Why is UTM Needed?

- FAA small UAS forecast – 2-3 million total in US by 2023
- Many use cases: package delivery, news collection, precision agriculture, infrastructure inspections, public safety, disaster response, etc.
- New entrants desire access and flexibility for operations
- Current users want to ensure safety and continued access
What is UTM?

- UTM is an “air traffic management” ecosystem for small UAS in low-altitude airspace
- UTM utilizes industry’s ability to supply services under FAA’s regulatory authority where these services do not exist
- UTM development will enable the management of large scale, low-altitude UAS operations:
  - Address beyond visual line of sight UAS operations under 400 ft. AGL
  - Define roles/responsibilities of FAA, operators, and other stakeholders
  - Define information architecture, data exchange protocols, software functions
  - Recommend performance requirements
Technical Capability Levels (TCL) Progression for System Development and Testing

TCL 1
- Remote Population
- Low Traffic Density
- Rural Applications
- Multiple VLOS Operations
- Notification-based Operations
- Completed 2015

TCL 2
- Sparse Population
- Low-Mod Traffic Density
- Rural / Industrial Applications
- Multiple BVLOS Operations
- Tracking and Operational Procedures
- Completed 2017

TCL 3
- Moderate Population
- Moderate Traffic Density
- Suburban Applications
- Mixed Operations
- Vehicle-to-Vehicle Communication
- Public Safety Operations
- Completed 2018

TCL 4
- Dense Population
- High Traffic Density
- Urban Applications
- Dense BVLOS Operations
- Large Scale Contingency Management
- Completed 2019
Flight Information Management System
- Enables airspace controls
- Facilitates requests
- Supports response in emergencies impacting NAS

UAS Service Supplier
- Federated Structure
- Cloud-based system
- Automated System
- Supports UAS with services (e.g., separation, weather, flight planning, contingency management, etc.)

Supplemental Data Service Provider
- Supplies supplemental data to USS and UAS Operator to support operations

UAS / UAS Operator
- Individual Operator
- Fleet Management
- On-board capabilities to support safe operations
Impact of UTM Research

Fielded Systems
- FAA LAANC use UTM concept
- UTM Pilot Program (UPP)
- UAS Integrated Pilot Program (IPP)

UTM did not exist prior to NASA involvement
- UTM has developed a market for Airspace Services
- FAA has adopted the UTM architecture and is continuing development on UTM service

UAS Rule Making
- Part 107 & Beyond
- Remote Identification
- Operational Approvals using UTM

FAA has been using NASA research to inform UAS policy and rulemaking
- The FAA recent reauthorization places sizable investment on the deployment of UTM

Industry Guidance
- Safety Case Development
- Data Exchange and Protocols
- Industry Standards

Industry UTM Standards Development is ramping up
- NASA research has accelerated the development of industry standards (e.g. Remote ID Standard)

International Harmonization
- UTM Construct and Architecture
- Use Cases

NASA UTM concepts and architecture has been internationally embraced
- The NASA UTM architecture promoted commerce which has enabled US domestic UTM airspace services companies to lead internationally