

# REPLICA

THE OFFICIAL PUBLICATION OF THE  
NATIONAL ASSOCIATION OF SCALE AEROMODELERS  
OCTOBER 2021

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The National Association of Scale Aeromodelers (NASA) is an organization founded to promote all forms of scale aeromodeling competition, and is the host of the Academy of Model Aeronautics (AMA) Scale Nationals as the A.M.A. Special Interest Group (SIG) for Scale Aeromodeling in the United States of America.

[www.nasascale.org](http://www.nasascale.org)

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# MESSAGE FROM THE NASA PRESIDENT Mike Barbee



## *Hello NASA Members and Friends,*

Hello NASA members, the 2021 NASA Classic is now history. The AMA site 4 served as a perfect site. The runway was closely cut and surroundings were wide open to make a perfect fit for the competition. The weather was excellent and the AMA staff did a fantastic job of preparing the flight line with tents and everything to make us comfortable. Thank you AMA. The pilots and winners are listed elsewhere in the newsletter.

I would like to clarify the qualification process for flying in the Classic. All those that qualify through out the year will receive a invitation letter from NASA. The classes that require static judging are Expert Sport Scale, Open Scale, Designer Scale, and Team Scale, if you qualify in one you qualify in all. To qualify in the static classes you must have a score that is at least ninety percent of the top score with all classes combined. You qualify in the Fun Scale classes of Novice and Expert simply by competing at one of the qualifiers during the season. I hope this clears up the questions on the NSC qualifications. We have nine NASA sponsored contests this coming year starting in November at the Ocala Flying Model Club, November 13-14, 2021. The site for the 2022 classic will be announced soon.

One of my goals as the NASA President is to put together a U.S. Scale Team for the World Scale Championships in 2024. As an AMA Special Interest Group, it is our mission to promote scale model contests and make the rules that apply to such. It has been fourteen years since we had a team selection for a world team. Now is the time to get ready for the 2024 Championships. Let's step up and show the world our talented scale builders and pilots. The FAI scale rules can be found on the FAI web site.

The rules differ from ours in a few ways so, become familiar with them before you start to build and fly your competition airplane. The team will consist of three pilots, an alternate and a team manager. We are working on ideas to fund the expenses and model transport to the championships. Jack Buckley and Allen Goff will head up the committee.

If you are interested in helping out in any way, donations are accepted and tax deductible, please contact Jack. I am sure he will appreciate your ideas and help. Send your donations to the AMA foundation and mark them for the FAI F4H team. One NASA member has already made a sizable donation and his employer matched his donation. Maybe your employer would be interested in helping, ask, it may work

If you are interested in trying out for the team, we will have the FAI class offered at the Nationals next year, 2022 as a practice event. Then at the 2023 Scale Nationals we will have the team selection. Let me give you a hint on this caliber of competition READ THE RULES and be prepared. We want to assemble the best pilots and builders for this world team. 'til next time, build it exact and fly it scale.

**Mike Barbee NASA President**

## Greetings Fellow Scale Enthusiasts & FAI SCALE US TEAM

It has been over 10 years since the US has staged an FAI Scale Team. NASA has decided it has been too long and is working toward assembling a Team for the 2024 competition and invites your involvement. We held a first practice at NATS 2021 (with two contestants) to test the judging and get a feel for scoring and logistics. A scoring program is now in testing.

Forget what you have thought of as FAI Scale. NASA is fielding a team for the FAI F4H class. This class is not like the F4C class, as there is no Builder of the Model rule. However, the model does go through the standard Static Judging as well as the Flight Judging. The competitor is required to sign a declaration as to how much he/she contributed to the scale accuracy of the presented model. This means that a kit built, plans built, purchased, or even an ARF aircraft is eligible, as long as the weight is under 15kg (33 lbs), same as for F4C. A designer model can score maximum static points and an ARF nearly zero points. Remember that any aircraft entered will need the regular documentation book for Static.

Required maneuvers are Take-Off, Figure 8, Descending 360 Circle, and Landing. This is not that different from the AMA requirements. We will have a full 3 round practice FAI contest at the 2022 NATS, with the team selection contest at the 2023 NATS. The 3 team members will be selected as well as a 4<sup>th</sup> member for the alternate position.

So, consider the challenge, Get an aircraft ready, add the descending 360 to your routine, practice, and join the fun at the 2022 NATS.

Smooth Air,

**Dave Houk**

## NASA to Select a US SCALE FAI TEAM for the 2024 WORLD SCALE CHAMPIONSHIP **By John Boyko**

I am excited to announce that NASA (National Association of Scale Aero-modelers) the official AMA SIG for scale modeling, has decided to select an FAI team for the 2024 World Scale Championships! The current plan is to field a team for the F4H class, then F4C if there is enough interest/support. NASA is focusing on the F4H class since the static rules are very similar to AMA's 512 Expert Sport Scale and/or Open Scale.

F4C may be offered later depending on the level of interest for that class. At the 2021 Scale Nationals (NATS) we flew the F4H class to gain an understanding of the logistics and procedures needed to select a team for 2024.

The F4 classes will be offered at the 2022 and 2023 Scale Nationals and NASA Scale Classic. Team selection will occur at the 2023 Scale Nationals (NATS) in Muncie for the 2024 World Scale Championships.

I hope you will want to be involved in this prestigious event.

Let me know if you have any questions. Fly Scale

**John**



# NASA Scale Classic News & Results

From September 16-19, 2021 Muncie, Indiana



**1st Place Open Scale & 1st Place Sport Scale Expert - Jeremy Arvin**



**1st Place Designer Scale & 2nd Place Open Scale - Al Kretz**



**1st Place Fun Scale Expert Dan Landis**



**2nd Place Sport Scale Expert Dale Arvin**



**2nd Place Fun Scale Expert Steve Eagle**



**3rd Place Fun Scale Expert Art Shelton**



**3rd Place Open Scale Mike Wolvern**

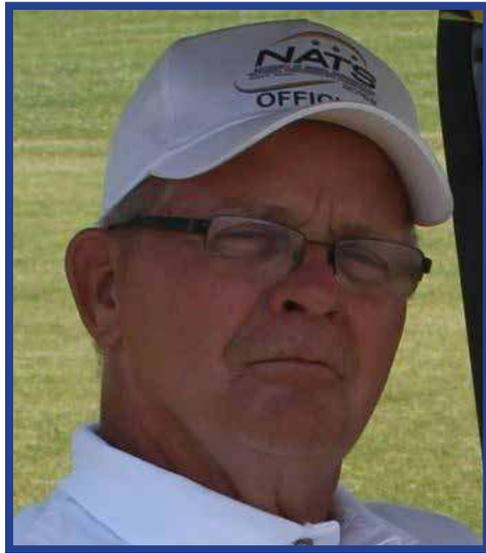


**3rd Place Sport Scale Expert Bob Benson**



**4th Place Fun Scale Expert Mike Barbee**

## On the control line side.



The year 2021 has been another strange year. Instead of looking backward, let's look forward to planning our 2022 c/l scale season. There are 5 c/l scale contests that we know of: Carmichael's, PA . June 13-18 at the Brodak estate, AMA U S Nationals in Muncie, IN . July 15-17, NASA Scale Classic, Northwest Regionals in Eugene, OR and the Broken Arrow contest at Buder park in St. Louis, MO. We need to try and support as many of these events as possible to keep c/l scale alive and active in the U S. The contest at Brodak will be in honor of John, and all the contributions he made to the modeling community.

Next year's U S Nationals will substitute F4B for Authentic scale. The rules of both classes are close to the same. It is exciting to note that we are trying hard to get F4B reinstated into the F4 world championships. Richard Schneider and I are members of a 4-person international board that will be rewriting some F4B rules to make this event easier and more appealing to c/l scale fliers.

After speaking with the F4 FAI chairman, it seems hopeful that all changes will be made and ready for the F4 FAI November committee meeting. If the changes are excepted, then 2024 looks good for us, and we will partner with the F4H (RC) team. This will be great as we have not sponsored a complete team (6 pilots) since 2008.

If you are interested in competing on the U S scale team, get to building. The 2022 Nats will be a great opportunity to become familiar with how F4B works, and the rules and regulations.

Most rules will remain the same but we are suggesting the introduction of 2.4 for optional controls and stand-off scale static judging. It will be important to read the new F4B rules when we have a conformation from the FAI F4 committee. Have a great building season and stay tuned to the NASA web site for up-to-date information. By the way, NASA will try and make our F4 team for the 2024 world championship paid for by dedicated donations to the AMA.

Support NASA with the purchase of NASA products, membership and next year's raffle.

Blessings

**Allen Goff**



*More photos from the Controline Side*



**YOU CAN RENEW  
YOUR 2022 DUES OR  
JOIN NASA ONLINE  
AT**

**[www.nasascale.org](http://www.nasascale.org)**



# COLUMBUS SCALE CLASIC PHOTOS 2021



# MORE COLUMBUS SCALE CLASIC PHOTOS 2021



## And a few MORE COLUMBUS SCALE CLASSIC PHOTOS 2021 Happy Pilots



**Col. Robert E, Thacker and USAC & USAF retired from our grace at 102 years of age. His ashes were dropped from the Lady Alice P51 by long time friend Dr.Ken “Wags” Wagner over San Clemente near his home. He was a dear friend to all of us and a true scale modeler with the criticism to follow if you didnt do it correctly. He is missed and left great memories behind.**

# SCALE CLUB NASA CONTEST SUPPORT



## Application for Scale Contest NASA Sponsorship

NASA will provide \$250.00 and 100 raffle tickets to each AMA sanctioned club that hosts an all scale AMA sanctioned contest providing the following stipulations are met.

- This application must be completed and returned to the NASA Contest Coordinator.
- AMA rules for scale competition and scoring must be followed.
- The contest must include all AMA Scale RC and/or Control Line Scale events.
- The contest must span at least two consecutive days.
- The application must be received two months in advance of the contest date.
- An electronic copy of the contest flyer must be provided with the application.
- NASA Score sheets must be used during the event. ([www.nasascale.org](http://www.nasascale.org)).
- The contest results must be submitted to the NASA CC with 30 days of the contest.

Upon NASA review of this application the Contest Director will be notified regarding approval by the NASA CC. Contests previously sponsored will have priority. Applicants will be notified of conflicting dates and allowed to resubmit. Once the annual sponsorship budget limit has been reached NASA will not accept new applications for the current year, however applications can be submitted for subsequent years.

Name of the Contest \_\_\_\_\_

Name of the Club \_\_\_\_\_

Name of the CD \_\_\_\_\_ AMA # \_\_\_\_\_

Name of contact \_\_\_\_\_

Contact Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Email \_\_\_\_\_

Telephone \_\_\_\_\_ Cell Phone \_\_\_\_\_

Date of the Contest \_\_\_\_\_ AMA Sanction # \_\_\_\_\_

Contest Location \_\_\_\_\_

Return this application to the NASA S/T at [jeffreykeithpike@hotmail.com](mailto:jeffreykeithpike@hotmail.com)

Return your contest results to the NASA S/T listed above.

Upon completion of all the above stipulations NASA will submit a check to the host club via the contact.

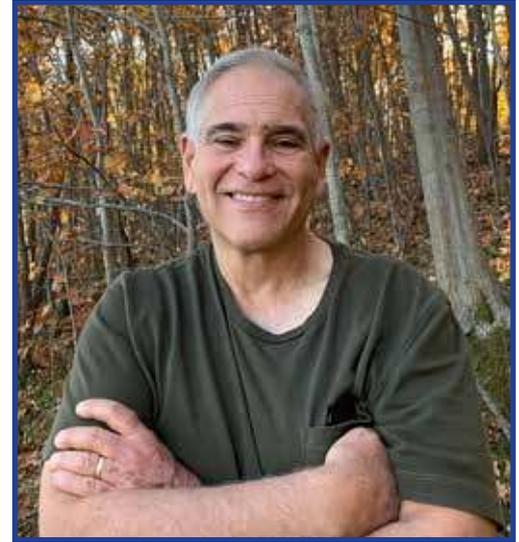
**The check must be payable to the order of the Official Club Name (no individuals allowed).**

*Revised November 20, 202*

# Success Hangs in the Balance

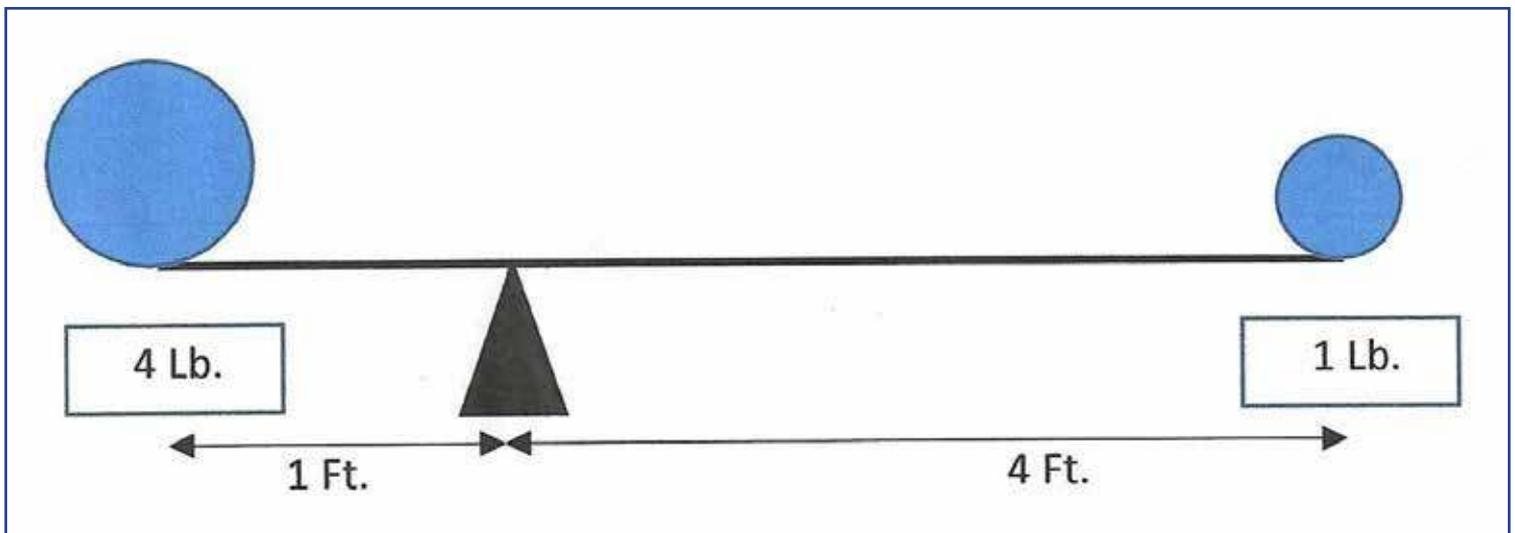
By Gerry Garing

We know the adage: “Nose heavy planes don’t fly well, and tail-heavy planes don’t fly long”. This article is not about the physics of aerodynamics, but rather one method of confirming an airplane’s center of gravity (CG). Desired CG is a range, usually around 25% - 33% of the wing chord, and not a specific point. An airplane’s CG will influence its flight characteristics and is often fine-tuned to the pilot’s satisfaction. Two pilots may fly the exact same plane and one may find it balances perfectly while the other says it needs nose weight, or vice versa. Think of it as a color spectrum where orange fades into red. There is no specific orange-red separation line, but there is an area where the color is either orange or red.



To find the CG we can support the plane with two fingers or some fancy gizmo under the wing and see if it rests level in the correct spot. This is a good method for smaller planes, but not practical for bigger and heavier planes. The Vanessa Rig uses cords to support the plane front and rear from a common point in a level position. A plumb bob suspended from that point will indicate the plane of the CG. I have used this method many times and is foolproof. As my planes became bigger and heavier, I found this awkward and difficult to perform alone. Now I rely on scales and mathematics just as in full scale aviation which is quite easy once you work with it.

An aircraft can be thought of as nothing more than a seesaw where the CG is the fulcrum. Balance is determined by the weight on each end and the distance each end is from the fulcrum. If one end is 4 times as heavy as the other, then the fulcrum will be one-quarter the distance as the other end.



Let’s suppose we used two scales to determine the weights on each end. You can see that 4 pounds located 1 foot from the fulcrum balances 1 pound located 4 feet from the fulcrum on the other side. This is really a case of torques. The 4 pounds would cause the see saw to rotate counterclockwise while the 1 pound would cause the see saw to rotate clockwise. If we removed the two scales from under the weights and placed one under the fulcrum, it would read the total weight of 5 pounds.

Let’s look at the example in the context and terms used in aviation. The fulcrum is unknown and is the point we are trying to locate as the CG. First some terms and definitions.

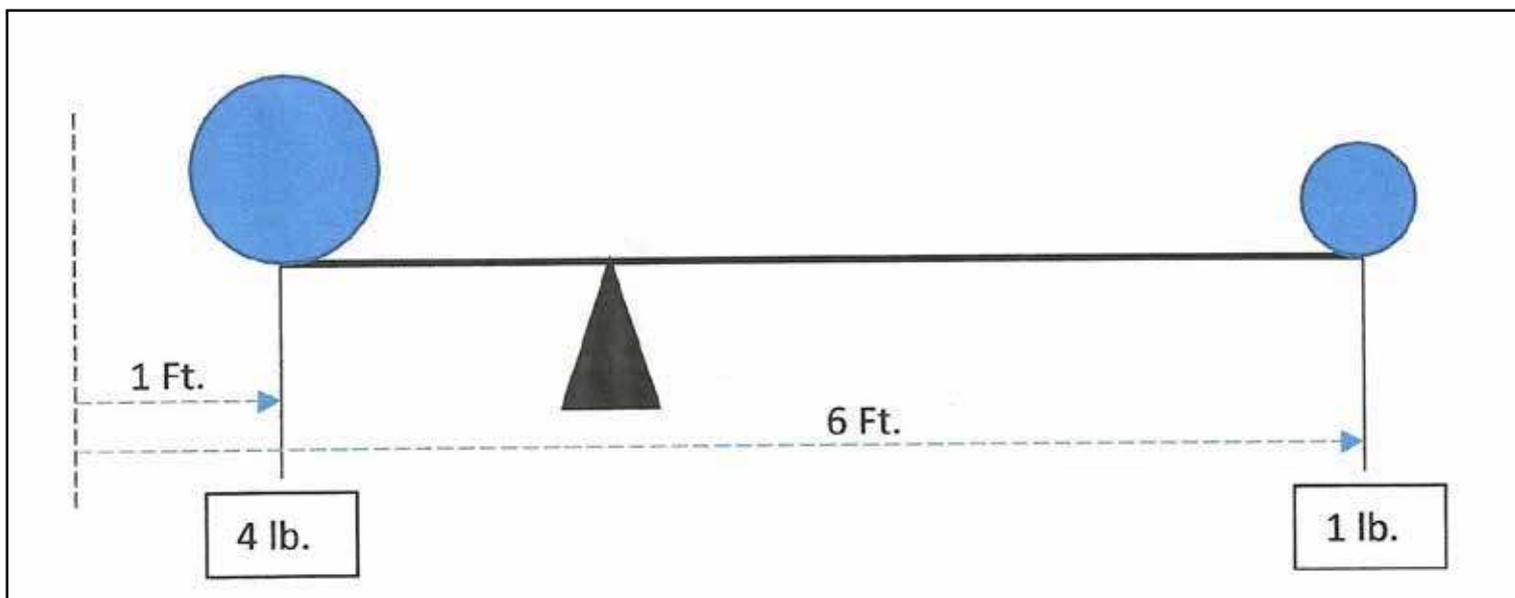
**Datum:** A reference line from which all distances are measured. The datum can be anywhere and can even be at some distance away from the system. As a note, there is no consistent datum among aircraft manufacturers

as spelled out in their maintenance manuals. Some use the firewall, others the leading edge of the wing, and others the front of the spinner. I find the front of the prop hub to be the simplest.

**Weight:** As measured at convenient locations such as the landing gear.

**Arm:** The arm is the distance the weight is located from the datum: If all the weights are all in the same direction away from the datum, they are all positive numbers. If they are in opposite directions, the ones to the right of the datum are positive and the those to the left of the datum will be negative. To avoid positives and negatives, I locate the datum at the front of the airplane.

**Moment:** Found by multiplying weight X's Arm



Based on the example above, we'll set the datum 1 foot left of the see saw and place a scale at each end. Enter the information in the table below:

Weight	Arm	Moment
Scale 1 4 lb.	1 Ft.	4 Ft-lb
Scale 2 1 lb.	6 Ft.	6 Ft-lb
<b>Total</b> 5lb		<b>10 Ft-lb</b>

The CG is the unknown Arm in the "Total" line. To find the CG, take the total moment (10 ft-lb) and divide it by the total weight (5 lb.). In this example,  $10 \text{ ft-lb} / 5 \text{ lb.} = 2 \text{ ft.}$  Therefore, the CG is 2 ft from the datum. This is the same as 1 ft to the right of the 4 lb. weight.

To do this with a model airplane: **Note:** the distances are transferred to the centerline of the airplane and not the actual distance from the datum.

1. Place each wheel on the center of the scale's platform. The height of each scale is adjusted to place the airplane in a level attitude. Transfer the location of the platform's center to the floor and make a mark. You could do this with one scale, measuring each separately but would need to block up the other wheels to maintain level as you go.
2. Mark the floor with the location of the datum. Since my datum is the prop hub, I use a carpenter's square to locate and mark this on the floor. See photo 1.
3. Measure the distances of the scales from the datum. Enter these in the data table.
4. Locate and measure the position of the leading edge of the wing. Enter this in the data table.

5. Enter the weights from the scales in the data table.

6. Calculate the CG.

I'll use my RV-3 as an example.

Photo 1: A scale is placed under each main wheel and a third under the tailwheel. The tailwheel is blocked up so the plane is in a level attitude.

Photo 2 shows the main wheel scales and the reference line on the floor to measure the Landing Gear Arm. Notice how close it is to the Leading Edge arm.

Fill in the weights and distances on the table:

Wt. (lb.)	Arm( in.)	Moment (In.-lb.)	Leading Edge Distance: 13.88 in
Left Main	11.33	13.5	153.0
Right Main	11.33	13.5	153.0
Tailwheel	3.1	72.0	223.2
Ballast	-----	-----	-----
Total	25.76		529.

Remember from the example above, the missing value under "Arm" in the total line is the CG. We find that by dividing total moment by total wt.:  $529.2/25.76 = 20.54$ . The CG is 20.54 in. from the datum. This isn't quite yet the answer we need. We are looking for the percentage of the CG along the wing's chord. Therefore, the CG is  $20.54 \text{ in.} - 13.88 \text{ in.} = 6.7 \text{ inches}$  back from the LE. The RV-3 wing chord is 19 inches.  $6.7 \text{ in.} / 19 \text{ in.} = 35\%$ .

I would like the CG to be closer to 30% for the initial flights. The front of the firewall is the most secure forward position, so I began placing weight there and recalculating until I arrived at that 30% target.

Wt. (lb.)	Arm( in.)	Moment (In.-lb.)	Leading Edge Distance: 13.88 in
Left Main	11.56	13.5	156.0
Right Main	11.56	13.5	156.0
Tailwheel	2.96	72.0	213.1
Ballast	1.14	6.5	7.4
Total	27.24		532.5

This time we get  $532.5/27.24 = 19.54$ ;  $19.54 - 13.88 = 5.66$ .  $5.66/19 = 30\%$ .

### **Final thoughts:**

This is like writing instructions on how to tie your shoes. It is much easier than it sounds in words. Take some time to work through this, and you'll see for yourself.

I bought two- 70 lb. scales and one- 11 lb. scale from Harbor Freight. One reads in pounds and ounces and the other in decimals of pounds. If one reads 12 pounds and 3 ounces, it needs to be converted to 12.25 pounds.

I balance without the prop (sometimes without the cowl) as I find it easier to work around and measure. We know, and the example above shows, how much weight is needed in the nose to change the CG. Putting the prop on after balancing probably won't change anything and if it does, its in our favor.

I originally made an Excel spreadsheet so I could just plug in numbers. Now I just use a calculator or a laptop or tablet. It's that easy.

Google: FAA Weight and Balance Handbook and download it. It explains different situations in very easy terms.

Google: Van's Aircraft weight and balance: You can find simple worksheets for each of their aircraft. It's only the datum numbers that differ from plane to plane. They are all the same procedure as explained above, so any one can be modified for your use.



***Gerys RV4 with Scales under the Wheels***



***Note the Steel Square to insure aircraft is Level against the prop back plate***

# Chatter from the Editor's Bench



Never have I been so covered up with work. Without the drama, we all know the story... Lets see I retired..... sort of, then consulted for the people for which I worked. Many of you stepped back into the game. The reports are that you made better income as a consultant than an employee. That is absolutely correct. What they didn't say is the time it eats up and the stress. That eats into family time, modeling, flying and anything else you like to do. That's my story this month for being tardy in getting the newsletter sent.

I enjoy putting the newsletter together and gratefully thank those that contribute to it. No one wants a newsletter with just the editor's view. We have enough of that on television. So please don't be shy and nothing of scale interest or a NASA event will be turned down.

I get to publish all the events that you guys have on the East Coast, and I have to say, I get jealous. That's going to change in about 7-8 months, actually during or after Top Gun. My business as an Emergency Radio Consultant and Designer has no location limits because what I do is Federal Fire Codes so I can be anywhere in my underwear doing my CAD design for the systems I am contracted to do at my pace.

OK, what am I leading up to? We are moving out of Sunny California and will most likely be at the local events, like the Columbus Scale Classic, The NATS at Muncie and even Dino's events. I see most of you at Top Gun and now I can hang out with a real building season.

Where you say? Actually a small town north of Raleigh, NC called Franklinton, in the trees and about 60' through the trees to the 18th Fairway. I do have a cool daughter there and a son in law, so family too.

A side bar to the deal is that my garage will be heated and with air conditioning or no deal! My great supporting wife has agreed to that expense.

I plan to fly as much as possible and most likely will have to get used to grass runways. None really exist here in California.

On another scale subject, most of the hobby related scale vendors say during this pandemic, they were really busy. That relates to a lot of you who had projects on the bench and were building. This is encouraging news and a boost for the hobby. Hopefully, that means we will see some new aircraft on the fields.

I am a huge fan of aviation museums and always look for new projects so mine will be different. Thank goodness for guys like Jerry Bate's who design off the beaten track cool aircraft. Can you tell I am a huge fan of his plans?

NASA Elections are zooming towards us and there will be a special mailing to all active NASA members. The mailing will contain the bio's of the people running for a director position and this will help guide your vote.

Last but not the only tidbit....NASA is going for the 2024 FAI US Scale Team. Read Mike Barbee's and John Boyko's article about how we will accomplish. This is a big step for NASA, and if you can help in anyway, let Mike or John know as well as any NASA Board member.

In closing, I am always looking for articles for this newsletter and I have to thank Gerry Garing for another outstanding article that may help save your scale project during that maiden flight.

Until next quarter, stay safe and healthy and charge those batteries for more scale events and flights.

**Sam**



# NASA MEMBERSHIP APPLICATION



## NATIONAL ASSOCIATION of SCALE AEROMODELERS

### ABOUT NASA

NASA is the AMA (Academy of Model Aeronautics) a Special Interest Group (SIG) for the United States. Nasa promotes and encourages scale competition for all types of scale aeromodeling. NASA produces Regional Contest and National Contest along with providing sponsorship to new and existing AMA Sanctioned Club Scale Contest. These are also qualifying events for the NASA Annual National Scale Contest.

### AMA NATIONAL CHAMPIONSHIPS

NASA is the Official Host for the AMA Scale National Championships (NATS) held at the AMA Headquarters in Muncie, Indiana. Events are offered in both R/C and C/L Scale.

### THE REPLICA NASA NEWSLETTER

The NASA Newsletter is published 6 times a year for paid membership. The newsletter features new sources of documentation, building tips, contest updates and results along with scale news, FAI information, 3-Views and other scale aeromodeling information for our membership.

### NASA WEBSITE

The NASA website is a great source for scale aeromodelers for building tips, documentation, contest information, and more. Visit the website to join or fill and mail the form below: [www.nasascale.org](http://www.nasascale.org)

#### SELECT ONE BELOW:

ONE YEAR MEMBERSHIP \_\_\_\_\_ USA Includes emailed REPLICA Newsletter \$20.00 USD

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FREE FLIGHT \_\_\_\_\_ CONTROL-LINE \_\_\_\_\_ RADIO CONTROL \_\_\_\_\_ JUDGING \_\_\_\_\_ CONTEST DIRECTOR \_\_\_\_\_

NAME (Last) \_\_\_\_\_ First \_\_\_\_\_ M.I. \_\_\_\_\_

ADDRESS: \_\_\_\_\_ AMA# \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP CODE \_\_\_\_\_ NASA # \_\_\_\_\_

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