AOPA PILOT

**OWNER-ASSIST**
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# PILOT

The Voice of General Aviation
aopa.org/pilot / November 2021 / $8.95

BEARHAWK AIRCRAFT 4-PLACE

## BUILD-A-BEARHAWK

CAPABLE BACKCOUNTRY HIGH-WING FOR THE FAMILY / **P. 60**

NOVEMBER 2021 Bearhawk Aircraft 4-Place / 2021 Gear Guide / Photography Portfolio: Heath Moffatt aopa.org

PILOT

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November 2021

VOL. 64 / NO. 11

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Outfit your hangar or shop with all the tools you'll need from our 2021 Gear Guide. Photography by Chris Rose


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# On your screen

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These and other videos can be accessed in the *AOPA Pilot* Digital Edition and on YouTube.

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## BUILDING A BEARHAWK

When he was looking for an "airplane for the mission," Mark Goldberg found the Bearhawk 4-Place, a Bob Barrows design suitable for STOL and unimproved airport operations. Goldberg set up an aircraft manufacturing facility in Mexico, producing Bearhawk quick-build kits for customers worldwide. ▶ **aopa.org/pilot/goldberg**

A HAPPY CROWD

The first AOPA Aviator Showcase took place in August in Manassas, Virginia. The single-day, consumer-focused event attracted more than 500 visitors and 50 exhibitors.

▶ **aopa.org/pilot/aviatorshowcase**

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Stay up to date with the latest news from the general aviation community in AOPA Live This Week.

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YOU CAN FLY

The AOPA Foundation You Can Fly High School Aviation STEM Curriculum is quickly being adopted at schools across the country, with 322 educational institutions in 44 states using the curriculum in the 2021-2022 school year.

▶ **aopa.org/pilot/ycfstem**

lessons learned from automobile engine manufacture to aircraft engines. One issue I hope Corsair can address is the availability of fuel for such an engine. Most airports, including my home airport, only have 100LL and Jet A. While this is a solvable problem, it could make marketing an engine that runs on unleaded gasoline difficult.

**Joseph Lawler / AOPA 110088**
**Spicewood, Texas**

## Thanks for the wisdom

I have read Barry Schiff's articles and books since 1980, when I became an AOPA member. 23,000 hours and too many years to count later, I want to thank him for his years of great storytelling and wisdom. I wish him many more years of writing. The only other author that comes close is the late Len Morgan of *Braniff* and *Flying* magazine.

**Mark Phillips / AOPA 731234**
**Murfreesboro, Tennessee**

## Little Big Twin

Being involved in a flight school that has a newer P2006T it was nice to read Jill W. Tallman's *AOPA Pilot* review of a "new generation" of aircraft ("Little Big Twin," July 2021). I must, however, say we have found several stumbling blocks with the Italy-based company when it comes to proper technical and parts support with items above the "normal" maintenance.

It would be good to see AOPA do follow up articles on the flight review with a perspective on maintenance support. When the first Diamond aircraft came out the company had a strong stance on technical and parts support; for a flight school or new twin owner that can be a make-it-or-break-it point.

**James Housel / AOPA 730685**
**Winter Park, Florida**

## Hangar Talk /

"I never suspected I'd be helping Bearhawk Aircraft's Mark Goldberg [pictured here] pick cucumbers and tomatoes when I stopped at the kit manufacturer's grass landing strip, warehouse, and ranch near Austin, Texas, to sample the performance envelope of a Bearhawk 4-Place," said *AOPA Pilot* Content Producer **David Tulis.** "And two weeks of downpours heavy enough to prematurely halt the Circuit of the Americas NASCAR race almost kept me there." It was so wet that Goldberg's Ford F-150 pickup became mired in the mud and had to be towed with a tractor. However, a 250-horsepower Lycoming six-cylinder engine in the 4-Place demo aircraft easily launched the short-takeoff-and-landing backcountry tool, as described in **"Capable Homebuilt Performer,"** which begins on p. 60. The Bearhawk 4-Place's cruising speed of between 140 to 150 mph is nearly four times the 40-mph landing speed. "And Goldberg's growing-season tips led to a bumper-crop cucumber, pepper, tomato, and watermelon harvest back in Maryland," added Tulis.

## Errata

In "A Wreck Rises," (October 2021 *AOPA Pilot)* we wrote that Sherwin-Williams created the luminescent paint used on the Turbo Seminole's propeller tips. In fact, Defense Holdings, Inc. (DHI—then Noesis Inc.) was contracted by the U.S. Navy to develop a process for making photoluminescent paint. DHI then partnered with Sherwin-Williams to develop the paint, marketed as AfterGlow.

In "Triumph Out of Tragedy" (September 2021 *AOPA Pilot)* we used the incorrect numeral for the C–141 Starlifter.

*AOPA Pilot* regrets the errors.

We welcome your comments! Send letters to Editor, *AOPA Pilot,* 421 Aviation Way, Frederick, Maryland 21701 or pilot@aopa.org. Letters may be edited for length and style.

I just finished Barry Schiff's article, "Lesson from the Left Seat" in the September 2021 ***AOPA Pilot*** magazine. Very insightful of the knowledge gained being a co-pilot versus a GA pilot. Being strictly a GA pilot, I have not had the opportunity to enjoy this aviators' rite of passage to become a captain.

**Paul Salmonson / AOPA 1481784**
**Cave Creek, Arizona**

# CAPABLE HOMEBUILT PERFORMER

STOL model can be constructed for around $100,000

BY DAVID TULIS
PHOTOGRAPHY BY MIKE FIZER AND THE AUTHOR

Mark Goldberg winced as pebbles from the unimproved runway in central Mexico flicked paint away from the Texan's newly constructed Van's Aircraft RV–8 low-wing homebuilt. He had just landed in Puebla and was eager to greet the family that housed and cared for him when he was a student at the University of the Americas in the 1970s.

During college, the international studies major became infatuated with the area near the Popocatépetl volcano, a three-hour drive southeast of Mexico City. He was impressed with the natural beauty of the highlands, the climate, and the colonial architecture in the state known for introducing the world to mole, the chocolate-based sauce made from poblano peppers.

He purchased property for a home here, and during the ensuing five decades Goldberg visited frequently, participated in family milestones, and considered them his relatives. "They're more like family than my family," he said. Goldberg named his son, Michael Agustin, for the patriarch, Agustin Limon.

He recalled that during visits to the area, "the gravely runway tore up the airplane" that he had meticulously completed with Limon's son, Angel, in 1998.

He was appalled at the damage. This won't do, thought Goldberg. He decided that he needed an aircraft more suited to the rustic environment. While others were pursuing what he calls the "go-fast airplanes" of the late 1990s and early 2000s, he turned his attention to the converse—a little-known but very capable plans-built four-seat backcountry short-takeoff-and-landing (STOL) high-wing called the

Santana, Kansas-based builder Bill Anton modified the cockpit doors of his Bearhawk 4-Place, pictured here. "When you get the nose high for landing, you're basically looking out the side windows, so the lowers provide a better view." The baggage compartment is "huge and amazingly useful" (right). Anton takes off from the Anton Flying UV cattle ranch. He's been working the land since he was 15.

Bearhawk Aircraft 4-Place that he found after doing research in 2000. As a plans-built airplane, the Bearhawk 4-Place remained an undiscovered gem until Goldberg approached designer Bob Barrows about producing a quick-build kit. Goldberg fashioned a factory in his home-away-from-home and instructed his adopted family how to build, run, and supervise an aircraft manufacturing facility in Mexico.

The aircraft, which is simply known as "the Bearhawk" even though it's the flagship for derivatives spanning two to six seats, has since proved so popular that orders are backed up for over a year. Goldberg attributes the increased appeal to the availability of the quick-build airplane kits and the parts kits he pioneered in 2001.

About 200 plans- and kit-built Bearhawk 4-Place airplanes are flying in the United States, Brazil, Canada, Australia, New Zealand, and Europe—and more than 1,700 plans have been sold in the past 20 years. Several Bearhawks have accumulated more than 1,000 hours. About 75 percent of the Bearhawks built have six-cylinder Lycoming O-540 engines and about a quarter of them have four-cylinder Lycomings. Goldberg said the advantages of the Bearhawk line, "apart from how good they fly," is "how ruggedly they're designed and built. The 4130 steel tubing fuselages are quite stout." The all-metal, completely flush-riveted wing is designed by "100-percent old-school mechanical engineer Bob Barrows," said Goldberg, and incorporates a Harry Riblett airfoil, which contributes to docile stall characteristics, gentle slow-speed manners, impressive short field performance, and cruise efficiency. "There's not a round-head rivet in the breeze" to create parasitic drag, he said.

The 2024 T3 aluminum used is the same material found in certified aircraft from manufacturers including Beechcraft, Cessna, and Piper. Some kit aircraft manufacturers use a cheaper grade of aluminum known as 6061 T6, which Goldberg said cost half as much, but is 40 percent weaker. "So, what it means, is that if you use a cheaper material, you can obviously sell your kits cheaper, but you also don't have the serious rugged structure like Bob Barrows designs."

Two oversize cockpit doors make entry and exit easy, and a spacious baggage area opens to an adjacent back-seat door. The rear fuselage accommodates a six-foot loading area. He said the airplane is "larger in every dimension" than a Cessna 172 Skyhawk and compares favorably with utility aircraft including a Maule, a Cessna 180 Skywagon, and a Cessna 182 Skylane.

## Barrows' design

Barrows' no-frills approach to designing aircraft is well-known to homebuilders. The aluminum wing is more efficient than a fabric wing and has a "good, sturdy design," Barrows said in an instructional YouTube video. The single-strut wing exhibits good lift, low drag, and low pitching moments, which contribute to higher

airspeeds than one expects in a utility category airframe of similar design. The fuselage's steel tube frame "has much better crashworthiness and is easy to repair if you get into an accident or something. You may even be able to do some field-repair if you're out in the boondocks and tear up something," Barrows said.

"Now we're making five different models, all designed by Bob [Barrows]," Goldberg said. The two-place tandem Patrol followed the original Bearhawk 4-Place as "a great alternative" to the backcountry do-it-all Piper Super Cub. The next Barrows design was the two-place Bearhawk LSA, which Goldberg said "pleasantly surprised" him with its capability. Two other models round out the line: the side-by-side, two-seat Companion, a derivative of the Bearhawk four-seat fuselage mated to Bearhawk Patrol wings "with some modifications"; and the brawny six-seat Model Five, so named because it was Barrows' fifth airplane design.

The original Bearhawk 4-Place was basically a scratch-built aircraft that appealed to a limited number of craftsmen until Goldberg came along. An import/export career prepared him to suggest to Barrows that they manufacture the aircraft as kits in Mexico using skilled labor from Goldberg's trusted friends. "I would never go to Mexico and hire strangers" to fabricate the aircraft parts, Goldberg said.

A 7,000-square-foot former coffee roasting facility was converted to an aircraft manufacturing facility in Atlixco. In 2001, Goldberg's Avipro Fabricantes produced the first kit at the factory near Puebla, Mexico, and he "kept the ball rolling" employing family whom he trusts and respects.

Angel Limon had previously traveled to the United States. and lived in Austin with Goldberg for more than a year while they constructed the Van's RV–8. Now Angel's two sons, Agustin and Luis, run the factory in Mexico. "I've known the two brothers since they were little kids," Goldberg said.

The operation is meticulous about quality control, Goldberg said. Custom jigs and factory tooling also ensure consistency. As proof he pointed to glassy smooth, burr-free gas welds at a juncture of seven tubes reminiscent of European racing bicycle quality. When comparing the frame materials and construction techniques to a competitor's product, "it would immediately be noticeable that our tubing is much beefier," he said.

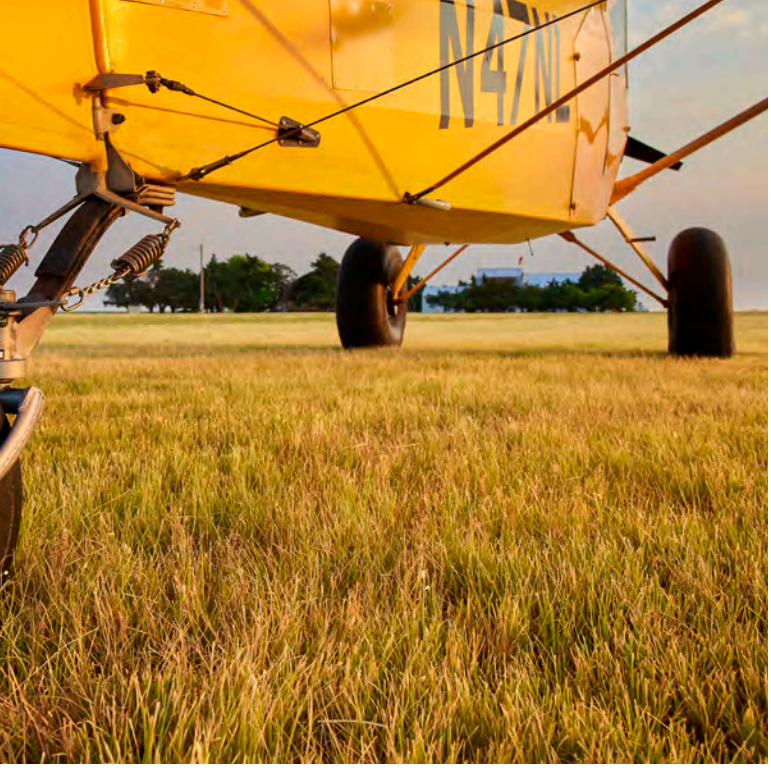
The fabricated and corrosion-proofed aluminum wing spars and ribs are finish-riveted and mated to pressure-tested fuel tanks, and then packaged with a fuselage, tail feathers, flaps, and other components, and transported overland to Texas, five per trailer load. From there, they are dispatched to customers worldwide.

Mild-to-wild engine choices from 150 to 260 horsepower have created a cult following for the capable four-seater. Builders have installed a variety of powerplants, from the familiar four-cylinder 180-horsepower Lycoming O-360, up to a six-cylinder Lycoming 260-horsepower O-540 parallel valve engine. "Once you get a taste of that power and get pushed back in your seat when you take off, it's very impressive, and very exciting," Goldberg said.

The Bearhawk has a useful load around 1,000 to 1,200 pounds; cruises between 135 and 150 miles per hour; lands at 40 mph; climbs between 1,000 and 2,000 feet per minute; and has a range between 650 and 900 miles, depending on the engine and power setting. Gross weight is 2,700 pounds on wheels and with floats attached.

Bearhawk builder and transition training instructor Jared Yates said the control harmony, stall characteristics, and low speed handling in the 4-Place are "exceptional." He said a key attribute is that "you're actually not going to accidentally stall one of these because there are so many warnings. It won't catch you by surprise."

Goldberg said the Barrows designs are unusual and especially useful because they "get on and off quite short"—200 to 400 feet at normal takeoff weight—and "also have surprisingly high cruise speeds. You know, Bob's designs take a lot. They are very rugged. We've fixed almost nothing in 2,000 hours except starters and alternators and some assemblies. Bob's designs are rock solid, and stout as can be."



A 260-horsepower, six-cylinder Lycoming IO-540 engine with ram-air induction and a K&N air filter, a composite MT three-blade propeller, and dual electronic ignition power Anton's 4-Place. A 10-inch full swiveling tailwheel incorporates a pin that pops in for rudder pedal steering. "It works really well and is robust. I haven't bent it yet and I'm not a perfect pilot," says Anton. Bearhawk Aircraft owner Mark Goldberg (above) constantly coaches builders. "If you're willing to ask questions...you'll be fine," he says.

## Kit Number One

Goldberg said constructing the airplane from a fuselage and advanced-completion wing kit is possible for those short on skills but long on patience. He built the example that he calls "Kit Number One" in about 13 months and affectionately named it El Atlixquense (from Atlixco), a tribute to the city where the factory is located.

"The first one isn't the prettiest 4-Place but it's a workhorse," he said during a visit to the Texas ranch near Austin. Two hangars of airplanes and airplane parts share space with a 2,600-foot-long grass landing strip; pastureland dotted with his five sheep and two grazing cows; and a garden with rows of watermelon, cucumbers, peppers, and tomatoes.

Goldberg said that building your own "brand-new airplane that you know inside and out—because you built it—and then taking off and having it fly and it being such a great flying airplane—that's a tremendous sense of satisfaction." A typical Bearhawk 4-Place model can be assembled for between $80,000 to $85,000 up to about $115,000, depending on engine and avionics choices, and may be an attractive option when considering a new, similarly equipped certified aircraft that could cost several hundred thousand dollars more.

Building an airplane from the ground up might seem like a daunting task to those who have yet to open a crate of parts and visualize themselves flying a fully assembled aircraft that they built one fastener at a time. Goldberg's cellphone rings daily with builders asking questions, and he coaches them through the nuances of home-building. Goldberg is keen to encourage others to pursue home-building for the sense of accomplishment and for the knowledge gained learning about every system, fastener, and component. "If you're willing to ask questions, and not just drill holes before you know what you're doing, you'll be fine," he said. "Most of the people buying our kits have never built an airplane before. It's awfully fun, and when you're in the airplane itself, it's even more thrilling. It's a satisfaction you don't really understand until you've done it." ■ *david.tulis@aopa.org*

**WHEN COMPARING THE FRAME MATERIALS AND CONSTRUCTION TECHNIQUES TO A COMPETITOR'S PRODUCT, GOLDBERG SAID "IT WOULD IMMEDIATELY BE NOTICEABLE THAT OUR TUBING IS MUCH BEEFIER."**

## SPEC SHEET

### Bearhawk 4-Place

Quick build wing and fuselage kit—less engine, avionics, paint, upholstery / **$51,000**
Typical cost / **Between $80,000 to $85,000 up to about $115,000, depending on engine and avionics**

**SPECIFICATIONS**

Powerplant options / **Lycoming O-320/O-360, 160 to 180 hp; Lycoming O-540, 260 hp; Continental O-470, 230 to 260 hp**
Wingspan / **33 ft**
Wing area / **180 sq ft**
Cabin width / **42 in**
Empty weight / **1,150 to 1,550 lb**
Max gross weight / **2,700 lb**
Useful load / **1,150 to 1,550 lb**
Fuel capacity, std. / **55 gal**
Fuel capacity, w/opt tanks / **72 gal**

**PERFORMANCE**

Takeoff distance, ground roll / **200 to 500 ft**
Rate of climb, sea level / **1,500 to 1,700 fpm**
Cruise speed (260 hp) / **160 mph true airspeed at 75%**
Cruise speed (180 hp) / **135 to 140 mph TAS**
Range / **650 to 900 miles**

**LIMITING AND RECOMMENDED AIRSPEEDS**

$V_X$ (best angle of climb) / **70 mph indicated**
$V_Y$ (best rate of climb) / **85 mph**
$V_{NE}$ (never exceed) / **175 mph**
$V_{S1}$ (stall, clean) / **52 mph**
$V_{SO}$ (stall, in landing configuration) / **44 mph**

Owners' forum: ▶ **bearhawkforums.com**

*All specifications are based on manufacturer's calculations. All performance figures are based on standard day, standard atmosphere, sea level, gross weight conditions unless otherwise noted.*

A Dynon SkyView HDX1100 touchscreen PFD with autopilot, a Garmin G5, and a Garmin 430W GPS/nav/com provide for potential flight in instrument conditions. Anton credits Crotts Aircraft in Dodge City, Kansas, for the completion help.

# Flying a Bearhawk 4-Place

I was introduced to the performance of a Lycoming 250-horsepower model by Charlotte, North Carolina-based airline pilot, Bearhawk 4-Place builder, and transition training instructor Jared Yates.

Despite a two-week deluge that mired Bearhawk Aircraft owner Mark Goldberg's Ford F-150 pickup, the 4-Place demo's tailwheel raised almost immediately with applied power and the main gear jumped from the Texas muck in about 10 seconds. A 10-degree climb angle at 100 mph launched us at 1,500 fpm.

Attention to rudder is paramount in an airplane that looks like an oversized Piper Super Cub but may hide 100 additional horsepower under the cowling. Pilots used to flying with their feet on the floor should get them in the game to counteract the airplane's adverse yaw.

My nosewheel-Cessna-familiar feet went to work leading turns with a hint of rudder. A touch of elevator trim from the overhead trim wheel helped maintain altitude during steep turns near Goldberg's grass airfield, Flying G H Ranch (9TE7).

The aircraft was quick to respond to pitch and roll input and the forces were lighter than those of a Cessna 182. Although the sight angle over the nose in straight-and-level flight tricked me into thinking the aircraft was descending when it wasn't, it provided exceptional visibility. The 42-inch-wide cockpit is 6 inches more spacious than a Skylane and allowed some breathing room between me and Yates. The seating position was comfortable, and the aircraft was as easy to climb into as it was to exit.

During power changes the thundering six-cylinder Lycoming O-540 in Goldberg's demo airplane demanded some pitch attention but the aircraft felt solid, secure, and lacked unwanted surprises.

The Bearhawk clawed toward the Texas clouds and some rudder pedal dancing kept us coordinated while I climbed through a steep pitch attitude at 40 mph. Yates suggested we avoid full power during the power-on stalls because the pitch angle would become "so extreme." Control forces remained tight and confidence-inspiring.

Yates said stall recovery would be simple, "stick forward an inch and you'll recover." He was correct—slight forward stick at the break led the recovery with an altitude loss of less than 100 feet and little drama.

Honestly, I was having such a fun time controlling the aircraft—and the power available to me—that I neglected to note the attitude indicator before the stall break. However, the sight picture was significantly past prudent and eyes outside to maintain control was the name of the game.

In landing configuration or in slow flight there's not as much aircraft pitch change during flap deployment as I'm used to in a Cessna 182. When deploying 20 degrees of manual flaps the aircraft slowed down considerably and the control forces remained as harmonious as they were in cruise. A Cessna 182 has a significantly heavier elevator feel in the landing configuration and also requires a couple of rolls of elevator trim. Conversely, trim adjustments to set up the Bearhawk 4-Place for landing were quite small.

A power-off stall was benign—and sort of a mush. Pilots feel a touch of buffeting before forward stick reduces the angle of attack and the airflow reattaches to the wing. Yates said that "it's hard to get a good stall break at idle power, absent the airflow induced by prop wash."

He cautioned that flying any taildragger requires a certain amount of specialized skill. Pilots transitioning to the Bearhawk should learn the sight picture and get familiar with the handling characteristics, but it doesn't require a lot of stick and rudder training because it's "such a well-mannered aircraft." He said most pilots spend the first 30 to 45 minutes on air work and handling, "and the rest of the time it's takeoffs and landings to master the tailwheel directional control."

I reluctantly relinquished the flight controls to Yates on short final because of the quagmire ahead but followed through lightly on the stick to get a feel for the landing. He plopped us down in a three-point position, stopping in about the same 200 feet as the takeoff distance. *—DT*

RISK MANAGEMENT /

# Flying low, safely

## Thoughts from AirCam designer Phil Lockwood

BY DAVE HIRSCHMAN

**LOW FLYING AND** safety may seem contradictory—but AirCam designer Phil Lockwood said he designed the open-air twin to do both at the same time.

"We fly to have fun, and the AirCam is purely about fun," said Lockwood, whose Florida firm has delivered about 300 of the two- and now three-seat kit airplanes since the 1990s. "The question is, how do we maximize fun and minimize risk?"

Lockwood is no stranger to high-risk flying. He piloted ultralights with notoriously balky two-stroke engines with wildlife photographers over remote parts of Africa for many years. The idea for the AirCam came out of a National Geographic assignment that required many hours of flying a few feet over the treetops of a sprawling rain forest where the odds of surviving a forced landing were slim.

"When I was flying single-engine airplanes in Africa, I accepted the risk," he said. "The only way to minimize risk was to minimize the time of exposure. That's just the way it was. But I wanted to do more."

The twin-engine AirCam allows pilots to climb at full gross weight on a single engine in any configuration. Just power up and center the ball on the inclinometer. The AirCam can even take off from a standing start on one engine.

But two four-stroke engines, excellent forward visibility, and low speed haven't eliminated risk—and AirCam pilots have struck powerlines and other obstacles, sometimes with fatal results.

At an annual AirCam gathering in coastal Georgia, Lockwood implored all pilots—not just those flying AirCams—to carefully scout out areas where they intend to fly low. His advice seems relevant to the growing number of pilots flying short-takeoff-and-landing aircraft in remote or wilderness areas—a tougher task since virtually all of the Super Cub-style STOL aircraft are single-engine airplanes with higher cruise speeds and less forward visibility than AirCams.

First, Lockwood says pilots must overfly low-flying routes at a safe altitude to find hidden obstructions; identify entry and exit points and stick to them; consider sun angles that can make obstacles harder to see, and make sure the chosen routes are unpopulated, legal, and won't bother anyone.

"Powerlines can be nearly impossible to see," Lockwood said. "Look for the poles, and rivers and valleys are the worst because those are the places powerlines are most likely to be."

When you spot powerlines, cross them at the poles which are easier to identify and define their high points.

"Once I've cleared an area, I'll go right down on the deck," Lockwood said. "But I only do that in areas I've reconned and know to be clear, legal, and considerate."

FAA regulations require pilots to stay at least 500 feet away from any person, vessel, or structure, and 1,000 feet above to 2,000 feet horizontal distance from buildings, bridges, or other objects. But Lockwood told pilots that's not enough. They should be thoughtful as well as legal.

"If I see a boat, I'll turn to avoid overflying it even if I'm a legal distance from it," he said. "It's the right thing to do."



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