



# The AMA History Project Presents: Biography of FRANK A. HOOVER



April 29, 1916 – December 27, 1999

Written and Submitted by Jim Simpson (1/2000); Transcribed and Edited by SS (7/2002), Updated by JS (10/2008), Reformatted by JS (09/2009)

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## Career:

- Early 1940s: Became a partner at a local hobby shop
- In the early to mid-1950s, his single-channel receiver, known as the ECE brand, went into production
- Formed F&M Electronics when the hobby shop grew to become his full-time job
- To increase business, he got into the transistor business
- Designed and developed relay-less radio systems
- 1963: Developed his first digital proportional and continually refined it
- Produced various Radio Control products including Radio Control collars for training dogs, Radio Control mini tanks, wireless microphones and motion detectors

## Honors:

- 1995: Model Aviation Hall of Fame

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*The following biography was written and submitted by Jim Simpson after the death of Frank Hoover.*

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Frank Hoover left his earthly life on December 27, 1999 after a long, tedious bout with cancer. It is my honor as a longtime friend to write this tribute to celebrate his life and place in the [Model Aviation] Hall of Fame.

Frank began his life on April 26, 1916 in Linglestown, Pennsylvania. His parents were Augustus G. and Lottie M. Moyer Hoover. He had three brothers and two sisters. As was not unusual with boy children of that time it seemed he always had an interest in aircraft and manifested it with model airplanes all through school until graduating from high school in Palmyra, Pennsylvania.

He was inducted into the U.S. Army in 1941 and immediately went to electronic school at Fort Monroe, Virginia, then on to learn electronic autopilots at Minneapolis-Honeywell in 1942. He was then stationed at Kirtland Field in Albuquerque, New Mexico. Also during this time, he became a partner in a local hobby shop and continued to build and fly Free Flight airplanes, which were modified to accommodate Radio Control.

In 1954, Frank went to work at Gulton Industries and stayed there for five years. By this time, he had perfected his single channel receiver design to the point that it was in production and doing well. Old time modelers will recognize it as the ECE brand receiver. It utilized a single hard tube and was a scant one inch by two inches by two inches. Of course, back then, the relay was not

part of the receiver and the actuators were either escapements or servos. A typical illustration is illustrated on the DeBolt Live Wire series Rebel plan dated 1956.

From this modest start, the business soon grew large enough to require his full-time attention so he formed F&M Electronics and continued to expand the product line in order to fulfill the demand for more, better and smaller radio systems. Frank moved his products into the transistor world and from there to single-channel to multi-channel offerings, usually the lightest and/or smallest available at the time. For example, the ECE receiver required a 67-1/2-volt battery, a 1-1/2-volt battery and a 3-volt battery. The transistorized replacement was the RTI 3-volt tone receiver and required only two Pencil batteries for operation of the entire control system.

One of the most troublesome components in those old radio systems was the relay. It was subject to vibration and dirt and the points required cleaning way too often. Frank's solution was to design and develop relay-less radio systems. Of course, the use of tone generators allowed simultaneous operation and being transistorized made light and small appropriate adjectives. Still, the best was yet to come.

In the fall of 1963, Frank was ready to produce the radio system we had all dreamed of and yearned for. Up until this time typical radio systems drove the actuators to the limit so if less than total movement was needed (usually was the case) the best we could hope for was to tap the control levers and the planes often responded by twitching. Smooth flight was seldom seen. The alternative to this was some form of what was known as TTPW (twin tone, pulse width) or galloping ghost systems. Both allowed smoother flight but had considerable other problems.

There were two different approaches to proportional Radio Control systems available at that time. The first was often referred to as "analog" and the other was "digital." A well-known example of the analog system was Zel Ritchie's Space Control System. Babcock, Bonner, Digicon, Logictrol, and F&M were in the final stages of development about the same time.

Prototypes of the F&M digital proportional were being flown in the fall of 1963 and the production models were the crown jewel in Frank's Radio Control modeling life. From that point on he continually refined and improved the system making it lighter, smaller, and ever more reliable. During this period, it was not uncommon for radio manufacturers to use other brands of servos and F&M had tried all others available before designing their own.

The choice of feedback system was between capacitive, resistive (more common) and inductive. A young, newly hired engineer championed the latter and the Magnavac servo made its appearance. History has since proven that both the capacitive and inductive feedback systems were not viable and the resistive pot style is in universal use. Frank was left with no choice except to cease production and close the plant in 1969.

He then went back to work at Gulton industries and stayed there until 1976 when he moved to work at Missouri Research Labs. From 1983 to 1985, he was with General Technology Corporation and moved on to Universal Metal Spinning Corporation where he stayed until 1989. At that time, he retired and took up the game of golf with typical youthful vigor. Golf continued as his main interest in life, but he did tell me he also helped his wife, Bobbi, with CAD floor plans, which she used in her real estate business.

Both Frank and Bobbi contracted cancer at nearly the same time and suffered through the difficult and painful “cure” procedures. As it happened, Bobbi made it OK, but Frank was not to go on.

Now, in retrospect, we consider Frank Hoover’s contribution to our world of Radio Control models. He began as an experimenter in the truest sense of the word. His experiments began with attempts to guide planes we now call Old-Timers with Radio Control. Perhaps success was then defined by a crash upwind, but it was only a relatively short time before Frank could affect the flight path with a single control we would now call a rudder trim tab. So much for left and right flight. Next we needed vertical control, thus throttle control came into the picture. Now comes Frank’s genius.

Local newspaper archives tell of his team winning a competition sponsored by the Los Alamos National Laboratory wherein the task was to build a radio receiver then find the “secret signal” with it. Not only was Frank good at radio design, but he also excelled in miniaturization. He developed a very small (for its time) single-channel receiver while employed at the Sandia Corporation (now known as Sandia National Laboratory), but they saw no commercial interest in it so he brought it to our market as the ECE single hard tube receiver. Hal DeBolt saw fit to feature it on many of his plans that were included in his kits sold during the 1950s. In a few years, his business grew from cottage to a full-time business with more than 30 employees and numerous electronic products.

Diversity was also part of the mix. Other Radio Control applications included radio collars for training dogs, an electronic cinch released used in rodeos, Radio Control miniature tanks (for Army training), wireless microphones and even motion detectors. Thus, we see that although beginning as an experimenter he was also successful in producing and selling many useable electronic items at both wholesale and retail levels.

Frank Hoover was recognized by the AMA for all these many contributions with his induction into the Hall of Fame in September 1995. He was very pleased and honored by this action. His family was justifiably proud as well.

Of all he has done, his contribution to the development of digital proportional Radio Control systems stands as the crown jewel and should be remembered by each of us every single time we grab the transmitter to fly our plane, drive our car or float our boat.

Thanks, Frank Hoover, from all of us ...

*(signed) Jim Simpson  
January 12, 2000*

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