



2013 can arrive

20 December 2012

The German Aerospace Centre (Deutsches Zentrum für Luft- und Raumfahrt; DLR) can look back on a highly eventful and exciting year. Once again in 2012, a great deal was achieved in our research fields of aeronautics, spaceflight, energy, transport and security. This retrospective article is a compilation of this year's highlights in images, web links and a film, which will be available in English in the new year.

<http://www.youtube.com/embed/ywxulLqdo4s?rel=0>

The diversity of topics covered this year was once again vast; the DLR research aircraft fleet welcomed the atmospheric research aircraft HALO into its ranks as a new member. At the same time, the research aircraft ATTAS went into retirement. To name but a few examples, the launch and flight of the ATV-3 Edoardo Amaldi European space transporter to the ISS was successful, while the sharp-edged hypersonic vehicle, SHEFEX II, communicated its experimental data in real-time, Europe's Galileo navigation system gained two more satellites, Germany's small TET-1 satellite was launched with 11 experiments on board, DLR scientists compiled a pilot study to expand the scope of renewable energy sources in Germany, the DESERTEC 'electricity from the desert' project reached new milestones, DLR Göttingen obtained a decommissioned regional train as its new research laboratory, while DLR researchers worked to improve the aerodynamic properties of trucks.

We look forward to many more research results in 2013, and we would like to wish you all the very best for the Festive Season and the New Year.

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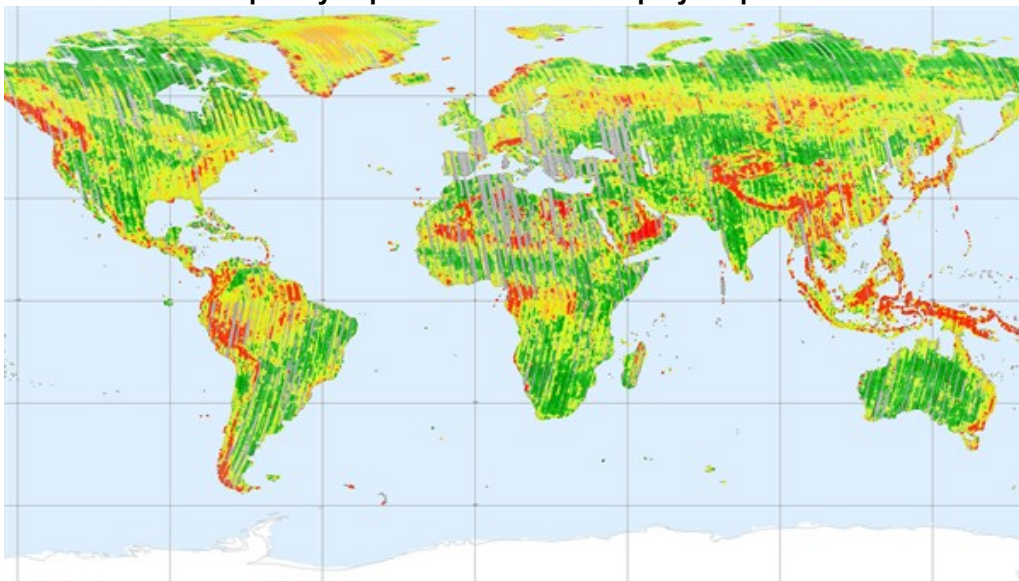
The third dimension - Tokyo



Over time, the megacity of Tokyo has grown out of an entire cluster of cities; surrounding urban areas such as Yokohama and Kawasaki have sprawled out towards the Japanese capital, forming a gigantic metropolitan region inhabited by over 34 million people. Almost a quarter of Japan's population resides on Tokyo Bay. Among other things, this image from the TerraSAR-X radar satellite shows some imposing high-rise buildings on an island in the river and, to the lower left, St. Luke's Tower, a 220-metre-high, 51-storey building, connected to the adjacent, lower residential high rise by a bridge that crosses over 100 metres in the air.

Credit: DLR (CC-BY 3.0).

TanDEM-X has completely captured the Earth - strip by strip



A year after the initial operational phase, TanDEM-X has mapped all land surfaces on earth except Antarctica completely. Elevation models have been generated with the data. According to the color scale, green tinted areas already comply with a the requirement of a two-metre accuracy. Yellow-coloured areas must be recorded a second time, reddish surfaces also require recording from a different angle. Gray-shaded strips have been recorded, but have yet to be processed.

Credit: DLR.

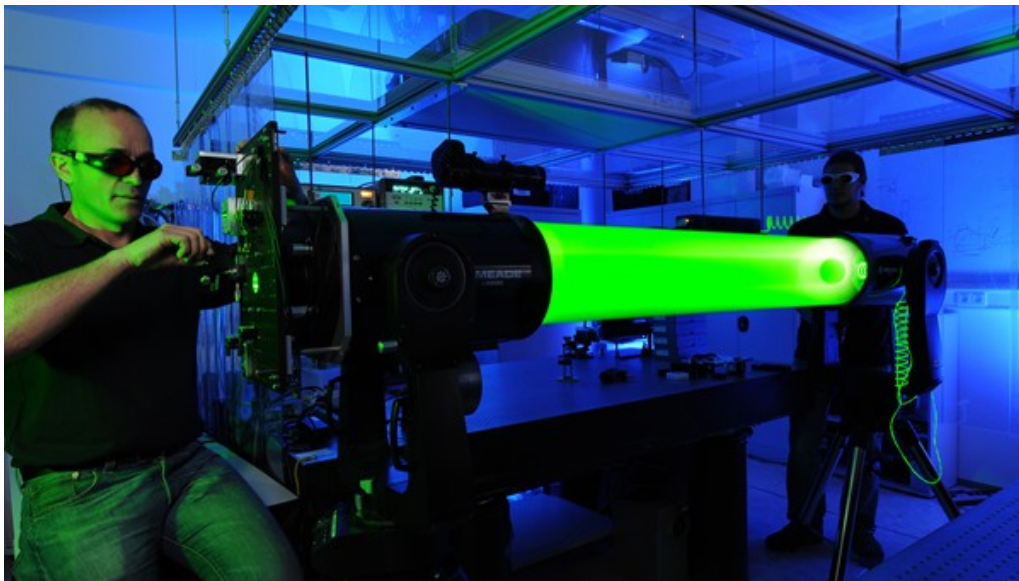
Learning from humpback whales means learning to fly better



While looking for a way to prevent dynamic stalling in helicopters, DLR researchers in Göttingen struck gold with humpback whales. These marine mammals are renowned for their great speed and acrobatic skills. This is due to their unusually large pectoral fins, which have characteristic bumps along the front edge. DLR researchers translated the idea of using bumps for delaying the onset of stalling to helicopter rotors, and tested it out using the Bo 105 research helicopter.

Credit: istockphoto.com/Josh Friedmann.

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).

ATV-3 now en route to the ISS



The third European Automated Transfer Vehicle (ATV) space transporter was launched on 23 March 2012 at 05:34 CET (01:34 local time) on board an Ariane 5ES rocket, from Europe's Spaceport in French Guiana.

Credit: ESA.

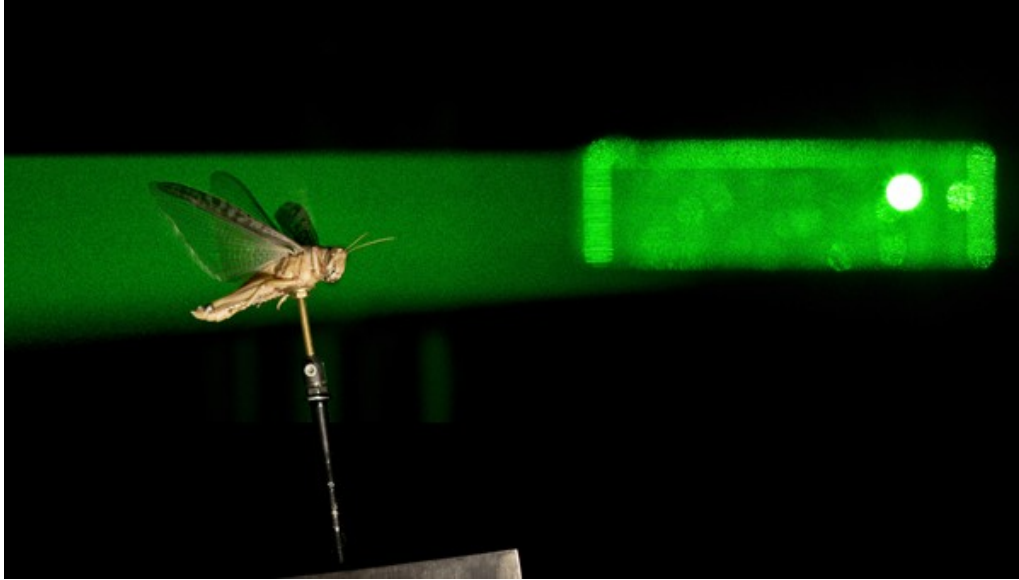
Expedition to the Antarctic



In the Antarctic, Jean-Pierre de Vera, a scientist at the DLR Institute of Planetary Research in Berlin, collected polar lichens that were exposed in the Mars simulation chamber to conditions replicating those found on the Red Planet.

Credit: DLR (CC-BY 3.0).

Laser light makes air flow visible



These investigations are being conducted in the one-metre wind tunnel at DLR Göttingen. "DLR and LaVision have a leading position in optical metrology, and we are bringing some extraordinary investigation subjects with us," explains Richard Bomphrey from the Zoology Department at the University of Oxford as he describes this Anglo-German collaboration. Oxford is one of the leading research centres for the study of insects. The insects are fixed to small rods with a drop of glue, which can be removed upon completion of the tests without harming them.

Credit: DLR (CC-BY 3.0).

RCAS technology is designed to prevent train collisions



In the Railway Collision Avoidance System (RCAS) research project, DLR researchers have developed a complete system for preventing train collisions, which does not rely on any fixed infrastructure. The Bayerische Oberlandbahn (BOB) is a collaborative partner, having made one of its 'Integral' type regional trains, shown in this image, available as a test vehicle for RCAS. The technology is now ready for the market.

Credit: DLR (CC-BY 3.0).

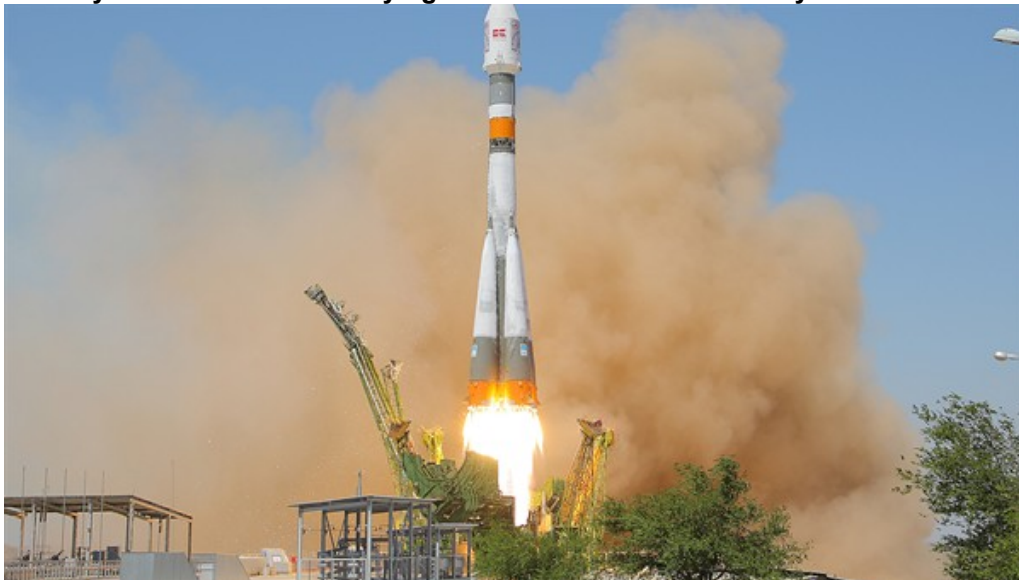
SHEFEX II – into space with sharp edges



DLR's SHEFEX II spacecraft was equipped with more than 300 sensors. SHEFEX II was launched on 22 June 2012 from the Norwegian Andøya Rocket Range.

Credit: DLR (CC-BY 3.0).

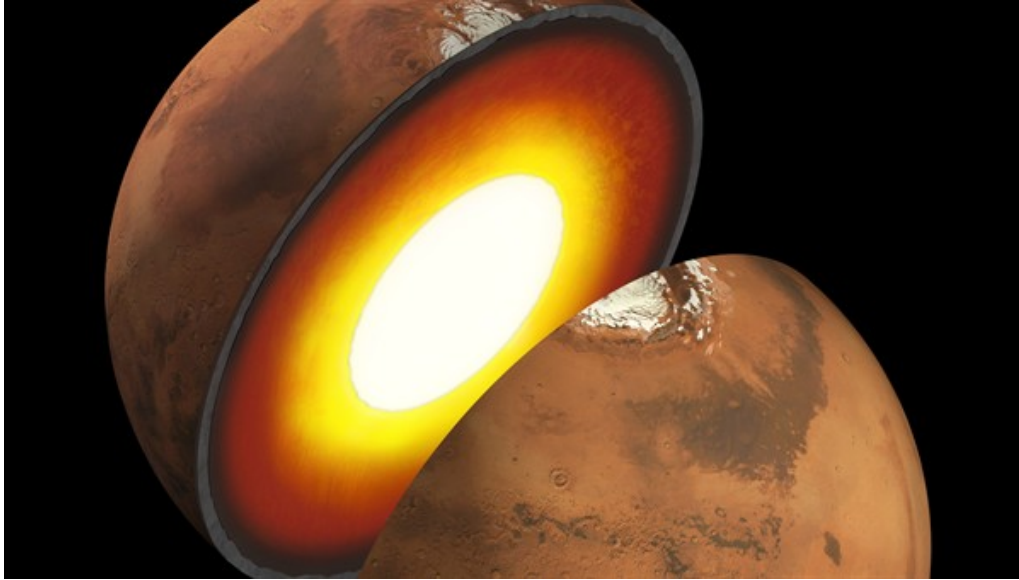
The Soyuz launch vehicle carrying TET-1 after launch on 22 July 2012



On 22 July 2012 at 08:41:39 CEST, the first small German satellite in the 'On-Orbit-Verification' (OOV) programme was carried into orbit from the Cosmodrome in Baikonur, Kazakhstan by a Russian Soyuz launch vehicle. TET-1 is a technology testbed with 11 experiments on board that will be operated in space for a year.

Credit: DLR.

Artist's impression of the interior of Mars



With a diameter of about 6800 kilometres, Mars is only half as large as Earth. Its internal structure is not well known. With the geophysical InSight lander planned for 2016/17, NASA expects to gain new insights into the structure and thermal evolution of the planet. Mars has, much like all rocky planets, a shell structure. The relatively small, hot iron core is surrounded by a presumably largely solidified shell of iron-rich, siliceous rocks. There is evidence that Mars, in its early history had magnetic field (probably a weak one).

Credit: JPL/NASA.

Electricity from solar power plants is becoming less expensive



The Sun behind the heliostat of a tower power plant. When operating the power plant, the mirrors on many heliostats direct sunlight to the tip of a tower where temperatures of up to 1000 degrees Celsius are generated. Electricity is produced via a turbine and a generator. Tower power plants operate at higher temperatures, which helps to make electricity generation more efficient.

Credit: DLR/Markus Steur.

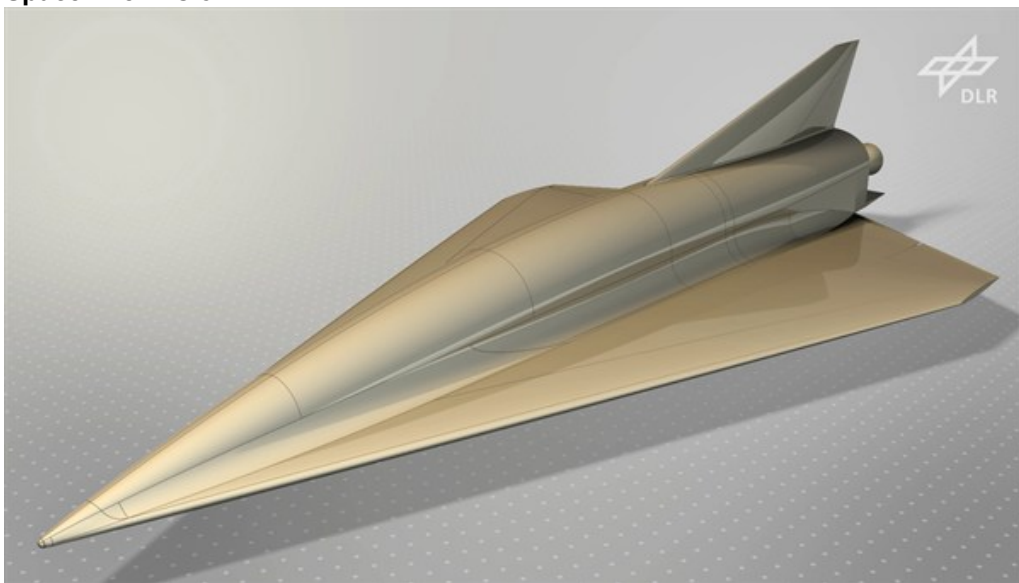
Quieter wind turbines and the optimisation of rotor blades



The Lower Saxony Ministry of Science and Culture is promoting the development of a research wind farm in Lower Saxony at the German Aerospace Center (DLR) with 10 million euros. DLR scientists want to develop quieter wind turbines and optimise rotor blade designs. In addition, precise wind forecasts using satellite data and lidar measurements will allow better system control.

Credit: DLR (CC-BY 3.0).

SpaceLiner vision



The DLR SpaceLiner is intended to stand upright like a space shuttle before launch and take off on its journey using rocket engines. After the initial burn, the reusable booster stage will separate from the orbiter, in which there will be a capsule with a capacity of 50 passengers. The glide phase will start eight minutes later, at 20 times the speed of sound. The landing, around 80 minutes later, will take place on a normal runway like a conventional aircraft.

Credit: DLR (CC-BY 3.0).

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