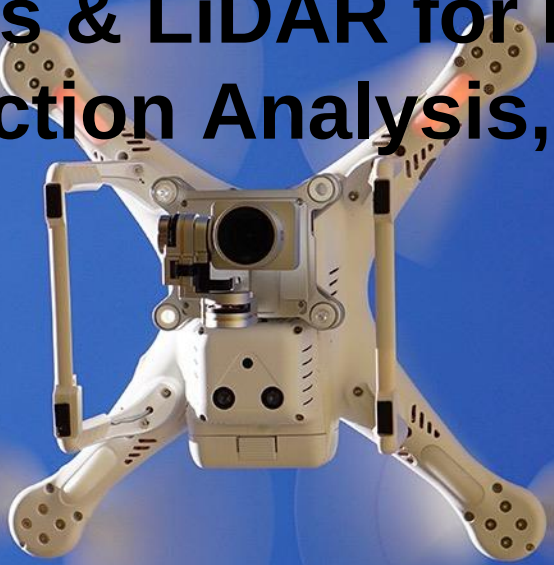
Evaluating the Use of Unmanned Aerial Vehicles & LiDAR for FAR Part 139 Inspections, Obstruction Analysis, and Airfield Maintenance



Chaim Van Prooyen | HJAIA | Project Manager
Katie Eleam | Michael Baker International | Aviation Planner
Jason Shivar | Michael Baker International | Civil Associate
Justin Gobbel | Pond & Company | Aviation Engineer

Hartsfield-Jackson Atlanta International Airport

POND Architects ▪ Engineers ▪ Planners

Michael Baker INTERNATIONAL

Goal and Objective

- **Combining Technologies**
  - LIDAR → surveying method that measures the distance to a target by illuminating it with a laser
  - UAV → “unmanned aerial vehicle”, also known as UAS or drone
  - Aerial Imaging → The taking of photographs of the ground from an elevated/direct-down position
  - Photogrammetry → The use of photography in surveying and mapping to measure distances between objects
- **Efficiency**
  - Short period of time needed for Runway/Taxiway closures
  - Cheaper than alternative methods and technologies
  - Equipment is easily accessible and ready to use

Industry Trends

- **Technology**
  - Collision Avoidance
  - Geo-fencing
- **FAA Part 107**
  - FAA recently released a 624 page publication that provides the first national, uniform regulations regarding the commercial operation of UAVs under 55 pounds
  - Establishes pilot certification procedures
  - Aims to simplify the application process for operating UAVs in the National Airspace System.
  - Allows users to request waivers of most operational restrictions if the proposed operation can be conducted safely

Use of UAV's on Airports

- **Pavement Evaluations**
  - UAV flies the along the pavement taking images
  - Images are analyzed and pavement distresses identified
  - Repair plans are recommended based off runway condition data
- **GIS and Aerial Imaging**
  - High resolution imaging can be used for a variety of applications such as planning, construction administration, and estimating
  - Aerial imagery can be used in conjunction with GIS software
- **Obstruction Analysis**
  - UAV to map approach / departure surfaces collecting obstruction data
- **Security**
  - UAV's are faster than officers on foot
  - Another eye in the sky to watch for unsafe and illegal actions

Overcoming Challenges

- **Operating in controlled airspace**
  - **Challenges:**
    - Risk of aircraft collision
  - **Solutions:**
    - Operate under restricted Runway / Taxiway Closures
    - Incorporate transponders in UAVs
- **Transponders**
  - **Challenges:**
    - Current UAVs cannot bare the weight of a transponder
    - Without transponders it is hard for control towers to track UAVs
  - **Solutions:**
    - Companies are currently designing and testing small / lightweight transponders for UAVs
- **Weight of Technologies**
  - **Challenges:**
    - LIDAR equipment still weighs a lot, thus making it a challenge to keep the drone under 55 pounds required by FAA Part 107
  - **Solutions:**
    - Companies are developing technologies to reduce the size of LiDAR equipment without losing resolution and data storage as well as the use of photogrammetry

Into the Future

- New Technologies Evolving
- Meeting Demands of Planning and Design Industry
- Regulations and Safety

Closing

- Many opportunities ahead for UAV and LiDAR technology
- Innovative ideas to the airport planning and design process for Part 139 certifications, pavement evaluations and planning issues
- New ways to provide additional services to airports for security, wildlife, and more