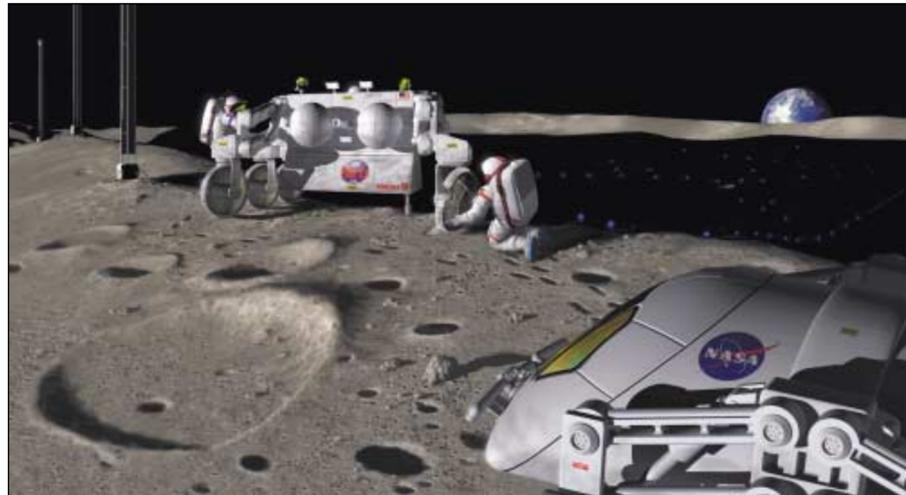


'Human beings are headed into the cosmos'

By Kendra Phipps



This illustration by Pat Rawlings depicts a massive reservoir of ice imbedded in permanently shadowed soil at the Moon's south pole. This reservoir can provide the hydrogen and oxygen to fuel a fleet of spacecraft and provide atmosphere and water for future lunar inhabitants. Analysis of data from the joint NASA-BMDO Clementine mission confirmed this frozen resource in 1997.

Excitement ran high in Johnson Space Center's Teague Auditorium as employees gathered to witness history.

President George W. Bush made a significant announcement Wednesday, Jan. 14, 2004, from NASA Headquarters concerning the future of the space agency. The speech was broadcast on NASA Television and shown to a packed auditorium at JSC.

"This Agency, and the dedicated professionals who serve it, have always reflected the finest values of our country: daring, discipline, ingenuity and unity in the pursuit of great goals," Bush said. "Inspired by all who have come before, and guided by clear objectives, today we set a new course for America's space program."

"We will build new ships to carry man forward in the universe," he said. "We will gain a new foothold on the Moon and prepare for new journeys to worlds beyond our own."

Bush's plan contains three goals, which are posted in full at <http://www.whitehouse.gov/news/releases/2004/01/20040114-1.html>:

"America will complete its work on the International Space Station by 2010, fulfilling our commitment to our 15 partner countries. ... To accomplish this goal, NASA will return the Space Shuttle to flight consistent with safety concerns and the recommendations of the Columbia Accident Investigation Board."

"The United States will begin developing a new manned exploration vehicle to explore beyond our orbit to other worlds – the first of its kind since the Apollo Command Module. The new spacecraft, the Crew Exploration Vehicle, will be developed and tested by 2008 and will conduct its first manned mission no later than 2014."

"America will return to the Moon as early as 2015 and no later than 2020 and use it as a steppingstone for more ambitious missions. A series of robotic missions to the Moon, similar to the Spirit Rover that is sending remarkable images back to Earth from Mars, will explore the lunar surface beginning no later than 2008 to research and prepare for future human exploration."

Bush said that the Space Shuttle's primary purpose over the next few years will be to help finish assembly of the Space Station, and that the fleet will be retired by 2010.

"Our current programs and vehicles for exploring space have brought us far, and they have served us well," Bush said. "Yet for all these successes, much remains for us to learn and explore. It is time for America to take the next step."

That "next step" is the Moon.

"The Moon is a logical step towards further progress and achievement," Bush said. "With the experience and knowledge gained on the Moon, we'll then be ready to take the next steps towards space exploration: human missions to Mars and to worlds beyond." At these words, applause erupted both in the Teague and at NASA Headquarters.

Bush said that while robotic missions will serve as necessary "trailblazers" to the Moon, humans must be a part of the exploration in order to research more effectively and think through unforeseen challenges – as well as to satisfy the human desire to explore the unknown.

"The human thirst for knowledge ultimately cannot be satisfied by even the most vivid images or the most detailed measurements," he said. "We need to see and examine and test for ourselves, and only human beings are capable of adapting to the inevitable uncertainties posed by space travel."

Sending humans to the Moon will not be an inexpensive task. Bush outlined his budget plan during his speech, and the key points are posted in full at <http://www.whitehouse.gov/news/releases/2004/01/20040114-1.html>. They include the points below.

- The funding added for exploration will total \$12 billion over the next five years. Most of this added funding for new exploration will come from reallocation of \$11 billion that is currently within the five-year total NASA budget of \$86 billion.

- In the Fiscal Year (FY) 2005 budget, the President will request an additional \$1 billion to NASA's existing five-year plan, or an average of \$200 million per year.

- From the current 2004 level of \$15.4 billion, the President's proposal will increase NASA's budget by an average of 5 percent per year over the next three years, and at approximately 1 percent or less per year for the two years after those.

Bush said that the country will be "repaid many times over" by the technological breakthroughs that

will arise from new exploration, and made reference to the "tangible benefits that improve our lives in countless ways" that have come from the space program. These include improvements to weather forecasting systems, satellite telecommunications, computing, electronics and medical technologies.

Another return on this investment, Bush said, will be the enthusiasm of students generated by this exploration.

"The fascination generated by further exploration will inspire our young people to study math, science and engineering," he said, "and create a new generation of innovators and pioneers."

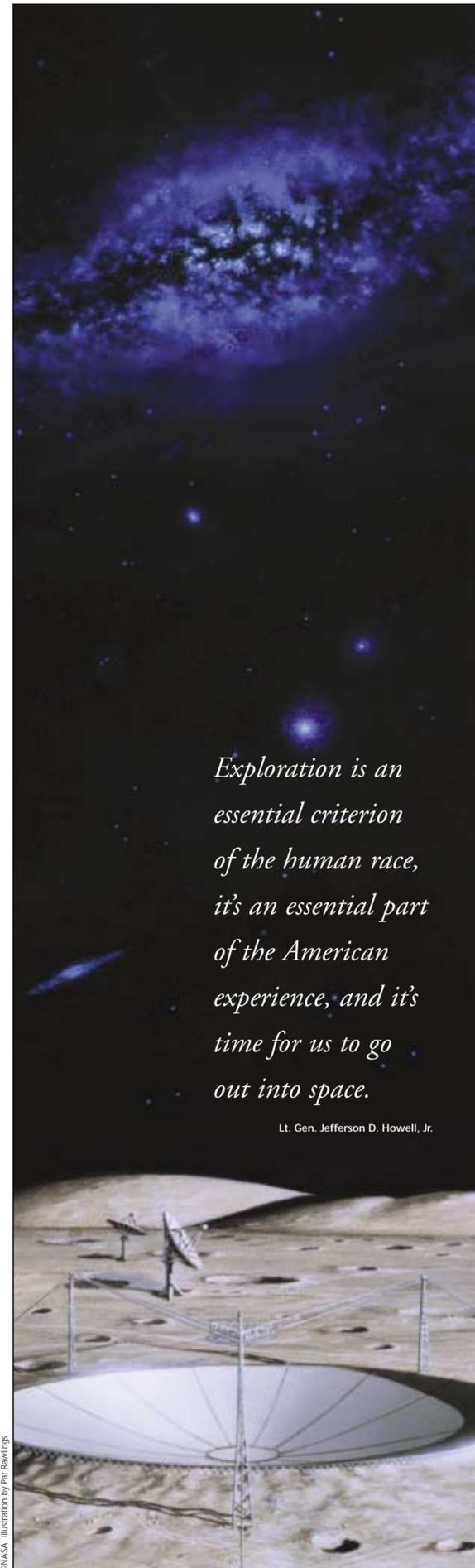
Bush concluded with an acknowledgement of the upcoming anniversary of the *Columbia* accident, and of the fact that "space travel brings great risks."

"*Columbia* did not turn away from the challenge, and neither will we," Bush said. "Mankind is drawn to the heavens for the same reasons we were once drawn to unknown lands and across the open seas. We choose to explore space because doing so improves our lives and lifts our national spirits – so let us continue the journey."

"We do not know where the journey will end," he said, "but we know this – human beings are headed into the cosmos."



The President's vision affirms the nation's commitment to human space exploration starting with a return to the Moon that will ultimately enable future exploration of Mars and other destinations.



Exploration is an essential criterion of the human race, it's an essential part of the American experience, and it's time for us to go out into space.

Lt. Gen. Jefferson D. Howell, Jr.

©NASA Illustration by Pat Rawlings

New Space Exploration Vision

On Jan. 14, the President announced a new vision for NASA

- Implement a sustained and affordable human and robotic program to explore the solar system and beyond
- Extend human presence across the solar system, starting with a human return to the Moon by the year 2020, in preparation for human exploration of Mars and other destinations
- Develop the innovative technologies, knowledge and infrastructures both to explore and to support decisions about the destinations for human exploration
- Promote international and commercial participation in exploration to further U.S. scientific, security and economic interests.

The vision affirms the nation's commitment to space exploration and provides a clear direction for the civil space program

- Vision responds to concerns expressed by the CAIB, Congress and elsewhere on the need for a long-term vision for human space exploration
- Vision broader than some reports that it is about returning humans to Moon; indeed, robotic activities and exploration of other destinations are critical elements
- Activities will be paced by experience, technology readiness and affordability
- Implementation begins now with key missions that are already in progress such as Mars exploration, visits to other solar system targets and Origins activities

Guiding Principles for Exploration

Pursue Compelling Questions

- Exploration of the solar system will be guided by compelling questions of scientific and societal importance
- Consistent with the NASA Vision and Mission, NASA exploration programs will seek profound answers to questions of our origins, whether life exists beyond Earth and how we could live on other worlds

Across Multiple Worlds

- NASA will make progress across a broad front of destinations
- Consistent with recent discoveries, NASA will focus on likely habitable environments at the planet Mars, at the moons of Jupiter and in other solar systems
- Where advantageous, NASA will also make use of destinations like the Moon and near-Earth asteroids to test and demonstrate new exploration capabilities

Employ Human and Robotic Capabilities

- NASA will send human and robotic explorers as partners, leveraging the capabilities of each where most useful
- Robotic explorers will visit new worlds first to obtain scientific data, demonstrate breakthrough technologies, identify space resources and send tantalizing imagery back to Earth
- Human explorers will follow to conduct in-depth research, direct and upgrade advanced robotic explorers, prepare space resources and demonstrate new exploration capabilities

For Sustainable Exploration

- NASA will pursue breakthrough technologies, investigate planetary resources and align ongoing programs to develop sustainable, affordable and flexible solar system exploration strategies
- The vision is not about one-time events and, thus, costs will be reduced to maintain the affordability of the vision

Starting Now

- NASA will pursue this vision as our highest priority
- Consistent with the FY 2005 budget, NASA will immediately begin to realign programs and organizations, demonstrate new technical capabilities and undertake new robotic precursor missions to the Moon and Mars before the end of the decade

Key Elements of New Space Policy

Space Shuttle

- Return the Space Shuttle to flight and plan to retire it by the end of this decade, following completion of its role in the construction of the International Space Station

International Space Station

- Complete assembly
- Refocus research to exploration factors affecting astronaut health
- Acquire crew and cargo systems, as necessary, during and after availability of Shuttle

Crew Exploration Vehicle (CEV)

- Develop a CEV to travel beyond low Earth orbit, the first new U.S. human space flight vehicle since the 1980s
- Undertake first test flight by the end of this decade to provide an operational capability to support human exploration missions no later than 2014

Lunar Exploration

- Begin robotic missions to the Moon by 2008, followed by a period of evaluating lunar resources and technologies for exploration
- Begin human expeditions to the Moon in the 2015–2020 timeframe

Mars Exploration

- Conduct robotic exploration of Mars to search for evidence of life, to understand the history of the solar system and to prepare for future human exploration
- Timing of human missions to Mars will be based on available budgetary resources, experience and knowledge gained from lunar exploration, discoveries by robotic spacecraft at Mars and other solar system locations, and development of required technologies and know-how

Other Solar System Exploration

- Conduct robotic exploration across the solar system for scientific purposes and to support human exploration
- In particular, explore Jupiter's moons, asteroids and other bodies to search for evidence of life, to understand the history of the solar system and to search for resources

Exploration Beyond

- Conduct advanced telescope searches for Earth-like planets and habitable environments around other stars

Enabling Capabilities

- Develop and demonstrate power generation, propulsion, life support and other key capabilities required to support more distant, more capable and/or longer-duration human and robotic exploration of Mars and other destinations