

AGENCY

Good vibrations for the 3Cat-4 CubeSat team on their preparation for launch

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In brief

³Cat-4 ("cube-cat-four") is a student CubeSat mission participating in the second cycle of ESA Education's Fly Your Satellite! programme. From 17 to 21 October 2022, students from the team took the proto-flight model of their nano-satellite to ESA Academy's [CubeSat Support Facility](#) in ESEC-Galaxia for the system vibration test campaign.

In-depth

³Cat-4 is a 1U CubeSat equipped with a Flexible Microwave payload. It will conduct Earth Observation, using GNSS (Global Navigation Satellite System) Reflectometry and L-band microwave radiometry, and it will also carry a receiver of AIS (Automatic Identification Services) messages used by vessel traffic services. The student team is part of the [Nanosat Lab](#), an initiative from the Universitat Politècnica de Catalunya.

— 3Cat-4 team performing a visual inspection of the CubeSat between runs of the vibration test

the spacecraft's structural design, especially for ³Cat-4 given that many of its units, including the payload module, L-band helix antenna, communications and attitude control board, and solar panels, have all been fully designed and manufactured in-house by the students themselves.

Under the guidance of ESA experts, the students executed vibration test runs in the satellite's three axis, as well as CubeSat functional health checks to verify the integrity after the vibration tests. The vibration tests were conducted using the CubeSat Support Facility's 20kN electrodynamic shaker and the team's custom-made adapter. A team member said of the test campaign: "*we now know the importance of having a procedure, and even more importantly, **following the procedure***".

— 3Cat-4 team integrating their CubeSat into the Vibration Test Adapter

The students demonstrated a commendable professional attitude, with their test campaign running flawlessly. After some further functional and mission testing to be conducted at University premises, the team will return to ESEC to conclude the environmental qualification with the system Thermal Vacuum-Thermal Cycling test.

ESA Academy would like to congratulate all students involved in the mechanical design of their CubeSat, as well as those who undertook the vibration tests. A major milestone on the road to launch has been completed! "*It's really scary when you apply those high stress levels to your five-year work*," explained a student, "*but then it's exciting to see that this small satellite has performed way better than expected!*"

To keep up to-to-date with developments, please visit the [Fly Your Satellite! website](#).