SAM Says ...

Successful IMAC Contest

Dave Stoik Does Super Job of Directing Event

Our 2005 IMAC contest is in the history books. We had 31 contestants, 2 more than I predicted. The farthest drive award goes to Mr. Loi Diep from Laguna Beach, CA. We had contestants from the Bakersfield and Camarillo areas as well as our regular Nor-Cal Bunch.

The only incident was a gentleman from Camarillo practicing on Friday, who came up short of the runway damaging his aircraft, but it was not completely destroyed.

The most consistent comment I received from contestants was what a great club we have. This is due to the selfless efforts of many of our SAM members. Bob Dooley gave up his entire weekend to do the scoring. Pilot registration was handled by Bob McGregor. Steve Saulovich was our assistant CD and helped keep the flight line going, as well as other behind the scenes duties.

Dick Moeller was out Friday putting up road signs as well as cooking on Sunday. Jack Jellá had the food shack well covered all weekend. John Midgorden was our chef on Saturday. Dale Oxford was out helping both days. Alan Brown, Bill Moore and Bob McGregor handled scribing duties on the flight lines. To all of the SAM members who helped make this event a success and any I forgot to mention, THANK YOU!!

I surveyed all of the pilots, and received a unanimous "yes" to an IMAC event next year! I have received several "thank you" emails from pilots grateful for the wonderful treatment by SAM members.

Our event received sponsorship from Desert Aircraft, Smart-Fly and Sean D. Tucker school of Aerobatics. Thanks to them for the great prizes.

My thanks to all SAM members that helped make this event successful.

by Dave Stoik, CD

President Says ....

Hey folks, what a FABULOUS IMAC event we had! I wasn't able to be there but I understand that Dave Stoik and a lot of fellow SAM members did get there and had a LOT of fun, plus generating some money for the Club. It seems these folks wanna come back and play at our field, and I think we're all for that.

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President Says ...

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There will be some topics at the next meeting at the Salinas Airport Meeting Room at 7:30 PM on September 9. Among those topics will be re-finishing the deck and railings of the cook shack and pressure washing and painting the container. We'll be talking about getting someone with a tractor to clean out the bamboo and brush at the north end of the runway, talking about the upcoming Electric Fun Fly for October 22nd, the the next two Ruddergates. PLUS, we'll be eating cookies and brownies with fresh coffee.

I've invited a representative from SRS Hobbies in Salinas to come to this meeting to talk with us so we can tell him what we need/desire to see in his shop and he can tell us what he can do. We NEED to support the locals so we can get the support we need from them.

That's about it for this month folks. Got some "stuff" happening in our lives right now that is taking a lot of extra time. But next month I'll write three pages for you! Before I forget, we now have four new pictures for next year's memorial event.

I wish you all to land on your wheels, keep those props a spinnin, and have HAPPY LANDINGS!

We NEED to group together and support the hobby and the industry. BUT, more important than that is we need to bond together and support each other as friends and as fellow modelers.

HAPPY LANDINGS!!!

Jim "CRASH" St. John

Good to see Bill Scuggs burning glow fuel again!

September Ruddergate Change!

September 18, 2005

Because of the conflict with the Lake McSwain float fly, the Board has changed the September Ruddergate date to September 18th. Bob McGregor will be our cook this month. Come and enjoy the food and fellowship.

August Glider Contest

Ten SAM members came early on August 13th to compete in the last glider contest of this season. Endurance was the name of the game. The first three flights required a landing under the limbo line. Most are getting pretty good at this feat—since all the contests this year required landing his way.

The last two rounds substituted a spot landing, which everyone found much more difficult to achieve.

Results of the competition are tabulated to the right.

by John Midgorden

Place	Glider Pilot
1st	Malcolm Beety
2nd	Walt Newman
3rd	Bob McGregor
4th	Jim Green
5th	Jack Jella
6th	John Midgorden
7th	Terry Gansberger
8th	Paul Sparks
9th	Fred Baker
10th	Dick Moeller

Good to have Paul Sparks at the Glider Contest

Next Newsletter Deadline—September 15th

Send Contributions to John Midgorden, Editor

http://www.jomidg@earthlink.net

or Phone: 831.633.4026

GHOST SQUADRON

Each month the newsletter will feature a model and RC pilot from yesteryear.

Answers to August's quiz!

Pilot ?

Plane Curtiss P-6E

Year April 1998

Can you name the human weight on the drag?

Can you name this tow pilot?

What was the year of this failed experiment?

Scene at the Field!

Dave Stoik
conducting pilot's meeting

Many IMAC Aircraft

IMAC

Judging and
Scribing
Scores

McGregor Taking the
Money

The Winner, Malcolm Beety,
Adding the Scores?!#

GLIDER CONTEST

Fred Baker Up, Up, and Away!

Dick Moeller's
Drab Glider

Minutes of the August meeting

President Jim St. John presided over the August Club meeting in the Conference Room at the Salinas Airport Terminal. Including Board members there were ten members in attendance. Bill Moore, President of the RC Bees club in Santa Cruze, was a guest at the meeting. Helen Klimas, owner of the Landing Zone Restaurant in the terminal, provided coffee and snacks for the meeting.

Bob McGregor gave a report of the club's finances. The Club's CD matured and Bob has cashed it out and put the money in the checking account. Based on action at the Board meeting Bob McGregor will take out a new CD in the amount of $5,000.

Chuck Bosso announced that he and his wife will not be able to do the October Ruddergate, much to the disappointment of all present.

Old Business

There was no old business discussed.

New Business

1. **IMAC Contest**: Dave Stoik outlined the help needed for the IMAC contest coming up August 6–7. He indicated that he had 29 pilots signed up and that some would be coming in on Friday afternoon. The flying will begin early Saturday morning around 9:45 AM.
2. **Newsletter**: Everyone present seemed pleased with the new newsletter format. Midgorden indicated that the next issue will be smaller, file size-wise.
3. **Glider Contest**: August 13th is the last Glider Contest of the season and the field will be closed to other flying that morning.
4. **Field Clean Up Day**: Jim expressed concern about those who came to fly on the Saturday scheduled for field maintenance. It was decided that two work days will be scheduled next year so that everyone will know when the field will be closed for maintenance needs.
5. **October Electric Fun Fly**: The Board is still looking for someone to CD this event. Midgorden will get publicity out to other clubs in the area.
6. **October Float Fly**: Dale Oxford will handle all the preparation for this event.
7. **Next Month's Program**: Midgorden announced that Alan Brown has an article for the next newsletter issue dealing with flutter. Alan will be available for the next club meeting to discuss this important phenomenon.
8. **Miller Memorial Fund**: As agreed earlier, this fund will be used to support the flight training program, particularly as it might related to young pilots.
9. **AMA "Introductory Membership" Program**: Dick Moeller moved and Dave Stoik seconded that SAM allow any persons with the 3-month membership in AMA (the essence of the "Introductory Membership" program) to fly free at our field during the period of their temporary membership.
10. **Bulk Fuel Purchase**: There was considerable discussion about the club purchasing glow fuel in bulk to get the cost down. Alan Brown shared how the RC Bees handle this issue. It was agreed that we should have Bob Dooley put a notice on the website to have members indicate their interest in a bulk purchase.

Because there was no program or show and tell, the meeting was adjourned by President St. John at 8:30 PM.

by John Midgorden

Next Club Meeting —September 7

Our new meeting place is the Conference Room at the top of the Salinas Airport Terminal. Use the outside stairs on the east side of the building. Club meeting begins promptly at 7:30 PM. Bring your Show and Tell.

The Board of Governors meets at 6:30 PM and all members are welcome.

Don't forget Alan Brown will be talking about his flutter article (see pages 6–7) at the next meeting!

AERO 101—FLUTTER

I had discussed a little about flutter when writing about flap-type controls (elevators, rudders, ailerons and flaps), but here I'll try to wrap it all together. I should point out that this is not one of my areas of expertise, so you'll have to bear with me if the treatment seems a bit superficial.

First, we should talk about torsional divergence of a wing. This can occur when the speed gets up to a value where the wing just wants to twist itself off by increasing its incidence rapidly. Here's how it happens, and what you can do to prevent it. First imagine that the wing is not fixed rigidly to the fuselage, but is mounted to a span-wise rod, which in turn is fixed to the fuselage, and then again to the opposite wing. This is more reasonable than you might think, because every structure, like a wing, has a so-called flexural axis, which can be thought of as equivalent to the span-wise rod joining the two wings together. Now let's assume that the aerodynamic center of the wing (this, you may remember, is where any incremental lift acts) is at the quarter-chord point. If we increase the angle of attack a little bit, the extra lift acts at this point.

Now the span-wise rod acts like a torsional spring. If the wing wants to twist in either direction, relative to the fuselage, the torsional stiffness of the spring will bring it back to where it was, and everything is fine. Now suppose that the rod is somewhat behind the quarter-chord point. When the angle of attack of the wing increases, there'll be another force and moment on the wing caused by the increased aerodynamic force. As you increase the airplane speed, this moment increases (proportional to the square of the speed) until it reaches a point where its rotating moment equals that of the spring force in the rod. This is known as the torsional divergence speed of the airplane, because beyond this speed, the lift force on the wing with its accompanying moment arm, will cause the wing to twist uncontrollably. End of airplane!

Back in the early days of flying, this subject was not well understood. A typical airplane wing would have a forward spar and rear spar, with not much between them. If it were a biplane, the two spars anchored the interplane struts, and the ailerons were hung on to the rear spar. You can imagine two things: 1) the wing wasn't very torsionally stiff, and 2) the equivalent flexural axis (i.e. where the equivalent span-wise rod was) was at least 40% back from the leading edge. If this sounds pretty bad, it's because it was. It wasn't uncommon for wings to tear off due to torsional divergence, and in fact lots of old movies show just this phenomenon.

Well, nowadays we know how to avoid that fairly easily. Firstly, make the wing very strong torsionally and secondly make sure the flexural axis is ahead of the 25% chord point, so that the extra lift from a higher angle of attack now helps you by giving a stable nose-down moment instead of an unstable nose-up moment. The answer - the classic D-nose structure. All the torsional stiffness in the wing is in the section from the leading edge to the main spar, the latter being at about the 25% chord point. The main spar also takes the majority of the basic bending loads on the wing, because that's generally where the lift acts.

Now a few cautionary notes: If you are making a model of a World War I airplane, and the kit designer builds in authenticity by making the structure look like the original, then it's going to act like the original. So you should be very cautious about flying it quickly. Otherwise, bang goes your expensive Proctor kit. Alternatively, beef the wing up with a complete D-nose torque box. Next cautionary note - I've seen articles in the model magazines suggesting that if a D-nose leading edge torque box is good, then surely a bigger chord torque box going from the main spar to the rear spar must be better. As you can see from the earlier discussion, while you'd increase the torsional rigidity (and the weight!), you'd move the flexural center back to where it would be unstable rather than stable - so don't do it! And the final cautionary note is that these arguments apply to tail-planes as well as wings. If a tail-plane is made of sheet material, then it's torsional stiffness won't be very high (because there isn't much thickness) and it's flexural axis will be about 50% back. So tails, as they are usually built, are much more susceptible to torsional divergence than wings. Of course, they usually have much lower aspect ratios than wings, which offsets this to quite an extent, but even so, if you plan to fly fast with lots of g-loadings on your airplanes, consider building your tails like you build your wings, with reasonable thickness and a good forward torsion box.

Now we'll move from torsional divergence to flutter. With good construction techniques, wing flutter is not common on normally structurally stiff model aircraft, so I'll concentrate on control flutter.

Flutter used to be a much bigger problem on full-sized aircraft with manual controls, because even if the system had very little play in it, the only resistance to movement was the pilot's strength. With the advent of hydraulic actuators, the resistance to movement was much improved. Our servos do essentially the same thing on our model airplanes.

Flutter is basically caused by the inertia of the control surface causing the surface to deflect during a rotation of the aircraft. Typically, if a wing starts going downward in a roll maneuver, whether caused by the pilot or for external reasons, the weight of the aileron will make it want to trail trailing edge upward if the center of gravity of the surface

is behind the hinge line. The resulting aerodynamic forces will make the wing accelerate further in the direction it's already going. Then the air forces on the control surface will make it go back towards the center position, and the inertia of the control will keep it going past center, whereupon the process repeats in the opposite direction. The frequency at which this occurs depends on the combination of surface mass, c.g. position relative to the hinge line, control aerodynamic characteristics and aircraft velocity. The stiffness of the control system plays a major part in the speed at which flutter begins, which is why we continually get advice in magazines and kit instructions on avoiding sloppiness in the control linkages. Naturally, this is a fairly complicated calculation, but the end result is that there will be a specific aircraft speed where flutter may begin.

The advice on minimizing sloppiness in linkages is extremely important, and is probably the most important thing we can do if following kit building instructions. However, there are other things we can do to help. Firstly, the moveable controls should be built as lightly as you feel comfortable with. Look at full-size aircraft up to the 1950's, and also a lot of general aviation aircraft much later than that, all of which had controls that were not power assisted. Typically even if the fixed parts of the aircraft were all metal, the control surfaces would be fabric covered, and their internal structure would be fairly lightweight. So that gets the mass of the control surfaces down.

Then they would often be mass-balanced, which means that a portion of the control surface extends forward of the hinge line, and that portion would have balancing mass inside it so that the net center of gravity of the control surface lies right on the hinge line. Thus when the aircraft rolls, for example, there would be no tendency for the control surface to rotate about its hinge line, and so there would be no reason for flutter to begin. Sometimes you have to allow for a further complication in the design process, which is the tendency for the wing itself to rotate as part of the whole oscillation. It turns out that if you calculate the whole motion, the balance point of the control should if anything be slightly ahead of the hinge line rather than exactly on it.

So if you are going to err, you should err in the direction of over balancing rather than under balancing. If you look at parked full-sized aircraft with manual controls at your local airport, you will probably notice that the mass-balanced elevators will be sitting trailing edge up, indicating that the c.g. of the control is ahead of the hinge line, or of course that the pilot tied the control stick back to the seat!.

Everything I've said applies to all basic controls, ailerons, elevators and rudders. Gravity is not a major issue, so rudders can flutter just like any other surface.

Often, aerodynamic balancing is combined with mass balancing, so some of the control surface will be ahead of the hinge line. This is mainly done to reduce pilot (or servo) load, so that's well worth considering also. Note, however, that aerodynamic and mass balancing are done for two different reasons which should not be confused. Mass balancing reduces the possibility of control surface flutter, while aerodynamic balancing reduces the loads on the control actuator. The actuator is the servo for our r/c models, while it can be either the pilot or a hydraulic actuator on a full-size aircraft.

Many competitive aerobatic flyers put several servos on one surface to alleviate the flutter problem and take care of the large loads. Superficially, this doesn't sound like the best possible idea, because it seems that mass and aerodynamic balancing would do a better job. One of the New Zealand entries in the Tournament of Champions recently installed geared tabs on his elevator, which is essentially an aerodynamic lever, to reduce the servo loads. However, one good reason for multiple servos is to distribute the aerodynamic loads span-wise, which certainly will also help to reduce flutter. It still seems to me that a total brute force approach is inappropriate.

So if you want to avoid flutter and reduce servo loads, try some of the approaches noted above, rather than just putting more and bigger servos on board and building in too much weight.

by Alan Brown

This is not flutter,
but passing through Mach One!

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Coming Events

September 18, 2005
Ruddergate

September 23–25, 2005
Float Fly at Lake McSwain

October 5, 2005
Board/Club Meeting at Salinas Airport

October 7–9, 2005
Float Fly at Lake San Antonio

October 22, 2005
Electric Fun Fly

October 30, 2005
Ruddergate

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