

MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (A2)  
Facilities and Operations of Microgravity Experiments (5)

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THE CARRIER KAP@FREGAT FOR TECHNOLOGY IN-ORBIT DEMONSTRATION AND  
LOW-GRAVITY RESEARCH USING THE FREGAT UPPER STAGE

**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.

Together with Lavoshkin Association a version to be accommodated onto SOYUZ/FREGAT called KAP@FREGAT has been designed and a successful (commercial and technical) feasibility analysis has been performed. The KAP Kit including the experiments mounted on an octagon raising cylinder underneath the primary passenger remains attached to the FREGAT upper stage. Using maximum battery lifetime the system can operate due to its autonomy up to one week in LEO. In addition the FREGAT Upper Stage provides specific performances like low-gravity environment/platform stabilization and/or pointing by the FREGAT ACS depending on the final experiment needs the mission profile will be designed finally to cope with the Customer's requirements. Typical potential customers of KAP are those looking for an in-orbit demonstration under real space environment (TRL 6 to 7), where a demonstrating on ground using representative test facilities is not sufficient to get a new technology qualified to be used in future space systems. On the other hand, scientific research using the low-gravity environment is another potential application for such kind of carrier. The combination of Kayser-Threde's KAP Kit and Lavoshkin's FREGAT capabilities leads to a flexible system for In-Orbit-Demonstration and scientific research as well as an efficient access to space. Integrating new developed separation devices, KAP@FREGAT 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@FREGAT mission in 2010 on SOYUZ/FREGAT.