The Flightline

Volume 39, Issue 12 Newsletter of the Propstoppers RC Club AMA 1042 December 2009

President's Message

.Thanks for all the support for the Board, all of the incumbents were elected for another term we will do our best.

The next meeting will start at 6:30 so all will get a chance to fly the simulators ,Mike Williams and Jeff Frazier will be bring them in for the meeting.

Dave Harding secured another indoor site [Brookhaven Township Gym]. This will take place on Jan.16 sat 6pm to 9pm. we would like to have a good turn out so please try to make it.

Don't forget indoor flying at Tinicum Gym takes place Dec 4 Jan 8 Feb. 5 March 5 6:30 to 9:30. This is a good-time-for-all place, so come on out.

It is that time of the year again, club dues for 2010 are due in January but we will willingly take your money at the next meeting, or send them to Ray Wopatek at the address on the back of this newsletter. Remember to show him or send a copy of your 2010 AMA card too.

Dick Seiwell

Agenda for December 8th Meeting
At the Middletown Library;
Doors open 6:30 pm, Meeting 7:30pm.

1. Simulator "Flying"
2. Membership Report
3. Finance Report
4. Show and Tell

INSIDE THIS ISSUE

Minutes of the Propstoppers Model Airplane Club

November 10th, 2009 at the Middletown library

Call to Order took place at 7:30 p.m. by Vice-President Dave Bevan

Roll-call by membership chair Ray Wopatek showed 17 members and 1 guest

Minutes of the October meeting were approved as printed in the newsletter

Treasurer's report was deferred in the absence of the Treasurer

Old Business:

Nominations for club officers for 2010 were opened and closed as no new nominations surfaced. The previously nominated officers, all incumbents were elected by acclamation.

The new club online forum was suggested as site for a Club calendar that would automatically remind us of important dates such as elections. It also has a polling capability for member input on topics such as the date for a Club picnic.

Dave Harding suggested that we should formally invite other clubs in our area to our indoor events. He has also secured the Brookhaven Township gym for an indoor flying event in January.

New Business:

John Anderson from the Chester County Cloud Kings suggested that we get together for common events at their field. He pointed out that their field also allows fuel engine flying.

Show and Tell:

Eric Hofberg showed his mini electric Sukhoi ARF from Parkzone. He has flown it and said it was a handful when flying on high rates. (picture and info on Propstoppers Group message)

Mike Williams and Jeff Frazier brought laptop simulators for the club to enjoy. They were very popular and will be available again next month.

Dave Harding showed some of his unidirectional carbon fiber and passed out some sheets for the members. He also showed the rebuild of his Boehle Giant Old Timer.

Adjournment took place at 8:45 p.m.

Richard Bartkowski, Secretary

Calendar of Events

Club Meetings

Monthly Meetings
Second Tuesday of the month.
Middletown Library
Doors open at 6:30 , meeting at 7:30 pm.

8th December

Tuesday Breakfast Meeting
Tom Jones Restaurant on Edgemont Avenue in Brookhaven.
9 till 10 am. Just show up.
Flying after at Chester Park 10 am.

Indoor Flying

At the Tinicum School Gym.
6:30 – 9:30 PM.
December 4, 2009
January 8, 2010
February 5, 2010
March 5, 2010

Regular Club Flying

At Christian Academy; Electric Only
Monday through Friday after school till dusk
Saturday 10 am till dusk
Sunday, after Church; 12 pm till dusk

Special Club Flying

Saturday mornings 10 am
Thursday evenings in the Summer
Tuesday mornings 10 am weather permitting after breakfast at Chester Park.

Check our Yahoo Group for announcements;
http://groups.yahoo.com/group/propstoppers/

Beginners

Beginners using due caution and respecting club rules may fly GWS Slow Stick or similar models without instructors.
The club also provides the AMA Introductory Pilot Program for beginners without AMA insurance.

Propstoppers RC Club of
Delaware County, Pennsylvania.
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Propstoppers Web Site; www.propstoppers.org

Is there a Jet in your future?

Of course there is! The RTF manufacturers are beginning to churn them out and the dealers are beginning to push them on you.

Of course, you could build one too, or maybe you just want the jet look and can deal with a pusher or even a tractor prop driven high speed machine to thrill the rail birds (and scare the pants off yourself).

I watched these intrepid fellows fly their highly loaded, NiCad "fueled" Mig-15s in San Diego Mid Winter Electrics some years ago. Very impressive flights but look at the drama of the bungee launch.

"So what" you say, well look at the cover picture and see what I am about to propose; let us build a club launcher.

The models on the cover are not ducted fan jets but pusher propeller powered models, perhaps a bit easier to build than a full-up ducted fan model but just as impressive in the air. There is even an RC Groups group for them; http://www.rcgroups.com/pusher-prop-jet-models-237/ Although most of the posts are for park flyers that can be easily hand launched. I am thinking about much bigger and higher powered models; hey, I could use a launcher for my deltas too. This one in the line of Dave Harding's delta developments held here by Rick Grothman is a particular handful to launch.

Here is prolific Brit Chris Golds DH Comet and Nimrod, both with four speed 400 pushers. Beautiful models on the ground and in the air, but a handful to hand launch with four pusher props whizzing around your hands and head.

Here are another two of his models; a twin pusher English Electric Canberra (later Martin B-57 ~ ask Dave Bevan about that one, he worked on it extensively) and a Supermarine Swift (as in Supermarine Spitfire in the jet age). Both of these models could use a bungee launcher.

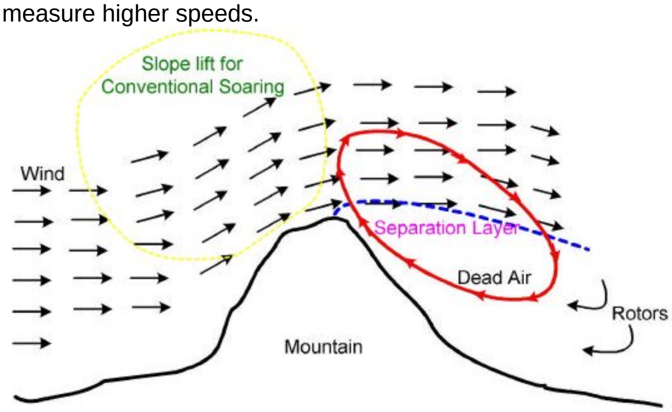
So what do you think guys? Shall we build one and have it ready for your next jet?

Dave Harding

Dynamic Soaring

Ella Fitzgerald is singing in my ear…. "Birds do it, bees do it, even educated fleas do it, let's do it…"…Dynamic Soaring? Well, birds do it but I don't know about the others, probably not as their L/D (lift over drag ratio) is too low. But Albatross' do it and range over hundreds of miles searching for food while expending little energy.

Over the last ten years or so RC glider pilots who slope soar have found that they can emulate the Albatross, not by the conventional front side of the slope soaring, but dipping from the front side into the lee side and return in a continuous loop. Speed increases with every turn and very high speeds are possible. Some believe they are flying over 400 mph and recorded speeds are in the high 300's (as they used to say in the real estate business, a long time ago) but that is because the radar guns don't respond fast enough to measure higher speeds.



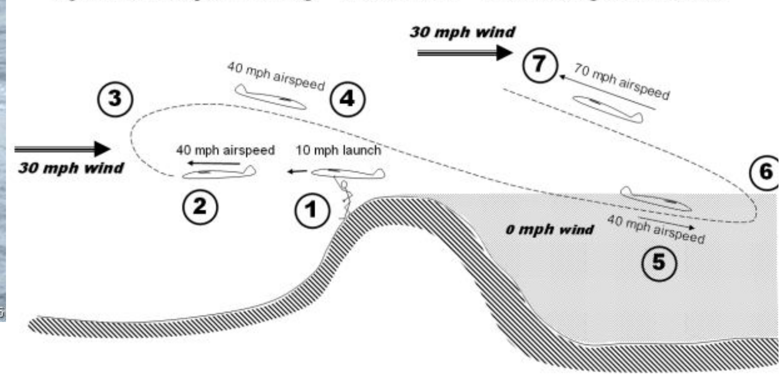
Now in my professional life I have learned when you are working on a complex technical problem you need a comprehensive analysis to obtain insights, but you also need a simple model to relate the overall process and not be baffled or misled by the complexities (can you say Global Warming Mathematical Model?). In the case of Dynamic Soaring the simple model escaped me. Somehow it all looked like perpetual motion, and I am not ready to accept that yet.

On the other hand, the other technical process mantra is "when theory and practice disagree, believe the practice"; and I know Dynamic Soaring works! What to do?

As luck would have it (no it is not luck come to think about it; my buddies are studying this and I am engaged on the periphery…. for now!) Anyway, recently I visited Professor Grenenstedt at Lehigh University to discuss DSing and get updated with his other projects: exhilarating! Prof G assured me he could explain the physics of DSing in a simple way, and he did, but I still didn't believe it so #1 grandson and I batted the theories around on the homeward drive. Finally I crossed the boundary and got it. But it does take the same kind of mind experiment the Einstein did in Switzerland early last century, you remember, when he discovered the laws of relativity! Well, maybe not quite that hard, but with the same elements.

First I will explain what happens then describe the physics. Let's consider an ideal dragless model flying on a slope against a 30 mph wind.

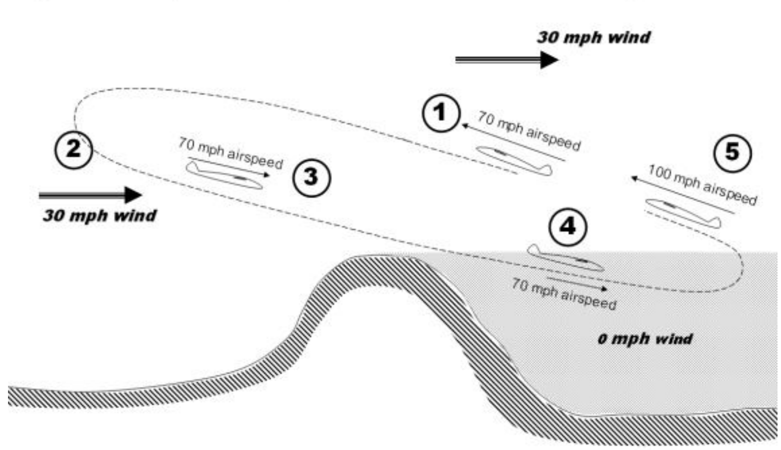
Dynamic Slope Soaring ~ First Pass ~ Ideal Dragless Model



1. The model is launched into the wind at 10 mph.
2. As it leaves your hand it experiences a 40 mph headwind; 10 + 30 = 40 mph.
3. You immediately make a 180 degree turn downwind. Because the model is dragless you loose no speed.
4. You now have a model travelling downwind at 40 mph (stay with me, we will expand on this later).
5. You dive the model into the windless lee of the hill. The model is now doing 40mph in still air.
6. You make another 180 degree turn back into the 30 mph wind.
7. You are now experiencing a 70 mph wind speed; 40 + 30 = 70 mph

Now we repeat the process;

Dynamic Slope Soaring ~ Second Pass ~ Ideal Dragless Model



1. We start where the last pass left off; climbing out of the shadow zone at 70 mph.
2. We now make another upwind turn of 180 degrees at 70 mph.
3. We follow this path back into the shadow zone at 70 mph
4. In the shadow zone we make another 180 degree turn upwind and enter the 30 mph headwind to achieve airspeed of 100 mph.

We may continue this process and the ideal dragless model will pick up 30 mph on each lap. But our model is not dragless and it turns out that the drag, expressed in L/D is a really important parameter. Here is why.

A real model with a specific L/D will slow down at each turn so not only will the jump in speed be less than the wind speed but there will be an upper limit to the speed achievable when the increase equals the loss.

Here is an example that Joe Wurts described in SE Modeler written in late 1998. He writes:

"One can derive the ratio of final velocity to initial velocity for a given rate of turn and a given turn L/D. It turns out that the wing loading drops out of the equations. The equation for final velocity divided by the initial velocity is:

V1/V0 = e^ (-theta/LD) where, V1 = final velocity V0 = initial velocity e = 2.7182818 (natural log #) theta = turn angle, in radians (180 degrees = 3.14 radians) L/D = Lift/Drag (glide ratio)

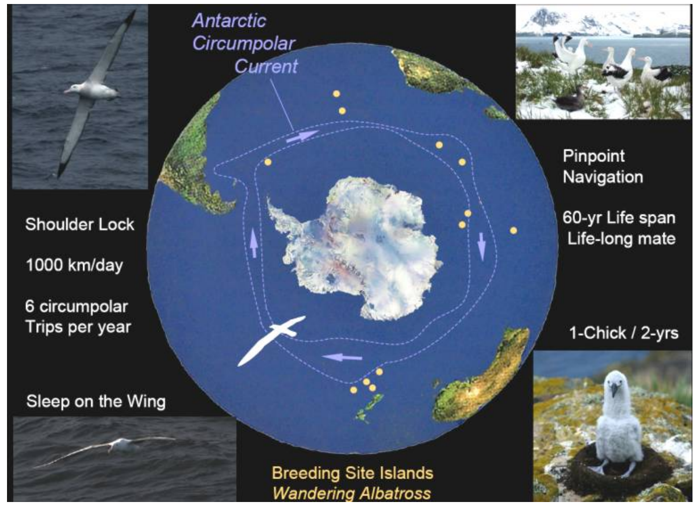
(Wait wait, we will make this easier in a mo)

Armed with this equation, one can start to figure out the potential from dynamic soaring. Assume a wind velocity of 30 mph and an L/D of 25 (good for a model sailplane). So, the airplane heading downwind has a ground speed of 40 mph (10 mph from airspeed plus the 30 mph tailwind) *(point 4 on our first diagram Ed.)*.

After crossing the shear boundary, the airspeed becomes equal to the ground speed *(point 5)*. Therefore, the plane is flying 40 mph ground speed in the "dead air" on the backside of the hill. Now, do a 180 degree turn in the dead air. The velocity ratio, V1/V0, for a 180 degree turn is 0.88 so you loose about 12% each turn. Therefore, the airspeed and ground speed after the turn is 35.3 mph *(point 6)*. Now, cross the shear boundary again into the headwind and the airspeed is now 65.3 mph *(point 7)*. Do another 180 degree turn, and the airspeed is 57.5 mph *(second picture point 3)*. In a single 360 degree turn, the sailplane gained 17.5 mph! Eventually, if you keep doing these turns, the velocity loss from the turn will equal the velocity gain from crossing the shear boundary. But, the final velocity will be about 134 mph!

An interesting note is that the maximum potential final velocity is linearly dependent on the velocity difference across the shear boundary. So if the wind speed goes from 30 to 60 mph, the final velocity potential goes from 134 mph to 268 mph!" And of course, with an even higher L/D you would go faster, as the SoCal flyers have demonstrated.

But this is slope soaring over a ridge with a shadow zone on the far side. The Albatross doesn't have this kind of environment, it soars over the Pacific Ocean surface; how? Well you see you only need a wind shear profile to fly DS and the Albatross flies in the wind shear over the ocean surface, typically about twenty meters high in the southern climes of its habitat. The wind at the sea surface is lower than at altitude and this profile and the Albatross' L/D in the high twenties is sufficient to make it work.



Surely flying in circles won't find enough food for this, the world's largest bird? It isn't, but the Albatross extracts energy from these flight modes and then uses this energy to move in the desired direction. But energy concepts are where I had the greatest difficulty in exorcising the potential motion beliefs. So, now we must go back and address the fundamentals and the fundamentals are involved with energy states. There are two energy states that concern us here;

- Potential Energy
- Kinetic Energy

Potential energy involves a weight raised to an altitude. In "Old English" units energy is expressed in Foot-pounds. Potential energy is easy;

Weight times the altitude = energy in foot pounds

Kinetic Energy is a bit more complicated;

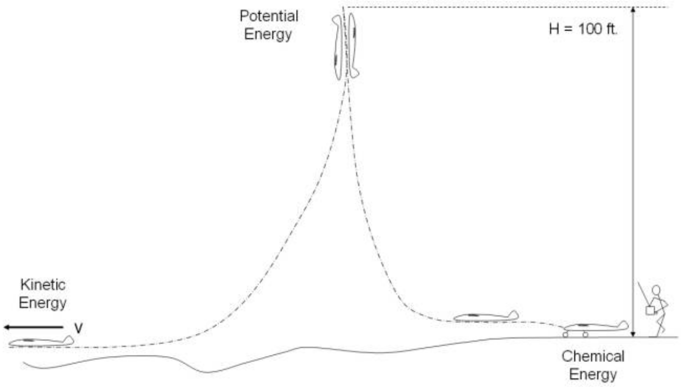
Weight divided by 'g' times velocity squared = energy in foot pounds *(Where 'g' is gravitational acceleration (32.2 ft/sec/sec) and velocity is in feet per second.)*

Now when we fly our airplanes we frequently convert one form of energy into another. In the case of our electric powered airplanes we first convert the chemical energy in the battery into kinetic energy as our model accelerates to takeoff speed, then more of the chemical energy to gain altitude; a combination of kinetic and potential energy. If we now shut off the motor and climb into a stall turn we convert all the energy in the model to potential energy; weight times height.

If we now dive the model to ground level we will accelerate to high speed, converting all the potential energy to kinetic energy.

With no losses, (no drag) we convert all the potential energy to kinetic energy the speed increase would be;

Speed increase = $\sqrt{height x 32.2}$ regardless of weight



So if we climb to 100 ft in the stall turn we will gain 56 ft / second. For a 1000 ft it would be 180 ft/sec or 122 mph
Conversely if we were to enter the zoom at 122 mph we could reach 1000 feet at the top of the stall turn; for a dragless model!

So how might we use this altitude gain? Well if we had a glider with an L/D of 25, much like the Albatross incidentally, we could travel 25,000 feet while loosing the altitude ~ almost five miles! And this is precisely what the Albatross does to maneuver all over the southern oceans. It doesn't climb to 1000 ft; rather it modifies the flight loop to favor moving in the direction desired with each turn. Apparently the Albatross can cover 600 miles in a day this way.

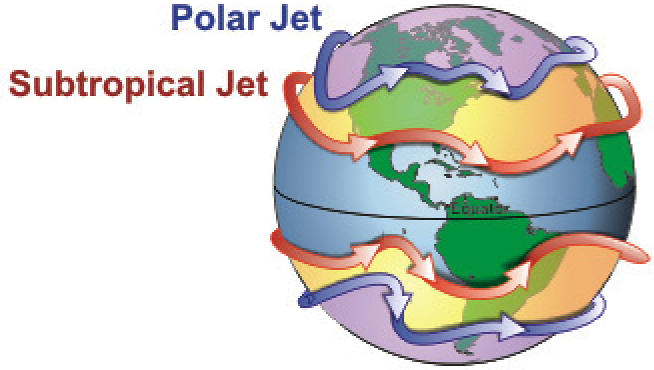
But speaking of energy, we were weren't we? The Albatross, like all animals gets its energy from food (chemical energy again) and it turns this energy into flight motions etc via its muscles. If we held our arms out for hours on end we would consume a good deal of energy and so does a bird holding its wings against the weight and aerodynamic forces. But the Albatross has another trick or two; it can lock its wing-bones into the cruise position and so does not consume energy powering muscles to do so. Furthermore scientists believe it can continue its cleaver flying while asleep!

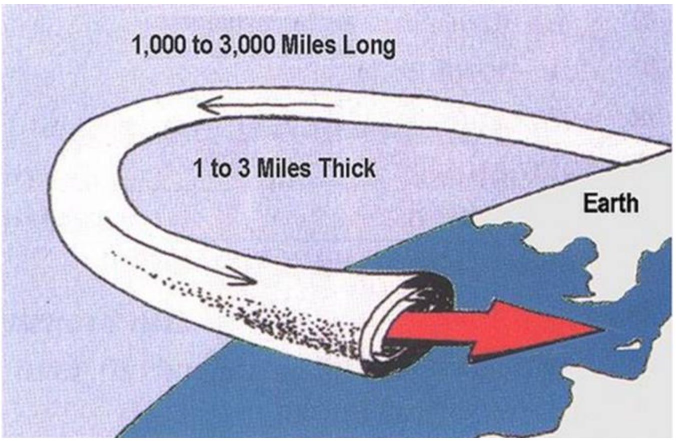
Ok, you say, why are we going into all this stuff when the subjects of interest are remotely controlled airplanes? Well it turns out that all this stuff is of some interest in the advanced airplane community because there is great value in unmanned airplanes that can stay aloft indefinitely, or for a very long time. And folks are just beginning to think that you could DS in the jet stream; the high speed, 100 mph+ currents that circle the world at altitudes of about 30,000 feet.

The jet stream is a fascinating phenomenon caused by a combination of tropical heating and polar cooling coupled with the earth rotation effects. You can read about it in Wikipedia; http://en.wikipedia.org/wiki/Jet_stream from which the following pictures were extracted.
There are four jet streams, the Polar and Subtropical streams in both hemispheres.

The jet streams, their position and strength, are vital components in today's commercial aviation. They are used to shorten west to east flight and avoided as much as possible in the other direction. Their effects on flights to Europe result in an hour difference in flight time between both directions.

It is apparent that the wind gradient of maybe 100 mph over 3000 ft is sufficient to sustain flight given an airplane with a good L/D, but how do you get up there? And how much maneuver room would you have in and out of the stream. How much lateral range and how fast could you fly upstream to reposition?





To make such estimations you need data on the strength and location of the jet streams. Fortunately there are almost 1000 permanent weather measurement sites around the globe that launch radiosonde instrumented weather balloons each day. The data gathered from these sites is posted to the World Wide Web for all to use (well, maybe not the Chinese as their web access is censored!)

So over the next few months I shall stay abreast of my east and west coast wizards as they probe both the art of the possible and the Government's deep pockets to move the aviation goal lines further. Meanwhile I am going to learn more about application of the earth's extreme winds when I attend Einar Envoldson's lecture on his attempt to soar to 100,000 feet over the Andes in the Southern Polar Jet Stream in a glider!

Dave Harding

Almost December at the Field ~ a grand day out.

Eric, Jeff, Mike, Mick, Daves Bevan and Harding shared it.

Eric and Peg Hofberg's Toy Train Christmas Open House

Our annual Toy Train Open House is scheduled for Sunday 12/27 from 2:00 to 5:00. All members of the Propstoppers and their friends and family are welcome. Refreshments will be served.

Eric & Peg Hofberg
836 Surrey Lane, Media, Pa. 19063
610-565-0408

Sam Nevis Blow-out Sale

Sam is selling everything; hundreds of items at blow-out prices. He has dozens of planes ready to fly and never flown. Many kits, motors, charger, radios, batteries Glow engines and power tools.
Some helicopters, one used but others un-flown. Everything must go.
I asked Sam if he could compile a list but he says there are too many items. Give him a buzz and arrange to visit his home in Drexel Hill.

Sam Nevins. 610-789-6031

Indoor Rubber Powered Free Flight

I want to extend an invitation to all of the Propstoppers, or any other AMA member, who might be interested in flying indoor rubber-powered free flight (No RC indoor allowed). We have obtained permission through New Castle County Recreational Services and have been flying every Thursday from 11am to 1pm at the Police Athletic League (PAL) gym at 7259 Lancaster Pike, Hockessin, DE. The only months we *can't* fly are June, July, and August. It is a fairly new facility with 3 basketball courts and a ceiling height of approx. 28ft. It is on the northwest side of Wilmington about 1-1/2 miles south of the PA/DE state line on Hwy 41. We would be happy to have the Propstopper's members and friends join us. There is no cost involved, but you must be an AMA member.

Newt Bollinger. 302 999-7027

Volume 39, Issue 12 Newsletter of the Propstoppers RC Club December 2009

Dave Harding – Editor
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Propstoppers R.C. M.A.C

We need a launcher like this when we start flying jets.

Tinicum School Indoors

6:30 – 9:30 PM.

December 4, 2009
This Friday

January 8, 2010
February 5, 2010
March 5, 2010

Look forward to seeing you there!

Mike Black

Brookhaven Borough Gym Indoors

I have arranged one date to show what we do and how we behave. So we can fly there on Saturday 16th of January from 6 pm till 9 pm I hope if we can put on a good showing and demonstrate that we can use the facility responsibly we may get a regular date when the calendar clears out.

Dave Harding

Membership Renewal For 2010

Membership renewal for 2010 is now available. You can renew by mail or at the club meeting in December

Bring cash or check and your 2010 AMA card.

Dues are $60.

Ray Wopatek
1004 Green Lane
Secane, PA. 9018

Please enclose a ***copy*** of your current A. M. A. Membership card,
And Please, Please enclose a Stamped self- addressed envelope.

Ray Wopatek Membership Chairman