

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





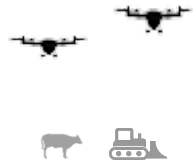
What is UTM?

- 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



TCL1

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

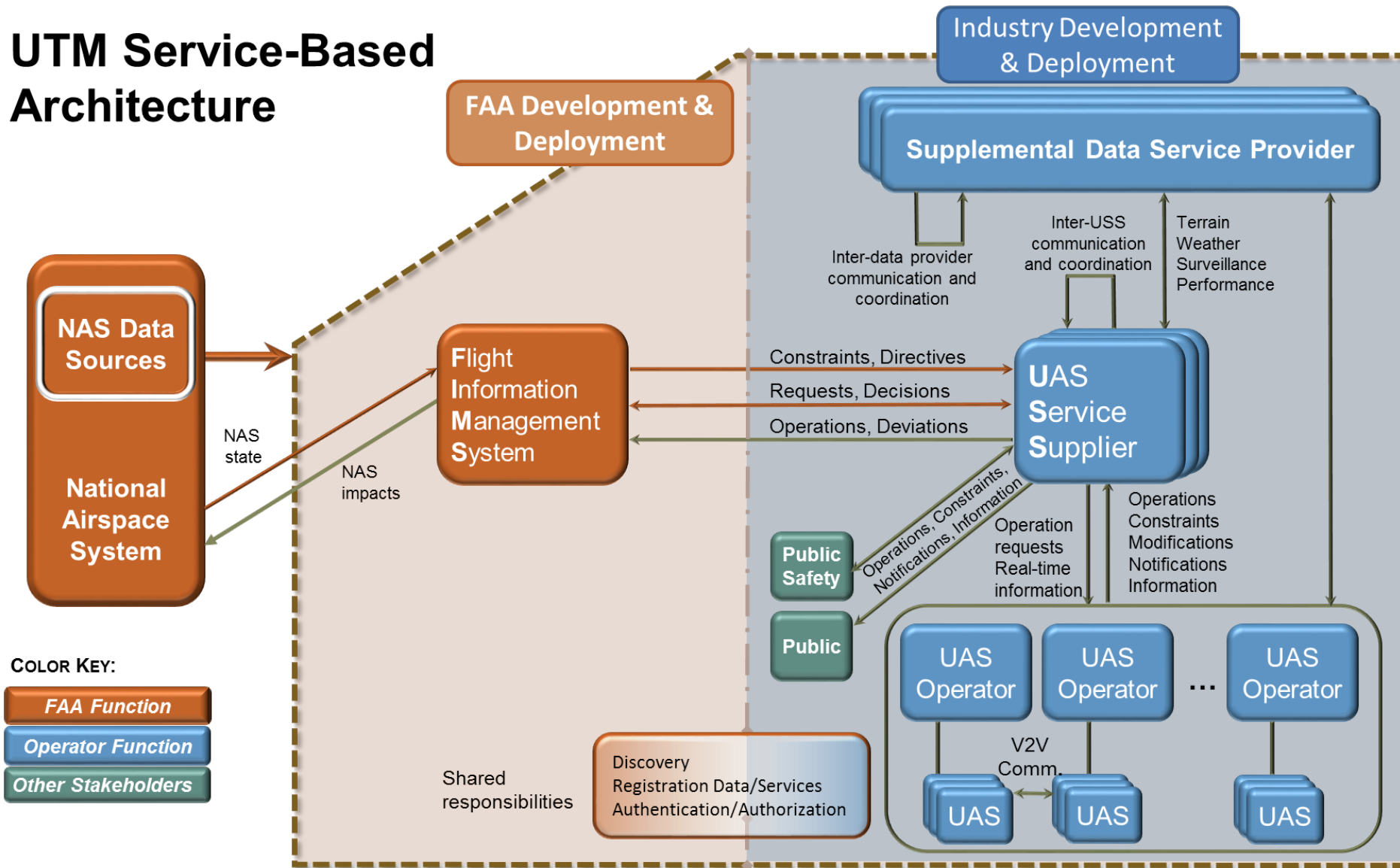
TCL 4

Dense Population
High Traffic Density
Urban Applications
Dense BVLOS Operations
Large Scale Contingency Management

Completed 2019



UTM Service-Based Architecture



COLOR KEY:

- FAA Function
- Operator Function
- Other Stakeholders

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)

UAS Rule Making

- Part 107 & Beyond
- Remote Identification
- Operational Approvals using UTM

Industry Guidance

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

International Harmonization

- UTM Construct and Architecture
- Use Cases

- **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

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

- **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