

**Research Activity Report**  
**Supported by “Leading Graduate Program in Primatology and Wildlife Science”**  
 (Please be sure to submit this report after the trip that supported by PWS.)

	2023. 12. 04
<b>Affiliation/Position</b>	Wildlife Research Center/M1
<b>Name</b>	Saidi, Mohamed Mohamed

<b>1. Country/location of visit</b>
Chubu University/Ena City
<b>2. Research project</b>
Basic Skills for Field Biology course for M1 students
<b>3. Date (departing from/returning to Japan)</b>
2023. 11. 07 – 2023. 11.09 (3 days)
<b>4. Main host researcher and affiliation</b>
Prof. Yoko Mitani, Prof. Ikki Matsuda, Dr. Nahoko Tokuyama WRC, Kyoto University & Dr. Sugita Satoru, Chubu University
<b>5. Progress and results of your research/activity</b> (You can attach extra pages if needed)
Please insert one or more pictures (to be publicly released). Below each picture, please provide a brief description.
<p>The Basic Skills for Field Biology training course was delivered in form of lectures, Journal paper presentation, Practical exercises, and application of Digital technologies in Biology research.</p> <p><b>a) Journal Paper presentation assignment</b></p> <p>The main purposes of this training course were, to learn basics of performing drone-based research in field biology and equipping students with group work skills through communicating with participants. In respect to these purposes, I was requested to form a class group I with my fellow student (Suzuki, Seki and Ogawa sans) and select a journal paper related to GIS or digital earth technologies for class presentation. We therefore selected a paper titled “<i>GIS as an Epidemiological Tool to Monitor the Spatial–Temporal Distribution of Tuberculosis in Large Game in a High-Risk Area in Portugal</i>” for class presentation. The paper was selected mainly due to the following reasons first, non among us has ever used Geographical information systems (GIS) tool previously and our current research plan does not envisage using GIS thus the paper provided an exciting platform to learn the techniques second, the paper integrated more than digital earth technology on its methodology part i.e GIS, Global Navigation satellite systems (GNSS) and Remote Sensing (RS), thus possibility to learn more than technique altogether, third authors documented for the first time the application of GIS as an epidemiological tool that can be used in parallel with other molecular epidemiological techniques on wildlife disease monitoring &amp; surveillance and last, is the fact that, authors intend to raise information that GIS based assessment of environmental and habitat factors on wildlife disease prevalence plays a pivotal role on wildlife disease cross-species prevention. I was of the student who presented this paper during class presentation, and thereafter inline with overall purpose of this course.</p> <p><b>b) Lectures</b></p> <p>First session of this training after arriving at the Training Centre afternoon of 20231107 was mainly class lectures of which Facilitator from started a series of class lectures by introducing “<i>The Civil Aviation Law of Japan</i>” that sets regulations and governs wide use of digital devices i.e Drones in Japan for various targets. The regulations included not limited to provisions stipulating the requirement for registration of flying digital device by the Ministry of Land and Forest (Drone license), application for permit to fly and use Drones in Japan as well as restrictions on the use and flying of Drones in populated areas as well as night time use of device among others. On this session, I learnt that, these laws and procedures are all set for maintenance of safety purposes to user and general public.</p> <p>Morning of the second day, Dr. Sugita talk highlighted principal behind the application of Drone as devices of global positioning. Here I learned that Drones uses either infrared sensors or radio waves to detect objects thus escape from hitting the object in the air. It also uses electromagnetic waves ranging 1.5 GHz to 6.5 GHz depending on brand, to communicate with monitor when in the air thus makes using drone a little easier.</p> <p>Moreover, I was merited to practically learn ways to assemble Drones in which “<i>Phantom 4 DJI Pro</i>” brand was provided and used. Drone assembly process basically starts with the insert of charged battery that powers the device then connect the controller to drone and then place the monitor in the controller (monitor can be smartphones or Ipad) and after that insert drone propeller that provide flying capacity to drone when switched on. Also, “<i>DJI Go 4 software</i>” among many publicly available software was introduced to be used with this brand of drone for capturing of images.</p>

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**c) Actual practice of drone flying**

Morning session of second day (2023.11.08) involved practical flying of *Phantom 4 DJI Pro*. But before that, I was taught various hands-on practices before drone flying using a mini-plastic made drone and simulated drone in the Flight simulator of the monitor. This involved power and ignition of “*Phantom 4 DJI Pro*”, ways to take off and control drone while in the air using the right buttons. Monitoring of drone battery charge and assessing the strength of connections or communication between “*Phantom 4 DJI Pro*” and transmitter in a flying mode (P in a P,S,A mode). The key point in this exercise I learned was first, Return to Home (RTH) code of “*Phantom 4 DJI Pro*” can be set at around 50m or 100m for safety of the device itself and it can only be activated by the device in case of emergency like collision with object in the air, flying out of range, sudden battery die-off and loss of signal between remote controller and “*Phantom 4 DJI Pro*” therefore guarantee a failsafe attitude second, depending on the power of drone, many devices are difficult to be clearly seen for monitoring above 100meters from the ground during the day thus operating these devices in the night is discouraged except deemed necessary and third many drone does not have inbuilt GPS for tracking location thus necessary to set manually the Home point using the “*DJI Go 4 software*” or relevant software, lastly, there is a possibility of obstruction between drone while in the air and the transmitter mainly due to interference with other free electromagnetic signals therefore, setting the home point code and allowing automatic activation is necessary.

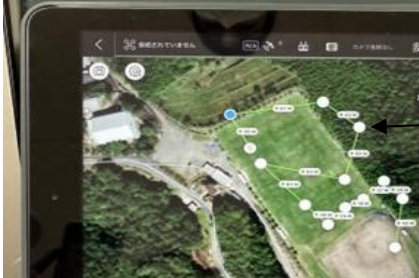


**Hands-on practice of flying Drone**

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**d) Application of “DJI Go 4 software” in Geofencing**

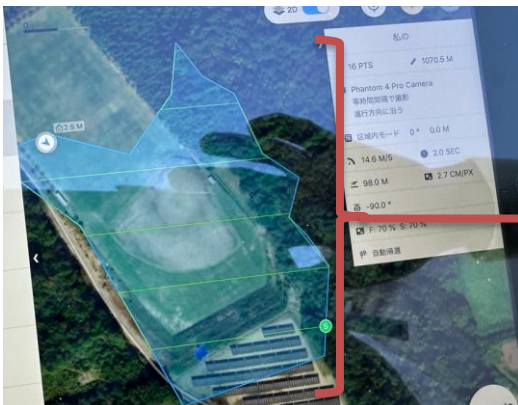
The “DJI Go 4 software” has a provision that can be used to limit the movement of “Phantom 4 DJI Pro” by setting a boundary. This is commonly applied when planning to capture a specific location of place by a process called geofencing. During this time, I learned procedures to abide when setting up a boundary for limiting “Phantom 4 DJI Pro” movement in a class group together with my fellow 3 student, starting with making the “Phantom 4 DJI Pro” way-points using the mission list tab in the DJI Go 4 software. After that, I flew the “Phantom 4 DJI Pro” and have it take a picture following the way-points



Way points created using the software

**e) Creation of map area for surveillance**

I also learned procedures to follow on creating a subtle map of an area that is intended for surveillance using drone. This application goes parallel with the previous process of making a geofencing as articulated in section “d” above.



Area intended for surveillance as created and mapped using DJI Go 4 software

**f) Application of “Agisoft Viewer Software” in drone image analysis & interpretation**

After we made the way-points limiting “Phantom 4 DJI Pro” movement and supplement the way points with geographical map of the area that I wanted to survey, I went to fly the drone and practically learn, experiences and follow the process of capturing image of the area using “Phantom 4 DJI Pro”. Completion of that stage paved a way for me to learn analysis of image/picture captured by the drone covering a specified area at a specified distance and camera angle.

Analysis of image starts with photo alignment, involving merging of all photos captured in 16-way points, then creation of *Ortho-mosaic* file (shows artificial lay-out of the area i.e plain area, elevated and contour) after selection quality parameters, point cloud and digital elevation mode.

*Ortho mosaic* file need to be exported in either Google KMZ, PEG, PNG and TIFF for real visualization

**g) Latest application of Digital technologies in Biology research**

During the third and last day (20231109), two talks were held purposely intended to introduce current application of digital earth technologies in field biology research. First session of the day was delivered by Dr. Taiki Katsumata who talked about “Development of New cetacean Research method using VTOL-UAV (Asuka MK-4). Take away message from this lecture was that, traditional methods used Binocular devices were mainly applied to survey intended area but the following was hindrance for their full utilization first, difficult to zoom in/out in out-of-reach areas by ship second difficult to estimate physical condition of an area. The Asuka MK-4 is Unmanned Aerial Vehicle (UAV) developed suitably for aerial survey providing practical solution to conventional methods.



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Small unmanned aerial vehicle (VTOL-UAV)  
ASUKA flying over “Mikawa bay” covering a  
104 km surveillance  
Photo courtesy: The Institute of Cetacean  
Research (Media release: March 28, 2022)

Second talk was delivered by Dr. Sato Inoue who highlighted the integration of Wildlife, Drone and Artificial Intelligence in Biology research. During this talk, I learned that using drone it is now possible to understand individual heterogeneity in collective behavioral study of animals and quantifying multiple behavior simultaneously using drones. Moreover, animals’ position and posture can be recorded by drone that makes it possible to estimate population size and behavior of study species respectively as well as tracking body parts movements even at night using digital earth technologies such as drones.

## 6. Others

### Acknowledgements

- I am especially grateful to Professor Yoko Mitani (sensei), Professor Ikki Matsuda and Dr Nahoko Tokuyama for the teaching and guidance during this field training.
- Special gratitude to Dr. Sugita Satoru of the Chubu University Training Centre for the theoretical and practical teachings during this course, most important hand-on session of flying drone and the use of different software for photo creation and interpretation.
- Massive appreciations to my fellow M1 student who made this field trip very joyous as we played together table tennis with lots of laughter.

