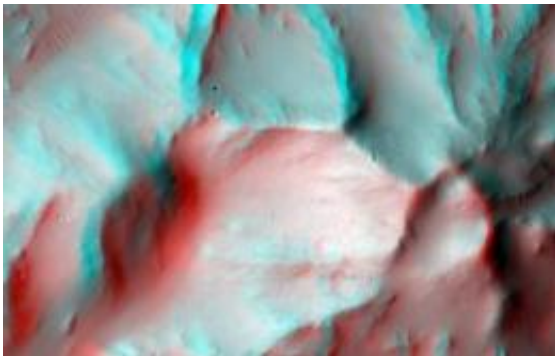


# With 'Google Earth' for Mars, explore the red planet from home

December 8 2011, By Shelley Littin

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Mars emerges in three dimensions in the image above with a simple pair of 3D glasses. Called an anaglyph image file, colors have been offset in this image so that the image may be viewed in 3D. This and many other anaglyphs are available on the HiRISE website. (Image: NASA/JPL/University of Arizona)

(PhysOrg.com) -- A new software tool developed by the HiRISE team in the UA's Lunar and Planetary Lab allows members of the public to download high-resolution images of the Martian landscape almost instantaneously and explore the surface of the Red Planet from their own desktops.

Imagine zooming in over the surface of Mars, sweeping over [sand dunes](#) and circling around the rims of craters – all from your home desktop.

With [HiView](#), the image-viewing tool recently released by the [High](#)

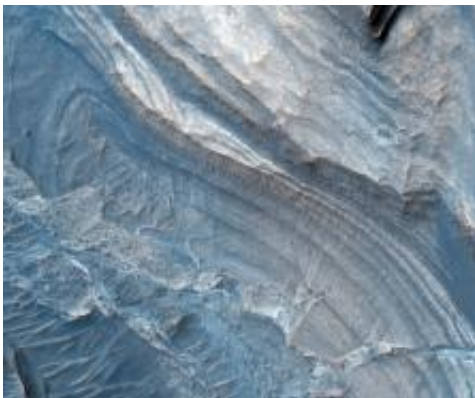
[Resolution Imaging](#) Science Experiment, or HiRISE, team at the University of Arizona's Lunar and Planetary Lab, you can do just that.

"HiView is intended to be a tool that both scientists and the general public can use to explore the images at the highest possible quality level, and do so quickly and easily," said Rodney Heyd, the ground data systems manager for the HiRISE mission.

Mounted aboard NASA's Mars Reconnaissance Orbiter, the HiRISE camera sweeps the surface of the [red planet](#) collecting image data.

"HiRISE is a scanning imager," explained Bradford Castalia, the systems analyst and principle developer who designed the HiView software. "It scans the surface of Mars from the spacecraft and gathers information as it's going. And it has to do this very, very fast."

"Imagine you want to take a picture of a single grain of sand using a camera pointing out through a hole in the bottom of your car as you drive over that grain of sand at 200 miles an hour," said Castalia. "You're going to take a picture of one grain of sand, and you want it to be really sharp. That's what HiRISE is doing. It's pushing the electronics to the extreme."



Said HiView developer Bradford Castalia: "You can really get into it in very interesting ways. The ability to see surface features from orbit around Mars and then to zoom right down onto the surface from HiRISE - that's breathtaking."

Credit: NASA/JPL/University of Arizona

The images produced by HiRISE are in the gigabyte size range: Up to tens of thousands of pixels across and more than 100,000 pixels high, the images are big enough to be murals on your living room wall. The current volume of image data from the HiRISE camera that has been made available to the public exceeds 67 Terabytes, said Heyd.

"This is the kind of research project that is fundamentally a data production operation. The research associated with it follows on from the production of the data," said Castalia. "We needed a way to get that data out to people: to the science community and to the public at large."

"The need for a tool like HiView was known from the very beginning of the HiRISE project," said Heyd. "The HiRISE camera produces images so large that it can take an hour or more to download a single image. Such large images also have large storage requirements." The HiRISE team adopted an image file format known as JPEG2000 to transfer and store the large volumes of imagery from the HiRISE camera. "This file format allows software supporting the JPEG2000 networking capabilities to download and view just a portion of any image in less than 30 seconds, resolving the need to spend a long time downloading an entire image and ensuring there is enough local storage space to hold the image," said Heyd.

In HiView, users can select a portion of the image and download only that portion of the image, so the user doesn't have to wait hours for the entire image file to download. "Once a region has been selected for

viewing, only the area that fits on the computer screen will be downloaded, plus a small additional region around the edges to make panning around the image more seamless," said Heyd.



An oval mesa similar to the mesas of Monument Valley in Arizona and Utah is a remnant of a geologic feature that once covered a greater area on the Martian surface. Credit: NASA/JPL/University of Arizona

"HiView is the simplest way to access HiRISE imagery. Once the application has been downloaded to your computer, you can drag and drop a link to any image on the HiRISE website to the HiView application and view that image at the same quality that our scientists are using to analyze the features found in the imagery."

HiView is equipped with a set of data exploration tools so that users can move beyond just viewing the images and explore the data scientifically if they are so inclined.

Castalia hopes that the tools will entice people of all ages and backgrounds to pursue their interests in science. "It's really easy to use and very accessible," said Castalia. "And this allows high school or elementary school students to use HiView to see beautiful HiRISE

imagery. I'm hoping that out of the corner of their eyes, they will see these tools and get excited about the science."

More than just an image-viewing tool, HiView also has image enhancement capabilities similar to the functions of Photoshop, and it is versatile in terms of the programs it is designed to work with, unlike many software applications.

A statistics tool gives information about the distribution of image values in a particular area of the image. A tool called a data mapper shows viewers a graph of source data and display data that allows users to apply contrast stretch to compare the source data and display data. HiView takes particular advantage of computers with multiple processing units and large or multiple desktops to provide a better use experience.

HiView isn't limited to HiRISE imagery. "HiView is able to read and write image data using conventional file formats so users can employ image formats that are suitable to their purpose," said Castalia. Members of the HiRISE science team use the program to get a first sense of what an observation contains, said Castalia.

"The pictures are beautiful, but there's real science in there," said Castalia. "That's part of what HiView allows people to do is to explore the science that's there in the imagery. People can really experience what it means to be involved in a [Mars](#) mission. All you have to do is get in there and explore."

"Given the volume of imagery that HiRISE produces no one has had time to fully analyze our entire data set," added Heyd. "So anyone with an interest in examining the imagery has the potential to discover something new."

Provided by University of Arizona

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