



# Towards a Low-Cost Quadrotor Research Platform

*Leon Keith Burkamshaw*

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## **Towards a Low-Cost Quadrotor Research Platform** Leon Keith Burkamshaw

Two aspects of currently available Miniature UAVs (MUAVs) that limit the adoption of this technology for civil and research purposes are the high cost and closed design philosophy. This thesis attempts to solve these problems by presenting an open source design that is focused on low-cost, while maintaining a reasonable level of performance. The use of Commercial Off-The-Shelf (COTS) equipment is maximized where possible to reduce development time and cost. A novel approach used by this design is the use of a Nintendo Wii MotionPlus device as an Inertial Measurement Unit (IMU). This mass produced COTS part provides a three degree of freedom IMU for minimal cost. All software is of a modular design to ease understanding and facilitate improvements. To reduce development time, and to help discover requirements, a Rapid Application Development (RAD) methodology has been adopted that is suitable for implementation by a single developer. Software prototypes are constructed and iteratively built upon to discover more requirements. At the completion of each phase, testing is performed. Once a suitable level of maturity has been reached, the software prototype is rolled into the main build. Flight-testing is performed at the completion of the design along with a quantitative measure of flight stability.

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