



## **EntrySat: A 3U CubeSat to study the reentry atmospheric environment**

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Entrysat has for main scientific objective the study of uncontrolled atmospheric re-entry. This project, is developed by ISAE in collaboration with ONERA and University of Toulouse, is funded by CNES, in the overall frame of the QB50 project. This nano-satellite is a 3U Cubesat measuring  $34*10*10$  cm<sup>3</sup>, similar to secondary debris produced during the break up of a spacecraft. EntrySat will collect the external and internal temperatures, pressure, heat flux, attitude variations and drag force of the satellite between  $\approx 150$  and 90 km before its destruction in the atmosphere, and transmit them during the re-entry using the IRIDIUM satellite network. The result will be compared with the computations of MUSIC/FAST, a new 6-degree of freedom code developed by ONERA to predict the trajectory of space debris.

In order to fulfil the scientific objectives, the satellite will acquire 18 re-entry sensors signals, convert them and compress them, thanks to an electronic board developed by ISAE students in cooperation with EREMS. In order to transmit these data every second during the re-entry phase, the satellite will use an IRIDIUM connection. In order to keep a stable enough attitudes during this phase, a simple attitude orbit and control system using magnetotorquers and an inertial measurement unit (IMU) is developed at ISAE by students.

A commercial GPS board is also integrated in the satellite into Entry Sat to determine its position and velocity which are necessary during the re-entry phase. This GPS will also be used to synchronize the on-board clock with the real-time UTC data.

During the orbital phase ( $\approx 2$  year) EntrySat measurements will be recorded transmitted through a more classical "UHF/VHF" connection.

Preference for presentation: Poster

Most suitable session:

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