

SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)

Launch Services, Missions, Operations, and Facilities (2)

Author: Mrs. Laura Appolloni
Centre National d'Etudes Spatiales (CNES), France

Dr. Paolo Baiocco

CNES, France

Mr. Matthieu Garcia

CNES, France

Mr. David Monchaux

Centre National d'Etudes Spatiales (CNES), France

FUTURE LAUNCHERS: OPERATIONAL GROUND CONCEPTS FOR A COMPETITIVE LAUNCH BASE

Abstract

In the frame of the preparation of a future launchers generation aiming at a timeframe beyond Ariane 6's first flight and entry into market, CNES is conducting preliminary studies on reusability technologies, engines, stages, launchers and launch systems. This activity is part of the French Space Agency vision for a forerunner projects' roadmap, as established early 2016.

CNES studies encompass an overall crescendo considering trade-off at system level for the choice of the best return strategy of the future launcher, and an ambitious real demonstrators' development for engine and stage tests to be carried out between 2018 and 2020.

New and historical partnerships are renewed in the frame of this future reusable rocket stage preparation, and multi-lateral and European programs run now in parallel to shape the challenge of European Space Industry of tomorrow.

The paper will briefly describe the actual environment leading to different studies supported by CNES under a National or partnership agreement in 2016.

It will focus on the operational ground concepts allowing to assemble, launch, recover and refurbish a first stage in-flight system demonstrator about 10 tons GLOW from the European Spaceport in French Guiana.

Different sites are considered, taking into account safety and budget constraints. As it is our intention to address cost driving factors since the early design phase, architectures to be studied for the ground operational concepts will need to be as simple as possible, and help identifying key parameters for the demonstrator's costs. Safety stays though killing criterion for the selection.

As a first step, vertical landing is considered to define a recovery strategy of the demonstrator, either on a sea barge or on ground, on the same pad used for launch or nearby. A horizontal landing has nevertheless not been discarded for a future reusable launcher, and will need to be further analyzed.