



PI CNMI 2019 D19

Lidar Mapping Report

Project ID - 175072

Work Unit - 219835

USGS CONTRACT NUMBER: G16PC00022

TASK ORDER: 140G0219F0063

NOAA CONTRACT NUMBER: EA-133C-16-CQ-0046

November 15, 2021

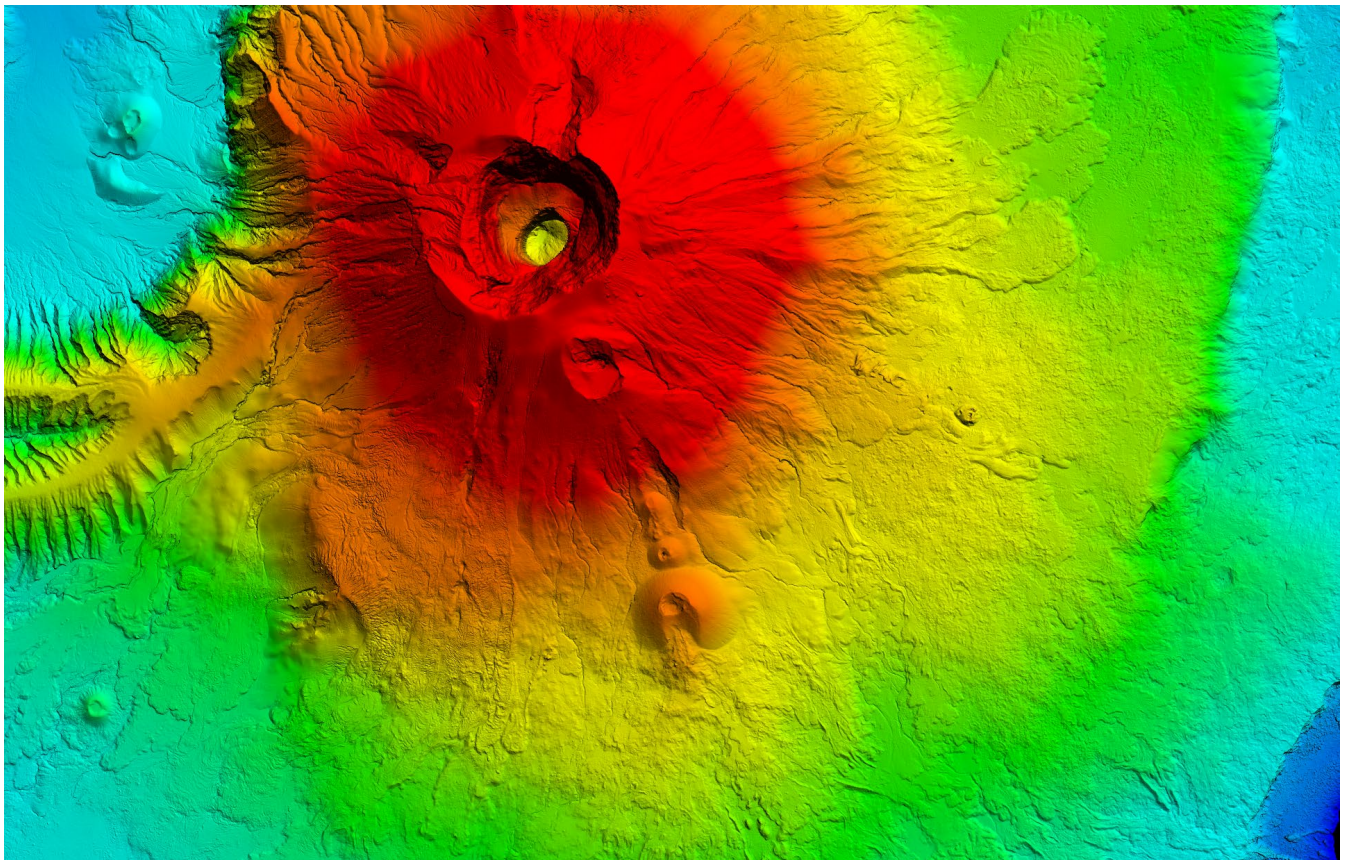


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1. EXECUTIVE SUMMARY

Woolpert Inc. (Woolpert) was contracted for a two-part lidar data acquisition and lidar data processing effort in the Commonwealth of the Northern Mariana Islands. Part one required lidar data acquisition, initial data processing, and data coverage verification in the field performed under the United States Geological Survey (USGS) Contract G16PC00022, Task Order Number 140G0219F0063 (USGS PI NMCI 2019 D19). Part two is for the final data processing, derivative lidar products, and QA/QC and is performed under the NOAA Office of Coastal Management (NOAA) Contract EA-133C-16-CQ-0046, Order Number 1305M219FNCNP0087 (T-0087-CNMI Lidar).

Woolpert collected lidar using their Hawkeye 4X topo-bathy lidar sensor, to provide high density topographic lidar to meet National Geospatial Program Lidar Base Specification Version 1.3 QL1 standard, while simultaneously acquiring bathymetric lidar data at National Coastal Mapping Strategy 1.0 QL2b standard.

Details of the survey, data processing, QC and product creation are provided within this report.

1.1. SURVEY AREA

The project included six areas of interest to be surveyed with topo-bathy lidar, identified as the islands of Pagan, Farallon de Medinilla, Saipan, and Tinian, Aguijan, and Rota. Survey areas are provided in Table 1 below, and shown in Figure 1. The islands of Pagan and Farallon de Medinilla (FdM) fall within Work Unit 219835. This work unit was delivered with the following Coordinate Reference System (CRS):

Horizontal Datum	NAD83 (MA11) Epoch 2010.0
Vertical Datum	NAD83 (MA11) Epoch 2010.0, Ellipsoid Heights
Projection	UTM 55N
Units (Horizontal and Vertical)	Meters

Woolpert conducted a simultaneous collect of topographic and bathymetric lidar using its Leica Hawkeye 4X sensor. All topo lidar data were collected to meet United States Geological Survey Quality Level 1 (USGS QL1) and all bathymetric lidar data were collected to meet accuracy requirement for the National Coastal Mapping Strategy v.10 Quality Level 2b (QL2b).

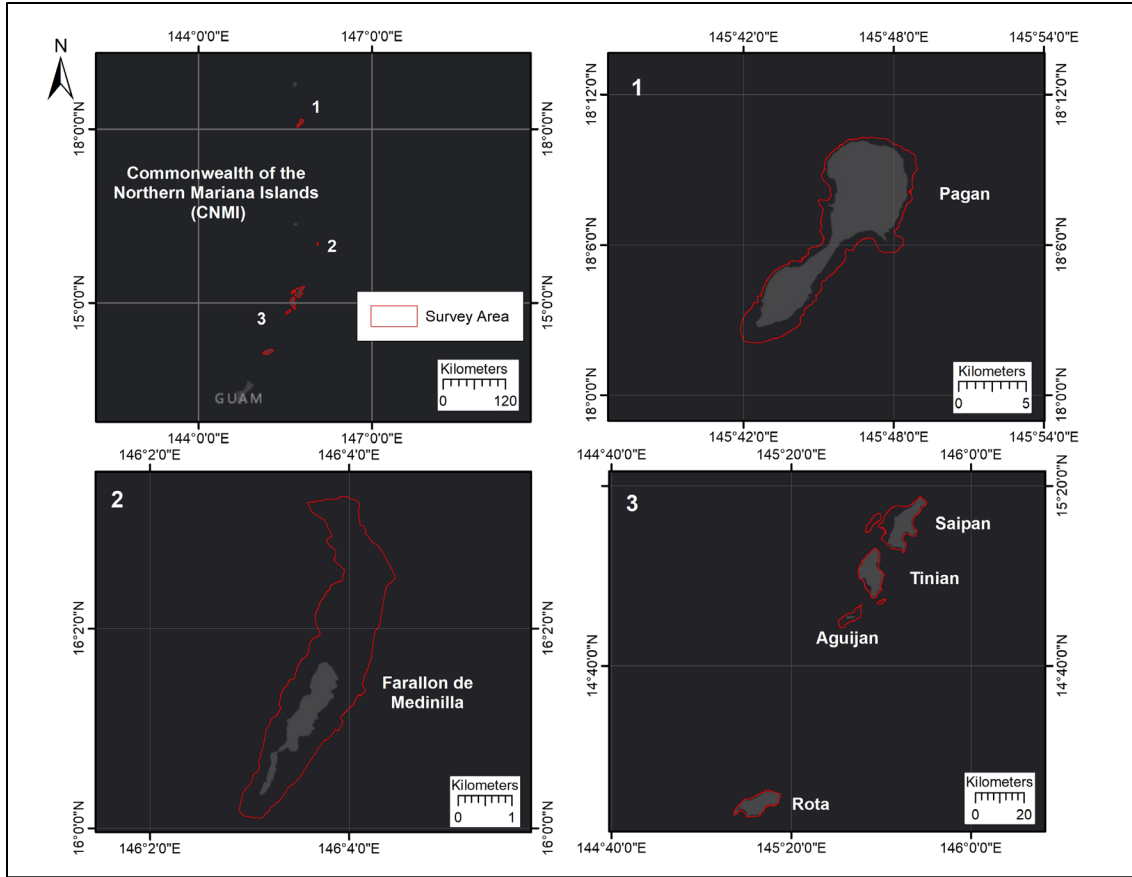


Figure 1: Planned Topo-Bathy (Hawkeye 4X) Survey Area

Table 1: Survey Areas

Location	Planned Survey Area (square kilometers/square miles)
Pagan	71/27
Farallon de Medinilla	6/2
Saipan	227/88
Tinian	129/50
Aguijan	35/14
Rota	109/42

2. DATA ACQUISITION

All lidar data were acquired using a Hawkeye 4X (HE4X) sensor. The HE4X sensor was mounted in a Leica PAV100 gyro-stabilized mount integrated with a NovAtel SPAN GNSS and LCI-100C IMU. Real time navigation and GNSS/IMU data logging was provided by Leica FlightPro software. Lidar data were logged on the Airborne Hydrography, AB (AHAB) operator console.

Below are the details of the lidar collection and processing.

2.1. MOBILIZATION

The HE4X was installed in a Reims-Cessna 406 (ZK-XLF) owned and operated by Kiwi Air. Calibration flights were collected over Saipan on August 25, 2019, February 23, 2020, and July 14, 2020. Survey data were acquired from

July 5 to August 25, 2019, February 12 to February 26, 2020, and June 19 to July 14, 2020. There was 1 aircraft maintenance day during the first collect in 2019.



Figure 2: Mobilized Survey Aircraft

2.1.1. AIRCRAFT OFFSET SURVEY

Physical mounting offsets between the GNSS antenna, IMU and gyro-stabilized mount were determined through a combination of manual measurements and iterative processing in NovAtel Inertial Explorer software.

Manual measurements were taken from the GNSS antenna to the reference point on the IMU in the HE4X sensor head. These measurements are added to the known offset between the IMU reference point and the rotation center of the gyro-stabilized mount to calculate the preliminary offset between the GNSS antenna and sensor reference point. This preliminary value was then used to seed the post-processing software which, through an iterative computation, uses the dynamic accelerations and rotations during flight to refine the offsets. Once the solution converges, the final offsets are entered into the flight management software and used in subsequent post-processing of the GNSS/IMU data for final trajectories.

Final offsets, shown in the Leica reference frame, are presented in Table 2.

Table 2: Aircraft Offsets

Sensor Head	Lever Arm	X (forward)	Y (right)	Z (down)
CHII (Topo and Shallow Channel)	Reference to GNSS Antenna L1 Phase Center	0.597 m	-0.066	-1.226
	Reference to IMU	-0.003 m	-0.006 m	-0.296 m
	Reference to IMU Rotation	0°	0°	90°
Deep Channel	IMU to GNSS Antenna L1 Phase Center	1.269	-0.140	-0.819
	Reference to IMU Rotation	0°	90°	-90°

2.2. LIDAR CALIBRATION

Field calibration of the HE4X system is carried out to eliminate systematic errors by calculating corrections for boresight errors, scanner angle errors, remaining IMU angle errors and any necessary internal timing errors. In order to verify or compute the field calibration, the following lines are flown (Figure 3):

- a. 2 x Line A over mixed terrain with flat or gentle slopes and features such as peaked roof buildings (1 x each direction)
- b. 1 x Line B offset +50% from Line A in one direction
- c. 1 x Line C offset -50% from Line A in the same direction as Line B
- d. 2 x Line D orthogonal to previous lines (1 x each direction)

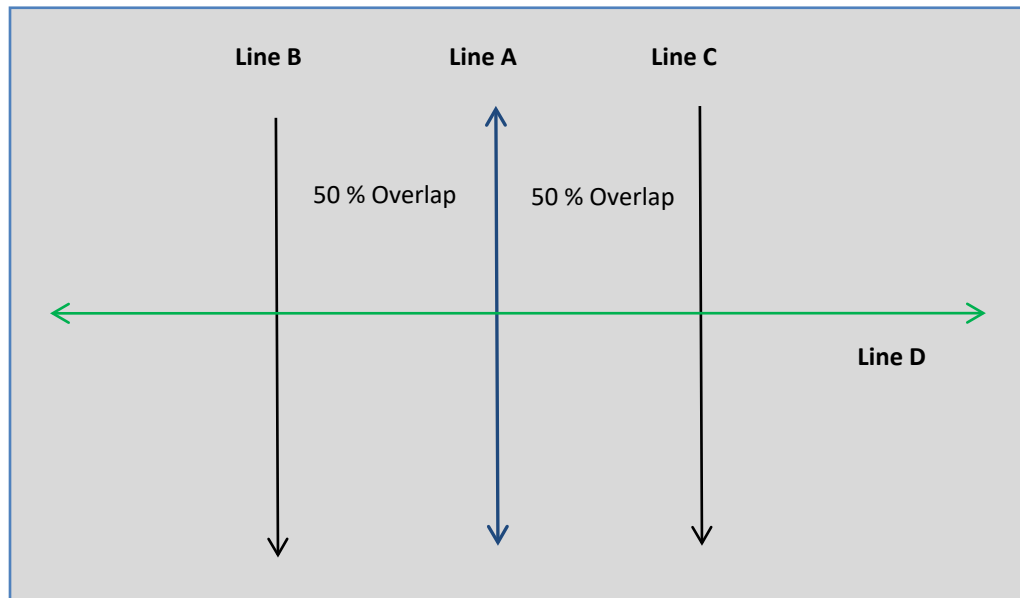


Figure 3: Schematic of HE3 Calibration Lines

A set of calibration lines were acquired at 500m, and 400m altitude for all calibration flights. The February 23, 2020 flight also included a set acquired at 800m altitude while the July 14, 2020 flight included a set at 600m altitude. All sets of lines are used to calibrate and verify the topographic lidar, while the 500m and 400m lines are used for the bathymetric lidar.

Calibration values are calculated using the automatic calibration routine within the Leica Lidar Survey Studio (LSS) software. This utility first identifies patches or areas of gentle slope within the overlap region of all the lines to use for calibration. Patch selection prevents areas of vegetation, side of cars or buildings, from being used in the calibration process. Next, the utility compares the front side and back side of the elliptical scan within the same line, as well as comparing all lines to each other, to identify suitable calibration parameters such that data within the patches match. The procedure is iterative and continues until the best possible solution is computed.

Calibration for each channel (topo, shallow, and deep) is done independently. Topo channel calibration was computed using 500m altitude lines. Any other altitude data was then used for verification. Calibration of the shallow and deep channel were computed using 500m altitude. Any lower altitude data were used for verification.

At each step of the calibration process, quality assurance is conducted to ensure values being calculated are valid. This is done using the Leica LSS Quality Control Utility. Two types of checks are done; firstly, the front scan is compared to the back scan for every line. Secondly, a single line is chosen as a baseline and is compared to every other line. We would expect the average errors from both checks to be small; less than 2cm. In addition, the data is visually reviewed. In particular, features are studied to ensure lines from different directions show structures in the same position, in other words, verifying horizontal accuracy is maintained. These tests all provide assurance of relative accuracy.

Ground truth is not used within the automatic calibration routine; however, ground truth can be used to verify absolute accuracy.

For this project, calibration lines were acquired over an urban area on the island of Saipan for all three calibration flights. Results from each full calibration are provided in Tables Table 3Table 4Table 5. Results are good and indicate that calibration was successful. Values computed were used for the entire project.

Table 3: August 25, 2019 Calibration QA Results

Test		Topo 500m	Topo 400m	Shallow 500m	Shallow 400m	Deep 500m	Deep 400m
Front to Back Scan Comparison	Average Error (m)	-0.0023	-0.0067	-0.0030	-0.0131	-0.0051	0.0084
	Std. Dev. of Error	0.0002	0.0004	0.0012	0.0017	0.0011	0.0023
Line to Line Comparison	Average Error (m)	-0.0188	-0.0106	-0.0179	-0.0185	-0.0138	-0.0138
	Std. Dev. of Error	0.0021	0.0020	0.0014	0.0019	0.0050	0.0050

Table 4: February 23, 2020 Calibration QA Results

Test		Topo 800m	Topo 500m	Topo 400m	Shallow 500m	Shallow 400m	Deep 500m	Deep 400m
Front to Back Scan Comparison	Average Error (m)	0.0066	0.0004	0.0028	0.0039	0.0053	0.0009	0.0168
	Std. Dev. of Error	0.0009	0.0007	0.0008	0.0026	0.0031	0.0018	0.0026
Line to Line Comparison	Average Error (m)	0.0355	0.0083	0.0030	0.0048	0.0016	-0.0025	0.0042
	Std. Dev. of Error	0.0053	0.0050	0.0021	0.0019	0.0084	0.0064	0.0071

Table 5: July 14, 2020 Calibration QA Results

Test		Topo 600m	Topo 500m	Topo 400m	Shallow 500m	Shallow 400m	Deep 500m	Deep 400m
Front to Back Scan Comparison	Average Error (m)	-0.0011	-0.0003	-0.0032	-0.0010	-0.0054	0.0049	0.0099
	Std. Dev. of Error	0.0004	0.0005	0.0004	0.0029	0.0024	0.0052	0.0023
Line to Line Comparison	Average Error (m)	-0.0016	-0.0122	-0.0053	-0.0120	-0.0074	-0.0109	-0.0043
	Std. Dev. of Error	0.0025	-0.0015	0.0016	0.0029	0.0030	0.0036	0.0027

Woolpert acquired a set of ground truth points with Real Time Kinematic (RTK) GNSS within the calibration area on August 23, 2019. Ground truth is not used within the automatic calibration routine; however, a comparison to the lidar data was used to verify absolute accuracy. Results presented in Table 6, Table 7, and Table 8 show data is well within required accuracy specifications.

Table 6: August 25, 2019 Calibration Ground Truth Comparisons

	Topo		Shallow		Deep	
	500m	400m	500m	400m	500m	400m
Average dz (m)	-0.0052	0.0064	-0.0196	0.0158	-0.0434	-0.0052
Root Mean Square (m)	0.0161	0.0178	0.0238	0.0453	0.0400	0.0448

Table 7: February 23, 2020 Calibration Ground Truth Comparisons

	Topo			Shallow		Deep	
	800m	500m	400m	500m	400m	500m	400m
Average dz (m)	0.0072	0.0018	-0.0246	0.0035	0.0042	0.0195	-0.0188
Root Mean Square (m)	0.0270	0.0360	0.0320	0.0301	0.0191	0.0383	0.0363

Table 8: July 14, 2020 Calibration Ground Truth Comparisons

	Topo			Shallow		Deep	
	600m	500m	400m	500m	400m	500m	400m
Average dz (m)	-0.0012	0.0100	0.0232	0.0066	0.0060	0.0256	0.0406
Root Mean Square (m)	0.0115	0.0096	0.0237	0.0181	0.0231	0.0245	0.0382

2.3. AERIAL SURVEY OPERATIONS

For ease of operations and data management, the survey area was split into twelve survey blocks (BL). Actual flight lines flown, including start and end data along with unique line ID, are provided in the flight line database included with the project deliverables. A summary of the daily operations is shown in Table 9. Detailed Flight Logs for each day are provided in Appendix A.

Table 9: Summary of Daily Operations

Flight (UTC Dates)	Engine Time	Air Time	Flown		Reflown		Comments
			km	%	km	%	
2019-07-04A							Pilot Transit to Saipan
2019-07-05A	5:27:00	5:00:00	487.3	12.9%	96.4	2.6%	BL03 (FdM), BL05 (Saipan)
2019-07-06A	1:05:00	0:45:00			16.1	0.4%	BL03 (FdM), BL05 (Saipan)
2019-07-06B	4:55:00	4:51:00	317.6	8.4%	13.4	0.4%	BL01, BL02 (Pagan)
2019-07-07A	5:37:00	5:14:00	234.2	6.2%	32.7	0.9%	BL01, BL02 (Pagan), BL04 (Saipan)
2019-07-08A	5:22:00	5:06:00	568.1	15.1%			BL04, BL05, BL06 (Saipan)
2019-07-09A							Weather
2019-07-10A							Weather
2019-07-11A	4:54:00	4:25:00	397.8	10.6%	62.1	1.6%	BL04, BL05, BL06 (Saipan), BL07 (Tinian)
2019-07-12A	0:47:00	0:35:00	59.8	1.6%	18.0	0.5%	BL06 (Saipan)
2019-07-12B	3:57:00	3:54:00	364.0	9.7%	46.7	1.2%	BL06 (Saipan), BL07, BL08 (Tinian), BL09, BL10 (Aguujan)
2019-07-13A	2:44:00	2:25:00	238.9	6.3%	44.7	1.2%	BL06 (Saipan)
2019-07-13B	2:07:00	2:04:00	102.7	2.7%	71.9	1.9%	BL08 (Tinian), BL11 (Rota)
2019-07-14A	2:38:00	2:04:00	106.3	2.8%	6.2	0.2%	BL11 (Rota)
2019-07-16A	1:00:00	0:39:00			85.3	2.3%	BL04, BL05 (Saipan)
2019-07-16B	1:21:00	0:59:00			96.7	2.6%	BL05 (Saipan)
2019-07-17A							Aircraft Maintenance, Weather
2019-07-18A	2:26:00	2:04:00			270.8	7.2%	BL05 (Saipan), BL07 (Tinian)
2019-07-20A	1:27:00	0:51:00			58.4	1.6%	BL04 (Saipan)
2019-07-20B	2:43:00	2:27:00			126.0	3.3%	BL05 (Saipan)
2019-07-21A	3:29:00	3:04:00			317.0	8.4%	BL04 (Saipan)
2019-07-22A	3:06:00	2:45:00	123.5	3.3%	23.5	0.6%	BL11 (Rota)

2019-07-22B	2:27:00	2:06:00			47.8	1.3%	BL06 (Saipan)
2019-07-22C	2:27:00	2:06:00	87.8	2.3%	55.8	1.5%	BL06 (Saipan)
2019-07-23A	1:55:00	1:32:00	11.3	0.3%	104.0	2.8%	BL04 (Saipan)
2019-07-23B							Weather / Rain and Low Clouds
2019-07-24A	5:59:00	5:24:00	371.6	9.9%	54.2	1.4%	BL04-BL06 (Saipan), BL11, BL12 (Rota)
2019-07-25A	3:33:00	2:39:00	134.3	3.6%	17.5	0.5%	BL08, (Tinian), BL12 (Rota)
2019-07-26A	2:44:00	2:10:00			119.6	3.2%	BL03 (FdM)
2019-07-27A	3:09:00	2:50:00	128.7	3.4%	38.1	1.0%	BL06 (Saipan), BL08 (Tinian), BL12 (Rota)
2019-07-28A	5:57:00	5:35:00			331.5	8.8%	BL01, BL02 (Saipan), BL08 (Tinian)
2019-07-29A							Weather / Rain and Low Clouds
2019-07-30A	5:23:00	5:07:00			262.4	7.0%	BL01, BL02 (Pagan)
2019-07-31A	4:00:00	3:21:00			187.6	5.0%	BL04, BL06, (Saipan), BL07, BL08 (Tinian), BL09, BL10 (Aguijan), BL11, BL12 (Rota)
2019-08-01A							Weather
2019-08-02A	3:46:00	3:23:00			82.3	2.2%	BL01, BL02 (Pagan)
2019-08-03A	4:20:00	3:57:00			98.6	2.6%	BL02 (Pagan)
2019-08-04A							Weather / Rain and High Winds
2019-08-05A							Weather / Rain and High Winds
2019-08-06A							Weather / Rain and High Winds
2019-08-07A	3:14:00	2:54:00			118.0	3.1%	BL04, BL05, BL06 (Saipan), BL12 (Rota)
2019-08-08A	2:47:00	2:28:00			111.5	3.0%	BL04, BL05, BL06 (Saipan)
2019-08-09A	1:11:00	0:51:00			45.8	1.2%	BL06 (Saipan)
2019-08-10A							Weather / Low Clouds
2019-08-11A							Weather / Low Clouds
2019-08-12A							Weather / Low Clouds
2019-08-13A	3:02:00	2:44:00			12.3	0.3%	BL02 (Pagan), BL12 (Rota)
2019-08-14A	1:04:00	0:43:00			22.3	0.6%	BL05 (Saipan)
2019-08-14B	0:42:00	0:23:00			15.4	0.4%	BL05 (Saipan)
2019-08-15A							Weather / Low Clouds
2019-08-16A							Weather / Low Clouds
2019-08-17A							Weather / Low Clouds
2019-08-18A							Weather / Low Clouds
2019-08-20A	3:30:00	3:04:00			19.0	0.5%	BL02 (Pagan)
2019-08-21A	1:25:00	0:53:00			36.7	1.0%	BL04, BL05 (Saipan)
2019-08-25A	2:15:00	1:46:00			178.2	4.7%	BL04, BL05 (Saipan)
2020-02-12A	1:17:00	0:48:00					

2020-02-15B	5:04:00	4:36:00			86.8	2.3%	BL02 (Pagan)
2020-02-16A	4:04:00	3:39:00			32.6	0.9%	BL02 (Pagan)
2020-02-19A	2:03:00	1:38:00	5.7	0.2%	17.6	0.5%	BL12 (Rota)
2020-02-19B	5:23:00	4:54:00	55.9	1.5%	4.0	0.1%	BL02 (Pagan), BL12 (Rota)
2020-02-20A	1:10:00	0:38:00					BL12 (Rota)
2020-02-21A	0:57:00	0:38:00					
2020-02-21B	0:55:00	0:36:00					
2020-02-22A	1:07:00	0:39:00					
2020-02-23A	4:16:00	3:51:00			15.6	0.4%	BL02 (Pagan)
2020-02-23A	4:16:00	3:51:00	2.0	0.1%	15.6	0.4%	BL02 (Pagan)
2020-02-23B	1:18:00	0:55:00	6.6	0.2%	6.2	0.2%	BL12 (Rota)
2020-02-23C	2:23:00	2:02:00			217.7	5.8%	Cal
2020-02-26A	3:48:00	3:28:00	2.0	0.1%	4.0	0.1%	BL02 (Pagan)
2020-06-19A	2:02:00	1:44:00			66.0	1.8%	Cal
2020-07-02A	4:11:00	3:54:00			26.7	0.7%	BL01, BL02 (Pagan)
2020-07-04A	1:25:00	1:04:00					BL12 (Rota)
2020-07-05A	0:46:00	0:21:00			10.5	0.3%	Cal
2020-07-05B	1:02:00	0:45:00					BL12 (Rota)
2020-07-11A	2:08:00	1:24:00			238.8	6.3%	Cal
2020-07-11B	1:17:00	0:57:00	21.7	0.6%	238.8	6.3%	BL12 (Rota)
2020-07-14A	2:07:00	1:15:00			231.3	6.1%	Cal
TOTAL	172:54:00	148:45:00	3828	101.7%	4556	121.0%	

2.3.1. THE HAWKEYE 4X SENSOR

All lidar data were acquired using a HE4X sensor (Figure 4). The HE4X is a latest generation topographic and bathymetric lidar sensor. The system provides denser data than previous traditional bathymetric lidar systems. It is unique in its ability to acquire bathymetric lidar, topographic lidar and 4-band digital camera imagery simultaneously.

The HE4X provided up to 500 kHz topographic data and an effective 140 kHz shallow bathymetric data and a 40 kHz deep channel. While not a required deliverable for this survey, 4-band 80 MP digital camera imagery was also collected simultaneously with the sensor's RCD-30 camera and utilized during data editing in some cases.

The bathymetric and topographic lasers are independent and do not share an optical chain or receivers, so they are optimized for their specific function. As with any bathymetric lidar, maximum depth penetration is a function of water clarity and seabed reflectivity. The HE4X is designed to penetrate to 3 times the secchi depth. This is also represented as $D_{max} = 4/K$, where K is the diffuse attenuation coefficient, and assuming K is between 0.1 and 0.3, a normal sea state and 15% seabed reflectance.

Both the topographic and bathymetric sub-systems use a palmer scanner to produce an elliptical scan pattern of laser points with a degree of incidence ranging from +/-14° (front and back) to +/-20° (sides), providing a 40° field of view. This has the benefit of providing multiple look angles on a single pass and helps to eliminate shadowing effects. This can be of particular use in urban areas, where all sides of a building are illuminated, or for bathymetric features such as the sides of narrow water channels, or features on the seafloor such as smaller objects and wrecks. It also assists with penetration in the surf zone where the back scan passes the same ground location a couple of seconds after the front scan, allowing the areas of whitewater to shift.



Figure 4: Hawkeye 4X Bathymetric Lidar Sensor Installation

For this project, the flight parameters shown in Table 10 were used. Flight lines were planned to provide 100% coverage using a 15% sidelap for the topo and 20% sidelap for the bathymetry.

During acquisition, flight lines are shown on a pilot’s display, and the aircraft is controlled by the pilots at all times. The HE4X system includes a NovAtel SPAN GNSS system with an LCI-100C IMU for aircraft position and orientation. The IMU is in the main Chiroptera sensor head, which includes the topo channel, shallow channel and RCD30 camera. Information from this IMU is also used in real-time by the PAV100 gyro-stabilized mount to compensate for deviations in pitch and roll. Aircraft bank angles were restricted to 20° to avoid any potential GNSS dropouts. No flights were planned if the PDOP was expected to go above 3.0.

Data were monitored for quality during acquisition using the Operators Console running on the AHAB collection computer. The operator monitored system status of the scanners and receivers, waveforms, camera images, data coverage, flight lines and the health of the navigation system.

All data were recorded to a removable solid-state hard disk. At the end of the flight the hard disk was removed and taken to the field office where data was copied on to backup disks for transmittal back to the main processing office. Data is reviewed daily in the field for quality and coverage to ensure that voids due to gaps between data swaths, instrument malfunction, insufficient return amplitude, or cloud cover/ground fog are re-captured. However, unavoidable voids due to exceptionally low reflectivity (composition roofing; wet asphalt paving; and shadowing by forest canopy) may occur.

Table 10: Survey Flight Parameters

System	
Aerial System	Leica Hawkeye 4X (topo-bathy)
Nominal Survey Altitude	480/600m (1575/1969 feet)
Nominal Survey Speed	130 knots
System Planned Sidelap	15% Topo / 20% Bathy
Lidar	

Scan Angle	≤ 40° (+/-20° from Nadir)
Nominal Swath Width	350m (1148 ft) at 480m altitude 435m (1427 ft) at 600m altitude
PRF (Topo)	450/500 kHz
Effective PRF (Shallow)	140 kHz
Effective PRD (Deep)	40 kHz
Pulse Density (Topo)	≥ 8 pulses/m ² (≤ 0.35 m NPS)
Pulse Density (Bathy)	≥ 2 pulses/m ² (≤ 0.71 m NPS)
Returns Collected Per Laser Pulse (Topo)	Up to 4
Returns Collected Per Laser Pulse (Bathy)	Up to 4
Intensity Range	0 – 65535 (16-bit)

2.3.2. POSITIONING

Position and orientation data were acquired in the aircraft using a NovAtel SPAN with LCI-100C IMU. All data were post-processed using NovAtel Inertial Explorer software to provide a tightly coupled position and orientation solution.

A single base station was used to control trajectory processing providing final trajectories for Saipan and Tinian on NAD83 (MA11), Epoch 2010, located in the Saipan airport. This base station was replaced for each of the three separate collects of the project (Table 11). SPN1, SPN2 and SPN3 were occupied with a Trimble GNSS receiver by Woolpert. Due to the distance of Rota, Aguijan, Farallon de Medinilla, and Pagan from the single base station on Saipan and their remoteness a precise point positioning (PPP) solution was used for them on ITRF2014.

To establish a reliable coordinate for SPN1 data were uploaded to the National Geodetic Service (NGS) Online Positioning User Service (OPUS), and for SPN2 and SPN3 Trimble CenterPoint RTX Post-Processing service was used. The average OPUS or RTX coordinate from multiple days of observations was used to process the final trajectories.

Logs for the trajectory processing are provided in Appendix B.

Table 11: GNSS Base Stations Used for Trajectory Processing, NAD83 (MA11) Epoch 2010.0

GNSS Base Station	Latitude	Longitude	Height (m)	Source
SPN1	15° 07' 12.38779"N	145° 43' 15.98811"N	116.756	OPUS
SPN2	15° 07' 12.35969"N	145° 43' 15.95277"N	116.789	RTX
SPN3	15° 07' 12.29815"N	145° 43' 16.16988"N	116.806	RTX

2.3.3. PPP SHIFTS

In order to account for any potential trajectory shifts between each survey day for flights processed with PPP trajectories over Pagan, Farallon de Medinilla, Aguijan, and Rota, QC data were acquired over single base survey data on Saipan island across the acquisition period.

The single base survey data on Saipan island was masked to areas of only return with a slope less than 10 degrees and compared to each lidar PPP QC line processed with PPP trajectory. A shift per line was computed and averaged across all lines for each island. During lidar processing any line to line vertical mismatches are removed, therefore, an average PPP shift per island was computed and applied to remove any remaining errors in the ellipsoid height due to the use of PPP processing of the trajectories. Results for each island are presented in Table 12.

Table 12: Corrections for PPP Shift

Survey Area	PPP Shift Applied to Lidar Data (m)
Pagan	0.105
FdM	0.087
Aguijan	0.087
Rota	0.081

2.4. GROUND SURVEY OPERATIONS

Ground control surveys were conducted to support the airborne acquisition. Ground control surveys were conducted to assist with final flight line calibration.

2.4.1. PRIMARY CONTROL POINTS

Woolpert used local GNSS base stations or precise point positioning (PPP) to conduct final trajectory processing as described in Section 2.3.2.

2.4.2. LIDAR GROUND SURVEY POINTS (GSPs)

Ground survey points (GSPs) were collected using traditional GNSS-based real time kinematic (RTK) survey techniques on Saipan, Tinian, and Rota. These points were used to remove any vertical bias in the lidar data.

The GSPs were all collected on bare earth surfaces on a level slope. Areas on elevated road structures (bridges, large culverts, etc.), were avoided.

2.4.3. LIDAR GROUND CHECK POINTS (GCPs)

Ground check points (GCPs) were not collected by Woolpert. The National Oceanic and Atmospheric Administration (NOAA) will be analyzing check points. These points are distinct from GSPs and will not be used to correct the lidar data in any way.

3. DATA PROCESSING

An overview of Woolpert's established HE4X processing workflow is presented in Figure 5. Initial data coverage analysis and quality checks to ensure there were no potential system issues were carried out in the field prior to demobilization of the sensor. Final processing was conducted in Woolpert's offices.

In general data were initially processed in Leica's Lidar Survey Studio (LSS) using final processed trajectory information. LAS files from LSS were then imported to a Terrascan project where spatial algorithms were used to remove noise and classify bare earth/ground. Manual review was conducted in both Terrascan and LP360 prior to product creation.

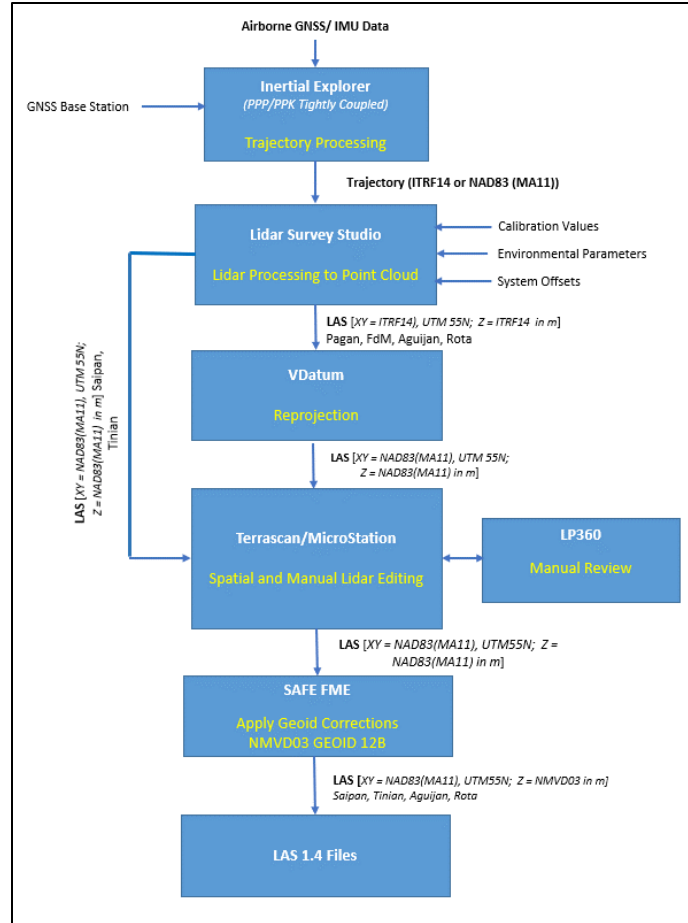


Figure 5: Overview of Processing Workflow

3.1. POSITION

Final trajectory data were post processed in NovAtel Inertial Explorer. Lever arms, shown in the NovAtel reference frame, are presented in Table 13. Inertial Explorer accounts for the fixed offset between the reference point and IMU and uses a multi-pass algorithm to compute a tightly coupled solution. GNSS base stations and precise point positioning (PPP) were used for processing, as described in Section 2.3.2. Trajectory processing logs are provided in Appendix B. Average Forward and Reverse Separation RMS for the project was 0.013m in Easting, 0.014m in Northing, and 0.043m in Height for single base solutions.

Table 13: Inertial Explorer Offsets

Sensor Head	Lever Arm	X (right)	Y (forward)	Z (up)
Chiroptera (Topo, Shallow)	Reference to GNSS Antenna L1 Phase Center	-0.061 m	0.600 m	0.930 m
	Reference to IMU Rotation	0 °	180 °	0 °
Deep Channel	Reference to GNSS Antenna L1 Phase Center	-0.140	1.269	0.819
	Reference to IMU Rotation	-90 °	0 °	180 °

3.2. LIDAR

3.2.1. RAW DATA PROCESSING

Lidar processing was conducted using the Leica Lidar Survey Studio (LSS) software. Calibration information, along with processed trajectory information were combined with the raw laser data to create an accurately georeferenced lidar point cloud for the entire survey in LAS v1.4 format. All points from the topographic and bathymetric laser include 16-bit intensity values.

During this LSS processing stage, an automatic land/water discrimination is made for the bathymetric waveforms. This allows the bathymetric (green) pulses over water to be automatically refracted for the pulse hitting the water surface and travelling through the water column, producing the correct depth. Another advantage of the automatic land/water discrimination is that it permits calculation of an accurate water surface over smaller areas, allowing simple bathymetric processing of smaller, narrower streams and drainage channels. Sloping water surfaces are also handled correctly.

Prior to processing, the hydrographer can adjust waveform sensitivity settings dependent on the environment encountered and enter a value for the refraction index to be used for bathymetry. The index of refraction is an indication of the water type. Values used for sensitivity settings and the index of refraction are included in the LSS processing settings files. A value of 1.34206 was used for the index of refraction, indicating saltwater.

In the field, default waveform sensitivity settings were used for processing. In order to determine the optimal waveform sensitivity settings for final processing, sample areas were selected and processed with multiple different settings, to iteratively converge on the best possible settings. This is done by reviewing the processed point cloud and waveforms within sample areas. A sample waveform is provided in Figure 6, while a sample LSS editing screen is provided in Figure 7. Settings affect which waveform peaks are classified as valid seabed, and which peaks are classified as noise. Optimal settings strike a balance between the amount of valid data that is classified as seabed bottom, and the amount of noise that is incorrectly classified due to peaks in the waveforms. Ideally all valid data is selected, while only a small amount of noise remains to be edited out. Once optimal threshold settings were chosen, these were used for the entire project.

It is important to note that all digitized waveform peaks are available to be reviewed by the hydrographer; both valid seabed bottom and peaks classed as noise. This allows the hydrographer to review data during TerraScan and LP360 editing for valid data such as objects that may have been misclassified as noise.

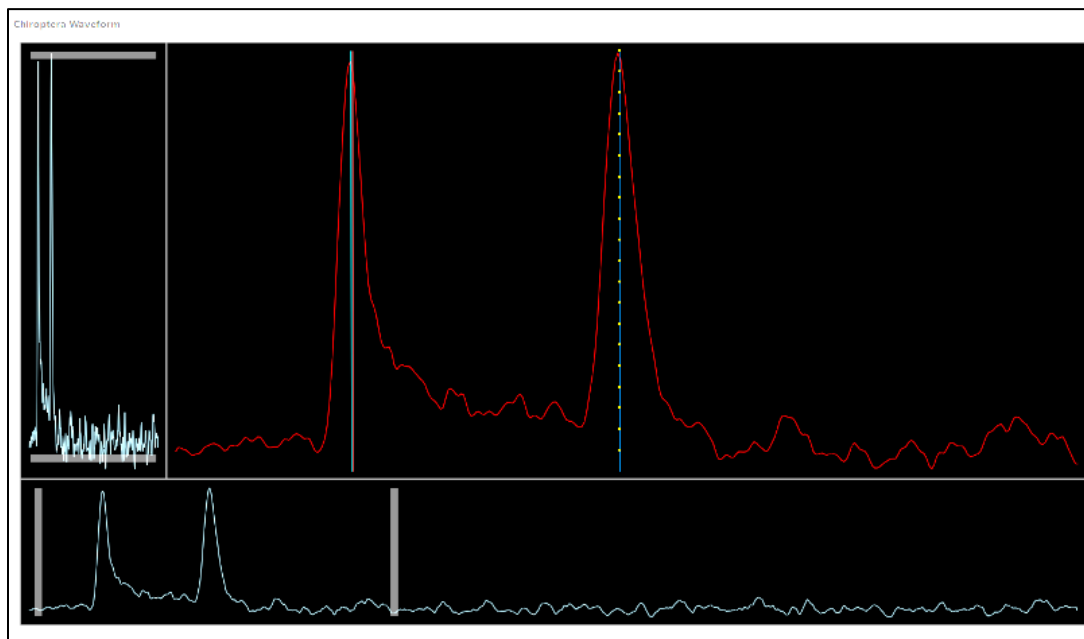


Figure 6: Sample Waveform in Shallow Water

- Re-class any topo unclassified laser data and bathy seabed data from the water surface to a water surface class
- Review bathymetry in cross section.
 - Re-class suitable data to Seabed (Class 40).
 - Re-class any noise in the bathy ground class to bathy noise (Class 45).
- Review topo ground points in areas of gaps or spikes.
 - Add points to ground (Class 2) from the topo laser if points are available to fill gaps in the ground model.
 - Re-class any noise in the ground class to Topo Unclassified (Class 1) if valid vegetation or other feature, or Noise if the point is not valid (Low Noise (Class 7) or High Noise (Class 18)).
- Review topo ground points for bridges and re-class to Bridge Deck (Class 17).
- Review bathymetry using imagery and nautical charts and re-class obvious man-made objects to Submerged Object (Class 43).

Once editing was completed in TerraScan the islands of Saipan, Tinian, Aguijan, and Rota were vertically transformed to the NMVD03 datum using GEOID12B. Pagan and Rota were not transformed as they were outside the GEOID12B extents and retained NAD83(MA11) ellipsoid heights.

Digital Elevation Models (DEMs) were then created using TerraModel at 1m resolution using Topo Ground, Seabed, and Submerged Object classes. (Class 2, 40, and 43).

The topo data was then reviewed for inland water bodies larger than 2 acres and for streams wider than 100 feet. These water bodies were hydro-flattened. Breaklines around inland water meeting the hydro-flattening requirements were digitized and a second set of DEMs were created using TerraModel at 1m resolution using Topo Ground (Class 2) and digitized breaklines for all islands. Only Pagan and Saipan contained water bodies requiring hydro-flattening.

3.3. REFLECTANCE

Although the bathymetry data includes intensity values, these are raw values. For intensity (reflectance) to correctly represent the reflectance of the seabed, the intensities must be normalized for any losses in signal as the light travels through the water column, so that the intensity value better reflects the intensity of the seabed itself.

One of the fundamental issues that exists with reflectance imagery is the variance in return due to water clarity differences occurring spatially along line, and temporally from day to day. This is challenging for any bathymetric lidar sensor.

If water clarity is relatively consistent along a line, then it is possible to achieve an overall homogenous reflectance image for an area. To a certain extent, variation in reflectivity intensity can be minimized by limiting the size of flight blocks and trying to ensure similar environmental parameters exist within a single flight block. In other words, where changes in water clarity or environment may be expected, flight blocks should be split to allow different normalization parameters to be used per block for the reflectance processing. Where this is not possible, and water clarity varies significantly along a line, variation in reflective intensity will be seen in the output imagery. While this imagery can still be analyzed and used for manual seabed classification, it prohibits the use of unsupervised, or semi-automated classification.

For this survey, cloud shadows (ambient light) had an effect on the resulting reflectance images.

Woolpert used proprietary in-house scripts developed in MATLAB to compute project specific correction parameters and normalize the raw intensity data for depth. This provides intensities that more closely represent the reflectance of the actual seabed. Corrected values were used to create 1m reflectance images per flightline using Applied Imagery's QT Modeler software. Individual flightline reflectance images were then used in Trimble's OrthoVista software to create a final reflectance image for the entire area.

OrthoVista was used to improve radiometric balancing between lines and the seamline editor was used to improve the joins between lines to remove as much line to line edge matching and cloud artifact issues as possible.

4. QUALITY CONTROL

Quality control is carried out through every phase of the project. Several checks were used to ensure data integrity and quality was maintained.

4.1. CALIBRATION

This is fundamental to good data accuracy. Calibration is discussed in detail in Section 2.2.

4.2. ONLINE CHECKS

The airborne operator monitored system status of the scanners and receivers, waveforms, camera images, data coverage, flight lines and health of the navigation system during data acquisition. Flight logs are maintained during data acquisition. Logs not only track lines acquired, but also any relevant information on weather or water clarity, instances when sensor issues occur and so on. These logs are a valuable resource during processing. They are provided in Appendix A.

4.3. POSITIONING

During acquisition, aircraft bank angles were restricted to 20° to avoid any potential GNSS dropouts. No flights were planned if the PDOP was expected to go above 3.0. Separation plots and additional statistics were reviewed for each flight trajectory processed.

4.4. TOPO COMPARISON TO ADJACENT LINES

Throughout data editing adjacent survey lines of data are compared to ensure there are no data busts, or system artifacts. During processing Terrasolid's TMatch software is run to examine the Delta Z differences between overlapping lines. If differences are greater than 0.02m, then a simple Z correction is applied per flight line to remove any vertical differences between flight lines. TMatch can then be run again once all corrections are applied to ensure adjacent lines agree within specification. This provides a measure of inter-swath accuracy. Fluctuation corrections were also run due to strong vertical differences throughout the flightline.

Overlap consistency was also measured by generating a grid at 2m using single returns in areas with less than 10 degrees of slope. The average relative accuracy of the lidar data for the project measured at 0.049 meters RMSDz with over 6 million samples measured. All differences per island are within specification (RMSDz <0.08m). Results for each island are shown in Table 14.

Table 14: Overlap Consistency

Survey Area	Count	Mean (m)	St Dev	RMSDz
Pagan	556930	0.0003	0.0692	0.069
FdM	7857	-0.0007	0.0677	0.068
Saipan	3212122	-0.0005	0.0328	0.033
Tinian	1119535	0.0015	0.0433	0.043
Aguijan	112140	-0.0004	0.0493	0.049
Rota	1434410	0.0002	0.0317	0.032

4.5. BATHY CROSSLINE ANALYSIS

Crosslines were run in a direction perpendicular to main scheme lines across the entire survey area, provided a good representation for analysis of consistency. All crosslines were used for crossline comparisons.

Crossline analysis was performed using the Fledermaus CrossCheck tool. Crossline point data were compared to a 1m gridded surface of the main scheme survey lines and statistics generated. Slopes greater than 10 degrees were excluded from the analysis. For each line, a histogram of the point comparison was reviewed in CrossCheck to ensure there was a normal distribution of data. A summary of the CrossCheck results is provided below. The result of the analysis meets the required National Coastal Mapping Strategy QL2b requirements.

Table 15: Cross Line Point to Surface Results

No. of Points Compared	27,471,390
Mean Difference (MD) in m	0.002
Standard Deviation (St. Dev)	0.121
Mean + 2* Std. Dev	0.244

In addition, 1m surfaces were created for the crosslines, and surface differences generated between the crossline and main scheme surfaces. Statistics for the difference surfaces were generated. Results matched those from the CrossCheck analysis, as shown below.

Table 16: Crossline Surface Difference Results

Mean Difference (m)	0.001
St. Dev	0.136

4.6. ABSOLUTE VERTICAL ACCURACY CHECKS

Absolute vertical accuracy checks will be carried out by NOAA. No check points will be used to adjust the lidar data.

5. DELIVERABLES

All data are provided in the project datum and coordinate system provided in Table 17.

Table 17: Project Datum and Projection

Horizontal Datum	NAD83 (MA11) Epoch 2010.0
Vertical Datum	NAD83 (MA11) Epoch 2010.0 Pagan, FdM
Projection	UTM 55N
Units (Horizontal and Vertical)	Meters

All deliverables listed in Table 18 are provided on a USB3 hard drive. The deliverables meet the required accuracy specifications.

All products are accompanied by FGDC compliant metadata, verified using the USGS Metadata Parser.

Table 18: Lidar Product Deliverables

Delivery Lot	Folder	Subfolder	Format	Cell Size	Contents
211535	metadata	reports	GeoTIFF	1m	Final bare earth raster files by island
		shapefiles	SHP	--	Supplemental shapefiles
	bare_earth	be_rasters	GeoTIFF	1m	Final bare earth raster files by island

	other	intensity	GeoTIFF	1m	Final intensity raster files by island
	point_cloud	tilecls	LAS 1.4 PDRF 6	--	Classified point cloud LAS files by island
211610	metadata	reports	GeoTIFF	1m	Final bare earth raster files by island
		shapefiles	SHP	--	Supplemental shapefiles
	bare_earth	be_rasters	GeoTIFF	1m	Final bare earth raster files by island
		breaklines	SHP		Breaklines use to create the bare earth rasters
	other	intensity	GeoTIFF	1m	Final intensity raster files by island
	point_cloud	tilecls	LAS 1.4 PDRF 6	--	Classified point cloud LAS files by island
other			SHP	--	Points used to control the survey.

In addition to the deliverables listed in Table 18 the project survey report is located in the root folder of the USB3 drive in PDF format.

5.1. CLASSIFIED POINT CLOUD (LAS FILES)

The classified point cloud LAS 1.4 files are delivered using standard ASPRS Classification Levels, with the LAS Topo-Bathy Domain Profile (July 17, 2013) classes. Final LAS classes included are provided in Table 19.

All LAS files include intensity values Therefore, all data are in Point Record Format 6.

Table 19: Delivered LAS Classes

Class Number	Class Name	Description
1	Unclassified	Processed, but not classified
2	Ground	Bare earth
W7	Low Point (Noise)	Spurious low point returns. Withheld bit set
9	Water	Water surface returns from topographic laser
17	Bridge Deck	Bridges
W18	High Noise	Spurious high point returns. Withheld bit set
20	Ignored Ground	Breakline proximity
40	Bathymetric Point	Submerged topography
41	Water Surface	Water surface returns from bathymetric laser
S42	Derived Water Surface	Synthetic water surface returns used in computing refraction at water surface. Synthetic bit set.
43	Submerged Object	Submerged Object (e.g. wreck, submerged piling)
W45	No Bottom At	Neither surface nor bottom. Withheld bit set.

APPENDIX A : FLIGHT LOGS

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL03, BL05	DATE:	5 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Cole B.
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.
MISSION ID:	079640_FdM, 079640_Saipan	CLOUDS:	Clouds @ 2500
BASE STATION:	SPN1	WIND:	6-8kts @ 80
ENGINE START:	19:45	ENGINE OFF:	1:12
ENGINE TIME:		ENGINE TIME:	05:27
GNSS START:		GNSS START:	
TAKEOFF:	20:09	TOUCHDOWN:	1:09
AIR TIME:		AIR TIME:	05:00

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		20:11:56				DS: QC_20190705_201211
000_FL1	5000	20:12:11	20:14:12	500	12	295
		20:31:23				DS: BL03_20190705_203138
000_FL1	0301	20:31:38	20:34:17	500	12	295
001_FL2	0302	20:36:15	20:38:55	500	12	295
002_FL3	0303	20:40:51	20:43:38	500	12	295
003_FL4	0304	20:45:34	20:48:19	500	12	295
004_FL5	0305	20:50:17	20:53:01	500	12	295
005_FL6	0306	20:55:07	20:57:54	500	12	295
006_FL7	0307	20:59:47	21:02:34	500	12	295
007_FL8	0308	21:04:26	21:07:04	500	12	295
008_FL9	0309	21:09:19	21:11:52	500	12	295
009_FL10	0310	21:13:46	21:16:15	500	12	295
010_FL11	0311	21:18:29	21:20:41	500	12	295
011_FL12	0312	21:22:36	21:24:32	500	12	295
012_FL13	0313	21:26:48	21:28:32	500	12	295
013_FL14	0395	21:31:14	21:33:06	500	12	295
		21:48:03				DS: BL05_20190705_214818
000_FL11	0511	21:48:18	21:54:36	500	12	295
001_FL10	0510	21:56:46	22:03:07	500	12	295
002_FL9	0509	22:04:54	22:11:17	500	12	295
003_FL8	0508	22:12:57	22:19:33	500	12	295
004_FL7	0507	22:21:22	22:27:45	500	12	295
005_FL6	0506	22:29:30	22:30:40	500	12	295
006_FL6	0506	22:40:18	22:46:43	500	12	295
007_FL5	0505	22:48:36	22:55:08	500	12	295
008_FL4	0504	22:56:59	23:03:37	500	12	295
009_FL3	0503	23:05:30	23:11:58	500	12	295
010_FL2	0502	23:13:45	23:16:36	500	12	295
011_FL2	0502	23:17:19	23:19:10	500	12	295
012_FL2	0502	23:19:40	23:20:18	500	12	295

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL03, BL05	DATE:	5 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Cole B.
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.
MISSION ID:	079640_FdM, 079640_Saipan	CLOUDS:	Clouds @ 2500
BASE STATION:	SPN1	WIND:	6-8kts @ 80
ENGINE START:	19:45	ENGINE OFF:	1:12
GNSS START:		GNSS START:	
TAKEOFF:	20:09	TOUCHDOWN:	1:09
		ENGINE TIME:	05:27
		AIR TIME	05:00

FL #	LINE #	START TIME	END TIME	TOPO		CHII PWR	REMARKS
				PRF	PWR		
013_FL2	0502	23:27:59	23:34:26	500	12	295	
014_FL1	0501	23:36:27	23:39:19	500	12	295	
015_FL1	0501	23:39:40	23:43:25	500	12	295	
016_FL12	0512	23:47:08	23:50:43	500	12	295	
017_FL13	0513	23:52:43	23:56:29	500	12	295	
018_FL14	0514	23:58:03	00:01:31	500	12	295	
019_FL15	0515	00:03:29	00:07:08	500	12	295	
020_FL16	0516	00:08:50	00:12:28	500	12	295	
021_FL17	0517	00:14:46	00:18:30	500	12	295	
022_FL18	0518	00:20:48	00:24:26	500	12	295	
023_FL19	0519	00:26:27	00:30:02	500	12	295	
024_FL20	0520	00:31:41	00:33:13	500	12	295	
025_FL21	0521	00:36:09	00:37:41	500	12	295	
026_FL22	0522	00:39:51	00:40:56	500	12	295	
027_FL23	0523	00:43:09	00:44:12	500	12	295	
028_FL30	0596	00:47:46	00:49:57	500	12	295	
029_FL29		00:53:58	00:54:09				BAD: Safety shutoff
030_FL29	0595	00:54:23	00:55:18	500	12	295	
		01:02:46					DS: QC_20190706_010301
000_FL1	5000	01:03:01	01:04:53	500	12	295	

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL03	DATE:	6 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Cole B.
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.
MISSION ID:	079640_FdM	CLOUDS:	Clouds @ 2500
BASE STATION:	SPN1	WIND:	6-8kts @ 80
ENGINE START:	19:40	ENGINE OFF:	20:45
ENGINE TIME:		ENGINE TIME:	01:05
GNSS START:		GNSS START:	
TAKEOFF:	20:00	TOUCHDOWN:	20:45
AIR TIME:		AIR TIME:	00:45

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		20:00:17				DS: QC_20190706_200032
000_FL2	5500	20:00:32	20:02:27	500 12	295	
		20:20:06				DS: BL03_20190706_202021
000_FL15	0314	20:20:21	20:22:12	500 12	295	
001_FL16	0315	20:24:18	20:26:14	500 12	295	
002_FL17	0316	20:28:10	20:30:07	500 12	295	
		20:41:00				System froze: Reboot

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL01, BL02	DATE:	6 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Cole B.
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	079640_Pagan	CLOUDS:	Clouds @ 3000
BASE STATION:	SPN1	WIND:	6-8kts @ 80

ENGINE START:	20:45	ENGINE OFF:	1:40	ENGINE TIME:	04:55
GNSS START:		GNSS START:			
TAKEOFF:	20:45	TOUCHDOWN:	1:36	AIR TIME	04:51

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		21:16:39				DS: BL02_20190706_211654
000_FL37	0237	21:16:54	21:17:34	450	14	295
001_FL1	0201	21:22:01	21:23:32	450	14	295
002_FL2	0202	21:25:16	21:27:02	450	14	295
003_FL3	0203	21:28:57	21:29:56	450	14	295
004_FL3	0203	21:30:23	21:30:57	450	14	295
005_FL3	0203	21:32:35	21:34:29	450	14	295
006_FL4	0204	21:36:08	21:38:20	450	14	295
007_FL5	0205	21:40:02	21:42:45	450	14	295
008_FL6	0206	21:44:20	21:47:24	450	14	295
009_FL7	0207	21:49:07	21:52:10	450	14	295
010_FL8	0208	21:53:52	21:56:55	450	14	295
011_FL9	0209	21:58:40	22:01:37	450	14	295
012_FL10	0210	22:03:14	22:06:05	450	14	295
013_FL11	0211	22:08:03	22:10:27	450	14	295
014_FL12	0212	22:12:51	22:14:39	450	14	295
015_FL13	0213	22:17:10	22:20:09	450	14	295
016_FL14	0214	22:21:42	22:24:40	450	14	295
017_FL15	0215	22:26:30	22:29:26	450	14	295
018_FL16	0216	22:31:30	22:34:18	450	14	295
019_FL17	0217	22:35:54	22:38:33	450	14	295
020_FL18	0218	22:40:26	22:43:03	450	14	295
021_FL19	0219	22:45:07	22:47:44	450	14	295
022_FL20	0220	22:49:36	22:52:06	450	14	295
023_FL21	0221	22:53:36	22:56:04	450	14	295
024_FL22	0222	22:57:41	23:00:04	450	14	295
025_FL23	0223	23:01:51	23:04:13	450	14	295
026_FL24	0224	23:05:51	23:08:03	450	14	295
027_FL25	0225	23:09:52	23:11:58	450	14	295
028_FL26	0226	23:13:32	23:15:30	450	14	295
029_FL27	0227	23:17:41	23:19:31	450	14	295

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL01, BL02	DATE:	6 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Cole B.
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	079640_Pagan	CLOUDS:	Clouds @ 3000
BASE STATION:	SPN1	WIND:	6-8kts @ 80

ENGINE START:	20:45	ENGINE OFF:	1:40	ENGINE TIME:	04:55
GNSS START:		GNSS START:			
TAKEOFF:	20:45	TOUCHDOWN:	1:36	AIR TIME	04:51

FL #	LINE #	START TIME	END TIME	TOPO		CHII PWR	REMARKS
				PRF	PWR		
030_FL28	0228	23:20:57	23:22:34	450	14	295	
031_FL29	0229	23:24:23	23:25:55	450	14	295	
		23:28:16					DS: BL01_20190706_232831
000_FL18	0118	23:28:31	23:30:15	500	12	295	
001_FL19	0119	23:32:14	23:34:11	500	12	295	
002_FL20	0120	23:35:57	23:38:03	500	12	295	
003_FL21	0121	23:39:43	23:41:55	500	12	295	
004_FL22	0122	23:43:39	23:45:49	500	12	295	
005_FL23	0123	23:47:26	23:49:49	500	12	295	
006_FL24	0124	23:51:31	23:53:51	500	12	295	
007_FL11	0111	23:55:42	23:57:37	500	12	295	
008_FL1	0101	23:59:11	00:00:37	500	12	295	
009_FL2	0102	00:02:29	00:04:13	500	12	295	
010_FL3	0103	00:06:08	00:08:14	500	12	295	
011_FL4	0104	00:10:06	00:12:14	500	12	295	
012_FL41	0141	00:14:40	00:16:06	500	12	295	
013_FL41		00:16:18	00:16:48				BAD: Safety Shutoff
014_FL42	0142	00:18:36	00:20:45	500	12	295	
015_FL43	0143	00:22:15	00:24:23	500	12	295	
016_FL44	0144	00:26:01	00:28:04	500	12	295	
017_FL45	0145	00:29:44	00:31:36	500	12	295	
018_FL25	0125	00:33:37	00:34:32	500	12	295	
019_FL25	0125	00:34:51	00:36:18	500	12	295	No deep data
020_FL5	0105	00:39:49	00:40:31	500	12	295	
021_FL5	0105	00:40:43	00:41:45	500	12	295	No deep data

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL01, BL02, BL04	DATE:	7 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Cole B.
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	079640_Pagan, 079640_Saipan	CLOUDS:	Clouds @ 3000
BASE STATION:	SPN1	WIND:	5kts @ 50

ENGINE START:	18:46	ENGINE OFF:	0:23	ENGINE TIME:	05:37
GNSS START:		GNSS START:			
TAKEOFF:	19:02	TOUCHDOWN:	0:16	AIR TIME	05:14

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		20:02:18				DS: BL02_20190707_200233
000_FL31	0231	20:02:33	20:03:50	450	14	295
001_FL32	0232	20:06:30	20:08:28	450	14	295
002_FL33	0233	20:10:13	20:12:07	450	14	295
003_FL34	0234	20:13:58	20:15:55	450	14	295
004_FL35	0235	20:17:27	20:19:21	450	14	295
005_FL36	0236	20:21:09	20:22:48	450	14	295
006_FL37	0237	20:24:40	20:25:55	450	14	295
007_FL38	0238	20:27:28	20:28:39	450	14	295
008_FL39	0239	20:30:25	20:31:43	450	14	295
009_FL40	0240	20:33:16	20:34:28	450	14	295
010_FL41	0241	20:36:06	20:37:24	450	14	295
		20:39:39				DS: BL01_20190707_203954
000_FL6	0106	20:39:54	20:41:49	500	12	295
001_FL7	0107	20:43:37	20:45:55	500	12	295
002_FL8	0108	20:47:44	20:49:23	500	12	295
003_FL8		20:49:41	20:49:58			BAD: Safety Shutoff
004_FL9	0109	20:51:55	20:53:41	500	12	295
005_FL10	0110	20:55:46	20:56:32	500	12	295
006_FL10		20:56:46	20:57:13			BAD: Safety Shutoff
007_FL11	0111	20:59:26	21:01:20	500	12	295
008_FL12	0112	21:03:00	21:05:09	500	12	295
009_FL13	0113	21:06:40	21:09:15	500	12	295
010_FL14	0114	21:11:06	21:13:42	500	12	295
011_FL15		21:15:47	21:15:50			BAD: Safety Shutoff
012_FL15	0115	21:16:15	21:18:38	500	12	295
013_FL16	0116	21:20:30	21:23:09	500	12	295
014_FL17	0117	21:24:37	21:27:35	500	12	295
015_FL26	0126	21:30:12	21:32:46	500	12	295
016_FL27	0127	21:34:29	21:37:09	500	12	295
017_FL28	0128	21:39:01	21:41:37	500	12	295

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL01, BL02, BL04	DATE:	7 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Cole B.
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	079640_Pagan, 079640_Saipan	CLOUDS:	Clouds @ 3000
BASE STATION:	SPN1	WIND:	5kts @ 50

ENGINE START:	18:46	ENGINE OFF:	0:23	ENGINE TIME:	05:37
GNSS START:		GNSS START:			
TAKEOFF:	19:02	TOUCHDOWN:	0:16	AIR TIME	05:14

FL #	LINE #	START TIME	END TIME	TOPO		CHII PWR	REMARKS
				PRF	PWR		
018_FL29	0129	21:44:07	21:45:59	500	12	295	
019_FL30	0130	21:49:33	21:52:05	500	12	295	
020_FL31	0131	21:53:48	21:56:02	500	12	295	
021_FL32	0132	21:57:47	22:00:02	500	12	295	
022_FL33	0133	22:01:43	22:03:54	500	12	295	
023_FL34	0134	22:05:45	22:07:58	500	12	295	
024_FL35	0135	22:09:50	22:11:59	500	12	295	
025_FL36	0136	22:13:58	22:16:04	500	12	295	
026_FL37	0137	22:18:07	22:19:43	500	12	295	
027_FL38	0138	22:21:36	22:22:52	500	12	295	
028_FL39	0139	22:24:34	22:25:47	500	12	295	
029_FL40	0140	22:27:36	22:28:51	500	12	295	
030_FL46	0195	22:30:58	22:33:28	500	12	295	
031_FL8	0108	22:35:50	22:37:12	500	12	295	
032_FL9	0109	22:39:39	22:40:45	500	12	295	
033_FL10	0110	22:42:27	22:43:24	500	12	295	
034_FL10		22:43:40	22:43:58				BAD: Safety Shutoff
035_FL15	0115	22:45:42	22:48:32	500	12	295	
		23:43:49					DS: BL04_20190707_234404
000_FL43	0443	23:44:04	23:45:45	500	12	295	
001_FL44	0444	23:47:40	23:49:24	500	12	295	
002_FL45	0445	23:51:14	23:52:54	500	12	295	
003_FL46	0446	23:55:03	23:56:41	500	12	295	
		00:10:35					DS: QC_20190708_001050
000_FL2	5500	00:10:50	00:12:46	500	12	295	

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL04, BL05, BL06	DATE:	8 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Cole B.
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	079640_Saipan	CLOUDS:	Clouds @ 3000
BASE STATION:	SPN1	WIND:	5kts @ 360

ENGINE START:	19:31	ENGINE OFF:	0:53	ENGINE TIME:	05:22
GNSS START:		GNSS START:			
TAKEOFF:	19:42	TOUCHDOWN:	0:48	AIR TIME	05:06

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		19:44:49				DS: QC_20190708_194504
000_FL1	5000	19:45:04	19:47:03	500 12	295	
		19:50:31				DS: BL05_20190708_195046
000_FL24	0524	19:50:46	19:52:35	500 12	295	
001_FL25	0525	19:54:55	19:56:44	500 12	295	
002_FL26	0526	19:58:37	20:00:26	500 12	295	
003_FL27	0527	20:02:19	20:03:48	500 12	295	
004_FL28	0528	20:06:12	20:07:21	500 12	295	
		20:09:33				DS: BL04_20190708_200948
000_FL13	0413	20:09:48	20:12:38	500 12	295	
001_FL12	0412	20:14:44	20:17:54	500 12	295	
002_FL11	0411	20:19:59	20:23:11	500 12	295	
003_FL10	0410	20:25:01	20:28:02	500 12	295	
004_FL9	0409	20:29:33	20:32:32	500 12	295	
005_FL8	0408	20:34:26	20:37:06	500 12	295	
006_FL7	0407	20:38:49	20:41:29	500 12	295	
007_FL6	0406	20:43:16	20:45:41	500 12	295	
008_FL5	0405	20:47:09	20:49:21	500 12	295	
009_FL4	0404	20:51:02	20:53:06	500 12	295	
010_FL3	0403	20:55:02	20:56:56	500 12	295	
011_FL2	0402	20:58:46	21:00:32	500 12	295	
012_FL1	0401	21:02:07	21:03:22	500 12	295	
013_FL42	0442	21:06:39	21:11:23	500 12	295	
014_FL41	0441	21:14:21	21:20:12	500 12	295	
015_FL40	0440	21:22:14	21:28:05	500 12	295	
016_FL39	0439	21:29:33	21:35:20	500 12	295	
017_FL38	0438	21:37:26	21:42:35	500 12	295	
018_FL37	0437	21:44:46	21:49:29	500 12	295	
019_FL36	0436	21:51:27	21:55:47	500 12	295	
020_FL35	0435	21:57:39	22:01:49	500 12	295	
021_FL34	0434	22:03:41	22:08:00	500 12	295	

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL04, BL05, BL06	DATE:	8 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Cole B.
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	079640_Saipan	CLOUDS:	Clouds @ 3000
BASE STATION:	SPN1	WIND:	5kts @ 360

ENGINE START:	19:31	ENGINE OFF:	0:53	ENGINE TIME:	05:22
GNSS START:		GNSS START:			
TAKEOFF:	19:42	TOUCHDOWN:	0:48	AIR TIME	05:06

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR		CHII PWR	REMARKS
022_FL33	0433	22:09:42	22:13:51	500	12	295	
023_FL32	0432	22:15:38	22:19:50	500	12	295	
024_FL31	0431	22:21:31	22:25:31	500	12	295	
025_FL30	0430	22:27:10	22:31:22	500	12	295	
026_FL29	0429	22:33:01	22:36:59	500	12	295	
027_FL28	0428	22:38:57	22:42:48	500	12	295	
028_FL27	0427	22:44:26	22:48:08	500	12	295	
029_FL26	0426	22:50:52	22:53:39	500	12	295	
030_FL25	0425	22:55:23	23:00:16	500	12	295	
031_FL24	0424	23:01:59	23:07:06	500	12	295	
		23:07:10					DS: BL04_20190708_230716
000_FL24		23:07:16					BAD: Change Drive
001_FL23	0423	23:08:49	23:13:37	500	12	295	
002_FL22	0422	23:15:09	23:19:54	500	12	295	
003_FL21	0421	23:22:59	23:26:07	500	12	295	
004_FL20	0420	23:27:49	23:31:02	500	12	295	
005_FL19	0419	23:32:49	23:35:51	500	12	295	
006_FL18	0418	23:37:45	23:40:43	500	12	295	
007_FL17	0417	23:42:18	23:45:07	500	12	295	
008_FL16	0416	23:47:07	23:49:51	500	12	295	
009_FL15	0415	23:51:35	23:53:38	500	12	295	
010_FL14	0414	23:55:39	23:57:24	500	12	295	
		00:00:40					DS: BL06_20190709_000055
000_FL30	0630	00:00:55	00:02:39	450	14	295	
001_FL29	0629	00:04:16	00:06:16	450	14	295	
002_FL28	0628	00:08:16	00:10:06	450	14	295	
003_FL27	0627	00:11:49	00:13:39	450	14	295	
004_FL26	0626	00:15:43	00:17:39	450	14	295	
005_FL25	0625	00:19:24	00:21:17	450	14	295	
006_FL24	0624	00:36:48	00:38:27	450	14	295	
007_FL23	0623	00:40:16	00:41:51	450	14	295	
008_FL22	0622	00:44:04	00:45:28	450	14	295	

PROJECT NAME:	079640 - CNMI - TopoBathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL04, BL05, BL06, BL07	DATE:	11 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Cole B.
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	079640_Saipan, 079640_Tinian	CLOUDS:	Clouds @ 2000
BASE STATION:	SPN1	WIND:	15Kts @ 96

ENGINE START:	19:40	ENGINE OFF:	0:34	ENGINE TIME:	04:54
GNSS START:		GNSS START:			
TAKEOFF:	20:03	TOUCHDOWN:	0:28	AIR TIME	04:25

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		20:23:15				DS: QC_20190711_202330
000_FL1	5000	20:23:30	20:25:31	500	12	295
		20:27:40				DS: BL04_20190711_202755
000_FL40	0440	20:27:55	20:33:58	500	12	295
001_FL31	0431	20:36:28	20:40:36	500	12	295
		20:42:07				DS: BL05_20190711_204222
000_FL26	0526	20:42:22	20:44:16	500	12	295
		20:45:47				DS: BL06_20190711_204602
000_FL25	0625	20:46:02	20:47:55	450	14	295
001_FL26	0626	20:49:47	20:50:42	450	14	295
002_FL26		20:51:32	20:51:52			BAD: Safety shutoff
		20:57:09				DS: BL07_20190711_205724
000_FL15	0715	20:57:24	21:02:33	450	14	295
001_FL16	0716	21:04:03	21:09:16	450	14	295
002_FL17	0717	21:11:15	21:16:40	450	14	295
003_FL18	0718	21:18:18	21:23:36	450	14	295
004_FL19	0719	21:25:28	21:30:15	450	14	295
005_FL20	0720	21:32:15	21:36:48	450	14	295
006_FL21	0721	21:38:46	21:43:07	450	14	295
007_FL22	0722	21:44:30	21:48:39	450	14	295
008_FL23	0723	21:50:16	21:54:33	450	14	295
009_FL24	0724	21:57:14	22:00:51	450	14	295
010_FL25	0725	22:02:59	22:06:21	450	14	295
011_FL26	0726	22:08:13	22:09:14	450	14	295
012_FL27	0727	22:11:39	22:13:33	450	14	295
013_FL14	0714	22:16:15	22:19:55	450	14	295
014_FL13	0713	22:21:16	22:24:42	450	14	295
015_FL12	0712	22:26:21	22:30:03	450	14	295
016_FL11	0711	22:31:55	22:34:30	450	14	295

PROJECT NAME:	079640 - CNMI - TopoBathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL04, BL05, BL06, BL07	DATE:	11 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Cole B.
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	079640_Saipan, 079640_Tinian	CLOUDS:	Clouds @ 2000
BASE STATION:	SPN1	WIND:	15Kts @ 96

ENGINE START:	19:40	ENGINE OFF:	0:34	ENGINE TIME:	04:54
GNSS START:		GNSS START:			
TAKEOFF:	20:03	TOUCHDOWN:	0:28	AIR TIME	04:25

FL #	LINE #	START TIME	END TIME	TOPO		CHII PWR	REMARKS
				PRF	PWR		
017_FL10	0710	22:36:26	22:38:26	450	14	295	
018_FL9	0709	22:40:42	22:44:13	450	14	295	
019_FL8	0708	22:46:03	22:47:33	450	14	295	
020_FL8	0708	22:50:48	22:54:08	450	14	295	
021_FL7	0707	22:56:03	22:59:33	450	14	295	
022_FL6		23:00:47	23:01:00				BAD: Safety shutoff
023_FL6	0706	23:01:21	23:04:07	450	14	295	
024_FL5	0705	23:06:05	23:09:37	450	14	295	
025_FL4	0704	23:12:32	23:16:20	450	14	295	
026_FL3	0703	23:22:28	23:26:24	450	14	295	
027_FL2	0702	23:28:21	23:31:56	450	14	295	
028_FL1	0701	23:33:43	23:37:31	450	14	295	
029_FL28	0728	23:39:04	23:41:25	450	14	295	
030_FL29	0729	23:42:49	23:44:57	450	14	295	
031_FL30	0730	23:46:47	23:48:51	450	14	295	
032_FL31	0731	23:49:58	23:52:02	450	14	295	
033_FL32	0732	23:53:38	23:55:39	450	14	295	
034_FL33	0733	23:57:31	23:59:19	450	14	295	
035_FL34	0734	00:01:23	00:03:10	450	14	295	
036_FL35	0735	00:04:30	00:06:17	450	14	295	
037_FL36	0736	00:08:17	00:10:04	450	14	295	
038_FL37	0737	00:11:22	00:12:53	450	14	295	
		00:14:57					DS: BL07_20190712_001512
000_FL38	0795	00:15:12	00:18:26	450	14	295	
		00:22:10					DS: QC_20190712_002225
000_FL1	5000	00:22:25	00:24:28	450	14	295	

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BLO6	DATE:	12 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Cole B.
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.
MISSION ID:	079640_Saipan	CLOUDS:	Clouds @ 2500
BASE STATION:	SPN1	WIND:	18kts @ 124
ENGINE START:	19:39	ENGINE OFF:	20:30
ENGINE TIME:		ENGINE TIME:	00:51
GNSS START:		GNSS START:	
TAKEOFF:	19:51	TOUCHDOWN:	20:30
AIR TIME:		AIR TIME:	00:39

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		19:53:41				DS: QC_20190712_195356
000_FL1	5000	19:53:56	19:55:52	450	14	295
		19:59:20				DS: BLO6_20190712_195935
000_FL8	0608	19:59:35	20:02:17	450	14	295
001_FL8	0608	20:02:48	20:04:33	450	14	295
002_FL7	0607	20:06:31	20:11:25	450	14	295
003_FL6	0606	20:13:19	20:17:32	450	14	295
004_FL5	0605	20:19:31	20:22:56	450	14	295
		20:25:00				System Reboot

PROJECT NAME:	079640 - CNMI - TopoBathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL06, BL07, BL08, BL09, BL10	DATE:	12 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Cole B.
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	079640_Aguijan	CLOUDS:	Clouds @ 2500
BASE STATION:	SPN1	WIND:	18kts @ 124

ENGINE START:	20:30	ENGINE OFF:	0:23	ENGINE TIME:	03:53
GNSS START:		GNSS START:			
TAKEOFF:	20:30	TOUCHDOWN:	0:20	AIR TIME	03:50

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS	
		20:48:34				DS: BL06_20190712_204849	
000_FL6	0606	20:48:49	20:52:43	450	14	295	Clouds
001_FL5	0605	20:54:40	20:58:04	450	14	295	Clouds
		20:59:41					DS: BL08_20190712_205956
000_FL24	0824	20:59:56	21:04:49	450	14	295	
001_FL23	0823	21:06:22	21:11:06	450	14	295	
002_FL22	0822	21:13:02	21:18:01	450	14	295	
003_FL21	0821	21:22:58	21:27:45	450	14	295	
004_FL20	0820	21:29:52	21:34:50	450	14	295	
005_FL19	0819	21:36:39	21:41:31	450	14	295	
006_FL18	0818	21:43:21	21:48:24	450	14	295	Clouds
		21:55:16					DS: BL07_20190712_215531
000_FL37	0737	21:55:31	21:57:04	450	14	295	
		21:59:17					DS: BL09_20190712_215932
000_FL1	0901	21:59:32	22:03:16	450	14	295	
		22:06:07					DS: BL10_20190712_220622
000_FL1	1001	22:06:22	22:08:05	450	14	295	
001_FL2	1002	22:09:36	22:11:24	450	14	295	
002_FL3	1003	22:13:24	22:15:20	450	14	295	
003_FL4	1004	22:17:21	22:19:02	450	14	295	
		22:21:41					DS: BL09_20190712_222156
000_FL2	0902	22:21:56	22:25:56	450	14	295	
001_FL3	0903	22:27:37	22:31:22	450	14	295	
002_FL4	0904	22:33:06	22:36:54	450	14	295	
003_FL5	0905	22:38:30	22:42:19	450	14	295	
004_FL6	0906	22:44:35	22:48:26	450	14	295	
005_FL7	0907	22:50:26	22:54:06	450	14	295	
006_FL8	0908	22:56:12	22:59:54	450	14	295	
007_FL9	0909	23:01:45	23:05:19	450	14	295	

PROJECT NAME: 079640 - CNMI - TopoBathy Lidar	BASE AIRPORT: Saipan (SPN)
LOCATION / AREA: Mariana Islands / BL06, BL07, BL08, BL09, BL10	DATE: 12 July 2019
AIRCRAFT: Reims F406 - ZK-XLF	PILOT: Cole B.
SYSTEM: Hawkeye 4x	OPERATOR: Andrew S.

MISSION ID: 079640_Aguijan	CLOUDS: Clouds @ 2500
BASE STATION: SPN1	WIND: 18kts @ 124

ENGINE START: 20:30	ENGINE OFF: 0:23	ENGINE TIME: 03:53
GNSS START:	GNSS START:	
TAKEOFF: 20:30	TOUCHDOWN: 0:20	AIR TIME 03:50

FL #	LINE #	START TIME	END TIME	TOPO		CHII PWR	REMARKS
				PRF	PWR		
008_FL10	0910	23:07:04	23:10:41	450	14	295	
009_FL11	0911	23:12:05	23:15:38	450	14	295	
010_FL12	0912	23:17:31	23:21:04	450	14	295	
011_FL13	0913	23:22:54	23:26:22	450	14	295	
012_FL14	0914	23:28:28	23:31:56	450	14	295	
013_FL15	0915	23:33:22	23:36:40	450	14	295	
014_FL16	0916	23:38:36	23:41:59	450	14	295	
015_FL17	0917	23:44:00	23:47:03	450	14	295	
016_FL18	0918	23:48:52	23:51:47	450	14	295	
017_FL19	0995	23:54:54	23:56:47	450	14	295	
		00:01:10					DS: BL08_20190713_000125
000_FL18	0818	00:01:25	00:03:51	450	14	295	Clouds
		00:15:04					DS: QC_20190713_001519
000_FL2	5500	00:15:19	00:16:18	450	14	295	

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL06	DATE:	13 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Cole B.
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	079640_Saipan	CLOUDS:	Clouds @ 2500
BASE STATION:	SPN1	WIND:	18kts @ 132

ENGINE START:	19:41	ENGINE OFF:	22:25	ENGINE TIME:	02:44
GNSS START:		GNSS START:			
TAKEOFF:	19:59	TOUCHDOWN:	22:25	AIR TIME	02:26

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		20:01:47				DS: QC_20190713_200202
000_FL2	5500	20:02:02	20:04:02	450	14	295
		20:06:39				DS: BL06_20190713_200654
000_FL6	0606	20:06:54	20:10:55	450	14	295
001_FL5	0605	20:13:33	20:17:24	450	14	295
002_FL4	0604	20:19:22	20:22:29	450	14	295
003_FL3	0603	20:24:44	20:27:29	450	14	295
004_FL2	0602	20:29:10	20:31:14	450	14	295
005_FL1	0601	20:33:10	20:34:57	450	14	295
006_FL9	0609	20:38:25	20:41:11	450	14	295
007_FL9	0609	20:41:56	20:43:46	450	14	295
008_FL21	0621	20:59:18	21:05:52	450	14	295
009_FL20	0620	21:07:15	21:13:44	450	14	295
010_FL19	0619	21:15:32	21:22:13	450	14	295
011_FL18	0618	21:23:51	21:30:21	450	14	295
012_FL17	0617	21:43:43	21:50:17	450	14	295
013_FL16	0616	21:52:02	21:58:49	450	14	295
014_FL15	0615	22:00:37	22:07:47	450	14	295
015_FL14	0614	22:11:00	22:13:02	450	14	295
		22:20:00				System Reboot

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL08, BL11	DATE:	13 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Cole B.
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	079640_Rota, 079640_Tinian	CLOUDS:	Clouds @ 2500
BASE STATION:	SPN1	WIND:	18kts @ 132

ENGINE START:	22:25	ENGINE OFF:	0:33	ENGINE TIME:	02:08
GNSS START:		GNSS START:			
TAKEOFF:	22:25	TOUCHDOWN:	0:28	AIR TIME	02:03

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		22:47:51				DS: BL11_20190713_224806
000_FL1	1101	22:48:06	22:50:42	500 12	295	
001_FL2	1102	22:52:29	22:55:15	500 12	295	
002_FL3	1103	22:57:09	23:00:07	500 12	295	
003_FL4	1104	23:02:00	23:05:06	500 12	295	
004_FL5	1105	23:07:01	23:10:08	500 12	295	
005_FL6	1106	23:11:57	23:13:49	500 12	295	
006_FL6	1106	23:14:10	23:15:01	500 12	295	
		23:40:57				DS: BL08_20190713_234112
000_FL17	0817	23:41:12	23:42:01	450 14	295	
001_FL17	0817	23:44:39	23:49:31	450 14	295	
002_FL16	0816	23:51:08	23:56:07	450 14	295	
003_FL15	0815	23:57:26	00:02:20	450 14	295	
004_FL13	0813	00:04:04	00:09:00	450 14	295	
005_FL12	0812	00:10:22	00:15:13	450 14	295	
006_FL14	0814	00:16:56	00:22:00	450 14	295	

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL11	DATE:	14 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Cole B.
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	079640_Saipan	CLOUDS:	Clouds @ 2500
BASE STATION:	SPN1	WIND:	5kts @ 125

ENGINE START:	23:25	ENGINE OFF:	2:03	ENGINE TIME:	02:38
GNSS START:		GNSS START:			
TAKEOFF:	23:52	TOUCHDOWN:	1:56	AIR TIME	02:04

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		23:55:35				DS: QC_12_20190714
000_FL2	5500	23:55:50	23:57:53	500	12	295
		00:21:56				DS: BL11_20190715_002211
000_FL8	1108	00:22:11	00:25:09	500	12	295
001_FL7	1107	00:26:32	00:29:41	500	12	295
002_FL6	1106	00:31:32	00:34:47	500	12	295
		00:40:26				DS: BL11_20190715_004041
000_FL5	1105	00:40:41	00:43:50	500	12	295
001_FL4	1104	00:45:43	00:48:51	500	12	295
002_FL3	1103	00:50:19	00:53:13	500	12	295
003_FL2	1102	00:55:08	00:57:57	500	12	295
004_FL1	1101	00:59:24	01:01:51	500	12	295
005_FL38	1138	01:05:37	01:07:24	500	12	295
006_FL37	1137	01:08:59	01:10:55	500	12	295
007_FL36	1136	01:12:32	01:14:35	500	12	295
008_FL35	1135	01:16:05	01:16:57	500	12	295
009_FL35	1135	01:17:09	01:18:15	500	12	295
010_FL13	1113	01:20:57	01:24:24	500	12	295
011_FL12	1112	01:31:07	01:32:49	500	12	295
						BAD: Topo laser shutoff

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL04, BL05	DATE:	16 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Cole B.
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	079640_Saipan	CLOUDS:	Clouds @ 3000
BASE STATION:	SPN1	WIND:	5kts @ 55

ENGINE START:	1:46	ENGINE OFF:	2:46	ENGINE TIME:	01:00
GNSS START:		GNSS START:			
TAKEOFF:	2:00	TOUCHDOWN:	2:39	AIR TIME	00:39

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		02:03:14				DS: QC_20190716_020329
000_FL2	5500	02:03:29	02:05:30			
		02:09:46				DS: BL05_20190716_021001
000_FL1	0501	02:10:01	02:12:48	500	12	295
001_FL1	0501	02:12:58	02:15:29	500	12	295
002_FL1		02:15:42	02:15:58			BAD: Safety shutoff
003_FL1		02:16:10	02:16:39			BAD: Safety shutoff
		02:19:48				DS: BL04_20190716_022003
000_FL22	0422	02:20:03	02:24:49	500	12	295
001_FL21	0421	02:26:49	02:29:59	500	12	295
002_FL20	0420	02:31:38	02:33:02	500	12	295
		02:35:00				End Survey: High Temp

PROJECT NAME:	079640 - CNMI - Bathymetry Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL05	DATE:	16 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Cole B.
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	079640_Saipan	CLOUDS:	Clouds @ 2500
BASE STATION:	SPN1	WIND:	7kts @ 109

ENGINE START:	19:38	ENGINE OFF:	20:59	ENGINE TIME:	01:21
GNSS START:		GNSS START:			
TAKEOFF:	19:54	TOUCHDOWN:	20:53	AIR TIME	00:59

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		20:11:25				DS: QC_20190716_201140
000_FL2	5500	20:11:40	20:13:43	500	12	295
		20:17:20				DS: BL05_20190716_201735
000_FL1	0501	20:17:35	20:23:09	500	12	295
001_FL1		20:23:25	20:23:37			BAD: Safety shutoff
002_FL1		20:24:03	20:24:23			BAD: Safety shutoff
003_FL2	0502	20:26:07	20:32:44	500	12	295
004_FL3	0503	20:34:38	20:41:18	500	12	295
005_FL4	0504	20:43:04	20:47:21	500	12	295
		20:48:00				End Survey

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL05, BL07	DATE:	18 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Cole B.
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	079640_Saipan, 079640_Tinian	CLOUDS:	Clouds @ 2000
BASE STATION:	SPN1	WIND:	12kts @ 124

ENGINE START:	20:13	ENGINE OFF:	22:39	ENGINE TIME:	02:26
GNSS START:		GNSS START:			
TAKEOFF:	20:28	TOUCHDOWN:	22:32	AIR TIME	02:04

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR		CHII PWR	REMARKS
		20:30:53					DS: QC_20190718_203108
000_FL1	5000	20:31:08	20:33:08	500	12	295	
		20:37:42					DS: BL05_20190718_203757
000_FL2	0502	20:37:57	20:41:07	500	12	295	
001_FL2	0502	20:41:14	20:43:57	500	12	295	
002_FL2	0502	20:44:07	20:45:10	500	12	295	
003_FL3		20:46:23	20:46:38				BAD: Safety shutoff
004_FL3	0503	20:46:46	20:52:53	500	12	295	
005_FL4	0504	20:55:33	21:02:15	500	12	295	
006_FL5	0505	21:03:51	21:10:23	500	12	295	
007_FL6	0506	21:12:23	21:19:25	500	12	295	
008_FL7	0507	21:21:18	21:27:43	500	12	295	
009_FL8	0508	21:41:37	21:48:17	500	12	295	
010_FL9	0509	21:51:52	21:58:25	500	12	295	
011_FL10	0510	22:00:12	22:07:38	500	12	295	
012_FL11	0511	22:08:58	22:15:18	500	12	295	
		22:20:17					DS: BL07_20190718_222032
000_FL37	0737	22:20:32	22:22:13	500	12	295	
001_FL36	0736	22:24:08	22:26:03	500	12	295	

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL04	DATE:	20 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Cole B.
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	079640_Saipan	CLOUDS:	Clouds @ 2000
BASE STATION:	SPN1	WIND:	14Kts @ 176

ENGINE START:	3:55	ENGINE OFF:	5:22	ENGINE TIME:	01:27
GNSS START:		GNSS START:			
TAKEOFF:	4:20	TOUCHDOWN:	5:11	AIR TIME	00:51

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR		CHII PWR	REMARKS
		04:22:47					DS: QC_20190720_042302
000_FL2	5500	04:23:02	04:25:01	500	12	295	
		04:28:03					DS: BL04_20190720_042818
000_FL14	0414	04:28:18	04:30:00	500	12	295	
001_FL15	0415	04:32:08	04:34:21	500	12	295	
002_FL16	0416	04:38:35	04:41:27	500	12	295	
003_FL17	0417	04:44:07	04:47:03	500	12	295	
004_FL18	0418	04:49:21	04:52:13	500	12	295	
005_FL19	0419	04:54:59	04:58:07	500	12	295	
006_FL20	0420	05:01:23	05:04:26	500	12	295	

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL05	DATE:	20 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Cole B.
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	079640_Saipan	CLOUDS:	Clouds @ 2000
BASE STATION:	SPN1	WIND:	8kts @ 90

ENGINE START:	19:48	ENGINE OFF:	22:31	ENGINE TIME:	02:43
GNSS START:		GNSS START:			
TAKEOFF:	20:08	TOUCHDOWN:	22:35	AIR TIME	02:27

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		20:13:53				DS: QC_20190720_201408
000_FL1	5000	20:14:08	20:16:06	500	12	295
		20:20:06				DS: BL05_20190720_202021
000_FL24	0524	20:20:21	20:22:09	500	12	295
001_FL25	0525	20:24:50	20:26:42	500	12	295
002_FL26	0526	20:29:43	20:31:38	500	12	295
003_FL27	0527	20:34:12	20:35:46	500	12	295
004_FL28	0528	20:38:41	20:39:54	500	12	295
005_FL23	0523	20:42:21	20:43:30	500	12	295
006_FL12	0512	20:46:07	20:49:44	500	12	295
007_FL13	0513	20:51:57	20:55:45	500	12	295
008_FL14	0514	20:57:55	21:01:22	500	12	295
009_FL15	0515	21:03:30	21:07:17	500	12	295
010_FL16	0516	21:09:23	21:12:54	500	12	295
011_FL17	0517	21:14:57	21:18:42	500	12	295
012_FL18	0518	21:20:54	21:24:33	500	12	295
013_FL19	0519	21:26:39	21:30:29	500	12	295
		21:45:23				BAD: Safety shutoff
						DS: BL05_20190720_214538
000_FL20	0520	21:45:38	21:47:12	500	12	295
001_FL21	0521	21:49:19	21:50:58	500	12	295
002_FL22	0522	21:53:16	21:54:29	500	12	295
003_FL30	0596	21:58:05	22:00:18	500	12	295
004_FL29	0595	22:04:02	22:04:16	500	12	295
005_FL29	0595	22:04:35	22:05:20	500	12	295

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL04	DATE:	21 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Jabin L
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	079640_Saipan	CLOUDS:	Clouds @ 2000
BASE STATION:	SPN1	WIND:	12kts @ 109

ENGINE START:	20:01	ENGINE OFF:	23:30	ENGINE TIME:	03:29
GNSS START:		GNSS START:			
TAKEOFF:	20:18	TOUCHDOWN:	23:22	AIR TIME	03:04

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		20:21:49				DS: QC_20190721_202204
000_FL1	5000	20:22:04	20:23:55	500	12	295
		20:30:37				DS: BL04_20190721_203052
000_FL13	0413	20:30:52	20:33:31	500	12	295
001_FL12	0412	20:36:03	20:39:08	500	12	295
002_FL11	0411	20:41:39	20:44:45	500	12	295
003_FL10	0410	20:46:53	20:50:06	500	12	295
004_FL9	0409	20:53:07	20:55:59	500	12	295
005_FL8		20:58:30	20:58:31			BAD: Safety shutoff
006_FL8	0408	20:58:50	21:01:15	500	12	295
007_FL7	0407	21:03:34	21:06:06	500	12	295
008_FL6	0406	21:08:25	21:10:54	500	12	295
009_FL5	0405	21:13:11	21:15:23	500	12	295
010_FL4	0404	21:17:39	21:19:45	500	12	295
011_FL3	0403	21:22:08	21:23:59	500	12	295
012_FL2	0402	21:26:29	21:28:17	500	12	295
013_FL1	0401	21:32:08	21:33:22	500	12	295
014_FL42	0442	21:35:49	21:41:01	500	12	295
015_FL41	0441	21:44:13	21:50:08	500	12	295
016_FL40	0440	21:52:52	21:59:16	500	12	295
017_FL39	0439	22:01:45	22:07:33	500	12	295
018_FL38	0438	22:10:26	22:15:54	500	12	295
019_FL37	0437	22:18:30	22:23:11	500	12	295
020_FL36	0436	22:25:43	22:30:11	500	12	295
021_FL35	0435	22:32:43	22:37:01	500	12	295
022_FL34	0434	22:40:16	22:44:33	500	12	295
023_FL33	0433	22:46:54	22:50:54	500	12	295
024_FL32	0432	22:53:42	22:57:46	500	12	295
025_FL30	0430	23:00:24	23:01:02	500	12	295
026_FL29	0429	23:04:24	23:08:22	500	12	295

PROJECT NAME: 079640 - CNMI - Bathy Lidar
LOCATION / AREA: Mariana Islands / BL04
AIRCRAFT: Reims F406 - ZK-XLF
SYSTEM: Hawkeye 4x

BASE AIRPORT: Saipan (SPN)
DATE: 21 July 2019
PILOT: Jabin L
OPERATOR: Andrew S.

MISSION ID: 079640_Saipan
BASE STATION: SPN1

CLOUDS: Clouds @ 2000
WIND: 12kts @ 109

ENGINE START: 20:01 **ENGINE OFF:** 23:30 **ENGINE TIME:** 03:29
GNSS START: **GNSS START:**
TAKEOFF: 20:18 **TOUCHDOWN:** 23:22 **AIR TIME** 03:04

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR		CHII PWR	REMARKS
		23:15:31					DS: QC_20190721_231546
000_FL2	5500	23:15:46	23:17:47	500	12	295	

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL11	DATE:	22 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Jabin L
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	079640_Rota	CLOUDS:	Clouds @ 2000
BASE STATION:	SPN1	WIND:	12kts @ 109

ENGINE START:	2:23	ENGINE OFF:	5:29	ENGINE TIME:	03:06
GNSS START:		GNSS START:			
TAKEOFF:	2:36	TOUCHDOWN:	5:21	AIR TIME	02:45

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		02:39:32				DS: QC_20190722_023947
000_FL2	5500	02:39:47	02:41:52	500	12	295
		03:06:46				DS: BL11_20190722_030701
000_FL33	1133	03:07:01	03:08:06	500	12	295
001_FL32	1132	03:11:10	03:13:13	500	12	295
002_FL31	1131	03:15:57	03:18:27	500	12	295
003_FL30	1130	03:20:48	03:23:08	500	12	295
004_FL29	1129	03:25:26	03:27:50	500	12	295
005_FL28	1128	03:32:58	03:36:03	500	12	295
006_FL20	1120	03:38:51	03:40:48	500	12	295
007_FL19	1119	03:45:39	03:47:39	500	12	295
008_FL18	1118	03:50:07	03:52:10	500	12	295
009_FL17	1117	03:55:16	03:57:43	500	12	295
010_FL16	1116	04:00:09	04:02:35	500	12	295
011_FL15	1115	04:04:45	04:07:17	500	12	295
012_FL14	1114	04:09:48	04:11:27	500	12	295
013_FL13	1113	04:14:12	04:17:41	500	12	295
014_FL12	1112	04:20:06	04:23:26	500	12	295
015_FL11	1111	04:25:43	04:28:43	500	12	295
016_FL10	1110	04:30:53	04:33:51	500	12	295
017_FL9	1109	04:36:33	04:39:15	500	12	295
018_FL34	1134	04:43:17	04:44:44	500	12	295
019_FL34		04:44:56	04:45:28			BAD: Safety shutoff
020_FL35	1135	04:47:24	04:48:17	500	12	295
021_FL35	1135	04:48:26	04:49:39	500	12	295
		05:13:46				DS: QC_20190722_051401
000_FL1	5000	05:14:01	05:16:04	500	12	295

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL06	DATE:	22 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Jabin L
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	079640_Saipan	CLOUDS:	Clouds @ 2500
BASE STATION:	SPN1	WIND:	8kts @ 100

ENGINE START:	19:34	ENGINE OFF:	20:30	ENGINE TIME:	00:56
GNSS START:		GNSS START:			
TAKEOFF:	19:49	TOUCHDOWN:	20:30	AIR TIME	00:41

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR		CHII PWR	REMARKS
		19:51:42					DS: QC_20190722_195157
000_FL1	5000	19:51:57	19:54:01	450	14	295	
		20:00:49					DS: BL06_20190722_200104
000_FL21	0621	20:01:04	20:07:47	450	14	295	
001_FL20	0620	20:10:10	20:17:11	450	14	295	
		20:25:00					System Reboot

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL06	DATE:	22 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Jabin L
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	079640_Saipan	CLOUDS:	Clouds @ 2500
BASE STATION:	SPN1	WIND:	8kts @ 100

ENGINE START:	20:30	ENGINE OFF:	22:01	ENGINE TIME:	01:31
GNSS START:		GNSS START:			
TAKEOFF:	20:30	TOUCHDOWN:	21:55	AIR TIME	01:25

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR		CHII PWR	REMARKS
		20:44:21					DS: BL06_20190722_204436
000_FL19	0619	20:44:36	20:50:00	500	12	295	
001_FL19	0619	20:50:17	20:51:28	500	12	295	
002_FL14	0614	20:54:00	21:00:39	500	12	295	
003_FL13	0613	21:03:21	21:06:08	500	12	295	
004_FL13		21:06:31	21:06:39				BAD: Safety shutoff
005_FL13	0613	21:06:52	21:09:56	500	12	295	
006_FL12	0612	21:12:17	21:18:26	500	12	295	
007_FL11	0611	21:20:35	21:26:52	500	12	295	
008_FL10	0610	21:29:28	21:35:17	500	12	295	
009_FL3	0603	21:37:58	21:40:29	500	12	295	
		21:44:43					DS: QC_20190722_214458
000_FL2	5500	21:44:58	21:46:58	500	12	295	

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL04	DATE:	23 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Jabin L
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	079640_Saipan	CLOUDS:	Clouds @ 3000
BASE STATION:	SPN1	WIND:	8kts @ 115

ENGINE START:	2:13	ENGINE OFF:	4:08	ENGINE TIME:	01:55
GNSS START:		GNSS START:			
TAKEOFF:	2:31	TOUCHDOWN:	4:03	AIR TIME	01:32

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		02:34:35				DS: QC_20190723_023450
000_FL2	5500	02:34:50	02:36:59	500	12	295
		02:40:23				DS: BL04_20190723_024038
000_FL28	0428	02:40:38	02:44:46	500	12	295
001_FL27	0427	02:47:12	02:50:57	500	12	295
002_FL26	0426	02:54:26	02:57:27	500	12	295
003_FL25	0425	02:59:46	03:04:42	500	12	295
004_FL24	0424	03:07:42	03:12:48	500	12	295
005_FL23	0423	03:15:24	03:20:26	500	12	295
006_FL23	0423	03:23:38	03:26:40	500	12	295
007_FL47	0495	03:30:00	03:33:41	500	12	295
008_FL48	0496	03:36:56	03:39:23	500	12	295
		03:55:30				DS: BL04_20190723_035545
000_FL46		03:55:45	03:56:15			BAD: No RCD30 data

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL04, BL05, BL06, BL11, BL12	DATE:	24 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Jabin L
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	079640_Saipan, 079640_Rota	CLOUDS:	Clouds @ 2500
BASE STATION:	SPN1	WIND:	8kts @ 115

ENGINE START:	20:22	ENGINE OFF:	2:21	ENGINE TIME:	05:59
GNSS START:		GNSS START:			
TAKEOFF:	20:51	TOUCHDOWN:	2:15	AIR TIME	05:24

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		20:53:27				DS: QC_20190724_205342
000_FL2	5500	20:53:42	20:55:38	500	12	295
		21:00:34				DS: BL05_20190724_210049
000_FL19	0519	21:00:49	21:04:37	500	12	295
001_FL29	0595	21:06:41	21:07:54	500	12	295
		21:10:53				DS: BL04_20190724_211108
000_FL43	0443	21:11:08	21:12:53	500	12	295
001_FL44	0444	21:15:39	21:17:32	500	12	295
002_FL45	0445	21:19:30	21:21:17	500	12	295
003_FL46	0446	21:23:37	21:25:27	500	12	295
004_FL48	0496	21:29:15	21:31:35	500	12	295
		21:35:57				DS: BL06_20190724_213612
000_FL22	0622	21:36:12	21:37:41	450	14	295
001_FL23	0623	21:40:12	21:41:51	450	14	295
002_FL24	0624	21:43:55	21:45:47	450	14	295
		22:08:00				DS: BL11_20190724_220815
000_FL21		22:08:15	22:08:20			BAD: Safety shutoff
001_FL21	1121	22:08:30	22:09:34	500	12	295
002_FL22	1122	22:12:32	22:14:16	500	12	295
003_FL23	1123	22:16:51	22:18:29	500	12	295
		22:22:53				DS: BL12_20190724_222308
000_FL54	1254	22:23:08	22:25:22	450	14	295
001_FL53	1253	22:27:24	22:29:42	450	14	295
002_FL52	1252	22:31:54	22:34:10	450	14	295
003_FL51	1251	22:36:29	22:38:52	450	14	295
004_FL50	1250	22:41:13	22:43:40	450	14	295
005_FL49	1249	22:45:35	22:46:17	450	14	295
006_FL49	1249	22:46:25	22:48:07	450	14	295
007_FL48	1248	22:50:31	22:53:10	450	14	295
		22:56:47				DS: BL11_20190724_225702

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL04, BL05, BL06, BL11, BL12	DATE:	24 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Jabin L
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	079640_Saipan, 079640_Rota	CLOUDS:	Clouds @ 2500
BASE STATION:	SPN1	WIND:	8kts @ 115

ENGINE START:	20:22	ENGINE OFF:	2:21	ENGINE TIME:	05:59
GNSS START:		GNSS START:			
TAKEOFF:	20:51	TOUCHDOWN:	2:15	AIR TIME	05:24

FL #	LINE #	START TIME	END TIME	TOPO		CHII PWR	REMARKS
				PRF	PWR		
000_FL24	1124	22:57:02	22:58:55	500	12	295	
001_FL25	1125	23:01:33	23:01:53	500	12	295	BAD: Safety shutoff
002_FL25	1125	23:02:04	23:03:50	500	12	295	
003_FL26	1126	23:06:08	23:09:07	500	12	295	
004_FL27	1127	23:11:25	23:14:26	500	12	295	
005_FL39	1195	23:17:01	23:19:46	500	12	295	
006_FL34	1134	23:22:49	23:24:11	500	12	295	
007_FL34	1134	23:24:19	23:24:53	500	12	295	
008_FL35	1135	23:26:55	23:29:12	500	12	295	
		23:31:48					DS: BL12_20190724_233203
000_FL1	1201	23:32:03	23:36:08	450	14	295	
001_FL2	1202	23:38:09	23:42:27	450	14	295	
002_FL3	1203	23:44:53	23:49:15	450	14	295	
003_FL4		23:51:25	23:51:48				BAD: Safety shutoff
004_FL4	1204	23:51:57	23:55:56	450	14	295	
005_FL5	1205	23:58:06	00:02:44	450	14	295	
006_FL6	1206	00:05:17	00:09:50	450	14	295	
007_FL7	1207	00:13:18	00:17:22	450	14	295	
008_FL8	1208	00:19:17	00:23:27	450	14	295	
009_FL9	1209	00:26:51	00:30:30	450	14	295	
010_FL10	1210	00:33:05	00:36:42	450	14	295	
011_FL11	1211	00:38:46	00:42:29	450	14	295	
012_FL12	1212	00:44:58	00:48:37	450	14	295	
013_FL13	1213	00:50:54	00:54:41	450	14	295	
014_FL14	1214	00:56:30	00:59:58	450	14	295	
015_FL15	1215	01:01:56	01:05:23	450	14	295	
016_FL16	1216	01:07:09	01:10:24	450	14	295	
017_FL17	1217	01:12:00	01:15:14	450	14	295	
018_FL18	1218	01:17:00	01:20:07	450	14	295	
019_FL19	1219	01:21:56	01:24:53	450	14	295	
020_FL20	1220	01:26:46	01:29:42	450	14	295	

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL04, BL05, BL06, BL11, BL12	DATE:	24 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Jabin L
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	079640_Saipan, 079640_Rota	CLOUDS:	Clouds @ 2500
BASE STATION:	SPN1	WIND:	8kts @ 115

ENGINE START:	20:22	ENGINE OFF:	2:21	ENGINE TIME:	05:59
GNSS START:		GNSS START:			
TAKEOFF:	20:51	TOUCHDOWN:	2:15	AIR TIME	05:24

FL #	LINE #	START TIME	END TIME	TOPO		CHII PWR	REMARKS
				PRF	PWR		
021_FL21	1221	01:31:29	01:34:28	450	14	295	
022_FL22	1222	01:36:17	01:39:15	450	14	295	

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL08, BL12	DATE:	25 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Jabin L
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	079640_Tinian, 079640_Rota	CLOUDS:	Clouds @ 2500
BASE STATION:	SPN1	WIND:	6kts @ 090

ENGINE START:	19:25	ENGINE OFF:	22:58	ENGINE TIME:	03:33
GNSS START:		GNSS START:			
TAKEOFF:	20:13	TOUCHDOWN:	22:52	AIR TIME	02:39

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		20:16:15				DS: QC_20190725_201630
000_FL1	5000	20:16:30	20:18:22	450	14	295
		20:39:36				DS: BL12_20190725_203951
000_FL47	1247	20:39:51	20:42:32	450	14	295
001_FL46	1246	20:45:13	20:47:59	450	14	295
002_FL45	1245	20:50:40	20:53:19	450	14	295
003_FL44	1244	20:56:02	20:58:57	450	14	295
004_FL43	1243	21:01:26	21:04:09	450	14	295
005_FL42	1242	21:06:58	21:09:44	450	14	295
006_FL41	1241	21:11:48	21:14:03	450	14	295
007_FL40	1240	21:16:48	21:18:36	450	14	295
008_FL39	1239	21:21:42	21:23:15	450	14	295
009_FL38	1238	21:25:39	21:27:19	450	14	295
010_FL37	1237	21:29:47	21:31:24	450	14	295
011_FL36	1236	21:34:16	21:35:47	450	14	295
012_FL35	1235	21:38:27	21:39:53	450	14	295
013_FL34	1234	21:43:00	21:45:12	450	14	295
014_FL33	1233	21:47:33	21:49:42	450	14	295
015_FL32	1232	21:52:20	21:54:26	450	14	295
016_FL31	1231	21:56:41	21:58:39	450	14	295
017_FL30	1230	22:02:05	22:03:53	450	14	295
018_FL29	1229	22:06:05	22:07:52	450	14	295
019_FL28	1228	22:10:12	22:11:44	450	14	295
020_FL27	1227	22:13:50	22:15:24	450	14	295
021_FL26	1226	22:17:54	22:20:21	450	14	295
		22:39:17				DS: BL08_20190725_223932
000_FL19	0819	22:39:32	22:44:23	450	14	295
		22:47:24				DS: QC_20190725_224739
000_FL2	5500	22:47:39	22:49:42	450	14	295

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL03	DATE:	26 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Jabin L
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	079640_FdM	CLOUDS:	Clouds @ 2000
BASE STATION:	SPN1	WIND:	12kts @ 95

ENGINE START:	19:20	ENGINE OFF:	22:04	ENGINE TIME:	02:44
GNSS START:		GNSS START:			
TAKEOFF:	19:47	TOUCHDOWN:	21:57	AIR TIME	02:10

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR		CHII PWR	REMARKS
		20:22:22					DS: BL03_20190726_202237
000_FL1	0301	20:22:37	20:25:16	500	12	295	
001_FL2	0302	20:27:21	20:30:19	500	12	295	
002_FL3		20:32:28	20:32:29				BAD: Shutter error
003_FL3	0303	20:32:49	20:35:17	500	12	295	
004_FL4	0304	20:37:25	20:40:23	500	12	295	
005_FL5	0305	20:42:28	20:45:21	500	12	295	
006_FL6	0306	20:47:08	20:50:06	500	12	295	
007_FL7	0307	20:52:00	20:54:57	500	12	295	
008_FL8	0308	20:56:58	20:59:50	500	12	295	
009_FL9	0309	21:01:48	21:04:32	500	12	295	
010_FL10		21:06:19	21:06:22				BAD: Shutter error
011_FL10	0310	21:06:37	21:08:58	500	12	295	
012_FL11	0311	21:10:39	21:13:04	500	12	295	
013_FL12	0312	21:15:13	21:17:19	500	12	295	
014_FL14		21:19:50	21:19:52				BAD: Shutter error
015_FL14	0395	21:20:05	21:21:43	500	12	295	
016_FL3	0303	21:25:03	21:27:54	500	12	295	
017_FL10	0310	21:29:34	21:32:12	500	12	295	

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL06, BL08, BL12	DATE:	27 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Jabin L
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	079640_Saipan	CLOUDS:	Clouds @ 2500
BASE STATION:	SPN1	WIND:	13kts @ 289

ENGINE START:	19:49	ENGINE OFF:	22:58	ENGINE TIME:	03:09
GNSS START:		GNSS START:			
TAKEOFF:	20:02	TOUCHDOWN:	22:52	AIR TIME	02:50

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		20:05:06				DS: QC_20190727_200521
000_FL1	5000	20:05:21	20:07:27	450	14	295
		20:18:06				DS: BL06_20190727_201821
000_FL30	0630	20:18:21	20:19:51	450	14	295
		20:27:33				DS: BL08_20190727_202748
000_FL2	0802	20:27:48	20:29:17	500	12	295
001_FL3		20:32:05	20:32:07			BAD: Safety shutoff
002_FL3	0803	20:32:20	20:34:00	500	12	295
003_FL4	0804	20:36:36	20:38:35	500	12	295
004_FL5		20:40:48	20:41:14			BAD: Safety shutoff
005_FL5	0805	20:41:34	20:43:24	500	12	295
006_FL6	0806	20:45:42	20:48:35	500	12	295
007_FL7	0807	20:50:56	20:53:49	500	12	295
008_FL8	0808	20:55:59	20:59:13	500	12	295
009_FL9	0809	21:01:53	21:05:30	500	12	295
010_FL10	0810	21:08:14	21:12:02	500	12	295
011_FL11	0811	21:14:30	21:19:16	500	12	295
012_FL5	0805	21:20:42	21:21:53	500	12	295
013_FL5	0805	21:21:55	21:23:08	500	12	295
014_FL3	0803	21:26:16	21:26:48	500	12	295
015_FL3	0803	21:26:57	21:28:09	500	12	295
016_FL1	0801	21:30:40	21:31:54	500	12	295
		21:54:53				DS: BL12_20190727_215508
000_FL23	1223	21:55:08	21:57:47	500	12	295
001_FL24	1224	22:00:33	22:03:33	500	12	295
002_FL25	1225	22:05:50	22:09:17	500	12	295
003_FL23	1223	22:11:38	22:14:47	500	12	295
004_FL48	1248	22:18:45	22:21:32	500	12	295
		22:46:02				DS: QC_20190727_224617
000_FL1	5000	22:46:17	22:48:29	500	12	295

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL01, BL02, BL08	DATE:	28 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Jabin L
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.
MISSION ID:	079640_Saipan	CLOUDS:	Clouds @ 2500
BASE STATION:	SPN1	WIND:	6kts @ 224
ENGINE START:	19:44	ENGINE OFF:	1:41
ENGINE TIME:		ENGINE TIME:	05:57
GNSS START:		GNSS START:	
TAKEOFF:	20:01	TOUCHDOWN:	1:36
AIR TIME:		AIR TIME:	05:35

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		20:03:05				DS: QC_20190728_200320
000_FL1	5000	20:03:20	20:05:26	450	14	295
		20:08:31				DS: BL08_20190728_200846
000_FL14		20:08:46	20:08:47			BAD: Safety shutoff
001_FL14	0814	20:09:01	20:10:11	450	14	295
002_FL14	0814	20:10:27	20:13:39	450	14	295
		21:15:02				DS: BL02_20190728_211517
000_FL41	0241	21:15:17	21:16:34	450	14	295
001_FL40	0240	21:18:54	21:19:37	450	14	295
002_FL40	0240	21:19:51	21:20:16	450	14	295
003_FL39	0239	21:22:09	21:22:22	450	14	295
004_FL39	0239	21:22:41	21:22:57	450	14	295
		21:28:47				DS: BL01_20190728_212902
000_FL10	0110	21:29:02	21:29:42	500	12	295
001_FL10	0110	21:30:01	21:30:18	500	12	295
002_FL9		21:32:35	21:32:41			BAD: Safety shutoff
003_FL9	0109	21:32:57	21:33:51	500	12	295
004_FL8	0108	21:36:34	21:38:54	500	12	295
005_FL7	0107	21:41:45	21:44:05	500	12	295
006_FL6	0106	21:46:52	21:48:48	500	12	295
007_FL5	0105	21:51:49	21:52:31	500	12	295
008_FL5	0105	21:52:53	21:53:40	500	12	295
009_FL4	0104	21:55:54	21:56:48	500	12	295
010_FL4	0104	21:57:04	21:57:52	500	12	295
011_FL3	0103	21:59:33	22:01:35	500	12	295
012_FL2	0102	22:03:52	22:05:33	500	12	295
013_FL1	0101	22:07:17	22:08:42	500	12	295
014_FL45	0145	22:12:39	22:14:24	500	12	295
015_FL44	0144	22:16:47	22:18:40	500	12	295
016_FL43	0143	22:20:23	22:22:25	500	12	295
017_FL42	0142	22:25:01	22:27:04	500	12	295

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL01, BL02, BL08	DATE:	28 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Jabin L
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.
MISSION ID:	079640_Saipan	CLOUDS:	Clouds @ 2500
BASE STATION:	SPN1	WIND:	6kts @ 224
ENGINE START:	19:44	ENGINE OFF:	1:41
ENGINE TIME:		ENGINE TIME:	05:57
GNSS START:		GNSS START:	
TAKEOFF:	20:01	TOUCHDOWN:	1:36
AIR TIME:		AIR TIME:	05:35

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR		CHII PWR	REMARKS
018_FL41	0141	22:29:28	22:30:29	500	12	295	
019_FL41	0141	22:30:45	22:31:33	500	12	295	
020_FL40	0140	22:32:55	22:34:07	500	12	295	
021_FL39	0139	22:36:27	22:37:43	500	12	295	
022_FL38	0138	22:39:51	22:41:09	500	12	295	
023_FL37	0137	22:43:13	22:44:52	500	12	295	
024_FL36	0136	22:46:38	22:48:44	500	12	295	
025_FL35	0135	22:50:52	22:53:02	500	12	295	
026_FL34	0134	22:55:13	22:58:27	500	12	295	Deep channel frozen
		23:08:02					DS: BL01_20190728_230817
000_FL33		23:08:17	23:08:19				BAD: Safety shutoff
001_FL33	0133	23:08:57	23:10:33	500	12	295	
002_FL32	0132	23:12:56	23:15:14	500	12	295	
003_FL31	0131	23:17:40	23:20:04	500	12	295	
004_FL30	0130	23:21:42	23:24:18	500	12	295	
005_FL18	0118	23:26:31	23:28:12	500	12	295	
006_FL19	0119	23:30:43	23:32:43	500	12	295	
007_FL20	0120	23:34:36	23:36:39	500	12	295	
008_FL21	0121	23:38:36	23:40:18	500	12	295	
009_FL21	0121	23:40:30	23:40:51	500	12	295	BAD: Safety shutoff
010_FL22	0122	23:42:43	23:44:57	500	12	295	
011_FL23		23:46:38	23:46:40				BAD: Safety shutoff
012_FL23	0123	23:46:54	23:49:07	500	12	295	
013_FL24	0124	23:50:49	23:53:08	500	12	295	
014_FL25	0125	23:56:05	23:57:52	500	12	295	Safety shutoff
015_FL25	0125	23:58:08	23:58:43	500	12	295	
016_FL26	0126	00:01:31	00:04:15	500	12	295	
017_FL27	0127	00:06:20	00:09:00	500	12	295	
018_FL28	0128	00:11:22	00:14:09	500	12	295	
019_FL29	0129	00:16:01	00:18:01	500	12	295	
020_FL17		00:20:51	00:21:33				BAD: Safety shutoff
021_FL17	0117	00:21:43	00:23:44	500	12	295	

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL01, BL02, BL08	DATE:	28 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Jabin L
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.
MISSION ID:	079640_Saipan	CLOUDS:	Clouds @ 2500
BASE STATION:	SPN1	WIND:	6kts @ 224
ENGINE START:	19:44	ENGINE OFF:	1:41
ENGINE TIME:		ENGINE TIME:	05:57
GNSS START:		GNSS START:	
TAKEOFF:	20:01	TOUCHDOWN:	1:36
		AIR TIME	05:35

FL #	LINE #	START TIME	END TIME	TOPO		CHII PWR	REMARKS
				PRF	PWR		
022_FL16	0116	00:25:58	00:28:47	500	12	295	
023_FL15	0115	00:31:00	00:33:57	500	12	295	
024_FL14	0114	00:35:26	00:38:20	500	12	295	

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL01, BL02	DATE:	30 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Jabin L
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	079640_Saipan	CLOUDS:	Clouds @ 2300
BASE STATION:	SPN1	WIND:	12Kts @ 180

ENGINE START:	19:35	ENGINE OFF:	0:58	ENGINE TIME:	05:23
GNSS START:		GNSS START:			
TAKEOFF:	19:51	TOUCHDOWN:	0:58	AIR TIME	05:07

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		20:49:10				DS: BL01_20190730_204925
000_FL10	0110	20:49:25	20:50:12	500 12	295	
001_FL10		20:50:38	20:50:41			BAD: Safety shutoff
002_FL11	0111	20:54:54	20:56:45	500 12	295	
003_FL12	0112	20:59:00	21:01:21	500 12	295	
004_FL13	0113	21:03:40	21:06:13	500 12	295	
005_FL33	0133	21:08:55	21:11:13	500 12	295	
006_FL46	0195	21:15:52	21:18:25	500 12	295	
007_FL21	0121	21:21:05	21:23:05	500 12	295	
008_FL23	0123	21:25:03	21:27:24	500 12	295	
		21:30:25				DS: BL02_20190730_213040
000_FL1	0201	21:30:40	21:32:09	450 14	295	
001_FL2	0202	21:33:57	21:35:42	450 14	295	
002_FL3	0203	21:38:04	21:38:52	450 14	295	Safety shutoff
003_FL3	0203	21:39:13	21:40:04	450 14	295	
004_FL4	0204	21:42:33	21:44:40	450 14	295	
005_FL5	0205	21:46:58	21:49:39	450 14	295	
006_FL6	0206	21:52:07	21:55:05	450 14	295	
007_FL7	0207	21:58:14	22:01:12	450 14	295	
008_FL8	0208	22:03:38	22:06:35	450 14	295	
009_FL9	0209	22:09:18	22:12:18	450 14	295	
010_FL10	0210	22:14:43	22:17:31	450 14	295	
011_FL11	0211	22:20:33	22:21:50	450 14	295	
012_FL11	0211	22:22:05	22:23:00	450 14	295	
013_FL12	0212	22:25:08	22:26:54	450 14	295	
014_FL13	0213	22:27:05	22:33:11	450 14	295	
015_FL14	0214	22:35:26	22:38:41	450 14	295	No RCD30 data
016_FL15	0215	22:40:44	22:43:40	450 14	295	
017_FL16	0216	22:45:58	22:48:53	450 14	295	
018_FL17	0217	22:51:03	22:53:40	450 14	295	
019_FL18	0218	22:56:00	22:58:56	450 14	295	

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL01, BL02	DATE:	30 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Jabin L
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.
MISSION ID:	079640_Saipan	CLOUDS:	Clouds @ 2300
BASE STATION:	SPN1	WIND:	12Kts @ 180
ENGINE START:	19:35	ENGINE OFF:	0:58
ENGINE TIME:		ENGINE TIME:	05:23
GNSS START:		GNSS START:	
TAKEOFF:	19:51	TOUCHDOWN:	0:58
		AIR TIME	05:07

FL #	LINE #	START TIME	END TIME	TOPO		CHII PWR	REMARKS
				PRF	PWR		
020_FL19	0219	23:01:18	23:03:49	450	14	295	
021_FL20	0220	23:06:38	23:09:17	450	14	295	
022_FL21	0221	23:11:39	23:14:06	450	14	295	
023_FL22	0222	23:16:43	23:18:55	450	14	295	Shutter error
024_FL23	0223	23:21:23	23:23:33	450	14	295	
025_FL24	0224	23:25:32	23:27:56	450	14	295	
026_FL25	0225	23:30:26	23:32:28	450	14	295	
027_FL26	0226	23:35:23	23:37:17	450	14	295	
028_FL27	0227	23:39:25	23:41:09	450	14	295	Clouds
029_FL28	0228	23:43:20	23:44:59	450	14	295	
030_FL29	0229	23:46:55	23:48:26	450	14	295	

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL04, BL06 to BL12	DATE:	31 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Jabin L
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	079640_Saipan	CLOUDS:	Clouds @ 2300
BASE STATION:	SPN1	WIND:	4kts @ 89

ENGINE START:	19:56	ENGINE OFF:	23:56	ENGINE TIME:	04:00
GNSS START:		GNSS START:			
TAKEOFF:	20:10	TOUCHDOWN:	23:31	AIR TIME	03:21

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		20:12:26				DS: QC_20190731_201241
000_FL1	5000	20:12:41	20:14:52	450	14	295
		20:19:41				DS: BL06_20190731_201956
000_FL30	0630	20:19:56	20:21:51	450	14	295
001_FL29	0629	20:23:58	20:25:59	450	14	295
002_FL28	0628	20:28:46	20:30:47	450	14	295
003_FL27	0627	20:33:22	20:35:26	450	14	295
		20:38:42				DS: BL04_20190731_203857
000_FL30	0430	20:38:57	20:43:26	450	14	295
		20:46:38				DS: BL08_20190731_204653
000_FL11	0811	20:46:53	20:51:42	450	14	295
001_FL10	0810	20:54:07	20:57:47	450	14	295
		21:03:42				DS: BL08_20190731_210357
000_FL30	0830	21:03:57	21:05:35	450	14	295
001_FL29	0829	21:07:34	21:09:17	450	14	295
002_FL28	0828	21:12:26	21:14:19	450	14	295
003_FL27	0827	21:17:11	21:18:38	450	14	295
004_FL26	0826	21:20:56	21:22:19	450	14	295
005_FL25	0825	21:23:22	21:24:46	450	14	295
		21:28:15				DS: BL07_20190731_212830
000_FL46	0745	21:28:30	21:29:48	450	14	295
001_FL45	0744	21:33:50	21:35:24	450	14	295
002_FL44	0743	21:37:32	21:39:19	450	14	295
003_FL42	0741	21:40:18	21:42:11	450	14	295
004_FL41	0740	21:42:26	21:44:03	450	14	295
005_FL40	0739	21:45:38	21:47:28	450	14	295
006_FL39	0738	21:50:21	21:51:43	450	14	295
007_FL43	0742	21:53:53	21:55:35	450	14	295
		22:17:08				DS: BL12_20190731_221723
000_FL74	1274	22:17:23	22:17:56	450	14	295

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL04, BL06 to BL12	DATE:	31 July 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Jabin L
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	079640_Saipan	CLOUDS:	Clouds @ 2300
BASE STATION:	SPN1	WIND:	4kts @ 89

ENGINE START:	19:56	ENGINE OFF:	23:56	ENGINE TIME:	04:00
GNSS START:		GNSS START:			
TAKEOFF:	20:10	TOUCHDOWN:	23:31	AIR TIME	03:21

FL #	LINE #	START TIME	END TIME	TOPO		CHII PWR	REMARKS
				PRF	PWR		
001_FL74	1274	22:18:08	22:18:26	450	14	295	Clouds
002_FL74		22:18:52	22:19:10				BAD: Safety shutoff
		22:24:30					DS: BL11_20190731_222445
000_FL40		22:24:45	22:24:56				BAD: Safety shutoff
001_FL40		22:25:10	22:25:17				BAD: Safety shutoff
002_FL40	1139	22:25:27	22:26:08	450	14	295	
003_FL42	1141	22:29:11	22:31:49	450	14	295	
004_FL43	1142	22:34:08	22:36:55	450	14	295	
005_FL41	1140	22:38:55	22:40:18	450	14	295	
006_FL44	1143	22:42:44	22:44:41	450	14	295	
007_FL46	1145	22:47:33	22:49:36	450	14	295	
008_FL45	1144	22:51:36	22:53:43	450	14	295	
009_FL47	1146	22:56:01	22:57:19	450	14	295	
010_FL48	1147	22:58:55	23:00:29	450	14	295	
		23:15:27					DS: BL10_20190731_231542
000_FL5	1005	23:15:42	23:17:03	450	14	295	
		23:18:48					DS: BL09_20190731_231903
000_FL20	0919	23:19:03	23:20:16	450	14	295	

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL01, BL02	DATE:	2 August 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Jabin L
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	079640_Saipan	CLOUDS:	Clouds @ 2000
BASE STATION:	SPN1	WIND:	5kts @ 270

ENGINE START:	19:32	ENGINE OFF:	23:18	ENGINE TIME:	03:46
GNSS START:		GNSS START:			
TAKEOFF:	19:48	TOUCHDOWN:	23:11	AIR TIME	03:23

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS	
		20:47:52				DS: BL02_20190802_204807	
000_FL14		20:48:07	20:48:17			BAD: Safety Shutoff: Clouds	
001_FL14	0214	20:48:34	20:51:04	500	12	295	Clouds
002_FL30	0230	20:57:42	20:58:56	500	12	295	Clouds
003_FL31	0231	21:01:30	21:02:48	500	12	295	Clouds
		21:08:26				DS: BL02_20190802_210841	
000_FL42	0242	21:08:41	21:10:07	500	12	295	Clouds
001_FL65	0265	21:13:00	21:14:31	500	12	295	
002_FL66	0266	21:15:54	21:16:55	500	12	295	
		21:21:07				DS: BL01_20190802_212122	
000_FL57		21:21:22	21:21:24				BAD: Shutter Error
001_FL57	0156	21:21:38	21:22:52	500	12	295	
002_FL56	0155	21:25:18	21:27:02	500	12	295	
003_FL55		21:29:07	21:29:10				BAD: Shutter Error
004_FL55	0154	21:29:27	21:30:21	450	14	295	
005_FL54	0153	21:32:31	21:33:39	450	14	295	
006_FL53	0152	21:36:11	21:37:36	450	14	295	
007_FL52	0151	21:39:40	21:40:51	450	14	295	
008_FL51		21:41:02	21:41:08				BAD: Safety Shutoff
009_FL51		21:42:00	21:42:12				BAD: Safety Shutoff
010_FL51	0150	21:43:48	21:45:22	450	14	295	
011_FL50	0149	21:48:07	21:49:06	450	14	295	
012_FL50	0149	21:49:21	21:50:41	450	14	295	
013_FL49	0148	21:53:13	21:54:53	450	14	295	
014_FL48	0147	21:58:10	21:59:15	450	14	295	
015_FL47	0146	22:01:26	22:02:57	450	14	295	
016_FL14		22:04:27	22:04:31				BAD: Wrong Direction
017_FL14		22:05:20	22:05:26				BAD: Wrong Direction
018_FL14	0114	22:09:51	22:12:46	450	14	295	

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL02	DATE:	3 August 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Jabin L
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	079640_Saipan	CLOUDS:	Clouds @ 2000
BASE STATION:	SPN1	WIND:	13kts @ 153

ENGINE START:	18:37	ENGINE OFF:	22:57	ENGINE TIME:	04:20
GNSS START:		GNSS START:			
TAKEOFF:	18:53	TOUCHDOWN:	22:50	AIR TIME	03:57

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR		CHII PWR	REMARKS
		19:58:20					DS: BL02_20190803_195835
000_FL69	0269	19:58:35	19:59:56	450	14	295	Clouds
001_FL68	0268	20:02:05	20:03:35	450	14	295	Clouds
002_FL67	0267	20:05:07	20:06:29	450	14	295	Clouds
003_FL66	0266	20:08:57	20:10:02	450	14	295	Clouds
004_FL65	0265	20:12:45	20:14:16	450	14	295	Clouds
005_FL64	0264	20:16:11	20:17:51	450	14	295	Clouds
006_FL63	0263	20:20:14	20:21:59	450	14	295	Clouds
007_FL62	0262	20:24:03	20:25:48	450	14	295	Clouds
008_FL61	0261	20:27:51	20:29:36	450	14	295	Clouds
009_FL60	0260	20:32:01	20:33:45	450	14	295	Clouds
010_FL59	0259	20:35:46	20:37:28	450	14	295	
011_FL58	0258	20:40:19	20:41:56	450	14	295	
012_FL57	0257	20:43:59	20:45:38	450	14	295	
013_FL70	0270	20:47:50	20:48:59	450	14	295	
014_FL69	0269	20:51:06	20:52:31	450	14	295	
015_FL68	0268	20:54:42	20:56:09	450	14	295	
016_FL67	0267	20:58:22	20:59:45	450	14	295	
017_FL42	0242	21:02:30	21:04:11	450	14	295	Clouds
018_FL43	0243	21:06:20	21:08:10	450	14	295	Clouds
019_FL30	0230	21:12:53	21:14:11	450	14	295	Clouds
020_FL31	0231	21:16:30	21:17:52	450	14	295	Clouds
021_FL51	0251	21:20:32	21:22:26	450	14	295	Clouds
022_FL50	0250	21:24:32	21:27:04	450	14	295	Clouds
023_FL49	0249	21:29:11	21:32:00	450	14	295	Clouds
024_FL44	0244	21:34:46	21:36:55	450	14	295	

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL04, BL05, BL06, BL12	DATE:	7 August 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Jabin L
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	079640_Saipan	CLOUDS:	Clouds @ 2500
BASE STATION:	SPN1	WIND:	16kts @ 223

ENGINE START:	20:46	ENGINE OFF:	0:00	ENGINE TIME:	03:14
GNSS START:		GNSS START:			
TAKEOFF:	20:59	TOUCHDOWN:	23:53	AIR TIME	02:54

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		21:03:11				DS: QC_20190807_210326
000_FL2		21:03:26	21:03:30			BAD: Shutter Error
001_FL2	5500	21:03:47	21:05:39	450	14	295
		21:09:55				DS: BL06_20190807_211010
000_FL63	0663	21:10:10	21:11:20	450	14	295
001_FL62	0662	21:13:14	21:14:33	450	14	295
002_FL61	0661	21:16:14	21:17:25	450	14	295
003_FL48	0648	21:20:58	21:23:42	450	14	295
004_FL49	0649	21:25:43	21:28:37	450	14	295
005_FL50	0650	21:30:41	21:33:28	450	14	295
006_FL51	0651	21:36:08	21:38:36	450	14	295
007_FL52	0652	21:41:14	21:42:40	450	14	295
008_FL53	0653	21:44:54	21:45:55	450	14	295
009_FL54	0654	21:48:26	21:49:35	450	14	295
010_FL55	0655	21:52:12	21:53:19	450	14	295
011_FL56	0656	21:55:30	21:56:29	450	14	295
012_FL57	0657	21:58:45	21:59:45	450	14	295
013_FL58	0658	22:01:45	22:03:02	450	14	295
014_FL59	0659	22:05:21	22:06:37	450	14	295
015_FL60	0660	22:08:40	22:09:51	450	14	295
		22:12:40				DS: BL04_20190807_221255
000_FL58	0456	22:12:55	22:14:08	500	12	295
		22:17:26				DS: BL05_20190807_221741
000_FL31	0529	22:17:41	22:17:54	500	12	295
001_FL31	0529	22:18:16	22:18:59	500	12	295
		22:52:06				DS: BL12_20190807_225221
000_FL62	1262	22:52:21	22:54:11	450	14	295
001_FL63	1263	22:57:27	22:59:33	450	14	295
002_FL59	1259	23:01:47	23:03:51	450	14	295
003_FL58	1258	23:06:19	23:08:25	450	14	295

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL04, BL05, BL06, BL12	DATE:	7 August 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Jabin L
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	079640_Saipan	CLOUDS:	Clouds @ 2500
BASE STATION:	SPN1	WIND:	16kts @ 223

ENGINE START:	20:46	ENGINE OFF:	0:00	ENGINE TIME:	03:14
GNSS START:		GNSS START:			
TAKEOFF:	20:59	TOUCHDOWN:	23:53	AIR TIME	02:54

FL #	LINE #	START TIME	END TIME	TOPO		CHII PWR	REMARKS
				PRF	PWR		
004_FL57	1257	23:10:52	23:13:11	450	14	295	
005_FL56	1256	23:16:14	23:19:03	450	14	295	
006_FL55	1255	23:21:12	23:23:45	450	14	295	
007_FL60	1260	23:26:15	23:27:50	450	14	295	

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL04, BL05, BL06	DATE:	8 August 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Jabin L
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	079640_Saipan	CLOUDS:	Clouds @ 2500
BASE STATION:	SPN1	WIND:	18kts @ 180

ENGINE START:	20:21	ENGINE OFF:	23:08	ENGINE TIME:	02:47
GNSS START:		GNSS START:			
TAKEOFF:	20:34	TOUCHDOWN:	23:02	AIR TIME	02:28

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		20:38:15				DS: QC_20190808_203830
000_FL1	5000	20:38:30	20:40:39	450	14	295
		20:46:06				DS: BL06_20190808_204621
000_FL47	0647	20:46:21	20:47:43	450	14	295
001_FL46	0646	20:50:42	20:52:55	450	14	295
002_FL45	0645	20:55:43	20:58:11	450	14	295
003_FL44	0644	21:01:18	21:03:53	450	14	295
004_FL43	0643	21:06:03	21:08:40	450	14	295
		21:12:08				DS: BL04_20190808_211223
000_FL57	0455	21:12:23	21:14:50	500	12	295
001_FL56	0454	21:17:37	21:20:08	500	12	295
002_FL55	0453	21:21:35	21:22:57	500	12	295
003_FL54	0452	21:25:22	21:26:46	500	12	295
004_FL53	0451	21:30:06	21:32:59	500	12	295
		21:36:11				DS: BL06_20190808_213626
000_FL42	0642	21:36:26	21:39:00	450	14	295
001_FL41	0641	21:42:10	21:44:56	450	14	295
002_FL40	0640	21:47:01	21:49:30	450	14	295
003_FL39	0639	21:52:37	21:55:07	450	14	295
004_FL38	0638	21:57:17	21:59:34	450	14	295
		22:01:53				DS: BL04_20190808_220208
000_FL52	0450	22:02:08	22:03:42	500	12	295
		22:08:57				DS: BL05_20190808_220912
000_FL32	0530	22:09:12	22:10:28	500	12	295

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL06	DATE:	9 August 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Jabin L
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	079640_Saipan	CLOUDS:	Few @ 2000
BASE STATION:	SPN1	WIND:	14kts @ 183

ENGINE START:	20:00	ENGINE OFF:	21:11	ENGINE TIME:	01:11
GNSS START:		GNSS START:			
TAKEOFF:	20:14	TOUCHDOWN:	21:05	AIR TIME	00:51

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR		CHII PWR	REMARKS
		20:17:19					DS: QC_20190809_201734
000_FL2	5500	20:17:34	20:19:52	450	14	295	
		20:23:02					DS: BL06_20190809_202317
000_FL13		20:23:17	20:23:21				BAD: Safety Shutoff
001_FL13		20:23:40	20:23:58				BAD: Safety Shutoff
002_FL13	0613	20:24:09	20:27:02	450	14	295	Safety Shutoff
003_FL13	0613	20:30:06	20:34:15	450	14	295	
004_FL31	0631	20:35:55	20:37:17	450	14	295	
005_FL32	0632	20:39:10	20:40:07	450	14	295	Safety Shutoff
006_FL33	0633	20:42:46	20:43:46	450	14	295	
007_FL34	0634	20:46:52	20:48:29	450	14	295	
008_FL35	0635	20:50:19	20:51:38	450	14	295	
009_FL36	0636	20:54:03	20:55:41	450	14	295	
010_FL37	0637	20:57:38	20:58:55	450	14	295	

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL02, BL12	DATE:	13 August 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Jabin L
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	079640_Saipan	CLOUDS:	Few @ 2000
BASE STATION:	SPN1	WIND:	14kts @ 276

ENGINE START:	19:38	ENGINE OFF:	22:40	ENGINE TIME:	03:02
GNSS START:		GNSS START:			
TAKEOFF:	19:50	TOUCHDOWN:	22:34	AIR TIME	02:44

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR		CHII PWR	REMARKS
		20:47:37					DS: BL02_20190813_204752
000_FL73	0273	20:47:52	20:49:02	450	14	295	Clouds
001_FL72	0272	20:50:54	20:52:06	450	14	295	Clouds
002_FL71	0271	20:54:48	20:56:05	450	14	295	Clouds
		22:08:15					DS: BL12_20190813_220830
000_FL74	1274	22:08:30	22:10:45	450	14	295	Clouds

PROJECT NAME: 079640 - CNMI - Bathy Lidar

LOCATION / AREA: Mariana Islands / BL05

AIRCRAFT: Reims F406 - ZK-XLF

SYSTEM: Hawkeye 4x

BASE AIRPORT: Saipan (SPN)

DATE: 14 August 2019

PILOT: Jabin L

OPERATOR: Andrew S.

MISSION ID: 079640_Saipan

BASE STATION: SPN1

CLOUDS: Few @ 2000

WIND: 10kts @ 060

ENGINE START: 20:00

ENGINE OFF: 21:04

ENGINE TIME: 01:04

GNSS START:

GNSS START:

TAKEOFF: 20:13

TOUCHDOWN: 20:56

AIR TIME: 00:43

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		20:15:42				DS: QC_20190814_201557
000_FL2	5500	20:15:57	20:17:59	500	12	295
		20:22:12				DS: BL05_20190814_202227
000_FL36		20:22:27	20:22:28			BAD: Safety Shutoff
001_FL36	0534	20:22:44	20:24:27	500	12	295
002_FL34	0532	20:30:03	20:30:45	500	12	295
003_FL34	0532	20:32:48	20:34:01	500	12	295
004_FL33	0531	20:37:18	20:39:23	500	12	295
005_FL35	0533	20:49:31	20:49:57	500	12	295
006_FL35	0533	20:50:08	20:51:19	500	12	295

PROJECT NAME: 079640 - CNMI - Bathy Lidar

LOCATION / AREA: Mariana Islands / BL05

AIRCRAFT: Reims F406 - ZK-XLF

SYSTEM: Hawkeye 4x

BASE AIRPORT: Saipan (SPN)

DATE: 14 August 2019

PILOT: Jabin L

OPERATOR: Andrew S.

MISSION ID: 079640_Saipan

BASE STATION: SPN1

CLOUDS: Few @ 2000

WIND: 13kts @ 074

ENGINE START: 21:46

ENGINE OFF: 22:28

ENGINE TIME: 00:42

GNSS START:

GNSS START:

TAKEOFF: 21:58

TOUCHDOWN: 22:21

AIR TIME: 00:23

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR		CHII PWR	REMARKS
		22:01:03					DS: BL05_20190814_220118
000_FL33	0531	22:01:18	22:03:02	500	12	295	Rain at end
001_FL33	0531	22:05:43	22:07:42	500	12	295	Rain
002_FL33		22:11:43	22:11:44				BAD: Safety Shutoff
003_FL33	0531	22:12:01	22:13:37	500	12	295	

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL02	DATE:	20 August 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Jabin L
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew B.

MISSION ID:	079640_Saipan	CLOUDS:	Scattered @ 2500
BASE STATION:	SPN1	WIND:	12kts @ 135

ENGINE START:	3:55	ENGINE OFF:	7:25	ENGINE TIME:	03:30
GNSS START:	3:59	GNSS START:	7:14		
TAKEOFF:	4:09	TOUCHDOWN:	7:13	AIR TIME	03:04

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		05:10:47				DS: BL02_20190820_051102
000_FL60	0260	05:11:02	05:11:51	450	14	295 Clouds
001_FL59	0259	05:14:43	05:14:56	450	14	295 BAD: Safety Shutoff: Clouds
002_FL14	0214	05:20:27	05:23:09	450	14	295 Safety Shutoff
003_FL14	0214	05:26:10	05:27:22	450	14	295

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL04, BL05	DATE:	21 August 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Jabin L.
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew B.

MISSION ID:	079640_Saipan	CLOUDS:	Broken @ 2200
BASE STATION:	SPN1	WIND:	12kts @ 45

ENGINE START:	20:00	ENGINE OFF:	21:25	ENGINE TIME:	01:25
GNSS START:	20:05	GNSS START:	21:10		
TAKEOFF:	20:15	TOUCHDOWN:	21:08	AIR TIME	00:53

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR		CHII PWR	REMARKS
		20:44:53					DS: BL04_20190821_204508
000_FL27	0427	20:45:08	20:48:52	500	12	295	
		20:53:34					DS: BL05_20190821_205349
000_FL4	0504	20:53:49	21:00:51	500	12	295	

PROJECT NAME:	079640 - CNMI - TopoBathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Saipan, NMI / BL04, BL05	DATE:	25 August 2019
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Jabin L.
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew B.

MISSION ID:	079640_Saipan	CLOUDS:	Broken @ 2000
BASE STATION:	SPN1	WIND:	10 kts @ 110

ENGINE START:	19:50	ENGINE OFF:	22:05	ENGINE TIME:	02:15
GNSS START:		GNSS START:	21:53		
TAKEOFF:	20:06	TOUCHDOWN:	21:52	AIR TIME	01:46

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR		CHII PWR	REMARKS
		20:34:48					DS: 500m_20190825_203503
000_FL1	0501	20:35:03	20:36:40	500	13	55	
001_FL2	0502	20:38:45	20:40:19	500	13	55	
002_FL3	0503	20:42:53	20:44:25	500	13	55	
003_FL4		20:46:39	20:46:43				BAD: Shutter Error before starting
004_FL4		20:50:49	20:52:34				BAD: Laser was firing before IP/PAV
005_FL5	0505	20:56:29	20:58:03	500	13	55	
006_FL6	0506	21:01:20	21:02:45	500	13	55	
007_FL4	0504	21:05:29	21:07:01	500	13	55	
		21:08:33					DS: 400m_20190825_210848
000_FL3		21:08:48	21:08:59				BAD: Eye Safety (Topo)
001_FL3		21:10:03	21:10:06				BAD: Laser firing when not on the line
002_FL3		21:11:56	21:12:13				BAD: Eye Safety (Clouds)
003_FL4		21:15:43	21:16:31				BAD: Shutter Error before starting
004_FL4	0404	21:22:04	21:23:20	300	10	45	
005_FL3	0403	21:25:48	21:26:59	300	10	45	
006_FL5	0405	21:29:37	21:30:59	300	10	45	
007_FL1		21:33:15	21:33:18				BAD: Shutter Error
008_FL1		21:34:14	21:34:16				BAD: Laser firing when not on the line
009_FL1		21:36:30					BAD: Laser firing when not on the line
010_FL2	0402	21:36:37	21:38:04	300	10	45	
011_FL1	0401	21:40:27	21:41:50	300	10	45	
012_FL6	0406	21:45:36	21:47:00	300	10	45	

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Guam (PGUM)		
LOCATION / AREA:	Mariana Islands /	DATE:	12 February 2020		
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Peter B.		
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.		
MISSION ID:	079640_Saipan	CLOUDS:	scattered @ 2000		
BASE STATION:	PGUM	WIND:	25 kts @70		
ENGINE START:	21:23	ENGINE OFF:	22:40	ENGINE TIME:	01:17
GNSS START:	21:32	GNSS START:	22:38		
TAKEOFF:	21:45	TOUCHDOWN:	22:33	AIR TIME	00:48

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		22:15:00				DS: BL12_20200212_221515
000_FL75	1275	22:15:15	22:17:20	450 14	295	BAD:
		22:20:00				Ended survey due to clouds/rain
		22:20:00				Ended survey

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Guam (PGUM)
LOCATION / AREA:	Guam, CNMI / BL02	DATE:	15 February 2020
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Peter B.
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.
MISSION ID:	80698_Guam	CLOUDS:	few @ 3000
BASE STATION:	PGUM	WIND:	29kts @ 96
ENGINE START:	21:21	ENGINE OFF:	2:25
ENGINE TIME:			05:04
GNSS START:	21:27	GNSS START:	2:22
TAKEOFF:	21:41	TOUCHDOWN:	2:17
		AIR TIME	04:36

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		23:09:21				DS: BL02_20200215_230936
000_FL43	0243	23:09:36	23:11:16	450 14	295	
001_FL44	0244	23:14:16	23:16:17	450 14	295	
002_FL45	0245	23:19:10	23:21:40	450 14	295	
003_FL46	0246	23:24:26	23:27:22	450 14	295	
004_FL47	0247	23:30:03	23:32:49	450 14	295	
005_FL48	0248	23:35:41	23:38:30	450 14	295	
006_FL49	0249	23:41:30	23:44:11	450 14	295	
007_FL52	0252	23:47:06	23:48:59	450 14	295	BAD: refly/clouds/300ft too low
008_FL60	0260	23:53:29	23:55:18	450 14	295	
009_FL52	0252	00:01:03	00:02:29	450 14	295	stoped line for cloud
		00:12:44				DS: BL02_20200216_001259
000_FL71	0271	00:12:59	00:14:07	500 12	295	
001_FL72	0272	00:17:02	00:18:14	500 12	295	
002_FL73	0273	00:20:30	00:21:40	500 12	295	
003_FL72	0272	00:24:34	00:25:42	450 14	295	
		00:29:56				DS: BL02_20200216_003011
000_FL56	0256	00:30:11	00:32:00	450 14	295	clouds in area
001_FL55	0255	00:35:26	00:36:43	450 14	295	clouds below triggered laser
002_FL54	0254	00:40:34	00:41:24	450 14	295	clouds below triggered laser
		00:52:00				Ended Survey due to clouds
		00:52:00				Ended survey

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Guam (PGUM)
LOCATION / AREA:	Guam, CNMI / BL02	DATE:	16 February 2020
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Peter B.
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.
MISSION ID:	80698_Guam	CLOUDS:	few @ 3500
BASE STATION:	PGUM	WIND:	25kts @ 90
ENGINE START:	21:54	ENGINE OFF:	1:58
ENGINE TIME:			04:04
GNSS START:	22:00	GNSS START:	1:56
TAKEOFF:	22:09	TOUCHDOWN:	1:48
		AIR TIME	03:39

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		23:46:17				DS: BL02_20200216_234632
000_FL52	0252	23:46:32	23:48:24	450 14	295	
001_FL53	0253	23:51:26	23:53:22	450 14	295	
002_FL54	0254	23:57:15	23:59:13	450 14	295	
003_FL55	0255	00:02:15	00:04:07	450 14	295	
004_FL56	0256	00:07:29	00:09:08	450 14	295	
		00:13:41				DS: BL02_20200217_001356
000_FL73	0273	00:13:56	00:15:00	450 14	295	
001_FL72	0272	00:17:59	00:19:01	450 14	295	
002_FL71	0271	00:21:47	00:22:54	450 14	295	
		00:26:00				Ended Survey

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Guam (PGUM)		
LOCATION / AREA:	Guam, CNMI / BL12	DATE:	19 February 2020		
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Peter B.		
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.		
MISSION ID:	80698_Guam	CLOUDS:	scattered @ 2500		
BASE STATION:	PGUM	WIND:	25kts @ 85		
ENGINE START:	0:18	ENGINE OFF:	2:21	ENGINE TIME:	02:03
GNSS START:	0:24	GNSS START:	2:19		
TAKEOFF:	0:35	TOUCHDOWN:	2:13	AIR TIME	01:38

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS	
		00:55:57				DS: BL12_20200219_005612	
000_FL75	1275	00:56:12	00:58:30	450	14	295	BAD: too low due to clouds
001_FL75	1275	01:24:10	01:26:11	450	14	295	
002_FL59	1259	01:29:33	01:31:38	450	14	295	
003_FL58	1258	01:34:38	01:36:46	450	14	295	
004_FL61	1261	01:39:50	01:42:05	450	14	295	
		01:55:00					Ended Survey Due to Clouds
		01:55:00					Ended Survey

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Guam (PGUM)
LOCATION / AREA:	Guam, CNMI / BL02, BL12	DATE:	19 February 2020
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Peter B.
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.

MISSION ID:	80698_Guam	CLOUDS:	scattered @ 3000
BASE STATION:	PGUM	WIND:	22kts @ 75

ENGINE START:	22:27	ENGINE OFF:	3:50	ENGINE TIME:	05:23
GNSS START:	22:34	GNSS START:	3:48		
TAKEOFF:	22:46	TOUCHDOWN:	3:40	AIR TIME	04:54

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS	
		23:05:57				DS: BL12_20200219_230612	
000_FL74	1274	23:06:12	23:08:23	450	14	295	BAD: clouds too low
		00:32:30					DS: BL02_20200220_003245
000_FL8	0281	00:32:45	00:33:50	450	14	295	
001_FL10	0283	00:37:02	00:38:13	450	14	295	
002_FL22	0295	00:41:16	00:42:37	450	14	295	
003_FL21	0294	00:46:11	00:47:25	450	14	295	
004_FL20	0293	00:50:04	00:51:02	450	14	295	
005_FL19	0292	00:54:25	00:55:25	450	14	295	
006_FL18	0291	00:58:05	00:59:10	450	14	295	
007_FL17	0290	01:01:11	01:02:16	450	14	295	
008_FL16	0289	01:06:02	01:07:08	450	14	295	
009_FL23	0296	01:09:53	01:11:14	450	14	295	
010_FL15	0288	01:14:22	01:15:33	450	14	295	
011_FL14	0287	01:18:42	01:19:53	450	14	295	
012_FL13	0286	01:23:02	01:24:43	450	14	295	GNSS Statistical Count Error
013_FL12	0285	01:28:00	01:29:44	450	14	295	
014_FL11	0284	01:32:40	01:34:02	450	14	295	turbulence
015_FL9	0282	01:36:52	01:37:51	450	14	295	turbulence
016_FL7	0280	01:40:21	01:41:39	450	14	295	
017_FL6	0279	01:44:40	01:46:01	450	14	295	turbulence
018_FL5	0278	01:48:52	01:50:14	450	14	295	turbulence
019_FL4	0277	01:53:17	01:54:39	450	14	295	
020_FL3	0276	01:57:32	01:58:58	450	14	295	
021_FL2	0275	02:02:15	02:03:30	450	14	295	
022_FL1	0274	02:06:10	02:07:25	450	14	295	
023_FL8	0281	02:10:17	02:11:24	450	14	295	refly
024_FL10	0283	02:14:44	02:15:51	450	14	295	refly
		02:16:00					Ended Survey

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Guam (PGUM)		
LOCATION / AREA:	Guam, CNMI / BL02	DATE:	23 February 2020		
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Peter B.		
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.		
MISSION ID:	079640_Saipan	CLOUDS:	scattered @ 2500		
BASE STATION:	PGUM	WIND:	22kts @ 65		
ENGINE START:	0:08	ENGINE OFF:	4:24	ENGINE TIME:	04:16
GNSS START:	0:14	GNSS START:	4:22		
TAKEOFF:	0:24	TOUCHDOWN:	4:15	AIR TIME	03:51

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS	
		02:03:07				DS: BL02_20200223_020322	
000_FL11	0284	02:03:22	02:04:42	450	14	295	
001_FL11	0284	02:08:32	02:09:48	450	14	295	
002_FL11	0284	02:12:52	02:14:08	450	14	295	
003_FL28	0298	02:18:12	02:18:36	450	14	295	low clouds, laser stopped
004_FL28	0298	02:22:34	02:23:37	450	14	295	too low 600ft
005_FL28	0298	02:27:45	02:28:50	450	14	295	too low 600ft
006_FL11	0284	02:44:58	02:46:18	450	14	295	
		02:47:00					Ended Survey due to Clouds
		02:47:00					Ended Survey

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Guam (PGUM)		
LOCATION / AREA:	Guam, CNMI / BL12	DATE:	23 February 2020		
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Peter B.		
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.		
MISSION ID:	079640_Saipan	CLOUDS:	scattered @ 2500		
BASE STATION:	PGUM	WIND:	20kts @ 60		
ENGINE START:	21:15	ENGINE OFF:	22:33	ENGINE TIME:	01:18
GNSS START:	21:22	GNSS START:	22:32		
TAKEOFF:	21:32	TOUCHDOWN:	22:27	AIR TIME	00:55

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS	
		21:52:55				DS: BL12_20200223_215310	
000_FL74	1274	21:53:10	21:55:18	450	14	295	laser stopped at end
001_FL73	1273	21:58:33	22:00:45	450	14	295	clouds, too low 150ft
		22:01:00					Ended Survey due to Clouds
		22:01:00					Ended Survey

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Guam (PGUM)
LOCATION / AREA:	Guam, CNMI / BL04, BL05, BL08	DATE:	23 February 2020
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Peter B.
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.
MISSION ID:	079640_Saipan	CLOUDS:	scattered @ 3500
BASE STATION:	SPN1	WIND:	25kts @ 60
ENGINE START:	23:39	ENGINE OFF:	2:02
ENGINE TIME:		ENGINE TIME:	02:23
GNSS START:	23:45	GNSS START:	2:00
TAKEOFF:	23:54	TOUCHDOWN:	1:56
		AIR TIME	02:02

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		23:57:25				DS: Cal-SaipanCNMI_800m_20200223
000_FL6	0806	23:57:40	23:59:06	320	30	295
001_FL5	0805	00:02:16	00:03:44	320	30	295
002_FL4	0804	00:08:05	00:09:36	320	30	295
003_FL3	0803	00:13:52	00:15:26	320	30	295
004_FL2	0802	00:18:28	00:20:15	320	30	295
005_FL1	0801	00:23:06	00:24:44	320	30	295
006_FL6	0806	00:28:47	00:30:18	320	30	295
		00:33:11				refly
						DS: Cal-SaipanCNMI_500m_20200224
000_FL1	0501	00:33:26	00:34:46	500	13	55
		00:52:15				DS: Cal-SaipanCNMI_500m_20200224
000_FL2	0502	00:52:30	00:54:11	500	13	55
001_FL3	0503	00:57:46	00:59:14	500	13	55
002_FL4	0504	01:02:51	01:04:21	500	13	55
003_FL5	0505	01:08:27	01:09:53	500	13	55
004_FL6	0506	01:13:59	01:15:21	500	13	55
		01:19:35				DS: Cal-SaipanCNMI_400m_20200224
000_FL6	0406	01:19:50	01:21:02	300	10	45
001_FL5	0405	01:25:13	01:26:29	300	10	45
002_FL4	0404	01:30:45	01:31:53	300	10	45
003_FL3	0403	01:36:21	01:37:29	300	10	45
004_FL2	0402	01:42:14	01:43:31	300	10	45
005_FL1	0401	01:46:59	01:48:17	300	10	45
		01:49:00				Ended Survey

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Guam (PGUM)		
LOCATION / AREA:	Guam, CNMI / BL02	DATE:	26 February 2020		
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Peter B.		
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew S.		
MISSION ID:	079640_Saipan	CLOUDS:	scattered @ 2000		
BASE STATION:	PGUM	WIND:	8kts @ 100		
ENGINE START:	22:06	ENGINE OFF:	1:54	ENGINE TIME:	03:48
GNSS START:	22:14	GNSS START:	1:53		
TAKEOFF:	22:22	TOUCHDOWN:	1:50	AIR TIME	03:28

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		22:41:17				DS: BL12_20200226_224132
000_FL18	1293	22:41:32	22:42:13	300	10	295 BAD: 300ft too low
		22:43:00				Ended Rota due to clouds
		22:45:00				Loaded Pagan Plan
		00:09:28				DS: BL02_20200227_000943
000_FL31	0297	00:09:43	00:10:47	300	10	295 500ft too low
001_FL31	0297	00:13:18	00:14:20	300	10	295 300ft too low
002_FL31	0297	00:19:32	00:20:37	300	10	295 400ft too low
		00:21:00				Ended Survey

PROJECT NAME:	2020-80698 - Guam - Bathy Lidar	BASE AIRPORT:	Guam (PGUM)
LOCATION / AREA:	Guam, CNMI / BL04, BL05, BL08	DATE:	19 June 2020
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Cole B.
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew B.

MISSION ID:	80698_Guam	CLOUDS:	Scattered @ 2800
BASE STATION:	SPN3	WIND:	10 kts @ 80

ENGINE START:	23:58	ENGINE OFF:	2:00	ENGINE TIME:	02:02
GNSS START:	0:00	GNSS START:	1:54		
TAKEOFF:	0:09	TOUCHDOWN:	1:53	AIR TIME	01:44

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		00:12:41				DS: Cal-SaipanCNMI_800m_20200619
000_FL1	0801	00:12:56	00:14:42			BAD: Incorrect settings
001_FL1	0801	00:22:54	00:24:39			
002_FL2	0802	00:27:00	00:28:45	320	30	295
003_FL3	0803	00:31:34	00:33:19	320	30	295
004_FL4	0804	00:35:21	00:36:54	320	30	295
005_FL5	0805	00:39:49	00:41:33	320	30	295
006_FL6	0806	00:45:23	00:47:02	320	30	295
		00:48:00				Completed 800m Cal.
		00:49:31				DS: Cal-SaipanCNMI_500m_20200619
000_FL4		00:49:46	00:50:13			BAD: Incorrect settings
001_FL4		00:52:38	00:52:40			BAD: Incorrect settings
002_FL4	0504	00:55:08	00:56:40	500	13	55
003_FL3	0503	00:59:31	01:01:04	500	13	55
004_FL1	0501	01:06:26	01:08:01	500	13	55
005_FL2	0502	01:10:41	01:12:14	500	13	55
006_FL6	0506	01:15:05	01:16:36	500	13	55
007_FL5	0505	01:20:35	01:22:03	500	13	55
		01:23:00				Completed 500m Cal.
		01:25:02				DS: Cal-SaipanCNMI_400m_20200619
000_FL4	0404	01:25:17	01:26:35	300	10	45
001_FL3	0403	01:29:09	01:30:32	300	10	45
002_FL1	0401	01:33:16	01:34:37	300	10	45
003_FL2	0402	01:37:15	01:38:38	300	10	45
004_FL6	0406	01:40:54	01:42:13	300	10	45
005_FL5	0405	01:46:19	01:47:37	300	10	45
		01:48:00				Completed 400m Cal.

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Guam (PGUM)
LOCATION / AREA:	Mariana Islands / BL02	DATE:	2 July 2020
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Cole B.
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew B.
MISSION ID:	079640_Saipan	CLOUDS:	Scattered @ 3000
BASE STATION:	PPP	WIND:	10 kts @ 90
ENGINE START:	0:51	ENGINE OFF:	5:02
ENGINE TIME:	04:11		
GNSS START:	0:55	GNSS START:	
TAKEOFF:	1:04	TOUCHDOWN:	4:58
AIR TIME:	03:54		

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		02:04:11				DS: BL01_20200702_020426
000_FL58	0157	02:04:26	02:05:36	500	12	295
001_FL59	0158	02:09:40	02:10:48	500	12	295
		02:14:08				DS: BL02_20200702_021423
000_FL2	0233	02:14:23	02:16:34	450	14	295
001_FL3	0234	02:19:36	02:20:56	450	14	295
002_FL1	0232	02:22:59	02:24:10	450	14	295
						300-400 ft below planned AGL
003_FL1	0232	02:26:52	02:28:03	450	14	295
						250-300 ft below planned AGL
		02:30:00				Completed Pagan reflights

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Guam (PGUM)
LOCATION / AREA:	Mariana Islands /	DATE:	4 July 2020
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Cole B.
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew B.
MISSION ID:	079640_Saipan	CLOUDS:	Scattered @ 2600
BASE STATION:	PPP	WIND:	15 kts @ 70
ENGINE START:	23:38	ENGINE OFF:	1:03
ENGINE TIME:			01:25
GNSS START:	23:44	GNSS START:	
TAKEOFF:	23:55	TOUCHDOWN:	0:59
		AIR TIME	01:04

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		00:12:33				DS: BL12_20200705_001248
000_FL1	1276	00:12:48	00:14:17	300 10	295	
001_FL2	1277	00:20:31	00:22:07	300 10	295	
002_FL18	1293	00:24:28	00:24:49	300 10	295	BAD: Eye safety – Aborted line
003_FL3	1278	00:28:11	00:29:47	300 10	295	
		00:32:00				Ended survey due to clouds

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands / BL08	DATE:	5 July 2020
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Cole B.
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew B.
MISSION ID:	079640_Saipan	CLOUDS:	Scattered @ 2700
BASE STATION:	SPN3	WIND:	15 kts @ 80
ENGINE START:	3:09	ENGINE OFF:	3:55
ENGINE TIME:			00:46
GNSS START:	3:12	GNSS START:	
TAKEOFF:	3:31	TOUCHDOWN:	3:52
		AIR TIME	00:21

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		03:33:31				DS: Cal-SaipanCNMI_800m_20200705
000_FL1	0801	03:33:46	03:35:37	320 30	295	
001_FL2	0802	03:37:47	03:39:30	320 30	295	
002_FL3	0803	03:42:03	03:43:41	320 30	295	150 ft below planned AGL
003_FL4	0804	03:45:58	03:46:35	320 30	295	BAD: Eye Safety - 150 ft below AGL
		03:48:00				Ended calibration due to clouds

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)
LOCATION / AREA:	Mariana Islands /	DATE:	5 July 2020
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Cole B.
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew B.
MISSION ID:	079640_Saipan	CLOUDS:	Scattered @ 2600
BASE STATION:	PPP	WIND:	15 kts @ 80
ENGINE START:	4:05	ENGINE OFF:	5:07
ENGINE TIME:			01:02
GNSS START:	4:09	GNSS START:	
TAKEOFF:	4:17	TOUCHDOWN:	5:02
AIR TIME			00:45

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		04:42:02				DS: BL12_20200705_044217
000_FL3	1278	04:42:17	04:43:57	300	10	295 East half 150 ft below plan AGL
		04:45:00				Ended survey due to clouds

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)		
LOCATION / AREA:	Mariana Islands / BL04, BL05, BL06	DATE:	11 July 2020		
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Cole B.		
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew B.		
MISSION ID:	079640_Saipan	CLOUDS:	Scattered @ 2200		
BASE STATION:	SPN3	WIND:	15 kts @ 90		
ENGINE START:	0:37	ENGINE OFF:	2:45	ENGINE TIME:	02:08
GNSS START:	0:41	GNSS START:	2:28		
TAKEOFF:	1:01	TOUCHDOWN:	2:25	AIR TIME	01:24

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		01:03:25				DS: Cal1-SaipanCNMI_600m_20200711
000_FL1	0601	01:03:40	01:05:23	450	14	295
001_FL2		01:09:08	01:09:19			BAD: System disarmed
002_FL2	0602	01:10:39	01:12:19	450	14	295
003_FL3	0603	01:15:00	01:16:39	450	14	295
004_FL4	0604	01:18:54	01:20:32	450	14	295
005_FL5	0605	01:23:16	01:24:53	450	14	295
006_FL6	0606	01:28:15	01:29:53	450	14	295
		01:30:00				Completed 600m Calibration
		01:32:01				DS: Cal1-SaipanCNMI_500m_20200711
000_FL1	0501	01:32:16	01:33:49	500	13	55
001_FL2	0502	01:36:07	01:37:44	500	13	55
002_FL3	0503	01:40:20	01:41:49	500	13	55
003_FL4	0504	01:43:47	01:45:15	500	13	55
004_FL5	0505	01:47:19	01:48:46	500	13	55
005_FL6	0506	01:51:38	01:53:04	500	13	55
		01:54:00				Completed 500m Calibration
		01:55:06				DS: Cal1-SaipanCNMI_400m_20200711
000_FL1	0401	01:55:21	01:56:44	300	10	45
001_FL2	0402	01:58:46	02:00:07	300	10	45
002_FL3	0403	02:02:25	02:03:42	300	10	45
003_FL4	0404	02:05:55	02:07:10	300	10	45
004_FL5	0405	02:09:15	02:10:32	300	10	45
005_FL6	0406	02:13:55	02:15:17	300	10	45
006_FL6	0406	02:18:08	02:19:28	300	10	45
		02:20:00				Completed Calibration

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Guam (PGUM)
LOCATION / AREA:	Mariana Islands /	DATE:	11 July 2020
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Cole B.
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew B.
MISSION ID:	079640_Saipan	CLOUDS:	Scattered @ 2600
BASE STATION:	PPP	WIND:	10 kts @ 105
ENGINE START:	22:27	ENGINE OFF:	23:44
ENGINE TIME:	01:17		
GNSS START:	22:32	GNSS START:	
TAKEOFF:	22:43	TOUCHDOWN:	23:40
AIR TIME:	00:57		

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		22:59:22				DS: BL12_20200711_225937
000_FL3	1278	22:59:37	23:01:14	300	10	295
001_FL4	1279	23:03:16	23:04:58	300	10	295
002_FL5	1280	23:07:17	23:09:02	300	10	295
003_FL6		23:10:47	23:11:01			BAD: Eye safety
004_FL6	1281	23:11:11	23:12:35	300	10	295
005_FL7	1282	23:14:56	23:17:48	300	10	295
006_FL18	1293	23:18:51	23:20:02	300	10	295
		23:22:35				DS: BL12_20200711_232250
000_FL8	1283	23:22:50	23:23:45	300	10	295
		23:25:00				Ended survey due to clouds

PROJECT NAME:	079640 - CNMI - Bathy Lidar	BASE AIRPORT:	Saipan (SPN)		
LOCATION / AREA:	Mariana Islands / BL04, BL05, BL06	DATE:	14 July 2020		
AIRCRAFT:	Reims F406 - ZK-XLF	PILOT:	Cole B.		
SYSTEM:	Hawkeye 4x	OPERATOR:	Andrew B.		
MISSION ID:	079640_Saipan	CLOUDS:	Scattered @ 2200		
BASE STATION:	SPN3	WIND:	15 kts @ 90		
ENGINE START:	3:46	ENGINE OFF:	5:53	ENGINE TIME:	02:07
GNSS START:	3:58	GNSS START:	5:36		
TAKEOFF:	4:19	TOUCHDOWN:	5:34	AIR TIME	01:15

FL #	LINE #	START TIME	END TIME	TOPO PRF PWR	CHII PWR	REMARKS
		04:21:51				DS: Cal-SaipanCNMI_600m_20200714
000_FL1	0601	04:22:06	04:23:52	450 14	295	
001_FL2	0602	04:25:57	04:27:40	450 14	295	
002_FL3	0603	04:30:21	04:31:55	450 14	295	
003_FL4	0604	04:33:50	04:35:25	450 14	295	
004_FL5	0605	04:37:43	04:39:19	450 14	295	
005_FL6	0606	04:42:10	04:43:54	450 14	295	
		04:44:00				Completed 600m Calibration
		04:45:47				DS: Cal-SaipanCNMI_500m_20200714
000_FL1	0501	04:46:02	04:47:44	500 13	55	
001_FL2	0502	04:50:00	04:51:32	500 13	55	
002_FL3	0503	04:54:01	04:55:29	500 13	55	
003_FL4	0504	04:57:23	04:58:51	500 13	55	
004_FL5	0505	05:01:15	05:02:42	500 13	55	
005_FL6	0506	05:05:17	05:06:45	500 13	55	
		05:07:00				Completed 500m Calibration
		05:08:37				DS: Cal-SaipanCNMI_400m_20200714
000_FL1	0401	05:08:52	05:10:16	300 10	45	
001_FL2	0402	05:12:12	05:13:39	300 10	45	
002_FL3	0403	05:15:54	05:17:10	300 10	45	
003_FL4	0404	05:18:49	05:20:03	300 10	45	
004_FL5	0405	05:22:38	05:23:51	300 10	45	
005_FL6	0406	05:27:09	05:28:32	300 10	45	
		05:29:00				Completed Calibration

APPENDIX B : PROCESSING LOGS

PROJECT NAME: 079640 - CNMI - TopoBathy Lidar
LOCATION: Saipan, CNMI
AIRCRAFT: Reims-Cessna 406 - ZK-XLF
SYSTEM: Hawkeye 4x

Mission	Copied to Disk	Nav Session	Nav Type	Calibration File	Cal Type	Processing Parameters	Check Processing Parameters	Processing Session	Number of FL	Process Topo	Process Shallow	Process Deep	Run QC Stats in FME	Comments
Cal-SaipanCNMI_500m_20190825_203503	DA	2019-08-25A	Final	CAL_TSD_20190614_r0	Initial	ProcessingCal_20170628_500	MC	20190909_134631	8	6	6	6	MC	Topo, Shallow, Deep
								Calibration_2019-09-09_20.58.06						Topo - Update Angles and Slant Range (r1)
								Calibration_2019-09-09_18.40.45						Shallow - Update Angles and Slant Range (r1)
								Calibration_2019-09-09_18.40.14						Deep - Update Angles and Slant Range (r1)
Cal-SaipanCNMI_400m_20190825_210848	DA	2019-08-25A	Final	CAL_TSD_20190614_r0	Initial	ProcessingCal_20170628_400	MC	20190909_134830	13	6	6	6	MC	Topo, Shallow, Deep
														Updated Cal File for Topo, Shallow, Deep Angles and Slant Range (r1)
Cal-SaipanCNMI_500m_20190825_203503	DA	2019-08-25A	Final	CAL_TSD_20190614_r1	Interim	ProcessingCal_20170628_500	MC	20190910_083850	8	6	6	6	MC	Topo, Shallow, Deep
								Calibration_2019-09-10_09.43.22						Topo - Update Angles and Slant Range (r2)
								Calibration_2019-09-11_14.00.23						Shallow - Update Angles and Slant Range (r2)
								Calibration_2019-09-10_09.52.44						Deep - Update Angles and Slant Range (r2)
Cal-SaipanCNMI_400m_20190825_210848	DA	2019-08-25A	Final	CAL_TSD_20190614_r1	Interim	ProcessingCal_20170628_400	MC	20190910_083926	13	6	6	6	MC	Topo, Shallow, Deep
														Updated Cal File for Topo, Shallow, Deep Angles and Slant Range (r2)
Cal-SaipanCNMI_500m_20190825_203503	DA	2019-08-25A	Final	CAL_TSD_20190614_r2	Interim	ProcessingCal_20170628_500	MC	20190910_101851	8	6	6	6	MC	Topo, Shallow, Deep
								Calibration_2019-09-10_14.06.11						Topo - Update Angles and Slant Range (r3)
								Calibration_2019-09-11_14.37.55						Shallow - Update Angles and Slant Range (r3)
								Calibration_2019-09-10_11.44.46						Deep - Update Angles and Slant Range (r3)
Cal-SaipanCNMI_400m_20190825_210848	DA	2019-08-25A	Final	CAL_TSD_20190614_r2	Interim	ProcessingCal_20170628_400	MC	20190910_101919	13	6	6	6	MC	Topo, Shallow, Deep
														Updated Cal File for Topo, Shallow, Deep Angles and Slant Range (r3)
Cal-SaipanCNMI_500m_20190825_203503	DA	2019-08-25A	Final	CAL_TSD_20190614_r3	Interim	ProcessingCal_20170628_500	MC	20190910_144444	8	6	6	6	MC	Topo, Shallow, Deep
								20190912_095756_MirrorCalibration						Topo - Mirror Cal (r7)
								Calibration_2019-09-11_15.48.56						Shallow - Update Angles and Slant Range (r4)
Cal-SaipanCNMI_400m_20190825_210848	DA	2019-08-25A	Final	CAL_TSD_20190614_r3	Interim	ProcessingCal_20170628_400	MC	20190910_144509	13	6	6	6	MC	Topo, Shallow, Deep
														Updated Cal File for Shallow Angles and Slant Range (r4)
Cal-SaipanCNMI_500m_20190825_203503	DA	2019-08-25A	Final	CAL_TSD_20190614_r4	Interim	ProcessingCal_20170628_500	MC	20190911_155540	8	6	6	6	MC	Shallow
								Calibration_2019-09-11_16.56.40						Shallow - Update Angles and Slant Range (r5)
Cal-SaipanCNMI_400m_20190825_210848	DA	2019-08-25A	Final	CAL_TSD_20190614_r4	Interim	ProcessingCal_20170628_400	MC	20190911_155614	13	6	6	6	MC	Shallow
														Updated Cal File for Shallow Angles and Slant Range (r5)
Cal-SaipanCNMI_500m_20190825_203503	DA	2019-08-25A	Final	CAL_TSD_20190614_r5	Interim	ProcessingCal_20170628_500	MC	20190911_170452	8	6	6	6	MC	Shallow
								Calibration_2019-09-11_21.17.41						Shallow - Update Angles and Slant Range (r6)
Cal-SaipanCNMI_400m_20190825_210848	DA	2019-08-25A	Final	CAL_TSD_20190614_r5	Interim	ProcessingCal_20170628_400	MC	20190911_170522	13	6	6	6	MC	Shallow
														Updated Cal File for Shallow Angles and Slant Range (r6)
Cal-SaipanCNMI_500m_20190825_203503	DA	2019-08-25A	Final	CAL_TSD_20190614_r6	Interim	ProcessingCal_20170628_500	MC	20190911_213459	8	6	6	6	MC	Shallow
								20190912_095315_MirrorCalibration						Shallow - Mirror Cal (r7)
Cal-SaipanCNMI_400m_20190825_210848	DA	2019-08-25A	Final	CAL_TSD_20190614_r6	Interim	ProcessingCal_20170628_400	MC	20190911_213530	13	6	6	6	MC	Shallow
														Updated Cal File for Topo, Shallow Mirror (r7)
Cal-SaipanCNMI_500m_20190825_203503	DA	2019-08-25A	Final	CAL_TSD_20190614_r7	Final	ProcessingCal_20170628_500	MC	20190912_100436	8	6	6	6	MC	Topo, Shallow, Deep
Cal-SaipanCNMI_400m_20190825_210848	DA	2019-08-25A	Final	CAL_TSD_20190614_r7	Final	ProcessingCal_20170628_400	MC	20190912_100458	13	6	6	6	MC	Topo, Shallow, Deep
Copy CAL_TSD_20190614_r7 to CAL_TSD_Survey_20190614_r0 for Survey														
Second Calibration														

PROJECT NAME: 079640 - CNMI - TopoBathy Lidar
LOCATION: Saipan, CNMI
AIRCRAFT: Reims-Cessna 406 - ZK-XLF
SYSTEM: Hawkeye 4x

Mission	Copied to Disk	Nav Session	Nav Type	Calibration File	Cal Type	Processing Parameters	Check Processing Parameters	Processing Session	Number of FL	Process Topo	Process Shallow	Process Deep	Run QC Stats in FME	Comments
HE4x_Cal-SaipanCNMI_400m_20200224_011950	MW	2020-02-23C	Final	CAL_TSD_Prelim_20200107_r0	Initial	ProcessingCal_20170628_400	MW	Cal-SaipanCNMI_400m_20200619	6	6	6	6	MW	
HE4x_Cal-SaipanCNMI_500m_20200224_005230	MW	2020-02-23C	Final	CAL_TSD_Prelim_20200107_r0	Initial	ProcessingCal_20170628_500	MW	Cal-SaipanCNMI_500m_20200619	6	5	5	5	MW	
								Calibration_2020-04-02_13.57.07						Topo - Update Angles and Slant Range (r1)
								Calibration_2020-04-02_13.57.23						Shallow - Update Angles and Slant Range (r1)
								Calibration_2020-04-02_13.57.30						Deep - Update Angles and Slant Range (r1)
HE4x_Cal-SaipanCNMI_800m_20200223_235740	MW	2020-02-23C	Final	CAL_TSD_Prelim_20200107_r0	Initial	ProcessingCal_20170628_800	MW	Cal-SaipanCNMI_800m_20200619	7	7			MW	
														Updated Cal File for Topo, Shallow Mirror (r1)
HE4x_Cal-SaipanCNMI_400m_20200224_011950	MW	2020-02-23C	Final	CAL_TSD_Prelim_20200107_r1	Interim	ProcessingCal_20170628_400	MW	Cal-SaipanCNMI_400m_20200619	6	6	6	6	MW	
HE4x_Cal-SaipanCNMI_500m_20200224_005230	MW	2020-02-23C	Final	CAL_TSD_Prelim_20200107_r1	Interim	ProcessingCal_20170628_500	MW	Cal-SaipanCNMI_500m_20200619	6	5	5	5	MW	
								Calibration_2020-04-03_09.05.10						Topo - Update Angles and Slant Range (r2)
								Calibration_2020-04-03_09.05.16						Shallow - Update Angles and Slant Range (r2)
								Calibration_2020-04-03_09.05.21						Deep - Update Angles and Slant Range (r2)
HE4x_Cal-SaipanCNMI_800m_20200223_235740	MW	2020-02-23C	Final	CAL_TSD_Prelim_20200107_r1	Interim	ProcessingCal_20170628_800	MW	Cal-SaipanCNMI_800m_20200619	7	7			MW	
														Updated Cal File for Topo, Shallow Mirror (r2)
HE4x_Cal-SaipanCNMI_400m_20200224_011950	MW	2020-02-23C	Final	CAL_TSD_Prelim_20200107_r2	Interim	ProcessingCal_20170628_400	MW	Cal-SaipanCNMI_400m_20200619	6	6	6	6	MW	
HE4x_Cal-SaipanCNMI_500m_20200224_005230	MW	2020-02-23C	Final	CAL_TSD_Prelim_20200107_r2	Interim	ProcessingCal_20170628_500	MW	Cal-SaipanCNMI_500m_20200619	6	5	5	5	MW	
								20200403_121800_MirrorCalibration						Topo - Update Angles and Slant Range (r3)
								20200403_121801_MirrorCalibration						Shallow - Update Angles and Slant Range (r3)
								20200403_121803_MirrorCalibration						Deep - Update Angles and Slant Range (r3)
HE4x_Cal-SaipanCNMI_800m_20200223_235740	MW	2020-02-23C	Final	CAL_TSD_Prelim_20200107_r2	Interim	ProcessingCal_20170628_800	MW	Cal-SaipanCNMI_800m_20200619	7	7			MW	
														Updated Cal File for Topo, Shallow Mirror (r4)
HE4x_Cal-SaipanCNMI_400m_20200224_011950	MW	2020-02-23C	Final	CAL_TSD_Prelim_20200107_r3	Final	ProcessingCal_20170628_400	MW	Cal-SaipanCNMI_400m_20200619	6	6	6	6	MW	
HE4x_Cal-SaipanCNMI_500m_20200224_005230	MW	2020-02-23C	Final	CAL_TSD_Prelim_20200107_r3	Final	ProcessingCal_20170628_500	MW	Cal-SaipanCNMI_500m_20200619	6	5	5	5	MW	
HE4x_Cal-SaipanCNMI_800m_20200223_235740	MW	2020-02-23C	Final	CAL_TSD_Prelim_20200107_r3	Final	ProcessingCal_20170628_800	MW	Cal-SaipanCNMI_800m_20200619	7	7			MW	
Copy CAL_TSD_20200107_r3 to CAL_TSD_Survey_20200212_r1 for Survey														
Third Calibration														
HE4x_Cal-SaipanCNMI_600m_20200714_042206	BH	2020-07-14A	Final	CAL_TSD_Prelim_20200107_r0	Initial	ProcessingCal_20200626_600	MC	Cal1-SaipanCNMI_600m_20200714	6	6	6	6		Topo, Shallow, Deep
HE4x_Cal1-SaipanCNMI_500m_20200714_013216	BH	2020-07-14A	Final	CAL_TSD_Prelim_20200107_r0	Initial	ProcessingCal_20170628_500	MC	Cal1-SaipanCNMI_500m_20200714	6	6	6	6		Topo, Shallow, Deep
								Calibration_2020-07-14_14.58.02						Topo - Update Angles (r1)
								Calibration_2020-07-14_14.59.57						Shallow - Update Angles (r1)
								Calibration_2020-07-14_15.03.12						Deep - Update Angles (r1)
HE4x_Cal-SaipanCNMI_400m_20200714_050852	BH	2020-07-14A	Final	CAL_TSD_Prelim_20200107_r0	Initial	ProcessingCal_20170628_400	MC	Cal1-SaipanCNMI_400m_20200714	6	6	6	6		Topo, Shallow, Deep
														Updated Cal File for Topo, Shallow, Deep Angles (r1)
HE4x_Cal-SaipanCNMI_600m_20200714_042206	BH	2020-07-14A	Final	CAL_TSD_Prelim_20200107_r1	Initial	ProcessingCal_20200626_600	MC	Cal1-SaipanCNMI_600m_20200714	6	6	6	6		Topo, Shallow, Deep
HE4x_Cal1-SaipanCNMI_500m_20200714_013216	BH	2020-07-14A	Final	CAL_TSD_Prelim_20200107_r1	Initial	ProcessingCal_20170628_500	MC	Cal1-SaipanCNMI_500m_20200714	6	6	6	6		Topo, Shallow, Deep
								Calibration_2020-07-14_15.32.12						Topo - Update Angles and Slant Range (r2)
								Calibration_2020-07-14_15.32.53						Shallow - Update Angles and Slant Range (r2)
								Calibration_2020-07-14_15.33.20						Deep - Update Angles and Slant Range (r2)
HE4x_Cal-SaipanCNMI_400m_20200714_050852	BH	2020-07-14A	Final	CAL_TSD_Prelim_20200107_r1	Initial	ProcessingCal_20170628_400	MC	Cal1-SaipanCNMI_400m_20200714	6	6	6	6		Topo, Shallow, Deep
														Updated Cal File for Topo, Shallow, Deep Angles (r2)
HE4x_Cal-SaipanCNMI_600m_20200714_042206	BH	2020-07-14A	Final	CAL_TSD_Prelim_20200107_r2	Initial	ProcessingCal_20200626_600	MC	Cal1-SaipanCNMI_600m_20200714	6	6	6	6		Topo, Shallow, Deep
HE4x_Cal1-SaipanCNMI_500m_20200714_013216	BH	2020-07-14A	Final	CAL_TSD_Prelim_20200107_r2	Initial	ProcessingCal_20170628_500	MC	Cal1-SaipanCNMI_500m_20200714	6	6	6	6		Topo, Shallow, Deep
								Calibration_2020-07-14_18.23.52						Topo - Update Angles (r3)
								Calibration_2020-07-14_20.30.01						Shallow - Update Angles (r3)

PROJECT NAME: 079640 - CNMI - TopoBathy Lidar
 LOCATION: Saipan, CNMI
 AIRCRAFT: Reims-Cessna 406 - ZK-XLF
 SYSTEM: Hawkeye 4x

Mission	Copied to Disk	Nav Session	Nav Type	Calibration File	Cal Type	Processing Parameters	Check Processing Parameters	Processing Session	Number of FL	Process Topo	Process Shallow	Process Deep	Run QC Stats in FME	Comments
								Calibration_2020-07-14_20.34.40						Deep - Update Angles (r3)
HE4x_Cal-SaipanCNMI_400m_20200714_050852	BH	2020-07-14A	Final	CAL_TSD_Prelim_20200107_r2	Initial	ProcessingCal_20170628_400	MC	Cal1-SaipanCNMI_400m_20200714	6	6	6	6		Topo, Shallow, Deep
														Updated Cal File for Topo, Shallow, Deep Angles (r3)
HE4x_Cal-SaipanCNMI_600m_20200714_042206	BH	2020-07-14A	Final	CAL_TSD_Prelim_20200107_r3	Initial	ProcessingCal_20200626_600	MC	Cal1-SaipanCNMI_600m_20200714	6	6	6	6		Topo, Shallow, Deep
HE4x_Cal1-SaipanCNMI_500m_20200714_013216	BH	2020-07-14A	Final	CAL_TSD_Prelim_20200107_r3	Initial	ProcessingCal_20170628_500	MC	Cal1-SaipanCNMI_500m_20200714	6	6	6	6		Topo, Shallow, Deep
								20200714_221134_MirrorCalibration						Topo - Mirror Cal (r3)
								20200714_221603_MirrorCalibration						Shallow - Mirror Cal (r3)
HE4x_Cal-SaipanCNMI_400m_20200714_050852	BH	2020-07-14A	Final	CAL_TSD_Prelim_20200107_r3	Initial	ProcessingCal_20170628_400	MC	Cal1-SaipanCNMI_400m_20200714	6	6	6	6		Topo, Shallow, Deep
														Updated Cal File for Topo, Shallow, Mirror Cal (r4)
HE4x_Cal-SaipanCNMI_600m_20200714_042206	BH	2020-07-14A	Final	CAL_TSD_Prelim_20200107_r4	Final	ProcessingCal_20200626_600	MC	Cal1-SaipanCNMI_600m_20200714	6	6	6	6		Topo, Shallow, Deep
HE4x_Cal1-SaipanCNMI_500m_20200714_013216	BH	2020-07-14A	Final	CAL_TSD_Prelim_20200107_r4	Final	ProcessingCal_20170628_500	MC	Cal1-SaipanCNMI_500m_20200714	6	6	6	6		Topo, Shallow, Deep
HE4x_Cal-SaipanCNMI_400m_20200714_050852	BH	2020-07-14A	Final	CAL_TSD_Prelim_20200107_r4	Final	ProcessingCal_20170628_400	MC	Cal1-SaipanCNMI_400m_20200714	6	6	6	6		Topo, Shallow, Deep
Copy CAL_TSD_Prelim_20200107_r4 to CAL_TSD_Survey_20200619_r0 for Survey														

PROJECT NAME: 079640 - CNMI - TopoBathy Lidar
LOCATION: Saipan, CNMI
AIRCRAFT: Reims-Cessna 406 - ZK-XLF
SYSTEM: Hawkeye 4x

Mission	Copied to Disk	Nav Session	Nav Type	Calibration File	CalType	Processing Parameters	Check Processing Parameters	Processing Session	Number of FL	Process Topo	Process Shallow	Process Deep	Verify Derived Water Surface (Coverage and Height)	Review Submerged Data for any settings issues	Review Shallow to Deep, Shallow to Topo	Colorize in IES	Review FLSP	Export Trajectories	Merge in FME	Comments
Saipan_OC_20190711_202330	CG	2019-07-11A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	QC_20190711_202330	1	1	1	1	X	X	X	--	X	TH	HA	
Saipan_BL04_20190711_202755	CG	2019-07-11A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	MC	BL04_20190711_202755	2	2	2	2	HA	X	X	--	X	TH	MC	
Saipan_BL05_20190711_204222	CG	2019-07-11A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r2	MC	BL05_20190711_204222	1	1	1	1	HA	X	X	--	X	TH	MC	
Saipan_BL06_20190711_204602	CG	2019-07-11A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_450m_r3	MC	BL06_20190711_204602	3	2	--	--	X	X	X	--	X	TH	MC	Do not process ID002
Tinian_BL07_20190711_205724	CG	2019-07-11A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	BL07_20190711_205724	39	20	20	20	KS	X	X	--	X	TH	HA	Do not process ID022
						ProcessingSurvey_20190615_500m_r2	HA			18	18	18	X	X	X	--	X	TH	X	
Tinian_BL07_20190712_001512	CG	2019-07-11A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r2	HA	BL07_20190712_001512	1	1	1	1	KS	X	X	--	X	TH	HA	
Saipan_OC_20190712_002225	CG	2019-07-11A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	QC_20190712_002225	1	1	1	1	X	X	X	--	X	TH	HA	
Saipan_OC_20190712_195356	CG	2019-07-12A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	QC_20190712_195356	1	1	1	1	X	X	X	--	X	CG	HA	
Saipan_BL06_20190712_195935	CG	2019-07-12A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_450m_r3	MC	BL06_20190712_195935	5	3	--	--	X	X	X	--	X	CG	HA	Do not process ID003, ID004
Saipan_BL06_20190712_204849	CG	2019-07-12B1	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_450m_r3	MC	BL06_20190712_204849	2	2	2	BH	X	X	X	--	X	TH	KS	
Tinian_BL08_20190712_205956	CG	2019-07-12B1	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_450m_r3	HA	BL08_20190712_205956	7	7	--	--	X	X	X	--	X	TH	KS	
Tinian_BL07_20190712_215531	CG	2019-07-12B1	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	BL07_20190712_215531	1	1	1	1	KS	X	X	--	X	TH	HA	
Aguujan_BL09_20190712_215932	CG	2019-07-12B2	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	BL09_20190712_215932	1	1	1	1	HA	X	X	--	X	NW	HA	
Aguujan_BL10_20190712_220622	CG	2019-07-12B2	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_450m_r3	HA	BL10_20190712_220622	4	4	--	--	X	X	X	--	X	NW	HA	
Aguujan_BL09_20190712_222156	CG	2019-07-12B2	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	BL09_20190712_222156	18	7	7	7	HA	X	X	--	X	NW	HA	
						ProcessingSurvey_20190615_500m_r2	HA			11	11	11	X	X	X	--	X	X	X	
Tinian_BL08_20190713_000125	CG	2019-07-12B1	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_450m_r3	HA	BL08_20190713_000125	1	1	--	--	X	X	X	--	X	TH	HA	
Saipan_OC_20190713_001519	CG	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Do not process
Saipan_OC_20190713_200202	CG	2019-07-13A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	QC_20190713_200202	1	1	1	1	X	X	X	--	X	CG	HA	
Saipan_BL06_20190713_200654	CG	2019-07-13A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_450m_r3	MC	BL06_20190713_200654	16	16	--	--	X	X	X	--	X	CG	HA	
Rota_BL11_20190713_224806	CG	2019-07-13B2	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	BL11_20190713_224806	7	7	7	7	X	X	X	--	X	NW	KS	
Tinian_BL08_20190713_234112	CG	2019-07-13B1	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_450m_r3	HA	BL08_20190713_234112	7	7	--	--	X	X	X	--	X	TH	KS	
Saipan_OC_12_20190714_235550	CG	2019-07-14A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	QC_20190714_235550	1	1	1	1	X	X	X	--	X	CG	HA	
Rota_BL11_20190715_002211	CG	2019-07-14A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	BH	BL11_20190715_002211	3							--	X	NW	X	
Rota_BL11_20190715_004041	CG	2019-07-14A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	BL11_20190715_004041	12	5	5	5	HA	X	X	--	X	NW	HA	Do not process 011
						ProcessingSurvey_20190615_500m_r2	HA			4	4	4	X	X	X	--	X	X	X	
Saipan_OC_20190716_020329	CG	2019-07-16A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	QC_20190716_020329	1	1	1	1	X	X	X	--	X	CG	HA	
Saipan_BL05_20190716_021001	CG	2019-07-16A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r2	MC	BL05_20190716_021001	4	2	2	2	HA	X	X	--	X	CG	MC	Do not process ID002, ID003. ID001_FL1 no deep raw files
Saipan_BL04_20190716_022003	CG	2019-07-16A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	MC	BL04_20190716_022003	3	3	3	3	HA	X	X	--	X	CG	MC	
Saipan_OC_20190716_201140	CG	2019-07-16B	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	QC_20190716_201140	1	1	1	1	X	X	X	--	X	CG	HA	
Saipan_BL05_20190716_201735	CG	2019-07-16B	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r2	MC	BL05_20190716_201735	6	2	2	2	BH	X	X	--	X	CG	X	Do not process ID001, ID002
Saipan_OC_20190718_203108	CG	2019-07-18A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	QC_20190718_203108	1	1	1	1	X	X	X	--	X	TH	HA	
Saipan_BL05_20190718_203757	CG	2019-07-18A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r2	MC	BL05_20190718_203757	13	3	3	3	HA	X	X	--	X	TH	HA	Do not process ID003
Tinian_BL07_20190718_222032	CG	2019-07-18A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	BL07_20190718_222032	2	2	2	2	KS	X	X	--	X	TH	HA	
Saipan_OC_20190720_042302	CG	2019-07-20A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	QC_20190720_042302	1	1	1	1	X	X	X	--	X	CG	HA	
Saipan_BL04_20190720_042818	CG	2019-07-20A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	MC	BL04_20190720_042818	7	7	7	7	HA	X	X	--	X	CG	MC	
Saipan_OC_20190720_201408	CG	2019-07-20B	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	QC_20190720_201408	1	1	1	1	X	X	X	--	X	CG	HA	
Saipan_BL05_20190720_202021	CG	2019-07-20B	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r2	MC	BL05_20190720_202021	14	13	13	13	HA	X	X	--	X	CG	MC	Do not process ID013
Saipan_BL05_20190720_214538	CG	2019-07-20B	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r2	MC	BL05_20190720_214538	6	4	4	4	HA	X	X	--	X	CG	HA	Do not process ID004, ID005
Saipan_OC_20190721_202204	CG	2019-07-21A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	QC_20190721_202204	1	1	1	1	X	X	X	--	X	CG	HA	
Saipan_BL04_20190721_203052	CG	2019-07-21A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	MC	BL04_20190721_203052	27	26	26	26	HA	X	X	--	X	CG	MC	Do not process ID005
Saipan_OC_20190721_231546	CG	2019-07-21A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	QC_20190721_231546	1	1	1	1	X	X	X	--	X	CG	HA	
Saipan_OC_20190722_023947	CG	2019-07-22A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	QC_20190722_023947	1	1	1	1	X	X	X	--	X	CG	HA	
Rota_BL11_20190722_030701	CG	2019-07-22A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	BL11_20190722_030701	22	5	5	5	HA	X	X	--	X	NW	HA	Do not process ID019
						ProcessingSurvey_20190615_500m_r2	HA			16	16	16	X	X	X	--	X	X	X	
Saipan_OC_20190722_051401	CG	2019-07-22A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	QC_20190722_051401	1	1	1	1	X	X	X	--	X	CG	HA	
Saipan_OC_20190722_195157	CG	2019-07-22B	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	QC_20190722_195157	1	1	1	1	X	X	X	--	X	CG	HA	
Saipan_BL06_20190722_200104	CG	2019-07-22B	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_450m_r3	MC	BL06_20190722_200104	2	2	--	--	X	X	X	--	X	CG	MC	
Saipan_BL06_20190722_204436	CG	2019-07-22C	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_450m_r3	MC	BL06_20190722_204436	10	9	--	--	X	X	X	--	X	CG	HA	Do not process ID004
Saipan_OC_20190722_214458	CG	2019-07-22C	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	QC_20190722_214458	1	1	1	1	X	X	X	--	X	CG	HA	
Saipan_OC_20190723_023450	CG	2019-07-23A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	QC_20190723_023450	1	1	1	1	X	X	X	--	X	CG	HA	
Saipan_BL04_20190723_024038	CG	2019-07-23A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	MC	BL04_20190723_024038	9	8	8	8	HA	X	X	--	X	CG	MC	Do not process ID008
Saipan_BL04_20190723_035545	CG	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Do not process
Saipan_OC_20190724_205342	CG	2019-07-24A1	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	QC_20190724_205342	1	1	1	1	X	X	X	--	X	TH	HA	
Saipan_BL05_20190724_210049	CG	2019-07-24A1	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r2	MC	BL05_20190724_210049	2	2	2	2	HA	X	X	--	X	TH	MC	
Saipan_BL04_20190724_211108	CG	2019-07-24A1	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	MC	BL04_20190724_211108	5	5	5	5	HA	X	X	--	X	TH	MC	
Saipan_BL06_20190724_213612	CG	2019-07-24A1	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_450m_r3	MC	BL06_20190724_213612	3	3	--	--	X	X	X	--	X	TH	HA	
Rota_BL11_20190724_220815	CG	2019-07-24A2	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r2	HA	BL11_20190724_220815	4	3	3	3	X	X	X	--	X	NW	KS	Do not process ID000
Rota_BL12_20190724_222308	CG	2019-07-24A2	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_450m_r3	HA	BL12_20190724_222308	8	8	--	--	X	X	X	--	X	NW	KS	

PROJECT NAME: 079640 - CNMI - TopoBathy Lidar
 LOCATION: Saipan, CNMI
 AIRCRAFT: Reims-Cessna 406 - ZK-XLF
 SYSTEM: Hawkeye 4x

Mission	Copied to Disk	Nav Session	Nav Type	Calibration File	Cal Type	Processing Parameters	Check Processing Parameters	Processing Session	Number of FL	Process Topo	Process Shallow	Process Deep	Verify Derived Water Surface (Coverage and Height)	Review Submerged Data for any settings issues	Review Shallow to Deep, Shallow to Topo	Colorize in LES	Review FLSP	Export Trajectories	Merge in FME	Comments
Rota_BLI1_20190724_225702	CG	2019-07-24A2	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r2	HA	BLI1_20190724_225702	9	7	7	6	X	X	X	--	NW	KS		Do not process ID001. ID007 no deep raw data
Rota_BLI2_20190724_233203	CG	2019-07-24A2	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_450m_r3	HA	BLI2_20190724_233203	23	22	--	--	X	X	X	--	NW	KS		Do not process ID003
Saipan_OC_20190725_201630	CG	2019-07-25A1	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	QC_20190725_201630	1	1	1	1	X	X	X	--	TH	HA		
Rota_BLI2_20190725_203951	CG	2019-07-25A2	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_450m_r3	HA	BLI2_20190725_203951	22	22	--	--	X	X	X	--	NW	KS		
Tinian_BLO8_20190725_223932	CG	2019-07-25A1	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_450m_r3	HA	BLO8_20190725_223932	1	1	--	--	X	X	X	--	TH	HA		
Saipan_OC_20190725_224739	CG	2019-07-25A1	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	QC_20190725_224739	1	1	1	1	X	X	X	--	TH	HA		
Fdm_BLO3_20190726_202237	CG	2019-07-26A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r0	DA	BLO3_20190726_202237	18	15	15	15	BH	BH	BH	--	BH	NW	DA	Do not process ID002, ID010, ID014
Saipan_OC_20190727_200521	CG	2019-07-27A1	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	QC_20190727_200521	1	1	1	1	X	X	X	--	TH	HA		
Saipan_BLO6_20190727_201821	CG	2019-07-27A1	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_450m_r3	MC	BLO6_20190727_201821	1	1	--	--	X	X	X	--	TH	HA		
Tinian_BLO8_20190727_202748	CG	2019-07-27A1	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_450m_r3	HA	BLO8_20190727_202748	17	15	--	--	X	X	X	--	TH	HA	Do not process ID001, ID004	
Rota_BLI2_20190727_215508	CG	2019-07-27A2	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r2	HA	BLI2_20190727_215508	5	5	--	--	X	X	X	--	NW	KS		
Saipan_OC_20190727_224617	CG	2019-07-27A1	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	QC_20190727_224617	1	1	1	1	X	X	X	--	TH	HA		
Saipan_OC_20190728_200320	HA	2019-07-28A1	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	QC_20190728_200320	1	1	1	1	X	X	X	--	TH	HA		
Tinian_BLO8_20190728_200846	HA	2019-07-28A1	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_450m_r3	HA	BLO8_20190728_200846	3	2	--	--	X	X	X	--	TH	HA	Do not process ID000	
Pagan_BLO2_20190728_211517	HA	2019-07-28A2	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_450m_r3	HA	BLO2_20190728_211517	5	5	--	--	X	X	X	--	X	KS		
Pagan_BLO1_20190728_212902	HA	2019-07-28A2	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	BLO1_20190728_212902	27	11	11	11	X	X	X	--	NW	KS		Do not process ID001, ID002
						ProcessingSurvey_20190615_500m_r2	HA				12	12	X	X	X	--	X	KS		
						ProcessingSurvey_20190615_500m_r1	HA				1	1				--	X	X		
						ProcessingSurvey_20190615_500m_r2	HA				1	1				--	X	X		No raw deep dat files
Pagan_BLO1_20190728_230817	HA	2019-07-28A2	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r2	HA	BLO1_20190728_230817	25	8	8	8	X	X	X	--	NW	KS		Do not process ID000, ID009, ID011, ID020. ID016_FL26, 022_FL16, 023_FL15 missing parts of deep UFx data
						ProcessingSurvey_20190615_500m_r1	HA				10	10	X	X	X	--	X	X		
Pagan_BLO1_20190730_204925	HA	2019-07-30A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	BLO1_20190730_204925	9	4	4	3	KS	X	X	--	NW	HA		Do not process ID001. ID000 no deep dat files
						ProcessingSurvey_20190615_500m_r2	HA				4	4	4	X	X	--	X	X		
Pagan_BLO2_20190730_213040	HA	2019-07-30A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_450m_r3	HA	BLO2_20190730_213040	31	31	--	--	X	X	X	--	NW	KS		
Saipan_OC_20190731_201241	HA	2019-07-31A1	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	QC_20190731_201241	1	1	1	1	X	X	X	--	TH	HA		
Saipan_BLO6_20190731_201956	HA	2019-07-31A1	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_450m_r3	HA	BLO6_20190731_201956	4	4	--	--	X	X	X	--	TH	HA		
Saipan_BLO4_20190731_203857	HA	2019-07-31A1	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	BLO4_20190731_203857	1	1	1	1	HA	X	X	--	TH	HA		
Tinian_BLO8_20190731_204653	HA	2019-07-31A1	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_450m_r3	HA	BLO8_20190731_204653	2	2	--	--	X	X	X	--	TH	KS		
Tinian1_BLO8_20190731_210357	HA	2019-07-31A1	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_450m_r3	HA	BLO8_20190731_210357	6	6	--	--	X	X	X	--	TH	KS		
Tinian1_BLO7_20190731_212830	HA	2019-07-31A1	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	BLO7_20190731_212830	8	4	4	4	KS	X	X	--	TH	HA		
						ProcessingSurvey_20190615_500m_r2	HA				4	4	4	X	X	--	TH	X		
Rota1_BLI2_20190731_221723	HA	2019-07-31A2	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_450m_r3	HA	BLI2_20190731_221723	3	2	--	--	X	X	X	--	NW	KS		Do not process ID002
Rota1_BLI1_20190731_222445	HA	2019-07-31A2	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	BLI1_20190731_222445	11	9	9	9	X	X	X	--	NW	KS		Do not process ID000, ID001
Aguijani_BLI0_20190731_231542	HA	2019-07-31A2	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_450m_r3	HA	BLI0_20190731_231542	1	1	--	--	X	X	X	--	NW	KS		
Aguijani_BLO9_20190731_231903	HA	2019-07-31A2	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r2	HA	BLO9_20190731_231903	1	1	1	1	X	X	X	--	NW	KS		
Pagani_BLO2_20190802_204807	HA	2019-08-02A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_450m_r3	HA	BLO2_20190802_204807	4	3	--	--	X	X	X	--	NW	KS		Do not process ID000
Pagani_BLO2_20190802_210841	HA	2019-08-02A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_450m_r3	HA	BLO2_20190802_210841	3	3	--	--	X	X	X	--	NW	KS		
Pagani_BLO1_20190802_212122	HA	2019-08-02A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	BLO1_20190802_212122	19	3	3	3	X	X	X	--	NW	HA		Do not process ID000, ID003, ID008, ID009, ID016, ID017
						ProcessingSurvey_20190615_500m_r2	HA				10	10	X	X	X	--	X	X		
Pagani_BLO2_20190803_195835	HA	2019-08-03A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_450m_r3	HA	BLO2_20190803_195835	25	25	--	--	X	X	X	--	NW	HA		
Saipan_OC_20190807_210326	HA	2019-08-07A1	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	QC_20190807_210326	2	1	1	1	X	X	X	--	TH	HA		Do not process ID000
Saipan1_BLO6_20190807_211010	HA	2019-08-07A1	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_450m_r3	HA	BLO6_20190807_211010	16	16	--	--	X	X	X	--	TH	HA		
Saipan1_BLO4_20190807_212155	HA	2019-08-07A1	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r2	HA	BLO4_20190807_212155	1	1	1	1	HA	X	X	--	TH	HA		
Saipan1_BLO5_20190807_221741	HA	2019-08-07A1	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r2	HA	BLO5_20190807_221741	2	1	1	1	HA	X	X	--	TH	HA		Do not process ID000
Rota1_BLI2_20190807_225221	HA	2019-08-07A2	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_450m_r3	HA	BLI2_20190807_225221	8	8	--	--	X	X	X	--	NW	KS		
Saipan_OC_20190808_203830	HA	2019-08-08A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	QC_20190808_203830	1	1	1	1	X	X	X	--	TH	HA		
Saipan1_BLO6_20190808_204621	HA	2019-08-08A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_450m_r3	HA	BLO6_20190808_204621	5	5	--	--	X	X	X	--	TH	HA		
Saipan1_BLO4_20190808_211223	HA	2019-08-08A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	BLO4_20190808_211223	5	5	5	5	HA	X	X	--	TH	HA		
Saipan1_BLO6_20190808_213626	HA	2019-08-08A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_450m_r3	HA	BLO6_20190808_213626	5	5	--	--	X	X	X	--	TH	HA		
Saipan1_BLO4_20190808_220208	HA	2019-08-08A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	BLO4_20190808_220208	1	1	1	1	HA	X	X	--	TH	HA		
Saipan1_BLO5_20190808_220912	HA	2019-08-08A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r2	HA	BLO5_20190808_220912	1	1	1	1	HA	X	X	--	TH	HA		
Saipan_OC_20190809_201734	HA	2019-08-09A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_500m_r1	HA	QC_20190809_201734	1	1	1	1	X	X	X	--	TH	HA		
Saipan1_BLO6_20190809_202317	HA	2019-08-09A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_450m_r3	HA	BLO6_20190809_202317	11	9	--	--	X	X	X	--	TH	HA		Do not process ID000, ID001
Pagani_BLO2_20190813_204752	HA	2019-08-13A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_450m_r3	HA	BLO2_20190813_204752	3	3	--	--	X	X	X	--	NW	HA		
Rota1_BLI2_20190813_220830	HA	2019-08-13A	Final	CAL_TSD_Survey_20190614_r0	Final	ProcessingSurvey_20190615_450m_r3	HA	BLI2_20190813_220830	1	1	--	--	X</							

PROJECT NAME: 079640 - CNMI - TopoBathy Lidar
 LOCATION: Saipan, CNMI
 AIRCRAFT: Reims-Cessna 406 - ZK-XLF
 SYSTEM: Hawkeye 4x

Mission	Copied to Disk	Nav Session	Nav Type	Calibration File	Cal Type	Processing Parameters	Check Processing Parameters	Processing Session	Number of FL	Process Topo	Process Shallow	Process Deep	Verify Derived Water Surface (Coverage and Height)	Review Submerged Data for any settings issues	Review Shallow to Deep, Shallow to Topo	Colorize in LES	Review FL SHP	Export Trajectories	Merge in FME	Comments
Pagan_BLO2_20200216_234632	AE	2020-02-16A	Final	CAL_TSD_Survey_20200212_r1	Final	ProcessingSurvey_20190615_450m_r3	AB	BL02_20200216_234632	5	5	-	-	X	X	X	-	-	-	-	BH X
Pagan_BLO2_20200217_001356	AE	2020-02-16A	Final	CAL_TSD_Survey_20200212_r1	Final	ProcessingSurvey_20190615_450m_r3	AB	BL02_20200217_001356	3	3	-	-	X	X	X	-	-	-	-	BH X
Rota_BLI2_20200219_005612	AE	2020-02-19A	Final	CAL_TSD_Survey_20200212_r1	Final	ProcessingSurvey_20190615_450m_r3	AB	BL12_20200219_005612	5	4	-	-	X	X	X	-	-	-	-	BH X
Pagan_BLO2_20200220_003245	AE	2020-02-19B	Final	CAL_TSD_Survey_20200212_r1	Final	ProcessingSurvey_20190615_450m_r3	AB	BL02_20200220_003245	25	25	-	-	X	X	X	-	-	-	-	BH X
Pagan_BLO2_20200223_020322	AE	2020-02-23A	Final	CAL_TSD_Survey_20200212_r1	Final	ProcessingSurvey_20190615_450m_r3	AB	BL02_20200223_020322	7	7	-	-	X	X	X	-	-	-	-	BH X
Rota_BLI2_20200223_215310	AE	2020-02-23B	Final	CAL_TSD_Survey_20200212_r1	Final	ProcessingSurvey_20190615_450m_r3	AB	BL12_20200223_215310	2	2	-	-	X	X	X	-	-	-	-	BH X
Pagan_BLO2_20200227_000943	AE	2020-02-26A	Final	CAL_TSD_Survey_20200212_r1	Final	ProcessingSurvey_20190615_450m_r3	AB	BL02_20200227_000943	3	3	-	-	X	X	X	-	-	-	-	BH X
Pagan_BLO1_20200702_020426	AB	2020-07-02A	Final	CAL_TSD_Survey_20200619_r0	Final	ProcessingSurvey_20200326_400m_r0	BH	BL01_20200702_020426	2	2	2	2	X	X	X	-	-	-	-	MC MC
Pagan_BLO2_20200702_021423	AB	2020-07-02A	Final	CAL_TSD_Survey_20200619_r0	Final	ProcessingSurvey_20200326_400m_r0	BH	BL02_20200702_021423	4	4	-	-	X	X	X	-	-	-	-	MC MC
Rota_BLI2_20200705_001248	AB	2020-07-04A	Final	CAL_TSD_Survey_20200619_r0	Final	ProcessingSurvey_20200326_400m_r0	BH	BL12_20200705_001248	4	3	-	-	X	X	X	-	-	-	-	MC MC
Rota_BLI2_20200705_044217	AB	2020-07-05B	Final	CAL_TSD_Survey_20200619_r0	Final	ProcessingSurvey_20200326_400m_r0	BH	BL12_20200705_044217	1	1	-	-	X	X	X	-	-	-	-	MC MC
Rota_BLI2_20200711_225937	AB	2020-07-11B	Final	CAL_TSD_Survey_20200619_r0	Final	ProcessingSurvey_20200326_400m_r1	BH	BL12_20200711_225937	7	2	-	-	X	X	X	-	-	-	-	MC MC
						ProcessingSurvey_20200326_400m_r1	BH			3	-	-	X	X	X	-	-	-	-	MC MC
Rota_BLI2_20200711_232250	AB	2020-07-11B	Final	CAL_TSD_Survey_20200619_r0	Final	ProcessingSurvey_20200326_400m_r1	BH	BL12_20200711_232250	1	0	-	-	X	X	X	-	-	-	-	MC MC

SURVEY PROGRESS

PROJECT NAME: 079640 - CNMI - TopoBathy Lidar
LOCATION: Saipan, CNMI
AIRCRAFT: Reims-Cessna 406 - ZK-XLF
SYSTEM: Hawkeye 4x

MISSION ID: 079640 - CNMI **LINES:** 392
SURVEY BLOCKS: BL01 to BL12 **LINE KM:** 3,764

Flight	Engine Time	Air Time	Flown km %		Reflown km %		Comments
2019-07-04A							Pilot Transit to Saipan
2019-07-05A	5:27:00	5:00:00	487.3	12.9%	96.4	2.6%	BL03 (FdM), BL05 (Saipan)
2019-07-06A	1:05:00	0:45:00			16.1	0.4%	BL03 (FdM), BL05 (Saipan)
2019-07-06B	4:55:00	4:51:00	317.6	8.4%	13.4	0.4%	BL01, BL02 (Pagan)
2019-07-07A	5:37:00	5:14:00	234.2	6.2%	32.7	0.9%	BL01, BL02 (Pagan), BL04 (Saipan)
2019-07-08A	5:22:00	5:06:00	568.1	15.1%			BL04, BL05, BL06 (Saipan)
2019-07-09A							Weather
2019-07-10A							Weather
2019-07-11A	4:54:00	4:25:00	397.8	10.6%	62.1	1.6%	BL04, BL05, BL06 (Saipan), BL07 (Tinian)
2019-07-12A	0:47:00	0:35:00	59.8	1.6%	18.0	0.5%	BL06 (Saipan)
2019-07-12B	3:57:00	3:54:00	364.0	9.7%	46.7	1.2%	BL06 (Saipan), BL07, BL08 (Tinian), BL09, BL10 (Aguijan)
2019-07-13A	2:44:00	2:25:00	238.9	6.3%	44.7	1.2%	BL06 (Saipan)
2019-07-13B	2:07:00	2:04:00	102.7	2.7%	71.9	1.9%	BL08 (Tinian), BL11 (Rota)
2019-07-14A	2:38:00	2:04:00	106.3	2.8%	6.2	0.2%	BL11 (Rota)
2019-07-16A	1:00:00	0:39:00			85.3	2.3%	BL04, BL05 (Saipan)
2019-07-16B	1:21:00	0:59:00			96.7	2.6%	BL05 (Saipan)
2019-07-17A							Aircraft Maintenance, Weather
2019-07-18A	2:26:00	2:04:00			270.8	7.2%	BL05 (Saipan), BL07 (Tinian)
2019-07-20A	1:27:00	0:51:00			58.4	1.6%	BL04 (Saipan)
2019-07-20B	2:43:00	2:27:00			126.0	3.3%	BL05 (Saipan)
2019-07-21A	3:29:00	3:04:00			317.0	8.4%	BL04 (Saipan)
2019-07-22A	3:06:00	2:45:00	123.5	3.3%	23.5	0.6%	BL11 (Rota)
2019-07-22B	2:27:00	2:06:00			47.8	1.3%	BL06 (Saipan)
2019-07-22C	2:27:00	2:06:00	87.8	2.3%	55.8	1.5%	BL06 (Saipan)
2019-07-23A	1:55:00	1:32:00	11.3	0.3%	104.0	2.8%	BL04 (Saipan)
2019-07-23B							Weather / Rain and Low Clouds
2019-07-24A	5:59:00	5:24:00	371.6	9.9%	54.2	1.4%	BL04-BL06 (Saipan), BL11, BL12 (Rota)
2019-07-25A	3:33:00	2:39:00	134.3	3.6%	17.5	0.5%	BL08, (Tinian), BL12 (Rota)
2019-07-26A	2:44:00	2:10:00			119.6	3.2%	BL03 (FdM)
2019-07-27A	3:09:00	2:50:00	128.7	3.4%	38.1	1.0%	BL06 (Saipan), BL08 (Tinian), BL12 (Rota)
2019-07-28A	5:57:00	5:35:00			331.5	8.8%	BL01, BL02 (Saipan), BL08 (Tinian)
2019-07-29A							Weather / Rain and Low Clouds
2019-07-30A	5:23:00	5:07:00			262.4	7.0%	BL01, BL02 (Pagan)
2019-07-31A	4:00:00	3:21:00			187.6	5.0%	BL04, BL06, (Saipan), BL07, BL08 (Tinian), BL09, BL10 (Aguijan), BL11, BL12 (Rota)
2019-08-01A							Weather
2019-08-02A	3:46:00	3:23:00			82.3	2.2%	BL01, BL02 (Pagan)
2019-08-03A	4:20:00	3:57:00			98.6	2.6%	BL02 (Pagan)
2019-08-04A							Weather / Rain and High Winds
2019-08-05A							Weather / Rain and High Winds
2019-08-06A							Weather / Rain and High Winds
2019-08-07A	3:14:00	2:54:00			118.0	3.1%	BL04, BL05, BL06 (Saipan), BL12 (Rota)
2019-08-08A	2:47:00	2:28:00			111.5	3.0%	BL04, BL05, BL06 (Saipan)

SURVEY PROGRESS

PROJECT NAME: 079640 - CNMI - TopoBathy Lidar
LOCATION: Saipan, CNMI
AIRCRAFT: Reims-Cessna 406 - ZK-XLF
SYSTEM: Hawkeye 4x

MISSION ID: 079640 - CNMI **LINES:** 392
SURVEY BLOCKS: BL01 to BL12 **LINE KM:** 3,764

Flight	Engine Time	Air Time	Flown km %		Reflown km %		Comments
2019-08-09A	1:11:00	0:51:00			45.8	1.2%	BL06 (Saipan)
2019-08-10A							Weather / Low Clouds
2019-08-11A							Weather / Low Clouds
2019-08-12A							Weather / Low Clouds
2019-08-13A	3:02:00	2:44:00			12.3	0.3%	BL02 (Pagan), BL12 (Rota)
2019-08-14A	1:04:00	0:43:00			22.3	0.6%	BL05 (Saipan)
2019-08-14B	0:42:00	0:23:00			15.4	0.4%	BL05 (Saipan)
2019-08-15A							Weather / Low Clouds
2019-08-16A							Weather / Low Clouds
2019-08-17A							Weather / Low Clouds
2019-08-18A							Weather / Low Clouds
2019-08-20A	3:30:00	3:04:00			19.0	0.5%	BL02 (Pagan)
2019-08-21A	1:25:00	0:53:00			36.7	1.0%	BL04, BL05 (Saipan)
2019-08-25A	2:15:00	1:46:00			178.2	4.7%	BL04, BL05 (Saipan)
2020-02-12A	1:17:00	0:48:00					
2020-02-15B	5:04:00	4:36:00			86.8	2.3%	BL02 (Pagan)
2020-02-16A	4:04:00	3:39:00			32.6	0.9%	BL02 (Pagan)
2020-02-19A	2:03:00	1:38:00	5.7	0.2%	17.6	0.5%	BL12 (Rota)
2020-02-19B	5:23:00	4:54:00	55.9	1.5%	4.0	0.1%	BL02 (Pagan), BL12 (Rota)
2020-02-20A	1:10:00	0:38:00					BL12 (Rota)
2020-02-21A	0:57:00	0:38:00					
2020-02-21B	0:55:00	0:36:00					
2020-02-22A	1:07:00	0:39:00					
2020-02-23A	4:16:00	3:51:00			15.6	0.4%	BL02 (Pagan)
2020-02-23A	4:16:00	3:51:00	2.0	0.1%	15.6	0.4%	BL02 (Pagan)
2020-02-23B	1:18:00	0:55:00	6.6	0.2%	6.2	0.2%	BL12 (Rota)
2020-02-23C	2:23:00	2:02:00			217.7	5.8%	Cal
2020-02-26A	3:48:00	3:28:00	2.0	0.1%	4.0	0.1%	BL02 (Pagan)
2020-06-19A	2:02:00	1:44:00			66.0	1.8%	Cal
2020-07-02A	4:11:00	3:54:00			26.7	0.7%	BL01, BL02 (Pagan)
2020-07-04A	1:25:00	1:04:00					BL12 (Rota)
2020-07-05A	0:46:00	0:21:00			10.5	0.3%	Cal
2020-07-05B	1:02:00	0:45:00					BL12 (Rota)
2020-07-11A	2:08:00	1:24:00			238.8	6.3%	Cal
2020-07-11B	1:17:00	0:57:00	21.7	0.6%	238.8	6.3%	BL12 (Rota)
2020-07-14A	2:07:00	1:15:00			231.3	6.1%	Cal
TOTAL	172:54:00	148:45:00	3828	101.7%	4556	121.0%	

CHIROPTERA LEVER ARMS

PROJECT NAME: 079640 - CNMI - TopoBathy Lidar
LOCATION: Saipan, CNMI
AIRCRAFT: Reims-Cessna 406 - ZK-XLF
SYSTEM: Hawkeye 4x

Axis	Ref to IMU In the system	Ref to GNSS In the system	IMU to Gimble Inertial Explorer	IMU to GNSS Inertial Explorer	Gimble to GNSS Inertial Explorer	Differences from Previous	Differences from Start
Start Values						Flight Pro	Inertial Explorer
X	-0.003	0.006	0.005	0.018	0.013	+ tve forward	+ tve stbd
Y	-0.006	0.000	0.003	0.117	0.114	+ tve stbd	+ tve forward
Z	-0.296	-1.305	-0.296	1.004	1.300	+ tve down	+ tve up
Lever Arm Estimate in Inertial Explorer - Test 1							
X		0.275	0.005	-0.014	-0.019	-0.032	-0.032
Y		-0.019	0.003	0.278	0.275	0.161	0.161
Z		-1.266	-0.296	0.970	1.266	-0.034	-0.034
Lever Arm Estimate in Inertial Explorer - Test 2							
X		0.384	0.005	-0.034	-0.039	-0.020	-0.052
Y		-0.039	0.003	0.387	0.384	0.109	0.270
Z		-1.252	-0.296	0.956	1.252	-0.014	-0.048
Lever Arm Estimate in Inertial Explorer - Test 3							
X		0.456	0.005	-0.045	-0.050	-0.011	-0.063
Y		-0.050	0.003	0.459	0.456	0.072	0.342
Z		-1.243	-0.296	0.947	1.243	-0.009	-0.057
Lever Arm Estimate in Inertial Explorer - Test 4							
X		0.504	0.005	-0.052	-0.057	-0.007	-0.070
Y		-0.057	0.003	0.507	0.504	0.048	0.390
Z		-1.237	-0.296	0.941	1.237	-0.006	-0.063
Lever Arm Estimate in Inertial Explorer - Test 5							
X		0.536	0.005	-0.056	-0.061	-0.004	-0.074
Y		-0.061	0.003	0.539	0.536	0.032	0.422
Z		-1.233	-0.296	0.937	1.233	-0.004	-0.067
Lever Arm Estimate in Inertial Explorer - Test 6							
X		0.557	0.005	-0.058	-0.063	-0.002	-0.076
Y		-0.063	0.003	0.560	0.557	0.021	0.443
Z		-1.231	-0.296	0.935	1.231	-0.002	-0.069
Lever Arm Estimate in Inertial Explorer - Test 7							
X		0.571	0.005	-0.059	-0.064	-0.001	-0.077
Y		-0.064	0.003	0.574	0.571	0.014	0.457
Z		-1.229	-0.296	0.933	1.229	-0.002	-0.071
Lever Arm Estimate in Inertial Explorer - Test 8							

CHIROPTERA LEVER ARMS

PROJECT NAME: 079640 - CNMI - TopoBathy Lidar
LOCATION: Saipan, CNMI
AIRCRAFT: Reims-Cessna 406 - ZK-XLF
SYSTEM: Hawkeye 4x

Axis	Ref to IMU In the system	Ref to GNSS In the system	IMU to Gimble Inertial Explorer	IMU to GNSS Inertial Explorer	Gimble to GNSS Inertial Explorer	Differences from Previous	Differences from Start
X		0.580	0.005	-0.060	-0.065	-0.001	-0.078
Y		-0.065	0.003	0.583	0.580	0.009	0.466
Z		-1.228	-0.296	0.932	1.228	-0.001	-0.072
Lever Arm Estimate in Inertial Explorer - Test 9							
X		0.586	0.005	-0.061	-0.066	-0.001	-0.079
Y		-0.066	0.003	0.589	0.586	0.006	0.472
Z		-1.227	-0.296	0.931	1.227	-0.001	-0.073
Lever Arm Estimate in Inertial Explorer - Test 10							
X		0.590	0.005	-0.061	-0.066	0.000	-0.079
Y		-0.066	0.003	0.593	0.590	0.004	0.476
Z		-1.226	-0.296	0.930	1.226	-0.001	-0.074
Lever Arm Estimate in Inertial Explorer - Test 11							
X		0.593	0.005	-0.061	-0.066	0.000	-0.079
Y		-0.066	0.003	0.596	0.593	0.003	0.479
Z		-1.226	-0.296	0.930	1.226	0.000	-0.074
Lever Arm Estimate in Inertial Explorer - Test 12							
X		0.595	0.005	-0.061	-0.066	0.000	-0.079
Y		-0.066	0.003	0.598	0.595	0.002	0.481
Z		-1.226	-0.296	0.930	1.226	0.000	-0.074
Lever Arm Estimate in Inertial Explorer - Test 13							
X		0.596	0.005	-0.061	-0.066	0.000	-0.079
Y		-0.066	0.003	0.599	0.596	0.001	0.482
Z		-1.226	-0.296	0.930	1.226	0.000	-0.074
Lever Arm Estimate in Inertial Explorer - Test 14							
X		0.597	0.005	-0.061	-0.066	0.000	-0.079
Y		-0.066	0.003	0.600	0.597	0.001	0.483
Z		-1.226	-0.296	0.930	1.226	0.000	-0.074
Lever Arm Estimate in Inertial Explorer - Test 15							
X	-0.003	0.597	0.005	-0.061	-0.066	0.000	-0.079
Y	-0.006	-0.066	0.003	0.600	0.597	0.000	0.483
Z	-0.296	-1.226	-0.296	0.930	1.226	0.000	-0.074

DEEP CHANNEL LEVER ARMS

PROJECT NAME: 079640 - CNMI - TopoBathy Lidar
LOCATION: Saipan, CNMI
AIRCRAFT: Reims-Cessna 406 - ZK-XLF
SYSTEM: Hawkeye 4x

Axis	Ref to IMU In the system	Ref to GNSS In the system	IMU to Gimble Inertial Explorer	IMU to GNSS Inertial Explorer	Gimble to GNSS Inertial Explorer	Differences from Previous	Differences from Start
Start Values						Flight Pro	Inertial Explorer
X				0.300	0.300	+ tve forward	+ tve stbd
Y				0.300	0.300	+ tve stbd	+ tve forward
Z				0.300	0.300	+ tve down	+ tve up
Lever Arm Estimate in Inertial Explorer - Test 1							
X		0.670		0.087	0.087	-0.213	-0.213
Y		0.087		0.670	0.670	0.370	0.370
Z		-0.874		0.874	0.874	0.574	0.574
Lever Arm Estimate in Inertial Explorer - Test 2							
X		0.889		-0.018	-0.018	-0.105	-0.318
Y		-0.018		0.889	0.889	0.219	0.589
Z		-0.873		0.873	0.873	-0.001	0.573
Lever Arm Estimate in Inertial Explorer - Test 3							
X		1.027		-0.076	-0.076	-0.058	-0.376
Y		-0.076		1.027	1.027	0.138	0.727
Z		-0.855		0.855	0.855	-0.018	0.555
Lever Arm Estimate in Inertial Explorer - Test 4							
X		1.115		-0.107	-0.107	-0.031	-0.407
Y		-0.107		1.115	1.115	0.088	0.815
Z		-0.842		0.842	0.842	-0.013	0.542
Lever Arm Estimate in Inertial Explorer - Test 5							
X		1.171		-0.123	-0.123	-0.016	-0.423
Y		-0.123		1.171	1.171	0.056	0.871
Z		-0.833		0.833	0.833	-0.009	0.533
Lever Arm Estimate in Inertial Explorer - Test 6							
X		1.207		-0.131	-0.131	-0.008	-0.431
Y		-0.131		1.207	1.207	0.036	0.907
Z		-0.828		0.828	0.828	-0.005	0.528
Lever Arm Estimate in Inertial Explorer - Test 7							
X		1.230		-0.136	-0.136	-0.005	-0.436
Y		-0.136		1.230	1.230	0.023	0.930
Z		-0.825		0.825	0.825	-0.003	0.525
Lever Arm Estimate in Inertial Explorer - Test 8							

DEEP CHANNEL LEVER ARMS

PROJECT NAME: 079640 - CNMI - TopoBathy Lidar
LOCATION: Saipan, CNMI
AIRCRAFT: Reims-Cessna 406 - ZK-XLF
SYSTEM: Hawkeye 4x

Axis	Ref to IMU In the system	Ref to GNSS In the system	IMU to Gimble Inertial Explorer	IMU to GNSS Inertial Explorer	Gimble to GNSS Inertial Explorer	Differences from Previous	Differences from Start
X		1.245		-0.138	-0.138	-0.002	-0.438
Y		-0.138		1.245	1.245	0.015	0.945
Z		-0.822		0.822	0.822	-0.003	0.522
Lever Arm Estimate in Inertial Explorer - Test 9							
X		1.254		-0.139	-0.139	-0.001	-0.439
Y		-0.139		1.254	1.254	0.009	0.954
Z		-0.821		0.821	0.821	-0.001	0.521
Lever Arm Estimate in Inertial Explorer - Test 10							
X		1.260		-0.140	-0.140	-0.001	-0.440
Y		-0.140		1.260	1.260	0.006	0.960
Z		-0.820		0.820	0.820	-0.001	0.520
Lever Arm Estimate in Inertial Explorer - Test 11							
X		1.264		-0.140	-0.140	0.000	-0.440
Y		-0.140		1.264	1.264	0.004	0.964
Z		-0.820		0.820	0.820	0.000	0.520
Lever Arm Estimate in Inertial Explorer - Test 12							
X		1.266		-0.140	-0.140	0.000	-0.440
Y		-0.140		1.266	1.266	0.002	0.966
Z		-0.819		0.819	0.819	-0.001	0.519
Lever Arm Estimate in Inertial Explorer - Test 13							
X		1.267		-0.140	-0.140	0.000	-0.440
Y		-0.140		1.267	1.267	0.001	0.967
Z		-0.819		0.819	0.819	0.000	0.519
Lever Arm Estimate in Inertial Explorer - Test 14							
X		1.268		-0.140	-0.140	0.000	-0.440
Y		-0.140		1.268	1.268	0.001	0.968
Z		-0.819		0.819	0.819	0.000	0.519
Lever Arm Estimate in Inertial Explorer - Test 15							
X		1.269		-0.140	-0.140	0.000	-0.440
Y		-0.140		1.269	1.269	0.001	0.969
Z		-0.819		0.819	0.819	0.000	0.519
Lever Arm Estimate in Inertial Explorer - Test 16							
X		1.269		-0.140	-0.140	0.000	-0.440

DEEP CHANNEL LEVER ARMS

PROJECT NAME: 079640 - CNMI - TopoBathy Lidar
LOCATION: Saipan, CNMI
AIRCRAFT: Reims-Cessna 406 - ZK-XLF
SYSTEM: Hawkeye 4x

Axis	Ref to IMU In the system	Ref to GNSS In the system	IMU to Gimble Inertial Explorer	IMU to GNSS Inertial Explorer	Gimble to GNSS Inertial Explorer	Differences from Previous	Differences from Start
Y		-0.140		1.269	1.269	0.000	0.969
Z		-0.819		0.819	0.819	0.000	0.519

GNSS BASE CALCULATIONS

PROJECT NAME: 079640 - CNMI - TopoBathy Lidar
LOCATION: Saipan, CNMI
AIRCRAFT: Reims-Cessna 406 - ZK-XLF
SYSTEM: Hawkeye 4x

File	Antenna Height (m)	Antenna Type	Ephemeris	Date	Time		Latitude			Longitude			Height (m)	RMS (m)	Comments		
					Start	Stop	Deg	Min	Sec	Deg	Min	Sec					
Station: SPN1																	
SPN1_20190724A.19o	2.000	R10	Precise	2019-07-24	19:00	2:00	N15	7	12.38664	E145	43	15.98851	116.802	0.037	NAD83-MA11 (Epoch 2010.0)		
SPN1_20190728A.19o	2.000	R10	Precise	2019-07-28	19:00	2:00	N15	7	12.38794	E145	42	15.98797	116.725	0.030	NAD83-MA11 (Epoch 2010.0)		
SPN1_20190730A.19o	2.000	R10	Precise	2019-07-30	19:00	1:00	N15	7	12.38880	E145	43	15.98786	116.742	0.014	NAD83-MA11 (Epoch 2010.0)		
Average:							N15	07	12.38779	E145	43	15.98811	116.756				
Standard Deviation:									0.00089				0.00028	0.033			
Station: SPN2																	
SPN2_20200223A.19o	1.825	R10	TrimbleRTX	2020-02-23	23:28	2:17	N15	7	12.35969	E145	43	15.95277	116.789	0.014	NAD83-MA11 (Epoch 2010.0)		
Average:							N15	07	12.35969	E145	43	15.95277	116.789				
Standard Deviation:									0.00000				0.00000	0.000			
Station: SPN3																	
SPN3_20200618A.T02	1.800	R10	TrimbleRTX	2020-06-18	22:55	2:11	N15	7	12.29866	E145	43	16.16967	116.815	0.017	NAD83-MA11 (Epoch 2010.0)		
SPN3_20200626A.T02	1.800	R10	TrimbleRTX	2020-06-26	1:09	6:36	N15	7	12.29763	E145	43	16.17009	116.796	0.013	NAD83-MA11 (Epoch 2010.0)		
Average:							N15	07	12.29815	E145	43	16.16988	116.806				
Standard Deviation:									0.00052				0.00021	0.009			

GNSS BASE SUMMARY

PROJECT NAME: 079640 - CNMI - TopoBathy Lidar
LOCATION: Saipan, CNMI
AIRCRAFT: Reims-Cessna 406 - ZK-XLF
SYSTEM: Hawkeye 4x

PID	Project Name	Latitude			Longitude			Height (m)	XY Datum	Z Datum	Source	Comments
		Deg	Min	Sec	Deg	Min	Sec					
	SPN1	N15	07	12.38779	E145	43	15.98811	116.756	NAD83-MA11 (Epoch 2010.0)	NAD83-MA11 (Epoch 2010.0)	OPUS	
	SPN2	N15	07	12.35969	E145	43	15.95277	116.789	NAD83-MA11 (Epoch 2010.0)	NAD83-MA11 (Epoch 2010.0)	RTX	
	SPN3	N15	07	12.29815	E145	43	16.16988	116.806	NAD83-MA11 (Epoch 2010.0)	NAD83-MA11 (Epoch 2010.0)	RTX	

TRAJECTORY PROCESSING

PROJECT NAME: 079640 - CNMI - TopoBathy Lidar
LOCATION: Saipan, CNMI
AIRCRAFT: Reims-Cessna 406 - ZK-XLF
SYSTEM: Hawkeye 4x

Project Name	Download Airborne Data	Create IE Project Directory	Copy Data to IE Project /Raw	Run Project Wizard	Base Station			Check Base Coordinate & Datum	Check Lever Arms	Process Time Window		Process TC	Review QC Plots	Separation			Solution Status	Comments
					Station ID	Receiver Type	Antenna (ARP) Height (m)			Start Time (GPS Week Time)	End Time (GPS Week Time)			East RMS (m)	North RMS (m)	Up RMS (m)		
2019-07-05A1_CH4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	504097	522685	CG	CG	0.012	0.017	0.069	Final	BL03
2019-07-05A1_HE4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	504015	522741	CG	CG	0.013	0.017	0.062	Final	
2019-07-05A2_CH4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	510176	522685	CG	CG	0.006	0.004	0.049	Final	BL05
2019-07-05A2_HE4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	510177	522741	CG	CG	0.010	0.008	0.050	Final	
2019-07-06A_CH4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	589779	592320	CG	CG	0.006	0.008	0.013	Final	BL03
2019-07-06A_HE4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	589425	592899	CG	CG	0.009	0.008	0.019	Final	
2019-07-06B_CH4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	593506	5923	CG	CG	0.012	0.021	0.051	Final	BL01, BL02
2019-07-06B_HE4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	593445	5950	CG	CG	0.012	0.022	0.058	Final	
2019-07-07A1_CH4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	68125	87692	CG	CG	0.010	0.010	0.069	Final	BL01, BL02
2019-07-07A1_HE4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	68061	87724	CG	CG	0.010	0.010	0.078	Final	
2019-07-07A2_CH4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	85200	87692	CG	CG	0.012	0.013	0.086	Final	BL04
2019-07-07A2_HE4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	85201	87724	CG	CG	0.013	0.013	0.086	Final	
2019-07-08A_CH4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	157024	175937	CG	CG	0.011	0.008	0.036	Final	BL04, BL05, BL06
2019-07-08A_HE4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	156962	176002	CG	CG	0.010	0.007	0.037	Final	
2019-07-11A_CH4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	418042	433885	CG	CG	0.011	0.007	0.037	Final	BL04, BL05, BL06, BL07
2019-07-11A_HE4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	417979	433888	CG	CG	0.008	0.007	0.032	Final	
2019-07-12A_CH4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	503218	506110	CG	CG	0.006	0.005	0.021	Final	BL06
2019-07-12A_HE4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	503011	519790	CG	CG	0.009	0.010	0.051	Final	
2019-07-12B1_CH4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	506614	519757	CG	CG	0.009	0.014	0.052	Final	BL06, BL07, BL08
2019-07-12B1_HE4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	503011	519790	CG	CG	0.009	0.010	0.021	Final	
2019-07-12B2_CH4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	499408	519823	CG	CG	0.010	0.007	0.047	Final	BL09, BL10
2019-07-12B2_HE4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	495805	519856	CG	CG	0.086	0.032	0.084	Final	
2019-07-13A_CH4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	589684	589705	CG	CG	0.006	0.007	0.021	Final	BL06
2019-07-13A_HE4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	589490	1995	CG	CG	0.049	0.070	0.096	Final	
2019-07-13B1_CH4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	600235	1818	CG	CG	0.132	0.075	0.135	Final	BL08
2019-07-13B1_HE4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	589490	1995	CG	CG	0.049	0.070	0.096	Final	
2019-07-13B2_CH4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	600235	602232	CG	CG	0.015	0.006	0.050	Final	BL11

TRAJECTORY PROCESSING

PROJECT NAME: 079640 - CNMI - TopoBathy Lidar
LOCATION: Saipan, CNMI
AIRCRAFT: Reims-Cessna 406 - ZK-XLF
SYSTEM: Hawkeye 4x

Project Name	Download Airborne Data	Create IE Project Directory	Copy Data to IE Project /Raw	Run Project Wizard	Base Station			Check Base Coordinate & Datum	Check Lever Arms	Process Time Window		Process TC	Review QC Plots	Separation			Solution Status	Comments
					Station ID	Receiver Type	Antenna (ARP) Height (m)			Start Time (GPS Week Time)	End Time (GPS Week Time)			East RMS (m)	North RMS (m)	Up RMS (m)		
2019-07-13B2_HE4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	599709	602232	CG	CG	0.096	0.060	0.160	Final	
2019-07-14A_CH4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	84709	93733	CG	CG	0.010	0.004	0.090	Final	BL11
2019-07-14A_HE4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	84644	93877	CG	CG	0.099	0.056	0.108	Final	
2019-07-16A_CH4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	179509	182507	CG	CG	0.006	0.005	0.022	Final	BL05
2019-07-16A_HE4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	179433	182534	CG	CG	0.006	0.004	0.022	Final	
2019-07-16B_CH4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	245283	248199	CG	CG	0.009	0.006	0.032	Final	BL05
2019-07-16B_HE4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	243735	248335	CG	CG	0.008	0.007	0.032	Final	
2019-07-18A_CH4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	418750	426948	CG	CG	0.011	0.010	0.028	Final	BL05, BL07
2019-07-18A_HE4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	418766	426978	CG	CG	0.010	0.009	0.028	Final	
2019-07-20A_CH4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	532882	537480	CG	CG	0.012	0.025	0.020	Final	BL04
2019-07-20A_HE4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	532785	537462	CG	CG	0.011	0.025	0.020	Final	
2019-07-20B_CH4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	590524	598187	CG	CG	0.006	0.007	0.023	Final	BL05
2019-07-20B_HE4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	589999	599754	CG	CG	0.007	0.006	0.032	Final	
2019-07-21A_CH4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	72415	84518	CG	CG	0.006	0.006	0.042	Final	BL04
2019-07-21A_HE4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	72347	74575	CG	CG	0.007	0.006	0.041	Final	
2019-07-22A_CH4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	95326	106034	CG	CG	0.011	0.005	0.034	Final	BL11
2019-07-22A_HE4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	95259	106066	CG	CG	0.011	0.006	0.034	Final	
2019-07-22B_CH4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	157258	159822	CG	CG	0.013	0.007	0.048	Final	BL06
2019-07-22B_HE4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	157176	165644	CG	CG	0.016	0.014	0.027	Final	
2019-07-22C_CH4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	160233	165595	CG	CG	0.009	0.009	0.016	Final	BL06
2019-07-22C_HE4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	157176	165644	CG	CG	0.016	0.014	0.027	Final	
2019-07-23A_CH4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	181402	186451	CG	CG	0.009	0.007	0.009	Final	BL04
2019-07-23A_HE4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	181337	187633	CG	CG	0.006	0.009	0.023	Final	
2019-07-24A1_CH4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	333838	353981	CG	CG	0.010	0.010	0.052	Final	BL04, BL05, BL06
2019-07-24A1_HE4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	333766	354024	CG	CG	0.010	0.010	0.065	Final	
2019-07-24A2_CH4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	338619	352001	CG	CG	0.026	0.021	0.236	Final	BL11, BL12
2019-07-24A2_HE4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	338619	352001	CG	CG	0.030	0.012	0.232	Final	

TRAJECTORY PROCESSING

PROJECT NAME: 079640 - CNMI - TopoBathy Lidar
LOCATION: Saipan, CNMI
AIRCRAFT: Reims-Cessna 406 - ZK-XLF
SYSTEM: Hawkeye 4x

Project Name	Download Airborne Data	Create IE Project Directory	Copy Data to IE Project /Raw	Run Project Wizard	Base Station			Check Base Coordinate & Datum	Check Lever Arms	Process Time Window		Process TC	Review QC Plots	Separation			Solution Status	Comments
					Station ID	Receiver Type	Antenna (ARP) Height (m)			Start Time (GPS Week Time)	End Time (GPS Week Time)			East RMS (m)	North RMS (m)	Up RMS (m)		
2019-07-25A1_CH4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	417535	428129	CG	CG	0.012	0.020	0.047	Final	BL08
2019-07-25A1_HE4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	417464	428179	CG	CG	0.012	0.022	0.045	Final	
2019-07-25A2_CH4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	417465	426275	CG	CG	0.014	0.022	0.030	Final	BL12
2019-07-25A2_HE4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	417465	426275	CG	CG	0.001	0.026	0.033	Final	
2019-07-26A_CH4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	502707	511344	CG	CG	0.007	0.006	0.033	Final	BL03
2019-07-26A_HE4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	502458	511329	CG	CG	0.004	0.005	0.036	Final	
2019-07-27A1_CH4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	590137	600975	CG	CG	0.007	0.008	0.025	Final	BL06, BL08
2019-07-27A1_HE4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	589966	600993	CG	CG	0.005	0.005	0.028	Final	
2019-07-27A2_CH4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	596706	599321	CG	CG	0.002	0.003	0.021	Final	BL12
2019-07-27A2_HE4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	596706	599321	CG	CG	0.002	0.003	0.021	Final	
2019-07-28A1_CH4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	71587	92390	CG	CG	0.026	0.025	0.085	Final	BL08
2019-07-28A1_HE4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	71301	92367	CG	CG	0.029	0.025	0.096	Final	
2019-07-28A2_CH4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	75560	89971	CG	CG	0.033	0.015	0.186	Final	BL01, BL02
2019-07-28A2_HE4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	75560	89971	CG	CG	0.031	0.016	0.171	Final	
2019-07-30A_CH4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	243682	262571	CG	CG	0.011	0.008	0.101	Final	BL01, BL02
2019-07-30A_HE4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	243605	262622	CG	CG	0.011	0.011	0.106	Final	
2019-07-31A1_CH4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	331321	344027	CG	CG	0.007	0.011	0.050	Final	BL04, BL06, BL07, BL08
2019-07-31A1_HE4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	331236	344073	CG	CG	0.008	0.011	0.052	Final	
2019-07-31A2_CH4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	338582	343356	CG	CG	0.003	0.004	0.022	Final	BL09, BL10, BL11, BL12
2019-07-31A2_HE4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	338582	343356	CG	CG	0.004	0.005	0.018	Final	
2019-08-02A_CH4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	502651	515761	CG	CG	0.005	0.010	0.070	Final	BL01, BL02
2019-08-02A_HE4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	502582	515797	CG	CG	0.009	0.018	0.075	Final	
2019-08-03A_CH4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	585823	600911	CG	CG	0.008	0.015	0.062	Final	BL02
2019-08-03A_HE4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	585714	600959	CG	CG	0.007	0.018	0.069	Final	
2019-08-07A1_CH4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	334276	345470	CG	CG	0.008	0.009	0.073	Final	BL04, BL05, BL06
2019-08-07A1_HE4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	334208	345520	CG	CG	0.011	0.013	0.083	Final	
2019-08-07A2_CH4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	341219	344073	CG	CG	0.110	0.093	0.140	Final	BL12

TRAJECTORY PROCESSING

PROJECT NAME: 079640 - CNMI - TopoBathy Lidar
LOCATION: Saipan, CNMI
AIRCRAFT: Reims-Cessna 406 - ZK-XLF
SYSTEM: Hawkeye 4x

Project Name	Download Airborne Data	Create IE Project Directory	Copy Data to IE Project /Raw	Run Project Wizard	Base Station			Check Base Coordinate & Datum	Check Lever Arms	Process Time Window		Process TC	Review QC Plots	Separation			Solution Status	Comments
					Station ID	Receiver Type	Antenna (ARP) Height (m)			Start Time (GPS Week Time)	End Time (GPS Week Time)			East RMS (m)	North RMS (m)	Up RMS (m)		
2019-08-07A2_HE4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	341219	344073	CG	CG	0.111	0.094	0.150	Final	
2019-08-08A_CH4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	419221	428787	CG	CG	0.013	0.008	0.055	Final	BL04, BL05, BL06
2019-08-08A_HE4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	419157	428830	CG	CG	0.014	0.008	0.051	Final	
2019-08-09A_CH4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	504274	508124	CG	CG	0.003	0.006	0.016	Final	BL06
2019-08-09A_HE4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	504200	508174	CG	CG	0.003	0.006	0.012	Final	
2019-08-13A_CH4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	243763	254318	CG	CG	0.004	0.006	0.032	Final	BL02, BL12
2019-08-13A_HE4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	243692	254360	CG	CG	0.004	0.005	0.032	Final	
2019-08-14A_CH4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	331558	334942	CG	CG	0.011	0.010	0.058	Final	BL05
2019-08-14A_HE4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	331428	334998	CG	CG	0.010	0.009	0.043	Final	
2019-08-14B_CH4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	337909	339933	CG	CG	0.004	0.013	0.035	Final	BL05
2019-08-14B_HE4x	CG	CG	CG	CG	SPN1	R10	2.000	CG	CG	337840	339951	CG	CG	0.007	0.012	0.048	Final	
2019-08-20A_CH4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	187240	199023	CG	CG	0.007	0.004	0.074	Final	BL02
2019-08-20A_HE4x	CG	CG	CG	CG	PPP	PPP	PPP	CG	CG	187180	199098	CG	CG	0.008	0.005	0.078	Final	
2019-08-21A_CH4x	CG	CG	CG	CG	SPN1	R10	2.100	CG	CG	331555	335698	CG	CG	0.004	0.006	0.049	Final	BL04, BL05
2019-08-21A_HE4x	CG	CG	CG	CG	SPN1	R10	2.100	CG	CG	331490	335856	CG	CG	0.005	0.060	0.050	Final	
2020-02-15B_CH4X	AE	AE	AE	AE	PPP	PPP	PPP	AE	AE	595632	8572	AE	AE	0.011	0.007	0.053	Final	BL02
2020-02-15B_HE4X	AE	AE	AE	AE	PPP	PPP	PPP	AE	AE	595549	8645	AE	AE	0.016	0.011	0.055	Final	
2020-02-16A_CH4x	AE	AE	AE	AE	PPP	PPP	PPP	AE	AE	79245	93415	AE	AE	0.011	0.016	0.057	Final	BL02
2020-02-16A_HE4x	AE	AE	AE	AE	PPP	PPP	PPP	AE	AE	79158	93465	AE	AE	0.009	0.015	0.060	Final	
2020-02-19A_CH4x	AE	AE	AE	AE	PPP	PPP	PPP	AE	AE	260667	267559	AE	AE	0.018	0.013	0.077	Final	BL12
2020-02-19A_HE4x	AE	AE	AE	AE	PPP	PPP	PPP	AE	AE	260551	267613	AE	AE	0.017	0.014	0.081	Final	
2020-02-19B_CH4x	AE	AE	AE	AE	PPP	PPP	PPP	AE	AE	340458	359306	AE	AE	0.012	0.008	0.082	Final	BL02
2020-02-19B_HE4x	AE	AE	AE	AE	PPP	PPP	PPP	AE	AE	340387	359361	AE	AE	0.015	0.007	0.095	Final	
2020-02-23A_CH4X	AE	AE	AE	AE	PPP	PPP	PPP	AE	AE	882	15740	AE	AE	0.009	0.008	0.055	Final	BL02, Rapid Ephemeris
2020-02-23A_HE4X	AE	AE	AE	AE	PPP	PPP	PPP	AE	AE	810	15787	AE	AE	0.009	0.009	0.059	Final	
2020-02-23B_CH4X	AE	AE	AE	AE	PPP	PPP	PPP	AE	AE	76938	81128	AE	AE	0.009	0.007	0.022	Final	BL02, Rapid Ephemeris
2020-02-23B_HE4X	AE	AE	AE	AE	PPP	PPP	PPP	AE	AE	76831	81180	AE	AE	0.008	0.009	0.021	Final	

TRAJECTORY PROCESSING

PROJECT NAME: 079640 - CNMI - TopoBathy Lidar
LOCATION: Saipan, CNMI
AIRCRAFT: Reims-Cessna 406 - ZK-XLF
SYSTEM: Hawkeye 4x

Project Name	Download Airborne Data	Create IE Project Directory	Copy Data to IE Project /Raw	Run Project Wizard	Base Station				Process Time Window		Process TC	Review QC Plots	Separation			Solution Status	Comments	
					Station ID	Receiver Type	Antenna (ARP) Height (m)	Check Base Coordinate & Datum	Check Lever Arms	Start Time (GPS Week Time)			End Time (GPS Week Time)	East RMS (m)	North RMS (m)			Up RMS (m)
2020-02-23C_CH4X	AE	AE	AE	AE	SPN2	R10	1.825	AE	AE	85530	93623	AE	AE	0.006	0.010	0.027	Final	Saipan Calibration (processed without final base coordinates)
2020-02-23C_HE4X	AE	AE	AE	AE	SPN2	R10	1.825	AE	AE	85451	93673	AE	AE	0.007	0.009	0.028	Final	
2020-02-26A_CH4X	AE	AE	AE	AE	PPP	PPP	PPP	AE	AE	339318	352378	AE	AE	0.010	0.005	0.047	Final	BL02, Ultra-Rapid Ephemeris
2020-02-26A_HE4X	AE	AE	AE	AE	PPP	PPP	PPP	AE	AE	339089	352427	AE	AE	0.011	0.006	0.047	Final	
2020-06-19A_CH4x	BH	BH	BH	BH	SPN3	R10	1.800	BH	BH			BH	BH	0.006	0.010	0.025	Final	Saipan Calibration
2020-06-19A_HE4x	BH	BH	BH	BH	SPN3	R10	1.800	BH	BH			BH	BH	0.007	0.012	0.024	Final	
2020-07-02A_CH4x	BH	BH	BH	BH	PPP			BH	BH		361397	BH	BH	0.008	0.006	0.032	Final	BL01, BL02
2020-07-02A_HE4x	BH	BH	BH	BH	PPP			BH	BH		361397	BH	BH	0.007	5.000	0.035	Final	
2020-07-04A_CH4x	BH	BH	BH	BH	PPP			BH	BH			BH	BH	0.048	0.012	0.052	Final	BL12
2020-07-04A_HE4x	BH	BH	BH	BH	PPP			BH	BH			BH	BH	0.048	0.018	0.059	Final	
2020-07-05B_CH4x	BH	BH	BH	BH	PPP			BH	BH			BH	BH	0.017	0.015	0.045	Final	Saipan Calibration
2020-07-05B_HE4x	BH	BH	BH	BH	PPP			BH	BH			BH	BH	0.014	0.011	0.044	Final	
2020-07-11A_CH4x	BH	BH	BH	BH	SPN3	R10	1.800	BH	BH			BH	BH	0.020	0.007	0.027	Final	BL12
2020-07-11A_HE4x	BH	BH	BH	BH	SPN3	R10	1.800	BH	BH			BH	BH	0.007	0.012	0.022	Final	
2020-07-11B_CH4x	BH	BH	BH	BH	PPP			BH	BH			BH	BH	0.004	0.006	0.029	Final	BL12
2020-07-11B_HE4x	BH	BH	BH	BH	PPP			BH	BH		603160	BH	BH	0.006	0.012	0.032	Final	
2020-07-14A_CH4x	BH	BH	BH	BH	SPN3	R10	1.800	BH	BH			BH	BH	0.010	0.006	0.027	Final	Saipan Calibration
2020-07-14A_HE4x	BH	BH	BH	BH	SPN3	R10	1.800	BH	BH			BH	BH	0.014	0.006	0.028	Final	