

From: National Control Line Racing Association  
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Garland, TX 75042



TO

## **SPECIAL: SLOW RAT ISSUE**

**INSIDE:**  
**District Reports**  
**Contest results**  
**Suppliers/Equipment**  
**Updated Contest Calendar**

**Torque Roll Issue #135**  
**December 2017**



Doug Mayer's new "Retro Baby" Fox Race Design.  
Suitable for Slow Rat and SSR racing events. See Inside  
for Article.

## PRESIDENT- Bill Bischoff

The 2017 season has wound down, so I guess it's time to start looking ahead to 2018. As we all know, the 2018 CL World Champ's will be in Landres, France in mid-July. This created a conflict with our own NATS, so we have gotten the NATS CL speed and racing events changed to the week of July 30 -August 3. Yes, this splits up CL, but it rescues speed, and to a lesser extent, racing, from an almost certain fatally low turnout. I know this doesn't please everyone, and I'm sorry. However, this did seem like the best option.

Individual events have not been assigned to specific days yet. As a reminder, we will have the same slate of events as last year: Mouse I, Quickie Rat, Clown race, F2C, AMA Slow Rat, Super Slow Rat, AMA Goodyear, and Sportsman Goodyear. I will also be inquiring about an extra day for the Muncie 500, a 500 lap Sportsman Goodyear race. Like last year, I will be seeking sponsors for the unofficial events, and like always, it would be awesome if somebody wanted to step up and be the event director, even if it's just for one event. There's time, so think it over.

This issue is our Slow Rat/ Super Slow Rat issue. Much of the information can also apply to Fox race and other "sport" race events. Doug Mayer's *Retro Baby* is equally suited to a .25 or a Fox .35. The information for the PDK *Mockingbird* kit can be adapted to any other slow rat or super slow rat (although I would probably use a metal bellcrank on an AMA slow rat), and even Fox/ Goldberg type planes. I hope everyone can get something useful from this issue.

We don't have a theme for the next issue, but I would personally like to learn more about Clown Race, especially peoples' experiences with different engines. I am building a Clown for next year, and have several engines to choose from, including a Conquest, a Rossi Mk II, a QM Nelson 15, and an Irvine 15. I would prefer to use an engine I already have, rather than buying a big bucks OS 18TZ. Any comments or recommendations? Send 'em in.

## SOUTH CENTRAL - Bill Bischoff

The final results for the 2017 South Central Top 20 is in this newsletter. We had an abbreviated year, with no races in Houston (or Kansas), and a weathered out contest and cancelled contest in Dallas. The Dallas club elected to cancel their Labor Day contest since so many of the contestants from the Houston area were busy dealing with the aftermath of Hurricane Harvey. The full Labor Day contest is being rescheduled for Feb 17/18, 2018 (tentative date). This includes Mouse I, Foxberg, Quickie Rat, Super Slow Rat, and Sport Goodyear, all on Saturday. There will also be Carrier on Sunday, and assorted Stunt events both days. Watch the StuntHangar.com forum and the NCLRA contest calendar for more details. Dallas will also be setting the rest of their 2018 schedule in January. Until next time, get building!

### 2017 SOUTH CENTRAL TOP 20 (includes NATS)

#### SPORT GOODYEAR 80 laps

- 1)Bill Lee 4:07.13
- 2)Mike Greb 4:07.64

- 3)Paul Gibeault 4:08.27
- 4)Bill Lee 4:11.01
- 5)Bill Lee 4:11.40
- 6)Bob Oge 4:16.32
- 7)Bill Bischoff 4:16.85
- 8)Mike Greb 4:18.24
- 9)Mike Greb 4:18.74
- 10)Bill Bischoff 4:20.98
- 11)Barnes team 4:23.62
- 12)Bill Bischoff 4:23.79
- 13)Bill Lee 4:26.03
- 14)Barnes team 4:26.96
- 15)Paul Gibeault 4:27.59
- 16)Barnes team 4:28.61
- 17)Patrick Hempel 4:29.30
- 18)Bob Heywood 4:30.25
- 19)Barnes team 4:32.12
- 20)Bob Oge 4:33.19

#### SPORT GOODYEAR 160 laps

- 1)Bill Lee 8:29.60
- 2)Bill Lee 8:34.01
- 3)Bill Lee 8:36.04
- 4)Bill Bischoff 8:43.48
- 5)Mike Greb 8:43.85
- 6)Paul Gibeault 8:47.62
- 7)Bill Lee 8:49.08
- 8)Patrick Hempel 8:50.87
- 9)Patrick Hempel 8:51.20
- 10)Mike Greb 8:58.27
- 11)Bill Bischoff 9:05.62
- 12)Patrick Hempel 9:14.76
- 13)Dale Gleason 9:16.78
- 14)Bill Bischoff 9:16.91
- 15)Mike Greb 9:24.69
- 16)Bill Bischoff 9:27.78
- 17)Bill Bischoff 9:40.34
- 18)Mike Greb 10:35.91
- 19)Patrick Hempel 11:35.72

#### GOLDBERG 70 laps

- 1)Patrick Hempel 5:23.44
- 2)John McCollum 6:50.22

#### MOUSE I 50 laps

- 1)Bill Lee 2:28.92
- 2)Patrick Hempel 2:29.57
- 3)Barnes team 2:31.77
- 4)Les Akre 2:33.67
- 5)Patrick Hempel 2:36.55
- 6)Barnes team 2:36.88
- 7)Les Akre 2:41.61
- 8)Barnes team 2:41.97
- 9)Barnes team 2:43.25
- 10)Bill Lee 2:44.28
- 11)Paul Gibeault 2:46.77
- 12)Patrick Hempel 2:47.01
- 13)Patrick Hempel 2:49.47
- 14)Mike Greb 2:51.96
- 15)Melvin Schuette 2:52.00
- 16)Jed Jusik 2:55.52

17)Mike Greb	2:57.30
18)Mike Greb	2:59.79
19)Mike Greb	2:59.97
20)Jed Kusik	3:02.12

**MOUSE I 100 laps**

1)John McCollum	4:49.86
2)Patrick Hempel	5:01.24
3)Barnes team	5:01.77
4)John McCollum	5:04.12
5)Les Akre	5:08.02
6)Patrick Hempel	5:09.36
7)Barnes team	5:20.45
8)Melvin Schuette	5:32.22
9)Bill Lee	5:51.24
10)Mike Greb	6:10.91
11)Mike Greb	6:15.09
12)Patrick Hempel	6:19.72

**QUICKIE RAT 70 laps**

1)Paul Gibeault	3:04.18
2)Les Akre	3:04.76
3)Bob Oge	3:06.88
4)Les Akre	3:11.15
5)Bill Lee	3:15.80
6)Bill Lee	3:17.61
7)Bill Bischoff	3:18.05
8)Bill Bischoff	3:23.16
9)Bill Bischoff	3:23.83
10)Barnes team	3:25.22
11)Bill Lee	3:26.58
12)Bill Bischoff	3:27.95
13)Bob Oge	3:34.25
14)Mike Greb	3:35.44
15)Barnes team	3:36.20
16)Barnes team	3:38.60
17)Bill Lee	3:39.33
18)Chuck Barnes	3:39.44
19)Mike Greb	3:39.77
20)Barnes team	3:41.82

**QUICKIE RAT 140 laps**

1)Les Akre	6:21.20
2)Bob Oge	6:30.22
3)Bill Lee	6:55.42
4)Paul Gibeault	7:08.30
5)Bill Bischoff	7:24.60
6)Barnes team	7:42.56

**SUPER SLOW RAT 100 laps**

1)Bill Bischoff	5:28.84
2)Bill Bischoff	5:35.18
3)Bill Bischoff	5:40.96
4)Bob Oge	5:42.03
5)Mike Greb	5:49.97
6)Les Akre	5:54.49
7)Charlie Johnson	5:54.99
8)Charlie Johnson	5:55.00
9)Mike Greb	5:58.69
9)Barnes team	5:58.69
11)Bill Lee	5:59.66

12)Mike Greb	6:04.91
13)Barnes team	6:06.10
14)Barnes team	6:10.85
15)Bob Oge	6:11.15
16)Mike Greb	6:17.61
17)Les Akre	6:19.00
18)Bob Oge	6:52.50
19)Barnes team	7:17.18
20)Barnes team	7:45.22

**NORTH EAST - Phil Valente**

MIDDLESEX MODELERS CONTEST RESULTS 10-15-2017

CD: Al Ferraro

Phil Valente reporting

**SPORTSMAN CLOWN LAPS**

7.5 minutes not to exceed 140 laps

1. Dave Edwards.....	137
2. Jim Vigani.....	137
3. Al Ferraro.....	135
4. Ernie Evon.....	119
5. Raul Diaz.....	63

**CLOWN SPEED MPH**

1. Dave Edwards.....	99.2 MPH
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**PERKY SPEED MPH**

1. Al Ferraro.....	107.2
2. Raul Diaz.....	90.0
3. Ernie Evon.....	71.1

SOUTH JERSEY AEROMODELERS CONTEST

RESULTS 11- 5- 2017

CD & Reporting: Phil Valente

**SPORTSMAN CLOWN LAPS**

7.5 minutes- not to exceed 140 laps

1. Dave Edwards.....	136
2. Ernie Evon.....	99

**PERKY SPEED MPH**

1. Tom Schaefer.....	109.28
2. Al Ferraro.....	109.05
3. Ernie Evon.....	74.7
4. Dennis Warchol.....	68.8

**CLOWN SPEED MPH**

1. Dave Edwards .....	95.40
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**FOX SPEED MPH**

1. Jim Vigani.....	106.25
2. Al Ferraro.....	106.05
3. Tom Schaefer.....	104.25

South Jersey Aeromodelers Contest Results from 11-19-2017

Phil Valente CD & Reporting.

**PERKY SPEED**

Ernie Evon.....	89.69 MPH
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## RETRO BABY FOX RACER BY DOUGLAS MAYER

Fox Racer or Super Slow Rat?? I'm sure you are asking yourself after reading this issue of the Torque Roll, "Which one should I build, and what the heck is the difference?"

Before I start, I wish to acknowledge my friend, mentor and old racing partner Mike MacCarthy. He taught me many of the techniques that are used on this airplane. You can use Retro Baby in Slow Rat or SSR/Fox race. Read the specific event rules and configure your airplane properly for either event. This article is specific to the Fox motor, but can be easily adapted to a .25 motor. I am making my design drawings available to the NCLRA for publication. Refer to the plans section on the NCLRA website, and look for Retro Baby. Also, I will be happy to e-mail full size plans to you (anywhere), or mail hard copy full size plans in the USA for \$15. See my contact info at the end of the article.

First of all, I'll give a little history and background of these racing planes, and why they are flown in the same class. Fox Race pre-dates SSR by 20 years or so. Fox race was invented as an alternative to flying high performance Slow Rat which was out of many people's abilities to fly or afford. So Fox Race was born as an entry level sport event for the average man. The Fox .35 was a good engine choice at the time because there was and still is a huge supply of available Fox .35's and the performance peaks out at an easy level to maintain for a sport event. The only modifications allowed to the Fox motor is to install a different needle valve, and change out the screws. No metal may be removed or added. The only exception is that pesky muffler mount on the engine case on the later models that sticks out right in front of the venturi and burns the hell out of your thumb when you try to choke the venturi. Cut that damn thing off, nobody can ever claim that's giving you any performance. The airframe rules are similar to slow rat with 300 square inch wing, with a 1" minimum thickness to within 2" from the tip. An overall [profile rules] fuselage length of 22" from prop washer to elevator hinge line is required. The fuselage must have a canopy and a rudder. Shut-offs are not allowed, so you need just the right size fuel tank to get 1 start and 2 pits in 100 laps without going over 100, or running under, and pitting 3 times. Hot fingers are not allowed, so we used to pit with 2 mechanics at the NATS. One mechanic was designated as the "Battery man" and his only job was to install the battery clip and hold onto the back of the plane, while the other pitman fueled and flipped the prop. Fox race became a very popular event in the late 90's, and was highly contested at the NATS for many years. The performance restrictions meant that the races were always very close and exciting.

Fast forward a few years..... where did SSR come from? To the best of my knowledge, the guys in my club at SCAR complained about the Fox .35 vibrating excessively, and acting inconsistent on the re-starts, so they decided to do some experimenting with some .25 motors and see if the performance was similar. The first motor of experimentation was the OS FP .25 and the OS LA .25 and they proved to be reliable motors and perform in the same envelope as the Fox .35. The rules got modified to allow for plain bearing .25 motors and the SSR class was born. The intent was always that you could fly either a Fox .35 or a .25 motor in the same event and have an equal outcome. This seems kinda crazy, but it actually worked out, and I believe that SSR/Fox Race is a fair event. Over time more and more guys have migrated to the .25 size motor.....but not everyone! Ha ha ha ha ! (Evil laughter of course!!)

Fox Race??? What? Why? Well, I was one of those guys competing at NATS in the early 2000's and I actually won 1<sup>st</sup> place in Fox Race in 2002. Somewhere around 2005, I took a hiatus from racing and sold a bunch of my airplanes and quit racing for a while. When I got

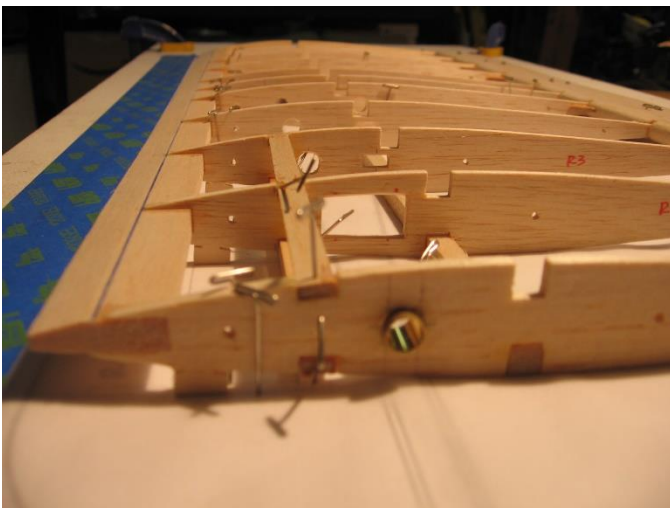
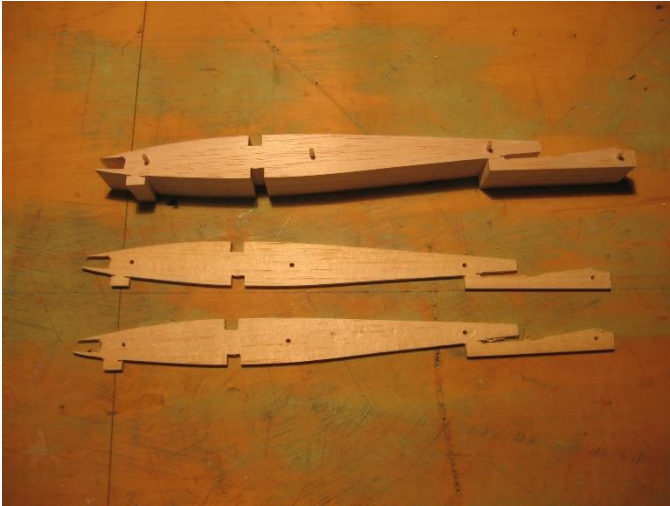
back into racing here in LA, I needed to build a new collection of airplanes so I could participate in the different events. SSR/Fox Race was one of those entries, so I decided to design a new airplane based on my successful airplane from previous years of NATS experience. The funny thing is that I bought a brand new .25 Brodak motor and it's still sitting in the box. Instead, I decided to mess with the guys in my club and resurrect one of my old Fox Motors and come out and kick their ass in SSR with an old Fox motor.

**Motor:** OK, here goes, I'm going to share all my secrets. My NATS winning motor had sheared a crankshaft and was in pieces. Since I had several Fox motors, I rebuilt my good motor with the good piston and liner with a new crank, and installed my best needle valve. I have always used a modified Super Tigre needle. I hone the outside diameter of the needle valve body to a thinner diameter to let more air thru the venturi. This seems like a minor item, but it is enough to boost some performance. I also use nylon washers on the outside of the venturi so no air sneaks in at the side of the needle, and it keeps the needle from coming loose. The fuel pin hole should be pointing straight down. For props, the best performing prop is the APC 9x6N that Vic Garner designed for Fox Race. It looks too skinny to do the job, but Vic put some magic in that prop design and it works like a charm. This prop is still commercially available from APC. On the front end, I always use an aluminum Dubro spinner. I think the weight is just enough to help the motor to free-wheel and cut down a bit on vibration. Do not use a Harry's Heavy Hub, even if you are trying to balance you plane. It is too heavy, and you will stress the motor at high RPM's and blow a crank. One last item, RUN YOUR MOTOR ON CASTOR OIL!! Do not run a Fox motor on only synthetic oil. You can run with a 50/50% blend of castor and Synthetic, but you must run Castor Oil. Fox motors were not designed for racing, and they get very hot at high RPM racing speeds. This is where people failed to understand how to race a Fox. The piston liner expands and there is no fit between the piston and liner when she comes in hot to the pit. This makes re-starts frustrating and nearly impossible. You need to douse the head and crank case with fuel or water to [shock] shrink the case and liner to create a fit so you can get a restart. Believe it or not, this works, and the motor regains pressure, and she will restart. The last thing to work out with your plane is the fuel tank size. Somewhere between 1-1/2 oz. to 1-2/3 oz. should work. You'll need to work this out on your own.



**The Plane Design:** This new plane is based on my old Vulture. Back in the late 90's Mike MacCarthy was looking for a Fox Racer worthy design. He found the Vulture which was an old Navy Carrier design. It had a short stubby wing around 320 square inches, and the right length profile fuselage. The Vulture became the Fox Racer of choice

for the Back-At-It team, so of course I had to build one too! Over the years, I made numerous modifications to my original plane. I took all those lessons and more, and incorporated them into this new design. I originally was going to call this plane a "Super Vulture", but I didn't like the styling of the vulture that much. Instead, I loved the styling of Mike's Slow Rat, the "Sharpshooter", with its sleek canopy, low rudder and tapered wing and stab. I blended the Vulture with the sharpshooter styling and came up with a new plane. I decided to call it "Retro Baby", not in terms of an infant child, but in terms of "Hey Baby" expression, hence, "Retro Baby". Oh well, it kinda stuck, so I'm going with it.



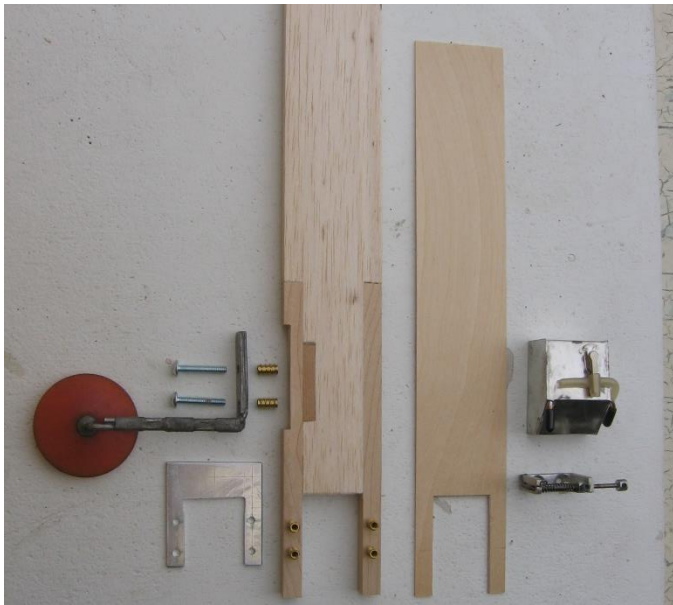
**Wing:** The wing is just over the minimum 300 square inches. Similar to the original Vulture, the wing is short and stubby and square. I wanted to use (1) rib template for the entire wing, so the only tapered shape comes from the tapered trailing edge. (Note: Install the trailing edge after installing the finished wing into the fuselage). To make the ribs, I make a template out of stiff cardboard or 1/16" plywood. Make 2 small holes to insert toothpick keys. These keep everything aligned. Trace your ribs out with an x-acto knife. After you have all your ribs, you can align them on the toothpick keys and sand the entire batch to a perfectly matching set. Ahhhh, the beauty of a square wing... Mike used to sheet the entire wing with 1/16" balsa skins, but I decided to just sheet the front of the wing from the leading edge to the wing spars. The ribs then get cap sheets from the spar to the trailing edge. To keep the wing as thin as possible, the ribs are

15/16" tall. The top and bottom skins bring the wing thickness to 17/16".....1/16" over the minimum. For the trailing edge, I used a pre-shaped balsa aileron that I had in the shop. It had just the right taper angle to blend with my airfoil, and provides a nice stout trailing edge for this flat skinny wing. You can see from the photos that I cut round lightening holes, but I think it's unnecessary, so I didn't show it on the plans. To get the right blend to the leading edge, I used a square stock 1/4" x 1" member. Prior to building the wing, you need to sand the leading edge to follow the contour of the ribs. This creates a flat surface to glue the 1/16" skins to. After gluing the skins, round the leading edge with sand paper. Mike used to make a hatch to connect the flying wires to the leadout wires inside the wing. I skipped the hatch, and just ironed a monocoat patch on the wing after connecting the wires. If you ever need to change out your wire, just use an x-acto knife and iron a new patch on. Simple is good! You will notice however; in lieu of a hatch, I still did add reinforcing mini-spars around the hatch area.



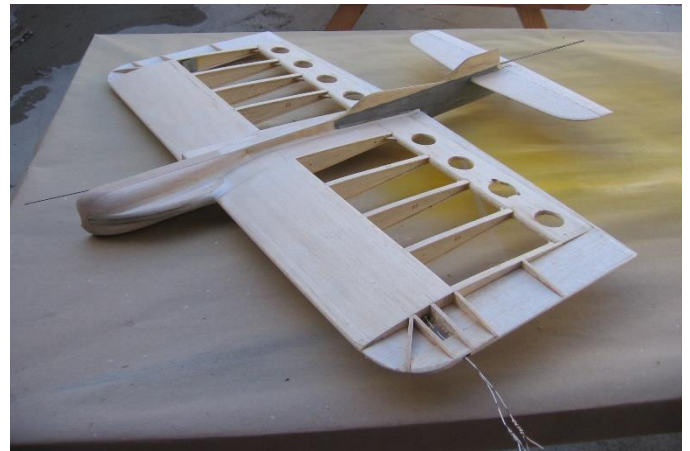
**Stabilizer & Elevator:** There are 2 options for the Stab/Elev assembly. For years I have simply used 1/8" hard balsa. For a plane this size, this seems kinda flimsy. If you use 1/8" balsa you may wish to use 2 oz. glass. The other option is to use 3/16" balsa and sand a nice symmetrical airfoil in in. The thicker balsa adds some rigidity and makes it easier to install CA type hinges. Hinges, yes you need hinges. Personally, I prefer CA hinges because they make your finished plane nice and clean. The 1/8" balsa or the 3/16" balsa are both thick enough to install CA hinges.

**Fuselage:** The overall fuselage is a piece of 1/2" balsa. I like to blend and sand my rudder and canopy into my fuselage. To do this, I make the rudder with a 1/32" plywood core, and 2 outer skins of soft 1/4" balsa. The canopy is simply a chunk of balsa from the wing cut out hole. After installing the rudder and canopy to the fuselage, you can sand everything to shape. I wanted to thin the back of the plane a bit, so after sanding, the tail didn't have its full 1/2" dimension. To strengthen the tail end of the plane at the stabilizer connection, I laminated a strip of 6 oz. carbon cloth to the fuselage and epoxy glassed the entire fuselage with 2 oz. fiberglass cloth. This method was outlined in my last articles in the "Goodyear Issue" of the Torque Roll. The stabilizer is mounted high on the fuselage to get it out of the wing slipstream. The thick rudder gives some extra strength to this connection. For the motor mounts and landing gear mounts, I used brass threaded



inserts in lieu of blind nuts. Mike always used 6-32 bolts on Fox .35's and anything bigger. This helps with the vibration concerns. The 6-32 inserts are glued and inserted into the hardwood, and then the motor plate just has thru holes for the Fox. (NOTE: if you build your plane like this for a Fox, you can always use a machined 3/16" aluminum adapter plate for a .25 size motor. Use the Fox 6-32 mounting holes for the plate, and machine separate 4-40 holes for your .25 motor). The landing gear is preassembled wire, plate, and soldered assembly and bolted on the fuselage. Mike liked bolt-on landing gear because he could remove all the

gears, and it made packing 20 airplanes in his trailer a lot easier for the long haul to NATS. Also, Mike always built (3) airplanes at once, and all the components were interchangeable for easy repairs from one plane to the next. You can certainly install fixed gear if you prefer. I use a 2" wheel for Fox, but you can use a 1-1/2" wheel for a .25 size motor. Interchangeable gear and motor mounts will allow you to use either size motor. The one item that is optional is the large chine cheek cowl. If you are building a FOX RACER, install the big chine! This is a vibration control feature. It is actually a triangular structural item that braces the nose back to the wing to stiffen up the nose. I recommend fiberglassing this chine and cheek cowl to the fuselage and the wing. I didn't at first, and retroactively came back and installed carbon reinforcing cloth to the nose after a maiden vibration flight. If you're just running a .25, you can skip this item and just build a cheek cowl.



**Finishing:** I only use epoxy primer and finish paint all my racing planes. I simply used Monocoat for the wings. Don't forget to add your racing number and AMA number. I went to the local motorcycle / Jet Ski store and found license number decals for jet skis to be the perfect size for a big plane. Dude!! They are perfect! They look awesome and all you have to do is peel-n-stick, and Voila!! Finished plane.....just like this article! Cheers!



Contact: If you want to request a copy of the plans, or have any questions or want some advice, you can e-mail me at: [douglasmayer58@gmail.com](mailto:douglasmayer58@gmail.com). I will be happy to help.



# HARDWARE AND SYSTEMS FOR THE "MOCKINGBIRD" SUPER SLOW RAT

Bill Bischoff

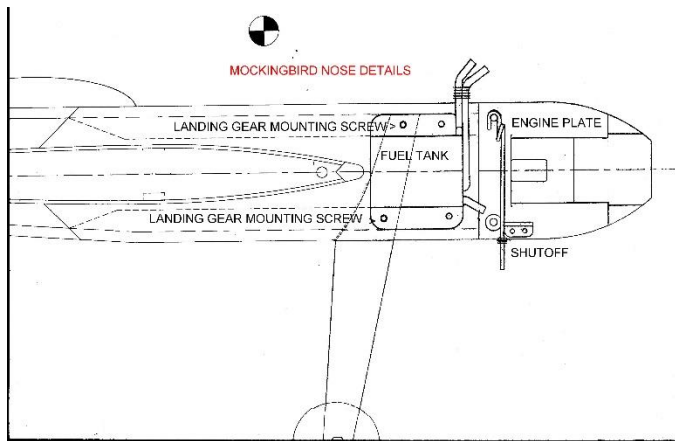
The PDK Mockingbird kit was designed to be a competition racing plane. That being said, it is expected that the purchaser should know how to get from basic airframe to race-ready aircraft. In this article, I will attempt to fill in some of the details that the plans do not cover. The information presented here can be adapted to other Super Slow Rat designs as well.

## FUEL TANK

Instructions are included for building a fuel tank. This particular tank is not required, but highly recommended. Do not drill the rear mounting holes yet.

## LANDING GEAR/ TANK MOUNTING

Assemble the fuselage up to and including the installation of the plywood nose doublers, but not the cheek cowls. Fabricate the landing gear strut per the plans. Use the cheek cowl with the landing gear notch to locate the landing gear strut on the inboard side of the fuselage. Drill through the fuselage for the landing gear mounting screws. These screws will be installed from the outboard side of the fuselage, and thread into the gear strut. They will also serve as the rear fuel tank mounting screws. The front tank mounting screws can be #4 x 1/2" sheet metal screws.



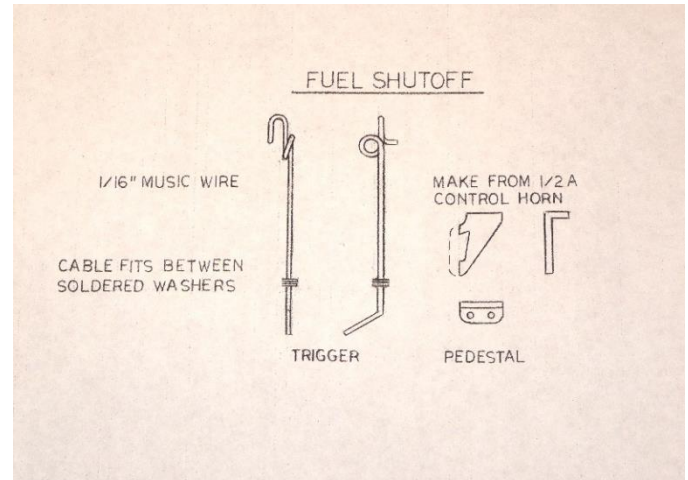
## ENGINE MOUNTING

Cut the engine mounting plate from 3/32" or 1/8" aluminum. Mount the engine in the traditional manner with 4-40 screws and blind nuts. (Just for the record, the OS 25 LA/ FP, Thunder Tiger GP 25, and Brodak 25 all have the same mounting pattern and will interchange.) The top rear plate mounting screw will also hold the shutoff, so this screw should be 3/4" long if the shutoff is used. The bottom plate mounting screw should be #4 x 1/2" countersunk, to not interfere with the fuel line.

## SHUTOFF

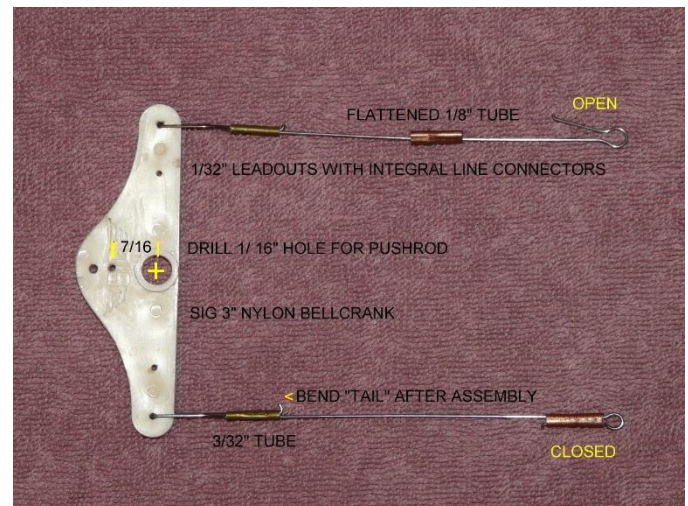
Even though it cannot be used in a race, a shutoff is useful while testing and practicing, and especially to avoid disaster if things start to go wrong. The shutoff trigger wire is bent from 1/16" music wire. After installation, bend the bottom to a convenient length and angle for the pit man. The modified

control horn that holds the shutoff open can be mounted with #2 sheet metal screws, or the engine mount plate may be drilled and tapped 2-56



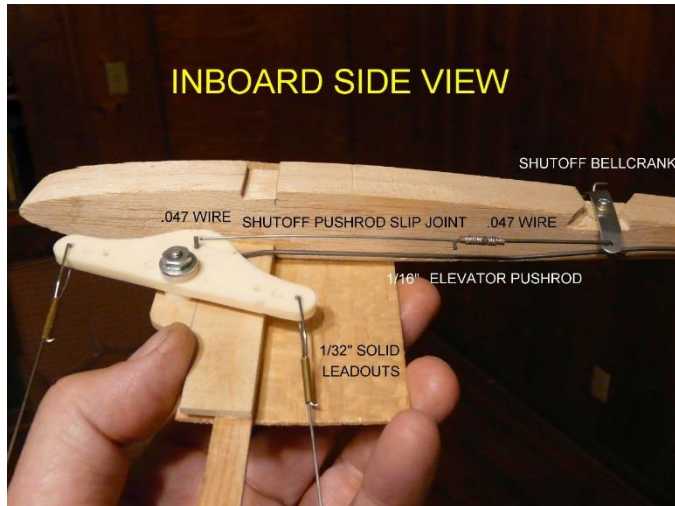
## BELLCRANK/ LEADOUTS

Use a modified 3" Sig bellcrank. Drill a new 1/16" pushrod hole in the bellcrank, 7/16" from the center of the bolt. Cut off the bellcrank at the outermost pushrod hole so it doesn't contact the center rib. Use 1/32" music wire for the leadouts. The ends of the leadouts form the line connectors; no additional line connectors are required. They can connect inside the wing for less drag, or outside the wing for simplicity. If you prefer, you can make traditional leadout terminations and use clips instead. For external leadout connections, use 3/32" or 1/8" brass tubing for the leadout guides. Begin by bending the round ends of the leadouts, which will become the line clips. When bending the "tail", be sure to leave enough room between the loop and the tail for the 1/8" brass tubing sleeve that becomes the closure. Cut the tail so that it is about 1/32" long. The 1/8" brass tube should be flattened to an oval cross section so it will slip past the tail all the way up to the loop. If you flatten the tube too much, it will be hard to slide; If you don't flatten it enough, it may not fit over the tail.



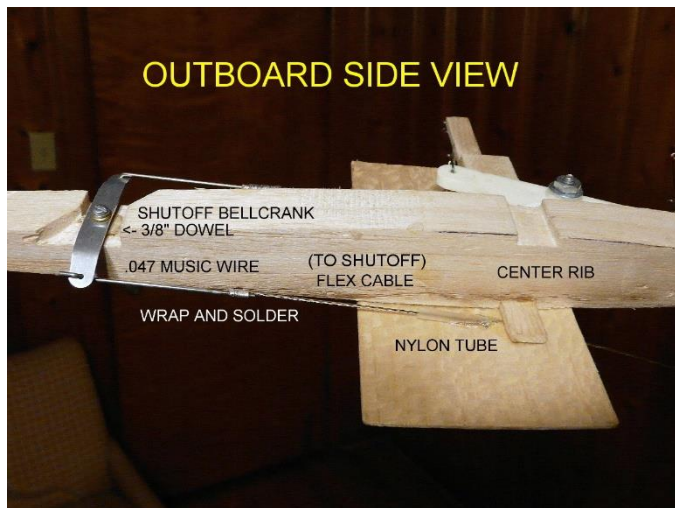
Internal line connections will be done in the same manner as external connections, except the leadouts will only be 5" long from loop to bellcrank. Be sure to bend the leadout loops so they lay horizontally in the wing, while the loops through the bellcrank are vertical. Holes cut into the bottom of the wing will allow

access to the line connections. An additional small piece of sheeting will be needed between ribs R3 and R4. Cover the holes with clear tape for flight. This will allow visual inspection. The line guides will be made from small maple blocks, which are slotted for the line ends to pass through. Make certain the leadout clips work smoothly and easily before they are permanently installed in the wing. If you don't, it will become abundantly clear later why you should have.



**PUSHROD**

Bend the pushrod from 1/16" music wire. Use a piece of 1/8" copper or brass tubing for a guide, and exit through the middle of the trailing edge. This gives a clean installation without the need for a large slot or pushrod exit fairing. It is intended for the control horn to be on the bottom of the inboard elevator. Use a Dubro 1/2A control horn, and attach the pushrod in the outer hole.



**SHUTOFF LINKAGE**

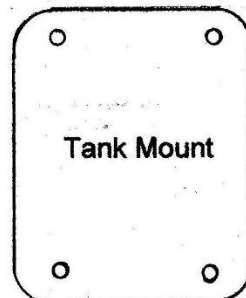
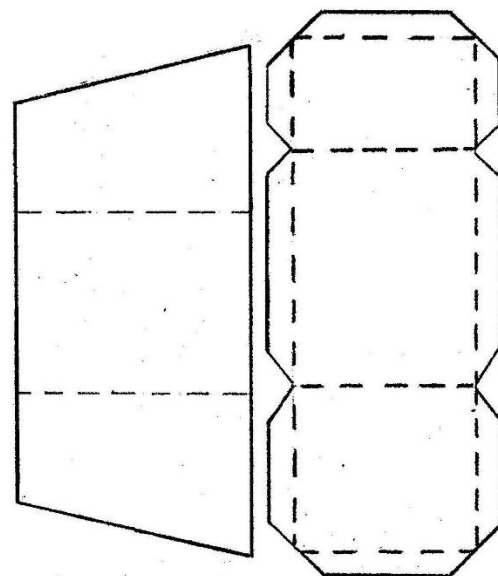
This linkage is adapted from an idea I stole from Bill Lee. It uses a cut down Perfect 1/2A bellcrank as a reversing linkage. It allows for the use of a pull-actuated shutoff without placing the control horn on top of the elevator, and gets the linkage to the outboard side of the fuselage where the shutoff is mounted. A 3/8" dowel is mounted vertically through the center rib, and the bellcrank is attached to it with a #2 x 1/2" sheet metal screw. Note that the linkage between the flight bellcrank and the reversing bellcrank has a slip joint. This eliminates any friction

from the shutoff cable in the control system. The music wire bits are .047" diameter, and the tube is 3/32" OD. The shutoff cable can come out on top or bottom, depending on the shutoff used. If you are not going to install a shutoff, obviously you can omit this linkage.

**"MOCKINGBIRD" SUPER SLOW RAT FUEL TANK**  
**Bill Bischoff**

In this article I will describe the tank design I use in Super Slow Rat. This tank has several attributes which are quite desirable in racing. First, even though this is a uniflow tank, it is not necessary to cap the overflow for flight. Like any uniflow tank, the fill/vent tube is positioned so it will be covered by the fuel until the tank is almost empty. Since this tank is wider at the front, the vent tube is located in the front outboard edge of the tank. Traditionally it would be at or near the bottom of the tank, but more about that a little later. Notice that the overflow tube also goes to the front outboard edge of the tank. Obviously, if it is to be the overflow, it needs to be at the top of the tank, but the fact that the overflow is also at the most outboard point in the tank, it acts as a "second" uniflow vent. Therefore, it is not necessary to cap it. However, it is essential that the ends of both the fill/vent tube and the overflow tube be above and inboard of the tank to prevent fuel siphoning. A quick look at the tank installation photos should make this clear.

**SUPER SLOW RAT FUEL TANK**  
**1.06 Oz.**

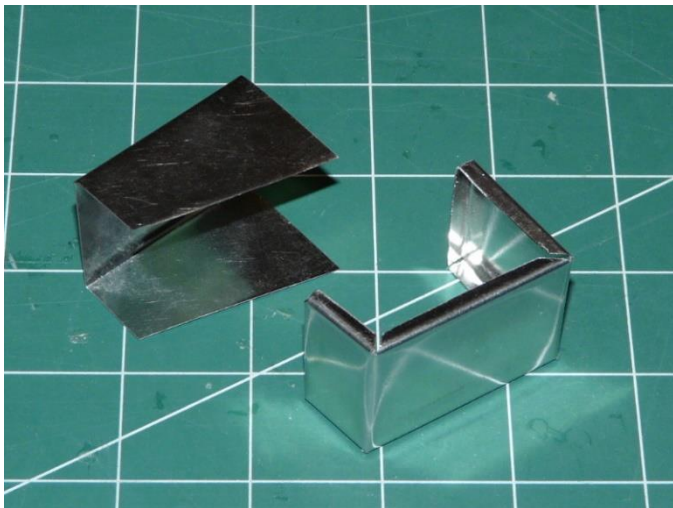


Fold on dotted lines  
Install tubes per text  
and photos



This tank can "act" like a smaller tank when you need a specific amount of laps. For example, Super Slow Rat requires two pitstops in 100 laps, and shutoffs are not allowed (except for emergencies). This means you need between 33 and 50 laps per tank. You don't want your tank to be too big OR too small, but if anything, a little too big is better. Let's say you are getting 55 laps. With this tank you have a way to partially fill your tank repeatably to the same amount, and not compromise your normal starting routine. Look at the picture of the tank on the Super Slow Rat. Notice that the fill/ vent tube is installed about half way up the front outboard edge of the tank, rather than near the bottom of the tank. In "normal" operation, the height is unimportant. But what happens when you fill the tank through the OVERFLOW? Once the fuel in the tank gets up to the level of the fill/ vent tube, fuel squirts out of the tank just as if it were full. This means you can get a full tank of fuel, or a predictable, repeatable partial load of fuel just by deciding which tube to squirt the fuel into. Then, all you have to do on race day is see how many laps you get on a full tank and how many laps you get on a short tank. Let's say 55 laps and 30 laps. If your pit man can do some simple math in his head, you can always get the right number of laps and pit stops. (In this case, you could do 30/30/55 laps.) If all that makes sense to you, then let me back up a bit. Because your airplane sits tail down, the back end of the tank is always lower than the front. To get a true half tank of fuel, the fill/vent tube needs to actually be lower than the center of the tank at the front., maybe 1/3 of the way up. I also recommend putting short pieces of two different colors of fuel line on the fill and overflow tubes for easy identification during the race.

OK, now that I have covered the basic concepts, let's talk about building one of these tanks. The size and shape of this is what I have found to work well for the Brodak 25 engine. Other engines may need something different. In any case, the objective is to get the outside edge of the tank about 1/2" outboard of the needle valve. This gives a good ground setting AND a good air setting.



The tank body is constructed of two parts as shown. I build my tanks out of K&S easy solder tin plated steel from the hobby shop (K+S 254). I use regular rosin core tin/lead electrical

solder, and extra paste flux as required. Note that all the tubes end just inside the tank where they are installed. The tank mounting plate is simply a rectangle of the same metal the tank is made of, soldered to the inboard side of the tank. When bending the parts, I bend them around a 1 1/4" wide metal ruler. This gives me consistent size and assures parallel bends. Be sure to pressure test the completed tank for leaks, then flush the tank with dope thinner to remove any particles or soldering flux. The last thing I like to do is flush the tank with fuel so the inside of the tank gets a light coating of oil. The tank is typically mounted with #4 x 1/2" sheet metal screws. In some installations, the landing gear mounting bolts also serve as the rear tank mounting bolts.



The Finished Fuel Tank Mounted On a "Mockingbird" SSR.

### CONTEST CALENDAR

**NOTE! Confirm all contest details with Contest Director!**

**NCLRA cannot be held responsible for errors or omissions!** This calendar is compiled from data collected at the NCLRA website [nclra.org](http://nclra.org). and other published sources. Members can log in to [NCLRA.org](http://NCLRA.org) and submit contest details.

#### **NORTHEAST DISTRICT**

None

#### **NORTH CENTRAL DISTRICT**

None

#### **NORTHWEST DISTRICT**

None

#### **MIDWEST DISTRICT**

None

#### **SOUTHEAST DISTRICT**

None

#### **SOUTH CENTRAL DISTRICT**

None

## SOUTHWEST DISTRICT

### 2017 Whittier Narrows Racing Contest Calendar

Whittier Narrows Park, S. El Monte, Ca., 34.042737, -  
118.070392

Dec 2-3

#### TOYS FOR TOTS Speed, Combat and Racing

All speed events including electric, 301-310 & 334,335 + perky & NASS Sport Jet & C Speed, Torquette Speed, Hollow Log Speed.

Combat: 75mph slow, F2D fast

Racing Sunday only: SCAR Goodyear, NCLRA Clown & Super Slow Rat/Fox Race and Quickie Rat, Musciano Log Racing  
Entry fee: 1 new unwrapped toy, approx value \$10-\$20.

**CD & Racing ED: Charlie Johnson**

NOTES:

1. **Contact CD or ED to confirm contest dates before traveling long distances.**
2. All Racing events Sunday only
3. Same four Racing events each contest
4. Clown will be flown on 60\2019 lines per NCLRA NATS rules
5. Other Racing events may be flown if two entrants show up ready to race
6. Combat and/or Navy Carrier events may be added to some contests.



The Business end of Doug Mayer's New "Retro Baby" Fox Racer. Note the Generous Cheek Cowl to absorb the Fox .35's inevitable vibration.

## NATIONAL RECORDS

SLOW RAT (.25 engine)

Op (70 laps) 3:01.52 Jim Gall/ Les Akre 7/04/11  
(140 laps) 6:17.59 Russ Green/ Bill Lee 7/07/09  
(no Jr or Sr record)

½ A MOUSE 1

Jr (50 Laps) 2:37.57 Scott Matson 7/15/99  
(100 Laps) 5:17.68 Scott Matson 7/17/99  
Sr (50 Laps) 2:44.68 Dave Rolley Jr 7/15/99  
(100 Laps) 5:20.11 D.J. Parr 7/16/98  
Op (50 Laps) 2:12.3 Jim Holland 7/16/04  
(100 Laps) 4:22 Ryan & Gibeault 7/15/99

½ A MOUSE 2

Op (70 Laps) 3:01.24 MacCarthy/Kerr 7/11/03  
(140 Laps) 6:18.13 Whitney/Hallas 7/10/09

SCALE RACING

Jr (70 Laps) 2:50.65 Bob Fogg III 7/16/91  
(140 Laps) 6:08.55 Bob Fogg III 6/23/92  
Sr (70 Laps) 3:15.12 Doug Short 7/11/00  
(140 Laps) 5:40.05 Bob Fogg III 7/11/95  
Op (70 Laps) 2:39.38 Willoughby/Oge 7/15/97  
(140 Laps) 5:33.04 Bob Fogg Sr 7/16/91

F2C TEAM RACING

Op (100 Laps) 3:42 Fisher/Wilk 7/13/15  
(200 Laps) 6:43.32 Fisher/Wilk 7/16/12

F2CN (NCLRA RULES)

100 Laps 4:14.84 Bill Lee/ Russ Green 7/07/11  
200 Laps 8:37:10 Wallick/Brozo 7/15/13

NCLRA "B" TEAM RACING

Op (35 Laps) 1:24.34 Burke/Duly 7/12/05  
(70 Laps) 3:05.73 Green/Lee 7/10/09  
(35+70 Laps) 4:33.91 Green/Lee 7/10/09  
(140 Laps) 6:08.80 Green/Lee 7/10/09

RAT RACING (.15 RULE)

Op (70 Laps) 2:44.6 Jim Holland 7/15/04  
(140 Laps) 5:33.1 Jim Holland 7/15/04  
Jr-Sr No record established

NCLRA FOX RACE

Jr (100 Laps) 5:57.11 Scott Matson 7/11/99  
Sr (100 Laps) 5:28.09 Scott Matson 7/16/02  
Op (100 Laps) 5:32.55 Tim Stone/Bob Oge 7/10/05

NCLRA CLOWN RACE

Op (7 ½ Min.) 150 Laps Bischoff/ Lee 7/15/15  
Op (15 Min.) 284 Laps Bischoff/Lee 7/15/15

NCLRA TEXAS QUICKIE RAT

(70 Laps) 2:58:72 Bill Lee/Bill Bischoff 7/18/13  
(140 Laps) 6:07.01 John McCollum/Bill Lee 7/14/05

NCLRA SUPER SLOW RAT

(100 Laps) 5:14.30 Bill Lee/Russ Green 7/05/09

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Includes stock muffler and carburetor.  
Requires venturi and needle valve assembly.

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1/4" ID, 4mm spraybar, fits 10mm hole

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Edges pre-rounded.

**wheels and axles \$6.00**

1 1/4" Williams Bros. wheels, 1/4" axles

**1/4" axles w/o wheels \$2.00**

With hardware- requires 1/4" hole in wheels

**1 oz fuel tank per Margaret June plans \$20.00**

**bellcrank button kit \$2.00**

includes hex buttons, eyelets, screws

**fuel shutoff trigger wire \$1.00**

per Margaret June article

**fuel bottle with fill fitting 8 oz. \$10.00**

**16 oz. \$11.00**

**Deluxe fuel bottle w/spring valve 8 oz. \$14.00**

**16 oz. \$15.00**

**racing handle, 3" spacing \$25.00**

metal frame, wooden grip, stainless cable  
(other spacing available by request)

Shipping \$10.00 for orders with engines / \$7.00 per order including fuel tanks  
or bottles / \$3.00 per order without fuel tanks, bottles. I accept paypal or  
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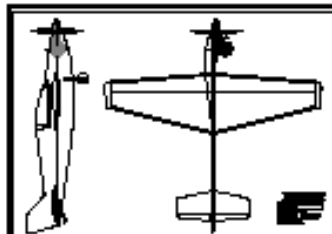
Paypal: [billbisch@hotmail.com](mailto:billbisch@hotmail.com)/ Mail checks to William Bischoff, 1809  
Melody Ln, Garland TX 75042. For questions, call (972)840-2135 or email  
[billbisch@hotmail.com](mailto:billbisch@hotmail.com)

# **MAYER AIRPLANE DESIGN ( MAD! )**

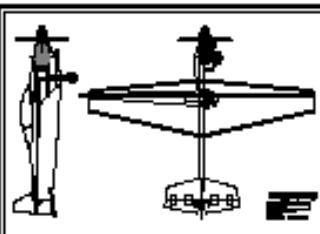
These drawings have been developed over many years, and some drawings have more details than others. I am happy to send multiple .PDF's (some with more notes and details) to be used as a guide for plans with less information. All plans are accurately scaled per AMA rules, and all stabilizers have been increased + 20% to 25% as allowed by the rules. Everything is ready to go.

All .pdf plans are FREE! email me at douglasmayer58@gmail.com, all plans are set to print at 30" x 42" full scale drawings, You will need access to a full size printer, such as kinko's, or your local reprographics shop (blueprinters) – Cheers!

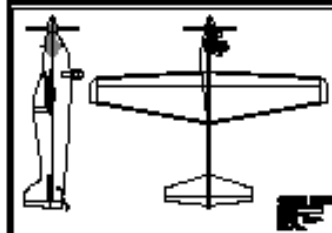
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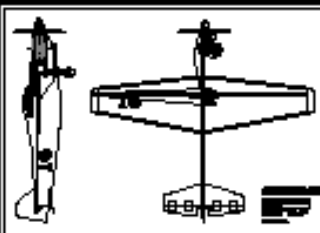
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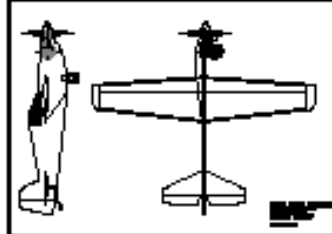
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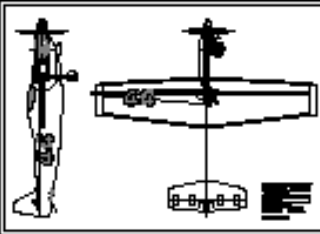
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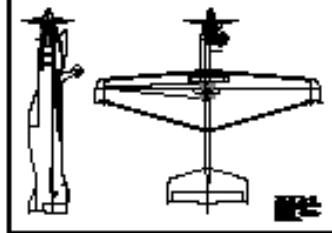
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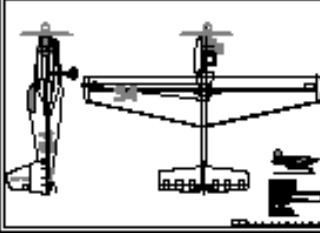
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detailed plan



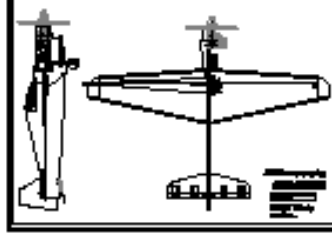
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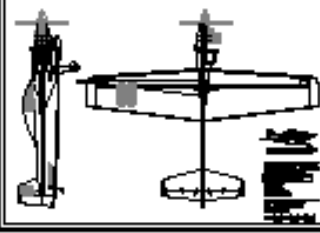
**CINNY**  
Jim Holland  
detailed plan



**OUTRAGEOUS**  
detailed plan



**KNOTTY GIRL**  
Bill Bischoff  
detailed plan



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