

# UNMANNED AIRCRAFT SYSTEMS in DISASTER MANAGEMENT

*An Introduction*



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# National Disaster Preparedness Training Center (NDPTC)

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Offers FEMA–certified training courses focused on Disaster preparedness, response, and recovery

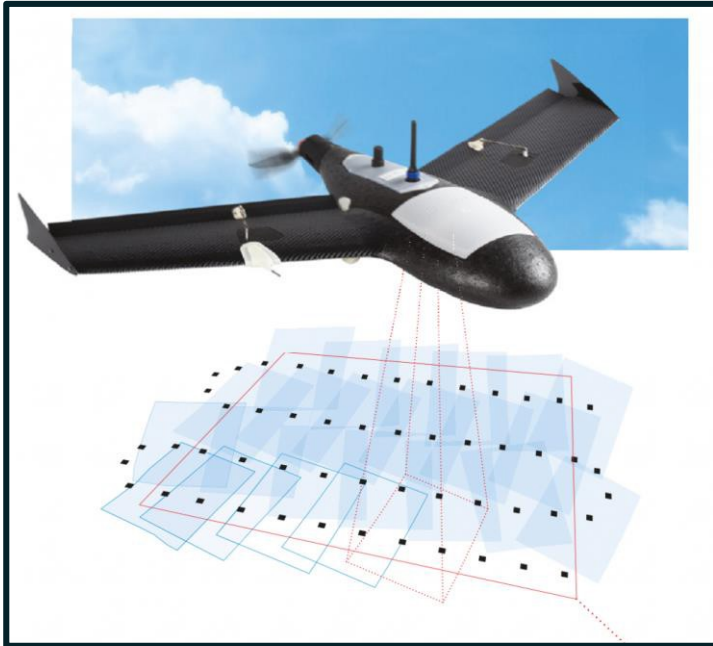
- New Series 2016: *UAS in Disaster Management*



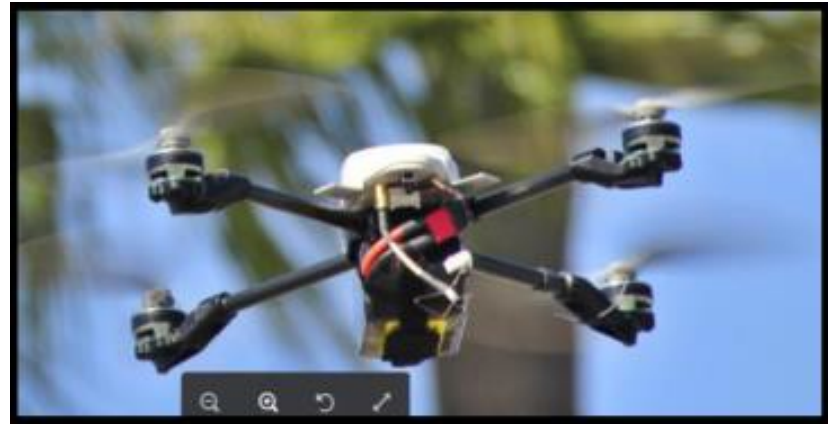
The National Disaster Preparedness Training Center offers FEMA certified courses. As a DHS/FEMA training provider we can offer this training at no direct cost to your agency. For more information or to schedule any of these courses at your location, please contact NDPTC's training office at: [ndptc-training@lists.hawaii.edu](mailto:ndptc-training@lists.hawaii.edu) or your State Administrative Agency.

# UAS – What They Are

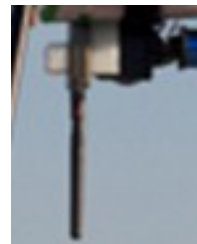
Fixed-wing



Rotorcraft



# UAS – What They Carry



Inspection  
and  
Awareness  
Imagery

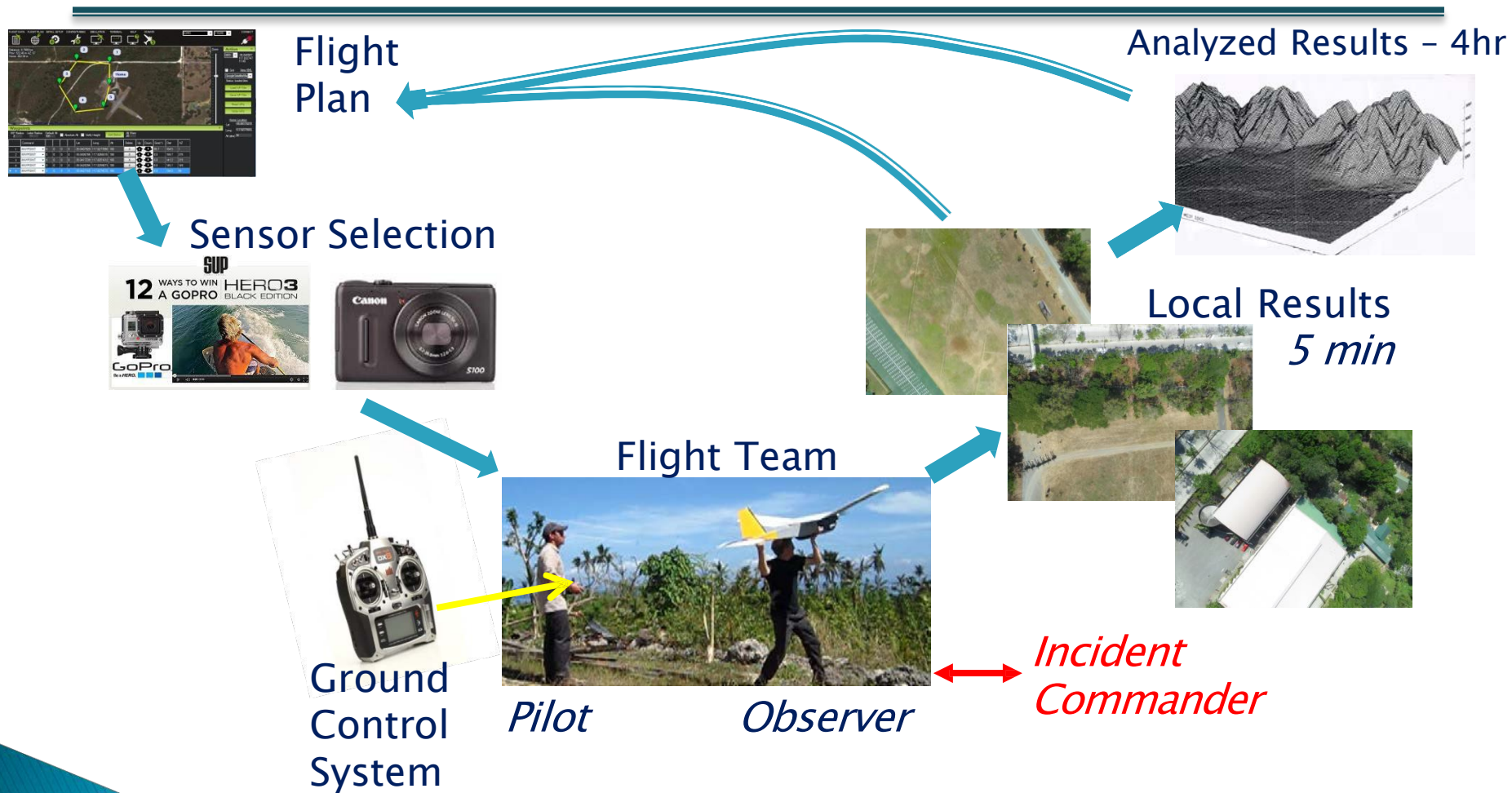
GPS-enabled  
For Precision  
Mapping

Spectral  
Analysis  
& Lidar

Electro-  
magnetic  
& Thermal IR

Siren &  
Atmospheric  
Science

# UAS – How They Operate



# UAS In Disaster Operations

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- ▶ *Unmanned Air Systems* – not *unpiloted*
  - Pilot supervises the flight... '*aviator first*' mindset
  - Flight is performed in support of Incident Commander
- ▶ *Drone* is inaccurate...but common, easy term



# Wide Area Assessment

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Tacloban, Philippines



Panay, Philippines

# Local Area Assessment



Individual frame



Detail – human activity



Photo-mosaic  
(5 min)



# Structure & Debris Assessment

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UH – Cal State Long Beach  
UAV Team  
Cebu, Philippines

# Damage Assessment, Access, & Rubble

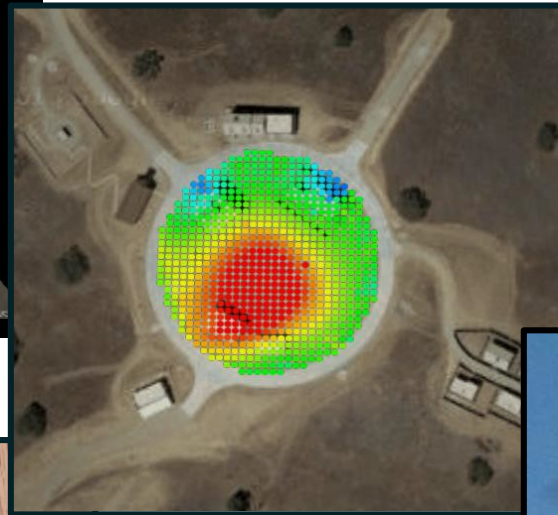
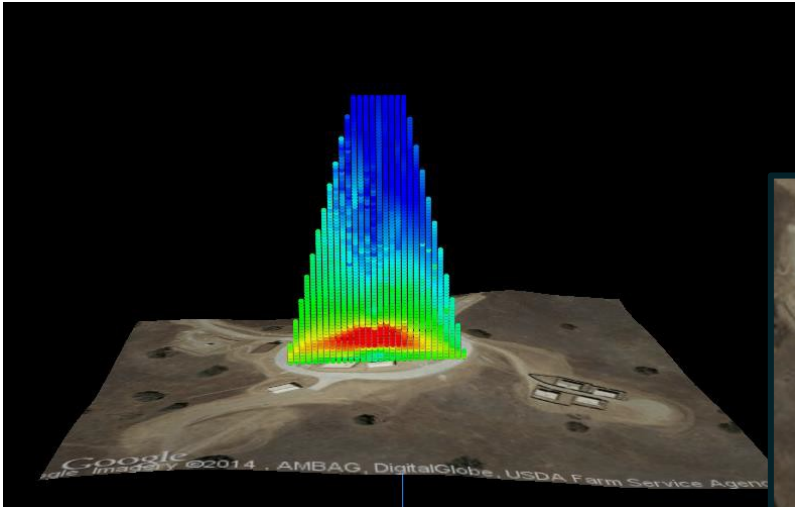
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# Post-disaster Comms Restoration

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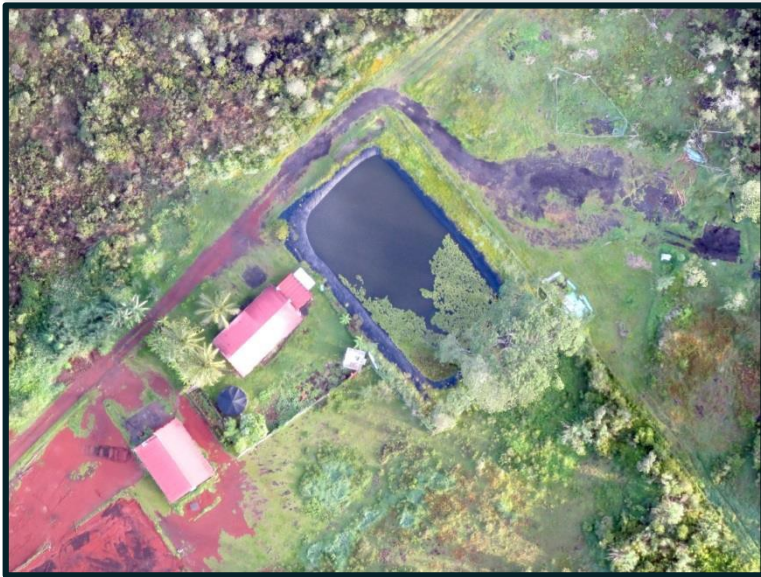
Carnegie—Mellon  
Engineering Team

# Wildfire

- ▶ Wildland and forest fire
- ▶ Structural fire
- ▶ Chemical fire
- ▶ Vegetation fuel status
- ▶ Wide area assessment to up-close inspection
- ▶ Safety corridors
- ▶ Propane tank threats



# Lava Inundation



10-31-14



11-11-14

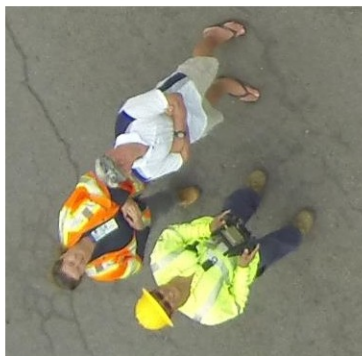
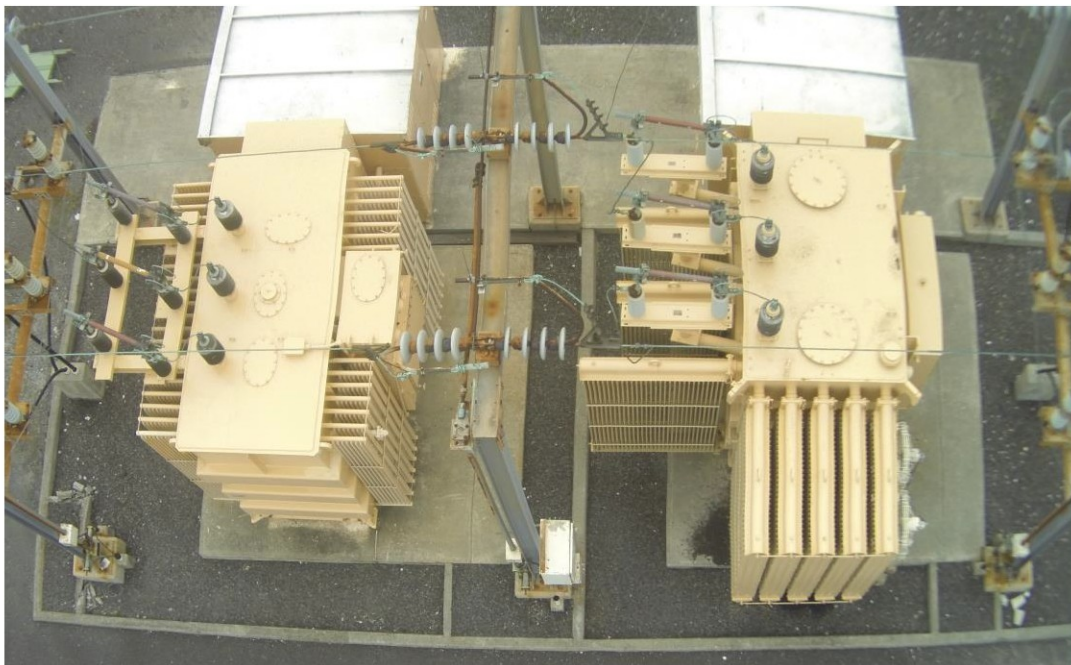


UH-Hilo UAS

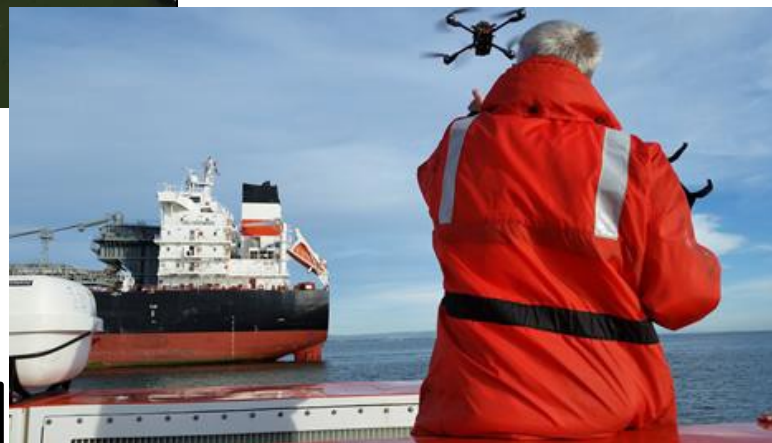
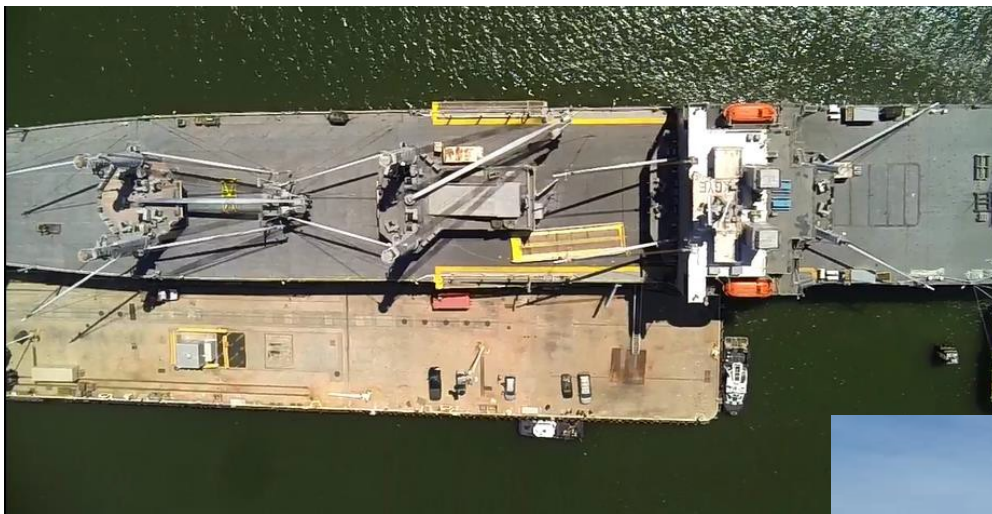
Team

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# Power Grid



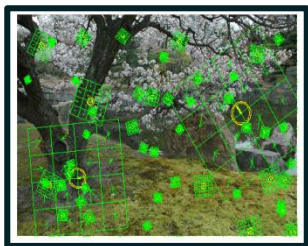
# Maritime Inspection



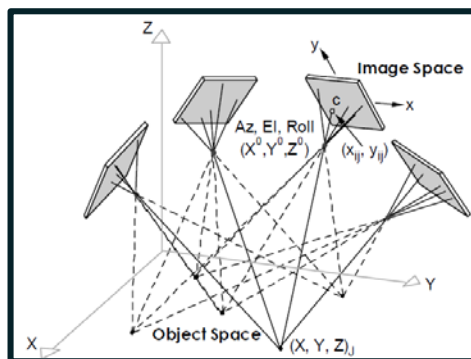
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# Beyond Stills & Video: Feature Extraction & Superposition

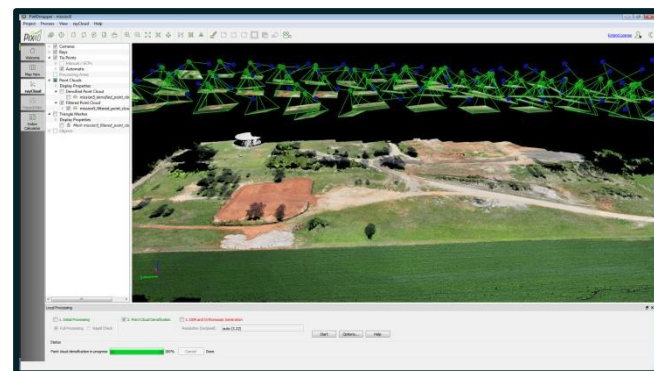
- Dissection & reconstruction...a new world of information for Disaster Operations Decision Makers



*Unstructured Imagery Collection*



*Image Decomposition & Feature Extraction*



*'Fly Around' Reconstruction 3-D Viewer*



*Post-flight 'Structure from Motion'...it doesn't stop here*

# How the S & T Community Can Help

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**Course 1: UAS and Disaster Management Certified in Spring 2016**

**Course 2: UAS Operations in Disaster Management in Spring 2017**

**Course 3: UAS Integration in Disaster Management in Fall 2017**

- **Take our Course, Promote Our Course(s)**
- **Become Certified Instructors, If Interested**
- **Send Us Any New UAS Disaster Apps**
- **Launch More UAS DM Operations, Integrate into Larger Organizations**

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