



EAA602 Log Book

Adirondack Chapter Newsletter
November 2006

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From The Presidents Desk

by Tim Cowper

We've had a great 2006 flying season, and, it's not over yet. The Fall colors have been very nice. In addition to getting up in Richie's Challenger once in a while, I've been flying one of Jack Schleich's J-3's under the instruction of Graham Prichard. What a great airplane, and an outstanding Instructor. Those taildragger landings are really fun! Thanks Jack & Graham.

Good news! I finally bought a new plane! Well, sort of. It's a home-built Zenair CH601-HDS, about 85% done. Needs a few things corrected and a little TLC, and it should be ready to go...hopefully. I bought it on Ebay, and Doug and I traveled to Toronto, Canada and trailored it back. Amazingly, we made it through the border no problem. Thanks Doug, again. I'm looking forward to getting it airworthy and flying.

The meeting this month was going to be an introduction to fabric covering, arranged by Don Leadly, with a later follow up class given by Don Hisert, both of which, I'm sure, will be awesome, but we decided to postpone them until next month. Instead, we're having a presentation by Carol Ann Garrett. Carol Ann recently made a complete solo circumnavigation of the earth in her Mooney. Her goal was to raise awareness and money to fight ALS, or Lou Gehrig's disease, and she has been traveling America talking to groups such as ours. Her presentaion should be fascinating. You don't want to miss it. See you there!

Tim



From Our VP's Desk

by Tony Rizzio

Well they are making me write another column this month I didn't think I was going to have to work this hard. They said just sit there and look pretty. Does Dick Cheney work this hard? I should get a raise.

You know im all excited about all the new planes and the new flyers we have. My Koala sold , and we will get another member. 2 new planes, Tom and Emma's plane and Fred will have a new one by spring. This will be some flying season.

Fred and I have been working on a membership application with the idea of giving them to each member to give to anyone who might be interested in the club. We will show you our idea at the meeting. It also includes a Know Your Fellow Member form this form should be filled out by all members this way others in the club can learn about your project's interests and plans. We would like your input it's your club. We also need a volunteer to update the web with all the new info.

We also need your ideas about programs and presentations for upcoming meetings. If you know of someone or something that will make our meetings more entertaining and less of a business meeting. Please let us know.

Tony

The Meeting This Month
Will Be At Edinburg
Community Center
(Old Town Hall)
@ 7:00pm on
MON. OCT. 30th



Atmospheric Gravity Waves

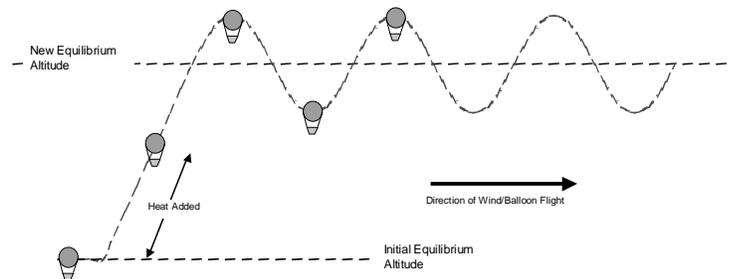
by Larry Saupe

Gravity waves? In the atmosphere? It seems like an odd topic in a newsletter, but for several light aircraft pilots it is definitely a topic of interest with regard to knowledge of the atmosphere that we fly in. Gravity waves are often called mountain waves and describe the phenomenon of an oscillatory flow (of wind) downstream of a large object (such as large hills or mountains). Most of us are more than familiar with the concept that flying downwind of a large object such as hills or mountains is highly undesirable due to unpredictable nature of the air and the often encountered turbulence. One other downstream flow condition that may form is the gravity wave. The gravity wave may or may not contain turbulence, and exists as a somewhat predictable oscillatory flow. Why use the term gravity when describing the atmosphere? The main reason is that the oscillatory motion of this wave is driven by gravity. Actually the interaction between gravity and buoyancy forces acting on an air parcel.

The familiar concept of a hot air balloon provides a good analogy. Consider a day without any wind. A hot air balloon will exist without motion at a specified altitude when the lifting force of the balloon (the buoyancy of the air within the envelope) exactly equals the opposing force of gravity. If the pilot were to add more heat to the balloon, the balloon would then climb owing to the lowered density of the air within the balloon. The balloon will continue to ascend until it reaches a new equilibrium point for the surrounding atmospheric density. In reality, the starting and end conditions represent steady state or equilibrium conditions. While the balloon is in motion it also contains kinetic energy and momentum (due to its mass and motion). Consider an aggressive pilot who quickly adds heat to the balloon, such that it experiences a very fast ascent. The balloon will quickly arrive at its new equilibrium altitude, however, due to

its vertical momentum, it overshoots this location. As it does, the unbalance between gravity and buoyancy forces changes signs, resulting in a larger force of gravity than force of buoyancy. The balloon then starts a decent, and if traveling fast enough overshoots the equilibrium condition once again, with the buoyancy forces now becoming larger than the gravity force. The balloon again changes direction and starts to ascend (much like spring mass-system with no shock absorber). If it were not for the dissipative (energy robbing) nature of the air viscosity (drag) the oscillatory motion might go on indefinitely. Let's now consider this same situation, but place the balloon in a 20 MPH wind. To the pilot sitting in the basket, the balloon oscillates as it did before (just going up and down about an equilibrium altitude). To the observer on a local hillside, the balloon appears to be traveling in a wave like motion (see Figure 1).

Figure 1 Oscillatory Balloon Motion

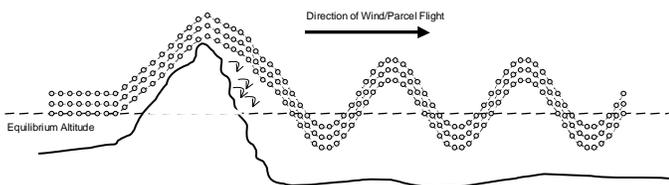


The motion shown in Figure 1 is precisely the motion seen when observing a gravity wave. Instead of one solitary balloon, now consider thousands of small balloons (we'll call them air parcels) traveling together in a given wind. Now, force these parcels away from their equilibrium altitude momentarily and they all will start to oscillate. In the case of gravity waves created by hills or mountains, the air parcels are forced out of equilibrium altitude as they travel up and over this obstruction. Once the parcels go over the top of the obstruction, they will either break up into turbulence or continue on down the lee side of the obstruction, attempting to once again reach an equilibrium altitude. Depending on local conditions downstream of the obstruction, these descending parcels may overshoot equilibrium



and create an oscillatory wave as the wind continues downstream (see Figure 2).

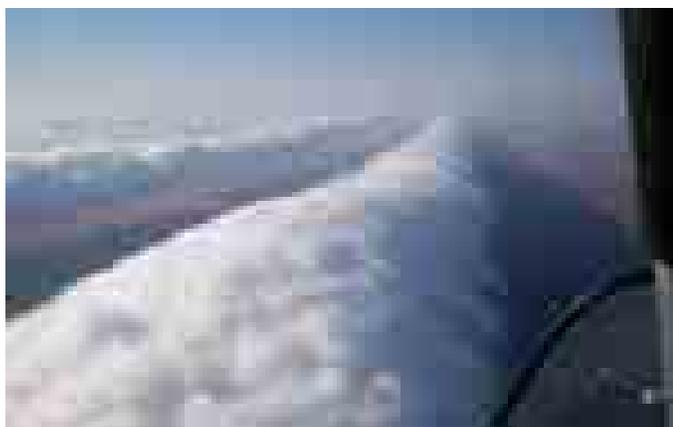
Figure 2 Air Flow over an Obstacle



Depending on atmospheric conditions and the terrain that creates them, gravity waves can extend for many miles and will typically slowly ascend over distance. These waves will either slowly dissipate or break up into turbulence near the end of its life cycle.

Weather, military and aviation agencies study these waves in great detail, as they can provide significant difficulties for unwary aviators. Reasonably sophisticated mathematical models are employed to predict the formation and behavior of these wave forms. If the air parcels contain high levels of relative humidity, the moisture may actually form a cloud as it travels through the high point (lowest pressure) regions of the wave. During these unique conditions the specific location and size of the wave can easily be identified (see Figure 3).

Figure 3 Soaring on a Gravity Wave



Though gravity waves can be quite dangerous if not treated with proper care by the pilot, they can also provide unique and unparalleled opportunities for the soaring crowd. Envision

soaring on the upward moving portions of these waves, much like a surfer catching a wave at a beach. A skilled soaring pilot can travel great distances while soaring along these waves. The picture in Figure 3 was provided by trike pilot William Olive while towing hang gliders up to a popular mountain wave in Australia. After releasing the hang gliders William has been known to soar his trike for many miles on this wave as well. This particular mountain/gravity wave is very well known and has been affectionately named Morning Glory. A fabulous internet link to William's (a.k.a Billo's) flying adventures on these waves is provided at the end of this article.

The above was only a very brief introduction to the topic of gravity waves. Interested readers can obtain more information via the following references:

Mathematical Modeling Reports

Theory of Airflow Over Mountains I&II; R.S. Scorer, Imperial College, London 1952
 UHP-APT 2002 Gravity Wave Campaign: Waves, Turbulence and Forecasts; G.Y. Jumper, E.A. Murphy, A.J. Ratkowski. AFRL Hanscom AFB, MA.

Texts

Atmospheric Gravity Waves; Carmen J. Nappo ISBN 0125140827
 Waves in Fluids; James Lighthill ISBN 0521010454
 Waves in the Ocean and Atmosphere, An introduction to Wave Dynamics; Joseph Pedlosky ISBN 3540003401

Descriptive Websites

<http://pcl.physics.uwo.ca/pclhtml/gravitywaves.html>
http://en.wikipedia.org/wiki/Gravity_wave

Gravity Wave Image & flying/soaring Websites

<http://www.williamolive.com/soliton/morning%20glory%20soaring%20link%20page.html>
<http://community.webshots.com/user/morningglory2005billo>
<http://www.dropbears.com/brough/Aopa.htm>

Around the world pilot Carol Ann Garratt will speak at our meeting on Monday Oct. 30th. Come on up for an interesting evening. 36,667 miles completed & 360 hours (with side trips), 7.4 months complete. What an experience! Check out her web page at: www.kerrlake.com/mgarratt/index.htm



EAA602 Trading Post For Sale

Cont. A-65
fresh rebuild no logs & Rotax 277 with gear box 14 total hours ,contact Fred Blowers 518 661-5623

Piper Colt
\$19,500 Experimental Colt, TW, sticks, Dual doors, 160 Lyc, 131 smoh strobes, gyro insts radio-xpond pix avail • Contact Tom Kravis - located Northville, NY • Telephone: 518 863 4988



By the way, I just picked up this little beauty. It's a Pulsar-582. It's about 80% completed (airframe is 100% complete) & the workmanship is beautiful. Just what I need, another project. Well you can't expect that I could spend the last 6 months helping Tim find his new plane and not end up finding something that I could fall in love with. See you all Monday.
Doug

EAA602 819 North Shore Rd Hadley, NY 12835

*President - Tim Cowper
VicePresident - Tony Rizzio
Treasurer - Rich Logerfo
Secretary - Walt Kostuk
Editor - Doug Sterling
Y.E. Coordinator -
Judy Sterling*

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