SPACE SYSTEMS SYMPOSIUM (D1)
Training, Achievements, and Lessons Learned in Space Systems (5)

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STYX: A STUDENT'S EXPERIENCE ON AIRBORNE ROCKET SYSTEMS

Abstract

Our aim is to launch a small rocket by using a radio-controlled airplane. Such launches enable the rocket itself to reach a higher altitude with a greater useful load. Of course this will also release the rocket from using a launching ramp, a very constraining ground installation.

This demonstrator will illustrate at a small scale the strong concepts of airborne rocket launching, such as reusability. The flight of our prototype including the launch of the rocket is planned during summer 2014.

Our project is based around two main components: a radio-controlled airplane called "Cyrano" and the rocket called "Reflex".

Cyrano is a lengthened "Super Bison" with a retention/dropping system designed for small rockets.

Reflex is 1m10 length, 65mm diameter and weights 2kg, includes its own control of its power unit. This rocket also disposes of a parachute in order to land safely after its flight.

The technological key of the project is the retention/dropping system. It is the interface between the carrier and the rocket. The aim of this interface is to be adaptable to multiple carriers-rockets pairs.

Right now, our ground tests is almost completed and we will carry on to the flight tests soon. Our tests policy consists in testing and validating the different components independently on the ground before proceeding to a flight test.

First we check all the vital parts (ability to fly safely), then the mission-related parts (retention/dropping system). The complete check-list has been designed in order to be as short as possible and to deal with possible failures cases. We expect our tests flights to teach us more about the safety procedures to respect and the other specific constraints that can be considered.

Periodically checking the demonstrator and its functions is vital, because it allows us to measure our progress and the behavior of the system as a whole. We then analyze the results and whether the test positive or not, there is always something to learn. The experience that we gain will lead to a report, summarizing the knowledge and improvements that can be made.