



COURTESY OF AIRSHIP VENTURES



## Low, slow, and comfortable

Aboard America's  
newest Zeppelin

BY THOMAS B. HAINES

With hardly a change in engine sound, the giant Zeppelin gently floated straight up, marking the start of the first U.S. commercial Zeppelin flight in 70 years and confusing me. Not what I expected. Previous experience in blimps, especially those with non-ducted engines, led me to believe that we were in for a steep departure—a pitch attitude that makes fixed-wing pilots grab the armrests because you just *know* that it's going to stall and plummet to the earth. But it safely churns skyward nonetheless.

This Zeppelin is no blimp and it's no 1930's dirigible either. Although this ship was built by the same company that brought us the famous *Hindenburg*, they've learned a lot in the past 70 years. N704LZ is a twenty-first century, fly-by-wire, computer-driven, all-composite wonder. Three engines drive four propellers that can vector their thrust by as much as 120 degrees, making the new Zeppelin so maneuverable that it can operate with as few as one ground crew member. A typical blimp requires 12 to 20 ground crew members. The enormous *Hindenburg* needed 240 pairs of feet on the ground.

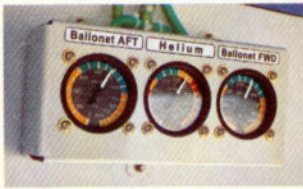
PHOTOGRAPHY BY CHRIS ROSE



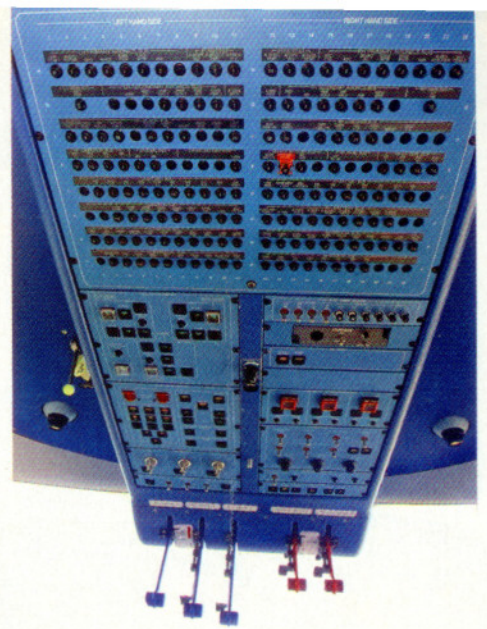
Pilot Fritz Günther maneuvers the 246-foot Airship Ventures Zeppelin over San Francisco neighborhoods—the first commercial flight of such an airship in seven decades.



N704LZ is the most sophisticated airship in the world. Fly-by-wire controls link the flight controls and engine commands. Computers manage envelope pressure, keeping the pilot in the loop through the display at bottom center, just above the three sets of engine controls, and the display just right of the attitude indicator. The pilot has mechanical back-up gauges (below). Manual back-up valve controls sprout from the overhead circuit breaker and switch panel (right).



The top display in the center stack shows engine parameters. Bendix/King navcoms and a Shadin fuel computer are just below the glareshield. The ship is equipped for IFR flight, but not yet certified for it.



The vectored thrust allow the Zeppelin to lift straight up, light as a feather; *lighter* than a feather if we want. A Lycoming 210-horsepower IO-360 protrudes from each side of the ship's envelope. A third IO-360 is connected to the aft end. The propeller assemblies on the side engines can be rotated from the typical tractor position of an airplane for forward movement to 120 degrees up to assist with climbs, particularly at takeoff. The aft propeller assembly acts as a pusher engine except when it is rotated downward by as much as 90 degrees to also assist with takeoffs and slow speed control. A side propeller assembly also driven by the aft engine revolves in a neutral pitch in flight, but acts as a helicopter tail rotor in takeoff and landing situations and in hover mode.

You might think that managing three engines and four rotating propeller assemblies would be a lot for the pilot to keep track of. Not so. In typical German engineering fashion, the work is all done by computers that interpret the pilot's desires as he (or she) moves a small joystick in the cockpit. The elevator and rudder are not very effective at slow takeoff and landing speeds. So especially in those situations, the computer manages the engines, the propellers, and the flight controls to make the ship go where the pilot wants it to go, which may mean straight up at takeoff. Pull on the stick and the aft vector at 90 degrees down will pull the tail down, causing the nose to go up. Push the stick to the right and the aft side rotor will pull the tail the left, causing the nose to go right. The pilot essentially has full maneuverability even at zero air-speed. It is that level of maneuverability that allows the Zeppelin to technically be landed and maneuvered on the ground with no assistance, although if you're going to shut it down, you'll need someone outside to keep it in place or hook it to a mast. Four people are needed during commercial operations to safely get passengers on and off the ship.

### Get your tickets

With only a half dozen people needed to operate the ship, including a pilot and flight attendant, suddenly the idea of selling rides in a Zeppelin begins to make economic sense—especially if you have dreams as big as the husband and wife team of Brian and Alexandra Hall. Although neither is a pilot, the young entrepreneurs have always shared a passion for everything aerospace. Brian fell in love with World War I airplanes as he watched the acts at the Old Rhinebeck

Aerodrome as a kid in upstate New York. At the other end of the spectrum, his passion for space led to a fervor for building model rockets. Similarly, Alex was drawn to space, with a dream of being an astronaut. Growing up near the Cardington airship hangars in Bedford, England, she became entranced by the big lumbering ships and the history of transglobal flights of the *Graf Zeppelin*. Brian's successful entrepreneurial ventures and Alex's work at space-related visitor centers in England and Oakland, California, fueled their dream of doing something different.

While in Cologne, Germany, in 2006 for business, Brian flew in a Zeppelin and returned home convinced that the scenic San Francisco area could support a similar sightseeing operation. He contacted Zeppelin a few months later and presented a business plan for such an operation. The company agreed and, with that, Brian and Alex set about raising the necessary funds to buy the ship and launch the business. Alex said six investors, including she and Brian, have funded the project so far with another round of funding scheduled for early 2009.

N704LZ is the fourth such ship built by the modern Zeppelin company. It was scheduled to be used by Zeppelin for sightseeing in Germany, but was sold to Airship Ventures. Another is deployed in commercial service over Germany where 85,000 passengers have flown—12,000 a year on average. It and the second German airship have been used for missions such as looking for diamond fields in Africa. The smooth and stable ships offer many advantages over helicopters when you need to fly low and slow vibration-free for special ops for as long as 24 hours at a time.

The 246-foot long N704LZ, largest in the world, flew over London before being partially disassembled in Hamburg, Germany, and shipped to Beaumont, Texas, aboard a 530-foot long container ship last October. After reassembly, it was flown to its historic new home at Moffett Field in California—site of U.S. lighter-than-air operations in the 1930s. The Zeppelin nests in one of three enormous airship hangars on the field; only 12 such hangars remain in the United States. Two of the Moffett hangars are 800 feet long.

### All aboard

Ground crew members brief the 12 passengers in a lounge in a NASA building at Moffett Field, Airship Ventures' temporary facilities while the World War II-era bachelors' and officers' quarters are being refitted for normal operations. Besides *AOPA Pilot* photographer Chris Rose, managing editor Julie Walker, and I, there are nine others aboard this first commercial flight. They range from a 30-something hard-core airship enthusiast (even dressed in 1930's garb), to a World War II-era German pilot who has lived in the United States for 40 years but grew up watching the original Zeppelins, and others just curious about what it might be like to float aloft in something that has a mass of seven tons, but might touch down "weighing" as little as 800 pounds. For that, the passengers will pay about \$1,000 a piece for this day's two-hour flight from Moffett past San Francisco International to the Pacific Coast. From there we'll hang a right and fly up the coast to the entrance to San Francisco Bay, across the Golden Gate



**Thanks to the envelope-mounted engines, the highly maneuverable Zeppelin requires only four ground crew members for commercial operations.**

Bridge and Alcatraz to the Bay Bridge, past Oakland and SFO again and back to Moffett. This is all at about 1,200 feet msl at a leisurely 40 knots or so, although we could sprint at up to 67 knots if we needed to.

Airship Ventures plans to offer one two-hour flight a day and multiple one-hour flights for about half the price. The one-hour flights will tool around the Oakland area and not make it out over the bay. Plans are in the works to offer flights out of Oakland-area airports and the wine coun-



Passengers enjoy panoramic views out of the expansive windows. The Airship Ventures flights attract airship aficionados and those just curious about the big aircraft.

try's Sonoma County Airport and other airports in the region. Corporate charters and special events are welcome.

After an airline-style briefing, we are escorted across the ramp to a grassy area as the lumbering ship comes back from its last proving flight. As the Zeppelin settles to the grass, a ground crew member grabs the rope from the nose. Other crewmembers latch a set of portable stairs to the cabin's door and throw bags of weight on board while we climb in two at a time to keep everything in balance. Inside the stand-up cabin, 12 first-class sized airliner seats await us—each placed next to enormous windows. The flight attendant points out the windows up front and in the aft door that open if we want to take pictures. Across the back of the cabin is a curved panoramic window. We fasten seat belts for takeoff and soon float upward, the engine noise and vibration almost imperceptible. At about 100 feet agl or so, we're cleared to move around the cabin and to take in the stunning views.

Of course, I migrate to the cockpit to talk to Fritz Günther, a German pilot on loan to Airship Ventures during start-up operations. Günther is a pilot for the company that operates the German Zeppelin. Alex reports that there are only about 150 active airship pilots in the world and only about a dozen active Zeppelin pilots. Airship Ventures has two pilots, Kate Board and Jim Dexter. Board, who was featured

in *AOPA Pilot's* "Pilots" column in the October 2005 edition, is one of only a very few female airship pilots; Martha King of King Schools being another.

Between radio calls from San Francisco approach, Günther explains how the ship works. Unlike the original Zeppelins and other airships of the 1930s, N704LZ is most different in that it uses helium for lift instead of hydrogen. While the deadly *Hindenburg* fire was fueled by hydrogen, experts now believe that it was the dope on the skin's fabric that mostly caused the 800-foot long ship to burn in a matter of minutes, probably ignited by static electricity. Nonetheless, helium is a more desirable and safer gas to use for lift. While blimps have no structure inside their envelopes—only the pressure of the gas keeps them from collapsing—Zeppelins and other rigid or semi-rigid airships have a structure to support the envelope, allowing them to run at lower gas pressures. The original Zeppelins had a complex structure—you could walk around inside the envelope on catwalks. The modern design is much simpler and lighter. Three longitudinal aluminum keels are joined together with carbon fiber triangles. The whole frame is tensioned by Kevlar cables. The engines, empennage, and cabin are fastened to the structure, but almost no engine vibration is passed into the cabin.

The envelope, which is made of a poly-

## A chance to scratch that itch

Gazing up at a Zeppelin, it's hard not to smile and be wowed by the remarkable aircraft. It's a stunning sight and, for pilots, it causes an itch. What must it be like to fly? Hearing that question a lot, the Halls have recently put together two different pilot experience packages. The first allows up to six pilots to spend half a day in ground school learning about the aircraft and then to spend the afternoon taking turns flying the Zeppelin, with each pilot getting about 30 minutes of stick time and a couple of more hours to enjoy the view. The VIP package is limited to just one or two pilots, allowing for as much as 2.5 hours of flight time. Pricing for the packages had not been set at press time, but more information is available online ([www.airshipventures.com](http://www.airshipventures.com)).

mer fabric similar to that used in space suits, is filled with helium. Inside the envelope are *ballonets*, which are basically sealed bags into which the pilot can pump air—or remove air—by controlling a series of valves in the cockpit. The ballonets are expanded or collapsed to account for changes in helium pressure as the ship climbs and descends and as the temperature changes. In the modern Zeppelins, management of the valves is mostly automated, with a computer monitoring the pressure and other ambient conditions and controlling the valves as needed to maintain a desired pressure. The volume of air in the ballonets can be used to change the center of gravity of the ship. Pumping more air into the forward ballonets and air out of the aft ballonets causes the nose to point downward, for

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example. However, moment-by-moment movement of the ship—climbs, descents, turns—is handled via the use of power, the vector of the propellers, and application of rudder and elevator.

The ship is currently certified for day and night VFR operations. IFR certification is in the works. It is well equipped, with Bendix/King flight displays, dual Bendix/King navcoms, transponder, DME, and ADF. The GPS is an IFR Bendix/King KLN 90B. Another screen provides a digital display of engine parameters. An additional screen shows outlines of the ship and the balance of the ballonets.

Günther says the San Francisco controllers are very accommodating, allowing the ship easy access to the entire bay area.

While Airship Ventures is just ramping up, Alex and Brian haven't stopped

dreaming. They have visions of at least two additional ships deployed to other parts of the country for sightseeing flights, scientific research, air shows, and special events. Expect to see advertising and sponsorship messages to show up on the sides of N704LZ soon. Meanwhile, the Zeppelin company has plans to offer larger and smaller models for various special missions and passenger flights, all using basically the same cockpit configuration.

While airship travel isn't fast, it is most definitely comfortable and provides remarkable views and perspectives not feasible from any other platform. Perhaps some day, we'll go back to the future and Zeppelins will challenge cruise ships for leisure travel. Günther puts it best: "It's one of the best ways to travel—

low, slow, and everyone likes us." **AOPA**

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For more information on Airship Ventures, visit the Web site ([www.airshipventures.com](http://www.airshipventures.com)).

#### INTERACTIVE ►

##### AOPA PILOT ONLINE



Fly along with Editor in Chief Tom Haines in N704LZ, the first Zeppelin to fly in the United States in 70 years, in this online video.

[www.aopa.org/pilot/zeppelinflight](http://www.aopa.org/pilot/zeppelinflight)