Atlas of the asteroid Vesta is online

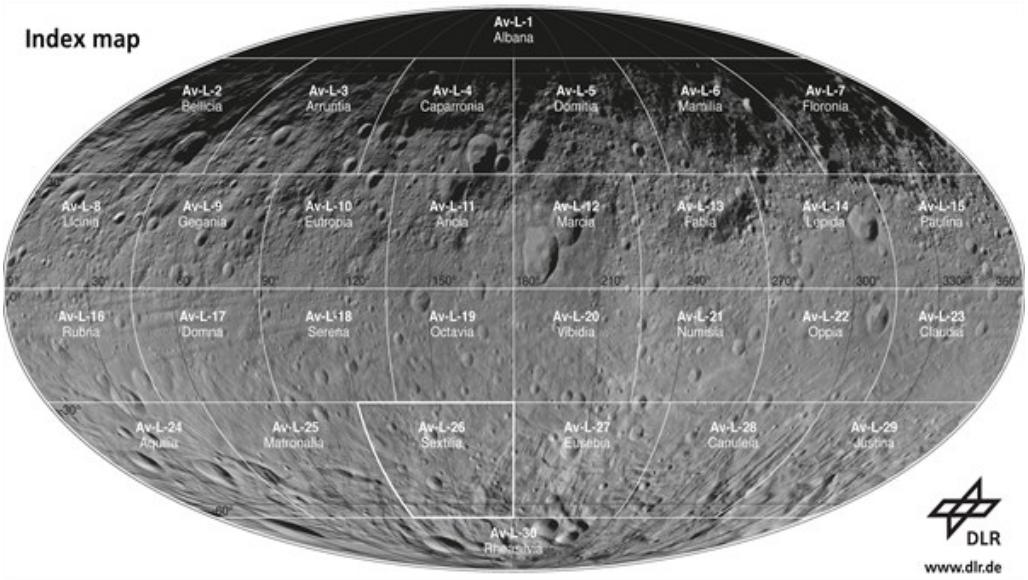
11 September 2013

On 11 May 2011, the camera on board the Dawn spacecraft acquired its first picture of the asteroid Vesta. Despite its diameter of 530 kilometres, this heavenly body appeared as no more than a white dot in the image – at that time, the spacecraft was still 975,000 kilometres away from its destination. But this changed significantly during the mission; after its arrival, the craft eventually orbited the irregularly shaped asteroid at an altitude of just 210 kilometres and went on to acquire thousands of images. The outcome of this complex mission was the creation of an atlas of the asteroid Vesta, which is now available to the public online. "Assemble this atlas from so many images was a laborious task," said Thomas Roatsch from the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR), where the data obtained during the mission was processed to create maps and elevation models.

Asteroid Vesta proved to be something of a treasure trove for planetary researchers. Three superimposed craters quickly acquired the nickname 'Snowman'. Impact craters of a kind never seen before, valleys, canyons and a mountain three times the height of Mount Everest – this asteroid exhibits a vast diversity of geological formations and has astonished scientists. "We did not expect such complex geology. The topography alone, with altitude differences of up to 20 kilometres, indicates tremendous dynamism in the surface shaping, as does the variety and diversity of the impact craters, valleys and canyons that extend across Vesta and the great differences in brightness of the surface material," said Ralf Jaumann from the DLR Institute of Planetary Research.

Extreme terrain forms in a small area

Gradually, this flood of data from the camera was transformed into an atlas of Vesta in which, very much in keeping with more familiar regional maps on Earth, one centimetre equates to roughly two kilometres on the surface of the asteroid. About 10,000 individual images were used for the atlas, creating the complete work from a mosaic. "For every page of the map in this series, we have used about 400 images from the camera," explained planetary researcher Roatsch, who presented the atlas at the European Planetary Society Congress (EPSC) in London. "The atlas shows just how extreme the terrain is on what is a rather small celestial body. For example, on the map page showing the south pole of Vesta, you can see the Severina Crater, which is 18 kilometres deep, while just 100 kilometres away, a mountain peak rises to a height of seven kilometres."



Overall view of Vesta showing the different map regions.

The Dawn spacecraft has since recommenced its journey through space. In 2015, it will reach the asteroid Ceres, its second mission objective, which is currently over 46 million kilometres away. While Vesta is a 'dry' asteroid with only a small amount of water ice, planetary researchers are expecting Ceres to be a 'wet' asteroid. Nevertheless, both will give researchers an insight into the earliest period in the life of the Solar System because their accretion into planets was prevented by large gravitational perturbations by Jupiter.

The mission

The Dawn mission to Vesta and Ceres is managed by NASA's Jet Propulsion Laboratory (JPL) in Pasadena, which is a division of the California Institute of Technology, for NASA's Science Mission Directorate in Washington D.C. The University of California, Los Angeles, is responsible for overall Dawn mission science. The camera system on the spacecraft was developed and built under the leadership of the Max Planck Institute for Solar System Research in Katlenburg-Lindau, Germany, with significant contributions from the German Aerospace Center (DLR) Institute of Planetary Research in Berlin and the Institute of Computer and Communication Network Engineering in Braunschweig. The Framing Camera project is funded by the Max Planck Society, DLR, and NASA/JPL.

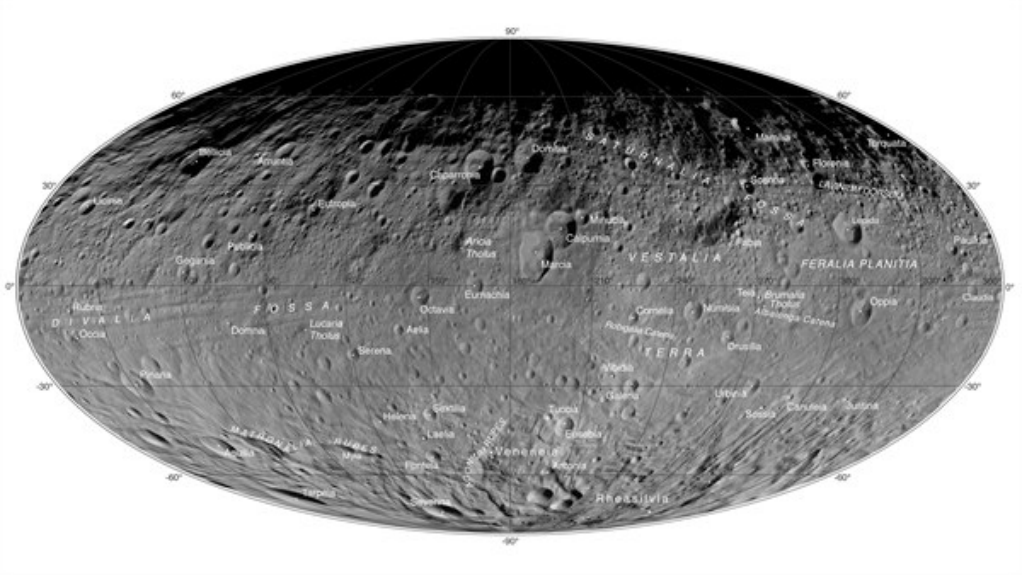
Contacts

Manuela Braun
German Aerospace Center (DLR)
Media Relations, Space Research
Tel.: +49 2203 601-3882
Fax: +49 2203 601-3249
Manuela.Braun@dlr.de

Dr Thomas Roatsch
German Aerospace Center (DLR)
Institute of Planetary Research
Tel.: +49 30 67055-339
Fax: +49 30 67055-402
Thomas.Roatsch@dlr.de

Prof.Dr. Ralf Jaumann
German Aerospace Center (DLR)
Institute of Planetary Research, Planetary Geology
Tel.: +49 30 67055-400
Fax: +49 30 67055-402
Ralf.Jaumann@dlr.de

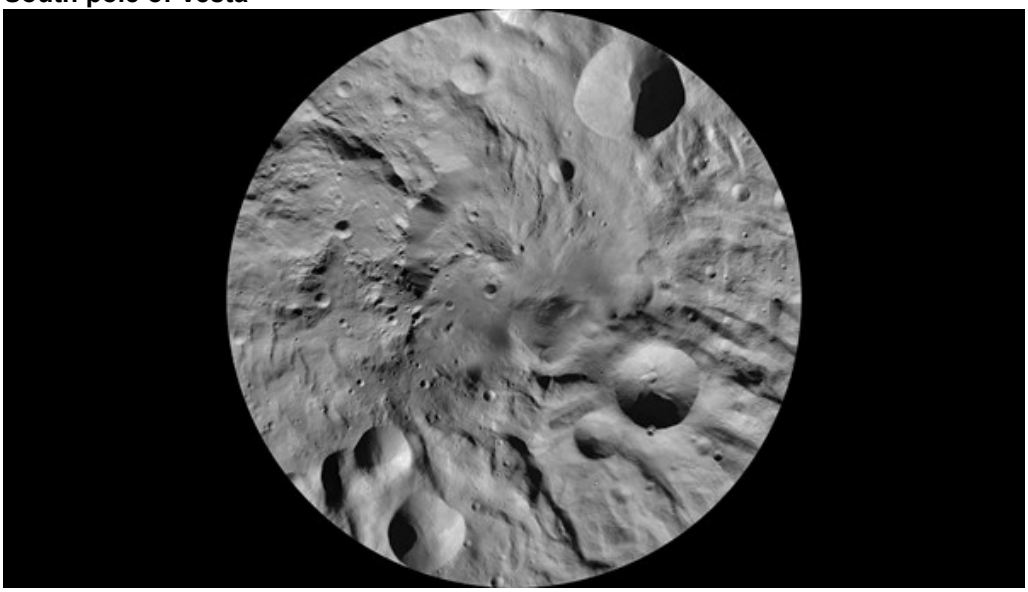
Overview of the asteroid Vesta



Scientists from the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR) have created an atlas of Vesta from about 10,000 individual images of the asteroid. The camera orbited the asteroid on board NASA's Dawn spacecraft.

Credit: NASA/JPL-Caltech/UCLA/MPS/DLR/IDA.

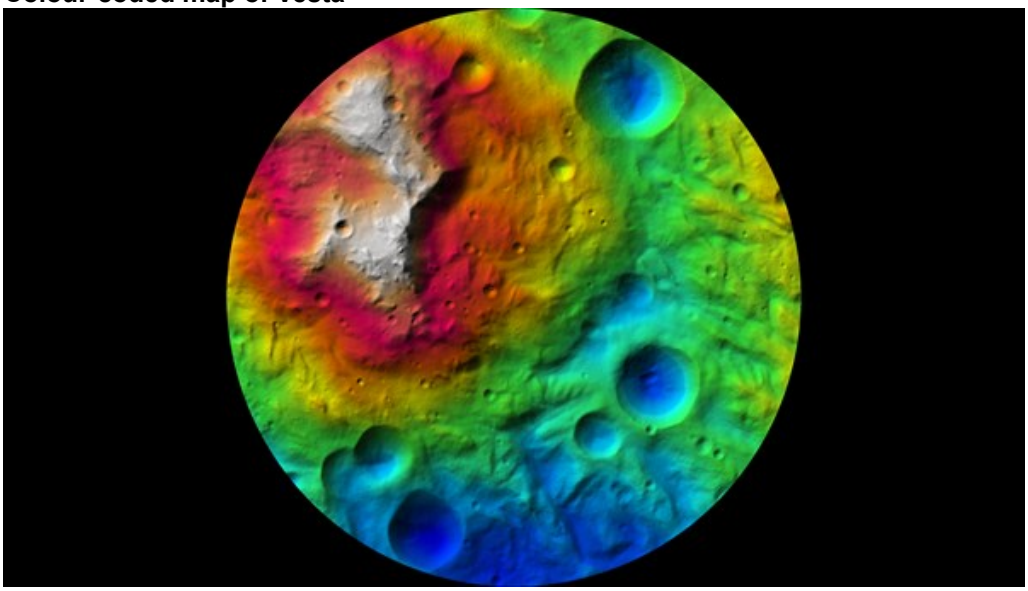
South pole of Vesta



This image shows the south polar region of asteroid Vesta. The map was created by the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR).

Credit: NASA/JPL-Caltech/UCLA/MPS/DLR/IDA.

Colour-coded map of Vesta



The camera on board the Dawn spacecraft imaged the asteroid Vesta from an altitude of 210 kilometres. Planetary researchers at the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR) processed this data to create maps and elevation models. This map employs colour-coding to depict the high and low points of the south polar region.

Credit: NASA/JPL-Caltech/UCLA/MPS/DLR/IDA.

Contact details for image and video enquiries as well as information regarding DLR's terms of use can be found on the DLR portal imprint.