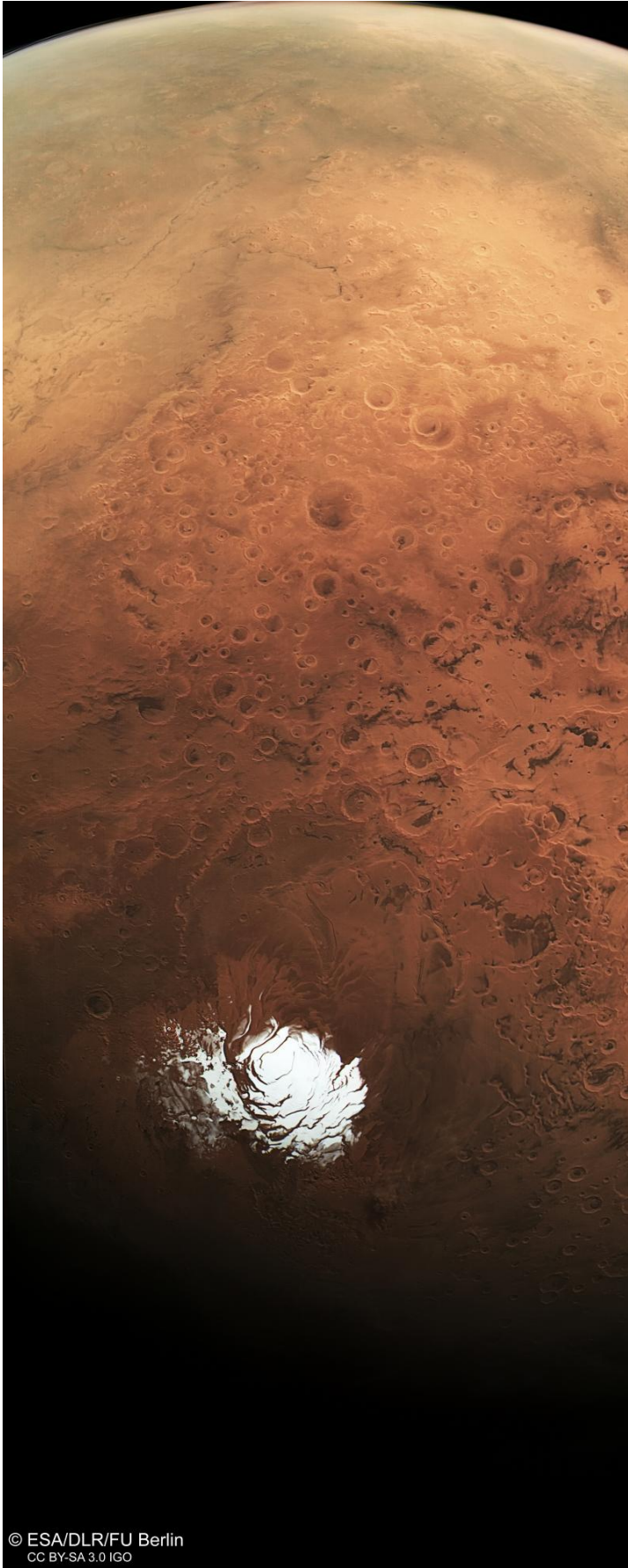


Sweeping over the south pole of Mars

September 11 2015



© ESA/DLR/FU Berlin
CC BY-SA 3.0 IGO

This sweeping view by ESA's Mars Express extends from the planet's south polar ice cap and across its cratered highlands to the Hellas Basin (top left) and beyond. [Click here](#) for an annotated image. The image was acquired by the high-resolution stereo camera on ESA's Mars Express on 25 February 2015. It is a 'broom calibration' image, acquired while the spacecraft performed a manoeuvre such that its camera pans over the surface far above the planet, at about 9 900 km. The ground resolution is about 1 km per pixel at the closest point to the surface. The image was created using data from the nadir channel, the field of view of which is aligned perpendicular to the surface of Mars, and the colour channels of HRSC. These channels have been co-registered using 'markers' on the surface, such as a mountain or dark spot, to achieve a common geometry. That is, for each colour channel, these markers are overlain to produce the colour image. This process is not needed for 'normal' nadir observations because the geometry is known here, unlike in this broom observation. Credit: ESA/DLR/FU Berlin, CC BY-SA 3.0 IGO

An unusual observation by Mars Express shows a sweeping view over the planet's south polar ice cap and across its ancient, cratered highlands.

The image was taken by the high-resolution stereo camera on ESA's Mars Express on 25 February.

During normal scientific imaging, the camera typically takes images pointing straight down towards the surface, from around the closest point to the planet along the spacecraft's elliptical orbit at an altitude of about 300 km.

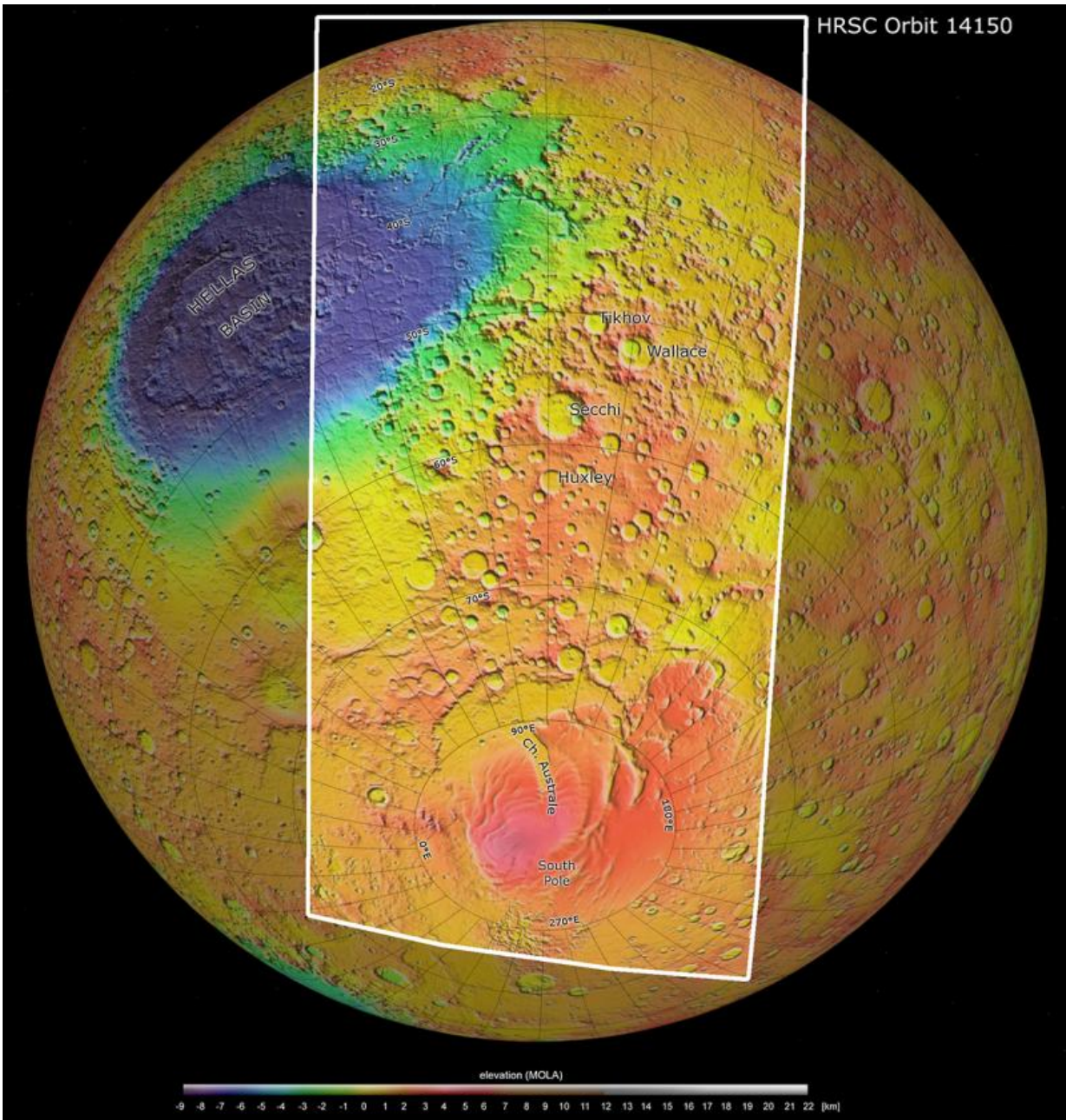
But in this unusual observation, known as a 'broom calibration' image, Mars Express turned such that its camera panned over the surface far above the planet, close to its furthest point along its orbit, in this case at

around 9900 km.

Importantly, as well as affording an unusual wide view, this allows the camera to record a range of features at the same illumination conditions, allowing essential calibration of the camera's sensors.

Towards the bottom of the image is the south polar [ice cap](#), comprising frozen water and carbon dioxide ice. This feature changes in size and shape with the seasons; the main image presented here was captured during the south polar summer, but during winter the ice extends into the smooth regions that can be seen surrounding it.

The mid-section of the image corresponds to the planet's ancient southern highlands – it is covered by a high density of [impact craters](#) of varying size and states of erosion, with many craters overlapping.



Colour-coded topography map of the region imaged by ESA's Mars Express on 25 February 2015, during orbit 14150. The elevation is indicated in the scale, with whites to reds the highest terrains, and blues to purples the deepest. The image spans from the south pole to about 10°N, and includes a portion of the vast Hellas Basin. Credit: ESA

Numerous patterns of dark, dusty dune deposits are also visible, swept up by wind and accumulating in impact craters and troughs.

Towards the top left of the image a portion of the giant Hellas basin can be seen. This feature spans more than 2200 km across and plunges some 8 km below the surface.

Two prominent channels – Dao Vallis and Niger Vallis – can be seen breaching the basin rim, made out as thin, dark wiggly lines in the colour image.

Hazy patches seen in the upper part of the image are attributed to clouds, while a thin, delicate layer of atmosphere follows the curvature of the planet at the horizon.

Provided by European Space Agency

Citation: Sweeping over the south pole of Mars (2015, September 11) retrieved 23 May 2024 from <https://phys.org/news/2015-09-south-pole-mars.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.