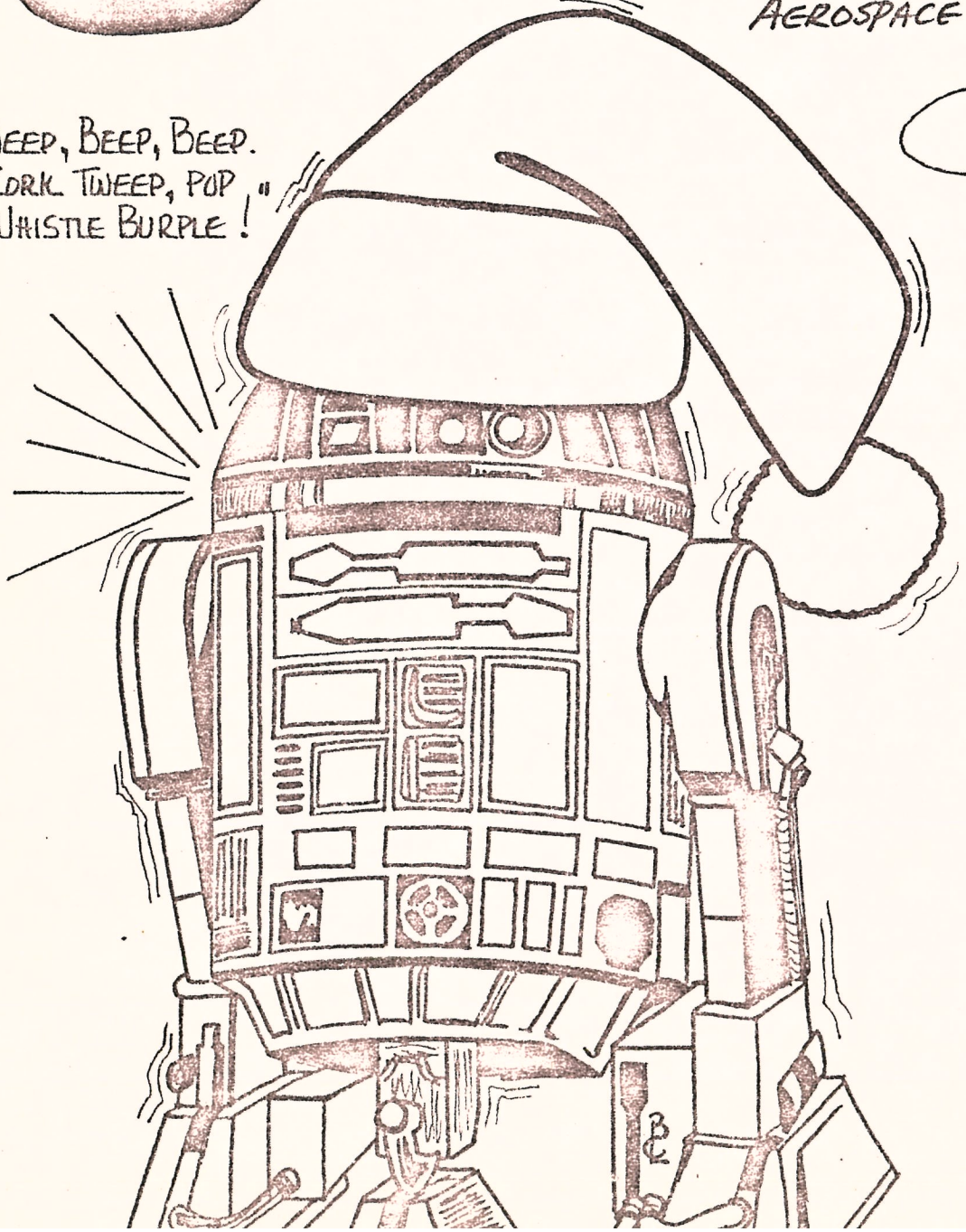
ORBITS

VOL. 1
NO. 7

DEC. '77'

JOURNAL OF THE EAU CLAIRE HIGH ORBITERS AEROSPACE MODELING CLUB. **



In This IssuE:

T - Minus Zero !

This is the last issue of volume one of Echoes. I hope you all enjoyed it, and I promise you volume two will be bigger and better. Get an interested friend to subscribe to Echoes, and bring your friends to club meetings. We could use more members. Back issues of volume one can be purchased at 50¢ a copy if you have missed any. Order from ECHO HQ.

We have two excellent features for this, our Christmas Issue. Mark Bundick, a member of the U.S. B/G Team that will represent our country in the 1978 World Championships, has submitted an article on his personal reflections of the World Championship Flyoffs held after NARAM-19 last August. Our second feature, by ECHO's own Chris Weege, reveals the secrets of the Flying Banana, Chris' own Hornet class R/G. Thanks guys, and keep that copy coming.

NAR President, Manning Butterworth, says of our new article on Space History, " I particularly enjoyed the Space History article in the November issue, In fact, I should think something similar would be appropriate for the Model Rocketeer." In a letter from Jon Rains, editor of Countdown (newsletter of the SPEAR Missle Minders of Philadelphia), he comments, "It (Echoes) is an excellant newsletter," and " I especially like your contest coverage." And, our friend Matt Steele of SNOAR section in Cleveland comments in a recent letter, " Thanks for the Echoes. It makes for some pretty interesting reading." If this is the response we are getting now think what it would be like if we had more contributors. Come on ECHO members! Get those articles in and let us know what you are doing in model rocketry. If you have questions about flying or something else send these in too and we will start a forum between members and other NAR people to find the answers. Let's all get active!

Merry Christmas, Happy New Year, and think National Championship for our section!

Editor

ERNO / CLUB CALENDAR & NEWS.

December 14, 1977. DeLong J. H. rm. 168 from 7 to 9 pm.
Work on theodolites. All models to be returned to Estes should have been turned in at 2013 Cameron St. by 12/11/77.

December 28, 1977. Parks and Rec.
No meeting. Have a Merry Christmas and Happy New Year !

January 11, 1978. DeLong J. H. rm. 168 from 7 to 9 pm.
Nomination of candidates for club offices. Out-of-town members may submit names for nomination, but should have these in to 2013 Cameron St., Eau Claire, Wi. 54701 by this date. All members are eligible to hold office.

* *

Our Milwaukee members are hosting another Regional after Pole Cat II. The tentative details for this meet are:

NARBAR-78. Will be held in the Milwaukee area. June 10 & 11, 1978.
Events: Scale, Pigeon EggLoft, Gemini Dual EggLoft, Class 00 P.D., Class 2 S.D., Sparrow B/G, Condor B/G, Hornet R/G, and Class 2 Helicopter Duration.

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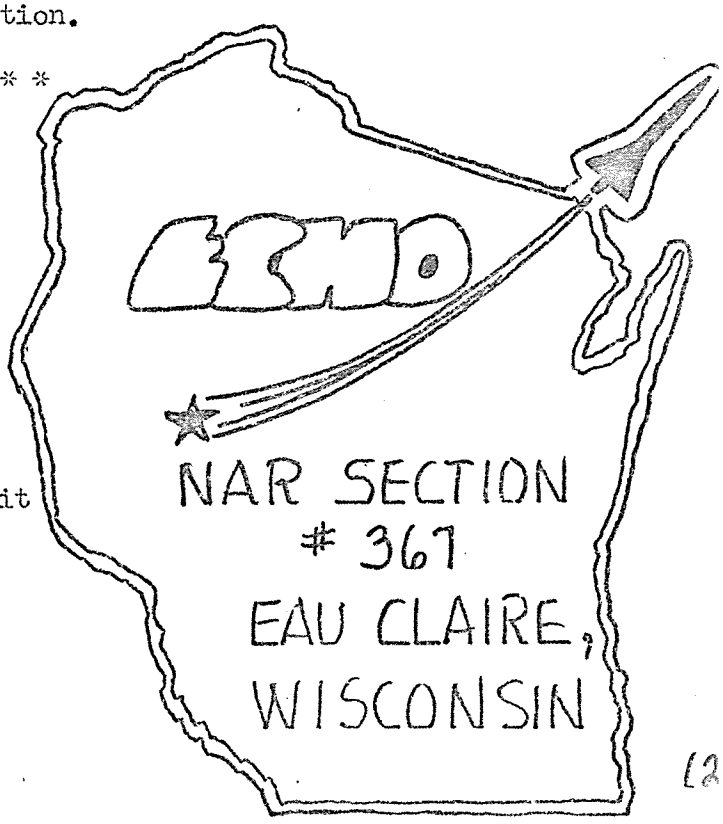
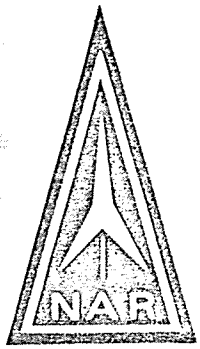
I sent the order in for our patches on November 28th. They take six to eight weeks to produce, so they should be ready by the end of January '78'. We ordered 10 patches, so those of you who want one will have to get your $2.10 in asap. Four are spoken for already, and they will go on a first come first served basis. We can order more, but it will take time to get them. Get in those sheckels guys !



Bruce

NOW is the time to join NAR

ONLY THROUGH NAR CAN YOU . . .



DON'T DELAY . . . JOIN TODAY!

* Keep Current with the latest events on the model rocketry scene through your own copy of the exciting, all-new MODEL ROCKETEER!
* Proudly Display your NAR colors with the new decals - - one large sheet containing all the useful sizes of the NAR symbol!
* Enjoy the Peace of Mind of your $1,000,000 liability protection!
* Avail Yourself of the opportunity to be a part of the international model rocketry fraternity - - the Fédération Aéronautique Internationale (FAI)!
* Learn all about the latest NAR regulations and contest rules in the revised "Pink Book"!

Additionally . . .

* For the first time - - the NAR FAMILY PLAN! one family member joins at the full rate - - any and all other members deduct $2.00 from their membership dues! (Sorry, you're going to have to share your family copy of MODEL ROCKETEER, but you still get all of the other benefits).
* And last but not least - - evidence of your membership in NAR - - the newly, redesigned wallet-size sporting license!

NAR MEMBERSHIP APPLICATION

National Association of Rocketry, P. O. Box 725, New Providence, N. J. 07974

MEMBERSHIP CATEGORY (Please check one box only)

- ☐ JUNIOR MEMBERSHIP *(Under 16 as of January 1)* $7.00
- ☐ LEADER MEMBERSHIP *(Under 21 as of January 1)* $8.00
- ☐ SENIOR MEMBERSHIP *(21 or over as of January 1)* $10.00

DATE OF BIRTH _____ NAR NO. _____ AMOUNT ENCLOSED _____
Month Day Year

NAME _____ DATE _____

STREET _____ NAR SECTION _____

CITY _____ STATE _____ ZIP _____

☐ Family Plan Membership (Deduct $2.00)

☐ FAI Stamp $2.00

☐ New ☐ Renewal

NAR No. _____

If I am accepted in the National Association of Rocketry, I pledge to observe and follow the NAR safety code. I am aware that a reported violation of the NAR safety code may lead to the revocation of my membership right. I also agree to abide by the by-laws and the standards and regulations of the NAR.

Signature _____

WIScon-1

Midwest Convention sponsored by the Tomah Aerospace Club, NAR Section #369, Star-Section # 7.

February 25 & 26, 1978.

Tentative Schedule
Saturday the 25th.

10:00 am - 11:00 am - Registration.
11:00 am - Noon - Keynote address and opening ceremonies.
Noon - 1:00 pm - Lunch.
1:00 pm - 5:00 pm - Midwest meeting and workshops.
5:00 pm - 7:00 pm - Supper.
7:00 pm - 8:00 pm - Manufacturers forum.
8:00 pm - ? am? - Movies and Sci/Fi Costume Party.

Sunday the 26th.

10:00 am - Noon - Model rocket auction.
Noon - 1:00 pm - Lunch
1:00 pm - 5:00 pm - Contests, Workshops, Songfest, Lier's contest, etc.
5:00 pm - 5:30 pm - Awards presentation.

*** There will also be live demonstrations of tissuing gliders, etc. Workshops will be conducted by various experts in the field. The Sci/Fi costume party will be a dance with live entertainment, refreshments and all around fun. There will be awards for the best costumes. As far as contests go, there will most likely be static scale, craftsmanship, posters and the like.

For more details contact: Tomah Aerospace Club, 324 W. Milwaukee, Tomah, Wisconsin 54660, or call (608) 372-5397.

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Oops, I goofed ! In the November issue I inadvertently misrepresented NARTREK. Manning Butterworth, NAR President, has corrected me. Rather than an educational program, "NARTREK is perhaps better described as a yet experimental training program being developed by a special committee in the Pacific Region."

SPACE HISTORY

December 1, 1957. Soviet Maj. Gen. G.I. Pokrovsky indicated in an article in Sovietskaya Aviatsiaya that current Russian space-flight research stressed the use of wings on space craft for re-entry into the atmosphere without damage. A winged vehicle would take off like a plane, attain a speed of 7,500 mph., switch to rocket motors and fold its wings in space, Pokrovsky reported.

December 6, 1957. The U.S. attempts to launch a 3.25 lb., 6.4" diameter globe called Vanguard. The vehicle was 72' long, weighed 22,600 lbs., and had three stages. This was to be the answer to Sputnik I. It was launched at 11:44 am. from Cape Canaveral and exploded on the launch pad.

December 6, 1958. Although Pioneer 3, a U.S. Army vehicle, failed to reach the moon, its ultimate goal, it did send back scientific data that proved the existence of two definite fields of radiation around the earth. The first one was between 1,400 and 3,400 miles above earth, and the second was between 8,000 and 12,000 miles up. The vehicle attained 25% of the distance to the moon and then fell back into earth atmosphere and burned up due to a 3.7 second too short first stage thrust duration.

December 17, 1958. NASA awarded a contract to the Rocketdyne Engine division of North American Aviation, Inc. for the developement of a rocket engine capabel of producing 1 to 1½ million pounds of thrust. Dr. Hugh L. Dryden, deputy NASA Administrator, said on 12/27/58 that the engine should be ready by about 1962, and that a cluster of 3 would be capable to launch a 50,000-pound satellite.

December 4, 1959. A 7 pound rhesus monkey named Sam was fired 55 miles into space from Wallops Is., Va. and brought back to earth safely in a successful test of the escape mechanism for the Mercury space capsule.

December 15, 1965. Gemini 6A and Gemini 7 performed the first space rendezvous 185 miles above earth. They closed to within 12" of each other. (Gemini 8 docked for the first time with an Agena target vehicle)

THE FLYING BANANA

By: Chris Weege, NAR # 25932

This past fall at WAMO I I placed first in Gnat R/G with a strange looking glider. This glider was the result of many minutes of research, development and the throwing together of balsa parts. I now bring forth unto you my warped wing wonder! Enter the Flying Banana!

The Banana is unique in several respects. First of all it has a butterfly tail rather than the conventional stab and rudder configuration. This tail assembly has not been prevalent in B/G or R/G designs. A second difference between the Banana and other gliders is that it utilizes the AVI Gold Series mini engines, which have not been used for gliders as much as they probably should. The large wing area of the Banana is larger than that found on most "Gnats". And, lastly, the Banana uses a warped wing which has never been used before to the best of my knowledge.

Building the Banana is straightforward, and easy enough for a novice to construct.

Step 1: Using the various piece outlines from the diagram on the following page make templates to use for drawing the various parts on the proper wood stock. Cut all pieces out and sand the tail pieces to an airfoil shape. Going by the cross section details, shape the spruce boom . Do not airfoil the wing yet!

Step 2: Take the wing and soak it in very hot water for about 5 minutes. Now take the saturated wing and form it around a cylindrical object that has about a 12" diameter. For this I used a large kitchen pot. In order to hold the wing in place while it dries, wrap several turns of string around it and tie it off. Let this dry for several hours.

Step 3: When the wing is dry give it a slight airfoil. Don't overdo this step or you will weaken the wing.

Step 4: Assemble the tail according to the diagram . Cut the rear portion of the boom at an angle of a few degrees for a length of 1½" from the very end forward. This will give you enough incidence for a better glide phase.

Step 5: Building the engine tube for this glider is a fairly simple procedure but it should be done with care. First cut a 2x7 inch strip of paper out and spread diluted white glue on one side. Now take a 3/8" dowel and wrap the paper around it in a parallel configuration. Remove the tube from the dowel and set it aside to dry. When dry, the tube can be cut to the proper length (1¾"). Now build the sliding pod ala Steve Behrends' "Vulture" design.

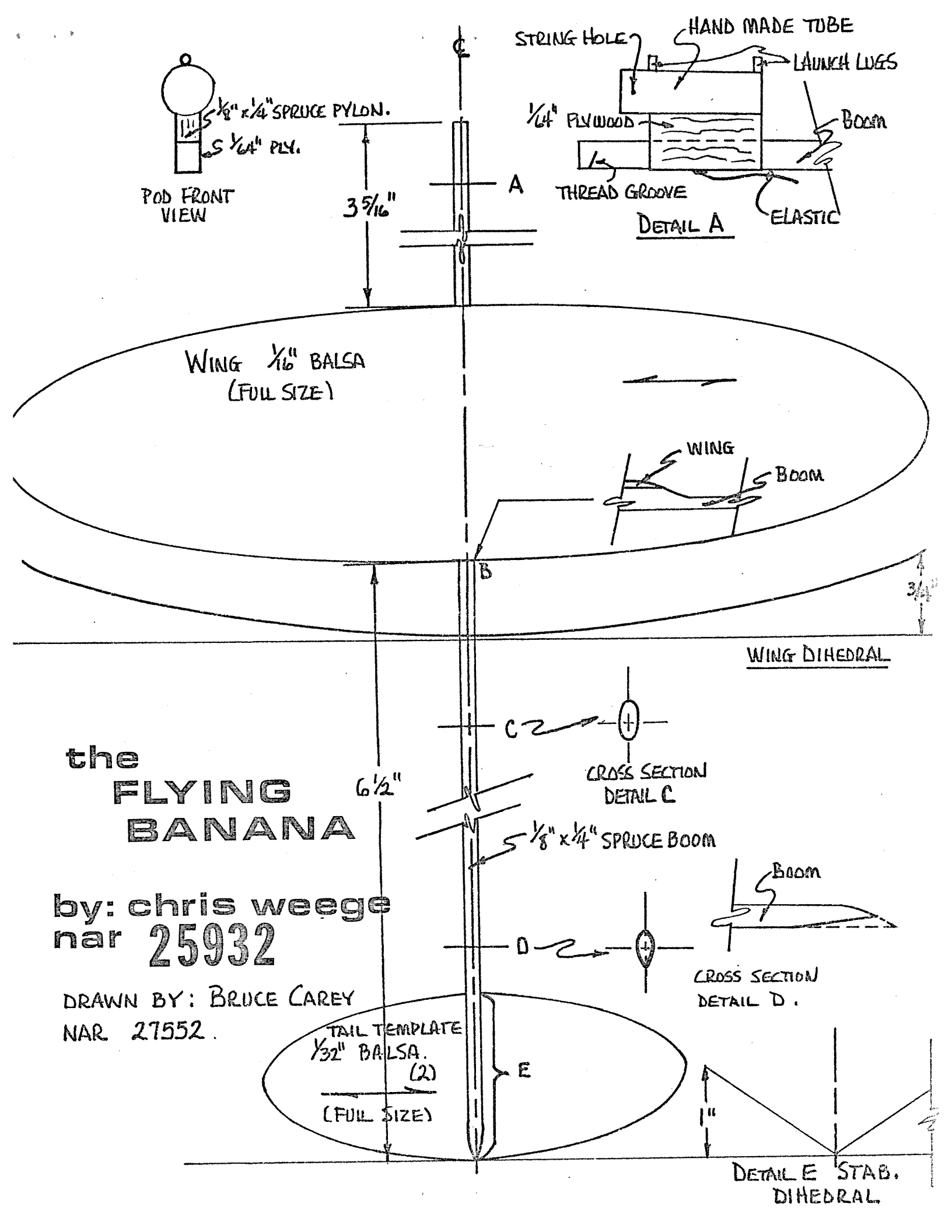
Step 6: Attach the wing to the boom with epoxy, and fillet the joint where the wing and boom meet also with epoxy.

Step 7: Finishing. I recommend that very little finishing be done to this glider other than coloring with markers for visibility.

Step 8: Trimming. This part should be accomplished as it is done with the Behrends' "Vulture" R/G version also. If you find that the Banana dives I suggest that you warp the boom up a little in the rear portion to create a few more degrees of incidence on the tail.

Good luck with the BANANA, and if you have any problems, questions, or other feedback please write me.

Chris Weege NAR# 25932
7614 N. Bell Rd.
Milwaukee, Wi. 53217



the FLYING BANANA

by: chris weege
nar 25932

DRAWN BY: BRUCE CAREY
NAR 27552.

TRIAL BY WIND

A personal report from the U.S. World Championship Flyoffs by Mark Bundick.

It is the morning of August 6, 1977, and NARAM-19 is over. Goodbyes are being said, the remains of models are packed away, and dead-tired rocketeers begin the journey home, except for a small band of eleven B/G fanatics. They do not seek national championships or awards. They can only earn a years worth of research, construction and test flying in preparation for the Third World Spacemodeling Championships. Of the eleven, only three will claim team positions. The rest will go home to wonder what went wrong and will have to wait until the next time, some two years away, to try again.

Each contestant is required to fly three flights of Sparrow and three flights of Eagle Boost Glide. The models are timed for a maximum of 120 seconds in Sparrow and 300 seconds in Eagle. This sort of arrangement makes the modeler strive for consistant performance. While this system is probably the best for B/G, the weather refused to cooperate at first. Overcast skies threatened rain, and winds were steady at 15 MPH. Under these conditions strategy would be critical. Harry Stine and Howard Kuhn set up 6 firing lanes in a Misfire Alley configuration. Chris Flanigan went over the FIA rules once more and the battle was on.

Three hours were alotted for Sparrow flights. Most of the people were preping standard fixed wing designs with 30 $in.^2$ of wing area and various flap and drop weight DTs. Only George Gassaway strayed from the trend with his Windrift flexwing. The day's first flight by Bernard Biales quickly pointed out the problems we would face. Bernard flew a straight conversion of the Lunchbox HLG. This small bird boosted well, but scored only 100 seconds when it was blown downrange quickly. Besides the wind, visibility was a problem as well. Mike Loman went with a large bird, but this too was blown away at 113 seconds, 7 seconds short of a "max". Despite the lack of lift, Chris Flanigan managed a "max" with an enlarged version of his Hornet design, the Fish-n-Chips. Gassaway had problems which resulted in a severe stall and a low score of only 41 seconds.

As Round 2 of Sparrow began the weather improved and started to stabilize. Short DT fuses were seen everywhere as many modelers were down to one bird. Biales showed everyone how to do it when his backup Lunchbox

DT'ed right at the edge of the field at 57 seconds. Despite the winds and lost models, two modelers who had problems in the first round went all out and scored "maxes". Gassaway retrimmed and got a max-scoring flyaway. Geoff Landis of MIT also maxed. Flanigan had to resort to using his Eagle entry inorder to insure a return, and scored only 29 seconds. Mark Bundick, having lost his primary model in Round 1, went to a backup bird without a DT. He trimmed for a spiral dive, to insure a return, and had to settle for a 40 second flight, far short of a "max".

With Sparrow Round 3 came a further improvement in the weather situation. Some thermal activity was now apparent as well. In this round there were five flyers who scored flights greater than 100 seconds. Geoff Landis started the Lift Parade with a 107 second flight. Unfortunately, the winds were still strong enough to blow a glider down range too fast. If anyone thought Geoff's flight was a fluke, Chris soon dispelled this notion when his 29 second flight in Round 2 with his Eagle class bird turned into a 105 second flight for Round 3. Without a DT this bird would have been lost. Gassaway continued to have minor problems, and managed only 100 seconds under better conditions than he had for his second round "max". This rounds'only "max" was turned in by the Bunny (Mark Bundick). Bunny set up on the pad minutes after Flanigan's flight, and waited for the next thermal. He managed to boost his bird into the center of the lift to accomplish his "max".

This ended the first event. When scores were totalled Bundick came out on top with 264 seconds total. Things were close, however, as Gassaway was 2nd. with 261 seconds, and Biales sat third with 260 seconds. The pre-meet favorite, Guppy Youngren, had problems which put him 6th. No one was assured of a team position yet, as Eagle B/G still had to be flown in the afternoon. This event would ultimately decide who the U.S. Team members would be. At this point the range was broken down for lunch.

At 2:15 pm the three hour clock started for Eagle B/G flights. R/C forces were strong; most of the MIT gang flew beautifully crafted 2-channel birds powered by twin D6.1s. These birds drew heavily on model airplane technology, and many used foam wings sheeted with balsa. Guppy flew first using a two stage pod. Things went well until second stage ignition when the right wing desided to leave the party. Despite Guppy's efforts at the controls the model came straight in and destroyed the R/C gear in the pro-

cess. When his pod was recovered it was determined that the upper stage D had catoed and blown the right wing off. He was given a reflight. Meanwhile, the free-flight buffs were not going down without a fight. Andy Mitchell flew Guppy's Sparrow design with an E5-2. Surprisingly the bird didn't shread; in fact, it boosted straight up with no roll and turned in a 135 second fly-away. Guppy was now ready for his reflight. This time he used a single D6.1, but experienced problems during boost. The model rolled once just before burnout and the wings folded up. DQ. Flanigan finally got to fly his Eagle in its intended event. He got a 57 second, edge-of-the-field flight using a DT. Bundick flew the meet's only 1-channel R/C entry. A Red-Baron gave him a short 18 second duration. Gassaway stuck with the flexies, and his 99 second flight with a return looked pretty good in light of the problems the R/C contingent was experiencing.

Round 2 of Eagle competition still held problems for the R/C crowd. Biales had a good boost, but had problems getting his bird to settle into a slow glide. Gassaway switched to a Sweepette HLG conversion powered by a C6-0/½A3-2t tandem. This combination gave a straight boost to respectable altitude and a well trimmed 111 second flight. Flanigan's trusty model finally flew away after 104 seconds, the victim of DT failure. Guppy's troubles continued when a streamer stripped off his pod and nullified a 2½ minute flight.

When Gassaway opened Round 3 with a DQ, his flexwing refused to eject, things seemed to look up for the R/C group. Landis had a straight, but low altitude boost and then only scored 67 seconds with no thermal help. Bundick looked at the wreckage of 4 R/C models and 2 radios and decided to use his backup, a Rebel Yell slide wing R/G. He used a C6-½A tandum which gave a straight boost and a 152 second flight, the best Eagle effort of the day. Guppy finally got his bird through the boost phase, got a clean, legal pod recovery, and seemed headed for a good flight. Unfortunately, when it rains it pours. His radio failed just as he was positioned to take advantage of some slope lift, and his 71 second flight was not enough to put him in the running.

When things were all over and Sparrow and Eagle results were tallied a team few would have predicted had been chosen. Gassaway's calm, consistant, well-planned effort earned him the top spot. Bundick's last Eagle flight combined with his win in Sparrow put him in second, 37 seconds

behind George. Flanigan was third, but stepped aside to concentrate on Scale Altitude. This put Bernard Biales in the final spot, the only veteran of International competition on the B/G team. Landis was chosen as alternate. While the results were not those predicted by the experts, they pointed out that practice and consistency will be the key factors the U.S. Team will have to strive for at the World Championships. Technology has potential, but in the final analysis it is the flyer and the flying that counts.

1978 U. S. INTERNATIONAL SPACEMODELING TEAM

Team Manager	Howard Kuhn	Alexandria, Virginia
Scale	Steve Behrends	Highland Park, Illinois
	Robert Biedron	Plainfield, New Jersey
	Thomas Hoelle	Fort Wayne, Indiana
Alternate:	David Alexander	Fairfax, Virginia
Scale Altitude	Chris Flanigan	San Diego, California
	John Langford	Atlanta, Georgia
	Matt Steele	Medina, Ohio
Alternate:	none selected as of 8/15/77.	
Boost Glide	George Gassaway	Homewood, Alabama
	Mark Bundick	Bloxom, Virginia
	Bernard Biales	Cambridge, Massachusetts
Alternate:	Geoffery Landis	Cambridge, Massachusetts

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OFFICIAL RESULTS
Boost Glider Flyoffs

Name and Place	Sparrow Boost Glide					Eagle Boost Glide			
	1	2	3	Tot.	Pl.	1	2	3	Tot.
1. G. Gassaway	41	120*	100	261	2	99	111	0	210
2. M. Bundick	104	40	120*	264	1	18	0	152	170
3. C. Flanigan	120*	29	105	254	4	57	104	0	161
4. B. Biales	100	57	103	260	3	0	65	16	81
5. G. Landis	3	120*	107	230	5	0	27	67	94
6. G. Youngren	31	100	11	142	6	0	0	71	71
7. A. Mitchell	29	33	0	62	9	135	0	0	135
8. M. Loman	113	0	15	128	7	0	0	0	0
9. D. Frost	96	0	0	96	8	0	0	0	0
10. M. Zienkiewicz	42	0	0	42	10	0	0	0	0
11. P. Barnes	0	0	39	39	11	0	0	0	0

All times given in seconds. * indicates a "max" achieved.