

AGENCY

Ladybird Guide to Spacecraft Operations boosts preparations for student satellite

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From 15 – 18 May 2018, 21 students from 9 different ESA Member and Associate States descended upon [ESA Academy's Training and Learning Centre](#), ESA's European space Security and Education Centre ([ESEC](#)), Redu, Belgium. Their mission: complete the [ESEO Ladybird Guide to Spacecraft Operations Training Course](#).

The Course's overarching theme was supporting preparations for the European Student Earth Orbiter, or ESEO for short. ESEO is a micro-satellite mission to Low Earth Orbit, where it will be able to take photos of Earth as well as measure radiation levels and test new technologies. Its aim is to provide students with invaluable hands-on experience.

This training course was delivered for the third time for the ESA Academy Programme by a senior ESA engineer from the [Advanced Operations Concepts Office of ESOC](#) (European Space Operations Centre). The engineer has several years of experience with spacecraft operations, and the teaching approach was chosen to include actual examples of spacecraft missions and real operational scenarios. This is a perfect fit with the "Ladybird approach", emphasising real-life examples and personal interactions, while limiting mathematical and technical aspects. The participants were there not only to learn about spacecraft operations, but also to think as operators.

"This course has certainly been a great experience," enthused a Spanish student from the Technical University of Madrid. "It has allowed me to glimpse the wonders and perils in the field of spacecraft operations: common yet strong mind traps, recurring errors, complex systems, elegant solutions and unsolved problems. Learning from real missions in the past, the problems they encountered, the mistakes that were made and some of the clever ways in which they managed to face those problems was a pleasure for a space enthusiast like me."

The training course covered all the fundamental disciplines necessary to understand how a spacecraft is operated, such as:

— Students attending welcome introduction

- Attitude Determination and Control
- Orbit Control
- Power Generation and Management
- On-board Data Handling
- On-board Software
- Thermal Control
- Telemetry, Tracking and Command

Once the basics had been conveyed, the students needed to put theory into practise with a group exercise. They were split into two groups: team Prince Charming and team BOHLIN. Each then had to plan a rough design for a spacecraft that they would operate in a virtual mission scenario. Happily, both teams managed to save their spacecraft from all manner of near-disasters, and retrieve valuable science data. The participants are now better-prepared than ever to support ESEO!

"The course provided an insightful overview of spacecraft subsystems from an operations standpoint," said a Spanish student from Cranfield University. "The course will be a great foundation of knowledge and skills to help me with my own satellite mission."