UAS 2.0: Innovative Infrastructure Management

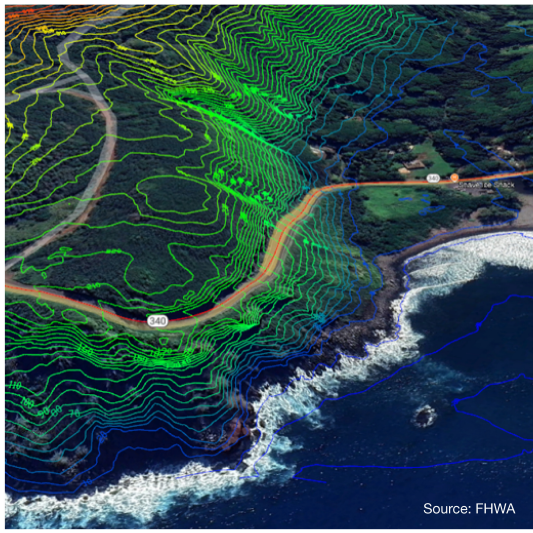
Every Day Counts
Innovation for a Nation on the Move

Revolutionizing infrastructure inspection with advanced Unmanned Aerial Systems (UAS).


Source: adobestock.com - Gorodenkoff

UAS
Unmanned Aircraft Systems

Source: FHWA


Source: FHWA

After the success of EDC-5, which led to drone use in all 50 States, the focus is now on improving how these tools are used. New features include remote docking, better work zone lighting, and more accurate performance to help transportation assets, like bridges and roads, last longer and perform more reliably.

Many transportation agencies face ongoing challenges in managing and maintaining infrastructure safely and efficiently. Traditional inspection methods often rely on manual field work, which can be time-consuming, costly, and difficult to perform in low-light or hard-to-reach areas, such as the underside of bridges. These activities can place both staff and the traveling public at risk and may require lane closures that disrupt traffic. Agencies may also need to manage changing equipment, staff turnover, and growing amounts of inspection data, increasing the chance for delays and error. Other routine activities, such as herbicide application and nighttime work zone lighting, can require a lot of resources, fuel, and materials. While UAS are now used by transportation agencies in all 50 States, there is a growing need to move beyond basic drone operations and use these tools to address gaps in current infrastructure management practices.

SAFER, SMARTER WAYS TO MANAGE INFRASTRUCTURE

UAS 2.0 provides agencies with safer and more efficient ways to inspect, monitor, and maintain transportation assets. By reducing the need for workers to operate in hazardous or difficult conditions, these systems help lower safety risks while saving time and resources. UAS 2.0 supports consistent data collection and digital workflows, making it easier for agencies to manage large amounts of inspection data despite staff or equipment changes. They also enable more precise maintenance activities, reducing unnecessary material use. Together, these capabilities help agencies make better-informed decisions and respond more quickly to infrastructure needs.

APPLICATIONS

UAS 2.0 can help modernize how agencies monitor and maintain transportation infrastructure by doing more than basic flight operations. Drones can be docked at important locations, like major bridges, and launched quickly to assess conditions following crashes, natural disasters, or other emergencies. They give responders a live view of damage before they arrive, so they can work quicker and safer. Adding built-in lighting systems to the drones can light up work zones at night without the glare or shadows of traditional light towers, making construction at night safer for workers and drivers. Using targeted herbicide spraying technology, drones can treat only the areas that need it, reducing chemical use and the labor needed to maintain highways and nearby areas affected by overspray. UAS 2.0 also allows agencies to collect, organize, and share large amounts of inspection and maintenance data, supporting long-term infrastructure management.

BENEFITS

Increased Safety. Fewer lane closures and less need for workers to access dangerous, hard-to-reach places are required.

Cost Savings. State DOTs have reported savings of more than 50%, with even more potential as the technology improves.

Long-Lasting Assets. Regular drone monitoring helps spot wear and tear early, preventing small problems from becoming big, costly repairs.

Better Nighttime Visibility. Built-in drone lights provide better, safer lighting for night work while using less fuel and costing less than traditional lighting.

Resource Efficiency. Targeted herbicide spraying uses fewer materials and less labor to maintain areas affected by overspray.

STATE OF PRACTICE

While basic UAS use is now common across the U.S., the next generation of UAS involves a few key steps for States:

- **Different Types of Drones**: Using a variety of drones to support tasks like spraying and lighting.
- **Working Together**: Agencies partnering to share data and improve efficiency across different government departments.
- **Federal Support**: The Federal Highway Administration (FHWA) offers education on best practices for dock-based inspections, data management solutions, and regulatory compliance.

RESOURCES

FHWA | Unmanned Aerial Systems

U.S. Department of Transportation
Federal Highway Administration

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