

SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
ON TRACK - UNDERGRADUATE AND POSTGRADUATE SPACE EDUCATION (2)

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SPACECRAFT OPERATIONS TRAINING CENTRE (STC)- EDUCATIONAL HIGHWAY FROM
UNIVERSITY TO SPACECRAFT OPERATIONS

Abstract

Since the first launch of a satellite many universities started to teach space related topics. Most of the universities consider the space related knowledge as a special case of mechanical engineering, electrical engineering or physics. The majority of the universities assign space institutes to these faculties. Therefore it's absolutely natural that lectures, exercises and exams are about topics like thermodynamics of re-entry, mechanical structures of spacecraft, orbit mechanics, flight dynamics, spacecraft data handling, image processing and so on. All these topics are about the composition and structure, mission, physics of a spacecraft, and the products a space mission provides. So is everything covered? Every year many spacecraft are launched and nearly every year there are more launched than the last year. Spacecraft are getting more and more optimized and industry is starting producing spacecraft in mini series like in the automotive industry. This means the need of industry for spacecraft developers is on the long term stagnating if not even decreasing. On the other hand the need for spacecraft operators is increasing with each launch. But how is a spacecraft operator trained and qualified. Operation of a spacecraft is clearly not seen as a task of engineering faculties. The knowledge needed to operate a spacecraft has a lot in common with the knowledge universities are teaching, but it differs significantly in the point of view and composition. Some areas are even not covered. An operator has to know a spacecraft in all details in order to judge if a command is valid, useful and adequate and he has to be able to read and interpret telemetry. All this he has to do on time. This requires not only the knowledge; it would ideally require some experience. Several universities identified this gap and started student satellite projects. The problem with this approach is that these take sometimes longer than the students are present or they are so simple that the benefit is minimal.

The aim of this paper is to show another approach VEGA developed for universities: The Spacecraft Operations Training Centre (STC). It is composed of a full mission operations simulator, a ground system simulation and many lectures and exercises, which allows flying a mission, based on the same standards as industry without the complexity and the costs of a real mission. This software suite is module-based and can be individually tailored to meet the needs of a particular university.