

TURN ^{AND} BANK

OFFICIAL NEWSLETTER OF RAAC CHAPTER 85

November 1999

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Old Frank Reminisces

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*Tools, Engine Storage
and Brake Springs*





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On The Cover:
 Longing for the days of summer...chapter members enjoy a summer evening
 Mark Munzel Photo

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.

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

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Computers in Aviation	Rob Prior	980-7723
General	Paul Trudel	532-8570

For inspections of Amateur Built Aircraft Projects contact the Recreational Aircraft Association Headquarters at 1-800-387-1028

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:

Brad Short, 8052-122a Street.Surrey. B.C. V3W-7R4

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>

Technical Guy

From the Western Canada RVator

Tools for Beginning Builders
John Huft (skywagon@rmi.net)
Pagosa Springs, CO

Now that I am almost done with my RV-8 tail feathers, (an expert is someone who has an opinion, and lives at least 100 miles away), I thought I would offer my thoughts on tools, and some building tips. I was a prototype machinist for 8 years, and might have some different ideas.

Before I started, I had a 30" combina-

tion shear/brake/roller from Harbor Freight. It weighs about 400 lbs., and costs a buck a pound. It has been a great tool, making straight bends, and straight cuts that need little deburring. Since I have this, I don't need a bandsaw. When I need to cut angle or thick metal, I clamp my sabre saw upside-down in the vise, and use it.

When I saw all the stiffeners that needed to be made for the rudder and elevators, I went into production mode, and made them all. I laid out each skin, made a list of lengths, and cut them all. Then I clamped a guide on the bed of the shear, and cut all the angles. Then I deburred. When I think about someone doing this on a band saw, it has to take a lot longer. Also, to set up everything again for each skin would add time. Machinists do this every chance they get.

I haven't seen any discussion on cutting lubricants. Aluminum is basically soft and sticky as metals go, and to keep the

tools (drills, saw blades etc.) from loading up, use some lubricant. One of the wax type sticks is best (no mess) but kerosene works great too. It will make your drills cut cleaner, and last longer.

Many of you are using levels to line up jigs and parts. The average hardware store bubble level is not all that accurate. You can get machinists' levels that are 10 times more sensitive. I have a David White laser level that I use a lot in building stairs, etc., that is 5 times more sensitive than the average \$150 from Tool Crib of the North. They are a great source of hand power tools (I am 4 hours drive from Home Depot).

I agree with the recent thread (? - ed) about cost of tools. If it is something you don't use too much, a cheap tool is ok, but if you will use it a lot, and for future projects, a cheap tool will drive you crazy for as long as you own it. Buy a good air drill, and a good rivet gun. That \$40 air drill

Continued on page 6

News on Homebuilt Aircraft Border Crossing Permits

Here's the FULL story!

...The permanent, perpetual, don't-have-to-apply-for-it **Border Crossing Permit For Homebuilts!**

By the long and splendid efforts of EAA, EAA Canadian Council, MOT and FAA, we now have a standing Border Crossing Permit to carry on board. Many Thanks to Rem Walker, EAA Canadian Council for sending it along.

Note! Copy of the permit along with requisite "letter of Permission" will be included in the journey logs for the Turbi and the J-5.

The following conditions must be met:

- 1) The aircraft has been issued a Canadian Special Certificate of Airworthiness with Block 7, "classification" listed as amateur-built.
- 2) The currently effective Canadian special certificate of airworthiness and this authorization shall be carried on board the aircraft.
- 3) A copy of this authorization shall be displayed in the aircraft when operating under the terms of this SFA.
- 4) The identification markings assigned to the aircraft by the country of registry must be displayed on the aircraft according to that

country's applicable requirements.

5. The aircraft shall be operated only by airmen holding appropriate certificates or licenses issued or validated by the United States or by the country of registry.

6. No person may be carried in this aircraft during flight unless that person has been advised of the content of this authorization and of the airworthiness status of the aircraft.

7. Persons or property shall not be carried for compensation or hire on board the aircraft.

8. The aircraft shall be operated under visual flight rules (VFR) day only, unless the operating limitations issued for the aircraft authorize night or instrument flight (IFR) operations, in which case the aircraft shall be equipped in accordance with 14 CFR part 91.205 and the pilot in command shall comply with 14 CFR part 91.711.

9. The aircraft shall be operated according to restrictions imposed by Transport Canada Aviation provided those restrictions do not limit or change the conditions herein imposed.

10. Except when they have been waived by the administrator for the purpose of an air show, the aircraft shall be operated according to the general operating and flight rules of 14 CFR part 91, and in particular section 91.711.

11. The operator of the aircraft shall advise

Air Traffic Control of the nature of the flight when establishing communications.

12. Except when otherwise directed by Air Traffic Control, or in the event of an emergency, all flights shall be conducted to avoid areas having heavy air traffic and to avoid cities, towns, villages, and congested areas, or any other area where the flights might create hazardous exposure to persons or property.

13. For participation in and air show, the FAA may impose any additional conditions or limitations deemed necessary to ensure the protection of persons or property. An operator who wished to participate in an air show must contact the geographically responsible Flight Standards District Office (FSDO) for issuance of a waiver to participate in waived airspace.

14. An aircraft operator, who is not the registered owner of the aircraft, must carry a signed letter of authorization from the registered owner showing the owner's permission for continued operation of the aircraft in U.S. airspace.

15. This Special Flight Authorization is valid for an indefinite period unless superseded or canceled in writing by the Administrator.

I Nicholas Lacey
Director, Flight Standards Service, FAA
Issued in Washington, D.C.
on July 31, 1999

BULLETIN BOARD

If you have questions or problems with your aircraft construction, we have members who have developed some expertise in various fields who have volunteered to advise you on methods, procedures and pitfalls in the capacity of **Builders' Counselors** something along the lines of the former designee programme. Please respect the fact that these are volunteers who may not appreci-

ate late calls, and will not return long-distance calls on their answering machines. Also, none are inspectors, and although experienced in their various fields, cannot be held responsible. It is and remains **YOUR** project. Their names and numbers are on page two and will be a regular feature of our contents page.

Please note that the locks for the club-

house and the club hangar have been changed. If you want a key that works in both hangar and clubhouse, give Rob Prior a call at 980-7723.

Don't forget that the December meeting is the chapter's annual **Wine and Cheese**. Contact the program chairman for further details. We should have more info in next month's newsletter. **T&B**

Minutes by Jim Hunter

Minutes of the General Meeting, 5 October, 1999

Call to order: 8:00 pm by President Pat O'Donnell who welcomed visitors and new members.

Spence/Walker: that the Minutes of the General Meeting of 7 September, 1999 be adopted as printed in the *Turn and Bank*. Discussion Carried.

Committee Reports:

Treasury: Verbal report by Treasurer Tim Novak.

Membership: Rob Prior: we have 145 paid up members and 29 complementary. Members are welcome to pay for AD2000 dues any time now.

Buildings: Dan Weinkam: OK. J-5 in the shop now but can be wheeled out easily if somebody needs to use the shop. See Dan.

Aircraft: Ted McHenry: Turbi busy and in good shape.

Library: Don Souter: OK. Thanx anonymous person for donation of some good books.

Designee Program: Bob Cutting: DOT looking sideways at the 51% rule particularly as it applies to partially made kit amateur builds. RAQ (RAA? - ed.) asking DOT for a re-definition. More to be heard on this. Bob resigning as AIR-ABA Chief due pressures of work. Terry Elgood will take over as

Regional Chief and Bob will continue as an Inspector.

RAAC: Bruce Prior attended the RAAC AGM as Director for our region. Had a full report for us but he became a Screecher so his computer crashed. (one point for the Luddites!) A full report in the next *Turn and Bank*. One

item that did pass at the meeting: Chapters to be assessed a per member charge to be sent to RAAC to help cover its costs. Bruce presented a special RAAC Achievement award to Bob Cutting for his years as Regional Chief DABI.

DHAPCOM: Terry Wilshire:

1) Committee met with Air Cadets who want to place a memorial at DHAP.

2) Still waiting on supply of 80/87 but apparently it's hard to get. Apparently Duncan has MOGAS at an almost human price. Terry will look into it.

3) Committee will be meeting with politicians on October 24 for a general review and will ask for a ten year license renewal.

4) Terry to visit with Remembrance Day Committee to present our plan for the November 11 fly-past.

Old Business:

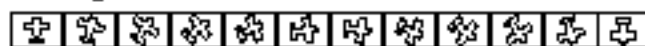
Annual General Meeting - Election of Officers.

Election of Officers ably conducted by Bruce Prior, Nominations/Election Chairman. The results are:

President: Tim Nicholas

Vice President: Emily Clemens

AIRFrame



Aircraft Portraits

Rob Prior
robp@evanboes

mail to: Airframe@istar.ca
http://home.istar.ca/~airframe

#204-130 E 11th Street, Northvan, B.C V7L 4R3 Ph. 604-280.7723

Treasurer: Tim Novak

Secretary: Jim Hunter

Program Chairman: Dan Lawler

Custodian: Don Souter

Directors: (to serve for three years) Terry Wilshire, Rob Prior. Elected by acclamation as Immediate Past President (and many thanx for his excellent service): Pat O'Donnell.

Serving the balance of their three year terms as our Directors will be:

George Spence

Colin Walker

C.R. Goguillot

Bruce Prior

Prior/Souter: that the ballots be destroyed. Discussion Carried.

New Business:

Remembrance Day Fly-Past: George Spence i/c:

Practice sessions: Sundays October 31 and November 7. Meet at clubhouse 10:00 am.

Recollect: No practice (at least one), No brief, No fly!

Meyer/Walker: that we adjourn. Carried.

Jim Hunter, Secretary.

T&B



One day in the winter of 1942, while working in Fort William, I just couldn't stand it any longer. No, Sir, I had to do something about that inner feeling. Everything was building up inside.

I was happy doing my part in building Hawker Hurricanes and Curtiss Helldivers (carrier based dive bombers) for the American Navy. It sure was exciting working in a factory with 5000 people all working on aeroplanes. Those Hurricanes were something. They cost \$75,000 each. They had Rolls Royce V-12 engines and they had over 1000 horses in them, and the paint department had all kinds of fun painting camouflage scenes all over them. Outside about 600 feet from the main buildings was a huge mound of dirt. This was used as a receiver when testing the four heavy calibre machine guns (two in each wing).

The Curtiss Helldiver was a lot different bird. Painted a light blue or sea green, it had a big 18-cylinder radial engine on it and the wings folded so that they could be parked close together when in storage either in the hangars or on the flight deck. For the size of the aircraft, it had a good size bomb bay and four heavy calibre machine guns in the wings and the pilot had his own personal tail gunner for protection from the back. The gunner sat in a cylindrical turret in the fuselage. However, something that seemed to be very inadequate was the method of turning the turret. The gunner had to push the turret around with his feet. I don't think he would appreciate that in action.



But hey, I'm all off the track. I started to tell you about that feeling. I had wanted to fly ever since I saw my first aircraft when I was 6 years old, and although I had not flown in an aircraft I caught a train and headed for Winnipeg. Arrived early on Friday morning and got me a hotel room and went to the RCAF recruiting station. I was going to join up and be a pilot. After writing a few tests I had a talk with a recruiting officer of some rank and he told me that he wasn't interested in a young man of my calibre. He said it would take them too long to train me. But he said they had a need for some other very important jobs and offered me training as a tail gunner. This was something I had to think about. I had visions of maybe having flying as a life career and I wasn't able to correlate this so I spent a couple more days in the McLaren Hotel. I would go out and ride the street car down main Street and down Portage Avenue. I tell you that sure is a cold country. The people around there told me that sometimes it got so cold that when they tried to talk their words froze and they had to wait till spring to find out what they'd said.



When Sunday night came, I decided to go back home and maybe try again in a few months, but as it turned out, it was many years before I went back to Winnipeg.

Been nice visitin'...

The gunner had to
push the turret
around with his
feet. I don't think
he would appreci-
ate that in action.

The Way It Was

by "Old Frank" Sutton

Technical Guy

Continued from Page 3

might last the project, but the good one is so much nicer to use, you might end up wishing the cheap one would die, so you can toss it. It is hard enough to persevere through one of these projects, without making it harder.

A good source for general tools and industrial supplies is MSC. Call 1-800-645-7270 and as for the "big book" catalog. You will have to make up a company name, but they don't check anything. The catalog is 4000 pages hardbound, and has every material, tool, etc. known to man. They are not the best prices, but they stock everything. 2-day UPS for the price of ground.

Remember how a mouse eats and elephant (one bite at a time). Stick with it, and one day your big problem will be deciding which fly-in to go to.

Engine Storage and Pre-Oiling Eustace Bowhay Blind Bay, BC

Assuming the engine was properly inhibited and was stored upside down with the cylinders well oiled before hanging, all I would do is keep the dehydrator plugs in good shape and avoid turning the crankshaft until ready to start it.

Then just before starting it, pre-oil it. Remember pre-oiling does not lubricate the cam lobes and lifters so cranking should be kept to a minimum. With clean dry plugs and properly primed it should start in the first three or four blades. As soon as there is an indication of oil pressure, go to 1000-1100 rpm to supply some sprayed oil to the cam lobes, lifters, wrist pins, and cylinders.

A simple and inexpensive way to pre-oil is to install a suitable steel fitting where the plug is above the left mag in the area of the oil cooler fitting. Then, with a new one or two gallon size clean garden-type pump up spray can, connect to the fitting in the engine and run at least a quart of warm oil into the engine. Then cap and safety wire, and start the engine.

This fitting will now be available to pre-oil anytime in the future and will require nothing more than the removing the top cowling and connecting the spray can.

It will take a bit of innovating to rig up

the proper connections for the pump up can. Be sure to use a steel fitting in the back of the engine - the proper one to accept a cap. A tip on rigging up the spray can: either replace the hose from the can with another hose if you want to save the spray nozzle then using another piece of hose insert a piece of aluminum tubing in the end with a flared end and the correct nut to fit your engine fitting. By saving the hose and spray nozzle you can use the spray can to wash the engine down with varsol.

Ideally pre-oiling should be done anytime the engine has been idle for more than thirty days.

Jerry Calvert:

I plan on getting an engine around 1 1/2 - 2 years in advance so the tips that Eustace has been posting on engine storage have really been of interest to me. I was pondering the thought of placing the engine on a tire and rotating occasionally to circulate the oil and had an idea. I am considering modifying a car engine stand to hold the Lycoming. Possibly mounting the Lyc on the engine mount and mounting the engine mount to a flat steel plate that would be attached to the engine stand. This would make rotating the engine very simple and lessen the possibility of damaging the engine.

Has anyone built something like this?

A big thanks to Eustace Bowhay for his tips!

Cleveland Brake Springs Mitch Faatz, Bay Area Rvators

This won't make a good X-files episode, but some people are reporting that some of the Cleveland brake cylinders that Van's has stocked several years ago had short springs. Jess Meyers stated the problem like this: "The problem was that it wouldn't return the

check valve in the master cylinder, thereby keeping a load on the main wheel cylinder. As it got hot, pressure built up in the wheel cylinder, as it could not release, which caused heat, then breakdown of the "O" ring, then leakage onto a hot disk, usually resulting in a good fire" Serious stuff.

Van's latest newsletter downplays this, but an RV builder further reported: "The bogus springs varied from 3.3" to 3.5" long in their free state" (They're supposed to be 4.125" to 4.25" long). I called Cleveland (1-800-BRAKING) straightaway, and the woman there was familiar with Jess Meyers and the problem he has identified. Yes, the springs are wrong, and they are sending four replacements (P/N 82-00900) to me, UPS red, under warranty.

Dragging brakes are serious business, especially on the runout. They can cause loss of control, increased runway length on take-off, and increased wear on the tires and brakes. Add a potential fire to this, and maybe it deserves some attention! Don't panic or demand your brake cylinders be replaced, but this is something you may want to check out if you have dragging brakes.

Also, make sure the tail is untied...*T&B*

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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: New 4130 Tubing - most sizes available. **Used** - Tripacer Fuselage (comes with logs), metal prop off 150 hp TRIPACER (comes with logs) Cessna spring steel gear legs, misc. wheels, axles, brakes and parts, misc. instruments (no altimeters!) A75 engine case, 7 Continental cylinders, some Lycoming cylinders (big), carbs, mags, pumps, old radios, etc. Call Pat at home, 533-1839.

WANTED: Medium size air compressor, with or without tank.

Doug 275-1405

FOR SALE: Icom handheld radio, brand new PTT with sidetone, charger, etc. \$500
George Gregory 882-8016

LOOKING FOR RESPONSIBLE PARTNERS:
1967 C-172, approx 4400 hrs, fresh annual,

engine on condition but strong. Flies great. ILS, ADF, Narco radios new in 1990. Child seat, 4 place intercom. Not fancy, but a good clean airplane.

1/3 share \$10,000, \$1/2 share 15,000.
George 882-8016

FOR SALE:

Crossover exhaust stainless 321 for 0-320 suitable for many including RV-3, RV-4, RV-6, Emeraude, etc., etc. (new) \$575 obo.
Colin Walker prop 72 x 44 for 65-85 hp Continental \$425 obo.

Bob Cutting 275-1603
Email rcutting@direct.ca

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:

1 set (8) 60810 (68763) M10 main bearings \$295 per set

1/2 set (4) of same \$150 per set

1 set (8) 60810 (68763) M003 main bearings \$295 per set

1 set (8) 61662 M10 Rod Bearings \$175 per set.

All bearings fit Lycoming 0-235 and 0-290 (without C/S prop). All are new, perfect but certs mislaid,

Gogi (604) 823-6428

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: Tailwind Project. I hate to let it go! All wood for wings, spars and ribs done,

Classified continued on page 8

Classified Ads (Continued from page 7)

new wing fittings, control system, Cougar fuselage mostly modified for Tailwind use.

George Gregory 882-8016

FOR SALE: Mags, turn and bank indicator. Fuel tank with gauge, cut down Sensenich prop, lots of other stuff.

George Gregory 882-8016

FOR SALE: Fleet F7 Biplane replica. Very close to original copy except for uncowed 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: Some Cont.0-200 parts: Case (checked, no cracks) Camshaft, Gears, Rods and Pistons; Carb and spider, Starter (pull type) and Generator, mags (one is disassembled). \$2500 for the package, offers considered on individual parts. Also, Prop hub for Cont. tapered shaft, \$350, Wing parts for Taylorcraft BC-12D (disassembled) including ribs, spars, compression struts, brace wires and strut fittings. Offers?

Contact David Smith (604) 513-0353

(604)513-0373 (fax)

FOR SALE: 1 pair David Clark Helicopter headset, 1 Telex MRB-2400 headset, 1 Mar-

vel Schebler MA3-SPA and 1 MA4-SPA carburetors. June McMann 943-5369

Aircraft Painting

Will paint, finish off aircraft for cash or part share in airplane. Prefer Cessna or Piper. Value of work is \$6-8000 depending on condition of aircraft.

Kevin 580-6264

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:

1- remote compass

6- switches bat handle

11- circuit breakers (Klixon)

1- Electric fuel pump Weldon A8100-00

1- Fuel gauge and sender - Stewart Warner

Call GRANT (604) 536-6945

FOR SALE:

ELT: ACK E-01, meets TSO c91 - A, complete with external antenna kit and remote panel \$225.

David Clark Headsets \$225 (mostly 10-30 type, helicopter and airplane.

Telex PT-300 PTT \$30.

Full map GPS Garmin 195 - Nicad pack, Pacific NW map chip, PC/MAC computer cable kit, mounting bracket. \$1500 or \$1200 without map data chip.

Bendix RSA 10 ED1 Injector Body, no history, \$400. Woodward Prop Governor

#210681, no history, \$400.

National 360 Parachute, blue with matching carry bag \$900

Christen 5 point aerobatic seat belt harness, with 2-point Military 3" belt \$350

Guido 948-3464 e-mail: glepore@direct.ca

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.

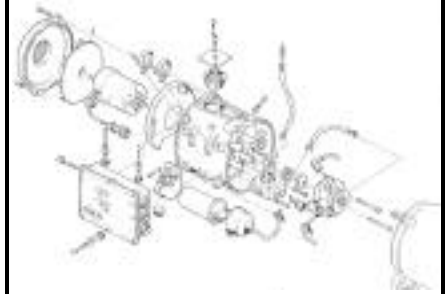
(604) 946-4152, Fax: (604) 946-4153

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

Technical Illustration Gordon J. Hindle FSAI & Associates



13386 Marine Drive, White Rock,
British Columbia, Canada V4A 1G2
Tel/Tfx. (604) 535 0592
www.lynx.bc.ca/gordon

ANOTHER YEAR is almost done. This is the second last newsletter of the Millenium!

What shape do you think sport flying will take in the years to come? Last month I pondered the potential impact of the Moller Skycar. Other exciting (or scary, depending on your vantage point) developments are waiting in the wings, so to speak.

This month's Sport Aviation has a little blurb on a personal helicopter powered by 4 tiny 2 stroke engines driving a pair of counter-rotating rotors. No tail rotor is needed. Safety is provided by a ballistic parachute (the rotors are, I assume, too small to autorotate) and the four engines provide a measure of redundancy. It can be landed



safely with two of the four engines operating.

Another development: Michael Mosher, a Silicon Valley entrepreneur has spent the past 3 years and about a million US bucks developing the SoloTrek Exo-Skeleton Flying Vehicle (I think he'll need a PR guy to pare down the name a bit. It's a tad cumbersome). It is a pair of ducted fans mounted side by side, with the pilot strapping in between and slightly forward of the two ducts. As might be expected, NASA and the

US army are interested in the thing. He hopes to be flying in the first quarter of 2000.

As I've said before, all of this is really exciting in the sense of accesability of flight to folks. To everybody. But I have mixed feelings: greatly increased use would mandate increased control by government authorities simply to keep order, and it *would* be needed (as if we didn't have enough already). In spite of my leanings towards new concepts I find myself feeling a little ambivalent. Could there come a day when we would have to be under Big Brother's eye even on our recreational, sheer joy-of-flight sort of outings?

Here's hoping not...