

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

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BIAS DETERMINATION FOR THE MICROSCOPE ACCELEROMETERS USING THE ZARM
CATAPULT SYSTEM - EXPERIMENTAL SETUP AND DATA ANALYSIS

Abstract

Accelerometers for space applications - like the electrostatic differential accelerometer for the MICROSCOPE mission for testing the equivalence principle in space - have to be tested and qualified in μg -conditions in order to demonstrate the system operation and to determine the characteristic sensor parameters. One important characteristic property is the sensor bias. In principle one can determine the sensor bias directly by using the 110 m catapult system at ZARM as test platform. Even in the evacuated drop tube the residual air pressure results in an air friction that depends on the capsule velocity. At the apex (highest point of the capsule trajectory) the acceleration (relative to the gravitational acceleration g) becomes zero due to the zero velocity at the apex. The direct measurement of the vertical linear acceleration sensor bias is affected by some additional effects that have to be understood in order to be able to determine the sensor bias. Two catapult campaigns have been carried out to demonstrate the principles of the bias determination using a SuperStar accelerometer (Onera). The presentation gives an overview on the experimental setup and on the corresponding data analysis.