

# A trace of space

Mission to moon brought together the best of 20th Century Technology.

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Throughout the manned space program, astronauts have certainly been the heroes, all risking their lives, and some losing their lives for the exploration of the final frontier.

Perhaps it wasn't until the 1995 film Apollo 13 — 37 years after America saw Neil Armstrong walk down those steps of the Lunar Module — that hundreds of America's brightest engineers at NASA received their due, too, for putting humans on the moon and returning them safely to earth.

As depicted in the movie, it was the engineers who tirelessly came up with the fix that would return the three Apollo 13 astronauts to home after an on-board explosion. They starred in the movie, too.

## The right stuff

Jim Wood, now 75, was there.

He was among the young engineers who joined NASA during its early years, the Mercury program, the topic of another popular movie about real-life space exploration, *The Right Stuff*, released in 1983.

Though now retired and living in Lago Vista, he has an interesting connection to Wharton. First, he is long-time friends with Art Schulze, founder of the 20th Century Technology Museum and owner of a medical device technology company here.

Wood and Schulze met and became friends at NASA. Wood was a NASA engineer, and Schulze was an engineer in the private sector. His Houston company got a contract to build the bio-medical monitoring equipment for NASA spacecraft.

## Wharton connection

That longtime friendship has now grown to a more visible connection with Wharton. Wood donated an historic aircraft to the 20th Century Technology Museum. Designed by aviation pioneer Burt Rutan, the VariEze home-built canard is on display in front of the museum. At the public dedication last week, Wood was among the participants.

Over lunch at Pat-A-Cake, Wood reflected on his years at NASA, with much pride over his accomplishments.

## Missing tapes

Over the past few weeks, there has been much publicity nationwide over the "missing" NASA video tapes of Neil Armstrong's July 20, 1969, descent from the Lunar Module onto the surface of the moon (see related story). Wood is certainly interested in these press reports.

He has reason to be. He headed the team that designed that camera.

He looks back at the experience with a sense of pride, a sense of accomplishment.

## Built by NASA

In those days, NASA engineers still built things themselves. The process started with a document that stated the design specifications, and everyone signed it. With those signatures, no one could ever say they didn't know, Wood said.

After the document was signed for the camera, his team actually built a prototype. Then, the specs went out to competitive bid. RCA got the contract and built the actual cameras that went to the moon.

The design challenges were many: extreme temperatures, varying by 150 degrees; vibration from the trip; difficult

lighting conditions from the brightest sun to the deepest shadows; figuring how to attach the camera to the Lunar Module; and how to ensure that it remotely would capture Neil Armstrong leaving the Lunar Module and descending onto the surface.

But the design worked. The entire world saw on their TVs Armstrong bounce down the steps, pause on the last one, and say,

*One small step for man.  
One giant leap for mankind.*

NASA didn't make things easy for the camera team. Putting the first moon walk on TV was being considered like a broken twig was part of a tree. First, Wood says the astronauts didn't like the idea, because they did not want the world to see if anything went wrong.

(Of the original Mercury astronauts, Wood says they certainly had "the right stuff." But their egos matched their incredibly high skill levels as test pilots and astronauts.)

## Scrapped twice

The idea of live cameras was scrapped twice from the mission. When it was finally added back, near the 11th hour, none of the other departments wanted to part with their own project funds to bring the idea of live moving pictures into the fold.

Wood credits Chris Craft, the architect of NASA's mission control and NASA's first flight director, as the catalyst.

"He finally decreed it will be part of the program."

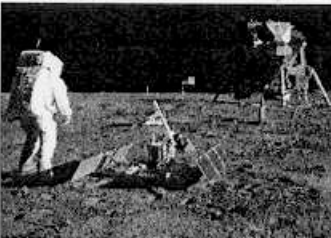
## Bandwidth dilemma

However, by the time the decision was made to incorporate the camera into the spacecraft, most of the "bandwidth" was already taken up. The bandwidth was the amount of information the radio signals between the spacecraft and the receiving stations on earth could hold. It is like a water pipe. In this case, most of the water was already dedicated to other uses.

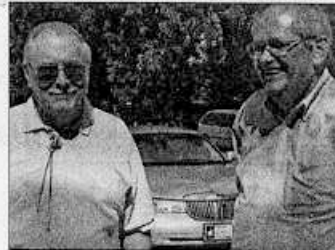
## Image quality

Press reports have said that the technology available back then was not good, and that's one reason why the moon pictures from 1969 were not very sharp. That's not the case, however. The reality was that Wood and his team were forced to lower the quality of the video images, not because of the limits then of video technology, but because they had just a fine thread of that bandwidth dedicated to the picture signals.

Instead of 60 frames per second, they had to settle on 10 frames per second. A



NASA Photo  
Neil Armstrong, behind the lens, takes a still photo of Buzz Aldrin setting up a lunar seismometer on the surface of the moon, with the Lunar Module in the background.



Staff Photo by Benjamin Sharp  
Jim Wood, left, and his friend Art Schulze at the dedication of the VariEze airplane.

good bandwidth for a black and white image would have been 6 mega-cycles. His team worked with just one quarter of one mega-cycle.

"It gave you a pretty crummy picture." While the pictures were not so hot, they were acceptable. And they certainly became part of America's most recognized video images, like President Kennedy making that famous speech, pointing his finger with each phrase, saying we're going to the moon, or an exhausted Charles Lindbergh climbing out of his plane in Paris after being the first man to fly across the Atlantic Ocean non-stop.

All taking one giant leap for mankind.

## Glenn the 'Boy Scout'

Wood joined NASA the same year John Glenn was shot into space. Glenn's Friendship 7 was the first manned spacecraft to orbit Earth.

Glenn was always his favorite of the original astronauts. "He was a great Boy Scout."

Wood, who had tested guided missiles for the U.S. Army before joining NASA, and other staffers knew they were doing things that had never been done before. But they were too caught up in the day-to-day challenges to reflect on the historical significance of it.

People just lived their jobs. They were thinking years ahead; they were solving technological challenges not for the current generation of spacecraft, but for the generation to follow, Wood said.

The goal, he said, was to use "proven technology" to do "unusual jobs."

As they worked, they raced down the halls. Every minute counted.

His first job at NASA was dealing with the transmission of telemetry data, ensuring that ground personnel knew how the spacecraft was performing, from pressures, to temperatures to electrical output and heat resistance.

He recalls the great tragedy of the Apollo mission, Jan. 27, 1967. A flash fire during a test on the launch pad killed the astronauts of Apollo 1, Gus Grissam, Ed White, and Roger Chaffee.

NASA learned many lessons from that tragic day, Wood said. And, sadly, he reflects, the entire Apollo mission might not had been a success if those lessons were not learned then and there.

## The lives of men

The Shuttle program was up and running when Wood retired in 1982.

"We were already designing a couple generations of space stations by the time I left," he said, with pride in his voice.

"You do have a sense of contributing something," he said. "Every piece of equipment was a whole book of experiences. We knew that everything we did affected the mission and the lives of men."