

UAS-RX

Enabling UAS Fire Ignitions in Complex Firefighting Contexts

NSF Award #1638099

2016-2019

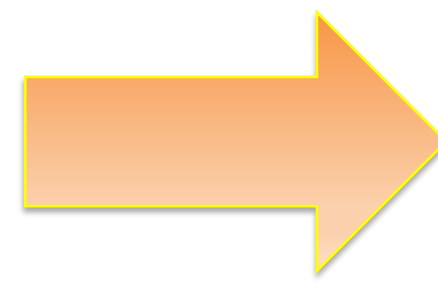


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Motivation and Vision

- Prescribed fire is critical for reducing catastrophic wildfires and sustaining healthy ecosystems
- Technology to support fire ignition and monitoring remains stagnant, risky, and expensive
- Project will develop UAS technology that can transform prescribed fire ignition & monitoring

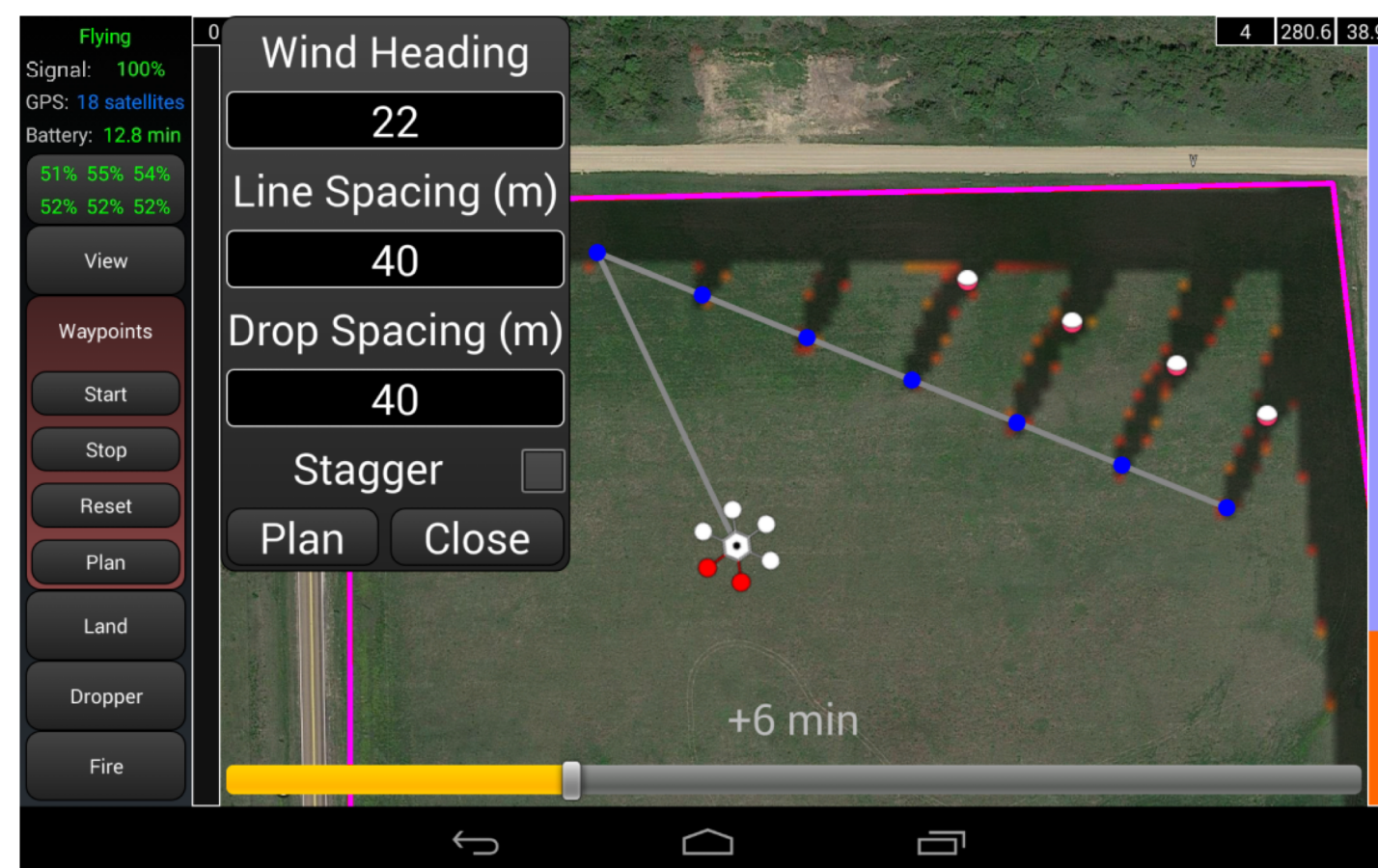


Activities and Findings



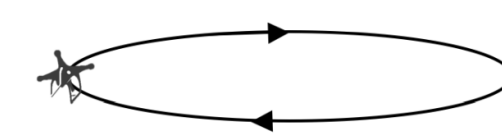
Increasing scalability

Larger load, monitor tens of acres, and perform longer flights. Has been tested with stakeholders



Autonomy with fire models

Adaptive path planning based on predicted fire locations



9/20 participants used for Area of Interest



3/20 participants used for Attract Attention and 3/20 for Sensor Lost



13/20 participants used for Landing and 7/20 for Low Battery



8/20 participants used for Low Battery

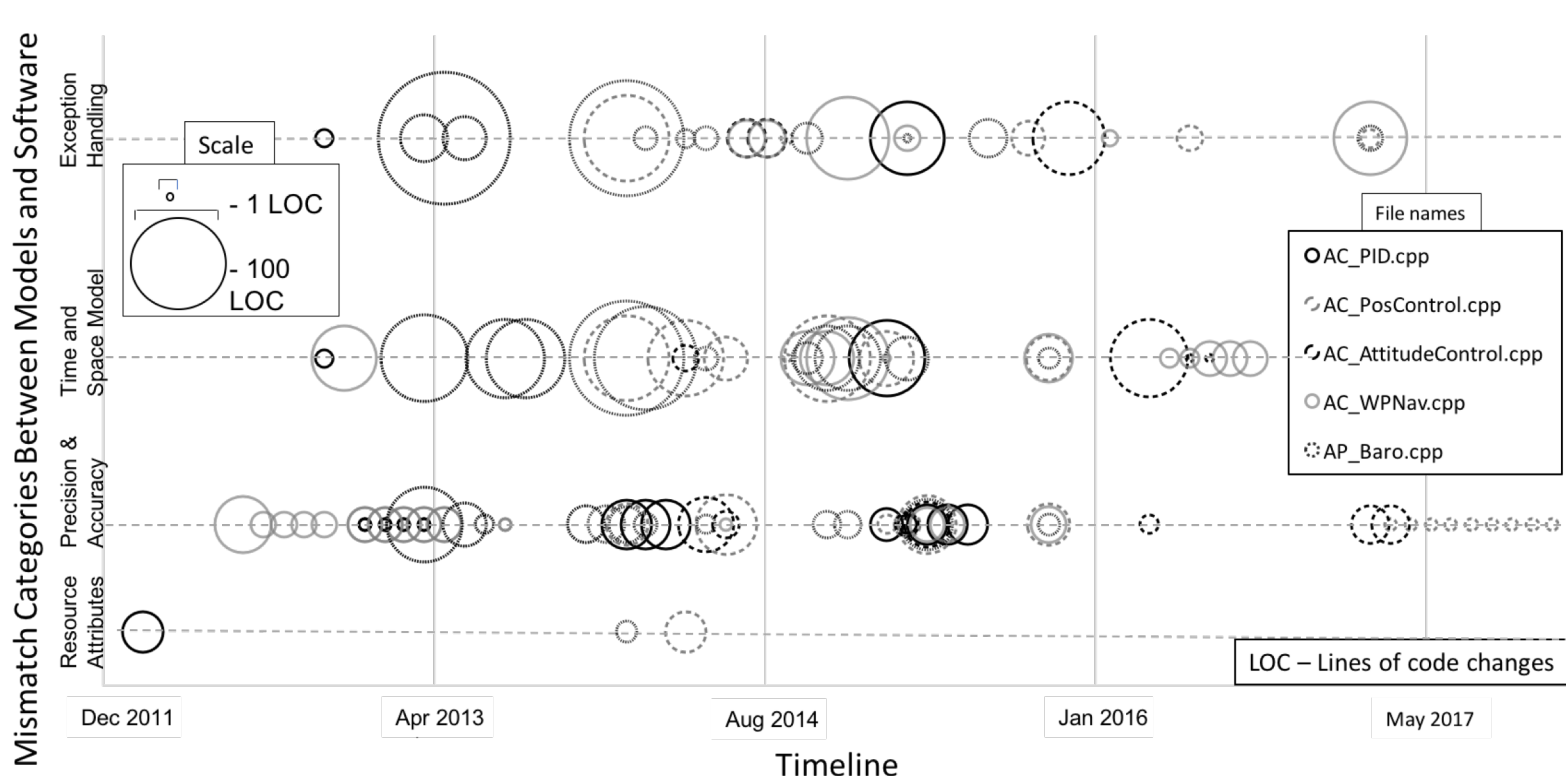
Motioning to communicate UAS intent

There seem to be universal gestures associated with UAS operations like low battery and landing. User attitudes towards robots did not affect their ability to recognize meaning of a gesture.



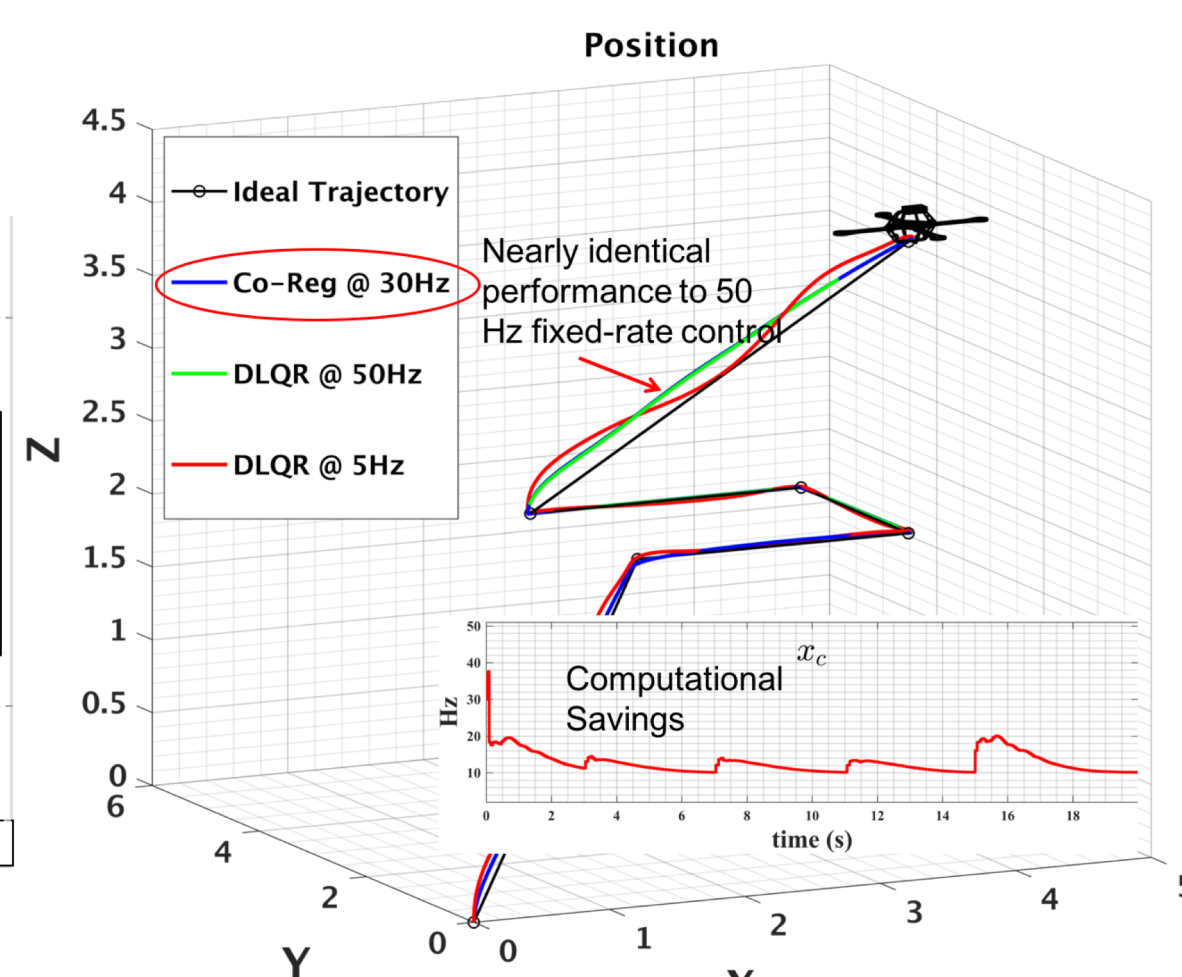
Performing tests with stakeholders

Variable most impacting public support for UAS is purpose. Perceived benefits included potential for improved safety and efficiency



Evolution of Control Software

We have categorized mismatches between control models and their software implementations and built a mutation tool to assess impacts



Balancing computational resources and path precision

Wasted resources from high fixed-rate control can be reclaimed by co-regulating physical and computational resources.

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