Tech Tip-015b
Micro Techniques for 1/8A NAR events:
& some Special Sport Flying Micro Models.

1/8A NAR events have started to spring up all over the country. Now we need to come to grips with some of the minor differences between building and flying standard 13, 18 and 24mm models and the new challenges of micro bodies, lighter weights, very tight spaces, reduced volume ejection chargers and tiny motors with only 1 or 2 very short delays.

Materials and parts:
Most of the Parts shown in the photo above are available from several sources: Quest Aerospace, Totally Tubular, A.S.P., Balsa Machine Service and our #1 micro parts source www.Fliskits.com.

*Clear payload section:* Polyethylene mailing tubes or packaging tubes in several sizes close to current paper tube sizes are available from McMaster-Carr Co. and other packaging supply stores.

*Fin material:* Can be as diverse a set of materials as you would like them to be. 1/64” and 3/64” 3-ply plywood, 1/16” and 1/32” basswood, .010”, .020” and .030” clear Polycarbonate sheeting, as well as .005” to .020” Fiberglass sheeting, Waferglass or G-10. Fins can also be fashioned from folded paper or plain old cardstock.

*Body tubes:* Some believe custom formed Fiberglass or Mylar bodies are the best for competition bodies. Others use drafting vellum or tracing papers. Still others use currently available .013” wall craft tubes. Airframe material choice will depend on what event is being flown and which materials we are most comfortable using. Sometimes a rolled bond paper custom tube may be just as efficient as anything out there. Whatever the choice don’t be afraid to experiment.

*Motor retention:* Motor stops can be made with a 3/16” section of T-2 (.246”) diameter body tube, or a custom hook can be fashioned from a paper clip (way to thick but it does work”) or .022” music wire. No motor retainer at all can also be used if the model is set up for friction fitting the motor with small strips of masking tape. It is also a good idea to allow at least 3/16” of the motor tube extend below the fin set to allow external as well as internal taping of the motor to the tube. Ejecting the motor is still an instant DQ.
**Nose Cone & Transitions:** Currently Pratt hobbies has an excellent selection of 10.5mm, 13mm and 18mm 2 piece very light weight vacuum formed styrene nose cones. Fliskits has a complete line of balsa micro Nosecones and Transitions to choose from. Some custom cones can be ordered from Balsa Machine Service. Turning your own isn’t that difficult with a lathe or even an electric hand drill. Most common materials for turning are: High density foam, Basswood, hardwood dowels and fine grain hard balsa for T2, T2+, T3, T4, 13 and 18mm models. Straight conical cones and transitions can easily be made from velum or tracing paper with Styrofoam plug shoulders.

**Centering Rings:** In the photo several black fiber centering rings sets are shown. These are all Totally Tubular items. Currently [www.Fliskits.com](http://www.Fliskits.com) & Balsa Machine may be the only two sources for die cut centering rings. They are well made excellent parts. Cutting your own in these small sizes can be a rough task. A good deal of patients and loads of throw away mistakes will result.

**Launch Lugs:** To lug or NOT to lug, that IS the question: Pop-lugs, Piston launchers, Tower launchers are generally viewed as the best method for competition models: If you do want to use permanent launch lugs several material will work. Fliskit now offer excellent Micro Launch lugs in several lengths. Very thick & heavy ink tubes from some pens can be used, bargain brand “Q-tips” have a hollow plastic tiny tube stem that work well, coffee stir sticks, Evergreen has a styrene 3/32” tube that can be used, or Plastruct 1/16” tubing can be drilled out to accept a .050” rod. In any case it’s better to use two very short 1/16” or smaller lugs than one long piece. Try to place the forward lug at or neat the CG of the model while tucking the other in a fin/body joint.

**Shock Cords:** Above are several examples of Kevlar lines that have proved to be very helpful. Kevlar lines alone without elastic have proven the longest lasting shock cords for micro models sport or competition. 24” to 30” beyond the forward end of the body seems to be the best length to ensure the nose and body remain attached. Pratt hobbies offer two products; SL1 and TKMB microbraid. Both are rated at 100lbs Microbraid is more supple and easier to work with. Overall braided Kevlar lines seem to hold up longer than twisted Kevlar lines. Other good source for Kevlar are The Thread Exchange [http://www.thethreadexchange.com](http://www.thethreadexchange.com) & [http://KevlarStore.web.com](http://KevlarStore.web.com)
**Chute Materials:** 1/4mil Mylar seems to be the best for competition cutes regardless of model size. 3” to 28” have been attempted in micro models with varying degrees of success. For the average modeler 10” or 12” seem to hold the best chance of successful full deployment. Below is a pictorial of one method for preparing 12” or under chutes. This is NOT the only way to pack a chute but it is one way that has worked well over time. Do not pre-pack micro chutes, even overnight may be too long for them to stay in these tight tiny tubes. Be sure to baby powder micro chutes well along with the interior of the body tube. Always use ejection plugs.
*Streamer Materials: Several materials are available for streamers: Crepe paper, tracing vellums, 1/2mil & 1mil Mylars. Widths of 2” to as wide a 6” have been attempted in micro models.  1/2” to 3” would seem to have the best chance of deployment.  I would suggest smaller and lighter streamers for higher deployment with faster decent, or wider and heavier for the possibility of lower (slower) decent rate?

Folding of streamers is one of those things that seem to defy the comprehension of most, myself included.  I once watched a couple folks on the field, fold and roll a 10in x 100” 1mil Mylar streamer tight enough to fit and deploy from a 13mm model.  I’ve NEVER been able to get a ½mil Mylar streamer of the same size in anything smaller the 18mm no mater what I tried.  Creasing and folding streamers is as much an ART as anything.  These competition streamers will be a tough trick for most of us.  As with competition chutes, competition streamers should always be powdered and flown with an ejection plug.

For nearly all scale and sport micro models permanent Teflon Streamers serve as both recovery system and wadding.  Below is a photo of the various types available on 43foot rolls.

* Helicopter and Glider Materials:  One of the other materials not discussed are spars for Flex-Wing gliders.  There are at least two types are spar material that work very well for micro flex-wings.  First is .022” stainless music wire.  Plain steel .022” music wire can also be used but rusts and weakens over time.  A full 12” long piece can be used to form a single (flex-wing skeleton frame) with 1/4mil Mylar as the covering.  An alternative is .030” or .050” carbon fiber rods available through several sources.  These rods are cut and attached to formed standard .022 wire springs with Kevlar thread and CA, making the overall assembly slightly heavier.

BG and RG models are constructed of the same contest weight balsa as their larger standard size brothers.

Micro helicopter models present a few other challenges, hinges and rotor attachments to name just a few.  Standard Rotaroc and Rose-a-rocs have been successfully produced using standard tubes and 1/16” contests balsa as rotors.  See the plans section for a simple 1/8A Rotaroc that will qualify in any competition.
“Igniter & Igniter Holders:” Much has been written about the difficulty getting good motor starts with the old “plug” style Quest Micro-Maxx igniters. Most of these stories concern the 9V battery powered silo launchers originally supplied by Quest with the “little Plastic Bricks” as Mr. Stine likes to refer to the made in China models he was never happy with. Just about any 12 volt launch system will light these igniters very well. Holding the plug can be a bit tricky but is easily remedied with a clothes pin or two.

Method one: Most Clothes pins spring eyes will slip easily onto a standard 1/8” launch rod. The clothes pin jaws will hold the igniter while a second clothes pin placed under the first on the 1/8” rod can hold a Micro-Maxx .049” diameter launch rod. Swivel the rod with the model to a position where the model will slide onto the igniter. Placing a 1/4” Z bend in the base of the .049” diameter rod makes this process even easier.

Method two: Remove the igniter for the plastic plug. A pair of pliers will easily separate the plastic plug halves. Lift out the igniter and remove most of the tape form the heavy .030” leads. Insert the igniter in the MM-II motors with a small piece of wadding. This will allow connection with standard micro clips as long as the wiring is supported.

Method three: In the photo above you can see the bare Ni-chrome wire igniters I’ve used for the last 15 years. They are .030gauge Ni-Chrome wire bent with a 1/4” to 3/8” double back and attachment leads where the entire igniter is less then 2” in overall length.

On the lower right of the photo above you can see the New Quest Q2 igniters. Quest recently released this new igniter for sale. Q2 igniters will fit any motor from Micro-Maxx and up. Care must be used while inserting these bare Nichrome igniters to make sure the fine wire leads above the glass bead do not touch which will short the igniter. Dipping Q2’s in home-made or kit pyrogen make the Q2 a great Micro Cluster igniters.

An easy slide over Micro model launcher can be made form a small wooden block to hold a micro launch rod with a 1/8” or 3/16” hole to slide over a standard launch rod to hold the model and a single clothes pin to hold an old style igniter plugs.

Another option could be a standard 1/8” x 1-1/2” launch lug glued to a 1” x 1” x 1/8 inch square of Balsa, or a spent 18mm motor casing with a slot or groove cut to hold the igniter plug and Z-bent Micro launch rod. The whole thing slips onto a standard launch rod.

At most Narhams launches there shouldn’t be any worry about micro Launchers as there will be a least two Add-ons in System-1’s utility box, and the author has micro launchers floating around for everyone’s use.
Here are a few examples of the various ways of launching Micro models. Some very easy, some require a little more work. Pop lugs are by far the easiest way to eliminate those drag laden launch lugs.

Pistons are a good bit fussier but do help use those first few fractions of a second of propellant.

Tower launchers: much more of a challenge to fabricate, but are far easier to work with on the field.
McCoy’s Micro Wonder Works
Micro-Maxx Deltie Boost glider Model #212

Original Design by Robert Edmonds Down Scale: By John McCoy Sr.
Drawing Complete: 08-05-99
Model Complete: 08-07-99

Boom .0625” x 5.5” x long Basswood

1 inch square

3 piece laminated 1/16” basswood Pod pylon
McCoy's Micro Wonder Works
Micro-Maxx 1/8 - 1/4A Flex Wing Boost Glider

Micro Competition Plan

Scale: Full Size  Duy Complete: 09-06-99
Model No.214:  Completed: 09-08-99  Ewt: 4.13g

.020 Stainless steel Fins are Spring (must have 2 complete turns of wire)
.020 music wire will work but rusts.

4.25" Flex Wing Glider
Full Size - weight 1.0g

.020" stainless steel spring
4-1/4" long spar with eye
4" long Center spar soldered to center

Bend up 5 Degrees +/-

Flex Cover of 1/4mil mylar or Drycleaner bag.

Always fly fliers with a stroopm ejection plug.

Booster Overall Length: 4.75" .28" .38"

1 inch square
McCoy’s Micro Wonder Works
Micro-Maxx - 1/8th & 1/4A- Parachute Duration
Competition model designs 216 a b and c

Scale: Full Size
Drawings Completed: 10-10-99
MM-234a/P/D - Completed: 10-30-98
MM-234b 10.5/7mm P/D - Completed: 11-06-99
MM-234c 10.5/7mm TaperPaper P/D - Complete 07-04-02

1 inch square

Sail

4.0" o.a. length

.75"

.375"

.75" x .75" (Make 3)
.015 washer glass

1.3125"

7.4375" (7.116") O.A. Length

4.0" .4475" (10.5mm) tube

3.375"

.125"
McCoy’s Micro Wonder Works
Micro-Maxx 1/8A - 1/4A Competition Streamer Duration

All are Pop Lug, Piston or Tower Launched.

MM-217a 7mm S/D - Completed: 10-30-99
MM-217c 10.5/7mm S/D - Complete: 11-16-00
MM-217b 10.5/7mm TaperPaper S/D - Complete: 07-17-02
McCoy's Micro Wonder Works
MM #218 - 1/8A Super Roc - Competition Plan
Maximum Length: 25cm (9/8125")
Scale: Full Size Drawing Complete: 10-10-99
Model Complete: 10-20-99 E.Wt: 2.9g

1 inch square

Over All Length: 25cm (9.84375)

4" X 23/8" BODY TUBE

.75" dia x 118" Motor step & shock cord anchor

30° 706 Kevlar Shock cord

.75" x .9" Tygon tape Streamer

Full Size Fin (Make 2)
.015 fiberglass .044" Phenolic
McCoy’s Micro Wonder Works
Micro-Maxx Model #219-2a & 3a (2x1/8A Cluster Altitude EXP)

Scale: as Noted: Dwg Complete: 08-22-04, Model Complete: 2a: 01-25-05, 3a: 09-05-04

1 Inch Square

.001” Kapton
Ablative 752 deg.
Cover (make several)

Vellum Shroud

Three fin placement 3a & 3a

OA Length 10.375”, Drawing not to scale.
McCoy's Micro Wonder Works
Micro-Maxx PeeWee Payload altitude/Duration

Competition model for Payload events using 6mm x 2.1875" 7.1 gram (1/4oz) Lead fill payload
Model 221b - #364a-Design complete:07-01-04 - Model complete:07-02-04

1 inch square

6.375" long

3.75"

4.0"

2.0"

MM 364a1a: PeeWee Payload-1.
1st model w/ 7.1g lead filled 2" long payload.
Dia 281" x 6.625" w/ 3/4" x 12" streamer.
Model Ewt: 3.0g
Payload: 7.1 g
Motor: 1.1 g
LOWt: 11.2 g Date: 07-02-04

5/8" Make 5/16"

.010" wallglass.

Streamers
Option.

5/8"
McCoy's Micro Wonder Works

MM 222b PaintBall Lofter

1/8A replacement for Egglofting, Paintball lofting

Design Complete: 07-06-04 - 1st Model Complete: 07-07-04

1 inch square

Button Quail Egg
.75" x 1"

Paintball
.68" dia.
3.2g

30" - 50 to 70lb
Kevlar
Lariat-loop

Pratt Hobbies
PNC-20c Ogive
or 20a Parabolic
Vacuumformed .020"
Styrene NoseCone
PNC-20c .736" x 2.25"
PNC - 3:1 Ogive

T-3 to T2+
C Ring

Make 3
1" x 1"
.010"
Waterglass
McCoy's Micro Wonder Works
Micro PCS Spot Lander: Model #228

Drawing completed: 08-02-00, Micro Model Completed: 08-18-00
Dia: .736", O.A. Length: 3.8125", Fin Span: 1.7656", Ewt: 8.9g

Original BT-60 model Designed by Paul Conner mid 1970's, O.A.Length 10.5" Dia 1.637"
Based on BT-60 Sentinel #1987 Kit 1.637" x 9.25" Nose cone with added 1.5" of BT-60 tubing.

* Body: .736" x 3" "Estes" PNC-20 Nose cone with .5" shoulder
* Motor Pod Tube: .281" x 2.0"
* Fin Can body tube: .736" X .5625"(9/16" Long)
* Rear bulkhead: .281" X .710" X .020 cardstock
* .236"(6mm) X 1.5" motor stop/forward tube reinforcement.
* Nose piece:.5" X .4475" tube with .125"basswood aluminum clad insert cap
* 70 lb Kevlar imbedded in Epoxy outside 10.5mm cap.
* tied to motor Pod balance point.
* 70 lb Kevlar Recovery device anchor loop tied to pod balance point.
* Use either 5" "Drag ring" chute or 1" x 18" crape streamer.

Full Size

PNC-20, .736" x 3.0"
Here we are in the first year of the new millennium. Now would you have believed our hobby/sport would still be around and kicking. We’re still here; but is becoming more difficult to find and keep suitable launch fields, especially on the east coast. For several years now it seems our hobby has been going in the wrong direction with larger & heavier models and motors in an ever shrinking real estate environment with government new regulator pressure looming ever nearer and tighter.

We’ve found a great way to have fun building, flying and promoting our hobby to the public in a less than gigantic format. In 1999 Quest Aerospace introduced the (Micro-Maxx) series of ready to fly, tiny all plastic models and the 6mm x 26mm .20 Ns. Micro-Maxx motors.

This started a complete rethinking of our modeling priorities. We began a quest (No pun intended) for parts and methods to convert our Micro-Maxx system to accept a wider range of size and type of Micro Models. We then began the hunt for modeling parts and supplies. Great news! We have all the stuff anyone needs to build models around the .281” O.D. / slightly over 7.1mm Micro-Maxx airframe and models up to about 17.8g have been flown to date. True my 1/65th PMC Lacrosse at 11.6g only reached about 12 feet but it worked, even flying from its truck bed launcher.

We have been working to produce a complete range of competition model rockets based on the .281” body tubes. The fleet now included designated 1/8A-1: Parachute duration model w/ 8” Mylar chute & Pop-lug. Streamer duration model w/ 2” x 24” streamer & piston launcher, 25cm SuperRoc, JellyBean “Egg” lofter, Night Flight 2000 - Led Payload model, Micro-Rose-a-roci Helicopter duration model, Micro PCS - Spot lander, 2, 3 & 4 motor Cluster Altitude models, Micro-Deltie and Ivey pop pod Boost Gliders, Micro- Nomad Rocket Glider, 90 and 110 degree Micro flex wing gliders, five Scale and Sport Scale project, 1:124th Bomac, Pratt Hobbies D-Region Tomahawk, Polaris-UGM-27, Pegasus and Arcus. Odd-Rocs include Frosty the Snowman, an Icicle theme rocket, a tiny flying 2x1/8A cluster “Scope mouthwash” bottle and a tiny Strawberry Extract Bottle. Plastic Model Conversations include a 1:40 Army Lacrosse which flies for the mobile 2-1/2 ton truck launcher, 1:40 AeroBee-Hi and several of the 1:200 AMT-Man in Space Collection. That should cover the entire gambit of NAR competition events. This set will allow us to do an entire model rocket presentation / demonstration in a parking lot setting at ANYTIME without worry about the size of the field, clearance or waivers. Most of these models have been flown at the clubs usual Middletown Park, MD launch site, turning in some impressive times.

As for Model - Model Rocketry we have been down sizing all of my favorite “Classic” models. This set now includes a .281” dia. Orbital Transport & gliding Orbiter, 13mm/7mm Mars Snooper, 13.mm/7mm Laser-X, 10.5mm Explorer Aquarius, 10.5mm/7mmCherokee-1/8A, 10.5mm Ram-Jet, Goblin, Der-Red-Max, X-Ray payloader and SkyDart glider, 7mm “The Point”, Nova Payloader, Warp-II 2-stage, and Hercules-2 stage. we now have a 30 model fleet that should interest and impress any group, weather a static or flying demo.

We have also recently completed a 6 position 36” long launch rack with controller that mounts on a camera tripod. All these gismo’s give us the ability to give a very through and interesting demonstration within the confines of very small surroundings.

Down sizing your favorite models is a little tedious and does take a bit a planning to convert tiny details to tinier part, but it is a challenge and sure beats having to buy expensive and now harder to get, scarce parts. Another Plus for downsizing is STORAGE: Instead of the 10” x 10’ 12” shed that is crammed with my regular and L.M.R. size models our entire 30 model collection is housed in a 9” x 10-1/2” x 20” plastic tool box with a 4” x 6” x 10” plastic box inside used only to house the PMC lacrosse on its scale duce & a half army truck launcher.) I can’t imagine where you HP guys store your rockets. I can’t see any down side to Modeling Micro Model rockets.
Here's how to get started:
* Buy a Micro-Maxx Starter set around $16.00 at Toys R Us. Ask about replacement motors. If we don’t ask for them, they won’t stock them!
* Convert the system to 12v by adding two 2/56” x 1/2” R.H. machine screws to the contact plates and projecting them to the outside of the launcher base top. This allows you to keep the internal hand controller at 9v or use regular micro clips from an external 12v system to connect the machine screws to the special igniter plug-ins.
* Convert a burnt igniter plug-in to a standard, solid wire micro-clip whip. Now you can use regular 30ga. NiChrome wire as igniters.
* Contact Totally Tubular. Buy a few 6mm, 7mm and 10.5mm body tubes. Ask around at meeting if anyone wants to go on a tube purchase order. Bulk orders save money and shipping.
* Buy and/or cut down some of your 1” x 1” x 12” basswood stock to 3/8” and 1/2” Squares for use in making nose cones. VHD Foam can also be used.
* Coffee stir sticks are great as launch lugs. Sand them well before you try to CA or Epoxy them in place. Or (Roll Your Own) form two strips of .110” wide laser paper on a .050 steel music wire mandrel. Thanks again Mark Petrovich for the tips on rolling tiny tubes.
* .030”, .020” and .015” styrene is great for fins as well as .10 wafferglass and .010” calandered Lexan (Polycarbonate), 1/64th plywood, and sanded .063”(1/16”) bass and balsa will also work on some of the “larger” models.
* Use 50 to 70lb Kevlar as your shock cords 24” to 30”. No added elastic, you don’t have the room.
* Use 3/4” plumbers Teflon tape as permanent wadding and/or as the models Streamer.
* If you are going to fly gliders or models larger than 5” long, buy a .041” Stainless Steel, 24” long launch rod. You need the extra length and Stiffness for gliders and larger models.
* Decals can be made by Papa Tango, or myself. You can also print of special inkjet papers though I can’t tell you how they will hold up.

Finally: Have some FUN building is what we do to get to the flying! By building Smaller, one can be challenged by the “Scale” factors and take pride in the accomplishments of converting projects to the smaller size.

News about Micro-Maxx motors:
We just received conformation from NAR - Standards and Testing the new Mirco Maxx-II motors have been Safety and Contest certified though some paperwork remains to be completed. Micro-Maxx II are the same 6mm x 26mm in a cardboard casing with .35 Ns power with a .5 to .875 second delay. This could make thing in the competition world very interesting in the next year or so.

I Hope to see more of you our there flying these smaller and challenging models in the near future.

Keep um Flyin’ -DOWNSIZED
John & Paul
Team 255 - The Grumpy Old Men