

# Photos From Mars

## Show Rocky Landscape

-- NASA's Spirit rover has sent its first images from Mars, showing a landscape scattered with small rocks. --

### **BACKGROUND:**

NASA's twin robot geologists, the Mars Exploration Rovers, launched toward Mars on June 10 and July 7, 2003, in 2003 in search of answers about the history of water on Mars. They are scheduled to land on Mars January 3 and January 24 PST (January 4 and January 25 UTC).

The Mars Exploration Rover mission is part of NASA's Mars Exploration Program, a long-term effort of robotic exploration of the red planet.

Primary among the mission's scientific goals is to search for and characterize a wide range of rocks and soils that hold clues to past water activity on Mars. The spacecraft are targeted to sites on opposite sides of Mars that appear to have been affected by liquid water in the past. The landing sites are at Gusev Crater, a possible former lake in a giant impact crater, and Meridiani Planum, where mineral deposits (hematite) suggest Mars had a wet past.

After the airbag-protected landing craft settle onto the surface and open, the rovers will roll out to take panoramic images. These will give scientists the information they need to select promising geological targets that will tell part of the story of water in Mars' past. Then, the rovers will drive to those locations to perform on-site scientific investigations over the course of their 90-day mission.

These are the primary science instruments to be carried by the rovers:

- **Panoramic Camera (Pancam):** for determining the mineralogy, texture, and structure of the local terrain.
- **Miniature Thermal Emission Spectrometer (Mini-TES):** for identifying promising rocks and soils for closer examination and for determining the processes that formed Martian rocks. The instrument will also look skyward to provide temperature profiles of the Martian atmosphere.
- **Mössbauer Spectrometer (MB):** for close-up investigations of the mineralogy of iron-bearing rocks and soils.
- **Alpha Particle X-Ray Spectrometer (APXS):** for close-up analysis of the abundances of elements that make up rocks and soils.
- **Magnets:** for collecting magnetic dust particles. The Mössbauer Spectrometer and the Alpha Particle X-ray Spectrometer will analyze the particles collected and help determine the ratio of magnetic particles to non-magnetic particles. They will also analyze the composition of magnetic minerals in airborne dust and rocks that have been ground by the Rock Abrasion Tool.
- **Microscopic Imager (MI):** for obtaining close-up, high-resolution images of rocks and soils.
- **Rock Abrasion Tool (RAT):** for removing dusty and weathered rock surfaces and exposing fresh material for examination by instruments onboard.

A goal for the rover is to drive up to 40 meters (about 44 yards) in a single day, for a total of up to one 1 kilometer (about three-quarters of a mile).

Moving from place to place, the rovers will perform on-site geological investigations. Each rover is sort of the mechanical equivalent of a

#### **IN THIS ISSUE:**

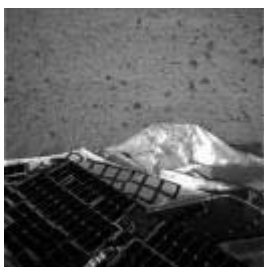
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geologist walking the surface of Mars. The mast-mounted cameras are mounted 1.5 meters (5 feet) high and will provide 360-degree, stereoscopic, humanlike views of the terrain. The robotic arm will be capable of movement in much the same way as a human arm with an elbow and wrist, and will place instruments directly up against rock and soil targets of interest. In the mechanical "fist" of the arm is a microscopic camera that will serve the same purpose as a geologist's handheld magnifying lens. The Rock Abrasion Tool serves the purpose of a geologist's rock hammer to expose the insides of rocks.

Between 1991 and 2001, the use of most major drug types increased among 8th and 10th graders. After 6 years of increases, 8th graders' past month marijuana use began to decrease in 1997, falling to 10.2%. This decline continued through 2001 to 9.2%. The use of inhalants declined after peaking in 1995. In 2001, 8th graders reported past month use of inhalants at 4%, a higher rate than the 2.4% reported by 10th graders and the 1.7% reported by 12th graders.

### **STORY:**

A traveling robotic geologist from NASA has landed on Mars and returned stunning images of the area around its landing site in Gusev Crater.



Mars Exploration Rover Spirit successfully sent a radio signal after the spacecraft had bounced and

rolled for several minutes following its initial impact at 11:35 p.m. EST (8:35 p.m. Pacific Standard Time) on January 3.

"This is a big night for NASA," said NASA Administrator Sean O'Keefe. "We're back. I am very, very proud of this team, and we're on Mars."

Members of the mission's flight team at NASA's Jet Propulsion Laboratory, Pasadena, Calif., cheered and clapped when they learned that NASA's Deep Space Network had received a post-landing signal from Spirit. The cheering resumed

about three hours later when the rover transmitted its first images to Earth, relaying them through NASA's Mars Odyssey orbiter.

"We've got many steps to go before this mission is over, but we've retired a lot of risk with this landing," said JPL's Pete Theisinger, project manager for the Mars Exploration Rover Project.

Deputy project manager for the rovers, JPL's Richard Cook, said, "We're certainly looking forward to Opportunity landing three weeks from now." Opportunity is Spirit's twin rover, headed for the opposite side of Mars.

Dr. Charles Elachi, JPL director, said, "To achieve this mission, we have assembled the best team of young women and men this country can put together. Essential work was done by other NASA centers and by our industrial and academic partners.

Spirit stopped rolling with its base petal down, though that favorable position could change as airbags deflate, said JPL's Rob Manning, development manager for the rover's descent through Mars' atmosphere and landing on the surface.

NASA chose Spirit's landing site, within Gusev Crater, based on evidence from Mars orbiters that this crater may have held a lake long ago. A long, deep valley, apparently carved by ancient flows of water, leads into Gusev. The crater itself is basin the size of Connecticut created by an asteroid or comet impact early in Mars' history. Spirit's task is to spend the next three months exploring for clues in rocks and soil about whether the past environment at this part of Mars was ever watery and suitable to sustain life.

Spirit traveled 487 million kilometers (302.6 million) miles to reach Mars after its launch from Cape Canaveral Air Force Station, Fla., on June 10, 2003. Its twin, Mars Exploration Rover Opportunity, was launched July 7, 2003, and is on course for a landing on the opposite side



of Mars on Jan. 25 (Universal Time and EST; 9:05 p.m. on Jan. 24, PST).

The flight team expects to spend more than a week directing Spirit through a series of steps in unfolding, standing up and other preparations necessary before the rover rolls off of its lander platform to get its wheels onto the ground. Meanwhile, Spirit's cameras and a mineral-identifying infrared instrument will begin examining the surrounding terrain. That information will help engineers and scientists decide which direction to send the rover first.

JPL, a division of the California Institute of Technology, manages the Mars Exploration Rover project for NASA's Office of Space Science, Washington.

For more information:

Mars Exploration Rover Mission:

<http://marsrovers.jpl.nasa.gov/>

British Mars Express:

[http://www.esa.int/SPECIALS/Mars\\_Express/index.html](http://www.esa.int/SPECIALS/Mars_Express/index.html)

### **SIGNIFICANCE:**

Surface Operations begin once the rover has completed its egress. The rovers were designed to last for 90 days of surface operations.

Surface operations includes two highly interconnected efforts:

- rover navigation, which allows the rover to reach places scientists identify as interesting for further study
- science investigations, which use the rover's science instruments to discover more about the martian environment

Engineers responsible for rover navigation and science team members must work closely together to achieve mission goals. What the rover will actually do on the surface will depend on complex calculations from the science team on which rock, soil, and other targets are high-priority and then intense discussion with the engineering team on whether the rover can actually move toward those targets safely and quickly.

Toward the end of the surface phase for both missions, both power and telecom

capabilities will be decreasing, as the Earth and the Sun become more distant from Mars, dust falls on the solar panels, the batteries lose capacity, and the Sun moves further North past the landing site latitude. Eventually, somewhere near Sol 91 it is expected that the rover will be unable to store up enough thermal or battery energy to prevent its components' overnight temperatures from falling below flight allowable levels. That will sooner or later result in failure of one or more of those components, silencing the rover forever.

## **UPDATE:**

### **Halliburton to Lose Iraq Oil Project**

-- The Defense Department is removing the Army Corps of Engineers from its role in supervising the program. --

### **BACKGROUND:**

Last year the Bush administration gave Halliburton, a company Dick Cheney ran before become vice-president, no-bid contracts in Iraq. Since then, Halliburton's contracts have expanded in scope and increased in price. Pentagon auditors said in December that a Halliburton subsidiary may have overcharged the government \$61-million to import fuel. The military said it rejected a separate bid for food services that was inflated by \$67-million.

In Halliburton's case, the administration maintained the company was uniquely suited to rebuild Iraq's oil industry quickly. The government sometimes has a need to expedite the delivery of essential goods and services. Restoring Iraq's production capacity and meeting its demand for fuel can help to foster reconstruction and improve the security situation. Contracts given to a Halliburton subsidiary, Kellogg, Brown & Root, have expanded beyond oil services. They now exceed \$2-billion, as add-on work, higher security

costs and other factors significantly boost the price.

### **STORY:**

*AP* Just weeks after Pentagon auditors said Halliburton may have overcharged taxpayers to import oil to Iraq, the Defense Department is



removing the Army Corps of Engineers from its role in supervising the program.

The Defense Energy Support Center, which buys fuel for the military throughout the world, will supervise the shipments and choose new contractors to replace Halliburton, Vice President Dick Cheney's former company.

Democratic lawmakers have criticized the prices charged the U.S. government by Halliburton's KBR subsidiary, which has been importing refined petroleum products into Iraq under a mission awarded without competitive bids. Cheney headed Halliburton before running for vice president.

Earlier this month, the Defense Department's auditing agency supported the Democrats' allegations, finding the company may have charged up to \$61 million too much for delivering gasoline to Iraqi citizens.

Ebberts would not comment on whether the audit prompted the change, which was ordered Dec. 23.

President Bush tried to calm the controversy, saying Halliburton should repay the government if it overcharged for fuel, which was imported from Iraq's neighboring countries.

Halliburton has said it expected to be cleared by the Defense Department. The company said its pricing resulted from a contract with a Kuwaiti firm, the only company approved as a supplier by the Corps.

Halliburton got its contract to rebuild Iraq's dilapidated oil industry as an outgrowth of a contract with the Army to provide emergency logistical help for situations such as the Iraq war. The Army Corps of Engineers opened the oil rebuilding process to competitive bidding earlier this year and was preparing to award up to \$2 billion in replacement contracts.

Those contracts will still be awarded for the rebuilding of Iraq's oil industry, but will no longer include oil imports, the Corps said.

Richard J. Connelly, director of the support center, said the existing contract would remain in place for now, so that fuel deliveries will not be interrupted.

The support center said it would award contracts under competitive bidding, a process that could take two to three months, but would consider a short-term contract until the bids are awarded.

### **SIGNIFICANCE:**

Questions raised in the draft audit created an unwarranted torrent of criticism of Halliburton from elected officials, candidates, critics of the US effort in Iraq and the national news media.

"We believe our response proves KBR delivered fuel to Iraq at the best value, the best price and the best terms," said Randy Harl, president and CEO of KBR.

The Defense Department approved that fuel be delivered from Kuwait, even though it was at a higher cost than Turkey. It's unfair to accuse Halliburton of paying too much for Kuwaiti fuel without full knowledge of the facts.

Harl added, "Defense Department auditors, third party auditors and internal auditors are checking our books every single day. In the normal course of events Halliburton would have an opportunity to respond to these audit findings. We believe that once the DCAA receives our response, it should be clear that no overcharges have occurred."

## BIOGRAPHY:

*Elvis Presley*

Elvis Aaron Presley was born to Vernon and Gladys Presley in a two-room house in Tupelo, Mississippi on January 8, 1935. His twin brother, Jessie Garon, was stillborn, leaving Elvis to grow up as an only child. He and his parents moved to Memphis, Tennessee in 1948, and Elvis graduated from Humes High School there in 1953.

Elvis' musical influences were the pop and country music of the time, the gospel music he heard in church and at the all-night gospel sings he frequently attended, and the black R&B he absorbed on historic Beale Street as a Memphis teenager. In 1954, he began his singing career with the legendary Sun Records label in Memphis. In late 1955, his recording contract was sold to RCA Victor. By 1956, he was an international sensation. With a sound and style that uniquely combined his diverse musical influences and blurred and challenged the social and racial barriers of the time, he ushered in a whole new era of American music and popular culture.

He starred in 33 films, made history with his television appearances and specials, and knew great acclaim through his many live concert performances on tour and in Las Vegas. Globally, he has sold over one billion records, more than any other artist. He has earned gold, platinum and multi-platinum awards for 141 different albums and singles, far more than any other artist. Among his many awards were 14 Grammy nominations (3 wins) and the Grammy Lifetime Achievement Award, which he received at age 36.

His talent, good looks, sensuality, charisma, and good humor endeared him to millions. Known the world over by his first name, he is regarded as one of the most important figures of twentieth century pop culture. Elvis died at his Memphis home, Graceland, on August 16, 1977.

<http://www.elvis.com>



## ENTERTAINMENT:

# Reading List 2004

Recommended books by American authors:

- |                           |   |
|---------------------------|---|
| Agee, James               | <b>A Death in the Family</b>                  |
| Anderson, Sherwood        | <b>Winesburg, Ohio</b>                        |
| Baldwin, James            | <b>Go Tell It On the Mountain</b>             |
| Bellamy, Edward           | <b>Looking Backward: 2000-1887</b>            |
| Bellow, Saul              | <b>Seize the Day</b>                          |
| Bradbury, Ray             | <b>Fahrenheit 451</b>                         |
| Cather, Willa             | <b>My Antonia</b>                             |
| Chopin, Kate              | <b>The Awakening</b>                          |
| Clark, Walter Van Tilburg | <b>The Ox-Bow Incident</b>                    |
| Cormier, Robert           | <b>The Chocolate War</b>                      |
| Crane, Stephen            | <b>The Red Badge of Courage</b>               |
| Dorris, Michael           | <b>A Yellow Raft in Blue Water</b>            |
| Ellison, Ralph            | <b>Invisible Man</b>                          |
| Faulkner, William         | <b>As I Lay Dying</b>                         |
| Fitzgerald, F. Scott      | <b>The Great Gatsby</b>                       |
| Gaines, Ernest            | <b>The Autobiography of Miss Jane Pittman</b> |
| Hawthorne, Nathaniel      | <b>The Scarlet Letter</b>                     |
| Heller, Joseph            | <b>Catch-22</b>                               |
| Hemingway, Ernest         | <b>A Farewell to Arms</b>                     |
| Kesey, Ken                | <b>One Flew Over the Cuckoo's Nest</b>        |
| Lee, Harper               | <b>To Kill a Mockingbird</b>                  |
| Lewis, Sinclair           | <b>Main Street</b>                            |
| London, Jack              | <b>Call of the Wild</b>                       |
| Melville, Herman          | <b>Moby-Dick</b>                              |
| Morrison, Toni            | <b>Sula</b>                                   |
| O'Connor, Flannery        | <b>A Good Man is Hard to Find</b>             |
| Parks, Gordon             | <b>The Learning Tree</b>                      |
| Plath, Sylvia             | <b>The Bell Jar</b>                           |
| Poe, Edgar Allan          | <b>Great Tales and Poems</b>                  |
| Potok, Chaim              | <b>The Chosen</b>                             |
| Salinger, J.D.            | <b>The Catcher in the Rye</b>                 |
| Sinclair, Upton           | <b>The Jungle</b>                             |
| Steinbeck, John           | <b>The Grapes of Wrath</b>                    |
| Stowe, Harriet Beecher    | <b>Uncle Tom's Cabin</b>                      |
| Twain, Mark               | <b>The Adventures of Huckleberry Finn</b>     |
| Vonnegut, Kurt            | <b>Slaughterhouse-Five</b>                    |
| Walker, Alice             | <b>The Color Purple</b>                       |
| Wells, H.G.               | <b>The Time Machine</b>                       |
| Wolfe, Thomas             | <b>Homeward, Angel</b>                        |
| Wright, Richard           | <b>Native Son</b>                             |

## SPORTS:

*A Tie at the Top*

Top-ranked Southern California laid out its case for the national championship the best way it knew how -- by dominating No. 4 Michigan with a 28-14 victory Thursday in the Rose Bowl.

The Trojans were left out of the Bowl Championship Series title game because of a weaker schedule, but they felt right at home in front of a sellout crowd of 93,849.

Matt Leinart threw three touchdown passes and caught another to lead the Trojans past the Wolverines with a performance so persuasive that voters almost certainly will leave USC atop the poll.

While the Trojans are primed to win their first title in 25 years, they would have to share it. Voters for the USA Today/ESPN coaches' poll are obligated to crown the winner of Sunday's Sugar Bowl between No. 2 LSU and No. 3 Oklahoma, playing in the BCS championship game. And while most college football experts are already declaring that USC is undoubtedly NCAA's best football team, the Trojans will have to be content to share a title this year.



## THIS WEEK IN HISTORY:

**January 5, 1968**

## Prague Spring begins in Czechoslovakia

Antonín Novotný, the Stalinist ruler of Czechoslovakia, is succeeded as first secretary by Alexander Dubcek, a Slovak who supports liberal reforms. In the first few months of his rule, Dubcek introduced a series of far-reaching political and economic reforms, including increased freedom of speech and the rehabilitation of political dissidents. Dubcek's effort to establish "communism with a human face" was celebrated across the country, and the brief period of freedom became known as the "Prague Spring."

On August 20, 1968, the Soviet Union answered Dubcek's reforms with invasion of Czechoslovakia by 600,000 Warsaw Pact troops. Prague was not eager to give way, but scattered student resistance was no match for Soviet tanks. Dubcek's reforms were repealed, and the leader himself was replaced with the staunchly pro-Soviet Gustav Husak, who re-established an authoritarian Communist regime in the country.

In 1989, as Communist governments folded across Eastern Europe, Prague again became the scene of demonstrations for democratic reforms. In December 1989, Husak's government conceded to demands for a multiparty Parliament. Husak resigned, and for the first time in two decades Dubcek returned to politics as chairman of the new Parliament, which subsequently elected playwright Vaclav Havel as president of Czechoslovakia. Havel had come to fame during the Prague Spring, and after the Soviet crackdown his plays were banned and his passport confiscated.

[www.thehistorychannel.com](http://www.thehistorychannel.com)

## FEATURE:

## MARS

Mars has a striking red appearance, and in its most favorable position for viewing, when it is opposite the sun, it is twice as bright as Sirius, the brightest star. Mars has a diameter of 4,200 mi (6,800 km), just over half the diameter of the earth, and its mass is only 11% of the earth's mass. The planet has a very thin atmosphere consisting mainly of carbon dioxide, with some nitrogen and argon. Mars has an extreme day-to-night temperature range, resulting from its thin atmosphere, from about 80°F (27°C) at noon to about 100°F (73°C) at midnight; however, the high daytime temperatures are confined to less than 3 ft (1 m) above the surface.

A network of linelike markings first studied in detail (1877) by G. V. Schiaparelli was referred to by him as *canali*, the Italian word meaning channels or grooves. Percival Lowell, then a leading authority on Mars, created a long-lasting controversy by accepting these canals to be the work of intelligent beings. Under the best viewing conditions, however, these features are seen to be smaller, unconnected features. The greater part of the surface area of Mars appears to be a vast desert, dull red or orange in color. This color may be due to various oxides in the surface composition, particularly those of iron. About one fourth to one third of the surface is composed of darker areas whose nature is still uncertain. Shortly after its perihelion Mars has planetwide dust storms that can obscure all its surface details.

Photographs sent back by the *Mariner 4* space probe show the surface of Mars to be pitted with a number of large craters, much like the surface of our moon. In 1971 the *Mariner 9* space probe discovered a huge canyon, Valles Marineris. Completely dwarfing the Grand Canyon in Arizona, this canyon stretches for 2,500 mi (4,000 km) and at some places is 125 mi (200 km) across and 2 mi (3 km) deep. Mars also has numerous enormous volcanoes-including Olympus Mons, e

largest in the solar system-and lava plains. In 1976 the *Viking* spacecraft landed on Mars and studied sites at Chryse and Utopia.

*Mars Global Surveyor*, which also reached Mars in 1997, has returned images of the surface. Mars appears to lack active plate tectonics; there is no evidence of recent lateral motion of the surface. With no plate motion, hot spots under the crust stay in a fixed position relative to the surface; this may explain the giant volcanoes. However, there is no evidence of current volcanic activity. There is evidence of erosion caused by floods and small river systems. The possible identification of rounded pebbles and cobbles on the ground, and sockets and pebbles in some rocks, suggests conglomerates that formed in running water during a warmer past some 2-4 billion years ago, when liquid water was stable and there was water on the surface, possibly even large lakes or oceans. There is also evidence of flooding that occurred less than several million years ago.

Because the axis of rotation is tilted about 25° to the plane of revolution, Mars experiences seasons somewhat similar to those of the earth. One of the most apparent seasonal changes is the growing or shrinking of white areas near the poles known as polar caps. These polar caps may be composed of ordinary ice or of dry ice (frozen carbon dioxide) and are thought to be only a few inches thick. During the Martian summer the polar cap in that hemisphere shrinks and the dark regions grow darker; in winter the polar cap grows again and the dark regions become paler.

The mean distance of Mars from the sun is about 141 million mi (228 million km); its period of revolution is about 687 days, almost twice that of the earth. It rotates on its axis with a period of about 24 hr 37 min.

Mars has two natural satellites, discovered by Asaph Hall in 1877. The innermost of these, Phobos, is about 7 mi (11 km) in diameter and orbits the planet with a period of rotation (7 hr 39 min), causing it to rise in the west and set in the east. The outer satellite, Deimos, is about 4 mi (6 km) in diameter.

*Quote of the Week:*

Surely happiness is reflective like the light of heaven; and in every countenance, bright with smiles and glowing with innocent enjoyment, is a mirror, transmitting to others the rays of a supreme and evershining benevolence

-Washington Irving

*Fact of the Week:*

The British monarchy costs taxpayers \$85 million a year.

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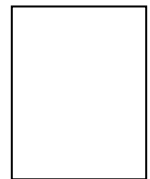
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