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Unmanned Aircraft Systems (UAS) Training

Report on WFP UAS Training in Madagascar—
Let's COORDINATE, Let's FLY and Let's MAP



August 2018

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Introduction

Antananarivo, Madagascar, 12—19 August

The first newly-designed Unmanned Aircraft Systems (UAS) training series took place in Antananarivo, Madagascar between 12 and 19 August 2018. The World Food Programme (WFP), as global lead agency of the Emergency Telecommunications Cluster (ETC), developed this training, which includes three modules: Let's COORDINATE on cooperation between various stakeholders; Let's MAP on processing data; and a practical flight exercise—Let's FLY.

More than 60 participants from humanitarian, government, academic and private sector organizations completed the three UAS modules looking at practical applications of this technology — from emergency preparedness and disaster response to climate adaptation. The participants learnt about the technology, policies and regulations, safety, data protection and data analysis.

The theoretical part was complemented by discussions on Madagascar's context, focusing on disaster preparedness for cyclones and floods. Different drone types were demonstrated and participants were able to log 16 hours of flight time.

These training courses were co-organized by WFP and the National Office of Risk and Disaster Management (BNGRC) with support from the European Commission's Directorate-General for European Civil Protection and Humanitarian Aid Operations (ECHO) and the Government of Belgium.

This training was organized and supported by:





Training Overview

Summary of UAS Training

In August 2018, WFP supported by BNGRC, ECHO and the Government of Belgium, delivered a trial run of the ETC-led UAS training courses on the use of drones in humanitarian context¹. Sixty representatives from more than twenty organizations attended this week-long event to learn about the technology, safety, privacy, data protection, code of conduct and more.



60 PARTICIPANTS

28 ORGANIZATIONS

The training comprised three components:

- Let's COORDINATE;
- Let's MAP²;
- Let's FLY.

Topics included:

- Technology overview, incl. construction & parts;
- Theory and principles of flight;
- Rules and regulations;
- Safety and risk prevention;
- Coordination with international and local actors;
- Ethics, with an emphasis on data protection;
- Use of UAS in Madagascar;
- Flight planning, incl. emergency procedures;
- Hands-on flight time;
- Mapping exercises;
- Way forward.



"This training covered the full spectrum of drone operations. Up to now the primary focus has been on the use of drones in emergencies through the coordination workshops, but this time it included flight training and mapping training. This gave the participants a feel of every aspect of using drones, from planning a flight, executing it, and then processing the data afterwards."

**Patrick McKay,
WFP Regional Bureau Johannesburg (RBJ)**

¹ Between January 2017 and June 2018, WFP supported by the Government of Belgium, delivered several workshops (from Belgium, through Colombia, to Niger) gathering experts from humanitarian, private sector and government organizations, to define the coordination model on use of drones in emergency preparedness and response. Lessons learnt from the different workshops were then integrated to produce new course material with three specialized modules: Let's COORDINATE, Let's MAP and Let's FLY. The UAS training in Madagascar was the first delivered in the new format.

² The Let's MAP course was conducted as a pilot for WFP participants only. The course material was subsequently refined and integrated into the UAS training.

Training Overview

Details on Three Training Components

Let's COORDINATE

After the official inauguration of the UAS Training series, several theoretical sessions were conducted: introduction to UAS technology; presentation on the humanitarian clusters and ETC coordination as well as country-level coordination. Moreover, BNGRC presented a session on their disaster risk management and response, while WFP talked about case studies on UAS coordination as well as safety considerations. Later the participants divided into groups to discuss best practices and to develop a concept of operation (CONOPS).

The second day of Let's COORDINATE covered the following topics: privacy law and practices, case studies and best practices from international UAS coordination, as well as a group exercise to develop a national coordination mechanism.

One of the key topics on Day 2 was data protection. BNGRC and WFP stressed the importance of planning data collection prior to engaging the technology by defining what information needs to be collected, and who will be allowed to access it. The best practice is to collect the minimum amount of data necessary for a full analysis and avoid the misuse of information. For instance, information on regions at risk of

landslide might be used by insurance companies to charge higher fees. Moreover, it is crucial to gain consent from the affected community and to plan how to protect the people, before collecting any information. In sudden onset emergencies, it is difficult to obtain permissions in a timely manner. Hence, in high-risk countries and regions, WFP and other international organizations, partner with the government to prepare for such occurrences by obtaining permissions ahead of time. In Madagascar, WFP and BNGRC will work with the communities at risk. This will also help to collect baseline data for comparison when the next emergency strikes.

The presentations were followed by group discussions on the way forward on using drones in Madagascar. In order to implement the UAS coordination model in country, the participants agreed on several actions:

- Identify all relevant actors;
- Put a coordination strategy in place and a communications plan around it;
- Identify the flow of information.



To ensure data is handled appropriately, the participants identified the following steps:

- Agree prior to flight what data will be collected, as well as how to store and share it;
- Develop policies on data access and use;
- Define data retention policy;
- Put data sharing agreements in place and identify secure channels for;
- Record each flight log for lessons-learnt.

This training module was complemented by a number of presentations from various WFP divisions, including Aviation Service, Aviation Safety, Digital Transformation, and Vulnerability Analysis and Mapping (VAM). These presentations covered a range of topics relevant to deploying drones in emergency preparedness and response—from embedding safety procedures into national aviation legislation, to practical applications of the technology for WFP and its partners e.g. by merging drone data with satellite imagery for better food security analysis.

Let's MAP

WFP ran a trial of the core module Let's MAP, teaching WFP participants on how to process data from UAS. This course taught participants how to create 2D maps and 3D models by using the following software:

- Pix4Dcapture
- AgiSoft Photoscan

Let's FLY

After moving from the capital city to Mantsoa Lake, WFP conducted the final module of the UAS Training—Let's FLY. which totalled 12 hours (2 x 6 hours) hands-on flight time. The participants were able to get 12 hours of hands-on flight experience using the following technology:

- Multi-rotor UAS (Spark and Mavic Pro);
- Fixed-wings UAS (Ebee).



Survey Results

36 participants took part in the survey distributed at the end of the Let's COORDINATE Training.

RESPONDENTS' BREAKDOWN



53% humanitarian organizations



31% government entities



11% academic institutions



5% private sector

RESPONDENTS' FEEDBACK

89% felt the training had **met their expectations**.

86% agreed the **amount of content** and **number of activities** were **appropriate** for the time available.

97% agreed there was a **good variety** of **content delivery methods**.

KEY TAKEAWAYS

- Practical applications of drones;
- Coordination between various stakeholders;
- Partnerships and networking;
- Technical overview of different drone types;
- Data processing and analysis;

- Safety and security procedures;
- Data privacy, management and storage;
- Regulations;
- Pre-mission planning & risk management.

SUGGESTION FOR FUTURE TRAINING

- Involve other actors e.g. Civil Aviation Authority (CAA) and International Civil Aviation Organization (ICAO);
- Provide more practice time;
- Divide into smaller group during demonstration;
- Share pre-reading materials (user manuals) & software prior to training ;
- Conduct a theoretical session on drone mechanics and the principles of aerodynamics;
- Organize a follow-up training.

Conclusion

The first run of the ETC training series on UAS use in humanitarian response was successfully conducted in Madagascar. This will serve as a starting point for the series of UAS Training courses to be held by WFP in six regions over the coming months. The full package of three training components serves as a starting point for various actors to define their national coordination mechanisms. It builds capacity for local staff, who will be able to use UAS technology from the flying to processing data for emergency preparedness and response.

OVER THE COMING MONTHS, WFP IS AIMING TO DELIVER 10+ SUCH TRAINING COURSES ACROSS DIFFERENT REGIONS WITH THE INTENTION OF BUILDING ON THE SUCCESS OF MADAGASCAR.

During the Let's COORDINATE training, the participants defined the way forward for the national actors to be able to effectively use drones in future disasters.

NEXT STEPS

- Advance training in Madagascar;
- Further development of standardized procedures and protocols;
- Development of checklists and manuals;
- Raising awareness among various stakeholders;
- Strengthen cooperation with local government e.g. working on obtaining permissions for data collection prior to emergencies.



Annex 1: Agenda

SESSION	TIME	FACILITATOR(S)
Sunday, 12 August (Let's MAP dry run, for WFP staff only)		
Monday, 13 August (Let's COORDINATE)		
Opening & Introductions	1.5 h	WFP, BNGRC
Introduction to UAS, ETC Coordination, and Country Coordination	1 h	WFP UAS Team
Overview of CAA and NDMO	1.5 h	CAA, BNGRC
Case Studies and Safety Considerations	1 h	BNGRC, WFP
Developing CONOPS	1 h	
Wrap-up Day 1	1 h	
Tuesday, 14 August (Let's COORDINATE)		
Opening and Review of Day 1	1 h	WFP, BNGRC
Overview of Privacy Laws and Practices	1 h	WFP, BNGRC
ETC UAS International Coordination (Best Practices & Case Studies)	1.5 h	WFP UAS and WFP Aviation
Group work on the Development of Coordination Mechanisms	1 h	WFP UAS Team
Planning Session for Practical Application	1 h	WFP UAS Team
Wrap-up Day 2	1 h	WFP UAS Team
Wednesday, 15 August (Let's MAP dry run, for WFP staff only)		
Thursday, 16 August (Let's COORDINATE and Let's FLY)		
Simulation Exercise 1 & 2	4 h	WFP UAS Team
Post Exercise Debrief	2 h	WFP UAS Team
Friday, 17 August (UAS Training evaluation and transfer to field location)		
Recap and Lessons-learnt on the Training	3 h	BNGRC, WFP
Training Review, Evaluation & Certificates	1 h	BNGRC, WFP
Saturday, 18 August (Let's FLY)		
Hands on Flight for Participants	6 h	WFP UAS Team
Saturday, 19 August (Let's FLY and transfer back to Antananarivo)		
Hands on Flight for Participants	6 h	WFP UAS Team

Acronyms

BNGRC	<i>Bureau National de Gestion des Risques et Catastrophes</i> (Madagascar National Office of Risk and Disaster Management)
CAA	Civil Aviation Authority
CONOPS	Concept of Operation
ECHO	Humanitarian Aid and Civil Protection
ETC	Emergency Telecommunications Cluster
NDMO	National Disaster Management Office
NGO	Non-governmental Organization
UAS	Unmanned Aircraft Systems
WFP	World Food Programme

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World Food Programme

Via Cesare Giulio Viola 68/70
00148 Rome, Italy
T +39 06 65131 wfp.org