

✦ CubeSAT housing for quantum computers / quantum chips

For the first time in the field of quantum computers research and development, a quantum chip has been incorporated into a space application and tested. The chip is integrated within an application used to capture imaging data of vegetation zones.

During development, the extreme loads occurring during a rocket launch are considered through successful qualification of mechanical tests (vibration & shock testing). All components must endure the applied test loads, for the measurement instrumentation to work flawlessly. With the aid of FEA simulations, the design and fabrication of the CubeSAT was developed by *CAE Simulation & Solutions* in close cooperation with the [Quantum Information Science and Quantum Computation](#) research group of the University of Vienna, and in collaboration with the satellite deployer.

The pictures on the right-hand side show the CubeSAT being prepared for a pressure chamber, and a rendering of the entire assembly with transparent cover plates.

An especially challenging task was the incorporation of various PCBs within the frame, considering the tight allowable specifications of cable bending radii, e.g. fiber optic cables. Using CAD based planning of cable lengths and routing, the cables were positioned precisely and charted. The packaging of an in a laboratory 1 x 1.5 m sized experimental setup into a 15 x 15 x 40 cm satellite was set to prove an interesting challenge! Parallel to the development of the digital twin, all components were prototyped using 3D printing, through which the assembly and wiring were tested interactively and could be optimized.

The simulation model (finite element model) was used to evaluate quasi-static and dynamic calculations (natural frequencies, random response, shock response) as well as for the weight optimization of the structure.

All structural parts were designed, simulated, and authorized for fabrication by *CAE Simulation & Solutions*. The final assembly of the CubeSAT was carried out by the team of the University of Vienna under the supervision of *CAE Simulation & Solutions* in the clean room RSC3 of DLR (*Deutsches Zentrum für Luft- und Raumfahrt*) in Trauen. The satellite was successfully launched in June 2025 and is since then successfully sending data.

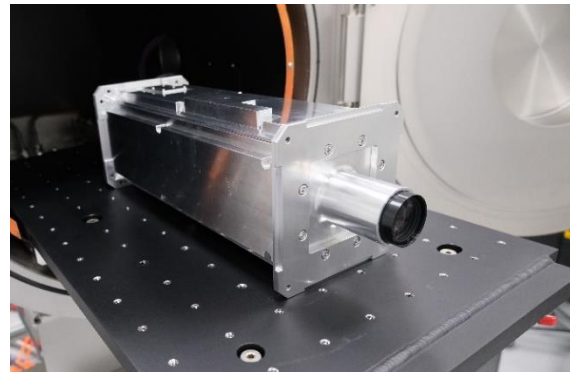


Figure 1: Fully assembled CubeSAT
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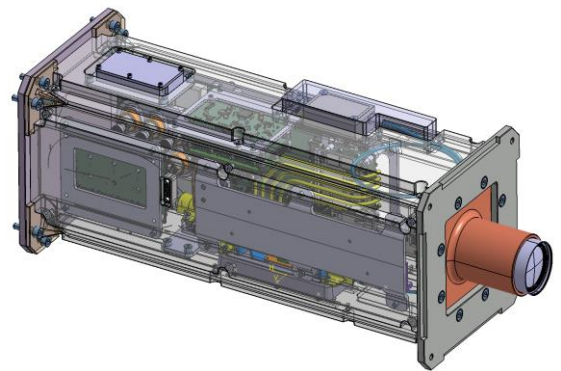


Figure 2: Technical rendering of the CubeSAT

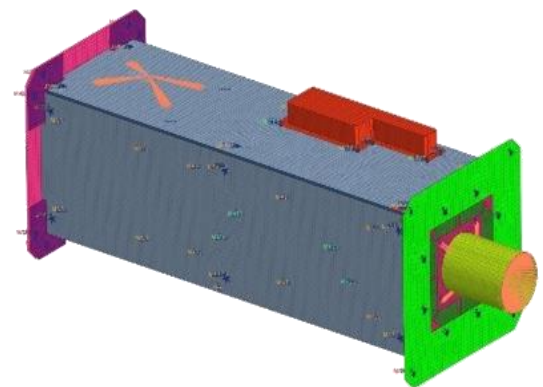


Figure 3: FEM Model of the CubeSAT



Figure 4: Assembly of the quantum computer
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