The Kennedy legacy: We can still rediscover the frontier of space

by Marsha Freeman

Last month's dramatic repair of the Hubble Space Telescope by Space Shuttle astronauts led many to recall the pride all Americans felt when the first men walked on the Moon nearly a quarter of a century ago. The Apollo program, announced by John F. Kennedy on May 25, 1961, was intended by the President to not only attain the goal of the first manned lunar landing, but to use this challenging effort of the exploration of space as a driver to reinvigorate education and advance manufacturing technology, as well as to serve as a demonstration to other nations around the world of what a free and democratic United States could accomplish vis-à-vis the Soviet Union.

Only three months into his term, President Kennedy was faced with the fiasco of the Bay of Pigs invasion of Cuba. He realized that, in order to change the direction his presidency was taking, he would have to set the country on the course of pursuing a great project. On April 12, 1961, Soviet cosmonaut Yuri Gagarin became the first man to orbit Earth. Vice President Lyndon Johnson aggressively lobbied for the administration's "great project" to be a forward-looking civilian space program.

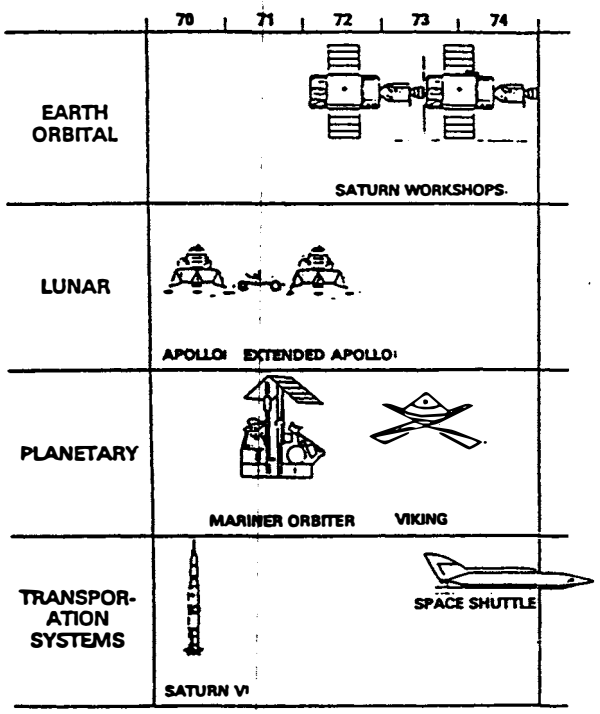
On April 20, President Kennedy asked Johnson to assess America's standing in the space race and determine what the U.S. program should do to match and beat the Soviets. The directors of the newly created research centers of the National Aeronautics and Space Administration (NASA) were asked to respond to a series of questions on space policy, and on April 29, Marshall Space Flight Center director Wernher von Braun sent his reply to the President via Johnson.

Von Braun's evaluation was that the United States would not be able to compete with the existing Soviet rockets, and that, therefore, a longer-range goal would have to be set to give the United States time to catch up. Von Braun wrote that to land "a man on the Moon and bring him back to Earth" would require a rocket "about 10 times as powerful" as what the Soviets then had demonstrated.

"We have a sporting chance of sending a three-man crew *around the Moon* ahead of the Soviets," von Braun wrote, and "we have an excellent change of beating the Soviets to the *first landing of a crew on the Moon*. . . . With an all-out crash program I think we could accomplish this objective in 1967/68." Von Braun's suggested formulation was: "Let's land a man on the Moon in 1967 or 1968." President Kennedy extended the deadline to "the end of this decade" of the 1960s, in adopting the von Braun program.

Greatest peacetime mobilization in history

President Kennedy's Apollo announcement would lead to the greatest peacetime mobilization of the scientific and engineering capabilities of any nation in history. For the next 20 years, the U.S. economy would benefit from the



Wernher von Braun's integrated space program, 1970-90.

introduction of computers into the transportation, manufacturing, and consumer sectors; the development of new materials, instruments, and devices for medical applications; satellite remote sensing to aid agriculture and improve weather forecasting; and thousands of other improvements to increase productivity throughout the economy.

Neither President Kennedy nor the visionaries in the space program, such as Wernher von Braun, conceived of the space program as something that had an "end." Kennedy compared space exploration to the opening of new continents to human activity through the seafarers of past ages, and described space as "this new ocean." But the U.S. space program came under attack from liberal think-tanks, the Soviets, and almost everyone in President Kennedy's own administration from the inception of the Apollo announcement. The program stayed on track while the President was alive through his personal attention to it, and the momentum and excitement this had generated.

The peak funding year for NASA was 1965. Lyndon Johnson's announcement of his "Great Society" initiative in 1964 opened the floodgates for the think-tanks and media to gear up the cultural paradgim shift away from science, economic growth, and optimism about the future toward zero growth, environmental scare hoaxes, the spread of illicit drugs, and the self-indulgent nihilism of the counterculture. "Inner space" was now to replace outer space as the object of inquiry for the human mind.

NASA officials such as Administrator James Webb fought tooth-and-nail to keep the forward motion of the space program alive. But it was becoming clear that the final lunar landing missions under the Apollo program would be cancelled (the last three were), and there was a constant danger that the end of the manned space program was near.

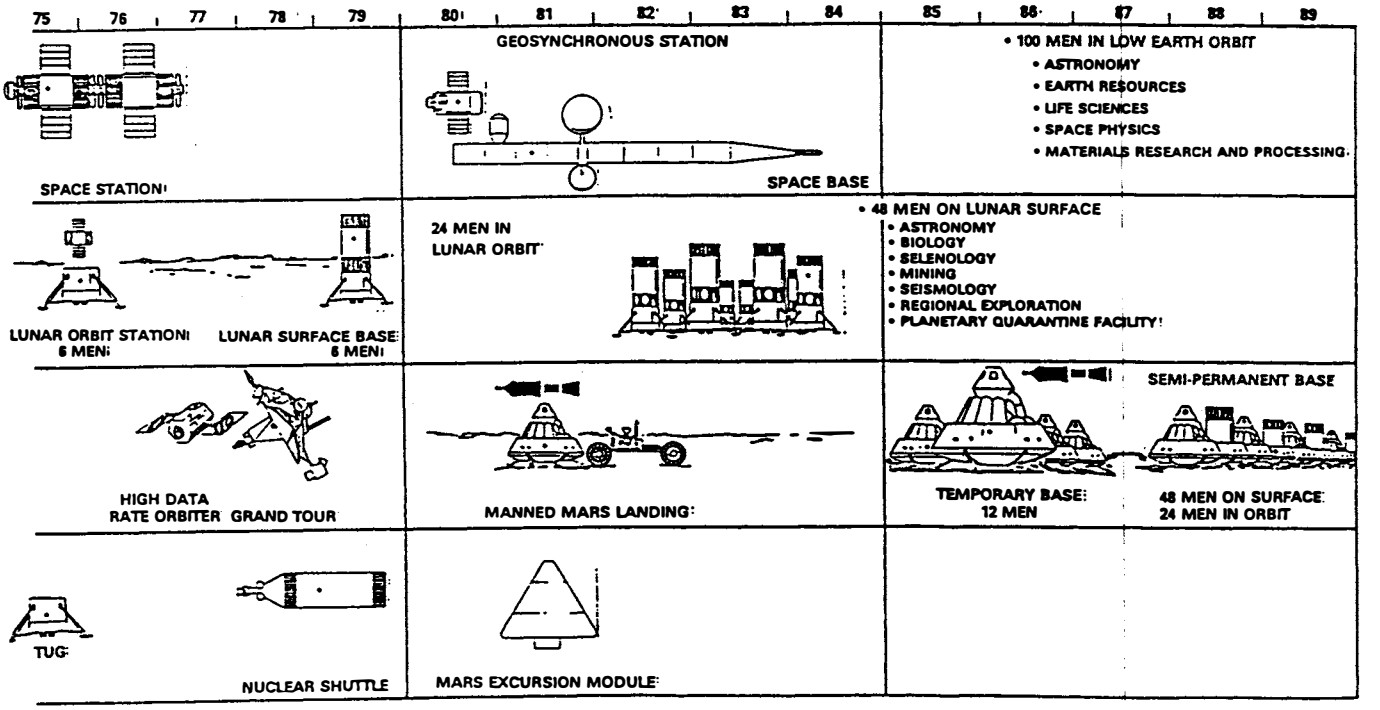
Von Braun's 'Integrated Space Program'

A few months before the July 20, 1969 lunar landing, President Richard Nixon asked Vice President Spiro Agnew to establish a Space Task Group to develop policy recommendations for the post-Apollo period. Wernher von Braun and the German space experts who had come here with him after World War II prepared a 20-year Integrated Space Program, (depicted in the accompanying figure) which was presented to the Space Task Group in September on behalf of NASA.

According to that program, basic space infrastructure in Earth orbit would be deployed to enable scientific experiments in the microgravity environment, Earth observation satellites, and space stations to enable trips to other parts of the Solar System.

The program envisioned an extension of the Apollo lunar missions of small, three-man crews, leading to the establishment of lunar bases throughout the 1970s. By the 1980s, the Moon would house a complex of scientific laboratories for research in astronomy, biology, and selenology (the study of the Moon), as well as industrial mining facilities.

By 1980, the Integrated Space Program projected, the first manned landing on Mars would be accomplished. This



would be preceded by unmanned missions, and followed by the operation of a semi-permanent Mars base by 1989 housing 48 men on the surface of the planet and supporting 24 more men in an orbiting Mars space station. Other spacecraft would be sent to explore both the inner planets, particularly Venus, and also a Grand Tour of the outer planets would be undertaken.

The transportation systems required to enable this array of space missions would include a reusable Earth-to-orbit space shuttle, an in-orbit tug to move spacecraft around from one orbit to another, a nuclear-powered shuttle for cislunar and Mars trips, and a Mars excursion module for the 1980s.

The Integrated Space Program could have been accomplished on the timeline presented in 1969, if the resources had been committed to make it a reality. But Nixon's Republican economic advisers convinced the President that it was more important to cut federal spending, which had ballooned in part to fund the increasingly unpopular war in Vietnam, than to use targeted federal spending to ensure real economic growth.

Out of the entire comprehensive 20-year Integrated Space Program, only the reusable Space Shuttle has been developed and built in the manned space program. Unmanned planetary probes have made journeys to all of the regular planets of the Solar System (which excludes Pluto); however, they had been envisioned not as ends in themselves, but precursors to in-depth robotic exploration, and eventually objects for study directly by men.

Astronaut John Glenn explains the use of a "space glove" to President John F. Kennedy. By 1980, if the original Apollo thrust had been kept up, the first manned landing on Mars would have been achieved.

When vision is blinded by pragmatism

What was the impact of having abandoned Kennedy's vision of the space program?

The downgrading of space exploration from an economic, scientific, and even cultural driver for the United States to a single line-item in the increasingly bloated federal budget left much of the U.S. economy without a continuous fountain of new technological breakthroughs. The last two decades have seen a slowdown in the rate of introduction of new technology into the economy, leading to a stagnation in productivity growth, lack of investment in infrastructure and basic industry, and increasing dependence upon financial speculation as opposed to growth in the physical economy.

Dozens of critical new technologies in energy production, metal and materials processing, transportation, and manufacturing sit idly on the shelves of R&D laboratories having never been commercially deployed.

Education, which was reoriented more toward science and mathematics in the late 1950s after the Soviets launched Sputnik, has increasingly become oriented to how children "feel" rather than whether they are prepared to contribute to the scientific frontiers of tomorrow.

Without long-range, challenging, and visionary goals, the citizens of this nation have become susceptible to believing hoaxes, scare stories, and lies. Irrational fears of technology, science, and scientists, and of virtually anything that is not "familiar," now dominate a citizenry which a mere two decades ago was focused on the accomplishments of space exploration, the excitement of new nuclear energy power plants that were the technology of the future, and its nation as the one that set the standard for great accomplishments throughout the world.

Many children throughout the 1960s wanted to become scientists, engineers, or astronauts, and many of them did. What a difference we see with today, where the heroes projected on television are football players, rock stars, or stock market speculators.

Although two decades have been virtually lost in our space program, exemplified by the fact that the space station that had been planned 20 years ago is continuously fighting for its very survival, it is not too late to set the goals for building cities on the Moon and performing manned missions to Mars during the first two decades of the twenty-first century.

There would be no more appropriate time to make such a turnaround in policy than this year, which marks the 25th anniversary of the first manned landing on the Moon.