Loose in the Foothills

by Bob Ring

How Your Cell Phone Came To Be

The subject of this column, namely cell phones, is a departure from my typical fare of personal experiences or local history subjects. I am belatedly discovering the power of today's cell phones and when I remembered that my uncle was involved in their development, I couldn't resist my history researcher impulses in putting this story together.

Did you know that your cell phone is really a very sophisticated and versatile two-way radio?

Mobile radio development started in the 1920s in Europe and the US for use in vehicles like taxi cabs, police cruisers, and ambulances. During World War II Motorola developed a backpacked Walkie-Talkie and a hand-held battery-powered two-way radio (about the size of a man's forearm) for the US military.

The first mobile telephone call was made by AT&T in 1946. By 1948 wireless telephone service was available in almost 100 US cities and highway corridors. But, throughout the phone call in these early examples, a mobile phone had to stay within range (up to about 20 miles) of a single high-power transmitter on a tall central tower. At that time there was no way to continue the call if the phone moved from one coverage area to the next. Besides this geographical limitation, the number of callers who could use the system at the same time was severely limited by the number of available frequencies (or channels).

Long Path to Cell Phones

In an internal memo for AT&T's Bell Laboratories in 1947, Douglas Ring (my uncle), outlined a new mobile telephone concept - a system comprised of multiple low-power transmitters spread throughout a city (up to two miles apart) in a hexagonal grid (the term "cell" did not come into common use until almost 20 years later), with automatic call handoff from one hexagon to another and reuse of frequencies within a city, greatly increasing the number of simultaneous callers. Unfortunately, the technology to accomplish this revolution didn't yet exist.

Effective implementation of the cellular concept did not come until the 1970s after Richard Frenkiel and Joel Engel of Bell Labs applied improved computers and electronics to make it work. Ironically, the first cell phone call was made in 1973 by Motorola engineer Martin Cooper who called his rival Joel Engel at AT&T to announce his success.

By the late 70s and early 80s, First Generation (1G) commercial cellular networks began to make their appearance, first in Japan, then Europe, followed by the US. Illinois Bell,

formed in Chicago from an FCC-licensed AT&T subsidiary, opened the first cellular system in the US in 1983. The world's first commercial handheld cellular phone was the Motorola DynaTAC 8000X It was over a foot high, weighed two pounds, offered just a half-hour of talk time for every recharging (took ten hours), and sold for $3,995.

In the 1990s Second Generation (2G) mobile phone systems were offered, replacing analog with digital transmissions, thereby increasing speed, flexibility, and capacity. Text messaging and access to media content like ring tones and news headlines were now available.

Smarter Cell Phones

Cell phones were evolving too. In 1992 IBM developed the first "smartphone," combining a computer with a speaker, a microphone, a touchscreen keypad, a display screen, a battery, a transmitter, and an antenna. The smartphone was released to the public in 1993 by BellSouth. Besides being a mobile phone, it also contained a calendar, address book, world clock, calculator, note pad, e-mail, send and receive fax, and games.

Due to more advanced batteries and more energy-efficient electronics, a trend started away from the early cumbersome large "brick" phones towards smaller hand-held devices. Costs came down too as the total number of users jumped from hundreds to millions of people.

The early 2000s saw the development of Third Generation (3G) cellular systems characterized by high-speed internet access. For the first time, streaming of radio and television to handsets became possible.

As 2011 begins, we see the emergence of Fourth Generation (4G) systems driven by the growth of mobile broadband services like electronic readers. Speed improvements up to 10-fold over existing 3G technologies are anticipated.

No longer needing high radio towers, cell phone transmitter antennas – many no larger than stereo speakers - can be mounted in church steeples, on trees and flagpoles, and on top of tall buildings. *Arizona Daily Star* readers will recall (April 1, 2009) that to avoid the sight of ugly antennas in the Catalina Foothills, cell phone providers started putting some antennas inside fake saguaros.

Tremendous Capability

Today, cell phones fit in the palm of your hand, weigh only a few ounces, and do everything but slice bread. Your phone can even take you to an online marketplace where you can shop for new apps (applications) among an unbelievable one hundred thousand "plus" choices.

Cell phones are big business! We are constantly barraged with advertising for an almost overwhelming number of choices with cute names like Bold, Captivate, Droid, Epic, Evo, Fascinate, iPhone, Touch, and Vibrant.

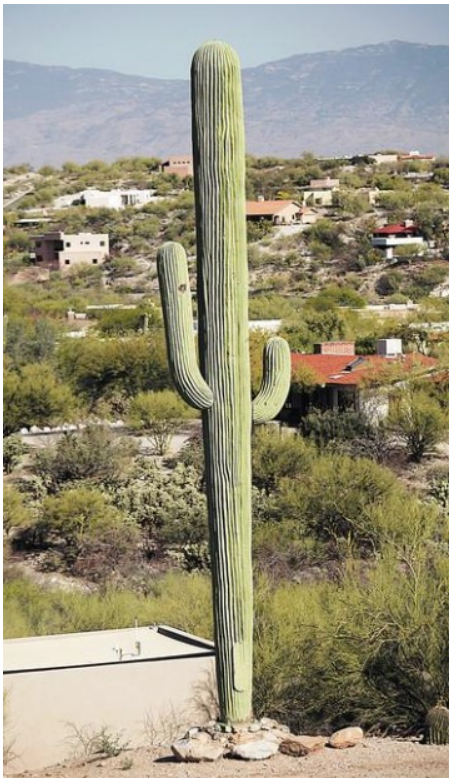
In case you were wondering, you can still make telephone calls on today's cell phones, but last December's *Consumer Reports* rating for voice quality on almost all phones is only "fair."

My cell-phone-pioneer uncle, Douglas Ring, lived until 2000. I don't know what he thought of the amazing development and expansion of his original idea.

Lately, Pat has given me every opportunity to explore each new evolutionary step of the cell phone, as she does. But I am totally behind the times! I keep thinking, if I make the wrong move, I'll be "beamed" up to the Starship Enterprise.

Sources *Online Articles: "What is a Cellular Telephone?" - Definition from Whatis.com, "History of Mobile Phones" and "Smartphone" from Wikipedia, "Cellular Telephone Basics" from Privateline.com; 1947 Bell Labs memo by Douglas H. Ring; Arizona Daily Star; Consumer Reports.*

In spite of its $3995 price tag in 1983, the first commercial hand-held cell phone – the Motorola DynaTAC 8000X – was very popular. (Courtesy Wikimedia Commons)



This fake saguaro, complete with woodpecker holes, was built by T-Mobile as a stealth cell phone tower on North Craycroft Road just south of East Territory Drive.
(Courtesy David Sanders / Arizona Daily Star)