The Flightline

Volume 33,Issue 4 Newsletter of the Propstoppers RC Club AMA 1042 April 2003

Editorial: Howdy Members!

Modelers are generally an interesting bunch. It takes a good deal of knowledge and skill to make and fly RC airplanes so it is no surprise that the people who do it also have interesting stories to tell. So, in an attempt to better know our members I am starting a series that requires your input.

This came about on the road to the Central Penn Swap Meet, when Jess Davis, Sam Nevins and Greg Dugan and I were discussing our first flights, not the model flights but our real airplane rides. Sam's story involved airports and airplanes long since gone into the history books. So, I want each and every one of you to jot down what, when and where you first flew, what was special about it and what impact did it have on your life. Then send it to me, either in an e-mail or snail mail, or if you have to just call and recount it. Of course if there were pictures it would be wonderful.

Sam's story was of flying in the front seat of a biplane without a seat belt. He was too macho to wear one. He says he was lucky that the forward cockpit was under the top wing because in a gust he was propelled out of his seat and only his head hitting the top wing kept him in. We will get more on this story.

Of course, you could tell us about any other interesting flights you have experienced too. For instance, did you know that while in the Navy, member Marty Zeller made the first point-to-point IFR helicopter flight? As a production test pilot for Boeing Vertol Marty had many a harrowing experience with airplanes that were not quite "finished". He flew them from the flight ramp at the Boeing plant on the banks of the Delaware River to the Philadelphia Airport flight test center (in the hangers on Island Road).

Your stories don't have to be this exciting, just tell us about them.

The second idea is to "visit" member's workshops. I used to be embarrassed with the mess in my basement, but I have come to believe that it is a fairly well organized work place with most things in their place and many works in process! I'll show you mine if you show me yours!

It is probably time for another "what are you building / flying" inquiry too. Send me that while you are on the line.

Last year we solicited the membership for talks and demonstrations at our meetings. Although we get some in our show and tell it would be nice if we could announce them in the newsletter prior to the meeting. This way, members can make a special effort to attend if there is a subject of interest. This month Mick Harris has told me of his intention to explain his technique for covering with clear Mylar then decorating with doped on tissue. It is a really attractive and lightweight technique that uses inexpensive materials. Stand by for immersion in that old dope smell! What can you share with us?

Dave Harding

Agenda for April 1st Meeting at Marple Library 7:30 pm

- Approval of March meeting minutes
- Finance report
- Membership report
- Field search report
- New business
- Field workday plans
- Covering with Mylar and tissue.
- Show and Tell

SAM 76, Propstoppers Founding Members in the picture that will appear in an article in this month's SAM Speaks

Inside This Issue

Calendar of Events

Club Meetings

Regular meeting 7:30 pm
Tuesday 1st April
At Marple Newtown Library

Regular meeting 7:30 pm
Tuesday 6th May
At Marple Newtown Library

Flying Events

Fieldwork Day at Sleighton
Saturday 12th April
9:30 till 12

Saturday 17th May
Old Eagles Electric Fun Fly
Hope NJ.
Call Dave Harding for convoy info.

Regular Club Flying

At Moore and Sleighton Fields

Daily	**10 am til Dusk**
Saturday	**10 am til Dusk**
Sunday	**12 p.m. till Dusk**

Propstoppers RC Club of
Delaware County, Pennsylvania.
Club Officers

President John Zebuski
610-328-2833 zebflyrc@aol.com

Vice President Dick Seiwell (610) 566-2698

Secretary Richard Bartkowski
(610) 566-3950 rbartkwoski@comcast.net

Treasurer Al Gurewicz (610)-494-8759

Membership Chairman Ray Wopatek
raywop@juno.com

Field Marshall Al Tamburro
(610) 353-0556 kaosal@webtv.net

Newsletter Editor Dave Harding
(610)-872-1457 davejean1@comcast.net
4948 Jefferson Drive, Brookhaven, PA, 19015

Webmaster Bob Kuhn
(610) 361-0999 kuhnrl1606@kuhnfamily.com

Propstopper's Web Site; www.propstoppers.org
Check the web site for back issues of the newsletter, pictures of club events and the calendar of future events.
Pictures courtesy of Bob Kuhn and Dave Harding

The President's Message

Dear fellow Propstoppers:

The February meeting seemed to get a little intense as concerns of quality flying site and a means to increase our cub membership, totally dominated the focus of the meeting. The flying site has been an issue for quite a while, Mike Black had put out the word last year and Chris Catania has been leading the search with minimal input from club members. We need to find a way to help this process along.

I feel our money situation for this year and next is in pretty good shape for now. I will explain further during our next meeting. Membership wise, things are looking up, we had an interested guest at our last meeting and I received an e-mail from someone who moved to Delaware County recently and is interested in joining the club.

As we address the challenges with the club, I hope we keep our troops in our hearts and prayers. They have a much greater battle in front of them, than we do here at home. Just a little thought to put things into perspective.

John Zebuski

Minutes of the Propstoppers MAC March 4th, 2003

President John Zebuski called the meeting at the Marple library to order at 7:30 p.m.

The roll call taken by membership chair Ray Wopatek showed 24 members and one guest present.

Treasurer's report was given by Treasurer Al Gurewicz and accepted by the membership.

The minutes of the February meeting as published were accepted by the membership.

Ray Wopatek reported 45 paid up members at this time. He stated he still planned to contact a few who had not renewed to get a final determination.

Old Business:

John Zebuski reported that the possible field site in Gradyville appears to be within 3 mi. of another R.C. site. This appears to propose a conflict for flying. He thought we would pass on this site for now. Chris Catania said we're close to signing a lease agreement for the Sleighton field. He says that they feel that the gate should always be kept locked so we should lock it behind us when we enter.

The discussion of runway relocation at the Sleighton field was continued. Chris Catania and Bob Crowell volunteered to examine the new runway site for suitability this weekend. Any plans on relocation will be tabled until we hear their report.

Field cleanup day: Saturday April 12th, 2003 was designated as the fieldwork day for Sleighton field

New Business:

The president asked for a field search committee to continue an active search for a new field. He thought this was necessary because Sleighton field is held on a month-by-month commitment. Several members suggested possible options that they said they would pursue.

Show and Tell:

Sam Nevins showed a vintage 1937 Dallaire from New Creations hobby. He built this as an electric and put in a geared speed 400 motor. He demonstrated his method of attaching the motor to the fuselage. The plane has a 36 in. span and weighs 17 ounces without batteries.

Greg Dugan showed an old-time Amptique also from New Creations hobby. He powered it with a speed 540 electric running on eight cells. He says he can't wait to give it a try.

Rich Klekotka showed a Midwest Super Sniffer from the 1970's. He said he finally got around to finishing it and installed a speed 400 geared motor when he converted it to electric. It has a 48-in. span and is covered with tissue and dope.

Bob Crowell is building a top-flight P 51 giant scale. He showed his 50 cc ignition gas engine. He is currently breaking it in and notes that it seems to have a lot of power.

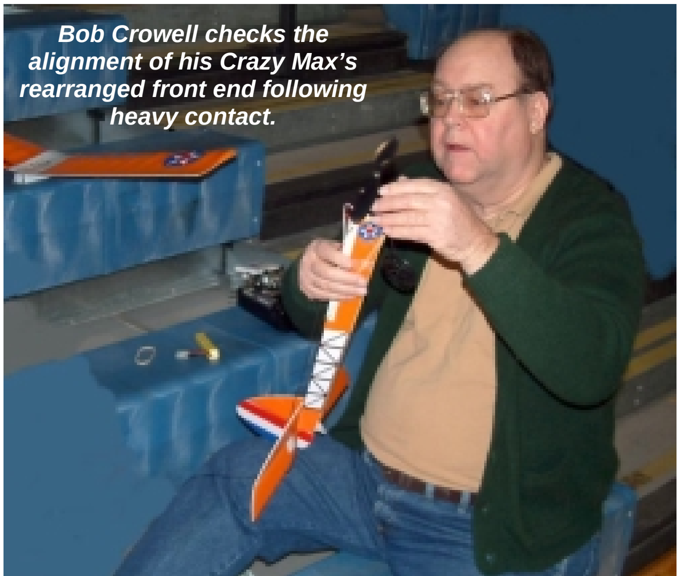
Adjournment: The meeting was adjourned at 9:00 p.m.

Richard Bartkowski – Secretary

Final Indoor Fun Fly

March saw the final scheduled indoor fun fly of the winter season with a steadily expanding attendance of participants and spectators. Models filled the spectrum from lightweight rubber free flight to hot almost-indoor models like Bob Crowell's Crazy Max, Keith Watson's B-2 and Rich Bourassa's flying disc with LiteSticks of various kinds in between.

Rusty Neithammer launches Keith Watson's Wattage B-2



Bob Crowell checks the alignment of his Crazy Max's rearranged front end following heavy contact.

Airborne portion of Keith Watson's TV system

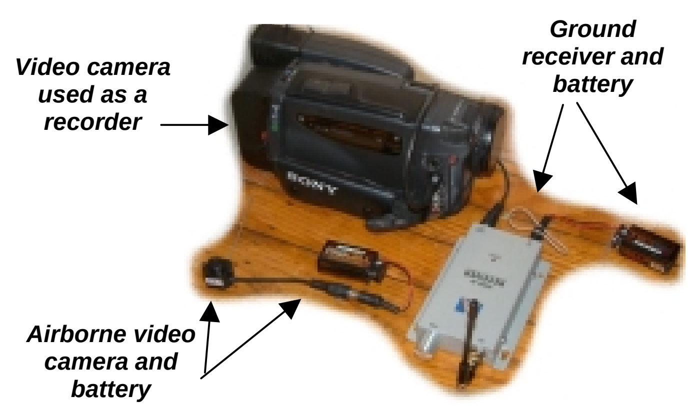
Keith Watson wowed us with a miniature airborne TV camera, which, with RF downlink weighs about two ounces. He flew this system mounted to his Mini IFO. The images were down linked to his video camera where they were recorded. The videos gave a very graphic illustration of the wild gyrations as these indoor RC models are controlled to stay within the airspace and off the walls and obstacles. Perhaps the most impressive fact about this system is that it cost only $30-$50. Keith says you search e bay for "Nanny Cam's" to find them. My search identified two different systems, those with about 100 ft range and the other with 1000 ft. The longer-range systems seem to run in the $100 range. At this cost and weight I expect we will see many more of them this flying season. How about it Bob Crowell? I want to see "cockpit" images from the outsize P-51 as it flies "missions" from Sleighton field.

Once again the youth contingent, sons and daughters, grandsons and granddaughters, made up much of the contingent of flyers and maybe most of the energy expended.

We may have one more indoor opportunity at Interboro High School so don't put your models away yet. Also, we have found that the calm evenings at Moore field provide wonderful opportunities to fly "indoor" models too.

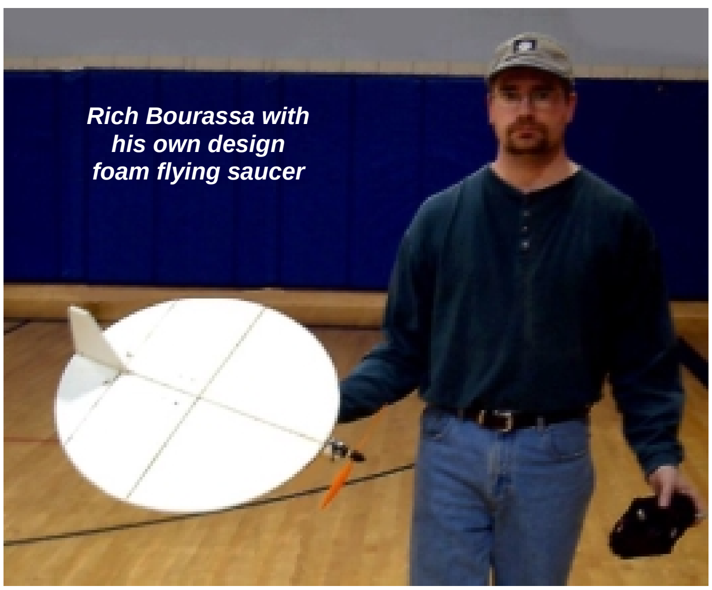
Dave Bevan back to basics with his Delta Dart. His EZB rubber duration model worked great in this gym.

Vice President Dick Seiwell with his two year old J-3 Stick. Flies great indoor and out.



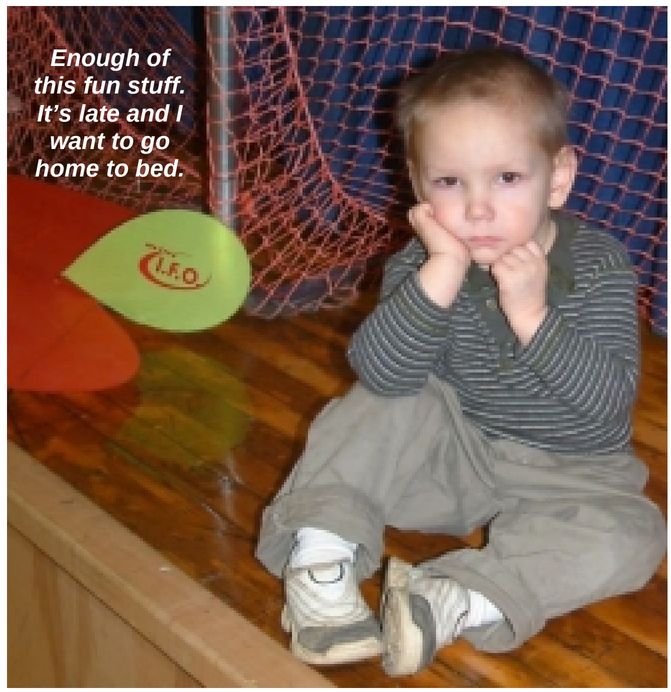
Keith Watson's airborne TV system.


Mickey Callahan with his "bruised" Lite Stick


Rich Bourassa with his own design foam flying saucer


Sons and Grandsons resting before the next onslaught.


Dave's granddaughter Susan shows the Delta Dart she built and flew in the Tinicum gym.

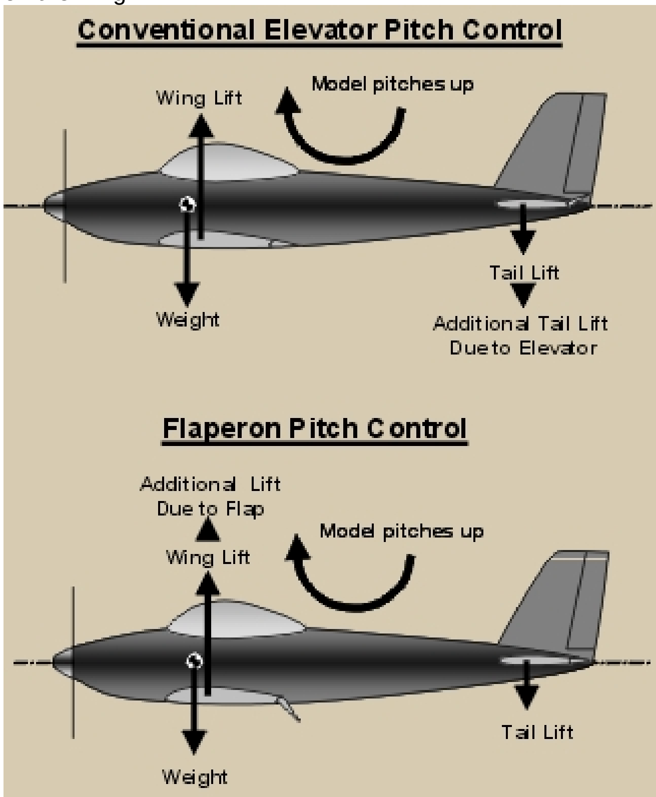

Enough of this fun stuff. It's late and I want to go home to bed.

All in all, I must say that the indoor flying over the last two years has provided more innovation and variety than we have seen at our traditional fields for years. Indoor flying with today's lightweight inexpensive equipment and simple construction materials and methods allows us to try so many different things. And the lightweight of these models mean they fly at low speeds and do little damage when they contact the surroundings while we sort them out. These same attributes can also extend to the slightly larger and heavier Park Flyers that are becoming a very significant slice of our diverse hobby. Just think, this is just the beginning, hang on for the ride.

Dave Harding

Tech Note; What's Up? Pitcherons and Flaperons

A recent eflight list-serve discussion raised the question of whether you could control a model in pitch with flaps or wing pitch alone. The former are called Flaperons and the latter, Pitcherons. Either way the idea is to eliminate the conventional elevator and control pitch purely with flaps on the wing.



Why would you want to do this? Well, you might want to save weight in general or weight in the critical tail location in particular.

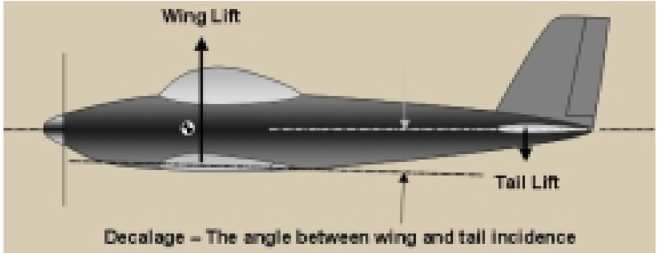
Our frequent contributor, "Professor" Don Stackhouse of DJ Aerotech made the following reply, which I have annotated with illustrative art. Here's Don;

Pitcherons can be made to work in some cases, but it gets tricky. There are several factors at work, and their sum can result in the elevator effect working in one sense or the other, or not at all, depending on the circumstances. We have experimented with this approach a while back, with mixed results. "Pitcheron" type models are an extreme example of this concept.

For the skeptics out there, consider the typical reaction of a plane in pitch when flaps are deployed. On some models there is no reaction, while others may tend to pitch up, and still others may pitch down. Obviously the whole issue is complex, and depends on the characteristics of each design (otherwise all airplanes would react similarly, which they don't), but the fact that some airplanes do react significantly in pitch does demonstrate that this idea can have the potential to control pitch to at least some extent.

So exactly how does this work? Ideally we should look at this from the standpoint of the "zero lift line" of the airfoil, but I think it might be easier to follow if we instead use the more commonly understood concepts of chord line and camber.

The basic pitch trim of an airplane is related to "decalage", which is the difference between the incidence angles of the wing and tail. As I mentioned above, the "purest" measurement of this is probably from their zero lift lines (i.e.: an imaginary line through the airfoil that when lined up with the airflow results in a lift coefficient for that airfoil of exactly zero), but we'll use the chord line.

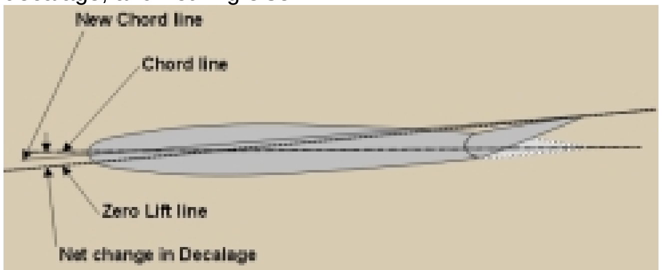


Decalage – The angle between wing and tail incidence

The chord line is an imaginary line through the airfoil running from the furthest forward point on the leading edge to the furthest aft point on the trailing edge. If we find the chord line of the wing and the chord line of the horizontal tail, the angle between them is the decalage.

Positive decalage means that the wing is at a more nose-up angle than the tail. For example, if we set the wing on the fuselage with a positive incidence of two degrees and mount the tail with an incidence relative to the fuselage of zero degrees, we have a decalage of two degrees. If we give the wing an incidence of one-degree leading edge up and the tail an incidence of one-degree leading edge down (or "negative one degree"), we still have a decalage of two degrees. If we mount the wing with an incidence of positive five degrees and the tail with an incidence of positive three degrees, the decalage is still two degrees. The plane will still fly with the wing at the same angle of attack in all three of these examples, and at the same airspeed (all other things being equal), but the fuselage's angle of attack will be different. Incidence between the wing and the fuselage controls the fuselage's flying angle for a given flight condition. The decalage controls the wing's angle of attack for that same condition. If you shim the leading edge of the wing up, the plane will fly slower, not because of the change in incidence on the fuselage, but rather because you changed the decalage.

When you move the elevator, you change the chord line of the horizontal tail, and therefore the decalage. If it's an all-flying tail, then that control movement changed only the decalage, and nothing else.



If you have a conventional elevator + stabilizer ("two element") tail, then you also altered the camber of the tail's airfoil, which changes its zero lift line, in addition to changing its incidence. The change in the zero lift line is in a direction that increases the effect of the incidence change, so that the effective change in decalage is even greater.

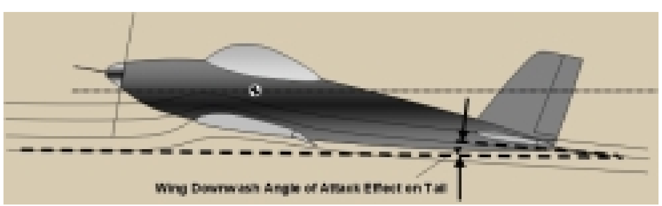
In most cases (although this can get really tricky in very small, slow, low Reynolds number cases), you've probably also increased the max lift coefficient capability of that airfoil. This is why you can usually get away with a smaller two-element tail than an all-flying tail, if elevator authority is the key-deciding factor in the tail size (however, if the key factor is dynamic stability, then they both probably need to be about the same size).

If you change the camber, you also change the airfoil's aerodynamic pitching moment coefficient. For a tail surface this is probably not a significant factor, since tails tend to have relatively small chords and areas relative to the rest of the plane, and therefore the moment caused by this aerodynamic pitching moment tends to be a very minor player in the total sum of the forces and moments acting on the plane. However, even this moment is in the direction that adds to the elevator's effectiveness.

Now, what if we try to put the main surface for pitch control on the wing of a conventional aft-tailed airplane, instead of on the stabilizer? When we deflect that surface, several things happen, and some of them tend to cancel each other.

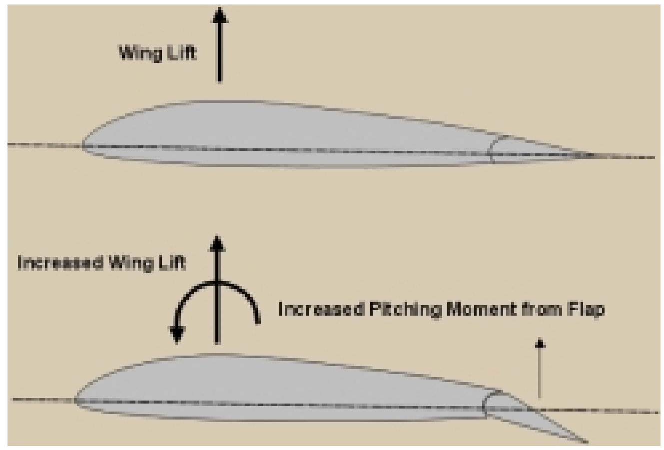
If we deflect the ailerons/trailing edge flaps downwards, we move the trailing edge location downward, which makes the wing's effective incidence more positive, which therefore increases the decalage. This will tend to pull the nose up.

The increased lift of the wing due to the increased angle of attack will increase its downwash angle. A wing makes lift by accelerating the air downwards, so the air behind the wing is therefore moving downwards relative to the airplane at some angle. If we make more lift, we increase this downwash angle. The increased wing downwash impinging on the tail will tend to push the tail down (i.e.: make its angle of attack more negative), also tending to pull the nose up. This downwash field extends for quite some distance both above and below the wing, so the vertical location of the tail relative to the wing and fuselage is not likely to significantly affect this.



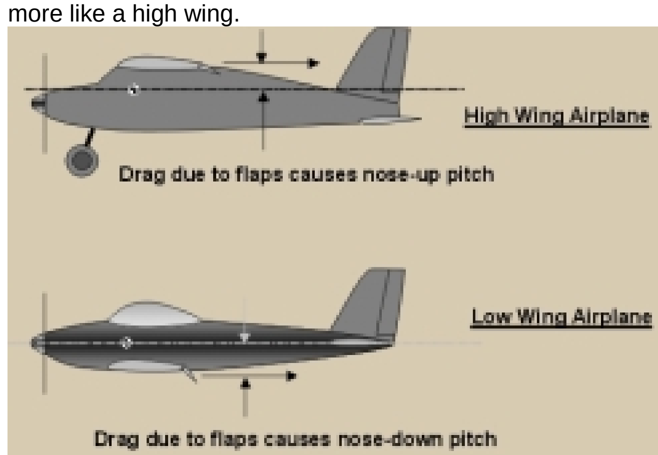
If this is a "pitcheron" airplane, where we just pivot the whole wing for this control input without altering its camber, then this is pretty much the total of what happens. However, if what we defected was an aileron or a flap, leaving the forward portion of the wing fixed, then we also altered the camber of the wing's airfoil. This will change its aerodynamic pitching moment, and in this case that will tend to push the nose down (opposite the direction of the other two effects), and it will probably be large enough to be significant. In that case, the location of the hinge line becomes an important factor.

If the hinge line is near the trailing edge, then a given angular deflection of the control surface has a relatively small effect on the total camber and the chord line, but because all that camber is being added near the trailing edge, it has a major effect on the aerodynamic pitching moment coefficient. It could be large enough to overcome the first two effects altogether, causing the plane to pitch nose-down, instead of the nose-up effect the other two factors are trying to create.



Conversely, a well-forward hinge line location will tend to minimize the effects on the aerodynamic pitching moment coefficient, and maximize the other two effects. On some of the models Joe and I experimented with, we used hinge line locations around 20% of the chord back from the LEADING EDGE of the wing. Aerodynamically this can have all sorts of interesting and mostly beneficial effects, but structurally it can be an engineer's worst nightmare!

The vertical location of the wing can be a factor. If the wing is low relative to the aircraft's C/G, then the increased drag from that extra lift we're now making will tend to pull the nose down. A high wing's drag will tend to pull the nose up. Dihedral is also a factor here, since the key location of this drag is at the Mean Aerodynamic Chord ("MAC") location, which on a typical tapered wing is a little bit inboard of the middle of the panel. If there's a lot of dihedral, it raises the MAC higher relative to the rest of the plane, making it act more like a high wing.

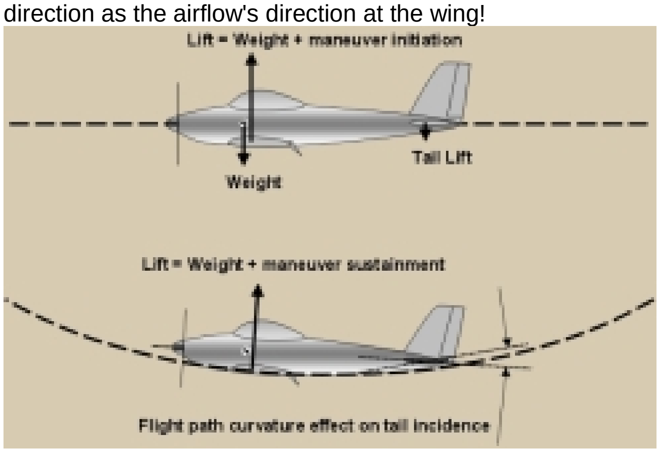


Another issue is pitch rate. So far we've discussed steady-state forces and behavior, when the plane is flying in equilibrium in a straight flight path. However, there are times such as during a loop, or pulling up during landing flair, or when the plane is in a steeply banked turn, when we want the plane's flight path to be curved relative to the pitch axis. This is where tail moment arm becomes an issue.

Now let's look at the situation of a plane doing a pitch-up maneuver, such as the pull-up into a loop. We're looking at a transient case here, so the airspeed hasn't changed yet to create a new equilibrium of lift forces and moments that puts the plane back on a straight flight path. However, there is still an equilibrium of sorts going on, because we still have to satisfy that most fundamental of engineering principles in Newtonian physics, that the sum of all the forces and the sum of all the moments (i.e." twisting forces") acting on the plane must always add up to exactly zero. If they don't, then somewhere there is a force or a moment that you haven't accounted for. This rule is right up there in stature with the Law of Conservation of Mass and Energy, the one that says you can't get something for nothing (which, by the way, is a pretty good law in economics as well!).

When we initially pull back on the stick, the angle of attack increases, so the wing starts making more lift, which accelerates the mass of the plane upwards. However, that upward movement changes the direction of the relative wind at the wing, reducing its angle of attack until the extra lift and the upward acceleration of the plane's mass is cancelled out. The wing's lift is now equal to what it was before plus whatever is needed to balance the centrifugal force from the plane's now-curved flight path, but less than what it was at the instant of the initial pull-up because the new relative wind direction at the wing has reduced the wing's angle of attack a little, part of the way back to what it was before the initial pull-up.

Meanwhile the plane's now-curved flight path has changed the relative wind at the tail in the opposite direction. The local airflow blowing on the tail is not in the same direction as the airflow's direction at the wing!



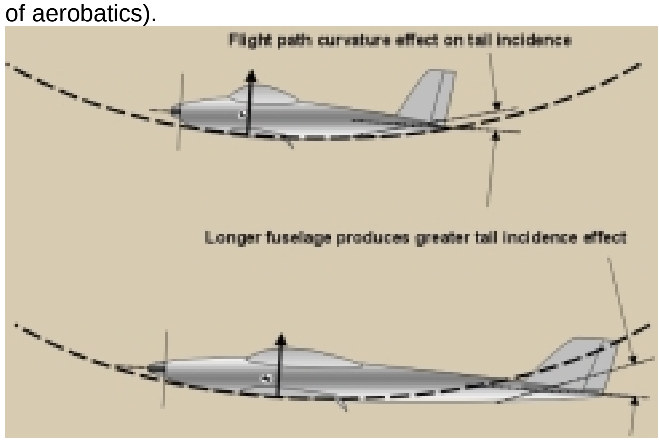
How much different? Generally it's a small angle (exactly enough to cancel out the effects of the change in the effective decalage from the deflected controls), but in the some cases it can be surprisingly large. For example, in an R/C hand-launched sailplane it can exceed 10-15 degrees in a very tight thermal turn. We found on our own RCHLG designs that the amount of up elevator needed just to compensate for this effect in a very steep turn was about twice what was required to bring the plane to a stall in level flight! The relative wind at the wing that results in an equilibrium of lift is in one direction, and the relative wind at the tail that satisfies that equilibrium is in a different direction.

If we draw a line perpendicular to the wing's relative wind at the wing's location and another line through the tail perpendicular to the tail's local relative wind, the point where the two lines cross will be approximately the center of the arc that represents the plane's curved flight path.

If the two lines are far apart at the wing and tail (i.e.: a plane with a long tail moment arm), then the radius to the center of this arc will be bigger than if the plane has a short tail moment arm.

By the way, this whole line of thinking applies even better to the question of aileron response and roll rate, but we'll save that one for another discussion, unless someone really wants to go into it now. This treatise is already getting way too long!

This radius of turn concept is partly where the idea of short-tailed planes being more maneuverable than long tailed airplanes comes from; an idea that has some truth to it but that does not cover all the factors. The amount of mass in the extremities is also a major factor, and there are a number of other factors as well. It is possible to have an extremely maneuverable plane with a very long tail moment arm. For example, the Spitfire has an unusually long tail moment arm, as does the famous Bücker Jungmeister, which literally "wrote the book" on modern aerobatics (the Aresti dictionary of aerobatics).



Having a short tail moment arm will help the turn rate, or the radius of the "turn" about the pitch axis, but it also makes some of the other factors, especially the effect of the wing's aerodynamic pitching moment coefficient, more critical.

In summary, regarding using flaps and/or ailerons as elevators, yes, it can be done. In our experience it's tricky to get it to work well, the direction of response for a given control input can be uncertain until you actually fly it ("up elevator" could result in a downward pitching response if the factors added up the wrong way), and in general the pitch control authority tends to be weaker than what you can get with a lot less trouble from a conventional elevator (if this were not so, then we would have stopped bothering to run control linkages all the way back to the tail a long time ago!). However, if there is some valid reason for going to all the trouble of sorting it out (for example, in some of our experiments we actually built proof-of-concept models with adjustable-length tail booms), it can be a viable alternative.

Don Stackhouse @ DJ Aerotech
djaerotech@erinet.com
http://www.djaerotech.com

Volume 33,Issue 4 Newsletter of the Propstoppers RC Club April 2003

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

Propstoppers R.C. M.A.C

Dave's four-year-old granddaughter Susan and her father, Peter Everett, winding the Delta Dart she built for the last Tinicum School Indoor. Susan attaches the labels and stamps to each month's newsletter.

Not long now guys, get em ready!

You too Mick!