

SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Future Space Transportation Systems Verification and In-Flight Experimentation (6)

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KAP@VEGA AS FUTURE IN-FLIGHT EXPERIMENTATION TEST-BED FOR NEW LAUNCHER
TECHNOLOGIES

Abstract

Kayser-Threde GmbH has developed a new concept called KAP (Kayser-Threde Auxiliary Payload Carrier) for In-Orbit Demonstration of new technologies and scientific experiments based on past experience with test satellites for Ariane 5. The main idea is to use available remaining payload capacity of the launcher to provide an efficient and flexible access to space for experiments and auxiliary payloads. The KAP Kit is fully autonomous providing the complete necessary infrastructure (power, data acquisition, telemetry) based on space qualified equipment flown on MAQSAT-B2 on Ariane L521 in 2005 and on TEXUS and MAXUS missions.

With VEGA as the future small member of the European Launcher Family a new possibility arises to implement a recurring test-bed facility for in-flight experimentation of new launcher technologies. KAP@VEGA is a new concept combining the heritage of In-Orbit Demonstration performed on several Ariane 5 flights with the new launcher accessing LEO. A demonstration mission is planned on VERTA-1 – the first operational flight after the maiden flight where most of the KAP equipment will be used as elements of an additional telemetry system for environmental monitoring and video signal acquisition and transmitting – with the goal to implement KAP@VEGA in a recurrent way on VEGA for a regular in-flight experimentation service.

The KAP Kit including the experiments will be mounted on a raising cylinder underneath the primary passenger and remains attached to the AVUM upper stage. Depending on the final AVUM performance and in-orbit lifetime the in-orbit experiment time will be adjusted to the experimenters needs. Main aspect here is to expose the experiments to a real launcher environment and to verify its successful performance during lift-off. Typical potential customers of KAP are those looking for an in-flight experimentation under real space environment (TRL 7 and higher), where a demonstrating on ground using representative test facilities is not sufficient to get a new technology qualified to be used in future space transportation systems. KAP@VEGA can also be used for scientific research using a low-gravity environment in case of VEGA upper stage stabilization manoeuvres. This feature is currently under investigation. Integrating new developed separation devices, KAP@VEGA missions will serve also as an attractive CubeSat launching opportunity.

The paper will present the current program and design status and describes the details of the envisaged first KAP@VEGA mission in 2011 on VERTA-1.