

Using high resolution imagery for Camp Management in Haiti



IOM considers the use of mapping drones a helpful tool to plan shelter units and to monitor the evolution of camps. As a result, IOM has been using drones since 2012 for this purpose. An initial drone flight in Port-au-Prince in February 2012 provided figures on seven camps for persons displaced by the 2010 earthquake. The imagery was used to delimit the extent of the camps, and then to count and uniquely identify the tents within each camp. These data could then be linked to IDP data stored in the Displacement Tracking Matrix (DTM). This helped establish the size of camps (as the number of tents and number of people were known), organize the camps into blocks and zones to inform registrations and operations for decision making.

Background

The International Organization for Migration (IOM) first used unmanned aerial vehicles (UAVs) in Haiti for census purposes,¹ but quickly recognized that UAVs could work in conjunction with the Displacement Tracking Matrix (DTM), a “monitoring tool used by the Camp Coordination and Camp Management (CCCM) Cluster as a means to rapidly collect data on the earthquake affected Internally Displaced Persons (IDPs) living in sites.”² After a first flight in the area around the presidential palace where several IDP camps had been set up a few hours after the 2010 earthquake, the UAVs were used regularly for monitoring IDP campsites. Based on the resulting imagery, IOM provided “cartographic atlases of identified IDP sites which feed into the decision support tools that guide the humanitarian response as well as the transition towards return and recovery.”³ This information was shared with other actors to help in decision-making.⁴

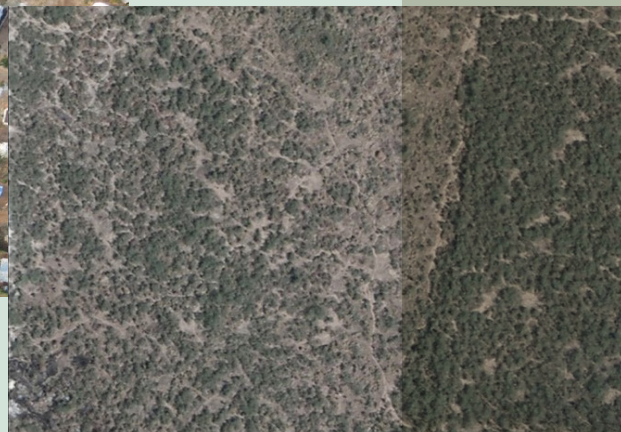


Figure 1 Upper left: Canaan April 2013;
bottom right: 3 years before

1 See case study No. 7 available at drones.fsd.ch

2 UAV (Unmanned Aerial Vehicle) as Aerial Mapping & GIS platform, Updated: December 2012, contact: Vlatko Avramovski (<https://docs.google.com/file/d/0B23KIWXOmZhJTkRIN2h5dmEtdWc/edit>)

3 ibid

4 Sebastián Ancavil, GIS Officer at IOM, Interviewed by Audrey Lessard-Fontaine, 11 October 2015.

Implementation

The first official flight took place in Port-au-Prince, and provided CCCM with up-to-date figures on the seven camps in that area. This flight showcasing the use of drones in the context of camp monitoring was conducted by the United Nations Institute for Training and Research (UNITAR) Operational Satellite Applications Programme (UNOSAT) using a Swinglet UAV. IOM originally planned this as a one-off initiative, but eventually decided to monitor the camps continuously, and purchased a drone of the same type shortly afterwards. In the years that followed, the UAV became a recognized tool for monitoring the more than 40 rapidly evolving camps around the country.

The long-term IOM monitoring of the IDP camps has enabled IOM to retrace the development of the camps, some of which closed down after a certain time while others (such as Jérusalem, Canaan and Onaville) evolved to become officially recognized by the Unité de Construction de Logements et Bâtiments Publics in 2013 as new neighbourhoods in need of long-term urban planning.

In this same period, Drone Adventures – in an effort to demonstrate the effectiveness of drone technology in humanitarian aid⁵ – used three eBees to take further imagery

5 Drone Adventures Blog Post: <http://blog.droneadventures.org/post/85864746895/drone-adventure-in-haiti> [Accessed 5 January 2016]

that also contributed to the camp monitoring. After buying an eBee, IOM continued data collection on campsites throughout 2014 and 2015. Since 2014, the OpenStreetMap (OSM) community has also owned an eBee drone, and has supported the assessments in Canaan. An updated assessment is planned for April 2016.

The imagery was first used to delimit the extent of the camp, and then to count and uniquely identify all the tents within the camp. These data could then be linked to the IDP data stored in the Displacement Tracking Matrix. The imagery together with the data from the DTM helped establish the size of camps (the number of tents as well as number of people per tent were known), organize the camps into blocks and zones and inform registration and operations for decision-making. Based on the up-to-date imagery and a precise elevation model, the shelter unit, for instance, was able to plan construction and build shelters, conduct risk assessments and make 3D models of the area.

In addition, sharing the information collected through drone use with partners such as the United Nations Stabilization Mission in Haiti helped develop estimates of the need for security personnel at the different sites.

IOM Haiti has been using UAVs to collect data since early 2012. In a series of technical meetings with the Civil Aviation Authority, we showed the tool, explained the imagery collection and discussed how IOM intended to use the information. After receiving approval from Civil Aviation, we employed the UAV in several ongoing projects – DTM, CCCM, Disaster Risk Reduction, and the Census of Affected Areas and Populations.

In the absence of regulations regarding civil UAV flights, we implemented some guidelines on flight timing and duration, geo-fences (such as the airport), areas of flights, altitude

and UAV speed. We had to reassure the Haitian authorities that the census project imagery would not capture information on individuals, that even high-resolution imagery cannot distinguish among faces.

The approval of the Civil Aviation Authority was a crucial first step, but when flying drones in the field we always seek the approval of the local population, so we took the time to meet with the people to explain our work and to discuss the kind of data that the UAVs and our field teams collect.

Sebastián Ancavil, IOM, 2016

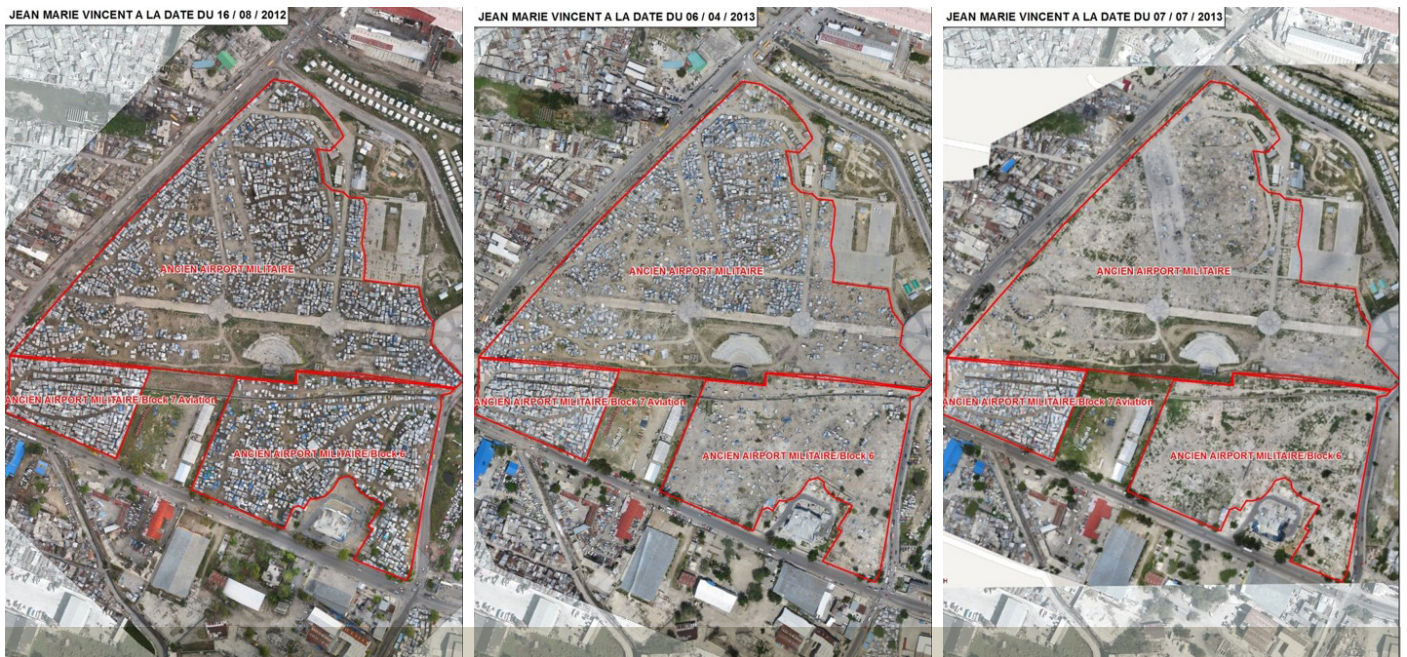


Figure 2 The evolution of Jean Marie Vincent Camp in Port-au-Prince was monitored by IOM until its closure in 2013



Figure 3 Evolution of Teren de Golf camp between March (see top left) and December 2013 (bottom right)

Evaluation

Impact

IOM considers the drone imagery a helpful tool that allowed them to greatly improve their response, especially in terms of planning for the shelter unit.⁶ Having detailed imagery of the area and high resolution DTM data helped them prepare their assistance and adapt shelter construction based on detailed ground data. Added value was gained by linking data collected using UAVs with information stored in the DTM. The benefits for planning and registration encouraged IOM to continue the monitoring for several years after the initial drone flights in 2012.

Choice of Method

The decision to use drones for camp monitoring was made after seeing the benefits of a first test deployment by UNOSAT. Since the idea was to monitor the camps regularly, a drone owned by IOM was considered the best choice. Other options (such as satellite imagery) would not have

allowed regular monitoring of sites at such reduced costs. Since IOM was able to use the drones in different projects, the organization views the investment as beneficial.⁷ In addition, the possession of a drone by IOM made it possible to collect information whenever needed.

Community Engagement and Social Acceptance

IOM concluded an agreement with the Civil Aviation Authority granting them permission to fly the drones, and all the assessments were made in coordination with local government and the international community. The inclusion of J/P HRO, a Haitian relief organization,⁸ in the follow-up process also contributed to the social acceptance of the project. Both IOM and UNOSAT emphasize that community and government acceptance and approval of the project and flights are key to success when planning and implementing a project using UAVs.

6 Sebastián Ancavil., Interviewed 21 October 2015.

7 The Different Uses of UAVs by IOM Haiti: http://proceedings.esri.com/library/userconf/unic15/papers/un_19.pdf [Accessed 22 February 2015]

8 <http://jphro.org/> [Accessed 24 February 2016]



Figure 4 Up-to-date imagery and an elevation model allowed the shelter unit to plan new construction effectively

Plans for Adaptation

While the IOM team in Haiti considers the use of UAVs for camp monitoring a success, there are no plans to adapt the project to other contexts yet, but IOM does have other tasks where it could make use of its newly acquired expertise.

The work with drones in Haiti continues in 2016. Both IOM and the OSM community regularly use drones for various activities including monitoring the evolution of urban neighbourhoods.

Resources

IOM Displacement Tracking Matrix:
<http://iomhaitidataportal.info/dtm/>

IOM Haiti – UAV applied to humanitarian aid:
<http://reliefweb.int/sites/reliefweb.int/files/resources/Unmanned%20Aerial%20Vehicle%20Technology.pdf>

The Different Uses of UAVs by IOM Haiti:
http://proceedings.esri.com/library/userconf/unic15/papers/un_19.pdf

Data Management Unit, IOM Haiti Mission:
<https://prezi.com/f0i-veg4txhf/data-management-unit-iom-haiti-mission-french/>

Acronyms

CCCM	Civil Aviation Safety Authority
DTM	General Packet Radio Services
IDP	Multi-drug resistant TB
IOM	International Organization for Migration
OSM	OpenStreetMap
UAV	Unmanned aerial vehicle
UNOSAT	United Nations Institute for Training and Research (UNITAR) Operational Satellite Applications Programme

The views expressed herein should not be taken, in any way, to reflect the official opinion of the European Union, and the European Commission is not responsible for any use that may be made of the information it contains.

Technical Specifications & Credits

Type of system: Swinglet and eBee Fixed Wing Mapping Drones
Deploying Agency: IOM
Piloting Agency: IOM
Dates of Deployment: Starting 2 January 2012
Author: Friederike Alschner, Audrey Lessard-Fontaine, Denise Soesilo, ed.

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