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NASA Unveils $104 Billion Plan To Return to the Moon by 2018

Spacecraft Draws on Apollo, Avoids Shuttle Foam Problem

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NASA yesterday released its master plan for returning humans to the moon by 2018 and eventually sending them to Mars, choosing rocketry from the space shuttle era and drawing inspiration from the Apollo program that first put humans on the lunar surface 36 years ago.

NASA Administrator Michael D. Griffin said the plan would cost $104 billion over the next 13 years, with increases for inflation, but would not require extra money beyond NASA's normal budgets. The pace of the project, he said, "will fit the funding that's available."

The plan envisions development of two new rockets, one of them almost as tall and even heavier than the Saturn V that launched the Apollo astronauts, and a new spacecraft to put four people on the moon for up to six months before bringing them back to Earth in a parachute landing.

And while the rocket technology is "shuttle-derived," the new plan abandons the concept of a winged, reusable spacecraft that can fly back to Earth and land at an airport. Griffin said the new "crew exploration vehicle" can be reused perhaps 10 times, but most of the new program's apparatus, like Apollo's before it, will be jettisoned in space or burned up in Earth's atmosphere.

Griffin also acknowledged that there will be a two-year period between the last space shuttle flight in 2010 and the first flight of the exploration vehicle, anticipated in 2012, during which the United States will have no ability to put humans in space.

This gap has been a space policy sticking point for more than a year between the Bush administration and Congress. Sen. Kay Bailey Hutchison (R-Tex.), chairman of the science and space subcommittee and an outspoken advocate of closing the gap, issued an enigmatic statement saying, "I will do everything possible to keep the shuttle and crew exploration vehicle programs on course."

Still, in response to several reporters' questions, Griffin sought to assure employees at NASA's shuttle program centers in the Gulf Coast states that the new program "can use 85 percent of the space shuttle work force."

"It's been pretty well coordinated among the centers," said John Logsdon, director of George Washington University's Space Policy Institute. "It appears to provide for a smooth transition."

The use of "crew" and "service" modules to orbit the moon while astronauts travel to and from the surface in a "lunar lander" called to mind the Apollo missions that put 12 men on the

moon between 1969 and 1972.

"We did not set out to make it like Apollo," Griffin said at a NASA headquarters news conference to release the agency's "Exploration Systems Architecture Study." "We looked at every vehicle, but people began to realize that the Apollo guys got it right."

Still, the new plan is "a significant advance over Apollo," he added, describing it as "Apollo on steroids." Among other differences, the new lander is larger, can put twice as many people on the moon, leave them there potentially for months instead of days, land them anywhere on the lunar surface instead of just at the equatorial region and leave the orbiting spacecraft without a crew onboard.

The new spacecraft will also use different, more efficient propellants than Apollo, and substitute lighter composite structures where Apollo used metal. Most important, while Apollo was born during the waning days of vacuum tubes, the new program will benefit from 45 years of advancements in computer science.

Griffin said the choice of targets for moon landings "will be driven by science," but unlike Apollo, the program is also designed so astronauts can linger and establish permanent bases on the lunar surface to develop technologies and test techniques for a more ambitious, subsequent Mars mission.

The new propellants, for instance, will use both oxygen, which can be mined from Martian rocks, or methane, which can be extracted from components of the Martian atmosphere. "One reason to go back to the moon is to learn to live off the land to enable longer-duration space missions," said Georgia Institute of Technology research engineer Douglas Stanley, who led the "Exploration" study for NASA.

Logsdon described the project as "a good plan -- but not an elegant one" because it does not make much use of advanced technology. "It's a doable approach to getting people into space safely," he added.

But space policy and engineering consultant Charles Lurio, an advocate of innovative private-sector approaches to space travel, criticized the new proposal for being too "massive" and "unaffordable now and unsustainable later."

The moon mission will begin by putting into space a new 358-foot "cargo launch vehicle" weighing 6.4 million pounds. It lifts the moon rocket and the lunar lander into low Earth orbit to await the arrival of the crew exploration vehicle, the combined service module-crew module.

Both the heavy lifter and the "crew launch vehicle" that carries the spaceship use solid rocket boosters, like the shuttle, and fuel tanks derived from the external tanks whose foam shedding caused the loss of the shuttle Columbia in 2003. Loose foam will not be a problem for the new spacecraft, which are perched in traditional fashion atop the tanks, out of harm's way.

The exploration vehicle will mate in Earth's orbit with the lunar lander, then the moon rocket will ignite, carrying vehicle and lander on the three-day trip to lunar orbit. From then on, the mission will unreel in Apollo-like fashion, with the astronauts riding to the moon's surface

aboard the lander, while the exploration vehicle orbits overhead.

Besides human space travel, the exploration vehicle can fly robotically, perhaps as a cargo carrier for a moon colony. It also could ferry crew and cargo to the international space station and dock autonomously there if necessary.

"The principal concern has always been the lunar mission," said Doug Young, program manager for the Northrop Grumman/Boeing team that is competing with Lockheed for the right to build the exploration vehicle. "But we've always known that we will ultimately have to meet the requirements" of the space station.