AMERICA'S RACE TO MOON GOT BOOST FROM STUART'S AEROSPACE WORKERS

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By Dan McCue of the News staff

Grumman Corp. employees helped build the Lunar Module that landed on the moon 30 years ago.

CAPE CANAVERAL - It began 42 years ago with an unwelcome Soviet surprise going beep in the night and culminated July 20, 1969, with one of the greatest adventures in human history as American astronauts Neil Armstrong and Edwin "Buzz" Aldrin became the first men to walk on the moon.

"It's very hard when you are a part of something to judge what the impact on the outside world is going to be," Aldrin said Friday at the Kennedy Space Center during a commemoration of the 30th anniversary of the Apollo 11 mission to the moon.

"But looking back, of course, this journey certainly had a major impact on millions of people throughout the world, and its effect on how we view things continues to unfold."

An estimated half-billion people watched their TV sets 30 years ago as Armstrong and Aldrin became the first humans to step onto the surface of another heavenly body.

But while viewers around the world were transfixed by one of the greatest achievements of the 20th century, many local residents felt a special sense of pride, knowing they had helped design the spacecraft that took Armstrong and Aldrin to the moon.

The engineering marvel was crafted over an eight-year period by what was then called the Grumman Aircraft Engineering, of Bethpage, N.Y., and Stuart.

"We actually started looking at creating such a spacecraft way back in 1960, going through a series of proposals and studies before winning the contract to build the Lunar Module in 1962," said Tom Kelly, who served as Grumman's chief engineer on the project.

The space race began Oct. 4, 1957. It was on that evening that the Soviet Union launched Sputnik I, the first satellite to orbit the Earth. America had barely come to grips with the satellite's constant blip-blip-blip across its consciousness when the Russians launched another spacecraft, Sputnik II, on Nov. 3, 1957. This time, the orb-shaped vehicle carried a passenger into space, a German shepherd named Laika.

"Needless to say, we at Grumman felt a lot of pressure," Kelly said last week from his home in Cutchogue, N.Y.

Because the Lunar Module was built in New York, engineers and technical troubleshooters in Stuart logged numerous air miles traveling back and forth.

"We were all concentrating on achieving a goal. Our motivation was we wanted to get to the moon and we wanted to get their first, before the Russians," Kelly said.

Differences between the two countries' programs made it hard to judge who was ahead in the space race.

The Russians, for instance, had the more powerful rockets, and therefore could launch heavier crafts on longer flights, enabling them to put a man in space first.

But the United States was ahead in scientific and technical innovation, launching craft that had practical applications in communications, navigation and weather reporting almost from the beginning.

The Lunar Module was the biggest space vehicle built to date. At slightly more than 23 feet tall and 31 feet wide, the vehicle dwarfed the Mercury space capsule then ferrying astronauts to and from Earth's orbit. When loaded with fuel and crew, the Lunar Module was more than 11 times heavier than the single-passenger Mercury capsule.

"We thought we could do a vehicle that would weigh around 22,000 pounds," Kelly said. "But the module actually wound up being closer to 32,000.

"Now, to an engineer, that's a world of difference. Weight was a very critical factor when it came to the Lunar Module. For every pound of weight that we added, we had to add three pounds of rocket propellant.

"That's why it was so spindly and one of the reasons we didn't have seats for the astronauts in it," Kelly said.

Recalling the first time he laid eyes on the Lunar Module, Aldrin said, "I have to admit I was a little disappointed ... it was surrounded by a lot of other things in the complex where it was being built, and it was hard to get a clear picture of it in one's mind.

"My first thought was I didn't know if it could do the job."

Meanwhile, the National Aeronautics and Space Administration was quickly moving ahead with plans to fulfill President Kennedy's ambition of landing a man on the moon by the end of the decade.

"There were four things that made the age of Apollo go," said Wally Schirra, one of the country's original seven astronauts and the only man to have flown in all three of NASA's programs - Mercury, Gemini and the first Apollo mission - preceding the moon landing.

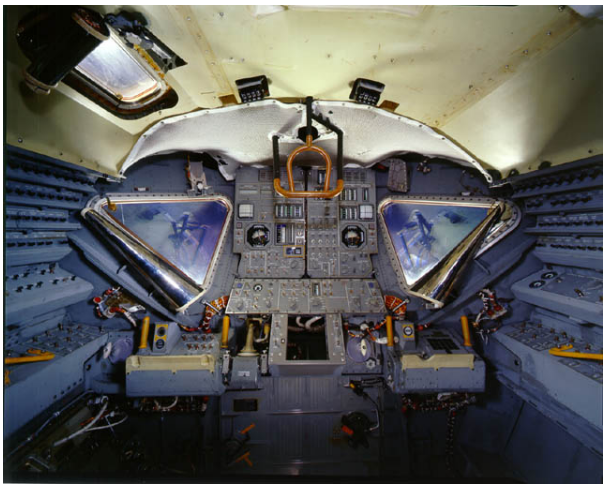
"First of all, you had a young and committed president," he said. "Then, a group of talented engineers, technicians, workers and scientists. On top of that, you had a Cold War reaching its peak. ... And then, we had a blank check."

Just as the country was about to embark on the Apollo program, tragedy struck Jan. 27, 1967, when a launch pad fire at Cape Canaveral killed astronauts Virgil "Gus" Grissom, Edward H. White and Roger Chaffee.

The event effectively closed NASA's manned space-flight program for 18 months while scientists sought to determine the cause of the fire - later determined to be a spark in a pure oxygen environment.

"The tragedy lead to an extensive review and substitution of materials used in the cabin of the Lunar Module," Kelly said. "We actually purged a great many materials that were in there, because prior to the fire, we had some pretty flammable stuff in there, including nylon and the material used to insulate the electrical wiring."

The first manned test of the Lunar Module took place in March 1969 with Apollo 9.



"The significance of that flight was the Lunar Module could not re-enter Earth's atmosphere," Kelly said. "If it had, it would have burned up. So the crew was really depending on it to work right."

Throughout the mission, Kelly and a crew of Grumman engineers were at Mission Control in Houston.

"We were actually right across the hall from the big control room that became so familiar to people who tuned in to watch the television coverage of those flights," Kelly recalled. "Apollo 9 was a big kick for us because the Lunar Module just worked perfectly."

The next test, and the only one left before NASA would attempt to put a man on the moon, was Apollo 10.

"On that mission, Tom Stafford and Gene Cernan put the module in a low orbit around the moon, coming as close as 50,000 feet about the surface," Kelly said.

"Flying the Lunar Module was a fighter pilot's dream," said Cernan, a Navy pilot before he became an astronaut. "The command module was sort of like a big bus, but the Lunar Module was different. During the Apollo 10 mission, we did everything Apollo11 would do but land."

Cernan, who later landed on the moon as commander of Apollo 17, let out a yell Friday as he described the mission.

"You know, when you start out on a mission like this, you want to save your fuel ... You've got a big mission ahead of you. You've got to land on the moon, but when you leave the surface of the moon, all that's behind you," he said. "What we did was fly around a little bit with the fuel we had left, took pictures, did a few things with the craft.

"We had a little fun. ... A little of the tension, a little of the apprehension, was gone."

The two-month span from May 26, 1969, when Apollo 10 splashed down in the Pacific Ocean, to July 16, 1969, when Apollo 11 lifted off, was intense.

"Oh yeah, the pressure kept building," Kelly said. "Despite having so much on the line, the actual flight seemed easy. A few things went wrong, but nothing as

diabolical as what they threw at us."

Yet those "few things" that went wrong provided their share of anxious moments.

Because of boulders on the moon, Armstrong had to take the module off automatic pilot and manually land it in a different location than planned. As he did so, a mechanism Kelly described as "a program alarm" went off.

"It was an alarm that had to be responded to immediately. You literally had to decide in seconds whether it really meant anything or not," he said. "Fortunately, one of our engineers had boned up on this aspect of the (module) and determined rather quickly that the landing radar was simply overloaded with data. On his assurances, the astronauts were advised to ignore the warning."

Although one potential catastrophe was averted, still another awaited Armstrong and Aldrin.

"Right after the landing, amidst all the excitement, we realized that we might have a terribly serious problem. ... Just after the module reached the surface, the engine was shut down. But when that happened, liquid helium continued to flow longer than it should have, freezing a section of the fuel line at both ends," Kelly said.

"Remember, the engine at this point was still very hot, and the heat began to build dramatically in the section of the line in which the fuel was trapped.

"The heat and the pressure in this one section of plumbing was going up dramatically. This had us extremely worried because rocket fuel was a pretty unstable chemical back then. If it heated up too much, it could explode.

"I can clearly remember Dr. Carl Lowe, director of the Apollo program for NASA, coming to us and demanding a position on the crisis from Grumman in a manner of minutes. I'll tell you, that led to some hasty conferences behind the scenes," Kelly said.

That's when Manny Dandritch, Grumman's chief propulsion engineer, came up with a novel solution - "burping" the engine.

"What it came down to was having the astronauts flip the engine switch, opening the valve and shutting it again very quickly to relieve the pressure," Kelly said.

"But just then, the ice plug melted. The pressure was relieved, and the problem went away as quickly as it developed. It probably all transpired in just 10 minutes, but we really sweated."

NASA went on to complete six successful lunar missions, and then there was the ill-fated Apollo 13 mission, during which the Lunar Module became something of a life raft for crew members.

Three decades later, Kelly said he finally can reflect on what it all meant.

"We all knew we were involved in something historic and outrageously audacious," he said. "I mean, even the guy sweeping the floor at Grumman felt it.

"The motivation to accomplish this was incredible. Each of the people involved wanted to be sure their little contribution worked exactly as had been intended. So while I've said how busy we all were, there was also this overriding sense of history, that we were a part of a great adventure.

"That's what made it so absolutely special," Kelly said.

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