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Carb Heat

NEWSLETTER

Hot Air and Flying Rumours

Vol 30 No. 4

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April 2000

Inside:

Next Meeting:
Thursday April 20, 2000 8:00 PM
National Aviation Museum

A video produced by the BBC courtesy of Irving Slone
"Junkyard Wars"

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While March started like a lamb; April has certainly come on like a lion! The second weekend in April sees us with 15 or so cm of snow on the ground, and a howling blizzard. It's Back!

This late snow will certainly delay the drying of our grounds, so please park in the First Air lot and walk across to the chapter hanger. We have already had folks get stuck at the end of the roadway leading to our building. The exercise will do you good and give the grounds a rest. Enough of the soap box; on to more peasant topics.

March Meeting Summary

Gary Loubert presented an interesting overview of electronic engine instrumentation options open to today's homebuilder. I particularly liked his modular approach to the systems he is designing. Gary plans to have Beta versions of his own design completed by the fall, and promised to update us on things at that time.

Carp Airport Lease

George Elliott has had a couple of positive meetings with the WCAA and things seem to be on track for securing our future at Carp airport.

As a reminder, if you joined the WCAA last year don't forget to renew your membership. It is essential that we don't drop the ball, and let the old crowd back in. While the fees are up to $25.00 for public members, it is a small investment to make in our continued future at Carp airport.

EAA Book & Video Sale

We are once again able to benefit from the Annual EAA Book and Video sale. This year, things are even better than ever. Virtually all books and videos in the EAA catalogue are on sale at 50% off their normal price (before taxes, dollar differential, and shipping costs of course

At the back of this month's newsletter is a listing of the most popular items along with their price to you in Canadian funds. If you are a video buff, check out the full catalogue at the next meeting, or check it out at EAA's web site, www.Eaa.org.). If you see an item you are interested in, simply take the U.S. dollar amount and round up to the nearest 50 cents to get the Canadian Sale equivalent.

Payment should be in the form of a cheque made out to EAA chapter 245, and your order and money in George Elliott's hands no later than April 30th. It will be 6 to 8 weeks before we receive delivery.

If you are a new member, this is the perfect opportunity to get Tony Bingellis's set of books that many of us feel are an essential bible for home-builders.

Black Hole Syndrome

A recent edition of Avweb had a fascinating article on the Black hole syndrome, which is an optical illusion which can affect pilots making long straight-in night approaches to isolated dark airports.

The illusion causes pilots to descend too soon, and too steeply, generally crashing two to three miles short of the runway. It is a particularly bad problem on clear, moonless nights.

The following comment by a reader brings the danger home vividly. I can tell you from personal experience that the black hole effect is very real and very dangerous. While approaching a "black hole" airport at night, I was startled to see the runway lights start to "twinkle". It only took me a second or two to realize that what was causing this effect was TREES in the visual path to the runway. I applied full power and got out of Dodge. God only knows how close I was to the ground. Contrary to the article, this was not a very long final. I flew downwind and base legs and I would say I was less than 2 miles from the runway when I turned final. The final was about a mile longer than usual because of hills that I knew were there but could not see due to the darkness.

Since this event, I have resolved to never fly an approach at night unless at least one the following factors are present: (1) VASI or equivalent (2) ILS Glide Slope (3) sufficiently long runway to allow a high approach. In addition, one MUST be aware of the terrain on final and maintain altimeter awareness until on short final.

Allowing your eyes to be your judge works in good daytime visibility, but it can kill you at night. I barely slept that night just thinking of how close a call I had.

The author Linda Pendleton has a knack for communicating technical safety issues very effectively. Check it out at www.Avweb.com.

April 20th Meeting

Our April 20th meeting feature topic will be a BBC produced video, courtesy of Irving Slone, titled "Junkyard Wars". Irving assures me it was one of the most amazing aviation videos he has ever seen. See you there.

Gary

"HomeBuilt" Inspection Process
by Curtis Hillier

There were some questions about the recent changes to the inspection process and costing at the last meeting so I thought I would summarize and provide some reference info for the members.

The current program is called the MD-RA Inspection Program. It is based out of London Ontario and the program consists of some 62 inspectors

2469 Aviation Lane
London, Ontario N5V 3Z9
Telephone 1-877-419-2111
Fax 1-519-457-0980

The office administrators name is "Gerard L. Haliburton" The building procedure can be followed several ways but the manual/booklet that is put out by the EAA Canadian Council and the RAA are most helpful and lead you through the process.

They encourage you to register as soon as you start your project. There is a listing of the approved 51% rule designs but if you are building from scratch you really have nothing to worry about. For the kits, you can find a listing of them in the COPA annual. If you are building a design that is not on the list you must submit the details for an evaluation. Refer to the AWM 549 for the details of experimental aircraft requirements with respect to maximum carrying capacity, gross weight, wing loading etc.

Here is a listing from MD-RA on the inspection costs:

- sub assemblies: $139.10 (try to get all of them done at once!)
- pre-cover/paint: $197.95
- Final: $513.60 ($250 if this is for the C of A)
- Final follow-up visit $ 69.55 (only if needed) travel: $ 0.30 (this is per Km and varies on where you are and were the inspector is)

And Misc. items:

- information Package $ 8.03
- Letter of Intent $ 21.40 (when you start your project)
- 51% determination $101.65 (only if your kit is not listed)

Another good source for this info according to the EAA CDN Council is COPA Canadian Flight February 2000 page C-17

Aviators' Learning Resources
by Heidi Brault

The Internet has become a viable educational resource with university degrees, college diplomas, and certificates now available online. The selection of curriculums and tutorials is growing as dot.com learning organizations build their libraries of courses. The choices range from how-to-articles and learning modules to in-depth courses. You can choose from a range of categories such as the arts and humanities, social sciences, hobbies, computers, and the Internet. The following companies are but a few that offer online learning opportunities:

notHarvard.com (http://www.notharvard.com)

Spectrum Virtual University (http://www.vu.org)

Geteducated.com (http://www.geteducated.com)

Embark.com Lifelong Learning (http://www.embark.com)

There are also learning resources available that are specifically geared for pilots and aviation enthusiasts. We all know that in flying you never stop learning! Here are some of the selections:

Aviation Tutorials http://www.avtutorials.com/

Homebuilt Homepage (http://www.homebuilt.org/)

Library of articles related to homebuilt aircraft (http://www.exp%2daircraft.com/

Flight Plan Tutorial for General Aviation (http://www.fltplan.com/tutorial.htm)

GPS Primer (http://www.aero.org/publications/GPSPRIMER/)

You may also want to note that Algonquin College will be offering aviation-related courses at the Woodroffe Campus this spring. If you know of anyone who is getting started in flying, they may want to investigate the following two courses:

Introductory Ground School for Recreational Flying (GEN5748)

Global Positioning System (GPS) and Electronic Navigation Instruments (GEN5752)

The GPS course is an afternoon workshop. The Algonquin College Spring Calendar is available at both Woodroffe and Rideau Campus.

Happy safe flying!

The Black Hole Approach: Don't Get Sucked In!
by Linda Pendleton

This article appeared on the avweb at www.avweb.com

Whether you fly a piston single or a heavy jet, a long straight-in approach at night over featureless terrain is a well-proven prescription controlled flight into terrain. AVweb's Linda Pendleton examines the optical illusions involved, and offers suggestions for making sure that you don't become a thing that goes bump in the night.

One of the major tenets of instrument flying is that you cannot rely upon your body -- or kinaesthetic senses -- to keep you upright. Repeatedly, your CFII has pounded into your head the premise that you can only believe what your eyes tell you. Just watch those gauges and all will be well. And it's true -- if what you are looking at are the gauges. When the view is out the windscreen, however, you cannot always believe your visual perceptions.

Great! First you can trust your eyes, then you can't. What's the deal here? Well, it's all in being human. This marvelous species you're so proud to be a part of has evolved over millions of years as a land-based animal moving at a normal speed of about three to four miles per hour. You can also manage occasional short bursts of up to 15 mph. Any time you go faster than that or put your eyes higher than eye level above ground you're subject to misperceptions.

Okay. So, you know that you can't always trust our perceptions. What is a black hole approach and what makes it so dangerous? The term "black hole" refers to the terrain below the approach to the airport, not the airport itself. Simply put, a black hole approach is a long, straight-in approach at night to a brightly lit runway over featureless and unlit terrain. Over the years, the black hole approach has claimed the lives of many pilots -- both novice and experienced. Night flying has always been more dangerous than daylight flying principally because of the lack of perceptual clues we all depend on to keep the shiny side up. You're all familiar with the false perceptions you can fall prey to caused by using a sloping cloud deck for a level horizon and the unsettling ambiguity caused by mistaking sparse ground lights for stars. You can overcome these visual traps, however, by simply referring to the flight instruments on the panel. The black hole approach is different in that a glance at the flight instruments won't always clue you in to the danger.

Optical illusions

Before we talk about black hole approaches, let's explore some of the ways your perceptions can mislead you. That will give us a basis for a better understanding of the illusions you experience during a black hole approach.

Your eyes really don't do the seeing -- your brain does. Your eyes simply transmit electrical pulses and your brain does the work of making sense of those spikes of electricity. It perceives what it "sees" in the setting in which it is viewed. The surrounding objects and colours -- or lack of them -- will have a big effect on what sense your brain makes of the electrical impulses sent to it by the retinas. Look at Figure 1. Decide which line is longer and then roll your mouse over the figure and see the change. Now you've probably seen this a million times before and you know the answer, but pay attention to how fooled you brain is by the surroundings of the two vertical lines. Now look at Figure 2 and decide which lines, if any, are parallel. Again, you probably know the answer, but notice again the overwhelming perception that the three long lines are not parallel. Even when you know the answer, the false perception is overpowering. Figure 3 shows the effect surrounding colour or intensity has on perception. Note the relative brightness of the smaller gray squares in the center of the black and white squares. Now roll your mouse over the figure and note the "change" in the gray squares. The small square surrounded by black seems brighter and closer than when it is surrounded by white, but both gray squares are in the same place and are the same colour.

Seeing is not believing! But why would the brain play such tricks on you? It's all a part of how you make sense of the world around you. The visual surroundings of an object give you valuable clues about its size and distance from you. Lines can show perspective, which is an indicator of distance. The brightness of an object is another attribute the brain takes into account when determining the nearness of an object. We perceive dimmer objects to be farther away than bright ones.

Night perils

Pilots have recognized since the early days of aviation that flying at night is more dangerous than flying in the daylight. In fact, flying at night in good weather is closer to a flight in IMC than it is to VMC. The low level of light means that the rod cells in the retina of the eye are going to be doing most of the work since they are more sensitive to very weak light energy. Unfortunately, the rods permit seeing only black, white, and grays. Since you base much of your perception of size and distance on color variation, you have a handicap already. Terrain and clouds can be almost impossible to see at night until it's too late and as was said earlier, ground lights can be mistaken for stars and horizons.

But what makes the black hole approach so different and so lethal? Well, first, referring to the attitude indicator, altimeter, and turn coordinator won't immediately alert you to the problem. Pilots who succumb to the black hole illusion are convinced, sometimes until it is too late, that they are on the proper glide path and all is going well. Second, although you may know intellectually that the illusion is taking place, you will still have an overwhelming urge to believe your false impressions. You can't take any training to keep from

experiencing this illusion. Like hypoxia, it WILL happen to you and your best defense is knowledge and avoidance.

Many researchers have studied the black hole illusion. Two Boeing engineers, Dr. Conrad L. Kraft and Dr. Charles L. Elworth, conducted a study in a specially developed night visual approach simulator flown by Boeing's senior pilot-instructors and came to some surprising conclusions. As you are aware, pilots flying a normal three-degree glide path see a constantly changing view of the runway. While the aiming point on the runway will remain stationary in the field of view, the visual angle occupied by the runway is constantly changing. Figure 4 illustrates how this visual angle changes during the approach. (I exaggerated the angles to make the illustration clearer, but the concept remains valid.)

When black isn't beautiful

What Kraft and Elworth discovered is that pilots conducting an approach over featureless terrain at night tend to keep the visual angle of the runway constant. Now, I'm going to ask you to think back to high school geometry. Do you remember the theorem that says that if two inscribed angles intercept the same arc of a circle, the angles are congruent? Whoa! That was a mouthful -- and worthy only of a high school geometry teacher. Let's look at another picture. Figure 5 shows a circle with an arc AB. Angles ACB and ADB are inscribed angles that intercept the same arc, AB, and therefore they are congruent, or equal. Do you see where I'm going here? It follows that if this theorem is true then you can turn it around to say that if two angles intercept the same arc of a circle and are congruent, then those two angles are inscribed on the circle, meaning that their vertices are on the circumferences of the circle.

Now let's look at Figure 6. This shows (although exaggerated for clarity) what happens when a pilot flies an approach to a runway and keeps the visual angle of the runway constant. The approach path will be on the circumference of a large circle centered over the approach area. This means that the descent to the runway will be too steep at first and will flatten out as it gets closer to the runway. As a matter of fact, the Boeing researchers found that the typical descent on a black hole approach, if continued to touchdown, would result in a landing (impact?) two to three miles short of the runway. Although the circular path is clear in the illustration, it is imperceptible to the pilot flying the approach.

Although research has not yet discovered why pilots tend to keep the visual angle of the runway constant under black hole conditions, they have discovered that the condition is universal. You WILL be fooled if you try to conduct a long, straight-in approach over featureless terrain using only out-the-window references. There is no amount of training or practice that will make this illusion go away. Just like the visual illusions we looked at earlier, you know what the answer is, but your perceptions lie to you repeatedly. As you have seen, these false perceptions can be overwhelming. The only defense you have is awareness and avoidance.

Some conditions make the black hole effect more pronounced. Be alert for the illusion when you observe these conditions:

- An airport that is on the near side of a brightly lit city with few or no terrain features or lights between you and the airport. The brightness of the city lights will give the impression that they are closer than they are.
- An airport that is on the coast or in very sparsely settled terrain such as deserts and wilderness areas. This is the classic black hole scenario. Los Angeles International landing to the east and Salt Lake City landing to the south are classic examples.
- A night with extremely clear air and excellent visibility. One of the things we use to judge distance is the normal hazing that distance provides. When the air is extremely clear, this lack of hazing makes things appear much closer than they really are.

Coping with the black hole illusion

Since you know what sets you up for the black hole illusion, what can you do to keep from being sucked in? The most obvious is to avoid long, straight-in approaches. The black hole illusion disappears within two to three miles of an airport so the most obvious thing to do is to fly to the airport at a known safe altitude and then descend and fly a normal traffic pattern.

We said earlier that reference to the flight instruments will not help in a black hole situation and that is true for a quick reference to the attitude indicator, airspeed indicator or altimeter. Nothing there will be immediately suspicious. If you study the VSI, however, you may notice a larger than normal rate of descent, but that may not be apparent. You need to do a little analysis to see the whole picture. A three-degree descent -- 300 feet per nautical mile -- is the normal landing descent. If you see more than that, you should be suspicious. However, what in the cockpit measures descent angles? Your airspeed indicator and VSI do. For that three-degree descent, your rate should be five times your ground speed. If you're doing 120 knots across the ground, your rate of descent should be about 600 fpm. If you don't know your ground speed, using your indicated airspeed will be close enough to keep you out of trouble. Of course, to use this formula for a descent to the runway, you have to know how far you are from the runway. DME, GPS, or good old-fashioned pilotage should be able to tell you that.

There are many other theories about factors that may contribute to the black hole illusions. Some are more believable than others, but the thing you MUST believe is that if the conditions are right, you can be fooled by the black hole illusion and the only way to keep from getting sucked in is to

analyze what you see out the windscreen and be aware that you, too, can be fooled. Seeing is not believing.

Books for Sale list submitted by Gary Palmer

Name:				
Tel #				

Payment in full by cheque to George Elliott required no later than Apr 30

Item	Item #	Description	Unit $	Total $
Qty	**Tony Bingelis series: A must have**			
	F-30140	The SportPlane Builder; Tony Bingelis	24.00	
	F-01395	SportPlane Construction Techniques; Bingelis	24.00	
	F-13950	Firewall Forward; Bingelis	24.00	
	F-15691	Tony Bingelis on Engines	24.00	
	F-15692	Tony Bingelis 4 volume set	77.00	
	Other Homebuilder books			
	F-37864	Aircraft Welding Manual	11.50	
	F-36688	Aircraft Welding Manual & Video Combo	24.00	
	F-18100	Wood/EAA Aircraft Building Techniques	11.50	
	F-11619	Wood/EAA Building Manual & Video Combo	24.00	
	F-13510	Custom Built Sport Aircraft Handbook	14.50	
	F-30157	GA Airfoils Harry Riblett	17.50	
	F-13470	CAM 107 Aircraft Power Plant Handbook	24.00	
	F-17878	Alternative Engines -Contact M. Myal	43.50	
	F-13097	Ultralight Access Handbook	19.50	
Video				
	F-12989	Golden Age of Air Racing	29.00	
	F-10429	Building Your Own Airplane Get Started	20.00	
	F-35776	Basic Aircraft Woodworking	20.00	
	F-36029	Basic Composite Construction	20.00	
	F-36687	Build your own plane: Welding	20.00	
	F-38113	Build your own plane: Corrosion	20.00	
	F-36467	Basic Aircraft Painting	25.00	
	F-36141	Fabric Covering with Ray Stits	29.50	
	F-14019	First Flights in your Homebuilt	10.00	
	F-10289	First Flights in your Ultralight	10.00	
	F-36851	Getting started in Aerobatics	20.00	
	F-10433	Aerobatics: Flying the Maneuvers	20.00	
	F-82778	Flying the Sukhoi SU-26	10.00	
	F-36139	Wonderful world of floats	25.00	
	F-38019	Advanced Seaplane flying	20.00	
	F-36421	Building of the Voyageur	10.00	
	F-38977	Oshkosh 98	20.00	
	F-30536	Oshkosh 97	20.00	
	F-17865	Oshkosh 96	15.00	

	F-12302	Oshkosh 95	13.00	
	F-14028	Oshkosh 94	13.00	
	F-31816	Oshkosh 93	13.00	
	F-38037	Ultimate Flights	13.00	
	F-36217	Experience the spirit of flight- museum	10.00	
	F-36972	Exhibit showcase	10.00	
	F-36976	Eagle Hangar showcase	10.00	
	F-00126	Molt Taylor's Aerocar	10.00	
	F-14029	Magnificent Desolation Apollo Astronauts	10.00	
	F-15859	Eagles, A great Run	10.00	
	F-98044	Young Eagle Cliff Robertson	10.00	
		Grand Total		

Classifieds

Place your ads by phone with Charles Gregoire @ 828-7493 or e-mail to cbgregoire@sympatico.ca Deadline is first of the month. Ads will run for three months with a renewal option of two more months.

The West Carelton Airport Authority (Carp) advises that they are taking names from those interested in renting space in a proposed 20 bay T-hangar bldg. They have about 11-12 names, and are looking for a 75% initial occupancy before they commit to breaking ground. Cost looks like $175-$200 per month. Those interested can call 839-5276 or fax 839-5390 for an application or further info.
Maj.GT.Rippon
DMP 4
(613)995-2684
e-mail: mail094a@dnd.ca

Wanted, One Pre-Amp coupler for a King 8002 Loran, rectangular type. Ernest B. Colbert,
E Mail: ecolbert@mfi.net or
Phone or Fax 1-352-625-3793 03/2000

For Sale/Trade
- Continental C90-12 with logs for sale or trade for Lycoming O-320 (may consider O-290D or D2)
- Vacuum pump and drive for Continental O-200.
- Pair of new 500X5 Rosenhan wheels, brakes and tires.
- Some 4x8 sheets 1/16 & 3/32 aircraft plywood
Lionel Robidoux 613-738-1066 01/2000

Homebuilt glider for sale, Miller Tern C-GWKW. Wood construction, amateur built in 1978. Aircraft has always been hangared at Pendleton. No accidents. Total Time 845 hrs. L/D 34:1 $6500
Juergen Weichert (613) 746-7685
juergen@accolade.ca
More information at http://accolade.ca/glider 10/99

Articles Wanted

I am always interested in receiving submissions for this, your, Newsletter. You may bring articles to the monthly meetings or mail information to the post office box or send me an e-mail attachment at:

cbgregoire@sympatico.ca 01/2000

EAA Chapter 245 Membership Application

NEW:___ RENEWAL:___ DATE:__/__/__
EAA NUMBER:.....
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OTHER AVIATION AFFILIATIONS:
COPA:____ RAAC:____
OTHER:_____

Annual Dues: January 1st to December 31st. (porated after March31st for new members/subscribers).
Associate Member ____: $30.00 Newsletter plus Chapter facilities
Full Member: ____: $55.00 Newsletter, hangar, workshop, tiedowns
Newsletter subscriber ____: $30.00 Newsletter
Note Associate and full members must also be members of EAA's parent body in Oshkosh WI, USA

Make cheque payable to:
EAA Chapter 245 (Ottawa)
Mail to - P.O. Box 24149, 300 Eagleson Road, Kanata, Ontario, K2M 2C3