Scalable Traffic Management for Emergency Response Operations (STEReO)

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National Aeronautics and Space Administration

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roots in air traffic control research

traditional air traffic control research and simulation

future of aviation

advancing technologies enable new aircraft types, increased demand for airspace, and need to safely manage the airspace

UAS traffic management (UTM) project

new paradigm of air traffic management using a distributed network of service providers

clear path forward for multiple areas of research, often overlapping

STEReO

Scalable Traffic Management

NASA's UAS Traffic Management (UTM) System

- access the airspace and coordinate use
- standardized platform for sharing operation information & data

ST**EReO**

Emergency Response Operations

existing challenges include…

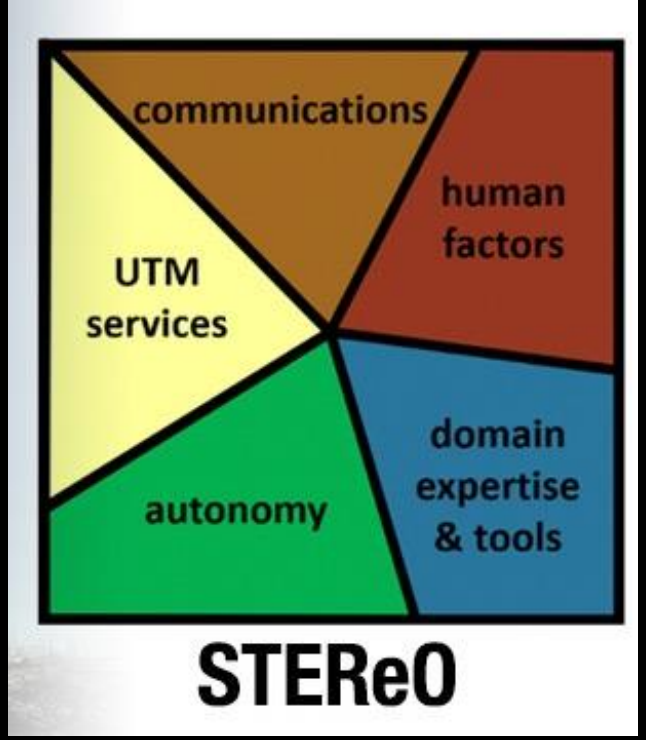
- limited communication and infrastructure
- manual coordination to deconflict airspace
- large number low altitude aerial missions (e.g. Search and rescue)
- remote sensing data can’t be received in a timely manner

To what extent can a STEReO ecosystem

Reduce response times

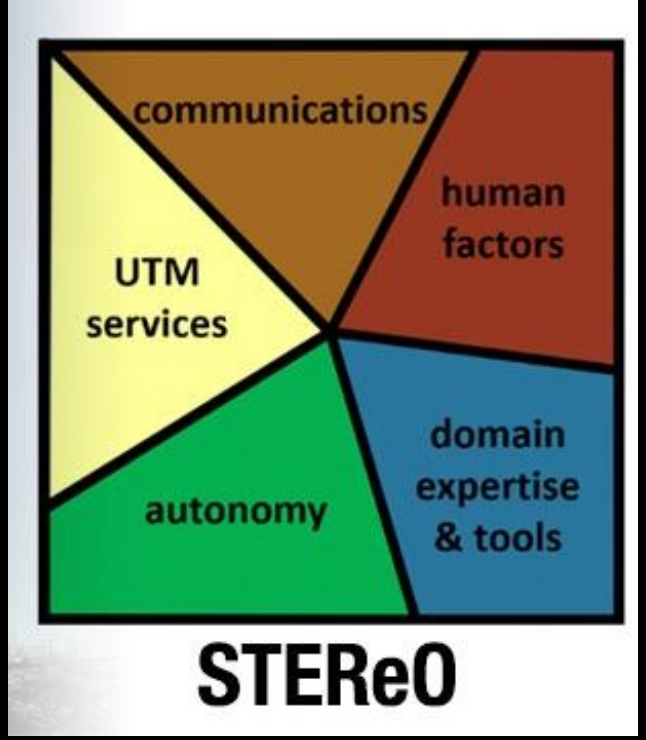
Provide operational resiliency to dynamic changes during a disaster event

Scale aircraft operations


communications
human factors
UTM services
autonomy
domain expertise & tools
STEReO


NASA


Safe2Ditch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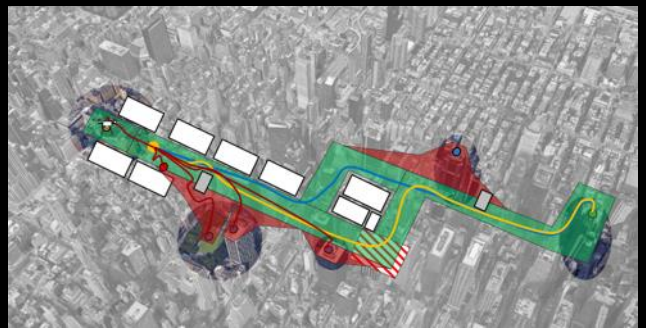


Safe2Ditch

Comms and autonomy slide alternatives

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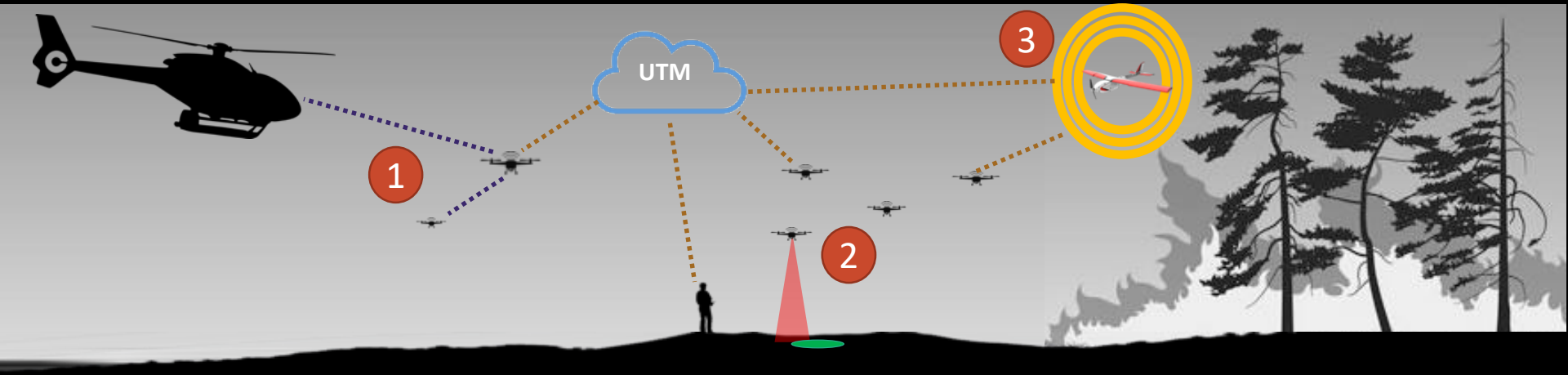
Proposal: Connected, Adaptive, and Autonomous Operations

The application of ad-hoc communication networks, vehicle to vehicle communication, and onboard autonomy to ensure the safety and resilience of the operations under a UTM system.



Communication & Autonomy

Connected, adaptive, and autonomous operations to ensure the safety and resilience of the operations

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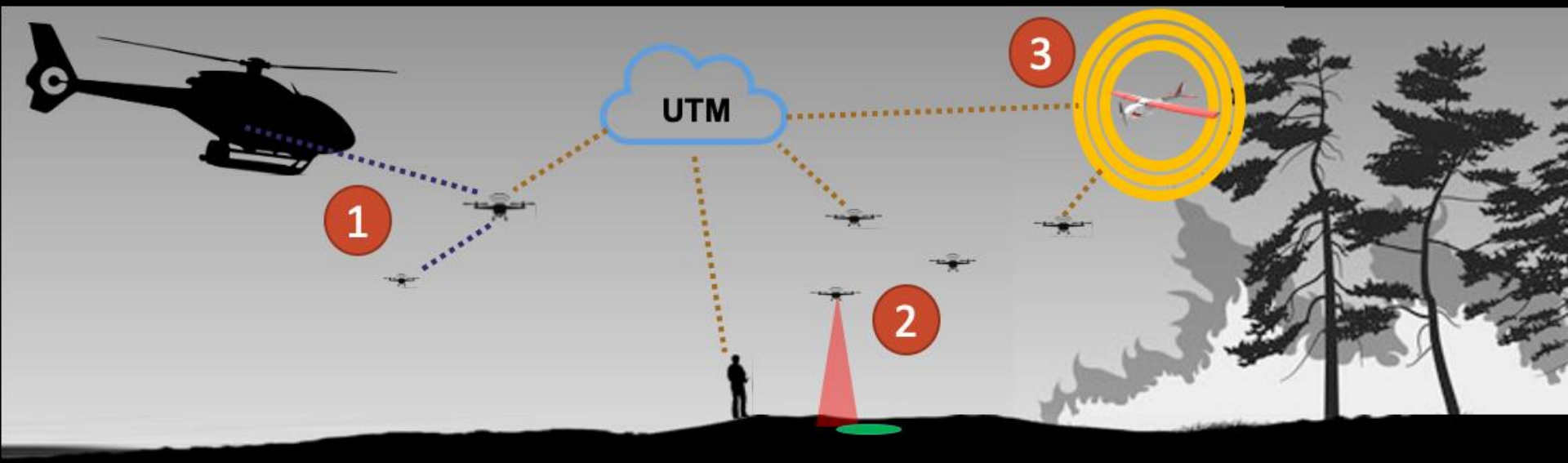

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UTM slide alternatives

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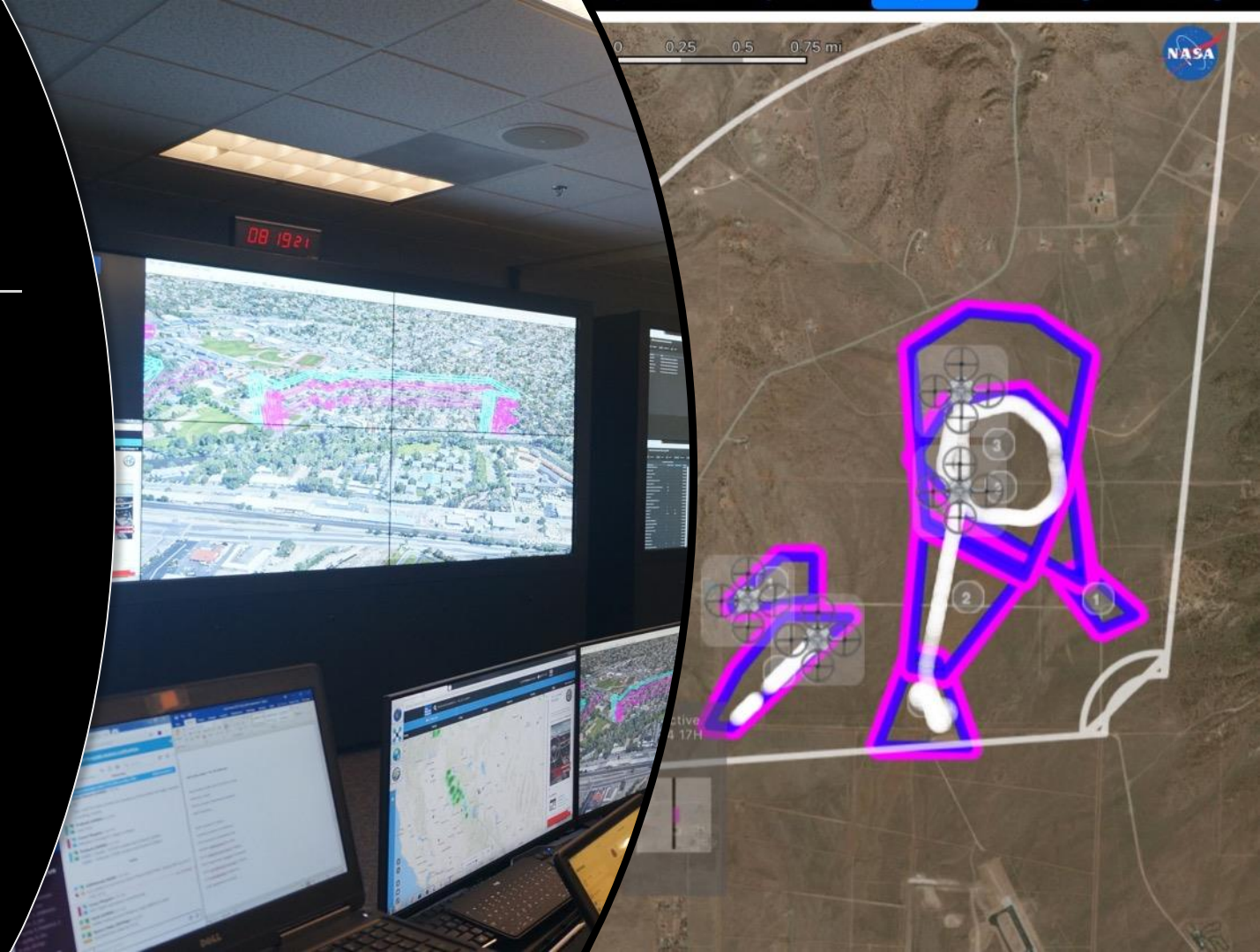
UAS traffic management & services

Coordinated airspace management and common operating picture



Proposal: UAS Traffic Management Extension

Common Airspace Operating Picture

Coordinated Airspace Management

UAS Services

Human factors/virtual collaboration slide alternatives

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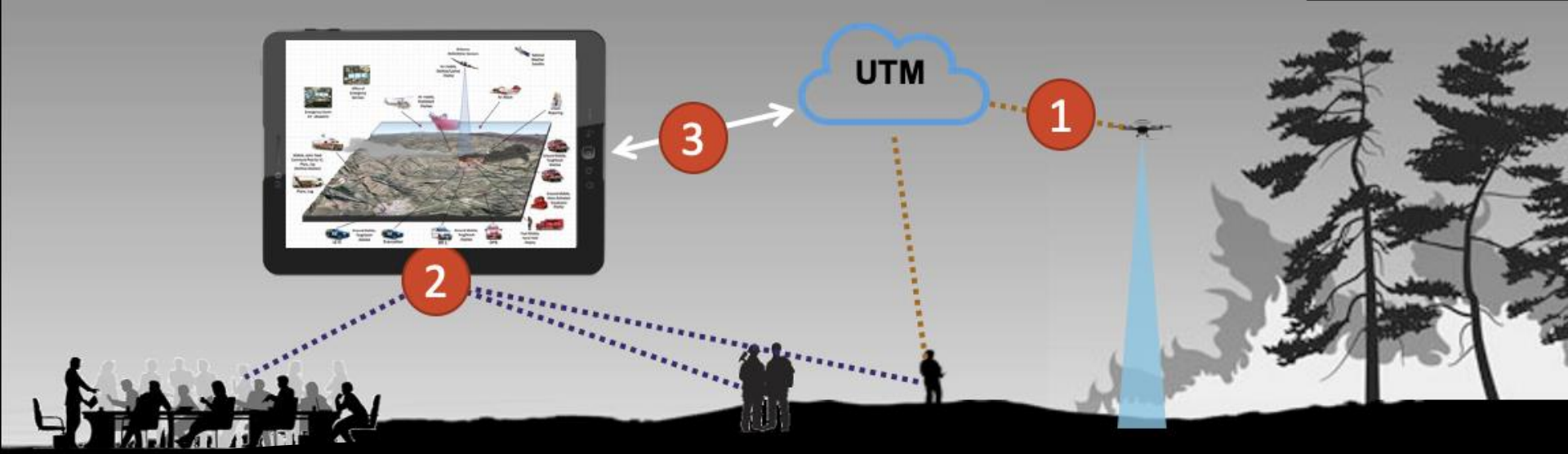
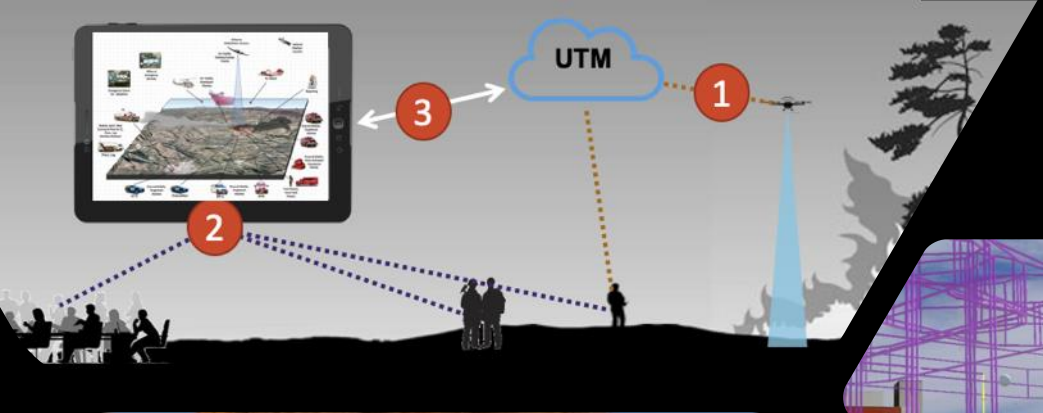


Distributed Virtual Collaboration

Collaborative tools to ingest remote sensing information and distribute a common mission operating picture for all stakeholders for strategic planning and decision-making



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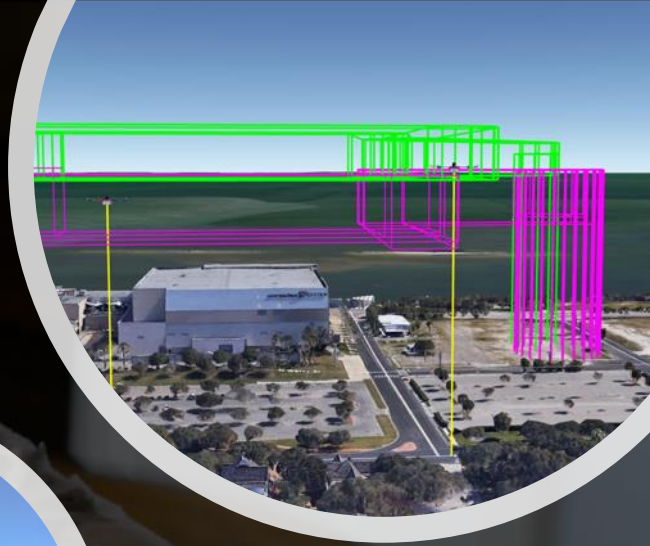

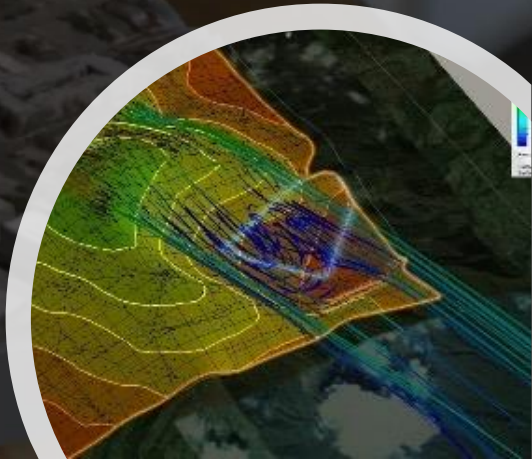

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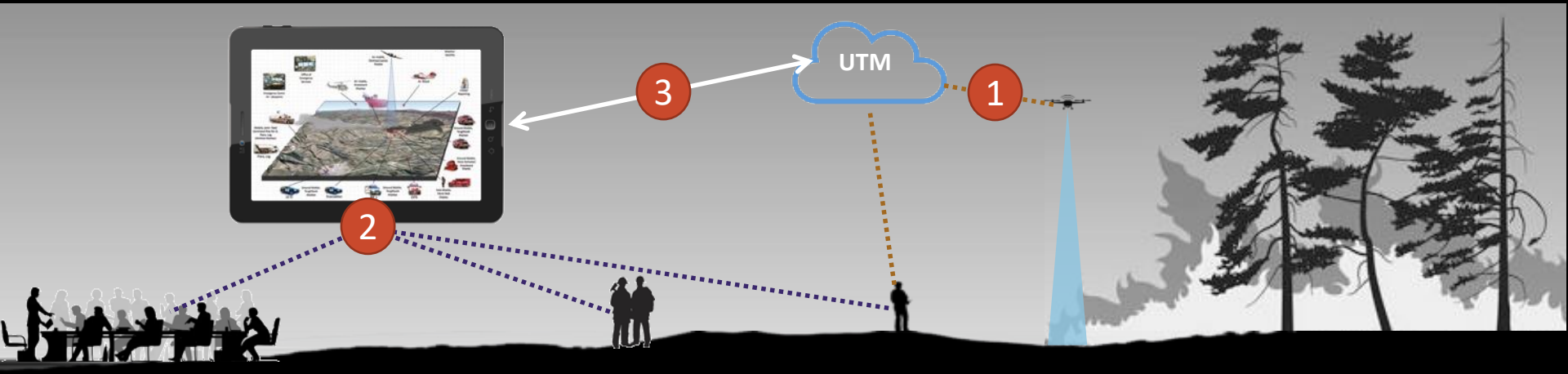

Demonstrations

California Wildfire Field Demonstration

Florida Hurricane Simulation

Why Is STEReO "Transformational?"

- The concept is going to change the world
  - Enables more missions quickly in response to a disaster event, which will save lives and minimize recovery costs.
- Opportunities for large impact
  - Technology addresses resiliency gap for UTM/UAM ecosystem
  - Technology advances state-of-the art in onboard autonomy and autonomous contingency management
  - Helps foster the UAS/UTM commercial market expansion to Public Safety Community

Why Is STEReO “Transformational?”

- Who cares?
  - FAA, UAS industry, Public Safety Agencies, and General Public.
- Community benefits/effects
  - It enables communities to have a faster recovery, provides more situation awareness during the disaster event, and supporting economy growth by expanding the UAS market.
- System level benefits
  - STEReO increases capacity of operations under a restricted airspace (e.g. TFR), as well as address the resilience requirements for nominal operations.


NASA