DRAGONFLY BUILDERS AND FLYERS NEWSLETTER

THE OFFICIAL VOICE OF DRAGONFLYERS ALL OVER THE WORLD

VOLUME 71 MAY - JUNE 1997

Reg Clarke's Direct Drive - Turbocharged Mark II Dragonfly of Sedgewick, Alberta, Canada

Hello Spud,

We've been working on the development of the EA-81 Subaru engine with direct drive & turbocharging for the homebuilt community in our Dragonfly over the last three years. We have learned volumes and volumes of information on how to convert and keep the Subaru healthy, safe and happy in an experimental aircraft. We have over 445 hours on this EA-81 in our faithful Dragonfly test vehicle, Xpresso #4. We have found it to be a very reliable engine.

With all this research done, we now feel we are ready to supply complete engine assemblies, engine components and related items for the EA-81 Subaru engine. For the Dragonfly builder we offer much more that engines. If you look at our price sheet on the next page you'll see we offer Engine overhaul and DF installation video's, header tanks, overflow tanks, custom radiators, but most

importantly the large cooling scoops and engine cowlings to install the Subaru EA-81 into your Dragonfly airframe. We also sell wheel pants for the DF also.

We will have a display at Oshkosh this year. We hope everyone can get around to see us and talk about their powerplant needs. We'll have my Xpresso #4 (Reg's) there and Bud Clark's Turbo /direct drive EA-82 Dragonfly if he has the time flown off by then.

I've been in the process of installing a Subaru 2.2 Legacy into Xpress #4. This engine package will produce approximately 135 hp to 18,500 feet (Love that Turbo!). The cowling has changed for this particular powerplant package in the DF. The inlets are smaller and lower down, it looks more like the "Nemisis" cowl. We've worked very hard to maintain the laminar flow characteristics. We will initially use the same prop and pitch settings at first to evaluate the gains of our new low drag DF cowl.

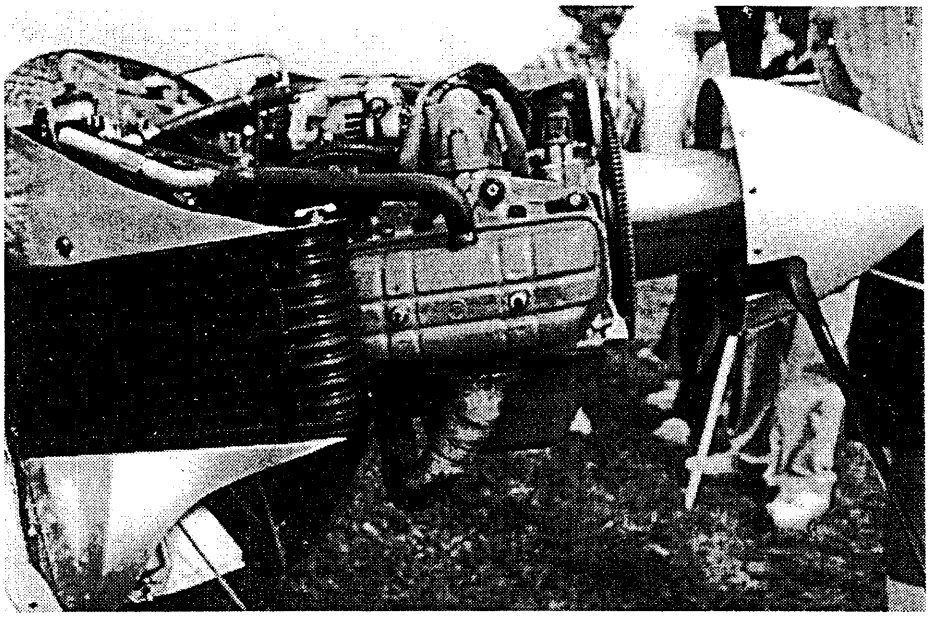
Bud is getting very close to the ever important first flight. He's installed a cockpit adjustable propeller. He was upset when he found out I was sneaking in a Legacy into Xpresso #4, of course he wants his #7 to be faster!

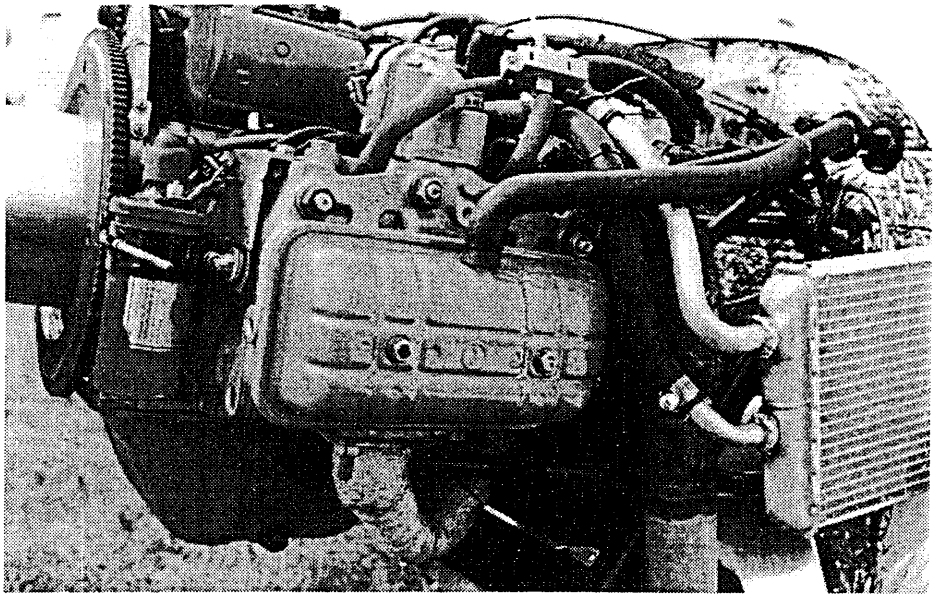
Again I hope to talk all of you this year at Oshkosh at our display and of the Dragonfly forum on Thursday night.

I wasn't sure if I was going to make Ottawa this year. I have a very busy schedule and it was going to be pretty tight! I was teasing Spud a little on how he was going to talk me into coming again this year and I was getting ready to tell him it was doubtful I could make it. Then he comes up with this sneaky dirty low down trick of ...."YA KNOW REG, ONE OF THE TANDEM WING PILOTS IS GOING TO FLY HOME WITH A GARMIN GPS 89 IN HIS COCKPIT THIS YEAR, AND IT COULD BE YOU!" Then he makes the final blow if you will in saying the farther away you are the better ones chances of winning the Garmin GPS!!!!!! This Spud..... he cheats.....I guess I'll be seeing everybody ALSO at our fly-in in Ottawa. I know Bud in his #7 as already committed to come and has reservation at the ever so famous "Spudley Hilton".

Yours Truly, Reg Clarke, Alberta, Canada

p.s. All you other tandem wing pilots, you can just go ahead a stay home.....Boy, I know just where I can mount that GPS.....





Instruction Videos/ Subaru Engines/ Related Systems/ Synthetic Lubricants/ R & D

Engine type: All aluminum four-cylinder, four stroke, liquid cooled, overhead valve, 4-valve cylinder, normally aspirated, or turbocharged

SPECIFICATIONS		
MODEL BASED ON SUBARU EA81	**XPRESS 75D**	**XPRESS 100DT**
Displacement	1.8L (109 in^3)	1.8L (109in^3)
Bore	92 mm (3.62")	92 mm (3.62")
Stroke	67 mm (2.64")	67 mm (2.64")
H.P./Altitude	75 HP/Sea level	100 HP/18,500'
Engine R.P.M. Take Off	Up to 4200 RPM	Up to 4200 RPM
Engine R.P.M. Cruise	3400 to 4000 RPM	3400 to 4000 RPM
Engine R.P.M. MAX	4500 RPM	4500 RPM
Manifold Pressure Take Off		40" TO 45"
Manifold Pressure Cruise		30" TO 36"
Manifold Pressure MAX		50" (5 min.)
Dry Weight (incl. starter, drive 6", alt, intake, exhaust, filters, etc.)	167 lbs.	182 lbs. Turbo, intercooled
Configuration – Subaru EA81	Direct Drive	Direct Drive
Direction of Rotation	Clockwise	Clockwise
Prop Flange & Bolt Pattern	SAE #1 (continental)	SAE #1 (continental)
Unit Price – Factory New (US/CAN. funds)	$5,895.00/6,779.25	$7,995.00/9,194.25
Coolant Temperature (in °F)	190 to 210 (Max 230)	190 to 210 (Max 230)
Oil Temperature (in °F)	200 to 240 (Max 280)	200 to 240 (Max 280)

EQUIPMENT & OPTIONS			
SUBARU EA81	**XPRESS 75D**	**XPRESS 100DT**	**PRICE (US funds)**
Videotape #'s 1 & 2 (Plus 6.00 S & H)	Std.	Std.	$89.95
Electronic Ignition (exchange)	Std.	Std.	299.00
Electric Starter	Std.	Std.	195.00
Alternator (45 amp)	Std.	Std.	219.00
Propeller Drive (Direct) 2" to 6"			400.00
Propeller Drive & Dowels			450.00
Propeller Drive, Dowels & Ring Gear	Std.	Std.	495.00
Port Heads	Opt.	Opt.	350.00
Hi Temp Paint (colours)	Std.	Std.	395.00
Air & Oil Filter (Amzoil)	Std.	Std.	69.00
Intake (exchange)	Std.	Std.	500.00
Exhaust	Std.	Std.	450.00
Exhaust (stainless steel)	Opt.	Opt.	675.00
Performance Coil & Wire Retainer	Std.	Std.	179.00
Newsletter & Updates	Std.	Std.	28.00
Turbocharger (carbon seal)		Std.	1300.00
Intercooler (air to air)		Opt.	650.00
Elison Throttle Body	Opt.	Opt.	699.00
Header Tank & overflow tank (clamp-on)	Opt.	Opt.	250.00
Header Tank & overflow tank (Aeroquip)	Opt.	Opt.	350.00
Custom Radiator (sizes)	Opt.	Opt.	Call
Oil Filter Adapter (Firewall) (Amzoil)	Opt.	Std.	69.00
Cooling Scoop	Opt.	Opt.	475.00
Wheelpants (Small Lamb Tire)	Opt.	Opt.	225.00
Dragonfly Cowls	Opt.	Opt.	475.00
Custom Work	Opt.	Opt.	Call
Cockpit Adjustable Ignition Timing Kit	Opt.	Opt.	69.00

NOTES:	
XPRESSO #4 is powered by Xpress 100DT	XPRESSO #7 is powered by 125RT
Making instruction videos on upholstering your Homebuilt	Making instruction videos on EJ22 (Legacy) engine

CRATING & SHIPPING EXTRA

All Air-Ryder products are EXPERIMENTAL and are not legal for use in certified aircraft. No warranty, expressed or made as to applicability for use in aircraft. Since Air-Ryder cannot control the installation or use of its products, it accepts no responsibility for any damage, loss, or personal injury incurred while using said products.

We specialize in High Output Subaru Engines

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Ottawa 1997

All right gang here comes number SEVEN. Can you believe it, this is our seventh year at Ottawa. It's only sixty days away as of this writing. First off, I've got to tell you about something thing I've been up to..... No Good of course. I've pondering and pondering what could I do to make this annual event even bigger or at least better.....I thought long and hard. What do we come for? Hmmmmmm. We'll we come for the airplanes. Builders come for their annual injection of building boost, learn what's new and maybe to see just how some else did their plane or special little item. Some come for the rides, to see if the Dragonfly is the project for them or a little bit of training for the ever so important day in their own Dragonfly. I figure it this way, my job is to get the airplanes to Ottawa and if I get the airplanes to Ottawa, then the people will come. It's sorta like the our own little "FIELD OF DREAMS". So I set a goal - 30 tandems wing airplanes at one time at the field, surely this would be a record of all records. My super good friend Jimmy Masal said right Spudley, what you been smokin! I asked Jimmy if he would like to bet again. He said no sir! I've already kissed you rump one to many times already betting with you on plane count at Ottawa - No thank you. So just how was I going to reach this all time goal..... hmmmm.....Whatwould be the incentive for the tandem wing guys to fly their plane to Ottawa, especially the guys that are farther away on the west and east coasts. I got it! We're going to give away a Garmin 89 GPS to one of the pilots of a tandem wing airplane. This is how it will work. For ever 250 miles that the tandem wing pilots home base is from Ottawa, Kansas he or she will get a serialized ticket "dropped in the hat". Example: if your home base is 900 miles away you'll get 3 tickets, if your 1400 miles away you'll get 5 (Reg Clarke started smiling again we heard of this little detail!) and so forth. Your odds will be excellent. Let's say we have our 30 airplanes and the pilot say get an average of three tickets, that's 90 tickets. Think of it you tandem

Continued on page 5

We've lost 4 great people!

It is with a heavy heart I write this message to you. Friday June 27th Howard Hardy went to sleep and passed away. I know he will be greatly missed by us all. Nancy was away visiting in California and returned Saturday night. We are hoping to have a memorial service at the airport where his hanger is located on Thursday July 3, 1997. His ashes will be scattered over the mountains as was his wishes. Nancy wanted me to contact everyone with the news..

Sincerely,
Helen Hardy Harrington
Daughter

Jimmy Masal says it all about our very good friend Howard Hardy below.....

● Howard Hardy

In my experience, certain people become thought of as "fixtures". I see them infrequently but usually I see them at the same place. Howard Hardy was a fixture at Ottawa. It seemed he was always there and each time there was something about his being there that stood out. It was uncanny but Howard was usually involved in some kind of misfortune that was briefly scary but shortly followed by great hilarity and humor. Howard never seemed to take himself too seriously and I think we all appreciated him for that. Except for the sadness this has caused his family I'll bet he is right this minute regaling the heavens with tales of his flight exploits. And the angels are shaking their heads in wonder at how Nancy could take it all. She can take this too, but we'll miss both of them at Ottawa. May God bless them.

Jim Masal

● Al Cultreri

The Arizona Dragonfly Club was sac dened today with the news of the passin of one of our own, Al Cultreri was foun in his home Sat by his neighbors, wh where alerted by the mail carrier tha something might be wrong. The Carrie noticed that the mail had not been picke up for several days and ask the neigh bors to check on him. The nieghbor entered the back yard and saw Al on the floor. It apperars that Al slipped and hi his head on Wednesday or Thursday.

We will all miss him greatly, regards tc all, Matt Gunsch

High Flight

Oh! I have slipped the surly bonds of earth And danced the skies on laughter-silvered wings, Sunward I've climbed, and joined the tumbling mirth Of sun-split clouds - and done a hundred things.You have not dreamed of - wheeled and soared and swung High in the sun-lit silence. Hov'ring there I've chased the shouting wind along, and flung My eager craft through footless halls of air.

Up, up the long, delirious, burning blue I've topped wind-swept heights with easy grace, Where never lark, nor even eagle flew - And, while the silent lifting mind I've trod, The high untrespassed sanctity of space. Put out my hand and touched the face of God

JOHN GILLESPIE MAGEE JR.

Reprinted in loving memory of:
Major Armando Alfredo Cultreri, U.S.A.F. Retired
May 12, 1933 - June 14, 1997

"A Warrior gone to rest."

Also we lost Linda Mace, Justin Mace's wife of Tucson, Arizona this spring

And Tom Reed of Washington last fall.

They all will be missed and our condolences go out to their families. - Spud Spornitz

"Ottawa 97" cont'd from page 4

wing pilots. You'll have a 1 in 90 chance of winning the Garmin 89 GPS to fly home with. This drawing is for the **attending pilots only**. It's our reward to them for completing their plane and bringing it to us at Ottawa, Kansas. Now I can guarantee that we'll be doing this in the future, but we be doing it this year. A few rules apply: 1. You must be a fully paid attendee of the overall event and awards banquet. 2. Must be a current subscriber to the appropriate groups newsletter, DF's = DBFN and the Quickies, Q-2's & Q-200's = Q-talk. 3. Distance measurement will be in statue miles and direct line (point to point). So there you go ladies and gentleman, I hope I've set the stage for our largest turn out ever. Mark those calendars and send in your registration today!

We have a couple of details still up in the air in regards in to this years banquet. The folks at the country club had double booked us with a 200-250 people class reunion with a band. I can assure you that this will not work. We will be having the event back at the Universities banquet hall where we've had it in the past or at the Eagles club. Details on this will be shared with you in the next newsletter and of course at the event itself.

We've already had some Dragonfly pilots pledge to be at this years fly-in, they are: Justin Mace in his Subaru powered MK II DF, Mark Snow in his Continental Powered O-200 MK II, Reg Clarke in his Direct Drive Turbo Charged EA-81 MK II DF and his brother Bud Clarke in his direct drive turbo charged EA-82 MK II DF (assuming he gets his hours flown off in time). We'll keep you posted on new attendees in the next newsletter.

The event is Friday August 29th, Saturday August 30th and Sunday August 31st.

● The Year of the Gals

At the recent Phoenix Canard Wing Fly-In, there was a special rap session for significant others (a.k.a. "the gals") to let the spouses/girlfriends get to know each other and share their feelings (the good, the bad and the ugly) about their guys' projects and passion (obsession?) with flying. We had a GREAT time, sharing lots of stories and laughs.

If you've been reluctant to ask your gal to attend the Ottawa Fly- In, or if she has not wanted to go in the past, please let her know that there will be a very special program for all of the women this year that will include a rap session like the one held in Phoenix.

A special invitation is extended to women like myself, who were not particularly thrilled with the whole idea of flying, but have come to understand, accept and even participate in their husband's new endeavor.

If you're a significant other, we'd really love to see you in Ottawa. More info will be available in the next newsletter, or you can stay informed by checking out my husband's DFly Website at http//www.si-inc.com/dragonfly.

See you in Kansas,
Debbie Stewart
P.O. Box 11929
Prescott AZ 86304
(520) 778-3747

The Big Oshkosh!

Here comes the "Big Oshkosh". And this is what we have scheduled for this years fly-in. First off don't forget that they have moved the start day ahead. It starts on Wednesday, not Thursday and runs through Tuesday. Of course Friday, Saturday and Sunday being the big days. The Dragonfly/Quickie Forum is Thursday evening at 7:00 P.m. and ends at 8:30PM. Your host for this Forum will be Patrick and Robin Taylor, Jimmy Masal and Spud Spornitz.

The next event is Friday evening as we have our Annual Dragonfly/ Quickie banquet at the Hilton. This event as turned out to be a big relaxing hit with everyone that attends. Well this year its going to be even a little bit more fun. You see we are having guests.....I guess I should explain. This year is the KR groups 25th anniversary and they had planned on having a nice celebration down at Butch's Anchor Inn where they've had it for years. That was all going quite nicely until Butch's closed up and I mean, like gone, gone! Jeanette Rand looked hi and low to find another facility to have this very special dinner with her builder and flyers. You got it! Dragonflyers and Quickie Gang to the rescue!!!!!! I've invited Mrs. and Rand and her gang to join us for dinner and we'll just help them celebrate those 25 years! I hope every one makes an extra effort to join us as we "ROAST EM AND TOAST EM" we help our fellow KR homebuilders celebrate those 25 years. Now the banquet is at the Hilton downtown Oshkosh, A cash bar will be open at 6:30 PM just outside our reserved dinning hall and dinner will be served at approximately 8:00 pm. After the meal we'll have speakers for the balance of the evening. The banquet fees are $15.00 per person and must be paid no later than 12:00 noon on Friday at the Great Plains Aircraft Booth. Please join us.

Oshkosh continues to be more & more commercialized every year, more builders with "Very Deep Pockets" and the little guys like the DF's, Quickies, KR's, Sonerai's and so forth continue to get lost in the maze. I think some day we should develop a fly-in that is just for the little guy. We could call it the "Little Guy Nationals" or something like that.... It would be a fly-in where you could not have a powerplant over 125 hp or a gross weight over 1200 to 1300 lbs. Think about that gang.....I'd like to hear your ideas on the topic. - Spud

WEIGHT AND BALANCE TIPS

● General

Homebuilder's often fail to understand the importance of controlling the weight and balance of their aircraft. They know that they must present the FAA inspecting representative with an empty weight and balance sheet but feel that it is just another piece of paper for the bureaucracy. They then carry out a flight test without regard to verifying that the aircraft is indeed safe when flown within established w&b limits or what the builder's calculations show to be established safe loadings. This is unacceptable and dangerous.

The object of this written informative material is to assist Dragonfly builders to become knowledgeable in W&B procedures, to help them define load conditions that are safe for flight and to provide minimal guidance for flight tests for confirmation of safe loadings. In the case of Dragonfly, the designer's specifications are as follows:

Forward-most CG location ....Station 57.5
Aft-most CG location .....Station 63.5
Maximum Gross Weight..... 1075#
(original spec 1600 cc engine)
First change.....1150#
(rev. for 1835 cc & bigger engines)
Latest change.....1300#
(when built to 9/96 spar specs)

The first thing a homebuilder should understand about w&b is that longitudinal or fore/aft CG limits are determined solely by aerodynamic theory and verified by stability-oriented flight testing. The designer's limits are sacrosanct.

When the cg is located well forward on a Dragonfly the aircraft will act very stable and once stalled will buck vigorously. It will require constant trimming as speed changes. When the CG is located ahead of the forward limit the aircraft will be overly stable which will cause it to exhibit lack of elevator authority such as needed during the landing flare. Minimum speed will be higher.

A Dragonfly with the cg located well towards the aft limit will be prone to over-control and PIO (pitch induced oscillation) particularly when flown by an unfamiliar pilot. In the case of the Dragonfly and Quickie series this is a prevalent cause of broken canards and propellers. Exceeding the aft limit will result in elevator over-sensitivity, pitch (and possibly lateral) divergence, death, or all the above. The aircraft will be unstable and essentially uncontrollable.

The homebuilder should also understand that maximum gross weight is normally established by structural analysis and static load testing. Although the Dragonfly allowable gross was increased when bigger engines were installed to improve rate-of-climb, this reason for increasing allowable maximum weight is unusual. Regardless of the design authority's reason for establishing limits, adherence to the designer's specification is mandatory. Exceeding the established maximum gross weight limit will diminish the design limit maneuver load factor and adversely effect gust penetration speeds.

Yes, the designer's limits are sacrosanct as long as the basic configuration is maintained. But if a builder adds or subtracts wing area or canard area then new aft-most and forward-most limits should be established by flight test. Wing extensions (like Glassairs and Lancairs add) are normally destabilizing and should result in new established limits. Furthermore, tiplets, vortilons, vortex generators and other flow changing devices can cause stabilizing or destabilizing changes to any basic configuration.

Most aircraft designs normally require no permanent ballast as long as occupant and other payloads are well managed. But watch your step! On one occasion the writer instructed an Chapter 723 builder to install 30# of permanent ballast under the cowling of his Smith Miniplane in order to fly within the established CG limits. In any number of little and big Ezes it was found necessary to add considerable ballast weight in the nose under the canard. Without ballasting all of these aircraft would have been unstable, diverged and crashed out-of-control..

● Weighing and Measuring

There are a number of ways to generate a good empty weight & balance. All involve accurately weighing in an exact attitude (usually level) and then measuring the distance from the scales to the reference. It doesn't matter whether the scales are placed under the wheels or the aircraft is hung from above. When appropriate the weighing and the measuring may be performed as two separate operations. And don't forget to measure or verify the locations of payload items even though these data may have been defined in the W & B section of the plans.

Help is required from another person when obtaining the geometric measurements. A 25 foot tape measure and plumb bob are a must. A piece of chalk, masking tape and pencil are also needed to mark lines and points on the floor. A work sheet such as that included is handy to record all the data, both geometric measurements and weights.

The easiest and most accurate method of weighing an aircraft is to use aircraft scales certified for light aircraft; these scales are normally available at good FBOs and are accurate to plus and minus one pound when properly maintained. With the understanding that you are doing the paper work, many operators will set-up and read the data for you to record. Usually the charge for

this minimal service is about $50- $75 and well worth it.

If you do not have the use of certified aircraft scales one alternative is to use two commercially accurate hanging-scales like big meat and produce scales. The motor mount and tail spring are good attach points for this type scale. Good accuracy and repeatability can be obtained by this method.

A builder's last option is to use bathroom scales with or without the extensions sold for aircraft weighing. A baby scale is helpful for the tail wheel. I have generally had poor results indicated by unacceptable repeatability using bathroom and other make-shift scales probably because of wheel side and fore-aft loads. After wasting a complete afternoon one day, the writer resolved to avoid using bathroom scales thereafter.

When conducting a weighing be sure to write down everything that can possible be pertinent. This avoids future unanswerable questions and having to re-weigh a second time. For example, record the following: Aircraft registration number, owner's name, date, scales used, attitude during weighing, amount of oil in the engine, state of other fluids (presumably none for an empty aircraft), and equipment missing. In many cases we do not have the propeller and spinner in place. Other times we are missing avionics or fire extinguisher. That's okay, we'll add them later during calculations. But be sure to record all pertinent information.

On two occasions, the writer has been asked to use the apex of the spinner or the propeller drive flange as reference. This occurs when an unsophisticated kit designer has used that as reference. This is very poor procedure. Always establish or define the longitudinal reference in terms of a permanently fixed solid piece of the airframe; an imaginary plain so many inches forward of the firewall usually works well and avoids handling negative measurements for items ahead of the reference.

● Calculations

After the weight and measurement data have been taken the fun begins. I should say that you can make this effort fun or the builder can drag through it and produce a sub-standard worthless document. This brings up the method of calculation to be applied. Kit airplanes usually come with a blank form to be used just for this purpose. In this case the arithmetic can be done manually. These work well for determining empty w & b but often leave off there.

A second method is to use a computer application designed just for the purpose. A word of warning here. The worst weight & balance the author ever saw was made from one of these. A computer application is no substitute for knowing what you are doing. It is better to intelligently use a computer spread sheet application such as Lotus 1-2-3 or Quattro. Spread sheets are really easy to learn particularly if a friend provides a few tips on learning. They pay off first by doing all the calculations. But their real value is for experimenting with or trying various loadings to define maximum load conditions. They can offer not only the best but the quickest method of processing W&B data and the product is in smooth form for the inspector as well as permanent cockpit use.

A typical spread sheet is shown in the attachment. Note that such a document starts with an area at the top which includes measurements and everything pertinent to the measurements, the weighing data, and the listing of any items of equipment not included. Then below that are separate portions showing worst condition loadings and a few typical loadings. When such a paper is in the aircraft a pilot should not have to do any field calculation before a flight.

Yes, a builder can manually massage his data to work out his worst allowable loadings. Regrettably this is a clumsy process but it can produce acceptable results. The back-side of the attached work sheet has a form which is suitable for manually calculating worst load conditions.

Let's say a few words about exceeding the designer's maximum gross weight. Any time this occurs we effect the allowable service limit load factor (+ and - G limits) and the cruise speed limit (Vc, yellow line and gust envelope), and stall speeds (Vs and Vf). We also lower the maneuver speed (Va, not color coded on the air speed meter). If you find that you will over-gross your aircraft contact the design authority.

● Flight Test Verification

During the flight test period it is the bounder duty of every homebuilder to assure that his or her new aircraft is safe at all placarded speeds and all allowable w&b loadings. A pilot should ballast appropriately to demonstrate cg conditions that his w&b calculations show to be theoretically safe. The aircraft is incrementally ballasted until the limits of forward-most cg, aft-most cg, or maximum gross weight are reached.

Extreme care should be used when approaching the aft cg limit. In no case should the elevator control response be too sensitive or the aircraft difficult to control. These symptoms are indicative of static instability.

The best way to study the effect of cg is to record and plot elevator position or stick pressure versus airspeed (preferably while keeping power constant). At a forward cg location the slope of the curve will be steep. When the cg is near the aft limit the slope will be flat.

Persons with no flight test experience should seek professional experience and read appropriate texts prior to beginning tests.

Nate Rambo
Camarillo, California

WEIGHT & BALANCE WORK SHEET

DRAGONFLY REG. NO. N _ _ _ _ _

Weighing Date: _____ Effective Date: _____

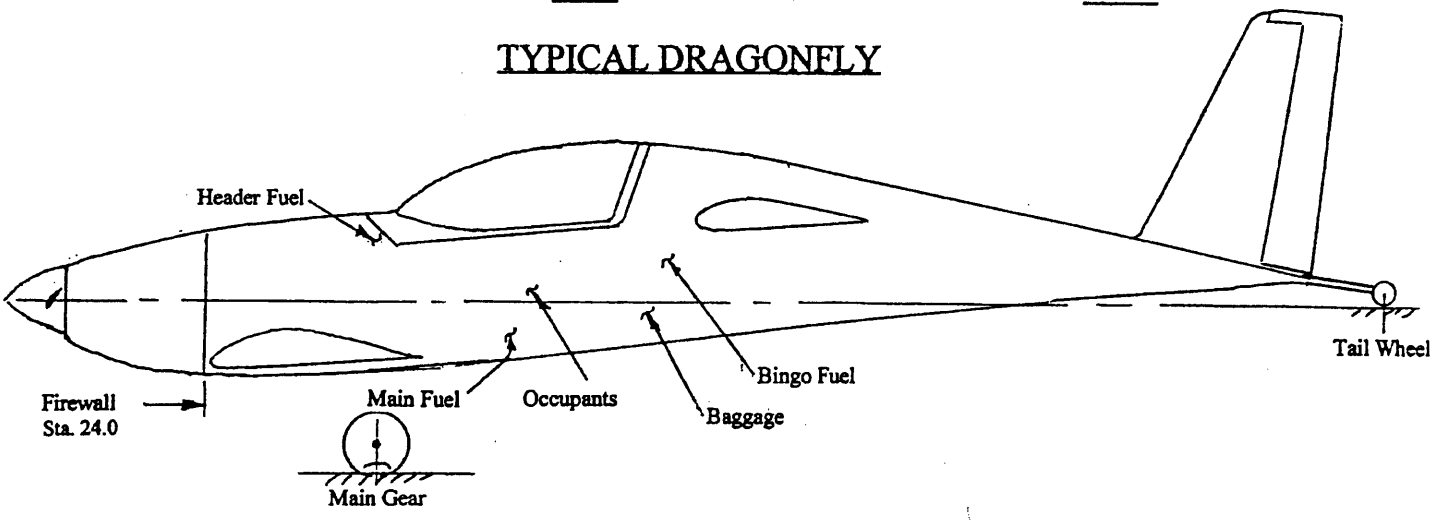
Description: Aircraft was measured and weighed in level attitude. 3.5 qts oil in crankcase. No fuel. Following items missing:_____.

Station Reference for all measurements: Firewall Face / Sta. 24.0

GEOMETRIC MEASUREMENTS

Item	Typical	This Aircraft	Item	Typical	This Aircraft
Firewall	24.0	24.0	Header Fuel	53.4	____
Main Gear	51.2	____	Bingo Fuel	100.0	____
Tail/Nose	220.0	____	Occupants	76.0	____
Main Fuel	61.0	____	Baggage	96.0	____
Other		____	Other		____

TYPICAL DRAGONFLY



EMPTY WEIGHT & BALANCE

ITEM	WEIGHT		STATION		MOMENT
LEFT WHEEL	_____	X	_____	=	_____
RIGHT WHEEL	_____	X	_____	=	_____
TAIL/NOSE WHEEL	_____	X	_____	=	_____
ADD (NOT INCL.)	_____	X	_____	=	_____
TOTAL	_____		_____		_____

CONDITION: Max Gross Wt

ITEM	WEIGHT		STATION		MOMENT
LEFT WHEEL	_____	X	_____	=	_____
RIGHT WHEEL	_____	X	_____	=	_____
TAIL/NOSE WHEEL	_____	X	_____	=	_____
ADD (NOT INCL.)	_____	X	_____	=	_____
TOTAL	_____		_____		_____

CONDITION: Aft Most CG

ITEM	WEIGHT		STATION		MOMENT
LEFT WHEEL	_____	X	_____	=	_____
RIGHT WHEEL	_____	X	_____	=	_____
TAIL/NOSE WHEEL	_____	X	_____	=	_____
ADD (NOT INCL.)	_____	X	_____	=	_____
TOTAL	_____		_____		_____

CONDITION: Forward Most CG

ITEM	WEIGHT		STATION		MOMENT
LEFT WHEEL	_____	X	_____	=	_____
RIGHT WHEEL	_____	X	_____	=	_____
TAIL/NOSE WHEEL	_____	X	_____	=	_____
ADD (NOT INCL.)	_____	X	_____	=	_____
TOTAL	_____		_____		_____

CONDITION: _____

ITEM	WEIGHT		STATION		MOMENT
LEFT WHEEL	_____	X	_____	=	_____
RIGHT WHEEL	_____	X	_____	=	_____
TAIL/NOSE WHEEL	_____	X	_____	=	_____
ADD (NOT INCL.)	_____	X	_____	=	_____
TOTAL	_____		_____		_____

Designer's Forward CG 58.7. Aft Most CG 63.5. Max Gross Wt. 1150/1300#

AIRCRAFT WEIGHT AND BALANCE
DRAGONFLY N999D
Effective date 3-1-97

****

STATION REFERENCES

Station 24.0 .....Firewall forward face

****

CONDITION..... EMPTY

Aircraft leveled & weighed 2-25-97 on certified aircraft scales. No fuel, 4 qts oil in crankcase.

ITEM	WEIGHT Lbs	STATION Inches	MOMENT Inch-lbs
Left Main Wheel	399.0	51.0	20349.0
Right Main gear	396.0	51.0	20196.0
Tail Wheel	27.0	220.0	5940.0
Total/Location	822.0	56.6	46485.0

CONDITION ..... MAX GROSS WT AT TAKE OFF
(Heaviest occupants and 2# bags)

Aircraft Empty	822.0	56.6	46485.0
Pilot & Passenger	380.0	76.0	28880.0
Main fuel 13 gal	78.0	61.0	4758.0
Header Fuel 3.0 gal	18.0	39.7	714.6
Baggage	2.0	100.0	200.0
Total/Location *	1300.0	62.3	81037.6

CONDITION .....AS ABOVE BUT LANDING

Empty Aircraft	822.0	56.6	46485.0
Pilot & Passenger	340.0	76.0	25840.0
Main Fuel 0 gal	0.0	61.0	0.0
Header Fuel 1.0 gal	6.0	39.7	238.2
Baggage	2.0	100.0	200.0
Total/Location ***	1170.0	62.2	72763.2

CONDITION ..... LIGHTEST PILOT - MOST FORWARD C.G.

Empty Aircraft	822.0	56.6	46485.0
Pilot (Light)	120.0	76.0	9120.0
Main Fuel 0 gals	0.0	61.0	0.0
Header Fuel 3.0 gal	18.0	39.7	714.6
Baggage	0.0	100.0	0.0
Total/Location **	960.0	58.7	56319.6

CONDITION ..... FIRST TEST FLIGHT

Empty Aircraft	822.0	56.6	46485.0
Pilot	160.0	76.0	12160.0
Main Fuel 13 gals	78.0	61.0	4758.0
Header Fuel 3 gals	18.0	39.7	714.6
Baggage	0.0	100.0	0.0
Total/Location	1078.0	59.5	64117.6

CONDITION ..... TYPICAL X-COUNTRY

Empty Aircraft	822.0	56.6	46485.0
Pilot @ Passenger	300.0	76.0	22800.0
Main Fuel 13 gals	78.0	61.0	4758.0
Header Fuel 3 gals	18.0	39.7	714.6
Baggage	30.0	100.0	3000.0
Total/Location	1248.0	62.3	77757.6

* Designer's Aft Most CG Sta. 63.5
** Designer's Forward Most CG Sta. 58.7
*** Designer's Max Gross Weight 1300#
(new spar design)

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THE CLASSIFIEDS

Great Plains Aircraft Supply Quality Aircraft Parts, Excellent Service & Support at Reasonable Prices Since 1982 - We have a full line of assembled and tested VW based aircraft engines, short or long block component packages - assembled or in kit form. We have individual components, quite a few replacement parts for Hapi and Revmaster engines, props and many accessories. The 64 page catalog and technical manual still only $4.00!! Send for yours today. Our business hours are Monday through Friday 8:00 AM to 6:00 PM and Saturdays 8:00 AM till NOON Great Plains Aircraft Supply P.O. Box 545 Boys Town, NE 68010 Phone (402) 493-6507 Fax (402)333-7750

For Sale: VW Type IV engine parts: engine case and bolts, connecting rods (2.0 liter) and crankshaft (71 mm), rebuilt heads and hardware, flywheel, pushrods, oil pump, oil cooler, oil filter bracket, plus other parts. Call Steve at (308) 485-4764

Wanted: Looking for a Canadain based Dragonfly project. The project should be somewhere between 50 % and 99%. We do not need any type of power plant or prop. Please contact Daryl Larson, Box 428, Killam, Alberta, Canada T0B 4C0. Phone (403) 385 3568 E-mail :larson@agt.net G

For Sale: Complete Dragonfly scratch built materials kit (no instruments). Cowling, canopy, all foam, all fiberglass cloth, Cleveland brakes (used, off a Cessna 172), front turtle deck mold, small wing jig female jigs, engine mount, tailwheel assembly, some small stika spruce pieces, all metal bellcranks. $2,000.00 Ed Page, P.O. Box 510094, St. Louis, MO 63151, Phone (314) 846-9008

Inboard Mark II "Hoop Style" Gear Plans - Full size hoop gear template drawings for making the mold and instructions on how to mount to the fuselage. $14.00 ($18.00 outside of U.S.) Mail your checks to: Bill Spornitz, 1112 East Layton Drive, Olathe, Kansas 66061-2936

Wanted: I'm looking for a pair of "un-used" Mark I wheel fairing halves from a Task Pre-fab kit. Also looking for a canard bottom fairing piece. Must be reasonably priced. Ask for Mark Carroll at (502) 759-3135 work or (502) 759-4740 home

For Sale: Complete new set of Dragonfly plans with construction videos. $175.00 Call Larry Bogan at (612) 576-0592 transferable

Free: - for the price of shipping. MK II H land gear mold. The onlt requirement is that you pass it on to the next guy or gal?) the same way - Free Ask for Matt (616) 343-6990

For Sale: MK II gear legs wit goodyear wheels and brakes. 1 1/2" axles, 6 X 6" wheels and tires. Brake system can be converted to Clevelands. Save time or extra pair. $350.00 Matt (616) 343-6990

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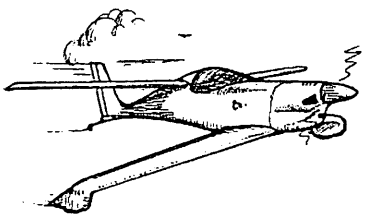

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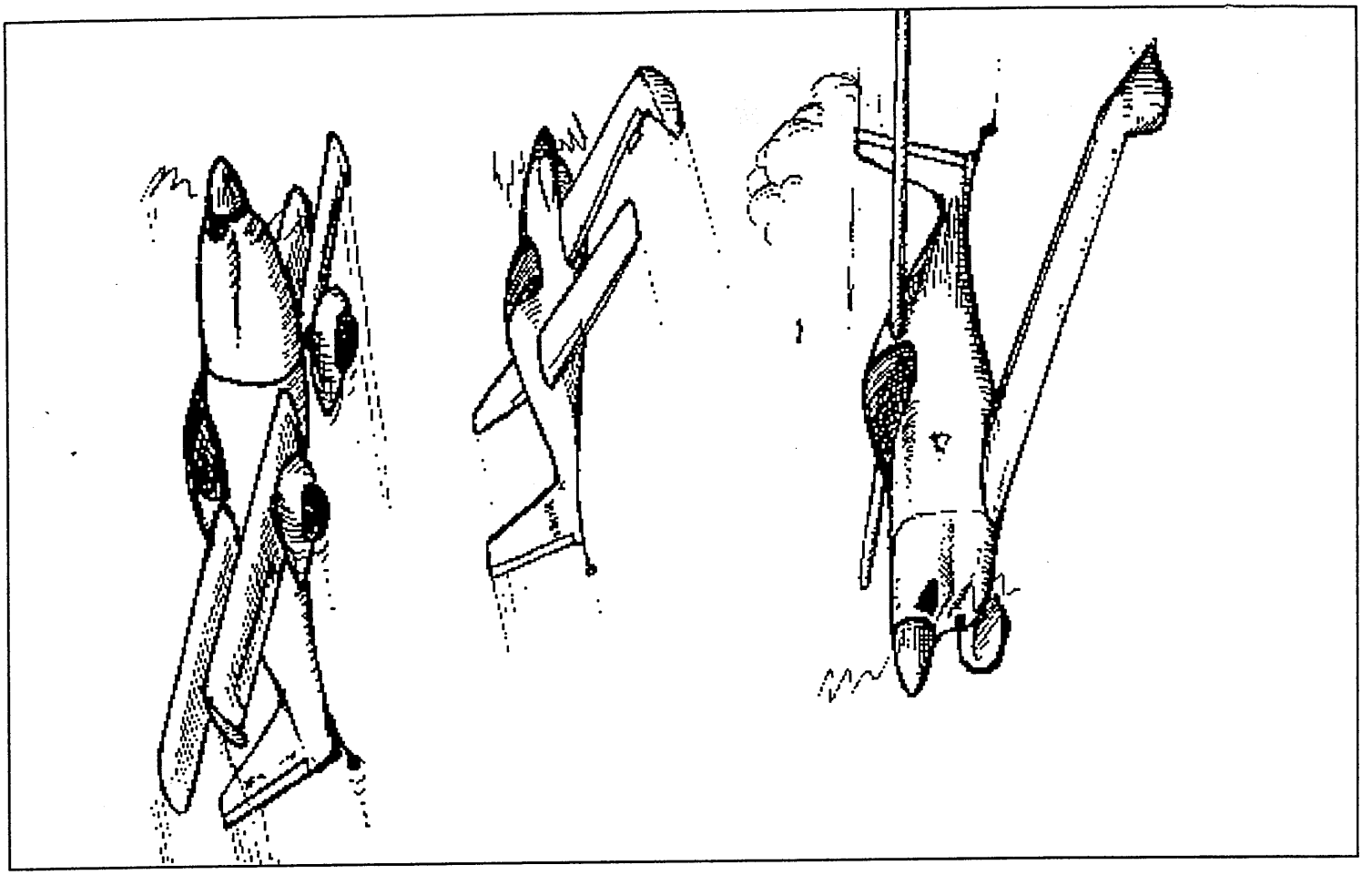

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Bill "Spud" Spornitz - Editor/Publisher

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