July - August 2007

# RECREATIONAL FLYER

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The Voice of Canadian Amateur Aircraft Builders $6.95


## Jim Dadson's Glastar

RAA
RECREATIONAL AIRCRAFT ASSOCIATION
RÉSEAU AÉRONEFS AMATEUR CANADA

# from the president's desk

Gary Wolf

### RAA AGM and Chapter 85 FLY-IN

Three Eastern and two BC RAA directors made their way to Chapter 85's fly-in, where the chapter hosted the 2007 RAA AGM. The members were friendly, the events were well organized and well attended, and we all enjoyed the weekend. The business meeting took place in the Chapter 85 clubhouse at Delta Airpark, and the Western members had direct input into the operations of RAA Canada. We sent out a call for a webmaster, and it looks as if someone from BC might be taking over this position. Early Sunday morning, RAA directors Tom Martin and Wayne Hadath climbed into Tom's F-1 Rocket EVO, and nine flight hours later they were back in Ontario.

The Board of RAA Canada would like to thank Terry Wilshire, Gerard Dyk, and all the other Chapter 85 members for their work in organizing this event. And I would like to thank Terry Elgood for the ride around the bay in his immaculate amateur-registered Tiger Moth.

### RAA Election, Another Acclamation

Yes, the nomination date came and went, and the only people throwing their names into the hat were your current Board members. All acclaimed.

### CADORS Reinstated

A couple of years ago Transport cut off access to the CADORS (Civil Aviation Daily Occurrence Reports) because someone leaked confidential information to the press. RAA Canada lobbied for access to this vital information, and asked that it be made available to all pilots. The CADORS are once again available online, and this time even to the general public. Privately owned aircraft have their idents removed from the reports, and there is a disclaimer that all reports are preliminary and unconfirmed. You may choose the national report, or if you wish to collect stats, you may do a search using a keyword for various fields.

http://www.tc.gc.ca/aviation/applications/cadors/splash.htm

### Confusion about Passenger Carrying in Basic Ultralights

The short answer is NO. It is now legal to add a passenger carrying rating to an UL permit, but this does not mean that the Basic UL airframe is somehow allowed to carry a passenger. We get several calls per month on this item. Basic UL's have no build or design standard, and they are not inspected, so they are not legal for the carriage of passengers. If the holder of a UL permit earns a passenger carrying endorsement, he may fly with a passenger in an AULA, or in an amateur-built, O-M, or certified airplane that meets the UL definition of 1200 gross, and 45 mph max stall speed. However if the plane is registered at 1201 pounds, the holder of an UL permit may not be PIC. Same if it stalls at 46 mph. There is no wiggle room here.

### Light Sport - Success

A lot of Canadians came back from Oshkosh impressed with the number and quality of Light Sport aircraft on offer. Cessna's new plane was released, and sold nearly 600 during the week. This number is now 700 and climbing. The sales success will mean a revolution in flight training in the US. Further, LAMA (Light Aircraft Manufacturers' Association) is doing what I have been requesting of our own LAMAC for years – they are inspecting the manufacturers and the planes in the Light Sport category, and are awarding a LAMA seal of approval to manufacturers who have proven that they meet the standards. This is the way it was supposed to have been done in AULA but neither Transport nor LAMAC took responsibility for confirming conformity with the DS 10141 standard. They both leave this up to the customer.

Once we get the Light Sport category into our regs, the only manufacturers who will be building AULA's will be those who cannot meet the requirements of Light Sport.

RAA has just received a press release from Zenith about their new Patriot Light Sport, a high wing all-metal with a large cabin and lots of luggage space. This plane is powered by the new lightweight Conti-

*continued on page 32*

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Kieth Charest

# features



**Glastar**
**Page 22**




# Delta's Excellent Fly-In


*Ah, the summer.* Sounds of engines, the smell of sweet fresh-mowed grass and the rumble of tires on turf airstrips. Barbeques and airplane talk and gentle breezes and friends. It's a good time to be alive.

Every year, Vancouver's Chapter 85 hosts a fly-in in early July. The event was well attended this year with 53 aircraft flying in, airplane rides in a Tiger Moth, a pancake breakfast with lunch and dinner following. This year the chapter also hosted the RAA's Annual General Meeting.

In the 1990's Delta's future was in doubt. The owners had decided to sell the airpark to the province, who at the time seemed inclined to simply close it. The chapter, led by member Terry Wilshire (and with support from RAA and COPA) pointed out that the Airpark could be operated as a self-sustaining public facility that would benefit the public while not draining the government treasury. Public parks are by nature a drain on a city's finances; tax money must be spent for the upkeep of these important public facilities. When the win-win was suggested, the government listened, and the present agreeable situation was created.

The chapter is in the unique position of being able to manage the airfield as a public park under

**Left: The late Colin Walker's Emeraude was voted Fan Favorite; right, President Gary Wolf gets a ride in Terry Elgood's Tiger Moth.**

the auspices of the Greater Vancouver Regional District, which gives the fly-in a more public feel than otherwise. Hikers on the strip park that borders Delta's southern extremity will drop in for a gander and the occasional coffee and plans are in the works for a multiuse facility that would serve both the pilots using the airfield and non-flyers walking the southern dyke.

### The 2007 AGM

On the July long weekend, Vancouver's Chapter 85 annual fly-in conincided with RAA's national AGM. Gary Wolf flew out by commercial jet to attend with Wayne Hadath, while Tom Martin and his wife flew out in Tom's EVO Rocket. RAA director Dave King drove in from Kelowna to attend but wasn't able to stay for the banquet.

The festivities started off with a meet and greet at Delta Heritage Airpark, home base of the Vancouver Chapter. Saturday afternoon saw folks preparing themselves and the airpark for the fly-in the following day, hanging about and just soaking in all the great aviation ambience; and of course, the Annual General Meeting at the chapter's clubhouse. President Gerard Van Djik introduced Gary, Tom, and Wayne, and the meeting got underway. The meeting was followed by an excellent banquet attended by 35 hungry aviators at the Delta Town and Country Inn. Gary, Tom and Wayne all addressed the attendees; Tom and Wayne flew out togther in Tom's EVO the morning of the fly-in.

### The Fly-In

The next day saw the fly-in. the weather was excellent, A number of awards were handed out, including Ben & Erin Peach (for flying a Cessna 172 won for the longest flight into Delta) and Sean Walker with his immaculate Emeraude (built by his dad Colin Walker) was nominated Fan Favourite. Amongst the attending aircraft were also a Fleet Canuck, Citabria, Porterfield, Pober Pixie, two Glasair TD's (John Grindon's TD had a feature this author had never seen before: a "taxi-cam" simply a small camera mounted under the spinner and connected to a video feed in the cockpit. No more S-turns!) , a number of RV's, a Fairchild 24C8E and two Scirocco's. Amongst the locals was Bruce Prior's excellent Cessna 190. In all, 53 airplanes flew in for the day.

*continued on page 28-29*


# ROTORWAY'S "NEW" 162F

by Ken Armstrong

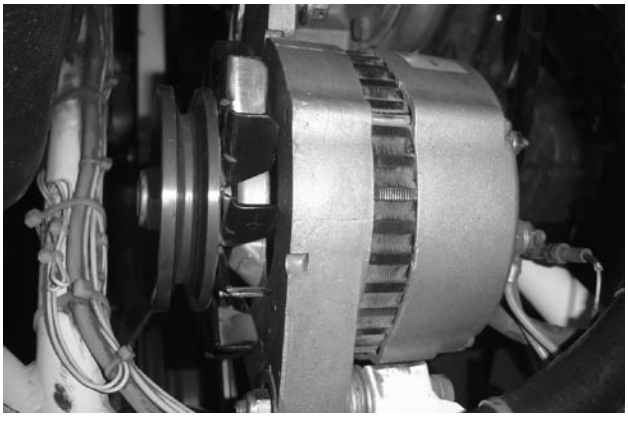
**So, what's new about the 162F – after all, the FADEC equipped helicopter first appeared in 1994? Actually, RotorWay has constantly enhanced the reliability, durability and functionality of this popular freedom machine and there are dozens of refinements that vastly improve the original version. You haven't heard much from RotorWay because they have been exceedingly busy filling orders with more than 2000 kits shipped since the introduction of the Exec 90 and 162F series.**

The new instrument panel and offset anti-torque pedals.

These helicopters are so popular that a number of after-market companies have started supplying their own version of product enhancements. Some of these "improvements" have created problems on the RotorWay machines and this necessitated further enhancements by RotorWay. For instance there have been builder problems with correctly lining up the secondary drive shaft system during initial construction and RotorWay advises that an after-market belt drive system with its associated clutch tension can load the shaft beyond its previous design tolerances. RotorWay solved this by creating a beefier 35 mm secondary drive shaft to replace the 30 mm version and now include an uppper secondary shaft mount bearing that can better accommodate mis-alignment and side loads. In my opinion, this self-aligning bearing is likely the most significant advance as the drive was considered to be the weakest link in this helicopter series and the stronger, self-aligning drive will likely result in increased sales. Moreover, the main drive belt clutch arm is longer and stronger in the pulley mounting area to avoid breakage that was caused by after-market "backside" idlers.

The 37 amp alternator has been superceded with a 51 amp system to meet builders' needs for increased electrical power for their avionics and other accessories. Similarly, the cyclic grip has been enhanced to a selection of switch systems for: starter, transmit button, channel selector, lights or other builder desired equipment.

The anti-torque pedals have been off-set to better align with pilot physiology and building/maintenance efforts reduced with a main drive pulley grease tool and digital protractor included with the kit. A grease point for the main shaft slider ball is now installed on the main shaft assembly and cotter pins are used for the chain master link in the drive system. The oil sump now comes with a "quick drain," for easy changes and the ignition sensor is more easily accessed thereby halving maintenance time. A new

**Right, top: New Secondary Drive temperature guage. Left: 51 amp alternator to handle lots of electrics.**

seal on the front of the oil bath allows alignment/adjustment of the main shaft during maintenance and an upper cover provides and inner lip to prevent leaks.

Fuel and oil lines are Teflon greatly extending their life cycle to 2000 hours and the fuel tank bottom fittings are now one piece making construction easier and providing a better seal. Previously excess fuel flow not required for combustion was returned to the left tank and this could have lead to a lateral weight imbalance. Dual lines now feed left and right tanks equally.

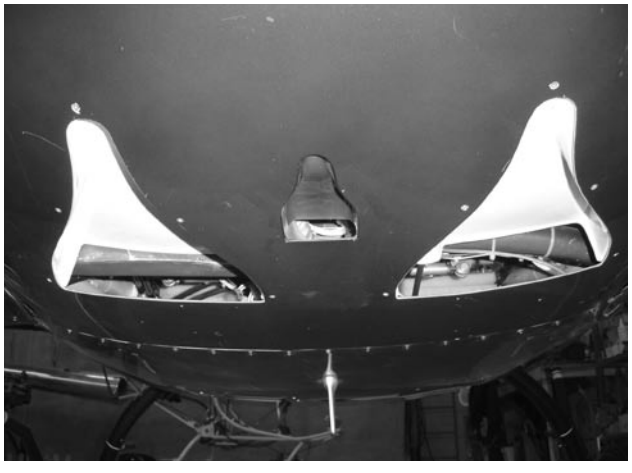
Reliability and system protection have been improved with several "instrumental" changes. A cockpit temperature gauge now monitors the secondary drive bearing, the oil pressure gauge is electronic and the dual tachometer is now digital and self calibrating with an optional alarm system that can provide both aural and light alarms for rotor speed alerts – a major safety improvement. The panel has been revamped to allow the flight instruments to be more visible – more quickly.

Belly NACA scoops provide increased airflow for the oil and engine coolant systems. It's noteworthy that RotorWay's training base at Stellar Airport near Phoenix conducts flying operations throughout the year – often in very hot weather with high density altitudes. The fleet is equipped with the above noted enhancements and has operated trouble free for more than 5000 hours with each bird logging approximately 600 hours annually.

The two mods that increase undercarriage strength, namely 30% thicker skids and higher temperature heat treatment of the rear landing gear have a secondary benefit of providing more cushion for hard landing and crash landing. This increases survivability of not only the helicopter but also the occupants.

The optional supercharging system (ACIS) has provided stalwart service for operators flying above 4000 feet as it provides sea level power up to very high altitudes as it "normalizes" the engine output. However, it should be noted some pilots are installing the system for low level operations and this is imprudent as it adds ten pounds of weight and greater complexity while providing no benefit. Moreover, some operators are removing/modifying the ACIS controls and overboosting their engines to obtain more power. Once again, like many after-market products, this is unwise as it stresses the engine and other components – often beyond their design limits. This will not only shorten the life of the engine but will also result in less dependable reliability and could easily lead to an accident. Over the decades of monitoring RotorWay's evolution and flying each new model in the series I have seen the wisdom in staying with their products and following their instructions for operation. Mind you, the after market suppliers have done their part in keeping the RotorWay R&D department working diligently to consistently hone the product and ofter enhancements when new technology becomes available. The beauty of

New multi function cyclic grip, instrument panel and offset pedals. Below, Gear is much stronger with new modifications.



**Top: improved clutch pulley system;**
**Below, the improved, efficient NACA cooling ducts**

## RotorWay RW 162F(enhanced)

| | |
|---|---|
| **ENGINE** | **RotorWay's RI 162F** |
| **KIT PRICE** | **$67,850** |
| **EMPTY WEIGHT** | **975 pounds** |
| **GROSS WEIGHT** | **1500 pounds** |
| **MAXIMUM CABIN WEIGHT** | **425 pounds** |
| **CRUISE SPEED** | **95 mph** |
| **TOP SPEED** | **115 mph** |
| **FUEL CAPACITY** | **17 gallons** |
| **FUEL FLOW** | **7-8 gph** |

*Specifications and performance data are provided by RotorWay.*

these advances is that most are retrofittable to older models allowing current owners to enjoy the benefits of RotorWay's efforts.

An improvement not mentioned on the data sheets is the evolution of the company management. The employees now own RotorWay and my assessment is that the operation is more efficient and customer oriented now than it has ever been in the three decades I have been monitoring its efforts.

### Proof in the Pudding

Since my full flight reports have appeared in previous Kitplanes issues, I will limit my comments to data relating to the improvements. My opportunity to confirm these improvements came with a test/evaluation flight with company chief pilot, John O'Neil. After a detailed walkaround inspection and tilting down the tail and turning the rotors to pre-lubricate the chain drive, we climbed in. First major mod. That bigger door opening is a blessing as I used to often bump my head climbing in for the crop spraying operations I conducted years ago with an Exec. The ledge on the edge of the seats has been eliminated and this makes them wider to accommodate increased girth….and the new instrument panel allows me to see everything clearly.

Start up is straightforward and I marvel once again as we go through the FADEC tests at this advanced electronics that accomplishes so much for data indication, enhanced safety, reliability and trouble shooting. Although I haven't flown a RW 162F in many years, she is easy to hover and with 380 pounds of pilots and nearly full fuel we hover with 27 inches of manifold pressure on this 52 degree winter day. Although there is 29" MP available, we are able to nudge through translational lift on this windless departure with hover power.

We conduct the standard chopper procedures and I find the control sensitivity and response to my taste and the throttle correlation is as good as any piston helicopter I have flown – excellent. Normally, my steeds are turbine helicopters and there are significant challenges hopping between the different piston machines for evaluations. However, the RotorWay makes it all relatively easy.

During our prolonged hovering operations and in-flight activities, the oil temperature doesn't get above 195 degrees F (230 limit) and the secondary drive never above 135 F. I'm told on a hot day it might get up to 150 F….(200 is the limit). Cruising serenely over the desert back to Stellar Airpark at 90 mph TAS with power set at 23" I muse the RotorWay has once again raised the bar in the homebuilt helicopter marketplace.

# Les Faucheurs de Marguerites 2007

par/by Serge Ballard
RAA 5591


LE TREIZIÈME RENDEZ-VOUS aérien annuel des Faucheurs de Marguerites qui s'est déroulé à Sherbrooke les 30 juin et 1 juillet derniers n'aura laissé personne indifférent et ce malgré la mauvaise météo locale. Le site a été installé par une vingtaine de nos bénévoles le vendredi en après-midi sous un soleil radieux et une température idéale. Déjà on pouvait croire à un succès inégalé en se basant sur les prédictions météo. Le soir venu les premiers arrivants aériens installaient leur campement sous l'aile de leur avion. Ils provenaient surtout du Québec, de l'Ontario et de la Nouvelle-Écosse, mais nous avions également l'honneur de recevoir un pilote Américain. Nos premiers campeurs terrestres quant à eux étaient confortablement installés avant même que le site ne l'eut été. Quelques commerçants sont arrivés en fin de journée le vendredi, mais la plupart se sont pointés chez-nous très tôt le samedi matin. (photo#1)

Les festivités ont débuté le 30 juin au matin, par une arrivée massive d'aviateurs venus profiter du déjeuner gratuit offert à tous les pilotes ayant atterri leur aéronef avant 10 heures du matin. La météo promise par les météorologues pour ce samedi n'avait rien à voir avec la triste réalité. Il faisait froid, c'était venteux et le ciel était obscurci avec des averses locales parsemées ici et là sur un rayon de près de 40 milles de l'aéroport de Sherbrooke. Vers 10 heures, 42 pilotes avaient profité de ce déjeuner et plusieurs autres vagues d'aéronefs sont parvenues à destination au cours des heures suivantes. En tout, près de 96 aéronefs comptant à leur bord plus de 163 personnes sont arrivées en ce samedi par la voie du ciel. Le public aussi était au rendez-vous à compter de 9 :00 heure du matin. Ceux qui sont arrivés tôt n'ont pas été déçus. Nombre d'entre eux en ont profité pour se payer un tour d'avion au dessus de notre belle région. Merci aux pilotes expérimentés et courtois de Paquin Aviation.

Le salon commercial faisait salle comble. Parmi les commerçants, notons la visite de Guy Deschènes, le représentant Canadien de Pipistrel qui nous a fait l'honneur de son moto-planeur Sinus. (photo #2) Jean-François Blanchette, représentant de Puma Aircraft et de Allegro nous a présenté son Puma. Pierre-Yves Girouard était aussi confortablement installé dans le grand hangar commercial avec son appareil de marque Flightstar. Luc Prémont de Dream Aircraft est venu nous présenter le premier Tundra Tricycle construit par le constructeur amateur Robert Blais. L'équipe de Air Création est venue nous présenter son véhicule récréatif de configuration pendulaire. Kitplane Builder, représentant de Aircraft Spruce & Speciality Canada a eu un succès remarquable avec son kiosque

| Catégorie<br>Category | Nom du propriétaire<br>Owner's name | Provenance<br>From | Marque- Modèle<br>Make-Model | Enregistrement<br>Registration |
|---|---|---|---|---|
| Trophée Lucien Beaulieu | Paul Poulin | St-Victor, Qc | Pietenpol Aircamper | C-GZHT |
| Marguerite #1 Plan | Paul Poulin | St-Victor, Qc | Pietenpol Aircamper | C-GZHT |
| Marguerite #2 Plan | Armand Laroche | Sherbrooke, Qc | Sportsman 2+2 | C-FUCP |
| Marguerite #3 Plan | René et Yves Lemelin | Sherbrooke, Qc | KR-2 | C-GIQA |
| Marguerite #1 Kit ex-aequo | Allister d'Entremont | West Pubnico, NS | PA-18 Amphibie | C-GSAL |
| Marguerite #1 Kit ex-aequo | Ron Béliveau | West Pubnico, NS | PA-18 Amphibie | C-GBSS |
| Marguerite #2 Kit | Robert Blais | Granby, Qc | Tundra Tricycle | C-FINX |
| Marguerite #3 Kit | François Marquis | Beloeil,Qc | Christen Eagle | C-FTIJ |
| Marguerite Contemporain | David Murray | St-Lazarre, Qc | Piper PA-24 Comanche | C-FLND |
| Marguerite Classique | Roger Lacroix | Mascouche, Qc | C-172 | C-FMMI |
| Marguerite Ultra-léger | Claude Clément | Louiseville,Qc | Saphir-II | C-IHER |
| Marguerite Professionnel | Guy Deschènes | Shefford, Qc | Pipistrel Sinus | C-FMOW |

2


3

de pièces. De nombreux amateurs sont repartis avec leur nouveau catalogue. Aero Technique était sur place pour vendre des pièces également. Notons également la présence de : l'équipe d'entretient moteur Aéro Atelier, CASAIR, Plein Vol, Vortex, Tel Air et ses systèmes d'avioniques et de communication satellite Iridium, PRD produits de nettoyage et de protection, Broderie CMC qui nous faisait des broderies sur casquettes sur mesure et sur place. Les représentants des principales associations étaient du nombre. Notons au passage les associations: RAAC, COPA, APBQ, le CAES, Serabec, Les cadets de l'air et la Fondation Aérovision Québec. L'Université de Sherbrooke était du nombre avec une équipe d'étudiants en ingénierie qui a pour projet de concevoir et fabriquer un avion en composite portant le nom l'Épervier. Monsieur Barceloux, artistes peintre axé aviation est venu présenter ses œuvres récentes. Monsieur Pierre Lalime, de La Collection d'Avion, a exposé 9 maquettes d'avions en bois. Il en a fait don aux Faucheurs de Marguerites et celles-ci ont toutes été remises lors de tirages organisés parmi le public visiteur et les bénévoles. Un événement particulièrement apprécié par nos visiteurs a sans contredit été le simulateur de construction amateur d'un bimoteur Beech Baron conçu et réalisé par Luc Sévigny. Les gens du public avaient droit à une séance d'entrainement particulière à bord du simulateur pour une durée d'une quinzaine de minutes. Les dons recueillis par monsieur Sévigny ont été remis à la Fondation des petits déjeuners. (photo #3)

Le début d'après-midi aura été marqué par l'arrivée inattendue d'un magnifique Pietenpol Aircamper. (photo #4) Ce dernier est une réplique exacte du prototype original, ce qui en fait un avion unique.



D'autres Pietenpol ont bien sûr été construits au cours des années, mais pas dans cette version. C'est monsieur Pierre Poulin de St-Victor qui en est le propriétaire constructeur, il est devenu la personne la plus convoitée de tout l'après-midi. Parmi les autres tourneurs de têtes de cet après-midi nuageux, notons la présence de François Marquis avec son Christen Eagle ainsi que Michel Laroche avec son Cozy. (photo #5)

Plusieurs séminaires se sont déroulés au cours de la journée. Parmi les sujets présentés, il y a eu : l'histoire d'une construction amateur présenté par Mark Strout; Gilles Boulanger nous a parlé de son nouveau livre intitulé « L'alouette affolée »; Gilles Boulanger et Denis Roy nous ont parlé d'un nouveau concept de fabrication d'avion par la technique de roto-moulage; monsieur Phillipot nous a informé des techniques utilisés pour ajuster le pas des hélices et réparer les hélices abimées; et notre ami et météorologue local, Mario Desmarais, nous a soufflé une infime partie de son savoir.

La soirée de samedi a été agrémentée d'un souper convivial et familial. Au menu des hamburgers à volonté préparés sur le gril par nos bénévoles, bien entourés de croustilles, de crudités, de desserts, de liqueurs, café et boissons de toutes sortes. La soirée dansante qui a suivi a été un succès sans précédent à ce jour. Il fallait voir les gens danser sur les chansons de notre chanteur animateur Jim. Jamais auparavant on a vu et jamais plus on ne reverra une danse aussi endiablée que celle de la locomotive qui a emporté sur son passage nombre de pilotes que l'on croyait incapables de danser. Cette soirée aura accueilli une soixantaine de personnes énergiques, dont certains venus de Nouvelle-Écosse. (photo #6)

Deux appareils sont arrivés de nuit après avoir contourné de nombreux systèmes nuageux sur leur itinéraire. Dimanche, on a observé un premier avion prendre son envol dès 6 :00 heure du matin à l'aéroport de Sherbrooke pour une randonnée locale. À 6 :30 heure on apercevait les premiers arrivants. Il faisait 9°C et le point de rosée était situé à 8°C. Pas besoin de vous dire que le système de dégivrage du carburateur était d'une certaine utilité à cette heure. Trente et un avions, donc 31 déjeuners offerts gratuitement aux pilotes, ont été enregistrés avant 10 :00 heure dimanche matin. Les mauvaises conditions météo qui s'annonçaient ont fait en sorte que plusieurs pilotes campeurs sont repartis en matinée. Au total, plus de 242 personnes sont arrivées par les voies aériennes au cours du week-end, pour un décompte de plus de 138 avions. Au-delà de 1600 personnes du public ont assisté à l'évènement, dont une trentaine de campeurs.

Quelques présentations et ateliers ont eu cours en ce dimanche dont un atelier de Masses et Centrage effectué sur un avion ultra-léger Sky Pup construit par Hamilton Paré et Raymond Roy, des membres du club local CAES.

Bien sûr il ne faut pas garder sous silence le très populaire concours de jugement d'aéronefs. Les prix attribués à ce concours sont convoités par les constructeurs amateurs et restaurateurs d'aéronefs de tout le pays. Pour ce concours, des juges expérimentés scrutent la qualité de construction et de restauration des aéronefs inscrits. Il a su faire sa réputation au fil des ans et c'est avec beaucoup d'enthousiasme que de nombreux constructeurs et pilotes de partout au pays viennent nous présenter leur travail. Plus de 40 aéronefs ont été inscrits au concours cette année. Nos juges ont eu de bien belles surprises encore une fois. Notons pour le lecteur profane, que cette initiative du club local vise à souligner l'effort considérable déployé par des individus pour construire un aéronefs de leurs mains, quelque fois avec des moyens rudimentaires, ou encore pour souligner l'effort déployé par certains pour sauvegarder et conserver des avions certifiés construits en usine dans un état digne de mention en

6


7

leur prodiguant des soins considérables. En ce sens, les avions sont d'abord classés en plusieurs catégories, dont : construction amateur à partir d'un plan, construction amateur à partir d'un kit, construction et restauration d'un avion ultra-léger, restauration d'un aéronef antique, restauration d'un aéronef classique et restauration d'un aéronef contemporain; chacune de ses trois dernières correspondant à une époque bien déterminée par la date de fabrication. On a également ajoutée la catégorie professionnelle au cours des dernières années afin d'encourager les commerçants à présenter leurs petits chefs d'œuvre à notre Rendez-vous aérien. Le Trophée Lucien Beaulieu, l'hommage ultime décerné par Les Faucheurs de Marguerites, est attribué au grand gagnant de la catégorie construction amateur par plan. Trois médailles Marguerites, en quelque sorte les médailles d'or, d'argent et de bronze, sont attribuées aux gagnants dans les catégories Plan et Kit. Les autres catégories comptent chacune un seul gagnant. La remise des prix s'est effectuée vers 12 :00 dimanche le 1 juillet sous le regard attentif de nombreux pilotes et constructeurs. Les résultats vous sont dévoilés dans le tableau suivant. Notre grand gagnant du Trophée Lucien Beaulieu cette année n'est nul autre que le propriétaire, constructeur et pilote du Pietenpol, Paul Poulin de St-Victor au Québec. Notez également que nous avons eu la surprise inattendue de juger des appareils jumeaux dans la catégorie de construction amateur par kit. Ils ont tous deux été construits par deux amis résidants de Nouvelle Écosse. Ceux-ci se sont classés ex-aequo pour la Marguerite #1 de la catégorie kit et se sont tous deux vus décernés une Médaille. (photo #7)

Aucun accident ou incident important n'est venu assombrir, outre les nuages, ce week-end. Les vrais passionnés étaient au rendez-vous. Que des sourires sur tous les visages et les yeux émerveillés des jeunes enfants et des plus grands devant ces engins de rêve. Le bilan est donc encore une fois très positif. Notre contrôleur aérien retraité de service, Serge Grenier, ne s'est pas ennuyé. Un nombre de mouvements impressionnant a été enregistré au cours du rendez-vous. Nos félicitations et un grand merci vont à Serge et à toute l'équipe de bénévoles mandaté à la sécurité au sol; c'est grâce à eux que les pilotes qui s'amènent aux Faucheurs durant ce week-end se sentent bienvenus et en sécurité dans notre périmètre d'action, malgré le nombre élevé de mouvements concourants. Il n'aura suffit que de 2 petites heures à nos bénévoles pour démanteler le site et remettre le terrain de l'aéroport dans l'état souhaité. L'expérience acquise au cours des années rend nos bénévoles de plus en plus efficace. Merci à tous. (photo #8)

En résumé, de bien belles surprises provenant du ciel canadien et un rendez-vous incontestable du grand public, a su réchauffer l'enthousiasme de tous les aviateurs et bénévoles participants qui a quelque peu été malmené par les caprices de la météo. C'est à un autre Rendez-vous aérien Les Faucheurs de Marguerites 2008 que nous vous convions tous. (photo #9)

*Note aux pilotes: Nous aimerions toutefois souligner le comportement cabotin de certains pilotes à l'égard des règles en vigueur lors d'un rassemblement aérien de ce type. Il y a eu au fil des ans quelques pilotes avides d'en mettre plein la vue au public, ou à leurs copains, qui sont devenus provisoirement les auteurs d'un spectacle improvisé. Notre événement n'est pas un spectacle aérien et pour conserver son statut et notre privilège de vous accueillir à ce Rendez-vous aérien annuel, il est impératif que tous les pilotes apportent le plus grand respect aux règlements aériens en vigueur pour de tels rassemblements, il en va de notre survie. Certains des comportements observés con-*


*stituent un affront direct aux organisateurs et bénévoles qui se vouent corps et âmes pour établir la sécurité sur le site et qui mènent un combat continu pour la survie des Rendez-vous aériens au Canada.*

**Les Faucheurs de Marguerites 2007 Fly-In**

This year's edition of Les Faucheurs de Marguerites du Québec annual Fly-In was held at the Sherbrooke Airport on June 30th and July 1st. Once again it was a very successful, despite of the bad weather. It all started very nicely on a sunny Friday afternoon when the 20 volunteers installed the site very efficiently. Friday night was announcing an unforgettable week-end with pilots arriving from Nova-Scotia, Ontario, United States and Québec Province far regions. Those brave men were prepared to camp under the wing. A few more enthousiasts arrived with their tent to settle themselves at the campground. Most of the commercial boots were installed early Saturday morning. (photo#1)

Activities started early on Saturday morning when massive arrival waves of pilots were heading to Sherbrooke Airport for a free breakfast. The warm and sunny weather forecasted by the weather stations never showed up. It was cold, windy and pilots were reporting a cloudy sky with local rain in a 40 milles radius. At 10 in the morning, 42 breakfast coupon were given to the early pilots. Newcoming aircrafts kept landing at the airport until late Saturday. At the end of the day, 96 aircrafts containing more than 163 pilots-passengers made their way to the Fly-In. General public was also responding very positively with about a 1000 attendies on Saturday. Many of those came early to get a ride inthe over the Sherbrooke area. Thanks to Paquin Aviation wll-bred and experimented pilots.

The commercial event was very popular with hundreds of enthousiats asking questions and buying products at their targetted kiosks. Among those merchants there was: Guy Deschènes, the Canadian representative for the European Pipistrel aviation company who came with his Sinus moto-glider (photo#2); Jean-François Blanchette, representing Puma Aircraft and Allegro Aircraft in Canada who came with a Puma this year; Pierre-Yves Girouard was confortably installed in the big hangar with a Flightstar aircraft; Luc Prémont of Dream Aircraft flew to Shebrooke with the first customer built tricycle plane; Air Creation team was showing their latest trike vehicle; KitPlane Builder of Missisauga Ontario who were representing Aircraft Spruce & Speciality had a kiosk with parts and catalogs that made the joy of many enthousiast builders; Aero Technique had a kiosk and parts too; Aéro Atelier of Lac à La Tortue did not miss this year's event; CASAIR, Plein Vol, Vortex, Tel Air, Produits RD, Broderie CMC were also very busy all week-end. National and regional aviation organization were also well represented: RAAC, COPA, APBQ, CAES, Serabec, air cadets and Aerovision Fundation of Québec. University of Sherbrooke was represented by the team of engineering students who are developping the Épervier all composite single seat aircraft. Painting Artist Barceloux was presenting his latest collection; Pierre Lalime of La Collection d'Avion had provided 9 wooden aircraft scupltures to Les Faucheurs, those were drawn among the public and the volunteers. One of the most appreciated kiosk this year was certainly the homemade Beech Baron simulator designed and built by Luc Sévigny. The simulator was running all week-end, providing 15 minutes training session to the attendees. Donations were collected for Les Petits Déjeuners Fundation. (photo#3).

Early Saturday afternoon was marked by the arrival of a magnificient head turning Pietenpol Aircamper. (photo#4) This aircraft is the only know reproduction of the original Pietenpol prototype. For sure there are many Pietenpol flying but they are all based on other iterations. The pilot owner builder is Pierre Poulin from St-Victor, Québec Province. Pierre has been the most popular pilot of the day with the many enthousiasts keeping asking questions to him all afternoon. Among the other pilots with a head turning aircraft, we should mention François Marquis with his Christen Eagle and Michel Laroche with his Cozy. (photo#5)

Several seminars and workshop were presented during the day, among the subjects there was: A amateur Built Story by Mark Strout; Gilles Boulanger spoke about his newly published book "L'Alouette affolée", a best seller with a original writing style; Gilles Boulanger and Denis Roy presented a roto-moulding conceptual approach for building plastic aircrafts, André Phillipot presented a seminar on propeller repairs and pitch adjustments; and Mario Desmarais reveal a little of his knowledge on weather forecasting.

Saturday night activities started around 18:00 pm


with a "all you can eat" hamburgers on the broil banquet prepared by the volunteers. Vegetables, chips, desserts, cofee, soft drinks and other alcoholic drinks were served generously. The dancing evening started at around 20:00 with Jim, the signer- animator, giving us a real good show. Never before have we seen such a successful happening with regional pilots, who we taught would never ever dance, be part of the devil's locomotive dance with fellow pilots coming from Nova Scotia and Ontario. Maybe they were scared that their wives had more fun with our visitors! This was realy something to remember. (photo#6)

Two planes arrived at night after rounding many cloud systems. On Sunday morning, we observed an aircraft taking off at 6:00 am for a local flight. At 6:30, the first newcommers were arriving. Temperature was 9°C and the Dew Point was 8°C. I don't need to specify that the Carb heat was a nice feature of a airplane on that morning. Trirty one aircrafts made their arrival to the Fly-In before 10:00 on Sunday, meaning 31 free breakfasts for those pilots. Bad weather coming was such that most campers decided to go for a early flight back home. In total, 242 persons came to attend the Fly-In in more than 138 aircrafts that week-end. We welcomed more than 1600 from the general public, including approximately 30 at the campground.

We had a few seminars on that day as well. The Weight & Balance Seminar presented by Serge Ballard was truly appreciated. A Sky-Pup homebuilt owned and built by Hamilton Paré and Raymond Roy, members from the Club de l'Aéronef Expérimental de Sherbrooke was used to show the how and why.

For sure we cannot leave without a word the Construction and Restoration Contest. Honours and Prizes for this Contest are coveted by builders all over Canada. That is why year after year we see more and more Homebuilders coming from Eastern and Western Provinces of Canada. This year was no exception and we are very proud of that. The contest is a local initiative started thirteen years ago by the homebuilders who decided to honour a fellow-members who patiently scratchbuilt their airplanes. The honour was named after Lucien Bealieu who was a pioneer in homebuilding in Sherbrooke area. More honours were given to the builders and the restorers when we saw emergence of the kit planes and ultra-lights. A medal was designed by Gilles Boulanger give the winner a proof of that recognition by their fellow. We nowdays distribute the Daisy Medals in multiple categories: Homebuilding from Plans (scratchbuilt), 3 medals and Trophée Lucien Beaulieu to the Grand Champion; Homebuilding from a Kit, 3 medals; Ultra-Light, 1 medal, Antique Restoration, 1 medal; Classic Restoration, 1 medal; Contemporary Restoration, 1 medal; and Professionnal Builder, 1 medal. This year more than 40 aircrafts were registered for the contest. Our judges enjoyed seeing surprisingly high workmanship, they even had the chance to judge twins this year. Winners of the Contest were honoured during a ceremony in the big hangar at 12:00 on Sunday. This year Grand Champion of the Lucien Beaulieu Trophye is Paul Poulin from St-Victor, Qc. for the incredible workmanship on his scrathbuilt Pietenpol Aircamper. In the kit plane category, honours go ex-aequo to Allister d'Entremont and Ron Béliveau for their PA-18 amphibian replicas. The two friends are from West Pubnico, Nova-Scotia. More details are given in the table below. Congratulation to all winners. (photo#7)

No accident or severe incidents were reported during the Fly-in. Despite the weather, the enthousiats were numerous and happy to gather together. Smiles on the happy faces and kids big round eyes when seeing all these beauties were de-facto during all event. Our conlusion is positive once again. Our special event retired Air Controller, Serge Grenier, was never out of work during the Fly-In. He reported an impressive number of movement in the area. Serge is

*continued on page 33*


THIS IS ANOTHER CHAPTER in a story that has been reported in previous editions of Recreational Flyer. The story is about Mark Pfister and his Baby Ace project. At this point one must ask, "Why Baby Ace?". Really, there are two answers. One is that his mentor Dick eaves of Nexus fame started with a Baby Ace and the other is that the building of this plane includes wood-working, metal working and welding, and finally, fabric covering.

Mark started his Baby Ace when he was fourteen by building the ribs. From there he went on to the spar, and then the assembly of the entire wings.

At this point Mark's project took a twist different from that of most builders. Mark belongs to an engineering family and his father has a factory with much automated machinery. This gave Mark a big advantage but also some real obligations. Number one was to learn the computer drafting program "Solid Works" and redraw the entire Baby Ace plans. As an aside, Mark became proficient enough in Solid Works to give grandson Keaton lesson number one. The program allowed Mark to print the fuselage plans full size on a long sheet of paper that he could glue to the building table. At this stage it was back to old-fashioned cut and fit the tubing and tack and then tig weld. The skills practiced at this stage where another reason for the project being a Baby Ace.

As is the case with "rag and tube" aircraft the basic fuselage has a multitude of small steel tabs to be welded onto its tubing for wooded formers to be bolted to give the plane its lines when the fabric is attached. With the plans committed to CAD Mark was able to take advantage of the "family" factory and cut out these tabs from flat stock with water jet. Even though they were created with the highest possible technology, attaching them was back to good old acetylene welding. Building up the cub type undercarriage, the rudder pedals, control column and all those pieces that don't seem to figure large in the plans took just plane time and effort in the old fashioned way.

The A-65 engine came out of one of those trade deals that really escapes description but what does go into the middle of the story is Mark's obtaining his private pilot's license at age 16. Fabric covering the Baby Ace using the Poly Fiber process was one of the other skills developed because of the selection of the Baby Ace. But here again Mark did enjoy a facility because as would have it, the family mechanical establishment has a paint shop. And it's bright red.

Where does one take a new amateur-built after the 25 hours are flown off? To Oshkosh, of course. Carl and his father took the southern route across Lake Erie to clear US customs at Sandusky, then west south of Chicago and then north. Mark reported that for each leg, if he took off in the Baby Ace with his father behind him in his Jungemann, the Jungmann would land first with Mark behind. The trip was worth it. Mark's baby Ace received the Bronze Lindy trophy for plans-built Champion..

Mark has now finished first year engineering at UWO and one doesn't know where the story goes from here. One knows, however, that at nineteen there are other thoughts besides airplanes and it is very doubtful if the next project has only one seat. RAA

# Across Canada

*RAA Chapters in Action*


### KW-RAA

KW-RAA held its first fly-in of the season at the farm strip of John and Kathy Kunz, near New Hamburg Ontario. A dozen planes flew in and some fifty members and guests enjoyed the BBQ meal cooked by Chef Don Sinclair. The weather cooperated and many brought their children and grandchildren along for the day. John showed the progress he has been making on his Dragonfly project. The new panel is installed, plumbed and wired, and the wheelpants have been widened for the 600-6 wheels that he needs for grass operations.

The next KW-RAA chapter fly-in is July 21st at the MacPat Rotac headquarters near Arthur Ontario.

The Ottawa-Rideau Chapter of RAA held their 2007 summer flyin on June10th. The weather cooperated with blue skies and light winds. We had 24 planes fly in and 12 vintage automobiles drive in. The aircraft were from eastern Ontario and western Quebec. The largest plane was Michael Potter's de Havilland Beaver. The smallest aircraft and largest group were the Challengers. We had four Challengers attend. We served hamburgers and hot dogs until 2:00 and the last aircraft left at 3:00 pm. The aircraft that flew the furthest arrived from Kingston. the second Sunday in June is a popular day for fly ins in eastern Ontario.

There are breakfasts in Cobden and St. Lazare and a competing BBQ lunch at Pendleton for the first time this year.

### Midland Fly-In

On Saturday morning, July 21st the winds were light and the sun was bright, a perfect day for a fly in.

With lots of help from chapter members we got set up early and were open for business by 9:am. The first plane was overhead at 8:30 am and came

*continued on page 30*

## Homebuilding Icon C.R. "Gogi" Goguillot Passes On

**Chapter 85 mourns the passing of Charles "Gogi" Goguillot, one of the charter members of the Chapter, and among the elite of BC homebuilders. He built a number of aircraft including a Smith Termite and the Turbi that remains the club's actively flown aircraft.**

**With Dan McGowan and Tony Swain he developed and sold plans for an SE-5 replica; the one built by Dan, also of Chapter 85, is airworthy and occupies a place of honour at Langley airport's Museum of Flight. He also managed the Museum of Flight , worked with the Airplane Supply Company in Richmond and Demel Aircraft when it was in Langley. He was a past president of EAAC (later RAAC) and was a gifted editorialist who excelled at exposing the foibles of government when it came to defending the rights we enjoy as pilots. He worked for years as the editor of the Chapter's newsletter, the Turn and Bank.**

**We'll miss you, Gogi.**

*In 1995 Aircraft Spruce and Specialty held a scratch built light aircraft design competition. The end result of this competition has become one of Canada's best kept aviation secrets, the Acrolite 1B designed by Ron Wilson of Murillo, ON.*

**Text and Photos by Doug McDonald**

# Acro

The Acrolite is a single seat, ultralight class biplane. It has a gross weight of 800 lbs and stalls power off at 45 miles per hour. Ron's original intent was to make a single place high performance ultralight that could perform as well as a single place Pitts but at a fraction of the price tag and complexity. Ron admits that the Acrolite 1B is not quite up to the wild performance of a 200 hp Pitts. It is, however quite capable of performing sportsman level aerobatics when appropriately registered as an Amateur Built. He estimates the Acrolite 1C model with its shorter wing and a 100hp Rotax 912S would be very close the original Pitts performance concept.

The Acrolite 1B is available as a plans only project. As part of the Aircraft Spruce design competition, Aircraft Spruce maintains exclusive marketing to the Acrolite 1B. Aircraft Spruce not only sells the plans for the Acrolite 1B, they also have a complete materials package broken down into kits that can be purchased individually or as a full materials package. Ron directly markets the plans for his other designs. They are a two place tandem high wing monoplane, the 2M, a slightly higher performance version of the biplane, the 1C, and a Tri-plane version, the 1T. Ron also is working on a single place high wing monoplane that will be called the 1M. As part of the plans and manual package, Ron says these designs also come with a materials breakdown to help with parts sourcing.

Ron originally became interested in aircraft design during the ultralight boom in the early 1980s. At Airventure Oshkosh he picked up a set of plans for a Hovey Deltabird. Ron soon decided he was not happy with the design and figured he could do better. He started talking to experienced builders and designers and reading several books on aircraft design. The result of this work was the Acrolite 1A. It is a basic single seat true ultralight biplane powered by a Rotax 447. The plane still exists today has stood up quite well over the years.

Satisfied with his initial design project, Ron decided to try his hand at designing a two place monoplane. This eventually became the Acrolite 2M. At the time, the Advanced Ultralight standards allowed for plans built AULAs and Ron contends that the 2M was the first true AULA in Canada. Unfortunately the AULA regulations changed and plans building was no longer acceptable. While the 2M is a good-flying, stable aircraft, Ron does not recommend it for training use due to its tandem seating and limited back seat space.

As the mid 1990's approached, Ron decided to re-visit the Biplane idea. He began work on the Acrolite 1B. The 1B is a far more conventional looking design than the 1A. Part way through the design process, Aircraft Spruce announced they were sponsoring a Scratch Built light aircraft design contest. Ron submitted his plans for the Acrolite 1B and was selected as one of three finalists out of over one


# Life


hundred submissions at Airventure 1995. The three finalists were given one year to complete construction of their designs and were to bring their planes to Airventure 1996 for a fly off to decide the final winner. Of the three finalists, Ron and his co-builders Peter Eisenbach, Vern Ennis, and Harold Spithoff were the only ones to complete construction of a prototype within the time limit. Even the year after that, at Airventure 1997, Ron and friends were the only design competition team to appear at Airventure with a completed aircraft. This time they really showed up the competition by bringing two completed Acrolite 1Bs to the show.

For the design of the Acrolite 1B, again Ron turned to the original DS 10141 as the basis for the design. Capable of +6 -4 g loading at gross weight and capable of flying a complete standard circuit with either no aileron input or no rudder input. Ron says, while it has to be the right day, it is possible to fly the 1B around the circuit using either only the ailerons or only the rudder for directional control.

The Acrolite 1B has a couple of innovative features. First, a major expense and complexity of most biplane designs is the wing bracing wires. The wires are a specialty item that are made by very few manufactures in the world and therefore have limited availability and typically are quite expensive. To get around this issue, Ron has designed the Acrolite to use a single aluminum streamlined strut to support the upper wing. The internal wing design is loosely based on a Cessna 180 wing to provide torsional and anti drag support from a single strut. The second innovation is that plans include directions for either a fabric covered plywood wing or a fully aluminum wing. This allows builders to select the material they are most comfortable working with. The two different wing designs are quite comparable with the aluminum wing being slightly lighter if 0.020 skins as indicated in the plans rather than all 0.025 skins.

The Acrolite 1B is designed to use the Rotax 912UL 80 hp engine. The prototype has flown using a Rotax 618 two stroke engine and Ron and crew have experimented with a 582 Rotax as well. Ron also believes a 503 Rotax would work to power the Acrolite 1B but it would not have great climb performance. Other engines that Ron thinks would work but are untested are the Jabiru 85 hp and the HKS 60 hp. Unfortunately, the small Continental and Lycoming engines would be too heavy as would the Corvair and Subaru auto conversions.

As part of the design testing, the wings and tail were statically tested to the design limit of +6 and -4 Gs with ballast. There was no sign of deformation at these loads. Also the wings and tail were tested at 75%to 125% of limit with asymmetrical loads. The flight tests were performed to the AULA standards that were current in the mid 1990s.

The construction of the Acrolite 1B is quite conventional. It is a fabric covered 4130 chromoly tube airframe with a spring aluminum conventional style (tail dragger) landing gear. The wing can be of either fabric covered plywood or cherrymax pulled rivet aluminum construction. The cowling is fiberglass. The upper wing is supported by streamlined aluminum struts with adjustable rod ends at the upper end and cabane struts in the centre. The lower wing is supported by vertical streamline "I" struts. All four wing panels have ailerons and the uppers are operated through slave struts from the lower wings.

The plans for the Acrolite 1B are large twenty four by thirty eight inch sheets. They are laid out using decimal inch units. To help the builder with jig layout, measurements are taken from edge to edge on tubing and not from the center point. Both the wood and the aluminum wingribs are laid out in full scale but there is a measurement chart to verify the scale. Most of the fittings are also laid out in full scale for easy replication. The assembly manual is written in plain language but is not intended to teach how to assemble aircraft. While a beginner builder would be able to build this aircraft from the plans, it is intended for someone with some experience in amateur building. An Acrolite would not be a quick build at an estimated 2000 hours to complete by an experienced builder. Aircraft Spruce estimated the airframe could be assembled for approximately $10,000.00 USD plus the cost of the engine and instruments.

Since this is a single seat high performance

**Left: two other Ron Wilson Designs: top, the 2M, and the 1T triplane. Although Aircraft Spruce retains exclusive rights to the Acrolite, Ron markets plans for these two designs and a higher performance version of the Acrolite, the 1C, directly.**

ultralight, I did not get the opportunity to fly it. I did sit in the cockpit on the ground and found it tight but comfortable. All of the controls were located in their normal locations with a standard stick and rudder configuration. These planes are taildraggers and therefore the visibility at taxi attitude was slightly limited over the nose. I only had to tilt my head a few degrees to either side to see around the nose. Slight "S" turns would likely provide excellent visibility during taxiing. Ron explained that there is very little issue with the weight and balance. The Acrolite has a fairly wide C of G range due to the stagger of the wings. There is not a specific maximum pilot weight for these planes but rather pilot size would be limited by the Empty Weight and fuel load. According to the manual a typical empty weight would be in the 500 to 550 lb range with a Rotax 912 engine and the Gross Weight is 800 lbs.

Ron took the Acrolite 1B up to let me get some photos of it in action. Due to turbulence conditions on a hot sunny day, Ron limited his demonstration to a few circuits with some low passes for photos. The plane appears to handle very well. He says the controls are harmonious with similar sensitivity in pitch and roll. The landing characteristics were good. Ron only demonstrated a three point landing but says wheel landings are no problem either. Ron recommends a thorough taildragger checkout before flying an Acrolite biplane. Flight experience in a Cub, Champ, or Citabria would be similar to the Acrolite. The Acrolite 1B has a stall speed of 45 mph power off and 39 mph power on. Landing speed is listed at 50 mph. The maximum level flight speed is listed at 130 mph and the VNE is 150 mph. Cruise at 5000 RPM is 110 mph so some cross country flying is possible but the range is listed at 250 miles on 9 gallons of fuel so many fuel stops would have to be scheduled. So far Ron and friends have put about 600 hours on the original prototype Acrolite 1B. In this time there have been no major issues beyond the routine maintenance and inspections and some minor repairs due to a few rough landings by inexperienced pilots. As far as support for airworthiness issues or service bulletins, Ron keeps track of the owners and will notify them if any issues come up. To this point there have been none.

Currently there are about thirty sets of plans in circulation and several aircraft under construction but only the examples built by Ron and his friends have flown. If anyone purchases a set of plans through Aircraft Spruce, they need to contact Ron to be sure he has been given current contact information. For more information on any of the Acrolite line of aircraft check out www.acrolite.org. To order information packages or plans for the Acrolite 1B contact Aircraft Spruce and Specialty at www.aircraftspruce.com.

*Ron Wilson's*
## ACROLITE

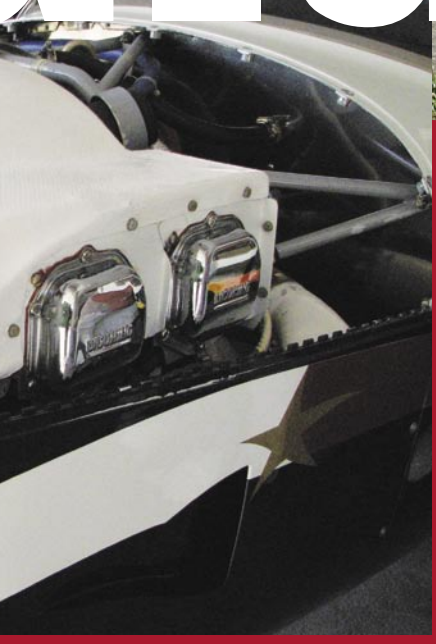
| | |
|---|---|
| Power Off Stall: | 45 mph |
| Power on Stall: | 39 mph |
| Landing Speed | 50 mph |
| Maneuvering Speed: | 85 mph |
| Maximum Level Speed | 130 mph |
| Never Exceed Speed: | 150 mph |
| Cruise Speed (5000RPM): | 110 mph |
| Best Rate of Climb: | 900 fpm |
| Range: | 250 sm |
| T/O and Landing distance: | 500 ft |

## I bought my Glastar kit in December of 1999

through the Coghlin brothers, who were the Canadian distributors for Stoddard Hamilton at the time. It was specially priced at $20,000 to celebrate the 20th anniversary of the company. I was fortunate to receive almost everything in the kit before SH closed its doors. In retrospect even with the $1500 of missing items, the Glastar was a bargain. Before deciding on an amateur - built, I had checked out the certified market and was disillusioned at being able to afford only a 30 or 40 year old plane. The internet gave me a lot of information about the various kit planes available and I went through mountains of specs and online brochures. A ride in an RV -6 showed me it was quick and nimble but I wanted something more stable that could also be put on floats. Ric Coghlin gave me a ride in his Glastar demonstrator and I was hooked. The Glastar was solid, quiet and stable, but was also a good performer. It had folding wings, lots of interior space and an astounding payload. There were several nice Glastars in my area, and with the Coghlins to provide support, this plane was the logical choice.

### Jan Dadson's

# Glastar



**by Jan Dadson and Gary Wolf / Photos by Kieth Charest**

The anniversary kit had a few quick build options. The steel cage was already in place, surrounded by the fuselage halves. The wings, motor mount and landing gear are attached to the cage while the fibreglass is there to provide the sleek and slippery shape. The fibreglass is moulded on both sides of a foam core. This provides exceptional strength and helps to make the plane rattle free. The balanced use of cage, fibreglass and aluminum flight surfaces in the Glastar allowed Stoddard Hamilton to design a plane with great utility and performance without excessive weight. A careful builder using an O - 320 can produce a Glastar with an empty weight slightly more than the average Cessna 152. My empty weight was a fair bit more but I loaded my plane with a lot of extras! I mostly stuck to the manuals for safety, and whenever I strayed from the manual I always cleared it with the technical people at New Glasair ( the company that picked up the fallen SH ). One example was moving the seat belt attach points from behind my head to the side. It entailed grinding off the powder coat

Guelph Airpark, and the modified area was treated with a special epoxy paint to match the powder coat protection. The factory now has the seatbelt mounts in the same location.

The quality of the fibreglass parts was excellent, and the exterior had a gel coating for smoothness. I had decided to paint the plane and so, to save weight I sanded most of the gelcoat off the fibreglass. The gelcoat is non structural and is not needed for the

fibreglass to be sound. New Glasair does not have the same gel coating on the Fiberglas parts anymore, as most people desire to paint instead. Many Glastars are not painted and the gelcoat is a good exterior finish that can be polished to a high gloss. For the first three years of the project I did not have a hangar. I started the kit in a 14x28 Coverall tent that had a translucent panel in the roof and I was able to do most of the glass work in the tent. Even in the winter the skylight acted like a greenhouse, and I could work in the tent without extra heat! Glass work is not done all at once, but placed in sequence in the manuals to facilitate the logical building process. I started with bonding control surfaces to hardpoints, glassing in bulkheads and setting the attach points for the rudder and horizontal. The Glastar uses a vinyl ester resin which is less toxic than epoxy resin. For safety I used a double canister mask whenever I was mixing and sanding the glass. I added my own touch to some of the composite work as well. I purchased an after market glass panel, and after fitting it to the plane I removed the bottom and made my own integral throttle, prop, mixture quadrant. I also inset the rudder and strut/gear fairings. The cowl also required a lot of composite work, including an air induction housing and NACA scoops, and fitting the cowl to the spinner and fuselage.

The rudder was completed in the coverall. It was built on a level table and was my first foray at riveting, using the riveting tools I had purchased on the internet. After a bit of practice I had the knack. Along with internet information I enjoyed the advice of the many homebuilders and restorers located at the Guelph Airpark. My early mistakes were easily corrected, and thankfully the rudder was to be painted! The skins were prepunched with alignment holes which allowed me to see the central lines I had drawn on the rib flanges. These were drilled and clecoed to (3/32) silver clecoes. Some of the rivets are universal head, some are dimpled and flush riveted and some were countersunk. I became comfortable enough to manufacture my own bucking bars to fit into difficult or tight spots. Riveting seems ominously difficult at first, but it is a skill that is easily learned.

The wings were going to be a very large task that would begin with fabricating an alignment jig. Since the Coghlins already had a jig and lots of experience, I decided to hand this job over to them. The wings are basically built the same as the rudder. The prepunched alignment holes are drilled up over the rib flange centerlines, and clecoed together while maintaining a strict alignment in the jig. Once done, the parts are dismantled , deburred, corrosion proofed with alumiprep, and protected with a durable coating. I used Mar Hyde as well as zinc chromate. All the aluminum surfaces were corrosion protected. I even poured zinc chromate in the struts and sloshed it around. The surface I decided to polish. Once the parts were prepped they were then re clecoed together and riveted. The jig allows the wing to be built leading edge up. Leading edge skins were attached to the spar, and skin edges butted up to them. The Glastar has a laminar flow wing, and the tight fitting wing skins add to the performance of the wing. The manual calls for some of the rivets to be flush riveted while others are fine to be universal . The ribs are about 2 feet apart with struc-

*The interior and panel received a lot of attention, as my wife Kathy and I are planning to spend a lot of time in this cockpit.*


**Above: Tot Lock magnetic latch is used on the oil inspection door. The magnet retracts the latch -nifty. Nothing protrudes into the airstream**

tural hat shaped sections riveted to the skins between the ribs for extra stiffness. The hat sections required some extra forming to conform to the curve of the wing. This was done using a wooden form and tweaking the edges by hand. The Coghlins fitted the wings in their nose-up jigs, and began drilling and riveting. They handed me back a pair of straight wings with the interiors plumbed and wired, and gas tanks installed.

The wings have fowler flaps which run on machined tracks that I faired for minimal drag. The flaps are huge and have 2 levels of displacement. The left aileron was fitted with an anti-servo tab to assist the ailerons in having the same deployment forces as the pitch control. All the moveable surfaces are mass balanced, and deployment deflections are all within design parameters. The rigging of the plane was done at the Coghlins where we set the incidence and dihedral of the wings, and the struts were drilled using the jig the Glastar builders group lends out. The rigging requires careful work, and the manual explains the procedure well. In general the manual is well written and the exploded drawings make it easy to understand where everything goes.

With regard to my previous sentence, the firewall forward directions in the manual were one page with one sentence. " Install everything forward of the firewall. " I had decided to try to put as much horsepower in as I could, due to dreams of possible float operations. I reasoned that I could also throttle back to go easier on an engine, rather than wring every last ounce of power to get reasonable performance. Mark Elste, who used to work for Leavens, built me an engine that so far works phenomenally well. It is an IO 360 M1BD. It has a 200 hp bottom end and high compression pistons. The injection is Bendix, and at present I am running a single drive dual magneto. I had initial cooling problems after first flight which have been resolved by enlarging the Naca scoop to the oil cooler and enlarging the cowl flap. Oil temps are now 195 or so on Aeroshell mineral oil even in the hot summer weather we've had lately. I had Terry Cleland come out and built a stainless 4 - 2 - 1 exhaust system that is a work of art and performs wonderfully. I cannot say enough about how happy I am with the engine and exhaust. I made a heat muff for cabin heat and it provides enough heat even with our winters. The Aerocompos-

ite propeller is an all carbon fibre propeller with a nickel leading edge. It uses a MacCauley constant speed hub. Initially I had a Hartzell but this prop saved 38 lb right on the nose, and outperformed the Hartzell prop on the same plane up to 9,000 ft. With this prop my firewall forward weight is about the same as an O - 320. Aerocomposites also supplied the glass spinner which fits very well.

The interior and panel received a lot of attention, as my wife Kathy and I are planning to spend a lot of time in this cockpit. We have two Boxer dogs who will travel with us, so the baggage area is carpeted. The next step is to drool proof it. The left side baggage door provides good access, and the 250 lb baggage allowance along with the 7.9" CG range allows all 48 gallons of fuel, my wife and myself, plus the two dogs and a bit of luggage to make a trip. We could make Florida in 8 hours, so we need comfort. The fuselage is relatively quiet inside even though I have not added any sound deadening. I did use a sheet of fibrefax on the aft side of the stainless firewall, but nothing else. With the headphones removed I have had a conversation on my cell phone in the cabin.

The Glastar seats have a fixed bottom on a slight incline and the seat backs slide fore and aft to fixed points to adjust for different sized people. The bases are filled with foam for energy absorption and the cushions are temperform foam. Herman's Upholstery in Kitchener stitched the leather seats and embroidered the Glastar logo on both the seat backs as a finishing touch. The paint job was done by Chris Kaiser, just north of Arthur, who is an antique auto restoration specialist. This is his first plane. He used PPG auto paints, base coat clear coat using only one can each of the green and white but eleven cans of flex additive! The wings and tail are polished thanks to Precision Aircraft Polishes, in Barrie as well as the Nuvite polish company. What can I say...I like shiny!

The IFR-capable panel is filled with the usual six pack, an Apollo radio stack, intercom/entertainment module, a KMD 150 moving map GPS, Vision Microsystem engine monitor and EC 100, as well as a Digitrak single axis autopilot. The autopilot was installed as a safety device, as it will follow a magnetic heading keeping the wings level or will follow a complete flight plan from the GPS making waypoint turns precisely. I am not IFR rated yet but have a night rating on my Private so I have a plane to grow in skill with. This year coming back from Oshkosh I

could have used an VFR OTT rating as the ceiling kept dropping all the way home. I duplicated many panel switches on the stick grip to ease pilot workload, along with the kit-supplied electric trim toggle from Ray Allen. The rudder trim tab is not adjustable but that is not an issue. I rest my feet on the rudder pedals for comfort more than control. It is a very comfortable cross country machine with good ergonomics.

So what does it go like? In a word, awesome! With flaps the plane lifts off the ground within a few hundred feet and it is a chore to get the flaps off before 90 kt as I'm only a couple of hundred feet off the runway at that speed. I have found that I can throttle back to 24 squared for a 100 kt climbout of 1000 fpm. A full throttle climb, especially with wind, is like holding onto a tiger's tail! The best angle climb leaves your stomach in your boots. An easy cruise for the engine seems to be 20 inches manifold at 23-2400 rpm which usually produces 130 - 135 kt and 10 - 11 gph. I have not started leaning this engine with any authority yet and hope to improve it's economy in the future. Full throttle level flight is a place I have rarely gone but I have seen 150+ kt. Control forces are light and even. They increase with speed as expected. A power off stall is an uneventfull mush at 48 kt of about 700 fpm. Letting go of the back pressure usually ends the stall with minimal loss in altitude. The ailerons remain usable all through the stall. Back in the circuit, I try to enter the downwind at 100 kt or less. That takes a bit of planning. I pull power to idle at mid field and put out the first notch of flaps when I reach 90 kt. Add a bit of power ( about 11 or 12 mp ) to maintain altitude and trim for 65 - 70 kt. On base I regulate descent with the throttle, and airspeed with trim. On final I deploy full flaps as needed, prop full fine and slip if needed. Airspeed is still 65 - 70 kt. I try to cross the threshold at 65 kt, round out just over the runway, and pull to idle as the wheels touch. Back pressure on the stick eases the roll out. Initially I braked hard but lately I have tried to be kinder to the plane and just let it slow down with minimal breaking. I rarely require the entire runway.

*So what does it go like? In a word, awesome!*

Besides enjoying the plane itself, I have certainly enjoyed getting to know all my new friends in aviation. Ric Coghlin, Tim Winger ( test pilot ), the Glastar builders group, and many of my friends at the Guelph Airpark who readily gave me a hand. Not to mention Hugh McDevitt, my flight instructor, who started the seed. Building a plane has been instructive, and a whole new level of patience has been learned. I started flying in order to change my lifestyle and get a hobby. It has become more important than a hobby and will hopefully open an entire new chapter in my life. I would also like to thank my friend Russ who helped me keep at it, and my wife Kathy who honestly has not complained but encouraged me. Thank you all.

Now with all that power and prop, can floats be too far in the future?

# Delta Fly-In

**Clockwise, from top: Members Terry Wilshire and Francois Leh on patrol; Judy Brenneman and Carol Foley staff the registration desk; John Grindon's Glasair TD featured a "taxi'cam" (extreme right of panel); proof positive that Tom's EVO made it to Delta.**

*Fly-In and AGM continued from page 5*

Terry Elgood flew a number of people in his immaculate Tiger Moth, including RAA President Gary Wolf.

The food was great, with over 150 breakfasts were served (both healthy low-carb and traditional pancake. Times change...) and a barbequed steak dinner available later in the day. Sun, airplanes, fellowship, great food: it just doesn't get much better.

Antique engines were on display from a local club and Classic cars also made an appearance, including an Edsel and a gorgeous Austin Healey 3000. Kids activities included a bean bag toss with prizes.

The event couldn't have happened without the dedicated efforts of so many volunteers.

Organizers and volunteers as follows:

Terry Wilshire in charge of ground support.

Vern Little, Bruce Prior Francois Leh - Marshalling with a crew of 5 volunteers from Pro IFR flight school (student pilots)

John Macready - car parking

Registration desk - Carol Foley & Judy Brenneman

Breakfast crew - Cooks Jim Brenneman & Rob Prior

Jean Prior - cash

Dee & Pat Lobsinger, Eleanor Spence - Servers

Joan Cox & Mary Swain - Food Support Managers

Lunch Crew - Ron & Lynn Zelschuk, Terry & Merilyn Elgood

Dinner Crew - Gail & Tim Nicholas

Shanara Walker - Water Girl (she made sure all ground crew had water)


**The food was plentiful and excellent. Below, Chapter 85's Druine Turbi was active during the meet.**

**Chapters** *continued from page 17*

from the Edenvale flying club, a Fokker style ultralight.

Soon many more would follow. A Spitfire homebuilt, and many more unique and restored aircraft.

The plane tally for the day was over 50 , all getting some great lunch and discount fuel for the trip home.

Thanks to Midland Airport for their support of our event.

Rides were available to see beautiful scenery in the Midland area. Collingwood Classic Aircraft Foundation was on hand to give rides in their beautiful Tiger Moth. B.P. Flight Training was also busy doing sight seeing rides.

Both were busy all day taking aviation enthusiasts for a tour or our neighborhood.

Midland Model Railroaders were set up with displays for the public to see and the Midland Car Club was on hand with some classics. Many visitors came in to see the many interesting sights and filled the parking lot.

At the end of the day, the event was a success, thanks to the good weather and the help of our chapter members. A special thanks goes to Bill Ritshoffer for his excellent barbequeing and everyone else for keeping things running smoothly.

*Paul Turner*

**Chapter 85 (Vancouver)**

Chapter 85 hosted the RAA's Annual General Meeting on the last day of June. In attendance were President Gary Wolf and Rocket Builders Tom Martin and Wayne Hadath. For more details, see page 4.

*Contributions to our Chapter Activities section are encouraged. Keep your fellow members updated on what is happening across Canada! Send your reports and newsletters to :*

*Recreational Aircraft Association*
*Brampton Airport,*
*RR#1, Caledon ON L7C 2B2*
*Telephone: 905-838-1357 Fax: 905-838-1359*
*Member's Toll Free line: 1-800-387-1028*
*email: raa@zing-net.ca*

# Product Review

**Luggage for Survival**

Flying is a great freedom when soaring over lakes, streams, trees and mountains. Finding a spot to touchdown is mostly a planned decision, however if you need to make an emergency landing you should be confident and prepared.

Preparation should include the compact, sturdy yellow reflective Pelican case which protects the contents of the "Crashkit" emergency preparedness kit developed for pilots by Pilot Supply Canada Ltd. The company believes that this product has all the essentials for first aid, fire, water, sustenance, shelter, tools and signaling help too. There are several kits available from a small, one person kit the "Alpha", to the largest kit the "67"(survival for 6 people for 7 days).

The company also has a "Last Kit Guarantee". Rob Flindall, President of the company stated that, "Should you ever have the opportunity to use one of our kits in a real world aviation situation we will replace it free of charge in exchange for your story."

This product was first introduced at SARSCENE 2006, the National Search and Rescue Secretariat conference. After three days of scrutiny, thousands of qualified police, fire, paramedics and rescue personnel agreed Crashkits are the best aviation survival kits available. Journalists from CTV Ottawa evaluated a number of products at the event and Crashkit was noted as the most innovative new product at the show.

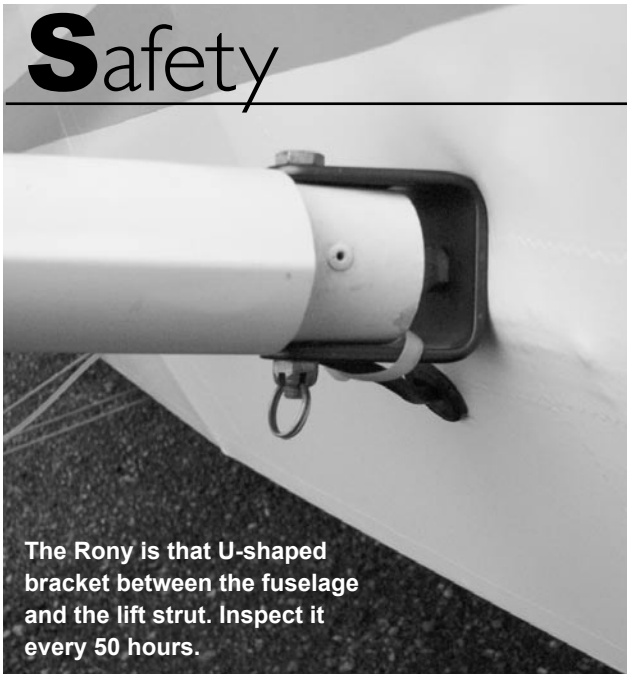
Pilot supply Canada Ltd is the manufacturer of Crashkit brand survival gear. Founded in early 2006, Crashkit has quickly become one of the world's leaders in the manufacture of high quality survival kits ranging from aviation to snowmobile kits. There are currently no other survival kits of this caliber in the marketplace.

**Specifications: Professional Flight Series Model 2– 7**

Dimensions : 10.63' x 9.69'" x 4.88'" (20.9 x 16.6 x 9.0 cm)
Weight : 7.15 lbs
Contents : 180 items covering food, fire, water, shelter, and first aid
Case : Pelican 1200 case - tough, watertight, polycarbonate case
Optional Acc's: Parachute deployment system; Aircraft Mounting Bracket
Warranty : Lifetime
Product Contents: Professional Flight Series Model 2– 7 (two people for seven days)
10 Hour Warmer (2 Pack) 2
12 in 1 Scissors 1
1200 Pelican Case 1
1930 Pelican Flashlight 1
2130 Pelican Flasher 1
2400 Calorie Food Bar 1
Accident Report Book 1
Acetaminophen Tablets (2 Pack) 5
Aluminum Foil 2
Aquatabs Water Purification 40
Bandaids 25
Bandanna 2
Benzalkonium Chloride Wipes 12
Biohazard Bag 1
Burn Free (Small) 4
Chapstick 2
Commando Saw 1
Critical Action Cards 1
Duct Tape (100") 1
Emergency Bag 2
Emergency Blanket 2
Emergency Drinking Water 2
Extra Tinder (6 Pack) 1
Eye Pads 2
First Aid Book 1
Fishing Kit 1
Flagging Tape (20 Feet) 2
Gauze - Triangular Bandage 2
Gauze Pad 3" x 3" 4
Gauze Pad 4" x 4" 5
Gauze Pad Compress 6" 2
Gauze Roll 4" x 5 Yard 2
Hot Chocolate 2
Insect Repellent Wipes 2
Knife Sharpener (Butterfly) 1
Matches (Wind & Waterproof) 2
Medical Grade Gloves (Pair) 1
Medical Instrument Kit 1
Medical Tape 2
Mosquito Head Net 2

*For additional information, Contact: Jeff McDonald, Dayman Andrews, 519 841 3048. Fax 519 837 4492, jeff_a_ mcdonald@rogers.blackberry.net*
**http://www.pilotsupply**
**http://ca crashkit.ca**

# Safety



The Rony is that U-shaped bracket between the fuselage and the lift strut. Inspect it every 50 hours.

### CHALLENGER RONY BRACKET INSPECTION -DO IT NOW!

Recently a US Challenger suffered the breakage of a Rony bracket, the U-shaped bracket that joins the lift strut to the fuselage longeron. This resulted in the loss of a wing. Fortunately for the pilot, he had a BRS chute, and the crash was not a fatal one. However because it was not a fatality, the US NTSB did not investigate, so there is no definitive answer as to the cause of the Rony failure. The Rony failed at the centre hole through which a bolt attaches the bracket to the fuselage longeron. The finger is being pointed at the lift strut bolt having been overtightened, causing the base of the Rony to become more curved. This allowed one of the points of the bolt head to work on the Rony, which presumably caused the crack.

Challenger considers the lift strut bolt to be a pin joint, and if the airplane is one which will have its wings removed often, the bolt is supposed to be done up to finger tight. If the plane is to remain assembled, the bolt may be done up to just snug and no more. No actual torque figure is given, but there will be only two or three threads showing. The nut is of course supposed to be lockwired or otherwise positively retained in either case. The Challenger that suffered the wing failure had six or more threads showing, the Rony had a pronounced curve, and the lift strut had been deformed to oval.

In Canada most of our 400+ Challengers are registered as Advanced Ultralights, so the maintenance schedule is set out by the manufacturer. Because the Challengers get flown more than most AULA's, there are many with over 1000 airframe hours. Challenger requires that every owner inspect his Rony brackets at 50 hour intervals. How to do this is not outlined in the Canadian Challenger manual, so RAA contacted Dave Goulet, the designer and manufacturer of the Challenger. Dave recommended to remove the Rony brackets for a careful inspection with a magnifying glass every 50 hours. He emphasized that any white powder or fretting is enought to justify replacement. This is the factory requirement, so under the rules of AULA, you MUST do this if your plane is to remain legal.

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*President's Message continued from page 2*

nental O-200. The big news is that the fuselage is all curves, a first for the high wing Zeniths.

### Uncertified Inflight Variable Pitch Props

While out in BC I followed up on an occurrence with an amateur-built plane that had been fitted with an uncertified variable pitch prop. This prop had unexpectedly shed a blade shortly after installation on its O-360, the result being a heavily damaged airplane and a loss of nearly $50K. A call to the manufacturer brought forth that there had been no factory testing on an O-360, despite that their website showed it as an application. There were only two of this manufacturer's props in Canada, and at the request of RAA Canada, the manufacturer has agreed to recall all props that have been sold in North America.

In recent years this is the fourth manufacturer of uncertified inflight variable pitch props that has suffered a catastrophic failure, and each time a plane has been wrecked. A certified Hartzell or MT costs only a few thousand more than most of the uncertified variable pitch props on the market. The manufacturers of certified props have undergone rigorous testing. With uncertifieds, the customer is usually the testbed. Ground adjustable props have a reasonable safety record, but the inflight adjustable ones cannot be said to have the same.

### Airspace Changes

On July 5th a 65 nm radius ring of Mode C transponder airspace was put into effect over southern Ontario, but for some reason Nav Canada did not see fit to issue the new VNC and VTA charts at the same time. Calls to Nav Canada elicited the answer that we could all find the change on page 57 of the Designated

*continues*

*Les Faucheurs*
*continued from page 15*

the calm voice that secures the many pilots converging to Sherbrooke airport during the event. He is the one that welcome them first when in the air and he is supported by the Security Team acting on the ground to make this happening a secured one for the pilots and their aircrafts. Thanks to all these volunteers. It took only two hours to the volunteers to dismantle the site after the Fly-In . The experience gained over those past thirteen years reveals a lot of efficiency. Congratulations go to all the volunteers.

We are inviting you all for Les Faucheurs de Marguerites 2008 Fly-In next year.

*Note to the visiting pilots: A Fly-In is not a show and Fly-In organizers are fighting constantly for the right to keep that status for their event in our country. Some specific rules have to be carefully followed by the aviators when attending to such event. They are essentially the ones to be followed on any airport every day. It is imperative that you follow the rules and not start a sudden show to impress friends or the crowd on ground. Doing this is showing disrespect to the organizers and volunteers who deploy large efforts to assure your security in the air and security on the ground. Not accounting for all the liability issues that would follow a drama initiated by such attitude. Think about it twice before showing us a stupid behaviour.* RAA

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*President's Message continued*

Airspace Handbook, a document that most pilots have not even heard of, and which we are not required to own. When we flight plan, charts are what we use for information. Next we look in the current CFS and put business cards in the pages of airstrips along our route. The current CFS does make mention of the new airspace on several airports' pages, but it is entirely possible to plan a route which will have no mention of the new transponder airspace on any of the pages bookmarked.

Having seen how unconcerned Nav Canada was, I called the FSS to see if there was a Notam about the airspace. Nothing was available, and Nav Canada does not think that it is necessary. Nav Canada's higher-ups said that it is Transport Canada's responsibility to issue a Notam, effectively passing the buck. They had done their duty by posting the information on page 57 of the DAH. Calls to the Transport's Ottawa airspace people got the response that Notams are the responsibility of Nav Canada. Transport and Nav Canada are each trying to drop this hot potato into the other's lap. Pilots flying into the province from other parts of Canada or from the US will by definition be using an out of date chart, and when they call FSS for weather and Notams, they will not be told about the new Mode C airspace that blankets much of southern Ontario.

Last week Nav Canada called to say that the Toronto VTA's were now available, and a call to Hammond Aviation confirmed this. The VNC's were to have been released at the end of September but pressuring (badgering?) by RAA moved this up a month. They will now be at the chart dealers at the end of August. There is one small problem though – all the VTA's have now been recalled because of an unspecified mistake, so that chart is back to square one.

The next step is to find out who really is in charge of issuing a Notam. Neither Nav Canada nor Transport Canada appear to want responsibility.

### Sailplane Mode C Exemption

At the June 21st Nav Canada stakeholder's meeting which was attended by two RAA reps, the sailplane people came in for a lot of heat because they do not carry transponders, and they do not usually file flight plans, despite that they sometimes get well above 8000 ft, and conflict with the approaches to Toronto and Hamilton. The position of one glider club is that they have been using this airspace for some forty years, and if the airliners cannot see them, the airlines should pay to have transponders installed in the sailplanes.

A friend of mine flies the corporate jet for a Fortune 500 company and he says that he crosses his fingers every time he is instructed to descend through cloud en route to Toronto. Sailplanes ride the thermals to cloudbase, and they do not ping the TCAS unless they have a Mode C transponder. My pal recently broke out the bottom of a cloud layer and had to do an immediate hard right to avoid wiping out the CEO, himself, and the sailplane pilot. It is a good thing that that the plane was an agile corporate jet. If it had been a 200 seat airliner, it could have been a bad day for everyone.

For some unfathomable reason, the sailplanes still have a CARS exemption from having to carry a transponder when they are in transponder airspace. These aircraft are nearly invisible to radar and to the naked eye, yet they continue to use the Mode C transponder airspace. The rest of us have to buy and maintain a Mode C transponder if we wish to use Mode C airspace, yet these invisible planes do not have to do this. Does any of this make sense to you? RAA

# Technical Stuff

### Longitudinal stability for Canard and Tailless aircraft by Frank Gue

Most of us take for granted the subtle things sport aircraft do automatically, such as recovering from the minor disturbances we encounter in routine flying. Much of this comforting automaticity is built into what is called "static longitudinal stability". As the textbooks say(1), this is the first consideration in aircraft design; all else follows from it. Our recreational airplanes are designed so that they fly level at cruise settings, and will return to that state quickly if disturbed. Note 2.

Explanations of this (3)(6) usually are in terms of conventional layouts with main wing at the front, tail behind, since that's what most of us fly. But many also fly tailless or canard, to which the same aerodynamic rules apply but in which they work out differently. Some of these differences are important to safe flying. The laws that cause the aft surface to "stabilize" us in a normal configuration work against us instead of for us in a canard. A web search will soon find references to the canard surface as a "destabilizer". This article is written to help the incurably curious to understand these tailless/canard differences, and pilots to understand better what their aircraft are doing for (or might do to) them.

### Pitch reactions of a tailless airplane

When a tailless aircraft is pitched up or down by a random gust, the only thing that can oppose the pitching is the wing. It does this using its inherent stability, imparted partly by shape (cross section) , partly by washout (twist), and partly by sweep back. Not all flying wings have all of these features, but any stable wing has one or more. The most important is shape. See Fig 1, which shows the three possible kinds of wing sections: positive, zero, and negative camber. The text(2) says that, for a flying wing, flight is possible only for a wing with negative camber. No practical wing looks like that: but the under surfaces of a flying wing airplane certainly does.

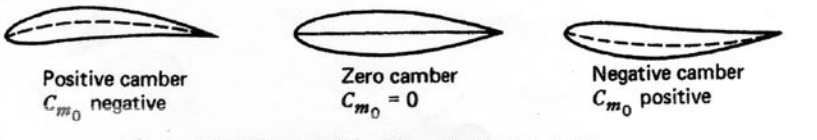


Fig. 1 Unstable, neutrally stable, and self-stable airfoils

Now, the wing lifts by developing a pressure difference between the upper and lower surfaces. The distribution of this pressure along the wing chord is complex, and has been plotted for many shapes using banks of manometer tubes arrayed top and bottom of the airfoils(5), also by mathematical calculation(1). They show that, as angle of attack is increased: (a) For a cambered airfoil with no reflex, such as the Clark Y, the net lift moves forward, while (b) For a reflexed airfoil such as the M6 or the various Fauvel flying wing sailplane sections, it moves back.

*Most of us take for granted the subtle things sport aircraft do automatically, such as recovering from the minor disturbances we encounter in routine flying.*

If you prefer to view this in terms of center of pressure, look at Fig. 2, where the data are from test sections mounted on trunnions in a wind tunnel. Here again, with a flat bottom section the center of pressure (the lift) moves forward with increasing angle of attack, while with the reflexed M6 it moves back.

Yet another view, for those comfortable with moment coefficient principles, is that Cm is very negative for an undercambered section, somewhat negative for a flat bottom section, zero for a streamlined section, and positive for a reflexed section. A flying wing must have a positive Cm.

The significance of this is that the direction of change in the position of the center of pressures is opposite for the two kinds of wings used in conventional and tailless airplanes. Their c.p. curves, Fig. 2 (opposite page), are nearly mirror images of one another. This suggests that these two wings might react oppositely under the same pitch changes, and indeed they do. For the flat-bottom Clark Y, the c.p. moves ahead if the wing pitches up (an unstable reaction); while for the reflexed M6 the c.p. moves aft (a stable reaction). Figs. 3(a) and 3(b) show how seemingly small changes in wing section

can have dramatic effects upon wing performance; and also that, the more camber a section has, the more stabilizing (stabilizer area and tail length) it will need.

What are the practical implications of this?

If the wing section is reflexed (trailing edge sloping upward), entering an updraft will cause the wing to have a higher angle of attack, bringing the aft part of the wing more directly into the airflow. This will move the Center of Pressure aft, causing the wing's lift, operating through the lever arm between it and the c.g., to exert a nose-down leverage, restoring the wing to its trimmed angle. The wing, as they say, has inherent stability. This is how aircraft such as Pete's Plank (a straight, unswept, untwisted wing) can be made to fly.

If you like backyard experiments, you can prove all this. Cut a 4x16 inch wing from 1/16-inch balsa. Soak it and strap it to dry on a paint can to camber it. Glue it, concave side UP, 1/3 of the way back on a 16-inch stick. Glue a 2x4 inch fin, but no elevator, to the tail. Balance at the 1-inch point on the wing chord with clay. Hand glide it. You'll find that, although the glide is horrible, the toy is longitudinally stable: it will not dive or stall. Now remove and glue the wing back on, concave side DOWN. You will find you cannot balance it against a dive or stall. You have proven the textbook statement(1) that only the negatively cambered wing will function as a straight winged tailless aircraft.

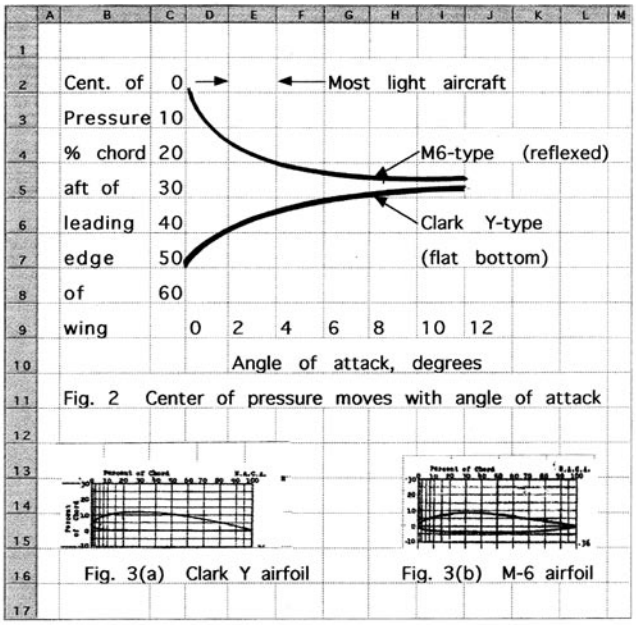



Fig. 2 Center of pressure moves with angle of attack



Fig. 3(a) Clark Y airfoil



Fig. 3(b) M-6 airfoil

Most tailless airplanes also have wing sweep back, which reduces the extreme sensitivity of a "plank" aircraft to movements of the c.g. A plank offers no leeway in c.g. placement, while a swept wing tailless has some, and a conventional layout has a lot.

OK, so a tailless aircraft can be made to be stable: What about a canard?

When an aircraft encounters an updraft, all surfaces acquire a higher angle of attack. If the aircraft has a canard surface, this increased angle of attack will cause the canard surface to develop more lift, which will pitch the nose up still further. This pitch-up, unless opposed, would become rapidly worse. The canard surface is a destabilizer. Remember that! It is a key characteristic of canards.

A canard aircraft, then, is a flying wing that has enough inherent stability to overcome the canard surface's de-stabilizing influence.

Canards must be set up, loaded, and flown such

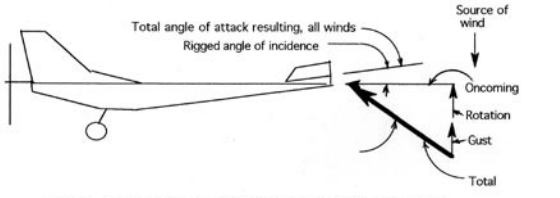



Fig. 4. How relative wind arrives on the canard surface

that neither surface ever stalls. If the canard does, the powerful aft lift of the wing will rotate the aircraft nose-down, which momentarily increases the canard angle of attack yet more, deepening its stall. If both surfaces stall, an irrecoverable mushing deep stall could result, as is well documented in the literature. See Fig. 4 (above), and note how a canard poorly designed, incorrectly built, or loaded with c.g. too far aft, could develop a deep stall. The relative airflow on the canard, normally fore-and-aft, is augmented by both the updraft and the nose-down rotation caused by the stall, leaving the canard surface far beyond its stalling angle, contributing only turbulence and no control at all. There are reports of canards suddenly diving in on final. Some think John Denver's crash was caused by canard-surface stall, although all explanations of that are speculative. Sadly, pilot instincts also are deadly, for hauling back on the stick will merely make the matter worse.

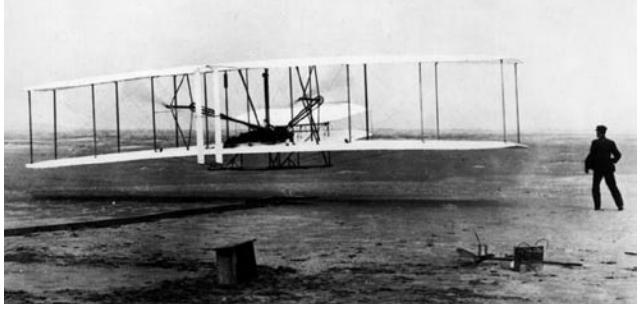
Alternatively, if the wing is also stalled, the aircraft may merely mush, and there won't be enough down travel in the canard to recover normal airflow. In a deep stall, the angles of attack of all surfaces approach 80-85 degrees; no movable surface can travel far enough to enable the pilot to regain control.

Obviously canards are not dangerous, since so many fly safely. But, where it has been possible to find the causes of crashes, there has been some foolish departure from specifications or good airmanship.

Our craft respond to tiny angles of their surfaces, and are very intolerant of bad loading. So hands up, everyone who wants to second-guess Burt Rutan on his canard designs, loading, and piloting. No, I didn't think so.

Then canard builders/owners had best comply closely with all manual instructions and later advisories on such matters as vortilons. Heed the advice such as given emphatically and uncompromisingly in one of the numerous web pages one can find using the search words "canard+deep stall": IF YOU HAVEN'T DONE A WEIGHT AND BALANCE RECENTLY, GROUND YOUR AIRCRAFT AT ONCE UNTIL YOU HAVE DONE IT. AND DON'T DEPEND ON THE BATHROOM SCALES - USE A PROPER BEAM SCALE.

On an historical note, one must be flabbergasted at the instantaneous, real-time, extemporaneous, instructor-less pilot training the Wright Brothers gave themselves while piloting the unstable Flyer. It had single surface, positively cambered wings (the "unflyable" cross-section), a canard (de-stabilzing) control surface, and a c.g. far aft owing to engine location. The Flyer



could hardly have been less stable. They should have killed themselves in a pile of sticks and muslin as Lilienthal and others did. To understand their struggles in those days before any of this was understood, examine Fig. 5 (below), the immortal photograph of that first flight. Wilbur runs by the wingtip, while Orville corrects his erratic mount with an extreme "up" angle of the canard. The rest of us took hours to learn to fly a trainer that would mostly fly itself; they learned to do it in milliseconds in a trainer that couldn't, wouldn't, and didn't. Wow.

What's this, then, about longitudinal stability involving "stalling"?

In regular flying, no surface ever stalls. There are only three reasons for a stall: 1. Deliberate, in a full-stall three-point landing (in a conventional, not a canard, aircraft), or when your flight instructor demonstrated it for you; 2. Deliberate, in aerobatic stunt maneuvers; 3. Unintentional, as in the notorious stall-spin and deep-stall accidents. Canards are particularly intolerant of stalling.

### So what have we learned?

Tailless and canard aircraft are critically dependent upon the shape of the wing cross section (airfoil section) for stability. Tailless and canard aircraft must have wing sections that have negative camber. The conventional layout is stable because of the horizontal stabilizer, while the canard is stable in spite of the canard surface, which is a destabilizer. Weight and balance are more critical than with conventional layouts and canard loading must be attended to religiously. Stability and recovery from disturbances do not require the stalling of any surface, and stalling of a canard surface can be dangerous.

Cheers, and CAVOK to you!

** Technical notes for the incurable engineers among us:*
*1. Perkins, C. and Hage, R., Airplane Performance, Stability, and Control, Wiley, New York, NY, 1949.*
*2. To be stable, the airfoil section chosen for a tailless airplane must have a positive moment coefficient, Cm.*
*3. This applies to longitudinal stability only. Spiral stability is something else. Every airplane wants to turn and some designs, if flown stick-fixed at cruise or full throttle, will spiral-dive fatally, as in the case of JFK Jr.'s crash. This is the subject of other articles.*

*Acknowledgment:*
*I am deeply indebted to Prof. Lloyd Reid, co-author of Ref. 2, for his expert and authoritative critique of the drafts of this paper. While any errors or omissions are mine, Prof. Reid's contributions were enormously helpful.*

*References:*
*1. Perkins, C.D., and Hage, R.E., Airplane Performance, Stability and Control, Wiley, New York, 1949*
*2. Etkin, B. and Reid, L.D., Dynamics of Flight, Wiley, New York, 1996*
*3. Gue, F.S., Aerodynamic Center, Oshkosh, WI, The Experimenter, June-July, 2003*
*4. There are hundreds of references to "canard", "deep stall", "Reflex, such as -*
*http://www.mh-aerotools.de/airfoils/nf_4.htm*
*and http://www.desktopaero.com/appliedaero/configuration/tailless.html*
*5. Ludington, C.T., Smoke Streams - Visualized Airflow, Coward-McCann. New York, NY, 1943.*
*6. Matheny, Dave, The Little Wing at the Back, Oshkosh, WI, Sport Pilot, July, 2005.*

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Here is my new Challenger as I just touched down for the first time at the Thompson Valley Sport Aircraft Club's strip at Knutsford, just south of Kamloops. It took me 16 months to put C-IWIL together. Twenty-seven years after my most recent "pic" flight I flew the initial voyage. The experience of flying an airplane of your own assembly was very satisfying and exhilarating at the same time. It will be a memory I'll cherish.

John McDermott of Lakeland Ultralights at Salmon Arm mentored my work and inspected the final product. John was extremely knowledgeable and patient with all my questions. It would have been a very difficult project without John's assistance.

Ed Lepp (also of Salmon Arm) provided my on-type dual training. He is a great instructor.

The members of Thompson Valley Sport Aircraft Club also provided lots of support. I'm very fortunate to belong to such a fine group.

# RAA Chapters and Meetings Across Canada

*The following is a list of active RAA Chapters. New members and other interested people are encouraged to contact chapter presidents to confirm meetings as places and times may vary.*

*ATLANTIC REGION*

*HAVELOCK NB: Weekly Sunday morning get together year round, all aviation enthusiasts welcome. Havelock Flying Club - 25 mi west of Moncton. Contact Sterling Goddard 506-856-2211 sterling_goddard@hotmail.com*

*QUEBEC REGION*

*COTE NORD (BAIE COMEAU): Meeting times to be advised. Contact Pres. Gabriel Chouinard, 418-296-6180.*

*LES AILES FERMONTOISES (FERMONT): First Sunday 7:30 pm at 24 Iberville, Fermont. Contact Pres. Serge Mihelic, 418-287-3340.*

*MONTREAL (LONGUEUIL): Chapter 415, Meeting in French second Wednesday at 8 pm, at CEGEP Edouard Montpetit 5555 Place de la Savane, St. Hubert, PQ. President Jacques Genest president@raa415.qc.ca (450) 447-9042*

*OUATOUAIS/GATINEAU: Every Saturday 9:00 am to noon at the restaurant l9Aileron in the airport terminal. Contact Ms N.C. Kroft, Gatineau Airport, 819-669-0164.*

*ASSOC DES CONSTRUCTUERS D'AVIONS EXPERIMENTAUX DE QUEBEC (QUEBEC): Third Monday 7:30 pm at Les Ailes Quebecoises, Quebec City Airport. Contact Pres. Ray Fiset, 418-871-3781. rayfiset@qc.aira.com*

*ASSOC AEROSPORTIVE DE RIMOUSKI: First Saturday at 9:00 am, La Cage aux Sports, Rimouski. Contact Pres. Bruno Albert, 418-735-5324.*

*ASSOC DES PILOTES ET CONSTRUCTEURS DU SAGUENAY-LAC ST JEAN: Third Wednesday 7:00 pm at Exact Air, St Honore Airport, CYRC. Contact Marc Tremblay, 418-548-3660*

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*BARRIE/ORILLIA: Fourth Monday 7:30 pm, Lake Simcoe Regional Airport. Contact Treas.Gene Bemus 705-325-7585 gene@encode.com*

*COBDEN: Third Thursday 8:30 pm at Club House, Cobden Airport. Contact Pres. Clare Strutt, 819-647-5651.*

*COLLINGWOOD AND DISTRICT: The Collingwood and District RAA, Chapter 4904, meets the first Thursday of every month, at 7:30 p.m. except July and August, at the Collingwood Airport or at off-site locations as projects dictate. For more information, contact Keith Weston, 705-444-1422 or e-mail at kcweston@sympatico.ca*

*EXETER: Second Monday 7:30 pm at Summers-Sexsmith Airfield, Winters-Exeter Legion. Contact Pres. Ron Helm, ron.helm@sympatico.ca 519 235-2644*

*FLAMBOROUGH: Second Thursday 8:00 pm at Flamborough Airpark. Contact Editor Frank Ball fdnmeball@sympatico.ca 905 822-5371*

*HAMILTON: Second Friday 8:00 pm Months of Feb, April, June, Aug, Oct, Dec, at Hamilton Airport. Contact Pres. Brian Kenney, 905-336-5190*

*KENT FLYING MACHINES: First Tuesday 7:30 pm at various locations. Contact President , Mac Mazurek 519-692-5309 macmaz@mnsi.net*

*KITCHENER-WATERLOO: Meets the third Monday of each month in the upstairs meeting room of the cadet building at CYKF, except during the summer months when we have fly-ins instead. Please contact arankaddd@rogers.com for information, or call 519-885-1155.*

*LONDON-ST. THOMAS: First Tuesday 7:30 pm. At the Air Force Association Building, London Airport. Contact President Angus McKenzie 519-652-2734 angus@lweb.net*

*MIDLAND-HURONIA: First Tuesday 7:30 pm Huronia Airport. Contact Secretary, Ted Aldred 705-526-4909 wings@csolve.net*

*NIAGARA REGION: Second Monday 7:30 pm at Niagara District Airport. Contact Pres. Ken Petterson swedishcowboy29@aol.com http://home.cogeco.ca/~raaniagara/*

*OSHAWA DISTRICT: Last Monday at 7:30 pm at Oshawa Airport, 420 Wing RCAF Assoc. Contact President Chris Gardiner 905-668-5703 cgardn628@rogers.com*

*OWEN SOUND Contact President Roger Foster 519-923-5183 rpfoster@bmts.com*

*OTTAWA/RIDEAU: Kars, Ont. 1st Tuesday. Contact: Secretary, Bill Reed 613-831-8762 bill@ncf.ca*

*SAUGEEN: Third Saturday for breakfast at Hanover Airport. Contact: Ed Melanson 519-665-2161 meled@wightman.ca*

*YQG AMATEUR AVIATION GROUP (WINDSOR): Forth Monday, 7:30 pm Windsor Flying Club, Airport Road, Contact: Kris Browne e_kris_browne@hotmail.com*

*SCARBOROUGH/MARKHAM: Third Thursday 7:30 pm Buttonville Airport, Buttonville Flying Clubhouse. Contact Bob Stobie 416-497-2808 bstobie@pathcom.com*

*TORONTO: First Monday 8 pm at Ch 41 Hangar on north end of Brampton Airport Contact: President, Earl Trimble 905-787-8524 northerntailwind@aol.com*

*TORONTO ROTORCRAFT CLUB: Meets 3rd. Friday except July, August, December and holiday weekends at 7:30 pm Etobicoke Civic Centre, 399 The West Mall (at Burnhamthorpe), Toronto. Contact Jerry Forest, Pres. 416 244-4122 or gyro_jerry@hotmail.com.*

*WIARTON: Bruce Peninsula Chapter #51 breakfast meetings start at 8:30am on the second Saturday of each month in the Gallery of Early CanadianFlight/Roof Top Cafe at Wiarton-Keppel Airport. As there are sometime changes, contact Brian Reis at 519-534-4090 or earlycanflight@symptico.*

*MANITOBA*

*BRANDON: Brandon Chapter RAA meets on the second Monday of each month at the Commonwealth Air Training Plan Museum at 7:30 PM except in the months of July and August. Contact Pres. John Robinson 204-728-1240.*

*WINNIPEG: Winnipeg Area Chapter: Third Thursday, 7:30 PM. Contact Jill Oakes 204-261-1007 raa_wpg_executive@yahoogroups.com*

*SASKATCHEWAN*

*NORTH SASKATCHEWAN: Third Monday 7:30 pm at Westwind, Hangar #3. Contact President Garth Pippin for info at 306-666-4476*

*ALBERTA*

*CALGARY chapter meets every 4th Monday each month with exception of holiday Mondays and July & August. Meetings from 19:00-22:00 are held at the Southern Alberta Institute of Technologies (SAIT) Training Hangar at the Calgary Airport. Join us for builder discussions, site visits, tech. tips, fly out weekends and more. Contact president Calvin Thorne at 403 932-4325 or email: cbthorne@telus.net*

*EDMONTON HOMEBUILT AIRCRAFT ASSOC: First Tuesday 7:30 pm EAHS boardroom. Contact President Bill Boyes 780-485-7088*

*GRANDE PRAIRIE: Third Tuesday, Chandelle Aviation Hangar, contact Jordie Carlson at 780-538-3800 work. or 780-538-3979 evenings. Email: jcarlson@telusplanet.net*

*MEDICINE HAT: Last Thursday of the month 7:30 pm RAAC Club Rooms, Airport. Contact Secretary, Boyne Lewis 403-527-9571 handblewis@thehat.ca*

*BRITISH COLUMBIA*

*ABBOTSFORD: Third Wednesday 7:30 pm Abbotsford Flying Club, Abbotsford Airport. Contact President, John Vlake 604-820-9088 email javlakeca@yahoo.ca*

*DUNCAN: Second Tuesday 7 pm members homes (rotating basis). Contact Pres. Howard Rolston, 250-246-3756.*

*OKANAGAN VALLEY: First Thursday of every month except July and August (no meetings) at the Kelowna Yacht Club. Dinner at 6:00pm, meeting at 7:30pm Contact President, Cameron Bottrill 250-558-5551 moneypit@junction.net*

*QUESNEL: First Monday/Month 7:00 p.m. at Old Terminal Building, CYQZ Airport. Contact President Jerry Van Halderen 250-249-5151 email: jjwvanhalderen@shaw.ca*

*SUNCOAST RAA CHAPTER 580: Second Sunday 13:30 pm Sechelt Airport Clubhouse, sometimes members homes. Contact Pres. Gene Hogan, 604-886-7645*

*CHAPTER 85 RAA (DELTA): First Tuesday 8pm, Delta Heritage Airpark RAA Clubhouse. 4103-104th Street, Delta. Contact President Gerard Van Dijk 604-319-0264, vandijkg@yahoo.ca. Website http://raa85.b4.ca.*

*VANCOUVER ISLAND AVIATION SOCIETY (VICTORIA): Third Monday 7:30 pm Victoria Flying Club Lounge. Contact Pres. Roger Damico, 250-744-7472.*

*THOMPSON VALLEY SPORT AIRCRAFT CLUB: Second Thursday of the month 7:30 pm Knutsford Club, contact President - Dick Suttie Phone 250-374-6136 e-mail - richard_suttie@telus.net*

*ALASKA HIGHWAY: meetings held every third Thursday of every month (except July & August) at the Taylor Fire Hall at 7:30 p.m. For more information call Richard at 782-2421 or Heath at 785-4758.*

*Chapter executives please advise of changes as they occur. For further information regarding chapter activities contact RAA Canada, 13691 McLaughlin Rd, R R 1, Caledon, ON L7C 2B2 Telephone: 905-838-1357 Fax: 905-838-1359 or call toll free: 1-800-387-1028 email: raa@zing-net.ca www.raa.ca*

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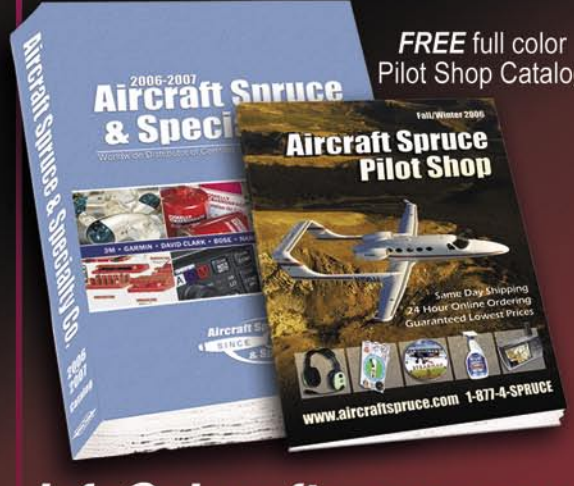


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