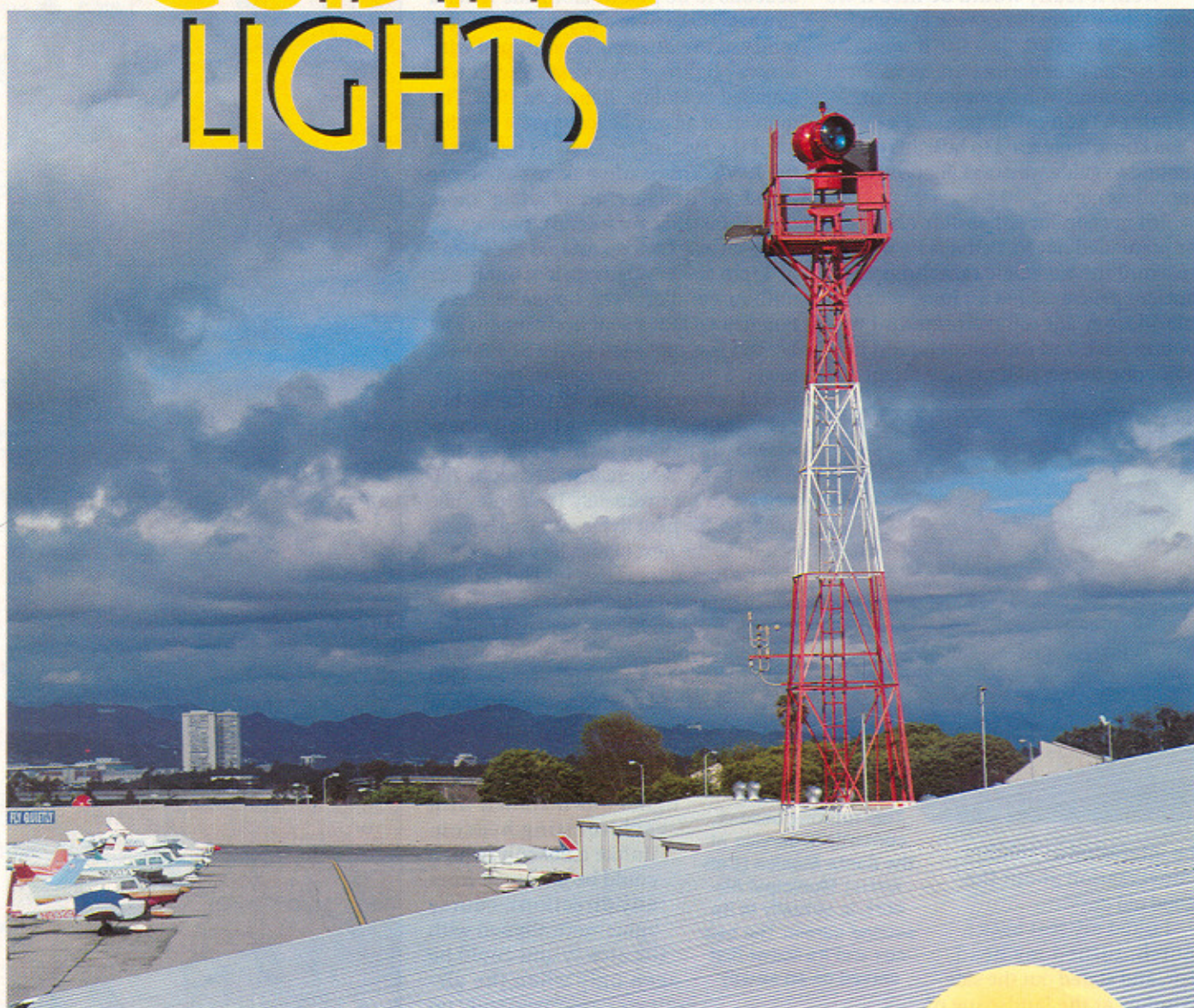


GUIDING LIGHTS



WE had just reached Flight Level 350 at the beginning of a nonstop flight from New York to Los Angeles. The nose of our Boeing 767 took aim at the upper rim of a setting sun that was barely visible through a diaphanous veil of cirrus spread across the western horizon. ● It was my first officer's turn to fly, and I paid little attention to the monologue that he was delivering to the passengers over the public-address system. What caught my ear, however, was his comment to them about how we would be flying over and along the south rim of the Grand Canyon. ● "Unfortunately, folks," he said with a straight face, "we won't be able to see the canyon tonight because the lights down there aren't used on Mondays." ● After he had finished, I wondered aloud about how many of our passengers might take seriously his

Airway beacons still shine

BY BARRY SCHIFF

comment that the Grand Canyon was illuminated the other six nights of the week.

"That would take a lot of lights," I offered.

"Well, it really would be nice if we could show them the canyon at night."

"Sure," I replied, "just like it would be nice if state boundaries were highlighted on the ground with fluorescent paint."

After a thoughtful pause, I added, "You know, there used to be lights on the ground to guide wayward pilots on dark, moonless nights."

But my copilot either didn't hear me or pretended not to. Perhaps he wanted to avoid the nostalgic ramblings of an ancient pelican slated for imminent and mandatory age-60 retirement. I was young once and thus understood how someone barely half my age might not

rest of the mail completed its journey aboard trains.

Nevertheless, Congress was ultimately convinced to fund a number of rotating beacons to be placed along the federal airways. These were similar to those currently in use at airports equipped with runway lighting. The first beacon was installed at Moline, Illinois, in 1926. The number of airway beacons grew steadily until the system reached its heyday in the 1950s. This is when there were more than 2,500 beacons "illuminating" more than 30,000 miles of federal airways.

An airway beacon rotated at either 3 or 6 rpm and emitted a pair of intense 2-million-candlepower, opposite-direction beams that swept horizontally. The beacon was mounted atop a 51-foot-tall tower; a pilot observing one, therefore, would see either six or 12 white flashes per minute. All beacons turned clockwise (as do modern rotating beacons).

The beacons were installed along the airways at approximately 10-statute-mile intervals. If a pilot flying over one beacon could see the next in line, he would know that he had at least that much visibility, which provided important reassurance—especially when he was over unpopulated areas, where weather observations were usually few and far between. This gave a pilot the confidence to continue at times when uncertainty might have suggested otherwise.

A pair of fixed red course lights was installed with each rotating beacon.

Unlike a beacon (which could be observed from any direction), course lights were aligned with the airway and could be seen only when the aircraft was approximately on course and when approaching

the beacon from one direction or the other. A pilot who could not see a course light would know, therefore, that he was significantly off course.

When an airway beacon was located at or near an airport equipped with runway lights, the course lights were green instead of red, which is why the modern rotating beacon installed at lighted airports consists of alternating green and white beams. Chrome-yellow windsocks illuminated from within were installed on the towers of such airway beacons. Windsocks also were slung from some beacon towers not located near an airport, to provide pilots with a visual sense of en route wind speed and direction. Beacons located at or near unlighted air-



This rotating beacon, currently in service at the Santa Monica (California) Municipal Airport, is actually in its second career. The beacon and its tower first served on an airway.

be interested in another conversation about the good old days.

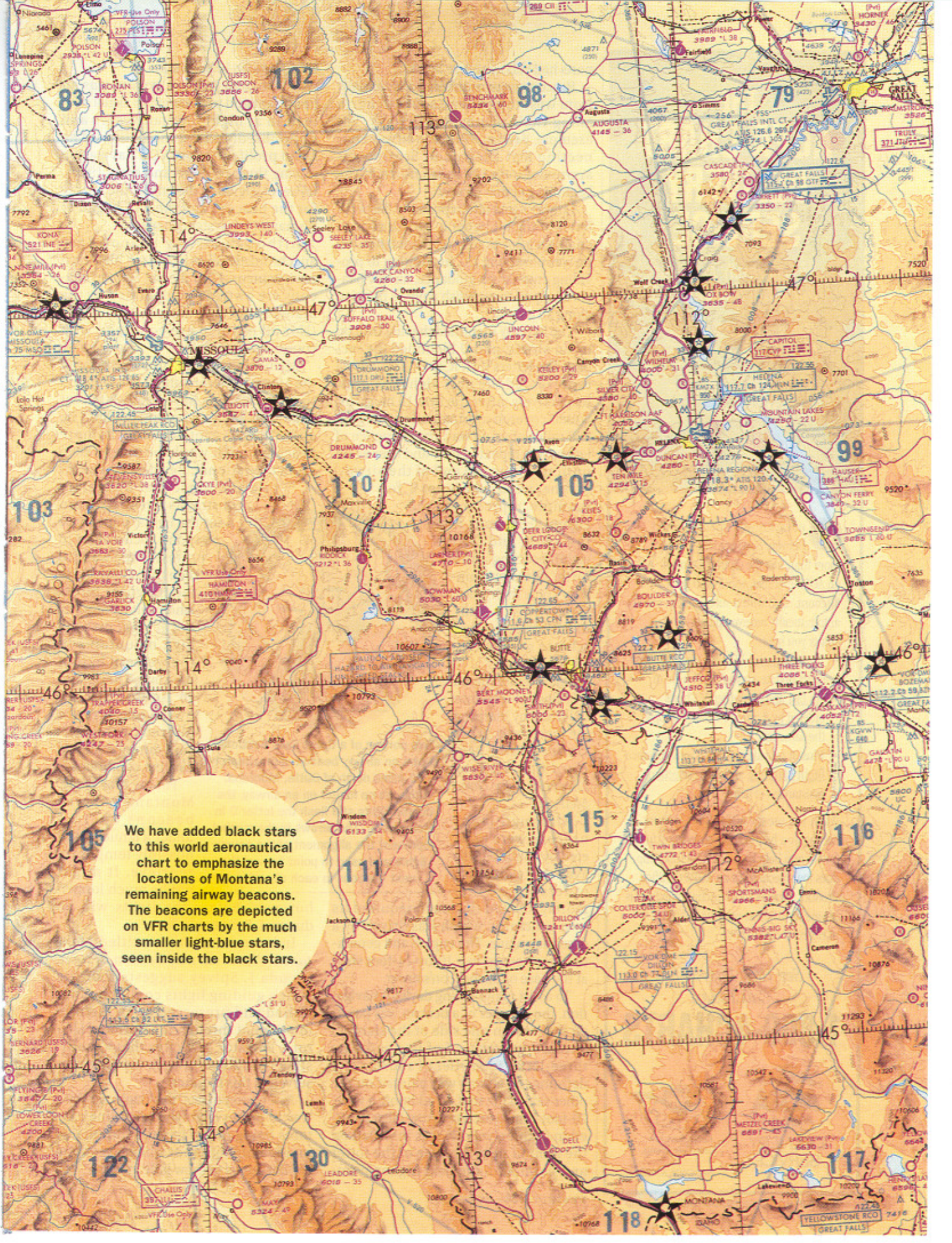
I tilted my seat back a notch, turned my head left, and stared out the side window at the landscape of western Pennsylvania retreating in slow motion. I found myself thinking about how the pilots of a bygone era used lighted airways to find their way at night.

The first experiment designed to test the feasibility of night cross-country flying began on February 22, 1921. This is when two airplanes loaded with mail departed New York for San Francisco and another two headed in the opposite direction along the same route. There were no radio aids to navigation in those days, and volunteers who lit bonfires along segments of the transcontinental route provided nighttime guidance to these VFR-only pilots.

It was difficult to assess the success or failure of that experiment; only one airplane reached its destination. The



We have added black stars to this world aeronautical chart to emphasize the locations of Montana's remaining airway beacons. The beacons are depicted on VFR charts by the much smaller light-blue stars, seen inside the black stars.



ports had yellow course lights.

Beacons were numbered sequentially from west to east, and south to north along their respective airways. For example, Beacon 37 on the airway connecting San Diego and Seattle was approximately 370 miles north of the beginning of that airway.

Course lights also repeatedly flashed a letter of the alphabet in Morse code to enable a pilot to identify which beacon he was observing. So, in addition to providing cross-track guidance, airway beacons helped to establish a pilot's position along an airway.

The letter W identified the first beacon on an airway, and U identified the second. The letters V, H, R, K, D, B, G, and M represented the next eight beacons, respectively. After the first 10 beacons, which covered approximately the first 100 miles of an airway, the sequence of letters was repeated over and over again until reaching the end of the airway.

In other words, the letter B, for example, represented the eighth, eighteenth, twenty-eighth, and thirty-eighth beacons, and so forth. Pilots presumably knew their positions within a hundred miles, so this scheme seldom created confusion.

Pilots remembered this illogical sequence of letters by learning the mnemonic, *When Undertaking Very Hard Routes, Keep Directions By Good Methods.*

Although many beacons were powered by commercially available electricity, others were so remotely located that each required its own generator, which was driven by a gasoline engine. The engine and generator were housed in a 10-by-14-foot shed at the base of the beacon's tower.

To assist pilots during daylight navigation, the number of a beacon was painted in black on one side of the slanted, chrome-yellow roof of its shed. The three-letter identifier of a major city defining the airway was painted on the other side of the roof. In addition, a wide, 70-foot-long concrete arrow (also painted in chrome yellow) was installed on the ground near the base of the tower and pointed to the next higher-num-

bered beacon in the chain.

The airway beacon system was an important and popular aid to visual navigation at night for many years and undoubtedly saved many lives. The rapid proliferation of VOR navigation during the late 1950s and early 1960s, however, signaled the end of the airway for the beacon, and the FAA began to dismantle the system en masse.

Although airway beacons are anachronistic relics in today's high-tech environment, 17 of the old Federal beacons are owned and operated by the State of Montana and are still in use. (Not all of them are equipped with course lights, however.)

Michael Ferguson, administrator of the Montana Aeronautics Division, says that the beacons have been slated for shutdown a number of times. "But," he adds, "there's a lot of history in those beacons, and it would be nice to keep them operational. Besides, whenever

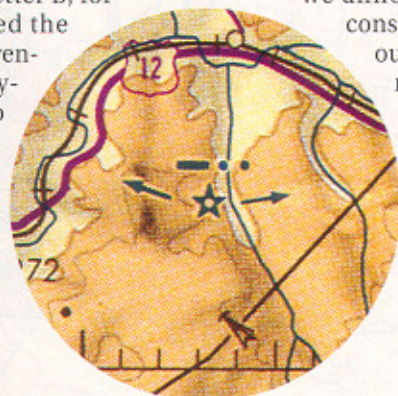
we announce that budgetary constraints threaten to turn out the lights, pilots here respond vociferously in protest. They want to keep them, especially the freighter pilots who prefer not to fly IFR at night over the high mountains in the western half of the state. They claim to be comforted by the reassurance offered by the beacons during marginal weather conditions."

For the time being, Montana's airway beacons operate under a tenuous and possibly temporary reprieve. It might not be much longer,

however, before the lights will be dimmed. Fade to black.

In her master's thesis titled *Montana's Visual Airway Beacon System*, Brenda J. Spivey suggests that the state's guiding lights could be sanctioned and preserved as an historic monument through the National Historic Register. She cites that a multi-state lighthouse system is being preserved in this manner.

As a matter of fact, this might also be a way to preserve graybeard airline captains being put to pasture. But that is more rambling about which my young copilot seems to show little interest. □



This portion of a Great Falls Sectional shows an airway beacon approximately 60 miles north of Butte, Montana. Although no longer on an airway, the course lights still flash the letter D in Morse code. The arrows in the symbol represent the alignment of the course lights and used to point toward the next beacons in each direction.