

SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
On Track - Undergraduate Space Education (3)

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CAPSTONE EXPERIENCE IN USM'S HIGH ALTITUDE BALLOON (HAB) PROJECT

Abstract

The implementation of Outcome Based Education (OBE) has improved the effectiveness of teaching space system design. A capstone design project that is significant with the OBE has been given to students in the Spacecraft design course to equip them with knowledge and skill in project management, and experience in developing, validating and manufacturing their design to serve the customer's requirement. This paper describes the capstone experience of the fourth year student of engineering in the High Altitude Balloon (HAB) project. This project has brought the students beyond paper design space mission with affordable cost, bridging the gap between classroom and industry. In this project, students worked in teams to develop the bus systems that carried the payload with experimental objectives of space photography and environment data collections. The payload consists of four cameras and two physical data sensors which are placed in the sealed and water resistant box, launched by the meteorological balloon to up to 30 km altitude, and left to burst due to over-expansion. Then, the payload will descend with a parachute and its location is tracked by Global Positioning System (GPS) while the data will be transferred spontaneously to the ground station. The structure's thermal system is maintained by an external insulator and an internal heat generator. The involvement of related agencies and industries in the design process gave significant capstone experience to the students which helped them develop the system according to industry standard. The student activities are highlighted in this paper, including the tests, the work presentations, and the outreach program that have been conducted.