



## System Architecture of Small Unmanned Aerial System for Flight Beyond Visual Line-of Sight

Author: ME5 Seah Kwee Siam

Thesis advisors: Dr David R. Jacques (Chairman), Dr John M. Colombi, Maj Scott Pierce, PhD

### Objective:

1. [Develop COTS based SUAS](#) capable of [operating 5 times the visual LOS](#).
2. [Establish framework for](#) effective and reliable [replication](#) across other UAS.
3. [Validate Safety of Flight](#) (SOF) of architecture and [seek airworthiness approval](#).

### Main research ideas:

- Notion of expandable SUAS in dirty and dangerous military operation. The published empty weight cost of military SUAS is US\$10,000/lbs and is not economical for this concept.
- COTS based UAS offers an [economical alternative](#) with potential for [shorter development time](#), which can better [adapt in](#) a rapidly [changing landscape](#) and [austere military budget](#).

### Research results

- Designed system obtained a Military Flight Release by USAF
- Key features of the architecture was flight tested with approval from AFIT's Technical Review Board/ Safety Review Board.

### Benefits/potential applications of the research

- Compared to published empty weight cost of small military UAS, the designed system saw a cost reduction of 98% (US\$2k vs US\$110k).
- Documented framework and design architecture facilitates application to other small SUAS

### Follow-up research

- Continue with proposed flight test sequence to verify complete architecture and validate the designed operating range



Reference

