

## **OUFTI-1: The CubeSat developed at the University of Liège, Belgium**

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OUFTI-1 will be the first nano-satellite from the University of Liège, as well as the first nano-satellite ever developed in Belgium. OUFTI-1 is being developed within the framework of a long-term, educative program, called Leodium (Liège in Latin), the goal of which is to develop a series of student satellites for scientific experiments.

OUFTI is not only a typical interjection from Liège (meaning “waouv”), but it could also stand for Orbital Utility For Telecommunication Innovation. The payload is a D-STAR<sup>(\*)</sup> repeater. D-STAR is an amateur-radio digital radio-communications protocol, which can transmit voice and data simultaneously. This means that one could e.g. transmit GPS data while talking, and this with a quality of voice far better than the one obtainable with a classical analog modulation. In addition, D-STAR repeaters are connected worldwide through the Internet, enabling users to talk across the entire world. Belgium’s first D-STAR repeater is now operational at our University, and forms a major part of our future satellite ground station. OUFTI-1 will probably be the first satellite ever to be fitted with D-STAR technology.

Our approach fully exploits the KISS (Keep It Simple & Stupid) philosophy. We intend to buy a CubeSat kit, and to use GaAs solar cells and Li-ion batteries. Our telecommunication system will have quasi omnidirectional antennas, and we will try to avoid, if possible, an active Attitude Determination and Control System. Our Command and Data Handling system will include the D-STAR payload as well as a simple CW radio beacon sending telemetry, which will serve as a backup system in case of failure of the main payload. These various sub-systems will be developed by students during their M.S. theses. These students will come from different departments of the College of Engineering and can take full advantage of the significant expertise and experience available in Liège in the space arena. One of our main objectives is to provide the appropriate environment to allow students to acquire hands-on experience, and to learn to work as a team and to manage projects.

The OUFTI-1 project was presented and defended at the Vega Maiden Flight Workshop (at ESTEC/ESA) in January 2008. Our CubeSat could be released in orbit as early as mid-2009 by one of the first Vega flights. This makes our schedule very challenging, but we have a motivated team that will benefit from a strong academic and industrial support. Thus, OUFTI-1 will demonstrate an innovative communications system, which will also be at the heart of future space experiments. Above all, OUFTI-1 will provide our students with a unique, exciting, and enriching experience.

(\*) D-STAR stands for Digital Smart Technology for Amateur Radio and is the result of a research lead by the Japanese Amateur Radio League, and funded by the Japanese government.