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
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
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

Columns
Bridges
Stay Cables
Bridges

Pylons
Bridges
Steel Trusses
Overhead Signs
Access over traffic lanes
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.
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
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