USING DRONES (UAS) FOR DISASTER DAMAGE ASSESSMENT IN VANUATU

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Drones for Disaster Damage Assessment

“Are drones a useful tool or toys that need to be regulated?”
The Washington Post

“Drones Are Not Toys and Should Not Be Treated as Such”
Los Angeles Times

“Industry just wants rules... because there are so many amazing things that can be done with a drone to make the world safer”
Nancy Egan, 3D Robotics, on FAA long awaited regulations
### Drones for Disaster Damage Assessment

**Why regulations?**

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#### Airspace Requirements:

- **VFR**
  - Minimum visual range
  - Adapted to local conditions

- **IFR**
  - Adheres to established IFR lines
  - Aeronautical charts

#### Operational Requirements:

- **Special Use Airspace**
  - Authorisation required

#### Hazardous Areas:

- **Uncontrolled airspace**
  - Includes VFR Traffic Lanes and General Aviation Areas (require separation by 5 NM)

#### Non-designated Airspace:

- **Common Operating Zones (COZ)**
  - Support for commercial and non-commercial operations

**NOTE:** images above are digital animations
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13 December 2016 – ICAO launched its new UAS Toolkit on the occasion of International Civil Aviation Day.

https://www4.icao.int/uastoolkit/home/about

May 2017. AUVSI ‘Xponential 2017’ Conference – ICAO announced its goal of developing a common global framework for UAS Traffic Management (UTM). This initiative is part of the work programme that has been assigned to ICAO by its 191 member States.
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CAAV. Part 101. DO’s (summary 1/2)

- Fly the aircraft so it isn’t a hazard to other aircraft, property and people.
- Avoid flying over people that you do not have consent from.
- Fly your aircraft clear of controlled airspace. Controlled airspace normally extends well beyond 4 km from a controlled aerodrome, and to the ground.
- Fly it only in daylight.
- Have consent from the owner of the land you are flying over.
- Have permission from the administering authority (such as the army) to fly in special use airspace (such as a military operating area).
- Are able to see the aircraft with your own eyes (eg, not through binoculars, a monitor, or smartphone) or have a second person with you as an observer.
- Give way to all manned aircraft.
- Have knowledge of airspace, especially restrictions applying in the area you want to fly.
- Are flying an aircraft that is no heavier than 25 kg.
- Fly no closer than 4 km from any uncontrolled aerodrome.
- Fly your aircraft no higher than 120 m (400 feet) above ground level.

For more information: www.caa.govt.nz
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CAAV. Part 101. DO NOT’s & Exceptions (summary 2/2)

Over or near a wildfire.

Anywhere near electricity transmission pylons, and wires.

Shielded operation
A shielded operation is a flight where your aircraft is within 100 m of, and below the top of, a natural or man-made object. For example, a building, or a forest of trees.

You can fly at night but only in a shielded operation.

You can fly your aircraft closer than 4 km from any aerodrome or heliport, provided; your flight is outside the boundary of the aerodrome, is a shielded operation, and in airspace that is physically separated from the aerodrome by a barrier that is capable of stopping the aircraft.

In the case of uncontrolled aerodromes, you get agreement from the aerodrome operator and are willing to comply with their conditions, and you have someone else with you to help monitor the flight;

In the case of controlled airspace, you have authorization from the air traffic control unit responsible for that airspace (go to www.airshare.co.nz to find out how).

In some situations you can fly higher than 120 m above the ground. Get advice from CAAV.

The owner of many local parks is the local council. Some councils have given blanket consent for people to fly their aircraft over those parks. Check with yours.

For more information: www.caa.govt.nz
CAAV. Part 102.

If not intended to fly under Part 101, submit an exposition to the Director (technical document as per Part 102.11), and obtain approval from CAAV to perform operations under an *Unmanned Aircraft Operator Certificate*.

Operations Specifications (Part 102.15): privileges and operations the operator is permitted to perform, including: (ii) identification of the geographical areas of operations approved by the Director.
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Use of drones for DDA:

Under Part 101:
- Image and video collection. Locally.
- Quick mapping of specific areas. 10 to 100 Ha/flight
- Restricted to VLOS operations.

Under Part 102:
- Cargo delivery (First response. Small payloads <2Kg)
- Internet tethering (restoration of communications)
- BVLOS operations.
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Use of drones for DDA. For example, TC Pam:

- Coordination with CAAV (?)
- Imagery collected by UAViators (13-14 March 2015)
- Imagery owned by the Government of Vanuatu
- Published on Mapbox (integration with Pix4D)
- Shared with the Humanitarian OpenStreetMap Team and Micromappers.

Source: Matt Irwin, “Mapping Cyclone Pam’s destruction with drones”
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Use of drones for DDA. For example, Ambae E.C. (1/2):

Source: UNICEF VFO. Vanuatu.
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Use of drones for DDA. For example, Ambae E.C. (2/2):

WASH cluster officers making decisions using the maps generated the same day from drone imagery.

Source: UNICEF VFO. Vanuatu.
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Use of drones for DDA. Concerns:

- “Kaljoral” and privacy concerns. Dealing with a vulnerable population.
- Are drones an “all-around” tool? Which specific tasks are they suited for?
- What about real time streaming to HQ’s and NDMO’s?

Source: NBC News
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Use of drones for DDA. What is next?:

- ADS-B: Automatic dependent surveillance – broadcast.
- ICAO Aviation System Block Upgrades (ASBU) Framework. Air/Ground Technologies.
- Improved situational awareness (radar in every plane).
- Suitable for UAS BVLOS.

How Does ADS-B Work?

uAvionix Ping2020. Miniature ADS-B transceiver for drones. 20 grams
Use of drones for DDA. What is next?:

- Adaptive Streaming: a video file is broken up into segments (encoded to adaptive format).
- As internet connection changes, it switches back and forth between qualities at each video segment.
- UAS long-range operations and two-way real-time control (streaming and remote desktop).
Questions