I have been asked about my background. So here it goes.

I graduated from the University of Michigan in 1967 with a BS degree in electrical engineering. I worked in the aerospace industry for over 30 years, first as a digital designer then as a system development engineer.

Circa 1969 BR700 Data Storage and Display System

The first projects that I worked on was the BR700 system. I am the one standing in the picture. The product eventually failed because of constantly changing customer requirements. I was profoundly affected by the failure. I began quietly looking for ways to design hardware products that were more flexible. In the process I became a strong advocate of the new embedded microprocessor technology; that is, replacing a product's hardwired control logic with a small microprocessor that implemented the control logic in software. Doing such a thing was a radical paradigm shift in electrical engineering that was not readily accepted. The term certifiably crazy was used more than once. To make matters worse, some of the critical components required to build embedded microprocessors were themselves still in development. The technology was in its infancy. In addition, the technology that we take for granted today had not yet been invented. Still, the promises offered by microprocessors were tremendous. By using embedded microprocessors, designers could respond to changing customer requirements by simply changing the microprocessor's software. In addition, spin-off products could be developed in a fraction of the time and cost required to produce those products using conventional development techniques of the day.

The first microprocessor based product that I built was a set of 20 keyboard-CRT workstations developed in 1972 for a factory automation project. The workstations were distributed throughout a very large manufacturing facility and connected by a communications network to a computer in the facility's data processing center. Production status information was entered on the workstations and sent to the processing center where it was used for production scheduling. We were horribly behind schedule on the project. The customer was threatening to cancel the contract, and design of the computer's communications processor had not yet begun, let alone building it. We were in deep trouble. To solve the problem an additional workstation was built. The workstation's CRT module was removed and replaced with a computer interface module. The workstation's microprocessor was then reprogramed to perform the communication processor function. The customer was very happy with the system, ordering a couple more workstations a year later.

I was awarded four patents for systems using embedded microprocessor technology. The systems were primarily advanced communication front-end processors used in Air Force computer centers throughout the world. Each front-end processor connected a multitude of military communication networks to the center's data processing computer. Typically, a center had multiple computers each with its own front-end processor.

One of the front-end processor spin-offs was an avionics controller installed in a P3 aircraft that controlled a deep submersible sonobuoy for an anti-submarine warfare (ASW) program. To the casual observer, the avionics controller was a totally different device from a front-end processor. But, if you took a closer look, it was apparent that the front-end processor could be easily modified and reprogrammed to perform the avionics function. That was done at considerable cost savings. The design life of the avionics controller was 2 years, after which a new controller would be built for the evolving sonobuoy system. A new avionics controller was never built. Instead, the microprocessor in the original controller was reprogrammed several times allowing the controller to be used for the duration of the program.

An interesting project was development of a data terminal for high speed communications through an IBM synchronous orbit communications satellite. The data terminal was enormously successful. However, the business venture failed since no one could figure out how to make use of 6 mega-bit-per-second data links. Why would anyone, other than insurance companies backing up databases, want to send long distance data that fast? However, on the local scene the situation was different. I worked with a number of the early 10 mega-bit-per-second local area networks, Ethernet being the only one to survive.

I was the lead engineer in development of a nationwide data communications network for the stock brokerage industry. We seriously considered using two new communication protocols called TCP and IP, but rejected them. At the time cross country data traffic was carried by low bandwidth leased telephone circuits. The high overhead inherent in TCP and IP would have bankrupted the company in terms of monthly telephone bills. TCP – IP, the foundation of the internet, had to wait until the advent of high bandwidth fiber optic cables to become practical.

As the result of problems encountered on development of the nationwide network, I published a paper recommending that the data link layer of the ISO seven layer communications architecture be divided into two sublayers, a media access sublayer and a logical link sublayer. For the stock brokerage network, we actually had to do this. Since the ISO architecture had just recently been universally accepted, suggesting that one of the layers be subdivided when over like a lead balloon. Several years later dividing the data link layer into two sublayers became the accepted practice, and still is.

I was first licensed as an amateur radio operator in 1959 as K8MEV. In 1989 I was licensed again as KJ6RZ and upgraded to Extra Class shortly after that. I served as the president of the Conejo Valley Amateur Radio Club (CVARC) for two years and as newsletter editor for several years after that.

I was involved in amateur radio emergency communication (ACS/ARES) for a number of years. During that time I was privileged to serve as emergency coordinator for a fantastic team of radio operators and engineers. At the strong urging of local government officials, we developed an extensive emergency radio communications network that was, and still is, heavily used. We were deeply involved in the President Reagan funeral handling radio communications along the route followed by the funeral procession. That was a huge operation (Operation Serenade) with every type of law enforcement organization that you could imagine involved. Despite the serious issues that occurred, some funny things happened as well. Like the "stealth Cessna" that flew under the extensive radar net into the no fly zone over the President Reagan Library. Nothing sinister. The Secret Service guys took their helicopter up and shooed the Cessna away. But it was funny when we heard that little airplane calmly flying along completely undetected by the extensive high-tech radar net providing air coverage during the funeral.

I have always been fascinated by ionospheric radio communications. How a little 15 meter wire antenna can launch radio signals that travel half way around the world still amazes me. I know why it works, but I am still amazed. Because of this fascination, my primary amateur radio interest is HF communications. In particular, providing reliable communications any time, any where, under any conditions. That is a tall order. Yet, during World War II radio operators had to do exactly that. At the time HF radio was the only means of long distance communications, including communications with ships at sea and aircraft. It didn't matter that ionospheric conditions deteriorated throughout the war. It didn't matter that solar minimum occurred in 1944, the worst year of the war. They had to get their radio traffic through, and they did. How did they do that? Learning what they did and improving on their techniques is a fascinating journey.