Mars...throughout history, no other planet in our solar system has captured human imagination like the red planet. For centuries, scientists wondered if Mars might be covered with vegetation – or even inhabited by intelligent beings.

Today, we know Mars to be quite different. It is a frozen, desert world with towering volcanoes – now silent – and deep canyons. Polar ice caps expand and contract with the Martian seasons. Evidence of ancient rivers and vast oceans indicate a warmer, wetter past.

Only in the past several decades have we been able to see Mars so clearly. Further, much of what we now know is due to the extraordinary efforts of a group of NASA scientists, engineers and technicians who came together in the 1970s and created an ambitious robotic mission...a mission they called Viking.

In August and September of 1975, two large, nearly identical spacecraft were launched from Cape Canaveral, Fl. Vikings 1 and 2, named for the fearless Nordic explorers of Earth, would finally give humans a close-up look at this alien world.
The Beginning

The Viking mission began nearly a decade before at NASA’s Langley Research Center, in Hampton, Va. In 1968, James Martin, former assistant manager for the Lunar Orbiter Project and now deceased, was chosen to lead the mission to Mars.

Managed from Langley, Viking was truly a collaborative effort. The Jet Propulsion Laboratory (JPL), in Pasadena, Calif., built the orbiters and would later manage the science mission. Glenn Research Center in Cleveland, known then as NASA Lewis, designed the Atlas/Centaur rockets. Martin Marietta was the principal contractor. James Martin led them all with commanding style.

“Jim had the experience,” said Tom Young, Viking’s mission director. “He knew what it took to make a project successful. He had the strength and the integrity to do those things that were necessary to make it work.”

“We were really trying to learn about Mars,” said Young. “I don’t think there was anyone on the program – be they engineer, administrator, scientist – who didn’t really appreciate, respect and agree that it was a science mission.”

Project Scientist Gerald Soffen, now deceased, admitted the team was not quite sure how to search for life on Mars, so they did the obvious. They searched for the small creatures always associated with the higher forms of life. They searched for microorganisms.

“I don’t know how you measure it, but Gerry was probably the difference between Viking being an extraordinary science mission and being a good science mission,” said Young.

The Launch

On Aug. 20, 1975, after years of painstaking work, Viking 1 perched atop its gleaming rocket and was launched into history. Just one month later, Viking 2 followed its twin. Both arrived at their destinations in the summer of 1976, America’s bicentennial year.

As Viking 1 eased into its orbit, an onboard camera began scanning potential landing sites.

Beamed back to Earth, the images were studied by Martin and his team. A favorable location was chosen – near ancient outflow channels in a low plain known as Chryse Planitia.
The Landing

About 2 a.m. July 20, 1976, the Viking 1 lander separated from the orbiter and began its hazardous descent to the surface. Plunging through the thin Martian atmosphere at nearly 10,000 miles per hour, the lander was protected by a heat-shielding aeroshell.

At about 19,000 feet, a large parachute was deployed, slowing the hurtling spacecraft. At 4,000 feet, the parachute and aeroshell were released and rockets fired, further slowing the lander’s descent to just six miles per hour.

For 19 agonizing minutes – the time it takes a radio signal to travel to Earth from Mars – the Viking team held their collective breath and waited for confirmation that the lander was down safely and was functioning.

“We got telemetry from the lander all the way down close to the surface, so we knew that the parachute had worked,” said Martin. “We knew the thrusters had worked. We knew the guidance system was working and that the radar was working. But there was a period of those 19 minutes when we didn’t know whether the lander landed successfully. That was nail-biting.”

It was finally confirmed – the Viking 1 lander had made it! “The excitement was overwhelming!” said Young. “People were hugging each other, jumping up and down – doing all those things you do when an extraordinary event has taken place.”

Immediately after touchdown, the lander’s camera took its first picture and relayed the historic image back to Earth. That first picture was of the lander’s foot – to see how far it had sunk into the Martian surface. “And we couldn’t have asked for anything better,” said Martin. “That picture was really worth a thousand words.”

The Viking team repeated this gut-wrenching process with Viking 2, which settled solidly on Martian soil Sept. 3, 1976.

Over the following years, the two Viking spacecraft conducted experiments studying atmospheric and soil composition, meteorology and seismology. These craft provided a catalog of more than 50,000 images from the Martian surface as well as from orbit.

The Science

The principal reason for the Viking mission was to look for evidence of life. Young aptly posed the central questions: “Are we alone or are there other living things out there? Might there have been other living things out there sometime in the past?”

The landers dug soil samples from the frozen surface and looked for signs of respiration – an indication of biological activity. Though the initial results were thought promising, Viking found no conclusive signs of life.

The spacecraft, originally designed to function for 90 days, continued collecting data for more than six years. In that time, the Mars textbook was rewritten. The mission ended in 1982, but the Viking data proved timeless.
Follow-on Missions

Viking blazed the trail for future Mars missions. Mars Pathfinder, the Sojourner rover, Mars Global Surveyor, Odyssey and the European Space Agency’s Mars Express continued to prepare the way.

The twin Mars exploration rovers, Spirit and Opportunity, captured the attention of young and old with their exploration of Mars. In spring of 2006, the rovers had already operated more than eight times as long as their originally planned three-month explorations on Mars. Combined, they have returned more than 150,000 images. In 2004, the project confirmed that at least one place on Mars had a wet and possibly habitable environment long ago.

The most recent mission, the Mars Reconnaissance Orbiter, launched in August 2005, arrived at the Red planet in March 2006, making it the fourth active satellite currently focused on Mars. The orbiter is expected to provide more science data than all previous Mars missions combined.

All of these missions relied on Viking technologies.

As it did for the Viking mission team in 1976, Mars continues to hold a special fascination. Thanks to the dedication of men and women working at NASA centers across the country, the mysterious Mars of our past is becoming a much more familiar place.

NASA’s march across the sparse, yet alluring, planet continues. More inquisitive craft are on the drawing satellite boards. Perhaps one will solve the mystery of what happened to the planet’s water. Perhaps one will deliver the ultimate scientific explorer: humans.

And when humans finally arrive on Mars, they’ll find a pair of dusty pioneers already there – the Viking landers that blazed the trail for all to follow.

Lessons learned from Viking technology have blazed the trail for Mars research. An artist’s concept of NASA’s Mars Science Laboratory serves to compare it with Spirit, one of NASA’s twin Mars Exploration Rovers. Mars Science Laboratory is in development for a launch opportunity in 2009, a landing on Mars in 2010 and investigation of that planet’s past or present ability to sustain microbial life.