

IAF HUMAN SPACEFLIGHT SYMPOSIUM (B3)
Commercial Human Spaceflight Programmes (2)

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THE AIR ZERO G ODYSSEY: TEN YEARS OF COMMERCIAL PARABOLIC FLIGHTS AND WHAT
WE LEARNT FROM THEM**Abstract**

The year 2021 saw the start of private human suborbital spaceflights as well as the return of private orbital flights. However, these flights remain rare and they are extremely expensive: from \$450,000 for a seat on a suborbital flight up to \$50,000,000 for a ticket on an orbital flight. They are therefore largely inaccessible to the vast majority of people. To enjoy one of the main assets of spaceflight and discover the sensation of weightlessness, parabolic flights are thus a very interesting alternative, the price of which per seat is around \$6,000.

For nearly 10 years, Novespace, subsidiary of CNES, the French space agency, has been operating weightless flights open to the general public under its brand Air Zero G. From 6 to 10 flights are planned each year from its base of Mérignac (France) or from various European airports. These flights are performed aboard the Airbus A310 Zero G. This aircraft offers exceptional flight performance and a large 180m³ free-floating open space cabin. Pilots are specifically trained to perform the parabolic maneuver.

During a flight of 16 parabolas, passengers successively experience true Martian gravity (0.38g), Lunar gravity (0.16g) and weightlessness (0g), as well as the sensation of hypergravity (1.8g) similar to the one of a rocket liftoff. It should be noted that only parabolic flight aircraft make it possible to experience partial gravity, as it was felt, for instance, on the Moon by the astronauts of the Apollo missions. To date, more than 1,500 people have flown in zero gravity with Air Zero G.

This oral presentation introduces the specificities of a parabolic flight for private individuals and offers an informed comparison in terms of microgravity between the different human weightless platforms available today (Airbus A310 Zero G, New Shepard, SpaceShip2, SpaceX Crew Dragon, etc.). It details the flight experience provided by Air Zero G and the various activities offered to passengers. It also presents the special flights that the company has carried out over the past 10 years (shooting of films and advertisements, special events in 0G, charity flight...) to illustrate the vast range of recreational or mediatic activities that can be performed onboard parabolic aircraft. Last, it will share the views of Novespace after 10 years in the weightlessness business for private individuals, with possible lessons learned for the community.