

# Interactive Human-Drone Partnerships in Emergency Response Scenarios

Jane Cleland-Huang and Walter Scheirer, University of Notre Dame

November 8-9, 2022

2022 Cyber-Physical Systems Principal Investigators' Meeting

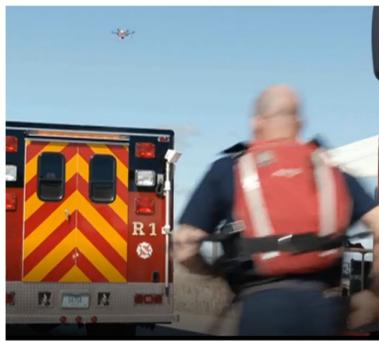
## Challenge:

To deploy sUAS as true partners with humans in emergency response missions -- serving as autonomous, self-coordinating, trusted members of a mission team.



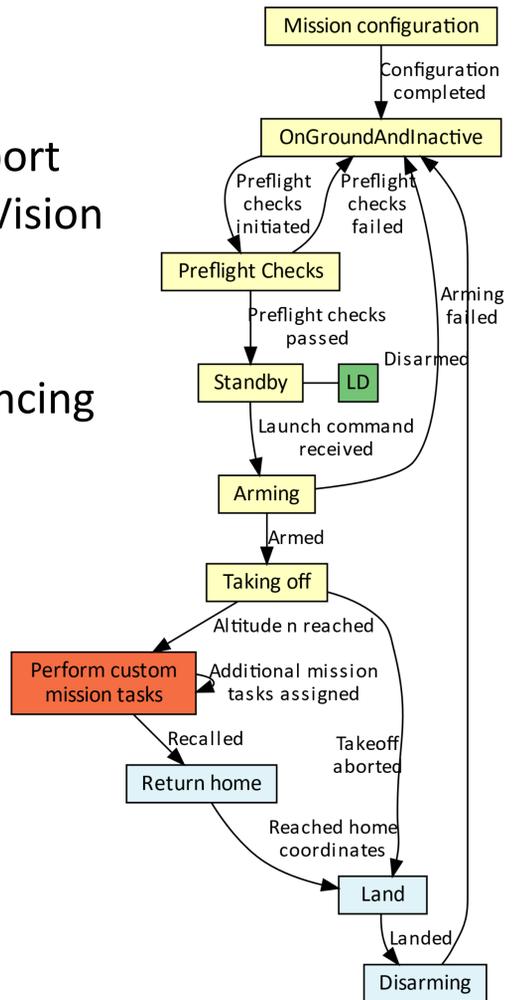
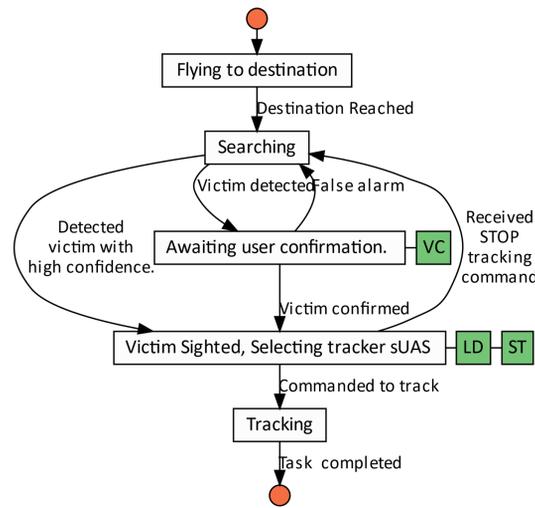
## Solution:

- Dynamically configurable sUAS by emergency responders for diverse missions.
- Human-machine partnerships through autonomous and collaborative sUAS.
- Interoperability across flight controllers & sUAS
- Air-tunnel leasing for multi sUAS missions.
- Hierarchical Computer Vision model distributed across edge devices and ground-based Microservices.
- CV-driven sUAS maneuvers to improve perspective.



## Scientific Impact:

- Novel aerial dataset of occluded people to support training new Computer Vision models.
- Vision-based maneuver controls library for enhancing vision-based tasks.



Each sUAS receives a specification, self-configures prior to launch, to enact and coordinate missions.

## Broader Impacts:

- Developing next-gen intelligent sUAS for use by emergency responders to save lives.
- Public events hosted with South Bend and Michigan City Fire departments.
- Research opportunities provided for over 20 undergraduate and 8 graduate students -- including underrepresented minorities.
- STEM outreach to local primarily minority-serving elementary schools.

