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# PARABOLIC FLIGHT CAMPAIGNS IN EUROPE WITH THE AIRBUS A300 ZERO-G: AN EVALUATION OF THE SCIENTIFIC OUTCOME

**Abstract**

Aircraft parabolic flights repetitively provide up to 23 seconds of reduced gravity during ballistic flight manoeuvres. Parabolic flights are used to conduct short microgravity investigations in Physical and Life Sciences and in Technology, to test instrumentation prior to space flights and to train astronauts before a space mission. The use of parabolic flights is complementary to other microgravity carriers (drop towers, sounding rockets), and preparatory to manned space missions on board the International Space Station and other manned spacecraft, such as Shenzhou and the Chinese Space Station CSS. The European Space Agency (ESA), the 'Centre National d'Etudes Spatiales' (CNES, French Space Agency) and the 'Deutsches Zentrum für Luft- und Raumfahrt e.V.' (DLR, the German Aerospace Centre) have used the Airbus A300 ZERO-G for research experiments in microgravity, and at Moon and Mars gravity levels, from 1997 until October 2014. The French company Novespace, a subsidiary of CNES, based in Bordeaux, France, is in charge of the organisation of Airbus A300 ZERO-G flights. A total of 104 parabolic flight campaigns have been organised by ESA, CNES and DLR since 1997, including 38 ESA, 34 CNES and 23 DLR microgravity campaigns, two Joint European ESA-CNES-DLR Partial-g Parabolic Flight Campaigns, and seven ESA Student campaigns. After 17 years of good and loyal services, this European workhorse for microgravity research in parabolic flights has been retired. The successor aircraft, the Airbus A310 ZERO-G, is being prepared for a first ESA-CNES-DLR cooperative campaign in Spring 2015. This paper looks back over 17 years of microgravity research in parabolic flights with the A300 ZERO-G, and attempts to give an overview of the scientific outcome of these more than 100 campaigns.