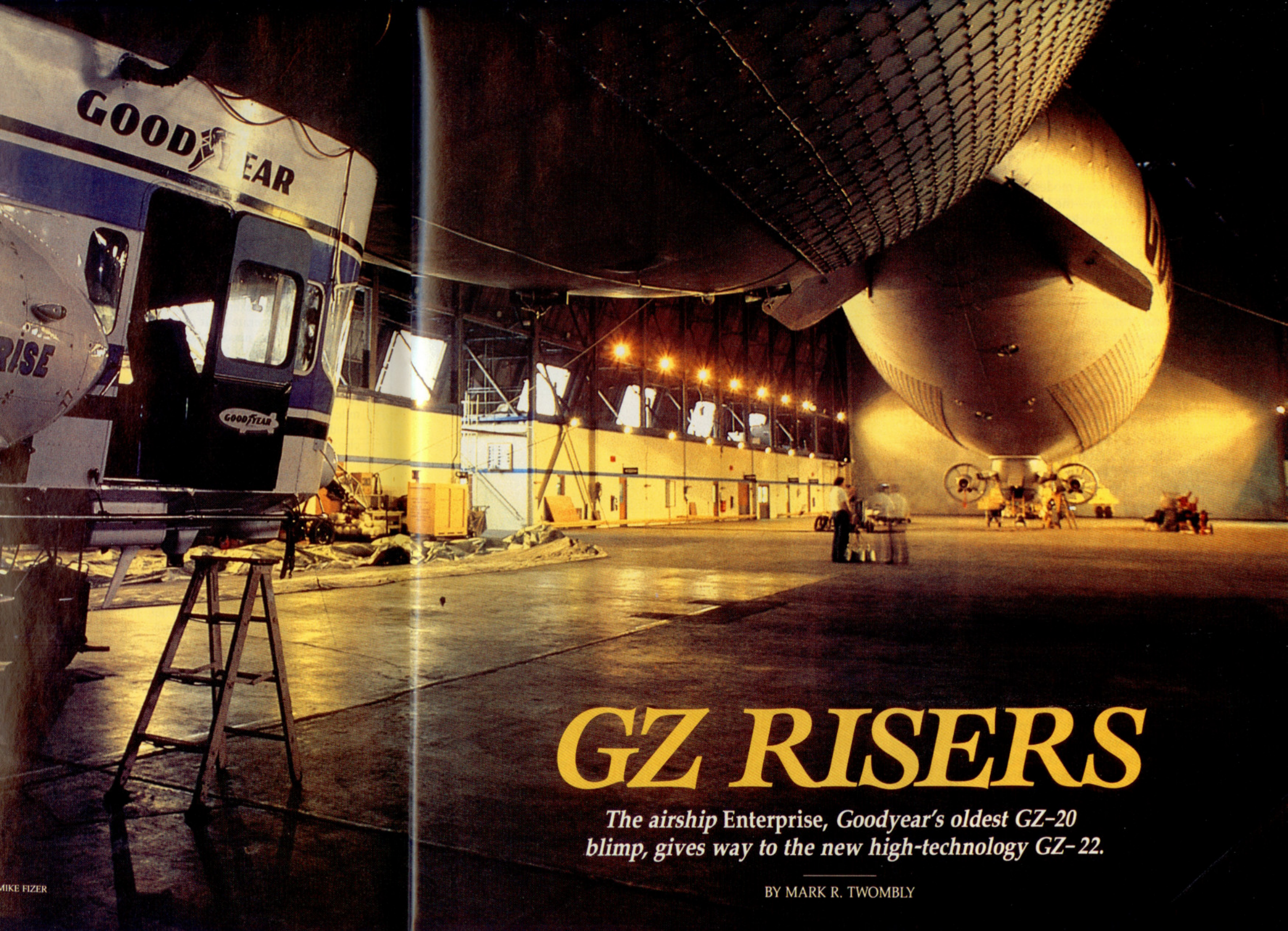


MIKE FIZER

GZ RISERS

The airship* Enterprise, *Goodyear's oldest GZ-20 blimp, gives way to the new high-technology GZ-22.

BY MARK R. TWOMBLY

Late in 1987, a familiar-looking ship sailed from a cavernous dock on the edge of Wingfoot Lake, southeast of Akron, Ohio. To the untrained eye, it looked identical to other ships that had passed through the area over the decades. To a knowledgeable observer, however, there were many differences. It was longer, for one. It had turbine engines that emitted a low whine instead of the clattering piston engines of the older ships. And the stern was different; the rudder and flippers were configured in the shape of an × instead of the traditional cross. Though familiar, this was a new ship.

It was The Goodyear Tire and Rubber Company's new GZ–22 airship, nee blimp. Originally conceived as a smaller-scale prototype for a modern military surveillance platform—the U.S. Navy is considering getting back into airships for submarine patrol—the GZ–22 will instead replace one of Goodyear's venerable GZ–20 blimps to carry on a long-standing tradition of service as the best company billboard imaginable.

Goodyear currently operates three GZ–20 blimps in the United States: *Enterprise*, based in Pompano Beach, Florida; *America*, based in Houston; and *Columbia*, based in Los Angeles. A fourth, *Europa*, operated out of Rome, Italy, for several years, but as a result of cost-cutting moves in 1986, it was deflated and shipped back to Akron for storage.

The GZ–22, which has been christened *Spirit of Akron* in honor of a gigantic rigid airship Goodyear built in the early 1930s, will replace *Enterprise* in Pompano Beach this winter. At the moment, Goodyear has no plans to build additional GZ–22s. It will be at least three years before another of the older blimps will reach the end of its service life, and even then Goodyear may elect to refurbish rather than replace.

The critical component in the life of a blimp is the gasbag. Goodyear's bags are made of two plies of Dacron fabric dipped in five coats of Neoprene rubber. The Dacron provides shape and strength; the Neoprene protects the fabric from deterioration and acts as a sealant to prevent transpiration of the helium. A coat of flat silver paint provides further protection from ultraviolet light and the elements. Each blimp gets a new coat of paint once a year.

The bags have a service life of about 15 years, according to Goodyear, but the company takes a conservative approach

The Spirit of Akron*'s cockpit (left) is state of the art with electronic instruments and flight control system. The* Enterprise *(above) is steered with a wooden ship's wheel.*

and limits service to 10 to 12 years. *Enterprise* has been flying for 10 years, *America* for seven. Rather than build an expensive new GZ–22, Goodyear likely will refurbish *Europa*'s bag and eventually use it to replace *America*'s.

For now, *Spirit of Akron* will be the only all-new blimp in Goodyear's fleet. It may not be immediately apparent to people on the ground that it is different from *Enterprise* and other GZ–20s, but in fact it is radically different.

The bag has the same 47-foot diameter as the earlier blimps but, at 205.5 feet, is 13.5 feet longer and, at 247,800 cubic feet, has about 18 percent more volume. The × configuration of the tail allows for greater ground clearance. A steep pitch up is *de rigueur* for a blimp departure, but *Enterprise*'s huge vertical fin limits angle of attack to six degrees to avoid a tail strike. *Akron* can safely be rotated to 10 degrees pitch up.

Enterprise is powered by a pair of normally aspirated 210-horsepower Continental IO-360 engines and two-blade, constant-speed propellers. *Akron* has turboprop power—lots of it: two 420-shaft-horsepower Allison 250-B17Cs that turn three-blade propellers encased in shrouds. Maximum speed is a blistering 65 miles per hour, 15 mph faster than the GZ–20.

The pilot can punch a rocker switch to pivot the entire engine/prop/shroud assembly through a 75-degrees positive, 30-degrees negative arc. Vectoring thrust gives *Akron* excellent short-field takeoff and landing capability. Whereas Goodyear's other blimps need about 1,200 feet of clear space for departures and approaches, *Akron* can levitate out of a field only slightly longer than it is.

The car suspended beneath the bag has a metal frame, but the skin is made of resin-bonded synthetic cloth sandwiched around a paper-honeycomb core. The composite skin is molded into a smooth, curved shape.

The 35-foot-long car is 12 feet longer than the GZ–20 car and can carry nine passengers, plus the pilot. (All of Goodyear's public relations blimps are operated single-pilot.) The huge bubble windows let passengers look straight down. *Enterprise* can carry six passengers but in smaller seats and tighter quarters.

Akron's night sign is larger as well. Some 8,084 yellow, red, blue, and green lights linked by 88 miles of wire cover both sides of the bag. The sign is controlled by a computer that can be quickly installed and removed from the car.

Public service messages and Goodyear promotional messages are flashed on the sign; no outside advertising is accepted by Goodyear.

The most remarkable contrast between the old and the new blimps is seen on the flight decks. *Enterprise*'s cockpit appears to have been designed by the Wizard of Oz, *Akron*'s by Boeing.

The GZ–20 car was designed 50 years ago and, except for periodic avionics upgrades and refurbishing, has remained pretty much the same. Pitch is adjusted by spinning a wooden-rim ship's wheel adjacent to the pilot's right leg. Depressing a rudder pedal yaws the blimp in the direction the pilot wants to turn. A profusion of levers on the left sidewall adjusts engine power, and a series of tubes filled with red-tinted water, in the center of the panel, gauge bag pressures. To adjust pressure, the pilot reaches up to a panel over the windshield and pulls or releases one or more cables to open or close air valves in the bag.

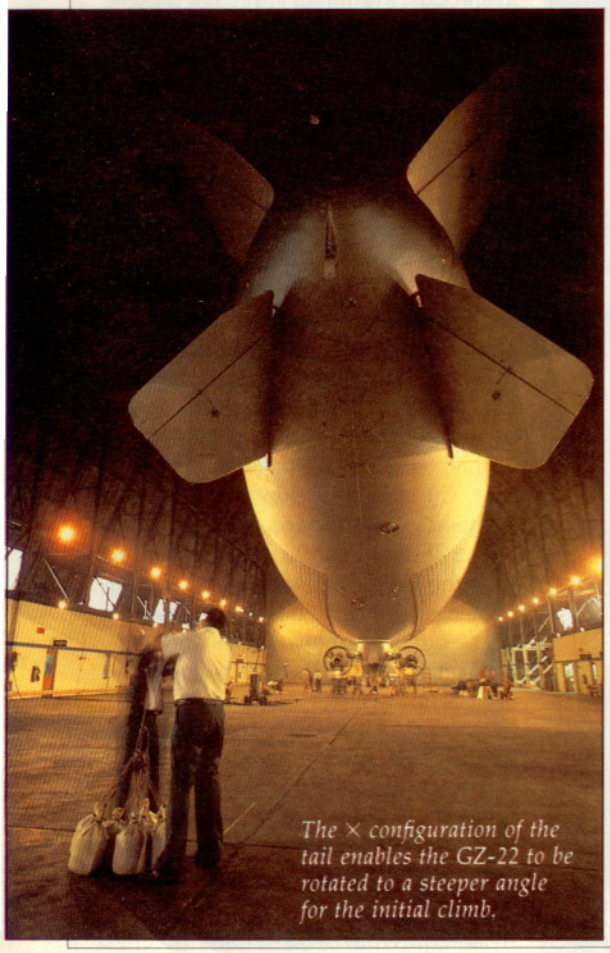
Akron has dual airplane-type yokes—no ship's wheel or rudder pedals—and a fly-by-wire flight control system. The pilot can throw a lever to switch to emergency backup mechanical control, but in the normal mode of operation, moving the yoke sends electrical impulses to a computer in the aft end of the car. The computer actuates hydraulic servos that move wire cables strung to the control surfaces. The advantages of the fly-by-wire system are very light stick forces and, therefore, far less work for the pilot.

The wide instrument panel houses a Collins electronic attitude indicator and horizontal situation indicator and digital pressure gauges. Color-coded levers overhead adjust pressure valves.

One other important difference distinguishes *Akron*. It is the first Goodyear blimp to be approved by the Federal Aviation Administration under new airship certification standards adopted in April 1987. Previous to that, the FAA relied on old U.S. Navy standards.

The first airship to be certified under the new FAA regulations was the British-built Airship Industries Skyship 600. However, FAA approval was based on British Civil Aviation Authority certification. *Akron* is the first blimp on which the FAA has had to conduct a complete certification program, including flight tests.

Goodyear received certification in September. *Akron* is to be flown to Pompano Beach for its winter public relations tour of the southeastern United States.



The × configuration of the tail enables the GZ-22 to be rotated to a steeper angle for the initial climb.

At the time of our visit, *Enterprise*'s pilots were transitioning to the GZ–22 at Goodyear's Wingfoot Lake blimp hangar. John Moran, chief pilot of *America* and a 20-year veteran of Goodyear blimps, was the chief certification pilot for the GZ–22 and is directing the transition training. Glen P. Henry, who was one of the last of the Navy's airship pilots, also is instructing in the GZ–22. Henry is chief pilot of *Enterprise* and will captain *Akron*.

The Wingfoot hangar is the last vestige of Goodyear's blimp operations in Akron. In 1986 Goodyear successfully fought off a hostile takeover attempt by a British corporate raider, but in doing so, the company incurred heavy debt. To recover, Goodyear sold portions of the company. Among them was Goodyear Aerospace, which manufactured the blimps operated by The Goodyear Tire and Rubber Company division. Goodyear Aerospace was bought by the Loral Corporation, which specializes in military products. For Goodyear Tire and Rubber to obtain another GZ–22, it would have to buy it from Loral.

Goodyear works its blimps hard. Each blimp flies an average of 1,800 hours a year. The demand for appearances far exceeds their availability. In general, Goodyear places top priority on events that have potential for the widest public exposure. Nationally broadcast television coverage is desirable. Goodyear has two remotely operated, gyro-stabilized cameras mounted in pods outside the blimp car. (A third is on order.) The Gyrocams deliver vibration-free, 360-degree views from high overhead.

The video virtuosity of the blimp/Gyrocam combination was dramatically demonstrated after the San Francisco area earthquake last October. *Columbia* was orbiting Candlestick Park to cover the World Series when the quake struck. Pilot John Crayton then began broadcasting amazingly clear, detailed pictures of earthquake-related fires and damage. For the next 10 days, *Columbia* was used to cover earthquake damage and broadcast public service messages on its night sign.

Appearances are orchestrated so that much of the time spent in a city is devoted to passenger rides. Goodyear customers come first on the passenger manifest. A blimp ride is a prized treat, especially because passengers are carried gratis.

All of the costs of covering an event—travel expenses to and from the city, room and board for pilots and ground crew, airborne television cameras, and fuel, maintenance, and other operating expenses—are borne by Goodyear. A gentlemen's agreement between the company and television networks provides that, at some point during the broadcast, the announcer will plug the blimp and its pilot for providing the stupendous aerial camera angles.

Like *Enterprise* before it, *Akron* will spend six months at its winter base in Pompano Beach and six months on summer tour. Each of the three blimp bases is staffed with five pilots and a 16-person ground crew. The entire crew goes on the road with the blimp for the summer. Even when they are back at base in the winter, frequent overnight trips—commitments, in Goodyear's lexicon—are inserted in the schedule.

During the summer, pilots work a six-

Helium allows a blimp to float free of the earth. A robust ground crew is essential to bringing it back. A mobile docking mast gently tucks the Akron back into its berth in the Wingfoot Lake airdock.

Approaching the airdock for a landing, the pace is serene, the view sublime, and the control inputs unbelievable.

day week, eight hours a day. The week is trimmed to four days in the winter.

Pilot-candidates must have a commercial certificate with an airplane rating. Goodyear tried *ab initio* training but found it to be more time-consuming and expensive than hiring fixed-wing pilots. A multiengine rating is not required. The blimps exhibit no adverse handling characteristics on one engine.

Each new pilot receives an average of 250 hours of training before qualifying for single-pilot operations. It takes five to six months to accumulate the training time. Much of it is logged on cross-country flights. The blimps do not have autopilots, and cross countries, which typically are eight-hour nonstops, are work intensive, especially in turbulence.

Akron's flying qualities are dictated by its massive size and slow speed. Anticipation is the name of the game. The blimp is slow to react to control inputs, and overcontrol is common among novice pilots.

The pilot also must monitor helium pressure in the bag. Pressure is regulated by adjusting the volume of each of two ballonets, large air-filled sacks in the bow and stern of the gasbag. Fully inflated, the ballonets take up 25 percent of the volume of the bag.

Optimum pressure of the helium is one inch of water, which is only slightly higher than atmospheric pressure. (Water pressure is a more convenient unit of measurement than inches of mercury.) If it is any lower, the bag loses its tautness and shape; any higher, and automatic valves will vent helium to prevent overpressure damage to the bag. Venting is to be avoided. Helium is the source of a blimp's buoyancy and shape, and venting it is akin to bleeding: Lose enough and you're going down.

As a blimp gains altitude, the helium expands and pressure inside the bag builds. Increasing temperature caused by the sun warming the bag also increases helium pressure. To maintain optimum pressure, the pilot must vent air from the ballonets. The blimp reaches its maximum operating altitude when the ballonets are completely empty. That's at 10,000 feet msl for both the GZ–20 and GZ–22, but it's largely a theoretical specification. The ballonets would have to be completely inflated at liftoff, leaving an insufficient volume of helium to launch the blimp with reasonable fuel or payload in the car. Normal service ceiling is 3,000 to 4,000 feet msl.

The ballonets also aid in climbing and descending. If the forward ballonet is partially deflated and the rear inflated, helium is displaced forward and the nose rises. Displace the helium aft by transferring air to the forward ballonet and the tail rises.

Air is pumped into the ballonets from scoops positioned behind the propellers. Electric fans serve as backups.

Wind can be a constant annoyance given the blimp's sedate cruise speed and surface area. Clouds can be dealt with—the Goodyear fleet is IFR equipped and certified. Pilots can and have flown approaches to minimums, but they maintain IFR currency mostly by donning the hood on cross countries.

Thunderstorms, snow, and ice are the most feared enemies. *Akron* is equipped with color radar and Stormscope for thunderstorm avoidance. Snow and ice add tremendous weight to the bag and can cause it to descend in flight or roll over if it's moored. It happened once in Houston. The local fire department saved the day by hosing the bag down and melting the dusting of snow. The blimp righted itself with no damage.

Six months on the road, eight-hour days at the helm of a complex ship, gripping and grinning with VIP passengers, and serving as chauffeur to a television camera and giant marquee—Goodyear works its pilots hard, too. You have to love people, changing scenery, hotels, and, of course, blimps to fly for Goodyear.

Affection for the great gray blimp comes easily. To watch the *Spirit of Akron* being herded out of its hangar, then released to bob and sway across the sky before it is gingerly wrestled to a landing by a dozen men, is to watch a gargantuan machine become a gentle, living giant. □