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# Eighth parabolic flight for the DLR - Airbus A300 ZERO-G on its second visit to Germany

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Zero-G ready for "Zero Gravity"

**World's largest flying laboratory for zero-gravity research at the Berlin Air Show**

In May 2006 the German Aerospace Center (DLR) is carrying out its eighth parabolic flight with the Airbus A300 ZERO-G. The world's largest flying laboratory will take off from Cologne-Bonn Airport before performing a total of five research flights in zero gravity. The aircraft will fly up to 31 parabolas during each flight, producing around 22 seconds of weightlessness. Scientists will use these vital seconds to carry out research in biology, human physiology, physics and materials research. In addition to their own research, they are also preparing experiments for the International Space Station (ISS). On 19 May 2006, the A300 ZERO-G will also be on show to the public at the International Aerospace Exhibition (ILA) in Berlin-Schönefeld.

**Parabolic flight at DLR**

DLR Parabolic flight: Experiments in "Zero-G"

Parabolic flight was originally devised to train astronauts in zero gravity. Today, the technique is mainly used to carry out experiments in weightless conditions and to test space technologies. This year, DLR's parabolic flight campaign will also provide students from Berlin with the chance to take part in an experiment that combines the fascination of scientific research with the personal experience of weightlessness.

This year, the parabolic flights are scheduled to take place between 15 and 29 May, including five flying days. On a normal flying day, the aircraft will fly 31 parabolas over three to four flying hours. To fly a parabola, the aircraft will climb steeply from horizontal flight at an angle of 47 degrees before the pilot cuts the thrust of the turbines, causing the aircraft to follow a path that resembles the trajectory of an object thrown into the air. The aircraft, together with its passengers, will then be in free fall, creating conditions close to total weightlessness for approximately 22 seconds. The researchers will have more than 40 minutes of weightlessness in total, alternated with periods of normal and double gravity.

**Research in zero gravity**

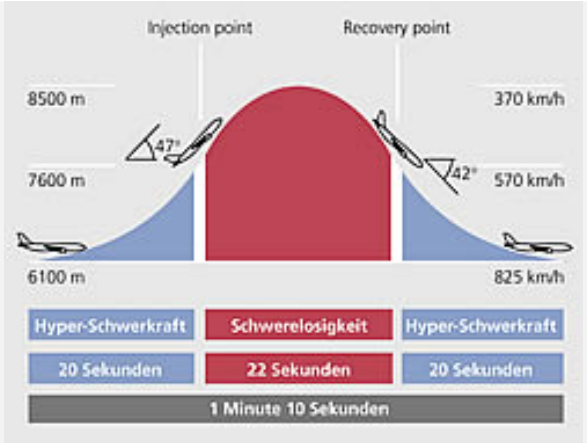

Airbus A300 Zero-G

What makes parabolic flight unique is the fact that during the flight, scientists and technicians can perform the experiments they themselves have devised. They can observe and evaluate the progress of the experiment and change the experimental parameters if need be. In medical trials, several test individuals can be tested one after the other. If necessary, experiments can even be continued during subsequent flights a few months later. Parabolic flight also offers an opportunity to carry out preliminary tests for more complex experiments to be performed on space missions.

Performing experimental work on board the Airbus A300 ZERO-G is similar to doing research in the laboratory, and the researchers can even use similar equipment to that which they would use in the lab. The experiments are constructed in boxes or racks that are securely bolted down to the floor of the cabin. Test individuals for medical trials are securely strapped into their seats or on the cabin floor.

To avoid any accidents during the flight, all experimental equipment is safety-tested before the first day of flying. To pass the safety test, the equipment must fulfill certain safety criteria: for example, it must have an emergency stop and survive a hard landing without breaking. Test individuals also need to be able to free themselves quickly in the event of an emergency.

**Research in zero gravity**




Parabolic flight manoeuvres

All life and all biological, physical and chemical processes on Earth exist under the perpetual influence of Earth's gravity. This gives rise to many questions, such as: What effect does gravity have on physical and biological processes? Can we use this knowledge to improve technological processes or products? What contribution can fundamental experiments on healthy people in zero gravity make to our understanding of the mechanisms of diseases and the treatment of patients on Earth?

In its Microgravity Research programme, DLR's Space Agency is helping scientists to study questions relating to the effects of gravity. These scientists are involved in a wide range of fields including biology, human physiology, physics, materials research and the development of new technologies. To carry out their research they use various manned and unmanned research techniques that offer varying periods of weightlessness: the drop tower in Bremen, parabolic flight, research rockets, satellites and the International Space Station (ISS).

**Airbus A300 ZERO-G**

The A300 ZERO-G at Cologne-Bonn Airport

For its parabolic flights the DLR uses the Airbus A300 ZERO-G. The European Space Agency (ESA) and the French space agency CNES also use the aircraft, courtesy of French company Novespace.

The Airbus A300 ZERO-G aircraft is used exclusively for test flights and experimental flights. The technically challenging parabola manoeuvre is performed by experienced French test pilots, while a team that has been specially trained in zero-gravity environments assists the scientists and takes care of safety on board.

Worldwide, three aircraft are used for parabolic flights: a DC-9 in the USA, an Iljushin 76 MDK in Russia and the Airbus A300 ZERO-G in Europe.

Airbus A300 ZERO-G:

- Experimental aircraft capable of performing parabolic flights
- Maiden flight: 28 June 1973
- First commercial parabolic flight: 1997
- Managed and owned by: Novespace
- Serviced by: EADS-Sogerma
- Sponsors: CNES and ESA
- Flight operations/safety: French test flight centre CEV

Technical data:

- Length: 53.62 metres
- Wingspan: 44.84 metres
- Height: 16.90 metres
- Turbines: General Electric CF6-50
- Number of seats: 40 for scientists, 10 for flight team
- Experimental area: 20 metres x 5 metres

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