

Division of Intermodal, Aviation Programs



# Uncrewed Aircraft Systems FY 2023 Annual Report



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Cover: Photo by UAS Pilot Courtney Peugh, District 4, Area 4 Construction Supervisor of I-75 interchange in Tift County

Above: UAS Pilots Landon Perry, District 7 Pre-Construction Supervisor, and Jakari Dean, District 7 Traffic Operations Engineer II

# The State of UAS

Across the nation, state departments of transportation (DOT) are using Uncrewed Aircraft Systems (UAS) to accomplish tasks that used to take days and heavy equipment to complete, such as inspecting bridges or creating 3D models of infrastructure that will help to track changes over time. As the complexity of missions evolves, pilots are utilizing Federal Aviation Administration (FAA) waivers to fly beyond visual line-of-sight (BVLOS). For BVLOS operations to grow in sophistication and volume, the FAA is implementing a UAS identification system.

The Remote Identification of Uncrewed Aircraft is the next step toward further integration of UAS into the National Airspace System. Remote ID is necessary to address aviation safety and security issues regarding UAS operations; it is an essential building block toward safely allowing more complex operations. The final rule has been sent to the Office of the Federal Register and became effective on September 16, 2023. Going forward, the Georgia Department of Transportation (Georgia DOT) will only fly Remote ID-compliant drones and continue to maintain its operational capacity by purchasing the Remote ID modules to ensure compliance.



*UAS Program Manager Demario Hall visited the Griffin Region College & Career Academy (GRCCA) Aviation Summer Camp. The students learned about the use and operation of drones as well as the opportunities that exist for young people who are interested in flying drones as a career.*

# UAS Awareness & Training

GDOT's UAS training provides pilots with a greater understanding of the organization's processes and procedures and strengthens pilots' existing skills, ultimately improving their flight proficiency.

In collaboration with the Ohio UAS Center, Georgia DOT has established e-learning content available for employees who are interested in becoming a UAS Pilot.

The four UAS e-Learning modules are:

<b>UAS Awareness</b> Available on GDOT ELMS	<b>UAS Pilot Certification</b> Coming soon
<b>UAS Teams Training</b> Coming soon	<b>UAS Train the Trainer</b> Coming soon

The image displays two screenshots from the UAS e-learning course interface. The left screenshot, titled 'Course Outline', shows a progress bar with four segments: Part I (What are UAS?), Part II (Who uses UAS?), Part III (What are UAS regulations?), and a final segment for 'Course review & knowledge check'. The right screenshot, titled 'Course Goals', lists five numbered goals: 1. Understand the meaning of "Unmanned Aircraft System (UAS)", 2. Be familiar with types of drones, 3. Understand UAS as it fits into the larger landscape of "autonomous aviation technologies", 4. Be familiar with types of drone operations, and 5. Be familiar with general licensing requirements. Both screenshots include a 'Transcript' player at the bottom and navigation icons.

The UAS Program Management team acquired drone simulation software to address the demand for skilled UAS pilots. The Zephyr drone flight simulator software teaches participants to effectively pilot a drone without the risks associated with normal operations. Upon successful completion, Georgia DOT personnel earn the Airborne Public Safety Association (APSA) Basic Proficiency Evaluation for Remote Pilot (BPERP) certification.



*Matt Coffelt UAS/AAM Program Development Manager participates in the APSA Basic Proficiency Evaluation for Remote Pilot (BPERP) flight evaluation in accordance with the NIST Standard Test Methods for Small Unmanned Aircraft Systems (sUAS).*



*The National Institute of Standards and Technology (NIST) Open Lane Test scenario is designed to measure pilot aptitude and help develop measurable skills. It is the only simulator on the market that can provide sophisticated and practical type of training which Georgia DOT has acquired to assist pilots in becoming more proficient.*

On March 29<sup>th</sup>, 2023, the GDOT UAS Program and Bridge Inspection Team performed a test of the Skydio 3D scan technology on the Piedmont Park Bridge.

Bridge inspection enhanced by UAS improves safety for the inspection team and the traveling public by reducing the need for temporary work zones and specialized access equipment and can also be very cost-effective.



*Partial 3D model of the Piedmont Park Bridge generated using Pix4D software.*

## FY 2023 UAS Program Report

Georgia DOT's UAS Program has two current initiatives:

1. Acquire the UAS resources essential for the inspection of critical infrastructure.
2. Raise UAS awareness by educating potential stakeholders and developing future use cases and pilots.

The Georgia DOT UAS Program is now in its eighth year. In the last year, the program gained three new pilots for a total of 30 pilots and 31 drones. Leadership's support of UAS technology contributes to the overall success of the UAS Program and ensures divisions and offices are in sync concerning equipment, policies, procedures and insurance coverage. The GDOT UAS Program management team engaged various business units with demonstrations and facilitations, aiming to assist remote pilots utilize drones to their full potential. In FY23, the UAS Program conducted missions such as disaster response, surveying & mapping, traffic operations, safety, bridge inspections and project documentation.

### Georgia DOT Policy Summary

The FAA issued 14 CFR Part 107 on August 29, 2016. It set forth safety regulations for small UAS weighing less than 55 pounds for non-hobbyist operations. The purpose of this policy and its application to Georgia DOT is twofold:

- (1) To ensure Georgia DOT and its employees remain compliant with 14 CFR Part 107 and all applicable state and federal laws.
- (2) To establish internal Georgia DOT procedural and operational requirements to ensure the safety and efficiency of all UAS flight operations conducted by Georgia DOT personnel.

This policy was enacted in 2017 as Georgia DOT Policy 3545-1. The UAS Program Management team will update this policy within the next year.

### Equipment Registration

Historically, the purchasing Georgia DOT district or office registered the equipment in accordance with FAA rules and regulations. Beginning in FY23 the UAS Program Manager assumed responsibility for registration to ensure seamless compliance with FAA regulations.

### UAS Pilot-In-Command

Georgia DOT personnel must obtain an FAA Remote Pilot Certificate with a small UAS rating prior to flying a Georgia DOT-owned UAS.

## Visual Observer

UAS flights must utilize a “two-person rule” as the minimum. The UAS Pilot-In-Command designates a Visual Observer (VO) for UAS flights. The VO provides an additional set of eyes for the pilot and watches for air traffic obstacles or objects aloft or on the ground. Visual Observer Training is now available to all Georgia DOT employees online through the ELMS Training Portal.

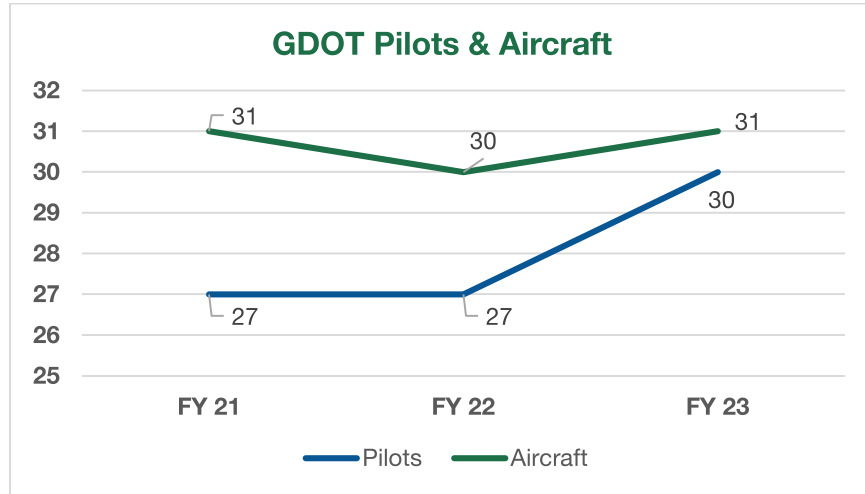


Figure 1

During FY 23 the Program added four new Pilots and lost two due to changes in position, resignations or retirement. Fleet aircraft increased by one with the acquisition of a DJI Matrice 300

## Distribution of Department UAS Pilots

Department	UAS Pilots	Trainees	Department	UAS Pilots	Trainees
Traffic Ops, H.E.R.O. Unit:	1	0	Traffic Ops/TMC:	0	0
Division of Intermodal:	4	0	District 1:	1	1
District 2:	1	0	District 3:	1	0
District 4:	3	0	District 5:	5	0
District 6:	1	0	District 7:	2	0
Bridge Design:	2	0	Maintenance:	1	0
Bridge Inspection:	5	2	Communications:	0	1
State Location (ODPS):	2	0	TIA:	0	0
Office of Legal:	1	0			

Figure 2

The GDOT UAS Program has identified opportunities to provide UAS awareness and training to offices such as Bridge Inspections and Division Maintenance staff.



In FY23 the UAS Program accumulated 2,790 flight minutes. This is a 41% decrease in the UAS utilization rate for Georgia DOT. Several factors contribute to a decrease in drone utilization rates and vary across Georgia DOT divisions and offices. Potential causes for the decrease include UAS Pilot turnover rate, operational complexity, limited use cases, cost, and safety concerns. Operating drones effectively requires training and technical expertise. The complexity of drone operation, maintenance, and data analysis is a barrier to adoption for UAS Pilots that lack the necessary skills or resources. It is important for GDOT to continue establishing a robust UAS training program and improve managing and sharing data.

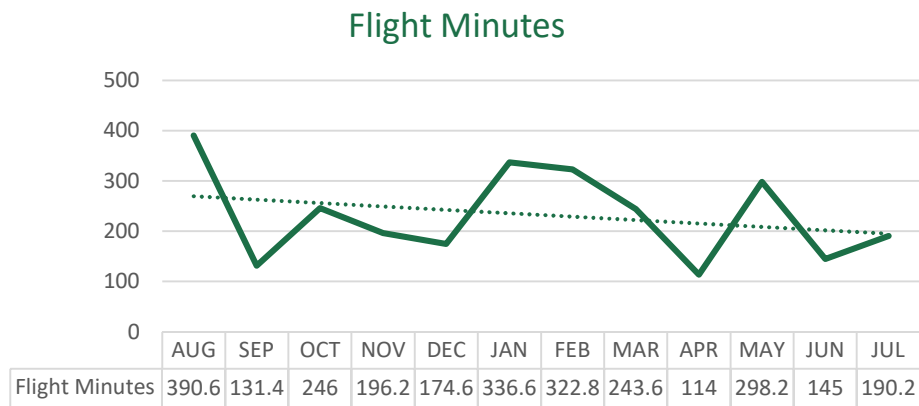


Figure 3

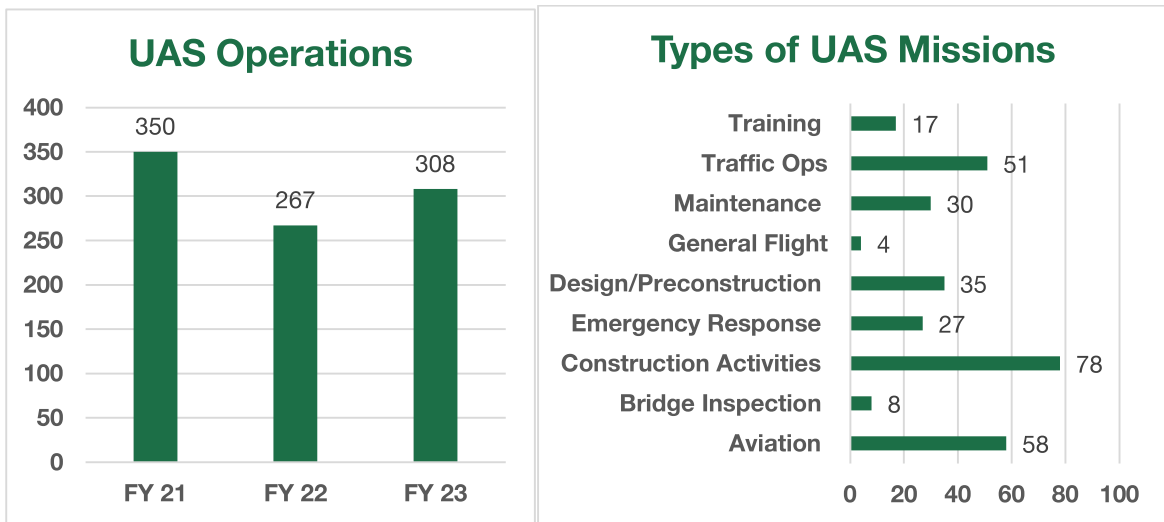


Figure 4

Figure 5

## Industry Collaboration

In FY23 the Georgia DOT UAS management team organized and led the Southeast DOT UAS workgroup. This collaborative effort led to valuable information exchange among DOTs in the Southeast region. Interaction with the workgroup provided insight on policies, procedures and objectives related to emerging technology, UAS purchases, and UAS flight team criteria. Representatives from Georgia DOT's Division of Intermodal participated in several state and national meetings during FY23 including:

- Represented Georgia DOT for the National Cooperative Highway Research Program (NCHRP) Project 23-20: Guidebook for Implementation of Uncrewed Aircraft Systems (UAS) and Advanced Air Mobility (AAM) Operational Capabilities
- Served as an AAM panel moderator at the Skyworx Augusta Innovation Exchange at the Georgia Cyber Institute
- Attended the Association for Unmanned Vehicle Systems International (AUVSI) Xponential Conference
- Presented on UAS Operations in Emergencies to FHWA Everyday Counts (EDC) 5 workshops
- Participated in the Advanced Air Mobility Workshop with the National Association of State Aviation Officials (NASAO)
- Represented the UAS Program in ongoing UAS research project update meetings through the Georgia DOT Office of Research.

## Future of UAS at Georgia DOT

The Georgia DOT UAS Program Manager and Program Development Manager will continue to identify new opportunities to expand collaboration and information sharing to move the program forward. The UAS Program Management team will continue to improve and expand the use of UAS for emergency operations, bridge inspections, traffic operations, project mapping and converting collected data into 2D and 3D plans and models.

A critical planning objective of the UAS Program includes developing a robust group of pilots capable of providing high-quality, actionable data and continuously monitoring this rapidly advancing technology.

## Gaining Exposure for the UAS Program

The UAS Program staff has begun several initiatives to increase exposure for the Georgia DOT UAS Program both internally and externally. These efforts include submitting articles on UAS operations to Georgia DOT's Office of Strategic Communications for inclusion in the Milepost magazine, The Extra Mile blog, and the Georgia DOT podcast Ahead of the Curve. Additionally, UAS Program Management team members routinely serve on industry panels and working groups relating to UAS and AAM.

# UAS Operations



*District 2 UAS Pilot Joshua Woodward conducts a preflight inspection prior to flying a UAS disaster recovery event to assess tornado damage in Jackson County.*



*The project consists of widening SR 3US/ 19/ US 41 from an existing four-lane rural typical to a six-lane urban typical. This will include the construction of a 10-foot shared use path. Once completed the proposed project will help improve both operations and safety for the travelling public. The expected date of completion is June of 2024. Image taken by District 7 UAS Pilot Landon Pery.*

# UAS Operations



*Currently under construction, the project will consist of the reconstruction of the I-285/Bouldercrest Rd interchange including the replacement of the Bouldercrest Rd bridge. The new bridge will consist of six 12-foot travel lanes and six-foot sidewalks with four-foot bike lines for both directions of travel along Bouldercrest Rd. Image taken by District 7 UAS Pilot Jakari Dean.*



*The project consists of 8.5 miles of road widening and relocation on SR 133 in Colquitt County. This Bridge is 450 feet long with 30-foot approach slabs on both sides over the Okapilco Creek North of Moultrie. Images taken by District 4 UAS Pilot Courtney Joseph Peugh.*

# UAS Operations



*The UAS Team utilized photogrammetry to inspect a runway in western Georgia suspected of having subbase water damage which caused the runway pavement to heave and rut. The UAS team created a digital elevation map that shows a large variance in elevation near the intersecting runways.*



*This project consists of an install for a new Compass Calibration Pad at The Golden Isles Airport, Brunswick, GA. The UAS images were taken by Jeffrey Griffith and were used for project documentation for the Glynn County Airport Commission.*

Aerial view of a drone flying over a road at an airport. The drone is in the center of the frame, flying over a long, straight road that stretches into the distance. The road has a yellow center line. To the left of the road is a grassy area and a fence. In the background, there are airport buildings and a runway. The sky is blue with some light clouds. A person in a high-visibility vest is standing on the left side of the road in the foreground.

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