MicrOmega on MASCOT: Preparing to visit an asteroid

17 June 2013

DLR and the French space agency CNES sign a Memorandum of Understanding

It will be a first: in 2018 the Japanese Hayabusa 2 Mission will feature an asteroid landing and will, for the first time, allow for data acquisition at various points of this kind of celestial body, assisted by MASCOT (Mobile Asteroid Surface Scout), the hopping landing craft developed by the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR). The French space agency CNES will contribute one of the four instruments on board the landing craft – the spectrometer MicrOmega. DLR and CNES confirmed collaboration at the Paris Air Show by signing a Memorandum of Understanding.

"Major space missions and projects, such as landing on an asteroid and conducting in situ experiments are only possible within the scope of international cooperation," emphasises Johann-Dietrich Wörner, Chairman of the DLR Executive Board. "The partners each contribute their own scientific and technological expertise, so cooperation is the real key to a successful mission." Already in October 2012, DLR signed a Memorandum of Understanding with the Japanese space agency JAXA to send the German landing craft MASCOT to asteroid 1999 JU 3 on board the Japanese orbiter Hayabusa 2.

Hopping from measurement to measurement

The plan is to send the orbiter to its destination in 2014. Upon arrival in 2018, the spacecraft will initially remain in orbit to scout the unknown terrain. "It is important to determine the right time to uncouple our lander from the orbiter," explains Tra-Mi Ho, Project Leader at the DLR Institute of Space Systems. A stable, yet extremely light cover will protect the shoe box-sized lander as it falls to the asteroid’s surface. The four instruments designed to conduct in situ measurements on the asteroid are located inside the DLR landing craft: the French infrared spectrometer that will analyse the surface composition and a magnetometer from TU Braunschweig to investigate the magnetic field. The DLR Institute of Planetary Research is contributing two instruments: a wide-angle camera to record the landing site and the fine structure of the soil, and a radiometer that will measure surface temperatures, among other things. Once the initial measurements are complete, MASCOT will use a mechanism developed at the DLR Institute for Robotics and Mechatronics to hop to the next measurement site, providing scientists with data from different positions on asteroid on 1999 JU 3, gathered over two asteroid days and nights. During its mission, the landing craft will be monitored from the DLR Microgravity User Support Center (MUSC).

By signing this agreement, Johann-Dietrich Wörner and the President of the French space agency, CNES, Jean-Yves Le Gall confirmed cooperation for the mission to the asteroid. With the landing and data acquisition on the asteroid's surface as well as the transport of soil samples back to Earth on the Hayabusa 2 spacecraft, scientists are hoping to gain information on the properties of this celestial body, which has remained practically unchanged for 4.5 billion years, and learn about the formation and evolution of our planet.

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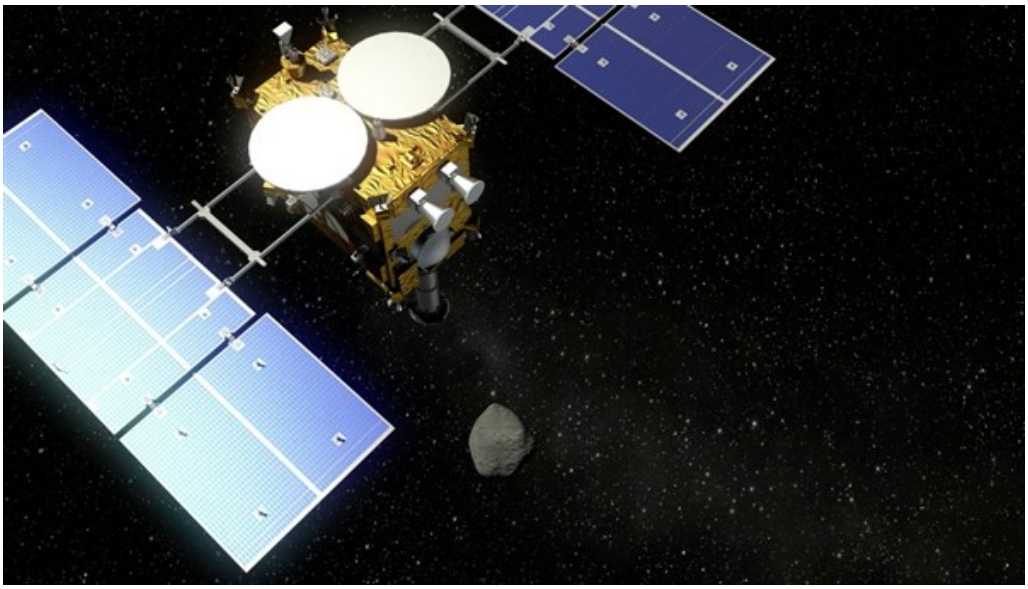
Reconnaissance mission to an asteroid



The Japanese Hayabusa 2 spacecraft will launch in 2014 to visit the asteroid 1999 JU 3. On board will be the German Aerospace Center (DLR) developed MASCOT (Mobile Asteroid Surface Scout), which will land on the asteroid and perform measurements with its four instruments.

Credit: DLR (CC-BY 3.0).

Signing Hayabusa 2 mission agreement

DLR Executive Board Chairman Johann-Dietrich Wörner (right), and Jean-Yves Le Gall, President of the French space agency CNES, signing at the Paris Air Show, a cooperation agreement for the Hayabusa 2 mission. During the mission in 2018 the landing craft MASCOT (Mobile Asteroid Surface Scout), developed by the German Aerospace Center (DLR), performing manually a landing on an asteroid for the first time and allow for data acquisition at various points of this kind of celestial body. The French space agency CNES will contribute one of the four instruments on board the landing craft – the spectrometer MicrOmega.

Credit: DLR (CC-BY 3.0).

Landing craft MASCOT

The Japanese space agency JAXA will send in 2014 the German landing craft Mobile Asteroid Surface Scout (MASCOT) to asteroid 1999 JU 3 on board the Japanese orbiter Hayabusa 2. A stable, yet extremely light cover will protect the shoe box-sized lander as it falls to the asteroid's surface. The four instruments designed to conduct in situ measurements on the asteroid are located inside the DLR landing craft: the French infrared spectrometer that will analyse the surface composition and a magnetometer from TU Braunschweig to investigate the magnetic field.

Credit: DLR (CC-BY 3.0).

Integration of MASCOT

DLR researchers are developing MASCOT, the Mobile Asteroid Surface Scout asteroid lander. The lander will fly to asteroid 1999 JU 3 on board the Japanese Hayabusa-2 spacecraft.

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