

MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (A2)
Microgravity Experiments from Sub-Orbital to Orbital Platforms (3)

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COMMERCIAL SUPPORT SERVICES FOR MICROGRAVITY EXPERIMENTS ON PARABOLIC
FLIGHTS

Abstract

The Berlin based company Blue Sky Solutions was founded as a spin-off from its partner company AI: Aerospace Institute in order to provide commercial launch services for small satellites as well as support services for microgravity experiments on aircraft parabolic flights.

Aircraft parabolic flights are a very useful tool for performing short duration microgravity investigations in the field of physics, life sciences, and space technology as well as space flight simulations including the training of astronauts before a space mission. The main advantages of parabolic flights for microgravity investigations are the short turn-around time between the experiment proposal and its performance, the reliability of the campaign dates, the flexibility of the experimental approach, the possibility of direct intervention by investigators on-board the aircraft during and between parabolas as well as the possibility of modifying the experiment set-up between flights.

Against the background of verifying different space technologies under microgravity conditions, the team members of Blue Sky Solutions have performed on a regular basis several parabolic flight campaigns on the European aircraft Airbus Zero-G in cooperation with the German Aerospace Center DLR. The flown experiments comprised microgravity testing of different experimental breadboard models for a net capture based active debris removal system as well as several test model configurations of separation mechanisms for small satellites. During these campaigns, which included very large experiment rack structures and heavy free floating objects, the team members of Blue Sky Solutions have experienced a total number of over 680 parabolas, equaling an accumulated flight time in microgravity of more than 4 hours.

Based on its own parabolic flight experience, Blue Sky Solutions provides to worldwide industry customers and members of the scientific community an attractive all-round carefree package to perform their microgravity experiment successfully on a parabolic flight campaign. The support services by Blue Sky Solutions completely cover not only the experiment design and all related safety aspects, but also the entire mandatory documentation. Experiments to be performed and all equipment to be installed on-board the Zero-G aircraft are carefully designed by qualified engineers from a structural, mechanical, electrical, safety and operational point of view and reviewed by experts several months before the campaign

in order to be compliant with all experiment design requirements. In addition, special precautions are taken to ensure that all operations during flights are conducted safely and that flying experimenters are adequately prepared for the repeated high and low gravity environments.