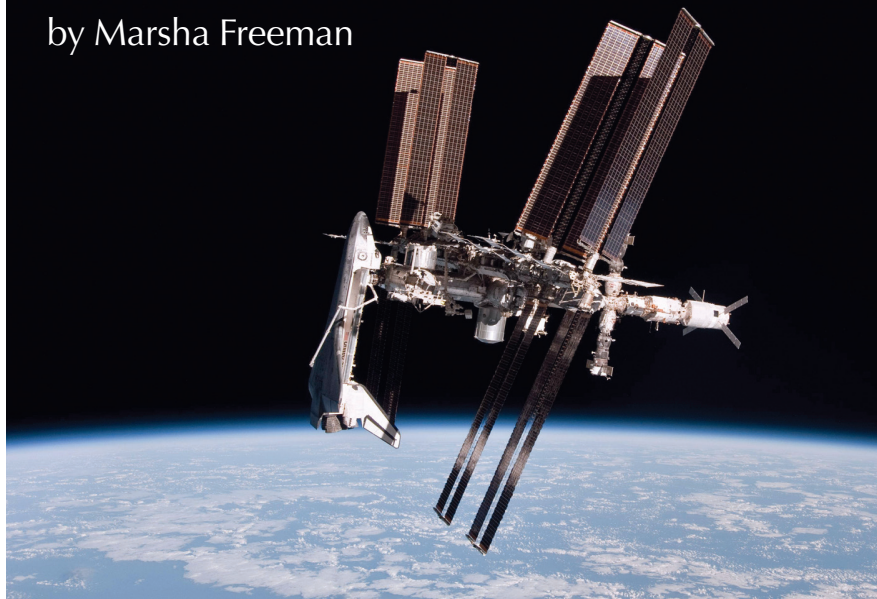


Shuttle Opened the Next Space Frontier

by Marsha Freeman



NASA

The transport on April 17 of the Space Shuttle orbiter *Discovery*, from its home base at the Kennedy Space Center in Florida, to its retirement home near Washington, D.C., allowed the American public to reflect upon what this unique space exploration capability had accomplished over its 30 years of service.

But the reason that thousands of people in the Washington area and beyond took their children out of school, and stood on rooftops, bridges, and highways as *Discovery* circled overhead, was not to reminisce, but because it reminded them that space exploration defines the task for the future, a future that is being robbed by the Obama Administration. If there were any feeling of melancholy among the Shuttle workers accompanying *Discovery* or the citizens who saw her that day, it was not because the Shuttle is

being retired, but because there is nothing to replace it.

Over three decades, the Space Shuttle fleet of five orbiters carried out ex-

traordinary missions: launching science probes to the farthest reaches of the Solar System; deploying telescopes, including the Hubble Space Telescope, that could peer farther into the Universe than any instrument before them; repairing errant satellites; and opening space travel, for the first time, to scientists, engineers, school teachers, and others from dozens of nations around the world.

Over its 30 years of service, NASA's Space Shuttle fleet's most long-lasting accomplishment was the construction of the International Space Station, seen here in May 2011, with the Shuttle orbiter *Endeavour* docked to it, on the left. Over the coming decades, what is learned on the Station will lay the basis for deep-space missions to come, such as those of Mars exploration.

But the Space Shuttle's true legacy is what it has done to help create the future.

Preparing for Mars

After the first manned landing on the Moon, in July 1969, NASA put for-



EIRNS/Marsha Freeman

All of the astronauts who have commanded missions aboard Discovery were present at the orbiter's roll out. The mission for the fleet now, they all stressed, is to inspire the next generation of space explorers.



EIRNS/Stuart Lewis

Over its lifetime, Space Shuttle Discovery completed 39 missions in orbit, traveled more than 140 million miles, and spent 365 days in space. The wear and tear on the vehicle was clearly seen when it was rolled out (right), for the ceremony to transfer it from NASA to the National Air & Space Museum. The Enterprise, in pristine condition (left) never flew in space, but was used for aerodynamic testing, and is externally identical to the flight-worthy orbiters. It will be on display at the Intrepid museum in New York City.

ward a three-phase program to build upon the accomplishments of Apollo: As lunar exploration continued, a reusable space transportation system to low Earth orbit would be used to build an orbiting space station. *This would lay the basis for later manned missions to Mars.*

The Space Shuttle fleet was the enabling capability to build the permanently manned International Space Station (ISS), which is the home and workplace for six crew members. On board, experiments underway are discovering the deleterious effects of microgravity on human physiology, the increased virulence of harmful bacteria and viruses, and palliative measures that could keep crew members healthy.

Partial-gravity centrifuges on the station could give us a preview of the challenges that living in a one-third Earth-gravity on Mars will present to future colonists. There are discussions underway to simulate the multi-minute lagtime in communications that will exist between a crew on Mars, and Mission Control in Houston. New technologies, such as plasma rockets for propulsion, will be given a trial-run on the station, before they are de-

ployed to deep space.

It is at the ISS that mankind will prepare for missions back to the Moon, and later, to Mars.

Inspiring the Next Generation

Throughout the ceremonies and celebrations for *Discovery's* transfer from NASA to the Smithsonian Institution's National Air & Space Museum, the top NASA leadership continued its campaign to try to deny the indefensible shutdown of the nation's manned space program, by the Obama Administration. By all accounts, very few people were convinced.

At the *Discovery* transfer ceremony on April 19, former astronaut and former Sen. John Glenn expressed his disappointment that the Shuttle fleet was being prematurely retired, and that the orbiters will now be museum exhibits. He had personally appealed to the White House after President Obama came into office, to reverse President Bush's policy to retire the Shuttle fleet, before there were a replacement.

Not only did the Obama Administration not reverse that foolish decision, it proceeded to *cancel* the next-generation Constellation manned space-flight program.

The space program represents

"America's pioneering nature," Glenn said, and the main job of the Space Shuttle orbiters now, is to inspire the next generation of explorers.

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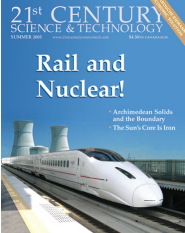
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