



## Capstone Project

### Final Report

2015

Project Title: Hybrid UAV Development for Emergency Response

Date: 28/08/2015

#### *Project Team Information*

Identifier: **CP-CBU-155**

Student workers:	Matthew De Bono	390758
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	Shanon Loveridge	218041

Academic supervisor: Colin Burvill

Academic examiner: Saman Halgamuge

Industry Mentor: Jonathon Manton, DEEE

Version: 1.0

## Acknowledgements

School of Engineering, Colin Burvill, Saman Halgamuge, Andrew Nolan, Jeff Hollingworth

## Contents

## 1 Executive Summary

The Executive Summary offers a succinct statement of your findings and contributions.

It will summarise the project description and your contributions to the associated discipline.

This section can be based on key sentences and paragraphs from your Scope of Works and Progress Report documents, and your Conclusions and Recommendations section.

No more than five pages of text and images.

## 2 Introduction

Final Reports with a Main Body of more than 40 pages can only be submitted with prior approval of the teams Academic Supervisor and Academic Examiner. Otherwise, a significant poor-presentation penalty may be applied by one or both assessing academics.

Introduction section begins the story of your project. Include a clear statement of objectives and the scope of the project (the Scope of Works document can be used as a basis).

The main activities of the client organization (if applicable) can be introduced.

Your report can then begin with the starting point of the project the need or want.

## 3 Literature Review

This section will summarise and analyse the literature sourced and reviewed for your project.

This task should have been mostly completed when you completed your Progress Report #2 presentation.

This section and the associated Bibliography should be directly transferred from your Progress Report submissions.

Include the Samsung aircraft to the lit review list

## 4 Remaining Sections

You are welcome to choose appropriate names for section headings.

The main argument will begin with a section describing your teams major activities, leading to the fulfilment of the objectives of your project. A flow chart will provide a useful visual aid.

Introduce the tasks that you were required to complete to satisfy the agreed project scope. Itemise tasks whenever possible to assist cross-referencing with following sections (i.e. your contributions).

Describe the development your ideas and strategies, the conceptual design and research methods used (as applicable), and why they were chosen (your literature review will be of value here).

Discuss any original contributions including, for example, modifications or extensions of published methods or associated knowledge. Your team may have made a more humble, but still valuable, contribution, where you customised an existing method for your specific application. Describe the benefits and, if applicable, deficiencies associated with your contributions.

The criteria against which preferred concepts are identified should be discussed. This aspect of your report, appropriately sectioned, will make extensive use of pictorial information (figures) and organised information (lists and tables).

Given Final Report submissions are normally not paper-based, all supporting material (figures, tables) in the main body should be easily read on a standard computer screen, for example: Text/font size should be consistent, Do not change from portrait to landscape orientation Maintain A4 size (i.e. no fold outs to accommodate A3 size) Appendices can include different page sizes to accommodate, for example, large-format Gantt charts.

The details of completed analyses and supporting calculations can be included in an Appendix, referred to, as required, from the main body of the report. Summaries, flow charts identifying methodologies, and sample calculations should be included in the main body of the report.

The process that you developed and then used to facilitate specific contributions may, itself, be one of your contributions (i.e. providing a framework for ongoing work by other practitioners or researchers). This is worthy of inclusion as a section of the main body of the report.

## 5 Conclusions and Recommendations

Confirm that the objectives stated in the Introduction have been met. If the objectives in the Scope of Works document have not been fully met, an argument is required as to why the outcomes do not correspond with those envisaged.

Opportunities for further work, identified through the activities of the current project but outside its scope, should be identified.

This section will summarise your teams final response to the initial question, problem or issue. A summary of the arguments associated with your outcomes will be provided so that the reader is aware of your reasoning.

Do not include any personal responses to the project (eg. ...we enjoyed working with Joe and learnt a lot from Jen...). Write this report as if you are a professional practitioner, representing a research organization or consulting design bureau.

You are encouraged offer details of successful task completion. Success can be interpreted in many ways, for example: Team CP-xxxx contributed X to the overall Y research program led by Professor Z The client mentor was satisfied with the alternative conceptual designs offered by team CP-xxxx The leader of the research division of the collaborating organisation was impressed with the alternative experimental method proposed by team CP-xxxx An extensive review of the scientific literature has been completed by team CP-xxxx Commercially available solutions were identified and ranked against criteria developed in conjunction with the client

You can report on the status of your contributions. For example, within the collaborating research laboratory, research group, research initiative, or client company, the final proposals of team CP-xxxx: have been implemented, are under review for later implementation, are awaiting detailed costing, or have provided a range of novel alternative strategies for later consideration.

Do not apologise. Focus only on the positive outcomes of your work. As an example, it is likely that tasks identified in your Scope of Works but not completed would have required more resources than were available. Identify important tasks not completed as opportunities for further work within the associated DME laboratory or client organization, and discuss why they are important. Given the many tasks that you have likely completed, your team now have an excellent knowledge of the requirements of the tasks not completed briefly outline your expectation of the resources (i.e. personnel expertise, equipment, facilities, finance) needed to complete important tasks.

## Appendix A

Detailed work completed by the project team not included in the main body (calculations, sketches, details of activities not suited to the main body, e.g. raw data from experiments).

## Appendix B

Management and administration information: Gantt chart (schedule) Include important issues associated with task duration prediction presented in your Progress Reports. Cumulative hours spent on project individual and/or team based, project diaries, meeting minutes or summaries (i.e. useful outcomes from each meeting). Each meeting will require a numeric identifier if you are to reference expert opinion in the main body of your report (eg. Section A.2.3). Individual or team based project diary. Copy of your final Scope of Works.

## Appendix C

### Existing Aircraft



Figure 1: Arcturus Jump, taken from [http://www.arcturus-uav.com/aircraft\\_jump.html](http://www.arcturus-uav.com/aircraft_jump.html)



Figure 2: X PlusOne, taken from <https://www.kickstarter.com/projects/137596013/x-plusone-your-ultimate-hover-speed-aerial-camera>

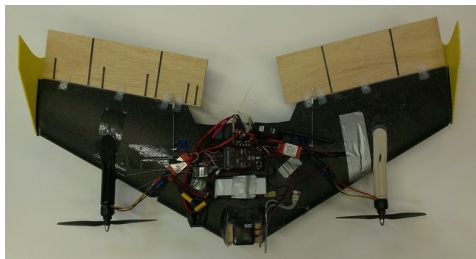


Figure 3: TBS Caipirinha, taken from [https://pixhawk.org/platforms/vtol/tbs\\_caipirinha\\_vtol](https://pixhawk.org/platforms/vtol/tbs_caipirinha_vtol)



Figure 4: FireFly6, taken from <http://www.robotshop.com/ca/en/firefly6-vtol-y6-multirotor-drone-frame.html>