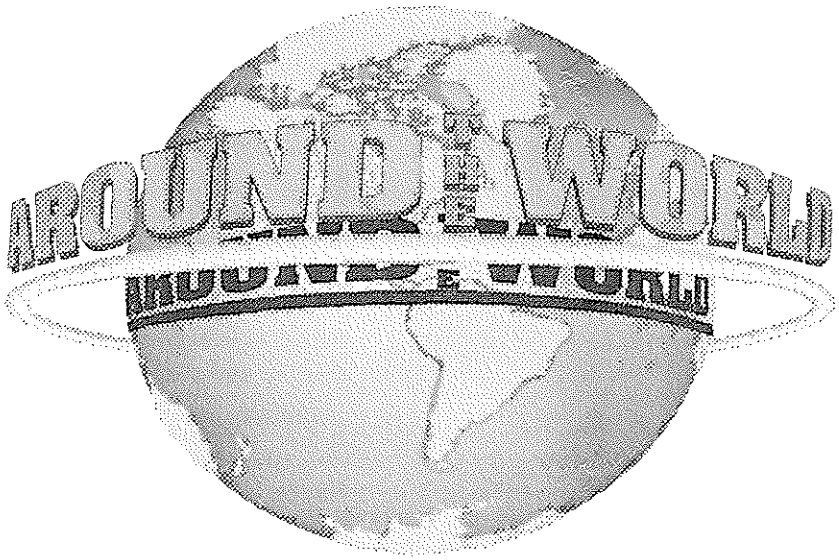
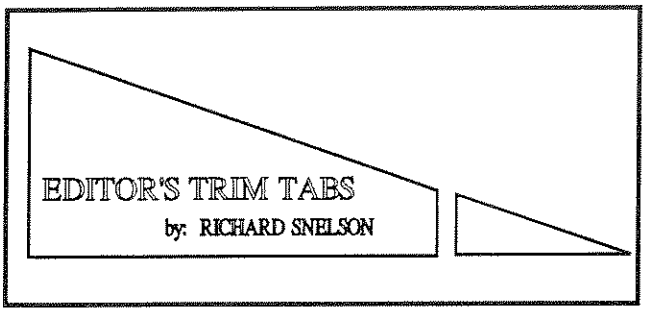
T-18 NEWSLETTER



The Flying Nut Contest Special

IN THIS ISSUE:



Calendar of Thorp T-18 Events for 1994

A return to McAlester, Oklohoma on May 6,7 & 8 (see Gary & Maxine Green's letter in the issue for the details.)

Join my EAA Chapter's Mystery Flying Game on May 21, 1994 to play "Where in Illinois is Homer Sanders". Starting time is 9:00 am at the Decatur, Illinois Airport.

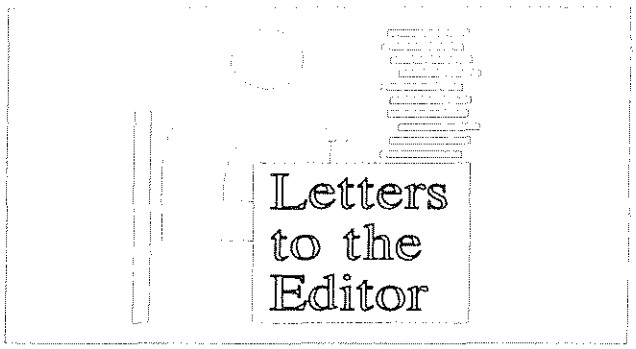
Oshkosh Events are: First Friday night of Fly-In, Butch's Anchor Inn for our banquet
Forum - No date yet
Nature Center Picnic ??? Don't know yet.

3rd Annual Placerville, California Thorp Fly-In on Sept 23-25, 1994

Kentucky Dam on Oct 7-9, 1994

Editors comments on Conditional Inspections:
It really doesn't matter if you have a repairman's certificate or hire a licensed aircraft mechanic to do the Conditional Inspection for you. In either case it's your safety that's at stake. Therefore ''you'' must insure that the inspection is complete and thorough. If the aircraft mechanic doesn't have a history of the homebuilt's problem areas he could easily miss some important item. If you expect that he will read up on your homebuilt before he inspects it you're probably wrong! Where can he find the data and information about your aircraft? It may be in the old newsletters if they are available in your file. However that would take days of reading for him, so I doubt if anyone could afford that. If he's inspecting a C-152 it's easy, just look up that type of aircraft and see what AD's apply. Not so with a homebuilt. We have very few similarities in our engines and equipment types. I'm sure he would know and suggest a venturi change for a MA3 or MA4 carburetor. This is a common problem that all MAs have. Would he go the extra mile to research the rest of the equipment? I doubt it. This brings us back to You! and your safety. What can you do in preparation for the inspection to ensure it is complete?
As a first step, collect information about your homebuilt. Read all the old newsletters again, or for the first time if you're a new owner. Make notes on important things to check for. Make a list and prepare the aircraft for the inspection by going over the plane your self. Do all the necessary or desired maintenance before you take it for the inspection. Don't forget to fill out the aircraft and engine logs as each item or maintenance is completed. And then share any information on the aircraft's history with the mechanic/ inspector.

Several Mutual Aid members that own T-18s and have a lot of experience with maintenance and inspections and have agreed to help up prepare for the inspections. In this newsletter you can read the first of two articles that can be used as general guidelines for a T-18 inspection. Don't consider the article a complete check list, only some of the things to check. Each aircraft is different and will require a special check list or inspection list to cover all the combinations of accessories and equipment. It's your responsibility to complete the list that you the ''repairman'' or the inspector will use as a reference to inspect your aircraft.
I feel fortunate in having built my T-18, which qualifies me for a Repairman's Certificate for performing the yearly conditional inspections on my specific aircraft. With the Certificate I certainly don't intend to spend a lot of dollars to hire the inspections done. However, if I can get another T-18 builder to assist in going over my airplane during the inspection, I would want the added assurance and safety factor it would bring. Be sure and see the article by Dave Eby and Paul Kirik on this subject in this issue.

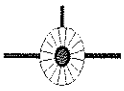


February 9, 1994

Dear Richard:

To keep you somewhat informed, I currently have a standard T- 18 fuselage which I purchased. It was in very bad shape and therefore for the last year I have been in the process of demolishing rather than building an airplane. I'm going the wrong way! Recently, I began constructing new parts, and I must tell you that I am increasing in both my speed and efficiency regarding ruining perfectly good sheet metal. No acceptable parts yet, just a lot of activity. I have many prefabricated components, including ribs, etc. I am looking for a windshield, canopy and a canopy frame as well as an engine cowling. My current plan is to use a 180 HORSE, but that is a long way off! If you can provide any assistance in locating parts or if you here of someone desiring to sell T-18 or S-18 stuff, please use my name. Thanks much!

With regards, Van D. Gray, 116 Flintrock Road, Hewitt, Texas 76643 Phone: (817) 666-2128



January, 24,1994

Dear Mr. Snelson, Please find enclosed my 1994 newsletter dues. It's hard to believe that so much time has passed since Oshkosh, I guess we have about 25 more weeks till '94, I very much enjoyed meeting you and your family, and snapping photos of your beautiful aircraft. The trip reminded me of some of my more younger years and the kindness the T-18 group has always extended. I recently obtained Wendell Green's project and set up a rather cozy shop here at my place of employment. I have been extremely busy lately and have been unable to complete anything other than a couple of ailerons, but it's a start! In addition, I am making a trip up to Seattle to transport Wayne Heigel's project down here (standard wing, standard fuselage, about 80% of the metal work complete) as I have acquired it as well. I hope all is well with your family, including the T-18. I look forward to seeing you at Oshkosh. Take care. Lee W. Walton (T-18 Builder !) DWH Memorial Airport, 20803 Stuebner-Airline #29, Spring, Texas 77379 (713) 370-5235.

KEN C. MORGAN 2011 OAKWOOD LANE ARLINGTON, TEXAS 76012 817/265-6838

23 February, 1994

Dear Rich,

I am sending you an article on my T-18 engine change from 029OG to 032OB2B. I am also including some performance comparison data between the two engines.

I was pleased to hear of renewed interest in the T-18. Those of us flying the Tiger, know how great an aircraft it is. This is probably difficult to get across to new and/or prospective builders, particularly with the RVs setting out there with attractive kit pricing. I was recently in Wichita, KS. for two weeks of aircraft composites lecture/lab and met an EAAer with a 150hp Glassair I converted to tri-gear configuration. He was unhappy with the Glassair because of high wing loading and heavy empty weight (over 1100 lbs). These conditions had a significant adverse affect on the performance of the aircraft. His admiration for the Thorp compared to the Glassair was almost embarassing, but confirms all of our testimonials regarding the

Thorp design and outstanding performance.

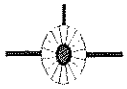
Rich, we appreciate your efforts as newsletter editor, hope to see you at the McAlester fly-in. Cordially yours, Ken C. Morgan

BILL WILLIAMS 2625 PIPKIN RD. LAKE-LAND, FL 33811 (813) 644-9649

MARCH 16, 1994

ANOTHER S-18 THORP FLIES, AND DOES IT FLY GREAT! SATURDAY N30WW FLEW FOR THE FIRST TIME AFTER SOME FIVE YEARS OF CONSTRUCTION TIME. IT LITERALLY FLEW HANDS OFF THE FIRST TIME. BOB HIGHLEY GAVE CHASE IN HIS T-18 AND FLEW OFF MY RIGHT WING. HE ASKED ''HOW DOES IT FLY''? I RESPONDED I GUESS OKAY'' AS I HELD MY HANDS OVER MY HEAD. N30WW IS A WIDE BODY, FOLDING WING WITH AN 0360-AIG AND HARTZELL CONSTANT SPEED PROP FOR POWER. ALL INDICA-TION THAT CRUISE WILL BE AROUND 180 MPH. MORE LATER AS I HAVE TO GET BACK FLYING TO LOG MY 25 HOURS, SO I CAN MAKE MCALESTER IN MAY. REGARDS, BILL WILLIAMS

RICH, Hope all's well with you & RoxAnne. Like to see you 'all at Sun'n Fun if possible. I've formally requested the nature center at Oshkosh for noon of Friday for our picnic. No word back yet. I'll keep on it. Should have another T-18 flying soon. N30WW - Bill Willian's is in the weight and balance, final inspection phase. Cheers, Bob Highley



Mr. Snelson,
I spoke to your wife today about subscribing to your newsletter. Enclosed please find my check for $25.00.

I am interested in buying a T-18 and would prefer one with a 150 HP engine. I do get "Trade-A-Plane", and have found that there are not many T-18's in the Northeast.

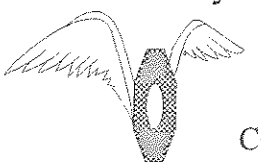
We are planning to go to Sun & Fun and hope to look at some there. Any help you can give me would be appreciated. Thank You. Sincerely, Jerry Romeo 32 Komar Drive, Ballston Lake, NY 12019.

Dear Dick, I went to the fly-in at Ky. Dam in my single place T-18 and had a great time. Had to get back to work in Nash. Tenn. on Sat and didn't get to meet you. I did get to see several great looking T-18s. I asked one memberjust exactly why they were so excited about the T-18's? He said, ''didn't you know, it's the best plane in the world?'' Since that time I have bought yet another T-18. This one a 2-place, 180hp, IFR--T-18. That leaves me with 2 18's, with a need for only one. Ihave enclosed a picture and info on my old T-18. Hopefully someone else would like to take advantage of my situation & buy the single place from me. Enclosed is a check for $ 25.00 for the newslet-ter & also a picture of the T-18 for sale. Hope-fully you know of someone that would be intrested in a great & fun airplane. I have truely loved flying this plane for about 70 hours now. I would like now to get my IFR ticket. In doing so I had to buy a different plane. If you could help me out in any way I would greatly appreci-ate your help. Thanks so much Dana Moore 4515 Nolensville Rd. Nashville Tenn. 37211

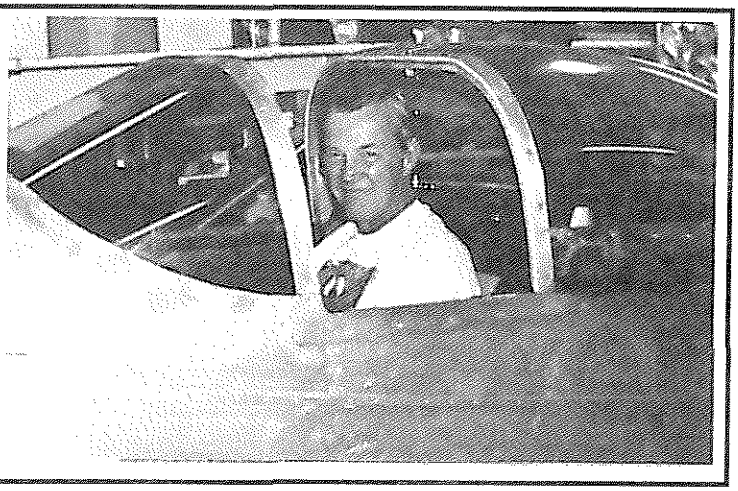
Fat Cat

by

Harvey Mikelsen



CONTEST WINNER



2/18/94

Since Hal Stephens let the cat out of the bag, so to speak, about my project in his Placerville Fly-in article, I might as well come clean. It is a wide body so I have named it Fat Cat and will have a Garfield, the cat flapping his arms in an attempt to fly on the vertical fin, with Jim Davis's permission. The school bus yellow top may have tiger stripes and it might have a white belly. The wings will have the standard plan-form and structure (except for the flap beam which is .032), however the aerodynamics will be all new.

I don't recommend changes to John's fine design, however I am a frustrated aerodynamicist. I have a Master's in Aeronautical Engineering from Purdue U. with a major in aerodynamics. I just retired (Read that laid off?) from Lockheed Missiles and Space Co. after 33 years of every kind of engineering besides aerodynamics.

Enclosed is a drawing of John's 64,412 with his flap. The airfoil is a good WW II technology airfoil and the flap is contemporary for the 1950s and 60s. Computer capability developed since then has allowed advances in airfoil design.

The airfoil I have chosen was designed by Harry Riblett in 1989 after he failed to interest NASA Langley in developing a new series of general aviation airfoils. It was chosen for it's very small pitching moment which should reduce induced drag from our smallish horizontal tail in cruise.

The flap airfoil I chose is the old Clark Y (Used on the J-3 Cub, Spirit of St. Louis, etc.), slightly modified. This choice as well as the cove/gap design was based on the comments of Arthur Phelps in his forum at Oshkosh'92. Mr. Phelps is a NASA Langley aerodynamicist and has modified his own BD-5 wing airfoil. I sent a set of blueprints to Mr. Phelps and he was kind enough to comment on them. Enclosed is his letter.

I made 1/4 scale wing sections with flaps and tested them in my wind tunnel. (I probably have the only private wind tunnel in Sunnyvale, all the rest of them are owned by NASA Ames or Lockheed.) The tests on the T-18 wing section showed separation starting at very small flap deflections at the trailing edge of the flap and progressing forward to incorporate the entire flap upper surface at 40 degrees deflection. The new wing/flap exhibited no separation at all. It also had a 30% increase in maximum lift coefficient at full flap deflection.

From the above testing you might think "Wow, he's in fat city!", but don't. First, separation is a boundary layer phenomena which is a function

of Reynolds Number. My tests were at lower than full size Reynolds Number which would tend to reduce separation tendencies. Second, the ability to use maximum lift will most likely be limited by the tail forces available. Full scale testing, i.e. flight testing will be required before this mod. can be considered a success. Stand by for the results, soon, I hope!

Other changes to my T-18 are: A single cooling air intake below the spinner and a cowl flap between the gear legs to reduce cooling drag. Separate oil cooler and heater NACA inlets. In other words a new cowl design. Twisted gear legs for drag reduction. A 6 inch prop extension between the zero timed IO 360 and the Prince 68/78 prop for improved prop efficiency. Graphite/epoxy canopy skirt and Thorp latch for better canopy seal. Light Speed Engineering electronic ignition in place of one of the mags. Frantz oil filter. Safety cables a la Bill Warwick in News Letter #51. Wet wings. More radios than I probably need including DME and GPS. Sound proofing of the cabin area. A jump seat in the baggage area for my dog, Princess.
Wow! I never sat down and listed all the changes before. For a guy who doesn't recommend changing John's design, I've gotten pretty wild. I hope it all works out.

Harvey Mickelsen Plans #1332 1007 Persimmon ave. Sunnyvale, CA 94087 (408) 737-0559

The letter from A.E. Phelps

A. E. Phelps Ill 883 Barrie Circle Newport News, VA 23602-3401 Tel: 804 874-5870 Fax: 804 873-3711 Jan 24, 1994

Dear Mr. Mickelson:
Firstly, please accept my apologies for being so long in replying to your letter of Dec 22, 1993. I have lots of reasons, but probably no real excuses. In any event, I was very interested to read your letter and to have an opportunity to see what you have done with the T-18 wing design and flap arrangement. From the results you show on Figure 2. it looks like you have an done a very good job with the flap redesign. You may be interested in knowing that the Grumman Gulfstream I commuter turboprop uses a modified ClarkY in a Fowler flap arrangement not too different from your own design. They did not, however, use vortex generators as you show on one of your drawings. Were the V.G.'s on the wind tunnel model? If so, you may want to rerun the tests to get the true effect of the flap nose and cove geometries you have chosen.
Can you, based on the results of your tunnel tests, comment on the effectiveness of Mr. Ribletts modifications to the basic airfoil nose shape in delaying flow separation on the airfoil? So far as I am aware, no systematic investigation on the relative characteristics of the old NACA 6-series cambered sections versus Mr. Riblett's newly cambered versions of the same thickness forms has been conducted, and I am curious to see if his predictions are confirmed by tests. Certainly his analyses using the Eppler II code have shown great promise, but that is an inviscid code and it may not be handling the separation model properly. In any case.. I am happy to see your careful systematic approach being taken before rushing off into a modification effort. Good job.

I have few comments and observations for your consideration: - The 14% Clark-Y section looks very good from your wind tunnel data. Reconfiguring the 15% Clark-Y in the way you have shown should probably be O.K., but you may have premature separation on the aft upper surface. The pressure recovery will be driven by the radius of curvature aft of the maximum thickness point of the flap airfoil, and your recontouring has reduced that radius somewhat. It may not be a problem, but I would suggest staying with a shape you know works based on test data.

Your chosen pivot point looks very good with respect to flap gap, overlap, and Fowler action, but it will of course have higher loads than the

original design. You should check to see that the moment produced by the flap load acting at the end of the longer flap bracket is adequately provided for where the bracket attaches to the wing rib.

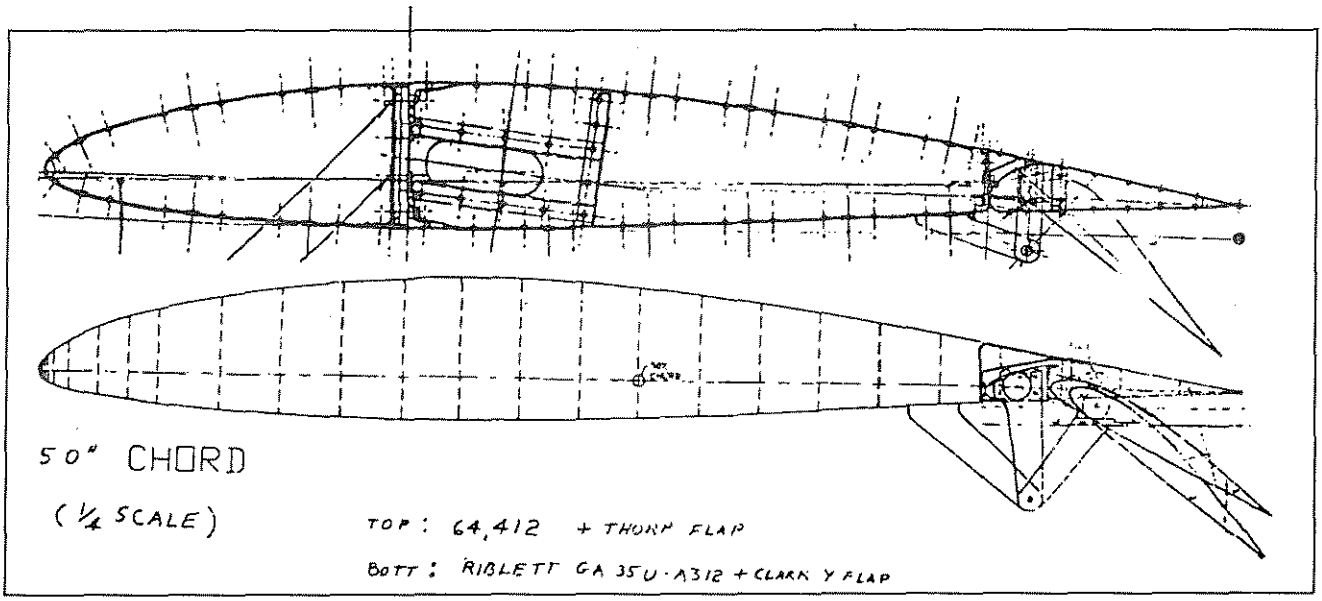
Note the interference of the flap torque tube with the fuselage lower longeron when the new flap is deflected to 40 degrees. It looks like you may have to cut away about half of the longeron flange to allow clearance for the torque tube, so you will want to pay close attention to providing adequate reinforcement across this critical member.

The newer flap is considerably thinner than the original flap designed by John, so you will want to check the structural design of the new flap to make allowance for the reduced section modulus in bending between the flap supports. I would advise strongly against adding a third flap bracket, as that can lead to alignment problems under the deflections that take place when the flap is loaded.

Finally, the improved aerodynamic performance of your flap will result in a more powerful nose-down moment when the flap is deflected. In addition, the fact that you have well attached flow over the flap for the full range of deflections now means that the downwash at the tail will be higher (and probably more powerful as well). So check carefully to see that you won't run out of pitch trim control power from the tail. If it looks like you will, you will probably need to alter the tail somewhat. It may only need a slot at the leading edge to provide a little more effective angle of attack, or it may need to be enlarged.

Congratulations on a nice bit of work - it is apparent to me that you are taking a properly conservative approach to modifying what is, by almost everyone's admission, an already excellent aircraft into an even better one. If there is anything else I can do to help, or if you would like to discuss any of these comments in more detail, please don't hesitate to call. Again, please accept my apologies for the late reply.

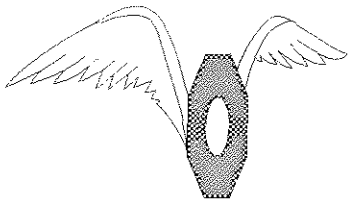
Best regards, Art Phelps Eph. 3:20.21



Harvey Mickelsen drawings of the wing profiles

ENGINE SWAP

by Ken C. Morgan



CONTEST WINNER

T-18 ENGINE INSTALLATION 032OB2B VS 029OG

I have written several articles for the newsletter on the conversion of the 029OG to improve its performance and obtain 135-140hp. This modified 029OG engine has been a terrific performer in my T-18 with cruise speeds in the same range as most 0320 powered Thorps. An outstanding Pacesetter 68" X 69" cruise prop has also contributed to the above average performance. You're probably wondering why I would go to the trouble of changing engines to obtain 20 to 25 more horsepower. The main reason was the fact that I had a low time 032OB2B 160hp on the bench, needing only an overhaul. I was also confident that I could find a builder that would be interested in the modified 0290, with only 100 hrs total time. 0320 performance improvements would include better take off/ climb with two aboard, and increased T-18 resale value with a certified engine installed. Horsepower increases are not always the answer as there is a point with the T-18, and other similar aircraft, where added HP and weight will have a negative effect, with little if any added performance and a marked deterioration in handling qualities. The 032OB2B was low time but had not run in about 15 years. I didn't know its condition but was hopeful the jugs would be clear of rust and corrosion after such a long hibernation. Fortunately, the original chrome had protected the cylinders with only a rejuvenation and satin finish process (last step in cermichrome) to make them like new. A standard major was accomplished on the 0320, including case inspection; inspect and polish crank (standard); cam/tappet recondition; new bearings, rings, pistons (new pistons and rings are less expensive than rings for the old pistons); and carb overhaul/update with needle/seat and float components. Major rotating components were weighed and balanced prior to final assy. I completed the overhaul in May of 93 and after several months, located a buyer for the 0290G. At that point, I had mixed feelings regarding the swap as the 029OG had done such a good job and was just getting broken in with about 100hrs TT. I might mention this engine change was from one conical mount (flat back) to another conical mount. The change from conical to dynafocal, or narrow to wide deck is more complicated and would require a change in engine mount, controls, carb intake, baffling etc.

The actual engine swap was relatively simple; however, with the 029OG out, I did clean up the firewall and brake line system, and plumbed vacuum lines for installation of a dry vac pump to run a DG and Horizon.

0320 Impressions

First Run: The 0320 engine was nosier and seemed to run rougher than the 0290, particularly at idle. Probable cause, new engine, more power, and higher compression. I used John T's overhauled engine "run in" procedure; "Run as little as possible on the ground, check for leaks, and get it in the air for proper cooling". First flight with the new engine was performed at 80% to 90% power at 4 to 5K feet for 1 1/2 hours. Except for high green oil temp all indicators were normal. Oil temp has dropped to mid

green, after 35 hours on the new engine.

Performance

As I have used the same Pacesetter prop (68" X 69"), the cruise performance is about the same (165mph indicated, at 24OOrpm). Takeoff and climb is substantially improved with the 0320. Static is 2300 rpm, with take off roll shorter by several hundred feet. At 120mph indicated, rate of climb is 1400ft/min (0290, 1000ft/min) single pilot. Top speed on the deck at 28OOrpm is 196mph indicated (0290 26OOrpm 188mph).

Weight/Balance: The 0320 added about 25lbs; however, that included the addition of a dry vac system. The empty CG moved forward slightly to compensate for the added weight. There were no inflight tendencies to bunt (horizontal tail stall) with full flaps above lOOmph. Stall is about the same for both engines, 63 clean, and 61 with flaps.

Recommendations

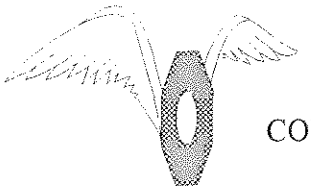
I had fun running with the big boys, at cruise, with the 0290G. The T-18 can be a good performer with the 029OG modified engine, and a properly matched prop. I always felt this was the engine John intended the T-18 to have, and it satisfied the T-18 purist in me. However, if your looking for a performance boost, particularly during takeoff and climb, the 0320 would definitely be the way to go. The expense of purchasing an 0320 engine just to get this added performance would depend on your spending limits, and performance requirements. In my case, I had traded for the 0320, and did not have the expense of procuring a new or used engine from scratch. I was also able to sell my 029OG for a good price, helping to offset the overhaul expense on the 0320. If you are starting out needing an engine I would recommend going with the 0320, but again, it depends on what might be available out there. A low cost (if thats possible) 0290G, that can be modified for 140HP output would certainly be an acceptable alternative. My references to the 0290 are for the G modified to achieve 140HP or the 029OD2, 135HP.

If you have plans to change your engine, or need a power plant for your T-18 give me a call. I would be happy to visit with you, and discuss your engine requirements. Happy T-18 Flying!

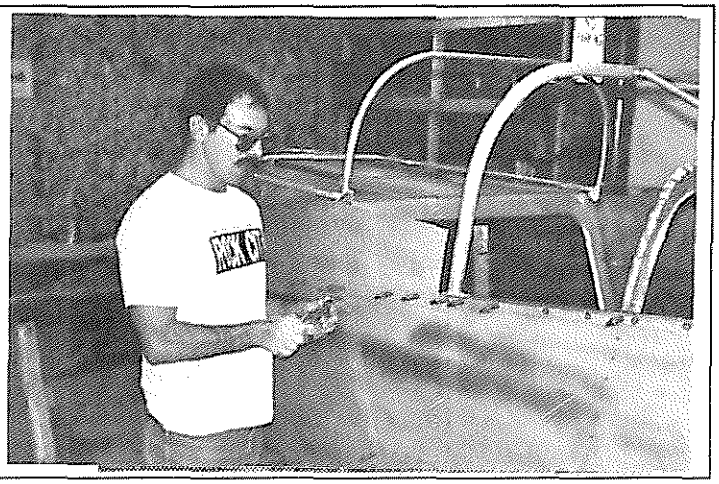
Ken C. Morgan, Thorp N46806

Project Report

by Roy Farris

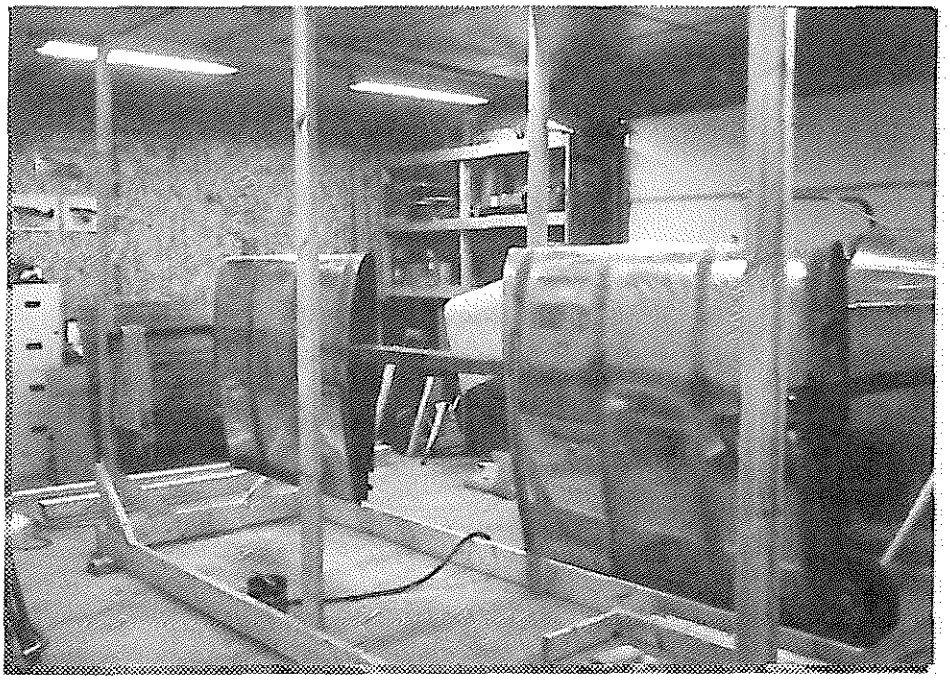


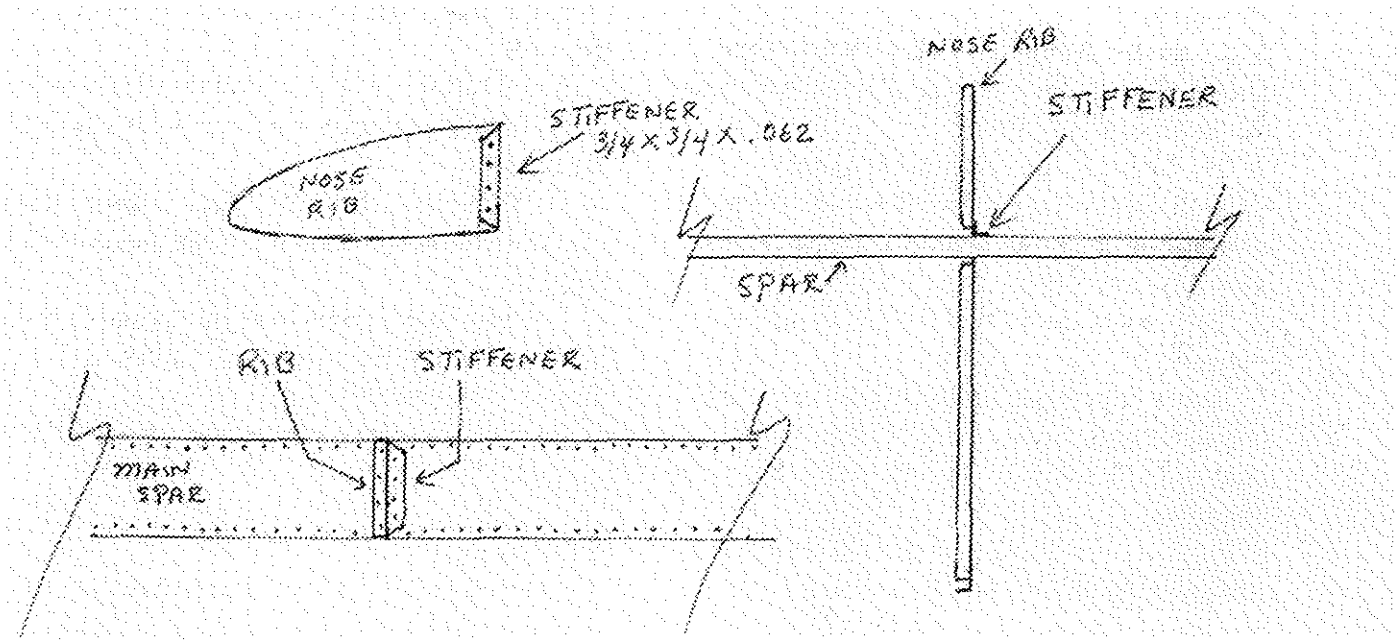
CONTEST WINNER



DEAR RICH, HERE IS MY NEWSLETTER CONTRIBUTION FOR THE NUTS & BOLTS CONTEST. I SURE WOULD LIKE SOMETHING FROM DON TAYLOR'S AIRPLANE TO PUT INTO MINE FOR GOOD LUCK. I HAD THE OPPORTUNITY TO MEET DON LAST YEAR AT OSHKOSH, AND HAD THE MOST WONDERFUL TIME TALKING WITH HIM ONE NIGHT AT DINNER. HE IS A FASCINATING GENTLEMAN TO LISTEN TO. I HAVE ENCLOSED A COUPLE OF PICTURES OF MY PROJECT. I HAVE BEEN AT IT FOR TWO YEARS COME JANUARY OF ''94''. SO FAR I AM SATISFIED WITH MY PROGRESS, AND I THINK ANOTHER SIX MONTHS WILL SEE ALL THE MAJOR METALWORK COMPLETED. I DO HAVE ONE ITEM THAT MAY BE OF INTEREST TO OTHER BUILDERS. THROUGH OUT MY LAST FOUR YEARS, I HAVE BEEN LEARNING ALL I CAN ABOUT THE T-18, SO I COULD INCORPORATE THE MOST UP TO DATE FEATURES POSSIBLE INTO MY PROJECT I LEARNED EARLY ABOUT THE SMALL DEFORMATION IN THE UPPER WING SKINS JUST AHEAD OF THE MAIN SPAR, THAT MOST ALL T-18'S SEEM TO HAVE. I LISTENED TO THE OTHER BUILDERS AND PILOTS ABOUT ITS PROBABLE CAUSES AND WHAT COULD BE DONE TO ELIMINATE IT. THE PROBLEM SEEMS TO BE CAUSED WHEN THE NOSE RIBS COMPRESS IN THE UPPER CORNER WHERE THE RIBS ATTACH TO THE MAIN SPAR. WHEN THE RIBS COMPRESS THIS CAUSES THE UPPER SKIN TO FORM A SMALL HUMP RIGHT IN FRONT OF THE MAIN SPAR. THIS ''HUMP'' IS PRESENT ON ALMOST ALL T-18'S THAT I HAVE SEEN. FROM WHAT I CAN GATHER, THE DEFORMATION IS CAUSED BY NORMAL WING LOADS, AND ONCE PRESENT NEVER SEEMS TO GET ANY WORSE. THE SOLUTION I BELIEVE IS RELATIVELY SIMPLE, HOWEVER, I DO NOT TAKE CREDIT FOR THE IDEA. I HAVEN'T HEARD OF ANYONE ELSE DOING IT, SO MAYBE I AM THE FIRST. THE FIX, IS TO ADD A 3/4 x 3/4 x.062 ANGLE STIFFENER, BETWEEN EACH NOSE RIB AND THE MAIN SPAR. IT IS AN EASY PROCESS AND SHOULD ADD ENOUGH RIGIDITY TO THE RIBS TO PREVENT THEM FROM COMPRESSING. THE STIFFENERS RESEMBLE THE VERTICAL STIFFENERS THAT MOST OF US ADD TO THE CENTER WING MAIN SPAR. I'M NOT SURE, BUT I BELIEVE THAT THESE RIB STIFFENERS COULD DOUBLE AS THE VERTICAL SPAR STIFFENERS, THUS KILLING TWO BIRDS WITH ONE STONE. I ADDED THESE STIFFENERS TO EVERY NOSE RIB IN THE WING. FOR REASONS THAT I WON'T GET INTO, I NEEDED TO SPACE MY NOSE RIBS FORWARD BY.062" SO I WAS ABLE TO ATTACH MY STIFFENERS BETWEEN

THE RIB FLANGE AND THE SPAR. I ATTACHED THE STIFFENER TO THE RIB SIDE BY FOUR-4 RIVETS AND THEN TO THE SPAR USING THE RIBS OWN MOUNTING. ON THE OTHER HAND, THE STIFFENER COULD BE ATTACHED TO THE SPAR OPPOSITE THE RIB FLANGE, AGAIN ATTACHED TO THE RIB BY FOUR -4 RIVETS AND THEN SEPARATELY TO THE SPAR BY FOUR, -4 RIVETS. I HOPE MY EXPLANATION IS UNDERSTANDABLE, AND ALTHO MY DRAFTING SKILLS ARE NONEXISTENT I HAVE INCLUDED A COUPLE OF DRAWINGS OF THE RIB STIFFENER AND IT'S APPLICATION. LET ME KNOW WHAT YOU THINK. KEEP'M FLYING ROY FARRIS NOBLE, IL

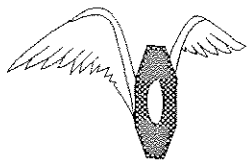




THE REGULATORY ASPECTS OF EXPERIMENTAL AMATUER BUILT AIRCRAFT INSPECTIONS from Dave EBY

The Requirement:
FAR Part 91.409 requires annual inspections; expect EXPERIMENTALS, this is why experimentals get "CONDITIONAL INSPECTIONS", not annuals. The requirement for a conditional inspection in the preceeding 12 months is on the limitation sheet to the aircraft.

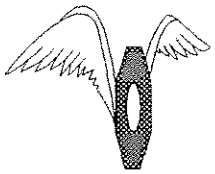
Who may do it?
Advisory Circular 65-23A allows a certified repairman, A&P, or rated repair station (AI) to conduct conditional inspections. AC 65-23A tells a homebuilder how to get a repairman certificate for his/her aircraft.



What must be done?
FAR Part 43, Appendix D lists the scope and detail of the inspection.

How is the inspection recorded?
FAR Part 91.417 specifies the records (Log Book) that an owner must keep. the entry to be made after the conditional inspection is in AC 65-23-A, " I certify that this aircraft has been inspected on_____ in accordance with the scope and detail of FAR Part 43 Appendix D and found to be in a condition for safe operation" The entry will include the aircraft total time in service, the name signature and certificate type and number of the person performing the inspection.

A STARTING PIONT CHECKLIST FOR THE CONDITIONAL INSPECTION
by Paul Kirik



Powerplant
1. Loose wooden props - check bolt torque frequently i.e. each change of season or every 50 hours of flying time.
2. Cracked spinner bulkhead & cones
3. Bushings moving forward out of the prop extensions flange into wooden props causing looseness and broken prop bolts.
4. No fire shields on fuel lines in engine compartment.
5. Brittle & cracked rubber fluid lines in the engine compartment. These hoses should be changed at least every 5 years due to heat deterioration.
6. Engine compartment wiring & fluid hoses not properly secured to engine mount etc.
7. Engine controls hard mounted from the firewall instead of from standoffs on the engine.
8. Carbs should have metal floats & one piece ventures.

Fuel System
1. Cracked fuel tank at fuel outlet boss weld.
2. No flexible fuel line between main tank & firewall.
3. Fuel shutoff valve mounted on fuel tank not within reach of pilot when wearing a shoulder hardness.
4. Fuel tank vent line not of fuel resistant materials. **(this recently caused a T-18 forced landing)**
5. Leaking seal on maintank fuel quantity transmitter mount. This is the main source of fuel fumes in the cockpit.
6. Fuel filler cap not marked for type & quantity of fuel.

Landing Gear
1. Cracked welds on ''A'' frame gussets
2. Rubber ''donut'' spacers between landing gear & firewall - worn & extruding out of position.

3. Loose axle mounting bolts - these should be checked for torque annually. They are mounted in tension & tend to stretch when we get current in one pass.
4. Worn or broken lower engine mount bolts on aircraft operating out of rough fields. ''MS'' high strength bolts should be used in place of ''AN'' bolts. (slight reaming will be required)
5. Nyloflow low temp brake lines run through engine compartment - should be aluminum or stainless.

Control Surfaces & Systems

1. Excessive wear of rudder mounting bushings.
2. Excessive movement in stabilator mounting bushings. (Note: in both cases it is necessary to manufacture oversize bushing & slightly ream the mounts to obtain a good fit)
3. Rudder & flap bushings rotating on bolts instead of control surface hinges. It is necessary to tighten the bushing bolts.
4. Interference between flap & aileron with the flaps fully extended.
5. Stabilator & stabilator tabs not properly rigged.
6. Ailerons not having proper travel in either direction - requiring rerigging.
7. Balance weights installed inside of stabilator leading edge not secured to leading edge skin per the drawings.
8. Interference between flap cables, rudder cables & trim in the forward & aft tunnels in cockpit.
9. Cracked welds in rudder pedal assembly at bottom welds.
10. Cracks in welds of control yoke, walking beam, vertical mount tube. (This has resulted in one fatal accident after complete failure)
11. Excessive play in pitch trim jack screw mount.
12. Check control stick for cracks (we know of one that broke just as the plane lifted off)

Airframe

1. Loose rivets on inboard wing mainspar caps. Rivets should be replaced with oversize cherrylock rivets as necessary and additional rivets installed per newsletter article.
2. Corrosion on inside of fuselage belly skins at low points - primarily just ahead of 601 bulkhead & aft of rudder pedals. Drain holes should be installed at low points.
3. Cracks in vertical stabilator top rib in area of top rudder hinge attachment.

TIPS ON LYCOMINGS

from Textron

A Reprint from the RV Newsletter

At the recent Aviation Exposition in Portland, representatives from Textron Lycoming gave us some tips on operation.

Lead fouling can be a problem, particularly when running on 1OOLL. A few simple procedures can help: 1) When leaning in cruise, apply carb heat for several seconds. Immediately after removing carb heat, beginning leaning. Slowly lean to peak EGT or until the engine begins to run rough, then richen 25 to 50 degrees F. 2) On shut-down, run the engine at 1200-1500 rpm for 15-20 seconds, then pull the mixture. Pull the throttle to idle after the engine begins to die. If you do have to remove the spark plugs to clean them, you can immerse the electrodes in Hoppes #9 gun solvent to help soften and remove the lead. When reinstalling the plugs, clean the inside of the plug tops and the ''cigarettes'' with MEK or acetone. Lycoming says it is important to do this every time. It removes the skin oils, grease residue, and other impurities that can form an electric ''bridge'' across what should be an insulated area, leading to premature failure. Use a small amount of anti-seize compound on the spark plug threads -- our new mechanic, Phil Duyck - a man who knows small airplane engines very well -- says emphasize the small amount, He also recommends setting the plugs in 0-320s and 0-360s with a torque wrench to about 30 ft-lbs. (Incidentally, the Lycoming rep told me that the long electrode REM37BY Champion

spark plugs that came with my 0-320-E3D engine may be used, -- see Lyc-Service Letter L192B-- even though they were not on the list of approved plugs I consulted. The different electrode pattern on these plugs was evidently developed to combat lead fouling. Since the -E3D is a low compression, 80 octane engine, and in many parts of the country 80 is not available, I will probably have to run 100LL on trips, which has four times the lead content of 80187. I'm going to try them ..... ks) We also discusses leaning procedures for taxi, climb, and cruise. Lycoming's recommendation was that the engine should idle between 550-650 rpm. (The low inertia of a wood prop usually prevents a smooth idle at less than 700-750 rpm, so d you are running lumber, this is acceptable). If the mixture is pulled to idle/ cutoff while the engine is idling, the rpm should increase 20-30 just before the engine stops. If it surges higher, the idle mixture is too rich and should be readjusted. Once the engine is properly adjusted, mixture may be left rich for taxi. On climb, the mixture should be left full rich until power is down to 75%. This power might be achieved a couple of different ways. Because RVs climb so well, you may choose to reduce power soon after a takeoff and climb at something like 75% -- if so you can lean to 50 degrees rich of peak, adjusting every once in a while as you go up. If you leave full power in, you should delay leaning until manifold pressure (rpm if you have a fixed pitch prop) drops off to 75% power. As long as the airplane is climbing, the engine should be left slightly richer than it is for cruise, to help with cooling. These and a few more tips are more fully discussed in Lycoming Service Letter L192B of Jan. 19, 1988 and Service Instruction 1094C dated Jan. 31, 1969. A chart of approved spark plugs is shown in Service Instruction 1042T of April 23,1993.

CRANKSHAFT OIL SEAL LOSSES FROM CENTRAL STATE'S ASSOCIATION

In recent months there seems to have been an increase in the number of crankshaft oil seal losses. This, as Australian Magna Liset discovered, causes loss of all lubricating oil resulting in a seized engine. Fortunately Magna had just completed the long over water flight from Australia to New Zealand before the seal popped out. Some old narrow deck Lycoming engines have a sheet metal retaining washer screwed to the crankshaft end of the case. This covers the oil seal thus holding the seal in place, even if it tries to slip out. It seems that later model tractor application of these engines don't require any retainer. Pusher applications may not follow the same rule, however. (Lycoming disagrees with the statement and says neither pusher nor tractor applications need the retainers, see below) The next time you are at your airplane see if your engine has the retainer. I have an 0-235-C and there is no retainer plate or screw holes on it. The oil seal retainer installation is covered by Ly-coming Service Instruction No. 1073A. It seems Lycoming made a crankshaft oil seal retaining plate safety kit, part number 74034. This kit included 2 oil seal retaining plates PN 74026, 4 #1 0-24 capscrews PN 74330, and 4 plain #1 0 washers PN STD-425. All Lycoming engines, that I can recall, have cast bosses in place on the crankcase. These bosses are sometimes drilled and taped for screws to hold the oil seal retainer ring. Perhaps it would be wise to install such a seal retaining method on all our engines. If your engine is down for overhaul it would be a simple matter to drill and tap the bosses

for a small screw (perhaps #1 0-24?) to hold th6 retaining washer. Such a washer could be easily made from flat thin aluminum stock (perhaps .032 2024T3?). If your engine is not apart you might consider cleaning the end of the crankcase VERY CAREFULLY and RTVing two halves of a split washer to the end of the case to retain the seal. Caution: be sure to use a fuel and oil proof type of RTV. Those of you who are running the B & C style of alternator drive pulley may be already covered. My pulley is so close to the crankcase that I don't see how the relatively wide seal could sneak by it. Of course no engine discussion is complete without a little CYA. To that end I called Gary Earon of Lycoming at (717) 327-7096. He said that the above idea would require field approval and the usual official paper chase. I indicated these were in experimental aircraft and he said it didn't make any difference because they were certified engines. He wouldn't offer any suggestion or feeling about the above retainer plate so I thought I'd find out what causes oil seals to ''pop out''. Gary said, ''There are only two reasons for oil seal loss: excessive crankcase pressure and improper oil seal installation.'' I asked how one might check for excessive crankcase pressure and he indicated pressure should be measured using an air speed indicator as a pressure gauge. The ''air speed'' should fall between 45 and 60 mph at full throttle. (For those of you using a water manometer that means no more than 1.7") The ''air speed'' indicator would be connected with the pitot port going to the oil filler tube. He suggested mak-ing a plug that fits the filler tube and temporarily replaces the dip stick. This plug would have a tube installed that allows attachment to the pitot side of the ''air speed'' indicator. The static port would be connected to the normal static ambient air pressure. The correct method of oil seal installation is listed on Lycoming Service Instruction #1 324A which Gary said would be available from any mechanic. I contacted 3 different A & P's to find they did not have such a thing. Lycoming's official answer was to contact Avial for a copy. I called the closest one, which is in Columbus, Ohio at (614) 258-3477, and requested a copy of the bulletin. They indicated they would send me one at no charge.

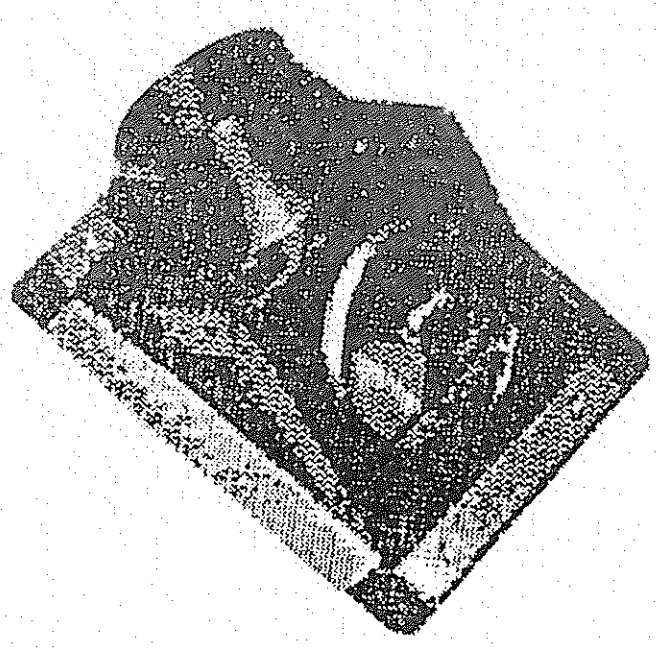
CABIN HEAT BOXES

MOUNTS ON FIREWALL TO DIRECT AND CONTROL HEAT TO COCKPIT, WINDSHIELD, ETC.

DESIGNED FOR USE WITH 2" AERODUCT. LIGHTEST (LESS THAN 5 OZ. TOTAL) AND MOST COMPACT AND RELIABLE DESIGN AVAILABLE. ABSOLUTELY HIGHEST QUALITY AND CONSTRUCTION. AIRCRAFT GRADE ALUMINUM, AND STAINLESS STEEL DOOR AND HINGE ASSEMBLY.

THIS IS THE BEST AND LEAST EXPENSIVE HEAT BOX AVAILABLE.

ADDITIONAL 2" ALUMINUM FLANGES ALSO AVAILABLE. MAY BE RIVETED OR WELDED.



BOXES — $50.00 EA.
+ 3.95 SHPG. & HANDLING

FLANGES — $5.00 EA.

JOHN EVENS
6855 ALLISON ST.
ARVADA, CO 80004
(303) 420-2724

Ron and Jane Hayes' beautiful "Best at Oshkosh 93" Thorp T-18

Richard, Sorry this took so long, I am not a good photographer or a writer! The hours are climbing and 102RH has been performing well! I am in the process of putting in a Garmin AVD 100, but really hate to quit flying long enough to mount it. The GPS operates hand held as well as panel mount so why bother mounting it during good flying weather? At 2300 and 23" I still am getting about 185 MPH. I have not calibrated the airspeed but the GPS seems to agree with my indicated. We are enjoying the Thorp and am looking forward to the Greely Fly In. Thanks Ron and Hayes.

Editor's Report: On "Let's bring Kay Thorp to Oshkosh 93"

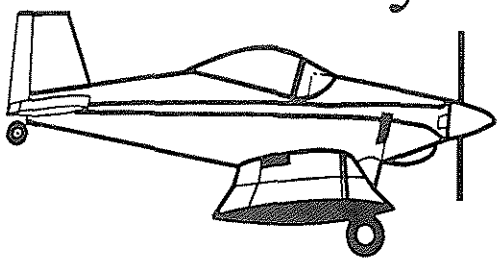
First let me thank everyone for their help in making Oshkosh 93 and Kays trip to the fly-in such a great success. Here's a run down on what the money went for.

Kay's travel & room while at Oshkosh	$800
The picnic at the nature center	$300
A check was sent to the EAA for a Memorial Wall plaque for John.	$200
Total:	$1300

Thanks again to all the T-18 Mutual Aid Members that contributed to this great T-18 Event.

Your Editor, Richard Snelson

McAlester Fly-In

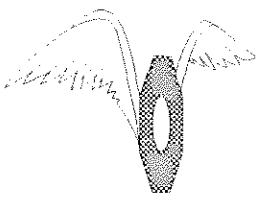


Gary and Maxine Green at Oshkosh

Feb 22, 1994

Dear Rich and Roxanne,

Enclosed is my $25 check for the newsletter. You sure put out a high quality publication. I'm taking over newsletter editor duties for our EAA chapter and I wish I knew how to put out the graphics and style that you do. But, I'm definitely computer impaired. The Spring Fly-In at McAlester is a go. I talked to Dee Cobb at the Holiday Inn in McAlester today. They'll make us the same deal as last year at the same price. That is $46 + tax for a double room. Folks have to call and make their own reservations. They ought to do it now since they can cancel up to the day of arrival at 6 PM in accordance with standard Holiday Inn policy. The phone # to call is 918-423-7766. They should mention that they want to be with the Holt- Green Party. I also talked to Phil Brenner at the McAlester Airport. They must have enjoyed us last May because they seem anxious to have us back. Phil said we can again use the vacant FSS facility. They have even spruced it up a bit. He also assured me they would make every effort to shelter as many planes as possible in the big hangar and hail sheds in the event of threatening, weather. I appreciate that attitude. Phil will also give us a discount on gas at least as good as last year, which was $1.75/gal. I'm going to have Leroy put the arm on him and see if we can't get him down to around $1.50/gal. I understand the supermarket owner who treated us so well last year is looking forward to our return and will again fix us up for our cookout if he can get a ride or two in a T-18. I reckon we can handle that! We plan on having a practice cookout/social hour on Friday nite (May 6th) so we will be in top form for the main event on Saturday nite (May 7th). Anyone who didn't have fun at that last year was just plumb anti-social. If it's too late to get this info in the T-18 NEWSLETTER, I'll send out a letter on it if you can provide me with the mailing labels or a mailing list. Leroy and Mary are in the Baja now, so I haven't talked to them recently but I'm pretty sure everything is on schedule for one of our best T-18 Fly-Ins yet, if the weather patterns cooperates.



Gary & Maxine Green
2530 Bellchase,
Granbury, TX 76048
(817) 579-1995