

AGENCY

Ladybird Guide to Spacecraft Communications Training Course 2018 completed!

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22 university students from 13 different ESA Member and Associate States participated in the second edition of ESA Academy's Ladybird Guide to Spacecraft Communications Training Course, which ran from 6 to 9 March 2018. Hosted at ESA Academy's Training and Learning Centre, ESA-ESEC in Belgium, the course was delivered by an ESA expert from the [Advanced Operations Concepts Office](#) in [ESA-ESOC](#).

"For me the best part of the course was having the opportunity to hear from the ESA expert all the experiences and stories that happened in some of the ESA missions. Also, it was very interesting to see how an operator thinks and not only theory," explained a Spanish student from the Politechnic University of Catalunya.

The goal of the training course was to give university students an overview of communication with spacecraft, and how the challenges of this impact the design of spacecraft subsystems and operations. A "Ladybird approach" was taken, emphasising real-life examples and personal interactions, while limiting mathematical and technical aspects. Given this different style, students were often asked to put themselves in the shoes of operators to solve communication problems from real missions, such as [Envisat](#).

"The course was a brilliant learning experience," said an Irish student from the University College Dublin. *"The material given to us was extremely interesting as well as challenging. The atmosphere created during the week made for a really enjoyable working environment with a group of amazing people that I hope to stay in contact with in the future."*

During the lectures the students learned about:

— Students discussing with expert

- the challenges of communicating with a spacecraft
- modulation
- demodulation
- coding
- protocols
- transmission
- reception

At the end of the week the students also had the opportunity to discuss in more depth additional issues faced by real ground stations.

ESA Academy courses always strive to give university students opportunities to see behind-the-scenes, and this was no exception. To complement what they were learning during the course, the students were given tours of ESEC by Operations Engineers; they visited the PROBA Operations Room and saw how ESEC communicates with the [PROBA](#) satellites; they also explored the Baseband Equipment Room, as well as the inside of the [Redu 1 Antenna](#).

— ESA/Redu S-band antenna console

Complementing the lectures was a group exercise. The students were split into two teams, and each had to design a spacecraft to complete a hypothetical interplanetary mission.

On Friday afternoon, each team presented their final design to the ESA expert and the other student team. They then faced a real-time operational issue that they had to manage to save their spacecraft! Both teams succeeded in this task, and even managed to impress the expert! During this group exercise the students were evaluated to allow them to claim, with their certificate of participation and course transcript, ECTS credit(s) to their respective universities.

"As a plain communication engineer, I had no idea on how interesting and challenging could be the realm of spacecraft communications. This course gave me a glimpse into this world providing a multidisciplinary and diverse environment thanks to the different technical backgrounds of all students involved. Awesome!" said an Italian student from the University of Padova.

A livestream of the course was set up allowing 14 additional university students from five different ESA Member States to attend the lectures. They could follow them live via the ESA Academy YouTube channel or play them back at a later stage. These students add also had the opportunity to ask questions to the ESA expert. To obtain a certificate of participation they needed to answer an online questionnaire.

The Ladybird Guide to Spacecraft Communications Training Course 2018 was a big hit with the participating students. In

— Students with their training participation certificates

the words of a Belgian student from the Universities of

Hasselt and Leuven: *"The course was very dynamic including lectures, group exercises and guided tours. I was able to network with other students with similar interests as well as broaden my horizon and discover the possibilities of working for ESA. This course was for sure a valuable contribution in my path towards a career within the agency."*

In September 2018, a complementary training course, called Ladybird Guide to Spacecraft Operations, will be offered to another group of university students. The call for applications will be launched in a few months. There are many more ESA Academy training opportunities planned for 2018! To find out more please visit the [Current Opportunities](#) webpage.

For more information about ESA Academy activities please contact: esa.academy@esa.int