# ATTRACTOR

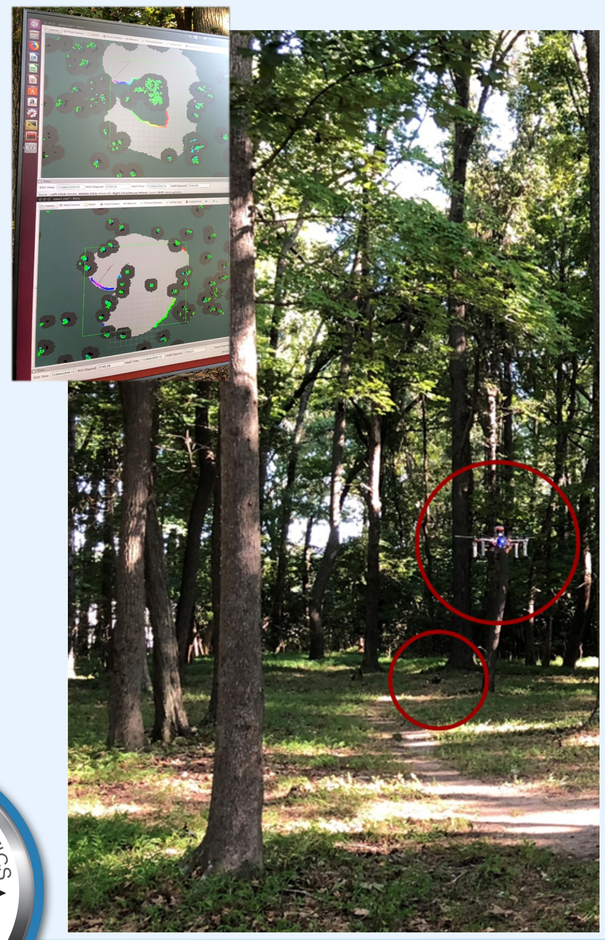
Autonomy Teaming & TRAjectories for Complex Trusted Operational Reliability

National Aeronautics and Space Administration

## AUTONOMOUS SEARCH AND RESCUE UNDER THE CANOPY (SARUC)

### Overview/Description

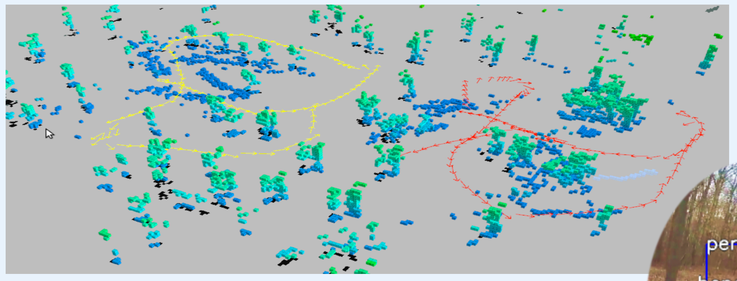
~2000 people are lost in wooded areas each year, hundreds with fatal outcomes. Growing numbers of people with cognitive impairments are lost in cities. Expanding air mobility will add to losses of small vehicles carrying humans. Scalable, versatile, and easily transferable to other domains, Autonomous Search and Rescue under the Canopy (SARUC) will have a lasting impact on saving lives.

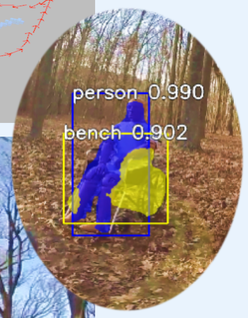


### Feasibility Assessment

Technologies are transferable to any cluttered domain, such as urban areas in the aftermath of disasters (e.g., floods, earthquakes, blackouts):

- Autonomous vehicle position, attitude and velocity computed from onboard sensors
- Context-based, robust and computationally tractable obstacle location and identification
- Multi-objective decision making to direct search in multi-agent operations
- Sharing information, such as vehicle status and map generation, among agents to ensure robust, conflict-free, multi-vehicle search





### Partners

- NASA LaRC, ARC, AFRC, GRC
- Carnegie Mellon University (CMU)
- University of Illinois Urbana Champaign (UIUC)
- Tufts University
- Massachusetts Institute of Technology (MIT)
- Other Government Agencies (OGA)

### Recent Results / Status

- AUVSI 2019 XCELLENCE Humanitarian Award in partnership with MIT for SARUC
- Four successful multi-asset flight tests of SARUC, demonstrating mapping and search under the tree canopy on LaRC CERTAIN outdoor range
- Successful outreach to active SAR operators

### Next Steps

- Integrated demonstration of SARUC with human-machine team, including a local SAR operator
- Technology transfer to city, state, and Federal Government agencies and other commercial SAR operators

### Publications

- Over 30 technical publications and conference presentations in the following venues:
  - AIAA Aviation, SciTech, DASC
  - ISER
  - ACHI
  - MOPTA
  - AAMAS
  - OGA technical interchange meetings

CONVERGENT AERONAUTICS SOLUTIONS

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