



The Flightline



Volume 40, Issue 1

Newsletter of the Propstoppers RC Club

AMA 1042

January 2010

President's Message



Well Happy New Year to all. Maybe this will be the year for a new field.

I did hear that the school is pleased that we are there, keeping the field in shape. Hope to have the stones by the gate when the weather warms up a little .If the stones are frozen and hard to spread I will make a few calls to the members for help to spread them a few days before they are dumped.

Don't forget Jan 8th for the indoor flying at the Tinicum Gym 6:30 to 9:30. and Saturday 16th January at the Brookhaven boro gym; 6 till 9 pm

Dues will be accepted at the Jan meeting and are due at the Feb meeting.

We will have the simulators at the meeting thanks to Jeff and Mike. This would be the meeting for show n tells bring in some of your best stuff. The field looks great but don't get stuck in the mud.

Please note; The library has changed its hours to close at 8 pm. So we will open at 6 with meeting at 6:30.

Dick Seiwel

Agenda for January 12th Meeting At the Middletown Library;

**Doors open 6:00 pm, Meeting 6:30pm,
Library closes by 8:00 NEW HOURS**

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

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Minutes of the Propstoppers Model Airplane Club December 8th, 2009 at the Middletown library

Call To Order took place at 7:45 p.m. by Vice-President Dave Bevan after an hour of simulator flying by the members

Roll-call by membership chair Ray Wopatek showed 22 members present

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

The treasurer's report was presented by Pete Ottinger and accepted by the membership

Old Business:

The December indoor event on Friday evening at the Tinicum School was very successful. Remember we have 2 upcoming indoor events in January. They are listed in the newsletter.

New Business:

The members discussed possibilities for placing carpeting on a small portion of the field to create a smooth take off area. Several materials were suggested. We will try some of these as they become available.

Member Sam Nevins is moving and selling his extensive line of model planes. His contact information is in the December newsletter.

Show and Tell:

Dick Bartkowski showed the bones and plans of a new flying wing old timer he is building called "The Bobtail Contender".



Mike Williams and Jeff Frazier brought their simulators and set up at 6:30 p.m.. Many members flew before and after the meeting and had a great time in the process.

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 6:00 , meeting at 6:30 pm.

12th January

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

One time at Brookhaven Boro Gymnasium
16th January 6 till 9 pm

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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Model Aircraft Flight Simulators

I know there is a lot of interest in the Real Flight simulator that Mike Williams and I have demoed at the last couple club meetings, so I wanted to take some time to write up my opinion and thoughts to help folks considering a purchase.

I think the basic package looks like a real winner for the basic to advanced needs of users for practice of airplane / helicopter flight. You get the USB controller (transmitter) and a lot of great content as far as models and fields. Unless you are really into the expansion packs, which add more models and fields, then I would go with this option. This is the first time RealFlight has offered a simpler / less expensive package that I am aware of - in fact, I personally would have bought this, had I not had the full G4.5 version that I upgraded to G5 for \$79.98.

There are some really neat other things that I never demoed at the club meetings that add to the experience of learning and skill building. For instance, there are a few really slick "events" that users can benefit from like:

- * **Spot Landing** - In this event, you get more points for landing in the middle of the striped designated area
- * **Dead Stick Landing** - Same as above, but the engine is "dead" making the precision landing attempts
- * **Limbo** - Here you have to make it under a progressively lower limbo bar and land after each successful attempt
- * **Helicopter Auto-Rotation Landing** - In this one you go up to a specified altitude and lose all power and land on a striped pad like above
- * **Helicopter Orientation Training** - I like this one - you need to "imitate" an instructor helicopter and hold the position for so much time
- * **Helicopter Hovering Training** - There is a defined / drawn circle that you need to stay in, or your helicopter explodes!

There are also some really fun items like "show me the money" where RealFlight keeps a "tab" of the estimated costs of your crashes during that session. Some costs are pretty sobering!

I know there are other simulators out there, but I do not have any "hands-on" experience with them. I can tell you that my flying skills and confidence drastically improved because of having a simulator. As I fly both planes and helicopters in real life, I really feel the physics of the models to the input from the transmitter is extremely realistic. In fact, I never flew a fully functional helicopter until I built my TRex500ESP - the first day I was able to confidently do basic hovering - that says something. Although, I will admit, I was scared / nervous as hell!

The bottom line is this - I personally feel whether you pay for the basic or full version (\$99.98 / \$199.98 respectively), you are getting your money's worth, as you will learn and make mistakes that net costing you NOTHING. That is awesome - especially with how much time and money we all invest in our models.

Real Flight Basic - \$99.98 ---
> <http://www3.towerhobbies.com/cgi-bin/wt...XXSG5&P=ML>

Other options (more expensive, but you get more models and can use add-ons):

RealFlight 4.5 - \$199.98 (my personal favorite, has better single player training events) ---

> <http://www3.towerhobbies.com/cgi-bin/wt...XVPC7&P=ML>
RealFlight G5 - \$199.98 (latest one, but has limited single player events, but better multi-player events)

---> <http://www3.towerhobbies.com/cgi-bin/wt...XYCX1&P=ML>

RealFlight Basic R/C Flight Simulator on Mode 2 from Great Planes (\$99.98 at Tower Hobbies Online)

This version is Mode 2-Left Hand Throttle and Right Hand Elevator, USA Standard

Compatible with Windows Vista, XP and Windows 7

New RealFlight Basic gives modelers all of the essentials needed for an ultra- realistic R/C flight simulator experience. Along with an excellent variety of aircraft and flying sites to choose from, potential flyers will also enjoy the same flight physics that have made the full version of RealFlight the best selling sim for the past 11 years! RealFlight Basic features many aircraft and flying fields found in current versions of RealFlight G4.5 and Expansion Packs-not stripped down, low quality ones. The Basic controller is based on an actual transmitter-unlike those found on similarly priced flight sims. RealFlight Basic offers all of the fun, convenience and educational benefits of simulated R/C flying-for less!

FEATURES: Choose from 47 aircraft and 6 PhotoField flying sites Easy navigation using the controller and QuickSelect menus Picture-in-picture views of the transmitter and a zoomed-in image of aircraft can be toggled on and off Control wind speed and direction Showcases all of RealFlight's unparalleled flight physics Single DVD

3D Flying Sites: Evergreen Airport Gold Country Aeromodeler Park Grass Flatlands Great Planes E-Fest Stone Creek Field Superstition Airpark RealFlight Basic includes 47 different aircraft ranging from gliders, sailplanes, foamies and 3D aerobats to electric and 3D helis.

Airplanes: ElectriFly Edge 540T EP 3D XLC ElectriFly E-Performance Series Reactor Bipe ElectriFly Matt Chapman Eagle 580 Great Planes 38% Extra 330S Krill 39% Katana Ultimate Biplane Yak 54 ElectriFly Sequence F3A 50 ElectriFly Slinger Great Planes Big Stik Great Planes Revolver Great Planes Super Sportster AirfoilZ Extra 260 Hybrid ElectriFly Pluma 3D Biplane ElectriFly Yak 54 3D Indoor EP ModelAero AeroCat E-Jet Hobbico Upstar 2M EP Hotliner AT-6 Texan ElectriFly Fokker D.VII Great Planes PT-17 Military Stearman P-51D Mustang Piper J-3 Cub RealFlight Airliner Spitfire .25 FlyZone SkyFly 2 Hobbico NexStar Hobbico NexStar EP Douglas A-4 Skyhawk F-86 Super Sabre Harrier L-39 Albatross AR-6 Endeavor F5D Pylon Racer Gee Bee R-2

Helicopters: Align T-Rex 500 EP Heli-Max Axe EZ Heli-Max Novus CP Miniature Aircraft X-Cell Fury 450 Ecoreuil Robinson R22 Impala .30 Trainer Dolphin 3D (.46) Dominion 3D Miniature Aircraft Stratus 90 Synergy N9 Thunder Tiger Raptor 90SE

INCLUDES: One Great Planes Basic RealFlight R/C Flight Simulator DVD with Controller

REQUIRES: Minimum Recommended System Requirements: Windows XP, Windows Vista or Windows 7 Intel Pentium 1.0GHz or equivalent 512 MB RAM 1GB Hard Drive Space DVD Drive 3D Accelerated Graphics Card with full DirectX 9 support and 32MB of dedicated video memory USB Port Local Administration Access required

COMMENTS: RealFlight Expansion Packs and Add-Ons are not compatible with RealFlight Basic.

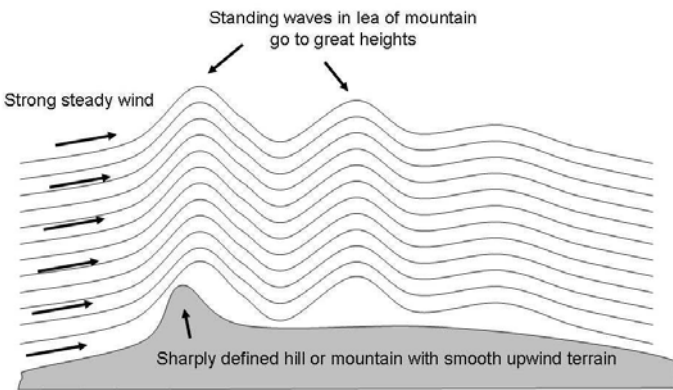
I hope this helps somewhat - if anyone has questions, please post here so we all can benefit from the discussion.

Jeff Frazier

Perlan, Soaring to 100,000 Feet



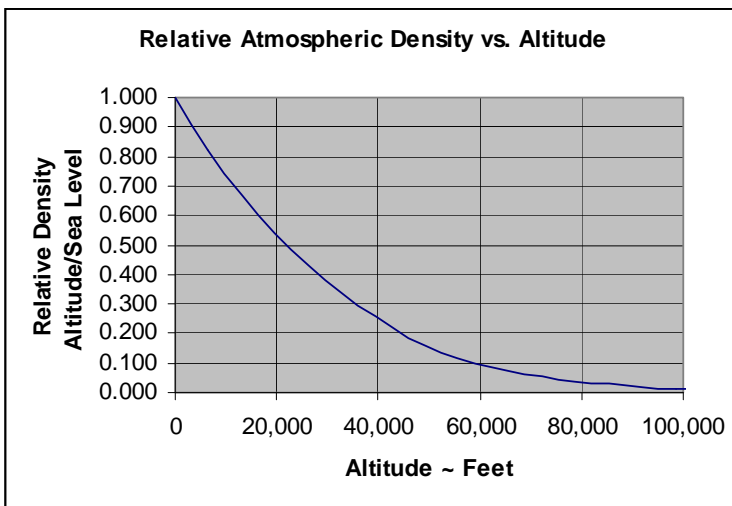
It began as project between Steve Fosset, a record-setting aviator, sailor, and adventurer, and the first person to fly nonstop around the world in a balloon, and Einar Enevoldson, a record-setting test pilot. Enevoldson was aware of mountain wave lift, a phenomenon in which air blowing over mountains creates ripples in the layers of air above it for up to 100,000 ft, depending on the strength of the wind and steepness of the incline. He knew sailplanes could use these stacked ripples to gain altitude.



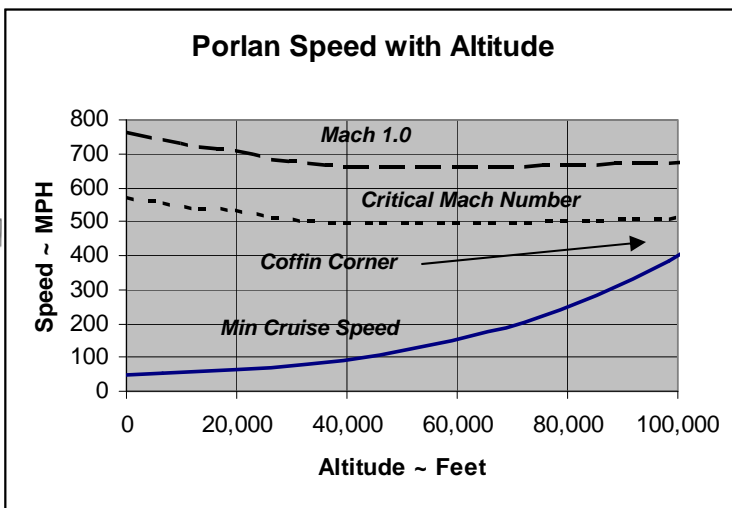
Indeed, the prior record was set in the Southern Sierras using just such a technique to reach 48,000 feet. Then he heard about the Polar Vortex, a consistent swirling wind that circles the South Pole during its winter. As this wind passes over the Andes in southern Argentina, it creates mountain waves that climb to 110,000 ft or higher. Enevoldson put the two together, recruited Fosset, and set about carrying out a mission that would see a sailplane climb the Polar Vortex to a record 50,727 ft in 2006. The next step was to custom build a sailplane that could carry them to 100,000 ft, breaking the altitude record for manned flight set in an SR-71 spy plane.

But first let us understand these wave phenomena. We must begin with the atmosphere. Earth's atmosphere is a mixture of gasses held against the earth's surface by gravity. The weight of these gasses at the surface is about 14.7 pounds on every square inch; the atmospheric pressure. As you climb higher there is less atmosphere above you so the pressure and density are less. Pressure and density are related by the gas laws and I bring this relationship in here because it is the air's density that allows wings to lift.

Lift is related to the local density and the square of the speed. Said another way, for an aircraft of a given weight the higher it goes the faster it must fly to generate the lift necessary to carry the weight.



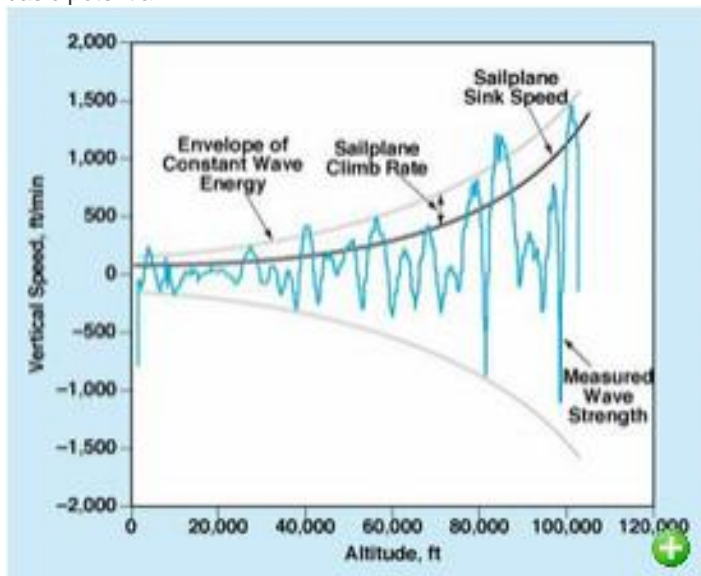
Here is the Perlan speed variation with altitude for cruise flight. Also shown is the speed of sound; Mach 1.0 and the likely critical Mach number for the Perlan's airfoil. The difference between the cruise speed and the critical Mach number speed is known as the "Coffin Corner". Go too fast and you encounter Mach buffet (remember the movie Sound Barrier?) Go to slow and you descend. On the U-2 the speed range in the Coffin Corner was two knots.



But the next problem is; are these standing waves strong enough to lift the sailplane? Without lift a plane like the Perlan steadily descends. The rate of descent can be calculated by knowing the inherent aerodynamics of the plane in terms of Lift over Drag fraction; L/D. In the case of the Perlan it is about 30:1. Now the actual rate of descent is the cruise speed divided by the L/D, and as we have shown the cruise speed increases significantly with altitude, so to stay aloft or climb the up-wash in these standing waves must exceed the rate of descent.

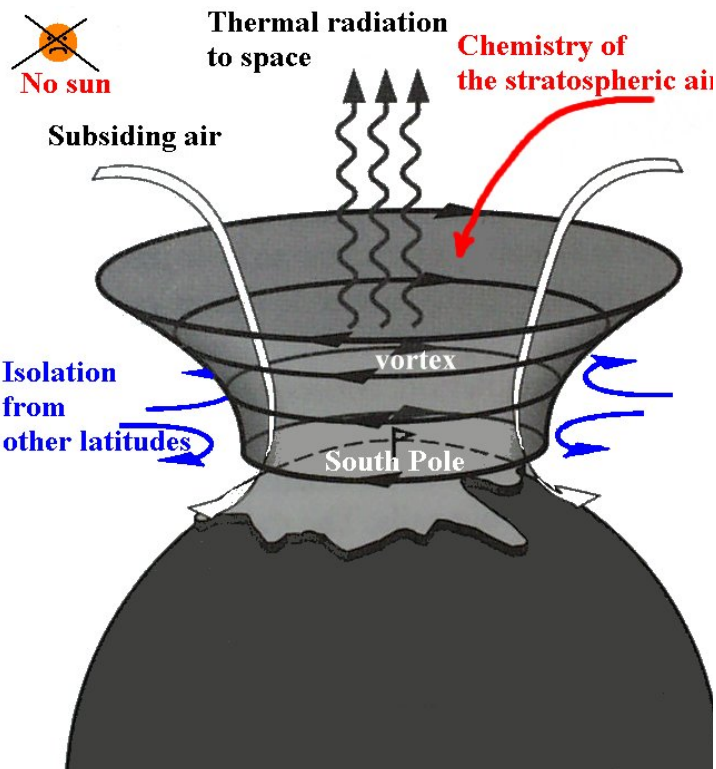
What is driving these people are the measurements made by the various metrological surveys. Here is a set of

standing wave up-wash velocities (and downwash) compared to the rate of descent of the Perlan. Note that some of the peaks at high altitudes have significantly more up-wash than the Perlan's rate of descent indicating that the project does have a basic potential.

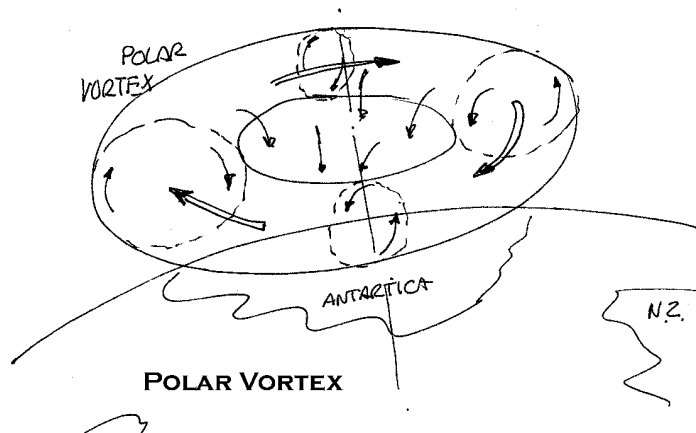


But why are the winds and standing waves so strong at high altitudes? What is this Polar Vortex, what causes it and how does it generate the high winds?

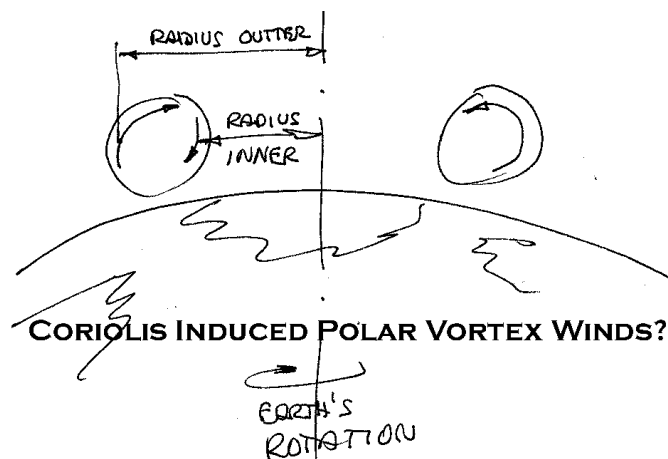
During the solar winter at the poles we find a pattern of intense cold which causes wide scale downward flow in the atmosphere. Now in all fluids and gasses flows at subsonic speeds result in pressure and velocity disturbances being communicated throughout inducing other flows.



The Polar Vortex flow is not unlike a smoke ring which is also induced by a mass of flow injected into a mass of fluid (air) except in this case the vortex sits on top (or bottom) of the rotating earth and the mass of flow is the cold depression.



I believe this condition produces its high winds due to interaction between the earth's rotation and Coriolis forces acting on the vortex core flows.



If you examine the core flows in relation to the earth's rotation you can see a similar picture to the common understanding of the ice dancer twirling at higher speeds by drawing in her arms. These are the same forces that act on helicopter rotor blades as they flap up and down during the rotation. These forces are the reason that most full-size helicopters have rotor hubs that allow the blades to move fore and aft.

Nevertheless, the Polar Vortex exists and does indeed produce very high winds at high altitudes and furthermore these winds occasionally impinge on the southern Andes mountains establishing the conditions whereby the Perlan project may meet its goals..... providing some rich guy puts up the money.

The Airplane

To build the plane they turned to **Windward Performance** in Bend, Oregon. With a team of aeronautical and tooling experts led by Greg Cole, the relatively young company has designed and manufactured the SparrowHawk, the first sailplane or glider built in the U.S. in 30 years.

The Perlan, Spanish for pearl. (It was named for the mother-of-pearl clouds commonly seen at high altitudes around the Polar Vortex.) Cole tackled the design issues and problems

of adding a pressurized cabin, a system and backup for scrubbing CO₂ out of the air so pilots needn't take bottled air, and a heater to ward off the -100°F outside temperatures.

Cole and his team conducted experiments to help them determine how much visibility a pilot would need to fly Perlan. He used the results to position round portals around the cockpit, much like Rutan's SpaceShipOne. The portals are more structurally sound than bulbous cockpit canopies. Cole also sized the cockpit for two passengers seated fore and aft. Although this created a larger and more-expensive aircraft, the options for a sponsor to serve as copilot, as well as future research flexibility, led Cole and the Perlan team to choose this configuration. (Unfortunately, Fosset died about this time in the project. But Morgan Sandcock, an Australian business man, stepped in to provide much needed financing. He plans on being onboard for the record setting attempt.)

After crunching the numbers, Cole discovered that at 90,000 ft, Perlan would be circling at about 44 knots indicated, but its true airspeed would be 300 knots and its Mach number would be 0.6, thanks to the thin atmosphere. (Air at that height is only 2% as dense as air at sea level. So planes must fly much faster to generate lift.) This put the plane right on the edge of transonic flight, a regime that gives aircraft designers fits. To get up to 100,000 ft, Cole would have to really push the envelope.

Realizing his limits, especially the financial ones, Cole opted to shoot for 90k ft, leaving the 100k ft mark for the next phase in Project Perlan. "I designed the plane to fly well at 60k ft, so it should do fine up to that point and through to 90k ft," says Cole.

Cole is confident he and his team will uncover some new engineering tricks and techniques during the project. "And if we get up top 90,000 ft, which I think we will, there will be a clamoring for scientific flights to take samples and measurements. Unlike balloons, we will be able to get data from specific areas and get it back in a timely manner." Perhaps the biggest hurdles for the Perlan team is getting a million dollars in funding and some good weather conditions.

Editor's note; attending the Lehigh University lecture by Einar Enevoldson was a thrill. This fellow is no spring chicken as they say but bright as a tack and still on the leading edge. It is great that such people still exist and we can listen to them on occasion.

Dave Harding

FAI Record Considerations

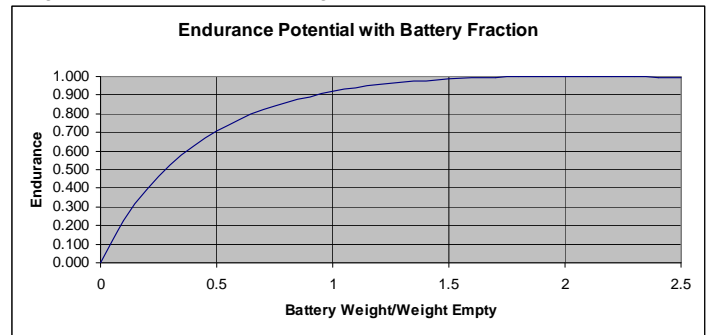
At various times I have reported on flying buddies and acquaintances who are not only thinking about setting FAI records but actually doing something about it. Recently I reported on the work of Professor Grenestedt of Lehigh U, but the other week I was contacted by a Brit with similar interests. Simon Wright wrote after he read my Giant Blog. He plans to set new UK records for FAI qualified electric airplanes for endurance, altitude and distance. Unlike the California and Lehigh friends the Brits specify the model must remain in sight of the flyer and no downlink of information is allowed; hence no GPS driven stuff, although you might argue that a GPS driven autopilot and timer that allowed the airplane to climb to altitude then descend meets that criteria.

Anyway it raised questions to do with the maximum endurance for an FAI qualified airplane. The FAI rules allow an all up weight not to exceed five kilos and a 1.5 sq meter surface area. Dick Bartkowski and Prof Grenestedt have both computed the theoretical maximum duration in terms of the battery size, or rather weight. Although the factors for electrics are similar to

gas driven airplanes there is one significant difference; there is no fuel burn-off for electrics and the weight remains constant throughout the flight.

The Rutan Voyager had a fuel fraction of 72% of all up weight but of course towards the end of the flight the all up weight was only about a quarter of the takeoff weight.

It turns out that the calculations of these basic relationships is quite simple and results in the finding that for any given airplane, motor and battery etc. the maximum endurance is obtained when the battery is twice the empty weight or 2/3 of the all up weight. Here is the relationship.



The physics here relates to the power required to fly the successively heavy airplane as you add battery mass. You see as weight increased so does the speed required for cruise flight. But power increase with speed cubed so there is successively reduced endurance increase with added batteries until you reach the point when endurance diminishes.

Simon is apparently an experienced modeler and the British current records quite modest since the rule changes and his goals are also modest, but the potential with his proposed airplane is there.

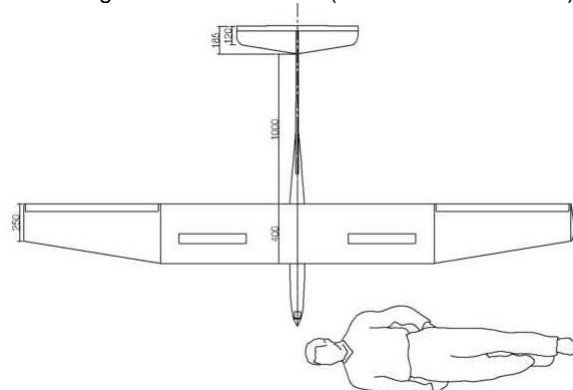
UK Records

- Duration 1h 46m 8s (12h 36m 46s)
- Distance 36.7km (164.19km) and
- Altitude 848m (3418m).

Simon's Goals

- Altitude 1000m followed by the mile then 2km.
- Duration of 3 hours, then 4 and hopefully 5 hours.
- Distance 2 hours at 30 mph cruise speed say 80km initially.

The reason Simon contacted me was for some advice on motors etc. It turns out that the record machine has characteristics almost like the Boehle Giant but better L/D so that duration motor works and the analysis of duration with six 4s 5000 mah batteries indicates a potential for over eleven hours and range of 300 miles or so (don't run into the sea!)



Dave Harding

More California Dreamin'

Once again I find myself in California with boundless model airplane opportunities, of which I will sample a few. Today flying buddy Mike Myers and I dipped our toes in the flying milieu first with a trip to the Sepulveda Basin flying site. We have been to this flying site many times over the years. It is sited in the Balboa Park recreation area of the southern San Fernando Valley. It is entirely located in a flood control basin behind the Sepulveda Dam. Of course, when there is a period of abundant rain the whole "Dam" area floods, but fortunately this doesn't happen very often.

There are extensive macadam runways, taxiways and pit areas for big airplanes and a separate area for helicopters and U/C. At one end the electric flyers have put down their stake as they have a separate building and shaded pit area with solar powered charging facilities. "park flyers" are flown off this end of the field which is scrubby grass. The rule is models under two pounds fly here, and that is where we put in a couple of flights.

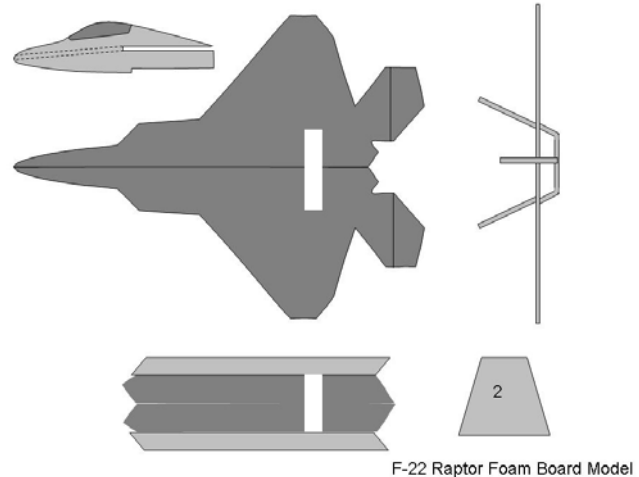
One reason I like flying here is the abundance of innovation you can see. And this time was no exception. Although there were relatively few flyers two of them took my attention. They were both flying foam board "jets" with centrally mounted pusher prop drive. Both models put on quite a flying display. Here is a picture of an F-22.



The other model which was perhaps a Rafael French canard delta was unpainted and my pictures turned out poorly so I will describe the construction which could apply to a wide variety of models. They are made from AC Moore or Michael's Foam Board, a product with paper on each side of a foam board. The paper stiffens the product and allows for easy painting etc. The boards are available in 1/2 inch and 3/16 inch thicknesses in 20 x 30 inch form.

The construction consists of a flat top surface in the form of the aircraft's plan form with control surfaces cut in as required. The lower surface is formed as a flat tray with vertical or sloping sides and is attached to the bottom forming a rectangular tunnel which looks like the inlets when viewed from the front and the exhaust when viewed from the rear. Air flows through this tunnel. The fuselage is represented by a profile piece and fins and rudders are added as appropriate. Servos are glued through the surfaces and the receiver, ESC and battery are mounted in the tunnel so as to protect and cool them.

Now the key part is the motor – propeller assembly. These models were flown with small outrunners and an appropriate propeller and this is mounted in a slot cut right through both surfaces. The longitudinal position of the slot is selected so that the CG ends up where you want it. One model, that shown above has the motor quite far aft whereas the other had is forward. Here is how you might build an F-22 Raptor for yourself.



F-22 Raptor Foam Board Model

But back to the Sepulveda flying site. Problem is they are under the approach to the Van Nuys airport so altitude is restricted to 400 ft. (Which is the case for all the model flying fields that the FAA knows about!). So Mike has joined, now don't laugh or cry, The Port A Potti Pilots. They have an excellent field (see the cover photo) with no altitude limits. It is located in Sylmar (site of an earlier earth quake of the same name) up in a wash behind another flood control dam. This site is more remote although housing is crowding in on it. There is a fine view of the surrounding mountains and the facilities are excellent. There is a fairly long paved runway and taxiway and covered areas with sturdy park benches for setup. The only downside is the surrounding terrain which is very rocky on one side and covered in six foot high scrub growth that is probably close to impenetrable. Not a good place to put a model down, you might not get it back at all. On the other hand you won't need the number of the tree climber, or cherry picker truck owner (Dick Seiwel).

I expect Mike and I will be back there when we want to fly glow models or go high.

Oh, why didn't we fly at our usual Rose Bowl site? Hmmm I think there was something going on there.....

Dave Harding from SoCal

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

Dave Harding – Editor
4948 Jefferson Drive
Brookhaven, Pa. 19015
610-872-1457

Propstoppers R.C. M.A.C



Whata name, but good field in a flood control area behind a dam in Los Angeles; paved runway too.

**New meeting hours; 6:00 to 8:00 meeting at 6:30
Middletown Library**

Tinicum School Indoors

6:30 – 9:30 PM.

January 8, 2010

February 5, 2010

March 5, 2010

Look forward to seeing you there!

Mike Black

Brookhaven Borough Gym Indoors

Saturday 16th of January from 6 pm till 9 pm

I have arranged one date to show what we do and how we behave

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 January

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