

## Pioneer inventor brought clarity to radio

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(This article appeared in the 01 January 2010 issue of the *Monmouth Message*)

“The continuous good fortune which has followed me, providing second chances at inventions when the first chance was missed and tossed away, has been all that a man could hope for and more than he has any right to expect.” - Maj. Edwin Howard Armstrong



*Maj. Gen. Randolph P. Strong, commander CECOM Life Cycle Management Command, and Command Sgt. Maj. Tyrone Johnson cut the Signal Corps insignia birthday cake at the celebration of what would have been the 119th birth of Maj. Edwin Howard Armstrong. Armstrong had close ties to the Army Signal Corps and Fort Monmouth. A photo of a young Armstrong looks on. (Photo by Russ Meseroll)*

People gathered on Dec. 16, a couple days early, to celebrate the anniversary of what would have been Maj. Edwin Howard Armstrong's 119th birthday.

Armstrong, who held dozens of patents, allowed the free use of those patents by the Army during World War II. Much of Armstrong's work centered on the development of frequency modulation (FM) radio technology. His work with radio changed the world.

Fittingly, the celebration took place in Armstrong Hall, Building 551, which was named after Armstrong on May 24, 1955.

The building initially housed the Army Signal Corps museum and is now used as the Education Center here, where more than 4,000 training courses are offered annually.

The proceedings began with a brief biography of Armstrong's life and his contribution to modern telecommunications and radio. Maj. Gen. Randolph P. Strong, commander CECOM Life Cycle Management Command, and Command Sgt. Maj. Tyrone Johnson cut the traditional birthday cake.

Armstrong was born Dec. 18, 1890 in New York and became interested in technology and science as a child. He entered Columbia University in 1909 to study in the Department of Electrical Engineering. He graduated in 1913. Immediately after graduating, he was invited back to work as an assistant professor.

At the start of World War I he joined the Signal Corps. He developed one of his most useful inventions when he was a captain serving in France. It was a complex, eight-tube receiver known as the superheterodyne circuit that amplified weak signals to a degree previously impossible. The circuit remains a basic component of nearly all modern radio and TV receivers, as well as many types of cellular phones and other communications devices.

Armstrong filed for a patent for his superheterodyne circuit in 1918 and two years later the patent was issued. He sold that patent, as well as one for another invention—the superregenerative receiver—and by 1923 he was a millionaire.

When he returned to Columbia after the World War I, Armstrong accepted no salary from the university. That way, he could avoid administrative work (and even teaching), allowing him to devote his energies to work on the FM radio.

His legal battles began with a series of feuds and litigation over rights to, and control of, his inventions shortly after the end of World War I.

In various cases, several of Columbia's faculty members of the Department of Electrical Engineering testified for him and several graduates of Columbia's Law School represented Armstrong throughout his career. The legal battles continued until he committed suicide in 1954.

Armstrong was posthumously elected by the International Telecommunications Union in Geneva to the roster of electrical greats to stand beside Alexander Graham Bell and Guglielmo Marconi.

Armstrong was a free thinker. When conventional wisdom of the era held that FM radio would never work, Armstrong pursued FM by himself. By 1934 he had filed a series of patents.



*Capt. Edwin Howard Armstrong received the Chevalier de la Légion d'honneur, the highest decoration in France, in 1919. General (real first name) Ferrie, head of French military communications, pinned the insignia on during a ceremony. (Army file photo)*

After years of painstaking experiments, he was able to prove in a demonstration at Columbia University in 1935 that wideband FM made possible a drastic reduction of noise and static. During the demonstration, he turned on his FM receiver in front of the audience. An FM transmission from a friend's house in Yonkers came in strong, clear, and static-free.

The stunned audience listened to a live music performance and a series of sounds, such as a glass of water being poured or a piece of paper being torn, which would have been unrecognizable over AM radio.

Armstrong frequently visited the Signal Corps Labs at Fort Monmouth beginning in 1938. He acknowledged in a 1946 letter that he served in an advisory capacity here. Armstrong was under contract at various times and attended conferences and field demonstrations at the behest of the Signal Corps.

It was Maj. Gen. Roger B. Colton, then chief signal officer, who in 1938 made the historic decision to employ FM in all future military radios.

In a letter from Armstrong to Colton dated June 29, 1944, Armstrong called the decision, “the most difficult decision of the history of radio which anyone was ever called upon to make...I most sincerely hope that when this war is over what your organization accomplished here can be duly laid before the world and properly acknowledged.”

In an oral history interview, World War II veteran John J. “Jack” Kelleher talked about how Armstrong's invention was important for Fort Monmouth.



*Dedication of Armstrong Hall by the 389th Army band. They played before the ceremony that first dedicated the building in 1955. It was originally the home of the Signal Corps museum. (Army file photo)*

From late 1940 until spring 1941, Kelleher was assigned to the Vehicular Radio Section, which supervised the development of new, very high frequency (VHF) equipment designed for use in tactical vehicles and in tanks.

“It used the new FM technique invented in 1933 by E. H. Armstrong and he was a frequent visitor to our facility [at the Signal Corps Laboratories],” Kelleher recalled. “The upshot of this work was that War Department's orders for VHF AM equipment were changed to call for FM instead.”

Because of Armstrong's success with FM radio, David Sarnoff of RCA and NBC forbid Armstrong from using the tower atop the Empire State building for his FM research.

The two men were once friends. Armstrong countered by erecting his own radio tower on the West Bank of the Hudson River in Alpine in 1937. The tower still stands today about 700 feet over area terrain and has a commanding view of Manhattan.

Before September 11, 2001, many radio and television stations broadcast their signals from the top of the World Trade Center. After the buildings were destroyed during the attacks, stations made arrangements to transmit signals from other locations.

After 9/11, even David Sarnoff's WNBC found a home on Armstrong's Alpine Tower. Armstrong's Alpine Tower ensured that news and broadcasting went on virtually uninterrupted despite the turmoil in New York City.