

# T-18 NEWSLETTER

ISSUE NUMBER 78



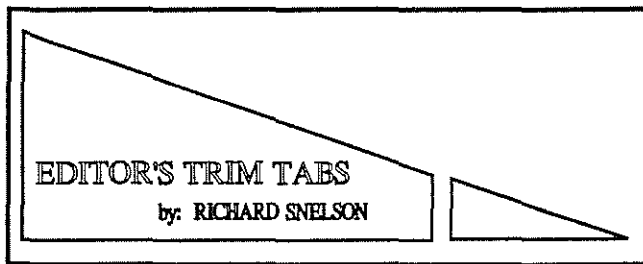
CRAIG MARSHALL OF SECHELT BC, CANADA



## *In This Issue:*

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The Leading Edge of Spray Technology  
by Richard Snelson

NOTICE: (STANDARD DISCLAIMER) As always , in the past, present, and future newsletters, we would like to make you aware that this newsletter is only presented as a clearing house for ideas and opinions, or personal experiences and that anyone using these ideas, opinions, or experiences, do so at their own discretion and risk. Therefore, no responsibility or liability is expressed or implied and is without recourse against anyone.



Welcome to the first issue of the T-18 Newsletter for 1991! It's hard to believe that last year went by so fast. Working at a full time job during the day, plus 30 hours or so each week for a T-18 project, plus time to do other things that are necessary like newsletters, broken this or that around our ranch, does make the time go by at a sonic pace. I am looking forward to the challenge of a new year, and have helped with the planning of some key T-18 Events and have laid the ground work to establish regional T-18 Meeting for the West Coast members. Let me say that I hope you are finding information in the newsletter that is of value to you as a T-18 Owner, Builder or enthusiast. One measure of this, that I use, is the continuing growth of the organization, with three to four new people joining each month. I have now been involved with the T-18 movement since 1964, reading, listening, and learning more and more about the Old lady of metal homebuilts. One thing that I firmly believe is that the T-18 is not a "sacred cow" and anyone that treats it as such will probably get bitten. It is however a solid airplane to be flown and maintained with much respect. Proper respect comes from knowledge and information that is exchanged in the newsletter and T-18 meeting and forums where-ever they occur. Here's a calendar of events for "1991".

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## 1991 Events

May 10-11, 1991  
Kentucky Dam Spring Meeting

June 22-23, 1991  
T-18 Builders Workshop in Clinton, IL

August 2, 1991 "Friday" Night  
Oshkosh T-18 Banquet at Butch's Anchor Inn Starts at 6:30  
Note! The change from Tuesday night in previous years.

August 5, 1991  
T-18 Forum in tent #6 at 11:30

October 10-11, 1991  
Kentucky Dam Fall Meeting

Dates to be arranged:  
West Coast T-18 Spring and Fall Meetings, planning to be handled by Hal Stephens of San Jose and/or H.B. Arnold of Sacramento.

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The builders work shop is open to anyone that needs some help in getting started or restarted on their project. Jim Paine an experienced builder has offered to help me with this effort. Other experienced builders would also be welcome. We will demonstrate the basic skills like riveting, and cutting\bending sheeting metal. We will need to know well ahead of time if you plan to attend so call or write now. Phone number here is (217) 935-4215 As for overnight needs: We offer yard camping, or Clinton has a new Days Inn Motel Phone (217) 935-4140 The workshop will be informal and tailored to meet your needs as we go. We will plan on having an evening cookout on Saturday night. I'm looking forward to a good turnout and hope this will serve to jump start those

folks that have been sitting back and only looking at airplane pieces.

I hope you noticed the change in the T-18 banquet from Tuesday to Friday night August 2, the first evening of the convention. This will make it harder to get our list of attendees made up on Friday, but should allow more folks to attend that can't always stay over the weekend for the Tuesday date. We will plan to judge the T-18s on the field over the weekend and make the award for the best one at the T-18 forum on Monday. Drop me a postcard if you plan to be at the banquet. I need some help in the following area.

I would like to increase the number of newsletters that go out in 1991, whether or not I can do this depends upon the number of articles that the membership submits. Currently that is the limiting factor in the number of letters per year. You don't have to polish an article to death just send it to me I'll work out the bugs. A good place to start would be the new section on Lessons Learned "the hard way" just a short to the point single paragraph note may save someone else from the same mistake. Safety and operational notes are always helpful to those just buying or building their T-18. Please contribute your articles and help me make 1991 a successful year for the T-18 Mutual Aid Society.

Richard Snelson  
T-18 Newsletter Editor  
Route 3, Box 295  
Clinton, IL 61727

Please check your mailing label if it has zeros in the upper left corner I have not received your renewal. Please return the Renewal for 1991 from the previous #77 Newsletter. Thanks

## Parts and Suppliers

Van's Aircraft, Inc  
P.O. Box 160  
North Plains, Oregon 97133  
Phone 503 647-5117

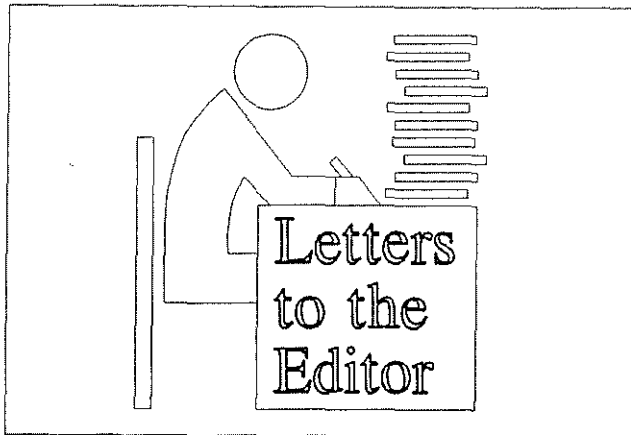
I just got their Van's Aircraft Optional Parts Catalog and it has a lot of items that would be of interest to a T-18 Builder. Not everything in it is available because of OEM agreements they have with manufacturers. However, they sell a set of engine baffles for 150 hp Lyc. for \$125. This is a good deal! I'll let you know how they fit the Thorp Cowl in the next letter. They have instruments, headsets, switches, alternators and cockpit heating\ventilation parts. More More More. As a side note, they agreed to exchange Newsletters and gave me an OK to reprint items of interest to T-18 builders from their RV Newsletter. Call and ask for the Catalog.

Custom Airparts  
1318 Gertude  
SanDiego, CA  
Phone (619) 276-6954

They supply stainless steel exhaust systems for the T-18. I have a report that they do good work, and are nice to do business with. Ask for Clint or Mario.

## For Sale Items

T-18 standard wing spar, complete with fittings. \$400  
T-18 seats bent & welded per Thorp plans \$30.00 each. Just bent \$15.00 each  
Paul Krogh's  
27118 Sherwood Forest Dr.  
Waterford, WI 53185



I'm running out of space in this newsletter and won't be able to include all the great letters that came in with the renewals, I do promise to get most of them in the next issue. On the subject of my last editorial about the EAA and it's lack of coverage of manufactures failing, I did get two well written letters on that issue.

February 10, 1991  
 Richard Snelson  
 Route 3, Box 295  
 Clinton, IL 61727

Dear Dick,  
 After a few days of searching for a reason for your editorial in the last T-18 Newsletter, I still have a problem with it's content. While you are entitled to your opinion, and I concur, I feel the T-18 newsletter should be a vehicle for the exchanging of ideas, problems parts and information pertaining to the T-18. Not a format to editorialize other aircraft builders or manufacturer. The Experimenter, The Homebuilder and now the Sport Aviation magazine started out as an newsletter for the Homebuilder with no ax to grind. I believe it still does just that. I would hate to see EAA take a negative view of T-18 builders or their aircraft just because of your editorial or any ones editorial printed in a newsletter for the Thorp T-18. The T-18 enjoys a good reputation with the EAA, As you know they have Don Taylors dis-

played at the museum as well as assisted us in putting on a Twenty-fifth Anniversary fly-by at Oshkosh. I sure would hate to see us jeopardize this relationship. Sincerely, William Williams cc: EAA Oshkosh, Len McGinty File

*William, The pull quote in the right hand corner of the editorial states my primary purpose in writing it. "Part of my decision to build a T-18 for the second time was based upon having a set of excellent complete plans and to also be able to build and complete the airplane no matter who goes out of business". I'm one of those people that got caught in a manufactures failure and bankruptcy. It happened right at the time I needed his support on a half completed project. I happen to think the EAA is doing a good job, and may be the only hope for general aviation. Can it do a better job for the homebuilder? I think so! I also think it would be a sad note if we can't put forth constructive criticism to help make it better. If someone at headquarters gets bent out of shape let it be at me! I state again it's only "MY OPINION". It takes a lot of material and time to prepare and edit this newsletter. Perhaps both of our time would have been better spent writing an article on building, and flying the T-18.*

*Rich*

————— And the second: —————

March 9-91      Jacque Fletcher  
                          #103, 877-64 Avenue NW  
                          Calgary, Alberta Canada  
                          T2K5J4

Dear Richard,  
 I truly appreciate the editorial you presented to us in the current issue number 77. It is honestly to the point about eroded policies of the EAA in Wisconsin. My membership with EAA has been "long term", and from that perspective, did like

and be proud of the EAA's growth and accomplishments. But, alas, like the Saskatchewan Wheat Pool Elevator Company, or any local Co-OP Retailing Company; each has become exactly the very corporation which each was organized to be an alternative to. Each has lost a great deal of their "old time" "bare faced" honesty, and have adopted policies of curtailed disclosure, as your article clearly points out.

In the fairly recent past our EAA and several of our GTA systems, and many Corporations have adopted very bad and uncompetitive policies in the marketplace. The policy of preserving the journalistic gilts and glitter you refer to, is no longer a very competitive enterprise. The member that realizes this, is getting the same sour taste in his or her mind that is closely related to the delusion one has of one's International Brotherhood Union. Seemingly the EAA has become a large political prize in membership! This is not only my own opinion, for I can write quite extensively about it, especially the Union Metaphor!

The survival of EAA, Unions, and other organizations may seem secure and assured at this time. However, the immediate future and the next few years will see the demise of most of these seemingly secure organizations. Also, most of the hierarchy of these organizations will likely not learn, or recognize the fact a value is not a value unless people want to buy it. The non-value-kits that have been foisted onto out innocent homebuilder, are most likely my fellow EAA members. It is the responsibility of each "victim" as well as the EAA to prosecute the fraud in criminal court.

The new competitive process is underway, all organizations must answer to produc-

ing and to disclose true, or untrue marketable values for society or perish. Some executives will discover that all consciousness-created, lasting values come from competitive value production. And dynamic competition and value production will rule. Each business will be forced to squeeze out all silly notions of their own operations and their dealings with others in order to survive domestically and to compete internationally. Total honesty is going to be very damned tough hard work. (Ask Dave Blanton or Rex Taylor!) Each job will be a profit-dependent one unable to exist outside of a hard fact, competitive world. The fake just ain't going to make it.

Many customers now; most future customers will be more discerning and can choose the corollary to the uncompetitive and unproven with ostracism. This new politics is free enterprise in the form of free competition, and is spreading worldwide. The most uncompromising sieve in the marketplace is going to screen out the fakes, unreliable, "smart", and non-values in the next five to ten years. It is certainty in my mind that the EAA will be forced to "sterilize" its policies before another five years pass-by. Too many "smart" individuals will "let" the EAA down, and its own lack of disclosure policies could destroy it. For the Oshkosh Headquarters are unwittingly but diligently "creating" their own brand spanking baby new competitor; which may be gleefully pushed by me and my peers --- --Dave Blanton? Rex Taylor? maybe yourself? This competitor to EAA could be a Giant!

I thank you, Jacque Fletcher.

Jim Strickenberger  
4344 Gem Ct.  
Erie, PA 16504

Richard:

-----I wonder if I can use the N.L. for a "help" situation? Many older N.L.'s give some very good descriptions by the older builders, particularly John Thorp himself, about building up the 0-290G. I still haven't been able to run down some of the Lycoming P/N's that are stamped and/or inked on some of the parts I have.

Lycoming themselves do not have a record of the numbers, yet the "box tags" read "Lycoming-Spencer Division. 0233-66345 piston" "AF 33 (600) 233489 product list #2 date pkd 2/54 item 110 method I" and they are still in cosmoline (by the way). I now have the public library trying to chase down some of the books on the 0-290G since the G.P.O., (Pittsburgh office) comes up with nothing and with the goodie bit of news they (nor apparently) the entire GPO System does not have the hand-books I'm seeking. I'm looking for 0-290G overhaul instructions handbook T.O. 3862-40-13 and the air force tech manual T.O.38G-40-13. Besides the public library, currently one of our EAA Chapter members (Vietnam copter pilot) is also trying through some contacts with his former service buddies. If I can sell this unit I'd like to have the info prepared so I can give a prospective buyer the full dope.

From my letter in N.L. #77 I received two communiques. One from Bob Yeakey regarding his "Ross Subaru" power conversion; I had visited with Bob in Dallas this past summer and saw his engine under development at Lou Ross's in Arizona. Really looks good! Also heard from Claude Stoysich; Omaha, NE. he has the V-6 of Blanton's hanging. I've been going over the pic's with a magnifying glass for

the last few days and will be dropping him a line with lots of questions. It too looks GREAT !!!

Well Richard, If any of the gents happen to have any other infor on the 0-290G, 0-290D outside of the EAA Engine overhaul, carburetion and conversion book and Lycomings overhaul manual and parts catalog PC-102 (reprints August 73 & Sept. 88) I'd appreciate hearing from them. Thanks Jim Strickenberger 4344 Gem Ct. Erie PA 16504

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Looking for a folding wing T-18 with 180 hp Lyc. and minimal avionics.  
Craig Sheely, Box 38 Manila, UT 84046  
(801) 784-3201

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I'm looking for a T-18, preferably S-18 with 150-180 hp, IFR panel, quality construction, in flying condition. Richard M. Orible 1216 Floribunda #7 Burlingame, CA 94010 Phone (415) 375-2718 work or 344-0201 home.

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Richard, What Desktop Publishing are you using? Nate Eastman  
*Nate- I use Pagemaker for the document and Arts & Letters for the special art work. My system is IBM PS/2 Model 60 and I current have about \$10,000 in hardware and software. Richard*

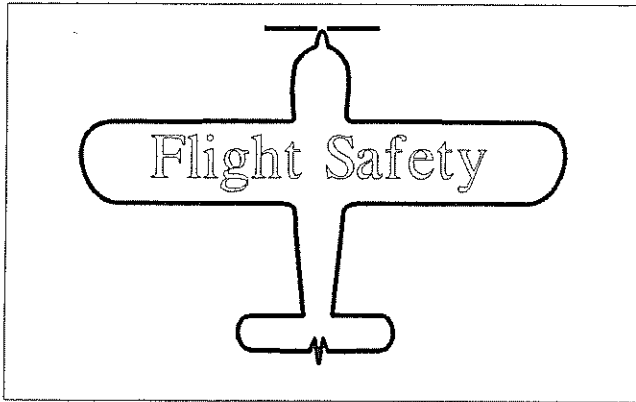
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John Popejoy writes his V6-T18 is ready to fly. Just waiting for the warm weather. He lives in Omaha, NE  
*Congratulation! John .*

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Also ready for the first flight is N682P owned by Gordon MacDonald of Glendale, California

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And here or two more things to add to your annual check-list.

Number 1.

Bolts that hold rudder cables to the rudder horn. Half way worn through. see diagram.

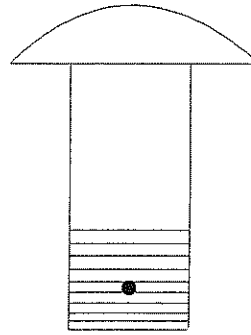
**Attention!! Folding Wing T-18s**

The following is from Gary E. Green  
Granbury, Tx

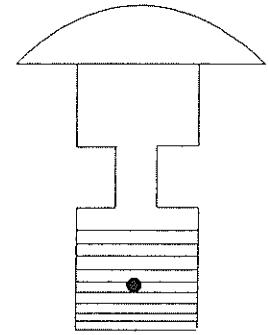
I've been helping Marty Sidener annual his T-18. He'd taken it to an AI over at Cleburne, TX to have it annulled and they'd found some unacceptable slop in the wing fittings. We brought the plane back home to figure out how to fix it. We found the pins were fitting quite loose in both main beam fittings. (This wing had been built by Ken Knowles years ago and has an unknown number of hours on it ). The pins themselves weren't out of tolerance but the holes in the 315 fittings were way out. We took the fittings out of the center section and outer wing and had them bored over sized at a local machine shop. We had to hog them out to .620 to clean them up. (The plans call for a hole of .562 to .563). We then made new pins to fit the enlarged holes. We're about ready to go back together with it now if we can get a couple of warm days.

My main reason for mentioning this problem it to alert others with the folding wing to check for this during annuals. I don't know if this was caused by normal wear or possible a poor fit when built.

Normal



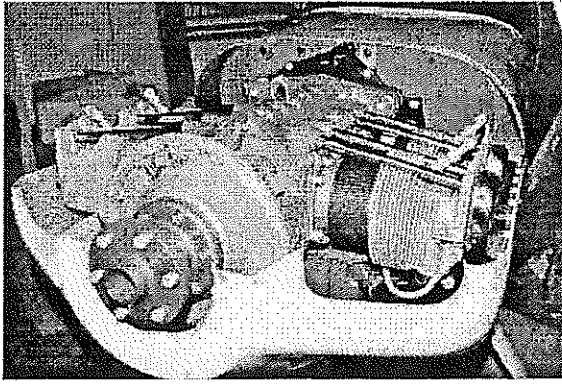
Mine!



Number 2.

Flaps "return" springs were cutting into the rear spar where the wing panes were bolted together.

RBB 3-18-91



## THE 0290 GPU "REVISITED"

by Ken C. Morgan

The 0290GPU (Ground Power Unit) was first discovered by homebuilders when it became government surplus in the early sixties. For those not familiar with this engine, it was used to power an Air Force jet engine starter/generator. The engine was a derivation of, and similar to, the standard 0290D aircraft engine (125HP); however, it did contain major components (crankshaft/cam) of the standard 0235 aircraft engine (115HP). The GPU has been somewhat controversial during the years due to poor overhaul techniques, crankshaft flange cracks, and general rumors of poor performance. All of the above are partly true; however, in order to separate fact from fiction, let's establish a baseline regarding the engine. First, and most importantly, the 0290GPU can be a reliable, dependable, and long running power plant for your experimental/homebuilt aircraft; however, it must be properly overhauled and modified to aircraft quality standards. An additional advantage of this engine is that it can, with modest expense, be modified to produce 135 to 140 horsepower.

John Thorp designed the T-18 with the 0290GPU in mind as a primary engine source. John, during the early days of the T-18, converted/modified many GPU

engines for builders in the southern California area. His ultimate modification/conversion was to use 0290D2 pistons (7:1 compression ratio compared to 6.5:1 of GPU) P/N 69841, beef up the crankshaft flange with a reinforcing plate, and machine the cylinders to accommodate the larger 0290D2/0320 intake valve seat P/N 72057 (P30 oversize), with intake valve, P/N 73938. The GPU exhaust valve is retained (13/32" stem), or you can install the standard Lycoming 0290D3 7/16" exhaust valve with new guides reamed to the proper stem diameter. 1/2" stem exhaust valves are not required or necessary for this engine. If you have completed the other conversion steps of case flange removal, installation of aircraft sump, accessory case, and second magneto, the engine is ready for the assembly process. This conversion will result in an 0290D2 135/140HP "look alike" engine, with solid lifters rather than the hydraulic valve lifter geometry of the 0290D2/0320 series engines. The 140HP is available for 5 minutes during takeoff at 2800 rpm. If the factory specified RPM figures are not sacred to you, more power could be developed at RPM's greater than those listed above. The increase in compression will obviously increase the intake valve face diameter. The valve modification is the additional "kick" needed, providing improved breathing and increased fuel/air mixture efficiency.

For those interested in GPU's, they are still available, mostly in some state of conversion/modification; however, occasionally you will find one in its original state. Considering the skyrocketing price of certified run out engine cores, the price of the GPU is most attractive. If you have an opportunity to pick up a converted GPU engine, or presently have one that may be a candidate for the above modifications, the following specifics are pre-



sented for your information/use.

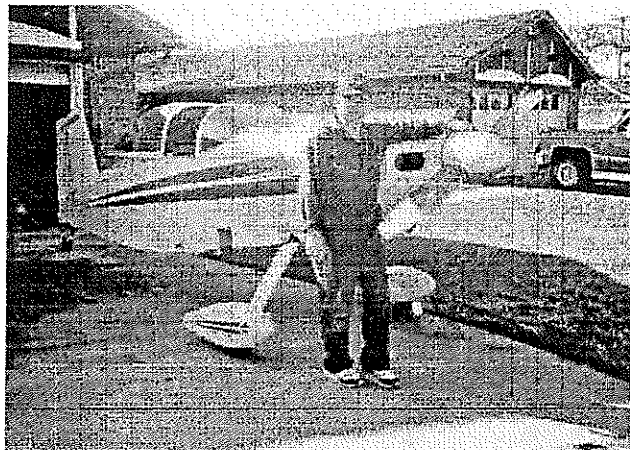
The GPU crankshaft flange re-enforcement is available with the longer driving lugs, from several west coast suppliers, cost with bushings is less than \$100. Consider this a must to insure integrity of the shaft flange. Also, make sure you install engine front nose seal retainers to prevent crankshaft front seal blow out due to high crank case pressures (see Lycoming service bulletin). The D2 piston, valve seat, and intake valve can be obtained from your local Lycoming distributor. Make sure you get the P30 valve seat that is 30 thousands oversize and will allow the proper "pinch" for the seat to cylinder fit after machining. The machining of the cylinder to take the new seat may present a problem with certified shops. I have a good cylinder repair shop in the area that has done the machining for me. Total cost for cylinder work about \$150 each, or \$600 per engine. This does not include normal cylinder reconditioning or guide replacement. For those with a standard GPU, aspiring for that 0320, for an extra \$600, you can have 140 horses compared to the 0320 150 HP. Clean up your project a little bit, wheel pants, gear fairings, etc., and you might not even know the difference.

I have an installed 0290GPU in my T-18 N46806. This engine has all the above modifications, plus additional enhancements such as balanced rotating parts, polished intake ports, and utilization of an 0320 sump with an MA4 SPA carburetor. A complete report of this engine and its performance will be submitted after test flights are completed in early spring.

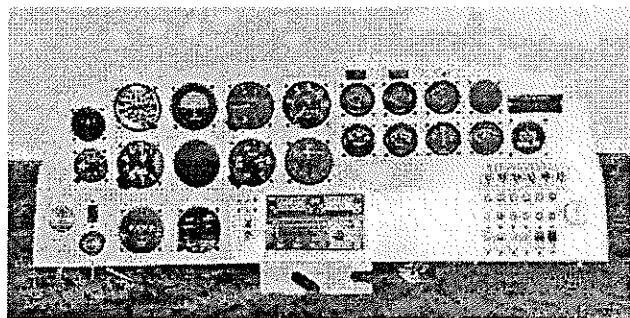
The above upgrade should be of interest to those with GPU engines in their aircraft, or individuals that may have

a GPU stashed away in the corner of the shop. I will be happy to answer questions regarding this article or other general questions on the GPU.

Ken C. Morgan  
1612 Northridge Dr.  
Arlington, TX 76012  
817/265-6838



KEN MORGAN AND N46806



KEN MORGAN'S PANEL

(Editor's Note: The following is another helpful letter from Ken.)

Dear Rich,

I am enclosing pictures of my T-18 N46806 instrument panel and the "enhanced" 0290 GPU engine (140HP). Some comments regarding the instrument panel. Before punching holes in the panel, buy an instrument panel layout

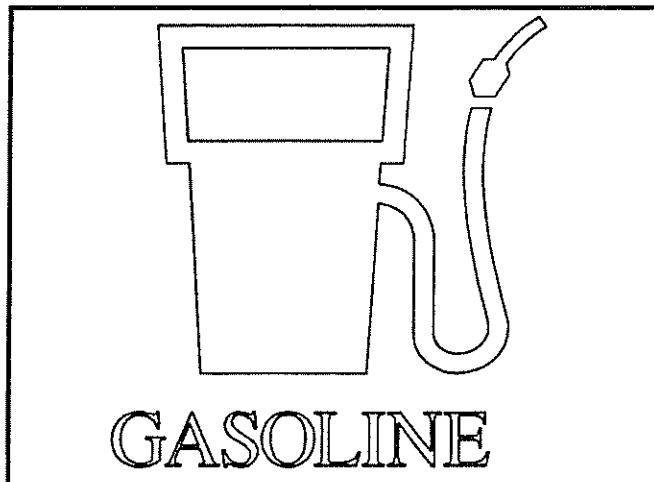
template (Aircraft Spruce), it will be a worthwhile investment. It's impossible to properly layout a panel without this handy template. Also, make poster board cut-outs of 2 1/4 and 3 1/8 instruments and layout on the panel; this preplanning will take most of the mistakes out of cutting holes too close and other errors that are impossible to correct after metal is cut. Most builders end up with engine gauges from several mfg. sources. I have had good experience with VDO gauges used in sports and performance automobiles. VDO has a line of custom engine instruments called "cockpit series". These are the units that I have used. You can pick up the VDO catalog from most any auto/hotrod performance distributor. In addition to quality, the price is also reasonable. Regarding avionics, I am not a sales person for Terra; however, after checking all new and used equipment on the market, they seem to have the most bang for the buck, with a good three year warranty. Most radio shops will not give you an unbiased opinion of Terra, as Terra's direct factory repair cuts out the local radio distributor/installer. My advice is to talk to the end user of this product, then you will get the correct after performance information. I have installed the Terra TRT 250 w/AT 3000 Encoder, ECDI TRINAV C VOR/LORAN indicator, and TXN 920 COM/NAV. All these units are TSO'ed and except for digital readout, are state of the art. The transponder is particularly attractive with a solid state output device rather than the standard cavity tube that can be very expensive when it blows. I obtained a used Foster LRN 500 Loran. This unit competes with the Tomorrow "Fly Buddy". It is a TSO'ed unit and is also IFR certifiable. This Loran has two very attractive features, one is its demo capability whereby you can take the unit home, set it up with a plug in power supply, and enter all your data for your

flight. The other desirable feature is the low cost of data base updates. I called the factory several days ago and can update the present data base from the new mid-continent stations, cost was only \$75.00 and that included an update on all other data in the data base.

Well Rich, I have only engine compartment work and installing the panel and associated wiring to complete N46806. I have gone out on a limb and made reservations for Kentucky Dam in May. J'nene and I will be there, fly or drive. We hope to have a good group from the Texas area in attendance. I visited with Gary Green last week, and he indicated they would make the trip provided that weekend is open on his flight schedule. While I am on the subject of Gary, I want to express my thanks to him for helping check me out before first flight in my T-18. For those of us who feel qualified to test fly their aircraft, it is a feeling of great comfort and relief to have someone like Gary offer a little stick and rudder time prior to first flight. In my case, N46806 has 400 hours of flight time; however, it will take to the air in the next few weeks with a complete rebuilding, including new engine, instrument panel, radios, etc. Hopefully, I can repay Gary's assistance by passing on help to another T-18'er down the line.

Rich, you're doing a great job with the newsletter. I know how anxious you are to get the personal T-18 in the air. Your taking the time for the T-18 newsletter is a contribution most of us would find hard to make. I'm sure I speak for the entire T-18 fraternity in expressing our appreciation for your efforts. By the way, just obtained the Microsoft FS4 Simulator software, it is great. See you in May at Kentucky Dam.

KEN MORGAN



## Article by Robert Yeakey

*(Editor's Note, Robert Yeakey was in fuels & lubricant research at Southwest Research Institute. )*

Gasoline is a miracle fluid! A small aircraft can easily travel 120 miles on 10 gallons of fuel. Visualize a stream of gasoline 120 miles long. That stream will have a diameter of just .054" ! That is a lot of power from a very small volume of fuel.

The energy in gasoline is remarkable--whether considering AV gas or auto gas. In fact, the auto gas has a slight edge in total energy. Normal gasoline has more than 19,000 btu's per pound of fuel.

I would like to share with you now, the over emphasis on slight differences between AV gas and auto gas:

First - the summer grade of unleaded car gas is nearly identical to AV gas. The auto gas is tailored to the weather for easy winter starting. The AV gas has the same specified volatility for all temperatures.

Second - the 80-87 AV gas offers less antiknock protection than unleaded auto regular. The standard motor method test rating on 80-87 is mon 80. Car regular will average 83-84 mon. except at high altitudes

marketing locations where antiknock protection needed is less. (mon=Motor Octane Number)

Third - The Reid vapor pressure--a worrisome thing to many aircraft pilots--is much higher in wintergrade gasoline for cars. The specification "7lbs/sq in" was picked out of the air many years ago and was never service tested. 7lb. AV gas means that fuel @100 degrees Fahrenheit will have an RVP of seven pounds per square inch. Similarly, wintergrade auto fuel of 12 RVP will have 12 pounds per square inch @100 degrees Fahrenheit. Any gasoline, under certain conditions, can vapor lock. Reduced fuel pressure of higher temperature will increase vapor locking tendencies. You have all heard about carburetor icing. Any gasoline acts as a refrigerant when vaporized. The answer to this problem is heated intake air, heated carburetor throttle plate, or venturi together with the throttle. I once ran a series of tests on anti-icing additives (silicons, ascohol, etc.) using a cold box and a 1949 six cylinder plymouth engine. The refrigerant effect was considerable. Measurement of throttle plate temperature ran 6 degrees Fahrenheit on average @ engine stall. Photographs of the throttle showed a good build up of frost (the cold box was loaded with humidity) The .006" space between the throttle plate and venturi would shut off the air and stall the engine.

Four - Turning now to leaded and unleaded fuel, 100 LL is actually 100-130 with 2 grams per gallon of tel instead of 4g/gallon used in the older 100-130. Before E.P.A. interference. This concentration of lead is the same as Humble Motor Fuel & Esso Extra when I was in Humble's Technical Service Department. For about 50 years regular grade fuel varied from 2 grams to 3 grams per gallon. 3 grams/gallon was the maximum by a gentleman's agreement among petroleum manufacturers. Lead tends to protect against valve face sticking to valve seats. It has, also,

some lubricating qualities. The aircraft engines of 7.00 to 1 ratio specifying 80-87 AV gas were designed for operation on essentially unleaded gasoline, it should be noted. (.4g/gallon, Exxon Spec. Sat. for AV gas). Lead has only one drawback for aircraft engines; it fouls the rather narrow spark plug setting specified for magneto supplied ignition systems. Automobiles have no problem with gaps specified from .030" to .050" in the battery or electronic ignition systems. TEL was first used to eliminate engine knocking and did very well until the EPA's decree that lead not be used in motor fuel. In spite of the alleged oil shortage, the gasoline production from a barrel of crude decreased by a matter of 10%. The refinery processing was complicated by the need to produce higher octane base stock. The unleaded fuel is nevertheless short by 2 octane! The leaded fuel served quite well from the time C.F. Ketting discovered it until the catalytic muffler was selected. Lead and/or phosphorous additives in gasoline impair catalytic type emission-control systems.

It might be of interest to point out that there are other ways of rendering exhaust gases clean. The German Bosen CIS injection system is one. Both of my '79 model Dasher VWs were emission control free legally. They had Bosen CIS fuel injection which incidentally was fully adjustable as to mixture ratio. A second method is the Japanese stratified charge engine used in many Honda automobiles.

#### Fuel System Design Recommendations for Improved Gasoline Accomodation

1. Equip system with dual fuel pumps near the tank or even in the tank. Eliminate the engine mounted pump. This type pump mounted on a hot engine raises fuel temperature and lowers fuel pressure from tank to pump accentuating fuel vapor lock tendencies.

2. The dual pumps should feed into a

saddle valve--as used on saddle tank motor trucks. If one pump quits the saddle valve will shut off the inoperative line and the other pump will take over fuel supply.

3. Steel 3/8" diameter fuel lines are to be preferred. Not only is the steel stronger but automotive flare nuts can be used with automotive hardware. Firesleeves in the engine compartment forward of the engine firewall as currently recommended should be incorporated. Avoid copper fuel lines because they act as a catalyst to form gum in the fuel.

4. Use fuel filler caps that allow air to enter in case of normal vent plugging, but prevent fuel vapor from escaping. This type cap is available or can be obtained by modification.

5. Fuel suction line should enter tank from top and go to within 1/2" of lowest tank point. Baffles in tank maybe desirable to dampen fuel movement during certain flight maneuvers.

6. The intake fuel line should be fitted with a "finger" filter to prevent line stoppage. A large fuel filter on the fuel feed between the saddle valve and the carburetor should be employed. This is an effective filter and found on all fuel injected cars.

7. With the suction line clearance condensation will settle to the bottom of the tank. Frequent checking for contamination will be unnecessary. A water finding paste on a wood pole can check for condensation in a manner like storage tank testing.

The above design recommendations will greatly reduce your airplanes sensitivity to variation of the weather and variation of the fuel. The remarkable saving in gasoline cost of auto fuel is mostly because of the handling and segregation requirement of a fuel that only comprises a half of one percent of motor fuel production. It should be mentioned in

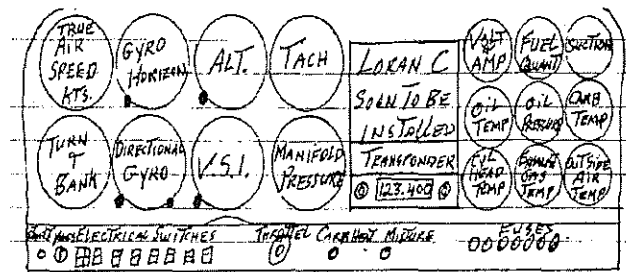
closing that the use of 100LL in an 80 octane engine is wasteful. 100LL in my instructor's 1949 Bonanza caused a 50 degrees Fahrenheit higher E.G.T. than the reading with car regular. The high octane fuel burns more slowly putting less energy to the cylinder and more heat out the exhaust.

Robert H. Yeakey



Our Cover Photo of Craig Marshall and his T-18-S, Serial #1191 C-GCWS

W. Schwars of Campbell River, British Columbia, Canada. Started July 11, 1980, finished with final inspection November 25, 1988. First flight March 22, 1987 due to winter weather and move to Vancouver B.C. Notation in building log, and signed by Transport Canada, reads quote, "High standard of Workmanship." This does not surprise me as Chuck spent many years in the Royal Canadian Air Force. Unfortunately, Chuck lost his medical validation after only flying his pride and joy for approximately 100 hours. (My heart goes out to him) So I am now the proud owner of this fine aircraft. Since purchase, I have installed full Gyro system, intercom, and remote fuel shut-off valve handle. I also relocated the gascolator to lowest point in fuel system, and added Manifold Pressure Gauge, Combination Amp and Volt meter, suction gauge, and Air Temp. Gauge. Panel now looks like this.



## A letter from Craig Marshall:

Dear Richard

Further to our telephone conversation of January 26, please find enclosed payment for T-18 M.A.S. membership, and back issues of newsletters starting at #64, as well as a photo of myself and my T-18's-serial #1191, Registration C-GCWS.

This aircraft was built by Charles

I am soon to angle 2 1/4 gauges on right side of panel 30 degrees for easier reading (highly recommended) and also install a Loran C and Transponder Mode C. Complete panel is vibration isolated on rubbermounts with fold down, (to access rear of panel) feature.

An in-flight engine fire is no fun, not being able to reach the fuel shut off valve, is much worse! So here is my idea of an easy fix, maybe your readers would like to see the following sketch.

Weld two 1/8" drive pins to end of a piece of 3/8 X .035" 4130 tubing, allow to extend 3/8" past end of tubing, pins must be 180 degrees apart. Drill two holes 180 degrees apart in existing valve handle slightly over size, to relieve binding, as drive tube comes away from valve at slight angle. Build tunnel stangion from 1/18" plate aluminum, same width as tunnel and rivnut in place, to support other end. Use locking collars on both sides of stangion, to eliminate end play. Use rubber Grommet. WORKS GREAT!

It is my observation that anyone who has their gascolator mounted on the firewall, likely has it mounted higher than the lowest point in fuel system. This must not be allowed to happen, as water will collect at the lowest point, and perhaps not cause a problem at temperatures above 32 degrees Fahrenheit, but at an altitude may freeze and expand, causing fuel stoppage, and engine out. My fix for this is to fabricate a bracket, and attach gascolator at engine mount to landing gear bolt. This will hang gascolator outboard of leftside landing gear tube, and with a one inch extension of drain cock, cock will exit the belly cowling just in front of the

landing gear (left side), fuel lines must run down hill to gascolator, and uphill to fuel pump or carburetor with no reversals. This method simplifies checking gascolator for water or sediment, without the chance of spilling fuel in engine compartment.

As I have limited time, flying my T-18 to date, I can only furnish you with the following information:

Aircraft: Thorp T-18-CW New Sunderland air foil, flush rivets.

Engine: Lycoming 0320-E2G 150 h.p. at 2700 r.p.m.

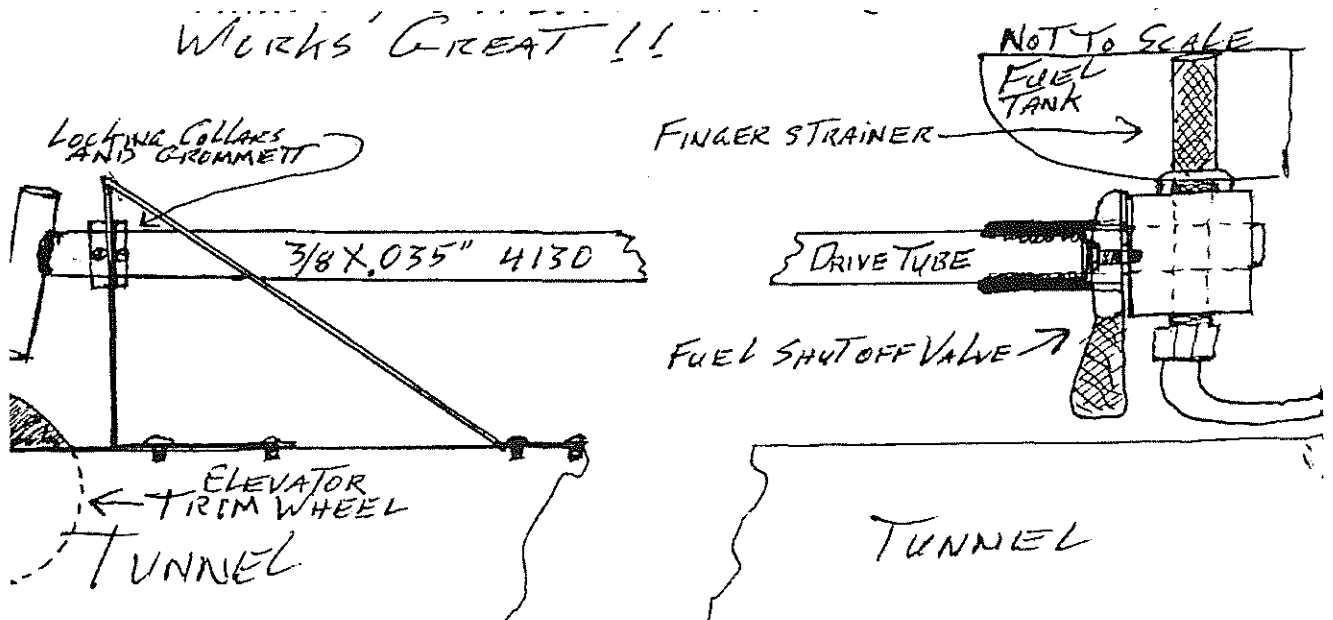
Propeller: Warnke Almost constant speed 67" X 77"

Climb: 1200-1300 fpm--at gross, 1500 lbs, empty weight 920 lbs. Climb is at 100 kts. and 2400 rpm full power

Top Speed Level Flight: TAS 167.4 kts at 3000 ft. and 27 inches, manifold pressure

Cruise Speed: TAS 147.8 kts at 3000 ft. with 2350 rpm and 25 inches manifold pressure which is about 75% power

Stall Speed: Clean 52 kts at 1400 lbs



Pilot System: Piper blade type located just behind main spar 2/3" the way out on left wing

Static System: (cabin) all hot and cold vents closed for above speed readings.

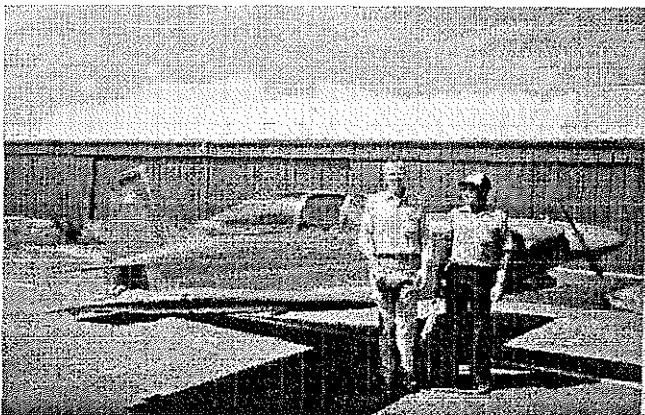
Any combination of venting produces only 1 1/2 kt. difference in airspeed indication. I have not had a chance to do a proper 2 way average ground speed check, I hope this will happen soon. If it produces major changes in airspeeds, I will let you know. The true airspeeds I listed, were taken from an uncalibrated airspeed system, and only corrected for altitude and temperature. I hope this information is of some value to anyone building or testing a T-18.

Please also send a copy of the newsletter this article is printed in, to the builder of this fine example.

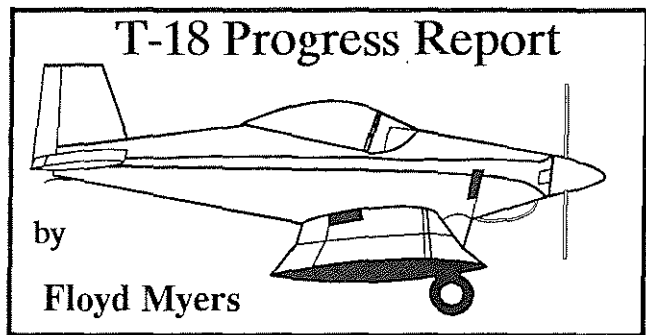
His address is: Charles W. Schwars  
RR #5, Compt. 57  
Vernon, British Columbia,  
Canada V1T-6L8

"Happy Landings!"  
Craig Marshall

P. S. Please excuse the spelling, I am a flyer, not a righter.



*First Flight N54 FS Frank Snedeker Bldg  
Cecil Hendricks Pilot June 1990*



5170 Sunset Drive

Ogden UT 84403

31 Jan 1991

Hello, Rich:

Not much progress on # 1158. I moved from Las Vegas in early Oct., and done needed maintenance on this house - then, it was just too cold to do much in the unheated garage. During the cold period, I have done what welding could be done - built some bushings - things of that sort. Serious work awaits warmer weather. Really, I do not consider Ogden a reasonable retirement location, and am reluctant to spend resources to build up a decent shop.

I built the outer wing panels, but had real problems. I had bought the partial kit, and am not able to determine where parts were bought. One set of sales slips (no indication of seller) shows skins, ribs, etc; another set shows some, but not all, of the same items. The ribs had been Whitney punched to 1/8". I drilled the web, and holes were misaligned up to 1/2 hole diameter!. So, for the first wing section, I added rib flange doublers, attached by AN-3 rivets and epoxy. On the second, per advise of others, I merely drilled new rivet holes, well away from the mismatched ones. So let me reiterate what others have said - "If you are not sure all parts were from the same supplier, be careful". Skins were bent per newsletter articles. Minor problems emerged with skin center punched hole locations and rib holes. So I went roughly in this sequence:

\*. Alignment strips were built, to wrap chordwise around the nose rib, the main beam, the aft rib, and the rear beam. Then and only then were holes drilled thru ribs and the web.

\*. The ribs were attached to the main beam, using machine screws which just filled the holes - a temporary attachment. The rear beam was then cleco'ed to the aft ribs.

\* Softwood boards, with nails in each end to engage the alignment holes in the nose rib, were temporarily installed to hold the nose ribs in position.

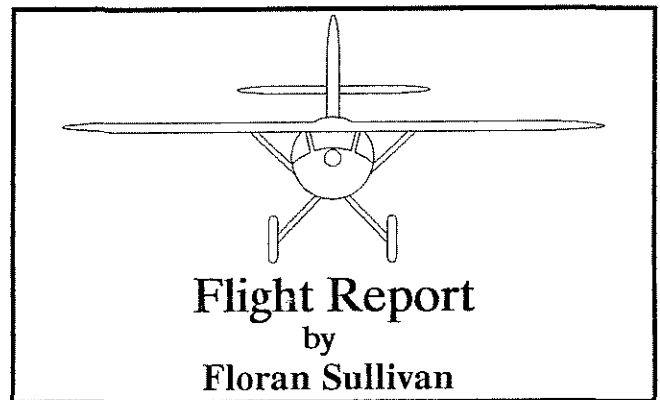
\*. A pull jig was then built. It consisted of two each 1 X 3, suitably trimmed and notched out as needed; one bore against the rear beam and the other was tied to upper and lower skins with wire. Pieces of 3/8" threaded rod, with nuts and washers inside, were used as jackscrews to pull the skin. The skin was pulled tight. Pieces of tubing (per newsletter) were taped fore and aft and eyeball aligned to eliminate twist. Then, two alignment holes were drilled thru skin and main beam, top and bottom, and dowed with tight fit machine screws. Then, the remaining holes were drilled -first 40, then 30.

\* The mess was disassembled and deburred. The main caps were counter-sunk, and the ribs riveted to the main beam. The skin was again wrapped (it was necessary to use the pull jig), alignment rechecked, and riveting began. I used the "coin press" method of dimpling, which seemed to work OK. The wing sections have drum tight skins and appear to have zero twist.

I have built several fittings, e.g., the stick socket, 522, 602-1, etc, using a "poor man's mill - a cross feed vise mounted on a bench drill press", using 3/8 flat and radius mill bits. It takes a lot of time, but what else is new? Should anyone care to try it, RIGIDITY IS A MUST. I learned the hard way.

I guess my change of address card went astray. I am missing NL 75, have 76, and nothing since. So here is my check for \$30.00 as dues - if more than needed, perhaps I could get those issues, or consider the excess a donation to the fund. I would never get as far as I am without the Newsletter. I appreciate it. Keep up the good work.

Floyd Myers



My T-18 is not a new one, it was completed and test flown in 1971, my serial # is 427 and is N427H. My T-18 was first test flown by Ron Zimmerman, and I was checked out in Ron's T-18 before flying mine, so I have to thank Ron for his great expertise and help.

I started my T-18 in May 1966, and was test flown in September of 1971. It is powered by a Lycoming 0290G-4 with oil pan from 0-320 with MA45PA carburetor, corvair oil cooler mounted forward of #2 cylinder, automotive airfilter (Banjo type) installation, and Thorp prop flange reinforcement. My prop was originally a 7GAM rebuilt to 68" dia X 66 pitch but is being changed to a Pacesetter200, 68" dia X 63 pitch -10. My airplane is built as per print except for some small things. On my elevator trim I used two universal joints and a short tube instead of flex cables, up front I used a radio compass 90 degrees



drive unit. My seats are built as Dick Cavin's article in "Sport Aviation", the airframe is all flush riveted and painted white with green trim, the paint is Dupont Dulux enamel. I have anti-friction bearings in the horizontal tail pivots, this was OK'd by John Thorp, the logs needed more material for this change. My landing gear was changed to a spring steel typeless main gear. The main gear is a little longer because the gear is quite soft. The gear system was set up by Ron Zimmerman and OK'd by John Thorp. I have not had any problem with good results, the "A" frame part of the gear system was not changed in design except cut off at the bottom of the firewall and the struts plug up into the "A" frame and bolted.

I have been flying with the new wood propeller and it is faster than with a metal prop, but I have a vibration I can't seem to fix. Any good ideas???

Yours,

Floran Sullivan

11355 36th Pl.N.

Plymouth, MN 55441



*Floran Sullivan's Beautiful T-18 SN #427*

## T-18 SPRING MEETING

*Kentucky Dam Village State Resort Park*

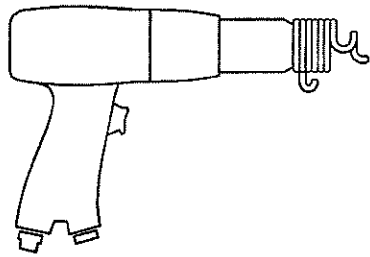
May 10,11 & 12

Make your reservations with the park directly. You must specify you want the Paine Party in order to get the quoted rates and a room, as the lodge may be full other than the rooms they are holding for our party. Phone is 1-800-325-0146

Bring your own tie-downs.

Kentucky Dam Village State Park  
P.O. Box 69  
Gilbertsville, KY 42022

## Builders Corner



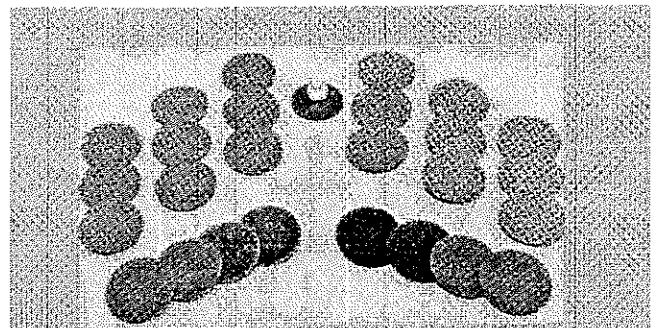
### Building The Flaps

A lot of thought has gone into the building of my T-18. Many times I have found myself staring at some assembly and going back and forth to the fuselage just thinking and planning how to get a perfect fit. So much thinking, on occasion there has existed a tendency to out think my self. For example leaving the flaps until the last, my thinking told me that by that time my vast experience with the rest of the plane would prepare me for the nasty little "beasts". And after all I built a set way back in the seventys so it should come back right! Oh well, so much for thinking and past experience. Nothing can prepare you for the tugging necessary to get that top skin over the ribs and spar all the time doing your best to keep it level with no twist. After struggling with the first one and building a barely acceptable flap some more thinging resulted in a way to bend that skin. We've been doing it all along on the wings, horizontal tail etc. All we need to do is adjust the center of bend for the large radius bend. By putting four sets of additional holes in the bottom "spare" material between the holes provides for the small radius and the actual rear skin holes we can bend the four additional times, each time pressing the pollywog down to a two to three inch radius. What this does is to establish a gentle continous bend going from where the front sharp bend will be back

to the top spar. If your building the flaps from scratch, its relatively easy to calculate where the extra sets of holes should be. On the Phil Tucker supplied parts the holes work out well for me at 3.5 inches forward of rear bend holes, then 4.4, 5, and 5.5. The skin pulled over with very little problem, in fact it allmost fall right into place. Good luck!

### Sanding Grinding and Polishing

I'm sure most of you know about the use of Scotch-Brite Pads for polishing Aluminum sheets and plate stock parts. But, did you know this same material is available in the form of various size wheels for use in a hand drill or a high speed die grinder? I rarely pick up a file anymore, just use the die grinder with a two inch Roloc Disk Pad starting with the brown for course and working to the gray for the super fine finish. Talk about fast work of polishing the edges of aluminum!

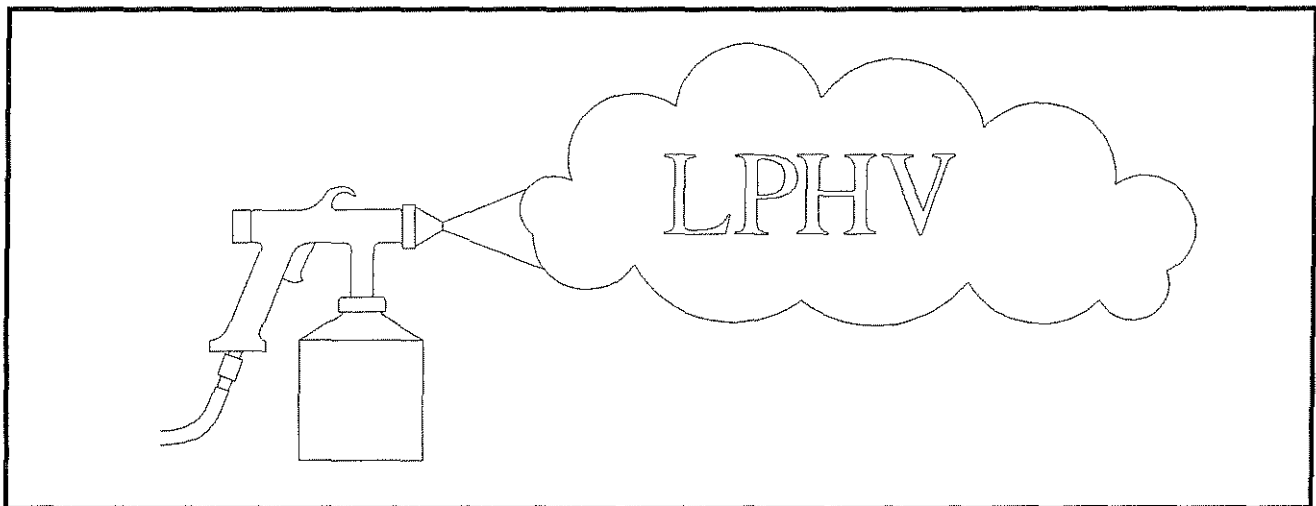


Choose either the 2 in. or 3 in. sample pack and prove to yourself how well these products work. Each sample pack contains 18 3M brand Coated Abrasive Discs and 8 Scotch-Brite Surface Conditioning Discs plus a 3M Roloc Disc Pad Holder and threaded shank.

UPC 051144-	Disc Pack No.	Pkg
13033	982 (2 in.)	10/Cs
13034	983 (3 in.)	10/Cs

To order, specify product name and number.

*Call your nearest machine tool dealer and ask for the Roloc or velcro type of disk.*



## THE LEADING EDGE OF SPRAY TECHNOLOGY

For those of us with an airplane to paint the acronym “LPHV” holds great promise, for the elimination of many of the pit-falls associated with the conventional spray-gun/air compressor combination. LPHV stands for “low pressure high volume” systems, not a new technology, but one that is really starting to catch on in both the automotive painting and furniture refinishing shops. The LPHV system is made up of a small air turbine, a relatively large air hose, and a special spray gun. The turbine supplies heated dry air in large volume, in the order of 40 CFM, at a pressure of 1 to 4 psi. In comparison a compressor system typically supplies air at 25 to 35 psi to the spray gun and at a much lower volume.

After a number of calls to vendors of LPHV equipment, it became clear that most of the sales people didn't know their equipment or it's application. It was great to finally find a company with knowledgeable sales personnel, this is The Lex-Aire Company of Arlington, Mass. Their personnel know the business and can discuss aircraft application and all the various paint types and the way to apply them correctly with their equipment. I was able to obtain a quality “USA” made system from Lex-Aire to use in my shop for evaluation in preparing this article. It's a real pleasure to see those words in the same sentence, quality and USA, so often today we only associate quality with foreign made items, with Lex-Aire these words can be used together.

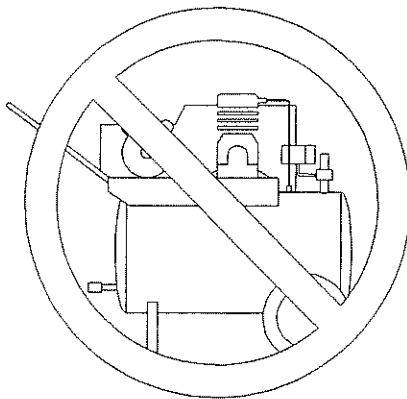
Perhaps the best way to describe the LPHV system is by comparison with the conventional spray system. My shops' compressed air system has two moisture separators in the line and I still have water and compressor oil problems with air tools and paint sprayers. The longer the compressor is on, the hotter it and the air it supplies gets. Hot air at high pressures causes moisture to condense in the storage tank and in the airline. As a result the moisture that gets by the dryer comes out on the fresh paint job through the spray gun. Professional painting shops spend big bucks buying dryer systems for getting moisture out of the compressor air stream. This problem is completely eliminated by the Lex-Aire LPHV Turbine since it supplies heated moisture and oil free air at a high volume and low pressure.

Paint from a conventional spray gun is delivered at a high pressure which causes much of it to bounce off in the form of mist or overspray, in comparison the Lex-Aire system

operates with low gun pressures of 1 to 2 psi. the paint doesn't bounce and it stays on the metal where you want it. This results in a large saving in material, I would estimate at least 30 to 40% less paint is required to cover the same area. The surprise here to watch out for is, since more of the paint stays where you want it you must be alert and not put too much on and cause a run. Because the cloud of paint is eliminated a full paint booth is no longer necessary, just use common sense and cover items that the slight overspray could get onto.

Control of the conventional paint spray gun has always been a problem of me since I don't paint that often and can never remember the correct settings for proper paint distribution. The Lex-Aire system is easy to set and operate, turn on the turbine and set the gun pressure to the desired pressure using a small valve on the inlet hose and reading the pressure on the small gauge on top of the gun. The amount of paint delivered is controlled by how far the trigger can be compressed, this is a screw adjustment on the back of the gun. I was also very impressed with the ability to set the gun spray pattern, this is accomplished by turning the guns nose for a vertical, horizontal or circular spray pattern. By turning the outer ring on the nose the pattern can be spread out or made smaller as you desire. The spray gun is simple to adjust and use, and since it has fewer parts than a conventional one the clean up is simple and fast.

If the turbine unit is kept away from the spray area and paint fumes, air for a face respirator can also be obtained in parallel with the spray gun by using a Y type connector. The turbine has filtering on it's input but this will not remove fumes from toxic paint so use caution and put it where it picks up clean fresh air if you use a respirator in parallel. The turbine air system is truly the way of the future for spray painting. It won't make you an instant expert with the spray gun, but many of the old problems of the compressor systems are eliminated, which does give you a better chance to produce a good looking airplane. If you would like more information on the Lex-Aire System give me a call, I am purchasing the demo system and may make it available to T-18 builders on a one month rental basis. Richard Snelson Phone (217) 935-4215



# LESSONS LEARNED

## "the hard way"

1. Scenario: Time for the first engine run on brand new O-360, T-18 N--- in the front yard. Wife watching for dogs and cats. Cranked a few seconds -- nothing. One more time --- nothing. Better pull the mixture and clear out the cylinders. Fired off on first blade. Mixture in immediately and it quit. I know what you're thinking. " The mixture control is hooked up backward." NO WAY!!!

Called Marvel Shebler. Told them it seemed mix control spool in the carb was 180 degrees out. They said impossible. Take it to Burbank Airmotive. They disassembled it and found the spool machined 180 degrees out. Burbank Airmotive and Marvel Shebler both said they never seen anything like it. They did not take into account "Murphy's Law". How about it, has anyone else ever experience this problem?

2. Someone told me when I was building that it was OK to use auto brake fluid in my aircraft system. I did with bad results which could have been worse.

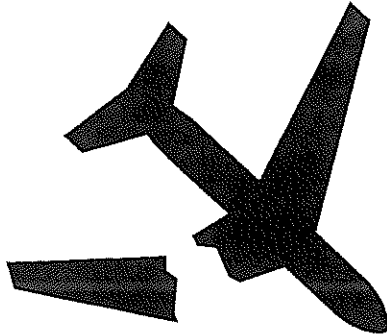
While on a cross country I locked my brakes to runup before takeoff. I do not have a parking brake. One brake failed to release when I got ready for takeoff. I messed around and it finally broke loose. I took off and when I got to my home airport luckily there was quite a lot of snow on the runway. The brake was locked again and i slid for a ways before it broke loose.

The O ring in the brake mechanism had deteriorated and swelled causing the lockup.  
**USE ONLY APPROVED AVIATION BRAKE FLUID!**

3. A friend of mine tack welded the adjustment nut on the flap. On final approach he lowered flaps - weld broke - one flap went up! Needless to say one wing went on a 45 degree close to the approach end of the runway. He raised the flaps quick, to save the oncoming tragedy. Why? Because, he said he forgot ot finish welding the nut.

As for me - I fit and rivetted the bulkhead that the vert. stab. attaches to the sideskin. When the vert spar on the stab. didn't fit the fitting on the front attach point - I had to put in new "splice" so.... Careful not to rivet that bulkhead until the vertical stablizer spar has been fitted. Thanks-  
Name withheld. \*!!!@!

# CRITICAL SAFETY INFORMATION



## ANOTHER T-18 CRASH HAS RESULTED FROM THE FAILURE OF A METAL PROPELLER. THIS ONE WITH FATAL RESULTS

I'm sorry this newsletter is a little late, but I thought it necessary to call it back from the printer to include this critical information. The newsletters have covered this exact failure a number of times in the past and yet "another fatal crash because of the same failure".

I don't have any information about who! are where! this happened, just the following notice from the FAA. Please! if you know any T-18 owners that do not get this newsletter pass this information along to them, or ask them to get in touch with me to get on our mailing list for this and other critical information.



