

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

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## ELEONORA, A 3U CUBESAT FOR THE CANADIAN SATELLITE DESIGN CHALLENGE

**Abstract**

In the paper we present the Eleonora mission. Eleonora is a 3U cubesat designed by PolyOrbite, a joint team from Polytechnique Montreal (Quebec, Canada) and the University of Bologna (Italy) to compete in the 2012-2014 iteration of the educational programme known as the Canadian Satellite Design Challenge (CSDC). The satellite was designed to carry two payloads: a camera and a deorbiting system based on an aerodynamic drag sail. The main mission of Eleonora is to use its camera to take photos of the Canadian Arctic for the Geocryolab (Laboratory of Geotechnics and Geomorphology of Cold Regions) of the University of Montreal. The secondary mission of Eleonora is to perform a deorbiting manoeuvre using its deployable drag sail. In the context of the CSDC, an inter-university competition, the Eleonora mission was developed over a 20 months timeline. The two teams worked in their respective country but had regular meetings, via teleconference or in person, to review the project. During this period, the two teams first ideated the mission, then designed, produced, integrated, and tested the 3U cubesat. The CSDC required Eleonora to undergo an informal preliminary design review, a critical design review, and a vibration test of the final design. At the end of the 2012-2014 CSDC, Eleonora obtained the third overall place among teams coming from ten of the major Canadian universities. A considerable success for the young student society PolyOrbite, created at Polytechnique Montreal in 2012 with the specific goal to recruit students who were passionate about space and willing to embark in the CSDC experience.

The paper describes the entire experience of creating a cubesat mission with a team of graduate and undergraduate students coming from different countries: from the design of the satellite, to the results of the environmental tests performed at the David Florida Laboratory of the Canadian Space Agency, passing through the organizational issues and the lessons learned, with a view to the future of the programme.