Modular Electronics Bay & Flight Card

Team 58 Project Technical Presentation to the 2017 IREC

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INTRODUCTION

One of the defining features of our team's electronics bay which contains our flight computers and on-board control computers is a removable card design. Due to the nature of our team and the fact that at one time we may have two or more active vehicles with varying dimensions and only a primary set of computers, the removable card design allows for rapid transfer of critical avionics across our entire vehicle platform.

MODULAR ELECTRONICS BAY

The structure reffered to as the Modular Electronics Bay is defined as the structure housing the power supply components which include the 12.8V LiFePo battery, 7.3V LiPo battery, voltage regulators, 9V battery, and key-switches. The main feature behind the modularity of the electronics bay, however, is the structure supporting the removal and mounting of the *Flight Card* along with the electrical connections necessary for interfacing with the *Flight Card*. One important aspect in the design of the Modular Electronics Bay is the standardization of the Flight Card mount across all of our teams vehicles which results in the same dimensional geometry and manufacturing process for all current electronic bays.

FLIGHT CARD

The physical component on which the control & DAQ computers, primary & secondary flight computers, and motor controller are all mounted on is referred to as the *Flight Card* which is held in place by vertical slots and two countersunk machine screws. All of the main electrical connections to the flight card on any vehicle are made with a standardized ribbon cable connector which in practice allows the Flight Card to be interchanged in between vehicles in approximately 15 minutes. Some electrical connections, specifically screw terminals on flight computers, cannot be interfaced with the standard ribbon cable connection and therefore must be connected and disconnected every time the Flight Card is removed from the Modular Electronics Bay.

RESULTS, CONCLUSIONS, AND FOLLOW-ON WORK

Aside from the time savings of having to switch computers across our team's different vehicles there is also the added benefit of minimizing the number of times specific components need to be un-mounted & re-mounted with fasteners which in the long run reduces physical wear and stresses on the individual components and computers. Another beneficial aspect from the implementation of Modular Electronic Bays across our team's vehicles including our competition vehicle Daedalus, is the reduced amount of time required for retrieving and updating any data or software across all essential computer systems for flight.