The Great Adventure

The 25th anniversary of the first Moon landing was celebrated July 20. Many at McDonnell Douglas recall their roles in helping to make it all possible.

By Kerry Veale
and Layne Parrish

It was, and is, the giant of American-built launch vehicles.

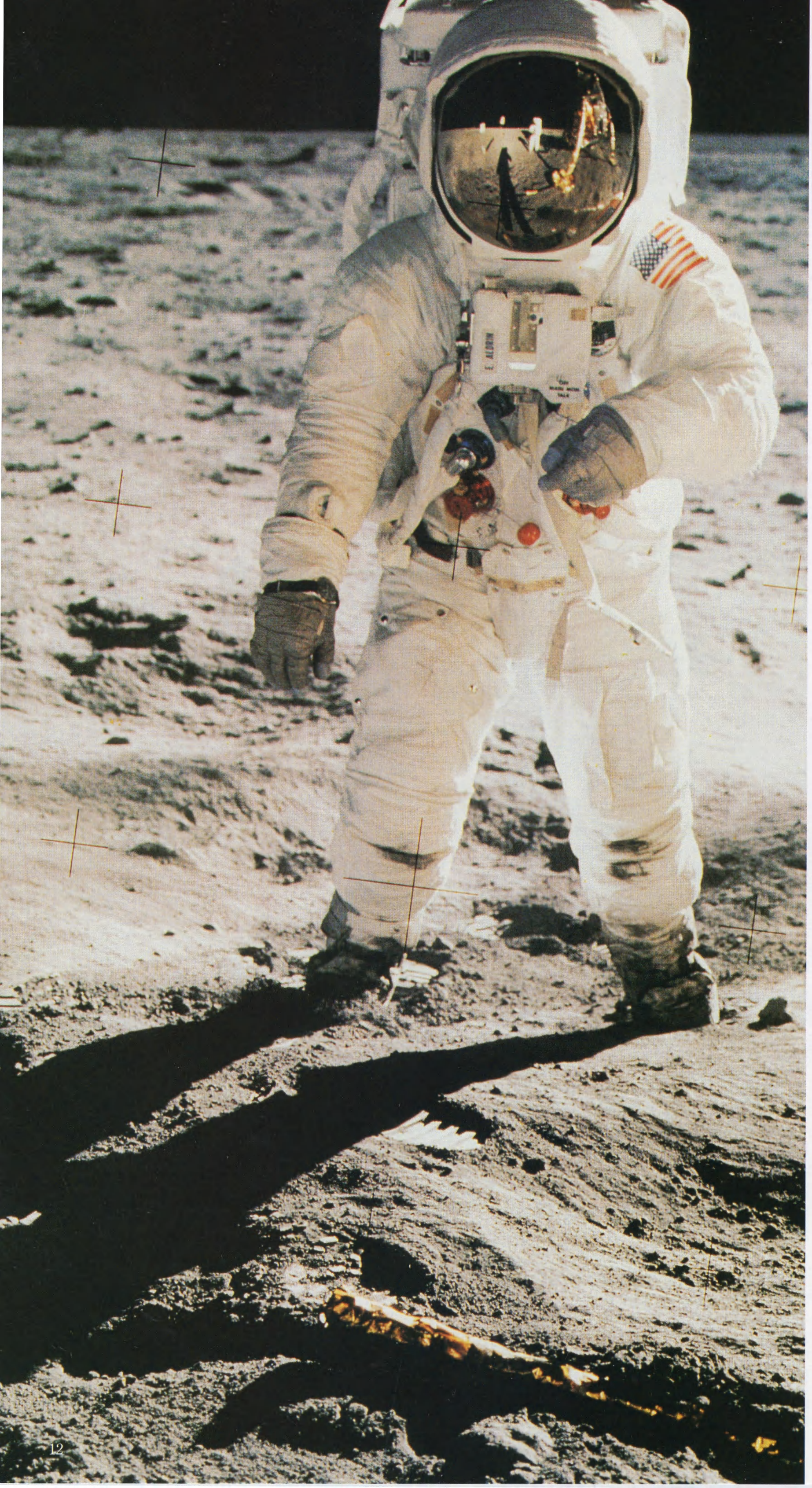
The mighty Saturn V rocket: six million pounds at liftoff, 36 stories high, and powerful enough to propel 50 tons of men and machinery toward the Moon.

The impetus for its development came on May 25, 1961, when President John F. Kennedy issued this challenge to Congress: "I believe that this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the Moon and returning him safely to Earth."

McDonnell Douglas's contribution to the historic Apollo 11 mission was not ▸

DESTINATION: The Moon. This is Apollo 11's view of the approach to Landing Site 2 in the southwestern Sea of Tranquility. The photo was taken July 20, 1969, while the lunar module was still in orbit.

LAUNCH VEHICLE: The Saturn V rocket, 36 stories high and powerful enough to carry 50 tons into space. McDonnell Douglas built the third stage.



only to build the third stage of the immense Saturn V launch vehicle, but also to build the Mercury and Gemini spacecraft that blazed the trail for Apollo.

In 1959, the McDonnell Aircraft Corporation signed a contract with NASA for the design and construction of 12 Mercury spacecraft. A year later, NASA selected the Douglas Aircraft Company to build the S-IV, the second stage of the Saturn I, the first in a line of Saturn vehicles that would gradually become powerful enough to carry men to the Moon. Ten S-IV stages were produced at the company's Santa Monica facility under the direction of the newly built Space Systems Center at Huntington Beach.

In the meantime, Mercury flights were pushing the U.S. ahead in the space race. In the spring of 1961, shortly after Yuri Gagarin of the USSR became the first human to orbit Earth, Alan Shepard, aboard Mercury-Redstone, became the first U.S. astronaut in space.

NASA announced the signing of a $456.6 million contract for Project Gemini with McDonnell in 1963. The spacecraft would be similar in shape to the Mercury capsule but larger and two to three times heavier.

Later that year, President Kennedy was assassinated. The nation grieved but nevertheless continued working toward Kennedy's dream for a Moon landing.

"It was a great adventure," says former astronaut Pete Conrad, now staff vice president of project development for strategic business development, at McDonnell Douglas

Astronaut Edwin Aldrin walks on the surface of the Moon near the leg of the lunar module "Eagle."

Aerospace in Huntington Beach. Conrad flew the Gemini 5 mission with Gordon Cooper in August 1965 to demonstrate the feasibility of a lunar mission. Their 120 Earth orbits over eight days set a record for duration in space. Creature comforts were scarce in the early days of space exploration. In the cramped quarters of the Gemini spacecraft, recalls Conrad, "we sat there for eight days all dressed up with no place to go." Niceties such as hot water and freezers came later in the space program.

As commander of Gemini 11, Conrad, and Richard Gordon, set an altitude record of 850 statute miles, docked and redocked with an Agena target and accomplished the first Gemini-Agena tethered flight.

Soon the S-IVB program began picking up momentum. The earlier, smaller S-IV had served as second stage in six space missions from 1964 through 1965. For the S-IVB, which would serve as the second stage of the Saturn IB and the third stage on the giant Saturn V rocket, final assembly was moved from Santa Monica to newly constructed, larger buildings in Huntington Beach.

Bill Siegfried, principal specialist for technology applications, strategic business development, MDA-West, served for six months as the company liaison for S-IVB with NASA management at Huntsville. At that time, just ten Douglas and ten NASA people met for monthly program reviews. Of the NASA technical experts, nine—including Wernher von Braun—were Germans originally from Peenemünde rocket works who had surrendered to American troops during World War II. "The Germans' dream and the original design for the Saturn V was to go to Mars," says Siegfried, who wrote a college paper in 1952 on designing a vehicle to go to the Moon.

The team met monthly to keep the program on track. "We were all in it together with a single objective," says Siegfried. "There was a mutual trust between ourselves and the customer. We were among friends."

The camaraderie and speed of development were part of what S-IVB veterans liked about the program. And those strides in space exploration were made using tools considered slow and inefficient by today's standards.

Milt Plomer, subcontracts technical manager for Loral/Vought on the Space Station program, remembers the computer used for launch control on the Saturn V. It was a 1958 steel mill computer converted by IBM for use on the space program.

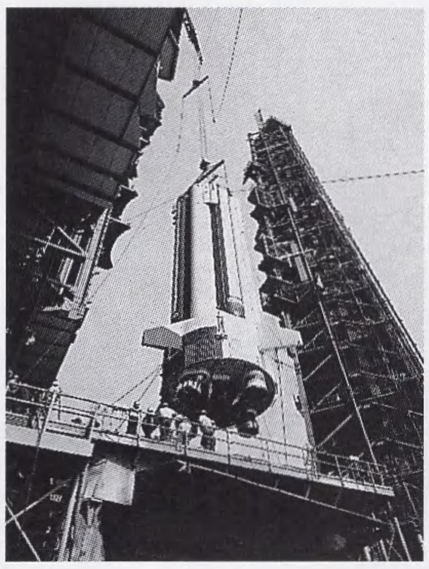
"It was clunky compared to what we have today," says Plomer. It was an improvement, though, on the slide rules used on the S-IV program.

The program had stringent test requirements. "We tested everything three times—in Huntington Beach, Sacramento, and the Cape," recalls retiree Ted Smith, who directed the Saturn programs from 1962 to 1968.

During the Apollo 11 mission, the S-IVB performed flawlessly.

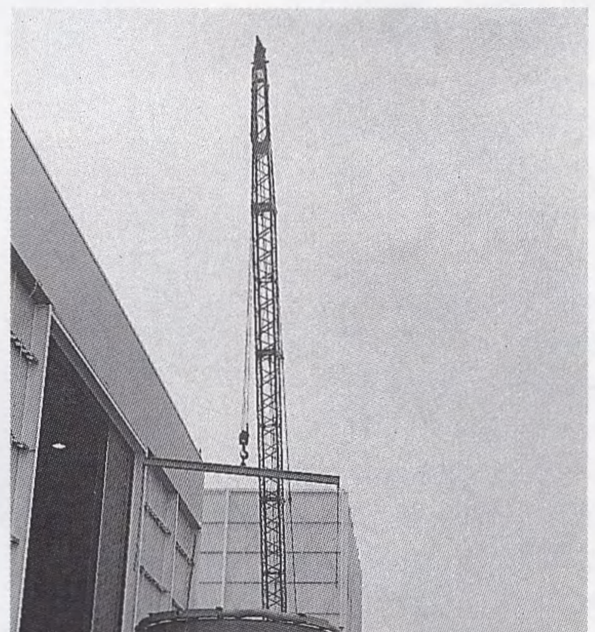
"It was a magnificent ride," reported astronaut Neil Armstrong after the 5 1/2-minute-long second firing of the S-IVB that placed the Apollo 11 in its flight path to the Moon and man's first landing on the lunar surface. The S-IVB burned for 2 1/2 minutes to provide the final thrust necessary to achieve a near-circular parking orbit about 103 nautical miles above Earth. Next the S-IVB was restarted to accelerate the Apollo 11 to an escape velocity of more than 24,000 mph while placing it in a trans-lunar trajectory. The lunar module, which had been tucked in the forward portion of the S-IVB, docked with the command and service module. Then the command, service, and lunar modules separated from the S-IVB, and the S-IVB flew on past the Moon and into orbit around the sun.

Much of the nation remembers Neil Armstrong's first step onto the Moon as the pinnacle of the mission. For others at McDonnell Douglas the biggest moment came ▸



Top: In January 1960, the first Project Mercury production spacecraft is loaded into a Douglas C-124 Globemaster II for shipment to Cape Canaveral, Florida.

Above: The Saturn Apollo 204 is on Pad 37B at Kennedy Space Center, Florida, in April 1967.



The first S-IVB is moved to final assembly at Huntington Beach in 1964. The earlier, smaller S-IVB had been built at Santa Monica.

earlier.

"The big relief was when they landed on the Moon," says Conrad, who was watching the large television screen at mission control in Houston. "Everyone leaped up and patted each other on the back."

It was several hours later that Armstrong stepped to the lunar surface, saying, "That's one small step for a man, one giant leap for mankind."

Pete Conrad went on to serve as commander of Apollo 12 and was the third man to walk on the Moon. Descending the steps of the lunar module, Conrad, who stands 5 feet 6 inches tall, said, "Man, that may have been one small step for Neil, but that's a long one for me." Conrad also served as commander of Skylab I, the first United States space station.

Because of design changes during the course of the program, the ignition circuit to re-ignite the lunar module as it left the Moon was a single-point failure system.

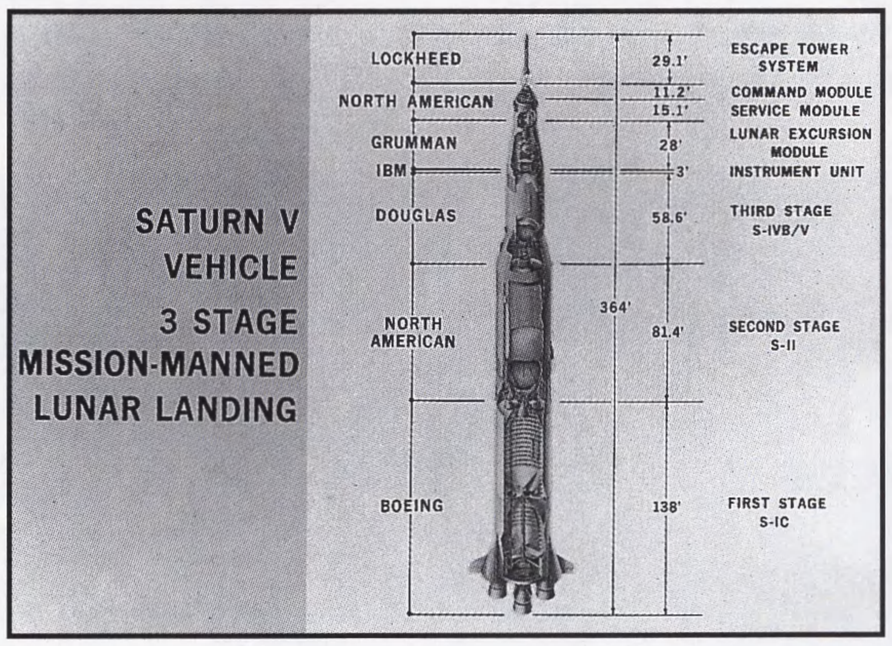
"Until the lunar module had rendezvoused again with the command service module, we were on pins and needles," Siegfried says. The re-ignition worked flawlessly.

McDonnell Douglas, with its experience and knowledge, has much at stake in the nation's space program. "As a nation, we are so preoccupied with the problems of today that we can't look to the future," Siegfried says. "As an industry, we need to do a better job of communicating about space to Congress and the public."

As a subcontractor to Boeing, McDonnell Douglas is a key player in the new International Space Station Alpha (ISSA) program. And as the Product Group 1 contractor for ISSA, McDonnell Douglas is responsible for building the integrated truss and data handling systems and hardware, communications system and monitoring equipment.

"On Apollo 11, the majority of our people were relatively young," recalls Rich Holmen, senior manager, configuration and data management, Space Station division. "We had an enormous learning curve, developing the new technologies and capabilities for the program. Those experiences later helped us win our Space Station contract. On the Space Station program, we have hired many young people who will be on the ground floor of developing the new technologies. These people will keep us in a preeminent position to assist in a Mars mission or Moon colonization—whatever comes next."

Beyond the issues of where and when space will be further explored is the issue of who will go. After more than 30 years of space



Above: A diagram of the Saturn V showing the companies who contributed to the rocket's construction.

Above right: Apollo II Commander Neil Armstrong inside the lunar module after making his historic Moon walk.

Right: Mercury astronauts with MDC co-founder James S. McDonnell. Front: Gordon Cooper, Donald Slayton, Walter Schirra. Back: Virgil Grissom, McDonnell, Alan Shepard, Scott Carpenter and John Glenn.

exploration, the number of space travelers is relatively small: 307 people, from 26 countries.

McDonnell Douglas has the technology to open the door to space travel for greater numbers of people. The Delta Clipper—a single-stage-to-orbit rocket—could be the first real, reusable space ship to carry passengers.

"The Delta Clipper is affordable space transportation," says Conrad. "It's my great desire to see the Delta Clipper succeed because it's something we've needed almost from the day we set foot on the Moon. Not a lot of people get to fly in space now, because it's just too expensive."

Working on the Delta Clipper Experimental (DC-X) program has brought McDonnell Douglas teammates like Gerry Coleman full circle from the S-IVB program. Coleman, propulsion manager for DC-X ground support systems, says, "The DC-X program is very much like the S-IVB program; we have more responsibility and satisfaction, and less bureaucracy. That's why we're enjoying the program so much."

"Maybe it won't happen in the lifetime of the Apollo 11 veterans," predicts Siegfried, "but we will go to Mars." ■

Kerry Veale and Layne Parrish work in internal communications at MDA-West.

Right: Aldrin deploys the passive seismic experiments package. The photo was shot by Neil Armstrong with a 70mm lunar surface camera.