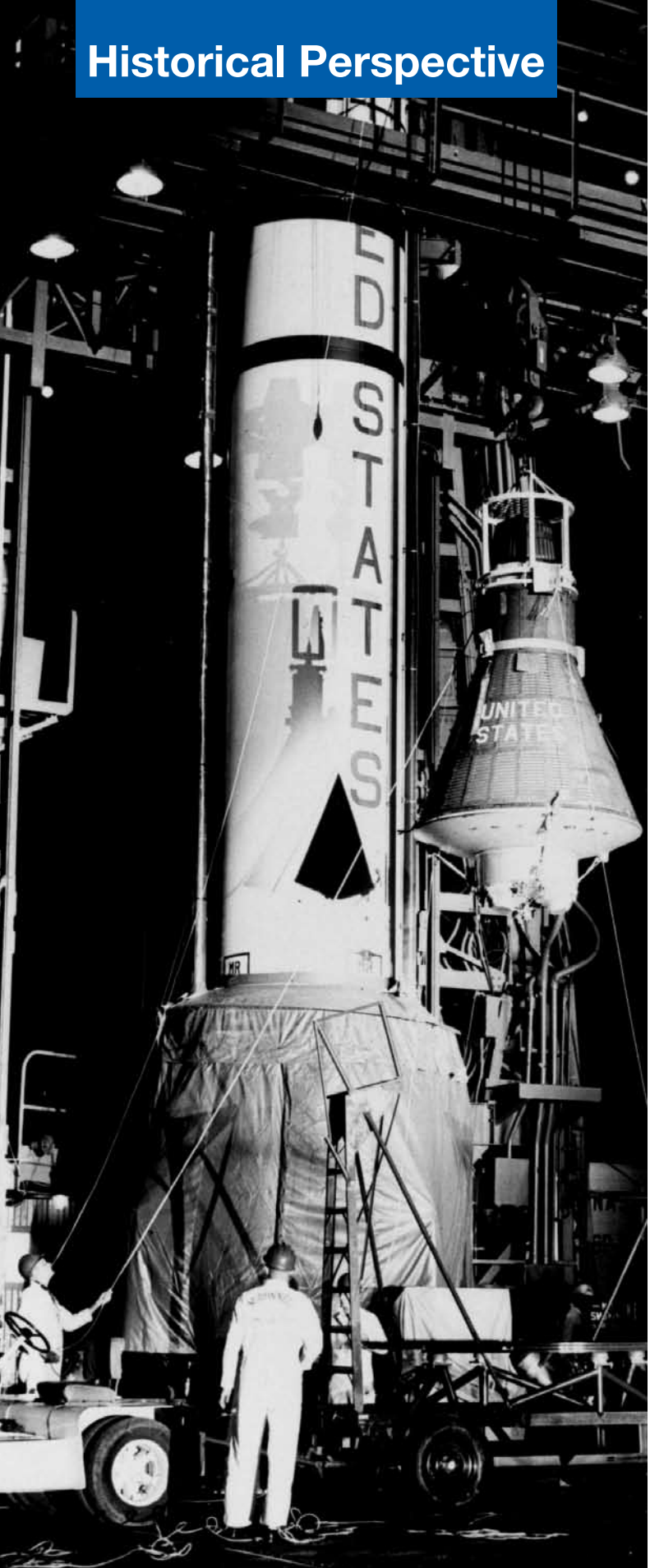


Project Mercury:

First step on the way to the moon

By Henry T. Brownlee Jr.

More than 50 years ago, on Oct. 4, 1957, the former Soviet Union's launch of Sputnik shocked the United States and initiated a space race between the two world powers to demonstrate political superiority through technological advancement.

PHOTO: James McDonnell (right) and T. Keith Glennan, the first NASA administrator, discuss the Mercury program using a model of the manned space capsule. BOEING ARCHIVES

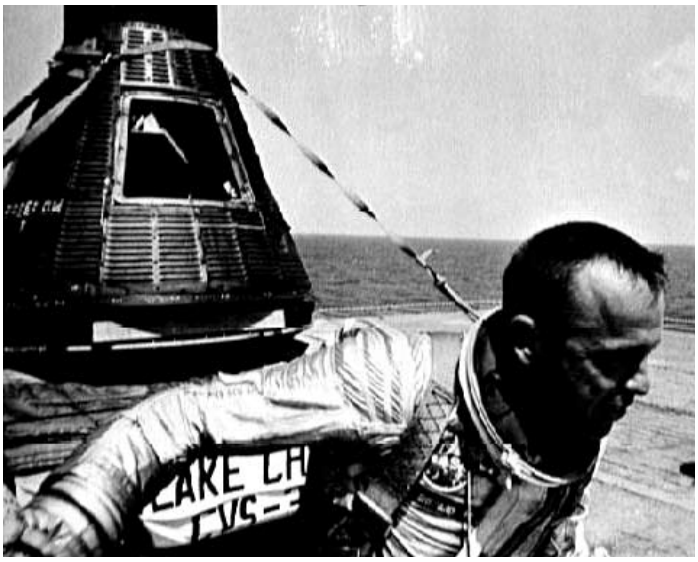
Less than two years later, in February 1959, NASA awarded the prime contract to design, test and build the Project Mercury manned spacecraft to McDonnell Aircraft Corporation (MAC).

Twelve companies, including Boeing predecessor companies MAC, Douglas Aircraft and North American Aviation, submitted proposals. The selection of McDonnell was a carefully guarded secret until the day of the announcement.

Several years before the launch of Sputnik, and before Alan B. Shepard Jr. became the first American to achieve suborbital spaceflight in May 1961, James S. McDonnell, president of MAC, studied placing a human in space.

Indeed, in a May 26, 1957, commencement speech at the Missouri School of Mines and Metallurgy in Rolla, Mo. (now the Missouri University of Science and Technology), McDonnell provided the engineering graduates a speculative timetable for space travel. He thought the United States would not achieve a manned Earth satellite until 1990, and a manned spaceship to land on the moon and return to Earth until 2010. It was in this same speech that McDonnell referenced the dangerous dilemma

PHOTO: McDonnell workers hoist the Freedom 7 capsule onto its Redstone launch vehicle. BOEING ARCHIVES



> "We go into space because whatever mankind must undertake, free men must fully share."
>
> *– John F. Kennedy, president of the United States, in a speech to the U.S. Congress, May 25, 1961*

PHOTO: Astronaut Alan B. Shepard is seen on the deck of the U.S. *Champlain* after the recovery of the Mercury capsule following the United States' first suborbital space flight May 5, 1961. NASA

of the Cold War with its escalating tensions and arms buildup, proposing that the United States "wage peace" through the development of dual-use technologies. "When a chemical rocket motor is developed for a missile, here is a means of propulsion that may be applied in whole or in part to a space vehicle. … And, when ways are found for a fighter pilot to survive high gravitation pulls at hypersonic speeds, this will help some future space pilot survive blastoff in a moonbound rocket," McDonnell said.

This approach, promoting dual-use technology, was a significant factor in his company's being awarded Project Mercury. Although the program's major objective was to achieve manned orbital flight and successful recovery, NASA also required a minimum of new technologies be developed that otherwise might slow the U.S. effort to catch up with the Soviet Union.

Kendall Perkins, former vice president of engineering for MAC, noted the company's selection as Project Mercury prime contractor was "largely a result of having foreseen and having long prepared to meet such a need" and that McDonnell engineering staff "had already laid much of the groundwork and had completed a great deal of the design and advance planning" on a spacecraft capable of orbiting Earth. In fact, McDonnell had used its own money and resources for more than a year working to develop such a spacecraft.

Between 1959 and 1961, McDonnell would work closely with NASA and some 4,000 suppliers and contractors to make Project Mercury a reality. Ultimately, MAC employees would develop and build 20 Mercury spacecraft, two procedural trainers, and ground support and checkout equipment.

The coned-shaped Mercury spacecraft including escape tower measured 28 feet (8.53 meters) tall and 78 inches (1.98 meters) wide and weighed 3,649 pounds (1,655 kilograms) when fully loaded. McDonnell used strong, lightweight materials such as titanium and beryllium to construct the spacecraft.

Multiple safety precautions were incorporated. For example, the spacecraft was designed so it could be operated automatically, manually or by ground control. The spacecraft cabin was equipped with molded, contoured couches that could transfer bodily loads evenly during peak acceleration and deceleration. In addition, although the Mercury spacecraft was equipped with a 100 percent oxygen environment within the cabin, astronauts' spacesuits had a separate oxygen supply.

McDonnell and NASA conducted hundreds of tests on every part of the spacecraft and with various rocket configurations before it was deemed ready for human flight.

Following his historic flight in a Mercury capsule, Shepard visited the McDonnell plant in St. Louis in May 1961 and spoke with employees.

"It has been a great pleasure and a great thrill for me to have worked with such a fine group of people and they have all helped the seven of us [astronauts] in building up our confidence," Shepard said that day. "The No. 7 craft, the one that we used, or Freedom 7 as we chose to call it, performed very well. … It performed well during the automatic phases when it took over by itself and went through various maneuvers and it also performed well when I was handling it."

Following the successful mission and an exhaustive review of the performance of the Project Mercury program, President John F. Kennedy gave a speech before a joint session of Congress noting his decision to send an American to the moon by the end of the decade.

"Space is open to us now, and our eagerness to share its meaning is not governed by the efforts of others. We go into space because whatever mankind must undertake, free men must fully share," said Kennedy. This speech, and the support of the U.S. Congress, led to the successful Gemini and Apollo space programs and, ultimately, to landing humans on the moon (see related story on moon landings on Page 28). ■

henry.t.brownlee-jr@boeing.com