

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

Author: Mr. Laurent Gathier  
Dassault Aviation, France, laurent.gathier@dassault-aviation.com

Mr. Pascal Jaussi  
Swiss Space Systems (S3), Switzerland, pascal.jaussi@s-3.ch  
Mr. Benoît Deper  
Swiss Space Systems (S3), Switzerland, benoit.deper@s-3.ch  
Mrs. Marie-Christine Bernelin  
Dassault Aviation, France, marie-christine.bernelin@dassault-aviation.com  
Mr. Philippe Coué  
Dassault Aviation, France, philippe.coue@dassault-aviation.com

## SMALL SATELLITES MISSIONS BY SOAR SUBORBITAL VEHICLE

**Abstract**

Swiss Space Systems (S3) is developing a suborbital transportation system including a dedicated partnership with Dassault Aviation for the SOAR vehicle. The S3 launch model uses a commercial airplane that is already certified for zero gravity flights, to take the SOAR space plane up to 10 km on its back. The SOAR will take care of the next part of the ascent up to an altitude of 80km, the height at which the upper stage will be launched in order to put the satellites into orbit. Once this operation is completed, the shuttle will return back by gliding towards its launch airport, where it will be prepared for the next launch. The system developed by S3 has many flexibility and safety advantages: the launch can be terminated and the shuttle can return to Earth at any time during the process.

The primary mission consists in launching small satellites in Low Earth Orbit (LEO). Among other missions, research-oriented micro-gravity operations are possible thanks to a trajectory allowing a few-minute-long zero-gravity period. In a later phase, a modified version of the shuttle will offer suborbital manned flights.

As the shuttle and the civilian transport aircraft used as a first stage are reusable, the access to space will be affordable to a bigger number of public and private customers, enabling emerging markets, countries, universities or research institutes to deploy their satellites or to carry out their experiments.

The SOAR space plane is atop a carrier aircraft for take-off and lands on a classical runway. As a consequence, the ground installations will be very similar to the ones existing in an airport no matter where around the world, offering therefore operational flexibility compared to classical launchers.

Thus, affordability and operational flexibility brought by this suborbital transportation system will modify the way space activities are performed today.