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Facilities and Operations of Microgravity Experiments (5)

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THE TEXUS/MAXUS TRANSFORMATION - HOW TO KEEP SOUNDING ROCKETS VERSATILE
AND COST EFFECTIVE

Abstract

Sounding rockets are an excellent platform for microgravity experiments lasting up to 15 minutes. Within the TEXUS/MAXUS sounding rocket program the team at Airbus Defence and Space developed and built a large number of sounding rocket instruments and facilities for various scientific disciplines since more than 40 years. The objectives of the microgravity experiments have evolved over time from basic research towards a growing percentage of technology demonstration and validation. Also, the complexity of experiments has increased significantly compared to the first experiments as the digital technology used in standard laboratories nowadays has drastically changed the way scientists approach their research. To reflect these increasing challenges new methods for the hardware and software implementation are required to remain versatile and cost efficient at the same time.

In the field of sounding rocket experiments commercially available hardware and software provide in most cases the optimum solution. A standardized platform concept has been developed based on COTS equipment and will be fully implemented starting with an experiment designated to fly on-board one of the next sounding rocket flights in 2019.

This approach goes hand in hand with a radical new architecture ("Industry 4.0") for the ground systems. With this concept also other microgravity platforms than sounding rockets, e.g. parabolic flights, drop towers, and also hyper-g centrifuges can be served by using the same experiment hardware in different environments.

Several examples demonstrate that the transformation of the TEXUS/MAXUS sounding rocket platform is already successfully implemented and further developments are under way.