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…

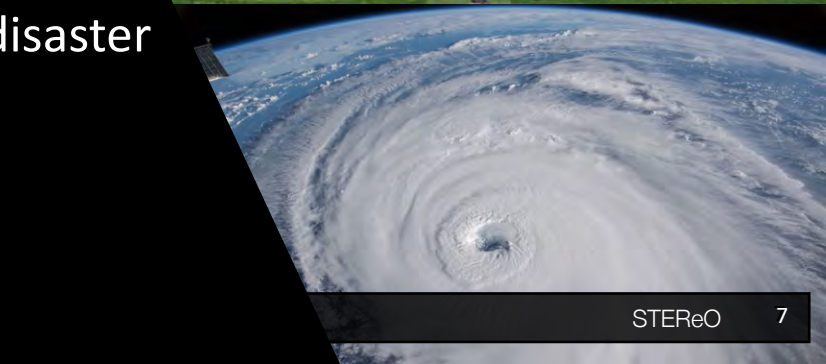
- limited communication and infrastructure
- manual coordination to deconflict airspace
- large number low altitude aerial missions (e.g. search and rescue)
- remote sensing data can’t be received in a timely manner

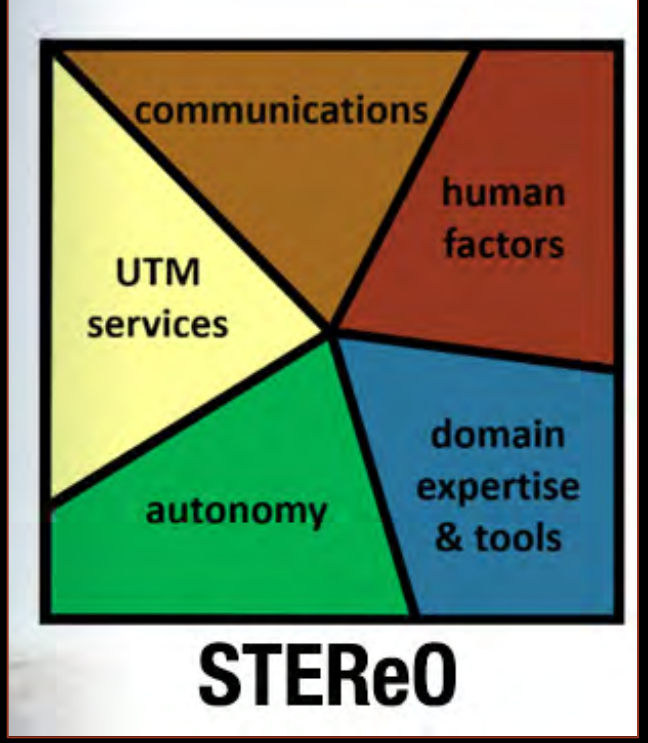
To what extent can a STEReO ecosystem

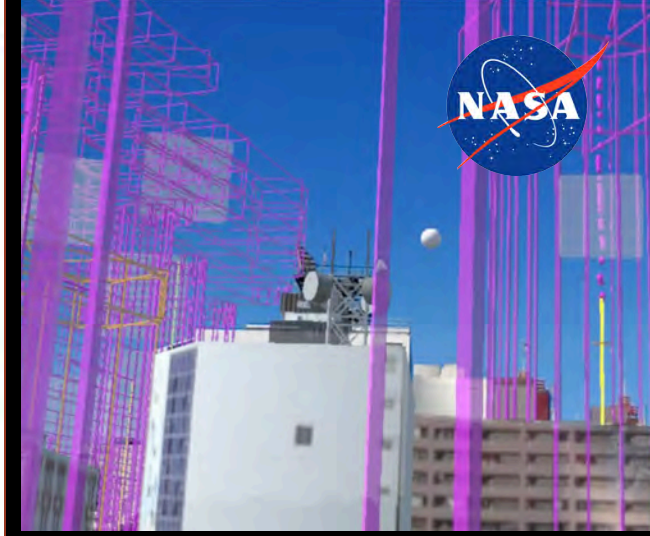
Reduce response times

Provide operational resiliency to dynamic changes during a disaster event

Scale aircraft operations




communications
human factors
UTM services
autonomy
domain expertise & tools
STEReO

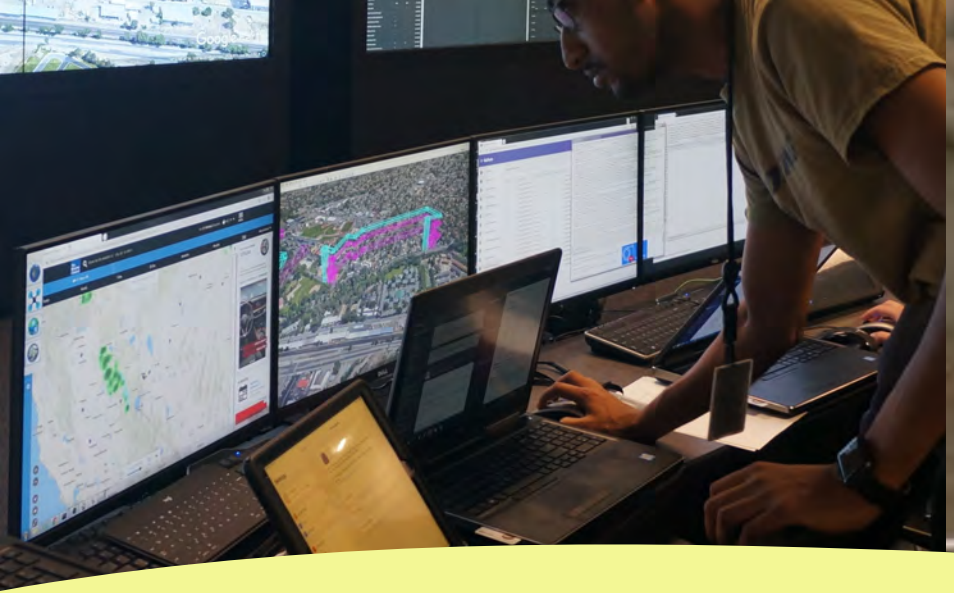

NASA


Safe2Ditch

Communications

persistent, interoperable, and expanded

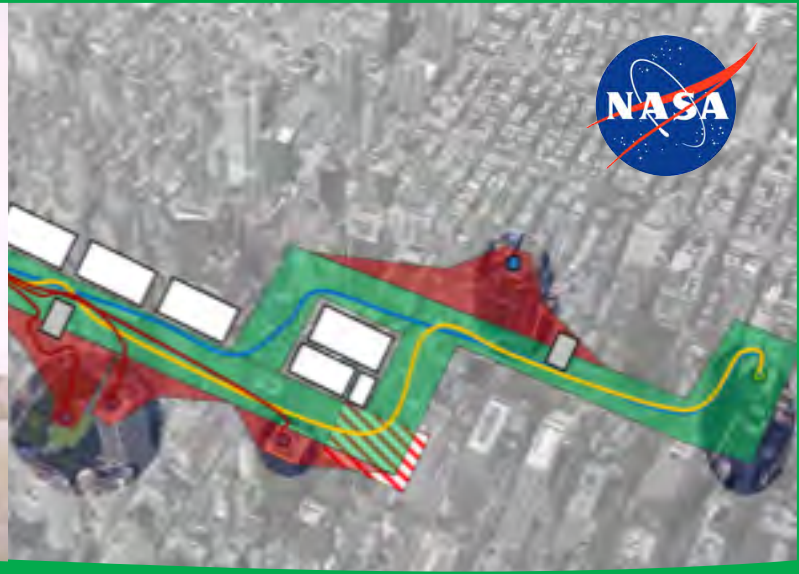
allocation of band for tracking UAS operations without burdening existing networks



UTM Services

airspace coordination and management

alleviates workload associated with incorporation of UAS operations



Autonomy

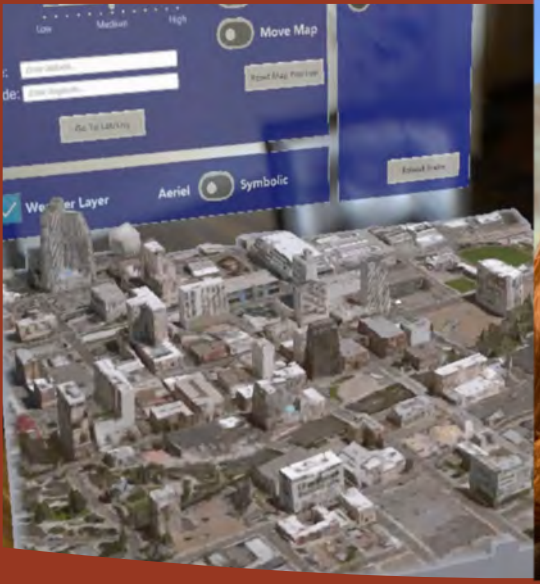
mission driven on-board decision making

support mission tasks and safe separation with payload directed flight

Domain Expertise & Tools

subject matter experts and stakeholders

collaboration on problem definitions, barriers and solutions




Human Factors

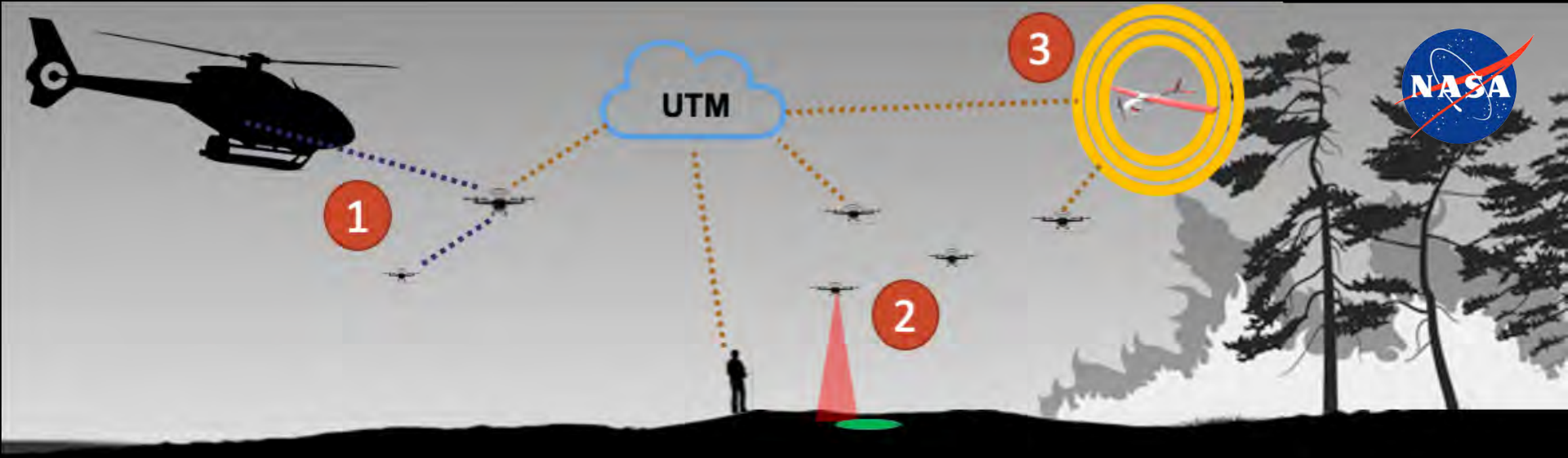
concept and information requirements

distributed virtual collaboration tools that demonstrate the information to action cycle

Targeted use-cases

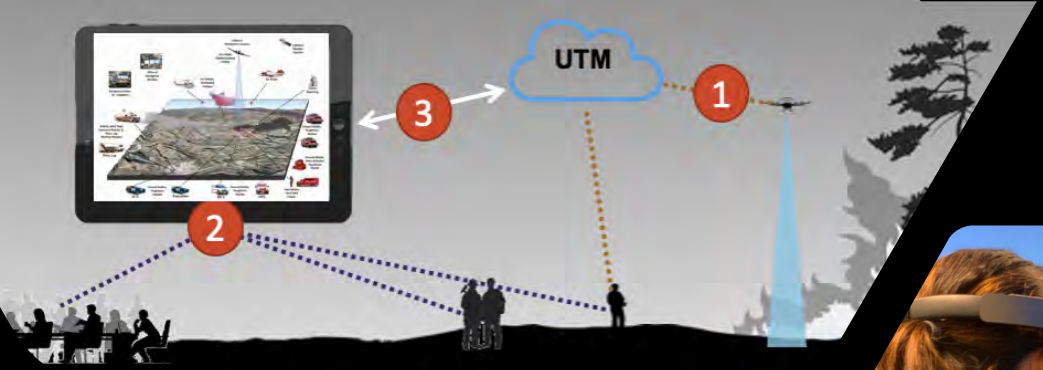
California wildfire field demonstration

Florida post-hurricane simulation



Connected, adaptive, and autonomous operations

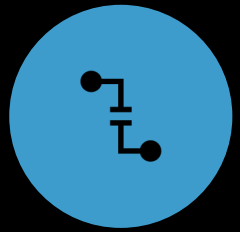
The application of UTM, ad-hoc communication networks, vehicle to vehicle communication, and onboard autonomy to enable airspace management and ensure the safety and resilience of the operations



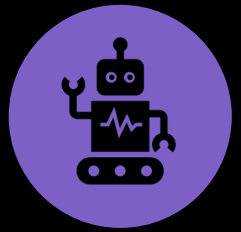
Distributed Virtual Collaboration

Collaborative tools to ingest data and distribute a common operating picture for all stakeholders for strategic planning and decision-making

Why is STEReO transofmarional?



ADDRESSES RESILIENCY GAP FOR UTM/UAM ECOSYSTEM



ADVANCES STATE-OF-THE ART IN ONBOARD AUTONOMY

FOSTER THE UAS/UTM EXPANSION TO PUBLIC SAFETY COMMUNITY

Why Is STEReO “Transformational?”

Who cares?

FAA, UAS industry, Public Safety Agencies, and General Public

Community benefits

- faster recovery
- more situation awareness during disaster

System level benefits

- increases capacity of operations under a restricted airspace (e.g. TFR)


NASA