Aids to Navigation Provided by the Lighthouse Bureau – Part I

Early development of aviation and the formation of the Airways Division in the Lighthouse Bureau

By Mary Louise Clifford and J. Candace Clifford

The newly-invented airplane proved its utility during World War I. When the war was over, the War Department continued to develop aviation for military purposes. The Post Office Department started the first air mail routes. And entrepreneurs began to examine the possible commercial uses of the airplane. Very few people today, however, remember that the federal agency charged by Congress in 1926 with overseeing the birth pangs of civil aviation was the Lighthouse Bureau in the Department of Commerce. The Bureau and its predecessors had a century and a half of experience in lighting seaways. How difficult would it be to light airways?

War Department Aviation

In 1920 the War Department indicated an interest in making use of lighthouses as daymarks for military planes. A letter from O. Westover, the Director of Air Service in the War Department, informed the Commissioner of Lighthouses in the Department of Commerce, that patrol of the Atlantic Coast between Langley Field in Hampton, Virginia, and Mitchell Field in Mineola, New York, was being regularly carried out by the Air Service:

"It is desired to establish radio, or visual liaison between the patrol planes and the lighthouse stations along the route of the patrol airplanes. The patrol airplanes are equipped with radio sending and receiving sets. The sending set has a range of wavelength of two hundred meters to five hundred fifty meters, but with added antenna inductances, it is possible to operate up to six hundred meters.

"It is also desired that the lighthouse stations along the route of the patrol be instructed to watch for the patrol airplanes with a view to sending assistance or notifying the nearest aviation station in the event of a forced landing.

"A letter has been written to the Commandant, United States Coast Guard, in reference to the cooperation of that service with the Air Service on the airplane patrol project."

The Commissioner's reply was favorable.

"... the Lighthouse Service will be pleased to cooperate in this matter, and will direct the Superintendents of the 3rd, 4th, and 5th Lighthouse Districts, whose addresses are Tompkinsville, N.Y., Philadelphia, Pa., and Baltimore Md., respectively, to instruct the keepers of the light stations and masters of light vessels in the patrol zone to be on the lookout for these patrol planes and to render all assistance possible, when required. It is suggested that you furnish the Bureau, if practicable, an approximate time table, in quadruplicate, showing when the planes will reach each light station....

"An experimental lighting apparatus is about to be placed at Navesink Light Station for throwing vertical beams to aid navigation. Radio fog-signal stations will be established at Sea Girt Light Station, on Ambrose Channel light vessel, and on Fire Island light vessel in the near future for the use of aerial or marine craft equipped with radio-direction finders.

"The Cape Charles, Winter-Quarter Shoal, Five-Fathom Bank, Overfalls, Fenwick Island Shoal, Tail of the Horseshoe, Northeast End, and Scotland light vessels, which are all in the proposed patrol zone, are equipped with radio, maintained and operated by the Navy Department...."

H. D. King, Superintendent of Lighthouses, 5th District, sent a memo to all the light keepers in his district on March 12, 1920.

"Subject: Coast Patrol Airplanes:

The Director of Air Service, War Department, has requested cooperation of the Lighthouse Service in establishing communication, either radio or visual, between Langley Field, Hampton, Va., and Mitchel Field, Mineola, Long Island, N.Y., with the Lighthouse stations along the route of this aerial patrol.

"The patrol airplane leaves Mitchel Field en route to Langley Field on Tuesday, Wednesdays and Fridays at 10 a.m. Patrol airplane leaves Langley Field en route to Mitchel Field on Mondays and Thursdays at 10 a.m.

"You are instructed to be on the lookout for these patrol planes and to render all assistance possible when required...."

In response to his request for an approximate time table, the Commissioner of Lighthouses received the following from the Director of Air Service in the War Department:

Time Table Of Coast Defense Airplanes between Langley and Mitchel Fields

Mondays and Thursdays

Langley Field	10:00 am
Cape Charles City	10:15
Chincoteague Inlet	10:45
Cape Henlopen	11:20
Cape May	11:30
Atlantic City	11:55
Barnegat Inlet	12:20 noon
Sandy Hook	12:45
Rockaway Beach	12:50
Mitchel Field	1:00 pm

Tuesday and Fridays

Mitchel Field	1:00 pm
Rockaway Beach	1:10
Sandy Hook	1:15
Barnegat Inlet	1:40
Atlantic City	2:05
Cape May	2:30
Cape Henlopen	2:40
Chincoteague Inlet	3:15
Cape Charles City	3:45
Langley Field	4:00

Navigational aids for air traffic

The Commissioner of Lighthouses sent a memo to the Secretary of Commerce in April 1921 in which he called "attention to the question of navigational aids for air traffic. This is a subject which has already received some attention and which is certain to be of increased importance in the future. Quite recently this office has had informal inquiries from the Navy on the subject, and during the late war supplied to the military services data as to lighthouses to be used to facilitate air navigation. Several manufacturers are making equipment to furnish lighted beacons for the aid of airplanes."

Lighthouse Bureau assistance to military aviation

The Commissioner of Lighthouses received a letter from Thurman H. Bain, Chief, Engineering Division, Air Service, War Department, dated May 20, 1922, indicating War Department interest in Lighthouse Bureau expertise.

"The Engineering Division, Air Service, is developing aerial beacons suitable for use in making connection with night flying, both for military purposes and for scheduled flights on airways, and altho the problems to be solved in the development of aerial beacons are different in many respects from those of the marine beacon, any information which, in your opinion, will assist the Air Service in the development of aerial lighthouses, will be greatly appreciated."

The Commissioner's reply listed a company in England, six in France, and one in the United States that made a specialty of manufacturing lighting apparatus for lighthouses.

"While this service has not been called upon to establish aids to aerial navigation, it would seem that any usual type of lighthouse apparatus employed to show a light if held or revolved horizontally would answer your purpose. The United States Lighthouse Service employs two types of lenticular apparatus known as (1) fixed lenses which show a steady light and (2) revolving lenses which show flashes of light of any desired characteristic...."

Identifying lighthouses from the air

The Navy Hydrographer, W. S. Crosley, wrote the Commissioner of Lighthouses in October 1925 that naval aviators were having difficulty in identifying many of the lighthouses in inland waters. The Acting Commissioner asked which lighthouses were important. Crosley supplied the following list.

East Coast

Most important
- Narragansett Bay
- Hudson River
- Delaware Bay and River
- Chesapeake Bay
- Potomac River
- Rappahannock River
- York River
- James River
- Albemarle Sound
- Currituck Sound
- Roanoke Sound
- Croatan Sound
- Pamlico Sound
- Pamlico River
- Neuse River

Less important
- Penobscot Bay
- Kennebec River
- Core Sound
- Bogue Sound
- Cape Fear River
- Savannah River
- St. John's River
- Lake Okeechobee
- Florida Reefs Nos. 1908-1931 Incl. 1968-1971 Incl.
- San Carlos Bay
- Pine Island Sound
- Tampa Bay
- Santa Rosa Sound
- Pensacola Bay
- Mobile Bay
- Mississippi Sound
- Lake Pontchartrain
- Mississippi River Passes
- Mississippi River
- Galveston Bay
- San Jacinto River

West Coast
- San Diego Bay
- San Francisco Bay
- Sacramento River
- Columbia River
- Juan de Fuca Strait
- Admiralty Inlet
- Puget Sound

The Commissioner then asked lighthouse superintendents in each district how much trouble it would be to paint an identifying roof marking on lighthouses for use as daymarks by aviators. The superintendents responded that the idea was feasible, but they had no money in their budgets for additional aids to navigation.

Among the responses, the 18th District superintendent was very specific as to which lighthouses in his district had sufficient roof area to carry daymarks.

"San Diego Bay: Both the Navy and Army aviation fields at San Diego are located at North Island, practically in the center of the harbor, and as this harbor is so compact and marked throughout by characteristic structures, it is not believed that aviators operating there would require identification marks on any of the light structures in the bay. However, if desired, numerals could be painted on the roof of the dwelling at the Ballast Point Light Station and also on the roof of the Quarantine Station at La Playa (subject to the approval of the Public Health Service).

"San Francisco Bay: Southampton Shoal Light Station, East Brother Light Station, Carquinez Strait Light Station and Roe Island Light Station could all be marked at little expense with identifying letters or numerals. Lights in the southern part of San Francisco Bay and in the upper part of Suisun Bay are either lens lanterns or post lanterns on beacon structures or single pile beacons, and it would not be feasible to mark these lights without going to considerable expense in building up the structures.

"Sacramento River: The lights maintained by this Service in the Sacramento River, with one exception, are post lights, and it would be impracticable to provide identification marks on the dolphin or single piles carrying such lights without expensive construction work."

Marking lighthouses

The *Lighthouse Service Bulletin* in May 1926 indicated that arrangements had been made with the Navy Department

". . . to try out experimentally a plan for painting the roofs of lighthouses with characteristic marks, along certain defined airways in Chesapeake Bay and tributaries in the fifth lighthouse district. A number of designated lighthouses are now being marked for this purpose on the airway between Norfolk and Washington. They are as follows: Upper Cedar

Point, Mathias Point Shoal, Lower Cedar Point, Cobb Point Bar, Blackistone Island, Ragged Point, Piney Point, Point Lookout, Smith Point, Great Wicomico River, Windmill Point, Stingray Point, Wolf Trap, New Point Comfort, York Spit, Back River, Cape Henry, Thimble Shoals, and Newport News Middle Ground.

"They are numbered serially, beginning at the north, each lighthouse in addition to the number bearing the letter 'WN,' indicating Washington-Norfolk. In all cases where there is roof space available for the painting of numbers sufficiently large to be legible, the serial number, together with the letter indicating the airway, is painted in large white block letters, thus: W1N, W2N, W3N, etc. In addition to the designating figures and letters a large white arrow pointing true north is painted on the roof.

"In lighthouses where there was insufficient roof space available, a wide ring of characteristic color is painted on the roof or on the awning of any gallery, with the eastern half of one color and the western half of contrasting color, the dividing line between the two halves of the ring indicating true north."

The Post Office Department develops airmail

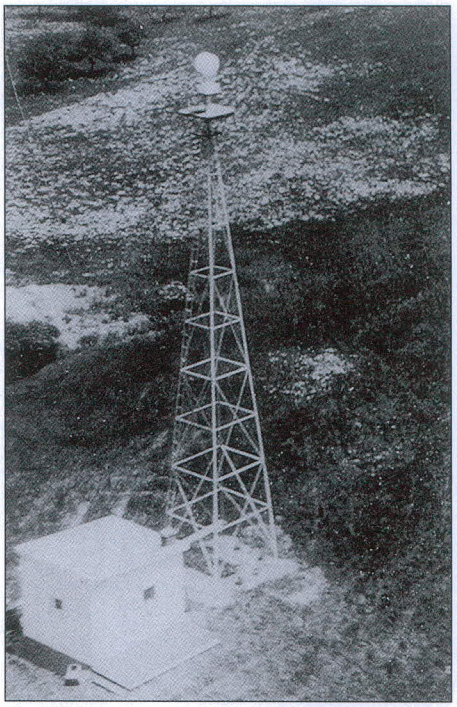
In May 1918 the first air mail route was established between New York and Washington, DC, with other short routes in the eastern states following. Airplane pilots needed aids to navigation, just as mariners did. Daymarks, such as a road or railroad or a prominent architectural landmark—a monument or a lighthouse—were essential. Lighthouses were readily identifiable from the air in good weather, and they would gradually have the first air-to-ground radios, developed by the Navy and first placed in light stations in the 1920s.

Probably the best-known pilot led home by the beam in a lighthouse was Captain William H. Wincapaw. Flying blind in a snowstorm in 1929, Wincapaw guided on the Dice Head Lighthouse. He was so grateful that he dropped gifts at Christmas time to the light keeper's family and began the tradition of the Flying Santa.

In order to fly at night, pilots of airplanes needed lighted beacons to follow, just as ships did. The Assistant Postmaster General admitted that, unless planes could fly at night, air mail was an expensive fad. It offered no clear-cut savings in time. Mail could cross the country by rail in three days. The short daylight hops aircraft could give to the mail weren't cost-effective.

Nevertheless, as air mail routes slowly expanded, visionaries dreamed of a transcontinental route to cover the 2,612 miles from New York to San Francisco. It would have 17 primary landing fields, each with an Air Mail Radio Station (AMRS). The transcontinental route was opened on August 20, 1920. All 17 AMRS were operational by the end of 1921.

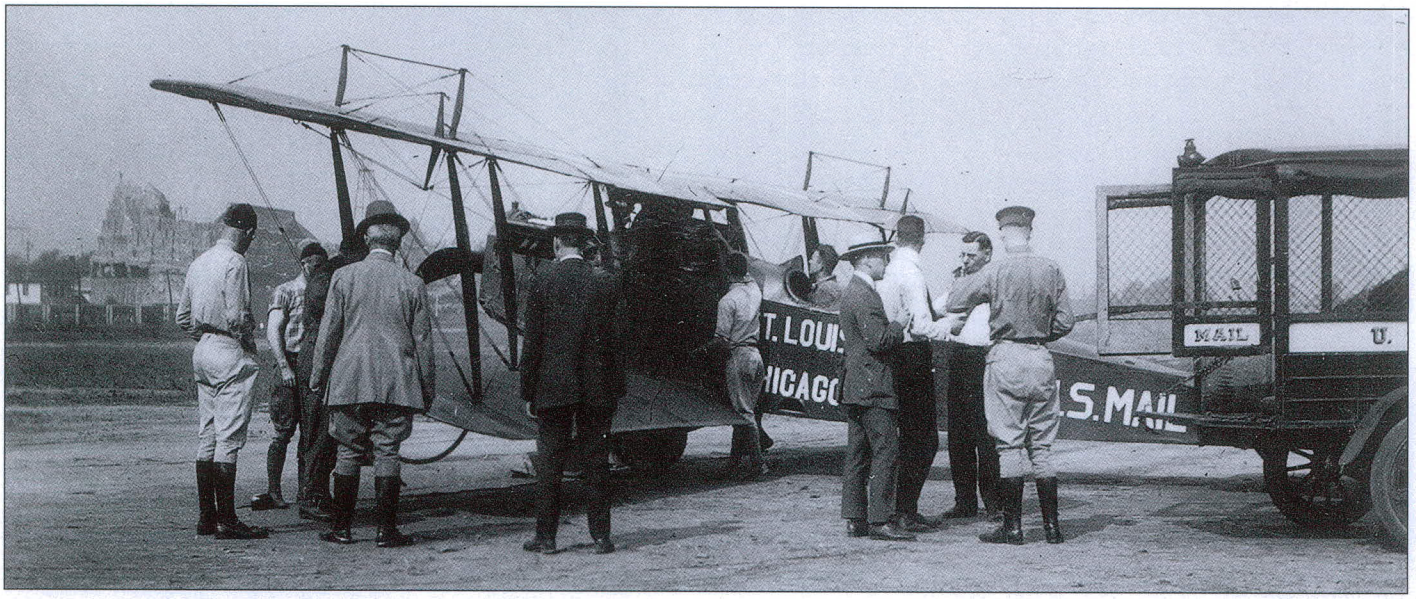
In February 1921 a grand experiment was conducted. Two flights would fly the Transcontinental, one in each direction and the flights would continue into the night. Despite a raging blizzard across the Great Plains and the Midwest, one flight was able to make it with its load of mail from San Francisco to New York. The determination of one pilot, Jack Knight, who flew three segments of the route, made it succeed. Jack was able to find his way across the snow-swept plains by following the bonfires lit by supportive citizens and postal employees.



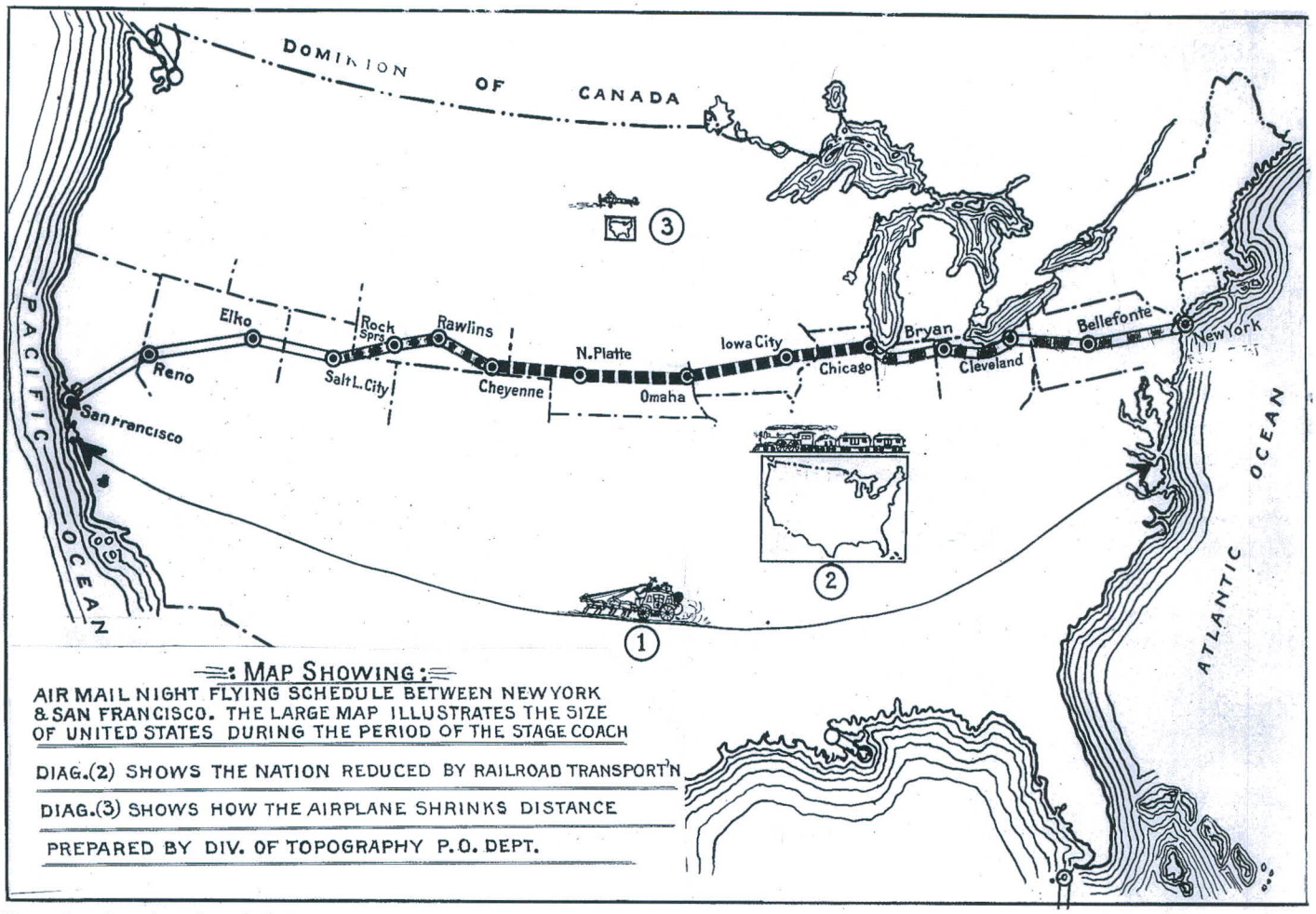
Beacon at an airfield in St. Louis, Mo in 1920.

Using six aircraft and six pilots, the air mail relay took slightly more than 24 hours to cover the distance from San Francisco to New York. This was proof of substantial timesaving. The experiment had also proved that commercial aviation depended on daymarks and lights at night, just as maritime navigation did.

The Post Office Department expanded its routes as quickly as possible. The general Superintendent of the Post Office Department, C. F. Egg, responded to questions about routes in a letter from T. W. Noblitt in Flat



Airplane being loaded with mail for the St. Louis to Chicago route.



Map showing the airmail flying schedule between New York and San Francisco. Date unknown. Note the interesting graphic method used to show how airmail can "shrink" the nation.

Creek, Tennessee, on February 23, 1924:

"Our night flying course extends from Chicago, Illinois, to Cheyenne, Wyoming. At Chicago, Iowa City, Omaha, North Platte and Cheyenne, we have terminal fields where regular landings and take-offs are made. These fields are equipped with a high-intensity arc searchlight which revolves three times a minute and has a range of approximately one hundred miles in clear weather. This is used as the terminal field beacon. The terminal field is also floodlighted and lights are placed around the boundaries in order to determine the limits of the field for the aviator. Buildings are floodlighted from the outside in order to give the pilot a daytime perspective

"The emergency fields which have been established every twenty-five miles along the course are equipped with an 18-inch incandescent searchlight. A 320-volt 900-watt motion picture lamp is used in these beacons. Like the terminal field beacons, they revolve but instead of revolving three times per minute, they are revolved six. At each corner of the emergency field an acetylene boundary marker is place. These boundary markers are similar to traffic beacons that are used at street intersections.

Airfield at Omaha, NE in the 1920s.

Airways emergency field boundary light.

"In addition to the above types of illumination, we also use an acetylene flashing beacon of low candle power. These beacons are placed every three miles along the course and mark the airway. They are especially helpful in bad weather."

Confusing lights

In 1924 the president of the Lake Carriers Association wrote to the Superintendent of 11th Lighthouse District complaining that a light established at Huron, Ohio, to guide the air mail service was confusing ship masters who could see it from Lake Erie. The issue went up the chain of command until Secretary of Commerce Herbert Hoover was negotiating with the Postmaster General on the subject. The final conclusion was that if the light was properly designated on maritime charts, it would no longer trouble ship navigators.

Congress regulates civil aviation

In the 1920s several bills were introduced in Congress to regulate civil aviation. In September 1925 President Coolidge took matters into his own hands by appointing his long-time friend Dwight W. Morrow, father-in-law of Charles Lindbergh, as chairman of a presidential board to study civil aviation.

Postmaster-General New, testifying before the Morrow Board, prefaced his testimony with the statement that postal air mail had no connection with the military, but when questioned as to his views on unification of the air services he joined Acting Secretary of War Davis and Secretary Wilbur in opposing that idea.

Secretary of Commerce Herbert Hoover was not questioned at all by the board and confined his statement to commercial air activities. He advocated creation of a bureau of civil aeronautics, however, and he said that he believed a self-supporting air service for commercial transportation was now a possibility within the United States, for which the Federal Government should immediately provide. He urged also an expansion of the Air Mail Service, which Mr. New previously had asserted had demonstrated that commercial aviation is "an entirely feasible thing."

Mr. Hoover recommended a Federal agency be created to give aviation approximately the same aid now given by the federal government to ship navigation and urged that municipalities cooperate by providing local air ports. Describing how the Federal Government lights and marks channels for water navigation, issues constant advice to navigators, provides for safety inspection of water craft and licenses navigation, Mr. Hoover said that the cost of providing a parallel service to aviation "would not be an extravagant sum. Much of the work," he continued, "of such a service can be undertaken by the extension of existing bureaus of the Department of Commerce, which have already technical personnel and established organizations."

The Air Commerce Act of 1926

President Coolidge presented the Morrow report to Congress in December 1925, requesting that it be implemented. It advised limiting federal authority to aircraft and airmen engaged in interstate or foreign commerce. It recommended that the work of establishing airways and providing other services should, in the interest of economy be undertaken by the extension of existing bureaus in the Department of Commerce which already had an overhead and directing staff. The Bureau of Lighthouses should undertake airway lighting; the Bureau of Standards, aviation research and development; the Coast and Geodetic Survey, airway mapping.

The Air Commerce Act of 1926 brought a variety of aviation-related tasks under the control of the Department of Commerce. The Transcontinental Airway System was transferred from the Post Office to the Bureau of Lighthouses, where a new airways division was formed.

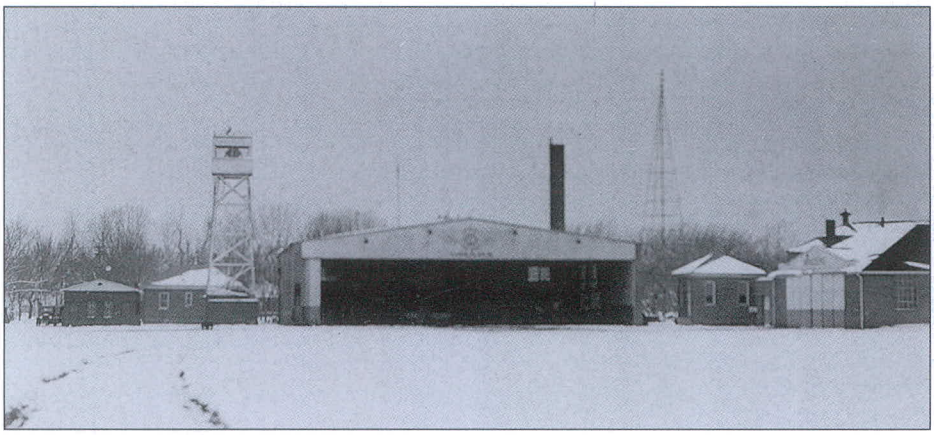
The Airways Division in the Lighthouse Bureau

In January 1927 the *Lighthouse Service Bulletin* outlined the duties of the Department of Commerce imposed by the Air Commerce Act of 1926. The work was placed under the immediate supervision of the Assistant Secretary of Commerce for Aeronautics, William P. MacCracken, Jr. Four divisions were established: Registration, Research, Airways, and Information.

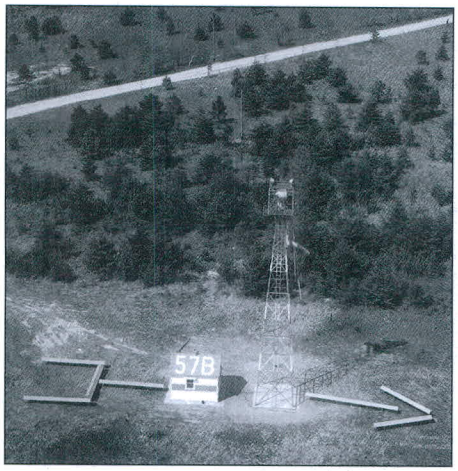
"In accord with the intent of Congress that existing facilities of the department should be used so far as practicable in carrying out the provisions of the Air Commerce Act, the airways division has been set up as a part of the Lighthouse Service, and F. C. Hingsburg, on October 1, 1926, was appointed chief engineer, airways division. Mr. Hingsburg was previously superintendent of lighthouses on general duty, and has been connected with the Lighthouse Service since 1911.

"Under the general supervision of the Assistant Secretary of Commerce for Aeronautics, the airways division will examine the airways, select emergency landing fields and beacon sites, erect structures, install the navigational aids, and thereafter maintain them. These activities are being carried out through some expansion of the Lighthouse Service, with additions as needed to its personnel, and under its district organization.

"The airways to be established during the fiscal year 1927 are primarily those required by the air transport companies engaged in carrying mail under contract with the Post Office Department. These and other companies are developing express and passenger traffic. The principal advantage of air transportation is the saving of time. In order to make the saving of time more effective night flying is essential, and the air navigation facilities being established on airways primarily provide the necessary lighting for night flying for carrying out the mail schedules established by the Post Office Depart-



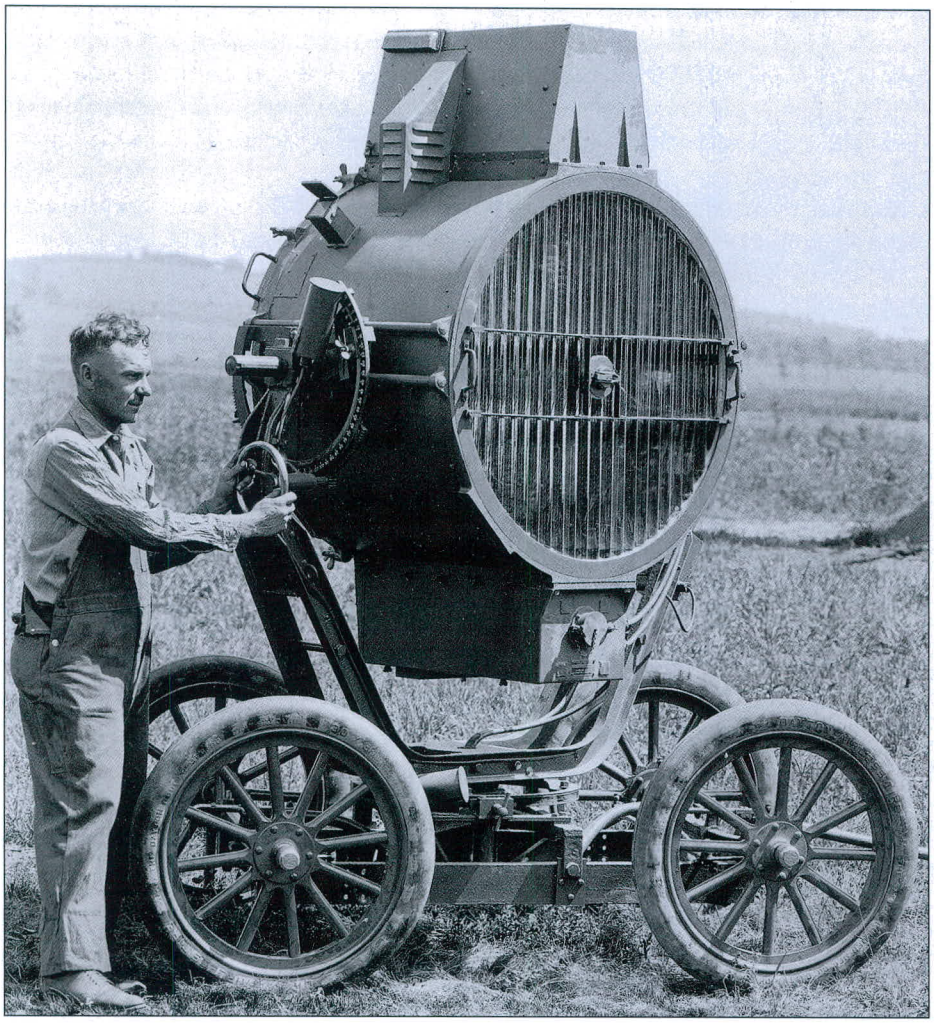
An airfield in Omaha, NE in the 1920s.



Route beacon between airfields with arrow and airway route number.

ment.

"There are 9,475 miles of airways now in operation or proposed for the near future, of which 2,041 miles of the transcontinental airway are already lighted. Over 1,100 miles of additional lighted airways will be established during the calendar year 1926. Along the airways between airports revolving searchlight beacons are established approximately 10 miles apart, and emergency landing fields are 40 to 50 acres in extent, having suitable runways of not less than 1,500 feet in length for the landing of aircraft. The fields are lighted by boundary lights spaced approximately 300 feet apart, showing the outline of the field from the air. A cable is carried around the field furnishing electric current to the 15-watt lamps in the boundary standards. Red lights are mounted on all obstructions and green lights are used to show the best approach to the field. An internally lighted wind cone mounted on the airway beacon structure shows the direction and velocity of the wind. The airway beacon consists of a 24-inch revolving searchlight with 1,000-watt lamp, showing candlepower of approximately 2,000,000, with a flash every 10 seconds. The searchlight beacons are mounted on 50-foot skeleton windmill type towers and are automatic in operation by the use of a sun relay where commercial power is not available. Otherwise, farm lighting sets are used for generating electric current. The daymark consists of a concrete arrow 56 feet long pointing the direction along the airway. Each airway route carries a number which is painted conspicuously on one side of the gable roof of power-house buildings. Each beacon is numbered consecutively, and the designated number is likewise painted to show from the air for the identification of the structure. Part-time caretakers are employed locally to operate the engine generating sets and for the maintenance of emergency fields."



Airways searchlight in Omaha, NE.

Informing the public about aviation

In May 1927 the *Lighthouse Service Bulletin* described the new "Airways Division's participation in an all-American aircraft show at Bolling Field during the meeting week of the Inter American Aeronautic Commission:

"The regulations division of the office of the Assistant Secretary of Commerce for Aeronautics, will have a corps of inspectors on the field to explain aircraft identification, licensing, and the general regulation of air commerce. One or more of the department's planes, used by inspectors in traveling about the country, will be in actual operation.

"The information division is showing a model ideal airport as a goal for those cities anxious that their airports shall rate the highest possible under the Department of Commerce schedule.

"The airways divisions of the Bureau of Lighthouses will exhibit a model of one of its intermediate landing fields equipped with beacon, boundary lights, obstruction lights, etc., together with a monster airway map showing the location of every beacon and lighted field on the airway system.

"These exhibits will be of profound interest to the mayors and chambers of commerce all over the country who have been asked by the show committee to send representatives.

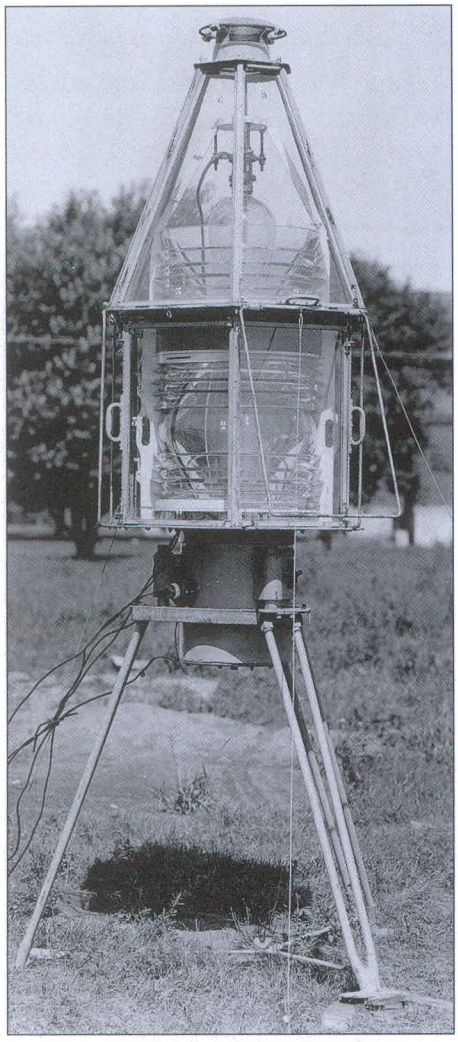
"The Coast and Geodetic Survey, of the Department of Commerce, will exhibit the first airway strip map to be published by the department, and samples of maps and mosaics to show the convenience and economy of aerial photography in both new mapping and correction of old maps.

"The Bureau of Standards will show a working model of a radiobeacon with the visual indicator for use in keeping aircraft along the airway. Another exhibit of interest to engine designers is the model of the Bureau of Standards altitude chamber, used for testing engines, both aircraft

and automobile, under pressure and temperature conditions corresponding to any specified altitude up to 45,000 feet. Superchargers are tested under flight conditions in this chamber. Various equipment for testing aircraft instruments will also be shown.

"It is expected that complete radiobeacon equipment will be demonstrated in flight and in an all-metal three-engine airplane using the department's transmitting beacon at College Park along the New York-Atlanta airway."

At the same time, the Lighthouse Bureau issued specifications for an airport flood light and the towers on which these lights would be mounted, soliciting bids from private contractors. This technology will be discussed further in Part II.



Portable airways beacon in Omaha, NE.

Growing enthusiasm for flying

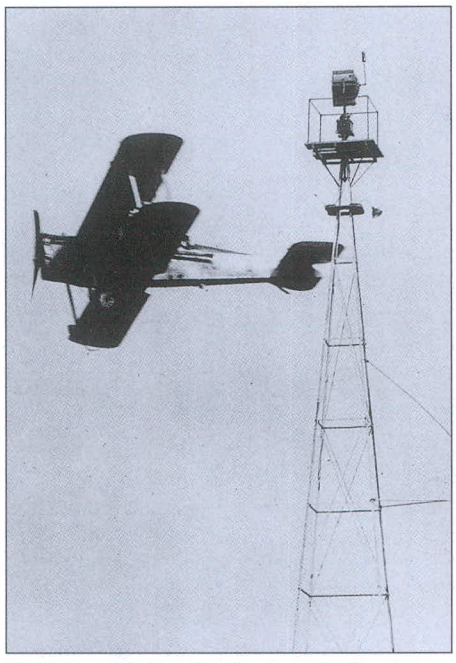
In May 1927 Charles Lindbergh flew solo across the Atlantic. Thereafter he flew route surveys for budding American airline companies and attended exhibitions in which he often starred. And thousands of people, thrilled with his accomplishment, sought flying lessons.

The 1927, 1928, and 1929 annual reports of the Commissioner of Lighthouses contain only a paragraph regarding the Airways Division of the Bureau of Lighthouses. Detailed information was published in the *Lighthouse Service Bulletin*. The December 1927 issue contained the following:

"An airways division has been set up as a part of the Lighthouse Service, the work of this division covering the examination of airways and intermediate landing fields and the erection and maintenance of aids to air navigation. . . . The plan followed has been to expand the present facilities and organization of the Lighthouse Service to carry on this work. The geographical organization is such that it has been necessary to establish only one new office, at Salt Lake City, Utah, the balance of the work being conducted through the existing district and bureau offices and organization.

"There were 1,386 miles of airways lighted during the year, on which 139 aids to air navigation were established and placed in operation by the Department of Commerce, and work on 694 miles of additional airways was under contract. The transcontinental airway, with 616 aids, previously maintained by the Post Office Department, was transferred to the jurisdiction of this department on July 1, 1927."

In 1928 the Bureau issued specifications for a 300mm acetylene airway route beacon, and asked two companies to submit prototypes, which would be tested and modified according to test results.



Mail plane circling the beacon light on emergency field in Omaha, NE.

In January 1929 the *Lighthouse Service Bulletin* reported that "Important progress was made during the fiscal year in extending and improving airway lighting, including improvement of lighting equipment and apparatus. About 2,450 miles of airways were lighted during the year and 520 aids to air navigation established. At the end of the fiscal year a total of 5,877 miles of airways were lighted with 1,275 lights in operation."

Inspection of airfields

Airfields were inspected, just as lighthouse stations were, by Bureau of Lighthouses officials. In July 1929 the *Lighthouse Service Bulletin* reported that the airways division of the Lighthouse Service is now using a Fairchild cabin monoplane, the N.S.-7, which is equipped for carrying four passengers in addition to the pilot, for inspecting air navigation facilities. The airplane is powered by a Wasp 400-horsepower air-cooled motor and is being equipped with the latest type radio and navigation equipment in order to properly certify the adequacy of the aids to air navigation, and landings are made at intermediate landing fields for the purpose of inspection.

"A recent 10-day inspection trip was made in the airplane N.S.-7 by Superintendent of Lighthouses F. C. Hingsburg, chief engineer of the airways division, and was piloted by W.T. Miller, principal airways extension superintendent. Starting from Washington, DC, the flight was made to Pittsburgh, Columbus, Dayton, St. Louis, Kansas City, Moline, Newton, Iowa City, La Crosse, Milwaukee, Chicago, Cleveland, New York, and back to Washington.

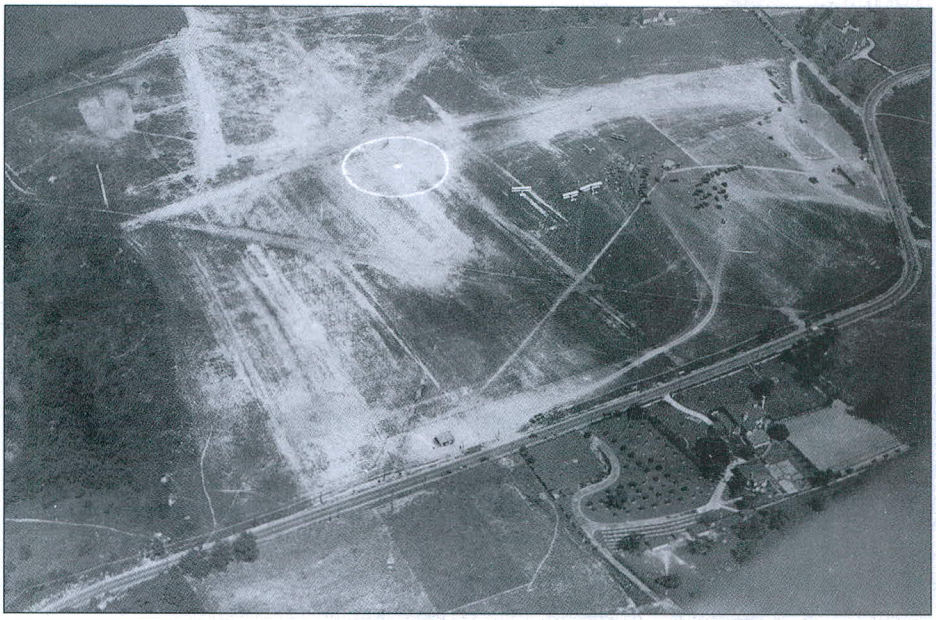
"The new proposed air route from Washington to Pittsburgh was flight checked and the feasibility of the route determined. The Army airway between Uniontown and Dayton was flown, and the new air terminal of the Pennsylvania Railroad at Columbus, Ohio, where connections are made to the Transcontinental Air Transport, was inspected. Beacon lights and intermediate landing fields on the lighted section of airway between Dayton and Columbus were also inspected from the air.

"Six new radio communication stations now under construction by the airways division at St. Louis, Kansas City, Iowa City, La Crosse, Chicago, and Bryan for broadcasting hourly weather conditions were inspected. These stations

are equipped with 2,000-watt radiotelephone transmitters.

"The intermediate landing fields and lighting facilities on the Kansas City - St. Louis Airway were inspected, also a section of the Kansas City - Chicago Airway. The twelfth lighthouse district office at Milwaukee, Wis., was visited, and Airways Engineer I. D. Marshall was a passenger over the Transcontinental Airway between Chicago and Cleveland, the beacon lights and intermediate fields on the route being inspected from the air. The new radiobeacon at Goshen was flight checked, adjusted to mark the airway course, and placed in operation.

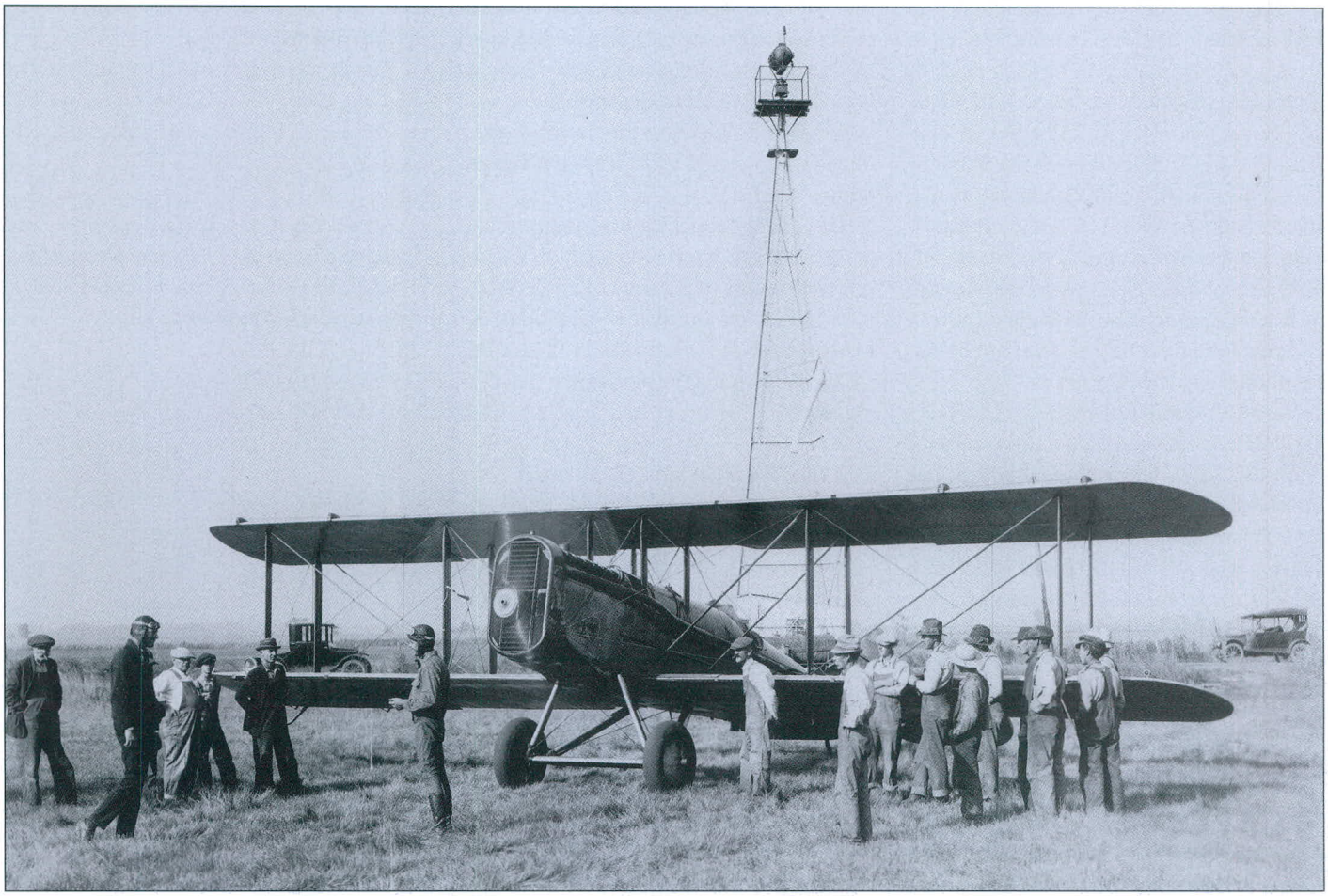
"The airway radiobeacon making the route over the Allegheny Mountains between Cleveland and New York were flown over and checked, the airplane landing at the fields at which these beacons are located and the stations inspected and adjusted. Voice broadcasts of weather information were received each hour while in flight, and the landing conditions at the terminal and principal landing fields were received by radio each hour very clearly and distinctly."



Aerial view of the airfield at Omaha, NE. Note the three aircraft at right center.

In June 1929 an inspection of air routes was made with the Superintendent of the 6th Lighthouse District participating. The inspection covered the section of the Atlanta - New York Airway from Richmond to Atlanta and . . . [included] four stops en route.

Superintendent H. L. Beck found that the information gained in this way would be of material assistance in the administration of the airways under the jurisdiction of his district. The experience of direct observation of the conditions of air navigation was found of



Mail plane with beacon behind. Note the two pilots at left and the automobiles in the background. Looks like a bunch of farmers at right.

great value in giving an appreciation, not otherwise obtainable, of the extent to which air navigation differs in exactitude from marine navigation by "dead reckoning"; of how inconspicuous the airways beacons and intermediate landing fields are from the air in the daytime; and how necessary to safety in foggy weather are the directional radiobeacons."

In June 1930 the *Lighthouse Service Bulletin* noted again the use of planes for inspection trips "The Lighthouse Service recently used established commercial transport passenger-carrying planes for inspection duty to good advantage. A saving in time of several days was effected by the general inspection officer of marine aids to navigation on his return journey from San Francisco to Washington. A plane was taken at Oakland, Calif., on April 12, the 365-mile trip to Los Angeles being completed in three hours. At 5 a.m. on April 15 a transport plane was boarded at Los Angeles for Kansas City, this part of the journey taking 12 hours, about one-third the time required by train travel."

Additional miles of airways

The March 1931 *Lighthouse Service Bulletin* reported that "A successful landing in a thick blanket of fog, was recently made by Charles Peeples, N.A.T. pilot, at Fort Worth, Tex. Enveloped by fog which he first encountered at the Red River, Peeples picked up the signals of the new airways radiobeacon, and approached Fort Worth. When these signals indicated that he was directly over the landing field, he banked his plane and made a successful landing. In describing the landing, the pilot said that nothing could be seen until he was nearly on the ground."

Airways facilities were further extended during 1931. Lighting installation was completed on about 2,283 additional miles of airways. The additional radio facilities established included 13 standard airway radio communication stations, 43 aural type and two visual type radio-range beacons, a number of radio-marker beacons, and telephone typewriter circuits aggregating over 3,000 miles.

Inspections by airplane

In June 1931 F. C. Hingsburg,, Chief Engineer, Airways Division, returned to Washington, having concluded a 5,400-mile aerial survey which included the proposed northern airway which would connect St. Paul, MN, and Seattle, WA. Leaving Washington on June 5, the journey was made by way of Bellefonte, PA., Chicago, and Salt Lake City to San Francisco. Contacts were made with airways district personnel at both Salt Lake City and San Francisco, and later at Portland, OR.

"From Seattle the route lay over the States of Idaho, Montana, North and South Dakota, and Wisconsin. This flight is a preliminary step to a detailed survey which Congress has authorized as a means of determining the feasibility of establishing a northern air route which would form a more direct connection between north Pacific cities and cities in the Great Lakes region.

"On his inspection Mr. Hingsburg was accompanied by Lawrence C. Elliott, airways extension superintendent, who is to be in charge of the northern airway survey."

An example of the usefulness of lighted aids to navigation for aircraft was contained in the December 1932 *Lighthouse Service Bulletin*:

"During coastal flights an airship carries on navigation by lighthouses and similar aids exactly as does a surface vessel. On the recent return of the airship *Akron* from the Puget Sound region, the commanding officer reported the voyage as particularly interesting because of the high speed that was made after rounding Tartoosh. During practically the whole night, several lights were in sight at one time, and it required continuous thumbing of the light list to keep up the identification of lights."

By 1933 the Federal Airway System operated by the Airways Division comprised 18,000 miles of lighted airways containing 1,550 rotating beacons and 236 intermediate landing fields. Air Mail pilots routinely navigated the skies during the night, following the signposts of the rotating beacons.

Airways Division removed from Lighthouse Bureau

A reorganization in the Department of Commerce took place in 1933, and the Airways Division was transferred from the Lighthouse Service to a new Aeronautics Branch. A letter from the Secretary of Commerce dated June 5 announced this change and appointed Frederick C. Hingsburg, formerly Chief, Airways Division, as Chief, Signal Division.

"May I take the opportunity to extend to the Bureau of Lighthouses my sincere thanks and congratulations for the splendid service they have rendered in the promotion of these all-important functions, aids to air navigation. This has been a signal service, and it is my wish that this testimonial be made a part of the record of the Bureau of Lighthouses, and all those who have made personal contributions, consider this also as addressed to them personally."

In 1934 the Aeronautics Branch was renamed the Bureau of Air Commerce. As commercial flying increased, the Bureau encouraged a group of airlines to establish the first three centers for providing air traffic control (ATC) along the airways. In 1936 the Bureau itself took over the centers and began to expand the ATC system.

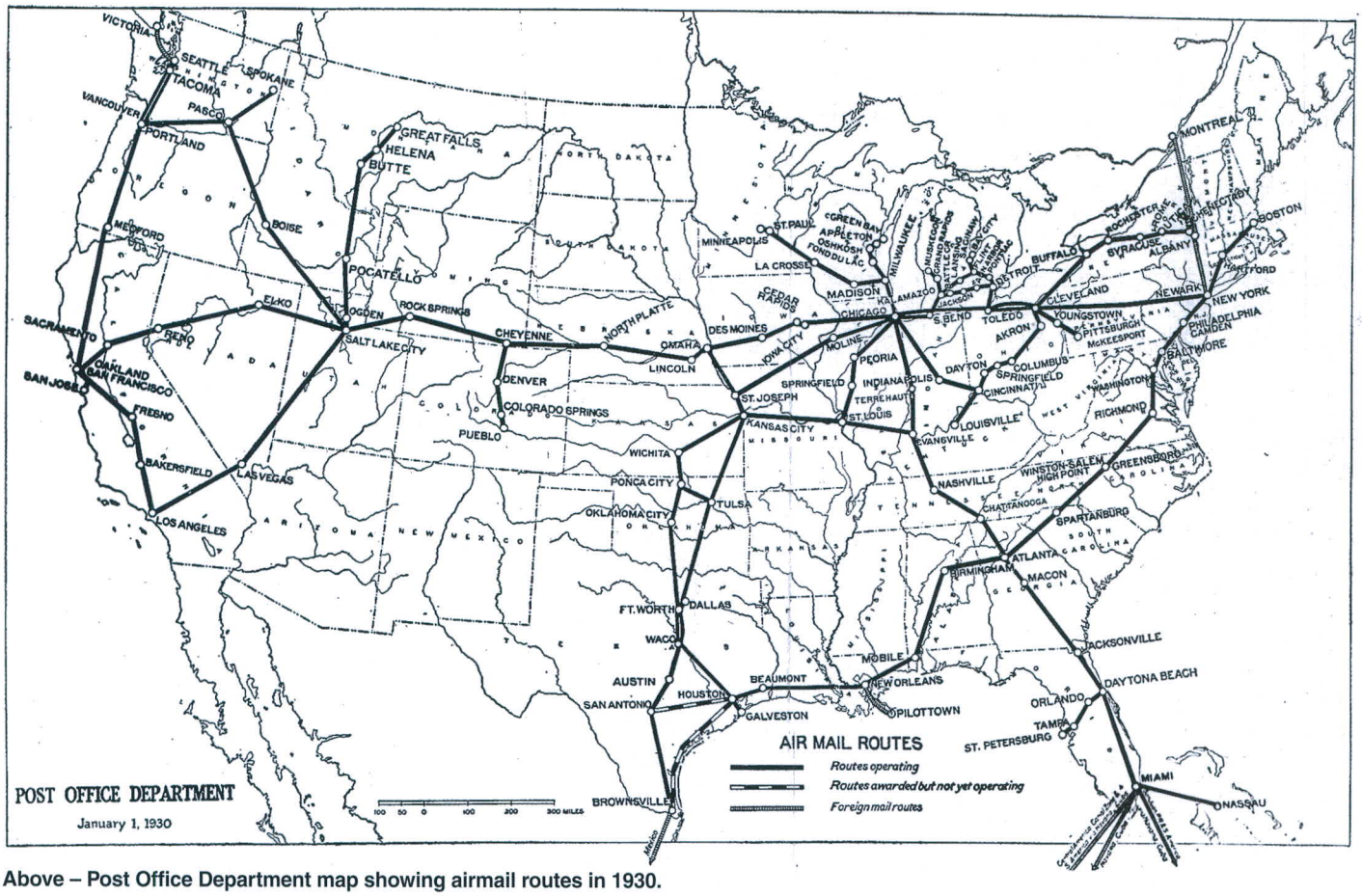
Creation of Civil Aeronautics Authority

In 1938, as a result of a need to modify the Air Commerce Act and a disastrous air safety record in the preceding years, the Civil Aeronautics Act was enacted. The Bureau of Air Commerce was replaced by the newly formed Civil Aeronautics Authority (CAA). The CAA was given the additional authority to issue air carrier route certificates and to regulate airline fares.

Part II of this article will be published in the next issue of *The Keeper's Log* and will explore the technical aspects of lighting the airways.

All photos in this article are from The National Archives. The reference material on which this article is based can be found at <www.marylouiseclifford.com>.

Mary Louise and J. Candace Clifford are the authors of five lighthouse books, the most recent being *Lighthouses Short and Tall*, for readers age 11 and up. For more information see <www.lighthouse-history.info>



Above – Post Office Department map showing airmail routes in 1930.
Below – Airmail service operator W. R. Strong at work in Omaha, NE.

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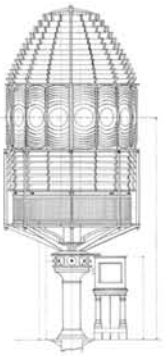

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Thomas Point Shoal Lighthouse, MD

The U.S. Lighthouse Society has donated to many lighthouse preservation projects throughout the U.S. Most recently we were honored by being presented with the Preserve America Stewardship Award from The White House for our restoration work at Thomas Point Shoal Lighthouse.

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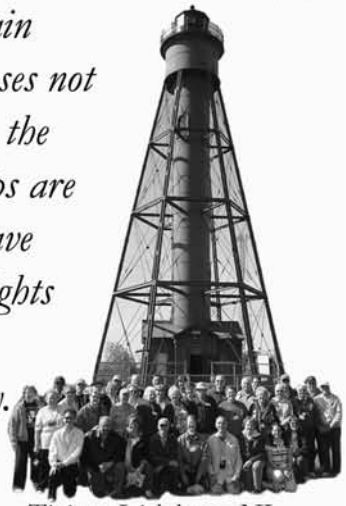

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