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Why the most expensive drone is not always better: Fixed-wing platform vs. prosumer multi-rotor platforms when used for visual spectrum aerial mapping

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This paper presents finding from field testing of two of the most popular fixed-wing UAV platforms and the low-cost DJI Phantom 3 Advanced. The purpose of our field testing was to determine whether the increased costs of currently available fixed-wing platforms versus using currently available prosumer quadcopter drones equated to superior data collection and efficiencies for 'drone mapping'. We compared RGB aerial imagery collection platforms on the basis of flight time, ease of resuming mission after battery swaps, and post-processing workflow. Our strategy was to be as efficient as possible, covering as many acres as possible with each battery. Our initial field tests with the Phantom 3 Pro and 3rd party automated flight-path apps revealed its largest inefficiency to be battery life. However, the Phantom 3's gimbaled camera made data collection at nadir more reliable. Both the Precisionhawk Lancaster Mark IV and the Sensefly eBee (non-rtk) were also acquired for testing. We found these systems to be cumbersome in the requirement of a laptop and external antenna as a ground station. Both had issues with data integrity during moderately windy conditions. Both fixed-wing platforms required an extra step to write the GPS metadata to the imagery before final processing. We concluded that the more expensive, fixed-wing platforms provide diminishing returns for the additional expense. The technological improvements of the DJI Phantom 4 Professional add increased efficiency to flight time and sensor quality for a comparatively inexpensive platform.

Biography

Eric Harkins is the Founder and CEO of Back Forty Aerial Solutions in Columbia, SC. He brings his unique mix of experience in natural resources management, enterprise IT and governmental GIS to Back Forty Aerial Solutions' mission of disrupting traditional data and media collection methods with aerial imaging technologies. The company focuses on providing aerial videography for production companies, project documentation and mapping services in construction and real estate, as well as consulting for UAV integration within private businesses and governmental agencies. He is also the Founding Member of the South Carolina UAV Operators Alliance, which promotes UAV technology adoption by existing industries as well as fostering a drone community within the state. He also volunteers as a Beta Tester with flight automation software company, Dronedeploy and serves as a Community Moderator for the sUAS Commercial Mapping Pilots Facebook Group.

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