T-18 Newsletter

June 2007

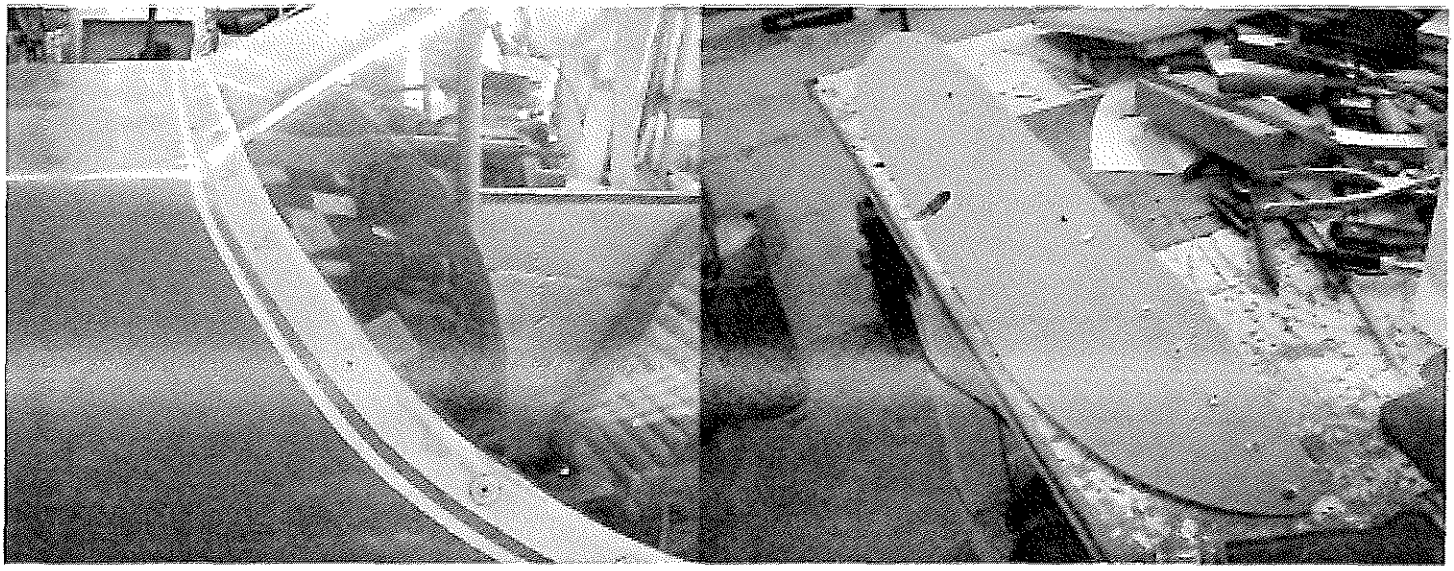
Jan Kemp ~ ZU-EOG ~ South Africa

In This Issue:

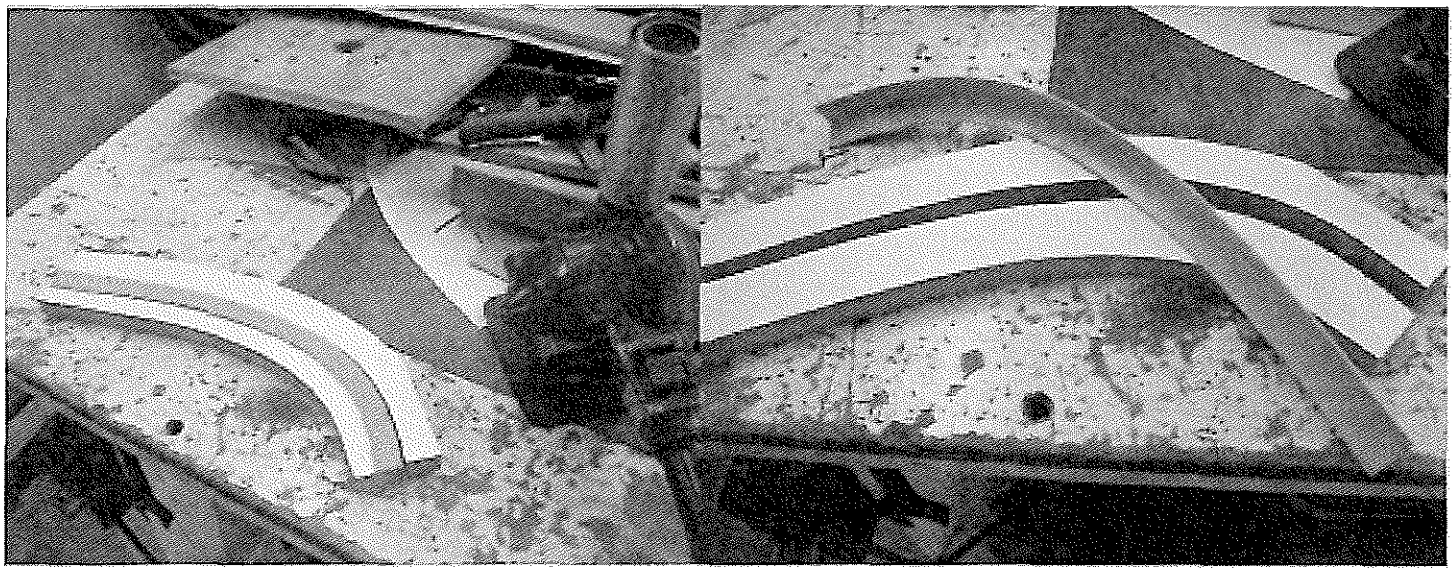
What To Do About The Top Of The Instrument Panel

By: Bob Highley

My recent engine install required some new gages. That got me to looking at the cover for the top of the instrument panel. I have never really liked what I had since it was one of the last things I made those many years ago when I was hurrying to finish my plane. I decided to make a new one.

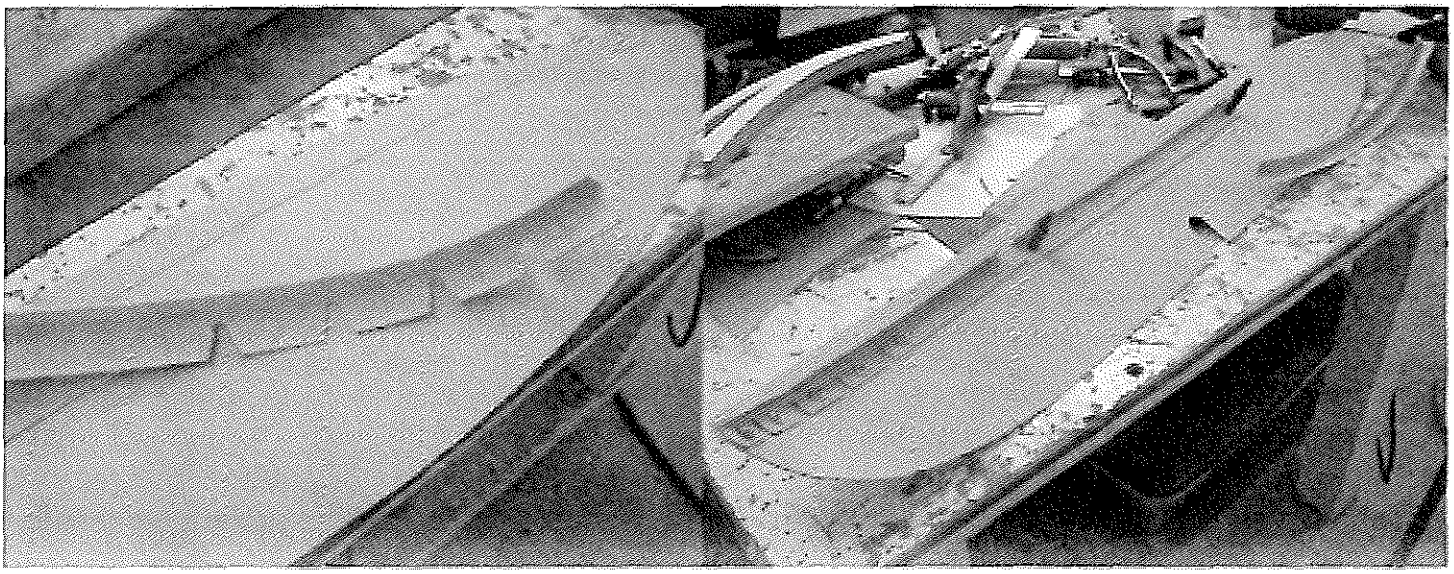


First, I got some .060 Kydex scraps from a friend in the business. I made the top of the cover to fit the opening with a little overhang for a glare shield.

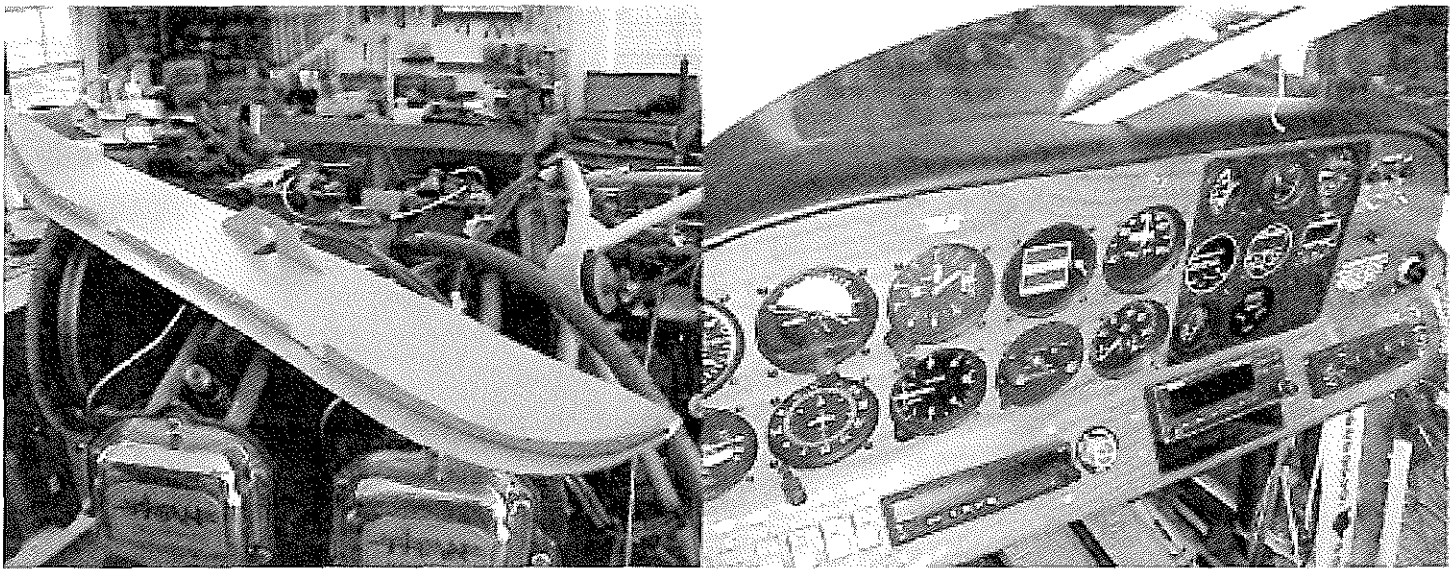


I made some stiffeners by making a simple form out of particle board. The profile was transferred from the instrument panel to make the form. After clamping a strip of kydex in the form, I heated it with a heat gun and just laid the flange down with a piece of wood. Don't use you fingers as Kydex forms at +185 degrees. This stuff is a lot of fun to fool with. It is the stuff they make the seat backs and tray tables for airliner intereriors.

What To Do About The Top Of The Instrument Panel, cont.



I notched the stiffeners to make them go around a bit of a compound curve and Pop Riveted them in place. Kydex is almost impervious and doesn't glue well, so the manufacturer suggests mechanical joining.



The left picture shows the finished top prior to covering it with foam and vinyl (Why yes, that is the new engine in a supporting role!). I put a bridge across the slot for the windshield support tube just to stiffen it up a bit. On the right is the finished product.

I used Kydex for a lot of the panels in my interior. The thinner varieties are sold as institutional wall covering under the trade name Korogard. I even used the thick version to make the front bulkhead of my Brock prop spinner, but that's another story.

Some helpful web sites:
www.kydex.com

A Little on Weight and Balance

Steve Rosenzwieg wrote: Can any of you confirm what the recommended C.G. limits are for the T-18? My W&B shows 71.38 to 80.81 Also the arms to the following areas don't seem to match the plans. There appears to be a difference of about 10 inches, so I don't know if the builder of my T-18 used a different datum for station 0 or not.

Pilot arm = 98.0
Baggage arm = 123.0
nose fuel arm = 61.0

If someone could compare with theirs, I'd appreciate it.

Steve
N48PW "Kong"

I ran across the same problem trying to figure my aircraft out. I didn't have much documentation since it has had several owners. I weighed it and it did not add up because the CG range had been quoted to me based on a builder's datum that differed from the plans. I bought a set of plans and figured out the problem. I'm not sure why, but some people have chosen to use a datum different than the plans. It is not a problem to do so for any particular aircraft as long as you mathematically reach the same balance point within the mean aerodynamic chord range, but the numbers out there can get confusing if you don't realize that some people use different numbers.

To make a long story short, the CG range if you use the plans drawing station as your datum, is 62.5 to 71.0 inches as engineered by Mr Thorp. It seems to work well for my aircraft and I keep it within that range. My aircraft (O-360 w/ constant speed prop, standard T-18) with no baggage, full fuel, and just my 185 pounds of pure muscle and bone, sits right at the forward end of that CG and handles perfectly there. I haven't explored the aft end really but I know there lots of expertise and opinions out there from guys with the lighter weight motors about the aft CG issues.

Glen Corell

On pages 5 and 6 you will see John Thorps original Weight and Balance for his airplane. These pages were made available by Richard Eklund. Looks pretty simple doesn't it!

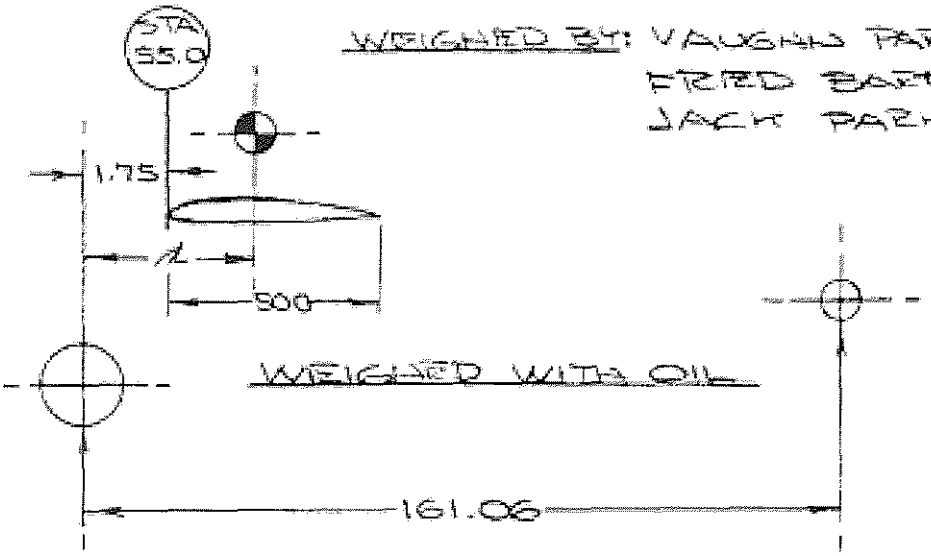
Hello Fellow T-18'ers.

I have just established a website at www.birchalls.com.au/thorpt18 This may be of interest to you for the newsletter as it has many photographs of my aeroplane, showing details of the 'go faster and pretty up mods' to be seen on my aeroplane. The photographs are numbered saying what they are on the website.

Unfortunately my aircraft is for sale. It was finished in 1995 and has only flown 650 hours since that time due to my health problems. I have it for sale for sixty thousand Aust.dollars. It flies like a dream and I am very sad. Thankyou for all your help. kindest regards

Ray Tilley. 56 Bald Hill Road.Launceston Tas.7250 gtilley@tassie.net.au

WEIGHT & BALANCE
THORP T-18, SERIAL # 02
N 18 JT (JOHN W. THORP)



WEIGHED BY: VAUGHN PARKER
FRED BARNES
JACK PARK

LEFT	448.5
RIGHT	448.5

TAIL = 41#

MAIN GEAR 897.0#

WEIGHT EMPTY (WITH OIL) = 897 + 41 = 938#

$\Sigma_{\text{MOMENTS}} = 0 = 938\,\ell - 161.06 \times 41$

$938\,\ell = 6603.46$

$\ell = 7.04$

STATION = 55.0 − 1.75 + ℓ = 53.25 + 7.04

STATION = 60.29" (AS WEIGHED)

MOMENT = 938 × 60.29 = 56,552.0
(AS WEIGHED)

PREPARED	Thorp	23 Feb 72	WEIGHT + BALANCE SERIAL # 02	MODEL T-18
TRACED				
CHECKED				
APPROVED			THORP ENGINEERING CO.	E-130
APPROVED				63

cont pg 6

ITEM	WEIGHT	STATION	MOMENT
EMPTY (WITH OIL)	938	60.29	56,552
FUEL (29 GAL)	174	50.0	8,700
PILOT	170	85.5	14,535
FORWARD C.G. 62.2 - 55.0/50 = 7.2/50 = 14.4%	1282	62.2	79,787
PASSENGER	170	85.5	14,535
BAGGAGE	100	109.0	10,900
GROSS WEIGHT 67.8 - 55.0/50 = 12.8/50 = 25.6%	1552	67.8	105,222
LESS FUEL	174	50.0	8,700
REARWARD C.G. 70.0 - 55.0/50 = 15/50 = 30.0%	1378	70.0	96,522

PREPARED	Thorp	29 MAR 72	WEIGHT + BALANCE SERIAL #07	MODEL T-18
TRACED				
CHECKED				
APPROVED			THORP ENGINEERING CO.	E-130
APPROVED				64

Wing Skin Tightener

By: Stephen R. Peirce

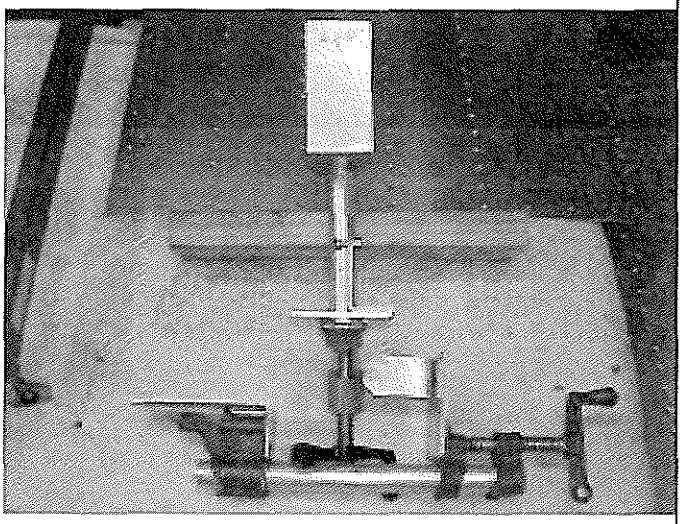
Let me lay some ground work to explain where I'm coming from for my tool development. While working on locating and drilling the ribs thru my wing skin for he out board wings I decided there has got to be a better way to pull the skin tight. This is the way I laid out my wing skins. I laid out my rivet holes with a rib and spar template which is 2' wide by X. I then transferred the rivet pattern to the wing skins utilizing these two patterns. Note: Remember to flip one of the skins over before you drill. The rib pattern, runs from the bottom rear spar to the top rear spar. The template was pulled as tight as possible to form a very tight fit for the wing skin.

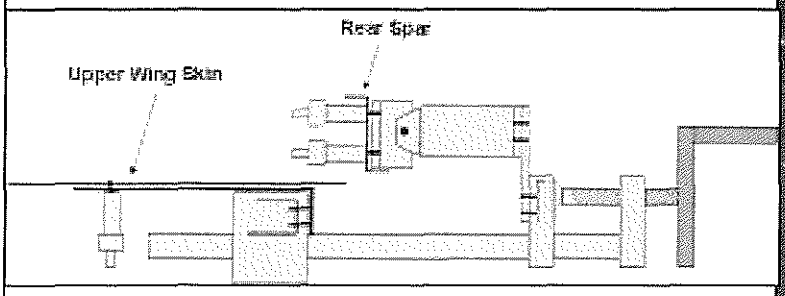
Now the main question is how do you get your wing skin nice and tight. The bottom of the wing is flat with the curved surface on the upper portion of the airfoil. When placing the skin over the wing and cleco the skin to the rear bottom spar I lacked about an inch and a half to cleco the upper wing skin spar holes to the holes in the upper rear spar. I did the cargo strap method on the outboard wings an got the wings skins tight but not as tight as I would like. So I went to my work bench and designed a wing skin tighten tool.

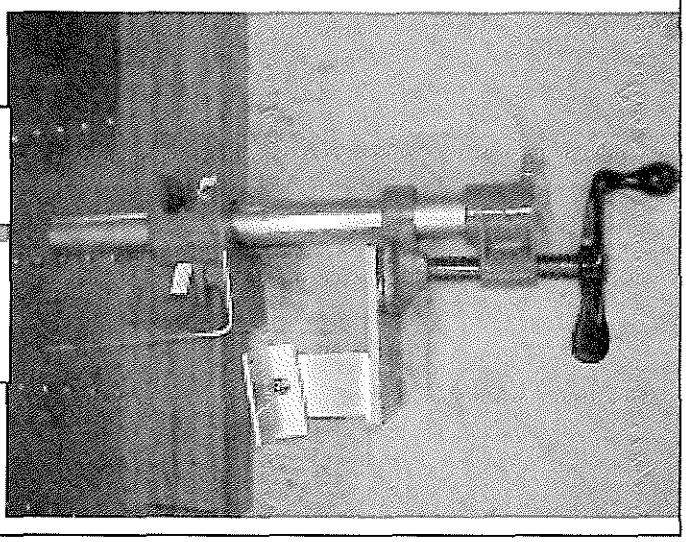
It is made from a wood clamp and has a screw and handle on one end that can be adjusted by, of course, turning the handle. The other end can slide up and down a pipe made of aluminum or steel. I used aluminum. I attached (riveted) and angle to the sliding end and riveted a plate to the screw end. On the screw adjustment side I attached a plate, and On the plate, I attached an angle that has a swivel angle on the end that can be clecoed to the center rib rear spar holes. The sliding portion of the tool end angle can be clecoed to the wing skin.

So to make this work, attach the screw portion of the tool the center rib holes on the back side of the rear spar. Slip the sliding end over the pipe and locate the hole in the angle to a wing skin hole and insert a cleco. Now do the same thing to the other center rib location and start turning the two handles together. With a few turns of the handles you can line up the holes of the skin to upper rear spar. It was so easy UGH The Caveman could do it.

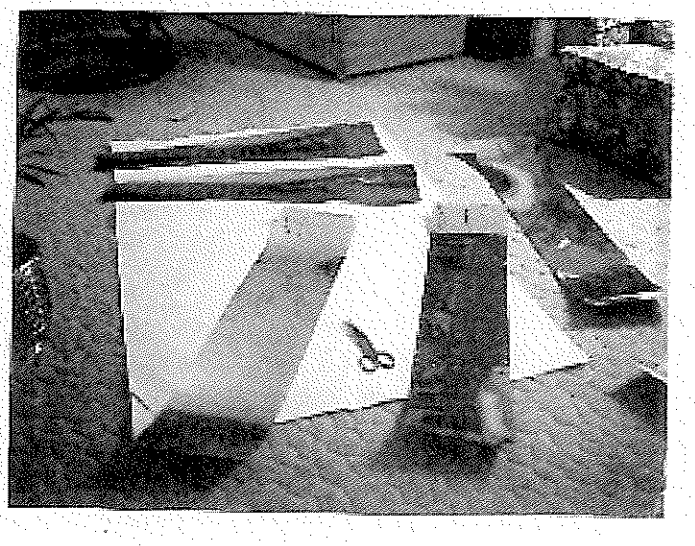
Stephen R. Peirce
Rocket City/Huntsville Al.
S/N # 078

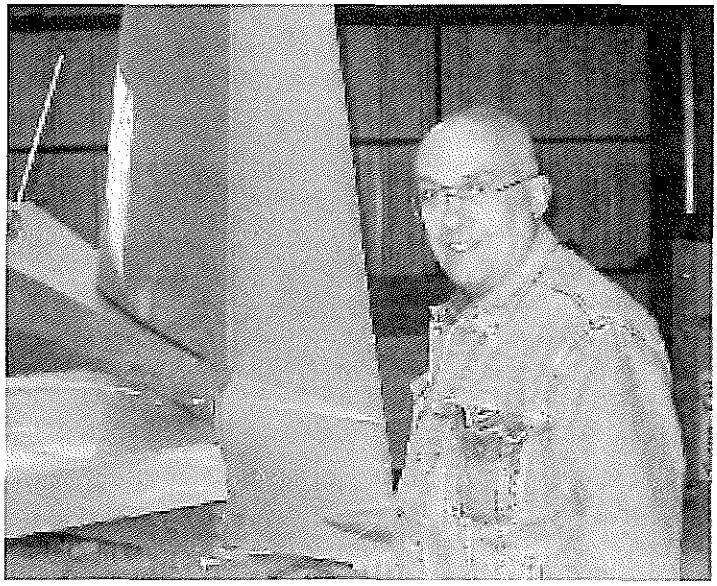






Things Remembered





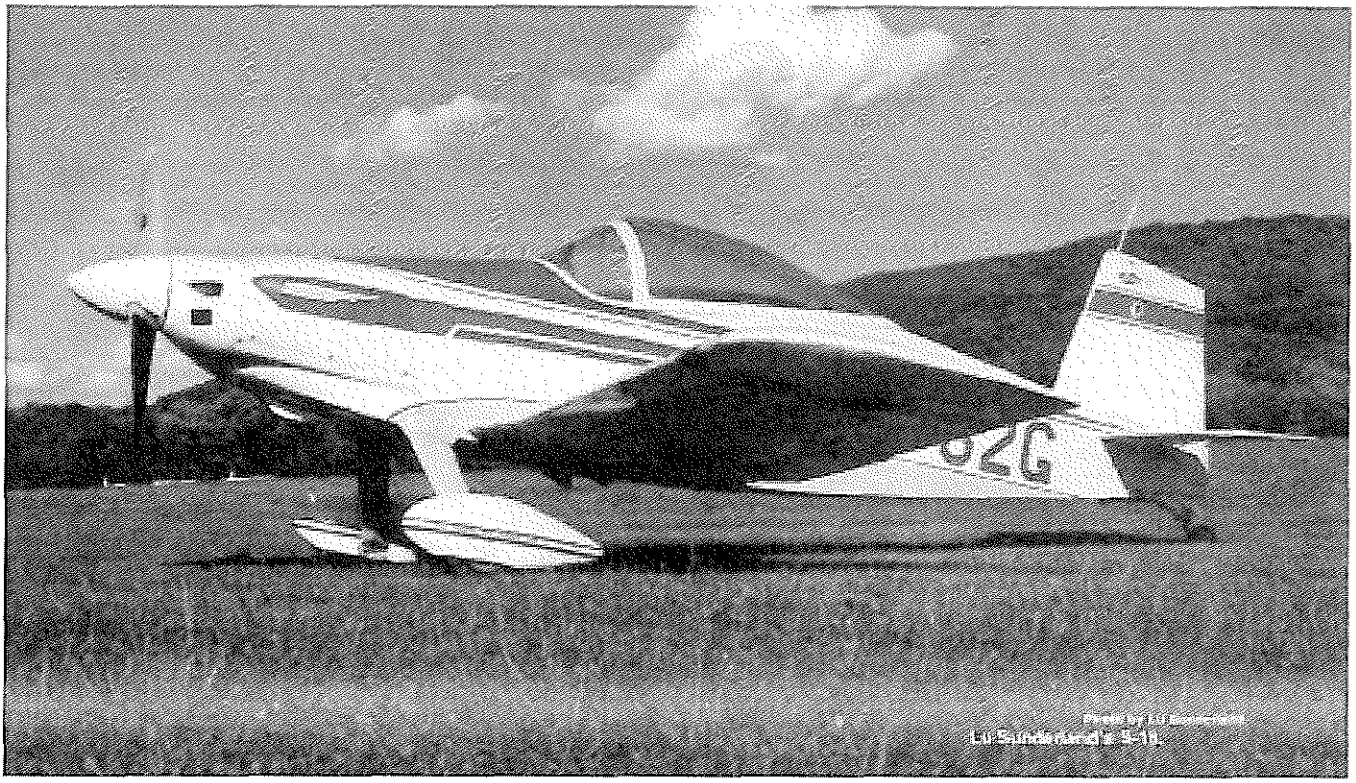
For those of you who are just starting out or thinking about starting a "Thorp". N818TR began in my living room and finally flew 13 June 2005.

RobertClayton

I live in Durban, South Africa. Twenty years ago I bought my T-18 from Bill Campling (Builder). When flew it in June 1976 it was the most advanced homebuilt aircraft in South Africa. Still today the T-18 stands its ground. I feel this is a tribute the its designer, and it is with pride I put it through its paces for others to see.

Details:
Registration ZS-UHX
SN 936
Engine Lyc O-320-E2A
Prop Sensenich wood 66 Dia x 76 Pitch

Regards
Darrell Miller



T-18 HISTORY

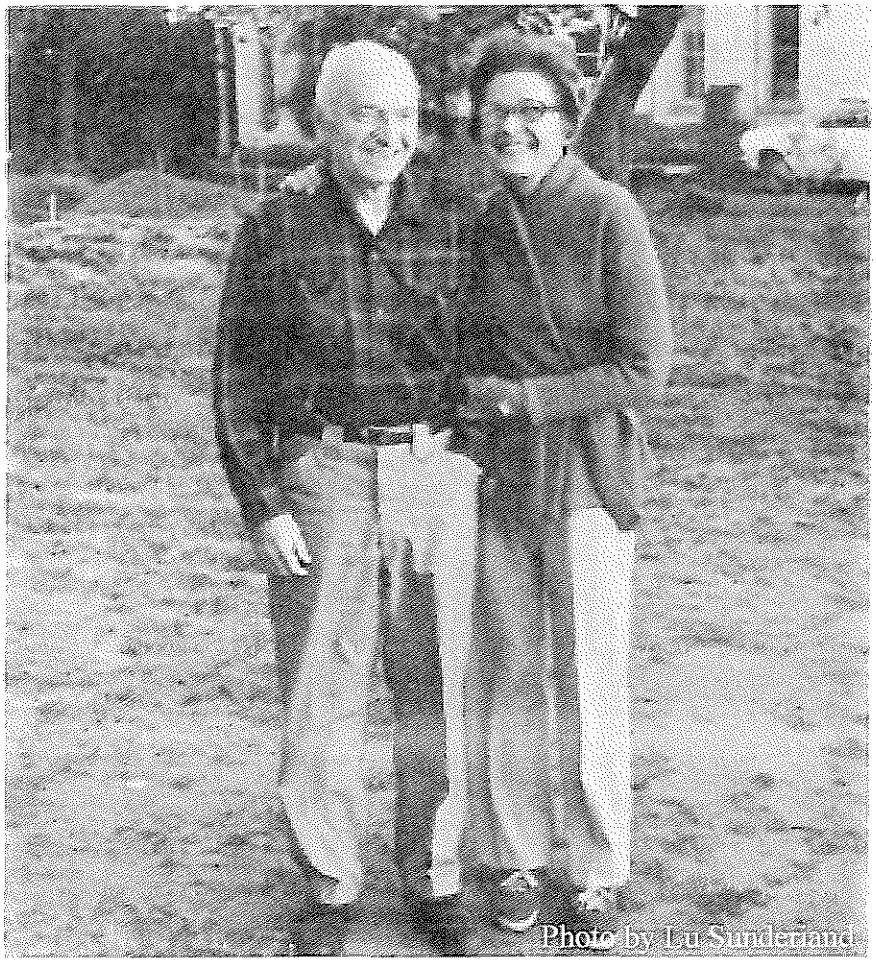
by **Dick Cavin**
10529 Somerton Rd.
Dallas. TX 75229

The readers of the February 1962 issue of SPORT AVIATION were presented with a homebuilt design proposal by John Thorp, widely recognized as one of the outstanding aircraft design¬ers in the world. In addition to design consultation work with nearly every firm in the business, his design accomplishments included the complete initial design of the Lockheed P-2V (which still holds the world's longest non-stop re¬cord), the Lockheed Big Dipper and Little Dipper, the Fletcher counter-insurgency fighter (first COIN), several models of the Fletcher agricultural planes built in New Zealand, and three different models of the Thorp Sky Skooter. Later would come the preliminary Piper Cherokee 135 design, a tri-gear model of the Beech D-18 with turboprop power, and the Twin Engine Derringer, to mention just a few.

Thorp's new 1962 design (his 18th, so designated T-18) featured simplicity of construction, sprightly performance, and an unapproachable building economy. It was a plain Jane, no frills, open cockpit two place, that would have aerobatic capability with its 6G wing. With open cowling (J-3 type), no wheel or gear fairings, and open cockpit, it would be aerodynamically dirty.

The T-18 design was developed around the surplus Lycoming O-290G auxiliary ground power unit engine, which converted easily to an O-290D and produced 125 hp. Hundreds of those engines abounded in surplus de¬pots and could be bought for from $100 to $300, depending on condition. Addi¬tion of an aircraft carburetor, another mag, a starter, generator and starter gear made it a first class aircraft pow¬erplant and often the average converted cost was only about $800.

In the years preceding Thorp's announcement, the late Joe Kirk had written several design proposal articles that were claimed to be super simple, easy to build, cheap, etc. They featured all-wood construction and were fabric covered. John Thorp took issue with the concepts, saying that they were only simple by virtue of being unsophisticated and because of what was not shown. He claimed that his design could be built in less time



John and Kay Thorp - In Retirement

and for less money than any design ever produced for homebuilders, regardless of its capability as an airplane.

The airframe economy was unmistakable. The T-18 was designed to be built of twelve 4' x 12' sheets of aluminum ranging in thickness from 0.016 to 0040, with most of the skin of .025 2024T3 sheet. Ribs and fuselage frames were designed to be hand-formed with a rubber mallet over plywood form blocks. The then average price of about 25 cents per square foot of aluminum sheet vs. $1/square foot for plywood made metal the logical choice.

By laying one fuselage side skin on top of the other, both could be drilled at once, saving both layout and drilling time. The modified rectangular shape allowed the airframe to be built without assembly jigs. This was done by accurately part to another by a fairly new technique called matched-hole tooling. Simple aluminum angle extrusions were used for longerons and outer wing spar caps, while the main spar caps of the center wing were made of 1/4" thick U channel on top and angle on the bottom. Spar webs were strips of flat sheet, with rear spars being bent up Z shapes of flat sheet also. The 20' 10' span wing used two four foot panels on each side of the fuselage and were sized to take advantage of the standard four foot sheet width for economy. The aluminum sheets were wrapped from trailing edge to trailing edge, with no drag-producing span-wise joints. In fact, there were no lapped skin joints perpendicular to the airstream on the entire airframe.

With the available power, Thorp could make the airplane small without being flimsy and still have excellent take-off and climb. The design empty weight of 600 pounds (with no electrical system or other frills) gave its 86 square feet of wing a loading of just over 13 lbs./sq, ft. and a span load of 55 Ibs./ft. Its maximum speed would be about 150 mph. Stall speed would be about 60 mph at its gross weight of 1150 lbs. With a fixed pitch prop and a 160 hp engine, the airplane would climb well in excess of 1500 fpm, make that 2500 fpm with a constant speed prop and 180 hp.

The landing gear was a simple "A" frame of heavy wall 4130 steel tubing, heat treated to 180,000 pounds per square inch and held to the fuselage with three 3/8' bolts. The motor mount also bolted to the A frame, so with the engine and fuselage attached directly to the main landing gear, landing stresses did not need to be transmitted from gear through the fuselage to the engine. The A frame landing gear has proven to be a rugged and durable gear, capable of taking much abuse

A 180hp T-18 owned by Gary Green of Enid, OK

before bending the legs, and it has been a maintenance free item. In addition, it has been a valuable safety feature, for in major type accidents it has prevented the engine from penetrating the cockpit. Also, the husky gear legs bend back like sled runners forming a rugged protective shield.

All controls were push-pull operated and all fittings were designed to be bandsawed out of flat aluminum plate. The wing fittings allowed the use of quickly removable "pip pins", permitting the entire wing to be lowered to the ground in one piece and the airplane taken home on a trailer.

Mr. Thorp held the patent on the all-flying horizontal tail (as used on the F-86, etc), so it was natural that the T-18 have one, too, as it saved about 25% in area and weight over a conventional stabilizer and elevator combo. The T-18 horizontal tail area was sized to 17% of the wing area, even with a relatively short tail length. The trailing edge of the horizontal tail incorporated a tab which moved in the same direction as the surface and thus provided stabilization and feel. A bob weight mounted ahead of the horizontal tail hinge point was used to provide the proper stick-force per G longitudinal feel force, as was commonly used in jet fighters before the advent of "fly-by-wire" controls starting with the F-111.

While John Thorp's stated mission at that time was to make an irreducibly simple design, he also said that if someone wanted to make such an airplane more sophisticated by adding a pressure cowling, canopy, gear leg and wheel fairings, the airplane could be coaxed up to 200 mph top speed. As it turned Out, when Bill Warwick first flew the prototype T-18, it soon became apparent that a wide two-place open cockpit was intolerably uncomfortable at 140 mph, so all T-18's have been fitted with sliding bubble canopies that look much like those an the late model P-51s,

The non-tapered wing on the T-18 has a dihedral break at the center of each panel, utilizing an aerodynamic principle that once was the secret of race pilots. This outboard dihedral wing makes a 90 degree intersection with the fuselage, avoiding the tangling of wing and fuselage flow fields, reducing drag and eliminating the use of complicated fillets that try to do the same thing. Another racing axiom was to never put the maximum wing thickness at the same point as the maximum fuselage width, again to minimize drag. If you look at the T-18 fuselage profile from above, it is quickly evident that each halt strongly resembles a slice of an airfoil. That's no accident either.

Lee Walton in his father John Walton's T-18

Mr. Thorp spent many hours in pressure distribution calculations to arrive at that exact shape. To put it simply, the idea is that the fuselage width should not decrease more rapidly than the airflow can remain attached. Designers in the '30s were aware of this principle, too, Look at the aft end of a Monocoupe or T-Craft fuselage and you will note the change in profile the last foot or so. This allowed reattachment of the airflow, hence less drag. Thorp's method is much more sophisticated obviously.

John Thorp also introduced EAAers to the "pop" rivet. He designed the T-1 8 so that the entire airframe could be built with them and have acceptable strength (a builder option). The simple hand tool for setting them made the investment in air tools, air compressor, etc. unnecessary

In addition to the many other educational aspects of great benefit to T-1 8 builders was the introduction to the fantastically detailed and easy to understand production type drawings that utilized the XYZ system of plane references, enabling the builder to locate a point in space with pin-point accuracy. Soon the terms, "Butt Line, Water Line, and Station" were old hat. He also introduced us to the decimal system, abandoning forever the clumsy fraction system most of us grew up with.

Dimensions often were called out to so many inches plus four places (i.e., 24.0025"). This callout frightened some early builders, who thought that Thorp required that degree of precision. They were relieved to learn that this level of accuracy was not required of them; it was only called out to make a series of numbers add up correctly. Working to a 1/64" accuracy was considered acceptable, except where

hole centers had to be matched, and that was readily accomplished with transfer templates.

When many of the first T-18 builders began their projects, there were only a half dozen sheets of drawings available and we had to pace our building to keep step with the oncoming drawings. The good response to Thorp's articles in SPORT AVIATION had caught him flat footed, so to speak, and the demand for drawings from impatient builders caused him to have to burn the midnight oil. At the end there were 219 drawing sheets, detailing every single part of the airplane. even down to the size and type of rudder return springs. These were truly production drawings and a factory could tool up and produce the T-18 with no further shop drawings needed.

Mr. Thorp's series of articles in SPORT AVIATION on building most components of the T-18 ran from May 1962 through August 1964, fourteen in all. John introduced the readers to "matched-hole tooling", which in essence is making one series of hole layouts very accurately match another. Since rivet hole layout via the time-honored method of measuring from A to B, dividing it by the desired rivet spacing, and stepping it off with dividers was time consuming, he gave us a new tool called a "transfer strip", a short length template with the hole pitch already laid Out. By flipping and flopping the strip down a long line, the hole pattern could easily be transferred.

This involved a tool new to most of us, the Whitney Punch, a plier-like tool that could make punched holes in sheet metal. The punch either had a flat end for punching through holes in a template, or a center nib for picking up a pattern of holes already center punched. The nibbed punch could also be removed and tapped with a hammer to leave a tiny punch mark. When tapped through holes in a template, it accurately reproduced hole patterns, hence the name matched-hole tooling.

Where the throat of the Whitney Punch could not reach, a 'new" type of drill bit was used — the "sheet metal grind". Basically, the drill bit strongly resembles the spur bit in wood drilling. It is a standard twist drill that is ground with a projecting point that enables it to accurately get in a punch mark without drifting.

Another simple little tool used often was the joggle fork, made from a flat piece of aluminum with a slot in it. When applied to a flange and squeezed In a vise, it enabled one to make an offset so that in places where angle longerons crossed the bulkhead, the skin would lie flat and flush.

Thorp devised a method to make wing ribs from 6061-T3 aluminum by stretch forming the flange with a rubber-tipped mallet, adding another skill to our rapidly growing knowledge of sheet metal techniques. An even simpler method using bend relief cutouts was shown as an option. Still another method of making ribs out of heat treated 2024-T3 with crimping pliers was also used. Today, there are three suppliers that furnish hydropressed ribs and practically every other part needed to build the T-18.

Many EAA'ers have a mental block against metal construction, refusing to believe it is actually easier than other methods. A good example of this skeptical attitude about metalworking was observed at the 1964 Rockford Fly-In. Volunteers were asked to build up a T-18 fuselage from scratch during a 5 day period. There was no electricity in our tent, so we had to use hand drills and other simple tools. We did not even have sawhorses, using folding chairs to support the fuselage! Actually we had to loaf a lot to stretch our work over three days, yet people would come by and "explain" to others that metal work was difficult (even though they had never tried itl). But there it was, being done quickly and easily by complete novices right in front of their eyes. Wood or pipe and rag would have taken many times more labor hours — plus jigs.

How long does it take to build a T-1 8? As President Reagan would say: "Well¬, that depends." Two have been built in six months, another in nine months, but the average is about two to three years. Of the two built in six months, one was built by a fisherman who made every part himself, although during severeral winter months he was able to work on it almost full time. The other one was built from one of Ken Knowles' kits by a young man with a full-time job, a wife and two small children. And he had no previous aircraft building experience. Of course, some projects have stretched out for ten years or more, but then some people don't finish a model airplane either, especially if they watch a lot of TV.

Using my templates and form blocks, I have built fuselages (hulls, ready for riveting) in less than 50 man-hours using no pre-fabricated parts. Riveting takes two people about six hours. I have built outer wing panels on a Saturday after¬noon, using only pre-fab ribs, the rest being made from scratch. This includes riveting. Yes, I was experienced, but I have "walked" several beginners through the same route and they take about 30% more time.

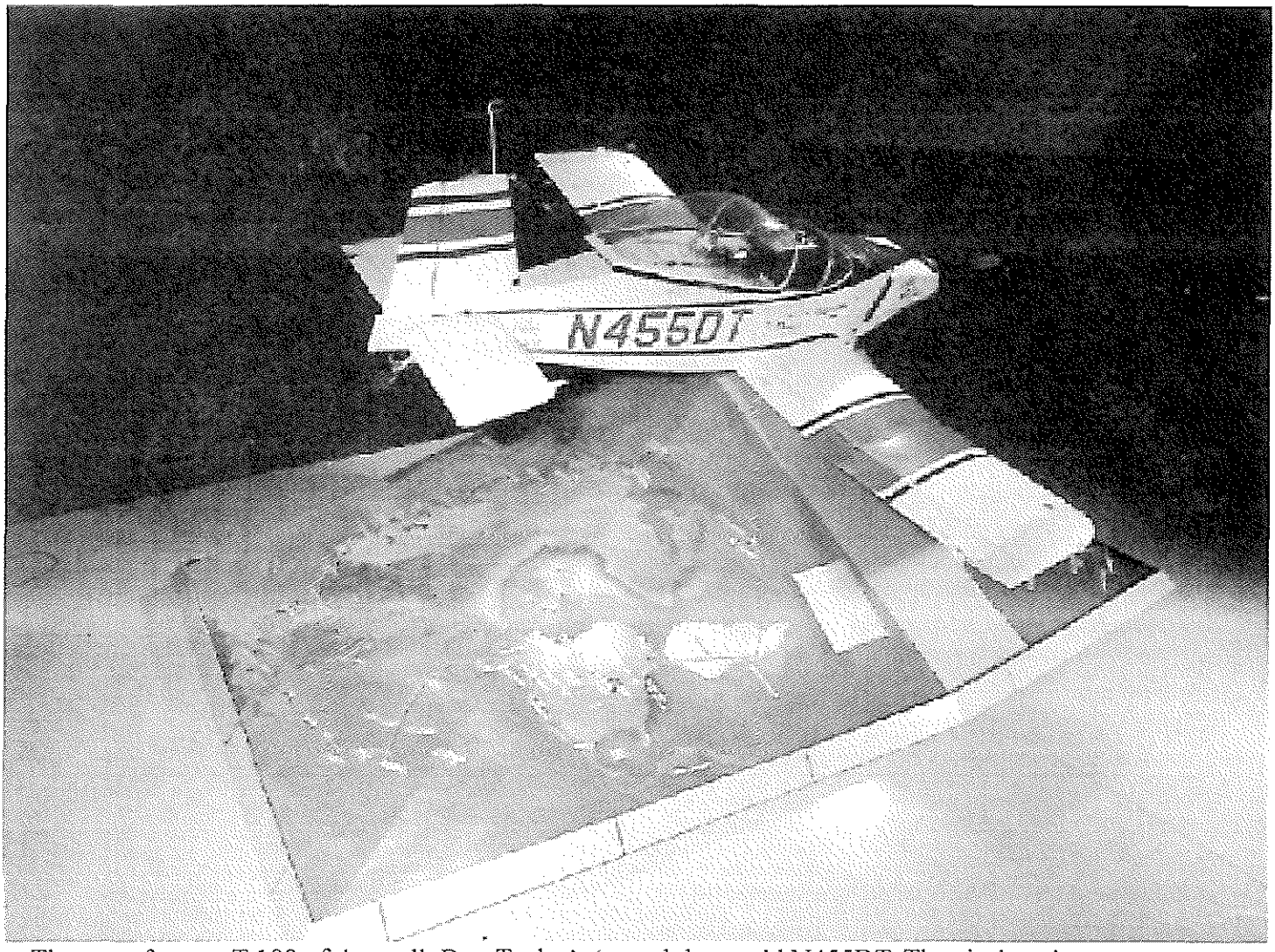
Soon after the T-18 plans became available we builders realized that there were some super bargains in surplus aluminum and parts around surplus dealers, so we saw the need to exchange information on these sources, John Thorp "volunteered" me, so the T-18 Mutual Aid Society Newsletter was born. I wrote five of them until my wife developed a heart problem, and then Lu Sunderland, a gifted aerospace engineer and writer, took over at that time. He retired from it after ten years when Newsletter #44 was done. I picked up on it again with #45 and now we have just published #64. This was the very first newsletter for builders of a specific type of airplane and we have covered in great detail every facet of building and flying the airplane. Many T-18 owners today have purchased flying T-18s, or nearly completed ones, so we have changed the name and direction of the newsletters to the T-18 Builders and Owners Association to better reflect the changing needs of the membership. Most of the owners of the 500 to 600 T-18s built to date participate in the Association.

Another ongoing purpose of the newsletters has been to alert the members about any A.D.s that might show up in service. Actually, the T-18 has had only one major mod in the mandatory category and that was to the horizontal tail.

It is estimated that T-18's have accumulated 150,000 hours collectively, with a half dozen individuals having flown their T-18s about 3000 hours. Bill Warwick, then of Torrance, CA, was the first to fly in the spring of 1964 and, after 3000 hours, is still as delighted with it as he was 22 years ago. B. C. Roemor (Manitowish Waters, WI) won the speed dash part of the Lowers-Baker-Falck race a few years back at 208 mph average. Later that year his son flew the T-18 to over 26,000 feet, a new home-built record. The late Dr. John Shinn demonstrated what could be done with a low-horsepower engine and careful workmanship when he was clocked at 198 mph in the Oshkosh efficiency contest with his 135 hp beautiful award winning T-18. Olive Canning flew his T-18 from his home base in Sydney, Australia to London and back, battling a typhoon, sand storms, and out-maneuvering a Syrian MIG fighter trying to shoot him down. The indomitable Don Taylor and his T-18 "Victoria" needs no introduction, having circled the earth almost twice, and making a U. S-Australia round trip, an Oshkosh to the North Pole round trip and several other long record setting hops, thus proving the T-18's load-carrying capability and its ability to handle almost any kind of weather. No other homebuilt design shares these honors.

Because there were two accidents as a result of exuberant pilots diving the T-18 far over the red line of 210 mph, John Thorp hired a team of flutter experts who had done the F-104 flutter tests to do a full-blown analysis of the horizontal tail. This professionally-run, inflight flutter test program identified a too-skinny rib attachment in the horizontal tail tab as the culprit. A tab reinforcement clip and relocated counter weights at the tips of the stabilator spar were made a part of a mandatory modification in 1967. The modification was demonstrated by John Thorp to be flutter free when he dove the T-18 far in excess of the VNE speed, as is normally required by the FAA for type certification. The T-18 Mutual Aid Society sponsored a complete inflight vibration propeller test that established safe operating envelopes for several cut-down metal propellers. Hartzell Propellers performed these tests with 500 pounds of test equipment loaded in Bob Dial's T-18 (see SPORTAVIATION November 1972). We also arranged for Sensenich to design and market two special wooden propeller models for the T-18 as a solution to the problem of highly pitched cut down metal props succumbing to fatigue failure.

As for accidents, the T-1 8 has had its share, but only the actions of the pilot or builder have been causative. When the T-18 has been built according to the plans and flown inside the limits envelope, it has been 100% safe. The T-18 has such marvelous balance between all control pressures and such excellent control authority that it truly is a dream to fly. You only have to think "turn" and it dutifully banks right in, with practically no adverse yaw. It is not, however, what you would call overly sensitive, like some of the hot racers, Some T-18s have a little pre-stall buffet, but this is easily cured with a 4-inch stall wedge on each wing, Ailerons are effective during stall, because the dihedral break and rectangular wing planform cause the inboard wing to stall first. The airplane spins well and will recover quickly as soon as controls are neutralized, but care must be used on pullouts, as the airplane will hit VNE in a hurry due to its cleanness. At a gross weight of 1250 pounds, the T-18 has a +6 and -3 G capability. With large engines and all the usual extras added, it is not unusual for the gross weight to go to 1500 pounds or better, obviously restricting



The most famous T-188 of them all, Don Taylor's 'round the world N455DT. The airplane is now on permanent display in the EAA Museum, mounted atop a huge map of the routes of Don's various record flight. it is located in an area where it can be viewed from two levels — from the main floor and from the second level Wittman Concourse where it is possible to look down into the cockpit and see the fuel tanks Don used on his North Pole flight.

its aerobatic repertoire.

Like any high performance taildragger in its size range, the T-18 is quick directionally on the ground, but directional ground control can easily be maintained without the use of brakes. It has more than adequate aileron and rudder control for nearly any crosswind situation. Returning from Oshkosh a few years back, I had a direct crosswind of over 30 kts. to land in and I was able to 'rassle it down to a safe stop. Not recommended, of course, but it can be done.

It does not take a superman to fly it— nor a superwoman either, but it does take competent training. Some 16 year olds have done all their dual and early solo on it and gotten along fine. One builder's wife has over 500 hours on theirT-18 (to his 150 hours).

Like any airplane of low aspect ratio (high span loading), increasing the angle of attack results in a higher pro¬portion of the total lilt being lost as the size of the win tip vortex increases. Consequently, pilots must be aware of the need for a bit more speed in turns. When flaps were added to the T-1 8, the pilot could fly at a lower angle of attack, approach at VSO ÷ 30% and cross the fence at VSO + 20%. This gave a steep approach, with sink rates of no more than 500-600 fpm, power off.

There has been an increase in the sophistication of the T-18 through the years. Electric trim for the stabilator, rudder and ailerons is quite common, and many have full certified IFR systems. Loran and Stormscopes are now also appearing in numbers, Many have either

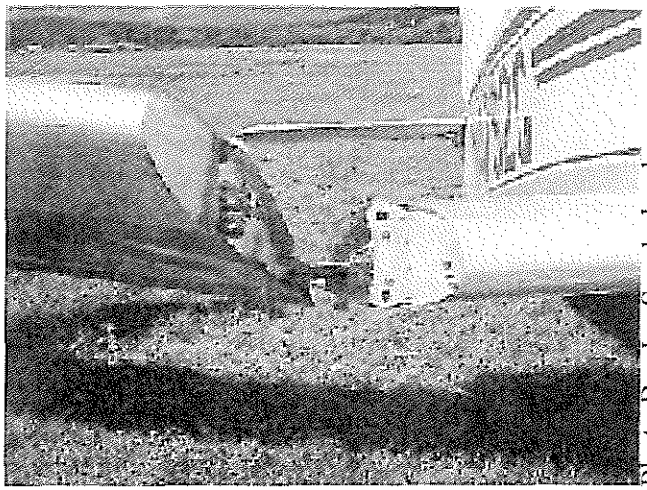


Photo By: Lu Sunderland

Removing main spar pins.

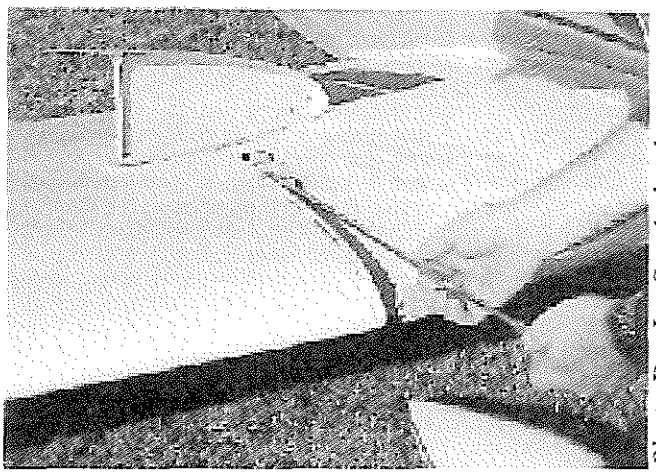


Photo By: Lu Sunderland

Only 3 pins have to be pulled to remove the wing. 2 in the main spar, 1 in the rear.

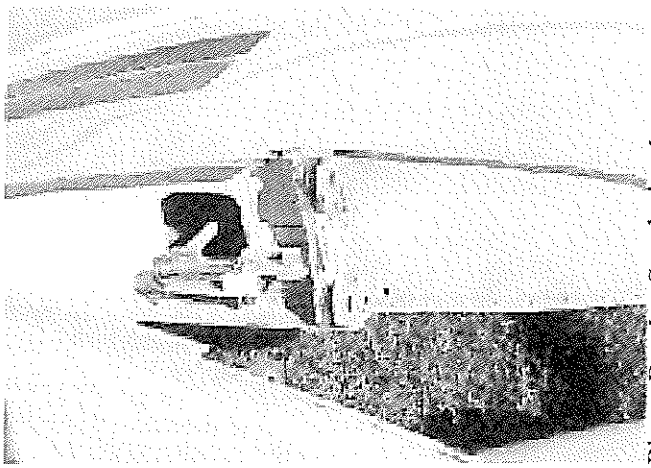


Photo By: Lu Sunderland

Flap and Aileron Connection

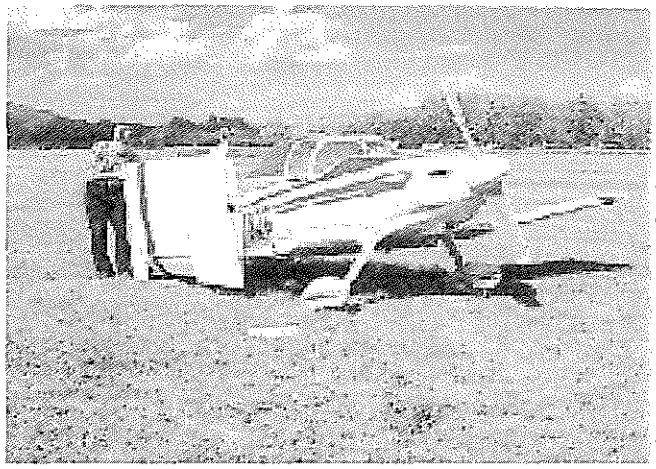


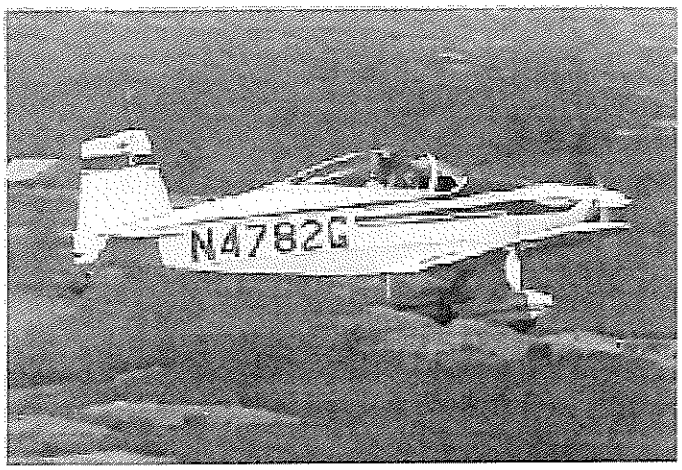
Photo By: Lu Sunderland

Lu Sunderland folding his S-18 Wing

added auxiliary tankage in the baggage area or under the seats and quite a number have added fuel in the wings. Electric flaps are also In".

As the years passed, two complaints surfaced on the 1-18. For two big people, the cockpit was on the snug side at shoulder level and some never liked the polydihedral wing configuration for looks (even though it is beautiful aerodynamically). A number also said they would like wing folding capability. Accordingly, in 1974 Lu Sunderland took the bull by the horns and began the redesign of the airplane, making the cockpit 2" wider. He also raised the canopy up 3/4" for more head room for very tall people. Consulting with Mr. Thorp, he was advised to add 5" in length to maintain the same low drag flow field of the original. This version is called T-18W (wide body). Lu also jumped in on the wing folding problem. To make the airplane trailerable, or roadable, it required shortening the center section so that with the wings folded the width was eight feet, including even the flap hinge horns. He also used heat-treated steel fittings to join outer and inner wing panels, thus raising the permissible aerobatic gross weight to 1480 lbs. The wing folding mechanism is relatively simple. To gain access, remove one screw and slip off a small D-section cover, exposing the main spar joint , no messy wrap-around gap cover to deal with, Front spars and rear spars have quick removable tapered pins and when pulled allow the wing to be slid out a couple of inches on a tube with universal joint and folded back or completely removed. Conversion to or from highway configuration takes only five minutes.

Ken Knowles of Norco, CA, demonstrates this feature at numerous Oshkosh Fly-Ins, folding and unfolding the wing where many thousands could witness the simplicity of it. This was called the T18C



Lu Sunderland's S-18

(convertible wing) and if combined with a wide body it was labeled the T-18CW. Ken, who has been the main T-1 8 kit supplier, says that since 1975, most new builders have elected to build the T-18 with one or both of those modifications.

When John Thorp's failing health forced him to take the T-18 plans off the market some three years ago, this became a problem for new builders, so again Lu Sunderland stepped in. He drew up a complete new set of plans, eliminating a few sheets of relatively unimportant or obsolete items. The longer and wider T-18CW with its new wing, having a different dihedral break, two-segment flaps, shorter ailerons, and a new high-lift airfoil (developed by Lu and a NASA friend), was indeed a different airplane. He and John Thorp agreed it should not be called a T-18 any more, so now the airplane is known as the S-18. The complete set of plans composed of 177 drawings and building instruction manual are available at a very modest price of $195 (see classified section of SPORT AVIATION). Even though the folding wing mechanism and new steel fittings added an extra 26 pounds, the new airfoil and increased flap area brought the stall speed down by 10 mph, gentling it in the process. High speed also increased slightly, 2-3 mph.

Other versions of the T-1 8 have been built two tricycle gear versions, one a super slick job with retractable gear, and a single place with retractable gear. Bill Johnson, a Boeing engineer, modified his T-1 8 with a retractable conventional gear and another airfoil similar to the LDS-4-212 used on the S-18, and with wing root strakes he cruised it at 230 mph, right up against the new red line he had established. He could also fly it at about 50mph at very high angles of attack. One of the California builders, Lyle Trusty, built a new wing for his 180 hp T-18, changing the airfoil, angle of incidence and planform and in the process upped the maximum speed. Addition of wing root strakes dropped the stall 6 mph, also. In the process he gained 130 rpm (25 hp) which in effect increased his range by 100 miles.

T-18 Mutual Aid Society members have many times expressed their deep gratitude to John Thorp for making this superb airplane available to EAA. To show our appreciation to this fine gentleman we began celebrating his birth¬day by squadrons of T-18s, Sky Skoot¬ers and Derringers flying in to his home airport at Lodi, CA. We also started a new tradition that builders of other designs have emulated.

Yes, that swaddling clothes newcomer of 24 years back is not only old enough to vote, but has also matured into a sleek, ultra sophisticated, high performance personal airplane — a rugged version of a poor man's P-51. Better yet its price and ease of construction still make it an outstanding choice for many EAAers. It is our guess that you will still see T-18s and S-18s on the scene another 24 years from now.

The above T-18 History was reprinted from an old Sport Aviation Magazine article, and submitted by Don Doubleday.

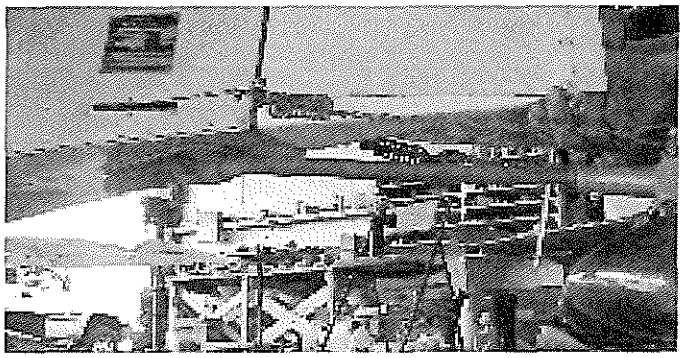
Another Tom Hunter Idea

Dear Thorp Owner, I am sure I am not the only one who has noticed the interruption in the flow of the bottom fuselage line at the intersection of the rudder. After I added the little tail wheel pant to my plane, that line just seemed to shout out at me. As you can see in the picture, I made a fairing to "cap" the bottom of the rudder. First I made a male plug using the bottom surface of the rudder as a guide (first removing the rudder) , then a female mold using tooling gel coat to achieve a high surface finish and then laid up the final part in the female mold. The part is two layers of fiberglass with the outside surface in Gel Coat. You will need to trim and fit. Then paint and mount. Cost of the part is $38.00 plus shipping.

cont. pg 17

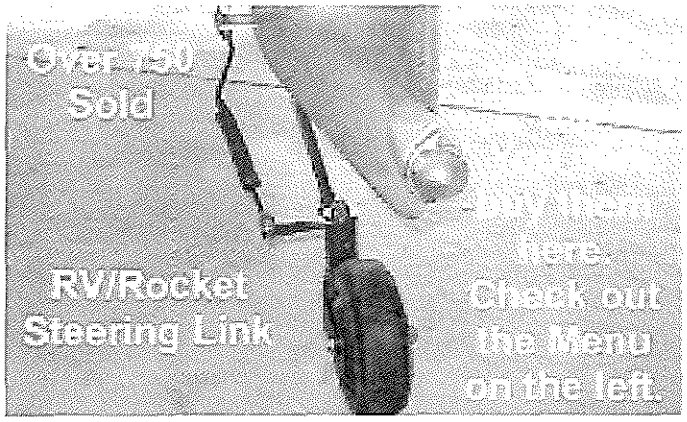
Another Tom Hunter Idea, cont.

Since I make these to order, allow 2 weeks for delivery.
Tom Hunter 805-227-4571 or email Thunter007007@yahoo.com



Steering Link ?

I have seen a steering link on several RV's and a Tailwind here at my local airport. I think it is a great idea and needs to be pursued on T/S-18's. It eliminates the spring and chains that steer the tailwheel. The guys that have them say there are great. I believe these may work with the Trusty tailwheel setup as the spring length and geometry are more like the RV's. I do not believe this item would ever work on the standard flat spring setup because the angle between the rudder steering horn and the tailwheel tiller bar is to great. Tom Hunter wanted me to see if there was any interest before he dove into building one. I for one would love to try one. I think if we T-18'ers come up with one for our application it would be better than this one. My friend with the Tailwing machined his own ans I believe it is beefer than this perticular one. Anyway



if there is any interest in this little idea, please let me know. I believe if the interest is there Tom Hunter would pursue the idea. Email me at: royfarris@earthlink.net with youe comments.

Roy Farris

Please Check The Back Cover For Upcoming Events

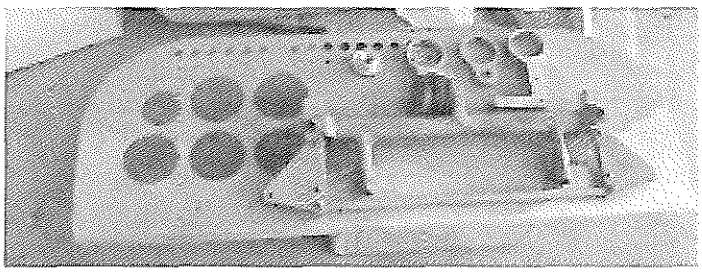
For Sale

Standard T-18 fuselage, parts, unconverted GPU and S-18 main beam. $2500.00
http://www.carlist.com/dev/mmp/st/index.html

Stretch
stretch@carlist.com

Parts For Sale

The instrument panel is only .080" thick and needs stiffeners. The stabilator lugs have needle bearings. The rest is part of the mast, complete walking beam plus and the rubber and metal washers for the landing gear and fuel tank exit bushing. The first $210.00 plus shipping.



Hurant Karibian
hkaribian@yahoo.com

T-18 For Sale NX53PD

1987 T-18. Standard/original. 800 hours since new airframe and new 0-320 D2A engine. Aymar Demuth prop, perfectly matched to engine and airframe. Landoll dynamic dampener/balancer installed. Airframe disassembled, stripped, repainted show style with Sherwin Williams Acry Glo and reassembled with new hardware 2004-2005. Ailerons and stabilator accurately balanced statically after painting. Installed new windshield, rudder cables, landing gear bushings, cowling, brake discs and linings, tires and an Aircraft Exhaust Technologies stainless exhaust system. Real lamb's wool seat covers on Tomahawk seats. Equipped with two Escort II nav coms with intercom, & King KT-76A encoding transponder, certified 6/06. ToMorrow 612 Loran. Century I autopilot, gyro and servo overhauled by Century Flight Systems, 6/06. No attitude indicator. Merl ELT. Flaps, aileron trim and elevator trim all electric. Scott 2000 tail wheel. Whelen nav/strobe wing tip lights. Prop crush plate is milled to hold prop bolt heads, so prop bolt torque can be checked without removing spinner. New vacuum pump 6/06. Wright Bros. Award at Dayton Air Show 1987. Best plans built Kerrville 1987. Second in 160 H.P. Class in Sun & Fun 100 race 1990 at 188 mph. Co-builder, co-owner and maintainer holds Airframe and Power Plant Mechanic Certificates and an Inspection Authorization, and is an AB DAR. Fresh condition inspection at sale time. Free condition inspections (owner assist) if the a/c is brought to the inspector while the inspector is able. Operating Limitations updated to 2006 change to Order 8130.2F. May be flown over densely populated areas and on congested airways. Free CFI checkout before sale transaction. New owner must demonstrate competency in the airplane prior to sale.

Price to be determined by who wants it the most. If we follow the advice of the Thorp Group, it won't sell because of the high price. If we set the price so it will sell, the Thorp Group will be displeased with us. Therefore, we are taking offers.

Photos on Trade-A-Plane 1st December '06 issue and last Thorp Newsletter, #135, March 2007.

Pat & Dave Eby, 3206 Martin Blvd., Wichita Falls, TX 76308 940 766 2523 aviatpd@aol.com

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We have a T-18 for sale:

Total time: 782 hours; Lycoming 0360 A1B; Hartzell constant speed prop (0 time since prop overhaul); King KX145; Appollo IIMorrow; Audio panel marker beacon; King transponder and encoder; electric trim; excelloent paint and interior; Cessna seats; soundproofed;$37500. Based at O61 (That's Cameron Park, CA)

Paul Kellas
(530) 677-7455

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4 RING GPU PISTONS • FOR SALE • lycoming 4 ring GPU pistons with rings, push rods, valve springs, intake values • Contact Ballico Stretch - located Auburn, CA USA
http://www.carlist.com/dev/mmp/4ring_gpu_parts/

T-18 Project

With regret I've had to put my T-18 project up for sale. It consists of all the sheet metal and extrusions, fabbed gear, a lot of Brock parts, ribs...etc. Also a cowl and spinner, wheels and brakes. I've done some work, getting the outer wing main beams ready to rivet, and trimming the ribs (they came hydro'd, but untrimmed).

I'm asking $4500 for the lot. It's located in Lubbock, TX.

Hate to sell - but I have another chap's Great Lakes, and two 'contract' airplanes, along with an L-5.

Andrew Budek

More For Sale

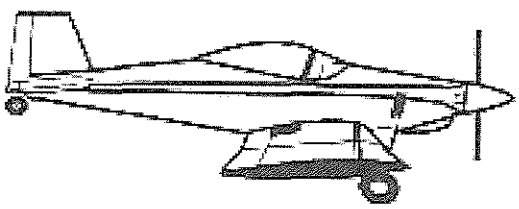
When a T-18 suffers a mishap it either becomes a consumer of parts--if the owner is restoring it--or, in worse cases, a parts donor.

Well, this one is a donor. I'll have a more detailed list of parts-for-sale later, but the items below will be available. Contact me via e-mail (rlsokoloff@yahoo.com)--not through the ThorpList--if any of this interests you.

--Seats
--Flap handle
--Walking beam, elevator control tube, and trim jack screw mechanisms.
--Complete instrument panel and instruments. including standard 6-pack and steam guages. One of these is the Airlogic digital volt-ammeter.
--320 engine souped up and stamped by JT himself. The 340 crank is trashed and two cylinder heads are broken. I have complete engine logs dating from the time it first coughed to life in a circa 1964 Piper. It has 1784 hours since JT's rebuild.
--Old Narco transponder (I don't have the model number right here.)
--Encoding altimeter
--KX-125 Nav/Com (the Obs is built right in).
--Cleveland brake/wheel assemblies
--Standard T-18 seats
--Various engine parts, e.g. oil cooler, carb, aero starter (I don't have the model number handy), dual crossover exhaust, already wrapped in thermal tape,
--Aeroproducts tailwheel with Trusty rod spring. (Tailwheel hardly used, rod spring has slight bend where it should be straight).
--Just about all fasteners you'd find on a standard T-18.

Not available:
--engine mount and wheel struts
--main spar
--any external metal surfaces
--anything to do with a canopy or windshield
--vacuum pump

I'm very pleased to say the airplane took all the force on a landing gone very bad due to pilot mismanagement--and it shows! So, no one was seriously hurt. (Thank you, JT!)



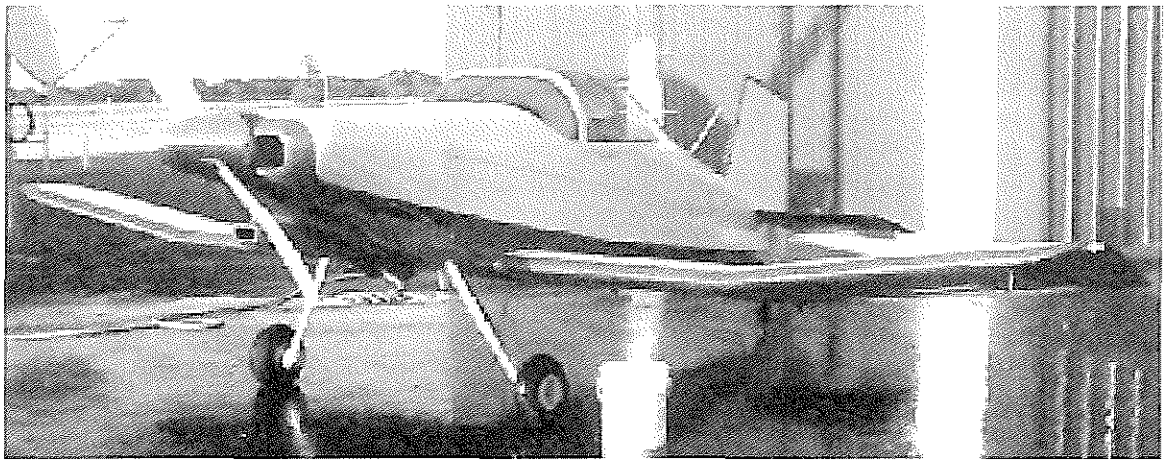
T-18/S-18 Thorp Newsletter
Roy Farris
1220 Stellar Drive
Franklin, IN. 46131
Phone: (317)736-8903
email: royfarris@earthlink,net

Newsletter No. 136
June 2007

Upcoming Events

Oshkosh, Airventure 2007 ~ Friday July 27,2007 ~ T-18 Luncheon and Forum in the Hospitality Tent in the Nature Center. For more information, contact Roy Farris at: royfarris@earthlink.net or (317)460-5916

Kentucky Dam Gathering ~ Oct. 12 - 14, 2007 ~ Gilbertsville, KY. For more information, contact Teresa Scola: btscloa@sbcglobal.net



David Reads New T-18. Ready for DAR Inspection and Test Flight