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PARABOLIC FLIGHTS WITH GLIDERS AS AN INNOVATIVE LOW COST PLATFORM FOR
MICROGRAVITY AND HYPERGRAVITY RESEARCH

Abstract

Aircraft parabolic flights are widely used throughout the world to create microgravity environment for scientific and technology research, experiment rehearsal for space missions, and astronaut training before space flights. The word aircraft is usually associated to motorized airplanes, either large aircrafts like the Airbus A310 ZERO-G of ESA/CNES/DLR, NASA's KC-135 and DC-9, Zero-G Corporation's Boeing 727-200 'G-Force One', and the Russian Ilyushin IL-76 MDK; or medium-sized airplanes like the Dutch NLR Cessna Citation II, the Canadian CSA Falcon 20, and the Japanese MU-300 and Gulfstream-II; or small aircrafts like the Spanish Mudry Cap 10B at the AeroClub Barcelona Sabadell, all used to perform parabolic flights for microgravity experimentation or public discovery 0g flights. However, there is another type of aircraft that can be used to recreate a microgravity environment during parabolic flights. These are gliders, with the enormous advantages of an extremely low cost, an immediate availability and a relative proximity. A recent glider parabolic flights campaign was conducted in 2016 in Israel with a Grob G-103 Twin II glider, in support of some pedagogical and simple physiological experiments of participants of the International Space University's (ISU) Space Studies Programme (SSP16) at Technion, Haifa - the first educational campaign in the Middle East. This paper will present the parabolic flight manoeuvres performed with a glider to achieve a microgravity environment and will review the different advantages and disadvantages of such a platform for research in reduced, high and quickly changing artificial gravities.