# STARDUST

January-February 1998


## Flexwing Gliders

by Jeff Vincent

### Pros and Cons of Flexies

| Advantages | Disadvantages |
|---|---|
| * Glide performance | * Easy to lose |
| * Good boost | * Turbulence-prone |
| * Ease of construction | * Singeing of material |
| * Visibility | |
| * Easy to dethermalize (DT) | |

### Flexie Construction Materials

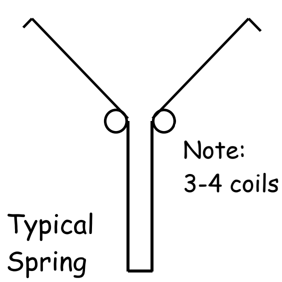
1. Three equal length spars of hard balsa, spruce, basswood, or bamboo. For mini-engine models start with 3/32nd inch square bass or spruce spars about twelve inches long. For standard engine models use 1/8th inch square spruce or bass spars about 15 to 18 inches long.

2. Music wire for spring. For mini models use 0.020" wire, standard models require 0.025" wire.

3. Flexie material. Dry cleaners' bag is recommended, although some people also use 1/4 mil aluminized mylar.

4. Elmer's Acrylic Latex (water-base) Contact Cement is recommended.

### Building Your Flexie




1. Cut spars to proper length.

2. Make spring from a 6" section of music wire. First, put the bend in the middle of it. Next, coil one side in about three coils. Coil the opposite side. The finished spring should look like the diagram.

3. Attach the spring to the center, and then the side spars. Attach it with Hot Stuff and wrap with thread to hold it in place, then Hot Stuff thread.

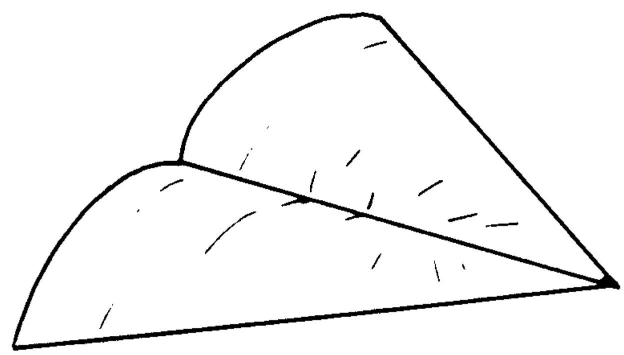
*(Continued on page 3)*

## An Overview of Flexwing Gliders

by Mark Johnson

reprinted from *American Spacemodeling,* March 1989

Some basics: the proper name for the typical model rocket flexie is a 'Rogallo parawing glider.' In fact, to get just a bit derogatory for a moment, the original patent issued in the 1950's to Francis Rogallo, then a NASA aeronautical engineer, was not for a glider, but a KITE! But the NAR and FAI treat them as gliders, so we've got no choice.



The secret of the flexwing is its very low wing-loading; that is, it's very light compared to the area of its wing. This can result, with good trim, in very low sink rates and good times even in still air. The average flexwing will usually beat the average fixed-wing glider, other things being equal. A good fixed-wing flyer, however, can usually outperform an average flexwing.

*(Continued on page 2)*

## In This Issue...

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Editor's Thermal

## This Issue: Substance and Style

This issue is devoted to flexwing gliders. Why? Flexwings gliders, long frowned upon by the hardcore balsa glider crowd, have become a lost art. This year's NARAM will have 1/2A Flexwing Multiround Duration among its events and I think its important for our members to become proficient at it. We may have a distinct advantage over other, less-practiced flexie flyers or, at the very least, we won't embarrass ourselves too badly.

Mark Johnson's article (page 1) gives a nice overview of just what a flexie is. My article (also page 1) gives a concise summary of flexie construction and flying. George Gassaway, master of the flexwing, shows us how its done with an extensive article and plans (page 4). I've even included an old Estes flexwing plan (page 8) from their Oddball Design Contest (circa 1967). It's hardly the state of the art, but it gives an interesting view of the hobby from 30 years ago. Finally, even our look at the web has a flying wing theme, featuring the Nurflügel flying wing and NASA lifting body WWW sites (page 7).

This issue also marks a change behind the scenes, moving from my old DTP software on the Atari ST emulator to Microsoft Publisher 97. Luckily, the programs are fairly similar, so the learning curve has not been too steep. One of the things that MSPub should allow is an easy adoption of printed items to web publishing. Hopefully you'll be seeing *Stardust* on the web soon. I've kept the newsletter design similar to the old one for this first issue, but look for changes in future issues. I'd appreciate feedback from the readers out there on how things look.

*Jeff Vincent*

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*(Continued from page 1)*

The typical competitive flexwing looks something like the figure on the previous page -- a 70-90 degree angle up front (more commonly near 90 these days), with plastic or Mylar sheeting TIGHT near the apex of the glider and loose near the tail. Springs to force opening are a matter of personal choice, but various kinds of coil spring seem to work best. The sheeting is usually 1/4 or 1/2 mil polyethylene (cleaner bag) or aluminized Mylar. The gliders I've seen in competition the last 2 years have been mostly based on about 10" long sticks in the 1/2A and A classes. Some of the Europeans have experimented with canard surfaces on flexies with a good deal of success. I have also seen a truly immense 40-inch F-powered flexie with very loose, baggy sheeting - much looser than classical hang-gliders - which turned in an incredible time. I can't remember how long it was, but it hung over a cornfield at NARAM-28 for what seemed like FOREVER!

Some problems with flexies: reliable deployment often is difficult. Many times the spring actuators don't work well, or the wing sheeting gets stuck by ejection charges. Trimming these beasts requires absolutely STILL air; the glide speed is so slow, it's impossible to trim in any breeze at all. Trim is still important since many contest directors will DQ models that do a 'falling leaf' motion instead of a true glide, reasoning that if it doesn't head with the wind, and more or less level, it isn't really gliding. You don't qualify a fixed-wing glider that's tumbling in, right?

Trim calculations can also be tricky. The best way to trim a flexie is to build somebody else's plans (see *American Spacemodeling* back issues for some flexie plans) and use their CG location on your model. Try gliding the thing indoors (big living rooms and basements work well). If it won't glide flat and sort of straight, it probably will not work out too well when you launch it!

(Continued from page 1)
4. On a large sheet of cardboard (or other working surface) mark three spar lines at 45 degree angles and mark spar lengths.

5. Tape rough-cut material down to working board. Tape it down as taut as possible with no loose areas.

6. Using a small brush, apply contact cement along spar lines on plastic and to spars. Allow to dry 10-15 minutes.

7. Attach center spar to material by pressing firmly. Attach side spars.

8. Fine trim material to size.

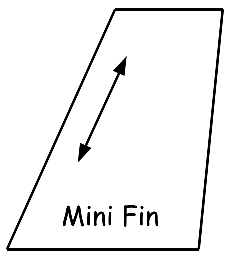
9. Secure side spars with mylar tape (optional).

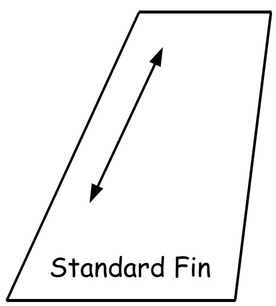
10. Color material with magic marker and dust model with talcum powder.

## Building Your Booster

1. Use a long body tube (1.33 times the spar length) the same diameter as your engine. This means a 16" BT-5 for mini's or a 24" BT-20 for standard models. Mark three fin lines.

2. Cut out the fins and round/ airfoil as desired. Glue the fins to the body.




3. Drill a small hole in middle of the base of one of the fins. Use a squid line shock cord about twice the length of the body tube. Attach the shock cord to the fin and fillet the fins.

4. Finish as desired. Attach a small streamer to the shock cord.

## Trimming Your Glider

1. The flexie's center of gravity should be at 35-40% of the length of the center spar from the nose. This translates into a balance point about 4.5" from the nose for a 12" model. Add weight to the nose or tail to obtain the proper balance.

2. The rear third of the center spar should have a gentle upward curvature, which will act as an elevator to stabilize the model.

3. Turning is controlled by the amount of billow at the rear of the flexie. If one side has more billow than the other, the model will turn towards the side with more billow. For instance, to get the model to turn left, warp the left spar gently inward to increase the billow on that side.

4. Gently toss the model on a flat stable glide to test it. If it stalls add a bit of nose weight. If it dives warp up the center spar a bit more. It should turn very gently to one side.

5. Fold the spars and roll the material loosely. Throw the model straight up. It should open at about 10-15 feet and settle into a stable glide. If it death dives, try warping up the center spar. If the material is excessively loose (too much billow), you may need to remove it and start again.

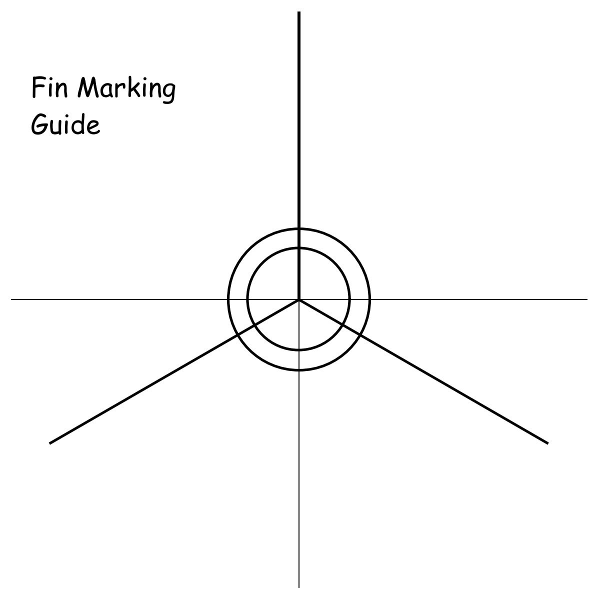
## Prepping Your Flexie

1. Select an engine with a moderate length delay (1/2A3-4T, A3-4T, B4-4, B6-4, or C6-5). Wrap the engine with masking tape to get a tight friction fit. Apply tape outside the tube to secure the engine. Insert ignitor.

2. Put enough wadding in the model to fill a length of 1 1/2 body diameters. Place the streamer in the model and put a small amount of wadding atop the streamer. Push this back so it rests on top of the engine.

3. Dust the flexie with talcum powder. Fold the spars back and fold the material (don't roll it) and gently slide the glider into the booster. The nose of the flexie should protrude no more than 1-2 inches from the tube when in place.

4. Put on your track shoes and fly!



# Flexies— The Choice of Champions?

## A Simple How-to on Flexie Construction

*By Craig P. Beyers*

The flexie—the Rogallo or flex-winged glider—has the distinction of being, depending on your viewpoint, either a fantastically-successful glider design, or grossly unfair. The achieved performances of these designs have often been significantly better than the performances of more orthodox balsa-winged gliders.

It seems as if interest in flexies was piqued by the performances of the Opel flexie at the Third World Spacemodeling Championships in Czechoslovakia in 1978—at least it seemed that way here on the East coast. A number of people, notably Charlie Sykos, the Heaton brothers, and John Kalyan, have flown flexies with great success. One of the more energetic designer/developers of flexies is George Gassaway, whose *Windrift* designs have performed very well, earning George a place on the US Team at the Fourth World Spacemodeling Championships at Lakehurst, NJ. The discussion and drawings that follow are the result of George's hours of designing and test-flying flexies, and represent one state-of-the-art in flexie design in the US.

The basic *Windrift* flexie has four major parts: the spars, the spring, the covering, and the booster.

**Spars**

All three spars should be the same length and should be sized as shown in Table 1.

Table 1. Spar Dimensions and Spring Wire Diameter for Flexies

| Engine Rating | Music Wire Spring Diameter (inches) | Spar Length (inches) | Spar Material and Dimensions (inches) |
|---|---|---|---|
| ¼A | 0.015 | 10-12 | 1/16 x 1/8 spruce* |
| ½A | 0.015 | 12 | 1/16 x 1/8 spruce* |
| A | 0.015 | 12-14 | 1/16 x 1/8 or 3/32 spruce |
| B | 0.020 | 14-16 | 3/32 x 1/8 spruce |
| C | 0.020 | 16-18 | 3/32 x 1/8 spruce |
| D | 0.025 | 18-21 | 3/32 x 1/8 or 3/32 x 3/16 spruce |
| E | 0.025-1/32 | 21-24 | 3/32 x 3/16 or 1/8 x 1/8 spruce |
| F | 1/32-? | 24-? | 1/8 x 3/16 or 3/16 x 3/16 spruce |

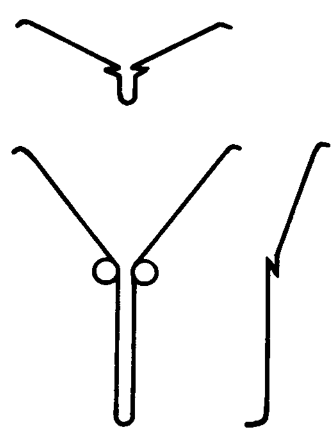
*3/32″ balsa can be used for ¼A and ½A events. These flexies will be lighter and will perform better, but will be more fragile.

**Spring**

The spring is possibly the most important part of a flexie because it holds the spars together at the front, keeps the spars apart at the rear and the covering taut when the glider deploys, and gives some dihedral to the "wings" to provide roll stability. It is made from small diameter music wire (see Table 1) and is attached to the spars with glue and thread. Figure 1 shows the configuration of the spring. Form the coil by wrapping the music wire once around a piece of 3/32″ (2.4 mm) diameter music wire. After the spring is attached to the spars, pull the spars into the flight position and tie a piece of thread to each spar to hold the spars in position so that you can attach the covering.

**FIGURE 1:**

Spring Configuration (Full Size)



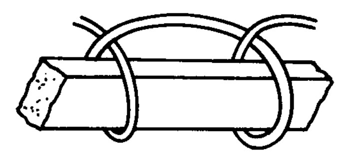
**Covering**

George uses plastic (¼-mil, from dry cleaner bags), although others have used aluminized Mylar. Plastic has advantages over Mylar in that it can be easily glued to the spars with cyanoacrylates such as *Hot-Stuff,* and that it seems less susceptible to the heat from the ejection charge. It suffers in visibility compared to Mylar because it is transparent whereas the Mylar is highly reflective.

George started out using cyanoacrylates to attach the covering, but has recently switched to thinned contact cement. To make the covering, cut a square of your chosen material with sides equal in length to the length of the spars. Then cut the back diagonally to fit the center spar. Attach the covering first to the two side spars and then to the center spar. Try to keep the covering tight at the front and somewhat loose at the rear (so that it billows) to minimize the chance of death dives. Use thread to sew the covering to the spars for better retention (see Figure 2).

**FIGURE 2:**

Stitching For Covering Attachment



After the covering is attached, free the spars by cutting the restraining threads.

**Booster**

In addition to a good glide, the successful flexie's performance depends on a straight stable boost and reliable glider deployment. Building a long booster with relatively large fins will ensure both. George recommends that the booster be long enough to allow about half the spar length between the engine and the glider when the glider extends from the front of the booster by 3″ to 4″ (76 mm to 102 mm—see Figure 3). For a 20″ (508 mm) flexie, the booster should be about 29″ to 30″ (737 mm to 762 mm). The booster should be recovered by a small chute or streamer, and an external shock cord mounted to the root of one fin. No nose cone is used.

**Getting It Back**

One of the disadvantages of flexies is that they're often hard to return, especially if the wind is blowing! One way of solving this problem is to use a dethermalizer to activate a change in center of gravity (CG) at some predetermined time. The basic system for dethermalizing flexies includes some rubber bands, an extra spar hinged to the center spar with a model airplane hinge, the dethermalizer (DT) fuse, and a nylon limit/activating line. As shown in Figure 4, the pendulum spar is hinged to the center spar at the flexie's CG, and is held in position by two rubber bands and the nylon limit/activating line. During boost the pendulum spar is folded forward and protrudes from the booster.

When the flexie deploys, the rear rubber band pulls the pendulum spar to a vertical position at the CG. The forward rubber band and the limit/activating line ensure that this position is maintained during flight. When the DT fuse burns through the limit/activating line, the rear rubber band is released. The front rubber band then pulls the pendulum spar forward, changing the CG and causing the flexie to dive—and making it easier to find!

A major disadvantage of the pendulum DT is its inherent high weight compared to the non-dethermalized flexie. George has experimented with a different system that does away with the pendulum. Figure 5 shows how this design works. The spring for this design operates only on the center spar and *one* side spar. A rubber band attached between the other spar and an extension on the center spar pulls the spar open. When the DT fuse burns through the nylon limit/activating line, releasing the rubber band, air pressure folds one wing, causing the flexie to fall. This DT is faster and much lighter than the pendulum DT. According to George, some up-elevator warp and a bit of tail weight is needed to obtain a good glide. Note that the angle between the two outer spars in George's experimental configuration is 110° instead of the more usual 90°. This small change increases wing area by about 15% with a minimal increase in weight.

Proponents of flexies will continue to rave about the performance and opponents will continue to complain about "kites" and "parachutes" not being legal gliders in NAR competition. But flexies will be around for a while—unless the wind blows! So, get out your spars, plastic, and music wire, and build a few flexies. Maybe you'll be as successful as George!

**FIGURE 3:**
Booster Configuration

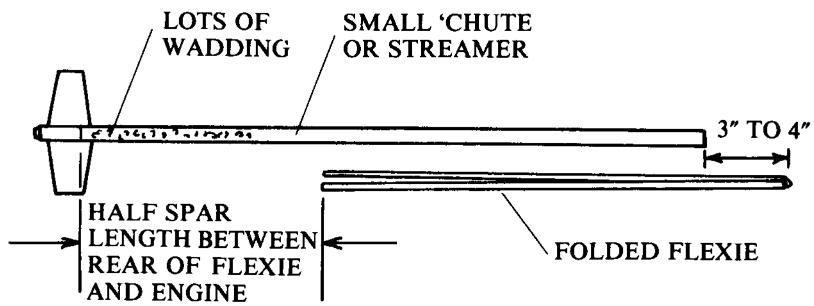



**FIGURE 4:**
Pendulum DT

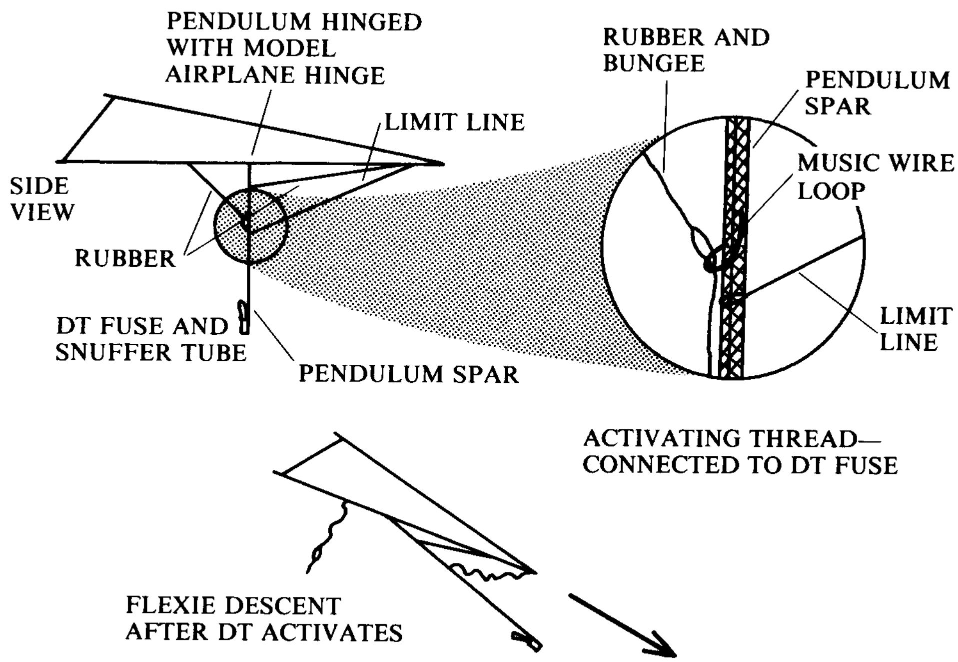
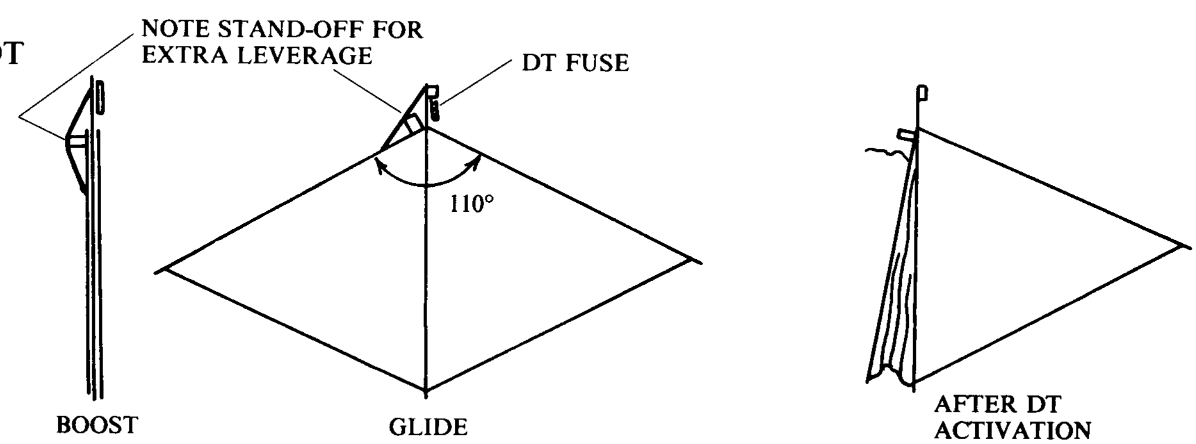
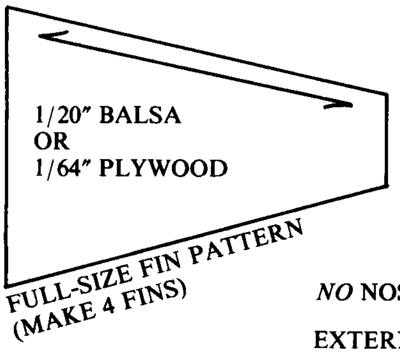


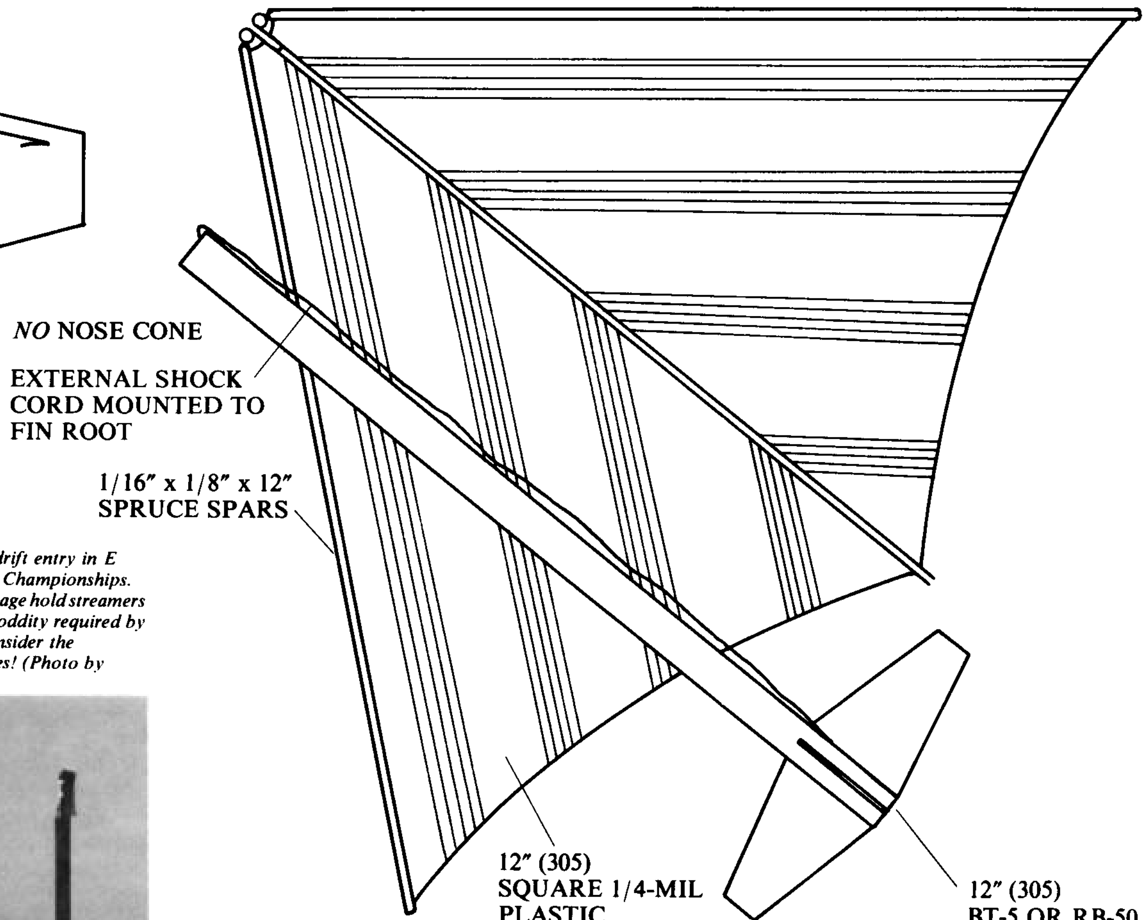

**FIGURE 5:**
"Lame Duck" DT



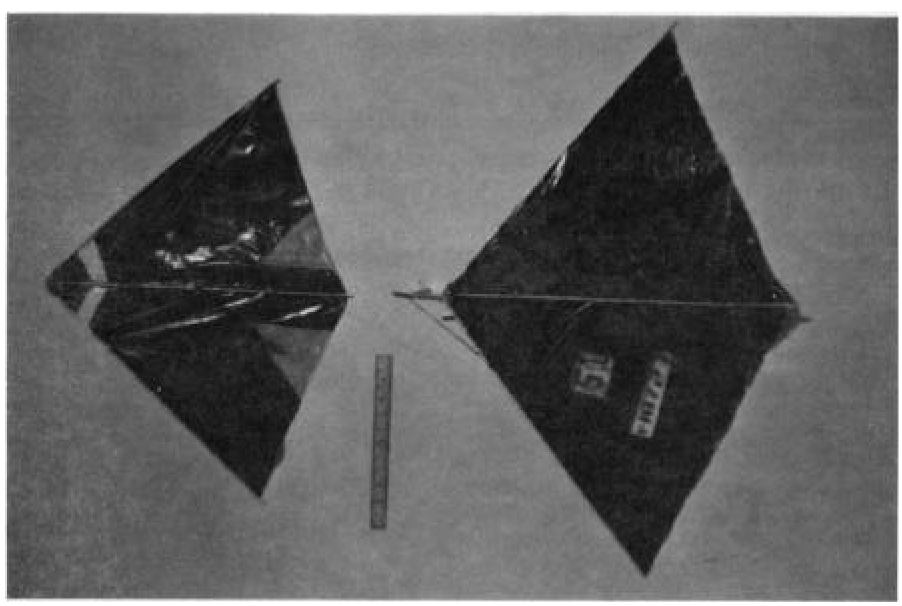
# WINDRIFT-A

*by George Gassaway and Tony Williams*
*from* ***Impact***



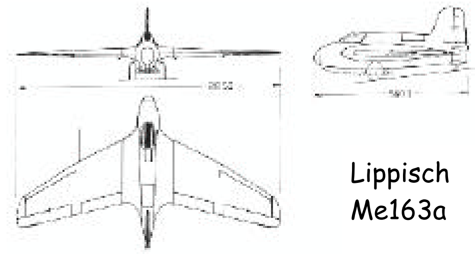




*George Gassaway hooks up his Windrift entry in E Boost/Glider during the 1980 World Championships. The pods near the fins on the second stage hold streamers for the recovery of the first stage, an oddity required by the FAI rules' apparent failure to consider the possibility of boost/gliders with stages! (Photo by C.D. Tavares)*



# On the Web: Nurflügels

http://www.teleport.com/~dbullard/html/nurflugel.html



Lippisch Me163a

Site creator Douglas Bullard says it best in his introduction:

*"What is 'Nurflügel'? Nurflügel is the name of my web page devoted to the history of flying wings. The term 'nurflügel' is the German term for what we Americans call 'flying wings'. When you think of it, that term isn't very precise, as all wings fly (at least the good ones do). My very literal translation program says that 'nurflügel' means literally, 'all-wing'. This is the true meaning of what we mean when we say 'flying wing'; that is, an airplane that consists primarily of only a wing, without extraneous surfaces such as rudders, horizontal stabilizers, fuselages, etc.*

*"In this page, I have endeavored to create the best archive of information on flying wings and selected tailless aircraft, with as many photos as I can cram online, all in high resolution. With each photo, I try to provide enough text to provide context."*

Some of the highlights of his site include:

- Lippisch Nurflügels - Planes from a man whose delta winged airplanes influenced a generation of aircraft design.
- Horten Nurflügels - Think the F-117 was the world's first Stealth jet fighter? Think again!
- Northrop Nurflügels - A bittersweet story of success, failure, and ultimate triumph.
- The Lifting Bodies - The X-24, the M2-FX, the HL-10, and others. A variant on an all-wing aircraft: all-fuselage, with no wings.

Lippisch DM-1

# Dryden Flight Research Center - The Lifting Bodies

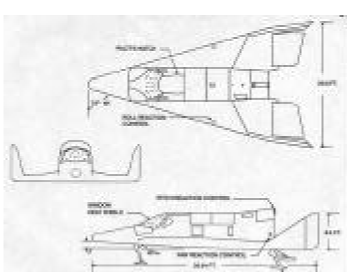
http://www.dfrc.nasa.gov/PAO/PAIS/HTML/FS-011-DFRC.html

This is a page from the NASA Facts Online resource at the Dryden Flight Research Center. It details research on lifting bodies, those small stubby vehicles of the '60s and '70s that were the direct predecessors to NASA's Space Shuttle. A particularly interesting link at the bottom of the page leads you to...

# Testing The Lifting Bodies At Edwards

http://www.dfrc.nasa.gov/History/Publications/LiftingBodies/contents.html

The full text and pictures of this book are available on the web, either as an HTML document or as an Adobe Acrobat file download. It features history, technical information, drawings, and photos of these unique vehicles. Particularly interesting was the segment on the abandoned X-20 Dynasoar project of the early 1960s (below).



Reprinted courtesy of Estes Industries
and Jim Zalewski's web site:
http://www.dars.org/jimz/rp00.htm
http://www.cmass.org:8000/archives/jimz/

# Odd BALL Contest Winners

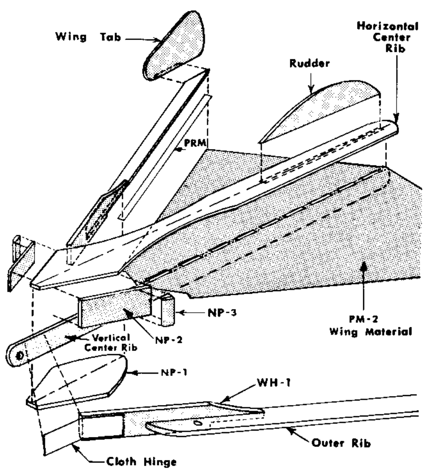
This contest brought in many entries of interest from all parts of the country. Many hours of careful scrutiny resulted in the final choice of the winners. Some of the entries were chosen for one feature which in our opinion may be a lasting contribution to the field of model rocketry.

Presented here are drawings and instructions for the first four place winners, and a list of the other six entries comprising the top ten spots.

## 1st "BaT"

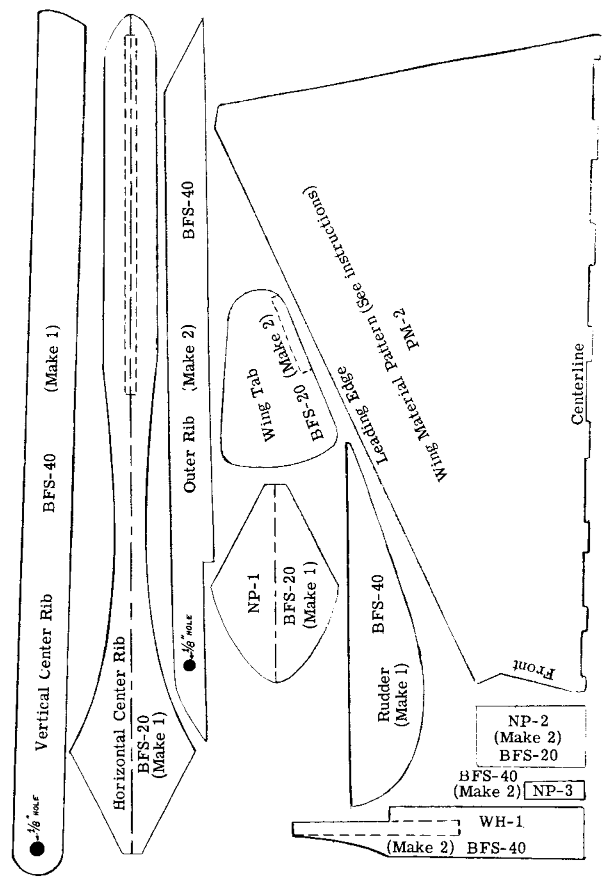
The BAT is a glider of para-wing design by David Swoboda of Minasha, Wisconsin. His plans included a 3-engine cluster booster using a BT-60 body tube 18" long. However, a Ranger or a Cobra (or a Bertha) will launch this glider. Here are the instructions for building your BAT.

The pattern group must be enlarged from the present half-size. By using dividers, you may wish to lay out the enlargements directly on the wood. If you draw the enlargements, draw them on stiff paper, and include grain direction and all dotted lines, as well as the part number. Lay out the parts on the wood, cut out and sand them smooth before assembly. Place the half-wing pattern's centerline to the folded edge of the PM-2. Cut carefully around the perimeter and notches of the pattern. Unfold the PM-2 and you have a delta-shaped wing with 1/8" x 1/2" notches down it's centerline.




PARTS LIST

| | | |
|---|---|---|
| 1 | Sheet balsa stock | BFS-40 |
| 1 | Sheet balsa stock | BFS-20 |
| 1 | Sq. ft. 'chute material | PM-2 |
| 1 | Sheet paper reinforcing | PRM-1 |




Lay the horizontal center rib on a flat surface (with the dotted lines facing you). Lay the wing material on this piece so the center of all notches line up with the centerline of the horizontal center rib. Hold the plastic in place and apply glue along all exposed parts of the horizontal center rib along the centerline. Apply a thin line of glue to the top edge of the vertical center rib. Place the vertical center rib rear edge even with the rear edge of the plastic material and over the centerline pressing down firmly to make good contact with the parts of the horizontal center rib thru all the notches and at the front end. Hold this part in place until the glue has set.

Glue one outer wing rib to part #WH-1 as shown. Repeat this step with the other outer rib and WH-1. Cut two 3/16" x 6-5/8" strips of PRM-1. Lay one strip along the leading edge of one side of the wing material. Repeat this step with the other strip and the other leading edge of the material.

Apply glue to the centerline of the NP-1 nose piece and put it in place on the bottom front of the vertical center rib. Follow this with part #NP-2, one on either side in the locations shown. The parts #NP-3 are finally placed at the rear outside edge of each piece of NP-2.

Dave specified a piece of TH-1 for hinging the outer rib-wing holder assembly to the vertical center rib. We found a piece of plain cotton cloth cut 1/2" x 1" made a more durable hinge. Glue the cloth hinge in place with white glue by first gluing it to the front of the WH-1, then fitting the WH-1 into place (in extended position) and gluing the remaining hinge material to the vertical center rib.

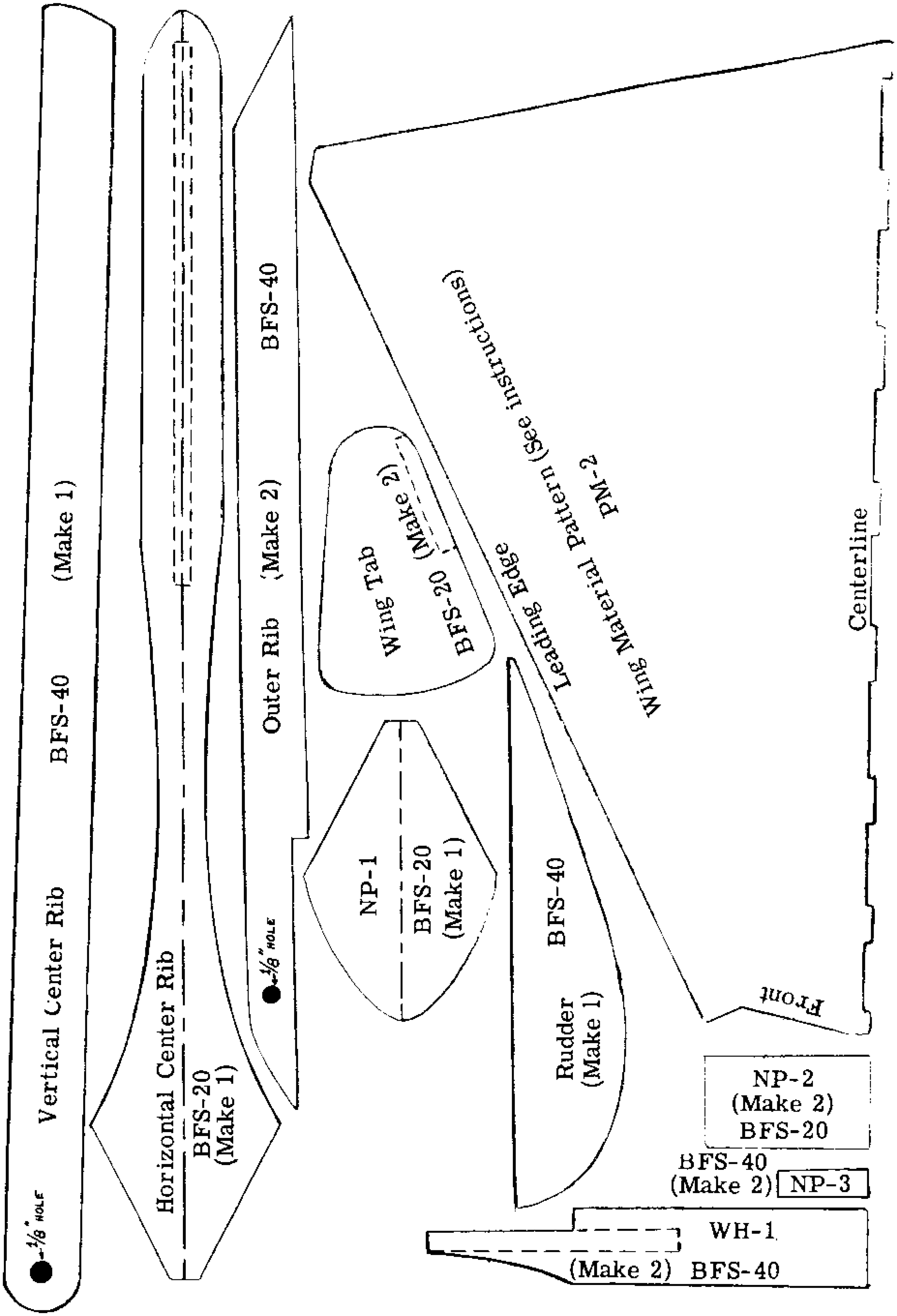
Apply a line of glue to the inside bottom edge of one outer rib. Carefully align the inside edge of the PRM strip with the inside edge of the outer rib as viewed from the top and press into the glue spread along the bottom of the outer rib Repeat this step with the other wing panel and outer rib.

Apply glue to the root edge of the rudder and place it into position on top of the horizontal center rib. Apply glue to the proper section of a wing tab and place it on the tapered end of an outer rib. Repeat this step with the remaining wing tab. Be sure the tabs and rudder dry in a vertical position.

Drill a 1/8" hole thru the vertical center rib as shown and thru each of the outer ribs at the points marked. Tie a knot in one end of a shock cord and thread the cord thru one outer rib, then, thru the vertical center rib and finally thru the other outer rib. Test the tension and pull tight enough to give positive but not violent action to each wing section as it goes into place. Hold the shock cord in place with a finger on the top side of the outer rib while you tie a knot in the cord snug against the underside of that rib. Clip off the excess shock cord and apply a drop of glue on each hole of the outer ribs only. When the glue has dried test the wing action again. Note the shock cord will equalize the tension on both sides by being able to move freely thru the hole in the vertical center rib.

After all parts have dried thoroughly, brush on a coat of sanding sealer on the wood surfaces only. Lightly sand the model and brush on a color coat of your choice.

# Full-size Templates for The Bat



## ASTRE Minutes - January 3, 1998

Compiled by Jeff Vincent

Treasurer Mike Seaman was unable to attend, but filed this treasury report:

**Checking Account:**

| | | |
|---|---|---|
| Deposits: | Caldwell family membership | $15.00 |
| | Hallenbeck junior membership | $ 5.00 |
| | Transfer from petty cash | $24.00 |
| Debits: | Check 141 to Michael Seaman for Bruce's Christmas gift | $40.00 |
| Previous Balance | | $51.63 |
| Present Balance | | $55.63 |

**Petty Cash:** The only change for the petty cash was the transfer of $24.00 from the cash to the checking account as recorded above.

| | |
|---|---|
| Previous Balance | $44.00 |
| Present Balance | $20.00 |

Long-time member John Sicker attended the meeting and renewed his membership. John also brought information on the NARCONN launch schedule (below). They have a new field in Pine Plains, NY, which sounds quite promising.

| | |
|---|---|
| March 22 | Pine Plains |
| April 19 | Pine Plains |
| May 3 | Pine Plains |
| May 30-31 | Cobleskill |
| June 14 | Pine Plains |
| June 27-28 | Cobleskill |
| July 18-19 | Cobleskill |
| August 15-16 | Cobleskill |
| September 12-13 | Cobleskill (CTRA Invitational) |
| October 10-11 | Cobleskill |
| October 18 | Pine Plains |
| November 7-8 | Cobleskill |
| November 15 | Pine Plains |

We discussed rechartering ASTRE. We should have enough insured NAR members to do so (assuming the same members are insured this year as last year). Wolf will handle the paperwork.

We finalized the details for the February building session. It will be held at Jeff's house from 1:00 to 4:30 pm on Saturday, February 21. It will be an open format, people can work on whatever projects they bring along. Jeff and Chuck Weiss procured a table after the meeting for use for future meetings.

We conducted club elections. The results were as follows:

| | |
|---|---|
| President | Wolf von Kiparski |
| Vice-President | John Sicker |
| Secretary | <not filled>* |
| Treasurer | Michael Seaman |
| Senior Advisor | Jeff Vincent |
| Member at Large | Chuck Weiss |

* - The Secretary's duties (taking meeting minutes) will be filled as needed at presidential discretion.

## ASTRE Minutes - February 7, 1998

Compiled by Jeff Vincent

The new leaders of the club wanted to devote more time at club meetings to interesting discussion topics and less to club business. Circumstances conspired to make this meeting an extreme example of this new policy.

Due to the extremely low attendance (Wolf, Jeff, and later, Chuck Hemker), all of the meeting was spent on the discussion topic, Computers in Model Rocketry. Some of the activities of the day included:

- Demos of PC WRASP (altitude) and VCP (CP) software,
- Demos of some of Jeff's old Atari rocket programs,
- Demos of Usenet newsreader software and discussion of rec.models.rockets and other newsgroups, and
- Sampling of MPC's "Rockets To Space" and Medio's "Jets" multimedia CD-ROMs.

After the meeting, the following dates for club events were established:

April 4 - Meeting at Jeff's house, discussion topic - Large Model Rockets and Mid-Power Rocketry,

April 18 - Sport Launch at Bruce's field in Johnstown,

May 2 - Meeting at Jeff's house, discussion topic - TBD.

# ASTRE Calendar

## ASTRE Contacts :

| | | |
|---|---|---|
| Wolf von Kiparski | 437-9747 | wolf@netheaven.com |
| Jeff Vincent | 439-2055 | jvincent@wizvax.net |
| Chuck Weiss | 883-8312 | cbweiss@telenet.net |

## How to get to Jeff's house...

Your destination is 39 Cherry Avenue in Delmar. Take Rt. 85 south/west (accessible from I-90, State Offices, Rt. 20, or Krumkill Rd.). After Rt. 85 changes from divided highway to two-way, you'll see the following landmarks (note, this is a complete list of the traffic lights you'll see):

- traffic light at Blessing Road, continue straight
- traffic light at New Scotland Road, take right to stay on Rt. 85
- traffic light at Rt. 140, take a left, follow to the end (1 mile)
- traffic light at Kenwood Avenue, go straight on to Cherry Ave.
- my house is 0.2 miles in from Kenwood Ave. It is the third house in a set of three similar houses on the right side of the street. There should be parking for 2-3 cars in the driveway, or, directly opposite my house (left side of Cherry Ave.) is Oak Street, and I believe there should be no trouble parking along the road there.

February 21 - **ASTRE Building Session and Competition Intro** - at Jeff Vincent's house, 39 Cherry Ave., Delmar, 1:00 pm. A free-form building session (bring whatever models you want to work on) and a show & tell describing the various forms of contest models (gliders, helicopters, scale, etc.).

March 7 - **ASTRE Meeting** - at Jeff Vincent's house, 39 Cherry Ave., Delmar, 1:30 pm. Show & tell topic - scale models.

March 22 - NARCONN Launch - Pine Plains, NY.

April 4 - **ASTRE Meeting** - at Jeff Vincent's house, 39 Cherry Ave., Delmar, 1:30 pm. Show & tell topic - Large Model Rockets and Mid-Power Rocketry.

April 18 - **ASTRE Sport Launch** - Bruce’s field in Johnstown, NY.

April 19 - NARCONN Launch - Pine Plains, NY.

May 2 - **ASTRE Meeting** - at Jeff Vincent's house, 39 Cherry Ave., Delmar, 1:30 pm. Show & tell topic - TBD.

May 3 - NARCONN Launch - Pine Plains, NY.

May 23-24 - NYSPACE 1998 Regional meet - Syracuse, NY area. Tentative events: A B/G, B SD, OSL, D DEL Alt, Sport Scale. Contact: John DeMar, 315-451-6470.

May 30-31 - NARCONN Launch - Cobleskill, NY.

August 8-14 - NARAM-40 NAR Annual Meet - AMA National Flying site, Muncie, IN. Events: 1/4A PD, 1/2A FW MR, A B/G, B HD. B SD MR, B Alt, D DEL Alt, Sport Scale, Research & Development. Contact: Glenn Feveryear, 717-456-5570.

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# ASTRE Membership Application

Name ______________________________________________

Address ____________________________________________

City _______________________________________________

State ____________________ Zip Code ______________

Phone ________________ Date of birth ______________

NAR number ___________ Tripoli number ______________

Send to: ASTRE
c/o: Wolf von Kiparski
46 Tremont Street
Albany, NY 12205

Membership Dues (check one):

[ ] Junior member - $5.00
(under 18)

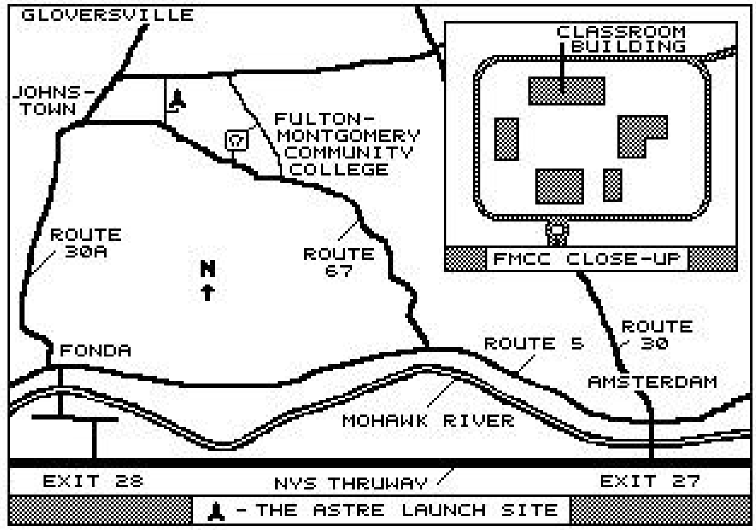
[ ] Senior member - $10.00
(over 18)

[ ] Family membership - $15.00
Number of newsletters: _____

Please make checks payable to "ASTRE".

## How To Get To The Flying Field

- From the east, take the Amsterdam exit (#27) off the Thruway
- Take a right and follow Route 30 North for one mile.
- Take a left at the second light after the bridge onto Route 5 West.
- Follow Route 5 for three miles. Take a right onto Route 67.
- Follow Route 67 for 5.5 miles. Shortly after passing FMCC, take a right onto the small road by Ed's RC shop. After one half mile you will see **JBJ Equine** on your right. Follow the driveway and park in the parking lot and walk to the range.




Jeff Vincent
Box 523
Slingerlands, NY 12159

ASTRE's Next Building Session - February 21 - at Jeff Vincent's house
ASTRE's Next Meeting - March 7 - at Jeff Vincent's house
In This Issue - Everything You Ever Wanted To Know About Flexies!