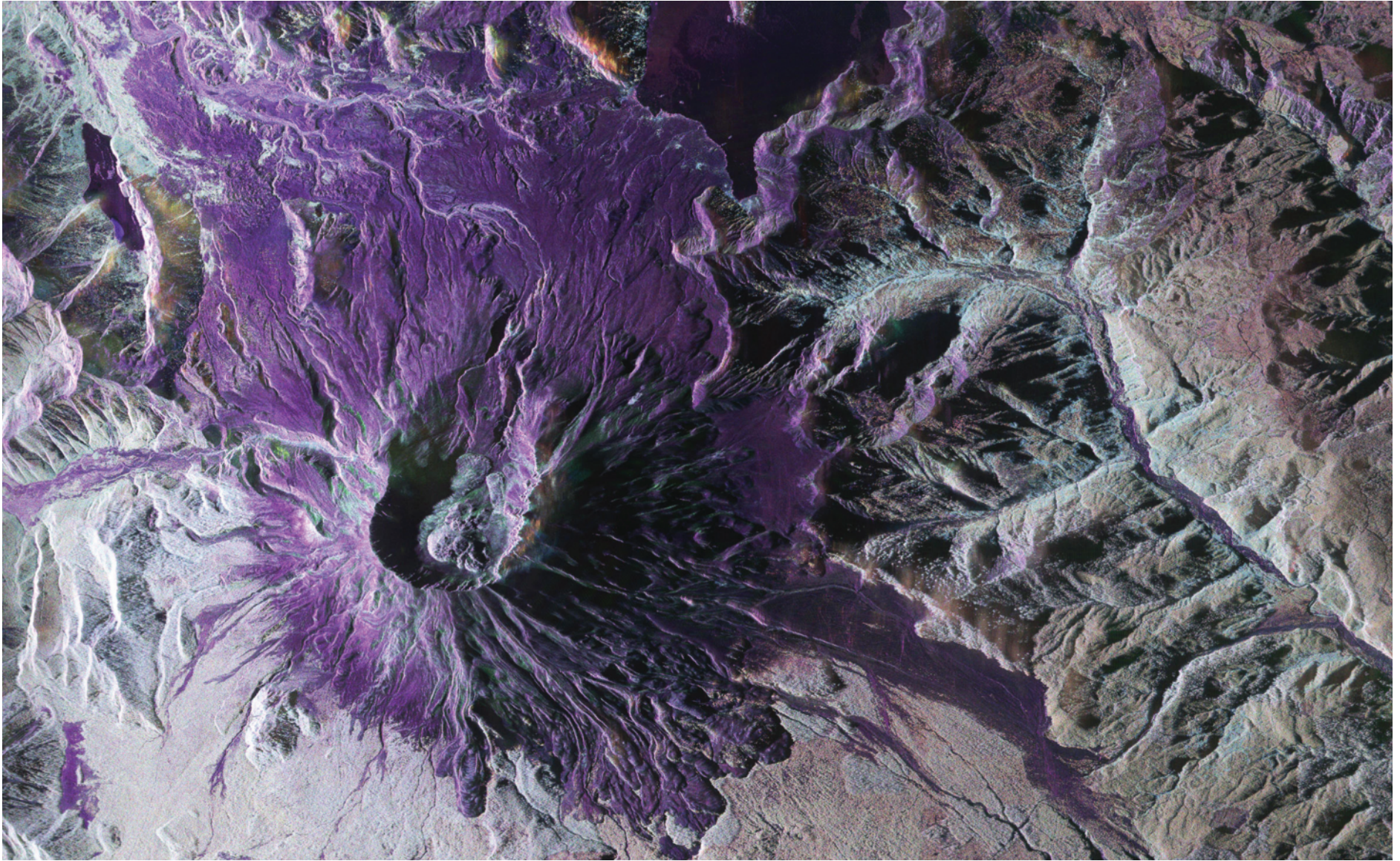




## Mount Saint Helens in False Color From UAVSAR







## UAVSAR and Mount Saint Helens

### About the Image

This false color, composite image of Mount Saint Helens was constructed by assigning colors (red, blue, and green) to three of the polarimetric layers collected by a new, airborne radar from an altitude of 41,000 feet. The image shows an area approximately 21 kilometers wide with a resolution of approximately 6 meters per pixel. Although covered with snow at the time, many features within the lava dome of Mount St. Helens are visible as the radar partially penetrates the snow layer. Also clearly visible is the tree line, in green, surrounding the peak.

### About Mount Saint Helens

Perhaps most famous for its catastrophic eruption on May 18, 1980 – the deadliest and most economically destructive volcanic event in the history of the United States – Mount St. Helens remains one of the most active volcanoes in the United States today. Renewed activity at this volcano in Washington was first observed in October 2004 when magma reached the surface of the volcano and formed a new lava dome on the south side of the existing 1980s dome. Since 2004, Mount St. Helens has exhibited near-constant activity with gradual extrusion of lava and periodic eruptions of ash and steam.

The Mount St. Helens National Volcanic Monument was created in the aftermath of the 1980 eruption to preserve the volcano and allow it to be studied and monitored. Scientists continually place instruments in and around the crater to continuously monitor earthquakes and

ground motion at the volcano. Real-time data are combined with field observations to assess potential hazards and forecast future activity. Currently, the new lava dome is undergoing deflation at a rate of about 1 centimeter per day as a result of the contractive cooling of new material that is continually forming the dome.

### About UAVSAR

A new airborne instrument built by NASA – a synthetic aperture radar capable of repeat pass interferometry – is taking a series of images of Mount St. Helens in order to measure the deformation of the dome and to demonstrate the utility of this emerging technology to measure rapidly changing structures.

The UAVSAR (Uninhabited Aerial Vehicle - Synthetic Aperture Radar) instrument was built at the Jet Propulsion Laboratory (JPL) with funding by the NASA Earth Science Technology Office (ESTO). As the name implies, UAVSAR is designed to eventually be flown on an uninhabited, remote-piloted aircraft such as the Northrop Grumman Global Hawk. For the flights over Mount St. Helens as well as other demonstration flights the instrument is being flown on the NASA Gulfstream III, a piloted airplane.

UAVSAR is a fully-polarimetric L-band (24 centimeter wavelength) synthetic aperture radar with an actively scanned electronic antenna that can be precisely pointed at its target. The instrument is flown on repeat pass missions over an area of interest and the images are

compared to determine what has changed in the intervening time. This process is called repeat pass interferometry.

The key challenge in obtaining repeat pass interferometry measurements is ensuring that the airplane and the instrument make the repeat trip as close to the original flight line as possible. The UAVSAR instrument utilizes real-time GPS to determine the aircraft's position to within 30 centimeters. A precision autopilot developed at NASA's Dryden Flight Research Center uses the GPS data to control the aircraft's flight path to within 2.5 meters. The GPS / Autopilot system, coupled with the UAVSAR's electronically steered antenna, enables repeated airborne measurements that can detect miniscule changes in the topography.

The UAVSAR instrument has the potential to measure and monitor a wide range of rapidly changing features on Earth and, with modifications, on other planets – from rapidly moving glaciers and changes in ice thickness to seismic activity and agriculture.

**For more information, visit the UAVSAR website at <http://uavsar.jpl.nasa.gov>**

**For more information on NASA Earth science technology development, visit the ESTO website at <http://esto.nasa.gov>**