

STEReO

combining NASA technologies and partnerships to transform
current-day emergency response operations

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STEReO

Scalable Traffic Management for Emergency Response Operations





- short history lesson
- UTM overview
- STEReO concept



NASA's research mission directorates:

- aeronautics (ARMD)
- human explorations and operations (HEOMD)
- science (SMD)
- space technology (STMD)

ARMD

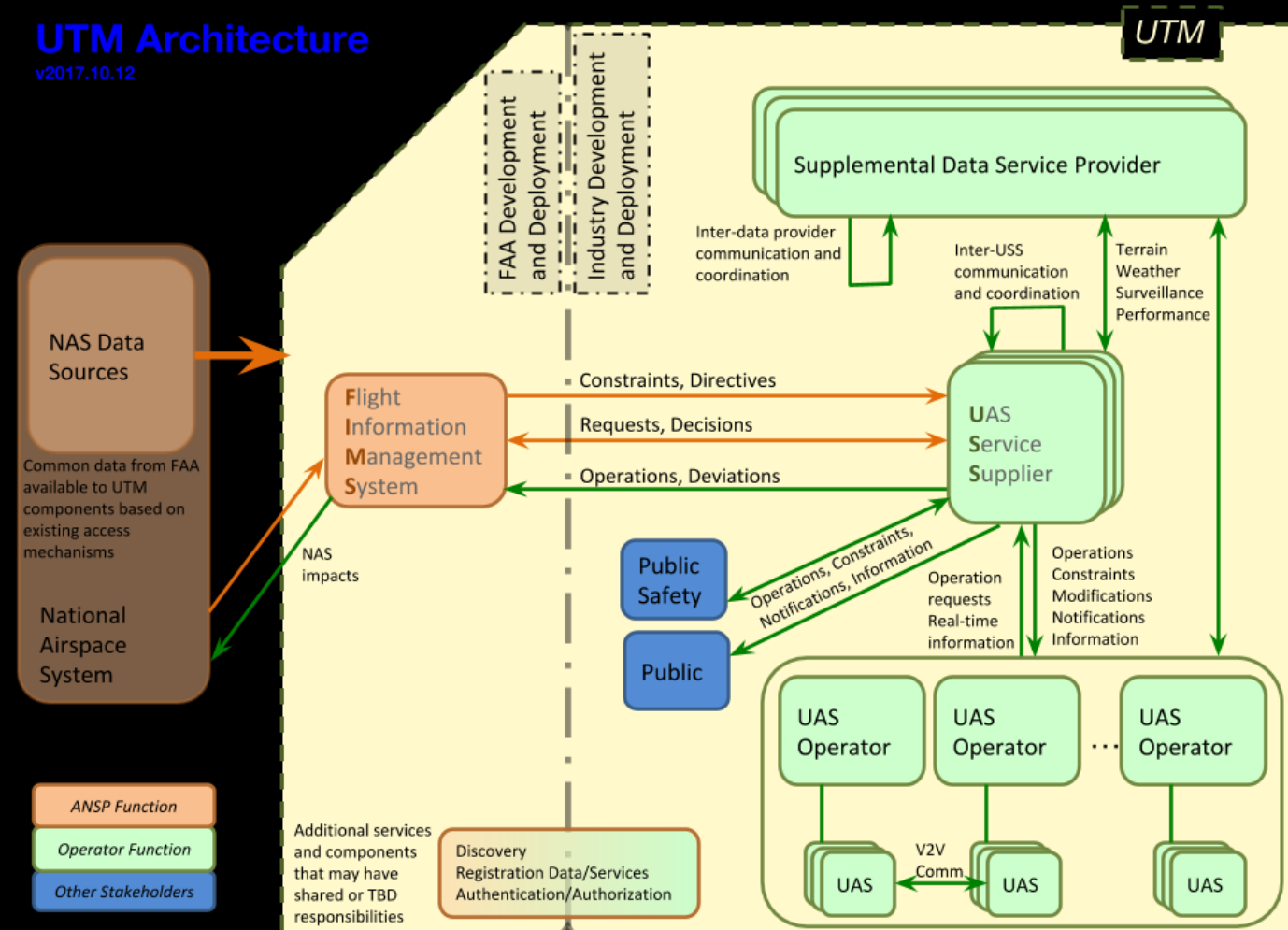
- air traffic management technologies
- vehicle design
- integrated aviation systems

airspace operations laboratory (AOL @ NASA Ames)

definitions and key concepts:

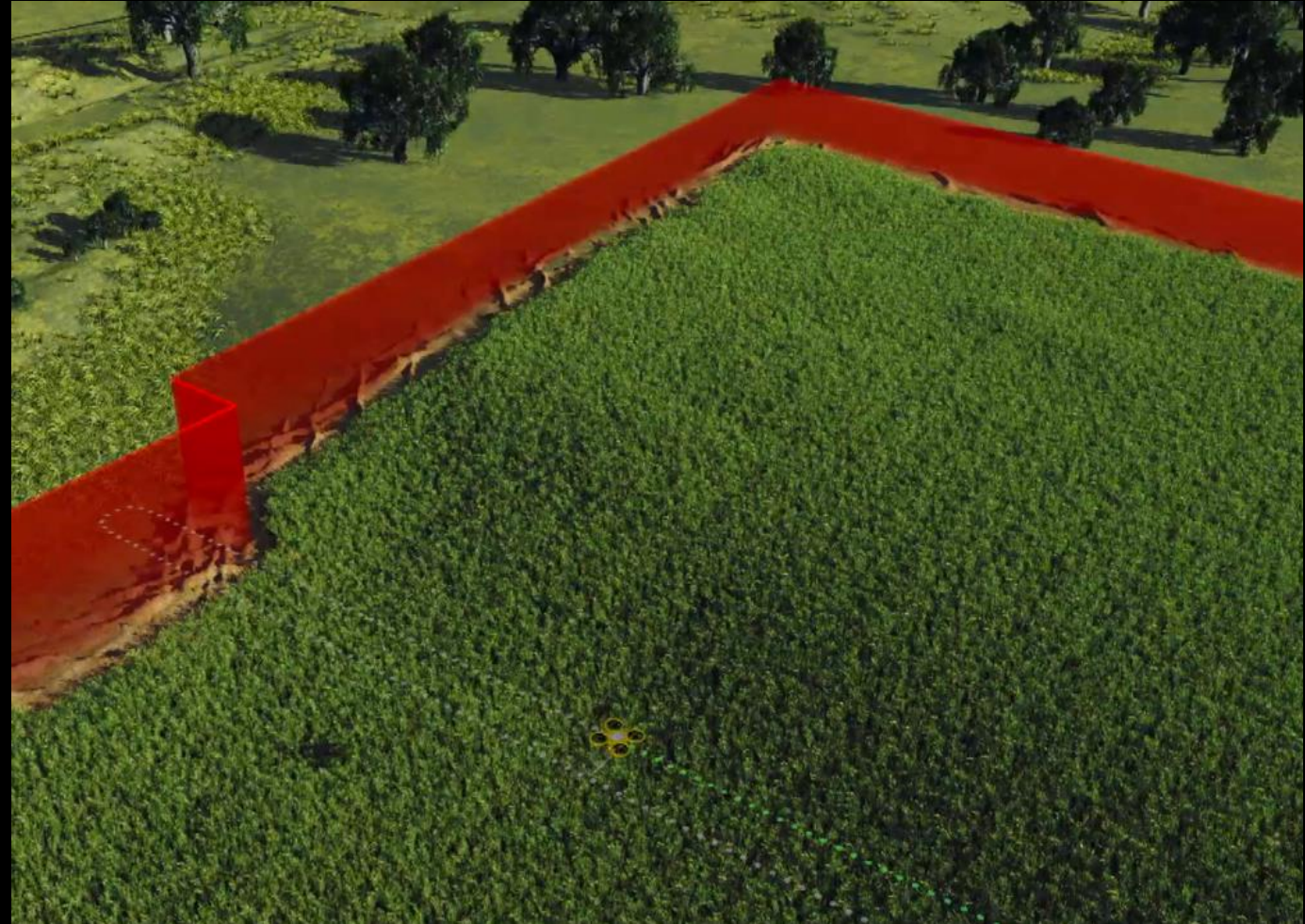
- UAS Service Supplier (USS)
- UAS Supplemental Data Service Supplier (SDSP)
- Flight Information Management System (FIMS)

UTM Architecture
v2017.10.12



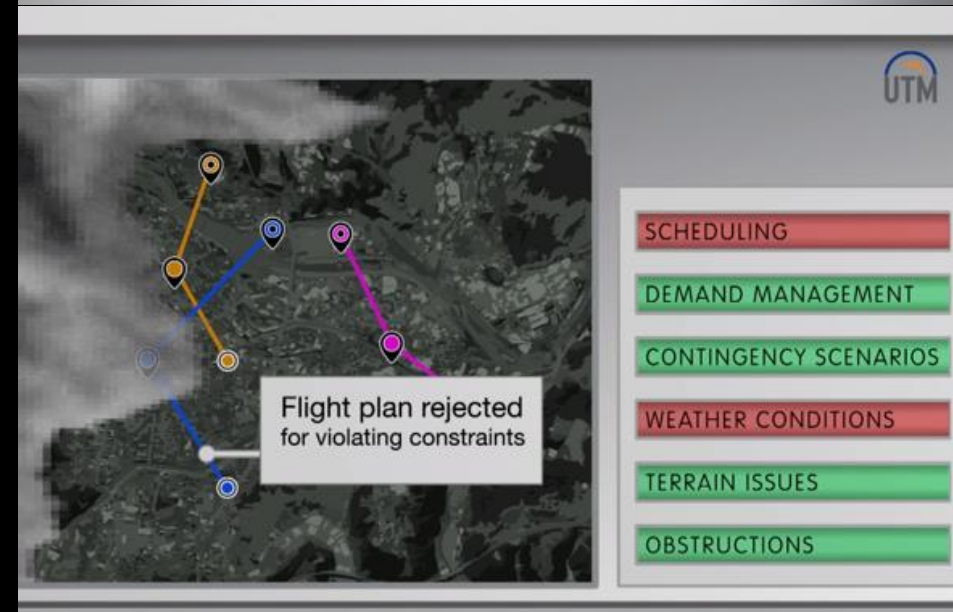
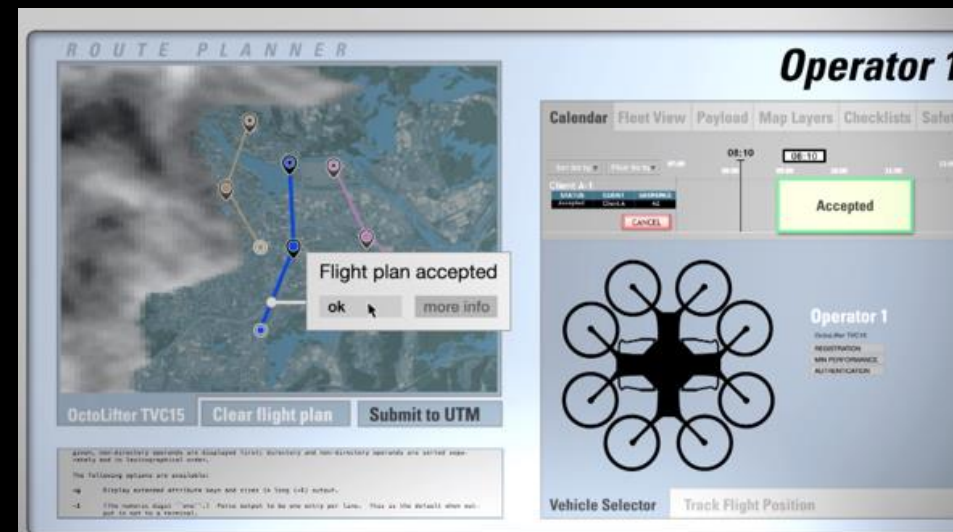
UAS Service Supplier (USS)

- enables the operator to send/receive data for UTM operations
- shares appropriate data with ATC and other USSs
- monitors constraints, conformance, and rules



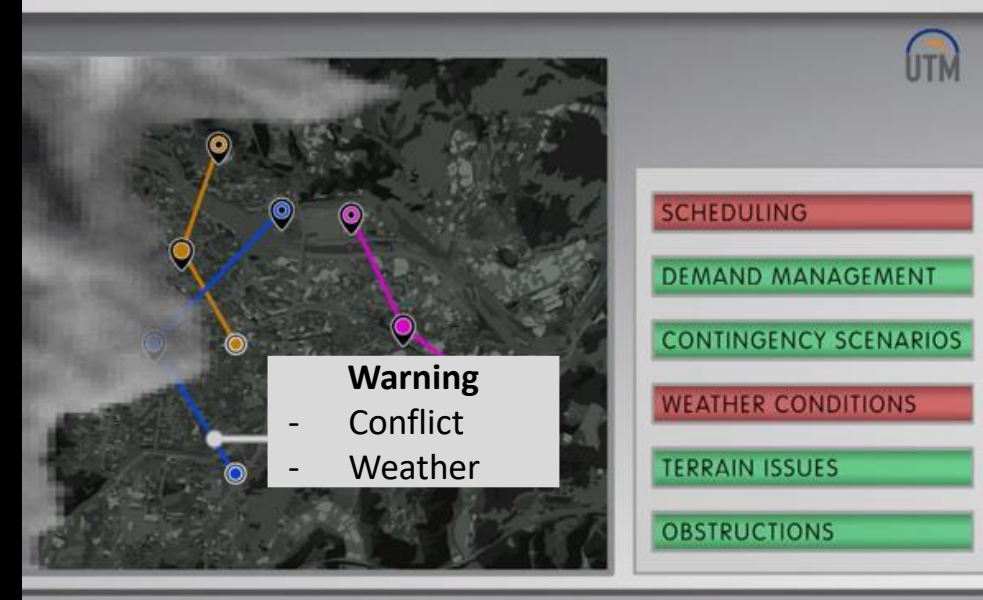
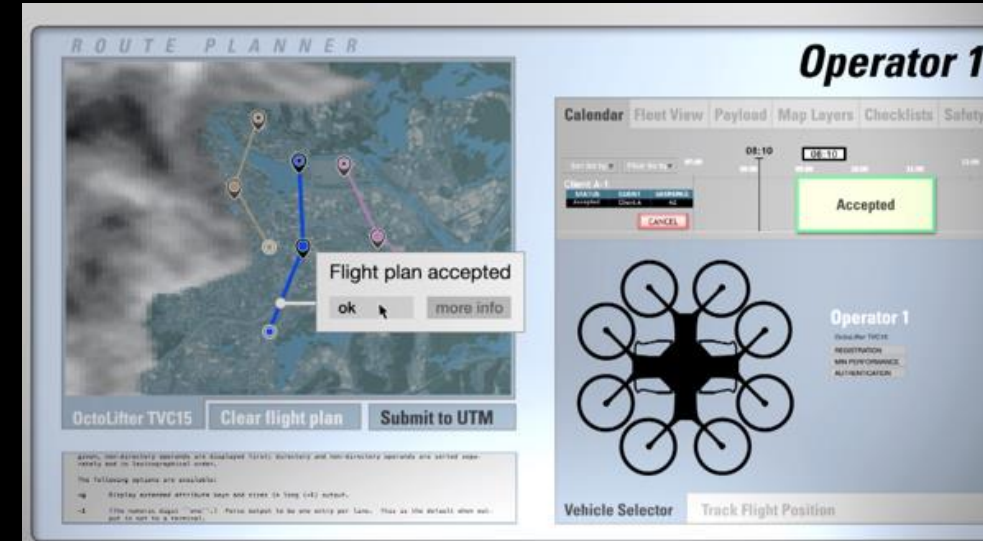
USS network

- standardized platform for sharing operation information & data
 - operator intention, contingency plans, equipage
- enables coordination between operators & other stakeholders across multiple platforms
- provides shared awareness



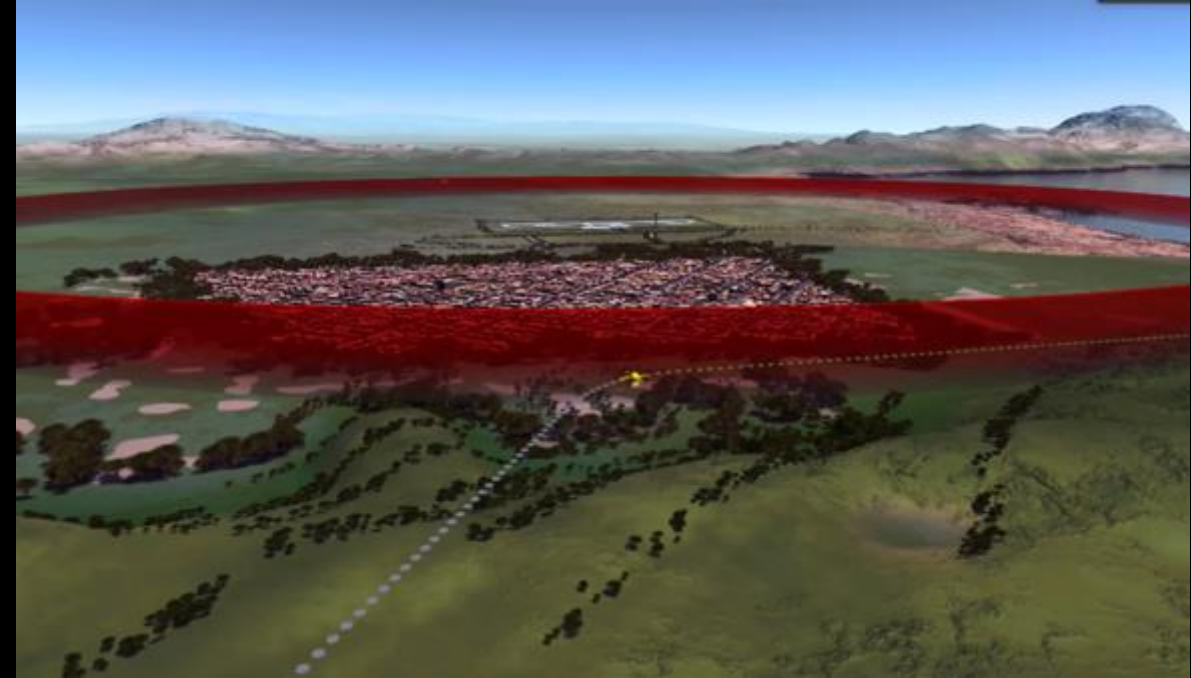
Supplemental Data Service Provider (SDSP)

- can connect to USSs and/or directly to vehicle operators
- Examples:
 - Surveillance feeds
 - Manned operations
 - Terrain
 - Weather
 - Flight planning



Flight Information Management System (FIMS)

- gateway between the NAS and UTM
 - how airspace/NAS information can be input to the UTM world
 - how the FAA can access UTM information





emergency response operations aren't easy:

- conducted under adverse conditions
- involve numerous organizations
- limited communication and infrastructure
- manual coordination to deconflict/use airspace
- challenges with timeliness of information

the result? safe procedures with minimal technological advances



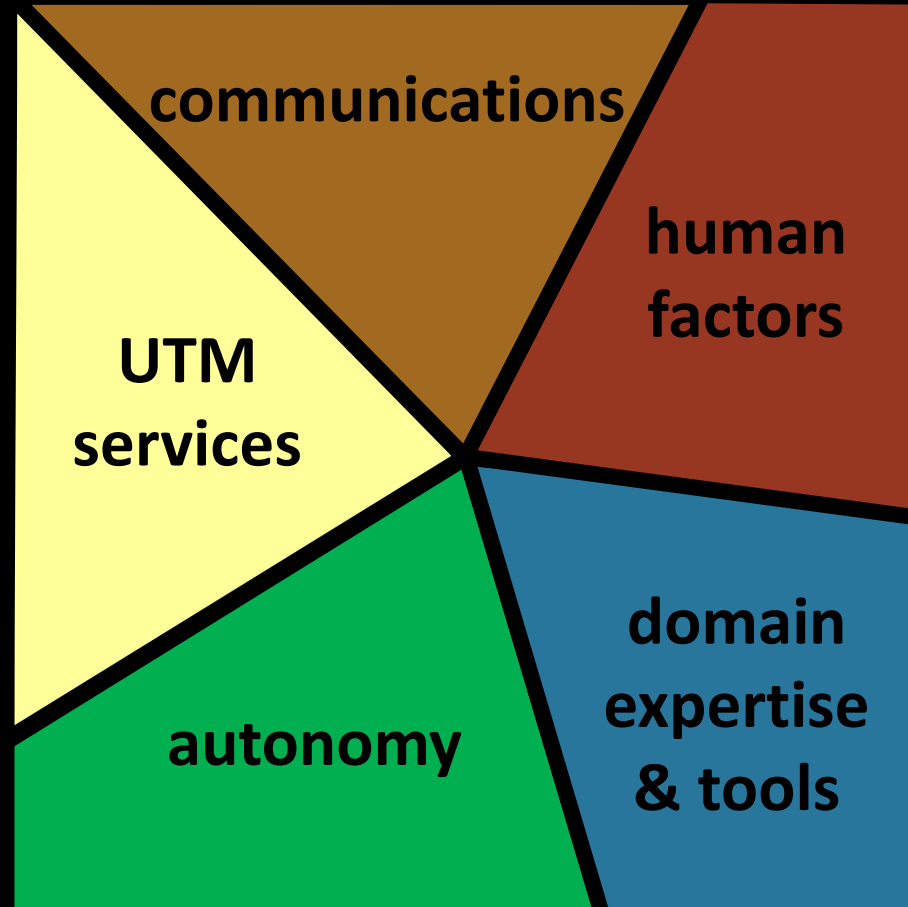
use innovative communication approaches to enable new traffic management and autonomous vehicle capabilities, providing a data-rich common operating picture

the result? responders can do more, know more, safely

STEReO as a product



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- how can state-of-the-art vehicle autonomy help UAS vehicles become a valuable part of emergency response operations?
 - what is the state-of-the-art?
 - what hurdles do we need to consider?
 - what are the ripe opportunities?



- how can UTM services be leveraged to support scalability of operations, and to provide improved awareness via an enhanced common operating picture?
 - what capabilities do UTM services enable?
 - how do they relate to today's procedures for airspace coordination?
 - what new capabilities can be added to UTM services that address the unique needs of emergency responders?



- how can advanced communication/connectivity technologies enable new data exchanges and information sharing?
 - what data do we want to send?
 - what infrastructure/techniques can we employ to send that data?
 - how can we support resilient operations/communications in challenging environments?



- how can data be delivered to best support operator awareness and decision-making?
 - what types of collaborations occur today?
 - what interfaces are the most appropriate for data-supported tasks?
 - what information must be included to support effective teamwork between operators, between systems, and between operators and systems?



- how can new processes, products, and options be integrated into existing workflows that are critical to established operations?
 - what things are used today?
 - where are there flexibilities and constraints?
 - what are the needs for interoperability/sharing?



flight test/demonstration

- spring/summer of 2021
- exercise manned-unmanned interactions
- implement new data exchanges for partially automated air traffic management
- challenge comms dependencies
- deliver enhanced shared situation awareness
- integrate with stakeholder systems/workflows

questions



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