



ACQUISITION REPORT – USGS LIDAR ACQUISITION

Lower NC Pottawatomie - OK

19 January 2012

Prepared for

United States Geological Survey
1400 Independence Road
Rolla, MO 65401
573.308.3612

Prepared by

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Fugro EarthData was tasked with acquiring lidar data over an Area of Interest (AOI) covering or portions of the Lower North Canadian Region of Pottawatomie and surrounding areas of Central Oklahoma. The project plan called for lidar to be collected with a nominal point spacing of 2 meters and a side lap of 10% or greater between flight lines. The AOI covers 735 square miles. A 100 meter buffer shall be used for each AOI as part of the flight planning and processing.

All acquisition was to be done during leaf off conditions in December 2011.

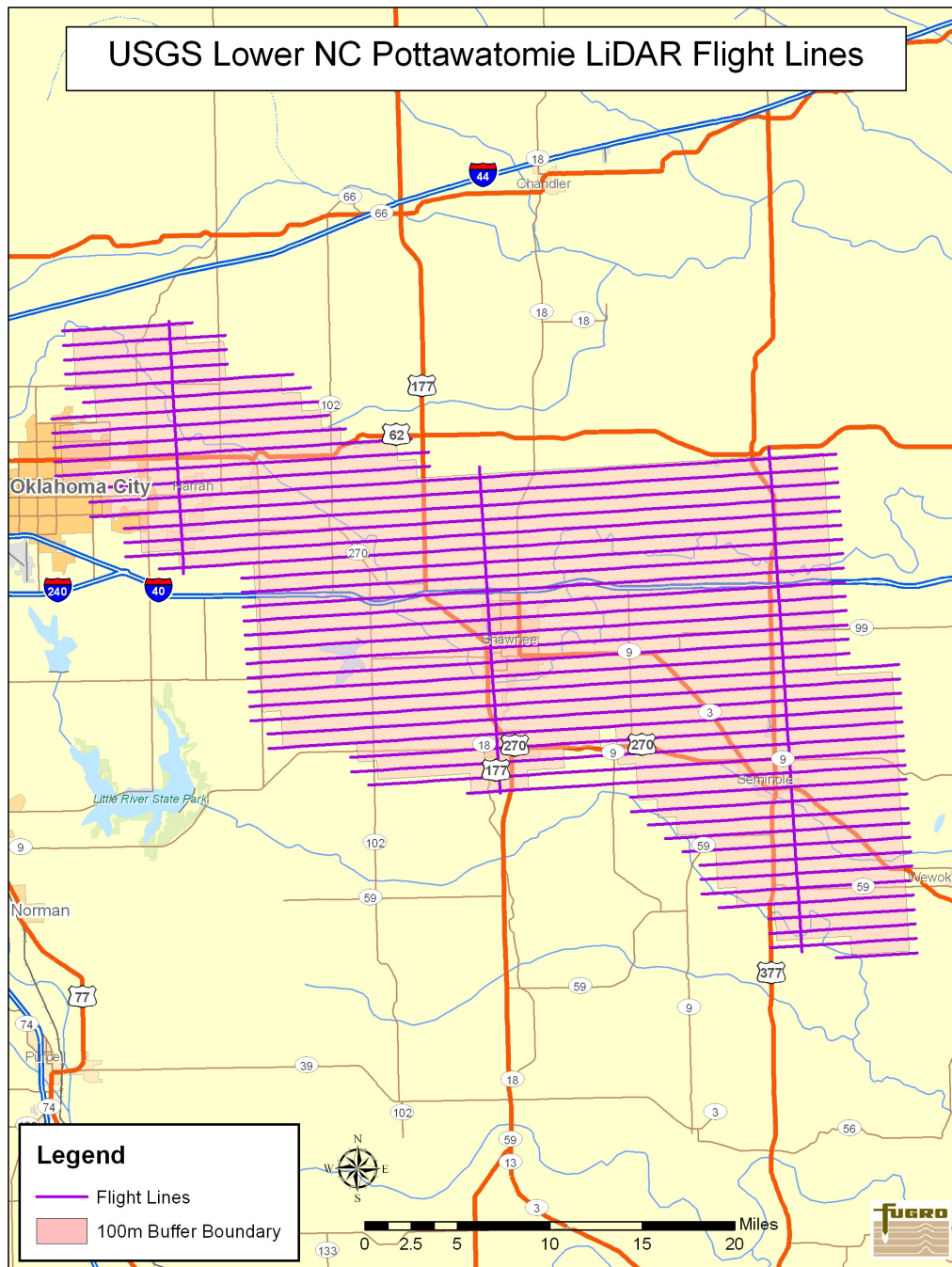


Fig. 1 Flight plan

The following is detail on the lidar acquisition covering the Lower NC Pottawatomie OK AOI.

Collections: 03
Collection Dates: December 08th and 10th, 2011
Field of View (FOV): 38 degrees
Average Point Density (planned): 2 pts/m²
Flight Level(s): 2350 / 7710 m/ft
Sensor Type: Leica ALS60
Sensor Serial Number(s): 113

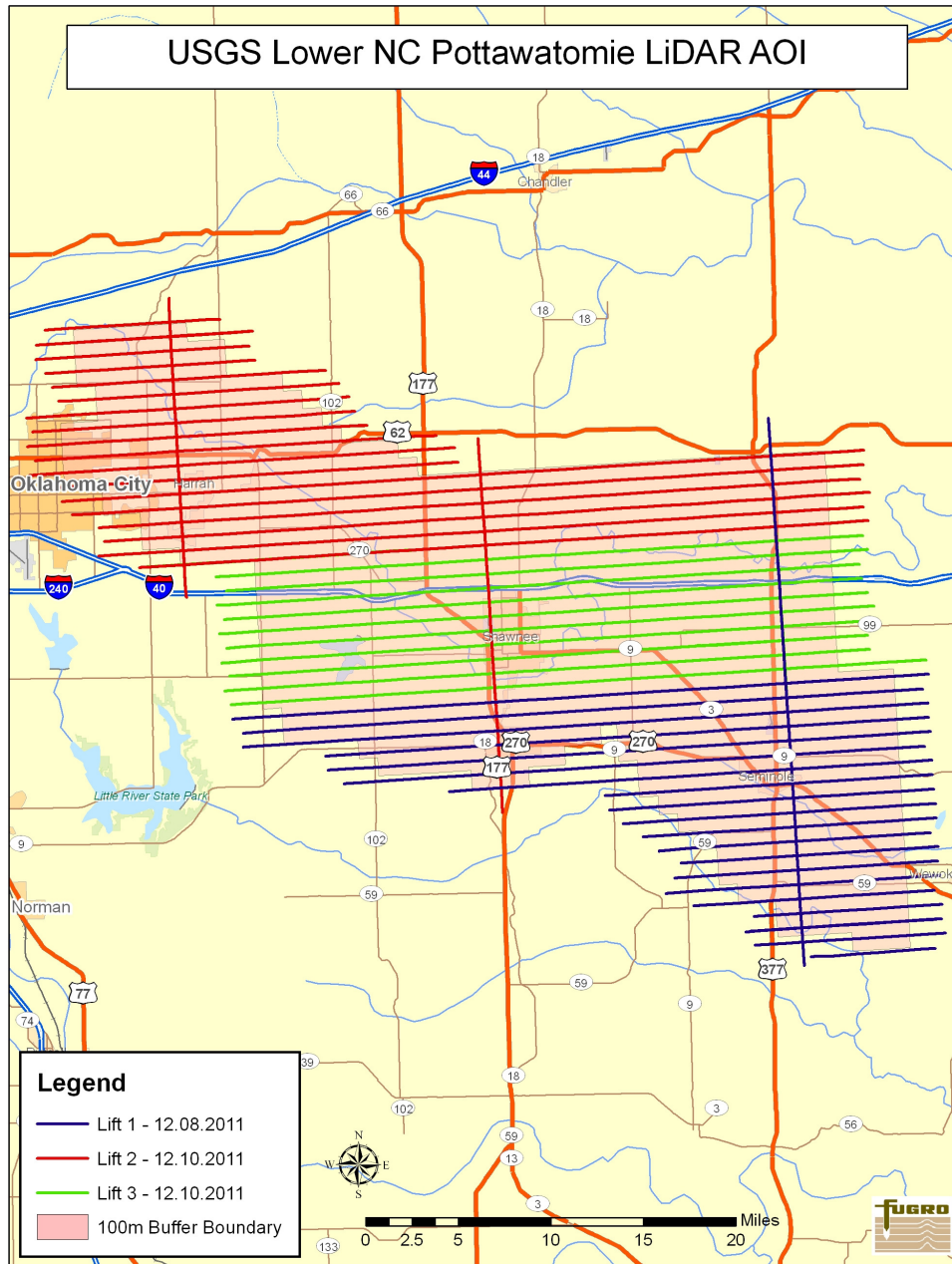


Fig. 2 AOI Executed Flight Trajectories



All acquired LiDAR data was QC'd in Frederick, MD and accepted for processing.
 Below are the flight logs, base stations information and GPS plot from all lifts covering the Lower NC Pottawatomie OK AOI.

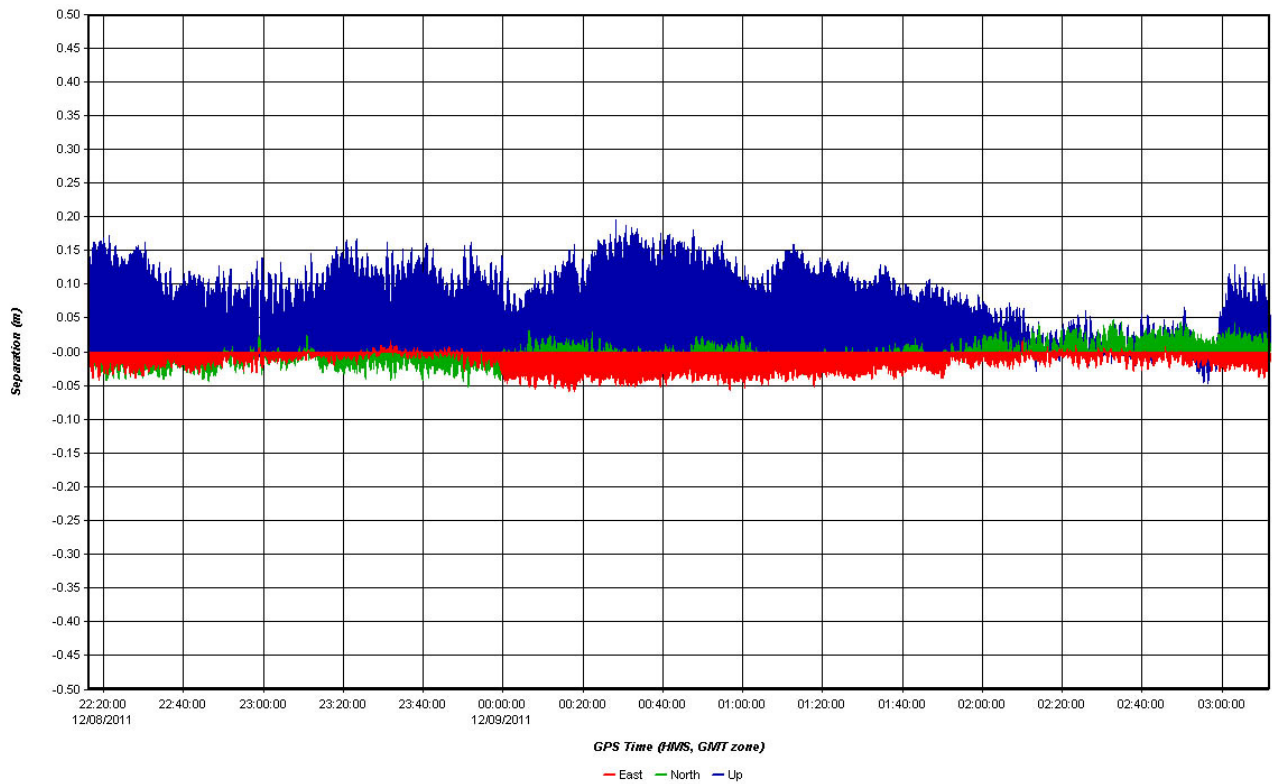
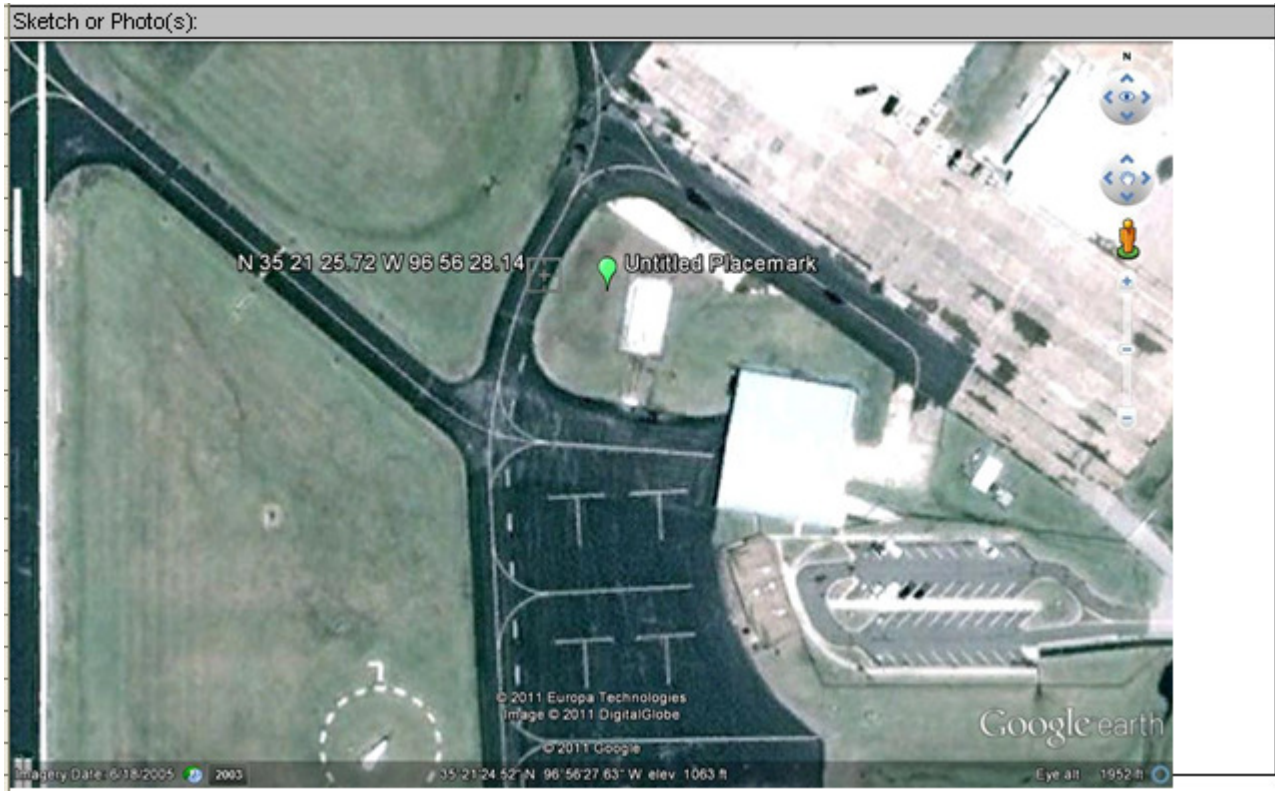
Flight Log/Base Station/GPS Processing – 12.08.2011 (sensor 113) – Lift 1

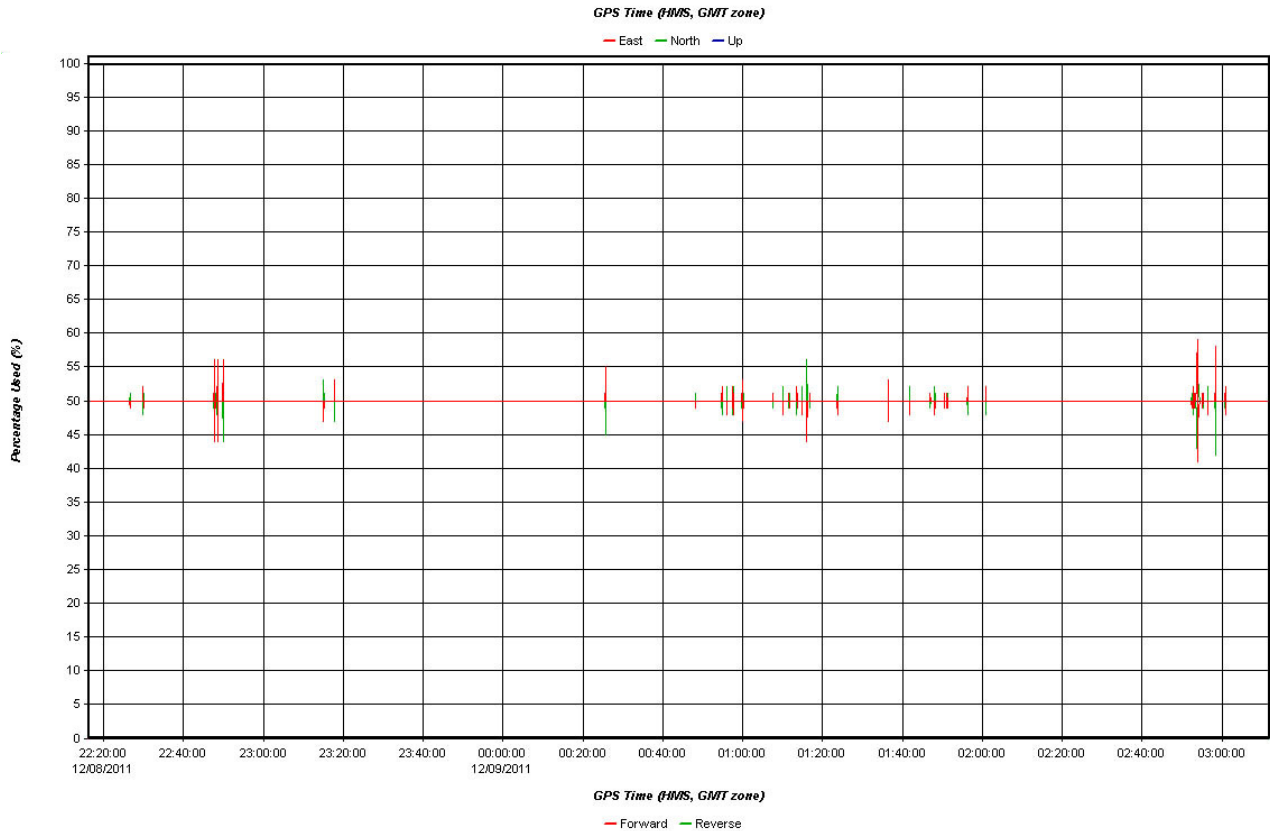
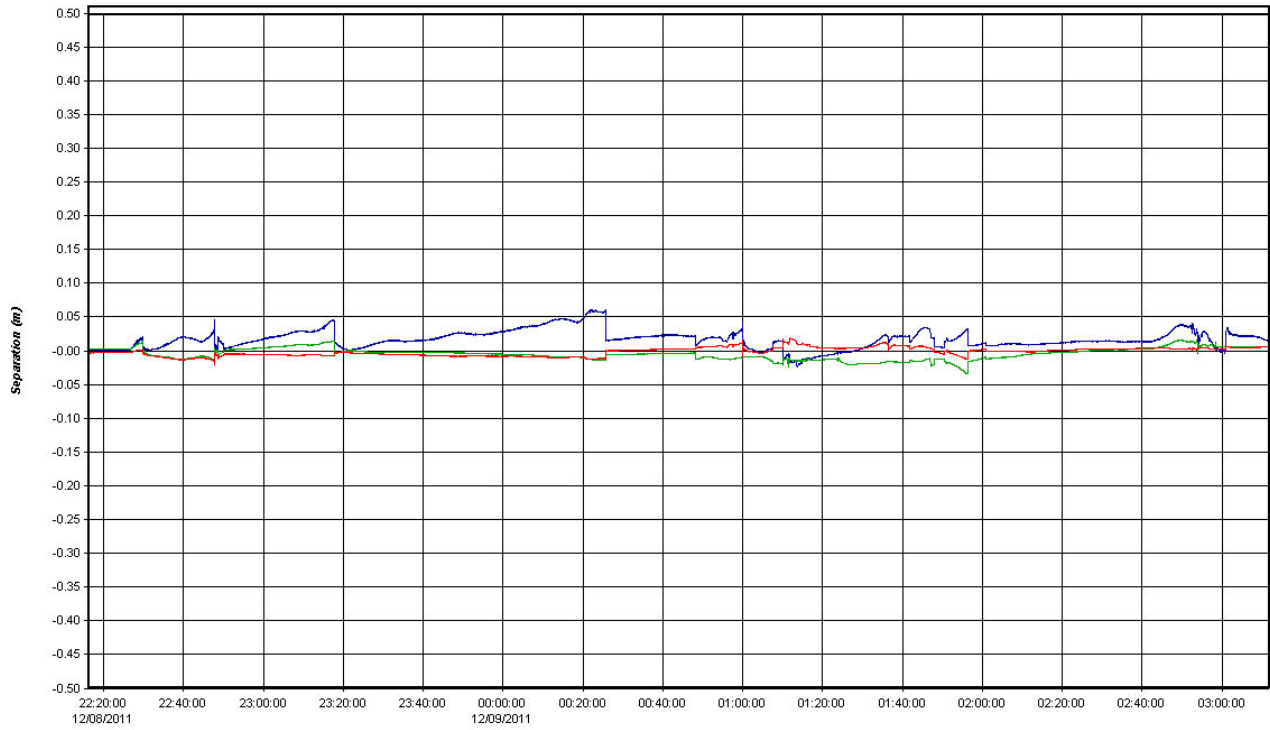
Horizons Job #		Project Name		Operator		Lift Begin			Lift End			Fit		Fit		Hobbs		Activity		
						Airport	Chocks	Hobbs	Airport	Chocks	Hobbs	Duration	Hrs	Hrs	Hrs	Hrs				
E11-0042-00		POTTAWATOMIE, NC		RACHEL ADAM		113													Transit	
8-Dec-11		11-342		Nathan Hayden								3:11	3.2	3.2					Production	
342_113_11004200_01		CCNS 4		ALS60								5:05	5.1	5.1						
Mission ID (DaySensorJobLift)		FMS		Aircraft		Airport ID	UTC	FOV	Altitude	Speed	Scan Hz	AR	SW1	SW2	km/WPT	Atm Setting	Download Drive	Rec ID	Rec ID	
342_113_11004200_01		CCNS 4		N76JN		KSNL	-6	38	7,710	170	34.5	15	4	0.878	30.09	30.17	EP750#05	ZX-011		
Area	Flight #	HZN	Client's	Wpt	From	To	Begin	End	UTC	Start	End	Dir	Altitude (feet)	Speed (knots)	Scan Rate	Comments and Conditions			SVs	PDOP
							22:16:00	22:21:00								GROUND STATIC				
							22:36:00	22:39:00								S-TURN				
POT_2M	49				33	1	28.1	0		22:49:16	22:58:00	178	8575	165	34.5	CROSS LINE			19	1.1
	1				1	6	0	4.4		23:01:11	23:03:00	088	8500	167	34.5	OFF LINE A LITTLE BIT AT THE BEGINNING OF LINE			17	1.3
	2				10	1	7.9	0		23:07:35	23:11:00	268	8560	140	34.5				18	1.2
	3				1	10	0	7.9		23:15:01	23:18:00	088	8550	165	34.5				18	1.2
	3				10	1	7.9	0		23:23:50	23:27:00	268	8555	142	34.5	CALIBRATION LINE			17	1.3
	4				10	1	7.9	0		23:38:42	23:42:00	267	8570	144	34.5				18	1.2
	5				1	13	0	10.5		23:48:15	23:52:00	088	8556	169	34.5				18	1.2
	6				14	1	11.4	0		23:56:53	0:02:00	268	8565	149	34.5				18	1.2
	7				1	14	0	11.4		0:06:07	0:10:00	088	8530	168	34.5				17	1.3
	8				14	1	11.4	0		0:15:08	0:19:00	268	8560	146	34.5				18	1.2
	9				1	15	0	12.3		0:23:11	0:27:00	088	8480	163	34.5				18	1.2
	10				16	1	13.2	0		0:32:40	0:37:00	267	8555	155	34.5				17	1.2
	11				1	17	0	14		0:41:45	0:46:00	087	8590	168	34.5				18	1.3
	12				18	1	14.9	0		0:51:38	0:57:00	268	8600	154	34.5				18	1.4
	13				1	18	0	14.9		1:01:58	1:07:00	088	8530	164	34.5				20	1.1
	14				28	1	23.7	0		1:12:10	1:20:00	268	8570	158	34.5				21	1.1
	15				1	34	0	29		1:25:43	1:35:00	088	8575	170	34.5				18	1.1
	16				35	1	29.9	0		1:40:03	1:50:00	267	8645	161	34.5				20	1
	17				1	35	0	29.9		1:54:40	2:04:00	087	8650	165	34.5				19	1.1
	18				40	1	34.2	0		2:09:15	2:20:00	268	8635	166	34.5				17	1.3
	19				1	40	0	34.2		2:24:35	2:35:00	087	8655	170	34.5				17	1.2
	20				41	1	35.1	0		2:40:05	2:51:00	268	8637	166	34.5				17	1.2
							2:53:00	2:56:00								S-TURN				
							3:04:00	3:09:00								GROUND STATIC				

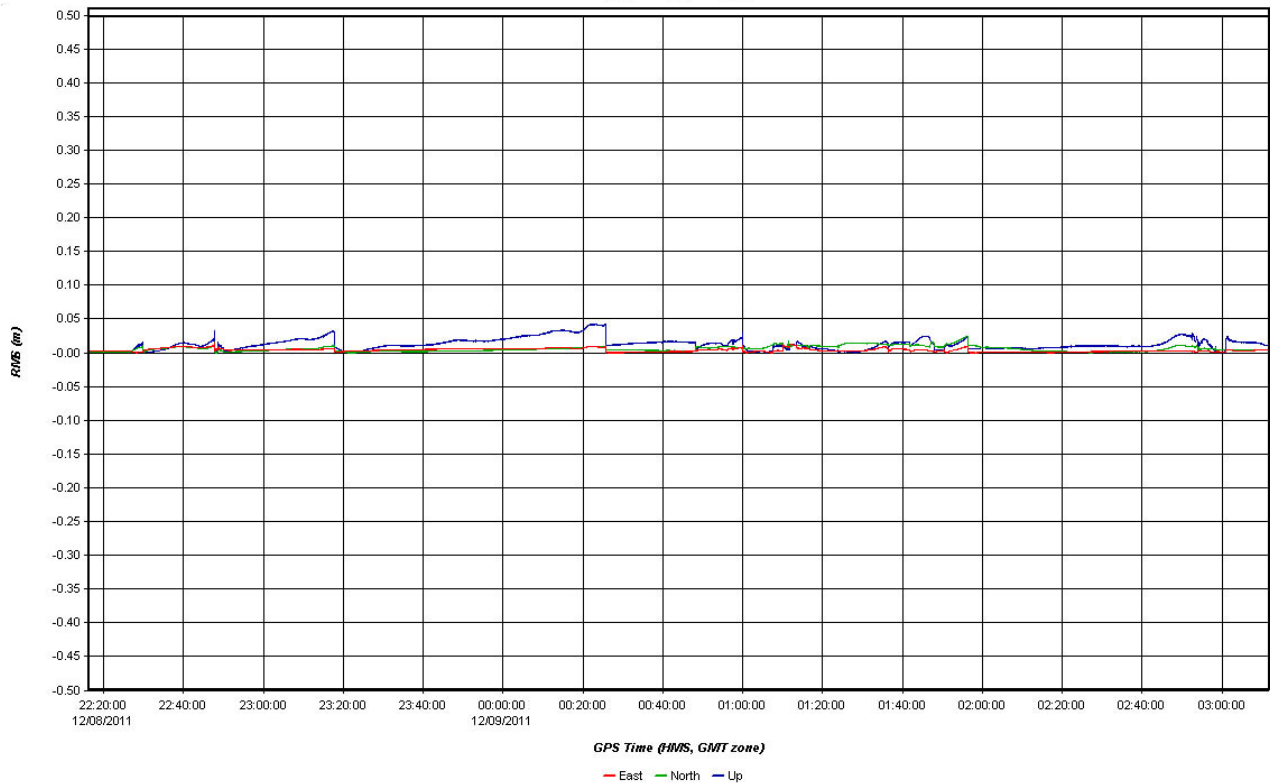
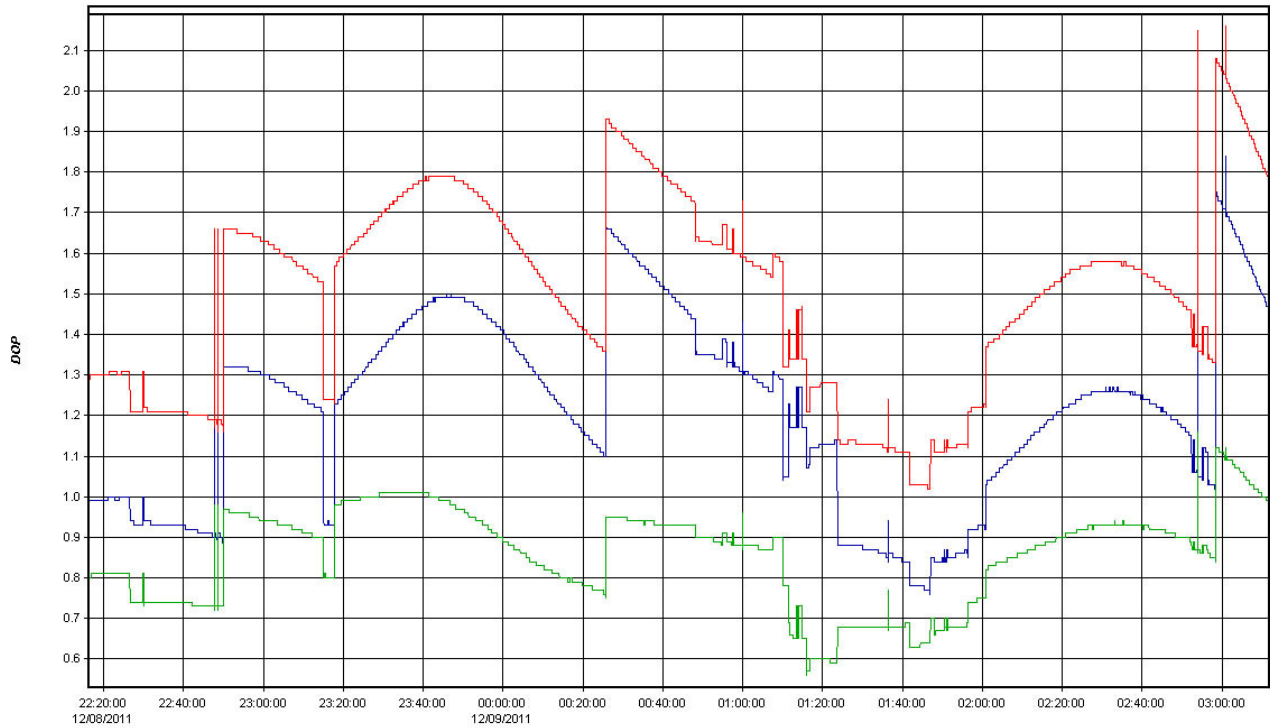
ALS
Flight Log

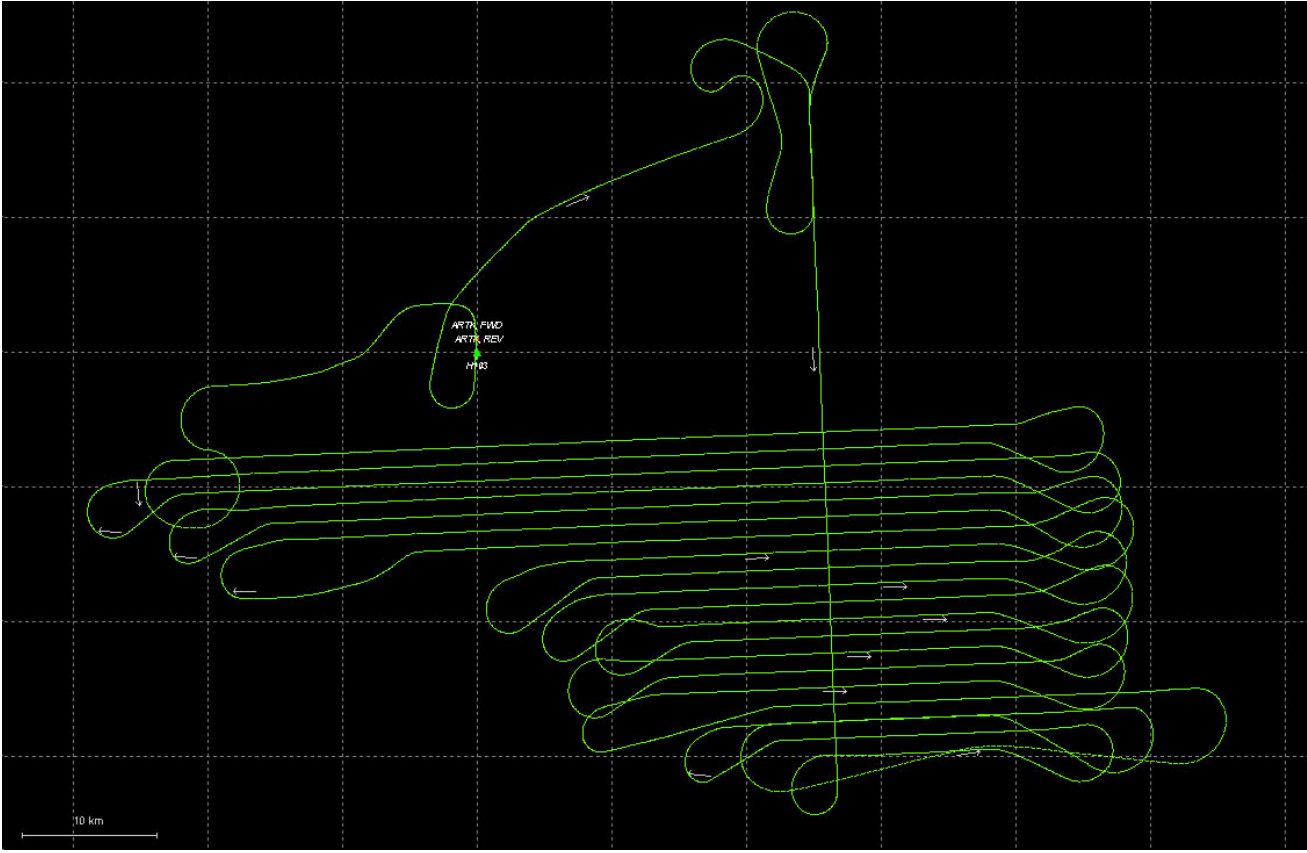


Fugro Horizons, Inc.		Survey Control Data Sheet			
Project Name: Pottawatomie County		Project # / Lift: E11-0042-00 / LIFT 1		Operator: Rachel Adam	
Date / Julian 12/8/11 11-342		Aircraft: N76JN		Mission #: 342 113 11004200 01	
Base Operator: Rachel Adam		State/County: Oklahoma, Pottawatomie County		USGS Quad:	
PID #: 0193		Designation: H193		Session: B	
		Ashtech S/N: ZX-11		Ant.S/N: ZX-11	
Tripod Desc:		Seco Precise Tripod:		Station Information:	
Fixed Height:	<input checked="" type="checkbox"/> High:	<input checked="" type="checkbox"/> Steel Point:	<input type="checkbox"/> Pub. Bench Mark:	<input type="checkbox"/> New Control (tmp):	<input type="checkbox"/> Base Station:
Non-Seco:	<input type="checkbox"/> Low:	<input type="checkbox"/> Collar:	<input type="checkbox"/> Pub. Control:	<input type="checkbox"/> Aerial Target:	<input type="checkbox"/> Photo I.D.:
Antenna Height: **		Description:			
Vertical (m): 1.8		<p>The temporary point, H193, at the Shawnee Regional Airport, KSNL, is located in a grass area that is NW of the FBO next to the fuel island. It is 60 ft. W of the NW corner of the fuel island, halfway in between the corner and a water drain. The point is a seven inch steel spike with a brass washer labeled "Fugro Horizons Inc Point 0193". It has 2 ribbons of orange tape rapped around it. See attached Google Earth photos. Point set by Rachel Adam on 12/9/2011.</p>			
Vertical (ft):					
** Measured to "Antenna Ref.Pt."					
Slant (m):					
Slant (ft):					
START Time: 19:53					
STOP Time: 03:25					
Local Time:					
UTC: <input checked="" type="checkbox"/>					
Latitude: N 35 21 25.66					
Longitude: W 96 56 28.03					
Height (m):					









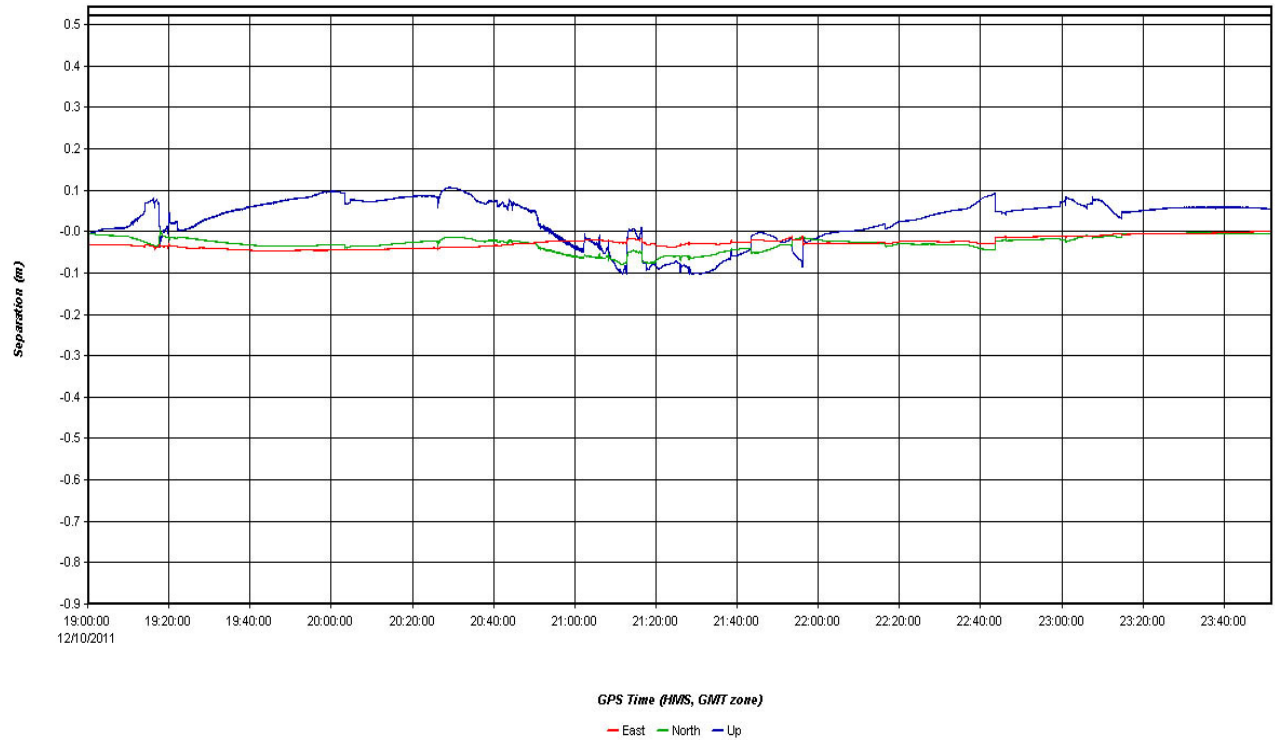


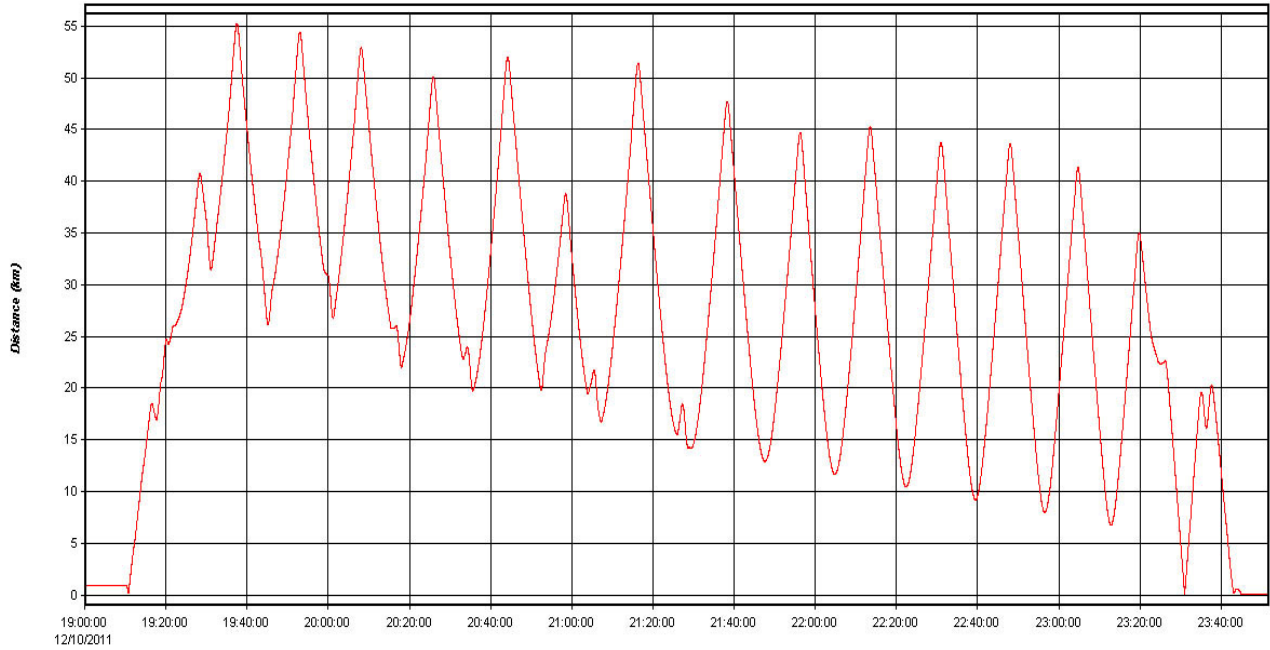
Flight Log/Base Station/GPS Processing – 12.10.2010 (sensor 113) – Lift 2

		ALS Flight Log										
		10.5 Lift Begin			Lift End			Fit	Fit	Hobbs	Activity	
		Airport	Chocks	Hobbs	Airport	Chocks	Hobbs	Duration	Hrs	Hrs		
		1	2	3	1	2	3					
Horizons Job # E11-0042-00 Project Name POTTAWATOMIE Operator RACHEL ADAM Unit 113 IMU PIA 2 Min Range' 6122 Max Range' 8346 Ground Temp °C 6.0 6.0 Shipping Track Base 1 ID H193 Base 2 ID		Flight Date 10-Dec-11 GPS Day 11-344 Lift 2 System ALS60 Pilot Nathan Hayden Sun* Solar Times (urc) Laser Power 74% Pulse Rate 89,500 Flying Temp °C -3.0 -3.0 Data Logger 3L1 Ant Ht 1.80 Rec ID ZX-011										
Mission ID (DaySensorJobLift) 344_113_11004200_02 FMS CCNS 4 Aircraft N76JN Airport ID KSNL UTC -6 FOV 38 Altitude 7,710 Speed 170 Scan Hz 34.5 AR 15 SW1 4 SW2 km/MPT 0.878 Alt. Setting 30.54 30.47 Download Drive Rec ID ZX-011		Flight # HZN : Client's From : To Vwpt Distance Begin : End UTC Start : End Altitude (feet) Speed (knots) Scan Rate Comments and Conditions SVs PDOP										
Area		19:00:00 19:05:00 ground static 19:17:00 19:20:00 s-turn POT_2M 50 1 17 0 14 19:22:40 19:27:00 358 8800 168 34.5 crossing line 15 1.4 48 9 1 7 0 19:32:13 19:35:00 267 8770 164 34.5 15 1.4 47 1 11 8.8 0 19:39:30 19:43:00 087 8740 162 34.5 15 1.3 47 11 1 8.8 0 19:47:19 19:50:00 268 8770 169 34.5 calibration line 15 1.3 46 1 11 8.8 0 19:54:55 19:58:00 088 8780 167 34.5 15 1.2 45 11 1 0 8.8 20:02:24 20:05:00 268 8720 170 34.5 16 1.2 44 1 15 0 12.3 20:10:18 20:15:00 087 8730 161 34.5 14 1.5 43 15 1 12.3 0 20:19:12 20:23:00 267 8760 171 34.5 14 1.4 42 1 18 0 14.9 20:27:14 20:32:00 087 8730 164 34.5 14 1.4 41 18 1 14.9 0 20:36:41 20:41:00 266 8720 172 34.5 15 1.1 40 1 19 0 15.8 20:46:10 20:53:00 086 8710 164 34.5 PDOP SPIKE ON WPT 16/ REFLYING 14 TO END OF LINE 13 1.4 40 14 19 11.4 15.8 21:01:22 21:03:00 087 8750 165 34.5 13 1.7 39 23 1 19.3 0 21:07:16 21:14:00 268 8750 173 34.5 BEEN HAZY THE WHOLE FLIGHT BUT RETURNS ARE GOOD 14 1.4 38 1 24 0 20.2 21:18:23 21:25:00 087 8720 165 34.5 15 1.3 37 24 1 20.2 0 21:29:29 21:36:00 268 8670 168 34.5 17 1 36 1 47 0 40.4 21:40:16 21:53:00 087 8680 165 34.5 17 1.1 35 47 1 40.4 0 21:58:13 22:11:00 268 8715 171 34.5 17 1.1 34 1 45 0 38.6 22:15:44 22:28:00 087 8670 167 34.5 STILL HAZY BUT STILL GETTING RETURNS BETWEEN 94 AND 100% 18 1 33 45 1 38.6 0 22:32:50 22:45:00 268 8700 168 34.5 18 1.1 32 1 45 0 38.6 22:49:53 23:02:00 087 8695 167 34.5 17 1.2 31 43 1 36.9 0 23:06:16 23:18:00 268 8640 172 34.5 17 1.2 51 22 1 18.4 0 23:27:40 23:34:00 178 8630 165 34.5 17 1.2 23:34:00 23:37:00 s-turn 23:45:00 23:50:00 ground static										



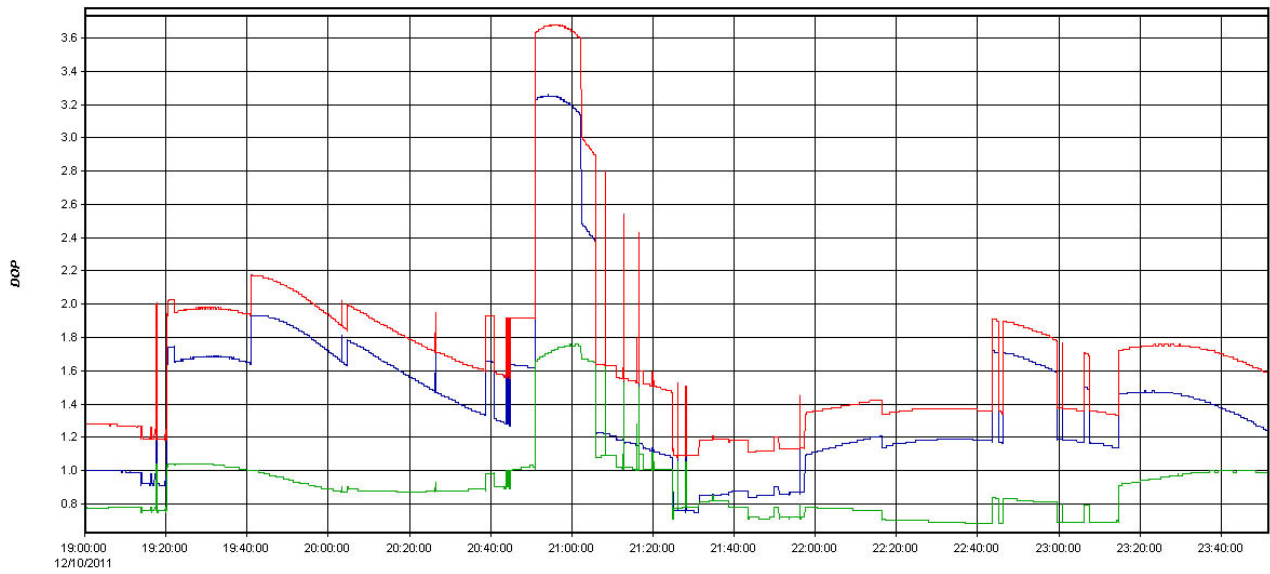
Fugro Horizons, Inc.		Survey Control Data Sheet			
Project Name: Pottawatomie County		Project # / Lift: E11-0042-00 / LIFT 2		Operator: Rachel Adam	
Date / Julian 12/8/11 11-342		Aircraft: N76JN		Mission #: 342_113_11004200_02	
Base Operator: Rachel Adam		State/County: Oklahoma, Pottawatomie County		USGS Quad:	
PID #: 0193		Designation: H193		Session: B	
		Ashtech S/N: ZX-11		Ant.S/N: ZX-11	
Tripod Desc:		Seco Precise Tripod:		Station Information:	
Fixed Height:	<input checked="" type="checkbox"/>	High:	<input checked="" type="checkbox"/>	Steel Point:	
Non-Seco:		Low:		Pub. Bench Mark:	
		Collar:		New Control (tmp):	
				Pub. Control:	
				Aerial Target:	
				Base Station:	
				Photo I.D.:	
Antenna Height: **		Description:			
Vertical (m):	1.8	<p>The temporary point, H193, at the Shawnee Regional Airport, KSNL, is located in a grass area that is NW of the FBO next to the fuel island. It is 60 ft. W of the NW corner of the fuel island, halfway in between the corner and a water drain. The point is a seven inch steel spike with a brass washer labeled "Fugro Horizons Inc Point 0193". It has 2 ribbons of orange tape rapped around it. See attached Google Earth photos. Point set by Rachel Adam on 12/9/2011.</p>			
Vertical (ft):					
** Measured to "Antenna Ref.Pt."					
Slant (m):					
Slant (ft):					
START Time:	19:53				
STOP Time:	03:25				
Local Time:					
UTC:	<input checked="" type="checkbox"/>				
Latitude:					
N 35 21 25.66					
Longitude:					
W 96 56 28.03					
Height (m):					





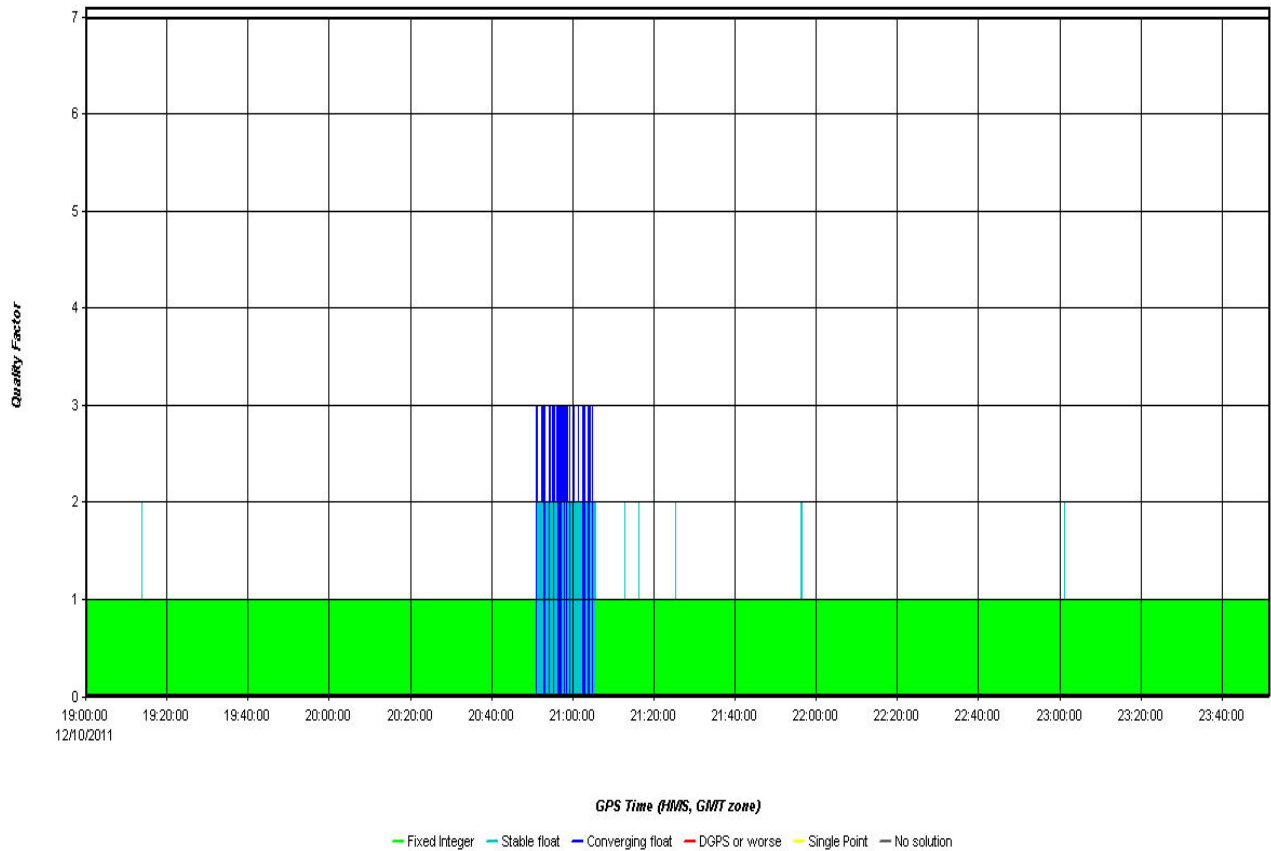
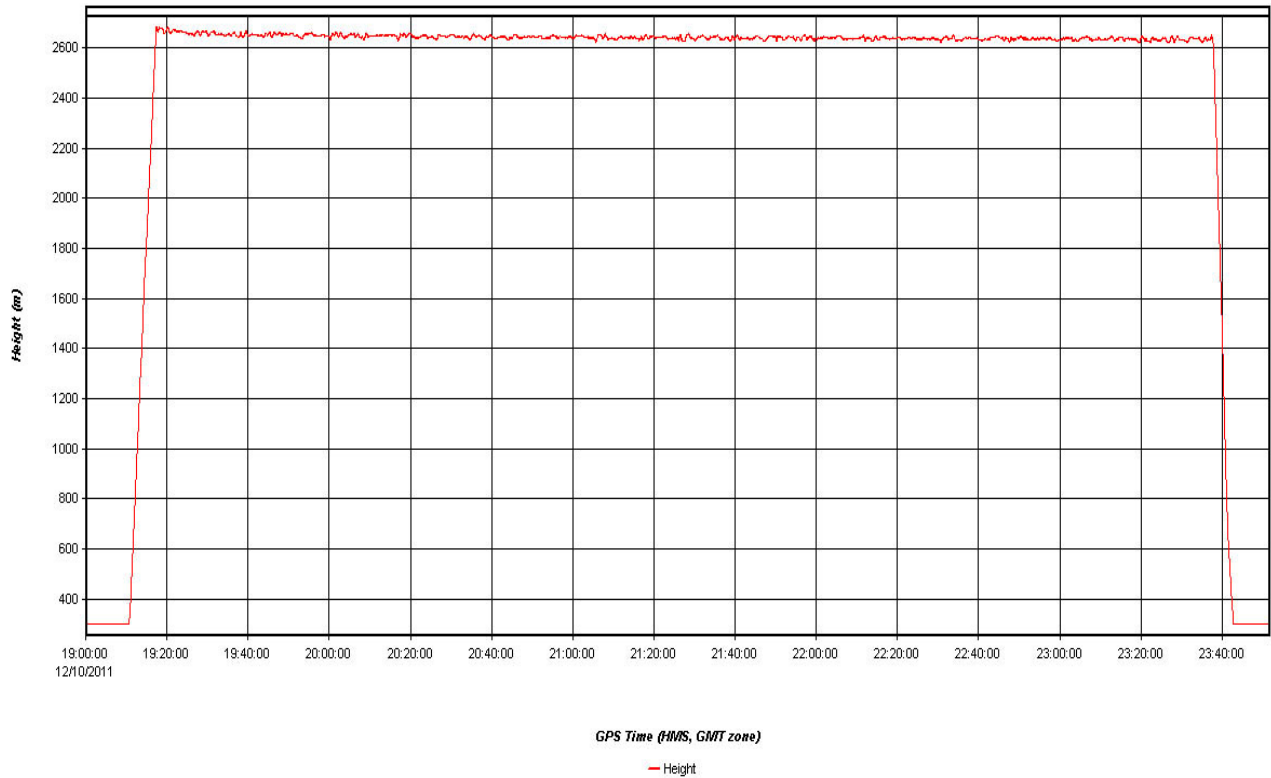
GPS Time (HRS, GMT zone)

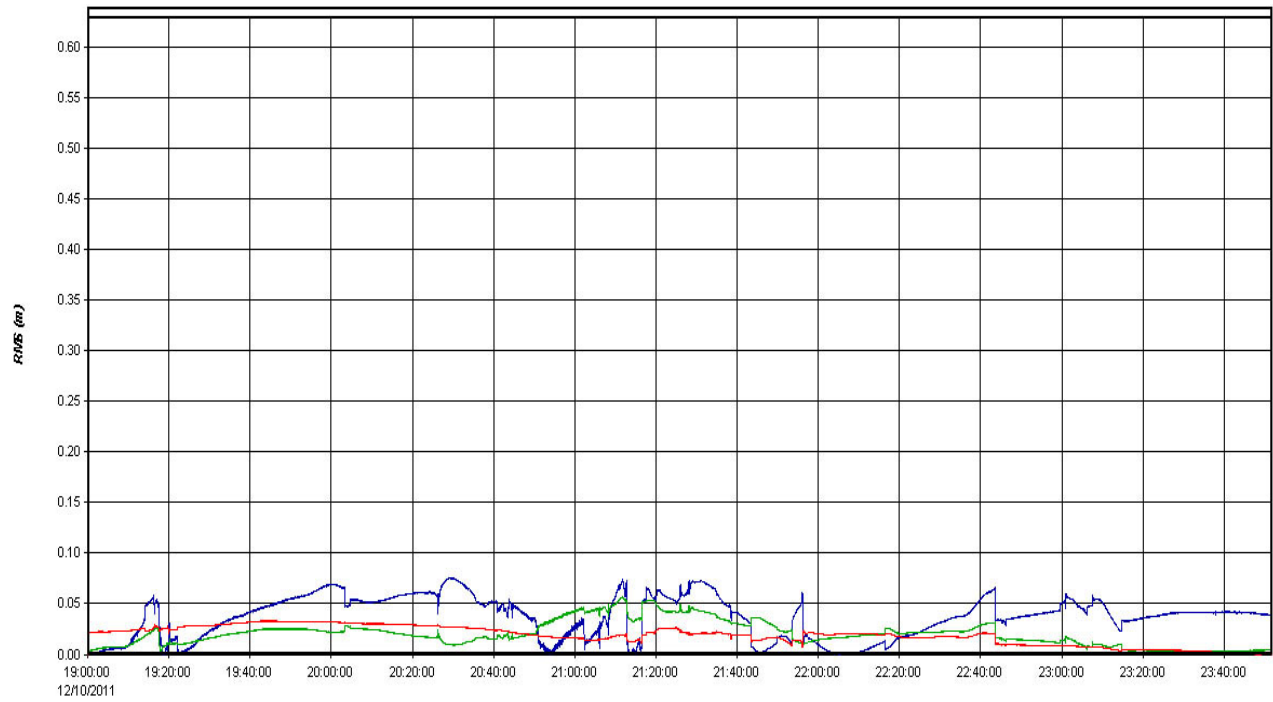
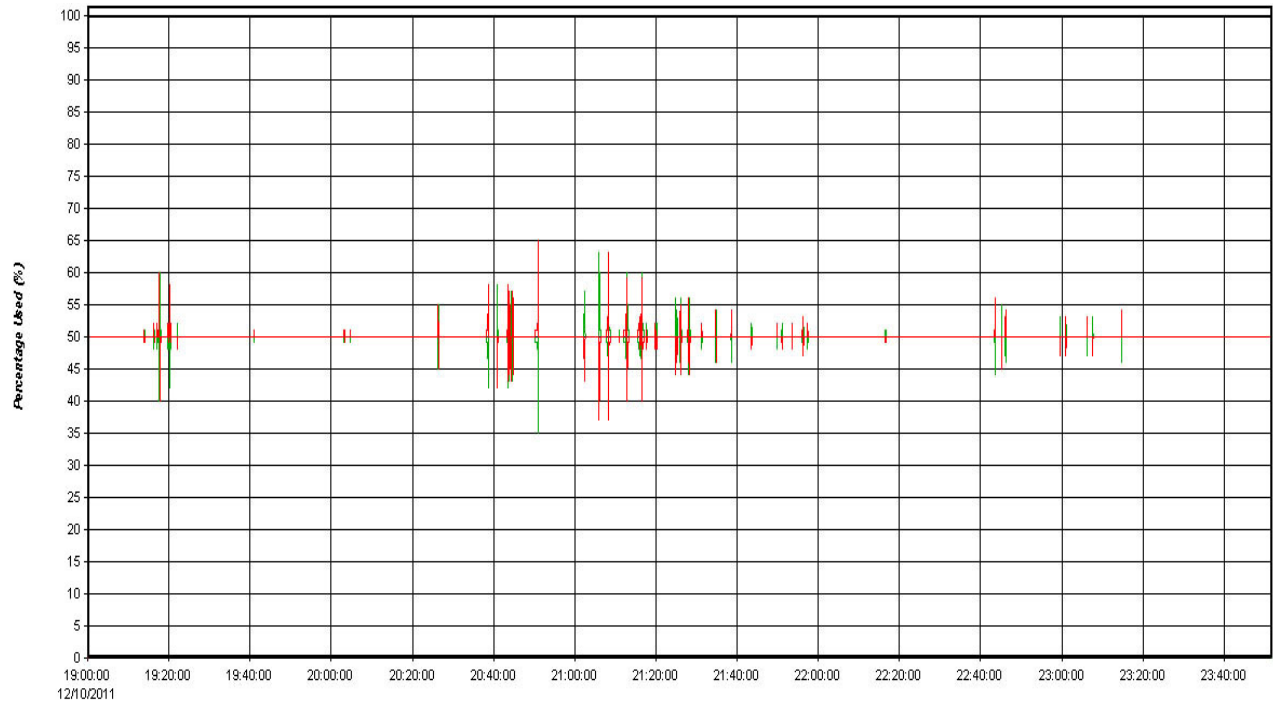
— Distance

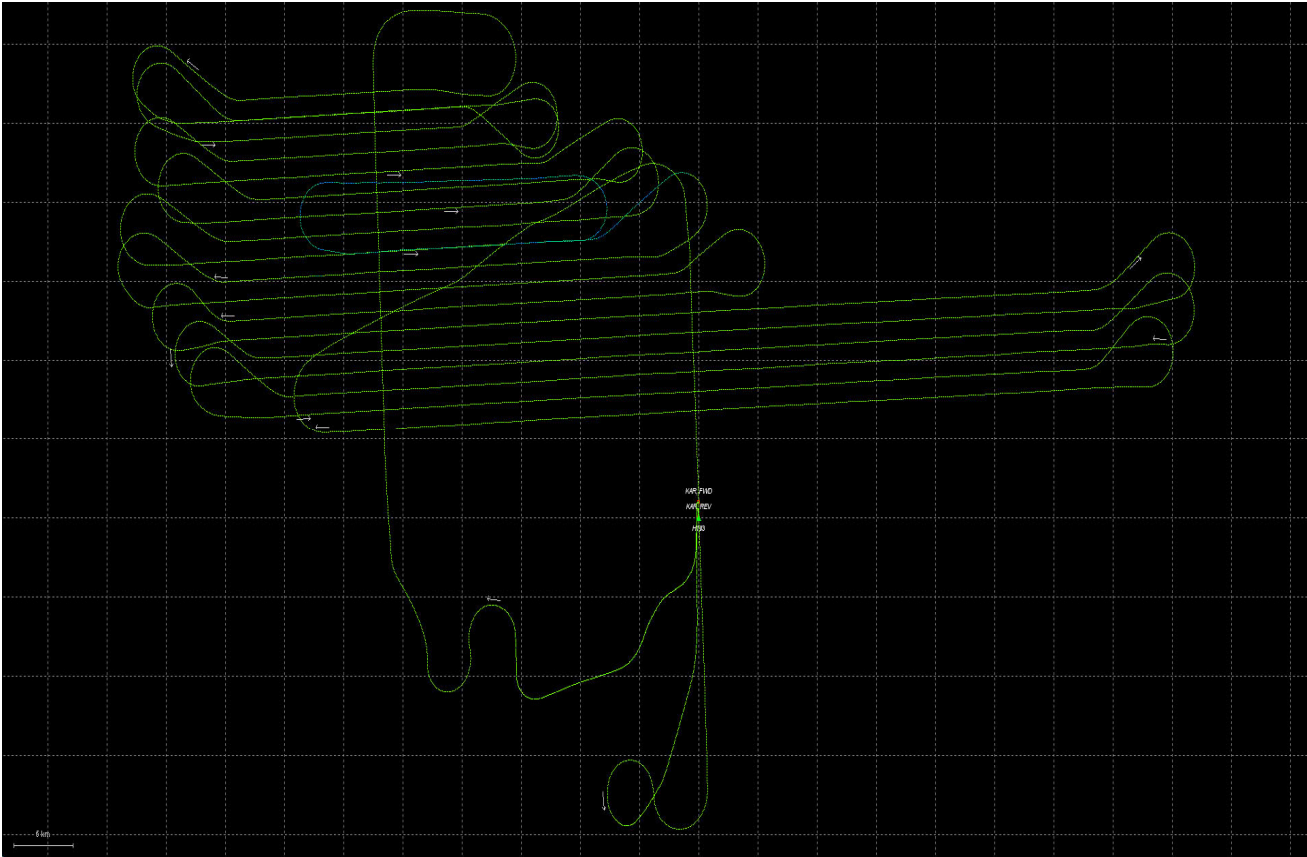


GPS Time (HRS, GMT zone)

— PDOP — HDOP — VDOP









Flight Log/Base Station/GPS Processing – 12.10.2010 (sensor 113) – Lift 3

Fugro Horizons, Inc.		10.5 Lift Begin			Lift End			Fit	Fit	Hobbs	Activity	ALS Flight Log									
		Airport	Chocks	Hobbs	Airport	Chocks	Hobbs	Duration	Hrs	Hrs											
		1	KSNL	0:40	5380.1	KSNL	4:21	5383.8	3:41	3.7			3.7	Production							
		2																			
3																					
Horizons Job #	Project Name			Operator		Unit	IMU	PIA	Min Range'	Max Range'	Ground Temp °C		Shipping Track	Base 1 ID	Base 2 ID						
E11-0042-00	POTTAWATOMIE			RACHEL ADAM		113		2	6122	8346	5.0	0.0		H193							
Flight Date	GPS Day	Lift	System	Pilot		Sun*	Solar Times (urc)		Laser Power	Pulse Rate	Flying Temp °C		Data Logger	Ant Ht	Ant Ht						
10-Dec-11	11-344	3	ALS60	Nathan Hayden					74%	89,500	-3.0	-2.0	3L1	1.80							
Mission ID (DaySensorJobLift)	FMS	Aircraft	Airport ID	UTC	FOV	Altitude	Speed	Scan Hz	AR	SW1	SW2	mi/MPT	Altm Setting	Download Drive	Rec ID	Rec ID					
344_113_11004200_03	CCNS 4	N76JN	KSNL	-6	38	7,710	170	34.5		15	4	0.878	30.47; 30.47		ZX-011						
Area	Flight #	Client's	Vpnt	Distance	UTC	Fit	Altitude	Speed	Scan	Comments and Conditions						SVs	PDOP				
					Start	End	Dir	(feet)	(knots)	Rate											
					0:46:00	0:51:00					ground static										
					1:00:00	1:03:00					s-turn										
POT_2M	49		28	18	38.2	24		177	8655	155	34.5	crossing line									
	23		30	38	41	52.3		1:13:52	1:16:00	088	8620	159	34.5	calibration line						19	1.1
	21		41	1	56.5	0		1:22:17	1:34:00	267	8560	168	34.5							18	1.1
	22		1	38	0	52.3		1:38:11	1:49:00	088	8640	163	34.5							20	1
	23		38	1	52.3	0		1:53:56	2:04:00	268	8630	168	34.5	Started recording right before 1st waypoint						19	1.1
	24		1	38	0	52.3		2:08:07	2:19:00	087	8640	167	34.5								
	25		38	1	52.3	0		2:22:49	2:33:00	268	8650	167	34.5								
	26		1	38	0	52.3		2:37:13	2:48:00	087	8660	170	34.5							16	1.1
	27		38	1	52.3	0		2:52:19	3:03:00	268	8660	164	34.5							16	1.1
	28		1	38	0	52.3		3:06:51	3:17:00	087	8615	166	34.5							15	1.4
	29		38	1	52.3	0		3:21:25	3:32:00	268	8640	167	34.5							15	1.3
	31		15	1	19.8	0		3:38:44	3:43:00	267	8565	167	34.5	reflew from last flight/ thought we had flown over a fire						15	1.2
	30		1	38	0	52.3		3:47:23	3:58:00	087	8610	166	34.5							17	1.1
					3:58:00	4:01:00					s-turn										
					4:13:00	4:18:00					ground static										



Fugro Horizons, Inc.		Survey Control Data Sheet			
Project Name: Pottawatomie County		Project # / Lift: E11-0042-00 / LIFT 3		Operator: Rachel Adam	
Date / Julian 12/10/11 11-344		Aircraft: N76JN		Mission #: 344 113 11004200 03	
Base Operator: Rachel Adam		State/County: Oklahoma, Pottawatomie County		USGS Quad:	
PID #: 0193		Designation: H193		Session: B	
		Ashtech S/N: ZX-11		Ant.S/N: ZX-11	
Tripod Desc:		Seco Precise Tripod:		Station Information:	
Fixed Height:	<input checked="" type="checkbox"/> High:	<input checked="" type="checkbox"/> Steel Point:	Pub. Bench Mark:	New Control (tmp):	Base Station:
Non-Seco:	<input type="checkbox"/> Low:	<input type="checkbox"/> Collar:	Pub. Control:	Aerial Target:	Photo I.D.:
Antenna Height: **		Description:			
Vertical (m): 1.8		<p>The temporary point, H193, at the Shawnee Regional Airport, KSNL, is located in a grass area that is NW of the FBO next to the fuel island. It is 60 ft. W of the NW corner of the fuel island, halfway in between the corner and a water drain. The point is a seven inch steel spike with a brass washer labeled "Fugro Horizons Inc Point 0193". It has 2 ribbons of orange tape rapped around it. See attached Google Earth photos. Point set by Rachel Adam on 12/9/2011.</p>			
Vertical (ft):					
** Measured to "Antenna Ref.Pt."					
Slant (m):					
Slant (ft):					
START Time: 19:53					
STOP Time: 03:25					
Local Time:					
UTC: <input checked="" type="checkbox"/>					
Latitude: N 35 21 25.66					
Longitude: W 96 56 28.03					
Height (m):					

