

PARTICIPATION OF UNDERGRADUATE STUDENTS TO THE SOLAR PANELS DESIGN OF THE EDUCATIONAL SPACECRAFT ESEO

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Short Abstract : The objective of this presentation is to discuss the participation of students at the University of Liège to the educational spacecraft project SSETI-ESEO proposed by the European Space Agency.

Extended Abstract : The Student Space Exploration and Technology Initiative (SSETI) was created by the ESA Education Department in 2000, in order to actively involve European students in real space missions. The aim is to give students practical experience and to enhance their motivation to work in the fields of space technology and science, thus helping to ensure the availability of a suitable and talented workforce for the future.

Three missions have been defined in the framework of the SSETI project:

- (i) SSETI Express which is a low-earth orbit, 60kg spacecraft launched in October 2005 by a COSMOS 3M launcher from Plesetsk.
- (ii) SSETI European Student Earth Orbiter (ESEO), a 120kg spacecraft planned for launch into geostationary transfer orbit in 2008.
- (iii) SSETI European Student Moon Orbiter (ESMO), planned for launch in 2010-2012. It will conduct experiments on its way to the moon as well as when lunar orbit is achieved.

SSETI students are now mainly involved in the ESEO satellite for which the University of Liège is in charge of the *MECH* workpackage. The students have to propose a design for the structure of the solar panels (including the geometry and materials) and their deployment and pointing mechanisms (including electrical circuits, motors, hinges and actuators). Through detailed finite element computations in the SAMCEF software, they have to verify the structural integrity of the panels during the launch phase and to guarantee a safe deployment once on-orbit. Another task is to ensure an appropriate orientation of the solar panels to collect the maximum power from the sun. An industrial partner specialized in the development of computer-aided engineering solutions, SAMTECH, and a research center, Liège Space Center, also bring their expertise to the project.

The objective of this contribution is to present the current design proposed by the students together with the numerical simulations that have been carried out. We will also discuss to what extent undergraduate students can effectively be involved in a real space mission and what is the framework provided by the University of Liège and the European Space Agency to make this educational project a success.