DATE: March 28, 2020

TO: YASSMIN GRAMIAN, P.E.

FROM: MELISSA J. BATULA, P.E.

SUBJECT: BRIEFING REQUEST – UTILIZATION OF DRONES FOR CONSTRUCTION INSPECTION

Overview:

- Department UAS Steering Committee is currently addressing utilization and implementation of drones.
- Seven sub-groups are: Survey, Bridge Inspection, Incident Management, HR, IT, Press Office and Miscellaneous (includes construction inspection, traffic and training)
- Department is continuing to pilot UAS usage in Districts 1 and 11.
- Department Draft UAS Policy is available and includes compliance with FAA regulations, Part 107.
- Utilization of UAS for construction inspection allows staff to perform daily/weekly checks at a safe distance from the operations.
- In accordance with Risk Based Inspection Guidelines identified in the Restarting Construction Projects guidance, the following operations will benefit from the use of drones:
    - Environmental Compliance and Mitigation Checks – Ability to observe remotely
    - Earthwork Calculations/Quantity take-offs utilizing LiDAR – Elimination of survey crew field staff and enables calculation of quantities via telework instead of in the field office
    - Bridge Deck Concrete Placements – Potential to eliminate one inspector
    - Guiderail Installation – Ability to observe proper installation remotely
    - Backfilling Pipe Trenches – Ability to observe proper installation remotely
    - Site Inspections for Maintenance and Protection of Traffic – Ability to observe remotely
    - Capture project progress, completion photos, and other tasks – Ability to observe remotely
- Estimated costs are $50,000 which includes purchasing of equipment and Part 107 testing fees. STIC funding is available to cover these costs.
- From an AASHTO 2019 survey, 36 States are utilizing high-definition cameras, LiDAR, and other technologies for construction inspection.
    - 24 States were actively working with universities to expand their UAS operations.

Recommendations:

- Step I (7-14 days) – Utilize currently approved drone pilots on critical projects to increase social distancing for construction inspection activities.
    - Drones can be utilized for more detailed work. (i.e. earthwork calculations)
    - Department Draft UAS Policy will be followed which includes risk assessments of missions and utilization of FAA Part 107 certified pilots.
    - Currently PennDOT has 7 certified pilots and 4 drones and there are 22 3rd Party pilots certified in accordance with Department Draft UAS Policy with available drones to assist the Department.
    - Department is currently surveying approved consultant companies for additional availability.
- Step II (30-60 days) – Develop ad hoc procedure and guidance for use of mini-drones.
    - Bureau of Aviation will compile available training materials for distribution to identified Department pilots
    - ECMS #04660 and #04661 Open End Engineering Agreements are available to assist the Department with training and deployment. (Office of Transformational Technology)
    - Districts will identify 3 construction inspectors to become FAA Part 107 certified

Prepared By: Kelly Barber, P.E.
Reviewed By: Jim Foringer, P.E.

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- Bureau of Aviation will explore obtaining FAA Certificate of Authorization (COA) for PennDOT to expedite UAS operator approvals.
  - Would allow pilots to conduct flights without FAA 107 certification.
- Finalize Department UAS Policy
- Implement specification for Photographic Documentation for Construction Projects.
- Procure and distribute 3 drones to each Engineering District. (33 drones total)
  - Evaluate use of mini-drones to allow more portability on the construction sites.

Next Steps:

- If approved, move forward with Step I and coordination with our Business Partners to assist in the rollout and implementation.
- Procure drones, evaluate (COA), and start training identified pilots.
- Evaluate utilization of drones for increased social distancing opportunities on other Department Critical/Essential Operations.

Deployment and Management:

- Training and certification to be handled by Bureau of Aviation
- Purchase and deployment of drones to be handled by Bureau of Project Delivery, Systems Management Section

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