Telstar: A half century of information from space

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By **NJ Voices Guest Blogger/For NJ.com**

The Telstar I satellite was a project of Bell Telephone Laboratories in New Jersey. Launched on July 10, 1962, it was the first orbiting communication satellite.

By A. Michael Noll

A half-century ago, the world became much smaller. Until then, it was hard to get telephone and television signals from other continents. But then came the launch of Telstar on July 10, 1962 — and everything began to change.

Telstar was the first active relay communication satellite. It received a signal up from Earth and then retransmitted that signal back down, spanning the Atlantic Ocean and bringing continents closer together. The frequency bands used for the uplink and downlink are still the ones mostly used today — Telstar got it right from the beginning.

The first test television transmission on July 10, 1962, was a taped video of an American flag. The signal was received in France, but missed in England because the British had the polarization wrong. Later, the first telephone calls across the Atlantic by satellite would be relayed over Telstar. A few weeks afterward, on July 23, Europeans saw Walter Cronkite live, a few minutes of a Chicago Cubs game and even a little of a news conference with President John F. Kennedy.

Telstar was a tremendous engineering and technological accomplishment by a multitude of innovative people at Bell Telephone Laboratories in New Jersey — the incubator for so many inventions that transformed our lives and created today's information age and digital era.

Telstar was preceded by five years by Sputnik, but that was not a communications satellite. Telstar beamed

signals across the Atlantic between large-horn antennas, which were in Maine, England and France. The signal received on Earth was so weak that these horn antennas had to be huge and were housed in domes about 200 feet in diameter.

Voice, fax and TV signals were transmitted in both directions across the Atlantic using Telstar. The satellite was roughly spherical, only about a yard in diameter and covered with solar cells to power it as it spun about its axis for stabilization.

To minimize the delay as signals were transmitted up and down, Telstar was placed in a relatively low elliptical orbit, averaging about 2,200 miles above Earth. But this meant it could be used for only about 20 minutes of each orbit since it passed rapidly overhead and required the huge ground antennas to move quickly to follow it. Dozens of Telstars would have been needed to provide continuous coverage.

The electronics on Telstar ultimately failed after a little more than a year — although it is still orbiting the Earth as historic space junk. But Telstar showed the way for a host of other communication satellites that would follow. Today, the Iridium constellation of 66 low-Earth-orbit satellites provides voice and data service around the globe.

Communication satellites in geostationary orbit beam mostly TV signals to the entire planet, including directly to homes using small receiving dishes.

Telstar was a cooperative venture involving private industry and government, with a strong international dimension. AT&T reimbursed the government for the rocket that launched Telstar into orbit. It took only about two years from Telstar's conception to its launch — an incredibly short time to design and construct the satellite and get all the system components, including the ground stations, in place to work together.

Telstar was the brainchild of John R. Pierce, who directed the communications principles division at Bell Telephone Laboratories until his retirement in 1971. He was a genius and an extraordinary innovator himself.

Without the scientific and technological achievements of solar panels, transistors and a traveling-wave-tube transponder, Telstar would not have been possible. It was Pierce's idea, coupled with the project leadership of Eugene F. O'Neill, that made the impossible possible — along with many engineers and scientists at Bell Telephone Laboratories.

A. Michael Noll, a resident of Stirling, is professor emeritus at USC. He and Michael Geselowitz recently edited "Bell Labs Memoirs: Voices of Innovation," a book containing biographical snapshots of a collection of people who were at Bell Telephone Laboratories in Murray Hill. Share your thoughts at njvoices.com.

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