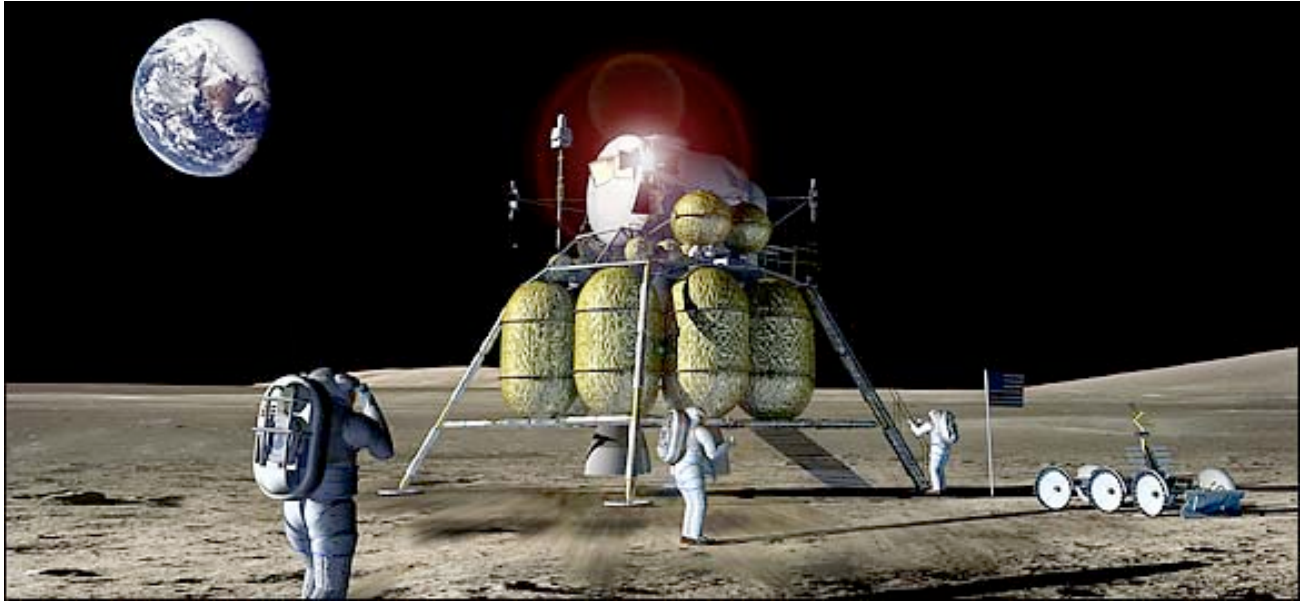


NASA Planning Return to Moon Within 13 Years

By WARREN E. LEARY

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WASHINGTON, Sept. 19 - Combining an old concept, existing equipment and new ideas, NASA gave shape on Monday to President Bush's promise to send humans back to the Moon by the end of the next decade.



NASA, via Reuters

Another small step: A depiction of a proposed new lunar lander.

Michael D. Griffin, the agency's new administrator, detailed a \$104 billion plan that he said would get astronauts to the Moon by 2018, serve as a steppingstone to Mars and beyond, and stay within NASA's existing budget.

The plan would use a new spacecraft similar to the Apollo command capsule of the original Moon program, and new rockets made up largely of components from the space shuttle program.

"It is very Apollo-like," Dr. Griffin said, "but bigger. Think of it as Apollo on steroids."

The plan drew a mixture of praise and criticism from lawmakers and space experts.

The chairman of the House Science Committee, Representative Sherwood Boehlert, Republican of New York, said it appeared to be "the safest, least expensive and most efficient way" of moving forward in space exploration, but added that current cost overruns in other NASA programs might make it hard to develop the new vehicle on schedule.

The outlines of the plan had been disclosed informally over the last two months by NASA officials and space experts. But Dr. Griffin's announcement laid out a timetable and a

budget, putting flesh on the bones of a proposal that Mr. Bush announced in January 2004 but had never described in detail.

Dr. Griffin said that after adjusting for inflation, the program would cost just 55 percent of what it cost to put a dozen men on the lunar surface from 1969 to 1972.

The pay-as-you-go plan, approved by the White House last week, would stay within NASA's \$16-billion-a-year budget through a combination of retiring the space shuttle, finishing the International Space Station and reallocating money from other NASA programs. And Dr. Griffin said the nation could well afford it, despite concern about tight budgets in the wake of Hurricane Katrina.

"We're talking about returning to the Moon in 2018," he said at a news conference here in Washington. "There will be a lot more hurricanes and a lot more other natural disasters to befall the United States and the world in that time, I hope none worse than Katrina.

"But the space program is a long-term investment in our future. We must deal with our short-term problems while not sacrificing our long-term investments in our future. When we have a hurricane, we don't cancel the Air Force. We don't cancel the Navy. And we're not going to cancel NASA."

Dr. Griffin and other space advocates, including influential members of Congress, have said the United States needs a replacement for the aging shuttle fleet as a matter of national security. Russia and China are currently capable of human spaceflight, and other countries have expressed interest in following suit. Dr. Griffin said the nation must maintain an independent capability to send people into space after the shuttle retires in 2010.

The new craft, called the crew exploration vehicle, would perch the astronauts' capsule above the rockets that power it into space, rather than alongside them as with the shuttle. NASA officials said it would be 10 times as safe as the shuttle, with a projected failure rate of 1 in 2,000, as opposed to 1 in 220 for the shuttle. The increased safety, they said, will be due in part to escape rockets that will be able to jettison the capsule away from the booster rocket in the event of an accident.

Dr. Griffin said the vehicle would be able to take as many as six astronauts to the space station, or fewer astronauts and some cargo. Or it could fly robotically without a crew, he added, carrying up some 25 tons of cargo, about as much as a shuttle can carry. The wingless craft, weighing 50 percent more than the Apollo, could carry a crew of four to the Moon.

As envisioned, the craft would resemble a larger version of the Russian spacecraft Soyuz, including solar-power panels deployed after launching. It would be carried aloft on a modified version of one of the shuttle's solid-fueled rocket boosters and a new second stage using one of the shuttle's main liquid-fueled engines. For Moon voyages, the craft would rendezvous in Earth orbit with lunar components lifted on a big new cargo rocket.

This heavy-cargo rocket, which could put 125 tons into orbit, would comprise two extended shuttle solid-fuel boosters attached to a liquid hydrogen-oxygen first stage made of an extended shuttle external fuel tank with five shuttle main engines. Atop this would be a new second stage using one or more of the shuttle main engines.

The bigger rocket, capable of lifting the payload of the Saturn V, which sent men to the Moon decades ago, would put into Earth orbit another rocket that could carry a landing craft and the crew vehicle to the Moon.

The Moon mission would be accomplished in stages. First, a vehicle with a lunar lander and a Moon rocket would be launched into Earth orbit. The crew capsule would be launched as much as a month later and would meet the first vehicle in orbit.

The joined craft would then be propelled to lunar orbit. From there, the landing craft would fly to the surface, and its crew of four would spend up to a week exploring.

Afterward, the top part of the two-piece lander would take the crew back to lunar orbit to rendezvous with the crew vehicle, which would have been left there unmanned, for the trip back to Earth. The bottom part of the lander could be left behind with equipment that might be used by future crews that land nearby, the agency said.

Nearing Earth, the crew vehicle would jettison its equipment module before the crew capsule plunged into the atmosphere. Parachutes would slow the capsule before it landed in the water or on land, possibly at Edwards Air Force Base in California. The landing would be cushioned by air bags on the craft's bottom or small rockets that fire just before touchdown.

Some of the big military contractors that stand to win multibillion-dollar contracts to launch and maintain the new mission vehicles said they were pleased by Monday's announcement.

"This is a big deal for us," said Michael Coats, chief of space exploration for the nation's largest military contractor, the Lockheed Martin Corporation, one of two teams competing to build the crew exploration vehicle. "Today's announcement means that we will have a stable program for a while. It would be great for us to compete and win a piece of the business."

Lockheed is the leader of a consortium that currently has a \$28 million contract to design the crew exploration vehicle. Another team, headed by the Boeing Company and Northrop Grumman, has an identical contract to design an alternative. NASA is expected to select the winning design next spring.

John E. Pike, a space policy expert with the consulting firm GlobalSecurity.org, said NASA needed to sell more people on the value of a Moon program if it is to preserve future budgets and continue space exploration. The Moon may be a source of the rare element helium-3, for instance, which could fuel fusion reactors to provide abundant electricity on Earth, he said.

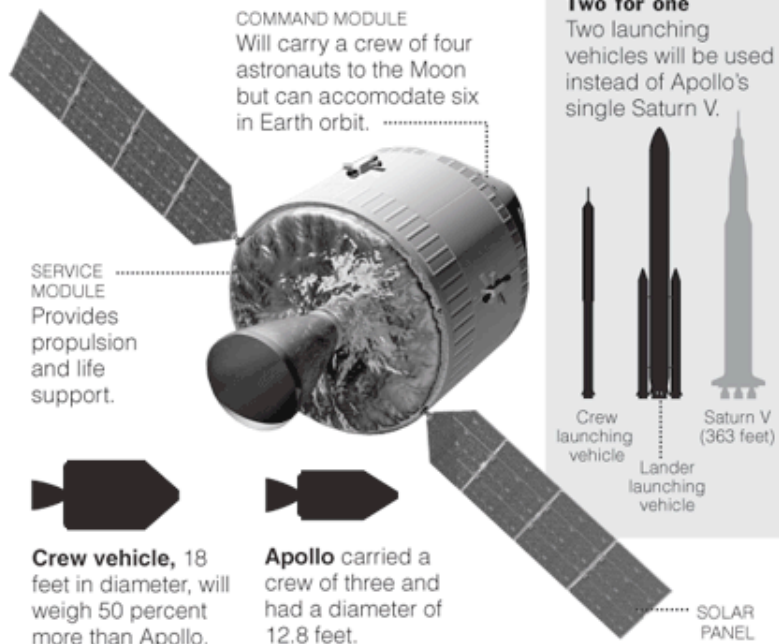
"NASA," Mr. Pike said, "needs to have reasons like this to go back to the Moon so the program has more stakeholders who see its value and want to protect it."

Leslie Wayne contributed reporting from New York for this article.

Back to the Moon

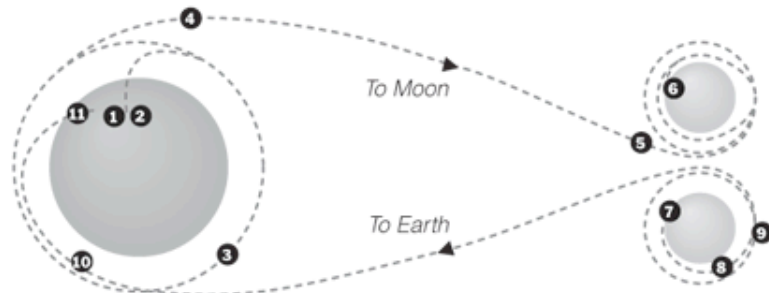
NASA has unveiled an ambitious plan to replace the shuttle and return Americans to the Moon by 2018. The design of the new craft is strikingly similar to the hardware used in the Apollo program nearly 50 years earlier, with a conical crew vehicle and a separate lander (not shown).

Crew Exploration Vehicle (C.E.V.)



From the Earth to the Moon

Unlike the Apollo effort, the new plan calls for the lander to be launched on a separate rocket from the crew vehicle. They will dock in Earth orbit before heading for the Moon. The entire crew will descend to the surface.



- 1 Lander launching 4 Departure 7 Ascent from Moon
- 2 Crew launching 5 Lunar orbit 8 Dock with C.E.V.
- 3 Docking 6 Lunar landing 9 Lander jettisoned
- 10 Re-entry 11 Landing

A timetable, but no longer a race

Unlike the space race of the 60's, there is not an all-out rush to reach the Moon. Apollo took 8 years to accomplish its goal. This plan will take 13 years.

