

**Airway Beacons,
an Integral Part of Montana's Night VFR Navigational
System:
Past History, Present Service, and Present Value.**

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Running Head: AIRWAY BEACONS

NECESSITY - THE MOTHER OF INVENTION

Our modern commercial airways and their associated navigational aids, like the airplane, are American inventions. Their birth was the result of the U.S. mail service in the 1920s.

The first pilot chosen to fly the inaugural flight for the U.S. Mail service in May 1918, was one George L. Boyle, fresh out of flying school. Sadly for George, he promptly got lost and landed at the wrong destination. The mail had to be put on a train to be delivered. (Komons, 1978).

By 1921 airmail planes were standardly equipped with a compass, a turn-and-bank indicator, and an altimeter; but pilot's ability to recognize physical landmarks was that pilot's most critical instrument. A pilot rarely flew at night and then only for short distances.

On August 20, 1920, radio stations at each airmail landing field were established, including a large station at the Post Office headquarters building in Washington DC. This was the beginning of the flight service station system. Radios were basically employed for ground-to-ground communication, not for navigational assistance. C.H. Claraham et al. (cited in Komons, 1978, p. 128).

There were no aeronautical charts or maps available before 1921. The Post Office did make road maps available, but they were maps of individual states,

each with a different scale of distances. They showed no altitudes or mountains. McGregor (cited in Komons, 1978, p. 127).

Mail planes worked in conjunction with the regular trains, so no mail traveled more than a short distance by air. The effort seemed hardly worthwhile. Paul Henderson, the Second Assistant Postmaster General in 1922, stated that airmail was an "impractical sort of fad and that it had no place in the serious job of postal transportation." It became clear to Henderson that if the airplane was ever to attain a permanent place in postal transportation, "it must be used for continuous flight of mail over relatively long routes." This meant flying at night. (Komons, 1978).

A daring night-flying experiment, conducted on February 22, 1921, was intended to demonstrate the practicality of night flying and to entice Congress to fund the lighting of the transcontinental route. On that day, two plane loads of mail were dispatched from New York to San Francisco, and another two from San Francisco to New York. Pilots flying the night segments depended on their primitive cockpit instruments, bonfires lit along the route by accommodating citizens, and dead-reckoning pilotage. Only one plane made it through.

Congress approved the funds for the lighting project, but it soon fell victim to cost cutting efforts of the Harding administration. (Komons, 1978).

Henderson did not give up though, and by 1923 he had enough private funding to proceed with his own project. Many airmail routes became lighted by

beacons, and by 1924 the U.S. Postal Service was considered to be the most efficiently organized and managed civil aviation undertaking in the world. Gray (cited in Komons, 1978, p. 132).

In 1926, the Federal Airways Division installed its first airway light beacon in Moline, Illinois. By 1933, the federal airway system comprised 18,000 miles of lighted airways on which were installed 1,550 rotating light beacons.

Edward P. Warner, noted that "Indeed though the light beacon survived many decades on the nations airways, its life in the mainstream of American aviation was brief." Warner (cited in Komons, 1978, p.140).

Mr. Warner turned out to be very wrong. The lighted airway beacon system flourished nationwide into the mid 1960s. It was during this decade that navigational technology advanced so quickly that many pilots thought the beacon system was becoming antiquated. The Federal Aviation Administration, in cost cutting efforts, began to pare down the system by decommissioning many beacons, especially in parts of the country where the FAA was unchallenged. The mountainous states were not so easily persuaded, and in Montana's case the responsibility of system maintenance was transferred to a state level.

Presently, Montana is the only state which continues to operate its lighted airway beacon system in the mountainous western third of the state.

HISTORY OF THE BEACON SYSTEM WITHIN MONTANA

The Federal Beacon System

In 1965 the Federal Aviation Administration (FAA) was responsible for reviewing the utilization of all airway light beacons and justifying their retention. (Basel, 1965). Justification for retention was based on the consideration of what unusual or exceptional hazards to flight might be caused by the discontinuance of the beacon light. Also considered was the number of operations dependent upon the beacon light for night navigation, under visual flight rules.

That year the FAA, in conjunction with the Montana Aeronautics Commission, conducted a preliminary review of all airway beacon lights in Montana. As a result of the study, the existing 39 beacon lights were categorized into two groups. Those in Group I were considered to have little or no value in their present location and could be relocated to local airports for more advantageous aeronautical use. The beacons in Group II were considered to be useful for VFR night navigation, but the FAA wanted more information to justify retention of the beacons.

The 39 beacons were categorized as follows:

GROUP I

- | | |
|--------------|--------------------------|
| 1) Riverdale | Southwest of Great Falls |
| 2) Huntley | East of Billings |
| 3) Broadview | North of Billings |

- | | |
|-------------------|-----------------------|
| 4) Willow Creek | North of Bozeman |
| 5) Galen | North of Warm Springs |
| 6) Iron Rod | South of Whitehall |
| 7) Edgehill | East of Miles City |
| 8) Hauser Lake | North of Helena |
| 9) Stanford | Northeast of Stanford |
| 10. Deer Lodge | Deer Lodge Airport |
| 11. Silverbow | Near Butte |
| 12. Bull Mountain | Northeast of Billings |

GROUP II

- | | |
|---------------------|-------------------------------------|
| 1) Montana City | Southeast of Helena |
| 2) Boulder Pass | South of Helena |
| 3) Whitetail Creek | North of Twin Bridges Airport |
| 4) Spokane Hill | East of Helena |
| 5) Strawberry Butte | Northwest of Bozeman |
| 6) Canyon Resort | Southwest of Dillon |
| 7) Homestake Pass | Southeast of Butte |
| 8) Cardwell | East of Whitehall |
| 9) Bozeman | Northeast of Bozeman City |
| 10) Bozeman Pass | Pass between Bozeman and Livingston |
| 11) Billings | West of Billings |

12) Stoney Point	North of Helena
13) Wolf Creek	East of Wolf Creek
14) Hardy	Southwest of Great Falls
15) Raynesford	East-Southeast of Great Falls
16) Piper	East of Lewistown
17) McDonald Pass	West of Helena
18) Avon	West of Helena, near Avon
19) Drummond	West of Drummond VOR
20) Bonita	Southeast of Missoula
21) University Mountain	East of Missoula City
22) Sherman Gulch	West of Missoula
23) Alberton	Northwest of Missoula
24) Thompson Creek	West of Superior
25) Saint Regis	East of Saint Regis town
26) Saltese	Southeast of Mullen Pass
27) Lodge Grass	Southeast of Billings near Wyola

In March of 1965, the FAA completed the evaluation of the comments resulting from the proposal to decommission the airway beacon system (Marsh, 1965). Notices were sent to 2,300 registered pilots and aviation organizations within Montana, but only 43 responses were received.

Eight organizations responded as follows:

- 1) Air Force - Decommission all.
- 2) Soaring Society of America - Decommission all.
- 3) National Business Aircraft Association - Decommission all.
- 4) Aviation Trades Association - They use Spokane Hill, Homestake Pass, University Mountain, and Sherman Gulch.
- 5) Deer Lodge Airport Board - Decommission all, request that the beacon be given to them.
- 6) Army National Guard - Request to retain Deer Lodge beacon.
- 7) Johnson Flying Service - Retain all of Group II.
- 8) Aeronautics Commission - Keep all except first 10 of Group I.

Only thirty-five pilots responded as follows:

- 2 - advised no need for any beacons.
- 4 - generally in favor of keeping all beacons; they were not night flyers.
- 1 - inactive pilot - no opinion one way or the other.
- 3 - generally in favor of keeping all beacons as they were active night flyers.
- 9 - National Guard Pilots in favor of specific beacons.
- 16 - civilian pilots in favor of specific beacons.

In light of these apathetic results, Edward Marsh, Director of the FAA, proposed to decommission 19 of the 39 beacons.

Later in June of 1965, the FAA completed a national study of the use of airway beacon lights. The study resulted in the decision of the FAA to retain only eight Montana beacons and decommission the rest by August 1965. (Basel, 1965). The eight beacon sites to be retained by the FAA were Bozeman, Bozeman Pass, Homestake Pass, McDonald Pass, Montana City, Sherman Gulch, Silverbow, and University Mountain.

Montana Beacon System Startup

In January 1966, Charles Lynch, Director of the Montana Aeronautics Commission, initiated the Montana Beacon System. The Aeronautics Board selected 12 beacons for continuous operation along Montana's airways. These 12 sites were:

- 1) Boulder Pass
- 2) Whitetail Creek
- 3) Spokane Hill
- 4) Strawberry Butte
- 5) Canyon Resort
- 6) Stoney Point
- 7) Wolf Creek
- 8) Hardy
- 9) Avon
- 10) Bonita

11) Alberton

12) Saltese

Along with the eight Federally-maintained beacons, Montana now had 20 beacons in use. Nineteen of the original 39 beacons were decommissioned, the balance were left in place or relocated to other airports within the State of Montana by mid-summer 1966. In 1967, the Montana Aeronautics Commission recommissioned their lucky thirteenth beacon by turning the Saint Regis site back on.

Historical Preservation

Of the 19 remaining original beacons, some were dismantled and used for parts. Others were donated to museums or communities. One such beacon, donated to the small town of Columbus, was reassembled and erected in 1961 by local aviators and residents as a community effort. (Kemmis, 1993). It remained in active and faithful service until 1993 when it fell to disrepair. The Stillwater Mining Company of Columbus realized the importance and the safety factor that the beacon provided for so many years, so the mining company agreed to donate technical personnel to refurbish the beacon to like-new condition. The Columbus airport beacon is still an important and useful navigation tool for all aviators, and also serves as a reminder of its unique heritage.

Attempt to Dismantle the Federal System

The FAA's ultimate goal, even prior to 1965, was to completely phase out the entire lighted airway beacon system. On August 25, 1969, the FAA conducted yet another evaluation of the proposal to discontinue the eight remaining airway beacons in Montana. The FAA claimed that the continued operation and maintenance of these beacons did not appear to provide a public service commensurate with costs involved. (Morris, 1969).

As a result of the survey, over 200 objections to discontinue beacon service were received from Montana pilots. The heavy response indicated a high degree of interest in and use of the beacon system. Therefore, by a directive issued by L. C. Morris, Jr., Chief of FAA Air Traffic, the beacons once again avoided the ax.

Montana Assumes Responsibility

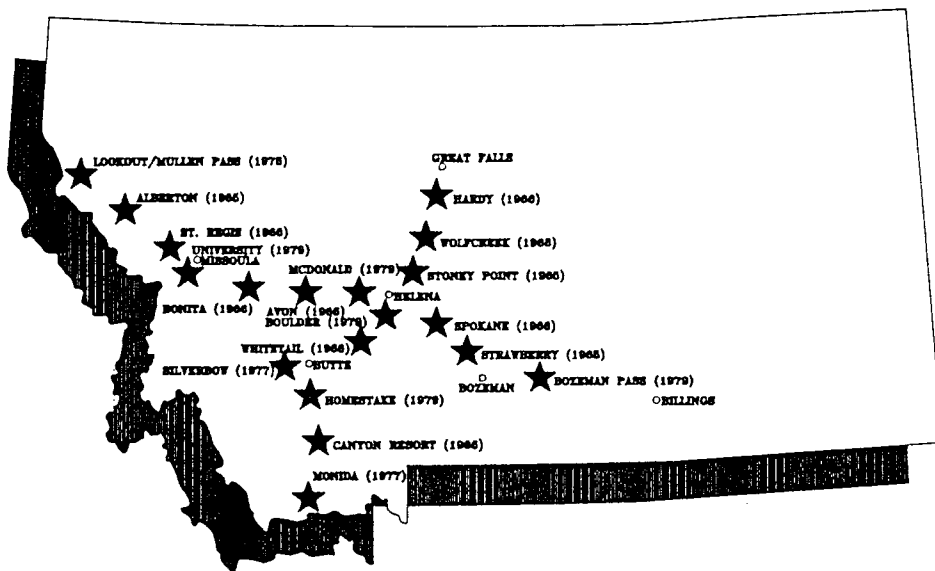
By 1971 all eight federally-owned beacons were still operating, as were the state-owned original 13 beacons. By this time the state Aeronautics Commission had relocated four additional beacons, one each to West Yellowstone, Dell, Townsend, and Lincoln Airports.

On December 9, 1971, the FAA circularized a public notice under Airspace Case 71-RM-80-NR soliciting public comments on the proposed decommissioning of all eight of the federally-owned and maintained beacons in Montana (Federal Aviation Administration [FAA], 1972). Later in December of 1971, the FAA

turned off the eight airway beacons regardless of the public comments on the subject. It was at this time that the Montana Aeronautics Commission made an agreement with the FAA whereby Montana would automatically assume the responsibility for operating the beacons. (Rausher, 1971).

During the time period from June 1977 through February 1979, all eight of the federally-owned beacons were legally transferred from the FAA to the Montana Aeronautics Commission, and by 1979 the Commission was responsible for the care and feeding of 19 beacons statewide. (Kneedler, 1979).

MONTANA BEACON LOCATIONS AS OF 1979 AND START-UP DATES



Boulder Pass Decommissioning

In 1984, Boulder Pass Beacon was decommissioned. Bonneville Power Administration federally requisitioned the area for construction of a large overhead power line which was to pass directly through the draw of the canyon, perpendicular to the highway and well above the beacon. In the past, this route was widely used by VFR pilots when the weather was marginal, with the beacon guiding them to the mouth of the pass. When the overhead wires were erected, it was determined that the beacon might become more of a hazard than a help, so it was decommissioned with the agreement that the overhead wires would bear 3-foot diameter white marking balls and flashing strobe lights for visibility.

Montana Pilots Association Involvement

By 1986 the Montana Aeronautics Division was feeling the pinch of financial budgetary constraints imposed by the legislature. Even though the Aeronautics Division always had always been a self-sustained agency, (wholly supported by a then one cent per gallon aviation fuel tax -- not by legislative allocated funds) the Aeronautics Board was directed to closely examine all of its programs to see where corners could be cut. An exhaustive review of Division programs and priorities were conducted by the Board, and the result was that the Board rated the airway beacon program at "10", the lowest possible priority ranking. It should be noted that only five of the nine Board members participated

in the ranking of Aeronautic Division programs, and only one of the five Board members was a pilot. (Ferguson, 1987).

The Aeronautics Division considered the probable abolishment of the beacon system a distinct possibility. The Montana Pilots Association rallied for the cause and to ensure impartiality, the MPA initiated and financed the most comprehensive beacon survey ever undertaken in Montana.

The Helena firm of Howard/Johnson Associates, Inc., was hired to prepare and conduct the survey. In March of 1989, the results were submitted to the Aeronautics Board.

The survey resulted in 1,058 total responses which showed the following:

- 1) Seventy-five percent of respondents stated that their primary flying was in the mountains (36%) or over the entire state (39%).
- 2) Twenty-eight percent stated that they flew in the mountains never or very little. Forty-one percent stated they flew in the mountains frequently.
- 3) Fifteen percent stated they flew frequently in the mountains at night while 68% stated they flew in the mountains never or very little.
- 4) Of those who flew at night over the mountains (998), 59% stated they used the airway beacons all the time (25%) or some of the time (34%).

- 5) Forty-four percent of the respondents stated that they had not used the beacons during the past 12 months. Eight percent stated that they had used them more than 25 times, 9% stated that they used them more than 10 times, and 14% stated that they used them more than 5 times.
- 6) Fifty-nine percent rated the beacon system as important (17%) or very important (42%) to aviation safety in Montana.
- 7) Sixty percent of all respondents rated the cost benefit to aviation as beneficial (20%) or very beneficial (40%).
- 8) Two percent of all respondents were student pilots, 57% percent pilots, 31% were commercial pilots, 31% held instrument ratings, 25% held multi-engine ratings, and 13% were Air Transport Pilot rated.
- 9) Beacon use during 1987-1988 (12 month period):

Mullen Pass	17%
Saint Regis	12%
Alberton	12%
University Mountain	27%
Bonita	17%
Avon	20%
McDonald Pass	24%

Stoney Point	19%
Wolf Creek	21%
Hardy	20%
Spokane Hill	22%
Strawberry	19%
Bozeman Pass	30%
Whitetail	15%
Silverbow	16%
Homestake	20%
Canyon Resort	9%
Monida Pass	11%

- 10) Seventy-one percent of student pilots felt that the beacons were important or very important to aviation safety.
- Sixty-four percent of private pilots felt that the beacons were important or very important to aviation safety.
- Forty-nine percent of commercial pilots felt that the beacons were important or very important to aviation safety.
- Forty-eight percent of instrument-rated pilots felt that the beacons were important or very important to aviation safety.
- Fifty-four percent of multi-engine rated pilots felt that the beacons were important or very important to aviation safety.

Fifty-one percent of Air Transport Pilots felt that the beacons were important or very important to aviation safety.

- 11) There were no significant differences among groups as to the cost benefits to aviation.

The final results of the Howard/Johnson Associates survey were presented at an Aeronautics Board meeting held in conjunction with the 1988 Aviation Conference in Billings, Montana. The Montana beacon system had once again undergone intense scrutiny, but emerged unscathed.

Politics

It was only a matter of time before the next changing of the governmental guard took office and again, for the betterment of Montana tax-payers, began the arduous process of re-inventing the proverbial wheel.

In 1988 Stan Stephens was elected governor. Along with the privilege of being Governor of the great State of Montana comes the privilege of appointing one's old buddies and largest financial backers to departmental head positions. This was the window of opportunity, out of which Governor Stephens gazed upon long time friend and Great Falls tire magnet, John Rothwell, to be the newly appointed Director of the Department of Transportation.

Rothwell's longtime association with the tire business made him a shoe-in for the upcoming awesome responsibilities associated with being the Director of

the largest Department in state government. It was widely believed by many in aviation circles that Rothwell's intent from the onset was to abolish the Aeronautics Board, consume the Aeronautics Division into the Highway Department as a one-man show, and sever any link between state government and aviation.

It seemed that the first order on his agenda was to review all Aeronautics programs and start chopping. Probably due to alphabetical organization, the Beacon program was first on the list. On this program, Rothwell did not utilize the "reinventing of the wheel" governmental privilege or the benefit of any past research that had been done; he simply used his new governor-christened powers and ordered that all the beacons in the state of Montana be turned off for the months of November and December 1991. The Montana Aeronautics Division complied by flipping all 18 switches and issuing a state-wide Notice to Airmen (NOTAM) through all flight service stations in Montana.

The response was overwhelming. Hundreds of letters poured in, not only to the Aeronautics Division, but to the Governor's office and to John Rothwell's office, in adamant support of the beacon system. The unsolicited response to turn the system back on was so great that the Aeronautics Board feared legal repercussions, and thus inquired about their legal liability through the Attorney General's office. (Fenger, 1992).

Action was taken at the January 1992 Board meeting, whereby seven of the nine Board members decided that the beacons should be turned back on. (Ferguson, 1992).

Decommissioning of Bozeman Pass

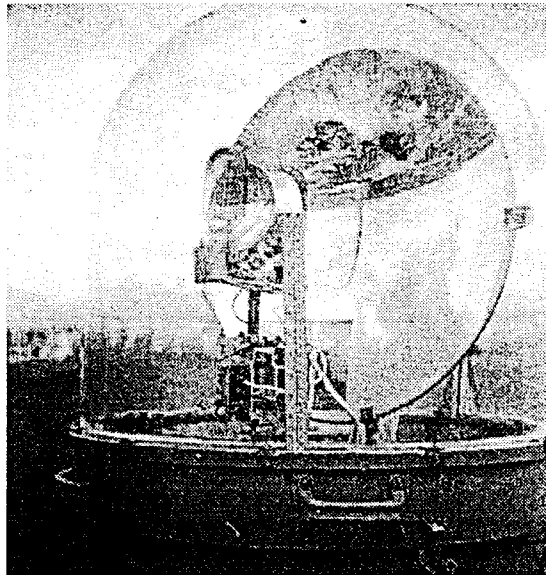
On March 2, 1993, the Bozeman Pass Beacon was decommissioned because Montana Power Company had erected a 180-foot radio repeater tower on the site complete with strobe lights. So, to avoid redundancy and confusion, the older, shorter beacon was turned off.

The Present Beacon System

Presently the Montana Aeronautics Division maintains 15 airway beacons, three obstruction beacons, and four airport beacons. The airway beacons are placed along well known, night VFR routes in the western third of Montana and are to be used as a margin of safety and for a sense of reassurance during marginal weather conditions. They are not intended to denote terrain clearance, or highest area terrain and are intended to be used in conjunction with other fundamental VFR instruments and aids such as a compass and maps.

The three obstruction beacons do denote the highest terrain in the immediate area, but are also considered airway beacons. These are Stoney Point, Silverbow, and Monida. The four Airport Beacons are on Ryegate, Dell, Lincoln, and West Yellowstone Airports. Mike Rogan (personal communication, August, 1994).

All of the airway beacons are 24-inch, dome-type lights which emit at least two-million candlepower. All are served by electrical power and are coded with course lights which can be seen clearly from only one direction. The beacon flashes two course lights back-to-back along the airway so that the pilot can follow this beam directly to the beacon. (Airmans Information Manual [AIM], 1987).



24" dome type beacon light

COST ANALYSIS

Historically, each time the beacon system was challenged, it was done for financial reasons. Prior to 1966, when the system was entirely federally-owned, the State of Montana had never before had to defend the cost of operation of the system.

1. The initial challenge came in 1969 when the state first considered the acquisition of eight remaining federal beacons. A rudimentary report of the present system was drafted, and the only cost consideration included in the report was that of electric service for beacons in fiscal year 1969. (Lynch, 1969). The total electrical service cost for the 12 state-owned beacons was \$1,188.88. Strawberry Butte Beacon had always operated on engine-generators, and the cost of fuel was not taken into consideration.
2. The year 1971 again brought legislative challenge to the system, and again, in financial justification, the Aeronautics Division prepared an operating cost statement for that fiscal year. Each beacon was audited on an individual basis. Yearly operating costs ranged from a low of \$254.54 at the Hardy Beacon to a high of \$1,702.8 at the Strawberry Butte Beacon. The following is a per item breakdown of total program costs:

ITEM

Land	\$ 455.00
Electric Power	1,165.92
Travel	651.78
Labor	1,123.20
Bulbs	360.00
Snow Machine rental	350.00
Miscellaneous expense	110.78

Total cost of operating the complete Airway Beacon System in 1971:
\$5,516.68.

Average cost per beacon: \$459.72.

Travel costs to and from the beacon by the maintenance technician was figured at nine cents per mile. The labor figure was based on the maintenance technicians' hourly rate. Miscellaneous expense included such items as photocell replacements, powerline repairs, and transformer replacement/repairs.

Because of the power supply, Strawberry Butte Beacon was the most expensive facility to maintain, and was roughly four times as expensive to operate, on the average, as the other sites. (Kneedler, 1971).

3. The cyclical challenge took place again in 1987 when the next most comprehensive and realistic cost analysis to date was compiled. The

conclusions of that study showed that for fiscal year 1987 the total system operating costs were \$17,942.45, or \$944.33 per beacon. Mid-way during that year, Strawberry Butte Beacon was converted to electric power. The study showed that if the beacon had been electric for the entire year included in the cost analysis, the total annual operating cost would have been \$14,599.00, or \$763.36 per beacon. At that same time, the Aeronautics Division was in the process of converting the system to 100% use of metal halide bulbs. Completion of this conversion would result in total system operating costs of \$9,496.34 annually, or \$499.80 per beacon. (Kneedler, 1987).

4. During 1991-92 the cyclic challenge again raised its costly head. Another cost analysis was made concentrating on the number of hours required each year to service the 18 state-owned beacons and the fiscal year 1991 operating costs.

Labor costs and hours were broken down separately and averaged out to 16.82 hours per beacon per year at an average labor cost of \$221.92 per beacon per year. Annual operating and labor costs were figured at \$11,483.01, an average cost per beacon per year of \$637.95. (Burrows, 1992).

5. As of the writing of this report, (August 1994) figure compilation for fiscal year 1993 costs were incomplete. The only cost analysis data available for

that year was the utility figure, \$4,446 and land rent of \$1,125. (Burrows, 1993).

6. It should be noted that the one cost associated with the Airway Beacon System which does not appear in any of the aforementioned cost analyses is the cost of actually preparing the detailed reports and justifying the beacon systems' existence every couple of years. However, a cost of decommission report is normally associated with a requested cost analysis report. The cost of compiling estimated decommission data has never actually been figured either, but there is associated expense. (Kneedler, 1987).

THE CHALLENGE TO DECOMMISSION

Two Options

To decommission a beacon or a system of beacons is not to merely flip a switch and turn it off. When the original land use permits for the beacons were drawn up, most land owners stipulated that if the beacon in question were ever taken out of service, the owner of the beacon would remove the tower, beacon, electrical poles, concrete foundations, and return the site to its original condition.

Nearly every time the beacon system was challenged in Montana, an operational cost analysis of the system was required to justify one of two options: Keep them on or turn them off.

As there are considerable costs associated with the decommissioning of beacons, this cost figure was sometimes included as part of the operational cost analysis.

The Decommission Studies

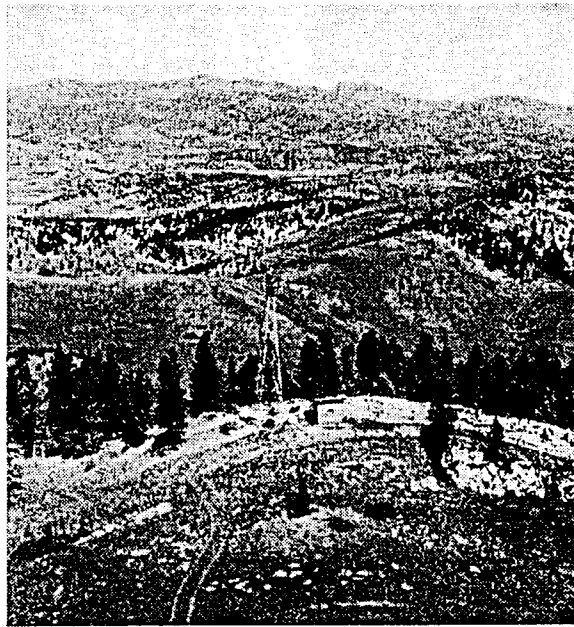
1. In 1966, the Montana Aeronautics Commission contracted to have 19 previously federally-owned beacons removed from their mountain-top locations. Some were re-erected, and some were donated to museums or public-use airports for historical purposes. Cost for removal and land restoration was \$2,144.31 per beacon. (Kneedler, 1971).
2. The next decommission study was done in 1971, and since there was no actual decommission work done, the figures were estimated. Construction

industry costs were estimated to have risen approximately 5% a year since 1966, so the estimated cost of decommissioning and removing towers was \$32,164.78. In addition, the beacons at Avon, Strawberry Butte, Wolf Creek, Bonita, Alberton, and Saint Regis are associated with one or two small frame buildings. Some of these buildings were used to house the engine generators which were part of the original 1930s installation. Some were used as foul-weather shelters for beacon maintenance personnel. A rough estimate of the cost to destroy these buildings and their concrete foundations and to restore the sites to their original condition was a lump sum estimate of \$500 per site. For the six sites mentioned above, this totaled \$3,000 for additional structure removal. (Kneedler, 1971).

Another associated cost that had to be taken into consideration was the fact that the Montana Aeronautics Commission owns and is responsible for a portion of the electrical power line at the beacons of Canyon Resort, Avon, Stoney Point, Whitetail, and Strawberry Butte. The inaccessibility of many of these locations made the \$3,800 estimate for removal of all lines seem low. Ultimately the cost to decommission the airway beacon system in 1971 was estimated at \$38,964.68. (Kneedler, 1971).

3. The operational cost analysis report of 1987 also contained the decommission option. It was estimated at that time that to decommission

the system and restore all sites would range from \$95,000 to \$142,500. Those figures were estimates given by Rick Bell of Bell and Associates of Helena, after having visited the McDonald Pass and Avon beacon sites. (Kneedler, 1987).



Stoney Point Beacon

ON OR OFF

The question of airway beacon usefulness is one which has been discussed with varying degrees of enthusiasm for many years. It is doubtful that there are any new arguments pro or con. The most frequently heard argument against the beacon system is that it is no longer of value in this modern day of electronic navigational aids. While that statement stands true from a technological point of view, it is here that the *Human Factor* figures heavily.

At night, at high altitudes, and during pleasant weather conditions, the lights of Montana's cities provide adequate visual reference. Unfortunately, experienced pilots know that these conditions exist on a frustratingly infrequent basis. Low ceilings and inclement weather, including fog and icing conditions, often prevent high altitude flight, but would not prevent making the flight at a lower, but still safe, altitude. Night flying under these conditions would usually prevent a pilot from observing more than one town at a time, eliminating his or her most valuable visual reference. Under such conditions, even though the pilot may have more complexed, more technical navigational aids on board, the airway beacon light provides a margin of safety and a sense of reassurance that simply cannot practically be duplicated.

It is interesting to note that in the previous beacon surveys, many airline pilots and commercial operators responded favorably to the beacon system.

The following is one of the most poignant letters received and sincerely brings home the fact that in this day of "Gee Whiz" gadgetry, the old original beacon standby still makes a pilot reflect on a time when the beacon was literally a fluorescent lifesaver in a dark cold ocean.



AIR LINE PILOTS ASSOCIATION SEATTLE FIELD OFFICE

SUITE 526, EVERGREEN BLDG., 15 S. GRADY WAY RENTON, WASHINGTON 98055-3254 (206) 228-4810

March 7, 1988

Mr. Michael D. Ferguson, Administrator
Aeronautics Division
Department of Commerce
State of Montana
P. O. Box 5178
2630 Airport Road
Helena, Montana 59604

RE: Airway Beacon Survey

Dear Mr. Ferguson: *Mik*

I contacted the Central Air Safety Chairmen of those carriers that operate in Montana and have forwarded your survey to them for dissemination to the pilots. Hope you get some results.

As a side note: I hope you keep the system. There are those GA pilots flying VFR at night that still might have a need for them.

Two years ago I was jump seating from Seattle to Chicago. The captain, who was retiring in six months, was giving me a "Cooks" tour of the many "Gee Whiz" devices on the 767. He spoke of his father who had been an airmail pilot in the late 20's. Flying on dead reckoning, pilotage, and the airways beacons. Look at this (cockpit) now! What would his dad have thought of it?

It was clear and cold at 41,000' that night and as the crew punched commands into the onboard computer, we crossed Washington and came over the pan handle of Idaho. Out ahead my eye caught by the winking of the bright sequence lights. Most of your system was in view. I pointed the Montana beacon system to the crew and mentioned - here we were in 1986 at 41,000 in a "glass" cockpit. Below was, to my knowledge, the last lighted airway system in the U.S. that I know of - 1932.

Both crewmembers paused. The skipper settled back in his chair and was quiet for some time. He sat and watched the lights until they were out of view. Then imperceptively shook his head. What he was thinking about I do not know, but those beacons on that clear cold night left an impression on all of us in the cockpit of the 767.

Sincerely,

Michael Oswald
Seattle Area Safety Coordinator

MO:jf

Montana is the last state to operate airway beacons, and the Montana Aeronautics Division considers the cost of operation to be insignificant, commensurate with the incalculable safety factor. The Division maintains that there is no other Division function which provides as much realistic and practical safety margins for so little cost. (Kneedler, 1971).

So, is the system still of value? One must ask several other related questions in order to answer the first.

- a) Is there any value to designing a pilot's seat so as to prevent fatigue and make the pilot comfortable during long, sometimes stressful flights?
- b) Is there any value to orchestrating cockpit resource management courses for better communication among crew members?
- c) Is there any value to development of highly accurate and complex O/O landing systems that can guide an aircraft to ground level with virtually no visibility?

These questions and the associated answers all center around modern technology in conjunction with the added benefit of past experience, but the answer to all questions will certainly contain reference to "If it makes the pilot feel safer, more comfortable, more confident, and more productive," then *YES*, it is of value. Apply the same partial answer to an antiquated, historic, but still

highly useful system to draw a conclusion. Please keep in mind the old saying

"If it isn't broken - Don't fix it."

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