Drones in Humanitarian Action

Mapping and Search & Rescue
Summary

- Mapping

- SAR
  - Monitoring, real-time information, rapid damage assessment

7 case studies

3 deployments

1 simulation

2 case studies

1 simulation
MAPPING

- Most common and most popular application.
- Lightweight, friendly designs and automated workflows.
- Accurate two-dimensional maps,
- Elevation models
- Thermal maps
- 3D maps
Advantages

- Aerial imagery of relatively small areas (<20km²)
- Areas with cloud cover
- Dense and fast changing settlements
- To create surface elevation models
Data Processing and Analysis

Depending on your needs .......

a BIG effort

Done in a snap

Comparison

Safety

You Define

YOUR OWN

SUCCESS

Suitability
## Data Processing and Analysis

<table>
<thead>
<tr>
<th>Application</th>
<th>Flood Mapping for Disaster Risk Reduction</th>
<th>Post Earthquake Mapping</th>
<th>Disaster Risk Reduction</th>
<th>Hurricane flood damage analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location</strong></td>
<td>Tanzania</td>
<td>Nepal</td>
<td>Tajikistan</td>
<td>Haiti</td>
</tr>
<tr>
<td><strong>Products</strong></td>
<td>- Digital street map</td>
<td>- Orthorectified aerial photograph</td>
<td>- Orthorectified aerial photograph</td>
<td>- Orthorectified aerial photograph</td>
</tr>
<tr>
<td></td>
<td>- District drainage system map</td>
<td></td>
<td>- DSM</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- 3D surface model</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mapping area size</strong></td>
<td>88 km²</td>
<td>1.5 km²</td>
<td>23 km²</td>
<td>2 km²</td>
</tr>
<tr>
<td><strong>Image resolution</strong></td>
<td>5 cm</td>
<td>3.4 cm</td>
<td>15.8 cm</td>
<td>4 cm</td>
</tr>
<tr>
<td><strong>Flight time</strong></td>
<td>(2-3 drones flying simultaneously)</td>
<td>1,5 days (with 6 consumer drones flying simultaneously)</td>
<td>11.6h (29 flights)</td>
<td>2 hours</td>
</tr>
<tr>
<td><strong>Number of Images</strong></td>
<td>20000</td>
<td>2065</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Data size</strong></td>
<td>700 GB</td>
<td>1-2 GB</td>
<td>37 GB</td>
<td>3 GB</td>
</tr>
<tr>
<td><strong>Data processing time</strong></td>
<td>6 weeks</td>
<td>2 days overnight</td>
<td>2 weeks</td>
<td>few hours</td>
</tr>
</tbody>
</table>
Cost Factors

- Preparation
- Data collection
- Data processing
- Data analysis
Emergency Response Mapping

Not yet a success ... 

- Not yet used immediately following an emergency
- An average of 6.5 days for a drone to arrive at the scene of a disaster
- Local capacity for drone mapping is still limited.

Ways to improve ...

- Success when existing drone in-country
- Equip first responders with drones to reduce response time and costs.
- Integration of these tools into the standard operating procedures
Way forward for mapping drones

- A need: remove the prejudice that surrounds the use of drones.

- On the technical level: Data management and data sharing.

- For emergency response: Trained local capacity in place, make pilots operational.
Search and Rescue

Aim of a drone deployment: increasing operational awareness of ground teams; help to locate missing people.

Very few field missions have been conducted. Most experiences were simulations.

Earliest stages of emergency = the least time for integrating new technologies and running tests.

Interest when drones equipped with infrared, or other specialized cameras.
Monitoring, rapid damage assessment and real-time information

**Principle:** data is delivered immediately

- A developing application area
- Situational awareness for ground teams
- Rapid assessment of damage, such as collapsed buildings or blocked roads

**No evidence of experience:**

- Monitoring distribution of goods,
- Identifying and analyzing temporary settlements or tracking displacement or movement of people
Are you ready for take off?