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TEACHING PRACTICAL LEADERSHIP IN MIT SATELLITE DEVELOPMENT CLASS: CASTOR AND EXOPLANET PROJECTS

Abstract

In a space systems design class at the Department of Aeronautics and Astronautics at MIT, undergraduate students conceive, design, build and test space vehicles and systems. During a three semester class, junior and senior students are faced with the challenges of a real-life engineering team project: fast-paced design, analysis, testing, and technical documentation. Strong project management and team skills are essential if the student teams are to produce a high quality design. Thus leadership instruction is an important part of the curricula; through the development of leadership skills students learn to work together more effectively, increasing the productivity of the team. Moreover, a strong leadership education is a key factor in improving the abilities of future engineers to become leaders in the companies and agencies in which they will work. However, leadership instruction often is presented in an abstract way, and students do not understand how to apply those principles. As a consequence students may underestimate the effect that leadership education can have on the successful development of their projects.

A model for teaching practical leadership skills in an engineering team was developed and tested in an MIT satellite design course. In that course, students designed and built two satellites: CASTOR and Exoplanet, projects that required skillful leadership abilities if the projects were to be developed in a short time. Based on theoretical material from the Gordon Engineering Leadership initiative, this model was composed of a set of active learning modules that took no more than 5 classroom hours. Data collected from faculty and students show that the approach improves the ability of students to interact productively with each other.

The article presents: overviews of the MIT Satellite development class and of the two missions used as test cases (CASTOR and Exoplanet); a detailed description of the leadership approach implemented; and some results related to the impacts that the activity had on the projects.