

## **10-lb Payload Electric Quadrotor**

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**Sponsor:** Ohio University, Air Force Office of Scientific Research



**Electric Quadrotor sensor platform with a 360-degree scanning LADAR mounted below the batteries in the center of the platform.**

A quadrotor aerial vehicle has been developed at Ohio University's Avionics Engineering Center for use as a navigation sensor testbed. The quadrotor was designed with a ten pound payload capacity, transforming what has typically been a light-weight airframe into a more robust platform. Specific design considerations included the characteristics of high power brushless motors and electronic speed controllers, the variation of motor rotational losses with frequency, and the impact of heat dissipation within the battery packs. Simple feedback loops were sufficient to stabilize the platform using a low-cost inertial measurement unit. An accounting of the component efficiencies allowed for effective mission planning based on the desired payload. The quadrotor, with a demonstrated ability to lift up to 10.6 pounds, provides a convenient way to flight test new sensor technology. The picture above shows the quadrotor with a 360-degree scanning Ladar mounted in the center below the batteries that power the brushless motors, each having a thrust in excess of 7 lbs.

Further reading: M. Stepaniak, "A Quadrotor Sensor Platform," Dissertation, School of Electrical Engineering and Computer Science, Ohio University, 2008.