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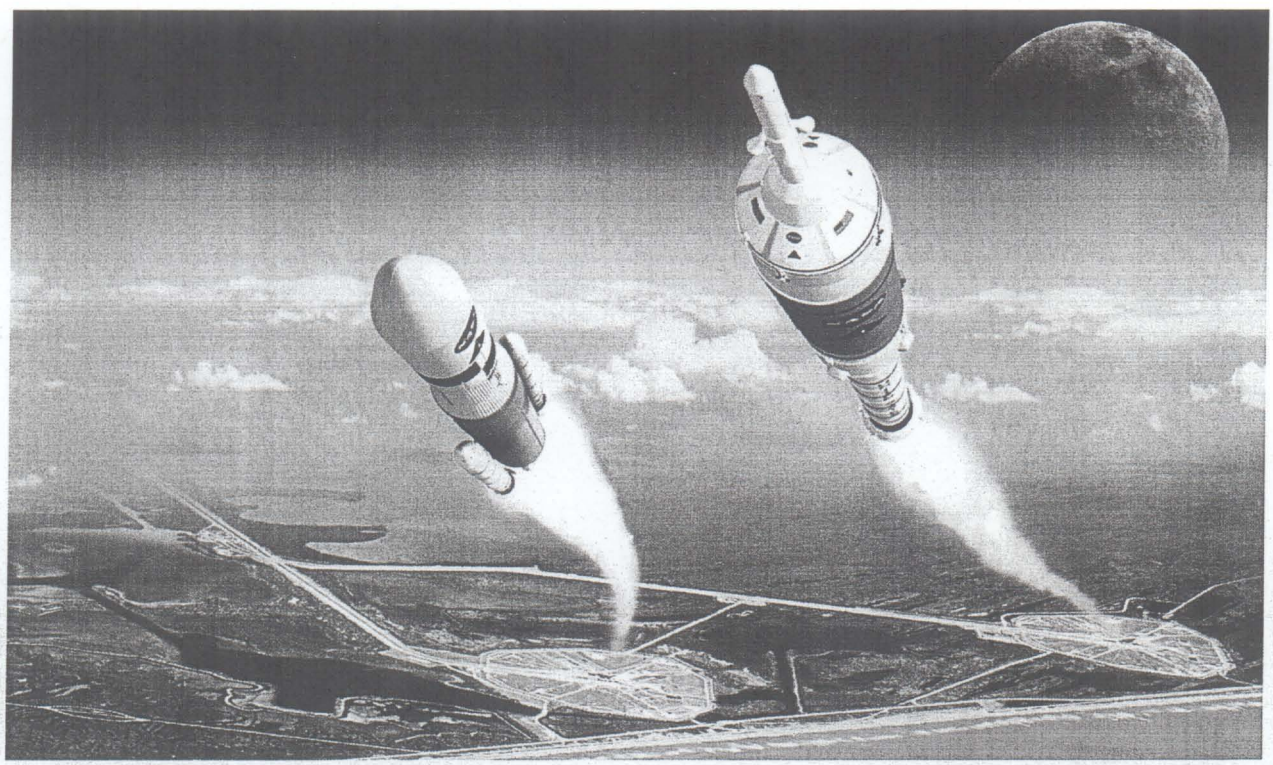
Launching to the Moon, Mars, and Beyond

John P. Sumrall, Manager Advanced Planning
Exploration Launch Projects Office
NASA Marshall Space Flight Center
Huntsville, AL 35812

Abstract

America is returning to the Moon in preparation for the first human footprint on Mars, guided by the U.S. Vision for Space Exploration. This presentation will discuss NASA's mission today, the reasons for returning to the Moon and going to Mars, and how NASA will accomplish that mission.

The primary goals of the Vision for Space Exploration are to finish the International Space Station, retire the Space Shuttle, and build the new spacecraft needed to return people to the Moon and go to Mars. Unlike the Apollo program of the 1960s, this phase of exploration will be a journey, not a race. In 1966, the NASA's budget was 4 percent of federal spending. Today, with 6/10 of 1 percent of the budget, NASA must incrementally develop the vehicles, infrastructure, technology, and organization to accomplish this goal. Fortunately, our knowledge and experience are greater than they were 40 years ago. NASA's goal is a return to the Moon by 2020.



Concepts of the Ares I crew launch vehicle (right) and Ares V cargo launch vehicle.

The Moon is the first step to America's exploration of Mars. Many questions about the Moon's history and how its history is linked to that of Earth remain even after the brief Apollo explorations of the 1960s and 1970s. This new

venture will carry more explorers to more diverse landing sites with more capable tools and equipment. The Moon also will serve as a training ground in several respects before embarking on the longer, more perilous trip to Mars.

The journeys to the Moon and Mars will require a variety of vehicles, including the Ares I Crew Launch Vehicle, the Ares V Cargo Launch Vehicle, the Orion Crew Exploration Vehicle, and the Lunar Surface Access Module. The architecture for the lunar missions will use one launch to ferry the crew into orbit on the Ares I and a second launch to orbit the lunar lander and the Earth Departure Stage to send the lander and crew vehicle to the Moon. In order to reach the Moon and Mars within a lifetime and within budget, NASA is building on proven hardware and decades of experience derived from the Apollo Saturn, Space Shuttle, and contemporary commercial launch vehicle programs. Less than one year after the Exploration Launch Projects Office was formed at NASA's Marshall Space Flight Center, engineers are testing engine components, firing test rocket motors, refining vehicle designs in wind tunnel tests, and building hardware for the first flight test of Ares I, scheduled for spring 2009.

The Vision for Exploration will require this nation to develop tools, machines, materials, and processes never before invented, technologies and capabilities that can be turned over to the private sector to benefit nearly all aspects of life on Earth. This new pioneering venture, as did the Apollo Program before it, will contribute to America's economic leadership, national security, and technological global competitiveness and serve as an inspiration for all its citizens.