ATV technology for the new Orion space capsule

17 November 2014

390 million euro deal secures German aerospace industry expertise

Construction of the International Space Station (ISS) started on 20 November 1998 with the launch of the Russian cargo and propulsion module 'Zarya' (Dawn). Today, the ISS is the largest and most complex research laboratory in space, an unparalleled and unique environment for scientific and technological experiments in a microgravity environment. Contributing approximately 40 percent of the development and running costs, Germany is Europe's largest ISS partner. The Automated Transfer Vehicle (ATV) is the European resupply craft used for the ISS. Airbus Defence and Space in Bremen built all five ATVs. The last space freighter in this series docked with the ISS on 12 August 2014. It is scheduled to depart from the Space Station in February 2015 and burn up upon re-entering Earth's atmosphere. However, this does not mean that the technologies developed for the ATV will be lost. Instead, they will be integrated into the European Service Module (ESM) for the new US space capsule Orion, intended to explore space beyond near-Earth orbit and the ISS.

"The fact that NASA came to us with this offer reveals how much confidence they have in our abilities. With ESM, we have for the first time produced a critical component for future NASA missions – whether for human spaceflight or unmanned missions," explains Rolf Densing, Director of ESA Programmes at the German Aerospace Center (DLR) Space Administration. This means that not only will German technical expertise be preserved, but it could even be expanded. "This is a definite option for the future. ESM is a sensible way of continuing the cooperation that started with ISS and could now incorporate new features," Densing continues. As well as scientific experiments, longer exploration missions might also involve testing of technologies used in life support systems, opening the door to interesting new fields of research and objectives for planetary researchers and also for human spaceflight.

On 17 November 2014, the European Space Agency (ESA) commissioned the aerospace company Airbus Defence and Space to develop and construct the service module for the Orion capsule. Thomas Reiter, ESA Director for Human Spaceflight and Operations and Bart Reijnen, Head of Orbital Systems and Space Exploration at Airbus Defence and Space and Director of their Bremen facility signed the 390 million Euro contract in Berlin in the presence of Brigitte Zypries, Parliamentary State Secretary at the German Federal Ministry for Economic Affairs and Energy and coordinator for aerospace. The service module is responsible for propulsion, power supply, thermal control and the storage of important supplies such as water and oxygen for the US capsule.

The maiden flight of the Orion capsule with the ESM is scheduled for 2017/ 2018. This will be an unmanned flight to the Moon and back. If NASA exercises its option for a second ESM, the second mission, planned for 2020/2021, will carry astronauts and navigate to a previously captured asteroid, returning home with samples on board. The system-level design for the service module was approved in May 2014. Now the detailed definition phase is underway and the first items of hardware are being constructed.

Orion and the European Service Module

The US Orion space capsule is designed for human spaceflight to the Moon and asteroids, and also for missions extending deep into space. Commissioned by NASA, Lockheed Martin Space Systems is developing and constructing the space capsule to accommodate four or more astronauts. The European Service Module (ESM), designed around technology developed for Europe's Automated Transfer Vehicle (ATV), is responsible for propulsion, power supply, thermal control and the storage of important supplies such as water and oxygen. Together, the Orion capsule and the ESM form the Multi-Purpose Crew Vehicle (MPCV). A first test flight with an uncrewed Orion capsule is scheduled for 4 December 2014. Fitted with a dummy service module, the capsule will be launched by a US Delta IV Heavy rocket. The ESM would enable flights by the MPCV to the International Space Station (ISS).

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Artist's impression of the Orion space capsule
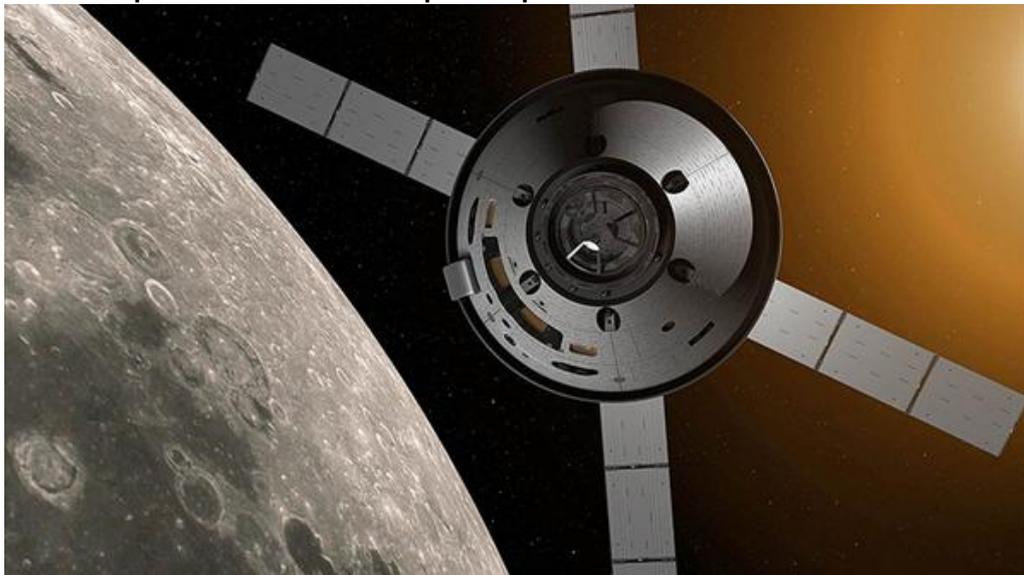
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Credit: NASA.

Contract signing for the European Service Module

On 17 November 2014, the European Space Agency (ESA) commissioned the aerospace company Airbus Defence and Space to develop and construct the service module for the Orion capsule. Thomas Reiter, ESA Director for Human Spaceflight and Operations and Bart Reijnen, Head of Orbital Systems and Space Exploration at Airbus Defence and Space and Director of their Bremen facility, put their signatures to the 390 million Euro contract in Berlin.

Credit: Airbus Defence & Space, dirma.

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