

Collaborative Autonomy and Safety for Teamed Human – Unmanned Aircraft Systems in Fast Evolving Wildfire Environment

Award No#: USDA 2019-67021-29011, 2019-67021-28993, 2019-67021-28992

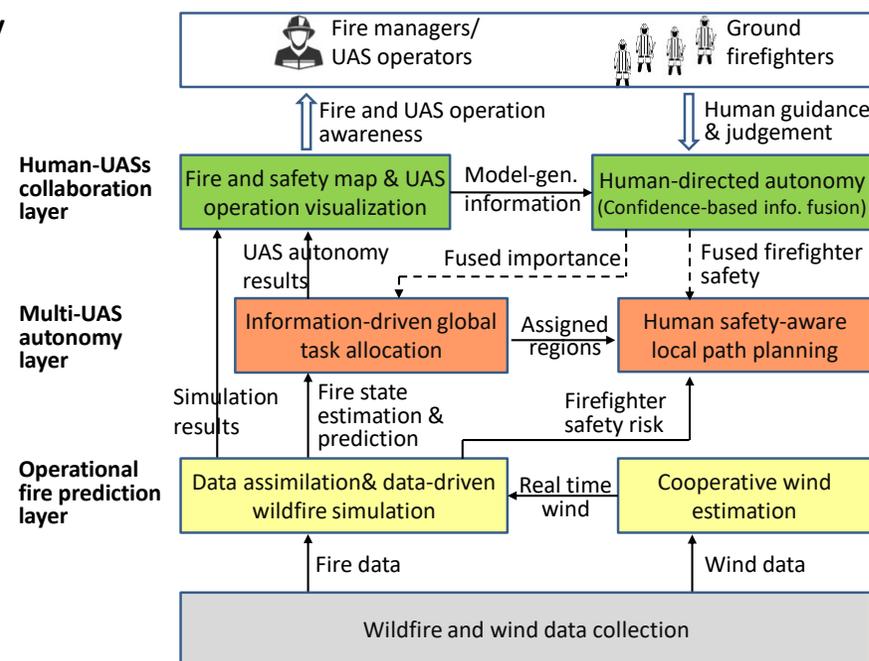
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Challenge

- Transforming wildfire management by enabling operational wildfire spread prediction and situation awareness for firefighters using a team of UASs.

Solution

- Cooperative fire and wind sensing and advanced data assimilation.
- Multi-UAS coordination and path planning in fast-evolving wildfire env.
- Human-directed autonomy to support teamed human-UASs collaboration.



Scientific Impact

- Fill the critical gap of real time wind and fire data collection.
- New information-driven multi-UAS coordination and safety-aware path planning algorithms.
- New approaches of human-directed autonomy for human-UAS collaboration.

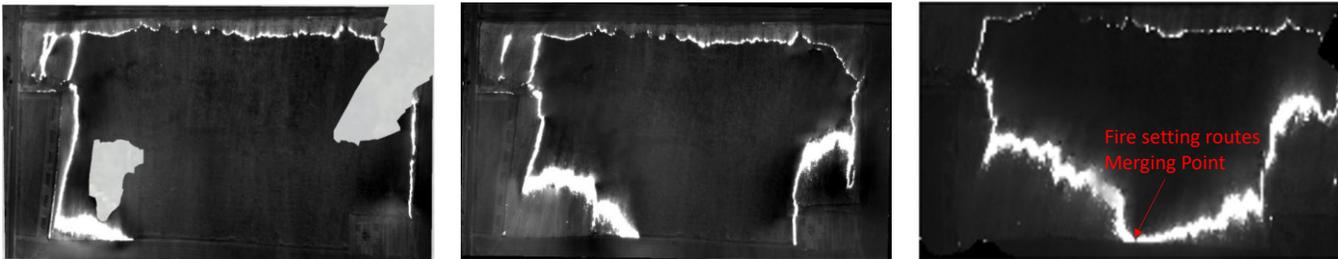
Broader Impact:

- Transform wildfire management through human-UASs collab.
- Education programs and outreach workshops.

Project Highlights



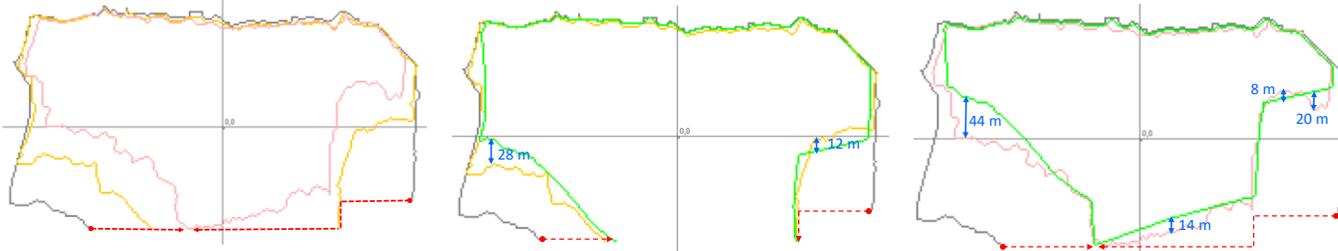
UAS platform and wildland fire monitoring



Loop 2 (ending time: 34min 14s)

Loop 3 (ending time: 38min 33s)

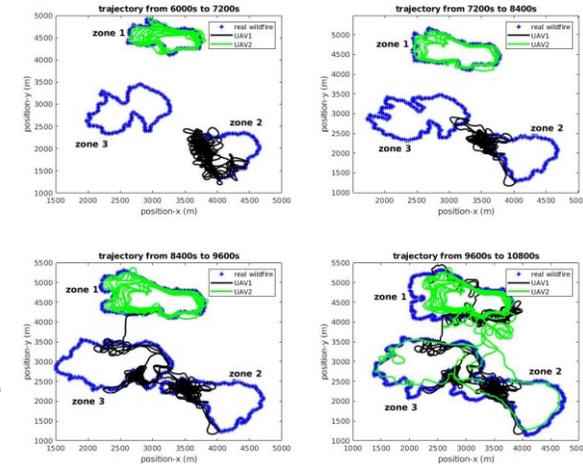
Loop 4 (ending time: 41min 17s)



UAS sensing and fire spread simulation

UAS Path Planning

- Multiple-fire monitoring
- Maximize information collection.
- Collision/obstacle avoidance
- Minimizing the time without fires in the UAV's field-of-view



Education & outreach

- Undergraduate student UAS design and test (left)
- Local communities prescribed burn events (right)
- UAS Integration for Fire Operation Workshop (2021)