

SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
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THE CALTECH SPACE CHALLENGE: LESSONS LEARNED AND FUTURE PLANS

Abstract

The Caltech Space Challenge is a 5-day student mission design competition for undergraduate and graduate students. A competitive pool of domestic and international students are formed into two teams, invited to Caltech, and tasked with designing a space mission of national and international importance. This competition brings together students from various disciplines, equips them with the necessary tools, and challenges them to produce a viable mission architecture and design. A primary goal of the program is that the innovative solutions produced will be considered by NASA for future missions.

The Caltech Space Challenge is a student-led program that was originally started by Caltech graduate students Prakhar Mehrotra and Jonathan Mihaly in 2011. The mission objectives were developed through a collaboration between Caltech and NASA-JPL. In 2011, students were challenged to design a human mission to a Near-Earth Object, in line with the President's initiative of sending astronauts to an asteroid by 2025. The problem statement for the 2013 Caltech Space Challenge was designed to build on the success of the 2011 competition, and to remain consistent with the flexible path approach advocated by the Augustine Committee. Students were challenged to design a human mission to a Martian moon, collect samples, and return safely to Earth.

The two teams were provided with a lecture series (~10 presentations) consisting of speakers from NASA, international space agencies, and private industry. The lectures were designed to provide the participants with the basic information required for their mission designs. This included lectures on topics ranging from team dynamics to orbital mechanics. Teams interacted directly with each of the speakers and were supported throughout the week by mentors from both NASA and industry.

The event has been extremely successful for the past three years, and the final team reports from 2011 have been presented at the AIAA Space 2012 Conference, and Team Explorer will present their results from 2013 at the IEEE Aerospace Conference in March 2014.

This paper will focus on the organizational and planning lessons learned by the student leaders, and plans for future events will be discussed. Approximate time-lines for the program will be highlighted, including fund-raising, applicant selection, publicity, technological/administrative support, and the structure of the workshop. The program has benefited greatly from advice from members of JPL's A-Team and Team-X, and this has allowed the organizers to structure an intensive, student event that yields a professional product in only 5 days.