Forget email for a moment. Nowadays we often take for granted the convenience, ease, and reliability of mailing a letter cross country to a friend, close relative, or business on the west coast. Simply drive down to the nearest post office, drop the letter into a drive-up mailbox without even getting out of your car—and Violá!! Almost as if by magic, the letter appears in the intended recipient's mailbox 2,000 miles away within two or three days. We all know this is able to happen by a series of surface (trucks) and air (airplanes) conveyances carrying the mail from point to point *en route*. Modern jet planes can make the coast-to-coast flight in a matter of hours rather than days. But it wasn't always that easy.

In the early days of aviation and well before the era of advanced electronics for navigation, radio guidance, or VOR's, the mail was carried cross country by a cadre of gutsy postal service pilots flying in biplane **Curtiss JN-4 Jennys**, often under less than ideal conditions. These planes had a cruising speed of 75mph with a service ceiling of 6,500' and two hour endurance. Before the early 1920's flying at night or through inclement weather was out of the question, almost suicidal. These pilots had to rely upon visual flight rules and landmarks they could spot on the surface for navigation.

There is a navigational arrow on the edge of Shinob Kibe Mesa near downtown St. George, UT, although it is too small to be seen in this photo.

Concrete navigational arrow near a water tank. The arrow is 75' long. The tower and shed were erected on the square parts of the arrow.

They often followed known railroads or familiar coast-to-coast auto routes. Accidents were frequent and pilot turn-over and mortality were high.

All that changed in 1924 when the US government decided to construct an airmail beacon tower system that could be followed by postal pilots night and day as long as they weren't in the clouds. The system consisted of a series of waypoints roughly five to ten miles apart. Each waypoint had a rotating beacon atop a 50-foot high tower and a 75-foot long concrete arrow on the ground painted bright yellow pointing in the direction of the route to be flown. The beacons rotated six times per minute and in clear weather could be seen ten miles away. The earliest towers used acetylene-gas powered lights which were fed by fuel stored in a shed at the base of the tower. The shed's roof was numbered to aid in identifying any waypoint's location on the ground.

Navigational concrete arrow near a 600' desert escarpment
The concrete arrows blend in with the desert terrain making them difficult to identify from even low altitude.

About every 25 to 30 miles an intermediate landing field was established in case of emergencies. The rotating beacons at these fields were brighter and could be seen up to 75 miles away in clear weather. After one year of operation the airmail service had 18 terminal airfields, 89 emergency airfields, and more than 500 beacon lights scattered over air routes throughout the country. The system was an unmitigated success. Before the beacon tower system was conceived, a transcontinental letter from New York City to San Francisco took ~83 hours for the cross country trip. After the system was in place, that time diminished to 33 hours. Upon completion of the system in 1933, there were 1,550 light beacons and directional arrows stretching throughout 18,000 miles of postal air routes in continental United States.

75' long concrete navigational arrow in the desert near St. George, UT. No one at the St. George Airport was able to help locate these arrows. The shed and tower were mounted on the square sections of the arrow.

In the mid 1920's Congress authorized the Postmaster General to contract for airmail service. Commercial aviation companies submitted bids and the first commercial airmail flight took to the air on February 15, 1926. The Curtiss JN-4 could not easily fly over the geographic barrier created by the Rocky Mountains due to

its low service ceiling, so it was replaced by the **DeHavilland DH-4** which had a service ceiling of 22,000' and cruise speed of 143 mph with endurance of 3.75 hours.

As a testament to the dangers of flying for the postal service, even with the aid of navigational beacons, during the winter of 1933-1934, the weather was particularly severe, and there were dozens of crashes. These resulted in the deaths of twelve pilots.

Aeronautical Museum with restored navigation arrow, beacon, and tower at Grant-Milan Airport (KGNT) near Grant, New Mexico. This is worth a visit if you are ever in the area.

Author standing on a concrete navigational arrow in Grant, New Mexico.

A fun thing that GA pilots, interested in the history of aviation, can do is find what remains of these navigational concrete arrows, many of which will be over 100 years old within the next ten years.

At least two of the concrete directional arrows were located on the ridgeline of Eagle Mountain which runs east-to-west just south of Williamsport Airport (KIPT). Unfortunately due to damage to the arrows from freezing and thawing, urban development, and overgrowth of brush and trees, most of the arrows east of the Mississippi are no longer visible from the air. The best places to see the remaining arrows are in the western states where the climate is warm and dry and the terrain is barren. A list of visible arrows can be found on **THIS** website.

The first time I tried to find a navigational arrow, on a trip to the west coast with another pilot, I researched the longitude and latitude coordinates of two arrows reported to be visible in the desert near St. George, UT. After a couple of hours of searching the area, we gave up, and I decided to try again my next trip to St. George. After doing further research upon returning home, I found two concrete arrows that could be seen on the aerial photos from GOOGLE MAPS web site. Once I determined exactly where these arrows were from GOOGLE MAPS, it was not difficult to locate them and take photos.

Navigational arrow, beacon tower, and shed -- restored at the Grant County Airport KGNT).

I understand it is possible to see the remains of the concrete arrows on the Eagle Mountain ridgeline near Williamsport, but they are not visible from the air. You have to hike in quite a distance to find them.

Restored beacon on top of 50' tower.

As technology improved so did the beacons and towers. However, by the mid 1930's, navigation and radio technology had improved to a point that flying with land-based visual guidance was no longer necessary. Also, on September 24, 1929, Lt. James Doolittle, using a safety pilot, Lt. Benjamin Kelsey, flew a 20-mile closed course from takeoff to landing entirely on instruments at Mitchell Field in Garden City, NY. After this feat, it was only a short time before radio navigation became widespread. The beacon and tower system was obsolete and no longer maintained.

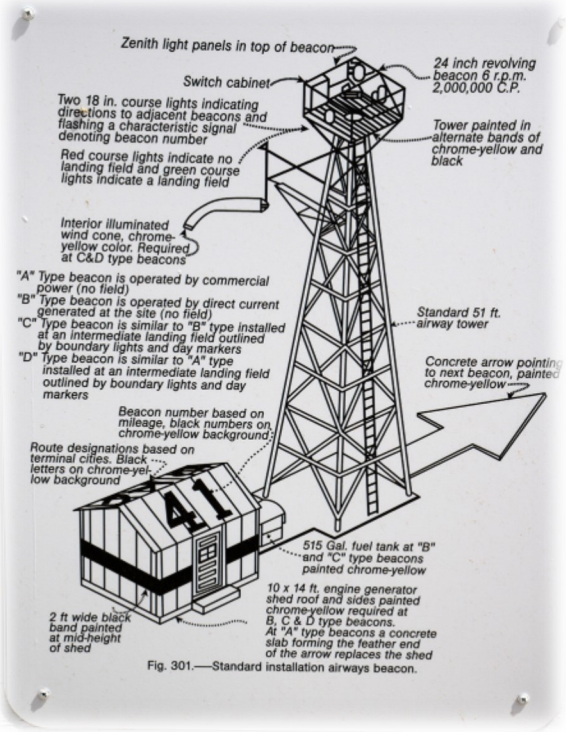

Diagram showing the configuration of the beacon tower andconcrete arrow at a / navigational way point.