MASA PLANET

September - October 2010
Volume 13, Issue 5

The Official Newsletter of the
Minnesota Amateur Spacemodeler Association
Established January 1998
2006 and 2007 NAR Medium Section of the Year
Host of NARCON 2007 and NARCON 2008
2008, 2009 and 2010 LAC Newsletter Award Recipient

NAR Section 576

Planet Table of Contents

Biggest Issue Ever!

MASA Planet Hat Trick

MASA Planet Wins LAC Newsletter Award!

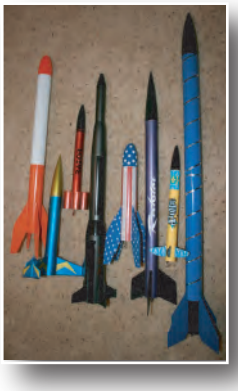
At the NARAM-52 Awards Banquet, *Sport Rocketry* Magazine Editor Tom Beach presented the LAC Newsletter Award to the MASA Planet. The award is presented to the NAR section that has been judged to have the best section newsletter over the past year. Part of the coveted award is the 42 year old traveling North American Rockwell Trophy and the legendary Secret Annex Box, whose contents are only revealed to winning sections. This is the third year in a row that the MASA Planet has won this award!

THANK YOU TO ALL THE MASA MEMBERS WHO HAVE CONTRIBUTED TO THE NEWSLETTER'S SUCCESS OVER THE PAST YEAR!

MASA Pays Forward at NARAM-52

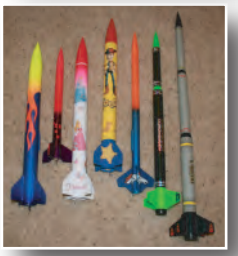
MASA Fi/Ti Rockets Rock

I'd like to offer a HUGE thank you to everyone who donated rockets for the NARAM 52 Fly-it/Take-it event! It was an overwhelming success!!! MASA has supported the NARAM FiTi event since it began 3 years ago. Club members donated 10 rockets to the first FiTi event and 36 rockets to the second FiTi event. This year, I issued a challenge for the club to meet last year's donation amount... I'm thrilled to report that we donated 50 rockets to this year's event!!!



As always, the rockets were very nicely done. Each rocket got its very own information sheet, which listed the rocket name, manufacturer, suggested engines, the builder's name and email (or the club's email address), and our club web address.

Although the FiTi event was advertised for Saturday and Sunday, the organizers did a fantastic job of offering FiTi rockets to any younger person they saw at the launch site throughout the week. I saw at least a few kids launching rockets that I recognized as our FiTi donations.



Again, thank you very much for your support!

Carol - MASA President and FiTi Coordinator

MASA PLANET

Future Launch Vehicle

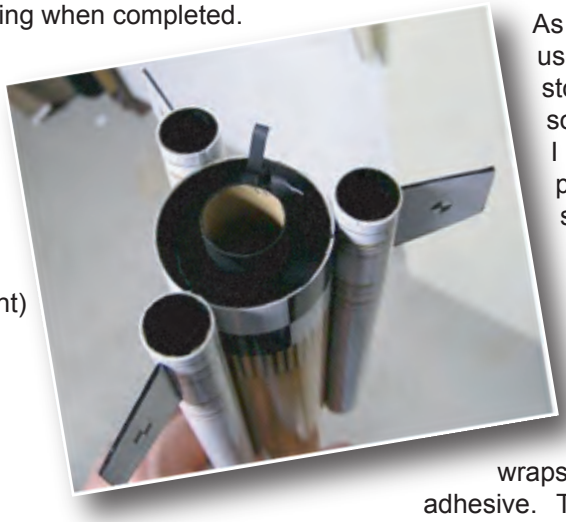
Quest Aerospace Kit Review

By Ray King

This is a single-stage sport-scale model of a conceptual heavy lifting NASA vehicle. It features beautiful, highly-detailed wraps and is quite striking when completed.

Component List

- 18” White Body Tube
- Blue Thrust Ring
- Motor Clip
- Yellow Motor Mount Tube
- Die-Cut Centering Ring
- Launch Lug
- ½ oz clay (Nose Cone Weight)
- 3 - 6” White Booster Tubes
- 3 - Booster Shoulder Tubes
- 3 – Booster Nose Cones
- Main Body Nose Cone
- Kevlar Shock Cord
- Elastic Shock Cord
- 14” Parachute
- 6 - Gripper Tabs
- 3 – 26” Shroud Lines
- Fin Core Sheet
- Lower Body Wrap
- Upper Body Wrap
- 3- Booster Body Wraps



This unusual rocket had some fit issues that aren't inconsistent with other Quest kits I've assembled. The instructions are fantastic, well thought out and illustrated, as we expect from Quest. The only issue I experienced was the kit was missing the Fin Core Sheet so I had to improvise. The rocket features three 'booster' pods spaced equally around the 40mm tube. These have the appearance of SRBs from the Space Shuttle. This kit has some unusual more features: No Balsa components, preprinted wraps for tubes and fins.

As I said the fin stock was left out of my kit and so I used some 1/32 harden balsa rather than card stock. I would recommend attaching the fins is some other method than the butt joint suggested. If I had to do it again I would leave tab on the fin and put a slit in the tubes to help improve their strength.

I really like the visual appearance of this rocket also. The body wraps provide exceptional details that would only be captured in some of the best scale models.

This was also my first attempt at applying body wraps, I chose to follow the directions and used spray adhesive. The spray adhesive gives you one chance to get the wrap in place correctly. I found that the wraps overlapped slightly which required additional trimming and fitting. After some time I was able to get the wraps to nicely. Once I was satisfied with the fit, I sprayed the back of the wrap, aligned the edge of the wrap and applied the edge to the line on the tube. I slowly rolled the wrap around the tube. Once in place I used blue painters tape to hold the seam securely together.

I also painted the nose cones with gloss black adds a nice contrast. Although the wraps were a challenge it was nice not to have fill and sand the tube repeatable to get a good appearance. Essentially, apply the wrap and you are ready to fly.

As I was building this rocket, I attempted to follow the instructions exactly; however, I could not help myself when it came to booster. It seemed this was a perfect opportunity to make this a cluster rocket. I formed the engine cones and attached them to a used A3-4T engine tube that I cut into 3 equal length sections. I applied some tape to around the outside of the engine tube to make it a pretty tight fit so I could fly the rocket with the engine cones.

Continued on the Next Page...

Future Launch Vehicle Concluded

When flying as a cluster I remove the engine cones and replace them with 3 engines, applying tape around the outside of the engine until they are a tight fit. Lastly, I doubled the amount of clay I added to the nose cone to ensure a stable flight as a cluster.

My first flight was a C6-3. I used dog barf in place of wadding and the stock parachute. The rocket accelerated nice and straight with good ejection and parachute. I found that one for the fins broke off and needed to be replaced. The second and third flight occurred about a month later first one on a C6-3 and the third was a C6-5 and 3 - A3-4T's. The cluster launch was awesome, the rocket made one or two twisted under boost exactly as I image any large rocket should. The parachute ejected just after the 3 booster engines ejected – very cool effect – I just wish I was able to video tape it. Maybe on the next launch.

This is a great rocket – challenge to build, very nice appearance and allows one to push the envelope if you to chose to. Great Job --- Quest!!!!

Special Note: Thanks to my daughter for the great pictures.

Ray

MASA Directory

Established January 1998
Founding President: Russ Durkee

2010 President
Carol Marple - masarocketry@rocketmail.com

2010 Vice President
Neal Higgins - nthiggins@gmail.com

2010 Secretary/Treasurer
Jason Colt - artimus772000@yahoo.com

MASA Planet Newsletter Editor
Jeff Taylor - jeff.taylor@mn-rocketry.net

MASA Planet On-Line
www.masa-rocketry.org/planetonline.htm

Club Website
www.masa-rocketry.org

Webmaster
Alan Estenson - estenson@mn-rocketry.net

Club Yahoo Group
http://groups.yahoo.com/group/masarocketry/

2010 Meeting Schedule

Subject to Change
Check MASA Website or Yahoo Group for updates

MASA October Meeting
Thursday, October 7 - 7:00 pm to 9:00 pm
Location: Science Museum of Minnesota, St. Paul
Topic: TBA

MASA November Meeting
Thursday, November 4 - 7:00 pm to 9:00 pm
Location: Science Museum of Minnesota, St. Paul
Topic: TBA

MASA December Meeting/Holiday Party
Saturday TBD - 6:30 pm to 9:00 pm
Location: Chaska Community Center Sun Room
The holiday party will include the following beauty contests: Scale (any scale model), Kitbash (anything you've kitbashed), Kid-constructed (anything that's been built by one of our younger members, open to those who are currently 17 and younger).

2010 Launch Windows

Subject to Change
Check MASA Website or Yahoo Group for updates

All MASA Launches are "Misfire Alley"
(bring your own launch pad and controller)

MASA September Launch
Saturday, Sep 25 - 10:00 am to 4:00 pm
Location: Nowthen*
Theme: **"Walk on the Wild Side"**
Events: Deuces Wild Drag Race
Cluster Drag Race
Clusters Day
Contest: Deuces Wild Beauty Contest

MASA October Launch
Saturday, Oct 23 - 10:00 am to 3:00 pm
Location: Nowthen*
Theme: **"OddtoberFest"** (Goony rockets, Odd-rocs, Halloween-themed rockets, SteamPunk, Birdies, and anything out of the ordinary)

MASA November Launch
Saturday, Nov 20 - 10:00 am to 2:00 pm
<<One week earlier than normal>>
Location: Elk River VFW
Theme: **"Walkin' in a Winter Wonderland"** (Winter or Holiday theme rockets)

Scheduled dates and launch sites are subject to change due to weather and/or field conditions. Check the MASA Web Site or MASA Yahoo Group for up-to-date changes.

* FAA waiver will be in effect at the Nowthen Field permitting high power flights to 4,500 feet agl. Field size supports up through J motors.

Got Talent?

At the September MASA Meeting, Club Secretary/Treasurer Jason Colt announced that the MASA Badge Design Contest is returning this year! YOU can have a chance to design the MASA badges for 2011. Watch for details soon!

Contributors to this issue of the MASA Planet.... Thank You!

- Jason Colt
- Mike Erpelding
- Alan Estenson
- Art Gibbens
- Ken Jarosch
- Ray King
- Carol Marple
- Glen Overby
- Jeff Taylor
- Dave Whitaker

To contribute pictures, stories, build reviews, or just about anything, email to jeff.taylor@mn-rocketry.net

"It's a Groove Thing"

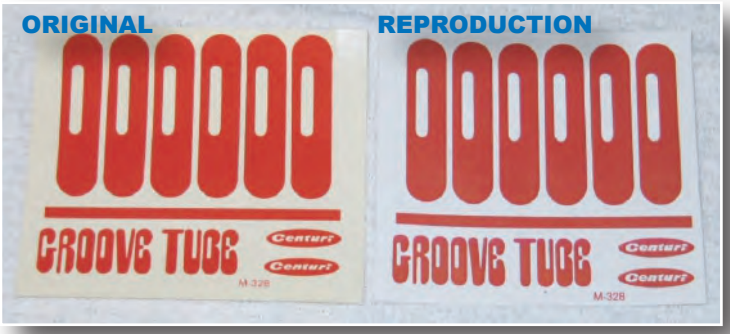
Cloning a Centuri Classic - Part 2

Continuation of Part 1 from the March-April 2010 Issue of the MASA Planet

By Alan Estenson

[In part 1 of this article, I built an accurate Centuri "Groove Tube" clone using ST-8 tubing and other components from Semroc.]

As previously mentioned, Excelsior Rocketry sells reproduction water-slide Groove Tube decals for a very reasonable $4. However, I felt the need to do things the hard way. Using Xara Xtreme vector graphics software, I took a downloaded scan from the JimZ web site as the basis for completely redrawing the decal sheet. The only challenging part was the funktastic lettering. My best efforts didn't turn up a matching typeface, so I had to draw each letter as an individual graphic. Others before me had redrawn the Centuri logo, so I was able to 'borrow" it and save time. The other graphics were simple to recreate.



Not long afterwards, an original, unused Groove Tube decal sheet appeared on ebay, and I ended up as the winning bidder. Looking at this pristine decal sheet, it became apparent that the scan from JimZ had been of mediocre quality. I scanned my "new" decal sheet and used it as a guide for drawing the decals a second time. Along the way, I learned some new tricks and ended up drawing most of the letters a third time before I was happy with them.

The proper decal color was another question. Both the JimZ scan and my ebay decal sheet were red. However, the Centuri catalog photo appeared to show dark blue decals. Of course, because I had redrawn the decals, I could print them out in any color that I wished. Since they were now in a vector format, I could also enlarge them without any loss of quality. That was a good thing because I had actually built seven Groove Tubes in four different sizes! I adjusted the scale of the decals in the drawing software, printed them onto clear waterslide decal paper using a color laser printer and then coated them with Microscale Liquid Decal Film.

In the true-to-the-original size, I actually built two GT clones. Just a smidgen larger (1.08X upscale), I built three GT's from BT-50 tubing. Going larger yet (1.80X), I built one GT from BT-60 with a 24mm motor mount; it's designed for "D" and "E" motors. Finally, I used the new Quest 50mm tubing and built the final Groove Tube (2.17X) with a 29mm motor mount. My intent was to fly it on "E" and "F" motors - even "G" if I dare.

By computing the scale factors based upon the ratio of the body tube diameters, I could calculate the upscale lengths for the main body tube, tube fins, and nose cone. In all of the upscale GT's, I ended up using nose cones that were shorter than what they should have been. To keep the overall proportions correct, I made the main body tube longer by whatever length that the nose cone was too short.

	Tube Dia (in.)	Scale Factor	Main Tube Length (in.)	Tube Fins Length (in.)	Nose Cone Length (in.)	Final Weight (oz.)
ST-8	0.908	1.000	13.0	3.0	4.6	2.1
BT-50	0.976	1.075	14.0	3.2	4.9	1.9
BT-60	1.637	1.803	23.4	5.4	8.3	7.5
Quest 50mm	1.970	2.170	28.2	6.5	10.0	14.9

To check stability, I estimated the Center of Pressure locations using both VCP and RockSim, and then chose the more pessimistic result (RockSim). Balance checks showed that the various sized Groove Tubes would all be stable with the largest planned motors installed in them. The ST-8 size clones were marginal, so I added a little lead shot to their nose cones.

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Cloning a Centuri Classic - Concluded

The original Centuri Groove Tube instructions call for a white base color with a red nose cone and blue tube-fins. This matches the early color catalog photos that I found online at the Ninfinger web site. I used Plastikote grey primer followed by a base coat of Rustoleum White spray paint. I then sprayed Rustoleum Navy Blue and Sunrise Red for the nose cone and tube fins. On some of the rockets, I switched the blue and red ends around. Also, on a few of them, I added a colored body tube band that appeared in the catalog photo but not in the instructions.

Once they were painted, I applied chrome silver pinstriping tape to match the original catalog photos. Then, I applied the waterslide decals followed by a protective clear coat of Future floor finish. I used red decals on most of the rockets, blue decals on a few, and green decals on one. Two of the BT-50 size Groove Tubes were donated to the NARAM 52 Fly-It, Take-It.

At MASA launches during June and July, the Groove Tubes started taking to the sky. So far, the 1X versions have flown beautifully on A and B motors. The 1.08X has flown on B and C motors. The 1.80X has launched on D12 and E9 motors, and the big 2.17X Groove Tube has soared nicely on an E20 and an F42.

So this brings my tubular tale to an end… except for a lingering urge to build a 2.44X upscale out of BT-70 tubing and fly it on a cluster of three D12's. Now that would be really Groovy!

2.17X Size on an E20

Sirius Rocketry Offers Discount to MASA Members!

Sirius Rocketry is now offering a 10% discount to MASA members from now until December 10th, 2010 for on-line orders. Just enter Coupon Code MASAPLANET1210 at checkout. If you haven't seen the amazing kits that Sirius has to offer, visit their website at www.siriusrocketry.com. Planet editor Jeff is currently building the Sirius Diemos (pictured above). Follow along with his progress on The Rocketry Forum at http://www.rocketryforum.com/showthread.php?t=14227

Carol's State of the Club Update

From the President

Congratulations to Jeff Taylor, MASA Planet Editor, for winning the LAC Newsletter Award/Trophy for the 3rd year in a row!! Thank you to everyone who has submitted articles, photos, etc., this past year.

NARAM 52 FiTi –We donated 50 rockets to this year's event! This was the 3rd year that MASA has supported the NARAM FiTi events. This year's donations far exceeded my hopes, in both quantity and quality. A HUGE thank you to everyone who built and donated rockets!

Congratulations to Caleb Boe, Daniel Boe, and Buzz McDermott on their impressive showing at NARAM 52. Caleb placed 1st in 1/4A BG, 1st in R&D, and 3rd overall (B Division). Daniel Boe placed 3rd in 1/4A BG (B Division), and Buzz McDermott placed 4th in B Streamer (C Division).

Planning is underway our 3rd Annual Regional NAR Contest, which will be held next summer.

Safety Grant – we requested and received a NAR Safety Grant in the amount of $216, to be used toward the purchase of a "smokechaser," air horn, and new first aid kit. The NAR recently announced another round of safety grants, so we will be applying for additional funds to cover the purchase of another set of PA speakers, additional fence posts and rope, plus a few miscellaneous items.

We've had a 12 members achieve their L1 and L2 certifications this summer. In comparison, approximately 25 people achieved their L1 or L2 cert in the first 10 years of MASA; we've certified an additional 12 people just this summer. Newly HPR certified members include:
L1 – Dave Schaffhausen, Steve Brown, Art Gibbens, Bob Moyle, Ken Hoyme, Caleb Griswold
L2 – David Gensler, Neal Higgins, Todd Carpenter, Dwayne Shmel, Caleb Boe, Carol Marple

Todd Schweim and Caleb Boe attended the World Spacemodeling Championship in Serbia. They both had an amazing time and have many stores (and a lot of pictures) to share.

We now have approximately 127 club members, including new members from Iowa and Illinois. Welcome to all of our new members! We hope to see you at a launch or club meeting soon.

MASA member Mike Erpelding supported the 2-day Boy Scout "Star Camp," where he helped about 700 Boy Scouts launch rockets.

Please remember to support the local hobby stores and on-line vendors who so generously offer discounts to our club members:
Hub Hobby - 10% discount to MASA members.
Off We Go Rocketry - 10% rebate to the club for all purchase made by MASA members. The rebate will be in the form of a donation to the club at the end of the year.
Sirius Rocketry - 10% on-line discount to all MASA members through early December.

MASA Outreach:

2010 4-H Rocket Launch, Stearns County Fair

By Mike Erpelding NAR #79922

The weather cooperated Saturday July 31, for the 2010 4-H rocket launch, at the Stearns County Fair. The wind was calm, to less than 5 MPH from the Northwest, the best direction for the layout of the Grandstand at the Fair. The light wind would carry all of the rockets out over the empty parking area for the demolition derbys and tractor pulls.

We had a great turn out with 32 4-Hers signed up to participate. The safety meeting started at 1:15 pm, to go over the basics of flying rockets. After the kids checked in that they were here, they recieved a special 4-H rocket launch participation ribbon.

A little after 1:30 pm we started prepping rockets.

We had a nice crowd of grandparents, parents, siblings, and friends turn out to watch the launch. The grandstand was at least 1/2 full.

I had Double Dozen set up with 6 pvc pads.

Dad, Mom, and Ethan came to the launch. Dad helped me prep rockets; while one of the 4-H dads helped the kids load the rockets on the pads and launch them.

There was a wide variety of rocket kits this year. Everything from small tumble recovery rockets, 3FNCs, to those fighter jet rocket kits, parasite gliders, and even one Mean Machine.

The kids got to at least fly their rocket once, a few flew for a second time at the end.

Flying continued until about 3:00 pm. I had everything packed up by 3:30 pm.

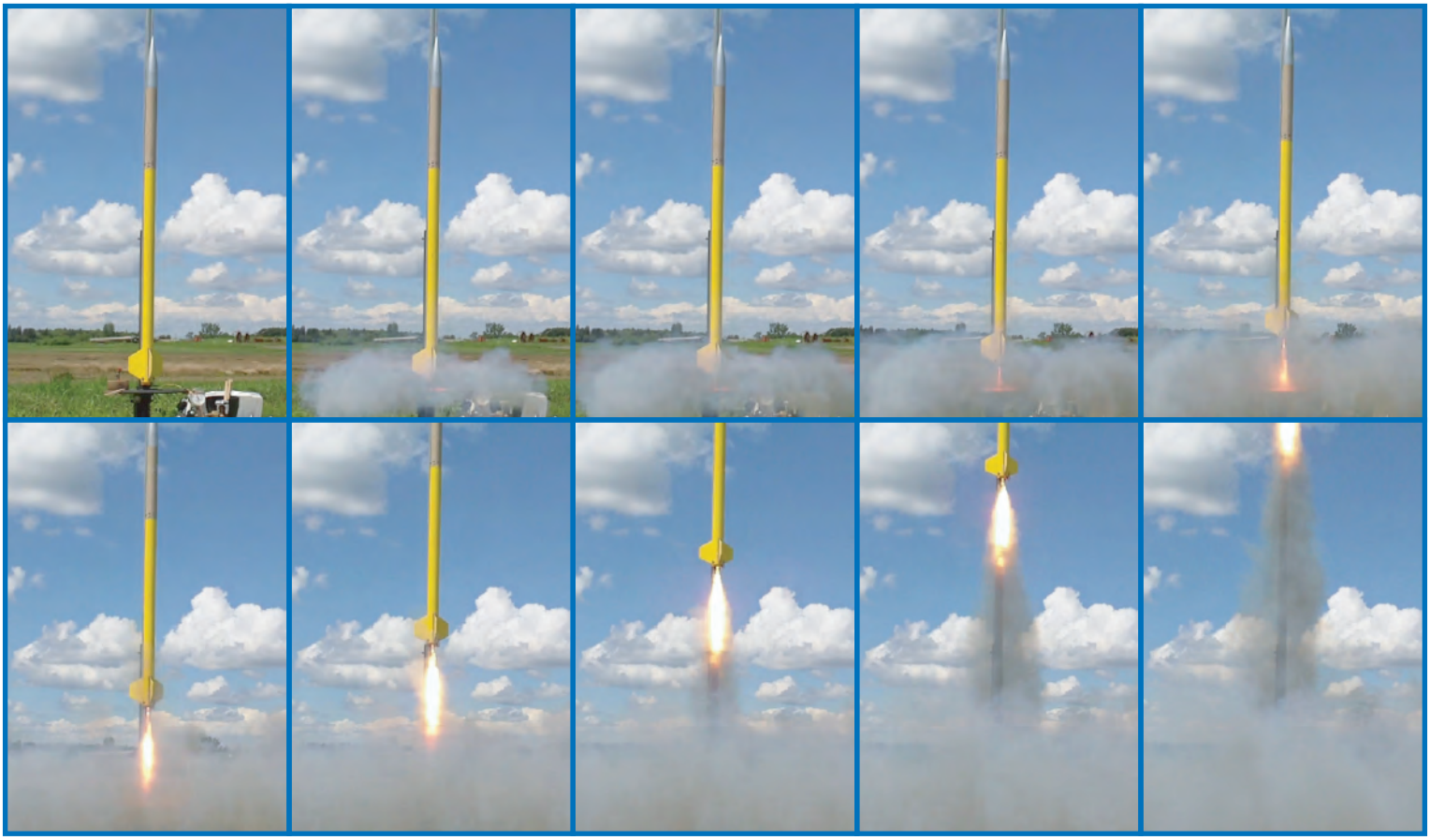
I'm looking forward to next year!

Freeze Frame

Glen Overby brought out his HD video camera to the July 26 MASA launch, and pulled these amazing stills from his video.

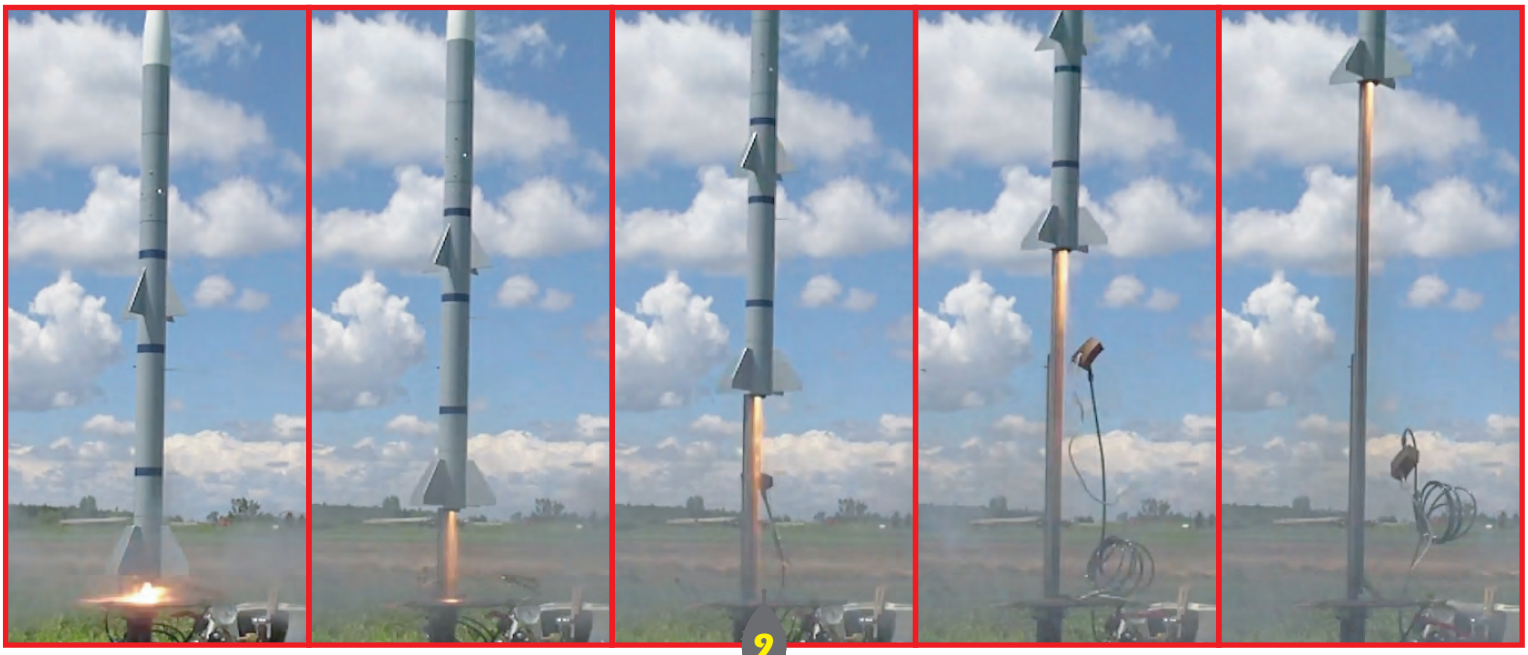
Glen's 38mm Minimum Diameter Rocket "I'm (Mostly) Yellow" on a G61

Submitted by Glen Overby



Dave's 2.5" Diameter AMRAAM Rocket on a Skyripper H124 Hybrid

Submitted by Dave Whitaker



"Model Launch Complex PVC-39"

Building a Simple and Inexpensive Launch Pad for Model and Mid-Power Rockets

by Alan Estenson

It happens to many rocketeers eventually; their trusty ol' Estes Porta-Pad just won't cut it anymore. Whether it has broken, worn out, or simply been outgrown as rockets became bigger and heavier, you realize that it's time for an upgrade. After a little shopping, you further realize that there aren't many commercially-made launch pads to choose from – at least, not at a reasonable price. Why not make your own? The parts are as close as the nearest hardware or home improvement store. They'll cost you not much more than ten bucks and will take less than an hour to assemble into a spiffy new launch pad.

The material of choice for this project is PVC. It's readily available, inexpensive, has a wide array of fittings, and is easy to work with. I built two slightly different variations of this pad design; let's call them PVC-39A and PVC-39B. Here's the shopping list for both:

PVC-39A Launch Pad Parts List

Description	Qty	Price*	Cost
1" x 5' PVC Pipe	1	$1.53	$1.53
1" PVC Female Tee (Threaded Inlet)	1	$1.07	$1.07
1" PVC Male Threaded Adapter	1	$0.38	$0.38
1" PVC Tee	2	$0.56	$1.12
1" PVC 90 Degree Elbow	4	$0.28	$1.12
3/4" x 1" PVC Male Threaded Adapter	1	$0.83	$0.83
3/4" IPS Gate Valve (Threaded)	1	$5.28	$5.28
* Menard's Prices as of May 2010		**Total**	**$11.33**

PVC-39B Launch Pad Parts List

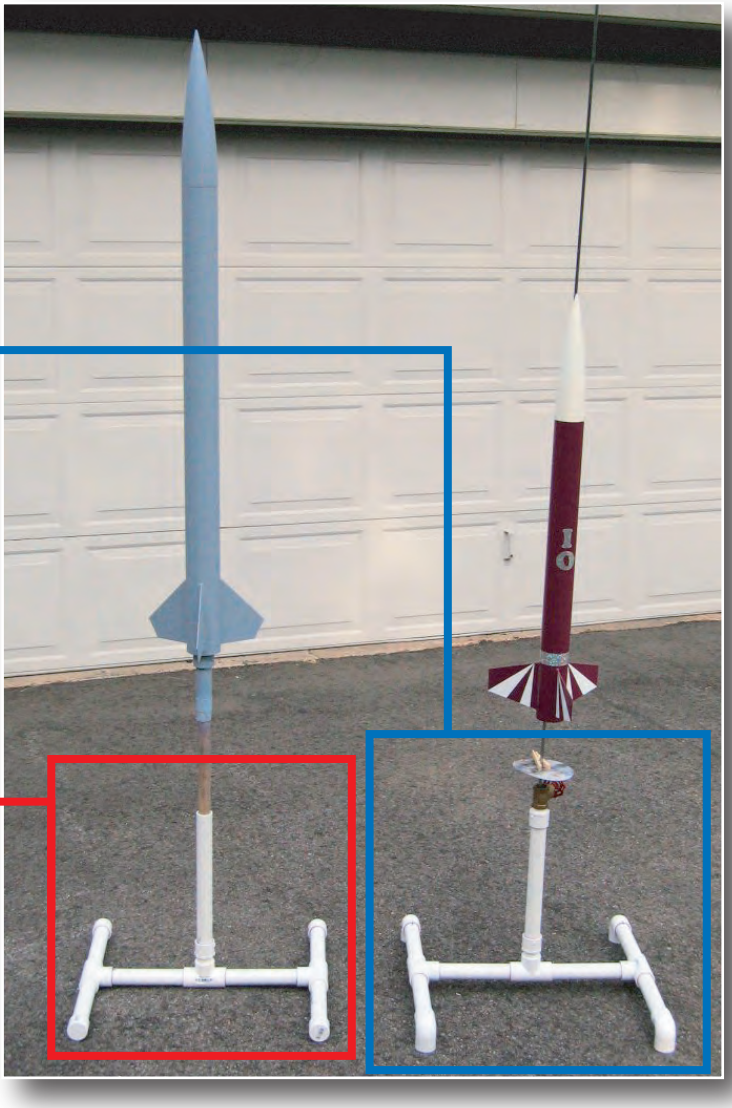
Description	Qty	Price*	Cost
1" x 5' PVC Pipe	1	$1.53	$1.53
1" PVC Female Tee (Threaded Inlet)	1	$1.07	$1.07
1" PVC Male Threaded Adapter	1	$0.38	$0.38
1" PVC Tee	2	$0.56	$1.12
1" PVC Cap	4	$0.51	$2.04
3/4" x 1" PVC Male Threaded Adapter	1	$0.83	$0.83
3/4" IPS Gate Valve (Threaded)	1	$5.28	$5.28
* Menard's Prices as of May 2010		**Total**	**$12.25**

In the PVC-39A design, the base of the pad is solidly glued together for extra strength and is raised slightly off of the ground, so it should be better on uneven surfaces. It has a footprint of 20.5" x 20.5", and my prototype weighed 3 lb, 5 oz.

In the PVC-39B design, the four legs are not glued in; instead, they are removable to let the pad disassemble for easier transport and storage. (Ax-Man has a $0.95 nylon bag that works perfectly for this.) The body of the pad sits on the ground, so it might be better suited for smoother surfaces. It has a footprint of 20.5" x 18", and my prototype weighed 3 lb, 1 oz.

I view these pads as being suitable for model and mid-power rockets up through about two pounds liftoff weight and "F" motors. If you stake the 39A's legs to the ground, you could safely go a little bigger and up through "G" motors too.

The great thing about PVC and these launch pad designs is that you can mix and match and modify to suit your own needs. Want a bigger footprint for more stability? Just buy more pipe and make all the sections longer. Want something heftier for even bigger rockets? Just switch to bigger diameter pipe and fittings.



The tools that you will need to build these pads are: tape measure, Sharpie marker, square and/or bubble level, saw, and utility knife. You'll also need small cans of PVC primer and PVC cement (about $2 each). Be sure to read the instructions on the primer and cement cans, wear rubber gloves, and work in a well-ventilated area. When you glue

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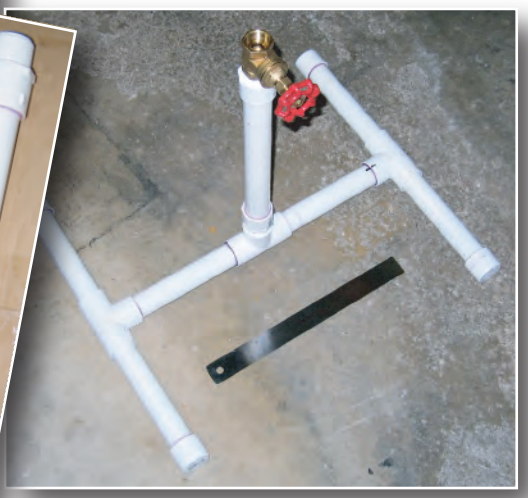
PVC Launch Pads Concluded

two parts together, remember to hold them in place firmly for about ten seconds while the cement grabs hold.

The first five assembly steps are the same for both pad versions:

1. Use your tape measure and Sharpie to mark the 5 foot pvc pipe into one 12-inch section and six 8-inch sections. Cut on those marks to divide up the pipe. A hand saw will work fine, although I personally use a "Sawzall". Use a utility knife and a rag to clean up the cut ends as needed.
2. The 12-inch pipe is your vertical riser. Glue the 1" threaded adapter onto one end and the ¾" threaded adapter onto the other end. After the cement sets, carefully screw the gate valve onto the ¾" adapter. The gate valve is your launch rod clamp.
3. Take the 1" female tee (with one threaded fitting) and glue an 8-inch pipe into each non-threaded fitting. Screw the 1" threaded end of the vertical riser into the threaded fitting.
4. Test fit a regular tee onto the end of one of the horizontal 8-inch pipes coming out of the central tee. You need to orient this tee horizontally such that the vertical riser will be at a right angle to the ground. Make a mark on the tee and pipe to help you orient them when you glue them together. Glue on this tee, then quickly set the center section on a flat surface and use the square and/or bubble level to confirm that the vertical riser is pointing straight up. You'll only have a few seconds to make any adjustments.
5. Glue the other regular tee onto the opposite end of the center section. Again, quickly set the center section on a flat surface to help you orient this tee horizontally and parallel to the previous tee. If these two end tee's aren't parallel to each other, the pad will end up skewed and won't sit flat. If they aren't horizontal, the vertical riser (and launch rod) won't be pointing straight up.



In the PVC-39A version, the four legs are glued into the tee's, and an elbow is glued onto the end of each leg to act as a foot.

6a. Glue the four remaining 8-inch pipes into the open ends of the two tee's.

7a. Test fit the elbows onto the ends of those four 8-inch pipes. With the pad on a flat surface, rotate each elbow until all the open ends are flat and square against that surface. Make marks on the tee's and pipes to help you orient them when you glue them on.

8a. One at a time, glue on each elbow. Check them again as you go to make sure that they're all squared up. If one of the elbows is rotated, the pad won't sit flat.

In the PVC-39B version, the four legs are not glued into the tee's, and a cap is glued onto the end of each leg.

6b. Glue a cap onto one end of each of the four remaining 8-inch pipes.

7b. Take those four pipes, and push them into the openings in the two tee's. (no glue!)

That's it! Let the cement set up overnight, and your new pad will be ready for years of launching. Slide your launch rod into the gate valve, and then close the valve firmly to clamp the rod in place. It will easily clamp on launch rods up through ¼" diameter, and you can usually angle the rod a bit to give you up to a couple degrees of tilt. Scraps of wood can also be placed under any two legs to give the pad some extra tilt if needed.

How about a bonus use for your pad? I made an extra vertical riser without the fitting and gate valve on top. This lets me use the pad as a painting stand for large rockets. I just insert a 1" wood dowel in the riser to hold the rocket.

Thanks to Ted Cochran – his PVC multi-pad system was the inspiration for this design.

Building the Yank Enterprises (LOC/Precision) Genesis for my L1 Certification

By Art Gibbens

I built this rocket at the spry young age of 52 to use for my Level 1 Certification into High Power Rocketry. I have been flying Model Rockets for 38 years, and I now finally have the time, money and wherewithal to see this task accomplished. I must confess that the reason for me using this particular rocket is that I am cheap and it was on closeout at Hub Hobby, Little Canada because it was missing some centering rings.

This is a 3 fins and a nose cone rocket, 3" diameter, 48" long, with through-the-wall fin slots and a 29mm motor mount. The main tube is phenolic with a plastic nosecone and plywood fins. It comes with a 36" nylon parachute and 14 feet of nylon shock cord.

Having flown for a few years I knew that I wanted my first rocket to be pretty straight forward and relatively tame in how it is built. But for longevity's sake, I modified the kit in two ways. The first is to make it a zipperless design by splitting the fin can from the upper portion of the rocket. The second modification grew out of the first because I needed to anchor my shock cord at the front end of the rocket. I decided to make a forward closure for my eye-bolt. This divided the upper section in two, so I cut the lower portion of the nose cone off and now I have a small electronics bay for an altimeter or cornfield buzzer.

I am also using a tried and true method of motor retention using T-nuts in the bottom centering ring with an aluminum plate that sandwiches the nozzle by three equally placed screws. One of my co-workers made the plate which I hope to be able to also use on other rockets.

With a shopping list in hand, I buzzed up to Hub Hobby LC to pick up 3 centering rings, a tube coupler and a longer motor tube. I also swung into Menards and picked up a second eye bolt that I would need for attaching the nylon shock cord. I already had the T-nuts that I had ordered in bulk on-line.

Step one was to figure out just how long the fin can portion should be using a stock-length tube coupler with a centering ring at each end. I redesigned the motor tube to be long enough to go from the aft end of the rocket all the way to the end of the tube coupler. I came up with lengths of 13 5/8" for the motor tube and 11 ¼" for the fin can portion of the external tube.

I drilled T-nut and vent holes in the aft centering ring , then drove the T-nuts in and added wood glue to help ensure retention. I drilled one hole in each of the two remaining centering rings: one for the screw eye at the top of the tube coupler and the other for a vent hole for chamber decompression during flight.

I attached the screw eye to the upper centering ring using a copious amount of wood glue to keep the nut from loosening. I butt-glued the centering rings to the tube coupler using wood glue. After the glue was dry I sanded the ends until both ends slid nicely into their respective tubes.

Basically, the fins were not cut deep enough to reach all the way to the center (motor) tube, so I had to use a scroll saw to modify them so they would reach. Once that was done I could dry fit the fin can to ensure all the pieces went together before applying glue or epoxy. I glued the engine tube into the centering rings in the tube coupler and waited for it to dry. Then I glued that sub-assembly into the aft tube of the rocket making sure that I did not set it too deep so the fins can still be glued in. While that glue was still wet I put glue on the root edges and slid them through the outer wall gluing them to the motor tube. Finally I applied glue to the end of the fins inside the bottom end of the rocket, and glued in the bottom centering ring making sure that the T-nuts and vent holes did not line up with the end of a fin.

I cut a bulkhead out of a piece of ½" plywood with a scroll saw and sanded it down using a circular sander. Within ten minutes I had a nicely rounded bulkhead. I drilled a hole near the center of it for the second screw-eye and then installed it, also gluing the nut into place. After that glue had dried I tied one end of the nylon shock cord to it and then glued the knot as well. The cord can still rock/swing on the eye as necessary during recovery but won't come undone. I then pulled the bulkhead through the upper tube to the desired place and attached it in place with epoxy. The epoxy cures in about an

Continued on the Next Page...

Building the Genesis - Continued

hour, so I went behind with wood glue from the forward end to seal any holes so the ejection pressure would not mess up an altimeter in the bay. This bay turned out very nice in my estimation. I'm toying with the idea of a camera of some kind as well as an altimeter at some point in the future.

I sanded the fins so that they had rounded edges knowing that I would be sanding them more during the finishing stages. Then I used masking tape at the end of the fins for dams and mixed up some epoxy. I used a popsicle stick to ensure that it was a nice smooth fillet with no air bubbles, doing two valleys at a time. I also attached the quarter inch launch lug to the upper section of the body tube at this point. I used wood glue to make the fillets for it later.

I sanded the molding seam on the nose cone smooth, thus beginning the tedious part of any project – the finishing. I re-watched Apogee's DVD on how to build a rocket for a refresher on how to fill in those pesky spirals that I just ignored on my model rockets in the past. I mixed up some Elmer's wood filler and slathered it on the spirals and the plywood fins. I let it set for a couple of days and used a sanding block with some 220 grit sandpaper to get a smooth finish. I still had a couple of divots to fill, so I used the wood filler straight from the container and then re-sanded.

All I Needed was an H Reload.

I got everything smooth as I wanted and then shot it with primer. I have never primed a rocket before so I wasn't sure what to expect. When I primed and sanded my 67 Falcon about 8 years ago I knew it gave the car a better paint job. So I laid on 3 light coats and let them dry. I dipped 600 grit wet sandpaper in water and started sanding. I got it shiny just like the video showed. I let it air dry for a couple of days and then painted the rocket.

Because there were three distinct pieces to this rocket, I decided to paint each piece a different color. I painted the nose cone red, the main tube white and the fin can blue. I did not follow the paint scheme on the packaging.

Next I attached the fin can to the shock cord and glued the knot. I then put a simple overhand knot in the shock cord to make a loop for attaching the parachute. To prevent the two pieces from banging into each other under chute during descent, I made sure the fin can was above the body tube when I placed the knot in the shock cord. I attached the parachute by simply looping the ends through the loop in the shock cord and then tucking the canopy through the shroud lines – simple and stout.

It was done, and now all I needed was an H reload and a successful flight to be L1 certified. I ordered an H reload from Alan at Hub Hobby, looked at all the data on-line for building an Aerotech reloadable rocket engine and waited for the May launch to arrive. Because of the long drive and making sure I

hadn't forgotten anything I didn't arrive at the field until after 9:30 am that day. It was very overcast but folks were still flying when I got there. I set up my table under Carol's pop-up canopy and set to work building the motor. It all went well right up to when I was about to put in the black powder for the ejection charge when it started to rain, lightning and thunder. The remainder of the launch was canceled so I stopped the assembly of the motor. It was a very soggy start towards certification.

Continued in the Next Issue...

2010 MASA Members

Registrations Received as of August 27

Cheryl Anderson	Kris Fredrick	Bob Moyle
Hunter Anderson	Kristina Fredrick	Lance Murphy
Kevin Anderson	Owen Fredrick	Mike Murphy
Levi Anderson	David Gensler	Scott Murphy
Timothy Barr	Art Gibbens	Eric Myers
Corey Bedford	Hannah Gibbens	Heather Myers
Glenn Bedford	Philip Gibbens	Jim Myers
Kevin Bedford	Renee Gibbens	Justine Myers
Lilia Bedford	Scott Gleason	Julia Nelson
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Daniel Boe	Gideon Griswold	Mark Nelson
Don Boe	Andy Heren	Nicole Nelson
Joshua Boe	Neal Higgins	Eric Oakley
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Luke Brown	Ken Jarosch	Cathy Schwartz
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Laura Carpenter	Karen Juntunen	Dwayne Shmel
Todd Carpenter	Brian Kilberg	Elizabeth Shmel
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James Fliger	Tim Melody	Austin Whitaker
Melissa Fliger	Lyle Merdan	Cindy Whitaker
Espen Fredrick	Gerald Meux Jr	David Whitaker
	David Miller	

Roster provided by MASA Secretary/Treasurer Jason Colt

127 Members to Date!

MASA Welcomes the Following New Members:

- Allison Fliger
- David Fliger
- James Fliger
- Melissa Fliger
- Espen Fredrick
- Kris Fredrick
- Kristina Fredrick
- Owen Fredrick
- Scott Gleason
- Cathy Komada
- Jacqueline Komada
- Jeffery Komada
- Vanessa Komada
- Alex Lundeen
- Phyllis Lundeen
- Randy Lundeen
- Gerald Meux Jr
- David Miller (Sirius Rocketry!)
- Eric Oakley
- Charlie Weisman
- Henry Weisman
- Joe Weisman
- Mabel Weisman

Low Amp Igniter Research

Low Amperage Igniters for Small AP Motors

By Ken Jarosch

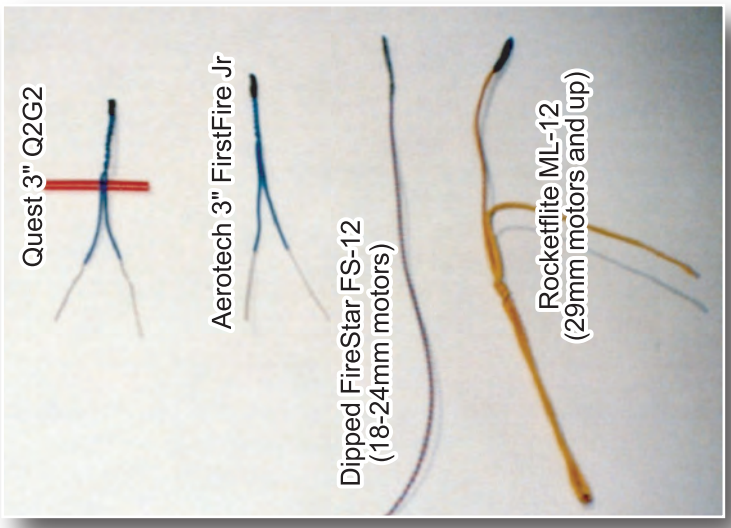
When is an igniter an igniter, and an ematch an ematch? It used to be simple, even for the BATFE. An igniter was a ground firing device with a heavy battery, and an ematch was used to fire the BP ejection charges from the avionics with low battery power. What about the grey area in between for airstarts or staging? Thermolite and flashbulbs? What about clustering?

The very excellent article "Build Bigger CLUSTERS with Better IGNITERS" By Boris Katan NAR 86703 L2 in the May/June 2009 issue of Sport Rocketry brought that issue back to me again. I especially like the article because I really like the RocketFlite Magnelite igniters and pyrogen, and have been using them since 2002. Also like the AppleWhite products mentioned in the article.

While not on the scale of that article, I wanted to try clustering several small AP motors for myself. In the grey area between igniters and ematches you have light igniters doubling as ematches, and you also have ematches doing ignition work. So I wanted to see what was available and what it took to make a Low Voltage/Low Current igniter for clustering.

RocketFlite Devices:
Starting with Magnelite ML-12's, I see they need 6 amps for firing. With a cluster of 5 motors I would have to deliver about 30 amps from my 30 amp relay controller. 4 motors would be the safe maximum.

Looking at the MagFire Ematches from RocketFlite, I see they have N/F (no fire) current of 0.92 amps and a A/F (all fire) current of 1.6 amps (or about 1/4 of the regular igniters). So I could fire 16 to 18 motors max. The manufacturer states they can be fired from a single 1.5 volt alkaline battery.



The cost for both ML-12's and MF-12's are $9.95 for a 12 pack. The ML pyrogen is $29.95, and the MF pyrogen is $39.99. Acetone is the thinner. Apparently you need the low current pyrogen for low current ematches. The manufacturer says you could get up to 900 ML/MF units with 40 grams of pyrogen material. Both the ML-12's and the MF-12's are best suited for 29 mm AP motors and above. The firing temperature is 5400 degrees. The ML pyrogen dips great when used on the yellow duplex blanks.

FireStar Devices:
My favorite igniters for small AP motors and my son Paul's all around favorite igniters are the FireStar FS-12 30 awg. twisted pairs. (Wire Wrap red & blue wires) These igniters need 3.0 amps average with 8.8 Peak amp inrush for 150 ms. for full vaporization of the ignition wire. That means 10 to 3 motors with the 30 amp relay controller. These igniters work great for 18 mm AP motors and even small nozzle E11's and F12's.

I wanted to see if they made a LOW Amperage ematch and sure enough, it's called the FS-12-LA. No data was available on the website so I asked about the details. I was told that the voltage and ohms were reduced by 60% due to the thinner bridge wire. No details there. The manufacturer stated the ematch/igniter could be fired from a 9 volt alkaline battery. (Quest controller uses 9 volt alkaline battery) No mention whether the standard pyrogen would work with this reduced current ematch.

The cost of the FS-12's are $0.94 each and the FS-12-LA's are $1.14 each. The dipping kit cost $25.95, and refills are $20.95. The manufacturer states about 1000 units per 40 grams of pyrogen. This material is thinned with Lacquer Thinner. These igniters/ematches are suited for 18 mm to 24 mm motors, although Paul uses them on 29 mm G's. The firing temperature is 5900 degrees.

NOTE: I use the Magnelite pyrogen on the FireStar igniters and noticed that it is not as easy as the Lacquer based material. Paul uses the FireStar pyrogen and gets a smoother head due to the better bonding to the 30 awg wire-wrap twisted pairs. Lacquer base to that wire covering material.


13 FireStar FS-12-LA (low amp)
lightly dipped with long pyro heads.

Continued on the Next Page...

Igniter Research Continued

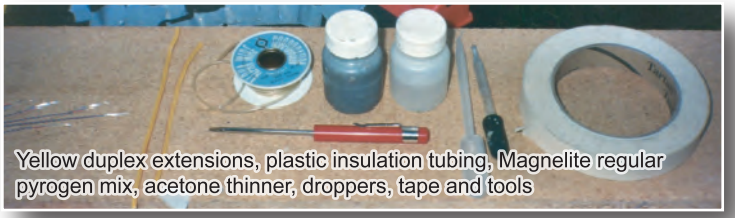
QuickBurst Kits and Materials:
I decided to check out the QuickBurst materials to get some idea where the igniter/ematch line could be drawn. They offer small igniters, large igniters and ematch kits. The manufacturer recommends that the ematches that use a 50 ga. wire bridge chip and a special H-3 pyrogen are for ematches only, and are NOT to be used as an igniter.

Large igniters, like the 30 awg Nickel Chromium 80 bridge wire is best used for single ground igniters and not clusters. Its resistance is 6.5 ohms per foot. The small igniter kit uses the 36 awg Nickel Chromium 80 bridge wire. This is used for ground firing, clusters and airstarting with avionics. The 36 awg resistance is 26 ohms per foot (or 4 times the 30 awg wire). Both these igniters work best with the standard Dip-It pyrogen, and are not used as an ematch. So these products cover the range from the ground igniter, the grey area (LOW AMP) igniter and the true ematch. According to QuickBurst, their pyrogen produces a 1600 degree penetrating burst.

Quest And AeroTech Devices:
Now what started all this research was my article (Igniter Review) on the stock 3" Quest Q2G2 igniters and the NEW Blue 3" FirstFire Jr. igniters for D-E Composite motors. The AeroTech igniters need 12 volts at 3 amps per igniter, while the original Quest Q2G2 will fire with 6 volts and 120 ma. or 1/8 amps of current. (Current specs are N/F 150ma and A/F 350ma). These could possibly be a low end cluster igniter for small AP motors. If the head of the Q2G2 doesn't produce enough ignition heat, a little thinned ML pyrogen will help. I've enhanced the Estes Solar Igniter for clusters with great results. I have also I have salvaged CopperHeads with ML enhancements.

The Igniter Review article and field tests revealed a lot of shortcomings with the 3" Q2G2 for small AP motors. Of course, the Q2G2 is a black powder end burner igniter. While the AeroTech 3" FirstFire Jr. igniters had a strong 100% ignition rate, the 3" Q2G2 igniters had a weak unreliable 55-60% rate. This was only for single AP motors, and no clusters at the time.

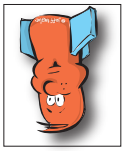
Both of these igniters will need pyro enhancements to be used with clusters. Also, the 3" Quest Q2G2 igniters will need additional modifications.


Yellow duplex extensions, plastic insulation tubing, Magnelite regular pyrogen mix, acetone thinner, droppers, tape and tools

Specifications: LOW AMPERAGE IGNITERS;
1) RocketFlite MAGFIRE MF-12's - N/F 0.92 amps., A/F 1.6 amps. 1.5 volts +
2) FireStar FS-12-LA - N/F 0.90 amps., A/F 1.6 amps. any voltage (See Field Notes)
3) QuickBurst Small Igniter Kit/ 36 awg bridge (Assume Similar to above)
4) Quest Q2G2 at 120 ma. or 1/8 amp at 6 volts. (Need ML or FS pyro enhancements and modifications for use with small single AP motors or clusters) Note: The 2010 catalog lists N/F 150ma. and A/F 350ma.

So, it was decided to experiment with the Modified Quest 3" Q2G2 and the FireStar FS-12-LA for small low current igniters.

Part 2 (Field Notes) will be in the next issue.
Ken Jarosch - NAR 56442 SR - TRA 10290 - MASA 148



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