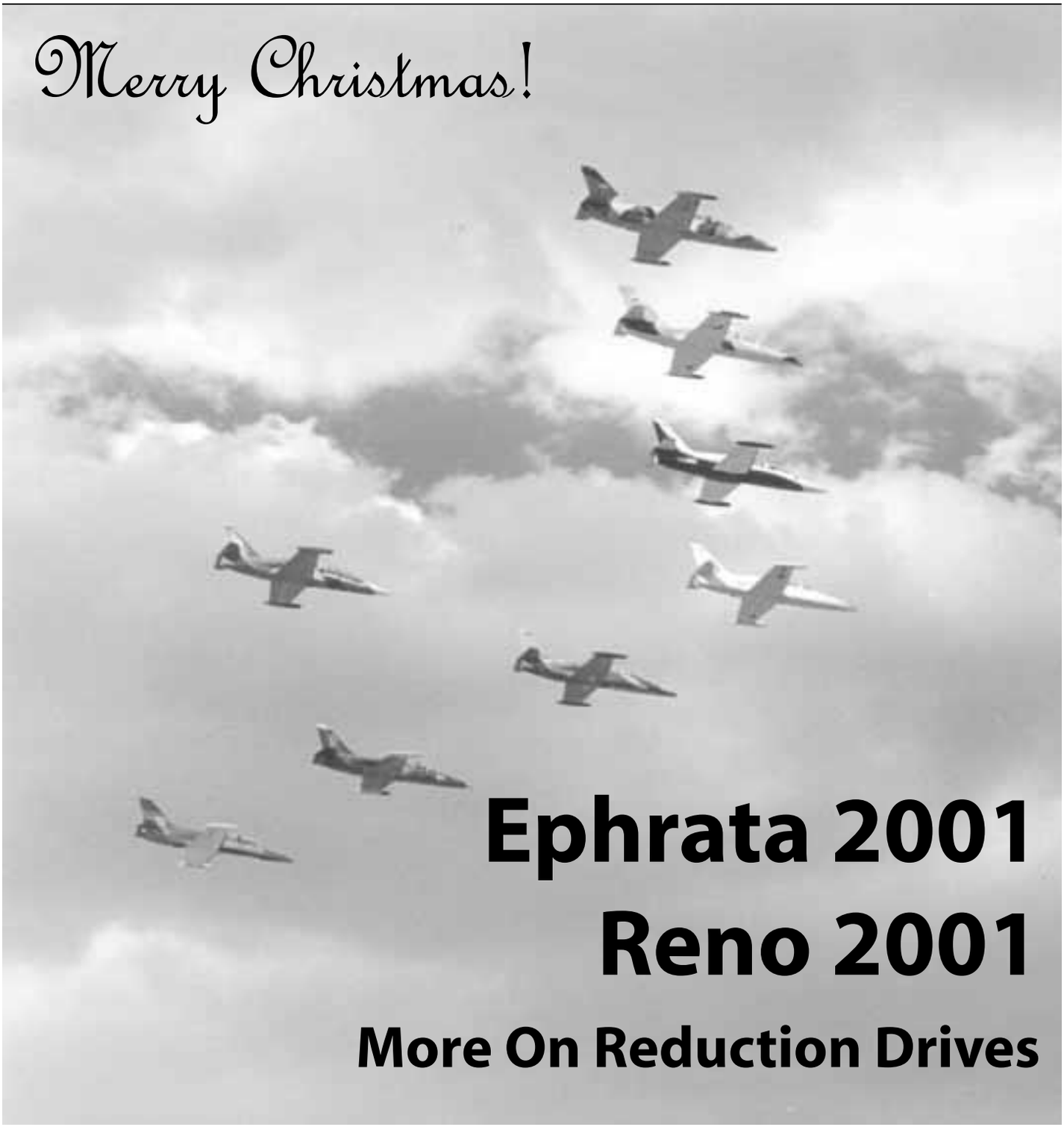
Turn & Bank

OFFICIAL NEWSLETTER OF RAAC CHAPTER 85 December 2001

Merry Christmas!



Ephrata 2001

Reno 2001

More On Reduction Drives

On the Cover:
L-39 Jet Practice at Reno: 6 racers plut 1 spare plus pace plane. Above: a REALLY long distance Reno Racer. Don souter Photos.

inside

The TURN AND BANK is the monthly publication of RAAC Chapter 85 and is intended to keep members informed as to the club's activities, and to promote safety and technical excellence in the field of sport aviation. No responsibility or liability is assumed, expressed or implied as to the content of articles contained in the Turn and Bank: the intention is to provide a forum for discussion and exchange of ideas.

Newsletter contributions should be mailed to George Gregory, 19470-88th Avenue, Surrey, B.C. V4N 3G5 no later than the 12th of each month. Business Fax is (604)-469-3495. Please remember to indicate "attention George Gregory" on your fax. Contributions can be e-mailed to George at:

gregdesign@axion.net

Enquiries to the Membership Chairman should be mailed to Rob Prior, #204-130 E.11th St., North Vancouver, B.C. V7L-4R3

For inspections of Amateur Built Aircraft Projects contact the MDRA Inspection Services , ph. 1-877-419-2111
fax 1-519-457-0980 email: mdrainsp@on.aibn.com
Regular Meetings are held on the first Tues. of each month at 20:00 in the clubhouse:

Delta Airpark, 4103-104th Street Delta, B.C. Clubhouse
phone: 596-3644
Mailing Address: Chapter 85, RAAC
c/o Delta Heritage Airpark, 4103-104th St.,
RR#3, Delta, B.C. V4K-3N3

Executive meetings are on the third Tues. of each month at 19:30 in the clubhouse.
Chapter aircraft pilots, mail cheques
(Payable to RAAC Chapter 85) to: Tedd McHenry
RAAC National Homepage:
http://www.inforamp.net/~raac
RAA Chapter 85 Homepage:
http://home.istar.ca/~airframe/raa_85
Delta Heritage Air Park Homepage:
http://home.istar.ca ~bb4
Source for CARS and Chapter 549 Airworthiness Manual:
http://www.aerotraining.com

RECREATIONAL AIRCRAFT ASSOCIATION CANADA
Delta Heritage Airpark
Vancouver, B.C.

President:	Tim Nicholas 572-1845
Past President:	Pat O'Donnell 533-1839
Vice President:	Emily Clemens
Secretary:	Jim Hunter 576-2678
Treasurer:	Don Souter 572-6279
Membership Chairman:	Rob Prior 422-8446
Librarian:	Tim Baker 588-0333
Program Chairman:	Dan Lawler 536-1536
Aircraft Chairman:	Tedd McHenry 574-4764
Hangar, Workshop, and Building Committee Co-Chairmen:	Dan Weinkam ..... 939-4745 Dave Bell
Newsletter:	
Production:	George Gregory 882-8016
Ass'y and Distribution:	Lothar Juraski 942-0700
Marketing:	Don Souter 572-6279
Check Pilots:	
	Tedd McHenry 574-4764
	Terry Wilshire 273-4741
	946-4152 (bus) 293-0663 (pager)
Directors:	
	George Spence 298-2541
	Colin Walker 581-9602
	Rob Prior 422-8446
	Terry Wilshire 273-4741
	Bruce Prior 437-4219
	Paul Trudel 532-8570
Builder's Counselors:	
Structures:	Dan McGowan 324-3348
Composites	Gordon Hindle 535-0592
Propellers and Wood:	Colin Walker 581-9602
Engines	John Vlake 820-9088
Steel	Pat O'Donnell 533-1839
Electrics	Grant Neal 536-6945
Aluminum	George Worden 433-5564
Computers in Aviation	Rob Prior 980-7723
General	Paul Trudel 532-8570

Technical Guy

Bill Husa

www.oriontechnologies.com

Reduction Drives, the Sequel
Part II

The next procedures should include a test stand, but one which can be pivoted about an axis perpendicular to the axis of the prop rotation. While running the prop at full RPM, the stand should be cycled around this second axis thus testing the reduction drive case's capability of absorbing the gyroscopic load of the prop. This is an important test for all cases but especially those which will be subject to aerobatic flight or rough operating conditions.

The static stand can also examine the torsional response of the system so if any problems appear they can be detected before installation on an airplane. In order to do this it is necessary that the engine is run not only at idle but also up to full RPM with a prop identical (or at least very similar) to one which will be used in service. This may necessitate a lower pitched or constant speed propeller so the engine can reach the extents of its operating envelope. Ideally, these tests should include a number of propeller combinations so different diameters, masses and applications can be examined.

A limit of ground based testing is that it cannot simulate thrust. The static thrust of most propellers is about one fourth (or less in some cases) of the prop's capability at speed so unless the stand is mounted on a truck or a rail so it can move, there is no practical way to simulate this force. Fortunately though, it is a minor consideration as compared to the magnitude of the other loads.

In the case of our own reduction drive, we are currently undergoing dyno testing and fine tuning of the design. By the time you read this we should have at least one hundred hours of running time, much of it at rated load. No, the program has not been without difficulties but the few we've had have been minor and almost predictable. So far the major problems had to do with weight and with cooling.

Since our initial design constraints were for the box to be applicable to the horsepower range of the rotary engine (160 hp to 300 hp +), we had to use the worst case scenarios for the design numbers. A number of individuals thought that I was too conservative or pessimistic in the values listed in the previous article, but to cover that wide a range we not only had to address the low performance application with the wooden prop, but also the high speed airplane with the three blade constant speed metal propeller, and the flight envelopes for both cases

Historically, flight testing has shown that operations in moderate turbulence can result in instantaneous pitch changes of about 300 degrees per second. Granted these are very momentary impulses but the reactions due to the motion must be accounted for in designing all the rotating components. Considering more severe flight conditions and/or aerobatic flight we chose to use 360 deg/sec. for the gyroscopic load design criteria. In short, experience and testing has shown that the values used in the article were accurate if albeit somewhat conservative for some applications.

Since money was somewhat short we also took shortcuts in the machining of the case and some of the components. As a result we did not remove nearly as much material as will be removed in the final configuration. This, coupled with the conservative design, has resulted in an overall weight in excess of ninety pounds. With further refinement and more complete machining, our current estimates for the final configuration are in the neighborhood of sixty five to seventy pounds. Yes, it's still pretty heavy but to cover the range of applications we had to stay conservative.

The most recent stumbling block had to do with heat. In doing our initial dyno runs we have been seeing oil temperatures rise to well over 230 degrees, even at low RPMs - the initial configuration did not have a circulating oil system but one is being added now. To get better data, the reduction drive's oil system will be separate from the engine's however on the production package, the oil circulation will be part of the engine's oil sump. (Subsequent tests determined that the heat rise was due to a misalignment problem in the gears caused by a loose fixture at the machine shop.)

Like I said, so far the problems have been minimal - we hope they'll stay that way. If all goes well, by the time this article is published we should be running full power endurance tests.

So what's the eventual goal? By the time we're finished, Hayes Rotary Engineering would like to supply the homebuilt aircraft market with a turn-key firewall forward engine/reduction drive system which is dependable, reasonably priced and flexible for upgrade. Looking at the complete package, a Hayes aircraft engine, producing 190 hp at 6,000 rpm, will weigh about 185 pounds dry. With reduction drive, alternator and cooling system the overall installed weight is expected to reach about 275 pounds. With turbocharger and intercooler, producing approximately 275 hp at 6,000 rpm, the installation weight will be something over 300 pounds.

So who is Hayes? Hayes Rotary Engineering was established 1975, providing engine services to rotary powered car owners and racing teams. The company

Continued on Page 8

Bulletin Board

Last I heard, Norm Helmer is looking for someone to help with his Paradyne project. The Paradyne is a cutting edge new concept in STOL aircraft that shows promise. If you're interested give him a call at 943-7887.

Dan Lawler would like you to send your email addresses to him at:

dan.lawler@kvaerner.com

He will create a database so he can send announcements about meeting programs, etc. Currently he has a list of about 20 e-mail addresses, and would like to expand it and keep it up to date.

Want to learn more about aircraft construction? Get involved in the J-5 project! Also, we are looking for help from someone knowlegable in fabric work. Talk to a member of the executive and they'll put you in contact with the right people.

Future General Meeting

For a future meeting (early in the new year), we will have Graham Scott at the meeting, who is the Western Canada representative for Sikkens Paints products. He should be able to answer all your painting questions (not limited to aircraft / automotive)!

For his presentation, Graham would like to prepare an aluminum panel (including rivets) with different sections showing before painting / after preparation / finished condition. We would appreciate the donation of a panel to be used for this sample. If anybody has a part that would suit (e.g. perhaps somebody has built a demo rudder kit that they never used, or maybe someone has a damaged control surface) and is prepared to donate it, please advise Dan Lawler at 604-737-4423 or Tim Baker at 604-588-0333.

Wine and Cheese Party

It's time for the Chapter's annual Christmas Wine and Cheese (this is in place of the regular meeting). As usual, it's a potluck sort of affair. If your last name begins with A-H, bring enough fancy squares or goodies for four people.

I-P: bring fruit: strawberries, grapes, sliced melon. also for four.

Q-Z: Veggies and dip, finger food, enough to feed four. See you there!

Minutes

Jim Hunter

Minutes of the General Meeting,
6 November, 2001

Call to order: 8:00 pm by President Tim Nicholas

Hunter/Walker: that the Minutes of the General Meeting of 2 October, 2001 be adopted as printed in the *Turn and Bank*. Discussion Carried.

Committee Reports:

Treasury: Verbal report by Treasurer Don Souter

Membership: Rob Prior: 114 paying members, 29 complimentary

Library: Tim "The Slanderer" Baker: We have lots of books on engines but they are a long time overdue. Please bring them back so that others may take them out. And then, there are those falsely accused of having books overdue when in fact...

Vice President: Emily Clemens: Annual Bash will be in the same place as has been for a couple of years, the Sundance in Ladner. That will be in the Spring.

RAAC: Rob Prior: Rob clarified and expounded upon some of his observations as were in "*Turn and Bank*" about the RAAC AGM. Still rather vague on the election procedure (RAAC, not Rob).

Newsletter: George Gregory: Going fine, says George

Program: Dan Lawler: Our speaker tonight is Mr. Mike Vaghan who is an insurance adjuster and will be speaking on the newly reconstituted RAAC aircraft insurance program. Our special program back on 27 October on "Biannual Recurrency" well attended and very successful.

Buildings: none of the chairmen here but apparently our clubhouse getting pretty sad what with subsidence, rot and such. The chairmen will be informed.

DHAPCOM: Terry Wilshire: Third Annual Appreciation Night Thursday, November 29 6:30 at the Sundance. $20. There are now gates at the two main entrances to the field. Those will be locked at night. The object is to prevent vehicle entrance.

Caretaker trailer to be moved because it is over a septic tank (should keep it warm)

Little trailer to go behind the coffee shop.

There are new roofs on some of the hangars.

The runway will be rollered when the weather is right at the optimum for the rollering to be effective.

The financial fund beginning to grow.

There will be a pancake breakfast before the fly-by on Remembrance Day - November 11.

On Tuesday, December 11, there will be a Career Personal Planning day whereon kids will get the opportunity to clean up a portion of the dyke! (Wowee!)

Old Business: None

New Business:

Remembrance Day morning will be a test says George. Stuff your face with pancakes or be to the clubhouse by 9:30 to get ready for the big fly-by (or both if you're quick).

Apparently Larry Thompson has flown his RV-6 all by himself. The fear was all in the thinking about it. Phinquing by George Spence.

Apparently our annual Wine and Cheese will happen (instead of a December meeting) but because nobody could be induced into coordinating it, it will be an Anarchistic Affair. The *Turn and Bank* will publish some sort of list (see above - Ed.) suggesting what to bring - but only if you feel like it. Carry on regardless.

Walker/Lawler: that we adjourn, which we dutifully did.

Jim Hunter, wretched clerk.

Ephrata 2001
Reno 2001

text and photos by Don Souter

Below: Hell-Er-Bust, as restored P-51. The pilot who flew her in WWII was brought in for an emotional reunion.

Ephrata 2001

A "normal" aerobatic contest is composed of 3 flights: 1)-a known sequence, 2)- a 'free' sequence (one that you have designed to certain rules and had approved) and 3)- an UNKNOWN.---This word seems to strike fear into the minds of many an aerobatic competitor----" what are they going to make me do that I have not practiced?" This contest was to be ALL unknown flights . Anyway only 12 pilots showed up; but all had alot of fun critiquing each other while flying these unknown and "bluff" flights. One pilot even had the gumption with having to work Fri. came Sat. morning to do all 3 flights in less than 2 hours. A brave attempt was made, and a good amount of knowledge was gained.

Have you ever tried doing a loop on a 45deg. angle? that was one of the maneuvers that awaited the "unlimited "category pilots. After many hours spent practicing proper form to find that an Immelman was to have a "sag" in it was proving to be difficult.

Beat this---for an UGLY loop -- one competitor found a way to come out of this loop in the opposite direction. Another one to beat was a barrel roll on a vertical line. Try that some time with a 150 hp Pitts.

Watching the pilots after hours was as much fun as watching them fly!!! "The dance of the flight" was always done with the enhancing antics of commentary from the peanut gallery. Properly encouraged by other relaxing competitors this was a twice daily ritual. As each new sequence was handed out by the contest chairman the pilots would each find an empty piece of ramp or parking lot or?? And walk the flight with many hand gestures and foot movements to accompany each maneuver or turnaround.

At the end of it all some pilots donated their second seat to the non flying assistants..... I finally got to fly in a GREAT LAKES BIPLANE---this is a beautiful restoration---(YES- I got to play with the stick and rudder) at least until my headset tried to depart the airplane. This IS an open cockpit. The kind pilot/owner (Larry) then flew me (hanging onto all those loose things) around the basic sequence: enter box--wag wings--Stall; spin(1 turn); vertical line- loop: 180 deg. turn; aileron roll; wag wings: you're done. "HEY -I CAN DO THIS!!"----Anyone got an airplane I can borrow (real cheap)?

Reno 2001

Day 1-- Reno--the competitors are into the swing of things and are busy tweaking or are already changing engines and props are being traded like candy in the school yard. Many are waxing and waxing///and waxing---hoping to squeeze that last MPH out of whatever horses under the cowling they have!! Most are looking forward to bettering the times that they already have for Qualifying. Some are just hoping to qualify as they have already spent the budget on everything in site to go faster.

The JETS have been out doing practice races and such with press and local dignitaries--should be interesting as this is another "STOCK" class .As with the T-6s the airplane ruled to be that way. Out of 7 pilots we have 1 women. An experienced T-6 pilot(also racing in T6 class) Mary Dilda has been showing that she intends to be competitive in this class also. While this is going to be something to watch I just cannot get as exited about this as they have that screech / not the deep throaty ROAR of the merlins and those big radial engines.

Several pilots are running in more than 1 class. Dave Morss --a familiar name for experimental test pilots is flying in 3 classes--Sport/Unlimited/Jets. Also we have the "I'll fly anything with wings" Skip Holm who hopes to pull off another victory for Dago Red.

Day 2-- headlines read AMERICA UNDER ATTACK!!---ALL AIRCRAFT

GROUNDED!!!!!!!!--this includes the firefighting equipment working border fires for California!----with this silent(in Reno) wake up call I walked the pits in search of anything "new " to photograph or talk to other pilots and mechanics for the latest pit gossip. Noticing the lack of several 'name brand ' aircraft--VOODOO , DREADNOUGHT, RARE BEAR, to name 3. A general sense of "LOST" was around most people in the pits.

DAY3--more of yesterday----I washed the truck AND trailer by hand for something to do!!!!! I also spend time looking for book stores etc.--I have never had so much time for UNKNOWN ACTIVITY. While I wandered around the "top dogs & head honcho" were busy trying to find some way to hold the races for all those who worked hard to make this year more smooth running and more fun/ not to mention the fans who had arrived early for the whole week of flying activity.

Day 4 --Brief episode of actual flying takes place. I am unsure if we were supposed to be or just misinterpreted the words that made it to us. Anyway the people that were unfamiliar with the course were given the green flag for about 8 minutes. then the black flag went out for the day!!--Our press briefings with Mike Houghton--CEO of the Reno Air Race Assoc.--the phone conversations were everywhere to FAA and the Pentagon/military to the highest of Senators and President's aids. Last word at 3:20 local time was that we would honor the national day of mourning and have a memorial service at11:00 local (Fri.) by the local church leaders. If flying is allowed we would participate by holding a number of "MISSING MAN" FORMATIONS to honor the dead of this horrific incident. Words used by many were "act of war". A few questions were asked by the assembled (pilots/security/ press/ramp personnel/etc.) Then it was declared we would RACE ON SATURDAY AND SUNDAY. The format being reduced to all races with air show only if time and co-ordination allowed for it . A general sense of quiet frustration but one of unity with others in the campground and the pits. All feeling saddened by the events but still wanting to get on with it.

MEMORIAL SERVICE RENO RAMP-2001 SEPT 14 / 11:00 am

Day 5-FRIDAY-Well we did have a nicely presented spiritual public memorial service today . A representative group of aircraft from each class were arranged around the dias in front of the grandstands/ and some were taxied past but still no flying.

AT APPROX. 15:10 SEPT.14/2001 THE RENO AIR RACES WERE OFFICIALLY CANCELED for this year. over $1,000,000.00 were spent in the setup and other things , and despite the efforts of many we were unable to get to fly. A statement from the crowd the BOD received a standing ovation from the assembled.

Above, preparations for the Memorial Ceremony, Sept.14. Below: Taps

The Chapter's second aircraft carrier trailer is for sale. It's a gem! $480 or best reasonable offer. It's at John Keon's place 16301 – 20 Ave., Surrey ph. 536-8589 or call Jim Hunter at 576-2678.

CLASSIFIED ADVERTISEMENTS

Classified Ads are free (within reason) to members. Display Ad rates are:

Business Card:$25 per year

1/4 page:	*$10/month*	*$100/yr*
1/2 page	*$15/month*	*$150/yr*
1 page:	*$25/month*	*$250/yr*

Ads that have been in for more than 6 months are subject to removal if space is required for other stuff. Please contact George the editor if you want it kept in.

FOR SALE:

52" x 34" Shettler's propeller with hub, $100.

Vic Gabas (604) 853-2778

For Sale: SIROCCO PROJECT

Fuselage, canopy, tail group complete. Air frame control components done except for cable. Main-wheel gear, wheels and brakes done. Tail-spring and wheel included. Panel made, no instruments. Lycoming 0-290 GPU Zero-timed. Will Neubert stainless cross-over exhaust with stainless muffler/ shrouds. Bendix PSC5 carb. Bendix mags with non-shielded leads. No starter, starter ring or alternator. Weldtech engine mount. McCauley prop.

Wings: ribs and minor spars done. Spar diaphragms done. Two spar-grade spruce planks. No other wing parts.

$15,000 firm, complete and not interested in parting-out

Jim Hunter 576-2678

FOR SALE:

1957 Tripacer Wings uncovered, all reworked. New leading edge. New ash tip. All Zinc Chromate ready to fabric. Included: 2-18 gal. gas tank, 2 - gas tank cover, landing light, aileron and flap, front and rear struts. Asking $4000 Canadian.

Roger Gauthier (Kelowna) (250)-763-1529
(250) 212-0832 (cel)

Wanted: PA 18 or PA 20/22 Wings. Some damage OK. 946-5881

For Sale: Electronic Tach 2.25" with generator (new) $125, 6" castoring tailwheel, $50, Electronic dimmer control, $25, 2 New 600.6 Goodyear Tires, $125 for pair, Combo EGT/CHT (needs probes),$50, Tach Cont.C85-0200, $35, Temp (OAT) gauge, new, $35, Windscreen Ant., Van's, new,$15, 525 battery (new) never had electrolyte, $75, Fuel Pressure Gauge O/H, $35, Lycoming Starter 0-290, 0235, 0320, 0360, for $375.

Bob Cutting 275-1603

FOR SALE: Fleet F7 Biplane replica. Very close to original copy except for uncowled engine. Engine: Kinner R55 160 hp. Aircraft is modified for solo operation from rear cockpit. Extra bellytank with wobble pump. Original Fleet wheels, brakes, pedals and stick column. Original parachute accommodating bucket seats, oversize tires, Stits covering, voice activated intercom. Ted Hendrickson Propeller, manual and extra key magswitch.

$35,000 Canadian. (604) 478-6048

Will consider small antique aircraft engine as trade-in.

FOR SALE: One set of 1500 Murphy floats ready to go.

Ole #45-3931 198 st. Langley BC
514-1280

FOR SALE: 6 Factory new Franklin 180 hp cylinders includes installed valves $300 each, will not part out.

Tim Novak 271-8586

FOR SALE: Softcom 2 place Intercom ATC-2Y, with accessories $110.

Stuart Gear (604) 941-9402
E-mail:sgear@infoserve.net

FOR SALE: 4130 Annealed Gauge Plate now in stock, .025 to .375. We will sell you the plate or laser cut the parts

Industrial Laser Cutting ltd.
(604) 946-4152, Fax: (604) 946-4153
E-mail: tmw@industriallaser.com

FOR SALE: 1- Miller 200 amp ac/dc H.F. Tig/stick welding machine - 220V 1 ph. $1200. 1- Miller 120 amp MIG (wire) welding machine, 110 volt. Portable sheet metal type, c/w gas kit (almost new) - $800.

Pat O'Donnell 533-1839

FOR SALE: Zenith 250 plans and parts, wing rib moulds $360. Christavia Mk IV project, 4130 steel tube, wing ribs, flaps ailerons, gear legs, wheels and brakes, tail stab and rudder, $3600.

Paul Trudel 532-8570

Building Partner Wanted:

partially completed Kitfox Model IV-1200. Time too limited to complete myself. Seek-

Continued on Page 8

ing building partner with some experience. Partnership arrangement - terms to be discussed. Call Marty BillinkoffDays (604) 322-7545 Cell (604) 351-0222 Evenings (604) 946-6475 email: martyb888@aol.com
WANTED: CASSUTT sport/racer or Smith Miniplane or similar type mildly aerobatic biplane. Contact Adrian Cooper at (604) 328-1431 or email at adriancooper@canoemail.com

Reduction Drives

Continued from Page 3

has been around for over seventeen years, all that time gaining significant experience with the Wankel engine. While others today are advertising selling conversion plans and a few engines over the past six years or so, Dennis (the owner) has been shipping on an average over sixty remanufactured engines per every month for each of those seventeen years. Adding that up that's over twelve thousand engines!

The outgoing engines are remanufactured, not rebuilt, to as good if not better than factory new specification. Experience has allowed Hayes Rotary to incorporate many patented improvements and embellishments to the design, all of which increase reliability, longevity, performance and economy, yet still allow engine prices to remain at very reasonable levels. My engine, which I bought several years ago for $3,500, has only moderate modifications yet is capable of delivering a bit over 200 hp at 6,000 rpm. Their racing engines have shown remarkable performance and reliability in track, off-road and marine applications.

For the aircraft market the buyer will be able to purchase the package complete with cooling system, ignition and exhaust, all ready to bolt in. Although the final price has not as of yet been set, preliminary estimates for the complete assembly run from about $5,300 for the standard 160 hp configuration and $6,300 for the improved 190 hp version, to around $7,500 for the turbocharged 275 hp version. The first sets should be going out the door by the first part of 1994. (To date the engines are available without the reduction drive system.)

If you wish to purchase just an engine, these and other configurations are available now, less of course the reduction drive. Prices for engines alone are $2,800 for the standard configuration, $3,800 for the modified but still normally aspirated engine, and $4,900 for the turbocharged version.

Other combinations will be available, some capable of delivering in excess of the 275 hp currently foreseen. If development goes well, a three rotor engine will be available in about three years, producing as much as 450 hp (turbocharged), weighing about 440 pounds installed.

All in all we feel that the rotary engine is an ideal aircraft powerplant, capable of providing dependable and economic service to a wide array of airframes. For more information you can contact Dennis Hayes at Hayes Rotary Engineering at (206) 881 - 3604.

Bill's articles are used by permission, and we gratefully acknowledge his contribution. His website address is listed on the article masthead on page 3.

LAST WORD

GEORGE GREGORY

I can't say enough about the value of a good airplane video. To say the indoctrin - er - education of our children is in hand is an understatement. I was worried for a while, I admit, but the children for some strange reason have come to respect my passion for flying and/or enthusiastically endorse it. Our youngest has nearly worn out my video of the 1989 Abbotsford Airshow and never fails to draw my attention to some act of aerial derring-do; a number of prized magazines have been worn out, but sacrifices must be made.

Building toys are great too. Lego remains a favourite, and my oldest is often requesting some "Let's build an airplane out of Lego" time (though this could be an unsubtle bribe to pull me away from domestic chores to do some quality Dad time - he knows what buttons to push). Flying Cars? We've built 'em. Anything's possible with Lego.

And then, of course there is the workshop. We build real things there. All of the kids seem to like to putter in there while Dad is working on *something.* (Three year old Nathan wanted, and got, a Craftsman tool box for his third birthday, and is getting an orbital sander for Christmas. Really.) A kitchen cabinet, working on the car...maybe even an airplane.

And the best part is that this is going down well in the spousal approval department. Concerns had been voiced a few years back that always wanting to disappear to the shop leaving her alone with 4 kids was a particularly heinous form of aeronautical selfishness. Now that these selfsame kids are getting old enough to buck a rivet, well... as long as I can log it as parenting time, the whole process gets a second look.

I'm biding my time. One doesn't want to seem too eager. But subtle probing comments and the proper coaching of the kids seem to be at long last bearing fruit.

I don't want to appear selfish. What better gift could a Dad give his kids than the love of flight (though their future spouses may wish me ill)? What about those great life skills, like selecting spar grade wood, or learning to weld 4130? What a Dad!

The mold is not entirely cast: research continues; but the signs are excellent. I'll issue further reports as things progress.