AASHTO SCOM Bridge TWG
Round Table Discussion
Unmanned Aerial Systems: Present & Future Uses
Bridge Inspection
Bridge Assessment

- Digital Cameras (optical imagery)
- Thermal Infrared
- Light Detection and Radar (LiDAR)

Bergen Quad-8 heavy lift – 10 lb payload managing 3-sensory devices at once. Manufactured in Vandalia, Michigan
Non-Destructive Evaluation of Bridge Elements

• Used to detect surface conditions
  • Bridge deck delamination, potholes, cracks, patching, etc.

• Overlapping imagery can be used to generate 3D models to characterize condition state of deck bridge
Mapping Bridge Deterioration
Thermal & Photo Data for 2 Bridges
UAV Optical and LiDAR Image Processing

• Three-dimensional Simultaneous Localization and Mapping
• Featured-based algorithms & classifiers tested
• Classifiers can be “trained” with examples of roadway assets
• Tested with street signs; could be used for other assets
Transportation Infrastructure Forensic

- Scour failure January 16, 2016, in Greece (University of Michigan)
- Failure location was physically inaccessible due to river
- Failure was mapped using high resolution photogrammetry principles
- Mapped using 649 photos from a UAS at different points of view within minutes

Modeling the information from the field provided:
- 3D point cloud
- Longitudinal cross-section
- Horizontal plane section to remove the bridge deck
- Bridge pier displacement, horizontal rotation and vertical inclination
Automated Spall Detection

- Automated spall detection algorithm (developed by MTU)
- Applied to high-resolution 3D elevation model
- Integrate automated algorithms into operations

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AASHTO SCOM Bridge TWG UAS Discussion Agenda

- Administrative (strengths vs. weaknesses)
  - FAA - COA/333 exemption & recent changes
- State DOTs & FHWA role/responsibility
  - Internal
  - Public Perception
- Synthesis of current uses & practices
- Data vs. Sensory needs
- Research Opportunities
  - NCHRP Long term
  - PFS
  - NCHRP 20-07