

Dragonflyer



Winter Issue — No. 21 — January 1986 — Dragonfly Newsletter

1985 AND BEFORE

A lot of new Dragonflys got into the air in 1985. As near as I can figure there are about 100 of them flying now. Most of these aircraft are in the United States, but we have one in Sweden, one in England, one in Germany, three in Canada, one in Australia and who knows how many in the building.

Plans sellers such as ourselves, seldom have any accurate way of determining what stage of the building process the builders are actually in.

A lot of guys buy the plans and never start on the airplane. Some start but fall out. The percentage of people who actually finish a scratch/built airplane is probably not more than 20% of the number of plans sold.

The number of finishers from kit/built airplanes, where they start out with a lot of prefabrication, appears to be considerably higher. Of course a lot of that is due to the fact that a builder has a large investment to start with and he simply can't afford not to build it after investing that much in it.

THE PROTOTYPE DRAGONFLY

The Prototype now has 1252 flying hours on it, has never been damaged in any way, unless you count a couple of broken props, and keeps on flying on a daily basis around here.

The only problems that have developed in that time have been metal fatigue in the tail wheel assembly which was reported in newsletter #14 and a crack in the rudder horn as was reported in newsletter #10.

I did have to replace the exhaust pipes at a little over 1000 hours. The last eight inches on the exhaust pipe was beginning to rust out and get thin. Interestingly enough, the hot section of the pipe up near the engine looked like it would go a long time yet. Several builders have asked about stainless steel pipes, but I believe the cost would be so terribly prohibitive that you could buy several sets of the mild steel pipes for the cost of one set of stainless.

REVIEW OF DESIGN UPDATES.

I've had a few people, not many, who were upset because we have continued to improve the airplane and in doing so redesigned some of the parts. One fellow wrote complaining that he had bought the old style motor mount and then we came out with the new one. He couldn't get rid of his old one. He said that we had changed the airplane from Mark I configuration to Mark II and he had to buy new landing gear legs. He had bought Azusa brakes and then we started using hydraulics and so on. His position is that we have taken advantage of him. We, according to our builder, have caused him to spend an extra \$1000.00, and he's not happy about it.

Well, I guess if we have, we've taken advantage of ourselves too. I've still got seven of those old style motor mounts. There's not a thing wrong with them. Most of the airplanes now flying have the old style mounts. We designed the new one because it was a whole lot easier to get fitted on to the airplane and made an easier construction job out of it. Is that bad? It didn't mean you had to throw away the other style mount if you already had it, there's nothing wrong with it, it's perfectly usable.

The brakes were not as good as they could have been. I didn't design them on the airplane, Rob did, but I never had any real problems with them, flew them for some six hundred total hours.

The Mark II version of Dragonfly was designed to overcome the fact that the wide stance landing gear is not well suited for anything other than pavement. Mk-I requires more piloting skill than the Mark II does and experience was showing that some of the guys didn't have the piloting skill necessary to make good landings. When we started finding that out, we did something about it by designing the Mark II. Was that bad?

We have never designed anything to make a mandatory change out of it. We've always endeavored to give you guys the options. When we come up with new stuff, you didn't have to throw away what you already had, other than the afore mentioned tail wheel and rudder horns. They were changed for safety reasons and were mandatory changes.

We are going to continue to come up with changes and improvements on the airplane because that is the nature of things. When we do come up with changes, it's to make a better airplane out of Dragonfly, or to make it easier to build, or to make it more desirable for new builders. After all, we are merchants and we've got to sell to stay in business, which means we keep eating.

Obviously, when we come up with new changes, we can't go back and buy back all the old parts and give a guy the newest thing in return. When Ford came out with 1986 models, they didn't take the 1985 models back, did they?

I've about come to the conclusion that in this business there is no way in the world that you're going to please all of the people all of the time and some of the people you're not going to be able to please any of the time.

I do have seven sets of the old motor mounts in stock, if any of you are still building a scratch built airplane and want to save some money, I'll sell those mounts at exactly half price or, \$72.75. They cost me more than that to have them made. If we took advantage of our frustrated builder, guess we really took advantage of ourselves.

Any plans seller that has any number of airplanes built from his plans always has a few builders who never are quite able, it seems, to get performance equal to the Prototype, or get the things working well for them. There are a lot of reasons for this. The most common reason is they simply refuse to follow the plans, make a lot of changes and as a result the airplane they come up with may have the same name as the one the designer built, but it is a far different airplane and of course, it's going to perform differently.

Since buying Viking Aircraft from Bob, I have stayed in very close contact with Bob, drawing upon his experience in aeronautical design, his experiences as a Navy pilot, his experience as a flight instructor, and his experience in dealing with the customers.

We have agonized together, caught in the frustration to get the builders to follow the plans, listen to us about flying the airplane, because after all, we are the authorities on the airplane. Bob originally designed it, put a lot of time in it. We bought the design. I spent a lot of hours with Bob learning the aerodynamic idiosyncracies of the design and I've put more time in the Dragonfly in flight hours than any other man on earth. In fact I've flown about nine of them now and participated in the flight testing on several of them.

There hasn't been anything in the newsletter directly from Bob in quite some time. But recently Bob got a copy of a little newsletter and sent me the following letter.

A LETTER FROM THE DESIGNER by BOB WALTERS

Those of you who purchased Dragonfly plans prior to the summer of 1982 have heard me speak out against irresponsibility before, but many of you have had no contact with me at all. I have not been closely associated with experimental aviation for several years now; however, I am in touch with Rex Taylor from time to time and I still read *SPORT AVIATION* and several other publications. What I read about and what I hear though the grapevine greatly disturbs me and it should disturb you also.

First let's take a look at the history of the Dragonfly. In 1979, there were no two seat sport aircraft that were easy to build, inexpensive, and roomy that also had good low speed performance coupled with reasonable top speed. I went through a long and difficult design process to arrive at the final Dragonfly configuration. This process involved a great many design compromises and is a story all of its own. The end result of my design work was an aircraft designed to be inexpensive, while still having good performance on VW engines. In order to meet my design parameters of good performance, simplicity, and low cost, I eliminated aerobatic capability, grass field capability, IFR capability, long cross country capability, the ability to carry much more than a toothbrush, short field capability, and lots of other things. For the simple reason that you "can't fool Mother Nature", no one else has since introduced anything that is vastly superior to the Dragonfly, at least not when all the design criteria are considered. I don't expect the Dragonfly to be a great aircraft forever, because materials technology

and manufacturing techniques are constantly getting better. Nevertheless, it is still a pretty good design almost six years down the pike.

I introduced the aircraft at Oshkosh in the summer of 1980 and I was fortunate enough to win the Outstanding New Design Award, but I was not able to discover the secret of getting something for nothing. Now that I do much of my design work on a computer, I still haven't discovered any free rides. The Dragonfly wasn't built by mistake. There was a reason for everything that went into the aircraft. Keep this in mind, because it seems to be a point that gets lost on some folks.

After a couple of years of struggling with the business of selling Dragonfly plans and discovering that my wife and I simply couldn't make ends meet as a "Mom and Pop" company, Rex Taylor took over the business. Rex was able to take advantage of his existing business structure to streamline the paperwork end of Viking Aircraft and make it much more efficient. That left him more time to promote the aircraft and work on several continuing development programs that I simply didn't have time to do previously. Over the years, Rex has developed the popular preolded components, he has pioneered the builders school concept, and he has incorporated a number of modifications in the design of the Dragonfly. One of the most obvious is the development of several landing gear options, including improvement in the braking system. Less obvious to the eye, but equally important is the testing and development of a limited number of changes to the materials used during construction. Each and every change was first carefully considered from the standpoint of cost, ease of building, impact on performance and most importantly, safety implications. Test samples were thoroughly investigated and in many cases rejected. Only then was the new component incorporated into the prototype, after which the change or modification was carefully tested. If the change proved successful, it was released to the builders. The point I'm making, is that any changes to the Dragonfly design are automatically expensive and time consuming if they are undertaken properly. Some of these changes were precipitated by new technology. For example, the brakes used by most builders were not available when the prototype was designed. There have also been great advances in fiberglass cloth during the last 6 years. Rex has elected to take advantages in these changes, but it must be emphasized, that these changes were made only after he made the appropriate tests.

Where does this leave the average builder these days? In pretty good shape, I think. The Dragonfly is still one of the best bargains around for performance verses the dollar. It is still possible for a first time builder to use the description of how I built the prototype to come up with an aircraft that he can expect to perform pretty much like the prototype, as long as he uses the recommended materials and construction techniques. Through the effort of Rex Taylor, builders now have the option to trade dollars off against building time and get into the air quicker by purchasing "Snap Dragon" pre-fab parts. Builders may also take advantages of other landing gear options, improved brakes, and many other smaller, but important changes and modifications. These builders are not likely to be

disappointed either with the safety or performance of their aircraft. Many builders are proving this to be true each day, as people all over the world continue to safely fly and enjoy their stock Dragonfly.

What concerns me, and what this letter is all about, is the irresponsible action of a handful of Dragonfly builders and others who might lead the unwary astray. A number of builders have chosen to ignore the guidance available in the plans, or newsletters. Let's look at one example. There is a fellow who started out with a set of Dragonfly plans and ended up with an aircraft that has a full IFR panel, a main fuel tank of 18 gallons, strobe lights, a heated pitot tube, and all sorts of other garbage that was never intended to be included in the design. This builder moved the header tank up forward to make more room for his instruments and radios and has even included an electrically retractable landing light, believe it or not. The landing light motor alone must weigh two or three pounds! The empty weight came out at \$740 and when he loads up the enlarged fuel tank, it only takes \$227 to bring him up to the maximum safe gross weight. That means that if he weighs \$175, he can take either a 52 pound bag or a 52 pound passenger, but not both. In other words, this poor guy has built a single seat aircraft with lots of baggage room, but only limited baggage capability. Why? Well it's obvious that he was trying to get something for nothing. He wanted to have a Falco or a Swearingen SX 300 on a Dragonfly budget.

Another fellow constructed his Dragonfly with materials that had proven to be substandard, made his own tri gear modifications, and then wound up breaking off the nose gear and damaging the canard and elevator. After repairing the control surfaces with micro, he experienced an exciting case of flutter that darn near killed him. He was lucky to get back on the ground in one piece. Another builder deleted the spars in the interest of saving building time! Luckily for him, his home brew engine failed, resulting in a forced landing and fire that totally destroyed the aircraft before the aircraft totally destroyed him. He escaped with scratches from a project that was bound to kill him sooner or later had it kept flying. These are only a few examples. Many other cases of poorly thought out modifications have resulted in near disaster, and have always produced an aircraft with disappointing performance.

Who are these folks that insist on doing these crazy things? They are without exception, not real aircraft engineers, but they sometimes consult an engineer (often a student) on one or more aspects of their modifications. Usually they are first time builders and/or low time pilots. Almost without exception, the guys who want a full IFR panel are those who are either working on their instrument ticket or have just gotten it. It usually turns out that their modifications result in poor performance and they are always surprised by these results! I can only conclude that these folks have some quirk in their personalities that preclude them from making rational judgements. How could someone possibly be surprised that an aircraft that is almost \$250 overweight will suffer poor performance. This same person reports (as though he has discovered an amazing fact) that

trying to run his full IFR panel, including heated pitot tube, overtaxes his small HAPI alternator. Any designer could predict these things, and they have. All the information needed to avoid these problems are published in the plans and Dragonfly newsletter.

How about the guy who almost tore his canard off with flutter? He had damaged the canard and elevator in a previous crash, added some undetermined amount of weight to the control surfaces while repairing them, and then was surprised that he got flutter well below the design redline of 180 mph. Adding to his surprise was the fact that he had previously flown his aircraft without flutter at speeds as high as 240 mph indicated! What surprises me is that his aircraft didn't self-destruct at 240. Gents, let me remind you that the elevator and ailerons of the Dragonfly were not designed to go faster than 180 mph true airspeed (not indicated airspeed). I am not saying that it "might" be dangerous to fly your aircraft in excess of designers gross weight. I am saying that it is definitely dangerous to exceed the recommended gross weight. You're cutting down on the design strength that is required to fly safely. The reserve strength designed into the Dragonfly isn't just nice to have. It is necessary. It isn't an aerobatic aircraft and wasn't meant to be. Remember those design compromises I mentioned earlier? One of those compromises was the elimination of any aerobatic potential at all. The Dragonfly is just the opposite of an aerobatic aircraft. It is not strong enough, it doesn't have enough aerodynamic drag, it doesn't have enough power, and the controls are all wrong for doing aerobatics. That doesn't make it a bad aircraft. It just means that I designed it to be a good sport airplane that would not cost too much, and aerobatic potential was one of the things I had to throw out along with rough field capability, IFR capability, and a whole lot of other things. It really is true that there is no free ride. Why some of these yo-yos think that they can get something for nothing is beyond me. I suppose there is no stopping them by trying to get them to listen to reason, because I've tried before.

The danger to you is that you might be taken in by these self styled experts by mistake. Realize that just because someone goes to the trouble to publish something, doesn't make it right. Word processors can be hazardous to your health. Lots of stuff that I read in various newsletters is good information, but lots of it is potentially deadly. Some of this danger is insidious. If you hear about a guy who made numerous modifications to his Dragonfly and there is no mention of any problems with his aircraft, I suppose it is natural for you to make the assumption that what he did is OK. If this information is then published in a newsletter, it begins to take on a life of its own. I have never met an independent newsletter publisher willing to admit that he has an awesome responsibility to other builders. Contrary to what most of these guys think, writing a newsletter is more than just reporting the news. It is giving guidance to a group of people engaged in a hobby which has the potential to prove fatal. If you read about some guy who tried Russian Roulette one time and didn't die, would you get out your revolver and give it a try yourself? Of course not, even if the writer was the publisher of a major newspaper. Why then, would you be prone to incorporate some untested design modification

simply because you saw the idea published in somebody's newsletter? If you are intent on suicide, Russian Roulette and irresponsible homebuilding have a lot in common. The trouble is, that Russian Roulette is against the law, while doing anything you want to your homebuilt is still allowed by our government. I personally think that is as it should be, but when you check in at the Pearly Gates (or the Gates of Hell as the case may be), don't try to tell anyone you're surprised to be there.

I'm really not kidding when I say that even though you do your best to build your aircraft exactly according to plans, it is perfectly reasonable to expect that it might turn out different. I can only speak for the performance of the prototype. Don't forget, these are not factory aircraft. You are the manufacturer. These aircraft are experimental and potentially dangerous. That is why it is imperative that you conduct a thorough and careful testing program to ensure that you have a safe aircraft. Don't be taken in by some rook with more guts than brains. Don't fly your aircraft over gross or over redline speed. In short, don't do anything stupid. You can then concentrate on coping with all the pitfalls and dangers inherent with aviation in the first place.

If you want to ignore this advice, then go right ahead. The law still allows you to do so. But be sure to explain to your wife and friends what you're doing. And be sure to be honest with yourself. That way no one will be surprised when you wind up with a piece of junk for an aircraft or worse yet, wind up splattered all over the country side, depending on how your luck is holding out.

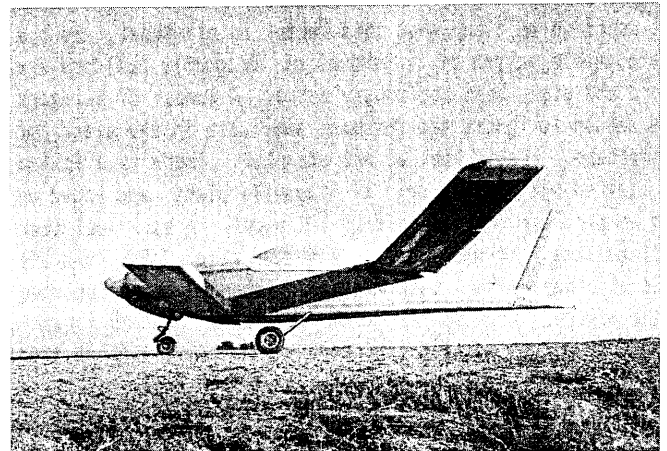
I don't want to be a spoil sport. Homebuilding can be a safe and enjoyable hobby, but only if you're really careful or really lucky. If you're new to aviation, ask a few old timers what they think about people who rely on luck as their primary defense against disaster. "**BOB WALTERS.**"

In this era of liability suits, with everybody suing everybody at the drop of a hat, in the aircraft business it becomes super important that you supply your builder with factual, tested, proven information only. Such information had better be well documented and capable of close scrutiny, because if somebody ever gets hurt the plans seller might have to stand up in a court of law and prove that every bit of information that he gave to the builder had been verified by testing and proven by flight hours.

The old prototype Dragonfly now has 1252 hours on it, no damage history, has given faithful, reliable service for almost six years now in all kinds of flying conditions.

I truly believe that we know more about what it takes to make a Dragonfly work and work well, what it takes to make our engines run and run right than any other source of information. Think about it. If some guy is telling you, "Oh my! my plane doesn't fly right, my engine doesn't run right. This is wrong, that's wrong. I can't make it go fast." He gives you a long list of his troubles. Is he the guy you want to follow? Doesn't it make more sense to follow the advise of somebody who does it right the first time and has proven it by hundreds of hours of in service time. All you've got to do is listen, guys, and we don't

charge you anything for the advise. We really want you to have every bit as good service as the prototype has given. Work with us. You'll be glad you did.



MARK III DRAGONFLY

Ever since day one in this Dragonfly business there have been guys who strongly objected to the tail-dragger configuration. Many of you have built the airplane and had to learn to fly a tail-dragger by doing it in a high-performance airplane with no previous instruction. Consequently, we had a rash of broken canards. Lack of tail-dragger experience, plus the wide span gear just plain wasn't a good combination.

We realize that we are probably losing a large segment of the market by not have a tri-cycle gear configuration for those people who simply are not going to fly a tail-dragger. So...Enter the Mark III!

The primary objective in designing a Mark III was to design a landing gear system that would retrofit into all the previous Dragonflies, Mark I's, Mark II's, plans-built airplanes or kit-built airplanes.

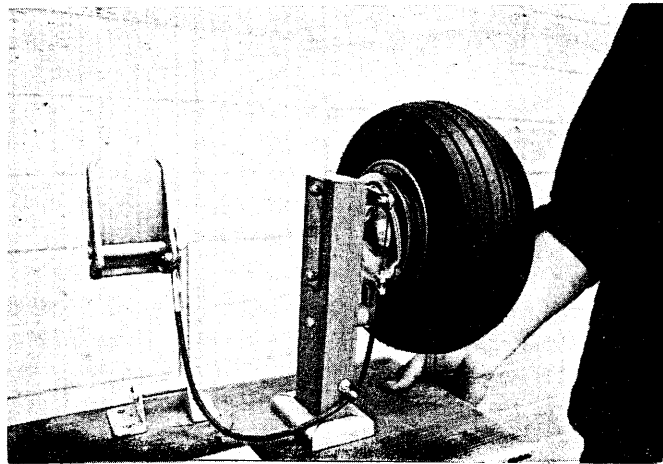
The nose gear strut is an air oleo pneumatic strut, full castering, and is retained to the airframe by welded structure tied to the motor mount. The motor mount is a standard new style mount. The landing gear structure is simply added on. The main gear assemblies consist of two welded gear mount structures that are glassed into the fuselage behind the seat back bulkhead, which function as the sockets for the spring steel gear legs, ala all the late model Cessna's. Net result is a gear that should put Dragonflies take-off and landing characteristics well within the piloting capabilities of virtually any pilot; particularly those who have never flown anything but tri-cycle geared airplanes. Several important things I do want to point out. This gear is being developed entirely by HAPI, with HAPI money. Viking has nothing to do with it. We've had to build a whole new airplane just to check out the landing gear. That's an expensive proposition.

There will be no plans sold for this landing gear now or in the future. It will be like the Mark II kit, totally developed by HAPI with HAPI money. If you buy the kit, you get all the drawings and everything necessary to build the airplane.

Since we have yet to flight test the landing gear, IT IS NOT FOR SALE AT THIS TIME. WE ARE NOT TAKING DEPOSITS and as yet, we have not established a sales price, if it

proves successful and we choose to sell it.

Whether or not it is ever put into production will depend on how much interest there is in it and based on that interest, we'll have some idea how many units we could produce and sell and that will establish a sales price. For those of you guys who are seriously interested in it, send us your name and address and say "I'm interested in the gear when a price is established." From that we can go ahead and make some decisions. If we do decide to produce it, those of you who are interested will be notified. You can make the decision then, whether you want to buy it or not.



MECHANICAL BRAKES

We do have a new type of internal expanding mechanical brakes in five inch wheels that take the 11 X 400 X 5 tire or can also take a 500 X 5 aircraft tire. Everything fits in Mark I. The wheel brake and axle set, everything from Mark I costs \$139.50. Now when we changed over to hydraulic brakes, I got stuck with a whole bunch of Ken Brock mechanical brake hardware, so if you guys building Mark I's want these mechanical brakes for \$139.50, I'll throw in every bit of the prefabricated Brock hardware that goes in a mechanical brake system for free. Who are we taking advantage of by updating the design? It seems like we're getting hit in the pocketbook worse than anybody.

I'VE CHANGED MY OPINION

I used to strongly advise against the use of individual toe brakes on the Mark I. I questioned whether the average tail-dragger pilot would be fast enough on his foot work to handle the wheel brakes independently, spread that far apart. I have flown four different Mark I landing gear configurations with individual braking on the tip mounted wheels and I've changed my opinion. The toe brakes can be used on the tip mounted wheels very effectively. For those of you who might decide to put toe brakes on, the same toe brake pedals that you use with the hydraulics can be used with the mechanical brakes and I'll make you the same deal, if you want to hook up the toe brake pedals to the mechanical brakes for the Mark I, I'll throw in the toe brake pedals free instead of the Ken Brock hardware.

Following is a letter from Gary Konrad.

With 14 days off from work around Christmas, it was time for another trip in my Dragonfly. Michigan already had 4" of snow on the ground when I departed Oakland-Pontiac Airport "Florida Round". It was 17° @ 10:30 AM when I took

off, but not to worry, it gets warmer the further south you go, right? Landing in Lexington, Ky. it was 11°. So much for the above theory. Other than the temperature, it was a perfect day for flying. Arriving in Venice, Florida by noon the next day completed one of two goals for the trip. Spending Christmas with Mom and Dad was one, flying my Dragonfly to the Bahamas was the second. So Friday, Dec. 27 I left Venice for West End and Freeport, Bahamas.

Leaving the Florida coast at West Palm Beach I crossed the ocean at 8,000 ft. It was a nice warm, clear day and the island was in sight in about 20 minutes. Landing at West End and clearing customs was "No problem, Man", a common phrase that everyone uses in the Bahamas. I hopped over to Freeport to find a hotel room for the night and was cleared to land #2 behind a United 727. After finally convincing the controller that my gear was down - he had never seen an airplane with wheels on the wing tips (or canard tips for that matter) - I tied down at the General Aviation Ramp.

Needless to say a Dragonfly in Freeport draws a lot of attention. There were a few remarks made about the sanity of the pilot for flying a VW engine on one mag across 70 miles of ocean. Since it had ran 220 hrs. without any trouble, what's another 1/2 hour or so. The next day brought clouds and cool weather, so I filed for a flight back to W. Palm Beach. Luckily I found some company for the flight back. Tom Peters and family agreed to help me fly around the rain clouds over the ocean by leading the way in their Seneca. We were able to reach a maximum altitude of 2,000 ft., but sometimes as low as 800 ft. above the ocean. Boy, there's a lot of water out there.

Clearing customs in W. Palm Beach brought out another crowd, but it seems that Dragonflys always do that. The rest of the trip home was uneventful and my Dragonfly now has over 240 hrs. on it in 18 months.

Calling in from 5 miles out, the controllers at Pontiac Tower welcomed me home from Florida, but somehow I can't buy their remark about all this white stuff on the ground being sand.

Round trip flight time was 21.8 hrs. and I used 87 gallons of gas for an average of 4.00 GPH. Not too bad, but now I've got to think of somewhere else to fly to. Maybe California, or Arizona, or Jamaica, or

Gary Konrad
3313 Harvard
Royal Oak, MI 48072

I've seen Gary's airplane and it's a very nice one. It follows the plans virtually to the letter. He's got a good flying airplane with no problems. The formula for a good flying Dragonfly is real simple. Just build it like the plans tell you to, it's that easy.

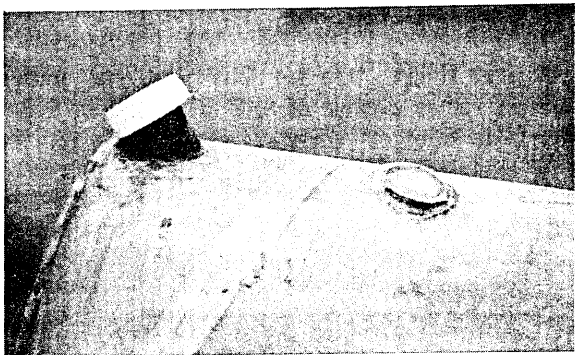
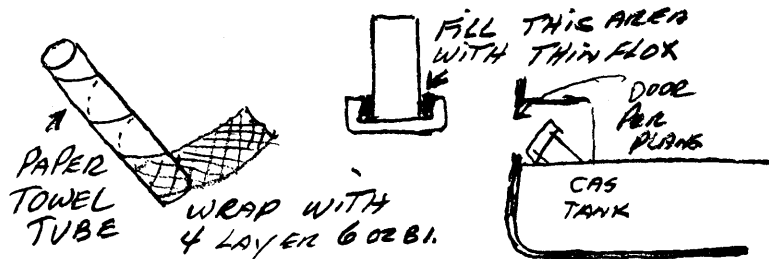
There are several Dragonflys whose pilots I am personally acquainted with that are accumulating an awful lot of hours. Don Purdy of San Diego has between 350 and 400 hours on his. Troy Burris, of southern California, has about 150 hours on his. Bob Verriest, I believe, told me that he has in excess of 200 hours. David Bethard, of Orange, Texas, I haven't had a recent report, but he's really stacking up the hours on his. All of these airplanes are Mark I's. All of them follow the plans very closely. They came out reasonable in weight. Their performance is up

there either at or very near what the Prototype turns in and the owners are very happy with them.

INEXPENSIVE STROBE LIGHTS

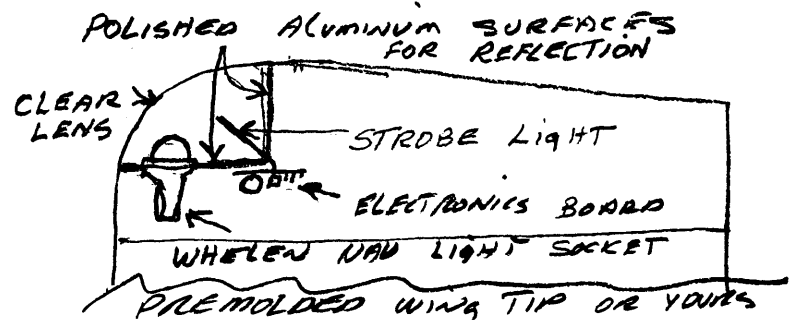
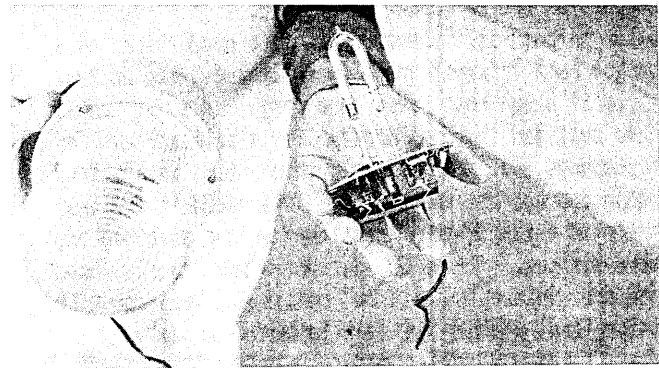
BUILD YOUR DRAGONFLY CHEAP

In building an airplane, it seems like every time you turn around something is going up in price. Seems like hardly anything ever goes down in price. I've got some changes for you this time. In building the Mark III, we've come up with a real simple, cheap gas cap. (see the little sketch) The gas cap is simply a molded polyethylene cap with big threads inside of it. They were on throw-away five gallon plastic jugs that crop dusting chemicals come in. I took the paper tube out of a roll of paper towels, waxed it very heavily on the outside with some paste wax and wrapped six ounce bi-directional cloth around it (about four layers) and let it set up, then took the cardboard tube out of it. Now I've got a real nice fiberglass tube which I trim square on one end. I then waxed the inside of my polyethylene cap and inverted the tube, stuck it inside the cap and poured in some epoxy loaded up with floc. Not real dry, so that it would go in and fill up all the air voids and let it set up. After it sets up, you just unscrew the cap and you've got your threads. Then I put it into the gas tank at about a 45 degree angle, which will make it convenient for the gas filler nozzle to go inside the tank. As vertically drawn on the plans it never has been really satisfactory. Total cost of this? You can probably go to your local city dump and find a real suitable gas cap lying there for the picking up. You can't beat that price, can you?



GAS GAUGE FOR THE MAIN TANK

A lot of you who have been around outboards are familiar with the type of gas cap that has a float and a gas gauge built into it, used in outboard gas tanks. Somebody sent us a liquidation sales flier and those gas caps with the gauge included are available for \$5.00. We put one in the main tank of the Mark III, right between the pilot's legs. It's very light, doesn't require any electrical connections, but will require possibly that you reach forward and pull the edge of the seat cushion back a little bit to read the gas gauge. If any of you guys are interested, we'll get a few of them. It's hard to beat the price.



You guys have heard me preach against loading a lot of weight in the airplane year after year in this newsletter and I'm still opposed to adding a lot of weight to the airplane. You can have navigation lights and strobe lights for a total system weight of about 2 pounds. If you're careful and cautious in your building, don't make everything resin rich, you can take that much weight out of the airplane by the judicious use of engine instruments, like the ones we put out here at HAPI. They save a lot of weight.

Dragonfly is not, was never intended to be, and will never be a good IFR platform. If you want an airplane loaded up for solid IFR flight in marginal conditions, please build something else. Don't kid yourself that you can do that with a Dragonfly.

Inexpensive Strobes - J. C. Whitney Co. in Chicago has a nice little strobe unit (see the picture) available. They are normally about \$19.00 apiece. They had them on special when I got these for \$12.99. The part number is 88-9315Y and that's out of J. C. Whitney's catalog #457C, page 97. You take all the junk that you don't need off the strobe and you wind up with the electronics and the strobe light and install it in the wing tip as per the little sketch, along with the nav lights.

Now I'm terribly opposed to nav lights and garbage sticking out in the airstream because they DO slow the airplane down and that's a fact. You can have a few of the goodies, if you really are careful about watching the weight and if you hide them internally so they don't slow the airplane down. Hang a bunch of garbage out in the breeze and it's going to slow the airplane down and it's never going to go as fast as the Prototype.

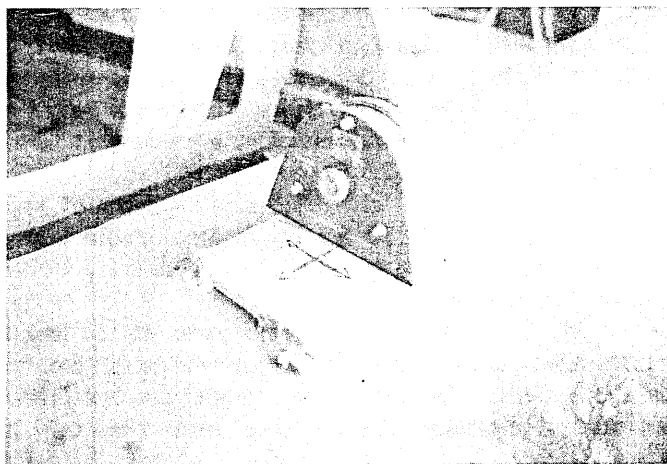
The total weight of this strobe system is 2 oz. for each unit plus the weight of the wiring and the switch. It's probably going to wind up weighing about 8 or 10 oz. total. If you add nav lights, you're probably going to pick up another pound.

INCIDENTS OF POOR INCIDENCE

As noted in earlier newsletters, I've had a chance to check some airplanes out that are flying and a couple that were not flying as well as they should have been. We have found that the incidence angles on the wing and canard were considerably in error from what's called for in the plans.

One fellow who was down here recently from Oregon had found that his airplane would only cruise about 140. We found the canard two degrees minus from the plans and the wing a half a degree plus. After correcting some of this, he still hasn't got it where it should be on the plans but he does report that the airplane is flying much better now.

I believe that part of the problem may be the use of a bubble level to set incidence. We use a precision inclinometer here in our Fun Flight Center building these Dragonfly kits, that will very accurately measure to minutes of a degree. We have checked bubble levels, like the old carpenter's level, with the inclinometer and found sometimes as much as a half a degrees difference, particularly if you reversed ends with the carpenter's level. I strongly advise that you get ahold of an inclinometer if possible. If you can't, there is an accurate way to assure that you're getting things level and it's described in the January, 1986 issue of Kit Planes. The system is very simple. Using just clear tubing and a little colored water, but by using a long length of tubing, very, very accurate leveling can be achieved without spending a great deal of money on precision instruments. The other way of leveling everything up would be shooting it with a transit. Some of you may have access to that kind of equipment or you can rent one at many equipment rental stores. It is super important to the performance of the airplane that the incidence angles relative to the water line be absolutely correct as spelled out on the plans. We build the wing and canard on the jig tables with the water line marks level and then before the wing and canard are removed from the jig table, we bond a piece of plywood about eight inches square right in the top center section of both the wing and canard. See Photo. This pad is put on level in both directions and bonded there and then we use that for the reference point when we set the wing and canard in the fuselage which has previously been blocked up at waterline level. This is a super important step guys, and you've got to really be careful doing it, because it's going to directly determine how well your airplane flies and how fast it flies.



SUPER HOPPED-UP ENGINE?

It has been suggested to me a couple of times recently that I've got some kind of a special engine in the Prototype or special propellor or something. That's simply not true and as proof of that, anybody who wants to pay a new engine price for my 60-2DM equipped with hydraulic lifters, can have the engine right off the nose of the Prototype.

There's nothing special about it. It's got over 200 hours on it. Anybody who believes that it turns in some kind of special performance can have it. My propellor is just a plain old Great American 52 X 42, the same one I've been running for over two years. The only thing special about it is it's getting pretty beat up now. I still have never found another propellor that performs better on Dragonfly than Great American's 52 X 42 or Props Inc.'s 52 X 42. When I do find a propellor that will outperform either one of those two props, that's the one I'm going to be wearing, cause I'm always looking for more performance.

BEST RATE OF CLIMB AND ENGINE COOLING

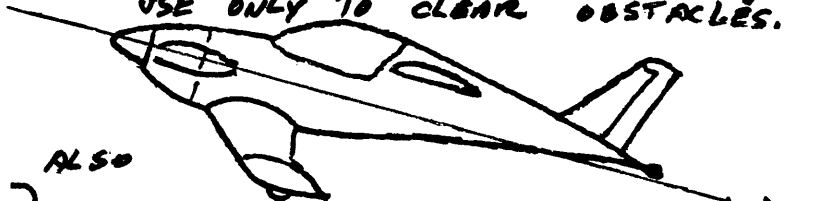
Just finished a telephone conversation with a builder who has a new Dragonfly with just a few hours on it. He's concerned because the rate of climb is not as good as he feels it should be, so perhaps a little explanation of best rate of climb, angle of climb and such is in order. The best angle of climb on the Prototype is at an indicated air speed of between 75 and 80 MPH. If I have to take off and immediately climb over an obstruction, that is the air speed I use. The best rate of climb comes in at indicated airspeed of 110 MPH.

The reason for this is shown in the little sketch. Dragonfly is a very clean airplane. At 75 and 80 MPH, it is in what I call 'the drag bucket' with a lot of induced airframe drag because of the high angle of attack on both the wing and canard. Once you've left the ground and climbed out over the trees and whatever obstructions you have at the airport, gotten yourself 300 or 400 feet above ground level, then push the nose down a little and while you're still continuing your climb, let the airspeed build up to 110 and then put a little back pressure on the stick and hold it to maintain the 110 as you go up. You'll notice your vertical speed indicator will now be up around 800 - 900 feet a minute. What you've done is let the airplane get out of the aerodynamic drag bucket and start going through the air cleanly. Now you can use the horsepower to climb instead of drag the airplane through the air. The very important side effect of this is, now the air is really whistling through the cowling and keeping the engine cool.

It should be noted and realized by Dragonfly builders that on take-off at low air speeds, we're asking the engine to deliver 100% power, but due to the low air speed, consequently the poor airflow transfer through the cowling, we're getting at best about 30% of cooling efficiency. After pushing the nose down a little bit and allowing the speed to build up to 110, cooling efficiency is good, climbing efficiency is very good and the airplane will perform for you. So realize that even though you might get lucky and build the airplane just perfect, everything right on the first flight, you're still going to have to spend a few hours flying it and exploring it and learning how to get the best performance out of it. I understand Dragonfly pretty well, but it didn't all happen in the first few hours. It has taken quite a few hours in the airplane to learn how to

get the best out of it, predict it, just as it does with any other airplane.

**CLIMB AT 85 MPH = BEST ANGLE
USE ONLY TO CLEAR OBSTACLES.**



ALSO

POOR COOLING (ABOUT 30% EFFECTIVE)
POOR OVER NOSE VISIBILITY
POOR RATE OF CLIMB
HIGH DRAG CONFIGURATION

CLIMB AT 110 MPH = BEST RATE.



ALSO

GOOD COOLING EFFECTIVENESS 80%
GOOD VISIBILITY OVER NOSE
VERY LOW DRAG,
EFFICIENCY!

SETTING A POSA CARBURETOR

Some of our builders having engines equipped with Posa carburetors or other adjustable mixture carburetors, have a little problem in determining the proper setting for the carburetor and recently we've found a system that seems to work pretty well, because it gives you a real reference point.

You should have an exhaust gas temperature gauge on the airplane with the probe installed on the right rear cylinder, as viewed from the cockpit, approximately an inch and a half down the exhaust pipe from the exhaust port on the head.

The reason we use the right rear cylinder is because of the spiral air flow in the cowling. The engine turns clockwise and the airflow tends to spiral around the fuselage clockwise. Consequently, that cylinder tucked away in the right rear corner gets less cooling air than any of the other cylinders and tends to run the hottest. That's the one we probe. It'll be the first one to show signs of distress.

The numbers I give you here are unimportant, because every exhaust gas temperature gauge is going to read a little different peak EGT temperature depending upon the location of the probe in the exhaust pipe, the way the flame hits the probe, and of course, the basic accuracy of the instrument itself. An exhaust gas temperature gauge is merely a comparative instrument. The numbers don't really mean anything on it.

This is the way it works. Tie the tail down securely, so there's no possibility of the airplane getting away from you. Start the engine, let it warm up and then go to wide open throttle and full-rich mixture and allow the engine to run that way for about forty-five seconds to a minute and

observe the exhaust gas temperature. Let's say that your exhaust gas temperature is 950 degrees. Now you slowly start leaning the mixture by pulling back on the mixture control lever and watch the rise in temperature on the EGT. Let's say the EGT goes up to 1250, peaks out and then starts cooling off. At about the same time the engine will start to miss from over-lean. THE IMPORTANT POINT! What we want to find out is how many degrees spread do we have between full-rich, full-throttle and peak exhaust gas temperature. Ideally we will have a spread of between 150 and 200 degrees. In the example we have a 300 degree spread which tells us that the engine is still too rich, because the temperature is too cool at the full-rich, full-throttle. We would then screw in the main needle one turn at a time until we come up to a full-rich, full-throttle temperature of between 1050 and 1100 degrees. If the temperature spread is less than 150 degrees, then the main jet must be opened and the mixture richened or severe damage will result to the engine in climb. That's the situation where the engine must develop 100% power with approximately 30% cooling. It is normal in an aircraft engine to set it to run quite rich at 100% climb power so that the excess fuel tends to cool the cylinder heads. The carburetors on Lycoming and Continental have "auto enrichment" power jets, so that at full-throttle, full-rich you really get a rich mixture. This little trick of using the exhaust gas temperature gauge to tell you where you are at really works. You'll wind up with the equivalent of "Auto-enrichment". Try it, you'll like it! It's particularly of help to people who haven't had a lot of experience with engines and possibly don't recognize the difference between rich and lean that those of us with more experience do.

HYDRAULIC LIFTERS

Since installing an engine in Dragonfly equipped with hydraulic valve lifters, it automatically and continuously readjusts the tappet clearance to allow for expansion and contraction that happens as the engine is operated. Tappet adjustment is a thing of the past.

Prototype Dragonfly has been flown since June of last year with no maintenance on the tappets whatsoever in over 200 hours of flying. Our Cygnet Prototype aircraft, with a Magnum engine in it, equipped with hydraulic lifters, has over 150 hours with no tappet adjustments.

With the hydraulic lifters automatically controlling clearances, the nuisance of adjusting valves periodically that is inherent in all Volkswagen engines installed in aircraft with solid lifters, is totally eliminated.

We can machine your crankcases (if you are building your own engine), for hydraulic lifters, provide you with the lifters, the cam, the special pushrods, everything it takes to make a conversion for \$295.00.

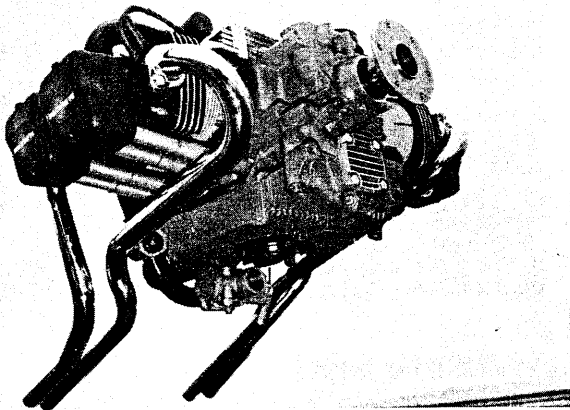
Don't confuse this with the slip-in piece of junk offered for about \$90.00 that you are supposedly able to use in stock solid lifter bores against a stock solid lifter cam. 'Tain't the same.

Our cam is especially ground for us to get the torque characteristics we want out of the engine and to run against hydraulic lifters. The lifters are an American made lifter and considerable machine work has to be done in the case to get the lifters installed, but when we get done, we don't have to pay any more attention to the valves than you do on

your car. American automobiles have been equipped with hydraulic lifters for years. How long has it been since you had to adjust a valve on your car?

Here at HAPI we have pioneered the hydraulic lifters, totally electronic dual ignition, individual cylinder heads, sodium filled valves and full factory warranties on the engines. None of our competitors can offer you any of these things. Some of them not only won't give you a guarantee, they want you to sign a liability release before they'll sell you an engine. Take a look at our new engines, I think you might like them.

One thing you should remember when building a Dragonfly. If you use anything other than a HAPI engine it's going to cause you to have to change the motor mount, exhaust pipes, cowling may not fit, spinner may not fit. You may get yourself into a whole barrel of snakes and greatly increase the building time on your airplane.



MAGNUM ENGINES

We are now shipping engines and rapidly catching up on our back order list on the Magnum engines. This engine will give you an honest 75 horsepower at 3400 RPM and weighs only 1 pound more than our 60 hp stock head based engine. It fits the standard Dragonfly lower cowl. Slight modification is required on the upper side of the cheek cowls to clear the larger intake manifolds. A new upper cowling will be available soon for those of you installing Magnums.

The computer predicts that rate of climb will be increased by 175 feet a minute, cruise speed will go up by 6 miles an hour with the Magnum. For those of you who already have an engine or perhaps are building your own engine, the heads, induction and carburetion system are available separately to either retrofit on older engines, or you can build your own new 75 horse.

Received a nice letter recently from Rich Werner. Thank you!

Dear Rex,

N4862h's first flight was today 6/26/85. It took 4 years almost to the day since I purchased my first materials and two months at the airport fine tuning it for its' first flight.

At the airport I spent three hours total time taxiing around on 3500' X 150' runway.

My flying experience puts me in the very low time pilot category. I got my license in 1977 and flew 50 of my 63 hours then with a couple during the construction process.

That leaves me with 10 hours to get myself ready for the Dragonfly. All my time to this point was in a 150 Cessna.

I also flew a Luscombe for an hour that I never really landed and an old Aronica to give me 2 hours 45 minutes taildragger time. Then back to 150 for more flapless landings at 80 MPH. My last 10 hours were all work and no play. I stayed in the pattern and did take-offs and landings except some small jaunts for stalls and slow flight.

Then the moment of truth came. I had only gotten my tailwheel off the ground 7 or 8 times til this point, (50-60 mph) with no short hops on the runway, only because of the shorter than recommended runway length. I got on it, the tail came off the ground and in a few seconds the plane lifted off with only a little back pressure. Climb out was 100 mph, turned back around and flew down wind at 140 mph. Stayed in the pattern at 2000 feet and noticed the plane was trimmed out hands off with no adjustments! All temp. were in the green, made a few high speed passes down the runway for the video camera then off to do some stalls and slow flight. My plane stalled somewhere on the lower end of 50-60 mph. No bucking or shudder, just the nose dropped slowly with complete aileron control. Slow flight was just reducing power, pulling back on the stick to maintain whatever airspeed you wanted down to 60 mph. I made one pass in landing form, "high" to just get a look at the runway, then I was ready to bring it in and "almost touch down". Downwind was 100 mph, 80 mph at the end of the runway, turned base at 70 mph and held 70-75 on final. Came in just like the 150 with no flaps, held it a foot over the runway til it settled and made an almost perfect three point landing, (no bounce). On roll-out, thinking to myself that I wasn't supposed to land this time! I landed past the numbers and turned off at mid field without hardly using my hydraulic brakes. I liked it so much, I went home, ate lunch and came back for another hour and landed with one small bounce. My third hour flight was in a 12-18 knot gusting crosswind. (I won't do that again for awhile). Went around twice before I got my speed and altitude right and settled down with three small hops. In a Dragonfly, no matter how poor your approach is, or your touchdown, if you don't like it, "full aft stick and full throttle" and it will take you up for another try.

See you at Oshkosh!

Rich Werner
44 Oak Creek Dr.
St. Charles, MO 63303

-SPECS.

-Dry Weight 642#

-HAPI 1835 60-20M

-HAPI Brakes

-5X5 McCreary 6 ply tires

-Top Speed indicated at

-level flight 160 mph

FOLLOWING IS A LETTER FROM JOE PING

Dear Rex,

I'm finally getting around to sending you some pictures of my Dragonfly. The pictures were taken in Aug. 85. My Dragonfly has about 20 hours on her now. I'm still working

out some bugs. The weather here has been absolutely horrible. I think we've had four flying days since October.

Since the pictures were taken, I've put 500 X 5 tires on the plane. They make taxiing much smoother and wear a lot better than the Lamb tires. I still have to put wheel pants on.

I have not had a lot of flying time in the plane, so I don't have any firm performance figures. My airspeed indicator is not accurate at high speeds. I think it needs a static system. Have any ideas?

I thank you for all your help.

Joe Ping
5712 N. Parker
Indianapolis, IN 46220

ATTENTION: MARK II BUILDERS

The Mark II modification plans furnished with the gear leg kits call for 2 layers of 6 oz. bi-directional to be wrapped around the gear legs. One builder reported poor adhesion of the glass to gear legs, resulting in a decrease in strength.

If you are building a Mark II, add these instructions to the treatment of your Mark II gear legs.

1. All exposed surfaces of the Mark II gear legs must be thoroughly sanded to remove any release agent that may still be present from the manufacturing process.
2. The corners of the gear leg should be sanded to 1/8" full radius before glassing.
3. Change two layers 6 oz. bi-directional cloth to read two layers 10 oz. bi-directional cloth.

The gear legs used in the drop tests and the gear legs on the prototype have proven more than adequate strength in the structure if good bonding is achieved. The increase in weight on the glass wrap will add an even greater margin of strength over the drop test proven original design strength.

Blueprints in house have been altered to reflect this change.

LORAN IN A DRAGONFLY

In the past year I've had the opportunity to do quite a bit of flying in a friend's Navion equipped with dual navcoms, horizontal situation indicator, ADF, DME, transponder, everything we used to consider necessary for accurate aircraft navigation.

A year ago, Harry installed a Loran in the Navion and I've flown it quite a bit since. Except for one communications radio, you might as well take the rest of the stuff out of the airplane and throw it away. It's no longer necessary. The Loran receiver can be programmed for 99 different way points, accurate within 60 ft., gives you on command exact latitude and longitude, compass heading to the next way point programmed into it, your true speed in knots over the ground, has a course deviation indicator and also gives you a read out in hours and minutes telling you how long it will take you to arrive at the next way point at the present speed.

I've never navigated with anything so accurate, so simple, so light, and so inexpensive.

We are setting up the Mark III Dragonfly with a package that consists of one Terra L-Nav 25 Loran receiver, one TX-720 Comm Transceiver and one TRT 250 Transponder. Total weight of this system including wiring, pre-amplifier on the

Loran antenna, the whole works, 7.7 lbs.

There has been some concern about the mid-continent gap that gives poor Loran reception. We live in the gap and the Loran receiver in the Navion is on line and functioning about 95% of the time. Sometimes it does blink out and the warning light comes on, but generally before you have flown two or three miles, it is back on line. There are plans to install two more Loran transmitter stations that will cover the mid-continent gap in the next couple of years. That would provide total coverage of the United States.

The Loran receiver can quite accurately put you within 60 ft. of where it says you are and that is where you will be.

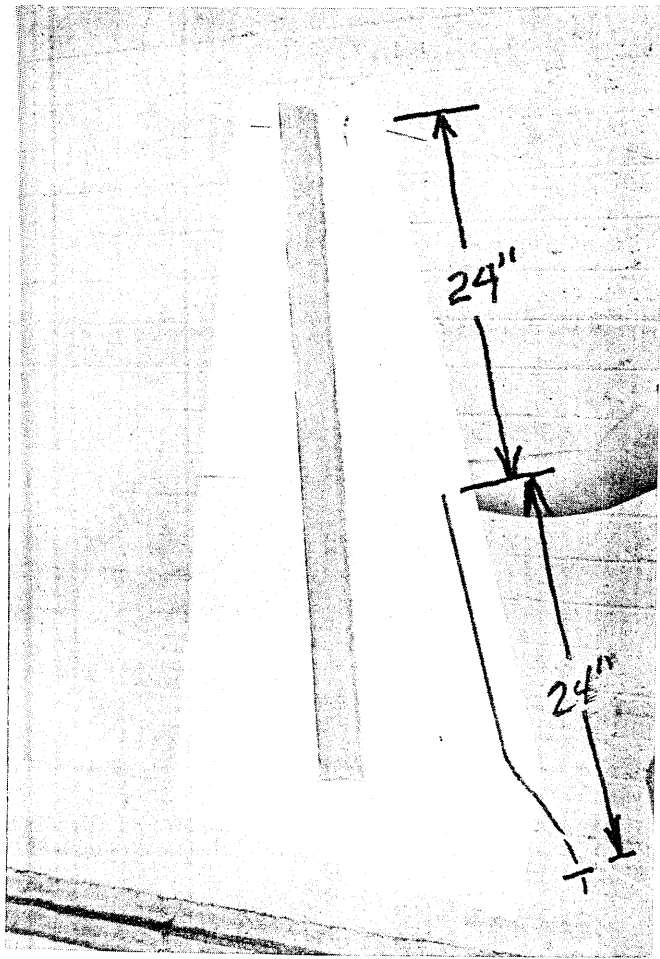


INEXPENSIVE LORAN ANTENNA

We read recently in Burt Rutan's "Canard Pusher" of a very inexpensive way that they install Loran antennas in the winglets of the Long-Eze and we're passing it on to you. The antenna is simply a 48" piece of RG58 coaxial cable. You strip the outer shield off of 24 inches of it, referring to the photograph, you'll see that the shielding ends about where Pat's arm is and the unshielded inner portion goes on up another 24". We simply cut a little channel and laid the antenna in the foam core before the glass was put on it.

The vertical fin was then installed in the aircraft and the pre-amplifier sets on the aft bulkhead just ahead of the rudder. You'll also note that the pitot tube is mounted on top of the rudder on the Mark III in a similar manner to what has been used for years on John Thorpes T18.

I have been plagued for years with people hooking their knee on the pitot tube on the prototype or, if I take it out, forgetting to put it back in before the next flight. My reasoning for putting the pitot tube up on the top of the vertical fin is it gets it clear out of the way and I don't have to worry about it then. If any of you guys want to do this, just put it in there before you put the outer skin on and be sure to put the line clear through at least up to the wing where you can couple onto it to connect it to your airspeed indicator.



SPECIAL DEAL ON LORANS

We purchased a few of the L-Nav 25 Loran receivers as pictured, complete with mounting tray, antenna lead, antenna pre-amplifier, mounting and installation instructions and even a cassette tape to teach you how to operate the system accurately and efficiently. We can offer these to you at a price so low you won't believe it, so low I can't even print it. If you're interested in one, give a call. When they're gone, there won't be any more at this price. They're brand new, complete factory warranty and everything applies.

We can also offer very significant savings on anything in the Terra radio line to our Dragonfly builders. Because we are aircraft manufacturers, we are able to obtain an original equipment manufacturers price from Terra, so can make some really good prices to our Dragonfly builders only. Call if interested.



MARK II WHEEL PANTS

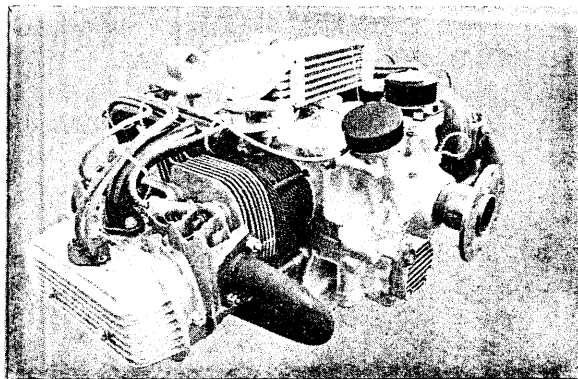
Our mold maker, Jim, is shown here holding the plug for the Mk II wheel pants. The molds have been made and he is currently producing wheel pants from them. They sell for \$120.00 a set. The set consists of four halves that you join together on the centerline. They are molded from polyester resin. Expect about one and a half hours' labor to join each wheel pant. They are patterned after the ones on the prototype.

FUN FLIGHT BUILDERS

We have had over thirty builders through the build it here program now. Would you believe you could build the wing, canard, fuselage, install wing and canard, lift and drag bulkheads, set incidence and alignment and bolt everything together the way it should be in nine working days?? Our builder, David Philpott, of Indiana, leaving here tomorrow has done just that. The program really works!

LOOK FOR A FEATURE ARTICLE ON THE FUN FLITE Program IN APRIL '86 HOME BUILT AIRCRAFT MAGAZINE

11



BARGAIN ENGINE

We have one brand new 60-2DM, solid lifter engine in stock ready for instant delivery. The engine would normally sell for \$3695.00. We'll discount it to \$3200.00 because it is last year's model. It's equipped with dual ignition, starter, alternator, mixture control carburetor, all the goodies.

We're no longer building any solid lifter engines, unless the customer specifically orders a solid lifter engine. Now all the new engines are standard equipment hydraulic lifters. That doesn't mean, however, that the standard lifter engines won't run. Virtually everybody who's flying a volkswagen is still flying on the solid lifters. They will take more valve maintenance, which takes about 20 minutes to adjust a set of valves. \$400.00 will buy a lot of 20 minute time periods.



VIKING AIRCRAFT

ELOY MUNICIPAL AIRPORT
R. R. 1, BOX 1000V - ELOY, AZ 85231
Telephone: 602/466-7538

Dragonfly
Now  *Approved*

First Class Mail



ITEMS AVAILABLE FROM VIKING

PLANS: \$175 (\$200 overseas) includes 1 year subscription to quarterly newsletter.

INFORMATION PACKAGE: \$10.00 (\$15.00 overseas) includes color lithograph.

QUARTERLY NEWSLETTER: \$10.00/year (\$15.00 overseas)

ALL PRICES INCLUDE AIRMAIL POSTAGE. ARIZONA RESIDENTS PLEASE ADD 6½% SALES TAX. OVERSEAS CUSTOMERS PLEASE SUBMIT U.S. FUNDS ONLY.

FIRST CLASS MAIL