Sabre *at* Sea

Converting a 1:72 F-86E into the prototype FJ-2 Fury

by Bill Dye

FOR THE LAST SEVERAL years I've been writing a collection of memoirs about my 36 years in aerospace. One story involves a guy named George, a designer who I had worked with briefly on the Space Shuttle program at North American Rockwell in the early '70s. When I knew him he was a seasoned North American guy and one of the Shuttle designers. I was a one-year-out-of-college new hire in the Aero-sciences Department assigned to Shuttle aerodynamic heating wind tunnel testing.

But my story wasn't complete because I couldn't remember his last name or what North American Aviation airplane George designed that had me in such awe of him. The memory thing, you know.

With some detective work I finally found a contact from my North American Rockwell days (actually, through plastic modeling). After a trail of email addressees, I found Louie Hecq, who was George's boss back then, actually way before the Space Shuttle. His son, who works at what used to be Rockwell but is now Boeing, gave me his father's phone number.

I phoned Louie, introduced myself and asked him about George. He said that George's last name was Owl. He said that he passed away many years ago and that he was the main designer of the XB-70. Halleluiah! – not that George passed on – but that finally my story was complete (I couldn't remember if it was the F-100, F-86 or what).

Later in the conversation with Louie, now in his mid-80s, I asked what he did during his years at North American. "Oh, nothing much," Louie said. "I was the manager of the North American Advanced Design Group, but before I became manager I designed the X-15."

I couldn't believe it. The X-15! (Did I mention that my 8th Grade Science Project was on the X-15? And that I

Since the XFJ-2 was a navalized F-86E, the Academy F-86E Sabre was a logical jumping-off point.

won 25 silver dollars at the Buhl Planetarium Science Fair in Pittsburgh in 1962? And when I spent some of the silver dollars on our vacation in Florida, some lady – New York accent, cigarette hanging from her lips, flower hat, huge eyeglasses, and raspy voice – asked if I'd been to Vegas? I digress.)

"I was one of four designers in the Advanced Design Group," Louie continued. "Each designer was told to come up with a design for this X-15 rocket plane project that NASA wanted. I lost. My boss told me that my design was chosen and would I please get crackin' and get the final design to the production group." I got the impression that no one was too keen on working on a NASA rocket plane. He didn't say why and I didn't ask.

As an aside he mentioned that his next assignment after the X-15 was to modify an F-86E for the Navy into the prototype XFJ-2 Fury. And we discussed details of that conversion. He did mention that the Navy wanted just enough mods to prove the concept.

After I got off the phone with Louie, I couldn't help but think that there was probably no plaque, no dinner, no speech, no $25 gift certificate, nothin' for

designing the X-15 . . . just, "Great job Louie, now would you please get to work on this Navy XFJ-2 thing?"

As coincidence would have it, I had just purchased the Fury DVD from http://www.rocket.aero/ . So, with my love of prototypes and blue Navy jets, inspiration from Louie and the X-15, and a DVD in my hot little hand, I just had to build #755, one of the first Fury prototypes.

The NA-181 was basically a navalized F-86E Sabre and bore very little relation to the earlier straight-winged FJ-1 Fury. One might then have expected the Navy to have designated the new swept-wing aircraft F2J-1, and perhaps even to have given it the name "Sea Sabre," following the British tradition. However, the Navy decided instead to assign the designation FJ-2 to the new fighter and to name it "Fury," implying that it followed logically from the earlier FJ-1. The reasons may have been more political than technical, the Navy hoping that the Congress would look more kindly on an aircraft which was a "logical extension" of an existing type than one which was completely new and probably much more likely to cost the taxpayer a ton of money.

Commander Pete Aurand (who was the commanding officer of VF-51, the only squadron to operate the straight-winged FJ-1 Fury) was appointed as the Navy's project director for the FJ-2. He had long been an advocate of the Navy acquiring swept-wing fighters.

On March 8, the Navy ordered three XFJ-2 prototypes. These were all to be built in NAA's Los Angeles factory, since the Columbus plant was not quite yet ready for operations. These were built under the company designation of NA-179, and their Navy BuAer serials were 133754-133756.

This was an example of yet another case in which prototypes were preceded by production aircraft in the numbering sequence. The first two prototype XFJ-2s (133754 and 133755) were basically navalized F-86E-10 aircraft, equipped with such features as a V-frame arrester hook, catapult points, and a lengthened nose wheel to raise the angle of attack during takeoff and landing. However, they did not have folding wings, and they were both

Since the XFJ-2 had no guns installed, Bill masked off the panel lines around the gun troughs, filled them in and sanded them flush.

unarmed. They were known as NA-179s by the company.

The powerplant for all three prototypes was the J47-GE-13 turbojet, and they all featured the "all-flying tail" of the F-86E-10-NA. All three of them were painted gloss sea blue, the standard naval paint scheme of the day

Despite its later serial number, the XFJ-2B (133756) was actually the first of the three prototypes to fly, taking off on its maiden flight on December 27, 1951 with test pilot Robert Hoover at the controls. It went out to Inyokern, California for armament tests. The first XFJ-2 followed on February 14, 1952, again flown by Bob Hoover.

A serious competitor to the FJ-2 had appeared in the form of the Grumman F9F-6 Cougar, which had flown for the first time on September 10, 1951. Although slower in level flight than the FJ-2 Fury, the Cougar was considered better at operations from carrier flight decks. Consequently, most of the 200 FJ-2s built went to land-based Marine Corps units, with the F9F-6s going to carrier-based units. Very few FJ-2s ever went to sea.

Since the XFJ-2 was basically an off-the-line F-86E with a longer nose gear, an arresting hook and a few smaller details, I began my search for a kit. The 1:72 scale F-86 kits that were available to me were the Fujimi F-86F and the Academy F-86E "El Diablo," and a Hasagawa F-86F. I bought the 1:72 scale Academy F-86E "El Diablo" kit, since I was looking for an E model.

I did find out that the Academy kit has the wrong 6-3 wing for a "pure" E, but that discovery was made after the kit was assembled. (The F-86F wing area was extended by adding three inches to the tip chord and six inches to the root cord. This meant the wing chord on the kit would have to be shortened. I found out too that a lot of the "E" Sabres were modified in the field in Korea with the 6-3 extension, so I'm sure the Academy "E" kit reflects that. But I needed a pure "E" configuration.)

The Academy kit is really quite nice. It has engraved panel lines and an excellent fit. The dropped slats are incorporated in the kit design (another attractive thing about this kit to me) but I would have to add the tail skid that I always see down in Fury photos, including the prototype. The canopy and windscreen are not too thick, very clear and separate so the model can easily be displayed canopy open or closed. While I didn't use the decals from the kit, they looked nice. Actually I did use a few, like the jet fuel red circles and a few others.

In addition to scouring my reference library, I purchased the Rocket Aero (http://www.rocket.aero/) Fury DVD and watched it dozens of times in the interest of doing sound research on my subject. (Pretty good DVD by the way; perfect for building this model.) I took lots of notes of prototype number 755 – the one with the white stripe along the fuselage. First I looked for structural details that differed from a stock F-86E like faired-over machine gun ports,

Opening the tail skid well was as easy as sketching out the dimensions on the model, drilling a few holes and opening it up, then walling it off with sheet styrene and sanding it flush.

camera pods, nose gear and arresting hook configuration. Later I looked for cockpit, pitot probe, fuel dump and gear door details. And even later I looked for marking details like stenciling, placement of the large "NATC" and other markings.

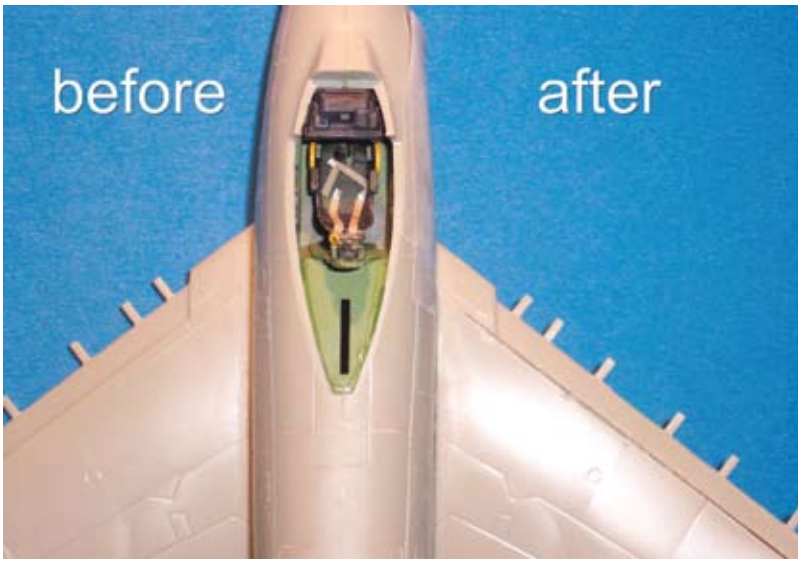
I also confirmed details such as the colors of the intake, gear doors, wheel wells and the color of the underside of the slats – all sea blue (no, I saw no red; red came later on production Furies).

The cockpit was a little misleading on the DVD. The flight training scenes showed a guy in a cockpit wearing a very old style helmet. The cockpit was teal/interior green with black panels and with ejection handles above the headrest, Navy style. I built up the model cockpit with those colors, but just before I started to paint the assembled model I took another look at the DVD.

What was bothering me was that the XFJ-2 was an off-the-line F-86E with some modifications. But why would Louie modify the cockpit for this first prototype? He knew that the Navy would only spend money on aircraft performance features absolutely necessary for carrier trials. The cockpit would do for the trials and then be "navalized" if production was ordered. Therefore, why would there be Navy ejection handles on this prototype? They would be required later on the production Furies.

There is some really good in-flight film of Fury prototype 755 taken from a chase plane on the DVD. In one sequence the chase plane photographer zoomed in on the XFJ-2 Fury, filming from the nose to the tail on the right side revealing every little detail, including the cockpit – black, no overhead ejection handles. (I think the pilot's eyes were brown.) That settled it. My theory was right. The cockpit interior shots on the DVD were obviously of a production Fury spliced in with the Fury prototype flying shots. So, unfortunately much later in the assembly sequence, I took off the handles and painted everything I could reach interior black.

The Academy F-86 comes with the 6-3 wing, a frequent modification to Korean War-era Sabres.



Backdating the wing to the factory-style F-86-F wing (the after wing) is more apparent when compared to the 6-3 wing (the before wing) in the kit.

The cockpit was built up per directions, doing the best I could for the flashlight-toting plastic model proctologists. Not having instrument decals, I painted the panel black and let it dry overnight. Later, dots of white paint were added on the panel over the black and allowed to dry for an hour or so. With a sharp needle or the tip of an X-Acto blade, I scraped away some of the white to let the black show through to look something like the instrument details. Then Future floor wax "dots" were carefully placed over each dial. The side panels were drybrushed to pop out some of the buttons and I put red/yellow paint over a white paint base for some of the cockpit red and yellow warning handles and knobs that I observed in a photo of an F-86E cockpit.

After adding enough weight to sink the *Bismarck* – it probably doesn't need as much as I put in but I do this just to be sure, ever since that Vampire I built that rocks back and forth like the bird and cup thing – I installed the cockpit assembly to one of the fuselage sides.

It was right around this time that I discovered that the Academy kit depicted an E

An extra wingtip probe, a camera pod on the vertical tail, and the distinctive test markings all help complete the transformation from Sabre to Fury.

field modified to an F wing configuration, so I embarked on modifying the wing. How hard could it be?

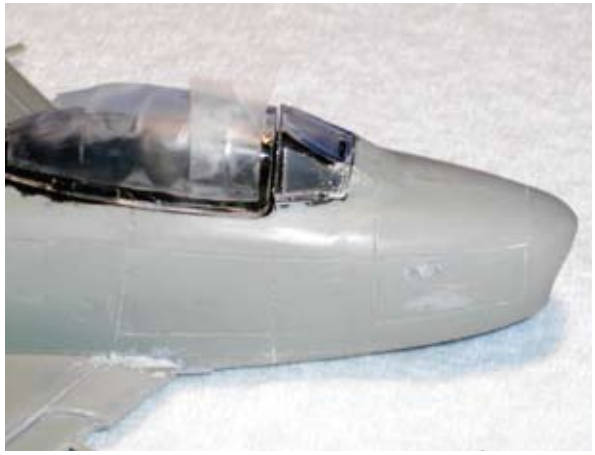
The web site http://f-86.tripod.com/wings.html was very helpful with respect to the F-86 variants and the 6-3 wing thing. I copied the plans from the website, adjusting the copy size until it matched the model's wing. I used this only as a rough template first to see how accurate the kit starting point really was with respect to sweep angle and chord dimensions – and it looked like Academy did pretty well.

The site explained that I had to first cut off the leading edge of the wing just behind the slat line, then remove a hunk of the remaining forward-facing edge 2.1mm (0.080 inches) from the root chord to 1.05mm (0.040 inches) from the tip chord – after compensating for the blade thickness.

Based on the dimensions above, I drew two pencil lines on the wing, the cut line and the "sand to" line. The thought did occur to me that this effort would probably be barely noticeable. But, I grabbed one of my trusty Techstar saws (you gotta get these!), held my breath and made the cut just behind the slat line; 20 thousandths of an inch at a time.

After the leading edge was cutoff the wing material required to make the 6-3 reduction in chord was hacked away. The removed slat/leading edge was sanded smooth, being careful not to break the slat extension brackets, and glued back onto the wing keeping the parts flush on the top surface. Some sanding of the lower wing plus putty was necessary to fair in the new joint.

This modification wasn't that

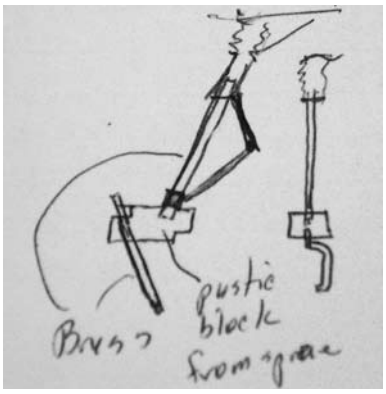


Bill eventually learned that the cockpit was mostly black, and he was able to paint it before the canopy was on and it was too late.

References:

- Ginter, Steve; *Naval Fighters Number Ten, North American FJ-2 Fury*, 1984
- Thomason, Tommy H., *U.S. Naval Air Superiority, Development of Shipborne Jet Fighters 1943-1962*, Midland Publishing, 2007
- XFJ-2 history, http://home.att.net/~jbaugher1/p86_20.html
- DVD, Rocket Aero, Fury (http://www.rocket.aero/) #755
- Phone conversation around August 2007 with Louie Hecq, XFJ-2 prototype designer for North American Aviation
- Sabre 6-3 wing mod reference: http://f-86.tripod.com/wings.html

Bill cut the kit nose gear strut and added a new oleo and a set of styrene anti-torque scissors.



A simple sketch based on photos was a big help in getting the nose gear proportions right.

bad – really. You can see in the photos a top view of the left wing root in the "before" condition and the right wing root after the chord was shortened. You can see the difference is small. But it does make it look different. And, frankly, I'm glad I did it.

The '"stubs" on the fuselage left from the original root chord leading edge were filed and sanded smooth. The new slat/wing span joints were filled with putty and sanded. After a few evenings work, it was a pure "E" - well, to the best of my knowledge, anyway.

I like "clean" aircraft – especially prototypes – and the DVD showed #755 flying without drop tanks most of the time. So I did not include them on the model.

I cut out the wing-tip lights and put in clear plastic pieces scrounged from the clear plastic trees that held the clear parts. After the glue dried they were sanded to match the wingtip contour and buffed them with a "KISS" brand fingernail file ("2-step process"). These are about $1.25 at Walgreens (or just about any drugstore). These are terrific! You can shine an entire 1:72 scale airplane in 15 minutes. The "step one" side would easily take the "boulders" off of any primer coat (without taking it off altogether) and then the "step 2" side polishes it so shiny that it squeaks. I bought six. The Walgreen's checkout girl looked at my nails, then the sticks, then me, then my nails. I just smiled. You should see the looks when I buy panty-hose (great for antenna aerials).

On the Fury DVD there was some sort of a pod hanging just below the right wing tip. I assumed it was a camera pod but in one of the references they referred to it as a "flotation device."

The flotation device under the right wing tip is shaped like a trapezoid; it was small, about 0.4 inches long on the edge that's attached to the underside of the model's right wing very close to but not quite at the wing tip. It's about .020 inches thick and .15 inches tall. The front edge is beveled back 15 degrees and the trailing edge about 30 degrees. The dimensions were frankly guesses by using the wing tip chord as a reference. I made one (well, two, since I messed the first one up) from scrap plastic and glued it to the underside of the wing. Actually this was done after I put on the first coat of blue on the airplane. I forgot to put this on until then. Otherwise, I would have added it before I painted. I held up the model to the TV screen with the DVD stopped on a shot of this flotation device and I was satisfied that it was pretty darn close.

At this point in the assembly, the model was just the basic fuselage and modified wings. It was time to incorporate some of the remaining modifications. First, the machine gun holes were filled by gluing in some stretched sprue that was close to

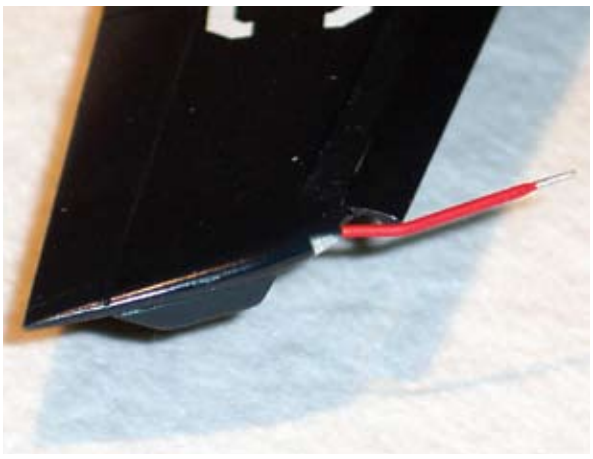
Bill's model was too glossy after the decals were applied, so he toned down the shine with a mixture of Future floor polish, alcohol and Tamiya flat base.

the diameter of the holes. Two days later, I surrounded these goobers of plastic with tape so as not to obliterate the nice surrounding detail and sanded them smooth.

Holes were drilled for the added left wing pitot probe and for the right pitot probe. I replaced the kit pitot with a brass one and dry-fitted an aft fuel dump on the right side of the airplane that would be attached later.

The arresting hook would be depicted by a decal since it was virtually flush with the fuselage, it's in 1:72 scale and it's on the bottom of the airplane. A white decal with black stripes would be just fine.

That said, having no tail skid really bothered me. It is very visible, since it's usually down when the airplane is on the ground, so the decal approach was just not acceptable to me. I simply drew a rectangle on the lower aft fuselage that looked about the right size, drilled a few holes at the corners and cut away the plastic so that all of the sides were about .015 inches too big, and then I inserted strips of .015 plastic to make a box.



The wing-tip "flotation device" was made from styrene rod and sanded to the proper shape.

Everything was sanded down to the original fuselage contour. The box sides were made the same height so I could attach the "lid" via the exhaust duct. This tail skid box took less than an hour to do and part of that time was spent putting a chuck roast into the oven.

The actual skid was simply a piece of rectangular plastic the same size as the inside dimensions of the square hole with a brass rod as an actuator. This was a really simple mod that I think enhanced the model.

This barrier pickup was a retractable strut that intended to catch the aircraft carrier barrier. The retractable barrier pickup was mounted on the belly just forward of the wing leading edge and was noticeably not flush with the fuselage belly.

Again using the DVD as a reference, I made a small piece of rectangular plastic (.10 in. wide X .46 in. long and.015 inches thick), masked it for stripes and then painted it black. The masking was removed, revealing the white stripes. I stored it in my little plastic bits box. Later it would be glued onto the belly after the painting and decaling was completed.

The nose gear was not an F-86E or F gear. It was modi-

fied to a Navy-style gear with a fork around the nose wheel. But the biggest difference was the length. The gear was noticeably longer to increase the Fury's angle of attack during takeoff. I viewed the DVD and references several times to come up with a new gear design. The kit gear was cut off just above the oleo and a .020 in. brass rod made for the new oleo.

The new nose gear had a fork that was offset longitudinally from the centerline of the oleo. I made an oleo interface to the new fork from a small block of plastic. I drilled a hole in this plastic block for the oleo, then another hole for the fork. The structural part of the fork was a .020 brass rod on the right side of the nose wheel and then a non-load-bearing brass piece was glued on later to complete the fork. The oleo strut length was about ¼" longer than the original kit strut.

Later I would paint the new nose gear dark sea blue, coat it with Future floor polish and then wrap a small piece of Bare Metal Foil around the oleo strut and add a very small scissors from .015 plastic. This was just four simple cuts with a sharp X-Acto knife to make a "V." The whole gear (including the tire, which I added later) except the oleo was washed with a mixture of flat interior black with a touch of flat brown thinned with lots of turpentine.

I noticed on the DVD that there was a small camera pod on the left side of the vertical tail. There were no dimensions, so I just cut a piece of plastic stock to a size that looked similar to what I observed on the DVD (about .010 inches square and .015 inches long).

The horizontal stabilizers were not attached until final assembly. The F-86E had a flying tail.

There is one thing that I did not do that I should have at this point: I should have drilled a hole in the aft corner of each speed brake well to accept the actuation piston assembly. I did replace the actuator with a brass rod, similarly to what I did for the nose gear oleo, but the installation on the model without these holes tried my patience. With this hole, the actuator would have stayed in place more easily whilst the piston was extended to the mounting hole in each speed brake. Not drilling those holes made the speed brake installation the most challenging thing to do on this model. My next F-86/Fury will have holes!

Also, I think I should have taken some stretched sprue and put in a few pieces to simulate what looks like hydraulic reservoirs in the speed brake well to busy this up a little.

I dunked the windscreen into Future and let it dry overnight on a paper towel covered by an aerosol spray-can lid to keep the kitty hairs off of it. The next day the windscreen was attached with super glue and after about an hour the seams were carefully sanded. The windscreen was then masked with tape. I put the tape on the windscreen and then with a new #11 X-Acto blade I cut around each pane very carefully, using the frame as a guide. I did this one pane at a time.

The test markings included many small detail decals swiped from a sheet for the F-8 Crusader.

In retrospect, Bill wished he'd drilled holes for the speed brakes' actuators, because it would have made placing the doors much easier.

The DVD showed that the gear wells, the inside of the gear doors and speed brake areas were dark sea blue. They certainly were not white or silver or any light color like zinc chromate, and the red pitot probes could easily be seen too. Nope, they weren't red either. So no masking of the wheel wells was necessary. That was nice. The speed brake hydraulic system plumbing was silver but the walls were blue. Again, the production Furies were different.

I Futured the sliding canopy and after it was dry (at least 48 hours) I masked it with tape. It was at this point I repainted the cockpit and canopy sill interior black.

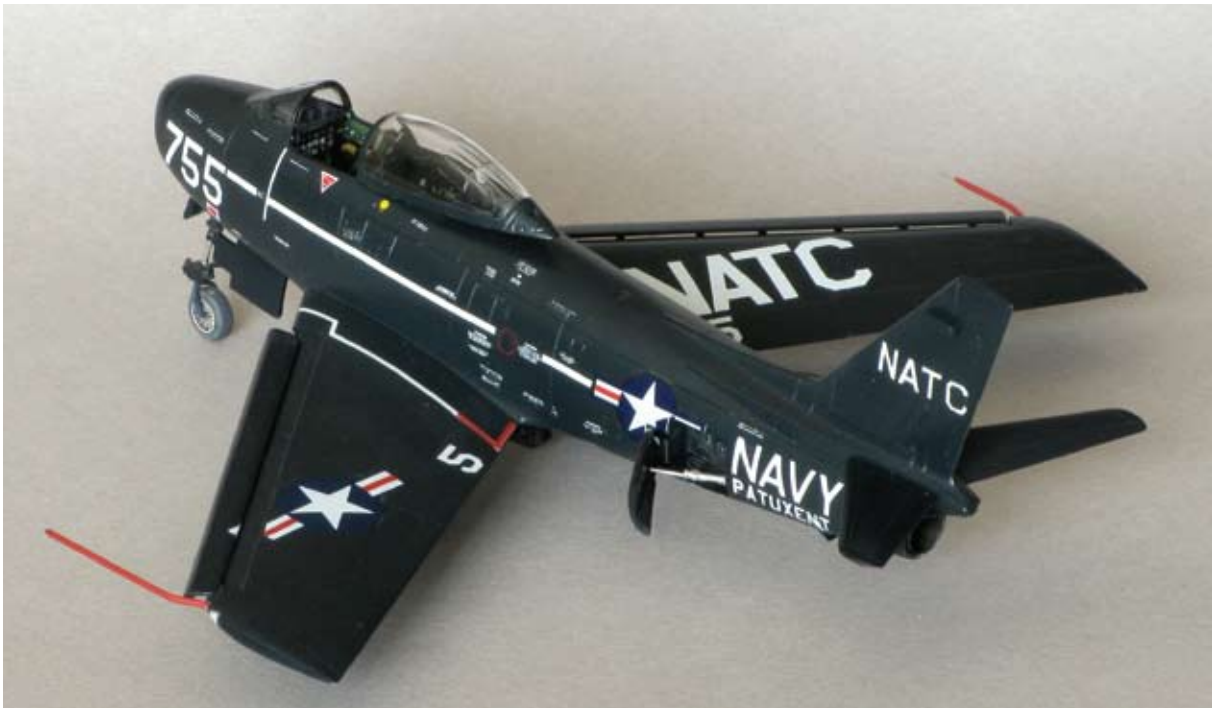
I jammed a pole up the Fury's exhaust for a handle and after the screaming died down I lightly airbrushed the model with a coat of Model Master gloss dark sea blue FS15042. I let the enamel paint dry rock hard (about a week, until the "clay" smell diminished) and then wet-sanded with 2000-grit paper. Then I polished it with my KISS nail polishing stick and hosed on a second coat of dark sea blue. After about 30 minutes, I applied a final coat except with about 70 percent thinner to give it a final gloss coat. It was glossy, but I wanted it even more so, so I over-coated the model with Future thinned with 10 percent alcohol.

Ah yes. Decals. Why is it that I can find decals for an obscure German Veelund-der-foker-schmit airplane flown by the Brazilian Air Force over Peru in the 1950s but I can't locate white letters? So I put out an APB for white letters. My good friend Dave Hansen supplied

When the masking was removed, the canopy was crystal clear thanks to a dip in Future floor polish.

F-86E Sabre >> XFJ-2 Fury

- Use the Academy F-86E kit and modify the wing to a shorter chord pre-6-3 wing. Remove 2.1mm (0.080 inches) from the root cord to 1.05mm (0.040 inches) from the tip cord after the leading edge is cut off just behind the slat trailing edge
- The XFJ-2 #755 was unarmed. The #755 Fury at the Naval Air Museum has gun ports - either it's not the same airplane but repainted as #755, or, it was modified later to include the guns. The still photo references, Louie, plus the DVD clearly indicate that there were no gun ports on #755
- Cockpit and instrument panels are interior black
- Add a "flotation device" to the underside of right wing tip (0.4" X 0.15")
- Add a small camera pod on left side of vertical tail near the top. There were no dimensions so I guessed (0.10" square and 0.15" long)
- Add second fuel dump on right side (same as left side). Paint both red
- Make longer nose gear and fork; about ¼ inch longer; use brass rod/tube
- All gears, doors and slat interiors are dark sea blue
- Add V-shaped arresting hook
- Add barrier pickup (small rectangle of plastic painted black with white stripes) to the belly centerline just a little aft of nose gear well
- Add larger diameter and longer pitot probe on left wing tip (brass wire). Both pitot probes are red
- Add a red dot in front of and just a little to the right of the wind screen (barrier guard – it's a pole that pops up to snag the barrier wires on the aircraft carrier to keep the wire from decapitating the pilot.)



Decals for the white lettering were nonexistent but Bill found a solution by tapping other muddlers.

the majority of the white letters and numbers from his collection. The "Patuxent" decals came from some IPMS members. This team effort included Norm Filer, who printed them, John Heck, who did the art, and Chris Bucholtz of Obscureco Aircraft who basically put John and Norm together as a sort of project manager.

So Dave, Norm, John and Chris came to my rescue! Thanks guys. Without their help this model would be an all blue El Diablo. Not that there's anything wrong with that.

I found some white stenciling from a Crusader decal sheet (Super Scale 72-385). All of the white stripes were made by painting a few dust coats of Model Master Acryl white primer then a few light coats of Model Master Acryl gloss white over a clear decal sheet and then cutting out the white lines with a new X-Acto blade.

I over-sprayed the decals with Future to lock in the decals. The Fury was now decaled and very glossy – a little too glossy. So, two evenings later I mixed a 50-40-10 percent mixture of Future, alcohol and Tamiya flat base respectively and sprayed it on the model. This gave a very slightly dulled semi-gloss, still shiny but not garishly glossy. Again I held the model up to the TV screen with an image from the DVD and compared the shininess; looked good to me.

The little bits like the fuel dumps (the DVD film shows two fuel dumps by the way – one on each side) and pitot probes were first painted with white primer and then later red and finally installed along with the landing gears and doors. The exhaust was painted a flat dirty brown by hand and streaked by dry-brushing with light gray

The tail skid was just a small rectangle of .015 plastic painted blue with a small brass rod painted silver for a strut.

I changed the nose gear scissors after the nose gear was attached. The sitting angle of the airplane was correct but the oleo looked too extended. I checked a shot of the Fury on the deck of a carrier and I could see that my oleo was just a little too long and the scissors were spread too wide. It looked like it would if it were extended in flight. So, I snapped off the original scissors and made a new one with a reduced acute angle.

The Academy kit is really nice. And this build was fun. It did take a little work to first get to the F-86E but very doable. Oh yes, and I got to talk to the designer, which was a kick. Thanks go to Dave Hansen for the white letters and numbers and moral support, and to the Norm Filer, John Heck and Chris Bucholtz team for the Patuxent decals. ■

BILL DYE IPMS/USA #43901

Bill Dye was born and raised in Pennsylvania. He started building models when he was in first or second grade and remembers the Aurora kits, the Willey Lee space models, a large F-88 "Voodoo," even a Vigilante that shot a torpedo out the back. With a B.S. in Aerospace Engineering and his bride, Joyce, he set off to Downey, California in 1973 to work for North American Rockwell as an aerodynamic heating wind tunnel test engineer on the Space Shuttle Program. It was during this time he restarted his plastic modeling in 1:72 scale. He later moved to San Jose and began work for Lockheed, Sunnyvale, CA in 1981 as a satellite propulsion engineer. Bill retired from Lockheed 2007. He and Joyce now live in Hendersonville, NC in a house with a basement for all of his toys.