COMMUNICATIONS EDUCATION AND TRAINING: INDUSTRY CERTIFICATION AND UNIVERSITY ACCREDITATION



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Student design competitions have emerged as a popular method for both professional associations and companies to engage engineering students and encourage them to join with like-minded colleagues to develop and test their engineering design and project management skills. By their nature, such competitions encourage a level and intensity of activity that is difficult to replicate in a design or project course. For many engineering students, participation can be a career-defining event.

Student design competitions comprise a diverse set. In some competitions, teams are given a problem to solve during the event, and can only prepare by practicing and training to solve similar problems. In other cases, the teams are given months to develop the solution on their own, and come together with other teams only for demonstration and judging. Some competitions are conducted as an activity associated with an engineering society's annual conference. In other cases, the competition is conducted as a standalone event. The prizes offered range from modest to exceptional.

Despite the significant effort and expenditure devoted to student design competitions in recent years, there are surprising few contributions to the literature on the subject. Manseur [1] and Schuster *et al.* [2] address the benefits and challenges of organizing and conducting student design competitions, while Wankat [3] assessed institutional factors that contribute to student team success. Here, we took a different route, and invited both organizer and student participants to reflect on their experience with the Canadian Satellite Design Challenge (CSDC), a national competition that encourages Canadian university students to form teams to design, build, and test small satellites called cubesats, and compete for both prestige and a possible opportunity to see their design lofted into orbit as a secondary payload.

In "The Canadian Satellite Design Challenge: Building Future Engineering Capability in Canadian Universities," Larry Reeves describes the organization and structure of the CSDC competition. Unique aspects of the competition include the manner in which the student teams from across the country are brought together for workshops and professional visits, the mid-term feedback provided through the Critical Design Review process, and the requirement that each team deliver Educational Outreach presentations to their local communities. As noted above, the prize awarded to the winning team is also unique: a possible opportunity to see their design turned into flight hardware and launched into orbit.

Some of the student projects in the 2012–2014 CSDC focused on contribution to space technology. In "Pioneering the Application of Diamagnetic Materials for Spacecraft Attitude Control," Justin Curran and Cass Hussman from the University of Victoria describe their team's efforts to develop a cubesat that will demonstrate a unique method for realizing an attitude control actuator. In "Testing a Self-Healing Material in Microgravity using a 3U CubeSat," Mehdi Sabzalian, Justin Whatley, Nathalie Parmentier, and Ali Elawad of Concordia University describe their team's efforts to develop a cubesat that will test the properties of a self-healing carbon composite material in space.

Other student projects focused on remote sensing using cubesats. In "Obtaining Infrared Spectral Imagery of the Upper Atmosphere Using a Cubesat," Keith Menezes and Tremayne Gomes of York University describe their team's efforts to develop a cubesat that will use a specialized infrared camera to analyze greenhouse gases in the upper atmosphere and thereby contribute to climate change research. In "Monitoring Glaciers from Space Using a Cubesat," Constance Fodé and colleagues from École Polytechnique de Montréal and the University of Bologna describe their team's efforts to develop a cubesat that will return imagery of Arctic glaciers in support of research being conducted by the University of Montreal's Cold Regions Geomorphology and Geotechnical Laboratory.

Still other student projects focused on study of a unique

payload. In "Biological Investigations Using a Cubesat,"Chantelle Dubois, Pawel Glowacki, and Ahmed Byagowi from the University of Manitoba described their team's efforts to develop a cubesat that will expose tardigrades — segmented micro-animals that have been described as nature's toughest animal — to the extreme conditions of space and assess their ability to survive.

In each article, the students share their perspectives on team formation and organization, project management, the impact of CSDC on their schools, and the overall legacy of their involvement. We hope that this rare opportunity to hear the voices of both the competition organizers and participants will stimulate much useful discussion concerning best practices and future opportunities for such events.

REFERENCES

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BIOGRAPHIES

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