REGION 11

Cagayan Flood Plain:

DREAM LiDAR Data Acquistion and Processing Report

TRAINING CENTER FOR APPLIED GEODESY AND PHOTOGRAMMETRY

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Abbreviations

ALTM	Airborne Laser Terrain Mapper
DAC	Data Acquisition Component
DEM	Digital Elevation Model
DSM	Digital Surface Model
DTM	Digital Terrain Model
DVC	Data Validation Component
FOV	Field of View
FTP	File Transfer Protocol
GPS	Global Positioning System
GNSS	Global Navigation Satellite System
POS	Position Orientation System
PRF	Pulse Repetition Frequency
NAMRIA	National Mapping and Resource Information Authority

Introduction

Introduction

1.1 About the DREAM Program

The UP Training Center for Applied Geodesy and Photogrammetry (UP TCAGP) conducts a research program entitled "Nationwide Disaster Risk and Exposure Assessment for Mitigation (DREAM) Program" funded by the Department of Science and Technology (DOST) Grants-in-Aid Program. The DREAM Program aims to produce detailed, up-to-date, national elevation dataset for 3D flood and hazard mapping to address disaster risk reduction and mitigation in the country.

The DREAM Program consists of four components that operationalize the various stages of implementation. The Data Acquisition Component (DAC) conducts aerial surveys to collect Light Detecting and Ranging (LiDAR) data and aerial images in major river basins and priority areas. The Data Validation Component (DVC) implements ground surveys to validate acquired LiDAR data, along with bathymetric measurements to gather river discharge data. The Data Processing Component (DPC) processes and compiles all data generated by the DAC and DVC. Finally, the Flood Modeling Component (FMC) utilizes compiled data for flood modeling and simulation.

Overall, the target output is a national elevation dataset suitable for 1:5000 scale mapping, with 50 centimeter horizontal and vertical accuracies. These accuracies are achieved through the use of state-of-the-art airborne Light Detection and Ranging (LiDAR) technology and appended with Synthetic-aperture radar (SAR) in some areas. It collects point cloud data at a rate of 100,000 to 500,000 points per second, and is capable of collecting elevation data at a rate of 300 to 400 square kilometers per day, per sensor.

1.2 Objectives and Target Outputs

The program aims to achieve the following objectives:

a) To acquire a national elevation and resource dataset at sufficient resolution to produce information necessary to support the different phases of disaster management;

b) To operationalize the development of flood hazard models that would produce updated and detailed flood hazard maps for the major river systems in the country;

c) To develop the capacity to process, produce and analyze various proven and potential thematic map layers from the 3D data useful for government agencies;

d) To transfer product development technologies to government agencies with geospatial information requirements, and;

e) To generate the following outputs:

1) flood hazard map
2) digital surface model
3) digital terrain model and
4) orthophotograph

1.3 General Methodological Framework

The methodology employed to accomplish the project's expected outputs are subdivided into four (4) major components, as shown in Figure 1. Each component is described in detail in the following sections.

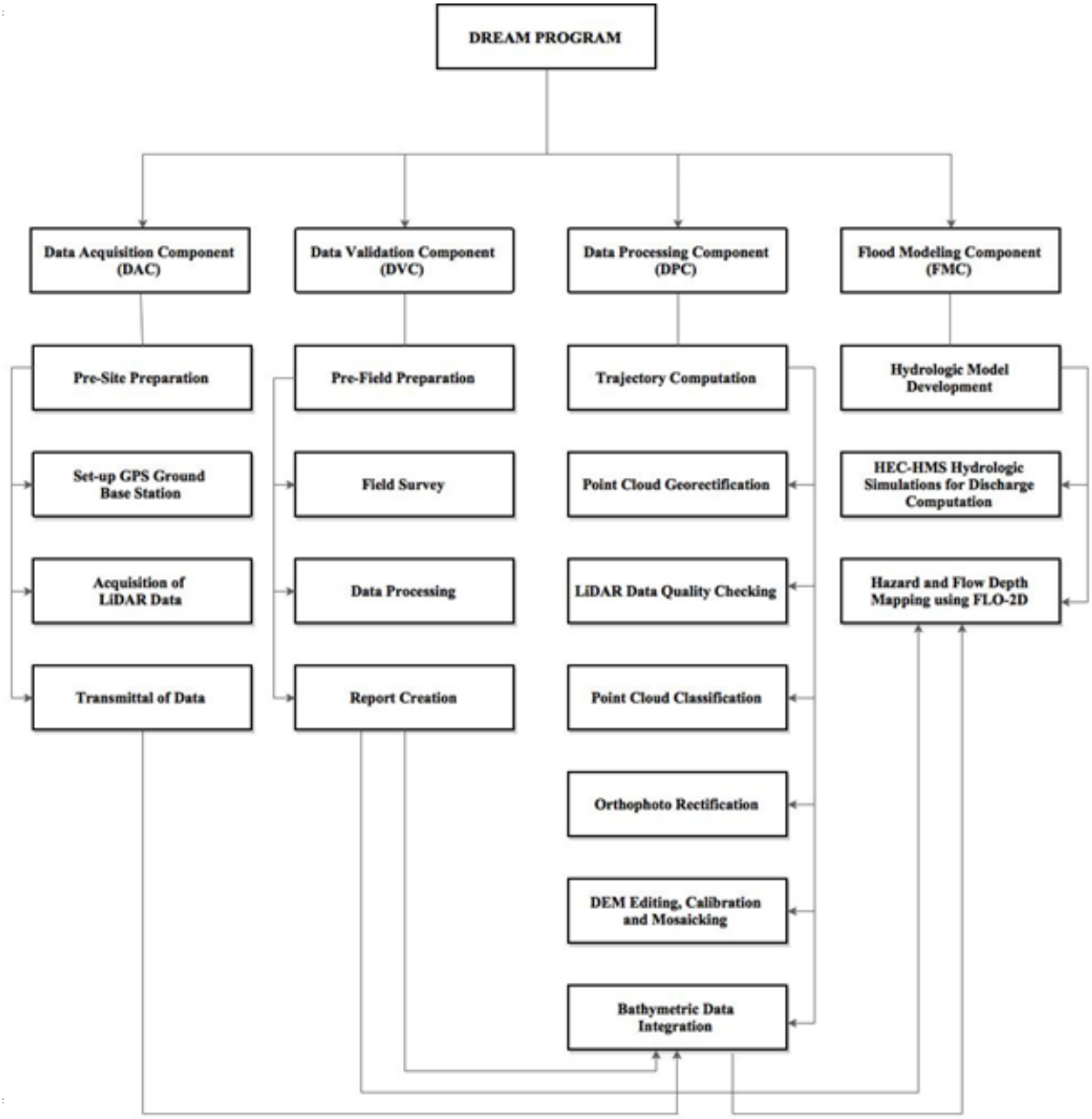

Figure 1. The General Methodological Framework of the Program

Study Area

Study Area

The Cagayan River Basin is located in the north eastern part of Luzon. The Cagayan River Basin is considered as the largest river catchment in the Philippines with an area of 25,649 square kilometres. The location of Cagayan River Basin is as shown in Figure 2.

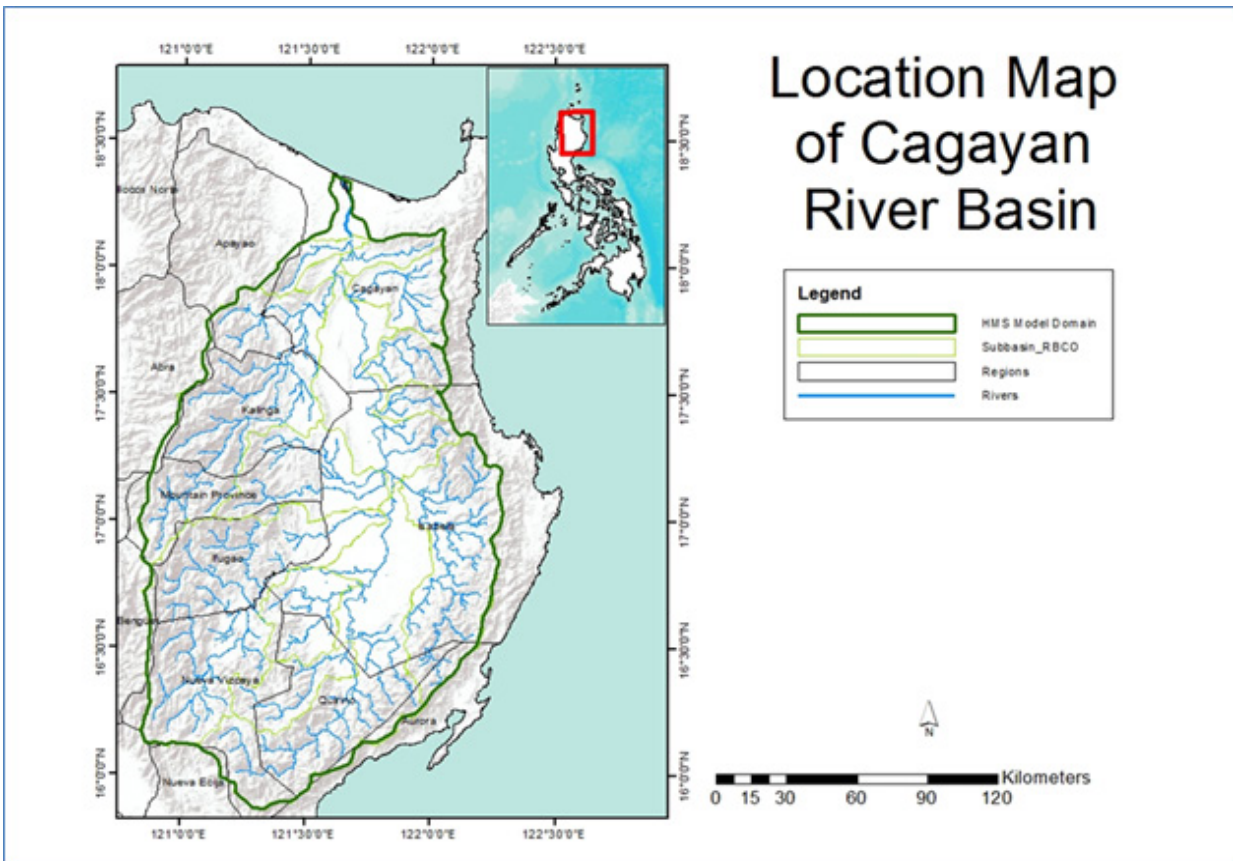

Figure 2. Cagayan River Basin Location Map

It is characterized by a valley oriented north to south. The valley is bounded on the east by the Sierra Madre Mountains, on the west by the Cordillera Mountains, on the south by the Caraballo Mountains, and on the north by the coastline of the Babuyan Channel. The basin covers the provinces Quirino, Nueva Vizcaya, Ifugao, Mountain Province, Kalinga, Apayao, Isabela, and Cagayan.

It drains the northern portion of the island and traverses through Tuguegarao City and Cauayan City and the towns of Natipunan and Maddela in Quirino; San Mateo in Ifugao; San Agustin, Jones, Echague, Angadanan, Naguilian, San Mariano, Gamu, Benito Soliven and Ilagan, Tumauini, Santo, Tomas, Cabagan, Santa Maria and San Pablo in Isabela; and, Enrile, Solana, Iguig, Samulung, Alcala, Santo Niño, Gattaran, Lasam, Lal-lo, Camalaniugan and Aparri in Cagayan.

The average annual rainfall ranges from 1,000 millimeters in the northern part up to 3,000 millimeters in the southern mountains. Floods caused by the Cagayan River flow slowly because of surface retention over the floodplain. Cagayan Valley is relatively flat and basin coverage has a gentle slope. Also, there are retardations of flooding due to several river meanders and gorges.

Study Area

The land and soil characteristics are important parameters used in assigning the roughness coefficient for different areas within the river basin. The roughness coefficient, also called Manning's coefficient, represents the variable flow of water in different land covers (i.e. rougher, restricted flow within vegetated areas, smoother flow within channels and fluvial environments).

The shape files of the soil and land cover were taken from the Bureau of Soils, which is under the Department of Environment and Natural Resources Management, and National Mapping and Resource Information Authority (NAMRIA). The soil and land cover of the Cagayan River Basin are shown in Figure 3 and Figure 4, respectively.

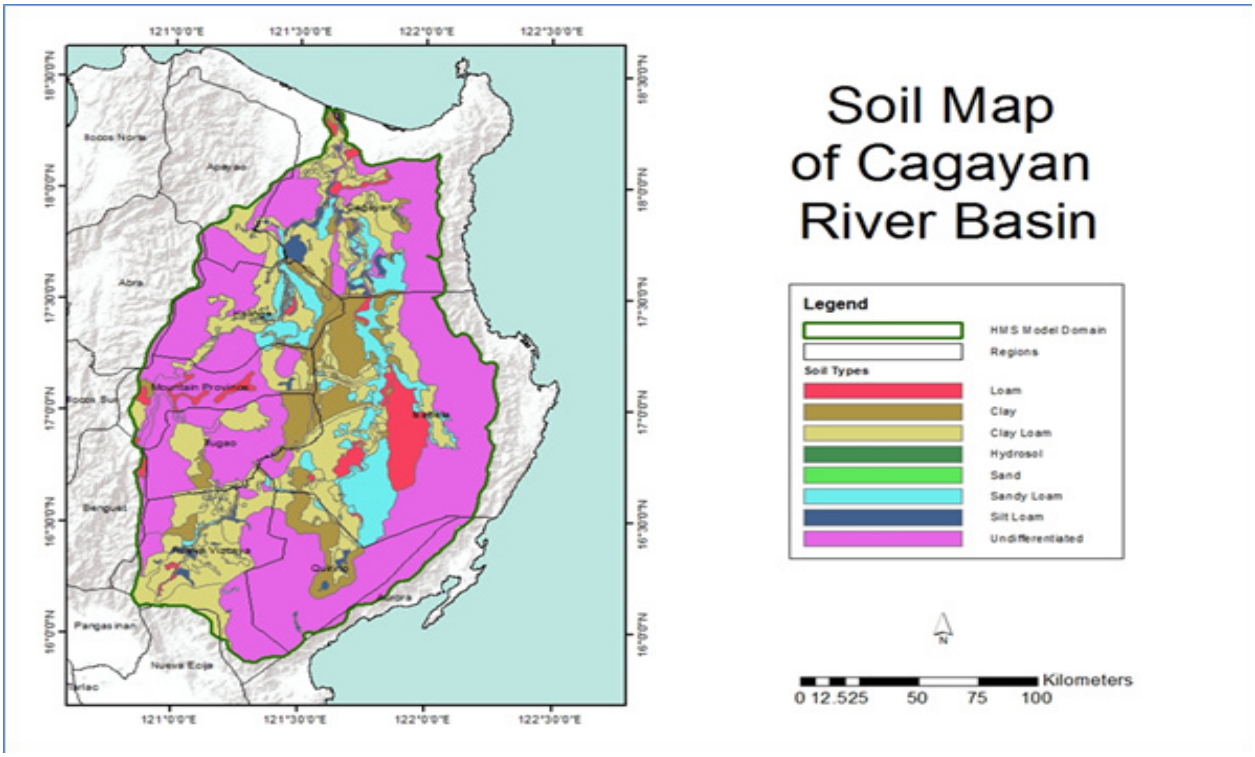

Figure 3. Cagayan River Basin Soil Map

Study Area

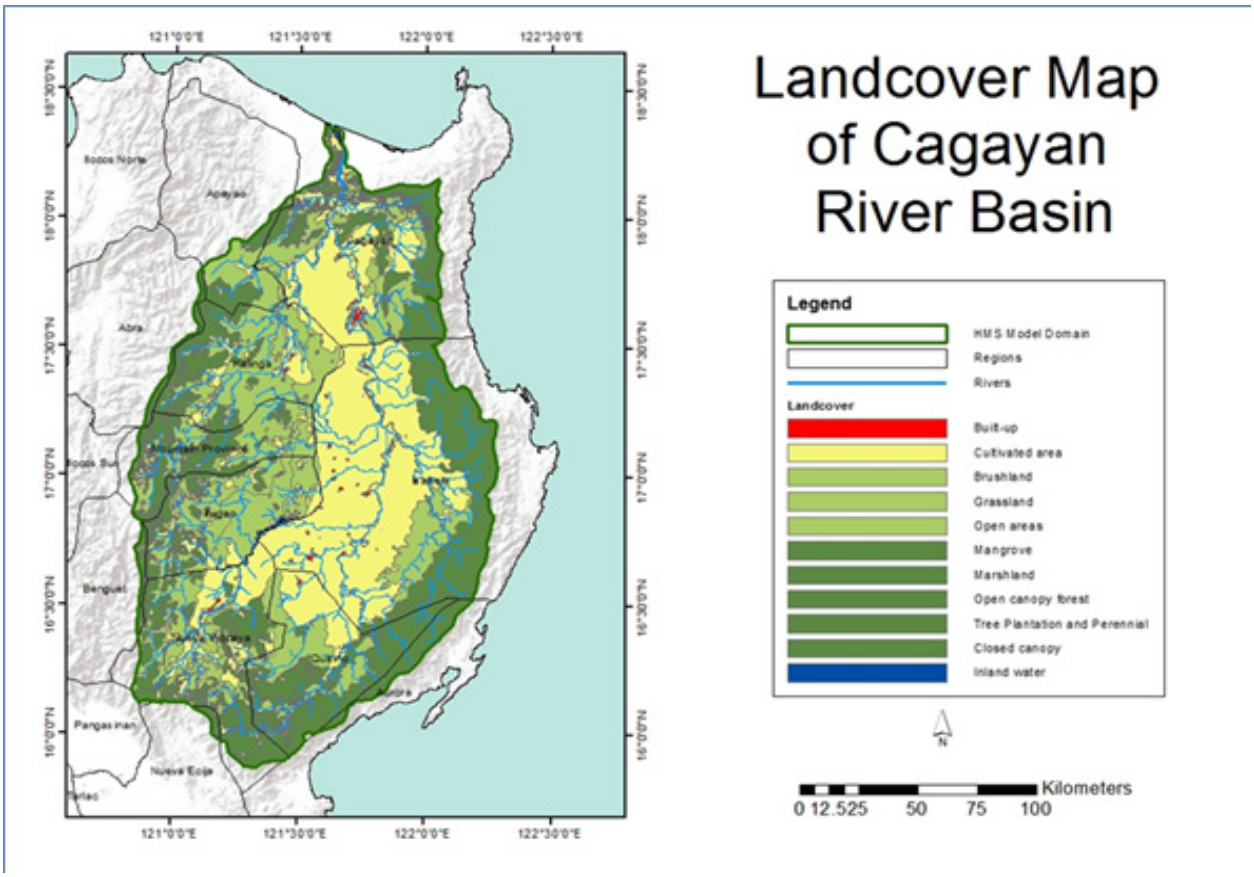

Figure 4. Cagayan River Basin Land Cover Map

Methodology

Methodology

3.1 Acquisition Methodology

The methodology employed to accomplish the project's expected outputs are subdivided into four (4) major components, as shown in Figure 5. Each component is described in detail in the following sections.

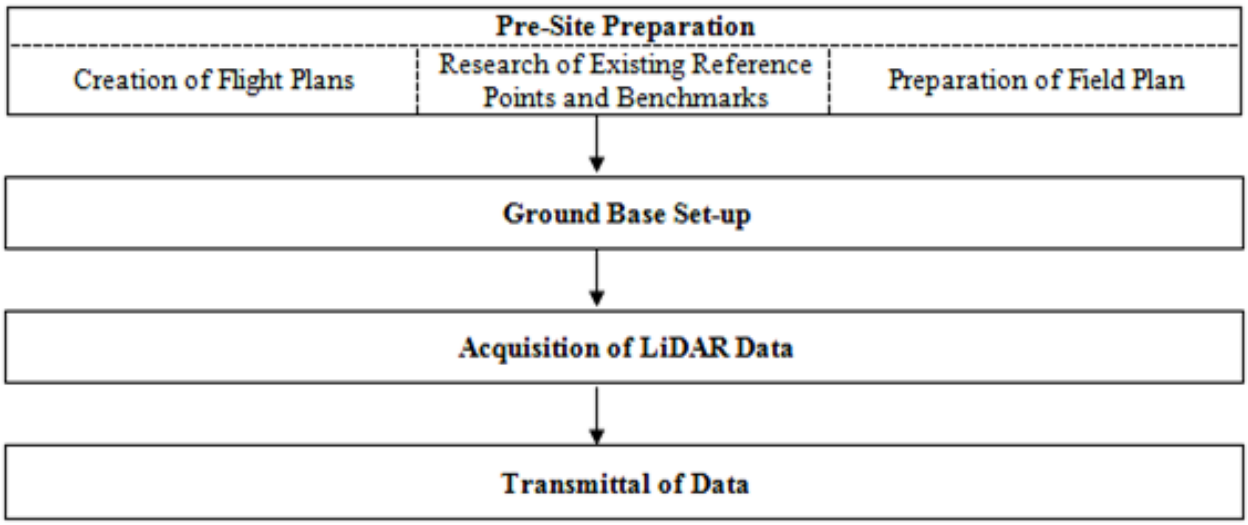

Figure 5. Flowchart of Project Methodology

3.1.1 Pre-site Preparations

3.1.1.1 Creation of Flight Plans

Flight planning is the process of configuring the parameters of the aircraft and LiDAR technology (i.e., altitude, angular field of view (FOV)), speed of the aircraft, scans frequency and pulse repetition frequency) to achieve a target of two points per square meter point density for the floodplain. This ensures that areas of the floodplain that are most susceptible to floods will be covered. LiDAR parameters and their computations are shown in Table 1.

The parameters set in the LiDAR sensor to optimize the area coverage following the objectives of the project and to ensure the aircraft's safe return to the airport (base of operations) are shown in Table 1. Each flight acquisition is designed for four operational hours. The maximum flying hours for Cessna 206H is five hours.

Methodology

Table 1. Relevant LiDAR parameters

Parameter		Formula	Description
SW (Swath Width)		SW = 2 * H * tan (θ/2)	H – altitude Θ – angular FOV
Pointing Space	ΔXacross	ΔXacross = (Θ * H) / (Ncos2(Θ/2))	ΔXacross – point spacing across the flight line H – altitude Θ – angular FOV N – number of points in one scanning line
	ΔXalong	ΔXalong = v / fsc	ΔXalong- point spacing along the flight line v – forward speed (m/s) fsc – scanning rate or scan frequency
Point density, dmin		dmin = 1 / (ΔXacross * ΔXalong)	ΔXacross, ΔXalong point spacings
Flight line separation, e		e = SW * (1 – overlapping factor)	SW – swath width
# of flight lines, n		n = w / [(1 – overlap) * SW]	w-width of the map that will be produce in meters. The direction of flights will be perpendicular to the width.

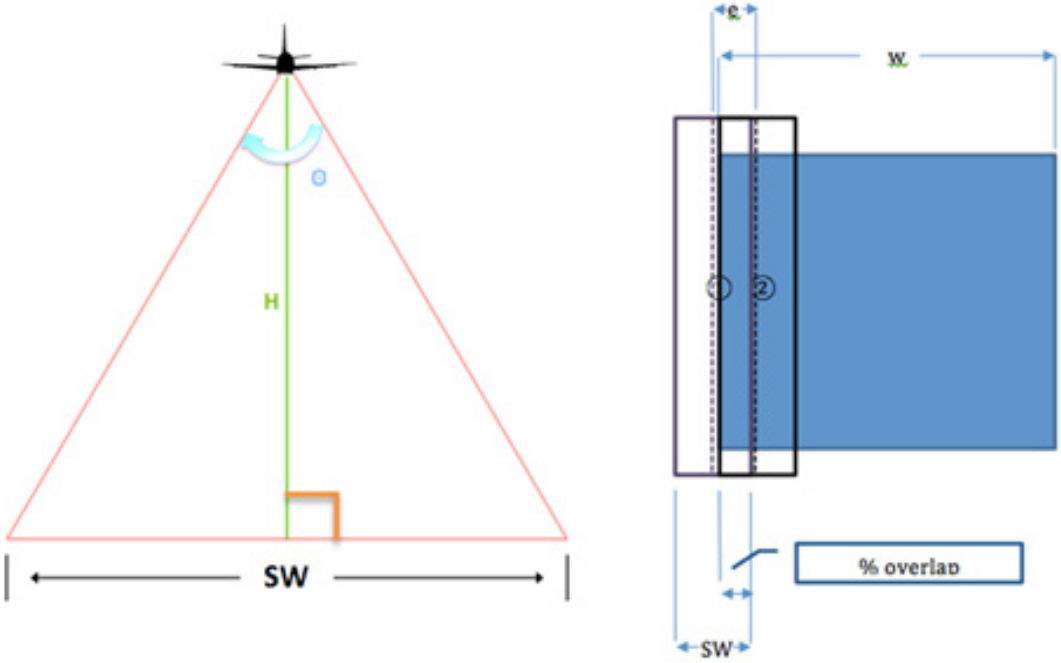

Figure 6. Concept of LiDAR data acquisition parameters

The relationship among altitude, swath, and FOV is show in Figure 6. Given the altitude of the survey (H) and the angular FOV, the survey coverage for each pass (swath) can be calculated by doubling the product of altitude and tangent of half the field of view.

3.1.1.2 Collection of Existing Reference Points and Benchmarks

Collection of pertinent technical data, available information, and coordination with the National Mapping and Resource Information Authority (NAMRIA) is conducted prior to the surveys. Reference data collected includes locations and descriptions of horizontal and vertical control (elevation benchmarks) points within or near the project area. These control points are used as base stations for the aerial survey operations. Base stations are observed simultaneously with the acquisition flights.

3.1.1.3 Preparation of Field Plan

In preparation for the field reconnaissance and actual LiDAR data acquisition, a field plan is prepared by the implementation team. The field plan serves as a guide for the actual fieldwork and included personnel, logistical, financial, and technical details. Three major factors are included in field plan preparation: priority areas for the major river basin system; budget; and accommodation and vehicle rental.

LiDAR data are acquired for the floodplain area of the river system as per order of priority based on history of flooding, loss of lives, and damages of property. The order of priority in which LiDAR data surveys are conducted by the team for the floodplain areas of the 18 major river systems and 3 additional systems is shown in Table 2.

Methodology

Table 2. List of Target River Systems in the Philippines

	Target River System	Location	Area of the River System (km^2)	Area of the Flood Plain (km^2)	Area of the Watershed (km^2)
1	Cagayan de Oro	Mindanao	1,364	25	1,338.51
1.1	Iponan	Mindanao	438	33	404.65
2	Mandulog	Mindanao	714	7	707.41
2.1	Iligan	Mindanao	153	7	146.38
2.2	Agus	Mindanao	1,918	16	1,901.60
3	Pampanga	Luzon	11,160	4458	6702
4	Agno	Luzon	6,220	1725	4495
5	Bicol	Luzon	3,173	585	2,587.79
6	Panay	Visayas	2,442	619	1823
7	Jalaur	Visayas	2,105	713	1,392
8	Ilog Hilbangan	Visayas	2,146	179	1967
9	Magasawang Tubig	Luzon	1,960	483	1,477.08
10	Agusan	Mindanao	11,814	262	11,551.62
11	Tagoloan	Mindanao	1,753	30	1,722.90
12	Davao	Mindanao	1,609	54	1555
13	Tagum	Mindanao	2,504	595	1,909.23
14	Buayan	Mindanao	1,589	201	1,388.21
15	Mindanao	Mindanao	20,963	405	20,557.53
16	Lucena	Luzon	238	49	189.31
17	Cagayan	Luzon	1,029	90	938.61
18	Boracay	Visayas	43.34	43.34	N/A
19	Cagayan	Luzon	28,221	10386	17,835.14

3.1.2 Ground Base Set-up

A reconnaissance is conducted one day before the actual LiDAR survey for purposes of recovering control point monuments on the ground and site visits of the survey area set in the flight plan for the floodplain. Coordination meetings with the Airport Manager, regional DOST office, local government units and other concerned line government agencies are also held.

Ground base stations are established within 30-kilometer radius of the corresponding survey area in the flight plan. This enables the system to establish its position in three-dimensional (3D) space so that the acquired topographic data will have an accurate 3D position since the survey required simultaneous observation with a base station on the ground using terrestrial Global Navigation Satellite System (GNSS) receivers.

3.1.3 Acquisition of Digital Elevation Data (LiDAR Survey)

Acquisition of LiDAR data is done by following the flight plans. The survey uses a LiDAR instrument mounted on the aircraft with its sensor positioned through a specially modified peep hole on the belly of the aircraft. The pilots are guided by the flight guidance software which uses the data out of the flight planning program with a mini-display at the pilot's cockpit showing the aircraft's real-time position relative to the current survey flight line. The reference points established by NAMRIA are also monitored and used to calibrate the data.

As the system collected LiDAR data, ranges and intensities are recorded on hard drives dedicated to the system while the images are stored on the camera hard drive. Position Orientation System (POS) data is recorded on the POS computer inside the control rack. It can only be accessed and downloaded via file transfer protocol (ftp) to the laptop computer. GPS observations were downloaded each day for efficient data management.

3.1.4 Transmittal of Acquired LiDAR Data

All data surrendered are monitored, inspected and re-checked by securing a data transfer checklist signed by the downloader (Data Acquisition Component) and the receiver (Data Processing Component). The data transfer checklist shall include the following: date of survey, mission name, flight number, disk size of the necessary data (LAS, LOGS, POS, Images, Mission Log File, Range, Digitizer and the Base Station), and the data directory within the server. Figure 7 shows the arrangement of folders inside the data server.

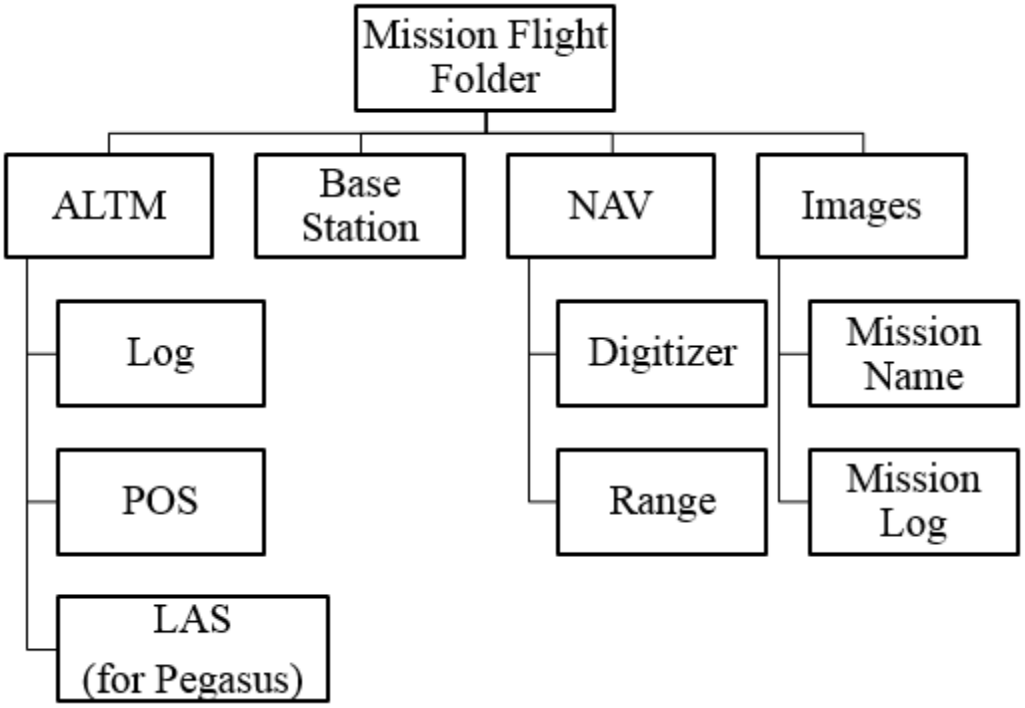

Figure 7. LiDAR Data Management for transmittal

3.1.5 Equipment (ALTM Pegasus and ALTM Gemini)

The ALTM Pegasus (Optech, Inc) is a laser based system suitable for topographic survey (Figure 8). It has a dual output laser system for maximum density capability. The LiDAR system is equipped with an Inertial Measurement Unit (IMU) and GPS for geo-referencing of the acquired data (Annex A contains the technical specification of the system).

The camera of the Pegasus sensor is tightly integrated with the system. It has a foot-print of 8,900 pixels across by 6,700 pixels along the flight line (Annex B contains the technical specification of the D-8900 aerial digital camera).

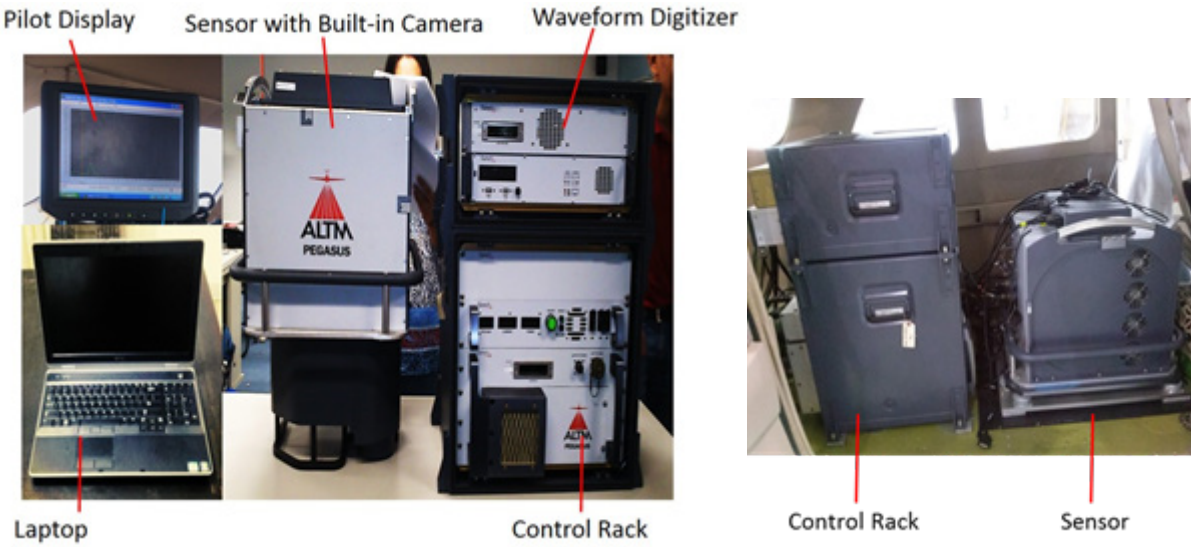

Figure 8. The ALTM Pegasus System: a) parts of the Pegasus system, b) the system as installed in Cessna T206H

The ALTM Gemini is a laser based system suitable for topographic survey especially in high altitude areas with 16 kHz of effective laser rate (Figure 9). It has integrated camera and waveform digitizer (Annex B).

The camera of the Pegasus and Gemini sensor is tightly integrated with the system. It has a footprint of 8,900 pixels across by 6,700 pixels along the flight line (Annex C).

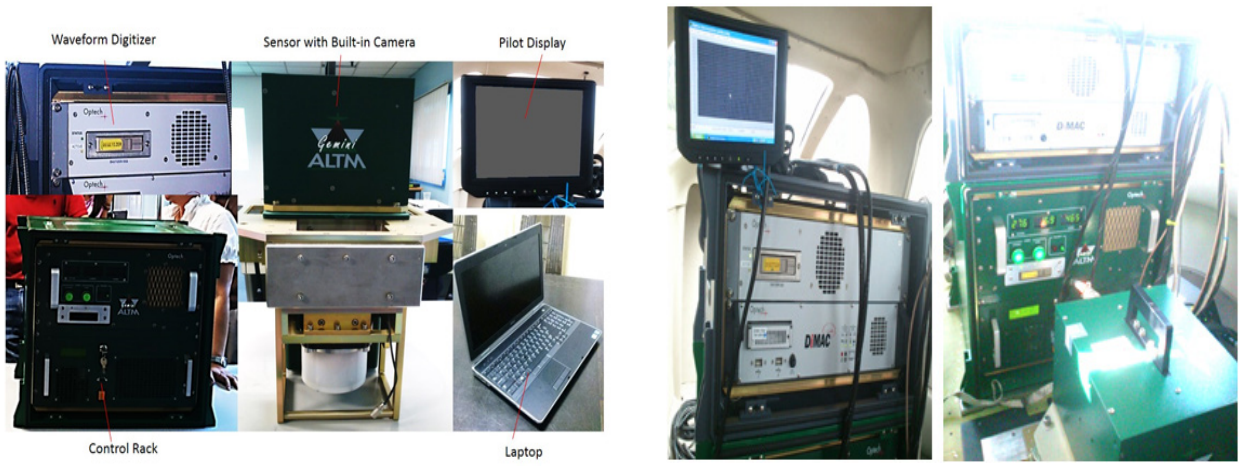

Figure 9. Concept of LiDAR data acquisition parameters

3.2 Processing Methodology

The schematic diagram of the workflow implemented by the Data Processing Component (DPC) is shown in Figure 10. The raw data collected by the Data Acquisition Component (DAC) is transferred to DPC. Pre-processing of this data starts with the computation of trajectory and georectification of point cloud, in which the coordinates of the LiDAR point cloud data are adjusted and checked for gaps and shifts, using POSPac, LMS, LAStools and Quick Terrain (QT) Modeler software.

The unclassified LiDAR data then undergoes point cloud classification, which allows cleaning of noise data that are not necessary for further processing, using TerraScan software. The classified point cloud data in ASCII format is used to generate a data elevation model (DEM), which is edited and calibrated with the use of validation and bathymetric survey data collected from the field by the Data Validation and Bathymetry Component (DVBC). The final DEM is then used by the Flood Modeling Component (FMC) to generate the flood models for different flooding scenarios.

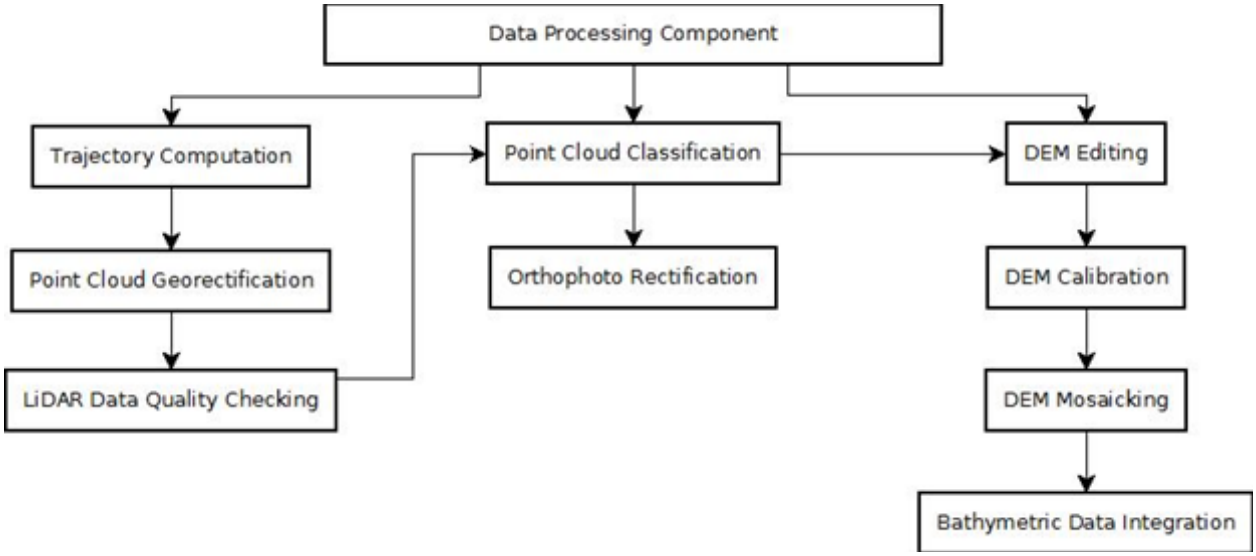

Figure 10. Schematic diagram of the data processing

3.2.1 Data Transfer

The Cagayan mission is named 1CAG171E260A, which was flown with the Airborne LiDAR Terrain Mapper (ALTM™ Optech Inc.) Pegasus system on September 17, 2013 over Cagayan. The Data Acquisition Component (DAC) transferred 22.3 Gigabytes of range data, 191 Megabytes of POS data, 5.68 Megabytes of GPS base station data to the data server on September 24, 2013. The whole Cagayan dataset was fully transferred on February 18, 2014.

3.2.2 Trajectory Computation

The trajectory of the aircraft is computed using the software POSPac MMS v6.2. It combines the POS data from the integrated GPS/INS system installed on the aircraft, and the Rinex data from the GPS base station located within 25 kilometers of the area. It then computes the Smoothed Best Estimated Trajectory (SBET) file, which contains the best estimated trajectory of the aircraft, and the Smoothed Root Mean Square Estimation error file (SMRMSG), which contains the corresponding standard deviations of the position parameters of the aircraft at every point on the computed trajectory.

The key parameters checked to evaluate the performance of the trajectory are the Solution Status parameters and the Smoothed Performance Metrics parameters. The Solution Status parameters characterize the GPS satellite geometry and baseline length at the time of acquisition, and the processing mode used by POSPac. The acceptable values for each Solution Status parameter are shown in Table 3.

The Smoothed Performance Metrics parameters describe the root mean square error (RMSE) for the north, east and down (vertical) position of the aircraft for each point in the computed trajectory. A RMSE value of less than 4 centimeters for the north and east position is acceptable, while a value of less than 8 centimeters is acceptable for the down position.

Table 3. Smoothed Solution Status parameters in POSPac MMS v6.2.

Parameter	Optimal Value
Number of satellites	More than 6 satellites
Position Dilution of Precision	Less than 3
Baseline Length	Less than 30 km
Processing mode	Less than or equal to 1, however short burtsts of values greater than 1 are acceptable

3.2.3 LiDAR Point Cloud Rectification

The trajectory file (SBET) and its corresponding accuracy file (SMRMSG) generated in POSPac are merged with the Range file to compute the coordinates of each individual point. The coordinates of points within the overlap region of contiguous strips vary due to small deviations in the trajectory computation for each strip. These strip misalignments are corrected by matching points from overlapping laser strips. This is done by the LiDAR Mapping Suite (LMS) software developed by Optech.

LMS is a LiDAR software package used for automated LiDAR rectification. It has the capability to extract planar features per flight line and to form correspondence among the identical planes available in the overlapping areas (illustrated in Figure 10). In order to produce geometrically correct point cloud, the redundancy in the overlapping areas of flight lines is used to determine the necessary corrections for the observations.

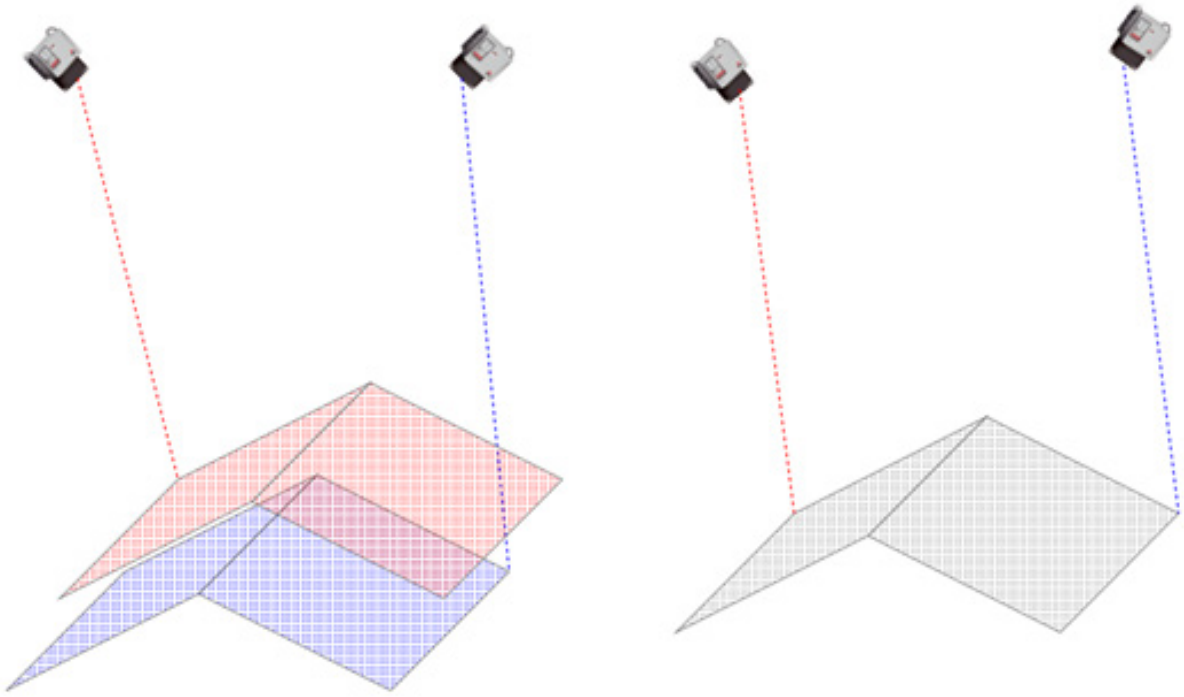

Figure 11. Misalignment of a single roof plane from two adjacent flight lines, before rectification (left). Least squares adjusted roof plane, after rectification (right).

The orientation parameters are corrected in LMS by using least squares adjustment to obtain the best-fit parameters and improve the accuracy of the LiDAR data. The primary indicators of the LiDAR rectification accuracy are the standard deviations of the corrections of the orientation parameters. These values are seen on the Boresight corrections, GPS position corrections, and IMU attitude corrections, all of which are located on the LMS processing summary report. Optimum accuracy is obtained if the Boresight and IMU attitude correction standard deviations are less than 0.001°, and if the GPS position standard deviations are below 0.01 meter.

3.2.4 LiDAR Data Quality Checking

After the orientation parameters are corrected and the point cloud coordinates are computed, the entire point cloud data undergoes quality checking, to see if: (a) there are remaining horizontal and vertical misalignments between contiguous strips, and; (b) to check if the density of the point cloud data reach the target density for the site. The LAStools software is used to compute for the elevation difference in the overlaps between strips and the point cloud density. It is a software package developed by Rapidlasso GmbH for filtering, tiling, classifying, rasterizing, triangulating and quality checking Terabytes of LiDAR data, using robust algorithms, efficient I/O tools and memory management. LAStools can quickly create raster representing the computed quantities, which provide guiding images in determining areas where further quality checks are necessary. The target requirements for floodplain acquisition, computed by LAStools, are shown in Table 4.

Table 4. Parameters investigated during quality checks.

Criteria	Requirement
Minimum per cent overlap	25%
Average point cloud density per square meter	2.0
Elevation difference between strips (on flat areas)	0.20 meters

LAStools can provide guides where elevation differences probably exceed the 20 cm limit. An example of LAStools output raster visualizing points in the flight line overlaps with a vertical difference of +/- 20 cm (displayed as dense red/blue areas) is shown in Figure 12.

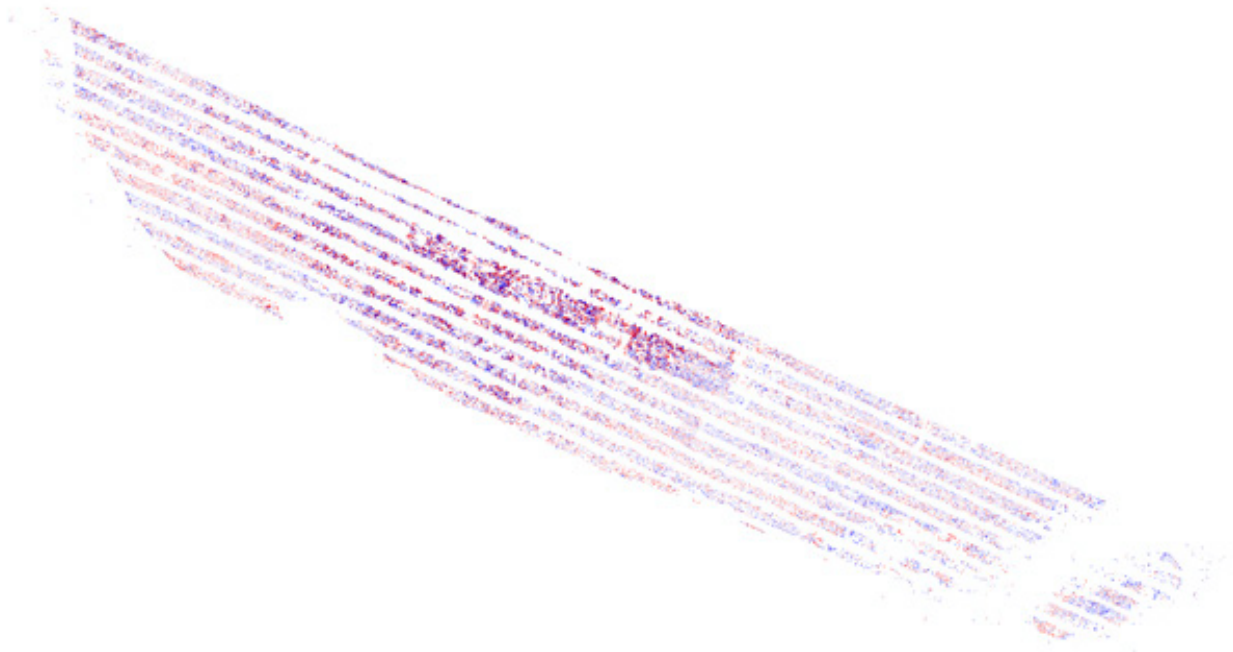

Figure 12. Elevation difference between flight lines generated from LAStools

To investigate the occurrences of elevation differences in finer detail, the profiling tool of Quick Terrain Modeler software is used. Quick Terrain Modeler (QT Modeler) is a 3D point cloud and terrain visualization software package developed by Applied Imagery, Inc. The profiling capability of QT Modeler is illustrated in Figure 13.

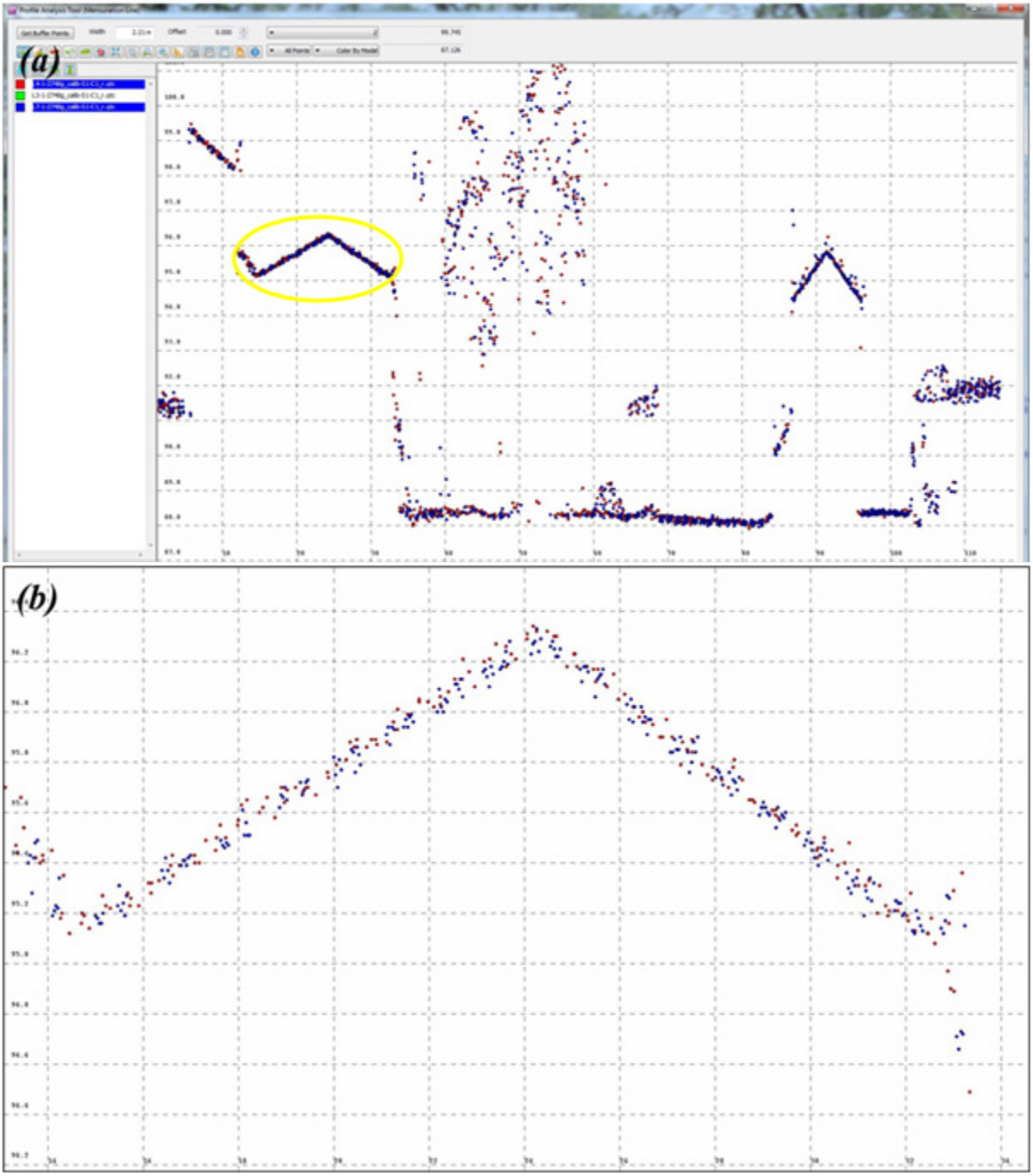

Figure 13. Profile over roof planes (a) and a zoomed-in profile on the area encircled in yellow (b)

The profile (e.g., over a roof plane) shows the overlapping points from different flight lines which serve as a good indicator that the correction applied by LMS for individual flight lines is good enough to attain the desired horizontal and vertical accuracy requirements. Flight lines that do not pass quality checking are subject for reprocessing in LMS until desired accuracies are obtained.

3.2.5 LiDAR Point Cloud Classification and Rasterization

Point cloud classification commences after the point cloud data has been rectified. TerraScan is a TerraSolid LiDAR software suite used for the classification of point clouds. It can read airborne and vehicle-based laser data in raw laser format, LAS, TerraScan binary or other ASCII-survey formats. Its classification and filtering routines are optimized by dividing the whole data into smaller geographical datasets called blocks, to automate the workflow and increase efficiency. In this study, the blocks were set to 1 km by 1 km with a 50 m buffer zone to prevent edge effects.

The process includes the classification of all points into Ground, Low Vegetation, Medium Vegetation, High Vegetation and Buildings. The classifier tool in TerraScan first filters air points and low points by finding points that are 5 standard deviations away from the median elevation of a search radius, which is 5 meters by default. It then divides the region into 60m by 60m search areas (the maximum area where at least one laser point hits the ground) and assigns the lowest points in these areas as the initial ground points from which a triangulated ground model is derived. The classifier then iterates through all the points and adds the points to the ground model by testing if it is (a) within the maximum iteration angle of 4° by default from a triangle plane, and (b) if it is within the maximum iteration distance (1.2 m by default) from a triangle plane. The ground plane is continuously updated from these iterations. The ground classification technique is illustrated in Figure 14. It is apparent that the smaller the iteration angle, the less eager the classifier is to follow changes in the point cloud (small undulations in terrain or hits on low vegetation). An angle close to 4° is used in flat terrain areas while an angle of 10° is used in mountainous or hilly terrains.

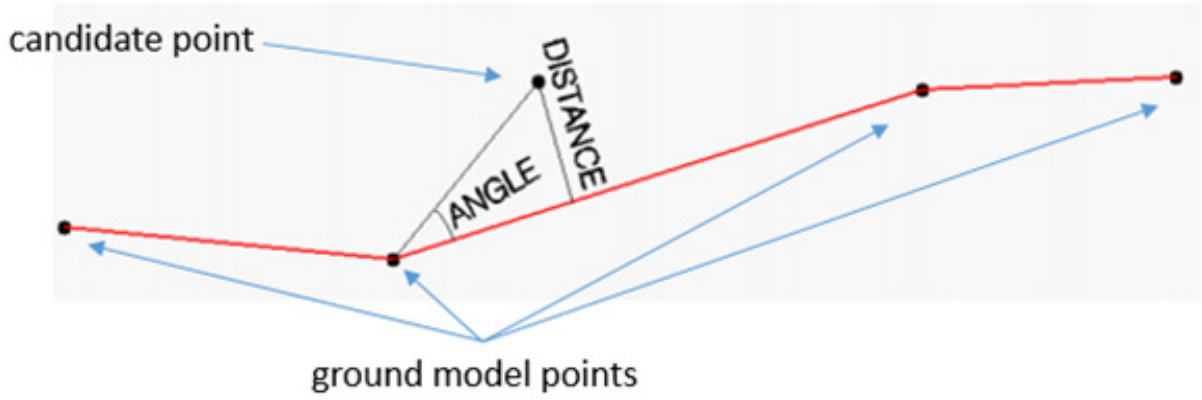

Figure 14. Ground classification technique employed in Terrascan

The parameters for ground classification routines used in floodplain and watershed areas are listed in Table 5.

Table 5. Ground classification parameters used in Terrascan for floodplain and watershed areas

Classification maximums	Floodplain (default)	Watershed (adjusted)
Iteration angle (degrees)	4	8
Iteration distance (meters)	1.20	1.50

The comparison between the produced DTM using the default parameters versus the adjusted is shown in Figure 15. The default parameters may fail to capture the sudden change in the terrain, resulting to less points being classified as ground that makes the DTM interpolated (Figure 15a). The adjusted parameters work better in these spatial conditions as shown in Figure 15b. Statistically, the number of ground points and model key points correctly classified can increase by as much as fifty percent (50%) when using the adjusted parameters.

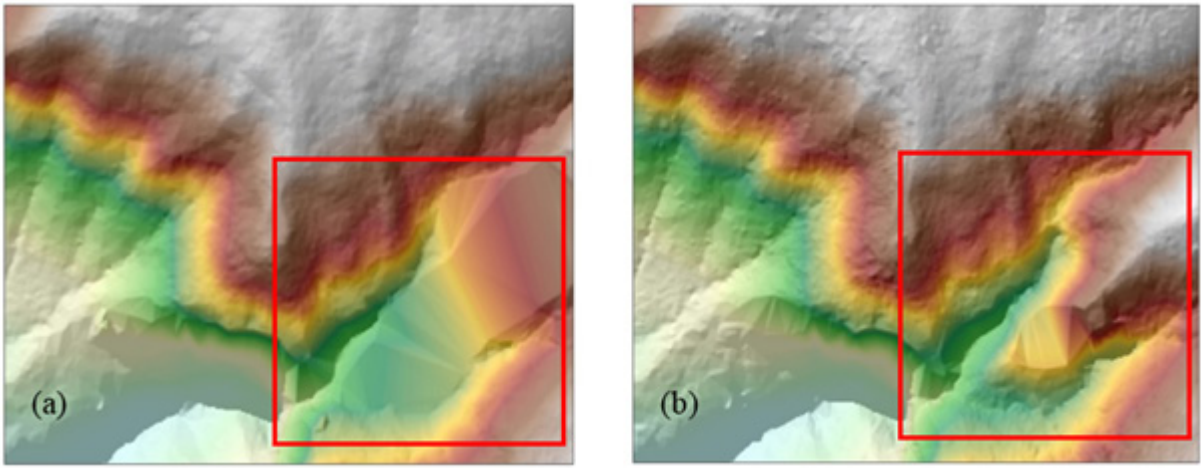

Figure 15. Resulting DTM of ground classification using the default parameters (a) and adjusted parameters (b)

The classification to Low, Medium and High vegetation is a straightforward testing of how high a point is from the ground model. The range of elevation values and its corresponding classification is shown in Table 6.

Table 6. Classification of Vegetation according to the elevation of points

Elevation of points (meters)	Classification
0.05 to 0.15	Low Vegetation
0.15 to 2.50	Medium Vegetation
2.50 to 50.0	High Vegetation

Methodology

The classification to Buildings routine tests points above two meters (2.0 m) if they only have one echo, and if they form a planar surface of at least 40 square meters with points adjacent to them. Minimum size and Z tolerance are the parameters used in the classify buildings routine as shown in Figure 16.

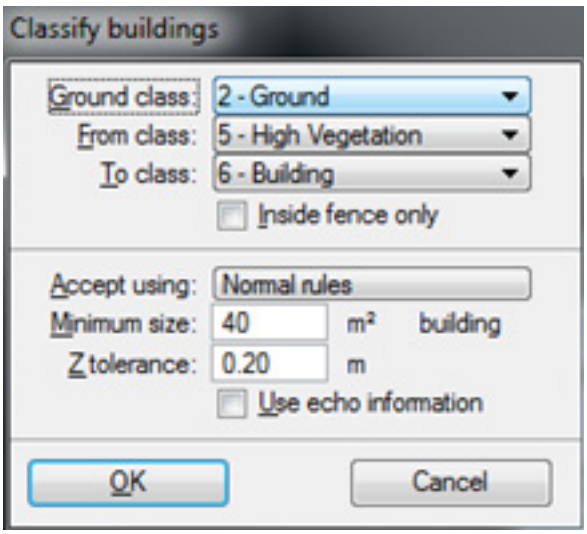

Figure 16. Default TerraScan building classification parameters

Minimum size is set to the smallest building footprint size of 40 m2 while the Z tolerance of 20cm is the approximate elevation accuracy of the laser points.

The point cloud data are examined for possible occurrences of air points which are to be deleted manually in the TerraScan window. Air points are defined as groups of points which are significantly higher or lower from the ground points. The different examples of air points are shown in Figure 17.

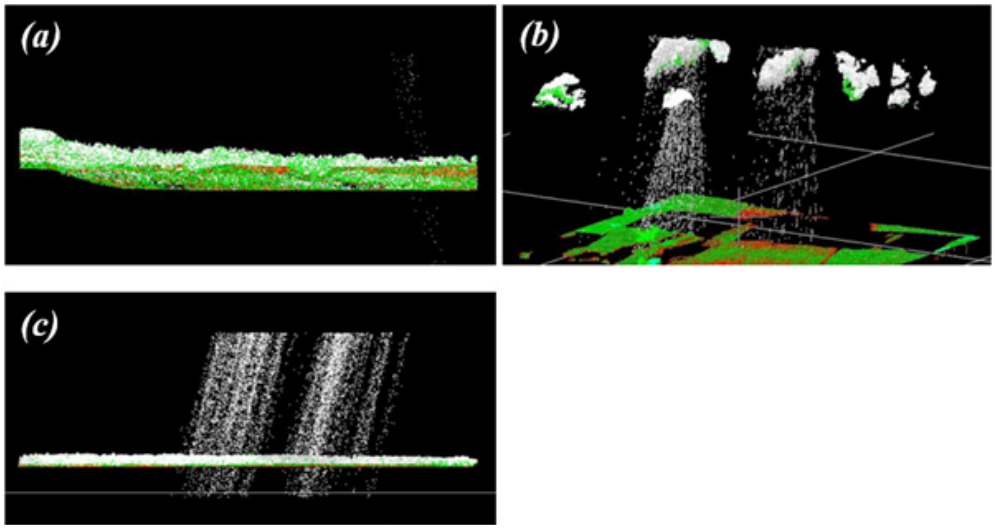

Figure 17. Different examples of air points manually deleted in the TerraScan window

The noise data can be as negligible as shown in Figure 17a or can be as severe as the one shown in Figure 17c. A combination of cloud points and shower of short ranges is displayed in Figure 17b. Shower of short ranges are caused by signal interference from the radio transmission of the tower and the aircraft. During every transmission on a specific frequency (around 120MHz), the signal is getting distorted due to the interference causing showers of short ranges in the output LAS.

Classified LiDAR point clouds that are free of air points, noise and unwanted data are processed in TerraScan to produce Digital Terrain Model (DTM) and the corresponding first and last return Digital Surface Models (DSM). These ground models are produced in the American Standard Code for Information Interchange format (ASCII) format. DTMs are produced by rasterizing all points classified to ground and model key points in a 1 m by 1 m grid. The last return DSMs are produced by rasterizing all last returns from all classifications (Ground, Model Key Points, Low, Medium, High Vegetation, Buildings and Default) in a 1 m by 1 m grid. The first return DSMs on the other hand are produced by rasterizing all first returns from all classifications. Power lines are usually included in this model. All of these ground models are used in the mosaicking, manual editing and hydro correction of the topographic dataset, in preparation for the floodplain hydraulic modelling.

3.2.6 DEM Editing and Hydro-correction

Even though the parameters of the classification routines are optimized, various digital elevation models (DTM, first and last return DSM) that are automatically produced may still display minor errors that still need manual correction to make the DEMs suitable for fine-scale flood modelling. This is true especially for features that are under heavy canopy. Natural embankments on the side of the river might be flattened or misrepresented because no point pierced the canopy on that area. The same difficulty might also occur on smaller streams that are under canopy. The DTM produced might have discontinuities on these channels that might affect the flood modelling negatively. Manual inspection and correction is still a very important part of quality checking the LiDAR DEMs produced.

To correctly portray the dynamics of the flow of water on the floodplain, the river geometry must also be taken into consideration. The LiDAR data must be made consistent to the topographic surveys done for the area, and the bathymetric data must be "burned", or integrated, into the DEM to make the dataset suitable for hydraulic analyses. However, no cross-sectional survey was performed for this area.

Results and Discussion

Results and Discussion

4.1 LiDAR Acquisition in Cagayan Floodplain

4.1.1 Flight Plans

Plans were made to acquire LiDAR data within the Cagayan floodplain. Each flight mission had an average of 15 flight lines and ran for at most 4 hours including take-off, landing and turning time. The parameter used in the LiDAR system for acquisition is found in Table 7.

Table 7. Parameters used in LiDAR System during Flight Acquisition.

Fixed Variables	**Values**		
Flying Height (AGL - Above Ground Level) (m)	750m	1000 m	1200 m
Overlap	30 %	30%	30 %
Max. field of View	50	50	50
Speed of Plane (kts)	130	130	130
Turn around minutes	5	5	5
Swath (m)	661.58 m	882 m	1058.53 m

The parameters that set in the LiDAR sensor to optimize the area coverage following the objectives of the project and to ensure the aircraft's safe return to the airport (base of operations) are shown in Table 7. Each flight acquisition is designed for four operational hours. The maximum flying hours for Cessna 206H is five hours.

Results and Discussion

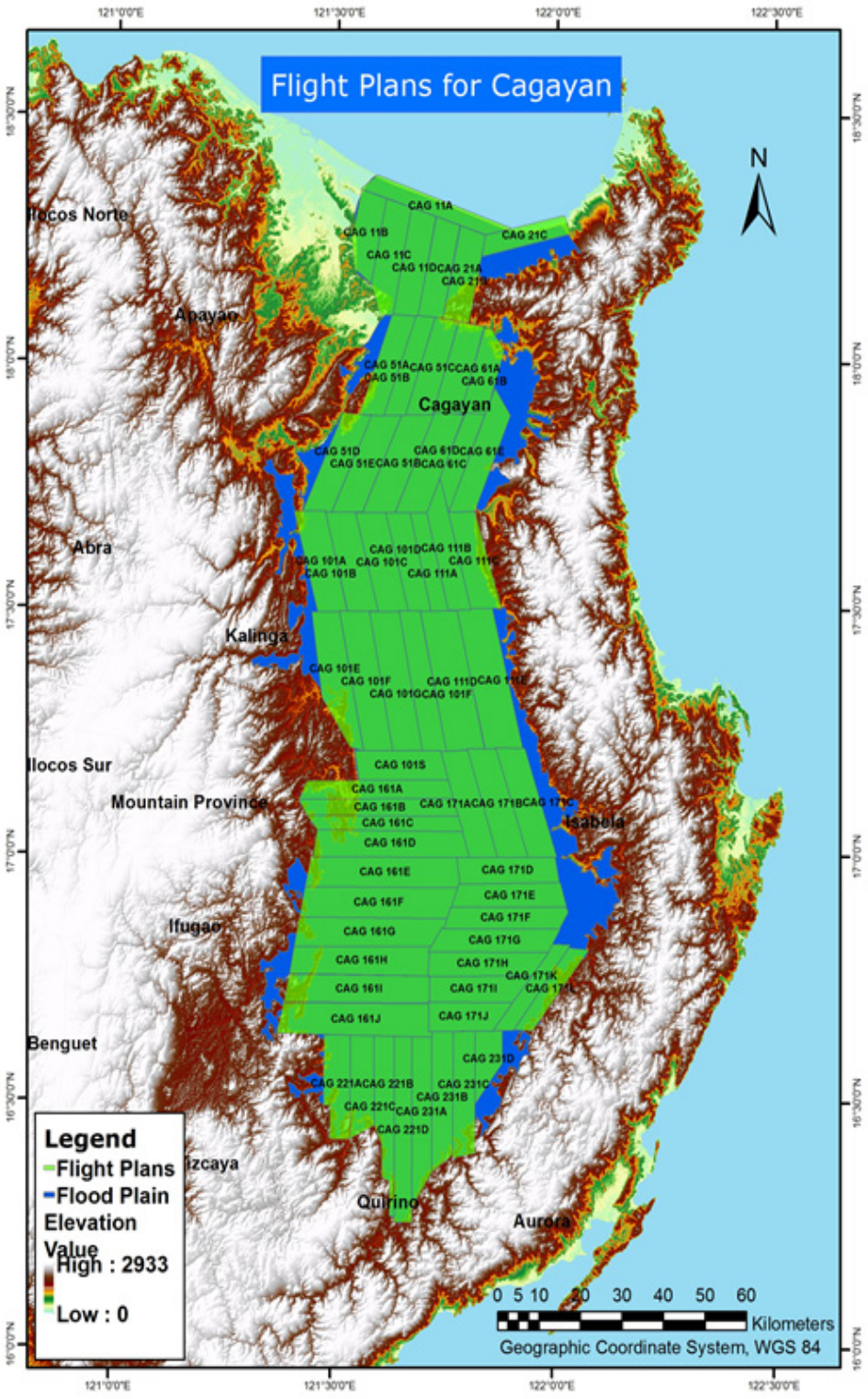

Figure 18. Cagayan Floodplain Flight Plans

Results and Discussion

4.1.2 Ground Base Station

The project team was able to recover one (1) NAMRIA control station with first (1st) order accuracy, twelve (12) with second (2nd) order accuracy and one (1) with fourth (4th) order accuracy .The certification for the base station is found in Annex F and the Benchmark Ortho values were obtained from the report of the Data Validation Component. The ground control point (GCP) was used as reference point during flight operations using TRIMBLE SPS R8, a dual frequency GPS receiver.

Table 8. Details of CGY-57 GCP used as base station for the LiDAR Acquisition

Station Name	CGY-57	
Order of Accuracy	2nd	
Relative Error (horizontal positioning)	1:50000	
Geographic Coordinates, Philippine Reference of 1992 Datum (PRS 92)	Latitude	17° 33' 33.68091"
	Longitude	121° 41' 10.30057"
	Ellipsoidal Height	21.22300 meters
Grid Coordinates, Philippine Transverse Mercator Zone 5 (PTM Zone 5 PRS 92)	Easting	572848.612 meters
	Northing	1942129.42 meters
Geographic Coordinates, World Geodetic System 1984 Datum (WGS 84)	Latitude	17°33 '27.65103" North
	Longitude	121°41'114.94099"East
	Ellipsoidal Height	57.422 meters
Grid Coordinates, Universal Transverse Mercator Zone 51 North (UTM 51N WGS 1984)	Easting	360563.72 meters
	Northing	1941800.44 meters

Figure 19. CGY-57 as recovered at the side of a small bridge in Brgy. San. Jose, Enrile, Cagayan Province.

Table 9. Details of the recovered NAMRIA horizontal control point CGY-66 used as base station for the LiDAR Acquisition.

Station Name	CGY-66	
Order of Accuracy	2nd	
Relative Error (horizontal positioning)	1:50000	
Geographic Coordinates, Philippine Reference of 1992 Datum (PRS 92)	Latitude	17° 42' 56.12254"
	Longitude	121° 34' 50.13936"
	Ellipsoidal Height	51.902 meters
Grid Coordinates, Philippine Transverse Mercator Zone 5 (PTM Zone 5 PRS 92)	Easting	561584.309 meters
	Northing	1959382.34 meters
Geographic Coordinates, World Geodetic System 1984 Datum (WGS 84)	Latitude	17°42 '50.05073" North
	Longitude	121° 34' 54.76735" East
	Ellipsoidal Height	87.364 meters
Grid Coordinates, Universal Transverse Mercator Zone 51 North (UTM 51N WGS 1984)	Easting	349484.16 meters
	Northing	1959169.01 meters

Figure 20. CGY-66 as recovered near the barangay hall of Brgy. Warat , Piat, Cagayan Province.

Results and Discussion

Table 10. Details of the recovered NAMRIA horizontal control point CGY-70 used as base station for the LiDAR Acquisition.

Station Name	CGY-70	
Order of Accuracy	2nd	
Relative Error (horizontal positioning)	1:50000	
Geographic Coordinates, Philippine Reference of 1992 Datum (PRS 92)	Latitude	17° 47' 54.79038"
	Longitude	121° 43' 31.26837"
	Ellipsoidal Height	26.859 meters
Grid Coordinates, Philippine Transverse Mercator Zone 5 (PTM Zone 5 PRS 92)	Easting	576904.118 meters
	Northing	1968617.425 meters
Geographic Coordinates, World Geodetic System 1984 Datum (WGS 84)	Latitude	17° 47'48.71170" North
	Longitude	121° 43' 35.88859" East
	Ellipsoidal Height	62.400 meters
Grid Coordinates, Universal Transverse Mercator Zone 51 North (UTM 51N WGS 1984)	Easting	364899 meters
	Northing	1968239.03 meters

Figure 21. CGY-70 as recovered at the back of Estefania Elementary School in Brgy. Estefania, Amulung, Cagayan Province.

Results and Discussion

Table 11. Details of the recovered NAMRIA horizontal control point CGY-70 used as base station for the LiDAR Acquisition.

Station Name	CGY-87	
Order of Accuracy	2nd	
Relative Error (horizontal positioning)	1:50000	
Geographic Coordinates, Philippine Reference of 1992 Datum (PRS 92)	Latitude	18° 03' 46.30032"
	Longitude	121° 38' 38.76326"
	Ellipsoidal Height	37.212 meters
Grid Coordinates, Philippine Transverse Mercator Zone 5 (PTM Zone 5 PRS 92)	Easting	568188.029 meters
	Northing	1997837.978 meters
Geographic Coordinates, World Geodetic System 1984 Datum (WGS 84)	Latitude	18° 03' 40.15861" North
	Longitude	121° 38' 43.36193" East
	Ellipsoidal Height	71.696 meters
Grid Coordinates, Universal Transverse Mercator Zone 51 North (UTM 51N WGS 1984)	Easting	356498.94 meters
	Northing	1997546.44 meters

Figure 22. CGY-87 as recovered near the Gattaran municipal hall in Gattaran, Cagayan Province.

Table 12. Details of the recovered NAMRIA horizontal control point CGY-92 used as base station for the LiDAR Acquisition.

Station Name	CGY-92	
Order of Accuracy	2nd	
Relative Error (horizontal positioning)	1:50000	
Geographic Coordinates, Philippine Reference of 1992 Datum (PRS 92)	Latitude	18° 12' 11.42361"
	Longitude	121° 39' 42.14392"
	Ellipsoidal Height	14.474 meters
Grid Coordinates, Philippine Transverse Mercator Zone 5 (PTM Zone 5 PRS 92)	Easting	569996.115 meters
	Northing	2013373.807 meters
Geographic Coordinates, World Geodetic System 1984 Datum (WGS 84)	Latitude	18° 12' 5.25321" North
	Longitude	121° 39' 46.73084" East
	Ellipsoidal Height	48.54 meters
Grid Coordinates, Universal Transverse Mercator Zone 51 North (UTM 51N WGS 1984)	Easting	358475.41 meters
	Northing	2013059.26 meters

Figure 23. CGY-92 as recovered in front of the flagpole of Lal-lo National High School in Lal-lo, Cagayan Province.

Table 13. Details of the recovered NAMRIA horizontal control point CGY-93 used as base station for the LiDAR Acquisition.

Station Name	CGY-93	
Order of Accuracy	2nd	
Relative Error (horizontal positioning)	1:50000	
Geographic Coordinates, Philippine Reference of 1992 Datum (PRS 92)	Latitude	18° 11' 3.37014"
	Longitude	121° 45' 13.15569"
	Ellipsoidal Height	27.380 meters
Grid Coordinates, Philippine Transverse Mercator Zone 5 (PTM Zone 5 PRS 92)	Easting	579731.474 meters
	Northing	2011319.092 meters
Geographic Coordinates, World Geodetic System 1984 Datum (WGS 84)	Latitude	18°10 '57.21078" North
	Longitude	121° 45' 17.74361" East
	Ellipsoidal Height	61.728 meters
Grid Coordinates, Universal Transverse Mercator Zone 51 North (UTM 51N WGS 1984)	Easting	368185.96 meters 2010898.96 meters
	Northing	1968239.03 meters

Figure 24. CGY--93 as recovered near the barangay hall of Brgy. Dagupan, Lal-lo, Cagayan Province.

Results and Discussion

Table 14. Details of the recovered NAMRIA horizontal control point CGY-3771 used as base station for the LiDAR Acquisition.

Station Name	CGY-3771	
Order of Accuracy	4th	
Relative Error (horizontal positioning)	1 in 10,000	
Geographic Coordinates, Philippine Reference of 1992 Datum (PRS 92)	Latitude	17° 42' 48.97202"
	Longitude	121° 34' 46.76260"
	Ellipsoidal Height	53.36500 meters
Grid Coordinates, Philippine Transverse Mercator Zone 5 (PTM Zone 5 PRS 92)	Easting	561485.49 meters
	Northing	1959162.214 meters
Geographic Coordinates, World Geodetic System 1984 Datum (WGS 84)	Latitude	17° 42' 42.90057" North
	Longitude	121° 34' 51.39076" East
	Ellipsoidal Height	88.831 meters
Grid Coordinates, Universal Transverse Mercator Zone 51 North (UTM 51N WGS 1984)	Easting	N/A
	Northing	N/A

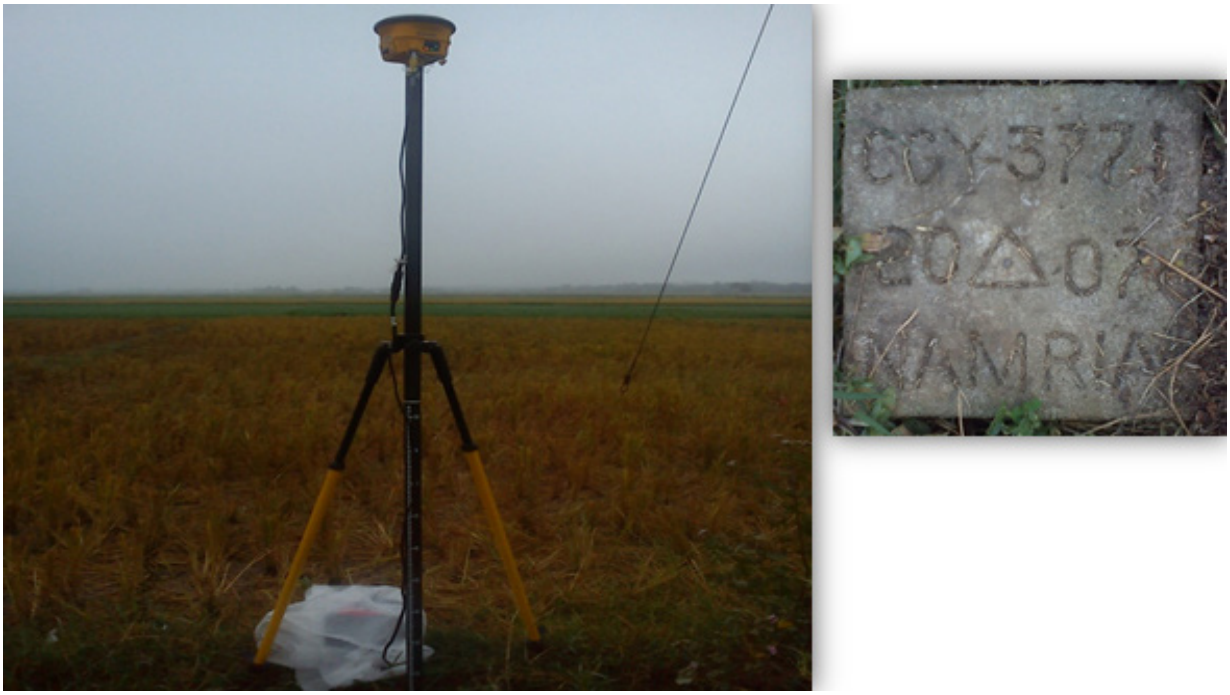

Figure 25. CGY--3771 as recovered near the barangay hall of Brgy. Warat , Piat, Cagayan Province.

Table 15. Details of the recovered NAMRIA horizontal control point ISB-4 used as base station for the LiDAR Acquisition.

Station Name	ISB-4	
Order of Accuracy	1st	
Relative Error (horizontal positioning)	1 in 100,000	
Geographic Coordinates, Philippine Reference of 1992 Datum (PRS 92)	Latitude	16° 30' 18.51803"
	Longitude	121° 44' 8.59378"
	Ellipsoidal Height	109.764 meters
Grid Coordinates, Philippine Transverse Mercator Zone 5 (PTM Zone 5 PRS 92)	Easting	578545.486 meters
	Northing	1825484.009 meters
Geographic Coordinates, World Geodetic System 1984 Datum (WGS 84)	Latitude	16°30 '12.72441" North
	Longitude	121° 44' 13.32219" East
	Ellipsoidal Height	149.42780 meters
Grid Coordinates, Universal Transverse Mercator Zone 51 North (UTM 51N WGS 1984)	Easting	365066.7 meters
	Northing	1825124.83 meters

Figure 26. ISB-4 as recovered in a field in Brgy. Masaya Centro, San Agustin, Isabela.

Results and Discussion

Table 16. Details of the recovered NAMRIA horizontal control point ISB-90 used as base station for the LiDAR Acquisition.

Station Name	ISB-90	
Order of Accuracy	2nd	
Relative Error (horizontal positioning)	1 in 50,000	
Geographic Coordinates, Philippine Reference of 1992 Datum (PRS 92)	Latitude	17° 19' 10.25017"
	Longitude	121° 46' 09.69589"
	Ellipsoidal Height	35.367 meters
Grid Coordinates, Philippine Transverse Mercator Zone 5 (PTM Zone 5 PRS 92)	Easting	581784.952 meters
	Northing	1915619.76 meters
Geographic Coordinates, World Geodetic System 1984 Datum (WGS 84)	Latitude	17° 19' 04.27901" North
	Longitude	121° 46' 14.35585" East
	Ellipsoidal Height	72.554 meters
Grid Coordinates, Universal Transverse Mercator Zone 51 North (UTM 51N WGS 1984)	Easting	369220.50 meters
	Northing	1915204.01 meters

Figure 27. ISB-90 as recovered beside the welcome sign of Brgy. Villa Luz, Delfin Albano, Isabela.

Table 17. Details of the recovered NAMRIA horizontal control point ISB-97 used as base station for the LiDAR Acquisition.

Station Name	ISB-97	
Order of Accuracy	2nd	
Relative Error (horizontal positioning)	1 in 50,000	
Geographic Coordinates, Philippine Reference of 1992 Datum (PRS 92)	Latitude	17° 08' 44.15866"
	Longitude	121° 40' 11.01238"
	Ellipsoidal Height	62.259 meters
Grid Coordinates, Philippine Transverse Mercator Zone 5 (PTM Zone 5 PRS 92)	Easting	571259.789 meters
	Northing	1896333.662 meters
Geographic Coordinates, World Geodetic System 1984 Datum (WGS 84)	Latitude	17° 08' 38.21759" North
	Longitude	121° 40' 15.68747" East
	Ellipsoidal Height	99.759 meters
Grid Coordinates, Universal Transverse Mercator Zone 51 North (UTM 51N WGS 1984)	Easting	358498.51 meters
	Northing	1896031.50 meters

Figure 28. ISB-97 as recovered besides a waiting shed in a vacant lot in Villa Bulusan, Mallig, Isabela

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Table 18. Details of the recovered NAMRIA horizontal control point ISB-116 used as base station for the LiDAR Acquisition.

Station Name	ISB-116	
Order of Accuracy	2nd	
Relative Error (horizontal positioning)	1 in 50,000	
Geographic Coordinates, Philippine Reference of 1992 Datum (PRS 92)	Latitude	16°59'4.21767"
	Longitude	122°0'23.58158"
	Ellipsoidal Height	97.639 meters
Grid Coordinates, Philippine Transverse Mercator Zone 5 (PTM Zone 5 PRS 92)	Easting	5394202.384 meters
	Northing	1878652.343 meters
Geographic Coordinates, World Geodetic System 1984 Datum (WGS 84)	Latitude	16° 58'58.33861" North
	Longitude	122° 0' 28.26808" East
	Ellipsoidal Height	136.459 meters
Grid Coordinates, Universal Transverse Mercator Zone 51 North (UTM 51N WGS 1984)	Easting	394202.384 meters
	Northing	1878652.343 meters

Figure 29. ISB-116 as recovered on the ground near a ridge about 200 meters away from a Military Camp located at Brgy. Poblacion (Zone 1), San Mariano, Isabela.

Table 19. Details of the recovered NAMRIA horizontal control point MC-1 used as base station for the LiDAR Acquisition.

Station Name	MC-1	
Order of Accuracy	2nd	
Relative Error (horizontal positioning)	1:50000	
Geographic Coordinates, Philippine Reference of 1992 Datum (PRS 92)	Latitude	N/A
	Longitude	N/A
	Ellipsoidal Height	N/A
Grid Coordinates, Philippine Transverse Mercator Zone 5 (PTM Zone 5 PRS 92)	Easting	N/A
	Northing	N/A
Geographic Coordinates, World Geodetic System 1984 Datum (WGS 84)	Latitude	16° 30' 13.36434" North
	Longitude	121° 44' 13.62483" East
	Ellipsoidal Height	99.484 meters
Grid Coordinates, Universal Transverse Mercator Zone 51 North (UTM 51N WGS 1984)	Easting	365216.76 meters
	Northing	1825076.561 meters

Figure 30. MC-1 as established near ISB-4 in Brgy. Masaya Centro, San Agustin, Isabela

Table 20. Details of the recovered NAMRIA horizontal control point ISB-2 used as base station for the LiDAR Acquisition.

Station Name	ISB-2	
Order of Accuracy	2nd	
Relative Error (horizontal positioning)	1 in 50,000	
Geographic Coordinates, Philippine Reference of 1992 Datum (PRS 92)	Latitude	N/A
	Longitude	N/A
	Ellipsoidal Height	N/A
Grid Coordinates, Philippine Transverse Mercator Zone 5 (PTM Zone 5 PRS 92)	Easting	N/A
	Northing	N/A
Geographic Coordinates, World Geodetic System 1984 Datum (WGS 84)	Latitude	16° 51' 06.23292" North
	Longitude	121° 52' 46.01057" East
	Ellipsoidal Height	130.38 meters
Grid Coordinates, Universal Transverse Mercator Zone 51 North (UTM 51N WGS 1984)	Easting	380624.988 meters
	Northing	1863491.374 meters

Figure 31. ISB-2 as established on the ground about 5 meters east of ISB-118 located at Brgy. Maligaya, Cauayan Isabela.

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Table 21. Details of the recovered NAMRIA horizontal control point PISB-1 used as base station for the LiDAR Acquisition.

Station Name	PISB-1	
Order of Accuracy	2nd	
Relative Error (horizontal positioning)	1:50000	
Geographic Coordinates, Philippine Reference of 1992 Datum (PRS 92)	Latitude	N/A
	Longitude	N/A
	Ellipsoidal Height	N/A
Grid Coordinates, Philippine Transverse Mercator Zone 5 (PTM Zone 5 PRS 92)	Easting	N/A
	Northing	N/A
Geographic Coordinates, World Geodetic System 1984 Datum (WGS 84)	Latitude	16° 58' 56.81323" North
	Longitude	121° 00' 27.42180" East
	Ellipsoidal Height	140.097 meters
Grid Coordinates, Universal Transverse Mercator Zone 51 North (UTM 51N WGS 1984)	Easting	394353.321 meters
	Northing	1877880.608 meters

Figure 32. PISB-1 as established on the ground at the south west side of a helipad and about 40 meters away south east from ISB-116 located at Brgy. Poblacion (Zone 1), San Mariano Isabela.

Table 22. Details of the recovered NAMRIA horizontal control point CAP-1 used as base station for the LiDAR Acquisition.

Station Name	CAP-1	
Order of Accuracy	2nd	
Relative Error (horizontal positioning)	1:50000	
Geographic Coordinates, Philippine Reference of 1992 Datum (PRS 92)	Latitude	N/A
	Longitude	N/A
	Ellipsoidal Height	N/A
Grid Coordinates, Philippine Transverse Mercator Zone 5 (PTM Zone 5 PRS 92)	Easting	N/A
	Northing	N/A
Geographic Coordinates, World Geodetic System 1984 Datum (WGS 84)	Latitude	17° 38'29.72001" North
	Longitude	121° 44'06.91080" East
	Ellipsoidal Height	63.145 meters
Grid Coordinates, Universal Transverse Mercator Zone 51 North (UTM 51N WGS 1984)	Easting	364899.000 meters
	Northing	1968239.03 meters

Figure 33. CAP-1 as established In Tuguegarao Airport.

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Table 23. Details of the recovered NAMRIA horizontal control point ISB-3634 used as base station for the LiDAR Acquisition.

Station Name	ISB-3634	
Order of Accuracy	2nd	
Relative Error (horizontal positioning)	1:50000	
Geographic Coordinates, Philippine Reference of 1992 Datum (PRS 92)	Latitude	N/A
	Longitude	N/A
	Ellipsoidal Height	N/A
Grid Coordinates, Philippine Transverse Mercator Zone 5 (PTM Zone 5 PRS 92)	Easting	N/A
	Northing	N/A
Geographic Coordinates, World Geodetic System 1984 Datum (WGS 84)	Latitude	17° 09'47.44627" North
	Longitude	121° 37' 28.89006" East
	Ellipsoidal Height	98.179 meters
Grid Coordinates, Universal Transverse Mercator Zone 51 North (UTM 51N WGS 1984)	Easting	353723.330 meters
	Northing	1898125.048 meters

Figure 34. ISB-3634 as recovered and reestablished as second order control is on the ground near a waiting shade located at Brgy. San Pedro, Roxas Isabela.

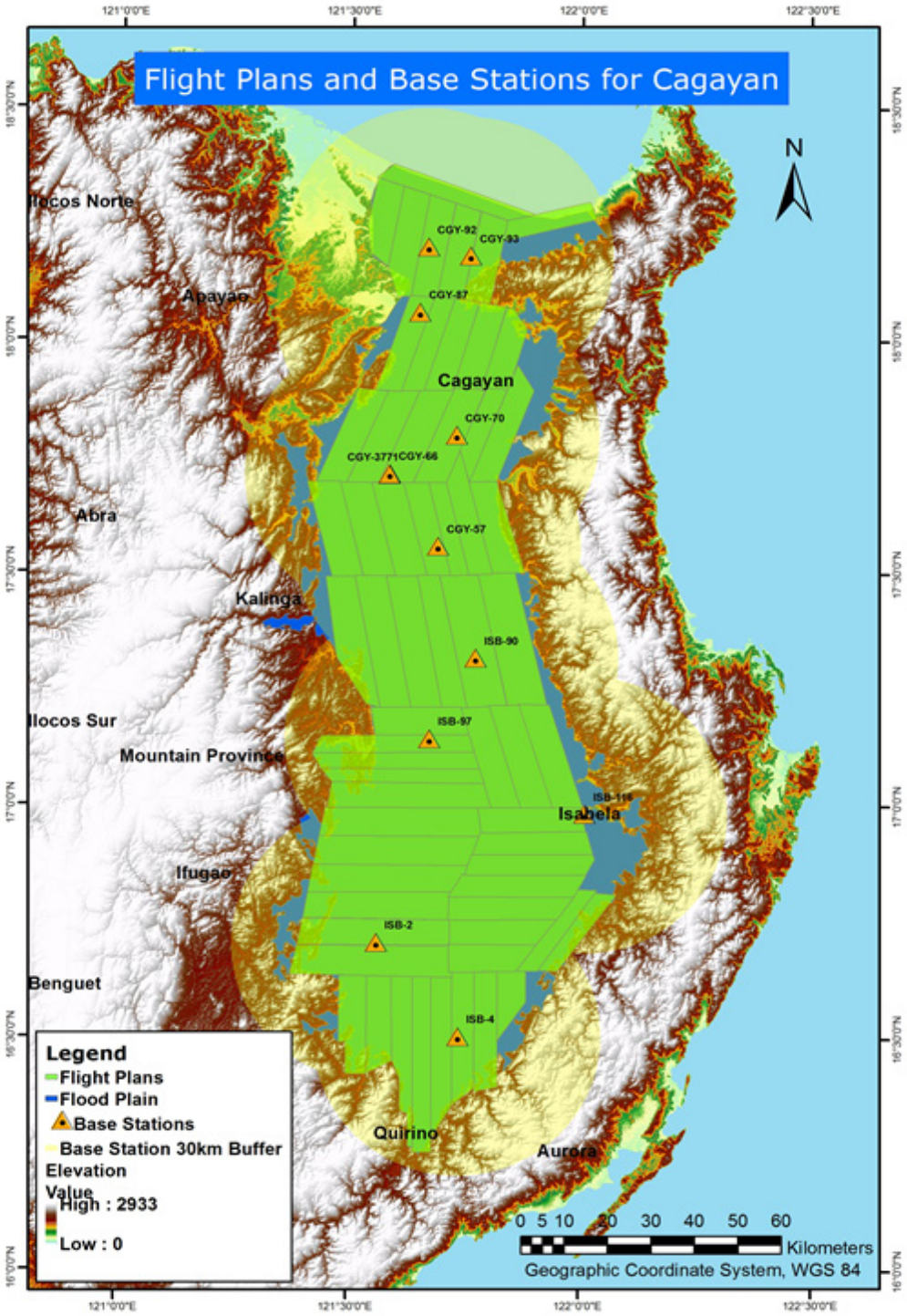

Figure 35. Cagayan Flight Plans and Base Stations.

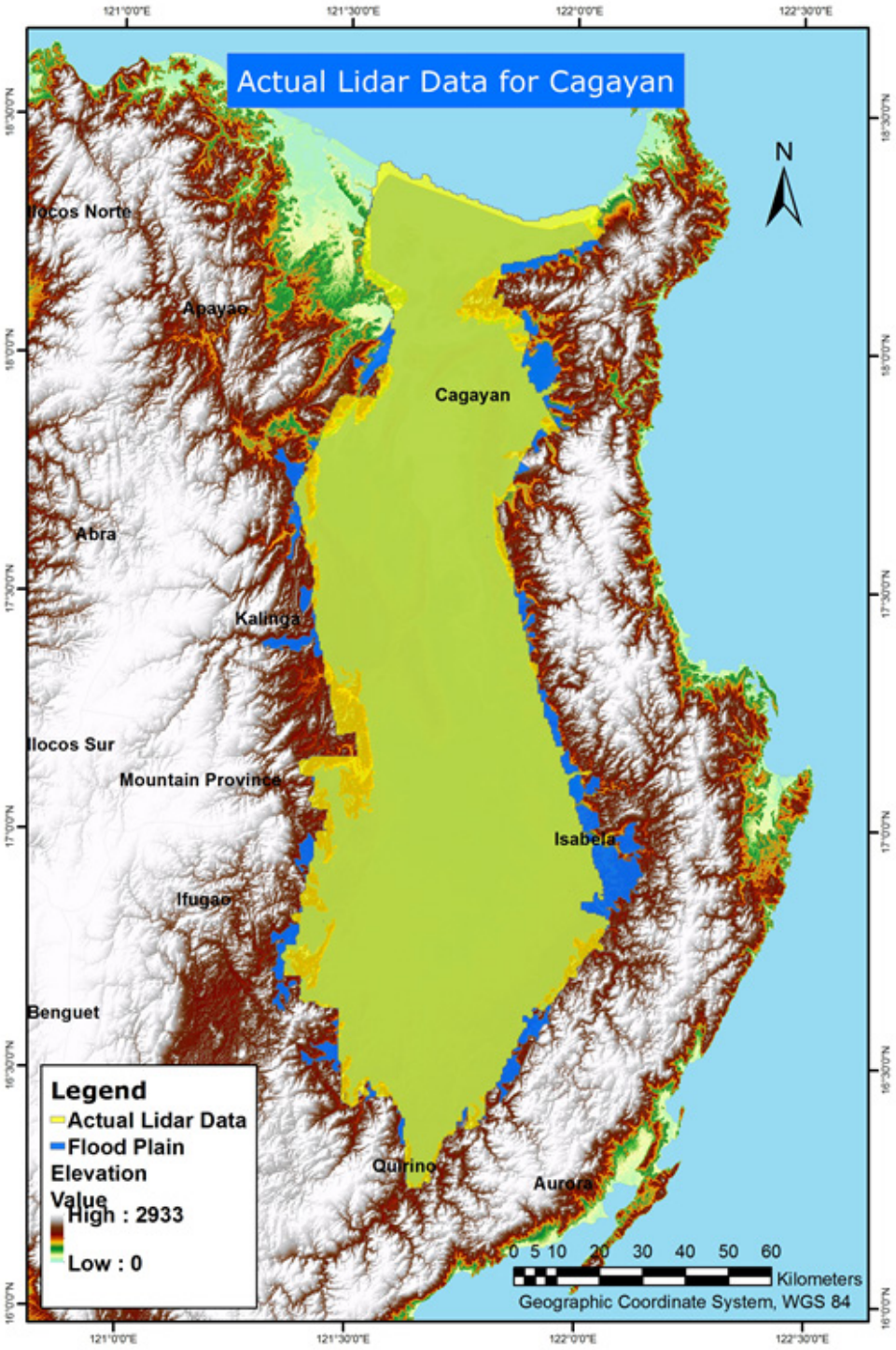

Figure 36. Cagayan Floodplain Data Acquisition LAS Output.

Results and Discussion

Table 24. Flight Missions for LiDAR Data Acquisition in Cagayan floodplain.

Date Surveyed	Name	Flight Plan Area (km²)	Surveyed Area (km²)	Area Surveyed within the River System (km²)	Area Surveyed Outside the River Systems (km²)	No. of Images (Frames)	Flying Hours	
							Hours	Minutes
Sept 4, 2013	161H	130.21	126.83	126.83	0	NA	3	10
Sept 5, 2013	161I	127.73	161.08	161.08	0	NA	3	23
Sept 5, 2013	161P	122.38	93.602	93.602	0	NA	2	29
Sept 6, 2013	161 I	127.73	230.65	230.65	0	NA	3	47
Sept 6, 2013	161F	121.69	169.09	169.09	0	NA	2	23
Sept 7, 2013	161PQ	122.38	114.8	114.8	0	NA	2	43
Sept 10, 2013	161L	115.53	30.476	30.476	0	NA	1	30
Sept 10, 2013	161M	104.67	70.641	70.641	0	NA	1	51
Sept 11, 2013	161LM	220.27	197.78	197.78	0	NA	3	5
Sept 18, 2013	161F	133.92	157.21	157.21	0	NA	3	40
Sept 19, 2013	171G	141.55	160.02	160.02	0	NA	3	22
Sept 22, 2013	171H	148.58	209.81	209.81	0	NA	3	0
Sept 22, 2013	171D, 171FS	240.56	214.52	214.52	0	NA	2	54
Sept 23, 2013	171I	130.9	148.35	148.35	0	NA	3	8
Sept 24, 2013	171J	112.15	122.4	122.4	0	NA	2	50
Sept 25, 2013	171C	171.56	173.2	173.2	0	NA	4	0
Sept 28, 2013	171K	87.869	110.76	110.76	0	NA	2	28
Sept 29, 2013	171L	93.986	101.19	101.19	0	NA	3	5

Results and Discussion

Date Surveyed	Name	Flight Plan Area (km²)	Surveyed Area (km²)	Area Surveyed within the River System (km²)	Area Surveyed Outside the River Systems (km²)	No. of Images (Frames)	Flying Hours	
							Hours	Minutes
Sept 30, 2013	161K	104.74	81.794	81.794	0	NA	2	45
Oct 3, 2013	161G, 171D	133.92	84.058	84.058	0	191	2	40
Oct 4, 2013	161I, 161H	127.74	132.63	132.63	0	863	4	10
Oct 8, 2013	161NO	221.01	227.31	227.31	0	1264	4	0
Oct 9, 2013	161Q	151.34	149.515	149.515	0	726	3	48
Oct 9, 2013	161E	112.37	89.486	89.486	0	543	2	18
Oct 13, 2013	161CD	126.34	156.82	156.82	0	1395	3	36
Oct 14, 2013	231A	166.85	179.29	179.29	0	1370	4	5
Oct 14, 2013	221D	185.55	136.09	136.09	0	483	2	35
Oct 15, 2013	221C	147.07	149.47	149.47	0	1122	4	5
Oct 15, 2013	221B	127.63	78.268	78.268	0	265	2	29
Oct 16, 2013	231A	166.85	150.958	150.958	0	1113	4	17
Oct 17, 2013	221C	147.07	218.79	218.79	0	981	4	23
Oct 17, 2013	231D	79.303	71.616	71.616	0	278	2	11
Oct 18, 2013	231D	79.303	81.973	81.973	0	265	4	5
Oct 18, 2013	231C	149.45	49.93	49.93	0	1113	2	23
Oct 19, 2013	221D, 231BS	185.55	116.86	116.86	0	901	4	5
Oct 21, 2013	161A	150.11	103.91	103.91	0	621	3	11

Results and Discussion

Date Surveyed	Name	Flight Plan Area (km²)	Surveyed Area (km²)	Area Surveyed within the River System (km²)	Area Surveyed Outside the River Systems (km²)	No. of Images (Frames)	Flying Hours	
							Hours	Minutes
Oct 22, 2013	161AB	132.61	104.01	104.01	0	847	2	47
Oct 23, 2013	111C	293.93	103.84	103.84	0	NA	4	11
Oct 25, 2013	111E	247.4	255.41	255.41	0	1258	4	41
Oct 25, 2013	111D	287.34	149.09	149.09	0	484	2	5
Oct 25, 2013	51E	159.99	134.88	134.88	0	NA	4	17
Oct 25, 2013	51E	159.99	51.556	51.566	0	NA	1	53
Oct 26, 2013	101D	124.35	176.63	176.63	0	NA	3	35
Oct 26, 2013	111D	287.34	118.52	118.52	0	289	1	59
Oct 26, 2013	51F	173.67	110.37	110.37	0	NA	3	53
Oct 26, 2013	51E, 51B	109.56	82.106	82.106	0	NA	2	41
Oct 27, 2013	51G	173.67	151.62	151.62	0	NA	4	11
Oct 27, 2013	61A	135.52	132.62	132.62	0	289	2	35
Oct 27. 2013	111C	293.3	169.35	169.35	0	NA	4	5
Oct 27. 2013	111D	287.34	112.4	112.4	0	NA	3	5
Oct 28, 2013	110A	173.3	102.94	102.94	0	635	3	41
Oct 29, 2013	111B	152.03	149.1	149.1	0	721	4	35
Oct 29, 2013	51B	109.56	88.596	88.596	0	369	2	47
Nov 7, 2013	21A, 51BS	134.06	83.349	83.349	0	NA	3	5

Results and Discussion

Date Surveyed	Name	Flight Plan Area (km²)	Surveyed Area (km²)	Area Surveyed within the River System (km²)	Area Surveyed Outside the River Systems (km²)	No. of Images (Frames)	Flying Hours	
							Hours	Minutes
Nov 7, 2013	51BS	109.56	64.311	64.311	0	287	2	17
Nov 10, 2013	21A	134.06	120.107	120.107	0	NA	3	11
Nov 11, 2013	11D	144.01	189.46	189.46	0	NA	4	17
Nov 11, 2013	21AS	134.06	87.964	87.964	0	NA	2	35
Nov 12, 2013	51A	135.04	143.137	143.137	0	NA	3	17
Nov 12, 2013	51AS	113.21	40.648	40.648	0	NA	2	5
Nov 13, 2013	51AS	113.21	80.895	80.895	0	NA	2	47
Nov 13, 2013	11AS	130.48	32.694	32.694	0	NA	2	17
Nov 14, 2013	21AS	134.06	147.419	147.419	0	378	4	29
Nov 30, 2013	101D	124.35	75.775	75.775	0	208	2	11
Nov 30, 2013	101D	124.35	95.768	95.768	0	NA	5	3
Dec 2, 2013	171A	162.1	63.253	63.253	0	NA	1	47
Dec 3, 2013	171A	162.1	157.74	157.74	0	NA	4	47
Dec 4, 2013	161AB	132.61	136.78	136.78	0	NA	3	47
Dec 5, 2013	161BCDES	126.34	289.98	289.98	0	NA	4	11
Dec 5, 2013	171B	172.58	55.671	55.671	0	NA	1	59
Dec 7, 2013	171B	172.58	215.3	215.3	0	NA	4	5
Dec 7, 2013	171C	171.56	35.451	35.451	0	NA	1	47
Dec 8, 2013	171C	171.56	206.83	206.83	0	NA	4	11

Results and Discussion

Date Surveyed	Name	Flight Plan Area (km²)	Surveyed Area (km²)	Area Surveyed within the River System (km²)	Area Surveyed Outside the River Systems (km²)	No. of Images (Frames)	Flying Hours	
							Hours	Minutes
Dec 10, 2013	221B, 221CS	127.63	168.571	168.571	0	1151	3	47
Dec 10, 2013	171D, 171C	140.56	45.716	45.716	0	440	2	11
Dec 11, 2013	101G	227.23	135.67	135.67	0	NA	3	53
Dec 17, 2013	101D	124.35	89.422	89.422	0	364	2	17
Feb 5, 2014	101D	124.35	104.98	104.98	0	NA	2	47
Feb 6, 2014	101A, 111C	173.47	129.008	129.008	0	NA	3	47
Feb 6, 2014	101A	173.47	115.16	115.16	0	NA	2	59
Feb 7, 2014	51D, 101D	156.26	174.812	174.812	0	NA	3	29
Feb 8, 2014	101A, 111C	103.47	99.849	99.849	0	NA	4	22
Feb 9, 2014	101F, 111D	227.23	158.585	158.585	0	NA	2	47
Feb 10, 2014	101E	206.09	89.965	89.965	0	NA	3	5
Feb 11, 2014	101E	206.09	122.84	122.84	0	NA	3	42
Feb 12, 2014	21A, 11A	134.06	123.93	123.93	0	NA	3	53
Feb 13, 2014	61DE	263.79	204.04	204.04	0	NA	3	5
Feb 15, 2014	101A, 111C	173.47	110.653	110.653	0	NA	1	53
Feb 17, 2014	51D	156.26	169.27	169.27	0	NA	3	5
Feb 17, 2014	51A	135.04	148.34	148.34	0	NA	2	59
Feb 18, 2014	101F, 101E	227.28	227.027	227.027	0	NA	4	23

Results and Discussion

A total of 115 missions were conducted for the LiDAR Data Acquisition in Cagayan floodplain, for a total of 375.16 hours of flying time for RP-C9022, RP-C9122 and RP-C9322. All missions are acquired using the Pegasus, Gemini and Aquarius LiDAR Systems. Table 24 shows the total area to be surveyed according to the flight plan and the total area of actual coverage per survey area.

Cagayan floodplain with a total of 10, 386 square kilometers was surveyed from September 4, 2013 to February 18, 2014 by Marvy Funtilon, Jasmine Alviar, Christopher Joaquin, Mark Gregory Ano, Pauline Joanne Arceo, Pearl Mars, Dan Christoffer Aldovino, Ma. Verlina Tonga, Lovely Acuna, Mary Catherine Baliguas, Renan Punto, Iro Niel Roxas, Lovelyn Asuncion and Faith Joy Sable, as shown in Table 25.

Table 25. Area of Coverage (in sq km) of the LiDAR Data Acquisition in Cagayan floodplain.

Location	Date Surveyed	Operator	Mission Name	Floodplain Surveyed Area (km^2)	Total Floodplain Area (km^2)	Watershed Surveyed Area (km^2)	Total Watershed Area (km^2)
Cagayan	Sept 4, 2013	M. Funtilon	1C161H248A	126.83	10, 386		
	Sept 5, 2013	J. Alviar	1C161249A	152.882		8.198	
	Sept 5, 2013	M. Funtilon	1C161P249B	93.602		0	
	Sept 6, 2013	M. Funtilon	1C161I250A	221.68		8.97	
	Sept 6, 2013	J. Alviar	1C161F120B	163.5		5.59	
	Sept 7, 2013	M. Funtilon	1C161Q251A	103.79		11.01	
	Sept 10, 2013	M. Funtilon	1C161L254A	30.476		0	
	Sept 10, 2013	M. Funtilon	1C161L254B	70.068		0.573	
	Sept 11, 2013	M. Funtilon	1C161M255A	189.98		7.8	
	Sept 18, 2013	M. Ano	1C171F261A	157.21		0	
	Sept 19, 2013	C. Joaquin	1C171G262A	160.02		0	
	Sept 22, 2013	M. Ano	1C171H265A	209.81		0	
	Sept 22, 2013	C. Joaquin	1C171D265B	214.52		0	
	Sept 23, 2013	P. Arceo	1C171I266A	148.35		0	
	Sept 24, 2013	M. Ano	1C171J267A	122.4		0	
	Sept 25, 2013	P. Arceo	1C171C268B	173.2		0	
	Sept 28, 2013	M. Ano	1C171K271A	110.76		0	
	Sept 29, 2013	P. Arceo	1C171L272A	58.93		42.26	

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Location	Date Surveyed	Operator	Mission Name	Flood-plain Surveyed Area (km²)	Total Flood-plain Area (km²)	Water-shed Surveyed Area (km²)	Total Water-shed Area (km²)
Cagayan	Sept 30, 2013	C. Joaquin	1C161K-S2271A	81.794		0	
	Oct 3, 2013	M. Ano	2CAG-161S276A	84.058		0	
	Oct 4, 2013	P. Mars	2CAG 161HS 277	132.63		0	
	Oct 8, 2013	P. Mars	2CAG 161NO 281A	187.05		40.26	
	Oct 9, 2013	D. Aldovino	2CAG 161QLS 282A	149.515		0	
	Oct 9, 2013	P. Mars, J. Alviar	2CAG 161E 282B	88.324		1.162	
	Oct 13, 2013	L. Acuna, V. Tonga	2CAG 161CD 286A	151.193		5.627	
	Oct 14, 2013	L. Acuna	2CAG 221A 287A	179.29		0	
	Oct 14, 2013	M. Funtilon	2CAG 221B 287B	136.09		0	
	Oct 15, 2013	L. Acuna, M. Baliguas	2CAG 221C 288A	149.47		0	
	Oct 15, 2013	R. Punto	2CAG 221D 288B	69.513		8.755	
	Oct 16, 2013	M. Baliguas, V. Tonga	2CAG 231A 289A	150.958		0	
	Oct 17, 2013	L. Acuna, V. Tonga	2CAG 221EB-S290A	218.79		0	
	Oct 17, 2013	M. Baliguas	2CAG 231B290B	71.616		0	
	Oct 18, 2013	R. Punto	2CAG 231D291A	81.973		0	
	Oct 18, 2013	M. Baliguas	2CAG 231BS291B	49.93		0	
	Oct 19, 2013	M. Baliguas	2CAG 221DS 292A, 2CAG 231BS 292A	116.86		0	
	Oct 21, 2013	V. Tonga	2CAG161B-C294A	103.91		0	

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Location	Date Surveyed	Operator	Mission Name	Flood-plain Surveyed Area (km²)	Total Flood-plain Area (km²)	Water-shed Surveyed Area (km²)	Total Water-shed Area (km²)
Cagayan	Oct 22, 2013	V. Tonga, M. Baliguas	2CAG 161AB 295A	104.01		0	
	Oct 22, 2013	P. Arceo	3CAGR 295A	53.135		0	
	Oct 23, 2013	C. Joaquin	3CAG 111C 296A	103.84		0	
	Oct 25, 2013	M. Baliguas	2CAG 111E 298A	255.41		0	
	Oct 25, 2013	I. Roxas	2CAG 111D 298B	149.09		0	
	Oct 25, 2013	P. Arceo	3CAG 51E 298A	134.88		0	
	Oct 25, 2013	C. Joaquin	3CAG 51E 298B	51.556		0	
	Oct 26, 2013	P. Mars	2CAG 101D 299A	176.63		0	
	Oct 26, 2013	I. Roxas	2CAG 111A 299B	118.52		0	
	Oct 26, 2013	C. Joaquin	3CAG 512 99A	110.37		0	
	Oct 26, 2013	P. Arceo	3CAG 51F 299B	82.106		0	
	Oct 27, 2013	M. Baliguas	2CAG 51G 300A	151.62		0	
	Oct 27, 2013	I. Roxas	2CAG 61A 300B	132.62		0	
	Oct 27. 2013	P. Arceo	2CAG 111CS 300A	169.35		0	
	Oct 27. 2013	C. Joaquin		112.4			
	Oct 28, 2013	C. Joaquin	3CAG 110A 301A	102.94		0	
	Oct 28, 2013	I.Roxas	2CAG 51A 301A	168.18		15.81	
	Oct 28, 2013	P. Mars	2CAG 61A 301B	130.4		16.16	
	Oct 29, 2013	I.Roxas	2CAG 61B 302A	179.972		26.47	
	Oct 29, 2013	M. Baliguas	2CAG 61D 302B	102.78		2.49	

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Location	Date Surveyed	Operator	Mission Name	Flood-plain Surveyed Area (km²)	Total Flood-plain Area (km²)	Water-shed Surveyed Area (km²)	Total Water-shed Area (km²)
Cagayan	Oct 29, 2013	C. Joaquin	3CAG 111B 302A	149.1		0	
	Oct 29, 2013	P. Arceo	3CAG 51B 302B	88.596		0	
	Nov 5, 2013	V. Tonga	3CAGR 309A	47.248		2.697	
	Nov 7, 2013	D. Aldovino	2CAG 21A 311A, 2CAG 51BS 311A	78.132		5.217	
	Nov 7, 2013	V. Tonga	2CAG 51BS 2311B	64.311		0	
	Nov 10, 2013	V. Tonga	2CAG 21A 314B	119.243		0.864	
	Nov 11, 2013	D. Aldovino	2CAG 11D 315A	184.35		5.11	
	Nov 11, 2013	V. Tonga	2CAG 21AS 315B	85.207		2.757	
	Nov 12, 2013	V. Tonga	2CAG 51A 316A	128.65		14.49	
	Nov 12, 2013	D. Aldovino	2CAG 51AS 316B	40.149		0.499	
	Nov 13, 2013	V. Tonga	2CAG 51AS 2317A	80.895		0	
	Nov 13, 2013	D. Aldovino	2CAG 11AS 2317B	32.694		0	
	Nov 14, 2013	V. Tonga	2CAG21A-S2318A	118.124		29.29	
	Nov 29, 2013	I. Roxas	2CAG-101C333A	155.977		0	
	Nov 30, 2013	D. Aldovino	2CAG-101D334A	75.775		0	
	Dec 2, 2013	P. Mars, F. Sable	2CAG 171A 336B	63.253		0	
	Dec 3, 2013	P. Mars	2CAG 171A 337A	157.74		0	
	Dec 4, 2013	P. Mars, F. Sable	2CAG 161AB 338A	132.27		4.51	

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Location	Date Surveyed	Operator	Mission Name	Flood-plain Surveyed Area (km²)	Total Flood-plain Area (km²)	Watershed Surveyed Area (km²)	Total Watershed Area (km²)
Cagayan	Dec 4, 2014	R. Punto	2CAG-161DES338B	225.34		0	
	Dec 5, 2013	P. Mars, F. Sable	2CAG161BC-DES339A	289.98		0	
	Dec 5, 2013	R. Punto	2CAG 171 339B	55.671		0	
	Dec 7, 2013	P. Mars, F. Sable	2CAG-171B341A	215.3		0	
	Dec 7, 2013	R. Punto	2CAG-171C341B	35.451		0	
	Dec 8, 2013	F. Sable	2CAG-171C342A	206.83		0	
	Dec 10, 2013	P. Mars	2CAG 221CS 231AS 344A	168.571		0	
	Dec 10, 2013	F. Sable	2CAG 171D 344B	45.716		0	
	Dec 11, 2013	F. Sable	2CAG-101G345A	135.67		0	
	Dec 16, 2013	F. Sable	2CAG101FG-S350A	115.58		0	
	Dec 17, 2013	I.Roxas	2CAG-101D351A	89.422		0	
	Dec 17, 2013	R. Punto	2CAG-171C341B	35.451		0	
	Feb 5, 2014	V. Tonga	2CAG 101DS 035B	104.98		0	
	Feb 6, 2014	M. Baliguas	2CA-G111037A, 2CAG101AC-S037A	129.008		0	
	Feb 6, 2014	V. Tonga	2CAG 101A 037B	115.16		0	
	Feb 7, 2014	M. Baliguas	2CAG-51D038A, 2CAG101A-S038A	174.812		0	
	Feb 8, 2014	V. Tonga	2CAG101A-S039A	99.849		0	

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Location	Date Surveyed	Operator	Mission Name	Flood-plain Surveyed Area (km²)	Total Flood-plain Area (km²)	Water-shed Surveyed Area (km²)	Total Watershed Area (km²)
Cagayan	Feb 9, 2014	M. Baliguas	2CAG 101GS 040A, 2CAG 101H 040A	158.585		0	
	Feb 10, 2014	V. Tonga	2CA-G101EO041A	89.965		0	
	Feb 11, 2014	M. Baliguas	2CAG-111F042A, 2CAG101E-S042A	122.84		0	
	Feb 12, 2014	V. Tonga	2CAG 11A 043A	123.93		0	
	Feb 13, 2014	M. Baliguas	2CAG-61D044A, 2CA-G61E044A	204.04		0	
	Feb 13, 2014	V. Tonga	2CAG-111ESO44B			0	
	Feb 15, 2014	M. Baliguas	2CAG101A-S046A	110.653		0	
	Feb 17, 2014	V. Tonga	2CAG-51D048A	98.667		70.60	
	Feb 17, 2014	M. Baliguas	2CAG 51A 048B	132.99		15.35	
	Feb 18, 2014	V. Tonga	2CAG 101ES 049A, 2CAG 101FS 049A	227.027		0	

4.2 LiDAR Data Processing

4.2.1 Trajectory Computation

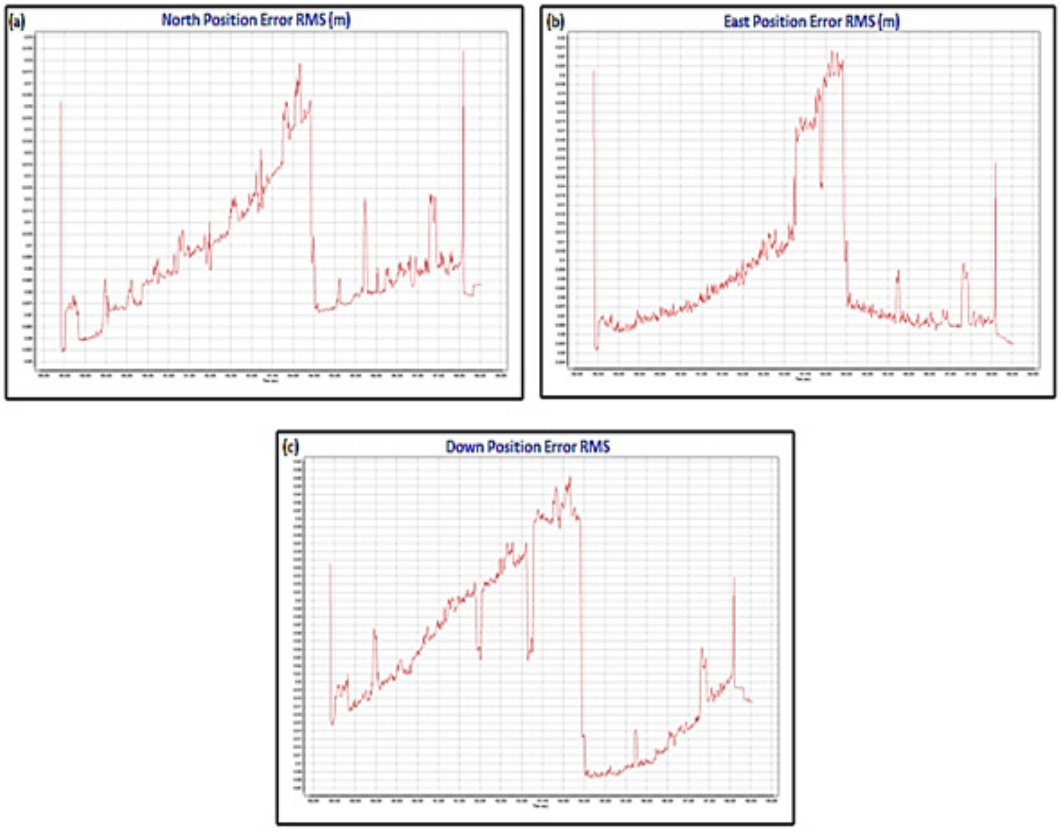

Figure 37. Smoothed Performance Metric Parameters of Cagayan flight

The *Smoothed Performance Metric* parameters of the Cagayan flight are shown in Figure 37. The x-axis is the time of flight, which is measured by the number of seconds from the midnight of the start of the GPS week. The y-axis is the RMSE value for a particular aircraft position with respect to GPS survey time. The North (Figure 37a) and east (Figure 37b) position RMSE values fall within the prescribed accuracy of 4 centimeters, and all Down (Figure 37c) position RMSE values fall within the prescribed accuracy of 8 centimeters.

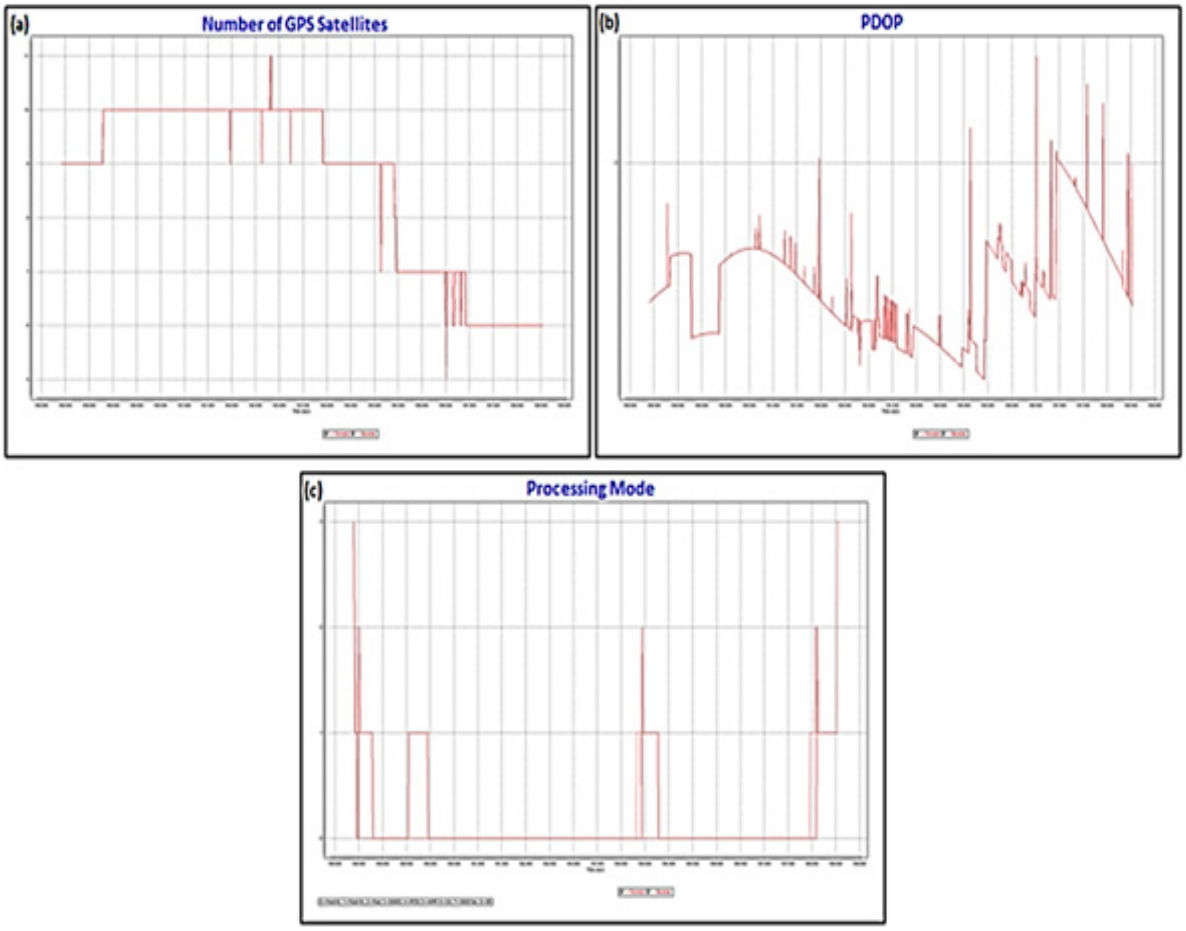

Figure 38. Solution Status Parameters of Cagayan Flight.

The *Solution Status* parameters of the computed trajectory for Cagayan flight 529P, which are the number of GPS satellites, Positional Dilution of Precision (PDOP), and the GPS processing mode used are shown in Figure 38. The number of GPS satellites (Figure 38a) graph indicates that the number of satellites during the acquisition was between 6 and 10. The PDOP (Figure 38b) value does not exceed the value of 3, indicating optimal GPS geometry. The processing mode (Figure 38c) varies from 0 to 1, the value 0 corresponds to a Fixed, Narrow-Lane mode, which indicates an optimum solution for trajectory computation by POSPac MMS v6.2; the value 1 corresponds a Wide-Lane mode. All of the parameters satisfied the accuracy requirements for optimal trajectory solutions as indicated in the methodology.

4.2.2 LiDAR Point Cloud Computation

The LAS data output contains 12 flight lines, with each flight line containing two channels, a feature of the Pegasus system. The result of the boresight correction standard deviation values for both channel 1 and channel 2 are better than the prescribed 0.001°. The position of the LiDAR system is also accurately computed since all GPS position standard deviations are less than 0.0016 meter. The attitude of the LiDAR system passed accuracy testing since the standard deviation of the corrected roll and pitch values of the IMU attitudes are less than 0.001°.

4.2.3 LiDAR Data Quality Checking

The LAS boundary of the LiDAR data on top of the SRTM elevation data is shown in Figure 39. The map shows gaps in the LiDAR coverage that are attributed to cloud cover present during the survey.

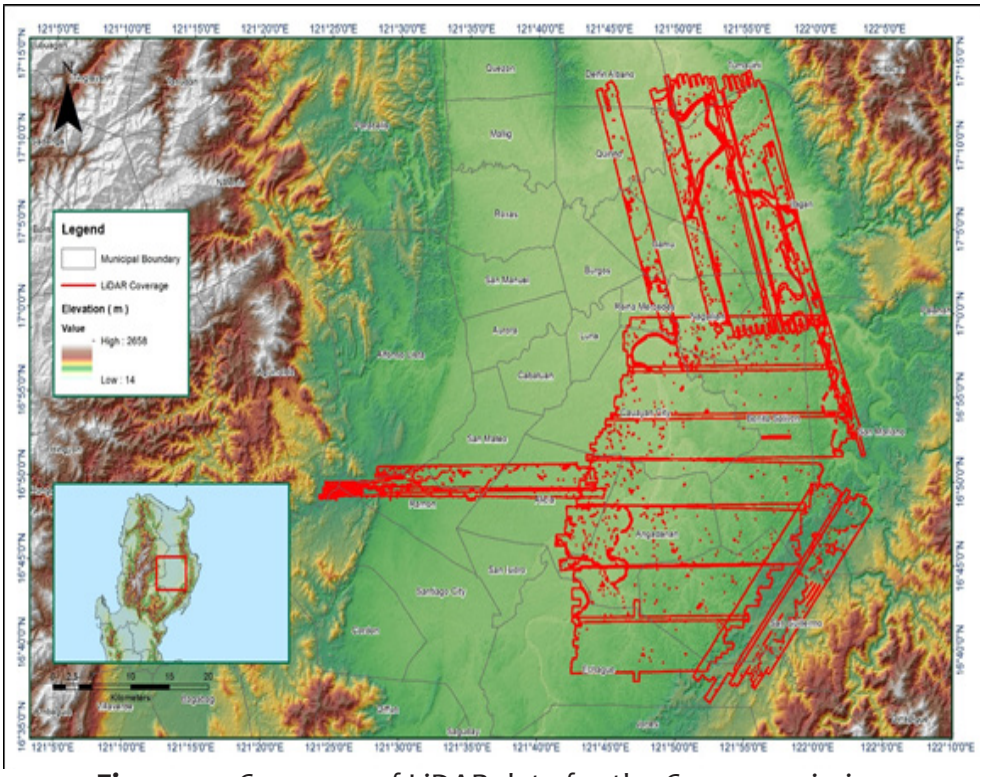

Figure 39. Coverage of LiDAR data for the Cagayan mission

The overlap data for the merged LiDAR data showing the number of channels that pass through a particular location is shown in Figure 40. Since the Pegasus system employs two channels, an average value of 2 (blue) for areas where there are only two overlapping flight lines, and a value of 3 (yellow) or more (red) for areas with three or more overlapping flight lines, are expected. The average data overlap for Cagayan is 42.31%.

The density map for the merged LiDAR data, with the red areas showing the portions of the data that satisfy the 2 points per square meter requirement, is shown in Figure 41. It was determined that 99.63% of the total area satisfied the point density requirement, and the average density for the entire survey area is 3.14 points per square meter.

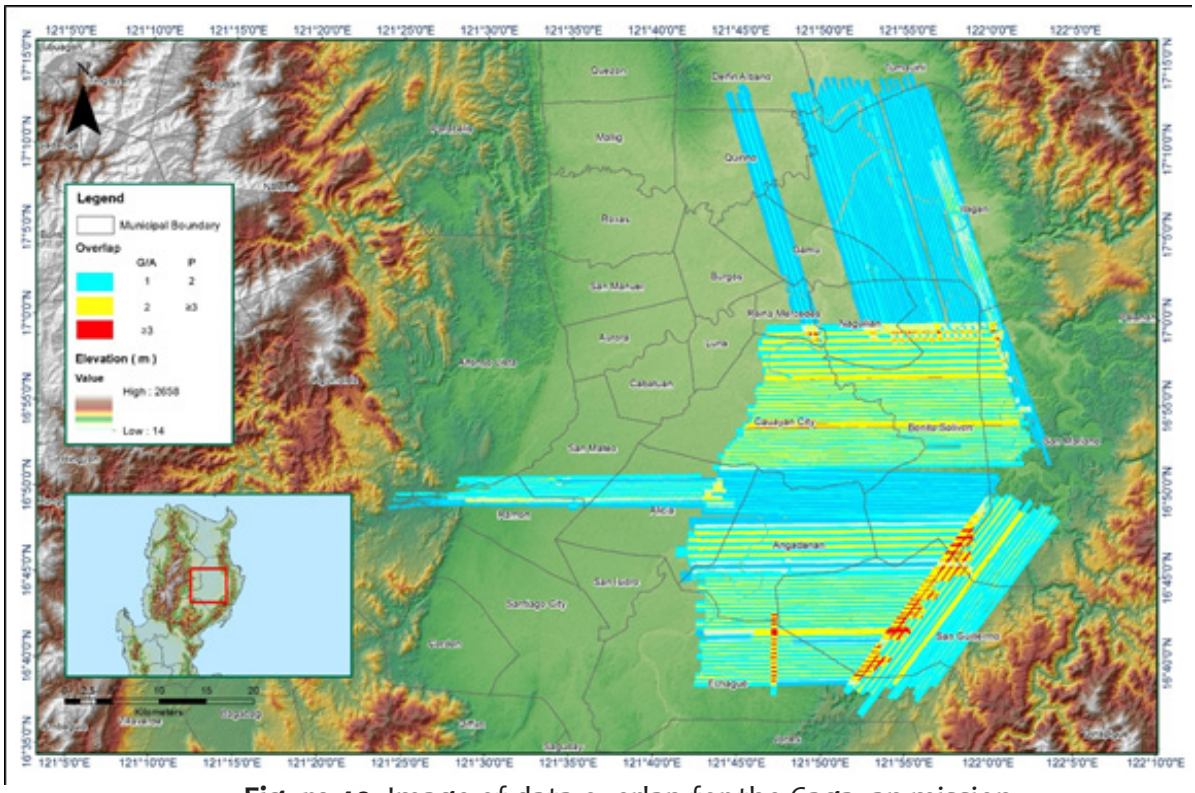

Figure 40. Image of data overlap for the Cagayan mission

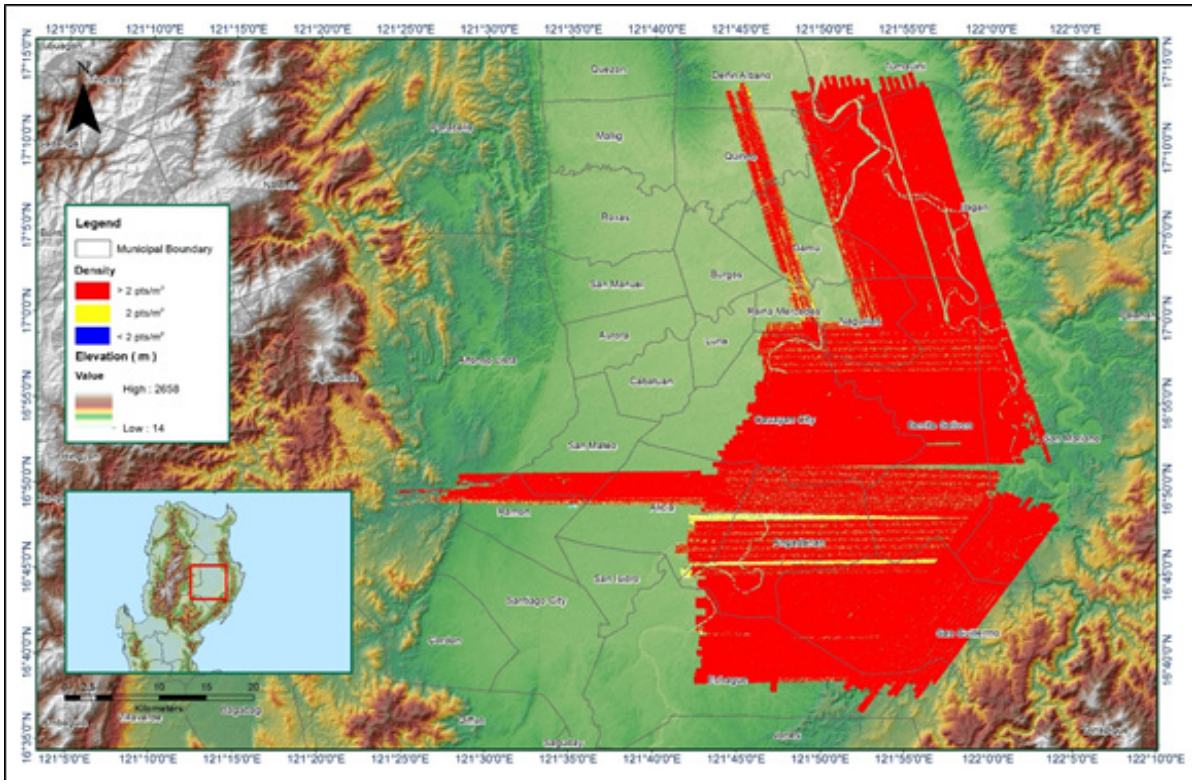

Figure 41. Density map of merged LiDAR data for the Cagayan mission

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The elevation difference between overlaps of adjacent flight lines is shown in Figure 42. The default color range is from blue to red, where bright blue areas correspond to a -0.20 m difference, and bright red areas correspond to a +0.20 m difference. Areas with bright red or bright blue need to be investigated further using QT Modeler.

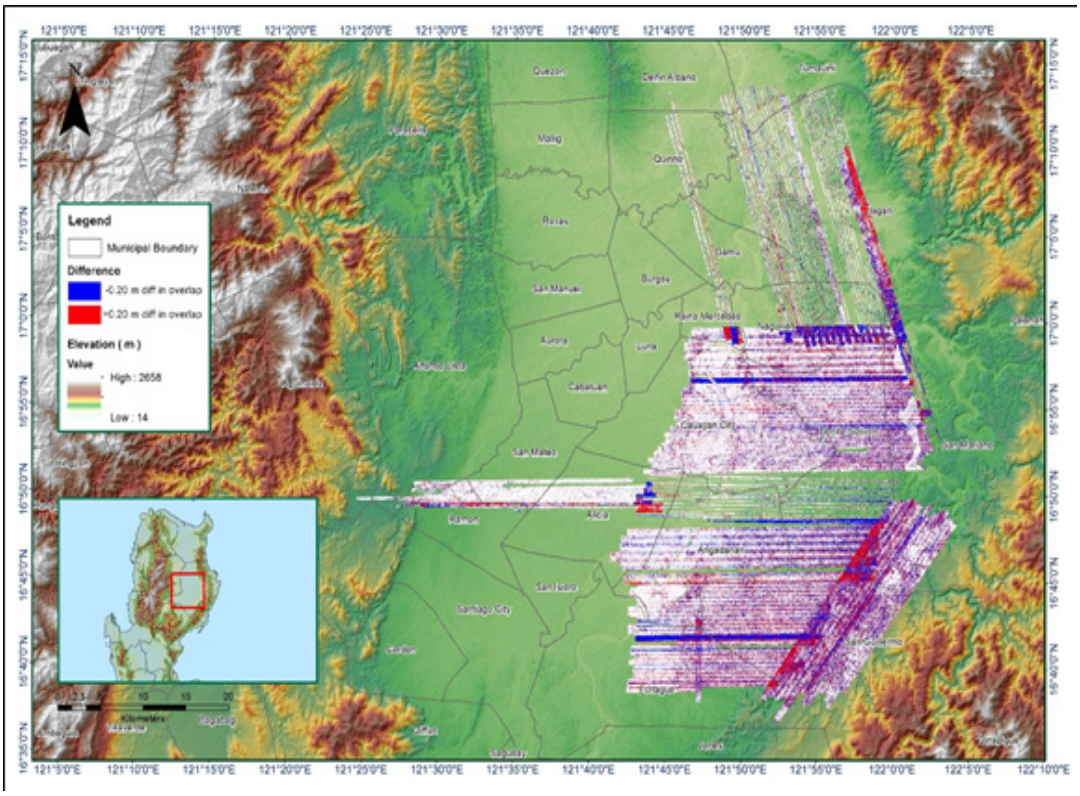

Figure 42. Elevation difference map between flight lines

A screen capture of the LAS data loaded in QT Modeler is shown in Figure 43a. A line graph showing the elevations of the points from all of the flight strips traversed by the profile in red line is shown in Figure 43b. It is evident that there are differences in elevation, but the differences do not exceed the 20-centimeter mark. No reprocessing was necessary for this LiDAR dataset.

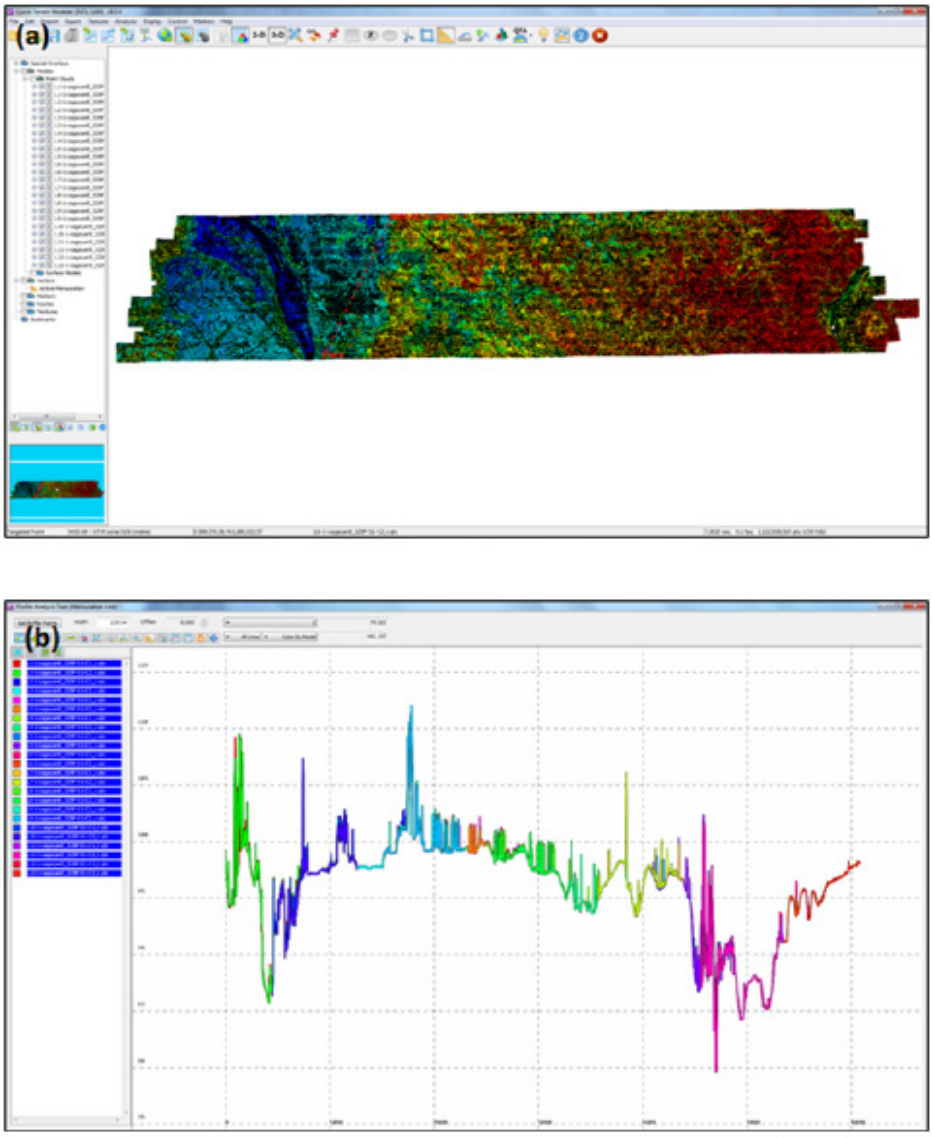

Figure 43. Quality checking with the profile tool of QT Modeler

4.2.4 LiDAR Point Cloud Classification and Rasterization

The block system that TerraScan employed for the LiDAR data is shown in Figure 44a generated a total of 19,119 1 kilometer by 1 kilometer blocks. The final classification of the point cloud for a mission in the Cagayan floodplain is shown in Figure 44b. The number of points classified to the pertinent categories along with other information for the mission is shown in Table 26.

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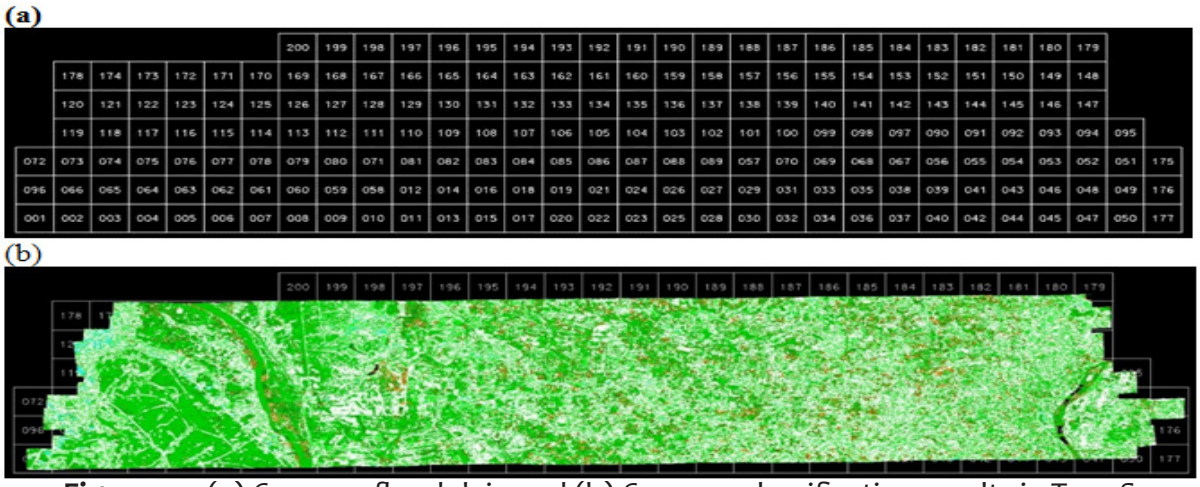

Figure 44. (a) Cagayan floodplain and (b) Cagayan classification results in TerraScan

Table 26. Cagayan classification results in TerraScan

Pertinent Class	Count
Ground	9,426,294,352
Low Vegetation	12,646,823,530
Medium Vegetation	26,185,909,136
High Vegetation	8,127,853,641
Building	391,440,100
Number of 1km x 1km blocks	19,119
Maximum Height	601.66 m
Minimum Height	21.54 m

An isometric view of an area before (a) and after (b) running the classification routines for the mission is shown in Figure 45. The ground points are in brown, the vegetation is in different shades of green, and the buildings are in cyan. It can be seen that residential structures adjacent or even below canopy are classified correctly, due to the density of the LiDAR data.

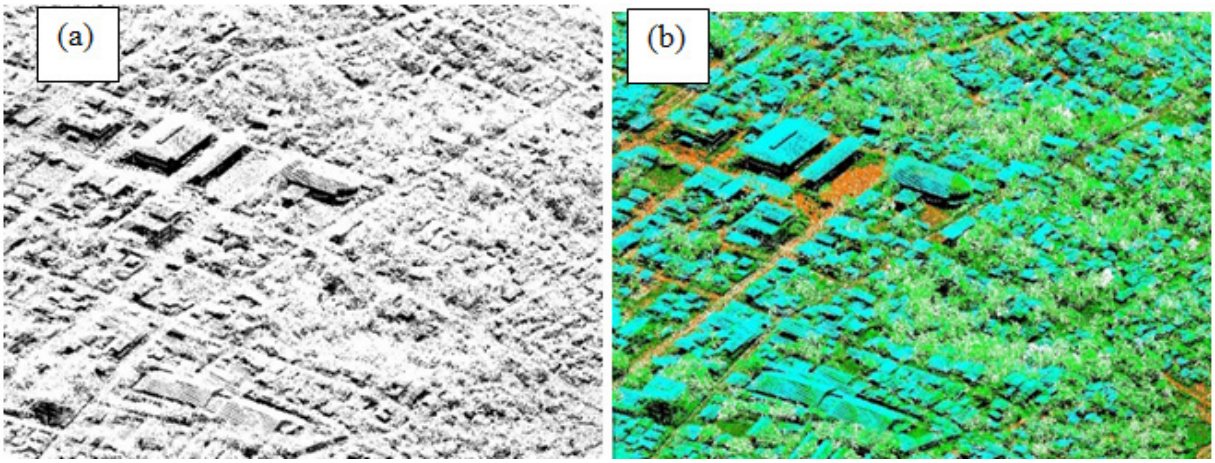

Figure 45. Point cloud (a) before and (b) after classification

4.2.5 DEM Editing and Hydro-correction

Portions of DTMs before and after manual editing are shown in Figure 46. It shows that the embankment might have been drastically cut by the classification routine in Figure 46a and clearly needed to be retrieved to complete the surface as in Figure 46b to allow to hydrologically correct flow of water. A small stream suffers from discontinuity of flow due to an existing bridge in Figure 46c. The bridge is removed also in order to hydrologically correct the flow of water through the river in Figure 46d.

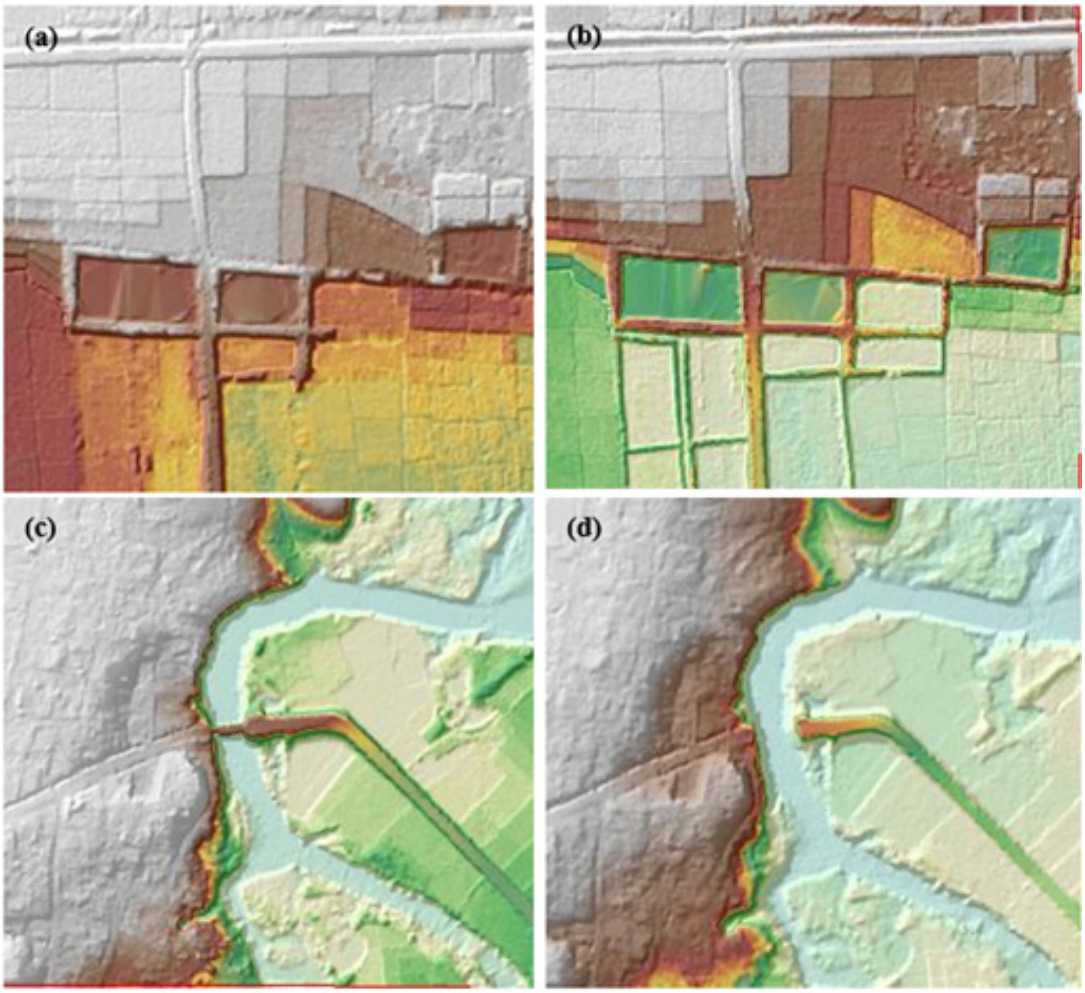

Figure 46. Images of DTMs before and after manual editing

Results and Discussion

The extent of the validation survey done by the Data Validation Component (DVC) in Cagayan to collect points with which the LiDAR dataset is validated is shown in Figure 47. A total of 5713 control points were collected. The good correlation between the airborne LiDAR elevation values and the ground survey elevation values, which reflects the quality of the LiDAR DTM is shown in Figure 48. The computed RMSE between the LiDAR DTM and the surveyed elevation values is 12.757 centimeters with a standard deviation of 12.756 centimeters. The LE 90 value represents the linear vertical distance that 90% of the sampled DEM points and their respective DVC validation point counterparts should be found from each other. Other statistical information can be found in Table 27. The final DTM and extent of the bathymetric survey done along the river is shown in Figure 49.

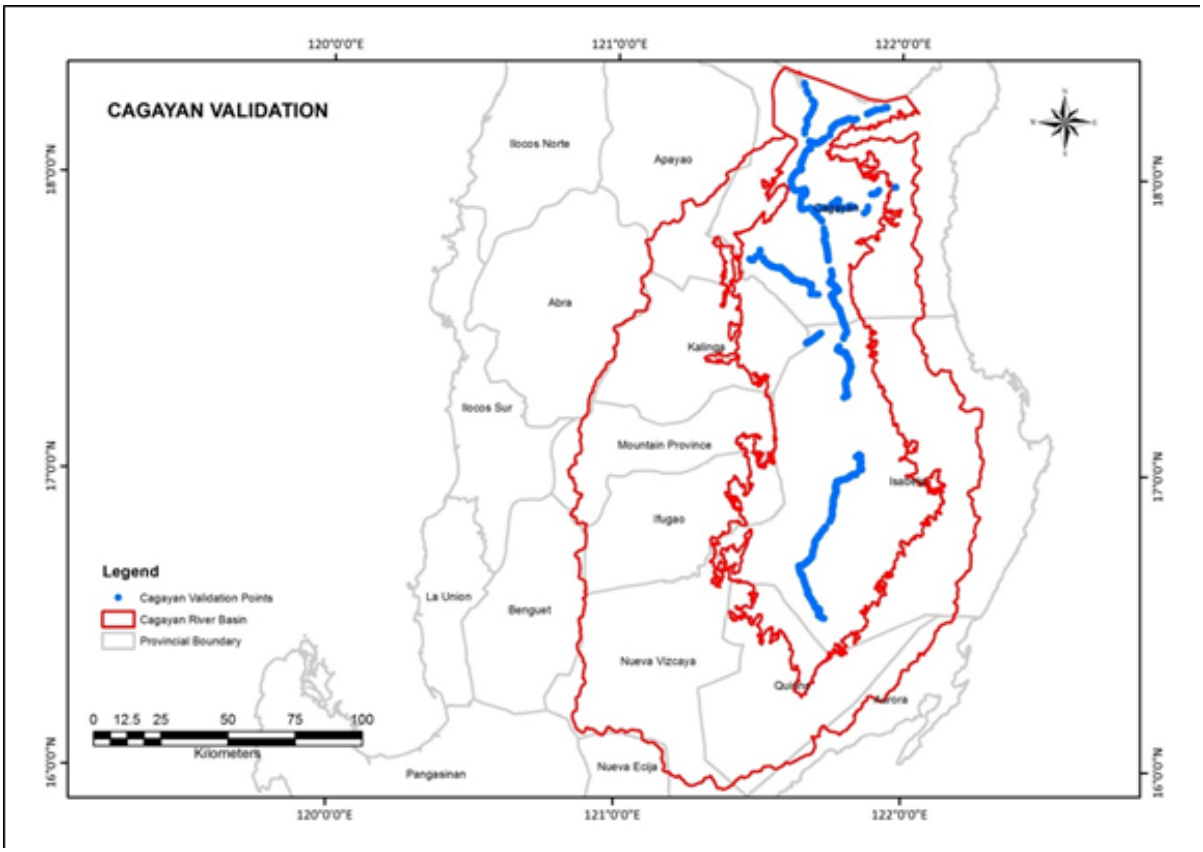

Figure 47. Map of Cagayan River System with validation survey shown in blue

Results and Discussion

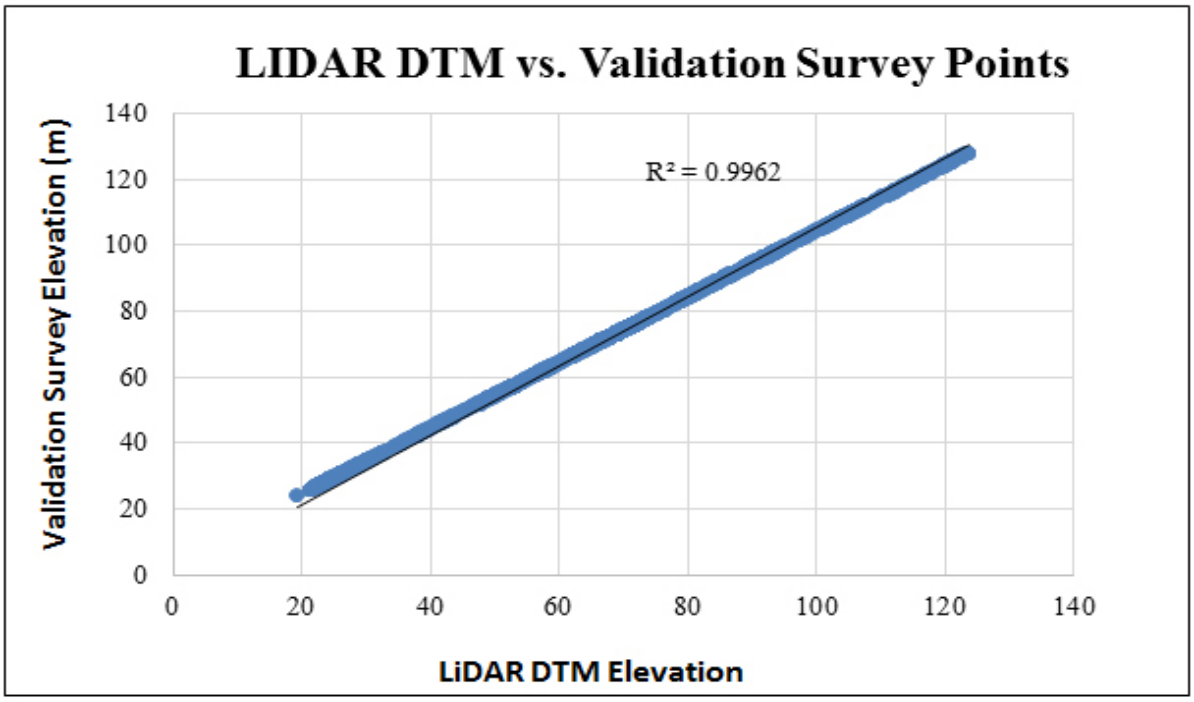

Figure 48. One-one Correlation plot between topographic and LiDAR data

Table 27. Statistical values for calibration of flights.

Statistical Information	Values (cm)
Min	-29.828
Max	27.385
RMSE	12.757
Stdev	12.756
LE90	16.583

Results and Discussion

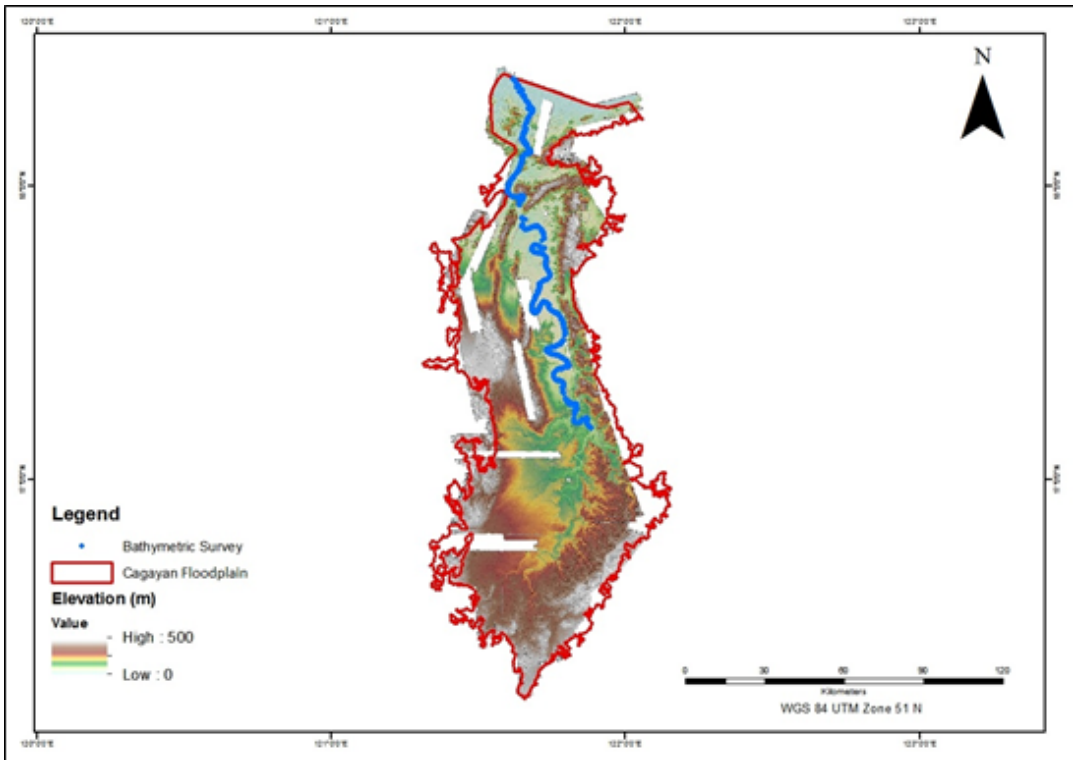

Figure 49. Final DTM of Cagayan with validation survey shown in blue

The floodplain extent for Cagayan is also presented, showing the completeness of the LiDAR dataset and DSM produced, is shown in Figure 50. Samples of 1 kilometer by 1 kilometer of DSM and DTM are shown in Figure 51 and Figure 52, respectively.

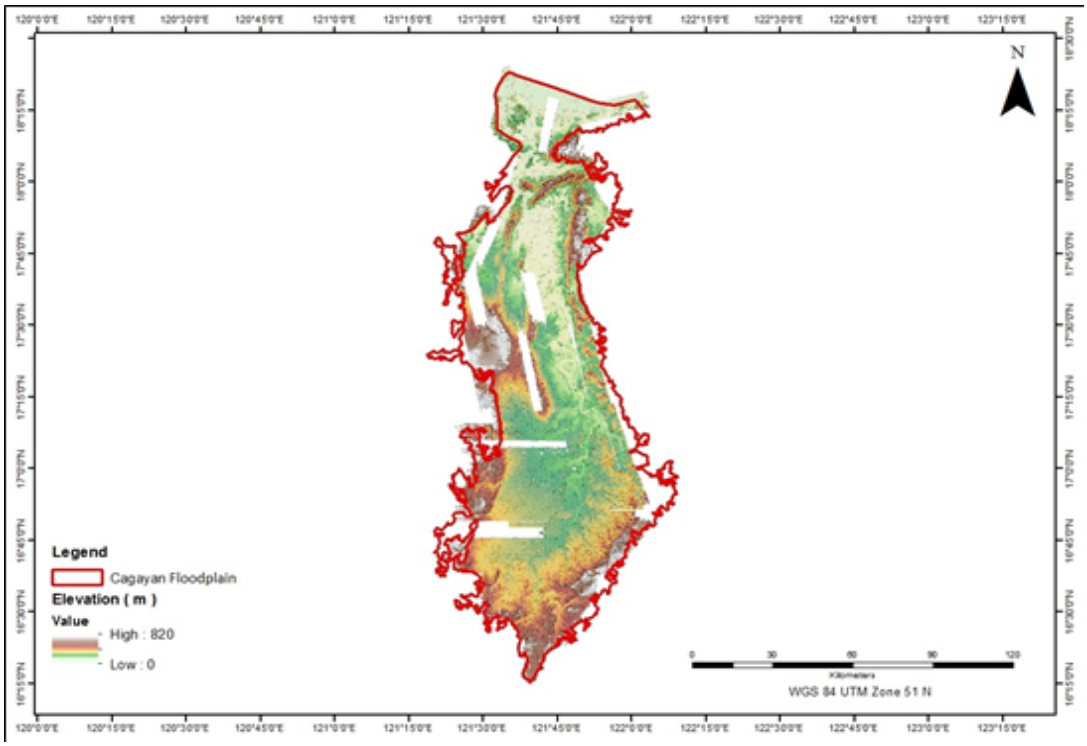

Figure 50. Final DSM in Cagayan

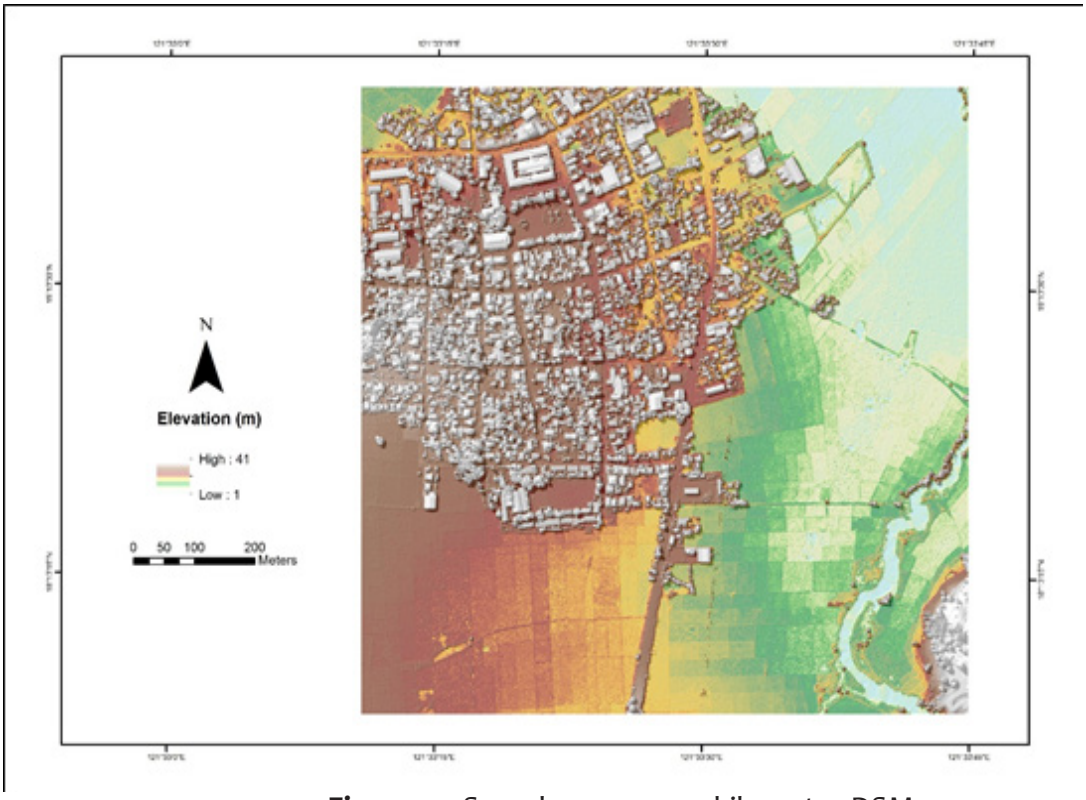

Figure 51. Sample 1x1 square kilometer DSM

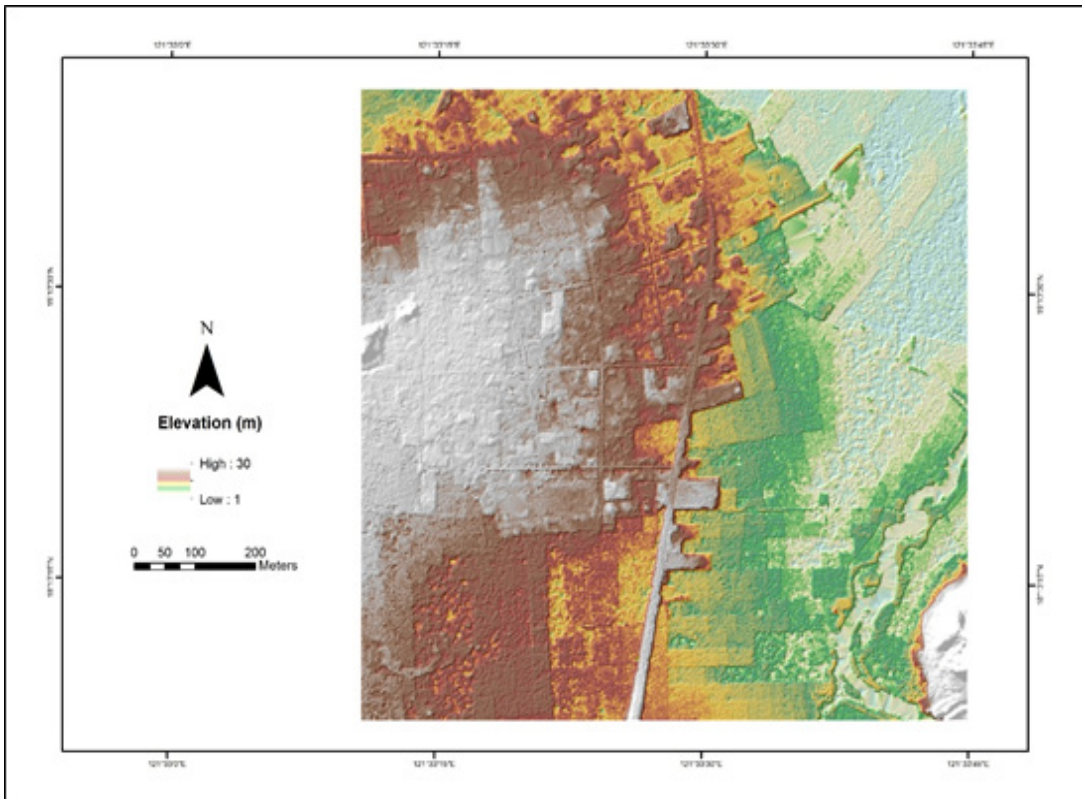

Figure 52. Sample 1x1 square kilometer DTM

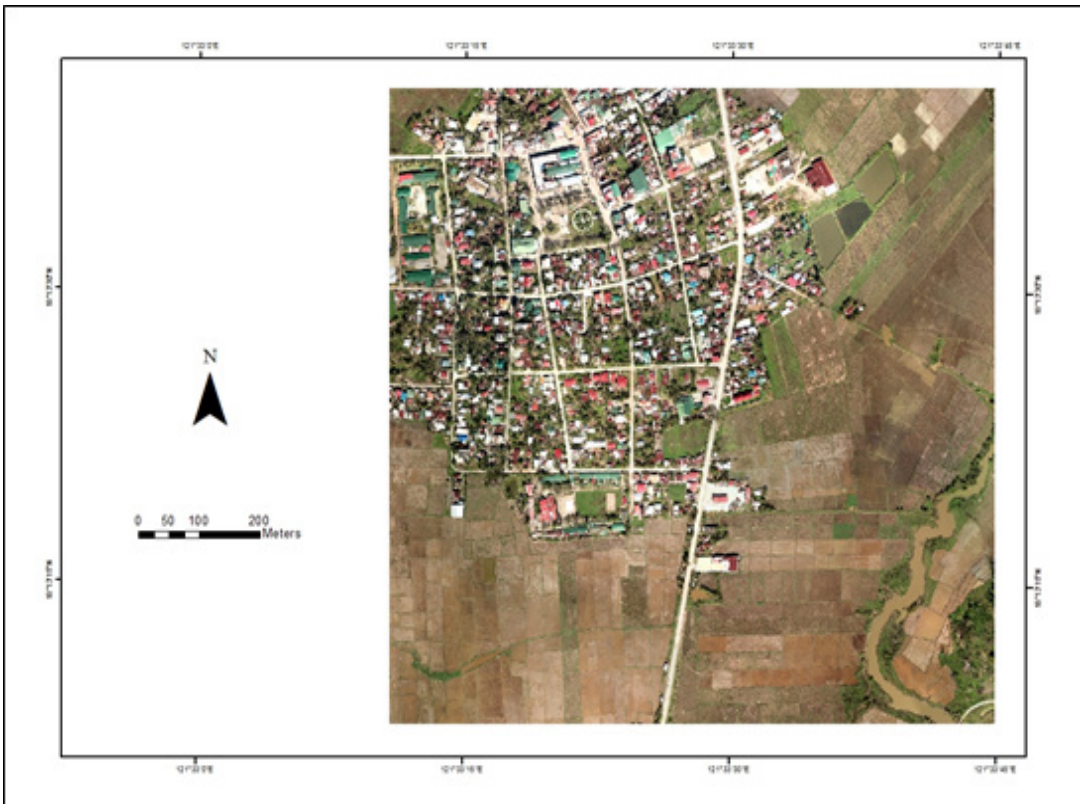

Figure 53. Image of data overlap for the Cagayan mission

Annexes

Annex A

OPTECH TECHNICAL SPECIFICATION OF THE PEGASUS SENSOR

Parameter	Specification
Operational envelope (1,2,3,4)	150-5000 m AGL, nominal
Laser wavelength	1064 nm
Horizontal accuracy (2)	1/5,500 x altitude, 1σ
Elevation accuracy (2)	< 5-20 cm, 1σ
Effective laser repetition rate	Programmable, 100-500 kHz
Position and orientation system	POS AV ™AP50 (OEM)
Scan width (FOV)	Programmable, 0-75 °
Scan frequency (5)	Programmable, 0-140 Hz (effective)
Sensor scan product	800 maximum
Beam divergence	0.25 mrad (1/e)
Roll compensation	Programmable, ±37° (FOV dependent)
Vertical target separation distance	<0.7 m
Range capture	Up to 4 range measurements, including 1st, 2nd, 3rd, and last returns
Intensity capture	Up to 4 intensity returns for each pulse, including last (12 bit)
Image capture	5 MP interline camera (standard); 60 MP full frame (optional)
Full waveform capture	12-bit Optech IWD-2 Intelligent Waveform Digitizer
Data storage	Removable solid state disk SSD (SATA II)
Power requirements	28 V, 800 W, 30 A
Dimensions and weight	Sensor: 630 x 540 x 450 mm; 65 kg;
	Control rack: 650 x 590 x 490 mm; 46 kg
Operating Temperature	-10°C to +35°C
Relative humidity	0-95% non-condensing

Annex B

OPTECH TECHNICAL SPECIFICATION OF THE D-8900 AERIAL DIGITAL CAMERA

Parameter	Specification
Camera Head	
Sensor type	60 Mpix full frame CCD, RGB
Sensor format (H x V)	8, 984 x 6, 732 pixels
Pixel size	6µm x 6 µm
Frame rate	1 frame/2 sec.
FMC	Electro-mechanical, driven by piezo technology (patented)
Shutter	Electro-mechanical iris mechanism 1/125 to 1/500++ sec. f-stops: 5.6, 8, 11, 16
Lenses	50 mm/70 mm/120 mm/210 mm
Filter	Color and near-infrared removable filters
Dimensions (H x W x D)	200 x 150 x 120 mm (70 mm lens)
Weight	~4.5 kg (70 mm lens)
Controller Unit	
Computer	Mini-ITX RoHS-compliant small-form-factor embedded computers with AMD TurionTM 64 X2 CPU 4 GB RAM, 4 GB flash disk local storage IEEE 1394 Firewire interface
Removable storage unit	~500 GB solid state drives, 8,000 images
Power consumption	~8 A, 168 W
Dimensions	2U full rack; 88 x 448 x 493 mm
Weight	~15 kg
Image Pre-Processing Software	
Capture One	Radiometric control and format conversion, TIFF or JPEG
Image output	8,984 x 6,732 pixels 8 or 16 bits per channel (180 MB or 360 MB per image)

Annex C

THE SURVEY TEAM

Data Acquisition Component Sub-team	Designation	Name	Agency/Affiliation
Data Acquisition Component Leader	Data Component Project Leader -I	ENGR. CZAR JAKIRI S. SARMIENTO	UP-TCAGP
Survey Supervisor	Chief Science Research Specialist (CSRS)	ENGR. CHRISTOPHER CRUZ	UP TCAGP
	Supervising Science Research Specialist	LOVELY ACUNA	UP TCAGP
	Supervising Science Research Specialist	ENGR. LOVELYN ASUNCION	UP TCAGP
LiDAR Operation	Senior Science Research Specialist	MARK GREGORY ANO	UP TCAGP
	Senior Science Research Specialist	JASMINE ALVIAR	UP TCAGP
Ground Survey	Senior Science Research Specialist	ENGR. GEROME HIPOLITO	UP TCAGP
LiDAR Operation	Senior Science Research Specialist	AUBREY MATIRA	UP TCAGP
	Research Associate	CHRISTOPHER JOAQUIN	UP TCAGP
Ground Survey	Research Associate	ENGR. JAMES WILBERT BELTRAN	UP TCAGP
LiDAR Operation	Research Associate	DAN CHRISTOFFER ALDOVINO	UP TCAGP
	Research Associate	MARVY FUNTILON	UP TCAGP
	Research Associate	PAULINE JOANNE ARCEO	UP TCAGP
	Research Associate	MARY CATHERINE ELIZABETH BALIGUAS	UP TCAGP
	Research Associate	MA. VERLINA TONGA	UP TCAGP
	Research Associate	JULIE PEARL MARS	UP TCAGP
	Research Associate	ENGR. IRO NIEL ROXAS	UP TCAGP
	Research Associate	PATRICIA YSABEL ALCANTARA	UP TCAGP
Ground Survey	Research Associate	RENAN PUNTO	UP TCAGP
	Research Associate	KENNETH QUISADO	UP TCAGP

Annex C

THE SURVEY TEAM

Data Acquisition Component Sub-team	Designation	Name	Agency/Affiliation
	AIRBORNE SECURITY	SSG. PRADYUMNA DAS RAMIREZ	PHILIPPINE AIR FORCE (PAF)
LiDAR OPERATION	PILOT	CAPT. JAMAAL CLEMENTE	ASIAN AEROSPACE CORPORATION (AAC)
LiDAR OPERATION	CO-PILOT	CAPT. MARK TANGONAN	ASIAN AEROSPACE CORPORATION (AAC)

Annex D

ANNEX D. DATA TRANSFER SHEET FOR CAGAYAN FLOODPLAIN

DATA TRANSFER SHEET
Feb 18, 2014

DATE of Operation	FLIGHT NO.	MISSION NAME	SENSOR	RAW LAS		POS (MB)	RAW IMAGES (GB)	MISSION LOG FILE (KB)	RANGE (GB)	DIGITIZER (GB)	BASE STATION (S)		OPERATOR COMMENTS (OPC LOGS) (Bytes)	Flight Plans		CASI (GB)	SERVER LOCATION
				ACTUAL (MB)	KML (KB)						BASE (MB)	BASE INFO (BYTES)		Actual (KB)	Kml (KB)		
10/29/2013	699G	2CAG61B302A	Gemini	N/A	63KB	281MB	46.4GB	365KB	23.5	157		12.3	459		12	N/A	\\FREENAS\geostorage7\Airborne_Raw\699G
10/29/2013	701G	2CAG61E302B	Gemini	N/A	318KB	145MB	23.7GB	188KB	13.2	N/A		12.3	539		9	N/A	\\FREENAS\geostorage7\Airborne_Raw\701G
2/2/2014	7047GC	2MtAS033A	Gemini	N/A	104	138	N/A	N/A	3.64	N/A	2.42	117	666	72.8	7.9	30.4	\\FREENAS\geostorage7\Airborne_Raw\7047GC
2/4/2014	7051GC	2CAG101D5035A	Gemini	N/A	178	152	N/A	N/A	19	N/A	9.06	143	355	310	8.13	47.9	\\FREENAS\geostorage7\Airborne_Raw\7051GC
2/6/2014	7054GC	2CAG101A037A & 2CAG111C037A	Gemini	N/A	43.3 & 140	210	N/A	N/A	17.9	N/A	1.15 & 9.58	385	721	43.3 & 140	446 & 333	58.4	\\FREENAS\geostorage7\Airborne_Raw\7054GC
2/6/2014	7055GC	2CAG101A037B	Gemini	N/A	210	162	N/A	N/A	15.9	N/A	576KB & 9.58	385	404	166	11.4KB	72.2	\\FREENAS\geostorage7\Airborne_Raw\7055GC
2/7/2014	7057GC	2CAG51D038A & 2CAG101D5038A	Gemini	N/A	251	176	N/A	N/A	19.2	N/A	937KB & 4.79	228	903	265 & 179	217 & 13.4	60.7	\\FREENAS\geostorage7\Airborne_Raw\7057GC
2/8/2014	7059GC	2CAG101A5039A & 2CAG111B5039A	Gemini	N/A	148	185	N/A	N/A	13.5	N/A	809KB & 9.85	252	339	204	NA	41	\\FREENAS\geostorage7\Airborne_Raw\7059GC
2/9/2014	7061GC	2CAG101G040A & 2CAG101H040A	Gemini	N/A	327	260	N/A	N/A	31.3	N/A	1.12 & 7.39	253	467	453 & 330	665	31.3	\\FREENAS\geostorage7\Airborne_Raw\7061GC

Received from

Name/Signature Lovely Acuna
Position Supervising SRS
Date 02/19/2014

Received by

Name/Signature JOIDA F. PRIETO
Position SSRS
Date

Verified by

Name/Signature JOIDA F. PRIETO
Position SSRS
Date

SEPT9G

DATA TRANSFER SHEET

Sep 9, 2013

DATE	FLIGHT NO.	MISSION NAME	SENSOR	RAW LAS	LOGS	POS	RAW IMAGES	MISSION LOG FILE	RANGE	DIGITIZER	BASE STATION(S)	OPERATOR COMMENTS (DPC LOGS)	FLIGHT PLAN	SERVER LOCATION
Sep 5, 2013	476G	**2C161K249B**	GEMINI	N/A	383 KB	196 MB	16.1 GB	129 KB	5.07 GB	N/A	37.2 MB	550 BYTES	3.72 KB	Z:\Airborne_Raw\476G
Sep 6, 2013	480G	**2C161O250B**	GEMINI	N/A	541 KB	163 MB	19.4 GB	187 KB	9.77 GB	N/A	20.2 MB	556 BYTES	4.68 KB	Z:\Airborne_Raw\480G
Sep 7, 2013	484G	**2C161J251B**	GEMINI	N/A	750 KB	268 MB	16.7 GB	342 KB	16.1 GB	N/A	2.29 MB 3.02	843 BYTES	3.94 KB	Z:\Airborne_Raw\482G

Received from

Name/Signature [signature]

Position [illegible]

Date 09/11

Received by

Name/Signature [signature]

Position SCRS

Date 09/11

DATA TRANSFER SHEET

Sep 10, 2013

DATE	FLIGHT NO.	MISSION NAME	SENSOR	OPERATOR	RAW LAS	LOGS	POS	RAW IMAGES	MISSION LOG FILE	RANGE	DIGITIZER	BASE STATION(S)	OPERATOR COMMENTS (DPC LOGS)	FLIGHT PLAN	SERVER LOCATION
Sep 4, 2013	479P	1C161H248A	Pegasus	M. Funtilon	94.3 MB	1.44 MB	190 MB	N/A	N/A	16.4 GB	N/A	34.8 MB	486 BYTES	613 KB	Z:\Airborne_Raw\479P
Sep 5, 2013	481P	1C161I249A	Pegasus	J. Alviar	115 MB	1.53 MB	203 MB	N/A	N/A	20.3 GB	N/A	37.2 MB	1.02 KB	466 KB	Z:\Airborne_Raw\481P
Sep 5, 2013	483P	1C161P249B	Pegasus	M. Funtilon	64.1 MB	0 BYTES	143 MB	N/A	N/A	11.2 GB	N/A	37.2 MB	471 BYTES	18.9 KB	Z:\Airborne_Raw\483P
Sep 6, 2013	485P	1C161I250A	Pegasus	M. Funtilon	252 MB	1.50 MB	232 MB	N/A	N/A	24.9 GB	N/A	32.8 MB	481 BYTES	466 KB	Z:\Airborne_Raw\485P
Sep 6, 2013	487P	1C161F250B	Pegasus	J. Alviar	175 MB	923 KB	138 MB	N/A	N/A	16.8 GB	N/A	32.8 MB	497 BYTES	395 KB	Z:\Airborne_Raw\487P
Sep 7, 2013	491P	1C161Q251A	Pegasus	M. Funtilon	128 MB	990 KB	163 MB	N/A	N/A	13.0 GB	N/A	5.03 MB	377 BYTES	20.4 KB	Z:\Airborne_Raw\491P

Received from

Name/Signature Patricia Ticantara

Position RA

Date 09/11

5E+08

Received by

Name/Signature Benjamin Magalbn

Position SIRS

Date 9/11

DATA TRANSFER SHEET

Sep 17, 2013

DATE	FLIGHT NO.	MISSION NAME	SENSOR	RAW LAS	LOGS	POS	RAW IMAGES	MISSION LOG FILE	RANGE	DIGITIZER	BASE STATION (S)	OPERATOR COMMENTS (DPC LOGS)	FLIGHT PLAN	SERVER LOCATION
Sep 11, 2013	501P	**1C161L254A**	Pegasus	39.0 MB	464 KB	80 MB	N/A	N/A	4.52 GB	N/A	9.06 MB	370 BYTES	579 KB	Z:\Airborne_Raw\501P
Sep 11, 2013	503P	**1C161L254B**	Pegasus	87.5 MB	686 KB	111 MB	N/A	N/A	8.73 GB	N/A	9.06 MB	402 BYTES	579 KB	Z:\Airborne_Raw\503P
Sep 12, 2013	507P	1C161M255A	Pegasus	201 MB	1.15 MB	178 MB	N/A	N/A	20.0 GB	N/A	6.27 MB	1000 BYTES	21.8 KB	Z:\Airborne_Raw\507P

Received from

Name/Signature Patricia Alcantara
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DATA TRANSFER SHEET

Sep 24, 2013

DATE	FLIGHT NO.	MISSION NAME	SENSOR	RAW LAS	LOGS	POS	RAW IMAGES	MISSION LOG FILE	RANGE	DIGITIZER	BASE STATION(S)	OPERATOR COMMENTS (DPC LOGS)	FLIGHT PLAN	SERVER LOCATION
22-Sep	545	1C171H265A	PEGASUS	204 MB	1.26 MB	165 MB	N/A	N/A	19.7 GB	N/A	12.5 MB	235 BYTES		Z:\Airborne_Raw\545P
22-Sep	547	1C171D265B	PEGASUS	178 MB	1.05 MB	179 MB	N/A	N/A	17.3 GB	N/A	12.5 MB	370 BYTES	24.5 KB	Z:\Airborne_Raw\547P

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Received by

Name/Signature Benjamin Magallon

Position SSRS

Date 9/24/13

DATA TRANSFER SHEET

Sep 24, 2013

DATE	FLIGHT NO.	MISSION NAME	SENSOR	RAW LAS	LOGS	POS	RAW IMAGES	MISSION LOG FILE	RANGE	DIGITIZER	BASE STATION(S)	OPERATOR COMMENTS (DPC LOGS)	FLIGHT PLAN	SERVER LOCATION
22-Sep	545	1C171H265A	PEGASUS	204 MB	1.26 MB	165 MB	N/A	N/A	19.7 GB	N/A	12.5 MB	235 BYTES	24.2 KB	Z:\Airborne_Raw\545P
22-Sep	547	1C171D265B	PEGASUS	178 MB	1.05 MB	179 MB	N/A	N/A	17.3 GB	N/A	12.5 MB	370 BYTES	24.5 KB	Z:\Airborne_Raw\547P
17-Sep	529	1C171E260A	PEGASUS	236 MB	1.23 MB	191 MB	N/A	N/A	22.3 GB	N/A	5.68 MB	427 BYTES	32.8 KB	Z:\Airborne_Raw\529P
18-Sep	533	1C171F261A	PEGASUS	265 MB	1.46 MB	222 MB	N/A	N/A	25.4 GB	N/A	6.83 MB	438 BYTES	28.7 KB	Z:\Airborne_Raw\533P
19-Sep	537	1C171G262A	PEGASUS	131 MB	1.68 MB	207 MB	N/A	N/A	22.4 GB	N/A	5.15 MB	503 BYTES	30.5 KB	Z:\Airborne_Raw\537P

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Date 09/24

DATA TRANSFER SHEET

Oct 7, 2013

DATE	FLIGHT NO.	MISSION NAME	SENSOR	RAW LAS	LOGS	POS	RAW IMAGES	MISSION LOG FILE	RANGE	DIGITIZER	BASE STATION(S)	OPERATOR COMMENTS (DPC LOGS)	FLIGHT PLAN	SERVER LOCATION
3-Oct	595	2CAGS276A	Gemini	N/A	415 KB	231 MB	11.5 GB	97.1 KB	10.4 GB	N/A	14.8 MB	257 BYTES	3.70 KB	Z:\Airborne_Raw\595G
4-Oct	597	2CAGHIJS277A	Gemini	N/A	954 KB	251 MB	58.1 GB	438 KB	35.3 GB	N/A	10.4 MB	364 BYTES	7.52 KB	Z:\Airborne_Raw\597G
4-Oct	599	2CAGLMS277B	Gemini	N/A	157 KB	87.3 MB	8.65 GB	67 KB	2.22 GB	N/A	10.4 MB	120 BYTES	7.52 KB	Z:\Airborne_Raw\599G

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DATA TRANSFER SHEET

Oct 8, 2013

DATE	FLIGHT NO.	MISSION NAME	SENSOR	RAW LAS	LOGS	POS	RAW IMAGES	MISSION LOG FILE	RANGE	DIGITIZER	BASE STATION (S)	SERVER LOCATION
23-Sep	555P	1CAG171I266A	Pegasus	217 MB	1.23 MB	192 MB	N/A	N/A	21.1 GB	N/A	9.62 MB	Z:\Airborne Raw\555P
24-Sep	559P	1CAG171J267A	Pegasus	170 MB	1.08 MB	174 MB	N/A	N/A	16.5 GB	N/A	9.91 MB	Z:\Airborne Raw\559P
28-Sep	575P	1CAG171K271A	Pegasus	121 MB	851 KB	138 MB	N/A	N/A	12.2 GB	N/A	5.4 MB	Z:\Airborne Raw\575P
29-Sep	577P	1CAG171L272A	Pegasus	154 MB	0.98 MB	183 MB	N/A	N/A	15.6 GB	N/A	10.2 MB	Z:\Airborne Raw\577P
30-Sep	581P	1CAG161KS273A	Pegasus	135 MB	923 KB	159 MB	N/A	N/A	17.6 GB	N/A	12.3 GB	Z:\Airborne Raw\581P

Received from

Name/Signature
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Date

Received by

Name/Signature
Position SSES
Date 10/08/13

Verified by

Name/Signature
Position SSES
Date 10/08/13

DATA TRANSFER SHEET

Oct 8, 2013

DATE	FLIGHT NO.	MISSION NAME	RAW LAS	LOGS	POS	RAW IMAGES	MISSION LOG FILE	RANGE	DIGITIZER	BASE STATION (S)	SERVER LOCATION
Sep 23, 2013	555P	1C171I266A	217 MB	1.23 MB	192 MB	N/A	N/A	21.1 GB	N/A	9.62 MB	Z:\Airborne_Raw\555P
Sep 24, 2013	559P	1C171J267A	170 MB	1.08 MB	174 MB	N/A	N/A	16.5 GB	N/A	9.91 MB	Z:\Airborne_Raw\559P
Sep 28, 2013	575P	1C171K271A	121 MB	851 KB	138 MB	N/A	N/A	12.2 GB	N/A	5.4 MB	Z:\Airborne_Raw\575P
Sep 29, 2013	577P	1C171L272A	154 MB	0.98 MB	183 MB	N/A	N/A	15.6 GB	N/A	10.2 MB	Z:\Airborne_Raw\577P
Sep 30, 2013	581P	1C161KS273A	135 MB	923 KB	159 MB	N/A	N/A	17.6 GB	N/A	12.3 GB	Z:\Airborne_Raw\581P

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Date 100813

DATA TRANSFER SHEET

Oct 11, 2013

DATE	FLIGHT NO.	MISSION NAME	SENSOR	RAW LAS	LOGS	POS	RAW IMAGES	MISSION LOG FILE	RANGE	DIGITIZER	BASE STATION (S)	OPERATOR COMMENTS (DPC LOGS)	FLIGHT PLAN	SERVER LOCATION
8-Oct	613	2CAG161NO281A	GEMINI	N/A	1.34 MB	237 MB	84 GB	280 KB	32.4 GB	N/A	65.5 MB	635 BYTES	324 KB	Z:\Airborne_Raw\613G
9-Oct	617	2CAG161QLS282	GEMINI	N/A	792 KB	231 MB	49 GB	370 KB	20.1 GB	N/A	12.4 MB	668 BYTES	349 KB	Z:\Airborne_Raw\617G
9-Oct	619	2CAG161E282B	GEMINI	N/A	564 KB	104 MB	34.5 GB	276 KB	12.5 GB	92.3 GB	12.4 MB	453 BYTES	117 KB	Z:\Airborne_Raw\619G

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Date 10/14/13

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Date 10/14/13

DATA TRANSFER SHEET

Oct 18, 2013

DATE	FLIGHT NO.	MISSION NAME	SENSOR	RAW LAS	LOGS	POS	RAW IMAGES	MISSION LOG FILE	RANGE	DIGITIZER	BASE STATION(S)	OPERATOR LOGS (OPLOG)	FLIGHT PLAN	SERVER LOCATION
Oct 13, 2013	635G	2CAG161D286A	GEMINI	N/A	1.25 MB	350MB	87.3GB	706KB	35.1GB	N/A	ISB 122A- 3.37MB ISB 122B-392KB ISB3634- 4.19MB PISB 2A-1.08MB PISB 2B- 168KB	890B	1.26MB	z:\Airborne_Raw\635G
Oct 14, 2013	637G	2CAG221A287A	GEMINI	N/A	1.27MB	392MB	85.4GB	693KB	39.1GB	N/A	ISB 4- 4.95MB ISB 3634A- 4.36MB ISB3634B- 2.70MB	641B	1.32MB	z:\Airborne_Raw\637G
Oct 14, 2013	639G	2CAG221B287B	GEMINI	N/A	517KB	239MB	31.1GB	244KB	14.8GB	N/A	ISB 4- 4.95MB ISB 3634A- 4.36MB ISB3634B- 2.70MB	443B	508KB	z:\Airborne_Raw\639G
Oct 15, 2013	641G	2CAG221C288A	GEMINI	N/A	1.12MB	394MB	69GB	555KB	33.8GB	N/A	BMSB 364- 896KB ISB 4- 4.91MB MC 1A- 1.0MB MC 1B- 245KB PPK- 911KB	804B	942KB	z:\Airborne_Raw\641G
Oct 15, 2013	643G	2CAG221D288B	GEMINI	N/A	391KB	220MB	18.2GB	1.29KB	10.6GB	N/A	BMSB 364- 896KB ISB 4- 4.91MB MC 1A- 1.0MB MC 1B- 245KB	378B	185KB	z:\Airborne_Raw\643G

Received from

Name Luigi Paragas
Position RA
Signature

Received by

Name Benjamin Magalso 10/21/2013
Position SSRS
Signature

Verified by

Name Benjamin Magalso
Position SSRS
Signature

DATA TRANSFER SHEET

Oct 29, 2013

DATE	FLIGHT NO.	MISSION NAME	SENSOR	RAW LAS	LOGS	POS	RAW IMAGES	MISSION LOG FILE	RANGE	DIGITIZER	BASE STATION(S)		OPERATOR COMMENTS (DPC LOGS)	FLIGHT PLAN		SERVER LOCATION
											Base	Base Info		Actual Plan	Kml	
Oct 16, 2013	645G	2CAG231A289A	GEMINI	N/A	1.08MB	405MB	67.0GB	565KB	31.8GB	N/A	ISB-4 - 5.20MB	23 BYTES	793 BYTES	64.6 KB	10.2 KB	Z:\Airborne_Raw\645G
											MC-1 - B - 4.75 MB (backup)	10 BYTES				
											MC-1 - C - 2.11 MB (backup)					
Oct 17, 2013	649G	2CAG221EBS290A	GEMINI	N/A	1.27MB	264MB	57.1GB	499KB	32.4GB	N/A	ISB-4 - 5.74MB	55 BYTES	861 BYTES	197KB	8.73KB	Z:\Airborne_Raw\649G
											MC-1- A - 529KB (backup)	12 BYTES				
											MC-1- B - 895KB (backup)					
											ISB-3634 A - 3.13MB (CONTIGENCY)	28 BYTES				
											ISB-3634 B - 3.97MB (CONTIGENCY)					
											PISB -2 A - 1.14MB (CONTIGENCY)					
											PISB -2B- 112KB (CONTIGENCY)					
Oct 17, 2013	651G	2CAG231B290B	GEMINI	N/A	334KB	121MB	18.3GB	142KB	10.8GB	N/A	ISB-4 - 5.74MB	55 BYTES	405 BYTES	80.09KB	8.04KB	Z:\Airborne_Raw\651G
											MC-1- A - 529KB (backup)	12 BYTES				
											MC-1- B - 895KB (backup)					
											ISB-3634 A - 3.13MB (CONTIGENCY)	28 BYTES				
											ISB-3634 B - 3.97MB (CONTIGENCY)					
											PISB -2 A - 1.14MB (CONTIGENCY)					
											PISB -2B- 112KB (CONTIGENCY)					
Oct 18, 2013	653G	2CAG231D291A	GEMINI	N/A	0 BYTES	280MB	57GB	477KB	21.2GB	157GB	ISB-4 - 5.17MB	10 BYTES	648 BYTES	7.05KB	12.1KB	Z:\Airborne_Raw\653G
											MC-1 -A - 151KB (backup)	10 BYTES				
											MC-1 - B- 1.24MB (backup)					
Oct 18, 2013	655G	2CAG231BS291B	GEMINI	N/A	38.0MB	113MB	13.6GB	138KB	6.67GB	N/A	ISB-4 - 5.17 MB	10 BYTES	410 BYTES	5.19MB	8.01KB	Z:\Airborne_Raw\655G
											MC-1-A - 151KB (backup)	10 BYTES				
											MC-1-B- 1.24MB (backup)					

Oct 19, 2013	657G	2CAG221DS292A and 2CAG231BS292A	GEMINI	N/A	30 MB	632MB	58.7GB	447KB	25.4GB	170GB	ISB - 4 - 4.44MB	12 BYTES	792 BYTES	600m- 4.62KB	600m- 10.2KB	Z:\Airborne_Raw\657G
											MC-1-A - 1MB (backup)	14 BYTES				
											MC-1-B- 255KB (backup)					
											ISB-3634 A - 4.89MB (CONTIGENCY)	28 BYTES		750m- 4.22KB	750m- 8.74KB	
											ISB-3634 B - 977KB (CONTIGENCY)					
											PISB -2 A - 1.01MB (CONTIGENCY)			850m- 255KB	850m- 12.0KB	
											PISB -2B- 192KB (CONTIGENCY)					

Received from

Name/Signature Aubrey Matias / Signature
Position 10-29-13 SSRS
Date

Received by

Name/Signature JOIDA PRIETO / Signature
Position SSRS
Date 10/29/13

Verified by

Name/Signature JOIDA PRIETO / Signature
Position SSRS
Date 10/29/13

Annex D

DATA TRANSFER SHEET
Oct 31, 2013

DATE	FLIGHT NO.	MISSION NAME	SENSOR	RAW LAS		LOGS	POS	RAW IMAGES	MISSION LOG FILE	RANGE	DIGITIZER	BASE STATION(S)		OPERATOR LOGS (OPLOG)	FLIGHT PLAN		SERVER LOCATION
				Output LAS	KML (swath)							BASE STATION(S)	Base Info (.txt)		Actual	KML	
Oct 23, 2013	668G	3LMS and 3CAG101HS296A	AQUARIUS	N/A	3CAG111C - 238KB 3LMS296A - 15.7KB	617.4 KB	244 MB	N/A	N/A	14.8 GB	N/A	CGY 57 - 4.45 MB ISB 90 - 3.62 MB	30 B	278B	296A - 4.89KB 3LMS - 3.33KB	5.21KB	z:\Airborne_Raw\668A
Oct 25, 2013	683G	2CAG111E298A	GEMINI	N/A	894 KB	1.38 MB	290 MB	81.7 GB	652 KB	42 GB	207 GB	ISB 90 - 5.87 MB	ISB 90 - 19B	593 B	4.21 MB	171KB	z:\Airborne_Raw\683A
Oct 25, 2013	685G	2CAG111DE298B	GEMINI	N/A	356KB	558 KB	118 MB	28.8 GB	246 KB	16GB	77.6	ISB 90 - 5.87 MB	ISB 90 - 19B	617B	4.04KB	8.31KB	z:\Airborne_Raw\685A
Oct 26, 2013	689G	2CAG111C299B	GEMINI	N/A	231KB	1.01MB	110MB	17.6 GB	147 KB	11.7 GB	N/A	ISB 90 - 6.05MB CGY 70 - 6.41 MB	ISB 90 - 19B CGY 70 - 14B	449 B	3.15 KB	7.21 KB	z:\Airborne_Raw\689A
Oct 27, 2013	693G	2CAG61D300B	GEMINI	N/A	96.6 KB	1.1 MB	146 MB	18.8 GB	114 KB	14 GB		CGY 70 - 7.49 MB	CGY 70 - 14B	770 B	4.51 KB	9.84 KB	z:\Airborne_Raw\693A

Received from

Name Patricia Alcantara
Position
Signature

Received by

Name JOIDA PRIETO 11/13/13
Position SSRS
Signature

Verified by

Name JOIDA PRIETO
Position SSRS
Signature 11/13/13

Annex D

DATA TRANSFER SHEET
Nov 5, 2013

DATE	FLIGHT NO.	MISSION NAME	SENSOR	RAW LAS		LOGS	POS	RAW IMAGES	MISSION LOG FILE	RANGE	DIGITIZER	BASE STATION(S)		OPERATOR LOGS (OPLOG)	FLIGHT PLAN		SERVER LOCATION
				Output LAS	KML (swath)							BASE STATION(S)	Base Info (.txt)		Actual	KML	
Oct 25, 2013	674A	3CAGS1E298A	AQUARIUS	N/A	N/A	715 KB	265 MB	N/A	N/A	20 GB	N/A	CGY 70 - 8.2 MB	CGY 70 - 14B	673B	5.05KB	357KB	z:\Airborne_Raw\674A
Oct 25, 2013	676A	3CAGS1E298B	AQUARIUS	N/A	N/A	242 KB	102 MB	N/A	N/A	6.75 GB	N/A	CGY 70 - 8.2 MB	CGY 70 - 14B	N/A	5.05KB	118 KB	z:\Airborne_Raw\676A
Oct 26, 2013	678A	3CAGS1F299A	AQUARIUS	N/A	N/A	547 KB	228 MB	N/A	N/A	15.3 GB	N/A	CGY 70- 6.41 MB	CGY 70 - 14B	52 B	5.10 KB	269 KB	z:\Airborne_Raw\678A
Oct 26, 2013	680A	3CAGS1F299B	AQUARIUS	N/A	N/A	422 KB	155 MB	N/A	N/A	11.6 GB	N/A	CGY 70- 6.41 MB	CGY 70 - 14B	494 B	5.10 KB	207 KB	z:\Airborne_Raw\680A
Oct 26, 2013	687G	2CAG101H299A	GEMINI	N/A	258KB	492KB	212 MB	N/A	2.48 KB	24.2GB	N/A	CAG 70 - 6.06MB ISB 90 - 5.87 MB	CAG 70 -14B ISB 90 - 19B	408B	3.7KB	6.93KB	z:\Airborne_Raw\687A
Oct 27, 2013	691G	2CAGS1E300A	GEMINI	N/A	350KB	623 KB	261 MB	N/A	1.9KB	23.2GB	N/A	CGY 70 - 7.49 MB	CGY 70 - 14B	N/A	4.81 KB	350KB	z:\Airborne_Raw\691A
Oct 27, 2013	682A	3CAG111C5300A	AQUARIUS	N/A	N/A	971 KB	241 MB	N/A	N/A	19.7 GB	N/A	ISB 90 - 5.87 MB	ISB 90 - 41 B	576 B	3.25 KB	354 KB	z:\Airborne_Raw\682A
Oct 27, 2013	684A	3CAG111D5300B	AQUARIUS	N/A	N/A	449 KB	176 MB	N/A	N/A	13.9 GB	N/A	ISB 90 - 5.87 MB	ISB 90 - 41 B	124 B	2.33 KB	248 KB	z:\Airborne_Raw\684A

Received from

Name Loida Paragas
Position RA
Signature

Received by

Name JOIDA PRIETO
Position SSRS
Signature 11/5/13

Verified by

Name JOIDA PRIETO
Position SSRS
Signature 11/5/13

DATA TRANSFER SHEET
Nov 6, 2013

DATE	FLIGHT NO.	MISSION NAME	SENSOR	RAW LAS		LOGS	POS	RAW IMAGES	MISSION LOG FILE	RANGE	DIGITIZER	BASE STATION(S)		OPERATOR LOGS (OPLOG)	FLIGHT PLAN		SERVER LOCATION
				Output LAS	KML (swath)							BASE STATION(S)	Base Info (.txt)		Actual	KML	
Oct 22, 2013	664A	3CAGR295A	AQUARIUS	N/A	N/A	321 KB	189 MB	N/A	N/A	7.71 GB	N/A	CGY 57- 5.81 MB ISB 3634- 4.84 MB	32 B	502 B	9.87 KB	126 KB	z:\Airborne_Raw\664A
Oct 22, 2013	673G	2CAG161A8295A	GEMINI	N/A	N/A	480 KB	167 MB	57 GB	189 KB	13.5 GB	N/A	CGY 57- 5.81 MB ISB 3634- 4.84 MB	33 B	529 B	4.07 KB	290KB	z:\Airborne_Raw\673G

Received from

Name: Loran faragas
Position: RA
Signature:

Received by

Name: JOIDA PRIETO
Position: SSRS
Signature:

Verified by

Name: JOIDA PRIETO
Position: SSRS
Signature:

DATA TRANSFER SHEET
Nov 6, 2013

DATE	FLIGHT NO.	MISSION NAME	SENSOR	RAW LAS		LOGS	POS	RAW IMAGES	MISSION LOG FILE	RANGE	DIGITIZER	BASE STATION(S)		OPERATOR LOGS (OPLOG)	FLIGHT PLAN		SERVER LOCATION
				Output LAS	KML (swath)							BASE STATION(S)	Base Info (.txt)		Actual	KML	
Oct 22, 2013	664A	3CAGR295A	AQUARIUS	N/A	N/A	321 KB	189 MB	N/A	N/A	7.71 GB	N/A	CGY 57- 5.81 MB ISB 3634- 4.84 MB	32 B	502 B	9.87 KB	126 KB	z:\Airborne_Raw\664A
Oct 22, 2013	673G	2CAG161A8295A	GEMINI	N/A	N/A	480 KB	167 MB	57 GB	189 KB	13.5 GB	N/A	CGY 57- 5.81 MB ISB 3634- 4.84 MB	33 B	529 B	4.07 KB	290KB	z:\Airborne_Raw\673A
Oct 25, 2013	674A	3CAG61C298A	AQUARIUS	N/A	N/A	715 KB	265 MB	N/A	N/A	20 GB	N/A	CGY 70 - 8.2 MB	CGY 70 - 14B	673B	5.05KB	357KB	z:\Airborne_Raw\674A
Oct 25, 2013	676A	3CAG53CDS298B	AQUARIUS	N/A	N/A	242 KB	102 MB	N/A	N/A	6.75 GB	N/A	CGY 70 - 8.2 MB	CGY 70 - 14B	N/A	5.05KB	118 KB	z:\Airborne_Raw\676A
Oct 26, 2013	678A	3CAG53F299A	AQUARIUS	N/A	N/A	547 KB	228 MB	N/A	N/A	15.3 GB	N/A	CGY 70- 6.41 MB	CGY 70 - 14B	52 B	5.10 KB	269 KB	z:\Airborne_Raw\678A
Oct 26, 2013	680A	3CAG51FS299B	AQUARIUS	N/A	N/A	422 KB	155 MB	N/A	N/A	11.6 GB	N/A	CGY 70- 6.41 MB	CGY 70 - 14B	494 B	5.10 KB	207 KB	z:\Airborne_Raw\680A
Oct 26, 2013	687G	2CAG103H299A	GEMINI	N/A	258KB	492KB	212 MB	N/A	2.48 KB	24.2GB	N/A	CAG 70 - 6.05MB ISB 90 - 5.87 MB	CAG 70 -14B ISB 90 - 19B	408B	3.7KB	6.93KB	z:\Airborne_Raw\687A
Oct 27, 2013	691G	2CAG51E300A	GEMINI	N/A	350KB	623 KB	281 MB	N/A	1.9KB	23.2GB	N/A	CGY 70 - 7.49 MB	CGY 70 - 14B	N/A	4.81 KB	350KB	z:\Airborne_Raw\691A
Oct 27, 2013	682A	3CAG111D300A	AQUARIUS	N/A	N/A	971 KB	241 MB	N/A	N/A	19.7 GB	N/A	ISB 90 - 5.87 MB	ISB 90 - 41 B	576 B	3.25 KB	354 KB	z:\Airborne_Raw\682A
Oct 27, 2013	684A	3CAG111DS300B	AQUARIUS	N/A	N/A	449 KB	176 MB	N/A	N/A	13.9 GB	N/A	ISB 90 - 5.87 MB	ISB 90 - 41 B	124 B	2.33 KB	248 KB	z:\Airborne_Raw\684A

Received from
Name: Patricia Alcantara
Position: CE
Signature: 11/07 [signature]

Received by
Name: JOIDA F. PRIETO
Position: SSRS
Signature: [signature] 11/7/13

Verified by
Name: JOIDA F. PRIETO
Position: SSRS
Signature: [signature] 11/7/13

DATA TRANSFER SHEET

Nov 8, 2013

DATE	FLIGHT NO.	MISSION NAME	SENSOR	RAW LAS		LOGS	POS	RAW IMAGES	MISSION LOG FILE	RANGE	DIGITIZER	BASE STATION(S)		OPERATOR LOGS (OPLOG)	FLIGHT PLAN		SERVER LOCATION
				Output LAS	KML (swath)							BASE STATION(S)	Base Info (.txt)		Actual	KML	
28-Oct	695	2CAG51C301A	GEMINI	N/A	505 KB	756KB	228MB	40.2GB	317KB	20.9GB	N/A	CGY 70 - 7592KB	1KB	2KB	5KB	8KB	Z:\Airborne_Raw\695G
28-Oct	697	2CAG61A301B	GEMINI	N/A	385 KB	588 KB	182MB	11.9GB	61KB	15.9GB	N/A	CGY 70 - 7592KB	1KB	1KB	5KB	9KB	Z:\Airborne_Raw\697G
5-Nov	715	3CAGR309A	AQUARIUS	N/A	131 KB	345KB	154MB	N/A	N/A	7.55GB	62.8GB	CGY 92 - 2445 KB	1 KB	2KB	5 KB	8KB	Z:\Airborne_Raw\715A

Received from

Name: Pearl Mary 11/8/13

Position:

Signature:

Received by

Name: JOIDA F. PRIETO 11/8/13

Position: SSRS

Signature:

Verified by

Name: JOIDA F. PRIETO 11/8/13

Position: SSRS

Signature:

DATA TRANSFER SHEET
Nov 11, 2013

	DATE	FLIGHT NO.	MISSION NAME	SENSOR	RAW LAS		LOGS	POS	RAW IMAGES	MISSION LOG FILE	RANGE	DIGITIZER	BASE STATION(S)		OPERATOR LOGS (OPLOG)	FLIGHT PLAN		SERVER LOCATION
					Output LAS	KML (swath)							BASE STATION(S)	Base Info (.txt)		Actual	KML	
7126	Nov 6, 2013	682G	LMS CALIBRATION	GEMINI	N/A	44 KB	126 KB	95.1 MB	3.28 KB	2/2/1 KB	2.39 GB	10.9 GB	11.4 MB	1 KB	458 B	26 KB	7 KB	z:\Airborne_Raw\682G
7146	Nov 7, 2013	684G	2CAG21A+2BS311A	GEMINI	N/A	40 KB	859 KB	171 MB	N/A	N/A	12.2 GB	28.6 GB	13.6 MB	1 KB	2 KB	6/8 KB	10/5 KB	z:\Airborne_Raw\684G
7166	Nov 7, 2013	686G	2CAG51BS2311B	GEMINI	N/A	217 KB	1.22 MB	293 MB	18.6 GB	146 KB	12.2 GB	N/A	13.6 MB	1 KB	1 KB	8 KB	5 KB	z:\Airborne_Raw\686G

Received from

Name C. SOARES
Position RA
Signature

Received by

Name JOIDA PRIETO
Position SSRS
Signature 11/11/13

DATA TRANSFER SHEET
Nov 13, 2013

DATE	FLIGHT NO.	NEW FLIGHT NO.	MISSION NAME	SENSOR	RAW LAS		LOGS	POS	RAW IMAGES	MISSION LOG FILE	RANGE	DIGITIZER	BASE STATION(S)		OPERATOR LOGS (OPLOG)	FLIGHT PLAN		SERVER LOCATION
					Output LAS	KML (swath)							BASE STATION(S)	Base Info (.txt)		Actual	KML	
Nov 5, 2013	715G	708A	3CAGR309A	AQUARIUS	NA	131 KB	345KB	154MB	NA	NA	7.55GB	62.8GB	CGY 92-2445KB	1KB	2KB	5KB	8KB	Z:\Airborne_Raw\708A
Nov 6, 2013	682G	712G_LMS	2CAGLMS310B	GEMINI	NA	44KB	126KB	95.1MB	3.28KB	2/2/1 KB	2.39GB	10.9GB	CGY 70-5724KB, RDM 1-5980KB	1KB	1KB	6KB	7KB	Z:\Airborne_Raw\712G_LMS
Nov 7, 2013	684G	714G	2CAG21A+5185311A	GEMINI	NA	40KB	859KB	171MB	NA	NA	12.2GB	28.6	CAP 1 110713-559KB***, CGY 70 - 7842KB*, CGY 93-4491KB**	1KB	2KB	6/8KB	10/5KB	Z:\Airborne_Raw\714G
Nov 7, 2013	686G	716G	2CAG518523118	GEMINI	NA	217KB	1.22MB	293MB	18.6GB	146KB	12.2GB	NA	CAP 1 110713-559KB**, CGY 70 - 7842KB*	1KB	1KB	8KB	5KB	Z:\Airborne_Raw\716G

*transit base,
**main base
***back up base

Received from

Name Roger Mars 11/13/13
Position
Signature

Received by

Name JOIDA PRIETO
Position SSRS
Signature 11/13/13

Verified by

Name JOIDA PRIETO
Position SSRS
Signature 11/13/13

DATA TRANSFER SHEET
Nov 26, 2013

DATE	FLIGHT NO.	MISSION NAME	SENSOR	RAW LAS		LOGS	POS	RAW IMAGES	MISSION LOG FILE	RANGE	DIGITIZER	BASE STATION(S)		OPERATOR LOGS (OPLOG)	FLIGHT PLAN		SERVER LOCATION
				Output LAS	KML (swath)							BASE STATION(S)	Base Info (.txt)		Actual	KML	
Nov 16, 2013	750G	2CAG11B320A	GEMINI	NA	504KB	809KB	229MB	48GB	389KB	24.1GB	89.1GB	CGY 70 - 10330KB, CGY 92 - 8154KB, CGY 93 - 8171KB	1KB	1KB	6KB	12KB	Z:\Airborne_Raw\750G
Nov 16, 2013	752G	2CAG11B53208	GEMINI	NA	626KB	1.48MB	116MB	1.45GB/1.45GB/8.52GB	13KB/78KB	5.45GB	35.9GB	CGY 70 - 10330KB, CGY 92 - 8154KB, CGY 93 - 8171KB	1KB	1KB	6KB	12KB	Z:\Airborne_Raw\752G
Nov 18, 2013	760G	2CAG21B322A	GEMINI	NA	318KB	999KB	176MB	29.5GB	284KB	12.5GB	51.7GB	CGY 66 - 4333KB, CGY 70 -8972KB, CGY 93 - 7398KB	1KB	1KB	5KB	9KB	Z:\Airborne_Raw\760G
Nov 19, 2013	762G	2CAG21B323A	GEMINI	NA	15KB	974KB	222MB	29.7GB/2.11GB	22KB/241KB/20KB	13.3GB/5.20GB	97.5GB	CGY 70 - 9391KB, CGY 92 - 6191KB, CGY 93 - 6106KB	1KB	1KB	9KB	9KB	Z:\Airborne_Raw\762G

Received from

Name Pearl Mars 11/26/13
Position PRA
Signature

Received by

Name JOIDA PRIETO 11/27/13
Position .SSRS
Signature

Verified by

Name
Position
Signature

DATA TRANSFER SHEET

Feb 18, 2014

DATE of Operation	FLIGHT NO.	MISSION NAME	SENSOR	RAW LAS		POS (MB)	RAW IMAGES (GB)	MISSION LOG FILE (KB)	RANGE (GB)	DIGITIZER (GB)	BASE STATION (S)		OPERATOR COMMENTS (DPC LOGS) (Bytes)	Flight Plans		CASI (GB)	SERVER LOCATION
				ACTUAL (MB)	KML (KB)						BASE (MB)	BASE INFO (BYTES)		Actual (KB)	Kml (KB)		
10/29/2013	699G	2CAG618302A	Gemini	N/A	63KB	281MB	46.4GB	365KB	23.5	157		12.3	459		12	N/A	\\FREENAS\geostorage\TJA\rborne_Raw\699G
10/29/2013	701G	2CAG61E302B	Gemini	N/A	318KB	145MB	23.7GB	188KB	13.2	N/A		12.3	539		9	N/A	\\FREENAS\geostorage\TJA\rborne_Raw\701G
2/2/2014	7047GC	2MtAS033A	Gemini	N/A	104	138	N/A	N/A	3.64	N/A	2.42	117	666	72.8	7.9	30.4	\\FREENAS\geostorage\TJA\rborne_Raw\7047GC
2/4/2014	7051GC	2CAG101D5035A	Gemini	N/A	178	152	N/A	N/A	19	N/A	9.96	143	356	310	8.13	47.9	\\FREENAS\geostorage\TJA\rborne_Raw\7051GC
2/6/2014	7054GC	2CAG101A037A & 2CAG111C037A	Gemini	N/A	43.3 & 140	210	N/A	N/A	17.9	N/A	1.15 & 9.58	385	721	43.3 & 140	446 & 333	58.4	\\FREENAS\geostorage\TJA\rborne_Raw\7054GC
2/6/2014	7055GC	2CAG101A037B	Gemini	N/A	210	162	N/A	N/A	15.9	N/A	576KB & 9.58	385	404	166	11.4KB	72.2	\\FREENAS\geostorage\TJA\rborne_Raw\7055GC
2/7/2014	7057GC	2CAG51D038A & 2CAG101D5038A	Gemini	N/A	251	176	N/A	N/A	19.2	N/A	937KB & 4.70	228	903	265 & 179	217 & 13.4	60.7	\\FREENAS\geostorage\TJA\rborne_Raw\7057GC
2/8/2014	7059GC	2CAG101AS039A & 2CAG111BS039A	Gemini	N/A	148	185	N/A	N/A	13.5	N/A	809KB & 9.85	252	339	204	NA	41	\\FREENAS\geostorage\TJA\rborne_Raw\7059GC
2/9/2014	7061GC	2CAG101G040A & 2CAG101H040A	Gemini	N/A	327	260	N/A	N/A	31.3	N/A	1.12 & 7.39	253	467	453 & 330	666	31.3	\\FREENAS\geostorage\TJA\rborne_Raw\7061GC

Received from

Name/Signature: Lovely Acuña
Position: Supervising SRS
Date: 02/19/2014

Received by

Name/Signature: JOIDA F. PRIETO
Position: SSRS
Date:

Verified by

Name/Signature: JOIDA F. PRIETO
Position: SSRS
Date:

DATA TRANSFER SHEET
Dec 5, 2013

DATE	FLIGHT NO.	MISSION NAME	SENSOR	RAW LAS		LOGS	POS	RAW IMAGES	MISSION LOG FILE	RANGE	DIGITIZER	BASE STATION(S)		OPERATOR LOGS (OPLOG)	FLIGHT PLAN		SERVER LOCATION
				Output LAS	KML (swath)							BASE STATION(S)	Base Info (.txt)		Actual	KML	
Nov 15, 2013	748G	2CAG11CS3319B	GEMINI	N/A	538 KB	1.10 MB	232 MB	53.8 GB	417 KB	24.7 GB	188 GB	25.9 GB	359 B	1.23 KB	N/A	N/A	Z:\Airborne_Raw\748G
Nov 19, 2013	764G	2CAG21B323B	GEMINI	N/A	522 KB	0.97 MB	131 MB	14.0 GB	150 KB	10.9 GB	89.0 GB	21.1 MB	1 KB	1 KB	5 KB	9 KB	X:\Airborne_Raw\764 G
Nov 20, 2013	766G	2CAG21C and 21BS324A	GEMINI	N/A	1.00 MB	932 KB	265 MB	48.5 GB	417 KB	26.3 GB	185 GB	23.8 MB	1 KB	2 KB	8 KB	14 KB	X:\Airborne_Raw\766 G
Nov 20, 2013	768G	2CAG21D324B	GEMINI	N/A	317 KB	2.07 MB	128 MB	17.6 GB	158 KB	9.05 GB	N/A	23.8 MB	1 KB	1 KB	9 KB	9 KB	X:\Airborne_Raw\768 G
Nov 21, 2013	770G	2CAG21DS325A	GEMINI	N/A	448 KB	847 KB	170 MB	28.7 GB	257 KB	14.2 GB	N/A	29.2 MB	1 KB	1 KB	5 KB	9KB	X:\Airborne_Raw\770 G
Nov 21, 2013	772G	2CAG61F325B	GEMINI	N/A	257 KB	438 KB	327 MB	21.7 GB	184 KB	11.6 GB	80.0 GB	29.2 MB	1 KB	2 KB	6 KB	10 KB	X:\Airborne_Raw\772 G
Nov 24, 2013	782G	2CAG101B328A	GEMINI	N/A	148 KB	269 KB	93.1 MB	15.1 GB	107 KB	7.63 GB	22.3 GB	14.4 MB	1 KB	1 KB	10.9 KB	22.3 KB	X:\Airborne_Raw\782 G
Nov 25, 2013	786G	2CAG101BS329A	GEMINI	N/A	882 KB	1.64 MB	274 MB	60.5 GB	480 KB	34.8 GB	124 GB	20.9 MB	1 KB	1 KB	10.9 KB	11 KB	X:\Airborne_Raw\786 G

Received from

Name JEZIEL PAUL ALAMBAN
Position RA
Signature 12/13/13

Received by

Name JOIDA F. PRIETO
Position SSS
Signature

DATA TRANSFER SHEET

Dec 20, 2013

DATE	FLIGHT NO.	MISSION NAME	SENSOR	RAW LAS		LOGS	POS	RAW IMAGES	MISSION LOG FILE	RANGE	DIGITIZER	BASE STATION(S)		OPERATOR LOGS (OPLOG)	FLIGHT PLAN		SERVER LOCATION
				Output LAS	KML (swath)							BASE STATION(S)	Base Info (.txt)		Actual	KML	
Dec 2, 2013	816G	2CAG171A336B	GEMINI	N/A	87.5 KB	179 KB	93.8 MB	N/A	N/A	8.63 GB	N/A	7.55 MB	277 B	346 B	4.03 KB	N/A	X:\Airborne_Raw\816G
Dec 2, 2013	818G	2CAG171A337A AND 2CAG161AB377A	GEMINI	N/A	432 KB	855 KB	289 MB	N/A	N/A	53.3 GB	156 GB	15.3 MB	317 B	504 B	8.48 KB	19.9 KB	X:\Airborne_Raw\818G
Dec 4, 2013	822G	2CAG161AB338A	GEMINI	N/A	300 KB	643 KB	222 MB	N/A	N/A	37.9 GB	122 GB	19.3 MB	315 B	512 B	69.5 KB	10.1 KB	X:\Airborne_Raw\822G
Dec 5, 2013	826G	2C161BCDES339A	GEMINI	N/A	384 KB	669 KB	256 MB	N/A	N/A	28.6 GB	170 GB	10.9 MB	289 B	489 B	5.08 KB	9.58 KB	X:\Airborne_Raw\826G
Dec 5, 2013	828G	2CAG171B339B	GEMINI	N/A	103 KB	198 KB	101 MB	N/A	N/A	9.82 GB	N/A	10.9 MB	289 B	353 B	66.3 KB	8.39 KB	X:\Airborne_Raw\828G
Dec 7, 2013	834G	2CAG171B341A	GEMINI	N/A	439 KB	669 KB	239 MB	N/A	N/A	40.2 GB	121 GB	11.3 MB	219 B	565 B	4.62 KB	4.63 KB	X:\Airborne_Raw\834G
Dec 7, 2013	836G	2CAG171C341B	GEMINI	N/A	74.4 KB	190 KB	85.6 MB	N/A	N/A	9.14 GB	N/A	11.3 MB	219 B	257 B	5.25 KB	10.2 KB	X:\Airborne_Raw\836G
Dec 7, 2013	838G	2CAG171C341A	GEMINI	N/A	824 KB	1.18 MB	244 MB	77.2 GB	613 KB	38.1 GB	N/A	11.3 MB	219 B	564 B	316 KB	10.2 KB	X:\Airborne_Raw\838G
Dec 10, 2013	846G	2CAG221CS231AS344A	GEMINI	N/A	699 KB	1.14 MB	223 MB	75.2 GB	597 KB	35.4 GB	N/A	15.7 MB	314 B	597 B	239 KB	9.27 KB	X:\Airborne_Raw\846G
Dec 10, 2013	848G	2CAG171D344B	GEMINI	N/A	269 KB	1.14 MB	113 MB	22.9 GB	222 KB	13.6 GB	N/A	15.7 MB	314 B	448 B	95.1 KB	10.5 KB	X:\Airborne_Raw\848G
Dec 13, 2013	858G	2CAG101G347A	GEMINI	N/A	1.14 MB	1.20 MB	178 MB	40.6 GB	314 KB	27.2 GB	38.1 GB	15.9 MB	308 B	250 B	406 KB	10.2 KB	X:\Airborne_Raw\858G
Dec 14, 2013	862G	2CAG101F348A	GEMINI	N/A	1.10 MB	1.72 MB	311 MB	N/A	N/A	59.9 GB	N/A	15.7 MB	308 B	1 KB	400 KB	10.1 KB	X:\Airborne_Raw\862G

Received from

Name GRACE B. SINADJAN
Position RESEARCH ASSOCIATE
Signature

Received by

Name JOIDA F. PRIETO 12/20/13
Position SSRS
Signature

DATA TRANSFER SHEET
6/17/2014 (Missing Flights - NEJ, CAG, Arayat)

DATE	FLIGHT NO.	MISSION NAME	SENSOR	RAW LAS		LOGS	POS	RAW IMAGES	MISSION LOG FILE	RANGE	DIGITIZER	BASE STATION(S)		OPERATOR LOGS (OPLOG)	FLIGHT PLAN		SERVER LOCATION
				Output LAS	KML (swath)							BASE STATION(S)	Base Info (.txt)		Actual	KML	
Oct 21, 2013	669G	2CAG1618C294A	GEMINI	NA	NA	NA	161MB	38.9	64/139	20	79.3	7.33	1KB	1KB	5	NA	X:\Airborne_Raw\6 69G
Jan 20, 2014	1009P	1NEJA030A	PEGASUS	3.49	NA	9.13	241	41.8	361	31.2	149	5.57	1KB	1KB	42/47	NA	X:\Airborne_Raw\1 009P
Jan 21, 2014	1011P	1NEJ18021A	PEGASUS	NA	68	8.56	185	15.3	NA	18.5	93.4	8.24	1KB	1KB	36	NA	X:\Airborne_Raw\1 011P
Jan 21, 2014	1013P	1NEJ180218	PEGASUS	NA	NA	6.13	150	NA	NA	11.3	53.8	8.24	1KB	1KB	NA	NA	X:\Airborne_Raw\1 013P
Jan 26, 2014	7032G	2NEJ1C026A	GEMINI	NA	122	NA	158	NA	NA	9.77	NA	8.03	1KB	1KB	5	NA	X:\Airborne_Raw\7 032G
Jan 28, 2014	7036G	2NEJ1C5028A	GEMINI	NA	259	262	185	NA	NA	11.1	NA	2.56	1KB	1KB	5	NA	X:\Airborne_Raw\7 036G
[illegible]	[illegible]	[illegible]	[illegible]	NA	TO FOLLOW											NA	[illegible]
Feb 2, 2014	7047G	2MIA5033A	GEMINI	NA	105	188	138	30.4(casi)	NA	3.64	NA	2.42	1KB	1KB	4	NA	X:\Airborne_Raw\7 047G

Received from

Name C. JOAS Y M
Position RA
Signature

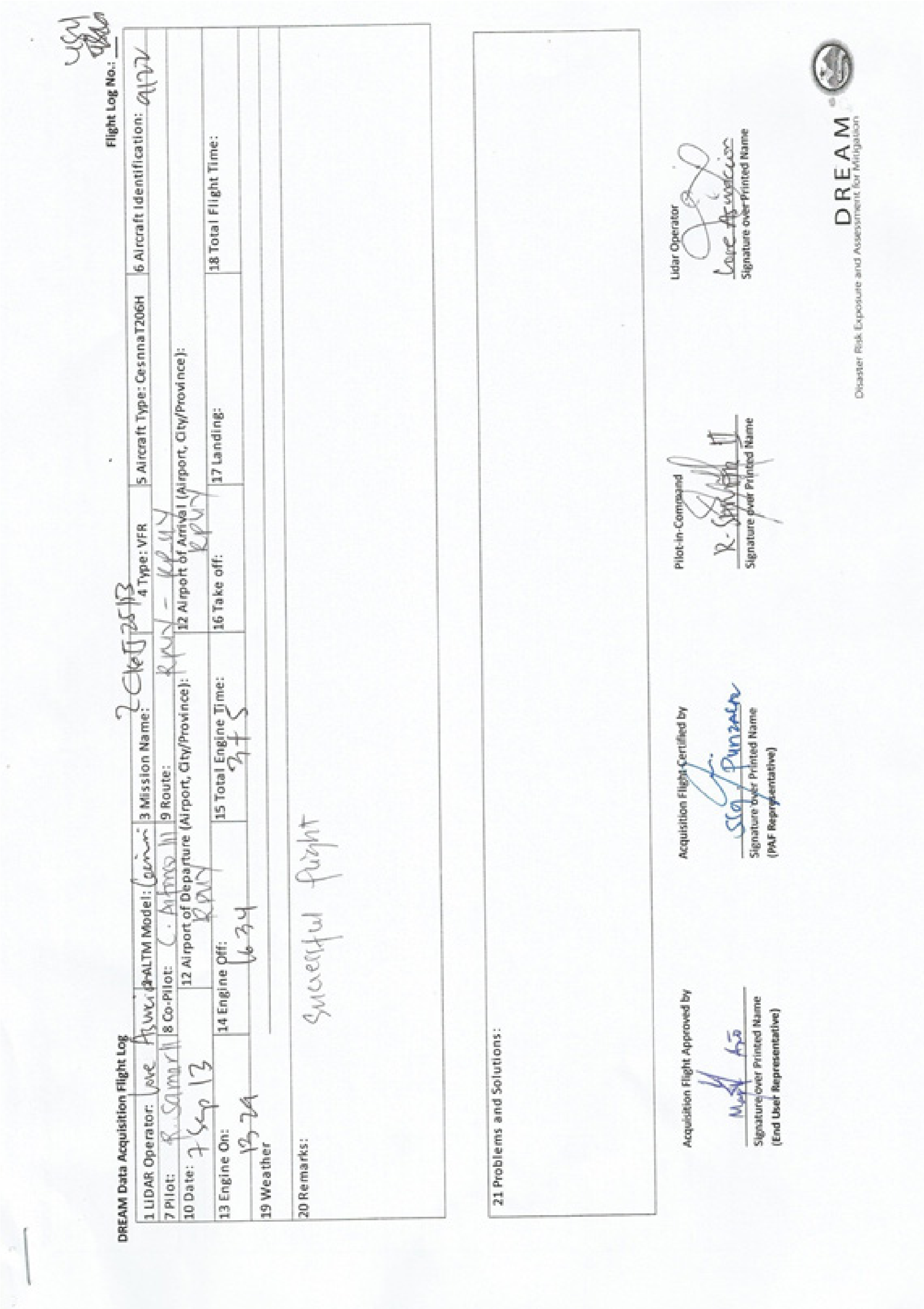
Received by

Name JOIDA PRIETO
Position SSRS
Signature 6/17/2014

Annex E

ANNEX E. FLIGHT LOGS FOR CAGAYAN FLOODPLAIN

1. Flight Log for 2CAG161J251B Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 9122

1 LIDAR Operator: Love Asuncion	2 ALTM Model: Gemini	3 Mission Name: 2CAGJ251J3	4 Type: VFR	5 Aircraft Type: CesnnaT206H	6 Aircraft Identification: 9122
7 Pilot: R. Samonte	8 Co-Pilot: C. Alfonso III	9 Route: RPUY - RPUY			
10 Date: 7 Sep 13	12 Airport of Departure (Airport, City/Province): RPUY	12 Airport of Arrival (Airport, City/Province): RPUY			
13 Engine On: 1324	14 Engine Off: 1634	15 Total Engine Time: 3+5	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather					
20 Remarks: Successful flight					

21 Problems and Solutions:

Acquisition Flight Approved by — Signature over Printed Name (End User Representative)

Acquisition Flight Certified by — SSG Punzalan — Signature over Printed Name (PAF Representative)

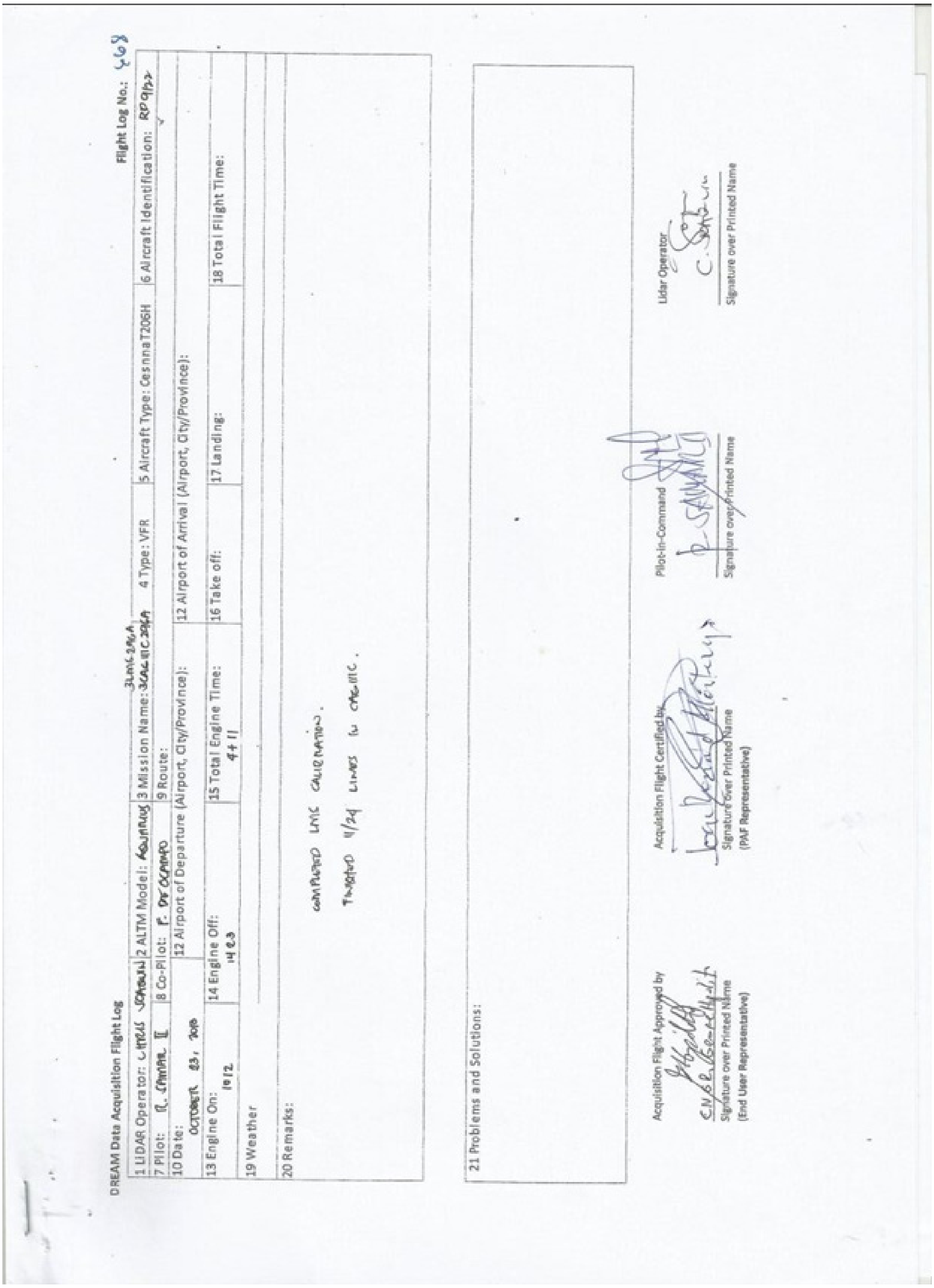
Pilot-in-Command — R. Samonte II — Signature over Printed Name

Lidar Operator — Love Asuncion — Signature over Printed Name

DREAM
Disaster Risk Exposure and Assessment for Mitigation

Annex E

2. Flight Log for 3LMS296A & 3CAG111C296A Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 468

1 LIDAR Operator: CHRIS SCABUIN	2 ALTM Model: AQUARIUS	3 Mission Name: 3LMS296A 3CAG111C296A	4 Type: VFR	5 Aircraft Type: Cesnna T206H	6 Aircraft Identification: RP9122
7 Pilot: R. SAMAR II	8 Co-Pilot: F. DE OCAMPO	9 Route:			
10 Date: OCTOBER 23, 2018	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 1012	14 Engine Off: 1423	15 Total Engine Time: 4+11	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather					

20 Remarks:

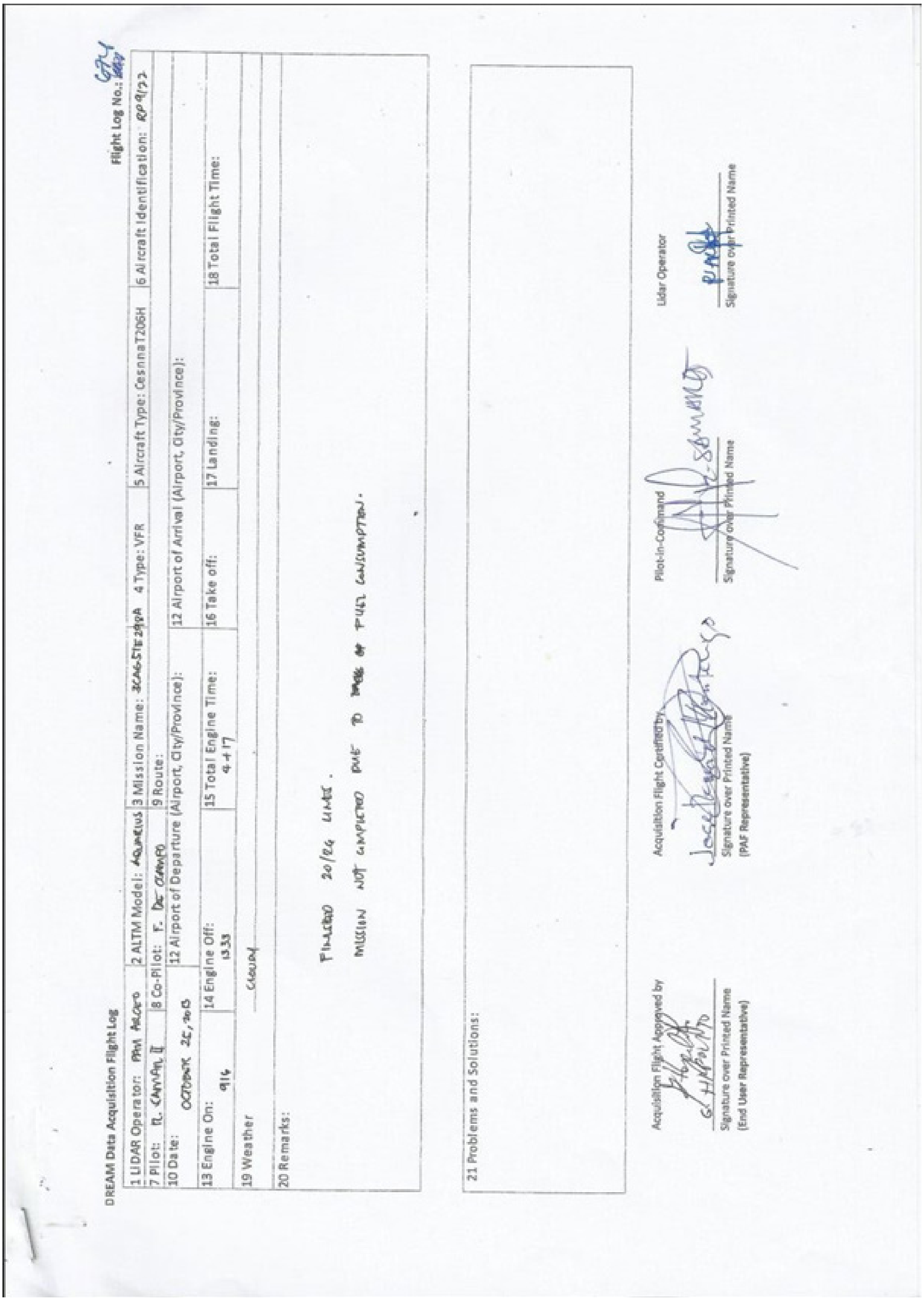
COMPLETED LMS CALIBRATION.

FINISHED 11/24 LINES IN CAG111C.

21 Problems and Solutions:

Acquisition Flight Approved by	Acquisition Flight Certified by	Pilot-in-Command	Lidar Operator
Signature over Printed Name (End User Representative)	Signature over Printed Name (PAF Representative)	R. SAMAR II Signature over Printed Name	C. SCABUIN Signature over Printed Name

3. Flight Log for 3CAG51E298A Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 624

1 LIDAR Operator: PAM ARCEO	2 ALTM Model: AQUARIUS	3 Mission Name: 3CAG51E298A	4 Type: VFR	5 Aircraft Type: Cesnna T206H	6 Aircraft Identification: RP9122
7 Pilot: R. CAMPAN II	8 Co-Pilot: F. DE CAMPO	9 Route:			
10 Date: OCTOBER 25, 2015	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 916	14 Engine Off: 1333	15 Total Engine Time: 4+17	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather: CLOUDY					

20 Remarks:

FINISHED 20/24 LINES.

MISSION NOT COMPLETED DUE TO [illegible] OF FUEL CONSUMPTION.

21 Problems and Solutions:

Acquisition Flight Approved by: Signature over Printed Name (End User Representative)

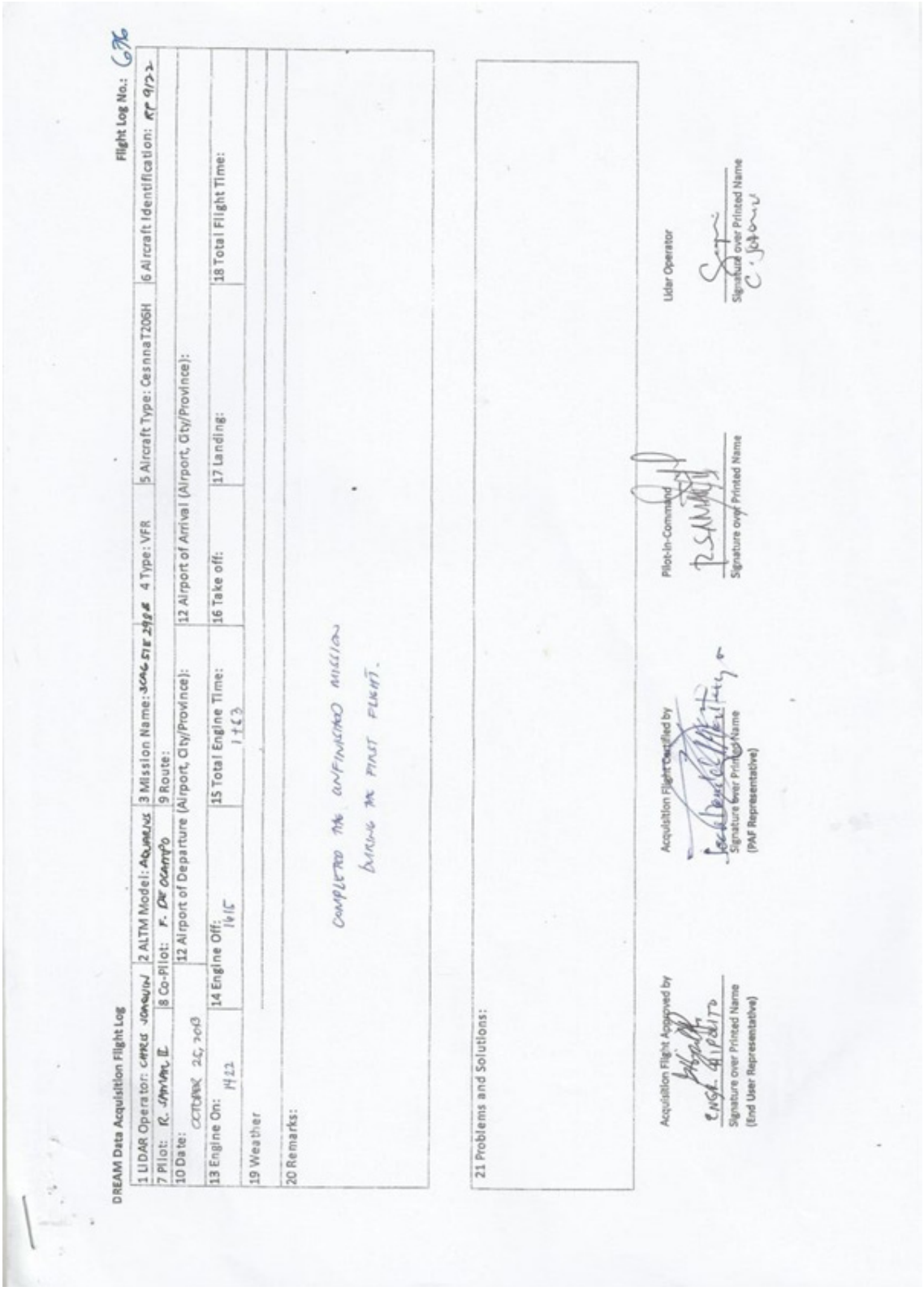
Acquisition Flight Certified by: Signature over Printed Name (PAF Representative)

Pilot-in-Command: Signature over Printed Name

Lidar Operator: Signature over Printed Name

Annex E

4. Flight Log for 3CAG51E298B Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 6

1 LIDAR Operator: CARLO JOAQUIN	2 ALTM Model: ACQUIRE	3 Mission Name: 3CAG51E298B	4 Type: VFR	5 Aircraft Type: CessnaT206H	6 Aircraft Identification: RP 9122
7 Pilot: R. SANTOS, JR.	8 Co-Pilot: F. DE OCAMPO	9 Route:			
10 Date: OCTOBER 26, 2018	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 1421	14 Engine Off: 1615	15 Total Engine Time: 1.5	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather					
20 Remarks: COMPLETED THE UNFINISHED MISSION DURING THE FIRST FLIGHT.					
21 Problems and Solutions:					

Acquisition Flight Approved by
Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by
Signature over Printed Name
(PAF Representative)

Pilot-in-Command
Signature over Printed Name

Lidar Operator
Signature over Printed Name

Annex E

5. Flight Log for 3CAG51F299A Mission

DREAM Data Acquisition Flight Log

Flight Log No.: 678

1 LIDAR Operator: C. JOAQUIN	2 ALTM Model: AQUARIUS	3 Mission Name: 3CAG51F299A	4 Type: VFR	5 Aircraft Type: Cesnna T206H	6 Aircraft Identification: RP-C9122
7 Pilot: [illegible]	8 Co-Pilot: C. ALFONSO III	9 Route:			
10 Date: OCTOBER 26, 2013	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 904	14 Engine Off: 1257	15 Total Engine Time: 3+53	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather					
20 Remarks: FINISHED 14/24 LINES.					

21 Problems and Solutions:

Acquisition Flight Approved by
Signature over Printed Name
(End User Representative)

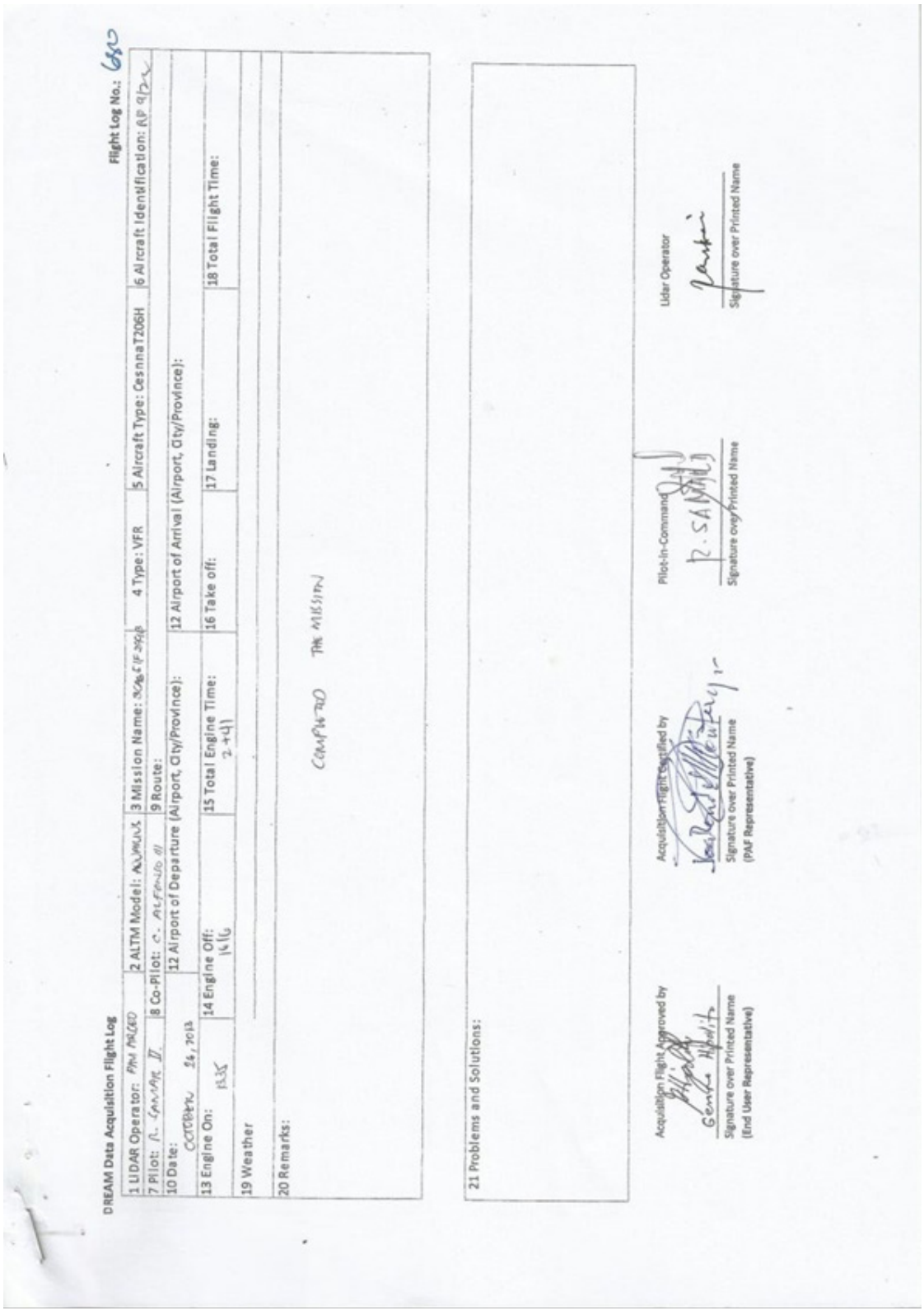
Acquisition Flight Certified by
Signature over Printed Name
(PAF Representative)

Pilot-in-Command
Signature over Printed Name

Lidar Operator
C. JOAQUIN
Signature over Printed Name

Annex E

6. Flight Log for 3CAG51F299B Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 040

1 LIDAR Operator: PAF PASCO	2 ALTM Model: ALS70	3 Mission Name: 3CAG51F299B	4 Type: VFR	5 Aircraft Type: Cessna T206H	6 Aircraft Identification: AP-BDX
7 Pilot: R. SAMMAR JT	8 Co-Pilot: C. ALFONSO III	9 Route:			
10 Date: OCTOBER 24, 2013	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 1335	14 Engine Off: 1416	15 Total Engine Time: 2+41	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather					
20 Remarks: COMPLETED THE MISSION					

21 Problems and Solutions:

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

Signature over Printed Name
(PAF Representative)

Pilot-in-Command

R. SAMMAR JT

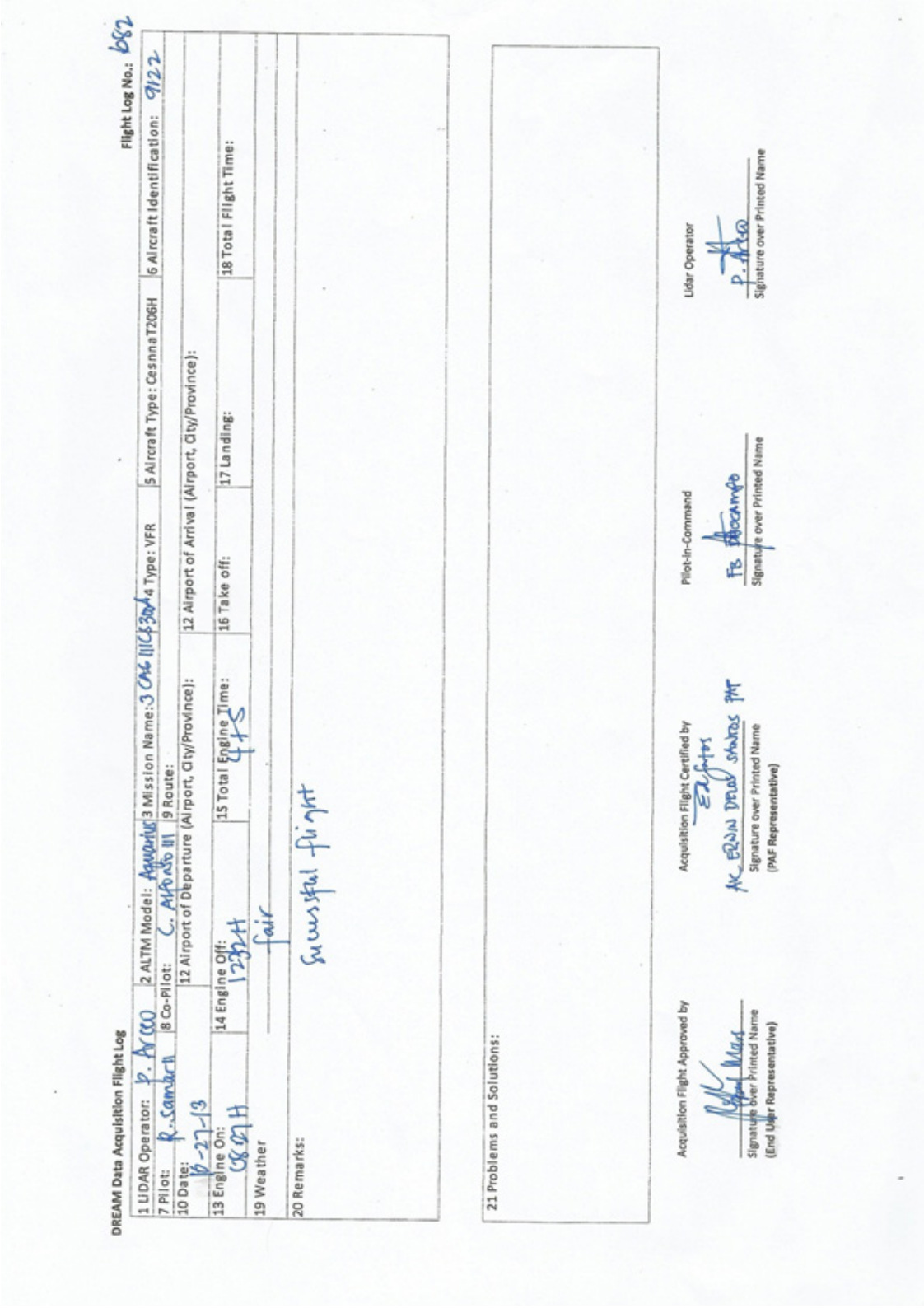
Signature over/Printed Name

Lidar Operator

Signature over Printed Name

Annex E

7. Flight Log for 3CAG111CS300A Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 082

1 LIDAR Operator: P. Arceo	2 ALTM Model: Aquarius	3 Mission Name: 3CAG111CS300A Type: VFR	5 Aircraft Type: Cessna T206H	6 Aircraft Identification: 9122
7 Pilot: R. Camacho	8 Co-Pilot: C. Alfonso III	9 Route:		
10 Date: 8-27-13	11 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):	
13 Engine On: 0807H	14 Engine Off: 1232H	15 Total Engine Time: 4+25	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather: fair				

20 Remarks: Successful flight

21 Problems and Solutions:

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

Signature over Printed Name
(PAF Representative)

Pilot-in-Command

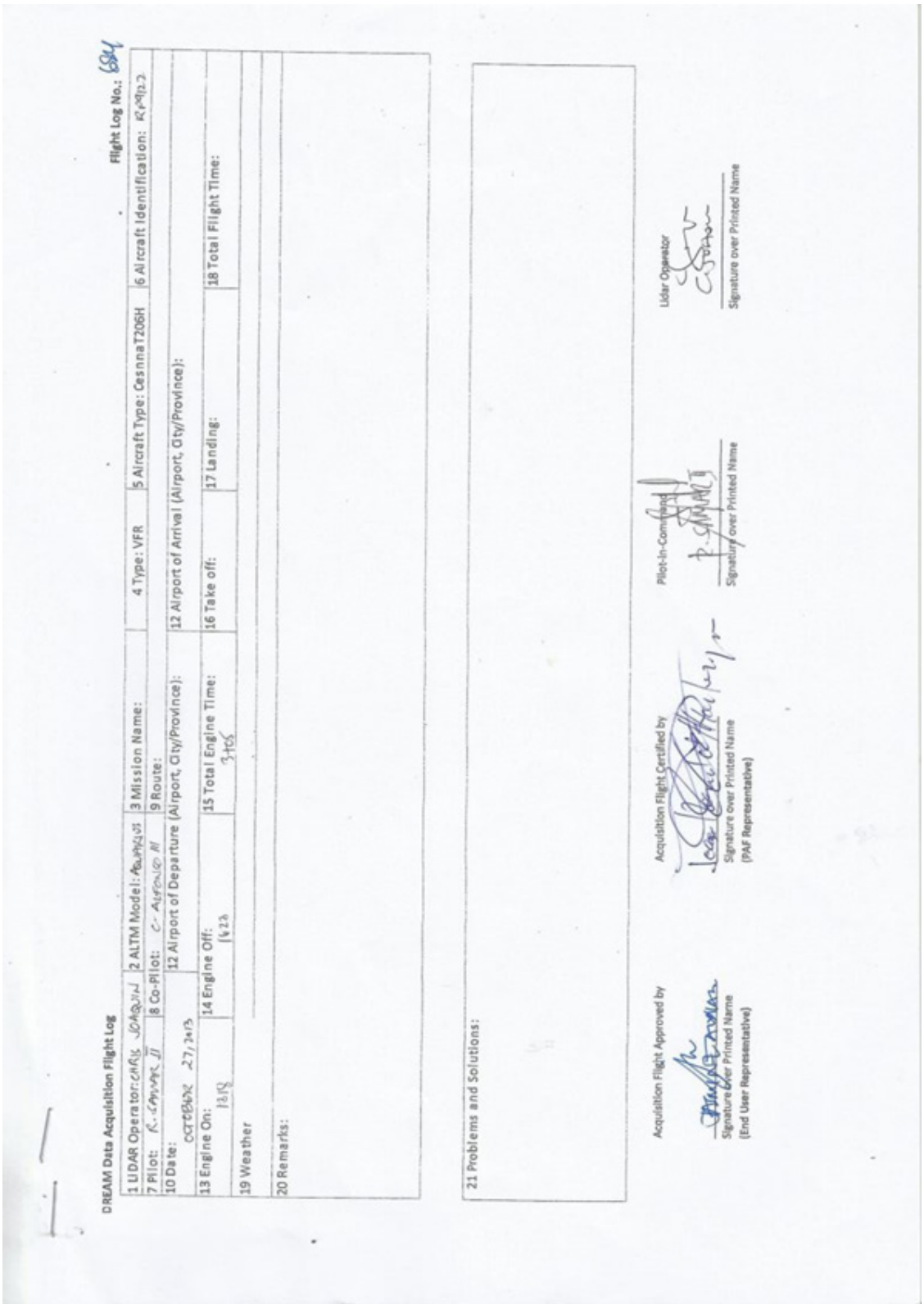
Signature over Printed Name

Lidar Operator

Signature over Printed Name

Annex E

8. Flight Log for 3CAG111DS300B Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 684

1 LIDAR Operator: [illegible]	2 ALTM Model: [illegible]	3 Mission Name:	4 Type: VFR / 5 Aircraft Type: Cessna T206H / 6 Aircraft Identification: [illegible]
7 Pilot: [illegible]	8 Co-Pilot: [illegible]	9 Route:	
10 Date: 27/2/13	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):
13 Engine On: 1615	14 Engine Off: 1628	15 Total Engine Time: 3+05	16 Take off: / 17 Landing: / 18 Total Flight Time:
19 Weather			
20 Remarks:			

21 Problems and Solutions:

Acquisition Flight Approved by
Signature over Printed Name
(End User Representative)

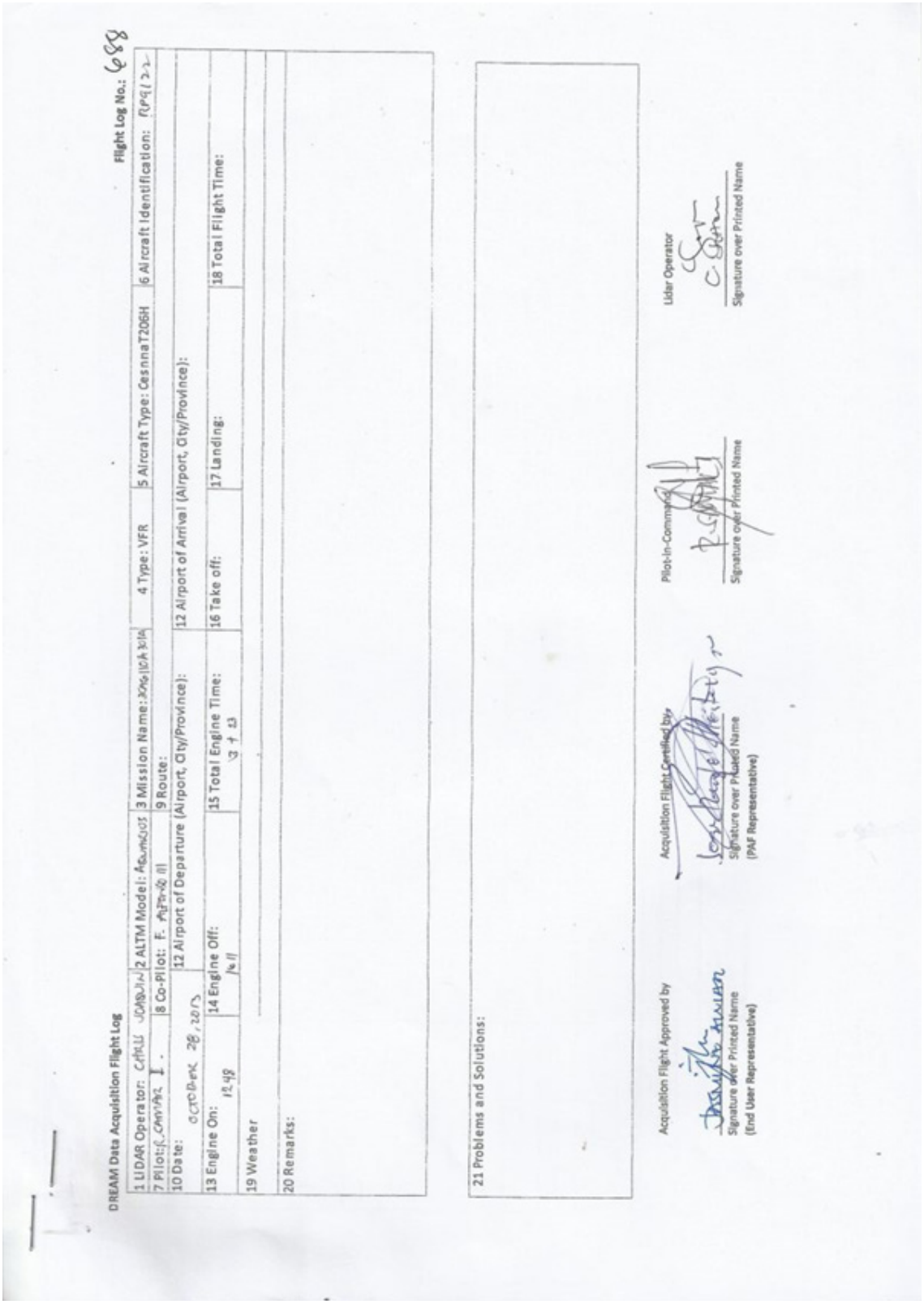
Acquisition Flight Certified by
Signature over Printed Name
(PAF Representative)

Pilot-In-Command
Signature over Printed Name

Lidar Operator
Signature over Printed Name

Annex E

9. Flight Log for 3CAG110A301A Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 088

1 LIDAR Operator: CARLO JOAQUIN	2 ALTM Model: Aquarius	3 Mission Name: 3CAG110A301A	4 Type: VFR	5 Aircraft Type: CessnaT206H	6 Aircraft Identification: RP-C1122
7 Pilot: [illegible]	8 Co-Pilot: F. [illegible]	9 Route:			
10 Date: OCTOBER 28, 2015	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 12:48	14 Engine Off: [illegible]	15 Total Engine Time: 3 + 23	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather					
20 Remarks:					

21 Problems and Solutions:

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by:

Signature over Printed Name
(PAF Representative)

Pilot-In-Command

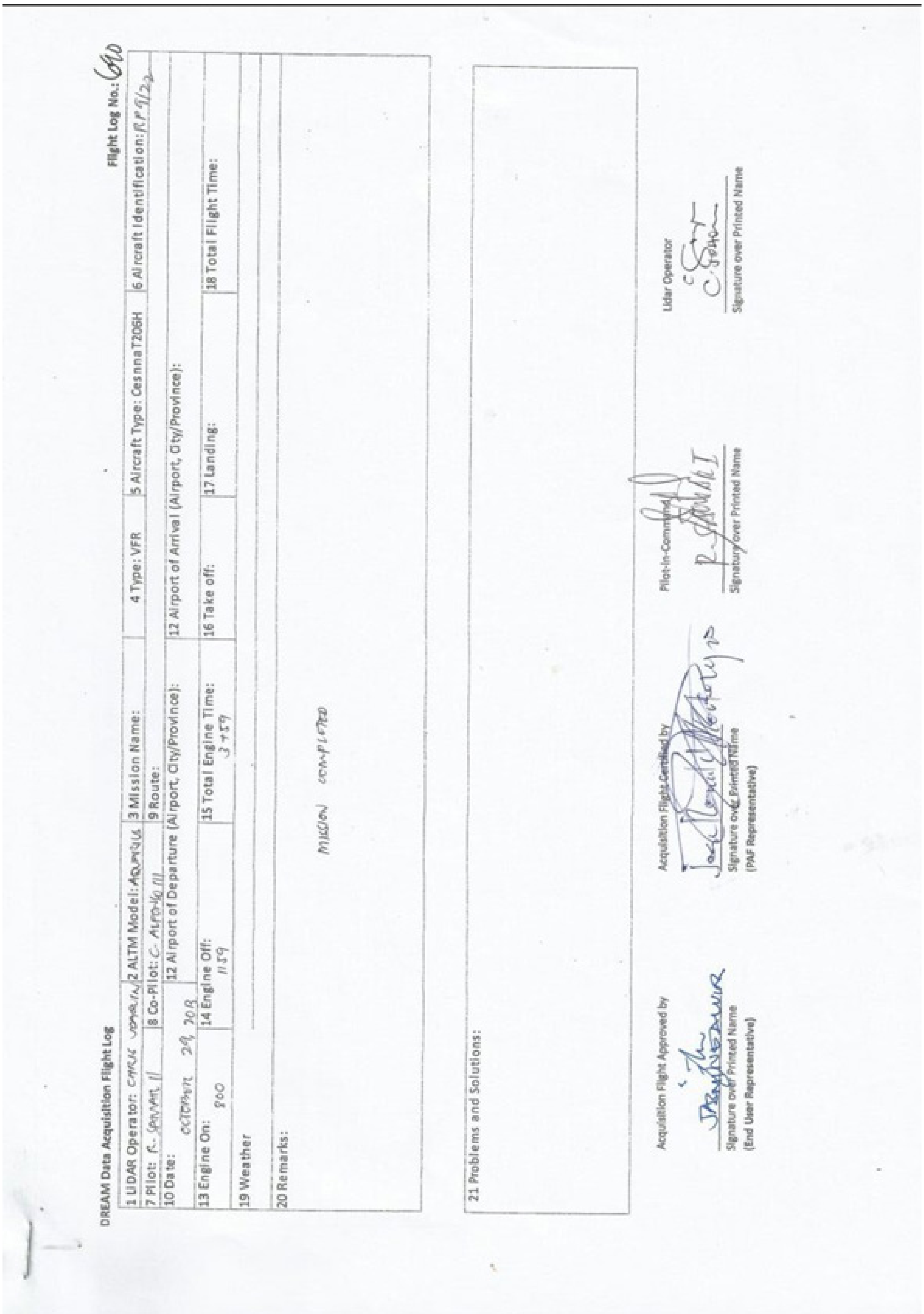
Signature over Printed Name

Lidar Operator

Signature over Printed Name

Annex E

10. Flight Log for 3CAG111BS302A Mission



DREAM Data Acquisition Flight Log

Flight Log No.: [illegible]

1 LiDAR Operator: [illegible]	2 ALTM Model: AQUARIUS	3 Mission Name:	4 Type: VFR	5 Aircraft Type: CesnnaT206H	6 Aircraft Identification: RP9122
7 Pilot: R. [illegible]	8 Co-Pilot: C. ALFONSO III	9 Route:			
10 Date: OCTOBER 29, 20[illegible]	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 800	14 Engine Off: 1159	15 Total Engine Time: 3+59	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather					
20 Remarks: MISSION COMPLETED					

21 Problems and Solutions:

Acquisition Flight Approved by
Signature over Printed Name
(End User Representative)

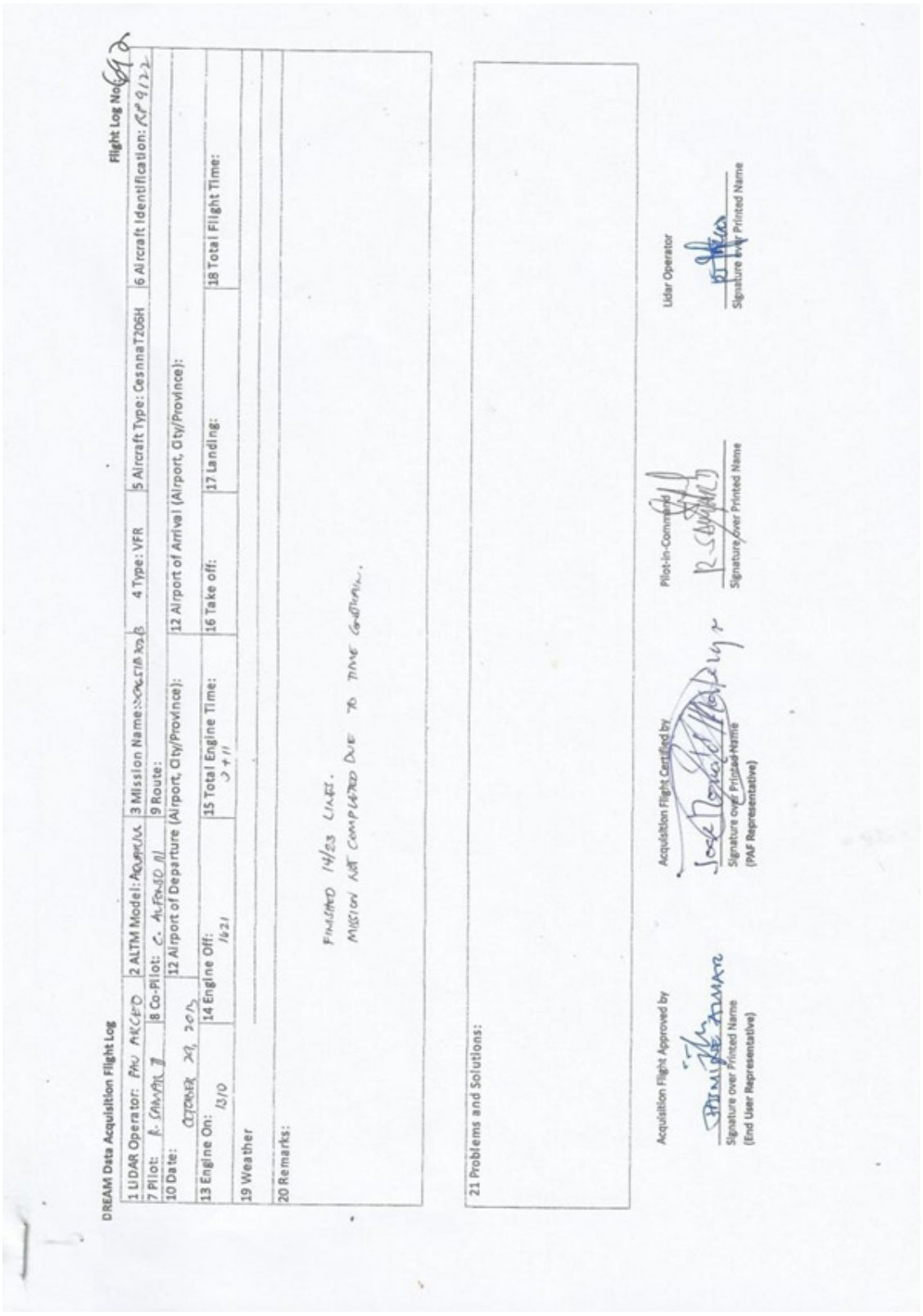
Acquisition Flight Certified by
Signature over Printed Name
(PAF Representative)

Pilot-in-Command
Signature over Printed Name

Lidar Operator
Signature over Printed Name

Annex E

11. Flight Log for 3CAG51B302B Mission



DREAM Data Acquisition Flight Log

Flight Log No: 07

1 LIDAR Operator: PHU ARCEO	2 ALTM Model: AQUARIUS	3 Mission Name: 3CAG51B302B	4 Type: VFR	5 Aircraft Type: Cessna T206H	6 Aircraft Identification: RP-9122
7 Pilot: R. SANTOS II	8 Co-Pilot: C. ALFONSO III	9 Route:			
10 Date: OCTOBER 29, 2015	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 1510	14 Engine Off: 1621	15 Total Engine Time: 3+11	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather					
20 Remarks: FINISHED 14/23 LINES. MISSION NOT COMPLETED DUE TO TIME CONSTRAINT.					
21 Problems and Solutions:					

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by:

Signature over Printed Name
(PAF Representative)

Pilot-in-Command

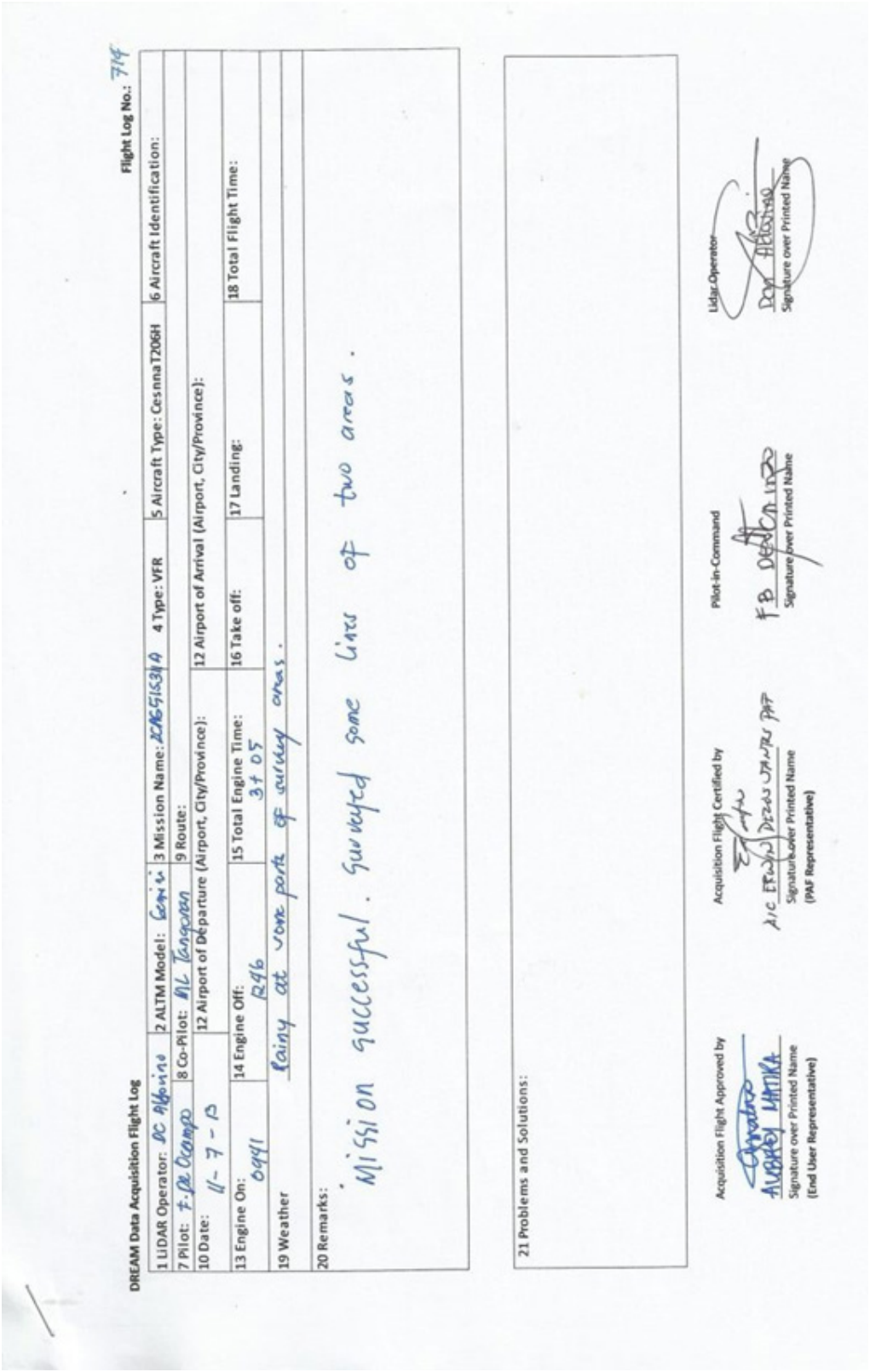
Signature over Printed Name

Lidar Operator

Signature over Printed Name

Annex E

12. Flight Log for 2CAG21A311A AND 2CAG51BS311A Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 714

1 LiDAR Operator: DC Aerospace	2 ALTM Model: Gemini	3 Mission Name: 2CAG51BS311A	4 Type: VFR	5 Aircraft Type: Cessna T206H	6 Aircraft Identification:
7 Pilot: F.B. Ocampo	8 Co-Pilot: NL Tangcangan	9 Route:			
10 Date: 11-7-15	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 0941	14 Engine Off: 1246	15 Total Engine Time: 3+05	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather	Rainy at some part of survey areas.				

20 Remarks:

Mission successful. Surveyed some lines of two areas.

21 Problems and Solutions:

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

Signature over Printed Name
(PAF Representative)

Pilot-in-Command

Signature over Printed Name

LiDar Operator

Signature over Printed Name

13. Flight Log for 2CAG51BS2311B Mission

DREAM Data Acquisition Flight Log

Flight Log No.: 76

1 LiDAR Operator: MVE Tonga	2 ALTM Model: Gemini	3 Mission Name: 2CAG51S2311B	4 Type: VFR	5 Aircraft Type: Cesnna T206H	6 Aircraft Identification: 9122
7 Pilot: P. Dela Ocampo	8 Co-Pilot: ML Tongonon	9 Route:			
10 Date: 11-7-13	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 1345	14 Engine Off: 1602	15 Total Engine Time: 2+17	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather: Good					
20 Remarks: Mission successful					

21 Problems and Solutions:

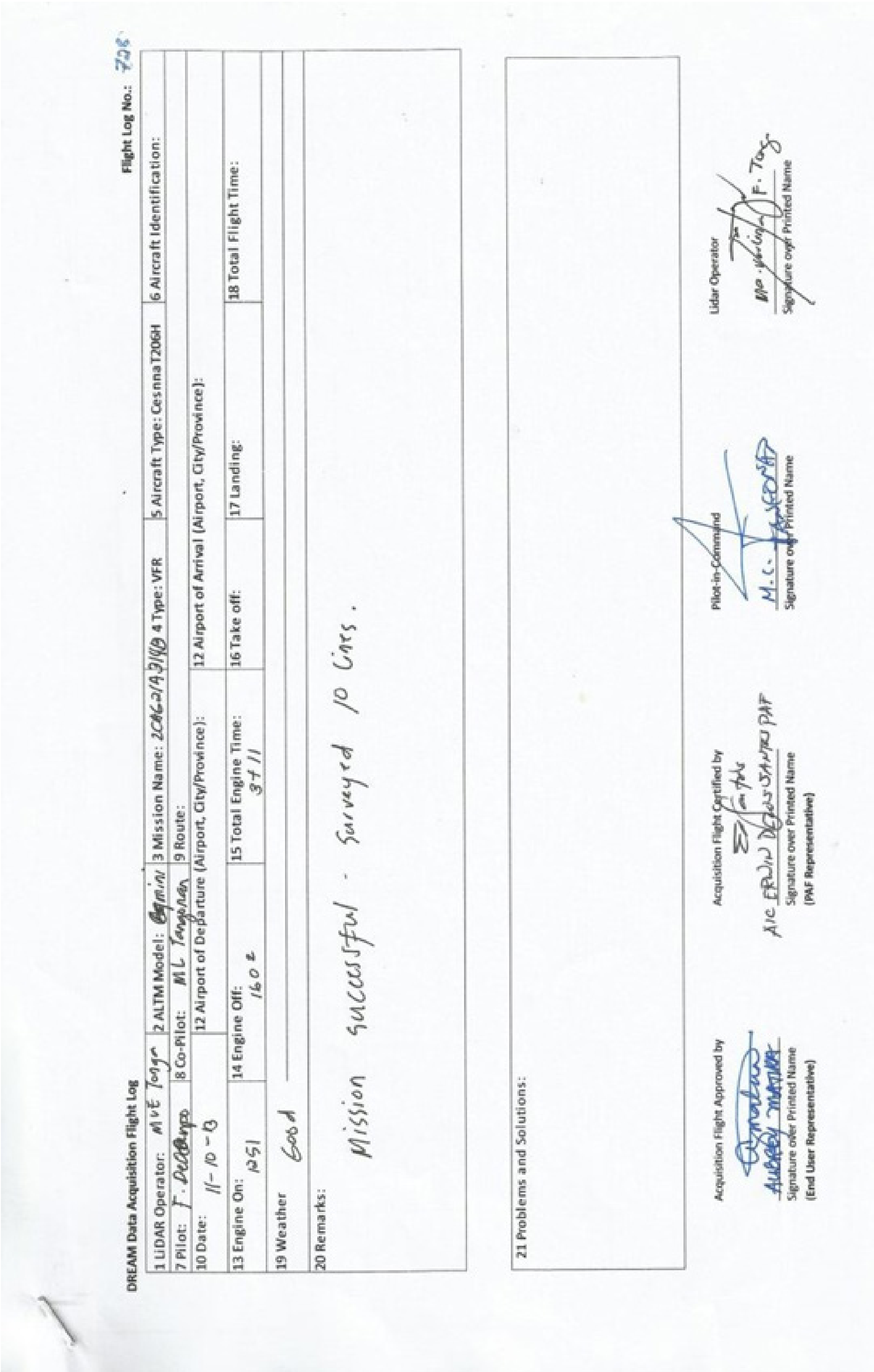
Acquisition Flight Approved by: Aubrey Matira — Signature over Printed Name (End User Representative)

Acquisition Flight Certified by: A1C Erwin Dorias Sanjos PAF — Signature over Printed Name (PAF Representative)

Pilot-in-Command: P. B. Dela Ocampo — Signature over Printed Name

Lidar Operator: Signature over Printed Name

14. Flight Log for 2CAG21A314B Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 728

1 LiDAR Operator: MVE Tonga	2 ALTM Model: Gemini	3 Mission Name: 2CAG21A314B	4 Type: VFR	5 Aircraft Type: Cesnna T206H	6 Aircraft Identification:
7 Pilot: F. DelaCampo	8 Co-Pilot: ML Tangonan	9 Route:			
10 Date: 11-10-13	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 1251	14 Engine Off: 1602	15 Total Engine Time: 3+11	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather: Good					

20 Remarks:

Mission successful - Surveyed 10 lines.

21 Problems and Solutions:

Acquisition Flight Approved by
AUBREY MATIRA
Signature over Printed Name
(End User Representative)

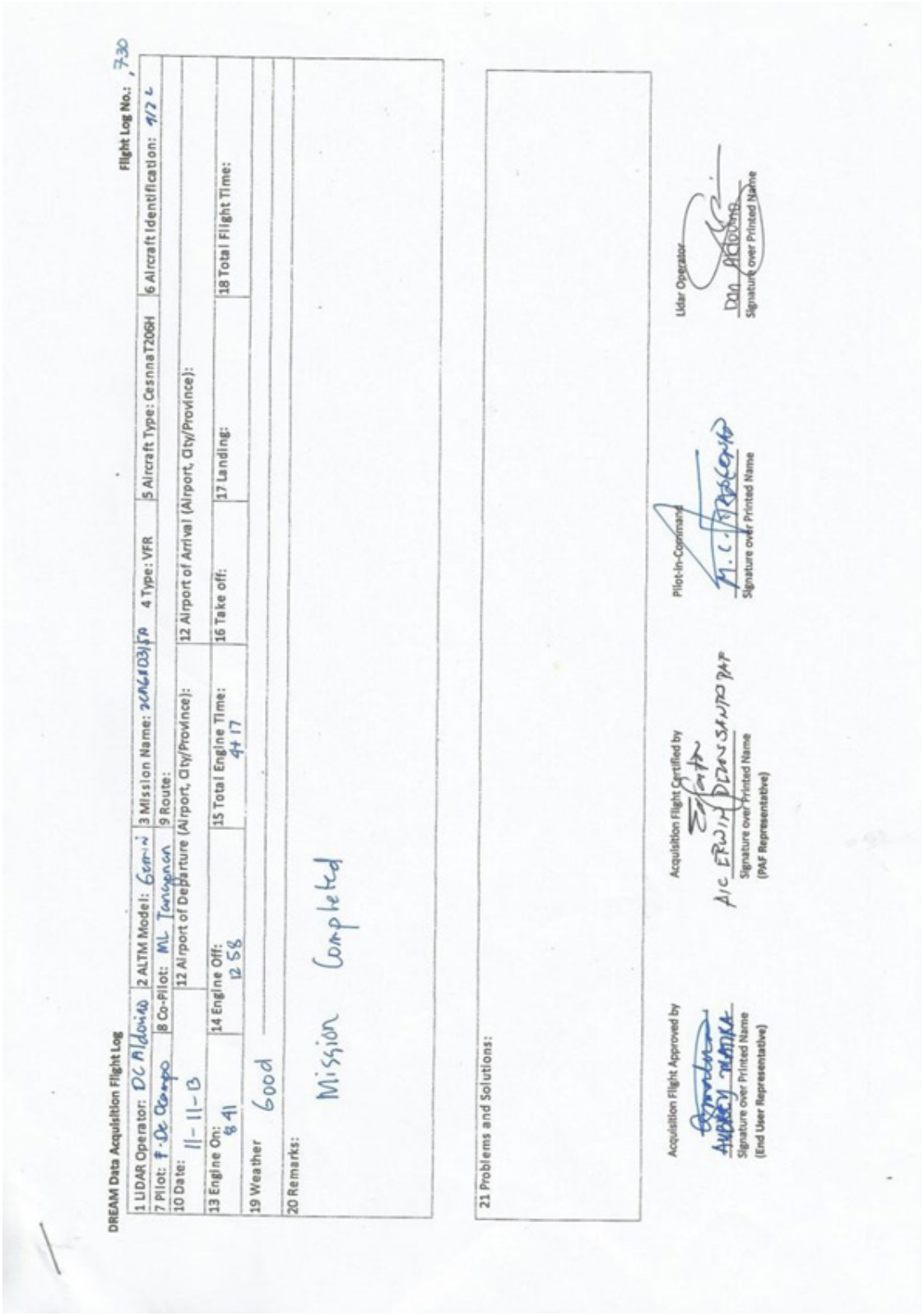
Acquisition Flight Certified by
A1C ERWIN DELOS SANTOS PAF
Signature over Printed Name
(PAF Representative)

Pilot-in-Command
M.C. TANGONAN
Signature over Printed Name

Lidar Operator
MA. VERLINA F. TONGA
Signature over Printed Name

Annex E

15. Flight Log for 2CAG11D315A Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 730

1 LIDAR Operator: DC Aldovino	2 ALTM Model: Gemini	3 Mission Name: 2CAG11D315A	4 Type: VFR
5 Aircraft Type: CessnaT206H	6 Aircraft Identification: RP-C		
7 Pilot: F. De Ocampo	8 Co-Pilot: ML Tarigonan	9 Route:	
10 Date: 11-11-13	11 Airport of Departure (Airport, City/Province):	12 Airport of Arrival (Airport, City/Province):	
13 Engine On: 8:41	14 Engine Off: 12:58	15 Total Engine Time: 4:17	16 Take off:
17 Landing:	18 Total Flight Time:		
19 Weather Good			
20 Remarks: Mission Completed			
21 Problems and Solutions:			

Acquisition Flight Approved by
Signature over Printed Name
(End User Representative)

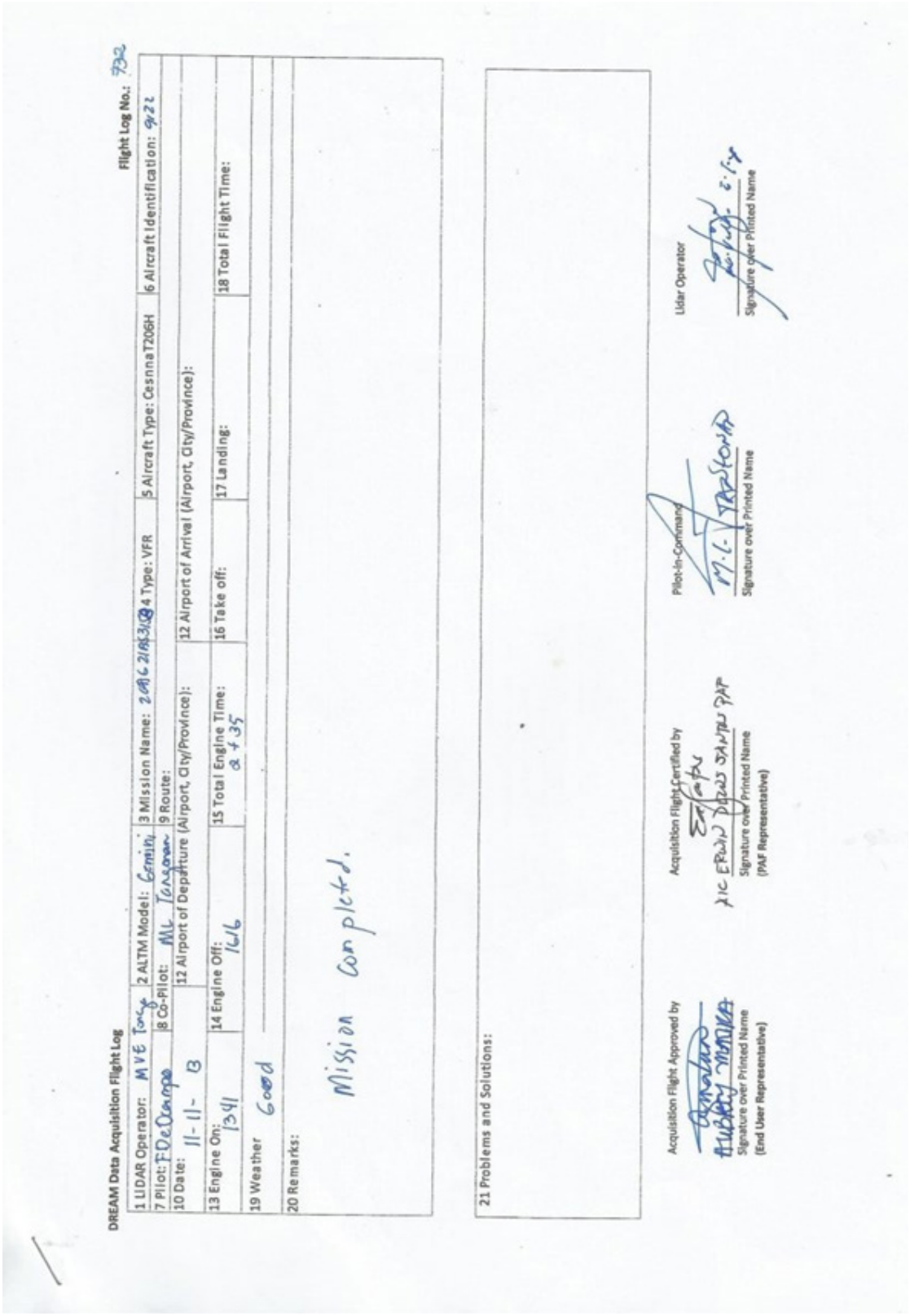
Acquisition Flight Certified by
Signature over Printed Name
(PAF Representative)

Pilot-in-Command
Signature over Printed Name

Lidar Operator
Signature over Printed Name

Annex E

16. Flight Log for 2CAG21AS315B Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 732

1 LIDAR Operator: MVE Tonga	2 ALTM Model: Gemini	3 Mission Name: 2CAG21AS315B	4 Type: VFR
5 Aircraft Type: CessnaT206H	6 Aircraft Identification: 9Z2		
7 Pilot: FDeOcampo	8 Co-Pilot: ML Tongcuan	9 Route:	
10 Date: 11-11-13	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):
13 Engine On: 1341	14 Engine Off: 1616	15 Total Engine Time: 2+35	16 Take off:
17 Landing:	18 Total Flight Time:		
19 Weather Good			
20 Remarks: Mission Completed.			
21 Problems and Solutions:			

Acquisition Flight Approved by
Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by
Signature over Printed Name
(PAF Representative)

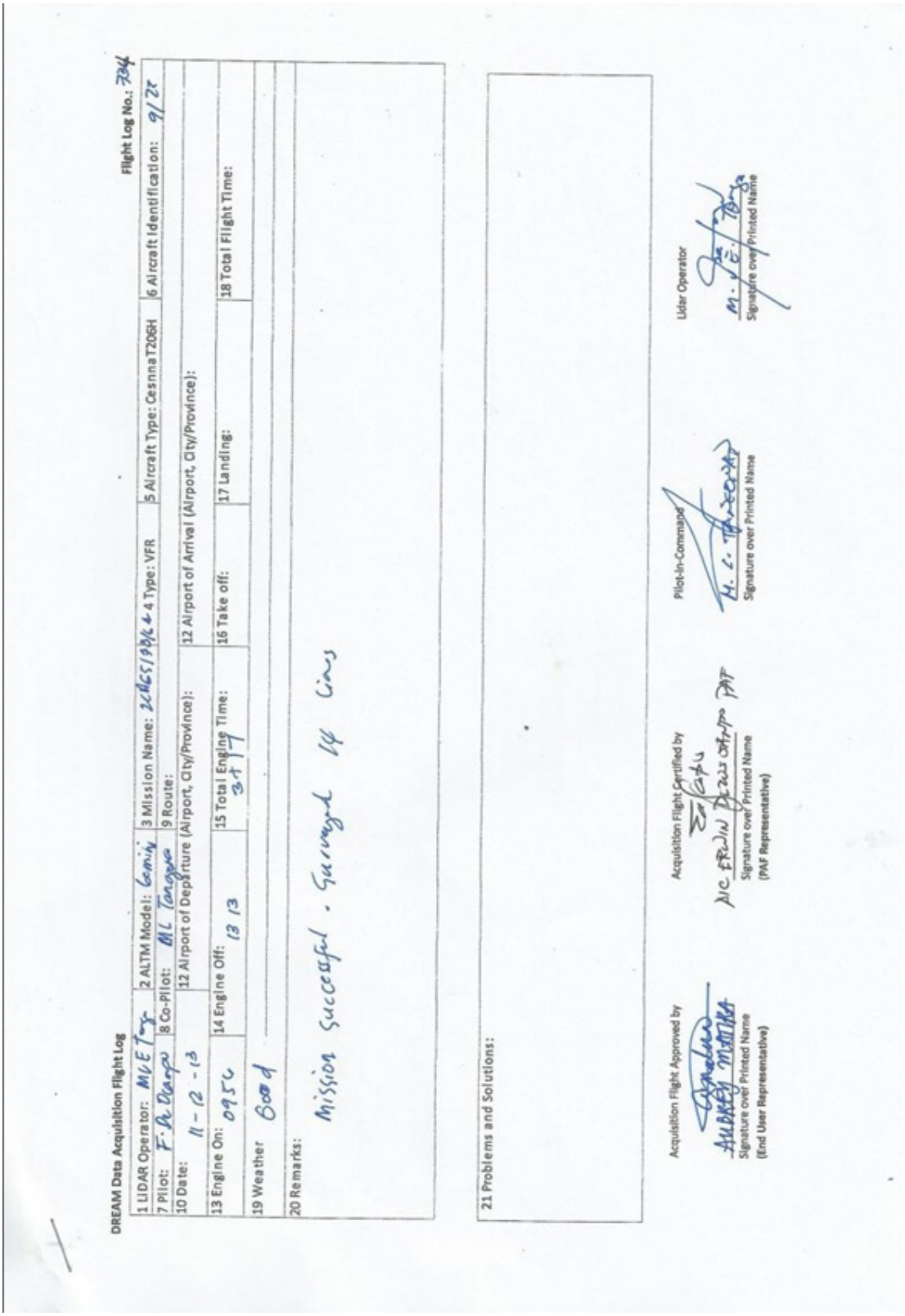
Pilot-in-Command

Lidar Operator
Signature over Printed Name

Signature over Printed Name

Annex E

17. Flight Log for 2CAG51A316A Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 734

1 LIDAR Operator: MVE Inc	2 ALTM Model: Gemini	3 Mission Name: 2CAG51A316A	4 Type: VFR
5 Aircraft Type: CessnaT206H	6 Aircraft Identification: 9/25		
7 Pilot: F. A. Diaz	8 Co-Pilot: ML Tongson	9 Route:	
10 Date: 11-12-13	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):
13 Engine On: 0950	14 Engine Off: 13 13	15 Total Engine Time: 3+19	16 Take off:
17 Landing:	18 Total Flight Time:		
19 Weather Good			

20 Remarks:

Mission Successful. Surveyed 14 Lines

21 Problems and Solutions:

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

Signature over Printed Name
(PAF Representative)

Pilot-in-Command

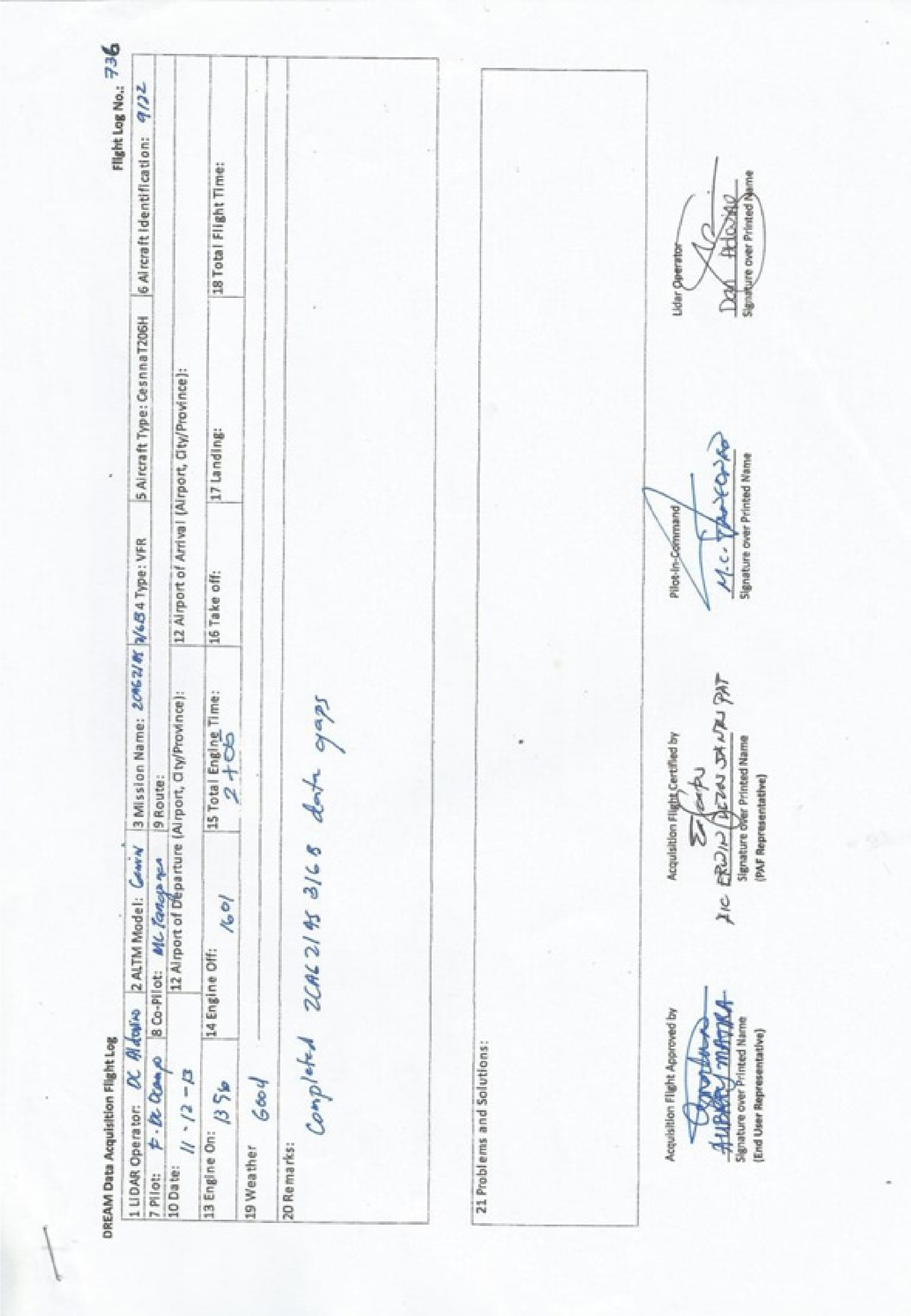
Signature over Printed Name

Lidar Operator

Signature over Printed Name

Annex E

18. Flight Log for 2CAG51AS316B Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 736

1 LIDAR Operator: DC Alcoreno	2 ALTM Model: Gemini	3 Mission Name: 2CAG21AS316B	4 Type: VFR	5 Aircraft Type: Cesnna T206H	6 Aircraft Identification: 9122
7 Pilot: F. De Ocampo	8 Co-Pilot: MC Tangonan	9 Route:			
10 Date: 11-12-13	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 1356	14 Engine Off: 1601	15 Total Engine Time: 2+05	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather: Good					
20 Remarks: Completed 2CAG21AS316B data gaps					

21 Problems and Solutions:

Acquisition Flight Approved by: Aubrey Matira — Signature over Printed Name (End User Representative)

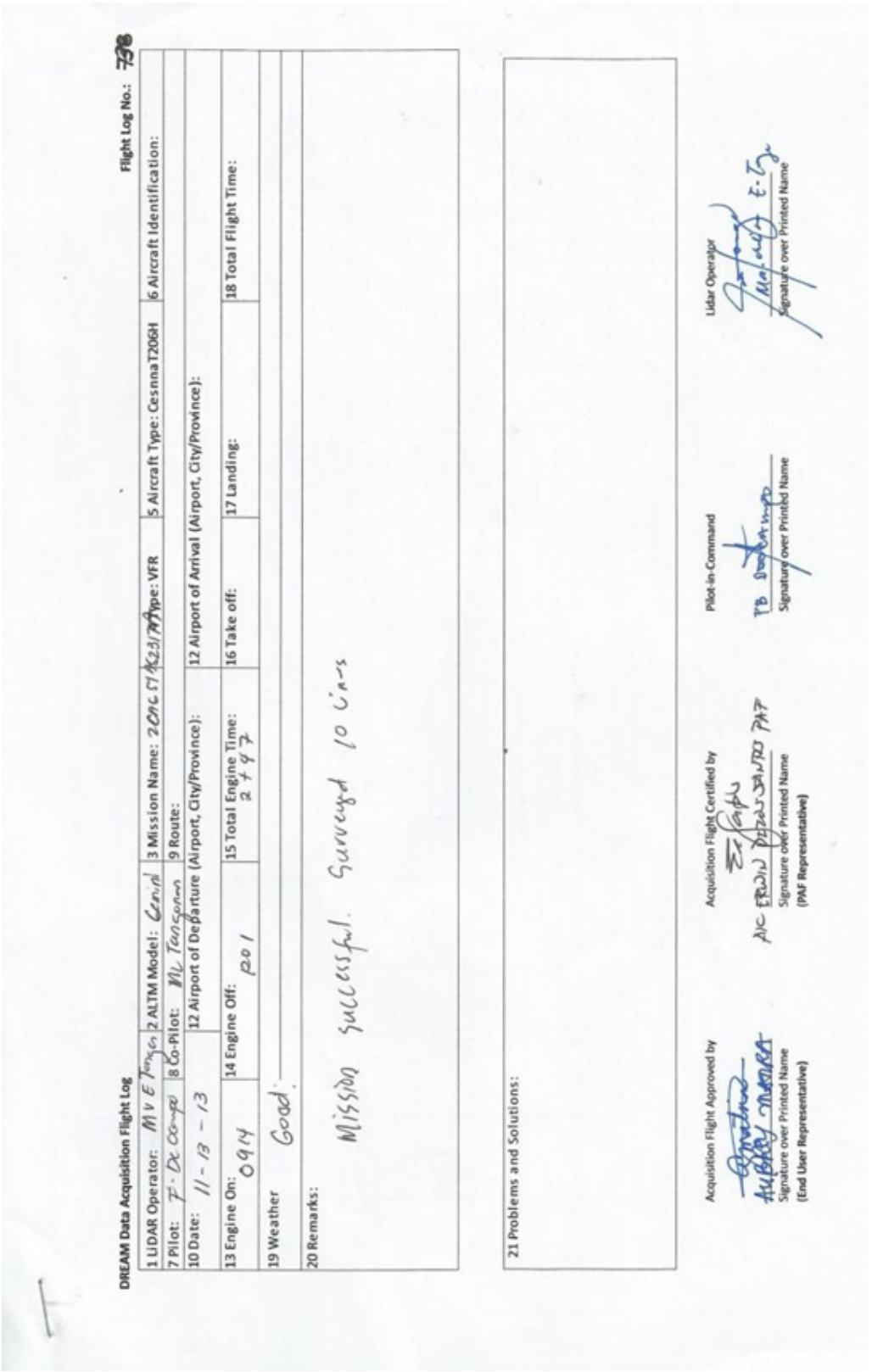
Acquisition Flight Certified by: 2LC Erwin Dezan Santa Pat — Signature over Printed Name (PAF Representative)

Pilot-in-Command: M.C. Tangonan — Signature over Printed Name

Lidar Operator: Dan Alcoreno — Signature over Printed Name

Annex E

19. Flight Log for 2CAG51AS2317A Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 796

1 LiDAR Operator: MVE Team	2 ALTM Model: Gemini	3 Mission Name: 2CAG 51 AS23/17 Type: VFR	5 Aircraft Type: Cessna T206H	6 Aircraft Identification:
7 Pilot: F. De Castro	8 Co-Pilot: Mr. Tenorio	9 Route:		
10 Date: 11-13-13	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):	
13 Engine On: 0914	14 Engine Off: 201	15 Total Engine Time: 2.9	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather Good				
20 Remarks: Mission Successful. Surveyed 10 Lines				

21 Problems and Solutions:

Acquisition Flight Approved by
Signature over Printed Name
(End User Representative)

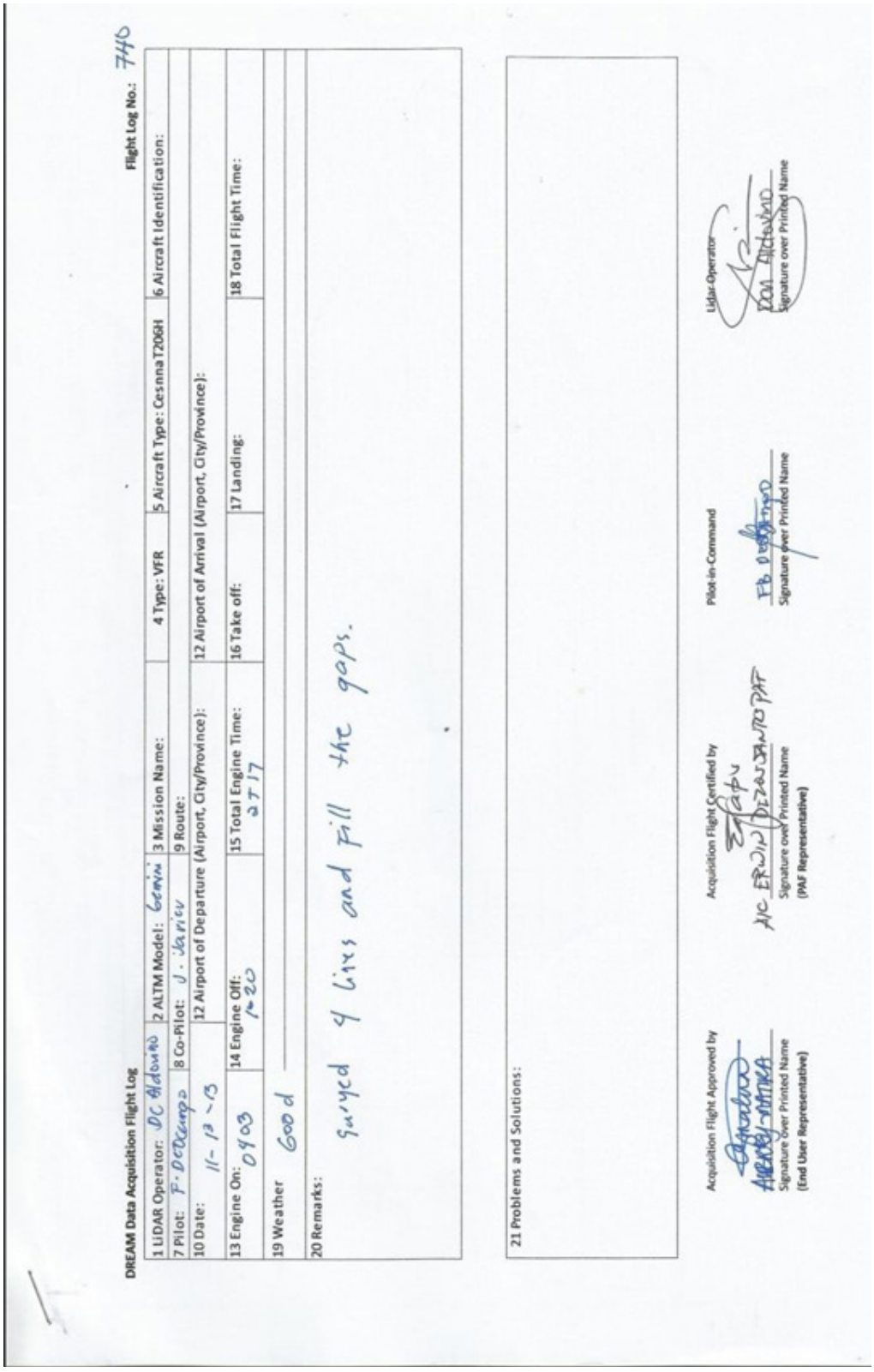
Acquisition Flight Certified by
AIC [illegible]
Signature over Printed Name
(PAF Representative)

Pilot-in-Command
FB [illegible]
Signature over Printed Name

Lidar Operator
Signature over Printed Name

Annex E

20. Flight Log for 2CAG11AS2317B Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 746

1 LiDAR Operator: DC Aldovino	2 ALTM Model: Gemini	3 Mission Name:	4 Type: VFR / 5 Aircraft Type: Cessna T206H / 6 Aircraft Identification:
7 Pilot: F. DeCampo	8 Co-Pilot: J. Javier	9 Route:	
10 Date: 11-13-13	12 Airport of Departure (Airport, City/Province):	12 Airport of Arrival (Airport, City/Province):	
13 Engine On: 0903	14 Engine Off: 1220	15 Total Engine Time: 3.17	16 Take off: / 17 Landing: / 18 Total Flight Time:
19 Weather Good			
20 Remarks: Surveyed 4 Lines and Fill the gaps.			
21 Problems and Solutions:			

Acquisition Flight Approved by
Signature over Printed Name
(End User Representative)

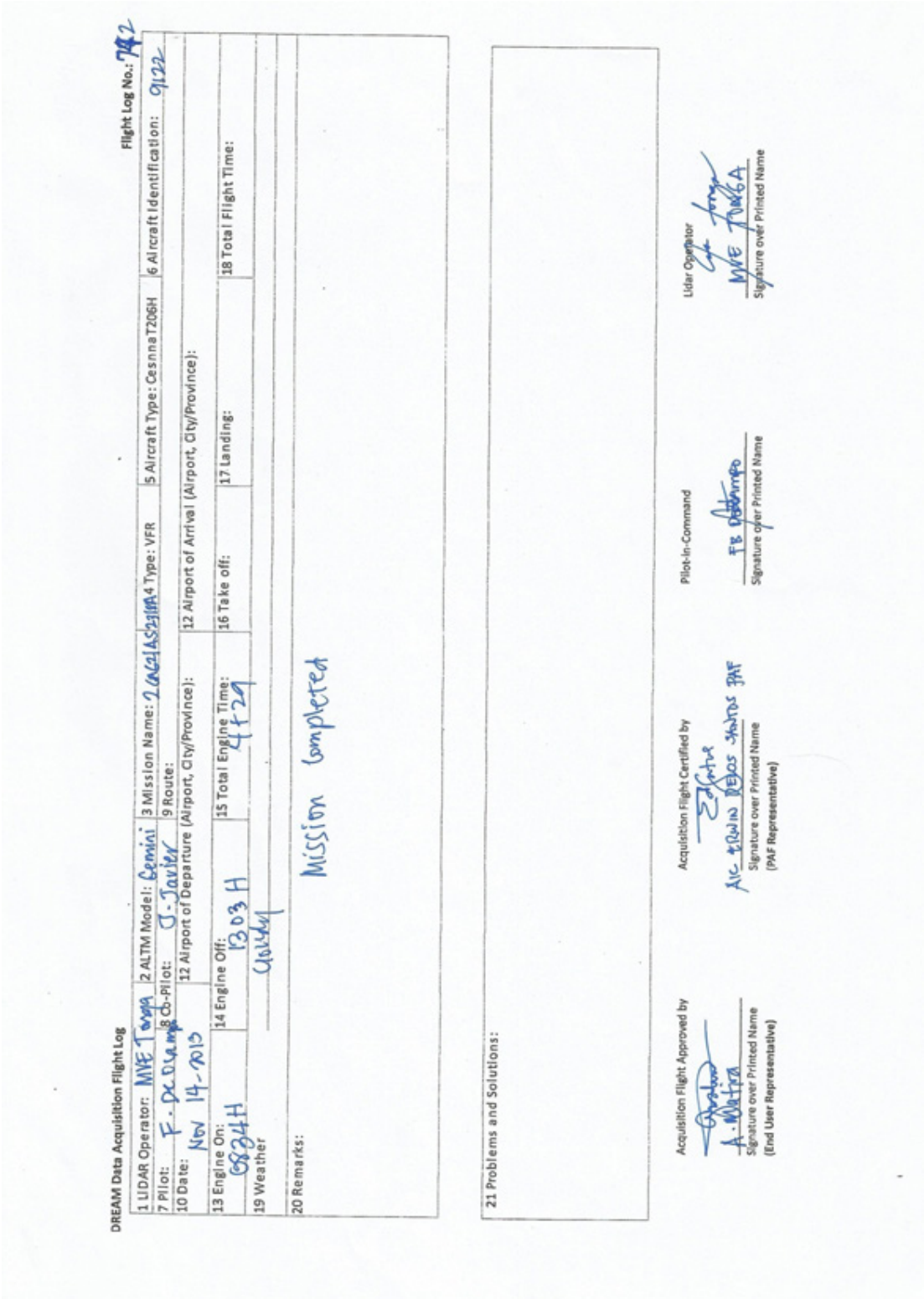
Acquisition Flight Certified by
Signature over Printed Name
(PAF Representative)

Pilot-in-Command
Signature over Printed Name

Lidar Operator
Signature over Printed Name

Annex E

21. Flight Log for 2CAG21AS2318A Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 742

1 LIDAR Operator: MVE Tonga	2 ALTM Model: Gemini	3 Mission Name: 2CAG21AS2318A	4 Type: VFR	5 Aircraft Type: Cessna T206H	6 Aircraft Identification: 9122
7 Pilot: F. Pedrano	8 Co-Pilot: J. Javier	9 Route:			
10 Date: Nov 14-2013	11 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 0834H	14 Engine Off: 1303 H	15 Total Engine Time: 4+29	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather: Cloudy					

20 Remarks: Mission completed

21 Problems and Solutions:

Acquisition Flight Approved by
Signature over Printed Name
(End User Representative)

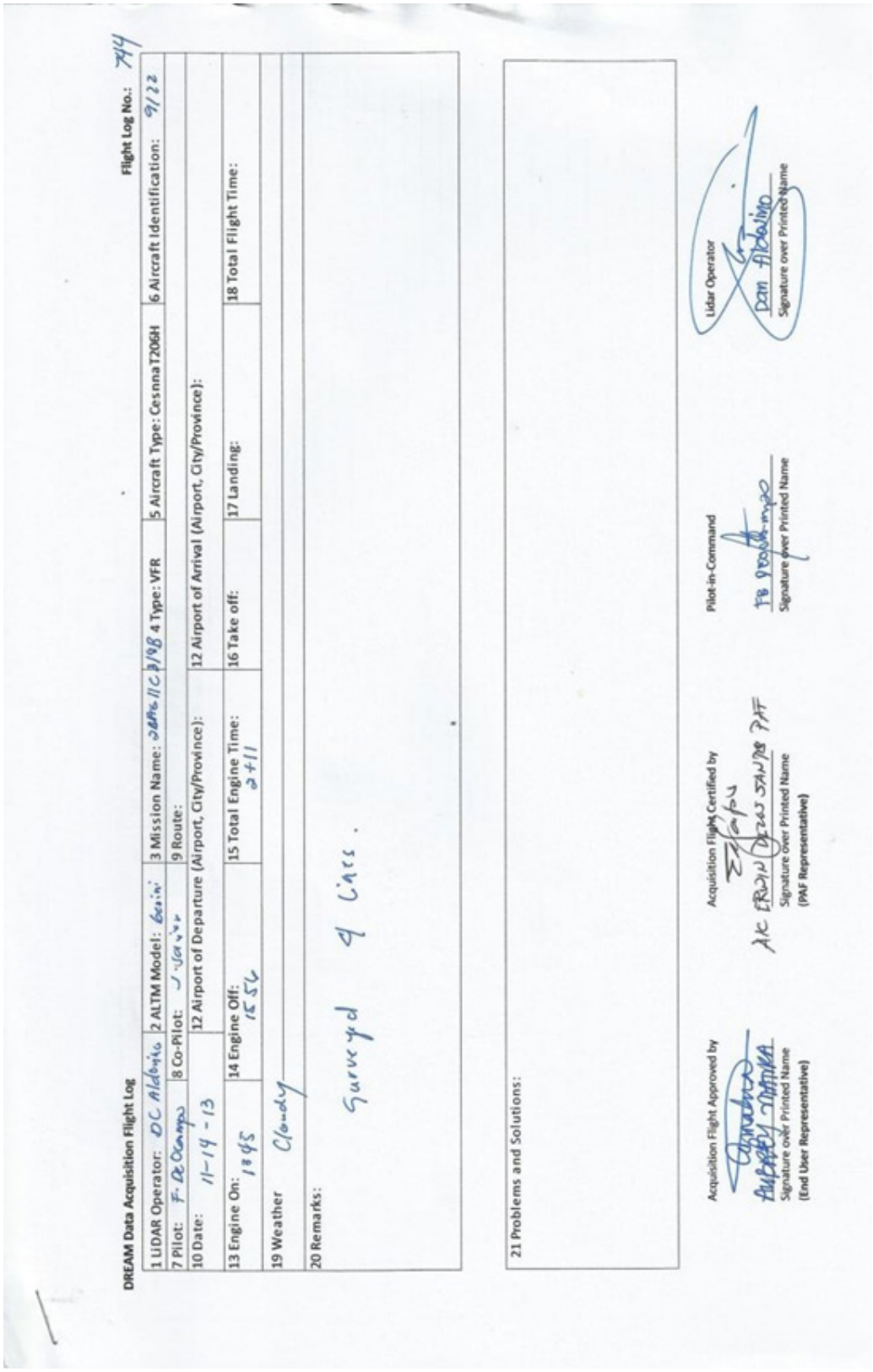
Acquisition Flight Certified by
ALC EDWIN REYES JR PAF
Signature over Printed Name
(PAF Representative)

Pilot-In-Command
FB Pedrano
Signature over Printed Name

Lidar Operator
MVE TONGA
Signature over Printed Name

Annex E

22. Flight Log for 2CAG11C318B Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 744

1 LIDAR Operator: DC Aldovia	2 ALTM Model: Galaxi	3 Mission Name: 2CAG11C318B	4 Type: VFR	5 Aircraft Type: Cessna T206H	6 Aircraft Identification: 9122
7 Pilot: F. De Ocampo	8 Co-Pilot: J. Javier	9 Route:			
10 Date: 11-14-13	11 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 1845	14 Engine Off: 1854	15 Total Engine Time: 3+11	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather Cloudy					
20 Remarks: Surveyed 4 Lines.					

21 Problems and Solutions:

Acquisition Flight Approved by
Signature over Printed Name
(End User Representative)

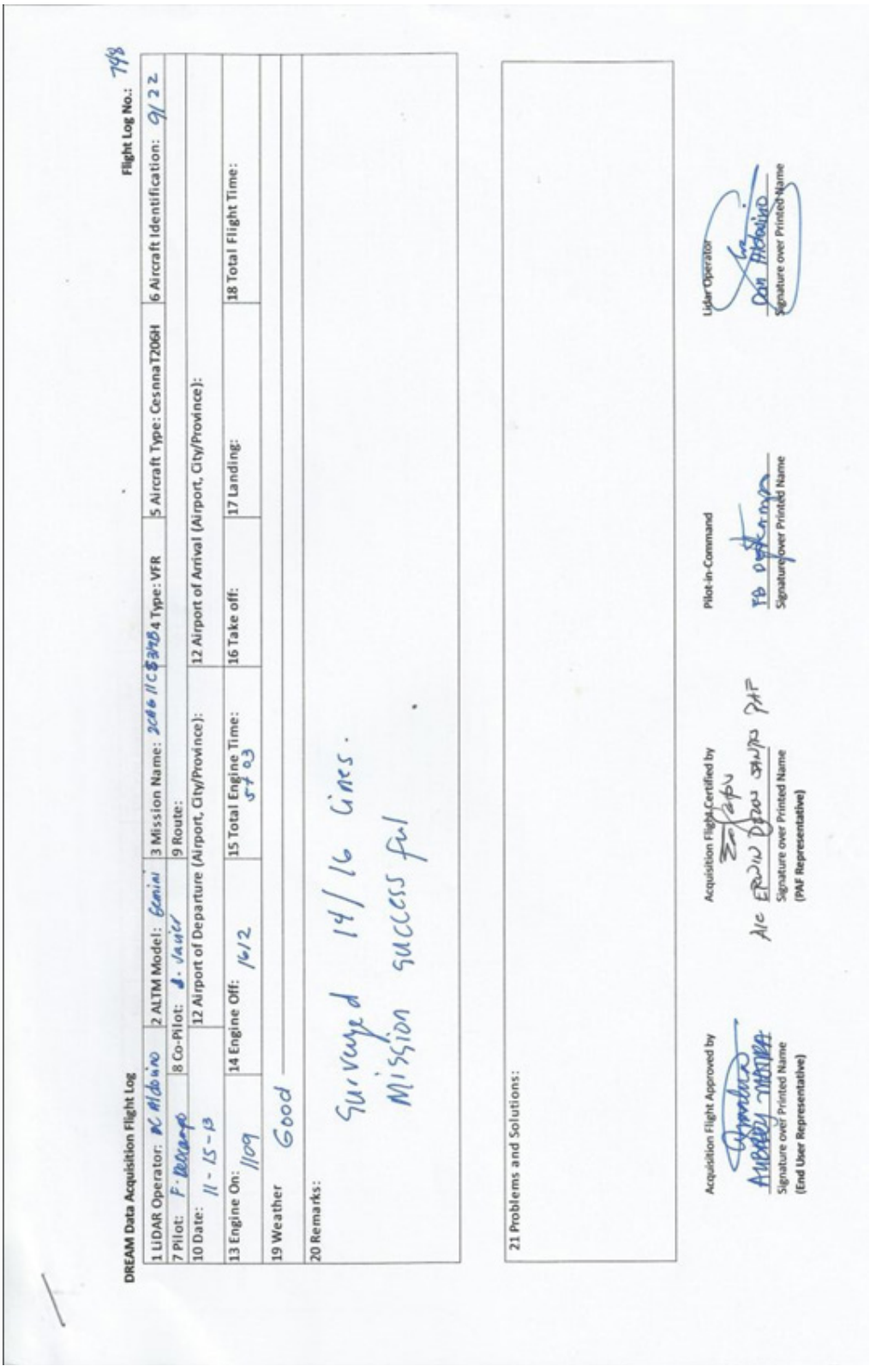
Acquisition Flight Certified by
Signature over Printed Name
(PAF Representative)

Pilot-in-Command
Signature over Printed Name

Lidar Operator
Signature over Printed Name

Annex E

23. Flight Log for 2CAG11CS2319B Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 798

1 LIDAR Operator: RC Aldaino	2 ALTM Model: Gemini	3 Mission Name: 2CAG11CS2319B	4 Type: VFR
5 Aircraft Type: CessnaT206H	6 Aircraft Identification: 91 2 2		
7 Pilot: F. Rosario	8 Co-Pilot: J. Javier	9 Route:	
10 Date: 11-15-13	12 Airport of Departure (Airport, City/Province):	12 Airport of Arrival (Airport, City/Province):	
13 Engine On: 1109	14 Engine Off: 1612	15 Total Engine Time: 5+03	16 Take off:
17 Landing:	18 Total Flight Time:		
19 Weather Good			

20 Remarks:

Surveyed 14/16 Lines.
Mission successful

21 Problems and Solutions:

Acquisition Flight Approved by
Signature over Printed Name
(End User Representative)

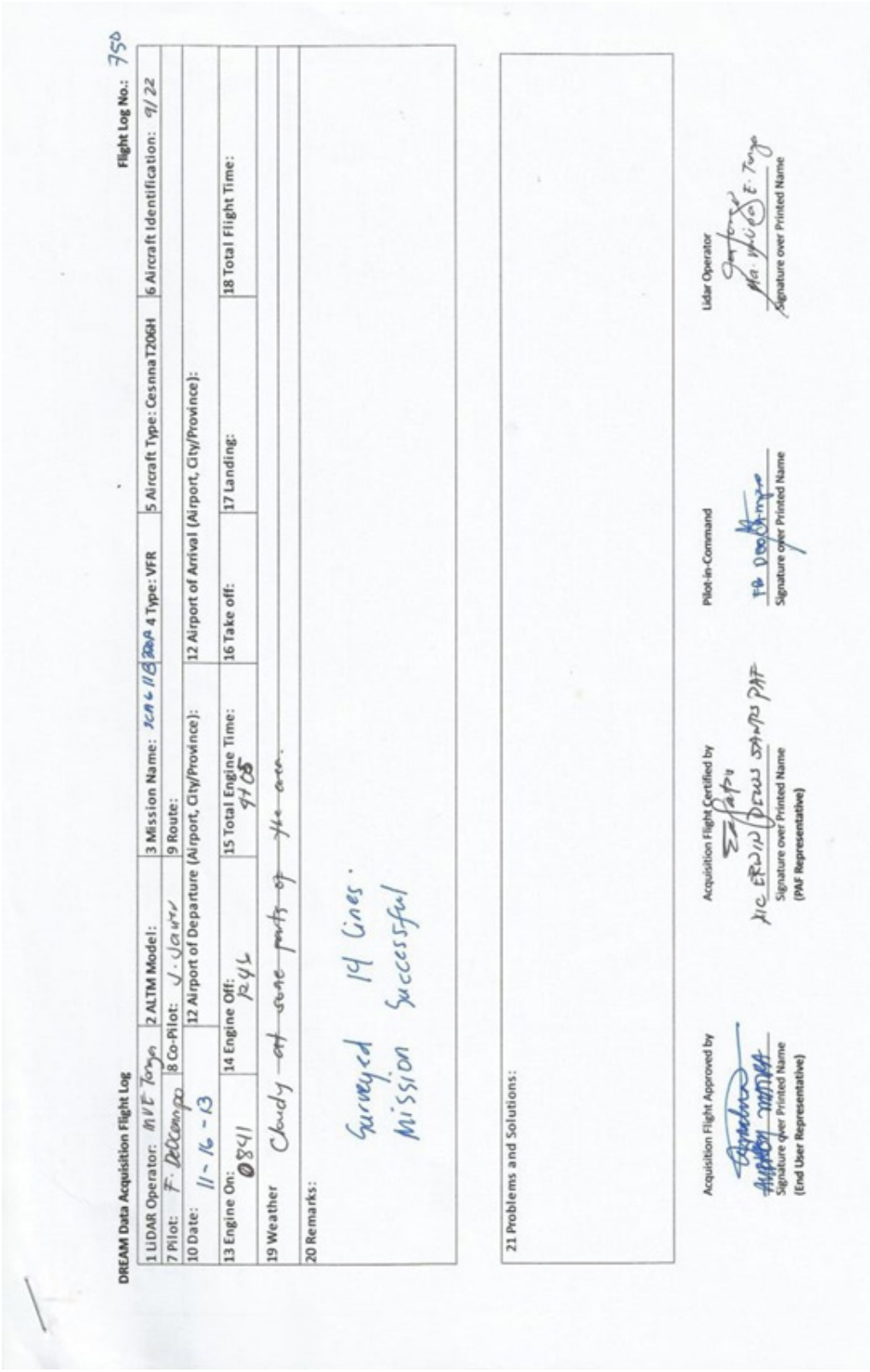
Acquisition Flight Certified by
Signature over Printed Name
(PAF Representative)

Pilot-in-Command
Signature over Printed Name

Lidar Operator
Signature over Printed Name

Annex E

24. Flight Log for 2CAG11B320A Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 750

1 LIDAR Operator: NVE Tonga	2 ALTM Model:	3 Mission Name: XCAG 11B320A	4 Type: VFR	5 Aircraft Type: Cessna T206H	6 Aircraft Identification: 9/22
7 Pilot: F. DeCampo	8 Co-Pilot: J. Javier	9 Route:			
10 Date: 11-16-13	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 0841	14 Engine Off: 1245	15 Total Engine Time: 4.08	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather Cloudy - at some parts of the area.					
20 Remarks: Surveyed 14 Lines. Mission Successful					
21 Problems and Solutions:					

Acquisition Flight Approved by
Signature over Printed Name
(End User Representative)

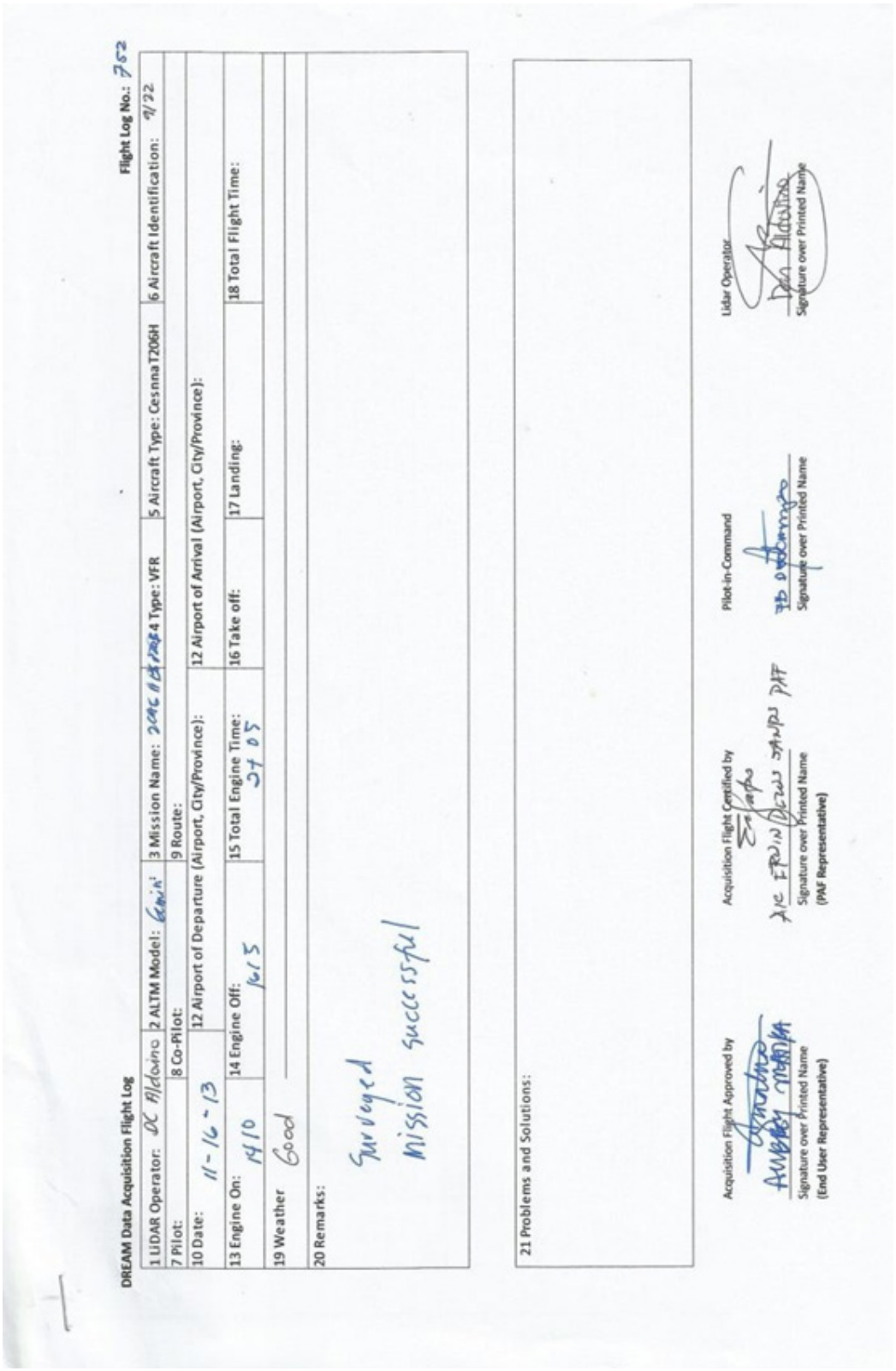
Acquisition Flight Certified by
Signature over Printed Name
(PAF Representative)

Pilot-in-Command
Signature over Printed Name

Lidar Operator
Signature over Printed Name

Annex E

25. Flight Log for 2CAG11CS2320B Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 752

1 LiDAR Operator: AC Aldovino	2 ALTM Model: Gemini	3 Mission Name: 2CAG11CS2320B	4 Type: VFR	5 Aircraft Type: Cessna T206H	6 Aircraft Identification: 9122
7 Pilot:	8 Co-Pilot:	9 Route:			
10 Date: 11-16-13	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 1410	14 Engine Off: 1615	15 Total Engine Time: 2+05	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather Good					
20 Remarks: Surveyed Mission successful					

21 Problems and Solutions:

Acquisition Flight Approved by
Signature over Printed Name
(End User Representative)

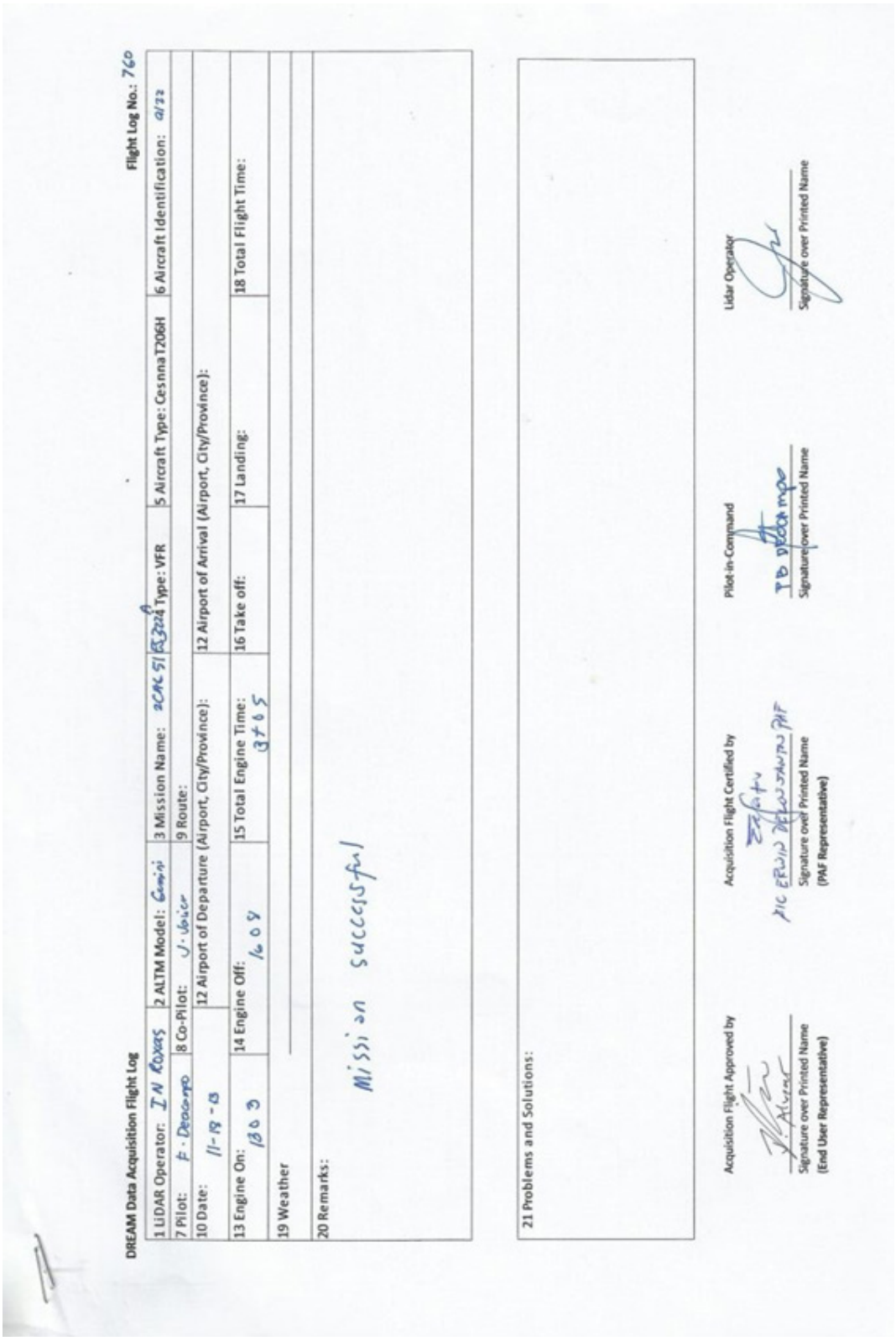
Acquisition Flight Certified by
Signature over Printed Name
(PAF Representative)

Pilot-in-Command
Signature over Printed Name

Lidar Operator
Signature over Printed Name

Annex E

26. Flight Log for 2CAG51D322B Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 760

1 LiDAR Operator: IN Koxas	2 ALTM Model: Gemini	3 Mission Name: 2CAG 51	Type: VFR	5 Aircraft Type: Cessna T206H	6 Aircraft Identification: 4122
7 Pilot: F. Deocampo	8 Co-Pilot: J. Javier	9 Route:			
10 Date: 11-19-13	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 1303	14 Engine Off: 1609	15 Total Engine Time: 3+05	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather					
20 Remarks: Mission successful					

21 Problems and Solutions:

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

Signature over Printed Name
(PAF Representative)

Pilot-in-Command

Signature over Printed Name

Lidar Operator

Signature over Printed Name

Annex E

27. Flight Log for 2CAG21B323A M

DREAM Data Acquisition Flight Log — Flight Log No.: 762

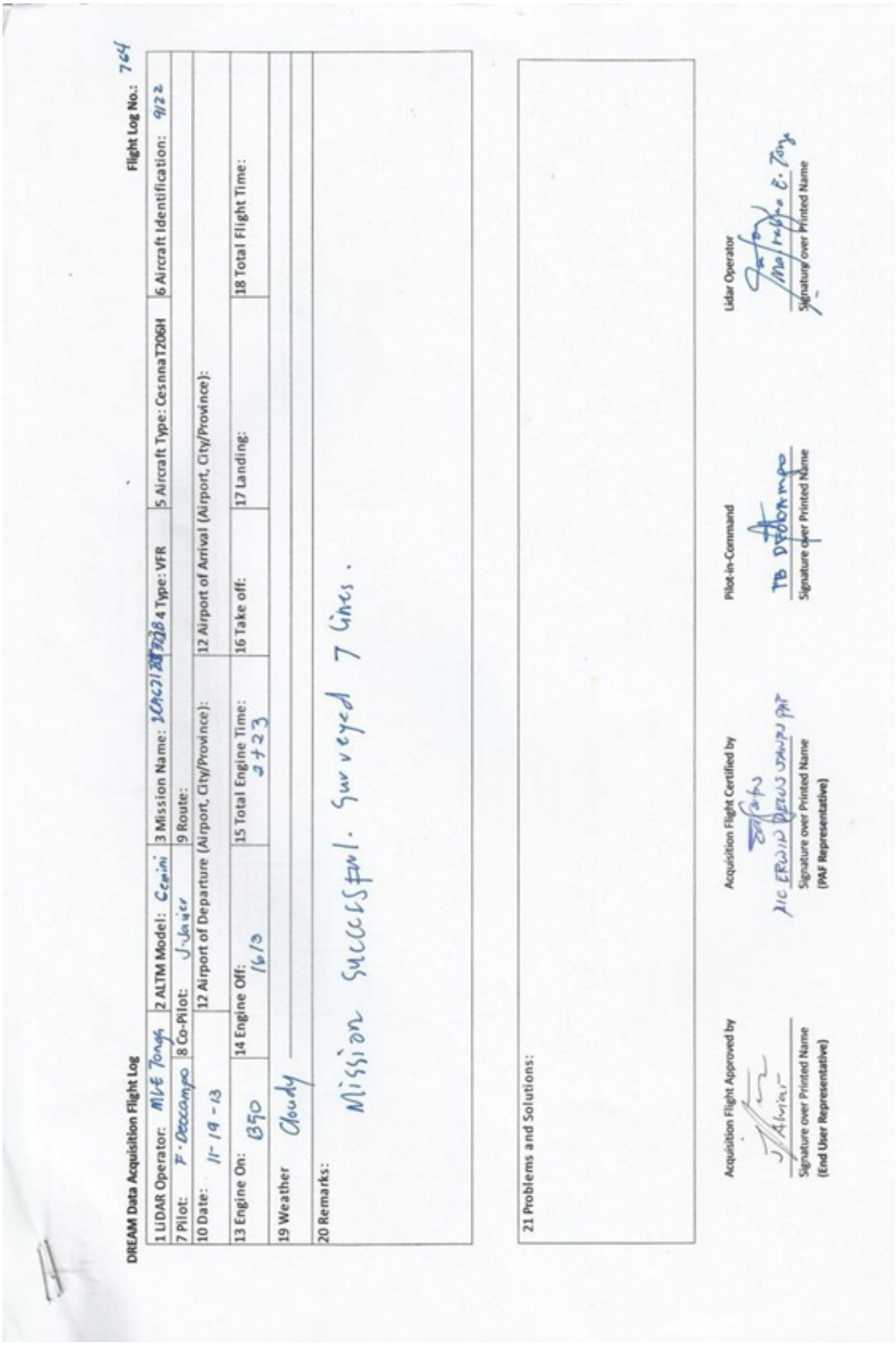
1 LiDAR Operator: IN Rocas	2 ALTM Model: Gemini	3 Mission Name: 2CAG21B323A	4 Type: VFR	5 Aircraft Type: Cesnna T206H	6 Aircraft Identification: 9122
7 Pilot: F. Ocampo	8 Co-Pilot: J. Javier	9 Route:			
10 Date: 11-19-13	12 Airport of Departure (Airport, City/Province): Tuguegarao		12 Airport of Arrival (Airport, City/Province): Tuguegarao		
13 Engine On: 0921	14 Engine Off: 1308	15 Total Engine Time: 3+47	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather: very cloudy					
20 Remarks: Surveyed 8 lines. Mission successful					

21 Problems and Solutions: 100% dropout → restarted several times, laser functioned on the way back to base

Acquisition Flight Approved by	Acquisition Flight Certified by	Pilot-in-Command	Lidar Operator
J. Alviar	A1C Erwin Delos Santos PA	FB Ocampo	
Signature over Printed Name (End User Representative)	Signature over Printed Name (PAF Representative)	Signature over Printed Name	Signature over Printed Name

Annex E

28. Flight Log for 2CAG21BS323B Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 764

1 LiDAR Operator: MVE Tonga	2 ALTM Model: Gemini	3 Mission Name: 2CAG21BS323B	4 Type: VFR	5 Aircraft Type: CessnaT206H	6 Aircraft Identification: 9122
7 Pilot: F. Deocampo	8 Co-Pilot: J. Javier	9 Route:			
10 Date: 11-19-13	11 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 850	14 Engine Off: 1613	15 Total Engine Time: 3+23	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather Cloudy					
20 Remarks: Mission successful. Surveyed 7 lines.					
21 Problems and Solutions:					

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

Signature over Printed Name
(PAF Representative)

Pilot-in-Command

Signature over Printed Name

Lidar Operator

Signature over Printed Name

29. Flight Log for 2CAG21C324A Mission

DREAM Data Acquisition Flight Log 2CAG21C324A and Flight Log No.: 766

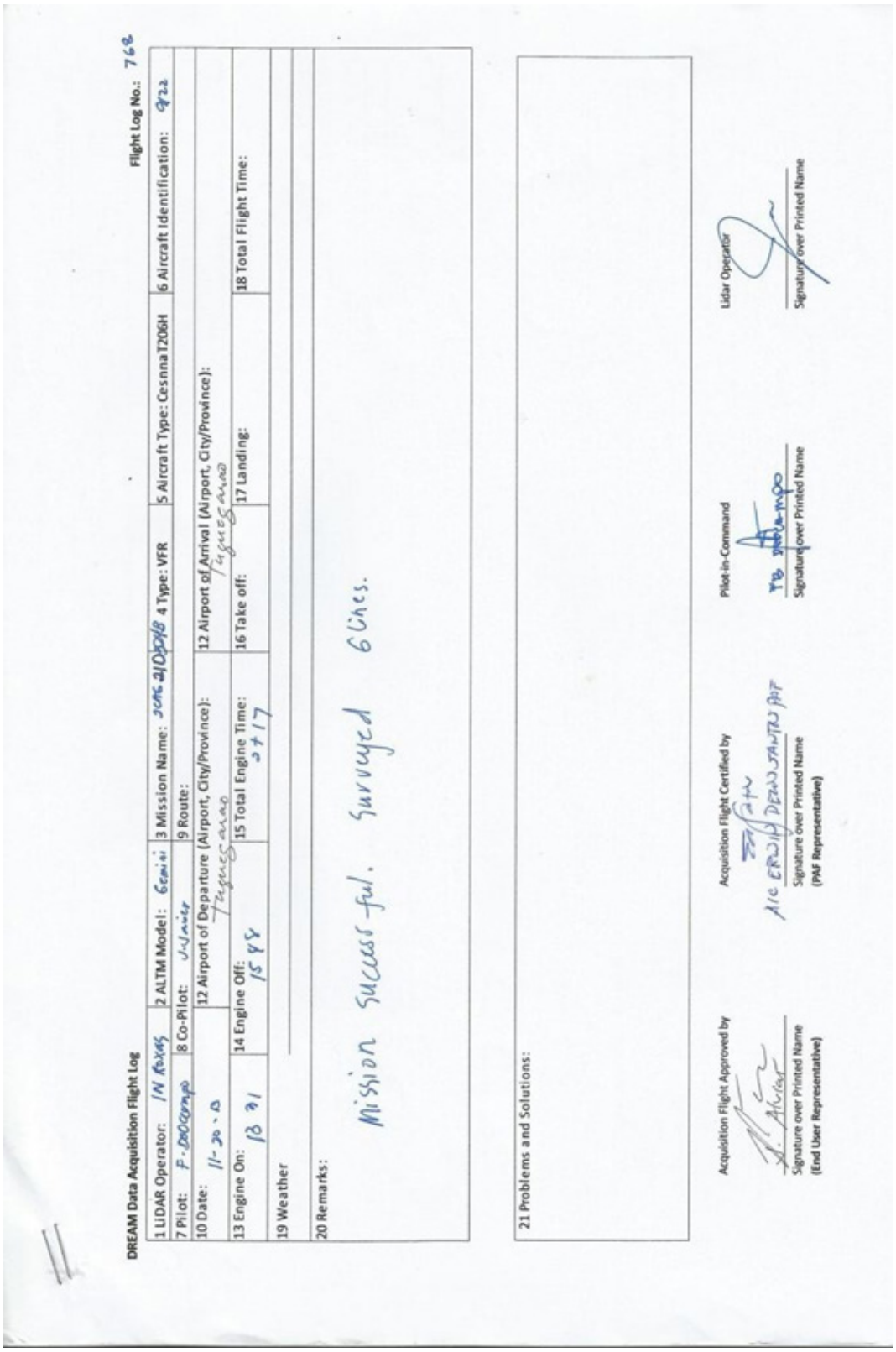
1 LiDAR Operator: MVE Tonga	2 ALTM Model: Gemini	3 Mission Name: 2CAG21C324A	4 Type: VFR	5 Aircraft Type: CesnnaT206H	6 Aircraft Identification: 9RE
7 Pilot: F. DeOcampo	8 Co-Pilot: J Javier	9 Route:			
10 Date: 11-20-13	12 Airport of Departure (Airport, City/Province): Tagaytay		12 Airport of Arrival (Airport, City/Province): Tagaytay		
13 Engine On: 0810	14 Engine Off: 1233	15 Total Engine Time: 4+23	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather Cloudy					
20 Remarks: Mission completed.					

21 Problems and Solutions:

Acquisition Flight Approved by	Acquisition Flight Certified by	Pilot-in-Command	Lidar Operator
J. Alviar	AIC ERWIN DELOS SANTOS PAF	ED DEOCAMPO	
Signature over Printed Name (End User Representative)	Signature over Printed Name (PAF Representative)	Signature over Printed Name	Signature over Printed Name

Annex E

30. Flight Log for 2CAG21D324B Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 762

1 LiDAR Operator: IN Reyes	2 ALTM Model: Gemini	3 Mission Name: 2CAG 21D324B	4 Type: VFR
5 Aircraft Type: CessnnaT206H	6 Aircraft Identification: 4722		
7 Pilot: P. Dacanay	8 Co-Pilot: Junior	9 Route:	
10 Date: 11-30-21	11 Airport of Departure (Airport, City/Province): Tagaytay Aero	12 Airport of Arrival (Airport, City/Province): Tagaytay Aero	
13 Engine On: 1331	14 Engine Off: 1542	15 Total Engine Time: 2+17	16 Take off: 17 Landing: 18 Total Flight Time:
19 Weather			
20 Remarks: Mission Successful. Surveyed 6 Lines.			
21 Problems and Solutions:			

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

Signature over Printed Name
(PAF Representative)

Pilot-in-Command

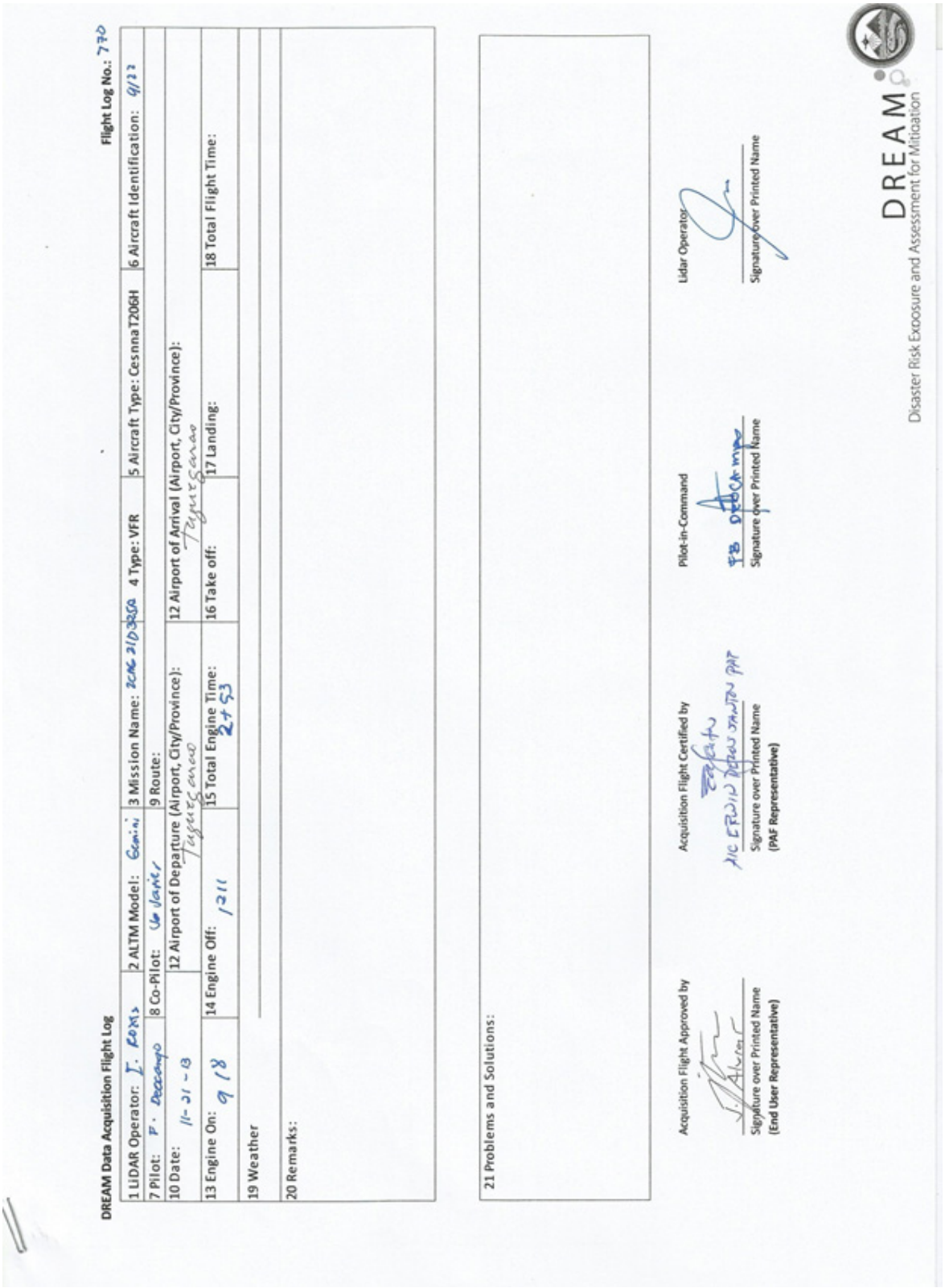
Signature over Printed Name

Lidar Operator

Signature over Printed Name

Annex E

31. Flight Log for 2CAG21D325A Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 730

1 LiDAR Operator: E. Reyes	2 ALTM Model: Gemini	3 Mission Name: 2CAG21D325A	4 Type: VFR	5 Aircraft Type: Cessna T206H	6 Aircraft Identification: 9122
7 Pilot: P. Decampo	8 Co-Pilot: De Javier	9 Route:			
10 Date: 11-21-13	12 Airport of Departure (Airport, City/Province): Tuguegarao		12 Airport of Arrival (Airport, City/Province): Tuguegarao		
13 Engine On: 918	14 Engine Off: 1211	15 Total Engine Time: 2+53	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather					
20 Remarks:					

21 Problems and Solutions:

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

Signature over Printed Name
(PAF Representative)

Pilot-in-Command

Signature over Printed Name

Lidar Operator

Signature over Printed Name

DREAM
Disaster Risk Exposure and Assessment for Mitigation

Annex E

32. Flight Log for 2CAG61F325B Mission

DREAM Data Acquisition Flight Log

Flight Log No.: 772

1 LiDAR Operator: MVE Tong	2 ALTM Model: Gemini	3 Mission Name: 2CAG61F325B	4 Type: VFR	5 Aircraft Type: Cesnna T206H	6 Aircraft Identification: 9122
7 Pilot: F. Decampo	8 Co-Pilot: J. Alviar	9 Route:			
10 Date: 11-21-13	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 1311	14 Engine Off: 1616	15 Total Engine Time: 3+05	16 Take off:	17 Landing:	18 Total Flight Time:

19 Weather: Cloudy

20 Remarks: Mission successful. Completed surveyed 8 lines.

21 Problems and Solutions:

Acquisition Flight Approved by: J. Alviar — Signature over Printed Name (End User Representative)

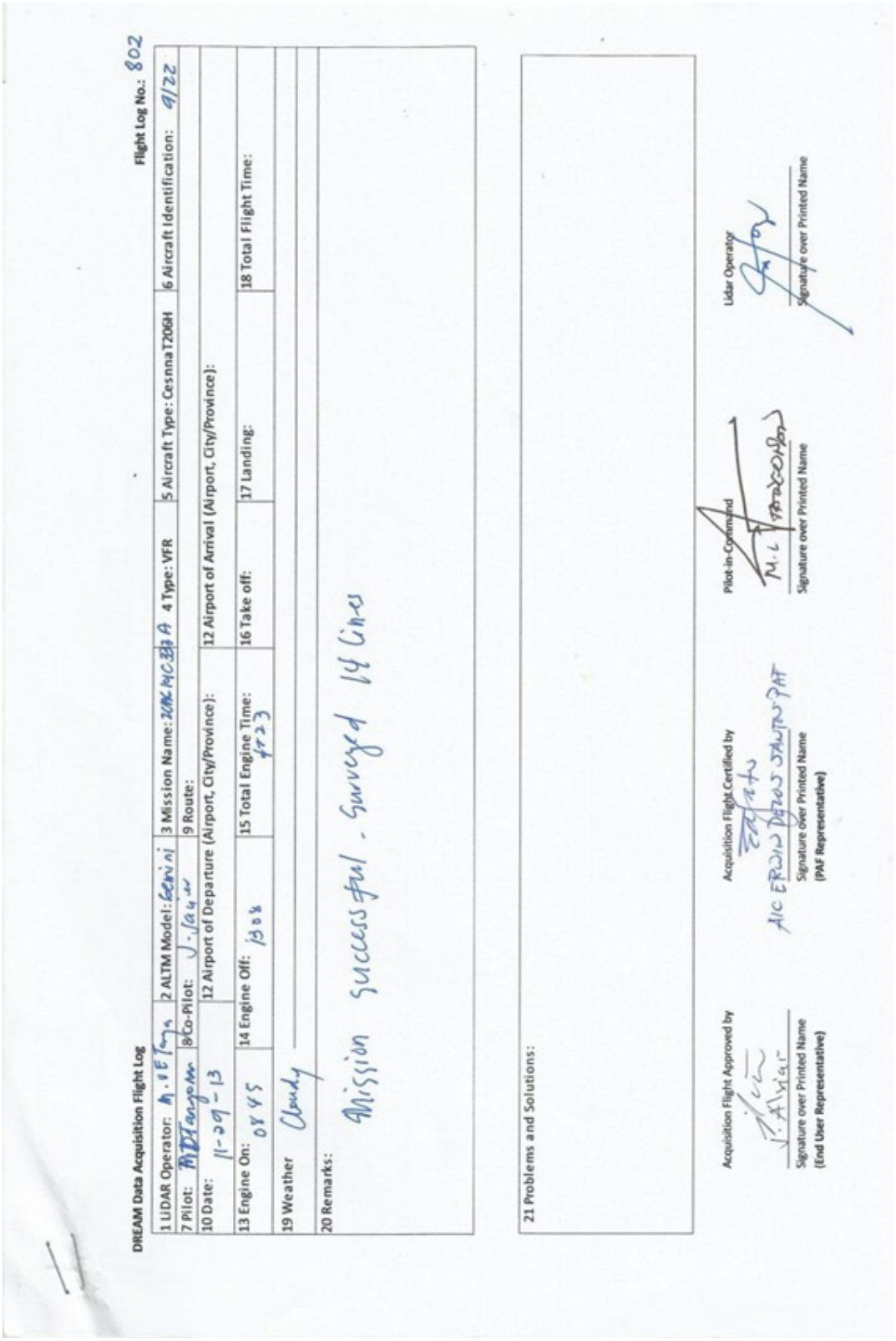
Acquisition Flight Certified by: A1C Erwin Dejoujantu PAF — Signature over Printed Name (PAF Representative)

Pilot-in-Command: F.D. Decampo — Signature over Printed Name

Lidar Operator: M. V. E. Tong — Signature over Printed Name

Annex E

33. Flight Log for 2CAG101BS329A Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 802

1 LiDAR Operator: M.I.E.T	2 ALTM Model: Gemini	3 Mission Name: 2CAG101BS329A	4 Type: VFR
5 Aircraft Type: Cessna T206H	6 Aircraft Identification: 9122		
7 Pilot: M.D.Thangam	8 Co-Pilot: J.Jayan	9 Route:	
10 Date: 11-09-13	12 Airport of Departure (Airport, City/Province):	12 Airport of Arrival (Airport, City/Province):	
13 Engine On: 0845	14 Engine Off: 1304	15 Total Engine Time: 4+23	16 Take off:
17 Landing:	18 Total Flight Time:		
19 Weather Cloudy			

20 Remarks:

Mission successful. Surveyed 14 Lines

21 Problems and Solutions:

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

AIC ERDAS DEZOS SAMPAT

Signature over Printed Name
(PAF Representative)

Pilot-in-Command

M.D. Thangam

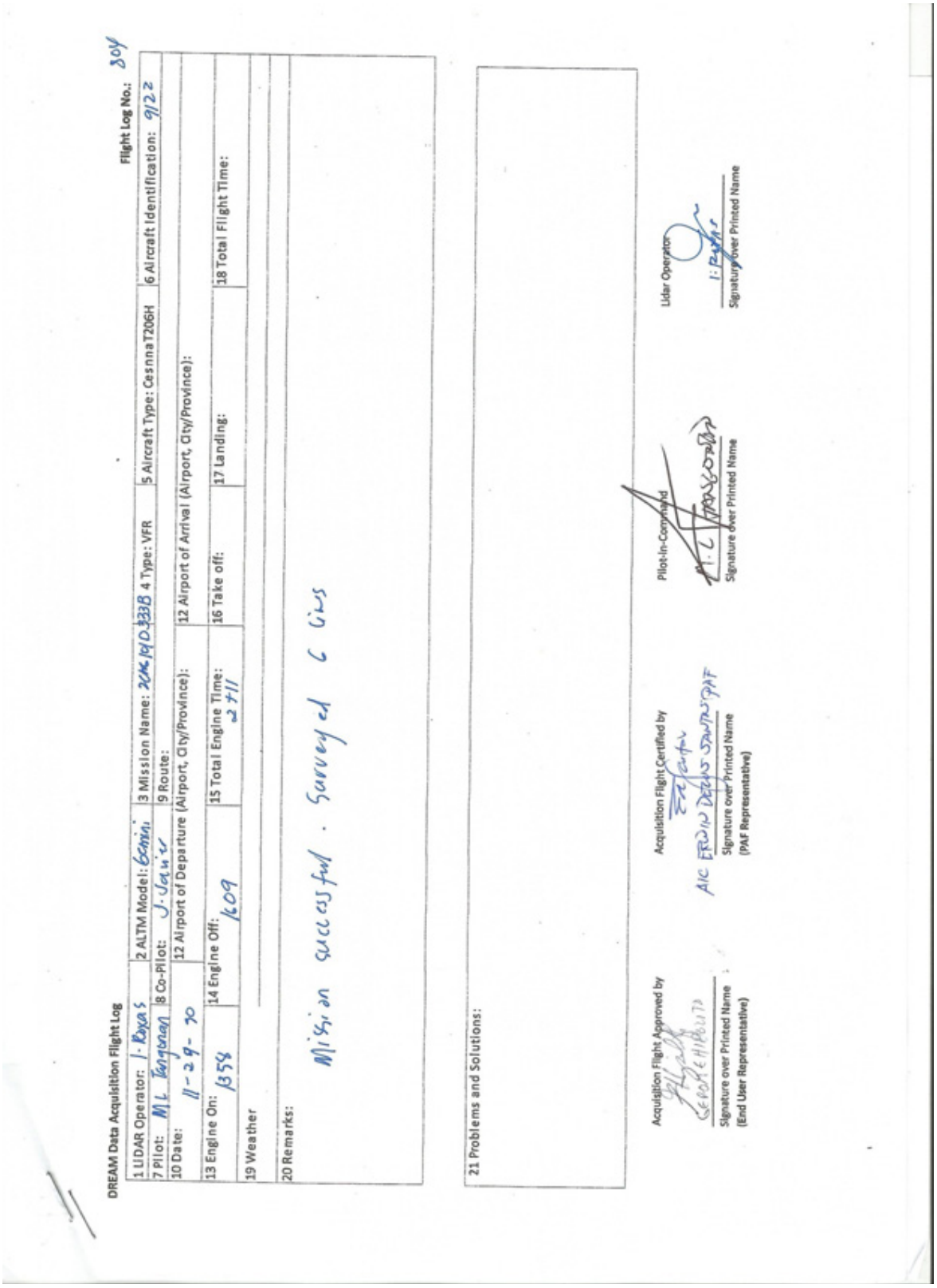
Signature over Printed Name

Lidar Operator

Signature over Printed Name

Annex E

34. Flight Log for 2CAG101D222B Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 304

1 LIDAR Operator: I. Roxas	2 ALTM Model: Gemini	3 Mission Name: 20K19D333B 4 Type: VFR	5 Aircraft Type: Cessna T206H 6 Aircraft Identification: 9122
7 Pilot: ML Bagnaan	8 Co-Pilot: J. Javier	9 Route:	
10 Date: 11-29-20	12 Airport of Departure (Airport, City/Province):	12 Airport of Arrival (Airport, City/Province):	
13 Engine On: 1358	14 Engine Off: 1609	15 Total Engine Time: 2+11	16 Take off: 17 Landing: 18 Total Flight Time:
19 Weather			
20 Remarks: Mission successful. Surveyed 6 Lines			

21 Problems and Solutions:

Acquisition Flight Approved by
Signature over Printed Name
(End User Representative)

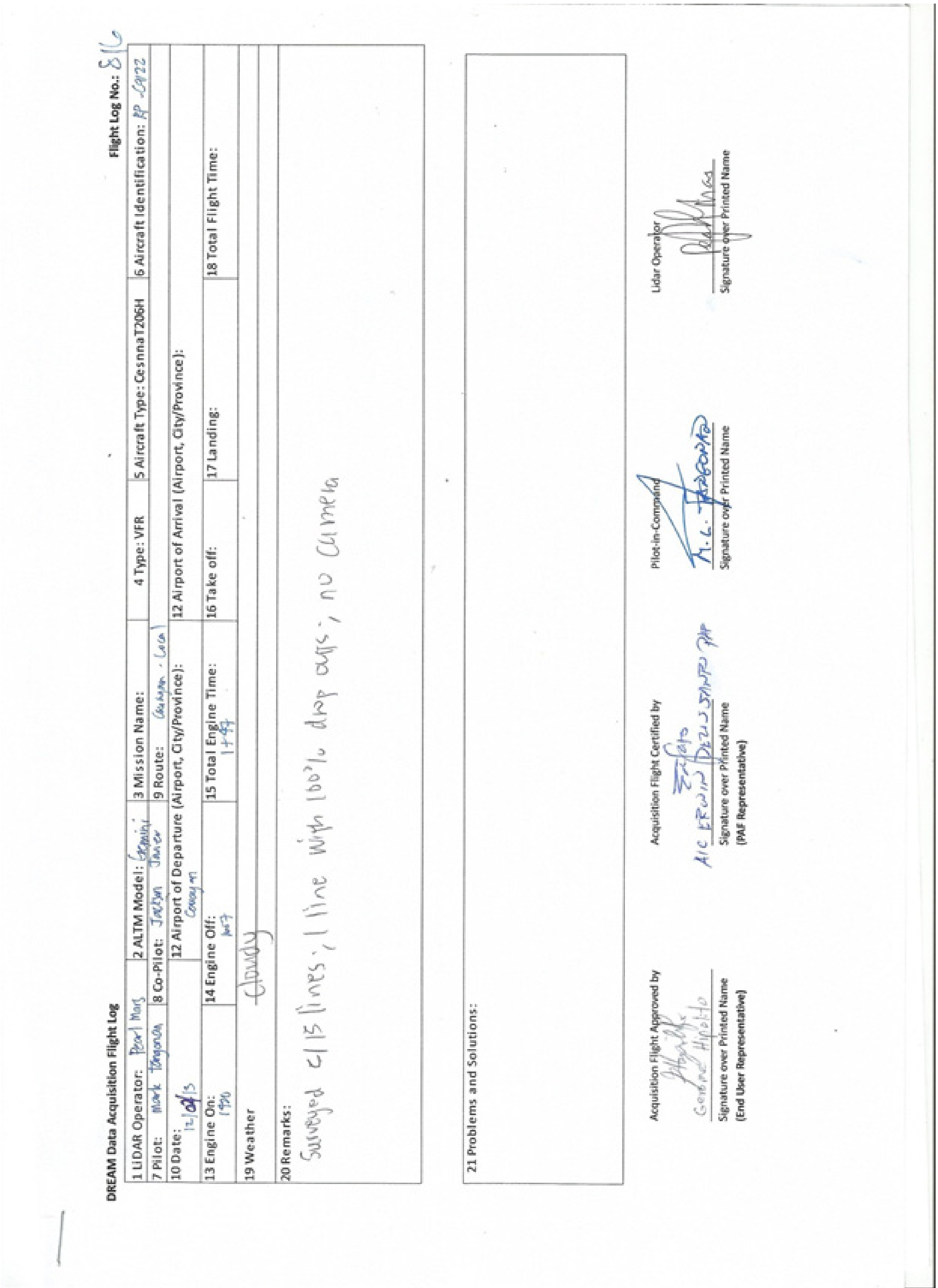
Acquisition Flight Certified by
AIC ERWIN DENNIS SAMSONPAF
Signature over Printed Name
(PAF Representative)

Pilot-In-Command
Signature over Printed Name

Lidar Operator
I. Roxas
Signature over Printed Name

Annex E

35. Flight Log for 2CAG171A336B Mission



DREAM Data Acquisition Flight Log — Flight Log No.: 816

1 LiDAR Operator: Pearl Mars	2 ALTM Model: Gemini	3 Mission Name:	4 Type: VFR	5 Aircraft Type: CesnnaT206H	6 Aircraft Identification: RP-C9122
7 Pilot: Mark Tangonan	8 Co-Pilot: Jackson Javier	9 Route: Cauayan - Local			
10 Date: 12/02/15	12 Airport of Departure (Airport, City/Province): Cauayan		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 1930	14 Engine Off: 2057	15 Total Engine Time: 1+27	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather: cloudy					

20 Remarks:

Surveyed c/15 lines; 1 line with 100% drop outs; no camera

21 Problems and Solutions:

Acquisition Flight Approved by: Gerone Hipolito — Signature over Printed Name (End User Representative)

Acquisition Flight Certified by: A1C Erwin Delos Santos PAF — Signature over Printed Name (PAF Representative)

Pilot-in-Command: M. L. Tangonan — Signature over Printed Name

Lidar Operator: Pearl Mars — Signature over Printed Name

Annex E

36. Flight Log for 2CAG171A337A Mission

DREAM Data Acquisition Flight Log

Flight Log No.: 518

1 LiDAR Operator: Pearl Mars	2 ALTM Model: Gemini	3 Mission Name:	4 Type: VFR	5 Aircraft Type: Cesnna T206H	6 Aircraft Identification: RP-C9122
7 Pilot: Mark Tangonan	8 Co-Pilot: Jackson Javier	9 Route: Cauayan local			
10 Date: 12/03/13	12 Airport of Departure (Airport, City/Province): Cauayan		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 1114	14 Engine Off: 1601	15 Total Engine Time: 4+47	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather: Cloudy					

20 Remarks:

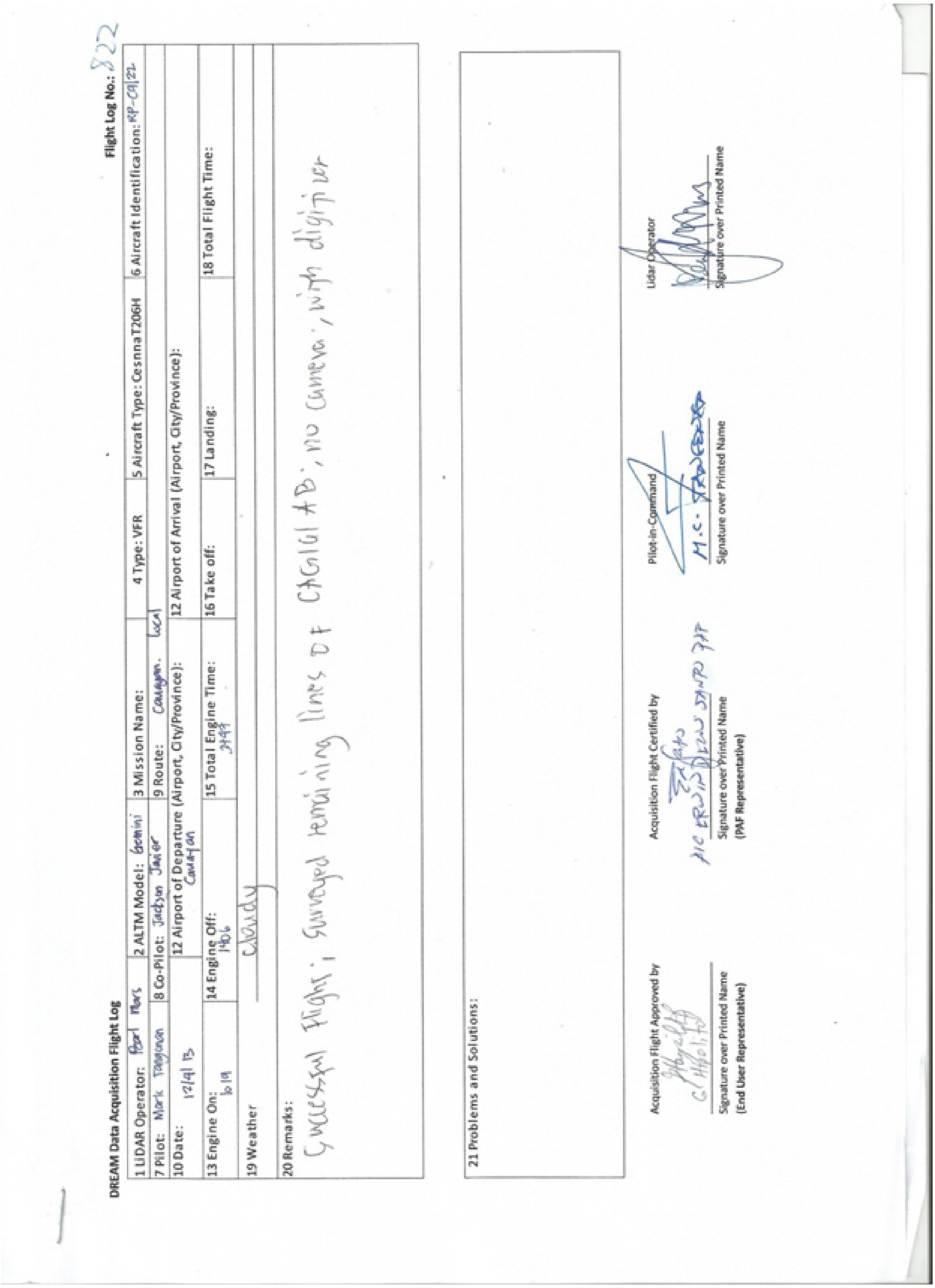
Successful flight; surveyed remaining lines of CAG171A and 7/22 lines of CAG161AB; no camera; with digitizer

21 Problems and Solutions:

Acquisition Flight Approved by	Acquisition Flight Certified by	Pilot-in-Command	Lidar Operator
Gerome Hipolito	Erwin Delos Santos PAF	M.C. Tangonan	Pearl Mars
Signature over Printed Name (End User Representative)	Signature over Printed Name (PAF Representative)	Signature over Printed Name	Signature over Printed Name

Annex E

37. Flight Log for 2CAG161AB338A Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 822

1 LiDAR Operator: Pearl Mars	2 ALTM Model: Gemini	3 Mission Name:	4 Type: VFR	5 Aircraft Type: CesnnaT206H	6 Aircraft Identification: RP-C9122
7 Pilot: Mark Tangonan	8 Co-Pilot: Jackson Javier	9 Route: Cauayan. local			
10 Date: 12/4/13	12 Airport of Departure (Airport, City/Province): Cauayan		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 1019	14 Engine Off: 1406	15 Total Engine Time: 3+47	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather: cloudy					

20 Remarks:

Successful flight; surveyed remaining lines of CAG161AB; no camera; with digitizer

21 Problems and Solutions:

Acquisition Flight Approved by

G. Hipolito

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

A1C ERWIN DIZON SANTO PAF

Signature over Printed Name
(PAF Representative)

Pilot-in-Command

M.C. TANGONAN

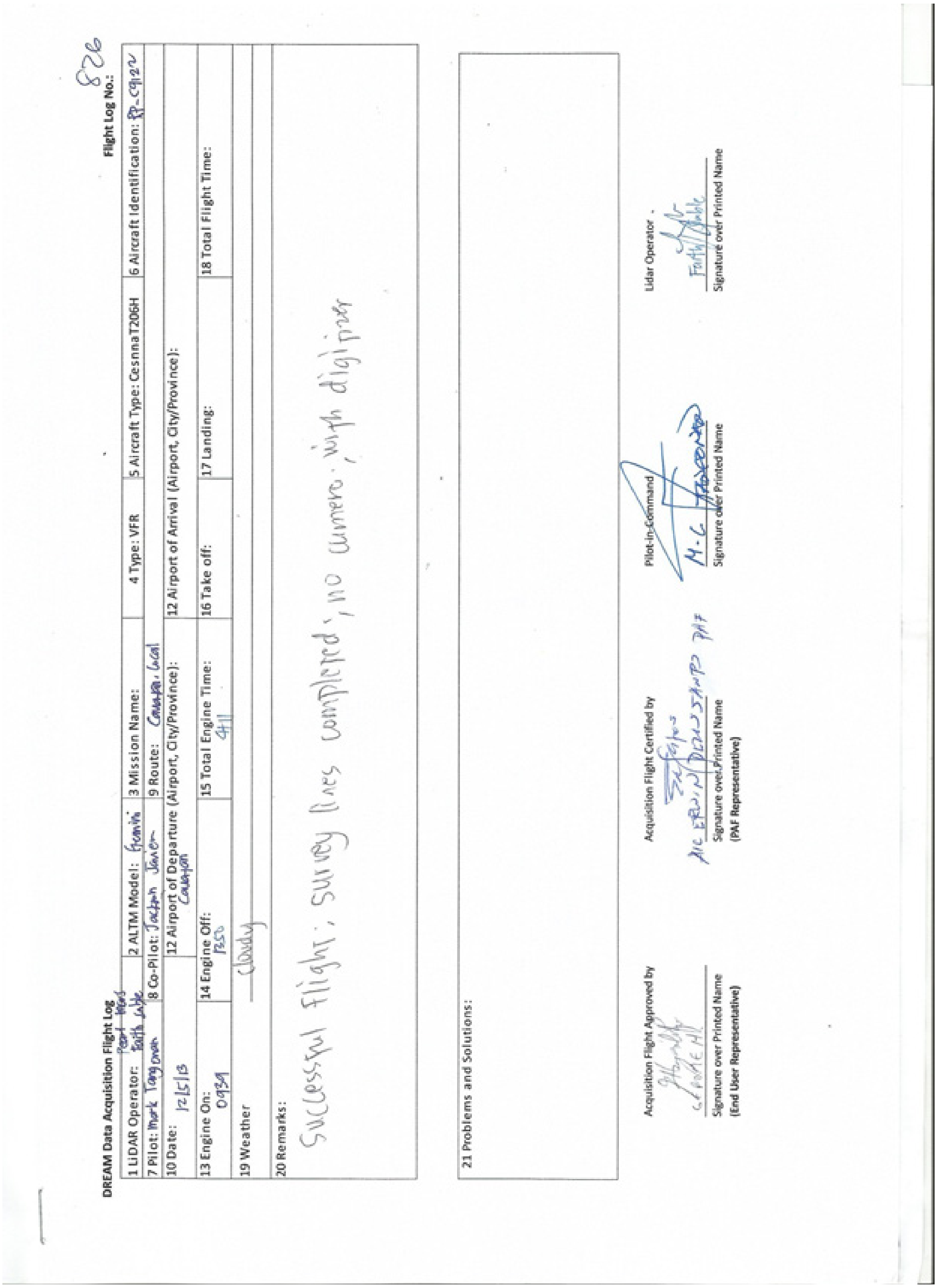
Signature over Printed Name

Lidar Operator

Signature over Printed Name

Annex E

38. Flight Log for 2CAG161BCDES339A Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 826

1 LiDAR Operator: Pearl Mars / Faith Sable	2 ALTM Model: Gemini	3 Mission Name:	4 Type: VFR	5 Aircraft Type: CesnnaT206H	6 Aircraft Identification: RP-C9122
7 Pilot: Mark Tangonan	8 Co-Pilot: Jackson Javier	9 Route: Cauayan Local			
10 Date: 12/5/13	12 Airport of Departure (Airport, City/Province): Cauayan		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 0939	14 Engine Off: 1350	15 Total Engine Time: 4+11	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather	cloudy				

20 Remarks:

Successful flight; survey lines completed; no camera; with digitizer

21 Problems and Solutions:

Acquisition Flight Approved by [illegible] Signature over Printed Name (End User Representative)

Acquisition Flight Certified by A1C Erwin Delos Santos PAF Signature over Printed Name (PAF Representative)

Pilot-in-Command M. C. Tangonan Signature over Printed Name

Lidar Operator Faith Sable Signature over Printed Name

39. Flight Log for 2CAG171339B Mission

DREAM Data Acquisition Flight Log

Flight Log No.: 828

1 LiDAR Operator: Roan Punk	2 ALTM Model: Gemini	3 Mission Name:	4 Type: VFR	5 Aircraft Type: CesnnaT206H	6 Aircraft Identification: RP-C9122
7 Pilot: Capt. Mark Tangonan	8 Co-Pilot: Jackson Javier	9 Route: Cagayan Local			
10 Date: 12/5/13	12 Airport of Departure (Airport, City/Province): Cagayan		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 1428	14 Engine Off: 1627	15 Total Engine Time: 1+59	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather	cloudy				

20 Remarks:

Successful flight; surveyed 6/6 lines; no camera; no digitizer

21 Problems and Solutions:

Acquisition Flight Approved by
Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by
A1C Erwin Dezus Sampu PAF
Signature over Printed Name
(PAF Representative)

Pilot-in-Command
M.C. Tangonan
Signature over Printed Name

Lidar Operator
Signature over Printed Name

Annex E

40. Flight Log for 2CAG171B341A Mission

DREAM Data Acquisition Flight Log

Flight Log No.: 8340

1 LiDAR Operator: Faith Sable	2 ALTM Model: Gemini	3 Mission Name:	4 Type: VFR	5 Aircraft Type: CesnnaT206H	6 Aircraft Identification: RP-C9122
7 Pilot: Mark Tangonan	8 Co-Pilot: Jackson Jawter	9 Route: Cauayan - Local			
10 Date: 12/7/13	12 Airport of Departure (Airport, City/Province): Cauayan		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 0957	14 Engine Off: 1402	15 Total Engine Time: 4+05	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather	Cloudy				

20 Remarks:

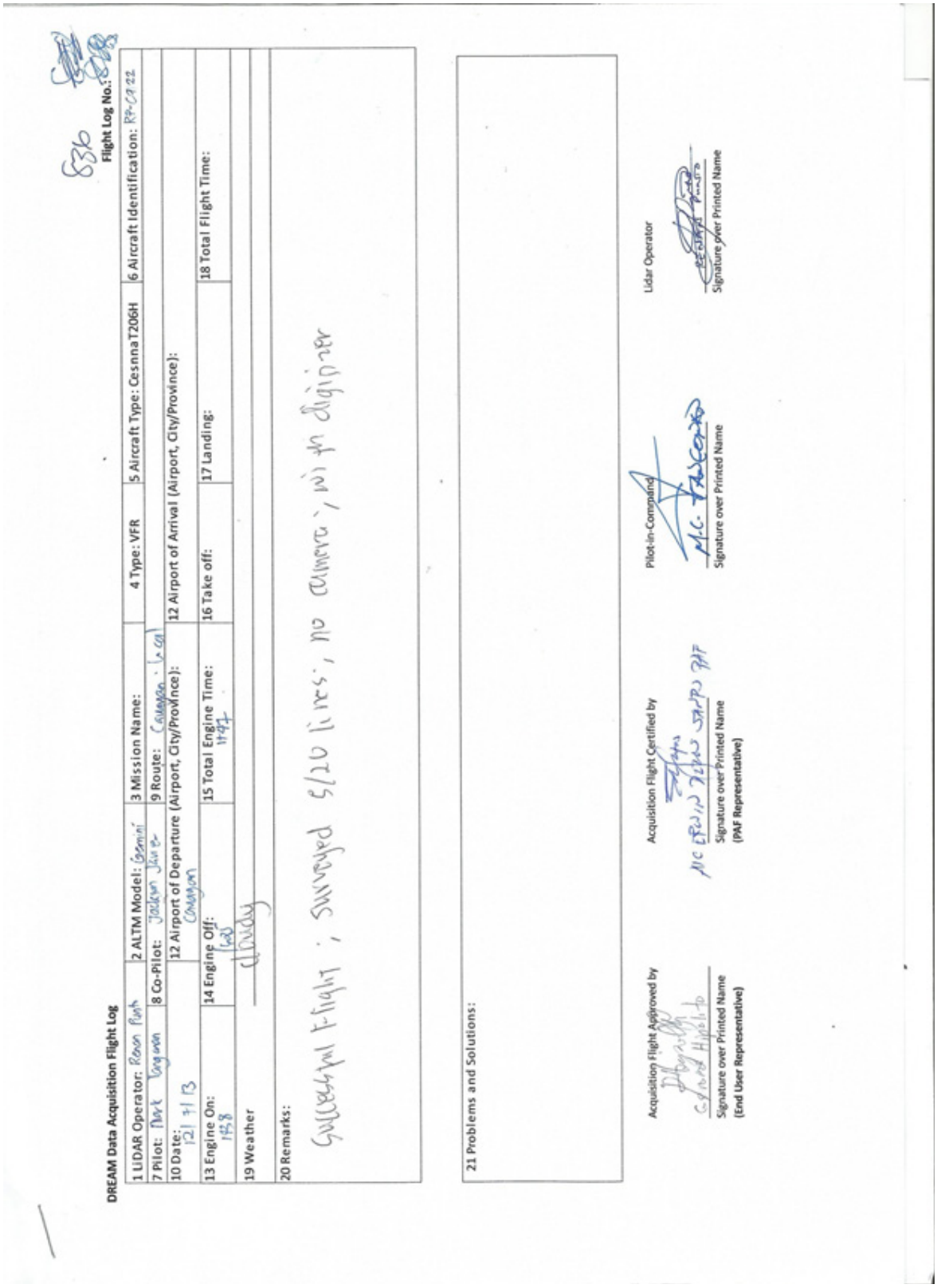
Successful flight; Surveyed remaining lines of CAG171B; no camera; with digitizer

21 Problems and Solutions:

Acquisition Flight Approved by	Acquisition Flight Certified by	Pilot-in-Command	Lidar Operator
Gerome Hipolito	P/O Erwin Dela Santos PAF	M.C. Tangonan	Faith Sable
Signature over Printed Name (End User Representative)	Signature over Printed Name (PAF Representative)	Signature over Printed Name	Signature over Printed Name

Annex E

41. Flight Log for 2CAG171C341B Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 836

1 LiDAR Operator: Rovin Park	2 ALTM Model: Gemini	3 Mission Name:	4 Type: VFR / 5 Aircraft Type: Cessna T206H / 6 Aircraft Identification: RP-C9122
7 Pilot: Mark Vergara	8 Co-Pilot: Jaclyn Javier	9 Route: Cauayan - Laoag	
10 Date: 12/1/13	11 Airport of Departure (Airport, City/Province): Cauayan	12 Airport of Arrival (Airport, City/Province):	
13 Engine On: 1128	14 Engine Off: 1245	15 Total Engine Time: 1+17	16 Take off: 17 Landing: 18 Total Flight Time:
19 Weather	do		

20 Remarks:

Successful flight ; surveyed 5/20 lines, no clouds, no difficulties

21 Problems and Solutions:

Acquisition Flight Approved by
Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by
Signature over Printed Name
(PAF Representative)

Pilot-in-Command

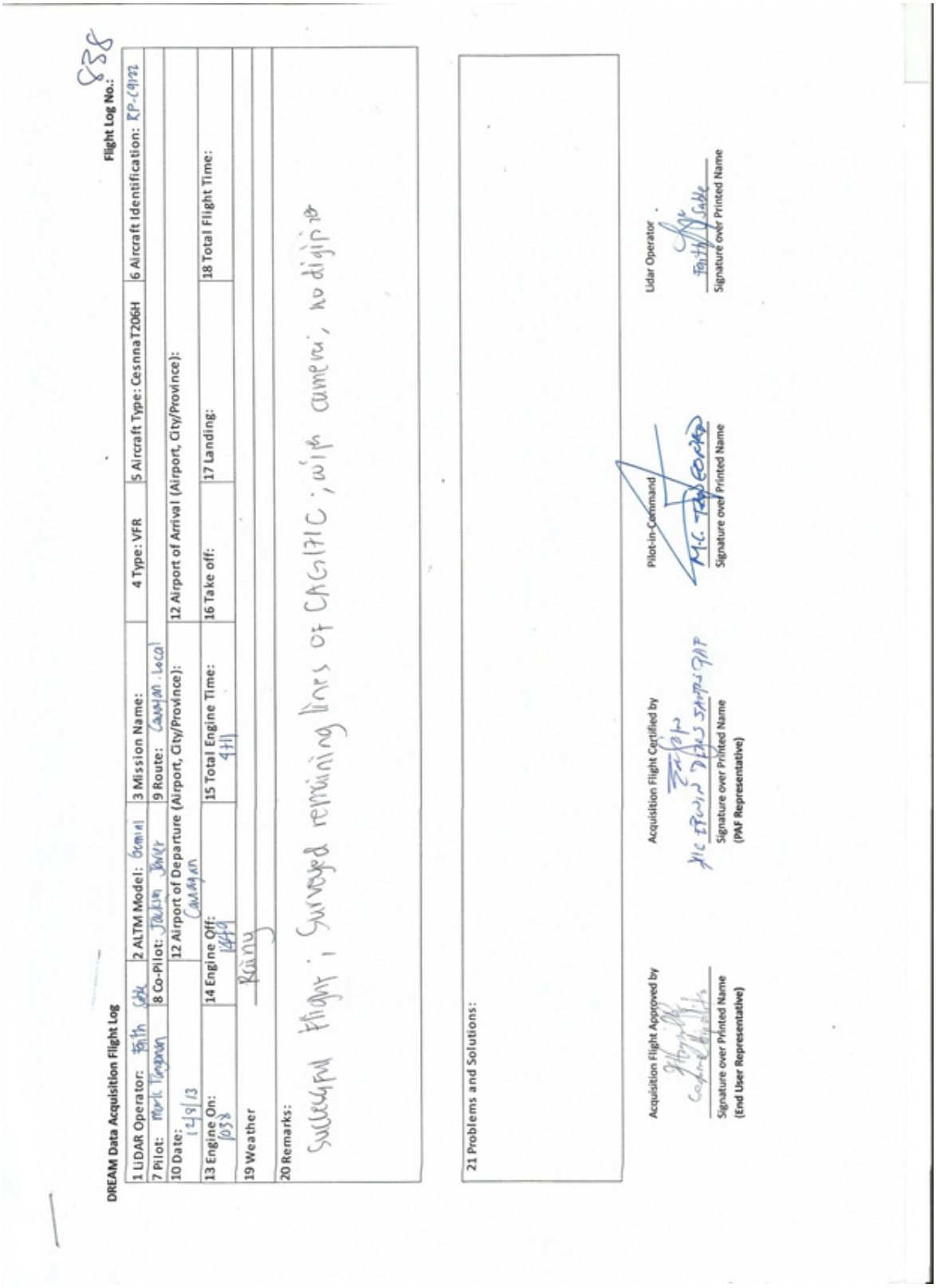
Lidar Operator

Signature over Printed Name

Signature over Printed Name

Annex E

42. Flight Log for 2CAG171C342A Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 238

1 LiDAR Operator: Faith Gale	2 ALTM Model: Optech	3 Mission Name:	4 Type: VFR	5 Aircraft Type: Cessna T206H	6 Aircraft Identification: RP-C9122
7 Pilot: Mark Timpman	8 Co-Pilot: Jaclyn Javier	9 Route: Cauayan - Laoag			
10 Date: 12/9/13	11 Airport of Departure (Airport, City/Province): Cauayan		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 1058	14 Engine Off: 1610	15 Total Engine Time: 4+11	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather: Rainy					

20 Remarks:
Successful flight; Surveyed remaining lines of CAG171C; with camera, no digitizer

21 Problems and Solutions:

Acquisition Flight Approved by
Signature over Printed Name
(End User Representative)

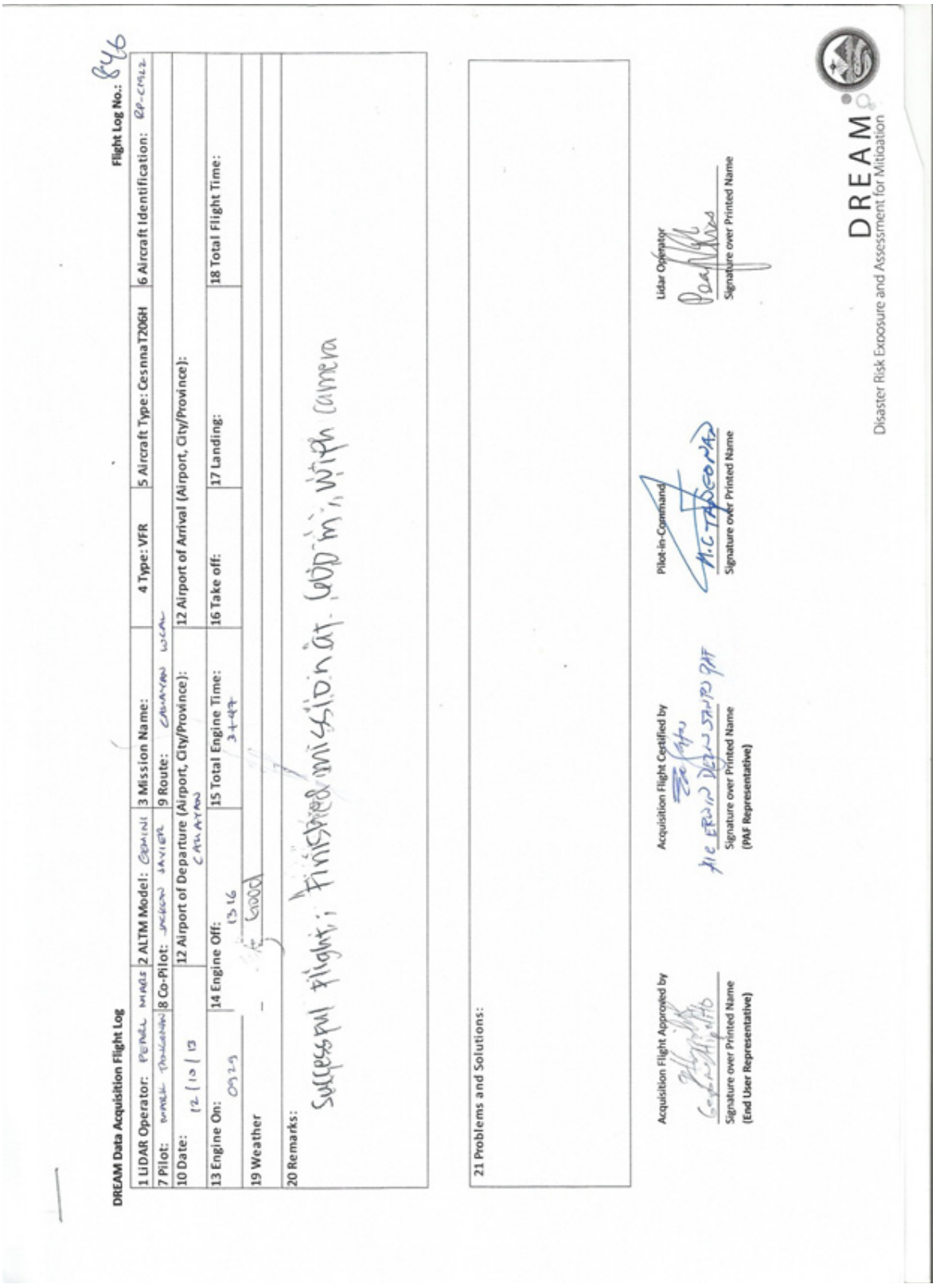
Acquisition Flight Certified by
Signature over Printed Name
(PAF Representative)

Pilot-in-Command
Signature over Printed Name

Lidar Operator
Signature over Printed Name

Annex E

43. Flight Log for 2CAG221CS231AS344A Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 846

1 LiDAR Operator: [illegible]	2 ALTM Model: [illegible]	3 Mission Name:	4 Type: VFR	5 Aircraft Type: Cessna T206H	6 Aircraft Identification: [illegible]
7 Pilot: [illegible]	8 Co-Pilot: [illegible]	9 Route: [illegible]			
10 Date: 12/13/13	12 Airport of Departure (Airport, City/Province): CAUAYAN		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 0925	14 Engine Off: 1316	15 Total Engine Time: 3+49	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather	Good				

20 Remarks:

Successful flight; Finished mission at 600 m; with camera

21 Problems and Solutions:

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

Signature over Printed Name
(PAF Representative)

Pilot-in-Command

Signature over Printed Name

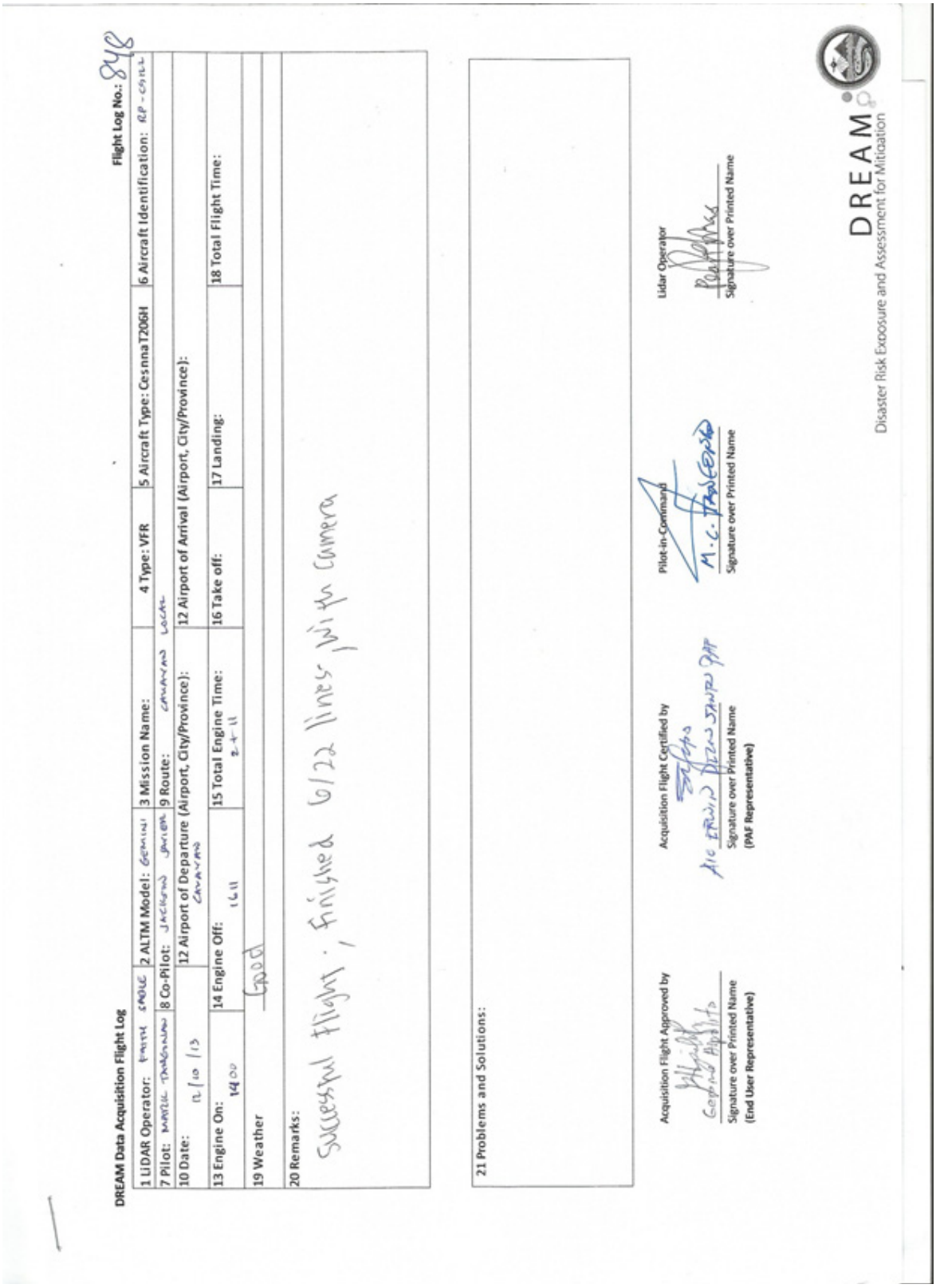
Lidar Operator

Signature over Printed Name

DREAM
Disaster Risk Exposure and Assessment for Mitigation

Annex E

44. Flight Log for 2CAG171D344B Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 848

1 LiDAR Operator: [illegible]	2 ALTM Model: Gemini	3 Mission Name:	4 Type: VFR / 5 Aircraft Type: Cessna T206H / 6 Aircraft Identification: RP-C[illegible]
7 Pilot: [illegible]	8 Co-Pilot: [illegible]	9 Route: Cagayan Local	
10 Date: 11/10/13	12 Airport of Departure (Airport, City/Province): Cagayan	12 Airport of Arrival (Airport, City/Province):	
13 Engine On: 1400	14 Engine Off: 1611	15 Total Engine Time: 2+11	16 Take off: / 17 Landing: / 18 Total Flight Time:
19 Weather: Good			
20 Remarks: Successful Flight, Finished 6/22 lines with Camera			
21 Problems and Solutions:			

Acquisition Flight Approved by
Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by
Signature over Printed Name
(PAF Representative)

Pilot-in-Command
Signature over Printed Name

Lidar Operator
Signature over Printed Name

DREAM
Disaster Risk Exposure and Assessment for Mitigation

Annex E

45. Flight Log for 2CAG101G345A Mission

DREAM Data Acquisition Flight Log

Flight Log No.: 858

1 LiDAR Operator: Engr. Sayla	2 ALTM Model:	3 Mission Name:	4 Type: VFR	5 Aircraft Type: CesnnaT206H	6 Aircraft Identification: RP-C9122
7 Pilot:	8 Co-Pilot:	9 Route:			
10 Date: 12/11/13	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 1147	14 Engine Off: 1540	15 Total Engine Time: 3+53	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather	cloudy				

20 Remarks:

Mission aborted due to precipitation; finished 10/22 lines

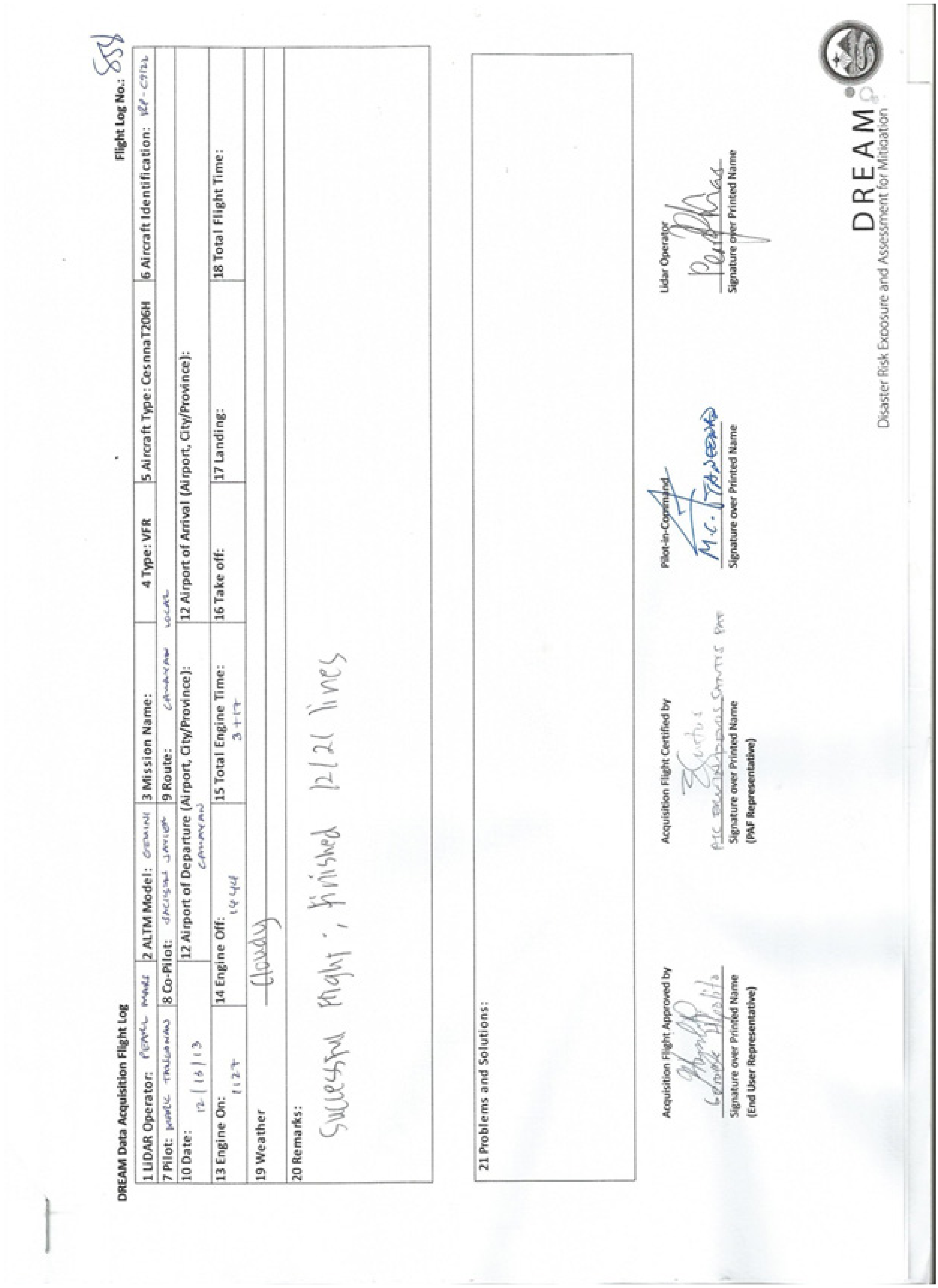
21 Problems and Solutions:

Acquisition Flight Approved by	Acquisition Flight Certified by	Pilot-in-Command	Lidar Operator
Gerome Hipolito	EN ERWIN DEZON SANZ PAF	M.C.	Pearl Mae
Signature over Printed Name (End User Representative)	Signature over Printed Name (PAF Representative)	Signature over Printed Name	Signature over Printed Name

DREAM
Disaster Risk Exposure and Assessment for Mitigation

Annex E

46. Flight Log for 2CAG101G347A Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 558

1 LIDAR Operator: PEARL MARES	2 ALTM Model: GEMINI	3 Mission Name:	4 Type: VFR	5 Aircraft Type: Cesnna T206H	6 Aircraft Identification: RP-C9122
7 Pilot: [illegible]	8 Co-Pilot: [illegible]	9 Route: [illegible] LOCAL			
10 Date: 12/16/13	12 Airport of Departure (Airport, City/Province): [illegible]		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 1127	14 Engine Off: 1444	15 Total Engine Time: 3+17	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather: cloudy					
20 Remarks: Successful flight; finished 12/21 lines					

21 Problems and Solutions:

Acquisition Flight Approved by — Signature over Printed Name (End User Representative)

Acquisition Flight Certified by — Signature over Printed Name (PAF Representative)

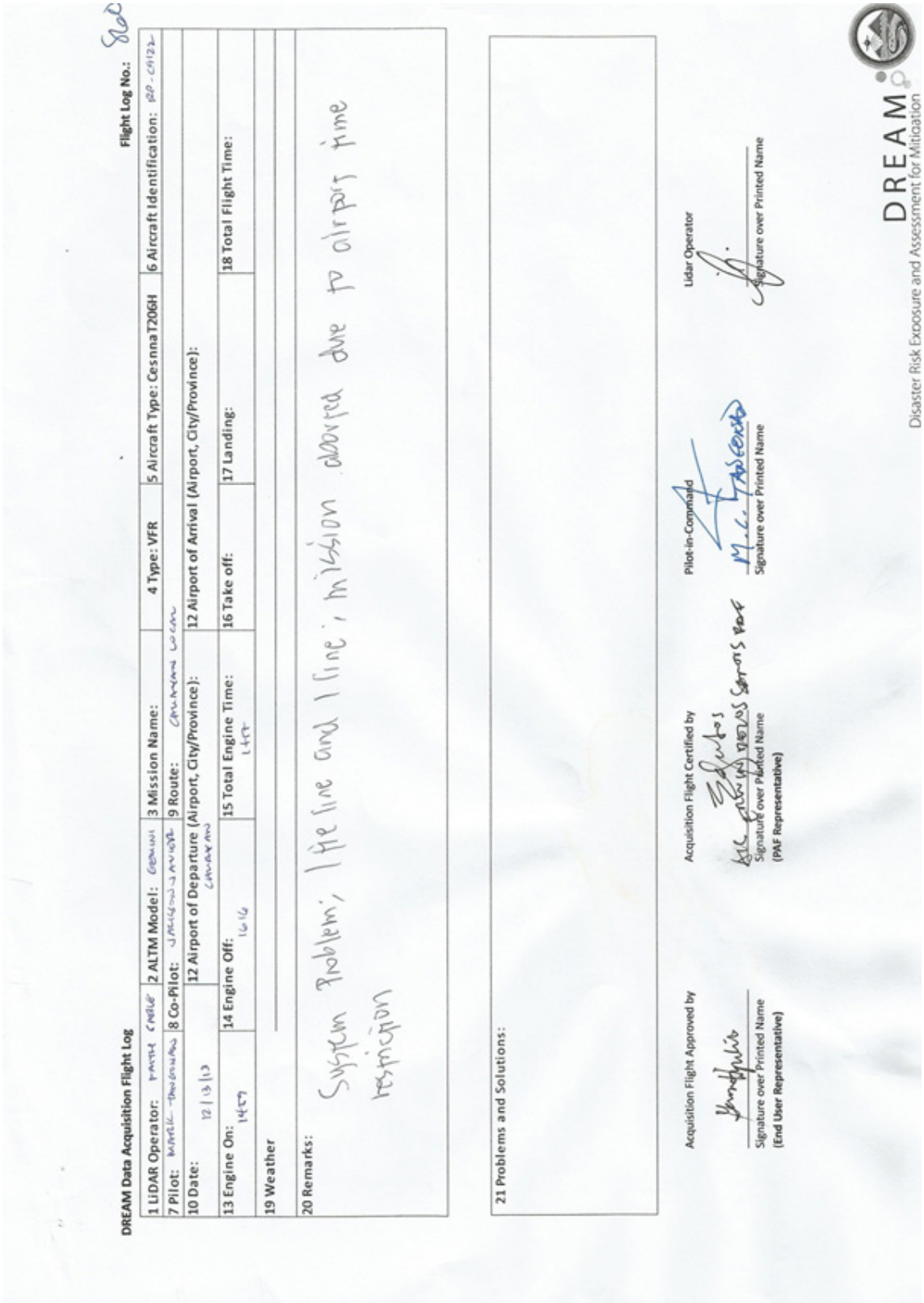
Pilot-in-Command — M.C. TABLEZO — Signature over Printed Name

Lidar Operator — Signature over Printed Name

DREAM Disaster Risk Exposure and Assessment for Mitigation

Annex E

47. Flight Log for 2CAG101F347B Mis



DREAM Data Acquisition Flight Log

Flight Log No.: Slot

1 LiDAR Operator:	2 ALTM Model:	3 Mission Name:	4 Type: VFR	5 Aircraft Type: Cessna T206H	6 Aircraft Identification:
7 Pilot:	8 Co-Pilot:	9 Route:			
10 Date: 12/13/13	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 1457	14 Engine Off: 1616	15 Total Engine Time: 1.5hrs	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather					
20 Remarks: System Problem; Fire line and 1 line; mission aborted due to airport time restriction					
21 Problems and Solutions:					

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

Signature over Printed Name
(PAF Representative)

Pilot-in-Command

Signature over Printed Name

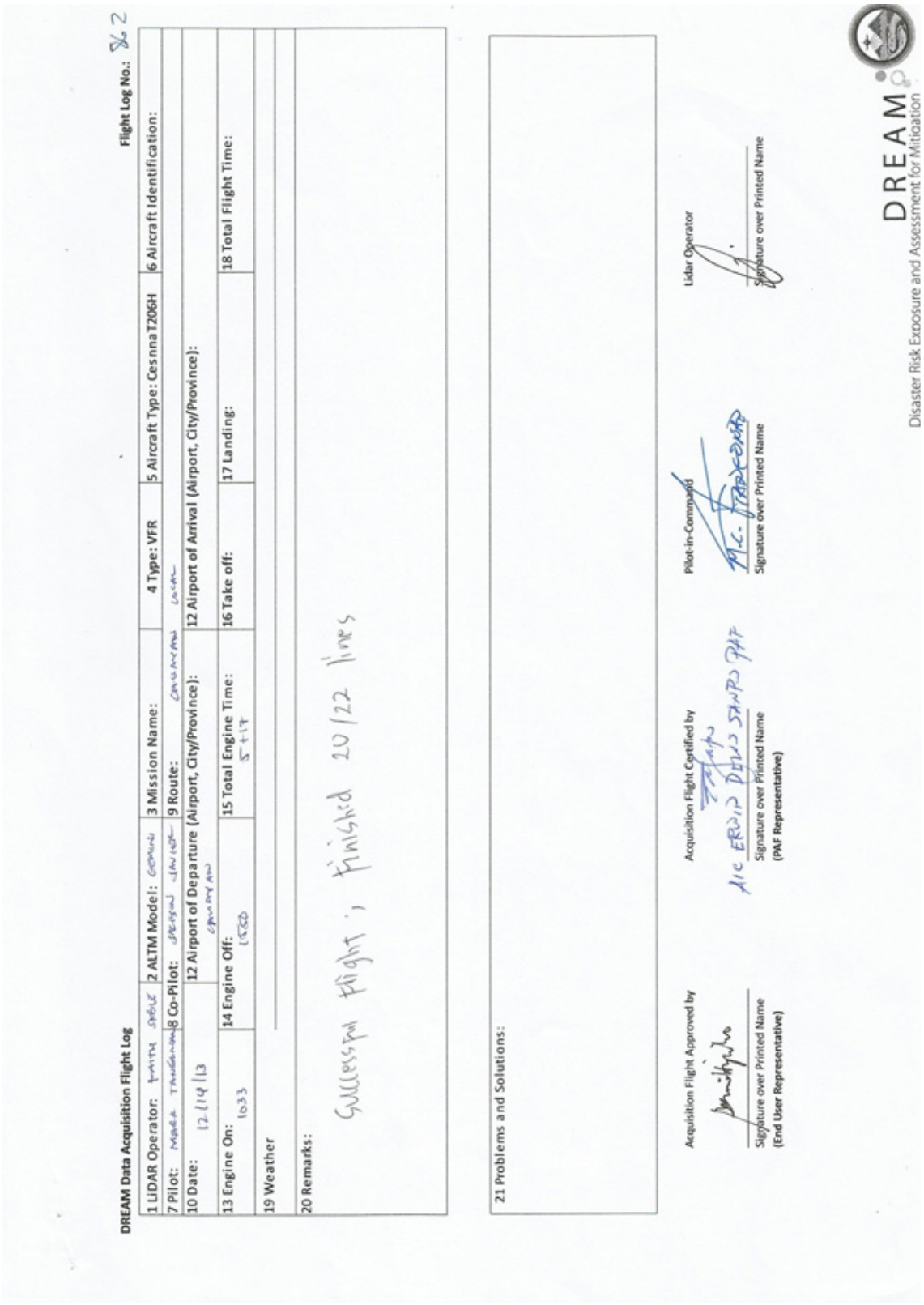
Lidar Operator

Signature over Printed Name

DREAM
Disaster Risk Exposure and Assessment for Mitigation

Annex E

48. Flight Log for 2CAG101F348A Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 2

1 LiDAR Operator:	2 ALTM Model:	3 Mission Name:	4 Type: VFR	5 Aircraft Type: Cessna T206H	6 Aircraft Identification:
7 Pilot:	8 Co-Pilot:	9 Route:			
10 Date: 12/19/13	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 1033	14 Engine Off:	15 Total Engine Time:	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather					
20 Remarks: Successful Flight ; Finished 20/22 lines					

21 Problems and Solutions:

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

ALC ERWIN DELOS SANTOS PAF

Signature over Printed Name
(PAF Representative)

Pilot-in-Command

Signature over Printed Name

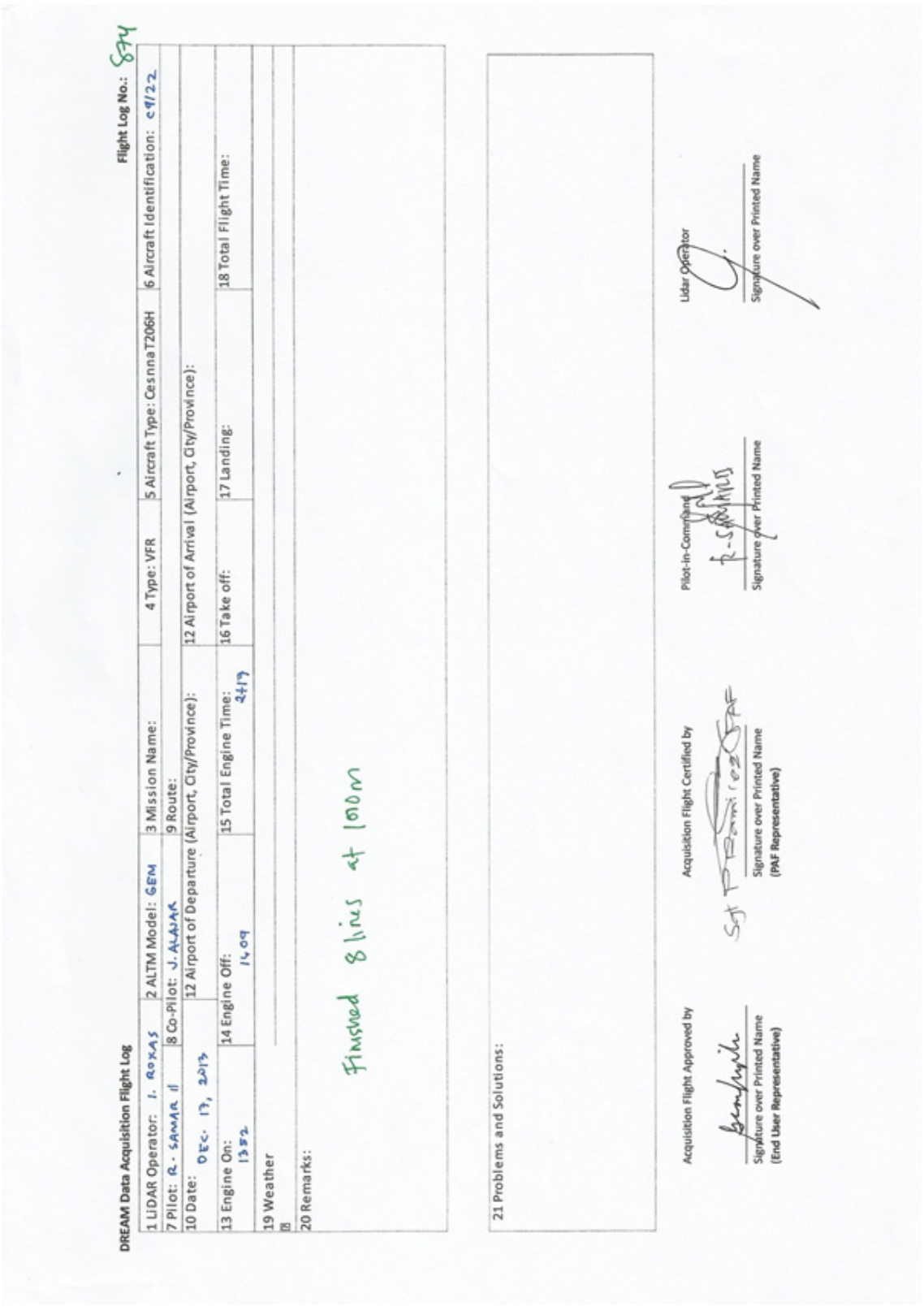
Lidar Operator

Signature over Printed Name

DREAM
Disaster Risk Exposure and Assessment for Mitigation

Annex E

49. Flight Log for 2CAG101D351A Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 874

1 LiDAR Operator: I. ROXAS	2 ALTM Model: GEM	3 Mission Name:	4 Type: VFR
5 Aircraft Type: CesnnaT206H	6 Aircraft Identification: c9122		
7 Pilot: R. SAMAR II	8 Co-Pilot: J. ALAJAR	9 Route:	
10 Date: DEC. 17, 2017	12 Airport of Departure (Airport, City/Province):	12 Airport of Arrival (Airport, City/Province):	
13 Engine On: 1352	14 Engine Off: 1409	15 Total Engine Time: 2+17	16 Take off:
17 Landing:	18 Total Flight Time:		
19 Weather			
20 Remarks: Finished 8 lins at 1000m			
21 Problems and Solutions:			

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

Sgt P Bermudez PAF

Signature over Printed Name
(PAF Representative)

Pilot-in-Command

R-SAMAR II

Signature over Printed Name

Lidar Operator

Signature over Printed Name

50. Flight Log for 1CAG161H248A Mission

DREAM Data Acquisition Flight Log Flight Log No.: 477

1 LiDAR Operator: M. Fortilan	2 ALTM Model: Peg	3 Mission Name: 1CAG161H248A	4 Type: VFR	5 Aircraft Type: CesnnaT206H	6 Aircraft Identification: 9022
7 Pilot: F. De Ocampo	8 Co-Pilot: M. Tangonan	9 Route:			
10 Date: 09-04-13	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 1217H	14 Engine Off: 1427H	15 Total Engine Time: 2+10	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather	partly cloudy				

20 Remarks:

surveyed 4/8 lines of CAG161H at 750+150m; laser to dropout and no images

21 Problems and Solutions:

Acquisition Flight Approved by
Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by
SSG Arguelles / Porto PAF
Signature over Printed Name
(PAF Representative)

Pilot-in-Command
M.E. Tangonan
Signature over Printed Name

Lidar Operator
M. Fortilan
Signature over Printed Name

DREAM
Disaster Risk and Exposure Assessment for Mitigation

Annex E

51. Flight Log for 1CAG161I249A Mission

DREAM Data Acquisition Flight Log

Flight Log No.: 481

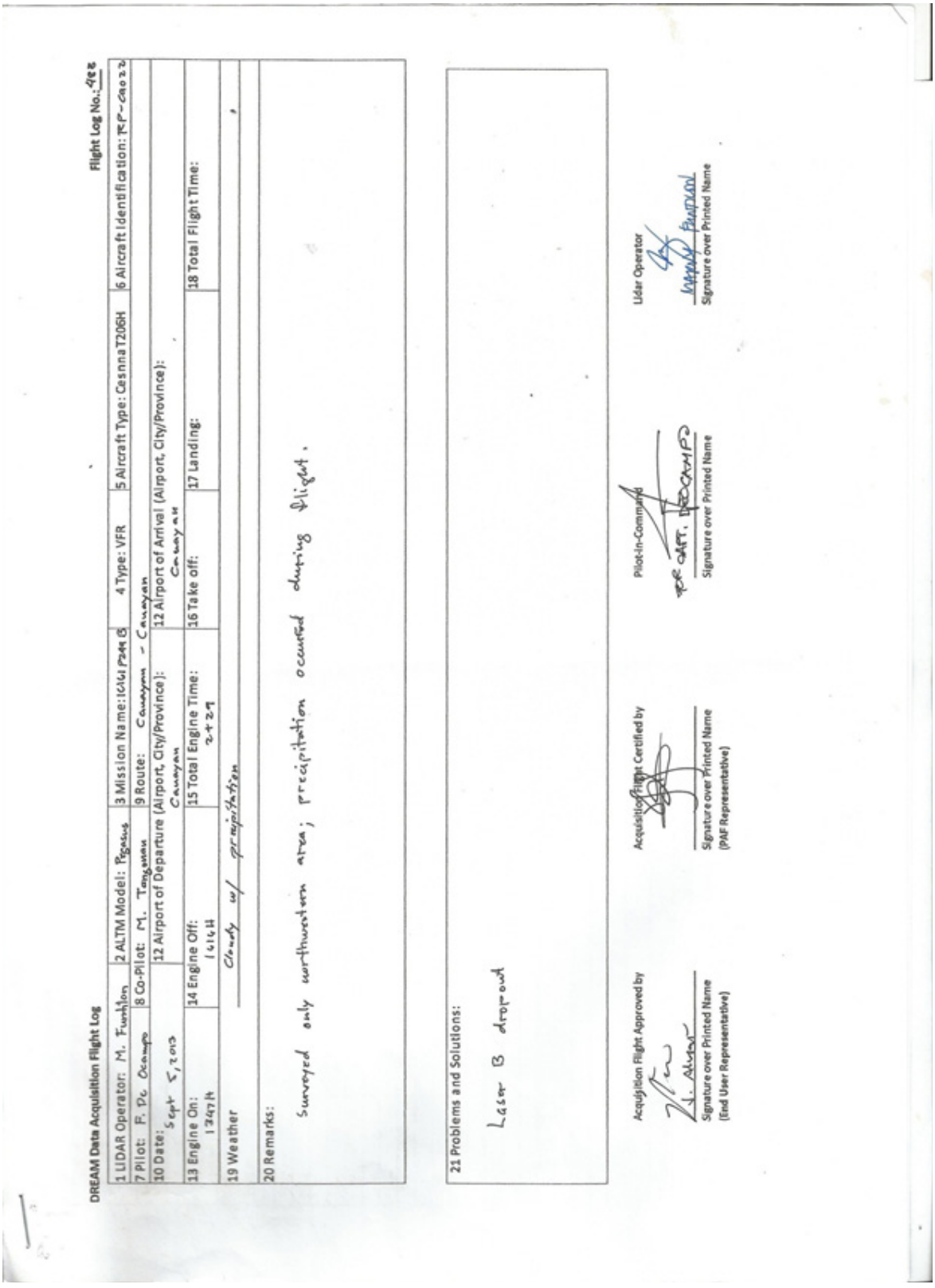
1 LIDAR Operator: J. Alviar	2 ALTM Model: Peg	3 Mission Name: 1CAG161I249A	4 Type: VFR	5 Aircraft Type: CesnnaT206H	6 Aircraft Identification: 9022
7 Pilot: F. De Ocampo	8 Co-Pilot: M. Tangonan	9 Route:			
10 Date: 09-06-14	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 0832H	14 Engine Off: 1155H	15 Total Engine Time: 3+23	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather	Very low cloud ceiling				
20 Remarks:	mission completed but with voids due to clouds and terrain at 750m AGL				

21 Problems and Solutions:

Acquisition Flight Approved by	Acquisition Flight Certified by	Pilot-in-Command	Lidar Operator
J. Alviar	SSG Arsenio G Topino PAF	M.G. Tangonan	J. Alviar
Signature over Printed Name (End User Representative)	Signature over Printed Name (PAF Representative)	Signature over Printed Name	Signature over Printed Name

Annex E

52. Flight Log for 1CAG161P249B Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 488

1 LIDAR Operator: M. Fumikon	2 ALTM Model: Pegasus	3 Mission Name: 161G P249 B	4 Type: VFR	5 Aircraft Type: Cessna T206H	6 Aircraft Identification: RP-C4022
7 Pilot: F. De Ocampo	8 Co-Pilot: M. Tangsuan	9 Route: Cauayan - Cauayan			
10 Date: Sept 5, 2013	12 Airport of Departure (Airport, City/Province): Cauayan		12 Airport of Arrival (Airport, City/Province): Cauayan		
13 Engine On: 1347H	14 Engine Off: 1614H	15 Total Engine Time: 2+27	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather	Cloudy w/ precipitation				

20 Remarks:

Surveyed only northwestern area; precipitation occured during flight.

21 Problems and Solutions:

Lack of Airport

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

Signature over Printed Name
(PAF Representative)

Pilot-in-Command

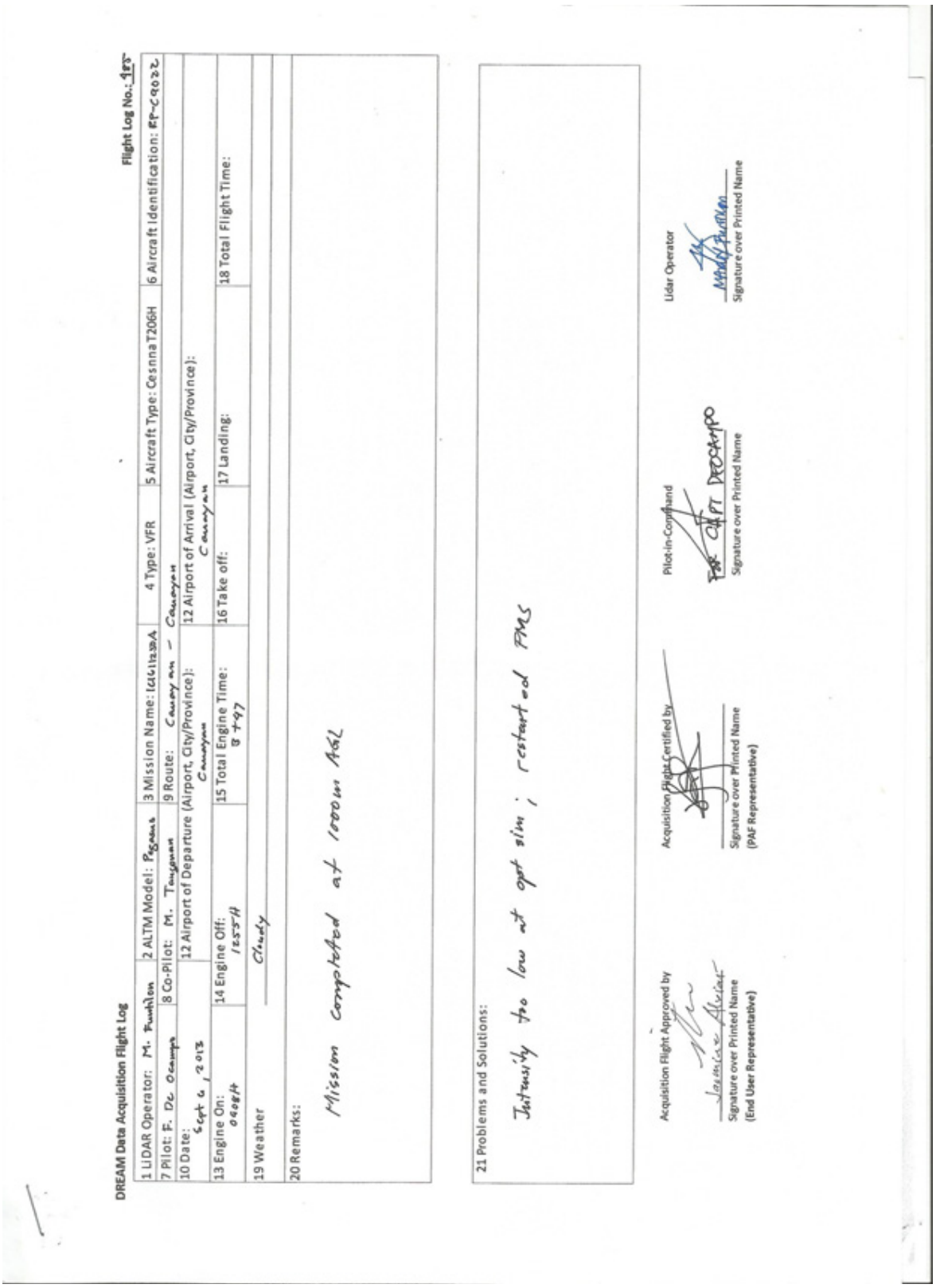
Signature over Printed Name

Lidar Operator

Signature over Printed Name

Annex E

53. Flight Log for 1CAG1611250A Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 1FS

1 LIDAR Operator: M. Pawlon	2 ALTM Model: Pegasus	3 Mission Name: 1CAG1611250A	4 Type: VFR	5 Aircraft Type: Cessna T206H	6 Aircraft Identification: RP-C9022
7 Pilot: F. De Ocampo	8 Co-Pilot: M. Tungcan	9 Route: Cauayan – Cauayan			
10 Date: Sept 6, 2013	11 Airport of Departure (Airport, City/Province): Cauayan		12 Airport of Arrival (Airport, City/Province): Cauayan		
13 Engine On: 0600H	14 Engine Off: 1555H	15 Total Engine Time: 9+57	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather: Cloudy					

20 Remarks:

Mission completed at 1000m AGL

21 Problems and Solutions:

Intensity too low at opt sim ; restarted PMS

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

Signature over Printed Name
(PAF Representative)

Pilot-in-Command

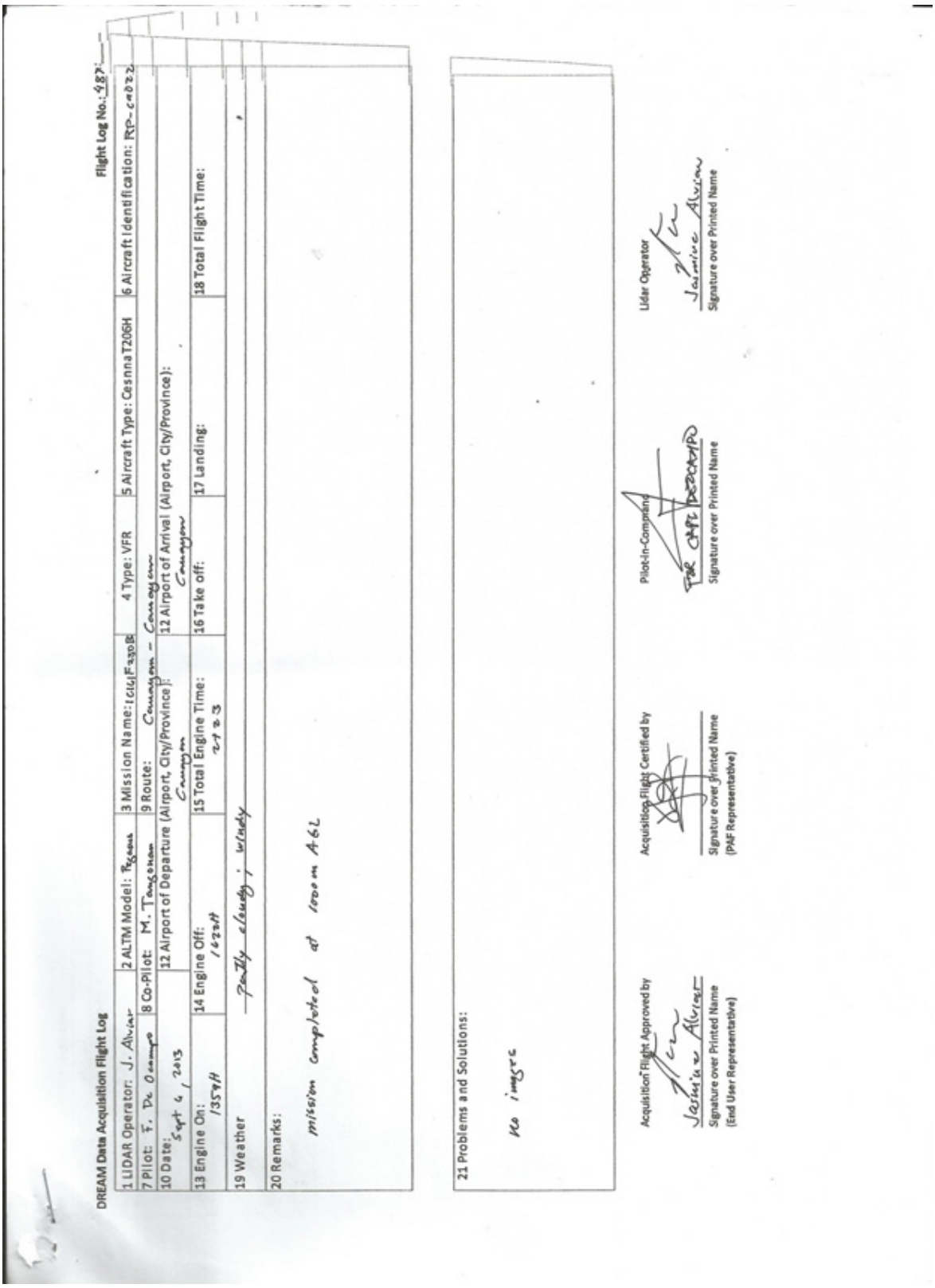
Signature over Printed Name

Lidar Operator

Signature over Printed Name

Annex E

54. Flight Log for 1CAG161F250B Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 987

1 LIDAR Operator: J. Alvarez	2 ALTM Model: Riegl	3 Mission Name: 1CAG161F250B	4 Type: VFR	5 Aircraft Type: Cessna T206H	6 Aircraft Identification: RP-c4032
7 Pilot: F. De Ocampo	8 Co-Pilot: M. Tongson	9 Route: Cauayan – Cauayan			
10 Date: Sept 4, 2013	11 Airport of Departure (Airport, City/Province): Cauayan		12 Airport of Arrival (Airport, City/Province): Cauayan		
13 Engine On: 1359H	14 Engine Off: 1624H	15 Total Engine Time: 2+23	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather	Partly cloudy / windy				

20 Remarks:

mission completed at 1000m AGL

21 Problems and Solutions:

no issues

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

Signature over Printed Name
(PAF Representative)

Pilot-in-Command

FRANCIS DE OCAMPO
Signature over Printed Name

Lidar Operator

Jasmine Alvarez
Signature over Printed Name

Annex E

55. Flight Log for 1CAG161Q251A Mission

M Data Acquisition Flight Log

Flight Log No.: 491P

1 LiDAR Operator: M. Funtilon	2 ALTM Model: Pegasus	3 Mission Name: 1CAG161Q251A	4 Type: VFR	5 Aircraft Type: Cesnna T206H	6 Aircraft Identification: RP-C9022
7 Pilot: F. De Ocampo	8 Co-Pilot: M. Tangonan	9 Route: Cauayan – Cauayan			
10 Date: Sept 7, 2013	12 Airport of Departure (Airport, City/Province): Cauayan		12 Airport of Arrival (Airport, City/Province): Cauayan		
13 Engine On: 1326 H	14 Engine Off: 1609 H	15 Total Engine Time: 2+43	16 Take off:	17 Landing:	18 Total Flight Time:

19 Weather: Partly Cloudy

20 Remarks:

Mission completed at 1000 m; no images

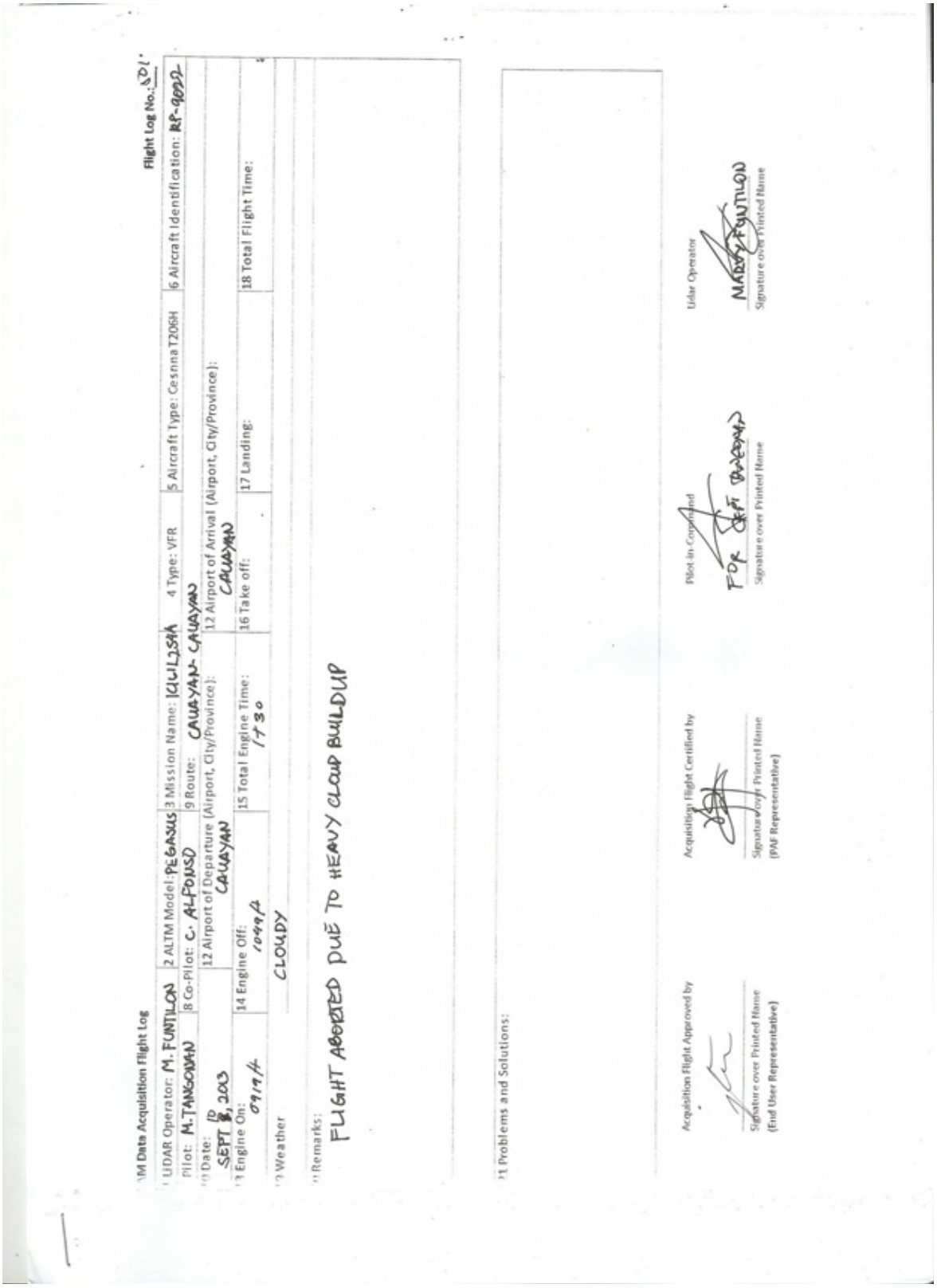
21 Problems and Solutions:

no images

Acquisition Flight Approved by	Acquisition Flight Certified by	Pilot-in-Command	Lidar Operator
J. Alviar		FOR CAPT OCAMPO	MARK FUNTILON
Signature over Printed Name (End User Representative)	Signature over Printed Name (PAF Representative)	Signature over Printed Name	Signature over Printed Name

Annex E

56. Flight Log for 1CAG161L254A Mission



Flight Log No.: 001

M Data Acquisition Flight Log

UDAR Operator: M. FUNTILON	2 ALTM Model: PEGASUS	3 Mission Name: 1CAG161L254A	4 Type: VFR	5 Aircraft Type: Cessna T206H	6 Aircraft Identification: RP-9092
Pilot: M. TANGONAN	8 Co-Pilot: C. ALFONSO	9 Route: CAUAYAN - CAUAYAN			
Date: 10 SEPT 8, 2003	12 Airport of Departure (Airport, City/Province): CAUAYAN		12 Airport of Arrival (Airport, City/Province): CAUAYAN		
Engine On: 0914	14 Engine Off: 1044	15 Total Engine Time: 1+30	16 Take off:	17 Landing:	18 Total Flight Time:
Weather: CLOUDY					

Remarks:
FLIGHT ABORTED DUE TO HEAVY CLOUD BUILDUP

Problems and Solutions:

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

Signature over Printed Name
(PAF Representative)

Pilot-in-Command
FOR CAPT TANGONAN

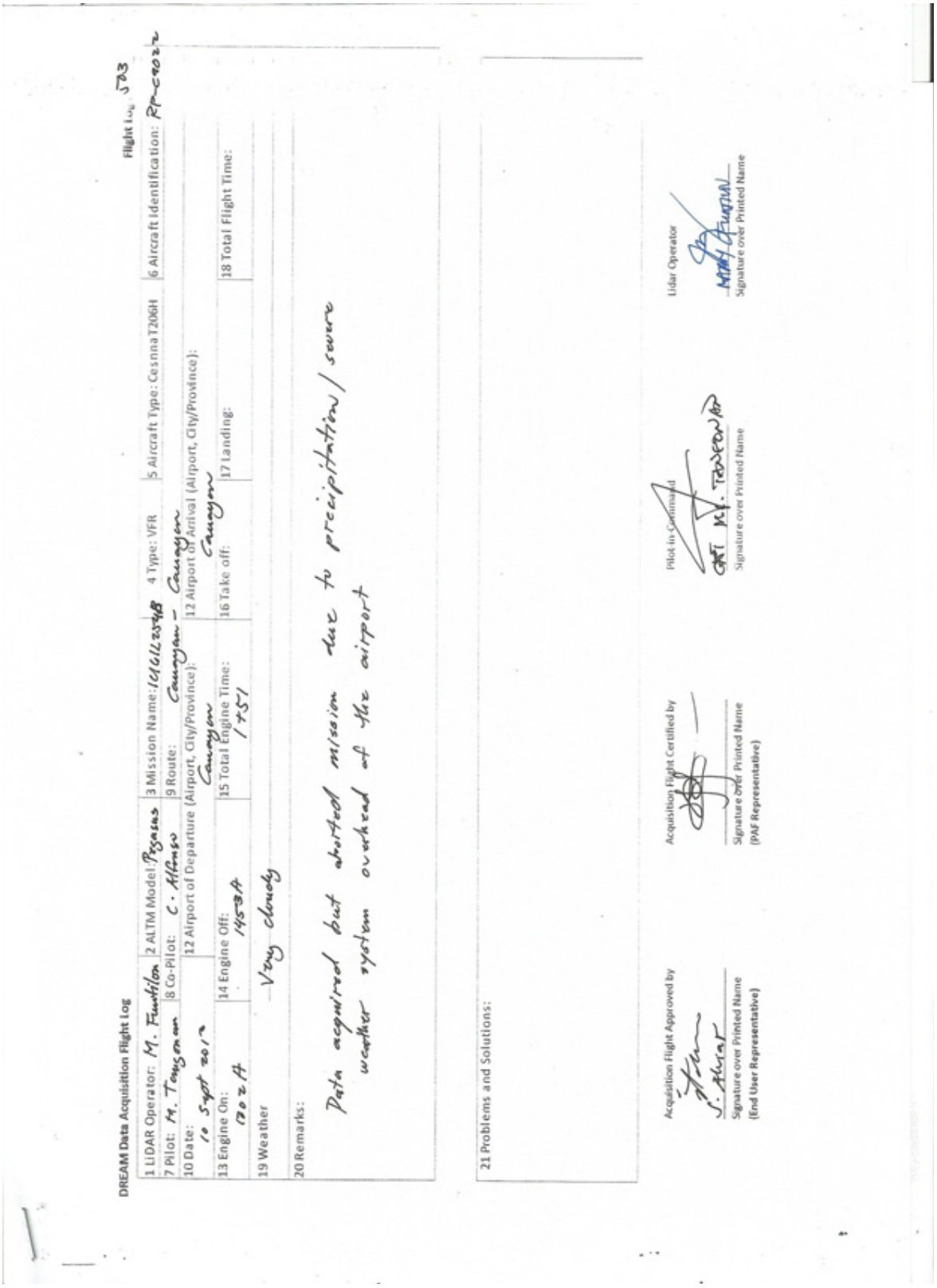
Signature over Printed Name

Lidar Operator
MARK FUNTILON

Signature over Printed Name

Annex E

57. Flight Log for 1CAG161L254B Mission



DREAM Data Acquisition Flight Log

Flight Log No. 083

1 LiDAR Operator: M. Fauntilon	2 ALTM Model: Pegasus	3 Mission Name: 1CAG161L254B	4 Type: VFR	5 Aircraft Type: Cessna T206H	6 Aircraft Identification: RP-C4022
7 Pilot: M. Tongson	8 Co-Pilot: C. Alfonso	9 Route: Cauayan – Cauayan			
10 Date: 10 Sept 2017	12 Airport of Departure (Airport, City/Province): Cauayan		12 Airport of Arrival (Airport, City/Province): Cauayan		
13 Engine On: 0622H	14 Engine Off: 1453H	15 Total Engine Time: 1.5hrs	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather: Very cloudy					
20 Remarks: Data acquired but shortened mission due to precipitation / severe weather system overhead of the airport					
21 Problems and Solutions:					

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

Signature over Printed Name
(PAF Representative)

Pilot-in-Command

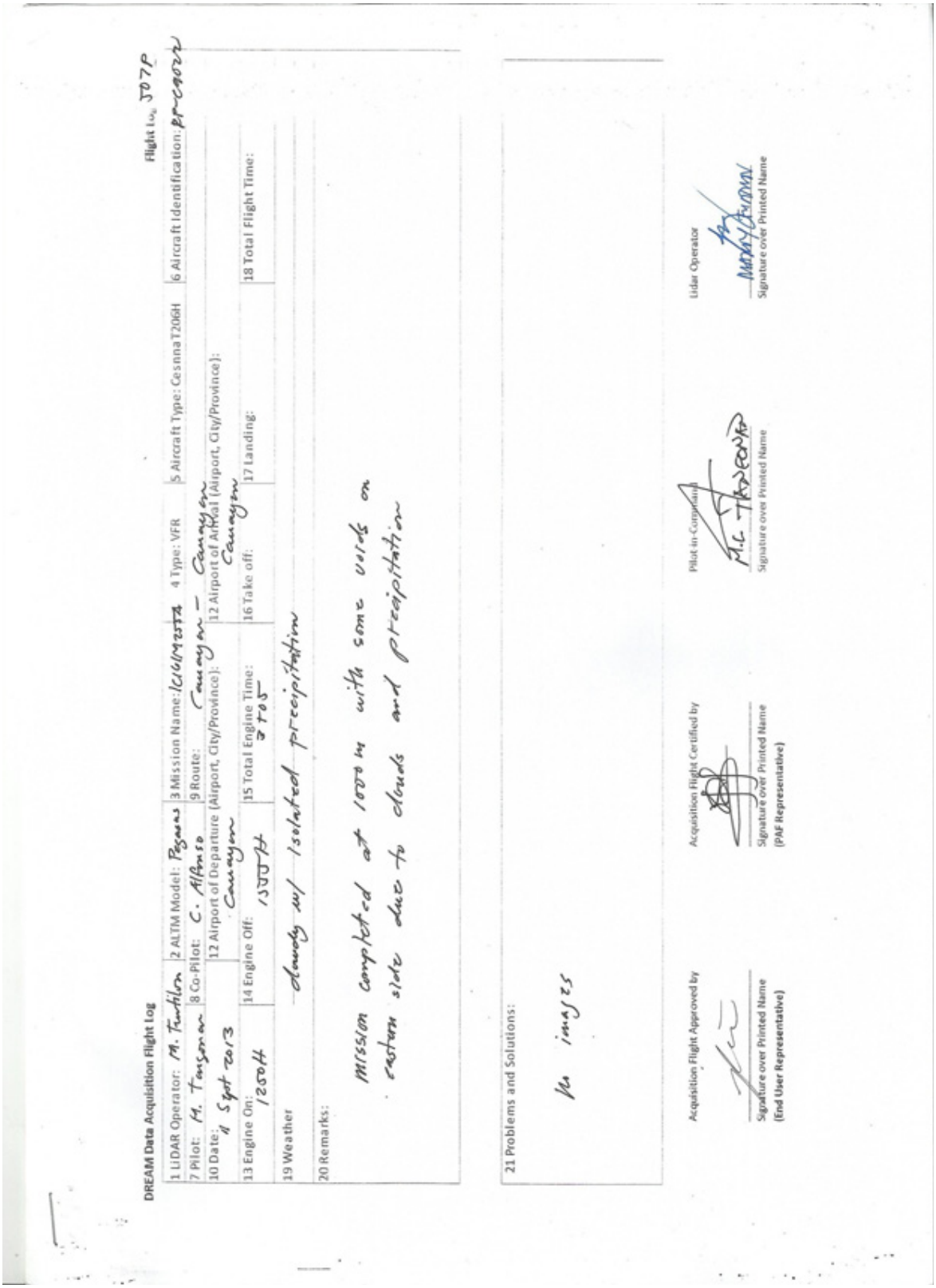
Signature over Printed Name

Lidar Operator

Signature over Printed Name

Annex E

58. Flight Log for 1CAG161M255A Mission



DREAM Data Acquisition Flight Log

Flight Log JO7P

1 LIDAR Operator: M. Tuñilao	2 ALTM Model: Pegasus	3 Mission Name: 1CAG161M255A	4 Type: VFR
7 Pilot: M. Tanguan	8 Co-Pilot: C. Alfonso	9 Route: Cauayan – Cauayan	
10 Date: 11 Sept 2013	12 Airport of Departure (Airport, City/Province): Cauayan	12 Airport of Arrival (Airport, City/Province): Cauayan	
13 Engine On: 1250H	14 Engine Off: 1330H	15 Total Engine Time: 3+05	16 Take off:
19 Weather: cloudy w/ isolated precipitation			17 Landing:

5 Aircraft Type: Cessna T206H

6 Aircraft Identification: PR-CAO22

18 Total Flight Time:

20 Remarks:

Mission completed at 1000 m with some voids on eastern side due to clouds and precipitation

21 Problems and Solutions:

No issues

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

Signature over Printed Name
(PAF Representative)

Pilot-in-Command

M.C. TANGUAN

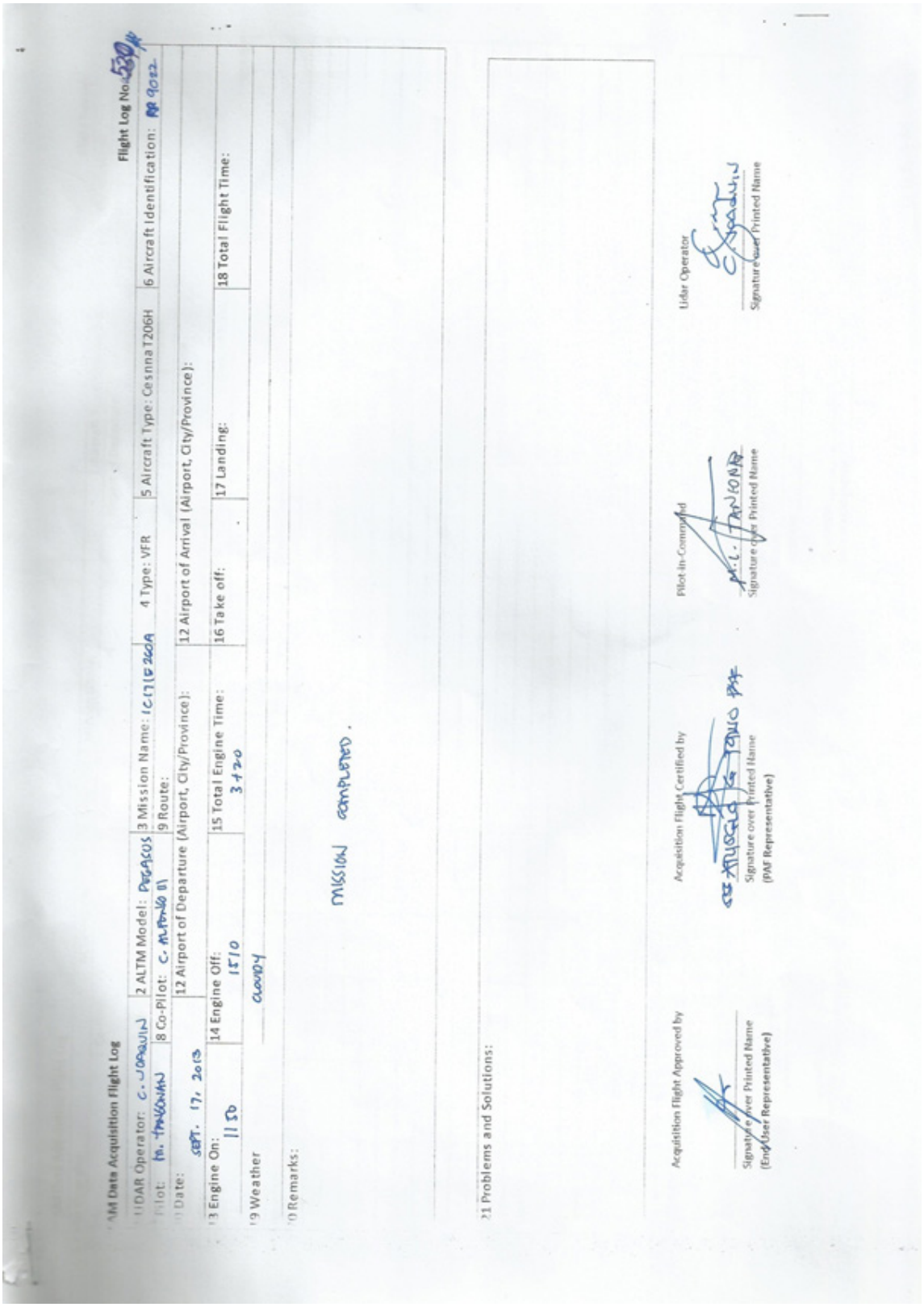
Signature over Printed Name

Lidar Operator

Signature over Printed Name

Annex E

59. Flight Log for 1CAG171E260A Mission



AM Data Acquisition Flight Log

Flight Log No: 530

1 LIDAR Operator: C. JOAQUIN	2 ALTM Model: PEGASUS	3 Mission Name: 1CAG171E260A	4 Type: VFR	5 Aircraft Type: Cessna T206H	6 Aircraft Identification: RP 9022
7 Pilot: Lt. TANGONAN	8 Co-Pilot: C. ALPAS 01	9 Route:			
10 Date: SEPT. 17, 2013	11 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 1150	14 Engine Off: 1510	15 Total Engine Time: 3+20	16 Take off:	17 Landing:	18 Total Flight Time:

19 Weather: CLOUDY

20 Remarks: MISSION COMPLETED.

21 Problems and Solutions:

Acquisition Flight Approved by

Signature over Printed Name (End User Representative)

Acquisition Flight Certified by

Signature over Printed Name (PAF Representative)

Pilot-in-Command

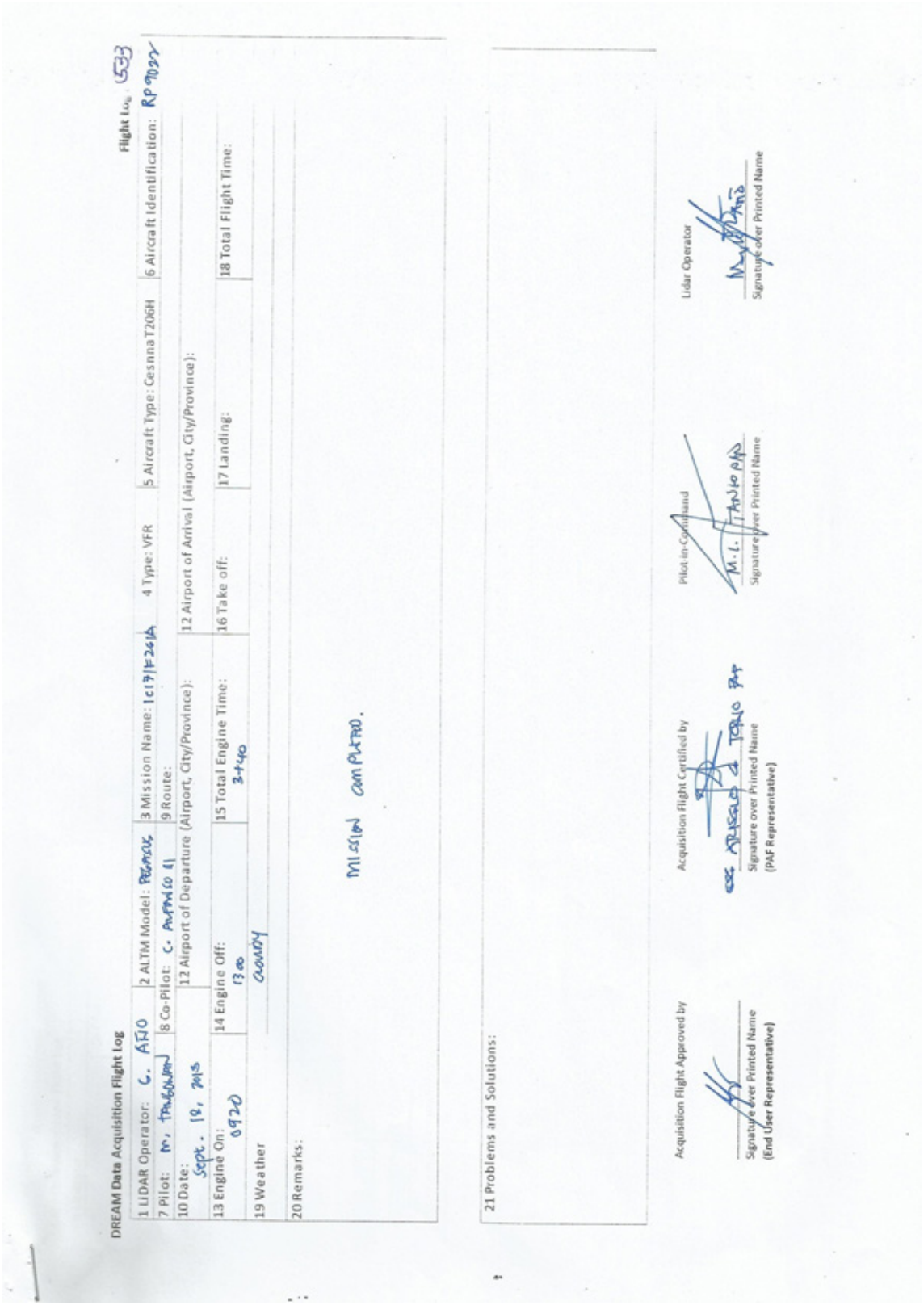
Signature over Printed Name

Lidar Operator

Signature over Printed Name

Annex E

60. Flight Log for 1CAG171F261A Mission



DREAM Data Acquisition Flight Log

Flight Log No. 533

1 LIDAR Operator: C. ARO | 2 ALTM Model: PEGASUS | 3 Mission Name: 1C171F261A | 4 Type: VFR | 5 Aircraft Type: Cessna T206H | 6 Aircraft Identification: RP 9022

7 Pilot: M. TANGONAN | 8 Co-Pilot: C. ARMILO III | 9 Route:

10 Date: Sept. 19, 2015 | 11 Airport of Departure (Airport, City/Province): | 12 Airport of Arrival (Airport, City/Province):

13 Engine On: 0920 | 14 Engine Off: 1300 | 15 Total Engine Time: 3+40 | 16 Take off: | 17 Landing: | 18 Total Flight Time:

19 Weather: CLOUDY

20 Remarks: MISSION COMPLETED.

21 Problems and Solutions:

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

SGT ARNULFO A. TORIO PAF

Signature over Printed Name
(PAF Representative)

Pilot-in-Command

M.L. TANGONAN

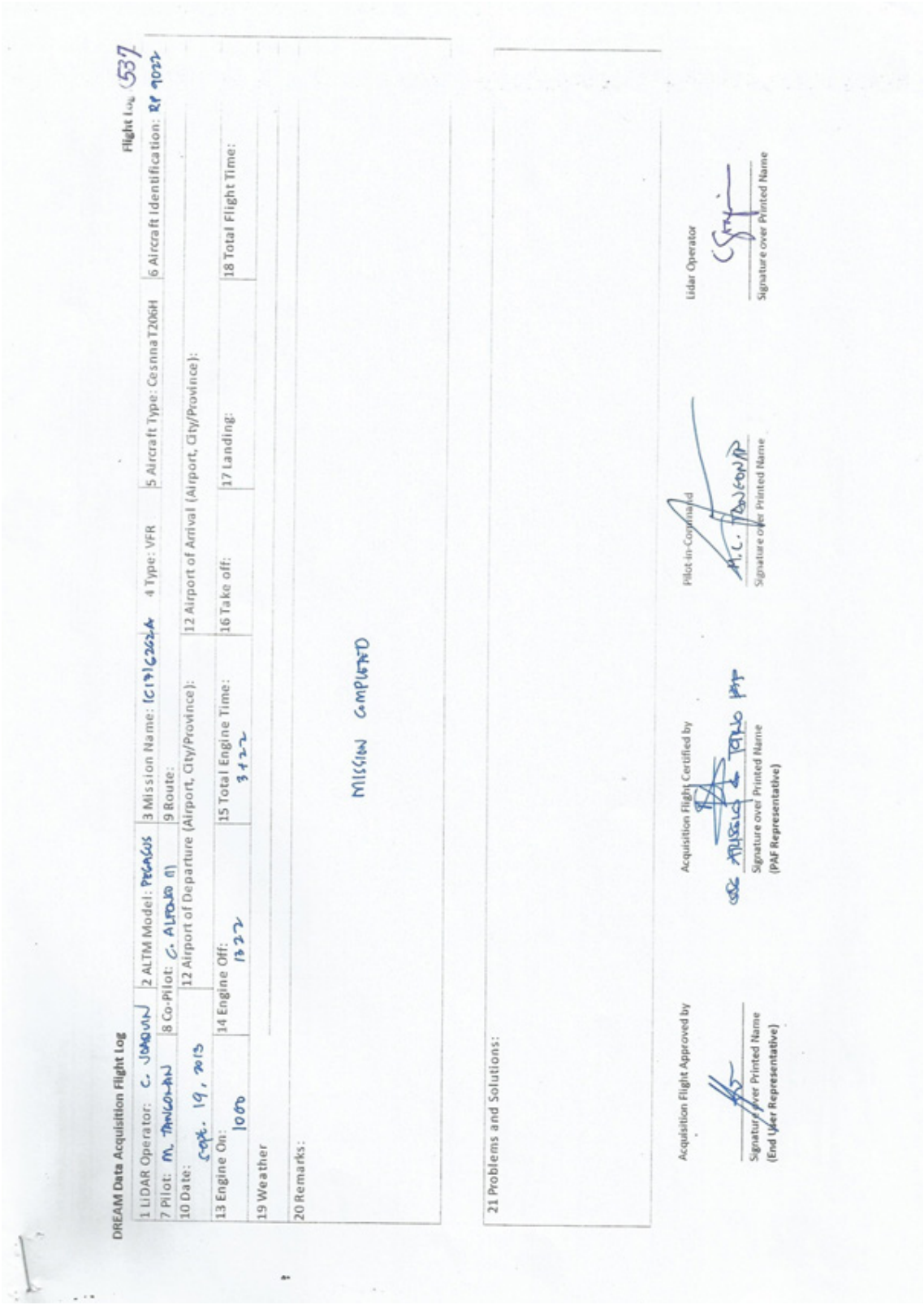
Signature over Printed Name

Lidar Operator

Signature over Printed Name

Annex E

61. Flight Log for 1CAG171G262A Mission



DREAM Data Acquisition Flight Log

Flight No. 537

1 LIDAR Operator: C. Jordan	2 ALTM Model: Pegasus	3 Mission Name: 1CAG171G262A	4 Type: VFR	5 Aircraft Type: Cessna T206H	6 Aircraft Identification: RP 7032
7 Pilot: M. Tangonan	8 Co-Pilot: C. Alforo III	9 Route:			
10 Date: Sept. 19, 2015	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 1060	14 Engine Off: 1822	15 Total Engine Time: 3+22	16 Take off:	17 Landing:	18 Total Flight Time:

19 Weather

20 Remarks:

MISSION COMPLETED

21 Problems and Solutions:

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

Signature over Printed Name
(PAF Representative)

Pilot in-Command

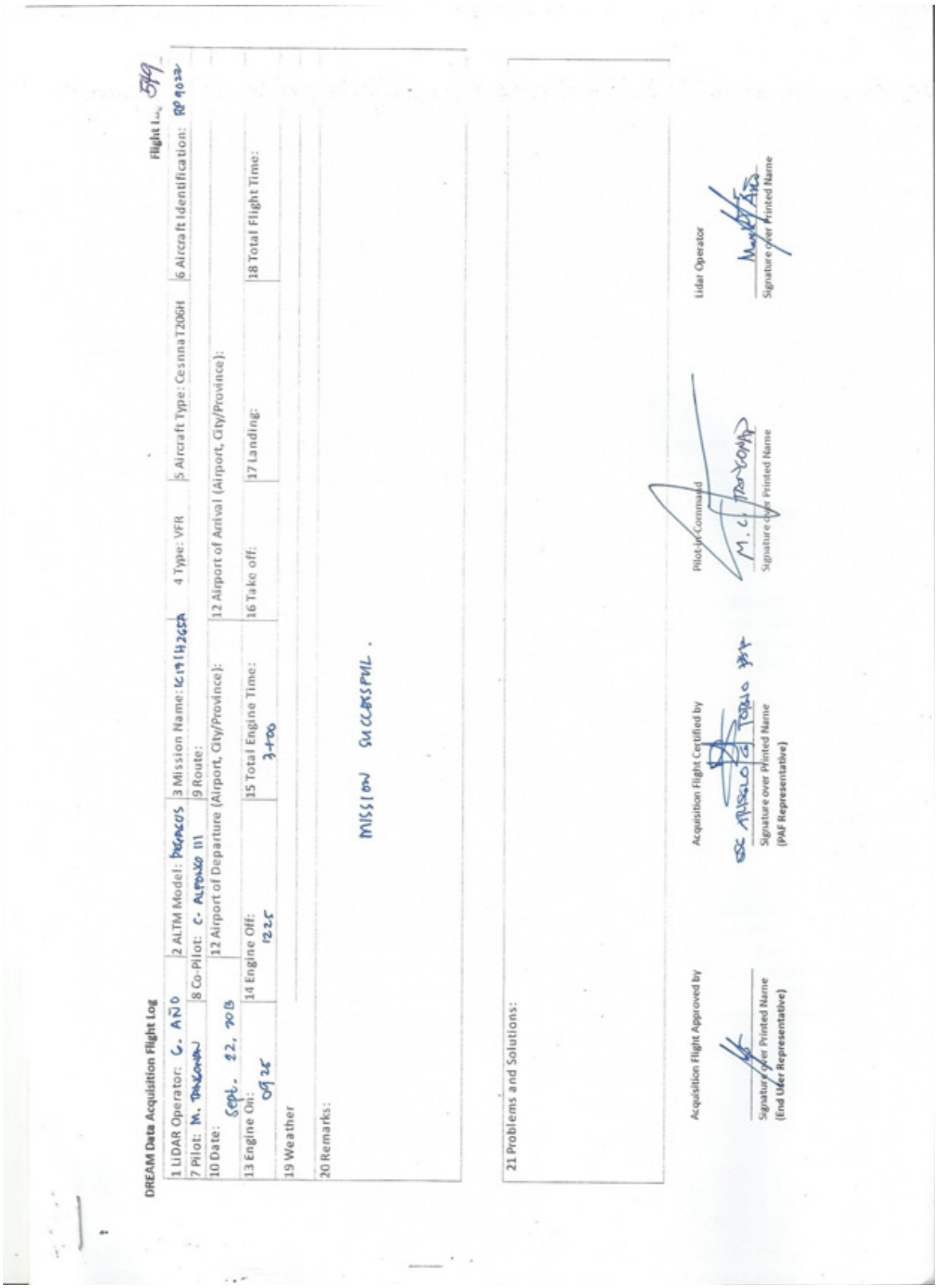
Signature over Printed Name

Lidar Operator

Signature over Printed Name

Annex E

62. Flight Log for 1CAG171H265A Mission



DREAM Data Acquisition Flight Log

Flight No. 549

1 LiDAR Operator: G. AÑO	2 ALTM Model: PEGASUS	3 Mission Name: 1CAG171H265A	4 Type: VFR
5 Aircraft Type: Cessna T206H	6 Aircraft Identification: RP 9022		
7 Pilot: M. TANGONAN	8 Co-Pilot: C- ALFONSO III	9 Route:	
10 Date: SEPT. 12, 2018	12 Airport of Departure (Airport, City/Province):	12 Airport of Arrival (Airport, City/Province):	
13 Engine On: 09:25	14 Engine Off: 12:25	15 Total Engine Time: 3+00	16 Take off:
17 Landing:	18 Total Flight Time:		
19 Weather			
20 Remarks: MISSION SUCCESSFUL.			
21 Problems and Solutions:			

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

Signature over Printed Name
(PAF Representative)

Pilot-in-Command

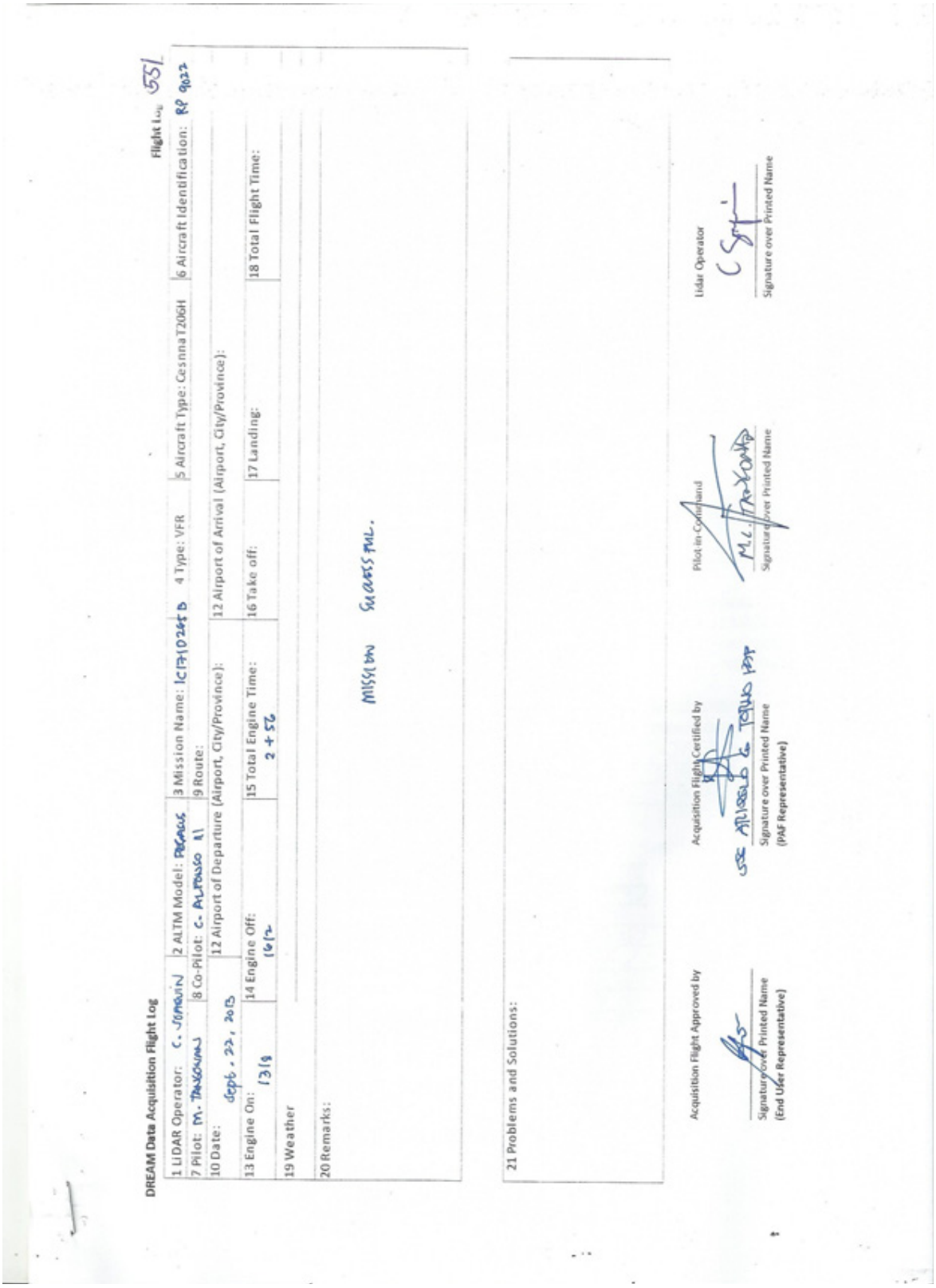
Signature over Printed Name

Lidar Operator

Signature over Printed Name

Annex E

63. Flight Log for 1CAG171D265B Mission



DREAM Data Acquisition Flight Log

Flight Log 551

1 LiDAR Operator: C. Jamuin	2 ALTM Model: Pegasus	3 Mission Name: 1CAG171D265B	4 Type: VFR	5 Aircraft Type: Cessna T206H	6 Aircraft Identification: RP 9022
7 Pilot: M. Tanggonan	8 Co-Pilot: C. Alfonso II	9 Route:			
10 Date: Sept. 22, 2015	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 1318	14 Engine Off: 1612	15 Total Engine Time: 2+52	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather					
20 Remarks: MISSION SUCCESSFUL.					
21 Problems and Solutions:					

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

Signature over Printed Name
(PAF Representative)

Pilot-in-Command

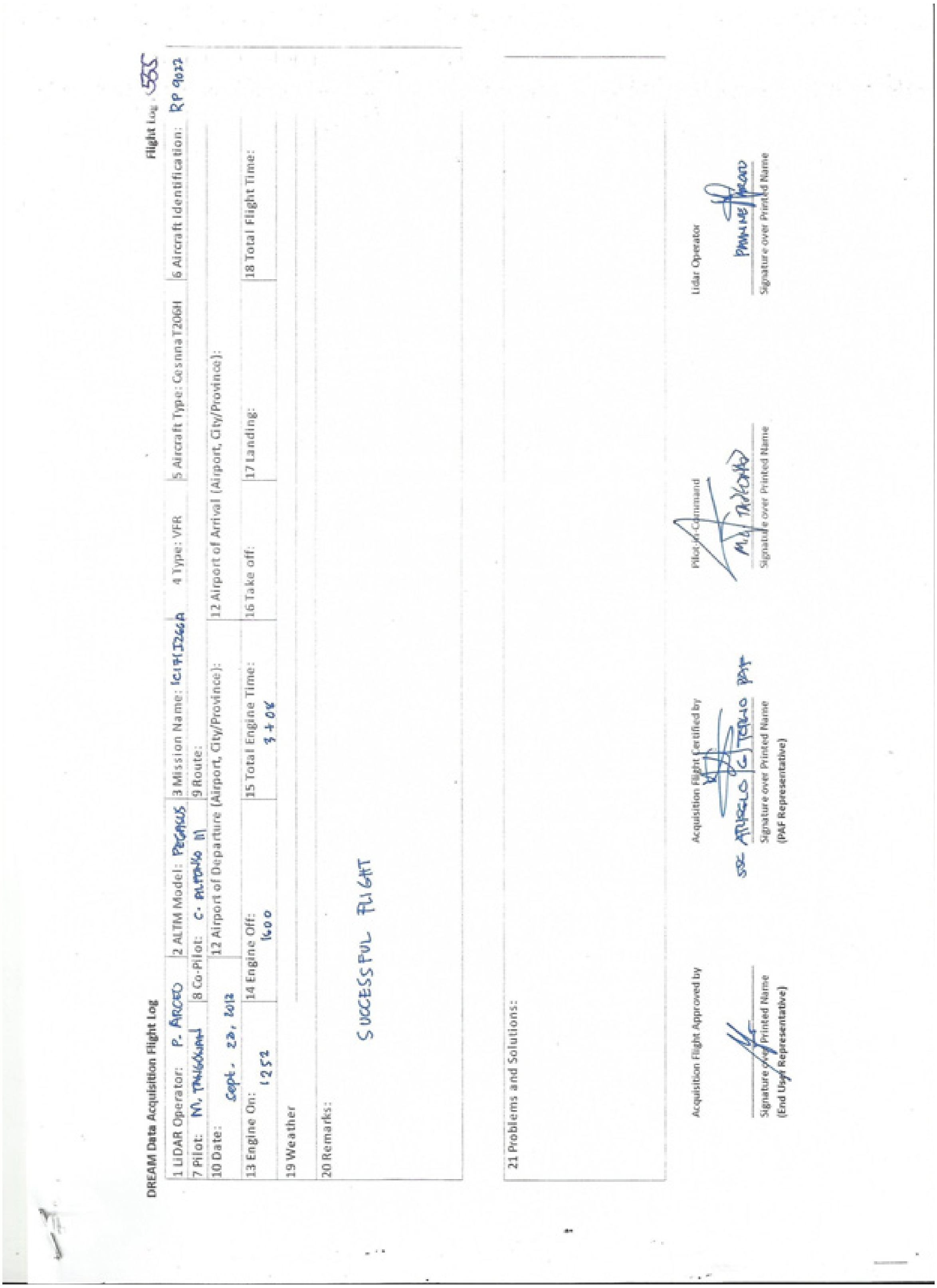
Signature over Printed Name

Lidar Operator

Signature over Printed Name

Annex E

64. Flight Log for 1CAG171I266A Mission



DREAM Data Acquisition Flight Log

Flight Log: 555

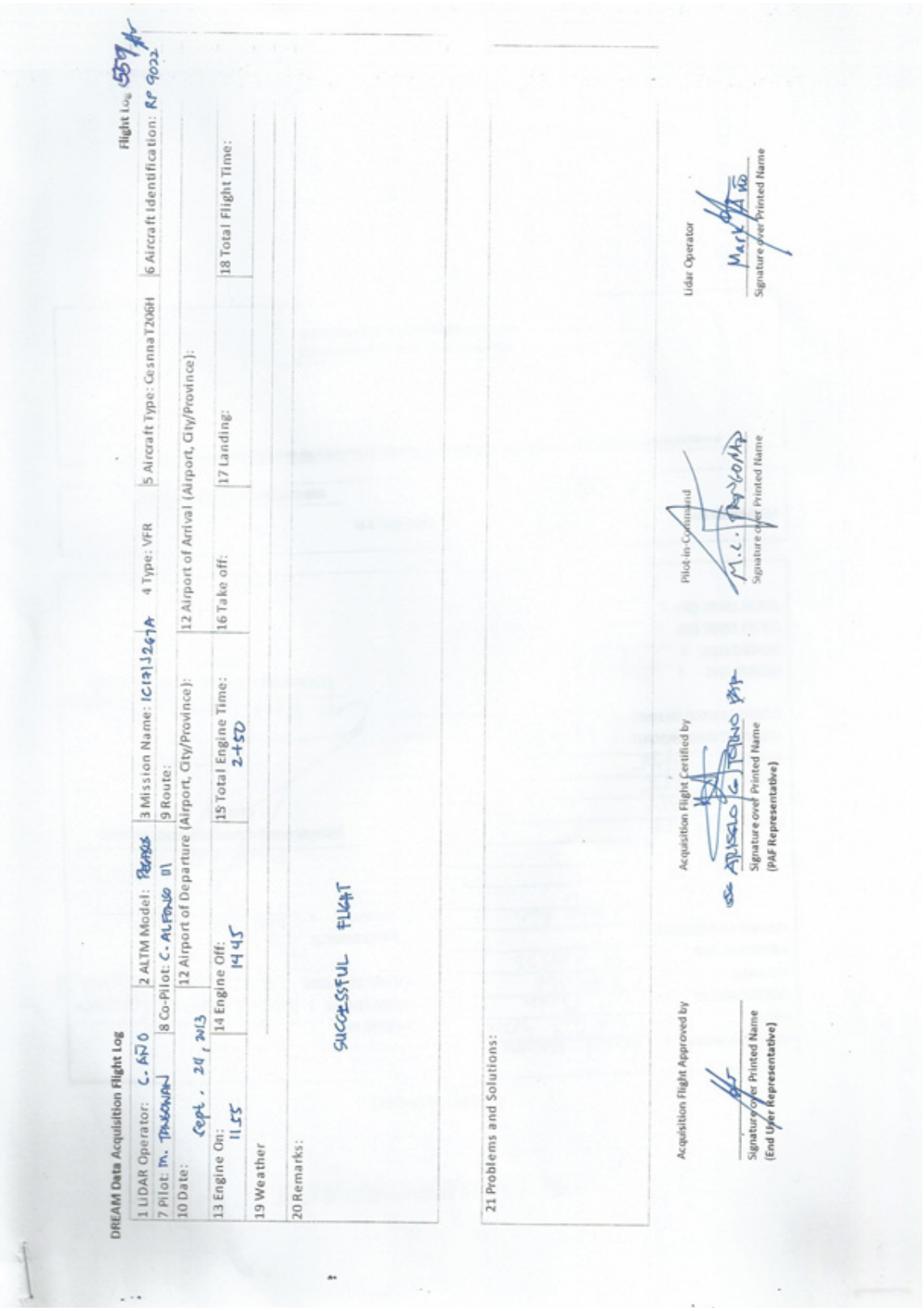
1 LiDAR Operator: P. ARCEO	2 ALTM Model: PEGASUS	3 Mission Name: 1C171I266A	4 Type: VFR	5 Aircraft Type: Cesnna T206H	6 Aircraft Identification: RP 9022
7 Pilot: M. TANGONAN	8 Co-Pilot: C. ALFONSO III	9 Route:			
10 Date: Sept. 23, 2012	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 1252	14 Engine Off: 1600	15 Total Engine Time: 3+08	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather					
20 Remarks: SUCCESSFUL FLIGHT					

21 Problems and Solutions:

Acquisition Flight Approved by	Acquisition Flight Certified by	Pilot-in-Command	Lidar Operator
	SSC ATURELO [G] TEPELO PAF	M. TANGONAN	PAMINE ARCEO
Signature over Printed Name (End User Representative)	Signature over Printed Name (PAF Representative)	Signature over Printed Name	Signature over Printed Name

Annex E

65. Flight Log for 1CAG171J267A Mission



DREAM Data Acquisition Flight Log

Flight Log 557

1 LIDAR Operator: C-AIO	2 ALTM Model: Pegasus	3 Mission Name: 1CAG171J267A	4 Type: VFR
5 Aircraft Type: Cessna T206H	6 Aircraft Identification: RP 9022		
7 Pilot: M. Tandingan	8 Co-Pilot: C. Alfonso 01	9 Route:	
10 Date: Sept. 24, 2013	12 Airport of Departure (Airport, City/Province):	12 Airport of Arrival (Airport, City/Province):	
13 Engine On: 11:55	14 Engine Off: 14:45	15 Total Engine Time: 2+50	16 Take off:
17 Landing:	18 Total Flight Time:		
19 Weather			
20 Remarks: SUCCESSFUL FLIGHT			
21 Problems and Solutions:			

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

Signature over Printed Name
(PAF Representative)

Pilot-in-Command

Signature over Printed Name

Lidar Operator

Signature over Printed Name

Annex E

66. Flight Log for 1CAG171C268B Mission

DREAM Data Acquisition Flight Log

Flight Log No.: 563

1 LiDAR Operator: P. ARCEO	2 ALTM Model: PEGASUS	3 Mission Name: 1C171C268 B	4 Type: VFR	5 Aircraft Type: Cesnna T206H	6 Aircraft Identification: RP 9022
7 Pilot: M. TANGONAN	8 Co-Pilot: C. ALFONSO III	9 Route:			
10 Date: Sept. 25, 2013	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 1176	14 Engine Off: 1576	15 Total Engine Time: 4+00	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather	CLOUD-1				

20 Remarks:

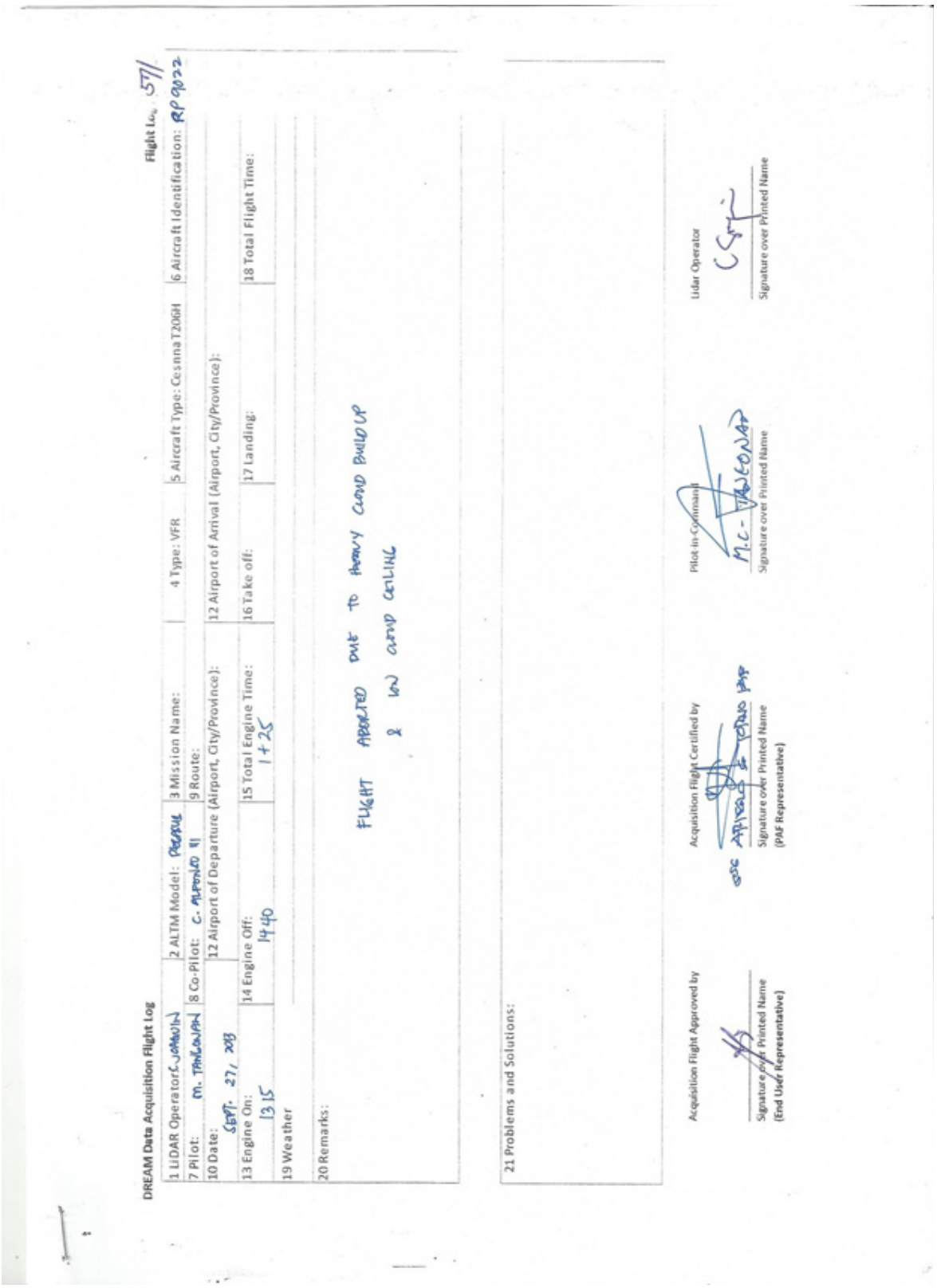
MISSION COMPLETED.

21 Problems and Solutions:

Acquisition Flight Approved by	Acquisition Flight Certified by	Pilot-in-Command	Lidar Operator
Signature over Printed Name (End User Representative)	ATUSALO G ... PSG Signature over Printed Name (PAF Representative)	M.L. TANGONAN Signature over Printed Name	PAULINE ARCEO Signature over Printed Name

Annex E

67. Flight Log for 1CAG171K270A Mission



DREAM Data Acquisition Flight Log

Flight No. 57

1 LiDAR Operator: [illegible]	2 ALTM Model: [illegible]	3 Mission Name:	4 Type: VFR	5 Aircraft Type: Cessna T206H	6 Aircraft Identification: RP9022
7 Pilot: M. TAMAYAO	8 Co-Pilot: C. ALFONSO II	9 Route:			
10 Date: SEPT. 27, 2018	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 13 15	14 Engine Off: 14 40	15 Total Engine Time: 1 + 25	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather					

20 Remarks:

FLIGHT ABORTED DUE TO HEAVY CLOUD BUILD UP & LOW CLOUD CEILING

21 Problems and Solutions:

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

Signature over Printed Name
(PAF Representative)

Pilot in-Command

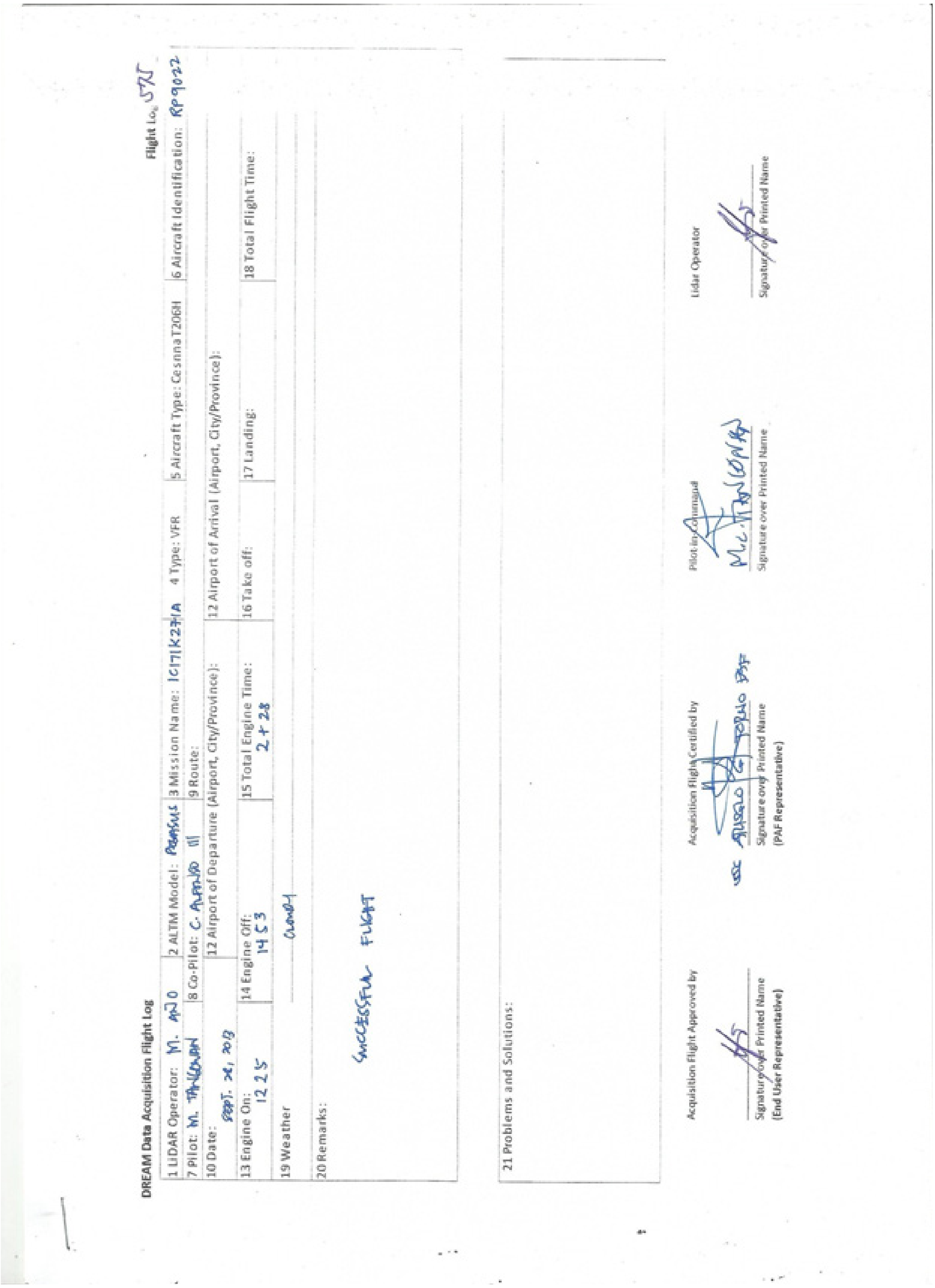
Signature over Printed Name

Lidar Operator

Signature over Printed Name

Annex E

68. Flight Log for 1CAG171K271A Mission



DREAM Data Acquisition Flight Log

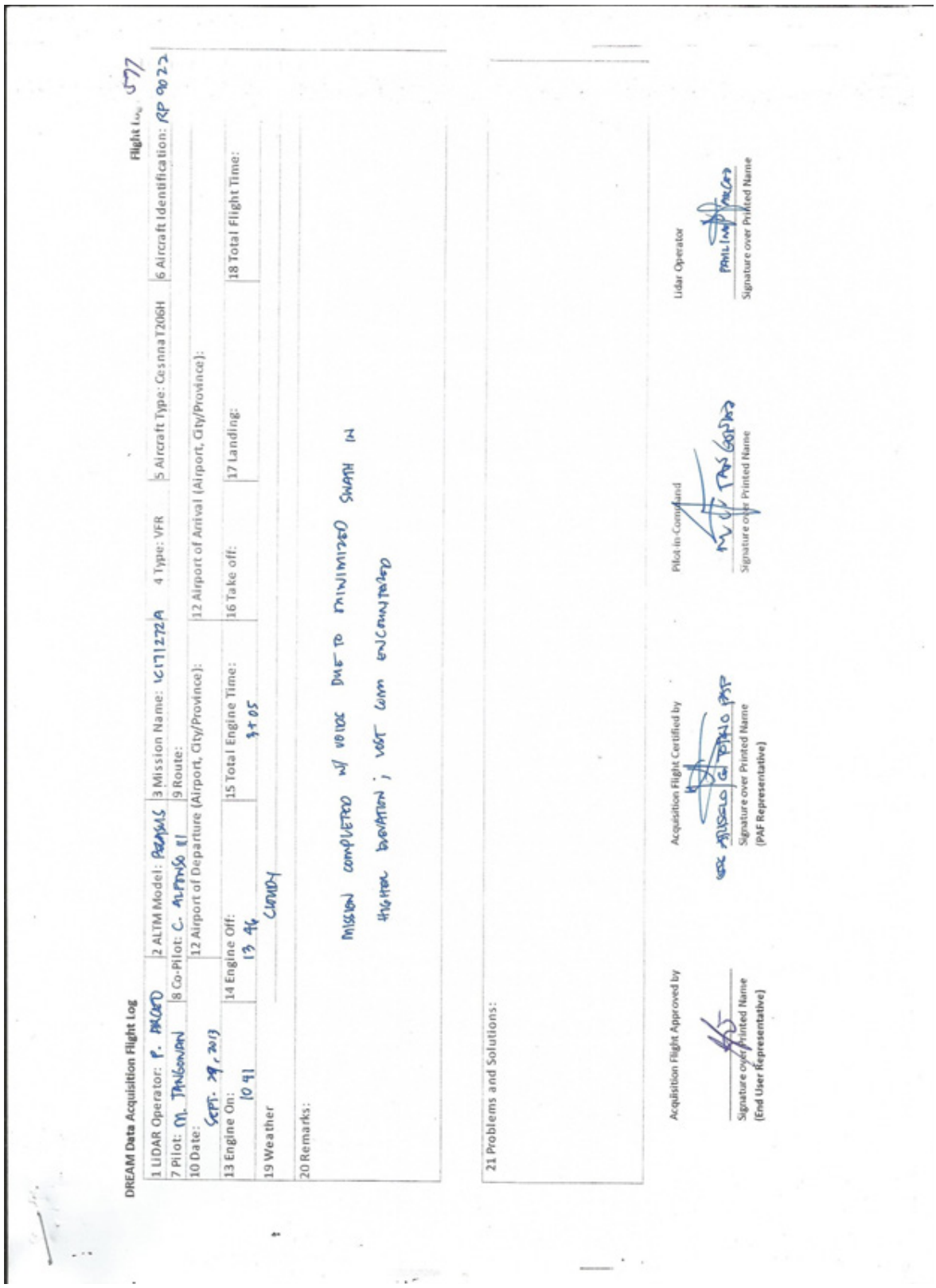
Flight Log No.: 575

1 LiDAR Operator: M. Anjo	2 ALTM Model: Pegasus	3 Mission Name: 1C171K271A	4 Type: VFR	5 Aircraft Type: CesnnaT206H	6 Aircraft Identification: RP9022
7 Pilot: M. Tangonan	8 Co-Pilot: C. Alfonso III	9 Route:			
10 Date: Sept. 28, 2013	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 1225	14 Engine Off: 1453	15 Total Engine Time: 2+28	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather: Cloudy					
20 Remarks: Successful flight					
21 Problems and Solutions:					

Acquisition Flight Approved by	Acquisition Flight Certified by	Pilot-in-Command	Lidar Operator
Signature over Printed Name (End User Representative)	LTC Alfonso G. Forlio PAF Signature over Printed Name (PAF Representative)	M.C. Tangonan Signature over Printed Name	Signature over Printed Name

Annex E

69. Flight Log for 1CAG171L272A Mission



DREAM Data Acquisition Flight Log

Flight Log 077

1 LIDAR Operator: P. PACARO	2 ALTM Model: RIEGL	3 Mission Name: 1CAG171L272A	4 Type: VFR
5 Aircraft Type: Cessna T206H	6 Aircraft Identification: RP 9022		
7 Pilot: M. TANGONAN	8 Co-Pilot: C. ALFONSO II	9 Route:	
10 Date: SEPT. 29, 2013	11 Airport of Departure (Airport, City/Province):	12 Airport of Arrival (Airport, City/Province):	
13 Engine On: 10 41	14 Engine Off: 13 44	15 Total Engine Time: 3+05	16 Take off:
17 Landing:	18 Total Flight Time:		
19 Weather CLOUDY			

20 Remarks:

MISSION COMPLETED W/ MINOR DEVIATION ; VERY GOOD ENJOYABLE FLIGHT

MISSION ACCOMPLISHED DUE TO MINIMIZED SWATH IN

21 Problems and Solutions:

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

Signature over Printed Name
(PAF Representative)

Pilot-in-Command

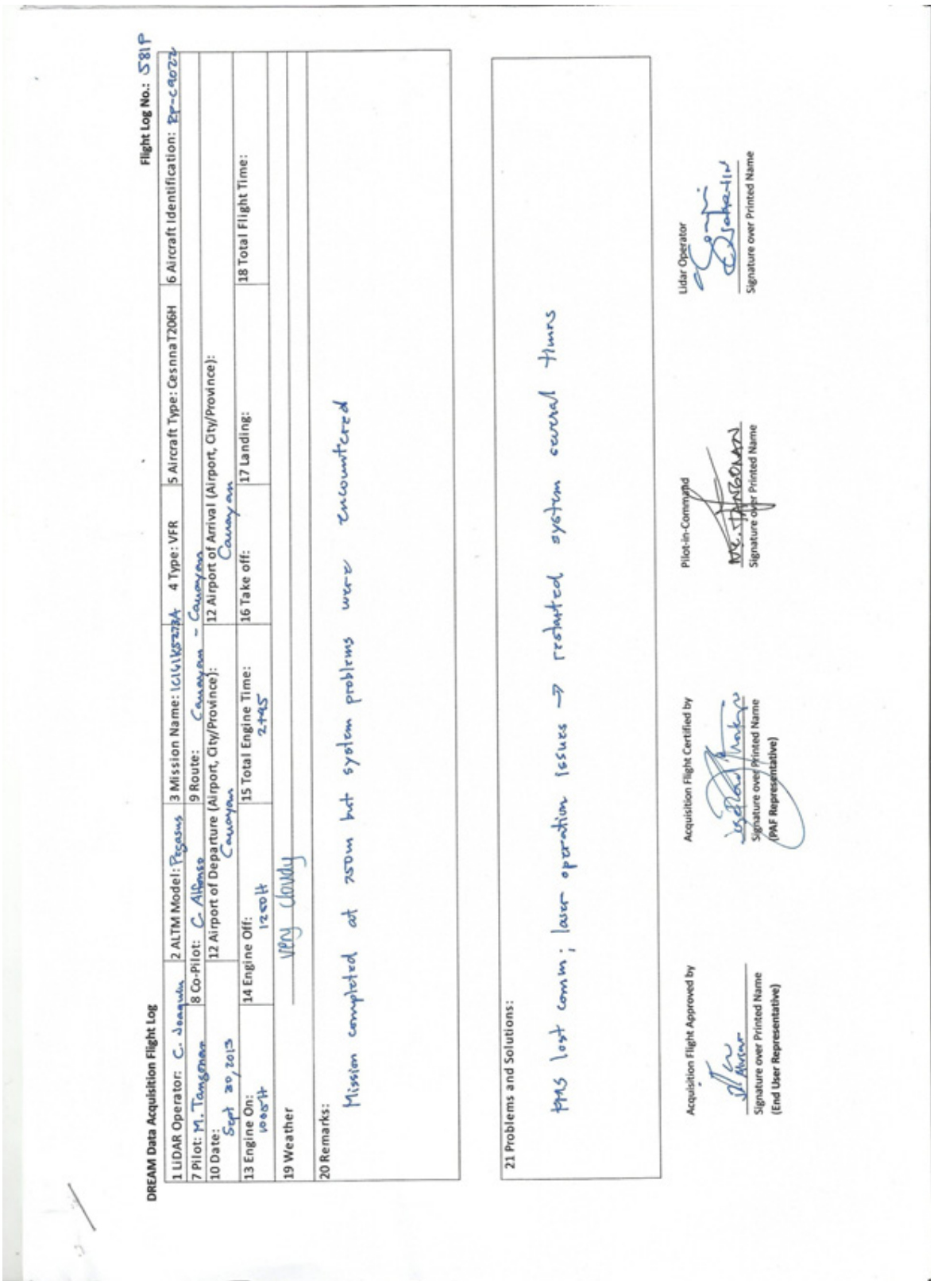
Signature over Printed Name

Lidar Operator

Signature over Printed Name

Annex E

70. Flight Log for 1CAG161KS273AMission



DREAM Data Acquisition Flight Log

Flight Log No.: S81P

1 LiDAR Operator: C. Jonson	2 ALTM Model: Pegasus	3 Mission Name: 1CAG161KS273A	4 Type: VFR	5 Aircraft Type: Cessna T206H	6 Aircraft Identification: RP-C4072
7 Pilot: M. Tangonan	8 Co-Pilot: C. Alfonso	9 Route: Cauayan – Cauayan			
10 Date: Sept 20, 2013	11 Airport of Departure (Airport, City/Province): Cauayan		12 Airport of Arrival (Airport, City/Province): Cauayan		
13 Engine On: 1005H	14 Engine Off: 1250H	15 Total Engine Time: 2.45	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather	VFR/ Cloudy				

20 Remarks:

Mission completed at 2500m but system problems were encountered

21 Problems and Solutions:

INS lost comm; laser operation issues → restarted system several times

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

Signature over Printed Name
(PAF Representative)

Pilot-in-Command

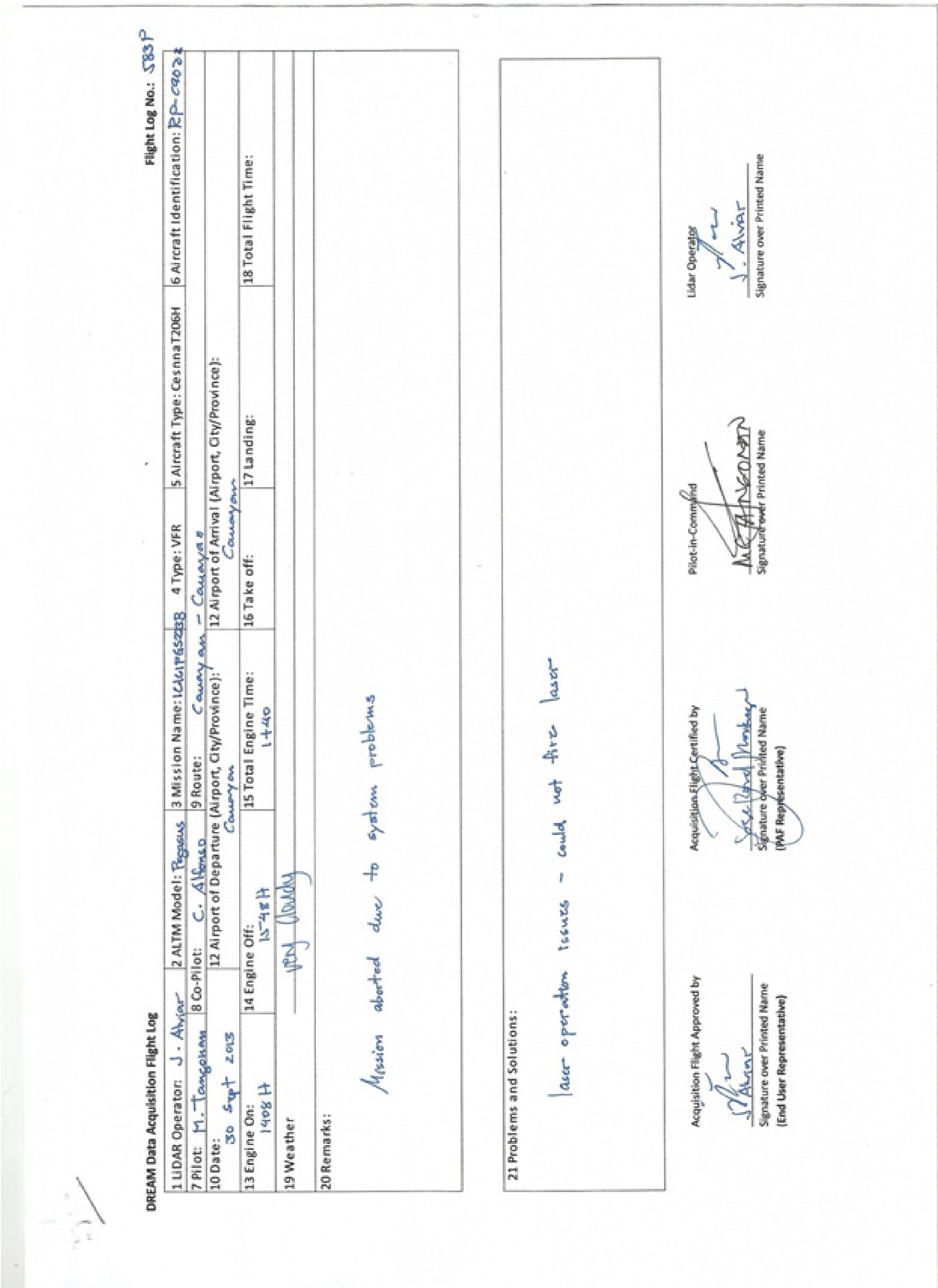
Signature over Printed Name

Lidar Operator

Signature over Printed Name

Annex E

71. Flight Log for 1CAG161FGS273B Mission



Flight Log No.: 5831P

DREAM Data Acquisition Flight Log

1 LiDAR Operator: J. Alviar	2 ALTM Model: Pegasus	3 Mission Name: 1CAG161FGS273B	4 Type: VFR	5 Aircraft Type: Cesnna T206H	6 Aircraft Identification: RP-C9022
7 Pilot: M. Tangonan	8 Co-Pilot: C. Alfonso	9 Route: Cauayan – Cauayan			
10 Date: 30 Sept 2013	12 Airport of Departure (Airport, City/Province): Cauayan		12 Airport of Arrival (Airport, City/Province): Cauayan		
13 Engine On: 1408H	14 Engine Off: 1548H	15 Total Engine Time: 1+40	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather: Very Cloudy					
20 Remarks: Mission aborted due to system problems					

21 Problems and Solutions: laser operation issues - could not fire laser

Acquisition Flight Approved by: J. Alviar — Signature over Printed Name (End User Representative)

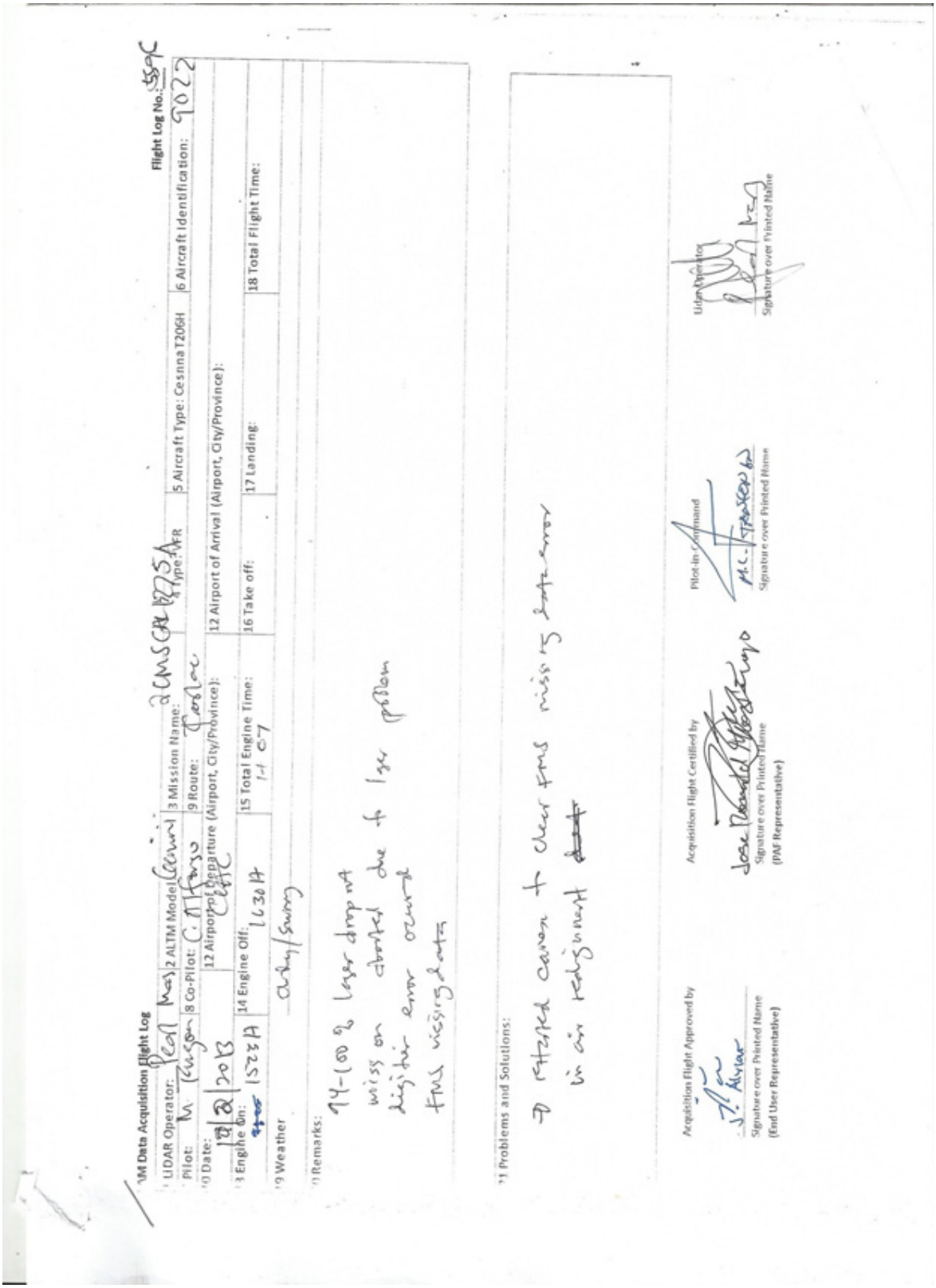
Acquisition Flight Certified by: Signature over Printed Name (PAF Representative)

Pilot-in-Command: M. Tangonan — Signature over Printed Name

Lidar Operator: J. Alviar — Signature over Printed Name

Annex E

72. Flight Log for 2LMSTAR275A



AM Data Acquisition Flight Log

Flight Log No.: 004

1 LIDAR Operator: Real Mas | 2 ALTM Model: Optech | 3 Mission Name: 2LMSTAR275A | 4 Type: VFR | 5 Aircraft Type: Cessna T206H | 6 Aircraft Identification: 9022

7 Pilot: M. Tayag | 8 Co-Pilot: C. Alfonso | 9 Route: Tarlac

10 Date: 19 02 2023 | 11 Airport of Departure (Airport, City/Province): Clark | 12 Airport of Arrival (Airport, City/Province):

13 Engine On: 1323 H | 14 Engine Off: 1630 H | 15 Total Engine Time: 1+07 | 16 Take off: | 17 Landing: | 18 Total Flight Time:

19 Weather: Cloudy/Sunny

20 Remarks:

14-(00 to Layer drop out
miss on channel due to layer problem
high dist error occured
FMS missing data

21 Problems and Solutions:

→ retarget canon + clear FMS miss to late entry
in air relight

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

Signature over Printed Name
(PAF Representative)

Pilot-in-Command

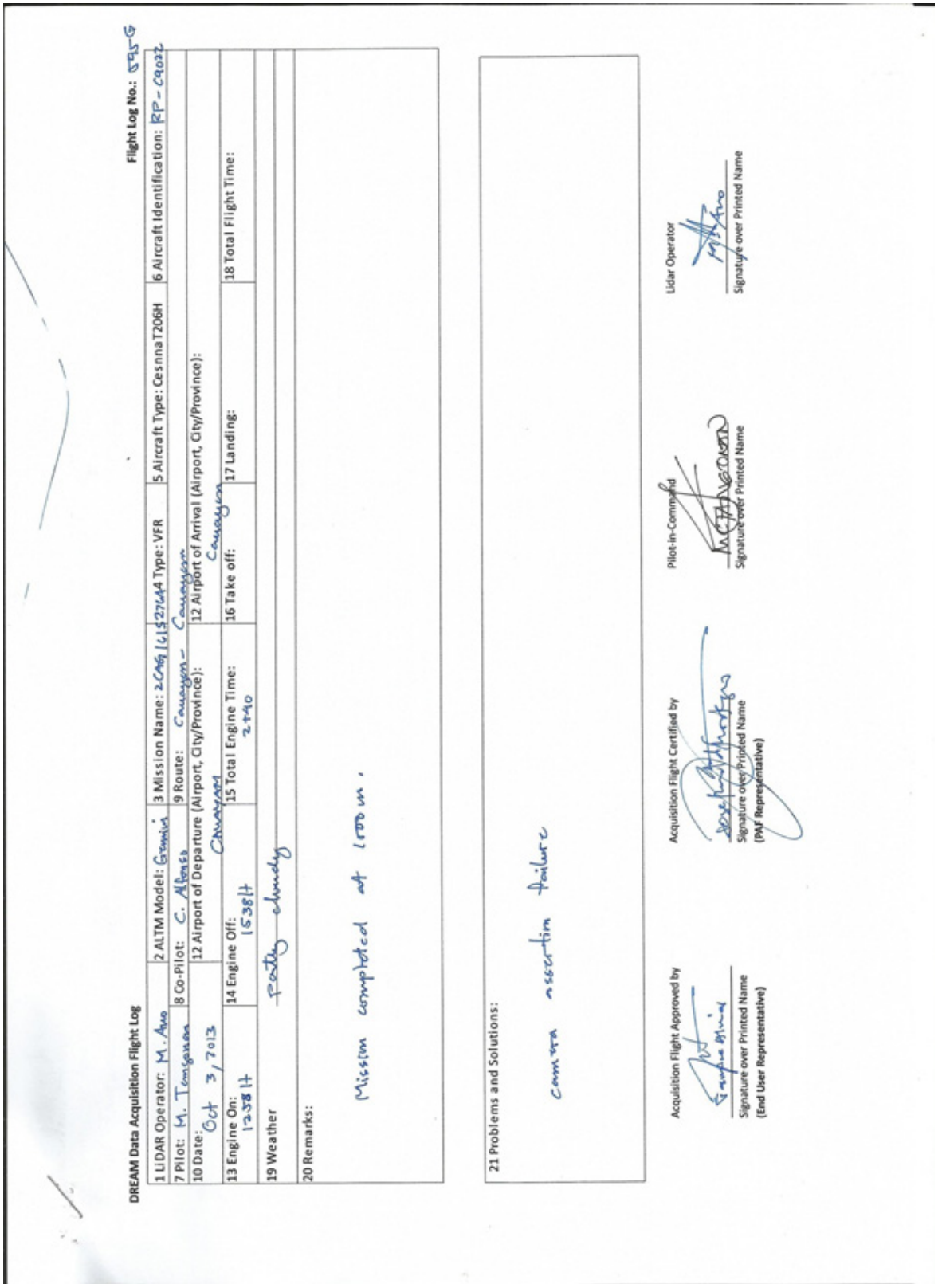
Signature over Printed Name

Pilot-in-Command

Signature over Printed Name

Annex E

73. Flight Log for 2CAG161S276A Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 595G

1 LIDAR Operator: M. Ayo	2 ALTM Model: Gemini	3 Mission Name: 2CAG161S276A Type: VFR	5 Aircraft Type: Cessna T206H	6 Aircraft Identification: RP-C9032
7 Pilot: M. Tongson	8 Co-Pilot: C. Abanes	9 Route: Cauayan – Cauayan		
10 Date: Oct 3, 2013	12 Airport of Departure (Airport, City/Province): Cauayan		12 Airport of Arrival (Airport, City/Province): Cauayan	
13 Engine On: 1238H	14 Engine Off: 1538H	15 Total Engine Time: 2.40	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather	Partly cloudy			

20 Remarks:

Mission completed at 1500 H.

21 Problems and Solutions:

camera rejection failure

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

Signature over Printed Name
(PMF Representative)

Pilot-in-Command

Signature over Printed Name

Lidar Operator

Signature over Printed Name

Annex E

74. Flight Log for 2CAG161HS277A Mission

DREAM Data Acquisition Flight Log — Flight Log No.: 5976

2CAGHS277A

1 LiDAR Operator: Pearl Mars	2 ALTM Model: Gemini	3 Mission Name: 2CAGHS277A	4 Type: VFR	5 Aircraft Type: Cesnna T206H	6 Aircraft Identification: 9022
7 Pilot: N. Tangonan	8 Co-Pilot: C. Alfonso	9 Route: Cauayan City			
10 Date: 19/4/13	12 Airport of Departure (Airport, City/Province): Cauayan Airport		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 0934	14 Engine Off: 1349	15 Total Engine Time: 4+10	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather	windy				

20 Remarks:

Camera ok - flight Conducted / Completed @ 750m
Laser ok
no digitizer

21 Problems and Solutions:

~~Camera ok~~

Acquisition Flight Approved by	Acquisition Flight Certified by	Pilot-in-Command	Lidar Operator
V. Alvarez		N.C. Tangonan	Pearl Mars
Signature over Printed Name (End User Representative)	Signature over Printed Name (PAF Representative)	Signature over Printed Name	Signature over Printed Name

Annex E

75. Flight Log for 2CAG161NO281A Mission

DREAM Data Acquisition Flight Log — **Flight Log No.:** 613G

1 LiDAR Operator: Mary	2 ALTM Model: Gemini	3 Mission Name: 2CAG161NO281A	4 Type: VFR	5 Aircraft Type: CesnnaT206H	6 Aircraft Identification: 9072
7 Pilot: N. Tayson	8 Co-Pilot: G. Alfonso	9 Route:			
10 Date: Oct 8, 2013	12 Airport of Departure (Airport, City/Province): Cauayan		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 0856	14 Engine Off: 1256	15 Total Engine Time: 4+00	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather	Sunny / cloudy				

20 Remarks:

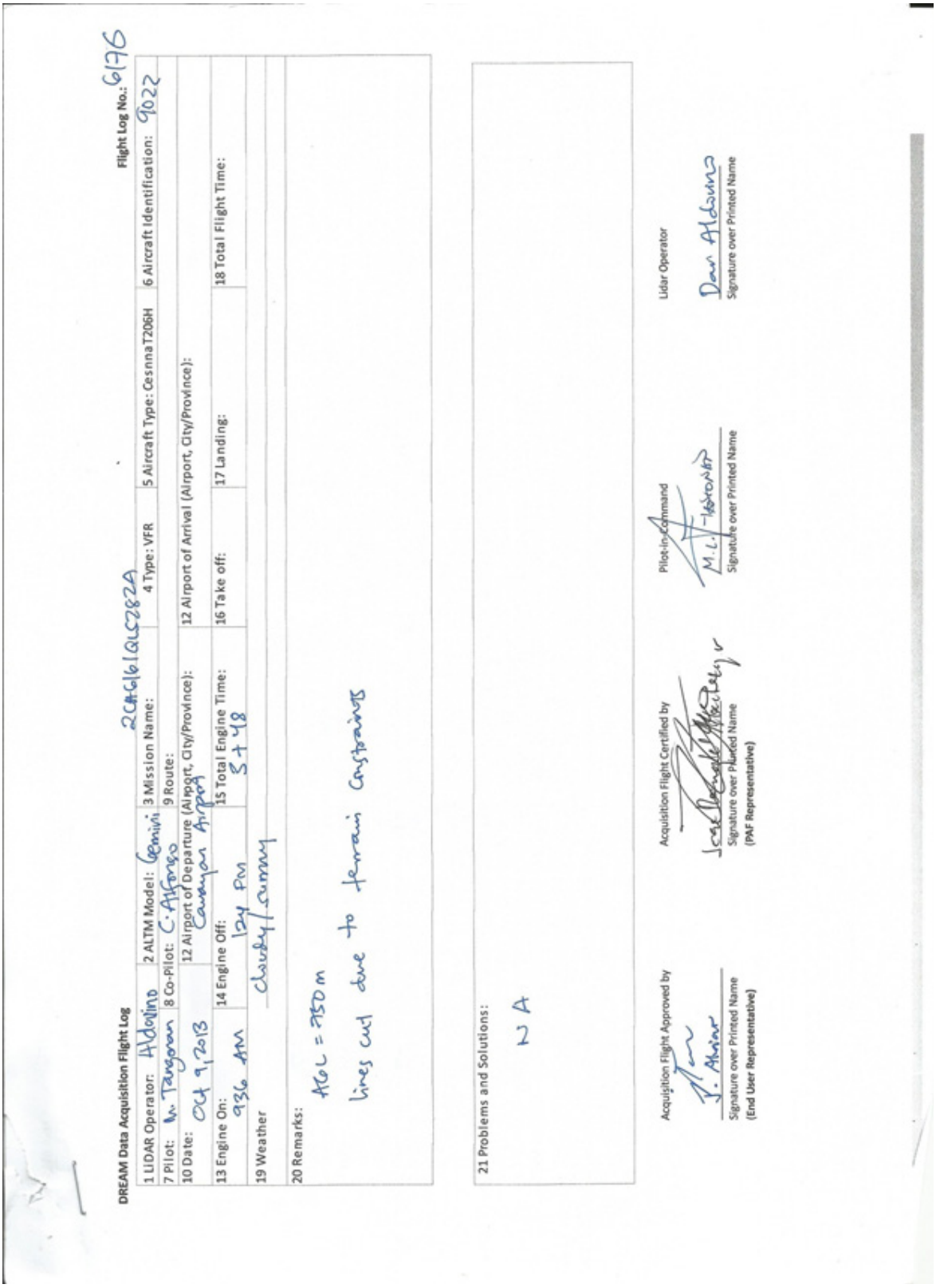
was not able to gather static data due to dmp) engine shut off. Sys. fit/retrofitting Camera ...

21 Problems and Solutions:

Acquisition Flight Approved by	Acquisition Flight Certified by	Pilot-in-Command	Lidar Operator
J. Alviar		M.C. Tangonan	
Signature over Printed Name (End User Representative)	Signature over Printed Name (PAF Representative)	Signature over Printed Name	Signature over Printed Name

Annex E

76. Flight Log for 2CAG161QLS282A Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 0176

1 LiDAR Operator: Aldrino	2 ALTM Model: Gemini	3 Mission Name: 2CAG161QLS282A	4 Type: VFR	5 Aircraft Type: CessnaT206H	6 Aircraft Identification: 9022
7 Pilot: W. Tangonan	8 Co-Pilot: C. Alfonso	9 Route:		
10 Date: Oct 9, 2018	12 Airport of Departure (Airport, City/Province): Cauayan Airport		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 9:36 AM	14 Engine Off: 12:14 PM	15 Total Engine Time: 2+48	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather: cloudy/sunny					

20 Remarks:

AGL = 750 m

lines cut due to terrain constraints

21 Problems and Solutions:

N A

Acquisition Flight Approved by

J. Alviar

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

Signature over Printed Name
(PAF Representative)

Pilot-in-Command

Signature over Printed Name

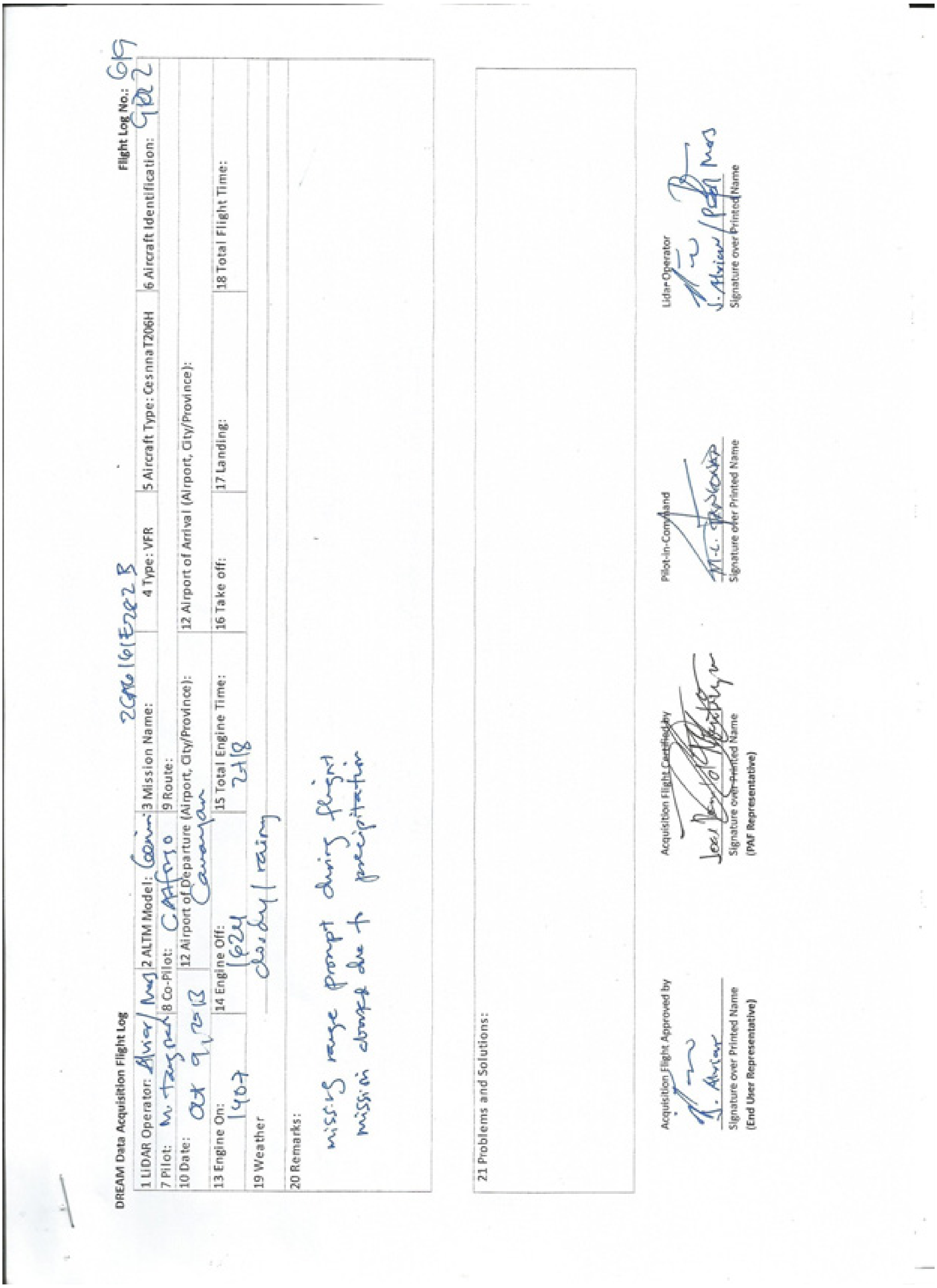
Lidar Operator

Dan Aldrino

Signature over Printed Name

Annex E

77. Flight Log for 2CAG161E282B Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 65

1 LIDAR Operator: Alviar / Mag	2 ALTM Model: Gemini	3 Mission Name: 2CAG161E282B	4 Type: VFR	5 Aircraft Type: Cesnna T206H
6 Aircraft Identification: 9122	7 Pilot: M. Tangonan	8 Co-Pilot: C. Alfonso	9 Route:	
10 Date: Oct 9, 2013	12 Airport of Departure (Airport, City/Province): Cauayan	12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 1407	14 Engine Off: 1624	15 Total Engine Time: 2+18	16 Take off:	17 Landing:
18 Total Flight Time:				
19 Weather: cloudy / rainy				

20 Remarks:

missing range prompt during flight
mission aborted due to precipitation

21 Problems and Solutions:

Acquisition Flight Approved by: J. Alviar — Signature over Printed Name (End User Representative)

Acquisition Flight Certified by: Signature over Printed Name (PAF Representative)

Pilot-in-Command: M.C. Tangonan — Signature over Printed Name

Lidar Operator: J. Alviar / P. Mag — Signature over Printed Name

Annex E

78. Flight Log for 2CAG161CD286A Mission

DREAM Data Acquisition Flight Log

Flight Log No.: C356

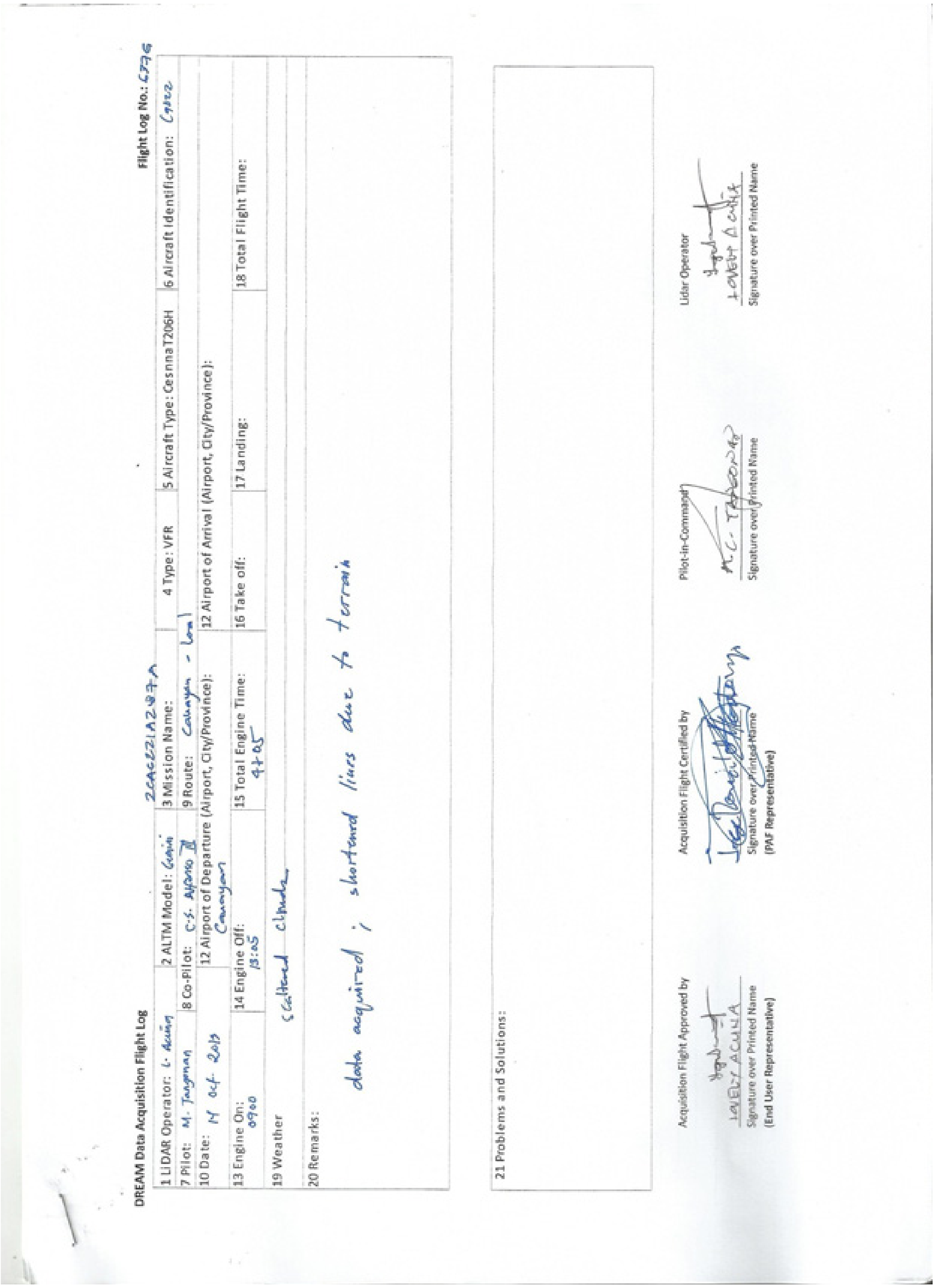
1 LiDAR Operator: L. Acuña, V. Tonga	2 ALTM Model: Gemini	3 Mission Name: 2CAG161CD286A	4 Type: VFR	5 Aircraft Type: CesnnaT206H	6 Aircraft Identification: C9022
7 Pilot: M. Tangonan	8 Co-Pilot: C.S. Alfonso III	9 Route:			
10 Date: 13 Oct. 2013	12 Airport of Departure (Airport, City/Province): Cauayan		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 1122H	14 Engine Off: 1458H	15 Total Engine Time: 3+36	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather					
20 Remarks: Scattered clouds Data acquired but lines 1-7 were not finished					

21 Problems and Solutions:

Acquisition Flight Approved by	Acquisition Flight Certified by	Pilot-in-Command	Lidar Operator
Loreit Acuña	Jose Ronald ...	M.C. Tangonan	Joleit Acuña
Signature over Printed Name (End User Representative)	Signature over Printed Name (PAF Representative)	Signature over Printed Name	Signature over Printed Name

Annex E

79. Flight Log for 2CAG221A287A Mission


DREAM Data Acquisition Flight Log

Flight Log No.: 6776

1 LiDAR Operator: L. Acuña	2 ALTM Model: Gemini	3 Mission Name: 2CAG221A287A	4 Type: VFR	5 Aircraft Type: CesnnaT206H	6 Aircraft Identification: C9022
7 Pilot: M. Tangonan	8 Co-Pilot: C.S. Alfonso II	9 Route: Cauayan - local			
10 Date: 14 Oct. 2013	12 Airport of Departure (Airport, City/Province): Cauayan		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 0900	14 Engine Off: 13:05	15 Total Engine Time: 4+05	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather: scattered clouds					

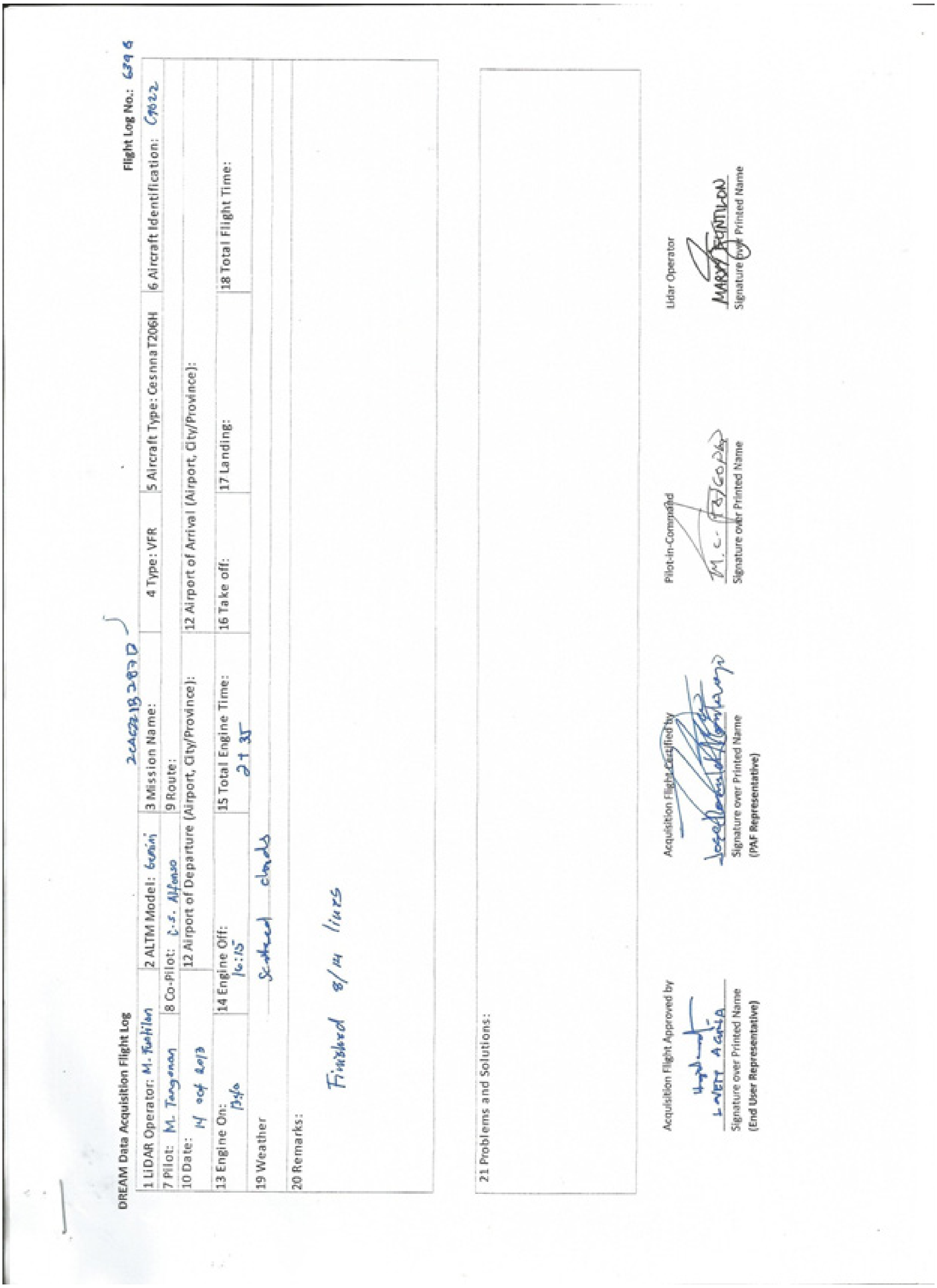
20 Remarks:

data acquired ; shortened lines due to terrain

21 Problems and Solutions:

Acquisition Flight Approved by	Acquisition Flight Certified by	Pilot-in-Command	Lidar Operator
LOVELY ACUÑA		M.C. TANGONAN	LOVELY ACUÑA
Signature over Printed Name (End User Representative)	Signature over Printed Name (PAF Representative)	Signature over Printed Name	Signature over Printed Name

80. Flight Log for 2CAG221B287B Mission



DREAM Data Acquisition Flight Log — Flight Log No.: 6395

1 LiDAR Operator: M. Rubilan	2 ALTM Model: Gemini	3 Mission Name: 2CAG221B287B	4 Type: VFR	5 Aircraft Type: Cesnna T206H	6 Aircraft Identification: C9022
7 Pilot: M. Tangonan	8 Co-Pilot: J.S. Alfonso	9 Route:			
10 Date: 14 Oct 2013	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 13:40	14 Engine Off: 16:15	15 Total Engine Time: 2+35	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather: Scattered clouds					
20 Remarks: Finished 8/14 lines					

21 Problems and Solutions:

Acquisition Flight Approved by — Signature over Printed Name (End User Representative)

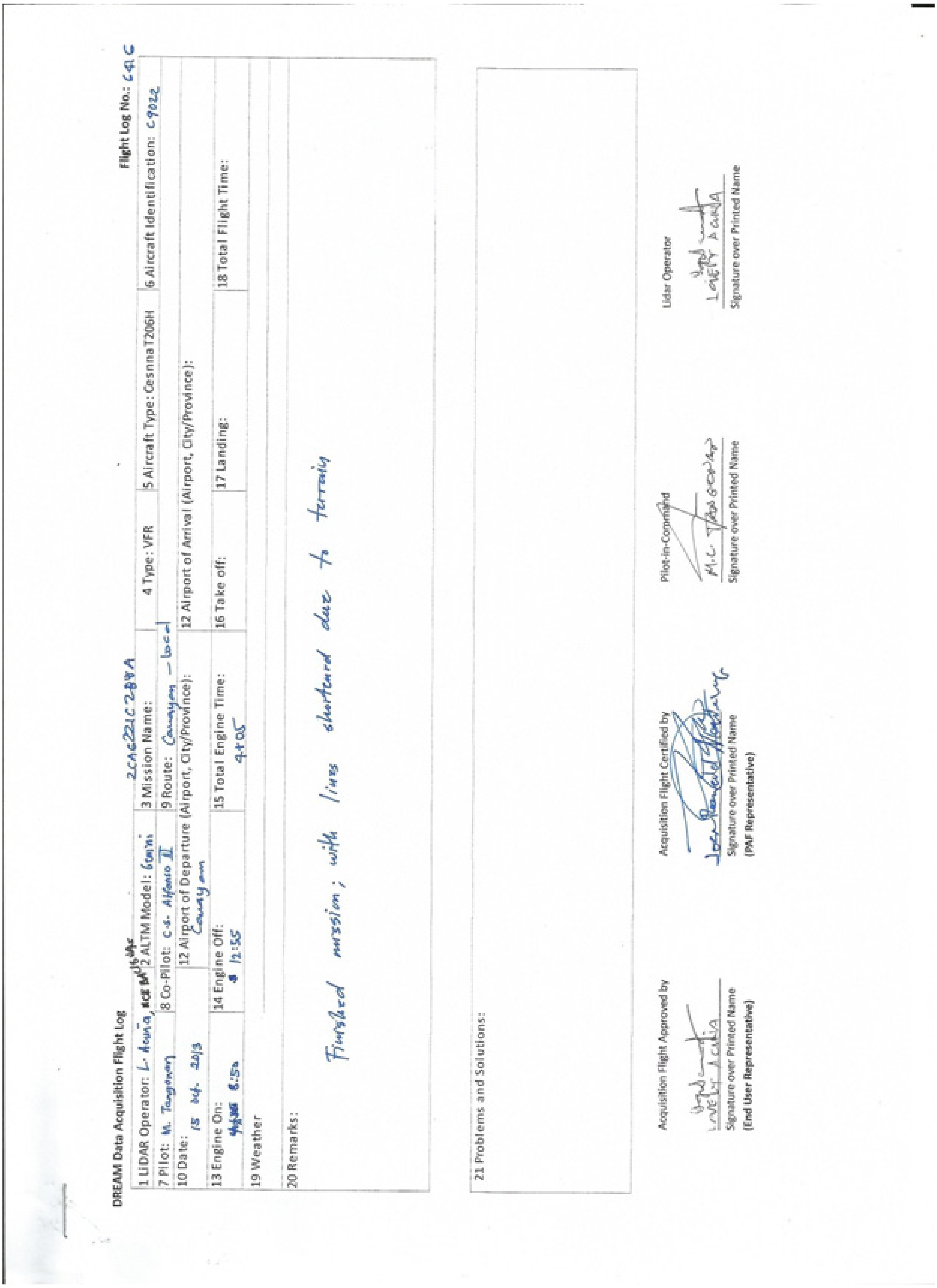
Acquisition Flight Certified by — Signature over Printed Name (PAF Representative)

Pilot-in-Command — Signature over Printed Name

Lidar Operator — Signature over Printed Name

Annex E

81. Flight Log for 2CAG221C288A Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 641G

1 LiDAR Operator: L. Acuña, [illegible]	2 ALTM Model: Gemini	3 Mission Name: 2CAG221C288A	4 Type: VFR	5 Aircraft Type: CesnnaT206H	6 Aircraft Identification: C9022
7 Pilot: M. Tangonan	8 Co-Pilot: C.S. Alfonso II	9 Route: Cauayan – local			
10 Date: 15 Oct. 2013	12 Airport of Departure (Airport, City/Province): Cauayan		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: [illegible] 8:50	14 Engine Off: [illegible] 12:55	15 Total Engine Time: 4+05	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather					

20 Remarks:

Finished mission; with lines shortened due to terrain

21 Problems and Solutions:

Acquisition Flight Approved by
[signature] Lovely Acuña
Signature over Printed Name
(End User Representative)

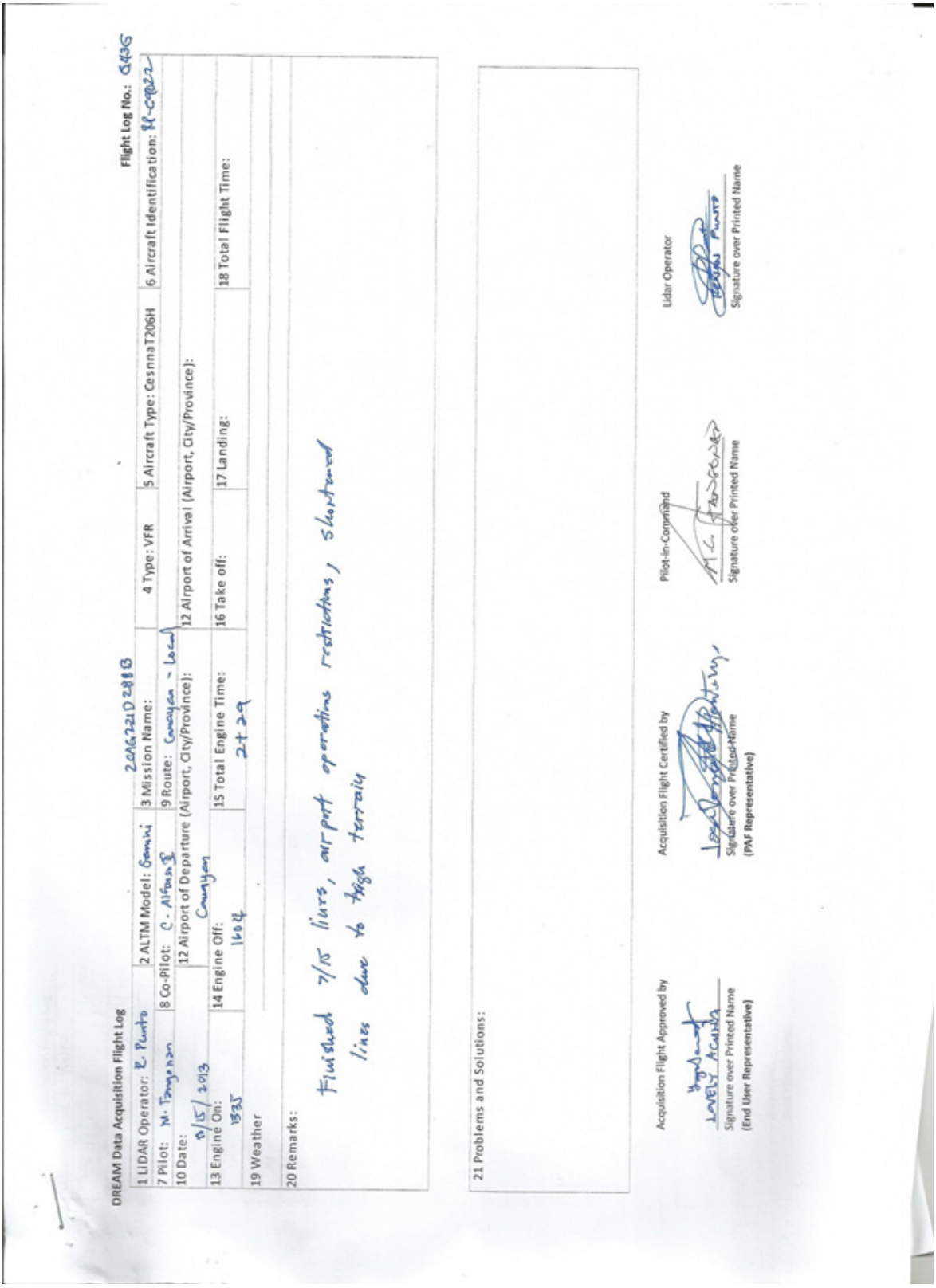
Acquisition Flight Certified by
[signature]
Signature over Printed Name
(PAF Representative)

Pilot-in-Command
[signature] M.C. Tangonan
Signature over Printed Name

Lidar Operator
[signature] Lovely Acuña
Signature over Printed Name

Annex E

82. Flight Log for 2CAG221D288B Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 0436

2CAG221D288B

1 LIDAR Operator: E. Punto	2 ALTM Model: Gemini	3 Mission Name:	4 Type: VFR	5 Aircraft Type: Cessna T206H	6 Aircraft Identification: RP-C9022
7 Pilot: M. Tangonan	8 Co-Pilot: C. Alfonso	9 Route: Cauayan - local			
10 Date: 9/15/2023	11 Airport of Departure (Airport, City/Province): Cauayan		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 1335	14 Engine Off: 1604	15 Total Engine Time: 2+29	16 Take off:	17 Landing:	18 Total Flight Time:

19 Weather

20 Remarks:

Finished 7/15 lines, airport operations restrictions, shortened lines due to high terrain

21 Problems and Solutions:

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

Signature over Printed Name
(PAF Representative)

Pilot-in-Command

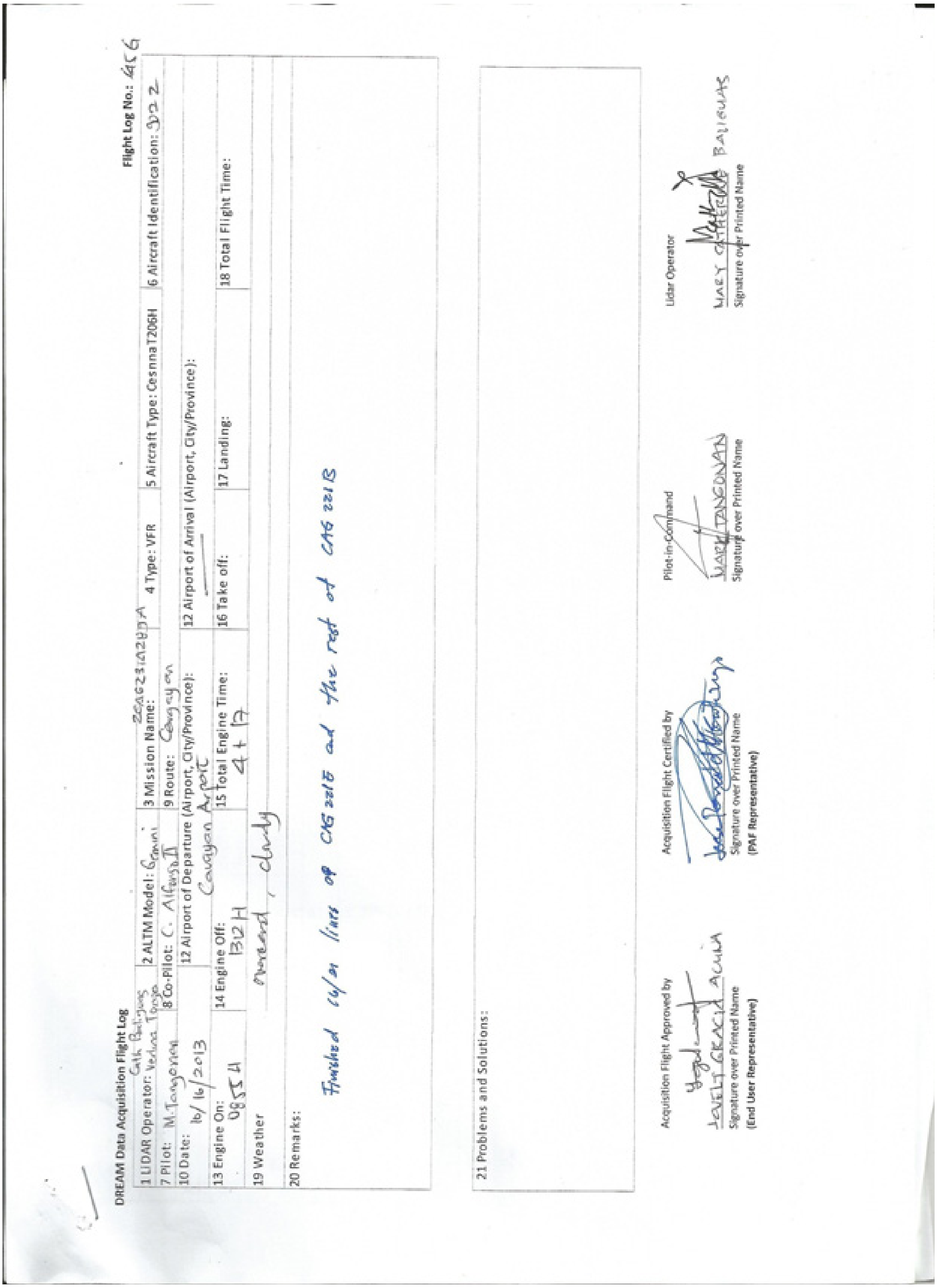
Signature over Printed Name

Lidar Operator

Signature over Printed Name

Annex E

83. Flight Log for 2CAG231A289A Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 456

1 LIDAR Operator: Cath Baliguas, Verlina Tonga	2 ALTM Model: Gemini	3 Mission Name: 2CAG231A289A	4 Type: VFR	5 Aircraft Type: CesnnaT206H	6 Aircraft Identification: 9022
7 Pilot: M. Tangonan	8 Co-Pilot: C. Alfonso II	9 Route: Cauayan			
10 Date: 10/16/2013	12 Airport of Departure (Airport, City/Province): Cauayan Airport		12 Airport of Arrival (Airport, City/Province): —		
13 Engine On: 0855 H	14 Engine Off: 1312 H	15 Total Engine Time: 4+17	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather: overcast, cloudy					

20 Remarks:

Finished 14/24 lines of CAG 231B and the rest of CAG 231B

21 Problems and Solutions:

Acquisition Flight Approved by: JOVELYN GRACIA ACUÑA — Signature over Printed Name (End User Representative)

Acquisition Flight Certified by: Signature over Printed Name (PAF Representative)

Pilot-in-Command: MARK TANGONAN — Signature over Printed Name

Lidar Operator: MARY CATHERINE BALIGUAS — Signature over Printed Name

Annex E

84. Flight Log for 2CAG221EBS290A Mission

DREAM Data Acquisition Flight Log

Flight Log No.: 6496

1 LIDAR Operator: L. Acorin, V. Tonga	2 ALTM Model: Gemini	3 Mission Name: 2CAG221EBS290A	4 Type: VFR	5 Aircraft Type: CesnnaT206H	6 Aircraft Identification: 9022
7 Pilot:	8 Co-Pilot:	9 Route:			
10 Date: Oct. 17, 2013	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 0900	14 Engine Off: 1323	15 Total Engine Time: 4+23	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather: cloudy with precipitation					
20 Remarks: Finished 12/15 lines of CAG 221E and the rest of CAG 221B					
21 Problems and Solutions:					

Acquisition Flight Approved by: Signature over Printed Name (End User Representative)

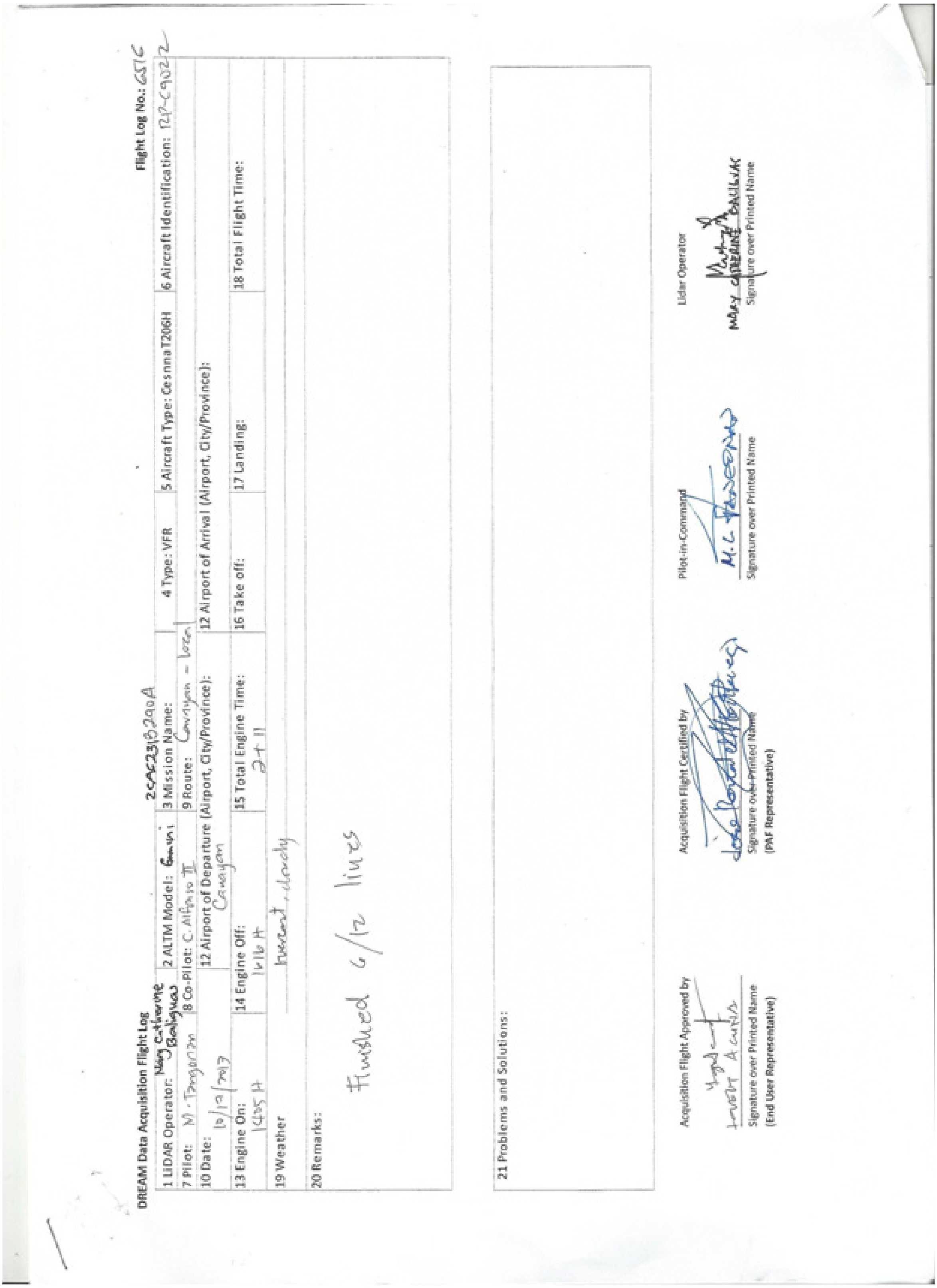
Acquisition Flight Certified by: Signature over Printed Name (PAF Representative)

Pilot-in-Command: Signature over Printed Name

Lidar Operator: Signature over Printed Name

Annex E

85. Flight Log for 2CAG231B290B Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 6576

1 LiDAR Operator: Mary Catherine Baligua	2 ALTM Model: Gemini	3 Mission Name: 2CAG231B290A	4 Type: VFR	5 Aircraft Type: Cesnna T206H	6 Aircraft Identification: RP-C9022
7 Pilot: M. Tangonan	8 Co-Pilot: C. Alfonso II	9 Route: Cauayan - local			
10 Date: 10/17/2013	12 Airport of Departure (Airport, City/Province): Cauayan		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 1405 H	14 Engine Off: 1616 H	15 Total Engine Time: 2+11	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather	overcast, cloudy				

20 Remarks:

Finished 6/12 lines

21 Problems and Solutions:

Acquisition Flight Approved by — Signature over Printed Name (End User Representative)

Acquisition Flight Certified by — Signature over Printed Name (PAF Representative)

Pilot-in-Command — M. C. Tangonan — Signature over Printed Name

Lidar Operator — Mary Catherine Baligua — Signature over Printed Name

Annex E

86. Flight Log for 2CAG231D291A Mission

DREAM Data Acquisition Flight Log

Flight Log No.: 6539

1 LiDAR Operator: R. Punto	2 ALTM Model: Gemini	3 Mission Name: 2CAG231D291A	4 Type: VFR	5 Aircraft Type: Cesnna T206H	6 Aircraft Identification: RP-C9022
7 Pilot: M. Tangonan	8 Co-Pilot: C. Alfonso II	9 Route: Cauayan - local			
10 Date: 10/18/2013	12 Airport of Departure (Airport, City/Province): Cauayan		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 0855 H	14 Engine Off: 1300 H	15 Total Engine Time: 4+05	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather: Scattered clouds					
20 Remarks: SUCCESSFUL FLIGHT					
21 Problems and Solutions:					

Acquisition Flight Approved by: Lovely Acuna — Signature over Printed Name (End User Representative)

Acquisition Flight Certified by: Signature over Printed Name (PAF Representative)

Pilot-in-Command: M. C. Tangonan — Signature over Printed Name

Lidar Operator: R. Punto — Signature over Printed Name

Annex E

87. Flight Log for 2CAG231BS291B Mission

DREAM Data Acquisition Flight Log

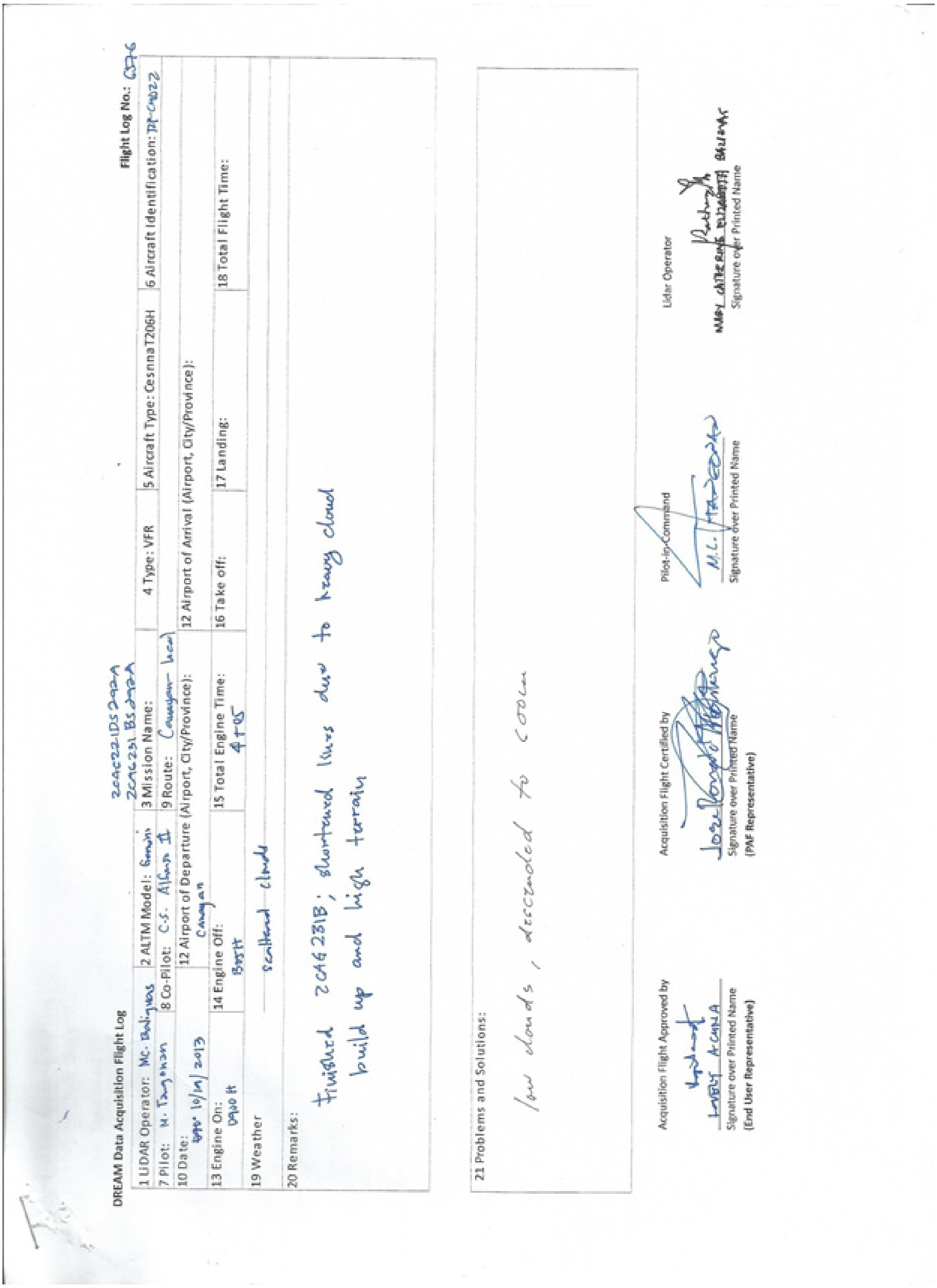
Flight Log No.: 6556

1 LiDAR Operator: M.C. Baligues	2 ALTM Model: Gemini	3 Mission Name: 2CAG231BS291B	4 Type: VFR	5 Aircraft Type: CesnnaT206H	6 Aircraft Identification: RP-C9022
7 Pilot: M. Tangonan	8 Co-Pilot: C. Alfonso II	9 Route: Cauayan - local			
10 Date: 10/18/2013	12 Airport of Departure (Airport, City/Province): Cauayan		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 1345H	14 Engine Off: 1608H	15 Total Engine Time: 2+23	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather: Scattered clouds					
20 Remarks: Finished 5/8 lines					
21 Problems and Solutions:					

Acquisition Flight Approved by	Acquisition Flight Certified by	Pilot-in-Command	Lidar Operator
Lovely Acuna	[illegible]	M.L. Tangonan	MCE Baligues
Signature over Printed Name (End User Representative)	Signature over Printed Name (PAF Representative)	Signature over Printed Name	Signature over Printed Name

Annex E

88. Flight Log for 2CAG221DS292A & 2CAG231BS292A Mission



DREAM Data Acquisition Flight Log — Flight Log No.: 6376

1 LIDAR Operator: MC. Baliguas	2 ALTM Model: Gemini	3 Mission Name: 2CAG221DS292A 2CAG231BS292A	4 Type: VFR	5 Aircraft Type: CesnnaT206H	6 Aircraft Identification: RP-C9022
7 Pilot: N. Tangonan	8 Co-Pilot: C.S. Alfonso II	9 Route: Cauayan - local			
10 Date: Oct 19, 2013	12 Airport of Departure (Airport, City/Province): Cauayan		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 0930 H	14 Engine Off: 1335 H	15 Total Engine Time: 4+05	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather: scattered clouds					
20 Remarks: finished 2CAG231B; shortened lines due to heavy cloud build up and high terrain					
21 Problems and Solutions: low clouds, descended to 600m					

Acquisition Flight Approved by: Lovely Acuña — Signature over Printed Name (End User Representative)

Acquisition Flight Certified by: [illegible] — Signature over Printed Name (PAF Representative)

Pilot-in-Command: [illegible] — Signature over Printed Name

Lidar Operator: Mary Catherine Elizabeth Baliguas — Signature over Printed Name

Annex E

89. Flight Log for 2CAG161BC294A Mission

DREAM Data Acquisition Flight Log

Flight Log No.: 6696

1 LIDAR Operator: V. TONGA	2 ALTM Model: GEM	3 Mission Name: 2CAG161BC294A	4 Type: VFR	5 Aircraft Type: CesnnaT206H	6 Aircraft Identification: C9022
7 Pilot: M. TANGONAN	8 Co-Pilot: C. ALFONSO III	9 Route:			
10 Date: Oct. 21, 2018	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 1240	14 Engine Off: 1551	15 Total Engine Time: 3+11	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather					

20 Remarks:

Surveyed 7/14 lines then ferry from Camayao to Tuguegarao

21 Problems and Solutions:

Acquisition Flight Approved by — Signature over Printed Name (End User Representative)

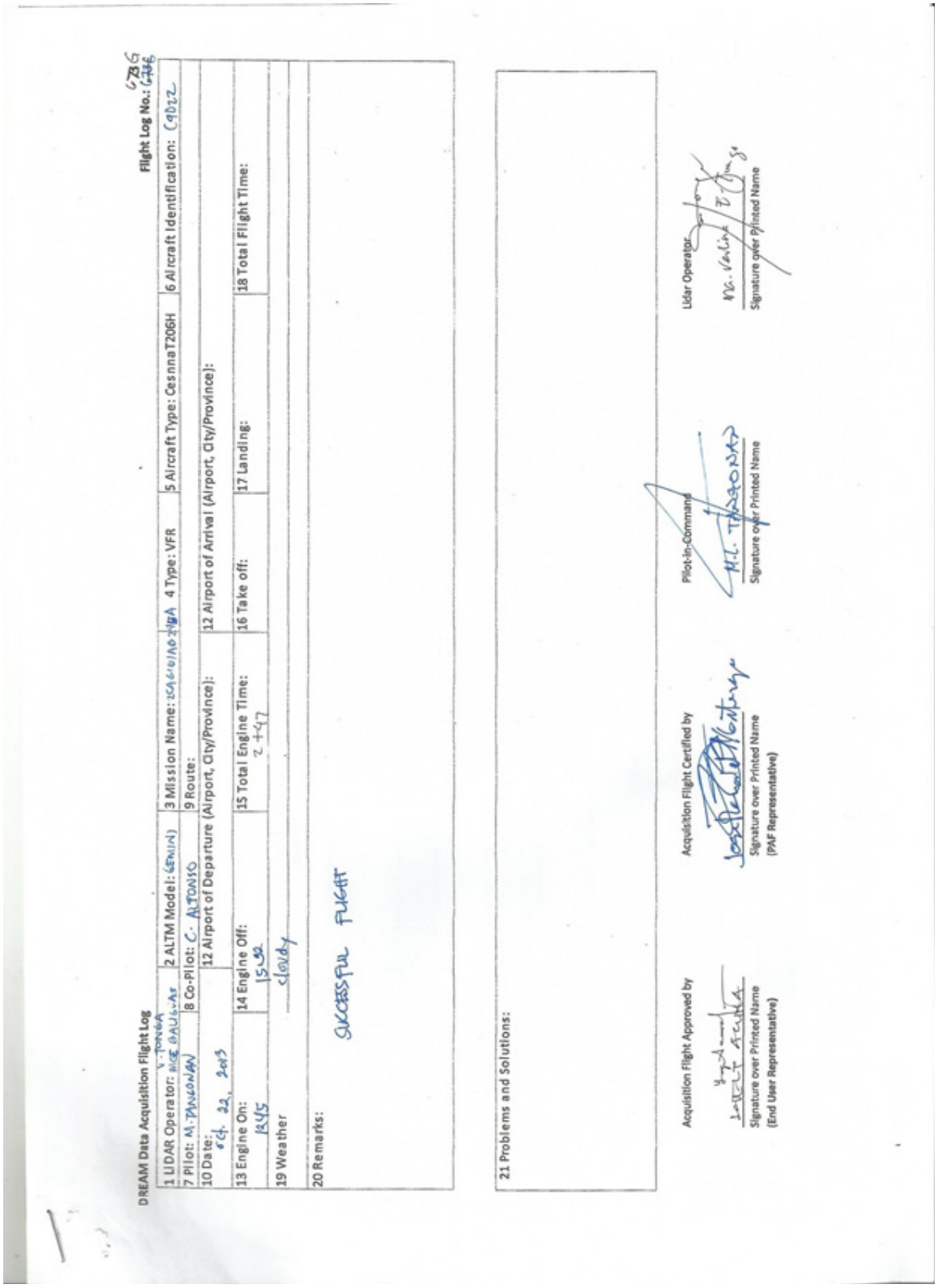
Acquisition Flight Certified by — Signature over Printed Name (PAF Representative)

Pilot-in-Command — M.L. TANGONAN — Signature over Printed Name

Lidar Operator — Ma. Verlina E. Tonga — Signature over Printed Name

Annex E

90. Flight Log for 2CAG161AB295A Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 736

1 LIDAR Operator: V. TONGAY	2 ALTM Model: GEMINI	3 Mission Name: 2CAG161AB295A	4 Type: VFR	5 Aircraft Type: Cessna T206H	6 Aircraft Identification: 9022
7 Pilot: M. TANGONAN	8 Co-Pilot: C. ALTONIO	9 Route:			
10 Date: Oct. 22, 2015	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 1545	14 Engine Off: 1552	15 Total Engine Time: 2+47	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather: cloudy					

20 Remarks: SUCCESSFUL FLIGHT

21 Problems and Solutions:

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

Signature over Printed Name
(PAF Representative)

Pilot-In-Command

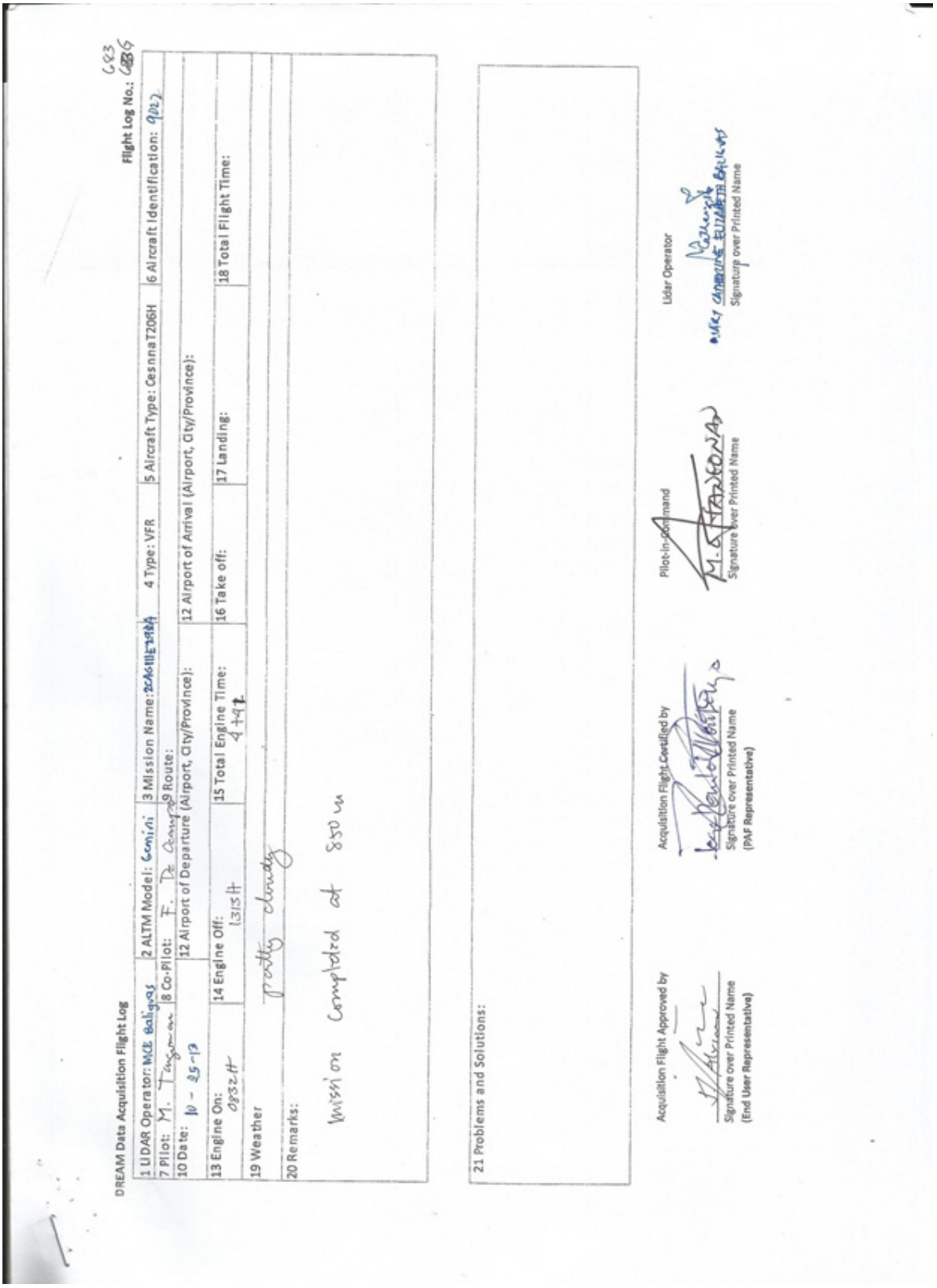
Signature over Printed Name

Lidar Operator

Signature over Printed Name

Annex E

91. Flight Log for 2CAG111E298A Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 083

1 LIDAR Operator: MDE Baligod	2 ALTM Model: Gemini	3 Mission Name: 2CAG111E298A	4 Type: VFR
5 Aircraft Type: Cessna T206H	6 Aircraft Identification: 9022		
7 Pilot: M. Tagunicar	8 Co-Pilot: F. De Castro	9 Route:	
10 Date: 10 - 25 - 13	11 Airport of Departure (Airport, City/Province):	12 Airport of Arrival (Airport, City/Province):	
13 Engine On: 0932H	14 Engine Off: 1315H	15 Total Engine Time: 4+41	16 Take off:
17 Landing:	18 Total Flight Time:		
19 Weather: pretty cloudy			
20 Remarks: Mission Completed at 850 m			
21 Problems and Solutions:			

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

Signature over Printed Name
(PAF Representative)

Pilot-in-Command

Signature over Printed Name

Lidar Operator

Signature over Printed Name

Annex E

92. Flight Log for 2CAG111D298B Mission

Flight Log No.: 6556

DREAM Data Acquisition Flight Log

1 LIDAR Operator: I. ROXAS | 2 ALTM Model: Gemini | 3 Mission Name: 2CAG111D298B | 4 Type: VFR | 5 Aircraft Type: Cesnna T206H | 6 Aircraft Identification: 9022

7 Pilot: M. Tangonan | 8 Co-Pilot: | 9 Route:

10 Date: 10-25-13 | 12 Airport of Departure (Airport, City/Province): | 12 Airport of Arrival (Airport, City/Province):

13 Engine On: 1413 H | 14 Engine Off: 1618 H | 15 Total Engine Time: 2+05 | 16 Take off: | 17 Landing: | 18 Total Flight Time:

19 Weather: partly cloudy

20 Remarks: Surveyed at 850m; camera assertion failed

21 Problems and Solutions:

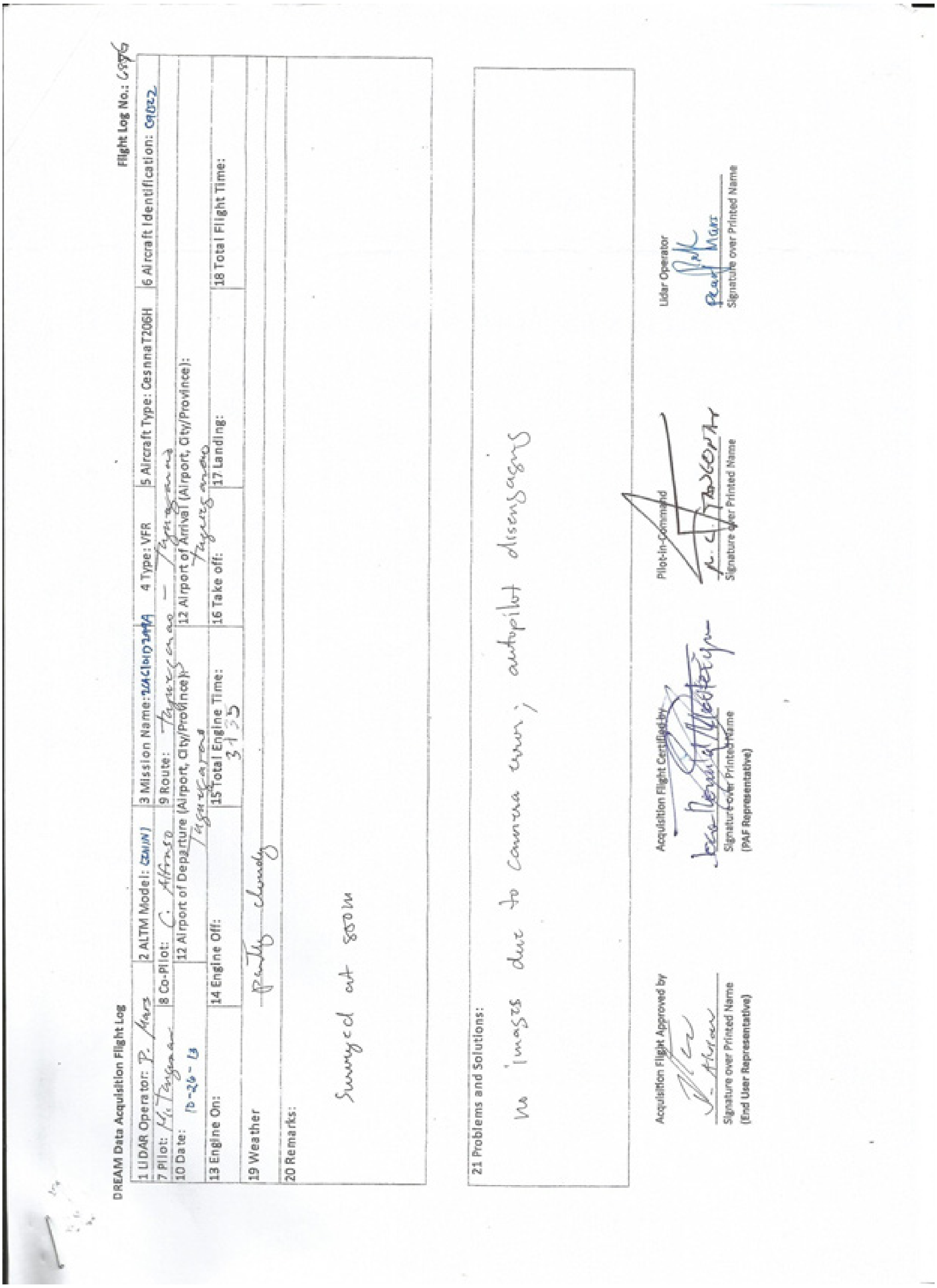
Acquisition Flight Approved by: J. Alviar — Signature over Printed Name (End User Representative)

Acquisition Flight Certified by: Jose Rowel Montenegro — Signature over Printed Name (PAF Representative)

Pilot-in-Command: M. C. Tangonan — Signature over Printed Name

Lidar Operator: I. Roxas — Signature over Printed Name

93. Flight Log for 2CAG101D299A Mission



DREAM Data Acquisition Flight Log

Flight Log No.: [illegible]

1 LIDAR Operator: P. Mars	2 ALTM Model: Gemini	3 Mission Name: 2CAG101D299A	4 Type: VFR	5 Aircraft Type: Cessna T206H	6 Aircraft Identification: 9022
7 Pilot: M. Tangonan	8 Co-Pilot: C. Alfonso	9 Route: Tuguegarao – Tuguegarao			
10 Date: 10-26-13	12 Airport of Departure (Airport, City/Province): Tuguegarao		12 Airport of Arrival (Airport, City/Province): Tuguegarao		
13 Engine On:	14 Engine Off:	15 Total Engine Time: 3+35	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather: Partly cloudy					
20 Remarks: Surveyed at 800m					

21 Problems and Solutions:

No images due to camera error; autopilot disengages

Acquisition Flight Approved by — Signature over Printed Name (End User Representative)

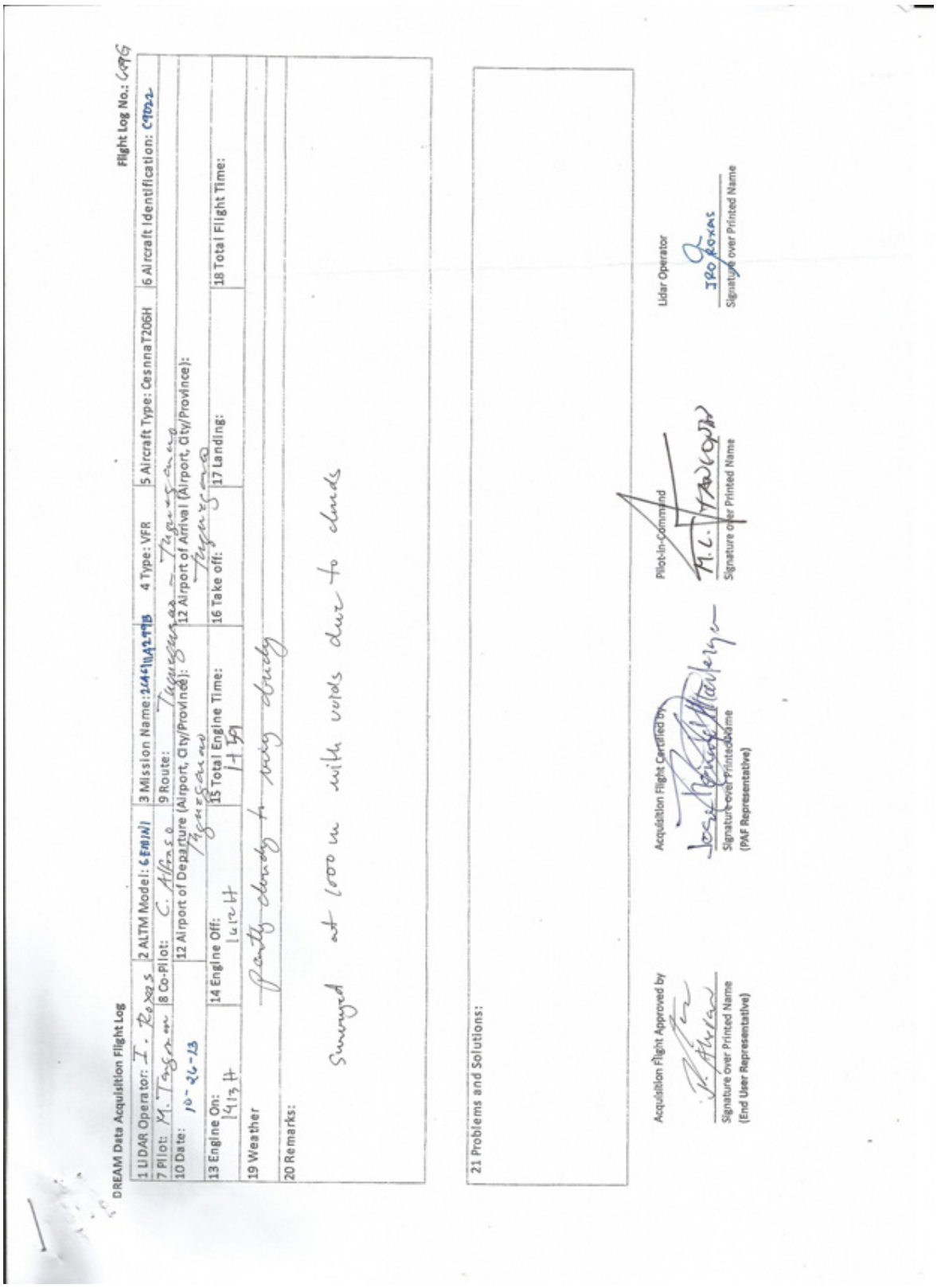
Acquisition Flight Certified by — Signature over Printed Name (PAF Representative)

Pilot-in-Command — Signature over Printed Name

Lidar Operator — Pearl Mars — Signature over Printed Name

Annex E

94. Flight Log for 2CAG111A299B Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 0096

1 LIDAR Operator: I. Rojas	2 ALTM Model: 6 EMIMI	3 Mission Name: 2CAG111A299B	4 Type: VFR	5 Aircraft Type: Cessna T206H	6 Aircraft Identification: CFDSZ
7 Pilot: M. Tagaan	8 Co-Pilot: C. Alfonso	9 Route: Tuguegarao – Tuguegarao			
10 Date: 10-26-13	11 Airport of Departure (Airport, City/Province): Tuguegarao		12 Airport of Arrival (Airport, City/Province): Tuguegarao		
13 Engine On: 1413 H	14 Engine Off: 1612 H	15 Total Engine Time: 1+59	16 Take off: Tuguegarao	17 Landing: Tuguegarao	18 Total Flight Time:
19 Weather: partly cloudy to rainy cloudy					
20 Remarks: Surveyed at 1000 m with voids due to clouds					
21 Problems and Solutions:					

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

Signature over Printed Name
(PAF Representative)

Pilot-in-Command

Signature over Printed Name

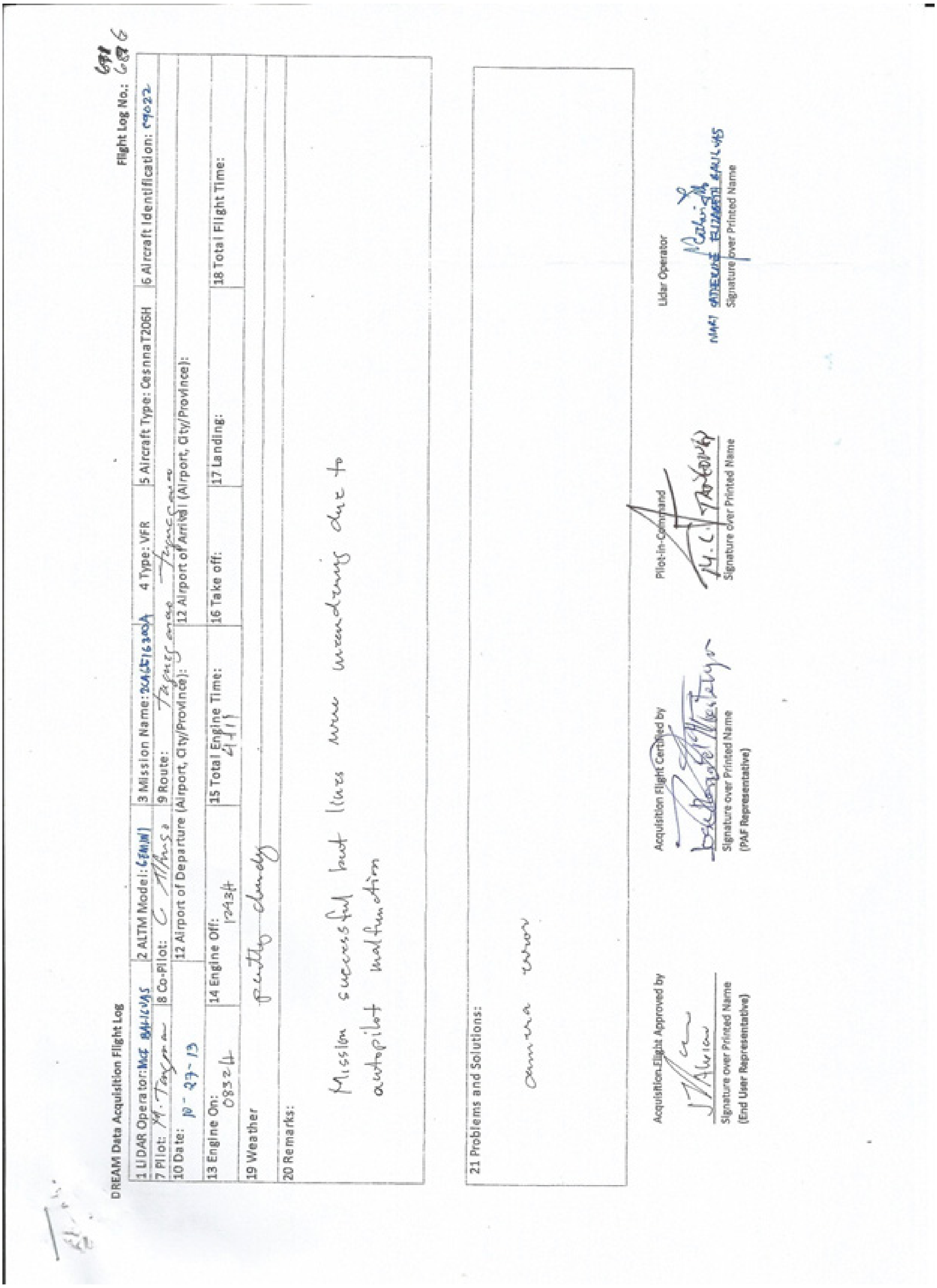
Lidar Operator

IRO ROJAS

Signature over Printed Name

Annex E

95. Flight Log for 2CAG51G300A Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 6896

1 LiDAR Operator: MCE BALICUAS	2 ALTM Model: GEMINI	3 Mission Name: 2CAG51G300A	4 Type: VFR	5 Aircraft Type: CesnnaT206H	6 Aircraft Identification: 9022
7 Pilot: M. Tangonan	8 Co-Pilot: C. Alfonso	9 Route: Tuguegarao - Tuguegarao			
10 Date: 10-27-13	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 0832H	14 Engine Off: 1243H	15 Total Engine Time: 4+11	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather	partly cloudy				

20 Remarks:

Mission successful but lines were wandering due to autopilot malfunction

21 Problems and Solutions:

camera error

Acquisition Flight Approved by — Signature over Printed Name (End User Representative)

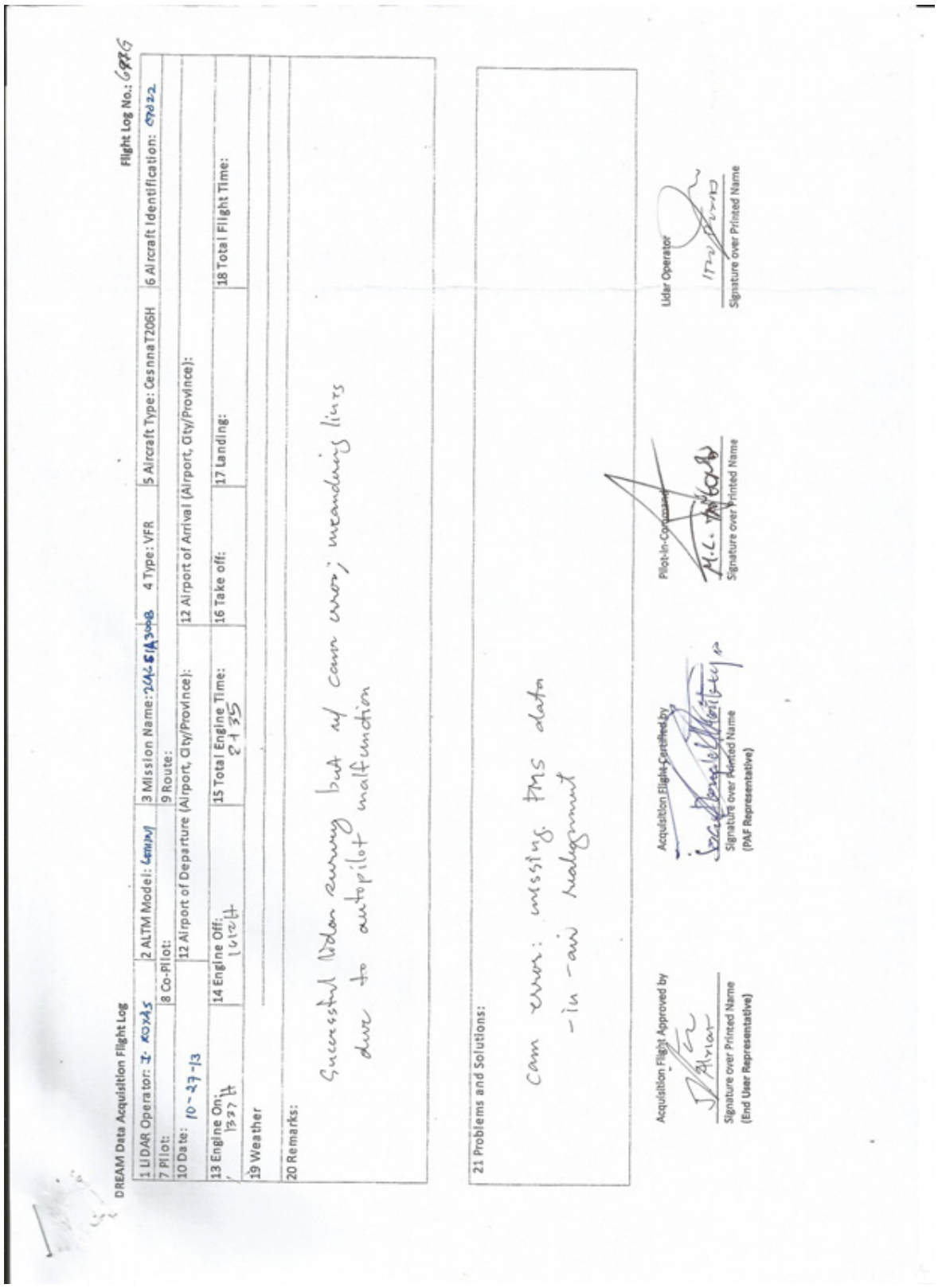
Acquisition Flight Certified by — Signature over Printed Name (PAF Representative)

Pilot-in-Command — Signature over Printed Name

Lidar Operator — Signature over Printed Name

Annex E

96. Flight Log for 2CAG61A300B Mission



DREAM Data Acquisition Flight Log

Flight Log No.: GRG

1 LIDAR Operator: T. KOYAS	2 ALTM Model: Galaxy	3 Mission Name: 2CAG61A300B	4 Type: VFR	5 Aircraft Type: Cessna T206H	6 Aircraft Identification: 6D222
7 Pilot:	8 Co-Pilot:	9 Route:			
10 Date: 10-23-13	11 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 1527	14 Engine Off: 1618	15 Total Engine Time: 2.1	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather					

20 Remarks:

Successful lidar survey but of some overs; meandering lines due to autopilot malfunction

21 Problems and Solutions:

Cam error: missing PMS data
- in-air realignment

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

Signature over Printed Name
(PAF Representative)

Pilot-in-Command

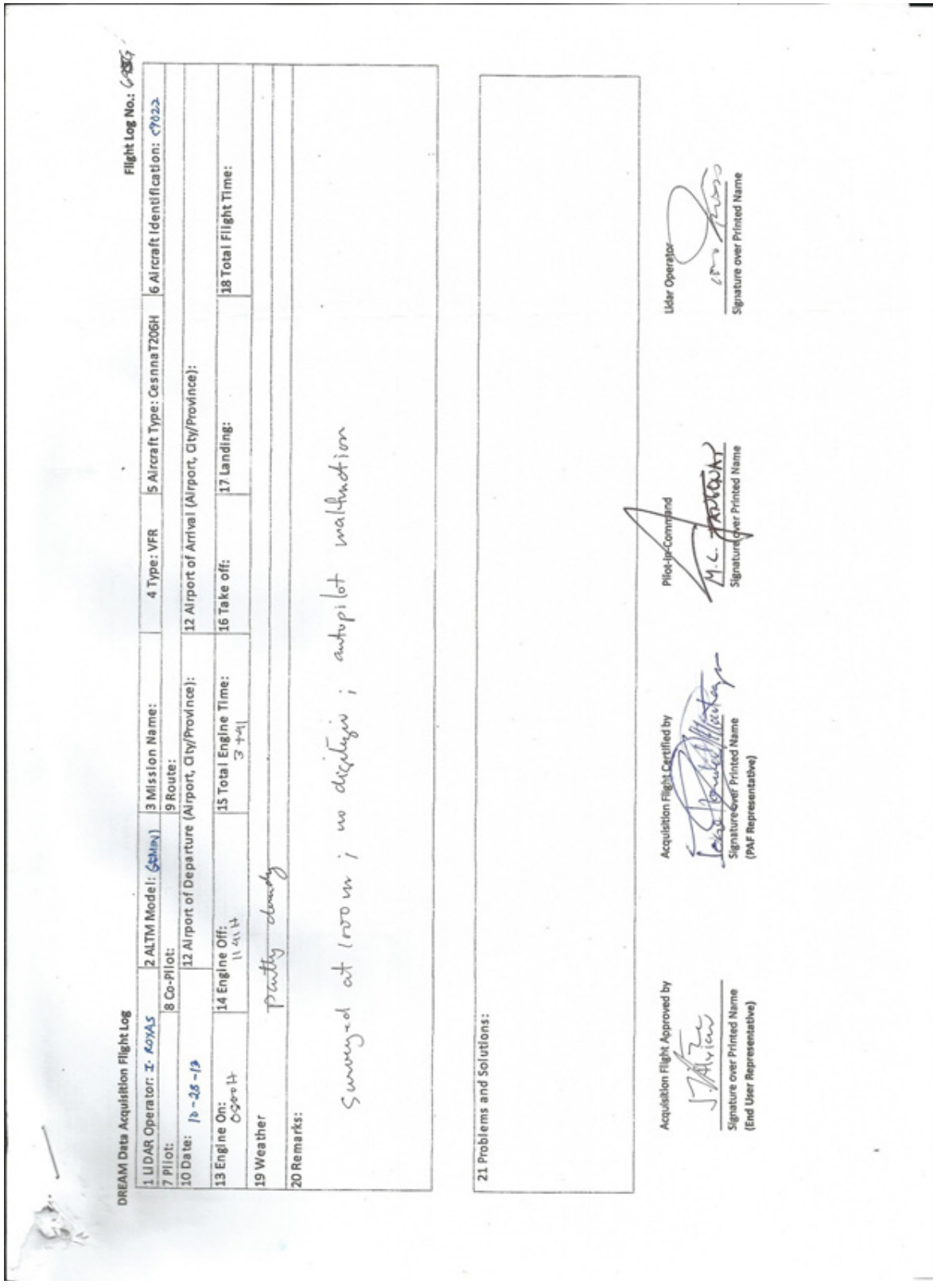
Signature over Printed Name

Lidar Operator

Signature over Printed Name

Annex E

97. Flight Log for 2CAG61D301A Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 0357

1 LIDAR Operator: ASTRAS	2 ALTM Model: GEMINI	3 Mission Name:	4 Type: VFR
5 Aircraft Type: Cessna T206H	6 Aircraft Identification: 7022		
7 Pilot:	8 Co-Pilot:	9 Route:	
10 Date: 19-08-19	12 Airport of Departure (Airport, City/Province):	12 Airport of Arrival (Airport, City/Province):	
13 Engine On: 0900 H	14 Engine Off: 1141 H	15 Total Engine Time: 2+41	16 Take off:
17 Landing:	18 Total Flight Time:		
19 Weather: partly cloudy			

20 Remarks:

Surveyed at 1000 m ; no deviation ; autopilot malfunction

21 Problems and Solutions:

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

Signature over Printed Name
(PAF Representative)

Pilot-in-Command

Signature over Printed Name

Lidar Operator

Signature over Printed Name

Annex E

98. Flight Log for 2CAG51A301B Mission

DREAM Data Acquisition Flight Log

Flight Log No.: 6985

1 LIDAR Operator: P. MARS	2 ALTM Model: GEMINI	3 Mission Name: 2CAG51A301B	4 Type: VFR	5 Aircraft Type: CesnnaT206H	6 Aircraft Identification: C9022
7 Pilot: M.L. TANGONAN	8 Co-Pilot: F.B. DE OCAMPO	9 Route: Tuguegarao – Tuguegarao			
10 Date: 10-28-13	12 Airport of Departure (Airport, City/Province): Tuguegarao		12 Airport of Arrival (Airport, City/Province): Tuguegarao		
13 Engine On: 1256	14 Engine Off: 1607	15 Total Engine Time: 3+11	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather	partly cloudy				

20 Remarks:

Mission completed

21 Problems and Solutions:

Acquisition Flight Approved by	Acquisition Flight Certified by	Pilot-in-Command	Lidar Operator
[illegible]	[illegible]	M.L. TANGONAN	P. MARS
Signature over Printed Name (End User Representative)	Signature over Printed Name (PAF Representative)	Signature over Printed Name	Signature over Printed Name

99. Flight Log for 2CAG61A302A Mission

DREAM Data Acquisition Flight Log

Flight Log No.: 6985

1 LIDAR Operator: P. MARS	2 ALTM Model: GEMINI	3 Mission Name: 2CAG61A30[illegible]	4 Type: VFR	5 Aircraft Type: CesnnaT206H	6 Aircraft Identification: C9022
7 Pilot: M.L. TANGONAN	8 Co-Pilot: F.B. DE OCAMPO	9 Route: Tuguegarao – Tuguegarao			
10 Date: 10-28-13	12 Airport of Departure (Airport, City/Province): Tuguegarao		12 Airport of Arrival (Airport, City/Province): Tuguegarao		
13 Engine On: 1256	14 Engine Off: 1607	15 Total Engine Time: 3+11	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather: partly cloudy					

20 Remarks:

Mission completed

21 Problems and Solutions:

Acquisition Flight Approved by: J. Alviar — Signature over Printed Name (End User Representative)

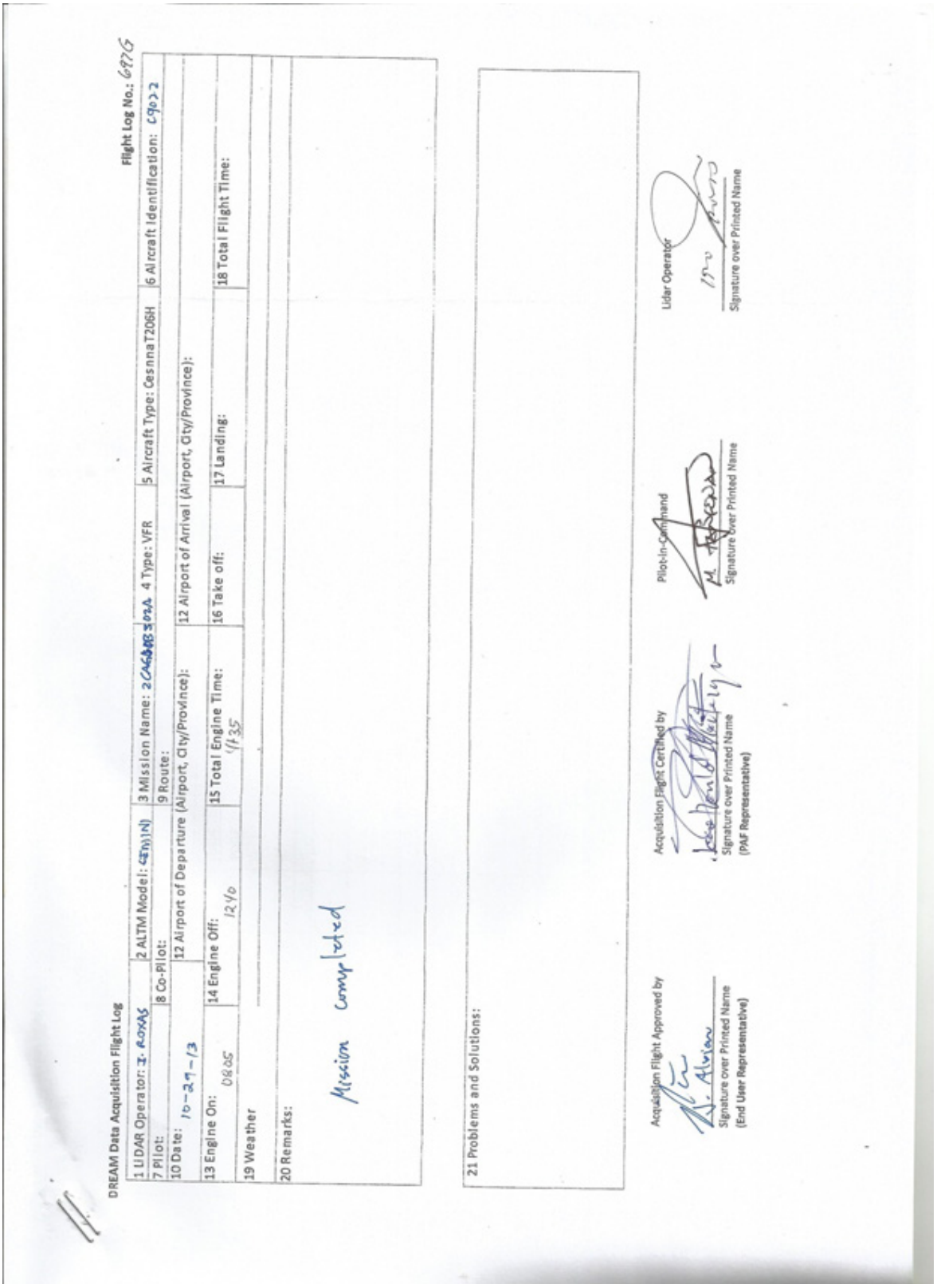
Acquisition Flight Certified by: [illegible] — Signature over Printed Name (PAF Representative)

Pilot-in-Command: M.L. TANGONAN — Signature over Printed Name

Lidar Operator: P. MARS — Signature over Printed Name

Annex E

100. Flight Log for 2CAG61B302B Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 6976

1 UDAR Operator: I-ROXAS	2 ALTM Model: CHM(N)	3 Mission Name: 2CAG61B302A	4 Type: VFR
5 Aircraft Type: Cessna T206H	6 Aircraft Identification: C9022		
7 Pilot:	8 Co-Pilot:	9 Route:	
10 Date: 10-29-13	11 Airport of Departure (Airport, City/Province):	12 Airport of Arrival (Airport, City/Province):	
13 Engine On: 0805	14 Engine Off: 1210	15 Total Engine Time: 4.35	16 Take off:
17 Landing:	18 Total Flight Time:		
19 Weather			
20 Remarks: Mission completed			
21 Problems and Solutions:			

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

Signature over Printed Name
(PAF Representative)

Pilot-in-Command

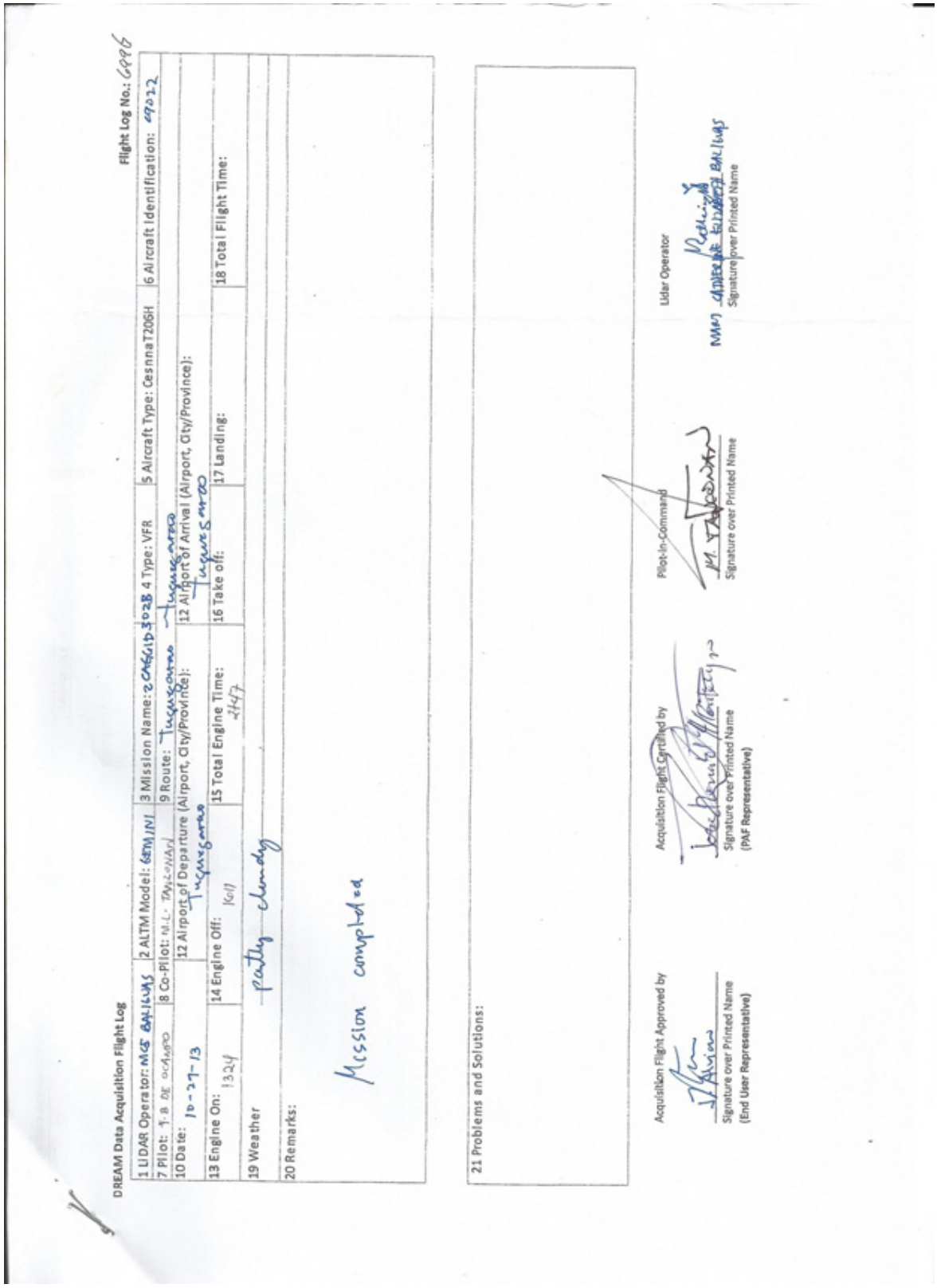
Signature over Printed Name

Lidar Operator

Signature over Printed Name

Annex E

101. Flight Log for 1CAG61AS356A Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 6996

1 LIDAR Operator: M/S BALUAS	2 ALTM Model: GEMINI	3 Mission Name: 1CAG61AS356A	4 Type: VFR	5 Aircraft Type: CessnaT206H	6 Aircraft Identification: 49022
7 Pilot: T.B DE ACHARD	8 Co-Pilot: M.L. TAYLOR	9 Route: Tuguegarao			
10 Date: 19-27-13	11 Airport of Departure (Airport, City/Province): Tuguegarao		12 Airport of Arrival (Airport, City/Province): Tuguegarao		
13 Engine On: 1324	14 Engine Off: Roll	15 Total Engine Time: 4+47	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather: partly cloudy					
20 Remarks: Mission completed					
21 Problems and Solutions:					

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

Signature over Printed Name
(PAF Representative)

Pilot-In-Command

Signature over Printed Name

Lidar Operator

MMO

Signature over Printed Name

Annex E

102. Flight Log for 2CAG101DS035B Mission

DREAM Data Acquisition Flight Log

Flight Log No.: 7051

1 LiDAR Operator: I. Tonga	2 ALTM Model: Gemini	3 Mission Name: 2CAG101DS035B	4 Type: VFR	5 Aircraft Type: Cesnna T206H	6 Aircraft Identification: 9322
7 Pilot: Samala	8 Co-Pilot: Alfonso III	9 Route: RPUT – Tuguegarao TP – RPUT			
10 Date: Feb 4, 2014	12 Airport of Departure (Airport, City/Province): RPUT		12 Airport of Arrival (Airport, City/Province): RPUT		
13 Engine On: 1336	14 Engine Off: 1623	15 Total Engine Time: 2H47	16 Take off:	17 Landing:	18 Total Flight Time: 2H39
19 Weather	strong winds				

20 Remarks:

mission successful; surveyed 10 lines (without CASI)

21 Problems and Solutions:

Acquisition Flight Approved by	Acquisition Flight Certified by	Pilot-in-Command	Lidar Operator
C. Hipolito	A1C Erwin Delos Santos PAF	R. Samala	[illegible]
Signature over Printed Name (End User Representative)	Signature over Printed Name (PAF Representative)	Signature over Printed Name	Signature over Printed Name

103. Flight Log for 2CAG111C037A & 2CAG101A037A Mission

DREAM Data Acquisition Flight Log

Flight Log No.: 2054

1 LiDAR Operator: MCE BALICUAS	2 ALTM Model: GEMINI	3 Mission Name: 2CAG101AS037A / 2CAG111C037A / 2CAG101A037A	4 Type: VFR	5 Aircraft Type: Cesnna T206H	6 Aircraft Identification: 9322
7 Pilot: J. ANAR	8 Co-Pilot: ALFONSO	9 Route: RPUT - Cagayan PP - RPUT			
10 Date: Feb. 6, 2014	12 Airport of Departure (Airport, City/Province): RPUT		12 Airport of Arrival (Airport, City/Province): RPUT		
13 Engine On: 0834	14 Engine Off: 1221	15 Total Engine Time: 3+47	16 Take off:	17 Landing:	18 Total Flight Time: 3+39
19 Weather: fair					

20 Remarks:

completed the rest of CAG111C and surveyed two lines of 101A. (with CAS1)

21 Problems and Solutions:

Acquisition Flight Approved by	Acquisition Flight Certified by	Pilot-in-Command	Lidar Operator
G HIPOLITO	A1C ERWIN DEBIS JAMPI PAF	R. SANTOS	MARY CATHERINE ELIZABETH BALICUAS
Signature over Printed Name (End User Representative)	Signature over Printed Name (PAF Representative)	Signature over Printed Name	Signature over Printed Name

Annex E

104. Flight Log for 2CAG101A037B Mission

DREAM Data Acquisition Flight Log

Flight Log No.: 2055

1 LiDAR Operator: V. TONGA	2 ALTM Model: Gemini-CASI	3 Mission Name: 2CAG101A037B	4 Type: VFR	5 Aircraft Type: Cesnna T206H	6 Aircraft Identification: 9322
7 Pilot: SAMAR II	8 Co-Pilot: ALFONSO III	9 Route: RPUT - Cagayan PP - RPUT			
10 Date: Feb. 6, 2014	12 Airport of Departure (Airport, City/Province): RPUT		12 Airport of Arrival (Airport, City/Province): RPUT		
13 Engine On: 1314	14 Engine Off: 1613	15 Total Engine Time: 2+59	16 Take off:	17 Landing:	18 Total Flight Time: 2+49
19 Weather	partly cloudy				

20 Remarks:

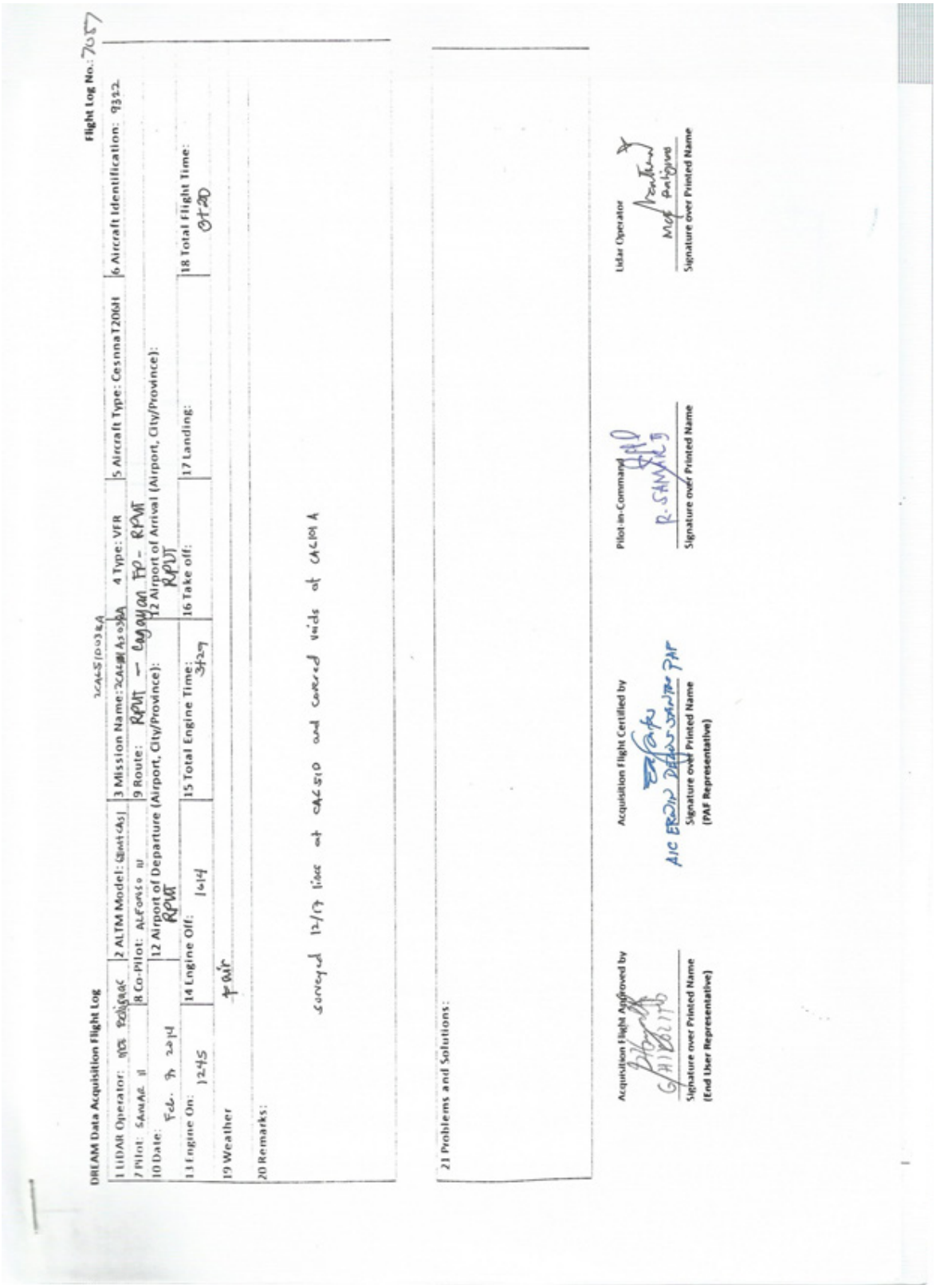
survey 12/22 lines (with CASI)

21 Problems and Solutions:

Acquisition Flight Approved by	Acquisition Flight Certified by	Pilot-in-Command	Lidar Operator
[signature]	A1C ERWIN [illegible] SANTOS PAF	R. SAMAR III	[signature]
Signature over Printed Name (End User Representative)	Signature over Printed Name (PAF Representative)	Signature over Printed Name	Signature over Printed Name

Annex E

105. Flight Log for 2CAG51D038A AND 2CAG101AS038A Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 7057

2CAG51D038A

1 LiDAR Operator: [illegible]	2 ALTM Model: [illegible]	3 Mission Name: 2CAG51As038A	4 Type: VFR	5 Aircraft Type: CessnaT206H	6 Aircraft Identification: 9322
7 Pilot: SAMAR II	8 Co-Pilot: ALFONSO III	9 Route: RPUT – Baggao TP – RPUT			
10 Date: Feb. 9, 2024	11 Engine On: 1245	12 Airport of Departure (Airport, City/Province): RPUT	13 Engine Off: 1614	14 Engine Time: 3+29	15 Take off: RPUT
16 Landing:	17 Total Flight Time: 0+20				

19 Weather: [illegible]

20 Remarks:

Surveyed 12/13 lines of 2AG510 and covered voids of 2AG101A

21 Problems and Solutions:

Acquisition Flight Approved by

[illegible]
Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

[illegible]
Signature over Printed Name
(PAF Representative)

Pilot-in-Command

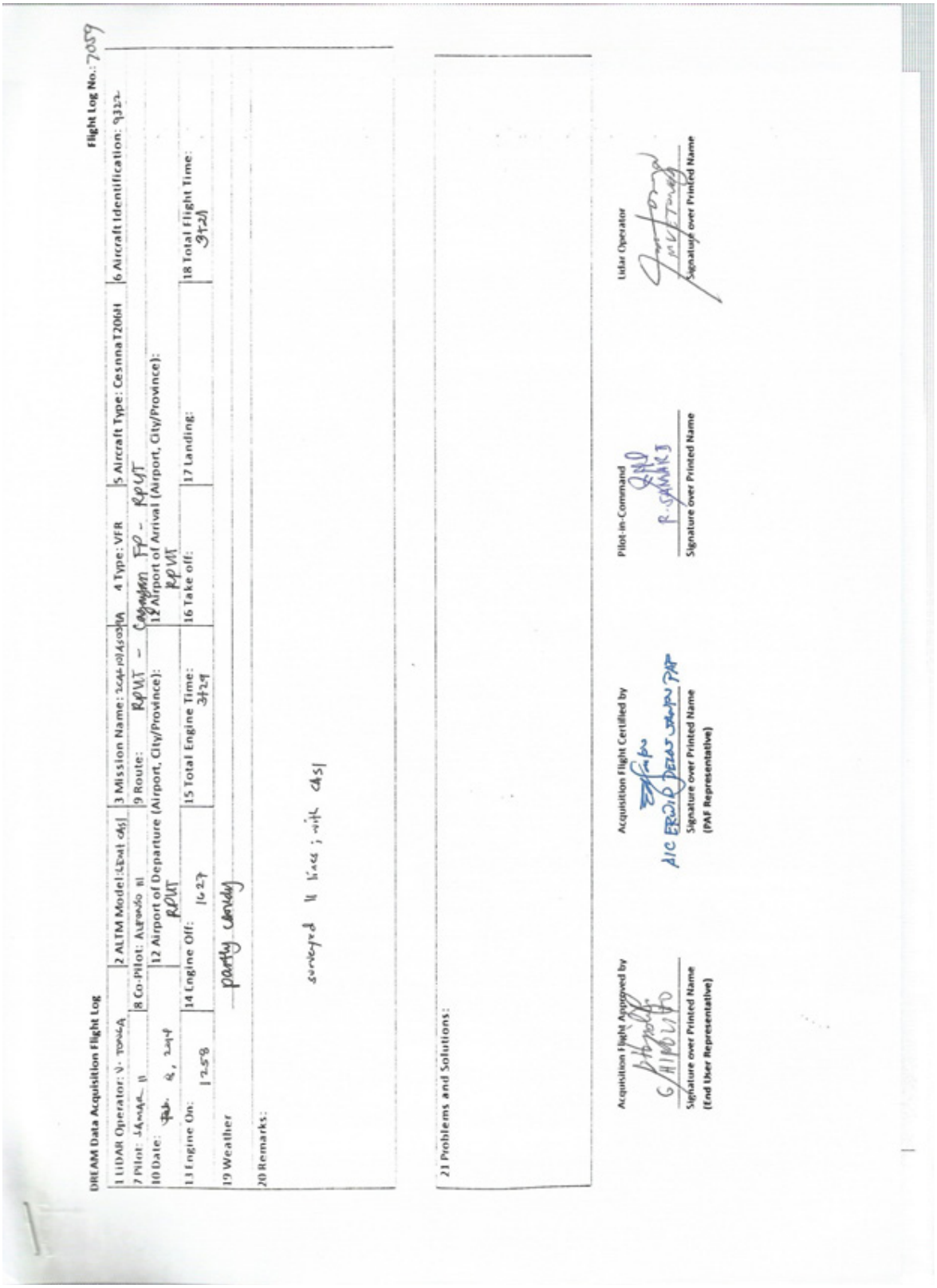
R-SAMAR II
Signature over Printed Name

Lidar Operator

[illegible]
Signature over Printed Name

Annex E

106. Flight Log for 2CAG101AS039A Mission



Flight Log No.: 7039

DREAM Data Acquisition Flight Log

1 UDAR Operator: [illegible]	2 ALTM Model: [illegible]	3 Mission Name: [illegible]	4 Type: VFR	5 Aircraft Type: Cessna T206H	6 Aircraft Identification: 9332
7 Pilot: [illegible]	8 Co-Pilot: [illegible]	9 Route: RPUT – [illegible] FP – RPUT			
10 Date: [illegible]	11 Airport of Departure (Airport, City/Province): RPUT	12 Airport of Arrival (Airport, City/Province): RPUT			
13 Engine On: 12:58	14 Engine Off: 16:27	15 Total Engine Time: 3+29	16 Take off:	17 Landing:	18 Total Flight Time: 3+29
19 Weather: partly cloudy					
20 Remarks: surveyed 11 lines with 45%					
21 Problems and Solutions:					

Acquisition Flight Approved by
Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by
Signature over Printed Name
(PAF Representative)

Pilot-in-Command
Signature over Printed Name

Lidar Operator
Signature over Printed Name

Annex E

107. Flight Log for 2CAG101GS040A & 2CAG101H040A Mission

DREAM Data Acquisition Flight Log

Flight Log No.: 2061

1 LiDAR Operator: MCE BALIGUAS	2 ALTM Model: GEMINI CASI	3 Mission Name: 2CAG101H040A (2CAG101GS040A &)	4 Type: VFR	5 Aircraft Type: Cesnna T206H	6 Aircraft Identification: 9822
7 Pilot: SAMAR II	8 Co-Pilot: ALFONSO III	9 Route: RPVT – Cagayan FP – RPVT			
10 Date: Feb 9, 2014	12 Airport of Departure (Airport, City/Province): RPVT		12 Airport of Arrival (Airport, City/Province): RPVT		
13 Engine On: 1028	14 Engine Off: 1450	15 Total Engine Time: 4+22	16 Take off:	17 Landing:	18 Total Flight Time: 4+12
19 Weather: cloudy					

20 Remarks:

surveyed 15 lines; cloudy in the survey area (without CASI)

21 Problems and Solutions:

Acquisition Flight Approved by	Acquisition Flight Certified by	Pilot-in-Command	Lidar Operator
G ALPOLITO	A1C ERWIN DELOS SANTOS PAF	R. SAMAR II	MCE BALIGUAS
Signature over Printed Name (End User Representative)	Signature over Printed Name (PAF Representative)	Signature over Printed Name	Signature over Printed Name

Annex E

108. Flight Log for 2CAG101E041A Mission

DREAM Data Acquisition Flight Log

Flight Log No.: 2063

1 LiDAR Operator: V. Tonga	2 ALTM Model: Gemini CAS1	3 Mission Name: 2CAG101E041A	4 Type: VFR	5 Aircraft Type: Cesnna T206H	6 Aircraft Identification: 9322
7 Pilot: Samar II	8 Co-Pilot: Alfonso III	9 Route: RPUT – Cagayan FTP – RPUT			
10 Date: Feb. 10, 2014	12 Airport of Departure (Airport, City/Province): RPUT		12 Airport of Arrival (Airport, City/Province): RPUT		
13 Engine On: 1332	14 Engine Off: 1619	15 Total Engine Time: 2+47	16 Take off:	17 Landing:	18 Total Flight Time: 2+39
19 Weather: Partly cloudy					

20 Remarks:

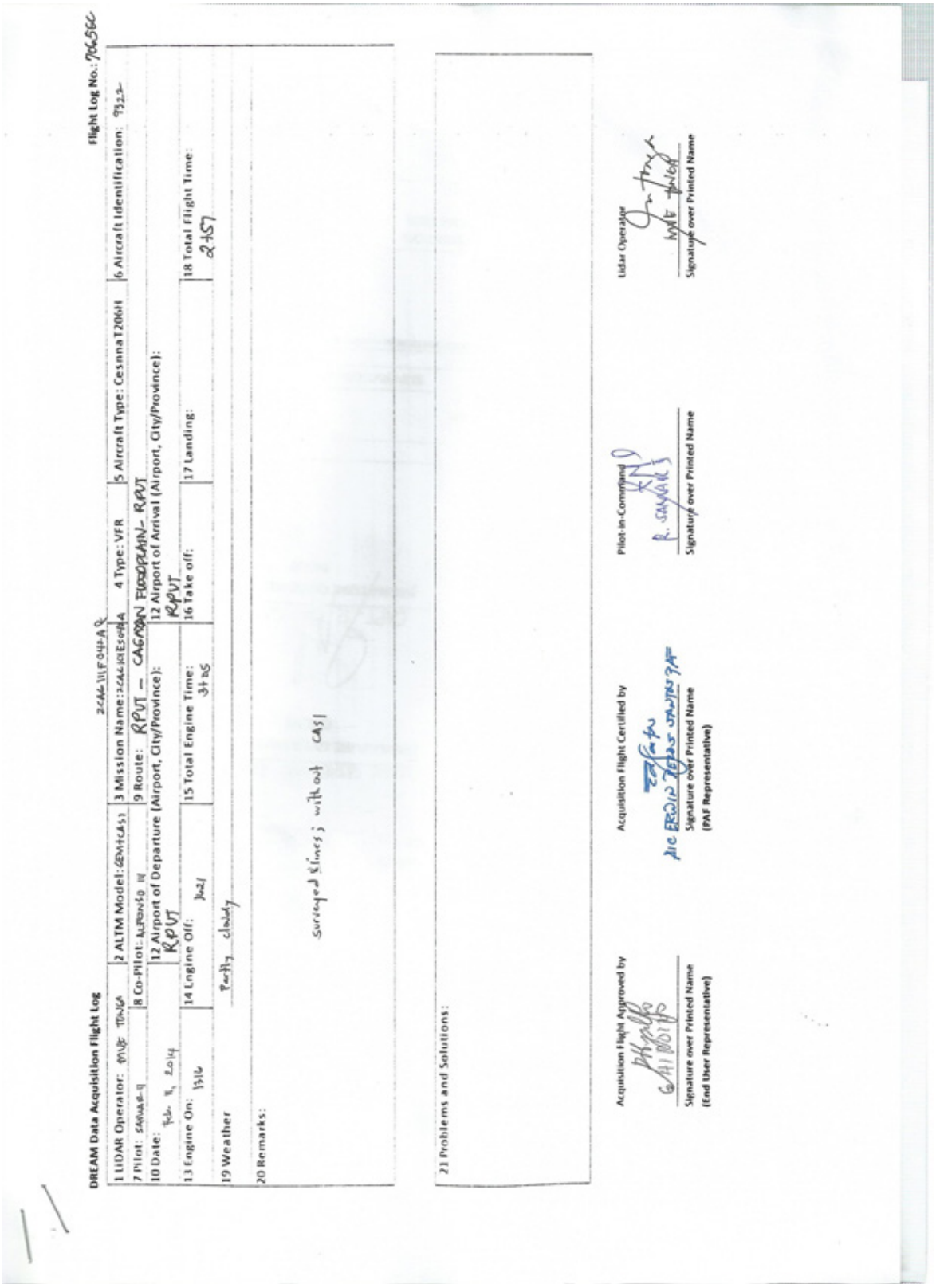
surveyed 8 lines with CAS1

21 Problems and Solutions:

Acquisition Flight Approved by	Acquisition Flight Certified by	Pilot-in-Command	Lidar Operator
G. Hipolito	A/C Erwin Delos Santos PAF	R. Samar II	Anne Tonga
Signature over Printed Name (End User Representative)	Signature over Printed Name (PAF Representative)	Signature over Printed Name	Signature over Printed Name

Annex E

109. Flight Log for 2CAG111F042A & 2CAG101ES042A Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 766566

2CAG111F042A &

1 LiDAR Operator: [illegible]	2 ALTM Model: [illegible]	3 Mission Name: 2CAG101ES042A	4 Type: VFR	5 Aircraft Type: Cessna T206H	6 Aircraft Identification: 9322-
7 Pilot: [illegible]	8 Co-Pilot: [illegible]	9 Route: RPVT – CAGAYAN FLOODPLAIN – RPVT			
10 Date: Feb. 11, 2014		11 Airport of Departure (Airport, City/Province): RPVT		12 Airport of Arrival (Airport, City/Province): RPVT	
13 Engine On: 1310	14 Engine Off: 1621	15 Total Engine Time: 3+05	16 Take off:	17 Landing:	18 Total Flight Time: 2+57
19 Weather: Partly cloudy					

20 Remarks:

surveyed lines; without CAS!

21 Problems and Solutions:

Acquisition Flight Approved by

Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by

Signature over Printed Name
(PAF Representative)

Pilot-in-Command

R. SAYAOI

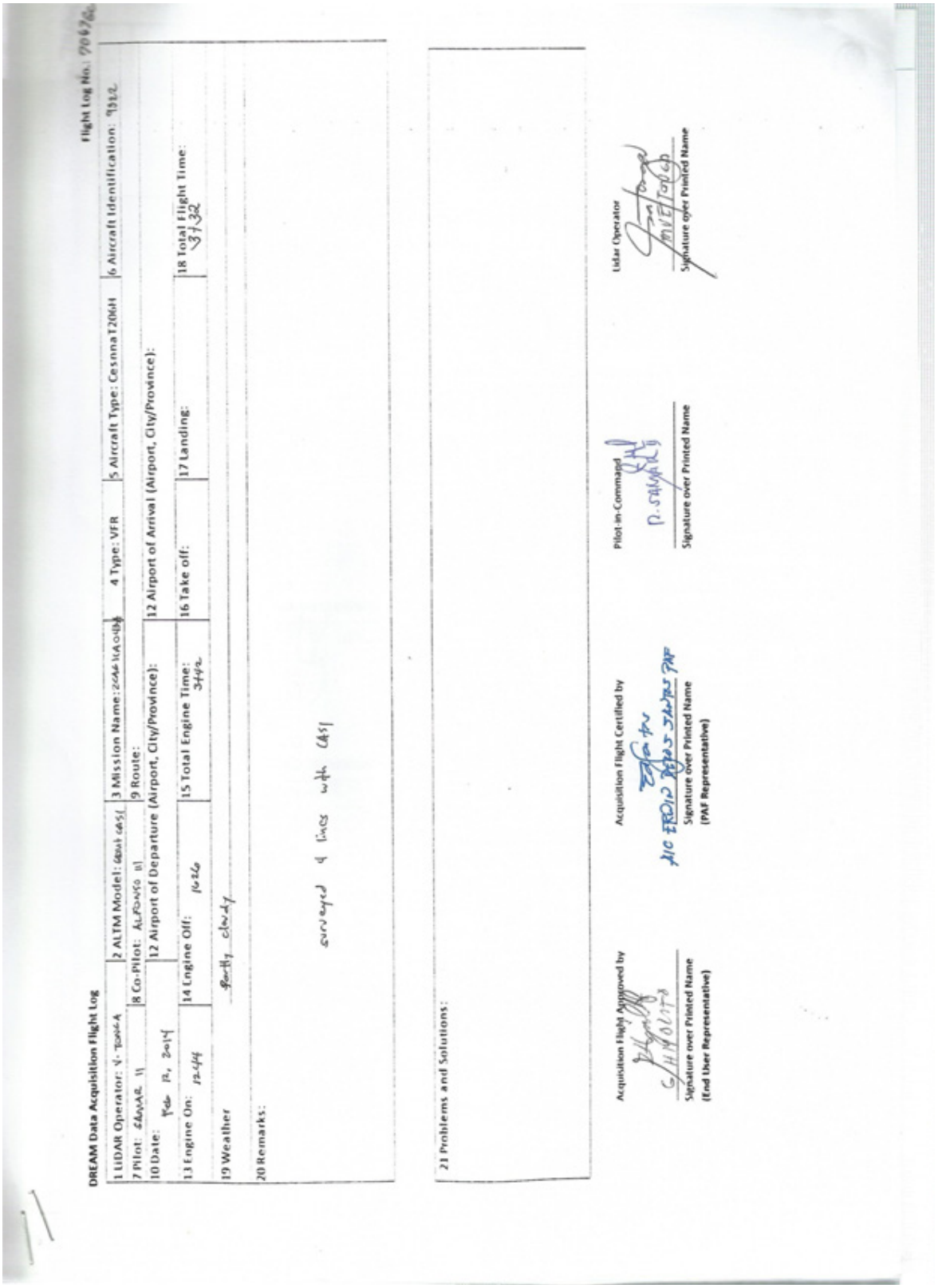
Signature over Printed Name

Lidar Operator

Signature over Printed Name

Annex E

110. Flight Log for 2CAG11A043A Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 0069

1 LIDAR Operator: [illegible]	2 ALTM Model: [illegible]	3 Mission Name: [illegible]	4 Type: VFR	5 Aircraft Type: Cessna T206H	6 Aircraft Identification: [illegible]
7 Pilot: [illegible]	8 Co-Pilot: [illegible]	9 Route:			
10 Date: Feb 12, 2014	11	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):	
13 Engine On: 12:44	14 Engine Off: 1626	15 Total Engine Time: 3+42	16 Take off:	17 Landing:	18 Total Flight Time: 3+32

19 Weather: Partly cloudy

20 Remarks:

surveyed 4 lines with CAS1

21 Problems and Solutions:

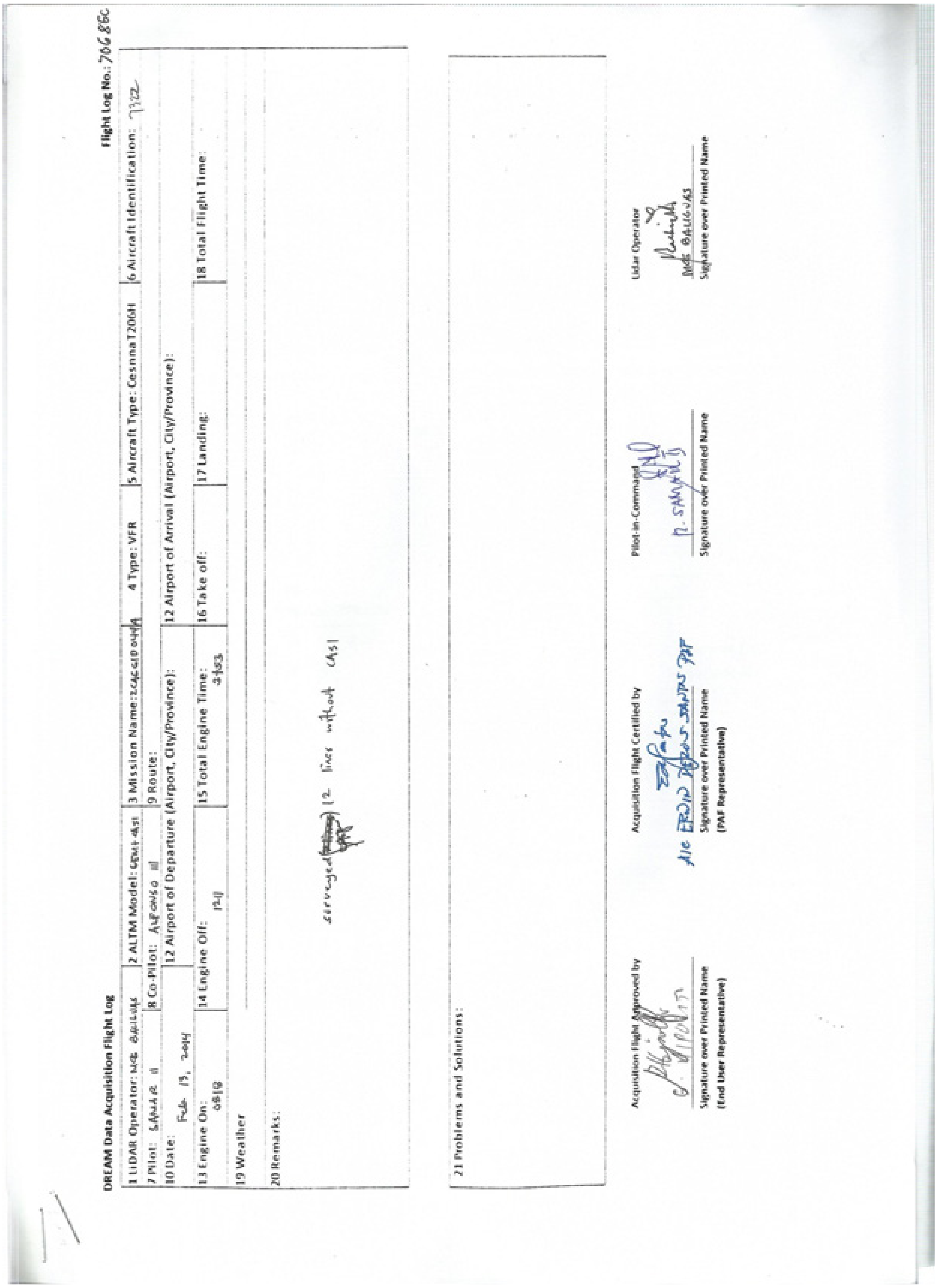
Acquisition Flight Approved by
Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by
Signature over Printed Name
(PAF Representative)

Pilot-in-Command
Signature over Printed Name

Lidar Operator
Signature over Printed Name

111. Flight Log for 2CAG61D044A & 2CAG61E044A Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 706 86C

1 LiDAR Operator: MCE BALIGUAS	2 ALTM Model: GEMI CAS1	3 Mission Name: 2CAG61D044A	4 Type: VFR	5 Aircraft Type: Cesnna T206H	6 Aircraft Identification: 7322
7 Pilot: SANAR II	8 Co-Pilot: ALFONSO III	9 Route:			
10 Date: Feb 13, 2014	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 0818	14 Engine Off: 1211	15 Total Engine Time: 3+53	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather					
20 Remarks: surveyed 12 lines without CAS1					
21 Problems and Solutions:					

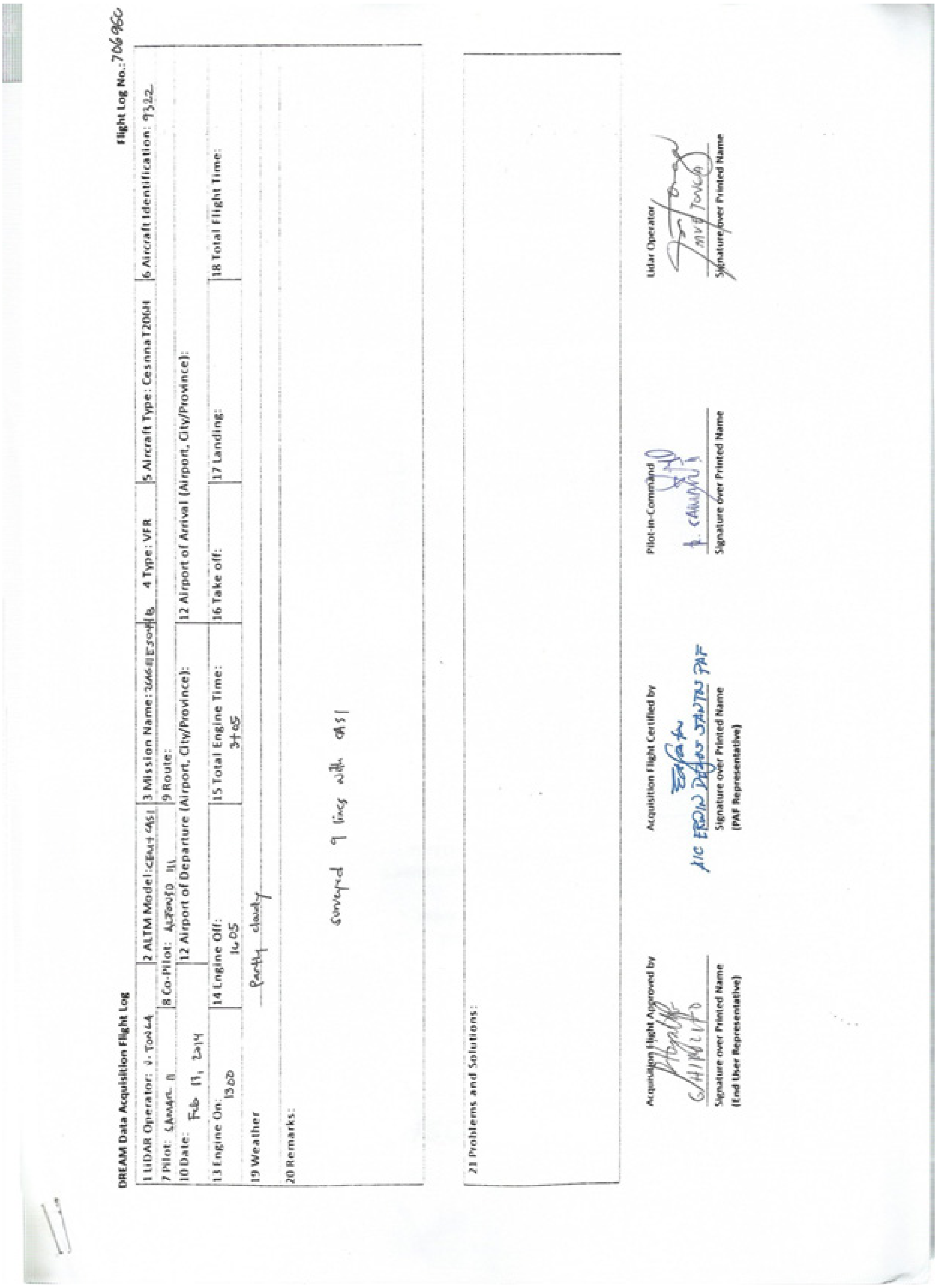
Acquisition Flight Approved by
Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by
A1C ERWIN DEROS SANTOS PAF
Signature over Printed Name
(PAF Representative)

Pilot-in-Command
R. SANAR II
Signature over Printed Name

Lidar Operator
MCE BALIGUAS
Signature over Printed Name

112. Flight Log for 2CAG111ES044B Mission


DREAM Data Acquisition Flight Log

Flight Log No.: 706960

1 LiDAR Operator: J. TONGA	2 ALTM Model: CEMI CAS1	3 Mission Name: 2CAG11ES044B	4 Type: VFR	5 Aircraft Type: Cesnna T206H	6 Aircraft Identification: 9322
7 Pilot: SAMAR R	8 Co-Pilot: ALFONSO III	9 Route:			
10 Date: Feb 13, 2014	12 Airport of Departure (Airport, City/Province):		12 Airport of Arrival (Airport, City/Province):		
13 Engine On: 1300	14 Engine Off: 1605	15 Total Engine Time: 3+05	16 Take off:	17 Landing:	18 Total Flight Time:
19 Weather	Partly cloudy				

20 Remarks:

Surveyed 9 lines with CAS1

21 Problems and Solutions:

Acquisition Flight Approved by
G. HIPOLITO
Signature over Printed Name
(End User Representative)

Acquisition Flight Certified by
A1C ERWIN DAGOT SANTOS PAF
Signature over Printed Name
(PAF Representative)

Pilot-in-Command
R. CAMARO
Signature over Printed Name

Lidar Operator
MVF TONGA
Signature over Printed Name

Annex E

113. Flight Log for 2CAG101AS046A Mission

DREAM Data Acquisition Flight Log

Flight Log No.: 20726C

1 LiDAR Operator: MCE BALIGUAS	2 ALTM Model: GEMINI CAS1	3 Mission Name: 2CAG101AS046A	4 Type: VFR	5 Aircraft Type: Cesnna T206H	6 Aircraft Identification: 9322
7 Pilot: S SAMAR III	8 Co-Pilot: ALFONSO III	9 Route: RPUT - CAG101A - RPUT			
10 Date: Feb. 15, 2014	12 Airport of Departure (Airport, City/Province): RPUT		12 Airport of Arrival (Airport, City/Province): RPUT		
13 Engine On: 0948H	14 Engine Off: 1141H	15 Total Engine Time: 1H53	16 Take off:	17 Landing:	18 Total Flight Time: 1H44
19 Weather: low clouds					

20 Remarks:

covered voids at CAG101A; mission aborted due to heavy cloud build-up

21 Problems and Solutions:

Acquisition Flight Approved by	Acquisition Flight Certified by	Pilot-in-Command	Lidar Operator
GEOM AIPINTO	A1C ERWIN DELOS SANTOS PAF	K SAMAR	MCE BALIGUAS
Signature over Printed Name (End User Representative)	Signature over Printed Name (PAF Representative)	Signature over Printed Name	Signature over Printed Name

114. Flight Log for 2CAG51D048A Mission

DREAM Data Acquisition Flight Log

Flight Log No.: 7076C

1 LIDAR Operator: MVB Tonga	2 ALTM Model: Gemini 051	3 Mission Name: 2CAG51D048A	4 Type: VFR	5 Aircraft Type: Cessna T206H	6 Aircraft Identification: 9322
7 Pilot: S. Amade II	8 Co-Pilot: Alfonso III	9 Route: RPUT – CAG51 – RPUT			
10 Date: Feb. 17, 2014	12 Airport of Departure (Airport, City/Province): Tuguegarao Airport		12 Airport of Arrival (Airport, City/Province): Tuguegarao Airport		
13 Engine On: 0851H	14 Engine Off: 1154H	15 Total Engine Time: 3+05	16 Take off:	17 Landing:	18 Total Flight Time: 2+51
19 Weather: Cloudy					

20 Remarks: Mission completed without CAG1

21 Problems and Solutions:

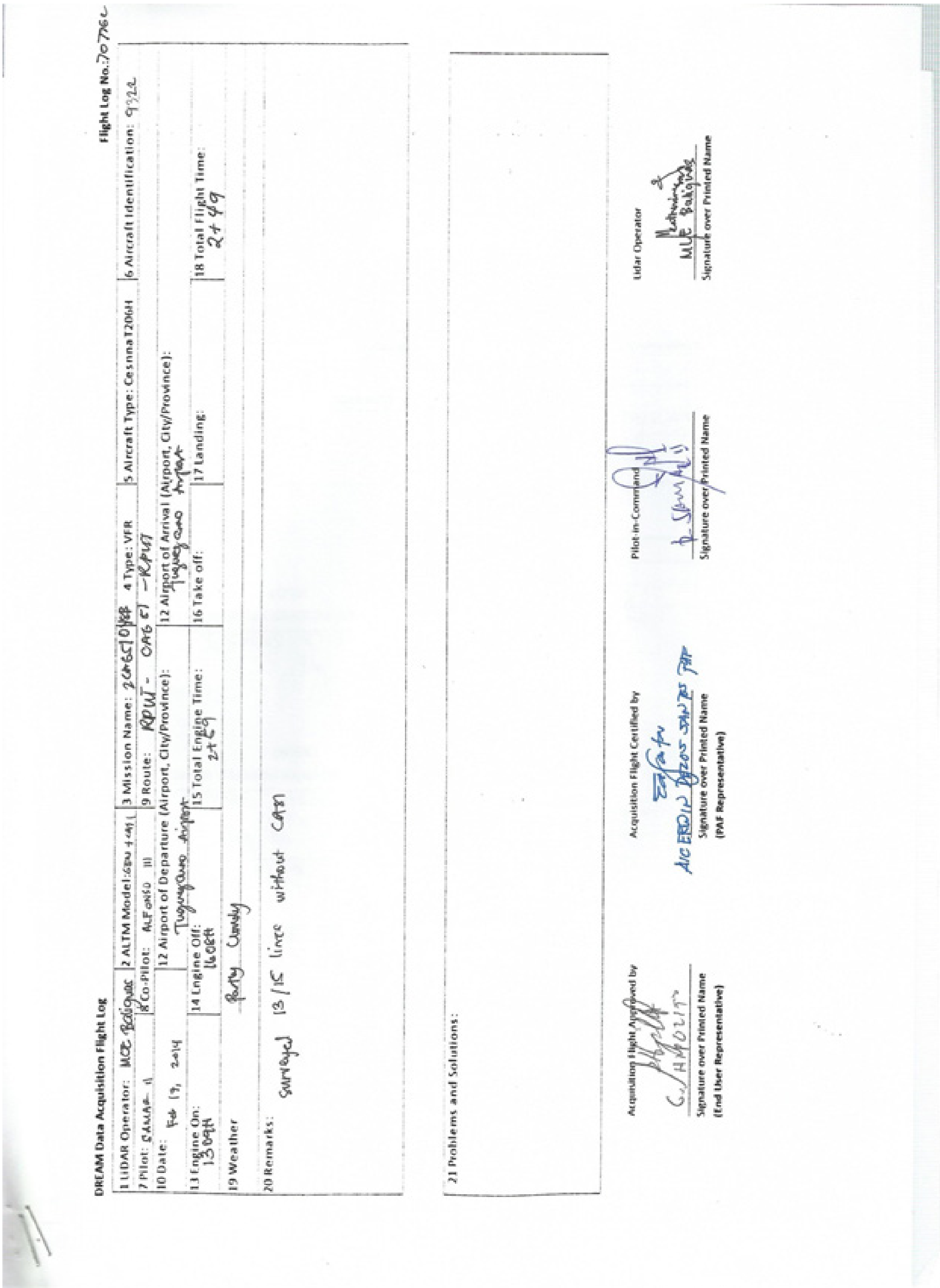
Acquisition Flight Approved by: Signature over Printed Name (End User Representative)

Acquisition Flight Certified by: A1C Erdie Delos Santos PAF — Signature over Printed Name (PAF Representative)

Pilot-in-Command: R. Samaniego — Signature over Printed Name

Lidar Operator: MVB Tonga — Signature over Printed Name

115. Flight Log for 2CAG51A048B Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 7076

1 LiDAR Operator: MCE Baligues	2 ALTM Model: Gem +	3 Mission Name: 2CAG51048B	4 Type: VFR	5 Aircraft Type: Cesnna T206H	6 Aircraft Identification: 9322
7 Pilot: C. SAMAR II	8 Co-Pilot: ALFONSO III	9 Route: RPUT - CAG 51 - RPUT			
10 Date: Feb 19, 2014	12 Airport of Departure (Airport, City/Province): Tuguegarao Airport		12 Airport of Arrival (Airport, City/Province): Tuguegarao Airport		
13 Engine On: 1309H	14 Engine Off: 1608H	15 Total Engine Time: 2+59	16 Take off:	17 Landing:	18 Total Flight Time: 2+49
19 Weather: Partly Cloudy					

20 Remarks: Surveyed 13/15 lines without CAM

21 Problems and Solutions:

Acquisition Flight Approved by: C. HAROLD — Signature over Printed Name (End User Representative)

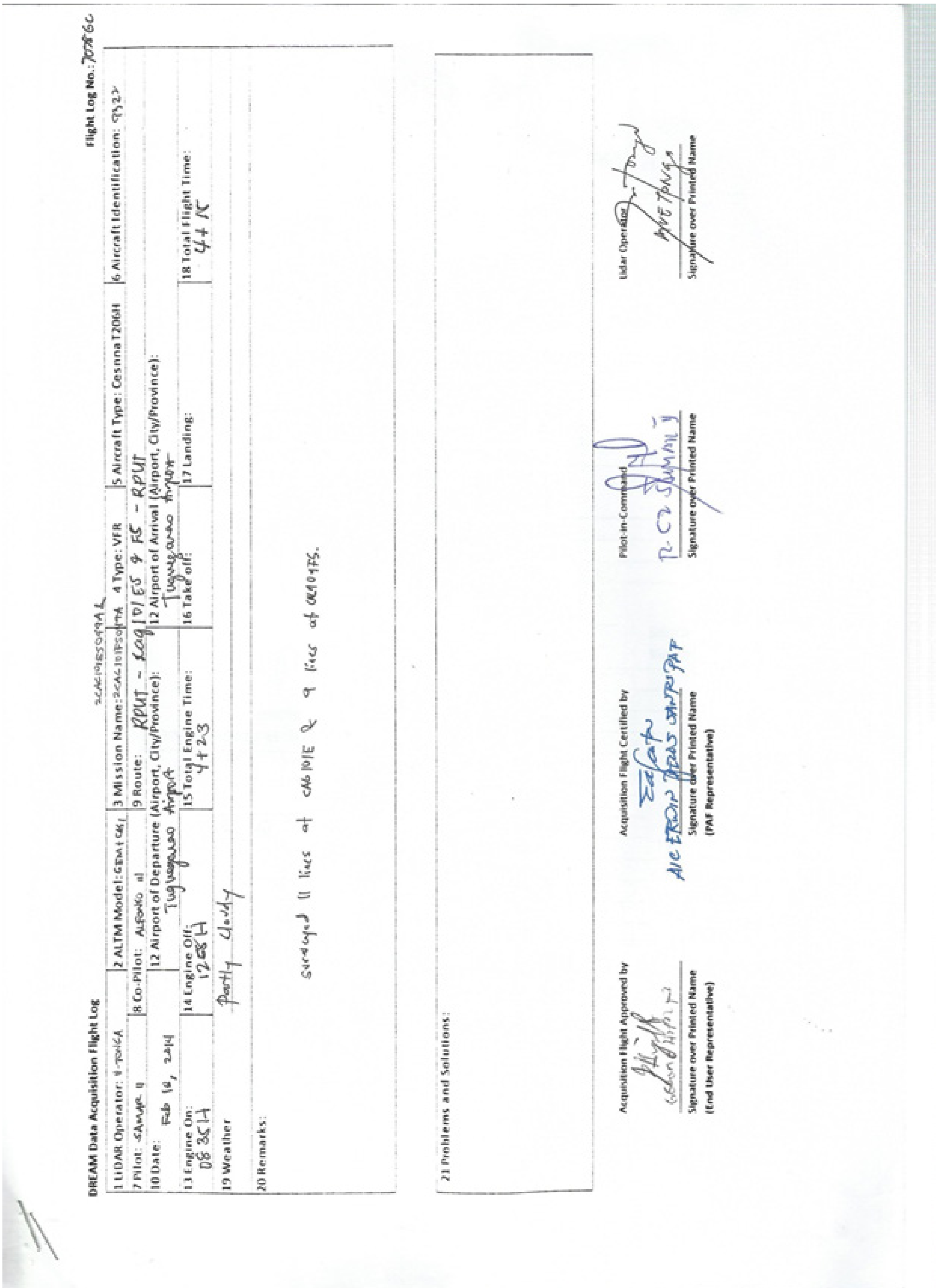
Acquisition Flight Certified by: A1C ERWIN DIZON SANTOS PAF — Signature over Printed Name (PAF Representative)

Pilot-in-Command: C. SAMAR II — Signature over Printed Name

Lidar Operator: MCE Baligues — Signature over Printed Name

Annex E

116. Flight Log for 2CAG101ES049A & 2CAG101FS049A Mission



DREAM Data Acquisition Flight Log

Flight Log No.: 7078GC

1 LiDAR Operator: V-TONGA	2 ALTM Model: GEM+CAG	3 Mission Name: 2CAG101FS049A / 2CAG101ES049A	4 Type: VFR	5 Aircraft Type: Cesnna T206H	6 Aircraft Identification: 9322
7 Pilot: SAMAR II	8 Co-Pilot: ALFONSO III	9 Route: RPUT - CAG101 ES & FS - RPUT			
10 Date: Feb 18, 2014	12 Airport of Departure (Airport, City/Province): Tuguegarao Airport		12 Airport of Arrival (Airport, City/Province): Tuguegarao Airport		
13 Engine On: 0835H	14 Engine Off: 1258H	15 Total Engine Time: 4+23	16 Take off:	17 Landing:	18 Total Flight Time: 4+15
19 Weather: Partly Cloudy					

20 Remarks:

Surveyed 11 lines at CAG101E & 9 lines at CAG101FS.

21 Problems and Solutions:

Acquisition Flight Approved by	Acquisition Flight Certified by	Pilot-in-Command	Lidar Operator
Signature over Printed Name (End User Representative)	A1C ERWIN JESUS SANTIPAP Signature over Printed Name (PAF Representative)	R. C2 SAMAR II Signature over Printed Name	MAE TONGA Signature over Printed Name

Bibliography

- CAGAYAN RIVER BASIN. (n.d.). Retrieved August 12, 2015, from https://kidlat.pagasa.dost.gov.ph/index.php/hydrometeorology/c

- The Cagayan River Basin. (2009, October 23). Retrieved August 12, 2015, from http://www.abs-cbnnews.com/research/10/23/09/cagayan-river-basin

DREAM

Disaster RIsk and Exposure Assessment for Mitigation