



## **MICRO AERIAL VEHICLE**

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## **ABSTRACT**

Micro Aerial Vehicle (MAV) is a new class of flight vehicles, which is much smaller than normal aircraft. Due to its small size, stealth, and availability of micro size camera and sensors, MAV can be used for surveillance, visual reconnaissance and damage assessment.

In this project, an attempt was made to design, fabricate and fly an MAV. In the process, detail testing on the MAV aerodynamic and the Astro Firefly System propulsion unit were performed. It was shown that the MAV configuration can fly stably.

An MAV weighing 100 gram with maximum dimension of less than 40 cm was successfully fabricated using balsa wood. The power source is 2 170 mAh lithium polymer battery. The MAV is designed to be controlled using elevons.

Flight test of the MAV failed due to insufficient thrust from the propulsion unit. This design failure is due to over estimation of the propulsion unit efficiency as compared to the actual efficiency of 35 –37 percent as determined during the wind tunnel test.

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# **CHAPTER I**

## **INTRODUCTION**

Micro Aerial Vehicle (MAV) is a new class of flight vehicles much smaller than model size aircraft. It operates at significantly lower speeds with Reynolds number within the range of 150000 or lower. The definition employed by Defense Advance Research Projects Agency (DARPA) of the United States limits these crafts size less than 15 cm in length, width, or height (approximately 6 inches cube) and having a mass less than 100 grams [1].

The reasons in development of MAVs are due to their applications and potential use such as for military operations in urban warfare such as visual reconnaissance, situational awareness, damage assessment, surveillance, biological or chemical agent sensing and communication relay. Other several commercial applications are such as search and rescue, border patrol, air sampling and field research [2].

In order to successfully develop an MAV, a team of engineers and scientists in the field of fluid mechanics, aerodynamics, materials, mechanics of aircraft structure, propulsion, control, and stability systems are required. In addition, since MAVs are micro size and much smaller than actual aircraft, the emerging technology such as micro-electromechanical systems (MEMS) helps in their development. This is important