Airborne observatory and electronic noses – DLR presents new space developments at ILA

05 September 2012

From the magnificent Vinci upper stage engine to the small but important MOSFET circuit board for the flight to asteroid 1993 JU3 – the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR) will be showcasing new developments in space technology at its stand during the ILA Berlin Air Show 2012 from 11 to 16 September.

The largest exhibit is Vinci, Europe's most powerful and advanced launcher upper stage engine. DLR's Lampoldshausen facility has tested Vinci in more than 60 experiments under space conditions. For this, the engine is operated on a test stand in a vacuum. The special feature during both testing and in operational service is that Vinci can be ignited multiple times and will be capable of delivering payloads either directly into geostationary transfer orbits or into multiple other orbits. Vinci is being built by the French company Snecma in collaboration with its European partners. The engine will enter service on the Ariane launcher in 2017.

In January 2013, the E-Nose will be deployed for the first time. The electronic gas sensor will measure the microbial load on the International Space Station. Upon successful completion of a test phase in the Russian segment, it will be possible to use the sensor throughout the Space Station or on future long-duration missions.

Planets and galaxies

Also on display at the DLR stand will be a replica of the MERTIS (MErcury Radiometer and Thermal Infrared Spectrometer) instrument, which will be launched on board the European planetary orbiter component of the BepiColombo mission to Mercury in 2015. When the spacecraft enters orbit around the planet six years later, scientists hope to gain new insights into its composition and properties. DLR and the Westfälische Wilhelms-Universität Münster developed the instrument together with German industrial partners and researchers from Poland.

The airborne observatory SOFIA (Stratospheric Observatory For Infrared Astronomy) has been in use since May 2010. A hatch in the fuselage opens during flight, giving the telescope a clear view into space.

Flight into space

In 2016, the launch vehicle VLM-1 (Veículo Lançador de Microsatélites) will carry the SHEFEX III spacecraft into space before re-entering Earth's atmosphere. DLR's MoRaBa Mobile Rocket Base is participating in the development of this small launcher by the Brazilian Space Agency (Agência Espacial Brasileira; AEB).

The SpaceLiner that DLR is currently investigating will be even faster and accommodate passengers. This ultra-fast glider will travel from Europe to Australia in only 90 minutes. An environment-friendly rocket engine will accelerate the passenger carrier, which then glides at an altitude of about 80 kilometres.

Resistant to space radiation

The smallest item on display is a circuit board fitted with power MOSFETs (Metal Oxide Semiconductor Field Effect Transistors). In 2014, the board will be launched on board the Japanese Hayabusa II mission to the asteroid 1993 JU3. The power transistors are qualified for use in space – with its harsh radiation environment. Previously, components of this type had to

be procured from the United States; these MOSFETs, which will be available in the near future, offer a European alternative.

For information about and photographs of all DLR exhibits at the ILA Berlin Air Show go to the special page on the DLR web portal. DLR and ESA are also holding their second joint SpaceTweetup at ILA 2012.

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SOFIA, the Stratospheric Observatory For Infrared Astronomy

The Stratospheric Observatory For Infrared Astronomy (SOFIA) on its maiden test flight with a completely opened telescope hatch on 18 December 2009 over the Californian Mojave Desert. The 2.7 metre telescope, built in Germany, is visible through the opening in the fuselage of this Boeing 747SP. The test flight with an open hatch enabled engineers to examine the movement of air in and around telescope and door under experimental conditions for the first time.

Credit: NASA/C. Thomas.

E-Nose: roll-out of an innovative German gas sensor on the ISS

E-Nose is an electronic gas sensing system for detecting microbial contamination online. DLR's quality and product assurance played a major part in its realization. From January 2013, this electronic nose will be working in the Russian segment of the International Space Station.

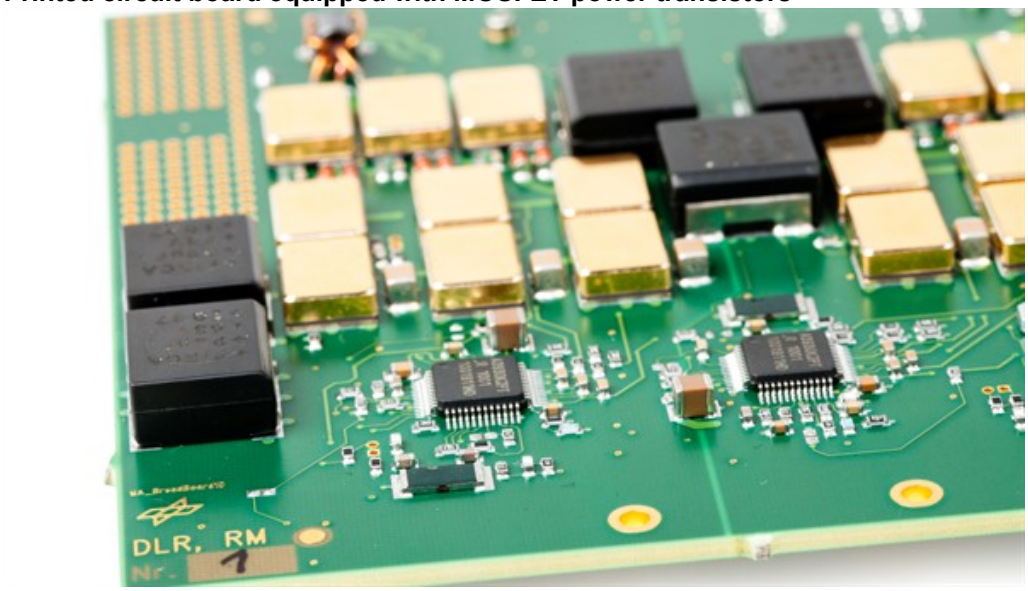
Credit: DLR (CC-BY 3.0).

VINCI - Europe's new upper-stage engine

VINCI should become available by 2017. As it is re-ignitable, the engine is capable of inserting satellites directly into a geostationary orbit or releasing them in a variety of other orbits. Furthermore, its active de-orbit capability helps to avoid space debris.

Credit: DLR (CC-BY 3.0).

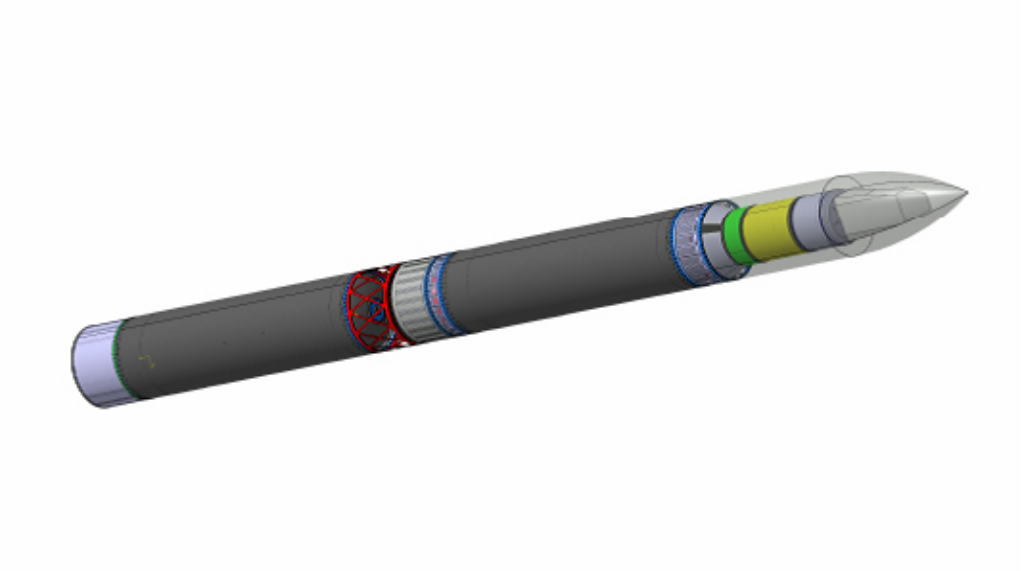
Printed circuit board equipped with MOSFET power transistors



The printed circuit board equipped with MOSFET power transistors (metal-oxide semiconductor field effect transistors) shown at the ILA is a component of the mobile asteroid surface scout. This is part of a small lander package on board of the Japanese craft Hayabusa II, which is scheduled to take off for the asteroid 1993 JU3 at end of 2014.

Credit: DLR/Infineon.

VLM-1 launcher (veículo lançador de microssatélites)



The VLM-1 is a small satellite launcherwhich is to be qualified for its first space mission by the Brazilian space agency, AEB. In 2016, VLM will to carry the SHEFEX-3 (SHarp Edge Flight EXperiment) spacecraft to the region between the upper layers of the terrestrial atmosphere and space. SHEFEX-3 will then separate from the VLM and return autonomously to the Earth at a velocity of seven kilometres per second.

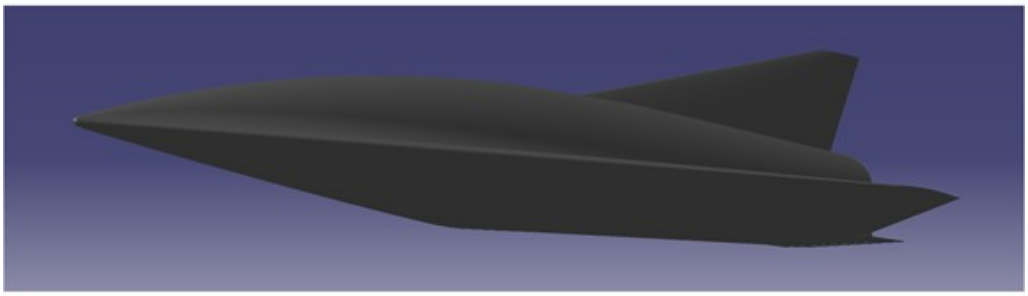
Credit: DLR/AEB.

Mercury radiometer and thermal infrared spectrometer (MERTIS)

In 2015, ESA's BepiColombo mission will begin its journey to Mercury. After six years in space, the spacecraft will enter orbit around Mercury and spend at least one year exploring the planet. The data acquired by its instruments will be transmitted to Earth, providing scientists with new information about the composition and properties of Mercury. Among the instruments is MERTIS (Mercury radiometer and thermal infrared spectrometer), a unique optical instrument incorporating the latest infrared technologies.

Credit: DLR (CC-BY 3.0).

The SpaceLiner – a revolutionary concept on the boundary between air travel and spaceflight



The SpaceLiner is a revolutionary concept on the boundary between air travel and spaceflight. With this ultrafast glider, passengers are expected to be able to cover the distance between Europe and Australia in just 90 minutes. The concept is based on an environment-friendly rocket engine that uses hydrogen and oxygen.

Credit: DLR (CC-BY 3.0).

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