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DANEO

Falcon 2000 airborne small launcher concept

Market driven vehicle

Supported by Dassault Aviation, the DANEO concept targets the small satellite market around 50 kg into LEO. Despite the lack of a dedicated launcher, this market has experienced a large growth in the recent years reaching hundreds of satellites. Through electronics and sensors miniaturization, coupled with constellation projects, these small satellites perform an increasing number of missions: optical observation, science, technology demonstration, education, etc. However, their flying opportunities are tightly dependent on the schedule of ISS cargo missions or secondary payload availability on regular rocket launches. A dedicated small satellite launcher will provide them the ability to choose customized orbits for their own missions: in-orbit demonstration and validation (IOD-IOV), optimized Earth observation, science experiment, in-orbit servicing, debris removal, etc.

Flexible air-launched rocket

For many years, Dassault Aviation has been developing air-launched concepts either under military aircraft (Mirage IV or Rafale) or on top of regular airliners like the VEhra aircraft, a suborbital vehicles family. This launch solution provides higher operational flexibility and targets more available orbits. Ground-based infrastructures are limited to an airport and a mission briefing room leading to significant cost reductions. Besides, the air-launch rockets have an improved performance compared with a ground based launcher.

The DANEO concept

During the preliminary evaluation phase, the study addressed the whole Falcon family and finally selected the Falcon 2000 as the best trade-off for this mission. Numerous topics were investigated, such as the launcher architecture, the separation maneuver, the launch trajectory or the aeronautic



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coupling between the plane and the launcher and it showed the feasibility of this concept, launching a 50 kg payload into LEO. This three-stage launcher has a diameter of 0.8 m and it is about 6.4 m long. The payload is included in a diameter of 0.8 m and a 1.0 m long fairing. The first two stages have a solid propellant and the last one, with a LOX/HC engine, provides a precise injection velocity. DANEO is a reactive, multi-mission launch solution, operated from an airport located inside the desired Launching State. The airplane does not need to be heavily modified and it could be used for other unrelated missions after a successful launch campaign.

The DANEO embodies this innovative vision for small satellites launches related to the Falcon 2000 operational flexibility.

