

Analysis of Single Point Accuracy Across Four DJI Drone Platforms

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Introduction

Spatial science as a field has been around since the first aerial photographs were taken by hot air balloon. Planes were the major tool to obtain aerial photography for quite some time until, in 1972, the first Landsat satellite was launched. This marked a turn towards satellites as the main source of georeferenced images of the earth. These satellites were and continue to be the most reliable way to obtain this imagery, however, since the advent of privately owned unmanned aerial systems (UAS), or drones, they have begun to be increasingly incorporated into the gathering of earth imagery. Unlike satellites, drones are portable, inexpensive, and can be used immediately wherever needed. Their high spatial resolution makes them ideal for many smaller scale projects where acuity is more important than scale. As these new devices are used in spatial science, it is important that they be as accurate as possible. The goal of this study was to assess drone accuracy across various drone models in reference to a known spatial coordinate. Four different drones were used in this survey; the Phantom 3 advanced, the Phantom 4 Pro, the Phantom 4 Advanced, and the Phantom 4 Pro 2. Sixty images were taken by each drone from their onboard camera. Each image was a picture of a professionally surveyed location on campus from an elevation of 4.5 feet above ground level. The first thirty images taken by each drone were obtained without shutdown to determine drone accuracy during extended use. The second thirty pictures were taken with the drone being shutdown between each image to determine performance from fresh restart.

Objectives

The goal of this project was to test drone accuracy over a survey point using four drone models including the DJI Phantom 3 Adv., the DJI Phantom 4 Adv., the DJI Phantom 4 Pro, and the DJI Phantom 4 v. 2. This investigation is important because personal drone use is becoming increasingly common, and knowing the accuracy of a UAS helps reduce error.

Methods

Selected a location marked by a surveyor with exact coordinates

Selected a date with good weather conditions for flight

Acquired 30 pictures with each drone, first without, then with hard shutdown between each image

Examined and compared images for accuracy against the survey ground point

Materials

Drones



The Phantom Series Drones all share a similar configuration to the above Phantom 4 Advanced

Surveyors Point



The Point used in this study was of the above survey point's style, with the exact UTM coordinates of 343865 E and 3499850 N

Results

Drones Ranked by Accuracy

1. Phantom 4 Advanced
2. Phantom 3 Pro
3. Phantom 4 Pro
4. Phantom 4 Pro 2

Discussion

The most accurate drone was the Phantom 4 advanced. This was surprising because the Phantom 4 Pro and Phantom 4 Pro 2 are both newer drones and are typically considered to be better. It was also surprising that the Phantom 3 Professional was the second most accurate, as it is the oldest of the 3 drones.

