

# CAREERS IN AVIATION THRU STEM? THE AIRPORT IS A GOOD PLACE TO START

COMBINED WITH YOUR CLASSROOM PROGRAM IN SCIENCE, TECHNOLOGY, ENGINEERING, & MATH

## GET THE GEARS TURNING

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ANOKA COUNTY-BLAINE AIRPORT    BLAINE AIRPORT PROMOTION GROUP    TOURS AVAILABLE K-12

### EDUCATION COORDINATOR JUNE 13, 2013



*From a trained telegraph operator at Western Union, to inventor, holding over 1,093 patents that included a battery for an electric car, electric power, the phonograph, the motion picture camera and a long-lasting electric light bulb. Thomas Alva Edison is credited as the fourth most prolific inventor in history.*

Thomas Edison gained notice as an inventor in 1877 with his unexpected accomplishment of producing a sound recording on tinfoil wrapped around a cardboard cylinder giving the world its first phonograph recording.

Edison's earlier inventions were outgrowth of his experience as a young telegraph operator and contributed greatly to mass communication, especially in telecommunications.

These innovations were products of Edison's development of the first industrial research lab located at Menlo Park, New Jersey under the supervision of Consulting Electrical Engineer, William Joseph Hammer. This research lab was funded from the sale of Edison's invention of the Quadruplex Telegraph to Western Union in 1874 for a sum of \$10,000.

The standard telegraph could only send a message one way on a wire. The problem of sending two signals simultaneous in opposite directions on the

same wire was solved previously by Julius Wilhelm Gintl and improved by J.B. Sterns.



**Standard land line telegraph hand key & radio headset, with transmitter on display at Golden Wings Museum**

Edison's patented method added the ability to double the number of signals that could be sent in each direction at the same time. A *Quadruplex Telegraph* used one signal to vary the strength of the signal called *Amplitude Modulation (AM)* and the other signal to vary the Phase called *Phase Modulation* to change the direction of the signal. This concept is now called *Polar Modulation*.



**Headset electronics receive signal at two electro magnets. When changes in signal amplitude are received a thin disk in the ear piece will vibrate producing the signal reproduction.**