

AcubeSAT, the 3U platform for biological experiments in space: a status update

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Given the ever-growing demand to make science in space more approachable –and the value of experimental data in such conditions –the SpaceDot team has been driven by the ambition of sending a low-cost, high-throughput, modular science platform in Low Earth Orbit (LEO), in service of open science. This has led to the conception of AcubeSAT, a 3U CubeSat carrying a novel payload which combines fluidics, optics and electronics to probe the gene expression of yeast cells in space. AcubeSAT is being developed by students at the Aristotle University of Thessaloniki, with support from the European Space Agency’s (ESA) Education Office under the Fly Your Satellite! 3 programme. Throughout the years, the team’s efforts to design, manufacture and integrate AcubeSAT’s various parts have led to the accumulation of useful knowledge and lessons learnt, which are all thoroughly documented in open-access fashion on its GitLab page.

Several key developments have occurred in the time that has passed since the last time the team was present in OSCW. Most notably, there has been a major redesign in key subsystems and the satellite’s payload. The mission is currently in the manufacturing and testing phase, having completed a full environmental qualification campaign of AcubeSAT’s SatNOGS COMMS board, which is based on Libre Space Foundation’s (LSF) design, while its payload assembly and OBC/ADCS board were qualified in vibration testing, with thermal and vacuum (TVAC) tests scheduled for both in September 2025.

With this presentation, the team plans to share its latest contributions to the open source space community, some of the technical lessons learned throughout the years focusing on the manufacturing and testing phase and the challenges that have been faced attempting to build a CubeSat in an academic environment by a student team.

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