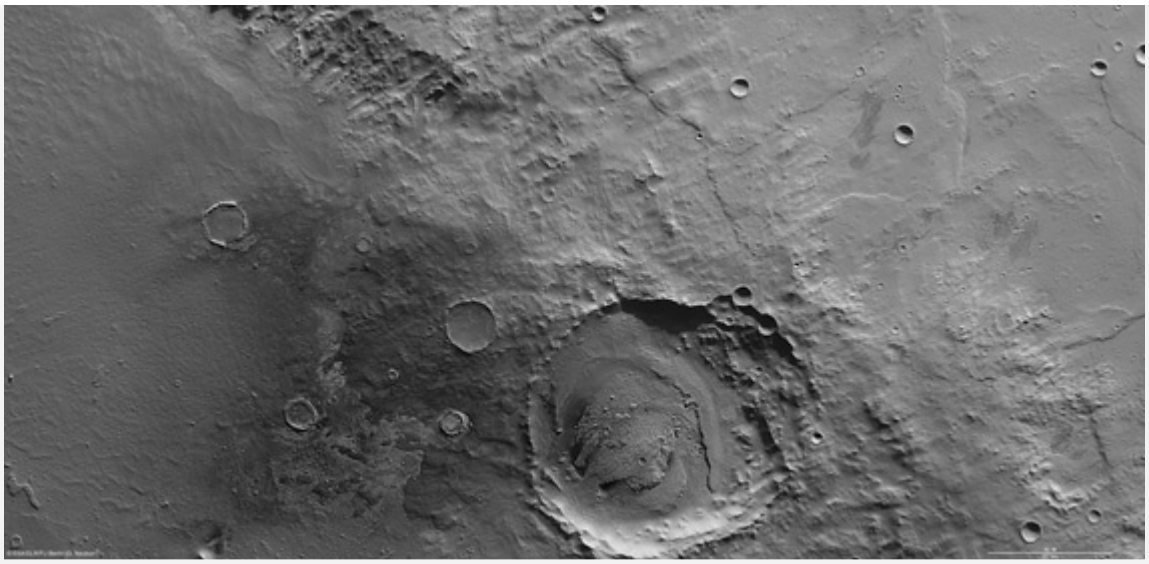
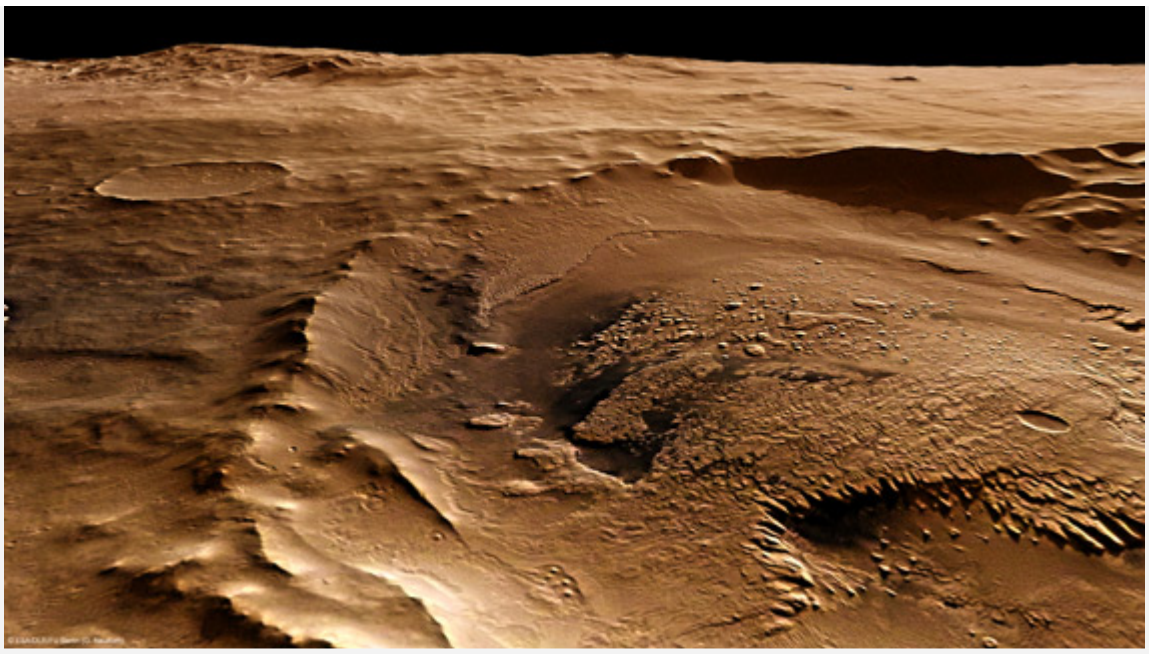
News Archive 2010

Wind and water have shaped Schiaparelli on Mars

10 December 2010

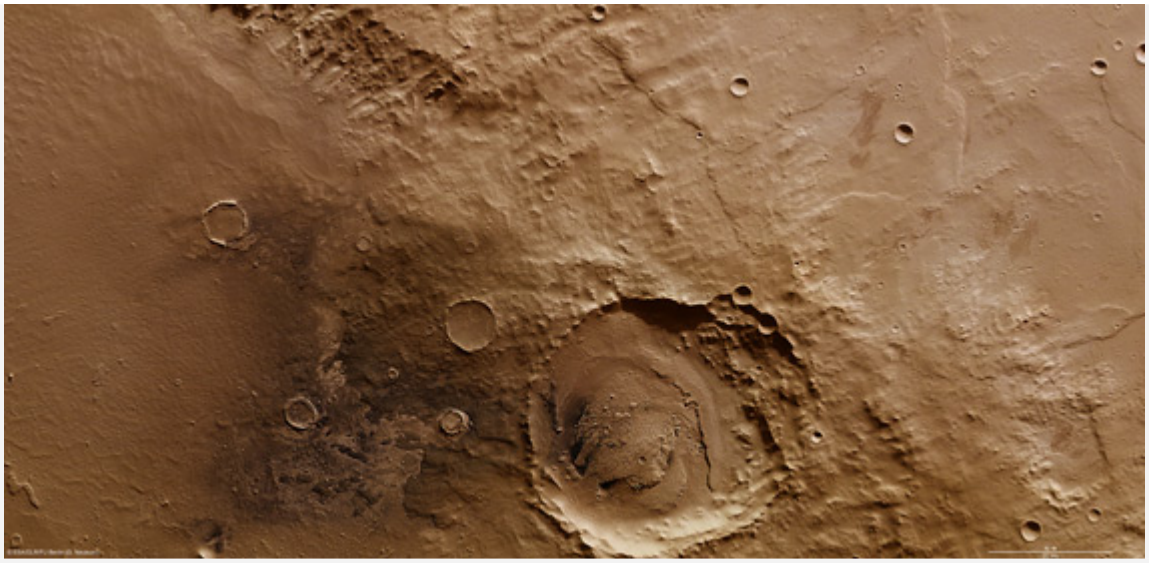


Schiaparelli in high resolution



Schiaparelli in perspective

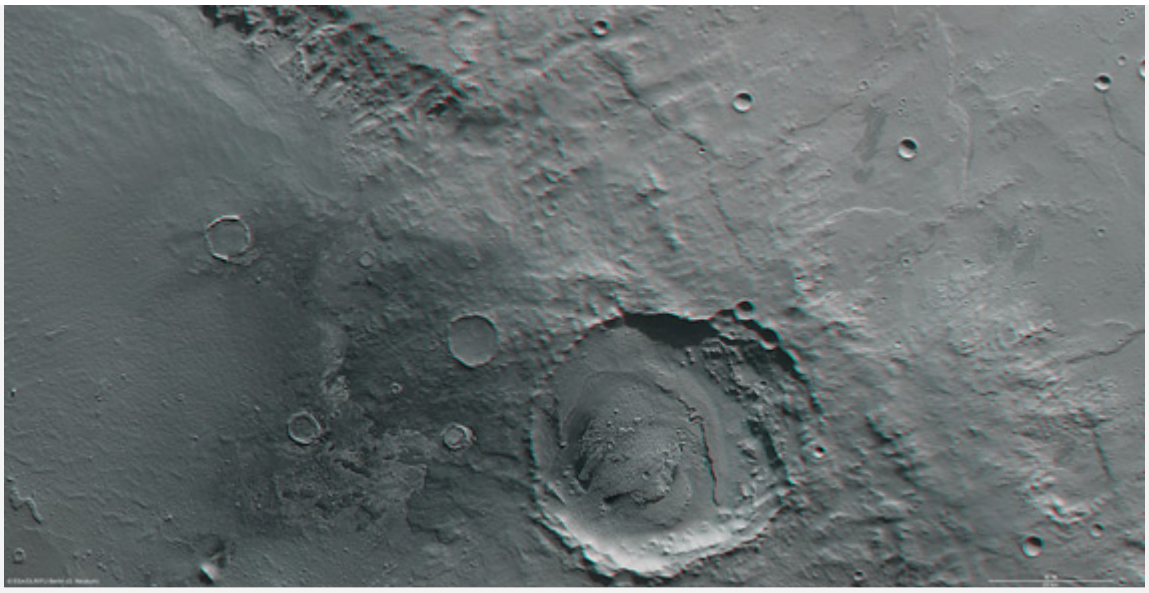
The small crater embedded in the north-western rim of the Schiaparelli impact basin features prominently in this new image acquired by the High-Resolution Stereo Camera (HRSC) operated by the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR) on ESA's Mars Express spacecraft. The image was acquired on 15 July 2010. All around is evidence of water in the past and the strong Martian winds that blow periodically.



Schiaparelli on Mars

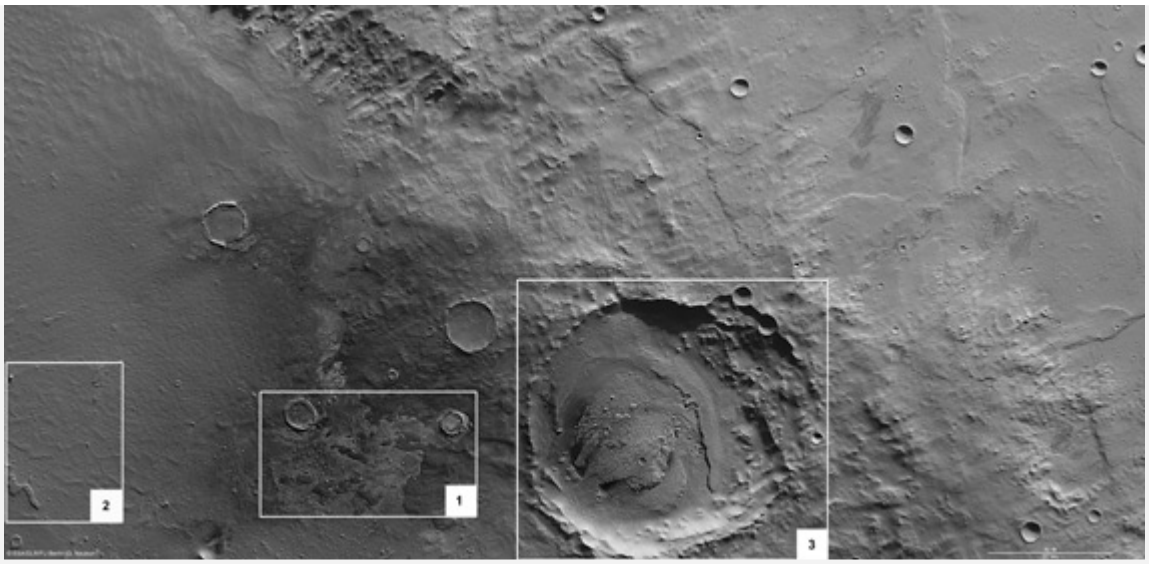
Schiaparelli is a large impact basin about 460 kilometres in diameter located in the eastern Terra Meridiani region on the equator of Mars. The centre of the basin lies at about 3°S/17°E and it is named after the Italian astronomer Giovanni Schiaparelli (1835–1910). Although he also studied Mercury and Venus, he is best known for his observations of the Red Planet.

During the 'Great Opposition' of 1877, when Mars passed close to Earth, Schiaparelli mapped the planet, discovering a number of straight dark lines across the red surface. He assumed that these were natural, water-filled channels and used the equivalent Italian word, 'canali'.



Schiaparelli in 3D

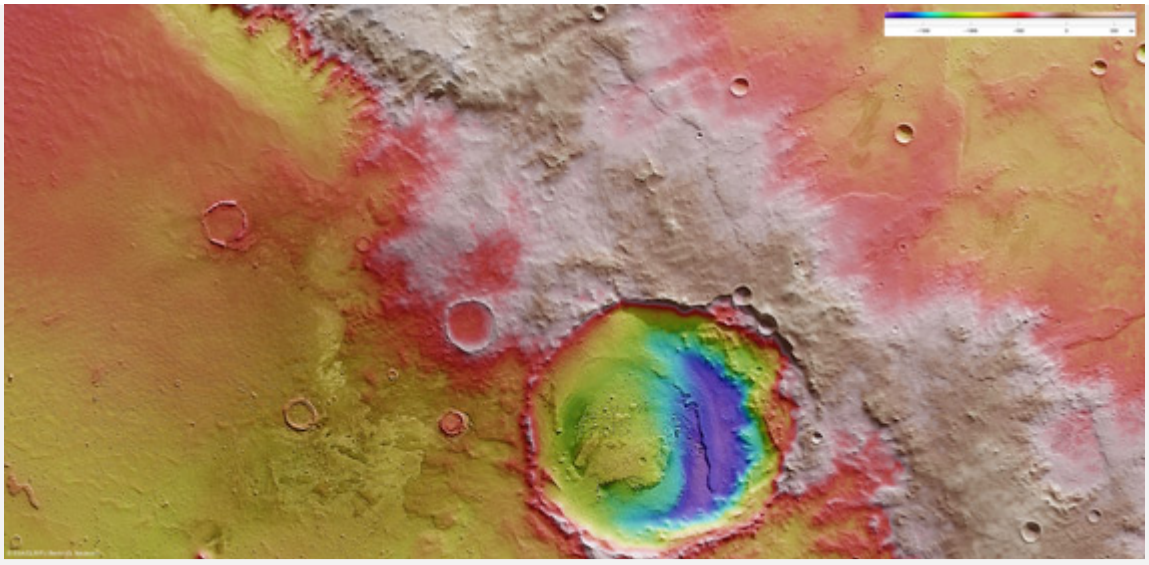
However, other astronomers thought he meant canals – artificial irrigation and transportation routes – which led to a few astronomers, and a large number of members of the general public, believing that they had been created by intelligent Martians.



Features in Schiaparelli

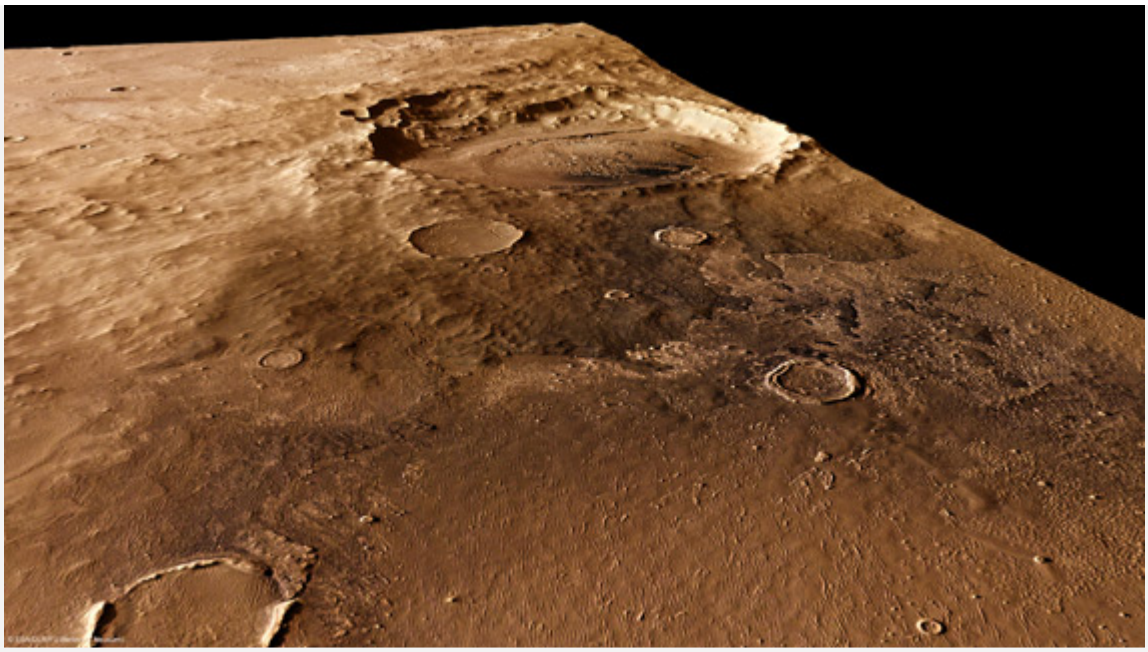
However, we now know that Schiaparelli's 'canali' were illusions created by the comparatively poor telescopes of the time and there are no water-filled channels on Mars today. Nevertheless, there is evidence in this new image that water was once present in this region of the planet, perhaps in the form of a lake.

The scene shows a small part of the north-western area of the Schiaparelli basin with the crater rim, the crater interior and parts of the surrounding highlands. Evidence for water can be seen in the form of dark sediments that appear on the floor of Schiaparelli, resembling those deposited by evaporated lakes on Earth.



Schiaparelli Elevation

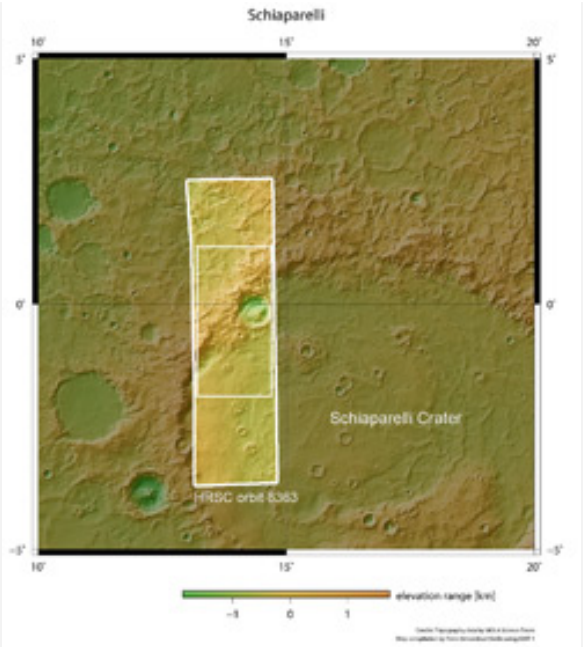
The interior of Schiaparelli has been modified by multiple geological processes, including the fall of ejecta blasted upwards by the initial impact, flows of lava that created the smooth plains and deposition of watery sediments. Box 1 shows part of these sedimentary deposits. Also in the crater floor, smaller impact craters have been partially flooded and filled.



Schiaparelli in perspective

The sediments forming the smooth plains in Box 2 have been modified by erosion, either by wind, water or both, to form sharp contours such as the narrow plateau at the bottom left. In other places, material has been deposited by the wind to form hills and dunes.

The prominent crater in Box 3 is 42 kilometres across and rests on the inner rim of Schiaparelli. The interior of the smaller crater is filled with sediments that appear to form a terrace in the northern part and a delta-like structure near the centre. The latter seems to be partially composed of rounded light-coloured mounds. Dark, wind-borne material has accumulated in the southern portion of the crater.



Schiaparelli in context

The High-Resolution Stereo Camera, HRSC, on the European Space Agency's Mars Express mission is led by the Principal Investigator (PI) Prof. Dr Gerhard Neukum, who was also responsible for the technical design of the camera. The science team of the experiment consists of 45 co-investigators from 32 institutions and 10 nations. The camera was developed at the German Aerospace Center, DLR, under the leadership of the PI and it was built in cooperation with industrial partners EADS Astrium, Lewicki Microelectronic GmbH and Jena-Optronik GmbH. The instrument on Mars Express is operated by the DLR Institute of Planetary Research, through ESA/ESOC. The systematic processing of the HRSC image

data is carried out at DLR. The scenes shown here were processed by the PI-group at the Institute for Geosciences of the Freie Universität Berlin in cooperation with the DLR Institute of Planetary Research, Berlin.

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