



Skywriter



Monthly Newsletter of the Calgary Ultralight Flying Club

January 1999

Across the Wing

by Wilf Stark

This is my third try at sitting in front of our Friend's terminal, whom we are visiting for Christmas here in central Iowa, looking for enough inspiration to do this monthly message. Turkey, Ham and many varieties of cookies have dulled all the senses. Going back for more helpings (often) has not helped either.

I've had two occasions to visit Beiseker Airstrip by car this month. Once was to pick up Dave Boulton who phoned that he would like to fly over for a visit. Since my back yard will only allow vertical landings, Beiseker, at 15 minutes distance was a more logical choice. Watching that sleek little Quickie fly was a pleasure as always. It continues to amaze me that the humble little Rotax 277 one-banger propels that airplane at 115 mph cruise speed. The second time, it was Ken McNeill who picked me up in order to "do lunch at Red Deer Airport". It was a nippy day, and I have to admit - there is something wonderfully decadent about cabin heat - lots of it - as well as getting to

your destination, which is 87 miles away, in only 40 minutes. Ken's Cardinal is supposedly over 20 years old - one would never know it from the superb interior and as-new exterior. Yup - I'm just a little envious.

The real reason for bringing these two instances up however, is the sad realization, that on both occasions, Beiseker was totally devoid of any other activity, and Red Deer had only two other movements besides ours, during the hour we lingered there. Where are all the flyers? I've also visited Okotoks 3 times by UL during '98 and each time the ULs were the only traffic during the time we were there. Are the costs of flying conventional small aircraft that high? On the up side, Indus is busier than ever, and sports 3 or 4 more hangars than it did a year or so ago, and every year, in our own club, there are

several completions - airplanes that are actively flown from the moment they have bitten air the first time.

I do not have enough knowledge about Canadian Aviation to have a grasp of "the big picture", but subjectively, it certainly seems that non-commercial aviators are not encouraged or supported in order to help grow this industry. It makes me truly appreciate the additional privileges that have come our way this year on the UL side. We can aspire to buy or build larger and faster machines, or simply continue to enjoy the very light and slower ones, and most important, we have landing privileges at just about every strip that we care to visit (provided we do not care to visit Calgary International). From my perspective, both Transport Canada and COPA are friends to the UL industry.



The Genesis Revelation - see story on page 2.

1999 will hopefully be another year of forward movement for all of us. We have activities planned that will help us to become safer pilots, and help us in our building activities. It continues to be very apparent that by helping each other in our club, we continue to be the most effective resource group that we have available. Let's use it - the price is right!

See you all on the 14th.

GENESIS REVELATION

compiled by Bernie Kespe

This new and exciting aircraft may well be the ultralight trainer and all around fun machine of the future. We have demanded a lot from this design, and it has exceeded our goals in every aspect. At the same time, it is one of the most relaxing and fun aircraft to fly. Excellent control authority, very predictable in flight, and unmatched performance for this type of aircraft.

The Revelation came about when we saw the need for a new and improved two place ultralight type trainer aircraft. We refused to take an old design and try to copy it with a few new improvements. The Revelation started from the basic design of the Genesis, which is a flight proven design. We simplified the building and had Dacron sails made for the wing and tail section.

The aircraft weight was reduced by removing the fiberglass enclosure, fabric, and paint. The result was a plane with outstanding performance on a Rotax 503DC, a very reliable and proven power plant. This aircraft is not a marginal performer with this engine. It will exceed most aircraft of this type that are using larger engines.

Another important item to note, the Revelation is not limited to just the Rotax 503 and you don't have to wonder if it can handle a larger engine. this airframe has been tested over and over again with all Rotax engines and the Subaru EA-81 engine

The beauty of the Revelation is that it can be upgraded to the Genesis at a later date. When we designed the Revelation, one consideration in upgrading was not having a lot of parts that would be wasted. The windscreen is the only item that would have to be replaced when you move up to the Genesis.

Many options are available for the Revelation. You can customize this plane to suit any of your flying or training needs

The Revelation build time is the lowest in the industry! You can actually put this plane together in a weekend. We do all the welding, fabrication, and most of the drilling at the factory. All that is left are the fun items you get to do in your garage!



Genesis Revelation

For more Information, or to order an Info Pack or Video, Send mail to:
Innovation Engineering, Inc.
Davenport Airport, 8970 Harrison St.
Davenport IA. 52804 or call:
1-800-GO-GENNI
PH. (319) 386-6966
FAX (319) 386-4569
or visit our internet site at:
Innovation@skywolf.com

GENESIS REVELATION SPECIFICATIONS

EMPTY WEIGHT:	450 LBS
USEFUL LOAD:	750 LBS
GROSS WEIGHT:	1200 LBS
OVERALL HEIGHT:	6'3.5"
WING SPAN:	30'8"
CHORD:	6'1"
WING AREA:	186 SQ FT
ENGINE HORSEPOWER:	52 HP
TYPICAL PERFORMANCE:	
CRUISE SPEED:	65 MPH
VNE (NEVER EXCEED):	100 MPH
STALL SPEED(SOLO):	30 MPH
STALL SPEED(DUAL):	40 MPH
RATE OF CLIMB(SOLO):	1000 FPM
RATE OF CLIMB(DUAL):	700 FPM
TAKE OFF ROLL(SOLO):	100 FT
TAKE OFF ROLL(DUAL):	150 FT
GLIDE RATIO:	10 TO 1
SERVICE CEILING:	10,000 FT

Skywriter

Skywriter is the official newsletter of the Calgary Ultralight Flying Club and is published 12 times per year. Articles and letters are very welcome and should be addressed to either Bob Kirkby, Bernie Kespe or Wilf Stark.

Editor: Bob Kirkby 569-9541
e-mail: kirkby@accine.ab.ca

Calgary Ultralight Flying Club

Meetings of the Calgary Ultralight Flying Club are held on the second Thursday of every month, except July and August, at 7:30 pm, at the Northeast Armoury, 1227 - 38 Avenue NE.

President: Wilf Stark 935-4248
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e-mail: vasseurb@cadvision.com

Director: Jim Creaser 226-0180
e-mail: creaser@cybersurf.net

Past President: Ed D'Antoni 247-6621
e-mail: ed.dantoni@logicnet.com

Kit Pricing: \$12,995.00(US) (with Rotax 503DC "B" gearbox)

PURCHASE AS YOU BUILD PLAN

For builders who want to get started on the finishing of the Genesis Revelation, but wish to amortize the investment over a period of time due to time and/or cash restraints, individual kits may be purchased.

BUILD PACKAGES

KIT # 1 \$4,753.48*

Includes: XL Wing frames, upper/lower wing battens ; aileron frames, upper and lower rudder fin, rudder, elevator, and
(continued on page 3)

Genesis - continued from page 2

stabilizer frames, control horns, Dacron sails (in a variety of colors), associated parts, hardware, & instructions (Packaging Fee.....Add \$75.00)

KIT # 2 \$4,173.60*

Includes: Fuselage frame, tailbooms, wingstruts, landing gear, nose gear, wheels and tires, tail wheel, control system push-pull cables, seat belts, chest restraint belts, instrument panel, seats, 10 gallon fuel tank, nose cone, Lexan windscreen, associated parts, hardware & instructions (Packaging Fee.....Add \$100.00)

KIT # 3 \$4,067.92*

Includes: Rotax 503 52 H.P. engine with pull start, B-drive dual carburetors, engine mount assemblies, throttle collector push-pull cables, throttle assembly, air cleaners fuel system (primer, brackets, hoses, & clamps), fuel pump mount, assemblies, shipping charges for Rotax to I.E.I. (Packaging Fee.....Add \$25.00)

TOTAL FOR ALL AIRCRAFT PACKAGES: \$12,995.00*

(Total does not include packaging fees)

The builder should be aware that the total packaging and shipping costs will be higher for individual building kits than if the complete aircraft kit is shipped at one time. Due to fluctuations in cost for the raw materials, parts, and assemblies, kits ordered after the initial shipment will be

sold at the price effective at the time of shipping.

*ALL PRICES F.O.B. DAVENPORT, IOWA. PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

Destinations

by Andy Gustafsson

1998 was a great year for flying. Looking through my pilots logbook I see 44 entries and a total accumulation of 49.6 hours.

The aircraft logbook shows that fuel consumption was 105 imp. gallons of unleaded gasoline. That means 2.1 imp.gal/ hr. Not bad for a Rotax 503. Usually I cruise at about 60-65 miles/hr and only during take-offs and climbing to higher altitudes, do I use full throttle settings.

The first entry for 1998 was on the 17 of January. I had my skis installed, and the day was calm with a temperature of - 5. C. Haze was hanging over Calgary and there

were some clouds. I flew to Kirkby's and landed on the soft snow, then on to Chestermere lake for coffee. After that I headed for Indus and made tracks on runway 27. Before landing at my home base I flew low over some mile-long fields, just a few feet above the snow. My last entry for the day was, "what a great day".

This is how I keep track of my flying adventures and my pilots logbook is full of memories of past flights and destinations. This way I can look back and remember, for example: Jan. 31, Wilf, Stu, Don and his wife and I, met at Kirkby's. A clear day with 6 miles/hr N.W. wind blowing very



Andy's Challenger at Kirkby's place.

smoothly. Don took off first and I had to catch up to him to tell him to wait, because Stu got a flat tire as he was taxiing out for take-off. We finally took off and had a fantastic flight to Beiseker, our destination for the day, 0 C and clear.

I abbreviate the words so that I can get as much information as possible on to the single line, without making it to cluttered. Here's another: On the 21 of March I went flying when I should have stayed on the ground. It reads: "Foggy, cloudy, very low ceiling, +5 C, picked up severe carb ice." I remember nursing the plane back to my home field and the engine stopped as I backed off the throttle on final approach, dead sticking it in. I should have known better than going flying in that kind of weather. And how can I forget Sunday, June 6. I had decided to fly to Linden. (Continued on page 4)



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"Your airplane deserves the best!"

Destinations - continued from page 3

Linden was deserted on that morning, no breakfast! Everything closed. With a hollow feeling in my belly, I took off for the south. Switching to Beiseker radio frequency, I could hear all kinds of traffic coming in to the Beiseker airport. I had stumbled upon the annual fly-in breakfast. I was cleared to the newly mowed runway, running parallel to the paved 16-34, touching down at the same time as a Murphy Renegade. I was invited to park among all the other aircraft and sample a great breakfast. Where were all the other CUFC members? My little Challenger II caused quite an interest among the "conventional" pilots.

On July 11, I flew in for the Kirkby annual breakfast and on the 18th it was Bishell's turn to dazzle us with his cuisine. Many times I go for a flight after work, just to "get away from it all". I don't really go anywhere, just bum around. I really enjoy those early summer evening flights, and coming back to roost just after sundown.

On the 4th of October, Stu and I had the honour to accompany Carl Forman on his first cross country flight in his brand new "Mini-max". We went to Dave Boultons picturesque strip, nestled in the foothills, just east of Okotoks. The flight down was smooth and Carl had a ball. It was a good brake-in flight for him as there was only minor fine tuning needed on his Rotax motivator. The afternoon turbulence made it's presence felt on the way back. We were tossed quite a bit.

The most popular destination seems to be Indus, with it's large number of Ultralight aircraft and pilots. Anytime I land there, I'm surrounded by the eager "Rat-pack" that make Indus such an interesting place to fly to.

It has been an interesting year in and around the "patch", near and far, and I know that 1999 will be something to look forward to. Let's make it a fun and SAFE year. I have been flying Ultralight aircraft for more than 10 years now and it just gets better and better. And I plan to keep flying well in to the next millennium. Have a safe year. Happy Landings. →

"Nobody's Flying School"

by Michael Bradford

Welcome to Nobody's Flying School. Some of -you may know the ropes here , but I'm betting that most of you are here for the first time. Good. This briefing will take a few minutes, then we will go right to the flight line and get started.

Nobody founded his flying school years ago on the principle that everyone should have an opportunity to learn to fly an ultralight safely. Nobody knew just how to do that. Since then, Nobody has taught hundreds of students who came here in the hope of achieving minimum flight.

The early days were far from safe. Nobody took the most capable students, with the motivation to overcome marginal machines, and watched and guided them. From their numbers and successes we can surmise that Nobody was an excellent instructor.

But a new day is upon us now. the aircraft fly and the engines run like Nobody's business. You are a fortunate group indeed.

"If everyone has filled in the waiver and unless we need to check anyone else for

blood type, let's pick up our earplugs and spare axles and go out to meet our machines. Nobody is going to make you a pilot."


The following story is completely true. Far from being typical, it may illustrate the fact that a professional instructor has a very critical task to perform for the student, a task which invariably differs in nature for each student he encounters: He must test the student's knowledge at every step, against valid standards.

It's not always fundamental snafu's which get a new pilot in trouble. Many, with a good grasp of the basics, bring with them poor, undeveloped seeing and thinking habits.

He was waiting for me by the hangar. Squat on his heels with knees at ear level, like an old leprechaun, the shoemaker smoked and backfired with each breath. There was no mistaking what he wanted. On the side of his step-van camper a brand new ultralight rested quietly.

One of his eyes scanned oblivion as he walked up and asked if I was the one he had come to see. Reluctantly, I introduced myself and (squinting paranoia) asked how I might help him. He said, "I need to learn to fly this thing, and I need a place to do it."

(Continued on page 5)



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Nobody's - continued from page 4

Time passed as I pondered his request. The shoemaker kept smoking and backfiring with each breath. I looked at him, and the sky, and the ultralight. It was not an unusual wish. Many have been lured by the desire to solo unaided.

There is a standing rule that we don't make rules (except the obvious guidelines for safety) until the need for a rule exists. In the case of not allowing someone to train himself, however, the rule was hard and fast. So why was I even considering the old guy's request?

I saw that dream in his one good eye.

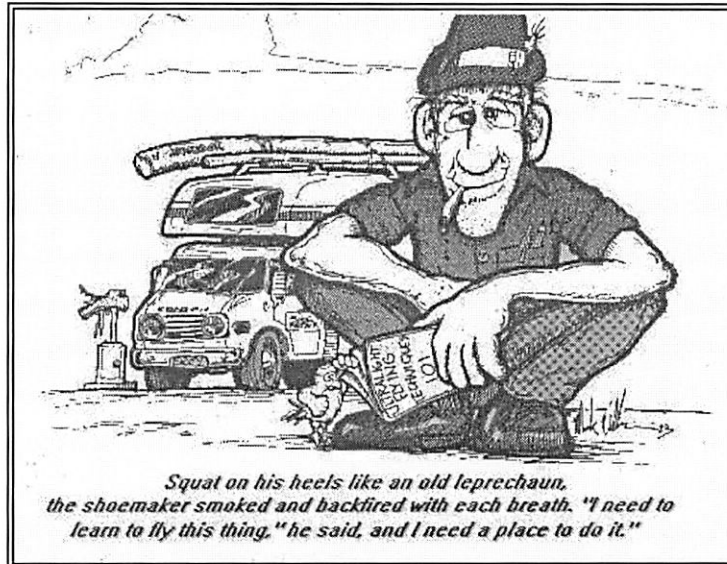
I made a lousy decision. Wanting to relive with him that feeling of accomplishment, I did that fellow a great disservice. And he set about learning to teach himself to fly.

As the shoemaker moved (slowly) from task to task in the assembly of his aircraft, it became even more apparent that he wasn't hitting on all cylinders, physically speaking. He smoked. He backfired. He rested for 45 minutes out of every hour.

Moving closer to his lifelong dream the shoemaker was beginning to grow on me; not just because of his age or determination. I gained increasing respect for one who would go through what he did. Somewhere in the back of my mind, I could hear his silent litany: before I die,

before I die.

Perhaps it was because of this drama I had constructed about him that I failed to do my professional best for the shoemaker. Certainly I did him no favors, no matter



what my intentions were.

Watching the first cautious taxi sessions of the shoemaker somewhat eased my guilt. He was being methodical, he was asking for advice, and was aware enough to detect and fix a couple of squawks on the aircraft.

The attitude and the approach he took to learning were encouraging. In no time at all he was moving (slowly) through

recognizable routines: He's going to make it, I remember thinking, he's going to make it.

The first clue to impending disaster came when he gained the confidence to venture above taxi speed. Imagine the psychic feeling which results from seeing an event before it happens. The first time the shoemaker cleared his tiny wheels from the runway, I could tell he was the victim of aviation's most common misconception: pull up, go up.

Most students come to the learning environment quite pre-educated in the basics. Many possess the ability to critique and improve their own performance. A rare few come with the developed judgment to guide themselves safely through the learning process. The shoemaker was another matter.

Sure enough, he pulled that nose up a little and, noticing the aircraft begin to settle, he pulled it up a little more. Disaster stuck its nose around the corner, then withdrew. Unfortunately, the shoemaker didn't know disaster from a hole in the ground. "

Turning around at the end of the runway, he repeated the scenario a second time. And I finally admitted to myself: "I'm going to have to talk with the old guy." One hour later I was almost convinced that pulling the nose up would result in unlimited climb. The idea seemed to have more inertia in the shoemaker's mind than I could defeat.

(Continued on page 6)



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Nobody's - continued from page 5

More cautious now than emotional, I began passionately selling him the idea of lessons. One hour later, I was offering him the instruction gratis: No go. Oh well, at least he agreed not to fly while I was away. Some what relieved, I hurried -off to run a few errands.

And so the shoemaker taught me a lesson. In his wry little leather smile I could clearly read a message: You shouldn't have believed me, kid. Of course I tried to fly it.

His machine was creeping up the runway, tied at the nosewheel to the old Ford tractor. The beautiful ultralight had been involuntarily rendered cartoppable. It looked like an obedient winged Camel.

And in that pile of airplane and alfalfa could be read the entire incident: Impact from nosewheel to right main gear. Rear axle, rear braces and drive shaft wasted. No wing tip or compression strut damage. He had to have hit fairly hard and flat.

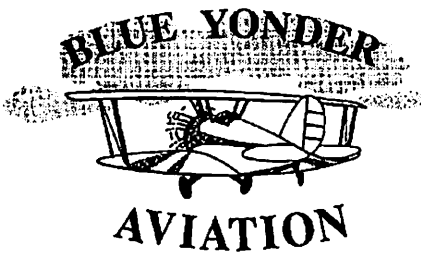
Another student, waiting for me to return, had witnessed the incident. According to him the shoemaker dove the aircraft to the ground with at least a little power on.

According to the shoemaker, he suddenly found himself at 50 feet, and simply pointed his mount to the ground. A single synaptic misfiring of an otherwise good mind nearly caused the shoemaker to erase himself.

Here the story should ideally end, with the shoemaker understanding the need to learn seriously and slowly, one new step at a time. He labors and learns and, in the end, flies off into the sunset while I suppress a lingering tear.

But Noooooo.

Word came by way of the local Pilot's party line. The shoemaker found himself another field to try his luck in. One-fourth the length of our field, surrounded by higher terrain and almost totally lacking in alternate landing sites, the shoemaker had not a chance of success.



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Having survived again (though not without injury, I understand) rumor has it he finally sold his craft. I would sooner believe he is quietly (without his wife's knowledge) rebuilding that bird again. A shame if he sold it. And a blessing.

The shoemaker's experience need not have been so negative. With a little time and effort he could have become a damn good pilot. His behavior and ability were truly encouraging. After overcoming that single fundamental obstacle—no matter how long it might have taken—he would have joined with his dream.

Imagine, though, his years of flying wishes. Swoops and loops and supersonic zooms, and all that time the imagination accumulates its own experience. Pull up, go up. I bust my butt to get ahead, and someday I'm going to fly. Pull up, go up.

Going over the justifications for allowing the shoemaker to attempt learning on his own, I can only guess: He simply tugged at my heartstrings. Evaluating a student and the student's needs is the primary responsibility of an instructor.

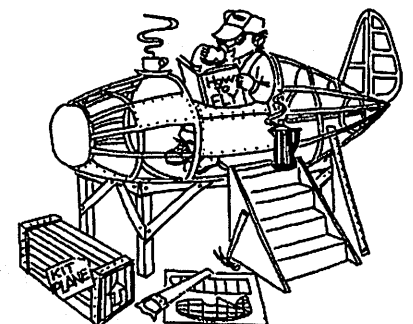
Can you train yourself to fly an ultralight? I saw a television short recently about a dentist in Italy who operated on his own mouth. So it can be done. I doubt seriously, however, he would be willing to learn dentistry on his own mouth!

When we set about to acquire a skill as life-critical as flight, we need the outside perspective and experience of one who understands the art of learning as well as the art of flying. The typical "hard landing" costs a great deal more than the most expensive course of instruction.

If you're already a "hot stick" and are transitioning to ultralights, you need the instructor as badly as anyone. It may only take you 30 minutes to check out, but without a briefing, every aircraft is a "blind date".

Like any encounter, the first solo in your new ultralight should be an intimate and exciting experience. Better if it's not the first time for both of you.

Find somebody's flying school. →



Classified

Wanted - Looking for a future Eureka Customer who would like to trade labour for up to 50% off Airframe Costs. Should be comfortable cutting/drilling/filing aluminum tube/channel/bar. Wilf 935-4248 (1/99)

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Props - 3-blade GSC fixed pitch for 277 pusher (R.H.) New 4-blade GSC Fixed pitch for 447 pusher (R.H.) Used. 10 Warp blades (R.H.) to make 72' Prop (you supply hub) new with nickel leading edge. Jim Creasser 226-0180. (4/98)

Classified ads are free to CUFC members. Forward ads to Bob Kirkby.

Heading My Way?

by Carl Forman

A while back at a club meeting, there was a discussion about magnetic versus true headings. I thought I'd acquaint myself with the subject and share the information with Skywriter readers.

When navigating between two points, we are taught to draw a straight line on a map. Next, we get our trusty protractor and measure the angle of intersection along a meridian of longitude. This gives us the true heading we should track along the ground to get to our destination.



Carl Forman ready to go flying in his MiniMax

Regrettably, life isn't so simple. The magnetic North Pole and the geographic North Pole are about 1,400 kilometers apart. The compass in your airplane points to the magnetic North Pole. The protractor told you the heading required relative to the true North Pole. The difference is called magnetic variation. Isogonic lines are drawn on aviation maps that tell what the magnetic variation is for the particular part of the world represented by that map.

Calgary's magnetic variation is 20 degrees east. There is a simple formula to reconcile magnetic and true headings, "variation east, compass least and variation west, compass best" (i.e. if the magnetic variation is given in degrees east your compass heading will read less than your true heading, if it is given in degrees west then your compass heading will read greater than your true heading). Hence, if you were flying a magnetic heading of zero degrees around Calgary, you would really be flying a true heading of 20 degrees east. Say you wanted to fly true east i.e. 90 degrees, you would have to subtract 20 degrees and fly a magnetic heading of 70 degrees. To give an idea of how magnetic variation changes in Western Canada, the variation at Regina is 13 degrees east.

The airplane's metal parts and electrical equipment also influence the magnetic compass. This is called magnetic deviation. Additional adjustments have to be made in order to compensate for magnetic deviation.

A runway designation is given using magnetic headings, divided by ten and rounded to the nearest whole number. Runway 34-16 runs straight north and south (in Calgary). Very high frequency

(VOR) compass roses on maps are also aligned with the magnetic North Pole. Control towers and ATIS give wind direction in degrees magnetic. However, aviation routine weather reports (metar), winds aloft and other weather reports all use true headings when describing wind direction. By the way, wind speed is always in knots.

At the meeting, it was debated whether we should note directions on a map as either "true" or "magnetic" bearings. I think it boils down to personal preference. Personally, when writing down a direction I have always differentiated by using a "T" or a "M" after the number to save confusion while I am in the air.

Happy Flying →

Watch those whirling blades, this could happen to you:

TWO PROP STRIKES PROVE FATAL: A passenger boarding a Cessna 182Q at the Chandler Airport in Fresno, Calif., last month walked through the pedestrian gate and into the plane's rotating prop. At Memphis

International Airport, a baggage handler with Northwest AirlinK was killed when she walked into a Saab 340's right prop while attempting to disconnect the ground power unit.

ANOTHER FATAL PROP STRIKE: There seems to be an unusually high number of prop strikes recently and, sadly, we've got another one to report. William Ray "Socks" Reams was killed when his plane's propeller struck him in the head. Reams was apparently trying to hand-prop his plane at the London-Corbin (Ky.) Airport.

Reprinted from Avweb's Avflash news bulletins.

STROBE OPTIONS

by Ray Waller

Kitplanes magazine Oct. 97 has a great article and a circuit diagram to build a recognition

light flasher. Trouble is, field effect transistors and integrated circuits are not everyone's bag, and getting some of these parts at your local radio shack can be another problem. So if you have a few parts lying around the garage and you can't figure out what to do with those old track light halogen lamps try building this circuit for your ultralight.

PARTS LIST

1. one automotive fuse holder and 5 or 7 amp fuse.
2. one 10 amp - 12 volt toggle switch.
3. one 12 volt panel light (optional).
4. one automotive electronic flasher-two terminals (metal case if possible)
5. two 50 watt (75 watt is also available) 12 volt quartz halogen lamps with built in reflectors. (consider using the 40 degree flood lights not the narrow beam spot lights)
6. one 12 volt 10 amp DC relay with one normally closed contact, Radio Shack part #275-248 or #275-218 or equivalent. (I used an Omron G2R-1-SN-DC12 SPDT 10A from Eecol Electric, south branch.)
7. #16 gauge copper strand wire. (Automotive type is fine)
8. automotive spade terminals.
9. motor cycle head light or other suitable enclosure.

HOW IT WORKS

When power is applied to the circuit, the flasher turns on quartz lamp #1 and also energizes relay R-1. When Relay R-1 is energized contact R-1 opens allowing only lamp # 1 to come on. When the flasher clicks off lamp #1 goes out, the relay loses power, and lamp # 2 comes on. As the flasher repeats the cycle the lamps alternate.

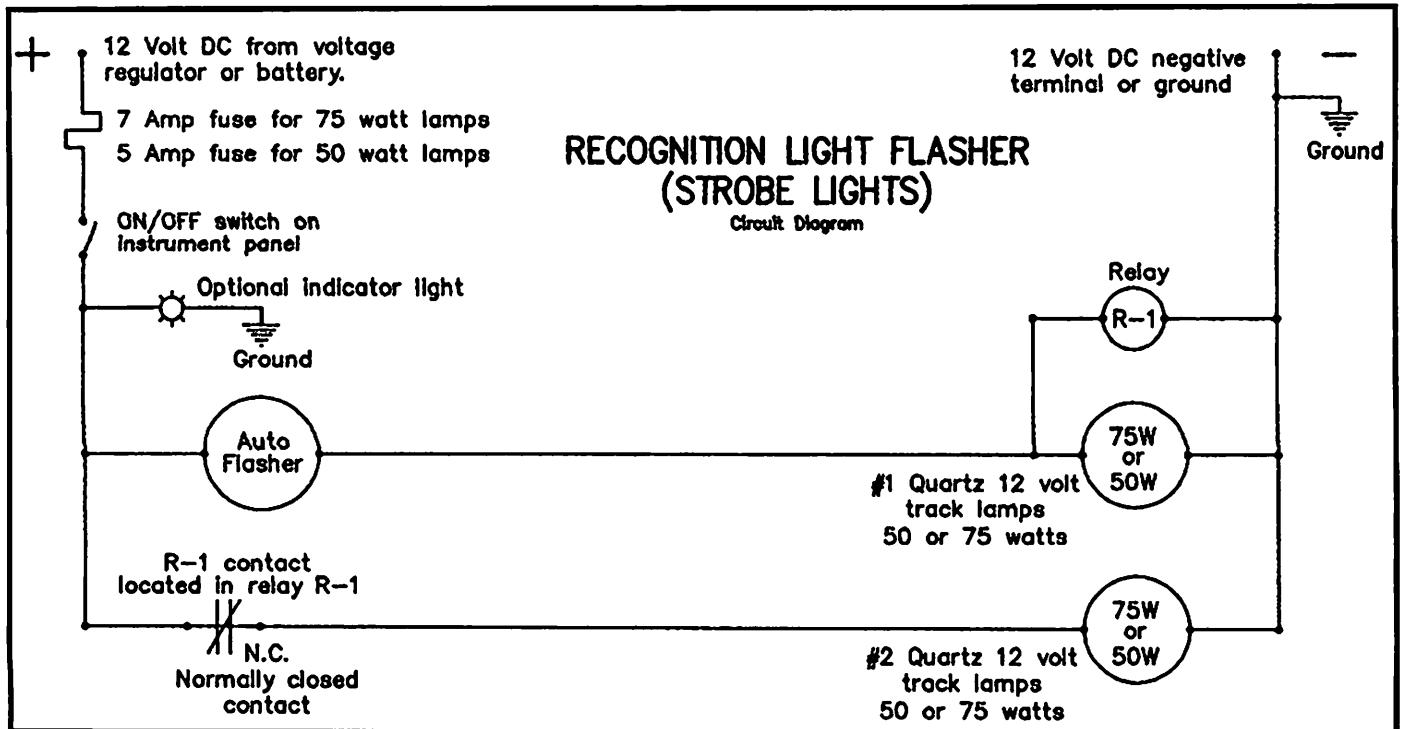
COMMENTS

Always make sure you fuse properly to protect yourself and your equipment. Allow some ventilation around the lamp enclosure as they can run fairly warm. Be sure to align the bulb filaments vertically. The bulbs will last longer.

If you have radio equipment, enclose all relays and circuitry in a metal box and then ground the box. The box can be mounted in any handy place.

Lamps can be mounted anywhere you desire but use shielded cable if you're running any distance. Two additional lamps can be paralleled into lamps one and two since only 100 watts of load is on at any given time. The high output coils on most Rotax engines are 130 watts (130 watts/12 volts = 10.83 amps). It's always a good idea to have a few spare watts left over to run the other toys that you may accumulate.

IF YOU HAVE ANY PROBLEMS CALL RAY AT:
274-4388 →



The Practical Side of Ground Effect

compiled by Bernie Kespe

Every airplane enthusiast has met the term, "ground effect," in textbooks. The way it is usually presented, one interprets it as meaning that a low-wing airplane may be expected to take off sooner and land slower than a similar high-wing.

But that is just the beginning of it, for, as a bulletin published by National Aviation Insurance Group of St. Louis points out, ground effect can and should enter into safe piloting technique. This is particularly so when low-powered airplanes operating out of unimproved fields are considered. Quite a number of accidents in the general aviation field have been traced to the quirks of ground effect. A pattern is clearly visible. The field is short and rough, or covered with tall grass, snow or mud. The

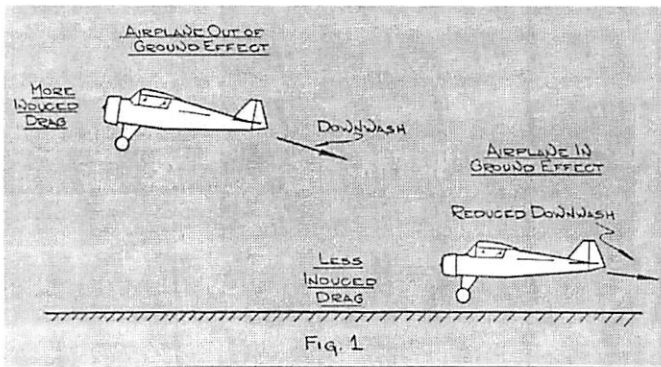


Fig. 1

plane is heavily loaded or its engine is not running at its best. After a sluggish run the pilot coaxes the plane off, barely clears the end of the runway, and then, seemingly clear of the ground, falls back to earth disastrously.

The total drag of an airplane is divided into two components, parasitic drag and induced drag. The two are always present, though in varying degrees. Parasitic drag is caused by the skin friction and turbulence of the air flowing past the various parts of the plane, and induced drag (a term tossed about casually by engineers but only

simply understood by most pilots) is the result of the wing's work of sustaining the airplane. The wing lifts the airplane simply by accelerating a mass of air downward, and don't be confused by the old cliché that most of the lift is developed by the upper surface of the wing. It's perfectly true that reduced pressure on top of an airfoil is essential to lift, but still

that is but one of the forces that contribute to the overall effect of pushing an air mass downward. Most of us have heard of the effect downwash has on the horizontal tail load and angle of attack, and you can see downwash at work in the dark exhaust left behind a jet plane as it makes a pass

over the airport.

Ground effect works on wing downwash. The more downwash there is, the harder the wing is pushing a mass of air down. Naturally, there's more drag . . . induced drag. At high angles of attack induced drag is high. As this corresponds to lower airspeeds in actual flight, it can be said that induced drag predominates at low speeds and parasitic drag is greater at the high speeds.



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When an airplane is on or near the ground, the ground effects wing downwash and the formation of wing tip vortices, Figs. 1 and 2. The result of reducing the downwash angle and the size of the tip vortices is to reduce the airplane's induced drag. In trying to take off from a poor field, a pilot uses full power and holds the plane in nose-high positions. Ground effect reduces induced drag, so the airplane is able to reach a speed at which it can be coaxed off. But as it gains altitude, induced drag steadily increases with the lessening of the help from ground effect. Twenty or thirty feet up, ground effect vanishes, the wing encounters the full effect of induced drag, and the straining plane which got off the ground on the

(continued on page 10)

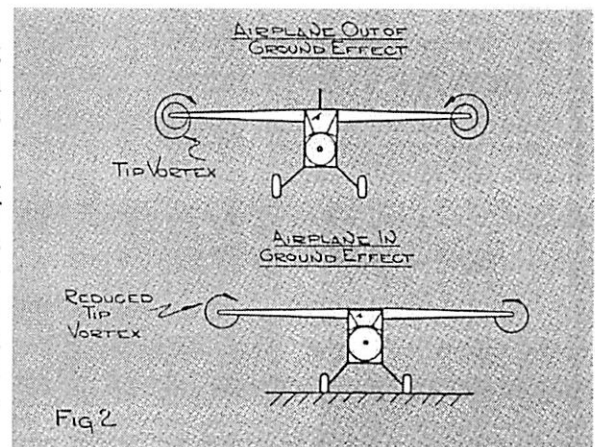


Fig. 2

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FROM SAC, [illegible]
SUBJECT: [illegible]

RE: [illegible]

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ragged edge of a stall become fully stalled and drops to earth.

ground, grass and snow, high airport altitude, high air temperature, a weak engine and a heavy load, in any of many combinations, is your danger signal .

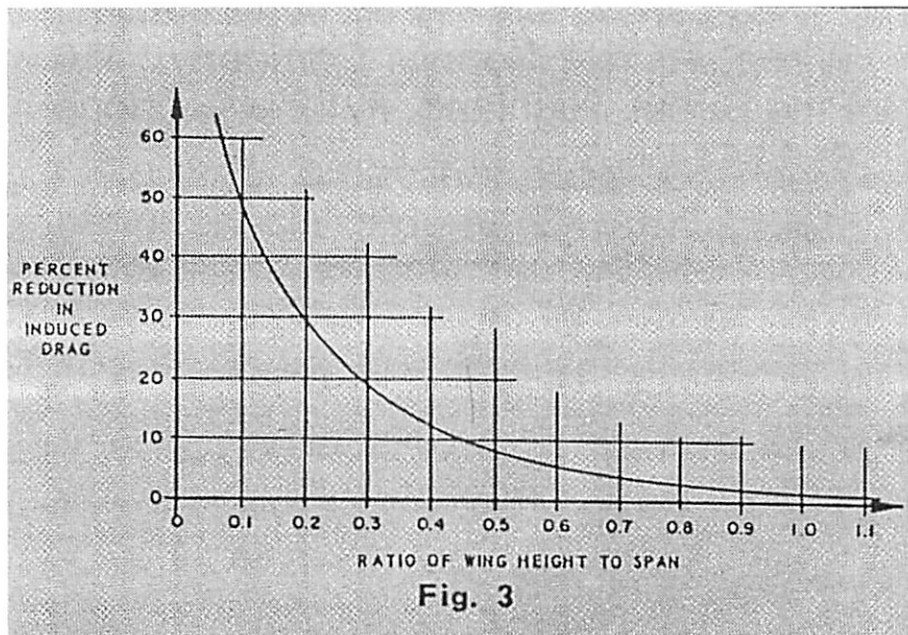


Fig. 3

Rather closely, the distance above the ground at which ground effect ceases to exist is equal to the span of the airplane's wing. This distance is measured from the ground to the wing, and so the pilot of a low-wing will seem to be "higher" when he runs out of ground effect than the pilot of a parasol monoplane.

Fig. 3 is a curve showing that the amount of induced drag does not bear a uniform relationship to altitude. If a plane has a 36 ft. span and at take-off its wing is 3.6 ft. above the ground, then by dividing 36 by 3.6 we get the ratio of wing span to height as 0.1, and reading up the graph at this figure we see that the plane has about 48 percent reduction in drag at the moment of lift-off as compared to normal flight at altitude. Drag increases rapidly as the plane climbs . . . at 18 ft. altitude there is only an eight percent reduction in drag and the plane will be rapidly flying out of ground effect. Now it is clear why so many planes struggle at 10 or 20 ft. into the air and then drop to earth.

The only safeguard is knowledge of this fact. A mixture of short runways, rough

Ground effect works when landing, too. In the common case of a plane coming in with excessive speed, it flies down from free air into ground-effect air and the reduction of induced drag as it nears the runway comes into effect to make the plane float. This leads to the classic type of overshoot. Recognize that ground effect can lead directly to floating and overshooting. On short fields, approach as slowly as is consistent with safety, and the effect of the ground is minimized. When you do overshoot, recognize that ground effect is reducing your induced drag and helping the plane to float on and on—so give it the gun and go around once you realize you have come in fast and are skating along on ground effect.

When you do find yourself in a marginal take-off situation, know your plane's take-off speed for the conditions prevailing, the distance required to accelerate to that speed, and then allow a generous margin of safety by picking up as much speed as possible just off the ground before trying to climb. If the plane is still dragging its wheels when it should be airborne about the landing while you can, for you are heading into a stall a dozen feet up. →

Caught in the Nick of Time

From the FAA's December 1998 issue of AC No. 43-16A, "Aviation Maintenance Alerts," proving once and for all that some folks at the FAA do have a sense of humor:

Sled; Model NP12-25; Noel Flyer; Oil Leak; ATA 7910

This aircraft had seven "oat eating" engines installed in accordance with Supplemental Type Certificate (STC) SA122598HOHO. The "Jolly Ole" pilot reported that oil dripped on the stable floor and requested it be repaired before an upcoming marathon flight. An inspection of the "skid lubrication" oil system disclosed a cracked oil tank. A .1225-inch long crack was on the side of the tank. There were two creases in the tank running in a vertical direction on both the forward and aft sides of the tank. It appeared the crack originated at the top of the forward crease. A pressurized oil tank with even a small crack can cause a substantial amount of oil loss.

Four vertically challenged technicians removed the tank and made the necessary repairs, although a final inspection revealed evidence of cookie crumbs and milk drops in the vicinity of the repair.

The submitter recommended the oil tank be inspected at frequent intervals, in the "off season," for creases, dents, cracks, and/or cookie crumbs. For all who read these Alerts and their loved ones, have a happy and safe New Year.

Part total time: 4,000,000 hours.

New Year's Dinner

The annual CUFC New Year's Dinner will be held in late February at the Northeast Armory. Look for details in the February Skywriter