

AGENCY

Post-Alpbach Summer School Event 2018 develops plans for ambitious mission to Ceres

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In July 2018, 62 students and young graduates in engineering and science took part in the 42nd Alpbach Summer School. Held in the stunning Austrian Tyrol, the students were challenged to design space missions that could return samples from small Solar System bodies, such as asteroids, comets, and dwarf planets. 24 participants have now continued their work in the Post-Alpbach Summer School Event 2018, held from 26 to 30 November 2018, at [ESA Academy's Training and Learning Facility at ESEC-Galaxia in Belgium](#).

This Post-Alpbach Summer School Event 2018 was co-organised by the [Austrian Research Promotion Agency \(FFG\)](#). *"I was happy to witness the Post-Alpbach students 2018 enthusiastically working at the new premises of the ESA Education Training Centre,"* said Michaela Gitsch, FFG, Summer School Director. *"I saw them learning and experiencing Concurrent Engineering and optimising the mission design of the Calathus mission to Ceres developed during the Summer School Alpbach. The Post-Alpbach Summer School Event at ESA Academy's Training and Learning Facility again showed that it is a valuable add on to the Summer School Alpbach, and another most fruitful cooperation between ESA and FFG with a common goal: to support the next generation of space scientists and engineers on their way toward positions in European space industry and science."*

These students, all veterans of the Summer School, were given a challenge: continue the sterling work begun during summer by furthering the design of the Alpbach Blue Team's Calathus mission. This ambitious endeavour comprised an orbiter and lander to investigate a feature on dwarf planet Ceres known as Occator Crater. Calathus would perform mass spectroscopy, take high resolution images of the surface, and most importantly, return samples of salty surface material to Earth for analysis. The foundations had been laid, but more work needed to be done!

"The ESA Post-Alpbach Summer School Event was a truly unique experience," said a Portuguese student from the University of Porto. *"It was nice to meet again some scientists and engineers from the Alpbach Summer School and have the opportunity to further develop the Calathus mission using the Concurrent Engineering method. It was the first time that I had contact with this approach and with the Open Concurrent Design Tool. The environment of this event is something that we can't find in academia and that makes this experience very valuable!"*

— The students' Calathus mission would return a sample from dwarf planet Ceres.

The students began by learning about the Concurrent Engineering design approach, which would underpin their efforts. A lesson in the [Open Concurrent Design Tool \(OCDT\)](#) was an excellent first step. Next, returning students from Blue Team presented their Calathus mission, and outlined its objectives. The challenges were great, but the students were not alone; they were supported by two ESA experts from ESA's Systems and Concurrent Engineering Section, several tutors with scientific and engineering backgrounds from the Alpbach Summer School and an ESA retiree with a lifetime of real-world experience.

A division of labour was required, so the students were split into small teams, each working on a different mission subsystem:

— Students answering the questions of the experts

- Communication
- Data Handling
- Instruments (Scientific team)
- Power
- Attitude and Orbit Control
- Mission Analysis
- Propulsion
- Structure
- Mechanisms
- Configuration
- Thermal