How Modern Technologies (drones, big data and AI) have Revolutionised Approaches to Disaster Management, Resilience and Response?

Haidar Baqir, Regional IT Emergencies Officer, WFP Regional Bureau for Asia-Pacific and Representative, Emergency Telecommunications Cluster (ETC)
Assisting 80 million people in around 80 countries each year, the World Food Programme (WFP) is the leading humanitarian organization saving lives and changing lives, delivering food assistance in emergencies and working with communities to improve nutrition and build resilience.

Two-thirds of our work is in conflict-affected countries where people are three times more likely to be undernourished than those living in countries without conflict.

Photo: WFP / Saikat Mojumder
Emergency Telecommunications Cluster
Who we are

The ETC is a global network of humanitarian, government and private sector organisations working together to provide shared communications services in humanitarian emergencies.
Where we worked in 2017

Operation active:
- Caribbean Islands
- Haiti
- Nigeria
- Yemen
- South Sudan
- Democratic Republic of Congo
- Bangladesh

Operation closed:
- Central African Republic
- Madagascar

Preparedness:
- Haiti
- Central African Republic

Countries:
- Central African Republic
- Yemen
- Syria
- Iraq
- Nigeria
- South Sudan
- Democratic Republic of Congo
- Madagascar
- Bangladesh
- Pacific

Region:
- Caribbean Islands
- Pacific
ETC Services

SECURITY COMMUNICATIONS
Through VHF radio

INTERNET CONNECTIVITY
Through quick-deploy satellite terminals and Wi-Fi hotspots

TECHNICAL HELP DESK
For users

COORDINATION AND INFORMATION MANAGEMENT
Including liaison with government authorities.

PREPAREDNESS

SERVICES FOR COMMUNITIES (S4C)

DRONE COORDINATION

IN HUMANITARIAN EMERGENCIES, COMMUNICATIONS MEANS
INFORMATION, CONNECTION, LIFE.

Photos: Office for the Coordination of Humanitarian Affairs (OCHA).

www.ETCluster.org
Drones Shapes and Sizes
Emergency Coordinators need to make rapid decision often with limited information.
Emergency Response

Drones provide a platform to rapidly collect remotely sensed image data at high resolution.
Nepal: Earthquake

April 25, 2015
Mapping Drone

Weight <750g
Flight time: <40 min
Area coverage of 1-3km²
Resolutions: 2.5 -20 cm
Maps comparisons

Drone

Google Earth

OpenStreetMap
Vegetation monitoring and crop stress detection

Normalized Difference Vegetation Index (NDVI) values give an indication of crop stress...

Reveals status of the crop about 10 days earlier than what can be seen by the human eye.
What the human eye sees
What the NIR image shows
What the NDVI shows
Disaster Risk Reduction and Recovery Mapping in Tajikistan (3D Modeling)
Digitized maps based on drone imagery were used for Urban Planning

Credit: Ramani Huria
Cell On Wings

Currently deployed with AT&T, US MNO
Roaming 6 GSM Networks
40 Sq Miles Coverage
Further than COWs
AI and Machine learning

An experienced remote sensing analyst normally achieves image analysis through visual interpretation.

One 20 minute flight, can take up to half a day to analyse!
AI and Machine learning

That requires machine learning software to rapidly assess UAV imagery (Big Data)
AI and Machine learning

- Faster decision making
- More informed process
- Improved targeted assistance
AI and Machine learning
AI and Machine learning
AI and Machine learning
AI and Machine learning

Rapid UAVs Data Analysis in Emergencies

List of Images

Results

Total area
- Damaged houses: 62
- Intact houses: 58

Visible area
- Damaged houses: 63
- Intact houses: 58
AI and Machine learning
The Future Is Now!

(Lets Plan, Coordinate, and Fly)
Humanitarian drone coordination: It’s a lot more than just drones.

- What kinds of metadata standards will be most useful?
- What kinds of regulations need to be written?
- What kind of data needs to be collected?
- How do we ensure protection of privacy, security and other rights?
- What are the best ways to share UAV data?
- What kinds of information services will be most efficient during disasters?
- How do communities need to be engaged?
Humanitarian Drone Missions: How time flies
UAV Deployment Coordination Model

Engage
- Request mechanism
- Awareness
- Advocacy

Needs
- Request Management
- Ticketing
- Prioritization

Mobilize
- Assets
- Partners

Plan
- Develop flight plan
- Services with needs
- Coordinate

Permission
- Aviation Authority
- Telecom Authority
- Acceptability

Response Phase

Tasking
- Organize teams
- Provide paperwork
- Coordinate deployment

Implement
- Fly
- Get the data
- Consolidate

Service Delivery
- Portal
- Format
- Analysis

Acceptance
- Final product
- Visualization

Deployment
The approach

- Technical Standards
- Partnership Framework
- Tools and Solutions
- AAP and Communities Engagement
- Advocacy in High Risk Countries
- Policies (Operational Manuals, Code of Conducts, SOPs, deployment, etc)
Impacts

Overlap  
Gaps  
Complexity  
Reputational Risk  
Operational Risk  
Wrong perception  
Delay of response

Efficiency  
Safety  
Cost Saving  
Collaboration  
Security  
Standardisation  
Trust & acceptance  
Community engagement  
Innovation
WFP Drone Activities

Throughout 2017-18, WFP consolidated the inputs from the TWG and conducted workshops and six countries – the Dominican Republic, Mozambique, Myanmar, Peru, Colombia, and Niger.

The workshops provided a clear definition of the coordination model; bringing together relevant stakeholders; identifying improvement areas; defining and evaluating methods to increase local, regional, and national capacity for emergency responses. WFP is planning a series of additional trainings in other high-risk countries.
QUESTIONS?