W R E N N E W S L E T T E R

Dave Neumeister, Publisher
5630 South Washington Road
Lansing MI 48911-4999

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Dear Wren Pilot-Owner-Dreamer:

Please consider a Wren Newsletter Subscription. Publication began in 1986 and is very irregular, due to the extremely low numbers in the U.S. <less than 12 known>.

What It's About

The Mission of the Wren Newsletter includes: (1) Publishing WREN Owner & Pilot submitted reports and questionnaire results (form over), (2) Providing subscribers with the address and phone of pilots making published reports in order to offer a vehicle for direct pilot to pilot communications, (3) Service difficulty Reports for the Wren, (4) WREN Accident Reports, and (5) Other information of interest to pilots and owners.

Please consider completing all or part of the questionnaire on the other side. The information is printed in the Newsletter. Typing or printing of your questionnaire response appreciated, should you choose to answer (it's optional).

Your publisher specializes in using information form the sources noted above, and can refer your specific questions to others. He is no expert on the WREN.

The Newsletter is starting a Form 337 file. If you have had an alteration or STC installed, please send in a copy of the paperwork.

Publications

AIRCRAFT NEWSLETTERS publishes Newsleters for: **STOL:** Arctic, Beaver/Otter, Helio, Maule, Norseman, Porter, Rallye, Varga, Wren. **High Performance:** Arrow, Malibu, PA-32, TB-Series <Aerospatiale>. **Twin:** Aztec, Baron, 310/320/335, 336/337, Duchess, Seminole, Seneca. **Sport:** AA-1, AA-5, Varga. **Economical:** Musketeer, Skipper, Tomahawk. **Future:** GA-7, Husky, Wilga. Sample: #10 SASE or call.

Dave Neumeister, Publisher

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For Owners & Pilots

Results published, all optional. Phrase answer so reader understands context. Rambling on encouraged. Please remember to put name, address & phones on response.

1. Year Manufactured____, Year Purchased____, Cost_____, Model_____. Registration Number_____, A/C Serial No._____; Engine Type_____, HP_____, Serial No._____, Prop Make_____, Model_____, S/N_____. Problems. Estimated per-hour operating cost_____

2. Number prior owners____ TTAE_____ Your TT_____ Wren Time_____

3. Name, Address & Phone of good mechanic. Recovery expert? Overhauler? Painter? Tire sizes. Toe-in problems? Corrosion at battery or near float attach points?

4. What item(s) cost most in terms of one-time maintenance? (logbook photocopies very helpful). What types of repetitive maintenance have cost the most and/or been irritating?

5. Problems you've encountered peculiar to this aircraft. Comparisons with other bush aircraft appreciated.

6. Insurance (?) carrier's Name, Address, Coverage, Limits & Premium.

7. Aircraft's Empty_____ & Gross Weight_____, Best climb light_____ & heavy_____, Highest MSL field attempted_____, Shortest landing_____ & takeoff_____ over obstacles. Airframe problems? Memorable flights?

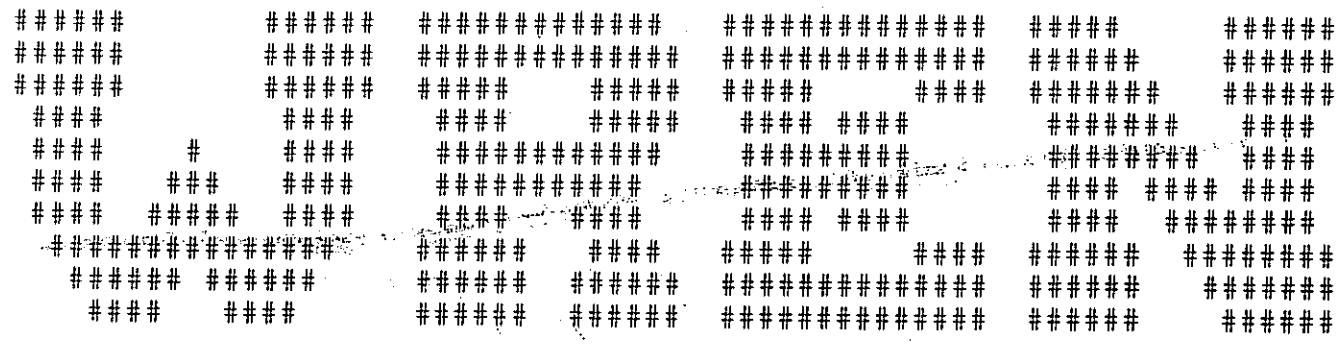
8. Avionics (make & model, with A-B-C-D-E rating for each): How often was each "repaired", who does good work?

9. Describe Experience with: Emergencies, Bush Flying, Tundra Tires, Skis, Floats, Banners, Fish Spotting, Glider Towing, etc.

10. Maximum Crosswind attempted?_____ Technique: Slip all the way, Crab then slip at last second, etc. Gear problems?

11. Part turnaround? Where ordered? How did you learn about Wrens?

12. Aircraft improvements you've made. Hangar flying. Rambling encouraged. If you can photocopy an article about Wrens you could donate to the library, it would be appreciated.



N E W S L E T T E R

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David E. Neumeister, Publisher Issue 1

October, 1986

Gary Glassmeyer reporting on the **Wren 460.** The Wren 460 is the kind of airplane you visualize when you are dreaming that you are flying. You are tucked under the covers warm and cozy, and your mind begins to drift. You're no longer aware of the real world around you. Somehow, you have obtained the abilities of a bird. There is no fear of stalling or spinning. You can approach, land, and take off on incredibly small patches of land.

Your dream goes on. You find yourself landing on back roads, in fields and pastures. On an approach to a 400 foot clearing; you find yourself high and fast. You can't make it. But it's no problem -- a small amount of power and you are climbing skyward with the flaps fully extended.

After a go-around in a very small pattern, you give the approach more careful thought. This time everything is perfect. And with a small breeze on your nose, you set down in about 150 feet.

* * *

Now as your mind creates a scene that casts you as a mighty eagle in search of prey. A very choice mouse is spotted at the tip of the shadow cast by a hugh grain silo. You maneuver into a position that puts the sun to your back and into the victim's eyes, a la Clint Eastwood. Then you approach the silo with about one-half wingspan of clearance and minimum airspeed.

Upon crossing the top of the silo, you spot your target and aim straight for it; with the propeller in reverse thrust and full flaps hanging out. With your nose up slightly above the horizon, and with only a bit of forward thrust, you sink your talons into the victim and fly away.

Continued On Page 2

This kind of flying is not a dream. It is real. If that silo were a 500-foot obstacle (not 50, 500); you could clear it and roll to a complete stop within 1,000 feet of its base. Some 1,800 hours of flying a **Wren 460** on a daily basis have given me some of the privileges of a bird and the load carrying capability of a pickup truck.

What is even better, is that the Wren is wrought from one of the world's most reliable and popular airframes, the **Cessna 182. (Ed. Note:** According to work done by **Aviation Safety,** the **Cessna 182** was the safest aircraft ever built to fly in. Fewer accidents, fewer fatals; per 100,000 flying hours than any other aircraft. Period.)

* * *

There are no changes to the engine, but the wing is extensively modified to make a **Wren.** There are 1,064 parts added to the **Wren 460,** which boost the empty weight by about 100 pounds. None of these extra parts requires high technology to fabricate; and they could be repaired or duplicated by a competent mechanic in the field.

These parts are 'over-designed' for strength, and are very rugged. It is reported that only 3 replacement parts for the **Wren** were sold during a period of 15 years.

* * *

Flying the Wren 460 is much like flying two different popular airplanes. With the full-span, double-slotted flaps fully extended, it's like being in an **Arctic, Maule, Super Cub,** or **Taylorcraft.** The main difference is that the stall of the **Wren 460** is more gentle and controllable. With the flaps up in cruise, it is like an everyday, load-hauling **Cessna 182.**

The most outstanding feature of the Wren 460, is the pair of full-span, double slotted flaps. Fully extended, they increase wing lift by 87% -- that's about like having a 60-foot long wing. Imagine the performance of a 230-hp, four-passenger powered sailplane!

Tied into the flap extension system, is an elevator trim system. Jack screws are used to move what normally is the fixed horizontal stabilizer. This feature nearly eliminates the need for the fast trim changes that otherwise would be required when changing from fast cruise with the flaps up, to slow flight with the whole shooting match trailing in the breeze.

There is nothing complicated about this automatic feature. In fact, it uses parts from a **Cessna 180** trim system. Consequently, replacement parts are available the world over.

Continued On Page 3

In order to get rid of the hugh amount of lift that still is being generated at touchdown speeds, **Wren** provides a button on the control wheel that retracts the flaps. Pushing this button immediately before the main gear touches, allows the weight of the airplane to settle on the wheels for maximum braking effectiveness.

Tires on a Wren can last more than 1,000 hours, providing you don't forget to get rid of all the flaps before standing hard on the brakes. Stalling speed is so slow, that you might try applying the brakes while the wing still is carrying the load. This results in grinding rubber off the tires, if you are landing on a paved runway.

* * *

Many manufacturers have added a relatively low cost leading edge cuff to their aircraft, to improve slow-speed performance. The leading edge modification contributes the most with the least cost and effort. The **Wren 460** has a leading edge cuff that is tapered; it is more pronounced as you go down the wing toward the tip.

This causes the stall to begin at the inboard end of the wing, and move slowly toward the tip, as the angle of attack is increased. The **Wren** retains full roll control, and can even climb with the inboard part of the wing fully stalled. To transition from a touchdown configuration, to a go-around configuration requires only a partial opening of the throttle.

* * *

About this far along, in the description of a Wren 460 to a group of pilots; some foolhardy taildragger pilot usually will step in and say that he knows of a certain conventional landing gear airplane that can do almost as well. All it takes to shut him up, is to ask him to show you how the taildragger will perform in a 30-knot crosswind, or while taking off and landing in six inches of sticky mud; or better yet, making a landing in zero-zero conditions.

Wren designers put an extra rugged nose gear on the airplane. It is one of the few aircraft that is capable of landing safely with no visibility, and no ceiling.

The very large tires make pretty good floats when operating out of thick mud. One day, when the rain had been driving down hard for hours, Gary headed out to his clay runway. The mud reached about a third of the way up the 18-inch diameter tires. Water was over the axles, and the propeller was sucking up muddy water and covering the windshield.

Gary could not see out the front. These circumstances would ground most airplanes, but in fact; proved to be of little consequence to the Wren.

Continued On Page 4

Because the takeoff distance is so short, eyeing the directional gyro on takeoff was all that was necessary to keep lined up with the runway. For fun, Gary decided to leave it on the ground awhile to see what terminal velocity through the mud would be.

37 MPH was all she could do. But 30 MPH was all she needed. A pull on the yoke shot the **Wren** into the air, and almost immediately; the driving rain washed the muddy windshield clear. A feeling of wonder filled Gary's chest, as it still does today when Gary thinks about the capabilities of this amazing bird.

* * *

Unlike other STOL planes, no special techniques are needed to get the **Wren** to perform. You simply shove in the throttle, and when the airspeed reads 30 mph, you rotate abruptly, and hold it in a climb. The secret to the **Wren's** design is its set of high-lift, full-span, double-slotted flaps.

You don't have to hang in on the prop like other STOL ships. Climb and approach are done in nearly a level attitude. That way, if your plugs foul, or a little water or ice get in your carburetor, you don't wind up in a tail slide.

This level climb, cruise, and approach attitude is a very important safety consideration. Visibility in many airplanes is poor on climb. Because full flaps are used during takeoff, the nose of the **Wren** is pitched down to give excellent visibility. Cooling is a serious problem with many STOL designs, because of high angles of attack needed to maintain slow flight. Many **Wrens** have been used for years of continuous slow speed patrolling with no problems.

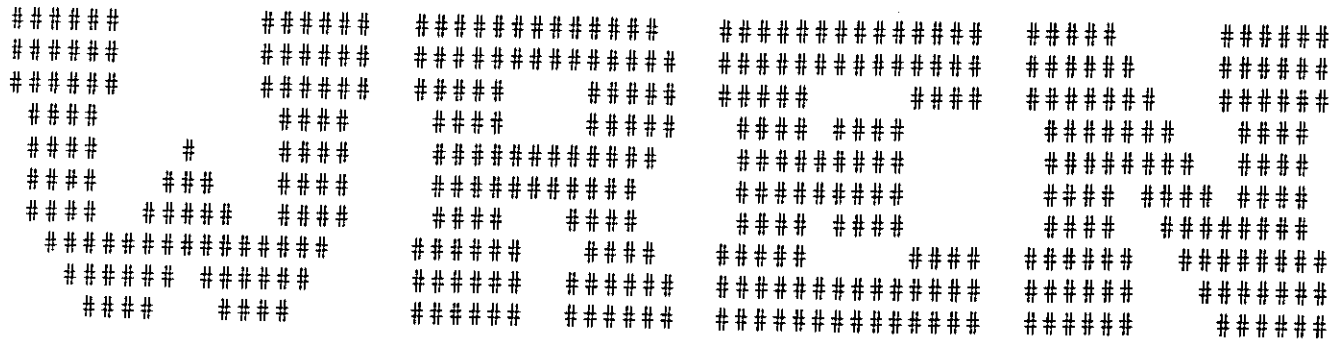
* * *

Gary related that one day, as he was flying to work, he came upon the **Goodyear Blimp.** Gary was early, so he decided to have some fun. Gary slowed down the **Wren,** and dropped full flaps. At an airspeed of about 40 mph, he assumed a position on the right side of the hugh blimp. He came up slowly from behind and slightly below the pilot's cabin.

As Gary passed the tail of the ship, he could see that the rudder was painted in red, white, and blue. The identification number was **N4A,** named the **Columbia.**

As Gary approached the cabin of the blimp, he slowed down to about 35 mph to take a good look. He could see the captain rubber-necking to take a second and third look at the unidentified flying object that had invaded his air space.

Continued In Issue 2



N E W S L E T T E R

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David E. Neumeister, Publisher Issue 2

January, 1987 Page 1

Norman K. Christie, 1810 Bel Aire Drive, Glendale, California 91201. Home: 818 241-7598. Work: 213 977-6639.

Dear Dave, I note your announcement in **Trade-A-Plane** regarding the **Newsletter.** I don't own a **Wren** yet, cut I am shopping for a **460P.** If there are any reported for sale that you know of, please have the seller contact me directly.

* * *

Todd Peterson, President; Advanced Lift Systems, Inc.; Route 1, Box 1003, Eloy Municipal Airport, Eloy, Arizona 85231. Phone: 602 466-3122.

Ed. Note: Todd sent along some information on his **260SE/STOL,** which is essentially a **Wren** without the fancy stuff. It has a 260 hp engine; with the forward Canard. I've attached copies of his flyers inside the **Newsletter.** Todd was one of the builders of the original **Wren 460P.** He now has this business.

Jim Frazee, 2045 North Gentry, Mesa, Arizona 85202. Phone: 602 844-8504; is trying to get the **Wren** production going again. If you're looking for a used **Wren**, Jim would be a good first stop.

Article Continued From Issue 1

'To make my adventure complete, I sped the **Wren** up, dropped about 300 feet, and flew a circle under the belly of this magnificent flying whale. The turning radius of the **Wren** is only 250 feet, so you can imagine the spectacular view.

'From a position behind, and underneath N4A, I built up to maximum cruise speed, and after safely passing the nose of the craft; I did a sharp pull-up at about 2,000 fpm initial rate of climb.

Continued On Page 2

'Most airplanes have one, two, or sometimes three rudders. The **Wren** has 11 rudders! Only one is where you might expect to find it, pivoting on the trailing edge of the vertical stabilizer. There are 5 more on the top of the left wing forward of the aileron, and another five on the right wing.

'These rudders were named **Wren's Teeth** by some character who must have thought they were as rare as hen's teeth. They are connected to the ailerons, and during slow flight, the teeth deflect broadside to the airstream ahead of the up aileron. The more the aileron is deflected, the more the teeth turn toward their maximum deflection of 60°.

'These teeth introduce a drag which offsets the adverse yaw created by the down aileron on the opposite wing during slow speed turns. The teeth on the down aileron side remain streamlined. The teeth move only in slow flight operation. At cruising speeds, they remain feathered into the airstream.

* * *

'A canard elevator and stabilizer are mounted immediately behind the propeller, and utilize the high energy of the propeller blast to provide additional pitch control in slow flight. Additional lift provided by this canard gives the **Wren** another 100 fpm rate of climb. This canard is so effective, that the nose wheel can be lifted off the ground in less than 30 feet during the takeoff roll. This can be useful in some applications, but because most of the maintenance of this aircraft centers around the engine, the canard is somewhat a nuisance. Many of these control surfaces have been removed by operators who decided they were not needed.

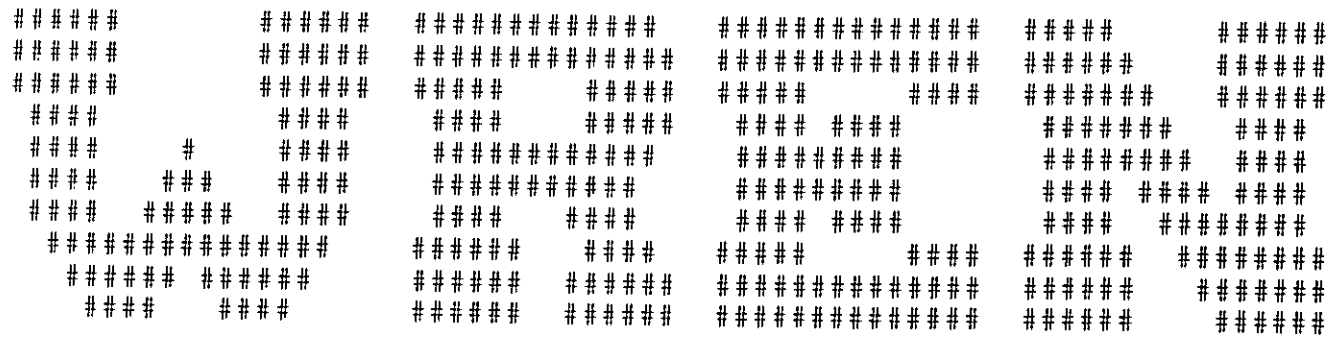
'One of my more memorable experiences in the **Wren** occurred in Vacaville, California; at the Nut Tree Airport. There often are very strong crosswinds there, and such was the case on this occasion. Not only was there a direct crosswind as I approached the runway, but it was gusty and turbulent, too.

'I aborted the first approach. On the second attempt, I had a good chance of getting down in one piece, but had to go around again to make room for a brand new **Mooney** just ahead of me. As I looked down on him, I saw his left wing drop abruptly, dig into the runway, and throw him into a ditch on the left side.

* * *

'What a terrible shame, I thought. I hope no one is hurt; I'm really going to have to work at this landing. My own landing was uneventful. The **Mooney** pilot had a severe case of broken pride, and considerable frustration, but was unhurt otherwise. The wind perpendicular to the runway was measured between 45 and 55 knots. I decided to tie down for the night and visit a friend.

Continued On Page 3



N E W S L E T T E R

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David E. Neumeister, Publisher Issue 3

April, 1987 Page 1

David Simonson, 3835 Baker Road, Minnetonka, Minnesota 55343. Phone: 612 938-7734.

Dear Dave, I do not own a **Wren** yet. I now own a **Beech Sierra** C-24 R-200.

STOL aircraft are my style. I have 2 farms in North Dakota, and having to land at airports is inconvenient.

* * *

Bill Ellis, SR Box 370, Gakona, Alaska 99586. Phone: 907 822-3426.

Dear Dave, I do not own a **Wren** yet; however, I hope to in the near future.

Have talked to Mr. Arthur Frazier about being the **Alaska** dealer for the **Wren 460P**, when he goes into production for them.

However, if any of the readers are aware of where one of the older models is for sale, I would be very interested in it.

I've been flying in Alaska over 30 years, and am an A.I. for the F.A.A.. Good luck with the **Newsletter.**

* * *

If you're looking for a Wren, or a similar craft now in production called the 260SE/STOL, I'd recommend the following:

Wren: Jim Frazee, 2045 North Gentry, Mesa, Arizona 85202. Phone: 602 844-8504.

260SE/STOL: Todd Peterson, Advanced Lift Systems, Inc.; Route 1, Box 1003, Eloy Municipal Airport, Eloy, Arizona 85231. Phone: 602 466-3122.

Article Concluded from Issues 1 & 2

The next day, the wind was even greater. It was blowing from between 50 and 60 knots. I loaded the baggage and, while doing the preflight; kept wondering how I was going to get the airplane safely into the sky.

The Sunday morning airport bums were starting to assemble around my airplane as I climbed inside. About 8 of them were holding on to the wingtips, as if to help me taxi out to the runway. I was still very confused as to what to do in this situation.

The Wren was faced directly into the wind at its tie down spot, and as I started to turn out, a gust blasted the rudder and turned me straight into the wind again.

* * *

A glance at the airspeed indicator started me thinking. I lowered the flaps to their maximum 30° position and motioned to those holding onto the wings to let go. I moved the throttle forward, eased back on the elevator, and looked straight down as my helpers disappeared directly **below** me.

The Wren was rising straight up at 1,000 fpm. I will never forget the sight of all those wide-open mouths and the craned necks of those fellows looking up in disbelief.

Moments later, someone came through on 122.8 saying ". . . Nut Tree traffic, this is Cessna 7-8-7. I have ... uh ... uh ... what appears to be an airplane going straight up in sight."

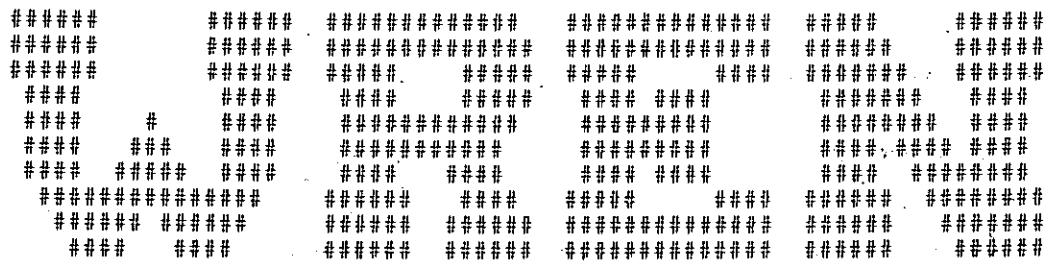
* * *

Although I have found no direct substitute for my instrument rating, I certainly was able to get along without it for an extended period of time, because the **Wren's** outstanding scud-running capability. Sneaking under overcasts and making tight turns to get out of traps is quite easy with the **Wren.**

The pounding turbulence that often is encountered during such escapades is softened considerably as a result of the slow airspeed obtainable with this bird.

As a test, I overloaded the **Wren** by some, and this time it took off in 400 feet, rather than the usual 270. Compared to other STOL planes, the **Wren's** operating costs are quite modest. It uses 12 gph of 80 octane fuel at 55% power. At an economy cruise speed of 115 mph, it burns 8 gph; and for slow-speed patrolling using 20% power, it uses only 5.3 gph.

There is only one more thing that I can say about the **Wren.** Although it is difficult to express (you have to fly one awhile to appreciate it), it has to do with the incredible peace of mind, the confidence and the constant sensation of amazement that this machine gives you. Fly one if you ever get the chance. Article written by **Gary Glassmeyer**



N E W S L E T T E R

Issue 4 David E. Neumeister, Publisher July 1987 Page 1

5630 South Washington, Lansing, Michigan 48911-4999 517-882-8433

* * *

Attorney Jack McManus, 4136 Rutland-Dunn Road, Oregon, Wisconsin 53575-2412. Phone: 608 257-7103.

Dear Dave, I have a 1965 Wren; purchased in 1985 for $73,000. **N-460JM** is Serial Number 182 56776. Has the Continental O470R rated at 230 hp, Serial Number 133457-6-R. Slow, slow, slow! I have 5,800 hours, with 150 in the Wren.

Don's Aero, in Reedsburg, Wisconsin; phone: 608 524-2620 does my mechanical work. I use the 8.00 x 6 on the mains, and 6.00 x 6 on the nose. Mechanically the aircraft has not made any demands to date.

* * *

Empty weight is 1,927, and my Wren has a useful load of 872.8 pounds. 60 mph is the best climb speed. Under all loads, I can clear a 50 obstacle in 300 feet.

Avionics include KMA 24, KX 155 with KI 209, and another KX 155 with KN 72. KT 76A Transponder, KR 86 ADF, KCS 55A, KA 52, D-12v, SPA 400, WX 10A, S-TEC AP. I'd rate them all A.

Crosswind component is 15 knots, but I've done 35 knots. I crab then slip at the last second. Only can get 125 mph out of the plane at 75% power. Too slow, too slow.

* * *

Ed. Note: Richard W. Jaeger, of a local Oregon, Wisconsin paper; did a nice article on Jack that is published below. The copy that Jack sent me had no Paper Name, Date, or Page Numbers. It is reproduced here. The entire article should be understood to be in quotes.

Oregon. Add "Soldier of Fortune to Jack McManus' list of exploits. This colorful Dane County lawyer, tanned and weary; is back from five weeks in Central America. There, he flew a medical rescue plane for the Wings of Hope, Inc. Hope is a volunteer humanitarian organization that is headquartered in St. Louis, Missouri.

For those who know McManus's forceful courtroom tactics and outspoken approach to life, his adventure comes as no surprise. According to McManus: "The spirit of adventure is natural for me. I like to think of myself as a soldier of fortune, ready to go anywhere at anytime to help the oppressed." Jack related to this reporter as he was leaning back in his chair, drawing a puff on his crooked Irish meerschaum.

"I'm no bleeding heart. You know that. I also am not into arms and ammunition, so this work gave me the chance to have the challenge of adventure, and to do some good for those in need," he added.

Continued On Page 2

The oppressed and needy in this case; were the natives of Belize. They were the injured, the pregnant, and the sick from the island jungles of the former British Colony on the eastern coast of Central America.

The mission for McManus, was to fly the Wings of Hope's six-passenger, single-engine Cessna 206 into those jungles, and transport the injured and ill; to the country's only hospital. The hospital is located in a wood-frame barracks in Belize City. Jack also flew medical supplies and personnel into the jungles, and into neighboring Guatemala.

It was strictly a voluntary, no-pay, no-reimbursement job. A one-man, one-plane, around-the-clock operation. "That may sound a bit overwhelming, but it's not as big as it sounds. We are talking about a small country, only 200 miles long, and 65 miles wide. About the size of three of our Wisconsin counties;" McManus said.

* * *

"However, you have to remember that we're talking about primitive conditions down there, none of this big-city municipal airport stuff;" he added.

Most of the airstrips where McManus put his Cessna down, were just that; strips of hard-packed soil, cut out of the jungle trees. Even his home base at San Pedro, on the island of Ambergris Cay; had only an asphalt-and-soil runway.

The 58-year-old lawyer-pilot is used to those conditions, however; which is one of the reasons he was accepted for the job.

"They were looking for a bush pilot, and you could call me that. I've put my own planes down on some pretty rugged soil in the backwoods fishing camps of Alaska; and in the Caribbean", McManus said; pointing to various photographs of some of those ventures on his office walls.

* * *

He once owned a resort in the Cayman Islands, in the Caribbean where he dodged palm trees to land his planes. Even the airstrip outside his rural Oregon office is nothing more than a swath cut out of a cornfield. He calls it the Hoonch-Na Shee-Kaw Airport; which is the Winnebago Indian term for Big Bear Standing Alone.

"I did a lot of seat-of-the-pants, dead-reckoning flying on this mission; because of the unpredictable weather. Squalls would pop up at any time, when the warm air from the sea blew inland to the mountains.

"I spent many days hopping from airstrip to the other, sitting there, waiting for the weather to clear. We had to fly no matter what. The sick and the wounded don't wait," McManus said.

* * *

"It was fun", he added, shrugging and grinning. McManus' perchant for flying goes back to his days in the Marines in China from 1945 to 1948. He worked as a courier, and was taxied about the Asian continent "by some pretty slick flyers."

"When I got out, and went to college on the GI bill, I decided to learn to fly. I almost made that my career rather than the law," he said.

McManus now owns five airplanes. He has logged 5,800 hours of flying time, and holds three classes of licenses, including multi-engine.

Continued On Page 3

Even his law office has the trappings of his aviation background, right down to the glass-topped coffee table that sits on a 450 horsepower Pratt & Whitney radial airplane engine.

The flying part of his month-long stint wasn't the only adventure to capture McManus' interest. The work he was doing, and the people he met also provided some new experiences.

"I have a great admiration for the medical people down there. They are working with primitive resources, but doing a great job with what they have," McManus said.

* * *

Although most of his flights were normal illness cases, he did have a couple of exciting medical evacuations. One was a man who had been shot in the stomach.

"I don't know who shot him, or how. I didn't want to ask; because it wasn't my job. All I know is that he was a real problem; kicking, and fighting; as we loaded him into the plane. I had to stop just before takeoff, and strap his legs down," McManus said.

"I really couldn't blame him for not wanting to sit still. They had slapped a big bandage on his gut. He was bleeding, and his innards were hanging out," he added.

* * *

Belize and the rescue flying he did, will probably be the closest "Flying Jack" will come to fulfilling his adventurous dreams of being a soldier of fortune.

"Belize City is today's city of intrigue like Seoul, Tangier, and Casablanca were in the past," McManus said. "It is a very cosmopolitan seaport, with many foreigners of varying backgrounds.

"English is the main language, but some speak Spanish, and a native Mayan is also spoken. That was no problem for me, because I know a little Spanish", McManus said. Belize City also is very dangerous to the point that you don't dare to go out after dark."

Will he go back?

"You bet. Probably this fall or winter, as soon as I can set a month of time aside from my practice. Now that I'm a widower, and my family is grown; I can take the time to do something like this. Call it a service to God and my Country," he said; his eyes twinkling.

* * *

Greg Milnar, 2114 Burma Lane, South St. Paul, Minnesota 55075. Phone: 612 451-1136.

Dear Dave, Enclosed is an article from the September 1963 issue of Popular Mechanics. The magazine cost 35 cents then. Ed. Note: The article is reproduced here. Mentally make quote marks around the entire article.

* * *

Take off at 30 mph. By Kevin Brown. The Wren cruises, hands off, at 26 mph. turns at 30 without losing altitude, and finally, lands on a silver dollar.

The easiest thing to report about the remarkable Wren, is that everything they say about it is true. Its specifications sound like a press agent's puff; but in a flight lasting more than one hour, Popular Mechanics found that none are exaggerated.

Continued On Page 4

The New Wren, a made-over Cessna 182; includes forward canard for pitch control, 'teeth' on upper wing for control in low-speed turns, huge double flaps, and a drooped leading edge on the high wing.

Take off at 30 mph can be done consistently in Wren, by using full 40° flaps. The flaps, double slotted, have eight panels and run full span.

Hands off fling at close to 30 mph. Try that in your own light plane! Speed gauge, added to normal cockpit instruments, works from an anemometer.

Wren lands just about where you want it. At Meacham field, in Fort Worth; it touched down at edge of runway, braked to a stop, turned into first taxi strip.

* * *

James Robertson, Wren's designer; explains nose control to Popular Mechanics' aviation editor. At low speeds, prop blast enables it to control pitch of the airplane.

It can cruise for extended periods, without engine overheating, at speeds as low as 50 mph. It can make completely controlled turns at 30 mph, without losing altitude. It's hard to stall, but easy to recover.

It makes its final approach at close to 30 mph, and lands; if not on a dime, at least on a silver dollar; and it rolls to a stop from 100 to 200 feet further on, depending on the wind, runway surface, and pilot.

* * *

It is, all in all, a highly unusual airplane. Its makers, the newly formed Wren Aircraft Corporation, of Fort Worth, Texas; call it HTOL, for "helicopter take off and landing." They claim it can operate from any area large enough to accommodate a helicopter. Others will probably put it in the STOL category, for "short take off and landing.

Its ability to get in and out of small areas, however, is only part of its story. Other aircraft, including STOL craft, and helicopters, can do this. Its unique feature, is its ability to maneuver and maintain level, controlled flight at remarkably low speeds. As low as 30 mph. The speed limit on most city streets, without sacrificing much of its maximum speed.

* * *

It's this ability that should suit it for a wide variety of utility operations, especially patrolling, surveillance, and bush operations; where landing away from an airport is necessary.

The Wren is actually a mongrel, made from a standard Cessna 180 or 182 with four major modifications. The addition of a forward canard, and a made-over wing that includes an augmented leading edge up front, vortex generators on top, and double flaps in the rear.

And there are no special controls for any of it. From the inside of the cockpit, the Wren operates like any other plane.

The canard, or nose control, is called the ULS (for ultra-low speed) control system. It gives the Wren the appearance of wearing a bristly mustache. It operates in conjunction with the elevator in the tail assembly. In fact, it is directly connected by a push-rod linkage.

As the elevator pitches the tail up or down, the ULS pitches the nose down or up. Its chief effectiveness is at low speeds, when the large flaps block out the elevator, and the prop blast gives it sufficient air stream to react against.

Continued On Page 5

The augmented leading edge; which is no more than a cuff of metal wrapped around the original wing edge; blunts and droops the edge, increasing its stall resistance over the original Cessna wing from a 16^{o} to a 28^{o} angle of attack.

The blunt edge makes it easier for the air to break around the edge at low speeds. The droop, in effect, drops the edge to meet the airstream head-on at high angles of attack.

The vortex generators, or spoilers; called "Wren's Teeth" by the makers; counteract yaw tendencies in low-speed banks. Only one set of "teeth" operate at a time. And, only at low speeds, without any extra control from the cockpit.

* * *

Geared to the ailerons, the teeth turn into the airstream only on the low-wing side, to keep the nose from yawing toward the high-wing side. They operate only at low speeds, because it is only at low speeds that the ailerons are deflected enough to bring them into play.

In slow turns, the aileron on the high-wing side is deflected downward, creating a drag. This tends to pull the nose toward the high wing. Meanwhile, when the aileron on the down-wing side is deflected upward; it brings its spoilers into play, creating a balancing drag. This then allows the nose to fly straight through the turn. The teeth on the high-wing side stay feathered throughout the turn.

* * *

The double flaps, while not new, are perhaps more effective on the Wren. Other STOL aircraft use them, but controlling the plane at low speeds is sometimes a problem. The ULS control, and the Wren's teeth; help overcome this. While these two modifications are essentially for control at low speeds; the flaps are definitely what brings the Wren down to those low speeds.

The flaps consist of four panels on each wing. They are mounted in pairs, and running the full span of the wing. The second panel of each outside pair acts as an aileron.

Or, to put it another way; each aileron doubles as a flap. The whole set can be locked at 10^{o}, 20^{o}, and 40^{o} angles. The makers claim that at any position, low-speed buffeting is impossible.

Continued In Issue 5

Wren Newsletter Subscription & Special Items Order Form
Use another sheet of paper if you want

Todd Peterson, President; Advanced Lift Systems, Inc.; Route 1, Box 1003, Eloy Municipal Airport, Eloy, Arizona 85231. Phone: 602 466-3122. Todd's company makes the 260SE/STOL, an aircraft similar to the Wren. Write him for more information.

Jim Frazee, 2045 North Gentry, Mesa, Arizona 85202. Phone: 602 827-8749. Jim had been working with the owners of the Wren company, attempting to secure the rights to bring it back into production. A representative on the other end of the line, stated that those efforts have broken down. You could still call Jim if you're looking for a used Wren. He sometimes has a handle on where they can be found.

Belvoir Publications, Inc. creates four top of the line (in my opinion) publications: Aviation Consumer, Aviation Safety, IFR, and Light Plane Maintenance; 1111 East Putnam Avenue, Riverside, Connecticut 06878. Phone: 800 227-5782.

Trade-A-Plane, the major used airplane source, costs $10.00 for 18 issues by sending a check to: P.O. Box 929, Crossville, Tennessee 38555.

Name & Phone:_ _

Address: _

Note: All payments must be US funds drawn on a US bank.

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Wren Personalized Items

Wren Tissue Box cover, with Wren in large block letters. Wren pencil cylinder. 3 1/2 by 4 1/2 tall. Holds 80 pencils or pens. Wren 13" by 13" clock. Wren across top, N-Number across bottom. Hardwood. Note: clock, tissue box, pencil cylinder & key ring can have any airplane name, not limited to Wren. Can also have person's name. Makes a great birthday, hangar, or anniversary gift.

_____ Kleenex or Puffs tissue box: $4.95. _____ Pencil Holder: $3.95.

_____ Clock: $12.95. _____ Kleenex Boutique cube to show 4 photos: $4.95.

_____ Key Ring: $1.95. _____ Licence Plate: $4.95.

$_____ Craft postage: $1.95 for one. $2.49 2 & up. $_____ Enclosed. Make check to: Wren Newsletter

* * *

Wren: For Sale, and Wanted to Buy ads are placed free for anyone: dealers, FBO's, non-subscribers, brokers, etc. No strings. Just submit ad each quarter. Phone in ads welcomed. This applies to Wren aircraft & parts only; for non-subscribers. Wren Newsletter published quarterly. Display Advertising: Write or call. I also publish newsletters for the following aircraft: AA-1, AA-5, Arctic, Arrow, Helio, Maule, Musketeer, Rallye, Skipper, Snow, Tomahawk, Varga, & Wren. Sample? SASE or call.

David E. Neumeister, Publisher

Bulk Rate U.S.

Wren Newsletter

Spring 1994 . Dave Neumeister, Publisher Issue 5.

5630 South Washington Road Lansing MI 48911-4999 517-882-8433

WREN REPORT

James F. Oberkirsch, Geri-Care, Inc., 9313 Rhythm Road, Midwest City, Oklahoma 73110. Voice: 405-733-2021, 918-587-2021, 417-782-2005.

In September of 1987 I was able to purchase N-2661Q, a 1968 Cessna 182K which was converted in 1974. The airplane is battleship grey, with red and black striping.

The first thing done was to replace all material inside the plane. Installation of soundproofing and new upholstery made the inside look as good as the exterior, that had just been painted.

Equipment Upgrade

Then began a two year project to upgrade the instrumentation and avionics. My wife not so jokingly tells me the only thing I didn't replace was the airspeed indicator. This airspeed indicator is special to the Wren, as its in mph and has the Wren logo embossed on it.

The backup system includes a Precise Flight Backup vacuum system and Pulselite system. Avionics includes a pair of KX-155 Nav/Coms, KR-86 ADF, KN-64 DME, KT-76A Transponder, KMA 24 Audio Panel, II Morrow 612B Loran, WX8 StormScope, 602 Graphic Engine Montior, Davtron 6 function Indicator M655 and 811 Clock.

Also, a Sporty's A300 Handheld with an outside antenna, ARP AP-12 Carburetor Ice Detector, Huntington Lift Reserve Indicator, AR Water Detector, Alternate Static Air System, Airflite File oxygen system and Rosen see through NSA Sun Visors.

Performance

Cruise is 140 miles per hour at 75% power carrying 23 inches of manifold pressure at 2,450 on the propeller. This burns 13.5 gallons an hour. As an instrument platform, it is outstanding at 75 mph IAS and 30° of flaps, unless the weather's just hellish, it is as steady as one could ask for.

I took a mountain flying course, and with three people aboard plus full survival gear, and with the long range tanks 75% full, we departed Leadville, Colorado at 1:00 p.m. Outside air temperature was 76°F. She handled it very nicely.

LOOKING TO BUY

Stan Farmer, P.O. Box 7000, East PMB 395, Texarkana, Texas 75501. No Phone Submitted.

I've owned a Cessna 206 with a Robertson STOL kit and loved it. I am looking for something smaller. I've read a few articles about the Wren and the Wren 460. Sounds like one hell of a little bird. I'm looking to purchase another aircraft, and am very interested.

I wrote to Bill McDonald of Roberts Airport in Redmond, Oregon. Only, I didn't have the correct address and it was returned. <Couldn't locate a Bill there either. Might Try Jerry Zimmer at 503-548-1023 #404 or Butler at 503-548-8166. Dan Knapp, apparently currently owns the Type Certificate and had an operation in Oregon also, but his number is disconnected and there is no listing anymore.

HOW TO MAKE THE WREN A LADY

Gerald Breuner, Rotary STOL, Inc., 4114 Goodrick Avenue, Richmond, California 94801. Voice: 415-234-7865.

On April 19, 1971, I bought a Wren 460. Great airplane. I was interested in STOL aircraft, and wanted to find out what the Wren could do. I found it flew slowly, both at the top and bottom end of the scale.

Lots of drag producers. Big tires, Wren's teeth, hinges and ULS control. Might as well be hauling floats. So I bought a 206 on a Lease Back for traveling. Had Gus Simpson put an Owl Cuff on it for the slow part. Good combination.

Interesting Adventures

I kept the Wren for another year to satisfy myself as to what it could do. As I recall, it could fly around all day at 60 miles per hour with full flaps and 2,000 rpm. The aircraft would be level.

That is, not nose high. It was controllable and difficult to stall. The center of lift moved aft with an increase in flap setting, and the stall would be a porpoising through two or three degrees of angle of attack. It was, in effect, nose heavy and very stable.

When it got down to the serious job of short landing, I got into some trouble. Ballooning. I read a pilot report in one of the flying magazines about someone else having the same problem. It would happen with a change in power while landing, you would be in a partial flare and need power to make your touch down point.

Performance

Add power and the nose came up, lots. You had to push the wheel if you added power. I decided that the ULS control was too sensitive, and wondered what the plane would fly like without it.

During my December of 1971 Annual, I removed it, hundred mile taped (duct taped) the holes in the cowling, got some experimental papers and took off and tried it.

The plane still had all the elevator control it needed, but wasn't sensitive on landing. The only thing wrong was that I could no longer picnic on the canard wing.

No Canard

I wanted to keep it this way without restrictions, so to get an STC for this change, was the next logical step to take. Little did I know what I was in for in this decision.

In January of 1972, I found a laid back, but very thorough FAA test pilot by the name of Ken Erdman. He obviously enjoyed his work, and knew his business. It was a joy to work with him. My log book shows only one entry during this time, as Ken was in command the rest of the time.

I wish I had entered more notes. My one effort was to spin the airplane solo, while Ken watched from his plane until he was convinced it would recover. But, I am getting ahead of my story.

Test Pilot Arrives

Ken showed up with a helmet, instruments, clip board, pitot, forms, and a spin chute. My job was to rig the spin chute, sensitive pitot on a pole with an instrument face that could be read from the cabin, and then do weight and balance.

To mount the spin chute, I bought a used tail cone, cut the rear half off, mounted a plywood bulkhead and attached the chute bag to that. Its cable was placed in a quick release mounted to the tail tie down ring. Also had to rig emergency door releases.

Spin Chute Problems

When I had that done, Ken came back and we tested the spin chute release I had made up. I went racing down the runway at Buchanan Field, Concord; and pulled the chute release. That momentarily straightened the plane into the slight cross wind.

Thinking the chute had worked properly, I pulled the second line that released the entire rig as I came abreast of Ken, observing from the side, and turned off the runway. I noticed Ken walking, better stomping, back down the runway. Some time later he came into the hangar with the chute.

The chute cable had pulled out of its nicopress fitting at the same time my back room release had broken. This all happened the instant the chute opened and Ken had to walk a quarter mile to pick up the pieces.

Repairs Made

I picked up a glider tow hook to replace my mickey mouse rig, and Ken re-did the nicopress sleeve that had never been swagged down. Satisfied that the spin chute would work, I took off to see if the aircraft would spin and recover. On turn in and one turn out. My log shows 20 times.

With Ken satisfied, we landed and he took it u with me as passenger, and the other flight testing began. All speeds and attitudes and full weight envelope. Ken seemed to want to know more about the plane than I did. We were a good team.

At full aft center of gravity, I would be in the back seat with lead in the baggage area. If we had to leave the plane, I would have had to move forward to exit. Helmet, chute and all.

Documentation

Everything was noted for study later. The ULS removal seemed not to effect the aircraft characteristics at all. Full stall landings were made without problems at full forward center of gravity, the tail tie down was almost touching the ground.

She was handling like a 182 of old, but with superb slow speed abilities. She had had her fling, but now had been taught to be a 'Lady' again. I received my one off STC in May of 1972.

Now came the hard part for me. The paperwork had to be furnished and finished. March 1973 brought the multiple STC after I supplied, corrected, re-wrote, re-drafted, signed, entered, completed, corresponded, etc.

Reaction to Paperwork

I felt like my step son who, doing homework would say, "This is my last re-write-ation.' Now everyone can have a "Lady Wren." I understand that all Wren STC owners have pushed the ULS wing.

It is a selling feature all right, but one similar to 'spoilers' on a car, unnecessary. But there is a big reason not to have it, she handles better. And I say that sincerely.

Background

I put the following letter out to Wren owners back in the late 1970's but didn't get too much response. I'm convinced that the ULS is a problem.

The FAA required full spin testing at full aft and full forward center of gravity positions, which obviously included takeoffs and landing.

Plenty of elevator for all occasions, but not too much as with the ULS. I would be happy to answer questions anyone might have on the subject.

Letter To Wren Owners

Dear Wren Owner,

A great bird that Wren, but I was having trouble landing mine. It seemed that every third or fourth landing was a go around, if on a short strip. If I concentrated on elevator while working the throttle, I could make 'book' figures, but it seemed like a lot of unnecessary control effort.

So, I removed what I decided was the culprit, the ULS canard wing. The Wren flew so well without it, I applied for an STC. One year and a full blown flight test program with anti-spin chute, door release, special pilot, etc., I received the STC.

I thought that you might be interested in modifying your Wren similarly. I'll supply the STC paperwork. The cost of removing the canard wing and control is peanuts, and does not require any change in aircraft structure. You can have your A&P patch the cowl according to the STC instructions, and sing you back into the air with your new 'Lady' Wren.

Besides handling like a lady, she flies 4-5 miles per hour faster, and carries 22 pounds more useful load. How can you beat that?

FAA APPROVAL STC LETTER

R. S. Sliff, Chief Aircraft Engineering Division, Department of Transportation Western Region, P.O. Box 92007, Los Angeles, California 90009.

In reply, refer to AWE-102/8110-6/A5079WE-S. Subject: Supplemental Type Certificate describing removal of nose control surface, which was installed as part of the Wren 460 modification in accordance with STC SA485SW, in accordance with Breuner STOL installation Number 111 dated 10 January 1973.

Dear Mr. Breuner:

We have completed our evaluation of the subject change in type design and are enclosing your Supplemental Type Certificate SA2662WE.

This certificate signifies approval of the change and authorizes modification of the aircraft, engine, or propeller of the model or models listed on the certificate.

If you plan to manufacture replacement or modification parts for sale in conformance with approval data listed on the certificate, you are required to comply with Parts 21.303 and 45.15 of the Federal Aviation Regulations.

Under the provisions of these regulations, parts must have identification and evidence of FAA approval to be eligible for installation on certificated aircraft, engines or propellers. Application for Parts Manufacturer Approval should be made in letter form listing each part name and number, the STC number, and the aircraft, engine, or propeller of the model or models for which the part or parts have been approved for installation.

The application should be addressed to the Chief, Manufacturing Inspection Branch at the address given.

The certificate may be transferred or made available to others by means such as licensing arrangement in accordance with FAR 21.47.

A copy of this certificate must be included with each kit you issue or each time you make the Supplemental Type Certificate data available to other persons who intend to make the subject alteration on other products.

WREN STC

The certificate was issued to the Wren Aircraft Company, then at 4400-C Moultron, Greenville, Texas 75401. The original Cessna 182 models approved for the modification were: 182H, 182J, 182K, 182L, and 182M. The original Type Certificate on the 182 is 3A13.

The Wren modification approved 6 design changes: (1) Full span double slotted flaps, (2) Drooped wing leading edge, (3) Aileron actuated drag plates, (4) Nose control Surface, (5) Elevator down spring alteration, (6) Relocated pitot head in accordance with Wren Master Drawing List Wren 460L, M-1, Revision F, dated March 5, 1969.

Further limitations and conditions are listed on FAA Form 337, Attachment Number 1, REvision F, dated May 13, 1969. The Wren STC was applied for January 19, 1965 and issued on March 1, 1965. The STC was reissued on 4-27-65, 8-29-66, 11-25-66, 11-27-67, 12-12-67, 5-13-69, 3-20-70 Revision 7.

Limits

Maneuvering	119 mph
Maximum structural cruising	169 mph
Never Exceed	193 mph
Flaps extended	95 mph

Center of Gravity Range

+41.0 to +46.0 at 2,800 pounds
+34.5 to +46.0 at 2,250 pounds
Straight Line variation between points given

Control Surface Movements

Wing Flaps	Up 30°	+/- 1°
Ailerons	Up 18°	Down 14° +/- 1°
Elevator (relative to stabilizer)	Up 26°	Down 17° +/- 1°
Elevator Tab	Up 21°	Down 21° +/- 1°
Rudder	Right 24°	Left 24° +/- 1°
Canard Flap (Relative to stabilizer)	Up 2°	Down 7° +/- 1°

Serial Numbers Eligible

Cessna 182-55247
Cessna 182-55845 and up
Wren 3-460-182G
Wren 20-460-182H and up
Wren 34-460-182J and up
Wren 39-460-182K and up
Wren 50-460-182L and up
Wren 51-460-182M and up

Flight Maneuver Load Factors

Flaps Up	+3.8	-1.52
Flaps Down	+2.0	

Name Address & Phones_____

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FREE STUFF

WREN Aircraft & Supplies Wanted to Buy, Ride Wanted, & For Sale ads run free.

AIRCRAFT NEWSLETTERS publishes Newsletters for: **STOL:** Arctic, Beaver/Otter, Helio, Husky, Maule, Norseman, Porter, Rallye, Wilga, Wren. **High Performance:** Arrow, Malibu, PA-32, TB-Series. **Twin:** Aztec, Baron, 310/320/335, 336/337, Duchess, GA7 Cougar, Seminole, Seneca. **Sport:** AA-1, AA-5, Varga. **Economical:** Musketeer, Skipper, Tomahawk. Sample? #10 SASE or call.

DIRECTORY

Todd Peterson, President; Advanced Lift Systems, Inc.; P.O. Box 98, Ashland, Kansas. Voice: 316-635-4055. Todd's company makes the 260SE/STOL, 230SE/STOL, Super Skylane, and Bushmaster, aircraft similar to the Wren. He has a brochure and $15.00 video demonstration tape available.

Jim Frazee, 2045 North Gentry, Mesa, Arizona 85202. Phone: 602 827-8749. Jim had been working with the owners of the Wren company, attempting to secure the rights to bring it back into production. A representative on the other end of the line, stated that those efforts have broken down. You could still call Jim if you're looking for a used Wren. He sometimes has a handle on where they can be found.

Dan Knapp, President, Wren Aviation Technologies, Redmond, Oregon. The phone listed has since been disconnected and a citizen who lives there said they've been gone for some time. Any information you have would be appreciated.

Publications: ESSCO, Aircraft Value Guide, 426 West Turkeyfoot Lake Road, Akron, OH 44319. Voice: 216-644-7724. Fax: 216-644-0886. Aviation Consumer, Maintenance, Safety, Used Aircraft Guide 6th Edition; P.O. 2626, Greenwich, CT 06836-2626. Voice: 800-829-9081, 813-921-4449. Fax: 813-922-0522. Trade-A-Plane, P.O. Box 929, Crossville, TN 38555. **Gyro Overhauls**, HSI and Encoder repairs: VIP Aeronautical, Brainard Airport, Hartford, CT 06114; 203-525-6713. Recommended by Aviation Consumer.

Aircraft Financing: Maryland National Bank, P.O. Box 17068 Mail Stop 090116, Baltimore, MD 21203; 301-290-4073. **Linda Lou Co.:** Discount Aviation Parts & Tools; 800-824-9912. **Engine Mounts**, Engineering Services: Harold Kosola, 5601 Newton Road, Albany, GA 31707; 912-435-4119.

Lawrence H. Derby Insurance, 410 South Main Street, Warren, AR 71671. 800-343-9553, 501-226-3711. Dickens & Company, P.O. Box 1663, Evanston, IL 60204. Voice: 800-323-5474, 708-328-7000. Fax: 708-864-6901. **Lift Reserve Indicator:** P.O. Box 135, Galesville, MD 20765; 301-867-1619. **Oil Analysis:** Spectro, P.O. Box 16526, Fort Worth, TX 76133; 817-292-2546. **Crankcase Welders:** Ajax Aviation, Inc., San Antonio, TX; 800-531-7212, 512-342-9494. Diversified Manufacturing Company, 2806 North Sheridan Road, Tulsa, OK 74115; 800-874-1351, 918-836-9101.

Logos & Panel Marking: Moody Aero-Graphics, P.O. Box 1359, Belleview, FL 32620; 904-245-2460, 800-749-2462. **Sky Ranch Shop Manual**, John E. Schwaner, Sacramento Sky Ranch, Inc., P.O. Box 22610, Sacramento, CA 95822; $30.00 500 pages illustrated. 916-421-7672. Overhaul advice. Schwaner & Text highly recommended by Light Plane Maintenance.

Dave Neumeister, Publisher

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Issue 6 Dave Neumeister, Publisher Fall 1994

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SOUNDPROOFING LIGHT AIRCRAFT

Bill Nash, Aircraft Remanufacturing Corporation, 1291 East Vista Way #150, Vista, California 92084. Voice: 619-749-0239. Fax: 619-749-6384.

Most of the materials described in this article are available from::

Aircraft Spruce & Speciality Company, 201 West Truslow Avenue, Fullerton, California 92632. Voice: 800-824-1930, 714-870-7551.

Wicks Aircraft Supply, 410 Pine Street, Highland, Illinois 62249. Voice: 618-654-7447.

Noisy Interiors

Much has been discussed as well as written about the noisiness of aircraft, inside and out. Because of these very valid concerns, sound measurements have been made. It is sometimes possible for cabin noise levels to be so high in some aircraft, as to damage one's hearing.

Elaborate techniques now exist to drastically reduce such noise. While time and expense are valid considerations, a soundproofing installation is not a luxury, it is an investment in the physical well being of the occupants as well as a valuable upgrade of the aircraft.

What's Your Level?

In a properly soundproofed airplane, the radio can be used with speaker and mike, instead of only the headsets. You'll even enjoy better direct communications between passengers and will not have to worry about damage to your hearing.

An intercom usually won't be necessary. After being properly soundproofed, using the latest space age materials, the noise level in the aircraft will be so low you may be able to have conversations in normal tones.

You'll wonder why you ever put up with all the noise before. The quieter aircraft will seem to have gained quality and feel plusher. Such an improvement shouldn't be considered costly.

Materials

Before I tell you how to accomplish this, we'll discuss some commonly used materials for sound attenuation. Keep in mind that soundproofing involves two concepts that require two different materials:

1. Sound absorption materials.

2. Sound blocking or barrier materials.

Because vibration of the airframe and penetration of sound into the cabin from the engine, propeller and airflow over the airframe are two distinct effects, we need to use two different materials.

Super Soundproofing Matting

This material is a closed cell vinyl and nitrile insulating material which will not absorb water or oil. Materials that absorb liquids are not suitable, because if they get wet, they will promote corrosion and increase the weight on board.

Testing.

During testing, we have found that ordinary 'foam rubber' and Fiberglas batting are virtually worthless in this application. The mat has the advantage of conserving and blocking heat.

It has fire retardant qualities and we have the manufacturer's assurance that, in thicknesses over 1/8 inch, it meets the requirements of Federal Aviation Regulation 25.853b. Therefore, it is suitable for aircraft use.

This matting is available in the following thicknesses <inch>: 1/8, 1/4, 3/8, 1/2, 3/4, and 1 inch. It may easily be cemented together to make other thicknesses.

Noise-Mat Barrier

This is a combination material that combines a heavy duty surface that is washable, a limpid layer, and a foam backing to provide some 'give.' It makes a very plush floor mat, and in combination with, and cemented to the aforementioned mat material, is very effective in really stopping engine noise coming through the firewall.

If ordinary kitchen Reynolds Aluminum Foil is sandwiched between the mats using contact cement, even more noise will be prevented from entering the cabin. While it is available only in 3/8 inch black with a width of 54 inches, its smooth surface will take color readily from vinyl and plastic sprays available in cans.

Such sprays are not very durable, so if scuffing is possible, it might be better to leave it black. It does not meet any FAR inflammability requirements, but is Underwriters Laboratories approved to UL 94 testing procedures.

Finish Cloths and Vinyls

These are available from your local automotive upholstery wholesaler in a myriad of thicknesses and colors. Most automotive materials will meet meet some auto industry inflammability requirements, but perhaps not specifically those as applied to aviation.

For aircraft applications, you would be interested in thin vinyl materials such as used for automobile headliners and the durable cloths that have a thin foam backing. These can easily be contact cemented to the sound proofing mats to produce very attractive, professional finished surfaces. The use of contact cement in spray cans simplifies application.

Installation Considerations

Each aircraft has its 'Hot Spots' to contend with. Hot spots are areas where noise is the loudest. A good soundproofing job would concentrate on these places that are the noisiest by placing more material there.

However, generally speaking, the places in a light aircraft that admit sound readily are:

1. Firewall.
2. Cowl forward of the instrument panel.
3. Kickpanels.
4. Sidewalls of the cabin.
5. Roof.
6. Wing roots.
7. Windows.

Windows

The windows are by far the greatest carriers of noise into the cabin. A thorough soundproofing job would place heavier layers of the materials where the sound was the loudest, near the front; and lighter insulation aft. The entire cabin should receive the treatment, above, below, and all around.

A Little at a Time

In an aircraft that has been flying, the best time to put in this material, is when the interior has been removed, when it can be installed with a minimum of effort. However, an installation can be made piecemeal.

That is, section by section, as the budget or time allows, with steadily improving results as more and more of the cabin area is insulated. Some installers will do the doors on a weekend, the firewall on another, etc.

In all cases, investigate thoroughly for evidence of corrosion or other damage before applying batting which might cover it up. While we cannot provide explicit instructions for every aircraft, we can give you some general pointers to insure a good, effective job.

Installation of the Soundproofing Mat

Technique #1

Cut your material to precise size and shape, beginning with the largest are to be covered. The material comes in different thicknesses to fit inside and to fill the formers and frames, cabin sides and ceiling.

We don't recommend razor blades or knives, they will leave ragged edges. Cut with an electric knife. We use a Hamilton Beach battery powered unit. These are very inexpensive home appliance models. The rechargeable feature is handy where an AC plug is not available, such as out on the aircraft ramp tiedown area.

Cut it a little oversize, so that it fits inside the former or frame with a push tight fit. It comes with a smooth 'skin' side and a rougher side. Either side can be cemented. A dab of contact cement here and there on the side will assure that it stays, but it should fit well enough so that it's quite tight. Use a brush for this.

Materials

Use waterproof contact cement. Do not overdo the cementing, because you may want to remove the material someday to look for corrosion, run wires, etc. Use judicial dabs of cement. You must put soundproofing every place where the inside of the skin is exposed, especially on the firewall and inside the upper instrument cowling and kick panel sides forward of the windshield.

If it's difficult to cut and fit the material directly, because of obstructions, make a little cardboard pattern by which to cut the material. Take your time, don't get into a hurry. Make it fit as neatly as possible. It goes without saying the material is to be installed only on the cabin side of the firewall.

If the firewall is covered with some kind of decorative mickey mouse firewall covering or Fiberglas batting, remove it. It may then be reinstalled but probably better to leave it off. Use the bits and pieces left over to insulate the smaller remaining spaces.

Plan As You Go

Those small pieces can be contact cemented together to make larger pieces, so not much need be wasted. Window frames and 'U' channels can simply be pushed full of the scraps.

Planning

Leftovers can also be used in the floor access panels by gluing them on the underside of the covers, then reinstalling the panels and access covers.

If you have some left over, it's worth it to glue it to the inside of the belly access covers, too. Every place sound can enter should be covered as much as possible, but installing the material everywhere inside of the floor isn't always practical.

Don't worry, even without that, the sound reduction will be very impressive. If your plane is apart for repairs or overhaul, a much more complete job can be done. But, do not overdo the gluing job, because if you do, the material can be difficult to remove if and when inspection is necessary in the future.

Technique #2

If your aircraft has 'snap-in' metal or Fiberglas upholstery panels, that are held in frames, we have had great success with the following method, which uses 1/2 inch or thinner mat material. First, remove all such panels.

Cut the mat materials a bit oversize and carefully cement a 1/2 inch layer of material to the inside of the panel, leaving the edge of the soundproofing all around the edge, slightly loose so that it can slide over the inside flange of the mounting frame.

Here, because these panels are nonstructural, and inspection won't be necessary, a full, even coating of contact cement on both the panel and mat, and then assembly will assure that the material will not ever come loose.

Next

Cut and fit thinner insulation material to the inside skin areas, same as the application of the material detailed previously. The idea here is to create a sound deadened, boxed in area with dead air space between the tow insulation layers. This is very effective and lighter, but requires more effort.

Fire Proof Ratings

The Federal Trade Commission considers that there are no existing test methods or standards devised to prove the flammability of any material, or <that there are no> accurate indicators of the performance of cellular plastic materials under actual fire conditions.

Most any material will burn under the 'right' conditions. The test procedures of FAR 853.b and UL 94 are intended only as measurements of the performance of materials under specific controlled conditions. These tests generally mean the material will burn, but not support a flame.

You can get a good idea about the material you intend to use with a match by burning a scrap of it. Materials used by an aircraft manufacturer years ago may not even meet present day 'standards.'

Generally speaking, if a person is responsible for returning a certified aircraft to service as a shop or mechanic, s/he should use materials that are FAA approved and follow approved procedures.

Weight Considerations

There is a weight penalty, of course. The noise mat barrier weighs one pound per square foot, while the super soundproofing mat weighs Ø.1 pound per square foot for the 1/8 inch thickness, and Ø.7 pound per square foot for the one inch material.

Weight Considerations

Such weights are not much of a consideration in a twin, but can mean alot in aircraft with engines under 150 horsepower. If a few extra pounds of soundproofing, perhaps even combined with an attractive interior offends your sensibilities, perhaps a better investment would be made in noise canceling headsets for everyone.

Observations

But in such a case, your wallet will be the one undergoing a dramatic weight reduction. In any case, the neatness and care that is taken to assure a good, tight fit and thorough application and covering of the inside skin areas around the cabin will determine the effectiveness of your soundproofing job. There is just so much you can do as a lot of sound is still going to come in the windows.

Those coming up on a windshield change might consider the thickest material possible, currently around 3/8 inch thickness. Our tests have shown that there is no advantage in using an material on the windows greater than 3/8 inch.

Also, a Fiberglas firewall batting cover fitted on the engine side will also help quiet single engine aircraft. This can be fabricated by your upholstery shop out of heat resistant materials. Cutouts for wiring and other necessary openings through the firewall can be closed by velcro fastenings and is well worth the additional cost and effort.

Other Areas to Consider

Loose fitting fairings causing gaps between the wing and fuselage in high wing aircraft can generate lots of wind noise. This can be stopped by using a a caulking gun filled with white weatherproof silicone caulk. Use clear if your paint in that area is not white.

Apply it wet while the fuselage and wing joining cover is off, for best results. First tuck in soundproofing mat firmly between the wing root and the fuselage. This will really help. This is not a problem in low wing planes, but should be investigated.

A noisy door because of a gap in its frame can mean the seals need replacement, or if the door cannot be made to fit properly, perhaps an inflatable door seal. There are dealers for inflatable door seal kits for many aircraft, and such kits can often be adapted to others. Ask us.

Special 3-M Tape

A sound absorbing metal tape, made by 3-M, will be useful for 'buzzing' areas usually found in metal aircraft. It can be applied to the inside area of the tailcone, as that area tends to amplify sound. Very little needs to be applied to a spot, as it is intended to just prevent the metal from 'oil-canning' and thereby tinnily buzzing and vibrating.

The new Hartzell 'Q' tip propellers should be considered by those who wish a really quiet ship. The noise reduction is very impressive.

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PRE-PURCHASE INSPECTION

Ernest Stadvec, ESSCO, 426 West Turkeyfoot Lake, Akron, Ohio 44319. Voice: 216-644-7724. Fax: 216-644-0886.

If you don't know your airplane, know your airplane dealer. Your initial inspection should be a good walk around look and check out the log books and all other aircraft papers. You can quickly eliminate the undesirables or establish a lower offering price for an airplane that appears rough.

A thorough log book inspection presents some pictures of the plane's maintenance history and parts replacement. Airplane and engine times should be noted so they fall in some proper sequence with all inspections and overhauls entered and signed off by certified mechanics or an FAA inspector.

Things To Look For In Log Review

Watch for gaps in time logged or missing pages. Check the engine serial number to determine if the engine is the original one or has been changed. An original engine with 3 or 4 overhauls on it can be a bad risk.

The next overhaul might be an expensive one, since about everything except the engine block will have to be replaced in the case of 4th or 5th overhauls. You can count on new cylinders and pistons at least in a 2nd, 3rd, or 4th overhaul.

Check the airframe serial number to see that it coincides with that listed in the airframe log book and the airplane papers. Unscrupulous persons have been known to substitute logs and papers on a rebuilt or damaged aircraft to make it appear to have no damage history.

Damage History

Look for damage history and note the extent, who repaired it, and how it was repaired, with new or used parts. Check the Form 337's Major Repair & Alteration record for repairs, alterations, weight and balance, and list of equipment. Make certain they are in proper order and a latest one made out for addition or elimination of any equipment.

Check the equipment list against the equipment on the airplane. If the equipment on the airplane does not agree with the latest From 337, be suspicious and cautious. Someone has either destroyed the latest Form 337 or has made an unauthorized removal or addition of equipment.

Adding or taking out equipment, necessitates, by regulation, a re-computation of weight and balance of the aircraft, and in the case of radio equipment, an electrical load analysis. The installation or removal must be made in accordance with FAA approved procedures and inspected by an authorized person. Proper entries must be made in the weight and balance equipment list and the aircraft and engine log books as well.

Do Your Research

If there are any questions on the Form 337, an inquiry to the Aircraft Records Branch, FAA, Oklahoma City, Oklahoma, may be made for copies that should be on file for the airplane involved.

Trick

Some unscrupulous shops and persons use a neat, but legal, trick to sidestep listing repair work done on an airplane if they wish to gloss over or disguise major rebuilding or repair work.

They will enter in the airplane papers a notation that the work was performed according to the FAA approved procedure, then note the procedure or the publication that outlines the work such as in accordance with CAM 20', etc.

It will then be noted that the work is covered in 'work order Number nnn, filed at _____.' The place named is usually some obscure shop many, many miles away. The careful buyer will take time to get all the information on the aircraft that is available, if it has been properly filed, even though a cover-up has been attempted.

Inspection Notes

Once you get the hang of inspecting aircraft yourself, after having a mechanic show you the ropes on several aircraft, your took kit should include clean rags to wipe oil and other fluids away to inspect for leaks. Also, a flashlight, Phillips head and regular screwdriver, a small wire brush or pen knife for scraping and getting into the corners to look for hidden corrosion or pitting.

Remove inspections plates and look into all inspection holes. Exterior paint can and will often hide corrosion, rot and rust. 'Always Hangared" aircraft will show less weather deterioration that one tied out year round.

Possible hidden rust and corrosion may be discovered by applying some solvent and scraping lightly with a wire brush or pen knife to clean the surface film from some critical points. These critical points include welds, attach points, or any location where two pieces of metal come in contact.

Metal

Look for evidence of electrolytic decaying action caused by two dissimilar metals in contact with each other. Check all points in contact with, or in a position to collect moisture. Float planes and aircraft near salt water coasts often show extensive corrosion. There may be corrosion on the inside of wings, and fuselage areas as well.

Evidence of aluminum, magnesium and aluminum alloy corrosion may be determined by checking surface flaking and powdering, which conceals pitting similar to rust. Rust starts as a thin film of discoloration on the surface of the metal.

A crust forms on the surface as the rusting process continues, and hides pitting which has the effect of gradually weakening the part. This results in eventual failure. Another indication of hidden rust, is blistered paint. Scraping the surface reveals the extent of the pitting.

Moving Parts

All moving parts, cables, pulleys, control surface hinges, cowling, cowl flaps, gear retraction mechanisms should be inspected for wear. If at all possible, a gear retraction test should be performed by an airframe mechanic.

When you and your mechanic have completed a detailed inspection of the airframe, give the engine the same attention. Remove the cowling or open it for easy access. Check the usual items on a preflight list. Give the engine a good visual inspection for signs of anything loose, broken, frayed or hanging.

Check For General Tightness

Also feel around for general tightness of as much as possible in the engine compartment. A dirty engine most often indicates the type of maintenance the airplane has had. But, be on guard when you spot an unusually clean engine. A recent cleaning often hides oil, hydraulic fluid and exhaust manifold leaks. Run the engine or check it again after a test flight.

Underneath

Inspect closely extremely clean belly surfaces, landing gear struts and areas around fuel tanks. Leaks generally will show up after the engine has been run and the airplane flown.

Do the compression check. Major problems can be ferreted out at once, and impending difficulties located as well, with this technique. The possibility of the engine needing a top or major engine overhaul may be determined so you can act accordingly to buy or pass on the airplane.

Inspect all engine compartment wiring, plumbing, tubing, ducts and cables for signs of wear, deterioration, tearing, rupture or other damage. Exhaust stacks should be removed and the muffler inspected for cracks and evidence of corrosion. Check heaters for leaks or signs of overheating.

Up Front

Inspect propeller blades for nicks and stone damage. Look for cracks in the spinner. While the engine is cool, check the security of the propeller by attempting to jiggle it on the shaft. Excessive play of the propeller shaft may indicate crankshaft bearing problems. A slight amount of play is normal in a cool engine.

Look for oil or grease on the blades of the propeller. This may mean bad seals. While running the engine, exercise the propeller, noticing ease of movement of the cockpit propeller control and the normal change in rpm as you vary the pitch.

After running the engine and exercising the propeller, check again for oil and grease on the blades, hub and on the cowling. Inspect the throttle, propeller, mixture, carburetor heat, and cowl flap linkages for proper operation and tautness.

Cabin

Inspect the cabin interior for general condition. This often shows better than any other part of the aircraft, the care or abuse given. Regardless of hours, a careful and proud owner will not permit his cabin interior to become shabby.

An airplane that has been used for flight instruction, air charter, rental, or other commercial operations, may be readily spotted. The great number of takeoffs and landings at high power settings, and use by "can't care less" renter pilots can take their toll on general condition and appearance.

More than average hours for that year and model have been logged, while the interior will no doubt show the harder usage. Often this type of airplane may be purchased at a better price, since there usually has been many hours of paid revenue time flown. This permits the operator to sell at a lower price.

Sometimes A Good Buy

Low time new demonstrators or airplanes used for limited student, charter, and rental activities that have been properly maintained over the limited amount of time flown, may be good buys in many cases. Some have 200, 500, 900 hours on them, enabling the operator to discount the airplane for a quick sale. Both the buyer and seller usually benefit from these deals.

Flight Test

If your ground inspection warrants further checking into the airplane, the flight evaluation should prove out the flight performance and mechanical condition so that you can proceed to either pass on the bird or make an offer.

Who Is Pilot In Command?

We recommend that you, the prospective buyer, not handle the controls until you have had a complete demonstration of the aircraft by the present owner. This leaves you free to observe and take notes during the demonstration.

The present owner or demonstration pilot usually is more familiar with the airplane and will be able to more ably demonstrate its performance and point out other characteristics. Many discrepancies may show up during starting, taxiing, and run-up.

A hard to start engine, rough idling, low or bad struts, dragging brakes, fumes in the cockpit, and other squawks will be easily noted by the alert prospective buyer. Insist on a good pre-takeoff check by the demonstration pilot.

What To Look For

This should include checking the magnetos, propeller controls, carburetor heat, mixture control, proper oil pressure, oil temperature, and cylinder head temperatures. Determine the proper operation of the flaps and gear warning lights, if the airplane is so equipped.

The owner's manual or airplane flight manual contains performance information for the aircraft, and should be used as a guide to determine if the airplane can still meet the published figures. If the airplane doesn't come close, be suspicious of the bird.

On takeoff, notice if the engine accelerates to full power smoothly. Try to check takeoff distances by using points on the runway and timing your ground run. Takeoff manifold pressures and rpm readings should be noted and compared with those in air craft manuals.

Flight Characteristics

Compare rate of climb figures by timing from takeoff to the first thousand feet, and then to successive 1,000 foot intervals. Note whether engine temperatures stay within proper limits as marked on green arcs in the airplane instruments.

In level flight, true airspeeds may be determined for different altitudes and most important, at the aircraft's optimum cruising altitude. Check the level flight characteristics 'hands off' to determine if the airplane is properly rigged at various power settings.

Proper operation of all flight instruments including the directional gyro, artificial horizon, rate of climb indicator, suction gauge, clock, altimeter, should be determined. Instrument repairs or replacement are expensive, if you buy the airplane with defective instruments.

Avionics

Have the demonstrator pilot turn on each radio for checking communications and navigational capabilities. Check both the speaker and headset for noise or interference. Notice whether the microphone is operating properly, and the strength and quality of your transmission to a tower, approach control or a radio facility. They'll quickly tell you if you are five by five <excellent> or two by two <not too good>.

Navigation Check

Set both navigation receivers on the same VOR station and the same radial to determine the accuracy of each. The Airman's Information Manual contains ground and airborne check points for VOR receivers. Allowable error of a navigation receiver in flight is +/- 6° in the air.

Standard VHF reception distance is 40 to 45 miles at an altitude of 1,000 feet at 'line of sight' with no obstructions such as high terrain between you and the VOR station. Have the pilot fly the instrument landing system so you can check operation and accuracy of the localizer and glide slope.

Other Electronic Considerations

Watch for the marker beacon receiver light and audio operation. Test the automatic direction finder <ADF> for strength and accuracy. If the aircraft is equipped with a wing leveler, two axis or three axis autopilot; have the pilot demonstrate its full capability including the couplers, if any.

All transponders must be TSO'd and tested by a certificated shop or radio technician. All late model Narco, ATG's and AT50's are not approved. If in doubt, check with a local radio shop on the legality of the transponder in the airplane you are considering.

If the airplane is to be flown IFR, then the altimeter and static system must be checked every two years. Air Taxi airplanes must be weighed every three years. List all avionics discrepancies so that you may properly evaluate the airplane. Check a local radio shop for an estimate of the cost for correcting discrepancies.

Bargaining Chips

These figures may then be used in negotiating a price for the airplane. Insist the seller fix avionics squawks or decrease the price accordingly. I recommend having avionics problems corrected by the seller before you buy or take delivery of the airplane.

Turn on the heater, noting volume of heat and presence of any exhaust fumes which indicates a heater or duct leaking and probably the presence of deadly carbon monoxide gas.

Slow Flight

Slow flight and stalls reveal much information about the airplane's low speed range characteristics. Both slow flight and stalls should be done in several configurations of flaps and gear up & down. The stall warning indicators should be checked against the airplanes natural shaking and shuddering approach to a stall.

Final Check

After landing, again look over the engine cowling and propeller for oil leaks and exhaust leaks, especially near the stacks and heater shrouds. Take another look at the landing gear, brakes, fittings for evidence of hydraulic leaks.

Another check of the fuel tanks for leaks after a flight may possibly pay dividends later on.

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