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

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Across disaster phases…

1. UAS application to disaster management

2. Psychosocial considerations of this integration

We can do this...

...if we also do that!

Human Security Faculty Cluster
UAS & Disaster Management Integration

A Framework

Occupational Health

Mitigation

Recovery

Preparation

Response

Incident Command

Population Resilience

Training
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.
Disaster Response Multiteam System
1. Identify Component Teams
2. Prioritize Cross-Training
3. Cultivate Shared Identity
Response Uses

Information Flow

- 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

• 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

<table>
<thead>
<tr>
<th>General</th>
<th>Incident Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Limitations of weather, line of sight, tethering, video quality, power source</td>
<td>• Formal communication and coordination processes that integrate UAS into disaster response MTS</td>
</tr>
<tr>
<td>• Government regulations, licenses, jurisdiction</td>
<td>• Feedback and debrief data integrated into training and simulations</td>
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<tr>
<td>• Self-efficacy for UAS use versus relying on previous practices in FUBAR/SNAFU contexts</td>
<td></td>
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</tbody>
</table>
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

Considerations

Time pressure
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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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