

40 years later, Lunar Camera still inspires awe

BY > Tom Delaney

Forty years ago this month, on July 20, 1969, one billion people around the world sat transfixed before their televisions. From an incredible 240,000 miles away, they watched Neil Armstrong climb down from his spacecraft, step onto the surface of the moon, and say, "One small step for man, one giant leap for mankind."

The camera that made that historic broadcast possible was designed and built here at Electronic Systems (then part of Westinghouse Electric Corp.). A team led by Lunar Camera program manager Stan Lebar developed the technology to capture images, broadcast across a quarter-million miles of space, and display them clearly to television viewers. The achievement was even honored with one of the television industry's Emmy Awards, for Outstanding Achievement in Coverage of a Special Event.

What those billion people did not know is that Lebar and his team had spent five years developing the Lunar Camera — five years of conquering obstacles that had once seemed insurmountable. During those same years, the rest of the Apollo systems — the spacecraft, the Saturn V rocket, the Lunar Excursion Module (LEM)

that would alight on the moon's surface, and others — were also being developed, tested and integrated into the Apollo program.

"I believe the Apollo Lunar Camera development ended up defining most of us who worked on it and in many cases had an impact on their lives unlike anything else they had ever worked on before," Lebar, who turns 84 at the end of July, said in an e-mail.

"Everyone who worked on the program understood from the very beginning that they were involved in an effort that would culminate in providing the world with the television images of mankind's first step onto a celestial body other than the planet Earth and that these images would be viewed by all who followed us far into the future."

Like the other systems, the camera had to endure the incredible temperature extremes of space, from 250 degrees above Fahrenheit to 300 degrees below. It had to survive the high vibration rates and g-forces of takeoff, the large air pressure difference between the Earth and the moon, and the extreme brightness and darkness of the lunar surface.

Another set of unique challenges were posed by Apollo 11's space and weight limitations. A vessel making a half-million-mile round-trip journey needed to be tremendously energy efficient, which meant small and lightweight. The average television camera in the 1960s weighed between 150 and 200 pounds. Lebar's team produced a camera that weighed only 7 pounds and could be operated with one hand. Power was at a premium, so every system had to be designed to work on as few watts as possible. The Lunar Camera operated on just 6 watts at 24 volts of direct current — less than the specs of a typical Christmas tree bulb. Indeed the engineers designed new types of micro-electronic chips, advancing the state of the art in that industry.

For a comparison, imagine setting out to design a refrigerator that weighed no more than a notebook computer, kept foods frozen in the Sahara Desert all summer long, yet used no more power than a cordless telephone — and was unaffected by hurricane-force winds. Possible? With a talented team of believers, and five years, who knows?

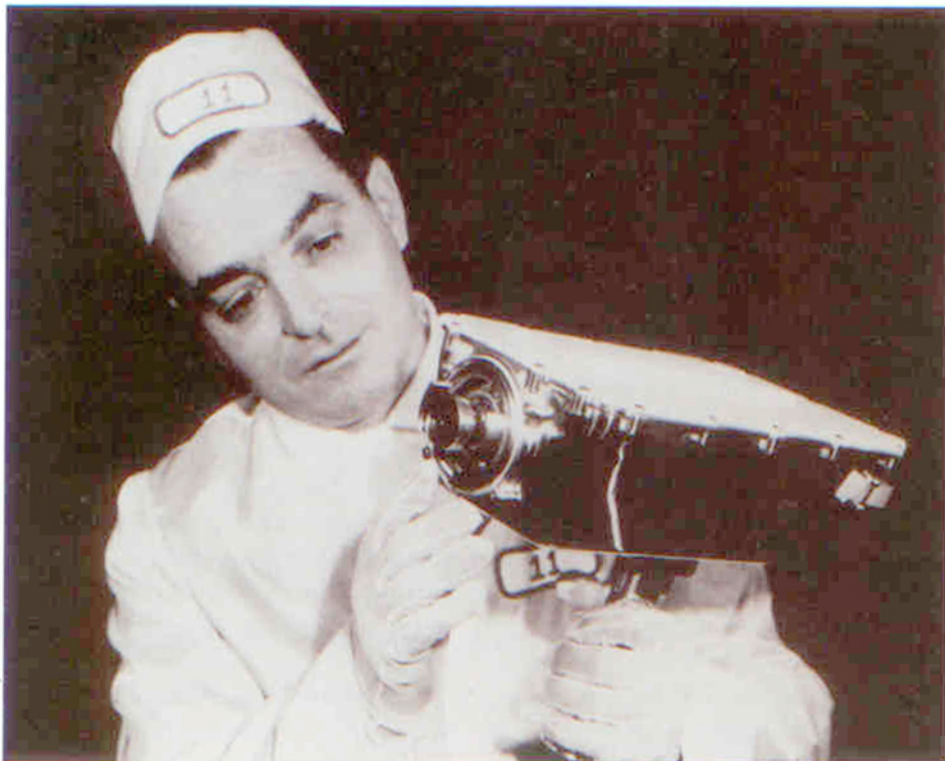
Forty years later, the first moon landing remains a compelling story that captivates generations.

"I have continually received letters and e-mails from all over the world from children and grandchildren of those who watched it live and just want to tell their story of how and where they viewed the telecast, and in many cases, the unusual circumstances of watching it on a TV in a town square, or watching a bootleg signal inside a country controlled by the Soviets," Lebar said.

"The Apollo 11 telecast is the only record of the first walk on the moon and I suspect it will be shown into the future as Apollo 11 is considered by many as the United States' greatest engineering achievement and the first step that will lead to the manned exploration of our solar system."

Apollo 11 was the culmination of a pledge made by President Kennedy in 1961, just days after America's first manned space flight, to land a man on the moon by the end of the decade. NASA's effort in leading the space program produced countless innovations and heroic accomplishments across a wide variety of fields.

Several other business units of today's Northrop Grumman Corp. also contributed



Stan Lebar, project manager for the Lunar Camera team, holds one of five cameras that were designed and built by Electronic Systems. The camera that went to the moon with Apollo 11 was left on the lunar surface.

