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Title: 35 Years Ago, "One Small Step."

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OLD RADIO

35 Years Ago, "One Small Step..."

During the last 100 years, so many of our world's greatest accomplishments have been made by, or with the assistance of, men and women who also were ham radio operators. Here is the story of one.

On July 20, 1969 while we were glued to our TV sets, Jack Yanosov and his co-workers at RCA in Camden, New Jersey, were monitoring the NASA circuits to see if all of their radios and electronics were working properly. The excitement rose at 02:51:16 UTC, when the hatch was opened and the "actual" first words transmitted from Neil Armstrong's backpack radio were, "OK Houston, I'm on the porch." And a few seconds later at 02:56:15 UTC, as his feet reached the surface, Armstrong said those memorable words, "That's one

small step for man, one giant leap for mankind." And a cheer went up in Camden, and around the world.

Those words, "One small step," were sent via VHF radio using Amplitude Modulation with a radio designed by a ham.

Going Back a Few Years

At the age of 18, Jack Yanosov started his career on the RCA assembly line soldering television sets. His job was to solder 11 connections as the set moved past his position on a conveyor belt.

"I wanted to do more than that. I didn't want to solder TVs the rest of my life," he said. So he enrolled at the Temple Techni-

cal School taking electronics engineering. He received his associate's degree in 1953, just before he was drafted for duty with the US Army in the Korean War.

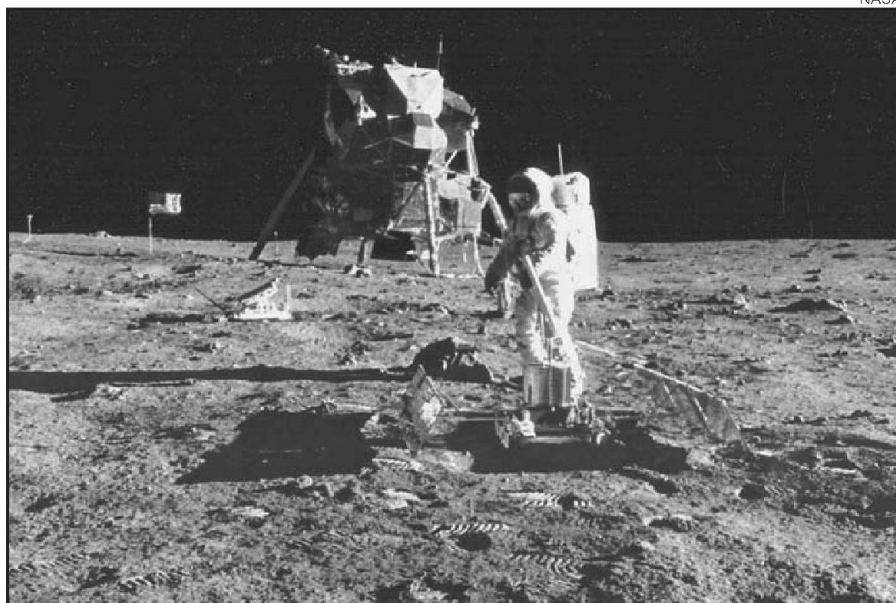
His degree and background helped him get into a technical field, and to receive additional electronics training at Fort Monmouth. Later he was assigned to the White Sands Proving Ground, in New Mexico. It was here he would finally get time for ham radio.

He had many mentors along the way who had encouraged him to get licensed, but work, school and military training came first. Finally, here, he found the time to be tested and he received his Novice ticket, KN2KEF.

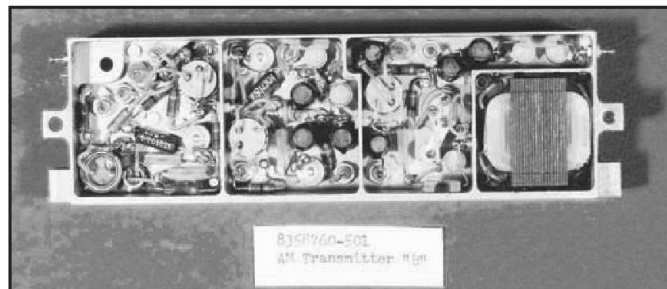
NASA



Jack Yanosov shown testing the extra-vehicular communications system radio in 1969.



Astronaut Edwin E. Aldrin Jr on the surface of the Moon. The photo was taken by Neil Armstrong. Note the antenna just behind Aldrin's head.

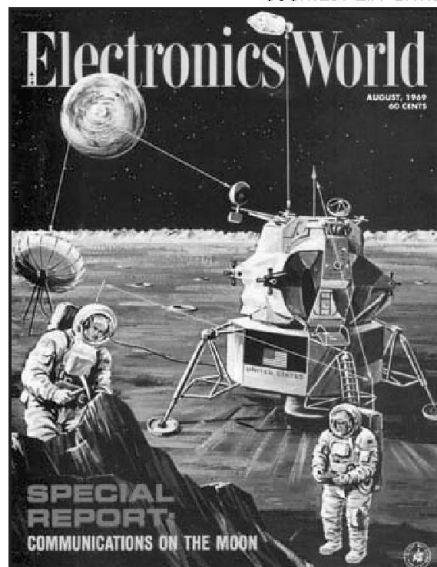


Jack Yanosov's transmitter, side 1.



Jack Yanosov's transmitter, side 2.

COURTESY ZIFF-DAVIS



The August 1969 issue of *Electronics World* featured an article describing the communications system used for the first moon landing.



After being discharged, he enrolled in Drexel University using the GI Bill. His ham radio activities would have to take a back seat while he studied to become an engineer.

He joined RCA at their Defense Communications Systems Division at about the same time as Sputnik was launched and the space race began. President Kennedy made it a priority that we would go to the moon. Yanosov began working on space projects during the Gemini missions.

RCA was contracted by NASA to develop and incorporate new technology and to do the engineering work for space applications. "It was an exciting time to be an engineer," he said.

RCA was loaded with engineers and technicians who were hams, so it was only natural that RCA would get the contract to design the radios that would be used by the astronauts while walking on the moon.

Jack Yanosov's project was to design, develop and produce working models of two AM VHF transmitters for the Apollo 11 flight. (259.7 and 296.8 MHz.) They

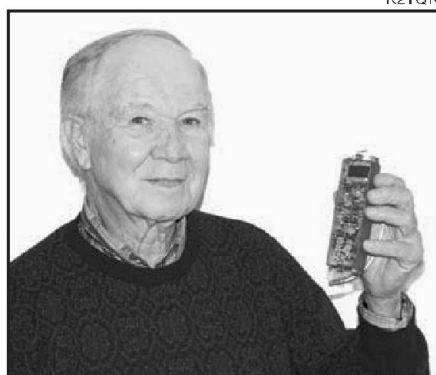
Jack Yanosov has had the honor to have his accomplishments read into the *Congressional Record* on July 20, 2004, by US Rep Frank A. LoBiondo of New Jersey. It reads in part:

Mr. LOBIONDO. Mr. Speaker I rise today to commend Jack Yanosov who helped design the transmitters that were used 35 years ago today in the Apollo mission that landed on the moon.

It was a humble rise for Jack Yanosov, who began his career on the RCA assembly line, and would eventually become the lead engineer on the Apollo communications project. It was on a transmitter built by Jack Yanosov that the first words were ever spoken on a planetary body other than earth. It was 35 years ago today, on July 20, 1969 that Neil Armstrong uttered his famous words that would inspire a generation, "One small step for man, one giant leap for mankind."

The good news for Neil Armstrong and the rest of the world, Jack Yanosov's transmitter worked just like it was designed to do.

Today is a special day for our nation. Thirty-five years ago, our country was locked in an arms race during a cold war that threatened to turn hot at any moment. The race for the moon was more than just a prize in the darkest reaches of space, it symbolized our nation's commitment to American ingenuity. We met our goal and made it to the moon, and we did it first. I am proud that a resident of New Jersey played such an important role in this groundbreaking human achievement. I would like to congratulate Jack Yanosov, and thank him on behalf of the people of New Jersey's Second Congressional District and America for a job well done.



Jack Yanosov today with his original prototype AM transmitter.

had to be lightweight, use solid-state components and consume minimal power, and they had to be small. See the two photos of his radio. One is top view, and the other is bottom view. They worked flawlessly.

His transmitters would become part of the 6.5 pound extravehicular communications system (EVCS), shown in the photo. His radios are the two small matching units near his left hand. This unit was mounted in the top of the backpack, located just behind the astronaut's head. You can see the antenna sticking up in the photo.

Each EVCS consists of a VHF transceiver in each astronaut's backpack. Each one measures 14 by 6 by 1 1/4 inches and weighs only 6.5 pounds. It contains two AM receivers, two AM transmitters, either an FM transmitter or an FM receiver, plus telemetry instrumentation to transmit astronaut biomedical data and spacesuit system status. All of this was fed over the VHF link to the Lunar Mod-

ule (LM) for uplink via UHF S-band microwave back to earth. The astronauts could talk to each other directly or through the LM for redundancy.

Electronics World magazine, August 1969, had an extensive article on the entire system. I will try to place a copy of this article on my Web site, www.eht.com/oldradio/arrl/index.html.

As impressive as all of this is, Jack said he feels his crowning glory in the Apollo flights was his VHF ground penetrating radar project, called the Lunar Sounder Experiment, used on the Apollo 17 flight. NASA wanted to find out what was below the moon's surface. Jack's radar transmitter could penetrate up to 1 kilometer.

Jack would never find the time to return to ham radio, although he kept up with all of ham radio's latest developments and news at work, from the many RCA employees who were hams.

After the Apollo program his RCA career would take him on a 12 year stint working on Trident submarine communications systems. He finally retired from GE, after they took over RCA.

Where Are They Now?

Jack's AM radios were jettisoned along with the EVCS to lessen the weight for take-off from the moon after each mission. They are lying there waiting for some space explorer to rediscover them. Jack thinks that if the batteries are replaced, they should start working again, just as good as new.

Now in his 70s, Jack Yanosov is happily retired and is out fishing every chance he gets.—K2TQN

QST