Stage 2 Green Assessment (GA): Training on Ground -truthing for GA through a Remotely Piloted Aircraft System

Prepared by: Center for Conservation Innovation Ph., Inc for the USAID SIBOL Activity

Training Date: July 31, 2023 to August 4, 2023 (Luzon CLuster); August 7 to 11, 2023 (Visayas-Mindanao Cluster)

Training Venue: Luzon cluster - Pampanga (venue TBA); Visayas-Mindanao Cluster - Cebu (venue TBA)

Training Type: face-to-face meeting

Training Objectives:

This training specifically aims to engage the participants in:

1. developing an aerial survey plan for ground-truthing to validate the land cover status after undergoing an extreme event and collect the necessary reference polygons for damage assessment and detect land-cover changes;
2. understanding the principles of ground-truthing through aerial surveys;
3. understanding the use of a Remotely Piloted Aircraft System (RPAS) and ground control points (GCPs) for ground-truthing; developing orthomosaic images from RPAS photography;
4. interpreting land cover classes from orthomosaic images and assessing accuracy; and
5. forming RPAS sub-teams and developing a schedule for each to cover the training polygons located on the ground.

Training Process:

This training is good for a duration of five days. This will consist of recollection of the process to develop a survey plan, concepts about aerial ground truthing, setting-up of ground control points and the base station, drone image processing, on-field training and fieldwork planning.

Training Program:

Date/Time	Topic	Duration	Resource person
	Day 0 (Sunday)		
	Arrival of facilitators and participants; Preparation		
	Day 1 (Monday)		
Program will commence by 9:00 AM			
08:30 AM to	Registration and arrival of participants		

Date/Time	Topic	Duration	Resource person
9:00 AM			
9:00 AM to 9:05 AM	Opening Prayer	5 mins	SIBOL Facilitator
9:05 AM to 9:10 AM	Opening Remarks	5 mins	DENR Climate Change Service
9:10 AM to 9:20 AM	Welcome Remarks	10 mins	DENR Regional Executive Director
9:20 AM to 9:30 AM	Message from SIBOL	10 mins	SIBOL Chief of Party
9:30 AM to 10:00 AM	Introduction of Participants	30 mins	Participants
10:00 AM to 10:10 AM	Introduction of Facilitators	10 mins	**Dr. Oliver G. Coroza;** **Kristine Andaya;** **Daniel Glenn Darapiza;** **Regina Aedrianne Felismino-Inovejas;** **Czeskian Realo** SIBOL Facilitators
10:10 AM to 10:40 AM	Introduction to SIBOL Green Assessment	30 mins	**Jennica Paula Masigan** SIBOL Facilitator
10:40 AM to 12:25 PM	**Lecture Series 1.1: Green Assessment transition from Stage 1 to Stage 2** ● Pre-Stage 2 preparation steps at Stage 1 rapid assessment; ● Review of creating reference points and training polygons for aerial survey planning ● Land cover classification for Green Assessment	1 hour 45 mins	**Dr. Oliver G. Coroza;** **Kristine Andaya;** **Regina Aedrianne Felismino-Inovejas** SIBOL Facilitator
12: 25 PM to 1:25 PM	Lunch	1 hour	
1: 25 PM to 3:10 PM	**Lecture Series 1.2: Preparations for Stage 2 mapping** ● Reference points map	1 hour 45 mins	**Dr. Oliver G. Coroza;** **Kristine Andaya** SIBOL Facilitator
3:10 PM to 5:00 PM	**Activity 1: Preparations for Stage 2 mapping** ● Review the preliminary map of reference points developed in Stage 1 to guide the ground-	1 hour 50 mins	Participants (Note: Each region has to bring to the session the rapid assessment map developed in Stage 1 for review and planning)

Date/Time	Topic	Duration	Resource person
	truthing/validation surveys; ● Develop and agree on the land cover classes to comprise the main map to be used for Stage 2; and ● Develop a plan for GT using either the traditional walk-through of ground surveys or rapid survey through RPAS.		
	Day 2 (Tuesday)		
Program will commence by 9:00 AM			
8:30 AM to 9:00 AM	Registration & Attendance	30 mins	**Dr. Oliver G. Coroza;** **Kristine Andaya;** **Daniel Glenn Darapiza;** **Regina Aedrianne Felismino-Inovejas;** **Czeskian Realo** SIBOL Facilitator & Participants
9:00 AM to 10:00 AM	Continuation of **Activity 1: Preparations for Stage 2 mapping**	1 hour	Participants
10:00 AM to 12:00 AM	● **Deliver presentations for the following activities** : ● **Activity 1:** Preparations for Stage 2 mapping	2 hours	**Dr. Oliver G. Coroza;** **Kristine Andaya;** **Daniel Glenn Darapiza;** **Regina Aedrianne Felismino-Inovejas;** **Czeskian Realo** SIBOL Facilitator & Participants
12:00 NN to 1:00 PM	Lunch		
1:00 PM to 1:20 PM	**Lecture Series 2.1: Ground-truthing by Aerial survey** ● Remotely Piloted Aircraft (RPA) vs Remotely Piloted Aircraft System (RPAS) ● Importance of using RPAS in conservation	20 mins	**Daniel Glenn Darapiza** SIBOL Facilitator

Date/Time	Topic	Duration	Resource person
1:20 PM to 4:00 PM	**Lecture Series 2.2:** The basic fundamentals and moves in flying drones	2 hours 40 mins	**Daniel Glenn Darapiza** SIBOL Facilitator
4:00 PM to 5:00 PM	**Lecture Series 2.3: Typical RPAS mapping workflow** ● Project Design ○ Training data points (from the pre-processed contemporary land cover and cover change analysis) ○ Area of interest ○ Maps ● Reconnaissance ○ Activities ○ List of equipment ● Flight planning ○ Manual flight or using flight planning software ○ Pix4D mapper App	1 hour	**Regina Aedrianne Felismino-Inovejas** SIBOL Facilitator
	Day 3 (Wednesday)		
Program will commence by 9:00 AM			
8:30 AM to 9:00 AM	Registration & Attendance	30 mins	**Dr. Oliver G. Coroza;** **Kristine Andaya;** **Daniel Glenn Darapiza;** **Regina Aedrianne Felismino-Inovejas;** **Czeskian Realo** SIBOL Facilitator & Participants
9:00 AM to 9:30 AM	Recap	30 mins	
9:30 AM to 11:00 AM	Continuation of **Lecture Series 2.3: Typical RPAS mapping workflow** ● Ground control point/ base station ○ GCP marker ○ Trimble ○ Hand-held GPS ● Aerial survey acquisition ○ Pre-flight preparations ○ Last minute revisions of flight plan ○ Actual flight ○ Post-flight	1 hour 30 mins	**Regina Aedrianne Felismino-Inovejas** SIBOL Facilitator

Date/Time	Topic	Duration	Resource person
	○ List of equipment		
11:00 AM to 11:30 AM	**Lecture Series 3: Requisite during flight survey** ● Forms ● Checklists	30 mins	**Regina Aedrianne Felismino-Inovejas** SIBOL Facilitator
11:30 AM to 12:30 AM	**Lecture Series 4: Post-flight requisite** ● Flight logs data tracker ● Data cleaning ● Data filing	1 hour	**Regina Aedrianne Felismino-Inovejas** SIBOL Facilitator
11:30 AM to 12:00 NN	**Lecture Series 5: Establishing Ground Control Points** ● Importance and component of GCPs ● Briefing on the sub-meter accuracy GPS and its importance ● Trimble Mobile Manager configuration ● Trimble Catalyst DA1 setup	30 mins	**Czeskian Realo** SIBOL Facilitator
12:30 PM to 1:30 PM	● Lunch		
1:30 PM to 2:00 PM	**Lecture Series 6:** Real Time Kinematic (RTK) aerial surveying ● Workflow of using the RTK enabled RPA ● Factors to consider in using an RTK enabled RPA ● Process of data collection ● DJI Phantom 4 RTK & base station set-up ● Processing using the DJI Terra software	1 hour 30 mins	**Daniel Glenn Darapiza** SIBOL Facilitator
2:30 PM to 4:30 PM	**Lecture Series 7:** Rule of Thumb on Ground truthing through RPAS	1 hour 30 mins	**Regina Aedrianne Felismino-Inovejas** SIBOL Facilitator
4:30 PM to 4:45 PM	Preparations for on-field calibration	15 mins	**Czeskian Realo**; SIBOL Facilitator & Participants
	Day 4 (Thursday)		
Program will commence by 7:00 AM			

Date/Time	Topic	Duration	Resource person
7:00 AM to 12:00 NN	Registration, Attendance and Transport	5 hours	**Dr. Oliver G. Coroza;** **Kristine Andaya;** **Daniel Glenn Darapiza;** **Regina Aedrianne Felismino-Inovejas;** **Czeskian Realo** SIBOL Facilitator & Participants
	On- Field calibration ● The basics,fundamentals and moves in flying drones		
12:00 NN to 1:00 PM	Lunch	1 hour	
1:00 AM to 5:00 PM	**On- Field calibration** ● Ground truthing through RPAS hands-on application	5 hours	
	Activity 2: Ground truthing through RPAS ● RPAS survey methodologies		
	Day 5 (Friday)		
Program will commence by 9:00 AM			
8:30 AM to 9:00 AM	Registration and Attendance	30 mins	**Dr. Oliver G. Coroza;** **Kristine Andaya;** **Daniel Glenn Darapiza;** **Regina Aedrianne Felismino-Inovejas;** **Czeskian Realo** SIBOL Facilitator & Participants
9:00 AM to 10:00 AM	**Lecture Series 8:** Data pre-processing using Pix4D mapper software	1 hour	**Daniel Glenn Darapiza** SIBOL Facilitator
	Activity 3: Data pre-processing using Pix4D mapper software		
10:00 AM to 10:15 AM	**Lecture Series 9:** Sample Interpretation of drone orthomosaic images based on the Land cover classification for Green Assessment through visualization	15 mins	**Daniel Glenn Darapiza** SIBOL Facilitator & Participants
10:15 AM to 11:30 NN	**Prepare presentations for the following activities** : **Activity 2:** Ground truthing through RPAS **Activity 3:** Data pre-processing using Pix4D mapper software **Post - evaluation Form**	1 hour 15 mins	**Dr. Oliver G. Coroza;** **Kristine Andaya;** **Daniel Glenn Darapiza;** **Regina Aedrianne Felismino-Inovejas;** **Czeskian Realo** SIBOL Facilitator & Participants

Date/Time	Topic	Duration	Resource person
11:30 AM to 1:00 PM	Lunch		
1: 00 PM to 2:15 PM	**Deliver presentations for the following activities** : **Activity 2:** Ground truthing through RPAS **Activity 3:** Data pre-processing using Pix4D mapper software	1 hour 15 mins	**Dr. Oliver G. Coroza;** **Kristine Andaya;** **Daniel Glenn Darapiza;** **Regina Aedrianne Felismino-Inovejas;** **Czeskian Realo** SIBOL Facilitator & Participants
2:15 PM to 2:45 PM	**Q&A:** Participants remarks regarding the training	30 mins	**Dr. Oliver G. Coroza;** **Kristine Andaya;** **Daniel Glenn Darapiza;** **Regina Aedrianne Felismino-Inovejas;** **Czeskian Realo** SIBOL Facilitator & Participants
2:45 PM to 3:15 PM	Distribution of Certificate of Appearance and Certificate for Completion of Training	30 mins	SIBOL Facilitators & Participants
3:15 PM to 3:30 PM	Closing remarks	15 mins	DENR CCS representative / SIBOL Representative

Training Requirements for the participants:

1. **Stage 1 output from the SIBOL Green Assessment: Remote Sensing Training and GIS Workshop**
2. Computer/ Workstation;
    a. Minimum Requirements:
        i. Hard drive: at least 500 HDD
        ii. Memory: at least 32GB RAM
        iii. Processor type: at least Intel core i7 processor
        iv. 32/64 bit
        v. Operating system: at least Windows 7
    b. Download mobile apps (Android: Playstore & Iphone: Apple Store)
        i. Pix4D capture;
        ii. CTRL+DJI;
        iii. Windy;
        iv. UAV Forecast;
        v. DJI Go 4;
    c. Download software
        i. QGIS; and
        ii. Pix4D mapper;
3. Remotely Piloted Aircraft/ Drone (*please bring if you have an equipment*);
4. Hand-held GPS
5. Sub-meter level precision GNSS receiver;
6. Binoculars;
7. Drone extra batteries;
8. External hard drive (optional);

Training Qualifications for the participants:

1. Team composition: at least one of the three participants from each office should have been a participant of the Green Assessment Stage 1 Training of Trainers, one PENRO representative, one CENRO representative
2. Natural Sciences, forestry or engineering background

- with primary institutional function to conduct remote-piloted aerial or land mapping surveys
- who knows how to use & read GPS and GNSS equipment
- able to exercise the function to overlay and manipulate spatial layers in different mapping software