



The Flight Line

Facebook Group: Alvin RC Flight Line

www.alvinrc.org

AMA Leader Club – Gold Level

Newsletter of Alvin RC Model Airplane Association Second Quarter 2020 (April, May, June)

HAPPY 2020 Spring Flying

With Spring we hope it brings a lot more flying!!!

Spring is getting close and we hope everyone has spent some of the bad weather days during winter to get their hanger cleaned up (right) and their “flying stock” ready to go. Flying at the field has been light (me included) during the winter months but hopefully spring and summer will bring out our members to fly instead of solving the world problems (remember we did that last year).

The following is a list of reasons we find that we cannot fly. No this list was not made by me it was made by our members and written on a white board over the years in the clubhouse. We have done an in-depth evaluation of each reason and our findings are noted alongside each excuse in ():

Too hot or too cold (BS)
Sky is wrong color (BS)
Receiver unreliable (BS)
Transmitter unreliable (BS)
Pilot unreliable (true verified by spouse)
Forgot wing tube (go get it)
Field too wet (stay on runway that is why we put it there)
Last pair of underwear (spouse said not true)
Want to let others fly (BS)
Just want to talk (nothing new in this one)

Too many crashes today (then don't)
Too many cyclers on road (don't belong over road)
Too lazy (verified)
Might hit a bird (you ain't that good)
I am hungry (ok to eat)
John is flying (he does that a lot – good for him)
Hang nail (poor baby)
Wind in wrong direction (fly other direction)
God told me not to fly (said he has a lot more important things to tell you not to do!!!!!!)

Note: BS stands for BS

Happening at the field

Come join us at the clubhouse for breakfast every Saturday morning between 8 AM and 9 AM. Gene and his crew are doing a great job and our turn out seems to be increasing each Saturday. Remember full breakfast for \$5 – you can't beat that anywhere!!!! Below are some pictures of the results of the clubhouse cleanup effort being led by Gene and Tom Youens:



Did Someone Say Combat? (Submitted by Mark Manusov) Ok folks how many times has your spouse told you, you have too many airplanes? Here's your chance to make her/him happy. Dig out that closet full of old airplanes and pick out the one you dislike the most, bring it to the field and join us for some combat. So far there are four of us ready to go and others have expressed an interest in putting something together. So far we've had about 6 contests with one ribbon cut, one midair and 4 contests that the ground won. John cut my ribbon. David got me with a midair and all three of us have tried the old kamikaze dive without much success although we did make some popcorn (plastic). Plan is to meet at the field Saturday morning and try to fly about 10. So far we have Johnny Pearce, David Deaton, John Hall, John Desmond and anyone else ready to go. Free glue and filament tape for instant repairs. Winner gets bragging rights and second place gets a free cup of coffee.



Note the streamer is still intact – score one for Mother Earth!

Next time you are at the field you will notice there is a large tree missing on the South side of the pilot parking area. The tree was a Hackberry that was rotting out in the trunk and we had to have it removed for concern of falling in our parking lot or on the canopy. We have been assured by “prominent club members” that removal of the tree will not cause any significant change in the crosswind patterns and therefore this cannot be added to the list of reasons not to fly!!!!



Safety – by Tom Youens, Safety Officer

If you have a question or suggestion about safety rules contact me directly or via email, htyouens@hotmail.com. I feel most of our members are very safety conscious, but if you should see someone repeatedly violating rules please contact me and I will discuss it with the member; your name will be kept confidential.

New Members:

Introduce yourself and welcome our new members – if you happen to introduce yourself and welcome an old member now you know them and if you do it twice you will know them better and be getting near my age!!!!!!!!!!

General Information

In an effort to save some money we are going to eliminate our Post Office box in May when it comes up for renewal. Our current PO box, Box 30, Alvin, Tx. rental will expire in May and we have elected to discontinue it. The rental cost that is now \$118 per year is excessive for the benefit. Our club mail is minimal and except for the bills, is

mostly "junk." Grady has arranged to have our bills sent directly to his home address for payment.

In order to provide a local address for the club, we will purchase and install a mailbox at the gate. We should have this installed before May.

The club's mailing address after May 1, 2020 will be:
Alvin RC Modelers Assoc. (or Alvin RC Club)
2444 CR 180
Alvin, TX. 77511

Dues payments or any important mail should be mailed to Grady's address. Membership dues for year 2020 (due during May 2020) should be placed in the clubhouse box or sent to Grady's address; Graydon Owens, 1308 Steele Dr., Friendswood, TX 77546

For Sale or Wanted:

Eflight Eratix 3D 25e ARF (Kit complete but no instructions) \$140.00
Also have a used Eflight 32 Brushless Outrunner motor 770KV (can be used on the Eratix) \$40.00
Contact Ken White – contact info on Club roster

Lost and Found:

If you have lost or found an item at the field that you do not know who it belongs to please let us know so we can post the description. Most items found at the field are placed on the counter by the row of windows in the clubhouse.

The Technical Corner – by Ken White

Let me know if you like "The Technical Corner". If not, that's ok too. If you have suggestions, I'm open. In this newsletter I am providing the formulas to calculate the CG for both conventional aircraft and canards. After that I have lots of data for the design of flying wings that will be included in future newsletters. Warning, it does get technical. Contact me at the field, call me or email me. Contact info in on the club roster. Technical Corner is attached at the end of the newsletter.

Smiles:

An elderly couple who were childhood sweethearts had married and settled down in their old neighborhood and are celebrating their sixtieth wedding anniversary. They walk down the street to their old school.

There, they hold hands as they find the old desk they'd shared and where he had carved "I love you, Sally."

On their way back home, a bag of money falls out of an armored car practically at their feet. She quickly picks it up, but they don't know what to do with it so they take it home. There, she counts the money, and it's fifty-thousand dollars. The husband says, "We've got to give it back." She says, "Finders keepers." And she puts the money back in the bag and hides it up in their attic.

The next day, two FBI men are going door-to-door in the neighborhood looking for the money and show up at their home. They say, "Pardon me, but did either of you find any money that fell out of an armored car yesterday?" She says, "No."

The husband says, "She's lying. She hid it up in the attic."

She says, "Don't believe him, he's getting senile."

But the agents sit the man down and begin to question him. One says, "Tell us the story from the beginning." The old man says, "Well, when Sally and I were walking home from school yesterday..."

The FBI guy looks at his partner and says, "We're outta here..."



Upcoming Events:

- Our next quarterly meeting will be April 25th at 9AM in the clubhouse.
- Remember our Annual Big Bird (30 straight years) is scheduled for April 11th. Fred Daniels is CD of the event and would welcome help. Please contact Fred if you can help work the event or help with set up and take down. Also please plan to take part in the event – even though we say Big Bird we ain't checking on size or does it have to be "big bird yellow"!!!!

- Events both flying and non-flying are listed on AMA's website under Competition/Calendar and also listed in AMA's magazine Model Aviation.

Club Executive Committee

President – Benny Behrens	Vice President & Safety Coordinator– Tom Youens
Treasurer – Grady Owens	Secretary – Tom Johnson
Board Member – Lewis Mack	Board Member – Ralph Hoeting
Board Member – Mark Manusov	Trustee – Ken White
Trustee – Fred Daniels	

Any comments, suggestions, corrections may be submitted to Benny Behrens at cbbehrens@comcast.net. If you have an article or information you would like to share with club members in the newsletter please send it to Benny Behrens.

THE TECHNICAL CORNER

A METHOD TO DETERMINE THE CG FOR MODEL AIRCRAFT (CONVENTIONAL AND CANARDS)

By Ken White

There are several methods of determining the center of gravity (CG) for aircraft. One method (especially for full size) is to weigh the aircraft under each wheel and determine the mass moment arms based on a datum location. Another method used and is quite accurate is to hang the model, get it level and use a plumb bob. This requires building the mechanism, which is called the Vanessa CG machine, to support the aircraft and can be somewhat cumbersome and tedious, depending on the model. Another (mathematical) method which makes more sense for model aircraft is to use the aerodynamic centers (AC) of the flying surfaces and formulas to calculate the CG. Don't worry, I am not going to go into how the formulas were derived, so all you have to do is make some simple measurements and plug the numbers in.

To determine the CG for any aircraft, first you determine the geometric centers for the wing and the tail (or canard). You must also determine the area of each of these surfaces (one side only) and a distance between these centers and simply plug the numbers in. I wrote a simple Excel spreadsheet program to make it simpler, but it is not necessary. I will give examples later as you do need to be careful with the hierarchy when solving.

To give credit these formulas were found in the June 1980 issue of Model Aviation written by Ron Van Putte. Another article in the June 1984 issue written by Dick

Sarpolus and Bernie Raad used these formulas in a Basic program for Canard design in their write-up.

Attached are a couple of drawings, one showing a conventional setup and the other a canard. The dimensions measured are the root and tip chords (R1, T1, R2 & T2), the half span of the wing and stab or canard (B1 & B2), the sweepback, if any (D1 & D2). If no sweepback then the value is "0", or if the sweep is forward then it is a negative number. In addition, measure the distance between the wing and stab or canard (L1). Take note where this distance (L1) is on each sketch. In addition to the drawings, attached are step by step guides to use the formulas:

Step 1 & 2 Calculate the area of the wing (S1) and stab or canard (S2)

Step 3 & 4 Calculate the Geometric center of each surface (X1 & X2)

Step 5 Determine the length between these centers (L)

Step 6 Determine the value of P (the aerodynamic center (AC))

Step 7 Calculate the CG.

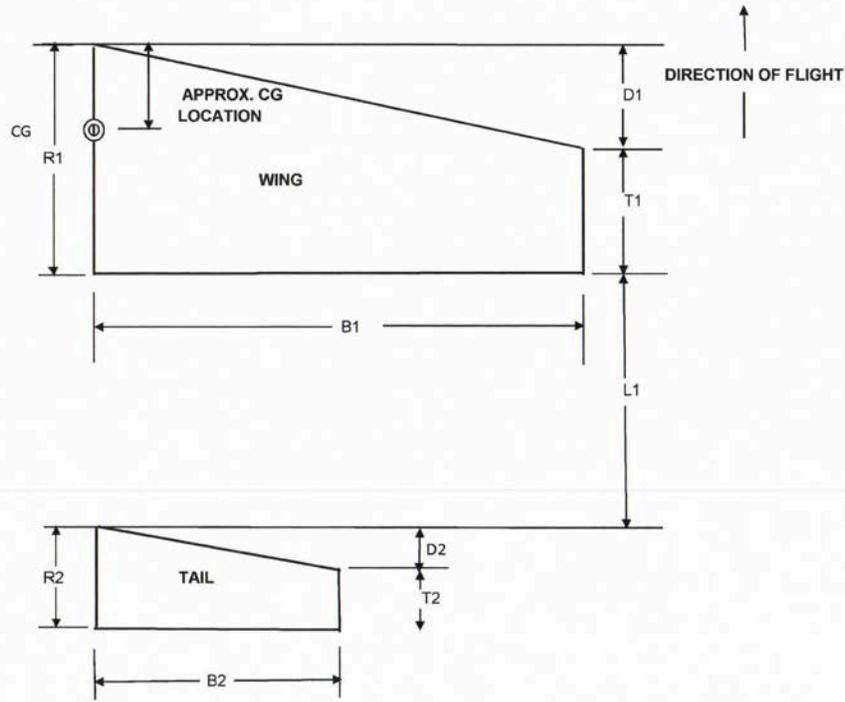
A couple of Notes:

One, the formulas in Steps 5, 6 & 7 are different depending if your model is conventional or canard. Do not mix them. The difference is subtle, but involves a factor of 3 in the denominator and a change in sign (+/-). Second, the calculated CG value gets you into a safe zone. The CG can have a range and after finding it you may want to experiment and move it aft depending on your flying skills.

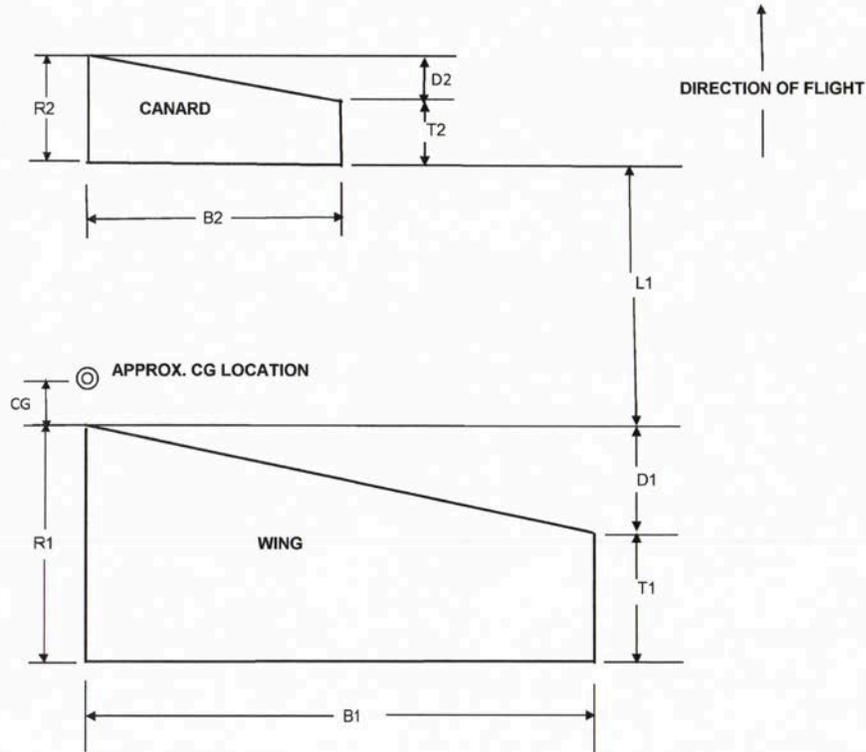
The last two pages have a couple of examples, using my spreadsheet program. One is for my Electric Stick and the other is my X-wing canard. The CG value obtained for the canard was a bit forward of where I fly it. So again, it gets you in the ballpark. You can use the values in the spreadsheet example to check if you want to calculate by hand, but please note the wing and stab span in the "boxes" are the full span. Use half that value in the formulas.

One other note, this is for simple wings such as straight or single taper or sweepback. If your wing is more complex such as multiple tapers or sweeps as for sailplane wings, involves more complex formulas. That is for next time as well as flying wing design. Again let me know if you like this stuff or have questions. If you don't that's ok too. If you have suggestions, I'm open. Contact me at the field, call me or email me. Contact info is on the club roster.

CONVENTIONAL LAYOUT



CANARD LAYOUT



Formulas to determine the CG for a conventional aircraft

- 1.) Area of the Wing, $S_1 = B_1 * Clavg$

S_1 = Area of the wing

B_1 = Wingspan

$Clavg$ = average chord

If your wing is a straight taper the average chord, $Clavg = (R_1 + T_1)/2$

R_1 = Wing Root

T_1 = Wing Tip

- 2.) Area of the Stab, S_2 is similar:

$$S_2 = B_2 * C_{2avg}$$

S_2 = Area of the stab

B_2 = Span of stab

C_{2avg} = average chord of stab $(R_2 + T_2)/2$

R_2 = Stab root

T_2 = Stab tip

- 3.) Geometric Center of Wing

$$X1 = \frac{R1^2 + R1*T1 + T1^2}{6 * (R1 + T1)} + \frac{D1}{3} \frac{R1 + 2*T1}{R1 + T1}$$

R1 = Wing root
 T1 = Wing tip
 D1 = Sweepback of wing (Neg. if Forward Sweep)

4.) Geometric Center of Stab

$$X2 = \frac{R2^2 + R2*T2 + T2^2}{6 * (R2 + T2)} + \frac{D2}{3} \frac{R2 + 2*T2}{R2 + T2}$$

R2 = Stab root
 T2 = Stab tip
 D2 = Sweepback of Stab (Neg. if Forward Sweep)

5.) Determine Length, L between Geometric Centers

$$L = X2 - X1 + L1 + R1$$

L1 = Distance between T.E. of wing and L.E. of stab at the Root

6.) Calculate offset from Geometric Center, P

$$P = \frac{L * S2}{3 * S1} - \frac{R1^2 + R1*T1 + T1^2}{15 * (R1 + T1)}$$

(Note: Do not use formulas 6 & 7 for a Canard)

7.) Calculate the CG

$$CG = X1 + P \text{ (Units behind wing Leading Edge at fuselage)}$$

Formulas to determine the CG for a Canard.

1.) Area of the Wing, S1 = Wingspan, B1 times the average chord, C1avg

If your wing is a straight taper the average chord, C1avg = (R1 + T1)/2
 S1 = B1 * C1avg

2.) Area of the Stab, S2 is similar

$$S2 = B2 * C2avg$$

S2 = area of stab
 B2 = span of stab
 C2avg = average chord of stab (R2 + T2)/2

3.) Geometric Center of Wing

$$X1 = \frac{R1^2 + R1*T1 + T1^2}{6 * (R1 + T1)} + \frac{D1}{3} \frac{R1 + 2T1}{R1 + T1}$$

R1 = Wing Root
 T1 = Wing Tip
 D1 = Sweepback of Wing (Neg. if Forward Sweep)

4.) Geometric Center of Stab

$$X2 = \frac{R2^2 + R2 * T2 + T2^2}{6 * (R2 + T2)} + \frac{D2}{3} \frac{R2 + 2 * T2}{R2 + T2}$$

R2= Stab Root

T2= Stab Tip

D2= Sweepback of Stab (Neg. if Forward Sweep)

5.) Determine Length, L between Geometric Centers

$$L = X1 - X2 + L1 + R2$$

L1 = Distance between L.E. of wing and T.E. of stab at the root

6.)

$$P = \frac{L * S2}{S1} + \frac{R1^2 + R1 * T1 + T1^2}{15 (T1 + R1)} \quad (\text{Note: This is for a Canard only})$$

7.)

$$CG = P - X1 \quad (\text{Units ahead of wing Leading edge at fuselage}) \quad (\text{Note: This is for a Canard Only})$$

CONVENTIONAL AIRCRAFT				RESULTS	
WING	TAIL	FUSELAGE			
MULTIPLIER 0.25 ▲ TOTAL SPAN (B4) 50.75 IN ▼	MULTIPLIER 0.25 ▲ TOTAL SPAN (B2) 19.00 IN ▼	MULTIPLIER 0.25 ▲ WING TO STAB @ ROOT (L1) 16.25 IN ▼	AREA OF WING (S1) = 589.97 IN ²		
MULTIPLIER 0.25 ▲ ROOT CHORD (R1) 11.75 IN ▼	MULTIPLIER 0.25 ▲ ROOT CHORD (R2) 6.25 IN ▼		AREA OF STAB (S2) = 118.75 IN ² % of WING = 20.13 %		
MULTIPLIER 0.25 ▲ TIP CHORD (T1) 11.5 IN ▼	MULTIPLIER 0.25 ▲ TIP CHORD (T2) 6.25 IN ▼		GEOMETRIC CENTER WING (X1) = 2.91 IN		
MULTIPLIER 0.25 ▲ SWEEPBACK (D1) 0.00 IN ▼	MULTIPLIER 0.25 ▲ SWEEPBACK (D2) 0.00 IN ▼		GEOMETRIC CENTER STAB (X2) = 1.56 IN		
			GEOMETRIC LENGTH (L) = 25.66 IN		
			P = 0.56 IN		
			CG(Units behind L.E. at root) = 3.47 IN		
			ASPECT RATIO (AS) = 4.37		

CANARD AIRCRAFT

WING	CANARD	FUSELAGE	RESULTS
MULTIPLIER 0.25 ▲ TOTAL SPAN (B1*2) 35.00 IN ▼	MULTIPLIER 0.25 ▲ TOTAL SPAN (B2*2) 13.00 IN ▼	MULTIPLIER 0.25 ▲ WING TO STAB-SEE SKETCH (L1) 16.75 IN ▼	AREA OF WING (S1) = 192.50 IN ²
MULTIPLIER 0.25 ▲ ROOT CHORD (R1) 5.5 IN ▼	MULTIPLIER 0.25 ▲ ROOT CHORD (R2) 4.50 IN ▼		AREA OF STAB (S2) = 45.50 IN ² % of WING = 23.64 %
MULTIPLIER 0.25 ▲ TIP CHORD (T1) 5.5 IN ▼	MULTIPLIER 0.25 ▲ TIP CHORD (T2) 2.50 IN ▼		GEOMETRIC CENTER WING (X1) = 2.88 IN
MULTIPLIER 0.25 ▲ SWEEPBACK (D1) 3.00 IN ▼	MULTIPLIER 0.25 ▲ SWEEPBACK (D2) 2.00 IN ▼		GEOMETRIC CENTER STAB (X2) = 1.80 IN
			GEOMETRIC LENGTH (L) = 22.32 IN
			P = 5.83 IN
			CG(Units ahead of L. E. at root) = 2.95 IN
			ASPECT RATIO (AS) = 6.36