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SOYUZ CANSAT, A FRENCH - RUSSIAN COOPERATION ON A SPACE PROJECT BETWEEN  
UNIVERSITY STUDENTS - FROM CONCEPTION UP TO FLIGHT DEMONSTRATION

**Abstract**

The CanSat is a multidisciplinary student project aimed at the design and development of a small scientific payload contained in the volume of a standard soda can. It is inspired by one of the current major space challenges: planetary probing. Soyuz-CanSat project was born in 2011 when Russian students from Samara State Aerospace University (SSAU) met French students from Institut Supérieur de l'Aéronautique et de l'Espace (ISAE-ENSICA) during the French launch campaign C'Space co-organized by French space agency (CNES) and Planete Science Association in August 2011. Both Russian and French teams are composed of undergraduate License and Master Degree students. This two-years project main purpose was the successful delivery and launch of a French CanSat (built in ENSICA), from a Russian rocket, 1/25th replica of the Soyuz, during the French C'Space 2013. The CanSat technology has been developed for 5 years within ISAE-ENSICA. Hence, this cooperation was to bring a whole set of evolutions and redesign of the previous CanSat in order to adapt it to its new constraints as a result of its integration in the rocket. This required strong communications between both teams and bilateral cooperation. The aim of a CanSat is to accomplish some specific missions that can be chosen freely. These missions will determine the scientific interest of the project as well as give a measure of the overall project success. With respect to the context of the project, the chosen missions for this CanSat were:

- ffl Payload integration on the rocket. Accelerations over 12g, volume and mass constraints, electronic start-up.
- ffl Real-time probing and data transmission to the ground (telemetry). Communication link within a range of 1.5 Km.
- ffl Autonomous Come-Back. Involving giving the CanSat the capability of reaching a predefined target on the ground, which is still a real scientific and industrial challenge.

The accomplishment of these three missions led to some specific tasks. A thorough analysis of the structure resistance to the new rocket constraints was held. Reinforcement and redesign of the former structure were needed. Additionally, in order to increase the communication range, it was decided to design and develop our own antennae. Those tasks make part of a whole multidisciplinary project enriched by the international cooperation frame where communication with Russian team was crucial.