

AGENCY

Students successfully complete Concurrent Engineering Workshop

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From 14 to 17 March 2017, 22 students from 11 different nationalities, including ESA Associate Member Canada, took part in a Concurrent Engineering Workshop.

Concurrent Engineering is a method of designing and developing products for the space sector. Contrary to traditional design methods, in Concurrent Engineering all subsystems are designed simultaneously.

Hosted at [ESA Academy's Training and Learning Centre](#), ESA Redu Centre, Belgium, students were trained by two System Engineers working at the [Concurrent Design Facility \(CDF\)](#) at the European Space Research and Technology Centre (ESTEC).

Students were assigned a specific mission: design a small single satellite that would rendezvous with Envisat, a large Earth observation satellite launched by ESA in 2002, but which stopped working in 2012. The main objective of the students' small satellite – called e.Inspector – was to determine how Envisat is tumbling through space in order to collect data for a future mission to de-orbit it. Moreover, their satellite needed to accomplish this task without any risk of collision. Once the rotational rate was determined, it could spend the rest of its lifetime making observations of Earth, or performing other experiments.

The students were divided into teams, each covering a different subsystem:

1. Configuration
2. Structures
3. Propulsion
4. Mission Analysis
5. Attitude and Orbit Control Subsystem (AOCS)
6. Power
7. Thermal
8. Optics & Sensors
9. Communication & Data Handling

The students began by creating a first iteration of the whole system. They then gradually and continually modified the subsystem designs, increasing the size of their satellite.

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During the second and the third days they performed a second iteration and began to achieve very respectable results. They even calculated power and thermal budgets, and determined the dimensions and configuration of the mini-satellite.

The trainers were very impressed with the students' work ethic. They were so motivated that they needed to be forced to take coffee breaks, and even then they kept on working!

On the last day the students froze the second iteration and presented their final subsystem designs. The experts then compared the results with the previous edition of this Concurrent Engineering Workshop where a different set of students had been given the same challenge.

Interestingly, the two groups started their study with similar assumption, but this time the students chose a different configuration for the satellite: instead of a CubeSat, as the earlier students had opted for, they chose a mini-satellite with a cubic shape, which led them to obtain different budgets. While the mini-satellite structure was larger, a simpler rendezvous approach was chosen that minimised cost.