



Scalable Traffic Management for Emergency Response Operations (STEReO)

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Roots in Air Traffic Control Research

traditional air traffic control
research and simulation

An aerial view of a city with various aircraft flying and landing. In the top left, a small propeller plane flies over a cluster of tall buildings. In the top right, a NASA logo is overlaid on a dark building. In the center, a large white commercial jet flies low over a city street. In the bottom right, a small red and white propeller plane is on a rooftop helipad. A semi-transparent dark box with white text is in the bottom right corner.

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



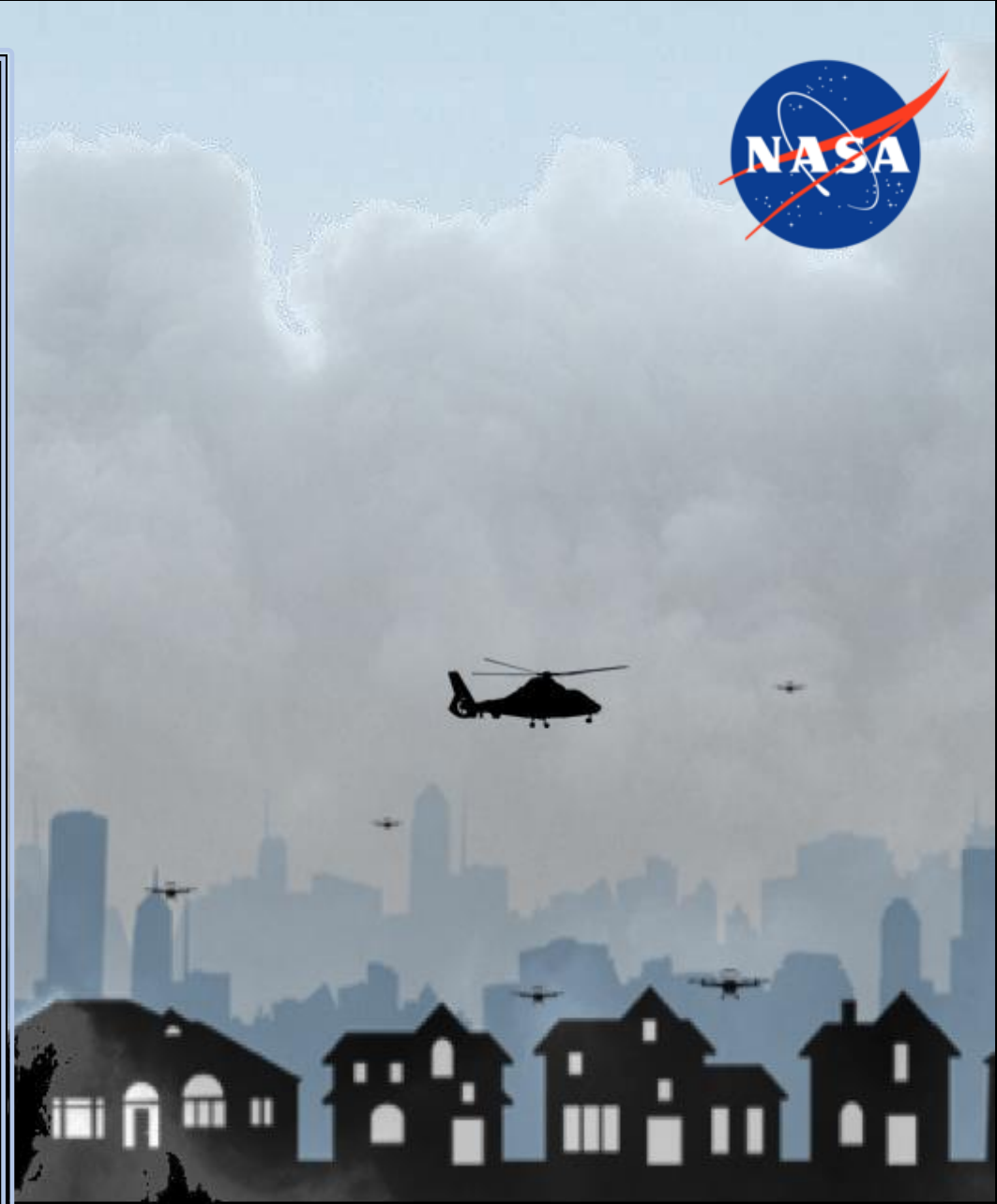
clear path forward for multiple areas of research, often overlapping

STEReO

Scalable Traffic Management

NASA's UAS Traffic Management (UTM) System

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

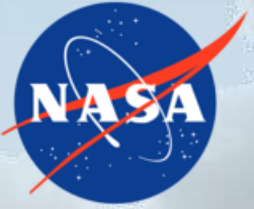


STEReO

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

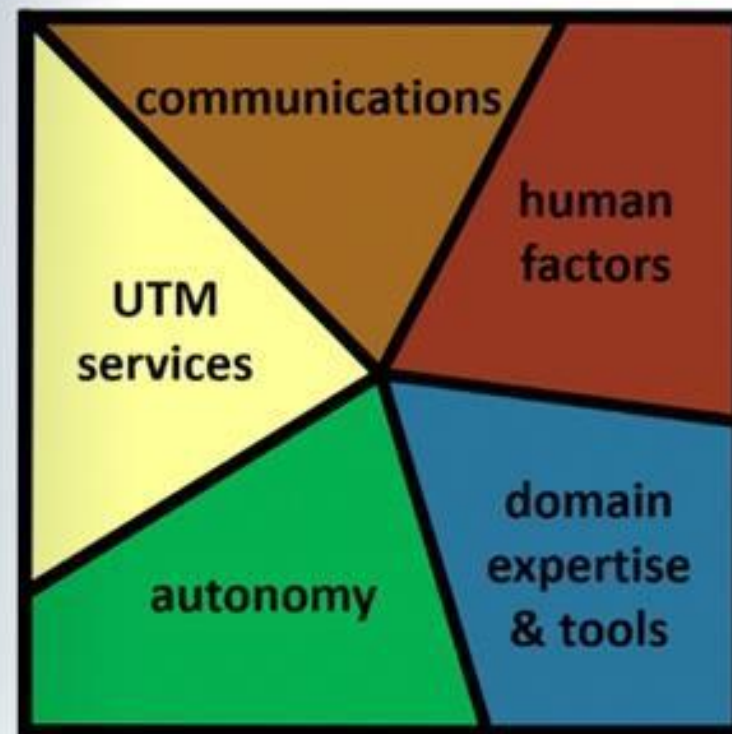


Safely scale and integrate
aircraft operations

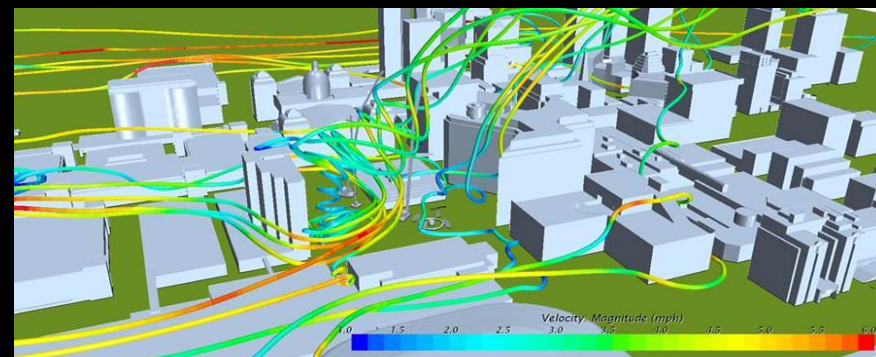
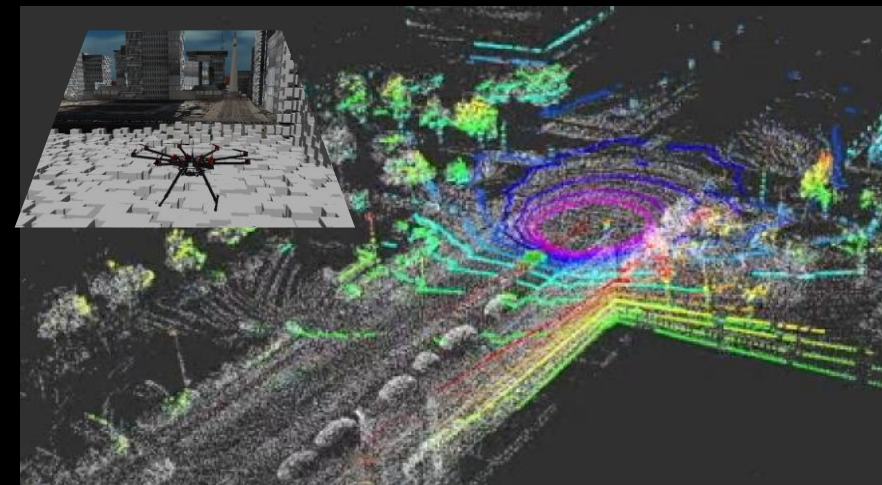


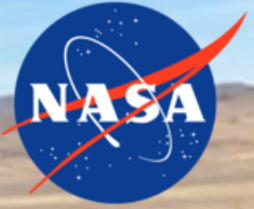
Provide operational
resiliency to dynamic
changes during a disaster
event





STEReO

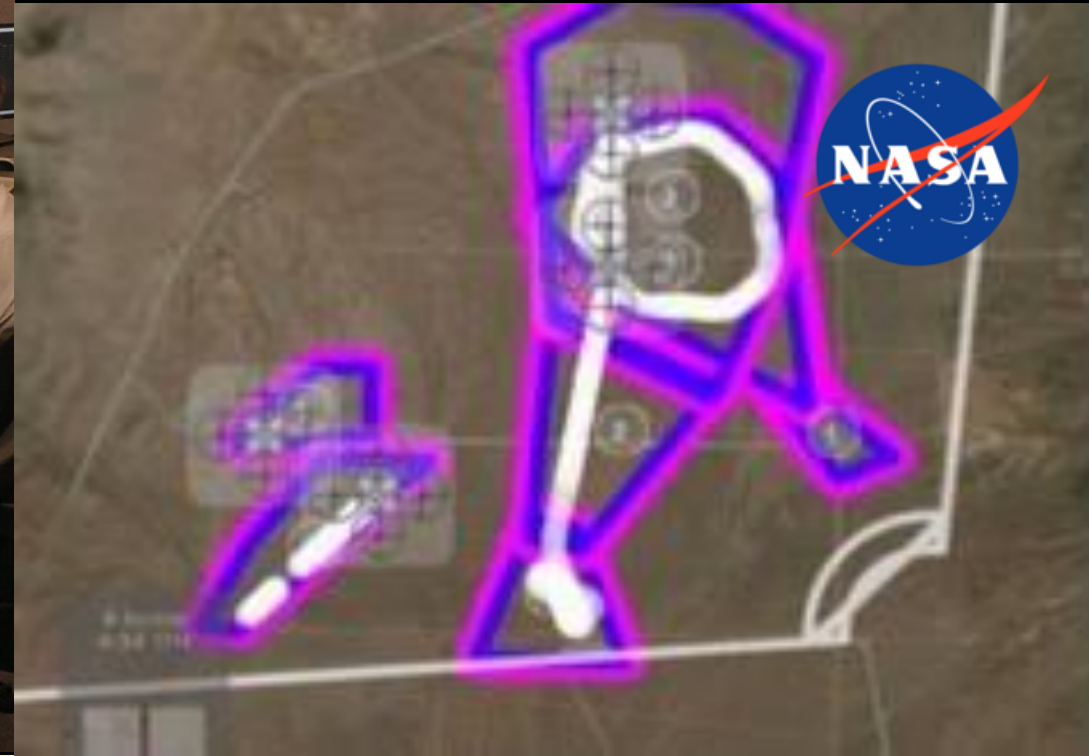




Communications

Persistent, Interoperable, and Expanded

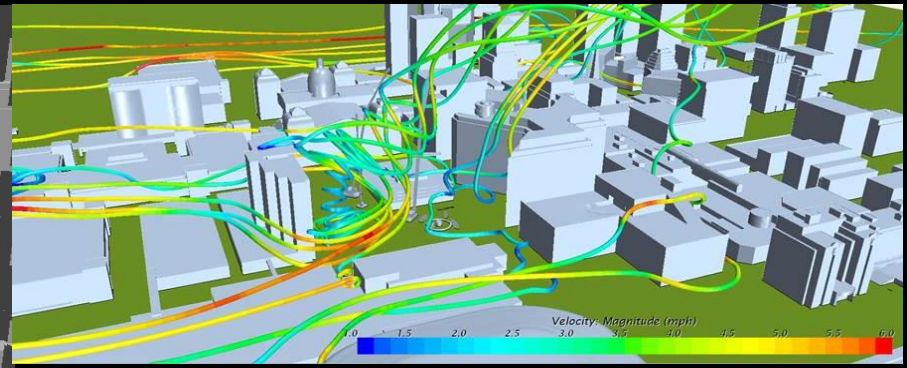
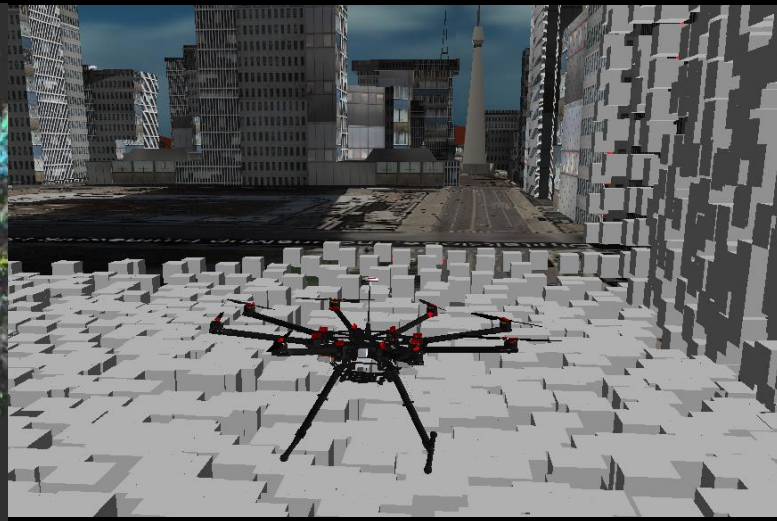
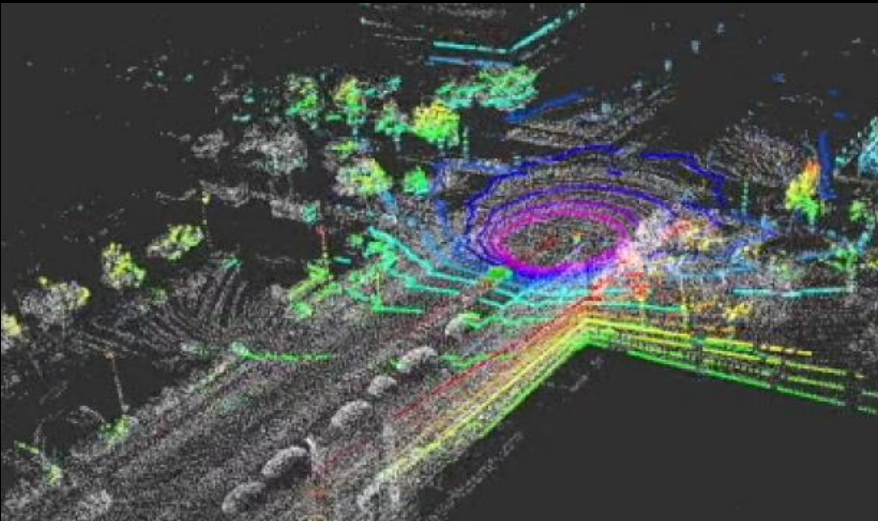
supports critical data exchanges, with a new allocation of spectrum for tracking UAS operations without burdening existing networks.



UTM Services

Airspace Coordination and Management

alleviates workload associated with incorporation of UAS operations



Autonomy

Operation-Driven Onboard and Ground-Based Automation

purposeful and pragmatic automation supports integration and scalability with safety, efficiency, performance, and enhanced capabilities



Domain Expertise and Tools

Subject-Matter Experts and Stakeholders

collaboration on problem definitions, barriers, and solutions, as well as integration with existing workflows



Human Factors

Concept and Information Requirements

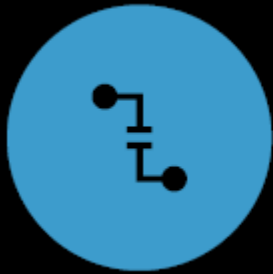
explore new tools and interfaces to demonstrate distributed and virtual collaborations



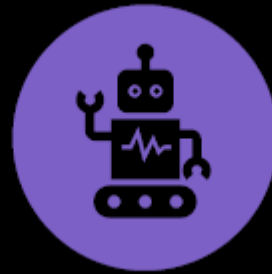
STEReO Use-Cases

- **Wildland fire emergency response**
- **Post-hurricane disaster response**

Why is STEReO Transformational?



Addresses
resiliency and
functionality gaps
for UTM/UAM
ecosystem



Advances the
state-of-the-art
in autonomy



Safely enables
new options for
emergency
responders

Why is STEReO Transformational?



Who Cares

- FAA, UAS Industry, First Responder Agencies, and General Public



Community Benefits

- faster response and recovery
- more situation awareness during disaster

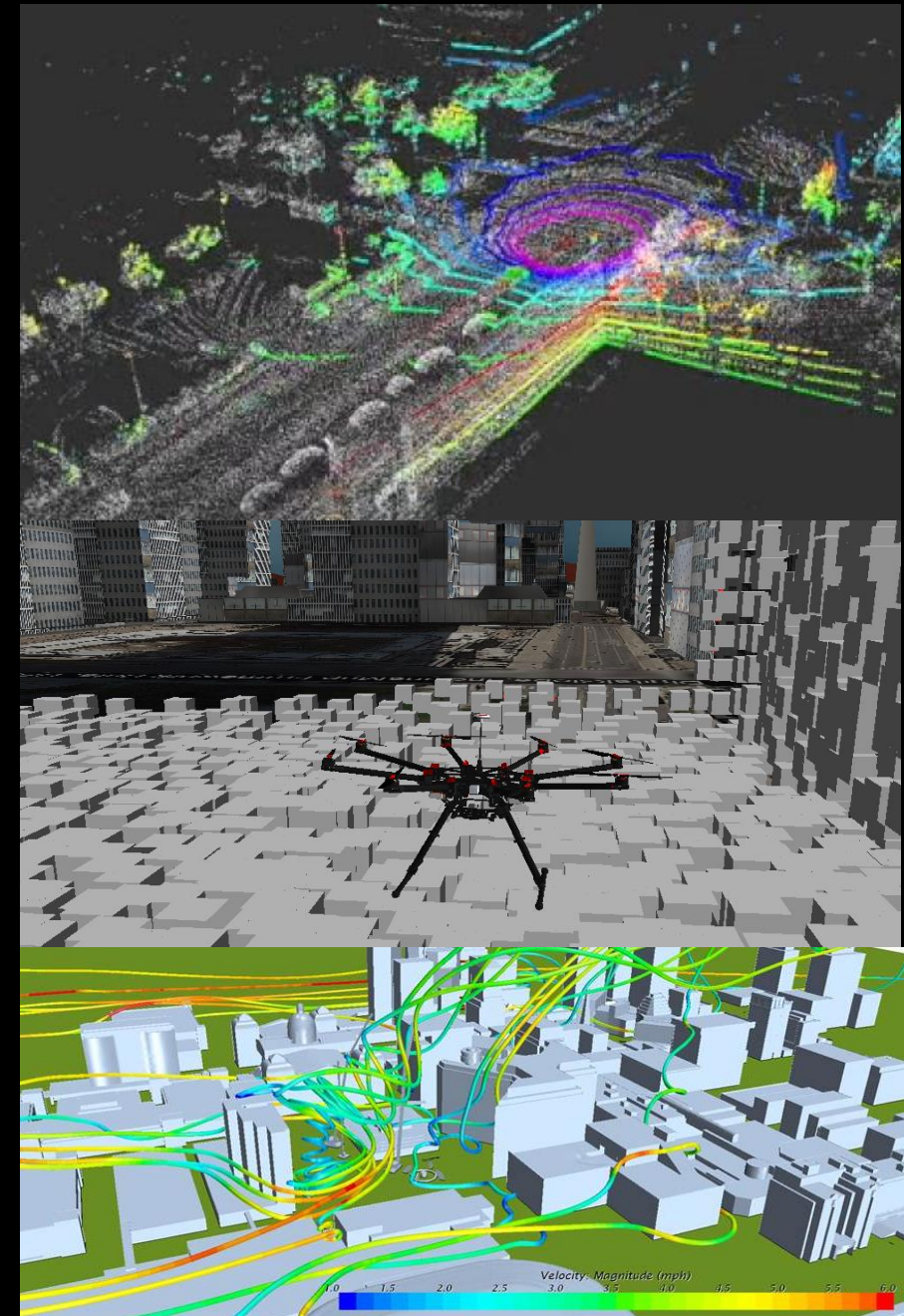


System-Wide Benefits

- Increases capacity of aerial operations during an incident response

Autonomy in STEReO

- Pragmatic and Purposeful
- Look, Think, Act, Communicate
- Autonomy is System-Wide (in the air and on ground)
- Goals
 - Safety
 - Efficiency
 - Functionality and Performance
 - Enhanced Capabilities
- Onboard autonomy must manage risks
 - Sense the environment, objectives, and hazards
 - Understand the risks and map the environment
 - Act to achieve mission goals while managing risks





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