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

Author: Mr. Hanns Selig
ZARM University of Bremen, Germany, selig@zarm.uni-bremen.de

Mr. Andreas Gierse
ZARM University of Bremen, Germany, andreas.gierse@zarm.uni-bremen.de

PARABOLIC FLIGHT WITH LIGHT AIRCRAFT

Abstract

Parabolic flight is a well known technique for experiments under zero-g conditions. Space Agencies offer zero-g opportunities with their large aircraft (Boeing, Airbus). This is an important part of zero-g research especially when a person needs to observe and control the experiment, which is not possible in drop tower facilities or sounding rockets. Large aircraft offer a long zero-g duration (>20s) and a high payload capacity which enables many teams to fly on the same flight. A light aircraft shows shorter zero-g duration and less payload capacity. The big advantages of light aircraft are the bigger flexibility in terms of flight scheduling and consideration of individual customer needs, the possibility to perform hundreds of parabolas within a short period, the reduced centrifugal acceleration level, the possibility to switch between different partial-g modes (zero-g, Moon, Mars) following individual demands - and finally very competitive prices. The lead time for the customer is drastically reduced compared to large campaigns and the corresponding flexible scheduling can meet the customers' demands in a very comfortable way. If needed, the aircraft can even fly to an airfield near the customer for a rather low rate. Parabolic flight with light aircraft is expected to be a fruitful addition to the already existing zero-g platforms. The concept is to provide additional opportunities for zero-g experiments and to perform pre-tests for zero-g experiments in order to improve the overall efficiency and to open the door for research, development and education for a broader target group. In the end all providers of zero-g platforms can benefit from this concept. A team of pilots and engineers in Germany called MiGrOp (Micro Gravity Operations) develops new flight opportunities with light aircraft that show the mentioned advantages. The paper gives an overview on the project.