

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

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AN INTERNATIONAL AND INTERDISCIPLINARY APPROACH ON LEARNING HOW TO DESIGN
A SPACE STATION

Abstract

The Space Station Design Workshop (SSDW), instigated by the Institute of Space Systems (IRS) at the University of Stuttgart, is an international and interdisciplinary workshop, targeted to undergraduate and graduate students as well as young professionals. The first workshop started in 1996, and except for some small breaks, it has taken place on a yearly basis. Currently 40 participants are divided into two teams, which within six days have to fulfill one goal: to design a space station. The teams are interdisciplinary arranged, including many aerospace engineers, but also participants from other engineering disciplines, physics, informatics, architecture, etc. are encouraged to attend. The mission statement changes every year, including targets such as Low Earth Orbit, cis-lunar space or Mars vicinity, often reflecting the current development in global exploration roadmaps. The goal of the workshop is to obtain creative solutions from young and fresh minds, but also to enable students to learn by doing how an interdisciplinary and international project works. Several tools are provided by the IRS for the entire week: internal/external experts on the required fields, providing both dedicated lectures and guidance during the week; a concurrent design facility and specialized software for systems engineering, mission analysis, radiation, visualization and ECLSS design. As the conceptual design needs to be created in a short period of time, the entire process is monitored by the IRS staff. This guidance should however not compromise the creativity and “out-the box thinking” of the participants. The experience of previous editions and the lessons learned help improving this guidance process year after year. This paper explains the teaching approach using the activities during the SSDW 2017 as an example, starting from the mission statement to the final presentation. As a conclusion, the evaluation and opinions of the experts, the students and the organization staff are presented, as well as the main lessons learned, including how they can be implemented to further improve the SSDW.