

Remote Launch System

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INTRODUCTION

In order to have control over all operations necessary for the hybrid launch of Daedalus and other hybrid vehicles our team has developed a Remote Launch System for the purpose of actuating solenoids, triggering an ignitor, measuring rocket fill weight, maintain a serial communication with the vehicle all while transmitting and receiving commands from a range of 1500 feet.

REMOTE LAUNCH SYSTEM

The computational power of the remote launch system consists of an Arduino Mega which handles all operational commands and with the use of an Xbee 900MHz module also transmits necessary data to the ground control Xbee module connected to a laptop. These Xbee modules amplified by Yagi antennas have an expected range of around 2 miles with favorable conditions and enable a pseudo-serial connection for operation of the Remote Launch System. Physically the Remote Launch System incorporates an LCD display for command and battery voltage status along with an ignitor arming key switch and an LED ignitor continuity checker. The way in which the Remote Launch System fires the main ignitor required for the hybrid engine is through the use of a *Monster Relay* which is designed to handle the high amperage current sent to the ignitor from the 24V source of the two sealed lead acid batteries required to power the system.

RESULTS, CONCLUSIONS, AND FOLLOW-ON WORK

The Remote Launch System has been tested in practice with an October launch of Daedalus along with multiple hot-fire tests in which it was used for ignitor burning and solenoid actuation. The multitude of tests involving the Remote Launch System has allowed our team to be confident in the fact that this system will preform as expected and reliably actuate solenoids, fire ignitor, and return serial data wirelessly across its operational range.