
PAMAP LiDAR PROGRAM



Department of Conservation & Natural Resources

LiDAR Acquisition Report

For

Program Years 2006, 2007 & 2008

Produced By:



2670 Wilhite Drive
Lexington, KY 40503

Under Contract to:

BAE SYSTEMS

BAE SYSTEMS - Information Solutions
124 Gaither Drive, Suite 100
Mount Laurel, NJ 08054

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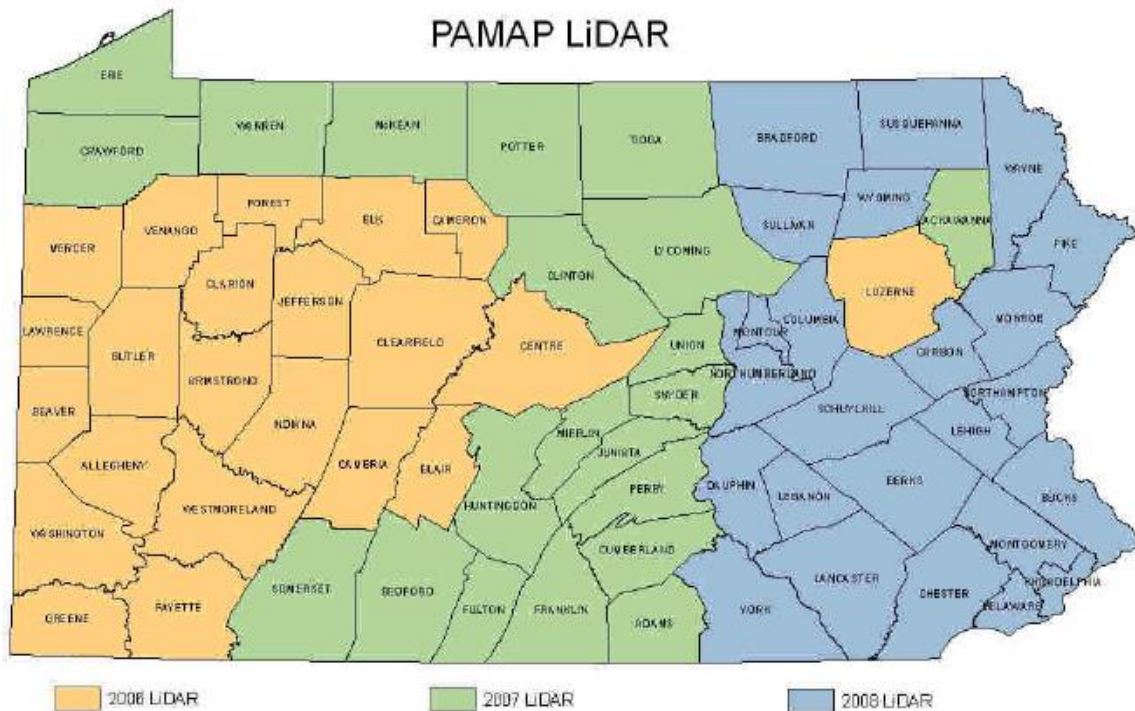
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SECTION 1

OVERVIEW

SECTION 1: OVERVIEW

The PAMAP Program conducted project to collect and process high resolution LiDAR elevation data for the entire state. Pennsylvania is one of the first states in the nation to complete collection of this level of elevation data for the entire state. In winter/spring 2006, the PAMAP Program began the project with the capture of LiDAR for 21 counties in the western part of the state, along with Luzerne County. LiDAR was acquired for an additional 21 counties in the winter/spring of 2007. Acquisition of LiDAR in the spring of 2008 covered 25 additional counties in the eastern third of Pennsylvania. The collection progress over the three year period is shown below.



Working as a subcontractor to the PAMAP Prime Consultant, BAE Systems, Mount Laurel, NJ, Photo Science has been the lead PAMAP data acquisition firm supporting both the imagery and LiDAR program since 2005.

The LiDAR data acquired by Photo Science in support of the Program is primarily being used to produce an accurate and high-resolution bare earth model of Pennsylvania. One of the primary uses of the bare earth model is to support floodplain mapping and flood control projects. The LiDAR data is collected and processed to generally meet specifications called for in FEMA's Guidelines and Specifications for Flood Hazard Mapping Partners. The data is collected with a 1.4-meter average point spacing (2-meter maximum) with a bare earth surface vertical accuracy of 18.5-centimeters RMSE. Data is in tile form using the PAMAP 10,000-foot tile index. All products are in the public domain.

The data products include:

- LiDAR Point Cloud – the LiDAR points are distributed in the binary LAS format. Each point is attributed for intensity, classification, etc. according to the LAS standard and PAMAP specifications.
- Digital Elevation Model – a 3.2-foot pixel (1-meter equivalent) raster GeoTIFF Digital Elevation Model (DEM).
- Contours – a 3D shape file of 2-foot contours is provided for each tile.
- Break lines – a 3D shape file of break lines is provided for each tile.

Photo Science's Role

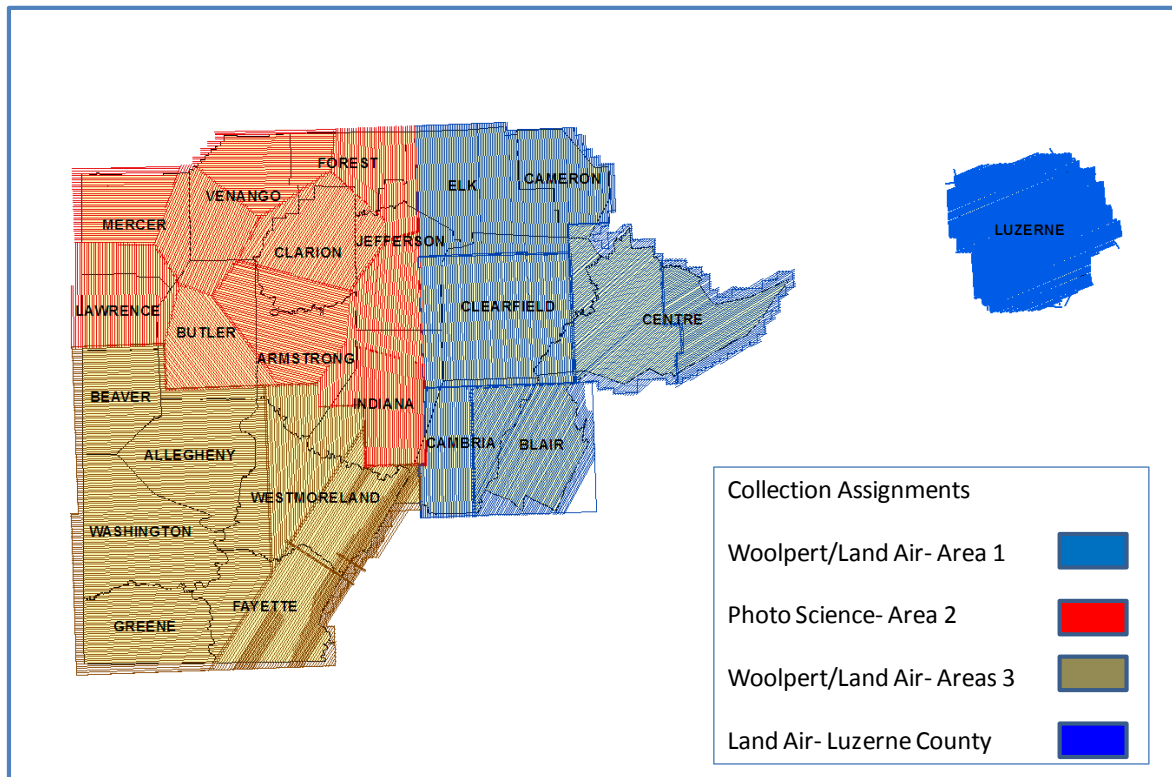
Coordinating other leading LiDAR data collection firms, Photo Science has provided airborne topographic LiDAR collection and post processing services to BAE Systems in support of PAMAP Program years in 2006, 2007 and 2008. This LiDAR data has been used to develop the terrain surface and derivative datasets identified above as well to support the orthophoto rectification of PAMAP imagery collected in each of the same years.

The following LiDAR providers directly supported the acquisition and processing activities in each of the three program years. Collection assignments are shown for each year in the provided diagrams.

PAMAP 2006

- Photo Science, Lexington, KY
- Woolpert Inc., Dayton, OH - sub consultant to Photo Science
- Land Air, Peach Tree, GA (now part of Northrop Grumman/3001) – sub consultant to both Photo Science for the Luzerne County Area and Woolpert

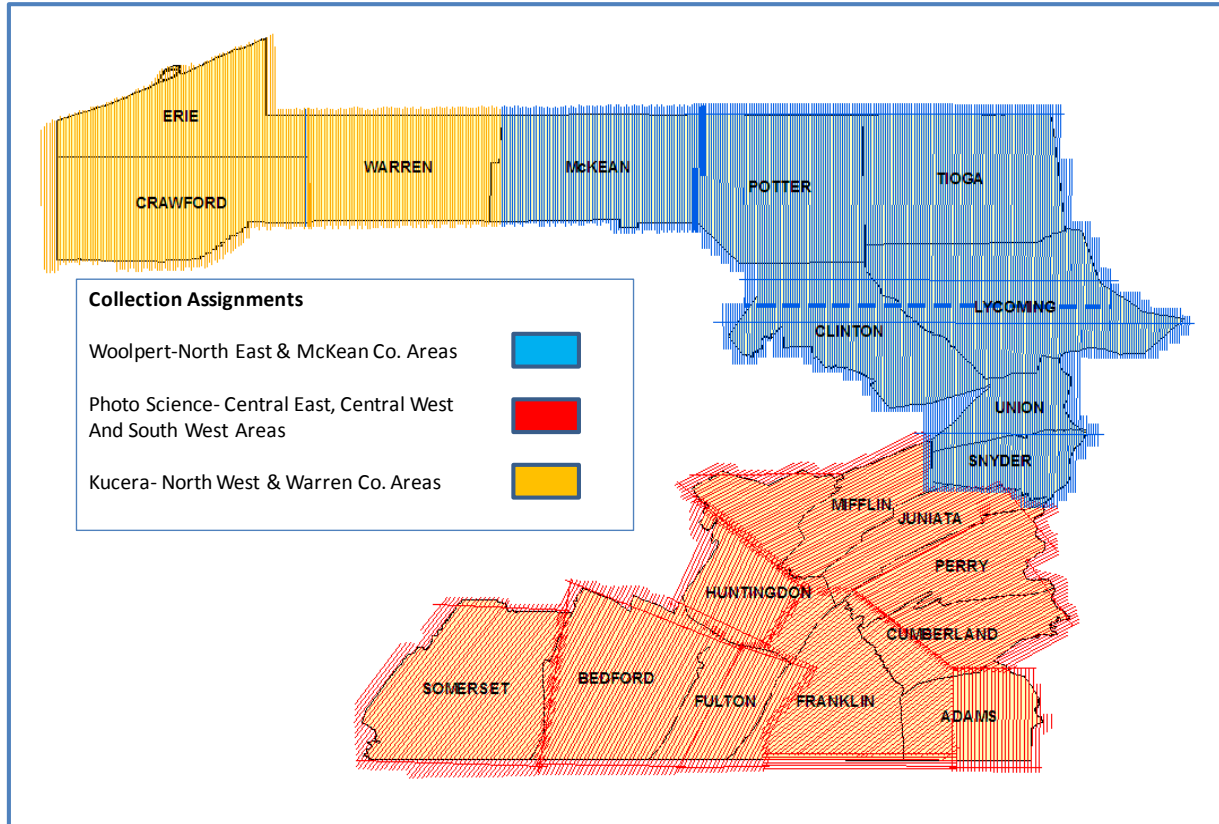
PAMAP 2006 LIDAR Collection Area



PAMAP 2007

- Photo Science, Lexington, KY
- Woolpert Inc., Dayton, OH - sub consultant to Photo Science
- Kucera International, Willoughby, OH – sub consultant to Photo Science

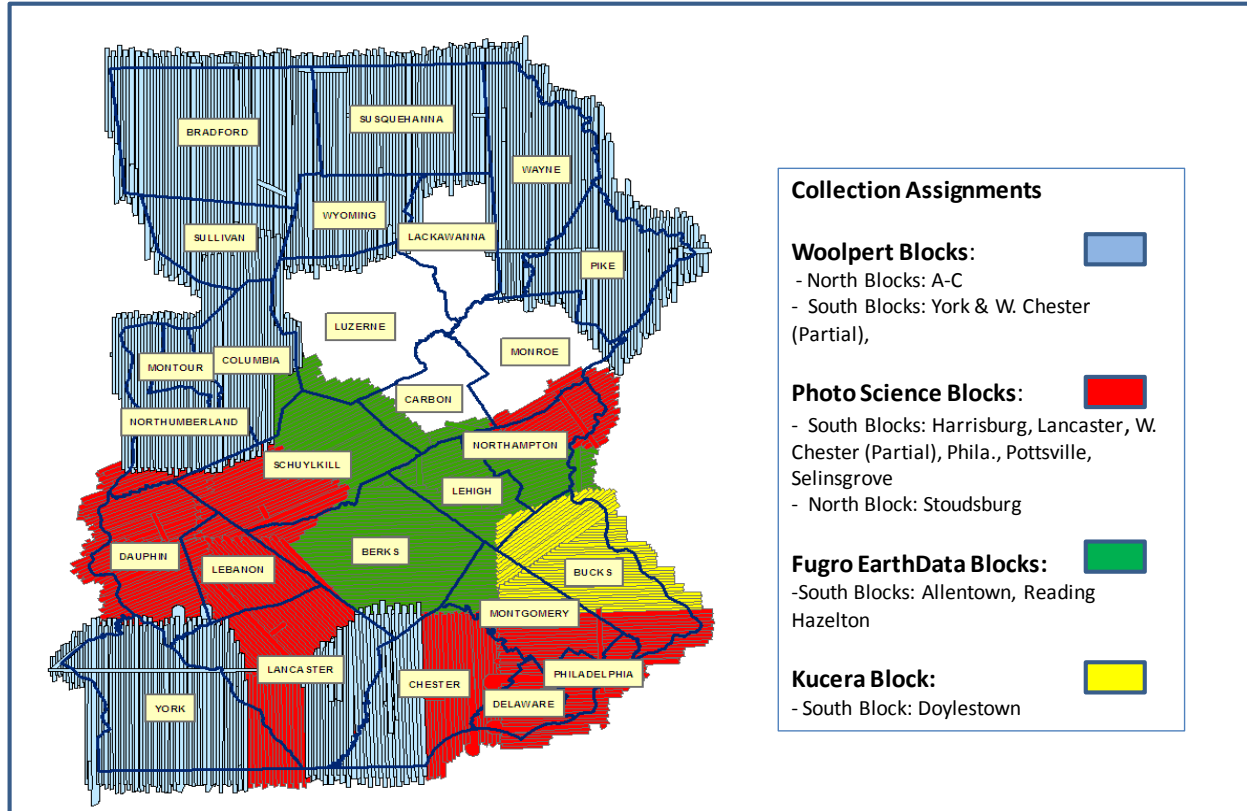
PAMAP 2007 LIDAR Collection Area



PAMAP 2008

- Photo Science, Lexington, KY
- Woolpert Inc., Dayton, OH - sub consultant to Photo Science
- Kucera International, Willoughby, OH – sub consultant to Photo Science
- Fugro EarthData, Fredrick, MD- sub consultant to Photo Science

PAMAP 2008 LIDAR Collection Area



Report Contents

This report contains a review of the project requirements and detailed information for LiDAR data acquisition, processing and quality control performed by Photo Science (and its sub consultants) including:

- Documentation specifying altitude, airspeed, scan angle, scan rate, LiDAR pulse rates, and other flight and equipment information deemed appropriate
- A LiDAR Data Acquisition Report
- A LiDAR Data Processing Report
- A System Calibration Report (Sample)
- Flight & Base Station Logs

Please note that Photo Science primary LiDAR sub consultant, Woolpert Inc., submitted separate (but similar) reports directly to BAE Systems for LiDAR acquisition and post processing work assignments covering each of the three program years (2006-2008).

Project Requirements

General standards for the LiDAR mission include:

- High density LiDAR data acquisition within the project limits at a sufficient altitude and density to support digital terrain model (DTM) development for 2-foot contours with a vertical accuracy of 18.5 cm RMSE for the bare earth surface & a vertical accuracy in vegetated areas of 37 cm RMSE.
- Avoidance of inclement weather for all flight missions as well as ground conditions that do not allow adequate and/or accurate laser returns (Snow, extremely high water etc.).
- Planned flight paths which provide satisfactory coverage of the study area, including both parallel and enough cross flight lines to allow for proper quality control.
- Documentation of flight mission date, time, flight altitude, airspeed, scan angle, scan rate, laser pulse rates and other information deemed pertinent.

SECTION 2

LIDAR DATA ACQUISITION

SECTION 2: LIDAR DATA ACQUISITION

This section provides an overview of the general LiDAR acquisition methodology employed by Photo Science and its subcontractors on the LiDAR portion of the PAMAP Program.

The following table provides the planned LiDAR system collection parameters that were utilized by Photo Science and its sub contractors for the PAMAP Project across all three project years. Actual parameter values fluctuate depending on sensor/aircraft configuration, terrain, ground conditions/cover, weather conditions and air space access. Please refer to the flight logs in Appendix A for actual parameters for each mission. Woolpert's parameters are detailed in their LiDAR Acquisition Reports that were separately delivered to BAE Systems for each of the three project years.

2006 Project

LiDAR Collection Parameter	Photo Science	Woolpert*	Land Air
Flying Altitude, Feet (AMSL)	6000	5500	5400
Airspeed (Knots)	128	130	130
Scan Angle, Degrees (FOV)	42	42	42
Scan Rate (Hz)	29	26	26
Pulse Rate (Hz)	54	41	41
Pulse Mode (Returns)	4	2/4	4
Ave Point Spacing (meters ²)	1.5	1.4	1.4

* Two different ALS sensor models utilized

2007 Project

LiDAR Collection Parameter	Photo Science	Woolpert*	Kucera
Flying Altitude, Feet (AMSL)	6000	5500/7000	6000
Airspeed (Knots)	128	130	140
Scan Angle, Degrees (FOV)	42	42	44
Scan Rate (Hz)	31	26/27	31
Pulse Rate (Hz)	57	41/54	56
Pulse Mode (Returns)	4	2/4	4
Ave Point Spacing (meters ²)	1.5	1.4	1.3

* Two different ALS sensor models utilized

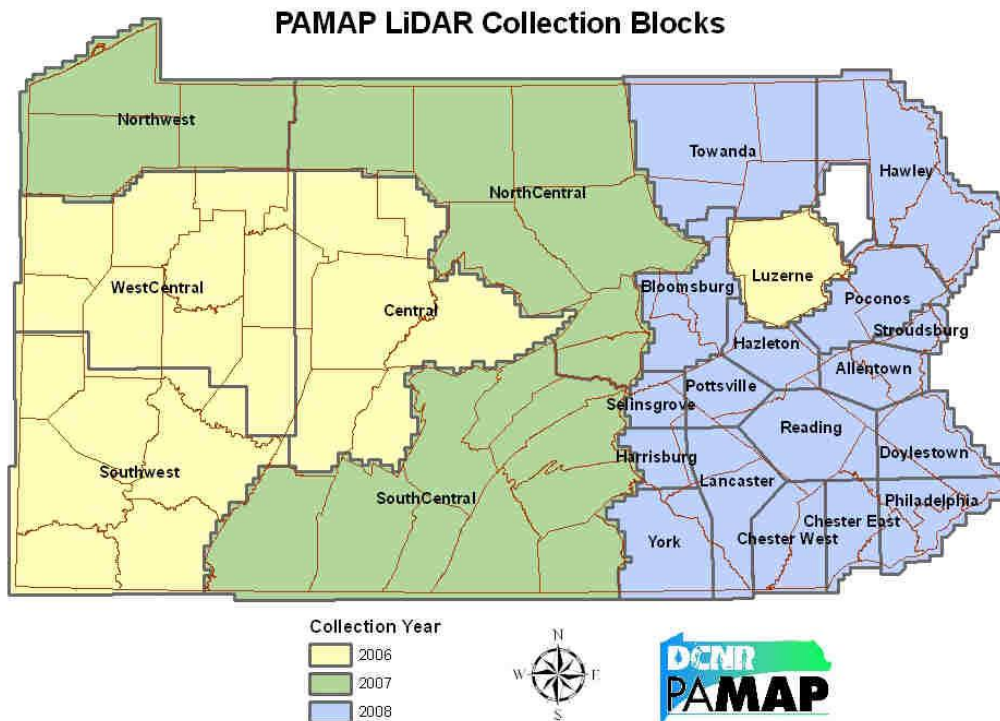
2008 Project

LiDAR Collection Parameter	Photo Science	Woolpert*	Kucera	Fugro Earthdata
Flying Altitude, Feet (AMSL)	7500	5500/7000	6000	8000
Airspeed (Knots)	120	130/125	130	160
Scan Angle, Degrees (FOV)	42	40/42	45	42
Scan Rate (Hz)	26	25/27	28	35
Pulse Rate (Hz)	53	41/53	52	93
Pulse Mode (Returns)	4	2/3/4	4	4
Ave Point Spacing (meters^2)	1.4	1.4	1.4	1.3

* Two different ALS sensor models utilized

LiDAR Overview

Photo Science conducted airborne topographic LiDAR surveys to support the production of a DEM for orthophoto rectification as well as 2-foot contour intervals. The LiDAR data was acquired for the entire State of Pennsylvania over a three year period (2006-2008) based on the collection blocks shown below.



LiDAR Mission

All LiDAR acquisition utilized Leica LiDAR ALS Systems with maximum pulse rates ranging from 40kHz to 150kHz. Leica Aeroplans detailing each LiDAR Provider's proposed collection parameters were previously submitted to BAE Systems for each project year along with flight line shape files and base stationing as part of the preflight planning deliverables. Additionally, specific details about the ALS systems are included in Section 5 of this report.

The airborne GPS (ABGPS) base stations supporting the LiDAR acquisition consisted of the Pennsylvania CORS system as well as supplemental bases set up by the flight and survey crews at various airports and control points in Pennsylvania. Dual Frequency data was logged continuously for the duration of each LiDAR flight mission at a one-second sampling rate or better. LiDAR collection was planned to try to remain within approximately 25 miles of base stations wherever possible.

The 2006-2008 flight line plans (shown below) for LiDAR acquisition consisted of parallel flights in north-south directions or as dictated by the terrain for maximum efficiency across the project site. The following is a breakdown of the number of approximate flight lines and flight line miles per project year.

PAMAP 2006

Areas 1, 2 & 3

- 1,132 flight lines
- 32,956 flight line miles

Luzerne County

- 84 flight lines
- 2,064 flight line miles

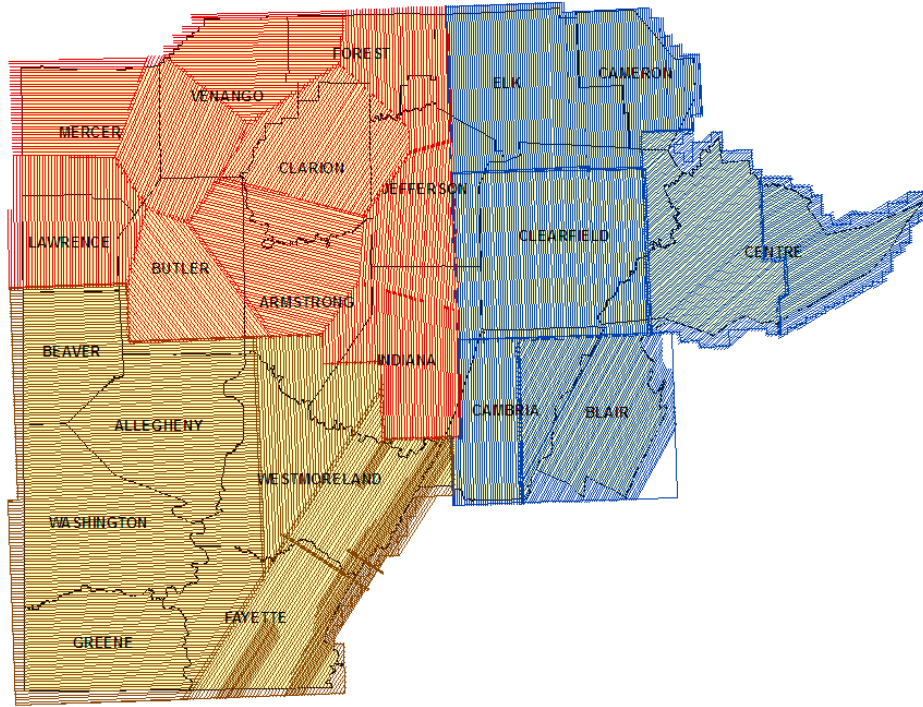
PAMAP 2007- All Areas

- 1,275 flight lines
- 34,216 flight line miles

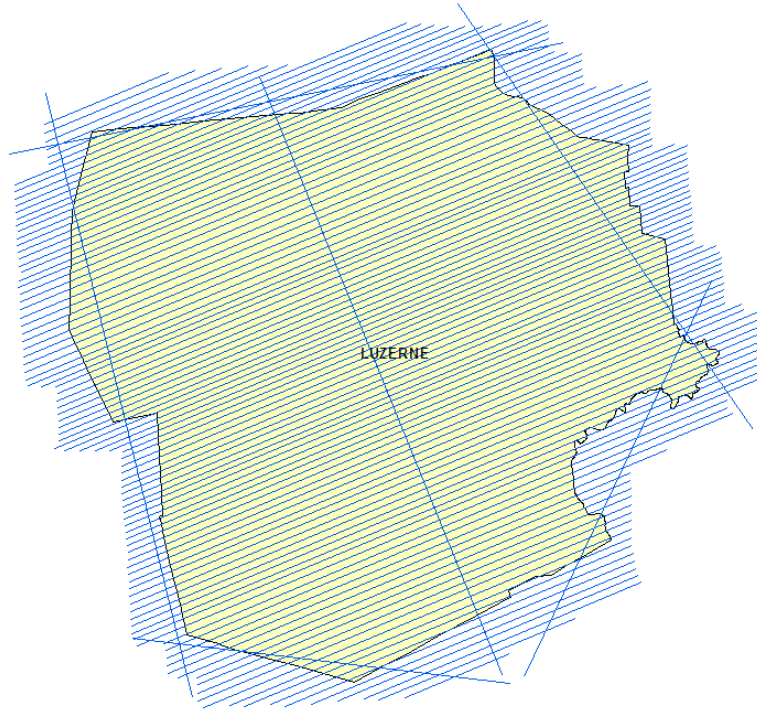
PAMAP 2008- All Areas

- 900 flight lines
- 22,303 flight line miles

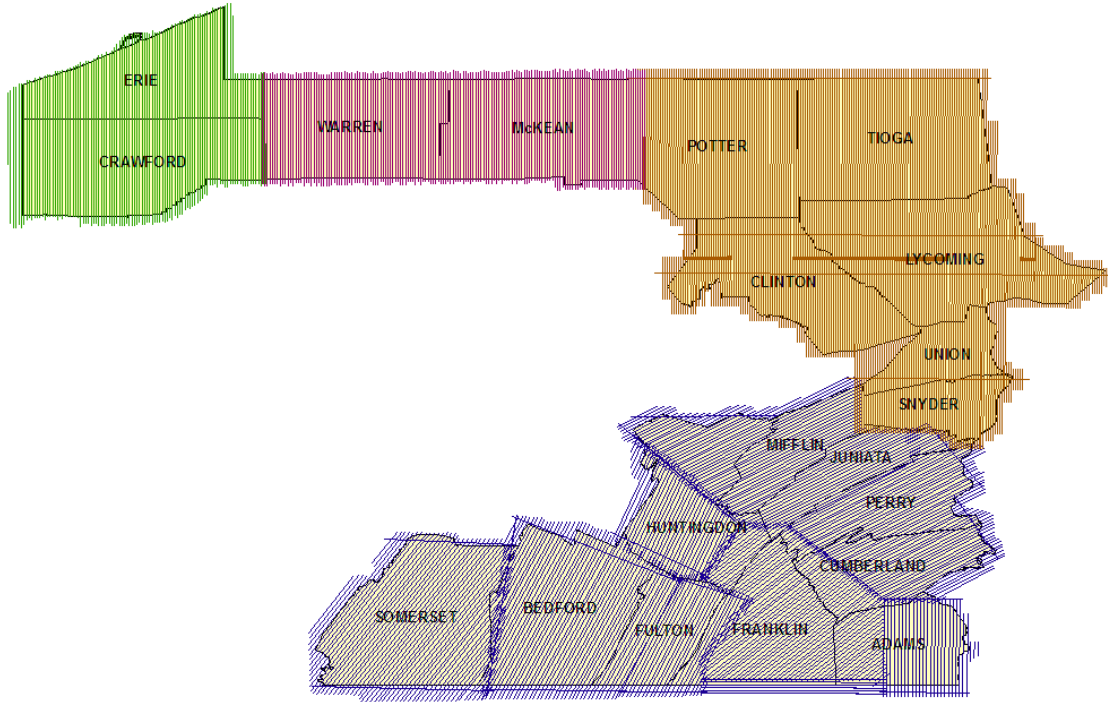
2006 Flight Plan



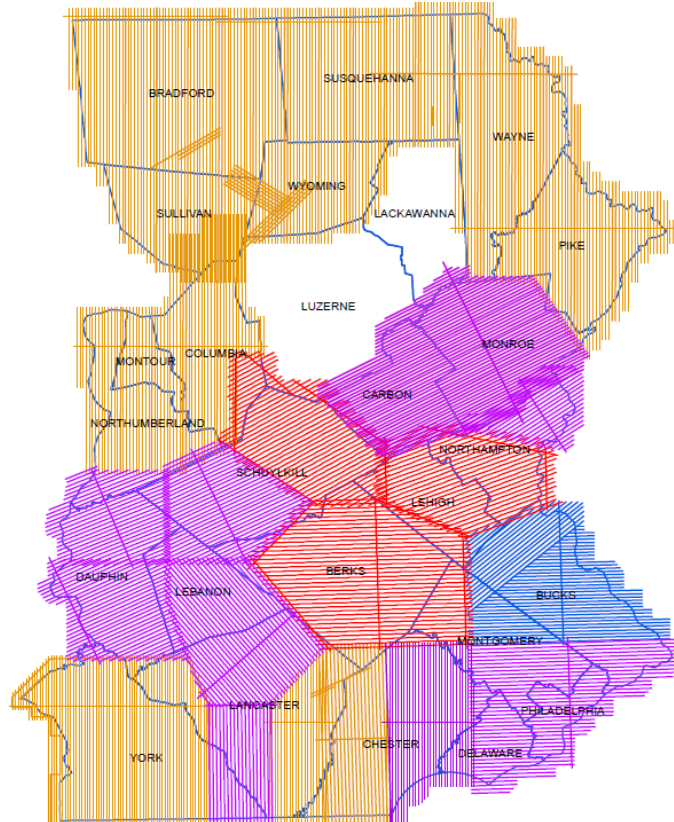
Luzerne County-2006



2007 Flight Plan



2008 Flight Plan



Data collected during the day (or night) was quality checked in the field by the collection crews to assure that there are no gaps or issues with data integrity. This is accomplished in order to develop a final data set before the equipment and crews leave the area. Generally we are able to catch 100% of the anomalies, but occasionally there may be issues that surface in the final processing that do require a return to an area. Photo Science had no data void issues for the 2006 or the 2008 collection areas. However, 2006 reflights were needed due to data voids in the Woolpert 2006 collection area. These were accomplished in the fall/winter of 2006/2007. Additionally, Photo Science did have some minor data anomalies and data void issues in 2007 that were picked up early during the 2008 season. All initial and re-collected LiDAR data was processed to the degree necessary to ensure that complete datasets were delivered in each of the three project years.

LiDAR Statistical Data

The general LiDAR acquisition parameters utilized in the PAMAP program are shown below in the sample Aeroplan. . Leica Aeroplans detailing each LiDAR Provider's proposed collection parameters were previously submitted to BAE Systems for each project year along with flight line shape files as part of the preflight planning deliverables.

Specific to Photo Science, two systems were utilized; one an upgraded 150 MHz system and the other a 50 kHz System upgraded to 150 kHz Collection parameters for the two required different settings to collect the data to the PAMAP specification required. Photo Science and its sub contractors used these same general parameters for collection for all three years of collection (2006, 2007, and 2008). This helped assure that all data was collected to meet the final Specification.

Sample: Typical AeroPlan

AeroPlan Mission Planning for ALS Airborne Laser Scanners
 Originator: Rohl
 Filename: AEROPLAN_Ver1_28C_ALS50-IL_temp_060820.xls

SCANSET1064.XLS

LEICA GEOSYSTEMS PROPRIETARY
 do not disclose without written consent of
 Leica Geosystems
 13 Park Drive
 Westford, MA 01886
 TEL (978) 692-8500 / FAX (978) 692-9510
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FOR SHAPE / COLORKEY, SEE BOX AT RIGHT

Scanner Setup

Commanded FOV (full angle)

Scan FOV (full angle)
 Scan FOV (half angle)
 Scan FOV (half angle)
 Terrain Elevation AMSL (minimum in survey area)
 Terrain Elevation AMSL (maximum in survey area)
 Nominal Flying Height Above Minimum Terrain Elevation
 Nominal Flying Altitude AMSL
 Airspeed
 Range/Intensity Mode (1, 2, 3, 4)
 Max Laser Pulse Rate
 Laser Pulse Rate Used
 System Controller Firmware (<V2.07, V2.07+)
 Laser Power Class (3=3W, 4=4W, LC50, XHR)
 Receiver Aperture Stop (45, 60, 65, 75, LM, ALS50)
 Scan Rate
 Max Scan Rate (ALS50 Phase I+ / Phase II upgrade)

degrees	<input type="text" value="45.00"/>	
radians	0.79	
degrees	22.50	
radians	0.39	
meters	<input type="text" value="275.00"/>	902.22 feet
meters	<input type="text" value="700.00"/>	2296.56 feet
meters	<input type="text" value="2012.00"/>	6600.97 feet
meters	<input type="text" value="2287.00"/>	7503.19 feet
knots	<input type="text" value="120.00"/>	61.73 meters/sec
	<input type="text" value="4.00"/>	
Hz	56300.00	
Hz	<input type="text" value="53000.00"/>	4.24 watts avg
	<input type="text" value="V2.07+"/>	
	<input type="text" value="LC50"/>	
degrees	<input type="text" value="ALS50"/>	
Hz	<input type="text" value="25.50"/>	
Hz	34.10	

Resulting Scan Pattern

Full Swath Width (nominal flying height above lowest terrain elevation)

Max Cross Track Spacing (occurs @ nadir)
 Max Along Track Spacing (occurs @ FOV edge)
 Cross Track / Along Track Ratio
 Illuminated Footprint Diameter (@ 1.e^2 energy)
 Point Density (average)
 Point Density (@ nadir)
 Area / Point (average)
 Average Point Spacing

meters	<input type="text" value="1666.80"/>	5468.42 feet	1.00 Spacing factor (Along track / Cr
meters	2.42	7.93 feet	
meters	2.42	7.94 feet	
	1.00		
meters	0.46	1.50 feet	
pts/meter^2	0.52	0.05 pts/ft^2	
pts/meter^2	0.34		
meters^2	1.94	20.90 ft^2	
meters	1.39	4.57 ft	

Required Attenuator or Percent Max Output

Minimum Attenuation Required or % output for ANSI Z136.1 (binoculars)
 Minimum Attenuation Required or % output for ANSI Z136.1 (naked eye)
 Equivalent Attenuator Selection Used
 Optical Output Factor (for reference only)
 Recommended Laser Current

OD	<input type="text" value="0.11"/>	
OD	<input type="text" value="0.00"/>	14.00 Max SNR
OD	<input type="text" value="0.23"/>	14.00 Average SNR
	0.59	
percent	65%	

Range Gate Settings

Nominal Maximum Slant Range
 Recommended Range Gate "MIN" Setting (incl. roll, nav allow.)
 Minimum Value for Range Gate "MAX" Setting
 Recommended Range Gate "MAX" Setting (incl. roll, nav allow.)

meters	2204.83
meters	<input type="text" value="1560.00"/>
meters	<input type="text" value="960.00"/>
meters	2232.00

Estimated SNR for Diffuse Targets - "full field"

Surface Reflectivity
 Nadir
 FOV Edge

<input type="text" value="0.10"/>
14.71
13.29

Estimated SNR for Diffuse Targets - "power line"

Line Diameter
 Line Reflectivity
 Nadir (best case, with line centered in laser footprint)
 FOV Edge (best case, with line centered in laser footprint)

millimeters	<input type="text" value="0.00"/>
<input type="text" value="0.30"/>	
0.00	
0.00	

LIDAR Flight Line Spacing (based on flying height above highest terrain elevation)

Roll Allowance (each side of nadir, 1 for roll-stabilized systems)
 Roll Allowance (each side of nadir)
 Navigation Tolerance (above/below planned elev'n)
 Swath Width After Roll All, El Nav Tol, Terr Variation
 Navigation Tolerance (each side of planned line)
Line Spacing (for complete coverage, after roll/nav allowances)
Side Overlap (based on total swath width)
 Coverage Rate (based on max line spacing)

degrees	<input type="text" value="1.00"/>	
radians	0.02	
meters	<input type="text" value="25.00"/>	82.02 feet
meters	<input type="text" value="1230.58"/>	4037.27 feet
meters	<input type="text" value="25.00"/>	82.02 feet
meters	<input type="text" value="1180.58"/>	3873.23 feet
percent	<input type="text" value="29.17"/>	
km^2 per hr	262.37	101.30 mi^2 per hr

Resulting Accuracy Estimates (1 sigma)

Assumed GPS Error

meters	<input type="text" value="0.11"/>
	Nadir
	FOV Edge

Estimated Cross-Track Error
 Estimated Along-Track Error
 Estimated Height Error

meters	0.22	0.25
meters	0.21	0.24
meters	0.13	0.15

Estimated Cross-Track Error
 Estimated Along-Track Error
 Estimated Height Error

feet	0.72	0.81
feet	0.69	0.79
feet	0.43	0.50

SECTION 3

PDOP INFORMATION

SECTION 3: PDOP INFORMATION

PDOP, the Positional Dilution of Precision, is a factor that describes the effects of satellite geometry on the accuracy of the airborne GPS solution. The geometric distribution of the satellites is measured relative to the locations of the receivers on the ground and in the aircraft. PDOP can be computed in advance, based on the approximate receiver locations and the predicted location of the satellite, which is called the satellite ephemeris.

Low PDOP numbers are preferable; the higher the PDOP number, the weaker the geometric quality of solution between the satellite, aircraft and reference receivers.

For the PAMAP LiDAR Program, Photo Science and its sub consultants ran prediction programs to determine times of PDOP before each mission (these are indicated on the Logs for each mission) to maintain a final PDOP of 4.0 or less during all LiDAR acquisition missions. Additionally PDOP was monitored during flights as the satellite geometry and the resultant PDOP levels are dynamic, changing with the position of the aircraft. Occasionally, one satellite in the network will drop below the horizon, breaking its connection to the receiver, and the PDOP level will spike above 4.0 momentarily. Small deviations of this type are accounted for during post-processing of the data through the use of Kalman filtering. If PDOP in the aircraft rises above 4.0 for a significant time period, the survey is usually stopped until the geometry improves.

SECTION 4

DATA PROCESSING AND QUALITY CONTROL

SECTION 4: DATA PROCESSING AND QUALITY CONTROL

LiDAR Data Processing

Photo Science and its sub consultants performed all initial post processing of the 2006, 2007 and 2008 LiDAR point clouds to an unclassified .LAS format. In conjunction with Woolpert and BAE Systems, Photo Science also performed initial bare earth classification for large portions of the datasets in each of the three project years. Lastly, Photo Science worked with BAE Systems to provide additional LiDAR “finishing” services to produce the final LiDAR and derivative elevation datasets identified in Section 1 in all three project years. This last area of “finishing” services provided by Photo Science has not been addressed in this report.

Initial Post Processing

In the initial post processing effort Photo Science employed GPS differential processing and Kalman filtering techniques to derive an aircraft trajectory solution at 1-second intervals for each base station within the project limits. Statistics for each solution (base station) were generated and studied for quality. The goal for each solution is to have:

- maintained satellite lock throughout the session
- position standard deviation of less than 5 centimeters
- low ionospheric noise
- few or no cycle slips
- a fixed integer ambiguity solution throughout the trajectory
- a maximum number of satellites for a given constellation
- a low (4.0 or less) Position Dilution of Precision (PDOP)

When the calibration, data acquisition, and GPS processing phases were complete, the formal data reduction process began. Photo Science LiDAR specialists:

- Studied individual flight lines and how these lines match adjacent flight lines to ensure the accuracy meets expectations.
- Identified and removed systematic error locally (by flight) which is not possible if the lines are combined into a block. This is sometimes the case when a satellite loss of lock occurs during a flight and the GPS solution fixes on the wrong integer ambiguity.
- Adjusted any small residual error (due to system noise) between flight lines and across all flight lines to survey ground control (or existing mapping if available).

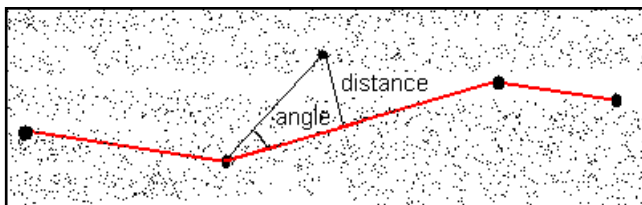
-
- Clipped the overlap region of each flight line to obtain a single homogenous coverage across the project area. This eliminated redundant, overlapping point data that could overwhelm terrain modeling software packages.
 - Processed individual flight lines to derive “Point Cloud.”

Given the airborne GPS aircraft trajectory and the raw LiDAR data subdivided by flight lines, we used manufacturer software to reduce raw information to a LiDAR point cloud on the ground. Photo Science utilized proprietary software to generate parameter files, allowing the manufacturer’s software to process a block; this allowed for the batch processing any number of flight lines. As part of this process, outliers in the data are removed. Typical outlying data points are a result of returns from clouds.

Automated Bare Earth Classification

One initial post processing was completed, initial bare earth classification steps included:

- Classifying the point cloud data into ground and non-ground points
- The classification algorithm classifies ground points by iteratively building a triangulated surface model. The routine started by selecting some local low points as sure hits on the ground then built an initial Triangulated Irregular Network (TIN) from selected low points. The routine then started developing the ground model upward by iteratively adding new laser points to it. Each added point made the model follow the ground surface more closely. Two iteration parameters, iteration angle and iteration distance, determine how close a point should be to a triangle plane so that the point could be accepted to the ground model. **Iteration angle** is the maximum angle between points, its projection on triangle plane and closest triangle vertex. **Iteration distance** parameter makes sure that the iteration does not make big jumps upwards when triangles are large. This helped to keep low buildings out of the ground model.



The vegetation and buildings were removed to obtain bare-earth. Even in areas covered by dense vegetation, ground points were correctly classified.

- Filtered the bare-earth data to remove small undulations.

Small random errors existed in the data due to electronic noise within the system. These errors manifest themselves as small undulations in the data. Using a software application based on a Gaussian operator and modified to for LiDAR data, Photo Science removed these small undulations. The filter controls accuracy by an elevation tolerance setting to meet a given accuracy threshold. The tolerance determines the maximum allowable elevation change of laser points. A data structure was developed suitable for LiDAR so that the searching routine is very fast [O(1) computational complexity] making this algorithm quite efficient.

- Edge matched individual flight lines, generated statistics on the fit, and clipped the flight lines to butt match each other.

The next step in the process was to clip individual flight lines such that adjacent flight lines butt match and a homogenous LiDAR coverage were provided across the entire mapping limit, without overlap. A software routine was utilized to follow the overlap region between two adjacent flight lines and place a “cut line” in the middle of the overlap region.

If all flights were consistent within the mapping specifications, ground control data was imported and studied for fit. As a QC measure, statistical reports were then generated for comparison of LiDAR points, ground control, and TINs generated by LiDAR points. The absolute accuracy was determined by comparison with ground control. Statistical analysis was then performed on the fit between the LiDAR data and the ground control. Based on the statistical analysis, the LiDAR data was then adjusted in relation to the ground control.

- Translated the Bare-Earth Data Into the Appropriate Map Projection

Once all of the data has been reduced and quality controlled, the bare-earth data was translated into the final map projection. Note that the airborne GPS aircraft trajectory was processed in the target datums in relation to the orthometric height. Photo Science used National Geodetic Survey’s GEOID03 software to derive the orthometric height.

The raw LiDAR point cloud data was derived in State Plane coordinates. All subsequent processing was carried out in this projection to avoid introducing errors associated with and moving across larger scale map projection zones. The data was translated into the target map projection through the coordinate conversion software. The entire transformation was generally setup and run in a batch mode.

As a final quality control step, the orthometric heights were compared against ground survey results.

SECTION 5

LIDAR CALIBRATION AND ACCURACY OVERVIEW

SECTION 5: ALS50 SYSTEM CALIBRATION TECHNIQUES AND ACCURACY REPORTS

Introduction

This Leica ALS50 and ALS50-II LiDAR System Calibration Report are used to represent confirmation of the LiDAR system specifications, performance, and requirements. The system functionality, elevation, and horizontal accuracy performance shall be demonstrated for calibration purposes. The following data is *representative* of the calibration for the units used by Photo Science and its sub contractors in collecting the PaMAP LiDAR data in 2006, 2007 and 2008.

This report contains various test results and information pertaining to the system. It should be noted that all numbers shown in this report are in **meters** unless otherwise stated. All coordinates stated in the report are in the WGS84 coordinate system with ellipsoidal elevation.

System Model Number:	ALS50 and ALS50-II
Client Name:	PA MAP
Calibration Date	March, 2008

System Specifications and Requirements

The ALS50 LiDAR systems, built by Leica Geo-Systems have the following specifications:

Nominal	
Operating Altitude	400 – 3,000 meters
Elevation accuracy	15cm single shot (one standard deviation)
Range Resolution	1 cm
Scan angle	Variable from 0 to 75°
Swath width	Variable from 0 to 1.5 X altitude
Scan frequency	Variable based on scan angle
Horizontal Accuracy	Better than 1/2000 X altitude
Supported GPS receivers	Ashtech Z12, Trimble 7400, Novatel Millenium
Laser repetition rate	58 kHz
Beam divergence	0.3 mrad
Laser classification	Class IV laser product (FDA CFR 21)
Eye safe range	400m single shot depending on laser repetition rate

Power requirements	28 VDC @ 25A
Operating temperature	10-35°C
Humidity	0-95% non-condensing

The ALS50-II LiDAR system, built by Leica Geo-Systems has the following specifications:

Nominal	
Operating Altitude	Up to 6,000 meters
Elevation accuracy	8 – 24 cm single shot (one standard deviation)
Range Resolution	Better than 1 cm
Scan angle	Variable from 0 to 75°
Swath width	Variable from 0 to 1.5 X altitude
Scan frequency	Variable based on scan angle
Horizontal Accuracy	7 – 64 cm (one standard deviation)
Supported GPS receivers	Ashtech Z12, Trimble 7400, Novatel Millenium
Laser repetition rate	Up to 150 kHz
Beam divergence	0.3 mrad
Laser classification	Class IV laser product (FDA CFR 21)
Eye safe range	400m single shot depending on laser repetition rate
Power requirements	28 VDC @ 25A
Operating temperature	0-40°C
Humidity	0-95% non-condensing

On Site Antenna Offsets and Location

Aircraft GPS Antenna

Measurements from the Aircraft Antenna to the instrument are surveyed as well as predicted by the processing software. Photo Science utilized three different aircraft during the course of this acquisition. Additionally subcontractors used different aircraft as well. Specific information can be provided if needed. Additionally this information is available in the LiDAR LAS files (part of the data delivery).

Reference to IMU Lever arms

The following measurements were calculated in the lab at Leica and will remain constant.

User to IMU Lever Arm (POS/AV) for AIMU in ALS50 SH19	
X	-0.269 m
Y	0.139 m
Z	-0.017 m

User to IMU Lever Arm (POS/AV) for LN200 in ALS50-II SH59	
X	-0.273 m
Y	0.161 m
Z	-0.017 m

SN19 is equipped with AIMU and SN59 is equipped with LN200.

Base Station GPS and Antenna

Typically Photo Science utilizes Trimble 5700 GPS receivers for ground station base receivers. The other subcontractors utilize the same or similar equipment, capable of receiving GPS signals at 1 Hz or better

Monument Description:	
GPS Receiver Type: Trimble 5700 Antenna Type: Trimble	Epoch Interval: 0.5 sec Elevation Mask: 10 degrees Observation Type: Static

Flight Calibration Methodology

Data Collection

To accomplish the formal calibration, Photo Science has established a calibration range consisting of an airport runway and other features in central Kentucky. The calibration range has been ground surveyed to an accuracy of better than 1 cm. Four flight lines with two different altitude and opposing headings (see Figure 5-3) are required in order to capture pitch, roll, heading (see Figure 5-1) and torsion errors (see Figure 5-2). This calibration range is captured at least twice per year, or more frequently as deemed necessary. Additionally anytime the unit is removed from the Aircraft it is calibrated immediately upon installation in another or the same aircraft. Photo Science and subcontractors also set-up "mini" calibration sites at smaller airports or areas for each individual project or project area. These are flown before an area is captured, at least once during capture and immediately upon completing acquisition for an area. This is accomplished in case something changes in the set-up that may be caused by equipment being moved in the aircraft for maintenance, extreme turbulence, or environmental factors (extreme heat, cold or moisture). The information below is typical of a calibration site, and may or may not be one utilized by Photo Science or any of the subcontractors.

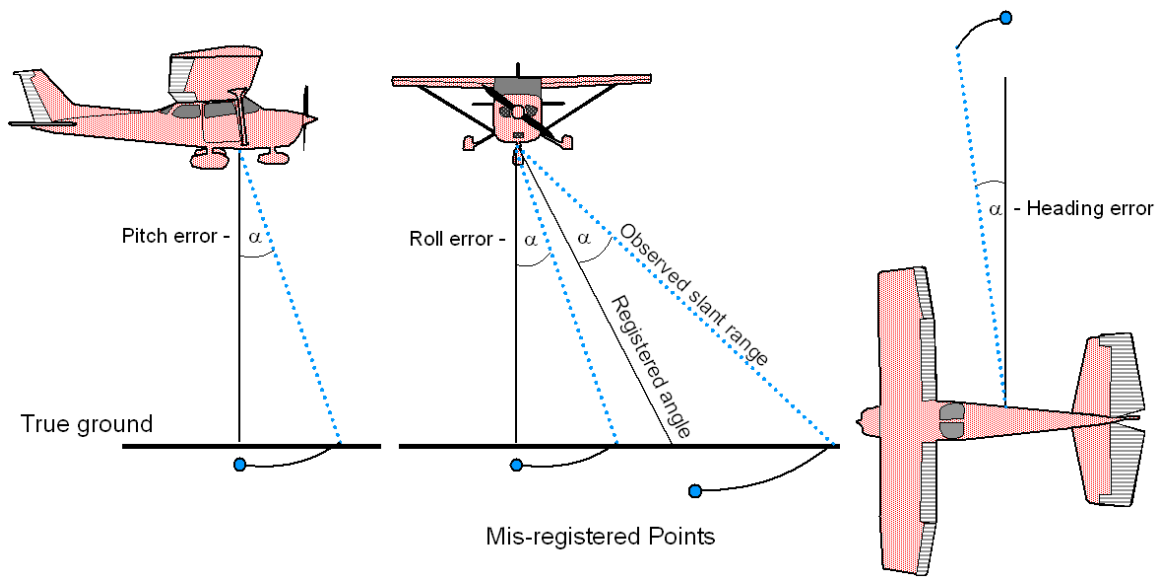


Figure 5-1: Misalignment Errors.

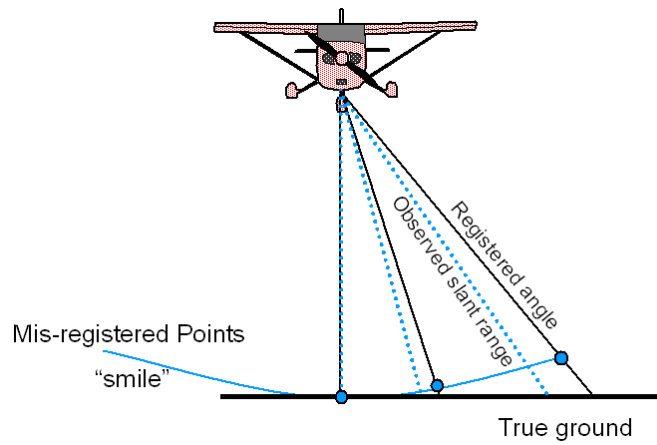


Figure 5-2: Torsion Error

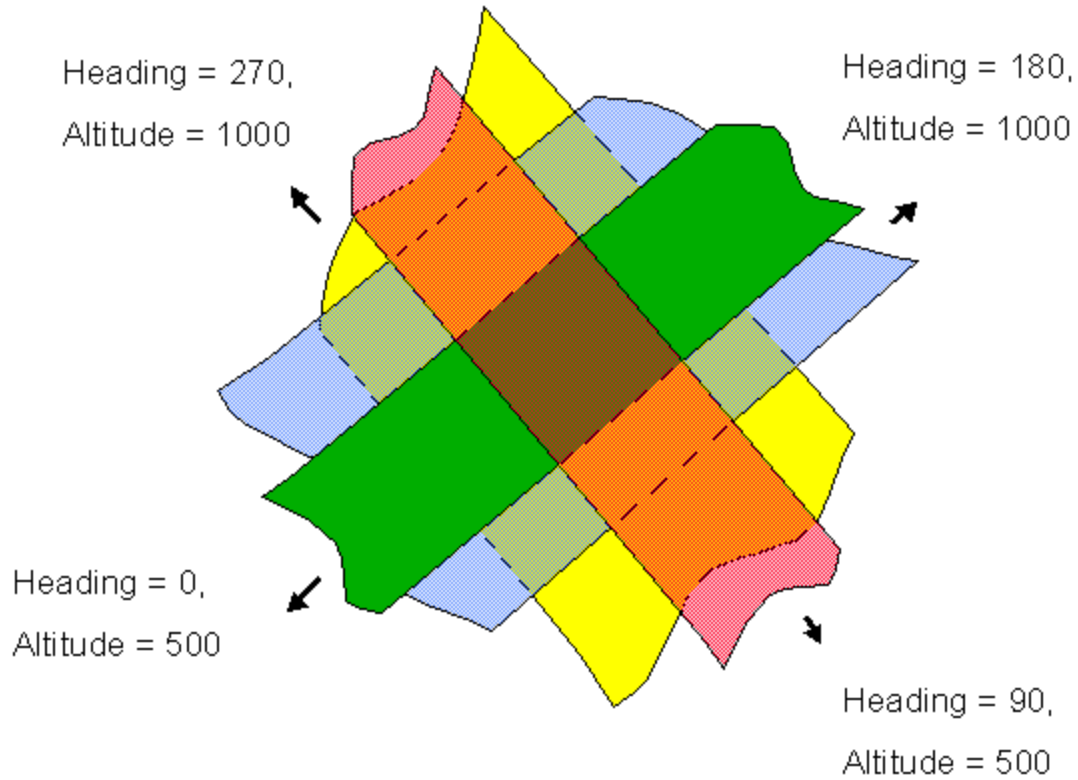


Figure 5-3: Optimal Flight Pattern for Calibration

Intensity Images

Four images from LiDAR intensity reflectance are generated in order to pick up tie points (see Figure 5-4). A least square adjustment (LSA) is performed using auto bore-sighting software provided by system manufacturer. Pitch, roll, heading, and torsion errors are calculated by LSA.



Figure 5-4: Ortho photo generated from LiDAR intensity reflectance.

Ground Control Points

Ground control points were collected along and across an airport runway. In this case a total of 116 runway points were surveyed. The LiDAR collects scan data over the control points and the data is then used to determine the absolute Z accuracy of the system. The distribution of the runway points can be found in Figure 5.5.

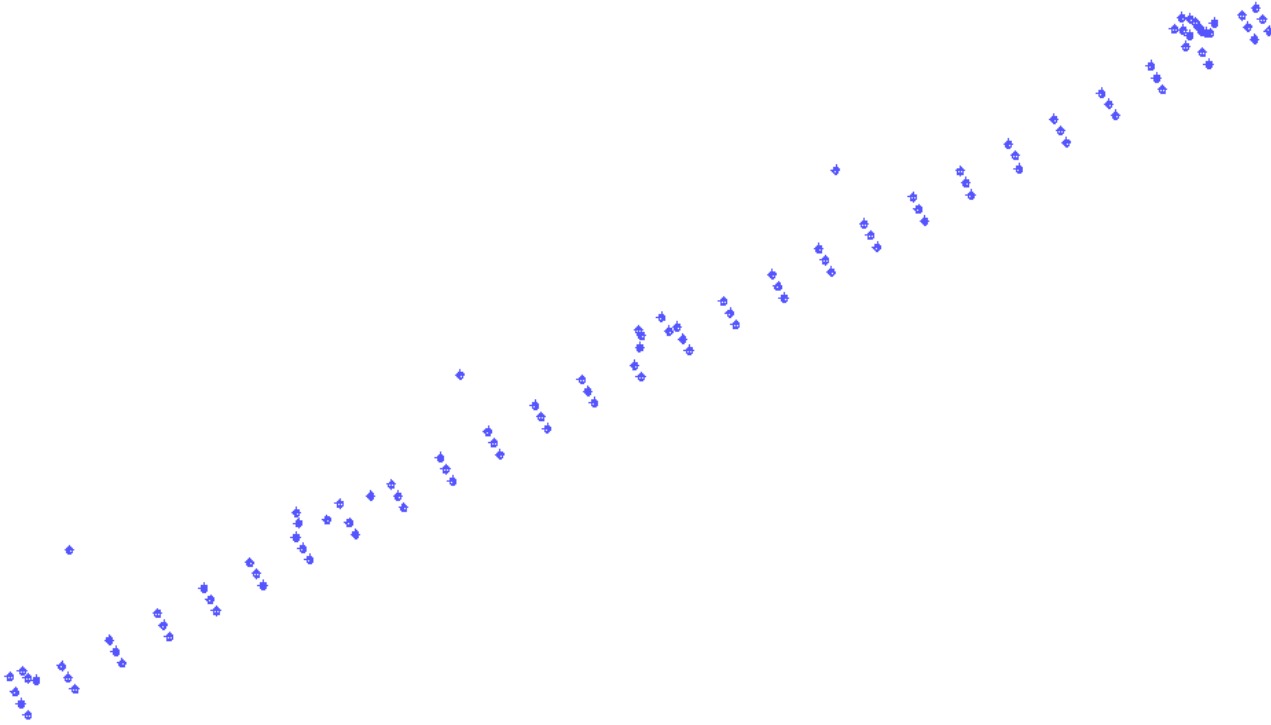


Figure 5-5: Ground control points on the runway

Flight over Ground Control Points

Flight lines, flown parallel and perpendicular to the runway control points were used to determine the elevation (Z) error of the LiDAR data as well as pitch, roll, heading, and torsion can be seen in Figure 5-6. Each day the runway was flown, multiple overlapping strips were performed to assure that most control points were covered and to increase the likelihood that a laser point would strike within 0.5 meters of a control point.

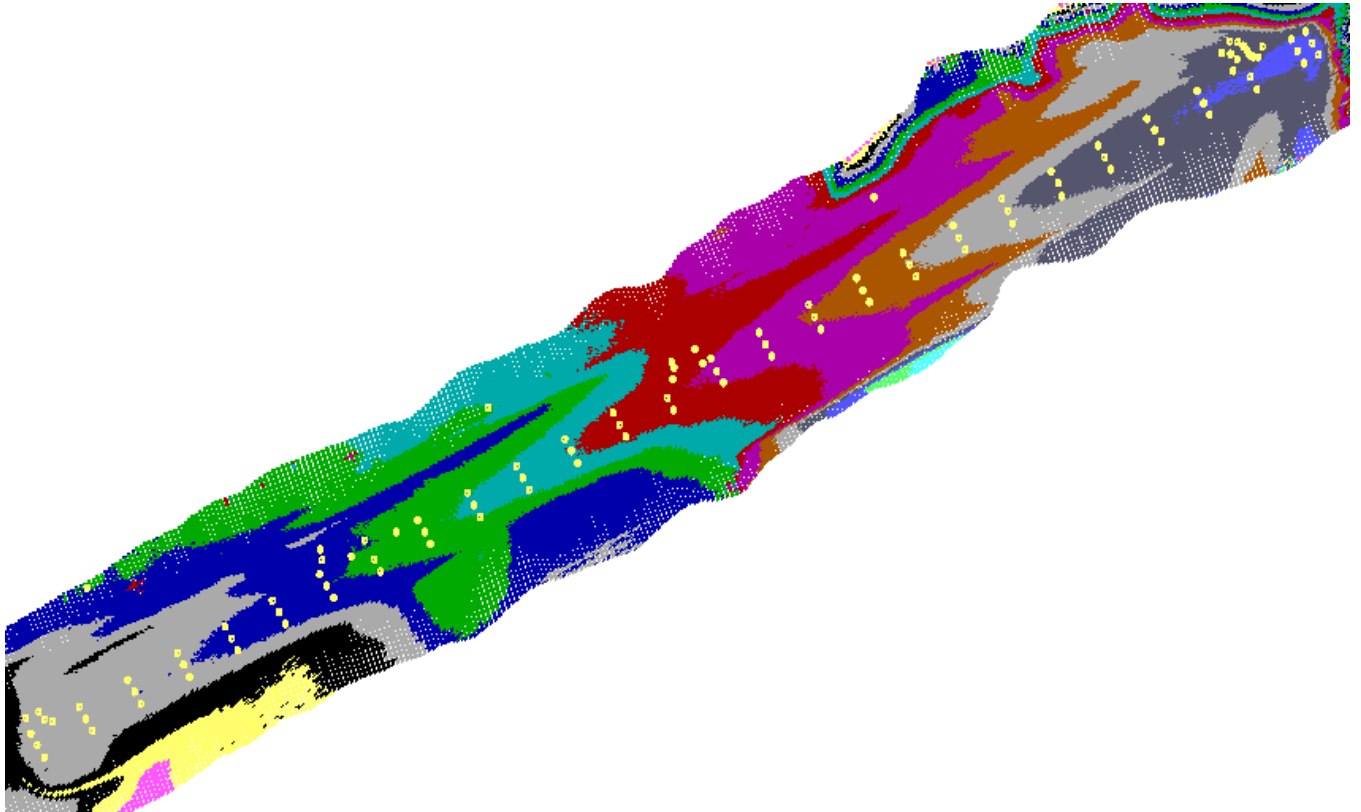


Figure 5-6: One flight line parallel to the runway ground control points. The flight line is color coded by elevation.

All missions flown by Photo Science and its subcontractors were flown with current calibration data for the particular unit were applied for that flight. Additionally, mini calibration flights would have also been applied.

Accuracy Assessments

Accuracy assessments were made against all data for each of the years of collection. The accuracy is assessed by comparison of the LiDAR data against ground surveyed check points collected just for that reason. Photo Science sub consultant, Rettew Associates of Lancaster, PA, provided GPS check point surveying services for all three project years in up to five (5) different land cover categories establishing 120 points in the 2006 project area including 20 points in Luzerne County, 100 points each in both the 2007 and 2008 project areas. Rettew's Report of Survey for each of the three project years has been separately provided to BAE Systems. Additionally, Photo Science utilized supplemental existing ground control data from concurrent and/or prior PAMAP imagery projects as well as any reliable available control points established by NGS, PennDOT, etc. Lastly, PAMAP QA Consultant, Dewberry, conducted comprehensive qualitative and quantitative reviews and accuracy assessments of the PAMAP LiDAR datasets. The results of their assessments can be found on the PAMAP Web Site at <http://www.dcnr.state.pa.us/topogeo/pamap/documents.aspx>.

Generally ground points are acquired in relatively flat open areas at least five meters from potential breaklines so that a fair assessment may be determined against the LiDAR data set. Horizontal placement is hard to determine against LiDAR data and the emphasis is against the vertical component.

The information below are Photo Science readings made against the LiDAR data for specific points delivered to the PAMAP program over the three year period and in cover different geographic areas, by year. Woolpert and BAE Systems would have made similar comparisons using the Rettew check points and other control for the areas that they were processing.

All readings/values are expressed in **US SURVEY Feet**.

2006- 21 County Area- Collection Block 2 (Northwest)

2006-RETTEW GPS CHECK POINT COMPARISON					
Statistical Analysis					
Average Dz	0.284				
Minimum Dz	-1.064				
Maximum Dz	1.276				
RMSE	0.472				
Standard Deviation	0.379				
Point	Easting	Northing	Known Z	LIDAR Z	Dz
BE1	2520771.030	423758.910	924.744	925.030	0.286
BE10	1313299.514	456318.715	1248.776	1248.9	0.124

BE11	1214931.404	488898.423	800.58	801.17	0.590
BE12	1361701.834	394822.873	1494.135	1494.3	0.165
BE13	1290555.683	391991.013	1197.556	1198.02	0.464
BE14	1346715.770	619540.151	1219.66	1219.88	0.221
BE15	1842013.351	502024.933	1083.129	1083.14	0.011
BE16	1719646.41	368181.745	1701.177	1701.16	-0.017
BE17	1646434.766	359149.59	1758.928	1759.7	0.772
BE18	1820195.486	473362.243	947.933	948.65	0.717
BE19	1778981.569	380228.46	1064.761	1064.61	-0.151
BE2	2460210.500	411706.600	1119.035	1119.770	0.735
BE20	1778232.402	437522.013	1737.812	1737.62	-0.192
BE21	1508282.915	542477.121	1021.38	1021.13	-0.252
BE22	1563325.828	536725.283	1341.84	1341.93	0.090
BE23	1654130.463	340121.701	1710.036	1710	-0.036
BE24	1668503.952	333873.165	1972.768	1972.81	0.042
BE3	2448877.060	384021.620	538.718	539.040	0.322
BE4	2461257.500	316656.270	1181.145	1181.960	0.815
BE5	1956285.495	588627.811	735.816	736.05	0.234
BE6	2008499.531	629792.822	605.978	606.08	0.102
BE7	1962475.82	613928.348	968.433	968.86	0.427
BE8	1312896.604	500511.278	1032.416	1032.6	0.184
BE9	1342696.786	491660.417	1297.725	1297.71	-0.015
BR1	2520843.47	423895.12	918.816	918.86	0.044
BR10	1315038.965	452264.168	1185.632	1185.85	0.218
BR11	1214882.164	489008.483	802.057	802.73	0.673
BR12	1361624.775	394694.025	1475.595	1475.7	0.105
BR13	1290824.053	391756.915	1201.148	1201.83	0.682
BR14	1346738.962	619274.339	1211.89	1212.53	0.645
BR15	1842154.896	501378.094	1107.63	1108.14	0.51
BR16	1720551.957	368691.536	1664.984	1665.1	0.116
BR17	1645699.578	359347.218	1748.592	1749.27	0.678
BR17	1645699.578	359347.218	1748.592	1749.27	0.678
BR18	1820366.832	473452.172	945.089	945.96	0.871
BR19	1778774.773	380382.477	1078.816	1078.95	0.134
BR2	2456579.87	409646.42	1088.95	1089.8	0.85
BR20	1778390.772	437692.515	1728.987	1729.11	0.123
BR21	1508350.910	542476.172	1020.90	1021.77	0.868
BR22	1563517.946	536787.787	1360.07	1360.17	0.097
BR23	1653952.891	339923.85	1687.414	1687.96	0.546
BR24	1668572.962	334071.263	1968.71	1968.79	0.08
BR3	2448405.81	384679.43	534.986	535.59	0.604

BR4	2461221.53	316770.21	1180.976	1181.99	1.014
BR5	1956605.516	587684.284	700.562	701.26	0.698
BR6	2008350.234	630504.698	612.467	outside	*
BR7	1964754.101	616469.279	951.138	951.6	0.462
BR8	1313012.385	500377.432	1010.066	1010.34	0.274
BR9	1342575.214	491820.625	1303.048	1303.28	0.232
FF1	2520496.92	423889.3	914.591	914.86	0.269
FF10	1313138.591	456460.501	1219.481	1220.06	0.579
FF11	1214832.719	489044.73	809.082	810.2	1.118
FF12	1361433.674	394804.739	1479.401	1479.09	-0.311
FF13	1290574.237	391853.448	1202.461	1202.74	0.279
FF14	1346537.516	619395.740	1202.89	1202.93	0.045
FF15	1842215.804	501387.256	1131.456	1132.14	0.684
FF16	1720496.685	368866.343	1690.735	1690.92	0.185
FF17	1646275.511	358538.838	1774.199	1773.93	-0.269
FF18	1819954.487	473106.813	948.356	949.16	0.804
FF19	1779074.502	380422.079	1098.741	1098.99	0.249
FF2	2460911.15	411401.25	1177.242	1177.71	0.468
FF20	1778475.489	437526.127	1755.589	1755.82	0.231
FF21	1507745.348	542793.504	1043.74	1043.44	-0.3
FF22	1563598.843	536919.901	1358.27	1358.20	-0.07
FF23	1654078.049	340725.761	1797.851	1798.26	0.409
FF24	1668813.018	334227.785	1961.078	1961.47	0.392
FF3	2448618.83	384780.25	539.12	539.62	0.5
FF4	2461479.01	316883.46	1206.875	1207.73	0.855
FF5	1955839.049	588939.238	809.844	811.12	1.276
FF6	2007941.505	628512.988	617.471	618.06	0.589
FF7	1962045.917	613742.572	963.287	963.82	0.533
FF8	1313300.593	500457.178	1009.488	1010.08	0.592
FF9	1342733.842	491929.913	1301.691	1302.22	0.529
HG1	2522670.82	425147.43	966.5	967.02	0.52
HG10	1313335.117	456546.656	1247.908	1248.1	0.192
HG11	1214910.915	488808.326	787.292	787.38	0.088
HG12	1361578.839	395021.574	1460.295	1460.32	0.025
HG13	1290744.51	391841.983	1202.696	1203.01	0.314
HG14	1346809.183	619282.065	1216.94	1217.44	0.505
HG15	1842021.595	501657.915	1090.73	1090.65	-0.08
HG16	1720269.18	368778.411	1692.831	1692.97	0.139
HG17	1645920.851	359301.769	1753.874	1754.7	0.826
HG18	1819804.515	473191.067	950.333	950.84	0.507
HG19	1778985.104	380396.007	1100.847	1101.26	0.413

HG2	2460140.89	411666.3	1122.534	1123.14	0.606
HG20	1778306.27	437549.753	1738.125	1738.12	-0.005
HG21	1507720.935	542640.533	1015.14	1015.20	0.063
HG22	1563198.309	536717.201	1342.38	1342.69	0.309
HG23	1654057.681	340414.668	1746.614	1746.78	0.166
HG24	1668284.065	333946.919	1975.51	1975.92	0.41
HG3	2448653.29	384422.2	537.089	537.57	0.481
HG4	2461150.27	316778.81	1174.75	1175.61	0.86
HG5	1955999.055	588862.043	786.218	786.98	0.762
HG6	2008387.009	629122.798	592.629	592.26	-0.369
HG7	1961936.447	614243.555	953.212	953.48	0.268
HG8	1313565.306	500640.76	1031.222	1031.39	0.168
HG9	1342728.027	491572.321	1292.953	1293.11	0.157
UA1	2520136.26	423227.2	914.648	914.53	-0.118
UA10	1314975.212	452457.661	1200.158	1200.54	0.382
UA11	1215086.251	488877.359	804.445	805.4	0.955
UA12	1359917.152	393966.822	1433.65	1433.26	-0.390
UA13	1290167.916	393031.591	1159.548	1159.62	0.072
UA14	1343190.842	623417.508	1256.74	1256.51	-0.226
UA15	1841219.351	492128.362	1036.43	1035.78	-0.650
UA16	1720084.429	368783.373	1707.96	1707.99	0.030
UA17	1646204.88	358954.552	1749.356	1749.17	-0.186
UA18	1819469.81	473398.618	954.506	955	0.494
UA19	1778839.44	377316.091	1008.414	1008.58	0.166
UA2	2459868.19	411758.7	1109.727	1109.87	0.143
UA20	1777981.632	437598.706	1716.196	1716.13	-0.066
UA21	1508091.714	542691.717	1029.23	1028.17	-1.064
UA22	1563199.408	536998.510	1331.71	1331.46	-0.249
UA23	1659241.465	343677.349	2001.006	2001.38	0.374
UA24	1668958.976	333712.211	1972.364	1972.4	0.036
UA3	2449141.64	383353.51	563.591	563.29	-0.301
UA4	2461771.34	316635.52	1224.295	1224.56	0.265
UA5	1954899.942	586718.974	728.887	728.68	-0.207
UA6	2009848.184	630403.767	623.625	623.72	0.095
UA7	1961878.194	614356.787	960.404	960.51	0.106
UA8	1312893.884	501492.658	1033.676	1034.18	0.504
UA9	1343074.36	491809.083	1295.003	1295.09	0.087

2006-OTHER CONTROL POINT COMPARISON

Statistical Analysis					
Average Dz	-0.207				
Minimum Dz	-0.657				
Maximum Dz	0.39				
RMSE	0.321				
Standard Deviation	0.252				
Point	Easting	Northing	Known Z	LIDAR Z	Dz
11	1251621.47	487308.74	1016.76	1016.28	-0.48
12	1300221.31	492434.91	1332.67	1332.08	-0.59
306	1633322.87	289190.94	1257.04	1256.77	-0.27
356	1197355.38	403070.48	1044.85	1044.43	-0.42
357	1196224.70	457162.74	923.40	923.31	-0.09
358	1407749.97	472591.33	1495.87	1495.21	-0.66
359	1409385.01	420188.67	1528.32	1527.97	-0.35
368	1641486.93	411245.80	1647.74	1647.77	0.03
369	1632881.44	354866.43	1545.20	1544.82	-0.38
376	1269184.36	433752.72	1229.79	1229.82	0.04
377	1263625.20	365802.91	1072.35	1072.16	-0.19
378	1347870.88	379832.01	1439.63	1439.42	-0.21
379	1339078.20	442171.98	1449.07	1448.87	-0.20
380	1500135.74	465252.66	1549.31	1549.24	-0.06
381	1487607.20	380583.68	1457.52	1457.14	-0.38
382	1576565.02	403607.39	1734.93	1734.80	-0.13
383	1574573.14	465218.72	1645.20	1645.23	0.03
384	1559846.98	336794.26	1245.76	1245.72	-0.04
N63	1334352.86	364036.95	1282.01	removed	*
TT64K	1644238.74	517429.42	1881.97	1882.36	0.39

2006-OTHER CONTROL POINT COMPARISON

Statistical Analysis					
Average Dz	-0.102				
Minimum Dz	-0.471				
Maximum Dz	0.44				
RMSE	0.307				
Standard Deviation	0.3				
Point	Easting	Northing	Known Z	LIDAR Z	Dz
N63	1334309.34	667418.58	1282.01	removed	*
377	1263576.20	669146.40	1072.35	1071.88	-0.47
406	1510311.77	540832.45	1076.50	1076.04	-0.46
309	1308093.96	596589.28	1310.13	1309.74	-0.39
361	1415282.21	528986.54	1341.98	1341.60	-0.38
370	1625759.22	528769.59	1722.42	1722.11	-0.31
405	1566093.17	493290.68	1028.73	1028.49	-0.24
302	1187399.42	586463.38	1101.59	1101.37	-0.22
360	1411686.12	644308.34	1453.53	1453.35	-0.18
307	1493287.62	600135.32	1429.98	1429.86	-0.12
371	1642693.68	468349.58	1552.41	1552.40	-0.01
403	1583522.23	410542.54	1798.21	1798.23	0.02
355	1199736.30	632037.13	827.68	827.79	0.11
308	1410572.20	588316.41	1397.91	1398.20	0.29
301	1190801.34	596068.43	1100.17	1100.56	0.39
E402	1557804.36	538493.79	1219.07	1219.51	0.44

2007- 21 County Area- South Zone Collection Blocks

2007-RETTEW GPS CHECK POINT COMPARISON					
Statistical Analysis					
Average Dz	0.128				
Minimum Dz	-0.384				
Maximum Dz	0.873				
RMSE	0.289				
Standard Deviation	0.263				
Point	Easting	Northing	Known Z	LIDAR Z	Dz
BE-13	1896941.465	417145.201	609.456	609.87	0.414
BE-14	1663418.979	323761.348	2005.010	2005.08	0.070
BE-15	1591372.003	156232.769	2040.948	2040.74	-0.208
BE-16	1735827.262	168240.563	1104.858	1104.83	-0.028
BE-17	1844192.321	154495.452	520.028	520.06	0.032
BE-18	1978727.438	165499.253	642.032	642.20	0.168
BE-19	2120563.940	184574.054	535.074	534.91	-0.164
BE-20	2094842.077	281112.046	607.999	607.90	-0.099
BE-21	2138486.905	412871.381	405.625	405.47	-0.155
BR-13	1896825.322	416958.135	606.070	606.80	0.729
BR-14	1663268.889	324399.398	1988.325	1988.16	-0.165
BR-15	1590815.163	156351.231	2001.051	2001.23	0.178
BR-16	1730989.205	166198.409	1219.006	1219.41	0.404
BR-17	1844773.190	154262.271	539.632	539.95	0.318
BR-18	1978617.782	165436.866	652.292	652.36	0.068
BR-19	2120464.633	184599.619	531.612	531.82	0.208
BR-20	2095213.404	281195.812	599.823	600.14	0.317
BR-21	2138642.576	412827.484	401.955	402.22	0.265
FF-13	1897070.082	417367.683	610.694	611.19	0.496
FF-14	1663415.437	324191.340	1999.842	2000.11	0.268
FF-15	1590987.753	156425.453	2006.908	2006.97	0.062
FF-16	1735736.210	168137.908	1104.310	1104.67	0.360
FF-17	1844384.625	154326.817	532.962	532.86	-0.102
FF-18	1978712.195	165552.858	640.135	640.16	0.025
FF-19	2120527.505	184527.432	531.434	531.83	0.400
FF-20	2095045.171	281159.663	601.030	601.41	0.380
FF-21	2138832.963	413046.992	400.967	401.36	0.393
HG-13	1896887.594	417056.549	607.548	608.05	0.502
HG-14	1663321.516	324301.280	1990.751	1990.78	0.029

HG-15	1590892.977	156472.413	2000.973	2000.90	-0.073
HG-16	1735838.478	168488.682	1109.100	1109.12	0.020
HG-17	1844386.152	154429.391	525.371	525.44	0.069
HG-18	1978802.110	165709.064	638.690	638.76	0.070
HG-19	2120606.210	184532.550	535.978	536.18	0.202
HG-20	2095139.429	281092.446	603.187	604.06	0.873
HG-21	2138148.063	413236.325	418.941	419.02	0.079
UA-13	1896517.424	417368.405	613.883	613.92	0.037
UA-14	1663431.179	323628.819	2009.610	2009.30	-0.310
UA-15	1591486.433	156235.564	2047.714	2047.33	-0.384
UA-16	1735772.835	168241.752	1107.386	1107.44	0.054
UA-17	1844495.783	154379.882	526.270	526.08	-0.190
UA-18	1976721.578	165354.594	611.331	611.37	0.039
UA-19	2120720.136	184623.923	542.519	542.69	0.171
UA-20	2091911.927	280387.155	611.939	612.09	0.151
UA-21	2140840.125	416814.873	391.815	391.59	-0.225

2007-OTHER CONTROL POINT COMPARISON

Statistical Analysis					
Average Dz	-0.007				
Minimum Dz	-0.73				
Maximum Dz	0.79				
RMSE	0.292				
Standard Deviation	0.294				
Point	Easting	Northing	Known Z	LIDAR Z	Dz
737	2168717.999	348136.685	447.667	447.960	-0.51
814	2026310.042	132857.926	716.982	717.320	-0.46
706	2187495.148	440303.509	430.990	431.340	-0.45
716	2160048.443	142613.193	628.418	628.830	-0.39
748	2084804.079	387190.432	733.774	734.280	-0.29
763	2071720.751	283927.035	720.286	720.800	-0.29
754	1783814.094	247262.397	1107.873	1108.450	-0.22
762	1978650.010	263949.534	742.956	743.540	-0.22
713	2184697.110	221446.229	421.872	422.470	-0.20
767	2022885.225	186642.158	854.623	855.240	-0.18
723	1785241.241	133493.666	1634.456	1635.080	-0.18
709	2200449.574	343877.784	388.629	389.270	-0.16
719	1974366.381	141574.010	673.835	674.510	-0.13
755	2124521.166	290918.048	566.815	567.490	-0.13

708	2185202.398	378053.217	444.591	445.270	-0.12
745	1971422.956	424739.545	507.050	507.730	-0.12
750	2103741.573	448162.329	645.178	645.880	-0.098
764	1992839.745	220749.568	603.833	604.540	-0.093
714	2193729.542	190079.778	1162.099	1162.820	-0.079
735	2101361.188	347636.382	902.249	903.000	-0.049
741	1939842.323	170715.491	520.254	521.010	-0.044
712	2177022.172	244611.354	439.237	440.010	-0.027
765	2050006.477	233355.655	1900.467	1901.240	-0.027
768	2127940.573	202865.525	559.735	560.510	-0.025
724	1730858.079	137274.964	1004.532	1005.320	-0.012
720	1936047.040	139241.487	525.743	526.580	0.037
734	2054799.201	337072.487	650.565	651.420	0.055
802	2137355.892	427486.215	564.935	565.790	0.055
74	2154096.369	483958.948	681.987	682.870	0.083
766	2121914.437	247309.676	797.115	798.030	0.115
707	2196298.250	414667.042	410.077	411.000	0.123
773	1765389.303	177277.422	1043.139	1044.070	0.131
753	2008509.761	298877.216	740.955	741.910	0.155
742	2075563.537	165942.670	606.632	607.600	0.168
816	2132318.707	163002.335	509.276	510.270	0.194
717	2094707.752	142735.303	516.875	517.910	0.235
815	2098634.776	132496.138	419.331	420.430	0.299
769	1823431.627	292107.397	871.530	872.660	0.33
73	2111523.943	487095.472	732.114	733.270	0.356
751	2008668.957	377900.930	631.169	632.350	0.381
749	2136790.006	385775.199	713.570	714.760	0.39
746	2023782.922	453850.366	550.660	551.910	0.45
747	2066963.995	417916.637	1128.713	1130.120	0.607
772	1743784.381	229423.679	1258.077	removed	*
203	1696931.443	184000.707	1000.776	1000.150	-0.726
314	1849681.444	475991.242	1024.597	1024.110	-0.587
209	1604047.522	207121.458	2406.082	2405.630	-0.552
774	1820891.643	185282.426	1177.273	1176.850	-0.523
200	1734444.023	339882.791	1449.166	1448.760	-0.506
203A	1696802.263	184048.037	1002.266	1001.870	-0.496
207	1555375.474	142246.856	2670.123	2669.770	-0.453
727	1772851.010	352963.195	1150.975	1150.700	-0.375
730	1846647.175	438729.989	1057.591	1057.370	-0.321
771	1849365.126	250789.454	1866.645	1866.440	-0.305
813	1883079.421	132596.437	445.378	445.270	-0.208

752	1836056.905	494231.808	1015.340	1015.300	-0.14
201	1711777.054	312048.057	1869.925	1869.890	-0.135
201	1711777.054	312048.057	1869.925	1869.890	-0.135
770	1881875.833	289017.549	851.157	851.160	-0.097
197	1608399.557	350031.240	2238.103	2238.110	-0.093
733	1977705.331	346709.694	734.956	734.970	-0.086
756	1674756.681	284196.157	2167.945	2167.960	-0.085
195	1577515.224	304467.756	2741.285	2741.320	-0.065
202A	1692906.390	260529.096	1827.142	1827.190	-0.052
210	1617276.736	283459.560	1995.390	1995.440	-0.05
725	1681508.143	222099.528	2221.138	2221.200	-0.038
194	1537554.498	257108.884	2548.239	2548.320	-0.019
332	1761838.324	312308.079	1328.436	1328.550	0.014
211	1653123.590	235766.596	2371.744	2371.860	0.016
329	1851821.404	347264.159	1225.602	1225.730	0.028
205	1665542.129	144300.304	1777.374	1777.520	0.046
205	1665542.129	144300.304	1777.374	1777.520	0.046
805	1936262.096	302191.779	1051.667	1051.820	0.053
743	1907148.142	433701.353	634.079	634.240	0.061
317	2006215.011	486979.057	770.941	771.120	0.079
728	1833556.018	378497.479	1164.391	1164.590	0.099
739	1936803.006	273344.941	974.034	974.240	0.106
198	1645975.604	337424.724	1751.028	1751.270	0.142
323	1947684.303	481364.292	763.283	763.540	0.157
744	1917208.874	389022.405	782.873	783.150	0.177
731	1891239.183	349161.243	1269.632	1269.910	0.178
202	1692898.745	260536.820	1827.258	1827.570	0.212
208A	1547884.557	215017.574	2278.354	2278.700	0.246
204	1688362.141	164455.329	1037.058	1037.410	0.252
722	1846822.381	136826.645	563.476	563.850	0.274
810	1941011.280	243428.504	1147.469	1147.850	0.281
775	1890257.760	194146.658	774.978	775.390	0.312
206	1616374.431	151820.627	2463.731	2464.180	0.349
196	1592458.149	345114.150	2364.487	2365.020	0.433
72A	2066614.094	501838.557	704.641	705.350	0.609
702	1898875.142	499869.671	1081.503	1082.360	0.757
732	1933774.933	348029.830	662.985	663.870	0.785

2008- 25 County Area- South Zone Collection Blocks

2007-RETTEW GPS CHECK POINT COMPARISON					
Statistical Analysis					
Average Dz	0.169				
Minimum Dz	-0.819				
Maximum Dz	0.84				
RMSE	0.393				
Standard Deviation	0.358				
Point	Easting	Northing	Known Z	LIDAR Z	Dz
BE1	2339992.48	182761.96	700.01	700.62	0.61
BR1	2339980.61	182687.90	698.92	699.76	0.84
FF1	2340326.37	183297.89	700.60	700.97	0.37
HG1	2340010.05	183262.44	704.46	704.78	0.33
UA1	2340308.31	182470.29	700.91	701.51	0.60
BE2	2439580.61	227240.14	668.71	668.44	-0.27
BR2	2439483.36	227244.07	666.99	outside	*
FF2	2439477.44	227367.96	658.36	658.98	0.62
HG2	2439617.61	227170.17	666.27	665.80	-0.47
UA2	2435768.34	224671.99	677.52	677.96	0.44
BE3	2239531.08	367237.71	472.86	472.38	-0.48
BR3	2239417.56	366961.23	454.68	454.72	0.04
FF3	2239690.31	367280.17	468.98	468.83	-0.15
HG3	2239625.39	367275.23	471.38	470.83	-0.55
UA3	2239511.11	367341.11	471.12	470.30	-0.82
BE4	2361274.56	414459.74	496.08	496.49	0.41
BR4	2360486.53	414177.62	477.48	478.14	0.66
FF4	2360406.26	414158.47	476.92	477.49	0.58
HG4	2360656.20	414096.85	483.70	484.29	0.59
UA4	2360662.93	414246.01	485.16	485.40	0.25
BE5	2494974.88	410828.82	402.56	402.78	0.22
BR5	2495193.10	410441.81	411.79	412.51	0.72
FF5	2494927.53	410569.09	407.13	407.65	0.52
HG5	2494638.63	410234.17	423.97	424.12	0.15
UA5	2495111.57	411207.45	393.06	393.26	0.20
BE7	2623752.41	447241.30	395.68	395.69	0.01
BR7	2623712.42	447169.31	396.19	396.44	0.25
FF7	2623754.72	446864.66	397.17	397.27	0.10
HG7	2623748.54	447338.28	394.90	394.82	-0.08

UA7	2623049.15	447018.77	401.63	401.52	-0.11
BE8	2766842.88	349419.54	221.08	221.31	0.23
BR8	2766892.29	349552.28	217.35	removed	*
FF8	2766786.76	349690.87	223.55	223.87	0.32
HG8	2766866.47	349638.48	221.22	221.08	-0.14
UA8	2767658.63	350243.66	232.51	232.85	0.34
BE9	2606909.07	205269.32	305.39	305.28	-0.11
BR9	2607065.06	205829.43	312.74	313.04	0.30
FF9	2606849.80	205846.24	314.62	314.84	0.22
HG9	2606914.14	205451.80	311.38	311.40	0.02
UA9	2606798.80	205224.05	310.02	309.90	-0.12
BE12	2610507.89	258380.22	463.72	463.66	-0.06
BR12	2610712.94	258491.26	461.01	outside	*
FF12	2610615.61	258075.68	449.44	449.18	-0.26
HG12	2610561.49	258401.90	464.03	463.98	-0.05
UA12	2610315.99	258507.33	456.50	456.51	0.01
BE20	2243195.98	281033.55	299.89	300.22	0.33
BR20	2243021.13	280671.33	306.62	307.45	0.83
FF20	2242945.47	280662.73	310.67	311.09	0.42
HG20	2243223.37	280701.26	298.37	298.80	0.43
UA20	2243655.06	280823.00	291.34	291.28	-0.06
M6	2295798.86	278343.24	462.41	462.31	-0.10
M368	2390450.86	198664.94	668.31	668.03	-0.28
BRANDPORT	2576573.66	246768.61	462.90	462.96	0.06
BM	2569762.40	237274.53	475.60	475.76	0.16
11B1	2790605.55	353802.53	131.49	outside	*
JORDAN	2597529.53	479595.78	334.06	334.74	0.68
KRUMS	2510768.25	459303.19	772.24	772.50	0.26
STRAUSS	2401859.99	428395.84	642.24	642.44	0.20
WOLFE	2282794.16	397029.82	512.29	512.35	0.06

APPENDIX A

LIDAR MISSION LOGS

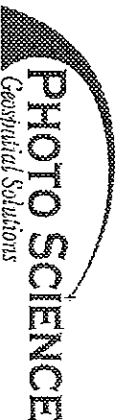
APPENDIX A

LIDAR MISSION LOGS: PAMAP 2006

LIDAR MISSION RECORD SHEET

Project Name	04 2006 CIVAR
Project Number	5855-013
Navigation File	04-FLAVK

Pilot	LIVERMORE
Tech	MADDY
Aircraft	N73206



Project's Laser Requirements		
FOV:	420	Attenuator: 0
Scan Rate:	29.0	Returns: 413
Pulse Rate:	54,000	Ground Speed: 188 KTS

Data Storage

Laser Drive #	2
IMU Card #	2
File Name:	060321B
First File #	43
Last File #	62

Begin Temp (AWOS/ADIS)	-6°C
Begin Dewpt (AWOS/ADIS)	-15°C
End Temp (AWOS/ADIS)	-3°C
End Dewpt (AWOS/ADIS)	-13°C

Date Flown	3-21-06
Takeoff Time	0948
Landing Time	1220
GPS Base Location	PSIBASEFLK
PDOP Times to Avoid	1315-1340, 1745-1825
Static Start or Flyover	START

Laser On Time	0953
Laser Off Time	1210

On-Board Antenna Offset		
X = -0.07	Y = 0.05	Z = -1.10

MISSION #	FL #	Groundspeed	Heading	Alt. AMSL	% Returns	DEGREES CLEAR	NOTES
060321-150451	9	130	S	6840	100	3	ICE ON LAKEST FIELDS, SOME SNOW
"	-151936	128	N	6840	100	1	
"	-153522	129	S	6840	100	4	
"	-160252	128	N	6750	100	1	
"	-161745	125	S	6750	100	4	
"	-163231	131	N	6750	100	1	
"	-164612	124	S	6750	100	3	
"	-165822	130	N	6750	100	1	
"	-170747	128	S	6640	100	4	

LIDAR MISSION RECORD SHEET

Project Name	PA 2006 LIDAR
Project Number	5855-013
Navigation File	PA-FRANK_PD-CROSS

Pilot	LIVERMORE
Tech	MOUSY
Aircraft	N73206



Project's Laser Requirements		
FOV:	42.0	Attenuator: 0
Scan Rate:	29	Returns: 443
Pulse Rate:	54,000	Ground Speed: 125 KTS

Data Storage	
Laser Drive #	4
IMU Card #	4
File Name:	060321C
First File #	0
Last File #	19

Begin Temp (AWOS/ADIS)	80.0	-1°C
Begin Dewpt (AWOS/ADIS)	70.0	-12°C
End Temp (AWOS/ADIS)		-1°C
End Dewpt (AWOS/ADIS)		-11°C

Date Flown	3-21-06
Takeoff Time	1420
Landing Time	1650
GPS Base Location	ASFBASEKI
PDOP Times to Avoid	1745-1825
Static Start or Flyover	STATIC

Laser On Time	1428
Laser Off Time	1643

On-Board Antenna Offsets			
X = -0.07	Y = 0.05	Z = -1.10	

MISSION #	FL #	Groundspeed	Heading	Alt. AMSL	% RETURNS	DEGREES of CLAS	NOTES
060321-193407	17	123	SE	6450	100	3	PA-CROSS
" -195449	37	129	N	6840	100	1	PA-FRANK
" -200914	38	129	S	6750	100	1	
" -202253	39	131	N	6750	100	1	
" -203951	40B	134	S	6750	100	1	
" -205206	41	133	N	6840	100	2	
" -210146	42	133	S	6840	100	1	
" -211723	36B	133	S	6756	100	1	
" -213221	35	128	N	6840	100	2	



Station Occupation Report For Airborne GPS

Project: PA 2006 LIDAR
Location: VENANGO REGIONAL AIRPORT (FKL)
FRANKLIN, PA AIRPORT
Completed by: MOURAY
Receiver: 2
Receiver Type: TRIMBLE 5700
Antenna Type: 2EPM4R GEODATA
Station ID: PSE BASE FKL PSE BASE FKL
Start -- H.I. (m): 1.499
End -- H.I. (m): 1.499
H.I. (ft): 4.29
Start Time: 0840 - 1333, 1420 - 1655
End Time: 1330, 1655
Time Zone: EASTERN
Operator: MADON, MURRAY



Comments M
1.499
1.499
1.499

LIDAR MISSION RECORD SHEET

Project Name	PA LIDAR 2006
Project Number	5855-013
Navigation File	PA-FLINK

Pilot	LIVERMORE
Tech	MOUNT
Aircraft	N7920G



Project's Laser Requirements		
FOV:	42°	Attenuator: 0
Scan Rate:	29	Returns: 4+3
Pulse Rate:	54,000	Ground Speed: 128 KTS

Data Storage

Laser Drive #	3
IMU Card #	3
File Name:	660327A
First File #	0
Last File #	18

Begin Temp (AWOSIADIS)	-3°C
Begin Dewpt (AWOSIADIS)	-6°C
End Temp (AWOSIADIS)	2°C
End Dewpt (AWOSIADIS)	-8°C

Date Flown	3-27-06
Takeoff Time	0702
Landing Time	0923
GPS Base Location	PSIFKLRBASE
PDOP Times to Avoid	0920-0950
Stall Start or Flyover	STATIC

Laser On Time	0707
Laser Off Time	0912

On-Board Antenna Offsets		
X = -0.07	Y = 0.05	Z = -1.10

MISSION #	FL #	Groundspeed	Heading	Alt. AMSL	% RETURNS	DEGREES OF CLAR	NOTES
060327-122605	10	126	S	6840	100	7	
060327-123615	11	130	N	6840	100	4	
060327-125145	13	126	S	6840	100	7	
060327-130658	12	132	N	6750	100	4	
060327-132157	14	132	S	6750	100	6	OFF AT NORTH END
060327-134443	15B	128	N	6750	100	4	
060327-140119	16	127	S	6750	99	6	

201
201
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LIDAR MISSION RECORD SHEET

Project Name	PA LIDAR 2006
Project Number	5855-013
Navigation File	PA-FRANK

Pilot	LIVERMORE
Tech	MOODY
Aircraft	NT322G



2670 Willble Drive
Lexington, KY 40503
Phone: (859) 277-8700
Fax: (859) 277-8901

Project's Laser Requirements		
FOV:	420	Attenuator: 0
Scan Rate:	29	Returns: 4+3
Pulse Rate:	54,000	Ground Speed: 128 KTS

Data Storage	
Laser Drive #	3
IMU Card #	3
File Name	060327B
First File #	19
Last File #	39

Begin Temp (AWOSI/ADIS)	30°C
Begin Dewpt. (AWOSI/ADIS)	-9°C
End Temp (AWOSI/ADIS)	7°C
End Dewpt. (AWOSI/ADIS)	-8°C

Date Flown	3-27-06
Takeoff Time	1010
Landing Time	1258
GPS Base Location	PSI FKL BASE
PDOP Times to Avoid	
Static Start or Flyover	STATIC

Laser On Time	1018
Laser Off Time	1245

On-Board Antenna Offsets		
x = -0.07	y = 0.05	z = -1.10

MISSION #	FL #	Groundspeed	Heading	Alt. AMSL	% FILTERS	DEGREES OF CARG	NOTES
0603027-152616	23	130	S	6840	100	6	
060327-154426	22	130	N	6840	100	5	
060327-160040	21	128	S	6840	100	5	
060327-161624	20	131	N	6750	100	4	
060327-163246	19	128	S	6750	100	5	
060327-164751	18	129	N	6750	100	4	
060327-170302	17	129	S	6750	100	5	
060327-171809	24	128	N	6840	100	4	
060327-173344	25	128	S	6840	100	5	

LIDAR MISSION RECORD SHEET

Project Name	PA LIDAR 2006
Project Number	SBSS-013
Navigation File	PA-FKL, PA-CR4, ANNAWVA

Pilot	LUCKETT
Tech	BRANK
Aircraft	N7320G



Project's Laser Requirements	
FOV:	42.0
Scan Rate:	29.0
Pulse Rate:	54000
Attenuator:	Ø
Returns:	4+3
Ground Speed:	128 kts.

Data Storage	
Laser Drive #	3
IMU Card #	3
File Name:	060327C
First File #	040
Last File #	064

Begin Temp (AWOS/ADIS)	09°C
Begin Dewpt (AWOS/ADIS)	-06°C
End Temp (AWOS/ADIS)	08°C
End Dewpt (AWOS/ADIS)	-08°C

Date Flown	MARCH 27 th , 2006
Takeoff Time	144 ^p EST
Landing Time	458 ^p EST
GPS Base Location	RS1 FKL BASE
PDOP Times to Avoid	5 ^{2p} → 6 ⁰⁵
Static Start or Flyover	STATIC

Laser On Time	146 ^p
Laser Off Time	449 ^p

On-Board Antenna Offset	X = -0.07	Y = 0.05	Z = -1.10
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MISSION #	FL #	Groundspeed	Heading	Alt. AMSL	NOTES
060327-185155	26	~128 kts.	S	6750'	~100% returns, ~4° sub
060327-190455	31	~128 kts.	N	6750'	skc, -hub
060327-191859	27	~130 kts.	S	6750'	~100% " , ~3° "
060327-193142	32	~128 kts.	N	6750'	~100% " , ~4° "
060327-194535	28	~128 kts.	S	6750'	~100% " , ~3° "
060327-195842	33	~128 kts.	N	6840'	~100% " , ~4° "
060327-201257	29	~128 kts.	S	6750'	~100% " , ~4° "
060327-202524	34	~128 kts.	N	6750'	~100% " , ~4° "
060327-203829	30	~130 kts.	S	6750'	~100% " , ~3° "
060327-205545	6	~128 kts.	N	6840'	~100% " , ~3° "
060327-210855	7	~128 kts.	S	6840'	~100% " , ~2° "
060327-212146	5	~125 kts.	N	6840'	~100% " , ~2° "
060327-213322	3	~128 kts.	S	6750'	~100% " , ~2° "
060327-214355	2	~128 kts.	N	6950'	~100% " , ~3° "

CLARION

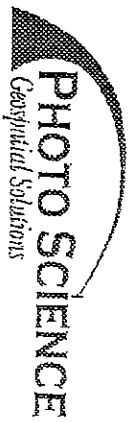
LIDAR MISSION RECORD SHEET

Process no [unclear] from 180 minutes (for 100% fill)

30%

Project Name	PA LIDAR 2006
Project Number	S855-013
Navigation File	PA-TITUS

Pilot	LUCKETT
Tech	ARABAK
Aircraft	N7320G



Project's Laser Requirements	
FOV:	42.0
Scan Rate:	29.0
Pulse Rate:	54000
Attenuator:	0
Returns:	4+3
Ground Speed:	128 kts

Data Storage	
Laser Drive #	4
IMU Card #	4
File Name:	060327D
First File #	005
Last File #	027

Begin Temp (AWOSIADIS)	07°C
Begin Dewpt. (AWOSIADIS)	08°C
End Temp (AWOSIADIS)	03°C
End Dewpt. (AWOSIADIS)	-09°C

Date Flown	MARCH 27th 2006
Takeoff Time	6:30p EST
Landing Time	9:12p EST
GPS Base Location	PSI TRAKE FWL & UPTL CORRS
PDOP Times to Avoid	5:30p - 6:30p
Static Start or Flyover	307th

Laser On Time	6:30p EST
Laser Off Time	9:33p EST

On-Board Antenna Offsets	x = -0.07	y = 0.05	z = -1.10
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TERRAMORCH ← TITUSVILLE →

MISSION #	FL #	Groundspeed	Heading	Alt. AMSL	NOTES
060327-285735	1	~128 kts.	E	6950'	~100% returns, ~3° swb
060328-000650	5	~128 kts.	W	6950'	~100% " , ~30" "
060328-002337	2	~128 kts.	E	6840'	~100% " , ~20" "
060328-004051	6	~128 kts.	W	6950'	~100% " , ~30" "
060328-005812	3	~130 kts.	E	6950'	~100% " , ~20" "
060328-011351	7	~128 kts.	W	6950'	~100% " , ~30" "
060328-013215	4	~128 kts.	E	6950'	~100% " , ~20" "
060328-014835	8	~128 kts.	W	6950'	~100% " , ~20" "
060328-022112	101	~105 kts.	W	~6350	
060328-026229	102	~120 kts.	E	~6750	
060328-023229	103	~90 kts.	S	~6500	

lines over FILL for check by Terramorph/GeoM.



Station Occupation Report For Airborne GPS

Project: LIDAR PA 2006

Location: VENANGO AIRPORT, FRANKLIN PA Project Number: 5855-013

Completed by: MOUDY & HRAJSAK Date: 3-27-06

Receiver: 1

Receiver Type: TRIMBLE 5700

Antenna Type: ZEPHYRUS GEODETIC

Station ID: PSIFKLBASE

Start -- H.I. (m): 1.438

End -- H.I. (m): 1.438 m

H.I. (ft): 4.717

Start Time: 0620

End Time: 21:55

Time Zone: EASTERN

Operator: MOUDY & PNH



Comments METERS

1.438

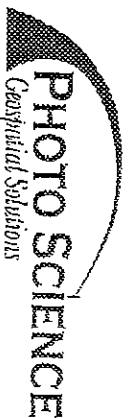
1.437

1.438

LIDAR MISSION RECORD SHEET

Project Name	PA LIDAR 2006
Project Number	S855 013
Navigation file	PA-TTUS

Pilot	LUCYETT
Tech	HRARAK
Aircraft	N73266



Project's Laser Requirements	
FOV:	4/20
Attenuator:	0
Scan Rate:	29.0
Returns:	4+3
Pulse Rate:	54000
Ground Speed:	128 kts.

Data Storage	
Laser Drive #	2
IMU Card #	2
File Name:	060329C
First File #	059
Last File #	080

Begin Temp (AWOSIADIS)	12°c
Begin Dewpt. (AWOSIADIS)	-02°c
End Temp (AWOSIADIS)	07°c
End Dewpt. (AWOSIADIS)	-03°c

Date Flown	MARCH 29th, 2006
Takeoff Time	6:08 P EST
Landing Time	9:12 P EST
GPS Base Location	P31 BASE-FKL & UPTL CORN
PDOP Times to Avoid	none fought
Static Start or Flyover	30TH

Laser On Time	6:12 P EST
Laser Off Time	8:51 P EST

On-Board Antenna Offset	X = -0.07	Y = 0.05	Z = -1.10
-------------------------	-----------	----------	-----------

MISSION #	FL #	Groundspeed	Heading	Alt. AMSL	NOTES	
060329-233235	9	~128 kts	E	6950'	~100% returns ~2° cdb	
060329-234918	13	~128 kts	W	6950'	~100% " ~40"	sk, haze, turb
060330-000752	10	~128 kts	E	6950'	~100% " ~20"	" " " "
060330-002547	14	~128 kts	W	6950'	~100% " ~40"	" " " "
060330-004431	11	~128 kts	E	6950'	~100% " ~20"	" " " "
060330-010200	15	~128 kts	W	6950'	~100% " ~40"	" " " "
060330-012111	12	~128 kts	E	6950'	~100% " ~20"	" " " "
060330-013444	17	~128 kts	W	6950'	~100% " ~40"	" " " "

301

LIDAR MISSION RECORD SHEET

Project Name	PA LITAC 2006
Project Number	5855-013
Navigation File	PA-7TMS

Pilot	LUCKENT
Tech	HEARMAN
Aircraft	N33206



Project's Laser Requirements		
FOV:	42°	Attenuator:
Scan Rate:	29.0	Returns:
Pulse Rate:	54000	Ground Speed:

Date Flown	MM/DD/YYYY
Takeoff Time	9:58P EST
Landing Time	11:54P EST
GPS Base Location	R31 BASE FVL
PDOP Times to Avoid	wave depth!
Static Start or Flyover	START

Data Storage	
Laser Drive #	2
IMU Card #	2
File Name:	060329D
First File #	000
Last File #	014

Begin Temp (AWOS/ADS)	06°C
Begin Dewpt. (AWOS/ADS)	-03°C
End Temp (AWOS/ADS)	05°C
End Dewpt. (AWOS/ADS)	-03°C

Laser On Time	10:22P EST
Laser Off Time	11:41P EST

On-Board Antenna Offsets		
X = -0.07	Y = 0.05	Z = -1.10

MISSION #	FL #	Groundspeed	Heading	Alt. AMSL	NOTES
060330-030724	29	~128 kts.	E	6750'	100% returns, ~20 orb skt, haze
060330-031935	32	~128 kts.	W	6950'	100% " " " " (corr. stream at 6750')
060330-032946	30	~128 kts.	E	6750'	100% " " " "
060330-034212	33	~128 kts.	W	6950'	100% " " " "
060330-035733	31	~130 kts.	E	6940'	100% " " " "
060330-040204	27	~128 kts.	W	6840'	100% " " " "
060330-041650	28	~128 kts.	E	6940'	100% " " " "
060330-042915	34	~128 kts.	W	6950'	100% " " " "
060330-043752	35	~128 kts.	E	6950'	100% " " " "



Station Occupation Report For Airborne GPS

Project: LIDAR PA2006

Location: VENANGO AIRPORT, FRANKLIN, PA Project Number: 5855-013

Completed by: MOUDY & PNH Date: 3-29-06

Receiver: 2

Receiver Type: TRIMBLE S700

Antenna Type: ZEPHYR GEODETIC

Station ID: PSIFKLBASE

Start -- H.I. (m): 1.420

End -- H.I. (m): 1.419

H.I. (ft): 4.658

Start Time: 0947 | 1419

End Time: 1203 | 2400

Time Zone: EASTERN

Operator: MOUDY & PNH



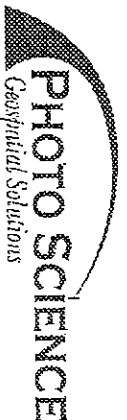
Comments

<u>1.420</u>	<u>4.658</u>
<u>1.419</u>	<u>4.657</u>
<u>1.420</u>	<u>4.658</u>

LIDAR MISSION RECORD SHEET

Project Name	LIDAR PA2006
Project Number	5855-013
Navigation File	PA-TTUS

Pilot	LIVEAMORIC
Tech	MEUDY
Aircraft	N7320G



Project's Laser Requirements

FOV:	42.0	Attenuator:	0
Scan Rate:	29.0	Returns:	4+3
Pulse Rate:	54,000	Ground Speed:	128 KTS

Data Storage

Laser Drive #	1
IMU Card #	1
File Name:	060330A
First File #	0
Last File #	18

Begin Temp (AVOS/ADIS)	-1°C
Begin Dewpt. (AVOS/ADIS)	-3°C
End Temp (AVOS/ADIS)	11°C
End Dewpt. (AVOS/ADIS)	1°C

Date Flown	3-30-06
Takeoff Time	0710
Landing Time	0954
GPS Base Location	UPTE
PDOP Times to Avoid	-
Static Start or Flyover	FLYOVER

Laser On Time	0717
Laser Off Time	0935

On-Board Antenna Offset			
X = -0.07	Y = 0.05	Z = -1.10	

MISSION #	FL #	Groundspeed	Heading	Alt. AMSL	% RETURNS	DECKETS OF CRAB	NOTES
060330-124543	19	133	E	6840	100	2	
060330-130324	20	130	W	6840	100	3	
060330-132205	21	136	E	6840	100	2	
060330-133825	24	130	W	6840	100	2	
060330-135349	25	128	E	6840	100	2	
060330-140810	26	128	W	6840	100	2	
060330-142152	23	128	E	6750	100	2	
<p>POTENTIALLY POLE ON LIDAR GLASS DURING THIS MISSION</p>							

LIDAR MISSION RECORD SHEET

Project Name	LIDAR PAZOOK
Project Number	5855-013
Navigation File	PA-GREEN

Pilot	LUCKETT
Tech	MOODY
Aircraft	N7920G



Project's Laser Requirements			
FOV:	42.0	Attenuator:	0
Scan Rate:	29.0	Returns:	443
Pulse Rate:	54,000	Ground Speed:	128 KTS

Data Storage	
Laser Drive #	1
IMU Card #	1
File Name:	060330c
First File #	38
Last File #	54

Begin Temp (AWOSIADIS)	18°C
Begin Dewpt. (AWOSIADIS)	1°C
End Temp (AWOSIADIS)	18°C
End Dewpt. (AWOSIADIS)	-1°C

Date Flown	3-30-06
Takeoff Time	1443
Landing Time	1716
GPS Base Location	GREENPORT
PDOP Times to Avoid	1710-1745
Static Start or Flyover	FLYOVER

Laser On Time	1447
Laser Off Time	1656

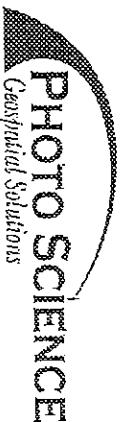
On-Board Antenna Offsets		
x = -0.07	y = 0.05	z = -1.10

MISSION #	FL #	Groundspeed	Heading	Alt. AMSL	% RFLTRAYS	DEGREES OF CARR	NOTES
060330-200435	7	128	E	6640	100	4	
060330-201948	8	132	W	6640	100	5	
060330-203433	9	129	E	6640	100	4	
060330-204835	10	130	W	6640	100	5	
060330-210248	11	131	E	6640	100	4	
060330-211704	12	131	W	6640	100	5	
060330-213113	13	130	E	6550	100	5	
060330-214539	14	131	W	6640	100	5	
[POTENTIAL FOR OIL ON LIDAR GLASS DURING THIS MISSION]							

LIDAR MISSION RECORD SHEET

Project Name	4104A PA2006
Project Number	5855-013
Navigation File	PA-CREEN

Pilot	LUCKETT
Tech	MOODY
Aircraft	N73206



2670 Willhite Drive
 Lexington, KY 40503
 Phone: (859) 277-8700
 Fax: (859) 277-8901

Project's Laser Requirements		
FOV:	42.0	Attenuator: 0
Scan Rate:	29.0	Returns: 443
Pulse Rate:	54,000	Ground Speed: 128 kts

Data Storage	
Laser Drive #	2
IMU Card #	2
File Name:	060330D
First File #	15
Last File #	35

Begin Temp (AWOS/AIS)	16°C
Begin Dewpt. (AWOS/AIS)	-1°C
End Temp (AWOS/AIS)	13°C
End Dewpt. (AWOS/AIS)	-2°C

Date Flown	3-30-06
Takeoff Time	1814
Landing Time	2114
GPS Base Location	GREENPORT
PDOP Times to Avoid	1710-1745
Static Start or Flyover	FLYOVER

Laser On Time	1820
Laser Off Time	2055

On-Board Antenna Offsets		
x = -0.07	y = 0.05	z = -1.10

MISSION #	FL #	Groundspeed	Heading	Alt AMSL	% RETURNS	DEGREES OF CRAW	NOTES
060330-234111	15B	128	E	6640	100	5	
060330-235459	16	129	W	6640	100	6	
060331-000840	17	130	E	6640	100	6	
060331-002218	18	128	W	6640	100	5	
060331-00355	19	129	E	6640	100	7	
060331-004937	20	128	W	6640	100	4	
060331-010253	21	130	E	6640	100	2	
060331-011609	22	127	W	6550	100	3	
060331-012919	23	129	E	6550	100	2	
060331-014241	24	126	W	6550	100	2	

*Station Occupation Report
For Airborne GPS*

Project:

PA LIDAR 2006

Location:

GREENVILLE, PA AIRPORT

Completed by:

PNH

Project Number: SB55-013

Date: MARCH 30th, 2006

Receiver:

"1" S/N 108

Receiver Type:

TRIMBLE 5700

Antenna Type:

ZEPHYR GEODETIC

Station ID:

GREENPORT

Start -- H.I. (m):

1.531 m

End -- H.I. (m):

1.531 m

H.I. (ft):

5.02 ft.

Start Time:

9:32 A

End Time:

9:55 P

Time Zone:

EST

Operator:

PNH

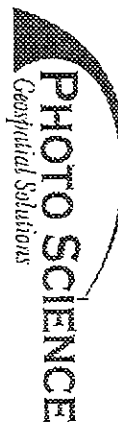


Comments

LIDAR MISSION RECORD SHEET

Project Name	2006 PAOLIDAE
Project Number	5855-013
Navigation File	PA-GREEN, PA-CROSS

Pilot	LIVERMORE
Tech	MONTY
Aircraft	N73206



2670 Willhite Drive
Lexington, KY 40503
Phone: (859) 277-8700
Fax: (859) 277-8901

628100
2-13-06

Project's Laser Requirements		
FOV:	42.0	Attenuator: 0
Scan Rate:	29.0	Returns: 443
Pulse Rate:	54,000	Ground Speed: 128 KTS

Data Storage	
Laser Drive #	4
IMU Card #	4
File Name:	060402A
First File #	82
Last File #	101

Begin Temp (AWOSIADIS)	13°C
Begin Dewpt. (AWOSIADIS)	-1°C
End Temp (AWOSIADIS)	14°C
End Dewpt. (AWOSIADIS)	0°C

Date Flown	4-2-06
Takeoff Time	1444
Landing Time	1730
GPS Base Location	GREENPORT
PDOP Times to Avoid	1755-1840
Static Start or Flyover	FLYOVER

Laser On Time	1448
Laser Off Time	1711

On-Board Antenna Offsets		
X = -0.07	Y = 0.05	Z = -1.10

MISSION #	FL #	Groundspeed	Heading	Alt AMSL	% Returns	DECKETS OF CARDS	NOTES
060402-200511	25	132	E	6550	100	6	PA-GREEN
060402-201825	26	131	W	6550	100	5	
060402-203156	27	130	E	6550	100	5	
060402-204516	28	128	W	6550	100	4	
060402-205954	29	128	E	6550	100	5	
060402-211236	30	130	W	6550	100	4	
060402-212726	1	131	N	6550	100	3	PA-CROSS
060402-214415	16	128	S	6550	100	1	↑
060402-220024	31	129	W	6550	100	5	PA-GREEN



Station Occupation Report For Airborne GPS

Project: 2006 PALIDAR

Location: GREENVILLE AIRPORT (GREENPORT) Project Number: 5855-013

Completed by: MOUDY Date: 4-2-06

Receiver: 2

Receiver Type: TRIMBLE 5700

Antenna Type: ZEPHYR GEODETIC

Station ID: GREENPORT

Start -- H.I. (m): 1,577

End -- H.I. (m): 1,577

H.I. (ft): 5,172

Start Time: 0945

End Time: 2243

Time Zone: EASTERN

Operator: MOUDY



Comments

POINT	METERS	FEET
3	1,576	5,170
1	1,577	5,172
6	1,577	5,172

LIDAR MISSION RECORD SHEET

Project Name	LIDAR PA2006
Project Number	8855-013
Navigation File	PA-NCSSR

Pilot	LUCKEY
Tech	MOODY
Aircraft	N77206



2670 Withie Drive

Lexington, KY 40503

Phone: (859) 277-8700

Fax: (859) 277-8901

Project's Laser Requirements		
FOV:	420	Attenuator: 0
Scan Rate:	25.0	Returns: 4+3
Pulse Rate:	54,000	Ground Speed: 128KTS

Data Storage

Laser Drive #	2
IMU Card #	2
File Name:	060406
First File #	37
Last File #	57

Begin Temp (AWOS/ADIS)	11°C
Begin Dewpt. (AWOS/ADIS)	-1°C
End Temp (AWOS/ADIS)	13°C
End Dewpt. (AWOS/ADIS)	-1°C

Date Flown	4-6-06
Takeoff Time	1447
Landing Time	1733
GPS Base Location	CAMPBELL
PDOP Times to Avoid	1735-1825
Static Start or Flyover	FLYOVER + STATIC

Laser On Time	1453
Laser Off Time	1725

On-Board Antenna Offsets		
x = -0.07	y = 0.05	z = -1.10

MISSION #	FL #	Groundspeed	Heading	Alt. AMSL	% RETURNS	DEGREES OF CANS	NOTES
060406-201523	13	127	S	6440	100	6	
060406-203020	14	128	N	6440	100	7	
060406-204538	15	128	S	6440	100	6	
060406-210032	16	127	N	6440	100	7	
060406-211503	17	128	S	6440	100	6	
060406-212946	18	130	N	6440	100	7	
060406-214412	19	128	S	6440	100	6	
060406-215852	20	128	N	6440	100	7	
060406-221312	21	130	S	6550	100	5	

LIDAR MISSION RECORD SHEET

Project Name	PA LIDAR 2006
Project Number	S855-013
Navigation File	PA-NCSTR

Pilot	Lucy EST
Tech	HPARK
Aircraft	N73206



2670 Millite Drive
Lexington, KY 40503
Phone: (859) 277-8700
Fax: (859) 277-8901

Project's Laser Requirements

FOV:	42	Attenuator:	0
Scan Rate:	29.0	Returns:	4+3
Pulse Rate:	54000	Ground Speed:	128 kts.

Data Storage

Laser Drive #	1
IMU Card #	1
File Name:	060406D
First File #	000
Last File #	021

Begin Temp (AWOS/ADIS)	13 °C
Begin Dewpt (AWOS/ADIS)	-02 °C
End Temp (AWOS/ADIS)	09 °C
End Dewpt (AWOS/ADIS)	-02 °C

Date Flown	April 6 th , 2006
Takeoff Time	6:59p
Landing Time	9:38p
GPS Base Location	CHST PORT
PDOP Times to Avoid	5350 ~ 6250
Static Start or Flyover	Both

Laser On Time	6 ⁴⁵ p
Laser Off Time	9:22p

On-Board Antenna Offsets		
x = -0.07	y = 0.05	z = -1.10

MISSION #	FL #	Groundspeed	Heading	All. AMSL	NOTES
060406-255108	22	~128 kts.	N	6550'	~100% returns, ~7° vrb
060407-000576	26	~128 kts.	S	6550'	over shore, -haze
060407-001914	23	~128 kts.	N	6550'	~100% " , ~8° "
060407-003409	27	~128 kts.	S	6640'	~100% " , ~7° "
060407-004745	24	~128 kts.	N	6440'	~100% " , ~8° "
060407-010155	28	~128 kts.	S	6550'	~100% " , ~8° "
060407-011533	25*	~128 kts.	N	6440'	~100% " , ~6° "
060407-012949	29	~128 kts.	S	6640'	~100% " , ~5° "
060407-015254	100	~85 kts.	S	8000'	~100% " , ~11° " 60° 42000 27-hz
060407-015726	201	~85 kts.	N	8000'	~100% " , ~13° "
060407-020233	300	~95 kts.	S	8000'	~100% " , ~10° "
060407-020731	301	~95 kts.	N	8000'	~100% " , ~14° "
060407-021227	200	~90 kts.	S	8000'	~100% " , ~9° "
060407-021639	101	~100 kts.	N	8000'	~100% " , ~11° "
060407-022157	400	~95 kts.	W	8000'	~100% " , ~8° "

ALBATROSS
HELICOPTER
OPERATION

**Station Occupation Report
For Airborne GPS**

Project: PA LIDAR 2006

Location: NEW CASTLE AIRPORT, PA (UCP)

Project Number: SB55-013

Completed by: PNH

Date: April 6th, 2006

Receiver: "1" (S/N 108)

Receiver Type: TRIMBLE S700

Antenna Type: ZEPHYR GEODETIC

Station ID: CASTPORT

Start -- H.I. (m): 1.443 m

End -- H.I. (m): 1.443

H.I. (ft): 4.735 ft.

Start Time: 7⁰⁶ A

End Time: 2144

Time Zone: EST

Operator: PNH



Comments

LIDAR MISSION RECORD SHEET

16 → 24 3pm

Project Name	FA LIDAR 2006
Project Number	SBSS-013
Navigation File	PA-CLRN1

Pilot	WALKETT
Tech	HENSKY
Aircraft	N73206



2670 White Drive
Lexington, KY 40503
Phone: (859) 277-8700
Fax: (859) 277-8901

Project's Laser Requirements	
FOV:	42°
Attenuator:	0
Scan Rate:	29.0
Returns:	4+3
Pulse Rate:	54000
Ground Speed:	128 kts.

Data Storage	
Laser Drive #	1
IMU Card #	1
File Name:	060408B
First File #	022
Last File #	

Begin Temp (AWOS/AIS)	07°C
Begin Dewpt (AWOS/AIS)	08°C
End Temp (AWOS/AIS)	01°C
End Dewpt (AWOS/AIS)	-12°C

Date Flown	April 8th, 2006
Takeoff Time	6:29p EDT
Landing Time	9:56p EDT
GPS Base Location	CLARK POTTS
PDOP Times to Avoid	5:30p → 6:30p
Static Start or Flyover	START

Laser On Time	6:33p EDT
Laser Off Time	9:32p EDT

On-Board Antenna Offsets		
X = -0.07	Y = 0.05	Z = -1.10

MISSION #	FL #	Groundspeed	Heading	Alt. AMSL	NOTES
060408-233322	10	~130 kts.	S	6840'	~100% return, ~7° only (off-line 12' water from start?) slope, haze, strong N wind
060408-234736	16	~125 kts.	N	6950'	~100% " " " " " " " " " "
060409-000400	13	~128 kts.	S	6840'	~100% " " " " " " " " " "
060409-001735	17	~128 kts.	N	6840'	~100% " " " " " " " " " "
060409-003248	14	~128 kts.	S	6840'	~100% " " " " " " " " " "
060409-004700	18	~128 kts.	N	6950'	~100% " " " " " " " " " "
060409-010709	15	~128 kts.	S	6840'	~100% " " " " " " " " " "
060409-012225	19	~128 kts.	N	6840'	~100% " " " " " " " " " "
060409-013723	22	~128 kts.	S	6840'	~100% " " " " " " " " " "
060409-015236	20	~128 kts.	N	6840'	~100% " " " " " " " " " "
060409-020719	23	~128 kts.	S	6840'	~100% " " " " " " " " " "
060409-022005	21	~128 kts.	N	6840'	~100% " " " " " " " " " "

*Station Occupation Report
For Airborne GPS*

Project: PA LIDAR 2006

Location: CLARION, PA AIRPORT (AXQ) **Project Number:** 5855-013

Completed by: PNH **Date:** APRIL 8th, 2006

Receiver: "1" (S/N 108)

Receiver Type: TRIMBLE S700

Antenna Type: ZEPHYR GEODETIC

Station ID: CLARPORT

Start -- H.I. (m): 1.589 m

End -- H.I. (m): 1.589

H.I. (ft): 5.21 ft.

Start Time: 3:49 p

End Time: 9:50 p

Time Zone: EDT

Operator: PNH



Comments

LIDAR MISSION RECORD SHEET

Project Name	PA LIDAR 2006
Project Number	SBSS-013
Navigation File	PA-CLR21

Pilot	LUKEEIT
Tech	HEARN
Aircraft	N33206



Project 09
at 10:00 AM

Project's Laser Requirements		
FOV:	420	Attenuator: 0
Scan Rate:	29.0	Returns: 413
Pulse Rate:	54000	Ground Speed: 128 kts.

Data Storage:	
Laser Drive #	1
IMU Card #	1
File Name:	060409A
First File #	047
Last File #	072

2670 Wilhite Drive
Lexington, KY 40503
Phone: (859) 277-8700
Fax: (859) 277-8901

Begin Temp (AWOS/ADIS)	00 °C
Begin Dewpt. (AWOS/ADIS)	-04 °C
End Temp (AWOS/ADIS)	06 °C
End Dewpt. (AWOS/ADIS)	-04 °C

Date Flown	April 9 th , 2006
Takeoff Time	9:24 AM EST
Landing Time	12:49 PM EDT
GPS Base Location	CLARKSPORT
PDOP Times to Avoid	5:25 PM - 6:19 PM
Static Start or Flyover	STATIC

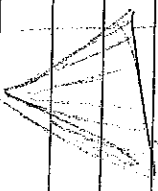
Laser On Time	9:24 AM EDT
Laser Off Time	12:37 PM EDT

On-Board Antenna Offsets		
X = -0.07	Y = 0.05	Z = -1.10

MISSION #	FL #	Groundspeed	Heading	Alt. AMSL	NOTES
060409_143145	31	~128 kts.	S	6840'	100% return, ~5° climb
060409_144654	43	~128 kts.	N	6950'	100% " , ~7° "
060409_145900	47	~128 kts.	S	7040'	100% " , ~6° " <i>clouds moving in from W</i>
060409_151223	48	~128 kts.	N	6950'	100% " , ~7° " <i>able to work a hole</i>
060409_152447	49	~130 kts.	S	6950'	100% " , ~6° " <i>" " " " " "</i>
060409_153735	50	~128 kts.	N	6950'	100% " , ~5° " <i>" " " " " "</i>
060409_154951	51	~130 kts.	S	6950'	100% " , ~6° " <i>" " " " " "</i>
060409_160237	52	~128 kts.	N	6950'	100% " , ~6° " <i>" " " " " "</i>
060409_161413	53	~130 kts.	S	6950'	100% " , ~6° " <i>" " " " " "</i>
060409_162714	54	~128 kts.	N	6950'	100% " , ~6° " <i>" " " " " "</i>
060409_163503	46	~128 kts.	S	6950'	100% " , ~5° " <i>" " " " " "</i>
060409_164629	42	~128 kts.	N	6950'	100% " , ~4° " <i>" " " " " "</i>
060409_165856	45	~128 kts.	S	6950'	100% " , ~5° " <i>" " " " " "</i>
060409_171040	41	~128 kts.	N	6950'	100% " , ~5° " <i>" " " " " "</i>
060409_172911	44	~128 kts.	S	6950'	100% " , ~4° " <i>" " " " " "</i>

mostly
sk. haze

read 56 miles
- 6 hours -



LIDAR MISSION RECORD SHEET

Project Name	PA LIDAR 2006
Project Number	S355-013
Navigation file	PA-CURN

Pilot	LUIGI ST
Tech	HRARAK
Aircraft	N33286

PHOTO SCIENCE
Geophysical Solutions

2670 Wildlife Drive
Lexington, KY 40503
Phone: (859) 277-8700
Fax: (859) 277-8901

Project's Laser Requirements	
FOV:	42°
Scan Rate:	29.0
Pulse Rate:	54000
Attenuator:	0
Returns:	4+3
Ground Speed:	128 kts

Date Flown	April 9th, 2006
Takeoff Time	1:34 p EDT
Landing Time	4:53 p EDT
GPS Base Location	CLARKSBORO
PDOP Times to Avoid	5.22 → 6.10
Static Start or Flyover	START

Data Storage	
Laser Drive #	2
IMU Card #	2
File Name:	06040913
First File #	0608
Last File #	0912

Laser On Time	1:40 p EDT
Laser Off Time	4:48 p EDT

Begin Temp (AWOS/AIS)	07 °C
Begin Damp (AWOS/AIS)	-05 °C
End Temp (AWOS/AIS)	11 °C
End Damp (AWOS/AIS)	-05 °C

On-Board Antenna Offsets	x = -0.07	y = 0.05	z = -1.10
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MISSION #	FL #	Groundspeed	Heading	Alt. AMSL	NOTES
060409_184733	40	~128 kts	S	6950'	~100% returns, ~4° wash
060409_185937	35	~128 kts	N	6840'	~100% " , ~5° "
060409_191224	39	~128 kts	S	6950'	~100% " , ~3° "
060409_192828	34	~128 kts	N	6950'	~100% " , ~5° " [VOID -192353]
060409_194144	38	~128 kts	S	6950'	~100% " , ~4° "
060409_195438	33	~128 kts	N	6840'	~100% " , ~4° "
060409_200914	37	~128 kts	S	6950'	~100% " , ~5° "
060409_202138	32	~128 kts	N	6840'	~100% " , ~5° "
060409_203459	36	~128 kts	S	6950'	~100% " , ~5° "
060409_204750	30	~128 kts	N	6840'	~100% " , ~4° "
060409_210135	27	~128 kts	S	6840'	~100% " , ~4° "
060409_211646	24	~128 kts	N	6840'	~100% " , ~3° "
060409_213137	28	~128 kts	S	6840'	~100% " , ~2° "
060409_214534	31	~128 kts	N	6840'	~100% " , ~4° "

Received special messages for 1st and 2nd legs: 9 miles for solution. Not used.

Survey done on road [521614] [11/11/06]

REDO OF 5.6 MILES (15)

Station Occupation Report For Airborne GPS

Project: PA LIDAR 2006

Location: CLARION, PA AIRPORT (AXQR)

Project Number: 5855-013

Completed by: PDH

Date: April 9th, 2006

Receiver: "1" (S/N 108)

Receiver Type: TRIMBLE 5700

Antenna Type: ZEPHYR GEODETIC

Station ID: CLARPORT

Start -- H.I. (m): 1.581m

End -- H.I. (m): 1.582m

H.I. (ft): 5.185 ft

Start Time: 8²⁰A

End Time: 5²⁰P

Time Zone: EDT

Operator: PDH



Comments



Station Occupation Report For Airborne GPS

Project: 2006 PA LIDAR

Location: CLARION, PA
CLARION COUNTY AIRPORT

Project Number: SR55-013

Completed by: MOUDY

Date: 4-13-06

Receiver: 2

Receiver Type: TRIMBLE 5700

Antenna Type: ZEPHYRUS GEODETIC

Station ID: CLARPORT

Start -- H.I. (m): 1.575

End -- H.I. (m): 1.575

H.I. (ft): 5.169

Start Time: 0852

End Time: 1152

Time Zone: EASTERN

Operator: MOUDY



Comments

POINT	M	F
1	1.576	5.170
3	1.575	5.168
6	1.575	5.169



Station Occupation Report For Airborne GPS

Project: 2006 PA LIDAR

Location: CLARON, PA
CLARON COUNTY AIRPORT

Project Number: 5855-013

Completed by: MOUDY

Date: 4-13-06

Receiver: 2

Receiver Type: TRIMBLE 5700

Antenna Type: ZEPHYR GEODETIC

Station ID: CLARPORT

Start -- H.I. (m): 1.626

End -- H.I. (m): 1.626

H.I. (ft): 5.338

Start Time: 1908

End Time: 2051

Time Zone: EASTERN

Operator: MOUDY



Comments

POINT	M	F
6	1.626	5.338
3	1.626	5.338
8	1.626	5.338

LIDAR MISSION RECORD SHEET

Project Name	PA LIDAR 2006
Project Number	5855-013
Navigation File	PA-CROSS, PA-LYNCH

Pilot	LUCKETT
Tech	MOODY
Aircraft	N73206



Project's Laser Requirements	
FOV:	4/2
Scan Rate:	29
Pulse Rate:	54,000
Attenuator:	0
Returns:	4+3
Ground Speed:	128 KTS

Data Storage	
Laser Drive #	2
IMU Card #	2
File Name:	060502M
First File #	14
Last File #	38

Begin Temp (AVOSIADIS)	18°C
Begin Dewpt. (AVOSIADIS)	-1°C
End Temp (AVOSIADIS)	21°C
End Dewpt. (AVOSIADIS)	-2°C

Date Flown	5-2-06
Takeoff Time	1057
Landing Time	1430
GPS Base Location	"PETERH"
PDOP Times to Avoid	-
Static Start or Flyover	FLYOVER

Laser On Time	1101
Laser Off Time	1415

On-Board Antenna Offsets	x = -0.07	y = 0.05	z = -1.10
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MISSION #	FL #	Groundspeed	Heading	Alt. AMSL	% RETURNS	Degrees of Climb	NOTES
060502-161649	9X	128	E	7040	100	1	PA-CROSS
060502-163227	12X	127	W	7040	100	2	↓
060502-164543	15	127	S	7040	100	2	PA-LYNCH
060502-170630	14	128	N	7040	100	2	
060502-171219	13	130	S	7040	100	0	
060502-172348	12	128	N	7040	100	4	
060502-173439	11	127	S	7040	100	1	
060502-174543	10	127	N	6950	100	1	
060502-175609	9	126	S	7040	100	1	
060502-180651	8	133	N	7040	100	1	
060502-181646	7	131	S	7040	100	1	
060502-182552	6	128	N	7040	100	2	
060502-183551	5	128	S	7040	100	1	
060502-184543	4	128	N	7040	100	1	
060502-185445	3	125	S	6950	100	1	
060502-190348	2	128	N	6950	100	4	
060502-191232	1	128	S	6950	100	2	

Station Occupation Report For Airborne GPS

Project: PA LIDAR 2006

Location: MARLENTOWN, PA N. FOREST CEMETERY **Project Number:** SB55-013
Completed by: PNH **Date:** MAY 2ND, 2006

Receiver: "1" (S/N 108)
Receiver Type: TRIMBLE 5700
Antenna Type: ZEPHYR GEODETIC
Station ID: -
Start -- H.I. (m): 1,452. m
End -- H.I. (m): -
H.I. (ft): 4,765 ft.
Start Time: 10³⁵A
End Time: 2³⁵P
Time Zone: EDT
Operator: PNH

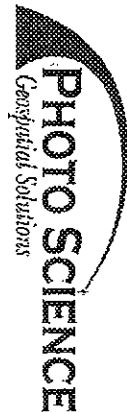


Comments ALUMINUM PSI CAP ON STEEL ROD FLUSH W/ GROUND
flyover @ 11⁰⁰A & @ 2⁰⁰P (10831220).

LIDAR MISSION RECORD SHEET

Project Name	PA LIDAR 2006
Project Number	S855-013
Navigator File	PA-LYNCH

Pilot	LUCKENT
Tech	Moubly
Aircraft	N7320G



Project's Laser Requirements		
FOV:	4/2	Attenuator: 0
Scan Rate:	29	Returns: 4/3
Pulse Rate:	54,000	Ground Speed: 128 kts

Data Storage	
Laser Drive #	3
IMU Card #	3
File Name:	060501B
First File #	22
Last File #	46

Begin Temp (AWOS/ADIS)	20°C
Begin Dewpt (AWOS/ADIS)	-4°C
End Temp (AWOS/ADIS)	17°C
End Dewpt (AWOS/ADIS)	-4°C

Date Flown	5-1-06
Takeoff Time	1653
Landing Time	2026
GPS Base Location	"PETE H"
PDOP Times to Avoid	1600 - 1640
Static Start or Flyover	FLOVER

Laser On Time	1658
Laser Off Time	2009

On-Board Antenna Offsets		
x = -0.07	y = 0.05	z = -1.10

MISSION #	FL #	Groundspeed	Heading	Alt AMSL	% RETURNS	DEGREES OF CLG	NOTES
060501-221330	36	128	S	7150	100	4°	
060501-222719	34	127	N	7150	100	5	
060501-224215	32	128	S	7150	100	4	
060501-225731	30	133	N	7150	100	4	
060501-231240	29	124	S	7150	100	4	
060501-232757	28	130	N	7150	100	4	
060501-234320	27	133	S	7040	100	5	
060501-235849	26	131	N	7040	100	4	
060502-001353	25	130	S	7040	100	4	
060502-002928	24	130	N	7040	100	4	
060502-004544	23	126	S	7040	100	4	
060502-005926	22	132	N	7150	100	5	

Station Occupation Report For Airborne GPS

Project: PA LiDAR 2006

Location: MARLENVILLE, PA - N FOREST CEMETERY **Project Number:** SB55-013
Completed by: PNH **Date:** MAY 1st, 2006

Receiver: "1" (S/N 108)

Receiver Type: TRIMBLE S700

Antenna Type: ZEPHYR GEODETIC

Station ID: -

Start -- H.I. (m): 1.508 m

End -- H.I. (m): 1.508 m

H.I. (ft): 4.945 ft.

Start Time: [8:20 A] [~12:15 P] [4:30 P]

End Time: [10:00 A] [3:32 P] [11:15 P]

Time Zone: EDT

Operator: PNH



Comments ALUMINUM PSI CAP DID NOT STAY IN PLACE FLUSH W/ GROUND

① unusable due to laser glitch (10831210)

② for 060501A (10831211)

③ for 060501B & 060501C (10831212)

LIDAR MISSION RECORD SHEET

Project Name	PA LINDAR 2006
Project Number	5855-013
Navigation File	PA-PUUX

Pilot	LIVERMORE
Tech	MURPHY
Aircraft	N7320C



Project's Laser Requirements		
FOV:	42	Attenuator: 0
Scan Rate:	29 (38 RT)	Returns: 4+3
Pulse Rate:	54,000	Ground Speed: 128 RTS

Data Storage	
Laser Drive #	4
IMU Card #	4
File Name:	0604308
First File #	23
Last File #	45

Begin Temp (AWOS/ADS)	16°C
Begin Dewpt. (AWOS/ADS)	-2°C
End Temp (AWOS/ADS)	19°C
End Dewpt. (AWOS/ADS)	-3°C

Date Flown	4-30-06
Takeoff Time	1206
Landing Time	1516
GPS Base Location	PUUXPORT
PDOP Times to Avoid	1125-1155, 1605-1640
Static Start or Flyover	FLYOVER

Laser On Time	1209
Laser Off Time	1500

On-Board Antenna Offsets		
X = -0.07	Y = 0.05	Z = -1.10

MISSION #	FL #	Groundspeed	Heading	ALT AMSL	% RETURNS	DEGREE OF CLAG	NOTES
060430-172529	21	129	N	6950	100	7	
060430-174244	19	123	S	6950	100	8	SCAN RATE 28 Hz AT 120 RTS
060430-180038	17	132	N	6950	100	8	
060430-181733	15	128	S	6950	100	9	
060430-183414	13	130	N	6950	100	8	
060430-185051	11	125	S	6950	100	8	
060430-190620	9	129	N	6840	100	7	
060430-192037	7	125	S	6840	100	8	
060430-193422	5	129	N	6840	100	7	
060430-194622	3	130	S	6840	100	7	

Station Occupation Report For Airborne GPS

Project: PA LIDAR 2006

Location: PUNXSUTAWNEY, PA AIRPORT

Project Number: SB55013

Completed by: PNH

Date: April 30th, 2006

Receiver: "1" (S/N 108)

Receiver Type: TRIMBLE S700

Antenna Type: ZEPHYR GEODESIC

Station ID: PUNXPOR25

Start -- H.I. (m): 1.572 m

End -- H.I. (m): _____

H.I. (ft): 5.16 ft.

Start Time:

7:57 ^A	↓	11:53 ^A	↓	4:37 ^P
11:30 ^A	↑	3:28 ^P	↑	10:20 ^P

End Time: _____

Time Zone: EST

Operator: PNH



Comments: flyover @ 8:25^A & 11:12^A 10831200

flyover @ 12:15^P & 3:02^P 10831201

flyover @ 5:10^P & 7:25^P 10831202

LIDAR MISSION RECORD SHEET

Project Name	PA LIDAR 2006
Project Number	5855-013
Navigation File	PA-KIT

Pilot	LUCKETT
Tech	MOODY
Aircraft	N73206



Project's Laser Requirements

FOV:	42	Attenuator:	0
Scan Rate:	29	Returns:	4+3
Pulse Rate:	54,000	Ground Speed:	128 KTS

Data Storage

Laser Drive #	3
IMU Card #	3
File Name:	060429B
First File #	22
Last File #	45

Begin Temp (AWOSI/ADS)	15°C
Begin Dewpt. (AWOSI/ADS)	-4°C
End Temp (AWOSI/ADS)	20°C
End Dewpt. (AWOSI/ADS)	-7°C

Date Flown	4-29-06
Takeoff Time	1215
Landing Time	1555
GPS Base Location	EUSEBIUS CEMETERY, "KITTA"
PDOP Times to Avoid	1125-1205, 1605-1645
State Start or Flyover	FLYOVER

Laser On Time	1221
Laser Off Time	1534

On-Board Antenna Offsets			
x = -0.07	y = 0.05	z = -1.10	

MISSION #	FL #	Groundspeed	Heading	Alt. AMSL	% RETURNS	DEGREE OF CLG	NOTES
060429-173514	26	128	E	6750	100	1	
060429-175216	25	130	W	6750	100	1	
060429-180919	19	127	E	6640	100	0	
060429-182755	18	126	W	6750	100	1	
060429-184618	17	130	E	6750	100	2	
060429-190429	16	130	W	6750	100	2	
060429-192246	15	126	E	6750	100	2	
060429-194038	14	127	W	6750	100	1	
060429-195935	13	128	E	6750	100	1	
060429-201622	12	130	W	6750	100	3	

Station Occupation Report For Airborne GPS

Project: PA LIDAR 2006

Location: ST. EUSEBIUS CEMETARY (KEYSTONE GPS 1) **Project Number:** SBSS 013

Completed by: PNH **Date:** April 29th, 2006
SAS.

Receiver: "1" (S/N 108)

Receiver Type: TRIMBLE S700

Antenna Type: ZEPHYR GEODESIC

Station ID: KEYSTONE GPS 1

Start -- H.I. (m): 1.484 m

End -- H.I. (m): 1.485 m

H.I. (ft): 4.87 ft.

Start Time:

8 ¹⁵ A	12 ⁰⁵ P
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End Time:

11 ²² A	4 ⁰⁰ P
--------------------	-------------------

Time Zone: EDT

Operator: PNH



Comments

① flyover @ 8¹⁵A & 11²²A 10831190

② flyover @ 12⁰⁵P & ? 10831191

**Station Occupation Report
For Airborne GPS**

Project: PA LIDAR 2006

Location: PUNXSUTAWNEY, PA AIRPORT **Project Number:** 5855-013
Completed by: PNH **Date:** APRIL 29th, 2006

Receiver: "1" (S/N 108)
Receiver Type: TRIMBLE 5700
Antenna Type: ZEPHYR GEODETIC
Station ID: PUNXPORT
Start -- H.I. (m): 1.530 m
End -- H.I. (m): _____
H.I. (ft): 5.02 ft.
Start Time: 5:32p EDT
End Time: 8:25p EDT
Time Zone: EDT
Operator: PNH



Comments

LIDAR MISSION RECORD SHEET

Project Name	PA LIDAR 2006
Project Number	5855-013
Navigation File	PA-NCSTL, PA-CROSS

Pilot	LIVRINGTON
Tech	MAUDY
Aircraft	N7320G



Project's Laser Requirements	
FOV:	42
Scan Rate:	29 (28) Returns: 423
Pulse Rate:	54,000 Ground Speed: 128 KTS

Data Storage	
Laser Drive #	4
IMU Card #	4
File Name:	060428A
First File #	1
Last File #	20

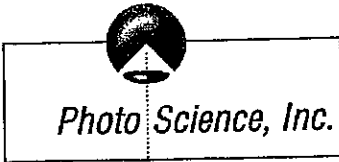
Begin Temp (AWOS/ADIS)	13°C
Begin Dewpt (AWOS/ADIS)	-5°C
End Temp (AWOS/ADIS)	16°C
End Dewpt (AWOS/ADIS)	-4°C

Date Flown	4-28-06
Takeoff Time	1316
Landing Time	1551
GPS Base Location	CASTROBT "NC 02"
PDOP Times to Avoid	1130-1200, 1610-1650
Static Start or Flyover	STARTK

Laser On Time	1322
Laser Off Time	1544

On-Board Antenna Offsets		
X = -0.07	Y = 0.05	Z = -1.10

MISSION #	FL #	Groundspeed	Heading	Alt. AMSL	% RETURNS	DEGREES OF CLAS	NOTES
060428-183541	CAL2	121	NE	6640	100	2	SCANN RATE OF 28HZ CALIBRATION AT 120 KTS
060428-184358	CAL2	130	SW	6640	100	2	
060428-185347	CAL3	130	NW	6640	100	6	↓
060428-190557	15	126	E	6640	100	4	PA-CROSS
060428-192924	36	132	S	6640	100	4	PA-NESTL
060428-194356	40	124	N	6750	100	3	
060428-195953	42	128	S	6640	100	3	
060428-201431	44	131	N	6640	100	4	
060428-202619	46	130	S	6640	100	3	
060428-203711	48	129	N	6750	100	4	



Station Occupation Report For Airborne GPS

Project: PA LIDAR 2006

Location: NEW CASTLE, PA

Project Number: 5855-013

Completed by: MOUDY

Date: 4-28-06

Receiver: 1

Receiver Type: TRIMBLE 5700

Antenna Type: ZEPHYR GNSS/RTK

Station ID: CASPER

Start -- H.I. (m): 1.675

End -- H.I. (m): 1.675

H.I. (ft): 5.495

Start Time: 1232 | 1637

End Time: 1605 | 1825

Time Zone: EASTERN

Operator: MOUDY



Comments

POINT	M	F
5	1.676	5.499
7	1.675	5.495
2	1.675	5.495

LIDAR MISSION RECORD SHEET

[CUBAN HD2]

Project Name	FA LIDAR 2006
Project Number	SBS5-013
Navigation File	PA-KIT

Pilot	LUCKEY
Tech	HERMAN
Aircraft	N73206



2670 Willhite Drive

Lexington, KY 40503

Phone: (859) 277-8700

Fax: (859) 277-8901

Project's Laser Requirements

FOV:	42°	Attenuator:	Ø
Scan Rate:	29.0	Returns:	4+3
Pulse Rate:	54000	Ground Speed:	128 kts.

Data Storage

Laser Drive #	1
IMU Card #	1
File Name:	060429C (preliminary)
First File #	ØØ1
Last File #	ØØØ

Begin Temp (AVOS/ADS)	15° C
Begin Dewpt (AVOS/ADS)	-05° C
End Temp (AVOS/ADS)	09° C
End Dewpt (AVOS/ADS)	-03° C

Date Flown	April 29th, 2006
Takeoff Time	7:55 P EDT
Landing Time	10:29 P EDT
GPS Base Location	CLARROCK
PDOP Times to Avoid	none found
Static Start or Flyover	START

Laser On Time	8:03 P EDT
Laser Off Time	10:29 P EDT

On-Board Antenna Offsets			
x = -0.07	y = 0.05	z = -1.10	

MISSION #	FL #	Groundspeed	Heading	Alt. AMSL	NOTES
060429-010653	3	~128 kts.	W	6640'	~100% returns, ~2° scrub. sk. haze
060429-012317	5	~128 kts.	E	6750'	~100% " , ~10" "
060429-013829	10	~128 kts.	W	6750'	~100% " , ~20" "
060429-015551	7	~128 kts.	E	6750'	~100% " , ~10" "
060429-021146	4	~128 kts.	W	6750'	~100% " , ~10" "
060429-022634	8	~128 kts.	E	6750'	~100% " , ~20" "
060429-024338	11	~128 kts.	W	6750'	~100% " , ~20" "
060429-030114	9	~128 kts.	E	6750'	~100% " , ~30" "
060429-031920	10	~128 kts.	W	6750'	~100% " , ~10" " red of E line

..... that's all that can be done w/ GPS base & clear...

*Station Occupation Report
For Airborne GPS*

Project: PA LIDAR 2006

Location: CLARION APT.

Project Number: SBSS-013

Completed by: PNH

Date: APRIL 29th, 2006

Receiver: "1" (S/N 108)

Receiver Type: TRIMBLE 5700

Antenna Type: ZEPHYR GEODETIC

Station ID: CLARPORT

Start -- H.I. (m): 1.506 m

End -- H.I. (m): 1.506 m

H.I. (ft): _____

Start Time: 7:18^p EDT

End Time: ~ 10²⁰^p EDT

Time Zone: EDT

Operator: PNH

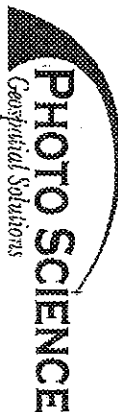


Comments

LIDAR MISSION RECORD SHEET

Project Name	PA LIDAR 2006
Project Number	5855-013
Navigation File	PA-NCSTL

Pilot	LIVERMORE
Tech	Mouly
Aircraft	W7320C



FOV:	42	Attenuator:	0
Scan Rate:	29 (28) (20KTS)	Returns:	4+3
Pulse Rate:	54,000	Ground Speed:	128 KTS

Laser Drive #	2
IMU Card #	2
File Name:	060427A
First File #	0
Last File #	17

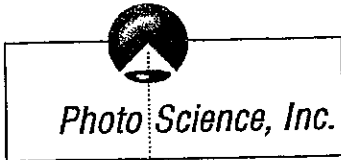
Begin Temp (AWOS/ADIS)	12°C
Begin Dewpt (AWOS/ADIS)	1°C
End Temp (AWOS/ADIS)	15°C
End Dewpt (AWOS/ADIS)	1°C

Date Flown	4-27-06
Takeoff Time	0937
Landing Time	1232
GPS Base Location	CASTROV
PDOP Times to Avoid	1155-1230, 1635-1720
Static Start or Flyover	STATIC

Laser On Time	0942
Laser Off Time	1151

X = -0.07	Y = 0.05	Z = -1.10
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MISSION #	FL #	Groundspeed	Heading	Alt AMSL	% RETURNS	DEBITS of APPS	NOTES
060427-145322	30	130	S	6640.	100	9-6	
060427-150848	32	120	N	6640	100	6-9	SCAN RATE OF 28 HZ AT 120KTS
060427-152353	34	131	S	6640	100	9-6	
060427-153853	37	129	N	6640	100	6-9	
060427-155500	41	127	S	6640	100	9-6	
060427-160844	39	129	N	6750	100	6-9	
060427-162736	38	133	S	6640	100	9-6	
060427-164058	35	128	N	6640	100	7	



Station Occupation Report For Airborne GPS

Project: PA LIDAR 2006

Location: NEW CASTLE, PA

Project Number: 5855-013

Completed by: MOUDY

Date: 4-27-06

Receiver: 1

Receiver Type: TRIMBLE 570

Antenna Type: ZEPHYR GEODETIC

Station ID: CASTPORT

Start -- H.I. (m): 1.624

End -- H.I. (m): 1.624

H.I. (ft): 5.329

Start Time: 0913

End Time: 1418

Time Zone: EASTERN

Operator: MOUDY



Comments

POINT	M	F
3	1.623	5.328
6	1.624	5.330
1	1.624	5.329



Station Occupation Report For Airborne GPS

Project: PA LIDAR 2006

Location: EUSEBIUS CEMETARY

Project Number: 5855-018

Completed by: MOUDY / LIVERMORE

Date: 4-27-06

Receiver: 1

Receiver Type: TRIMBLE 5700

Antenna Type: ZEPHYR GEODETIC

Station ID: EUSEBIUS

Start -- H.I. (m): 1.534

End -- H.I. (m): _____

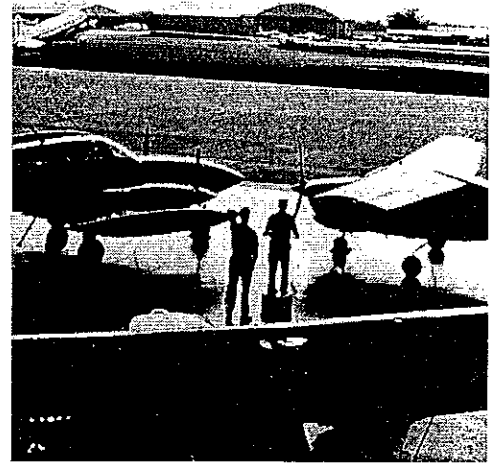
H.I. (ft): 5.030

Start Time: 1725

End Time: _____

Time Zone: EASTERN

Operator: MOUDY / LIVERMORE



Comments	POINT	M	F
	4	1.533	5.028
	7	1.534	5.030
	1	1.534	5.032

LIDAR MISSION RECORD SHEET

Project Name	PA-LIDAR 2006
Project Number	SBSS-013
Navigation File	PA-KITT

Pilot	LUCKETT
Tech	HEARSK
Aircraft	N7320K



2670 Wilhite Drive

Lexington, KY 40503

Phone: (859) 277-8700

Fax: (859) 277-8901

Project's Laser Requirements	
FOV:	57°
Scan Rate:	29.0
Pulse Rate:	54000
Attenuator:	0
Returns:	4+3
Ground Speed:	128 kts

Data Storage	
Laser Drive #	2
IMU Card #	2
File Name:	060424A
First File #	025
Last File #	046

* Begin Temp (AWOS/ADIS)	13°C
Begin Dewpt: (AWOS/ADIS)	07°C
End Temp (AWOS/ADIS)	09°C
End Dewpt: (AWOS/ADIS)	06°C

Date Flown	April 24th 2006
Takeoff Time	7:55 p EST 0 BTP
Landing Time	11:07 p EST 0
GPS Base Location	ST. EUSTACHIUS CHM. (KENNEDY CR31)
PDOP Times to Avoid	none tonight
Static Start or Flyover	FLYOVER

Laser On Time	7:57 p EST
Laser Off Time	10:59 p EST

On-Board Antenna Offsets		
x = -0.07	y = 0.05	z = -1.10

MISSION #	FL #	Groundspeed	Heading	Alt. AMSL	NOTES
060425_011955	32	~ 120 kts.	W	5640'	~ 100% returns, ~ 10 sec 28hz overboard, -haze
060425_013456	37	~ 130 kts.	E	5640'	~ 100% " " ~ 20" 29hz " " "
060425_014619	33	~ 120 kts.	W	5640'	~ 100% " " ~ 10" 28hz " " "
060425_020039	38	~ 130 kts.	E	5640'	~ 100% " " ~ 20" 29hz " " "
060425_021136	34	~ 120 kts.	W	5690'	~ 100% " " ~ 10" 28hz Searchlight, " " "
060425_022547	39	~ 130 kts.	E	5640'	~ 100% " " ~ 10" 29hz " " "
060425_023845	35	~ 120 kts.	W	5640'	~ 100% " " ~ 10" 28hz " " "
060425_025044	40	~ 128 kts.	E	5640'	~ 100% " " ~ 20" 29hz " " "
060425_030148	36	~ 120 kts.	W	5640'	~ 100% " " ~ 20" 28hz " " "
060425_031639	41	~ 128 kts.	E	5640'	~ 100% " " ~ 10" 29hz " " "
060425_032450	31	~ 125 kts.	W	5640'	~ 100% " " ~ 10" 29hz " " "

08:00 p EST
Zulu from End?

Station Occupation Report For Airborne GPS

Project: PA LiDAR 2006

Location: ST. EUSEBIUS CEMETARY, EAST BRADY PA **Project Number:** 5855-03
Completed by: PNH **Date:** April 24th, 2006

Receiver: "1" (SN 108)
Receiver Type: TRIMBLE 5700
Antenna Type: ZEPHYR GEODETIC
Station ID: KEYSTONE GPS 1
Start -- H.I. (m): 1.404 m
End -- H.I. (m): 1.404 m
H.I. (ft): 4.605 ft.
Start Time: 548 P
End Time: 325 A
Time Zone: EDT
Operator: PNH



Comments N 40° 59' 09.2"
W 079° 36' 04.5"
40° 59.15'
79° 36.08'

LIDAR MISSION RECORD SHEET

Project Name	PA LIDAR 2006
Project Number	5855-013
Navigation File	PA-BTLR, PA-CROSS

Pilot	LIVERMORE
Tech	MOODY
Aircraft	N7320G



Project's Laser Requirements	
FOV:	4/2
Attenuator:	0
Scan Rate:	29 (28) Returns: 4+3
Pulse Rate:	54,000 Ground Speed: 128 KTS

Data Storage	
Laser Drive #	3
IMU Card #	3
File Name:	060426
First File #	44
Last File #	62

Laser On Time	1654
Laser Off Time	1903

Begin Temp (AMOS/ADIS)	14°C
Begin Dewpt (AMOS/ADIS)	-3°C
End Temp (AMOS/ADIS)	14°C
End Dewpt (AMOS/ADIS)	-3°C

Date Flown	4-26-06
Takeoff Time	1650
Landing Time	1913
GPS Base Location	ARP BTL (BUTLER COUNTY ARPA)
PDOP Times to Avoid	-
Static Start of Flyover	START

Laser On Time	1654
Laser Off Time	1903

On-Board Antenna Offsets	X = -0.07 Y = 0.05 Z = -1.10
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MISSION #	FL #	Groundspeed	Heading	Alt AMSL	% RETURNS	DEGREES of CAB NOTES
060426-220429	24	129	S	6640	100	4
060426-221819	23	120	N	6640	100	6
060426-223245	22	130	S	6640	100	4
060426-224623	21	121	N	6640	100	4
060426-230027	20	129	S	6640	100	3
060426-231308	19	121	N	6640	100	4
060426-232622	18	132	S	6640	100	4
060426-233822	17	120	N	6640	100	3
060426-235645	4	130	E	6550	100	7

SCAN RATE of 28 Hz at 120 KTS

PA-CROSS 12 EASTERN MILES



Station Occupation Report For Airborne GPS

Project: PA LIDAR 2006
Location: BUTLER COUNTY AIRPORT **Project Number:** 5855-013
Completed by: MOUDY **Date:** 4-26-06
Receiver: 7
Receiver Type: TRIMBLE 5700
Antenna Type: ZEPHYR GEODETIC
Station ID: ARP BTP
Start -- H.I. (m): 1.561
End -- H.I. (m): 1.561
H.I. (ft): 5.121
Start Time: 0708
End Time: 1935
Time Zone: EASTERN
Operator: MOUDY



Comments

POINT	M	F
7	1.561	5.121
4	1.561	5.121
2	1.561	5.121



Station Occupation Report For Airborne GPS

Project: PA 2006 LIDAR

Location: BUTLER COUNTY AIRPORT

Project Number: 5855-013

Completed by: Mandy

Date: 4-25-06

Receiver: 1

Receiver Type: TRIMBLE SP00

Antenna Type: ZEPHYR GEODETIC

Station ID: ARP RTP

Start -- H.I. (m): 1.572

End -- H.I. (m): 1.572

H.I. (ft): 5.158

Start Time: 0757

End Time: 1105

Time Zone: EASTERN

Operator: Mandy



Comments

POINT	M	F
5	1.572	5.158
7	1.572	5.158
2	1.571	5.156

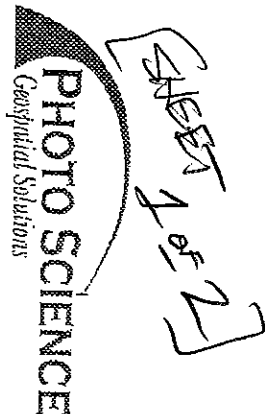
DON BAILEY
724-586-6665
724-822-4452

LIDAR MISSION RECORD SHEET

Project Name	PA LIDAR 2006
Project Number	S855-013
Navigation File	PA-RTLR

Pilot	LUCKETT
Tech	HRABAL
Aircraft	N73206

SHEET 1 of 2



2670 Willite Drive
Lexington, KY 40503
Phone: (859) 277-8700
Fax: (859) 277-8901

Project's Laser Requirements	
FOV:	420
Scan Rate:	29.0
Pulse Rate:	54000
Attenuator:	0
Returns:	443
Ground Speed:	128 kts.

Data Storage	
Laser Drive #	2
IMU Card #	2
File Name:	060423A
First File #	000
Last File #	024

Begin Temp (AWOS/ADIS)	17°C
Begin Dewpt (AWOS/ADIS)	06°C
End Temp (AWOS/ADIS)	
End Dewpt (AWOS/ADIS)	

Date Flown	April 23rd, 2006
Takeoff Time	5:50 EDT
Landing Time	8:40 EDT
GPS Base Location	BTP ARP
PDOP Times to Avoid	4:30-5:15
Static Start or Flyover	STARTL

Laser On Time	5:50 EDT
Laser Off Time	8:40 EDT

On-Board Antenna Offsets	x = -0.07	y = 0.05	z = -1.10
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MISSION #	FL #	Groundspeed	Heading	Alt. AMSL	NOTES
060423-222525	12	~130 kts.	SE	6550'	100% redun, ~10° val
060423-223515	11	~128 kts.	NW	6550'	~290°
060423-224447	10	~128 kts.	SE	6550'	~100°
060423-225504	9	~128 kts.	NW	6550'	~110°
060423-230326	8	~128 kts.	SE	6550'	~110°
060423-231119	7	~128 kts.	NW	6550'	~100°
060423-231815	6	~130 kts.	SE	6550'	~80°
060423-232448	5	~128 kts.	NW	6550'	~80°
060423-233021	4	~128 kts.	SE	6550'	~100°
060423-233540	3	~128 kts.	NW	6550'	~100°
060423-234031	2	~128 kts.	SE	6550'	~290°
060423-234509	1	~128 kts.	NW	6550'	~100°
060423-234911	X3	~130 kts.	N	6550'	~100°
060424-000018	25	~130 kts.	SE	6750'	~100°

bln 6800' - haze, turb

SFP
BTP

*Station Occupation Report
For Airborne GPS*

Project:

PA LIDAR 2006

Location:

BUTLER, PA AIRPORT (BTP)

Project Number: 5855-013

Completed by:

PNH

Date: APRIL 23rd, 2006

Receiver:

"1" (S/N 108)

Receiver Type:

TRIMBLE 5700

Antenna Type:

ZEPHYR GEODETIC

Station ID:

BTP ARP

Start -- H.I. (m):

1.472 m

End -- H.I. (m):

1.472 m

H.I. (ft):

4.83 ft.

Start Time:

4:30p

End Time:

8:55p

Time Zone:

EDT

Operator:

PNH



Comments

LIDAR MISSION RECORD SHEET

Project Name	PA LIDAR 2006
Project Number	S855-013
Navigation File	PA-INDI

Pilot	LUCKETT
Tech	HEARAK
Aircraft	N73206



Project's Laser Requirements	
FOV:	42°
Scan Rate:	29.0
Pulse Rate:	51000
Attenuator:	0
Returns:	43
Ground Speed:	128 kts.

Data Storage	
Laser Drive #	2
IMU Card #	2
File Name:	060420c
First File #	000
Last File #	021

Begin Temp (AWOSIADIS)	24° C
Begin Dewpt. (AWOSIADIS)	00° C
End Temp (AWOSIADIS)	17° C
End Dewpt. (AWOSIADIS)	02° C

Date Flown	April 20th, 2006
Takeoff Time	6:17p EST
Landing Time	9:11p EDT
GPS Base Location	IDIA & PITT COES
PDOP Times to Avoid	none found!
Static Start or Flyover	BOTH!

Laser On Time	6:20p EDT
Laser Off Time	8:48p EDT

On-Board Antenna Offset		
X = -0.07	Y = 0.05	Z = -1.10

MISSION #	FL #	Groundspeed	Heading	Alt. AMSL	NOTES
060420-235727	5	~128 kts.	N	6640'	~100% return, ~4° cals
060420-235827	2	~128 kts.	S	6640'	~100% " " " " "
060421-000521	4	~128 kts.	N	6640'	~100% " " " " "
060421-001227	1	~128 kts.	S	6550'	~100% " " " " "
060421-001915	3	~128 kts.	N	6640'	~100% " " " " "
060421-002651	42	~128 kts.	W	6640'	~100% " " " " "
060421-003839	46	~128 kts.	E	6550'	~100% " " " " "
060421-004805	43	~125 kts.	W	6550'	~100% " " " " "
060421-005750	47	~128 kts.	E	6550'	~100% " " " " "
060421-010611	44	~125 kts.	W	6550'	~100% " " " " "
060421-011708	45	~128 kts.	E	6550'	~100% " " " " "
060421-012550	48	~128 kts.	W	6550'	~100% " " " " "
060421-013350	49	~128 kts.	E	6440'	~100% " " " " "
060421-014046	50	~128 kts.	W	6350'	~100% " " " " "
060421-014639	51	~128 kts.	E	6440'	~100% " " " " "

← LIDAR →

bln hgt, hds, h-ezre
smooth, "

IDR

LIDAR MISSION RECORD SHEET

Project Name	PA LIDAR 2006
Project Number	SBSS 2013
Navigation File	PA-INDI

Pilot	LUCKETT
Tech	HEARSH
Aircraft	N73206



Project's Laser Requirements	
FOV:	42°
Scan Rate:	29.0
Pulse Rate:	54000
Attenuator:	0
Returns:	4+3
Ground Speed:	128 kts

Data Storage	
Laser Drive #	4
IMU Card #	4
File Name:	06042013
First File #	035
Last File #	061

2670 Wildlife Drive
 Lexington, KY 40503
 Phone: (859) 277-8700
 Fax: (859) 277-8901

Date Flown	APRIL 20th, 2006
Takeoff Time	101P EDT
Landing Time	438P EDT
GPS Base Location	INDI A
PDOP Times to Avoid	4 1/2P → 5 30P
Static Start or Flyover	START

Laser On Time	101P EDT
Laser Off Time	438P EDT

On-Board Antenna Offsets	X = -0.07	Y = 0.05	Z = -1.10
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Begin Temp (AWOS/AOS)	22 °C
Begin Dewpt (AWOS/AOS)	04 °C
End Temp (AWOS/AOS)	25 °C
End Dewpt (AWOS/AOS)	01 °C

MISSION #	FL #	Groundspeed	Heading	Alt. AMSL	NOTES
060420_181301	X5	~128 kts.	E	6900'	~100% returns, ~2° cob
060420_182315	S1	~128 kts.	N	7150'	" " " "
060420_183823	S2	~128 kts.	S	7240'	" " " "
060420_185914	X6	~128 kts.	W	6800'	" " " "
060420_191659	L1	~128 kts.	N	6640'	" " " "
060420_192636	6	~128 kts.	S	6640'	" " " "
060420_193322	12	~128 kts.	N	6640'	" " " "
060420_194310	7	~128 kts.	S	6640'	" " " "
060420_195021	13	~128 kts.	N	6640'	" " " "
060420_200016	8	~128 kts.	S	6640'	" " " "
060420_200946	14	~128 kts.	N	6640'	" " " "
060420_201744	9	~128 kts.	S	6640'	" " " "
060420_201539	15	~128 kts.	N	6750'	" " " "
060420_203503	10	~128 kts.	S	6640'	" " " "

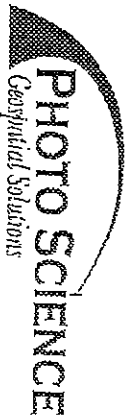
SKETCH #2

INDI

LIDAR MISSION RECORD SHEET

Project Name	PA LIDAR 2006
Project Number	SBSS-013
Navigation File	PA-INDI

Pilot	LUCKEY
Tech	HARRAN
Aircraft	N73206



Project's Laser Requirements	
FOV:	42°
Scan Rate:	29.0
Pulse Rate:	54000
Attenuator:	0
Returns:	4+3
Ground Speed:	128 kts.

Data Storage	
Laser Drive #	4
IMU Card #	4
File Name:	060420A
First File #	016
Last File #	034

2670 Willile Drive
 Lexington, KY 40503
 Phone: (859) 277-8700
 Fax: (859) 277-8901

Begin Temp (AMOS/ADIS)	16.0 °C
Begin Dewpt. (AMOS/ADIS)	05.0 °C
End Temp (AMOS/ADIS)	21.0 °C
End Dewpt. (AMOS/ADIS)	02.0 °C

Date Flown	April 20th 2006
Takeoff Time	9:39A EST
Landing Time	12:12P "
GPS Base Location	INDI A
PDOP Times to Avoid	12:50 → 12:42
Static Start or Flyover	START

Laser On Time	9:40A EST
Laser Off Time	12:09P "

On-Board Antenna Offset	x = -0.07	y = 0.05	z = -1.10
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MISSION #	FL #	Groundspeed	Heading	Alt. AMSL	NOTES
060420-145152	41	~128 kts.	S	6950'	~100% returns, ~4° crab
060420-150504	46	~128 kts.	N	7150'	Severe clear, smooth
060420-151913	42	~128 kts.	S	7040'	~100% " , ~4.0"
060420-153223	47	~128 kts.	N	7150'	~100% " , ~3.0"
060420-154627	43	~128 kts.	S	7040'	~100% " , ~2.0"
060420-155927	48	~128 kts.	N	7150'	~100% " , ~2.0"
060420-161251	44	~128 kts.	S.	7040'	~100% " , ~2.0"
060420-162557	49	~128 kts.	N	7150'	~100% " , ~1.0"
060420-163925	45	~128 kts.	S	7150'	~100% " , ~2.0"
060420-165217	50	~128 kts.	N	7150'	~100% " , ~1.0"

Station Occupation Report For Airborne GPS

Project: PA LiDAR 2006

Location: INDIANA, PA AIRPORT (IDI)

Project Number: SB55-013

Completed by: PHH

Date: APRIL 20th, 2006

Receiver: "1" (S/N 108)

Receiver Type: TRIMBLE 5700

Antenna Type: ZEPHYR GEODETIC

Station ID: IDI A

Start -- H.I. (m): 1.501 m

End -- H.I. (m): _____

H.I. (ft): 4.925'

Start Time: 8:10 A

End Time: _____

Time Zone: EDT

Operator: PHH



Comments

LIDAR MISSION RECORD SHEET

Project Name	PA LIDAR 2006
Project Number	S955-013
Navigation File	PA-INDI

Pilot	LUCETT
Tech	HEARAK
Aircraft	N73206



Project's Laser Requirements	
FOV:	42°
Scan Rate:	29.0
Pulse Rate:	54000
Attenuator:	Ø
Returns:	4x3
Ground Speed:	128 kts.

Data Storage	
Laser Drive #	3
IMU Card #	3
File Name:	060419B
First File #	053
Last File #	075

2670 Wilhite Drive
 Lexington, KY 40503
 Phone: (859) 277-8700
 Fax: (859) 277-8901

Begin Temp (AWOSIADIS)	23.0 °C
Begin Dewpt. (AWOSIADIS)	02.0 °C
End Temp (AWOSIADIS)	18.0 °C
End Dewpt. (AWOSIADIS)	02.0 °C

Date Flown	April 19th 2006
Takeoff Time	5:40p EDT
Landing Time	8:40p EDT
GPS Base Location	IDI A
PDOP Times to Avoid	were brought
Static Start or Flyover	START

Laser On Time	5:42p EDT
Laser Off Time	8:28p EDT

On-Board Antenna Offsets	X = -0.07	Y = 0.05	Z = -1.10
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MISSION #	FL #	Groundspeed	Heading	Alt. AMSL	NOTES
060419_225423	31	~128 kts.	S	6840'	~100% returns, ~2.0° swb
060419_231013	28	~125 kts.	N	6840'	~100% " , ~2.0" "
060419_232539	32	~128 kts.	S	6840'	~100% " , ~3.0" "
060419_233956	37	~125 kts.	N	6950'	~100% " , ~2.0" "
060419_235439	33	~128 kts.	S	6950'	~100% " , ~2.0" "
060420_000810	38	~125 kts.	N	6950'	~100% " , ~2.0" "
060420_002219	34	~128 kts.	S	6950'	~100% " , ~2.0" "
060420_003622	39	~125 kts.	N	6950'	~100% " , ~1.0" "
060420_005027	35	~128 kts.	S	6840'	~100% " , ~2.0" "
060420_010358	40	~125 kts.	N	6950'	~100% " , ~1.0" "
060420_011817	36	~128 kts.	S	6840'	~100% " , ~1.0" "

same clear, turb

INDI

LIDAR MISSION RECORD SHEET

Project Name	PA LIDAR 2006
Project Number	SBSS-013
Navigation File	PA-INDI

Pilot	LUCKETT
Tech	HEARST
Aircraft	H73206



2670 Willitle Drive
Lexington, KY 40503

Phone: (859) 277-8700

Fax: (859) 277-8901

Project's Laser Requirements	
FOV:	42°
Scan Rate:	29.0
Pulse Rate:	51000
Attenuator:	Ø
Returns:	4+3
Ground Speed:	128 kts.

Data Storage	
Laser Drive #	3
IMU Card #	3
File Name:	060419A
First File #	032
Last File #	052

Begin Temp (AWOS/A/DIS)	21°C
Begin Dewpt (AWOS/A/DIS)	04°C
End Temp (AWOS/A/DIS)	23°C
End Dewpt (AWOS/A/DIS)	04°C

Date Flown	April 19 th 2006
Takeoff Time	2 ⁰⁰ P EDT
Landing Time	4 ⁴³ P "
GPS Base Location	INDI A
PDOP Times to Avoid	4 ⁴⁵ P → 5 ¹² P
Static Start or Flyover	START

Laser On Time	2 ⁰⁵ P EDT
Laser Off Time	4 ³³ P "

On-Board Antenna Offsets	x = -0.07	y = 0.05	z = -1.10
--------------------------	-----------	----------	-----------

MISSION #	FL #	Groundspeed	Heading	All. AMSL	NOTES
060419_191403	23	~128 kts.	S	6750'	~100% returns ~2° crab
060419_193044	21	~125 kts.	N	6750'	~100% " ~10" "
060419_194702	24	~128 kts.	S	6750'	~100% " ~30" [Offline end] "
060419_200310	22	~125 kts.	N	6750'	~100% " ~30" "
060419_201934	25	~128 kts.	S	6750'	~100% " ~20" "
060419_203450	29	~128 kts.	N	6840'	~100% " ~20" "
060419_205026	26	~130 kts.	S	6750'	~100% " ~20" "
060419_210617	30	~128 kts.	N	6840'	~100% " ~20" "
060419_212215	27	~130 kts.	S	6750'	~100% " ~30" "

Look for PDOP spike

*Station Occupation Report
For Airborne GPS*

Project: PA LIDAR 2006

Location: BUTLER COUNTY AIRPORT, PA (BTP) **Project Number:** 5855-013

Completed by: MOUDY **Date:** 5-23-06

Receiver: 1

Receiver Type: TRIMBLE 5700

Antenna Type: ZEPHYR GEODETIC

Station ID: ARP BTP 1976

Start -- H.I. (m): 1.571

End -- H.I. (m): 1.571

H.I. (ft): 5.153

Start Time: 1455

End Time: 1659

Time Zone: EASTERN

Operator: MOUDY



Comments

POINT	M	F
1	1.571	5.155
4	1.570	5.151
6	1.571	5.141

Station Occupation Report For Airborne GPS

Project: PA LIDAR 2006

Location: CLEARFIELD-LAWRENCE AIRPORT (FIG)
CLEARFIELD, PA

Project Number: 5855-013

Completed by: MOUDY

Date: 5-23-06

Receiver: 2

Receiver Type: TRIMBLE S700

Antenna Type: ZEPHYR GEODETIC

Station ID: CLEARPORT

Start -- H.I. (m): 1.651

End -- H.I. (m): 1.651

H.I. (ft): 5.419

Start Time: 1819

End Time: 2000

Time Zone: EASTERN

Operator: MOUDY



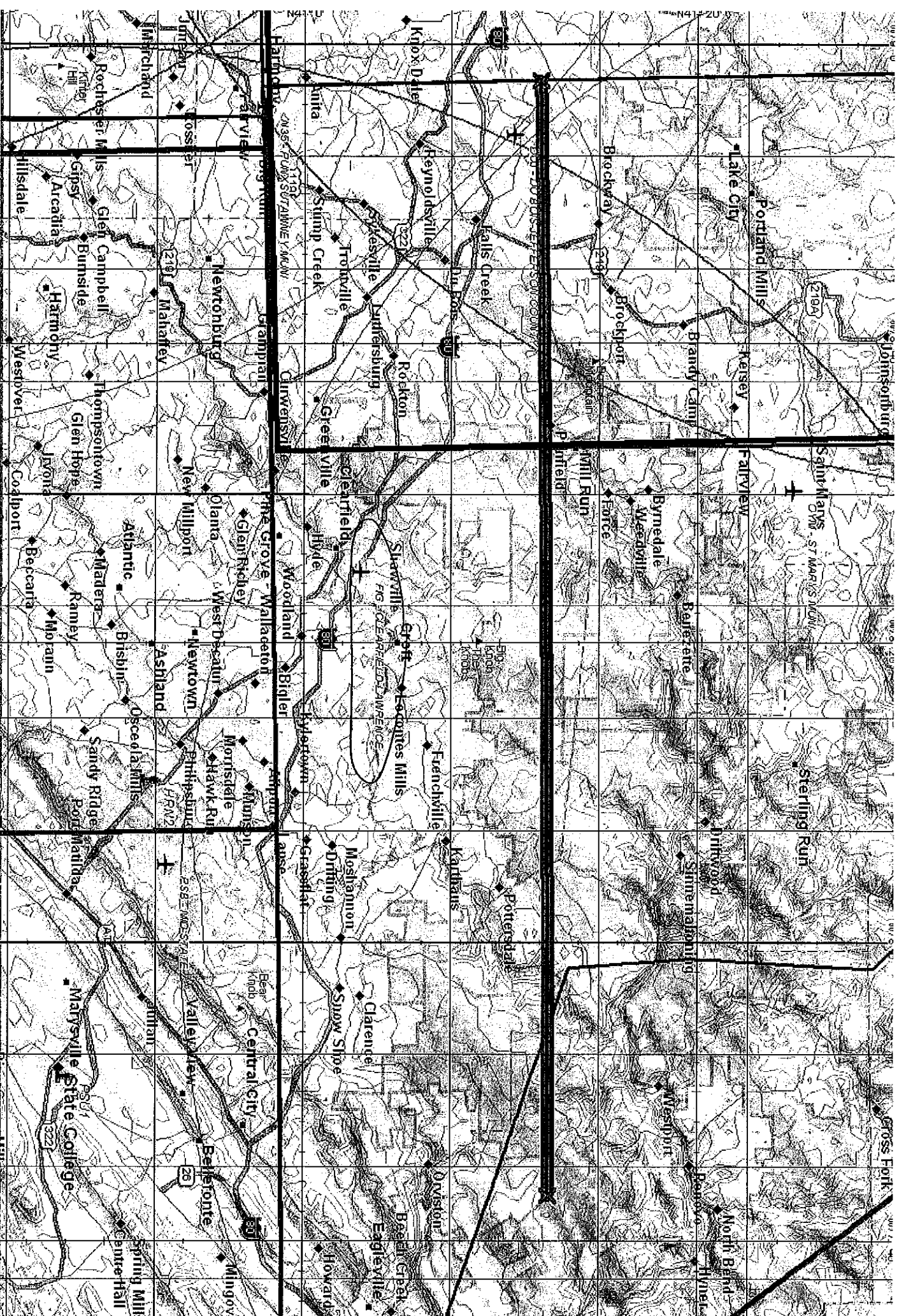
Comments

POINT	M	F
1	1.652	5.420
4	1.651	5.418
6	1.651	5.418



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Scale: 1:50,000



4
 "PAMISSX" is in file name
 -loaded on new laptop & ready to go!

Daily Log										GPS Information			Meteorological Conditions				
Project #		Project Description		Level Arm		GPS		IMU		AGC		Elevation		Temp		Pressure	
0504065		LUZERNE		y z		0.31 0.025 -1.311		Base 1 Base 2 Base 3		12/4		13.0°c		288-153k		29.78 inHg	
HAZELTON PA		Attenuator: POS #		Attenuator: POS #		Attenuator: POS #		Start Time		Miles Flown		File Name		Ant Hgt		Air Type	
N7938Q		0.0 Open (UnJared) (High Altitude)		0.5 POS 1 (Half Red Half Black) (Medium Altitude)		1.0 POS 2 (All Red) (Low Altitude)		3:25:28		39.13		GPS Base Station Information		2			
Line/Dir	Pilot	Operator	Altitude	Scan Angle	Rate	AGL (m)	AMS (ft)	RCC	Pulse Rate	Speed	Void Yr	Conditions/Comments					
035	72	0:23:41	5500	43°	40600°	0032531	306	25.1	25.1	120 kts		REFLIGHT					
036	252	0:44:19	5500	43°	40600°	004118		25.1	25.1	109 kts		REFLIGHT					
052	72	1:10:20	5500	43°	40600°	011016		25.1	25.1	121 kts		REFLIGHT					
053	252	1:30:36	5500	43°	40600°	013029		25.1	25.1	119 kts		REFLIGHT					
079	72	1:52:57	5500	43°	40600°	015255		25.1	25.1	107 kts		REFLIGHT					
082	252	2:15:47	5500	43°	40600°	021542		25.1	25.1	111 kts		REFLIGHT					
085	72	2:35:03	5500	43°	40600°	023503		25.1	25.1	117 kts		REFLIGHT					
095	252	2:47:51	5500	43°	40600°	024748		25.1	25.1	105 kts		REFLIGHT					
097	72	2:59:57	5500	43°	40600°	025958		25.1	25.1	123 kts		REFLIGHT					
BS	203	3:13:57	5500	43°	40600°	031358		25.1	25.1	123 kts		BORESCOPE					

LIBAR FLIGHT SUMMARY			Data Collection			Survey			Comments			Weather		
Altitude Flight Time	4:05:37	Hobbs Time		Percent Complete		Percent Complete		Check Sites		Check Sites		Clear		Clear
Laser Collection Time	2:11:07	Start	531.1	Total Flight Lines		Total Check Sites						Fair		Fair
Miles Flown on Flight	281.14	Stop	584	Lines Completed	9	Check Sites Completed						Partly Cloudy		Partly Cloudy
		Total	2.9	Lines Completed Today	9	Sites Completed Today						Cloudy		Cloudy

www.landairmap.com

Field Crew		Project #		LIDAR Daily Log		GPS Information		Meteorological Conditions	
nathan mike brent		031806a		Lever Arm		Base 2		Elevation	
Location		luzurne		GPS		Base 3		Temp	
Aircraft		N56602		IMU		Aero 2		Pressure	
Altitude		Scan/Angle/Rate		Attenuator/POS #		IMU Information		File Name	
Total Time		AGL (m)		0.0 Open (Full Red) (High Altitude)		Start Time		Ant Hgt	
				0.5 POS1 (Half Red/Half Black) (Medium Altitude)		Stop Time		Ant Type	
				1.0 POS2 (1/4 Red, 3/4 Black) (Low Altitude)		Speed		Conditions/Comments	
99	21:35:59	21:40:38	0:04:39	213559			93 kts		
98	21:52:50	21:58:12	0:05:22	215250			97 kts		
97	22:03:19	22:10:35	0:07:16	220319			123 kts		
96	22:13:20	22:23:35	0:10:15	221320			150 kts		
95	22:37:40	22:45:51	0:08:11	223740			98 kts		
94	22:49:26	23:00:35	0:11:09	224926			137 kts		
93	23:05:51	23:07:12	0:01:21	230551					
92									
91									
90									
89									
88									
87									
86									
85									
84									
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REWORK

LIDAR FLIGHT SUMMARY		Data Collection		Survey		Comments	
Aircraft Flight Time	2:23:00	Percent Complete	4.8%	Percent Complete		Windy gusts 25 knots. Temperatures at altitude -15 degrees Cel.	Weather
Laser Collection Time	0:45:13	Total Flight Lines	105	Total Check Sites			<input checked="" type="checkbox"/> Clear
Miles Flown on Flight	86.35	Lines Complete	5	Check Sites Complete			<input type="checkbox"/> Fair
		Lines Completed Today	5	Sites Completed Today			<input type="checkbox"/> Partly Cloudy
							<input type="checkbox"/> Cloudy

Flight Date		Pilot		Operator		Field Crew		Daily Log				GPS Information			AGC		Meteorological Conditions				
Line/Date	Time	Start	Stop	Total Time	Altitude	Scan Angle/Rate	Location	GPS	IMU	Attenuator/POS #	Start Time	Stop Time	Speed	Miles Flown	Elevation	Temp	Pressure	File Name	RAX File	Ant. Hgt	Ant. Type
3/27/2008							luzerne county pennsylvania	0.31	-0.046	0.025	-1.311				12/4	1800	6.0°C	30.15 inHg	102100 Pa		
BS1	93	2:58:09	3:00:00	0:01:51									154 kts	2.95%							
BS2	272	3:07:21	3:10:00	0:02:39									104 kts	3.99%							
BS3	71	3:19:00	3:32:00	0:13:00	031900								143 kts	3.56%							
BS4	251	3:37:13	3:53:00	0:15:47	033713								117 kts	3.56%							
BS5	71	3:58:15	4:12:00	0:13:45	035815								132 kts	3.29%							
BS6	49	4:18:40	4:33:00	0:14:20	041840								120 kts	3.82%							
BS7	48	4:37:48	4:52:00	0:14:12	043748								129 kts	3.64%							
BS8	47	4:57:17	5:14:00	0:16:43	045717								118 kts	3.62%							
BS9	46	5:18:19	5:34:00	0:15:41	051819								135 kts	3.25%							
BS10	45	5:38:49	5:56:00	0:17:11	053849								119 kts	3.80%							
BS11	94	6:03:47	6:06:00	0:02:13	060349								149 kts	5.72%							
OVERFLY BASE ON WAY TO ALLENTOWN FOR FUEL.																					

LIDAR FLIGHT SUMMARY				Data Collection				Survey				Comments				Weather			
Altitude	Time	Start	Stop	Percent Complete	Total Flight Lines	Lines Complete	Lines Completed Today	Percent Complete	Total Check Sites	Check Sites Complete	Sites Completed Today	Clear	Fair	Partly Cloudy	Cloudy				
3667.1	3672.4	297.61	5.3	57.0%	105	60	8					<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				

LIDAR Daily Log										GPS Information			Meteorological Conditions										
Project #		Project Description		GPS		IMU		Attenuation		AGL (m)		RCC		Pulse Rate		AOC		Elevation		Temp		Pressure	
032806b		Luzerne		0.31 -0.046		0.025 0.095		-1.311 -0.260		0.0 0.5 1.0		Open (Full Red) POS1 (Half Red/Half Black) POS2 (1/4 Red/3/4 Black)		High Altitude Medium Altitude Low Altitude		124							
Field Crew		Operator		Start		Stop		Scan Angle/Rate		Altitude		Scan Time		Speed		Miles Flown		File Name		Ant. Hgt		Ant. Type	
Mike Chad		Mike		16:34:57		16:44:53		16.34/57		163457		1:31:19		114 Kts		19.68							
				16:49:34		17:05:40		16.49/34		164934		1:37:06		119 Kts		36.52							
				17:08:20		17:12:07		17.08/20		170820		1:03:47		119 Kts		36.85							
				17:14:52		17:19:23		17.14/52		171452		0:04:33		125 Kts		39.69							
				17:21:36		17:26:43		17.21/36		172136		0:05:07		126 Kts		42.08							
				17:29:56		17:35:57		17.29/56		172956		0:06:01		106 Kts		42.20							
				17:38:25		17:44:38		17.38/25		173825		0:06:10		117 Kts		43.46							
				17:57:28		18:08:20		17.57/28		175728		0:10:52		117 Kts		45.71							
				18:11:06		18:22:47		18.11/06		181106		0:11:40		109 Kts		44.44							
				18:26:08		18:37:43		18.26/08		182608		0:11:35		132 Kts		47.85							
				18:40:05		18:52:36		18.40/05		184005		0:12:31		125 Kts		44.77							
				18:55:07		19:07:48		18.55/07		185507		0:12:41		128 Kts		49.46							
				19:10:47		19:23:30		19.10/47		191047		0:12:43		137 Kts		31.53							
				19:25:53		19:39:29		19.25/53		192553		0:13:36		128 Kts		31.91							
				19:42:09		19:55:10		19.42/09		194209		0:14:01		120 Kts		32.22							

LIDAR FLIGHT SUMMARY				Data Collection				Survey				Comments		Weather	
Avant Flight Time	Robos Time	Start	Stop	Percent Complete	Total Flight Lines	Percent Complete	Total Check Sites	Percent Complete	Total Check Sites	Check Sites Complete	Check Sites Complete Today	Lines Completed Today	Lines Completed Today	Weather	Weather
4:48:00	36:76.5	2:38:25	3:54:50	69.5%	105	105	73	73	73	73	16	16	16	☑ Clear	☑ Clear
														☐ Fair	☐ Fair
														☐ Partly Cloudy	☐ Partly Cloudy
														☐ Cloudy	☐ Cloudy

REFLOWN

LIDAR Daily Log										GPS Information		Meteorological Conditions					
Field Crew		Project #		Project Description		GPS		IMU		Base		Elevation		Airport			
Chad Mike		040206A		Luzerne		0.31 -0.045		0.025 -1.311 -0.280		Base 1 Base 2 Base 3 Aero 2		124					
Flight Date		Operator		Location		AGL (m)		Altitude (ft)		Start Time		Stop Time		Speed		Miles Flown	
4/2/2006		Chad Mike		HZZ N56602		0.0 0.5 1.0		0.0 0.5 1.0		15:55:00		20:32:00		121 kts 116 kts 121 kts 107 kts 130 kts 122 kts 122 kts 113 kts 120 kts		39.49 32.49 31.16 32.49 30.78 34.91 32.78 31.68 37.75 32.53 33.00 39.21	
Line/Dir		Start		Stop		Scan Angle/Rate		Roc		Pulse Rate		Conditions/Comments					
101		16:51:00		18:48:15													
15		17:01:12		17:15:46													
16		17:18:44		17:33:41													
17		17:36:18		17:50:54													
18		17:53:32		18:08:54													
19		18:11:44		18:26:24													
20		18:28:40		18:43:38													
21		18:46:17		19:01:00													
22		18:53:27		19:19:31													
23		19:22:19		19:37:45													
BS1		18:40:00		19:56:00													
BS2		16:19:01		18:25:31													
270		20:09:39		20:13:55													

LIDAR FLIGHT SUMMARY				Data Collection		Survey		Comments		Weather	
Altitude	Flight Time	Start	Stop	Percent Complete	Total Flight Lines	Percent Complete	Total Check Sites				
3997.3	3:37:00	2:59:21	3:09:21	91.4%	105						
3993.30	3:03:30	3:03:30	3:07:01		96						
	Total	4:8			11						

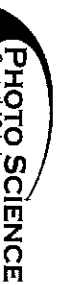
Flight Date		Pilot		Operator		Field Crew		Daily Log										GPS Information		AGC		Elevation		Meteorological Conditions	
Line/Dir	Time	Start	Stop	Start	Stop	Start	Stop	Project #	Project Description	Altitude	Scan Angle	Rate	AGL (m)	AMSL (ft)	Attenuator	RCC	Pulse Rate	Speed	Miles Flown	Altitude	Temp	Pressure			
004	72	20:18:38	20:19:19	CARL	CARL	050408A		LURZENE	5500	43°	40600°	25.1	120 Kts	158 mph	4.18	25.1	25.1	109 Kts	125 mph	124	26.0°C	29.95 inHg			
010	72	20:45:55	20:48:49						5500	43°	40600°	25.1	121 Kts	139 mph	6.96	25.1	25.1	121 Kts	139 mph						
012	72	21:04:58	21:07:58						5500	43°	40600°	25.1	121 Kts	139 mph	6.96	25.1	25.1	121 Kts	139 mph						
014	72	21:28:34	21:31:34						5500	43°	40600°	25.1	119 Kts	137 mph	6.85	25.1	25.1	119 Kts	137 mph						
031	72	21:48:00	22:07:12						5500	43°	40600°	25.1	107 Kts	123 mph	38.99	25.1	25.1	107 Kts	123 mph						
032	251	22:10:16	22:28:59						5500	43°	40600°	25.1	117 Kts	135 mph	40.35	25.1	25.1	117 Kts	135 mph						
033	72	22:31:28	22:49:52						5500	43°	40600°	25.1	105 Kts	121 mph	38.26	25.1	25.1	105 Kts	121 mph						
034	251	22:52:53	23:12:09																						

LIDAR FLIGHT SUMMARY				Data Collection		Survey		Comments		Weather	
Aircraft Flight Time	LiDAR Collection Time	Hobbs Time	Start	Stop	Percent Complete	Total Flight Lines	Check Sites Complete	Sites Completed Today	Clear	Fair	Partly Cloudy
5:13:28	1:30:10	526.9	1:30:10	1:55:52	10	10	10	10	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				Total							

APPENDIX A

LIDAR MISSION LOGS: PAMAP 2007

LIDAR MISSION RECORD SHEET



2870 White Drive - Lexington KY - 40503 - 889.277.8700 - www.photoscience.com

Project Name	Pa. Lodge
Project Number	5855-015
Navigation File	

Pilot	Newton
Tech	Livingstone
Aircraft	N9471R

Date Flown	3-29-2009
Takeoff Time	1:29
Landing Time	4:58

Project Scanning Requirements		
FOV (degrees):	45	Attenuation(OD) or Laser Current(%):
Scan Rate (Hz):	25.55	65%
Pulse Rate (Hz):	53,000	Altitude AGL (ft):
Ground Speed (Kts):	120	7503
		Range Gate (m):

Data Information	
IPAS File Name	20070329
FrontTo	172501 000
LIDAR Unit #	000 ->
HD #	Unit 2 (S/n 059)

GPS Base Location(s)	209A
PDOP Avoidance	5' 20" - 5' 55"
Static or Flyover?	Static
Laser On Time & Off Times	1:33p - 4:46

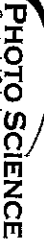
[SKN 59 - 070329A]

NOTES			
Begin Temp	55°F	Ground (airport)	Field Elev.
Begin Dewpoint	20°F		
Begin Pressure	30.48		
Mid Temp	60°F	209	2,200
Mid Dewpoint	11°F		
Mid Pressure	30.41		
End Temp	60°F	209	2,200
End Dewpoint	10°F		
End Pressure	30.41		

FILE	FL #	Alt (AMSL)	Heading	Speed	Returns	Crab	NOTES
182516	3	4901	SW	120	100		
183639	4	8401	NE	120	100		snow at ski resorts - 1 mile North of TSP
184641	6	8101	NE	120	100		
184927	8	8201	SW	120	100		
185950	7	7901	SW	120	100		seven springs
19.1339	5	8701	NE	120	100		snow at ski resorts - 1 mile North of TSP or 9 miles from N end of road
19.3058	9	7901	SW	120	100		
19.5038	10	7901	NE	120	100		
201023	11	7901	SW	120	100		
203056	12	7901	NE	120	100		
	13	7901					
	14	7901					
	15	7901					
	16	7901					
	17	7901					
	18	7901					
	19	7801					
	20	7801					
	21	7901					
	22	7901					

5419
1.652
12:24p

LIDAR MISSION RECORD SHEET



2670 Wilhite Drive - Lexington KY - 40503 - 859.277.8700 - www.photoscience.com

Project Name	R. L. J. Jr.
Project Number	5855-015
Navigation File	

Pilot	Maximon
Tech	Livermore
Aircraft	N9471R

Date Flown	3-29-07
Takeoff Time	5:55p
Landing Time	8:04p

Project's Scanning Requirements	
FOV (degrees):	45
Scan Rate (Hz):	2550
Pulse Rate (Hz):	53000
Ground Speed (kts):	120
Attenuation (OD) or Laser Current (%):	65%
Altitude AGL (ft):	7503
Range Gate (m):	

Data Information	
IPAS File Name	20070329 215051.000
From/To	000 ->
LIDAR Unit #	Unit 2 (s/n 059)
HD #	

GPS Base Location(s)	269A
PDOP Avoidance	
Static or Flyover?	Static
Laser On Time & Off Times	6:00p on 7:55p

[5855-070329B] 7:50p

Begin Temp	60°F	Ground (airport)	269	Field Elev.	2200	Temp. at Altitude	0°C
Begin Dewpoint	10°F						
Begin Pressure	30.41						
Mid Temp	58°F		269		2200		0°C
Mid Dewpoint	10°F						
Mid Pressure	30.41						
End Temp	53°F		269		2200		0°C
End Dewpoint	10°F						
End Pressure	30.41						

FILE	FL #	Alt. (AMSL)	Heading	Speed	Returns	Grab	NOTES
221219	2	7901	WNW	120	100		
223008	13	7901	SW	120	100		
225207	14	7901	NE	120	100		
231424	15	7901	SW	120	100		
233721	16	7901	NK	120	100		
	17	7901					
	18	7901					
	19	7901					
	20	7901					
	21	7901					

Station Occupation Report For Airborne GPS

Project: Pa Lidar 2007

Location: 209, Somerset, PA.

Project Number: 5855-015

Completed by: Rob Livermore

Date: 3-29-2007

Receiver: S

Receiver Type: Trimble 5700

Antenna Type: Zephyr

Station ID: 209A

Start -- H.I. (m): 1.652

End -- H.I. (m): 1.652

H.I. (ft): 5419

Start Time: ~~12:24p~~ 5:06p

End Time: 5:06p 8:19p

Time Zone: Eastern

Operator: Rob Livermore



Comments

for N9471R - S/N 059 070329A #B

Station Occupation Report For Airborne GPS

Project: Pa-Lidar 2007

Location: Somerset, PA **Project Number:** 5855-015

Completed by: Rob Livermore **Date:** 3-30-07

Receiver: S

Receiver Type: Trimble 5700

Antenna Type: Zephyr

Station ID: 269A

Start -- H.I. (m): 1.727

End -- H.I. (m): 1.727

H.I. (ft): 5.662

Start Time: 6:11 AM

End Time: 11:19 AM

Time Zone: Eastern

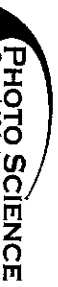
Operator: Rob Livermore



Comments

for N9471R - S/N 059 mission 070330A

LIDAR MISSION RECORD SHEET



2870 Wilshire Drive - Lexington KY - 40503 - 859.277.8700 - www.photoscience.com

Project Name	
Project Number	5255-274
Navigation File	

Pilot	Lucas
Tech	
Aircraft	N9471R

Date Flown	3-20-2011
Takeoff Time	5:52P
Landing Time	11:02P

Project's Scanning Requirements	
FOV (degrees):	45
Scan Rate (Hz):	265
Pulse Rate (Hz):	53000
Ground Speed (Kts):	120
Attenuation(OD) or Laser Current(%):	65%
Altitude AGL (ft):	
Range Gate (m):	142-2376

Data Information	
IPAS File Name	20075330
From/To	000 ->
LIDAR Unit #	Unit 2 (5/n 059)
HD #	

GPS Base Location(s)	FUL2P
PDOP Avoidance	520-545P
Static or Flyover?	Flyover
Laser On Time & Off Times	6:04p 10:41p

Begin Temp	18°C	Ground	(airport)	Field Elev.	70	Temp. at Altitude	3°C
Begin Dewpoint	-08°C						
Begin Pressure	30.18						
Mid Temp	16°C				70		20°C
Mid Dewpoint	-6°C						
Mid Pressure	30.21						
End Temp	11				HGR		70
End Dewpoint	405						
End Pressure	30.16						

[5/n 59 - 07033013]

FILE	FL #	Alt. (AMSL)	Heading	Speed	Returns	Crab	NOTES
221711	3	7301	SW	120	100		lost 40% - got 2 miles
223724	4	7301	NE	120	100		got on - Rocked wings 1/2 way.
225630	5	7201	SW	120	100		
231459	6	7201	NE	120	100		off 1200 ft. online - 2.2 after start
233324	7	7101	SW	120	100		
235239	8	7101	NE	120	100		
001037	9	7101	SW	120	100		
002910	10	7101	NE	120	100		
004706	11	7101	SW	120	100		
610438	12	7101	NE	120	100		
012202	13	7101	SW	120	100		
013925	14	7101	NE	120	100		
015625	15	7101	SW	120	100		
621347	16	7201	NE	120	100		
023009	17	7201	SW	120	100		
	18	7101	NE				
	19	7201	SW				
	20	7301	NE				
	21	7301	SW				
	22	7301					

*Station Occupation Report
For Airborne GPS*

Project: PA MAP LIDAR 2007

Location: N OF McCONNELLSVILLE, PA

Project Number: SBSS-015

Completed by: PNH

Date: MARCH 30th, 2007

Receiver: "1" (S/N 108)

Receiver Type: TRIMBLE S700

Antenna Type: ZEPHYR GEODETIC

Station ID: FULOP

Start -- H.I. (m): 1.545 m

End -- H.I. (m): 1.545 m

H.I. (ft): 5.07 ft.

Start Time: 5²²

End Time: 11⁰⁰

Time Zone: EDT

Operator: PNH



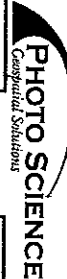
Comments

25' trees (5), ~ 50 feet W & slightly downhill - no leaves & relatively spindly

for N9471R - 070330B (S/N 059)

flyover @ 6:30 & 10:55

LIDAR MISSION RECORD SHEET



2570 White Drive - Lexington KY - 40503 - 858.277.8700 - www.photoscience.com

Project Name	Pc Lidar
Project Number	5855-015
Navigation File	

Pilot	Luckett
Tech	Livermore
Aircraft	N9471R

Date Flown	5-31-07
Takeoff Time	7:30 A EDT
Landing Time	11:00 A EDT

Project's Scanning Requirements	
FOV (degrees):	45
Scan Rate (Hz):	25.5
Pulse Rate (Hz):	53000
Ground Speed (Kts):	120
Attenuation (OD) or Laser Current (%):	65%
Altitude AGL (ft):	
Range Gate (m):	

Data Information	
IPAS File Name	2007031
From/To	000 ->
LIDAR Unit #	Unit 2 (s/n 059)
HD #	

GPS Base Location(s)	Flytop
PDOP Avoidance	13350-1150
Static or Flyover?	Flyover
Laser On Time & Off Times	7:40A 10:40A

Begin Temp	07°C	Ground	(airport)	Field Elev.		Temp. at Altitude	3°C
Begin Dewpoint	-04°C						
Begin Pressure	30.6						
Mid Temp	09°C						1°C
Mid Dewpoint	-04°C						
Mid Pressure	30.20						
End Temp	11°C						2°C
End Dewpoint	-06°C						
End Pressure	30.21						

[5/31/07 5:59 - 070331A]

FILE	FL #	Alt. (AMSL)	Heading	Speed	Returns	Grab	NOTES
115506	1	7101	E	120	100		
121355	21	7501	NE	120	100		
122044	26	7501	SW	120	100		
122907	25	7301	NE	120	100		
123527	22	7301	NE	120	100		
124630	23	7701	SW	120	100		
125650	24	7901	NE	120	100		
130433	2	7501	W	120	100		
132115	18	7101	SW	120	100		
133851	19	7201	NE	120	100		Remains off peak 2 mins
135516	20	7301	SW	120	100		
141204	21	7301	NE	120	100		
143935	6	7201	SW	120	100		

Station Occupation Report For Airborne GPS

Project: PA MAP 2007 LIDAR

Location: N of McCONNELLSVILLE, PA Project Number: SB55-015

Completed by: PNH Date: MARCH 31st, 2007

Receiver: "1" (S/N 108)

Receiver Type: TRIMBLE 5700

Antenna Type: ZEPHYR GEODETIC

Station ID: FULOP

Start -- H.I. (m): 1.656 m

End -- H.I. (m): 1.656 m

H.I. (ft): 5.435

Start Time: 7¹⁴ A

End Time: 11⁰⁰ A

Time Zone: EDT

Operator: PNH



Comments

25' trees (s), ~ 50 ft. W & slightly downhill - no leaves & relatively spindly

for N9471R - 070331A (S/N 059) "FORT LITTLETON" AREA

fly over @ 7⁴⁰-A & 10⁵⁰-A

LIDAR MISSION RECORD SHEET



2670 Wilshire Drive - Lexington KY - 40503 - 859.277.8700 - www.photoscience.com

Project Name	<i>Pc Lidar - 2008</i>
Project Number	<i>5855-015</i>
Navigation File	

Pilot	<i>Luckett</i>
Tech	<i>Livermore</i>
Aircraft	<i>N9471R</i>

Date Flown	<i>2-21-07</i>
Takeoff Time	<i>1:31p</i>
Landing Time	<i>5:30p</i>

Project's Scanning Requirements	
FOV (degrees):	<i>45</i>
Scan Rate (Hz):	<i>255</i>
Pulse Rate (Hz):	<i>530000</i>
Ground Speed (kts):	<i>120</i>

Data Information	
IPAS File Name	<i>20070531</i>
From/To	<i>000 -></i>
LIDAR Unit #	<i>Unit 2 (s/n 059)</i>
HD #	

Begin Temp	<i>14°C</i>	Ground (airport)	<i>HGR</i>	Field Elev.	<i>704</i>	Temp at Altitude	<i>3°C</i>
Begin Dewpoint	<i>-04°C</i>						
Begin Pressure	<i>30.19</i>						
Mid Temp	<i>16°C</i>			<i>704</i>			<i>2°C</i>
Mid Dewpoint	<i>-03°C</i>						
Mid Pressure	<i>30.14</i>						
End Temp	<i>16°C</i>			<i>HGR</i>			<i>2°C</i>
End Dewpoint	<i>-02°C</i>						
End Pressure	<i>30.13</i>						

GPS Base Location(s)	<i>Geisler</i>
PDOP Avoidance	<i>515:550</i>
Static or Flyover?	<i>Flyover</i>
Laser On Time & Off Times	<i>1:46p 5:11p</i>

[5/159 - 070331B]

FILE	FL #	Alt. (AMSL)	Heading	Speed	Returns	Crab	NOTES
<i>174639</i>	<i>10</i>	<i>7301</i>	<i>SW</i>	<i>120</i>	<i>100</i>		
<i>180035</i>	<i>9</i>	<i>7301</i>	<i>NE</i>	<i>120</i>	<i>100</i>		
<i>181220</i>	<i>8</i>	<i>7301</i>	<i>SW</i>	<i>120</i>	<i>100</i>		
<i>182404</i>	<i>7</i>	<i>7201</i>	<i>NE</i>	<i>120</i>	<i>100</i>		
<i>183238</i>	<i>6</i>	<i>7201</i>	<i>SW</i>	<i>120</i>	<i>100</i>		
<i>184048</i>	<i>5</i>	<i>7401</i>	<i>NE</i>	<i>120</i>	<i>100</i>		
<i>184657</i>	<i>4</i>	<i>7301</i>	<i>SW</i>	<i>120</i>	<i>100</i>		
<i>190008</i>	<i>11</i>	<i>7301</i>	<i>NE</i>	<i>120</i>	<i>100</i>		
<i>191841</i>	<i>12</i>	<i>7301</i>	<i>SW</i>	<i>120</i>	<i>100</i>		
<i>192603</i>	<i>13</i>	<i>7301</i>	<i>NE</i>	<i>120</i>	<i>100</i>		
<i>193913</i>	<i>14</i>	<i>7401</i>	<i>SW</i>	<i>120</i>	<i>100</i>		
<i>195229</i>	<i>15</i>	<i>7401</i>	<i>NE</i>	<i>120</i>	<i>100</i>		
<i>201057</i>	<i>16</i>	<i>7501</i>	<i>SW</i>	<i>120</i>	<i>100</i>		<i>200 meters @ start new file # 195844</i>
<i>202350</i>	<i>17</i>	<i>7501</i>	<i>NE</i>	<i>120</i>	<i>100</i>		<i>Turned on last minute - look closely.</i>
<i>203702</i>	<i>18</i>	<i>7401</i>	<i>SW</i>	<i>120</i>	<i>100</i>		
<i>205052</i>	<i>19</i>	<i>7501</i>	<i>NE</i>	<i>120</i>	<i>100</i>		
<i>210331</i>	<i>20</i>	<i>7501</i>	<i>SW</i>	<i>120</i>	<i>100</i>		
	<i>21</i>	<i>7401</i>	<i>NE</i>				
	<i>22</i>	<i>7401</i>	<i>SW</i>				
	<i>23</i>	<i>7601</i>	<i>NE</i>				

Station Occupation Report For Airborne GPS

Project: PA MAP 2007 LIDAR

Location: near PA TWENPIKE "Willow Hill" EXIT TOLL PLAZA **Project Number:** S855015

Completed by: PNH **Date:** MARCH 31st, 2007

Receiver: "1" (SN 108)

Receiver Type: TRIMBLE S700

Antenna Type: ZEPHYR GEODETIC

Station ID: GEISLER

Start -- H.I. (m): 1.474 m

End -- H.I. (m): 1.474 m

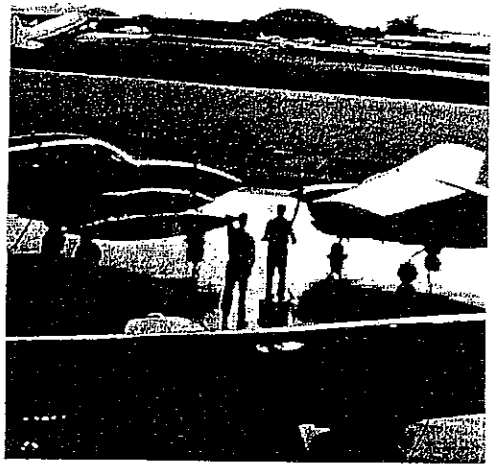
H.I. (ft): 4.835 ft.

Start Time: 12⁵⁵p

End Time: 5³⁰p

Time Zone: EDT

Operator: PNH

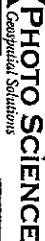


Comments

50' tree ~ 100' SW & slightly uphill - no leaves
metal street light ~ 50' E

for N9471R - 070331B (SN 059) "CHAMBERSBURG" AREA
flyovers @ 1⁵⁵p & 5¹⁵p

LIDAR MISSION RECORD SHEET



2670 Wilshire Drive - Lexington KY - 40503 - 859.277.8700 - www.photoscience.com

on 659A 5238
1-5-21

Project Name: 201111-5000410
 Project Number: 5855-015
 Navigation File: _____

Pilot: Myron
 Tech: Estevan
 Aircraft: N9471R

Date Flown: 4-3-07
 Takeoff Time: 7:25A (airport) 259
 Landing Time: 11:59 (airport)

Project's Scanning Requirements

FOV (degrees): 45 Attenuation(OD) or Laser Current(%): 65
 Scan Rate (Hz): 255
 Pulse Rate (Hz): 53000 Altitude AGL (ft): _____
 Ground Speed (kts): 130 Range Gate (m): 112-2376

Data Information

IPAS File Name: 60070403_111110_000
 From/To: 000 ->
 LIDAR Unit #: _____ Unit 2 (s/n 059)
 HD #: _____

GPS Base Location(s): 2F9A
 PDOP Avoidance: 1200-1255g
 Static or Flyover?: Static
 Laser On Time & Off Times: 7:30 11:49a

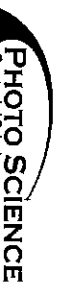
070403A - 5/15/09

NOTES

Begin Temp	52°F	Ground (airport)	269	Field Elev.	2200	Temp at Altitude	0
Begin Dewpoint	36°F						
Begin Pressure	30.09						
Mid Temp	65°F		269		2200		0
Mid Dewpoint	38°F						
Mid Pressure	30.12						
End Temp	73°F		269		2200		1
End Dewpoint	39°F						
End Pressure	30.09						

FILE	FL #	Alt (AMSL)	Heading	Speed	Returns	Grab	NOTES
114525	26	820	SW	130	100		High Red last 13.3
120934	27	830	NE	120	100		10.4 DIST
123357	28	830	SW	120	100		" "
125749	29	840	NE	120	100		" "
132208	30	840	SW	120	100		" "
134655	31	850	NE	120	100		" "
141126	32	850	SW	120	100		Site of fit 93 9-11-01 N. Lake Indian Grove in area on left of line
143546	33	850	NE	120	100		N40 03 03.90 W 78 52 01.0 Airport
150024	34	850	SW	120	100		Eng 18 DIST, Shanksville Pa. Airport North of Lake Rd. line
152428	35	850	NE	120	100		
	36	850	SW				

LIDAR MISSION RECORD SHEET



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Project Name	P. Lidar - Somerset
Project Number	5855-015
Navigation File	

Pilot	M. Jones
Tech	W. Jones
Aircraft	N9471R

Date Flown	4-3-07
Takeoff Time	7:18 p.m.
Landing Time	4:40 p.m.

Project's Scanning Requirements	
FOV (degrees):	65
Scan Rate (Hz):	355
Pulse Rate (Hz):	53,000
Ground Speed (kts):	120
Attenuation (OD) or Laser Current (%):	65
Altitude AGL (ft):	
Range Gate (m):	

Data Information	
IPAS File Name	20070403_191113000
From/To	000 ->
LIDAR Unit #	Unit 2 (s/n 059)
HD #	

GPS Base Location(s)	259A
PDOP Avoidance	5
Static or Flyover?	Static
Laser On Time & Off Times	3:22 4:27

07403 B - 5459

Begin Temp	80°F	Ground (airport)	269	Field Elev.	2,200	Temp. at Altitude	3
Begin Dewpoint	37°F						
Begin Pressure	29.97						
Mid Temp	81°F				2,200		
Mid Dewpoint	35°F						
Mid Pressure	29.94						
End Temp			269		2,200		
End Dewpoint							
End Pressure							

FILE	FL #	Alt. (AMSL)	Heading	Speed	Returns	Crab	NOTES
194106	36	4501	SW	120'	100		
250730	37	4601	N/E	120	200		safe winds - 115-130 Turb.
	38	4701					
	39	4801					
	40	4901					
	41	5001					
	42	5101					
	43	5201					
	44	5301					
	45	5401					

LIDAR MISSION RECORD SHEET



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Project Name	Pal. Lidar - Somers
Project Number	SPS-25
Navigation File	

Pilot	Mayson
Tech	Livermore
Aircraft	N9471R

Date Flown	4-3-2007
Takeoff Time	12:56
Landing Time	

Project's Scanning Requirements	
FOV (degrees):	45
Scan Rate (Hz):	25.5
Pulse Rate (Hz):	53000
Ground Speed (Kts):	120
Attenuation(OD) or Laser Current(%):	65%
Altitude AGL (ft):	
Range Gate (m):	

Data Information	
IPAS File Name	20070403 164918
From/To	000 ->
LIDAR Unit #	Unit 2 (s/n 059)
HD #	

GPS Base Location(s)	269A
PDOP Avoidance	SP-5:50p
Static or Flyover?	Static
Laser On Time & Off Times	1:04p

0:10:45 C

Begin Temp	75	Ground	(airport)	269	Field Elev.	2,200	Temp. at Altitude
Begin Dewpoint	38						
Begin Pressure	30.06						
Mid Temp				269	2,200		
Mid Dewpoint							
Mid Pressure							
End Temp				269	2,200		
End Dewpoint							
End Pressure							

FILE	FL #	Alt (AMSL)	Heading	Speed	Returns	Crab	NOTES
171906	36	8501	NE				1000ft.
	37	8601					
	38	8701					
	39	8801					
	40	8901					
	41	9001					
	42	9101					
	43	9201					
	44	9301					
	45	9401					
	46	9501					
	47	9601					
	48	9701					
	49	9801					
	50	9901					
	51	1001					
	52	1101					
	53	1601					
		1701					

no idea what this says
date not used, apparently in

Station Occupation Report For Airborne GPS

Project: PA Map 2007 - LIDAR

Location: ~~PA~~ 269 A

Project Number: 5855-015

Completed by: D. Mullins

Date: 4-21-07

Receiver: #5

Receiver Type: 5700

Antenna Type: ZEPHYR GEODETIC

Station ID: 269 A

Start -- H.I. (m): 1.64⁴⁹ m

End -- H.I. (m):

H.I. (ft): 5.398

Start Time: 1:26p 4:20p

End Time: ~~1:26p~~ 3:53p 6:25p

Time Zone: Eastern

Operator: Derrick Mullins



Comments

90091110.dat use for LIDAR missions

90091110.dat sh 59 070421A & B

PDOP 5.8%
11:05 - 11:35
340 - 4251

LIDAR MISSION RECORD SHEET



2670 Whitlie Drive - Lexington KY - 40503 - 859.277.8700 - www.photoscience.com

Project Name	DAMAPP2007
Project Number	SSSS-015
Navigation File	SOMERSET

Pilot	D. Morgan
Tech	D. Mullins
Aircraft	N9471R

Date Flown	4-22-07
Takeoff Time	6:45 AM
Landing Time	10:59

Project's Scanning Requirements	
FOV (degrees):	45
Scan Rate (Hz):	25.50
Pulse Rate (Hz):	53000
Ground Speed (kts):	120
Attenuation(OD) or Laser Current(%):	69%
Altitude AGL (ft):	
Range Gate (m):	

Data Information	
IPAS File Name	20070422-224055.00
From/To	000 ->
LIDAR Unit #	Unit 2 (s/n 059)
HD #	

GPS Base Location(s)	269
PDOP Avoidance	NA
Static or Flyover?	Static
Laser On Time & Off Times	6:55 / 10:38

SM 59 070422A

	Ground	(airport)	Field Elev.	Temp. at Altitude
Begin Temp	77	26.9	2272	10
Begin Dewpoint	29	"	"	"
Begin Pressure	30.47	"	"	"
Mid Temp	69	"	"	10
Mid Dewpoint	29	"	"	"
Mid Pressure	30.18	"	"	"
End Temp	65	"	"	10
End Dewpoint	28	"	"	"
End Pressure	30.17	"	"	"

FILE	FL #	Alt (AMSL)	Heading	Speed	Returns	Crab	NOTES
230325	41	8301	SW	120	100		
232418	42	8201	NE	120	100		
234356	43	8101	SW	120	100		
000220	44	8001	NE	120	100		
001926	45	7901	SW	120	100		
003534	46	7901	NE	120	100		
005055	47	7901	SW	120	100		
010530	48	7901	NE	120	100		
011906	49	8001	SW	120	100		
013143	50	8001	NE	120	100		
014336	51	7901	SW	120	99/100		
015414	52	7701	NE	120	100		
020416	53	7601	SW	120	100		
021313	54	7601	NE	120	100		
022109	55	7501	SW	120	100		
022420	56	7401	NE	120	99/100		
023442	57	7301	SW	120	98/100		
	58	7301	NE	120	97/100		

Station Occupation Report For Airborne GPS

Project: PA MAP 2007 - LIDAR

Location: Airport
Sandlot Pt (269)

Project Number: SB55-015

Completed by: _____

Date: 4-22-07

Receiver: ~~5700~~ #5

Receiver Type: 5700

Antenna Type: ZEPHYR GEODETIC

Station ID: 269A

Start -- H.I. (m): 1.6785 m

End -- H.I. (m): _____

H.I. (ft): 5.510 ft

Start Time: 6:23

End Time: ?

Time Zone: Eastern

Operator: DTM



Comments

use for LIDAR mission: s/n 59 070422A

Station Occupation Report For Airborne GPS

Project: PA MAP 2007 LIDAR

Location: N of MCCONNELLSBURG, PA

Project Number: SB55-015

Completed by: PJH

Date: April 23rd, 2007

Receiver: "1" (S/N 108)

Receiver Type: TRIMBLE 5700

Antenna Type: ZEPHYR GEODETIC

Station ID: FULOP

Start -- H.I. (m): 1.5375 m

End -- H.I. (m): _____

H.I. (ft): 5.045 ft.

Start Time: [8:18 A] [11:14 A]

End Time: [11:11 A] [12:20 P]

Time Zone: EDT

Operator: PJH



Comments _____

505 S/N 059 mission 070423A & B (partial)

flyovers @ 8:52 A & 11:02 A
12:31 P & 1:11 P

general
PSI ramp 555 road
1-6003 m

LIDAR MISSION RECORD SHEET



2570 Wilshire Drive - Lexington KY - 40503 - 859.277.3700 - www.photoscience.com

Project Name: **PAMAP 2007**

Project Number: _____

Navigation File: _____

Pilot: **D. Mayhew**

Tech: **D. Williams**

Aircraft: **N9471R**

Date Flown: **4-24-07**

Takeoff Time: **4:25**

Landing Time: **6:30**

(airport) **HMZ**

(airport)

Project's Scanning Requirements

FOV (degrees): **60**

Scan Rate (Hz): **28.10**

Pulse Rate (Hz): **60,000**

Ground Speed (kts): **120.0**

Attenuation(OD) or Laser Current(%): **42%**

Altitude AGL (ft): _____

Range Gate (m): _____

Data Information

IPAS File Name: _____

From/To: **000 ->**

LIDAR Unit #: _____

Unit 2 (s/n 059)

HD # _____

GPS Base Location(s): **HMZ**

PDOP Avoidance: _____

Static or Flyover? **Static**

Laser On Time & Off Times: **4:30 / 6:15**

	Ground	(airport)	Field Elev.	Temp. at Altitude
Begin Temp	24	HMZ	1163	6°
Begin Dewpoint	11	"	"	"
Begin Pressure	30.63	"	"	"
Mid Temp		"	"	"
Mid Dewpoint		"	"	"
Mid Pressure		"	"	"
End Temp	23	"	"	"
End Dewpoint	9	"	"	"
End Pressure	30.04	"	"	"

FILE	FL #	Alt. (AMSL)	Heading	Speed	Returns	Crab	NOTES
2041204	20	5401	SW	120	99		
210714	19	5401	NE	120	100		
213145	18	5701	SW	126	91		
215502	17	5801	NE	120	99		
	16	5901					
	15	5901					
	14	5901					
	13	6001					
	12	6101					
	11	6101					
	10	6201					
	9	6401					
	8	6701					
	7	7001					
	6	7001					
	5	7661					
	4	6601					
	3	5401					
	2	5501					
	1	5301					

LIDAR MISSION RECORD SHEET

PHOTO SCIENCE
Geospatial Solutions

2670 White Drive - Lexington KY - 40503 - 859.277.8700 - www.photoscience.com

Project Name	PAMAP 2007
Project Number	5855-010
Navigation File	

Pilot	D. M. ...
Tech	D. M. ...
Aircraft	N9471R

Date Flown	4-25-07
Takeoff Time	8:44
Landing Time	10:00

(airport) HMLZ

Project's Scanning Requirements		
FOV (degrees):	60	Attenuation(OD) or Laser Current(%):
Scan Rate (Hz):	28.1	42%
Pulse Rate (Hz):	60000	Altitude AGL (ft):
Ground Speed (kts):	120	Range Gate (m):

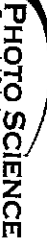
Data Information	
IPAS File Name	20070425-123809.000
From/To	000 ->
LIDAR Unit #	Unit 2 (sln 059)
HD #	# 2

Begin Temp	12	Ground	(airport) HMLZ	Field Elev.	1163	Temp. at Altitude	70
Begin Dewpoint	8						
Begin Pressure	3008						
Mid Temp							
Mid Dewpoint							
Mid Pressure							
End Temp	14						
End Dewpoint	7						70
End Pressure	3005						

GPS Base Location(s)	HMLZ
PDOP Avoidance	10:55am - 11:25am / 3:30p - 4:10p
Static or Flyover?	Static
Laser On Time & Off Times	8:55 - 9:50

FILE	FL #	Alt. (AMSL)	Heading	Speed	Returns	Crab	NOTES
125622	16	5901	SW	120	100		
131719	15	5901	NE	120	99/100		
	14	5701					
	13	6001					
	12	6101					
133551	11	6101	SW	120			Abort clouds
	10	6201					
	9	6401					
	8	6401					
	7	7001					
	6	7001					
	5	7001					
	4	6861					
	3	5401					
	2	5501					
	1	5301					

LIDAR MISSION RECORD SHEET



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Project Name	PANAP.2007
Project Number	
Navigation File	

Pilot	D. McMan
Tech	D. McMan
Aircraft	N9471R

Date Flown	4-29-07
Takeoff Time	11:21
Landing Time	12:00

Project's Scanning Requirements	
FOV (degrees):	60°
Scan Rate (Hz):	89.1
Pulse Rate (Hz):	60000
Ground Speed (Kts):	120
Attenuation(OD) or Laser Current(%):	42%
Altitude AGL (ft):	
Range Gate (m):	

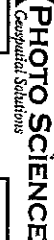
Data Information	
IPAS File Name	151250.000
From/To	000 ->
LIDAR Unit #	Unit 2 (s/n 059)
HD #	# 1

GPS Base Location(s)	H1M2
PDOP Avoidance	10:35-11:55/3:10-4:00
Static or Flyover?	Static
Laser On Time & Off Times	11:24 / 11:55

Begin Temp	19	Ground	H1M2	Field Elev.	1163	Temp. at Altitude	20
Begin Dewpoint	8						
Begin Pressure	29.99						
Mid Temp							
Mid Dewpoint							
Mid Pressure							
End Temp	20						20
End Dewpoint	8						
End Pressure	29.98						

FILE	FL #	Alt. (AMSL)	Heading	Speed	Returns	Cab	NOTES
153224	14	5961	SW	120	100		11 miles Remaining
	13	6001					
	12	6001					
	11	6161					
	16	6201					
	9	6401					
	8	6701					
	7	7001					
	6	7001					
	5	7601					
	4	6801					
	3	5401					
	2	5501					
	1	5301					

LIDAR MISSION RECORD SHEET



2570 White Drive - Lexington KY - 40503 - 859.277.8700 - www.photoscience.com

Project Name	PM.P 2009
Project Number	555-615
Navigation File	

Pilot	D. Morgan
Tech	D. Williams
Aircraft	N9471R

Date Flown	4-29-07
Takeoff Time	1:55
Landing Time	3:11

Project's Scanning Requirements	
FOV (degrees):	60
Scan Rate (Hz):	28.1
Pulse Rate (Hz):	6000
Ground Speed (Kts):	120
Attenuation(OD) or Laser Current(%):	42%
Altitude AGL (ft):	
Range Gate (m):	

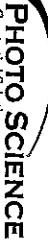
Data Information	
IPAS File Name	174805.001
From/To	000 ->
LIDAR Unit #	Unit 2 (s/n 059)
HD #	# 1

GPS Base Location(s)	Hm 2
PDOP Avoidance	3:10-400
Static or Flyover?	Static
Laser On Time & Off Times	1:59 - 2:45

Begin Temp	22	Ground	(airport)	Hm 2	Temp. at Altitude
Begin Dewpoint	8				
Begin Pressure	29.96				
Mid Temp					
Mid Dewpoint					
Mid Pressure					
End Temp	22				20
End Dewpoint	8				
End Pressure	29.95				

FILE	FL #	Alt (AMSL)	Heading	Speed	Returns	Crab	NOTES
180329	14	5901	SW	120	99/100		Finish Point Line
181327	13	6001	NE	118	100		
183020	12	6001	SW	120	99/100		
184507	11	6101	NE	118	100		
	10	6201					
	9	6400					
	8	6701					
	7	7001					
	6	7001					
	5	7001					
	4	6800					
	3	5401					
	2	5501					
	1	5301					

LIDAR MISSION RECORD SHEET



2670 Wilhite Drive - Lexington KY - 40503 - 859.277.8700 - www.photoscience.com

Project Name	PA MAP. 2007
Project Number	5855-015
Navigation File	

Pilot	O. Myrman
Tech	D. Miller
Aircraft	N9471R

Date Flown	4-29-07
Takeoff Time	4:44 PM
Landing Time	7:05 PM

Project's Scanning Requirements	
FOV (degrees):	60
Scan Rate (Hz):	28.1
Pulse Rate (Hz):	60,000
Ground Speed (Kts):	120
Attenuation (OD) or Laser Current (%):	42%
Altitude AGL (ft):	
Range Gate (m):	

Data Information	
IPAS File Name	203914_600
From/To	000 ->
LIDAR Unit #	Unit 2 (s/n 059)
HD #	#1

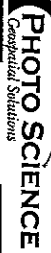
GPS Base Location(s)	HM2
PDOP Avoidance	—
Static or Flyover?	Static
Laser On Time & Off Times	4:49 - 6:58

Begin Temp	23	Ground	HM2	Field Elev.	1163	Temp. at Altitude	10
Begin Dewpoint	6						
Begin Pressure	29.94						
Mid Temp							
Mid Dewpoint							
Mid Pressure							
End Temp	22						
End Dewpoint	5						
End Pressure	29.96						

FILE	FL #	Alt (AMSL)	Heading	Speed	Returns	Crab	NOTES
205752	10	6201	SW	120	100		
211101	9	6401	N	120	100		
212237	8	6701	SW	120	100		
213333	7	7001	N	120	100		
214213	6	7001	SW	120	100		
215015	5	7001	N	118	100		
215706	4	6801	SW	115	100		
220045	3	5401	S	120	100		
223107	1	5301	E	120	100		Flyover

Gas 3:50

LIDAR MISSION RECORD SHEET



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Project Name	DA MAT 200
Project Number	
Navigation File	

Pilot	D. Magnus
Tech	O. Williams
Aircraft	N9471R

Date Flown	4-30-07
Takeoff Time	15:34 (airport)
Landing Time	(airport)

Project's Scanning Requirements	
FOV (degrees):	61
Scan Rate (Hz):	29
Pulse Rate (Hz):	65K
Ground Speed (kts):	120
Attenuation(OD) or Laser Current(%):	46%
Altitude AGL (ft):	
Range Gate (m):	

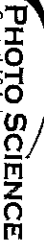
Data Information	
IPAS File Name	153039.000
From/To	000 ->
LIDAR Unit #	Unit 2 (s/n 059)
HD #	#3

GPS Base Location(s)	
PDOP Avoidance	3:10 - 3:45
Static or Flyover?	Static
Laser On Time & Off Times	15:36 - 15:51 (6:31)

Ground		Field Elev.		Temp. at Altitude
Begin Temp	21		1504	9°
Begin Dewpoint	08			
Begin Pressure	29.88			
Mid Temp				
Mid Dewpoint				
Mid Pressure				
End Temp	22			40
End Dewpoint	07			
End Pressure	29.88			

FILE	FL #	Alt (AMSL)	Heading	Speed	Returns	Crab	NOTES
155217	40	5401	N	120	100		
155903	39	5301	S	120	150		
161066	38	5201	N	120	100		
	37	5201	S				
	36	5201					
	35	5201					
	34	5301					
	33	5301					
	32	5301					
	31	5301					
	30	5201					
	29	5201					
	28	5201					
	27	5301					
	26	5301					
	25	5301					
	24	5301					

LIDAR MISSION RECORD SHEET



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Project Name	PD 100 P 2007
Project Number	5455-015
Navigation File	

Pilot	D. McPherson
Tech	
Aircraft	N9471R

Date Flown	4-30-07
Takeoff Time	8:57
Landing Time	8:36

Project's Scanning Requirements	
FOV (degrees):	45
Scan Rate (Hz):	2550
Pulse Rate (Hz):	53600
Ground Speed (kts):	120

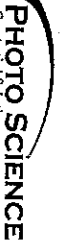
Data Information	
IPAS File Name	194501
From/To	000 -> 038
LIDAR Unit #	Unit 2 (s/n 059)
HD #	3

GPS Base Location(s)	App
PDOP Avoidance	N/A
Static or Flyover?	Static
Laser On Time & Off Times	4:02 - 8:26

Begin Temp	23	Ground (airport)	App	Field Elev.	1504	Temp. at Altitude	3
Begin Dewpoint	1	App	App	1504			
Begin Pressure	29.95	App	App	1504			
Mid Temp	22	App	App	1504		2	
Mid Dewpoint	1	App	App	1504			
Mid Pressure	29.90	App	App	1504			
End Temp	17	App	App	1504		2	
End Dewpoint	-1	App	App	1504			
End Pressure	29.95	App	App	1504			

FILE	FL #	Alt (AMSL)	Heading	Speed	Returns	Crab	NOTES
201122	37	7201	SW	119	100		
202315	35	7201	NE	120	99		
203529	34	7301	SW	120	100		
204304	33	7301	NE	115	100		
210109	32	7301	SW	118	100		
211347	31	7301	NE	120	100		
212656	30	7201	SW	120	100		
214021	29	7201	NE	119	100		
215350	28	7201	SW	120	100		
220702	27	7301	NE	100-120	100		
222111	26	7301	SW	120	100		
223451	25	7301	NE	100-120	99		
224839	24	7301	SW	120	100		
230211	23	7301	NE	100-120	100		
231620	22	7301	SW	120	100		
233128	21	7401	NE	105-120	100		
234538	20	7401	SW	120	100		
235907	19	7401	NE	114	100		
001312	18	7401	SW	120	100		

LIDAR MISSION RECORD SHEET



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5/4 @ 11:15 END 6:10
 HI = 1.6485
 HI = 5.409



mid time

Project Name	PA MAP
Project Number	5855-015
Navigation File	

Pilot	D. Myerson
Tech	D. Williams
Aircraft	NB477R

Date Flown	5-1-07
Takeoff Time	11:32
Landing Time	2:52

Project's Scanning Requirements		
FOV (degrees):	61	Attenuation(OD) or Laser Current(%):
Scan Rate (Hz):	29.0	Altitude AGL (ft):
Pulse Rate (Hz):	65000	Range Gate (m):
Ground Speed (kts):	120	

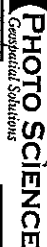
Data Information	
IPAS File Name	152458.000
From/To	000 ->
LIDAR Unit #	Unit 2 (s/n 059)
HD #	#3

GPS Base Location(s)	A00 Airport
PDOP Avoidance	300 - 345
Static or Flyover?	Static
Laser On Time & Off Times	11:35 - 2:48

Begin Temp	18	Ground (airport)	A00	Field Elev.	1504	Temp at Altitude	8°
Begin Dewpoint	02		"	"	"		
Begin Pressure	3060		"	"	"		
Mid Temp	22	Ground	A00	Field Elev.	1504	Temp at Altitude	8°
Mid Dewpoint	06						
Mid Pressure	2994						
End Temp	25	Ground	A00	Field Elev.	1504	Temp at Altitude	10°
End Dewpoint	07						
End Pressure	2940						

FILE	FL #	Alt. (AMSL)	Heading	Speed	Returns	Grab	NOTES
154142	17	5401	N	120	100		
155533	16	5401	S	120	99/100		
160953	15	5401	N	120	100		
162345	14	5401	S	120	100		
163723	13	5401	N	120	106		
165207	12	5461	S	120	100		
170606	11	5501	N	120	100		
171955	10	5501	S	120	99/100		
173351	9	5501	N	120	99/100		
174755	8	5501	S	120	100		
175425	7	5501	N	120	100		
180138	6	5501	S	120	100		
181208	1	5201	SE	120	96/97		
183421	2	5401	NW	120	99		
	2	5501					Bedford

LIDAR MISSION RECORD SHEET



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Project Name	5855-015 PA MWP 2007
Project Number	5855-015
Navigation File	

Pilot	D. Myrman
Tech	O. Mullins
Aircraft	N9471R

Date Flown	5-2-07
Takeoff Time	1:17pm
Landing Time	2:142

Project's Scanning Requirements	
FOV (degrees):	60
Scan Rate (Hz):	2900
Pulse Rate (Hz):	65 K
Ground Speed (kts):	125
Attenuation(OD) or Laser Current(%):	46%
Altitude AGL (ft):	
Range Gate (m):	192

Data Information	
IPAS File Name	170793.000
FrontTo	000 ->
LIDAR Unit #	Unit 2 (sn 059)
HD #	3

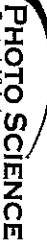
GPS Base Location(s)	A00
PDOP Avoidance	3:00 - 3:40 / 10:40 - 10:55
Static or Flyover?	Static
Laser On Time & Off Times	1:20(1:30) / off * 2:32

	Ground	(airport)	Field Elev.	Temp. at Altitude
Begin Temp	19	A00	1504	35
Begin Dewpoint	9			
Begin Pressure	2998			
Mid Temp	20			30
Mid Dewpoint	9			
Mid Pressure	2998			
End Temp	21			3
End Dewpoint	8			
End Pressure	2998			

FILE	FL #	Alt. (AMSL)	Heading	Speed	Returns	Crab	NOTES
172557	14	5401	NE	116	100		R.F. file to fill gap
173663	5	5601	SW	120	100		R.F. file to fill gap
174815	15	5901	NE	120	100		
174846	13	6001	NE	120	100		
181203	11	6101	SW	120	100		
187942	12	6001	NE	120	100		
182609	14	5901	SW	120	100		

5:07
39.15
49.15

LIDAR MISSION RECORD SHEET



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Project Name	PA MAF 2507
Project Number	585-015
Navigation File	

Pilot	D. M. M. M.
Tech	D. M. M. M.
Aircraft	N9471R

Date Flown	5-2-07
Takeoff Time	5:33
Landing Time	10:26

Project's Scanning Requirements	
FOV (degrees):	45
Scan Rate (Hz):	25,50
Pulse Rate (Hz):	53667
Ground Speed (kts):	120
Attenuation(OD) or Laser Current(%):	69%
Altitude AGL (ft):	
Range Gate (m):	

Data Information	
IPAS File Name	232526.000
From/To	000 ->
LDAR Unit #	Unit 2 (s/n 059)
HD #	#3

GPS Base Location(s)	RVL
PDOP Avoidance	10:30
Static or Flyover?	Static
Laser On Time & Off Times	7:31 / 10:22

Begin Temp	18	Ground (airport)	RVL	Field Elev.	820	Temp at Altitude	-20
Begin Dewpoint	7						
Begin Pressure	3001						
Mid Temp	14						-30
Mid Dewpoint	5						
Mid Pressure	3008						
End Temp	14						-2
End Dewpoint	5						
End Pressure	3011						

FILE	FL #	Alt. (AMSL)	Heading	Speed	Returns	Crab	NOTES
234937	23	7400	W	120	160		
001101	24	7400	E	130	160		
003322	25	7400	W	120	160		
005543	26	7400	E	120	160		
011815	27	7400	W	120	100		
014029	28	7400	E	120	100		
020248	29	7300	W	120	100		Portion of line 10 miles
	30	7300					
	31	7300					
	32	7300					
	33	7300					
	34	7300					
	35	7300					
	36	7300					

LIDAR MISSION RECORD SHEET

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Project Name	PA MAP 2007
Project Number	5855-015
Navigation File	

Pilot	D McQueen
Tech	
Aircraft	N9471R

Date Flown	5-3-07
Takeoff Time	3:55
Landing Time	6:54
	(airport) RVL
	(airport)

Project's Scanning Requirements	
FOV (degrees):	45
Scan Rate (Hz):	25.50
Pulse Rate (Hz):	53K
Ground Speed (Kts):	120
Attenuation(OD) or Laser Current(%):	69%
Altitude AGL (ft):	
Range Gate (m):	

Data Information	
IPAS File Name	194744.D01
From/To	000 ->
LIDAR Unit #	Unit 2 (s/n 059)
HD #	45

GPS Base Location(s)	RVL
PDOP Avoidance	
Static or Flyover?	Flyover
Laser On Time & Off Times	3:59 - 6:37

Begin Temp	21	Ground	(airport) RVL	Field Elev.	811	Temp. at Altitude	-4
Begin Dewpoint	2						
Begin Pressure	3017						
Mid Temp	21						-4
Mid Dewpoint	4						
Mid Pressure	3016						
End Temp	21						-2
End Dewpoint	3						
End Pressure	3015						

FILE	FL #	Alt (AMSL)	Heading	Speed	Returns	Crab	NOTES
201034	13	8501	W	120			No Good - Wrong Alt. Re-fly @ End - off course
202324	13	7501	E	120			
203407	12	7501	W	120	100		
204342	11	7501	E	120	160		
205345	10	7501	W	120	160		
210217	9	7501	E	120	100		
211137	8	7601	W	120	99/100		
212019	7	7601	E	120	100		
212930	6	7601	W	120	100		
213831	5	7601	E	120	100		
214659	4	7801	W	120	100		
215414	3	7901	E	120	100		
220544	2	7801	E	120	100		
222546	13	7501	SW	120	100		

*Station Occupation Report
For Airborne GPS*

Project: PAMAP 2007

Location: Bedford *Project Number:* 5855-015

Completed by: _____ *Date:* 2-24-07

Receiver: 5700

Receiver Type: # 5

Antenna Type: _____

Station ID: _____

Start -- H.I. (m): 1.6588

End -- H.I. (m): _____

H.I. (ft): 5.443

Start Time: 4:10

End Time: (6:20 ??)

Time Zone: East-m

Operator: DTM



Comments

*Station Occupation Report
For Airborne GPS*

Project: PA MAP 2007

Location: Brdford / HMZ

Project Number: _____

Completed by: _____

Date: 4-25-06

Receiver: #5

Receiver Type: S700

Antenna Type: _____

Station ID: _____

Start -- H.I. (m): 1.6414

End -- H.I. (m): _____

H.I. (ft): 5.384

Start Time: 8:22

End Time: 10:18

Time Zone: Eastern

Operator: DTM



Comments

*Station Occupation Report
For Airborne GPS*

Project: PA MAP - 2007

Location: Bedford Hmz

Project Number: 5855-015

Completed by: _____

Date: 4-29-07

Receiver: #5

Receiver Type: 5700

Antenna Type: _____

Station ID: HMZ

Start -- H.I. (m): 1.6607

End -- H.I. (m): _____

H.I. (ft): 5.448

Start Time: 11:02

End Time: 12:0

Time Zone: Eastern

Operator: DTM



Comments _____

*Station Occupation Report
For Airborne GPS*

Project: PAMAP-2007

Location: HMZ

Project Number: SGSS-015

Completed by: _____

Date: 4-29-07

Receiver: #5

Receiver Type: S700

Antenna Type: _____

Station ID: _____

Start -- H.I. (m): 1.6607

End -- H.I. (m): _____

H.I. (ft): 5.448

Start Time: 1:39

End Time: _____

Time Zone: Eastern

Operator: DTM



Comments _____

*Station Occupation Report
For Airborne GPS*

Project: PAMP 2007

Location: HMZ

Project Number: 5855-015

Completed by: _____

Date: 4-29-07

Receiver: ~~5700~~ #5

Receiver Type: 5700

Antenna Type: _____

Station ID: Bedford (HMZ)

Start -- H.I. (m): 1,6607

End -- H.I. (m): _____

H.I. (ft): 5,448

Start Time: 3:50

End Time: 7:

Time Zone: Eastern

Operator: DTM



Comments

*Station Occupation Report
For Airborne GPS*

Project: PA MAP 2007

Location: A00

Project Number: 5855-015

Completed by: D. Mullins

Date: 4-30-07

Receiver: 5

Receiver Type: 5700

Antenna Type: _____

Station ID: A00 AP 1964 STA B

Start -- H.I. (m): 1.6325

End -- H.I. (m): 1.6325

H.I. (ft): 5.355

Start Time: 9:35

End Time: 8:47

Time Zone: Eastern

Operator: Mullins



Comments _____

*Station Occupation Report
For Airborne GPS*

Project: PA Map 2007

Location: Altoona

Project Number: 5855-015

Completed by: _____

Date: 5-1-07

Receiver: S

Receiver Type: S700

Antenna Type: _____

Station ID: A00

Start -- H.I. (m): 1.6485

End -- H.I. (m): █

H.I. (ft): 5.409

Start Time: 11:05 (EST) (

End Time: 6:10

Time Zone: Eastern

Operator: DTM



Comments

*Station Occupation Report
For Airborne GPS*

Project:

PAMap

Location:

Bedford

Project Number: S855-015

Completed by:

Date: 5-8-07

Receiver:

#5

Receiver Type:

5700

Antenna Type:

Station ID:

HMZA

Start -- H.I. (m):

1,6430

End -- H.I. (m):

H.I. (ft):

5,390

Start Time:

9:30

End Time:

10:32

Time Zone:

Eastern

Operator:

Dm



Comments

*Station Occupation Report
For Airborne GPS*

Project: PA MAP - 2007

Location: Altoona

Project Number: 5-2-07

Completed by: _____

Date: 5-2-07

Receiver: #5

Receiver Type: 5700

Antenna Type: _____

Station ID: A00

Start -- H.I. (m): 1.6545

End -- H.I. (m): 5.428

H.I. (ft): _____

Start Time: 8:37

End Time: _____

Time Zone: Eastern

Operator: DTM



Comments _____

*Station Occupation Report
For Airborne GPS*

Project: PA MAP 2007

Location: Bedford (HMZ)

Project Number: 5B55-015

Completed by: _____

Date: 5-4-07

Receiver: #5

Receiver Type: S700

Antenna Type: _____

Station ID: HMZ

Start -- H.I. (m): 1.5999

End -- H.I. (m): _____

H.I. (ft): 5.249

Start Time: 9:34

End Time: 10:16

Time Zone: Eastern

Operator: DTM



Comments

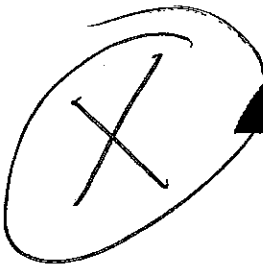


PHOTO SCIENCE

Geospatial Solutions

?
? 27th



Station Occupation Report For Airborne GPS

Project: PAMAP 2007

Location: Bedford Air Port (HMZ)

Project Number: _____

Completed by: _____

Date: _____

Receiver: #5

Receiver Type: S700

Antenna Type: _____

Station ID: HMZ

Start -- H.I. (m): 1.6175

End -- H.I. (m): _____

H.I. (ft): 5.298

Start Time: 5:35

End Time: _____

Time Zone: Eastern

Operator: DTA



Comments

*Station Occupation Report
For Airborne GPS*

Project: PA MAP 2007 - LIDAR

Location: CHAMBERSBURG AIRPORT, PA

Project Number: SBSS-015

Completed by: JNH

Date: MARCH 28th, 2007

Receiver: "1" (S/N 108)

Receiver Type: TRIMBLE S700

Antenna Type: ZEPHYR GEODETIC

Station ID: CHAMPORT

Start -- H.I. (m): 1.643 m

End -- H.I. (m): 1.643 m

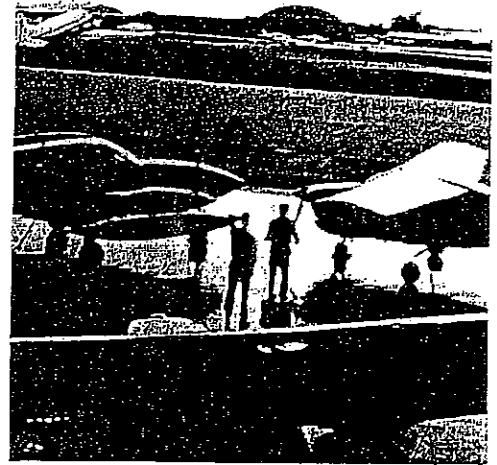
H.I. (ft): 5.39 ft.

Start Time: 6:35p

End Time: ~ 9⁴⁰p

Time Zone: EDT

Operator: JNH



Comments

for S/N 019 070328A

N 7320G

Station Occupation Report For Airborne GPS

Project: PA MAP 2007 LIDAR

Location: CHAMBERSBURG AIRPORT, PA Project Number: 5855-015

Completed by: TNH Date: MARCH 29th, 2007

Receiver: "1" (S/N 108)

Receiver Type: TRIMBLE 5700

Antenna Type: ZEPHYR GEODETIC

Station ID: CHAMBERS

Start -- H.I. (m): 1.649 m

End -- H.I. (m): _____

H.I. (ft): 5.41 ft.

Start Time: 9²⁵A

End Time: _____

Time Zone: EDT

Operator: TNH



Comments

for S/N 019	070329A
H73206	070329B
	070329C

Station Occupation Report For Airborne GPS

Project: PA MAP 2007 - LIDAR

Location: CHAMBERSBURG PA AIRPORT

Project Number: SB55-015

Completed by: PNH

Date: April 2nd, 2007

Receiver: "1" (S/N 108)

Receiver Type: TRIMBLE S700

Antenna Type: ZEPHYR GEODETIC

Station ID: CHAMPORT

Start -- H.I. (m): 1.614 m

End -- H.I. (m): _____

H.I. (ft): 5.29 ft.

Start Time: 5⁰⁹ P

End Time: 8⁴⁵ P

Time Zone: EAST

Operator: PNH



Comments

use for S/N 019 mission 070402A
N73206

Station Occupation Report For Airborne GPS

Project: PA MAP 2007 LIDAR

Location: S101 - GETTESBURG, PA

Project Number: 5855-015

Completed by: PNH

Date: 4-2-07

Receiver: "3"

Receiver Type: S700

Antenna Type: ZEPHYR GEODETIC

Station ID: S 101

Start -- H.I. (m): 1,4935

End -- H.I. (m): "

H.I. (ft): 4,900

Start Time: 9:10pm (4/2/07)

End Time: 12:59 AM (4/3/07)

Time Zone: Eastern

Operator: Derrick Mullins



Comments

use for S/N 019 mission 070402B
N73206

Station Occupation Report For Airborne GPS

Project: PA MAP 2007 LIDAR

Location: HAGERSTOWN, MD AIRPORT

Project Number: SBSS-015

Completed by: PNH

Date: APRIL 3RD, 2007

Receiver: "1" (S/N 108)

Receiver Type: TRIMBLE S700

Antenna Type: ZEPHYR GEODETIC

Station ID: EARTHDATA

Start -- H.I. (m): 1.511 m

End -- H.I. (m): 1.511 m

H.I. (ft): 4.96 ft.

Start Time: 9⁰⁵A

End Time: ~2³⁰P

Time Zone: EDT

Operator: PNH

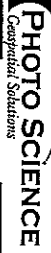


Comments

See missions S/N 019 070403A & B
N73206

near EarthData's Hagerstown flight ops hangar, w/ their permission

LIDAR MISSION RECORD SHEET



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Project Name: PA MAP 2007
 Project Number: SBSS-015
 Navigation File: []

Pilot: Lucas
 Tech: HERRM
 Aircraft: N7320G

Date Flown: March 28th, 2007
 Takeoff Time: 6:20 EDT (airport) N68
 Landing Time: 9:20 EDT (airport) N63

Project's Scanning Requirements

FOV (degrees):	45°	Attenuation(OD) or Laser Current(%):	65%
Scan Rate (Hz):	25.5	Altitude AGL (ft):	660'
Pulse Rate (Hz):	53000	Range Gate (m):	-
Ground Speed (Kts):	120 kts.		

Data Information

POS AV file name	070328A
From/To	000 -> 019
LIDAR Unit #	Unit 1 (sn 019)
HD/Card #	1

GPS Base Location(s): CHANPERET
 PDOP Avoidance: 5.5 -> 5.5
 Static or Flyover? START
 Laser On Time & Off Times: 6:54 -> 9:16

Weather

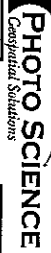
Begin Temp	15 °C	Ground (airport)	704'	Temp. at Altitude	+9 °C
Begin Dewpoint	-05 °C				
Begin Pressure	30.27				
Mid Temp	11 °C				+7 °C
Mid Dewpoint	-05 °C				-
Mid Pressure	30.32				-
End Temp	11 °C				+5 °C
End Dewpoint	+09 °C				-
End Pressure	30.35				-

[3/19 - 070328A]

FILE	FL #	Alt (AMSL)	Heading	Speed	Returns	Grab	NOTES
070328-230731	34	7300'	S	~120 kts.	~100%	~10°	low high, - haze
070328-233049	35	7300'	N	~120 kts.	~100%	~8°	
070328-235232	36	7500'	S	~120 kts.	~100%	~10°	
070329-001456	37	8300'	N	~120 kts.	~100%	~8°	Down e 7600' b/c pass terrain. low pressure
070329-003413	38	8100'	S	~120 kts.	~100%	~10°	
070329-005851	39	8300'	N	~120 kts.	~100%	~8°	

WAIT ON HERRM (3/15) (2/11)

LIDAR MISSION RECORD SHEET



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9:52A → 9:54A from HGR → N63

Project Name	PA MAP 2007
Project Number	5855-015
Navigation File	

Pilot	Luckett
Tech	Harshaw
Aircraft	N7320G

Date Flown	March 29th, 2007
Takeoff Time	9:52A (airport) N63
Landing Time	12:25P (airport) HGR

Project's Scanning Requirements	
FOV (degrees):	45°
Scan Rate (Hz):	25.5
Pulse Rate (Hz):	53000
Ground Speed (kts):	120 kts
Attenuation(OD) or Laser Current(%):	63%
Altitude AGL (ft):	6601'
Range Gate (m):	-

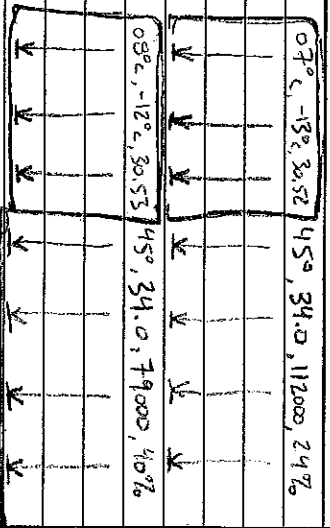
Data Information	
POS AV file name	0703229A
From/To	020 → 040
LIDAR Unit #	Unit 1 (sn 019)
HD/Card #	1

GPS Base Location(s)	CHAMPORSE
PDOP Avoidance	9.5A → 9.5A, 12.5P → 15P
Static or Flyover?	STATIC, FLYOVER
Laser On Time & Off Times	9:52A → 12:26P

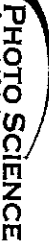
	Ground	(airport)	Field Elev.	Temp. at Altitude
Begin Temp	+07°C	HGR	704'	+02°C
Begin Dewpoint	-13°C			-
Begin Pressure	30.52			-
Mid Temp	+08°C			+02°C
Mid Dewpoint	-12°C			-
Mid Pressure	30.53			-
End Temp	+12°C			+02°C
End Dewpoint	-12°C			-
End Pressure	30.57			-

[SK 19 - 0703229A]

FILE	FL #	Alt (AMSL)	Heading	Speed	Returns	Grab	NOTES
070329-135542	ATT 1	3225'	NW	~100 kts	~100%	~15°	skc, haze, turb
070329-140013	ATT 2	"	SW	~100 kts	~100%	~5°	"
070329-140537	ATT 3	"	SE	~95 kts	~100%	~17°	"
070329-141037	ATT 4	"	NE	~95 kts	~100%	~2°	"
070329-141723	ATT 5	4860'	SE	~100 kts	~100%	~11°	"
070329-142243	ATT 6	"	SW	~95 kts	~100%	~1°	"
070329-142906	ATT 7	"	NW	~90 kts	~100%	~12°	"
070329-143422	ATT 8	"	NE	~95 kts	~100%	~1°	"
070329-144845	40	3500'	S	~120 kts	~100%	~6°	" , smooth
070329-150945	41	3500'	N	~120 kts	~100%	~5°	"
070329-152953	42	3600'	S	~120 kts	~100%	~7°	"
070329-155021	43	3600'	N	~120 kts	~100%	~5°	"
070329-161029	44	3700'	S	~120 kts	~100%	~8°	"



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Project Name	PA MAP 2007
Project Number	SBS-015
Navigation File	

Pilot	LUCAST
Tech	HERASAK
Aircraft	NT320G

Date Flown	MARCH 29 th , 2007
Takeoff Time	13 ³⁰ EDT (airport) HGR
Landing Time	508 ⁰⁰ EST (airport) HGR

Project's Scanning Requirements	
FOV (degrees):	45°
Scan Rate (Hz):	25.5
Pulse Rate (Hz):	53000
Ground Speed (kts):	120 kts
Attenuation(OD) or Laser Current(%):	63%
Altitude AGL (ft):	6601'
Range Gate (m):	-

Data Information	
POS AV file name	070329B
From/To	041 → 065
LIDAR Unit #	Unit 1 (sn 019)
HD/Card #	"1"

GPS Base Location(s)	CHAMPORST
PDOP Avoidance	12 ⁵⁰ → 11 ⁵⁰ , 5 ²⁵ → 5 ⁴⁵
Static or Flyover?	FLYOVERS
Laser On Time & Off Times	1 ⁴⁰ → 4 ⁴³

[5/19 - 070329B]

	Ground	(airport)	Field Elev.	Temp. at Altitude
Begin Temp	+13 °C	HGR	704'	+3 °C
Begin Dewpoint	-12 °C			-
Begin Pressure	30.48			-
Mid Temp	+14 °C			+3 °C
Mid Dewpoint	-14 °C			-
Mid Pressure	30.44			-
End Temp	+14 °C			+3 °C
End Dewpoint	-12 °C			-
End Pressure	30.40			-

FILE	FL #	Alt (AMSL)	Heading	Speed	Returns	Crab	NOTES
070329 - 175416	45	7700'	N	~120 kts	~100 %	~6°	
070329 - 181330	46	7700'	S	~120 kts	~100 %	~10°	skc, haze, smooth
070329 - 183317	47	7700'	N	~120 kts	~100 %	~6°	
070329 - 185140	48	7800'	S	~120 kts	~100 %	~10°	
070329 - 190941	49	7800'	N	~120 kts	~100 %	~6°	
070329 - 192719	50	7800'	S	~120 kts	~100 %	~10°	
070329 - 194515	51	7800'	N	~120 kts	~100 %	~6°	
070329 - 200219	52	7800'	S	~120 kts	~100 %	~10°	
070329 - 202000	53	7900'	N	~120 kts	~100 %	~6°	
070329 - 203539	54	7900'	S	~120 kts	~100 %	~9°	

Included direct to fuel & PDOP & empty statements

LIDAR MISSION RECORD SHEET



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Project Name: PA MAP 2007
 Project Number: S855-015
 Navigation File:

Pilot: Lucretia
 Tech: HARRAWAY
 Aircraft: N7320G

Date Flown: APRIL 2nd, 2007 (to the 3rd)
 Takeoff Time: 9:20 EST (airport) HGR
 Landing Time: 12:50 EST (airport) HGR

Project's Scanning Requirements

FOV (degrees): 45°
 Scan Rate (Hz): 25.5
 Pulse Rate (Hz): 53000
 Ground Speed (kts): 120 kts

Attenuation(OD) or Laser Current(%): 65%
 Altitude AGL (ft): 660'
 Range Gate (m): -

Data Information

POS AN file name: 070402B
 From/To: 03B -> 059
 LIDAR Unit #: Unit 1 (sn 019)
 HD/Carid #: 42

GPS Base Location(s): S 101 E D, MUMFINSY
 PDOP Avoidance: none tonight
 Static or Flyover? FLYOVERS
 Laser On Time & Off Times: 9:50 -> 12:50 EST

	Ground	(airport)	Field Elev.	Temp. at Altitude
Begin Temp	+19.0c	HGR	704'	+3.0c
Begin Dewpoint	+01.0c			-
Begin Pressure	30.00			-
Mid Temp	+19.0c			+4.0c
Mid Dewpoint	+01.0c			-
Mid Pressure	30.01			-
End Temp	+18.0c			+4.0c
End Dewpoint	+01.0c			-
End Pressure	30.02			-

[S/N 19 070402B]

FILE	FL #	Alt. (AMSL)	Heading	Speed	Returns	Crab	NOTES
070403-020317	19	7100'	N	~120 kts	~100%	~120	
070403-021845	20	7100'	S	~120 kts	~100%	~120	
070403-023353	21	7100'	N	~120 kts	~100%	~120	
070403-024915	22	7000'	S	~120 kts	~100%	~150	
070403-030441	23	7000'	N	~120 kts	~100%	~110	
070403-032041	24	7000'	S	~120 kts	~100%	~130	
070403-033649	25	7000'	N	~120 kts	~100%	~110	
070403-035055	26	7000'	S	~120 kts	~100%	~140	
070403-040643	27	7200'	N	~120 kts	~100%	~110	
070403-041241	28	7200'	S	~120 kts	~100%	~160	
070403-041933	29	7100'	N	~120 kts	~100%	~110	
070403-042714	2	7100'	W	~120 kts	~100%	~80	

★

LIDAR MISSION RECORD SHEET



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Project Name	PA MAP 2007
Project Number	SBS-015
Navigation File	CHANGES.RAW

Pilot	LUCKE T
Tech	HARRIS
Aircraft	N7320G

Date Flown	APRIL 30, 2007
Takeoff Time	9:57A (airport) HGR
Landing Time	12:25P (airport) HGR

Project's Scanning Requirements	
FOV (degrees):	45°
Scan Rate (Hz):	25.5
Pulse Rate (Hz):	53000
Ground Speed (kts):	120 kts
Attenuation(OD) or Laser Current(%):	65%
Altitude AGL (ft):	660'
Range Gate (m):	-

Data Information	
POS AV file name	070403A
From/To	000 -> 020
LIDAR Unit #	Unit 1 (sn 019)
HD/Carid #	"3"

GPS Base Location(s)	EAR-HDATA
PDOP Avoidance	82A -> 93A, 1225P -> 1255P
Static or Flyover?	STATIC
Laser On Time & Off Times	9:44A -> 12:25P

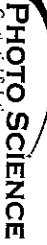
[5/19 070403A]

	Ground	(airport)	Field Elev.	Temp. at Altitude
Begin Temp	+15.0°C	HGR	704'	+5.0°C
Begin Dewpoint	+05.0°C			-
Begin Pressure	30.09			-
Mid Temp	+19.0°C			+6.0°C
Mid Dewpoint	+04.0°C			-
Mid Pressure	30.08			-
End Temp	+22.0°C			+6.0°C
End Dewpoint	+04.0°C			-
End Pressure	30.07			-

FILE	FL #	Alt (AMSL)	Heading	Speed	Returns	Grab	NOTES
070403-134851	55	7200'	N	~120 kts.	~100%	~13°	skys, smooth, breeze, strong W wind
070403-140654	56	7300'	S	~120 kts.	~100%	~14°	" " " " " "
070403-142133	57	7200'	N	~120 kts.	~100%	~13°	" " " " " "
070403-143604	58	7300'	S	~120 kts.	~100%	~15°	" " " " " "
070403-144912	59	7300'	N	~120 kts.	~100%	~13°	" " " " " "
070403-150219	60	7300'	S	~120 kts.	~100%	~12°	" " " " " "
070403-151908	65	7300'	W	~120 kts.	~100%	~5°	" " " " " "
070403-152456	84	7500'	E	~120 kts.	~100%	~4°	" " " " " "
070403-153054	83	7400'	W	~120 kts.	~100%	~4°	" " " " " "
070403-153641	82	7400'	E	~120 kts.	~100%	~4°	" " " " " "
070403-154252	81	7300'	W	~120 kts.	~100%	~5°	" " " " " "
070403-154801	80 & 79	7300'	E	~120 kts.	~100%	~5°	" " " " " "
070403-160257	73	7200'	W	~120 kts.	~100%	~6°	" " " " " "

offwind ~120 w/c wind

LIDAR MISSION RECORD SHEET



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Project Name	TRA MAP 2007	Pilot	LUCKETT
Project Number	5855-015	Tech	HEASAK
Navigation File		Aircraft	N7320G

Date Flown	April 25, 2007
Takeoff Time	1330 EST (airport) HGR
Landing Time	2100 EST (airport) HGR

Project's Scanning Requirements	
FOV (degrees):	45°
Scan Rate (Hz):	25.5
Pulse Rate (Hz):	53000
Ground Speed (Kts):	120 kts
Attenuation(OD) or Laser Current(%):	65%
Altitude AGL (ft):	660'
Range Gate (m):	-

Data Information	
POS AV file name	070403B
FromTo	021 -> 027
LIDAR Unit #	Unit 1 (sn 019)
HD/Carid #	" 3 "

GPS Base Location(s)	EAONTAAT
PDOP Avoidance	1250 -> 1250, 500 -> 5300
Static or Flyover?	STATIC
Laser On Time & Off Times	1420 -> 2070

Begin Temp	+23 °C	Ground	(airport) HGR	Field Elev.	704'	Temp. at Altitude	+7 °C
Begin Dewpoint	+05 °C						
Begin Pressure	30.02						
Mid Temp							
Mid Dewpoint							
Mid Pressure							
End Temp							
End Dewpoint							
End Pressure							

[070403B SW 19]

FILE	FL #	ALT (AMSL)	Heading	Speed	Returns	Grab	NOTES
070403-175205	74	7200'	W	~120 kts	~100%	~2°	skc, smooth, haze, W winds
070403-180554	75	7200'	E	~ kts	~ %	~ °	chubby - laser malfunction. pulse rate at max
070403-181005	76	7200'	W	~ kts	~ %	~ °	- correct pulse rate, slow and regular (good)
070403-181008	77	7200'	E	~ kts	~ %	~ °	- enable reading out of page
070403-181015	78	7200'	E	~ kts	~ %	~ °	- red measurement display - under
070403-181025	79	7200'	E	~ kts	~ %	~ °	- W & trees not clear
							height = 185' (w/ 1800 ft)
							error light on laser box not illuminated
							red light - correct pulse return, 72 screen goes from 2000' to 2200'
							error light on laser box not illuminated
							error light on laser box not illuminated
							error light on laser box not illuminated
							error light on laser box not illuminated
							error light on laser box not illuminated
							error light on laser box not illuminated
							error light on laser box not illuminated
							error light on laser box not illuminated
							error light on laser box not illuminated
							error light on laser box not illuminated
							error light on laser box not illuminated
							error light on laser box not illuminated
							error light on laser box not illuminated

070403-182607 = test on ground w/ laser high ground returns
 - error light on laser box not illuminated

LIDAR MISSION RECORD SHEET



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Project Name	PA MAR 2007
Project Number	SESS-015
Navigation File	CHAMBER

Pilot	LUCKETT
Tech	HOARBYN
Aircraft	N7320G

Date Flown	April 20 th , 2007
Takeoff Time	5:19 p EST
Landing Time	8:29 p EST
	(airport) HGR

Project's Scanning Requirements	
FOV (degrees):	45°
Scan Rate (Hz):	25.5
Pulse Rate (Hz):	53000
Ground Speed (kts):	120 kts
Attenuation(OD) or Laser Current(%):	65%
Altitude AGL (ft):	6601'
Range Gate (m):	-

Data Information	
POS AV file name	070420B
From/To	007 -> 027
LIDAR Unit #	Unit 1 (sn 019)
HD/Carid #	4

GPS Base Location(s)	EACINDATA
PDOP Avoidance	good after 4:20p
Static or Flyover?	START C
Laser On Time & Off Times	5:24p -> 8:24p

Begin Temp	20 °C	Ground (airport)	HGR	Field Elev.	704'	Temp. at Altitude	+4 °C
Begin Dewpoint	-02 °C						-
Begin Pressure	30.09						-
Mid Temp	19 °C						+4 °C
Mid Dewpoint	-02 °C						-
Mid Pressure	30.09						-
End Temp	18 °C						+3 °C
End Dewpoint	-03 °C						-
End Pressure	30.09						-

FILE	FL #	Alt (AMSL)	Heading	Speed	Returns	Grab	NOTES
070420_213326	74	7200'	W	~120 kts	~100%	~9°	skc. turb
070420_214305	75	7200'	E	~120 kts	~100%	~9°	" "
070420_220032	76	7200'	W	~120 kts	~100%	~9°	" "
070420_221400	77	7200'	E	~120 kts	~100%	~9°	" "
070420_ "	91	7200'	E	~120 kts	~100%	~9°	" "
070420_222940	90	7500'	W	~120 kts	~100%	~9°	" "
070420_223729	89	7300'	E	~120 kts	~100%	~8°	" "
070420_224334	88	7500'	W	~120 kts	~100%	~10°	" "
070420_225107	87	7500'	E	~120 kts	~100%	~10°	" "
070420_225747	86	7400'	W	~120 kts	~100%	~10°	" "
070420_230608	92	7100'	E	~120 kts	~100%	~10°	" "
070420_231257	93	7100'	W	~120 kts	~100%	~10°	" "
070420_231911	94	7100'	E	~120 kts	~100%	~10°	" "
070420_232551	95	7100'	W	~120 kts	~100%	~11°	" "
070420_233227	96	7100'	E	~120 kts	~100%	~10°	" "
070420_233911	97	7100'	W	~120 kts	~100%	~11°	" "
070420_234703	61	7200'	N	~120 kts	~100%	~5°	" "
070420_235727	62	7200'	S	~120 kts	~100%	~8°	" "

3/19 070420B

(includes line 91) (named "77")

Station Occupation Report For Airborne GPS

Project: PA MAP LIDAR 2007

Location: HAGERSTOWN, MD AIRPORT **Project Number:** 5855-015

Completed by: JNH **Date:** APRIL 20th, 2006

Receiver: "1" (S/N 108)

Receiver Type: TRIMBLE 5700

Antenna Type: ZEPHYR GEODETIC

Station ID: EARTHDATA

Start -- H.I. (m): 1.581 m

End -- H.I. (m): 1.581 m

H.I. (ft): 5.19 ft.

Start Time: 5:04p EDT

End Time: ~ 8:25p EDT

Time Zone: EDT

Operator: JNH

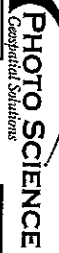


Comments

use for mission 070420B

S/N 19

LIDAR MISSION RECORD SHEET



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Project Name	PA MAR 2007 ATTUNE DR & HGR
Project Number	SB55-015
Navigation File	C:\JAMRSR

Pilot	LUKEST
Tech	HARRAL
Aircraft	N7320G

Date Flown	April 21st, 2007
Takeoff Time	8:57A EDT (airport) HGR
Landing Time	11:2A EDT (airport) HGR

Project's Scanning Requirements	
FOV (degrees):	45°
Scan Rate (Hz):	25.5
Pulse Rate (Hz):	53000
Ground Speed (kts):	120 kts
Attenuation(OD) or Laser Current(%):	65%
Altitude AGL (ft):	660'
Range Gate (m):	-

Data Information	
POS AV file name	070421A
From/To	028 -> 045
LIDAR Unit #	Unit 1 (sn 019)
HD/Carid #	4

GPS Base Location(s)	ENORTHDAVA
PDOP Avoidance	75A -> 8:5A, 11:5A -> 11:5A
Static or Flyover?	57A57L
Laser On Time & Off Times	9:02A -> 11:5A

SM 19 070421A

Begin Temp	+12°C	Ground	(airport) HGR	Field Elev.	704'	Temp. at Altitude	+5°C
Begin Dewpoint	+03°C						-
Begin Pressure	30.23						-
Mid Temp	+16°C						+6°C
Mid Dewpoint	+02°C						-
Mid Pressure	30.24						-
End Temp	+17°C						+11°C
End Dewpoint	+02°C						-
End Pressure	30.23						-

FILE	FL #	Alt (AMSL)	Heading	Speed	Returns	Grab	NOTES
070421 - 131506	63	7200'	S	~120 kts	~100%	~4°	sketch smooth
070421 - 132519	64	7100'	N	~120 kts	~100%	~2°	
070421 - 133452	65	7100'	S	~120 kts	~100%	~4°	
070421 - 134312	66	7100'	N	~120 kts	~100%	~2°	
070421 - 135113	67	7100'	S	~120 kts	~100%	~4°	
070421 - 135848	68	7100'	N	~120 kts	~100%	~2°	
070421 - 140546	69	7100'	S	~120 kts	~100%	~4°	
070421 - 141214	70	7100'	N	~120 kts	~100%	~2°	
070421 - 141733	78	7100'	S	~120 kts	~100%	~4°	
<hr/>							
070421 - 142021	991	4900'	W	~100 kts	~100%	~8°	ATTUNE
070421 - 143311	992	4900'	S	~100 kts	~100%	~2°	
070421 - 143753	993	4900'	E	~100 kts	~100%	~9°	
070421 - 144302	994	4900'	N	~100 kts	~100%	~1°	
<hr/>							
070421 - 144908	995	3200'	E	~100 kts	~100%	~6°	45°, 34.0kts, 11200, 24%, 3229'
070421 - 145401	996	3200'	S	~100 kts	~100%	~2°	
070421 - 145911	997	3200'	W	~100 kts	~100%	~6°	
070421 - 150427	998	3200'	N	~100 kts	~100%	~5°	

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Station Occupation Report For Airborne GPS

Project: PA MAR 2007 LIDAR

Location: HAGERSTOWN MD AIRPORT

Project Number: SB55-015

Completed by: PHH

Date: APRIL 21ST 2007

Receiver: "1" (S/N 103)

Receiver Type: TRIMBLE S700

Antenna Type: ZEPHYR GEODETIC

Station ID: EARTHDATA

Start -- H.I. (m): 1.613 m

End -- H.I. (m): 1.614

H.I. (ft): 5.29 ft.

Start Time: 8³⁶A

End Time: 11²²A

Time Zone: EDT

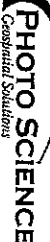
Operator: PHH



Comments

use for S/N 19 mission 070421A

LIDAR MISSION RECORD SHEET



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Project Name	PA MAP 2007
Project Number	585-015
Navigation File	GETTY

Pilot	LAUREN
Tech	HELIAN
Aircraft	N7320G

Date Flown	APRIL 21 ST 2007
Takeoff Time	12:26p EST (airport) THV
Landing Time	3:41p EST (airport) THV

Project's Scanning Requirements	
FOV (degrees):	45°
Scan Rate (Hz):	25.5
Pulse Rate (Hz):	53000
Ground Speed (Kts):	120 kts
Attenuation(OD) or Laser Current(%):	65%
Altitude AGL (ft):	660'
Range Gate (m):	-

Data Information	
POS MV file name	070421B
From To	047 -> 068
LIDAR Unit #	Unit 1 (sn 019)
HD/Card #	4

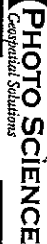
GPS Base Location(s)	YORKPORT
PDOP Avoidance	11:54 -> 11:54, 3:50 -> 4:24
Static or Flyover?	STARTLE
Laser On Time & Off Times	12:53p -> 3:41p

3/19 070421B

	Ground	(airport)	Field Elev.	Temp. at Altitude
Begin Temp	+21°C	THV	480'	+5°C
Begin Dewpoint	+01°C			-
Begin Pressure	30.19			-
Mid Temp	+22°C			+6°C
Mid Dewpoint	00°C			-
Mid Pressure	30.18			-
End Temp	+22°C			+6°C
End Dewpoint	-02°C			-
End Pressure	30.15			-

FILE	FL #	Alt. (AMSL)	Heading	Speed	Returns	Crab	NOTES
070421-170046	3	7100'	S	~120 kts	~100%	~2°	skt smooth
070421-171640	4	7100'	N	~115 kts	~100%	~1°	" "
070421-173140	5	7100'	S	~120 kts	~100%	~2°	" "
070421-174728	6	7100'	N	~115 kts	~100%	~1°	" "
070421-180234	7	7100'	S	~120 kts	~100%	~1°	" "
070421-181806	8	7100'	N	~115 kts	~100%	~1°	" "
070421-183318	9	7100'	S	~120 kts	~100%	~2°	" "
070421-184836	10	7100'	N	~115 kts	~100%	~1°	" "
070421-190337	11	7100'	S	~120 kts	~100%	~1°	" "
070421-191916	12	7100'	N	~120 kts	~100%	~1°	" "

LIDAR MISSION RECORD SHEET



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Project Name	PA MAR 2007
Project Number	SBSS-015
Navigation File	GETTY

Pilot	LUCKETT
Tech	HARRIS
Aircraft	N7320G

Date Flown	April 21st 2007
Takeoff Time	5:15 p.m. EST (airport) THV
Landing Time	7:45 p.m. EST (airport) THV

Project's Scanning Requirements	
FOV (degrees):	45°
Scan Rate (Hz):	25.5
Pulse Rate (Hz):	53000
Ground Speed (kts):	120 kts
Attenuation(OD) or Laser Current(%):	65%
Altitude AGL (ft):	660'
Range Gate (m):	-

Data Information	
POS AV file name	070421C
From/To	000 → 019
LIDAR Unit #	Unit 1 (SN 019)
HD/CD #	1

GPS Base Location(s)	YORKPORT
PDOP Avoidance	3.8 → 4.2
Static or Flyover?	STATIC
Laser On Time & Off Times	5:28 → 5:49, 5:58 → 7:39

	Ground	(airport)	Field Elev.	Temp. at Altitude
Begin Temp	+23.0°	THV	430'	+7.0°
Begin Dewpoint	+02.0°	"	"	-
Begin Pressure	30.13	"	"	-
Mid Temp				
Mid Dewpoint				
Mid Pressure				
End Temp	+19.0°	THV	430'	+5.0°
End Dewpoint	+02.0°	"	"	-
End Pressure	30.13	"	"	-

FILE	FL #	Alt. (AMSL)	Heading	Speed	Returns	Grab	NOTES
070421-215249	1	7100'	W	~120 kts	~100%	~2°	skt smooth
070421-220746	13	7100'	N	~120 kts	~100%	~6°	↑ turbulence ↓
070421-222236	14	7100'	S	~120 kts	~100%	~6°	red error
070421-223736	15	7100'	N	~120 kts	~100%	~6°	massive spray
070421-225229	16	7100'	S	~120 kts	~100%	~5°	the encoder works
070421-230742	17	7100'	N	~120 kts	~100%	~5°	↑ out of sync
070421-232213	18	7100'	S	~120 kts	~100%	~5°	big wave then 25 degrees

at beginning of this flight, 25 km/h up for low and low and low and low
 was 25° - pulse rate does not equal selected in encoder calibration >
 back screen says recorded data with no data stored & green led. All data
 reloaded the whole unit (except 708) & reloaded over our 60% system
 problem did not occur during end of flight.

SN 19 070421C

Station Occupation Report For Airborne GPS

Project: PA MAP 2007 LIDAR

Location: YORK, PA AIRPORT Project Number: 5855-015
 Completed by: PHH Date: APRIL 21st, 2007

Receiver: "1" (S/N 108)
 Receiver Type: TRIMBLE 5700
 Antenna Type: ZEPHYR GEODETIC
 Station ID: YORKPORT
 Start -- H.I. (m): 1.585 m
 End -- H.I. (m): 1.585 m
 H.I. (ft): 5.20 ft.
 Start Time:

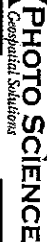
12 ¹⁹ p	4 ⁴⁵ p
~ 3 ⁵⁰ p	

 End Time:
 Time Zone: EDT
 Operator: PHH



Comments: use. for S/N 19 missions 070421B & C

LIDAR MISSION RECORD SHEET



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Project Name: **PA MAP 2007**
 Project Number: **5355-015**
 Navigation File: **BEFORE**

Pilot: **LUKEN**
 Tech: **BARAN**
 Aircraft: **N7320G**

Date Flown: **April 22nd, 2007**
 Takeoff Time: **11:30A** (airport) **MMZ**
 Landing Time: **3:23P** (airport) **MMZ**

Project's Scanning Requirements

FOV (degrees): **45°** Attenuation(OD) or Laser Current(%): **65%**
 Scan Rate (Hz): **25.5**
 Pulse Rate (Hz): **53000** Altitude AGL (ft): **660'**
 Ground Speed (Kts): **120 kts.** Range Gate (m): **-**

Data Information

POS AV file name: **070422B**
 From/To: **037 -> 062**
 LIDAR Unit #: **Unit 1 (sn 019)**
 HD/Carid #: **-**

GPS Base Location(s): **MMZ A**
 PDOP Avoidance: **115A -> 1135A, 3:50p -> 4:25p**
 Static or Flyover?: **574711C**
 Laser On Time & Off Times: **12:05p -> 3:10p**

S/N 19 070422B

	Ground	(airport)	Field Elev.	Temp. at Altitude
Begin Temp	+24 °C	MMZ	1163'	+6 °C
Begin Dewpoint	-01 °C			-
Begin Pressure	30.27			-
Mid Temp	+26 °C			+7 °C
Mid Dewpoint	-02 °C			-
Mid Pressure	30.24			-
End Temp	+24 °C			+7 °C
End Dewpoint	-03 °C			-
End Pressure	30.20			-

FILE	FL #	Alt (AMSL)	Heading	Speed	Returns	Grab	NOTES
070422-160903	32	7700'	S	~120 kts.	~100 %	~50	sketchy, smooth
070422-163304	33	7700'	N	~120 kts.	~100 %	~50	" "
070422-165559	34	7700'	S	~120 kts.	~100 %	~50	" "
070422-174946	35	7700'	N	~120 kts.	~100 %	~50	" "
070422-174246	36	7500'	S	~120 kts.	~100 %	~50	" "
070422-180609	37	7600'	N	~120 kts.	~100 %	~50	" "
070422-182843	38	7600'	S	~120 kts.	~100 %	~50	" "
070422-185115	39	7700'	N	~120 kts.	~100 %	~40	" "

ended b/c could not get another line before PDOP spiked

LIDAR MISSION RECORD SHEET



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N690EH
N622EX
N111EX
N442EX

Project Name	PA MAR 2007
Project Number	535015
Navigation File	BEDEFORD

Pilot	LM14547
Tech	HEARD
Aircraft	N7320G

Date Flown	April 22nd, 2007
Takeoff Time	4:50 EST
Landing Time	8:08 EST

Project's Scanning Requirements	
FOV (degrees):	45°
Scan Rate (Hz):	255
Pulse Rate (Hz):	53000
Ground Speed (Kts):	120 kts.
Altitude (OD) or Laser Current(%):	65%
Altitude AGL (ft):	6601'
Range Gate (m):	-

Detail Information	
POS AV file name	070422C
From/To	000 -> 023
LIDAR Unit #	Unit 1 (sn 019)
HD/Card #	2

GPS Base Location(s)	NMZ A
PDOP Avoidance	3.40 -> 4.85
Static or Flyover?	START
Laser On Time & Off Times	4:54 -> 7:50

5/11/19 070422C

	Ground	(airport)	Field Elev.	Temp. at Altitude
Begin Temp	+28°C	NMZ	1163'	+7°C
Begin Dewpoint	-04°C			-
Begin Pressure	30.17			-
Mid Temp	+28°C			+7°C
Mid Dewpoint	-04°C			-
Mid Pressure	30.16			-
End Temp	+24°C			+7°C
End Dewpoint	+04°C			-
End Pressure	30.15			-

FILE	FL #	Alt. (AMSL)	Heading	Speed	Returns	Crab	NOTES
070422_21014	40	7600'	S	~120 kts.	~100%	~6°	sk. turb
070422_213212	41	7600'	N	~120 kts.	~100%	~4°	" "
070422_215335	42	7500'	S	~120 kts.	~100%	~3°	" "
070422_221513	43	7600'	N	~120 kts.	~100%	~4°	" "
070422_223622	44	7600'	S	~120 kts.	~100%	~3°	" "
070422_225707	45	7500'	N	~120 kts.	~100%	~3°	" "
070422_231740	46	7500'	S	~120 kts.	~100%	~3°	" "
070422_233756	47	7500'	N	~120 kts.	~100%	~5°	" "

Station Occupation Report For Airborne GPS

Project: PA MAP LIDAR 2007

Location: BEDFORD PA AIRPORT

Project Number: 5855-015

Completed by: PNH

Date: APRIL 22nd, 2007

Receiver: "1" (S/N 108)

Receiver Type: TRIMBLE 5700

Antenna Type: ZEPHYR GEODESIC

Station ID: HMZ A

Start -- H.I. (m): 1.540 m

End -- H.I. (m): _____

H.I. (ft): 5.05 ft.

Start Time:

~ 8 ¹⁰ A	11 ³⁵ A	4 ³⁰ P
10 ⁵⁵ A	~ 2 ³⁰ P	#

End Time: _____

Time Zone: EDT

Operator: PNH



Comments

use for S/N 19 missions 070422A, B, & C

LIDAR MISSION RECORD SHEET



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Project Name	PA MAR 2007
Project Number	535-015
Navigation File	"SHERMAN"

Pilot	LUCIFER
Tech	HARRIS
Aircraft	N7320G

Date Flown	APRIL 29th, 2007
Takeoff Time	7:28A EST
Landing Time	10:32A EST

Project's Scanning Requirements	
FOV (degrees):	45°
Scan Rate (Hz):	25.5
Pulse Rate (Hz):	53000
Ground Speed (kts):	120 kts
Attenuation(OD) or Laser Current(%):	65%
Altitude AGL (ft):	660'
Range Gate (m):	-

Data Information	
POS AV file name	070429A
From/To	024 -> 044
LIDAR Unit #	Unit 1 (sn 019)
HD/Carid #	2

GPS Base Location(s)	PSI BASE 0194
PDOP Avoidance	705A -> 735A, 1055A -> 1155A
Static or Flyover?	STATIC
Laser On Time & Off Times	788A -> 920A

5/19 070429A

Begin Temp	+11°C	Ground	(airport)	Field Elev.	Temp. at Altitude
Begin Dewpoint	+7°C	KCVY			+1°C
Begin Pressure	29.87				-
Mid Temp	+14°C				+1°C
Mid Dewpoint	+7°C				-
Mid Pressure	29.88				-
End Temp	+17°C				+2°C
End Dewpoint	+5°C				-
End Pressure	29.88				-

FILE	FL #	Alt. (AMSL)	Heading	Speed	Returns	Grab	NOTES
070429-120410	57	7200'	S	~120 kts	~100%	~16°	slc, haze, strong winds
070429-120910	56	7100'	N	~120 kts	~100%	~15°	
070429-122026	55	7100'	S	~120 kts	~100%	~17°	
070429-123208	54	7000'	N	~120 kts	~100%	~16°	
070429-124522	53	7000'	S	~120 kts	~100%	~18°	
070429-125916	52	7000'	N	~120 kts	~100%	~16°	going very low below nearby
070429-131344	51	7000'	S	~120 kts	~100%	~18°	
070429-132805	50	7000'	N	~120 kts	~100%	~16°	fair below - mixed phase snow
070429-134316	49	7000'	S	~120 kts	~100%	~18°	
070429-135851	48	7000'	N	~120 kts	~100%	~16°	
070429-141434	47	7000'	S	~120 kts	~100%	~18°	(80 miles in sky from Seoul)

LIDAR MISSION RECORD SHEET

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Project Name	PA MAP 2007
Project Number	535-015
Navigation File	"SHEPHERD"

Pilot	Lucret
Tech	HEASER
Aircraft	N7320G

Date Flown	APRIL 29th 2007
Takeoff Time	1126A EST (airport) N94
Landing Time	302P EST (airport) N94

Project's Scanning Requirements

FOV (degrees):	52°	Attenuation(OD) or Laser Current(%):	51%
Scan Rate (Hz):	27.4	Altitude AGL (ft):	5601'
Pulse Rate (Hz):	60000	Range Gate (m):	-
Ground Speed (kts):	120 kts.		

Data Information

POS AV file name	070429 B
From/To	000 -> 026
LIDAR Unit #	Unit 1 (sn 019)
HD/Card #	3

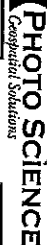
GPS Base Location(s)	PS1 BASE @ N94
PDOP Avoidance	105A → 115A, 350 → 375
Static or Flyover?	Static
Laser On Time & Off Times	1131A → 258P

	Ground	(airport)	Field Elev.	Temp. at Altitude
Begin Temp	+18.0°C	KLXY		+4.0°C
Begin Dewpoint	+03.0°C			-
Begin Pressure	29.89			-
Mid Temp	+21.0°C			+4.0°C
Mid Dewpoint	+03.0°C			-
Mid Pressure	29.86			-
End Temp	+22.0°C			+5.0°C
End Dewpoint	+4.0°C			-
End Pressure	29.83			-

5/19 070429 B

FILE	FL #	ALT (AMSL)	Heading	Speed	Returns	Crab	NOTES
070429 - 153839	46	6000'	N	~120 kts.	~100%	~14°	few feet @ 500' h2ze, strong NW winds, -4WD
070429 - 155413	45	6000'	S	~120 kts.	~100%	~16°	(85 m @ 5.5 m/s wind from S end)
070429 - 160942	44	6000'	N	~120 kts.	~100%	~13°	
070429 - 162536	43	6000'	S	~120 kts.	~100%	~15°	
070429 - 164138	42	6000'	N	~120 kts.	~100%	~12°	
070429 - 165833	41	6000'	S	~120 kts.	~100%	~12°	
070429 - 171520	40	6000'	N	~120 kts.	~100%	~9°	
070429 - 173234	39	6000'	S	~120 kts.	~100%	~10°	scat @ 7000' NW winds, "
070429 - 174932	38	6000'	N	~120 kts.	~100%	~10°	
070429 - 180644	37	6000'	S	~120 kts.	~100%	~10°	
070429 - 182344	36	6000'	N	~120 kts.	~100%	~10°	
070429 - 184053	35	6000'	S	~120 kts.	~100%	~10°	

LIDAR MISSION RECORD SHEET



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Project Name	PA MAP 2007
Project Number	S35-015
Navigation File	"SURCMAN"

Pilot	LUCKETT
Tech	HEARAK
Aircraft	N7320G

Date Flown	April 29th 2007
Takeoff Time	4:06P EST (airport) N94
Landing Time	7:28P EST (airport) N94

Project's Scanning Requirements	
FOV (degrees):	45°
Scan Rate (Hz):	25.5
Pulse Rate (Hz):	53000
Ground Speed (kts):	120 kts
Attenuation(OD) or Laser Current(%):	65%
Altitude AGL (ft):	6601'
Range Gate (m):	-

Data Information	
POS AV file name	070429.c
From/To	027 ->
LIDAR Unit #	Unit 1 (sn 019)
HD/Car #	3

GPS Base Location(s)	PS1 735E @ N94
PDOP Avoidance	3.15 -> 3.15
Static or Flyover?	Static
Laser On Time & Off Times	4:12 -> 7:29

5/19 070429.c

	Ground	(airport)	Field Elev.	Temp. at Altitude
Begin Temp	+23.0c	KCVY		+4.0c
Begin Dewpoint	+4.0c			-
Begin Pressure	29.82			-
Mid Temp	+23.0c			+5.0c
Mid Dewpoint	+3.0c			-
Mid Pressure	29.83			-
End Temp	+22.0c			+4.0c
End Dewpoint	+3.0c			-
End Pressure	29.83	V	V	-

FILE	FL #	ALT. (AMSL)	Heading	Speed	Returns	Crab	NOTES
070429_201856	34	7000'	N	~120 kts	~100%	~10°	scale 9000', haze, NW winds, combing turb
070429_203525	33	7000'	S	~120 kts	~100%	~10°	"
070429_205135	32	7100'	N	~120 kts	~100%	~10°	"
070429_211006	31	7100'	S	~120 kts	~100%	~10°	"
070429_212849	30	7100'	N	~120 kts	~100%	~10°	10000'
070429_214957	29	7100'	S	~120 kts	~100%	~10°	"
070429_220716	28	7100'	N	~120 kts	~100%	~10°	"
070429_222932	27	7100'	S	~120 kts	~100%	~10°	"
070429_224745	26	7100'	N	~120 kts	~100%	~10°	"
070429_231153	1	7000'	S	~140 kts	~100%	~2°	"

Station Occupation Report For Airborne GPS

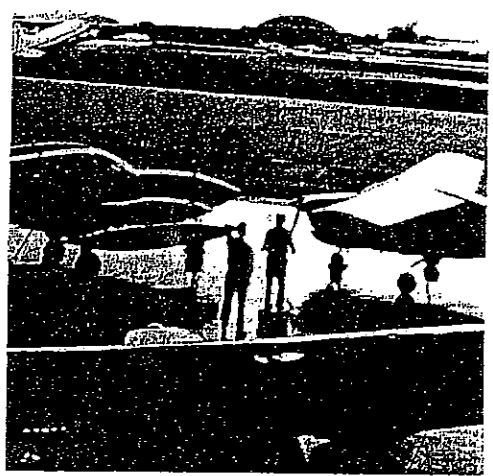
Project: PA MAP 2007 LIDAR

Location: CARLISLE, PA AIRPORT Project Number: S855-015
 Completed by: PNH Date: APRIL 29th, 2007

Receiver: "1" (S/N 108)
 Receiver Type: TRIMBLE 5700
 Antenna Type: ZEPHYR GEODETIC
 Station ID: PS1 N94
 Start -- H.I. (m): 1.547 m
 End -- H.I. (m): 1.5475 m
 H.I. (ft): 5.075 ft.
 Start Time:

~7 ³⁰ A	11 ¹² A	3 ⁵⁰ P
~10 ²⁰ A	3 ¹¹ P	~7 ⁴⁰ P

 End Time:
 Time Zone: EDT
 Operator: PNH



Comments

- could not recover existing monumentation on field so set a cap on rebar
 - PSI aluminum cap w/ orange survey ribbon between runway & ramp taxiway
 - flush w/ ground, mid field

use for LIDAR missions: S/N 19 070429 AB&C

Station Occupation Report For Airborne GPS

Project: PA MAP 2007 LIDAR

Location: CARLSLE PA AIRPORT Project Number: SB55015
 Completed by: PNH Date: APRIL 30th, 2007

Receiver: "1" (S/N 108)
 Receiver Type: TRIMBLE 5700
 Antenna Type: ZEPHYR GEODETIC
 Station ID: PSI BASE @ CARLSLE
 Start -- H.I. (m): 1.4885 m
 End -- H.I. (m): 1.489 m
 H.I. (ft): 4.88252698 ft.
 Start Time: ~11⁰⁵ A
 End Time: ~4²⁰ P
 Time Zone: EDT
 Operator: PNH



Comments: use for LIDAR mission? S/N 19 070430A

LIDAR MISSION RECORD SHEET

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Project Name	PA MAR 2007
Project Number	S855-015
Navigation File	"SHERMAN"

Pilot	LUKE ST
Tech	HARREN
Aircraft	N7320G

Date Flown	MAY 18 2007
Takeoff Time	7:34A EST
Landing Time	10:54A EST

Project's Scanning Requirements	
FOV (degrees):	45°
Scan Rate (Hz):	255
Pulse Rate (Hz):	53000
Ground Speed (kts):	120 kts
Attenuation (OD) or Laser Current (%):	65%
Altitude AGL (ft):	6601'
Range Gate (m):	-

Data Information	
POS AN file name	070501A
From/To	020 -> 040
LIDAR Unit #	Unit 1 (sn 019)
HD/Carid #	4

GPS Base Location(s)	RS1 BASE @ N94
PDOP Avoidance	65A -> 73A, 105A -> 112A
Static or Flyover?	STATIC
Laser On Time & Off Times	7:42A -> 10:20A

5/19 070501A

	Ground	(airport)	Field Elev.	Temp. at Altitude
Begin Temp	+12°C	<XY		+7°C
Begin Dewpoint	+5°C			-
Begin Pressure	30.06			-
Mid Temp	+12°C			+8°C
Mid Dewpoint	+3°C			-
Mid Pressure	30.05			-
End Temp	+16°C			+10°C
End Dewpoint	+5°C			-
End Pressure	30.05			-

FILE	FL #	Alt (AMSL)	Heading	Speed	Returns	Crab	NOTES
070501 - 120521	2	7100'	N	~90 kts	~100%	~10°	over 9000' haze w/ wind, showers nearby
070501 - 122314	19	7100'	S	~110 kts	~100%	~16°	"
070501 - 124839	18	7100'	N	~120 kts	~100%	~16°	"
070501 - 131207	17	7100'	S	~105 kts	~100%	~16°	"
070501 - 133635	16	7100'	N	~120 kts	~100%	~14°	"
070501 - 140036	15	6100'	S	~110 kts	~100%	~16°	7300' " " " " 520, 274kts, 6000kts
							ended due PDOP spike

crab varied greatly from 1nd to 2nd - the most

Station Occupation Report For Airborne GPS

Project: PA MAP 2007 LIDAR

Location: CARLISLE PA AIRPORT Project Number: SB55-015

Completed by: PNH Date: MAY 1st, 2007

Receiver: "1" (S/N 108)

Receiver Type: TRIMBLE 5700

Antenna Type: ZEPHYR GEODETIC

Station ID: PS1 BASE @ CARLISLE

Start -- H.I. (m): 1.546 m

End -- H.I. (m): 1.546 m

H.I. (ft): 5.07 ft

Start Time: ~ 7³⁰A

End Time: ~ 10⁴⁵A

Time Zone: EDT

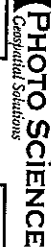
Operator: PNH



Comments

use for LIDAR mission: S/N 19 070501A

LIDAR MISSION RECORD SHEET



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Project Name	PA MAP 2007
Project Number	S855-015
Navigation File	"SHEGMAN" & "M.F.FILIN"

Pilot	LucyTT
Tech	Harold
Aircraft	N7320G

Date Flown	May 1st, 2007
Takeoff Time	4:02p EDT (airport) RVL
Landing Time	6:20p EDT (airport) RVL

Project's Scanning Requirements	
FOV (degrees):	45°
Scan Rate (Hz):	25.5
Pulse Rate (Hz):	53000
Ground Speed (kts):	120 kts.
Attenuation(OD) or Laser Current(%):	65%
Altitude AGL (ft):	6601'
Range Gate (m):	-

Data Information	
POSAV file name	070501B
FrontTo	041 -> 061
LIDAR Unit #	Unit 1 (sn 019)
HD/Coord #	4

GPS Base Location(s)	M1FFPORT
PDOP Avoidance	3.50 -> 3.40p, 10.45p -> 11.00p
Static or Flyover?	Static
Laser On Time & Off Times	4:16p -> 6:37p

5/19 070501B

Begin Temp	+23.0°C	Ground (airport)	RVL	Field Elev.	819'	Temp. at Altitude	+10.0°C
Begin Dewpoint	+8.0°C						-
Begin Pressure	29.87						-
Mid Temp	+25.0°C						+10.0°C
Mid Dewpoint	+9.0°C						-
Mid Pressure	29.82						-
End Temp	+23.0°C						+9.0°C
End Dewpoint	+9.0°C						-
End Pressure	29.78						-

FILE	FL #	Alt. (AMSL)	Heading	Speed	Returns	Crab	Notes
070501-202611	14	7100'	N	~120 kts.	~100%	~15°	few above haze, haze W winds
070501-204842	13	7100'	S	~100 kts.	~100%	~12°	" " " " " "
070501-211235	12	7100'	N	~120 kts.	~100%	~14°	sect " " " "
070501-213320	11	7100'	S	~100 kts.	~100%	~10°	" " " "
070501-214156	10	7200'	N	~120 kts.	~100%	~14°	" " " "
070501-215006	9	7200'	S	~100 kts.	~100%	~10°	" " " " haze
070501-215758	8	7200'	N	~120 kts.	~100%	~10°	" " " "
070501-220643	7	7200'	S	~105 kts.	~100%	~10°	" " " "
070501-221358	6	7300'	N	~120 kts.	~100%	~8°	" " " "
070501-222130	5	7300'	S	~105 kts.	~100%	~8°	" " " "
070501-222724	4	7300'	N	~120 kts.	~100%	~8°	" " " "
070501-223412	3	7300'	S	~105 kts.	~100%	~8°	" " " "

NOTES: [Laser on like rate glitch again @ begin recording] [5:30p? ES screen and 1 pulse sensor on 6:00]

Station Occupation Report For Airborne GPS

Project: PA MAE LiDAR 2007

Location: MIFFLIN Co., PA AIRPORT

Project Number: SBSS 015

Completed by: PNH

Date: MAY 1st, 2007

Receiver: "1" (S/N 108)

Receiver Type: TRIMBLE 5700

Antenna Type: ZEPHYR GEODETIC

Station ID: MIFFPORT

Start -- H.I. (m): 1.617 m

End -- H.I. (m): 1.617 m

H.I. (ft): 5.305 ft.

Start Time: ~ 3:40 p

End Time: ~ 7:00 p

Time Zone: EDT

Operator: PNH



Comments

use S₁-LiDAR mission: (S/N 19) 070501B

LIDAR MISSION RECORD SHEET



Project Name	7A Mar 2007
Project Number	5855-015
Navigation File	"MIFLIN"

Pilot	WALTER
Tech	HEATON
Aircraft	N7320G

Date Flown	Mar 2nd 2007
Takeoff Time	7:30 EDT
Landing Time	10:20 EST
Field Elev.	RVL
Temp. at Altitude	RVL

Project's Scanning Requirements	
FOV (degrees):	45°
Scan Rate (Hz):	25.5
Pulse Rate (Hz):	53000
Ground Speed (kts):	120 kts
Attenuation(OD) or Laser Current(%):	65%
Altitude AGL (ft):	6601'
Range Gate (m):	-

Data Information	
POS AV file name	070502A
From/To	000 -> 021
LIDAR Unit #	Unit 1 (sn 019)
HD/Card #	1

GPS Base Location(s)	MERRICK
PDOP Avoidance	1030 → 1150
State or Flyover?	STATIC
Laser On Time & Off Times	7:49 → 10:14

NOTES	
Begin Temp	+17°C
Begin Dewpoint	+7°C
Begin Pressure	30.02
Mid Temp	+15°C
Mid Dewpoint	+6°C
Mid Pressure	30.07
End Temp	+14°C
End Dewpoint	+4°C
End Pressure	30.11
Ground (airport)	RVL
Field Elev.	RVL
Temp. at Altitude	+20°C

FILE	FL #	ALT (AMSL)	Heading	Speed	Returns	Grab	NOTES
070502_235046	52	7100'	S	~120 kts	~100 %	~110°	bln hrtz above, good visibility
070503_001259	53	7100'	N	~120 kts	~100 %	~80°	scat " " " "
070503_003550	54	7100'	S	~120 kts	~100 %	~80°	few above, " "
070503_005649	55	7100'	N	~120 kts	~100 %	~80°	" " " "
070503_011745	56	7100'	S	~120 kts	~100 %	~100°	" " " "
070503_013749	57	7100'	N	~120 kts	~100 %	~70°	" " " "
070503_015812	58	7100'	S	~120 kts	~100 %	~90°	" " " "

5/19 070502A

Station Occupation Report For Airborne GPS

Project: PA MAP LIDAR 2007

Location: MIFFLIN Co, PA Airport Project Number: SB55-015
 Completed by: PNA Date: MAY 2nd, 2007

Receiver: "1" (S/N 108)
 Receiver Type: TRIMBLE 5700
 Antenna Type: ZEPHYR GEODETIC
 Station ID: MIFFPORT
 Start -- H.I. (m): 1.601 m
 End -- H.I. (m): "
 H.I. (ft): 5.255 ft.
 Start Time: 7⁰⁷ p
 End Time: 10³⁷ p
 Time Zone: EDT
 Operator: PNA



Comments

use for LIDAR missions: S/N 19 070502A
S/N 59 070502B

LIDAR MISSION RECORD SHEET



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Project Name	PA MAP 2007
Project Number	S85-015
Navigation File	"MIFFLIN"

Pilot	LUKE T
Tech	WESAM
Aircraft	N7320G

Date Flown	MAY 30, 2007
Takeoff Time	11:28 EDT (airport) RWL
Landing Time	2:58 EDT (airport) RWL

Project's Scanning Requirements	
FOV (degrees):	45°
Scan Rate (Hz):	25.5
Pulse Rate (Hz):	53000
Ground Speed (kts):	120 kts
Attenuation(OD) or Laser Current(%):	65%
Altitude AGL (ft):	660'
Range Gate (m):	-

Data Information	
POS AV file name	070503B
From/To	037 ->
LIDAR Unit #	Unit 1 (SN 019)
HD/Carid #	1

GPS Base Location(s)	MIFREPORT
PDOP Avoidance	105A -> 119A, 280 -> 330
Static or Flyover?	574-71C
Laser On Time & Off Times	1120A -> 2020

SM 19 070503B

Begin Temp	+16°C	Ground (airport)	Field Elev.	819'	Temp. at Altitude	+2°C
Begin Dewpoint	+1°C					-
Begin Pressure	30.27					-
Mid Temp	+16°C					+3°C
Mid Dewpoint	+1°C					-
Mid Pressure	30.25					-
End Temp	+18°C					+3°C
End Dewpoint	+1°C					-
End Pressure	30.21	Y		Y		-

FILE	FL #	Alt (AMSL)	Heading	Speed	Returns	Grab	NOTES
070503-152842	40	7200'	N	~120 kts	~100%	~40	
070503-154731	41	7200'	S	~120 kts	~100%	~50	high thru over, 22 min, good visibility
070503-160707	42	7200'	N	~120 kts	~100%	~40	
070503-162736	43	7100'	S	~120 kts	~100%	~40	
070503-164746	44	7100'	N	~120 kts	~100%	~30	
070503-170839	45	7100'	S	~120 kts	~100%	~50	
070503-172942	46	7200'	N	~120 kts	~100%	~30	
070503-175003	47	7100'	S	~120 kts	~100%	~40	
070503-181329	1	7300'	N	~135 kts	~100%	~10	[experience below @ 7 min from N end?] (Airelec)

LIDAR MISSION RECORD SHEET



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Project Name	RA MAR 2007
Project Number	S855015
Navigation File	"MIFR114"

Pilot	W. G. ...
Tech	MARKER
Aircraft	N7320G

Date Flown	MAY 3rd, 2007
Takeoff Time	3:51P EST
Landing Time	6:42P EST

Project's Scanning Requirements	
FOV (degrees):	45°
Scan Rate (Hz):	25.5
Pulse Rate (Hz):	53000
Ground Speed (kts):	120 kts
Altitude (OD) or Laser Current(%):	65%
Altitude AGL (ft):	6601'
Range Gate (m):	-

Data Information	
POS AV file name	070503c
From/To	000 -> 019
LIDAR Unit #	Unit 1 (sn 019)
HD/Card #	2

GPS Base Location(s)	"MUFFPOTS" & 35M1 GORS
PDOP Avoidance	250 -> 335, 1080 -> 1050
Static or Flyover?	START & FLYOVERS
Laser On Time & Off Times	3:58P -> 6:34P EST

S/M 19 070503c

	Ground	(airport)	Field Elev.	Temp at Altitude
Begin Temp	+21°C	RVL	819'	+20°C
Begin Dewpoint	+2°C			-
Begin Pressure	30.17			-
Mid Temp	+20°C			+20°C
Mid Dewpoint	+2°C			-
Mid Pressure	30.16			-
End Temp	+21°C			+30°C
End Dewpoint	+3°C			-
End Pressure	30.16	V	V	-

FILE	FL #	ALT (AMSL)	Heading	Speed	Returns	Crab	NOTES
070503 - 201731	14	7500'	N	~120 kts	~100%	~2°	skc good visibility - turb
070503 - 203009	15	7500'	S	~120 kts	~100%	~2°	" " " " " "
070503 - 204325	16	7500'	N	~120 kts	~100%	~2°	" " " " " "
070503 - 205718	17	7500'	S	~120 kts	~100%	~3°	" " " " " "
070503 - 211144	18	7500'	N	~120 kts	~100%	~2°	" " " " " "
070503 - 212535	19	7400'	S	~120 kts	~100%	~2°	" " " " " "
070503 - 213943	20	7400'	N	~120 kts	~100%	~2°	" " " " " "
070503 - 215451	21	7400'	S	~120 kts	~100%	~2°	" " " " " "
070503 - 221100	22	7400'	N	~120 kts	~100%	~2°	" " " " " "

Station Occupation Report For Airborne GPS

Project: PA MAP 2007 LIDAR

Location: MIFFLIN Co., PA AIRPORT Project Number: 5855015
 Completed by: PNH Date: 5/3/07

Receiver: "1" (S/N 108)
 Receiver Type: TRIMBLE S700
 Antenna Type: ZEPHYR GEODESIC
 Station ID: MIFFPORT
 Start -- H.I. (m): 1.6425 m
 End -- H.I. (m): "
 H.I. (ft): 5.39 ft.
 Start Time:

7 ⁵⁵ A	10 ⁵³ A	3 ⁴⁰ P
10 ³⁴ A	2 ²⁰ P	7 ⁰² P

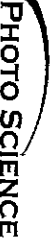
 End Time:
 Time Zone: EDT
 Operator: PNH



Comments

use for LIDAR missions: S/N 19 070503ABC
S/N 59 070503ABC

LIDAR MISSION RECORD SHEET



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Project Name	PA MAR 2007
Project Number	SPS 01S
Navigation File	"MIFUN"

Pilot	LUCETT
Tech	KEASKE
Aircraft	N7320G

Date Flown	MAY 4 th 2007
Takeoff Time	9:11 AM EST
Landing Time	10:54 AM EST

Project's Scanning Requirements	
FOV (degrees):	45°
Scan Rate (Hz):	25.5
Pulse Rate (Hz):	53000
Ground Speed (kts):	120 kts

Data Information	
POS AN file name	070504A
From/To	021 → 030
LIDAR Unit #	Unit 1 (sn 019)
HD/Card #	2

GPS Base Location(s)	MUSPORT
PDOP Avoidance	6.5 → 7.2 → 10.2 → 10.5 → 10.5 → 10.5 → 10.5
Static or Flyover?	STATIC
Laser On Time & Off Times	9:55A → 10:15A

	Ground	(airport)	Field Elev.	Temp. at Altitude
Begin Temp	+12 °C	RVL	819'	+3 °C
Begin Dewpoint	+1 °C	↓		-
Begin Pressure	30.30	↓		-
Mid Temp	/	/	/	/
Mid Dewpoint	/	/	/	/
Mid Pressure	/	/	/	/
End Temp	+14 °C	RVL	819'	+3 °C
End Dewpoint	0 °C	↓		-
End Pressure	30.30	↓		-

FILE	FL #	Alt. (AMSL)	Heading	Speed	Returns	Crab	Notes
070504-132005	1	7300'	S	~120 kts	~100 %	~1°	sk. calm winds, +7kts
070504-134207	47	7200'	N	~120 kts	~100 %	~2°	

3/4 19 070504A

Station Occupation Report For Airborne GPS

Project: PA MAP 2007 LIPAR

Location: MIFFLIN Co., PA AIRPORT

Project Number: 5855-015

Completed by: PWH

Date: MAY 4th, 2007

Receiver: "1" (S/N 108)

Receiver Type: TRIMBLE 5700

Antenna Type: ZEPHYR GEODETIC

Station ID: MIFFPORT

Start -- H.I. (m): 1.6605m

End -- H.I. (m): 1.6605m

H.I. (ft): 5.45 ft.

Start Time: 8⁴⁷A

End Time: ~10²⁰A

Time Zone: EDT

Operator: PWH



Comments

*Station Occupation Report
For Airborne GPS*

Project: PA MAP 2007 LIDAR REFLIGHTS

Location: ALTOONA/BLAIR COUNTY AIRPORT, PA Project Number: SBSS-015

Completed by: PNH Date: Nov. 30th, 2007

Receiver: "1" (S/N 108)

Receiver Type: TRIMBLE S700

Antenna Type: ZEPHYR GEODETIC

Station ID: AOO AP 1964 STA B

Start -- H.I. (m): 1.488 m

End -- H.I. (m): 1.488 m

H.I. (ft): 4.885 ft.

Start Time: 11¹⁵A

End Time: 12¹P

Time Zone: EST

Operator: PNH



Comments

Station Occupation Report For Airborne GPS

Project: PA MAP 2007 LIDAR REFUGITS

Location: CARLISLE, PA AIRPORT (N94) Project Number: 5855-015

Completed by: PNH Date: Nov. 30th, 2007

Receiver: "1" (S/N 108)

Receiver Type: TRIMBLE 5700

Antenna Type: ZEPHYR GEODETIC

Station ID: PS1 CAP @ N94

Start -- H.I. (m): 1.486 m

End -- H.I. (m): 1.486 m

H.I. (ft): 4.875 ft.

Start Time: 8³¹A

End Time: 10⁰⁹A

Time Zone: EST

Operator: PNH



Comments

use for S/N 019 - 071130A

Kucera International Flight Logs for Warren County Area- PAMAP 2007 LIDAR

PASS	Line#	Flight	AIRSPEED	AGL	AMSL	AMSL	FOV	SCAN RATE	Pulse Rate	ATTEN	R+I	MISSION ID	JOB#_NAME	NOTES
#	Direction		kts	Feet	feet	Meters	degrees	Hz	Hz	Setting	MODE	Date_MissionID		
1	79RF	N	140	5725	7200	2195	44	30	52500	Half	4+3	070503-201333-1613-1615		
2	1	E	140	5725	7200	2195	44	30	52500	Half	4+3	070503-202042-1620-1634		
3	2	W	140	5725	7200	2195	44	30	52500	Half	4+3	070503-203931-1639-1652		
4	3	E	140	5725	7200	2195	44	30	52500	Half	4+3	070503-205659-1656-1709		
5	4	W	140	5725	7200	2195	44	30	52500	Half	4+3	070503-211346-1713-1727		
6	5	E	140	5725	7200	2195	44	30	52500	Half	4+3	070503-213108-1731-1743		
7	6	E	140	5725	7200	2195	44	30	52500	Half	4+3	070503-214816-1748-1801		
8	7	E	140	5725	7200	2195	44	30	52500	Half	4+3	070503-220513-1805-1817		
9	8	W	140	5725	7200	2195	44	30	52500	Half	4+3	070503-222203-1822-1835		
10	9	E	140	5725	7200	2195	44	30	52500	Half	4+3	070503-223912-1839-1852		
11	10	W	140	5725	7200	2195	44	30	52500	Half	4+3	070503-225624-1856-1909		
12	11	E	140	5725	7200	2195	44	30	52500	Half	4+3	070503-231352-1913-1926		
13	52	S	140	5725	7200	2195	44	30	52500	Half	4+3	070503-233620-1936-1947		
14	12	E	140	5725	7200	2195	44	30	52500	Half	4+3	070504_114305		
15	13	W	140	5725	7200	2195	44	30	52500	Half	4+3	070504_115837		
16	14	E	140	5725	7200	2195	44	30	52500	Half	4+3	070504_121351		
17	15	W	140	5725	7200	2195	44	30	52500	Half	4+3	070504_122935		
18	16	E	140	5725	7200	2195	44	30	52500	Half	4+3	070504_124507		
19	17	W	140	5725	7200	2195	44	30	52500	Half	4+3	070504_130057		
20	18	E	140	5725	7200	2195	44	30	52500	Half	4+3	070504_131634		
21	21	W	140	5725	7200	2195	44	30	52500	Half	4+3	070504_133202		
22	22	E	140	5725	7200	2195	44	30	52500	Half	4+3	070504_134724		
23	23	W	140	5725	7200	2195	44	30	52500	Half	4+3	070504_140317		
24	24	E	140	5725	7200	2195	44	30	52500	Half	4+3	070504_141830		
25	25	W	140	5725	7200	2195	44	30	52500	Half	4+3	070504_143408		
26	26	E	140	5725	7200	2195	44	30	52500	Half	4+3	070504_144922		
27	27	W	140	5725	7200	2195	44	30	52500	Half	4+3	070504_150525		
28	20	E	140	5725	7200	2195	44	30	52500	Half	4+3	070504-174902-1349-1402		
29	41	W	140	5725	7200	2195	44	30	52500	Half	4+3	070504-181047-1410-1424		
30	42	E	140	5725	7200	2195	44	30	52500	Half	4+3	070504-182923-1429-1442		
31	43	W	140	5725	7200	2195	44	30	52500	Half	4+3	070503-184738-1447-1500		
32	44	E	140	5725	7200	2195	44	30	52500	Half	4+3	070504-190528-1505-1519		
33	45	W	140	5725	7200	2195	44	30	52500	Half	4+3	070504-192359-1523-1537		
34	46	E	140	5725	7200	2195	44	30	52500	Half	4+3	070504-194237-1542-1555		
35	47	W	140	5725	7200	2195	44	30	52500	Half	4+3	070504-195939-1559-1612		
36	48	E	140	5725	7200	2195	44	30	52500	Half	4+3	070504-201643-1616-1629		
37	49	W	140	5725	7200	2195	44	30	52500	Half	4+3	070504-203411-1634-1647		
38	50	E	140	5725	7200	2195	44	30	52500	Half	4+3	070504-205209-1652-1704		
39	51	W	140	5725	7200	2195	44	30	52500	Half	4+3	070504-210933-1709-1722		
40	19	E	140	5725	7200	2195	44	30	52500	Half	4+3	070505_115231		
41	28	W	140	5725	7200	2195	44	30	52500	Half	4+3	070505_120822		
42	29	E	140	5725	7200	2195	44	30	52500	Half	4+3	070505_122355		
43	30	W	140	5725	7200	2195	44	30	52500	Half	4+3	070505_123936		
44	31	E	140	5725	7200	2195	44	30	52500	Half	4+3	070505_125457		
45	32	W	140	5725	7200	2195	44	30	52500	Half	4+3	070505_131042		
46	33	E	140	5725	7200	2195	44	30	52500	Half	4+3	070505_132618		
47	34	W	140	5725	7200	2195	44	30	52500	Half	4+3	070505_134153		
48	35	E	140	5725	7200	2195	44	30	52500	Half	4+3	070505_135713		
49	36	W	140	5725	7200	2195	44	30	52500	Half	4+3	070505_141250		
50	37	E	140	5725	7200	2195	44	30	52500	Half	4+3	070505_142810		
51	38	W	140	5725	7200	2195	44	30	52500	Half	4+3	070505_144351		
52	39	E	140	5725	7200	2195	44	30	52500	Half	4+3	070505_145851		
53	40	W	140	5725	7200	2195	44	30	52500	Half	4+3	070505_151431		

APPENDIX A

LIDAR MISSION LOGS: PAMAP 2008

LIDAR MISSION RECORD SHEET

PHOTO SCIENCE
Geospatial Solutions

2670 Wilshire Drive - Lexington KY - 40503 - 859.277.8700 - www.photoscience.com

5:11:00
4:92

Project Name	PA MAR 2008
Project Number	SBS5019
Navigation File	PHUX E-W

Pilot	Lucas AT
Tech	HARGAN
Aircraft	N7320G

Date Flown	APRIL 19th 2008
Takeoff Time	9:19p EDT
Landing Time	12:48 A EDT
	EDT
	Field Elev.
	Temp. at Altitude

Project's Scanning Requirements	
FOV (degrees):	46°
Scan Rate (Hz):	25.5
Pulse Rate (Hz):	53000
Ground Speed (kts):	120 kts.
Attenuation(OD) or Laser Current(%):	65%
Altitude AGL (ft):	6500'
Range Gate (m):	-

Data Information	
POS AV file name	080418A
Front/To	000 -> 024
LIDAR Unit #	Unit 1 (sn 019)
HDI/Card #	" 1 "

GPS Base Location(s)	3(RAND) PRTS
PDOP Avoidance	3.05A -> 4.25A
Static or Flyover?	Static
Laser On Time & Off Times	9:23p -> 12:35A EDT

Begin Temp	+20°C	Ground	(airport)	Field Elev.	466'	Temp. at Altitude	+13°C
Begin Dewpoint	00°C						
Begin Pressure	29.98						
Mid Temp	+18°C						+13°C
Mid Dewpoint	00°C						
Mid Pressure	29.98						
End Temp	+14°C						+12°C
End Dewpoint	+04°C						
End Pressure	29.99		W				

[080418A-SM19
N7320G]

FILE	FL #	Alt. (AMSL)	Heading	Speed	Returns	Grab	NOTES
080419-013958	1226	6500'	E	~120 kts	~100%	~40	sketch, haze, smooth, W winds
080419-015429	1227	6500'	W	~120 kts	~100%	~30	
080419-020633	1228	6500'	E	~120 kts	~100%	~50	
080419-021900	1229	6500'	W	~120 kts	~100%	~40	
080419-023130	1230	6500'	E	~120 kts	~100%	~60	
080419-024409	1231	6500'	W	~120 kts	~100%	~40	
080419-025613	1232	6500'	E	~120 kts	~100%	~60	
080419-030839	1233	6500'	W	~120 kts	~100%	~30	
080419-032049	1234	6500'	E	~120 kts	~100%	~50	
080419-033436	1235	6500'	W	~120 kts	~100%	~30	
080419-034529	1236	6500'	E	~120 kts	~100%	~30	
080419-035634	1237	6500'	W	~120 kts	~100%	~20	
080419-040706	1238	6500'	E	~120 kts	~100%	~30	
080419-041506	1239	6500'	W	~120 kts	~100%	~20	
080419-042229	1240	6500'	E	~120 kts	~100%	~20	
080419-043025	1241	6500'	W	~120 kts	~100%	~20	

LANDED FOR FUEL

[FOUND AT 6500' ALTITUDE]

LIDAR MISSION RECORD SHEET

PHOTO SCIENCE
Geospatial Solutions

2670 Willhite Drive - Lexington KY - 40503 - 859.277.8700 - www.photoscience.com

Project Name: 24 MAR 2008
 Project Number: SBSS-019
 Navigation File: PHILLY E-W

Pilot: LUCKETT
 Tech: HARRAN
 Aircraft: N7320G

Date Flown: April 19th, 2008
 Takeoff Time: 1:18 A EST
 Landing Time: 3:18 A EST

Project: Scanning Requirements	
FOV (degrees):	46°
Scan Rate (Hz):	25.5
Pulse Rate (Hz):	53000
Ground Speed (kts):	120 kts
Altitude (AGL) (ft):	6500'
Range Gate (m):	-

Data Information	
POS AV file name	080419A
From/To	025 -> 038
LIDAR Unit #	Unit 1 (sn 019)
HD/Card #	"1"

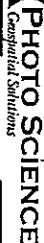
GPS Base Location(s): RANDOLPH PORT & PARD COGS
 PDOP Avoidance: 3.0 SA -> 4.5 SA
 Static or Flyover?: FLYOVERS
 Laser On Time & Off Times: 12:34 -> 2:58A EST

080419A-S/M 19
N7320G

	Ground	(airport)	Field Elev.	Temp. at Altitude
Begin Temp	+14°C	00N	466'	+12°C
Begin Dewpoint	+04°C	↓	↓	-
Begin Pressure	29.98	↓	↓	-
Mid Temp				
Mid Dewpoint				
Mid Pressure				
End Temp	+12°C	00N	466'	+11°C
End Dewpoint	+05°C	↓	↓	-
End Pressure	29.96	↓	↓	-

FILE	FL #	Alt. (AMSL)	Heading	Speed	Returns	Crab	NOTES
080419_054240	1242	6500'	S	~120 kts	~100%	~3°	skys-haze, smooth, W winds [Flare @ 6500' rec ast]
080419_060006	1225	6500'	W	~120 kts	~100%	~2°	
080419_061400	1224	6500'	E	~120 kts	~100%	~2°	
080419_062804	1223	6500'	W	~120 kts	~100%	~3°	
080419_064224	1222	6500'	E	~120 kts	~100%	~3°	
							LANDED FOR PDOP SPIKE

LIDAR MISSION RECORD SHEET



Project Name: RA-MAP 2008
 Project Number: SBSS-019
 Navigation File: PHILLY E-W

Pilot: Luke IT
 Tech: HOARAK
 Aircraft: N7320G

Date Flown: APRIL 19th, 2008
 Takeoff Time: 4:55A EST
 Landing Time: 7:01A EST

Project's Scanning Requirements	
FOV (degrees):	46°
Scan Rate (Hz):	25.5
Pulse Rate (Hz):	53000
Ground Speed (kts):	120 kts
Altitude (AGL) (ft):	6500'
Range Gate (m):	

Data Information	
POS AV file name	080419B
From/To	039 -> 057
LIDAR Unit #	Unit 1 (sn 019)
HDI/Card #	" 1"

GPS Base Location(s): BARDHPORTS & PARK COPS
 PDOP Avoidance: 305A -> 405A, 650A -> 700A EST
 Static or Flyover?: FLYOVERS, STATIC END
 Laser On Time & Off Times: 4:44A -> 6:44A EST

[080419B-0419
N7320G]

	Ground	(airport)	Field Elev.	Temp. at Altitude
Begin Temp	+11°C	CON	466'	+11°C
Begin Dewpoint	+05°C	↓	↓	-
Begin Pressure	29.96	↓	↓	-
Mid Temp				
Mid Dewpoint				
Mid Pressure				
End Temp	+11°C	CON	466'	+11°C
End Dewpoint	+05°C	↓	↓	-
End Pressure	29.97	↓	↓	-

FILE	FL #	Air. (AMSL)	Heading	Speed	Returns	Grab	NOTES
080419_090412	1221	6500'	W	~120 kts	~100%	~80	skt, base smooth, SW winds
080419_092043	1220	6500'	E	~120 kts	~100%	~60	
080419_093645	1219	6500'	W	~120 kts	~100%	~90	
080419_095306	1218	6500'	E	~120 kts	~100%	~60	
080419_100923	1217	6500'	W	~120 kts	~100%	~90	
080419_102538	1216	6500'	E	~120 kts	~100%	~70	

[Landed For PDR SPIKE & FATIGUE]

Station Occupation Report For Airborne GPS

Project: PA MAP 2008 LIDAR

Location: BRANDYWINE AIRPORT, PA

Project Number: SB55-019

Completed by: PNH

Date: APRIL 18th 2008

+ APRIL 19th 2008

Receiver: "1" (SN 1083)

Receiver Type: TRIMBLE S700

Antenna Type: ZEPHYR GEODETIC

Station ID: BRANDPORT

Start -- H.I. (m): 1.693 m

End -- H.I. (m): 1.693 m

H.I. (ft): 5.555 ft

Start Time: 9:01 P

End Time: ~ 7:10 A

Time Zone: EDT

Operator: PNH

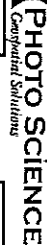


Comments

use for missions: 080418A-SN19

080419A & B - SN19

LIDAR MISSION RECORD SHEET



2870 Willink Drive - Lexington KY - 40503 - 859.277.8700 - www.photoscience.com

Project Name	PA MAP 2008
Project Number	SBSS-019
Navigation File	PHILLY E-W

Pilot	Lucy EST
Tech	HRARAW
Aircraft	N7320G

Date Flown	April 19th 2008
Takeoff Time	6:42 P EST
Landing Time	10:22 P EST
Altitude (at takeoff)	02N
Altitude (at landing)	M05

3:45

Project's Scanning Requirements	
FOV (degrees):	46°
Scan Rate (Hz):	25.5
Pulse Rate (Hz):	53000
Ground Speed (Kts):	120 kts
Altitude (AGL) (ft):	6500'
Range Gate (m):	-

Data Information	
POS AV file name	080419C
From/To	000 -> 026
LIDAR Unit #	Unit 1 (sn 019)
HDI/Card #	"3"

GPS Base Location(s)	BELMONT & PEARL COES
PDOP Avoidance	3.5 to 5.5
Static or Flyover?	BOTH
Laser On Time & Off Times	6:50 -> 9:58

[080419C-5419]
N 7320G

	Ground	(airport)	Field Elev.	Temp. at Altitude
Begin Temp	+25°C	02N	466'	+10°C
Begin Dewpoint	+03°C			-
Begin Pressure	29.92			-
Mid Temp	+12°C			+10°C
Mid Dewpoint	+02°C			-
Mid Pressure	29.95			-
End Temp	+20°C			+10°C
End Dewpoint	+03°C			-
End Pressure	29.97			-

FILE	FL #	All (AMSL)	Heading	Speed	Returns	Grab	NOTES
080419-230821	1201	6500'	W	~120 kts	~100%	~90	with this over, 1422e, smooth, strong winds
080419-232939	1202	6500'	E	~120 kts	~100%	~90	" " " " " " " "
080419-235040	1203	6500'	W	~120 kts	~100%	~90	" " " " " " " "
080420-001144	1204	6500'	E	~120 kts	~100%	~80	" " " " " " " "
080420-003249	1205	6500'	W	~120 kts	~100%	~80	" " " " " " " "
080420-005320	1206	6500'	E	~120 kts	~100%	~80	" " " " " " " "
080420-011403	1207	6500'	W	~120 kts	~100%	~90	" " " " " " " "
080420-013454	1208	6500'	E	~120 kts	~100%	~90	" " " " " " " "
LANNED FOR FUEL							

LIDAR MISSION RECORD SHEET

PHOTO SCIENCE
Geospatial Solutions

2670 Willhite Drive - Lexington KY - 40503 - 859.277.8700 - www.photoscience.com

Project Name	1A MAR 2008
Project Number	SBSS-019
Navigation File	PHILADELPHIA E-W

Pilot	LUCKETT
Tech	HRASAK
Aircraft	N7320G

Date Flown	April 19th, 2008
Takeoff Time	1054 P EST
Landing Time	2051 A EST

3:15

FOV (degrees):	46°	Attenuation (OD) or Laser Current (%):	65%
Scan Rate (Hz):	25.5	Altitude (AGL) (ft):	6500'
Pulse Rate (Hz):	53000	Range Gate (m):	-
Ground Speed (Kts):	120 kts		

POS AV file name	030420A
From/To	027 -> 049
LIDAR Unit #	Unit 1 (sn 019)
HD/Carid #	133

GPS Base Location(s)	BLANDFORD & PARL COPS
PDOP Avoidance	305A -> 515A
Static or Flyover?	307H
Laser On Time & Off Times	11:03 P -> 139 P

[030420A-54119]
N7320G

Begin Temp	+17°C	Ground (airport)	OAN	Field Elev.	466'	Temp. at Altitude	+10°C
Begin Dewpoint	+06°C						
Begin Pressure	29.99						
Mid Temp	+16°C						+10°C
Mid Dewpoint	+07°C						
Mid Pressure	29.99						
End Temp	+15°C						+09°C
End Dewpoint	+09°C						
End Pressure	29.99						

FILE	FL #	All. (AMSL)	Heading	Speed	Returns	Crab	NOTES
080420-032520	1209	6500'	W	~120 kts	~100%	~12°	W/lt. Man-over-board, smooth, steep SE winds
080420-034613	1210	6500'	E	~120 kts	~100%	~10°	" " " " " " " "
080420-040718	1211	6500'	W	~120 kts	~100%	~13°	" " " " " " " "
080420-042728	1212	6500'	E	~120 kts	~100%	~11°	" " " " " " " "
080420-044602	1213	6500'	W	~120 kts	~100%	~14°	" " " " " " " "
080420-050424	1214	6500'	E	~120 kts	~100%	~12°	" " " " " " " "
080420-052242	1215	6500'	W	~120 kts	~100%	~15°	" " " " " " " "

few birds in area

Station Occupation Report For Airborne GPS

Project: PA MAP 2008 LIDAR

Location: BRANDYWINE AIRPORT, PA

Project Number: SB55-019

Completed by: PNH

Date: APRIL 19th, 2008

Receiver: "1" (S/N 1033)

Receiver Type: TRIMBLE 5700

Antenna Type: ZEPHYR GEODETIC

Station ID: BRANDPORT

Start -- H.I. (m): 1.659m

End -- H.I. (m): 1.659m

H.I. (ft): 5.445 ft.

Start Time: 6²²P

End Time: 2-A

Time Zone: EDT

Operator: PNH

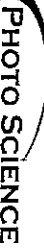


Comments

use for missions: 080419C-S/N19

& 080420A-S/N19

LIDAR MISSION RECORD SHEET



2570 Willhite Drive - Lexington KY - 40503 - 859.277.8700 - www.photoscience.com

Project Name	PA MAP 2008
Project Number	SBSS-019
Navigation File	WEST CHASTER

Pilot	Luc West
Tech	Harper
Aircraft	N7320G

Date Flown	April 23rd, 2008
Takeoff Time	6:17p EST
Landing Time	10:14p EST
	(airport) OGN (airport) MAS

Project's Scanning Requirements	
FOV (degrees):	54°
Scan Rate (Hz):	27.4
Pulse Rate (Hz):	60000
Ground Speed (kts):	120 kts
Altitude (OD) or Laser Current(%):	54%
Altitude AGL (ft):	5500'
Range Gate (m):	-

Data Information	
POS AV file name	080423A
From/To	001 -> 028
LIDAR Unit #	Unit 1 (sn 019)
HDI/Card #	"3"

GPS Base Location(s)	RRANDPORT
PDOP Avoidance	none 1:1:1:1:1
Static or Flyover?	BOTH
Laser On Time & Off Times	6:24p -> 9:59p EST

	Ground	(airport)	Field Elev.	Temp. at Altitude
Begin Temp	+23°C	OGN	466'	+09°C
Begin Dewpoint	+08°C			-
Begin Pressure	30.12			-
Mid Temp	+21°C			+08°C
Mid Dewpoint	+08°C			-
Mid Pressure	30.13			-
End Temp	+17°C			+09°C
End Dewpoint	+11°C			-
End Pressure	30.15			-

FILE	FL #	Alt. (AMSL)	Heading	Speed	Returns	Grab	NOTES
080423-223049	840	5600'	S	~120 kts	~100%	~6°	6:27 EST @ 5900', there, -thick, W winds (55°) (clouds 10 mi from N end?)
080423-225216	841	5500'	N	~120 kts	~100%	~8°	" " " " " " " " " " " "
080423-230746	842	5500'	S	~120 kts	~100%	~7°	" " " " " " " " " " " "
080423-232407	843	5500'	N	~120 kts	~100%	~7°	few @ 5900' EN end, there, smooth, W winds
080423-234100	844	5500'	S	~120 kts	~100%	~7°	" " " " " " " " " " " "
080423-235558	845	5500'	N	~120 kts	~100%	~8°	ske, there, smooth, light W winds
080424-001208	846	5500'	S	~120 kts	~100%	~7°	" " " " " " " " " " " "
080424-002744	847	5500'	N	~120 kts	~100%	~7°	" " " " " " " " " " " "
080424-004341	848	5500'	S	~120 kts	~100%	~7°	" " " " " " " " " " " "
080424-005853	849	5500'	N	~120 kts	~100%	~7°	" " " " " " " " " " " "
080424-011508	850	5500'	S	~120 kts	~100%	~6°	" " " " " " " " " " " "
080424-013027	851	5500'	N	~120 kts	~100%	~7°	" " " " " " " " " " " "
080424-014630	852	5500'	S	~120 kts	~100%	~6°	" " " " " " " " " " " "
LANDED FOR FUEL							
[FUEL @ 5500' FOR CLOUDS, INITIALLY TAKEN MAINTAINED IN PER AIR REQUEST]							

[080423A-5/4/19]
N7320G

031-059

5462

LIDAR MISSION RECORD SHEET



2870 Willink Drive - Lexington KY - 40503 - 859.277.8700 - www.photoscience.com

Project Name:	PA-MAR 2008
Project Number:	SBS-018
Navigation File:	WEST CASTER

Pilot:	LUCYTT
Tech:	HARRAN
Aircraft:	N7320G

Date Flown:	APRIL 23 rd , 2008
Takeoff Time:	1046 P EST
Landing Time:	117 A EST
Field Elev.:	466'
Temp. at Altitude:	+09°C

Project's Scanning Requirements	
FOV (degrees):	45°
Scan Rate (Hz):	25.5
Pulse Rate (Hz):	53,000
Ground Speed (kts):	120 kts
Altitude (AGL) (ft):	6500'
Range Gate (m):	-

Data Information	
POS AV file name:	080423B
Front/To:	029 -> 047
LIDAR Unit #:	Unit 1 (sn 019)
HD/Card #:	"3"

GPS Base Location(s):	BLAND POINT
PDOP Avoidance:	1.20A -> 4.00A (SV 25 min/1h)
Static or Flyover?:	FLY
Laser On Time & Off Times:	10520 -> 102A EST

Begin Temp:	+16°C	Ground (airport)	466'	Temp. at Altitude:	+09°C
Begin Dewpoint:	+11°C				
Begin Pressure:	30.14				
Mid Temp:	+15°C				
Mid Dewpoint:	+11°C				
Mid Pressure:	30.14				
End Temp:	+10°C				
End Dewpoint:	+10°C				
End Pressure:	30.14				

[080423B-5/1/19]
N7320G

FILE	FL #	Alt. (AMSL)	Heading	Speed	Returns	Crab	NOTES
080424-030256	853	6750'	N	~120 kts	~100%	~5°	she, haze smooth, 1st windy
080424-031906	854	6750'	S	~120 kts	~100%	~4°	" " " " " "
080424-033432	855	6750'	N	~120 kts	~100%	~5°	" " " " " "
080424-035032	856	6750'	S	~120 kts	~100%	~4°	" " " " " "
080424-041077	857	6800'	W	~120 kts	~100%	~8°	" " " " " "
080424-042010	839	6800'	N	~120 kts	~100%	~4°	" " " " " "
080424-044530	838	6750'	S	~120 kts	~100%	~2°	" " " " " "
							LANNED EAR PDOP & FATIGUE

Station Occupation Report For Airborne GPS

Project: PA MAP 2003 LIDAR

Location: BRANDYWINE AIRPORT, PA

Project Number: SBSS-019

Completed by: PNH

Date: April 23rd, 2008

Receiver: "1" (N 1083)

Receiver Type: TRIMBLE S700

Antenna Type: ZEPHYR GEODETIC

Station ID: BRANDPORT

Start -- H.I. (m): 1.693 m

End -- H.I. (m): 1.693 m

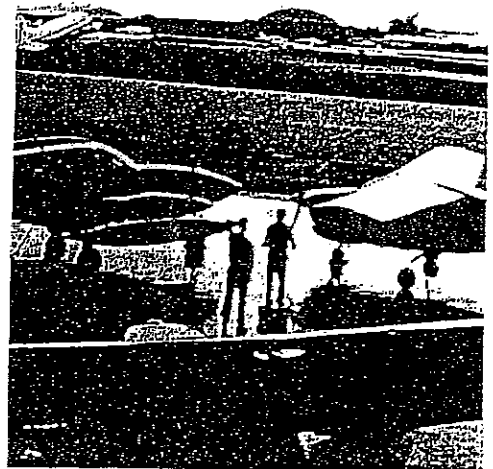
H.I. (ft): 5,555 ft.

Start Time: 5:55p

End Time: ~ 1:30 A

Time Zone: EDT

Operator: PNH

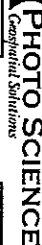


Comments _____

use for missions: 080423A-5/19

080423B-5/19

LIDAR MISSION RECORD SHEET



Project Name	PA MAP 2008
Project Number	5855-019
Navigation File	WEST CHESTER

Pilot	WILKINSON
Tech	HEARMAN
Aircraft	N7320G

Date Flown	APRIL 24 th 2008
Takeoff Time	10:42 A EST
Landing Time	2:24 P EDT
Ground	MAS
Field Elev.	MAS

Project's Scanning Requirements	
FOV (degrees):	45°
Scan Rate (Hz):	255
Pulse Rate (Hz):	53000
Ground Speed (kts):	120 kts
Altitude (OD) or Laser Current(%):	65%
Altitude AGL (ft):	6500'
Range Gate (m):	-

Data Information	
POS AV file name	080424A
From/To	000 -> 026
LIDAR Unit #	Unit 1 (sn 019)
HDI/Card #	"1"

GPS Base Location(s)	40N H
PDOP Avoidance	95% → 105% 250 → 350 EST
Static or Flyover?	START
Laser On Time & Off Times	10:46 → 2:15 EST

Begin Temp	+18°C	Ground	MAS	Field Elev.	660'	Temp. at Altitude	+08°C
Begin Dewpoint	+02°C						
Begin Pressure	30.25						
Mid Temp	+20°C						
Mid Dewpoint	+04°C						+08°C
Mid Pressure	30.24						
End Temp	+21°C						
End Dewpoint	+03°C						
End Pressure	30.20						

[080424A-S/M19
N7320G]

FILE	FL #	Alt. (AMSL)	Heading	Speed	Returns	Crab	NOTES
080424_145501	837	6800'	N	~120 kts	~100%	90° E	
080424_151240	836	6800'	S	~120 kts	~100%	10° E	steep, haze, smooth, NW winds
080424_153043	835	6800'	N	~120 kts	~100%	10° E	
080424_154904	834	6800'	S	~120 kts	~100%	10° E	
080424_160744	833	6850'	N	~120 kts	~100%	10° E	
080424_162600	832	6900'	S	~120 kts	~100%	10° E	
080424_164406	831	6900'	N	~120 kts	~100%	8° E	
080424_170522	816	7000'	S	~120 kts	~100%	4° E	
080424_172356	815	7000'	N	~120 kts	~100%	2° E	
080424_174227	814	6950'	S	~120 kts	~100%	2° E	
080424_175954	813	6950'	N	~120 kts	~100%	3° E	

LANDS FOR BAD PDOP SPIKE RESTRICTED & FUEL & MAG AD

Station Occupation Report
For Airborne GPS

Project: PA MAP 2008 LIDAR

Location: WEST CHESTER Co. AIRPORT, PA

Project Number: SB55-019

Completed by: PNH

Date: APRIL 24th 2008

Receiver: "1" (S/H 1083)

Receiver Type: TRIMBLE S700

Antenna Type: ZEPHYR GEODETIC

Station ID: 40N H

Start -- H.I. (m): 1.687m

End -- H.I. (m): 1.687m

H.I. (ft): 5.535 ft.

Start Time: 9⁴⁸_A

End Time: 2³⁵_P

Time Zone: EDT

Operator: PNH



Comments

use for mission: 080424A-5/1/19

Station Occupation Report For Airborne GPS

Project: PA MAP 2008 LIDAR

Location: CHESTER COUNTY, PA AIRPORT

Project Number: SB55019

Completed by: PNH

Date: APRIL 25th, 2008

Receiver: "1" (S/N 1083)

Receiver Type: TRIMBLE S700

Antenna Type: ZEPHYR GEODETIC

Station ID: 40N H

Start -- H.I. (m): 1.702 m

End -- H.I. (m): 1.702 m

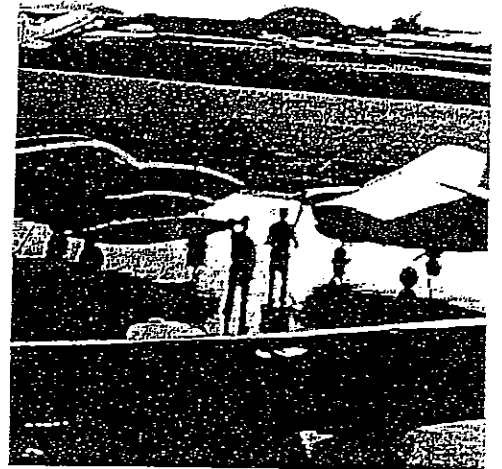
H.I. (ft): 5.585 ft.

Start Time: 11:5A

End Time: ~ 1:35P

Time Zone: EDT

Operator: PNH



Comments

use for mission : 080425A-S/N 19

LIDAR MISSION RECORD SHEET

PHOTO SCIENCE
Geospatial Solutions

2570 Wilhite Drive - Lexington KY - 40503 - 859.277.8700 - www.photoscience.com

Project Name	FA MAP 2008
Project Number	5855-019
Navigation File	WOOLPERCT'S NO. 1ST AREA.D

Pilot	LUKE ST
Tech	HEARAW
Aircraft	N7320G

Date Flown	APRIL 25 th 2008
Takeoff Time	4:30 p EST
Landing Time	8:26 p EST
Field Elev.	H2L

Project Scanning Requirements	
FOV (degrees):	42°
Scan Rate (Hz):	26.8
Pulse Rate (Hz):	53300
Ground Speed (kts):	130 kts
Attenuation (OD) or Laser Current (%):	100%
Altitude AGL (ft):	7000'
Range Gate (m):	-

Data Information	
POS ANV file name	080425B
From To	035 -> 063
LIDAR Unit #	Unit 1 (sn 019)
HD/Card #	"1"

GPS Base Location(s)	WHEELTON AIRPORT APR 2 1965
PDOP Avoidance	2 nd → 3 rd
Static or Flyover?	STATION
Laser On Time & Off Times	4 th → 8:50 p EST

Begin Temp	+24°C	22N	530'	+08°C
Begin Dewpoint	+04°C			-
Begin Pressure	30.02			-
Mid Temp	+24°C			+09°C
Mid Dewpoint	+05°C			-
Mid Pressure	30.01			-
End Temp	+17°C			+08°C
End Dewpoint	+10°C			-
End Pressure	30.03			-

[080425B - 5/19]
N7320G

FILE	FL #	Alt. (AMSL)	Heading	Speed	Returns	Grab	NOTES
080425-205020	45D	7350'	NE	~130 kts	~100%	~7°	
080425-211230	46D	7350'	SW	~130 kts	~100%	~6°	high ave, haze, smooth W/Wind
080425-213518	47D	7350'	NE	~130 kts	~100%	~8°	
080425-215610	48D	7350'	SW	~130 kts	~100%	~6°	
080425-221523	49D	7350'	NE	~130 kts	~100%	~8°	
080425-223529	50D	7350'	SW	~130 kts	~100%	~6°	
080425-224453	51D	7350'	NE	~130 kts	~100%	~8°	
080425-225502	52D	7350'	SW	~125 kts	~100%	~7°	
080425-231159	44D	7350'	SW	~130 kts	~100%	~8°	
080425-233501	43D	7350'	NE	~130 kts	~100%	~9°	
080425-235617	42D	7350'	SW	~130 kts	~100%	~8°	
							LANDED 3/4 FUEL DEPLETION
							& CONDITIONS DETERIORATING
							1724 IN 2762

Station Occupation Report For Airborne GPS

Project: PA MAP 2008-LIDAR

Location: HAZLETON, PA Airport

Project Number: 5855-019

Completed by: PNH

Date: APRIL 25th, 2008

Receiver: "1" (S/N 1083)

Receiver Type: TRIMBLE S700

Antenna Type: ZEPHYR GEODESIC

Station ID: ARP 2 1960

Start -- H.I. (m): 1.653 m

End -- H.I. (m): 1.653 m

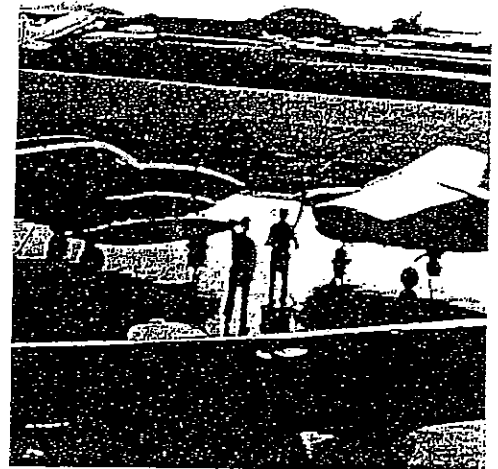
H.I. (ft): 5.42 ft.

Start Time: 4:04p

End Time: ~ 8:35p

Time Zone: EDT

Operator: PNH



Comments _____

use for mission 080425TB-S/N 19

Station Occupation Report For Airborne GPS

Project: PA MAP 2008 LIDAR

Location: HAZLETON, PA AIRPORT

Project Number: SB55-019

Completed by: PNH

Date: APRIL 26th, 2008

Receiver: "1" (S/N 1083)

Receiver Type: TRIMBLE S700

Antenna Type: ZEPHYR GEODETIC

Station ID: _____

Start -- H.I. (m): 1.664m

End -- H.I. (m): _____

H.I. (ft): 5.46ft.

Start Time: 10⁰⁶A

End Time: _____

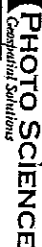
Time Zone: _____

Operator: PNH



Comments

LIDAR MISSION RECORD SHEET



2570 Willite Drive • Lexington, KY • 40503 • 859.277.8700 • www.photoscience.com

Project Name	PA MAP 2008
Project Number	S855019
Navigation File	Wobersg North D

Pilot	LMWEST
Tech	HZARAK
Aircraft	N7320G

Date Flown	APRIL 27 th 2008
Takeoff Time	5:41 P EST
Landing Time	7:11 P EST
Field Elev.	530'
Temp. at Altitude	+04°C

Project: Scanning Requirements	
FOV (degrees):	42°
Scan Rate (Hz):	26.8
Pulse Rate (Hz):	53800
Ground Speed (kts):	130 kts
Altitude (OD) or Laser Current (%):	100%
Altitude AGL (ft):	7000'
Range Gate (m):	-

Data Information	
POS AV file name	080427A
FrontTo	003 → 015
LIDAR Unit #	Unit 1 (sn 019)
HDI/Card #	"2"

GPS Base Location(s)	HAZLETON MARIOTT AFB 2 1965
PDOP Avoidance	2.49 → 2.56, max 4.1 kts
Static or Flyover?	STATIC
Laser On Time & Off Times	5:49 → 6:30 EST

[080427A-5419] N7320G

Begin Temp	+14°C	Ground (airport)	ZZN	Field Elev.	530'	Temp. at Altitude	+04°C
Begin Dewpoint	+08°C						
Begin Pressure	30.15						
Mid Temp							
Mid Dewpoint							
Mid Pressure							
End Temp	+17°C		AVP				+04°C
End Dewpoint	+08°C						
End Pressure	30.03						

FILE	FL #	Alt. (AMSL)	Heading	Speed	Returns	Crab	NOTES
080426-220121	6D	8500'	NE	~130 kts	~100%	~1°	
080426-221152	5D	8500'	SW	~130 kts	~100%	~3°	high over, low forest below & water leads in 2002, +2002 smooth, W winds
080426-222044	4D	8500'	NE	~130 kts	~100%	~1°	
080426-222744	3D	8500'	SW	~130 kts	~100%	~3°	
080426-223544	2D	8500'	NE	~130 kts	~100%	~2°	
080426-224142	1D	8500'	SW	~130 kts	~100%	~3°	
080426-224647	6F	8500'	SE	~130 kts	~100%	~3°	
LANDED DUE TO EXCESSIVE CLOUDS THROUGHOUT REMAINDER OF PROJECT AREA							
PAROM Clouds							

Station Occupation Report For Airborne GPS

Project: PA MAP 2008 LIDAR

Location: HAZLETON, PA AIRPORT

Project Number: SB55-019

Completed by: PNH

Date: APRIL 27th, 2008

Receiver: "1" (S/N 1083)

Receiver Type: TRIMBLE S700

Antenna Type: ZEPHYR GEODESIC

Station ID: ARP 2 1965

Start -- H.I. (m): 1.541 m

End -- H.I. (m): 1.541 m

H.I. (ft): 5.06 ft.

Start Time: 5¹² p

End Time: ~7²⁵ p

Time Zone: EDT

Operator: PNH



Comments

user mission: 080422A-S/119

LIDAR MISSION RECORD SHEET



Project Name:	PA MAP 2008
Project Number:	SB55019
Navigation File:	Whoever's North "D" AREA

Pilot:	LITTLE T
Tech:	HEARN
Aircraft:	N7320G

Date Flown:	APRIL 29th 2008
Takeoff Time:	6:19 EDT (airport) HZL
Landing Time:	7:30 EST (airport) AWP

Project:	Scanning Requirements:
FOV (degrees):	42°
Scan Rate (Hz):	26.8
Pulse Rate (Hz):	53800
Ground Speed (kts):	130 kts.

Data Information:	
POS AV file name:	0804294
Front/To:	000 → 008
LIDAR Unit #:	Unit 1 (sn 019)
HDICard #:	"1"

GPS Base Location(s):	HZL AIRPORT AGR 2.1965 ft PANS CABL
PDOP Avoidance:	4.8 → 5.0 → 2.2 → 3.5 → 3.5A
Static or Flyover?:	BOTH
Laser On Time & Off Times:	6:26p → 7:30 EST

[0804294-5/19 N 7320G]

	Ground	(airport)	Field Elev.	Temp. at Altitude
Begin Temp	+12°C	HZL	1600'	-05°C
Begin Dewpoint	-10°C			
Begin Pressure	29.93	↓	↓	
Mid Temp				
Mid Dewpoint				
Mid Pressure				
End Temp				
End Dewpoint				
End Pressure				

FILE	FL #	Alt. (AMSL)	Heading	Speed	Returns	Crab	NOTES
080429-223157	41D	7350'	NE	~130 kts	~100%	~10°	scat @ 7500' - haze turb, NW winds
080429-225304	40D	7350'	SW	~130 kts	~100%	~8°	

LANDED FOR FUEL

LIDAR MISSION RECORD SHEET

PHOTO SCIENCE
Aerial Solutions

2570 Winkle Drive - Lexington KY - 40503 - 859.277.5700 - www.photoscience.com

NW150-2

Project Name	PA MAP 2008
Project Number	SBS 019
Navigation File	WOLPERT'S NORTH D

Pilot	MULETT
Tech	HARRON
Aircraft	N7320G

Date Flown	APRIL 29th 2008
Takeoff Time	0820 EST
Landing Time	1200 A EST
Field Elev.	AWP
Temp. at Altitude	H2L

Project's Scanning Requirements	
FOV (degrees):	42°
Scan Rate (Hz):	26.8
Pulse Rate (Hz):	53900
Ground Speed (Kts):	130 kts
Altitude (OD) or Laser Current (%):	100%
Altitude AGL (ft):	700'
Range Gate (m):	-

Data Information	
POS AV file name	080429B
FrontTo	009 -> 040
LIDAR Unit #	Unit 1 (sn 019)
HDI/Car #	111

GPS Base Location(s)	ARR 2 1465 H2L & PAWS COGS
PDOP Avoidance	2 nd → 3 rd
Static or Flyover?	
Laser On Time & Off Times	8:50 → 12:00 EST

Begin Temp	+09°C	Ground (airport)	H2L	Field Elev.	1600'	Temp. at Altitude	-05°C
Begin Dewpoint	-09°C						
Begin Pressure	29.83						
Mid Temp	+08°C						-06°C
Mid Dewpoint	-08°C						
Mid Pressure	29.89						
End Temp	+05°C						-08°C
End Dewpoint	-05°C						
End Pressure	29.92						

[080429B - SW019]
N7320G

FILE	FL #	Alt. (AMSL)	Heading	Speed	Returns	Grab	NOTES
080430-002533	39D	7350'	NE	~130 kts	~100%	~120	few shows here - turb. W winds (strong)
080430-004713	38D	7350'	SW	~115 kts	~100%	~90	(full throttle)
080430-011206	37D	7350'	NE	~135 kts	~100%	~110	(steps)
080430-013333	36D	7350'	SW	~110 kts	~100%	~100	(full throttle)
080430-015846	35D	7350'	NE	~130 kts	~100%	~120	(steps)
080430-022016	34D	7600'	SW	~110 kts	~100%	~80	(steps) (full throttle)
080430-024533	33D	7600'	NE	~130 kts	~100%	~110	(steps)
080430-030725	32D	7600'	SW	~165 kts	~100%	~90	(full throttle)
080430-033356	31D	7600'	NE	~130 kts	~100%	~110	(steps)
080430-035621	30D	7600'	SW	~105 kts	~100%	~90	(full throttle) (altitude 13m from H2L)
LANDED DUE TO FUEL DEPLETION & FATIGUE							

Station Occupation Report For Airborne GPS

Project: PA MAP 2008 LIDAR

Location: HAZLETON, PA Airport Project Number: SBSS-019

Completed by: PNH Date: April 29th, 2008

Receiver: "1" (S/N 1083)

Receiver Type: TRIMBLE 5700

Antenna Type: ZEPHYR GEODETIC

Station ID: ARP 2 1965 HZL

Start -- H.I. (m): 1.518m

End -- H.I. (m): 1.517m

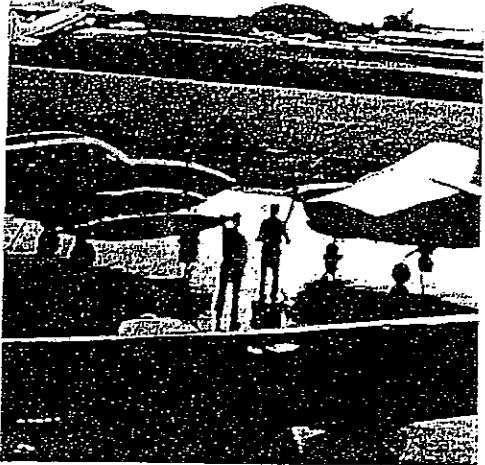
H.I. (ft): 4.98ft.

Start Time: 6:03p

End Time: ~12:40A

Time Zone: EDT

Operator: PNH



Comments

use for mission: 080429A - S/N 19

080429B - S/N 19

LIDAR MISSION RECORD SHEET

PHOTO SCIENCE
Geospatial Solutions

2670 Whittle Drive - Lexington KY - 40503 - 859.277.8700 - www.photoscience.com

Project Name: PA-MAP 2008
 Project Number: SBSS-019
 Navigation File: WOLFEN'S NORTH D

Project's Scanning Requirements:
 FOV (degrees): 42°
 Scan Rate (Hz): 26.8
 Pulse Rate (Hz): 53,900
 Ground Speed (kts): 130 kts

Altitude (OD) or Laser Current(%): 100%
 Altitude AGL (ft): 7000'
 Range Gate (m): -

Pilot: LANCE
 Tech: HARRIS
 Aircraft: N7320G

Date Information:
 POS AV file name: 080430A
 From To: 016 - 022
 LIDAR Unit #: Unit 1 (sn 019)
 HD/CD # "2"

GPS Base Location(s): ARR 2 1965 HZL & PAWS CARP
 PDOP Avoidance: 9.25A → 10.20A
 Static or Flyover?: START-L
 Laser On Time & Off Times: 8:14 → 9:15A EST

[080430A - 5/4/19
N7320G]

Date Flown	Ground	(airport)	Field Elev.	Temp. at Altitude
April 30th 2008	+05%	HZL	1600'	-11°
Takeoff Time	-12%	EST		
Landing Time	30.02	EST		
Begin Temp				
Begin Dewpoint				
Begin Pressure				
Mid Temp				
Mid Dewpoint				
Mid Pressure				
End Temp				
End Dewpoint				
End Pressure				

FILE	FL #	Alt. (AMSL)	Heading	Speed	Returns	Crab	NOTES
080430_125405	7D	8350'	NE	~130 kts	~100%	~12°	sketch at 3000' NE good vis. smooth W winds (shy) clouds NE END
080430_130817	8D	8350'	SW	~105 kts	~100%	~12°	clouds NE 1/2
							VOID FOR PDOP, FOCUSED ON SHORTER LINES B/L
							OF KNOWN SMALL GOOD PDOP WINDOW
							VOID BOTH LINES - Clouds
							(RETURN @ 080430D)

VOID

LIDAR MISSION RECORD SHEET

PHOTO SCIENCE
Crescent Solutions

2870 White Drive - Lexington KY - 40503 - 859.277.8700 - www.photoscience.com

3/25

Project Name: 7A MAP 2008
 Project Number: SBSS 019
 Navigation File: WOOLBERT NORFAD

Pilot: Luke H
 Tech: HASAW
 Aircraft: N7320G

Date Flown: APRIL 30th 2008
 Takeoff Time: 10:48 A EST
 Landing Time: 2:25 P EST

Project Scanning Requirements

FOV (degrees):	48°	Attenuation (OD) or Laser Current (%):	83%
Scan Rate (Hz):	28.4	Altitude AGL (ft):	6000'
Pulse Rate (Hz):	59000	Range Gate (m):	-
Ground Speed (kts):	150 kts		

Date Information

POS AV file name	<u>080430B</u>
From/To	<u>023 - 047</u>
LIDAR Unit #	<u>Unit 1 (sn 019)</u>
HDI/Card #	<u>"2"</u>

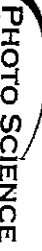
GPS Base Location(s): ARR 2 1415 HZL & PAMS CORS
 PDOP Avoidance: 9.5 → 10.2 @ 2.30 p → 2.52 p
 Static or Flyover?: STATIC
 Laser On Time & Off Times: 11:22 A → 2:24 p EST

080430B - 5/1/019
 N7320G

	Ground	(airport)	Field Elev.	Temp. at Altitude
Begin Temp	<u>+07°C</u>	HZL	<u>1600'</u>	<u>-08°C</u>
Begin Dewpoint	<u>-12°C</u>			
Begin Pressure	<u>30.04</u>			
Mid Temp	<u>+09°C</u>			<u>-07°C</u>
Mid Dewpoint	<u>-14°C</u>			
Mid Pressure	<u>30.02</u>			
End Temp	<u>-09°C</u>			<u>-06°C</u>
End Dewpoint	<u>-19°C</u>			
End Pressure	<u>30.01</u>			

FILE	FL #	Alt. (AMSL)	Heading	Speed	Returns	Grab	NOTES
080430-150738	29D	6600'	NE	~130 kts	~100%	~50	
080430-152907	28D	6600'	SW	~120 kts	~100%	~70	set at 6300' - haze, turb, W winds (heavy)
080430-155335	27D	6600'	NE	~130 kts	~100%	~120	
080430-161653	26D	6600'	SW	~120 kts	~100%	~60	
080430-164008	25D	6850'	NE	~130 kts	~100%	~100	
080430-170141	24D	6850'	SW	~120 kts	~100%	~50	
080430-172434	23D	6950'	NE	~130 kts	~100%	~110	
080430-174736	22D	6850'	SW	~120 kts	~100%	~50	

LIDAR MISSION RECORD SHEET



Project Name	PA MAP 2008
Project Number	SBS-019
Navigation File	Wood REGRS NORTH.D
Scanning Requirements	
FOV (degrees):	48°
Scan Rate (Hz):	23.4
Pulse Rate (Hz):	59000
Ground Speed (kts):	130 kts
Attenuation (OD) or Laser Current (%): 83%	
Altitude AGL (ft): 6000'	
Range Gate (m): -	

Pilot	LWLEST
Tech	HRABAN
Aircraft	N7320G
Data Information	
POS AV file name	080430c
From/To	648 → 061
LIDAR Unit #	Unit 1 (sm 019)
HD/CD #	"2"

Date Flown	April 30th 2008
Takeoff Time	3:42 P EDT
Landing Time	4:16 P EDT
Field Elev.	1600'
Temp. at Altitude	-07°c

GPS Base Location(s)	AKP 2 1965 HZL & PAM'S CORPS
PDOP Avoidance	4.50 → 5.00 START
Static or Flyover?	EST
Laser On Time & Off Times	3:50 → 4:10 EST

Begin Temp	+11°c	HZL	1600'	-07°c
Begin Dewpoint	-21°c	↓	↓	-
Begin Pressure	30.00	↓	↓	-
Mid Temp				
Mid Dewpoint				
Mid Pressure				
End Temp	+11°c	HZL	1600'	-07°c
End Dewpoint	-28°c	↓	↓	-
End Pressure	30.00	↓	↓	-

FILE	FL #	Alt. (AMSL)	Heading	Speed	Returns	Crab	NOTES
080430_191124	21D	6850'	NE	~130 kts	~100%	~6°	state 2300', haze, birds, strong SW winds
080430_193342	20D	6850'	SW	~120 kts	~100%	~4°	
080430_195632	19D	6850'	NE	~130 kts	~100%	~6°	
080430_201910	18D	7100'	SW	~120 kts	~100%	~3°	
							LANNED FOR PDOP

[080430c - 3/19] N7320G

LIDAR MISSION RECORD SHEET



2870 Willhite Drive - Lexington KY - 40503 - 859.277.8700 - www.photoscience.com

Project Name	7A MAP 2003
Project Number	S855019
Navigation File	W0017E25 N0084 D

Pilot	W. J. ...
Tech	H. J. ...
Aircraft	N7320G

Date Flown	April 30th 2003
Takeoff Time	5:28 p EST
Landing Time	9:17 p EDT
Field Elev.	1600'
Temp. at Altitude	-09°C

FOV (degrees):	42°	Attenuation (OD) or Laser Current (%):	100%
Scan Rate (Hz):	26.9	Altitude (ft):	7000'
Pulse Rate (Hz):	53000	Range Gate (m):	-
Ground Speed (kts):	130 kts		

POS AN file name	080430D
From/To	041 -> 069
LIDAR Unit #	Unit 1 (sn 019)
HD/Carid #	"1"

GPS Base Location(s)	ARR 2 1465 Hz & 2005 Coas
PDOP Avoidance	4.5% -> 5.2%
Static or Flyover?	STATIC
Laser On Time & Off Times	5:31p -> 9:01p

Begin Temp	+11°C	Ground	(airport)	Field Elev.	1600'	Temp. at Altitude	-09°C
Begin Dewpoint	-22°C						
Begin Pressure	30.01						
Mid Temp	+10°C						
Mid Dewpoint	-21°C						
Mid Pressure	30.02						
End Temp	+07°C						
End Dewpoint	-16°C						
End Pressure	30.06						

[080430D - 5/4/19]
N7320G

FILE	FL #	Alt. (AMSL)	Heading	Speed	Returns	Crab	NOTES
080430-213537	17D	8100'	NE	~130 kts	~100%	~7°	sect @ 8500' haze, turb, showy SW winds
080430-215804	16D	8100'	SW	~120 kts	~100%	~4°	" " " " " "
080430-220533	15D	8100'	NE	~130 kts	~100%	~6°	" above " " " "
080430-224217	14D	8100'	SW	~120 kts	~100%	~3°	" " " " " "
080430-230017	13D	8100'	NE	~130 kts	~100%	~6°	" " " " " "
080430-231655	12D	8100'	SW	~120 kts	~100%	~3°	" " " " " "
080430-233246	11D	8100'	NE	~130 kts	~100%	~3°	few above haze " " " "
080430-234807	10D	8100'	SW	~120 kts	~100%	~3°	" " " " " "
080501-000302	9D	8350'	NE	~130 kts	~100%	~4°	" " " " " "
080501-001653	8D	8350'	SW	~120 kts	~100%	~2°	" " " " " "
080501-003024	7D	8350'	NE	~130 kts	~100%	~4°	" " " " " "
080501-004603	6F	7350'	SE	~130 kts	~100%	~8°	" " " " " "

LANDSD 13/1 ACED COMPLETE...!



Station Occupation Report For Airborne GPS

Project: PA MAR 2003 LIDAR

Location: HAZLETON, PA AIRPORT

Project Number: S855-019

Completed by: PNH

Date: APRIL 30th, 2008

Receiver: "1" (S/N 1083)

Receiver Type: TRIMBLE S700

Antenna Type: ZEPHYR GEODETIC

Station ID: ARP 2 1965 HZL

Start -- H.I. (m): 1.649 m

End -- H.I. (m): 1.649 m

H.I. (ft): 5.41 ft

Start Time:

3 ²³ A	~10 ²⁵ A	~2 ⁴⁵ P
9 ³² A	~2 ²⁵ P	9 ³⁰ P

End Time:

3 ²³ A	~10 ²⁵ A	~2 ⁴⁵ P
9 ³² A	~2 ²⁵ P	9 ³⁰ P

Time Zone: EDT

Operator: PNH



Comments _____

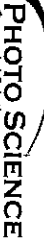
use for missions: 080430A - 5/19

080430B - 5/19

080430C - 5/19

080430D - 5/19

LIDAR MISSION RECORD SHEET



2570 Wilshire Drive - Lexington KY - 40503 - 859.277.8700 - www.photoscience.com

3802 +10T
17th April

Project Name	PA_MGR 2008
Project Number	5855-019
Navigation File	

Pilot	W. J. W. W.
Tech	Y. W. W.
Aircraft	N24488

Date Flown	4/10/08
Takeoff Time	1933
Landing Time	2345

Project's Scanning Requirements	
FOV (degrees):	45
Scan Rate (Hz):	25.7
Pulse Rate (Hz):	53000
Ground Speed (kts):	120
Altitude (ft):	6000
Range Gate (m):	

Data Information	
IPAS File Name	20080411_01500
From/To	000 -> 034
LIDAR Unit #	Unit 2 (5/n 059)
HD #	2

GPS Base Location(s)	LNS C
PDOP Avoidance	-
Static or Flyover?	STATIC
Laser On Time & Off Times	1936 2340

Begin Temp	19	Ground	403	Temp. at Altitude	7
Begin Dewpoint	04				
Begin Pressure	3007	LNS	403		
Mid Temp	16				
Mid Dewpoint	07	LNS	403		8
Mid Pressure	3006				
End Temp	16				
End Dewpoint	07	LNS	403		8
End Pressure	3007				

[080410C - 5/259
N 24488]

FILE	FL #	Alt. (AMSL)	Heading	Speed	Returns	Grab	NOTES
234848	621	6951	NW	120	100		
000610	620	6951	SE	120	100		
002359	619	7001	NW	120	100		
004128	618	7001	SE	120	100		
010005	611	6951	NW	120	100		Need to do 612-617
011525	610	6951	SE	120	100		
013105	609	6951	NW	120	100		
014519	608	6951	SE	120	100		
015819	607	6951	NW	120	100		
020950	606	6951	SE	120	100		
022057	605	6951	NW	120	100		
023013	604	6951	SE	120	100		
023900	603	6951	NW	120	100		
024634	602	6901	SE	120	100		
025248	601	6901	NW	120	100		
025751	604	6901	SE	120	100		
030354	605	6901	SE	120	100		
032013	604	7001	NE	120	100		

Station Occupation Report For Airborne GPS

Project: PA MAP 2008

Location: LNS LANCASTER, PA Airport Project Number: 5855-019

Completed by: YOUNG & MAYMON Date: 4-10-08

Receiver: #4

Receiver Type: 5700

Antenna Type: ZEPHYR GEODETIC

Station ID: LNS C

Start -- H.I. (m): 1.975 m

End -- H.I. (m): 1.975 m

H.I. (ft): 6.258 ft

Start Time: 1:17 PM

End Time: 11:48 P

Time Zone: Eastern

Operator: YOUNG



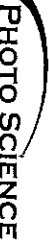
Comments

use for missions: 030410A-5/259

" B "

" C "

LIDAR MISSION RECORD SHEET



2670 White Drive - Lexington KY - 40503 - 859.277.8700 - www.photoscience.com

Project Name	PA MAP 2008
Project Number	585-019
Navigation File	HARDIS BWA6

Pilot	YOUNG
Tech	MAYMON
Aircraft	N2448G

Date Flown	14 April 08
Takeoff Time	134A
Landing Time	219P

(airport)	CXY
(airport)	CXY

Project's Scanning Requirements:	
FOV (degrees):	61°
Scan Rate (Hz):	78.0
Pulse Rate (Hz):	6500
Ground Speed (kts):	120
Attenuation (OD) or Laser Current (%):	46%
Altitude AGL (ft):	4600
Range Gate (m):	

Data Information	
IPAS File Name	20080414_172542
From/To	000 -> 031
LIDAR Unit #	Unit 2 (s/n 059)
HD #	2

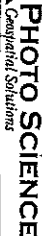
GPS Base Location(s)	CXY AEP 1952
PDOP Avoidance	1030-1120A 320-400P
Static or Flyover?	STATIC
Laser On Time & Off Times	1137A 310P

08041413-5M59
N24486

Begin Temp	7°C	Ground (airport)		Field Elev.		Temp. at Altitude	-4°C
Begin Dewpoint	-6°C		CXY		347		
Begin Pressure	3005						
Mid Temp	11°C		CXY		347		-3°C
Mid Dewpoint	-4°C						
Mid Pressure	3004						
End Temp	11°C						
End Dewpoint	5°C		CXY		347		-1°C
End Pressure	3002						

FILE	FL #	Alt (AMSL)	Heading	Speed	Returns	Crab	NOTES
124927	213	5001	NE	120	100		
160217	212	5001	SW	120	100		
161759	211	5001	NE	120	100		
163116	210	5001	SW	120	100		
164457	209	4951	NE	120	100		
165721	208	5001	SW	120	100		
170921	207	5001	NE	120	100		
172000	206	5001	SW	120	100		
173034	205	5001	NE	120	100		
173927	204	4951	SW	120	100		
174656	203	4951	NE	120	100		
175322	202	4951	SW	120	100		
17956	201	4951	NE	120	100		
181138	216	5001	NE	120	100		
182534	217	4901	SW	120	100		Dist. in last 2 miles
183910	218	4901	NE	120	100		
185326	219	4901	SW	120	100		
190843	217	4901	NE	120	100		Dist. in last 2 miles

LIDAR MISSION RECORD SHEET



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Project Name	PA MAR 2008
Project Number	5855-019
Navigation File	HARRISBME6

Pilot	YOUWB
Tech	MANNON
Aircraft	N2448G

Date Flown	14 APRIL 08
Takeoff Time	644P
Landing Time	113P

Project's Scanning Requirements

FOV (degrees):	61°	Attenuation(OD) or Laser Current(%):	46%
Scan Rate (Hz):	29.0	Altitude AGL (ft):	4600
Pulse Rate (Hz):	6500	Range Gate (m):	
Ground Speed (Kts):	120		

Data Information

IPAS File Name	20080415_003532
From/To	000 -> 037
LIDAR Unit #	Unit 2 (s/n 059)
HD #	2

GPS Base Location(s)	CXY AIRP 1952
PDOP Avoidance	600-635P
Static or Flyover?	STATIC
Laser On Time & Off Times	645P 1057P

[080414D-SM59]
N2448G

Begin Temp	12°C	Ground (airport)	CXY	Field Elev.	347	Temp. at Altitude	-1°C
Begin Dewpoint	-7°C		CXY		347		
Begin Pressure	3002						
Mid Temp	11°C						
Mid Dewpoint	-7°C		CXY		347		-2°C
Mid Pressure	3003						
End Temp	9°C						
End Dewpoint	-8°C		CXY		347		
End Pressure	3011						

FILE	FL #	Alt (AMSL)	Heading	Speed	Returns	Crab	NOTES
225756	221	4901	NE	120	99		
231214	222	4901	SW	120	100		
232603	223	4901	NE	120	99		
233946	224	4901	SW	120	99		
235357	225	4901	NE	120	100		
000806	226	4901	SW	120	100		
002237	227	4901	NE	120	98		
003736	228	4901	SW	120	100		
005043	229	4901	NE	120	100		
010841	230	4901	SW	120	100		
012138	231	4901	NE	120	98		
013330	232	4901	SW	120	100		
014521	233	4901	NE	120	100		
015458	234	4901	SW	120	100		
020424	235	4901	NE	120	99		
021336	236	4901	SW	120	99		
022106	237	4901	NE	120	98		
022759	238	4901	SW	120	100		
023358	239	4901	NE	120	100		
023849	240	4901	SW	120	100		
024639	241	4951	NW	120	100		

Station Occupation Report For Airborne GPS

Project: PA MAP 2008 LITAC

Location: CXY CAPITAL CITY AIRPORT HARRISBURG, PA Project Number: 5855-019

Completed by: MAYMON Date: 4-14-2008

Receiver: #4

Receiver Type: Trimble 5700

Antenna Type: ZEPHYR GEODETIC

Station ID: CXY ARP 195Z

Start -- H.I. (m): 1.762 m

End -- H.I. (m): 1.762 m

H.I. (ft): 5.780 ft.

Start Time: 9:08A

End Time: ~ 11:30P

Time Zone: Eastern

Operator: MAYMON



Comments

use for missions: 080414A - S/M 59

" B - "

" C - "

" D - "

LIDAR MISSION RECORD SHEET



2870 Winthie Drive - Lexington KY - 40503 - 859.277.8700 - www.photoscience.com

Project Name: PA MAP 2008
 Project Number: 5855-019
 Navigation File: LANCASTER

Pilot: Younge
 Tech: MAYMON
 Aircraft: N2448G

Date Flown: 15 APRIL 08
 Takeoff Time: 417P (airport) LNS
 Landing Time: 603P (airport) LNS

Project's Scanning Requirements

FOV (degrees):	45	Attenuation(OD) or Laser Current(%):	69%
Scan Rate (Hz):	25.5	Altitude AGL (ft):	
Pulse Rate (Hz):	5300D	Range Gate (m):	
Ground Speed (kts):	120		

Data Information

IPAS File Name	20080415-231615
From/To	000 -> 606
LIDAR Unit #	Unit 2 (s/n 059)
HD #	2

[080415C-5M59]
 N2448G

GPS Base Location(s): LANL CORS LMS C
 PDOP Avoidance: 550-620P
 Static or Flyover?: FLYOVER
 Laser On Time & Off Times:

Begin Temp	14°C	Ground (airport)	Field Elev.	Temp. at Altitude
Begin Dewpoint	-3°C	LMS	403	-4°C
Begin Pressure	3015			
Mid Temp				
Mid Dewpoint				
Mid Pressure				
End Temp	14°C			
End Dewpoint	-5°C	LNS	403	-4°C
End Pressure	3014			

FILE	FL #	Alt (AMSL)	Heading	Speed	Returns	Grab	NOTES			
212952	644	6801	S	120	98					

Errors: The laser is in 3rd mode but the receiver is not receiving a start pulse
 Laser back reflection error

*Station Occupation Report
For Airborne GPS*

Project: PA MAP 2008

Location: LNS

Project Number: 5855-019

Completed by: MAYMON

Date: 15 APRIL 08

Receiver: #4

Receiver Type: TRIMBLE 5700

Antenna Type: REPHYR GEODETIC

Station ID: LNS 6

Start -- H.I. (m): 1.670

End -- H.I. (m): 1.670

H.I. (ft): 5.480

Start Time: 1112A

End Time: _____

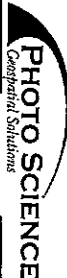
Time Zone: Eastern

Operator: MAYMON



Comments _____

LIDAR MISSION RECORD SHEET



Project Name	RA MAR 2008
Project Number	5855-019
Navigation File	LANCARS.RSR

Pilot	Young
Tech	HOBBS
Aircraft	ND448G

Date Flown	April 17th 2008
Takeoff Time	5:28 P EST
Landing Time	6:27 P EST

Project Scanning Requirements

FOV (degrees):	45°	Attenuation(OD) or Laser Current(%):	69%
Scan Rate (Hz):	25.5	Altitude AGL (ft):	6600'
Pulse Rate (Hz):	53000	Range Gate (m):	-
Ground Speed (kts):	120 kts		

Data Information

IPAS File Name	20080417_232202
From/To	000 -> 009
LIDAR Unit #	Unit 2 (s/n 039)
HD #	~2"

GPS Base Location(s)	LANC CORS
PDOP Avoidance	3.20 -> 3.70, max 4.1 later
Static or Flyover?	FLYOVERS
Laser On Time & Off Times	5:34 -> 6:14 EST

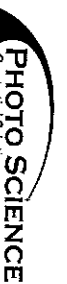
[080417A-SIN59]
N 2498G

	Ground	(airport)	Field Elev.	Temp. at Altitude
Begin Temp	+23°C			+10°C
Begin Dewpoint	00°C	LNS	403'	
Begin Pressure	30.04			
Mid Temp				
Mid Dewpoint				
Mid Pressure				
End Temp	+22°C			
End Dewpoint	+01°C	LNS	403'	
End Pressure	30.03			

FILE	FL #	Alt. (AMSL)	Heading	Speed	Returns	Crab	NOTES
080417_214729	643	6800'	S	~120 kts	~100%	~2°	skc, haze smooth, 1st NW winds
080417_220314	642	6850'	N	~120 kts	~100%	~3°	skc, S S winds low of 2hr.
							LANES FOR CREW CHANGE
							PREVIOUS MENTIONED TENTATIVELY SAVED PROCEEDING
							W/TA DATA COLLECTION W/ OVERSEA CREW MEMBER

18913

LIDAR MISSION RECORD SHEET



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Project Name: PANAP
 Project Number: CRSS-019
 Navigation File: Landerster

Pilot: LUETT
 Tech: YOUNG
 Aircraft: N2448G

Date Flown: 4/17/08
 Takeoff Time: 1909
 Landing Time: 2145
 (airport) LNS
 (airport) LNS

Project's Scanning Requirements

FOV (degrees):	<u>450</u>	Attenuation(OD) or Laser Current(%):	<u>6906</u>
Scan Rate (Hz):	<u>75.5</u>	Altitude AGL (ft):	<u>10000</u>
Pulse Rate (Hz):	<u>53000</u>	Range Gate (m):	
Ground Speed (kts):	<u>120</u>		

Data Information

IPAS File Name	<u>2008-010135</u>
From/To	<u>000 -> 020</u>
LIDAR Unit #	
Unit 2 (s/n 059)	
HD #	<u>2</u>

GPS Base Location(s): LANC CRSS
 PDOP Avoidance: NA
 Static or Flyover?: 1-Flyover
 Laser On Time & Off Times: 1913 2120

[0804178.5459]
 N2448G
 213415

Begin Temp	<u>22</u>	Ground (airport)		Field Elev.		Temp. at Altitude	<u>10</u>
Begin Dewpoint	<u>-1</u>		<u>LNS</u>	<u>403</u>			
Begin Pressure	<u>3062</u>						
Mid Temp	<u>21</u>		<u>LNS</u>	<u>403</u>			<u>9</u>
Mid Dewpoint	<u>-1</u>						
Mid Pressure	<u>3001</u>						
End Temp	<u>18</u>		<u>LNS</u>	<u>403</u>			<u>8</u>
End Dewpoint	<u>00</u>						
End Pressure	<u>3001</u>						

FILE	FL #	Alt. (AMSL)	Heading	Speed	Returns	Crab	NOTES
232181	641	6800	S	120		RX	VOID?
232739	646	6800	S			RX	VOID?
233544	646	6851	S	120	100		
235035	640	6851	N	120	100		
000503	639	6851	S			RX	VOID?
601053	639	6851	S	120	100		
002530	638	6900	N	120	100		
003907	637	6900	S	120	100		
005306	636	6900	N	120	100		
0107240	635	6900	S	120	100		

Station Occupation Report For Airborne GPS

Project: PA MAP 2008 LIDAR

Location: LNS LANCASTER, PA AIRBORNE Project Number: 5855-019

Completed by: PHH Date: 18 APRIL 08

Receiver: #4

Receiver Type: 5700

Antenna Type: ZEPHYR 600PETL

Station ID: LNS C

Start -- H.I. (m): 1.788 m

End -- H.I. (m): 1.788 m

H.I. (ft): 5,867 ft

Start Time: 11040L

End Time: 20:42

Time Zone: EDT

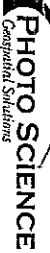
Operator: YOUNG? CAMPBELL?



Comments

use for mission: 080418A-5/1459

LIDAR MISSION RECORD SHEET



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Project Name	SE11454101C	PA MAP 2008
Project Number	5855-019	
Navigation File		SEMAP.BOV

Pilot	M. Younk
Tech	C. Miller
Aircraft	N2448G

Date Flown	4-19-08
Takeoff Time	12:02 PM
Landing Time	3:09 PM

Project's Scanning Requirements	
FOV (degrees):	45
Scan Rate (Hz):	25.50
Pulse Rate (Hz):	53000
Ground Speed (kts):	120
Attenuation(OD) or Laser Current(%):	69
Altitude AGL (ft):	6600
Range Gate (m):	-

Data Information	
IPAS File Name	20080419-
From/To	172417
LIDAR Unit #	000 -> 030
HD #	Unit 2 (s/n 059)

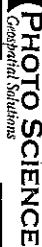
GPS Base Location(s)	Pennington
PDOP Avoidance	1910-1910-1910, 1735-1735
Static or Flyover?	Static
Laser On Time & Off Times	12:07:04 -

080419A-SIN 59
N2448G

Begin Temp	29	Ground (airport)	Field Elev.	Temp. at Altitude
Begin Dewpoint	02	SEG	450	9C
Begin Pressure	29.91			
Mid Temp	29			
Mid Dewpoint	04			
Mid Pressure	29.89			
End Temp	28			
End Dewpoint	04			
End Pressure	29.88			

FILE	FL #	Alt (AMSL)	Heading	Speed	Returns	Crab	NOTES
161853	101	7101	SW	120			The LIDAR is not ready to be
162552	102	7001	NE	120			checked. Please wait.
163427	103	7001	SW	120			
164243	104	7051	NE	120			
165214	104A	7051	NE				
170226	105	7051	SW				
171528	106	7051	NE				
172936	107	7101	SW				may be re-flown
174319	108	7051	NE				may be re-flown
175720	109	7051	SW				re-fly
181331	110	7101	NE				
182818	111	7101	SW				20.7 re-fly 2.9 of track
184308	111A	7101	NE				
	112	7101	SW				

LIDAR MISSION RECORD SHEET



Project Name	Calvin
Project Number	5855-019
Navigation File	

Pilot	Yancy
Tech	DAMBERG
Aircraft	N2448G

Date Flown	4.19.08
Takeoff Time	4:05 PM
Landing Time	8:13 PM

Project's Scanning Requirements

FOV (degrees):	45	Attenuation(OD) or Laser Current(%):	69
Scan Rate (Hz):	25.50	Altitude AGL (ft):	600
Pulse Rate (Hz):	53060	Range Gate (m):	
Ground Speed (kts):	120		

Data Information

IPAS File Name	20080419-
From/To	000 -> 035
LIDAR Unit #	Unit 2 (sh 059)
HD #	2

GPS Base Location(s)	Penn part
PDOP Avoidance	
Static or Flyover?	Static
Laser On Time & Off Times	4:10 PM

[080419B-SM59]
N 2448G

	Ground	(airport)	Field Elev.	Temp. at Altitude
Begin Temp	28			100
Begin Dewpoint	03		450	
Begin Pressure	29.80			
Mid Temp	28			100
Mid Dewpoint	03		450	
Mid Pressure	29.85			
End Temp	24			90
End Dewpoint	05		450	
End Pressure	29.96			

FILE	FL #	Alt. (AMSL)	Heading	Speed	Returns	Crab	NOTES
203046	112	7101	SW	120			
203614	113	7101	NE				
205054	114	7051	SW				
210447	115	7051	NE				
	116	7101	SW				Re Fly
212708	116A	7101	SW				
215710	107A	7101	SW				
221041	109A	7051	NE				
222630	110A	7101	SW				
224639	124	7251	NE				
225707	125	7351	SW				
231210	126	7251	NE				
232050	127	7501	SW				
232850	124	7401	NE				
233524	129	7351	SW				
234129	130	7251	NE				
234755	123	7301	SW				

VOID - bad data/empty passivity

VOID

080419
81
82
1501

080419
81
82
1501

Station Occupation Report For Airborne GPS

Project: PA Map 2008 LIDAR

Location: Pennport SEUNSGROVE, PA AIRPORT Project Number: 5855-019

Completed by: Mark Young PNA Date: 4/19/08

Receiver: S700 "4"

Receiver Type: TRIMBLE S700

Antenna Type: ZEPHYR GEODESIC

Station ID: Pennport PENNPORT

Start -- H.I. (m): 1.854 1.854m

End -- H.I. (m): 1.854 1.854m

H.I. (ft): 6.082 6.082ft

Start Time: 9:11AM

End Time: 8:29PM

Time Zone: EDT

Operator: M. Young

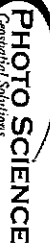


Comments

use for missions: 080419A-5/1/08

080419B-5/1/08

LIDAR MISSION RECORD SHEET



2870 Wilshire Drive - Lexington KY - 40503 - 859.277.8700 - www.photoscience.com

1435

Project Name	PA MAP 2008
Project Number	5855-019
Navigation File	PA019.MILE

Pilot	Max M. ON
Tech	YOUNG
Aircraft	N2448G

Date Flown	24 APRIL 08
Takeoff Time	0730 A (airport) 2ER
Landing Time	0950 A (airport) 2ER

Project's Scanning Requirements	
FOV (degrees):	45°
Scan Rate (Hz):	25.5
Pulse Rate (Hz):	53000
Ground Speed (kts):	120
Attenuation(OD) or Laser Current(%):	69%
Altitude AGL (ft):	6600
Range Gate (m):	-

Data Information	
IPAS File Name	20080424-132034
From/To	000 -> 010
LIDAR Unit #	Unit 2 (sh 059)
HD #	2

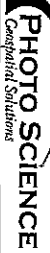
GPS Base Location(s)	2ER RTOR
PDOP Avoidance	1005-1030A
Static or Flyover?	57-257C
Laser On Time & Off Times	0135 0950

[080424A-5/MS9]
N2448G

Begin Temp	11° C	Ground (airport)	2ER	Field Elev.	1734	Temp. at Altitude	8° C
Begin Dewpoint	0° C						
Begin Pressure	3027						
Mid Temp	12° C						10° C
Mid Dewpoint	0° C						
Mid Pressure	3029						
End Temp	13° C						
End Dewpoint	2° C						
End Pressure	3030						

FILE	FL #	Alt. (AMSL)	Heading	Speed	Returns	Crab	NOTES
114713	501	7301	SW	120	100		
115514	502	7301	NE	120	100		
120428	503	7351	SW	120	100		
121345	504	7351	NE	120	100		- Suside begin
122333	505	7451	SW	120	100		
123358	506	7351	NE	120	100		
124408	507	7501	SW	120	100		
125428	508	7351	NE	120	100		
130516	509	7351	SW	120	100		
131617	510	7351	NE	120	100		- 7.0 ALT.
132755	511	7401	SW	120	100		
133923	512	7451	NE	120	100		

LIDAR MISSION RECORD SHEET



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Project Name	PL MAP 2008
Project Number	5855-019
Navigation File	POTTSVILLE

Pilot	YOU N6
Tech	MAV/ABW
Aircraft	N2448G

Date Flown	24 APR 08
Takeoff Time	1035A
Landing Time	240P

Project's Scanning Requirements	
FOV (degrees):	45°
Scan Rate (Hz):	25.5
Pulse Rate (Hz):	5800
Ground Speed (kts):	120
Attenuation(OD) or Laser Current(%):	69%
Altitude AGL (ft):	6600
Range Gate (m):	-

Data Information	
IPAS File Name	20080424_162939
From/To	000 -> 034
LIDAR Unit #	Unit 2 (5/n 059)
HD #	2

GPS Base Location(s)	ZERRPORT
PDOP Avoidance	1000-1030A 250-310P
Static or Flyover?	STAYTIC
Laser On Time & Off Times	1038A 231P

[080424R-51M59]
N2448G

Begin Temp	14°C	Ground	(airport)	Field Elev.		Temp. at Altitude	8°C
Begin Dewpoint	4°C		ZER	1734			
Begin Pressure	30.30						
Mid Temp	17°C						
Mid Dewpoint	0°C		ZER	1734			
Mid Pressure	30.28						
End Temp	20°C						
End Dewpoint	-3°C		ZER	1734			10°C
End Pressure	30.25						

FILE	FL #	Alt (AMSL)	Heading	Speed	Returns	Crab	NOTES
144846	513	7451	SW	120	100		
150148	514	7401	NE	120	100		
151454	515	7401	SW	120	100		
152744	516	7351	NE	120	100		
154150	517	7301	SW	120	100		
155533	518	7301	NE	120	100		
161005	519	7301	SW	120	100		
162418	520	7251	NE	120	100		
164201	526	7151	SW	120	100		
165716	527	7151	NE	120	100		
171253	528	7151	SW	120	100		
172641	529	7201	NE	120	100		
173955	530	7201	SW	120	100		
175048	531	7201	NE	120	100		
180014	532	7101	SW	120	100		
180801	533	7101	NE	120	100		
181413	534	7101	SW	120	100		
181918	535	7201	NW	120	100		

Station Occupation Report For Airborne GPS

Project: PA MAP 2008 LIDAR

Location: ZER POTTSVILLE PA Airport Project Number: 5855-019

Completed by: MAYMON & YOUNG Date: 24 APRIL 08

Receiver: #11

Receiver Type: TRIMBLE 5700

Antenna Type: ZEPHYR LOGARITHM

Station ID: ZERREPORT

Start -- H.I. (m): 1.816 m

End -- H.I. (m): 1.816 m

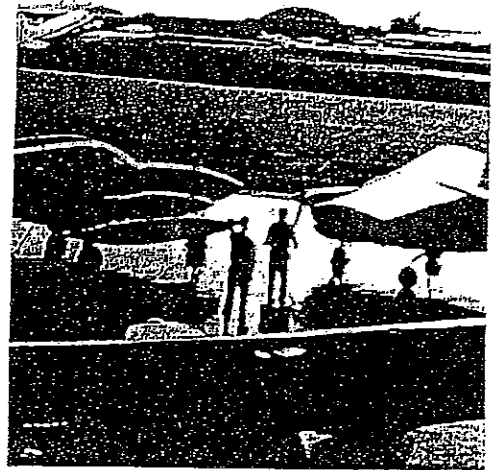
H.I. (ft): 5.957 ft

Start Time: 7:17A / 3:27P

End Time: 3:15P / 5:25P

Time Zone: EASTERN D.T.

Operator: MAYMON



Comments

use for missions: 080424A - 8A 59

" B "

" C "

Station Occupation Report For Airborne GPS

Project: PA MAP 2008 LIDAR

Location: SEG SELINSGRОВF, PA Airport Project Number: SB55-019

Completed by: YOUNG Date: 24 APRIL 08

Receiver: #4

Receiver Type: 5700

Antenna Type: ZEPHYR GEODETIC

Station ID: PENNPOR

Start -- H.I. (m): 1.892 m

End -- H.I. (m): 1.892 m

H.I. (ft): 6.210 ft

Start Time: 6:04P

End Time: 9:04P

Time Zone: Eastern D.T.

Operator: YOUNG



Comments

use for mission: 0904/24D-5/59

Station Occupation Report For Airborne GPS

Project: PA. MAP 2008 LIDAR

Location: CXY CAPITAL CITY AIRPORT HARRISBURG, PA Project Number: SB55-019

Completed by: MAYMON Date: 24 APRIL 08

Receiver: #4

Receiver Type: 5700

Antenna Type: ZEPHYR GEODETIK

Station ID: CXY ARP 1952

Start -- H.I. (m): 1.731 m

End -- H.I. (m): 1.731 m

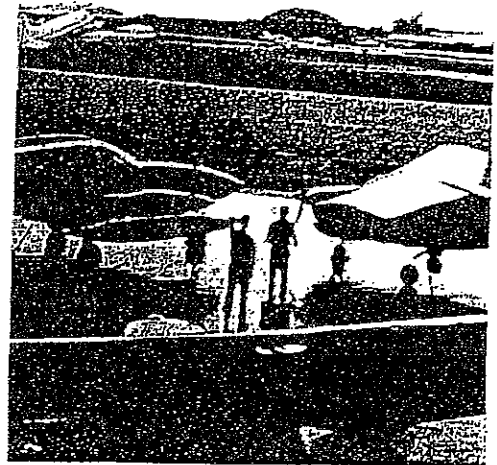
H.I. (ft): 5.680 ft.

Start Time: 9:38P

End Time: 10:19P

Time Zone: Eastern

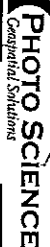
Operator: MAYMON



Comments

use for mission: 080424E-5/MS9

LIDAR MISSION RECORD SHEET



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Project Name	PA MAP 2008
Project Number	5355-019
Navigation File	STR0658W4

Pilot	YOUNG
Tech	MAYKON
Aircraft	N2448G

Date Flown	25 APR 08
Takeoff Time	1031A (airport) 1117
Landing Time	

Project's Scanning Requirements	
FOV (degrees):	45°
Scan Rate (Hz):	25.5
Pulse Rate (Hz):	53000
Ground Speed (kts):	120
Attenuation (OD) or Laser Current (%):	69%
Altitude AGL (ft):	6600
Range Gate (m):	-

Data Information	
IPAS File Name	20080425_162312
From/To	000 -> 037
LIDAR Unit #	Unit 2 (slr 059)
HD #	3

GPS Base Location(s)	SLR12TOWNS
PDOP Avoidance	1000-10304
Static or Flyover?	STATIC
Laser On Time & Off Times	22 1634A

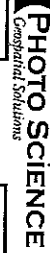
[080425A-3459]
N 2448G
SHEET 1 of 2

FILE	FL #	Alt. (AMSL)	Heading	Speed	Returns	Crab	Ground (airport)	Field Elev.	Temp. at Altitude
144600	904	6901	NE	120	100				10°C
145203	902	7001	SW	120	100				
145836	926	6951	SE	120	100				
151339	925	7601	SW	120	100				
151812	924	7351	NE	120	100				
152234	923	7001	SW	120	100				
152732	922	6901	NE	120	100				
153231	921	6901	SW	120	100				
154201	920	6851	NE	120	100				
154959	919	6901	SW	120	100				
155809	918	6901	NE	120	100				
160636	917	6901	SW	120	100				
161531	916	6951	NE	120	100				
162457	915	6951	SW	120	100				
163507	914	6951	NE	120	100				
164513	913	6951	SW	120	100				
165704	912	6951	NE	120	100				
170903	911	6951	SW	120	100				
172213	910	6951	NE	120	100				
173450	909	7001	SW	120	100				

NOTES	
Begin Temp	17°C
Begin Dewpoint	2°C
Begin Pressure	30.18
Mid Temp	21°C
Mid Dewpoint	-1°C
Mid Pressure	30.14
End Temp	
End Dewpoint	
End Pressure	

1

LIDAR MISSION RECORD SHEET



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Project Name: PA MAR 2008
 Project Number: 485-019
 Navigation File: 507 Roads Base

Pilot: Young
 Tech: Mark Young
 Aircraft: N2448G

Date Flown: 25 APRIL 08
 Takeoff Time: [redacted]
 Landing Time: 3:11 P
 [redacted] [redacted] [redacted]

Project's Scanning Requirements

FOV (degrees): 49
 Scan Rate (Hz): 25.5
 Pulse Rate (Hz): 53000
 Ground Speed (kts): 120

Attenuation (OD) or Laser Current (%): 69%
 Altitude AGL (ft): 6000
 Range Gate (m): -

Data Information

IPAS File Name: 20080425_162312
 From/To: 000 -> 037
 LIDAR Unit #: Unit 2 (S/n 059)
 HD #: 3

GPS Base Location(s): BURLINGTON
 PDOP Avoidance: 1000-1030A
 Static or Flyover?: STATIC
 Laser On Time & Off Times: 2:28P - 2:43P

080425A - 3/4 57
 N 2448G

Begin Temp	Ground (airport)	Field Elev.	Temp. at Altitude
Begin Dewpoint	/	/	/
Begin Pressure	/	/	/
Mid Temp	/	/	/
Mid Dewpoint	/	/	/
Mid Pressure	/	/	/
End Temp	23°C	ARB	394
End Dewpoint	4°C		9°
End Pressure	30.09		

FILE	FL #	Alt. (AMSL)	Heading	Speed	Returns	Grab	NOTES
174742	906	7001	NE	120	100		
180118	907	7001	SW	120	100		
181454	906	7001	NE	120	100		
182829	905	7001	SW	120	100		
184151	903	7151	NE	120	100		
184655	901	7201	SW	120	100		

2

Station Occupation Report For Airborne GPS

Project: PA MAP 2008 LIDAR

Location: LN7 BLAIRSTOWN, NJ AIRPORT Project Number: 5855-019

Completed by: MAYMON Date: 25 APRIL 08

Receiver: #4

Receiver Type: S700

Antenna Type: ZEPHYR GEODETIC

Station ID: BLAIRSTOWN 4

Start -- H.I. (m): 1.754 m

End -- H.I. (m): 1.754 m

H.I. (ft): 5.755 ft.

Start Time: 9:28A

End Time: 3:24P

Time Zone: Eastern

Operator: MAYMON



Comments

use for mission: 080425A-5/1 59

LIDAR MISSION RECORD SHEET



Project Name: PA MAP 2008
 Project Number: 5855-019
 Navigation File: SEGN5G60VE

Pilot: Mymon
 Tech: HARRIS
 Aircraft: N2448G

Date Flown: MAY 10th 2008
 Takeoff Time: 4:50
 Landing Time: 7:00
 (airport) SEG
 (airport) EST
 (airport) EST
 (airport) SEG

Project's Scanning Requirements

FOV (degrees):	45°	Attenuation(OD) or Laser Current(%):	70%
Scan Rate (Hz):	27.4	Altitude AGL (ft):	6600'
Pulse Rate (Hz):	56000	Range Gate (m):	-
Ground Speed (kts):	130 kts		

Data Information

IPAS File Name	2008510-224702
From/To	000 -> 018
LIDAR Unit #	Unit 2 (sln 059)
HD #	"3"

GPS Base Location(s): PENNPORT
 PDOP Avoidance: 4.0 → 4.0
 Static or Flyover?: STATION
 Laser On Time & Off Times: 5:20 → 6:50 p EST

080510B-SM59
 N2448G

	Ground	(airport)	Field Elev.	Temp at Altitude
Begin Temp	+17°			+02°
Begin Dewpoint	+04°	SEG	450'	
Begin Pressure	29.84			
Mid Temp				
Mid Dewpoint				
Mid Pressure				
End Temp	+18°			+02°
End Dewpoint	+05°	SEG	450'	
End Pressure	29.83			

FILE	FL #	ALT. (AMSL)	Heading	Speed	Returns	Crab	NOTES
030510-21105	107	7100'	SW	~130 kts	~100%	~11°	settle 6500' very windy, great visibility, smooth, NW winds (flume NE end?)
030510-212340	109	7050'	NE	~130 kts	~100%	~12°	" " " " " " " "
080510-213746	110	7100'	SW	~130 kts	~100%	~10°	" " " " " " " "
080510-215352	123	7300'	NE	~130 kts	~100%	~10°	" " " " " " " "
080510-220505	124	7250'	SW	~130 kts	~100%	~10°	" " " " " " " "
080510-221420	125	7350'	NE	~130 kts	~100%	~10°	skc, good visibility, smooth, NW winds
080510-222345	126	7250'	SW	~130 kts	~100%	~10°	" " " " " " " "
080510-223121	127	7500'	NE	~130 kts	~100%	~10°	" " " " " " " "
080510-223859	128	7400'	SW	~130 kts	~100%	~9°	" " " " " " " "
080510-224424	129	7350'	NE	~130 kts	~100%	~10°	skc - haze, smooth, NW windy
080510-224944	130	7250'	SW	~130 kts	~100%	~9°	" " " " " " " "

Station Occupation Report For Airborne GPS

Project: PA MAP 2008 LIDAR

Location: SEUNSGROVE, PA AIRPORT Project Number: 5855-019

Completed by: PNH Date: MAY 10th 2008

Receiver: "1" (SN 1083)

Receiver Type: TRIMBLE 5700

Antenna Type: ZEPHYR GEODETIC

Station ID: PENNPORST

Start -- H.I. (m): 1.698m

End -- H.I. (m): 1.698m

H.I. (ft): 5.57 ft.

Start Time: ~ 4:25p

End Time: ~ 7:15p

Time Zone: EDT

Operator: PNH



Comments

use for mission 080510B



FUGRO EARTHDATA, INC.

Lift	Airport	Chocks Out	Airport	Chocks In	Duration	4.6 Hrs.	Ramp	Activity
1	KRDG	14:50	KRDG	19:29	4:39	4.6		Production
2								
3								
4								

Earthdata Lidar Flightlog

Earthdata Job # E08-0037		Client's Job #		Lidar S/N #39		Mode 4+3		IMU Start 14:53		Shipping Track Number		Operator Gabriella Juarez		Wx.	Start	End		
Project Name PA MAP LIDAR READING				IMU S/N 56014219		AGC # 1 & # 2 12/3		IMU Stop 19:27		Airport ID KRDG		Pilot Jack Finn		GND Temp	9 C	15 C		
Mission ID (DaySensorJobLift) 1063908003701				AMT 8,200.00		Range Gate 5866-9055		Laser Pulse Rate 93,900		Base GPS Receiver ID		Aircraft N806CP	FMS ASCOT	Alt Temp	-8 C	-8 C		
Date 15- Apr- 08		GPS Date 08-106		UTC Offset EDT -4		Flight Plan		Laser % 100	H.D. # LD146-03	Download "Firewire"		Base Point ID KRDG		Base GPS Ant. Ht. 2.000		UTM Zone	Altm Setting 30.22	30.15
EDA Line #	Direction	From WPT	To WPT	Beginning GPS Time	Ending GPS Time	FOV	Scan Rate	Speed (Kts)	Comments / Conditions			SVs	VDOP	HDOP				
1	089	1	21	151903	1524	42	35.0	168				10	1.4					
2	269	24	1	152915	1536	42	35.0	169				11	1.4					
3	089	1	27	154045	1548	42	35.0	161				11	1.5					
4	269	30	1	155339	1602	42	35.0	166				10	1.5					
5	089	1	32	160624	1615	42	35.0	155				10	1.5					
6	269	35	1	162032	1630	42	35.0	167				10	1.5					
7	089	1	38	163516	1646	42	35.0	163				10	1.4					
8	269	41	1	165042	1702	42	35.0	169				10	1.4					
9	089	1	44	170621	1719	42	35.0	155	LIGHT TURBULENCE			11	1.3					
10	269	47	1	172424	1738	42	35.0	158	LIGHT TURBULENCE			10	1.5					
11	089	1	48	174219	1756	42	35.0	158	LIGHT TURBULENCE			11	1.3					
12	269	49	1	180102	1815	42	35.0	151	LIGHT TO MODERATE TURBULENCE			11	1.5					
1	046	24	1	182133	1828	42	35.0	156	LIGHT TO MODERATE TURBULENCE			10	1.7					
5	180	1	20	183359	1839	42	35.0	169	LIGHT TO MODERATE TURBULENCE			10	1.6					
3	360	15	1	184818	1852	42	35.0	155	LIGHT TO MODERATE TURBULENCE			11	1.4					
4	293	26	1	185918	1907	42	35.0	157	LIGHT TO MODERATE TURBULENCE			11	1.3					



FUGRO EARTHDATA, INC.

Lift	Airport	Checks Out	Airport	Checks In	Duration	5.8 Hrs.	Ramp	Activity
1	KHZL	13:15	KHZL	19:05	5:50	5.8		Production
2								
3								
4								

Earthdata Lidar Flightlog

Earthdata Job # E08-0037		Client's Job #		Lidar S/N #39		Mode 4+3		IMU Start 13:17		Shipping Track Number		Operator Gabriella Juarez		Wx.	Start	End	
Project Name PA MAP LIDAR HAZELTON				IMU S/N 56014219		AGC # 1 & # 2 12/3		IMU Stop 19:04		Airport ID KHZL		Pilot Jack Finn		GND Temp	17 C	27 C	
Mission ID (DaySensorJobLift) 10939E08003701				AMT 8,200.00		Range Gate 5866-9055		Laser Pulse Rate 93,900		Base GPS Receiver ID		Aircraft N806CP	FMS ASCOT	Alt Temp	9 C	9 C	
Date 18-Apr-08		GPS Date 08-109		UTC Offset EDT -4		Flight Plan		Laser % 100	H.D. # LD146-03	Download "Firewire"		Base Point ID KHZL	Base GPS Ant. Ht. 2.000	UTM Zone	AltM Setting	30.06	30.06
EDA Line #	Direction	From WPT	To WPT	Beginning GPS Time	Ending GPS Time	FOV	Scan Rate	Speed (Kts)	Comments / Conditions			SVs	VDOP	HDOP			
1	242	6	1	134407	1346	42	35.0	155				11	1.5				
2	062	1	7	134919	1351	42	35.0	162				11	1.5				
3	242	10	1	135502	1358	42	35.0	145				11	1.5				
4	062	1	11	140116	1404	42	35.0	158				11	1.5				
5	242	14	1	140818	1412	42	35.0	166				11	1.4				
6	062	1	14	141532	1419	42	35.0	158				11	1.4				
7	242	15	1	142251	1427	42	35.0	163				11	2.0				
8	062	1	14	143019	1434	42	35.0	165				12	1.2				
9	242	15	1	143751	1442	42	35.0	162				11	1.4				
10	062	1	14	144511	1449	42	35.0	159				11	1.3				
11	242	15	1	145313	1457	42	35.0	163				10	1.3				
12	062	1	16	150106	1505	42	35.0	168				10	1.4				
13	242	18	1	150950	1515	42	35.0	160				10	1.4				
14	062	1	20	151823	1524	42	35.0	169				11	1.4				
15	242	22	1	152758	1534	42	35.0	157				11	1.5				
16	063	1	27	153841	1546	42	35.0	153				11	1.5				
17	242	29	1	155013	1558	42	35.0	160				10	1.5				
18	062	1	29	160123	1611	42	35.0	168				10	1.5				
19	243	29	1	161424	1623	42	35.0	158				10	1.4				
20	062	1	30	162813	1636	42	35.0	161				10	1.4				
21	243	30	1	164037	1649	42	35.0	155				10	1.4				
2	002	25	1	165436	1702	42	35.0	166	X TIE LINE			11	1.3				
3	132	1	17	170535	1710	42	35.0	170	X TIE LINE			10	1.5				
4	126	27	1	171645	1724	42	35.0	170	X TIE LINE			11	1.3				
1	304	28	1	173209	1740	42	35.0	150	X TIE LINE / LIGHT TURBULENCE			11	1.3				
22	063	1	29	174605	1754	42	35.0	155				11	1.6				
23	243	29	1	175803	1806	42	35.0	163				10	1.7				
24	063	1	30	181106	1820	42	35.0	160	LIGHT TURBULENCE			10	1.7				
25	243	29	1	182341	1832	42	35.0	158	LIGHT TURBULENCE			11	1.6				
26	063	1	29	183603	1845	42	35.0	164	LIGHT TO MODERATE TURBULENCE			11	1.4				

Project: 59405 PAMAP Doylestown Block
Aircraft: N369MA - Navajo Chieftan
Crew: Jay & Sean D.

Sensor: ALS50 - SN037

PASS	Line#	Flight	AIRSPEED	AGL	AMSL	AMSL	FOV	SCAN RATE	Pulse Rate	ATTEN	R+I	MISSION ID	Notes
#		Direction	kts	Feet	feet	Meters	degrees	Hz	Hz	Setting	MODE	Date_MissionID	> New Encoder Settings
1	1114	SW	130	6000	6100	1820	45	27	52000	0.3	4+3	080330_181757	
2	1113	NE	130	6000	6100	1820	45	27	52000	0.3	4+3	080330_183350	offline, reflow 041808
3	1112	SW	130	6000	6100	1820	45	27	52000	0.3	4+3	080330_184806	
4	1111	NE	130	6000	6100	1820	45	27	52000	0.3	4+3	080330_190159	
5	1110	SW	130	6000	6100	1820	45	27	52000	0.3	4+3	080330_191542	
6	1109	NE	130	6000	6100	1820	45	27	52000	0.3	4+3	080330_192857	
7	1108	SW	130	6000	6100	1820	45	27	52000	0.3	4+3	080330_194056	
8	1107	NE	130	6000	6100	1820	45	27	52000	0.3	4+3	080330_195254	
9	1106	SW	130	6000	6100	1820	45	27	52000	0.3	4+3	080330_200343	
10	1105	NE	130	6000	6100	1820	45	27	52000	0.3	4+3	080330_201330	
11	1104	SW	130	6000	6100	1820	45	27	52000	0.3	4+3	080330_202157	
12	1103	NE	130	6000	6100	1820	45	27	52000	0.3	4+3	080330_202901	
13	1102	SW	130	6000	6100	1820	45	27	52000	0.3	4+3	080330_203455	
14	1101	NE	130	6000	6100	1820	45	27	52000	0.3	4+3	080330_203934	
15	1115	NE	130	6000	6100	1820	45	27	52000	0.3	4+3	080330_205310	
16	1116	SW	130	6000	6100	1820	45	27	52000	0.3	4+3	080330_210725	
17	1117	NE	130	6000	6100	1820	45	27	52000	0.3	4+3	080330_212152	
18	1153	E	130	5900	5900	1800	45	28	52000	0.3	4+3	080417_214352	Aeroplan/Flight Plan Altered
19	1152	W	130	5900	5900	1800	45	28	52000	0.3	4+3	080417_220303	for lines 1118-1154.
20	1151	E	130	5900	5900	1800	45	28	52000	0.3	4+3	080417_222117	
21	1150	W	130	5900	5900	1800	45	28	52000	0.3	4+3	080417_224004	New Datalogger for Lines 1118-1154
22	1149	E	130	5900	5900	1800	45	28	52000	0.3	4+3	080417_225930	
23	1148	W	130	5900	5900	1800	45	28	52000	0.3	4+3	080417_231937	Old DL - 16MB files
24	1147	E	130	5900	5900	1800	45	28	52000	0.3	4+3	080417_233846	New DL - 32MB files
22	1146	W	130	5900	5900	1800	45	28	52000	0.3	4+3	080417_235831	
23	1145	E	130	5900	5900	1800	45	28	52000	0.3	4+3	080418_001609	
24	1144	W	130	5900	5900	1800	45	28	52000	0.3	4+3	080418_003328	
25	1143	E	130	5900	5900	1800	45	28	52000	0.3	4+3	080418_005121	refly final 14 miles
26	1143	E	130	5900	5900	1800	45	28	52000	0.3	4+3	080418_015740	
27	1142	W	130	5900	5900	1800	45	28	52000	0.3	4+3	080418_020914	
28	1141	E	130	5900	5900	1800	45	28	52000	0.3	4+3	080418_022454	
29	1140	W	130	5900	5900	1800	45	28	52000	0.3	4+3	080418_024058	
30	1139	E	130	5900	5900	1800	45	28	52000	0.3	4+3	080418_025556	
31	1138	W	130	5900	5900	1800	45	28	52000	0.3	4+3	080418_031001	
32	1137	E	130	5900	5900	1800	45	28	52000	0.3	4+3	080418_032407	
33	1136	W	130	5900	5900	1800	45	28	52000	0.3	4+3	080418_033637	
34	1135	E	130	5900	5900	1800	45	28	52000	0.3	4+3	080418_034810	
35	1134	W	130	5900	5900	1800	45	28	52000	0.3	4+3	080418_035948	
36	1133	E	130	5900	5900	1800	45	28	52000	0.3	4+3	080418_041054	
37	1132	W	130	5900	5900	1800	45	28	52000	0.3	4+3	080418_042130	
38	1131	E	130	5900	5900	1800	45	28	52000	0.3	4+3	080418_043233	
39	1130	W	130	5900	5900	1800	45	28	52000	0.3	4+3	080418_044141	
40	1129	E	130	5900	5900	1800	45	28	52000	0.3	4+3	080418_045038	
41	1128	W	130	5900	5900	1800	45	28	52000	0.3	4+3	080418_050009	
42	1127	W	130	5900	5900	1800	45	28	52000	0.3	4+3	080418_050626	
43	1126	E	130	5900	5900	1800	45	28	52000	0.3	4+3	080418_051239	
44	1125	E	130	5900	5900	1800	45	28	52000	0.3	4+3	080418_201141	
45	1124	W	130	5900	5900	1800	45	28	52000	0.3	4+3	080418_201755	
46	1123	E	130	5900	5900	1800	45	28	52000	0.3	4+3	080418_202336	
47	1122	W	130	5900	5900	1800	45	28	52000	0.3	4+3	080418_202936	
48	1121	E	130	5900	5900	1800	45	28	52000	0.3	4+3	080418_203454	
49	1120	W	130	5900	5900	1800	45	28	52000	0.3	4+3	080418_204013	
50	1119	E	130	5900	5900	1800	45	28	52000	0.3	4+3	080418_204409	
51	1118	W	130	5900	5900	1800	45	28	52000	0.3	4+3	080418_204751	
52	1154	S	130	5900	5900	1800	45	28	52000	0.3	4+3	080418_205353	no access into Class B airspace
53	1113	NE	130	6100	6100	1800	45	28	52000	0.3	4+3	080418_211612	