



Member - National Association  
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### Special points of interest:

- "Ignition!"
- Gary Briggs shows us how he won first place in PMC at DAR-STAR 7.1!
- We had a huge launch in May, so we have a huge photo section to cover it in this issue!
- We still need more stuff!

### Ignition!

By J. Stuart Powley



*Jack Sprague wrangles about a ba-zillion kids at the May launch. We have lots more pictures from it inside this issue!*

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Here we are yet again in the throws of another relentless Texas summer. I would tell you how hot it is, but my thermometer just melted. Still, things have not been quiet around the old DARS campsite. In May we had a huge launch, which is featured in this issue. In June we finally got *DARSTAR 7.1, A New Hope* off of the ground. We also had another launch in June and a few outreaches, and so on and so on....

So you can see, we have been busy! In this issue Gary Briggs gives us a fantastic look at his first place winning PMC model from DARSTAR. He tells us all the little tricks of the trade from stability to detailing. It's a beautiful model and a fantastic article!

We also have a large pictorial covering the May launch. I usually don't do this, but it was a huge launch and I got lots of pictures, so why not?

Coming up in future issues, we will have DARSTAR coverage and reviews of some pretty cool new offerings from Red River Rocketry. Moon day is also coming up again in July (see page 13), and DARS will be there!

For right now, though, crank down the A/C to "Sub-Zero," take a long drink of lemonade (or your frosty beverage of choice) and dig into our big scoop of *Shroudlines!*

## Adventures in PMC and Other Dangerous Endeavors

By Gary Briggs, NAR 76909, L2

From the beginning, the first NAR contest that really got my attention was plastic model conversion. I suspect that is because it combined 2 things from my childhood that I always thought should be combined, but never really had the skills to attempt. As a child growing up in the middle of Michigan, I built numerous models, mostly of World War II airplanes. Once built, they became great toys, and my buddies and I would have flying adventures at 1:48<sup>th</sup> scale, re-enacting several battles that never were. There were many including a Spitfire, a P-47, a P-38, a Kingfisher, a P-61 and many, many, more. Of course we also flew rockets, but somehow never quite got the idea to put them together, probably because I never really built many jets. I only recall a 1:72 F-14 Tomcat and a 1:32 F-4J Phantom, and the Phantom haunted me for a long time because I wanted to do a great job on it, but never really had the resources or tools to do it. Most of the earlier planes were painted, and many suffered from glue and paint finger prints, as well as other anomalies not found in their full size counterparts.

Fast forward way too many years to this year's PMC Contest. The selection of the F-104 was based on a number of factors. I wanted to start simply enough and get something that would fly well. For that, I skipped the huge array of bombs and missiles, although that was a really tough urge to fight. I focused on building a clean model and learning about the finishing skills needed to build a great model, which could also fly. The

F-104 was a great jet as to me it was the hot rod of the Century Series. It had some design challenges when it came to the air superiority fighter role that it was supposed to play, but above all, it was fast. As I researched it, I also found out that it intersected with a few other jets that I was interested in historically; the XB-70 Valkyrie that it literally collided with and the Phantom F-4 which used the same engines to become the air superiority and multi-role fighter that the F-104 really never made it to. The selection of the QF-104A of the 3205<sup>th</sup> Drone Squadron was driven by the selection of this particular Testors/Hawk based model and the search for an interesting, yet manageable paint job. The research on this program also got my interest once I understood that these F-104s were becoming Mach 2 targets for BOMARCs and the early air to air missiles of the day.

Overall, the experience of PMC has been a good one and probably results in a bit of a revival of some modeling of the early age of jet fighters. It has exposed me to some more of Cold War explosion of technology that shaped my childhood. It has also introduced me to a new set of tools and skills that are applicable to these models and rockets.

What follows is some of the content from my contest write up about the construction of the model, plus some color commentary on the task.

### Rocket Construction

After acquiring the model from eBay, I was able to pretty quickly

determine how the build would progress based on the approach for the conversion. As F-104s are notoriously simple in their design, there really aren't that many questions as to your approach on the conversion. The main decision to be made is around where to do the split, and that is largely driven by how much room you want for parachutes and what cockpit detail you want to retain. I chose to make the split at a seam just behind the cockpit and in front of the engine inlets. The seam gave me a straight line to cut on, and the position gave me enough room to have a plug/nosecone attachment that sat behind the cockpit, leaving room for "detail" there (more on that later). I held the rocket halves together with tape and made the cut the model with a razor saw. I cleaned the edges by sanding the cut edges on a flat surface, placing the sand paper on the surface and running the cut edges carefully over that. Once that was complete, I went to work on centering the stuffer tube inside the model. This was done via a combination of packing peanuts (the type that appear to be made from strips of Styrofoam), and then securing the positioning with Magic Putty (an epoxy clay). The Magic Putty is actually fairly light and attractive for this purpose since it conforms to the desired shape, sets up solid, and also contains an adhesive to hold things together. I added some additional epoxy to make sure that everything stayed together, especially around the cockpit section. I did the fuselage section first, and once that had cured, I taped the sections together to align the model and then pushed the Magic putty in around a balsa plug that served as the nose cone on this model. Alignment is critical here, since anything that is off is going to detract from your built model.

Take your time and make sure things line up.

The final step on the stuffer tube was to add a motor block that would also be the anchor point for the shock cord. My weapon of choice here is always Kevlar, but I wanted a little extra insurance on this one, so after attaching a piece of 1/16<sup>th</sup> braided cord around the block, I then protected that with a sleeve of 1/8<sup>th</sup> tubular Kevlar. Su-



Figure 5: Using Magic Putty to center the stuffer tube

per glue works great here to hold it all together, you just need to be very careful that everything is where you want it once you apply it as it sets up on the Kevlar incredibly strong. There is generally no turning back once this hardens and I ended up doing this twice, as my first attempt had too much of the sheath in the ejection path, that would have created more back pressure resistance than I

wanted there. You can work the super glue Kevlar combination with power tools, but it is a very tough and has the added benefit of dulling anything that tries to cut it.

The next big part of a PMC conversion is adding nose weight as plastic models make no attempt at being flight worthy other than providing an aerodynamic shape. I essentially put the entire model together with tape to determine its CG. There are various methods of putting together the CP calculation, but for these models, cardboard cutout seems to be the best. I knew that the CG needed to be ahead of the leading edge of the wings and to get that balance and found I needed about 1.5 ounces of weight to offset a C6-3 sitting in the



Figure 6: Engine block and shock cord attachment

back of the model. A spin test with spring confirmed stable flight in this configuration. I used egg style 1/2 oz. fishing weights in an attempt to not have so many loose objects needing a composite to hold them all together. I did use BBs in front of the weight in the nose to better center the main sinker. As there wasn't enough room in the nose section to get all the weight that was needed, I placed another 1/2 oz. weight behind the cockpit, but cut it into halves to provide a better fit into the model and hopefully require less epoxy to hold it in.

This pretty much concluded the conversion component of the model other than determining the remainder of the shock cord harness and parachute arrangement. From here, it was all about making the model look like a model, or better yet, the real thing.

### Model Construction

To say that the Testors/Hawk model of the F-104 was lacking some modeling detail would be a gross understatement. Although it managed to capture the basic shape of the aircraft, it's cockpit was devoid of any actual detail for the modeler, as were the other openings into the body, such as behind the air brakes, landing gear, and engine. It lacked many of the seam lines and only showed rivets on the tail section. Additionally, there were some details common to all the A and C models that were absent in the kit, such as the pitot tube, the ventral fin, and the arrestor hook that were also added to this model from another kit. There were several other



Figure 7: Attaching the weights to move the CG





modeling details that I attempted to add to this model and their construction details follow.

On the front of the plane, the cockpit presented some special challenges as the parts supplied did not present any detail of the actual jet. This is where I discovered the wonders of models from manufacturers, like Hasegawa, that contain details down to the switches, dials, and rivets, and will definitely be on my shopping list in the future. To attempt to fill some of this gap, I reworked the supplied cockpit components by cutting the dash from the original set up and positioning it as far back as possible. I then added a decal from a model found on line to get some details on the dash. I grabbed a donor seat from another model and painted it to look like the C1 or C2 model ejection seat. It was mounted directly to the body door rather than on a floor to make it fit under the canopy. This was another area that required a fair amount of filler to close gaps around the door and the body. A donor control stick was also added along with side bolsters, to represent the actual cockpit tub as well as a back wall, and decals to represent the side panel controls. The gun port was closed, using Green Stuff (an epoxy clay from Games Workshop that allows for more modeling time than Magic Putty), to model the QF-104 shrouded gun port. The final added detail up front was a donor pitot tube which had to be blended in with Squadron Putty. I found that there are modeling companies that make scale versions of these made from brass, which are likely to have a better life-

span upon landing than the plastic one that I used. Also a note for a future build.

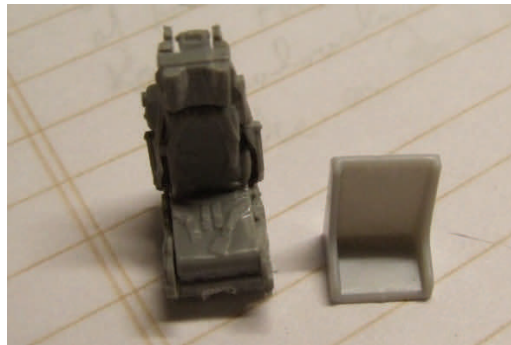


Figure 8 - Seat comparison - kit seat on the right

On the back half of the fuselage, the main additions were the antennae on the top to represent the one used for radio control of the QF-104. The ventral fin was added to aid stability as well as more accurately represent the jets design. It also created a convenient place to mount one of the launch lugs, er, circular antennas found on the bottom of the fuselage. The next big area of modification was the speed brakes. I decided to add the detail of open speed brakes after seeing several models online with this detail. It consisted of pieces of plastic card to close the area behind the doors and then square plastic tracks that the door actuators would run on. From there, I constructed door actuators from 1/32 square plastic stock, to fit around the tracks and into the slots on the doors. I found it very difficult to get accurate research on the real workings of these doors and could find no pictures of the doors open other than those of models, so I can't speak to the actual accuracy here, but hopefully the end result is useful. One other detail here was to cut and position the ailerons to roll the model in flight as well as cutting

the flaps and rudder to more accurately represent these components.



Figure 9 - Constructed door actuators

As there wasn't any internal detail on the open landing gear and I wanted a model with retracted gear for flight, I did convert the model to have a closed landing gear configuration. I actually practiced this on another model and found similar issues with both. Generally, manufacturers of cheaper models don't appear to spend much time ensuring that the landing gear doors can be used to actually model a closed landing gear configuration. That means that you spend a fair amount of time modifying these components so that they will fit together like they are supposed to. In most cases you are trying to create butt

joints (edge to edge gluing) with nothing behind the doors to help support the positioning. Once I had the components modified to fit together via sanding, I used packing peanuts again to hold up the center piece of the rear landing gear and thin pieces of plastic card to create a support and pseudo hinge for the landing gear doors. I then used the slow drying of plastic glue to my advantage as it allowed me to continuously modify the position of the doors to closed as it dried, ensuring that I ended up with a final position that I liked. As the fit of the final product was not spectacular (see earlier comment about how this was not really designed or QCed to work this way), white Squadron Putty and Bondo Glazing Compound were in required to fill the gaps. Additionally CA was used



Figure 10 - Closing the landing gear doors

as a filler to close the seams to a reasonable thickness. You then go back over the seam in an attempt to make those consistent with a exacto knife or other sharp tool. The last details added to the back of the jet were a tube to represent the smoke generator and a borrowed arrestor hook from another model.

### The Paint and Decals

Since it had been a very long time since I had painted a jet model, I had to pull together techniques I had used on rockets and Warhammer figures that I put together with my son. From the Warhammer experience, I knew that I wanted to try acrylics on this, since I had seen how lifelike their finishes could be. Most of the rocket experience was probably just around taping and masking, of which there was plenty.

I purchased a very inexpensive Testors "airbrush" kit, which contained a number of acrylic aircraft colors as well as a can of air and siphon feed paint jar that attached to the can of air. It worked remarkably well, and I was able to lay down smooth coats of acrylic and enamel paint with it. With the acrylics, I was generally able to touch up spots with a brush, blending reasonably well into the original finish. Obviously less is more here. I put the enamels down without primer, which worked well, but was a mistake as they were metallic, and I needed to go back and mask them to paint the acrylics. The result was some "weathering" on the enamel areas. I did have some issues with the acrylics being prone to peeling off with tape. I used Tamyia tape, which is generally low tack, but in a few spots, it would pull up all the way to the plastic. This model was somewhat unusual in the

plastic that it used, so it may have had something to do with that. An important step to note out of the box is washing the model parts in warm soapy water to remove all mold release. This also helps the paint stick. The canopy presented some serious challenges in getting paint to stick and getting clean lines. I am not thrilled with the final result, but will use it as a learning experience. I need to spend some more time online to determine better ways to approach this.

Decals were mostly from the kit, but I did customize the tail and fuselage number, using my NAR number for the tail, and a derivation of that for the fuselage which matched the approach used on the actual drones. I used Testors decal paper and bonder for this. A final coat of Testor Dulcoat sealed the deal, muted the shine, and protected the decals.



Figure 11 - Masking of the cockpit section





Figure 12 - Finished product!

### Mission Points

The mission points for this flight will be a simulation of a typical final day for a QF-104A from the 3205<sup>th</sup>. The jet will ascend rapidly, showing the F-104's amazing climb capability. A nice spiral flight pattern will represent the radio controller showing off before having his jet destroyed. Sometime after takeoff, a BOMARC tracking station will pick up the jet and the missile will be fired to intercept. As the jet begins to make its turn for level flight, it will be intercepted by the BOMARC, causing the jet to break into two pieces, and emitting a plume of white smoke. Of course firing the BOMARC would be too dangerous

and in violation of the NAR safety code so that part will have to be left to the imagination. Additionally, the drama of hundreds of gallons of jet fuel igniting in the sky will have to be skipped due to safety concerns as well. To safely return the model to the ground, parachutes will be used to bring the 2 flaming body parts back to the ground. Some collateral damage from the missile strike will most likely be simulated at landing.

### Contest Day

Having never done a PMC contest I didn't know exactly what to expect. The judge (Jack), basically gathered up all of the mod-

els to do static judging and assess how well you did in converting the model and making it look like the real thing. Once that was complete, you were basically free to fly. The winds that day were a bit up and down, but a little after noon we got another decent lull and it seemed like time to fly.

I got the model up on the 3/16<sup>th</sup> 4ft rod to provide stability on takeoff. I had a dipped Q2G2 igniter in the motor to avoid any issues with a misfire. I failed to let the judge know that I was ready to fly, which could have been bad, but Sam's announcement on the PA got the job done. The model jumped off the pad pretty quickly on a C6-3 and then started to spiral up its



flight path. I looked pretty jet like at the top and was starting into a bit of a glide at ejection. Luckily, I had plenty of shock cord and I don't think that the parts came together at all. The 18" parachute deployed out of the BT20 tube without issue, but it did pop a shroud line, bringing it down a bit faster than I was looking for. The landing was pretty amazing. As I walked up on it, I noticed that it had landed among a bunch of sunflowers. Better yet, the cockpit section landed in a crack in the ground, saving the pitot from any damage. Looking at the fuselage, both speed breaks were attached and the paint still looked good. In the end, my first experience at PMC was pretty good. I managed to win the PMC event and took 3<sup>rd</sup> overall in the DARSTAR meet. Out of the experience, I picked up some new modeling skills and renewed and interest in jet fighters of the 60s and 70s as well as their models. I will be building some more models for sure, and I will be ready with something interesting for the next PMC contest.



Figure 14: Part of the PMC lineup for DARSTAR 7.1



Figure 13: The landing!

All photos by Gary Briggs



## Scenes From a VERY BUSY Launch!

By J. Stuart Powley NAR 29573

Once in a while there comes along a launch that really stands out for some reason. May 2011 was just such a launch! The most distinctive feature of this launch is that there were TONS of people there! (Ironically enough, DARSTAR 7.1 had to be rescheduled from this date due to not enough flyers). Rather than prattle on about facts and figures ( which I don't know anyway) here are some sights from the day!



*The launch queue was never empty, making DARS members work hard to get everyone checked out and checked in!*



*An SR-71 goes up.....*



*...and comes down. It's always good to make sure that chute isn't packed too tightly!*





*Young rocketeers Nicholas and Collin didn't seem to mind the wait to fly!*



*Drag races are always fun!*



*Another crowd shot shows how busy this launch really was. Still, things went smoothly, and everyone had a great time!*



*Blueprint of disaster. This Estes Eliminator came apart in spectacular fashion. I think it was due to a cato...*





*After foraging in the fields for quite some time looking for the Merlin, James comes back with it...and much, much more!*

*James Turner's Red River Merlin was one of the few mid power flights of the day.*



*Adam Amick flew this model, which by any other name is still as sweet!*



*A rather shady character loading up a 20 year old PMC model for a test flight.*



*The X-3 Stiletto flew, but since it was designed for mini-B's, the two A's couldn't heave it high enough.*



*Gary Briggs checks out the results. I eventually went with an AMT UFO Mystery Ship for DARSTAR... He eventually got first place.*



### How to Contribute to Shroudlines

Contributions are always appreciated and always used! Just give me any stuff (articles, pictures, cartoons, ramblings, etc) at the monthly meeting or e-mail them to [stu29573@yahoo.com](mailto:stu29573@yahoo.com).

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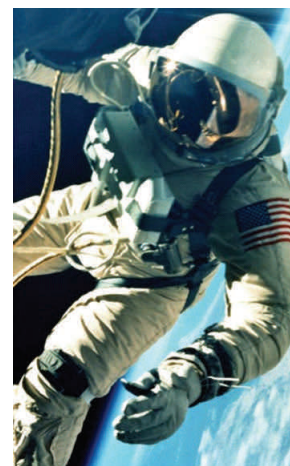
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Membership in DARS is open to all interested persons. Membership in NAR is encouraged, but not required. Annual dues are \$10.00 for individuals and \$15.00 for families. The entire family, including children, are welcomed to the meetings. Go to the website and fill out and send an application to join or renew your membership.

The club normally meets on the first Saturday of each month at 1:00 p.m.

Visit the DARS website for the meeting location: [www.dars.org](http://www.dars.org)



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