Filter Manager

View Filters

Filter Name	Type	Active
Baselines	User Defined	
Post-processed	User Defined	Active
Processed Vectors	User Defined	
Real-time	User Defined	
All	Dynamic	
CAD Only	Dynamic	
Raw Data Only	Dynamic	

New
Copy
Rename
Delete

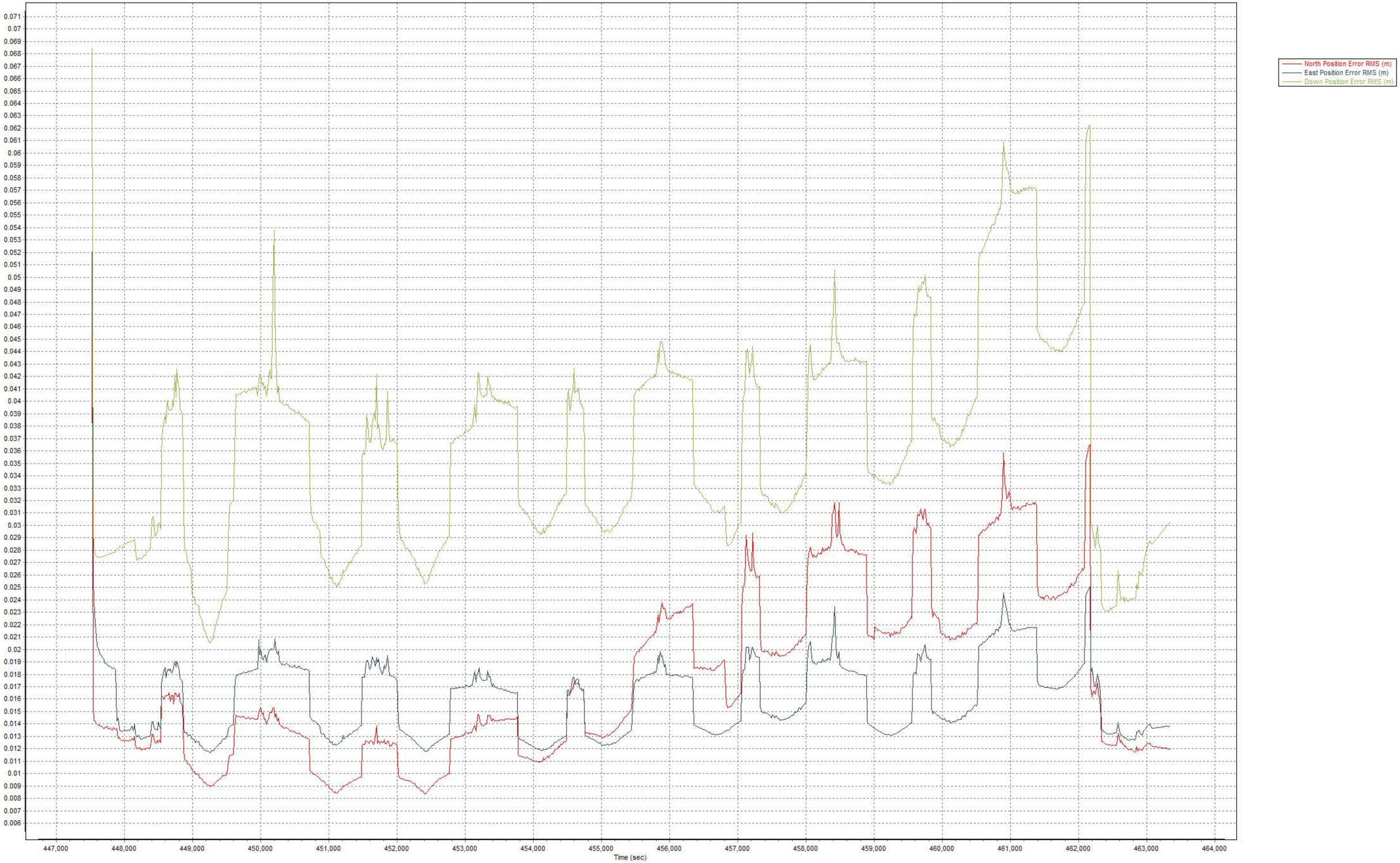
View Filter - Post-processed

- Raw Data
- CAD
- Flag
- Layers
- Display Styles

Data Type Name	Visible	Selectable
Azimuth	☐	☐
Baseline	☑	☑
Images	☑	☑
Laser Rangefinder	☐	☐
Offset	☐	☐
Point	☑	☑
PP Continuous	☐	☐
PP Stop and Go Vector	☐	☐
PP Vector	☐	☐
PP Vector Imported	☐	☐
RTK Vector	☐	☐
Trajectory	☑	☑

☑ Apply to graphics view on Apply or OK

Apply
OK
Cancel


North Position Error RMS (m)
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Time (sec)

From: opus <opus@ngs.noaa.gov>
Sent: Thursday, February 19, 2015 1:57 PM
To: Stonerock, Mike
Subject: OPUS solution : zma10480.15o OP1424372169010

FILE: zma10480.15o OP1424372169010

1008 NOTE: Antenna offsets supplied by the user were zero. Coordinates
1008 returned will be for the antenna reference point (ARP).
1008

NGS OPUS SOLUTION REPORT
==========

All computed coordinate accuracies are listed as peak-to-peak values.
For additional information: http://www.ngs.noaa.gov/OPUS/about.jsp#accuracy

USER: mstonerock@aca-net.com DATE: February 19, 2015
RINEX FILE: zma10480.15o TIME: 18:56:53 UTC

SOFTWARE: page5 1209.04 master91.pl 022814 START: 2015/02/17 00:00:00
EPHEMERIS: igr18322.eph [rapid] STOP: 2015/02/17 23:59:00
NAV FILE: brdc0480.15n OBS USED: 55557 / 60061 : 93%
ANT NAME: MPL_WAAS_2225NW NONE # FIXED AMB: 252 / 274 : 92%
ARP HEIGHT: 0.000 OVERALL RMS: 0.015(m)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2015.1301)

X:	966042.985(m)	0.011(m)	966042.221(m)	0.011(m)
Y:	-5663001.018(m)	0.016(m)	-5662999.415(m)	0.016(m)
Z:	2761581.489(m)	0.001(m)	2761581.310(m)	0.001(m)
LAT:	25 49 28.58531	0.007(m)	25 49 28.60426	0.007(m)
E LON:	279 40 50.93376	0.013(m)	279 40 50.91640	0.013(m)
W LON:	80 19 9.06624	0.013(m)	80 19 9.08360	0.013(m)
EL HGT:	-6.428(m)	0.012(m)	-8.044(m)	0.012(m)
ORTHO HGT:	18.646(m)	0.025(m)	[NAVD88 (Computed using GEOID12A)]	

	UTM COORDINATES (UTM (Zone 17))	STATE PLANE COORDINATES (SPC (0901 FL E))
Northing (Y) [meters]	2856437.019	165361.458
Easting (X) [meters]	568236.232	268259.521
Convergence [degrees]	0.29658655	0.29658655
Point Scale	0.99965749	0.99999869
Combined Factor	0.99965850	0.99999970

US NATIONAL GRID DESIGNATOR: 17RNJ6823656437(NAD 83)

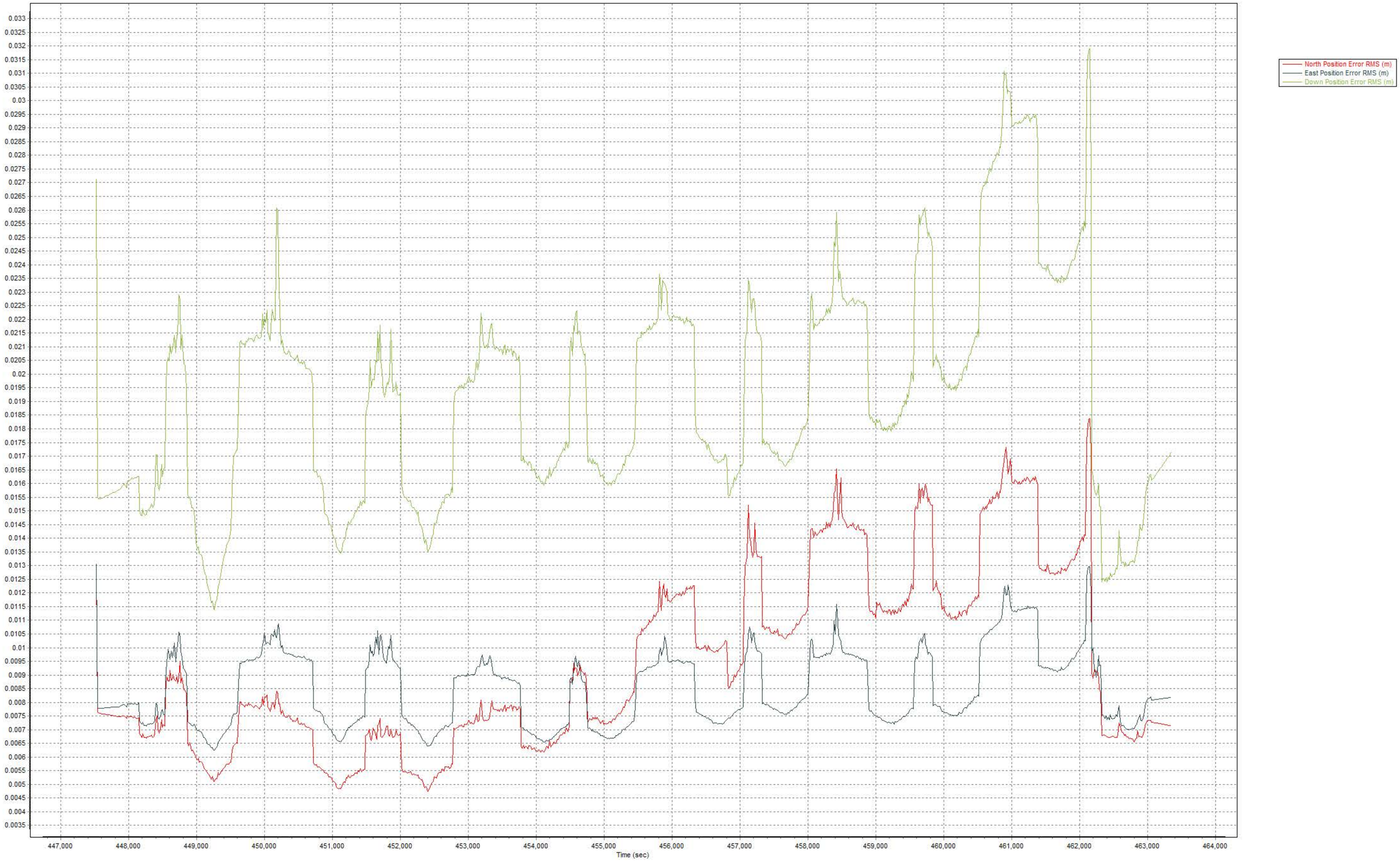
BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DF7050	MTNT MIAMI TNT CORS ARP	N255156.760	W0805425.186	59103.0

DG9798 PBCH WEST PALM CORS ARP N265046.638 W0801309.299 113632.4
DH3834 LAUD LAUDERDALE CORS ARP N261146.341 W0801023.014 43690.3

NEAREST NGS PUBLISHED CONTROL POINT
DF9225 MIAMI WAAS 1 CORS ARP N254928.585 W0801909.066 0.0

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.


North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
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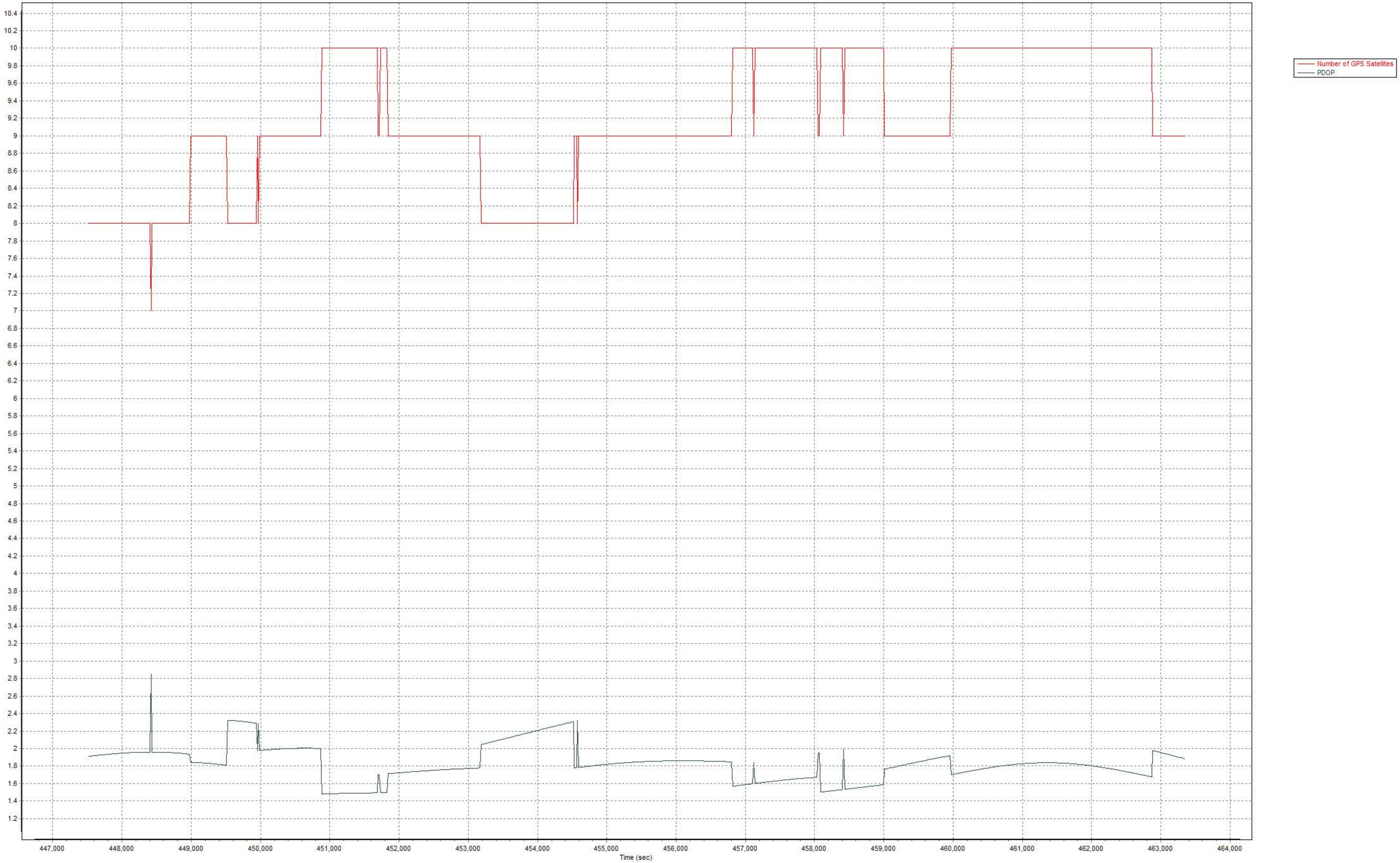
Time (sec)


Number of GPS Satellites
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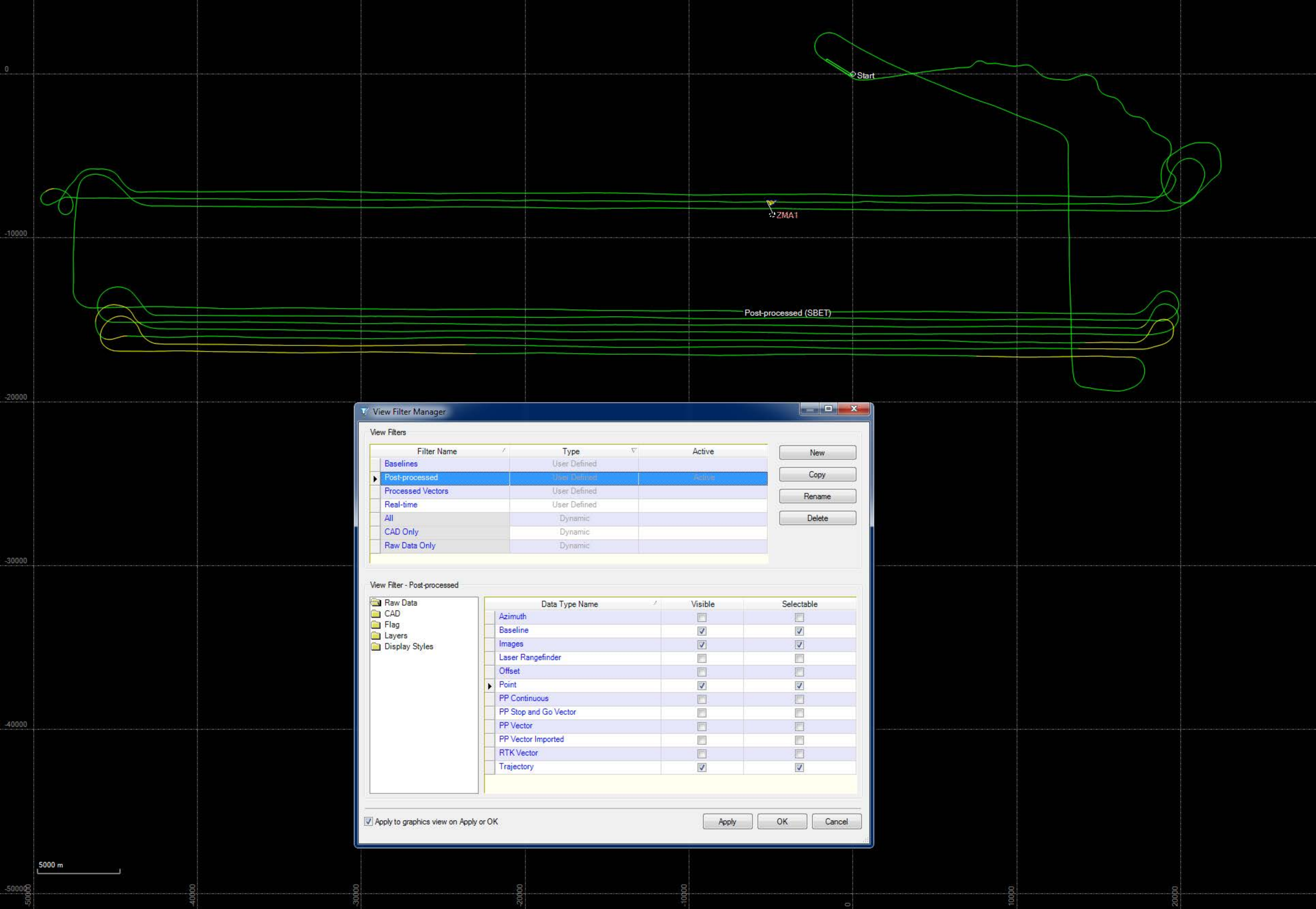
Time (sec)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View Filters
Filter Name
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Baselines
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Raw Data
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Flag
Layers
Display Styles
Data Type Name
Visible
Selectable
Azimuth
Baseline
Images
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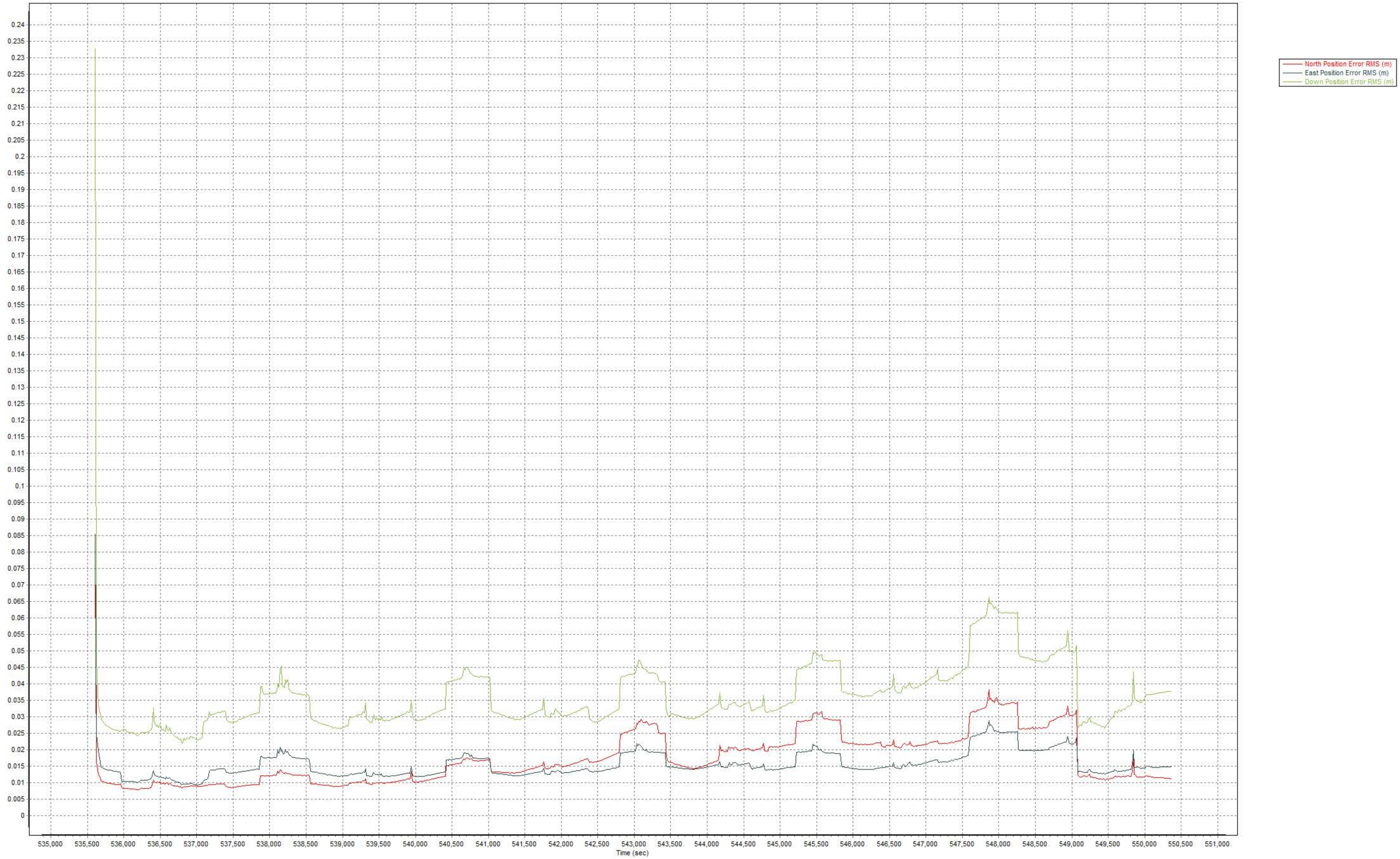
PP Continuous
PP Stop and Go Vector
PP Vector
PP Vector Imported
RTK Vector
Trajectory
Apply to graphics view on Apply or OK
Apply
OK
Cancel


North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
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0.205
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0.195
0.19
0.185
0.18
0.175
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Time (sec)

From: opus <opus@ngs.noaa.gov>
Sent: Tuesday, April 14, 2015 7:05 AM
To: Stonerock, Mike
Subject: OPUS solution : flc60970.15o OP1429009477919

FILE: flc60970.15o OP1429009477919

1008 NOTE: Antenna offsets supplied by the user were zero. Coordinates
1008 returned will be for the antenna reference point (ARP).
1008

NGS OPUS SOLUTION REPORT
==========

All computed coordinate accuracies are listed as peak-to-peak values.
For additional information: http://www.ngs.noaa.gov/OPUS/about.jsp#accuracy

USER: mstonerock@aca-net.com DATE: April 14, 2015
RINEX FILE: flc60970.15o TIME: 11:05:20 UTC

SOFTWARE: page5 1209.04 master92.pl 022814 START: 2015/04/07 00:00:00
EPHEMERIS: igr18392.eph [rapid] STOP: 2015/04/07 23:59:00
NAV FILE: brdc0970.15n OBS USED: 46737 / 52085 : 90%
ANT NAME: TRM41249USCG SCIT # FIXED AMB: 237 / 267 : 89%
ARP HEIGHT: 0.000 OVERALL RMS: 0.017(m)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2015.2644)

X:	954549.587(m)	0.007(m)	954548.824(m)	0.007(m)
Y:	-5684046.720(m)	0.002(m)	-5684045.113(m)	0.002(m)
Z:	2722300.638(m)	0.019(m)	2722300.457(m)	0.019(m)
LAT:	25 25 52.98266	0.016(m)	25 25 53.00123	0.016(m)
E LON:	279 31 58.82120	0.007(m)	279 31 58.80380	0.007(m)
W LON:	80 28 1.17880	0.007(m)	80 28 1.19620	0.007(m)
EL HGT:	-16.681(m)	0.011(m)	-18.304(m)	0.011(m)
ORTHO HGT:	8.197(m)	0.023(m)	[NAVD88 (Computed using GEOID12A)]	

	UTM COORDINATES (UTM (Zone 17))	STATE PLANE COORDINATES (SPC (0901 FL E))
Northing (Y) [meters]	2812822.740	121732.293
Easting (X) [meters]	553596.648	253614.941
Convergence [degrees]	0.22889413	0.22889413
Point Scale	0.99963547	0.99997666
Combined Factor	0.99963809	0.99997928

US NATIONAL GRID DESIGNATOR: 17RNJ5359612822(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DP6859	FLF1 FL FOUNDATION 1 CORS ARP	N253655.240	W0802309.912	21942.0

DF9225 ZMA1 MIAMI WAAS 1 CORS ARP N254928.585 W0801909.066 46021.8
DF7050 MTNT MIAMI TNT CORS ARP N255156.760 W0805425.186 65327.8

NEAREST NGS PUBLISHED CONTROL POINT
DL2758 CARD SOUND 6 CORS ARP N252552.982 W0802801.178 0.0

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

From: opus <opus@ngs.noaa.gov>
Sent: Thursday, February 26, 2015 10:08 AM
To: Stonerock, Mike
Subject: OPUS solution : flmb0520.15o OP1424963229654

FILE: flmb0520.15o OP1424963229654

1008 NOTE: Antenna offsets supplied by the user were zero. Coordinates
1008 returned will be for the antenna reference point (ARP).
1008

NGS OPUS SOLUTION REPORT
==========

All computed coordinate accuracies are listed as peak-to-peak values.
For additional information: http://www.ngs.noaa.gov/OPUS/about.jsp#accuracy

USER: mstonerock@aca-net.com DATE: February 26, 2015
RINEX FILE: flmb0520.15o TIME: 15:08:01 UTC

SOFTWARE: page5 1209.04 master90.pl 022814 START: 2015/02/21 00:00:00
EPHEMERIS: igr18326.eph [rapid] STOP: 2015/02/21 23:59:00
NAV FILE: brdc0520.15n OBS USED: 58630 / 61497 : 95%
ANT NAME: LEIAR20 NONE # FIXED AMB: 209 / 226 : 92%
ARP HEIGHT: 0.000 OVERALL RMS: 0.013(m)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2015.1410)

X:	984362.809(m)	0.007(m)	984362.045(m)	0.007(m)
Y:	-5661886.690(m)	0.010(m)	-5661885.086(m)	0.010(m)
Z:	2757401.057(m)	0.010(m)	2757400.879(m)	0.010(m)

LAT:	25 46 57.83775	0.011(m)	25 46 57.85672	0.011(m)
E LON:	279 51 45.83209	0.006(m)	279 51 45.81493	0.006(m)
W LON:	80 8 14.16791	0.006(m)	80 8 14.18507	0.006(m)
EL HGT:	-15.498(m)	0.010(m)	-17.116(m)	0.010(m)
ORTHO HGT:	10.211(m)	0.021(m)	[NAVD88 (Computed using GEOID12A)]	

	UTM COORDINATES (Zone 17)	STATE PLANE COORDINATES SPC (0901 FL E)
Northing (Y) [meters]	2851906.498	160829.390
Easting (X) [meters]	586500.367	286529.891
Convergence [degrees]	0.37527669	0.37527669
Point Scale	0.99969239	1.00003360
Combined Factor	0.99969482	1.00003604

US NATIONAL GRID DESIGNATOR: 17RNJ8650051906(NAD 83)

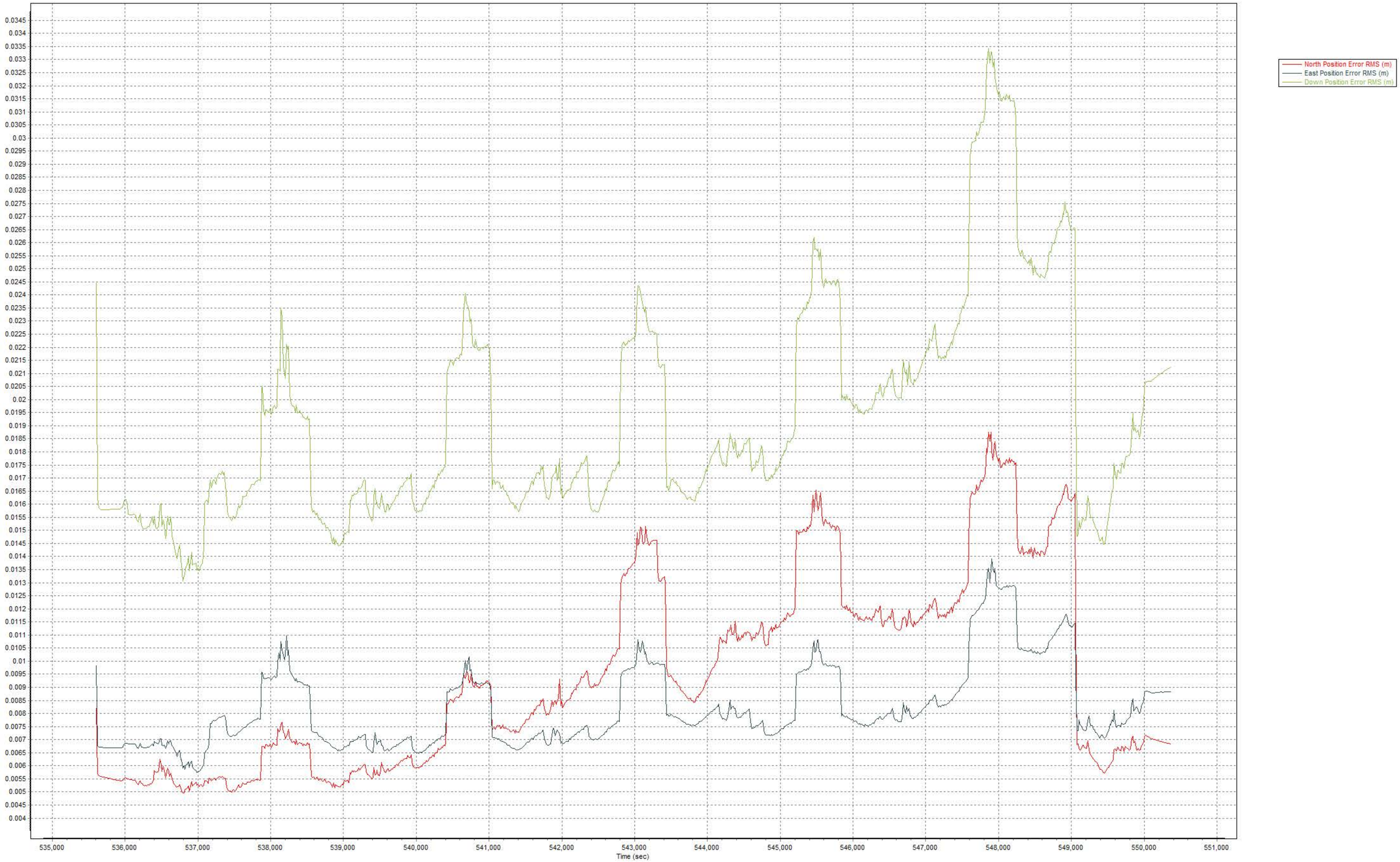
BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DF9225	ZMA1 MIAMI WAAS 1 CORS ARP	N254928.585	W0801909.066	18823.8

DL2756 FLC5 CARD SOUND 5 CORS ARP N252553.839 W0802801.043 51084.5
DF7050 MTNT MIAMI TNT CORS ARP N255156.760 W0805425.186 77723.1

NEAREST NGS PUBLISHED CONTROL POINT
AC3545 SOUTH MIAMI BEACH WATER TWR N254653.151 W0800813.405 146.5

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.


North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
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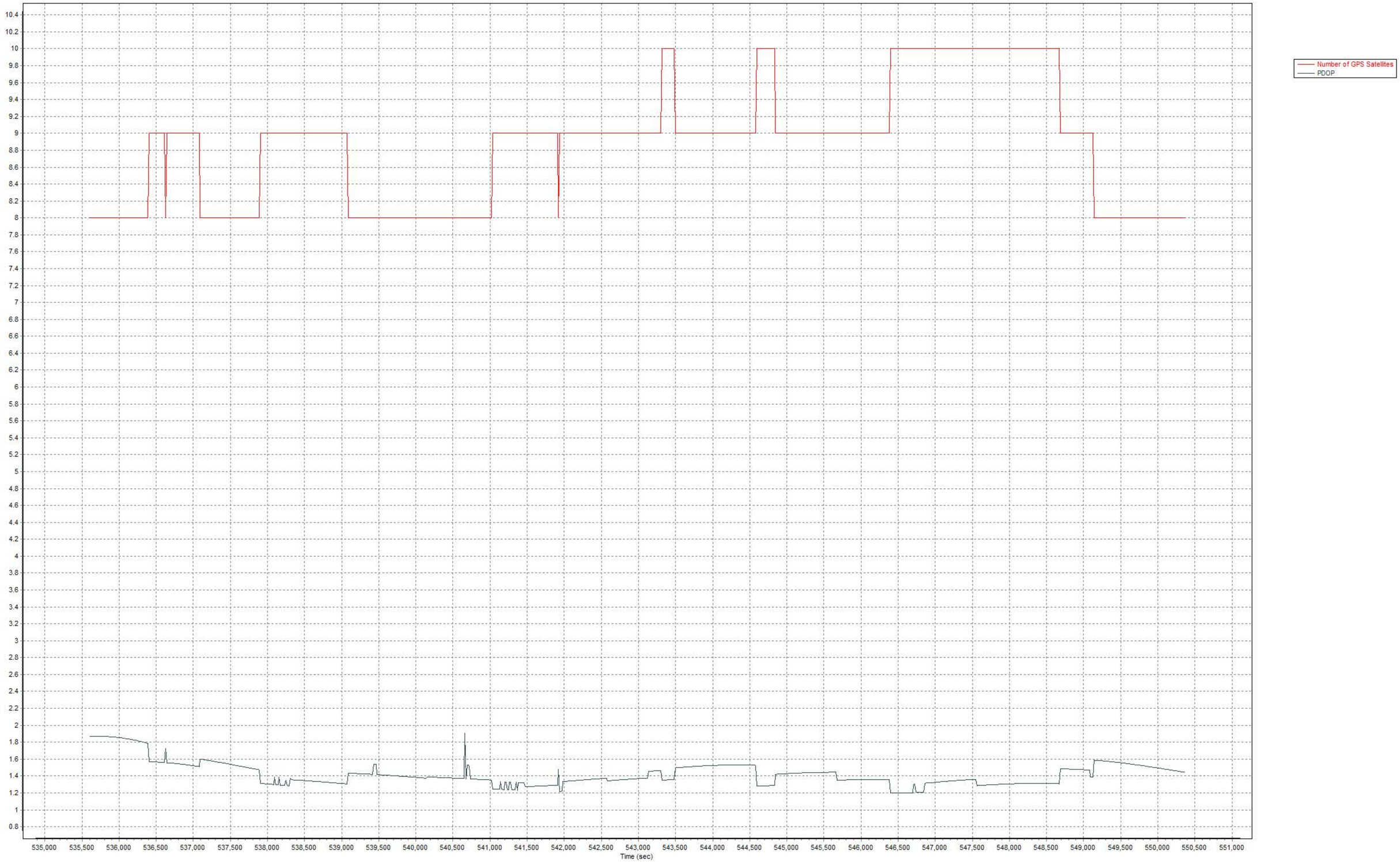
Time (sec)


Number of GPS Satellites
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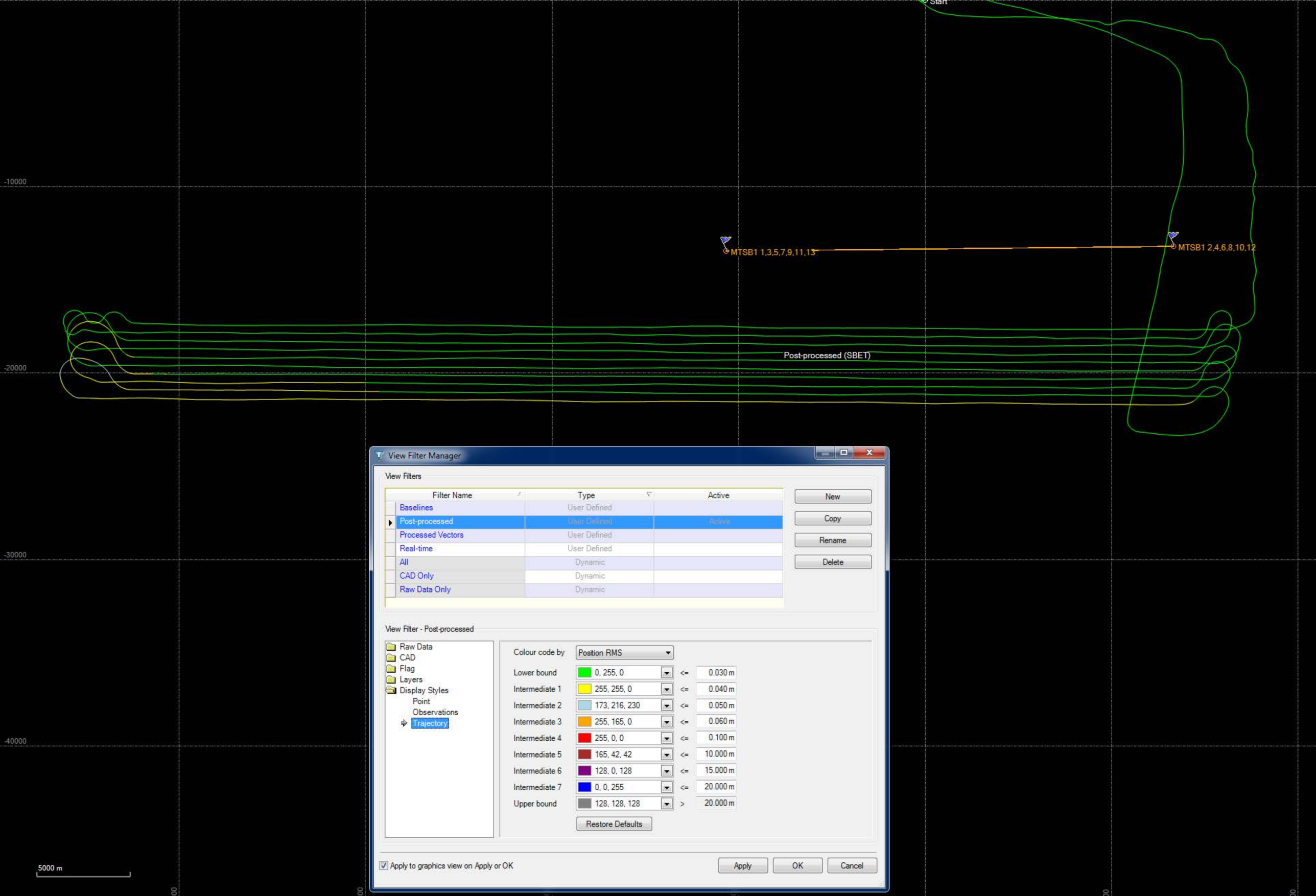


View Filter Manager

View Filters

Filter Name	Type	Active
Baselines	User Defined	
Post-processed	User Defined	Active
Processed Vectors	User Defined	
Real-time	User Defined	
All	Dynamic	
CAD Only	Dynamic	
Raw Data Only	Dynamic	

New
Copy
Rename
Delete

View Filter - Post-processed

- Raw Data
- CAD
- Flag
- Layers
- Display Styles
  - Point
  - Observations
  - Trajectory

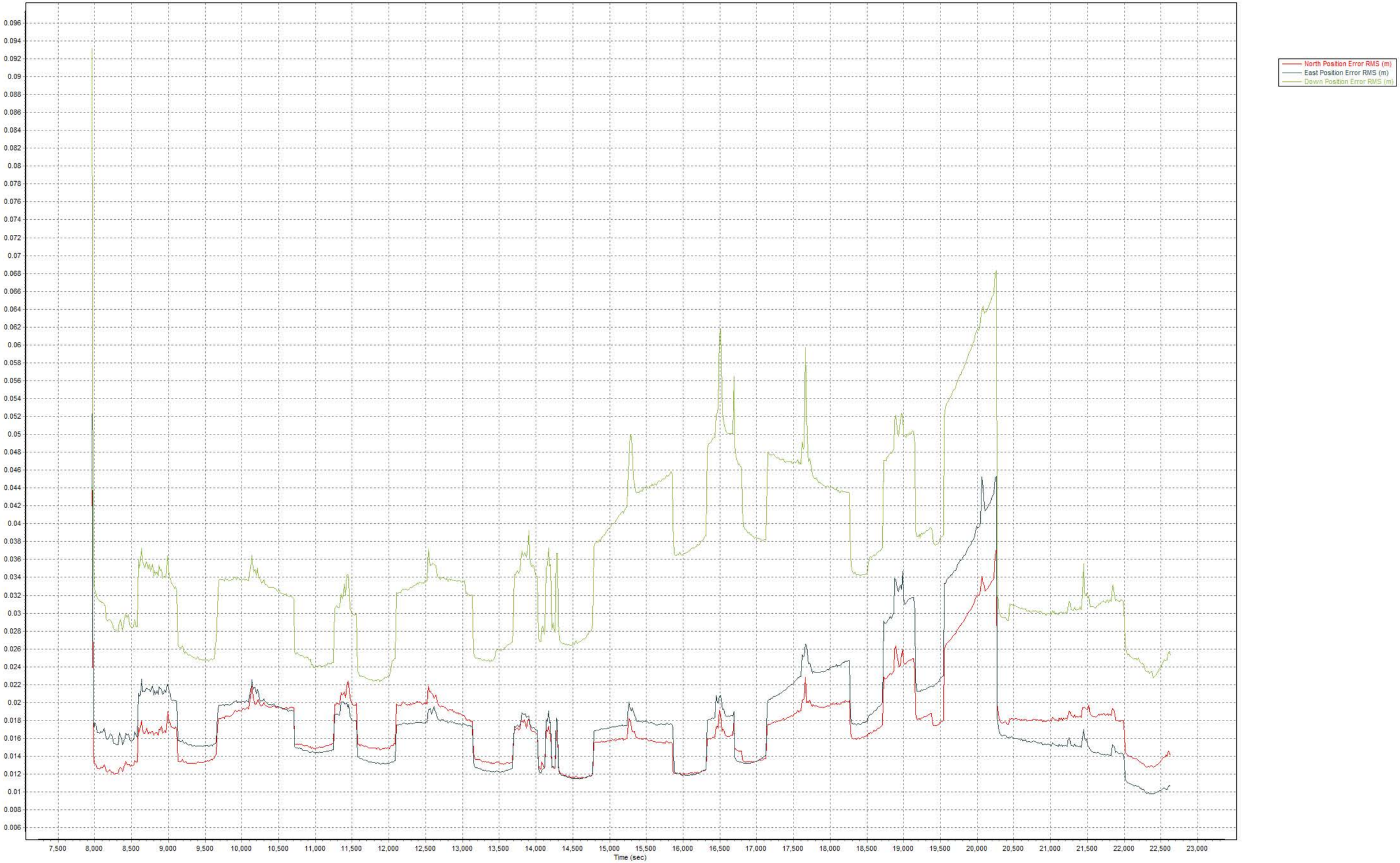
Colour code by: Position RMS

Lower bound	0, 255, 0	<=	0.030 m
Intermediate 1	255, 255, 0	<=	0.040 m
Intermediate 2	173, 216, 230	<=	0.050 m
Intermediate 3	255, 165, 0	<=	0.060 m
Intermediate 4	255, 0, 0	<=	0.100 m
Intermediate 5	165, 42, 42	<=	10.000 m
Intermediate 6	128, 0, 128	<=	15.000 m
Intermediate 7	0, 0, 255	<=	20.000 m
Upper bound	128, 128, 128	>	20.000 m

Restore Defaults

Apply to graphics view on Apply or OK

Apply | OK | Cancel


North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
0.096
0.094
0.092
0.09
0.088
0.086
0.084
0.082
0.08
0.078
0.076
0.074
0.072
0.07
0.068
0.066
0.064
0.062
0.06
0.058
0.056
0.054
0.052
0.05
0.048
0.046
0.044
0.042
0.04
0.038
0.036
0.034
0.032
0.03
0.028
0.026
0.024
0.022
0.02
0.018
0.016
0.014
0.012
0.01
0.008
0.006
7,500
8,000
8,500
9,000
9,500
10,000
10,500
11,000
11,500
12,000
12,500
13,000
13,500
14,000
14,500
15,000
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17,000
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18,000
18,500
19,000
19,500
20,000
20,500
21,000
21,500
22,000
22,500
23,000
Time (sec)

From: opus <opus@ngs.noaa.gov>
Sent: Thursday, February 19, 2015 1:57 PM
To: Stonerock, Mike
Subject: OPUS solution : zma10480.15o OP1424372169010

FILE: zma10480.15o OP1424372169010

1008 NOTE: Antenna offsets supplied by the user were zero. Coordinates
1008 returned will be for the antenna reference point (ARP).
1008

NGS OPUS SOLUTION REPORT
==========

All computed coordinate accuracies are listed as peak-to-peak values.
For additional information: http://www.ngs.noaa.gov/OPUS/about.jsp#accuracy

USER: mstonerock@aca-net.com DATE: February 19, 2015
RINEX FILE: zma10480.15o TIME: 18:56:53 UTC

SOFTWARE: page5 1209.04 master91.pl 022814 START: 2015/02/17 00:00:00
EPHEMERIS: igr18322.eph [rapid] STOP: 2015/02/17 23:59:00
NAV FILE: brdc0480.15n OBS USED: 55557 / 60061 : 93%
ANT NAME: MPL_WAAS_2225NW NONE # FIXED AMB: 252 / 274 : 92%
ARP HEIGHT: 0.000 OVERALL RMS: 0.015(m)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2015.1301)

X:	966042.985(m)	0.011(m)	966042.221(m)	0.011(m)
Y:	-5663001.018(m)	0.016(m)	-5662999.415(m)	0.016(m)
Z:	2761581.489(m)	0.001(m)	2761581.310(m)	0.001(m)
LAT:	25 49 28.58531	0.007(m)	25 49 28.60426	0.007(m)
E LON:	279 40 50.93376	0.013(m)	279 40 50.91640	0.013(m)
W LON:	80 19 9.06624	0.013(m)	80 19 9.08360	0.013(m)
EL HGT:	-6.428(m)	0.012(m)	-8.044(m)	0.012(m)
ORTHO HGT:	18.646(m)	0.025(m)	[NAVD88 (Computed using GEOID12A)]	

	UTM COORDINATES (UTM (Zone 17))	STATE PLANE COORDINATES (SPC (0901 FL E))
Northing (Y) [meters]	2856437.019	165361.458
Easting (X) [meters]	568236.232	268259.521
Convergence [degrees]	0.29658655	0.29658655
Point Scale	0.99965749	0.99999869
Combined Factor	0.99965850	0.99999970

US NATIONAL GRID DESIGNATOR: 17RNJ6823656437(NAD 83)

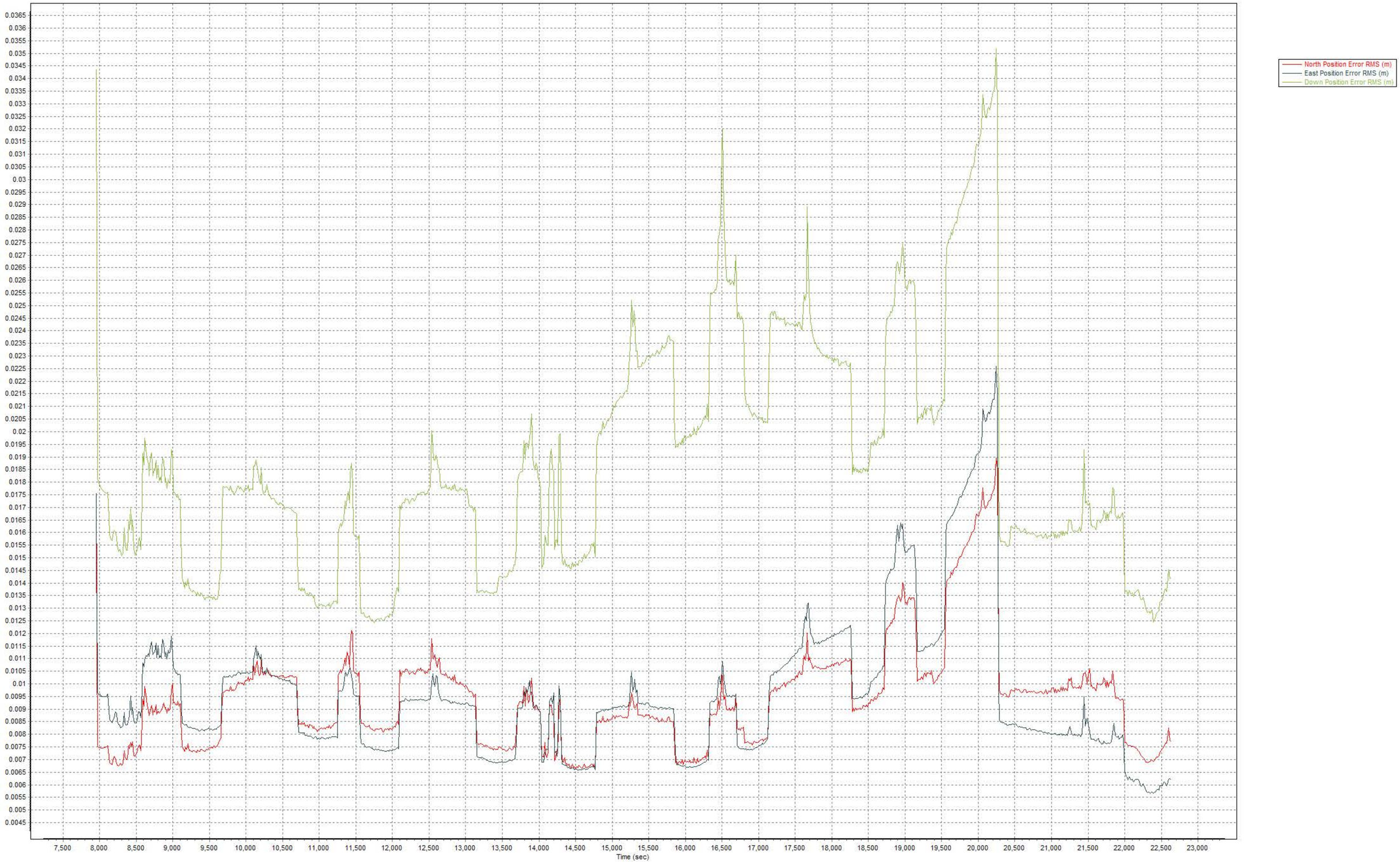
BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DF7050	MTNT MIAMI TNT CORS ARP	N255156.760	W0805425.186	59103.0

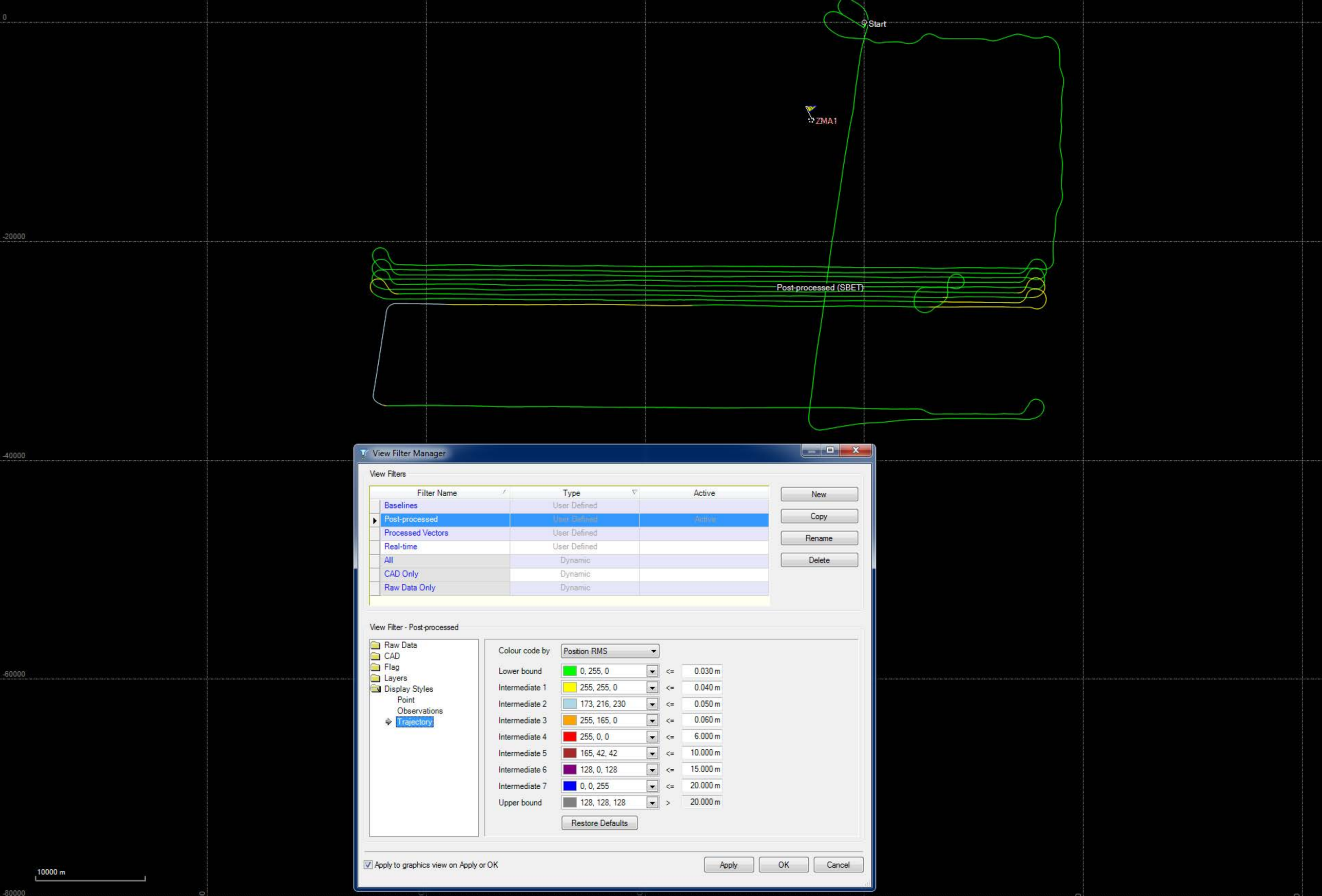
DG9798 PBCH WEST PALM CORS ARP N265046.638 W0801309.299 113632.4
DH3834 LAUD LAUDERDALE CORS ARP N261146.341 W0801023.014 43690.3

NEAREST NGS PUBLISHED CONTROL POINT
DF9225 MIAMI WAAS 1 CORS ARP N254928.585 W0801909.066 0.0

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.


North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
0.0365
0.036
0.0355
0.035
0.0345
0.034
0.0335
0.033
0.0325
0.032
0.0315
0.031
0.0305
0.03
0.0295
0.029
0.0285
0.028
0.0275
0.027
0.0265
0.026
0.0255
0.025
0.0245
0.024
0.0235
0.023
0.0225
0.022
0.0215
0.021
0.0205
0.02
0.0195
0.019
0.0185
0.018
0.0175
0.017
0.0165
0.016
0.0155
0.015
0.0145
0.014
0.0135
0.013
0.0125
0.012
0.0115
0.011
0.0105
0.01
0.0095
0.009
0.0085
0.008
0.0075
0.007
0.0065
0.006
0.0055
0.005
0.0045
7,500
8,000
8,500
9,000
9,500
10,000
10,500
11,000
11,500
12,000
12,500
13,000
13,500
14,000
14,500
15,000
15,500
16,000
16,500
17,000
17,500
18,000
18,500
19,000
19,500
20,000
20,500
21,000
21,500
22,000
22,500
23,000
Time (sec)


Number of GPS Satellites
PDOP
Time (sec)



View Filter Manager

View Filters

Filter Name	Type	Active
Baselines	User Defined	
Post-processed	User Defined	Active
Processed Vectors	User Defined	
Real-time	User Defined	
All	Dynamic	
CAD Only	Dynamic	
Raw Data Only	Dynamic	

New
Copy
Rename
Delete

View Filter - Post-processed

- Raw Data
- CAD
- Flag
- Layers
- Display Styles
  - Point
  - Observations
  - Trajectory

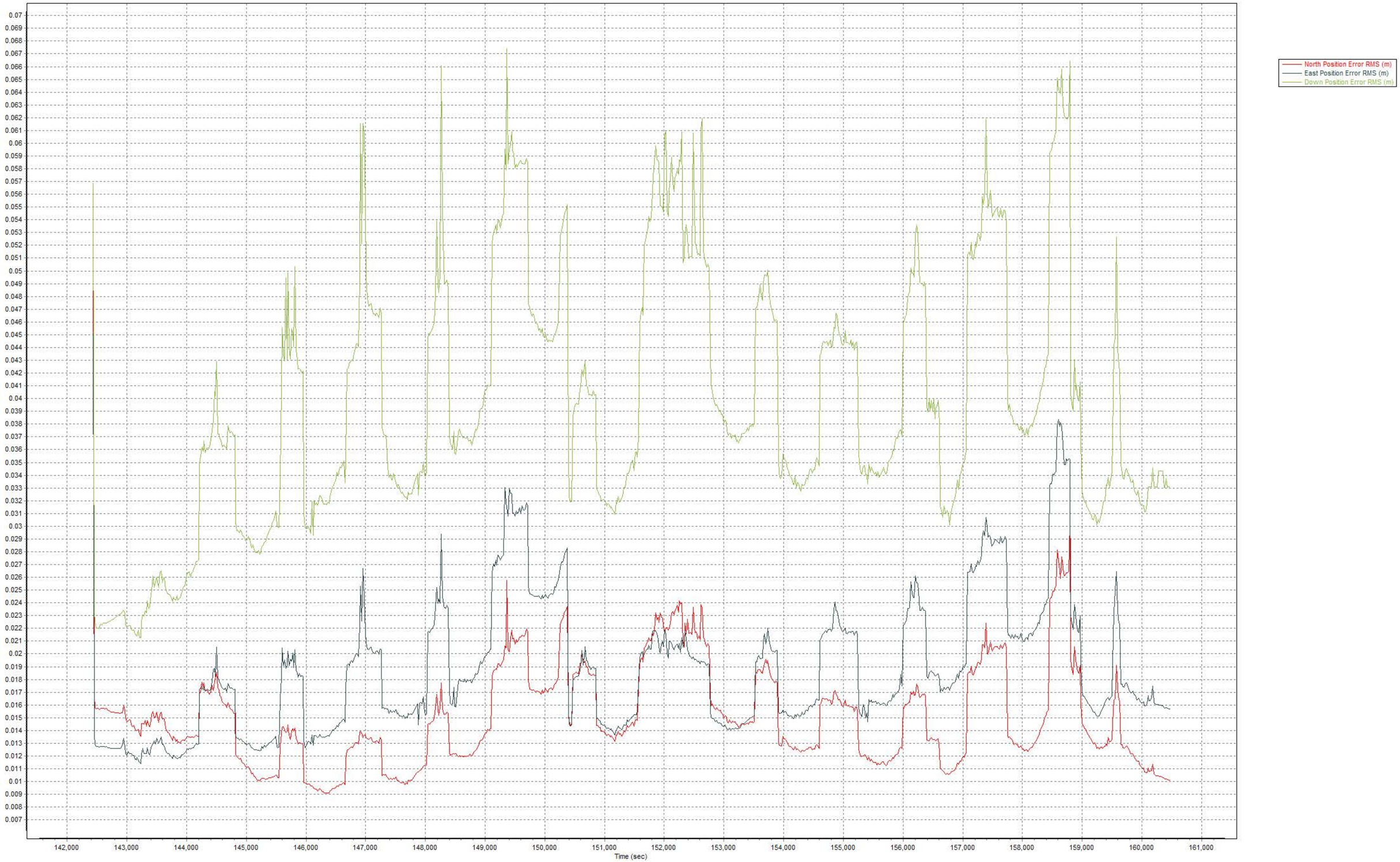
Colour code by: Position RMS

Lower bound	0, 255, 0	<=	0.030 m
Intermediate 1	255, 255, 0	<=	0.040 m
Intermediate 2	173, 216, 230	<=	0.050 m
Intermediate 3	255, 165, 0	<=	0.060 m
Intermediate 4	255, 0, 0	<=	6.000 m
Intermediate 5	165, 42, 42	<=	10.000 m
Intermediate 6	128, 0, 128	<=	15.000 m
Intermediate 7	0, 0, 255	<=	20.000 m
Upper bound	128, 128, 128	>	20.000 m

Restore Defaults

Apply to graphics view on Apply or OK

Apply | OK | Cancel


North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
0.07
0.069
0.068
0.067
0.066
0.065
0.064
0.063
0.062
0.061
0.06
0.059
0.058
0.057
0.056
0.055
0.054
0.053
0.052
0.051
0.05
0.049
0.048
0.047
0.046
0.045
0.044
0.043
0.042
0.041
0.04
0.039
0.038
0.037
0.036
0.035
0.034
0.033
0.032
0.031
0.03
0.029
0.028
0.027
0.026
0.025
0.024
0.023
0.022
0.021
0.02
0.019
0.018
0.017
0.016
0.015
0.014
0.013
0.012
0.011
0.01
0.009
0.008
0.007
142,000
143,000
144,000
145,000
146,000
147,000
148,000
149,000
150,000
151,000
152,000
153,000
154,000
155,000
156,000
157,000
158,000
159,000
160,000
161,000
Time (sec)

From: opus <opus@ngs.noaa.gov>
Sent: Thursday, February 26, 2015 10:13 AM
To: Stonerock, Mike
Subject: OPUS solution : rmnd0520.15o OP1424963544212

FILE: rmnd0520.15o OP1424963544212

1008 NOTE: Antenna offsets supplied by the user were zero. Coordinates
1008 returned will be for the antenna reference point (ARP).
1008

NGS OPUS SOLUTION REPORT
==========

All computed coordinate accuracies are listed as peak-to-peak values.
For additional information: http://www.ngs.noaa.gov/OPUS/about.jsp#accuracy

USER: mstonerock@aca-net.com DATE: February 26, 2015
RINEX FILE: rmnd0520.15o TIME: 15:13:07 UTC

SOFTWARE: page5 1209.04 master91.pl 022814 START: 2015/02/21 00:00:00
EPHEMERIS: igr18326.eph [rapid] STOP: 2015/02/21 23:59:00
NAV FILE: brdc0520.15n OBS USED: 58547 / 61885 : 95%
ANT NAME: LEIAR20 NONE # FIXED AMB: 206 / 224 : 92%
ARP HEIGHT: 0.000 OVERALL RMS: 0.012(m)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2015.1410)

X:	961335.331(m)	0.005(m)	961334.569(m)	0.005(m)
Y:	-5674075.787(m)	0.010(m)	-5674074.182(m)	0.010(m)
Z:	2740535.393(m)	0.010(m)	2740535.213(m)	0.010(m)

LAT:	25 36 49.58917	0.007(m)	25 36 49.60791	0.007(m)
E LON:	279 36 57.85939	0.003(m)	279 36 57.84208	0.003(m)
W LON:	80 23 2.14061	0.003(m)	80 23 2.15792	0.003(m)
EL HGT:	-13.982(m)	0.013(m)	-15.602(m)	0.013(m)
ORTHO HGT:	11.128(m)	0.026(m)	[NAVD88 (Computed using GEOID12A)]	

	UTM COORDINATES (UTM (Zone 17))	STATE PLANE COORDINATES (SPC (0901 FL E))
Northing (Y) [meters]	2833056.742	141973.201
Easting (X) [meters]	561856.015	261877.127
Convergence [degrees]	0.26633800	0.26633800
Point Scale	0.99964724	0.99998844
Combined Factor	0.99964944	0.99999064

US NATIONAL GRID DESIGNATOR: 17RNJ6185633056(NAD 83)

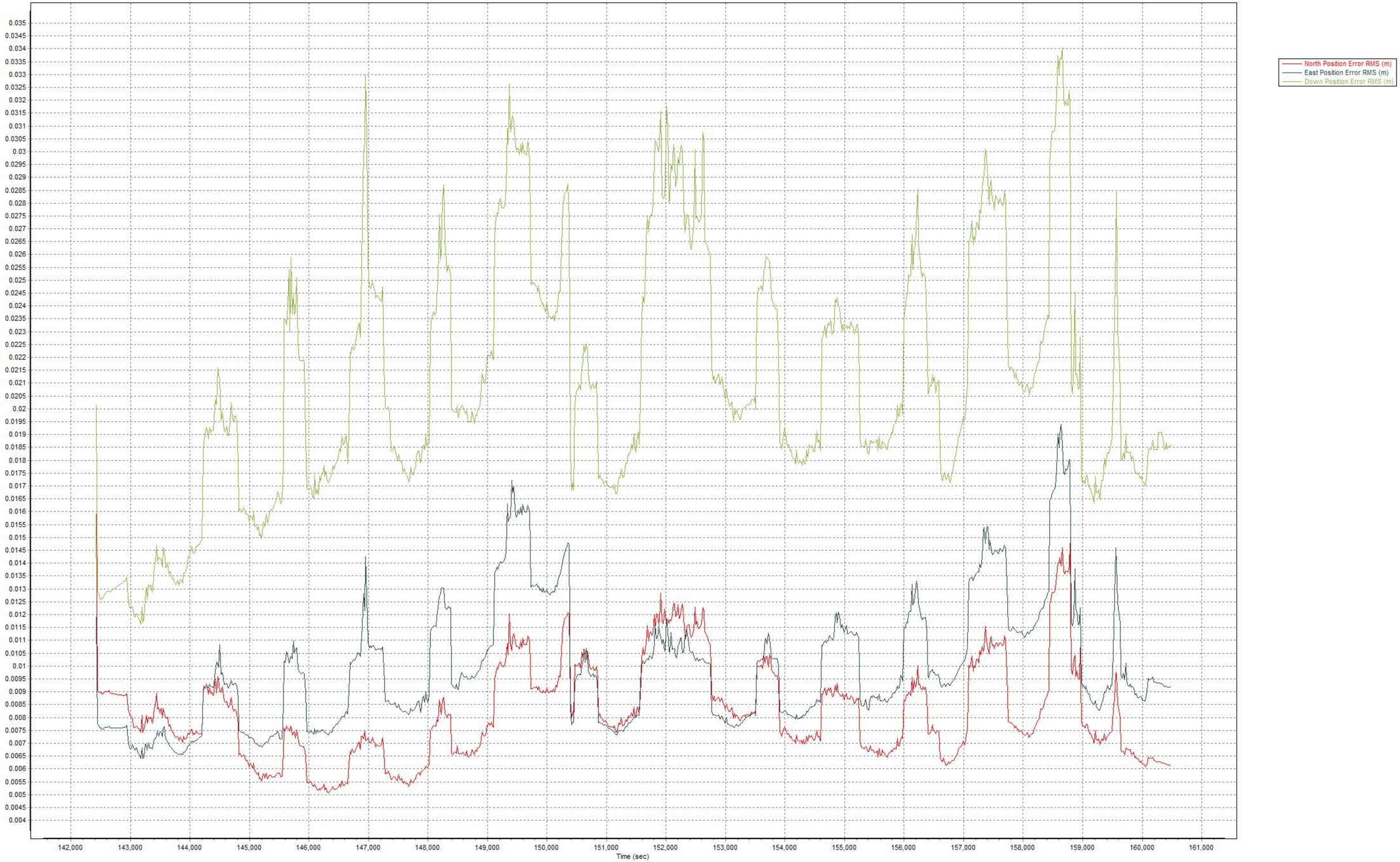
BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DL2756	FLC5 CARD SOUND 5 CORS ARP	N252553.839	W0802801.043	21836.8

DF9225 ZMA1 MIAMI WAAS 1 CORS ARP N254928.585 W0801909.066 24243.6
DF7050 MTNT MIAMI TNT CORS ARP N255156.760 W0805425.186 59445.6

NEAREST NGS PUBLISHED CONTROL POINT
AF9577 RICHMOND 6 CORS ARP N253649.589 W0802302.140 0.0

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.


North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
0.035
0.0345
0.034
0.0335
0.033
0.0325
0.032
0.0315
0.031
0.0305
0.03
0.0295
0.029
0.0285
0.028
0.0275
0.027
0.0265
0.026
0.0255
0.025
0.0245
0.024
0.0235
0.023
0.0225
0.022
0.0215
0.021
0.0205
0.02
0.0195
0.019
0.0185
0.018
0.0175
0.017
0.0165
0.016
0.0155
0.015
0.0145
0.014
0.0135
0.013
0.0125
0.012
0.0115
0.011
0.0105
0.01
0.0095
0.009
0.0085
0.008
0.0075
0.007
0.0065
0.006
0.0055
0.005
0.0045
0.004
142,000
143,000
144,000
145,000
146,000
147,000
148,000
149,000
150,000
151,000
152,000
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156,000
157,000
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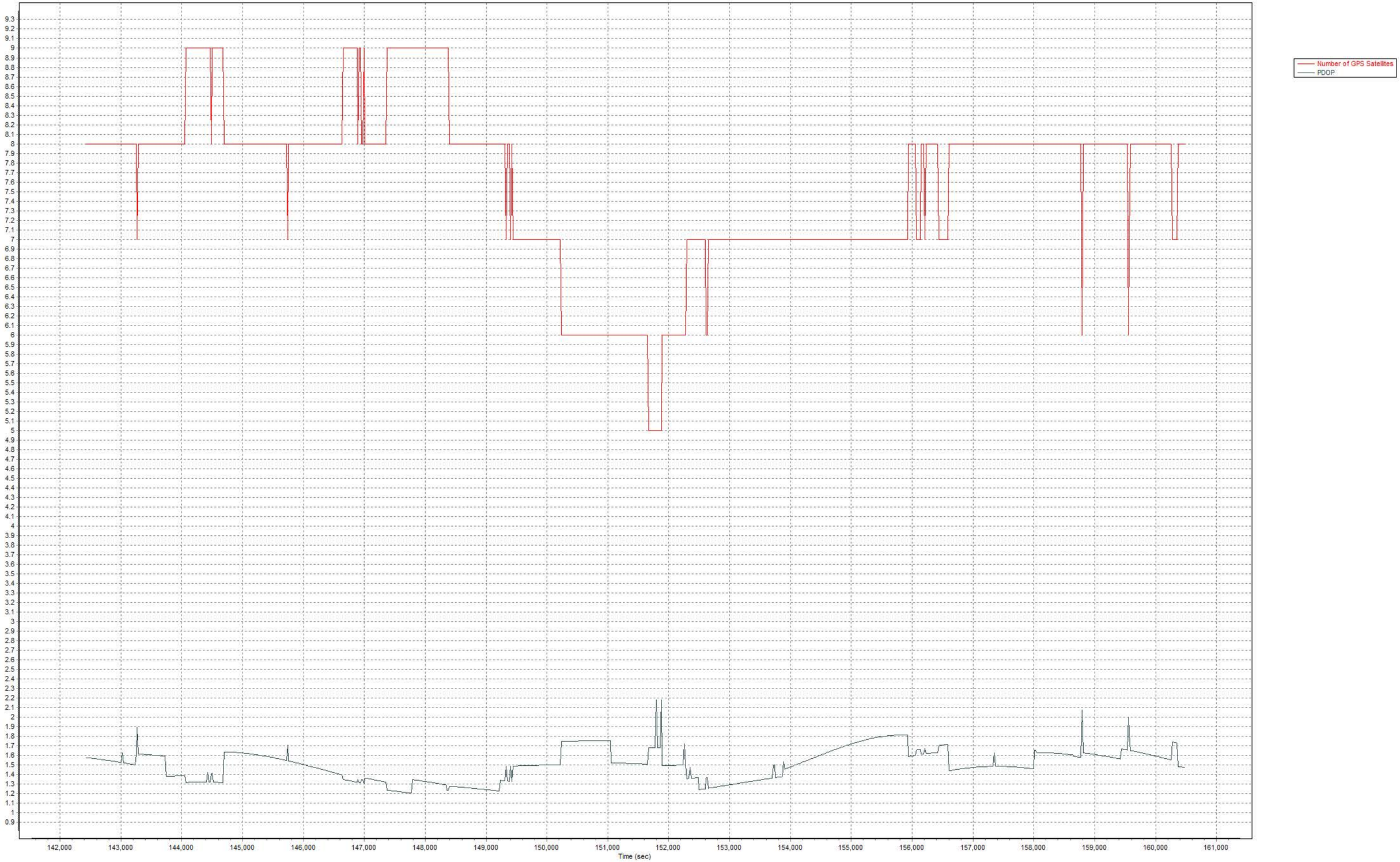
159,000
160,000
161,000
Time (sec)


Number of GPS Satellites
PDOP
9.3
9.2
9.1
9
8.9
8.8
8.7
8.6
8.5
8.4
8.3
8.2
8.1
8
7.9
7.8
7.7
7.6
7.5
7.4
7.3
7.2
7.1
7
6.9
6.8
6.7
6.6
6.5
6.4
6.3
6.2
6.1
6
5.9
5.8
5.7
5.6
5.5
5.4
5.3
5.2
5.1
5
4.9
4.8
4.7
4.6
4.5
4.4
4.3
4.2
4.1
4
3.9
3.8
3.7
3.6
3.5
3.4
3.3
3.2
3.1
3
2.9
2.8
2.7
2.6
2.5
2.4
2.3
2.2
2.1
2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
142,000
143,000
144,000
145,000
146,000
147,000
148,000
149,000
150,000
151,000
152,000
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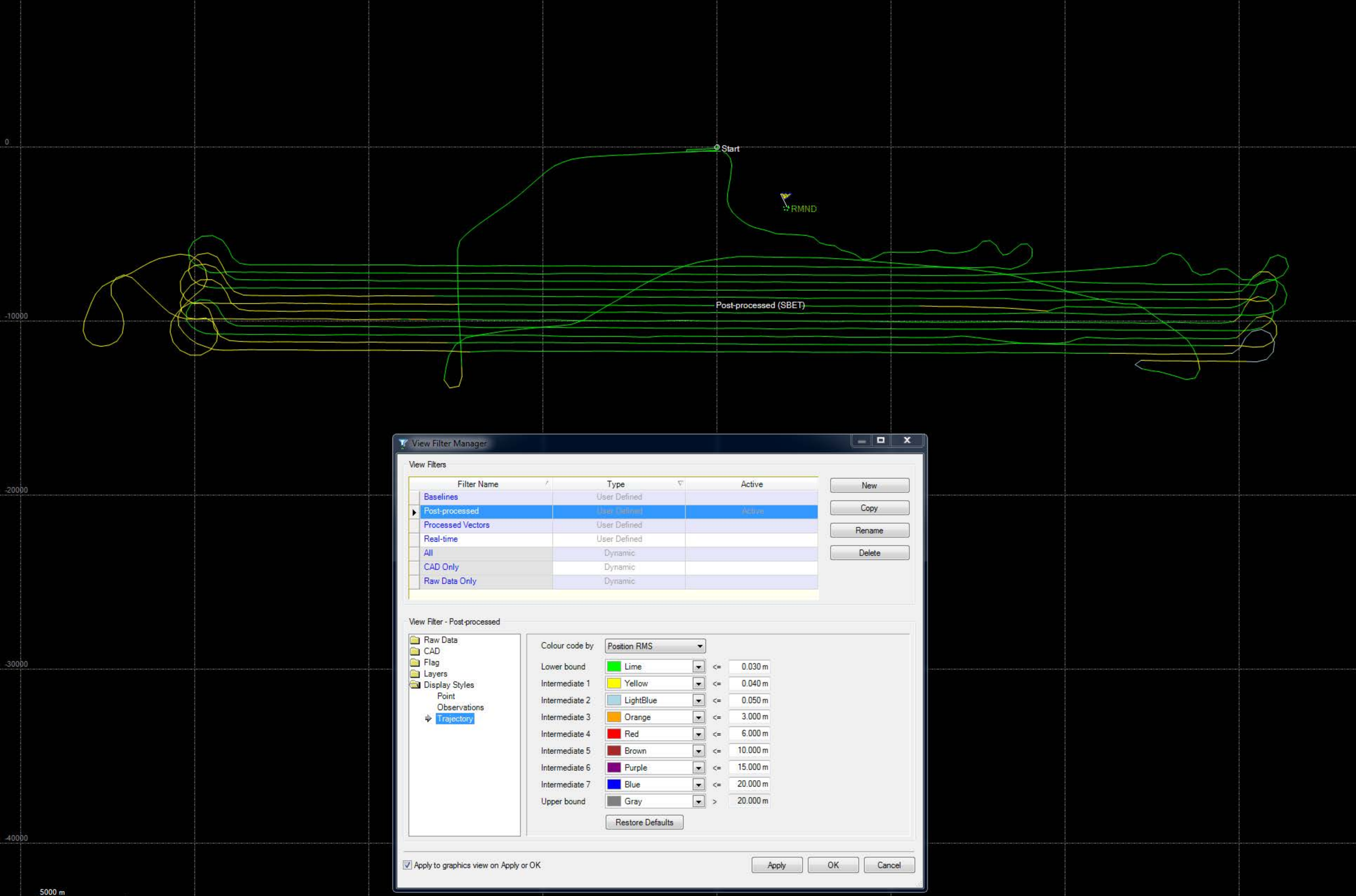
160,000
161,000
Time (sec)


0
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-20000
-30000
-40000
Start
RMND
Post-processed (SBET)
5000 m
-40000
-30000
-20000
-10000
0
10000
20000
30000
View Filter Manager
View Filters
Filter Name
Type
Active
Baselines
User Defined
Post-processed
User Defined
Active
Processed Vectors
User Defined
Real-time
User Defined
All
Dynamic
CAD Only
Dynamic
Raw Data Only
Dynamic
New
Copy
Rename
Delete
View Filter - Post-processed
Raw Data
CAD
Flag
Layers
Display Styles
Point
Observations
Trajectory
Colour code by
Position RMS
Lower bound
Lime
<=
0.030 m
Intermediate 1
Yellow
<=
0.040 m
Intermediate 2
LightBlue
<=
0.050 m
Intermediate 3
Orange
<=
3.000 m
Intermediate 4
Red
<=
6.000 m
Intermediate 5
Brown
<=
10.000 m
Intermediate 6
Purple
<=
15.000 m
Intermediate 7
Blue
<=
20.000 m
Upper bound
Gray
>
20.000 m
Restore Defaults
Apply to graphics view on Apply or OK
Apply
OK
Cancel


North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
0.19
0.185
0.18
0.175
0.17
0.165
0.16
0.155
0.15
0.145
0.14
0.135
0.13
0.125
0.12
0.115
0.11
0.105
0.1
0.095
0.09
0.085
0.08
0.075
0.07
0.065
0.06
0.055
0.05
0.045
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
-0.005
-0.01
-0.015
-0.02
-0.025
-0.03
-0.035
234,000
235,000
236,000
237,000
238,000
239,000
240,000
241,000
242,000
243,000
244,000
245,000
246,000
247,000
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249,000
250,000
251,000
Time (sec)

From: opus <opus@ngs.noaa.gov>
Sent: Thursday, February 26, 2015 10:13 AM
To: Stonerock, Mike
Subject: OPUS solution : rmnd0520.15o OP1424963544212

FILE: rmnd0520.15o OP1424963544212

1008 NOTE: Antenna offsets supplied by the user were zero. Coordinates
1008 returned will be for the antenna reference point (ARP).
1008

NGS OPUS SOLUTION REPORT
==========

All computed coordinate accuracies are listed as peak-to-peak values.
For additional information: http://www.ngs.noaa.gov/OPUS/about.jsp#accuracy

USER: mstonerock@aca-net.com DATE: February 26, 2015
RINEX FILE: rmnd0520.15o TIME: 15:13:07 UTC

SOFTWARE: page5 1209.04 master91.pl 022814 START: 2015/02/21 00:00:00
EPHEMERIS: igr18326.eph [rapid] STOP: 2015/02/21 23:59:00
NAV FILE: brdc0520.15n OBS USED: 58547 / 61885 : 95%
ANT NAME: LEIAR20 NONE # FIXED AMB: 206 / 224 : 92%
ARP HEIGHT: 0.000 OVERALL RMS: 0.012(m)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2015.1410)

X:	961335.331(m)	0.005(m)	961334.569(m)	0.005(m)
Y:	-5674075.787(m)	0.010(m)	-5674074.182(m)	0.010(m)
Z:	2740535.393(m)	0.010(m)	2740535.213(m)	0.010(m)

LAT:	25 36 49.58917	0.007(m)	25 36 49.60791	0.007(m)
E LON:	279 36 57.85939	0.003(m)	279 36 57.84208	0.003(m)
W LON:	80 23 2.14061	0.003(m)	80 23 2.15792	0.003(m)
EL HGT:	-13.982(m)	0.013(m)	-15.602(m)	0.013(m)
ORTHO HGT:	11.128(m)	0.026(m)	[NAVD88 (Computed using GEOID12A)]	

	UTM COORDINATES (UTM (Zone 17))	STATE PLANE COORDINATES (SPC (0901 FL E))
Northing (Y) [meters]	2833056.742	141973.201
Easting (X) [meters]	561856.015	261877.127
Convergence [degrees]	0.26633800	0.26633800
Point Scale	0.99964724	0.99998844
Combined Factor	0.99964944	0.99999064

US NATIONAL GRID DESIGNATOR: 17RNJ6185633056(NAD 83)

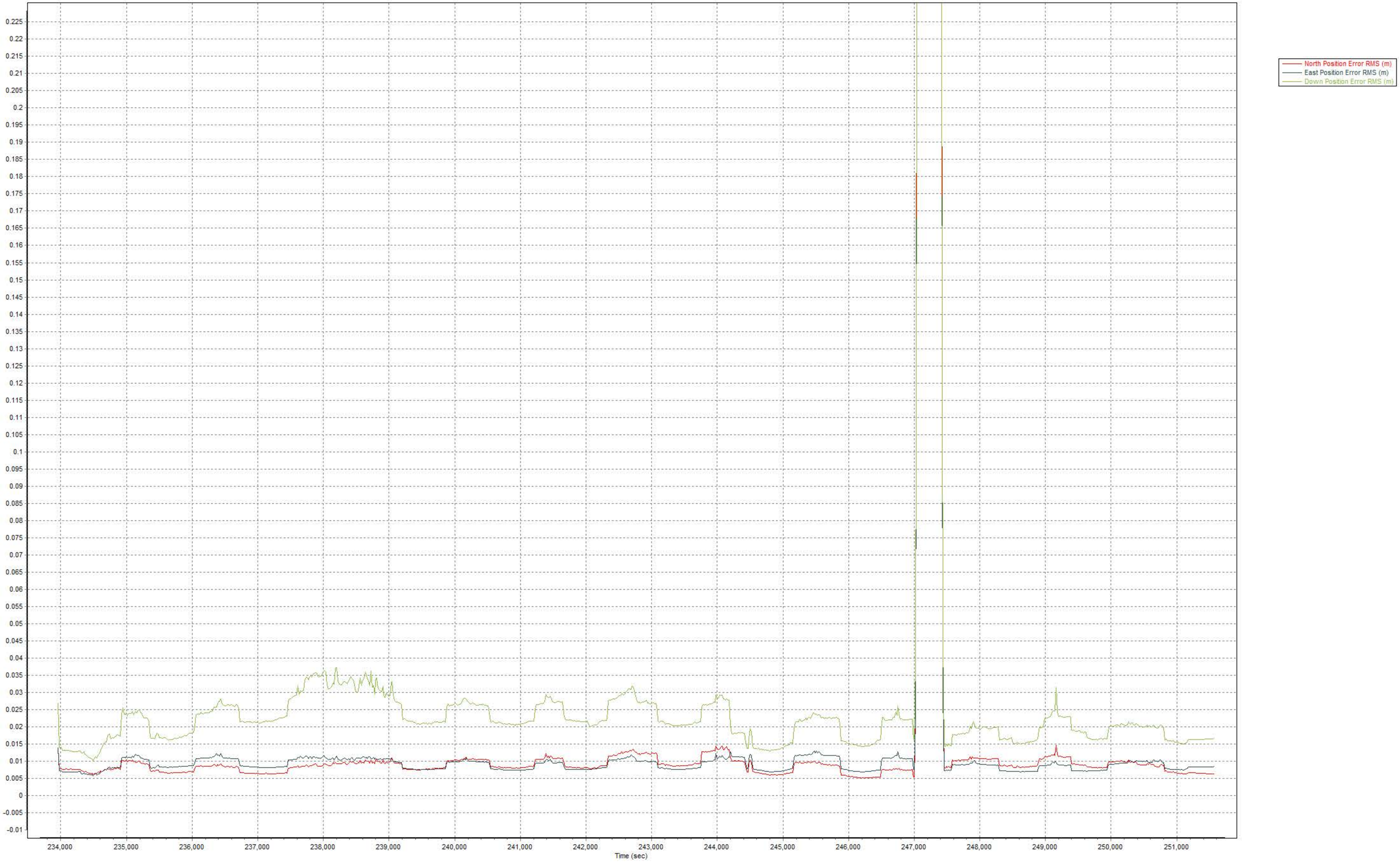
BASE STATIONS USED

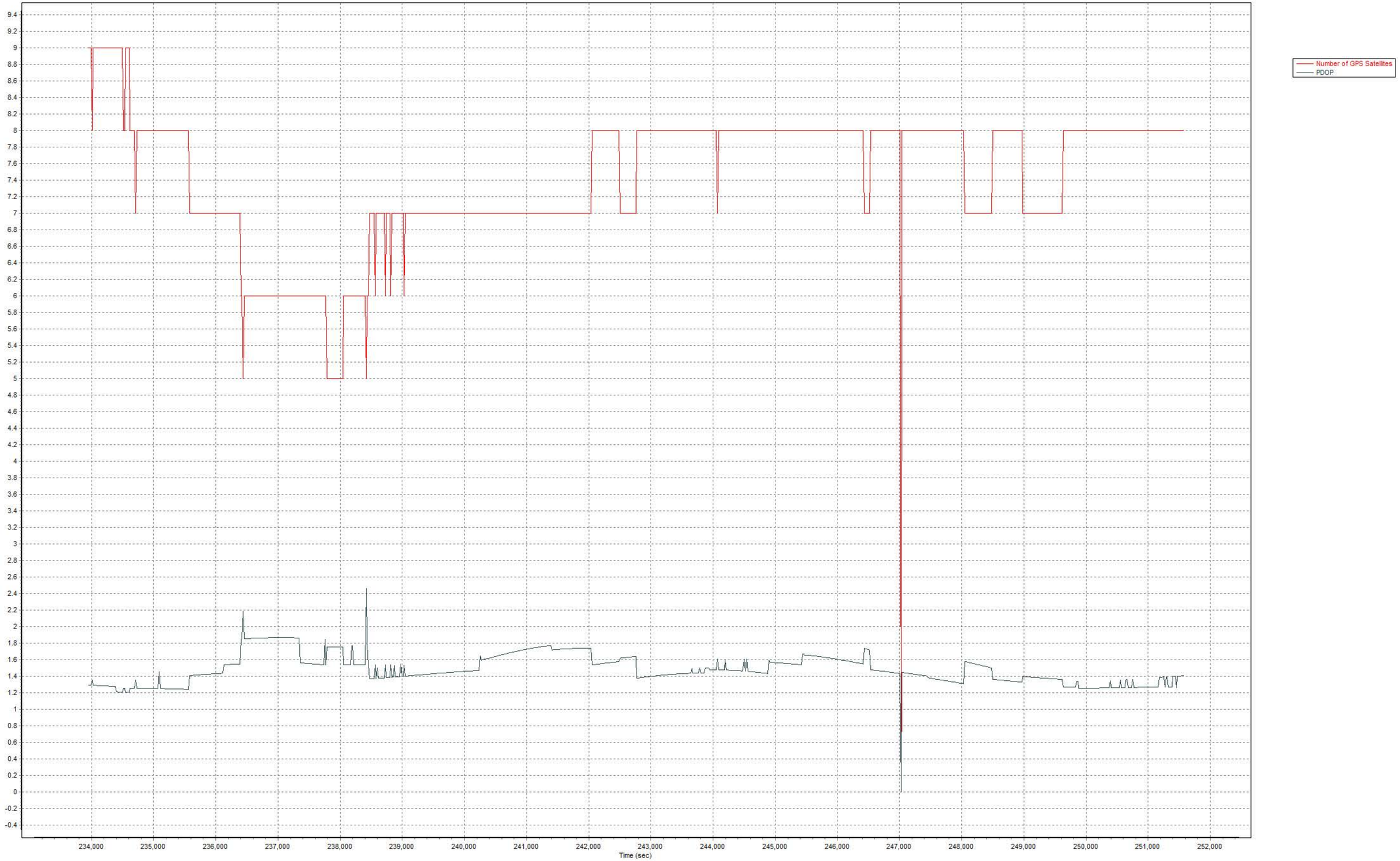
PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DL2756	FLC5 CARD SOUND 5 CORS ARP	N252553.839	W0802801.043	21836.8

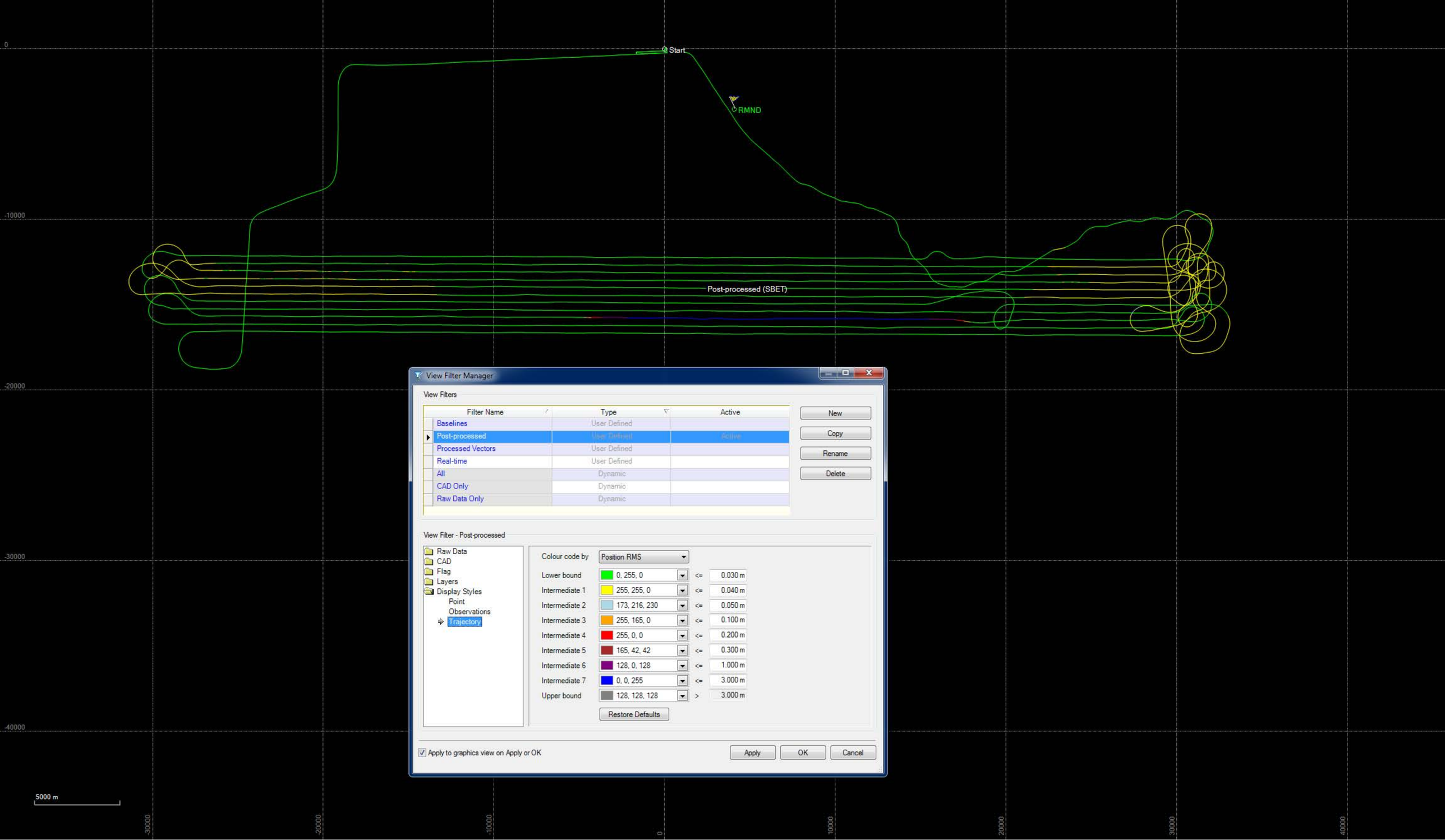
DF9225 ZMA1 MIAMI WAAS 1 CORS ARP N254928.585 W0801909.066 24243.6
DF7050 MTNT MIAMI TNT CORS ARP N255156.760 W0805425.186 59445.6

NEAREST NGS PUBLISHED CONTROL POINT
AF9577 RICHMOND 6 CORS ARP N253649.589 W0802302.140 0.0

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.


North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
0.225
0.22
0.215
0.21
0.205
0.2
0.195
0.19
0.185
0.18
0.175
0.17
0.165
0.16
0.155
0.15
0.145
0.14
0.135
0.13
0.125
0.12
0.115
0.11
0.105
0.1
0.095
0.09
0.085
0.08
0.075
0.07
0.065
0.06
0.055
0.05
0.045
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
-0.005
-0.01
234,000
235,000
236,000
237,000
238,000
239,000
240,000
241,000
242,000
243,000
244,000
245,000
246,000
247,000
248,000
249,000
250,000
251,000
Time (sec)


Number of GPS Satellites
PDOP
9.4
9.2
9
8.8
8.6
8.4
8.2
8
7.8
7.6
7.4
7.2
7
6.8
6.6
6.4
6.2
6
5.8
5.6
5.4
5.2
5
4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
234,000
235,000
236,000
237,000
238,000
239,000
240,000
241,000
242,000
243,000
244,000
245,000
246,000
247,000
248,000
249,000
250,000
251,000
252,000
Time (sec)



View Filter Manager

View Filters

Filter Name	Type	Active
Baselines	User Defined	
Post-processed	User Defined	Active
Processed Vectors	User Defined	
Real-time	User Defined	
All	Dynamic	
CAD Only	Dynamic	
Raw Data Only	Dynamic	

New
Copy
Rename
Delete

View Filter - Post-processed

- Raw Data
- CAD
- Flag
- Layers
- Display Styles
  - Point
  - Observations
  - Trajectory

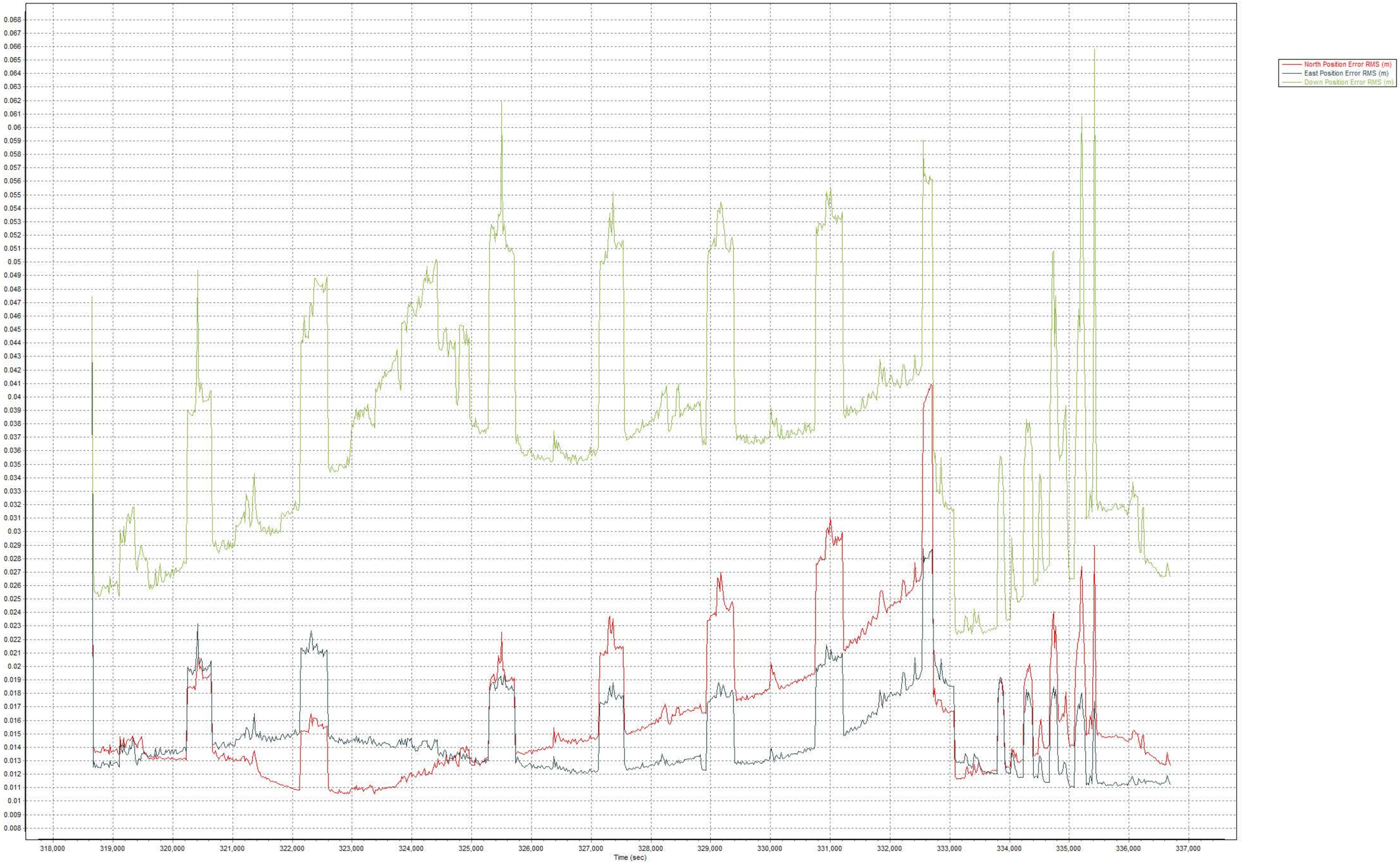
Colour code by: Position RMS

Lower bound	0, 255, 0	<=	0.030 m
Intermediate 1	255, 255, 0	<=	0.040 m
Intermediate 2	173, 216, 230	<=	0.050 m
Intermediate 3	255, 165, 0	<=	0.100 m
Intermediate 4	255, 0, 0	<=	0.200 m
Intermediate 5	165, 42, 42	<=	0.300 m
Intermediate 6	128, 0, 128	<=	1.000 m
Intermediate 7	0, 0, 255	<=	3.000 m
Upper bound	128, 128, 128	>	3.000 m

Restore Defaults

Apply to graphics view on Apply or OK

Apply | OK | Cancel


North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
0.068
0.067
0.066
0.065
0.064
0.063
0.062
0.061
0.06
0.059
0.058
0.057
0.056
0.055
0.054
0.053
0.052
0.051
0.05
0.049
0.048
0.047
0.046
0.045
0.044
0.043
0.042
0.041
0.04
0.039
0.038
0.037
0.036
0.035
0.034
0.033
0.032
0.031
0.03
0.029
0.028
0.027
0.026
0.025
0.024
0.023
0.022
0.021
0.02
0.019
0.018
0.017
0.016
0.015
0.014
0.013
0.012
0.011
0.01
0.009
0.008
318,000
319,000
320,000
321,000
322,000
323,000
324,000
325,000
326,000
327,000
328,000
329,000
330,000
331,000
332,000
333,000
334,000
335,000
336,000
337,000
Time (sec)

From: opus <opus@ngs.noaa.gov>
Sent: Tuesday, April 14, 2015 7:25 AM
To: Stonerock, Mike
Subject: OPUS solution : mtnt0980.15o OP1429010651712

FILE: mtnt0980.15o OP1429010651712

1008 NOTE: Antenna offsets supplied by the user were zero. Coordinates
1008 returned will be for the antenna reference point (ARP).
1008

NGS OPUS SOLUTION REPORT
==========

All computed coordinate accuracies are listed as peak-to-peak values.
For additional information: http://www.ngs.noaa.gov/OPUS/about.jsp#accuracy

USER: mstonerock@aca-net.com DATE: April 14, 2015
RINEX FILE: mtnt0980.15o TIME: 11:24:55 UTC

SOFTWARE: page5 1209.04 master92.pl 022814 START: 2015/04/08 00:00:00
EPHEMERIS: igr18393.eph [rapid] STOP: 2015/04/08 23:59:00
NAV FILE: brdc0980.15n OBS USED: 56558 / 61731 : 92%
ANT NAME: LEIAR20 NONE # FIXED AMB: 251 / 279 : 90%
ARP HEIGHT: 0.000 OVERALL RMS: 0.015(m)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2015.2671)

X:	907579.145(m)	0.002(m)	907578.380(m)	0.002(m)
Y:	-5670639.708(m)	0.021(m)	-5670638.109(m)	0.021(m)
Z:	2765679.853(m)	0.014(m)	2765679.673(m)	0.014(m)

LAT:	25 51 56.76104	0.022(m)	25 51 56.77987	0.022(m)
E LON:	279 5 34.81360	0.006(m)	279 5 34.79554	0.006(m)
W LON:	80 54 25.18640	0.006(m)	80 54 25.20446	0.006(m)
EL HGT:	-18.930(m)	0.018(m)	-20.538(m)	0.018(m)
ORTHO HGT:	5.392(m)	0.034(m)	[NAVD88 (Computed using GEOID12A)]	

	UTM COORDINATES (UTM (Zone 17))	STATE PLANE COORDINATES (SPC (0901 FL E))
Northing (Y) [meters]	2860821.815	169747.750
Easting (X) [meters]	509318.156	209321.336
Convergence [degrees]	0.04057425	0.04057425
Point Scale	0.99960107	0.99994225
Combined Factor	0.99960404	0.99994522

US NATIONAL GRID DESIGNATOR: 17RNJ0931860821(NAD 83)

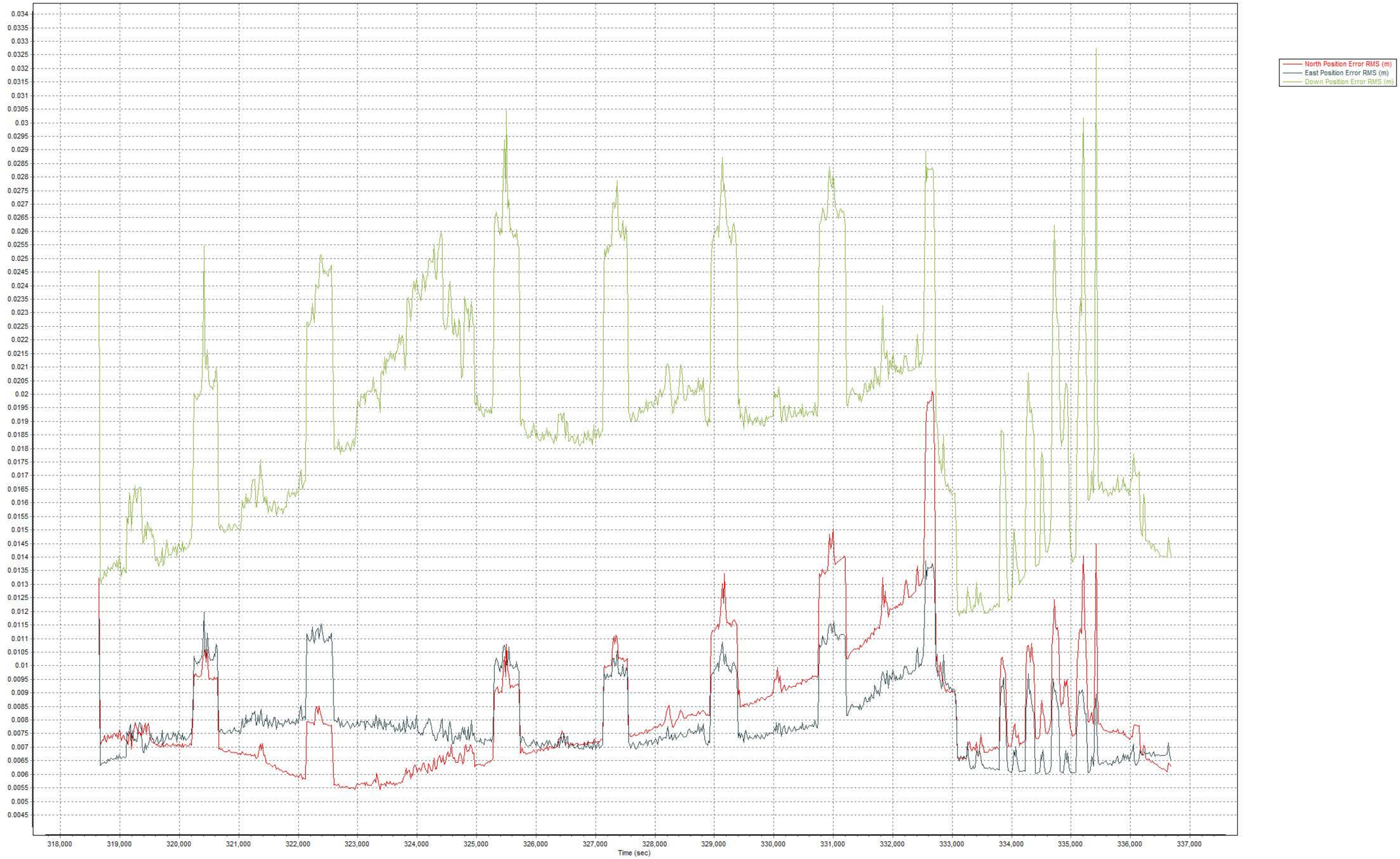
BASE STATIONS USED

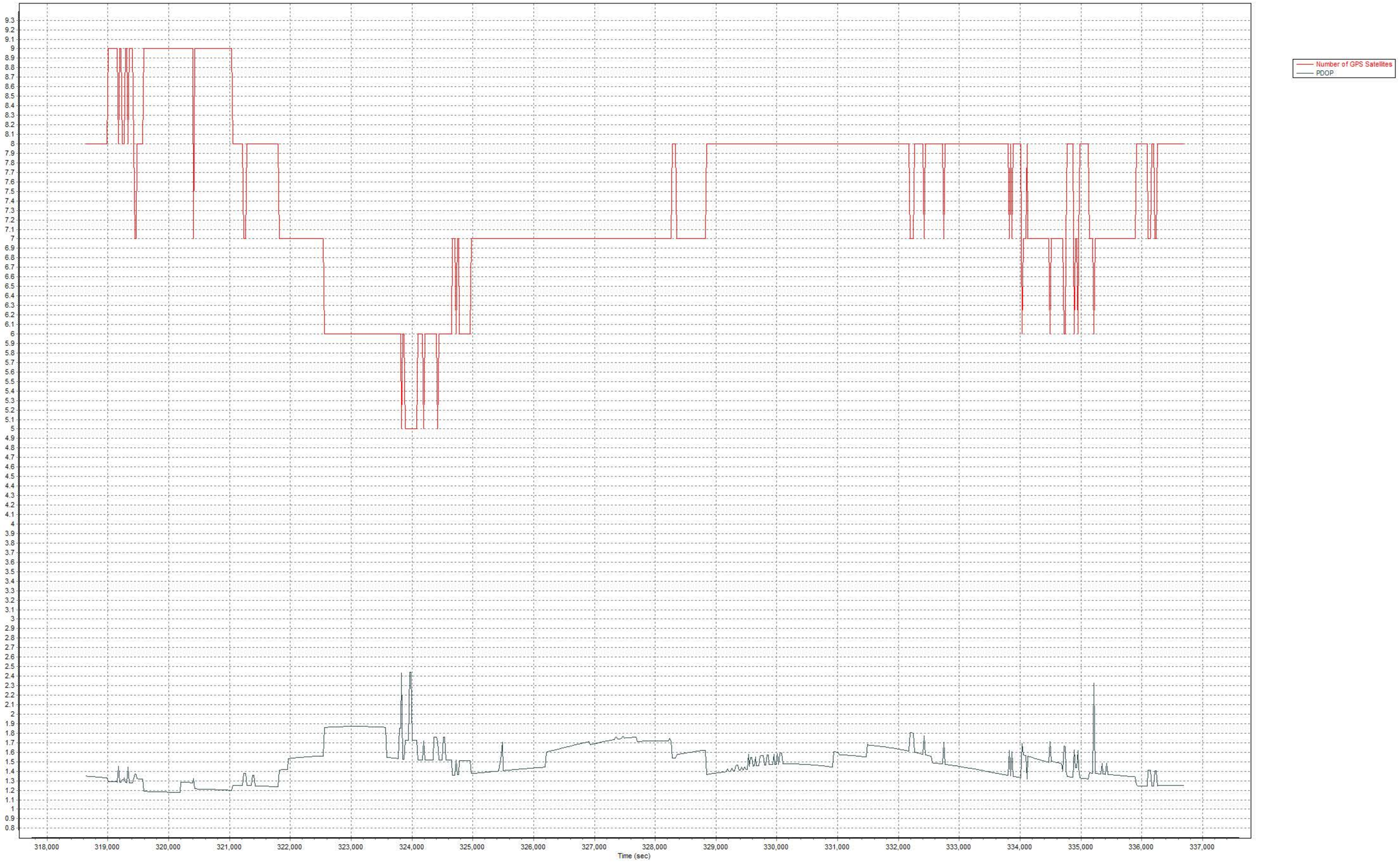
PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DL2756	FLC5 CARD SOUND 5 CORS ARP	N252553.839	W0802801.043	65310.9

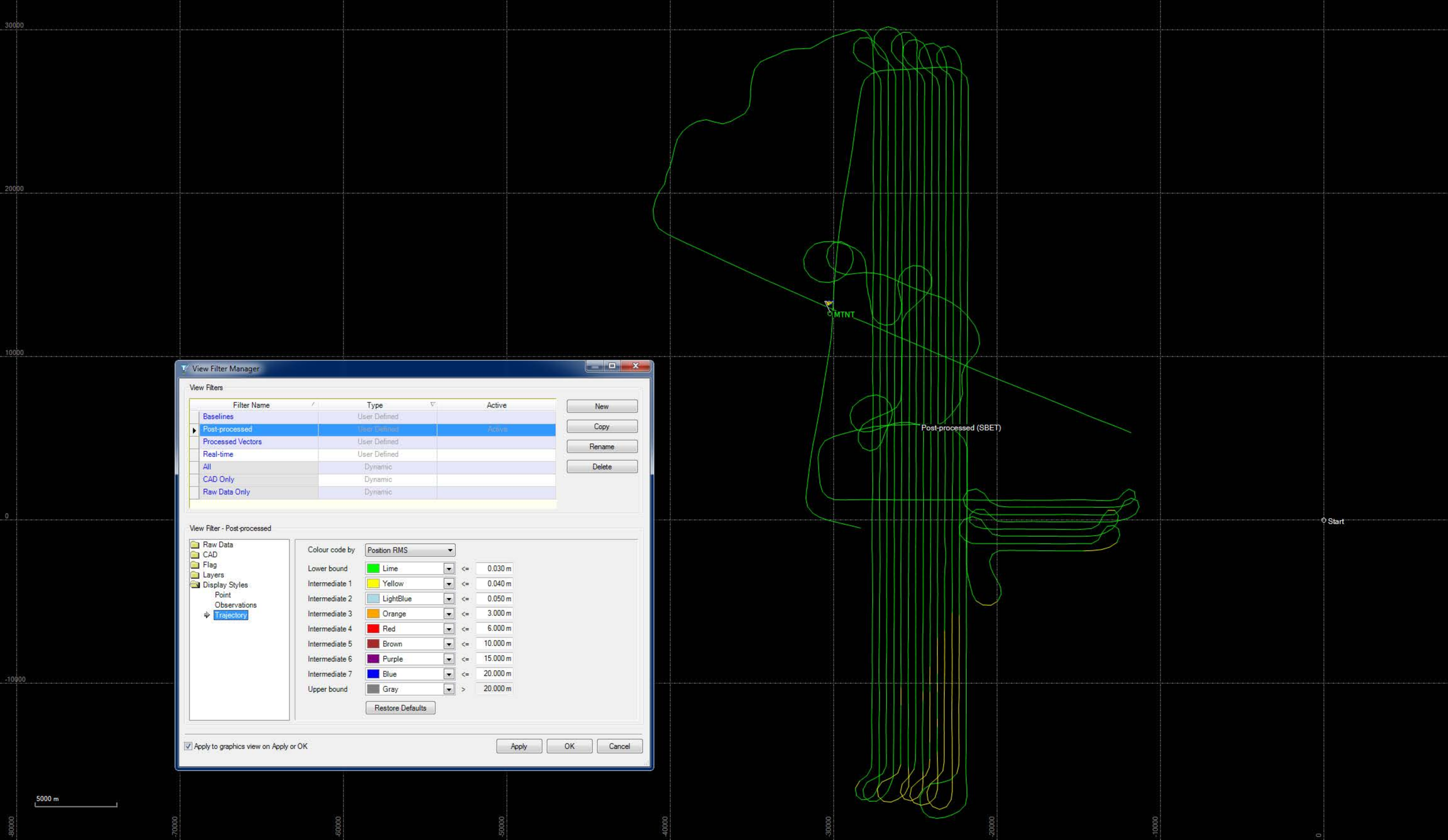
DF9225 ZMA1 MIAMI WAAS 1 CORS ARP N254928.585 W0801909.066 59103.0
DP6859 FLF1 FL FOUNDATION 1 CORS ARP N253655.240 W0802309.912 59172.4

NEAREST NGS PUBLISHED CONTROL POINT
DF7050 MIAMI TNT CORS ARP N255156.760 W0805425.186 0.0

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.


North Position Error RMS (m)
East Position Error RMS (m)
Down Position Error RMS (m)
0.034
0.0335
0.033
0.0325
0.032
0.0315
0.031
0.0305
0.03
0.0295
0.029
0.0285
0.028
0.0275
0.027
0.0265
0.026
0.0255
0.025
0.0245
0.024
0.0235
0.023
0.0225
0.022
0.0215
0.021
0.0205
0.02
0.0195
0.019
0.0185
0.018
0.0175
0.017
0.0165
0.016
0.0155
0.015
0.0145
0.014
0.0135
0.013
0.0125
0.012
0.0115
0.011
0.0105
0.01
0.0095
0.009
0.0085
0.008
0.0075
0.007
0.0065
0.006
0.0055
0.005
0.0045
318,000
319,000
320,000
321,000
322,000
323,000
324,000
325,000
326,000
327,000
328,000
329,000
330,000
331,000
332,000
333,000
334,000
335,000
336,000
337,000
Time (sec)


Number of GPS Satellites
PDOP
9.3
9.2
9.1
9
8.9
8.8
8.7
8.6
8.5
8.4
8.3
8.2
8.1
8
7.9
7.8
7.7
7.6
7.5
7.4
7.3
7.2
7.1
7
6.9
6.8
6.7
6.6
6.5
6.4
6.3
6.2
6.1
6
5.9
5.8
5.7
5.6
5.5
5.4
5.3
5.2
5.1
5
4.9
4.8
4.7
4.6
4.5
4.4
4.3
4.2
4.1
4
3.9
3.8
3.7
3.6
3.5
3.4
3.3
3.2
3.1
3
2.9
2.8
2.7
2.6
2.5
2.4
2.3
2.2
2.1
2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
318,000
319,000
320,000
321,000
322,000
323,000
324,000
325,000
326,000
327,000
328,000
329,000
330,000
331,000
332,000
333,000
334,000
335,000
336,000
337,000
Time (sec)


30000
20000
10000
0
-10000
-80000
-70000
-60000
-50000
-40000
-30000
-20000
-10000
0
5000 m
MTNT
Post-processed (SBET)
Start
View Filter Manager
View Filters
Filter Name
Type
Active
Baselines
User Defined
Post-processed
User Defined
Active
Processed Vectors
User Defined
Real-time
User Defined
All
Dynamic
CAD Only
Dynamic
Raw Data Only
Dynamic
New
Copy
Rename
Delete
View Filter - Post-processed
Raw Data
CAD
Flag
Layers
Display Styles
Point
Observations
Trajectory
Colour code by
Position RMS
Lower bound
Lime
<=
0.030 m
Intermediate 1
Yellow
<=
0.040 m
Intermediate 2
LightBlue
<=
0.050 m
Intermediate 3
Orange
<=
3.000 m
Intermediate 4
Red
<=
6.000 m
Intermediate 5
Brown
<=
10.000 m
Intermediate 6
Purple
<=
15.000 m
Intermediate 7
Blue
<=
20.000 m
Upper bound
Gray
>
20.000 m
Restore Defaults
Apply to graphics view on Apply or OK
Apply
OK
Cancel

APPENDIX B

The NGS Data Sheet

See file dsdata.txt for more information about the datasheet.

```
PROGRAM = datasheet95, VERSION = 8.7.1
1        National Geodetic Survey,   Retrieval Date = AUGUST  7, 2015
 AC0464 ***********************************************************************
 AC0464  DESIGNATION -  A 274
 AC0464  PID         -  AC0464
 AC0464  STATE/COUNTY-  FL/MIAMI-DADE
 AC0464  COUNTRY     -  US
 AC0464  USGS QUAD   -  ROYAL PALM RANGER STATION (1979)
 AC0464
 AC0464                        *CURRENT SURVEY CONTROL
 AC0464  ______________________________________________________________________
 AC0464* NAD 83(1986) POSITION- 25 30 00.     (N) 080 33 02.     (W)    SCALED
 AC0464* NAVD 88 ORTHO HEIGHT -     1.724 (meters)        5.66  (feet) ADJUSTED
 AC0464  ______________________________________________________________________
 AC0464  GEOID HEIGHT    -        -24.66  (meters)                      GEOID12B
 AC0464  DYNAMIC HEIGHT  -          1.721 (meters)        5.65  (feet) COMP
 AC0464  MODELED GRAVITY -    978,988.9   (mgal)                        NAVD 88
 AC0464
 AC0464  VERT ORDER      -  FIRST     CLASS II
 AC0464
 AC0464.This mark is at Homestead Airport (X51)
 AC0464
 AC0464.The horizontal coordinates were scaled from a topographic map and have
 AC0464.an estimated accuracy of +/- 6 seconds.
 AC0464.
 AC0464.The orthometric height was determined by differential leveling and
 AC0464.adjusted by the NATIONAL GEODETIC SURVEY
 AC0464.in June 1991.
 AC0464
 AC0464.The dynamic height is computed by dividing the NAVD 88
 AC0464.geopotential number by the normal gravity value computed on the
 AC0464.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 AC0464.degrees latitude (g = 980.6199 gals.).
 AC0464
 AC0464.The modeled gravity was interpolated from observed gravity values.
 AC0464
 AC0464;                    North         East     Units  Estimated Accuracy
 AC0464;SPC FL E     -   129,300.      245,180.      MT  (+/- 180 meters Scaled)
 AC0464
 AC0464                          SUPERSEDED SURVEY CONTROL
 AC0464
 AC0464  NGVD 29 (??/??/92)    2.187  (m)             7.18    (f) SUPERSEDED  1 2
 AC0464  NGVD 29 (09/01/92)    2.187  (m)             7.18    (f) ADJUSTED    1 2
 AC0464
 AC0464.Superseded values are not recommended for survey control.
 AC0464
 AC0464.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 AC0464.See file dsdata.txt to determine how the superseded data were derived.
 AC0464
 AC0464_U.S. NATIONAL GRID SPATIAL ADDRESS: 17RNJ451203(NAD 83)
 AC0464
```

AC0464_MARKER: DB = BENCH MARK DISK
AC0464_SETTING: 34 = SET IN THE FOOTINGS OF SMALL/MEDIUM STRUCTURES
AC0464_SP_SET: CONCRETE BASE FOR WIND SOCK
AC0464_STAMPING: A 274 1966
AC0464_MARK LOGO: CGS
AC0464_MAGNETIC: N = NO MAGNETIC MATERIAL
AC0464_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
AC0464+STABILITY: SURFACE MOTION
AC0464_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
AC0464+SATELLITE: SATELLITE OBSERVATIONS - February 21, 1991
AC0464
AC0464 HISTORY - Date Condition Report By
AC0464 HISTORY - 1966 MONUMENTED CGS
AC0464 HISTORY - 1987 GOOD USPSQD
AC0464 HISTORY - 1988 GOOD USPSQD
AC0464 HISTORY - 19910221 GOOD FLDNR
AC0464 HISTORY - 19910302 GOOD USPSQD
AC0464 HISTORY - 20010524 GOOD USACE
AC0464
AC0464 STATION DESCRIPTION
AC0464
AC0464'DESCRIBED BY COAST AND GEODETIC SURVEY 1966
AC0464'5.7 MI NW FROM HOMESTEAD.
AC0464'ABOUT 4.6 MILES WEST ALONG AVOCADO DRIVE FROM THE SOUTH DADE
AC0464'BAPTIST CHURCH AT HOMESTEAD, THENCE ABOUT 0.6 MILE NORTH ALONG
AC0464'SW. 217TH AVENUE, THENCE ABOUT 0.5 MILE WEST ALONG ENTRANCE DRIVE
AC0464'TO HOMESTEAD GENERAL AVIATION AIRPORT, ABOUT 95 YARDS NORTHWEST
AC0464'OF THE NORTHWEST CORNER OF THE ADMINISTRATION BUILDING, SET IN THE
AC0464'TOP OF THE NORTHWEST CORNER OF THE CONCRETE BASE FOR THE WIND
AC0464'SOCK, 71 FEET WEST OF WEST EDGE OF PARKING AREA, AND ABOUT LEVEL
AC0464'WITH THE TAXI STRIP.
AC0464
AC0464 STATION RECOVERY (1987)
AC0464
AC0464'RECOVERY NOTE BY US POWER SQUADRON 1987 (TD)
AC0464'RECOVERED IN GOOD CONDITION.
AC0464
AC0464 STATION RECOVERY (1988)
AC0464
AC0464'RECOVERY NOTE BY US POWER SQUADRON 1988 (TD)
AC0464'RECOVERED IN GOOD CONDITION.
AC0464
AC0464 STATION RECOVERY (1991)
AC0464
AC0464'RECOVERY NOTE BY FL DEPT OF NAT RES 1991
AC0464'RECOVERED IN GOOD CONDITION.
AC0464
AC0464 STATION RECOVERY (1991)
AC0464
AC0464'RECOVERY NOTE BY US POWER SQUADRON 1991 (LFG)
AC0464'RECOVERED IN GOOD CONDITION.
AC0464
AC0464 STATION RECOVERY (2001)
AC0464
AC0464'RECOVERY NOTE BY US ARMY CORPS OF ENGINEERS 2001 (BFS)
AC0464'THE STATION MARK WAS FOUND IN GOOD CONDITION.

*** retrieval complete.
Elapsed Time = 00:00:07

The NGS Data Sheet

See file dsdata.txt for more information about the datasheet.

```
PROGRAM = datasheet95, VERSION = 8.7.1
1        National Geodetic Survey,   Retrieval Date = AUGUST  6, 2015
 DL2756 ***********************************************************************
 DL2756  CORS         -  This is a GPS Continuously Operating Reference Station.
 DL2756  DESIGNATION -  CARD SOUND 5 CORS ARP
 DL2756  CORS_ID      -  FLC5
 DL2756  PID          -  DL2756
 DL2756  STATE/COUNTY-  FL/MIAMI-DADE
 DL2756  COUNTRY      -  US
 DL2756  USGS QUAD    -  HOMESTEAD (1994)
 DL2756
 DL2756                         *CURRENT SURVEY CONTROL
 DL2756  ______________________________________________________________________
 DL2756* NAD 83(2011) POSITION- 25 25 53.83958(N) 080 28 01.04343(W)   ADJUSTED
 DL2756* NAD 83(2011) ELLIP HT-   -16.661 (meters)        (08/??/11)   ADJUSTED
 DL2756* NAD 83(2011) EPOCH   -  2010.00
 DL2756* NAVD 88 ORTHO HEIGHT -          **(meters)           **(feet)
 DL2756  ______________________________________________________________________
 DL2756  NAD 83(2011) X  -    954,551.445 (meters)                    COMP
 DL2756  NAD 83(2011) Y  - -5,684,034.944 (meters)                    COMP
 DL2756  NAD 83(2011) Z  -  2,722,324.461 (meters)                    COMP
 DL2756  GEOID HEIGHT    -        -24.88  (meters)                    GEOID12B
 DL2756
 DL2756.Formal positional accuracy estimates are not available for this CORS
 DL2756.because its coordinates were determined in part using modeled
 DL2756.velocities. Approximate one-sigma accuracies for latitude, longitude,
 DL2756.and ellipsoid height can be obtained from the short-term time series.
 DL2756.Additional information regarding modeled velocities is available on
 DL2756.the CORS Coordinates and Multi-Year CORS Solution FAQ web pages.
 DL2756
 DL2756.The coordinates were established by GPS observations
 DL2756.and adjusted by the National Geodetic Survey in August 2011.
 DL2756
 DL2756.NAD 83(2011) refers to NAD 83 coordinates where the reference
 DL2756.frame has been affixed to the stable North American Tectonic Plate.
 DL2756
 DL2756.The coordinates are valid at the epoch date displayed above
 DL2756.which is a decimal equivalence of Year/Month/Day.
 DL2756
 DL2756.The PID for the CORS L1 Phase Center is DL2757.
 DL2756
 DL2756.The XYZ, and position/ellipsoidal ht. are equivalent.
 DL2756
 DL2756.The ellipsoidal height was determined by GPS observations
 DL2756.and is referenced to NAD 83.
 DL2756
 DL2756. The following values were computed from the NAD 83(2011) position.
 DL2756
 DL2756;                   North         East     Units Scale Factor Converg.
 DL2756;SPC FL E     -   121,758.677   253,618.618   MT  0.99997666   +0 13 44.1
 DL2756;SPC FL E     -   399,469.93    832,080.42    sFT  0.99997666   +0 13 44.1
```

```
DL2756;UTM  17      - 2,812,849.115   553,600.323   MT  0.99963548   +0 13 44.1
DL2756
DL2756!             -  Elev Factor  x  Scale Factor =   Combined Factor
DL2756!SPC FL E     -   1.00000262  x   0.99997666  =   0.99997928
DL2756!UTM  17      -   1.00000262  x   0.99963548  =   0.99963810
DL2756
DL2756                          SUPERSEDED SURVEY CONTROL
DL2756
DL2756  NAD 83(CORS)-  25 25 53.83997(N)    080 28 01.04416(W) AD(2002.00) c
DL2756  ELLIP H (05/??/09)  -16.652  (m)                       GP(2002.00) c c
DL2756
DL2756.Superseded values are not recommended for survey control.
DL2756
DL2756.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
DL2756.See file dsdata.txt to determine how the superseded data were derived.
DL2756
DL2756_U.S. NATIONAL GRID SPATIAL ADDRESS: 17RNJ5360012849(NAD 83)
DL2756
DL2756_MARKER: STATION IS THE ANTENNA REFERENCE POINT OF THE GPS ANTENNA
DL2756
DL2756                          STATION DESCRIPTION
DL2756
DL2756'DESCRIBED BY NATIONAL GEODETIC SURVEY 2011
DL2756'STATION IS A GPS CORS.  LATEST INFORMATION INCLUDING POSITIONS AND
DL2756'VELOCITIES ARE AVAILABLE IN THE COORDINATE AND LOG FILES ACCESSIBLE
DL2756'BY ANONYMOUS FTP OR THE WORLDWIDE WEB.
DL2756'   ftp://cors.ngs.noaa.gov/cors/README.txt
DL2756'   ftp://cors.ngs.noaa.gov/cors/coord/coord_08
DL2756'   ftp://cors.ngs.noaa.gov/cors/station_log
DL2756'   http://geodesy.noaa.gov/CORS

*** retrieval complete.
Elapsed Time = 00:00:03
```

The NGS Data Sheet

See file dsdata.txt for more information about the datasheet.

```
PROGRAM = datasheet95, VERSION = 8.7.1
1        National Geodetic Survey,   Retrieval Date = AUGUST  6, 2015
 DL2758 ***********************************************************************
 DL2758  CORS         -  This is a GPS Continuously Operating Reference Station.
 DL2758  DESIGNATION -  CARD SOUND 6 CORS ARP
 DL2758  CORS_ID      -  FLC6
 DL2758  PID          -  DL2758
 DL2758  STATE/COUNTY-  FL/MIAMI-DADE
 DL2758  COUNTRY      -  US
 DL2758  USGS QUAD    -  HOMESTEAD (1994)
 DL2758
 DL2758                        *CURRENT SURVEY CONTROL
 DL2758  ______________________________________________________________________
 DL2758* NAD 83(2011) POSITION- 25 25 52.98252(N) 080 28 01.17849(W)   ADJUSTED
 DL2758* NAD 83(2011) ELLIP HT-   -16.668 (meters)        (08/??/11)   ADJUSTED
 DL2758* NAD 83(2011) EPOCH   -  2010.00
 DL2758* NAVD 88 ORTHO HEIGHT -          **(meters)           **(feet)
 DL2758  ______________________________________________________________________
 DL2758  NAD 83(2011) X  -    954,549.598 (meters)                    COMP
 DL2758  NAD 83(2011) Y  - -5,684,046.732 (meters)                    COMP
 DL2758  NAD 83(2011) Z  -  2,722,300.640 (meters)                    COMP
 DL2758  GEOID HEIGHT    -        -24.88  (meters)                    GEOID12B
 DL2758
 DL2758.Formal positional accuracy estimates are not available for this CORS
 DL2758.because its coordinates were determined in part using modeled
 DL2758.velocities. Approximate one-sigma accuracies for latitude, longitude,
 DL2758.and ellipsoid height can be obtained from the short-term time series.
 DL2758.Additional information regarding modeled velocities is available on
 DL2758.the CORS Coordinates and Multi-Year CORS Solution FAQ web pages.
 DL2758
 DL2758.The coordinates were established by GPS observations
 DL2758.and adjusted by the National Geodetic Survey in August 2011.
 DL2758
 DL2758.NAD 83(2011) refers to NAD 83 coordinates where the reference
 DL2758.frame has been affixed to the stable North American Tectonic Plate.
 DL2758
 DL2758.The coordinates are valid at the epoch date displayed above
 DL2758.which is a decimal equivalence of Year/Month/Day.
 DL2758
 DL2758.The PID for the CORS L1 Phase Center is DL2759.
 DL2758
 DL2758.The XYZ, and position/ellipsoidal ht. are equivalent.
 DL2758
 DL2758.The ellipsoidal height was determined by GPS observations
 DL2758.and is referenced to NAD 83.
 DL2758
 DL2758. The following values were computed from the NAD 83(2011) position.
 DL2758
 DL2758;                   North         East     Units Scale Factor Converg.
 DL2758;SPC FL E     -   121,732.289   253,614.949   MT  0.99997666   +0 13 44.0
 DL2758;SPC FL E     -   399,383.35    832,068.38    sFT  0.99997666   +0 13 44.0
```

```
DL2758;UTM  17      - 2,812,822.736   553,596.656   MT  0.99963547   +0 13 44.0
DL2758
DL2758!             -  Elev Factor  x  Scale Factor =   Combined Factor
DL2758!SPC FL E     -   1.00000262  x   0.99997666  =   0.99997928
DL2758!UTM  17      -   1.00000262  x   0.99963547  =   0.99963809
DL2758
DL2758                          SUPERSEDED SURVEY CONTROL
DL2758
DL2758  NAD 83(CORS)-  25 25 52.98292(N)    080 28 01.17929(W) AD(2002.00) c
DL2758  ELLIP H (05/??/09)  -16.660  (m)                       GP(2002.00) c c
DL2758
DL2758.Superseded values are not recommended for survey control.
DL2758
DL2758.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
DL2758.See file dsdata.txt to determine how the superseded data were derived.
DL2758
DL2758_U.S. NATIONAL GRID SPATIAL ADDRESS: 17RNJ5359612822(NAD 83)
DL2758
DL2758_MARKER: STATION IS THE ANTENNA REFERENCE POINT OF THE GPS ANTENNA
DL2758
DL2758                          STATION DESCRIPTION
DL2758
DL2758'DESCRIBED BY NATIONAL GEODETIC SURVEY 2011
DL2758'STATION IS A GPS CORS.  LATEST INFORMATION INCLUDING POSITIONS AND
DL2758'VELOCITIES ARE AVAILABLE IN THE COORDINATE AND LOG FILES ACCESSIBLE
DL2758'BY ANONYMOUS FTP OR THE WORLDWIDE WEB.
DL2758'   ftp://cors.ngs.noaa.gov/cors/README.txt
DL2758'   ftp://cors.ngs.noaa.gov/cors/coord/coord_08
DL2758'   ftp://cors.ngs.noaa.gov/cors/station_log
DL2758'   http://geodesy.noaa.gov/CORS

*** retrieval complete.
Elapsed Time = 00:00:04
```

The NGS Data Sheet

See file dsdata.txt for more information about the datasheet.

```
PROGRAM = datasheet95, VERSION = 8.7.1
1        National Geodetic Survey,   Retrieval Date = AUGUST  7, 2015
 DP6859 ***********************************************************************
 DP6859  CORS         -  This is a GPS Continuously Operating Reference Station.
 DP6859  DESIGNATION -  FL FOUNDATION 1 CORS ARP
 DP6859  CORS_ID      -  FLF1
 DP6859  PID          -  DP6859
 DP6859  STATE/COUNTY-  FL/MIAMI-DADE
 DP6859  COUNTRY      -  US
 DP6859  USGS QUAD    -  GOULDS (1994)
 DP6859
 DP6859                        *CURRENT SURVEY CONTROL
 DP6859  ______________________________________________________________________
 DP6859* NAD 83(2011) POSITION- 25 36 55.24087(N) 080 23 09.91295(W)   ADJUSTED
 DP6859* NAD 83(2011) ELLIP HT-   -20.451 (meters)        (03/??/15)   ADJUSTED
 DP6859* NAD 83(2011) EPOCH   -  2010.00
 DP6859* NAVD 88 ORTHO HEIGHT -          **(meters)           **(feet)
 DP6859  ______________________________________________________________________
 DP6859  NAD 83(2011) X  -    961,107.992 (meters)                    COMP
 DP6859  NAD 83(2011) Y  - -5,674,032.125 (meters)                    COMP
 DP6859  NAD 83(2011) Z  -  2,740,689.423 (meters)                    COMP
 DP6859  GEOID HEIGHT    -        -25.10  (meters)                    GEOID12B
 DP6859
 DP6859.Formal positional accuracy estimates are not available for this CORS
 DP6859.because its coordinates were determined in part using modeled
 DP6859.velocities. Approximate one-sigma accuracies for latitude, longitude,
 DP6859.and ellipsoid height can be obtained from the short-term time series.
 DP6859.Additional information regarding modeled velocities is available on
 DP6859.the CORS Coordinates and Multi-Year CORS Solution FAQ web pages.
 DP6859
 DP6859.The coordinates were established by GPS observations
 DP6859.and adjusted by the National Geodetic Survey in March 2015.
 DP6859
 DP6859.NAD 83(2011) refers to NAD 83 coordinates where the reference
 DP6859.frame has been affixed to the stable North American Tectonic Plate.
 DP6859
 DP6859.The coordinates are valid at the epoch date displayed above
 DP6859.which is a decimal equivalence of Year/Month/Day.
 DP6859
 DP6859.The PID for the CORS L1 Phase Center is DP6860.
 DP6859
 DP6859.The XYZ, and position/ellipsoidal ht. are equivalent.
 DP6859
 DP6859.The ellipsoidal height was determined by GPS observations
 DP6859.and is referenced to NAD 83.
 DP6859
 DP6859. The following values were computed from the NAD 83(2011) position.
 DP6859
 DP6859;                   North         East     Units Scale Factor Converg.
 DP6859;SPC FL E     -   142,146.109   261,659.472   MT  0.99998811   +0 15 55.5
 DP6859;SPC FL E     -   466,357.69    858,461.12    sFT  0.99998811   +0 15 55.5
```

```
DP6859;UTM  17      - 2,833,229.591   561,638.434   MT  0.99964691   +0 15 55.5
DP6859
DP6859!             -  Elev Factor  x  Scale Factor =   Combined Factor
DP6859!SPC FL E     -   1.00000321  x   0.99998811  =   0.99999132
DP6859!UTM  17      -   1.00000321  x   0.99964691  =   0.99965012
DP6859
DP6859                          SUPERSEDED SURVEY CONTROL
DP6859
DP6859.No superseded survey control is available for this station.
DP6859
DP6859_U.S. NATIONAL GRID SPATIAL ADDRESS: 17RNJ6163833229(NAD 83)
DP6859
DP6859_MARKER: STATION IS THE ANTENNA REFERENCE POINT OF THE GPS ANTENNA
DP6859
DP6859                          STATION DESCRIPTION
DP6859
DP6859'DESCRIBED BY NATIONAL GEODETIC SURVEY 2015
DP6859'STATION IS A GPS CORS.  LATEST INFORMATION INCLUDING POSITIONS AND
DP6859'VELOCITIES ARE AVAILABLE IN THE COORDINATE AND LOG FILES ACCESSIBLE
DP6859'BY ANONYMOUS FTP OR THE WORLDWIDE WEB.
DP6859'   ftp://cors.ngs.noaa.gov/cors/README.txt
DP6859'   ftp://cors.ngs.noaa.gov/cors/coord/coord_08
DP6859'   ftp://cors.ngs.noaa.gov/cors/station_log
DP6859'   http://geodesy.noaa.gov/CORS

*** retrieval complete.
Elapsed Time = 00:00:11
```

The NGS Data Sheet

See file dsdata.txt for more information about the datasheet.

```
PROGRAM = datasheet95, VERSION = 8.7.1
1        National Geodetic Survey,   Retrieval Date = AUGUST  6, 2015
 DJ3675 ***********************************************************************
 DJ3675  CORS         -  This is a GPS Continuously Operating Reference Station.
 DJ3675  DESIGNATION -  KEY WEST 6 CORS ARP
 DJ3675  CORS_ID      -  KYW6
 DJ3675  PID          -  DJ3675
 DJ3675  STATE/COUNTY-  FL/MONROE
 DJ3675  COUNTRY      -  US
 DJ3675  USGS QUAD    -  BOCA CHICA KEY (1971)
 DJ3675
 DJ3675                        *CURRENT SURVEY CONTROL
 DJ3675  ______________________________________________________________________
 DJ3675* NAD 83(2011) POSITION- 24 34 56.29161(N) 081 39 10.04925(W)   ADJUSTED
 DJ3675* NAD 83(2011) ELLIP HT-   -12.039 (meters)        (08/??/11)   ADJUSTED
 DJ3675* NAD 83(2011) EPOCH   -  2010.00
 DJ3675* NAVD 88 ORTHO HEIGHT -          **(meters)           **(feet)
 DJ3675  ______________________________________________________________________
 DJ3675  NAD 83(2011) X  -    842,488.657 (meters)                      COMP
 DJ3675  NAD 83(2011) Y  - -5,741,925.633 (meters)                      COMP
 DJ3675  NAD 83(2011) Z  -  2,637,065.336 (meters)                      COMP
 DJ3675  GEOID HEIGHT    -        -21.76  (meters)                      GEOID12B
 DJ3675
 DJ3675  Network accuracy estimates per FGDC Geospatial Positioning Accuracy
 DJ3675  Standards:
 DJ3675         FGDC (95% conf, cm)     Standard deviation (cm)     CorrNE
 DJ3675            Horiz  Ellip           SD_N   SD_E   SD_h      (unitless)
 DJ3675  ----------------------------------------------------------------------
 DJ3675  NETWORK    3.31  12.24           1.32   1.39   6.24     -0.00593110
 DJ3675  ----------------------------------------------------------------------
 DJ3675  Click here for local accuracies and other accuracy information.
 DJ3675
 DJ3675
 DJ3675.The coordinates were established by GPS observations
 DJ3675.and adjusted by the National Geodetic Survey in August 2011.
 DJ3675
 DJ3675.NAD 83(2011) refers to NAD 83 coordinates where the reference
 DJ3675.frame has been affixed to the stable North American Tectonic Plate.
 DJ3675
 DJ3675.The coordinates are valid at the epoch date displayed above
 DJ3675.which is a decimal equivalence of Year/Month/Day.
 DJ3675
 DJ3675.The PID for the CORS L1 Phase Center is DJ3676.
 DJ3675
 DJ3675.The XYZ, and position/ellipsoidal ht. are equivalent.
 DJ3675
 DJ3675.The ellipsoidal height was determined by GPS observations
 DJ3675.and is referenced to NAD 83.
 DJ3675
 DJ3675. The following values were computed from the NAD 83(2011) position.
 DJ3675
```

```
DJ3675;                    North         East     Units Scale Factor Converg.
DJ3675;SPC FL E     -    27,732.189   133,882.551   MT  0.99999515   -0 16 17.7
DJ3675;SPC FL E     -    90,984.69    439,246.34   sFT  0.99999515   -0 16 17.7
DJ3675;UTM  17      - 2,718,854.708   433,905.110   MT  0.99965395   -0 16 17.7
DJ3675
DJ3675!             -  Elev Factor  x  Scale Factor =   Combined Factor
DJ3675!SPC FL E     -   1.00000189  x   0.99999515  =   0.99999704
DJ3675!UTM  17      -   1.00000189  x   0.99965395  =   0.99965584
DJ3675
DJ3675                          SUPERSEDED SURVEY CONTROL
DJ3675
DJ3675  NAD 83(CORS)-  24 34 56.29162(N)    081 39 10.04967(W) AD(2002.00) c
DJ3675  ELLIP H (10/??/07)  -12.036  (m)                      GP(2002.00) c c
DJ3675
DJ3675.Superseded values are not recommended for survey control.
DJ3675
DJ3675.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
DJ3675.See file dsdata.txt to determine how the superseded data were derived.
DJ3675
DJ3675_U.S. NATIONAL GRID SPATIAL ADDRESS: 17RMH3390518854(NAD 83)
DJ3675
DJ3675_MARKER: STATION IS THE ANTENNA REFERENCE POINT OF THE GPS ANTENNA
DJ3675
DJ3675                          STATION DESCRIPTION
DJ3675
DJ3675'DESCRIBED BY NATIONAL GEODETIC SURVEY 2011
DJ3675'STATION IS A GPS CORS.  LATEST INFORMATION INCLUDING POSITIONS AND
DJ3675'VELOCITIES ARE AVAILABLE IN THE COORDINATE AND LOG FILES ACCESSIBLE
DJ3675'BY ANONYMOUS FTP OR THE WORLDWIDE WEB.
DJ3675'   ftp://cors.ngs.noaa.gov/cors/README.txt
DJ3675'   ftp://cors.ngs.noaa.gov/cors/coord/coord_08
DJ3675'   ftp://cors.ngs.noaa.gov/cors/station_log
DJ3675'   http://geodesy.noaa.gov/CORS

*** retrieval complete.
Elapsed Time = 00:00:03
```

The NGS Data Sheet

See file dsdata.txt for more information about the datasheet.

```
PROGRAM = datasheet95, VERSION = 8.7.1
1        National Geodetic Survey,   Retrieval Date = AUGUST  6, 2015
 DH3834 ***********************************************************************
 DH3834  CORS         -  This is a GPS Continuously Operating Reference Station.
 DH3834  DESIGNATION -  LAUDERDALE CORS ARP
 DH3834  CORS_ID      -  LAUD
 DH3834  PID          -  DH3834
 DH3834  STATE/COUNTY-  FL/BROWARD
 DH3834  COUNTRY      -  US
 DH3834  USGS QUAD    -  FORT LAUDERDALE NORTH (1995)
 DH3834
 DH3834                         *CURRENT SURVEY CONTROL
 DH3834  ______________________________________________________________________
 DH3834* NAD 83(2011) POSITION- 26 11 46.34158(N) 080 10 23.01431(W)   ADJUSTED
 DH3834* NAD 83(2011) ELLIP HT-   -18.135 (meters)        (08/??/11)   ADJUSTED
 DH3834* NAD 83(2011) EPOCH   -  2010.00
 DH3834* NAVD 88 ORTHO HEIGHT -          **(meters)           **(feet)
 DH3834  ______________________________________________________________________
 DH3834  NAD 83(2011) X  -    977,399.488 (meters)                      COMP
 DH3834  NAD 83(2011) Y  - -5,642,719.506 (meters)                      COMP
 DH3834  NAD 83(2011) Z  -  2,798,575.179 (meters)                      COMP
 DH3834  GEOID HEIGHT    -        -25.63  (meters)                      GEOID12B
 DH3834
 DH3834.Formal positional accuracy estimates are not available for this CORS
 DH3834.because its coordinates were determined in part using modeled
 DH3834.velocities. Approximate one-sigma accuracies for latitude, longitude,
 DH3834.and ellipsoid height can be obtained from the short-term time series.
 DH3834.Additional information regarding modeled velocities is available on
 DH3834.the CORS Coordinates and Multi-Year CORS Solution FAQ web pages.
 DH3834
 DH3834.The coordinates were established by GPS observations
 DH3834.and adjusted by the National Geodetic Survey in August 2011.
 DH3834
 DH3834.NAD 83(2011) refers to NAD 83 coordinates where the reference
 DH3834.frame has been affixed to the stable North American Tectonic Plate.
 DH3834
 DH3834.The coordinates are valid at the epoch date displayed above
 DH3834.which is a decimal equivalence of Year/Month/Day.
 DH3834
 DH3834.The PID for the CORS L1 Phase Center is DP1679.
 DH3834
 DH3834.The XYZ, and position/ellipsoidal ht. are equivalent.
 DH3834
 DH3834.The ellipsoidal height was determined by GPS observations
 DH3834.and is referenced to NAD 83.
 DH3834
 DH3834. The following values were computed from the NAD 83(2011) position.
 DH3834
 DH3834;                    North         East     Units Scale Factor Converg.
 DH3834;SPC FL E     -   206,614.440   282,650.277   MT  1.00002549   +0 21 54.3
 DH3834;SPC FL E     -   677,867.54    927,328.45    sFT  1.00002549   +0 21 54.3
```

```
DH3834;UTM  17      - 2,897,675.925   582,622.077   MT  0.99968428   +0 21 54.3
DH3834
DH3834!             -  Elev Factor  x  Scale Factor =   Combined Factor
DH3834!SPC FL E     -   1.00000285  x   1.00002549  =   1.00002834
DH3834!UTM  17      -   1.00000285  x   0.99968428  =   0.99968713
DH3834
DH3834                          SUPERSEDED SURVEY CONTROL
DH3834
DH3834  NAD 83(CORS)-  26 11 46.34168(N)    080 10 23.01438(W) AD(2002.00) c
DH3834  ELLIP H (06/??/05)  -18.141  (m)                       GP(2002.00) c c
DH3834
DH3834.Superseded values are not recommended for survey control.
DH3834
DH3834.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
DH3834.See file dsdata.txt to determine how the superseded data were derived.
DH3834
DH3834_U.S. NATIONAL GRID SPATIAL ADDRESS: 17RNJ8262297675(NAD 83)
DH3834
DH3834_MARKER: STATION IS THE ANTENNA REFERENCE POINT OF THE GPS ANTENNA
DH3834
DH3834                          STATION DESCRIPTION
DH3834
DH3834'DESCRIBED BY NATIONAL GEODETIC SURVEY 2011
DH3834'STATION IS A GPS CORS.  LATEST INFORMATION INCLUDING POSITIONS AND
DH3834'VELOCITIES ARE AVAILABLE IN THE COORDINATE AND LOG FILES ACCESSIBLE
DH3834'BY ANONYMOUS FTP OR THE WORLDWIDE WEB.
DH3834'   ftp://cors.ngs.noaa.gov/cors/README.txt
DH3834'   ftp://cors.ngs.noaa.gov/cors/coord/coord_08
DH3834'   ftp://cors.ngs.noaa.gov/cors/station_log
DH3834'   http://geodesy.noaa.gov/CORS

*** retrieval complete.
Elapsed Time = 00:00:03
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The NGS Data Sheet

See file dsdata.txt for more information about the datasheet.

```
PROGRAM = datasheet95, VERSION = 8.7.1
1        National Geodetic Survey,   Retrieval Date = AUGUST  6, 2015
 DF7050 ***********************************************************************
 DF7050  CORS         -  This is a GPS Continuously Operating Reference Station.
 DF7050  DESIGNATION -  MIAMI TNT CORS ARP
 DF7050  CORS_ID      -  MTNT
 DF7050  PID          -  DF7050
 DF7050  STATE/COUNTY-  FL/COLLIER
 DF7050  COUNTRY      -  US
 DF7050  USGS QUAD    -  FIFTYMILE BEND (1995)
 DF7050
 DF7050                          *CURRENT SURVEY CONTROL
 DF7050  ______________________________________________________________________
 DF7050* NAD 83(2011) POSITION- 25 51 56.76077(N) 080 54 25.18638(W)   ADJUSTED
 DF7050* NAD 83(2011) ELLIP HT-   -18.928 (meters)        (08/??/11)   ADJUSTED
 DF7050* NAD 83(2011) EPOCH   -  2010.00
 DF7050* NAVD 88 ORTHO HEIGHT -          **(meters)           **(feet)
 DF7050  ______________________________________________________________________
 DF7050  NAD 83(2011) X  -    907,579.146 (meters)                      COMP
 DF7050  NAD 83(2011) Y  - -5,670,639.713 (meters)                      COMP
 DF7050  NAD 83(2011) Z  -  2,765,679.846 (meters)                      COMP
 DF7050  GEOID HEIGHT    -        -24.32  (meters)                      GEOID12B
 DF7050
 DF7050.Formal positional accuracy estimates are not available for this CORS
 DF7050.because its coordinates were determined in part using modeled
 DF7050.velocities. Approximate one-sigma accuracies for latitude, longitude,
 DF7050.and ellipsoid height can be obtained from the short-term time series.
 DF7050.Additional information regarding modeled velocities is available on
 DF7050.the CORS Coordinates and Multi-Year CORS Solution FAQ web pages.
 DF7050
 DF7050.The coordinates were established by GPS observations
 DF7050.and adjusted by the National Geodetic Survey in August 2011.
 DF7050
 DF7050.NAD 83(2011) refers to NAD 83 coordinates where the reference
 DF7050.frame has been affixed to the stable North American Tectonic Plate.
 DF7050
 DF7050.The coordinates are valid at the epoch date displayed above
 DF7050.which is a decimal equivalence of Year/Month/Day.
 DF7050
 DF7050.The PID for the CORS L1 Phase Center is DP2649.
 DF7050
 DF7050.The XYZ, and position/ellipsoidal ht. are equivalent.
 DF7050
 DF7050.The ellipsoidal height was determined by GPS observations
 DF7050.and is referenced to NAD 83.
 DF7050
 DF7050. The following values were computed from the NAD 83(2011) position.
 DF7050
 DF7050;                    North         East     Units Scale Factor Converg.
 DF7050;SPC FL E     -   169,747.742   209,321.337   MT  0.99994225   +0 02 26.1
 DF7050;SPC FL E     -   556,914.05    686,748.42    sFT  0.99994225   +0 02 26.1
```

```
DF7050;UTM  17      - 2,860,821.807   509,318.157   MT  0.99960107   +0 02 26.1
DF7050
DF7050!             -  Elev Factor  x  Scale Factor =   Combined Factor
DF7050!SPC FL E     -   1.00000297  x   0.99994225  =   0.99994522
DF7050!UTM  17      -   1.00000297  x   0.99960107  =   0.99960404
DF7050
DF7050                          SUPERSEDED SURVEY CONTROL
DF7050
DF7050  NAD 83(CORS)-  25 51 56.76081(N)    080 54 25.18701(W) AD(2002.00) c
DF7050  ELLIP H (08/??/03)  -18.942  (m)                       GP(2002.00) c c
DF7050
DF7050.Superseded values are not recommended for survey control.
DF7050
DF7050.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
DF7050.See file dsdata.txt to determine how the superseded data were derived.
DF7050
DF7050_U.S. NATIONAL GRID SPATIAL ADDRESS: 17RNJ0931860821(NAD 83)
DF7050
DF7050_MARKER: STATION IS THE ANTENNA REFERENCE POINT OF THE GPS ANTENNA
DF7050
DF7050                          STATION DESCRIPTION
DF7050
DF7050'DESCRIBED BY NATIONAL GEODETIC SURVEY 2011
DF7050'STATION IS A GPS CORS.  LATEST INFORMATION INCLUDING POSITIONS AND
DF7050'VELOCITIES ARE AVAILABLE IN THE COORDINATE AND LOG FILES ACCESSIBLE
DF7050'BY ANONYMOUS FTP OR THE WORLDWIDE WEB.
DF7050'   ftp://cors.ngs.noaa.gov/cors/README.txt
DF7050'   ftp://cors.ngs.noaa.gov/cors/coord/coord_08
DF7050'   ftp://cors.ngs.noaa.gov/cors/station_log
DF7050'   http://geodesy.noaa.gov/CORS

*** retrieval complete.
Elapsed Time = 00:00:05
```

The NGS Data Sheet

See file dsdata.txt for more information about the datasheet.

```
PROGRAM = datasheet95, VERSION = 8.7.1
1         National Geodetic Survey,   Retrieval Date = AUGUST  6, 2015
 DG9798 ***********************************************************************
 DG9798  HT_MOD      -  This is a Height Modernization Survey Station.
 DG9798  CORS        -  This is a GPS Continuously Operating Reference Station.
 DG9798  DESIGNATION -  WEST PALM CORS ARP
 DG9798  CORS_ID     -  PBCH
 DG9798  PID         -  DG9798
 DG9798  STATE/COUNTY-  FL/PALM BEACH
 DG9798  COUNTRY     -  US
 DG9798  USGS QUAD   -  DELTA (1983)
 DG9798
 DG9798                        *CURRENT SURVEY CONTROL
 DG9798  ______________________________________________________________________
 DG9798* NAD 83(2011) POSITION- 26 50 46.63807(N) 080 13 09.29990(W)   ADJUSTED
 DG9798* NAD 83(2011) ELLIP HT-   -15.303 (meters)        (08/??/11)   ADJUSTED
 DG9798* NAD 83(2011) EPOCH   -  2010.00
 DG9798* NAVD 88 ORTHO HEIGHT -    11.21  (meters)       36.8   (feet) GPS OBS
 DG9798  ______________________________________________________________________
 DG9798  NAVD 88 orthometric height was determined with geoid model    GEOID12A
 DG9798  GEOID HEIGHT    -        -26.50  (meters)                     GEOID12A
 DG9798  GEOID HEIGHT    -        -26.50  (meters)                     GEOID12B
 DG9798  NAD 83(2011) X  -    967,386.995 (meters)                     COMP
 DG9798  NAD 83(2011) Y  - -5,611,813.854 (meters)                     COMP
 DG9798  NAD 83(2011) Z  -  2,863,023.040 (meters)                     COMP
 DG9798
 DG9798.Formal positional accuracy estimates are not available for this CORS
 DG9798.because its coordinates were determined in part using modeled
 DG9798.velocities. Approximate one-sigma accuracies for latitude, longitude,
 DG9798.and ellipsoid height can be obtained from the short-term time series.
 DG9798.Additional information regarding modeled velocities is available on
 DG9798.the CORS Coordinates and Multi-Year CORS Solution FAQ web pages.
 DG9798
 DG9798.The coordinates were established by GPS observations
 DG9798.and adjusted by the National Geodetic Survey in August 2011.
 DG9798
 DG9798.NAD 83(2011) refers to NAD 83 coordinates where the reference
 DG9798.frame has been affixed to the stable North American Tectonic Plate.
 DG9798
 DG9798.The coordinates are valid at the epoch date displayed above
 DG9798.which is a decimal equivalence of Year/Month/Day.
 DG9798
 DG9798.The orthometric height was determined by GPS observations and a
 DG9798.high-resolution geoid model using precise GPS observation and
 DG9798.processing techniques.
 DG9798
 DG9798.The PID for the CORS L1 Phase Center is DP1678.
 DG9798
 DG9798.The XYZ, and position/ellipsoidal ht. are equivalent.
 DG9798
 DG9798.The ellipsoidal height was determined by GPS observations
```

```
DG9798.and is referenced to NAD 83.
DG9798
DG9798. The following values were computed from the NAD 83(2011) position.
DG9798
DG9798;                      North         East     Units Scale Factor Converg.
DG9798;SPC FL E     -   278,612.209   277,595.212   MT  1.00001548   +0 21 09.4
DG9798;SPC FL E     -   914,080.22    910,743.62    sFT  1.00001548   +0 21 09.4
DG9798;UTM  17      - 2,969,649.129   577,568.737   MT  0.99967428   +0 21 09.4
DG9798
DG9798!             -  Elev Factor  x  Scale Factor =   Combined Factor
DG9798!SPC FL E     -   1.00000240  x   1.00001548  =   1.00001788
DG9798!UTM  17      -   1.00000240  x   0.99967428  =   0.99967668
DG9798
DG9798                          SUPERSEDED SURVEY CONTROL
DG9798
DG9798  NAD 83(CORS)-  26 50 46.63829(N)    080 13 09.30061(W) AD(2002.00) c
DG9798  ELLIP H (04/??/05)  -15.309  (m)                       GP(2002.00) c c
DG9798
DG9798.Superseded values are not recommended for survey control.
DG9798
DG9798.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
DG9798.See file dsdata.txt to determine how the superseded data were derived.
DG9798
DG9798_U.S. NATIONAL GRID SPATIAL ADDRESS: 17RNK7756869649(NAD 83)
DG9798
DG9798_MARKER: STATION IS THE ANTENNA REFERENCE POINT OF THE GPS ANTENNA
DG9798
DG9798                          STATION DESCRIPTION
DG9798
DG9798'DESCRIBED BY NATIONAL GEODETIC SURVEY 2011
DG9798'STATION IS A GPS CORS.  LATEST INFORMATION INCLUDING POSITIONS AND
DG9798'VELOCITIES ARE AVAILABLE IN THE COORDINATE AND LOG FILES ACCESSIBLE
DG9798'BY ANONYMOUS FTP OR THE WORLDWIDE WEB.
DG9798'   ftp://cors.ngs.noaa.gov/cors/README.txt
DG9798'   ftp://cors.ngs.noaa.gov/cors/coord/coord_08
DG9798'   ftp://cors.ngs.noaa.gov/cors/station_log
DG9798'   http://geodesy.noaa.gov/CORS

*** retrieval complete.
Elapsed Time = 00:00:03
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The NGS Data Sheet

See file dsdata.txt for more information about the datasheet.

```
PROGRAM = datasheet95, VERSION = 8.7.1
1         National Geodetic Survey,   Retrieval Date = AUGUST  6, 2015
 DF9225 ***********************************************************************
 DF9225  CORS         -  This is a GPS Continuously Operating Reference Station.
 DF9225  DESIGNATION -  MIAMI WAAS 1 CORS ARP
 DF9225  CORS_ID      -  ZMA1
 DF9225  PID          -  DF9225
 DF9225  STATE/COUNTY-  FL/MIAMI-DADE
 DF9225  COUNTRY      -  US
 DF9225  USGS QUAD    -  HIALEAH (1994)
 DF9225
 DF9225                        *CURRENT SURVEY CONTROL
 DF9225  ______________________________________________________________________
 DF9225* NAD 83(2011) POSITION- 25 49 28.58534(N) 080 19 09.06615(W)   ADJUSTED
 DF9225* NAD 83(2011) ELLIP HT-    -6.408 (meters)        (08/??/11)   ADJUSTED
 DF9225* NAD 83(2011) EPOCH   -  2010.00
 DF9225* NAVD 88 ORTHO HEIGHT -          **(meters)           **(feet)
 DF9225  ______________________________________________________________________
 DF9225  NAD 83(2011) X  -    966,042.990 (meters)                      COMP
 DF9225  NAD 83(2011) Y  - -5,663,001.035 (meters)                      COMP
 DF9225  NAD 83(2011) Z  -  2,761,581.499 (meters)                      COMP
 DF9225  GEOID HEIGHT    -        -25.07  (meters)                      GEOID12B
 DF9225
 DF9225  Network accuracy estimates per FGDC Geospatial Positioning Accuracy
 DF9225  Standards:
 DF9225         FGDC (95% conf, cm)     Standard deviation (cm)     CorrNE
 DF9225            Horiz  Ellip           SD_N   SD_E   SD_h      (unitless)
 DF9225  ------------------------------------------------------------------
 DF9225  NETWORK    1.09   4.01           0.43   0.46   2.05      0.04594195
 DF9225  ------------------------------------------------------------------
 DF9225  Click here for local accuracies and other accuracy information.
 DF9225
 DF9225
 DF9225.The coordinates were established by GPS observations
 DF9225.and adjusted by the National Geodetic Survey in August 2011.
 DF9225
 DF9225.NAD 83(2011) refers to NAD 83 coordinates where the reference
 DF9225.frame has been affixed to the stable North American Tectonic Plate.
 DF9225
 DF9225.The coordinates are valid at the epoch date displayed above
 DF9225.which is a decimal equivalence of Year/Month/Day.
 DF9225
 DF9225.The PID for the CORS L1 Phase Center is DI8144.
 DF9225
 DF9225.The XYZ, and position/ellipsoidal ht. are equivalent.
 DF9225
 DF9225.The ellipsoidal height was determined by GPS observations
 DF9225.and is referenced to NAD 83.
 DF9225
 DF9225. The following values were computed from the NAD 83(2011) position.
 DF9225
```

```
DF9225;                    North         East     Units Scale Factor Converg.
DF9225;SPC FL E     -   165,361.459   268,259.524   MT  0.99999869   +0 17 47.7
DF9225;SPC FL E     -   542,523.39    880,114.79   sFT  0.99999869   +0 17 47.7
DF9225;UTM  17      - 2,856,437.020   568,236.234   MT  0.99965749   +0 17 47.7
DF9225
DF9225!             -  Elev Factor  x  Scale Factor =   Combined Factor
DF9225!SPC FL E     -   1.00000101  x   0.99999869  =   0.99999970
DF9225!UTM  17      -   1.00000101  x   0.99965749  =   0.99965850
DF9225
DF9225                          SUPERSEDED SURVEY CONTROL
DF9225
DF9225  NAD 83(CORS)-  25 49 28.58580(N)    080 19 09.06695(W) AD(2002.00) c
DF9225  ELLIP H (12/??/03)   -6.427  (m)                       GP(2002.00) c c
DF9225
DF9225.Superseded values are not recommended for survey control.
DF9225
DF9225.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
DF9225.See file dsdata.txt to determine how the superseded data were derived.
DF9225
DF9225_U.S. NATIONAL GRID SPATIAL ADDRESS: 17RNJ6823656437(NAD 83)
DF9225
DF9225_MARKER: STATION IS THE ANTENNA REFERENCE POINT OF THE GPS ANTENNA
DF9225
DF9225                          STATION DESCRIPTION
DF9225
DF9225'DESCRIBED BY NATIONAL GEODETIC SURVEY 2011
DF9225'STATION IS A GPS CORS.  LATEST INFORMATION INCLUDING POSITIONS AND
DF9225'VELOCITIES ARE AVAILABLE IN THE COORDINATE AND LOG FILES ACCESSIBLE
DF9225'BY ANONYMOUS FTP OR THE WORLDWIDE WEB.
DF9225'   ftp://cors.ngs.noaa.gov/cors/README.txt
DF9225'   ftp://cors.ngs.noaa.gov/cors/coord/coord_08
DF9225'   ftp://cors.ngs.noaa.gov/cors/station_log
DF9225'   http://geodesy.noaa.gov/CORS

*** retrieval complete.
Elapsed Time = 00:00:04
```

APPENDIX C

CHECK POINTS

PID	X	Y	Z
101	709684.6	599451.2	17.32
102	697136.1	535702.3	9.12
103	740042.1	519234.8	13.08
104	842367.6	614162.5	9.79
105	780864.8	383942.6	5.9
106	894861.6	359362.9	3.85
107	820927.1	394651.5	4.65
108	759910.5	519324.2	13.22
109	933580	490174	5.42
110	850442.4	416286.6	2.05
111	827319.3	506884.2	9.23
112	866413.3	600324.4	4.7
113	942228.1	526550.2	6
114	945243.8	599905.2	2.08
115	843475.8	328161.5	4.43
116	899646.9	548464.4	5.84
209	903504.4	596082.9	5.67
211	867890.1	569543.5	5.73
215	858529.4	543037.6	5.12
219	881852.6	529843.4	8.31
232	860390.9	453752.2	7.58
244	796260.6	447641.4	7.35
260	800140.2	574079.1	11.74
282	897832.5	480093	4.61
287	833333.9	458825.8	8.9

CONTROL

PID	X	Y	Z
201	709256.1	573176.4	16.3
202	701700.6	530906	9.36
203	718503.4	518782	9.03
204	731504.8	518837	9.04
205	841860.5	610934.3	5.74
206	839826.6	584150.2	7.9
207	855904	595748.6	7.27
208	887241.2	590797.5	6.02
210	936189.8	594058	8.51
212	896889.3	571099	5.39
213	915654.9	574933.8	4.15
214	944045.3	568403.9	3.11
216	916195.5	558141.8	8.37
217	945042.6	545683.2	2.86
218	853640.6	532218	6.87
220	909218.3	524731.6	9.12
221	928244.1	527704.3	5.25
222	939442.7	518193.5	4.35
223	931805.5	492514.8	4.82
224	935505.4	502809.9	3.67
225	847005.6	519056	7.08
226	903827.7	499141.2	2.27
227	916987.5	541258.7	9.22
228	827151.1	482883.4	8.5
229	854815.2	497340.1	7.07
230	881653.9	492462.7	8.52
231	882312.1	468285.8	6.49
233	844381.5	442264.7	10.45
234	813001.9	418977.4	6.64
235	850980.2	408242	5.11
236	858019.3	427122.7	6.42
237	876837.7	447391.5	4.97
238	894649.1	357293.3	5.55
239	841125.3	339828.5	3.63
240	838271	354254.8	3.69
241	796794.5	388165.6	3.23
242	833875.8	381497	2.9
243	801426.3	425516.9	4.83
245	827015.9	449279	8.68
246	795740.8	476324.5	7.43
247	826719.8	519214.8	10.22
248	795450	519053.4	7.78
249	857718.7	552513.8	5.98
250	868830.6	587340.2	6.71
251	873412.6	558304.4	9.83

252	824567.6	493036.8	6.81
253	791665.9	394908.1	13.16
254	868321.2	345872.4	5.74
255	858400.2	352584.5	3.62
256	802206.1	359194.6	8.28
257	835611	394734.3	1.56
258	823641.4	405399.4	5.63
259	780908.8	545665.9	11.5
261	821505.8	605807.4	11.5
262	772711.9	533513	10.59
263	768136.4	526755	11.18
264	779959.7	519211.3	9.26
265	706255.2	526071.1	9.9
266	708102.5	560663.5	16.44
267	706238.5	544928.7	16.57
268	696297.6	534822.9	7.92
269	809035.5	519275.4	7.16
270	825570.7	566234.1	8.97
271	855909.1	572060.9	7.61
272	835255.6	591801.7	12.34
273	882376.1	599865.6	6.99
274	845220.9	580544.4	7.2
275	844028.6	534992.4	11.06
276	826128.8	546828.2	6.57
277	871802.1	411084.6	5.74
278	860929.4	405665.3	5.55
279	871593.8	421957.7	6.53
280	835410.6	472850.5	6.47
281	872656.3	437460.5	6.1
283	921143.7	408030.8	2.13
284	930059.1	440027.3	2.45
285	933387.8	485597.7	7.24
286	931987.4	509769.6	6.26
288	880923.6	455025.7	6.97
289	839798.9	437518.9	12.21
290	823669.1	431946.9	8.01