Mars Trip Shows That Space Is ‘Cool’ Again

By PATTY REINERT and MARK CARREAU

PASADENA, Calif. – Jennifer Harris was not yet born when Neil Armstrong took that first small step for man, but she still cries every time she sees a documentary on the Apollo program.

She was a 7-year-old farm girl living in Ohio when Viking landed on Mars 21 years ago. She doesn’t remember it.

But Harris and her colleagues at NASA’s Jet Propulsion Laboratory last week showed their fellow Earthlings something they’ll never forget: It was the week that citizens of the Blue Planet sent their robotic explorers on a triumphant return to the Red Planet.

Pathfinder, still up and running, was a low-budget project to Mars. The $262 million mission was built from off-the-shelf parts in an extremely short time frame by a team of young nerds who were in short pants – or not yet among us – when John Glenn first orbited Earth 35 years ago.

Judging from the hoopla, however, NASA has a hit on its hands. Pathfinder capped its seven-month journey July 4 by bouncing onto the rusting, rock-strewn Martian plans and landing on its feet. The mother ship and its robot rover, Sojourner, have since returned enough data to keep scientists busy for months, maybe years.

The mission, which would have been considered successful if it had merely landed safely, has jump-started the search for life in the cosmos, prompted the Vatican to reassert God’s universal dominance and has millions of people buying toy spacecraft and poring over photos of the Martian landscape as if they were pages from a “Where’s Waldo” book.

Harris, an MIT-trained aerospace engineer who served as flight director on landing day, has an explanation for all of this.

“Space is very cool,” she said.

Millions of Internet surfers would seem to agree.

Rich Pavlovsky, JPL’s webmaster, said NASA's Web site alone is expected to top 300 million hits for the week, not to mention hits on more than 20 privately operated “mirror sites” transmitting the same data.

The number of people trying to access the sites over the Fourth of July weekend was phenomenal, but there was a huge increase Monday, presumably because people returned to work and couldn’t resist taking advantage of faster modems and more powerful computers at the office.

“We have blown away all records for NASA events,” Pavlovsky said. “I think people are just excited to see what the surface of Mars Is like. People are fascinated because it looks so much like Earth”

E-mail to NASA scientists and engineers has been pouring in from around the world, with suggestions for improving lander and rover performance, as well as proposed names for the rocks surrounding the landing site.

Pathfinder's team seems partial to cartoon characters with Yogi, Boo-boo and Casper among the monikers selected.

"They are just having a little fun with the data," Pathfinder scientist Peter Smith said of the e-mail writers.

Well sure, it's fun. But Viking landed, took pictures and soil samples and delivered a Martian weather report more than two decades ago. What have we really learned from Pathfinder?

Donna Shirley, an aerospace engineer who manages the Mars Exploration Program office at JPL, said the most important thing Pathfinder taught us was "that we can land on Mars and rove for the price of making a major motion picture."

"And that's what it was supposed to prove," she said.

Shirley said the mission also will be remembered for:

A bumpy rock named Barnacle Bill, which contains quartz, indicating Mars may be much more like Earth than previously thought.

The Ares s Vallis landing site. While Viking showed us a flat, red plain littered with rocks, Pathfinder showed us an up-close view of an enormous flood channel and distant mountains named Twin Peaks.

"The scientists are just going bananas," Shirley said.

The mission also is likely to be credited with changing the image of NASA workers from the crew-cut, pocket-protector set to what Shirley describes as "a bunch of kids running around wearing weird clothes" who are enthusiastic, emotional and "very human."

"This is this generation's Apollo landing," she said. "They grew up on video games and computers and Star Trek and Star Wars. This mission was made for them. It's got all the cool stuff."

The trail that Pathfinder blazed is expected to show the way for numerous relatively low0cost missions to explore Mars and other planets, and – eventually – to seek out new life, or in the case of Mars, very old life.

"We're closer to answering the question about life because we've now proven we can afford to go look," Shirley said. "Congress has made it excruciatingly clear that they are not willing to fund more than NASA's current budget."

Doing good work on the cheap has been the mantra and the mandate of NASA Administrator Dan Goldin, who took over the helm of the space agency in 1992. Pathfinder, as well as several other recent missions, shows Goldin's "faster, cheaper, better" approach to space exploration can actually work.

"As soon as you cut the time, that cuts the cost," said Lloyd Keith, a JPL engineer who had less than three years to develop and test Pathfinder's flight computer and software, the brains of the spacecraft. The time constrains forced Keith and his colleagues to modify existing spacecraft components, communications equipment, cameras and sensors, rather than develop them from scratch.

The probe's computer is basically the same machine that whipped Russian chess grandmaster Garry Kasparov earlier this year, modified to shield it from space radiation. The 6-inch by 9-inch, 2-pound computer cost only $2.5 million to develop, test and launch.

By turning to the marketplace rather than developing their own hardware and software, Keith's team was able to spend 1 ½ years testing the equipment, which lowered the overall risk of failure.

By contrast, NASA's pre-Goldin ventures averaged more than 10 years to develop, and cost a bundle. In today's dollars, Viking cost $3.6 billion. The agency also spent $1 billion on the Mars Observer, which exploded as it approached the Red Planet in 1993.

It spent $1.4 billion on Galileo, which as been circling Jupiter and its major moons since 1995. But the surveyor's high-speed transmitter failed to unfurl in flight, a huge setback that resulted in its findings being sent back to Earth at a frustratingly slow speed.

Besides making budget planners happy, researchers said that Pathfinder could provide an extra payoff in the form of high morale among the next generation of astronauts, scientists and engineers. The probe also could renew support from the American public for space exploration. That was reinforced, in part, by brining outer space to cyberspace.

"As we bring images to the Internet, people feel like they're researchers themselves," said David Brandt, executive director of the National Space Society, a lobbying group in Washington, D.C. "And as people get the feeling they're more part of the mission, they start to see Mars as the frontier – as a new place for us to go and explore."

Go? To that forbidding, frigid, aid place?

"There's no question it's a hostile place," said Louis Friedman, executive director of the Planetary Society in Pasadena, Calif., a 100,000-member group of space aficionados started by science fiction icon Carl Sagan. "But we could live there … or our children could."

Human exploration of Mars could take pace in the relatively near future, say, 2010, researchers said – except for the fact that there is absolutely no funding for it.

When that day comes, Brandt envisions Earthlings tromping about the Martian plains, turning over those rocks wit the cute names and hanging over cliffs to take core samples.

Friedman also hopes to have a nagging question answered. "I want to know if humans can be a multiplanet species," he said. "I want to ask the first person (who goes) to Mars, 'Did (you) like it there?"

"When we went to the moon, the aeronauts were thrilled with the experience, but no e of them really liked it there. No one wanted to stay."

Sending man to the moon changed our view of ourselves and our place in the universe. Going got Mars, where our home appears as a tiny blue morning star, would provide yet another perspective, Friedman said.

"On the one hand, it doesn't really matter to the guy who goes to work every day and comes home, eats dinner, watches a couple of sitcoms and goes to bed," he said. "On the other hand, the very fabric of our being causes us to look into what is life – what does it mean to be human?

"Are we along in the universe, or is there other life out there? Either way, the consequences of knowing are very profound," Friedman said.

Before those dreams and wonderings get completely out of hand, Brandt said, we've got to pull people back down to Earth.

“There are plans for a human mission to Mars in file cabinets at NASA, but there is clearly not congressional support for it,” he said. “What Pathfinder does, we hope, is make it a little bit easier for NASA’s budget to go through this year.”

Several other things would have to happen before humans ever set foot on Mars, Shirley said.

The first priority is the international space station, scheduled to begin construction sometime next year and to be completed by early 2003.

“We need the life science data. We need to get people up in orbit and do a lot of testing,” Shirley said. “When we go to Mars, we want to keep people up there three years at a time. We need to know how the body is going to respond.”

Much more needs to be learned about Mars, and developing the technology for sustaining human life there and getting Earthlings home again safely could take years.

Still, Shirley believes that humans will get there.

“We are going to do it because that’s what people do,” she said. “It’s the frontier, and we have an undying curiosity about the frontier. We want to know what’s out there.”

Meanwhile, Harris and her teammates are looking for new challenges, even new planets, to explore.

“We joke that it would be really terrible if our careers peak at 28,” she said. “I love it. I’m excited, and I feel like I’m doing something significant to serve my country.”

Her next task could be the planned 2005 Mars mission aimed at brining a box of rocks back to Earth for hands-on study, or the Europa lander, to explore Jupiter’s moon …

Very cool.

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