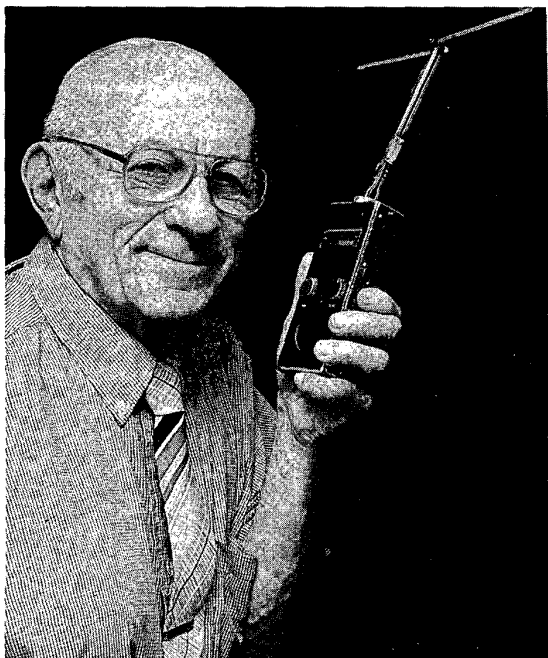


In Memorium

Alfred J. Gross

Wireless Radio System Pioneer



Alfred J. Gross, SM'52, F'82, LF'87

Al Gross, pioneer in the field of wireless communications and inventor of the WWII walkie-talkie, passed away in Sun City, Arizona, December 21, 2000.

Al played a major role in establishing personal portable communications. His efforts led to invention of the first walkie-talkie prior to WWII, in 1938. In 1948, he successfully lobbied the FCC to establish a segment of the radio frequency spectrum for two-way radio communications that later became the Citizens Band (CB). In 1949 he invented the telephone pager and devices that led to cordless and cellular telephone technology. Many of Al's patents expired before these wireless technologies gained widespread popularity.

In 1984, Al received the IEEE Centennial Medal and was recently awarded the 2000 Millennium Medal. His IEEE Fellow Award was for his pioneering work in VHF and UHF mobile radio. His most recent honor was the July 2000 Lemelson-MIT Lifetime Achievement Award for Invention

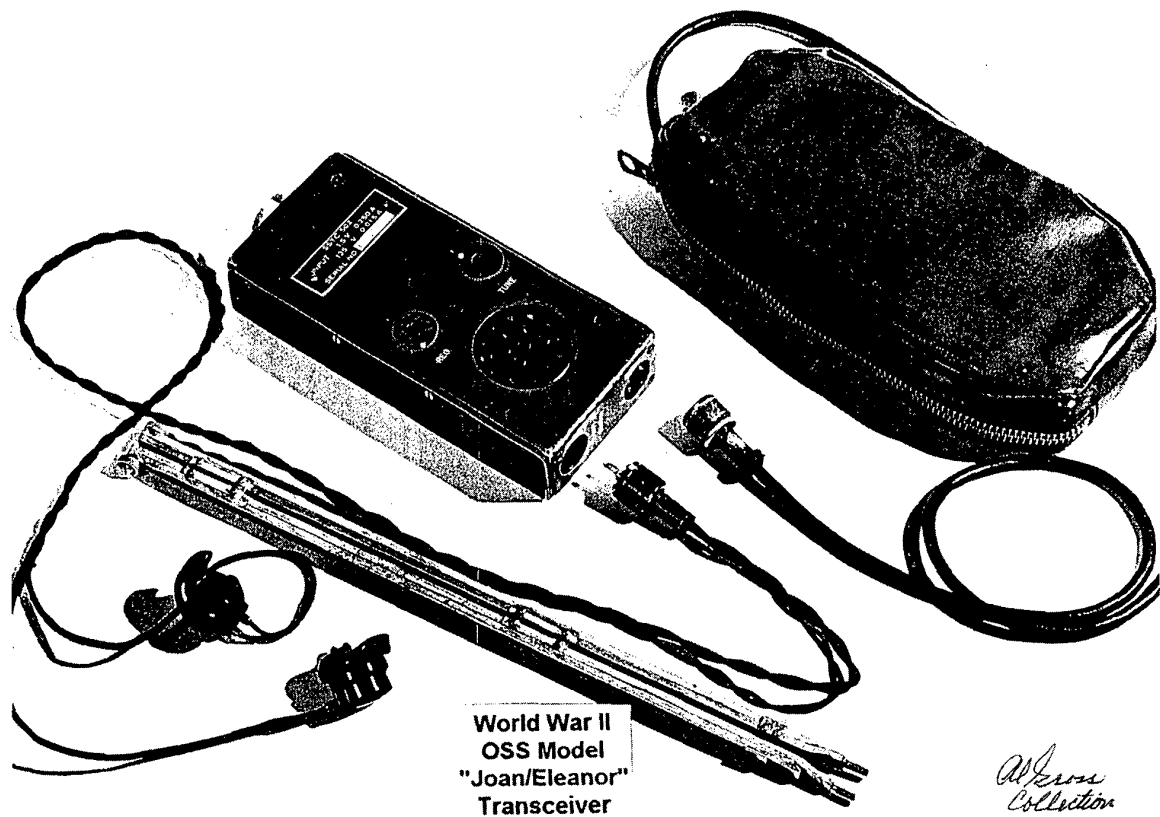
and Innovation that identified him as a visionary who revolutionized technology and enhanced the quality of life. Over the years, IEEE Societies and numerous professional radio organizations worldwide honored him. In 1990, Al was presented with the IEEE VTS Avante Guard Medal and Citation; and in 1992, the USAB Professional Leadership Award. Other awards include a Commendation from President Reagan (1981), the Marconi Gold Medal (1995), and the Edwin H. Armstrong Award from the IEEE Communications Society. Al founded and was the first chairman of our Arizona Chapter. He was an AESS Distinguished Lecturer.

BITTEN EARLY BY THE AMATEUR BUG

Born in Toronto in 1918, Alfred J. Gross grew up in Cleveland, Ohio. He was captivated by radio at the age of nine and turned his basement into an amateur radio headquarters by the time he was twelve. Al obtained his amateur radio license at age 16 and held it until his death. In 1934, portable wireless communications did not exist and very little understanding of radio frequency communications, circuits, designs, and propagation above 100 Mhz existed. While enrolled in the electrical engineering program at what is now Case Western Reserve University, Gross concentrated his efforts above 100 Mhz and resolved to invent a portable radio that could transmit and receive at short range. In the late 1930s, using miniature vacuum tubes, he explored portions of the RF spectrum above 200 Mhz. This effort resulted in the development of hand-held units that operated at 300 Mhz and were able to communicate at distances of up to 30 miles. By 1938, Gross had invented and patented the hand-held, two-way personal radio or "walkie-talkie."

SECURE RADIO FOR WWII USE

Following the onset of WWII, a fellow radio ham in the Office of Strategic Services (OSS) arranged for a two-way radio demonstration at OSS headquarters. The US Office of Strategic Services (OSS) soon recruited Al to head a project to develop a miniaturized sensitive receiver circuit. In 1941, these efforts led to the development of the Joan/Eleanor (J/E) two-way radio system (see Figure on next page) that OSS agents used to communication with high-flying aircraft in enemy-occupied Europe. At that time, Al became acquainted with another radio pioneer, Major Edwin Armstrong. During



World War II
OSS Model
"Joan/Eleanor"
Transceiver

*Al Gross
Collection*

Al Gross authored the article "*Joan/Eleanor Spies*" that appeared in this magazine August 1997 on pages 28-29, (12, 8).

J/E development, Armstrong suggested a super regenerative circuit, which Al incorporated. The resulting OSS ground-to-air communications system was virtually impossible for the enemy to detect. The US Joint Chiefs of Staff called it one of the most successful wireless intelligence gathering methods ever employed. The Joan/Eleanor project was classified Top Secret by the OSS and was only made public in 1976. It was this work that set the stage for the subsequent wireless personal radio, cordless phone, and pager patents.

WIRELESS INVENTIONS CONTINUE IN POST-WAR PERIOD

At the conclusion of WWII, Gross formed the Citizens Radio Corporation to produce two-way radio for personal use. In 1948, their equipment was the first to receive FCC approval for use in the new "Citizens Band (CB)." Gross sold most of his units to farmers and to the US Coast Guard, for use in tending buoys. This was well before the widespread popularity of CB radio. Al's second major breakthrough was adapting his two-way radio for cordless signaling by inventing and patenting the telephone pager. Gross intended his pocket-sized device to be used by doctors, but found healthcare

professionals unimpressed. Most doctors used the excuse that the beeping would upset patients, and some even worried it would interrupt their golf game. (Timing is everything!)

In 1950, Al demonstrated a hand-held transceiver to the FCC as a "cordless remote telephone." He then tried, in vain, to interest US telephone companies in mobile telephony but was rebuffed. Bell Telephone was not interested, and other companies were afraid of Bell's monopoly on transmission lines. Gross continued to invent, earning a dozen patents for his own company and the US government. In September 1958, Gross Electronics Company received FCC approval for Class D mobile and hand-held use. Since 1990, Al was employed as a Senior Principal Engineer at Orbital Sciences Corporation's Chandler, Arizona facility as a specialist in microwave communications.

Al was keenly aware that many of his CB radio, cell phone, and pager patents expired long before they achieved public acceptance and gained popularity. Interviewed by the *Arizona Republic* Newspaper, he responded with a smile, saying, "*I was born thirty-five years too soon. If I still had the patents on my inventions, Bill Gates would have to stand aside for me.*" The greatest joy for Al Gross came from presentations he frequently gave to local elementary and high school students on technology and invention. ■