Applying Drones on Transportation Projects

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Applications for Drones

- Tax Assessment
- Floodplain
- Utilities
- AEC
- Transportation
- Emergency Response
- Agriculture
- Quarry/Landfill
- Urban Planning
Applying Drones on Transportation Projects

- building stock condition survey and inspection
- structural health monitoring and precision survey in civil engineering
- inspection and survey for cartography, orthophotography, topography, cadastral mapping, environmental impact assessment & land development
- surveying and monitoring of infrastructure
- surveying and monitoring of routes like roads, motorways, railways and track systems
- object surveying and monitoring of constructions, buildings, structures and facades
- inspection and survey of bridges, tunnels, level crossings, viaducts, subways etc.
- inspection and survey of cathedrals, monasteries, castles, ruins etc
- inspection and survey of surfaces, embankments, dams, reservoirs, protective and retaining walls etc
- surveying and measurements of objects and facilities to create point clouds, topographic data, digital terrain modelling, 3D modelling, reconstruction and volumetric analysis
- construction site surveys and monitoring for documentation of construction progress
- remote sensing and surveying for archeological geo-referencing, reconstruction and excavation monitoring
- precision inspection and surveying of heritage monuments
Applying Drones on Transportation Projects

• Design
  – Perspective views
  – Site Planning
  • 3D Models of site and surrounding buildings
  • Base for concept models, renderings, 3D printing, etc.
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• Construction
  – Progress imagery and videos
  – Lifting and placement of construction elements
  – Inspection
  – Change Detection
Applying Drones on Transportation Projects

• Completion and Marketing
  – Highlight various building features
  – Explain size, shape, materiality, circulation (i.e. general intro to the building or)
Site Construction and Engineering

- Smaller projects are cost prohibitive to carry out with full scale aircrafts
- UAV’s are ideal for smaller project areas
Applying Drones in Inspection and Monitoring
Applying Drones in Inspection and Monitoring

- Primarily used for visual inspection
- Equipped with high resolution cameras
- Close up, accurate view of a structure or site
  - Applications
    - Oil and gas pipeline inspections
    - Power line inspections
    - Wind turbine inspections
    - Photovoltaic system inspections
    - Roadwork, ramp, bridge and canal inspections
    - Railroad infrastructure inspections
    - Safety assessments
    - Flooding change detection
    - Erosion monitoring
Structural Inspection
Pipeline inspection
Transmission line inspection

- Can be outfitted with thermal sensors
- Provides virtual access to towers
- A safer way of inspecting lines
Hazardous Environments
Hazardous Environments
State DOTs and Drones

- State transportation departments are increasingly studying the use of drones for everything from inspecting bridges to clearing car accidents.
- Michigan transportation officials are set to begin a two-year study. Minnesota has tested a drone to help conduct safety inspections of bridges. Vermont is using federal grant dollars to study the use of drones to monitor river flooding and figure out how much material is needed to fix roads.
- In Massachusetts, a group has also been looking at the pros and cons of drone use, from potential threats to their possible use surveying construction projects.
- The states are among 33 that have studied or used drones, helped develop drone polices, or aided in drone research.
- That’s according to a new survey by the American Association of State Highway and Transportation Officials, which represents departments of transportation in all 50 states, Washington, D.C., and Puerto Rico.
Federal Drone Rules and Regulations

Current FAA Position

- FAA Part 107 – new regulations for commercial small unmanned aerial system (sUAS) went into effect in late August 2016
  - Caveat: I am NOT a lawyer!
- Pilot issues simplified: PIC certification
- No visual observer necessary
- Momentary loss of visibility is allowed
- Can operate from moving land (and water) vehicle (as long as you are not carrying packages)
- Twilight operation allowed
- Ceiling of 400’ (vs 500’ that was desired) – HOWEVER there is some liberalization of this for structures
  - Allowed with in 400’ boundary of structure and 400’ above structure
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