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Sky Walking
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Q: The space shuttle is scheduled for its next test flight (after the 2003 Columbia accident) in May 2006—has NASA fixed the problems that doomed Columbia?

A: NASA has decided to remove the sprayed-on area of foam insulation on the shuttle's external tank that shed a chunk during last summer's Discovery test flight. That built-up foam "ramp" protected a channel of wires and pipes running down the side of the tank; analysis shows the extra protection isn't needed, and its complicated shape made it difficult to apply foam consistently there. Once two tanks are ready (one for Discovery, one for its backup "rescue" shuttle Atlantis), NASA will launch, perhaps in May, but more likely in early summer.

The reason we need to replace the shuttle as soon as possible is that other unexpected problems with the 25-year-old orbiters may crop up, forcing another costly, lengthy redesign.

Q: The president has announced a new direction for NASA and the US in space. Does a national goal of returning to the Moon and shooting for Mars make sense?

A: NASA's lack of a long-term goal in the past two decades led to the government neglect that nearly killed the Space Station and delayed the shuttle's replacement, one of the causes of the Columbia disaster. So the president's statement of ambitious new goals was long overdue. Now astronauts know that the risks they take are matched by the promise that humans will once again leave Earth orbit, as we did in Apollo 35 years ago.

If robotic explorers find recoverable water and mineral resources on the Moon, we may need human explorers there to exploit them. If the Moon is not resource-rich, we should bypass it for the resources already known on the near-Earth asteroids, giving us valuable deep-space experience needed to protect our planet and prepare us for the search for ancient life on Mars.

Q: In your experience, what elements of the astronaut's job are toughest on spouses, children, and families? How do they cope?

A: Spaceflight demands total focus on the success of the mission. The long months of training and concentration (stretching as long as 3-4 years) inevitably lead to an astronaut spending too much time, both physically and mentally, away from the family. At the same time, his or her family knows that their future together hangs on the outcome of those last few seconds of the countdown at the Cape. As the launch date approaches, stress and anxiety build to levels I never anticipated. Putting families through that for mission after mission (I trained for seven of the eleven years I was at NASA) takes a big toll on families. They get through it with love, understanding, prayer, and the support of friends and extended families.

Q: Why should our young people want to become astronauts? What skills will they need to succeed in the 21st century space program?

A: The next generation of explorers may have the opportunity to crew an outpost on the Moon, erect telescopes a million miles from Earth, nudge hazardous asteroids from a collision course with our planet, or search for life in the ancient bedrock of Mars. Those potential adventures are breathtaking in scope and potential payoff. But those challenges will demand the best from our youth and our educational system, forcing us to be the globe's leaders in science and technology. We'll need young people highly trained in math, science, and all types of engineering. That's the key to our economy's competitiveness in the 21st Century. We graduated 60,000 engineers last year; the Chinese—700,000.

Q: What are your most vivid memories of your experience in space?

A: Two things: my four shuttle flights gave me an incredible experience building close friendships with my fellow astronauts. We worked hard to build teamwork, trusted each other with our lives, and shared a unique adventure together. Those friendships—with some of the finest Americans I will ever know—will last a lifetime.

The aesthetic experience of looking back at Earth over 53 days in orbit is one I'll treasure always. The beauty of our planet with its fragile complexity, and the immensity of the universe we insignificant humans inhabit, gave me a glimpse of Creation and a confirmation of faith that's priceless.