Aeronautics Drone Operations Highlights

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Aeronautics Uncrewed Aircraft Systems (UAS) Program

Building statewide UAS capability to improve safety, efficiency and data-driven impact

Program Evolution

2016 Program Launched

Established an internal UAS capability within Aeronautics.

2019 Shift to Data Deliverables

Expanded from flying missions to producing imagery, maps, models, and inspection products.

Today Distributed Model

Central Aeronautics team supports a trained network across MassDOT.

Current Program

50
Distributed Pilots

6
Full-time Pilots

Statewide Reach	Supports multiple state agencies with shared UAS expertise, field operations, and data deliverables.
BVLOS Capability	FAA-authorized capability expands missions beyond visual line of sight.

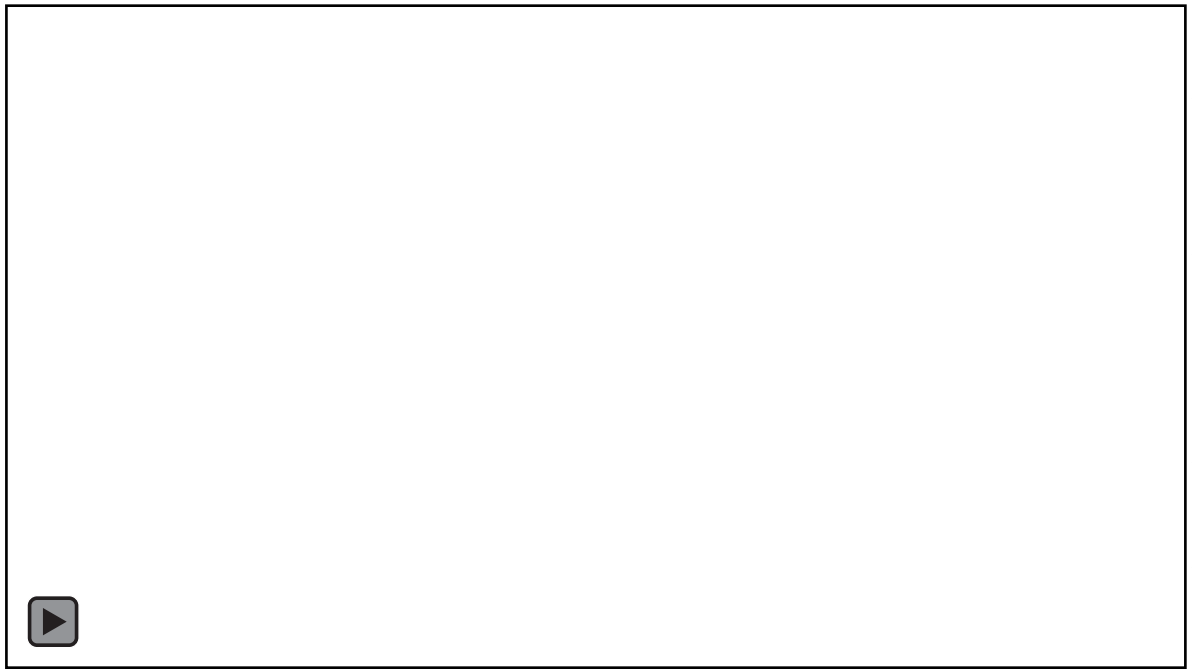
What the program adds

- **Safety**
  Safer access to difficult or hazardous areas.
- **Efficiency**
  Faster, repeatable data collection with less traffic disruption.
- **Technical capacity**
  Builds specialized UAS skills in existing roles; expands capability

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Bridges

Expanding access to bridge conditions between required inspections



- Enables engineers to inspect bridges more frequently and monitor emerging concerns, while complementing, not replacing, required inspections.
- Since 2019 200+ bridges inspected with UAS, providing engineers an additional tool for condition monitoring.
- Traditional close-access inspections can require snooper trucks, lane closures, and significant traffic control, limiting opportunities for additional inspections.
- UAS provides rapid access to difficult-to-reach areas without the same traffic impacts.
- High-resolution and thermal imagery can identify potential conditions not readily visible through conventional observation.

District 1 Culvert Inspection

Use UAS to safely and efficiently inspect difficult to access culverts.

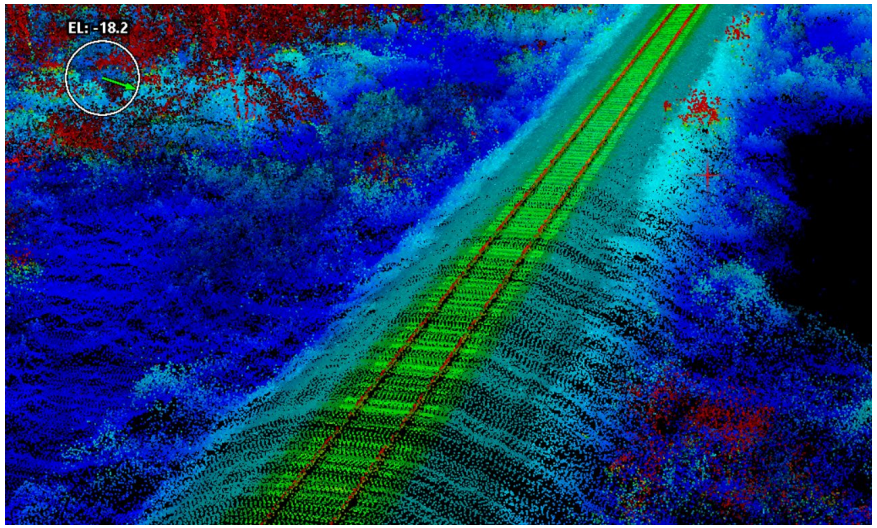
UAS are being used to establish a scalable, safer, and repeatable approach to inspecting District 1's 176 culverts within the Ancillary Structures Program.

- Conduct aerial and close visual inspections of culvert structures and associated features.
- Capture high-resolution imagery to document existing conditions.
- Reduce the need for personnel to access constrained or potentially hazardous areas.
- Establish a repeatable UAS-based workflow that can be scaled across the District 1 inventory.



Rail and Transit

Providing direct, independent visibility into rail infrastructure and construction





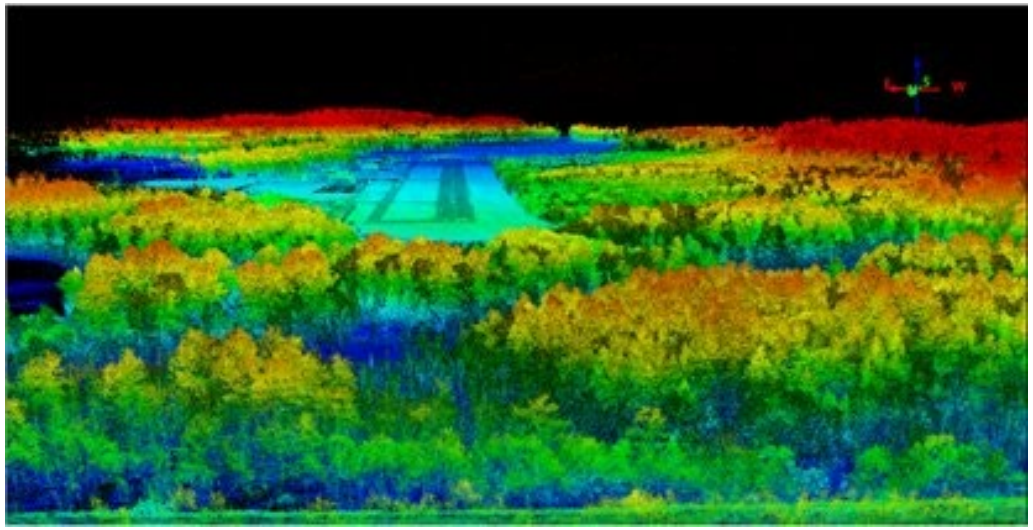
- Since 2019 1,000+ UAS flights and 554+ miles of rail corridor surveyed, providing MassDOT with direct visual data across the rail network.
- Independent verification of rail infrastructure and construction, supplementing observations made from adjacent roadways and contractor-reported work.
- Rail crossing mapping provides current imagery and documentation to support FHWA Part 130 safety assessments.
- Embankment and drainage mapping provides detailed aerial data to support engineering analysis and identify areas requiring attention.
- Repeatable aerial documentation allows MassDOT to monitor changes over time rather than relying solely on periodic site visits or contractor reports.

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Airport Surfaces

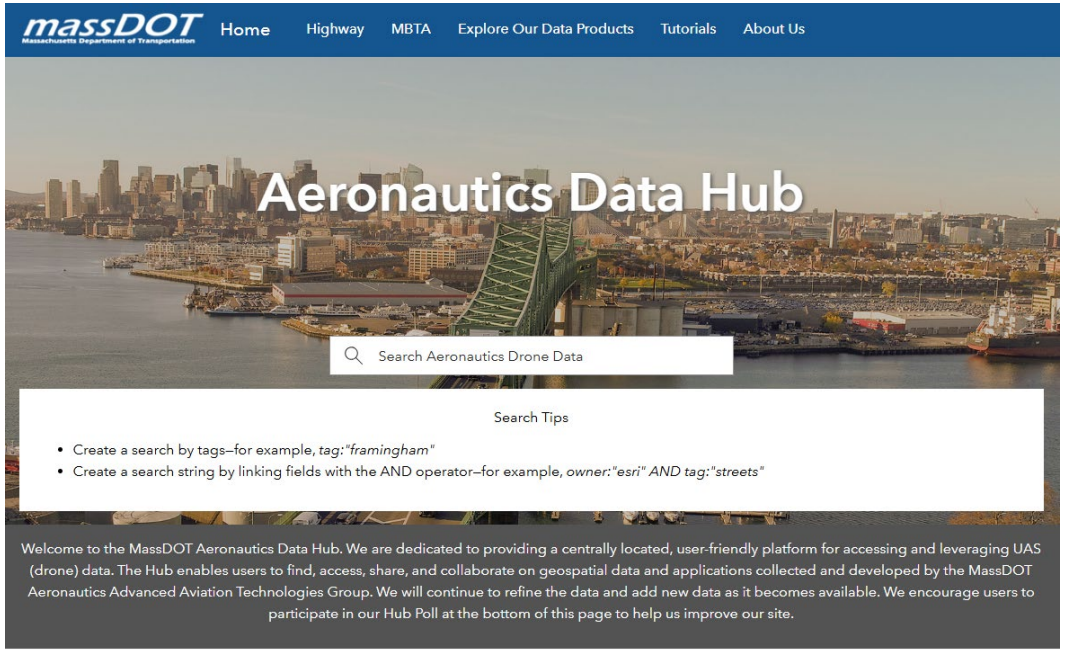
Identify and analyze obstacles within airport approach paths to support aviation safety

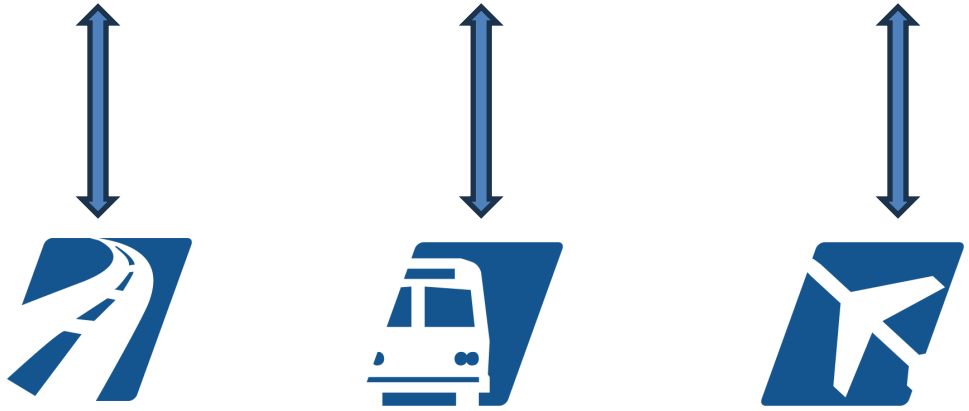
- Survey approach and departure corridors for trees, vegetation, structures, terrain, and other potential obstacles.
- Generate accurate aerial imagery and 3D/photogrammetric data to establish obstacle locations and elevations.
- Compare identified features against applicable airport approach/departure protection surfaces.
- Provide airport personnel with current, geospatially referenced data to support obstacle evaluation, mitigation, and ongoing monitoring.



Aeronautics Data Hub

Turning raw UAS data into accessible, actionable information for MassDOT





- Eliminates the need for users to manage thousands of photos and scattered file folders.
- In-house UAS data specialists process and organize collected data into usable products such as imagery, maps, 3D models, and inspection documentation.
- Centralizes UAS data across MassDOT, organized by asset, location, and mission.
- Makes data readily accessible to MassDOT and other Commonwealth employees without requiring specialized processing expertise.
- Preserves a searchable historical record that allows assets to be monitored and compared over time.

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Thank You

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