

SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Small Launchers: Concepts and Operations (7)

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STYX: A STUDENT'S PROJECT 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.

We expect the test flights – including the practical work before and after flight – to teach us more about the limits of this concept, the safety procedures to respect as well as the other specific constraints.

It will show at our scale the possibilities of building a low-cost way to put into orbit a small payload by using an airplane instead of the first stage of a classic rocket. Moreover, it could reduce the ground installations needed to a standard launch. Indeed, this launching concept only requires needs an airport.

Fully reusable, our demonstrator could theoretically fly multiple times. We designed it in order to be as easy as possible to build and we learned from transforming this design into a reality.

We expect our tests flights to teach us more about the operability of our concept and the possible industrial applications that can be considered. The experience that we gain will lead to a report, summarizing the knowledge and improvements that can be made.