Networked sUAS for Wildfire Mitigation

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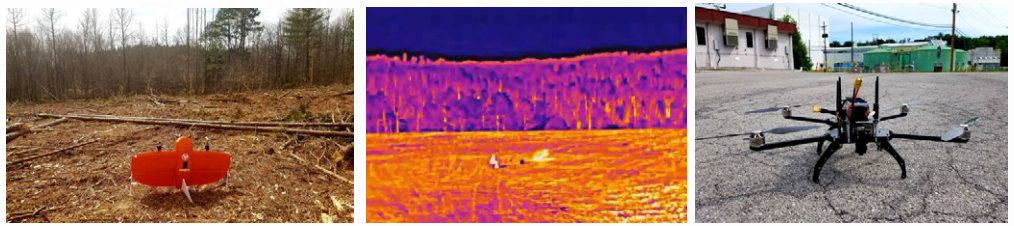
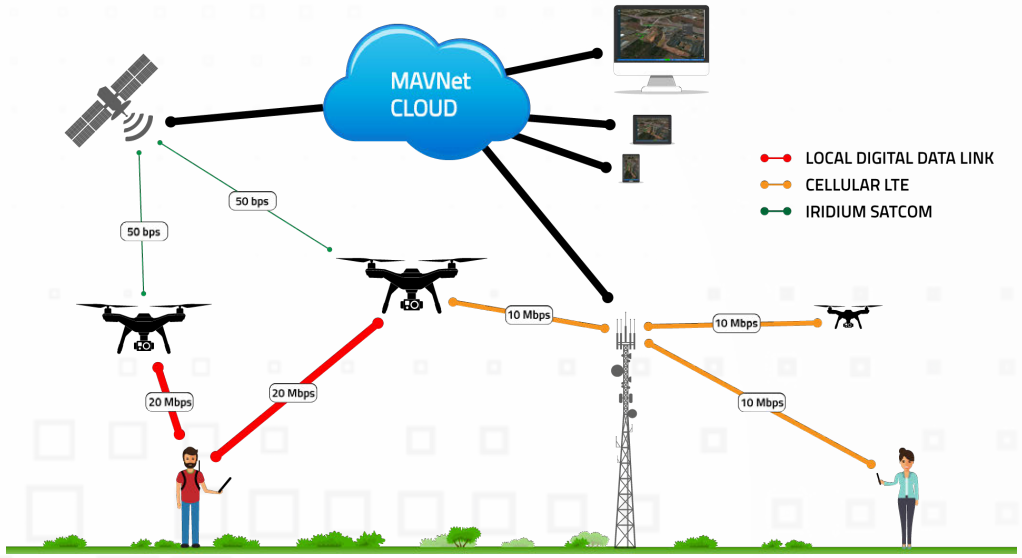
Networked sUAS for Wildfire Mitigation

- Networked sUAS are becoming commercially available
  - Advances in low SWAP-C hardware is making the technology affordable, appropriate, and accessible
  - Multiple connection options:
    - Line-of-Site: Mesh networks, Digital data links
    - Cellular: Auterion, Verizon, Skydrone, FlytBase
    - Satellite: Cobham, Honeywell, Open Source DIY
- Advantages
  - Easily share data between:
    - Users
    - Vehicles
    - Ground assets
  - Operate multiple vehicles
  - Access to more powerful cloud processing architectures
  - Gain “whole picture” of situational awareness





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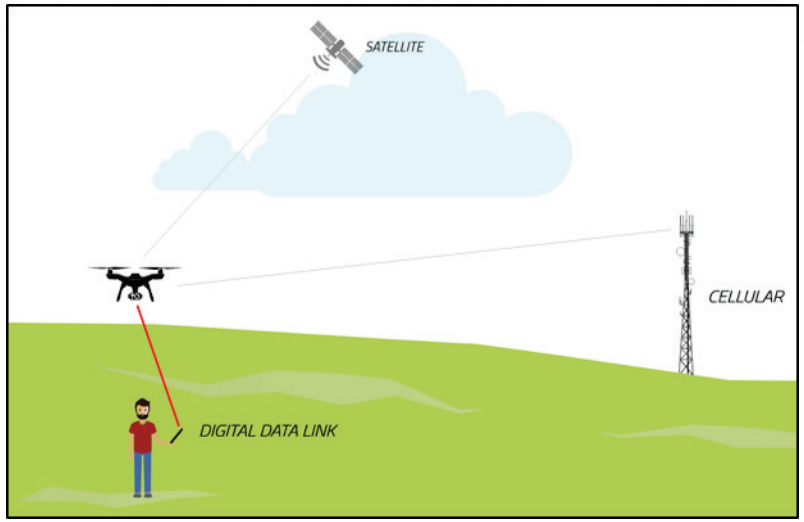
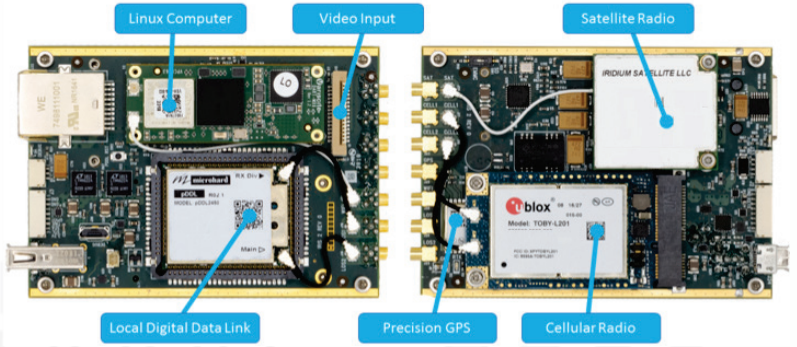
MAVNet: Multi-Modal Autonomous Vehicle Network

- Developed at ORNL in 2018; commercially licensed in 2020; patent pending
- Multi-network sUAS command, control, and compute solution
- Integrates three communication technologies for redundancy and reliability in a variety of environments.
  - Line-Of-Sight (LOS):
    - Very high bandwidth connection
    - Operations in close proximity to the pilot
  - Cellular:
    - High bandwidth connection
    - Extended range flight operations where cellular service is available
  - SATCOM:
    - Low bandwidth connection
    - Global operations
    - Disaster response where infrastructure is damaged





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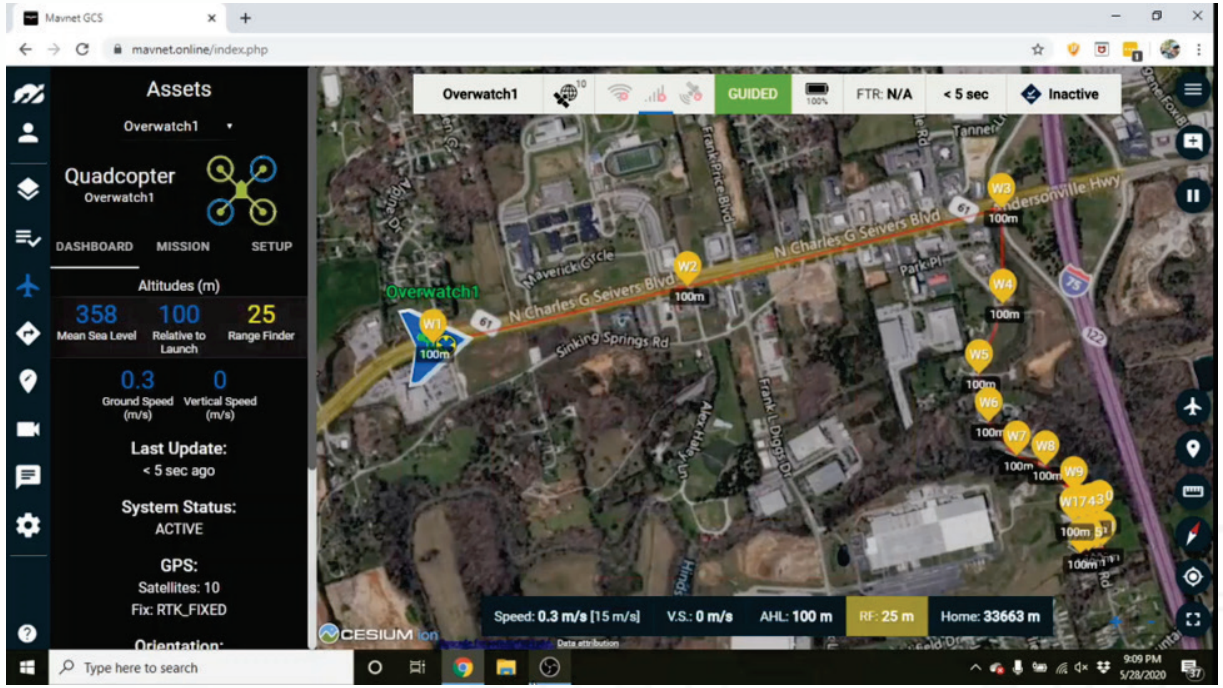

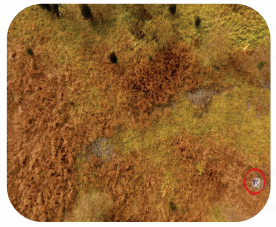

Search And Rescue

Disaster Response

Infrastructure Inspection

Security

- Web-Based Ground Control System
  - Allows for multiple users to view data or command aircraft based on authorization levels
  - Requires no specialized software; available on mobile
  - Solutions developed for personnel tracking, weather monitoring, and data processing
  - APIs developed for further applications
- Example Application: Post-Disaster Infrastructure Inspection
  - AI-driven autonomous sUAS power distribution inspection
  - ORNL-developed algorithms conduct autonomous inspections and provide real-time damage information across MAVNet

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