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The man in the moon

12.06.2009

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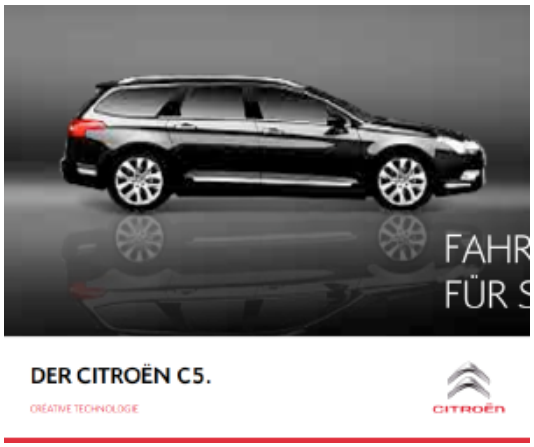
Planetologists from Münster involved in NASA mission



"I've booked my flight to Florida, I can hardly wait for things to get going," says Prof. Harald Hiesinger from the Institute of Planetology at Münster University, who is looking forward to one very special event - the lift-off of an ATLAS V rocket in Cape Canaveral.

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Weather conditions permitting, the rocket is due to send the so-called Lunar Reconnaissance Orbiter (LRO) into orbit round the moon on June 17. Also travelling on board is an experiment that Hiesinger is working on.

A total of six experiments are being flown into space by NASA. They range from the laser altitude scanner aimed at producing a highly exact topographical map, and an instrument for measuring temperatures on the moon, to a piece of apparatus designed to measure possible biological effects of cosmic radiation. Also on board is "LCROSS", a satellite which will divide into two parts upon arriving at the moon. One half will make a pinpoint crash landing on the moon and the other half will fly into the cloud of dust thus raised and analyse the moon material before

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likewise falling down on to the moon's surface.

Hiesinger's project is "LROC", three Lunar Reconnaissance Orbiter Cameras which are to bring to light hitherto unseen details of the moon. "The amount of data will exceed anything gathered by lunar missions so far," promises Hiesinger. He estimates that it will be around 70 terabytes in the first year. Two of the cameras, which were developed especially for this mission, have a focal length of 70 centimetres and a diameter of 27 centimetres. These narrow-angle cameras will be providing black-and-white pictures with a resolution of half a metre. There is also a smaller, wide-angle camera which, with a resolution of 100 metres, can produce colour pictures and will cover all of the moon.

The cameras serve a variety of different purposes. One of the most important is to determine the age of the moon's surface. The age of the moon itself - 4.527 billion years - was ascertained very precisely four years ago by Prof. Klaus Mezger from the Centre of Geochronology. "That was a fantastic achievement, but Mezger was only able to work with a few rock samples. We, on the other hand, have the whole moon in our sights and will therefore be able to determine geological activity over longer periods of time." Hiesinger's team will be using a simple trick: they'll simply be counting the number of craters, because the more impacts a planet has suffered, the older its surface is.

The work involving the precision cameras has another objective. They can help find landing spots for future missions, whether manned or unmanned. Hiesinger also wants to follow up the theory that there are remains of water ice in the particularly deep craters at the poles. This water could have come from gas emissions from inside the moon or have been brought to the moon's surface by comets. The craters at the poles are so deep that sunlight never penetrates them. At ground level temperatures are up to -230 degrees Celsius. "In contrast, we have permanent sunlight at the edges of some craters," explains Hiesinger. "These would be ideal landing spots because the solar energy at these crater edges could be used, and at the same time the necessary water could be extracted from the ice at the bottom." And, he adds, the Japanese SELENE/Kaguya mission has just recently demonstrated that the cameras are sensitive enough to see down to the bottom of the crater.

Hiesinger wants to study not only the age of the moon, but also its composition. The wide-angle camera has various colour channels, including ultra-violet and infra-red. "Every mineral has special spectral features which enable us to safely identify it," says Hiesinger. The element titanium is what interests him most.

Funding for the mission is assured for one year initially. The mission could, however, be continued as LRO has enough fuel on board. Hiesinger hopes so, as the two narrow-angle cameras can only capture a fraction of the moon's surface in one year - around ten percent, he reckons. Nevertheless, the amount of data will be gigantic and it will be sent by the probe back through space to Arizona State University, where it will be stored. A little later, selected data will be sent over to Germany. "We don't have the storage space to cope with all the data," Hiesinger explains. Nor do they have the staff necessary to evaluate everything. That's why the first data are due to be made public half a year after they have been calibrated, so that all scientists can have access to them. "We'll be getting so much data that evaluating them will keep generations of scientists busy," he says.

"Of course we'll be cherry-picking," Hiesinger adds with a grin. "After all, we invested a lot of time and money in getting the project off the ground." It isn't easy to be selected for a planet mission, he adds. However, it isn't the first success of this kind for the Institute of Planetology. The "BepiColombo" probe is being sent to Mercury in 2014 with the "MERTIS" project, and Hiesinger is also involved in "Mars Express". The Münster scientists are also involved not only in "Moonrise", the return of probes from the largest impact crater on the moon, but

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also in the "ExoMars" mission to the red planet. So although Hiesinger certainly has experience of planetary missions, he still says, "A rocket lift-off really is something special - you don't want to be sitting at home when it happens." The only thing to hope for now is that the weather plays along and the Lunar Reconnaissance Orbiter can take off as planned on June 17 ...

Brigitte Nussbaum | Source: Informationsdienst Wissenschaft
Further information: lunar.gsfc.nasa.gov/
www.uni-muenster.de/Planetology/en/homepage/homepage.html

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