

AGENCY

Online Ladybird Guide to Spacecraft Communications Training Course 2021 inspires University students

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Although the COVID-19 pandemic continues to disrupt lives around the world, many activities can continue thanks to modern technology. ESA Academy have embraced this approach, and have recently run the Ladybird Guide to Spacecraft Communications Training Course 2021.

Spread across eight afternoon sessions between 11 and 22 January, delivery was entirely online. In attendance were 60 Bachelor, Master, and PhD students, all with engineering backgrounds, from 17 different ESA Member States and three Associate States. Lending their expertise as course tutor was a senior ESA Engineer belonging to the Advanced Mission Concepts and Management Support Office of the Operations Department.

— Trainer delivering a lecture during the online Ladybird Guide to Spacecraft Communications training course

As effective as virtual courses are, it can be difficult to foster the sense of camaraderie that comes from being on-site together. To help with this, an ice-breaker activity was organised online with the students the week before the

course began. This was a new initiative for ESA Academy's Training and Learning Programme, and was a positive experience for both the students and organisers. "Having the ice-breaker and meeting everyone for the first time was organised well and allowed me to settle my nerves before the actual course started," remarked a British student from the University of Nottingham.

The course's primary objective was to familiarise students with the fundamental concepts of spacecraft telecommunications. Being "Ladybird"-style meant that lectures were kept to a general point of view, and avoided heavy analytical or mathematical detail. Generous use was made of easy-to-understand examples, in addition to intuitive diagrams.

Over the eight afternoon sessions, the following topics were covered:

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- Signal modulation and demodulation
- Channel coding
- Communication protocols
- Transmission
- Signal reception
- An overview of several real ground stations

The course trainer has many years of experience with spacecraft operations, which proved invaluable when providing actual examples of missions and real operational scenarios. This brought the topics to life for the students, immersing them in the problems that can arise during a real space mission. During lectures the trainer would often challenge the students with quizzes, keeping them on their toes!