Space Systems

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ExoMars 2016 – The heat is on!

- Airbus Defence and Space heat shields will keep mission capsule safe as it descends through the Martian atmosphere
- Airbus Defence and Space will also build the Mars rover for ExoMars 2018 mission

Airbus Defence and Space, the world number two in space technologies, has designed and built the two heat shields which will enable the Schiaparelli capsule of the ExoMars 2016 mission to withstand its descent through the Martian atmosphere and land on the Red Planet later this year.

The lander module was launched on 14 March from the Baikonur cosmodrome in Kazakhstan along with a Trace Gas Orbiter that will look for trace gases while in orbit around Mars.

“After building the heat shield for the Huygens probe which landed in 2005 on Titan, one of Saturn’s moons, the Airbus Defence and Space teams are getting ready to write a new chapter in planetary exploration by enabling Europe to demonstrate the latest critical atmospheric re-entry technologies,” François Auque, Head of Space Systems said. “The expertise we have built up in this field, as well as in space exploration in general, enables us to prepare the next generation of heat shields which could be used to explore other planets and return samples to Earth.”

The Schiaparelli front heat shield, 2.4 m in diameter and weighing 80 kg, consists of a carbon sandwich structure built by Airbus Defence and Space’s Spanish teams that is then covered with 90 tiles of an insulating material called Norcoat Liège, at the company’s Bordeaux (France) site. During the atmospheric entry phase, this material is able to withstand temperatures of up to 1,850°C during the descent before it is jettisoned. The rear heat shield, also built by Airbus Defence and Space near Bordeaux, contains the parachutes used for the descent phase. It weighs only 20 kg and comprises 93 tiles of 12 different shapes, bonded to a carbon structure. The probe’s equipment is integrated into the front heat shield and then mated with the back-cover, before final assembly, which took place on the Baikonur launch site.

The ExoMars programme, led by Thales Alenia Space Italia, is a joint initiative by ESA and the Russian space agency, Roscosmos and foresees two missions. The 2016 mission comprises the Trace Gas Orbiter (TGO) and the Schiaparelli demonstrator, or the EDM (Entry, Descent and Landing Demonstrator Module), which will land on the Red Planet to test the entry, descent and landing technologies that will be used in future Mars missions. The two elements will separate as they approach Mars after a seven-month journey.

Schiaparelli is not just a technology demonstrator designed to prove Europe's ability to successfully make a controlled landing on the surface of Mars. During the few days of its mission on Martian soil, scientific instruments will collect large amounts of data to significantly enhance our knowledge of the Red Planet. In this type of mission, the atmospheric entry phase is crucial, and the front and rear heat shields will be key elements of the demonstration.

The TGO will be placed in Martian orbit by its propulsion system built in Germany by Airbus Defence and Space. Its mission lasting several years will be to study atmospheric gases, in particular noble gases such as methane, for which it will study geographical and seasonal variations so that its origin can be determined. The TGO will also act as the data relay for the ExoMars 2018 mission, which will include a rover built in the United Kingdom by Airbus Defence and Space and a surface science platform. It will also have a data relay role for NASA's rovers. The ExoMars 2018 rover will need to be capable of landing on Mars, moving around, navigating independently and collecting samples for analysis on-site.

About Airbus Defence and Space

Airbus Defence and Space, a division of Airbus Group, is Europe's number one defence and space enterprise and the second largest space business worldwide. Its activities include space, military aircraft and related systems and services. It employs more than 38,000 people and in 2015 generated revenues of over 13 billion Euros.

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