

CONSTRUCTION OF AN AUTOMATED SYSTEM FOR LAUNCHING A WATER ROCKET

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Design and construct a water rocket automated launcher which makes better accuracy a water rocket to land into a given fixed point. After introducing the water rocket activities in Sri Lanka by Arther C Clarke Institute for Modern Technologies in 2005 in collaboration with Asia Pacific Regional Space Agency Forum (APRSAF) it has achieved immense popularity among the Sri Lankan school community. Apart from sending local students to the APRSAF international water rocket competition annually the ACCIMT expects students to learn basic science objectives behind the water rockets which they theoretically study at their class rooms. It is an inexpensive way for students to learn the basics of forces in Physics and also help to understand the principles of aeronautics. Beyond these basic science concepts, the practice of true engineering can also be deployed through designing and construction of microcontroller based water rocket launching system for water rockets. The launcher is expected to design for getting appropriate projectile angle and azimuth for a set target by considering parameters such as up-thrust, air resistance, etc.

The aim of this project is to build a rocket out of a plastic bottle, using water and air pressure to generate the thrust and also design a nose cone and fins that help the rocket travel in a predictive manner by increasing stability and minimizing drag. Moreover, investigate some of the variables that may affect the distance travelled by the rocket and also design a simulation using a MATLAB programming language and parameters of the water rocket motion. Modern mems sensors will be used to determine environmental conditions and the input parameters, which acts as the propellant for the launch and the air pressure. These data will be fed to an estimation model which will be derived through statistical techniques to determine launching parameters for the high accuracy servo motors and pressure pumps. The success outcome of the project will help not only for the students whom nominated for the APRSAF annual water rocket competition to get successful results at the competition but also which enable to apply for a patent since no one has ever constructed such an automated launching system.

Keywords: Aeronautics, Drag, Projectile, Thrust