



**Don Cavanaugh**

Mike Mussington has discovered a very interesting website [www.jet-man.com/actuel.html](http://www.jet-man.com/actuel.html) showing a Swiss character by the name of Yves Rossy who has developed a set of composite wings with a 3 meter span and having 4 "Jet Cat" model jet engines mounted underneath. The wings fold while he rides aloft in a Pilatus Porter airplane. He jumps out at 5000 meters altitude, deploys the wings, starts the engines, and off he goes - flying in formation with the Porter at speeds of over 200 km./hr. -- looks like Superman with wings - Amazing guy!! - Yves was a pilot of a Mirage III in the Swiss air force, and then

flew as an airbus captain for a number of years. Check it out - definitely worth a look. -- I wonder how he lands?? - does he strap a skateboard to his chest??

So what's happening in the club?

### **Club Meeting Sunday 21 Jan 2007 -- Meeting Fallout**

Location:- Durham College, - 1610 Champlain Ave - Whitby  
Time:- 7:00 p.m.

Twenty five guys turned up for the first meeting of the year -- everybody seemed to be in an exceptionally good mood as the meeting got underway at about 7:10 p.m. with president Don Mitchell starting off by auctioning the "Trash & Treasures" - there were lots of "treasures" - including many magazine bundles and a couple of nice static display models.

### **Treasurer's Report: -**

Treasurer Jeanne Mitchell outlined the clubs present financial position - with receipts taken in from about a dozen members and some minor disbursements for MAAC registration and website expenses. I won't quote the exact numbers here because of the more or less confidential nature of that info -- but suffice it to say that the club finances are currently in good shape and the membership is growing at about the usual rate.

## **New Webmaster - Howard Smith**

President Don Mitchell announced that Howard Smith had assumed the duties of webmaster- replacing Kelly Lawson in that position. Howard explained that Kelly Lawson was finding his work responsibilities had grown to the point that he was really unable to continue the duties of webmaster. So Howard has assumed these responsibilities which are in addition to his present job of webhost (running the website), which in itself is a lot of work. Howard is also the club communications officer - so he will be busy. Don Mitchell recognized this and also expressed the club's gratitude for the good work and service given to the club by Kelly Lawson.

Kelly Lawson assumed the webmaster duties in September of 2004 on the sad death of Keith Kettle, the previous webmaster. Keith's passing left a real hole in the ability of the club to communicate with the membership because people who have the necessary technical skills and the editorial savvy to handle the job are few and far between. Kelly saw our predicament and unselfishly stepped up and took on the job. In doing so he not only rescued the club from a communications disaster, but greatly improved the website in the process. The club is most grateful for this. So a big tip of the hat to Kelly Lawson for the terrific job he's been doing. We trust that he will take as much satisfaction as the club does from his service to us all.

## **Visitors at the meeting:**

There were four visitors at the meeting: - they were

Barry Bowden:- Barry is interested in advanced structural techniques and has had considerable hands-on experience with composite structures made from advanced materials including carbon fibre.

Ken Waugh: Ken has been a frequent visitor to the field and has bought three aircraft kits and some engines on ebay - he's obviously serious about getting started. Dave Parton has been helping him.

Frank Ogiltree: Frank came to the meeting with Howard Smith and also bought a new trainer aircraft with him to gather advice from the club.

Doug Biggs: Doug came alone to the meeting and advised us that he was given a new electric Piper Cub - for Christmas. The Cub has the motor and radio system installed and was looking for help in getting started to learn how to fly his new machine.

### **Club Field Report:**

Don Mitchell said what the field warning signs had been put up as requested by MAAC . Don also said that he had purchased new locks for the gate and impound box, and emphatically requested **all members to always tumble the locks after opening the gate and never leave the lock hanging open on the chain after opening the gate because the locks are quickly stolen by passers-by**. Don further advised all members to lock the gate "lock-to-lock" -- our lock to the CLOCA lock so that CLOCA can have access to the field by opening their lock. If we don't do this and simply lock the chain "lock-to-chain" then CLOCA will have to cut the chain to gain access to the property - thus shortening the chain and resulting in work and expense for the club to replace the chain. Don warned that if we continue to fail to observe the above practice of locking "lock-to-lock" - the club will have to go to CLOCA and give them our lock combination - which obviously compromises security. So it's a simple thing to do right guys - this matter has been raised before in the newsletter - and the problem persists -- so please follow the above procedure.

Note in passing that there will be a new combination for the locks starting this spring.

### **Heydenshore:**

Don Mitchell said that he had been in contact with Heydenshore and had been told that they only have about 25 serviceable tables whereas we need about ten more than that. Don added that if he had known earlier that there was a table shortage, he'd have been reluctant to pay them the retainer to rent the Heydenshore pavilion. However, we are past that, and it may be necessary for the members to find the required 10 additional tables at the time of the sale.

Don also said that at the next meeting the club would be looking for volunteers to help run the event.

### **Pylon Racing:**

Jeanne Mitchell said that she had received orders for 29 pylon racer aircraft. Don Mitchell indicated that this would surface enough money to allow purchase of materials to start building the racers - which he wants to get on with as soon as reasonably possible.

On that subject, - the building of the new pylon racers for got under way on the evening of 25<sup>th</sup> January in Don Cavanaugh's basement with seven guys turning up to lend a hand. It is planned to continue these building sessions at the same location every Thursday evening until the racers are completed. Anybody interested in turning up for these sessions would be more than welcome.

Coffee Break & "Bull Session" providing advice to new modelers present.

Don Mitchell invited the members to have their coffee.

While doing so the three models and other equipment brought to the meeting by some of the newer members were examined by the more experienced members who not only freely gave their opinions, but also offered further assistance down the road. It turned out to be a most effective forum for the newcomers and was a lot of fun for everybody.

Of particular note, was the display of a new hand-built 61cc single cylinder four-stroke "L-head" engine currently nearing completion in the home machine shop of Don Mitchell. The engine was designed by Don himself and is truly a work of art.

The meeting ended about 8:30 p.m.

### **MAAC Heavy Lift Competition**

Check the MAAC website & you'll find that MAAC is sponsoring a heavy lift competition to be held this fall - September 22 & 23, 2007 in Leamington Ontario. The competition is open to the first 30 applicants and the entry fee is \$250.00. Cash prizes of \$3000, \$1500, \$750 and \$375 for first, second and third and fourth place respectively will be awarded.

The aircraft is limited to 1000 sq in wing area (including stab area) and is to be powered by a specified unmodified O.S. 61 engine burning fuel supplied by the contest director (10% nitro I believe). Simply put, you need to take off within a 200 ft distance - fly a 360 degree circuit and land within a specified distance -- all the while carrying a payload contained within a 4" x 4" x 16" cargo bay. The guy who carries the most payload wins. There are bonus points for flying the circuit empty of payload.

The competition looks similar to that run by SAE stateside annually for university students - at which I recall, Canadian universities have done very well. So there is a very interesting and challenging competition to think about - anybody interested??

### **February Club Meeting - 18<sup>th</sup> February 2007**

This meeting is a must guys - Don Mitchell has arranged to have Dave and Ron from Pinnacle Hobbies come and give us all a presentation on electric power - they'll be bringing along some equipment to demonstrate and they'll be able to get you started in the right direction if you're considering electric power and they'll be able to answer any questions you may have on the subject. It's bound to make an interesting evening to learn about this rapidly growing aspect of our hobby.

### **Final Thoughts**

I knew a lady who was so ugly she could clabber buttermilk by just looking in the jar!  
(Garrison Keillor)

## Canadian Aviation History -- Canadair CL-84 "Dynavert"



### Specifications:

Wing Span 33 ft, 4 in (10.16m)  
Max width over propeller tips 34ft, (10.6m)  
Length 53 ft. 7 in. (16.34m)  
Diameter Main Propellers 14 ft. (4.3 m)  
Diameter Tail Propellor 7.1 ft. (2.2 m)  
Weight Empty 9023 lb. (4093 kg)  
Max T/O weight(VTOL) 12600 lb. (5710 kg)  
Max T/O Weight (STOL) 14500 lb. (6580 kg)  
Max Speed 321 mph (518 km/hr.)  
Max Range 420 miles (680 km)  
Power Two Lycoming T53 Model LTC 1500 hp Turboshaft Engines

As early as 1956 NATO issued a specification for an aircraft which would take off vertically, hover, and travel at much higher airspeeds than a helicopter could manage. Soon afterwards Convair in San Diego became interested in developing such an aircraft as did a number of other companies. At the time Convair was owned by General Dynamics and they came up with the idea that their aircraft name should incorporate the word "Dynamics" in one form or another - and since the aircraft was to have vertical takeoff capability - the name "Dynavert" evolved. This moniker was not very popular with the engineering staff at Canadair who were tasked with developing and building the CL-84 since Canadair was also owned by General Dynamics. It is likely that one of the most compelling reasons why Canadair was chosen was because financing for the venture was provided by the Canadian Defense

Research Board and the Department of Defense Production. Also Canadair had on staff, a talented designer and aerodynamicist, Fred Phillips who had been sent to Canadair by Convair and whose capabilities were not particularly challenged by the conversion of the CL-28 Argus (an ongoing project at Canadair at the time) from the Bristol Britannia. At any rate - Fred Phillips was generally considered responsible for the development of the CL-84.

There are two reasons mentioned for the technical success of the CL-84. - the aerodynamic considerations were given a very high priority (hardly surprising) and the control systems were made as simple and direct as possible (also not very surprising).

As you can see from the picture above, the aircraft had a wing which could pivot about a horizontal axis running athwartships through an angle of 100 degrees from a normal wing position to more or less straight up. The tilting mechanism was hydraulically driven. The engines were fixed to the wing so that the machine could fly as a conventional airplane or transition to fly like a helicopter. This transition from hover to normal flight mode required varying degrees of horizontal stabilizer trim angles which were determined from extensive wind tunnel testing. (I can't determine where this testing was done) Also, particularly at hover and transition, additional pitch trim was needed and was provided by counter-rotating propellers spinning about a vertical axis located aft of the empennage. These can be seen in the photo. The transition from hover to horizontal flight at 115 mph took 13 seconds. The main propeller discs were 14 ft in diameter and extended slightly beyond the wingtips so the whole of the wing (except for the portion above the fuselage) was immersed in the propeller slipstream. This together with the full span leading and trailing edge flaps, which were programmed with the wing tilt angle, ensured that the wing never stalled. All of the programming for the wing and empennage surfaces was accomplished by mechanical mixing mechanisms consisting of mechanical levers and cams which gave the pilot the same control movements over the aircraft regardless of whether he was hovering or in level flight.- these systems were designed by Karl Irbitis and were kept as simple as possible to avoid potential problems. The systems performed flawlessly.

The power of both engines was controlled by a single power lever in all flight regimes. During hover, movement of the power lever caused a direct adjustment of the blade angle, analogous to the collective pitch control in a helicopter, while the constant speed unit automatically maintained the selected propeller rpm. When the aircraft transitioned to level flight, this direct adjustment in blade angle faded out automatically.

The only unfamiliar control function the pilot had to deal with was the wing tilt control, which was a switch on the power lever. This simple power control made it easy for fixed wing pilots to perform transitions from hover to forward flight in their first flight in a CL-84.

The CL-84 prototype made it's first flight in hover on May 7 1965, flown by chief test pilot Bill Longhurst. On September 12, 1967, after 305 relatively successful

flights, the aircraft was at 3000 ft when a bearing in the propeller control system failed. Both the pilot and the observer successfully ejected but the prototype was lost. Canadair redesigned it's replacement, - the CL-84-1 incorporating over 150 design improvements including the addition of dual controls, upgraded avionics and an airframe stretch ((5', 3 in. longer) and engine power increased by 100 hp. The CL-84-1 first flew on 19 February 1970 with Longhurst again at the controls. Doug Atkins assumed the role of chief test pilot in January 1971.

The Vietnamese war was at it's height at the time and the U.S. Navy expressed an interest in the aircraft. Adkins took the CL-84-1 on a tour of Washington D.C., Norfolk Virginia, Edwards Air Force Base (California), and then on to full-blown operational trials on the USS Guam. The CL-84-1 performed flawlessly, demonstrating capability and versatility in a wide range of operational roles including troop deployment, radar surveillance, and anti-submarine warfare. The potency of the CL-84-1 as a gun platform was demonstrated dramatically when fitted with a General Electric SUU 11A/A pod housing a six-barrel 7.62 mm "Gatling" mini-gun which delivered 3000 rounds per minute right on the target.

Continuing tripartite trials by Canadian, US (army/marine) and Royal Air Force pilots at the US Navy's Patuxent River Experimental Test Center convinced all of them that the CL-84-1 was a highly effective and capable machine.

Disaster struck on 8 August 1973, when a catastrophic failure of the left propeller gear box caused the entire propeller and gear-box assembly to be torn away in a maximum climb rate test. The US Navy and Marine pilots ejected safely but of course the aircraft was lost. Canadair immediately sent the second CL-84-1 to complete Phase 2 of the trial aboard the USS Guadacanal. In the face of gale force winds, the "84" performed magnificently in tasks such as ferrying troops and blind flying. The ship is shown below during flight trials on the "Guadacanal- it's transitioning from hover to level flight & you can clearly see the flaps and leading edge slats:-



"Phases 3 and 4 of the tests were completed successfully, however, despite rave reviews by the 40 or so pilots that flew it, no production contract was awarded by the U.S. government.

Canadair's main sales effort had been to sell the "84" to Uncle Sam, - so when that didn't work out they conducted a campaign to sell it to other countries - Germany, Holland, Italy, The Scandinavian countries, the United Kingdom, and of course to the Canadian Armed Forces. There was no interest. Sadly, the project was terminated at Canadair in 1974. It is difficult to determine why there was so little interest, however the Vietnamese war was winding down and the helicopter airspeeds had increased considerably, thus marginalizing the advantage of the tilt wing concept. There were many parallel developments in response to the same NATO spec. including the Hiller X-18 and the Bell XV-15 which were similar to the CL-84 and the Hiller-Ryan XC-142A (similar to the "84" but having four engines), none of which ever got past the experimental stage. It appears that the whole tilt-rotor concept did not inspire much trust. Even at the present time, the Bell V-22 Osprey which is conceptually similar to the CL-84 has only now been put into production after being plagued with a multitude of problems including four major crashes. Arguably, however, the CL-84 was the simplest and therefore the best of them all!

The two surviving machines wound up in museums - CX 8402 (pictured above) resides in the Canadian Aviation museum in Ottawa alongside another faded dream of technological greatness in Canada, - the Avro Arrow. CX8403 was never flown and went to the Western Canada Aviation Museum in Winnipeg. It was shipped there in two sections, fuselage and wings and only the fuselage is on display in the main gallery. So next time you're in those neighborhoods, drop in and marvel at a truly great Canadian aircraft which was perhaps a bit ahead of it's time.

*Don Cavanaugh*