



The Flightline



Volume 38, Issue 5

Newsletter of the Propstoppers RC Club

AMA 1042

May 2008

President's Message

Well the fields are in good condition and waiting for your planes .Well this is the month for pride day I would hope to have a nice turn out. These are the people who give us the fields so please lets give them a good show this is a great hobby .If we could get more of the township interested maybe we could get a better field with a long time lease which would be good. **I'm going to ask everyone try and make time for this event this is the big one which could help you and the club maintain a flying site in the township.** I believe set up time is to be complete by 9AM please come on time. There will be a helicopter landing around noon which could end the flying but we will see. The next meeting will be at the library 7:30 Tues. the 13th. Hope to see you there bring some show & tells

See you at the field Christian academy Thursday night and at the meeting Tues. the 13th

Dick Seiwell

*Agenda for May 13th Meeting
At The Middletown Library;
Doors open 7pm, Meeting 7:30pm.*

1. Approval of April Meeting Minutes
2. Membership Report
3. Finance Report
4. Discussion of 2008 event plans
5. Plans for Middletown Community Pride Day
6. Show and Tell

Minutes of the Monthly Meeting

April 8th, 2008 at the Middletown library

The meeting was called to order at 7:30 p.m. by Vice President Dave Bevan

Roll-call by membership chair Ray Wopatek showed 16 members present

Minutes of the March meeting were approved as printed

The treasurer's report was presented by Phil Oetinger and approved by the membership

Old Business:

Dave Bevan updated us on the Widener aircraft team. Their plane is ready and they are currently preparing to give a report on their project to the Widener faculty. They will also report on their design and predictions at the Marietta Georgia international competition site. They will also have to fly the model in the contest to verify their predictions. Because of problems with the current arrangement, they will need a new test field for next year's project.

President Seiwell finalized our plans for the Middletown Pride Day celebration where we will present and demonstrate various models.

The club had a prolonged discussion on current fields and future field possibilities.

New Business:

President Seiwell proposed that we get a box of small gliders to hand out and pride day. The club approved and appropriated \$50 for the project.

Show and Tell:

Mick Harris showed his 52" wingspan Brooklyn Dodger, a 1941 old timer design reengineered for electric power. He powers it with a new brushless and LiPo battery.



INSIDE THIS ISSUE

- 1 **President's Message**
- 1 **Monthly Meeting Minutes**
- 2 **April Meeting Agenda**
- 2 **Calendar**
- 3 **At the Fields**
- 4 **Tool Boxes**
- 6 **Here We Go Again, a new model for Europe**
- 8 **Middletown Pride Day Event**

Calendar of Events

Club Meetings

Monthly Meeting Tuesday 13th May 2008 at the Middletown Library Doors open at 7:00 pm Meeting at 7:30

Middletown Township Community Pride Day, Williamson Trade School Saturday 10th May, 10 till 3 pm

Summer Monthly Meetings at Sleighton Field, Second Tuesday; gas flying ok.

Tuesday Breakfast Meeting
The Country Deli, Rt. 352 Glenn Mills
9 till 10 am. Just show up.

Regular Club Flying

At Middletown / Sleighton Field

Monday - Friday;

10 am until dusk - Electric Only

Saturday

10 - 3pm-for FUEL PLANES and

10 - Dusk for Electric

Sunday - 12 - Dusk - Electric Only

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 Sleighton Field

Tuesday mornings 10 am Sleighton Field

weather permitting after breakfast.

Beginners using due caution and respecting club rules may fly GWS Slow Stick without instructors.

Dave Bevan showed a small balsa profile spitfire glider with a 12 wingspan that he built 35 years ago. He flew it in the meeting room and it flew as well as it did many years ago.



Frank Robinson showed his Ford Model T spark box used to ignite the Dynajet motor which we may demo on Pride Day.



Adjournment took place at 8:45 p.m.

Dick Bartkowski, Secretary

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At The Fields

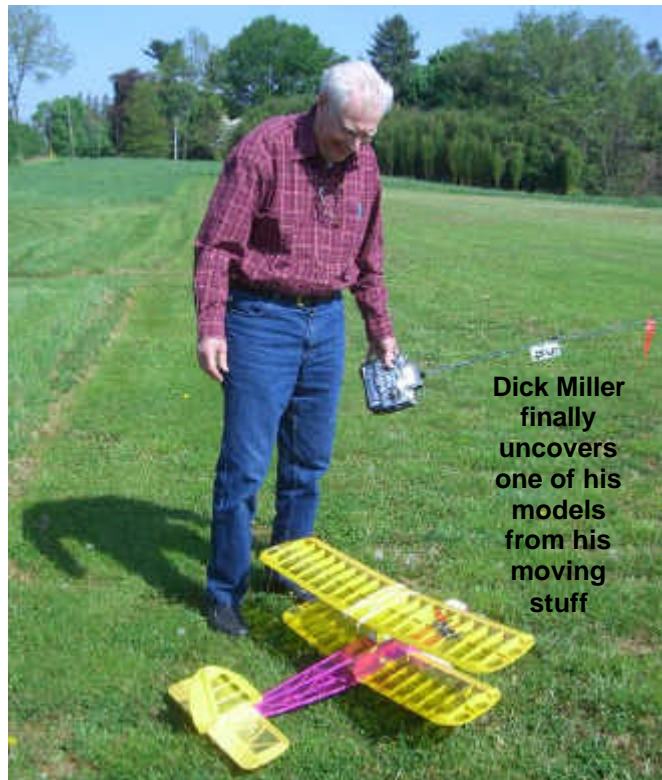
The good weather has brought out some Propstoppers at both fields on the usual Tuesday morning, and Saturday mornings at Sleighton, and Thursday evenings at Christian Academy.

Remember, the fields are available every day according to the limits described on page 2.

Potential Junior member Drew with his trainer following a good flight at Christian Academy



Ed Gortezka with another Bitza, or something like that. A Korda rubber fuselage with other bits and pieces.



Dick Miller finally uncovers one of his models from his moving stuff



Chuck Kime assists a Delta Dart group in the Coeburn School Gifted Children's program.

Tool Boxes

Working efficiently allows us to put a dent in that old saw "too many airplanes, too little time" so it is worth putting some effort into it.

When I started back into the hobby I was living in California in a rented house. We had taken very few of our personal things and, of course, no modeling tools. My colleagues at Scale Composites enticed me to think about aeromodeling again as most of them were modelers and they held semi regular slope combat sessions in the local hills. Also, in our community in the Tehachapi Mountains there was a model club with its own field. I began to attend their meetings.

Soon, after surveying the magazines and catalogs I decided to build something; a Skimmer electric glider from Hobby Lobby. This was a stick-build kit so I needed some tools.

At that time we lived high in the mountains in a magnificent modern house with views 270 degrees over the mountains and surrounding valleys.



Even in late winter the sun was strong and so was my desire to build outdoors on the deck.



Of course it is a bit of a pain to take your modeling gear outdoors as you find what you need is back in the shop and you spend half the time walking back and forth. So I decided to make a tool caddy from corrugated cardboard. It had a center divider with an integral handle. On one side were a series of short compartments for knives, pins, pliers etc. and on the other side two long compartments for screwdrivers, files etc.

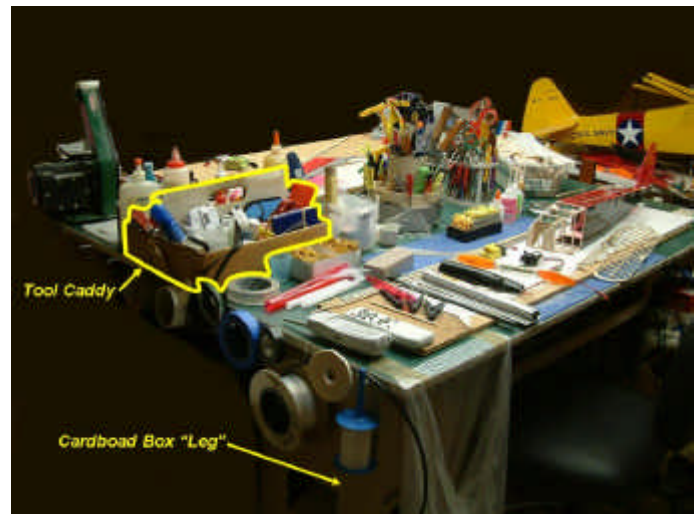
This worked well enough and soon I found that it was also useful at the flying field, indeed there were efficiencies associated with knowing where to find a particular tool which of course was in the same place at home too.

When we returned to Pennsylvania the tool caddy

came home with me along with a few models and a good deal of new stuff.

In Pennsylvania I had maintained my basement workshop that I built when we moved to our current house in the early 60's but it had morphed into a motorcycle shop. The modeling stuff was largely still there, stashed away in various nooks, but it was woefully out of date so some upgrading was in order; I was back into aeromodeling.

I had been attracted to a modeling bench a friend used a two-sided affair allowing you to build on one side and cut on the other. So, when our things (now weighing just at the statutory limit of 5000 lb) were trucked back to Brookhaven I made such a bench out of half a table tennis table, an old wood consol TV and three cardboard packing boxes. The tool caddy took up a particular place in the center, accessible from both sides.



The tool caddy followed me into the Propstoppers and soon certain members who were regulars at the flying fields and the indoor meets knew where the CA would be, or maybe a knife or screwdriver.



Not too long ago I glued some foam blocks to the handle extension so I could add a range of screwdrivers and other tools.

Meanwhile I had begun to build up my SoCal workshop and made a similar but "improved" tool caddy; I made it bigger. But what do you know, it didn't work at all, I don't really know why but I guess it was just too big to fit on the small bench. So in a weak moment I bought a fishing tackle box, one with a whole array of sub-boxes, medium and small ones. It also had a tray under the lid. This didn't work either as all the useful stuff was in boxes; Not at all convenient for quick access at home or field.

The East Coast caddy continued to be very useful, but after ten years or so it was getting a bit ratty, in fact the handle was beginning to weaken under the strain. I reinforced it once with a piece of wood then again with a piece of metal but eventually I had one of those moments; "this bloody thing is passed its sell-by date"! So I went shopping for a replacement.

I looked at the fishing tackle boxes again and found that Plano, the same manufacturer that made my SoCal box, made one fitted entirely with draws, but still with a compartment under the lid. This seemed to be a good starting point so I bought it.



My plan was to make it work in the same way as my old cardboard box; to hold the common tools and materials on the bench top as well as serving as a field box. It took some simple modifications but I have succeeded, indeed I bought an identical box in SoCal and outfitted it in exactly the same way, including putting the same things in the same locations.

I made two box modifications. First I cut out one of the externally accessible compartments in the folding lid so I could store my glue bottles in the upper compartment so they are accessible with the lid open and closed (this was also necessary because the glue bottles are taller than the lid compartment).



The second modification or modifications was to cut out the draw dividers so as to provide larger spaces for those tools that need it. The material cuts easily so this was a straightforward task using a knife and razor saw.



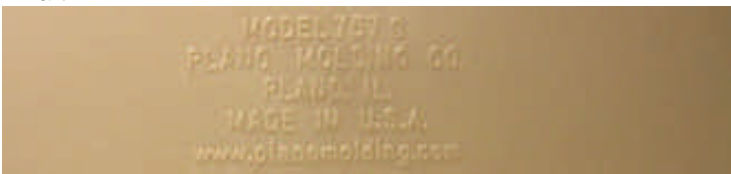
The final task was to make labels so I could quickly learn where stuff belongs and the guys at the field can find things with less of my involvement too. Another neat trick with this box is that I can remove the front panel so as to take up less space on the bench top. It is easy to remove and replace when I am ready to take it to the field. The only other feature I would like is a removable lid as access to the top compartment is not possible from both sides.

Like the old cardboard caddy this tool box has proven to be an excellent idea, it works great at home and at the field. Indeed at the last Champs the SoCal box was in constant use by all four of our flyers, one of whom went home

and bought one for himself. He even asked me to send him pictures of my box with the compartment assignment so he could make his identical.



Want to buy one? Here is the model number. They are \$25 at Kmart.



Just thought you might be interested.

Dave Harding

Here we Go Again, a new model for Europe

Would you believe I enjoy SAM competition? A rhetorical question but it hit me yet again. Dick Bartkowski and I are going to compete in the European SAM Champs again this year. Dick has been working on his models for a while now, getting them sorted out and beginning to do some test flying. I have been cruising with the thought that my existing models are very competitive but then it suddenly occurred to me that they have changed the rules for the Speed 400 event. Hmm... Is my speed 400 model competitive? I certainly thought it was last year and should have been at the SAM Champs although the results said otherwise. But was that the fault of the model or the operator. Well, both as it turned out but the thoughts woke me up and here I am taking a short break from a multi day 18 /7 burst of building to meet my newsletter deadline.

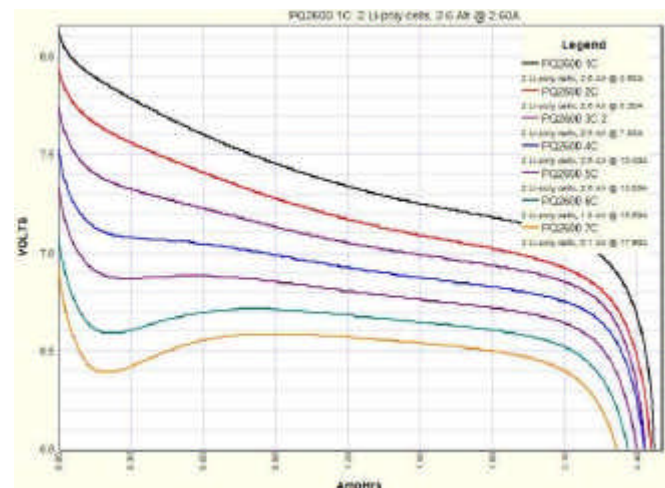
The Speed 400 event has morphed over the last several years, beginning with ½ A Electric Texaco as an AMA and Euro event and a personal favorite; I won the Nats one year. But the Europeans began to fiddle with the event three years ago and turned it into a limited motor run event. Texaco events require you to fly the maximum time on a fixed battery capacity. Limited Motor Run events allow a fixed motor run time followed by a glide. I think the Europeans made the change while incorporating battery chemistry changes. In Europe NiCad batteries are now banned due to the toxicity of the heavy metal Cadmium. Also they wanted to add Lithium chemistry batteries to the rules in some kind of equal way to the NiMh battery. This they did by specifying either a six cell NiMh or two-cell LiPoly battery of any capacity, driving an un-gearred Graupner Speed 400 motor. In the rules for the last two

years the airplane had to have a 10 ounce per square foot wing loading. The competition allowed a three minute motor run. This year they changed the rules again to an 8 ounce wing loading, a minimum weight of 16 ounces and a two-minute motor run.

The limiting factors in engineering a competitive model are the power you can draw from a speed 400 motor on the voltage from the specified battery and the size and weight of the model. Physics relates these factors and basically determines the altitude you can achieve. Biology applies the limits because if you do a good job but make the model too small you will not be able to see it at the peak of the climb!

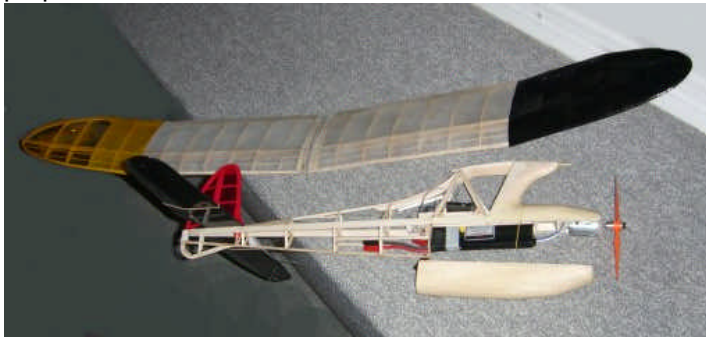
Naturally, being a competitive person I sought other ways to get an advantage. For 2006/7 I expected to easily make a model fit within the weight requirements and probably would have to add ballast. So, why not use a huge LiPo battery in stead of lead? Why you ask, well because the voltage from a LiPo battery varies throughout the run, starting at 8.4 volts and ending at 6 volts. Since we would only use about 500 mah on each flight using a big battery would ensure the voltage was on the high end for most of it. Furthermore, operating at a low C rate; Capacity / Current, I would further increase the operating voltage because big batteries have lower internal resistance (Fat Pipes). (See the chart).

This aspect of the design worked better than expected and I even had to reduce the diameter of the chosen prop to keep the current within what I thought was a reasonable limit; 11 amps. Note this point, it would come back to bite me several times.



The model tested well although my tests were always using a one minute climb. It even packed in my golf bag together with the big LMR Stardust Special. The Testing was being done just to sort out the trims and transitions and I thought it unnecessary and risky to make the full three-minute runs as the model might

be lost from going out of sight. But I did manage to fry some motors on these short runs until I used the smaller propeller.



In Europe two years ago I made the flyoff OK but then lost the model in the late afternoon sun, resulting in a violent corrective maneuver and folding the wing. I lost it in a cornfield only finding the horizontal stab. But I made another for the next year.

This time my first flight was magnificent, an easy maximum, but it was gutless in the second and third flights and I eventually realized I had fried the magnets and performance was way down below par.

All too slowly I realized that the closely wrapped motor installation and largely sealed cowling was causing the motor to overheat in the long climbs, something you would not find in short test flights.



My focus on low drag was causing a problem more acute than others were experiencing with their open-motor installations. Furthermore, when you overheat the magnets there is nothing obviously wrong with the model or motor; until you fly it again! What to do?



Well, first add cooling and this is the focus of my new model. Second, either test the rpm of the motor after each flight or install a new motor for each flight, or a combination of both. A couple of extra \$8 motors with ESC's attached is a very small price to pay compared to the trip to Europe! Oh, why build a new model, well the 2008 rules with a 16 ounce minimum weight and a two minute motor run favors a larger model. The old model is too small for so the new one is slightly bigger at 288 sq inches wing area. Not much bigger but the difference in wing loading will probably increase the glide time by 30 seconds.

But how to do the cooling? And I still want to preserve the low drag of my earlier models. Preserve, heck, I want to reduce it even more by cleaning up all the protuberances and cowl cracks etc. Early in the development of the Hawker Hurricane Hawkers did an experiment where they cleaned up all the protuberances and knits etc and covered over the gun apertures. The result was a 35 knot increase in speed) but I digress.

Cooling is lumped into the category of internal aerodynamics in the big airplane world and it is just as important as the external stuff. Well, almost as important as you pay for the drag of the air you introduce and don't put back the way you found it. It's even worse for engine inlets as you not only get a drag increase but you lose power too.

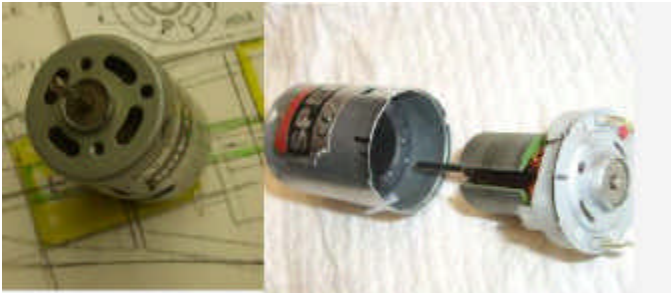
Imagine scooping up a flow stream then pulling it through an orifice, expanding it willy-nilly, letting it drift around inside then sucking it back out into the fast moving airflow. It is a bit like stepping on to a running track during a race; you have to speed up fast and there is some turmoil while you do. This is sometimes known in the business as Momentum Drag, because you stole the momentum of the air you introduced. The magnitude of the momentum drag is the air mass introduced per unit time times the change in speed in to out. Now you have this in your head, imagine how we can do this with a minimum loss of momentum.

The second factor is just how well this air cools the motor. Of course the answer is well enough, but the key is just how little air you scoop to achieve it.

Clearly the air that is just kinda floating around isn't doing much and neither is the blast coming through the inlet and going down the fuselage and back out, if it doesn't bathe the motor on the way.

So, you want to scoop up the minimum of air mass, direct it over the part to be cooled and then deposit it back into the airstream with a minimum loss of momentum. Oh yes, you don't want to dump it in a location that will cause the external flows to be interrupted or you will cause even more drag.

The speed 400 motor has two cooling paths, one internal and the other external, and two elements that require cooling; the magnets and the armature windings.



The internal cooling requires the motor be mounted allowing the front face "inlets" to be open but airflow depends on a difference in pressure between the two apertures. The flow, of course, will be from the one with the highest pressure to the one with the lowest, and finishing the thought, the flow volume will be proportional to the pressure difference. The external cooling "flow" will depend entirely on the motion of cooling air around the case; another tough one if you cowl the motor. Just sticking it in a plenum won't do much.



But before we move on to engineering the cooling airflows let's address the other forms of heat rejection; radiation and conduction and even one more factor; the thermal mass.

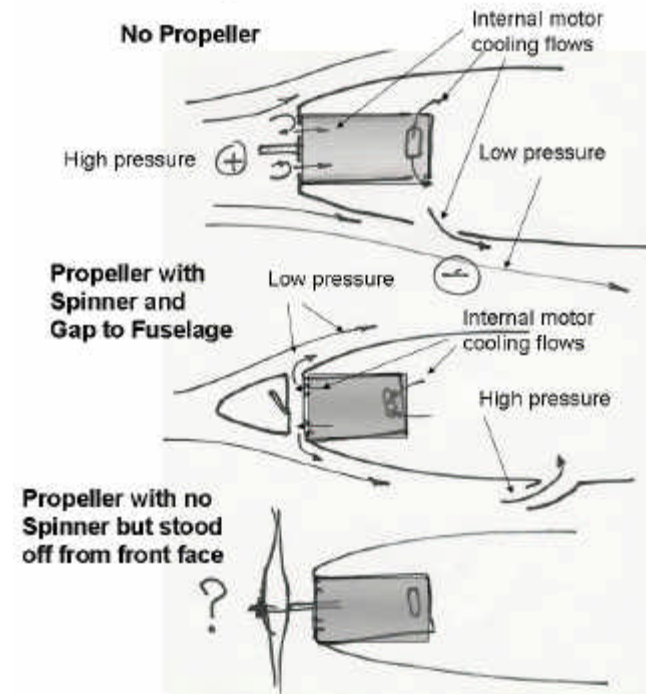
You see we are worried about temperature in the critical parts and the temperature stems from the inefficiency of the motor; its internal heating. But the temperature rise from a specific energy applied is a function of both heat rejection; cooling, and the thermal mass.

Imagine that we apply a 50 watt candle to a speed 400 motor. The temperature will increase over time. Now imagine that we encase the speed 400 motor in a four inch cube of copper. Yep, the temperature in a given time will be substantially less. Ok, now make it a one ounce cylinder of copper surrounding the motor and let's also cut fins in it. The temperature rise will be more than the four inch block but less than the bare speed 500. The copper absorbs some of the heat and the fins aid in dissipating it too. This is what we achieve when we use a heat sink with a motor, and you are allowed to do so in the speed 400 event (and all kinds of other stressing cases too.)

But the heat sink takes space and the fins don't work if there is no air flow.

My approach is to maximize the heat rejection through flow management and eschew the heat sink due to its effect on space, and thereby airplanes drag. But to achieve a satisfactory flow behind a propeller is a classic problem. You see the flow behind a propeller hub is chaotic so you can't rely on a cooperative behavior.

Factors Effecting Front End and Internal Air Flows



If there were no propeller then you might put an exhaust on the low pressure area as the cowl expands, just like the flow around the front part of an airfoil. And you would expect the pressure on the front bulkhead would be positive so an internal flow from front to back would be expected. But we do have a propeller so the next question is what can we

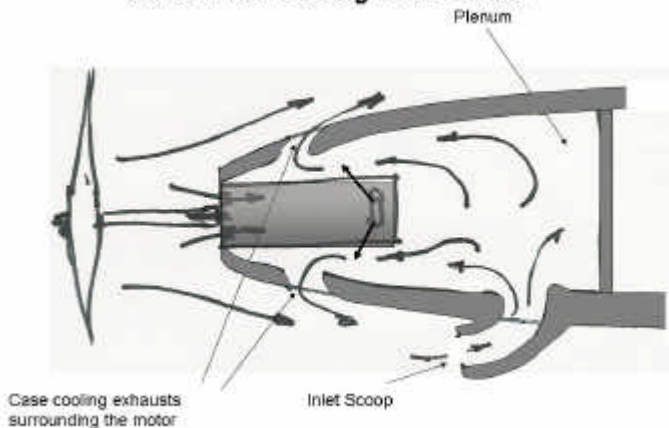
do to create a favorable flow field?

The second sketch shows what you might expect from using a spinner stood off from the front bulkhead so as to allow for flow between the two. In this case the pressure in the space between prop and bulkhead would be of low pressure as the flow around the spinner and front fuselage is expanding. A cooling flow through the motor therefore requires a high pressure inlet to the compartment and this could be achieved by a forward facing inlet scoop. However, the propeller may completely screw up the flow around the spinner and front fuselage (do I hear you say smoke or tuft test? This is only a hobby folks).

The last scheme is to mount a prop with minimal hub on a long extension out in front of the front bulkhead. Who knows what would happen here. Is the pressure on the bulkhead high or low?

Now we have to consider the factors in cooling the outside case of the motor. Again we need an inlet in a high pressure area and exhausts in a low pressure area but we also need the flows to bathe the motor case.

Motor Case Cooling Flow Issues



Perhaps we can achieve this with a scoop inlet and an array of exhausts towards the front of the motor case and arranged around the fuselage circumference. A bulkhead is probably necessary to form a plenum around the motor encouraging the cooling flows to restrict their energy to the motor area rather than dissipating throughout the fuselage. But we are still left with the issue of internal motor flows and the pressure on the front bulkhead area, behind the prop.

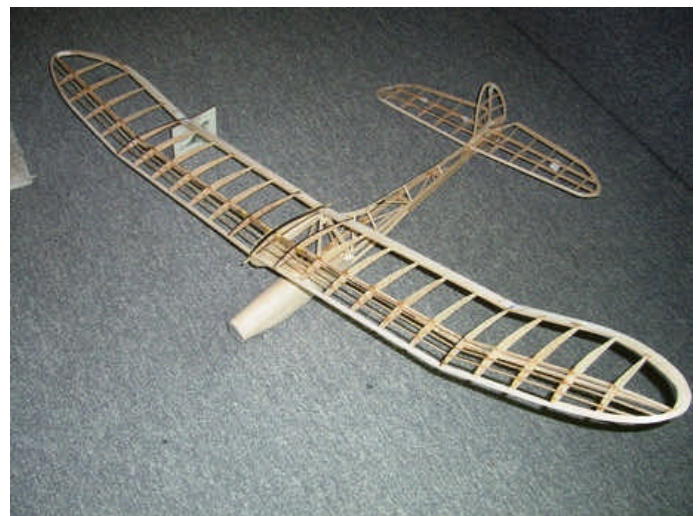
Actually I ordered a special spinner from Hobby Lobby, one that incorporates a cooling inlet in the nose.



What a solution? But out of stock! However, the new Euro rules also allow folding propellers so I ordered this one too;



I am going to try to arrange this spinner and a faired front bulkhead so as to give the flows a chance in that area. In the meantime I have largely finished the frame-up of the new model including a tightly fitting cowl.



I had better get this thing finished and tested. Europe takeoff is only three weeks away; yikes!

Dave Harding

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Propstoppers R.C. M.A.C



The Tuesday Breakfast Club fly at Sleighton Field following breakfast at the Country Deli early in May. From the left, Mick Harris, Dick Bartkowski, Dick Miller, new member Joe Secunda, John Tulai, Chuck Kime, Dave Harding, Ed Goretzka, George Rhoad and Charlie Storm. Picture taken by club President, Dick Seiwel



Middletown Community Pride Day, Saturday 10th May

11 am till 4 pm

Propstoppers, be there early, bring a plane to fly or show and tell or bring an engine to run.
But be there to support our club!