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# TWO JOINT EUROPEN PARTIAL-G PARABOLIC FLIGHT CAMPAIGNS FOR SCIENCE AND EXPLORATION AT MOON AND MARS GRAVITY LEVELS

**Abstract**

Aircraft parabolic flights provide repetitively short periods of reduced gravity and are used to conduct scientific and technology microgravity investigations, to test instrumentation prior to space flights and to train astronauts before a space mission. Since 1997, CNES, DLR and ESA use the Airbus A300 ZERO-G, currently the largest airplane in the world for this type of experimental research flight. This mean is managed by the French company Novespace. Since 2010, Novespace offers the possibility of flying reduced gravity levels equivalent to those on the Moon and Mars. To answer an increasing request of scientists to conduct experiments at intermediate levels of gravity (between 0 and 1g) to better study the influence of gravity and to prepare for research and exploration during space flights and future planetary exploration missions, CNES, DLR and ESA organized two Joint European Partial-g Parabolic Flight campaigns in June 2011 and December 2012. During these two campaigns, parabolas were flown during three flights on each campaign providing micro-, Moon and Mars gravity levels with duration typically of 20s, 25s and 32s with a mixed complement of investigations in Physical and Life Sciences and in Technology. The paper will present the approach taken to organise these two campaigns and the various experiments conducted, with some preliminary results to show the interest of this unique research tool for microgravity and partial gravity investigations.