

The Potential Use of Drones on Transportation Structures Inspection



54th Meeting of the Civil GPS Service Interface Committee
U.S. State and Local Government Subcommittee



Who is ICA?



Asset Maintenance Contractor working for DOTs to maintain, operate and inspect structures.

Currently serving 16 Florida Counties that include:

- 3400 bridges, including the Skyway Bridge
- 45 Movable Bridges
- Overhead Signs
- HMLPs
- TSMAs



Areas Where Drones Could Improve Inspections



Bridges

- Undersides
- Columns
- Stay Cables
- Main Pylons
- Steel Trusses

Overhead Signs

HMLPs



Why Use Drones for Inspection Purposes?

SAFETY



Most structures aren't constructed to accommodate inspection. Therefore, access is attained by methods that:

- Require traffic lane closures (Dangerous for the inspector and for the public)
- Require use of extraordinary physical skills (climbing)
- Require specialized types of access equipment
- Often necessitate night work

Bridges

Bridge Underside



Bridges

Columns



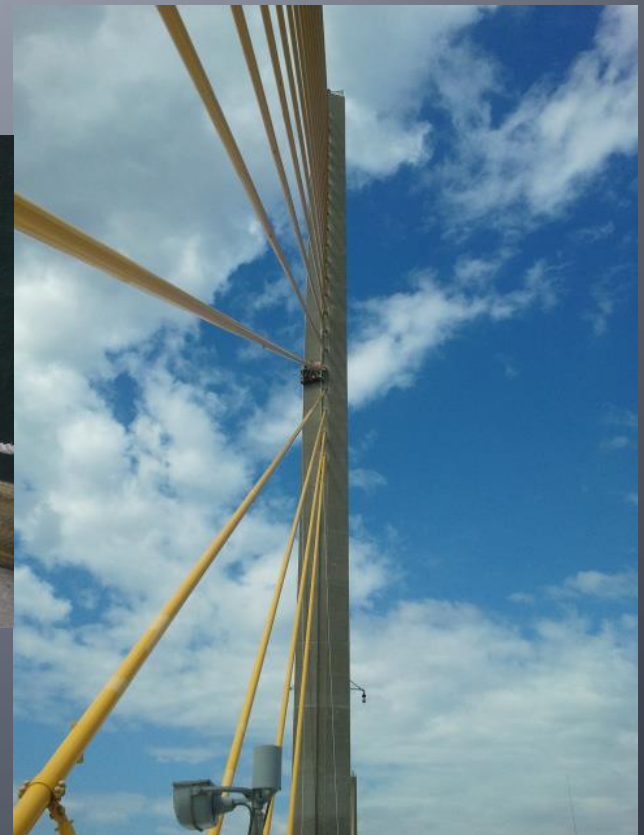
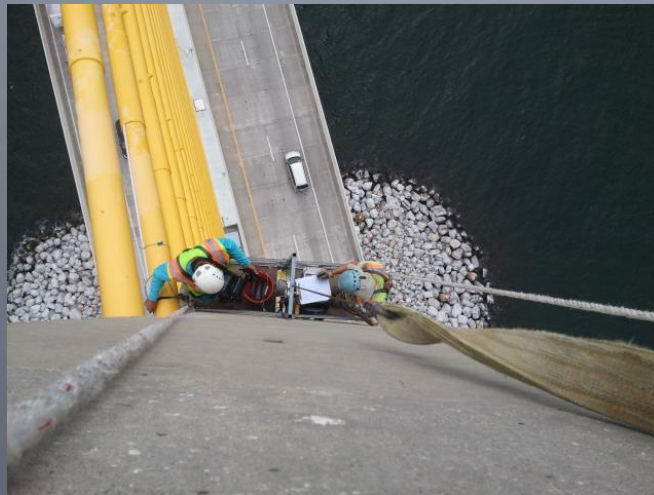
Bridges

Stay Cables



Bridges

Pylons



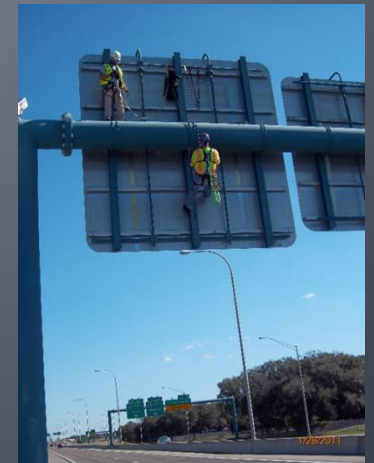
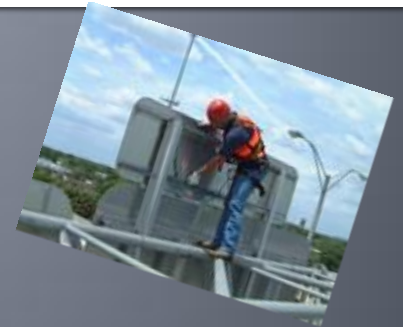
Bridges

Steel Trusses



Overhead Signs

Access over traffic lanes



Why Use Drones for Inspection Purposes?

QUALITY



Most inspections are visual assessments

Occasionally, visual inspections are accompanied by some form of hands-on (tactile) information such as sounding for loose or delaminated concrete

Why Use Drones for Inspection Purposes?

QUALITY



UAVs utilize HD cameras that are:

- Capable of visualizing conditions at high resolution
- Recording inspection for future reference and comparison
- Operate during daylight hours for greater visibility
- Capable of customization to better determine conditions such as using infrared technology

High Mast Light Poles



High Mast Light Poles

Quality



High Mast Light Poles

Quality



Drones in Inspection - Pros

- Inspectors remain safely on the ground (up to 1000 ft. away)
- Eliminates the need for several other pieces of equipment
- Allows close-up view of areas, while not actually touching components
- Provides comprehensive photographic evidence that can be shared with others
- No lane closures required
- Provides data on height and distance from object
- Allows inspection during daylight hours

Locally Owned and Operated UAV



Drone Fail-Safes

- Use GPS Guidance
 - Uses 6+ Satellites (usually 11)
 - If lose connection, will sit where it is for 3 minutes until contact restored or will return home
- 2 redundant power systems (4 batteries)
 - Monitor battery power
 - If get to 25%, return home
 - Can run on 1 battery
 - Could tether continuous power
- Wind
 - Automatically readjusts course

Drones – The Future

- Customization
 - Add IR Cameras to locate Delaminations in Concrete
 - Add Acoustic Coupling to Gauge Steel
 - Other NDT Methods
- FAA Regulations
- Pilot Certifications

Questions

