

OUFTI-1, the first nanosatellite developed at the University of Liège

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OUFTI-1 is the first CubeSat developed at the University of Liège, as well as the first nanosatellite ever developed in Belgium. This project aims at providing hands-on experience to students through the development of a series of nanosatellites.

The goal of our first CubeSat is to put the new amateur radio digital telecommunication protocol D-STAR in space. We plan to provide D-STAR communications between stations that can be located in two different geographical areas. The reason is that we have to compensate the Doppler shift on-board, since custom ground D-STAR transceivers do not permit to do so. We therefore have a complex communication architecture. We plan to receive both our telecommands and the regular users' signals using D-STAR. We will transmit all our telemetry using D-STAR. However, to keep ourselves robust and to make sure we will permanently be able to know the state of our CubeSat, we will also transmit some key measurements via a CW beacon, and other less critical measurements via another beacon. Radio-amateurs will be provided a software to decode those parameters. The transmission of telecommands and reception of telemetry require Doppler compensation in our ground station.

Our CubeSat will have two electrical power systems. One will be a robust system, while the second is currently being developed with Thales Alenia Space ETCA.

Other subsystems are also currently under development. The on-board computer software are being programmed, the attitude and thermal controls are being determined, the antenna deployment system is under prototyping, and the structure is being assembled.

The various subsystems are currently developed by students during their M.S. thesis. The team is composed of thirteen students from different engineering fields: aerospace, mechanics, computer and electrical engineering,... They come from two departments of the University of Liege and two engineering schools. This highly multidisciplinary team is managed by two PhD students from the involved departments. Professors and specialists from the industry form an "advisory board" who advises students in their choices and tasks. They also can take full advantage of the significant expertise and experience available in Liège in the space arena.

OUFTI-1 is one of the nine CubeSats selected by the European Space Agency to take part in the VEGA maiden flight. This new launcher is scheduled to lift off in November 2009.