

AGENCY

Students design lunar water-prospecting missions for the Concurrent Engineering Challenge 2022!

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In brief

Hosted at ESA Academy's [Training and Learning Facility](#), ESA-ESEC, Belgium, the Concurrent Engineering Challenge 2022 was originally planned in 2020, but was delayed due to the COVID-19 pandemic. The wait was well worth it, as the challenge – ultimately running from 4 to 8 April 2022 – proved to be a huge success.

In-depth

Cross-Europe collaborations

— EPFL students with their certificates

Participating on-site were 16 university students from eight different ESA Member States and Canada, closely mentored by two ESA Systems Engineers from ESA's Systems and Concurrent Engineering Section. They were joined remotely by two additional groups of students and supporting staff from European universities equipped with their own Concurrent Engineering Facilities: EPFL, the Swiss Federal Institute of Technology in Lausanne (Switzerland); and [Uni.lu](#), the University of Luxembourg. In total, 39 university students took part in this challenge.

"The organisation was a great interdisciplinary success from our team's perspective," explained a coordinator from Uni.lu. "The SnT research centre where our Concurrent Design Facility is located stands for 'Interdisciplinary Centre for Security, Reliability and Trust'. Similarly, our student team had members from Space Systems, Space Communications, and Space Robotics research groups from SnT. So, putting together an interdisciplinary team and leading them in the challenge was a very rewarding experience for us that symbolises the interdisciplinary collaboration spirit of SnT and collaborative capabilities of concurrent design approach."

Mission brief: find the lunar water!

The goal was to familiarise students with Concurrent Engineering, and also help universities to develop their own Concurrent Engineering Facilities. To achieve this, students were given a hypothetical mission to design using Concurrent Engineering. They were briefed that water on the Moon is a vital resource for future space missions to our celestial neighbour and into deep space. Finding and mapping sources of lunar water is very difficult, so the students were tasked with designing a prospecting mission to quantify water ice resources hidden in shadowy regions near the Moon's poles. High-resolution mapping should be achieved via reflectometry between a Mothercraft and two CubeSats in lunar orbit.

"This challenge was a great experience!" enthused a student from EPFL. "We had the opportunity to discover the Concurrent Engineering approach to design a lunar mission. The use of this new working method, the collaboration and motivation of the students, and the commitment of the engineering team all contributed to make this week successful and enriching."

Each group came up with a mission name and patch:

- ESEC: WOLF (Water-Ice Orbiter for the Luna Future)
- Uni.lu: LuWiEx (Lunar Water Ice Explorer)
- EPFL: DUMBO (Dual Moon Beam Orbiter)

At each of the three sites, students were divided into subteams to cover key areas: