



## **FUGRO GEOSPATIAL, INC.**

### **Collection Report – USGS Lidar Acquisition**

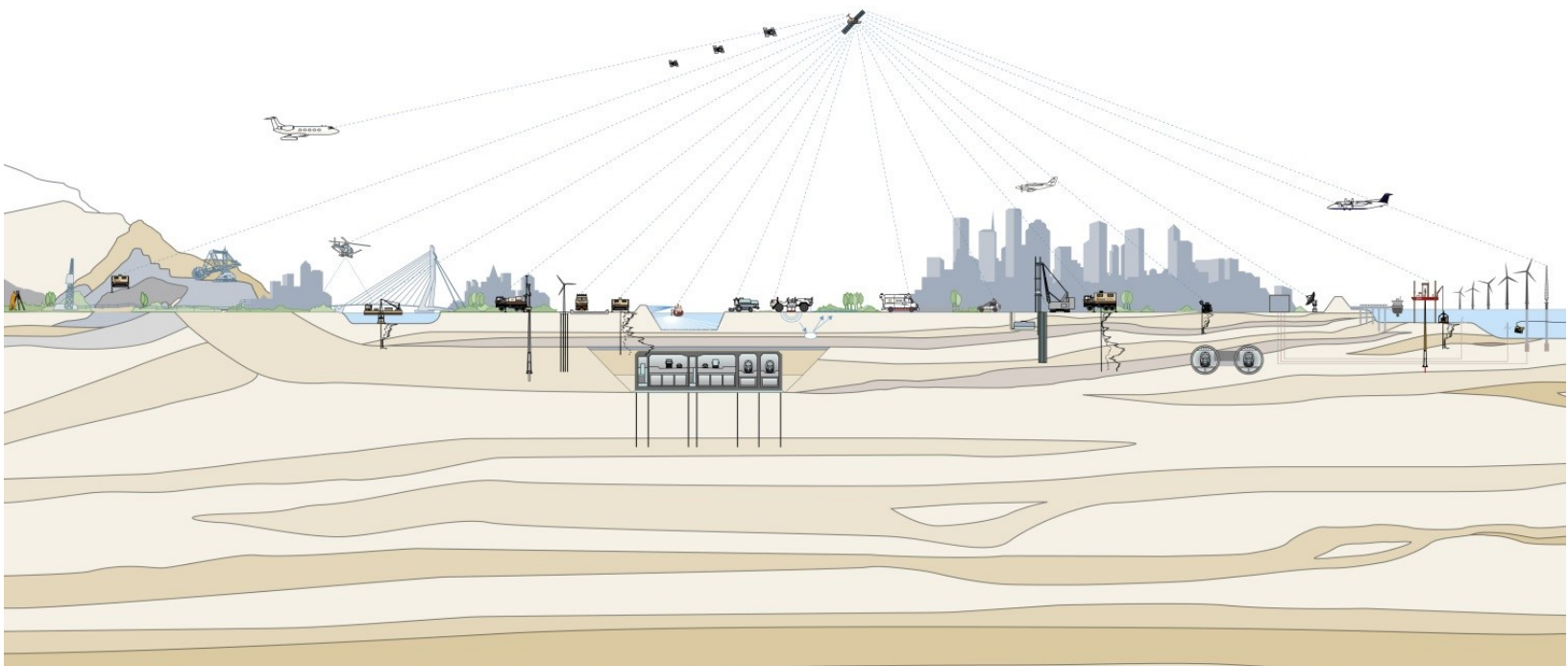
VA\_UpperMiddleNeck\_2018\_D18

Prepared for:

United States Geological Survey  
1400 Independence Road  
Rolla, MO 65401  
(573) 308-3689

January 29, 2019

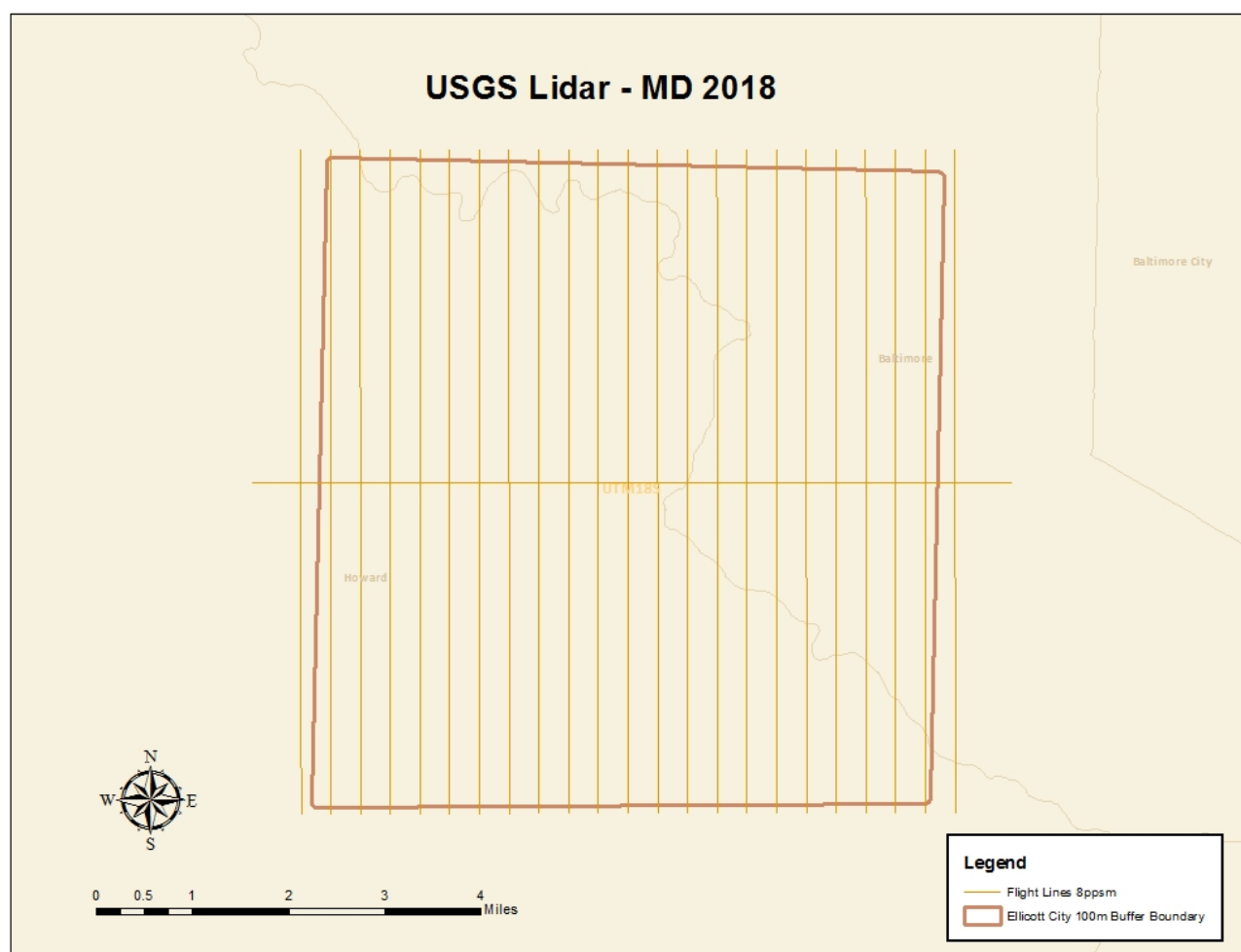
USGS Contract: G17PC00015  
USGS Task Order: 140G0218F0449



Fugro was tasked with planning, acquiring, processing, and producing derivative products of high resolution lidar data (QL1) collected at an aggregate nominal pulse spacing (ANPS) of 0.35 meters (8ppsm), including overlap, over Ellicott City, MD for the USGS VA\_UpperMiddleNeck\_2018\_D18 task order. The area of interest (AOI) covers approximately 42 square miles. A 100-meter buffer was added to the AOI covering approximately 43 square miles; all products will be generated to the limit of this buffered boundary.

Lidar data, and derivative products produced in compliance with the task order will be based on the “**U.S. Geological Survey National Geospatial Program Lidar Base Specification Version 1.3**”.

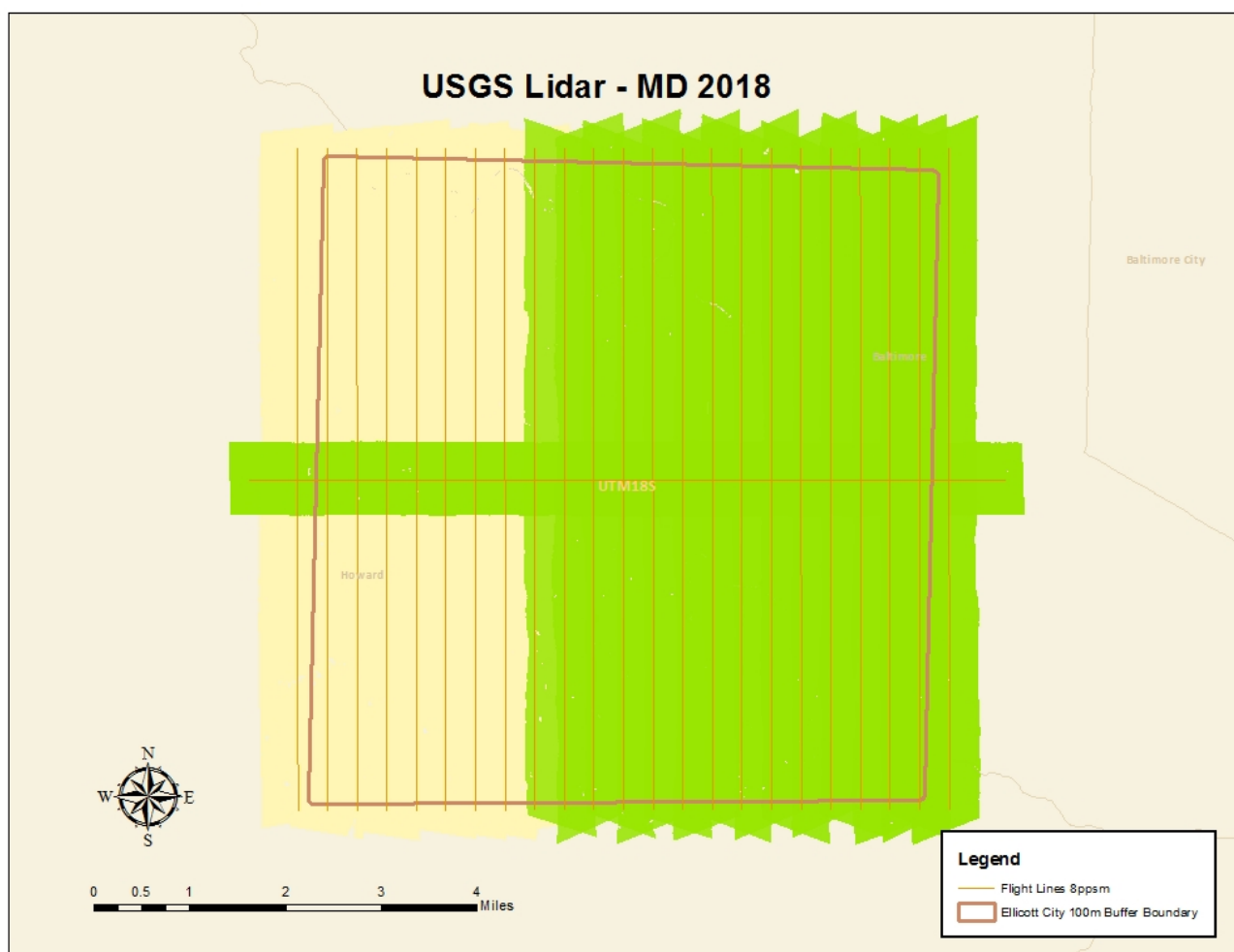
The acquisition for this project occurred during the acceptable collection windows that existed between December 3 and December 7, 2018.



*Figure 1: Flight plan*

The following is detail on the **2018** lidar acquisition covering the Ellicott City, MD Lidar buffered boundary.

**Collections:** 2  
**Collection Dates:** December 3<sup>rd</sup> and December 7<sup>th</sup>, 2018  
**Field of View (FOV):** 26.5 / 42 degrees  
**Average Point Density (planned):** 8 ppsm  
**Flight Level(s) AMT:** 2650 m  
**Sensor Type(s):** Leica ALS80-HP  
**Sensor Serial Number(s):** SN-8133



*Figure 2: Executed Collection Footprints*

All acquired lidar data was QC'd and accepted for processing.

Below are the acquisition logs and GPS plots from the lidar collections covering the VA\_UpperMiddleNeck\_2018\_D18 Ellicott City, MD Lidar buffered boundary.

USGS  
COLLECTION REPORT



Acquisition and Processing details ----- 181203\_133\_33780088\_01 (December 3, 2018)

Log:

Menu		18.165 Lift Begin			Lift End			Flt	Flt	Hobbs	Activity	
		Airport	Chocks	Hobbs	Airport	Chocks	Hobbs	Duration	Hrs	Hrs		
1		KMRB	13:23	8076.6	KMRB	17:16	8080.5	3:53	4.00	3.9	0900-Production	
2												
3												

FUGRO		Fugro USA Land, Inc.										ALS	
												Flight Log	
												AC80-44-00-02	

FGI Job #	Project Name			System	Unit	IMU	PIA	SW1	SW2-Gain	Aper	AutoScan	Ground Temp°C	Min Range Gate	Data Logger Drive
33780088	USGS FY18 MD final			ALS80	133	uRS	5		255	60°	Yes	9.4 10.0	8020	MM70-04
Flight Date	GPS Day	Lift		Sun°	Solar Times (UTC)			Laser Power		Pattern	Flying Temp °C	Max Range Gate		Download Drive
3-Dec-18	18-337	1		NA	NA			100%		Triangle	0.0 1.0	9147		NS1TB-55
Mission ID (yymmdd_Sen_Job_Lit)	Aircraft	Airport ID	FMS	UTC	AMT (ft)	Speed	Scan Hz	Pulse Rate	FOV	kmWPT	Altm Setting			Shipping Track
181203_133_33780088_01	N76JN	KMRB	FCMS		8,700	150	52.0	534,200	27	1.595	29.73 29.77			
Pilot #1		Pilot #2		Operator #1		Operator #2								
Grant Cassell		Jeff Faulkner		Adam Mueller										
Base 1 ID	Location	Rec ID	Ant ID	ARP (m)	Start Time (UTC)		Stop Time (UTC)		GPS Filename	Operator	Data			
FEDI 1019	KMRB	Unit 4	4	1.8	03-Dec-18 12:43		03-Dec-18 17:27		GR3-41203m	Adam Mueller	With AB			
Base 2 ID	Location	Rec ID	Ant ID	ARP (m)	Start Time (UTC)		Stop Time (UTC)		GPS Filename	Operator	Data			
MDDM	MD	CORS			CORS				CORS		CORS			

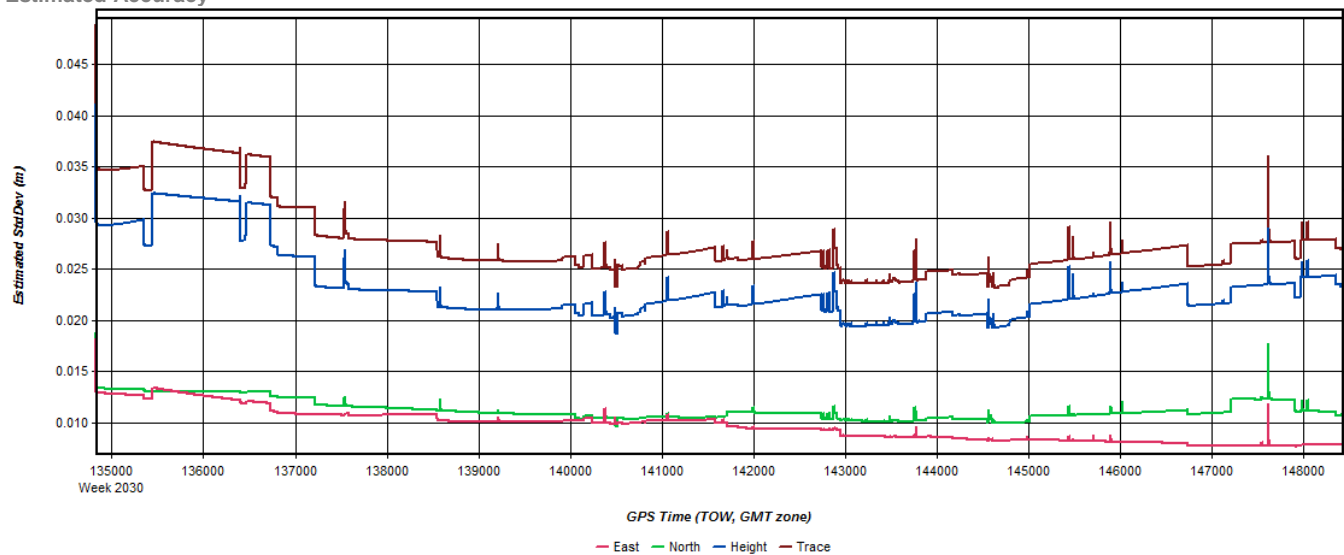
  

Area	Flight #		Wpt		Distance		UTC		Flt	Altitude (GPS)	Speed (knots)	Scan Rate	Comments and Conditions	SVs	PDOP
	FGI	Client's	From	To	Begin	End	Start	End							
							13:28:39	13:33:39					Ground Static	13	1.4
							14:12:49	14:17:49					Over Flight MDDM CORS	14	1.5
							14:22:03	14:26:00					S turn	14	1.4
MD4ppsm	24		9	1	12.8	0	14:31:30	14:35:25	W	8744	112	52.0	1114 GB left	15	1.3
	23		1	8	0	11.2	14:41:37	14:44:28	N	8644	138	52.0		16	1.1
	22		8	1	11.2	0	14:49:01	14:51:52	S	8644	135	52.0		16	1.2
	22		1	8	0	11.2	14:55:37	14:58:17	N	8644	140	52.0	Calibration line; 1108 GB left	16	1.2
	21		1	8	0	11.2	15:06:22	15:09:08	N	8644	140	52.0	1106 GB left	18	1.1
	20		8	1	11.2	0	15:13:25	15:16:14	S	8644	130	52.0	1104 GB left	18	1.1
	19		1	8	0	11.2	15:21:49	15:24:54	N	8644	130	52.0		17	1.1
	18		8	1	11.2	0	15:29:12	15:32:07	S	8694	131	52.0		18	1.0
	17		1	8	0	11.2	15:36:19	15:39:13	N	8694	134	52.0		17	1.1
	16		8	1	11.2	0	15:44:04	15:46:51	S	8694	140	52.0		16	1.2
	15		1	8	0	11.2	15:51:10	15:53:53	N	8694	136	52.0		18	1.0
	14		8	1	11.2	0	15:58:29	16:01:23	S	8694	130	52.0		19	1.1
	13		1	8	0	11.2	16:04:08	16:06:55	N	8694	141	52.0		19	1.1
	12		8	1	11.2	0	16:11:39	16:14:35	S	8746	130	52.0		19	1.1
	11		1	8	0	11.2	16:19:02	16:21:42	N	8795	140	52.0	possible cloud north end	19	1.1
	10		8	1	11.2	0	16:25:56	16:28:56	S	8795	131	52.0	possible cloud km 6-4; cloud km 3-1	18	1.2
							16:29:16	16:31:29					S turn	18	1.2
							17:08:30	17:13:30					Ground Static	19	1.2

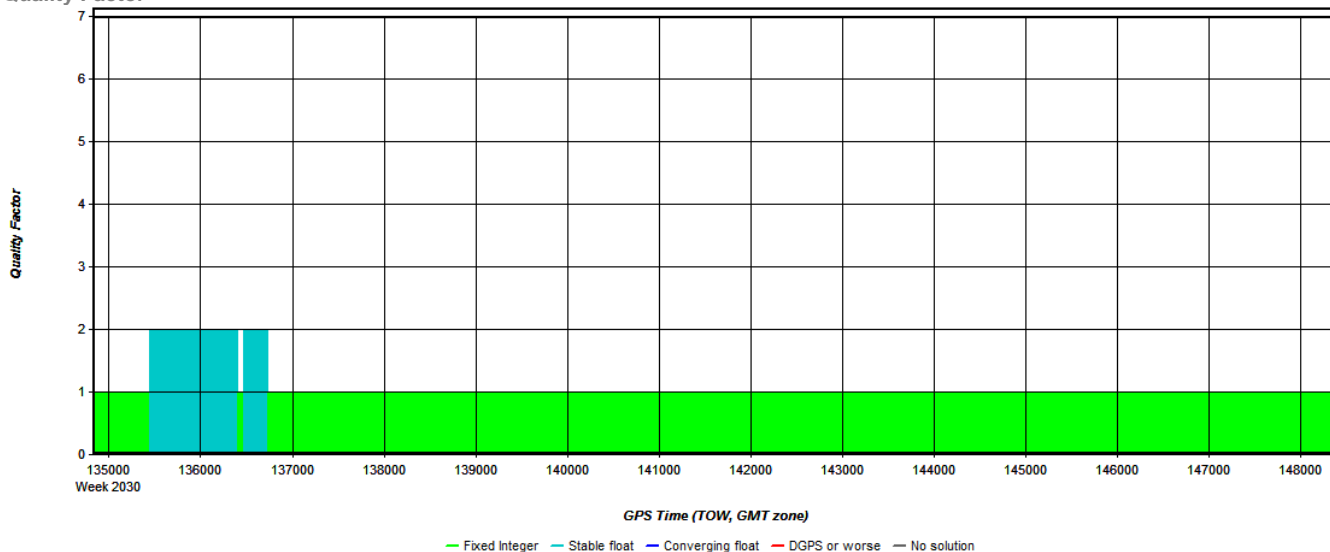
Trajectory and GPS Plots:



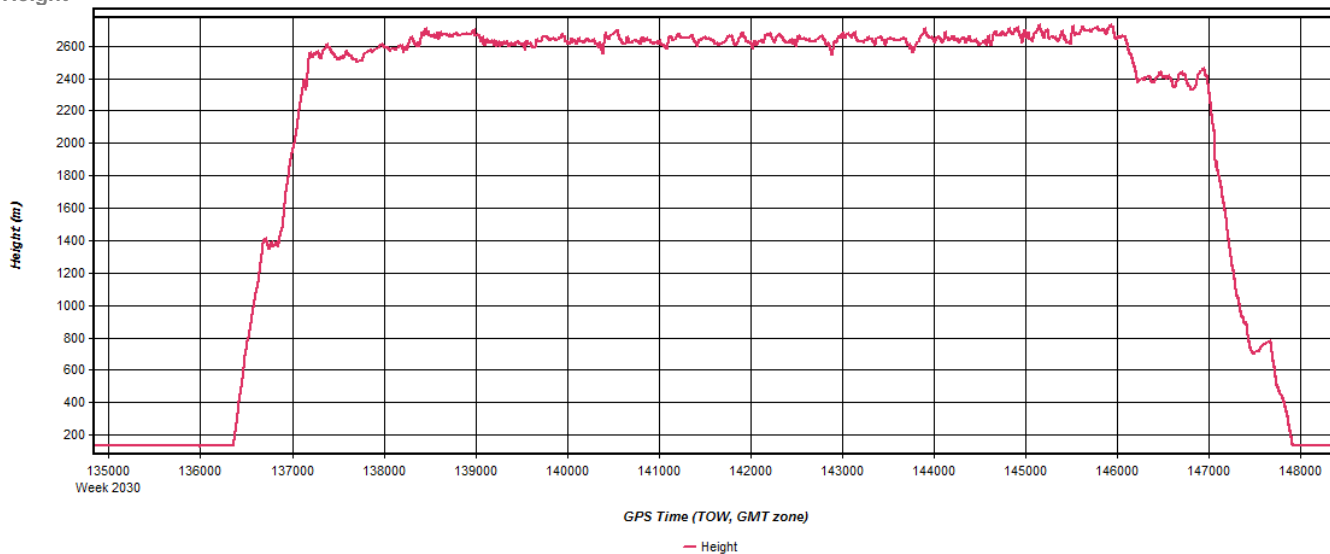
Estimated Accuracy



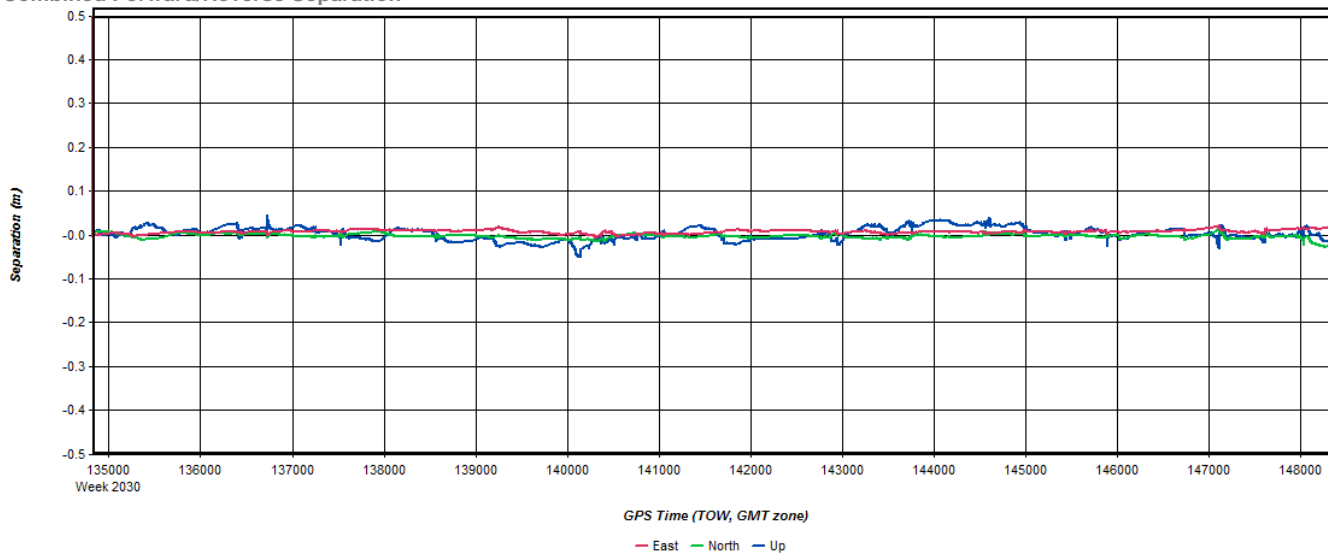
Quality Factor



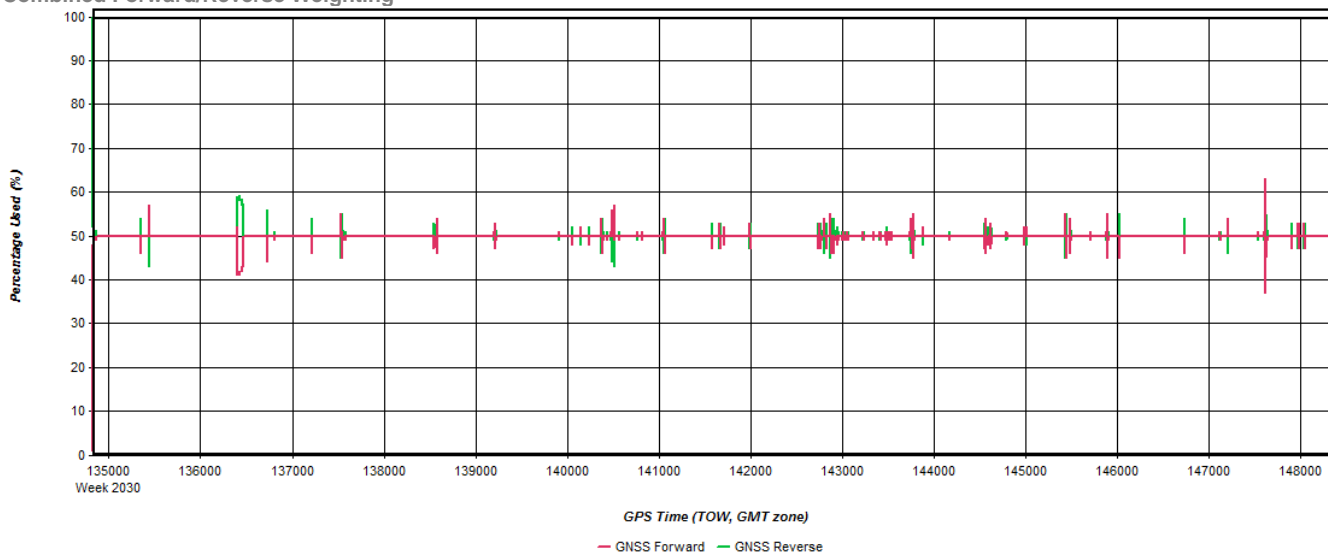
Height



Combined Forward/Reverse Separation

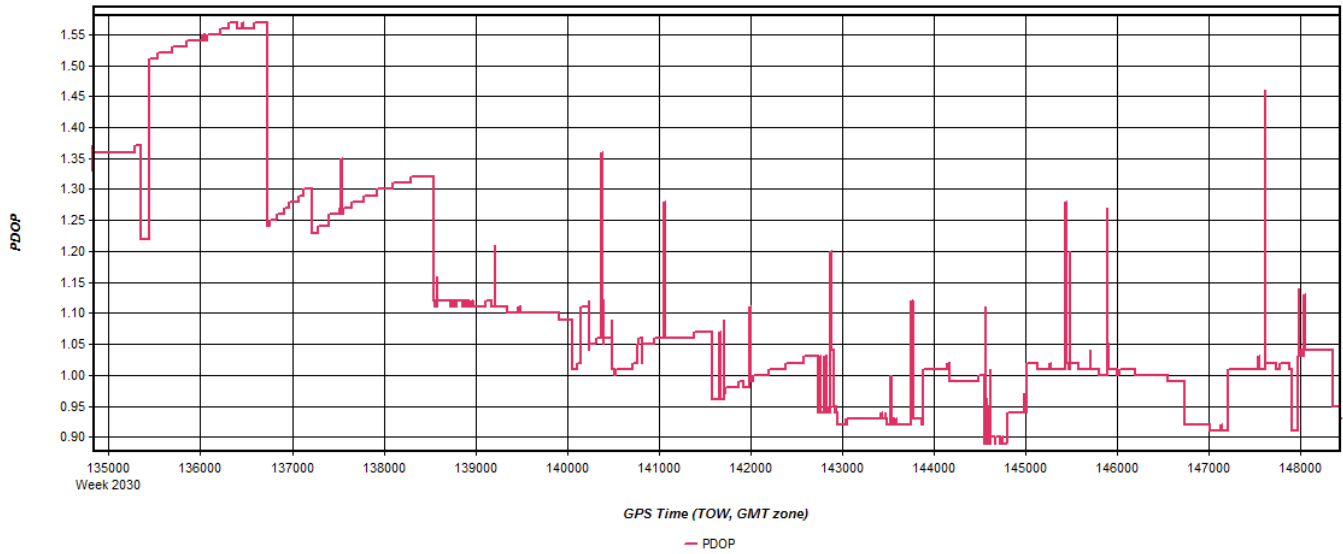


Combined Forward/Reverse Weighting

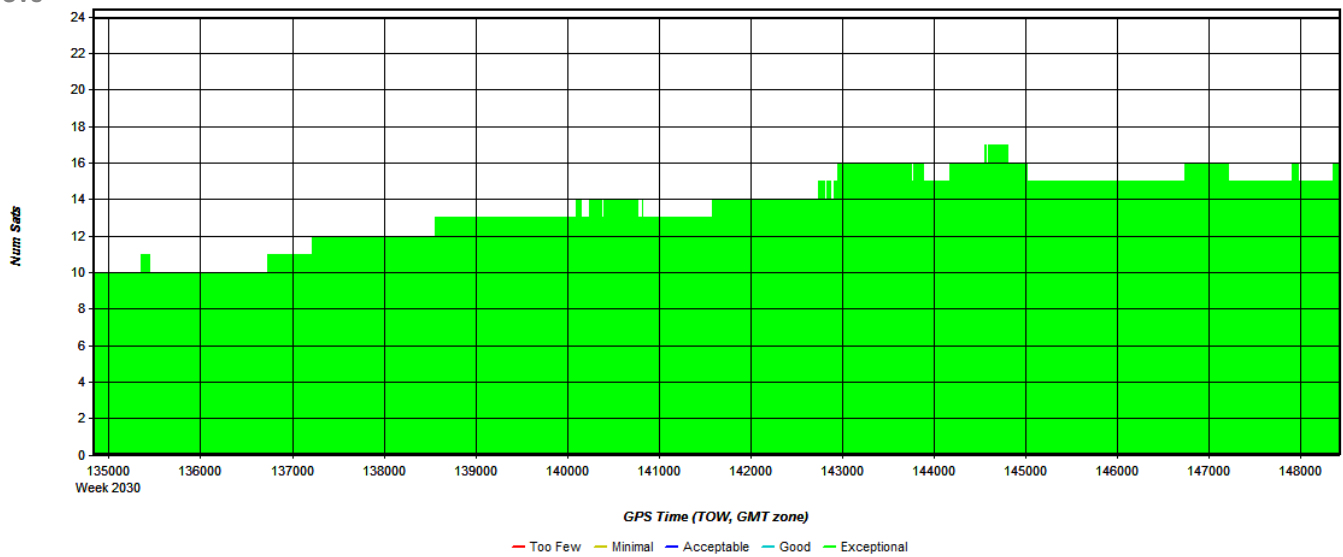


# USGS COLLECTION REPORT

## PDOP



## SVs





USGS  
COLLECTION REPORT



Acquisition and Processing details ----- 181207\_133\_33780088\_02 (December 7, 2018)

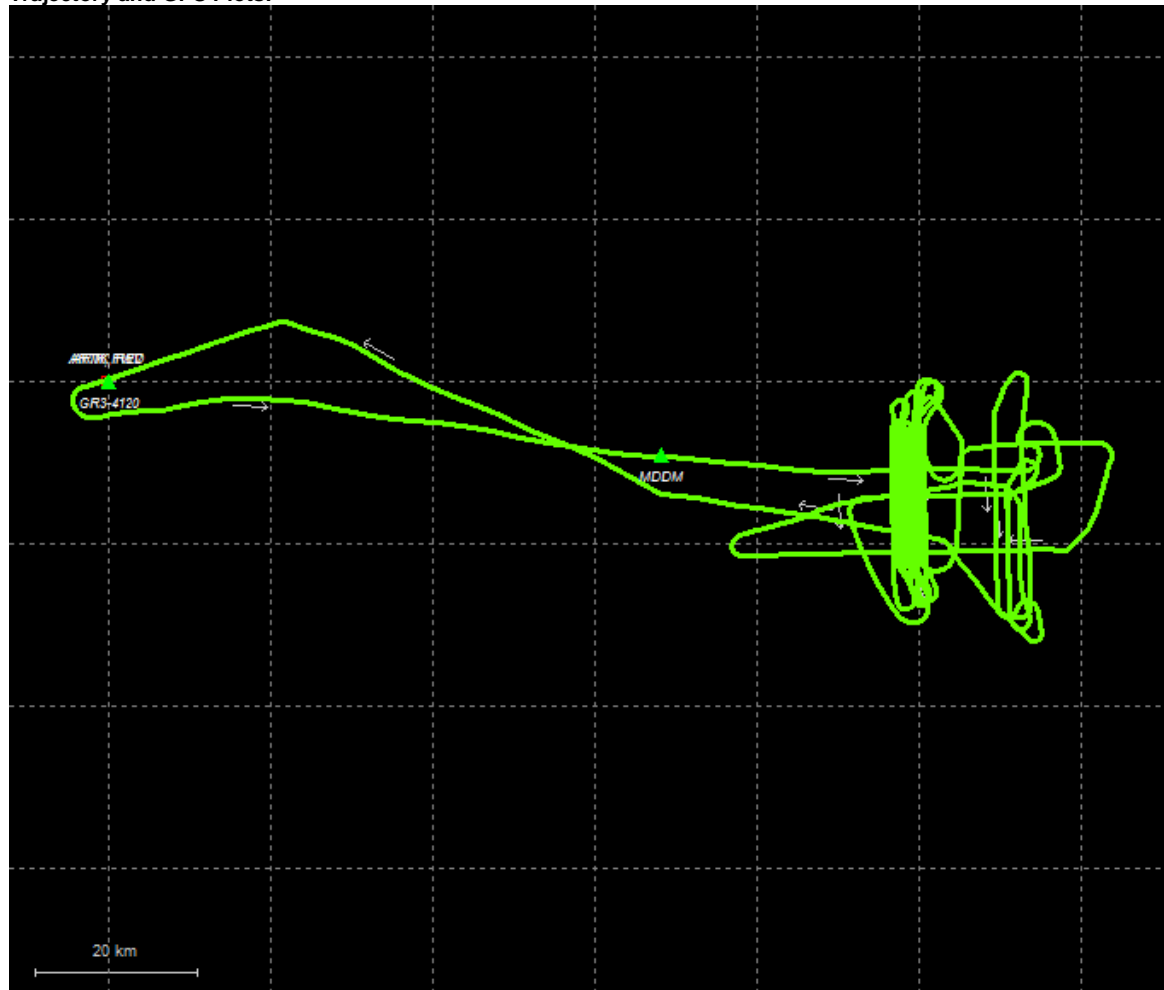
Log:

Menu		18.165		Lift Begin			Lift End			Flt	Flt	Hobbs	Activity
		Airport	Chocks	Hobbs	Airport	Chocks	Hobbs	Duration	Hrs	Hrs			
1	KMRB	13:05	8080.5	KMRB	17:04	8084.4	3:58	4.00	3.9	0900-Production			
2													
3													

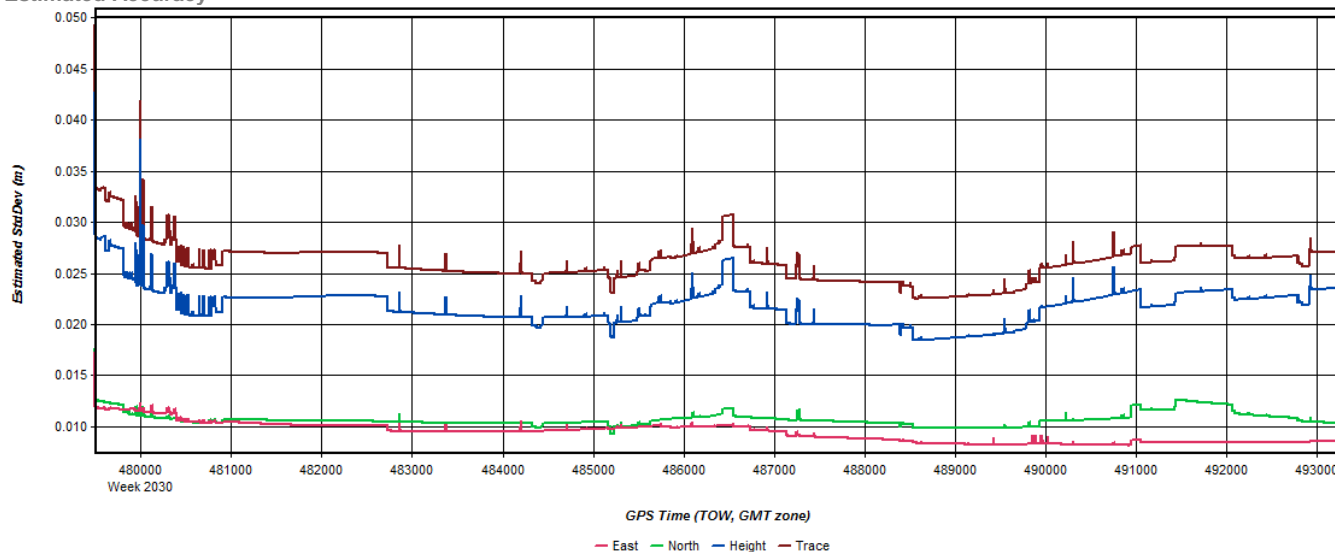
  

FUGRO USA Land, Inc.		ALS		Flight Log		AC80-44-00-02									
FGI Job # <b>33780088</b>	Project Name <b>USGS FY18 MD final</b>		System <b>ALS80</b>	Unit <b>133</b>	IMU <b>uIRS</b>	PIA <b>5</b>	SW1 <b>255</b>	SW2-Gain <b>60°</b>	Aper <b>Yes</b>	AutoScan <b>Yes</b>	Ground Temp °C <b>-1.0 2.0</b>	Min Range Gate <b>8020</b>	Data Logger Drive <b>MM70-04</b>		
Flight Date <b>7-Dec-18</b>	GPS Day <b>18-341</b>	Lift <b>2</b>	Sun° <b>NA</b>	Solar Times (UTC) <b>NA</b>		Laser Power <b>100%</b>	Pattern <b>Triangle</b>	Flying Temp °C <b>-11.0 -9.0</b>	Max Range Gate <b>9147</b>	Down load Drive <b>NS1TB-105</b>					
Mission ID (yymmdd_Sen_Job_Lit) <b>181207_133_33780088_02</b>		Aircraft <b>N76JN</b>	Airport ID <b>KMRB</b>	FMS <b>FCMS</b>	UTC	AMT (ft) <b>8,700</b>	Speed <b>150</b>	Scan Hz <b>52.0</b>	Pulse Rate <b>534,200</b>	FOV <b>27</b>	kmWPT <b>1.595</b>	Altm Setting <b>30.41 30.44</b>	Shipping Track <b>773914251881</b>		
Pilot #1 <b>Grant Cassell</b>		Pilot #2 <b>Jeff Faulkner</b>		Operator #1 <b>Adam Mueller</b>		Operator #2									
Base 1 ID <b>FEDI 1019</b>	Location <b>KMRB</b>	Rec ID <b>Unit 4</b>	Ant ID <b>4</b>	ARP (m) <b>1.8</b>	Start Time (UTC) <b>07-Dec-18 17:53</b>	Stop Time (UTC) <b>07-Dec-18 16:10</b>	GPS Filename <b>GR3-41207m</b>	Operator <b>Adam Mueller</b>	Data <b>With AB</b>						
Base 2 ID <b>MDDM</b>	Location <b>MD</b>	Rec ID <b>CORS</b>	Ant ID	ARP (m)	Start Time (UTC) <b>CORS</b>	Stop Time (UTC)	GPS Filename <b>CORS</b>	Operator	Data <b>CORS</b>						
Area	Flight #		Wpt		Distance		UTC		Flt	Altitude (GPS)	Speed (knots)	Scan Rate	Comments and Conditions	SVs	PDOP
	FGI	Client's	From	To	Begin	End	Start	End							
													Ground Static	18	1.1
													Over flight MDDM CORS	16	1.4
													S Turn	16	1.5
MD4ppsm	24		9	1	12.8	0	14:00:23	14:03:52	W	8746	126	52.0	<b>Cross line</b>	16	1.3
	9		1	8	0	11.2	14:10:49	14:13:29	N	8795	140	52.0	1079 GB left	16	1.4
	8		8	1	11.2	0	14:17:32	14:20:20	S	8844	140	52.0	<b>1077 GB left</b>	17	1.4
	7		1	8	0	11.2	14:24:08	14:27:00	N	8844	135	52.0	1075 GB left	18	1.2
	7		8	1	11.2	0	14:31:31	14:34:13	S	8844	140	52.0	<b>Calibration</b>	18	1.2
	6		8	1	11.2	0	14:43:14	14:45:56	S	8844	144	52.0	1071 GB left	17	1.3
	5		1	8	0	11.2	14:49:53	14:52:49	N	8795	130	52.0		19	1.2
	4		8	1	11.2	0	14:56:39	14:59:30	S	8844	137	52.0		19	1.3
	3		1	8	0	11.2	15:04:03	15:06:54	N	8844	130	52.0		19	1.1
	2		8	1	11.2	0	15:09:54	15:12:49	S	8894	140	52.0		20	1.0
	1		1	8	0	11.2	15:17:01	15:19:57	N	8894	125	52.0	1058 GB left	18	1.2
							15:20:31	15:23:35					S Turn	18	1.2
													Switch to Area MD2ppsm; checked settings		
MD2ppsm	32		26	1	39.9	0	15:31:32	15:40:32	W	7444	130	35.0	Cross line	20	1.1
	31		5	1	6.4	0	15:49:42	15:51:12	S	7444	130	35.0		20	1.1
	30		1	6	0	8	15:54:30	15:56:27	N	7444	138	35.0	Clouds forming in area	20	1.1
	30		6	1	8	0	16:00:36	16:03:00	S	7444	140	35.0	Calibration line; Possible clouds on line	19	1.2
	29		15	1	22.3	0	16:13:08	16:17:53	S	7444	145	35.0	Clouds forming in area; possible cloud km 17, 8, and 6	18	1.2
							16:18:02	16:19:50					S Turn	18	1.2
							16:55:50	17:00:50					Ground Static	17	1.2

Trajectory and GPS Plots:

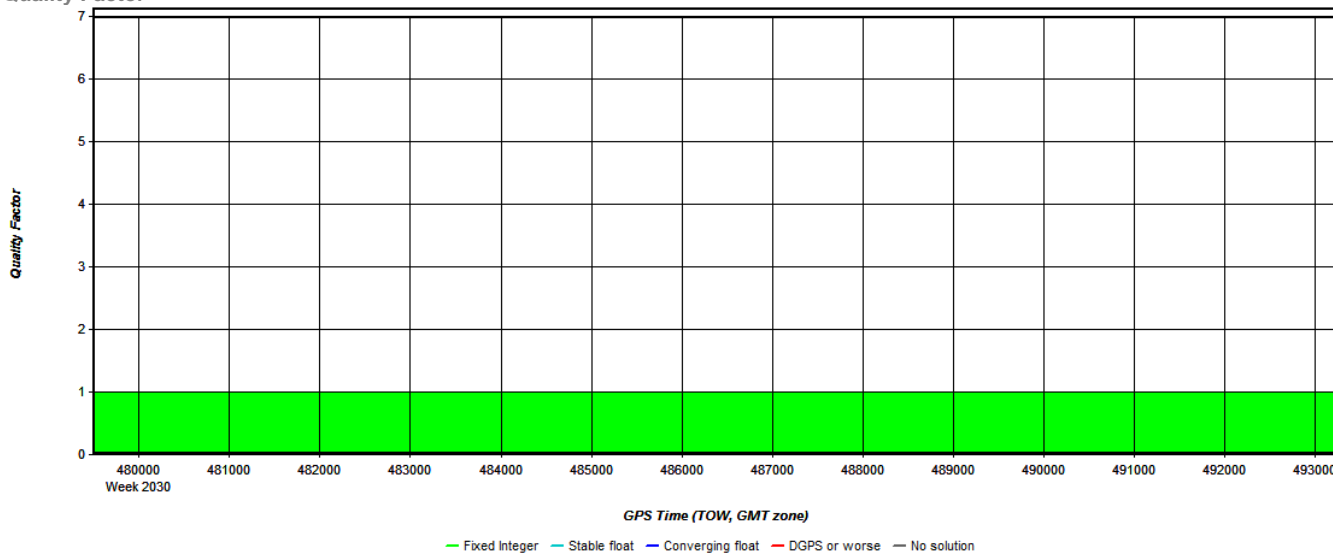


Estimated Accuracy

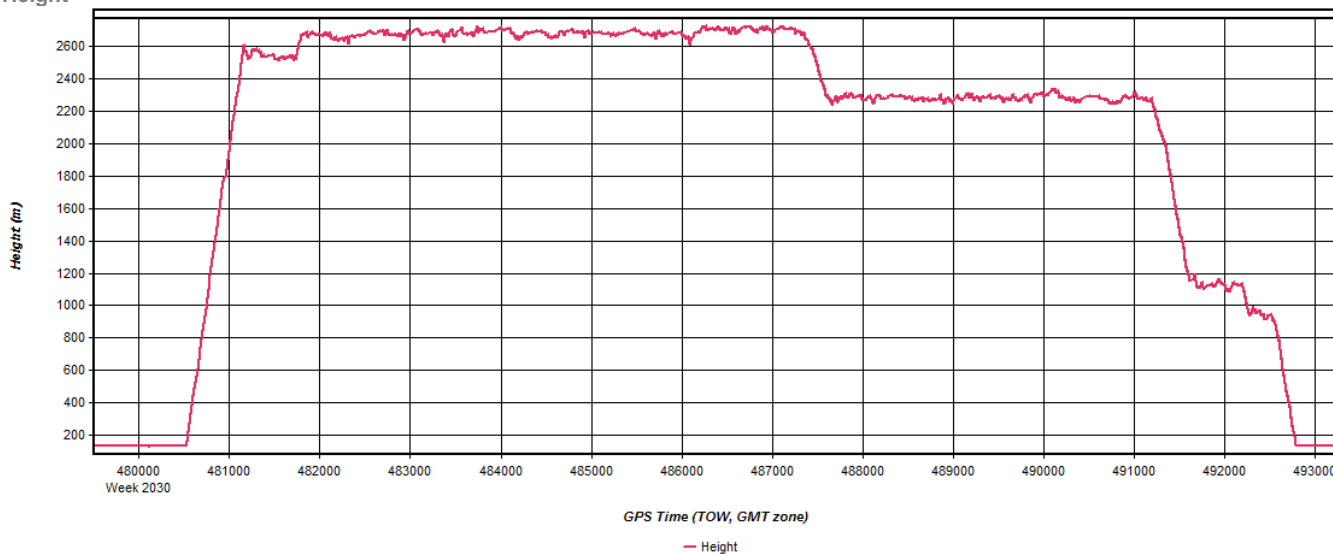




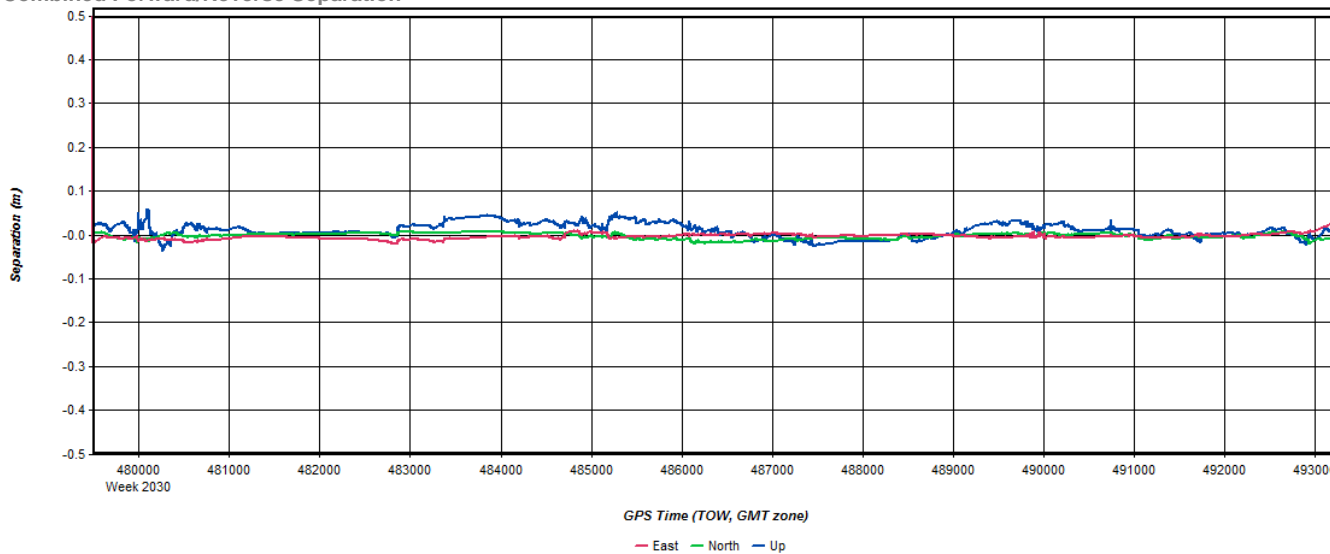
Quality Factor



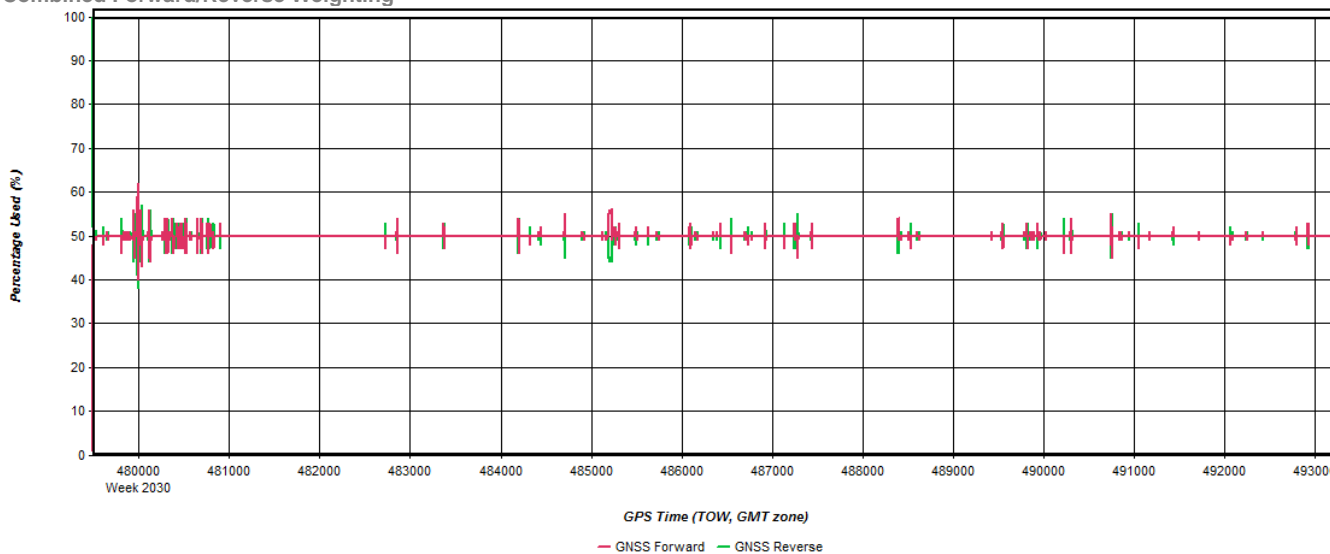
Height



Combined Forward/Reverse Separation

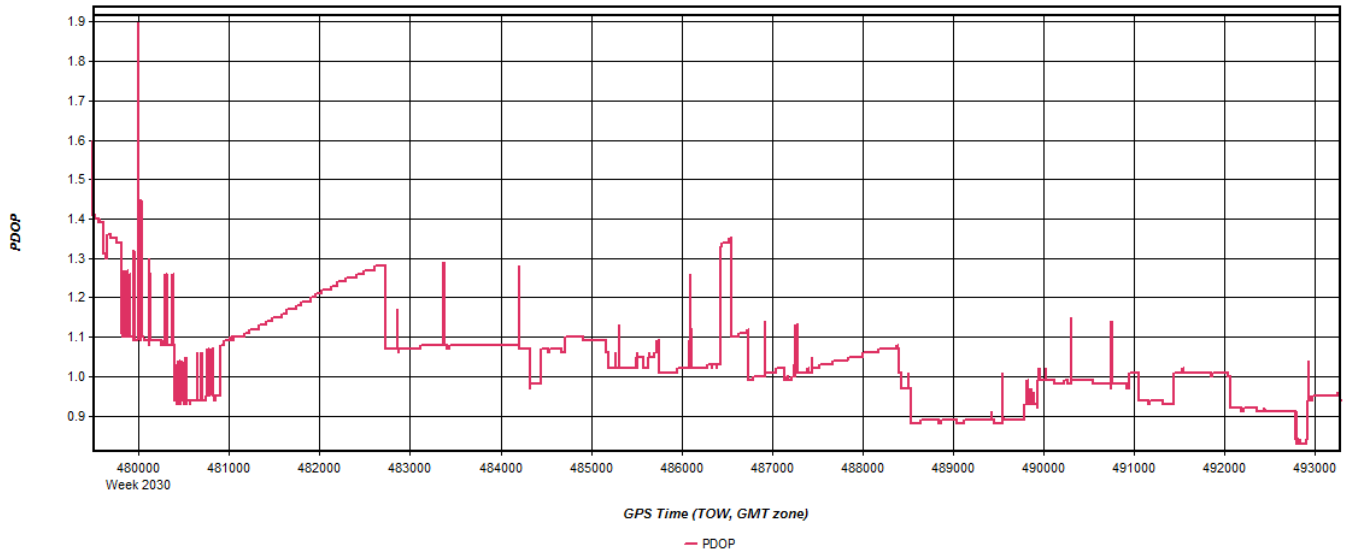


Combined Forward/Reverse Weighting



# USGS COLLECTION REPORT

## PDOP



## SVs

