

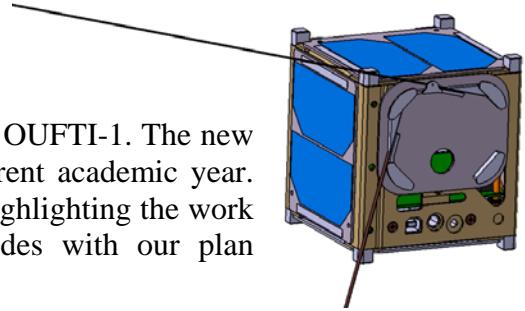


Newsletter n°4 January 2012

HAPPY NEW YEAR!

The OUFTI-1 team wishes you all the best for 2012.

This newsletter focuses on the status and near-future of OUFTI-1. The new team is presented, as well as the schedule for the current academic year. The technical status of the CubeSat is then described, highlighting the work of former and new students. The newsletter concludes with our plan regarding the launch.



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TEAM AND SCHEDULE FOR 2011-2012

Five new students joined the team in September: Gilles Bodson, Alain Collette, and Audric Hay from HELMO-Gramme, Alexei Dick from HEPL-INPRES, and Romain Gojon from Ecole Centrale de Lyon. They already gained insight into OUFTI-1 during the first term, in parallel with their classes. They acquired a global technical view of the spacecraft and became familiar with the technologies and equipment involved in their subsystem. They will be working full-time on OUFTI-1 from February.

The first part of the work will be focused on design and development. This will allow starting manufacturing of the engineering model by the end of March. Tests should start about mid-April, first on each subsystem individually and then on interconnected subsystems. The objective is to get a functional and tested engineering model by June. The students will deliver this model along with the necessary documentation to build the flight model.

The flight model will be built during summer, in order to perform qualification tests by September. These tests will be performed at Centre Spatial de Liège (CSL).

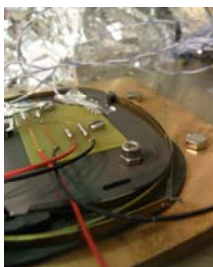
LOOKING BACK ON 2010-2011

The components of the **Attitude Control System** were ordered and received. Two sets of one permanent magnet and four hysteretic rods are waiting for integration of engineering and flight models.



Permanent magnet for attitude control.

The **Electrical Power Supply** subsystem has its main functionalities implemented and tested. Some secondary functions, such as USB battery charger, are still to be implemented.



Antenna deployment system during tests.

The **Mechanism** subsystem (antenna deployment) was tested at Centre Spatial de Liège (CSL) last June. The tests were performed under vacuum at low (-60°C) and high ($+60^{\circ}\text{C}$) temperatures. The tests proved the correct functioning of the system but it was also noticed that the deployment of the antennas could be blocked by a remaining part of the retention wire. This problem is currently investigated in order to improve the design and guarantee the deployment.

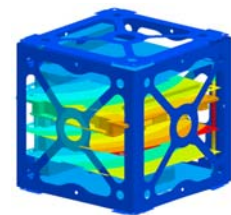
The “processing” part, i.e. (de)coding and (de)modulation, of the **Communication** subsystem is complete. Regarding the radio-frequency part (mainly amplifiers), some tests were performed on the receiving circuit and showed that improvements were needed. The emitting circuit will be designed by Audric Hay (HELMO-Gramme). He will also integrate and test the whole subsystem.

Most of the **On-Board Computer** software was coded and tested. This year, Alexei Dick (HEPL-INPRES) will develop a mode dedicated to on-ground tests of the satellite.



Battery box and thermal control system during tests.

The major task of the student in charge of the **Thermal Design** was to deeply investigate the Thermal Control System of the batteries. Indeed, tests performed in June 2010 showed that the system could not keep batteries above 0°C. The thermal control system was therefore complemented with polymer insulators. The tests performed last June at CSL demonstrated the efficiency of this new solution. Romain Gojon (Ecole Centrale de Lyon) will update the thermal model and perform thermal-vacuum tests on OUFTI-1.



Finite-element model of OUFTI-1.

The **vibrational** behaviour of OUFTI-1 during launch was studied thanks to a detailed finite-element model. Gilles Bodson (HELMO-Gramme) will keep this model up-to-date and perform tests on the engineering model.

The **Ground Station** hardware is operational at the Montefiore Institute (ULg). The station is regularly used for satellite tracking. Alain Collette (HELMO-Gramme) will develop the Mission Control Software.

LAUNCH

The planning described above aims at a launch towards the end of 2012. Opportunities have been identified and discussions are ongoing with a launch provider. OUFTI-1 will thus not be part of the Vega Maiden Flight (as initially planned). The OUFTI-1 team wishes all the best to the teams of the CubeSats that will take place onboard!

The OUFTI-1 team is pleased to collaborate with numerous partners and thanks them for their support.



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