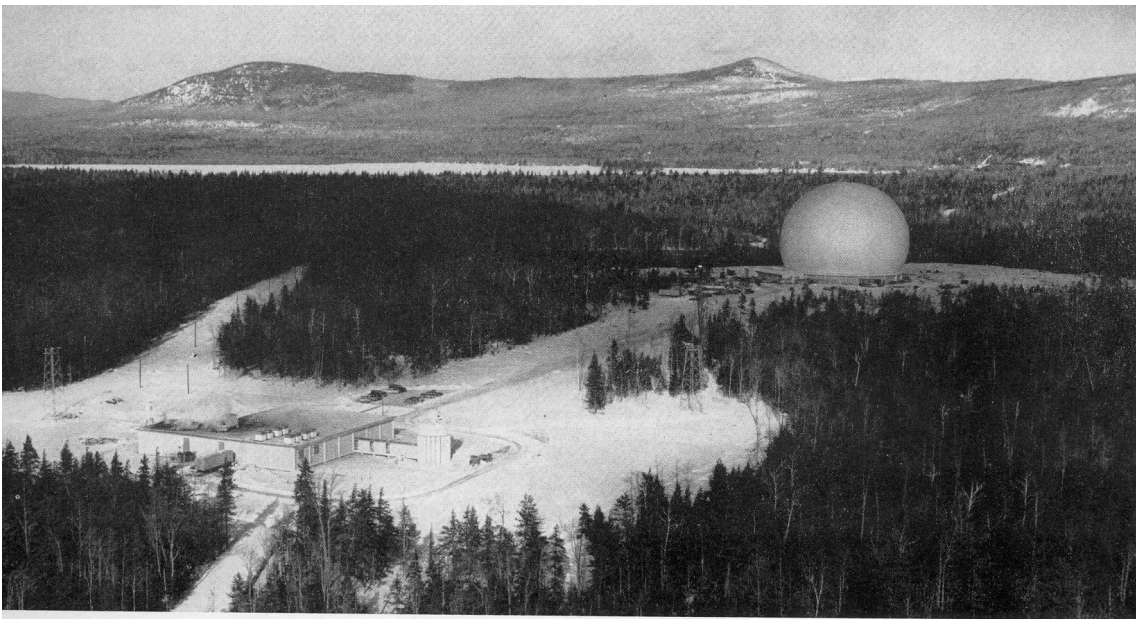


MAINE ASSOCIATION OF ENGINEERS MEETING July 23, 1962

The meeting of **July 23, 1962** was held in **Andover, Maine** at the new **satellite tracking station**. There were a total of **277** members and guests in attendance. The topic for this meeting, which drew one of the largest turnouts in **MAE** history, was the newly operating ground station for the **Bell System's "TELSTAR" project**. The **TELSTAR I** satellite had been rocketed into orbit on **July 10, 1962** to serve as "repeater tower in the sky" to link communications in the US with Europe. It was the first step in international communications through space.

The technology at the time to transmit communications overseas was through short wave radio broadcast and under sea submarine cables. On land the evolving technology in this country was through microwave transmission. The television medium was still in its black & white infancy but was poised to expand. Global communications was still a dream that engineers had the solution for. Earth communications were increasing on old technology of poles and wires and underground cables. The answer was microwave radio waves. Microwaves traveled in straight line requiring repeater towers in a "line of sight" fashion about 30 miles apart. The Bell System controlled the telephone network in this country and utilized a microwave network for its long distant call service. In the early 1960's growth projections for the use of overseas telephone and communications in the 1980s looked at tens of millions of messages a year. This would require many thousands of overseas message circuits to take care of this growth. The existing short wave radio and submarine cables could not meet the future needs for telephone service, alternate routes, data transmission and television across the oceans.

The answer was the vast expanse of space. With the first orbiting satellite in 1957 came the plan to use satellites "flying thousands of miles high", to receive earth station signals, amplify them and relay them downward to a receiving station on another continent. One of the challenges for engineers, first being that of getting a satellite in orbit, was to provide a satellite with its own power supply. The Telstar I satellite had 3600 'solar cells' on its surface, which converted the sun's rays into energy to charge its batteries and to power the radio equipment.



Bell System's Earth station at Andover, Maine. It was built for Project Telstar experiments, looking toward overseas telephone and television service via satellites in space.

One of the antennas for the Telstar project was located in Andover, Maine. One of the desirable characteristics for the Andover site was that the location was surrounded by mountains, providing a natural bowl-like configuration which enhanced the radio signal reception. The earth station was designed to simultaneously send and receive signals while continuously following an orbiting satellite thousands of miles away. The antenna at Andover was a giant horn constructed of aluminum and steel. It measured 180 feet long, 95 feet high and weighed 380 tons and was built with the 'accuracy of a fine watch'. (This was when watches were all-mechanical devices!) The antenna was so big that its thin inflated cover of fabric and synthetic measured 161 feet high and 210 feet across. This fabric was kept inflated by a positive air pressure. This '**radome**', and at the time was the **largest air inflated structure in the world**. If laid flat on the ground the dome would cover 3 acres. People and trucks entered through air lock doors to prevent deflation. The antenna was constructed inside the inflated dome. A 70-foot ring gear allowed the antenna to move vertically and an inner ring on the floor of the dome allowed the antenna to move horizontally about the center point.

The **TELSTAR I** satellite was 34" in diameter and weighed 170 pounds. It received 6000 MC signal from the ground and sent 4000 MC signal to the ground. The orbit speed was 16,000 MPH, in an orbit that varied in height from 500 to 3000 nautical miles. The time for the satellite to circle the earth was 2 1/2 hours.

Article by MAE member Art Ray.