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DLR Webcast: DLR researchers support the development of the solar-powered aircraft Solar Impulse

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DLR researchers conduct ground vibration tests

In 2012, Solar Impulse is to set out on a flight around the globe and will be in the air day and night during that time. Initial test flights of this unique solar-powered aircraft Solar Impulse are in progress in the Payerne region of Switzerland. The German Aerospace Center (DLR) is supporting this ambitious project and various DLR Institutes are involved in providing this support. In early 2010, DLR's Institute of Aeroelasticity (Institut für Aeroelastik) ground vibration tests on prototypes in Zurich.

This is a task that requires the technology, design and construction of the aircraft to be of the highest standard. The aircraft needs a large wing surface area in order to generate sufficient lift. These wing surfaces also provide space for the solar cells, which power the four electric motors.

For Solar Impulse to continue its round-the-world flight after sunset, its batteries need to store sufficient solar power during the day to keep the propulsion units supplied with energy until sunrise. The exceptionally lightweight construction of this aircraft is key to its ability to save energy. Solar Impulse has the wingspan of an Airbus A340, but it is only as heavy as a mid-range passenger car.

The lightweight structure of Solar Impulse needs to be robust as well as flexible in order to withstand in-flight loads and to ensure that the aircraft remains manoeuvrable. To a certain extent, these material characteristics can be simulated on the computer. The actual characteristics of the aircraft design and the chosen materials are, however, most accurately reproduced during the ground vibration test. The insights gained during these tests lay the groundwork for the test flights.

In this DLR webcast, Solar Impulse pilot André Borschberg and Marc Böswald from the DLR Institute for Aeroelastics in Göttingen present the project and the ground vibration test (GVT) procedure.

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