NOAA and USGS Big Island, Hawaii Lidar Airborne Lidar Report

December 2020



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1. Overview

About

This project contains a comprehensive outline of the G17PD01221-MODP00001 NOAA/USGS Big Island, Hawaii Lidar task order issued by the United States Geological Survey's National Geospatial Technical Operations Center (USGS-NGTOC). This task order called for the acquisition and processing of singlephoton QL1 data covering approximately 4,028 square miles over the Big Island of Hawaii.

Purpose

This data is intended for use in coastal management decision making, including applications such as support for local hydrologists and watershed managers in their decision-making processes and for formulating a sediment budget and identifying soil erosion hotspots.

Specifications

Data for this task order was acquired and produced to meet USGS Lidar Base Specification 2020 revision A standards and the American Society of Photogrammetry and Remote Sensing (ASPRS) Positional Accuracy Standards for Digital Geospatial Data (Edition 1, Version 1.0).

Spatial Reference

Geospatial data products were produced using the following horizontal and vertical spatial data reference system.

Horizontal	EPSG Code	6635
	Datum	NAD83 (PA11)
	Projection	UTM Zone 5
	Units	Meters
Vertical	Datum	NAVD88
	Geoid	GEOID12B
	Units	Meters
	Height Type	Orthometric

Table 1-1. Spatial Reference System

Task Order Deliverables

All data products produced as part of this task order are listed below. All tiled deliverables had a tile size of 1,000-meters x 1,000-meters. Tile names are derived from the USG National grid.

Table	1-2.	Deliver	ables
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Lidar Data			
Classified lidar point cloud data	 8,629 files Tiles in .las v1.4 format Classes 1 – Processed, not Classified 2 – Ground 3 – Vegetation 7 – Noise 9 – Water 10 – Ignored Ground 17 – Bridge Decks 18 – High Noise 		
Breaklines used for hydro- flattening	 Lake, river, coast, and bridge features as feature classes in an Esri file geodatabase Water bodies greater than 2 acres as polygon features Rivers 30.5 meters / 100 feet and greater in width as polyline features 		
Hydro-flattened bare earth digital elevation model (DEM)	8,629 files 1-meter pixel size, 32-bit floating-point; no bridges or overpass structures GeoTIFF format		
Intensity Imagery	8,629 files 1-meter pixel size, 8-bit gray-scale (linear rescaling from 16-bit intensity) GeoTIFF format		
Spatial Metadata			
Swath separation images	8,629 files 1.5-meter pixel size, 8-bit, GeoTIFF format		
Swath polygons	Georeferenced, polygonal representation of the detailed extents of each lidar swath Polygon feature class in an Esri file geodatabase		
Data Extent	Esri shapefile format		
Tile Index	Esri shapefile format		
Metadata and Reports			
Metadata	Deliverable-level FGDC CSDGM/USGS MetaParser Compliant metadata in .xml format		
Lidar Project Report	Project report with flight logs in .pdf format		

Figure 1-1. Project Area



2. Acquisition

Flight Planning

Aerial lidar data for this project was collected using the specifications listed below.

The Single Photon Lidar (SPL) data acquisition was acquired at a density greater than the task order specified density of QL1 or 8 points per square meter. USGS and NOAA agreed the density of the data should be reduced to provide a more manageable data set. The data was decimated to provide a density not less than 8 points per square meter, however due to significant overlap of acquisition flight lines in some areas of the project, the density in some cases exceeds 8 points per square meter.

Specification	Target
Resolution	 8 points per square meter 0.35-meter nominal point spacing
Overlap	At contractor's discretion, but enough to ensure there are no data gaps between usable portions of the swath and nominal point density is achieved
Acquisition Window	Acquisition window shall be at a period of annual minimal water level in the winter 2018 acquisition window starting in January
Data Voids	 Not allowed except Where caused by water bodies Where caused by areas of low near infra-red (NIR) reflectivity (i.e. asphalt or composition roofing) Where appropriately filled-in by another swath
Acquisition Conditions	 Cloud and fog-free between the aircraft and ground Ground is snow free Ground has no unusual flooding or inundation, except in cases where the goal of the collection is to map the inundation Intermittent streams must be dry at the time of collection Leaf-off is not a requirement for this task order; however the USGS National Geospatial Program (NGP) only requires that penetration to the ground must be adequate to produce an accurate and reliable bare-earth surface suitable for incorporation into the 1 meter 3DEP National Map data layers Time of day is not of concern; however night time acquisitions are likely preferable

Table 2-1. Acquisition Requirements

Flight Planning

Flight plans using the following.

Software

• Leica Mission Pro v12.1 / 12.3

Equipment

- SPL100 SN7, with uIRS IMU
- RCD30 camera with 80mm lens (SN CAMERAHEAD-82573-E-798528_LENSSYSTEM80132-A-785423)
- Novatel DL5 GPS base station receiver
- Aircraft: Mission 1 Dynamic Aviation King Air A90 N96Y and N95S

On February 28, 2018 Woolpert modified the Task Order and provided approval to change the flight plan to 20% overlap. This change was implemented to improve data acquisition progress in terms of area coverage within the 60-day best effort window. New flight plans were computed for the areas yet to be acquired as of February 28, 2018.

The caveat was provided that density of > 8 points per meter may not be achieved on dark surfaces such as lava and in vegetation. This was stated in the amendment and communicated to the end user client.

	Initial	Feb 2018
Flying Height (AGL)	10,500 - 14,000 ft	10,500 - 14,000 ft
Line-to-Line Overlap	50%	20%
Flying Speed	180 knots	180 knots
Swath Width	~2,000 m (15° ½ angle/30° full FOV scanner)	~2,000 m (15° ½ angle/30° full FOV scanner)

Table 2-2. Planned Settings

Due to the complexity of the terrain of the Island of Hawaii, the AOI was broken up into 900 meter terrain bands. Within each terrain band sub-blocks were created to parallel the slope of the volcano.

Due to the terrain variability of the island some flight lines were planned to target a specific AOI, but in doing crossed another AOI. As the impact to the point cloud could vary from terrain dropouts to low point density outside the AOI, these flight lines were only used to populate the intended AOIs for which they are respectively planned.

Lidar Sensor Information

Aerial lidar data was acquired for this project using the Leica Single Photon Lidar (SPL100) sensor system.

Table 2-3. Leica Single Photon Lidar	^r (SPL100) Sensor Info
--------------------------------------	-----------------------------------

Lidar Unit		
Beam configuration	10 x 10 array	
Laser wavelength	532 nm	
Laser divergence	0.08 mrad (1/e2 per beam, nominal)	
Laser pulse width	400 psec	
Laser optical output	5 W average	
Eye safety	NOHD <300 m	
Pulse repetition frequency	60 kHz (6.0 MHz effective pulse rate)	
Return pulses	Up to 10 returns per channel per laser shot including intensity	
Operation altitude (1)	2,000 - 4,500 m AGL	
Scanner pattern	Oblique scanner	
Scan speed	Programmable up to 25 Hz (1,500 RPM)	
Field of view	20°, 30°, 40° or 60° fixed	
Point density (2)	Typically 20 points / sqm at 4,000 m AGL	
Vertical accuracy (2, 3, 4)	< 10 cm 1 σ	
Horizontal accuracy (2, 3, 4)	< 40 cm 1 σ	
System Electronics		
Components	1 x LiDAR Controller, 1 x Camera Controller CC33	
Dimensions	597.0 L x 508.0 W x 454.1 H mm	
Weight	21.8 kg	
Environmental		
Pressure	Non-pressurized cabin up to ICAO 18,000 ft	
Humidity	0% to 95% RH according ISO7137 (non-condensating)	
Operating temperature	-0 °C to 40 °C	
Electrical		
Avg. power consumption of complete system	600 W / 28 VDC	
Max. peak power consumption of complete system	1,000 W / 28 VDC	
Fuse on aircraft power outlet	1 x 40 A	

1 Max. operating altitude is achieved at ≥10% reflectivity (e.g. dry asphalt) and 100% laser output

2 Accuracy and point density stated in the table is acquired @4,000 m AGL, 100 m/s aircraft speed

3 The 1σ value represents the 68% confidence interval. Typically, the RMSE value is equal to 1 accuracy value

4 Vertical and horizontal accuracy estimations are based on the integrated SPAN system and a GPS error of 5 cm

Source: Leica SPL100 Single Photon LiDAR Sensor Data Sheet

 $https://leica-geosystems.com/-/media/files/leicageosystems/products/datasheets/leica_spl100_ds.ashx?la=en-us\&hash=FDABDAFAB-63C650F291836095F0841EF$

Lidar Sensor Specification

Acquisition specifications are listed in the table below. An initial quality control process was immediately performed on to review the data coverage, airborne GPS data, and trajectory solution.

Table 2-4. Project Acquisition Specifications

Settings	Leica SPL100
Max. Number of Returns	2,000
Nominal Point Spacing	0.35 m
Nominal Point Density	8 ppsm
Flying Height Above Ground Level	3,200 - 4,420 m
Flight Speed	180 knots
Scan Angle	30°
Scan Rate Used	21 Hz
Pulse Rate Used	50 kHz
Multi-Pulse in Air	Disabled
Swath Width	2,000 m
Swath Overlap	20%

Timeline

Lidar data was collected from January 30, 2018 through January 6, 2002. Figure 2-1 shows aerial lidar coverage by lift. A total of 362 individual flight lines were collected.

Operators identified the AOIs on the Island of Hawaii and studied the weather conditions daily to determine which areas were most suitable for data acquisition. Weather conditions proved extremely challenging during the collection window. Due to very challenging weather conditions complete acquisition of the Island of Hawaii was unable to be completed during the contractual collection windows.

Approximately 38% of the AOI was collected during the 2018 collection window.

In the 2019/2020 collection window, approximately 61% of the targeted AOI had been collected.

For more information, see the Flight Logs in Appendix 1 and the Acquisition GPS Times in Appendix 2.

Figure 2-1. Flight Coverage



GNSS and IMU Equipment

Prior to mobilizing to the project site, flight crews coordinated with the necessary air traffic control personnel to ensure airspace access. Crews were on-site, operating a Global Navigation Satellite System (GNSS) Base Station for the airborne GPS support.

Leica Airborne Sensor Operators established a survey monument at Kona International Airport (KOA) and set up Novatel DL5 GPS base station receiver prior to each data acquisition flight.

The survey monument established for Mission 1 (KOA GPS) was not accessible to the flight crews due to increase aircraft activity during the data acquisition period.

Flight navigation during acquisition was performed using IGI CCNS (Computer Controlled Navigation System). The pilots are skilled at maintaining their planned trajectory, while holding the aircraft steady and level. If atmospheric conditions are such that the trajectory, ground speed, roll, pitch and/or heading cannot be properly maintained, the mission is aborted until suitable conditions occur.

Base stations were set by acquisition staff and was used to support the aerial data acquisition. CORS stations were used in post-processing to aid in GPS/IMU solution quality when necessary. See the table below for stations operated during acquisition.

For more information, see the GNSS / IMU Report in Appendix 3.

Table 2-5. GNSS Base Stations

Station Name	Easting (Meters)	Northing (Meters)	Ellipsoid Height L1 Phase Center (Meters)	Orthometric Height (Meters)
KOA GPS	181138.790	2183742.105	33.904	15.715
KOA GPS2	181120.252	2183899.855	33.525	15.536
MKEA	242674.343	2191367.901	3754.485	3728.033
ML01	229665.109	2162159.911	3429.348	3401.413

Projected Coordinates in NAD83 (PA11) UTM Zone 5 meters, NAVD88 (GEOID12B - Hawaii) meters

Acquisition Quality Assurance

Woolpert developed a quality assurance and validation plan to ensure the acquired lidar data meets the USGS Base Specification Version 2020 revision A. For quality assurance purposes, the lidar data was processed immediately following acquisition to verify the coverage has appropriate density, distribution, and no unacceptable data voids. Accompanying GPS data was post processed using differential and Kalman filter algorithms to derive a best estimate of trajectory. The quality of the solution was verified to be consistent with the accuracy requirements of the task order. Any required re-flights were scheduled at the earliest opportunity.

The spatial distribution of the geometrically usable first return lidar points was reviewed for density requirements as well as regular and uniform point distribution - verifying the lidar data is spaced so that 90% of the cells in a 2*NPS grid placed over the data contain at least one lidar point. The NPS assessment is made against single swath, first return data located within the geometrically usable center portion (typically ~90%) of each swath. Additionally, the data was reviewed for unacceptable data voids – verifying no area greater than or equal to $(4 \times ANPS)^2$ exhibited data coverage gaps.

3. Processing

Processing Summary

Once the lidar data passed initial QC, the dataset was corrected for aircraft orientation and movement. This process used airborne inertial, orientation, and GPS data collected during acquisition along with ground-based GPS data. The data went through a geometric calibration that further corrected each laser point. This calibrated data set was used to create the LAS point cloud. The LAS point data was initially classified into "ground" and "non-ground", then further refined using the classes specified in this task order. Breaklines were drawn to denote hydrological features. After the hydro-flattening process, the final deliverables products were created.

GNSS-IMU Trajectory Processing

Kinematic corrections for the aircraft position were resolved using aircraft GPS and static ground GPS (1-Hz) for each geodetic control (base station) for three subsystems: inertial measurement unit (IMU), sensor orientation information, and airborne GPS data.

Post-processing of the IMU system data and aircraft position with attitude data was completed to compute an optimally accurate, blended navigation solution based on Kalman filtering technology, or the smoothed best estimate of trajectory (SBET).

Differential GPS solutions were computed for all lifts. The Leica established base station and supplemental CORS stations were used to ensure high quality GPS solutions were computed. Novatel Inertial Explorer 8.70.4517 was used for GPS post processing.

Software: POSPac Software v. 5.3, IPAS Pro v.1.35., Novatel Inertial Explorer v8.60.6129

Trajectory Quality

The GNSS trajectory and high-quality IMU data are key factors in determining the overall positional accuracy of the final sensor data. Within the trajectory processing, there are many factors that affect the overall quality, but the most indicative are the combined separation, the estimated positional accuracy, and the positional dilution of precision (PDOP).

Combination Separation

Combined separation is a measure of the difference between the forward-run and the backward-run solution of the trajectory. The Kalman filter was processed in both directions to remove the combined directional anomalies. In general, when these two solutions match closely, an optimally accurate and reliable solution is achieved.

The data for this task order was processed with a goal to maintain a combined separation difference of less than ten (10) centimeters.

Estimated Positional Accuracy

Estimated positional accuracy plots the standard deviations of the east, north, and vertical directions along a time scale of the trajectory. It illustrates loss of satellite lock issues, as well as issues arising from long baselines, noise, and/or other atmospheric interference.

PDOP

The PDOP measures the precision of the GPS solution in regard to the geometry of the satellites acquired and used for the solution.

The data for this task order was processed with a goal to maintain an average PDOP value below 3.0. Brief periods of PDOP over 3.0 are acceptable due to the calibration and control process if other metrics are within specification.

Geometric Calibration

After the initial phase was complete, a formal reduction process was performed on the data. Laser point position was calculated by associating the SBET position to each laser point return time, scan angle, intensity, etc. Raw laser point cloud data was created for the whole project area in LAS format. Automated line-to-line calibrations were then performed for system attitude parameters (pitch, roll, heading), mirror flex (scale) and GPS/IMU drift. Statistical reports were generated for comparison and used to make the necessary adjustments to remove any residual systematic error.

Raw data from the SPL100 system was loaded into HxMAP processing software. Lidar calibration was computed on a flight-by-flight basis. Full data extraction is run on the raw TOF data and de-noised, georeferenced point clouds were output in WGS84 z5, ellipsoid heights. All lifts were combined into a block, and HxMAP proprietary line registration tool was ran. Final point clouds were output in NAD83 (PA11) UTM Zone 5 meters, NAVD88 (GEOID12B) meters.

Software: Proprietary Software, TerraMatch v20, Leica CloudPro 1.2.4; HxMAP LiDAR Survey Studio

Quality Control Report

Lidar technicians processed the data in the HxMAP processing platform to extract georeferenced point clouds. Quality Control coverage checks included an assessment of calibration quality, point cloud coverage, potential sensor anomalies to ensure the data met the specification of the project. Any quality issues identified in a line were flagged, investigated and planned for reflight if necessary.

After the data set passed QC, blocks were assembled in the HxMAP processing platform. Point clouds were run through HxMAP proprietary line-to-line registration tool. This step adjusted line-to-line fit to an optimal correction of each point. This provided a best-fit point cloud of the entire data set.

The data was then exported to the desired projection: NAD83 (PA11) UTM Zone 5 meters, NAVD88 (GEOID12B) meters.

Lidar Data Classification

The Single Photon Lidar (SPL) data acquisition occurred between multiple acquisition seasons creating significant data overlap between seasons. To reduce excessive density, the data was processed to eliminate excess overlap in these areas.

LAS data was classified as ground and non-ground points with additional filters created to meet the task order classification specifications. Statistical absolute accuracy was assessed via direct comparisons of ground classified points to ground RTK survey data. Based on the statistical analysis, the lidar data was then adjusted to reduce the vertical bias when compared to the survey ground control of higher accuracy.

Calibrated LAS files were imported into the task order tiles and initially filtered to create a ground and non-ground class.

Then additional classes were filtered as necessary to meet the following client-specified classes. See Table 3-1 for all classes used and the total number of points within each class.

Classified LAS files were evaluated through a series of manual QA/QC steps as well as a peer-based review to eliminate remaining artifacts from the ground class. This included a review of the DEM surface to remove artifacts and ensure topographic quality.

Software: Proprietary Software, TerraScan v20

Class Number	Class Name	Points
Class 1	Processed, but unclassified	75,670,312,647
Class 2	Bare earth	16,311,842,934
Class 3	Vegetation	20,803,867,245
Class 7	Low noise	208,048,310
Class 9	Water	92,162,699
Class 10	Ignored Ground	571,699
Class 17	Bridge deck	642,348
Class 18	High noise	34,820,347

Table 3-1. Classified Point Breakdown

Hydrologic Flattening

The lidar task order required compilation of breaklines defining the following types of water body features:

Lakes, reservoirs, ponds	Minimum of 2-acres or greater
	Compiled as closed polygons, collected at a constant elevation
Rivers, streams	Nominal width of 30.5 meters / 100 feet
	Compiled in direction of flow, with both sides maintaining an equal elevation gradient
Bridge breaklines	Breaklines used to enforce a logical terrain surface below a bridge

Woolpert utilized the following steps to hydrologically flatten the water bodies and for gradient hydrologic flattening of the double line streams within the existing lidar data:

- 1. The newly acquired lidar data was utilized to manually compile the hydrologic features in a 2D environment using the lidar intensity and bare earth surface. Open Source imagery was used as reference when necessary.
- 2. An integrated software approach was applied to combine the lidar data and 2D breaklines. This process "drapes" the 2D breaklines onto the 3D lidar surface model to assign an elevation. A monotonic process is performed to ensure the streams are consistently flowing in a gradient manner. A secondary step within the program verifies an equally matching elevation of both stream edges. The breaklines that characterize the closed water bodies are draped onto the 3D lidar surface and assigned a constant elevation at or just below ground elevation.
- 3. All classified ground points from inside the hydrologic feature polygons were reclassified to water, class nine (9).
- 4. All classified ground points were reclassified from within a buffer along the hydrologic feature breaklines to buffered ground, class ten (10). The buffer distance was approximately the task order designed nominal pulse spacing distance.
- 5. Breaklines used for bridge removal during the hydrologic flattening were included with the hydrologic breakline geodatabase deliverable. The purpose of these breaklines is for a more aesthetically pleasing DEM appearance.
- 6. The lidar ground points and breaklines were used to generate a digital elevation model (DEM).
- 7. QA/QC for this task was performed by reviewing the hydrologically flattened DEM and hydrologic breakline features. Additionally, a combined approach utilizing commercial off the shelf software and proprietary methods were used to review the overall connectivity of the hydrologic breaklines.

TerraScan was used to add the hydrologic breakline vertices and export the lattice models.

Breaklines defining the water bodies greater than 2-acres were provided as polygon features. Rivers and streams with a nominal minimum width of 30.5 meters (100 feet) were provided as polyline features. Bridges were provided as point features. All lake, river, coast, and bridge breaklines compiled as part of

the flattening process were provided in an Esri file geodatabase.

Software: TerraScan v20, TerraModeler v20, Esri ArcMap v10.7, LP360 v2019.1.30.4

Digital Elevation Model

TerraScan was used to add the hydrologic breakline vertices and export the lattice models. Class 2 (ground) lidar points in conjunction with the hydro breaklines and bridge breaklines were used to create 1-meter hydro-flattened bare-earth raster DEM files. Using automated scripting routines within ArcMap, an 32-bit floating point raster GeoTIFF file was created for each tile. Files were clipped to the data extent. GDAL was used to apply the Each surface is reviewed using Global Mapper to check for any surface anomalies or incorrect elevations found within the surface.

Software: TerraScan v20, Esri ArcMap v10.7, GDAL 2.4.0, Global Mapper v20.0

Low Confidence Polygons

The single photon lidar data acquisition for this award occurred across two separate deployments. The approximate date range of the first acquisition window was from January 2018 to March 2018 and second window was from November 2019 to January 2020. Given the complexity of the terrain, the flight plan for the project included significant overlapping and off-angle lines between the 2018 and 2019/2020 collection which can create more opportunity to notice differences than is normally seen in a lidar collection where lines tend to follow a single direction and acquisition across years is cut into more complete blocks.



For each acquisition season, the acquired data was processed and geometrically calibrated by Woolpert's teaming and data acquisition partner Hexagon. During the calibration, the data was processed to meet the required accuracy specifications per each mission as well as between adjacent missions of the differing flight dates within a given acquisition season. Once the calibration was complete and the data entered full processing, Woolpert made the best efforts to populate delivery tiles containing flights from different acquisition seasons with data acquired from a single season. In these tiles preference was given to the points acquired during the 2018 season because of the significant data processing had occurred within these tiles prior to the second acquisition season. In some areas pieces of lines from the different acquisitions created the edge artifacts. Low confidence polygons were generated around these areas to make the user aware of the discrepancy.

Software: Esri ArcMap v10.7, Global Mapper v20.0

Intensity Imagery

Lidar intensity data derived from the acquired lidar data was linearly rescaled from 16-bit intensity and provided as 1-meter pixel, 8-bit, 256 gray scale GeoTIFF format intensity imagery files. Files were clipped to the data extent.

Software: TerraScan v20, Esri ArcMap v10.7

Metadata

FGDC CSDGM/USGS MetaParser-compliant metadata was produced in XML format. The metadata includes a complete description of the task order client information, contractor information, project purpose, lidar acquisition and ground survey collection parameters, lidar acquisition and ground survey collection dates, spatial reference system information, data processing including acquisition quality assurance procedures, GPS and base station processing, geometric calibration, lidar classification, hydrologic flattening, intensity imagery development, and final product development.

Other metadata deliverables included swath separation images in GeoTIFF format. The data extent and delivery tile index were provided as Polygon features in and Esri file geodatabase. A georeferenced, polygonal representation of the detailed extents of each acquired lidar swath was produced as a polygon feature class in an Esri file geodatabase.

4. Accuracy Assessment

Horizontal Accuracy

The data sets was produced to meet ASPRS "Positional Accuracy Standards for Digital Geospatial Data" (2014) for a 0.27 cm RMSEx / RMSEy Horizontal Accuracy Class which equates to Positional Horizontal Accuracy = +/- 0.67 cm at a 95% confidence level.

Raw Lidar Swath Testing

NOAA collected independent checkpoints located in non-vegetated and vegetated land cover classes in order to perform independent vertical accuracy testing on the lidar point cloud swath and DEM data.

This project required the lidar point cloud swath to be produced to meet a Non-Vegetated Vertical Accuracy (NVA) value of 19.6 cm at a 95% confidence level using an RMSEz target value of 10 cm x 1.9600.

Digital Elevation Model Testing

NOAA collected independent checkpoints located in non-vegetated and vegetated land cover classes in order to perform independent vertical accuracy testing on the lidar point cloud swath and DEM data.

This project required DEM data to be produced to meet a Non-Vegetated Vertical Accuracy (NVA) value of 19.6 cm at a 95% confidence level using an RMSEz target value of 10 cm x 1.9600 and a Vegetated Vertical Accuracy (VVA) value of 0.30 cm at the 95th percentile error.

Appendix 1: Flight Logs

	• •				
- when	ιt	has	to	be	right

					Lift	Airport	Chocks Out	Airport	Chocks In	Duration	2.5 Hrs.	Ramp	Actvity				
					1	PHKO	21:27	PHKO	23:59	2:32	2.5		Production		-		
- when it has	to be	right		u	2									SPL1	00 F.	light	Log
			Geosy	stems	3											0	0
NWG Job #		C	ient's Joh #	Lidar	4 S/N	Cata Dalay	Cata Dur	IML	Start	Shinning Tr	rack Number		Operator		1		
S18-010			IEIII S JOD #	1 uar 7	5/IN	Gale Delay	Gale Dui	INIO	Start	Shipping h			TJ Smith	'n	Wx	Start	End
	Project Na	ame		IMU S	S/N	Scan	Angle	IMU	Stop	Airpo	ort ID		Pilot		GND		
WOOL	PERT	HAW	AI'I			1	5		-	PH	KU	Migue	l Bisono / M	att Heuser	Temp	25	27
Missio	n ID (DayS	ensorJobLi	ft)	AM	Г	Range	e Gate	Scan Fr	requency	Base GPS	Reciver ID	So	an Angle	Aircraft	Alt		_
180130_0	0007_	S18-0'	10_01	VAF	VAR. Flight Plan		RG Data Data	Deversione		3	34	Dees	15	N96Y	Temp	2	2
30- Jan- 18	GPS 18-	030	UTC Offset	Fiighti	Flight Plan		Puise Rate	Download		Base r	οιπι 1D Δ1	Dase	GPS ANL HL	UTIM Zone	KPA	29.84	29 79
	NWG		From	То		• • •			Altitude	Speed						20.04	20.10
Flight Plan	Line #	Directo	WPT	WPT	Beginnir	ng GPS Time	Ending G	SPS Time	(feet)	(Kts)	Comments /	Conditions				SVs	PDOP
PRE-FLIGHT G	PS STA	ATIC S	TART TIME		20)5908	210	646			IMU Stati	c Run-up)			24	1.2
					2	2147	21	50			S-turn						
A-B6	204	25	36	1	2	2152	22	.04	14000	180						19	1.3
	205	205	1	36	2	2209	22	21	14000	180						16	1.6
	206	25	36	1	2	2226	22	38	14000	180						17	1.4
	207	205	1	36	2	2242	22	54	14000	180						17	1.4
	208	25	36	19	2	2300	23	06	14000	180	partial line	Э				16	1.4
	209	205	19	36	2	2312	23	18	14000	180	partial line	Э				17	1.2
	210	25	36	19	2	2324	23	31	14000	180	partial line	Э				17	1.2
	211	205	19	36	2	2336	2343		14000	180	partial line	Э				18	1.3
					2	2343	2346			S-turn					18	1.3	
					00	:05:30	00:0	7:30			IMU statio	c Run-do	wn			18	1.5
											BASE ST	ATION -	KOA1				
											KOA1 ST	ART @	19·43 30.JAN	118			
											KOA1 ST		0.41 31.IANI1	18			
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			•		Lif	Airport	Chocks Out	Airport	Chocks In	Duration	4.6 Hrs.	Ramp	Actvity	1			
					1	РНКО	19:07	РНКО	23:44	4:37	4.6		Production			• • • ·	_
when it has	to be	right	Le	u	2									SPL10)0 F	light	Log
			Geosy	stems	3	5								-		•	•
NWG Job #		CI	ient's Job #	Lidar	S/N	Gate Delay	Gate Dur	IMU	Start	Shipping Tr	ack Number		Operator				
S18-010				7		_		185	5205				TJ Smitl	ı	Wx.	Start	End
	Project Na	ame		IMU S	5/N	Scan	Angle	IMU	Stop	Airpo	ort ID	Miaur	Pilot	att Hausar	GND		20
Missio	DID (DavS	HAVVA Sensor.lobl.if	4 1 #)	AM	г	1 Range	5 e Gate	Scan Fr	requency	Pff Base GPS	KU Reciver ID	S	an Angle	Aircraft	I emp	26	28
180131_(0007_	S18-0′	., 10_02	VAF	R.	AF	RG		0440109	3	4		15	N96Y	Temp	0	-1
Date	GPS	Date	UTC Offset	Flight I	Plan	Laser Pwr	Pulse Rate	Download	l "Firewire"	Base F	Point ID	Base	GPS Ant. Ht.	UTM Zone	KPA		
31- Jan- 18	18-	031	From	То	_	5 W			Altitudo	KC	DA1					29.84	29.82
Flight Plan	Line #	Directo	WPT	WPT	Beginni	ng GPS Time	Ending G	SPS Time	(feet)	(Kts)	Comments /	Conditions				SVs	PDOP
					18	35205	185	705			IMU STA	ГIС				25	1.0
					19	92300	192	600			S-TURN					23	1.2
A-B4	148	124		11	19	93000	193	300	13600	180						24	1.1
	147	304	11		19	93800	194	200	13600	180						24	1.1
	146	124		12	19	94700	195	100	13600	180						24	1.1
	145	304	14		19	95600	200	100	13600	178						24	1.2
	144	124		18	20	00600	201	200	13600	175						24	1.3
	143	304	19		20	01700	202	300	13600	177			24	1.3			
	142	124		21	20	02800	203	500	13600	180	SOME SN	IALL CI	OUD			23	1.3
	141	304	23		20	04000	204	700	13600	177	CLOUD		23	1.3			
A-B5	151	334	38		20	05400	210	600	13600	178						23	1.2
	150	154		15	2′	11100	211	600	13600	178						22	1.1
	149	335	12		2′	12000	212	400	13600	178						23	1.0
	152	154		39	2′	13000	214	200	13600	180						21	1.1
	153	334	39		2′	14700	220	000	13600	180						19	1.2
	154	154		39	22	20600	221	800	13600	180						17	1.4
	155	334	39		22	22300	223	600	13600	178						19	1.3
	156	154		39	22	24100	225	400	13600	180						19	1.3
	157	334	39		22	25900	231	200	13600	180						18	1.4
	508	274	18		23	32100	232	700	16000	172	CROSS L	INE				17	1.3
					23	32800	233	200			S-TURN					17	1.4
					23	35030	235	230			IMU STA	ГIС				19	1.3
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- when	it	has	to	be	right

		be right			Liff 1	Airport PHKO	Chocks Out	Airport PHKO	Chocks In	Duration 4:37	4.6 Hrs.	Ramp Ac	otvity			_	
- when it has t	to be I	right	Le	la	2	·!								SPL1()0 F	light	Log
			Geosy	stems	3	<u>.</u> !	├ ───┤	 			──┤					C	<u> </u>
NWG Job #		Cli	ient's Job #	Lidar	4 S/N	Gate Delay	Gate Dur	IMU	Start	Shipping T	rack Number	/ 	Operator	L			
S18-010	ļ	1		7	ļ		_	185	5151	1. 5			TJ Smith	1	Wx.	Start	End
P	roject Na	ame		IMU १	S/N	Scan	Angle	IMU	Stop	Airpo	ort ID		Pilot		GND		
Mission			\ []	AM	<u>т </u>	T Rang	. 5 le Gate	Scan Fr	requency	Base GPS	IKU Reciver ID	Miguei в Scan	Angle	Aircraft	I emp	21	28
180201_0	J007_	S18-01	10_03	VAI	R.	A	RG		oquone,	3	34	1	5	N96Y	Temp	1 '	2
Date	GPS	Date	UTC Offset	Flight	Plan	Laser Pwr	Pulse Rate	Download	d "Firewire"	Base F	Point ID	Base GPS	S Ant. Ht.	UTM Zone	КРА	'	
01- Feb- 18	18-	032	From		'	5 W	L	<u> </u>	Altitudo	KC)A1	2.0	m			29.87	29.85
Flight Plan	Line #	Directo	WPT	WPT	Beginnir	ng GPS Time	Ending C	GPS Time	(feet)	(Kts)	Comments /	Conditions				SVs	PDOP
					18	35151	185	651			IMU STAT	TIC				26	1.0
	, <u> </u>				19)2000	192	200			S-TURN					25	1.2
A-B6	169	024	10	['	19)2900	193	3200	14000	180						26	1.1
	170	204		10	19	3800	194	100	14000	175						26	1.1
	171	024	11		19	4700	195	5000	14000	176	FEW THI	N CLOUD				27	1.1
	172	204		11	19)5500	195	;900	14000	175	FEW THI	N CLOUD				26	1.2
	173	024	12		20)0500	200	900	14000	180	FEW CLC	JUD				26	1.2
	174	204	,]	12	20)1400	201	800	14000	172	FEW CLC	JUD				24	1.4
Cross Line	506	090	,I	38	20)2500	203	800	13800	180	CLOUD]	25	1.2
	237	205	,	14	20)4500	205	5000	16700	175	TEMP -1					25	1.1
	236	025	22		20)5800	210	400	16500	182	FEW CLOUD					21	1.1
	235	205	, <u> </u>	23	21	1000	211	700	16300	180	FEW CLC	JUD]	23	1.0
	234	025	24		21	2300	213	3000	16100	180	FEW CLC	JUD				20	1.0
	233	205		25	21	3600	214	500	15900	175	FEW MO	RE CLOUD)			19	1.0
	232	025	26		21	5000	215	900	15400	180	FEW TOC	O MANY CI	LOUD			18	1.1
	203	205	,	36	22	20300	221	500	14000	175	CLOUD					15	1.5
A-B5	158	154	1	39	22	22300	223	3600	13600	175	1					17	1.3
	159	334	38		22	24100	225	5400	13600	180	FEW THI	N CLOUD			i	17	1.3
	160	154	1	38	22	25900	231	100	13700	175	FEW THI	N CLOUD			i	16	1.3
	161	334	37	(23	31600	232	2900	13700	180	MORE TH	HIN CLOUE)			17	1.2
	, 		1	· · · · · · · · · · · · · · · · · · ·	23	32900	233	3000			S-TURN				i	18	1.3
	, †		1	[23	35050	235	5250			IMU STA	TIC			i	18	1.3
	, — †		1			1										1	
	, — †		1			1										1	
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			P		Lift 1	Airport PHKO	Chocks Out 18:49	Airport PHKO	Chocks In 21:17	Duration 2:28	2.5 Hrs. 2.5	Ramp	Actvity Production				
- when it has	to be I	right	Geosy	stems	2 3 4									SPL10)0 F	light	Log
NWG Job #		Cli	ient's Job #	Lidar : 7	S/N	Gate Delay	Gate Dur	IMU 193	Start	Shipping Tr	ack Number		Operator			Stort	End
518-010 F	Project Na	ame		IMU S	S/N	Scan	Angle	IMU	Stop	Airpo	ort ID		Pilot		GND	Start	End
WOOL	.PERT	HAWA	AI'I			1	5	212	410	PH	ко	Migue	el Bisono / M	att Heuser	Temp	25	27
Missior 190202 0	ו ID (DayS	ensorJobLif	t)	AM [®]	T 5	Range	e Gate	Scan Fr	equency	Base GPS	Reciver ID	S	can Angle	Aircraft	Alt	4	2
180202_0 Date	GPS	Date	UTC Offset	Flight	`. Plan	Laser Pwr	Pulse Rate	Download	"Firewire"	Base F	Point ID	Base	GPS Ant. Ht.	UTM Zone	remp	-	2
02- Feb- 18	18-	033		-		5 W				KO	DA1	2	2.0 m		KPA	29.93	29.95
Flight Plan	NWG Line #	Directo	From WPT	To WPT	Beginnir	ng GPS Time	Ending (GPS Time	Altitude (feet)	Speed (Kts)	Comments /	Conditions	5			SVs	PDOP
					18	3237	183	737		. /	IMU STAT	ГІС				25	1.0
					19	0600	190	900			S-TURN					19	1.3
A-B6	202	025	35		19	1800	193	000	14100	180	CLOUD					23	1.2
	193	205		17	19	3500	194	000	14100	175	INSIDE T	HIN CLO	DUD			26	1.1
	192	025	17		19	4600	195	5100	14100	180	FEW THI	N CLOL	ID			24	1.2
	191	205		17	19	5600	200	200	14100	175	FEW SMA	ALL CLO	DUD			25	1.2
	190	025	17		20	0700	201	200	14100	182	A FEW M	ORE SI	MALL CLOUE)		24	1.2
A-B1	1	097		17	20	1800	202	300	13400	180	A COUPLE SMALL CLOUD					24	1.2
	2	277	19		20	3000	203	700	13400	180	A COUPL	E SMAI	L CLOUD			25	1.1
	3	097		22	20	4200	204	900	13400	180	A FEW M	ORE SI	MALL CLOUE)		24	1.1
	4	277	23		20	5300	210	100	13400	180	MORE SN	/ALL C	LOUD			21	1.1
					21	0200	210	500			S-TURN					22	1.0
					21	2210	212	410			IMU STAT	ΓIC				21	1.0
											BASE ST	ATION	KOA1	- / -			
											KOA1 ST		17:43 02FE	B18			
											KUA1 SI		1:39 02FEB	18			

			P		Lift 1	Airport PHKO	Chocks Out 20:59	Airport PHKO	Chocks In 22:58	Duration 1:59	2.0 Hrs. 2.0	Ramp	Actvity Production				
- when it has	to be	right	Geosy	stems	2 3									SPL10)0 F	lighti	Log
NWG Job # S18-010		CI	ient's Job #	Lidar : 7	S/N	Gate Delay	Gate Dur	IMU 204	Start 720	Shipping Tr	ack Number		Operator TJ Smith		Wx	Start	End
WOOI	Project Na	ame HAW/	AI'I	IMU S	S/N	Scan 1	Angle 5	IMU	Stop	Airpo PH	ort ID KO	Mique	Pilot Pilot	att Heuser	GND Temp	26 C	28 C
Missio	n ID (DayS		ft)	AM'	T D	Range	e Gate	Scan Fr	equency	Base GPS	Reciver ID	S	can Angle	Aircraft	Alt	11 C	11 C
Date	GPS	Date	UTC Offset	Flight	Plan	Laser Pwr	Pulse Rate	Download	"Firewire"	Base F	Point ID	Base	GPS Ant. Ht.	UTM Zone	КРА	-110	-110
03- Feb- 18	18- NWG	-034	From	То		5 W			Altitude	KC Speed	DA1	2	2.0 m			29.98	29.94
Flight Plan	Line #	Directo	WPT	WPT	Beginnir	ng GPS Time	Ending G	GPS Time	(feet)	(Kts)	Comments /	Conditions	;			SVs	PDOP
					20	04720	205	6220 400			IMU STA	ПС				22	1.1
	550	010		4.4	21	4100	214	400	00000	475	S-TURN					20	1.2
DS	558	212	21	14	21	5000	210	400 600	22900	175	SOME CL					20 10	1.2
	556	212	21	22	21	21100	220	900	22900	178	SOME CL					10	1.4
	555	032	23	~~~	22	2400	223	100	22900	170	SOME CL					19	1.3
	000	002	20		22	23400	223	600	22000	100	S-TURN					19	1.2
					23	30320	230	520			IMU STA	ГІС				18	1.2
											BASE ST	ATION KOA1					
											KOA1 ST	ART @	20:17 03FEI	318			
											KOA1 ST	OP @ 2	2:13 03FEB	18			

					l iff	Airport	Chocks Out	Airport	Chocks In	Duration	1 4 Hrs	Ramp Ac	stvity	l			
					1	PHKO	20:37	РНКО	22:03	1:26	1.4	Pro	oduction				
- when it has t	to be	right	Je		2									SPL10)0 F	light	Log
			Geosy	stems	3											U	U
Job #		C	ient's Job #	Lidar	4 S/N	Gate Delav	Gate Dur	IMU	Start	Shipping Tr	ack Number		Operator				
S18-010				7	0,11	Guie Delay	Guie Dui	201	855	ompping n			TJ Smith		Wx.	Start	End
P	Project Na	ame		IMU S	S/N	Scan	Angle	IMU	Stop	Airpo	ort ID		Pilot		GND		
WOOL	.PERT	HAW	All			1	5			PH	KO		Dynamic Pi	lot	Temp	24 C	27 C
Mission 180206	007 S	SensorJobLi C18010	n) 06	АМ VД F	· .	Range	e Gate	Scan Fr	equency	Base GPS	Reciver ID	Scan A	Angle	Aircraft NGGY	Alt Temp	-3 C	-3 C
Date	GPS	Date	UTC Offset	Flight F	Plan	Laser Pwr	Pulse Rate	Download	l "Firewire"	Base F	Point ID	Base GPS	S Ant. Ht.	UTM Zone		-00	-00
06- Feb- 18	18-	037	HST -10							KO	DA1	2.0	m		KPA	29.79	29.81
Flight Plan	Line#	Directo	From WPT	To WPT	Beginnir	ng GPS Time	Ending (SPS Time	Altitude (feet)	Speed (Kts)	Comments /	Conditions				SVs	PDOP
	Line #	Dirooto			20:	:18:55	20:2	23:55		(110)	IMU STA	TIC				22	1.3
					20	:57:00	21:0	00:00			S-TURN					23	1.0
A-B6	189	025	17		21	:03:00	21:0	8:00	14000	182	FEW CLC	DUD				23	1.0
	188	205		16	21	:13:00	21:1	9:00	14000	180	FEW CLC	DUD				23	1.0
	187	025	16		21:24:00		21:2	9:00	14000	180	FEW CLC	DUD				21	1.2
	186	205		16	21	:34:00	21:3	9:00	14000	178	FEW CLC	DUD				20	1.3
					21.34.00						S-TURN					20	1.3
					22:10:10		22:1	2:10			IMU STA	TIC				19	1.4
											ATC UNA	BLE/UNWI	ILLING TO	WORK WIT	HUS		
											NO OTHE	R AREAS	CLEAR / E	END FLIGHT	•		
											BASE ST	ATION - KO	OA1				
											KOA1 ST	ART @ 19:	:25 / 06F	eb18			
											KOA1 ST	OP @ 22:2	20 / 06Fe	b18			
												<u> </u>					
					1												
					1												

					Lift	Airport	Chocks Out	Airport	Chocks In	Duration	3.4 Hrs.	Ramp Ac	ctvity				
			- Po	ica	1	РНКО	19:06	РНКО	22:29	3:23	3.4	Pr	oduction			1° - 1- 4	
- when it has	to be I	right		u	2									SPL10	10 F	light	Log
			Geosy	stems	3												
Job #		CI	ient's Job #	Lidar	⊐ S/N	Gate Delay	Gate Dur	IMU	Start	Shipping Tr	ack Number		Operator				
S18-010				7									Troy Sentn	er	Wx.	Start	End
	Project Na	ame	A 11	IMU S	S/N	Scan	Angle	IMU	Stop	Airpo	ort ID		Pilot	1.4	GND	10.0	0.5
WOOL				ΔM.	Г	1 Rande	5 Gate	Scan Fr	equency	PH Base GPS	Reciver ID	Scan		IOI Aircraft	Temp	19 C	25
180209	007 S	518010	07	VAI	א.	rang	Calc	Ocarri	equency	Dase of 0		15 deg	Wedge	N96Y	Temp	-2 C	-3 C
Date	GPS	Date	UTC Offset	Flight	Plan	Laser Pwr	Pulse Rate	Download	"Firewire"	Base F	Point ID	Base GPS	S Ant. Ht.	UTM Zone			-
09- Feb- 18	18-	040	HST -10							КС	DA1	2.0)m		КРА	29.95	29.90
Flight Plan	Line #	Directo	From WPT	To WPT	Beainnir	na GPS Time	Ending G	SPS Time	Altitude (feet)	Speed (Kts)	Comments /	Conditions				SVs	PDOP
					18:	:53:00	18:5	9:00	()	(****)	IMU STA	TIC				24	1.1
					19:	20:00	19:2	5:00			S-TURN					24	1.2
A-B5	162	154	36		19	:27:00	19:3	7:00	13900	200	Gating Er	rors first 4	nmi. Pitch	5 mount out	of limit	24	1.2
	163	334	-	35	19:	42:00	19:5	4:00	14100	160	Gating Er	rors first 3	nmi.			22	1.4
	164	154	34		19	59:00	20:0	9:00	14300	200	Gating Er	rors first 3	nmi.			23	11
	165	334		33	20	:14:00	20.2	6:00	14500	160	Gating Fr	rors first 1	nmi.			23	12
	166	154	32	00	20	30.00	20:4	0.00	14700	200	Gating Er	rors first 3	nmi			23	11
	167	334	02	31	20	44.00	20:1	5:00	14000	160	Gating Er	rors first 1	nmi			20	1.1
	168	154	30	51	20	00.00	20.0	0.00 0.00	15400	200	Cating Er	rore first 3	nmi			20	1.0
	220	134	50	42	21	:00:00 2 :17:00 2		3.00 4.00	17000	160	Cating Er	rore first 7	nmi Manu	al APC Pace	Norv	10	1.0
D-D4	220	150	10	42	21	40:00	21.5	4.00 2:00	17000	200	Gating Er	rore first 7	nmi		Jvery	19	1.1
	329	109	42	40	21.	.40.00	21.0	2.00	17000	200	Coting Er	roro firot 7	nmi Monu		Norv	10	1.4
	330			43	21	.30.00	22.1	2.00	17000	160					overy	17	1.3
					22.	.12.00	22.1	0.00	17000							17	1.3
					22	35:00	22:4	0:00			IMU STA	IIC				16	1.3
													NI (1		-		
											50 Kts Wir	nd from the	North cau	Ising Pitch to	5		
											Causing F	PAV limit to	hit on Sol	Ithbound Lin	es		
											BASE ST	ATION - KO	OA1				
											KOA1 ST	ART @ Ap	prox 18:30	/ 09Feb18	3		
											KOA1 ST	OP @ App	rox 22:50	/ 09Feb18			

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-	when	IL	IIdS	ιO	De	ngnu

					1.10	A. (A.'			0.411	-	A 1 11				
					Lift	Airport	Chocks Out	Airport	Chocks In	Duration	2.4 Hrs.	Ramp	Actvity				
La contra de			Te		1	PHKO	18:35	PHKO	19:18	0:43	0.7		Production	11		liaht	
- when it has t	to be	right			2	PHKU	0:12	PHKU	1:53	1:41	1.7		Production	SPLIC		iigiili	LOG
			Geosy	stems	3												
Job #		Cl	ient's Job #	Lidar	S/N	Gate Delay	Gate Dur	IMU	Start	Shipping Tr	rack Number		Operator				
S18-010				7		-		2018021	2182059	MM S	PL001		Troy Sentr	ner	Wx.	Start	End
Р	roject Na	ame		IMU S	S/N	Scan	Angle	IMU	Stop	Airpo	ort ID		Pilot		GND		
WOOL	PERT	HAW	All			1	5			PH	KO		Dynamic Pi	ilot	Temp	27	
Mission	ID (DayS	ensorJobLif	ft)	AM ⁻	Г	Range	e Gate	Scan Fr	equency	Base GPS	Reciver ID	Sc 4 E al	can Angle	Aircraft	Alt		•
180212_		51801		VAI Elight [K.	Looor Dur	Dulas Data	Download	"Eirowiro"	NBV07	080011	15 Q			Temp	6	6
12. Feb. 18	18-	043	HST -10	riigiiti		Lasel Fwi	Fuise Rale	Download	FILEWIE	Dase r	οιπι 1D Δ1	Dase	2 0m		KPA	29 89	
	10	040	From	То					Altitude	Speed			2.0111			23.03	
Flight Plan	Line #	Directo	WPT	WPT	Beginnir	ng GPS Time	Ending G	GPS Time	(feet)	(Kts)	Comments /	Conditions	;			SVs	PDOP
					18:	21:00	18:2	7:00			IMU STAT	ГIС				21	1.4
					18:	46:00	18:5	0:00			S-TURN					25	1.1
AOI A BIk 6	175	025		13	18:	52:00	18:5	5:00	14000	180	Stuck at "	Opening	Detector Sh	utter"		24	1.2
	176	205	13		18:59:00		19:0	3:00	14:00	180	Next Line	Same t	hing ABORT				
					18:59:00						Nick note	d Conne	ection to LIDA	RLost			
													Lui attompted	to Poconno	ct on de		
											Closed Sr		bui allempleu				
											No Conne	ection					
					0:0	03:00	0:06	6:00			STATIC					20	1.2
					0:2	25:00	0:28	3:00			S-TURN					19	1.3
AOI A BIk 6	203	025		36	0:3	31:00	0:42	2:00			Gate Erro	rs 5nmi	online Man A	ARG Set (Clo	ud)	20	1.2
	205	205	36		0:4	46:00	0:58	3:00			Gate Erro	rs 13nm	ni online Man	ARG Set (C	loud)	20	1.4
	206	025		36	1:(02:00	1:1:	5:00			Gate Erro	rs 5nmi	online Man A	ARG Set (Clo	oud)	21	1.5
	207	205	36		1:	18:00	1:3	1:00			ARG Four	nd Grou	nd OK after (Cloud		21	1.3
	204	025		15	1::	35:00	1:39	9:00			For Calibr	ation if t	this helps 6n	mi Man ARG	ì	20	1.3
					1:4	40:00	1:4	5:00			STURN					21	1.3
					1:	57:00	2:05	5:00			STATIC						
											Let Syster	m Contro	ol Laser And	Shutter at sta	art		
											BASE ST	ATION -	KOA1				
											KOA1 ST	ART @	Approx 17:40	FEB 12			
											KOA1 ST	<mark>OP @ A</mark>	pprox 02:20	FEB 13			

		ρ.			Lift	Airport	Chocks Out	Airport	Chocks In	Duration	3.1 Hrs.	Ramp	Actvity				
					1	РНКО	22:22	PHKO	1:26	3:04	3.1		Production				,
- when it has t	to be I	right		u	2									SPL10)0 Fi	light	Log
			Geosy	stems	3												
Job #		Cl	ient's Job #	Lidar S	⊐ S/N	Gate Delay	Gate Dur	IMU	Start	Shipping Tr	ack Number		Operator				
S18-010				7				2018021	6220714	MM No	Number		Troy Sentn	er	Wx.	Start	End
P	roject Na	ame	A 11	IMU S	6/N	Scan	Angle	IMU	Stop	Airpo	ort ID		Pilot Dynamia Dil	ata	GND	07	07
Mission	ID (DavS		All #)	AM	r	3 Range	U Gate	Scan Fr	equency	Base GPS	Reciver ID	Sc	an Angle	OIS Aircraft	Temp	21	27
180216	_007_\$	S1801	, 0_9	VAF	R.					NBV07	080011	15 D	eg Wedge	N96Y	Temp	-20	-20
Date	GPS	Date	UTC Offset	Flight F	Plan	Laser Pwr	Pulse Rate	Download	"Firewire"	Base F	Point ID	Base	GPS Ant. Ht.	UTM Zone	КРА		
16- Feb- 18	18-	047	HST -10	т.					A Mitter of a	KC	DA1		2.0m			29.90	29.85
Flight Plan	Line #	Directo	WPT	WPT	Beginnir	ng GPS Time	Ending 0	GPS Time	(feet)	Speed (Kts)	Comments /	Conditions				SVs	PDOP
					22:	:07:00	22:1	2:00			IMU STA	TIC				18	1.3
					22:	:45:00	22:4	9:00			S-TURN					18	1.3
AOI Ds Blk 2	546	032	24		22:	:52:00	22:3	80:00	22900	190	pitch limit	no fire, A	Alot of Cloud,	, goto AOI Es	S	24	1.2
									Tried Las	er Overr	ide						
					Tried Laser Override Says Enabeling Laser OverR Reset OBD But TOF cards w Full SPL Power Cycle							aser OverRid	е				
									Says Enabeling Laser Overk Reset OBD But TOF cards w Full SPL Power Cycle						t		
											Reset OBD But TOF cards wo Full SPL Power Cycle Laser Started then Stopped ?						
AOI Es Blk 1	559	264	9		Full SPL Power Cycle 24900 Laser Started then Stopped (n Stopped ?			19	1.3			
	560	084		9					24900		No Laser	Fire, Sh	utter Working	J		17	1.5
	559	264	9	9 24900 23:39:00 23:43:00 24900					Attemped	Laser C	verRide and	Laser Fire, I	No Go	18	1.3		
	560	84		9	23:	48:00	23:5	50:00	24900		Full SPL	Restart A	AGAIN			21	1.3
	559	264	9		23:	:56:00	0:00	0:00	24900	170	Good Ru	n				22	1.2
	560	84		9	0:0	04:00	0:07	7:00	24900	205	Good Rui	n Cloud	on Ends			21	1.2
	561	264	10		0:	12:00	0:16	6:00	24900	170	Good Rui	n Cloud	on Ends			22	1.2
	562	84		10	0::	20:00	0:23	3:00	24900	205	Good Ru	n Cloud	on Ends			23	1.2
	563	264	9		0::	28:00	0:3	1:00	24900	170	Good Rui	n Cloud	on Ends			23	1.2
	564	84		9	0::	36:00	0:38	8:00	24900	205	Good Rui	n Cloud	on Ends			22	1.2
	565	264	9		0:4	43:00	0:46	6:00	24900	170	Good Rui	n Cloud	on Ends			21	1.3
	566	84		9	0:	51:00	0:53	3:00	24900	205	Good Rui	n Cloud	on Ends, Ro	ll at Start MC	A	22	1.2
					0:	53:00	0:56	6:00	24900	200	S-TURN					22	1.2
					1:	31:00	1:36	6:00			IMU STA	TIC				21	1.1
											IMU STATIC						
											BASE STATION - KOA1						
											KOA1 START @ Approx 21:30 FEB 16						
											KOAT START @ Approx 21:30 FEB 16 KOA1 STOP @ Approx 01:45 FEB 17						

_	when	it	has	to	he	right
_	WHEH	IL	LIDD	ιO	De	ngnu

						Airport	Chocks Out	Airport	Chocks In	Duration	<u>1.9</u> Hrs.	Ramp Actvity				
			- Poi	ica	1	РНКО	18:54	РНКО	20:48	1:54	1.9	Production		י <u>ה</u> ה ר	'!'~bt	1 - 0
- when it has	to be	right		in	2								-SPL		lignti	Log
			Geosy	stems	4											
Job #		CI	ient's Job #	Lidar	S/N	Gate Delay	Gate Dur	IMU	Start	Shipping Tr	rack Number	Opera	itor			
S18-010	Project N	ame		7 IMU	S/N	Scan	Angle	201802	Stop	MM No	Number	Troy Se	ntner	Wx.	Start	End
WOO	LPERT	HAW	AII		0/11	3	30	INIO	otop	PH	IKO	Dynamic	Pilots	Temp	20	
Missio	n ID (DayS	ensorJobLif	ít)	AM	Т	Rang	e Gate	Scan Fr	requency	Base GPS	Reciver ID	Scan Angle	Aircraft	Alt		
180219	_007_S	Date	_ 10	VAI Elight	R. Plan	Laser Pwr	Pulse Rate	Download	"Firewire"	NBV07	2080011	15 Deg Wedge	N96Y	Temp	-14	
19- Feb- 18	18-	050	HST -10	riighti		Laser I Wi	1 uise i vale	Download	i i newne	KC	DA1	2.0m		KPA	29.91	
Flight Plan	Line #	Dirocto	From	То	Roginni		Ending		Altitude	Speed	Commonto	Conditions			SV/a	PDOP
	Line #	Directo	VVPI	VVPI	18	:42:00	18:4	8:00	(leet)	(KIS)	IMU STAT				25	1.2
					19	:15:00	19:1	9:00			S-TURN				24	1.2
AOI C Blk 2	515	212		8	19	:22:00	19:2	7:00	18900	180	Good Run	l			24	1.2
	463	288	10		19	:34:00	19:3	7:00	19500	180	PAV Out o	of Drift Warning at	start of line		24	1.1
	462	108		11	19	:42:00	19:4	5:00	19500	180	PAV Out o	of Drift Warning or	n line		22	1.1
	461	288	12		19	:50:00	19:5	4:00	19500	180	Good Run	l			22	1.1
	460	108		12	19	:59:00	20:0	2:00	19500	180	PAV Out o	of Drift Warning at	start of line		23	1.0
	459	288	12		20	9:59:00 2 0:07:00 2		1:00	19500	185	PAV Out o	of Drift Warning at	start of line		23	1.0
	458	108		12	20	:17:00	20:2	20:00	19500	180	Laser No	Fire ??? Touch no	othing and try	next line	21	1.0
	457	288	11		20	:25:00	20:2	9:00	19500	180	No Laser	Again. ABORT An	d Send Files		20	1.0
					20	.29:00	20:3	5:00	19500		S-TURN				22	1.2
					20:	:52:00	20:5	57:00			IMU STAT	TIC			21	1.1
					<u> </u>						USB shoo	k loose of OC on	taxi, ? extenc	ed loggir	g	
				 							BASE ST	ATION - KOA1				
				ļ	<u> </u>						KOA1 ST	ARI @ Approx 1/	:30 FEB 19			
				 							KOA1 STO	JP @ Approx 01:	30 FEB 20			
															 	
															 	
															 	
	1				1											
					1											
				,	T											

				Pica		Airport	Chocks Out	Airport	Chocks In	Duration	3.1 Hrs.	Ramp	Actvity				
			Te	ica	1	РНКО	18:41	PHKO	21:47	3:06	3.1		Production				
- when it has	to de	rignt			2									SPL1	00 F	lighti	Log
			Geosy	stems	3											-	
Job #		Cli	ient's Job #	Lidar	⊐ S/N	Gate Delay	Gate Dur	IMU	Start	Shipping Tr	rack Number		Operator				
S18-010				7				2018	0220	MM No	Number		Troy Sentn	er	Wx.	Start	End
			A 11	IMU S	S/N	Scan	Angle	IMU	Stop	Airpo	ort ID		Pilot		GND		00
WOOL			\ 	AM	т	Rang	e Gate	Scan Fr	equency	Base GPS	KU Reciver ID	Sc	Dynamic Pil	Aircraft	Temp	24	26
180220_	_007_S	518010	,″ /_11	VAI	R.	rung	outo	Countri	oquonoy	NBV07	080011	15 D	eg Wedge	N96Y	Temp	-8	-7
Date	GPS	Date	UTC Offset	Flight f	Plan	Laser Pwr	Pulse Rate	Download	"Firewire"	Base F	Point ID	Base	GPS Ant. Ht.	UTM Zone	KDA		
20- Feb- 18	18-	051	HST -10						A 1/1/2 - 1	KC	DA1		2.0m			29.96	29.96
Flight Plan	Line #	Directo	From WPT	I o WPT	Beginnir	ng GPS Time	Ending (GPS Time	Altitude (feet)	Speed (Kts)	Comments /	Conditions				SVs	PDOP
					18	:27:00	18:3	33:00			IMU STA	TIC				24	1.3
					19:	:03:00	19:0	06:00			S-TURN					24	1.2
AOI C Blk 2	458	108		12	19:	:09:00	19:1	3:00	19500	195	VOG in L	ower Are	as			24	1.2
	457	288	11		19:	:18:00	19:2	22:00	19500	170	couple sn	nall cloud	ls			24	1.2
AOI B Blk 4	355	159		10	19:	:27:00	19:3	31:00	19300	180	Mount Dr	ift Out of	Limit Warnin	ıg		23	1.1
	354	339	11		19:	:35:00	19:3	39:00	19300	175	Mount Dr	ift Out of	Limit Warnin	ıg		21	1.1
	353	159		13	19:	14:00 19:4 14:00 19:4		7:00	19200	180	Mount Dr	ift Out of	Limit Warnin	ıg		22	1.1
	352	339	14		19:	:52:00	19:5	56:00	19200	180	Mount Dr	ift Out of	Limit Warnin	ıg		22	1.0
	351	159		15	20:	:01:00	20:0	06:00	19100	180	Mount Dr	ift Out of	Limit Warnin	ıg		21	1.0
	350	339	17		20:	:10:00	20:1	5:00	19100	175	Mount Dr	ift Out of	Limit Warnin	ıg		20	1.0
	349	159		18	20:	:19:00	20:2	25:00	19000	180	Mount Dr	ift Out of	Limit Warnin	ng		20	1.0
	348	339	20		20:	:30:00	20:3	36:00	18900	180	Mount Dr	ift Out of	Limit Warnin	ıg		18	1.2
	347	159		20	20:	:41:00	20:4	18:00	18800	180	Mount Dr	ift Out of	Limit Warnin	ng		17	1.4
	346	339	21		20:	:52:00	20:5	59:00	18700	180	cloud on	longer lir	les, move to	blk 6		15	1.5
AOI B Blk 6	399	048		17	21:	:03:00	21:0	00:80	17900	180	cloud nor	th end				19	1.3
	398	228	17		21:	:13:00	21:1	8:00	17400	170	cloud nor	th half C	U filling in all	areas Abort		19	1.3
					21:	:20:00	21:2	26:00			S-TURN					19	1.3
					21:	:52:00	21:5	57:00			IMU STA	TIC				18	1.2
											BASE ST	ATION -	KOA1				
											KOA1 ST	ART @ /	Approx 17:30	Feb 20			
											KOA1 ST	<mark>OP @ A</mark>	pprox 22:30	FEB 20			
	1			1													1

				_	Lift	Airport	Chocks Out	Airport	Chocks In	Duration	2.5 Hrs.	Ramp	Actvity				
- when it has	to bo	right	Je	ica	1	РНКО	18:56	РНКО	21:26	2:30	2.5		Production			1:	
	lo de	ngin			2									SPLIC	JUF	lighti	LOG
			Geosy	stems	3												
Job #		CI	ient's Job #	Lidar {	5/N	Gate Delay	Gate Dur	IMU	Start	Shipping Ti	rack Number		Operator			I	
S18-010				7				2018030	2184020	Drive \$	SPL002		Troy Sentn	er	Wx.	Start	End
WOOI	Project Na	ame	A 11	IMU S	6/N	Scan 2	Angle n	IMU	Stop	Airpo DU	ort ID		Pilot Dynamic Pi l	ote	GND Temp	22	27
Missior	ID (DayS	ensorJobLif	- 11 it)	AM	r	Range	e Gate	Scan Fre	equency	Base GPS	Reciver ID	Sc	can Angle	Aircraft			21
180302_	007_S	18010	_13	VAF	R.	Ū				NBV07	080011	15 D	eg Wedge	N96Y	Temp	-15	-15
Date	GPS	Date	UTC Offset	Flight F	Plan	Laser Pwr	Pulse Rate	Download	"Firewire"	Base I	Point ID	Base	GPS Ant. Ht.	UTM Zone	KPA		
02- Mar- 18	18-	061	HST -10	Ta						KC	DA1		2.0m			30.02	30.04
Flight Plan	Line #	Directo	WPT	WPT	Beginnir	ng GPS Time	Ending (GPS Time	(feet)	(Kts)	Comments /	Conditions	i			SVs	PDOP
					18:	:42:00	18:4	8:00			IMU STA	TIC				22	1.3
					19:	:15:00	19:1	9:00	17000		S-TURN					23	1.0
AOI B Blk 4	1121	340	43		19:	:21:00	19:3	35:00	17000	180	Manual A	RG at 2.	.5 Nmi in, Bui	Iding CU in \	/OG N	23	1.0
	1122	160		43	19:	:39:00	19:5	64:00	17000	180	Mount Re	started	On Line Error	, Layer Pus	hing in	19	1.2
					19:	:54:00	19:5	59:00	18500	180	S-TURN					18	1.4
					19:	04:00 1: 10:00 20		9:00	17500	190	S-TURN					17	1.6
AOI D BIk 2	1221			11	20:	:04:00 1 :10:00 2 :19:00 2		5:00	22900	195	Cloud Ea	st 2 nmi				17	1.6
	1220		14		20:	:19:00	20:2	24:00	22900	170	Man ARG	6 at 3 Nn	ni in, Cloud E	3 nmi		19	1.3
	1219			15	20:	:29:00	20:3	34:00	22900	195	Man ARG	at 3 Nm	ni in, Cloud E	2 nmi		19	1.3
	1218		16		20:	:38:00	20:4	4:00	22900	170	Cloud E 4	nmi, Mo	ount Restarte	d On Line Ei	ror	19	1.3
	1217			17	20:	:49:00	20:5	53:00	22900	200	Man ARG	6 at 3 Nn	ni in, Cloud E	2 nmi		19	1.3
	1216		18		20:	:58:00	21:0	94:00	22900	-	Laser No F	ire, SPL	GUI Lost Conr	nnection to Lic	lar *	17	1.4
					21:	:04:00	21:0	9:00	22000		S-TURN a	and ABC	DRT**			17	1.3
					21:	:30:00	21:3	35:00			IMU STA	TIC					
											*Attepted t	o Recon	nect, Start Col	lecting, Fire La	aser		
											ERROR	Packet [Drop				
											**Coditions	s Wind ar	nd Cloud gettir	ng worse, wan	t		
											to Notify S	Sigma B	efore Weeke	nd			
											BASE ST	ATION -	KOA1				
											KOA1 ST	ART @	Approx 17:45	5 Mar 2			
											KOA1 ST	OP @ /	Approx 22:00) Mar 2			
	1																

				• ·	Lift	Airport	Chocks Out	Airport	Chocks In	Duration	2.1 Hrs.	Ramp	Actvity				
when it had	to bo	right	<i>Te</i>	ica	1	PHKO	18:23	РНКО	20:31	2:08	2.1		Production			1	
- WHEN IT HAS	to de	right			2									SPL1	<i>JU F</i>	lighti	Log
			Geosy	stems	3												
Job #		С	lient's Job #	Lidar	S/N	Gate Delay	Gate Dur	IMU	Start	Shipping Tr	rack Number		Operator			· · · ·	
S18-010				7				2018030	4180851	Drive S	SPL003		Troy Sentr	ner	Wx.	Start	End
14/00	Project N	ame	A 11	IMU S	S/N	Scan	Angle	IMU	Stop	Airpo	ort ID		Pilot	1	GND	05	
Missi				AM	т	Rang	e Gate	Scan Fr	equency	Base GPS	Reciver ID	Sc	Dynamic Pl	Aircraft	Temp	25	28
180304	_007_S	618010)_14	VAI	R.	Rung	outo	Courre	equency	NBV07	7080011	15 D	eg Wedge	N96Y	Temp	4	2
Date	GPS	Date	UTC Offset	Flight f	Plan	Laser Pwr	Pulse Rate	Download	"Firewire"	Base F	Point ID	Base	GPS Ant. Ht.	UTM Zone	KPA		
04- Mar- 18	18-	-063	HST -10	T.					A lété v el e	KC	DA1		2.0m			29.98	29.98
Flight Plan	Line #	Directo	WPT	WPT	Beginnir	ng GPS Time	Ending G	GPS Time	(feet)	Speed (Kts)	Comments /	Conditions				SVs	PDOP
					18 ⁻	:10:00	18:1	8:00			IMU STA	TIC				23	1.4
					18	:37:00	18:4	1:00	13600		S-TURN					21	1.4
AOI A BIk 4	1059	124		23	18	:43:00	18:5	00:00	13600	180	East 1/2 of	of Line in	Cloud			24	1.2
	1058	304	23		18	:56:00	19:0	3:00	13600	175	East 1/2 of	f Line in (Cloud Goto A6	(20k over D a	& E)	21	1.2
					19	:08:00	19:1	3:00	14000	180	S-TURN					23	1.0
AOI A BIk 6	1065	025	36		19	:18:00	19:3	0:00	14000	180	Man ARG	no Clou	id, Cloud No	rth 10 Nmi		23	1.0
	1066			36	19	:36:00	19:4	6:00	14000		Man ARG	, Cloud	North 10 Nm	i		19	1.1
	1067	025	34	10	19	:50:00	19:5	9:00	14000		Man ARG	no Clou	ud, Flew Sout	th 24 Nmi Or	ıly *	15	1.4
	1068		10	34	20	:03:00	20:1	1:00	14000		ARG worl	ked, Sou	th 24 Nmi Oi	nly *	<u> </u>	15	1.4
				<u> </u>	20	:11:00	20:1	5:00	14000		S-TURN (Next Lir	ne in Cloud- A	ABORT)		16	1.3
				<u> </u>	20	:35:00	20:4	0:00			IMU STA	TIC		/		16	1.3
					<u> </u>												
											BASE ST	ATION -	KOA1				
					<u> </u>						KOA1 ST	ART @	Approx 17:40) Mar 4			
				<u> </u>							KOA1 ST	OP @ A	Approx 20:45	Mar 4			
		1			1							<u> </u>	-				
					1												
					1												
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- when	it	has	to	be	right

		D •			Lift	Airport	Chocks Out	Airport	Chocks In	Duration	n 2.1 Hrs.	Ramp	Actvity				
	(. I		Tei	ica	1	РНКО	18:46	РНКО	20:54	2:08	3 2.1		Production				
- when it has t	to de l	right			2									SPL10)0 F	light	Log
			Geosy	stems	3											U	U
Job #		CI	ient's Job #	Lidar	4 S/N	Gate Delav	Gate Dur	IMU	Start	Shippina T	rack Number		Operator		1		· · · · ·
S18-010		-		7		cate 2 chay	0000000	2018030	6183005	Drive	SPL004		Troy Sentn	er	Wx.	Start	End
F	Project Na	ame		IMU {	S/N	Scan	Angle	IMU	Stop	Airp	ort ID		Pilot		GND		l l
WOOL	.PERT	HAW	A II			3	0			PH	IKO		Dynamic Pil	ots	Temp	24	27
Mission	ID (DayS		t) 15		T	Range	e Gate	Scan Fr	requency	Base GPS	S Reciver ID	Se 15 D	can Angle	Aircraft	Alt	10	10
Date	_UU7_3 GPS	Date	IS UTC Offset	Flight	v. Plan	Laser Pwr	Pulse Rate	Download	"Firewire	Base	Point ID	Base	GPS Ant. Ht.	UTM Zone	remp	-10	-10
06- Mar- 18	18-	065	HST -10	g		Lucci i m	1 dice r dice	20111000		K	DA1	2000	2.0m		KPA	29.95	29.96
Flight Plan	Line #	Directo	From	То	Deginnir		Ending		Altitude	Speed	Commonto	Conditions				S)/a	DDOD
-	Line #	Directo	VPI	VPI		32.00	218·3		(leet)	(KIS)						24	1 2
					10.	12.00	10.0		22000			South Po	int was in VOC		2)	10	1.2
	1016	250	10		19.	21.00	19.1	0.00	22900	100					<u>-</u>)	10	1.1
AULD BIK 2	1210	250	10	40	19.	21.00	19.2	20.00	22900	180	Man AGF	Resel				20	1.2
	1215	70		18	19:	31:00	19:3	37:00	22900	195	Mount not p	arked at e	and of prev line N	Iount Error on I	ine	18	1.1
	1214	250	19		19:	43:00	19:4	19:00	22900	180	Man AGF	Reset i	needed no clo	oud at start		17	1.2
	1213	70		19	19:	54:00	20:0	00:00	22900	195	Man AGF	Reset i	needed no clo	oud at start		15	1.5
	1212	250	19		20:	05:00	20:1	1:00	22900	180	Man AGF	R Reset i	needed no clo	oud at start		17	1.3
	1211	70		20	20:	17:00	20:2	23:00	22900	195	ARG wor	ked at st	art. Clouds c	on East Side		17	1.3
					20:	23:00	20:2	27:00	22900	195	S-TURN	Looked	at southpoint	again nogo a	abort	17	1.3
					20:	57:00	21:0	03:00			IMU STA	TIC					
											BASE ST	ATION -	KOA1				
											KOA1 ST	ART @	Approx 17:40	Mar 6			
											KOA1 ST	OP @ A	pprox 21:16	Mar 6			
											Mount Lo	g Uploa	ded to FTP				
					<u> </u>						1						
					<u> </u>						1						
1					<u> </u>						1						
				i	<u> </u>						1						
					<u> </u>						1					I	
					<u> </u>						1						
					<u> </u>						1						
				 '	───												

				D •			Chocks Out	Airport	Chocks In	Duratior	n 4.0 Hrs.	Ramp	Actvity				
when it has	to bo	right	<i>Te</i>	ica	1	РНКО	18:29	РНКО	22:31	4:02	2 4.0		Production			'l' l- 1	
- WHEITIL HAS	to de	right			2									SPL1	<i>JU F</i>	lighti	Log
			Geosy	rstems	3												
Job #		CI	ient's Job #	Lidar	S/N	Gate Delay	Gate Dur	IMU	Start	Shipping T	rack Number		Operator			, I	
S18-010				7				2018030	07181345	Drive	SPL011		Troy Sentr	ner	Wx.	Start	End
WOO	Project Na	ame	A 11	IMU :	S/N	Scan	Angle	IMU	Stop	Airp	ort ID		Pilot	lata	GND Tomp	26	27
Missio	Dn ID (DavS		AII ft)	AM	Т	Rang	e Gate	Scan Fi	requency	Base GPS	S Reciver ID	Sca	an Angle	Aircraft		20	21
180307	_007_S	618010		VA	R.				. ,	NBV07	7080011	15 De	g Wedge	N96Y	Temp	-13	-13
Date	GPS	Date	UTC Offset	Flight	Plan	Laser Pwr	Pulse Rate	Download	d "Firewire"	Base	Point ID	Base G	SPS Ant. Ht.	UTM Zone	KPA		
07- Mar- 18	18-	-066	HST -10	То					Altitudo	KC		2	2.0m			29.93	29.89
Flight Plan	Line #	Directo	WPT	WPT	Beginniı	ng GPS Time	Ending C	GPS Time	(feet)	(Kts)	Comments /	Conditions				SVs	PDOP
					18	:15:00	18:2	22:00			IMU STA	TIC				22	1.3
					18	:49:00	18:5	53:00	19900		S-TURN					21	1.1
AOI C	1174	194		53	18	:55:00	19:1	3:00	19900	180	*Could no	ot get AR	G to Reset a	ifter Mona Lo	ba	21	1.0
	1173	14	53		19	:18:00	19:3	35:00	19900	180	*AGR Star	t Good, co	ould not get to	o Reset after I	ML	17	1.1
	1172	194		54	19	:40:00	19:5	58:00	19900	185	Man ARG	at Start	Cloud			14	1.4
	1171	14	54		20	:03:00	20:2	21:00	19900	180	ARG Star	t Good, N	North End C	loud		15	1.2
	1170	194		54	20	:25:00	20:4	4:00	19900	180	North and	South E	nd Cloud			15	1.2
	1169	14	53		20	:48:00	21:0	06:00	19900	180	North and	South E	nd Cloud			13	1.5
	1168	194		53	21	:10:00	21:2	28:00	19900	180	North and	South E	nd Cloud, fe	ew online		15	1.2
	1167	14	53		21	:32:00	21:5	50:00	19900	180	North and	South E	nd Cloud, fe	ew to scat on	line	15	1.4
	1166	194		53	21	:54:00	22:1	2:00	19900	180	North and	South End	d Cloud, scat	tered online A	bort	19	1.3
					22	:13:00	22:1	7:00	19900	180	S-TURN					19	1.3
					22	:37:00	22:4	2:00		•	IMU STA	TIC				19	1.2
											BASE ST.	ATION -	KOA1				
											KOA1 ST	ART @ A	xpprox 17:30) Mar 7			
											KOA1 ST	<mark>OP @ A</mark> p	prox 22:55	Mar 7			

- when it has to be right						Airport	Chocks Ou	Airport	Chocks In	Duration	n 2.1 Hrs.	Ramp	Actvity				
			Je	ica	1	РНКО	18:41	РНКО	20:48	2:07	2.1		Production			liabtl og	
														SPL100 FlightLo			
			Geosy	stems	4												
Job # Clie			ient's Job #	Lidar S/N		Gate Delay	Gate Dur	IMU Start		Shipping Track Number			Operator				
S18-010				7				2018030	8182750	Drive S	SPL005		Troy Sentr	Troy Sentner		Start	End
	Project Na		A 11	IMU S	5/N	Scan 2	Angle If		Stop	Airport ID		Pilot Dynamic Bilots		GND Tomp	21	25	
Missior		ensorJobLif	-\ ft)	AM		r Rang		e Gate Scan Fr		Base GPS Reciver ID		S	can Angle	Aircraft		21	25
180308_007_S18010_)_17	VAF	R				. ,	NBV07	080011	15 Deg Wedge		N96Y	Temp	-1	-1
Date	Date GPS Date		UTC Offset	Flight Plan		Laser Pwr	Pulse Rate Download		"Firewire"	Base F	Point ID	Base GPS Ant. Ht.		UTM Zone	KPA		
08- Mar- 18	18-	067	HST -10	То					Altitudo	KC	DA1		2.0m			29.96	29.98
Flight Plan	Line #	Directo	WPT	WPT	Beginning GPS Time		Ending C	GPS Time (feet)		(Kts)	Comments /	/ Conditions					PDOP
					18:29:00		18:3	18:35:00			IMU STAT	ATIC					1.1
					18:55:00		18:5	18:58:00 1:			S-TURN	N					1.0
AOI A BIk 4	1057	124		23	19:01:00		19:09:00		13700	180	in thin VO	/OG and few fly it anyway					1.0
	1058	304	23	9	19:13:00		19:19:00		13600	175	East 14nr	nmi					1.0
	1059	124	9	23	19:24:00		19:29:00		13600	180	East 14nr	nmi *Mount restarted online error					1.2
	1056	304	23		19:33:00		19:40:00		13700	175	Few						1.2
	1055	124		23	19:45:00		19:53:00		13700	180	Man ARG	RG at start of line, Few CU mid line					1.4
	1054	304	23		19:57:00		20:05:00		13600	175	Man ARG	G at start of line, Few CU mid line *					1.3
	1053	124		22	20:10:00		20:17:00		13700	180	Man ARG	G at start of line, Scat CU end in ovlap					1.3
	1052	304	21		20:21:00		20:28:00		13800	175	Scat CU e	J east end in ovlap, few on rest of line				19	1.3
					20:29:00		20:34:00		14700	180	S-TURN	JRN gone to Broken Next lines				17	1.3
				20:53:00		20:58:00				IMU STATIC				18	1.1		
										-							
											BASE ST	ATION -	KOA1				
											KOA1 ST	A1 START @ Approx 18:10 Mar 8					
											KOA1 ST	OA1 STOP @ Approx 21:10 Mar 8					
											MOUNT L	.OG UP	LOADED TO	FTP			
				•	Lift	Airport	Chocks Out	Airport	Chocks In	Duration	3.4 Hrs.	Ramp	Actvity				
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when it has	to bo	right	Te	ica	1	РНКО	18:45	РНКО	22:07	3:22	3.4		Production			1: 1- 4	
	to de l	ngnt			2									SPL10	10 F	light	LOG
			Geosy	stems	3												
Job #		CI	ient's Job #	Lidar	S/N	Gate Delay	Gate Dur	IMU	Start	Shipping T	rack Number		Operator				
S18-010				7				2018031	0182752	Drive	SPL006		Troy Sentn	er	Wx.	Start	End
	Project Na			IMU S	6/N	Scan	Angle	IMU	Stop	Airp	ort ID		Pilot Dynamia Dil	ata	GND	24	25
Mission	-PERI	ensor.lobl if	AII †)	AM	r	Range	U e Gate	Scan Fr	equency	Base GPS	Reciver ID	S	Dynamic Pil	OIS Aircraft		21	25
180310	_007_S	18010	_ 18	VAF	R .				,	NBV07	080011	15 D	eg Wedge	N96Y	Temp	1	0
Date	GPS	Date	UTC Offset	Flight F	Plan	Laser Pwr	Pulse Rate	Download	"Firewire"	Base I	Point ID	Base	GPS Ant. Ht.	UTM Zone	KΡΔ		
10- Mar- 18	18-	069	HST -10	T .					A 14:4 I .	KC	DA1		2.0m			29.96	29.98
Flight Plan	Line #	Directo	From WPT	I O WPT	Beginnir	ng GPS Time	Ending 0	GPS Time	(feet)	Speed (Kts)	Comments /	Conditions				SVs	PDOP
					18:	:30:00	18:3	35:00			IMU STA	TIC				20	1.1
					19:	:01:00	19:0	4:00	14000		S-TURN					18	1.1
AOI A BIk 6	1060	205		13	19:	:07:00	19:1	2:00	14000	180	Auto IT In	it Errors	Refly Line, F	ew off shore		19	1.0
	1060	025	13		19:	:19:00	19:2	23:00	14000	180	Reloaded	Flightpl	an on OC60	no error		17	1.2
	1061	205		14	19:	:27:00	19:3	32:00	14000	180	Mount Re	started	Online Error,	continue		14	1.3
	1062	025	15		19:	:38:00	19:4	3:00	14000	180	Good Line	Э				15	1.6
	1063	205		16	19:	:47:00	19:5	52:00	14000	175	Man ARG	i no clou	d			15	1.4
	1064	025	16		19:	:57:00	20:0	02:00	14000	180	Man ARG	i no clou	d			16	1.4
	1065	205		16	20:	:07:00	20:1	2:00	14000	180	North 16	Nmi only	, with Few, n	orth shore of	<	15	1.4
	1066	025	16		20:	:17:00	20:2	23:00	14000	175	North 16	Nmi only	, with Few, n	orth shore of	<	14	1.4
	1067	205		16	20:	:27:00	20:3	33:00	14000	180	North 16	Nmi only	v, with Few, n	orth shore fe	W	14	1.4
	1068	025	16		20:	:37:00	20:4	4:00	14000	175	North 16	Nmi only	v, with Few, n	orth shore fe	W	16	1.3
AOI B BIk 6	1146	228	6		20:	:49:00	20:5	53:00	16100	180	Good Lin	e with F	ew N end			15	1.3
	1147	48		8	20:	:58:00	21:0	1:00	16100	180	Good Lin	e with F	ew N end			16	1.3
	1148	228	13		21:	:05:00	21:0	9:00	16100	180	Good Lin	e with F	ew N end			16	1.3
	1149	48		15	21:	:14:00	21:1	9:00	16100	185	Mount Re	started	Online Error,	continue		16	1.3
	1150	228	17		21:	:23:00	21:2	29:00	16100	180	Good Lin	e with F	ew N end			16	1.5
	1151	48		18	21:	:33:00	21:3	89:00	16100	185	Good Lin	e with F	ew N end			15	1.5
	1152	228	18		21	:45:00	21:5	51:00	16300	180	Good Lin	e with F	ew N to Mid			18	1.4
					21:	:51:00	21:5	5:00	16000	195	S-TURN					18	1.4
					22	:10:00	22:1	5:00			IMU STA	TIC				17	1.4
											BASE ST	ATION -	KOA1				
											KOA1 ST	ART @	Approx 17:50	Mar 10			
											KOA1 ST	<mark>OP @</mark> A	pprox 22:20	Mar 10			
	1										1			-			

					Lift	Airport	Chocks Out	Airport	Chocks In	Duration	3.8 Hrs.	Ramp	Actvity				
- when it has	to be	right	Je	ica	1	РНКО	18:22	РНКО	22:08	3:46	3.8		Production	CDI 11	າ <i>∩ ⊏</i>	liabt	
			Geosv	stems	3									SFLI		iigiili	LUY
					4												
Job #		Cl	ient's Job #	Lidar	S/N	Gate Delay	Gate Dur	IMU	Start	Shipping Tr	ack Number		Operator				
S18-010				7	2/01	Coor	America	2018031	1180726	Drive S	SPL001		Troy Sentr	ner	Wx.	Start	End
WOOI		ame HAW	Δ 11		5/IN	Scan 3	Angle 0	INIO	Stop	Airpo PH	KO		Dvnamic Pilot	lots	GND Temp	22	
Mission	n ID (DayS	ensorJobLif	it)	AM	Г	Rang	e Gate	Scan Fr	equency	Base GPS	Reciver ID	So	can Angle	Aircraft	Alt		
180311_	_007_S	18010	_19	VAF	र.					NBV07	080011	15 D	eg Wedge	N96Y	Temp	4	5
Date	GPS	Date	UTC Offset	Flight F	Plan	Laser Pwr	Pulse Rate	Download	l "Firewire"	Base F	Point ID	Base	GPS Ant. Ht.	UTM Zone	KPA		
11- Mar- 18	18-	070	HST -10	Та					Altitudo	KC	DA1		2.0m			29.99	30.01
Flight Plan	Line #	Directo	WPT	WPT	Beginnir	ng GPS Time	Ending G	GPS Time	(feet)	(Kts)	Comments /	Conditions	;			SVs	PDOP
					18:	:09:00	18:1	8:00			IMU STAT	ГIС				22	1.1
					18:	:37:00	18:4	3:00	15500		S-TURN					22	1.1
AOI A BIk 4	1050	124		19	18:	:44:00	18:5	50:00	15500	180	Man ARG	req no	cloud, Good	Line		20	1.1
	1051	304	20		18:	:55:00	19:0	01:00	14700	175	2 x Mount	Restart	Online			20	1.1
	1052	124		21	19:	:06:00	19:1	3:00	13800	180	Mount Re	start On	line			18	1.3
	1053	304	22	11	19:	:18:00	19:2	2:00	13700	180	SE 11 Nm	ni Only				17	1.4
AOI A BIk 3	1049	038		38	19:	:30:00	19:4	3:00	13800	180	Good Line	9				15	1.6
	1048	218	39		19:	:47:00	20:0	00:00	13800	175	Lost groui	nd over	Water, Man A	ARG reset		16	1.4
	1047	038		39	20:	:04:00	20:1	7:00	13800	180	Few SW (Ovlap, F	ew at 6 Nmi	to NE end		16	1.4
	1046	218	39		20:	:21:00	20:3	33:00	13800	180	Mount Re	start On	lline, PAV Init	. Failed Onli	ne	15	1.6
	1045	038		39	20:	:37:00	20:5	50:00	13800	180	Mount Re	start On	line			17	1.2
	1044	218	38		20:	:54:00	21:0	06:00	13900	180	2 x Mount	Restart	Online			18	1.2
	1043	038		22	21:	:10:00	21:1	7:00	14100	180	SW 22 Nr	ni Only				18	1.3
	1042	218	22		21:	:22:00	21:2	29:00	14500	175	SW 22 Nr	ni Only	Mount Resta	irt		17	1.5
	1234	038	23	3	21:	:37:00	21:4	5:00	13200	180	Cloud 7 N	lmi of W	est Side			19	1.4
					21:	:45:00	21:0	07:00	13000	180	S-TURN					19	1.5
					22:	:13:00	22:1	8:00			IMU STAT	ГIС				19	1.3
											BASE ST	ATION -	KOA1				
											KOA1 ST	ART @	Approx 17:30) Mar 11			
											KOA1 ST	OP @ A	pprox 22:30	Mar 11			
					ļ												

_	when	it	has	to	he	right
_	WHEI	IL	LIDD	ιU	De	ngnu

					Lift	Airport	Chocks Out	Airport	Chocks In	Duration	2.6 Hrs.	Ramp Actvity					
- whon it has t	to bo i	right	Je	ica	1	РНКО	18:40	РНКО	21:16	2:36	2.6	Produc	tion	SPI 10	n F	liaht	
		ingine	Geosy	stoms	3											igiti	LUY
.lob#		CI	ient's Job #	Lidar	4 S/N	Gate Delay	Gate Dur	IMU	Start	Shipping Tr	ack Number	0	perator				
S18-010		0.		7		Guio Dolay	Guto Bui			5ppg		TJ	Smith		Wx.	Start	End
F	Project Na	ame		IMU S	S/N	Scan	Angle	IMU	Stop	Airpo	ort ID		Pilot		GND		
WOOL		HAW/		AM	Т	1 Range	5 e Gate	Scan Fr	equency	Base GPS	KO Reciver ID	Scan Angle		Aircraft	Temp	25 C	27 C
180315_	007_S	18010)_20	VAF		r tangt	outo	Courre	oquonoy			Courry inglo		N96Y	Temp	4 C	4 C
Date	GPS	Date	UTC Offset	Flight F	Plan	Laser Pwr	Pulse Rate	Download	"Firewire"	Base F	Point ID	Base GPS Ant.	Ht.	UTM Zone	ΚΡΔ		
15- Mar- 18	18-	074	HST -10	То					Altitudo	KC	DA1	2.0m				30.01	30.02
Flight Plan	Line #	Directo	WPT	WPT	Beginniı	ng GPS Time	Ending G	GPS Time	(feet)	(Kts)	Comments /	Conditions				SVs	PDOP
					18	:27:00	18:3	3:00			IMU STA	ГІС				19	1.1
					18	:56:00	18:5	9:00			S-TURN					18	1.2
AOI R	1243			8	19	:01:00	19:0	5:00	14000	180						18	1.2
	1242	107	8		19	:09:00	19:1	2:00	14000	177	A FEW SI	MALL CLOUD				16	1.4
A-BLOCK 1	1000	097		25	19	:17:00	19:2	26:00	13400	177						16	1.5
	1001	277	24		19	:30:00	19:3	8:00	13400	178						17	1.3
	1002	097		24	19	:43:00	19:5	51:00	13600	175						17	1.3
	1003	277	24		19	:56:00	20:0	4:00	14400	175						17	1.3
	1004	097		23	20	:08:00	20:1	6:00	15100	175						17	1.2
	1005	277	23		20	:20:00			15900	175	CLOUD E	AST END OF I	LINE			18	1.2
A-BLOCK 6	1079	205		26	20	:35:00	20:4	4:00	15600	177	ARG ISSU	E OVER WATE	R STAR	T / FEW CL	OUD	18	1.2
	1078	025	28		20	:49:00	20:5	68:00	14600	177	ARG ISSI	JE AT START	/ SON	IE CLOUD		19	1.2
					20	:59:00	21:0	2:00			S-TURN					18	1.5
					21	:19:00	21:2	24:00			IMU STA	ГІС				19	1.3
											BASE ST	ATION - KOA1					
											KOA1 ST	ART @ 18:04	/ 15M	ar18			
											KOA1 ST	OP @ 21:37 /	15Ma	r18			

- when it has to be right	Leica
	Casavatana

 Lift
 Airport
 Chocks Out
 Airport
 Chocks In
 Duration
 1.4 Hrs.
 Ramp
 Actvity

 1
 PHKO
 18:38
 PHKO
 20:00
 1:22
 1.4
 Production

SPL100 FlightLog

			Geosy	stems	4												
Job #		CI	ient's Job #	Lidar	S/N	Gate Delay	Gate Dur	IMU	Start	Shipping T	rack Number		Operator			0 1 1	
518-010	Project No			1 	2/N1	Soon	Anglo	18.41.1	Stop	Airp	art ID		I J Smith		VVX.	Start	End
wool	PFRT		ΔII		5/IN	3can	5	INIO	Stop	PH	IKO	Г	Dvnamic Pi	lot	GND Temp	24 C	25 C
Mission	n ID (DayS	ensorJobLi	ft)	AM	Г	Rang	e Gate	Scan F	requency	Base GPS	S Reciver ID	Scan /	Angle	Aircraft	Alt	240	200
180327	_007_S	18010	_23	VAF	ર.								-	N96Y	Temp	5 C	5 C
Date	GPS	Date	UTC Offset	Flight I	Plan	Laser Pwr	Pulse Rate	Download	d "Firewire"	Base	Point ID	Base GPS	S Ant. Ht.	UTM Zone	KDA		
27- Mar- 18	18-	086	HST -10	V 5.	2					K	DA1	2.0	m		NEA	29.90	29.94
Flight Plan	Line #	Directo	From WPT	To WPT	Beainnii	ng GPS Time	Endina (GPS Time	Altitude (feet)	Speed (Kts)	Comments /	Conditions				SVs	PDOP
					18	:25:26	18:3	30:26	()	(****)	IMU STA	TIC				14	1.6
					18	:54:00	18:5	57:00			S-TURN					15	1.4
Δ 4	1056	124	9	23	18	:58:00	19:0	03:00	13700	180	SOME CI	LOUD				15	15
	1055	304	23	0	19	·07·00	19.1	15:00	13700	180	SOME CI					14	1.5
	1054	124	0	23	19	·20·00	19.2	28.00	13600	180	SOME CI					14	1.0
	1053	304	8	0	19	:34:00	19.2	37:00	13700	180						15	1.7
	1000	001			19	:37:00	19:4	40:00	10/00	100	S-TURN					15	1.2
					20	:04:20	20:0)9:20			IMU STA	TIC				15	1.4
											END FLIC	GHT DUE T)			
											BASE ST		OA1				
											KOA1 ST	ART @ 17	:44 / 27N	lar18			
											KOA1 ST	OP @ 20:1	4 / 27Ma	ar18			

			•		Lif	t Airport	Chocks Out	Airport	Chocks In	Duration	2.9 Hrs.	Ramp	Actvity	1
					1	PHKO	18:20	РНКО	21:14	2:54	2.9		Production	
- when it has	to be	right		uu	2]S
			Geosy	stems	3	5								
leb #			iant'a lah #	Lider	4	Coto Dolovi	Cata Dur		Stort	Chinning Tr	ook Number		Operator	_
S18-010		CI	ient's Job #		3/N 7	Gale Delay	Gate Dur	INIU	Start	Shipping II	ack number		T.I Smit	h
	Project Na	ame		IMU	S/N	Scan	Angle	IMU	Stop	Airpo	ort ID		Pilot	
WOO	PERT	HAW	All			1	5			PH	ко		Dynamic F	Pilot
Missio	n ID (DayS	SensorJobLif	ft)	AM	IT	Rang	e Gate	Scan Fr	requency	Base GPS	Reciver ID	S	can Angle	
180328	_007_S	518010		VA	R.	Lassa Dum	Dulas Data	Deumlese	I "Financina"	Deee		Dees		\bot
Date 28- Mar- 18	GPS 18-	Date 087	HST -10		Pian 3 2	Laser Pwr	Pulse Rate	Download	"Firewire"	Base F		Base	GPS Ant. Ht.	
	10-		From	To	·.∠				Altitude	Speed			2.0111	
Flight Plan	Line #	Directo	WPT	WPT	Beginnii	ng GPS Time	Ending C	PS Time	(feet)	(Kts)	Comments /	Conditions	3	
					18	:09:21	18:1	4:21			IMU STA	TIC		
					18	:38:00	18:4	1:00			S-TURN			
B 4	1122	159	0	43	18	:44:00	18:5	8:00	17000	176	CLOUD E	BOTH EI	NDS OF LIN	E
	1123	339	42	0	19	:04:00	19:1	8:00	17000	176	CLOUD E	BOTH EI	NDS OF LIN	E
	1124	159	0	39	19	:24:00	19:3	7:00	17500	181	CLOUD E	BOTH EI	NDS OF LIN	E
	1125	339	37	0	19	:41:00	19:5	4:00	18000	180	CLOUD E	BOTH EI	NDS OF LIN	E
	1126	159	0	35	19	:59:00	20:1	1:00	18300	181	CLOUD			
	1127	339	34	0	20	:15:00	20:2	7:00	18600	176	CLOUD			
	1125	159	0	37	20	:32:00	20:4	5:00	18000	181	REFLOW	/N FOR	OPERATOR	RAR
					20	:45:00	20:4	8:00			S-TURN		Actvity Production Operato TJ Smit Pilot Dynamic F an Angle 3PS Ant. Ht. 2.0m IDS OF LIN IDS	
					21	:20:20	21:2	2:20			IMU STA	TIC		
											END FLIC	GHT / C	CLOUD IN A	
												_		
											BASE ST	ATION	Production Operator TJ Smitt Pilot Dynamic P Scan Angle GPS Ant. Ht. 2.0m ns ENDS OF LINI ENDS O	
											KOA1 ST	Operator TJ Smit Pilot Dynamic F Scan Angle Base GPS Ant. Ht. 2.0m Conditions TIC Conditions TIC 30TH ENDS OF LIN 30TH ENDS O	Mar	
											KOA1 ST	OP @ 2	p Actvity Production Operato TJ Smi Pilot Dynamic Scan Angle e GPS Ant. Ht. 2.0m Is NDS OF LIN Actor NDS OF LIN Actor	lar1
													Ramp Actvity Production Operator TJ Smit Pilot Dynamic F Scan Angle Base GPS Ant. Ht. 2.0m ittions H ENDS OF LIN H ENDS OF LIN H ENDS OF LIN H ENDS OF LIN OR OPERATOF '/ CLOUD IN A @ 21:35 / 28N	
					+									



Wx.

GND

Temp

Alt

Temp

Aircraft

N96Y

Start

24 C

- 4 C

End

26 C

- 4 C

- 18	GPS 18-	Date • 087	UTC Offset HST -10	Flight	Plan Laser Pwr .2	Pulse Rate	Download	d "Firewire"	Base K(Point ID DA1	Base GPS Ant. Ht. 2.0m	UTM Zone	KPA	29.98	30.00
lan	Line #	Directo	From	То	Beginning GPS Time	Ending	2PS Time	Altitude	Speed	Comments	/ Conditions			SV/c	
		Directo			18:09:21	18:1	4:21	(leet)	(RIS)	IMU STA	TIC			19	13
					18:38:00	18:4	1:00			S-TURN				18	1.4
	1122	159	0	43	18:44:00	18:5	58:00	17000	176	CLOUD	BOTH ENDS OF LINE			19	1.3
	1123	339	42	0	19:04:00	19:1	8:00	17000	176		BOTH ENDS OF LINE			18	1.3
	1124	159	0	39	19:24:00	19:3	37:00	17500	181		BOTH ENDS OF LINE			18	1.3
	1125	339	37	0	19:41:00	19:5	54:00	18000	180		BOTH ENDS OF LINE			18	1.3
	1126	159	0	35	19:59:00	20:1	1:00	18300	181	CLOUD				18	1.2
	1127	339	34	0	20:15:00	20:2	27:00	18600	176	CLOUD				17	1.4
	1125	159	0	37	20:32:00	20:4	15:00	18000	181	REFLOW	/N FOR OPERATOR	ARG MIX-UF	C	19	1.3
					20:45:00	20:4	18:00			S-TURN				18	1.3
					21:20:20	21:2	22:20			IMU STA	TIC			20	1.3
										END FLI	GHT / CLOUD IN AL	L AOI's			
										BASE ST	ATION - KOA1				
										KOA1 ST	rart @ 17:04 / 28N	/lar18			
										KOA1 ST	FOP @ 21:35 / 28Ma	ar18			
				-	-					-				-	

- when	it h	as to	be	right

- when it has	to be I	right	Le	ica	Lift	Airport PHKO	Chocks Out 17:34	Airport PHKO	Chocks In 21:25	Duration 3:51	3.8 Hrs. 3.8	Ramp	Actvity Production	SPL10)0 F	liaht	Loa
		5	Geosy	stems	3											3	3
Job #		CI	lient's Job #	Lidar	S/N	Gate Delay	Gate Dur	IMU	Start	Shipping Tra	ack Number		Operator		14/	Otaut	E . d
516-010	Project Na	ame		IMU	/ S/N	Scan	Angle	IMU	Stop	Airpo	ort ID		Pilot		VVX.	Start	Ena
WOOL	PERT	HAW	All			1	5			PHI	ко		Dynamic P	ilot	Temp	22 C	27 C
Mission	ID (DayS	ensorJobLi	ft)	AM	Т	Range	e Gate	Scan Fr	equency	Base GPS	Reciver ID	S	can Angle	Aircraft	Alt	_	
180329_	<u>007_S</u>	518010)_25	VA	R.	Looor Dur	Dulas Data	Download	"Eirowiro"	Page D	Point ID	Paga	CDS Apt Lit	N96Y	Temp	5 C	5 C
29- Mar- 18	GPS 18-	088	HST -10	V 5	.2	Laser Pwr	Puise Rale	Download	Filewile	Base P	A1	Dase	2.0m		KPA	29.98	30.01
Flight Plan			From	То					Altitude	Speed			2.0				
	Line #	Directo	WPT	WPT	Beginnin	ig GPS Time		GPS Time	(feet)	(Kts)	Comments /		3			SVs 21	PDOP
					17.	21.27 50:00	17.2	.0.27								21	1.1
D 2	1044	220	10	0	17.	55.00	17.5	03.00 00.00	15200	175	3-TURN					20	1.1
R Z	1244	320	10	0	17.	05.00	17.0	7.00	14500	175						20	1.1
٨٥	1245	025	0	0	10.	18.15	18.0	9·00	14000	172	R/E COM					13	1.2
AU	1065	205	2	9 9	18.	24.00	18.2	9.00 98.00	14000	172	R/F COM					10	1.3
	1067	025	9	2	18.	32.00	18:3	5:00	14000	180	R/F COM					10	1.0
	1068	205	2	10	10.	39·00	18:4	3.00	14000	170	R/E COM		/ FEW SMA			19	1.3
	1060	205	0	35	10.	52.00	10.4	5:00	14000	176						10	1.0
	1003	025	35	0	10.	09.00	19:2	21.00	14000	175		-0nmi				17	1.0
	1070	205	0	35	10.	25:00	19:3	7.00	14000	177		-7nmi 3	30-35nmi			18	1.0
	1072	025	34	0	10.	41.00	19:5	2·00	14000	178		4-28nm	i 6-0nmi			18	1.2
	1073	205	0	34	19	57.00	20.0	8.00	14000	176		-7nmi 2	28-34nmi			18	1.4
	1074	025	33	0	20:	13:00	20:2	4:00	14000	175	CLOUD 3	3-25nm	i. 5-0nmi			18	1.4
	1075	205	0	32	20:	29:00	20:4	0:00	14000	176	CLOUD 0	-6nmi. 2	25-32nmi			19	1.3
	1076	025	32	0	20:	44:00	20:5	5:00	14000	175	CLOUD 3	2-25nm	i, 6-0nmi			19	1.3
	1077	205	0	30	21:	00:00	21:1	0:00	14000	180	CLOUD 0	-8nmi, 2	23-30nmi			18	1.4
					21:	11:00	21:1	4:00			S-TURN	,				18	1.2
					21:	31:40	21:3	6:40			IMU STAT	TIC				20	1.2
											END FLIG	HT DU	E TO CLOUE) IN ALL AOI	's		
										-							
											BASE ST	ATION ·	- KOA1				
											KOA1 ST	ART @	16:54 / 29	Mar18			
											KOA1 ST	OP @ 2	1:44 / 29M	ar18			

-	when	it	has	to	be	right	

- when it has	to be	right	Le	ica stems	Lif 1 2 3	Airport PHKO	Chocks Out	Airport PHKO	Chocks In 19:35	Duration 2:16	2.3 Hrs. 2.3	Ramp Actvity Productic		100 F	light	Log
Job #		CI	ient's Job #	Lidar	S/N	Gate Delay	Gate Dur	IMU	Start	Shipping Tr	ack Number	Ope	rator		Chart	Find
516-010	Project Na	ame		IMU :	/ S/N	Scan	Angle	IMU	Stop	Airpo	ort ID	IJ 3 Pi	lot	OND	Start	End
WOOI	PERT	HAW	All			1	5			PH	ко	Dynam	ic Pilot	Temp	22 C	27 C
Missio	n ID (DayS	ensorJobLi	ft)	AM	Т	Rang	e Gate	Scan Fi	requency	Base GPS	Reciver ID	Scan Angle	Aircraf	Alt		10.0
180330_	_007_8	518010 Date	UTC Offset	VA Elight	K. Plan	Laser Pwr	Pulse Rate	Download	1 "Firewire"	Rase F	Point ID	Base GPS Ant Ht		Temp	0 C	- 13 C
30- Mar- 18	18-	089	HST -10	V 5	. 2	Laser I wi	T uise Male	Download		KC	DA1	2.0m		KPA	29.98	30.00
Flight Plan	1	Discrete	From	То	Deviewi		En dia a O		Altitude	Speed	0	O an althion a			0)/-	DDOD
	Line #	Directo	WPT	WPT	Beginni 17	10.57	Ending G	5.57	(teet)	(Kts)					5Vs 21	
					17	. 10.07	17.1	0.00			S_TURN				10	1.0
P 6	1154	228	17	0	17	.37.00 ·44·00	17.4	0.00	17400	17/					19	1.0
00	1152	048	0	18	17	. 11.00	18.0	0.00	16700	165					18	1.0
	1152	228	18	10	18	:05:00	18:0	9.00	16300	175	R/F COM				15	1.1
	1151	048	8	18	18	·13·00	18.1	7.00	16100	174	R/F COM				15	1.4
	1150	228	17	8	18	·21·00	18:2	5:00	16100	177	R/F COM				16	1.0
D 2	1191	110	0	10	18	:38:00	18:4	0.00	23000	180			GATE		16	1.0
	1192	290	12	0	18	:45:00	18:4	8.00	23000	175	WRONG	GATE RANGE E			16	1.0
	1102	110	0	13	18	:54:00	18:5	8.00	23000	180	DETECTO		RED		16	1.0
B 5	1130	238	21	0	19	·07·00	10:0	<u>4.00</u>	16700	180				}	15	1.0
5	1100	200	21	Ŭ	19	·14·00	19.1	7:00	10/00	100	S-TURN	DETEOROR			15	1.0
					19	.40:50	19:4	5:50				TIC.			16	1.0
								0.00			BASE ST				10	
											KOA1 ST	ART @ 16:33 /	30Mar18			
											KOA1 ST	OP @ 21:22 / 3	30Mar18			
															1	
															1	
															1	

					0		14.6			Lift Begin			Lift End		Flt	Flt	Hobbs				
					P			Lift Ai	rport	Chocks	Hobbs	Airport	Chocks	Hobbs	Duration	Hrs	Hrs	Actvity			
- when i	t has	to be	right	•		a	u	1 P	HKO	19:37		PHKO	21:16		1:39	1.70					
					Geo	syste	ms	2		 	<u> </u> 		1						—Fli	aht	Loa
NWG Job	o #		Pro	oiect Na	me		Ope	rator	S	SH I	CU	Moun	t			MM	Mode	MM-1	Do	vnload-	1
19-702	2		Ha	waii S	PL		Marl	k Doll		7			-			Si	ngle	SPL004			
Flight Da	te	GPS	Day	Lift	Sy	stem	Р	ilot	S	un°	Solar T	mes (UTC)	Win	d Dir° W	ind (knts)			MM-2	Dov	vnload-2	2
23-Nov-	19	19-3	327	1	SP	L007	Derek	Malone	≥≲	30°											
Mission	nID (y	ymmdd_Sen	_Job_Lift))	Air	craft	Airport ID	FMS	UTC	AMT (ft)	Speed	IT	ĊT	Config	juration	GSD	km/WPT	Compression	Ship	oing Tra	ck
1911:	23_00	7_1970	2_01		NS	95S	PHKO	FCMS	-10		180kts	Auto	Auto	Hi-R	es All				7770	6741 0	734
Base 1 ID		Loca	ation		Re	ec ID	Ant ID	ARP (m)	-	Start Time	(UTC)	Stop	Time (UTC	;)	GPS I	Filename		Operator		C	Data
1321		Kona	a, Hi	-		_		1.5			1		1		00163/	270.PD			<u></u>		r
	Li	ne ID	V	Vpt	Dist	ance	U'	тс	Flight	Altitude	Speed	Integ			Comme	nts and (Conditions				
Area	NWG	Client's	From	То	Begin	End	Start	End	Dir	(GPS)	(knots)	Time							SVs	PDOF	P Sun°
							19:14:00	19:19:00)				static								
							19:55:00	19:58:00)				s-turn								
A4	2045				0	12	20:02:00	20:04:00	S	12,300	180		Comments and Conditions static s-turn complete, multiple mount roll errors, no cu complete, good line, no cu refly with less mount roll errors, complete, no cu s-turn cu on entire line (scrub line)relocate								39
	2046				12	0	20:08:00	20:10:00	N	12,300	180		complete	e, good line	e, no cu				20	1.5	40
	2045				0	12	20:15:00	20:17:00	S	12,300	180		refly with	less mour	nt roll error	s, comp	lete, no cu	L	21	1.2	42
							20:28:00	20:32:00)				s-turn								
B3	2093				0		20:34:00	20:41:00	NE	16,500	180		cu on en	23	1.2	44					
													s-turn								
B4	2097					0	20:54:00	20:58:00	NW	16,500	180		cu on en	tire line (<mark>so</mark>	crub line)	- return	to base		21	1.2	46
													s-turn								
							21:21:00	21:26:00)				static								
	<u> </u>				<u> </u>	<u> </u>															
	 																				
	 																				
	 																				
	<u> </u>					<u> </u>			<u> </u>												

					0		14.6			Lift Begin			Lift End		Flt	Flt	Hobbs					
					P			Lift Aiı	port	Chocks	Hobbs	Airport	Chocks	Hobbs	Duration	Hrs	Hrs	Actvity				
- when i	t has	to be	right		L	a	u	1 PI	IKO	18:46		PHKO	20:16		1:30	1.50						
					Geos	svste	ms	2			<u> </u>	ļ	1						—FI	aht		
NWG lot	.#		Dro	viact Na	mo		Ond	3 protor			CU	Moun	+			N/IN/	Modo	MANA 1		9	1	
19-702) "		Ha	waii S			Mar			7	00	WOUL	i.			Si	nale	SPI 008		willoau		
Flight Da	te	GPS	Day	Lift	Sv	stem	P	ilot	S	un°	Solar T	imes (UTC)	Win	d Dir° V	Vind (knts)		igio	MM-2	D	wnload	-2	
24-Nov-	19	19-3	328	2	SPI	L007	Derek	Malone	≥	30°		()			()							
Missior	nID (y	ymmdd_Sen	_Job_Lift))	Air	craft	Airport ID	FMS	UTC	AMT (ft)	Speed	IT	СТ	Confi	guration	GSD	km/WPT	Compression	Shi	ping Tra	ack	
1911:	24_00	7_1970	2_02		NS	95S	РНКО	FCMS	-10		180kts	Auto	Auto	Hi-F	Res All				7770	6863 (J727	
Base 1 ID		Loca	ation		Re	ec ID	Ant ID	ARP (m)		Start Time	(UTC)	Stop	Time (UTC	;)	GPS	Filename)	Operato	or		Data	
1321		Kona	a, HI	_			-	1.5					-		***COR	S ML01	***	Mark D				
	Lii	ne ID	V	Vpt	Dist	tance	U	тс	Flight	Altitude	Speed	Integ			Comme	ents and	Conditions					
Area	NWG	Client's	From	То	Begin	End	Start	End	Dir	(GPS)	(knots)	Time							SV	s PDO	P Sun°	
							18:27:00	18:32:00					static									
							18:56:00	19:01:00					s-turn									
B4	2097				19	0	19:13:00	19:16:00	Ν	16,600	180		cu @ sou	18	1.8	30						
	2096				0	24	19:21:00	19:25:00	S	16,500	180		cu @ sou	uth end					18	2.0	32	
	2095				14	0	19:30:00	19:33:00	Ν	16,500	180		cu @ sou	uth end					18	2.0	34	
	2094				0	7	19:42:00	19:43:00	S	16,600	180		small cu	20	1.5	36						
							19:44:00	19:46:00					s-turn									
													wx check									
							20:21:00	20:26:00					s-turn wx check in B5 Conditions deteriorating. Returning to base static									
													***PLEAS	E USE CO	ORS STATIO	N <u>ML01</u>	FOR GPS	PROCESSING.			_	
													BASE ST	ATION 13	21 MALFUN	CTION. N	IO PDC FI	LE RECORDED ON				
													FLASH C	ARD***								
																					_	
																				_	_	
	<u> </u>																			_	_	
																				_	_	

					0		14.6			Lift Begin			Lift End		Flt	Flt	Hobbs						
					P	in	-	Lift Air	port	Chocks	Hobbs	Airport	Chocks	Hobbs	Duration	Hrs	Hrs	Actvity					
- when it	: has	to be	right	•		a	u	1 PF	IKO	18:01		РНКО	22:18		4:17	4.30							
					Geos	syste	ms	2		i 	i 				ł				—I	Flic	ıht l	Lod	
NWG Job	#		Pro	ject Na	me		Ope	rator	S	SH I	CU	Moun	t			MM	Mode	MM-1		Dowr	nload-1		
S19-01	0		Hav	waii S	PL		Mark	Doll	-	7						Sir	ngle	SPL006					
Flight Dat	e	GPS	Day	Lift	Sys	stem	Pi	lot	Su	un°	Solar Ti	mes (UTC)	Win	d Dir° 🛛 🕅	/ind (knts)			MM-2		Dowr	nload-2		
25-Nov-*	19	19-3	329	3	SPL	L007	Derek	Malone	≥3	80°													
Mission	ID (y	ymmdd_Sen	_Job_Lift)		Air	craft	Airport ID	FMS	UTC	AMT (ft)	Speed	IT	СТ	Confi	guration	GSD	mi/WPT	Compression		Shippir	ng Trac	k 100	
I9112 Base 1 ID	ວ_00 <i>1</i> T	_5190	10_03		IN S	100			-10	Start Time	180kts	Auto				Filename		Operato	//	70 80	J/4 0	iZ3	
1321		Kona	a. HI				Antib	1.5			(010)	Otop		.)	00163	290.PD0	2	Mark Do	, SII		De	ala	
	Li	ne ID	Ŵ	/nt	Dist	ance	U	TC.	Flight	Altitude	Speed	Integ	-		Comme	ents and (Conditions						
Area	NWG	Client's	From	То	Begin	End	Start	End	Dir	(GPS)	(knots)	Time			Comme		Jonatione			SVs	PDOP	Sun°	
							17:44:00	17:49:00			()		static										
							18:18:00	18:20:00					s-turn complete										
A6	2047				0	14	18:24:00	18:27:00	Е	13,800	180		complete	20	1.1	20							
	2048				14	0	18:31:00	18:34:00	W	13,800	180		complete	19	1.2	23							
	2049				0	12	18:38:00	18:40:00	Е	13,800	180		complete	18	1.3	24							
	2050				7	0	18:46:00	18:47:00	W	13,800	180		complete	17	1.6	26							
													delay for										
B1	2051				20	0	18:59:00	19:03:00	W	16,600	180		complete	17	1.6	28							
	2052				0	25	19:09:00	19:14:00	Е	16,600	180		complete	17	1.6	30							
	2053				24	0	19:20:00	19:25:00	W	16,600	180		complete	•						17	1.6	32	
	2054				0	63	19:28:00	19:40:00	Е	16,600	180		28-33km	small cu,	complete					18	1.4	33	
	2055				69	0	19:47:00	20:01:00	W	16,600	180		cu on e.e	end, checł	small cu 2	20-0km,	complete			21	1.1	37	
													cu rapidl	y develop	ng, moving	g south							
B1	2059				0	52	20:07:00	20:17:00	Е	16,600	180		43-e.end	l cu, comp	lete					21	1.1	40	
	2060				55	0	20:23:00	20:34:00	W	16,600	180		e.end - 41km cu, w.end cu, complete									42	
	2061				0	55	20:39:00	20:49:00	E	16,800	180		scattered cu throughout entire line relocating south									44	
							21:05:00	21:09:00					s-turn										
B5	2116				7	0	21:17:00	21:19:00	W	19,200	180		complete 2									48	
	2115				0	10	21:28:00	21:30:00	E	19,000	180		complete	9					\square	27	1.0	48	
	2114				13	0	21:34:00	21:37:00	W	18800	180		complete	9						25	1.1	49	
	2113				0	16	21:40:00	21:43:00	E	18500	180		complete							25	1.1	49	
	2112				25	0	21:47:00	21:53:00	W	18500	180		complete	e scattered	t cu on line					24	1.3	49	
													cu'ed out s-turn, return to base, static										

					0		14.6				Lift Begin	Ĩ		Lift End			Flt	Flt	Hobbs					
					P	in		Lift	Airp	ort	Chocks	Hobbs	Airport	Chocks	Hob	bs Du	uration	Hrs	Hrs	Actvity				
- when it	has	to be	right	<	Le	a	u	1	PH	KO	18:12		PHKO	21:58			3:46	3.80						
					Geos	syste	ms	2				 		1		_					— F	=lic	ht l	_oq
NWG Job	#		Pro	ject Na	me		Ope	erator		S	Н	CU	Moun	t				MM	Mode	MM-1		Dowr	load-1	
S19-01	0		Hav	waii S	PL		Mark	c Doll		7	7							Sir	ngle	SPL010				
Flight Dat	e	GPS	Day	Lift	Sys	stem	Pi	ilot		Su	ın°	Solar Ti	mes (UTC)	Wir	nd Dir°	Wind (k	ints)			MM-2		Dowr	load-2	
26-Nov-*	19	19-3	30	4	SPL	_007	Derek	Malone)	≥3	°0°	-												
Mission		/mmdd_Sen	_Job_Lift)		Air	craft	Airport ID	FM	S	UTC	AMT (ft)	Speed	IT	CT	Co	onfiguratio	on	GSD	mi/WPT	Compression	: 	Shippir	ig Trac	k NFO
Base 1 ID	6_00 <i>1</i>	_ 519 0	tion		Re	000 010			/IS (m)	-10	Start Time		Auto			1I-Res A	GPS F	ilename		Operato	//	70.93		DOZ
1321		Kona	a. HI				Antib	1.5	5	,	Start Time	(010)	Otop	Time (or	.)	C	01633	300.PD	2	Mark De	oll		Da	ala
	Lii	ne ID	W	/pt	Dist	ance	U	тс		Fliaht	Altitude	Speed	Integ				ommei	nts and (Conditions					
Area		Client's	Erom	То	Begin	End	Start	End	4	Dir	(GPS)	(knots)	Time			Ū	onninoi		Jonatione			S\/c		Sun°
71100	1000	Olionto	TION	10	Begin		18:03:00	18.0	- 8∙00		(01.0)	(111010)		static								0.00		oun
							18:25:00	18:3	0:00					s-turn									-+	
B1	2206				0	30	18:34:00	18:3	9:00	NF	15.700	180		s-turn complete, good (diagonal line) complete, cu @ 63km- east end										23
	2056				0	69	18:49:00	19:0	2:00	F	16.600	180		complete	20	1.6	26							
	2057				69	0	19:05:00	19:19	9:00	W	16,600	180		complete	20	1.8	30							
	2058				0	68	19:23:00	19:3	6:00	E	16,600	180		complete, cu @ 63km- east end complete, cu @ east end - 58km complete, cu @ 55km-east end s-turn										32
							19:37:00	19:3	9:00					complete, cu @ 63km- east end complete, cu @ east end - 58km complete, cu @ 55km-east end s-turn complete, good										
														complete, cu @ east end - 58km complete, cu @ 55km-east end s-turn complete, good										
B5	2111				31	0	19:53:00	19:5	9:00	W	18,500	180		complete, cu @ 55km-east end s-turn complete, good										38
	2110				0	34	20:04:00	20:1	0:00	Е	18,400	180		complete	e, good							22	1.2	39
	2109				34	0	20:15:00	20:2	1:00	W	18,200	180		complete	e, good							23	1.1	41
	2108				0	33	20:25:00	20:3	1:00	Е	18,000	180		complete	e, good							20	1.2	42
	2107				31	0	20:35:00	20:4	1:00	W	17,800	180		complete	e, good							20	1.2	43
	2106				0	32	22:44:00	20:5	0:00	Е	17,700	180		complete	e, good							20	1.2	44
	2105				32	0	20:55:00	21:0	1:00	W	17,500	180		complete	e, good							21	1.1	45
	2104				0	32	21:06:00	21:1:	2:00	Е	17,300	180		complete	e, good							22	1.1	46
	2103				36	0	21:17:00	21:2	5:00	W	17,100	180		complete, cu @ western edge of line									1.1	47
	2102				0	39	21:29:00	21:3	6:00	Е	16,900	180		complete, cu @ w.end -15km								25	1.0	48
														cu rapidly developing returning to base									$ \longrightarrow $	
							21:38:00	21:4	0:00					s-turn										
					<u> </u>		22:03:00	22:0	8:00					static										
									\square												\square			

					0		14.6				Lift Begir	1		Lift End			Flt	Flt	Hobbs				
					P	in	-	Lift	Airp	ort	Chocks	B Hobbs	Airport	Chocks	Но	obbs	Duration	Hrs	Hrs	Actvity			
- when i	t has	to be	right	•	Je	a	u	1	PH	ко	19:40		PHKO	21:59			2:19	2.30					
					Geos	syste	ms	2						 							—FI	aht	Loa
NWG Job	o #		Pro	ject Na	me		Ope	erator		S	Н	CU	Mour	nt				MM	Mode	MM-1	Do	wnload-	1
S19-01	0		Ha	, waii S	PL		Marl	k Doll		-	7							Sir	ngle	SPL035			
Flight Da	te	GPS	Day	Lift	Sys	stem	Р	ilot		Su	ın°	Solar T	imes (UTC)	Wir	nd Dir°	° Wi	nd (knts)			MM-2	Do	wnload-	2
27-Nov-	19	19-3	331	5	SPL	_007	Derek	Malon	Э	≥3	0°												
Missior	ID (y	ymmdd_Sen	_Job_Lift)		Air	craft	Airport ID	FM	S	UTC	AMT (fl) Speed	IT	CT		Configu	uration	GSD	mi/WPT	Compression	Ship	ping Tra	ck
Base 1 ID	:/_00/ T	<u>_5190</u>	10_05				Ant ID		/IS (m)	-10	Start Tim		Auto		2)	HI-RE	GPS I	Filename		Operato	///I	04377	ZI4
1321		Kona	a, HI				AILID	1.	5		Start Tim	C (010)	010		5)		00163	310.PD0	b	Mark Do	SII		
	Li	ne ID	W	- Vpt	Dist	ance	U	тс	-	Fliaht	Altitude	Speed	Integ			-	Comme	nts and (Conditions				
Area	NWG	Client's	From	То	Begin	End	Start	En	d	Dir	(GPS)	(knots)	Time								SV	PDO	Sun°
							19:33:00	19:3	8:00					static									
							20:01:00	20:0	4:00			1	1	s-turn									
														SPL didn	't fire \	when o	n line po	ower cycl	e SPL is	sue resolved	22	1.2	42
D1	2172				0	18	20:25:00	20:2	9:00	Е				complet	e, goo	od					22	1.2	42
	2173				22	0	20:34:00	20:3	8:00	W				complet	e ga	ating er	rors rese	t ground	level estim	ate	22	1.1	43
	2174				0	22	20:43:00	20:4	7:00	Е				complet	e, goo	od					22	1.1	44
	2175				23	0	20:51:00	20:5	5:00	W		_		complet	e, goo	od					23	1.0	45
	2176				0	24	21:00:00	21:0	4:00	E				complet	e, goo	od					24	1.1	46
	2177				24	0	21:09:00	21:1	3:00	W				complet	e, goo	od					24	1.0	46
	2178				0	25	21:17:00	21:2	2:00	E				complet		ERROR "	roll angle (at e	nd of line)"			26	1.0	47
							21.25.00	21.3	0.00					s-turn	ig in ·	Tetui							
							22:04:00	22:0	9:00					static								+	
							0																
		<u> </u>																				1	
									$ \rightarrow $														

					0		14.6			Lift Begin			Lift End		Flt	Flt	Hobbs				
					P			Lift Aiı	port	Chocks	Hobbs	Airport	Chocks	Hobbs	Duration	Hrs	Hrs	Actvity			
- whe	ı it has	to be	right	t 🕻		a	u	1 PI	IKO	18:03		РНКО	20:03		2:00	2.00					
					Geo	syste	ms	2		1	<u> </u> 		1						—Fli	aht	Loa
NWG	Job #		Pro	oiect Na	me		Ope	S erator	S	6H	CU	Moun	t			MM	Mode	MM-1	Dov	vnload-	1
S19-	010		Ha	, waii S	PL		Mar	k Doll		7						Si	ngle	SPL007			
Flight	Date	GPS	Day	Lift	Sy	stem	P	ilot	S	un°	Solar T	mes (UTC)	Win	d Dir° V	/ind (knts)			MM-2	Dov	vnload-2	2
7-De	c-19	19-3	341	6	SP	L007	Derek	Malone	≥≲	80°											
Mis	ion ID	yymmdd_Ser	n_Job_Lift	t)	Air	craft	Airport ID	FMS	UTC	AMT (ft)	Speed	IT	СТ	Confi	guration	GSD	km/WPT	Compression	Ship	oing Tra	ck
191	207_00	7_S190	10_06	j	N	95S	PHKO	FCMS	-10	o . .	180kts	Auto	Auto	Hi-F				Oranata	7771	3048 7	492
Base 11		LOC	auon a HI		Re	ec ID	Ant ID	ARP (m)		Start Time	(UTC)	Stop	I Ime (UTC)	GPS 00163			Operator Mark Do	r JI		Jata
1321				Alint.	Diet	lanaa		1.0	Flinks	Altitudo	Cread	lute a				nto and	Conditiona		,		
Area			From		Disi	End	Stort	End	Dir		(knota)	Time			Comme	ints and i	Conditions		SV/c	PDOI	
Alea			FIOIII	10	Degin	Ena	17:55:00	18:00:00		(010)	(KIIOLS)	Time	static						378	FDOr	Jun
							18:30:00	18:32:00					s-turn								
B1	205	3			F	56	18:37:00	18:40:00	W	16.600	180		refliaht. c	20	1.5	22					
	205	7			56	E	18:44:00	18:47:00) E	16,600	180		reflight, c	20	1.5	24					
	205	8			E	52	18:52:00	18:55:00	W	16,600	180		reflight, c	20	1.5	25					
	205	9			38	E	18:59:00	19:01:00	E	16,600	180		reflight, c	21	1.4	26					
	206	C			E	38	19:05:00	19:09:00	W	16,600	180		reflight, c	21	1.2	28					
	206	1			38	Е	19:19:00	19:22:00	E	16,800	180		reflight, c	23	1.1	30					
	205	5			0	13	19:35:00	19:39:00	W	16,600	180		cu on en	23	1.2	32					
							19:40:00	19:45:00)				s-turn								
													no joy in E	35, snow o	n Mauna Ke	a and Ma	auna Loa				
							20:08:00	20:13:00					static								
																					<u> </u>
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																				-	╉───┤
																					+

					0		14.6			Lift Begin	1		Lift End		Flt	Flt	Hobbs				
					P	in	-	Lift Air	port	Chocks	Hobbs	Airport	Chocks	Hobbs	Duration	Hrs	Hrs	Actvity			
- when i	t has	to be	right	•		a	u	1 PH	ITO	18:55		РНКО	22:25		3:30	3.50					
					Geos	syste	ms	2		<u> </u>			1						—Fli	aht	Loa
NWG Job	o #		Pro	oiect Na	me		Ope	erator	S	SH I	CU	Moun	t			MM	Mode	MM-1	Do	vnload-	1
S19-01	0		Ha	, waii S	PL		Marl	k Doll		7						Si	ngle	SPL017			
Flight Da	te	GPS	Day	Lift	Sys	stem	Р	ilot	S	un°	Solar T	mes (UTC)	Win	d Dir° V	/ind (knts)			MM-2	Do	vnload-2	2
8-Dec-1	9	19-3	342	7	SPI	L007	Derek	Malone	≥3	30°											
Missior	וD (אַ	ymmdd_Sen	_Job_Lift))	Air	craft	Airport ID	FMS	UTC	AMT (ft)	Speed	IT	ĊT	Confi	guration	GSD	km/WPT	Compression	Ship	oing Tra	ck
19120	8_007	_S190 ⁻	10_07		NS	95S	PHKO	FCMS	-10		180kts	Auto	Auto	Hi-F	Res All			Ourset	7771	3163 2	270
		Loca	ation		Re	ec ID	Ant ID	ARP (m)		Start Time	(UTC)	Stop	I Ime (UTC)	GPS 00163			Operato Mark Do	r Jl	^L	Data
1321			a, m	. .	D : (1.5		A 11/1 1			-		00103	420.00			//I		
A.r.o.o.		ne ID	V From		Dist	ance	U	TC End	Flight		Speed	Integ			Comme	ents and	Conditions		S)/r		Cup ^o
Alea	NVG	Cilents	FIOIII	10	Begin	LIIU	18:45:00	18:50:00		(010)	(KIIOLS)	Time	static at I		25				308	FDO	Sun
							19:10:00	19:14:00					s-turn								
A2	2017				0	70	19:16:00	19:30:00	S	13,500	180		complete	20	1.1	28					
	2016				71	0	19:33:00	19:47:00	N	13,500	180		complete	19	1.2	33					
	2015				0	75	19:52:00	20:05:00	S	13,500	180		complete	20	1.1	35					
	2014				77	0	20:09:00	20:23:00	Ν	13,500	180		complete	22	1.1	38					
	2013				0	79	20:28:00	20:43:00	S	13,500	180		complete	24	1.1	40					
	2006				88	0	20:50:00	21:06:00	Ν	13,500	180		complete	22	1.3	43					
													clouded								
							21:08:00	21:12:00					s-turn								
D1	2182				23	0	21:19:00	21:24:00	W	22,900	180		complete	, cu on la	st frame or	n w.end			25	1.2	46
	2181				0	25	21:27:00	21:32:00	Е	22,900	180		complete	, cu on la	st 2 frames	s on w.ei	nd		25	1.2	46
	2180				26	0	21:37:00	21:42:00	W	22,900	180		complete	, cu on la	st 3 frames	s on w.ei	nd		27	1.2	47
	2179				0	26	21:47:00	21:50:00	E	22,900	180		complete	e, cu on la	st 5 frames	s on w.si	de		27	1.2	47
	2210				0	32	21:59:00	22:05:00	N	22,100	180		complete	e, cu al 22	km-n.ena				27	1.3	47
							22.00.00	22.10.00					s-turn static at NWG base in Kona								
							22.23.00	22.07.00													
											1										

					0		14.6			Lift Begin			Lift End	1	Flt	Flt	Hobbs					
					Y	pic		Lift Air	bort	Chocks	Hobbs	Airport	Chocks	Hobbs	Duration	Hrs	Hrs	Actvity				
- when	it has	to be	right	<		~		1 FF	ικυ	17.47		PHKU	22.09		4.22	4.40						
					Geo	syste	ms	3											− ⊢II(jht I	Log	
NWG Jo	b #		Proj	ect Na	me		Ope	rator	S	H	CU	Moun	t		-	MM	Mode	MM-1	Dow	nload-1		
S19-01		GPS				tom	Mark	t Doll	<u> </u>	7	Solar Ti		\\/in	d Dir ^o I W	ind (knte)	Si	ngle	SPL002		nload-2	,	
9-Dec-	19	19-3	343	8	SPL	.007	Derek	Malone	≥3	BO°		1103 (010)	vvii					101101-2	Dow	1110au-2		
Missio	ו ID (y)	/mmdd_Sen	_Job_Lift)		Airo	craft	Airport ID	FMS	UTC	AMT (ft)	Speed	IT	СТ	Config	juration	GSD	km/WPT	Compression	Shipp	ing Trac	ck	
19120)9_007	_S1901	0_08		NS)5S	PHKO	FCMS	-10		180kts	Auto	Auto	Hi-R	es All				7771 9	436 5	399	
Base 1 ID 1321		Loca Kona	tion a. HI		Re	CID	Ant ID	ARP (m)		Start Time	(UTC)	Stop		C)	00163	-liename 430.PD		Operator Mark Dol	a	Da	ata	
	Lir	ne ID	W	pt	Dist	ance	U	TC	Fliaht	Altitude	Speed	Integ			Comme	nts and (Conditions					
Area	NWG	Client's	From	To	Begin	End	Start	End	Dir	I (GPS)	(knots)	Time							l SVs	I PDOP	I I Sun°	
_	1						17:41:00	17:46:00					static - n	o valid GPS tim	e on SPL GUI	power cy	cle system r	resolved	—		1	
		0					18:00:00	18:05:00					s-turn									
B3	2084				0	19	18:09:00	18:13:00	N	16,700	180		complete									
	2085				21	0	18:17:00	18:21:00	S	16,600	180		complete	19	1.9	18						
	2086	1			0	23	18:25:00	18:29:00	N	16,500	180		complete	19	2.0	20						
	2087				53	0	18:38:00	18:48:00	S	16,500	180		complete	20	1.6	22						
	2088				0	53	18:53:00	19:03:00	Ν	16,500	180		complete	20	1.9	25						
	2089	1			53	0	19:07:00	19:17:00	S	16,500	180		complete	18	1.8	28						
	2090				0	52	19:21:00	19:31:00	Ν	16,500	180		complete	21	1.1	30						
	2091				51	0	19:35:00	19:44:00	S	16,500	180		complete	e, ground leve	el estimate adj	justed			20	1.2	33	
	2092				0	50	19:48:00	19:59:00	Ν	16,500	180		complete	e, cu at 20-	-32km, 40	end			19	1.2	35	
	2093				30	0	20:03:00	20:09:00	S	16,500	180		complete	e, cu at 20-	9km				21	1.2	37	
	2083				10	0	20:15:00	20:16:00		18,800	180		complete	e					24	1.1	39	
							20:17:00	20:20:00					s-turn									
E2	2212				26	0	20:29:00	20:33:00	Ν	23,600	180		complete	9					26	1.1	41	
	2195				0	16	20:38:00	20:41:00	Е	24,700	180		complete	23	1.2	41						
	2196				17	0	20:44:00	20:47:00	W	24,700	180		complete	23	1.2	41						
	2197				0	18	20:51:00	20:54:00	E	24,700	180		complete	22	1.4	43						
	2198				18	0	20:58:00	21:01:00	W	24,700	180		complete	e					23	1.3	44	
	2199				0	18	21:05:00	21:08:00	E	24,700	180		complete	e					24	1.2	44	
	2200				18	0	21:12:00	21:16:00	W	24,700	180		complete	9					24	1.2	45	
	2201				0	17	21:19:00	21:23:00	E	24,700	180		complete	e					23	1.3	46	
	2202				17	0	21:27:00	21:30:00	W	24,700	180		complete	e					25	1.4	46	
	2203				0	15	21:34:00	21:36:00	E	24,700	180		complete	Э					25	1.2	47	

					0		14.6			Lift Begin			Lift End		Flt	Flt	Hobbs				
					P			Lift A	Airport	Chocks	Hobbs	Airport	Chocks	Hobbs	Duration	Hrs	Hrs	Actvity			
- when i	t has	to be	right		Le	u	u	1	рнко	17:47		PHKO	22:09		4:22	4.40					
					Geos	svste	ms	2												liaht	
					0000	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		3		<u> </u>			<u> </u>							iigin	LUY
NWG Job) # •		Pro	ject Na	me D		Ope	rator		5H 7	CU	Mour	it			MM	Mode	MM-1		Download	i-1
SI9-UI	U to	000				tom				/	Color Ti		Min		ind (knta)	Sir	ngie	SPL002			10
		GPS 10.1	Day 2/1-2	0	e o sys		Pi Dorok	Malone			Solar T	imes (UTC)	vvino		ina (knis)			IVIIVI-2		Jownioad	-2
9-Dec-		IJ-C		•				EMS			Sneed	<u>і іт</u>		Confic	uration	GSD	km/M/DT	Comprossion	<u> </u>	inning T	rack
19120	9 007	//////ud_3en	10 08			5S		FCMS	-10				Auto	Hi-R	es All	650		Compression	777	1 9436	5399
Base 1 ID	<u>-007</u>		ation		Red		Ant ID	ARP (m)	Start Time		Stor			GPS	- Filename		Operator	r	1 0400	Data
1321		Kona	a. HI				7.000	1.5	/		(0.0)			,	00163	430.PD0	b	Mark Do) 		2 4 14
	Lir	ne ID	1	/nt	Dist	ance	117	т <u>с</u>	Elight	Altitude	Spood	Intog			Comme	nts and (Conditions				
				γpι		ance		-	Figin	Annouc	Speed	Integ			Comme		Jonations				
Area	NWG	Client's	From	То	Begin	End	Start	End	Dir	(GPS)	(knots)	Time							S	Vs PD0	P Sun°
	2204				12	0	21:41:00	21:43:	W 00	24,700	180		complete	;						25 1.	2 47
							21:44:00	21:46:	00				s-turn								
]		1	22:13:00	22:18:	00				static								
													skiff of sn	ow on the w	estern slop	es of Ma	una Loa				
																					-
																					_
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				<u>i</u>		<u>i</u> 															_
						<u>i</u>															_
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					0		14.6			Lif	t Begin			Lift End		Flt	Flt	Hobbs					
					P	in		Lift	Airpo	ort (Chocks	Hobbs	Airport	Chocks	Hobbs	Duration	Hrs	Hrs	Actvity				
- when it	has	to be	right	•	Le	a	u	1	PHK	(0	17:52		РНКО	22:32		4:40	4.70						
					Geos	syste	ms	2				<u> </u>				-				—F	[:] liq	ht l	_oq
NWG Job	#		Pro	ject Na	me		Оре	rator		SH		CU	Moun	t			MM	Mode	MM-1		Down	load-1	
S19-01	0		Hav	waii S	PL		Mark	Doll		7							Sir	ngle	SPL009				
Flight Dat	e	GPS	Day	Lift	Sys	stem	Pi	lot		Sun°		Solar Ti	mes (UTC)	Win	d Dir°	Wind (knts)			MM-2)	Down	load-2	
10-Dec-	19 ID (19-3	344	9	SPI	L007	Derek	Malone		≥ 30 '		Speed	1 			figuration	000		0		hinnin	a Trac	l.
19121	ע) טו החח ח	ymmdd_Sen S190	_Job_Lift) 10 09		AI NO			FINS	s	-10	ανιι (π)	Speed	Auto	Auto	Con Hi-	Res All	GSD	KM/WPT	Compression	51 777	nippin 2 07	g Track ' 96 7 5	564
Base 1 ID	0 <u>_007</u>	_0100 Loca	ation		Re	ec ID	Ant ID	ARP (m)	Sta	art Time	(UTC)	Stop	Time (UTC)	GPS	Filename		Operato	r	<u> </u>	Da	ata
1321		Kona	a, HI					1.5	5							00163	440.PD0	>	Mark Do)II			
	Liı	ne ID	N	/pt	Dist	tance	U	ГС	F	light A	Altitude	Speed	Integ		<u> </u>	Comme	ents and 0	Conditions					
Area	NWG	Client's	From	То	Begin	End	Start	End		Dir	(GPS)	(knots)	Time							ę	SVs	PDOP	Sun°
							17:40:00	17:45	5:00					static									
							18:00:00	18:12	2:00					s-turn									
B5	2113				0	12	18:15:00	18:18	8:00	E ´	18,500	180		reflight c	omplete						20	1.6	18
	2112				13	0	18:23:00	18:26	6:00	W	18,500	180		reflight c	omplete						20	1.6	19
	2111				0	5	18:30:00	18:32	2:00	E ´	18,500	180		3rd parall	el line coll	ected for SPI	_ calibrati	on			22	1.6	20
	2102				0	17	18:40:00	18:44	1:00	E ´	16,900	180		reflight c	omplete						23	1.3	22
	2101				0	40	18:52:00	19:00):00	E ´	16,600	180		complete	e						22	1.4	24
	2100				38	0	19:04:00	19:12	2:00	W	15,900	180		complete	e						24	1.2	27
	2099				0	35	19:16:00	19:23	3:00	E	15,600	180		complete	9					:	25	1.2	28
	2098				31	0	19:27:00	19:33	3:00	W	15,600	180		complete	9					;	22	1.2	31
							19:35:00	19:38	3:00					s-turn							\square		
C1	2117				0	45	19:48:00	19:57	2:00	S ´	19,600			partial _{(ac}	cess granted int	o Bradshaw MOA ·	vill attempt to c	ollect as many lir	nes before airspace goes hot)	;	24	1.1	34
	2118				45	0	20:01:00	20:09	9:00	N ´	19,600			partial						:	24	1.1	36
	2119				0	48	20:12:00	20:21	:00	S ´	19,600			partial						;	24	1.1	38
	2120				50	0	20:25:00	20:35	5:00	N ´	19,600			partial						;	25	1.1	40
	2121				0	53	20:38:00	20:48	3:00	S ´	19,600			partial						:	25	1.1	41
	2123				39	0	20:52:00	21:00):00	N ´	19,600			partial								1.4	43
	2125				0	39	21:03:00	21:10):00	S ´	19,600			full line							25	1.2	44
	2128				35	0	21:14:00	21:21	:00	N ´	19,700			full line, check cu at 4-0km (north end)							24	1.3	45
	2131				0	35	21:24:00	21:30):00	S ´	19,800			full line, check cu at 4-0km							26	1.2	46
	2134				31	0	21:34:00	21:39	9:00	N 2	20,000			full line,	check cu	at 4-0km				;	26	1.3	46
	2143				0	26	21:43:00	21:47	2:00	S 2	24,000			full line,	check cu	at 4-0km				:	26	1.3	47
	2211				0	52	21:55:00	22:05	5:00	E	19,700			full line,	check cu	at 45-52km	(east er	id)		;	27	1.2	47
	2207				32	0	22:11:00	22:18	3:00	W	17,900			full line							26	1.2	47

Lift Airport Chocks Hobbs Airport Chocks Hobbs Duration Hrs Hrs Activity			
- when it has to be right 1 PHKO 17:52 PHKO 22:32 4:40 4.70			
Geosystems 2	-Flic	thr	l ou
		J	Log
S10 010 Howeii SPI Mark Dell 7	Dow	/nioad-1	
ST3-010 Flight Date GPS Day Lift System Pilot Sun° Solar Times (UTC) Wind Dir° Wind (knts) MM.2	Dow	nload-2)
10- Dec-19 19-344 9 SPI 007 Derek Malone >30°	DOW	110au-2	-
Mission ID (vymmdd Sen Job Lift) Aircraft Airport ID FMS LITC AMT (ft) Speed LT CT Configuration GSD km/WPT Compression	Shipp	ing Tra	ck
191210 007 S19010 09 N95S PHKO FCMS -10 180kts Auto Auto Hi-Res All	7772 0	796 7	564
Base 1 ID Location Rec ID Ant ID ARP (m) Start Time (uTc) Stop Time (uTc) GPS Filename Operator		D	ata
1321 Kona, HI 1.5 00163440.PDC Mark Doll			
Line ID Wpt Distance UTC Flight Altitude Speed Integ Comments and Conditions			
Area NIWG ICliant's From I To Bogin IEnd Start I End Dir (GPS) (knoto) Time	SV/a		Sup ^o
	372	FDOF	Sun
22:19:00 22:21:00 s-turn	_		
22:36:00 22:41:00 static			
	_		
	_		
	_		
	+		
	_		

					0		14.6				Lift Begin			Lift En	d		Flt	Flt	Hobbs					
					P	in		Lift	Air	oort	Chocks	Hobbs	Airport	Chocks	s F	Hobbs	Duration	Hrs	Hrs	Actvity				
- when it	t has	to be	right	•	Le	a	u	1	PH	IKO	17:36		РНКО	19:59	-		2:23	2.40						
					Geos	syste	ms	2			<u> </u>			1	-						—Fli	aht	Log	
NWG Job)#		Pro	ject Na	ime		Оре	erator		S	SH	CU	Moun	t				MM	Mode	MM-1	Dov	/nload-1	Ť	
S19-01	0		Hav	waii S	PL		Marl	k Doll		•	7							Sir	ngle	SPL001				
Flight Dat	te	GPS	Day	Lift	Sys	stem	Р	ilot		Sı	un°	Solar T	imes (UTC)	W	ind Di	Dir° Wi	nd (knts)			MM-2	Dov	/nload-2	2	
11-Dec-	19	19-3	845	10	SPL	_007	Derek	Malon	e	23	30°	Cread	17			Configu	un eti e m	005			Chin		al.	
19121	1 007	/mmdd_Sen \$1901	_Job_Lift)					FN	MS MS	- 10	ΑΜΤ (Π)					Hi-Re	uration Se All	GSD	KM/VVP1	Compression	Snip	ing Tra 807 9	ск 560	
Base 1 ID	I_007	Loca	ation		Re		Ant ID	ARP	' (m)	-10	Start Time	UTC)	Stop	Time (U	TC)		GPS I	Filename		Operator			ata	
1321		Kona	a, HI					1.	5			•					00163	450.PD0	>	Mark Do	II			
	Lii	ne ID	W	/pt	Dist	ance	U.	тс		Flight	Altitude	Speed	Integ				Comme	nts and (Conditions					
Area	NWG	Client's	From	То	Begin	End	Start	Er	nd	Dir	(GPS)	(knots)	Time								SVs	PDOF	Sun°	
							17:30:00	17:3	35:00					static										
							17:57:00	18:0	00:00					s-turn										
C1	2122				0	15	18:01:00	18:0	04:00	S	19,600	180		comple	19	1.6	14							
	2130				12	0	18:06:00	18:0	08:00	Ν	19,600	180		complete complete										
	2124				0	14	18:12:00	18:1	14:00	S	19,600	180		complete complete SPL roll error - in flight restart sequence carried out - resolved										
														complete complete SPL roll error - in flight restart sequence carried out - resolved complete										
	2127				0	13	18:24:00	18:2	27:00	S	19,600	180		complete 1 SPL roll error - in flight restart sequence carried out - resolved 2 complete 2 complete 2										
	2136				12	0	18:30:00	18:3	32:00	Ν	19,600	180		complete 1 SPL roll error - in flight restart sequence carried out - resolved 2 complete 2 complete 2 complete 2 complete 2										
	2133				0	12	18:36:00	18:3	38:00	S	19,600	180		comple	te						21	1.3	21	
	2140				12	0	18:41:00	18:4	14:00	Ν	19,600	180		comple	23	1.1	23							
	2138				0	12	18:47:00	18:5	50:00	S	19,600	180		comple	te						22	1.2	24	
	2142				12	0	18:53:00	18:5	56:00	Ν	19,600	180		comple	te						22	1.2	25	
	2145				0	12	18:59:00	19:0	02:00	S	19,600	180		comple	te						23	1.1	26	
	2148				13	0	19:05:00	19:0	08:00	Ν	19,600	180		comple	te						24	1.1	27	
	2151				0	16	19:12:00	19:1	15:00	S	19,600	180		comple	te						25	1.1	28	
							19:16:00	19:1	19:00					s-turn										
D1	2178				25	0	19:25:00	19:2	29:00	W	22,900	180		reflight complete 2									30	
	2177				0	5	19:32:00	19:3	34:00	E	22,900	180		5km parallel line flown for SPL calibration 2									32	
	2176				5	0	19:37:00	19:3	58:00	W	22,900	180		5km parallel line flown for SPL calibration									32	
							19:40:00	19:4	+2:00			<u> </u>		S-turn										
							20:04:00	20:0	19:00															
																					_	<u> </u>		

					0		14.6				Lift Begin			Lift E	nd		Flt	Flt	Hobbs				
					P			Lift	Airp	port	Chocks	Hobbs	Airport	Choc	ks	Hobbs	Duration	Hrs	Hrs	Actvity			
- when it	has	to be	right	•	Le	u	u	1	PH	IKO	17:50		PHKO	20:2	22		2:32	2.50					
					Geos	svste	ms	2			1	<u> </u>									— Elia	thr	
NIM/G Job	#		Dro	ioct No	mo	,	One	3 Instan		9		CU	Moun	+				NANA	Modo	NANA 1	Dov		LUY
S19-01	n		Ha	waii S	PI		Mark				7 7	CU	WOUL	IL III				Sir		SPI 013	Dov	/iiiuau-i	
Flight Dat	e	GPS	Dav	Lift	Svs	stem	Pi	ilot		Sı	, un°	Solar T	mes (UTC)	v	Nind	l Dir° W	ind (knts)	0.	igio	MM-2	Dov	nload-2	
12-Dec-1	19	19-3	346	11	SPL	_007	Derek	Malone	•	≥3	30°		. ,				()						
Mission	ID (y)	/mmdd_Sen	_Job_Lift)		Air	craft	Airport ID	FM	S	UTC	AMT (ft)	Speed	IT	СТ		Config	guration	GSD	km/WPT	Compression	Shipp	ing Trad	:k
19121	2_007	_S190 ⁻	10_11		N9	95S	PHKO	FCN	/IS	-10		180kts	Auto	Auto	0	Hi-R	es All				7772 3	198 0	740
Base 1 ID		Loca	ation		Re	c ID	Ant ID	ARP	(m)		Start Time	(UTC)	Stop	Time (UTC)		GPS	Filename		Operator		D	ata
1321		Kona	a, HI	-				1.	5			-					00163	460.PD0		Mark Do	ll		_
	Lir	ne ID	V	/pt	Dist	ance	U	тс		Flight	Altitude	Speed	Integ				Comme	ents and (Conditions				
Area	NWG	Client's	From	То	Begin	End	Start	En	d	Dir	(GPS)	(knots)	Time								SVs	PDOF	Sun°
							17:41:00	17:4	6:00					static								Î	
							18:09:00	18:1	2:00					s-turn									
C1	2117				58	40	18:14:00	18:1	8:00	Ν	19,600	180		partial	l, lin	ie now col	mplete				20	1.8	17
	2118				40	63	18:24:00	18:2	8:00	S	19,600	180		partial	I, lin	ie now col	mplete				20	1.4	19
	2119				74	43	18:34:00	18:3	9:00	Ν	19,600	180		partial	l, lin	ie now col	mplete				22	1.2	21
	2120				79	45	18:50:00	18:5	6:00	Ν	19,600	180		partial	l, lin	ie now col	mplete				21	1.3	24
	2121				83	48	19:08:00	19:1	4:00	Ν	19,600	180		partial	l, lin	ie now col	mplete				21	1.2	27
	2123				73	34	19:26:00	19:3	3:00	Ν	19,600	180		partial	l, lin	ie now col	mplete				20	1.2	31
	2129				0	31	19:36:00	19:4	3:00	S	19,600	180		compl	lete						20	1.2	32
	2126				35	0	19:45:00	19:5	2:00	N	19,600	180		compl	lete	<u> </u>	00.07	(I)			20	1.2	34
	2132				0	27	19:56:00	20:0	1:00	S	19,600	180		compl	lete	check cu	23-27km ((s.end)			19	1.2	35
							00.00.00	20.0	4.00					cu rapi	iaiy i	building fro	om the east.	returning	to base				
							20:02:00	20:0	4:00 2:00					s-turn									
							20.27.00	20.3	2.00					Static									
																						1	

					0		14.6			Lift Begir	1		Lift End		Flt	Flt	Hobbs				
					P	in	-	Lift A	lirport	Chock	s Hobbs	Airport	Chocks	Hobbs	Duration	Hrs	Hrs	Actvity			
- when it	t has	to be	right	•	Le	a	u	1 F	РНКО	18:29	1	PHKO	21:54		3:25	3.40					
					Geos	syste	ms	2		<u> </u>			1						—Fli	aht	Loa
NWG Job	#		Pro	ject Na	me		Ope	erator		SH	CU	Moun	t			MM	Mode	MM-1	Do	vnload-1	
S19-01	0		Hav	waii S	PL		Marl	< Doll		7						Sir	ngle	SPL014			
Flight Dat	te	GPS	Day	Lift	Sys	stem	Р	ilot	S	un°	Solar T	imes (UTC)	Win	d Dir° 🛛 🕅	/ind (knts)			MM-2	Do	vnload-2	!
16-Dec-1	19	19-3	350	12	SPL	_007	Derek	Malone	≥	30°											
Mission	ID (y	ymmdd_Sen	_Job_Lift)		Air	craft	Airport ID	FMS	UTC	AMT (f	t) Speed	IT	CT	Config	guration	GSD	km/WPT	Compression	Ship	oing Trac	ж соо
Base 1 ID	6_007 T		IU_IZ						-10	Start Tim		Auto			GPS	Filename		Operator	1112		009 lata
1321		Kona	a, HI		110		Antib	1.5	<u></u>		010)	010		<i>,</i>	00163	500.PD	0	Mark Do	11		ata
	Lii	ne ID	N N	/pt	Dist	ance	U'	тс	Fligh	t Altitude	Speed	Integ			Comme	ents and (Conditions				
Area	NWG	Client's	From	To	Beain	End	Start	End	Dir	(GPS) (knots)	Time							SVs	PDOF	Sun°
							18:24:00	18:29:0	0		,		static							+	
							18:51:00	18:53:0	0				s-turn								
A3	2035				0	47	18:55:00	19:05:0	0 S	15,30	0 180		complete	;					20	1.2	25
	2036				56	0	19:09:00	19:19:0	0 N	14,50	0 180		complete)					20	1.1	27
	2037				0	59	19:23:00	19:34:0	0 S	14,10	0 180		complete	;					20	1.1	30
	2038				59	0	19:39:00	19:49:0	0 N	13,90	0 180		red SPL RC	LL ERROR	at n.end of line	e. Re-boota	&Refly		22	1.1	33
	2038				59	0	20:07:00	20:17:0	0 N	13,70	0 180		complete	e without S	SPL error				23	1.1	37
	2039				0	59	20:21:00	21:31:0	0 S	13,70	0 180		complete	;					21	1.5	39
	2044				7	0	20:36:00	20:38:0	0 N	13,10	0 180		complete)					24	1.2	41
	2040				24	0	20:43:00	20:49:0	0 N	14,20	0 180		complete	;					24	1.2	42
	2041				0	24	20:51:00	20:56:0	0 S	14,10) 180		complete)					24	1.2	43
	2042				11	0	21:00:00	21:02:0		14,10	J 180		complete	<u>}</u>					27	1.2	43
	2043				27	0	21:05:00	21.00.0		16,50	180								27	1.2	44
	2213				44	0	21:28:00	21:36:0	0 W	15,80) 180		complete	, dense c	u at 17km-	0km			21	1.2	46
							21:38:00	21:40:0	0	-,			' s-turn	,		-					
							22:00:00	22:05:0	0				static							-	
													*NWG bas	se station 1	321 was fo	und NOT	logging 1.	5hrs after wheels dow	vn.	1	
													IF there is	a gap in 0	0163500.PE	DC data, p	olease use	CORS MLO1 or HIL	R		
																				\perp	
																					

					0		14.6	6			Lift Begir	1		Lift End		Flt	Flt	Hobbs					
					P			Lift	Air	port	Chocks	B Hobb	s Airport	Chocks	Hobbs	Duration	Hrs	Hrs	Actvity				
- when i	t has to	o be	right		Le	u	u	1	PH	IKO	18:29		РНКО	21:54		3:25	3.40						
					Geos	svste	ms	2												F	-lia	ht I	nu
			Dre	is at Nias			0.0	3					Marin					Mada					-09
					ne DI		l Op Mai	erator k Doll			7	CU	Mour	10							Dowr	1020-1	
Elight Dat		GPSI		Wall Si		tem				SI	/ In°	Solar T		Win	d Dir° W	ind (knts)		igie	SPL014		Dowr	load-2	
16-Dec-	19	19-3	50	12	SPI	007	Derek	Malo	ne	>7	in°	Solar I	ines (010)						101101-2		DOW	lloau-z	
Mission	ID (vymn	ndd Sen	Job Lift)	12	Airc	craft	Airport ID	F	MS			Speed	ІІТ		Confic	uration	GSD	km/WPT	Compression	ç	Shippir	ng Trac	k
19121	6 007 9	S1901	0 12		N9	5S	РНКО	FC	MS	-10		180kts	Auto	Auto	Hi-R	es All				77	72 63	321 66	389
Base 1 ID	<u> </u>	Loca	tion		Red	c ID	Ant ID	AR	P (m)		l Start Tim	e (UTC)	Stop	ן ס Time (טדט	C)	GPS	I Filename		Operato	or		Da	ata
1321		Kona	, HI					1	.5	1						00163	500.PD	c	Mark D	oll			
	Line	ID	W	/pt	Dista	ance	ι	лс		Flight	Altitude	Speed	Integ			Comme	ents and (Conditions					
Area		ient's	From	То	Begin	End	Start	 E	ind	Dir	(GPS)	(knots)	Time								SVs	PDOP	Sun°
				<u> </u>					-														
								<u>i</u>															
				 				<u> </u> 															
				 		 		<u> </u>															
						<u> </u>																	
				<u> </u>		 																	
													1										
													1										

					0		14.6			Lift Begin			Lift End		Flt	Flt	Hobbs				
					P			Lift A	irport	Chocks	Hobbs	Airport	Chocks	Hobbs	Duration	Hrs	Hrs	Actvity			
- when it	has	to be	right	•	Je	u	a	1 P	HKO	18:29		PHKO	21:54		3:25	3.40					
			-		Con	wata	200	2			1									aht	
					Geos	syste	115	3											ΓII	JII	LUY
NWG Job	#		Pro	ject Na	me		Oper	rator	S	Н	CU	Moun	t			MM	Mode	MM-1	Dow	nload-1	
S19-010	0		Hav	waii S	PL		Mark	Doll		7						Sir	ngle	SPL014			
Flight Dat	e	GPS	Day	Lift	Sys	stem	Pil	ot	Su	ın°	Solar Ti	mes (UTC)	Win	d Dir°	Wind (knts)			MM-2	Dow	nload-2	
16-Dec-1	19	19-3	350	12	SPL	.007	Derek I	Malone	≥3	0°											
Mission	ID (yy	/mmdd_Sen	_Job_Lift)		Airo	craft	Airport ID	FMS	UTC	AMT (ft)	Speed	IT	ĊT	Con	figuration	GSD	km/WPT	Compression	Shipp	ing Trac	ж
19121	6_007	_S190 ⁻	10_12		N9	5 S	PHKO	FCMS	-10		180kts	Auto	Auto	Hi-	Res All				7772 6	321 66	689
Base 1 ID		Loca	ation		Re	c ID	Ant ID	ARP (m)		Start Time	(UTC)	Stop	Time (UTC	C)	GPS I	Filename		Operator		D	ata
1321		Kona	a, HI					1.5							00163	500.PD0	0	Mark Do	1		
	Line ID Wpt Distance			ance	UT	C	Flight	Altitude	Speed	Integ	-		Comme	nts and (Conditions						
Area	NWG	Client's	From	То	Begin	End	Start	End	Dir	(GPS)	(knots)	Time							SVs	PDOP	Sun°

					0		14.6			Lift Begin			Lift End		Flt	Flt	Hobbs					
					P	in	-	Lift Aiı	port	Chocks	Hobbs	Airport	Chocks	Hobb	os Duration	n Hrs	Hrs	Actvity				
- when it	t has	to be	right	C		a	u	1 PI	IKO	19:12		PHKO	23:42		4:30	4.50						
					Geos	syste	ms	2		 	<u> </u>		1						—IF	lia	ht l	_od
NWG Job	#		Pro	ject Na	me		Ope	rator	S	SH I	CU	Moun	t			MM	Mode	MM-1		Down	load-1	
S19-01	0		Hav	, waii S	PL		Mark	Doll	-	7						Sir	ngle	SPL025				
Flight Dat	te	GPS	Day	Lift	Sys	stem	Pi	lot	Su	un°	Solar Ti	mes (UTC)	Wir	nd Dir°	Wind (knts)			MM-2	[Jown	load-2	
17-Dec-	19	19-3	851	13	SPI	L007	Derek I	Malone	≥3	80°												
Mission	ID (yy	mmdd_Sen	_Job_Lift)		Air	craft	Airport ID	FMS	UTC	AMT (ft) Speed	IT	СТ	Co	nfiguration	GSD	km/WPT	Compression	Sh	ippin	g Track	(76
I9I2I Base 1 ID	/_00/	_5190	IU_I3			155 0 D			-10	Start Time	180kts	Auto			I-Res All	Filename		Operato	///2	2 783 T	30 12	/5
1321		Kona	a. HI		i te		Antib	15			= (UTC)	Stop		.)	00163	510.PD0	2	Mark Do	oll		Da	la
1021	Lin		, \/	/nt	Dist	ance		10	Flight	Altitude	Speed	Integ			Comme	ants and (Conditions					
A				-рс - т.	Dist		Otaut				(limeta)	Time			Comme		Jonations					0
Area	NVVG	Clients	From	10	Begin	End	5tart 19:05:00	19:10:00	Dir	(GP3)	(knots)	Time	static						5	vs i	DOP	Sun
							19:32:00	19:35:00					s-turn						_	-		
B2	2062				11	0	19:39:00	19:41:00	N	18.800	180		complete	e						24	11	32
	2063				0	14	19:45:00	19:47:00	s s	18,100	180		complete	- 9						25	1.1	33
	2064				16	0	19:52:00	19:55:00	N	17,600	180		complete	e						25	1.1	34
	2065				0	18	19:58:00	20:02:00	S	17,000	180		complete	e					- 2	26	1.0	35
	2066				19	0	20:05:00	20:09:00	N	16,600	180		complete	Э					2	25	1.1	37
	2067				47	0	20:19:00	20:27:00	N	16,500	180		complete	e					2	23	1.5	39
	2068				0	49	20:31:00	20:40:00	S	16,600	180		complete	Э					2	24	1.2	40
	2069				50	0	20:44:00	20:53:00	N	16,600	180		complete	Э					2	24	1.3	42
	2070				0	52	20:57:00	21:07:00	S	16,600	180		complete	e					2	26	1.2	43
	2071				54	0	21:11:00	21:20:00	N	16,500	180		complete	e, cu at	19-13km				2	26	1.2	44
													cu to the	east, h	eading to D2							
													s-turn							\square		
D2	2183				22	0	21:30:00	21:34:00	W	22,500	180		complete	e					2	27	1.1	45
	2184				0	30	21:37:00	21:43:00	E	22,500	180		complete	9					2	27	1.2	46
	2185				33	0	21:50:00	21:56:00	W	22,500	180		complete	e					2	26	1.2	47
	2186				0	35	22:00:00	22:06:00	E	22,500	180		complet	e				(0.7)	2	26	1.1	47
	2187				36	0	22:11:00	22:17:00	W	22,500	180		complete	e, check	tor cu at wes	stern ext	ent of line	e (0-5km) overlap?	2	21	1.2	47
	2188				0	36	22:20:00	22:27:00	E	22,500	180		complet	e, check	for cu at wes	stern ext	ent of line	e (0-5km)	2	20	1.1	47
	2189				36	0	22:31:00	22:38:00	W	22,500	180		complet	e, check	tor cu at wes	stern ext	ent of line	e (0-5km)	2	2	1.0	47
	2190				0	36	22:42:00	22:49:00	E	22,500	180		complet	e, check	tor cu at wes	stern ext	ent of line	e (U-7km)	1	9	1.1	47
	2191				11	0	22:55:00	22:57:00	W =	22,500	180		complete	9					1	9	1.1	46
	2192				0	29	23:00:00	23:05:00	Ε	22,500	180		complet	e					1	9	1.1	46

					-		14.6			Lift Begin			Lift End		Flt	Flt	Hobbs				
					P			Lift Aiı	rport	Chocks	Hobbs	Airport	Chocks	Hobbs	Duration	Hrs	Hrs	Actvity			
- when	it has	to be	right	t (L	u	u	1 PI	HKO	19:12		PHKO	23:42		4:30	4.50					
					Geo	svste	ms	2											—Flia	thr	l oq
								3									Maala		_ <u>````</u>	<u> </u>	LUY
NVVG JOI	0# I 0		Pro		me DI		Ope Mort	rator Coll		7 7	CU	Mour							Dov	/nload-1	
Elight Da		GPS	Па			tom				/ In°	Solar Ti		Wing	1 Dir ^o Wi	nd (knte)	31	igie	SPL025	Dov	nload-2)
17-Dec-	.10	19_1	251	13		007	Derek	Malone		80°	Solar Ti	mes (010)	VVIIC					11111-2	Dov	/iiiuau-2	•
Mission					Air	craft		FMS		AMT (ft)	Speed	Г ІТ		Config	uration	GSD	km/W/PT	Compression	Shipr	ing Tra	ck
19121	17 007	7 S190	10 13		NS)5S	PHKO	FCMS	-10		180kts	Auto	Auto	Hi-R	es All			Compression	7772 7	836 1	275
Base 1 ID	 	Loca	ation		Re	c ID	Ant ID	ARP (m)		I Start Time	(UTC)	Stop	Time (UTC))	GPS F	l Filename		Operator			ata
1321		Kona	a, HI					1.5	1			İ İ			00163	510.PD0	c	Mark Do	II		
	Li	ne ID	l v	/pt	Dist	ance	U	ГС	Flight	Altitude	Speed	Integ			Comme	nts and (Conditions				
Area	NWG	Client's	From		Begin	End	Start	End	- Dir	(GPS)	(knote)	Time							SV/c	PDOP	Sup
Alea	2102				20		22:00:00	21.15.00		22 500	190	Time	aomploto						10	1 2	45
	2193	<u> </u>					23.09.00	23.20.00		22,500	100								19	1.2	40
	2194					0	23.19.00	23.20.00		22,300	100		complete						19	1.3	45
		<u> </u>		<u> </u>		<u> </u>	23:21:00	23.24.00					s-turn								
							23:46:00	23.51.00	/				static								
		i 				i 		 													
	_																				
		<u> </u>		<u> </u>		<u> </u>															
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					0		14.6			Lift Begin			Lift End		Flt	Flt	Hobbs				
					P			Lift A	irport	Chocks	Hobbs	Airport	Chocks	Hobbs	s Duration	Hrs	Hrs	Actvity			
- when it	t has	to be	right	c	Je	u	a	1 F	HKO	19:12		PHKO	23:42		4:30	4.50					
			-		Con	wata	-	2			{									aht	
					Geos	syster	115	3												gni	LUY
NWG Job	#		Pro	ject Na	me		Oper	rator	S	Н	CU	Moun	t			MM	Mode	MM-1	Do	wnload-1	I
S19-010	0		Hav	waii S	PL		Mark	Doll	-	7						Sir	ngle	SPL025			
Flight Dat	te	GPS	Day	Lift	Sys	stem	Pil	lot	Su	ın°	Solar Ti	mes (UTC)	Wir	nd Dir°	Wind (knts)			MM-2	Do	wnload-2	2
17-Dec-1	19	19-3	851	13	SPL	.007	Derek I	Malone	≥3	0°											
Mission	ID (y	/mmdd_Sen	_Job_Lift)		Airo	craft	Airport ID	FMS	UTC	AMT (ft)	Speed	IT	ĊT	Cor	nfiguration	GSD	km/WPT	Compression	Ship	ping Trad	ck
19121	7_007	_S190 ⁻	10_13		N9	5 S	PHKO	FCMS	-10		180kts	Auto	Auto	Hi	-Res All				7772	7836 12	275
Base 1 ID		Loca	ation		Re	c ID	Ant ID	ARP (m)		Start Time	(UTC)	Stop	Time (UTO	C)	GPS I	Filename		Operato	r	D	Jata
1321		Kona	a, HI					1.5							00163	510.PD0	0	Mark Do	bll		
	Line ID Wpt Distance		ance	UT	TC	Flight	Altitude	Speed	Integ			Comme	nts and (Conditions							
Area	NWG	Client's	From	То	Begin	End	Start	End	Dir	(GPS)	(knots)	Time							SVs	PDOF	Sun°

					0		14.6				Lift Begin			Lift E	End		Flt	Flt	Hobbs				
					P			Lift	Airp	port	Chocks	Hobbs	Airport	Choo	cks	Hobbs	Duration	Hrs	Hrs	Actvity			
- when it	has	to be	right	•	Le	a	u	1	PH	IKO	18:11		PHKO	20:3	35		2:24	2.40					
					Geos	svste	ms	2						1							-Fli	thr	ο ο
NWG Job	#		Pro	iect Na	me		One	3 erator		S	н	CU	Moun	t				MM	Mode	MM-1	Dov	nload-1	209
S19-01	0		Hav	waii S	PL		Mark	k Doll		-	7	00	Would					Sir	nale	SPI 024	Do	inioud i	
Flight Dat	te	GPS	Day	Lift	Sys	stem	Pi	ilot		Su	un°	Solar Ti	mes (UTC)	١	Wind	l Dir° W	ind (knts)		.9.0	MM-2	Dov	nload-2	2
18-Dec-	19	19-3	352	14	SPL	_007	Danie	el Choi		≥3	80°												
Mission	ID (y	/mmdd_Sen	_Job_Lift)		Air	craft	Airport ID	FM	S	UTC	AMT (ft)	Speed	IT	СТ	Γ	Config	guration	GSD	km/WPT	Compression	Shipp	ing Trad	ck
19121	8_007	'_S190 ⁻	10_14		N9	95S	PHKO	FCN	/IS	-10		180kts	Auto	Aut	to	Hi-R	es All				7772 9	147 6	999
Base 1 ID	e 1 ID Location Rec ID Ant I										Start Time	e <mark>(</mark> UTC)	Stop	Time	(UTC)		GPS	Filename		Operator		D	ata
1321		Kona	a, HI	_				1.3	5					-			00163	520.PD0	5	Mark Do	II		
	Liı	ne ID	V	Vpt	Dist	ance	U	ТС		Flight	Altitude	Speed	Integ				Comme	ents and (Conditions				
Area	NWG	Client's	From	То	Begin	End	Start	End	d	Dir	(GPS)	(knots)	Time								SVs	PDOF	Sun°
							18:01:00	18:0	6:00					static									
							18:36:00	18:3	8:00					s-turn	I								
C1	2135					0	18:40:00	18:4	6:00	Ν	19,600	180		comp	lete						23	1.2	22
	2137				0		18:56:00	18:5	9:00	S	19,600	180		on line	, fran	ne camera fi	ring, SPL NO	T firing n	o red error o	n GUI reboot & refly	19	1.2	25
	2137					0	19:13:00	19:1	5:00	Ν	19,600	180		comp	lete						19	1.1	28
	2139				0		19:19:00	19:2	3:00	S	19,600	180		comp	lete						19	1.1	29
	2141					0	19:26:00	19:2	8:00	Ν	19,600	180		comp	lete						20	1.1	30
	2144					0	19:37:00	19:4	0:00	Ν	19,600	180		on line	, fran	ne camera fi	ring, SPL NO	T firing n	o red error c	n GUI reboot & refly	21	1.1	32
	2147				0		19:45:00	19:5	0:00	S	19,600	180		comp	lete						22	1.1	33
	2144					0	19:54:00	19:5	9:00	N	19,600	180		comp	lete						22	1.2	34
	2150				0		20:05:00	20:0	6:00 2:00	S	19,600	180		Abort I	line -	on line, fra	ne camera fi	ring, SPL	NOT firing	- Return to base	23	1.1	36
							20:08:00	20:1	2:00					s-lurn	1								
							20.43.00	20.4	0.00					Static									

					•	14.6	6			Lift Begin			Lift End		Flt	Flt	Hobbs				
					Pair		Lift	Air	port	Chocks	Hobbs	Airport	Chocks	Hobbs	Duration	Hrs	Hrs	Actvity			
- when i	t has	to be	right		Jeu	u	1	PH	IKO	18:11		РНКО	20:35		2:24	2.40					
					Geosyste	ms	2	_											_FI	iaht	
	# 1		Dre	is of Max		0.	3					Marrie					Mada			911	<u> </u>
S10-01	^#			yectiva Woli Q	nie DI	Mar	erator Ir Doll	1		7	CU	Moun	n						D	ownioad	1
Elight Da	v	GPS	Dav		F L System	F	Pilot		 Si	/ In°	Solar Ti	mes (UTC)	Win	d Dir° M	(ind (knts)		Igie	MM-2	D	wnload-	2
18-Dec-	19	19-3	352	14	SPI 007	Dani	el Cho	oi	>3	so°	eela n	1100 (010)							5	milouu	-
Mission	ID (yyr	nmdd Sen	Job Lift)		Aircraft	Airport ID	F	MS	UTC	AMT (ft)	Speed	IT	ГСТ	Config	guration	GSD	km/WPT	Compression	Sh	ping Tra	ack
19121	8_007_	_S190 ⁻	10_14		N95S	РНКО	FC	CMS	-10		180kts	Auto	Auto	Hi-F	les All				7772	9147	6999
Base 1 ID		Loca	tion		Rec ID	Ant ID	AR	P (m)		Start Time	(UTC)	Stop	Time (UTO	C)	GPS	Filename		Operato	r		Data
1321		Kona	a, HI				1	.5							00163	520.PD	C	Mark Do)II		
	Line	e ID	W	/pt	Distance	U	тс		Flight	Altitude	Speed	Integ			Comme	ents and (Conditions				
Area	NWG	Client's	From	То	Begin End	Start	E	nd	Dir	(GPS)	(knots)	Time							SI	s PDO	P Sun°
																					Ī
							-														
							<u> </u>														
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					0		14.6			Lift Begin			Lift End		Flt	Flt	Hobbs				
					P			Lift Ai	irport	Chocks	Hobbs	Airport	Chocks	Hobbs	Duration	Hrs	Hrs	Actvity			
- when it	has	to be	right	•	Je	u	a	1 P	HKO	18:11		PHKO	20:35		2:24	2.40					
			-		Con	weto	ma	2			-									ht l	
					Geos	syster	115	3											LIÍ	JIILI	LUY
NWG Job	#		Pro	ject Na	me		Ope	rator	S	H	CU	Moun	t			MM	Mode	MM-1	Dow	nload-1	
S19-01	9-010 Hawaii SPL		Mark	Doll		7						Sir	igle	SPL024							
Flight Dat	e	GPS	Day	Lift	Sys	tem	Pi	ot	Su	ın°	Solar Ti	mes (UTC)	Win	d Dir°	Wind (knts)			MM-2	Dow	nload-2	
18-Dec-1	19	19-3	352	14	SPL	.007	Danie	l Choi	≥3	0°											
Mission	ID (y	/mmdd_Sen	_Job_Lift)		Airo	craft	Airport ID	FMS	UTC	AMT (ft)	Speed	IT	ĊT	Con	figuration	GSD	km/WPT	Compression	Shippi	ng Trac	ж
19121	Mission ID (yymmdd_Sen_Job_Lift) Aircraft 191218_007_S19010_14 N95S		PHKO	FCMS	-10		180kts	Auto	Auto	Hi-	Res All				7772 9	147 69	999				
Base 1 ID		Loca	ation		Re	c ID	Ant ID	ARP (m)		Start Time	(UTC)	Stop	Time (UTC	C)	GPS F	Filename		Operator		Da	ata
1321		Kona	a, HI					1.5							00163	520.PD0	>	Mark Do	1		
	Line ID Wpt Distance			UT	C	Flight	Altitude	Speed	Integ			Comme	nts and C	Conditions							
Area	NWG	Client's	From	То	Begin	End	Start	End	Dir	(GPS)	(knots)	Time							SVs	PDOP	Sun°

					0		14.6				Lift Begir			Lift End			Flt	Flt	Hobbs					
					P			Lift	Air	port	Chocks	Hobbs	Airport	Chocks	Ho	lobbs	Duration	Hrs	Hrs	Actvity				
- when it	t has	to be	right	c	Je	u	u	1	PH	IKO	18:39		PHKO	20:12			1:33	1.60						
					Geos	syste	ms	2				1		1							— F	lia	ht l	nd
	#		Dro	ia at Na		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	0.00	3					Mour	+				NANA	Mada		_Ľ,	ng av		<u>_09</u>
S10-01	• •			yectiva Woli S	me DI		Ope Mad	rator k Do	1		7	CU	WOUN	IL III				Sir			L	own	oau-i	
Elight Dat	v te	GPS	Dav	ift	FL Svs	stem	P	ilot		Si	/ In°	Solar T	mes (UTC)	Wi	nd Dir	° Win	nd (knts)	SI	iyie	SFL000 MM-2	г	own	oad-2	
24-Dec-	19	19-3	358	15	SPI	007	Danie	al Ch	oi	>	30°	Coldi 1	11100 (010)								-			
Mission	ID (y	ymmdd Sen	Job Lift)	10	Air	craft	Airport ID		MS	UTC	AMT (ft) Speed	IT	СТ		Configu	ration	GSD	km/WPT	Compression	Sh	ippin	g Trac	k
19122	4 007	, S190.	10 15		NS	95S	РНКО	F	CMS	-10	,	180kts	Auto	Auto		Hi-Re	s All	-			777	3 36	_ 19 85	560
Base 1 ID		Loca	ation		Re	c ID	Ant ID	AF	RP (m)		Start Tim	e (UTC)	Stop	Time (UT	C)		GPS F	ilename		Operato	r		Da	ata
1321		Kona	a, HI						1.5								001635	580.PD0	0	Mark Do	bli			
	Lii	ne ID	V	/pt	Dist	ance	U	тс		Flight	Altitude	Speed	Integ	-			Comme	nts and (Conditions			ſ		
Area	NWG	Client's	From	То	Beain	End	Start		End	Dir	(GPS)	(knots)	Time								s	vs I	PDOP	Sun°
					5		18:33:00	18	:38:00		, ,	~ /		static							-			
							19:04:00	19	:06:00					s-turn								+		
							19:15:00	19	:25:00	W				SPL REL	ERR	ROR "coi	mmanded	to fire bu	t not firing"	REBOOT/REFLY	2	6	1.1	29
D1	2180				7	0	19:27:00	19	:28:00	E		180		reflight,	comp	olete					2	6	1.1	29
	2179				7	0	19:36:00	19	:38:00	E		180		reflight,	comp	olete					2	5	1.1	31
	2178				7	0	19:47:00	19	:49:00	E		180		SPL cal	bratio	on line,	complete							
														cu rapid	ly dev	velopin	g from the	e east	return to	base				
							19:50:00	19	:52:00					s-turn										
							20:17:00	20	:23:00					static										
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					0		14.	6			Lift Begin			Lift End	ł		Flt	Flt	Hobbs					
					P			Lift	Air	port	Chocks	Hobbs	Airport	Chocks	Hobb	s Du	Iration	Hrs	Hrs	Actvity				
- when i	t has	to be	right	t (L	u	u	1	PH	IKO	18:39		РНКО	20:12			1:33	1.60						
					Geos	svste	ms	2														-lio	iht I	nu
	. 4 Т		Dre	is at Nav			0	3					Main					N 4 N 4	Mada					-09
C10_01	^ <i>#</i>			voii C	me DI		ορ Μα	rk Dol			o⊓ 7	CU	Iviour	"				NIN Sir				Dowr	1020-1	
Elight Da	v te	GPS	Dav	I lift		tem	Ivia		•	S	/ un°	Solar T		Wi	nd Dir°	Wind (k	nts)	01	igie	MM-2		Dowr	lload-2	
24-Dec-	19	19-3	358	15	SPI	007	Dani	iel Ch	oi	23	so°	Colur 1								101101-2		Down		
Mission	ID (yy	mmdd Sen	Job Lift)		Airo	craft	Airport ID	F	MS	UTC	AMT (ft)	Speed	IT	 СТ		nfiguratio	n	GSD	km/WPT	Compression		Shippi	ng Trac	k
19122	4_007	S190 ⁻	10_15		N9	55	РНКО	F	CMS	-10		180kts	Auto	Auto	н	i-Res Al	1				77	73 30	5 ¹ 9 8	560
Base 1 ID		Loca	ation		Red	c ID	Ant ID	AR	P (m)		L Start Time	e (UTC)	Stop	D Time (UT	C)		GPS F	ilename		Operato	or		Da	ata
1321		Kona	a, HI						.5	1			1			0	01635	580.PD	0	Mark Do	oll			
	Lin	ne ID	V	/pt	Dista	ance	ι	JTC		Flight	Altitude	Speed	Integ			С	ommer	nts and (Conditions					
Area	NWG	Client's	From	То	Begin	End	Start		Ind	Dir	(GPS)	(knots)	Time									SVs	PDOP	Sun°
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					0		14.6			Lift Begin			Lift End		Flt	Flt	Hobbs				
					P			Lift Ai	irport	Chocks	Hobbs	Airport	Chocks	Hobbs	Duration	Hrs	Hrs	Actvity			
- when it	has	to be	right	•	Je	u	a	1 P	HKO	18:39		PHKO	20:12		1:33	1.60					
			-		Con	weto	ma	2			-									ht l	
					Geos	syster	115	3											ΓII	JIILI	LUY
NWG Job	#		Pro	ject Na	me		Ope	rator	S	Н	CU	Moun	t			MM	Mode	MM-1	Dow	nload-1	1
S19-01	0		Ha	waii S	PL		Mark	Doll		7						Sir	ngle	SPL006			
Flight Dat	e	GPS	Day	Lift	Sys	tem	Pi	ot	Su	ın°	Solar Ti	mes (UTC)	Win	d Dir°	Wind (knts)			MM-2	Dow	nload-2	-
24-Dec-1	19	19-3	358	15	SPL	.007	Danie	l Choi	≥3	0°											
Mission	ID (y	mmdd_Sen	_Job_Lift)		Airo	craft	Airport ID	FMS	UTC	AMT (ft)	Speed	IT	ĊT	Con	figuration	GSD	km/WPT	Compression	Shipp	ing Trac	ж
19122	4_007	_S190 ⁻	10_15		N9	5S	PHKO	FCMS	-10		180kts	Auto	Auto	Hi-	Res All				7773 3	619 8	560
Base 1 ID		Loca	ation		Re	c ID	Ant ID	ARP (m)		Start Time	(UTC)	Stop	Time (UTC	;)	GPS F	ilename		Operator	r	D	ata
1321		Kona	a, HI					1.5							00163	580.PDC)	Mark Do)II		
	Liı	ne ID	V	/pt	Dista	ance	UT	C	Flight	Altitude	Speed	Integ			Comme	nts and C	Conditions				
Area	NWG	Client's	From	То	Begin	End	Start	End	Dir	(GPS)	(knots)	Time							SVs	PDOP	Sun°

					0		14.6			Lift Begii	1		Lift End		Flt	Flt	Hobbs					
					P			Lift Air	port	Chock	s Hobbs	Airport	Chocks	Hobbs	Duration	Hrs	Hrs	Actvity				
- when it	has	to be	right	•	L	a	u	1 PH	IKO	18:32	2	PHKO	22:06		3:34	3.60		Calibration				
					Geos	svste	ms	2											I	Flic	iht l	
NW/C Job # Project Name				One	3 erator	S	н	CU	Моци	+			MM	Mode	MM-1	•	Dowr	load-1	-09			
S19-010	" C		Ha	waii S	PL		Peter	Hrabak	SPL	.007	33565	1891	7			Single SPI 021				Bowinioud		
Flight Dat	е	GPS	Day	Lift	Sys	stem	Р	lot	Su	un°	Solar Ti	mes (UTC)	Win	d Dir° W	ind (knts)			MM-2		Download-2		
2-Jan-2	0	20-0	002	16	S	PL	Dynam	ic Crew										SPL021				
Mission	ID (y	ymmdd_Sen	_Job_Lift)		Air	craft	Airport ID	FMS	UTC	AMT (f	t) Speed	IT	СТ	Config	guration	GSD	mi/WPT	Compression	S	Shipping Track		
200102_	SPL0	07_S19	010_ ⁻	16	NS	95S	PHKO	FCMS	-10	variab	le ≤180						77	7773 8317 0931) 31		
Base 1 ID	i	Loca	ation		Re		Ant ID	ARP (m)		Start Tim		Stop	ο Time (υτα	2)	GPS I	Filename		Operato	or Is a l	Data		
РНКО ГВО	Sigr	hature FI	ignt pa	arking	18	321	1321	1.75	_	17:	30		23:00		00160	020.PCI	<u> </u>	Peter Hra	Dak		F	IP
	Lii	ne ID	V	/pt	Dist	ance	U'	TC	Flight	Altitud	e Speed	Integ	Comments and Conditions									
Area	NWG	Client's	From	То	Begin	End	Start	End	Dir	(GPS) (knots)	Time								SVs	PDOP	Sun°
							18:25:00	18:31:00	<				(static	@PHKO)	(S-turns @	18:59 to	o 19:03z)					
C1	2146				0	28	19:09:00	19:14:00	S	20400)' 180	19.3	skc, grea	at vis, smo	oth			(COMPLE	TE)	22	1.2	26
C1	2149				28	0	19:21:00	19:27:00	Ν	20300)' 175	19.5	skc, great vis, smooth (COMPLETE)					TE)	22	1.3	28	
C1	2152				0	29	19:33:00	19:39:00	S	20200)' 175	19.7	skc, great vis, smooth (COMPLETE)					TE)	22	1.2	30	
C1	2154				46	0	19:47:00	19:56:00	Ν	19600)' 175	20.6	skc, great vis, smooth (COMPLETE)				TE)	23	1.3	33		
C1	2156				0	45	20:02:00	20:11:00	S	19600)' 175	20.7	skc, great vis, smooth (COMPLETE)				TE)	23	1.2	35		
C1	2158				44	0	20:17:00	20:26:00	Ν	19600)' 175	20.6	skc, great vis, smooth (COMPLETE)				TE)	24	1.2	37		
C1	2160				0	43	20:32:00	20:40:00	S	19600)' 180	20.6	skc, grea	at vis, smo	oth			(COMPLE	TE)	23	1.2	39
C1	2162				42	0	20:46:00	20:54:00	N	19600)' 175	20.6	skc, grea	at vis, smo	oth			(COMPLE	TE)	23	1.2	41
													RESTA	RTED SPL	DUE TO L	ASER	NOT STO	PPING FIRING				
C1	2164				0	75	21:09:00	21:23:00	S	19600)' 180	20.6	very few	below, gre	eat vis, smo	ooth (clo	ouds 53-5	58km) (COMPLET	TE)	22	1.2	44
C1	2165				50	0	21:28:00	21:29:00	N	19600)' 175	20.7	LASER	DID NOT	FIRE/COLL	ECT				20	1.2	46
C1	2165				50	0	21:??	21:38:00	N	19600)'				-IRE/COLL		04.40.					
							22:10:00	22:15:00	<				(static	@PHKO)	(S-lums @	21:39 10) 21:422)					

					0		14.6			Lift Begir			Lift En	d		Flt	Flt	Hobbs					
					P			Lift Air	port	Chocks	Hobbs	Airport	Chocks	i H	lobbs	Duration	Hrs	Hrs	Actvity				
- when it	has	to be	right	•	Le	a	u	1 Pł	IKO	18:51		PHKO	22:10			3:19	3.30		Production				
					Geos	syste	ms	2			<u> </u>			-						— F	=lic	iht l	Loa
NWG Job	#		Pro	iect Na	me		Ope	Operator SH CU		Moun	t				MM	Mode	MM-1		Dowr	load-1	9		
S19-01	0		Ha	waii S	PL		Peter	Hrabak	SPL	.007	33565	1891	7				Sir	ngle	SPL008				
Flight Dat	е	GPS	Day	Lift	Sys	stem	Р	ilot	Su	un°	Solar Ti	mes (UTC)	Wi	nd Dir	r° Winc	d (knts)		-	MM-2		Download-2		
6-Jan-2	0	20-0	006	16	S	PL	Dynam	ic Crew					^	000	~4	0 kts			SPL008				
Mission	ID (y	ymmdd_Sen	_Job_Lift)		Air	craft	Airport ID	FMS	UTC	AMT (ft) Speed	IT	CT		Configur	ation	GSD	mi/WPT	Compression	S	Shipping Track		k
200106_	SPL0	07_S19	010_	16	N9	95S	PHKO	FCMS	-10	variabl	e ≤180	Char	-			CDC I			Oreanete	77.	773 9873 3774		
	Sigr	Loca	iaht na	rking	Re 11	221	Ant ID	ARP (m)		Start 11m		Stop	> Time (U⊺ ∼?3∙∩∩	C)		GPS F			Operator Poter Hral	r bak		Da E	ata TD
PHKO PBO	Sigi		ignt pe		Diet	521	1321	1.75	Eli ale 4	A 1616 vol a		lute a	23.00	-		001000		Dour dittion o	Feler fild				
A			V	ирі Т.	Dist		0 Otaat	TC Fred	Flight		Speed	Integ	Comments and Conditions						0)/-		0		
Area	NVVG	Clients	From	10	Begin	End	5tart	Ellu	Dir	(GPS)	(knots)	Time	(atatia	ØDL		turna	10:04 to	10.12-)		_	SVS	PDOP	Sun
D 2	0400				0	44	18:44:00	10:49.00	<	22500			(static @PHKO) (S-turns @19:04 to 19:13z)					25	1.0	07			
D2	2190				0	- 11	19:17:00	19.20.00		22500	180	20.4	skc, -nz, smooth (REFLIGHT COMPLETE					25	1.2	27			
D2	2189				11	0	19:24:00	19.27.00	VV	22500	180	20.4	skc, -hz, smooth (REFLIGHT COMPLETE)					25	1.2	29			
D2	2188				0	11	19:32:00	19:34:00	E	22500	175	20.4	skc, -hz, smooth (PARALLEL FOR CALIB)				.IB) тс\	26	1.2	30			
B3	2091				41	24	19:47:00	19:50:00	S	16500	180	20.8	skc, -fiz, conti-turb (REFLIGHT COMPLETE)				TE)	26	1.1	33			
B3	2092				6	50	19:57:00	20:06:00	N	16500	170	20.9	skc, -nz, cont -turb (REFLIGHT COMPLETE)			IE)	26	1.2	35				
B3	2093				30	20	20:11:00	20:13:00	S	16500	195	20.9	skc, -nz, smooth (PARALLEL FOR CALIB)			IB)	26	1.2	37				
								00.07.00		40000			laser did not fire due to >15 degree roll message, recycled system			n TEV							
C1	2163				34	0	20:30:00	20:37:00	N	19600	175	20.7	SKC, -NZ	, cont					(COMPLE	TE)	24	1.2	39
C1	2161				0	29	20:41:00	20:46:00	S	19600	190	20.6	SKC, -NZ	, cont	t -turb				(COMPLE		25	1.0	41
C1	2159				27	0	20:53:00	20:58:00	N	19600	165	20.6	skc, -nz	, con					(COMPLE		20	1.3	42
01	2157				0	26	21:03:00	21:08:00	S	19600	190	20.7	skc, -nz	, con					(COMPLE		22	1.1	43
	2155				25	0	21:14:00	21.20.00	N	19600	170	20.0	skc, -nz		t turb				(COMPLE		19	1.2	45
	2155				0	24	21.24.00	21.20.00	5	19000	190	20.7	skc, -Hz	, cont	t turb						20	1.2	40
	2150				23	50	21.34.00	21.59.00		19000	105	20.0	SKC, -nz, cont -turb (COMPLETE)				лс) цт)	20	1.1	40			
CI	2104				60	50	21.47.00	21.30.00	IN	19000	160	20.5	(ototio			turna	21.50 to	21.54-)	CALLED REFLIGI	,	19	1.2	47
							22.10.00	22.21.00	<				(static	@FF	10) (3	-turns @	21.50 10	0 21.042)					<u> </u>
					 	 																	
					<u> </u>	<u> </u>					-												
					<u> </u>	<u> </u>					-												
											_												

Appendix 2: Acquisition GPS Times

Lift Name	Lift Date	Start Time (GPS seconds)	End Time (GPS)				
204	1/30/2018	201384385	201385076				
205	1/30/2018	201385389	201386109				
206	1/30/2018	201386395	201387080				
207	1/30/2018	201387372	201388081				
208	1/30/2018	201388433	201388815				
210	1/30/2018	201389901	201390280				
211	1/30/2018	201390614	201391004				
148	1/31/2018	201462249	201462352				
147	1/31/2018	201462820	201462929				
146	1/31/2018	201463258	201463372				
145	1/31/2018	201463962	201464091				
144	1/31/2018	201464427	201464542				
143	1/31/2018	201465303	201465413				
142	1/31/2018	201465744	201465856				
141	1/31/2018	201466780	201466886				
151	1/31/2018	201467753	201467999				
150	1/31/2018	201468345	201468544				
149	1/31/2018	201468884	201469077				
152	1/31/2018	201469429	201469695				
153	1/31/2018	201470965	201471214				
155	1/31/2018	201472654	201473254				
157	1/31/2018	201475408	201475411				
282	1/31/2018	201476140	201476320				
169	2/1/2018	201548606	201548784				
170	2/1/2018	201549121	201549303				
171	2/1/2018	201549656	201549836				
172	2/1/2018	201550172	201550379				
173	2/1/2018	201550739	201550957				
174	2/1/2018	201551289	201551521				
237	2/1/2018	201553165	201553428				
236	2/1/2018	201553889	201554303				

Lift Name	Lift Date	Start Time (GPS seconds)	End Time (GPS)
235	2/1/2018	201554628	201555074
234	2/1/2018	201555413	201555873
232	2/1/2018	201557063	201557571
203	2/1/2018	201557866	201558560
159	2/1/2018	201560153	201560844
160	2/1/2018	201561182	201561890
161	2/1/2018	201562249	201562856
202	2/2/2018	201634338	201635031
193	2/2/2018	201635329	201635651
192	2/2/2018	201636006	201636313
191	2/2/2018	201636625	201636939
190	2/2/2018	201637268	201637578
1	2/2/2018	201637912	201638248
2	2/2/2018	201638663	201639035
3	2/2/2018	201639350	201639786
4	2/2/2018	201640060	201640514
558	2/3/2018	201729796	201730062
557	2/3/2018	201730431	201730806
556	2/3/2018	201731131	201731554
555	2/3/2018	201731883	201732321
189	2/6/2018	201986235	201986516
188	2/6/2018	201986857	201987157
187	2/6/2018	201987494	201987790
186	2/6/2018	201988090	201988394
162	2/9/2018	202239615	202240238
163	2/9/2018	202240573	202241301
164	2/9/2018	202241594	202242154
165	2/9/2018	202242518	202243161
166	2/9/2018	202243512	202243995
167	2/9/2018	202244328	202244957
168	2/9/2018	202245271	202245746
328	2/9/2018	202246398	202247281
329	2/9/2018	202247655	202248325
330	2/9/2018	202248647	202249587
Lift Name	Lift Date	Start Time (GPS seconds)	End Time (GPS)
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10203	2/13/2018	202517063	202517751
10205	2/13/2018	202518016	202518717
10206	2/13/2018	202518990	202519686
10207	2/13/2018	202519950	202520641
559	2/16/2018	202860670	202860818
560	2/17/2018	202861144	202861282
561	2/17/2018	202861606	202861773
562	2/17/2018	202862065	202862205
563	2/17/2018	202862543	202862713
564	2/17/2018	202863024	202863137
565	2/17/2018	202863429	202863581
566	2/17/2018	202863904	202864029
515	2/19/2018	203103494	203103660
463	2/19/2018	203104063	203104241
462	2/19/2018	203104579	203104774
461	2/19/2018	203105048	203105254
460	2/19/2018	203105576	203105780
459	2/19/2018	203106085	203106293
458	2/20/2018	203188992	203189181
355	2/20/2018	203190122	203190233
354	2/20/2018	203190583	203190762
353	2/20/2018	203191061	203191213
352	2/20/2018	203191586	203191759
351	2/20/2018	203192131	203192366
350	2/20/2018	203192689	203192929
349	2/20/2018	203193194	203193495
348	2/20/2018	203193855	203194155
347	2/20/2018	203194543	203194843
345	2/20/2018	203195225	203195521
346	2/20/2018	203195958	203196127
398	2/20/2018	203196404	203196579
1121	3/2/2018	204053722	204054493
1122	3/2/2018	204054820	204055597
1221	3/2/2018	204056664	204056847

Lift Name	Lift Date	Start Time (GPS seconds)	End Time (GPS)
1220	3/2/2018	204057241	204057496
1219	3/2/2018	204057805	204058040
1218	3/2/2018	204058348	204058661
1217	3/2/2018	204058951	204059233
1059	3/4/2018	204224239	204224511
1058	3/4/2018	204225094	204225454
1065	3/4/2018	204226319	204226875
1066	3/4/2018	204227459	204228023
1067	3/4/2018	204228250	204228760
1068	3/4/2018	204228998	204229500
1216	3/6/2018	204399280	204399616
1215	3/6/2018	204399928	204400238
1214	3/6/2018	204400605	204400957
1213	3/6/2018	204401296	204401608
1212	3/6/2018	204401951	204402315
1211	3/6/2018	204402653	204403001
1171	3/7/2018	204488182	204489262
1169	3/7/2018	204490976	204492026
1168	3/7/2018	204492280	204493329
1167	3/7/2018	204493995	204494454
1166	3/7/2018	204495031	204495975
1057	3/8/2018	204570903	204571301
11058	3/8/2018	204571732	204571745
11059	3/8/2018	204572300	204572488
1056	3/8/2018	204572832	204573240
1055	3/8/2018	204573559	204573999
1054	3/8/2018	204574306	204574733
1053	3/8/2018	204575025	204575441
1052	3/8/2018	204575727	204576120
1060	3/10/2018	204744792	204745022
1061	3/10/2018	204745328	204745580
1062	3/10/2018	204745941	204746209
1063	3/10/2018	204746493	204746764
1064	3/10/2018	204747081	204747373

Lift Name	Lift Date	Start Time (GPS seconds)	End Time (GPS)
11065	3/10/2018	204747664	204747981
11066	3/10/2018	204748284	204748603
11067	3/10/2018	204748886	204749201
11068	3/10/2018	204749485	204749778
1146	3/10/2018	204750296	204750396
1147	3/10/2018	204750725	204750866
1148	3/10/2018	204751144	204751388
1149	3/10/2018	204751702	204751968
1150	3/10/2018	204752246	204752560
1151	3/10/2018	204752867	204753185
1152	3/10/2018	204753574	204753900
1050	3/11/2018	204829098	204829447
1051	3/11/2018	204829745	204830115
11052	3/11/2018	204830422	204830832
11053	3/11/2018	204831131	204831333
1049	3/11/2018	204831876	204832616
1048	3/11/2018	204832886	204833639
1047	3/11/2018	204833914	204834664
1046	3/11/2018	204834891	204835470
1045	3/11/2018	204835887	204836605
1044	3/11/2018	204836862	204837556
1043	3/11/2018	204837827	204838271
1042	3/11/2018	204838539	204838983
1234	3/11/2018	204839509	204839911
1243	3/15/2018	205175791	205175929
1242	3/15/2018	205176208	205176346
1000	3/15/2018	205177181	202863581
1001	3/15/2018	205177467	205177939
1002	3/15/2018	205178248	205178710
1003	3/15/2018	205179033	205179489
1004	3/15/2018	205179769	205180210
1005	3/15/2018	205180498	205180928
1079	3/15/2018	205181377	205181873
1078	3/15/2018	205182203	205182747

Lift Name	Lift Date	Start Time (GPS seconds)	End Time (GPS)
11056	3/27/2018	206212338	206212644
11055	3/27/2018	206212937	206213368
11054	3/27/2018	206213703	206214129
893	3/28/2018	206297943	206298723
1123	3/28/2018	206299162	206299942
1124	3/28/2018	206300357	206301016
1126	3/28/2018	206302415	206303072
1127	3/28/2018	206303422	206304027
11125	3/28/2018	206304460	206305105
1244	3/29/2018	206381432	206381572
1245	3/29/2018	206381961	206382046
21065	3/29/2018	206382597	206382797
21066	3/29/2018	206383118	206383306
21067	3/29/2018	206383590	206383752
21068	3/29/2018	206384049	206384227
1069	3/29/2018	206384820	206385518
1070	3/29/2018	206385801	206386496
1071	3/29/2018	206386794	206387484
1072	3/29/2018	206387738	206388390
1073	3/29/2018	206388698	206389338
1074	3/29/2018	206389625	206390264
1075	3/29/2018	206390591	206391195
1076	3/29/2018	206391527	206392142
1077	3/29/2018	206392454	206393042
1154	3/30/2018	206467094	206467261
1153	3/30/2018	206467729	206468067
11152	3/30/2018	206468365	206468583
11151	3/30/2018	206468864	206469071
11150	3/30/2018	206469349	206469559
1191	3/30/2018	206470352	206470388
1193	3/30/2018	206471333	206471371
1130	3/30/2018	206472096	206472492
2046	11/23/2019	258574619	258575450
2045	11/23/2019	258575026	258575090

Lift Name	Lift Date	Start Time (GPS seconds)	End Time (GPS)
2097	11/24/2019	258658003	258658199
2096	11/24/2019	258658543	258658745
2095	11/24/2019	258659120	258659187
2094	11/24/2019	258659754	258659791
2047	11/25/2019	258741494	258741599
2048	11/25/2019	258741944	258742035
2049	11/25/2019	258742341	258742426
2050	11/25/2019	258742862	258742863
2051	11/25/2019	258743616	258743837
2052	11/25/2019	258744210	258744475
2053	11/25/2019	258744841	258745119
2054	11/25/2019	258745352	258745615
2055	11/25/2019	258746624	258747241
2060	11/25/2019	258748808	258749215
2116	11/25/2019	258751871	258751950
2115	11/25/2019	258752543	258752650
2114	11/25/2019	258752915	258753054
2113	11/25/2019	258753241	258753421
2112	11/25/2019	258753712	258753998
2206	11/26/2019	258828458	258828789
2056	11/26/2019	258829414	258830004
2057	11/26/2019	258830580	258831168
2111	11/26/2019	258833252	258833590
2110	11/26/2019	258833887	258834252
2109	11/26/2019	258834529	258834911
2108	11/26/2019	258835125	258835488
2107	11/26/2019	258835736	258836088
2106	11/26/2019	258836309	258836662
2105	11/26/2019	258836968	258837318
2104	11/26/2019	258837613	258837974
2103	11/26/2019	258838274	258838685
2102	11/26/2019	258838977	258839402
2172	11/27/2019	258921636	258921681
2173	11/27/2019	258922219	258922233

Lift Name	Lift Date	Start Time (GPS seconds)	End Time (GPS)
2174	11/27/2019	258922678	258922692
2175	11/27/2019	258923272	258923294
2058	12/7/2019	259780145	258831427
2059	12/7/2019	259780394	258747686
2061	12/7/2019	259781588	258749605
2017	12/8/2019	259867836	259867857
2016	12/8/2019	259868891	259868937
2015	12/8/2019	259870000	259870071
2014	12/8/2019	259870989	259871085
2013	12/8/2019	259872237	259873040
2006	12/8/2019	259873529	259874392
2182	12/8/2019	259875220	259875394
2181	12/8/2019	259875705	259875973
2180	12/8/2019	259876246	259876536
2179	12/8/2019	259876802	259877062
2210	12/8/2019	259877742	259877943
2084	12/9/2019	259950173	259950383
2085	12/9/2019	259950645	259950874
2086	12/9/2019	259951128	259951381
2087	12/9/2019	259951929	259952505
2088	12/9/2019	259952794	259953418
2089	12/9/2019	259953655	259954228
2090	12/9/2019	259954486	259955090
2091	12/9/2019	259955330	259955875
2093	12/9/2019	259957050	259957380
2083	12/9/2019	259957729	259957831
2212	12/9/2019	259958548	259958693
2195	12/9/2019	259959100	259959276
2196	12/9/2019	259959493	259959673
2197	12/9/2019	259960066	259960085
2198	12/9/2019	259960347	259960379
2199	12/9/2019	259960725	259960844
2200	12/9/2019	259961274	259961391
2201	12/9/2019	259961616	259961734

Lift Name	Lift Date	Start Time (GPS seconds)	End Time (GPS)
2202	12/9/2019	259962224	259962232
2203	12/9/2019	259962467	259962475
2204	12/9/2019	259963017	259963017
2101	12/10/2019	260039185	260039629
2100	12/10/2019	260040022	258660600
2099	12/10/2019	260040601	260040817
2098	12/10/2019	260041456	260041632
2125	12/10/2019	260047063	260047069
2128	12/10/2019	260048039	260048051
2131	12/10/2019	260048314	260048349
2134	12/10/2019	260048888	260049176
2143	12/10/2019	260049434	260049684
2211	12/10/2019	260050367	260050724
2207	12/10/2019	260051168	260051499
2117	12/10/2019	260209724	260042610
2118	12/10/2019	260210458	260043740
2119	12/10/2019	260210874	260044046
2120	12/10/2019	260211859	260045279
2121	12/10/2019	260212918	260045541
2123	12/10/2019	260213990	260046805
2122	12/11/2019	260122488	260122655
2130	12/11/2019	260122797	260122923
2127	12/11/2019	260123927	260124066
2136	12/11/2019	260124255	260124379
2133	12/11/2019	260124604	260124737
2140	12/11/2019	260124926	260125057
2138	12/11/2019	260125306	260125446
2142	12/11/2019	260125668	260125796
2145	12/11/2019	260126008	260126157
2148	12/11/2019	260126363	260126504
2151	12/11/2019	260126740	260126898
2177	12/11/2019	260128020	258924384
2176	12/11/2019	260128273	258923660
2129	12/12/2019	260214616	260214994

Lift Name	Lift Date	Start Time (GPS seconds)	End Time (GPS)
2126	12/12/2019	260215185	260215551
2132	12/12/2019	260215816	260216113
2035	12/16/2019	260557804	260558323
2036	12/16/2019	260558590	260559204
2037	12/16/2019	260559417	260560065
2038	12/16/2019	260562036	260562677
2039	12/16/2019	260562913	260563558
2044	12/16/2019	260563856	260563938
2040	12/16/2019	260564257	260564530
2041	12/16/2019	260564746	260565012
2042	12/16/2019	260565268	260565382
2043	12/16/2019	260565591	260565702
2213	12/16/2019	260566080	260566162
2208	12/16/2019	260566950	260567323
2062	12/17/2019	260646874	260646874
2063	12/17/2019	260647149	260647227
2064	12/17/2019	260647586	260647727
2065	12/17/2019	260647962	260648091
2066	12/17/2019	260648501	260648512
2067	12/17/2019	260649237	260649537
2068	12/17/2019	260650139	260650343
2069	12/17/2019	260650678	260650696
2070	12/17/2019	260651976	260652049
2071	12/17/2019	260652287	260652418
2183	12/17/2019	260653427	260653581
2184	12/17/2019	260654021	260654214
2185	12/17/2019	260654674	260655018
2186	12/17/2019	260655598	260655626
2187	12/17/2019	260655881	260655018
2188	12/17/2019	260656814	260656886
2189	12/17/2019	260657111	260657205
2190	12/17/2019	260657819	260658178
2191	12/17/2019	260658583	260658662
2192	12/17/2019	260658883	260659193

Lift Name	Lift Date	Start Time (GPS seconds)	End Time (GPS)
2193	12/17/2019	260659414	260659414
2194	12/17/2019	260659981	260660021
2135	12/18/2019	260729672	260729958
2137	12/18/2019	260731561	260731751
2139	12/18/2019	260732025	260732178
2141	12/18/2019	260732413	260732511
2147	12/18/2019	260733595	260733829
2144	12/18/2019	260734074	260734322
2178	12/24/2019	260127763	261252153
2146	1/2/2020	262027402	262027658
2149	1/2/2020	262028125	262028438
2152	1/2/2020	262028836	262029159
2154	1/2/2020	262030078	262030197
2156	1/2/2020	262030621	262030724
2158	1/2/2020	262031864	262031947
2160	1/2/2020	262032374	262032807
2164	1/2/2020	262034572	262035168
2092	1/6/2020	259956151	262376381
2163	1/6/2020	262378059	262378238
2161	1/6/2020	262378569	262378626
2159	1/6/2020	262379412	262379480
2157	1/6/2020	262379903	262379950
2155	1/6/2020	262380703	262380771
2153	1/6/2020	262381091	262381186
2150	1/6/2020	262381883	262381889

Appendix 3: GPS / IMU Report

Figure 1: Map



Figure 2: Forward/Reverse or Combined Separation Plot



Figure 3: Float or Fixed Ambiguity



Figure 4: Forward/Reverse Separation Plot (Fixed)



Figure 5: Estimated Position Accuracy Plot



Figure 6: PDOP Plot



Figure 7: Number of Satellites Line Plot



Figure 8: Status flag for IMU processing



Figure 9: Fwd/Rev Attitude Separation Plot



Figure 10: Estimated Attitude Accuracy Plot



Figure 11: Azimuth Plot



Figure 12: Roll & Pitch Plot



Figure 13: Velocity Profile Plot



Figure 14: Body Frame Velocity Plot



Figure 15: Height Profile Plot



Figure 16: C/A Code Residual RMS Plot



Figure 17: Carrier Residual RMS Plot



Figure 18: L1 Doppler Residual RMS Plot



Figure 19: Accelerometer Bias Plot



Figure 20: Gyro Drift Plot



Figure 1: Map



Figure 2: Forward/Reverse or Combined Separation Plot



Figure 3: Float or Fixed Ambiguity



Figure 4: Forward/Reverse Separation Plot (Fixed)



Figure 5: Estimated Position Accuracy Plot



Figure 6: PDOP Plot


Figure 7: Number of Satellites Line Plot



Figure 8: Status flag for IMU processing



Figure 9: Fwd/Rev Attitude Separation Plot



Figure 10: Estimated Attitude Accuracy Plot



Figure 11: Azimuth Plot



Figure 12: Roll & Pitch Plot



Figure 13: Velocity Profile Plot



Figure 14: Body Frame Velocity Plot



Figure 15: Height Profile Plot



Figure 16: C/A Code Residual RMS Plot



Figure 17: Carrier Residual RMS Plot



Figure 18: L1 Doppler Residual RMS Plot



Figure 19: Accelerometer Bias Plot



Figure 20: Gyro Drift Plot



Figure 1: Map



Figure 2: Forward/Reverse or Combined Separation Plot



Figure 3: Float or Fixed Ambiguity



Figure 4: Forward/Reverse Separation Plot (Fixed)



Figure 5: Estimated Position Accuracy Plot



Figure 6: PDOP Plot



Figure 7: Number of Satellites Line Plot



Figure 8: Status flag for IMU processing



Figure 9: Fwd/Rev Attitude Separation Plot



Figure 10: Estimated Attitude Accuracy Plot



Figure 11: Azimuth Plot



Figure 12: Roll & Pitch Plot



Figure 13: Velocity Profile Plot



Figure 14: Body Frame Velocity Plot



Figure 15: Height Profile Plot



Figure 16: C/A Code Residual RMS Plot



Figure 17: Carrier Residual RMS Plot



Figure 18: L1 Doppler Residual RMS Plot



Figure 19: Accelerometer Bias Plot



Figure 20: Gyro Drift Plot



2018-02-02_Day033_7 - 20180202183201

Figure 1: Map



2018-02-02_Day033_7 - 20180202183201

Figure 2: Forward/Reverse or Combined Separation Plot


Figure 3: Float or Fixed Ambiguity



Figure 4: Forward/Reverse Separation Plot (Fixed)



Figure 5: Estimated Position Accuracy Plot



Figure 6: PDOP Plot



Figure 7: Number of Satellites Line Plot



Figure 8: Status flag for IMU processing



Figure 9: Fwd/Rev Attitude Separation Plot



Figure 10: Estimated Attitude Accuracy Plot



Figure 11: Azimuth Plot



Figure 12: Roll & Pitch Plot



Figure 13: Velocity Profile Plot



Figure 14: Body Frame Velocity Plot



Figure 15: Height Profile Plot



Figure 16: C/A Code Residual RMS Plot



Figure 17: Carrier Residual RMS Plot



Figure 18: L1 Doppler Residual RMS Plot



Figure 19: Accelerometer Bias Plot



Figure 20: Gyro Drift Plot



Figure 1: Map



Figure 2: Forward/Reverse or Combined Separation Plot



Figure 3: Float or Fixed Ambiguity



Figure 4: Forward/Reverse Separation Plot (Fixed)



Figure 5: Estimated Position Accuracy Plot



Figure 6: PDOP Plot



Figure 7: Number of Satellites Line Plot



Figure 8: Status flag for IMU processing



Figure 9: Fwd/Rev Attitude Separation Plot



Figure 10: Estimated Attitude Accuracy Plot



Figure 11: Azimuth Plot



Figure 12: Roll & Pitch Plot



Figure 13: Velocity Profile Plot



Figure 14: Body Frame Velocity Plot



Figure 15: Height Profile Plot



Figure 16: C/A Code Residual RMS Plot



Figure 17: Carrier Residual RMS Plot



Figure 18: L1 Doppler Residual RMS Plot


2018-02-03_Day034_7 - 20180203204644

Figure 19: Accelerometer Bias Plot



2018-02-03_Day034_7 - 20180203204644

Figure 20: Gyro Drift Plot



Figure 1: Map



Figure 2: Forward/Reverse or Combined Separation Plot



Figure 3: Float or Fixed Ambiguity



Figure 4: Forward/Reverse Separation Plot (Fixed)



Figure 5: Estimated Position Accuracy Plot



Figure 6: PDOP Plot



Figure 7: Number of Satellites Line Plot



Figure 8: Status flag for IMU processing



Figure 9: Fwd/Rev Attitude Separation Plot



Figure 10: Estimated Attitude Accuracy Plot



Figure 11: Azimuth Plot



Figure 12: Roll & Pitch Plot



Figure 13: Velocity Profile Plot



Figure 14: Body Frame Velocity Plot



Figure 15: Height Profile Plot



Figure 16: C/A Code Residual RMS Plot



Figure 17: Carrier Residual RMS Plot



Figure 18: L1 Doppler Residual RMS Plot



Figure 19: Accelerometer Bias Plot



Figure 20: Gyro Drift Plot



Figure 1: Map



Figure 2: Forward/Reverse or Combined Separation Plot



Figure 3: Float or Fixed Ambiguity



Figure 4: Forward/Reverse Separation Plot (Fixed)



Figure 5: Estimated Position Accuracy Plot



Figure 6: PDOP Plot



Figure 7: Number of Satellites Line Plot



Figure 8: Status flag for IMU processing



Figure 9: Fwd/Rev Attitude Separation Plot



Figure 10: Estimated Attitude Accuracy Plot



Figure 11: Azimuth Plot



Figure 12: Roll & Pitch Plot



Figure 13: Velocity Profile Plot



Figure 14: Body Frame Velocity Plot


Figure 15: Height Profile Plot



Figure 16: C/A Code Residual RMS Plot



Figure 17: Carrier Residual RMS Plot



Figure 18: L1 Doppler Residual RMS Plot



Figure 19: Accelerometer Bias Plot



Figure 20: Gyro Drift Plot



Figure 1: Map



Figure 2: Forward/Reverse or Combined Separation Plot



Figure 3: Float or Fixed Ambiguity



Figure 4: Forward/Reverse Separation Plot (Fixed)



Figure 5: Estimated Position Accuracy Plot



Figure 6: PDOP Plot



Figure 7: Number of Satellites Line Plot



Figure 8: Status flag for IMU processing



Figure 9: Fwd/Rev Attitude Separation Plot



Figure 10: Estimated Attitude Accuracy Plot



Figure 11: Azimuth Plot



Figure 12: Roll & Pitch Plot



Figure 13: Velocity Profile Plot



Figure 14: Body Frame Velocity Plot



Figure 15: Height Profile Plot



Figure 16: C/A Code Residual RMS Plot



Figure 17: Carrier Residual RMS Plot



Figure 18: L1 Doppler Residual RMS Plot



Figure 19: Accelerometer Bias Plot



Figure 20: Gyro Drift Plot



Figure 1: Map



Figure 2: Forward/Reverse or Combined Separation Plot



Figure 3: Float or Fixed Ambiguity



Figure 4: Forward/Reverse Separation Plot (Fixed)



Figure 5: Estimated Position Accuracy Plot



Figure 6: PDOP Plot



Figure 7: Number of Satellites Line Plot



Figure 8: Status flag for IMU processing



Figure 9: Fwd/Rev Attitude Separation Plot



Figure 10: Estimated Attitude Accuracy Plot


Figure 11: Azimuth Plot



Figure 12: Roll & Pitch Plot



Figure 13: Velocity Profile Plot



Figure 14: Body Frame Velocity Plot



Figure 15: Height Profile Plot



Figure 16: C/A Code Residual RMS Plot



Figure 17: Carrier Residual RMS Plot



Figure 18: L1 Doppler Residual RMS Plot



Figure 19: Accelerometer Bias Plot



Figure 20: Gyro Drift Plot



Figure 1: Map



Figure 2: Forward/Reverse or Combined Separation Plot



Figure 3: Float or Fixed Ambiguity



Figure 4: Forward/Reverse Separation Plot (Fixed)



Figure 5: Estimated Position Accuracy Plot



Figure 6: PDOP Plot



Figure 7: Number of Satellites Line Plot



Figure 8: Status flag for IMU processing



Figure 9: Fwd/Rev Attitude Separation Plot



Figure 10: Estimated Attitude Accuracy Plot



Figure 11: Azimuth Plot



Figure 12: Roll & Pitch Plot



Figure 13: Velocity Profile Plot



Figure 14: Body Frame Velocity Plot



Figure 15: Height Profile Plot



Figure 16: C/A Code Residual RMS Plot



Figure 17: Carrier Residual RMS Plot



Figure 18: L1 Doppler Residual RMS Plot



Figure 19: Accelerometer Bias Plot



Figure 20: Gyro Drift Plot



Figure 1: Map



Figure 2: Forward/Reverse or Combined Separation Plot



Figure 3: Float or Fixed Ambiguity



Figure 4: Forward/Reverse Separation Plot (Fixed)



Figure 5: Estimated Position Accuracy Plot



Figure 6: PDOP Plot


Figure 7: Number of Satellites Line Plot



Figure 8: Status flag for IMU processing



Figure 9: Fwd/Rev Attitude Separation Plot



Figure 10: Estimated Attitude Accuracy Plot



Figure 11: Azimuth Plot



Figure 12: Roll & Pitch Plot



Figure 13: Velocity Profile Plot



Figure 14: Body Frame Velocity Plot



Figure 15: Height Profile Plot



Figure 16: C/A Code Residual RMS Plot



Figure 17: Carrier Residual RMS Plot



Figure 18: L1 Doppler Residual RMS Plot



Figure 19: Accelerometer Bias Plot



Figure 20: Gyro Drift Plot



Figure 1: Map



Figure 2: Forward/Reverse or Combined Separation Plot



Figure 3: Float or Fixed Ambiguity



Figure 4: Forward/Reverse Separation Plot (Fixed)



Figure 5: Estimated Position Accuracy Plot



Figure 6: PDOP Plot



Figure 7: Number of Satellites Line Plot



Figure 8: Status flag for IMU processing



Figure 9: Fwd/Rev Attitude Separation Plot



Figure 10: Estimated Attitude Accuracy Plot



Figure 11: Azimuth Plot



Figure 12: Roll & Pitch Plot



Figure 13: Velocity Profile Plot



Figure 14: Body Frame Velocity Plot



Figure 15: Height Profile Plot



Figure 16: C/A Code Residual RMS Plot



Figure 17: Carrier Residual RMS Plot



Figure 18: L1 Doppler Residual RMS Plot



Figure 19: Accelerometer Bias Plot



Figure 20: Gyro Drift Plot



2018-03-04_Day063_7 - 20180304180851

Figure 1: Map



2018-03-04_Day063_7 - 20180304180851

Figure 2: Forward/Reverse or Combined Separation Plot


Figure 3: Float or Fixed Ambiguity



Figure 4: Forward/Reverse Separation Plot (Fixed)



Figure 5: Estimated Position Accuracy Plot



Figure 6: PDOP Plot



Figure 7: Number of Satellites Line Plot



Figure 8: Status flag for IMU processing



Figure 9: Fwd/Rev Attitude Separation Plot



Figure 10: Estimated Attitude Accuracy Plot



Figure 11: Azimuth Plot



Figure 12: Roll & Pitch Plot



Figure 13: Velocity Profile Plot



Figure 14: Body Frame Velocity Plot



Figure 15: Height Profile Plot



Figure 16: C/A Code Residual RMS Plot



Figure 17: Carrier Residual RMS Plot



Figure 18: L1 Doppler Residual RMS Plot



Figure 19: Accelerometer Bias Plot



Figure 20: Gyro Drift Plot



Figure 1: Map



Figure 2: Forward/Reverse or Combined Separation Plot



Figure 3: Float or Fixed Ambiguity



Figure 4: Forward/Reverse Separation Plot (Fixed)



Figure 5: Estimated Position Accuracy Plot



Figure 6: PDOP Plot



Figure 7: Number of Satellites Line Plot



Figure 8: Status flag for IMU processing



Figure 9: Fwd/Rev Attitude Separation Plot



Figure 10: Estimated Attitude Accuracy Plot



Figure 11: Azimuth Plot



Figure 12: Roll & Pitch Plot



Figure 13: Velocity Profile Plot



Figure 14: Body Frame Velocity Plot



Figure 15: Height Profile Plot



Figure 16: C/A Code Residual RMS Plot



Figure 17: Carrier Residual RMS Plot



Figure 18: L1 Doppler Residual RMS Plot


2018-03-06_Day065_7 - 20180306183005

Figure 19: Accelerometer Bias Plot



2018-03-06_Day065_7 - 20180306183005

Figure 20: Gyro Drift Plot



Figure 1: Map



Figure 2: Forward/Reverse or Combined Separation Plot



Figure 3: Float or Fixed Ambiguity



Figure 4: Forward/Reverse Separation Plot (Fixed)



Figure 5: Estimated Position Accuracy Plot



Figure 6: PDOP Plot



Figure 7: Number of Satellites Line Plot



Figure 8: Status flag for IMU processing



Figure 9: Fwd/Rev Attitude Separation Plot



Figure 10: Estimated Attitude Accuracy Plot



Figure 11: Azimuth Plot



Figure 12: Roll & Pitch Plot



Figure 13: Velocity Profile Plot



Figure 14: Body Frame Velocity Plot



Figure 15: Height Profile Plot



Figure 16: C/A Code Residual RMS Plot



Figure 17: Carrier Residual RMS Plot



Figure 18: L1 Doppler Residual RMS Plot



Figure 19: Accelerometer Bias Plot



Figure 20: Gyro Drift Plot



Figure 1: Map



Figure 2: Forward/Reverse or Combined Separation Plot



Figure 3: Float or Fixed Ambiguity



Figure 4: Forward/Reverse Separation Plot (Fixed)



Figure 5: Estimated Position Accuracy Plot



Figure 6: PDOP Plot



Figure 7: Number of Satellites Line Plot



Figure 8: Status flag for IMU processing



Figure 9: Fwd/Rev Attitude Separation Plot



Figure 10: Estimated Attitude Accuracy Plot



Figure 11: Azimuth Plot



Figure 12: Roll & Pitch Plot



Figure 13: Velocity Profile Plot



Figure 14: Body Frame Velocity Plot


Figure 15: Height Profile Plot



Figure 16: C/A Code Residual RMS Plot



Figure 17: Carrier Residual RMS Plot



Figure 18: L1 Doppler Residual RMS Plot



Figure 19: Accelerometer Bias Plot



Figure 20: Gyro Drift Plot



Figure 1: Map



Figure 2: Forward/Reverse or Combined Separation Plot



Figure 3: Float or Fixed Ambiguity



Figure 4: Forward/Reverse Separation Plot (Fixed)



— East — North — Up

Figure 5: Estimated Position Accuracy Plot



Figure 6: PDOP Plot



Figure 7: Number of Satellites Line Plot



Figure 8: Status flag for IMU processing



Figure 9: Fwd/Rev Attitude Separation Plot



Figure 10: Estimated Attitude Accuracy Plot



Figure 11: Azimuth Plot



Figure 12: Roll & Pitch Plot



Figure 13: Velocity Profile Plot



Figure 14: Body Frame Velocity Plot



Figure 15: Height Profile Plot



Figure 16: C/A Code Residual RMS Plot



Figure 17: Carrier Residual RMS Plot



Figure 18: L1 Doppler Residual RMS Plot



Figure 19: Accelerometer Bias Plot



Figure 20: Gyro Drift Plot



Figure 1: Map



Figure 2: Forward/Reverse or Combined Separation Plot



Figure 3: Float or Fixed Ambiguity



Figure 4: Forward/Reverse Separation Plot (Fixed)



Figure 5: Estimated Position Accuracy Plot



Figure 6: PDOP Plot



Figure 7: Number of Satellites Line Plot



Figure 8: Status flag for IMU processing



Figure 9: Fwd/Rev Attitude Separation Plot



Figure 10: Estimated Attitude Accuracy Plot


Figure 11: Azimuth Plot



Figure 12: Roll & Pitch Plot



Figure 13: Velocity Profile Plot



Figure 14: Body Frame Velocity Plot



Figure 15: Height Profile Plot



Figure 16: C/A Code Residual RMS Plot



Figure 17: Carrier Residual RMS Plot



Figure 18: L1 Doppler Residual RMS Plot



Figure 19: Accelerometer Bias Plot



Figure 20: Gyro Drift Plot



Figure 1: Map



Figure 2: Forward/Reverse or Combined Separation Plot



- East - North - Up

Figure 3: Float or Fixed Ambiguity



Figure 4: Forward/Reverse Separation Plot (Fixed)



Figure 5: Estimated Position Accuracy Plot



Figure 6: PDOP Plot



Figure 7: Number of Satellites Line Plot



Figure 8: Status flag for IMU processing



Figure 9: Fwd/Rev Attitude Separation Plot



- Roll - Pitch - Heading/Az

Figure 10: Estimated Attitude Accuracy Plot



Figure 11: Azimuth Plot



- Heading/Azimuth - GPS-COG

Figure 12: Roll & Pitch Plot



— Roll — Pitch

Figure 13: Velocity Profile Plot



Figure 14: Body Frame Velocity Plot



Figure 15: Height Profile Plot



Figure 16: C/A Code Residual RMS Plot



Figure 17: Carrier Residual RMS Plot



Figure 18: L1 Doppler Residual RMS Plot



Figure 19: Accelerometer Bias Plot



Figure 20: Gyro Drift Plot



Figure 1: Map



Figure 2: Forward/Reverse or Combined Separation Plot



Figure 3: Float or Fixed Ambiguity



Figure 4: Forward/Reverse Separation Plot (Fixed)



Figure 5: Estimated Position Accuracy Plot



Figure 6: PDOP Plot


Figure 7: Number of Satellites Line Plot



Figure 8: Status flag for IMU processing



Figure 9: Fwd/Rev Attitude Separation Plot



Figure 10: Estimated Attitude Accuracy Plot



Figure 11: Azimuth Plot



Figure 12: Roll & Pitch Plot



Figure 13: Velocity Profile Plot



Figure 14: Body Frame Velocity Plot



Figure 15: Height Profile Plot



Figure 16: C/A Code Residual RMS Plot



Figure 17: Carrier Residual RMS Plot



Figure 18: L1 Doppler Residual RMS Plot



Figure 19: Accelerometer Bias Plot



Figure 20: Gyro Drift Plot



Figure 1: Map



Figure 2: Forward/Reverse or Combined Separation Plot



Figure 3: Float or Fixed Ambiguity



- Float - Forward Fixed - Reverse Fixed - Fixed (2 or more)

Figure 4: Forward/Reverse Separation Plot (Fixed)



Figure 5: Estimated Position Accuracy Plot



Figure 6: PDOP Plot



Figure 7: Number of Satellites Line Plot



GPS Time (TOW, GMT zone)

- Num Sats - GPS - GLONASS - BeiDou - Galileo - QZSS

Figure 8: Status flag for IMU processing



GPS Time (TOW, GMT zone)

- None - Align - Free - DMIUPT - PHSUPT - GPSUPT - ZUPT - CUPT - GVUPT - PSR

Figure 9: Fwd/Rev Attitude Separation Plot



Figure 10: Estimated Attitude Accuracy Plot



Figure 11: Azimuth Plot



GPS Time (TOW, GMT zone)

- Heading/Azimuth - GPS-COG

Figure 12: Roll & Pitch Plot



Figure 13: Velocity Profile Plot



Figure 14: Body Frame Velocity Plot



Figure 15: Height Profile Plot



Figure 16: C/A Code Residual RMS Plot



Figure 17: Carrier Residual RMS Plot



Figure 18: L1 Doppler Residual RMS Plot



Figure 19: Accelerometer Bias Plot



GPS Time (TOW, GMT zone)

- Body-X - Body-Y - Body-Z

Figure 20: Gyro Drift Plot



GPS Time (TOW, GMT zone)

- Body-X - Body-Y - Body-Z

2018-03-29_Day088_7 - 20180329172052

Figure 1: Map



2018-03-29_Day088_7 - 20180329172052

Figure 2: Forward/Reverse or Combined Separation Plot


Figure 3: Float or Fixed Ambiguity



Figure 4: Forward/Reverse Separation Plot (Fixed)



Figure 5: Estimated Position Accuracy Plot



GPS Time (TOW, GMT zone)

- East - North - Height

Figure 6: PDOP Plot



Figure 7: Number of Satellites Line Plot



Figure 8: Status flag for IMU processing



GPS Time (TOW, GMT zone)

- None - Align - Free - DMIUPT - PHSUPT - GPSUPT - ZUPT - CUPT - GVUPT - PSR

Figure 9: Fwd/Rev Attitude Separation Plot



Figure 10: Estimated Attitude Accuracy Plot



Figure 11: Azimuth Plot



GPS Time (TOW, GMT zone)

- Heading/Azimuth - GPS-COG

Figure 12: Roll & Pitch Plot



Figure 13: Velocity Profile Plot



Figure 14: Body Frame Velocity Plot



Figure 15: Height Profile Plot



GPS Time (TOW, GMT zone)

— Height

Figure 16: C/A Code Residual RMS Plot



Figure 17: Carrier Residual RMS Plot



GPS Time (TOW, GMT zone)

- RMS - SD

Figure 18: L1 Doppler Residual RMS Plot



GPS Time (TOW, GMT zone)

- RMS - SD

Figure 19: Accelerometer Bias Plot



Figure 20: Gyro Drift Plot



Figure 1: Map



Figure 2: Forward/Reverse or Combined Separation Plot



GPS Time (TOW, GMT zone) - East - North - Up

Figure 3: Float or Fixed Ambiguity



Figure 4: Forward/Reverse Separation Plot (Fixed)



GPS Time (TOW, GMT zone)

- East - North - Up

Figure 5: Estimated Position Accuracy Plot



GPS Time (TOW, GMT zone) — East — North — Height

Figure 6: PDOP Plot



GPS Time (TOW, GMT zone)

- PDOP

Figure 7: Number of Satellites Line Plot



GPS Time (TOW, GMT zone)

- Num Sats - GPS - GLONASS - BeiDou - Galileo - QZSS

Figure 8: Status flag for IMU processing



GPS Time (TOW, GMT zone)

- None - Align - Free - DMIUPT - PHSUPT - GPSUPT - ZUPT - CUPT - GVUPT - PSR

Figure 9: Fwd/Rev Attitude Separation Plot



GPS Time (TOW, GMT zone)

⁻ Roll - Pitch - Heading/Az

Figure 10: Estimated Attitude Accuracy Plot



GPS Time (TOW, GMT zone) — Roll — Pitch — Heading/Az

Figure 11: Azimuth Plot



GPS Time (TOW, GMT zone) — Heading/Azimuth — GPS-COG

Figure 12: Roll & Pitch Plot



GPS Time (TOW, GMT zone)

- Roll - Pitch

Figure 13: Velocity Profile Plot



GPS Time (TOW, GMT zone)



Figure 14: Body Frame Velocity Plot



GPS Time (TOW, GMT zone)

-x -y -z

Figure 15: Height Profile Plot



GPS Time (TOW, GMT zone)



Figure 16: C/A Code Residual RMS Plot



- RMS - SD

Figure 17: Carrier Residual RMS Plot



Figure 18: L1 Doppler Residual RMS Plot



GPS Time (TOW, GMT zone)

- RMS - SD
2018-03-30_Day089_7 - 20180330171024

Figure 19: Accelerometer Bias Plot



GPS Time (TOW, GMT zone)

- Body-X - Body-Y - Body-Z

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Figure 20: Gyro Drift Plot



GPS Time (TOW, GMT zone)

Body-X Body-Y Body-Z