# Flying auditorium and robotic microsurgery

*16 August 2012*

**DLR is the largest institutional exhibitor at ILA 2012 in Berlin**

The future of aerospace will be showcased by the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR) at the International Aerospace Exhibition (Internationale Luft- und Raumfahrtausstellung; ILA) in Berlin, from 11 to 16 September 2012. DLR is the largest institutional exhibitor at this year's ILA, with a 600 square metre booth in the 'Space & Aeronautic World' (Hall 4). In addition, as an institutional partner along with the European Space Agency (ESA), DLR is contributing around 30 exhibits to the Space Pavilion, in Hall 4. In the open air grounds, DLR's work will be presented in the form of spectacular aircraft from its research fleet; these include the Antares DLR-H2 power glider, the Falcon 20E, the Cessna C208B Grand Caravan 'flying auditorium', the EC-135 FHS, Flying Helicopter Simulator, and the A300 ZERO-G for parabolic flights. DLR will be also providing information on career opportunities in the aerospace sector at the ILA CareerCenter (14 and 15 September, Hall 7).

**Aeronautics and atmospheric research**

Many of the aircraft in DLR's research fleet bear a logo promoting their role of ILA ambassadors in the course of their missions. Specialists in the field and general visitors will be able to admire these aircraft in the open air grounds during their 'stopover' at ILA.

The **Antares DLR-H2** can only fly using fuel cells; the motor glider is also the first aircraft able to take off using fuel cells.

The **Falcon 20E** provides basic data necessary for the work carried out by atmospheric researchers. The research aircraft can fly into storms and measure the chemical composition of the air there. It was also the first aircraft to measure the ash content in the atmosphere when the Eyjafjallajökull volcano erupted on Iceland in April 2010.

Also on show at ILA is the **Cessna 208B Grand Caravan**; it has been converted into a flying auditorium, and gives students the opportunity to experience different types of flight tests on board the aircraft and to track measurement data in detail.

Helicopter pilots can put new technologies to the test in the EC-135 FHS Flying Helicopter Simulator. The computers integrated into the FHS enable the helicopter to respond in actual flight as it would when flying with a new control system.

For its parabolic flights, DLR uses the **A300 ZERO-G** from the French company Novespace. The aircraft flies up to 31 parabolas during each flight; each parabola produces around 22 seconds of weightlessness. Scientists can use these vital seconds to carry out research in biology, human physiology, physics and materials research.

**Findings from space for use on Earth**

In the Space Pavilion DLR, ESA and the German Aerospace Industries Association (Bundesverband der Deutschen Luft- und Raumfahrtindustrie e.V.; BDLI) will be demonstrating how findings from research in space and spaceflight can be put to use on Earth. The slogan: 'Space for Earth'. Here, visitors will be able to learn how satellites influence our daily lives in terms of communication and navigation, as well as the importance of Earth observation to protect and care for our environment. They will also be able to take a look at the Martian landscape. Spaceflight robotics and its applications can also be used on Earth, in the areas of mobility and healthcare. Furthermore, DLR will be presenting its research into the detection and

monitoring of space debris, its expertise in testing future technologies for propulsion systems, and more.

**The future of aerospace**

DLR researchers are continuously working on safe, environment-friendly aviation. The presentations in the 600 square metre booth, located at the Space & Aeronautic World, will include ways to build lighter and hence more environmentally friendly engines and the materials that will be used in aerospace in the future. Furthermore, DLR researchers will be demonstrating how they can use knowledge they have gained from aviation to make wind turbines more efficient and lighter. Where will the aircraft of the future get the energy they need to fly? DLR scientists are not only working on new propulsion concepts for aircraft, but also on new, alternative fuels. What is the future for flight guidance? New descent methods should relieve those living near airports of noise emissions by scattering the noise. With the Advanced Low Noise Aircraft (ALNA), DLR will present a flight concept for the future; current knowledge from aviation research has been incorporated to this concept.

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## The Falcon in flight


The DLR research aircraft started operations in 1976 and has been used in numerous scientific research missions.

**The 'flying auditorium' - Cessna 208B**


The Cessna C208B Grand Caravan (registration D-FDLR) was converted into a 'flying auditorium' at the Oberpfaffenhofen flight facility.

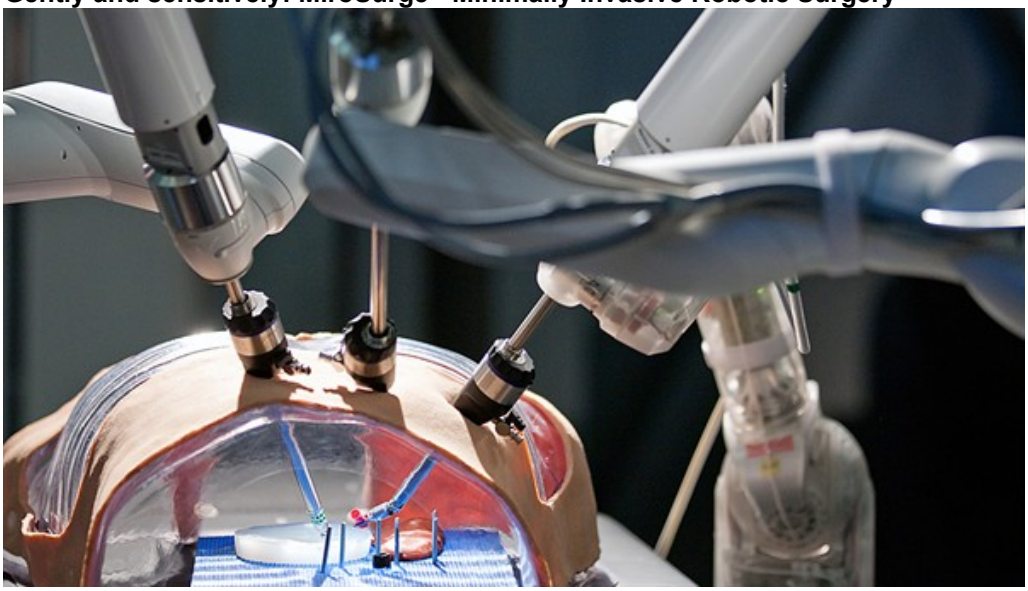
Credit: DLR (CC-BY 3.0).

**22 seconds of weightlessness on board the A300 ZERO-G**


DLR's parabolic flights normally consist of three flight days – of about three to four flight hours each – during which 31 parabolas are flown. In a parabolic flight, the aircraft first climbs steeply from horizontal flight before the pilot cuts the thrust of the turbines, causing the aircraft to follow a parabolic flight path. This creates conditions close to complete weightlessness (microgravity) for approximately 22 seconds. A flight campaign therefore offers a total of about 35 minutes of microgravity, alternated with the Earth's standard gravitational acceleration on the one hand, and twice that standard gravitational acceleration on the other.

Credit: Novespace.

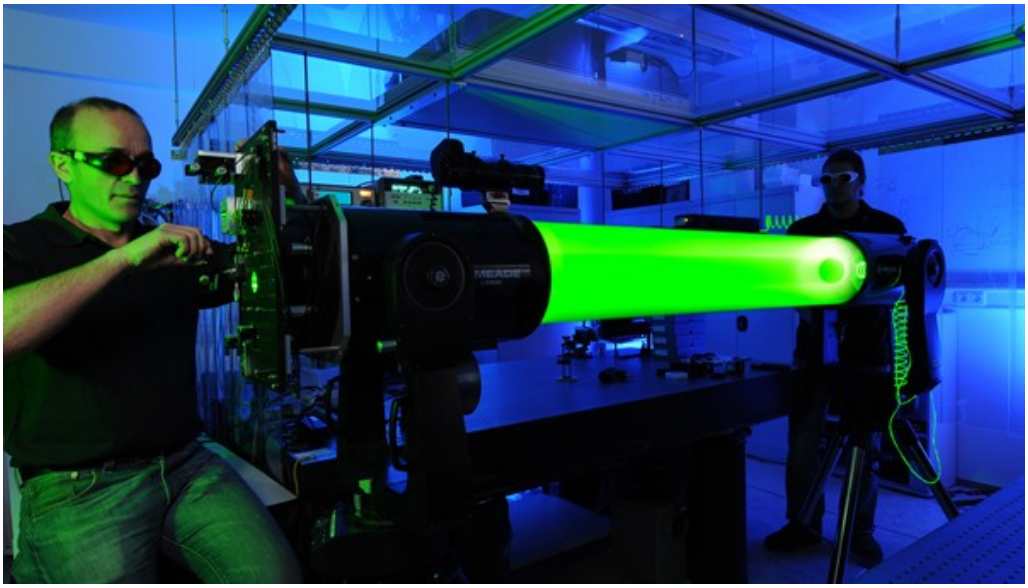
**Gently and sensitively: MiroSurge - Minimally Invasive Robotic Surgery**



In this project, robotics have been successfully applied to minimally invasive surgery, also known as 'keyhole surgery'.

Credit: DLR (CC-BY 3.0).

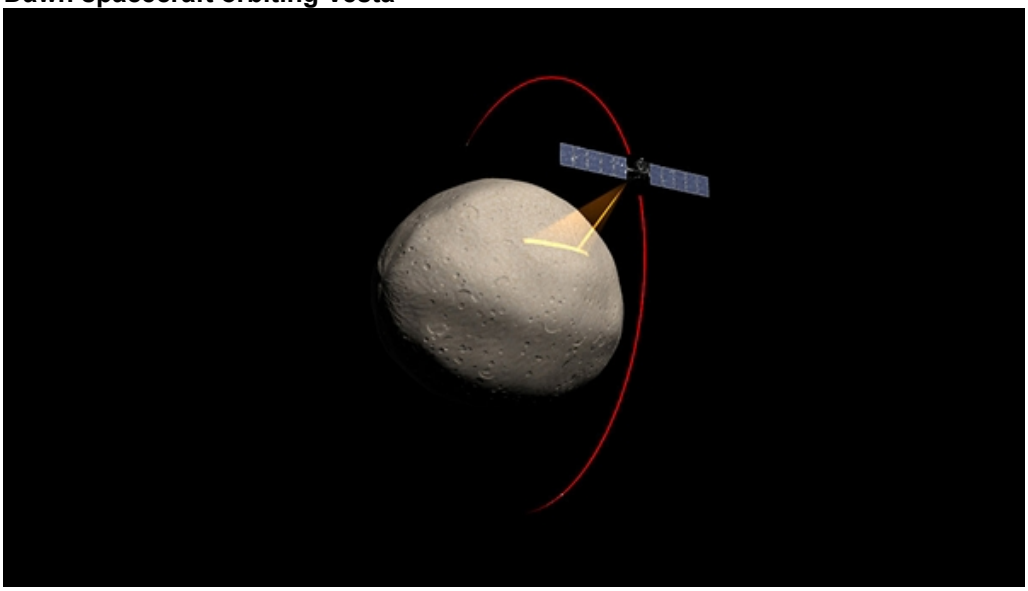
**Laser research**



The Institute of Technical Physics at the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR) develops and builds lasers. In the future, lasers will be capable of detecting items of space debris and accelerating the decay of their orbits.

Credit: DLR (CC-BY 3.0).

**Dawn spacecraft orbiting Vesta**



NASA's Dawn spacecraft, powered by ion propulsion, is carrying three different instruments to the main asteroid belt between Mars and Jupiter. Alongside a spectrometer from the Italian space agency (Agencia Spaziale Italia; ASI) and a gamma ray and neutron detector from the Los Alamos National Laboratory, is a German camera system, referred to as a 'framing camera', on board.

Credit: NASA/JPL.

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