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# Integrating Aviation Technology, Emergency Services, and Human Resilience: Considerations from Social Scientists

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# Overview

Across disaster phases…

1. UAS application to disaster management

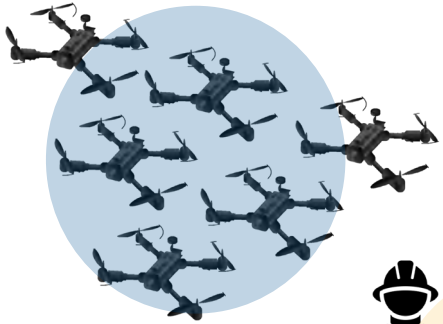
We can do *this*…

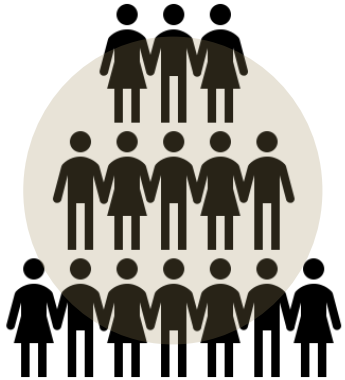
2. Psychosocial considerations of this integration

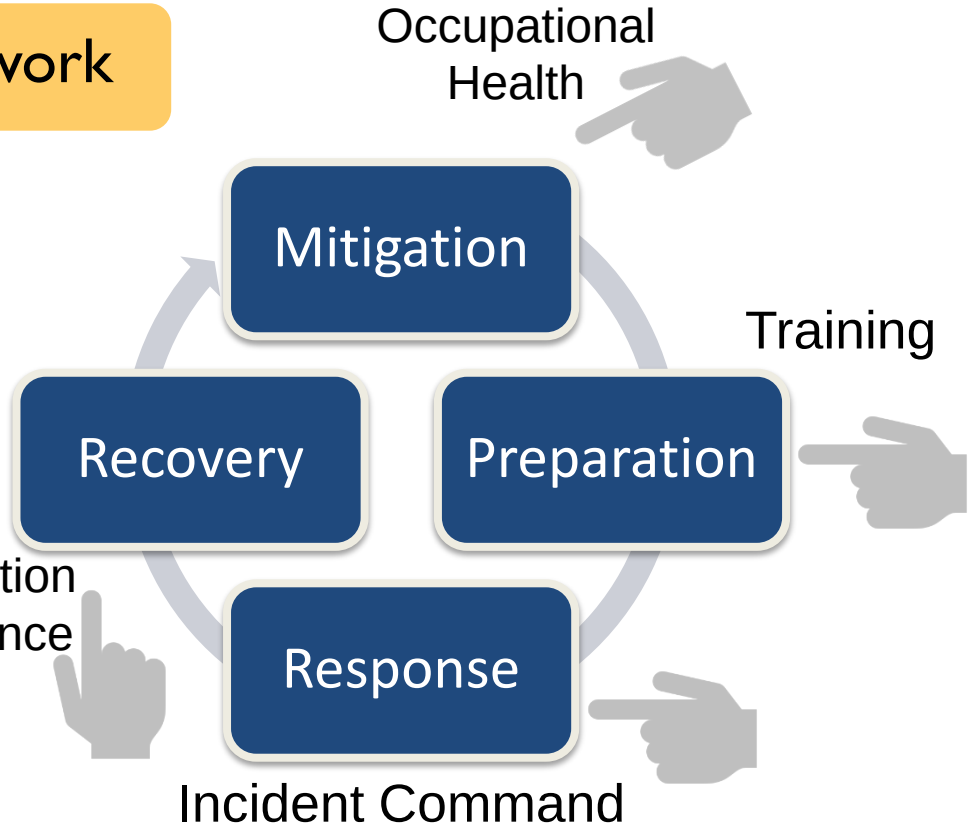
…if we also do *that!*

# UAS & Disaster Management Integration

A Framework







# UAS & Disaster Management Integration

## Social Science Challenges

Integrating UAS & greater disaster response team

Role of UAS team members across disaster phases

Communication & coordination networks

Impact on performance & well-being

Impact on disaster-impacted communities

# Preparation Uses

- UAS Uses in Disaster Prep
  - Preassessment
  - Mapping
  - Non-emergency
  - Emergency
- UAS Training and Integration
  - Preplanning
  - Deployment

FFs in South Korea are trained to use drones at the scene of high-rise building fire

# Preparation Considerations

Disaster Response Multiteam System

1. Identify Component Teams
2. Prioritize Cross-Training
3. Cultivate Shared Identity

Incident Command

Boundary Spanners

Component Teams

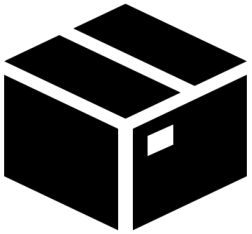
Responder Agency Teams

UAS Operator Team(s)

# Response Uses

## Information Flow

- Event
- Incident Command orders deployment
- User deploys UAS
- UAS collects data
- User reads data
- User translates data into findings
- User transfers findings to Incident Command
- Incident Command translates data
- Incident Command reacts to translation
- Feedback/reevaluate



Resource Delivery

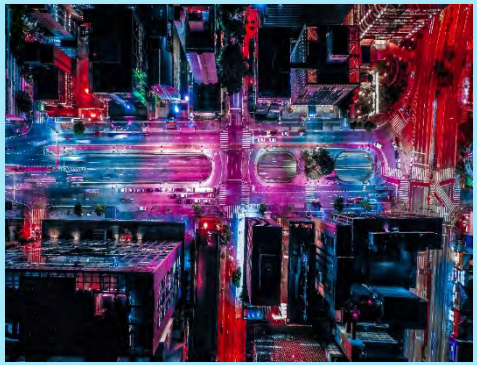
Ocean/Beach Monitoring

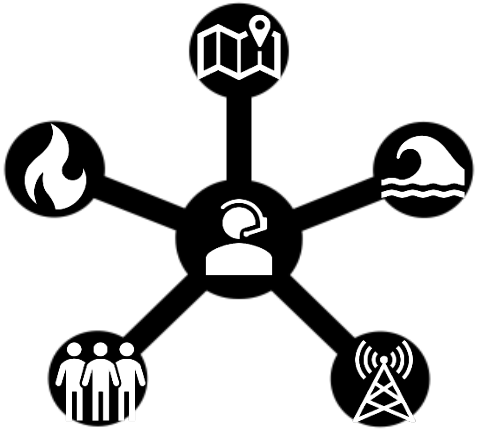
# Response Uses

Incident Command

- UAS integration - Improve situation awareness
  - Fire expansion (forest fires)
  - Impacted areas (after disaster, FEMA)
- Communication & Coordination - Better inform disaster responders
  - Resource availability across sites
  - Who is in trouble, where to find them
  - Establishing personnel accountability system

# Response Considerations





## General

- Limitations of weather, line of sight, tethering, video quality, power source
- Government regulations, licenses, jurisdiction
- Self-efficacy for UAS use versus relying on previous practices in FUBAR/SNAFU contexts

## Incident Command

- Formal communication and coordination processes that integrate UAS into disaster response MTS
- Feedback and debrief data integrated into training and simulations

# Recovery Uses

Private Sector

- Insurance
- Mapping

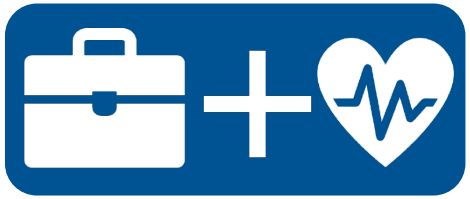
FEMA

Preliminary damage assessments for inaccessible areas

General

Documentation of structural recovery progress

# Recovery Considerations



## Occupational Health

- Stressors unique to UAS operation
- Context of existing work stress
- Disaster responder performance & Well-being

- Time pressure
- Decision-making
- Environmental hazards
- Physical demands & fatigue
- Interpersonal interactions
- Task context novelty

- Long hours
- Shift work
- Under-staffing
- Fatigue
- Variable workload

- Cognitive demands
- Ergonomic design
- Vigilance
- Attention switching
- Vicarious performance
- Visual strain

# Recovery Considerations

## Crisis Communication: Public Concerns with UAS

Stigma toward the word "drone"

Initially used in conflict situations

Privacy

Drone owners are not required to register with FAA making privacy violations unidentifiable (Ackerman, 2017)

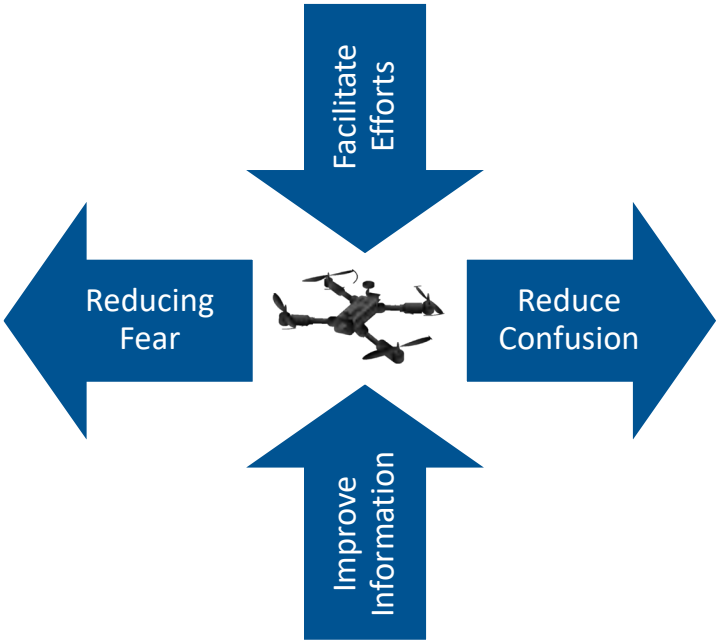
Who is in charge?

Who is flying the drone?

What do we trust?

# Recovery Considerations

Crisis Communication: Leveraging UAS as a mechanism for recovery



# Recommendations

## Future Work

- How do we best integrate UAS considering the challenges of both disaster settings and MTS?
- How does the community influence UAS integration in disaster management and vice-versa?

## Application

- Best practices for training response teams with UAS
- Ensuring well-being of all disaster response teams
- Strategies to communicate UAS involvement with the public


**Integrating UAS & greater disaster response team**

**Role of UAS team members across disaster phases**

**Communication & coordination networks**

**Impact on performance & well-being**

**Impact on disaster-impacted communities**

# Questions?

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