Skywriter

Monthly Newsletter of the Calgary Ultralight Flying Club

June 1991

View From Above

by Paul Hemingson

The main program for the May 1991 meeting was a presentation by Rod Stewart of CASARA. Rod was supposed to appear at the April meeting but went missing. So, I sent out an alert and managed to find him in time for the May meeting.

Rod gave us an overview of the purpose, objectives and organizational structure of this Search and Rescue organization. Their civilian volunteers work with the military in a coordinated manner, and have participated in several recent searches for downed aircraft in the Rocky Mountains. Insurance and regulatory requirements currently limit any role by ultralight pilots, but Rod admitted that our machines offer some real advantages in searching low and slow. In the past, myself and other members have participated as decoys during S & R exercises, and we may again. Rod is a 182 pilot and invited us all to the CASARA annual BBQ on June 22 at his homestrip at Priddis. The rumour that they will be cooking up outdated survival rations is pure speculation. Bring a steak and they will supply all the condiments and salads, etc. His phone is 931-2473, and I know he is familiar with procedures at this local strip. Plan accordingly. I expect there will be more than usual activity at the strip. Follow the rules of the air and use your common sense to get in and out safely.

The business portion of the meeting dealt with our participation in the 8th annual Red Deer International Airshow, August 3 & 4. I had earlier contacted the organizers, who are welcoming us again this year to participate in both the Fly-by and Static Programs. This is the highest profile event in which we participate. Gord Keegan will be getting interested members together to jointly decide on a safe and interesting Fly-by program. Those taking part should realize that they are responsible for their own safety, and the safety of all other participants. See Gord's article for more details.

I am also looking for volunteers to be pilot in command of an information booth at the show to hand out brochures, and generally navigate through any questions from the public. Last year's show attracted about 70,000 people, so you're bound to meet some interesting folks. And with the new UL aeroplane policy, I anticipate some REAL pilots bellying up to the booth for more info on the regs. So, if you're willing to help out give me a call.

The new regs are another story. I need your feedback. There are three areas to discuss. These are UL aeroplane standards, UL pilot standards, and UL operating standards. The most controversial issue appears to be UL pilot standards. I would like to compose a letter to TC with constructive input.

For example, here are some questions to consider. What should the PPL-UL training standards contain? To what extent should the training syllabus contain information on getting into controlled airports? UHF Radio Procedure? Minimum requirements for passenger carrying? Navigation? Decision Making? How will endorsements be made? You get the idea. I think the Club is positioned to provide some meaningful input on these issues. Me, and some of the boys on the executive have met to share some ideas and identify areas of concern. Your queries and concerns will be appreciated.

I hope you are all taking advantage of the recent good weather to get in some flying. I got some airtime myself after several weeks of inactivity. For the first half-hour or so, my skills were as green as the newly budding trees. The beauty of flying solo is that only you know your areas of weakness. My time was best spent in doing touch and goes. This exercise really shows up any shortcomings. Anyone can fly an airplane, but only a pilot can safely return it from the ocean of air to the shoreline of earth...fly safe.

Classified

ABC Ballistic Chute - never used, hermetically sealed, excellent - $1000. OBO. Paul Hemingson 931-2363.

Ivo Prop - updated 3-blade, ground adjustable, 60", composite blades. LH tractor or RH pusher, new - $375. Paul Hemingson 931-2363.

Braid - for shielding ignition circuits, $2.00 per foot to CUFC members. Also shielded wire and connectors. Bob Kirkby 569-9541 or 291-5560.

Hiperlight - single place biplane, TTAF 50 hrs, new Rotax 377, new RPM prop, hydrolic brakes, intruments, candy apple red paint, super flyer - $9950.00. Jim Creasser 226-0180.

Classified ads are free to CUFC members. Call Bob Kirkby, 569-9541 to place your ad.

Fly Paper

by Gord Keegan

Shake, Rattle and Roll

We talk frequently about vibration as it relates to our ultralights, both in the training phase and later on when we own an aircraft. We are well versed in the use of nylock nuts, castle nuts, cotter pins, lock wire, etc. in an attempt to thwart the insidious nature of vibration and it's effect on the various metals used in our planes. Let me tell you about a couple of examples, both found by an observant friend, Bernie Kespe, while helping me with annual inspection.

The greatest potential for damage from vibration exists when materials of different hardness co-exist in close proximity to each other. I have a fiberglass fairing on my Beaver, which rests on the aluminum support tubes of the nosewheel. Upon very close inspection, we found that the fiberglass had eaten half way through the aluminum support tubes. The rough edge of the hole through the fairing was acting exactly as a hack saw relative to the aluminum tubing. In the second instance, the steel ring which attaches the cable for my ballistic chute to the front spar had worn through its plastic coating and had eaten 1/4 of the way through the inboard compression strut. The aluminum tubing was no match for the hard steel of the ring.

It is important to note that the damage was only found upon very close inspection and after disassembly for annual inspection. Please take a close look at your aircraft and examine any points where dissimilar metals make even the slightest contact. The frequency and severity of vibration generated by our Rotax engines is legendary and we must do whatever we can to protect the airframe, instruments, fabric, etc. from the effects.

As Paul mentioned in his column, last meeting was our first opportunity to discuss our participation in the Red Deer Airshow 1991. Last year was our first year of participation and it was a big success, resulting in a return engagement this year. The plan is to fly to Red Deer, preferably on the Friday evening, with a brief stopover in Olds-Didsbury for refueling, creature comforts, brain de-scrambling, etc. Accommodation and transportation are provided by the airshow committee for the pilots. Then up early Saturday morning for pre-flight briefing and showtime around mid-morning. We are looking for a few good men, a few good airplanes and lots of support from all club members to make this as memorable an experience as it was last year. Since the display will consist largely of close formation flying, regular practice sessions are mandatory and will begin soon. If you are interested in flying at the show, please call me at 238-0177 immediately. I will give you more details when you call.

Keep the dirty side down!

CARES BBQ

Plan to attend the CARES BBQ on June 22 at the Priddis-Chemcor strip (the old Smith Engineering strip). Bring your own beef, everything else is supplied!

CALGARY ULTRALIGHT FLYING CLUB

EXECUTIVE

President
Paul Hemingson 931-2363

Vice-President
Gord Keegan 238-0177

Treasurer
Gord Tebbutt 288-0545

Secretary
Bernie Kespe 255-7419

Director
Jim Creasser 226-0180

Skywriter Editor
Bob Kirkby 569-9541

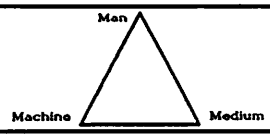
Skywriter is the official publication of the Calgary Ultralight Flying Club and is published 12 times per year. Opinions expressed by our writers are not necessarily those of the club. Articles and letters to the editor are very welcome from any readers. Address correspondence to: Bob Kirkby, RR 7, Calgary, AB T2P 2G7

Meetings of the Calgary Ultralight Flying Club are held the first Wednesday of every month at 7:30pm at

R.C.A.F. Association
110 - 7220 Fisher Street S.E.
Calgary, Alberta

Safety Corner

by Paul Hemingson



BIGGER BIRDS BEST BEHAVE!!!

Your don't see big birds taking off from fenceposts, or landing three-point on powerlines, or skinny branches. It's not because their toes can't curl around the wires. Neither do they flit about in short radius turns, or demonstrate STOL traits. We have all seen the cheeky lightweight sparrow darting in and out to harass the slow moving crow. There must be a reason for their different behaviour. The same principles apply when we turn our light birds into heavy birds. What is the effect of packing extra weight in your ultralight?

All aircraft labour with extra weight. Ultralights are more sensitive to extra weight than most aircraft. A safe pilot needs to know the symptoms of these labour pains and the prognosis. Adding 200 pounds to your 300+ pound UL machine has a much bigger effect than adding the same weight to a 1600 pound machine.

In this article, I explore some of the effects of weight and the implications on performance. These are things you need to know, whether moving up to a heavier machine, or adding weight to your current machine. In this day of gadgets and widgets, its easy to bolt on accessories that add up. The weight may also take the form of extra gear, extra gas, or...an extra passenger in the future. From take-off to touchdown, a pilot needs to consider weight. Even the Big Iron boys estimate the weight of their Heavies. They must do it for a reason.

Most pilots are aware of the importance of the Center of Gravity and the implications of loading an aircraft too far ahead...or behind the C of G. If the load is outside of the known envelope for balance, the elevator does not have enough power/deflection to trim the aircraft to level flight. This would be disconcerting to discover after one has broken ground. Preflight weight and balance calculations may save you the trouble of doing longer and more intricate replacement cost calculations, postflight. But even if you're within the C of G, stuff can happen when you're packing extra weight. I guess birds don't have elevators or rudders, since they can't load themselves outside of the C of G envelope.

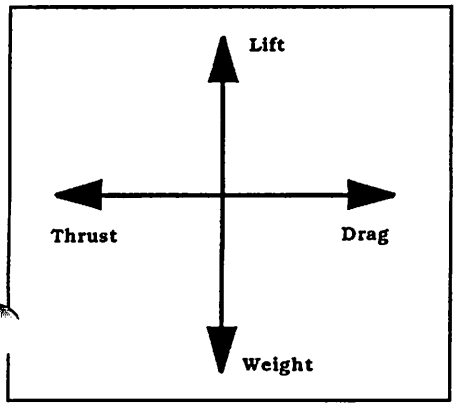


Figure 1.

Back to basics. Remember the old lift-weight-thrust-drag diagram from pilot theory 101 (Figure 1).

This simple diagram contains the roots of aviation wisdom that is easily dismissed once we have written our theory test. Consider for the moment that we add 200 pounds..ie. increase the downward pointing arrow by 200 pounds. Now lets consider the effect of how this 200 pounds is accommodated from take-off to touchdown. Obviously, lift has to be increased by 200 pounds in order for the airplane to leave the runway.

Airplanes are smart. They easily sense this extra weight and act accordingly. The airplane expresses its eagerness to fly in two ways. One is to meet the air at higher velocity and the second way is for the wings to attack the onrushing air at a greater angle...up to a certain angle. Big birds always attempt to take-off into wind to minimize the ground roll.

So in order to leave the ground, the airplane needs to reach higher speed on the takeoff roll. The higher speed eats up runway in the process, and the first observation you will make is "Hmmmmm.....I am really moving...usually I take off at a lower speed". The conclusion to draw is that packing extra weight uses up more runway and requires a higher speed before pulling it off. I usually figure on adding 10 mph to the takeoff speed and doubling the length of the take-off roll.

Now, you're airborne. The most immediate observation will be that your rate of climb seems anemic. It should be. The Law of Gravity is working just fine, exactly as it should. You don't get something for nothing.

(continued on page 4)

(Safety - continued from page 3)

Getting that extra weight to your cruise altitude requires energy. Big birds instinctively use thermals and mechanical lift that we mortals have difficulty sensing.

Back to the four forces of flight diagram. You're motor-prop combination puts out a fixed amount of thrust at a given power setting. In order to climb, the lift (upward) component must be greater than the weight (downward) component. To get extra lift, there are only to options.....increased speed or increased angle of attack. Since your already at maximum take-off power you cannot increase speed. Like all inclined planes the angle of incidence is fixed. With the increased weight you are inclined to climb at a higher angle of attack. This increases drag and with a fixed amount of thrust, there just isn't as much extra energy left over for the lift component. With less vigorous lift, the rate of climb decreases. The end result is that it takes longer to get to cruise altitude. You can figure on a climb rate that is half it's usual value when you're flying your Ultralight Lite. Plan accordingly.

Now you're in cruise. Levelling off, and reducing power to your usual setting, the aircraft attitude seems different. It should. Back to the vector diagram. In level flight the lift component exactly equals the weight component, by definition. Otherwise, you will be climbing or descending.

Airplanes are smart. To sustain the extra weight at the cruise altitude, the airplane must fly at a higher angle of attack. In doing so, you will get a lower cruise speed since, as argued previously, more energy is going into lift and also lost to drag. If the airplane feels as though it is wallowing as if in slow flight....it is! The extra weight will give you a slower cruise. You can increase the power setting for a more normal attitude and crisper control response, but expect to burn more fuel...so your range is correspondingly reduced with a given amount of fuel! Lindbergh and the Spirit of St. Louis were essentially a flying gastank, and he got lots of slowflight practice in the hours of his flight. He knew that to get the range for a Trans-Atlantic flight he needed to fly at the most efficient speed.

If you were to try some stalls now, you would find that stall speed is higher due to the extra weight. Think about it. Referring to the four forces diagram, it is apparent that when an airplane stalls, the lift is no longer sustained and the airplane begins to sink. The sinking motion, along with the attitude change induced by the pilot combine to create an excessive angle of attack that results in a situation where the airflow separates from the wing. An airplane is smart and wants to fly. It expresses its eagerness to fly by dropping its nose to regain the lift. The stall will come earlier when you are heavier. Big birds appear to ride updrafts to the edge of a stall. They then dive, converting altitude to airspeed and then cash in the airspeed for altitude when they sense an updraft. Our soaring senses are not as good and besides we like to hold our altitude.

Turns will also feel heavier when you're loaded up. Refer back to the force diagram and the forces on an aircraft in curving flight, and it will become apparent. It will be easier to think this through now, rather than later when the situation manifests itself. Rather than explain it now, I leave it to your intellectual curiosity to figure out why.

If you feel uncomfortable with the extra weight, you will likely want to return to the airfield to think it over. Beware. the energy deficit you experieced in the climbout phase comes back in spades when you want to return to earth. Obviously, you will want to carry more speed on approach than you did in your light ultralight. Remember the stall speed is higher. The touchdown will be faster and landing roll-out much longer. Kinetic energy is given by the formula 1/2MV squared, where M=mass and V=velocity. Obviously, if you're packing extra weight the mass increases. Doubling the weight doubles the kinetic energy. You will now find yourself with both extra weight and extra speed....your kinetic energy has increased dramatically. Ensure you have lots of runway to dissipate this energy. Big birds always try to land into wind to minimize the strain on their landing gear. Big birds have more robust landing gear to accomadate the extra energy -- one reason they have drumsticks.

In summary, the effect of extra weight is to force the aircraft to behave differently, not necessarily negatively, just differently. The airplane does the best it can to adjust to it's new load. The least we can do is to adjust our thinking to the effects of the extra load. It behooves the pilot to understand the differences and translate these to a new set of performance specs and operating procedures to ensure safe flight.

ABOUT INSTRUMENTS Part 1

Reprinted in several installments from an instructional booklet by SKY SPORTS

SkySports offers such a large variety of instruments and so many pilots are new to the sport that we felt it was time for a little explanation. While the information is basic, our experience tells us that even seasoned pilots will benefit from some of the information we will present. We hope you won't take offense if we allow some of our opinions to creep into the discussion.

Absolute Minimums - Flight safety dictates that every ultralight, air recreational vehicle or experimental aircraft, particularly those powered by two-stroke engines, should at least have two instruments -- an airspeed indicator (ASI) and an engine temperature gauge of some type. The airspeed indicator is important to help the pilot maintain airspeed comfortably higher than his machine's stall speed at all times, and, because two-stroke engines are aluminum and prone to overheat if not properly tuned, we think it's necessary to continually take the engine's temperature to avoid sudden silences.

After these, the next instrument to consider is a tachometer, the fourth a compass and finally an altimeter. In addition to these basics, many recreational pilots add vertical speed indicators, slip indicators, air temperature gauges -- even clocks -- to their panels or instrument pods. All of these instruments offer many choices in terms of size, sensitivity, price, etc.

But before we discuss instruments themselves, we want to point out the most fundamental concern anyone should have before buying their first instrument.

The topic is vibration.

Vibration - the instrument's Mortal Enemy

By definition, instruments are highly sensitive, complex devices, requiring tender loving care. Yet airframe builders, almost without exception, do not take instruments into consideration when they design their machines. Accordingly, it is up to you to create an environment in which instruments can survive.

The biggest problem is high-frequency vibration, generated by the engine and transmitted through the airframe structure. The further away your engine is from the panel, the less vibration. The more turns in the tubing or structure the vibration must negotiate before reaching your panel, the better. And some instruments, such as engine instruments, can take quite a bit of vibration. Others, such as the altimeter, can take very little before giving up the ghost.

If you have an instrument, of any make or type, whose needle seems to respond,

but wanders during flight, don't automatically assume you have a bad instrument. It's probably a vibration problem, especially if the wandering seems to come and go as engine speed is adjusted during flight. To be sure, remove the instrument from its mount and fly with it in your lap. The human body is a great vibration isolator. If the unit seems to work fine away from its mount, the problem is obviously vibration.

If your airspeed indicator reads what you believe to be excessively high or low (5 mph low to 5 mph high is the factory's standard), it usually is a static pressure problem, not vibration. However, if the needle "wanders" or vibrates, you have a vibration problem.

It should go without saying that any tendency of your instruments' needles to wander or vibrate is an indication that you have a vibration problem. Such symptoms are telling you that your instruments are being damaged, and if you don't take corrective measures immediately, you're going to be out a bunch of bucks.

But it is impossible to be specific when it comes to outlining the precautions necessary to keep your instruments happy. Each airframe presents a very different environment in terms of resonance, vibration, shock absorption, etc. The best we can do is to give you a few basic "dos" and "don'ts" which should be followed when you are thinking about installing instruments.

Do -- plan to vibration isolate every instrument you plan to install.

Don't -- assume that a rubber grommet between the instrument and the panel, or a couple of dabs of silicone cement will be "good enough".

Do -- look at the long term. That is, you may be installing just one instrument now, but you should consider the future -- what will happen if you decide you need another instrument?

Don't -- assume that the manufacturer of the airframe has considered vibration when he designed an instrument panel into his airframe. Without exception, the panels in the current crop of "little airplanes" are not suitable for instruments as they come from the factory.

Do -- discuss with your instrument supplier how and where you plan to install your instruments and consider his advice carefully. □

Sky Sports
Hendersonville, NC 28739
(704) 693-3383

The preceding article is reprinted from the March-April 1991 issue of The Recreational Flyer - the RAA magazine.

- the Editor

Aviation & Aerospace Trivia

The **largest aircraft manufacturer** in Canada (units produced), may be Murphy Aircraft. In 1990, the Chilliwack, B.C. ultralight manufacturer shipped 125 kits for their Renegade and Rebel aircraft. Ninety-five percent of this production was exported.

The importance of **air transportation in the Canadian territories** is illustrated by Yellowknife's ranking in airports with control towers. Airport movements at the N.W.T. town of 13,500 placed it 37th out of 60 Canadian airports with active towers in 1989, one behind Sault Ste. Marie, population 83,000. Norman Wells, N.W.T. ranked 21st of the airports in Canada with flight service stations, one ahead of Medicine Hat, Alta., population 40,000. Norman Wells has a population of 502.

The **most interesting listing** in this directory may be G & M Aircraft Ltd., an aerial control and fire suppression company in St. Albert, Alberta. G & M operate three B-25 Mitchell bombers.

Most people believe that the **first feet on the moon** were American, but in fact they were Canadian. The foot pads on the 'Eagle' lunar excursion module were manufactured in Canada by Heroux Inc., of Longeuil, Quebec.

The International Civil Aviation Organization reports that the world civil aircraft registry (162 ICAO countries) shows a total of 376,420 aircraft at the end of 1989. 23,810 of those were in Canada.

The **fastest growing airline market** is the Pacific Rim. In 1970, eight of the 25 most populated cities in the world were on the Pacific Ocean. By 1980, the number had grown to 11 of 25. Cathay Pacific forecasts that by the year 2000, 14 of the 25 largest cities will be on the 'Rim' and all of them will have populations over 10 million.

Aeroflot, the national airline of the USSR has more than 70,000 pilots flying to 3,600 cities and towns. Pilot applicants often have difficulty passing a Russian language exam since more than 100 dialects are spoken within the Soviet Union. Aeroflot does not hire former military pilots. There is no seniority in the airline. Pilots are promoted by a review board that considers flight scores, test scores and recommendations. Each flight crewman must pass a physical examination before each flight. The airline stopped accepting pilot applications from women in the late 1960s. Officials suggested that women belong in the home and to subject them to the stresses of the cockpit is a crime.

What is the largest aircraft manufacturer in Canada? Fantasy Balloons whose AX-7 balloon stands 70 feet high from basket to peak and contains 77,000 cubic feet of hot air. The New Dundee, Ont. manufacturer also claims to have produced the most certified private aircraft in Canada in 1990, but won't divulge how many that was.

Recent Canadian research has shown **the fitter the astronauts** the more susceptible to space motion sickness they are. Canadian astronaut Ken Money says he will recommend that astronauts cease exercising a couple of months prior to launch to lower their susceptibility. Researchers also believe that astronauts who are heavy drinkers may be less susceptible to motion sickness in space because repeated exposure to alcohol may acclimatize the inner ear to the effects of a microgravity environment. Research has yet to be done to confirm this hypothesis, however.

The Boeing 747-400s being delivered to Canadian Airlines International and Air Canada this year are 140,000 lbs. heavier than the original model 747. Five and a half tons of the new airplane's 870,000 lb. gross weight is in the 50,000 inflight service items required for a typical international flight. One ton of air is added to the 392-passenger airplane's weight when the cabin is pressurized at cruise altitude. One engine on the 747-400 produces 57,900 lbs. of take-off thrust, more than the combined thrust of all four engines on the first Boeing 707. The model 400 burns 11 to 15 per cent less fuel than the 747-300, has 600 fewer lights, switches and gauges in the cockpit and one less flight crewmember. The tractor required to pushback the 747-400 weighs 120,000 lbs. Boeing delivered an average of one $150 million 747 every four working days during 1990 and ended the year with a backlog of 298 orders for the popular airliner.

Reprinted from Aviation and Aerospace Magazine, May 1991.