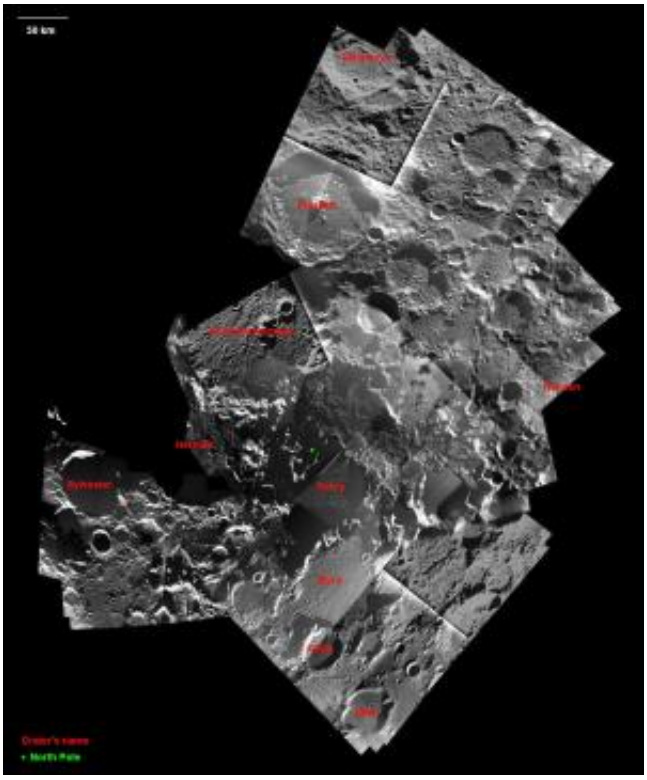
Smart mapping at the Moon's North pole

October 1 2013



This mosaic of the lunar north pole was obtained with images taken by the Advanced Moon Imaging Experiment (AMIE) on board ESA's SMART-1. The pictures were taken between May 2005 and February 2006, during different phases of the mission. The mosaic, composed of about 30 images, covers an area of about 800 by 600 km. The lunar near-side facing Earth is at the bottom of the map, while the far-side is at the top. A number of interesting lunar craters are indicated. Peary, visible in the centre of the mosaic, is the crater closest to the lunar north pole. It is nearly circular (about 73 km across), with an eroded rim and a relatively flat crater floor marked by smaller craters inside. The southern part of its interior is permanently in shadow, making it difficult to image. It was named after the American polar explorer Robert Edwin Peary (1856-1920). Byrd, in the bottom-centre part of the mosaic, is a crater about 94 km across. Its

rim is eroded, and its floor was once flooded by lava which left it nearly flat. It was named after the American polar explorer Richard Evelyn Byrd (1888-1957). Hermite is an impact crater about 104 km across, located along the northern lunar limb, close to the north pole of the Moon. From Earth, this crater is viewed nearly from the side, illuminated by oblique sunlight. It is eroded and has a rugged outer rim, incised from past impacts. Its interior forms a wide plain marked by numerous tiny craters and low hills. Sylvester, about 58 km in diameter, is an almost-circular lunar impact crater visible on the left-hand side of the image. It is located along the northern limb, and has a sharp-edged rim. Due its location, it only receives sunlight at a low angle. It is named after the English mathematician James Joseph Sylvester (1814-1897). Plaskett crater, about 109 km across, is located on the northern far-side of the Moon, 200 km from the north pole, near the lunar limb. It receives sunlight at a low angle. When obtaining the images, SMART-1 was flying over the north pole at a distance of about 3000 km, allowing large-field (about 300 km across) and medium-resolution views (300 m/pixel). Each individual image includes areas imaged with colour filters and a more exposed area. The differences have been corrected accordingly to obtain this mosaic. Credit: ESA

(Phys.org) —ESA's SMART-1 mission to the Moon – the first ESA spacecraft to travel to and orbit the Moon – was launched 10 years ago, on 27 September 2003, on an Ariane 5 from Europe's spaceport in Kourou.

SMART stands for Small Missions for Advanced Research in Technology. The mission travelled to the Moon using electric propulsion, arriving in lunar orbit on 15 November 2004. Its battery of miniaturised instruments included an X-ray spectrometer to map key chemical elements in the lunar surface.

The image highlighted here, which was first published in 2007, is a 30-image mosaic of the lunar north pole obtained with the SMART-1 AMIE camera, spanning an area of about 800 x 600 km.

The map shows the geography and illumination of the north pole, which are of particular interest for future exploration of the Moon. Some crater rims in this region are almost always exposed to sunlight, and are nicknamed "peaks of quasi-eternal light". Conversely, some deep craters are permanently shadowed, and likely contain water ice that could be exploited by future explorers.

After having completed its science operations, the SMART-1 mission ended on 3 September 2006 by hitting the lunar surface. Earth-based telescopes recorded the impact as a bright flash and a burst of debris.

The measurements made by SMART-1 were used to help later missions to the Moon, such as Japan's Kaguya, India's Chandrayaan-1, China's Chang'e-1 and NASA's Lunar Reconnaissance Orbiter.

The electric propulsion system developed for SMART-1 will benefit ESA's upcoming BepiColombo mission to Mercury, and other future science missions.

Provided by European Space Agency