

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

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VLM-1 MICROSATELLITE LAUNCHER

Abstract

The German Aerospace Center (DLR), together with the Brazilian Institute of Aeronautics (DCTA/IAE) intends to develop a microsatellite launcher. The current status of the project is shortly prior to the PDR (preliminary design review). The target is to perform the maiden flight within a time frame of 4 years, and the flight ticket price shall be less than 10 Mio US\$. Market analysis have shown that in the area of microsatellites there is a need of a dedicated microsatellite launcher, as the alternative, nowadays, is to fly as a piggy back on large launchers without the possibility to influence the time schedule and the desired orbit. The analysis indicated a need of more than 5 microsatellite launches per year with their main applications in the field of science, agriculture monitoring, meteorology and surveillance. The vehicle consists of a 3 stage solid motor configuration, where the first and second stages are identical except for the nozzles. The total mass of propellant will be in the order of 25 metric tons, whereas the total mass of the whole vehicle will be about 28 tons. The total length of the vehicle will be in the order of 19 meters, and its diameter will be 1.46 m. The first two stages will have flexible nozzles in 2 axes whereas the third stage will have a fixed nozzle. The initial aim is to bring microsatellites with a total mass of 200 kg into an equatorial, or 70 kg into a sunsynchronous low earth orbit.

To reduce the inert mass of the whole vehicle, light weight technology will be implemented including carbon fibre and aramide for the motor cases. Innovative and redundant technology for the GNC systems will be used to increase the accuracy and reliability for the desired trajectory. Total independent and autonomous subsystems will permit a fast checkout and testing to confirm the flight readiness of the whole systems before liftoff. Instrumentation will provide a comprehensive monitoring of all onboard vital systems during flight.

The cooperation between Moraba (Mobile Rocket Base), DLR, and the Brazilian institution DCTA/IAE in this project provides a heritage of more than 40 years of experience and competence in the field of sounding rockets, balloons and satellites.