San Diego Model Expo 2018 Update 3

It's almost time for the San Diego Model Expo for 2018!

It will be held on Saturday, June 9, 2018 at the San Diego Air & Space Museum Annex at Gillespie Field, 335 Kenney Street, El Cajon, CA 92020.

Note – we are still looking for volunteers to help judge, setup, tear down and sell raffle tickets.

To volunteer to judge, please contact our lead judge, Jerry Jackson – leadjudge@ipmssd.org

To volunteer to help setup or tear down, please contact our contest coordinator Manny Gutsche – contestcoordinator@ipmssd.org

To volunteer to help sell raffle tickets, please contact our Secretary, Joel Hendricks – secretary@ipmssd.org

The themes for this year are:

"Poke the Bear" – The Soviet Union, 1917-1991

60 Years of the Chevrolet Impala

Please see the full flyer below:

2018_ModelExpo_flyer-16JAN

The registration form is here:

2018_Registration

The individual contest entry form is here:

2018_Model_Entry

Please note – you must submit one registration for all of your models together and have one entry form per entry. The registration form must be turned in during registration. Each entry form stays with its model entry and is used for judging and contest photography.

The list of categories is here:

2018_Contest_Categories

There will also be a special award for the best 1/48 scale Boeing Stearman PT-17 model – the winner will get a ride in the Stearman formerly owned by Steve McQueen! (Note – the model winner must agree to donate his or her model to the Allen Airways Flying Museum. Please see the flyer below for details.

BillAllen_Stearman_Flyer (2)

Project Mercury Test Shot!

Scratch-building a 1/48 Scale Little Joe Launch Vehicle

Photo of the Little
Joe 1 shot.

History

During the summer of 1958, as development and design advanced on Project Mercury, the United States' first manned space-flight program, it became apparent that a low-cost launch vehicle would be needed to accomplish various full-scale testing associated with the launch and recovery environment of the Mercury mission. The resulting vehicle came to be called "Little Joe" after sectional drawings showed a four-hole configuration for the large solid rocket motors. This layout reminded the designers of the crap-game throw of a double deuce on the dice.

The Little Joe vehicle was one of the first boosters designed in the U.S. that utilized the concept of clustering large multiple solid rocket motors to launch payloads for research. The main solid rocket motors chosen for the Little Joe vehicle were derived from the Sergeant rocket and were called either Castor or Pollux depending on the anticipated booster flight profile. Both the Castor and Pollux motors had the same nozzle and casing dimensions and burned for the same length of time, about 35 seconds. The difference was that an individual Pollux delivered about 40,000 lbs. of thrust, while each Castor motor's output was closer to 55,000 lbs.

As the design progressed, four Recruit solid rocket motors were added to the layout, which enhanced the operational flexibility of the vehicle. Each Recruit had about 35,000 lbs of trust and would burn for about 2-1/2 seconds. The main requirement of the booster was to qualify the Mercury spacecraft and its escape motor during the maximum dynamic portion of the Atlas launch trajectory (commonly referred to as Max q). Other test objectives of the Little Joe program included the confirmation of the Mercury capsule's load bearing integrity during launch and abort, high altitude abort, parachute deployment after launch vehicle separation and recovery techniques after landing.

Requests for proposals to build the airframe and its associated launcher assembly were disseminated to the aerospace manufacturing community during the fall of 1958 with twelve companies responding. The Missile Division of North American Aviation won the competition and was awarded a contract on December 29, 1958 to build seven airframes and the launcher assembly. Each Little Joe could be built and launched for about $200,000.00 or about one fifth the cost of a Redstone booster launch.

The initial payloads for the Little Joe launch vehicle were pre-production mercury capsules, called boilerplates, these were designed and built at the NACA/NASA Langley Research Center. Five boilerplate capsules were used on the first five launch attempts with two McDonnell built production capsules used on the last three flights. Both of the initial boilerplate and production flights were failures with their payloads being destroyed at the end of those flights. The last two flights used the same production capsule with the last flight qualifying the MacDonnell spacecraft for manned spaceflight.

The Little Joe launch vehicle was designed with enough flexibility to accommodate several different flight regimes. This flexibility resulted from installing either two or four Castor or Pollux solids as well as the four Recruit motors. The first series of lower altitude Max q tests (LJ-1, LJ-6, LJ-1a & LJ-1b) used two live and two inert Pollux and four live Recruit motors while the three production capsule flights used two live and two inert Castor motors as well as the four Recruit motors. The one high-altitude flight (LJ-2) used the ultimate configuration, four live Castor and four Recruit motors. The process of certifying the production spacecraft and launch escape system (LJ-5, LJ-5a & LJ-5b) also included certification of the operational parachute recovery system, retrorocket package, the orbital hatch, and the spacecraft to booster umbilical fairings. Since the Little Joe was envisioned as a low-cost alternative to the Redstone and Atlas boosters, no guidance system was developed. Four large fins that surrounded the lower exterior of the booster were used to stabilize the vehicle in flight.

Flight-testing with the Little Joe began in August 21, 1959, and all of the flight tests took place from the Wallops Island Station, located on the eastern shore of Virginia. The eighth and last Little Joe flight occurred on April 28, 1961.

The Model

Digging into the program showed that all eight of the original Little Joe flights had slight differences in markings and details. So I decided to model a specific flight, finally settling on the LJ-1b round, which was the first flight to demonstrate the primary objective of the Little Joe program, a successful abort sequence while flying the anticipated Atlas Max *q* ascent profile. This mission was flown on January 21, 1960.

I began the model after drawing up a set of plans for the little Joe booster, payloads and the launcher assembly in 1/48 scale. Using .040” sheet styrene the cylindrical booster parts and the spacecraft adaptor were vacuuformed off of wooden masters. Sheet stock of the same thickness was used to make the disks that held the motors as well as the ring frame. The Recruit and Pollux motor shapes as well as the fins, were initially scratch-built and then multiple copies were resin cast to make up the sets needed.

After the motor support disks were fitted into the cylindrical section the two booster haves were glued together and the resulting seams filled and sanded. *(See Figs.1 & 2)* .005” thick sheet styrene fin-reinforcing plates were then added to the outside of the booster under the location of the four fins. After the airframe was scribed attention moved to the fins themselves as well as the adapter. The fins were mastered out of .020” styrene sheet and constructed in such a way as to allow for the inclusion of a stub wedge, which could be attached to the airframe and created a positive attachment surface for the fins to the airframe.

Fig.1 – A. Basic vacuuformed pieces for the airframe and adapter. B. Cylinder haves cut out. C. Interior of cylinder halves with mounting locators for the rocket motors. D. Motor and cylinder alignment disks.

Fig2 – A The original Pollux motor shape with its resin copy above and the recruit motor below. B. Motor cluster in alignment disks. C. Airframe cylinder with Castor/Pullux motors dry-fitted. D. The layout of the motors in one half of the airframe.

The two halves of the spacecraft adapter were sanded to the correct length, attached together and then the location of the twenty bolt attach cutouts were cut away near the top of the adapter. The locations of the cutouts were determined by using a paper pattern that was taken from the plans. The cutouts were backed with .010” styrene sheet stock and all voids were filled. A short lip was added to the inside of the top of the cylindrical booster and a .005” by .020” styrene ring was glued to the outside of this lip. The lip and ring centered the adapter on the launch vehicle cylinder and created a panel line between the adapter and the top of the booster.

At the bottom of the booster, a modified cruciform I-beam was created that supported the lower portions of the recruit motors and the fins on the launch pad. This was made of .010” styrene strip and sheet. The sheet was cut to the cruciform shape and the strip was used for the sides of the shape.

After construction on the booster was finished, work turned to the payload. The LJ-1b round utilized a Mercury boilerplate capsule shape. While the size and shape of the boilerplate was the same as the production capsule, the exterior details were completely different. For the spacecraft shape itself, I vacuuformed parts for the crew cabin section, parachute compartment and the antenna canister. The exterior details on these parts were added using strip and sheet styrene of various thicknesses. These parts were then resin cast.

Fig.3 – The scratch-build boilerplate Mercury Capsule master parts. B. The resin copies of the boilerplate parts. C. The Little Joe adapter; on the right, the bolt-holes are being cut out, on the left, all bolt-holes are finished and the adapter seams have yet to be filled.

I used some of the 1/48 Revell/Monogram Mercury kit parts for the escape tower but scratch-build most of the assembly. Styrene rod was cut to make the tower legs and a jig was created that allowed the three basic parts for each tower leg to be assembled. The three tower legs were temporarily attached to the kit aero-wedge fairing and also to the modified bottom of the escape motor. The new antenna cap was then attached to each leg and .020" styrene rod was cut to fit for each horizontal and diagonal tower strut needed. The kit also supplied the main escape motor exhaust nozzles.

Fig.4 – A. The jig used to make the escape tower legs. B. In the upper left is the jig used to align the main motor nozzles on the escape motor end cap, the modified nozzles are to the right and the modifications made to the end cap in the lower left. C. and D. both show the finished escape tower.

The Launcher

The launcher was based on photographs taken by Sven Knudsen as well as contemporary photographs and drawings supplied to me by Ben Gunther. I re-drew the launch pad and support mast based on these sources and used these drawings as well as a scaled parts breakdown to create the launcher for the model.

The launcher consisted of the base, launch vehicle support, pivot and jackscrew cover, and the umbilical mast assemblies. Because the Little Joe was unguided, the launcher was constructed to allow the vehicle to be aimed in both azimuth and elevation. Both movements were controlled by electrically powered jackscrews with limit switches that could be manually set to prevent over-travel. The elevation change was limited to 20 degrees from the vertical while the azimuth travel was limited to 90 degrees.

Construction started with the tripod shaped base assembly, which supported the rest of the launcher. .010″, .015″, .020″ and .030″ styrene sheet as well as Evergreen tube was used to make the base assembly. The launch vehicle support assembly was tackled next and this structure with its four launch vehicle support pads needed to fit the bottom of the Little Joe airframe. The U-shaped rectangular boxes were constructed with .040″ sides and joists and covered with .015″ skins. The mast support pads were added, as were the four booster support pylons. The jackscrew cover assembly was tackled next. This was constructed mainly out of .015″ sheet stock and included two “ramps” which allowed the legs of the support assembly to be positioned at an 80-degree elevation.

Fig.5 – A through D. In-progress shots of the build-up of the launch stand base.

Fig.6 – A. through D. The jackscrew cover for the launch stand.

The mast assembly consisted of two I-beam sections constructed out of .015″ sheet for the web and .010″ strip for the flanges. The stabilizing arm at the top of the lower mast included a small length of piano wire to attach the top of the booster to the mast. The various lines and mechanical devices used to retract cables and such were then cobbled together.

Fig.7 – A. & B. The launch vehicle support assembly. C. The umbilical mast.

The base for the model was made out of .040″ styrene sheet glued to a ¾” plywood sheet cut large enough so that an acrylic dust cover could cover the model. The mounting pads for the launcher were added, as were sections of the rails that supported the scaffold, which was used during the erection of the vehicle onto the launcher. An oak frame was then added to finish off the sides of the base.

A last test fit of all of the major sub-assemblies was carried out and any tweaks were performed before disassembly and the process of painting and decaling could begin.

Fig.8 – final fit-up of all of the major parts of the model. All of this is temporarily glued together with Aleene’s Original Tacky Glue.

Paint and Decals

The Little Joe launch vehicles and boilerplate capsules were finished in high-contrast colors to aid in photographic documentation of the flights. I ended up using an old Scale-Master solid color sheet that was a very close match to Testors International Orange (FS 12197) that looked to be close enough to the orange used on the Little Joe vehicle. This allowed me to use the decal sheet on the fins and the cylindrical areas of the model.

Prior to painting the launcher, the small assembly details were finished off. These included rivets made with white glue, Grantline bolts and grab handles out of some railroad detail sets I had. The sub-assemblies were then given a primer coat, any flaws were taken care of and Testors Medium Gray, FS 35237 was applied. The model base itself received a coat of Floquil Concrete and the metal rail guides were hand painted using Testors Metalizer Magnesium. Some general staining and blast effects were added using thinned paint and pastel chalks.

On the Mercury launch escape system, the tower and escape motor parts were first primed with Testors Lt. Gull Gray and then airbrushed with several light coats of Floquil Reefer White. The escape motor casing and antenna canister were then painted with the International Orange color. The tower, bottom of the escape motor including the three nozzles and the stability wedge had Testors Flat Black applied. The tower jettison motor was painted with Floquil Reefer Yellow. After all escape tower/motor parts had dried, the parts were carefully assembled using 5-minute epoxy.

The main airframe cylinder, adapter and fins were all primed with Alclad primer and then Alclad II Dull Aluminum was applied. The fins were masked leaving the leading edge exposed and Testors Metalizer Aluminum was used to give some color variation. Paper patterns were created for the orange and black markings on the fins and these were cutout from the Scale-Master solid decal sheet and applied with some Micro-Sol to help settle them down. The International Orange panels on the cylinder were also cut out of the solid decal sheet using paper patterns for size. It took two sets of decals to get the orange opaque enough on the metallic surfaces. I drew up the UNITED STATES stencils for both the airframe and capsule in my antiquated 2D-CAD program and the file was sent off to Rick Sternbach of Space Model Systems. Rick kindly created the decals on his now defunct Alps printer, which truly finished off the look of the model.

The exterior of the Castor motors were painted with Floquil Reefer White and then masked to paint the orange and yellow colored bands on the nozzles. The interiors of the nozzles were painted with a deeper shade of Alclad. A similar technique was used on the recruit motors with the exterior colors being red and Alclad II Jet Exhaust.

Final Assembly

The capsule was attached to the adapter section and the Marman Clamp cover and fairings were created and applied. After a coat of primer the entire capsule/Marman clamp fairing/adapter was painted Floquil Reefer White, then masking was applied to spray the upper half of the boilerplate Folquil Old Silver and the lower part of the adapter Alclad Dull Aluminum. The white on the capsule side and the Dull Aluminum on the adapter was then masked off with the resulting area sprayed Testors International Orange. After masking off the orange band on the adapter the Marman clamp cover/fairings were painted flat black. Paper patterns were also created for the orange panels on the capsule shape and the solid orange decal sheet once again supplied the color for those areas.

For final assembly, the launcher subassemblies were attached together using 5-minute epoxy and the launcher was attached to the base. After the motors and their cruciform support were attached to the bottom of the airframe, this was attached to the launcher. The capsule/adapter assembly was then added to the top of the airframe and the umbilical wiring added from the launcher to the rocket. Finally the escape tower assembly and the fins were attached to complete the model.

At 1/48 scale, the Little Joe is small enough to sit comfortably on the shelf yet large enough to show-off some of the details of the real thing. All of the North American Little Joe boosters were used in the test program but the launcher and two replicas are still in existence. It's a long trip out to the Wallops Island Visitors Center, that's where the launcher and one replica is exhibited. The other replica resides at the Hampton Air Power Park, Hampton, Virginia.

Photos of the Finished Model

April 2018 Meeting

During our April meeting, we welcomed a lot of new folks to our club who brought models for show n' tell. We also held our bi-annual model contest which our Lead Judge, Jerry Jackson, used as an opportunity to train new judges. Full results of the contest are in the picture below, but Tim Shipley won the Best in Show for his 1-48 Stearman. Our Tie Fighter group build continues. Our next meeting will be held on Friday, May 25. That will be our last meeting before the San Diego Model Expo which will be held on June 9.

All pictures were taken by Ethan Idenmill

EVA Models 1/32 Scale Lunar Roving Vehicle

AS15-88-11901

History

The Apollo Lunar Roving Vehicle (LRV) was an electric-powered vehicle designed to operate in the low-gravity vacuum of the Moon and to be capable of traversing the lunar surface, allowing the Apollo astronauts to extend the range of their surface extravehicular activities. Three LRVs were used on the Moon: one on Apollo 15 by astronauts David Scott and Jim Irwin, one on Apollo 16 by John Young and Charles Duke, and one on Apollo 17 by Eugene Cernan and Harrison Schmitt.

During 1965 and 1967, the Summer Conference on Lunar Exploration and Science brought together leading scientists to assess NASA’s planning for exploring the Moon and to make recommendations. One of their findings was that a Local Science Service Module (LSSM) was critical to a successful program and should be given major attention. At MSFC, von Braun established the Lunar Roving Task team, and in May 1969, NASA selected the Lunar Roving Vehicle (LRV) for use in manned lunar missions and approved the Manned Lunar Rover Vehicle Program as a MSFC hardware development.

On 11 July 1969, just before the successful Moon landing of Apollo 11, a request for proposal for the final development and building the Apollo LRV was released by MSFC. Boeing, Bendix, Grumman and Chrysler submitted proposals. Following three months of proposal evaluation and negotiations, Boeing was selected as the Apollo LRV prime contractor on 28 October

1969. Boeing would manage the LRV project in Huntsville, Alabama. As a major subcontractor, General Motors' Defense Research Laboratories in Santa Barbara, California, would furnish the mobility system (wheels, motors, and suspension), Boeing in Seattle, Washington, would furnish the electronics and navigation system. Vehicle testing would take place at the Boeing facility in Kent, Washington, and the chassis manufacturing and overall assembly would be at the Boeing facility in Huntsville.

The first cost-plus-incentive-fee contract to Boeing was for $19,000,000 and called for delivery of the first LRV by 1 April 1971. Cost overruns, however, led to a final cost of $38,000,000, which was about the same as NASA's original estimate. Four lunar rovers were built, one each for Apollo missions 15, 16, and 17; and one used for spare parts after the cancellation of further Apollo missions. Other LRV models were built: a static model to assist with human factors design; an engineering model to design and integrate the subsystems; two one-sixth gravity models for testing the deployment mechanism; a one-gravity trainer to give the astronauts instruction in the operation of the rover and allow them to practice driving it; a mass model to test the effect of the rover on the LM structure, balance, and handling; a vibration test unit to study the LRV's durability and handling of launch stresses; and a qualification test unit to study integration of all LRV subsystems.

LRVs were used for greater surface mobility during the Apollo J-class missions, Apollo's 15,16 and 17. The rover was first used on 31 July 1971, during the Apollo 15 mission. This greatly expanded the range of the lunar explorers. Previous teams of astronauts were restricted to short walking distances around the landing site due to the bulky space suit equipment required to sustain life in the lunar environment. The range, however, was operationally restricted to remain within walking distance of the lunar module, in case the rover broke down at any point. The rovers were designed with a top speed of about 8 mph (13 km/h).

The LRV was developed in only 17 months and performed all its functions on the Moon with no major anomalies. Scientist-astronaut Harrison Schmitt of Apollo 17 said, “The Lunar Rover proved to be the reliable, safe and flexible lunar exploration vehicle we expected it to be. Without it, the major scientific discoveries of Apollo 15, 16, and 17 would not have been possible; and our current understanding of lunar evolution would not have been possible.”

The LRVs experienced some minor problems. The rear fender extension on the Apollo 16 LRV was lost during the mission’s second extra-vehicular activity (EVA) when John Young bumped into it while going to assist Charles Duke. The dust thrown up from the wheel covered the crew, the console, and the communications equipment. High battery temperatures and resulting high power consumption ensued. No repair attempt was mentioned.

The fender extension on the Apollo 17 LRV broke when accidentally bumped by Eugene Cernan with a hammer handle. Cernan and Schmitt taped the extension back in place, but due to the dusty surfaces, the tape did not adhere and the extension was lost after about one hour of driving, causing the astronauts to be covered with dust. For their second EVA, a replacement “fender” was made with some EVA maps, duct tape, and a pair of clamps from inside the Lunar Module that were nominally intended for the moveable overhead light. This repair was later undone so that the clamps could be taken inside for the return launch.

Also on the Apollo 15 mission during the initial checkout it was discovered that the front steering mechanism did not work. However the rover was designed with both front and rear steering so that on the first traverse only the rear steering was used. Prior to the second traverse the astronauts succeeded in freeing the front steering mechanism.

The color TV camera mounted on the front of the LRV could be remotely operated by Mission Control in pan and tilt axes as well as zoom. This allowed far better television coverage of the EVA than the earlier missions. On each mission, at the conclusion of the astronauts' stay on the surface, the commander drove the LRV to a position away from the Lunar Module so that the camera could record the ascent stage launch. The camera operator in Mission Control experienced difficulty in timing the various delays so that the LM ascent stage was in frame through the launch. On the third and final attempt (Apollo 17), the launch and ascent were successfully tracked.

(*Excerpted from Wikipedia*)

The Model

I bought the EVA Models 1/32 Scale Lunar Roving Vehicle (LRV) at the 1998 IPMS Nationals, which was held in Santa Clara, California. With resin castings which are delicate and crisp and the well-detailed photo-etched parts, the kit is typical for a multi-media offering. A very nice, well-detailed 3-page assembly instruction sheet was included. Two astronaut figures and a lunar base are also included in the kit.

The box contains 93 resin parts; 10 of which make up the two figures, plus the base and one other that is the alignment former for the High-Gain Antenna. Also there are 24 photo etch parts on a single fret and some miscellaneous styrene rod. There are many small and delicate resin parts, so care needs to be taken in removing them from their carrier. I used an X-acto micro saw to remove the smaller resin parts. There were some minor pinholes in some parts and occasionally while sanding the carrier remnants off of the parts, more were revealed. I found that Squadron White Filler Putty worked just fine in filling those holes.

I started work on the kit with the wheels and fenders. After cleaning up the wheel, a determination of what direction was “up” based on the location of the attachment points for the suspension was needed. Then a hole was drilled straight into the bottom of each wheel to accept a short length of .050 stainless steel wire to attach it to the base. The “chevron treads” were a breeze to put on, I just follow the directions given. The only change I made was to use 3/16” diameter rod instead of the 1/4” suggested to form the chevrons so that when they are attached, they are definitely pushed out to fit the contour of the wheels. I made sure to create two pairs of wheels; all of the chevrons needed to “point” forward when the wheels are attached to the chassis frame.

Painting the wheels started by airbrushing the inside and outside wheel hubs with Testor’s Metal Master Non-Buffing Steel. Paper masks were then applied to the hubs and the rest of the wheels were airbrushed with Testor’s Metalizer Buffing Titanium. After letting the wheels sit of a day, the outer portions of the disks were masked and the center hubs on the outside the electrical motor housings on the inside were airbrushed flat white. After removing the masking the attachment points for the suspension were brush painted with Testor’s Metalizer Non-Buffing Aluminum. Taking a small amount of SNJ’s aluminum polishing powder and a old cotton shirt, the chevrons were lightly rubbed to give them a slightly different sheen that the rest of the wheel. For the final step on the wheels I used Scale-Master Sheet #SS-3 White Striping and Sheet #SS-2 Black Striping to make the white and black markings that go on the outer sides of each wheel disk.

The main fenders are really delicate so after carefully removing them from their pour stubs I used a dulled #10 X-Acto blade to adze their edges. I wanted the inside ridge to match the existing ridge on the outside of each fender. All of the fender extensions were left on their carriers to ease the process of painting and decaling. The color for the fenders was made from Floquil Railroad Colors. I mixed a little Reefer White into Reefer Orange to take the orange down some, and then I mixed in some Floquil Tuscan to darken the tint. I tried to match the color to photos taken of the rovers on the moon. After all sides of the fender parts were painted the insides of the fenders and the extensions were airbrushed with Testor’s Medium Gray and then an overcoat misting of Testor’s Gunship Gray. Both front fender dust flaps (part 27) were base painted with Testor’s Dark Ghost Gray then over-sprayed with the Medium and Gunship gray on the insides like the rest of the fender parts. The American flag decals on the fender extensions were applied over a white decal rectangle taken from the “spares” box. The final step was to take a mix of Floquil’s Gloss and Flat Clear and overcoat the outside surfaces of the fenders and extensions.

Now it was on to the chassis frame, I assembled the forward chassis section (Part 3) to the four torsion bar receptacles and after airbrushing the battery covers flat white and masking them, the frame was airbrushed with Testor’s Light Gray. Using thinned Testor’s Medium Gray, the battery covers were then accented. The rear chassis (part 2) was assembled with the remaining torsion bar receptacles, and its inner support (part 6) were also painted light gray. After drying, parts 2 & 6 were assembled together. Next, all of the torsion bars, made out of the .025 styrene rod were attached and brush painted with the Testor’s Non-Buffing Aluminum. The center chassis was then assembled and the frame was painted with the light gray. After the frame was masked, the floorboards were airbrushed with the Testor’s Non-Buffing Aluminum. To attach the three chassis sections, I super glued the sections together and then drilled a .028 hole through the inside of the center chassis frame into each side frame member of the front and rear chassis assemblies. Then a length of .025 stainless steel wire was glued into each hole to support the weight of rest of the vehicle and the seated crewman. I didn’t bother to fill in the holes, as the seat assemblies and the footrests would cover them. The brackets on the side of the center chassis were painted with flat white and the white and black markings were cut out of decal material.

There was a little flash on the webbing on the seat backs, so a lot of care was taken when cleaning the edges of the webbing and the tubular frame, as they are very fragile. The seat bottoms were painted separately from the seat backs. I airbrushed the bottom seats parts flat white and after masking, I airbrushed both the canvas covering of the seat bottoms and the webbing on the seat backs with Testor’s Sand. After drying, the horizontal webbing members on the seat backs were brush painted with Testor’s Non-Specular Sea Blue, and the frame was hand brushed with the light gray. The seat parts were then weathered with Testor’s Medium Gray and drybrushed with Testor’s Camouflage Gray. After drying, the carrier was sanded off of the seat backs and the parts glued together with CA glue.

For the assembly of the High-Gain Antenna, I followed the kit’s assembly instructions with the following changes. Prior to step one, I painted the groves in the resin former black so that when the wire mesh is applied, the groves are still visible, as this would help later in the alignment of the ribs. I then proceeded through step five. In step six, after gluing the inner end of each rib to the etched disc, I only tacked the outer end of the ribs to the wire screen. Then I proceeded to complete steps seven and eight. (You will find that after attaching the deployment mechanism central core (part 31) to the ribs they are strong enough to survive the removal of the antenna from the former and your chances of gluing the screen to the former is considerably lessened.) After I had attached part 31 to the inner ends of the ribs, I went back and re-attached any rib outer ends that had popped loose. (In my kit, the curvature of the ribs was not quite the same as the curvature of the resin former.) I then proceeded to step ten and cut the antenna off of the former. After it was loose, most of the rib ends had again popped loose, this turned out to be a good thing as I found it much easier to trim the edges of the wire screen without the ends of the ribs being glued down. It was also easier to attach the length of the ribs to the wire screen without the resin former. I could put my finger under the mesh and carefully glue the rib down. After all of the ribs ends were re-glued, I carefully brush painted the ribs with the Testor's Non-Buffing Aluminum. I did change the length of the large rod called out in step 7 of the general directions that goes between part 45 and 49 to 1/2" instead of 3/4". This looked a little more in-scale to me based on the LRV lunar surface photos.

I replaced the resin "mast" which supports the High-Gain antenna. The new support included a replacement for the short steel rod and was, I felt, more structurally sound. It includes two telescoping steel tubes and a length of .025 K & S stainless steel music wire. The existing resin part was used as a guide in cutting the lengths for the new parts. The larger steel tube is approximately .060 O.D. and .042 I.D., while the smaller tube is about .040 O.D. and .028 I.D. I replaced the small length of .025 steel music wire included in the kit with a longer piece that ran the length of the support.

The Storage Pallet Assembly was built as per step 4 in the instructions; the only exception was that I painted all of the major pallet parts light gray instead of flat white. Part 19, the Control & Display Console, was painted flat white, masked, and the face painted flat black. When dry, the dials and switches were drybrushed with Camouflage Gray and the details painted, I used the same color mix for the arm rest as was used on the fenders. The hand Controller (Parts 22A, 22B) was assembled, painted flat white and attached. after painting the handle of the Lunar Communications Relay Unit (LCRU) (Part 9), white and the left side instrument panel black, the rest of the unit was covered with a deep gold foil. The Television Control Unit (TCU) (Part 32) and TV Camera (Part 21) also had foil applied after being painted. The thermal control mirrors on the TCU and camera were made out of Silver Shrink Mirror. The parts for the 16mm Camera and Low-Gain Antenna were assembled after being painted, the only change being the replacement of the support rod for the Low-Gain Antenna with a piece of .025 steel music wire. Finally the outer wings of the footrests were removed and the footrests were air brushed with Testor's Non-Buffing Aluminum. All of the subassemblies were then set aside until after the chassis and suspension were put together.

To attach the wheels to the chassis I created a 1/2" plywood base jig and on it, located the wheelbase and wheel width and then drilled holes to accept the .050 steel rods that were in the bottom of the wheels. The center of the jig was built up so that the chassis sat 15-1/2 scale inches above the bottom of the wheels and located so that the wheels were in line with the velocity-square dampers (Part 26). The jig center section had the same dimensions as those of the LRV center chassis. The chassis was then spot-glued with Aleene's Tacky Glue directly to the center section of the jig and the wheels were placed into their locator holes. This is why it's important that the locator holes drilled into the bottom of the wheels be as straight as possible, as they will determine the look of the vehicle after the suspension pieces are put on. To complete the suspension was a simple matter of cutting the .035 styrene rod provided in the kit to the correct lengths and adapting the velocity-square dampers to the top of the wheel and chassis. I used Zap-A-Gap CA to secure all of these parts. The dampers were pre-painted while the rods were brushed painted with the non-buffing aluminum after the vehicle was removed from the jig. While the vehicle was still glued to the jig, I attached the fender parts to the wheel. The instruction sheet implies that you do this prior to attaching the wheels to the suspension, but I wanted the fenders to be lined up with the vehicle’s local horizon. I used small strips of black shrink tubing cut to 1/32” wide for the runners on the main fender parts. The extensions were then attached to the shrink tube runners. After all suspension parts were applied the tacky glue was wetted and the vehicle carefully lifted off of the jig.

The last steps were to apply all of the subassemblies to the vehicle. I used the jig as support while attaching the seats, control console, footrests, aft equipment rack, antenna assemblies and cameras. I went to an electronics supply store and got the thinnest white insulated wire I could find and used it for the cabling between the antenna, the camera and their control assemblies.

The vehicle scales out very well to the documentation that I have. The 90” wheelbase measured out exactly, while the distance from between left and right wheels ended up being 75” instead of the 72” that my documentation shows. This was done so that the wheels would sit in the tracks on the lunar landscape base supplied with the kit. If one wants to include the hinging mechanisms between the chassis section then some modifications might have to be made to the forward and aft chassis frames to keep the wheelbase at 90”. The width of each wheel is right-on at 9” and the diameter is also correct at 32.19” (Yea, like I could really measure that .19”!) The finished diameter of my HGA mesh measured out to 33”, while the diameter that I have for the real thing says it should be 38”. This difference could very well be caused by my construction method as there certainly can be some leeway in the final diameter based on how one attaches the ribs to the center disk. The seats appear to be a bit too wide and the configuration of the seat covers is not the same as the lunar vehicles. This would be very hard to change and I don’t think it would be worth the hassle.

All in all, this is a really great kit! The build-up went relatively smoothly, the only problems I encountered were related to my unfamiliarity with the media used in the kit. I also had some difficulty with the HGA build-up. The results, however, were well worth the work. When finished, the kit looks great and you get a very complete, visually stunning replica of the LRV.

March 2018 Meeting

We had a great meeting on March 30 at the Girl Scouts headquarters. We had lots of show n' tell. Thanks to Dan King for taking photos.

For next time, please bring an entry for our semi-annual club contest. If you are interested in judging at ModelExpo, this contest will be a good opportunity to give it a try. Also, if you are interested in helping to take photos at the ModelExpo, we will have a training session. Finally, please bring your Tie Fighters for the continuing group build.

San Diego Model Expo 2018 Update 2

We are busy preparing for the San Diego Model Expo for 2018, which will be held on Saturday, June 9, 2018 at the San Diego Air & Space Museum Annex at Gillespie Field, 335 Kenney Street, El Cajon, CA 92020.

The themes for this year are:

“Poke the Bear” – The Soviet Union, 1917-1991

60 Years of the Chevrolet Impala

Please see the full flyer below:

2018_ModelExpo_flyer-16JAN

The registration form is here:

2018_Registration

The individual contest entry form is here:

2018_Model_Entry

Please note – you must submit one registration for all of your models together and have one entry form per entry. The registration form must be turned in during registration. Each entry form stays with its model entry and is used for judging and contest photography.

The list of categories is here:

2018_Contest_Categories

There will also be a special award for the best 1/48 scale Boeing Stearman PT-17 model – the winner will get a ride in the Stearman formerly owned by Steve McQueen! (Note – the model winner must agree to donate his or her model to the Allen Airways Flying Museum. Please see the flyer below for details.

BillAllen_Stearman_Flyer (2)

February 2018 Meeting

We had a great meeting in February. We had lots of models brought in for show n' tell. The Tie Fighter group build held its second meeting. The Model Expo planning committee also held a meeting regarding the current status of our June contest. As a reminder the San Diego Model Expo will be held on Saturday, June 9 at the Gillespie Field annex of the San Diego Air and Space Museum in conjunction with the San Diego Model Car Club. Please see San Diego Model Expo 2018 and San Diego Model Expo 2018 Update 1 for details. In May we will have training sessions for anyone who would like to judge or take photographs at the June contest.

Modeling the Gemini-B in 1/24 Scale

US Air Force Image of the anticipated Manned Orbital Lab Circa 1964

A Very Short History

The U.S. Air Force's Manned Orbital Lab (MOL) project was first announced on December 10, 1963; by Defense Secretary Robert McNamera, at the same press conference he announced the cancellation of the U. S. Air Force's DynaSoar project. On August 25, 1965, President Johnson announced the formal go-ahead of the project. The program as announced was to consist of two unmanned and five manned flights originating from Vandenberg Air Force Base in California. Douglas was to build the laboratory, McDonnell the Gemini B and General Electric was to manage the experiment package. In 1968, fabrication of the first three flight vehicles (two unmanned and the first manned spacecraft) was undertaken. The entire vehicle was to be launched on a variant of the Titan IIIC called the Titan IIIM. On June 10, 1969, the Deputy Secretary of Defense, David Packard, announced the cancellation of the MOL project on grounds of cost savings and "advances in automated techniques for unmanned satellite systems". In the interim a total of 1.4 billion dollars had been spent on the Air Force's Manned Orbital Laboratory space project.

McDonnell Gemini B Image

The Gemini-B Vehicle Description

The model depicts the McDonnell portion of the project and consists of the Gemini-B re-entry vehicle and the spacecraft adapter. (A vehicle modified from the NASA Gemini spacecraft which was flown as America's second manned space program.) Several mockups, trainers and at least one flight article were assembled by McDonnell prior the cancellation of the program. The major changes from NASA's Gemini included a thicker and slightly wider heat shield. A unique 25.8″ diameter heat shield hatch and a 25″ diameter Large Pressure Bulkhead (LPB) hatch that would allow the astronauts direct, pressurized access to the laboratory portion of the spacecraft. Also modified were the seats, hatch stowage area and instrument panels. The Gemini B Adapter Module was completely different from the NASA Gemini Adapter Module. First off, it was only 54.03″ in height. The forward diameter being the same as the NASA Gemini adapter (88.50″) but the base diameter was 118.35″. (The NASA Gemini adapter was 90.0″ tall, with a base diameter of 120″.) Like the NASA Gemini adapter, the "B" adapter was divided into two sections. However, also unlike the NASA Gemini adapter, the longer section was the retro adapter (at 33.32″). The major internal components included the six retro-rockets and their support structure, a crew transfer tunnel and the environmental control system coolant pump module. The 20.17″ tall equipment adapter included two equipment beams, which supported the main batteries, several "electronic black boxes", the primary oxygen subsystem and the Gemini-B crew cabin coolant module water tanks. The equipment adapter also housed the pad abort control system separation rockets.

McDonnell Gemini B Image

Two kits of the 1993 Revell re-release of the 1/24 scale

Gemini Spacecraft model (first released in 1966) were used to create this model.

Crew Cabin – External Changes

Each of the three sections of the crew compartment (parts Nos. 12, 13, 14) needed some amount of modification. On the bottom of part No. 14, the shingled section that includes the slot for the stand was removed and replaced with a similar section from a second kit. The major change on both the left and right crew compartment parts (Nos. 12 & 13) involved lengthening the coves in front of the hatches. This started by placing the hatches in their respective openings and, using a French curve, drawing the outline of the lengthened cove. The material within those lines was then removed using a razor saw and files. The second kit was again used to supply the lengthen cove material. This cove area came from the hatch as well as the adjacent crew compartment area. After gluing these two areas together, they were then shaped to fit into the vacant space.

New cove pieces fitted into Part 13.

After the outside edges of each new cove were shaped to fit, the hatch-side edge was faired in so that the hatch would fit snugly. This edge was further modified to accommodate a new hatch sill. Other modifications to parts No. 12 7 13 included the reduction of both hatch sills by a little more than half their original width, the removal of the equipment section to crew cabin section umbilical covers just below each hatch opening and the filling of the hatch hinge pin receptacles. The last modification made was to the lower portion of the parachute bridle on part 13 to mirror its configuration on part 12. After these modifications, the edges of the three crew compartment parts were lightly sanded and the parts glued together with the inside of each seam reinforced with .040” x .100” styrene strip.

When the three crew compartment parts where dry, the seams between these parts were filled. After taping over the detail on either side of the seams adjacent to part 14, I used Squadron’s White Putty and after several applications, the excess was sanded away. With the tape removed, Testors Camouflage Gray was airbrushed in a thin coat on each seam and they were checked for flaws. If any were found, the whole process was repeated. In the sanding process, the only details removed were the tiny washers along the seam line. When all looked good, these washers were replaced by .005” styrene disks cut with a Waldron Punch and Die set. A tiny spot of white glue simulated the missing nut on the new washers. The seam between the hatches was much easier to deal with. I cut a parachute bridle cover out of .005” styrene stock, painted it white and glued it on near the end of the assembly process.

The finished exterior seam
between Parts 13 & 14.

In the kit, the details of the forward part of the cabin section are poorly represented. This includes the Reentry Control Section (RCS Section) and the Rendezvous and Recovery Section (R&R Section), parts 15,16 (Capsule Forward Section, right and left half respectively) and part 17 (Nose Section). I chose some rather radical surgery to replicate the exposed channels on either side of the rectangular washers on these sections. I decided to remove and replace the washers completely and create new channels. For the RCS Section, the locator pins were removed, the seams cleaned up, and the two parts were glued together. Then using some .030” sheet styrene, two circular disks were made to fit inside the section. These were glued in and the area around each washer line was removed until a .125” wide gap was created. A razor saw made quick work of removing most of this material with riffer and needle files used to clean and true up the edges.

Because the average thickness of the RCS Section was .050”, I used the following combination of styrene strips to allow the new washers to flush up to the outer contour of the section. First, a .020” x .020” strip was glued even to the inside edge on each side of the gaps. This supported a .015” x .125” strip that filled the gap. After all seams were filled, .010” x .100” strip styrene was cut to length and carefully scribed to indicate each washer. These strips were then glued down the center of each channel. The bolts in the middle of each washer were the last detail added. Once again, a drop of white glue applied with the cut end of a toothpick mimicked these bolts.

After removing the nose fairing cover on part 17, a similar sequence was used to replicate these washers. Four support disks were used, the first at the lower end, the next 5/16” higher, then one at 5/8” from the bottom and the last at the top of the section. Because some of the washers don’t run straight up the R&R Section, a micro saw was used to remove the angled washers. The two extra interior disks allowed the R&R Section to be cut into two parts at the step (15/32” up from the lower edge) and to pick up the “V” shaped shingle on the TY axis. This cutting through the section was done after all channels were completed and a .010” x 1-13/32” diameter disk was inserted to create a seam at this location. All though a lot of work, this looked much better than simply scribing channels around the existing washers.

The reconfigured channels
in the nose sections.

The nose fairing was reconfigured based on McDonnell photos of the Gemini B. The three rendezvous latch covers were also removed from the side of the R&R Section. These were replaced with styrene “plugs” attached to the nose cap. This allowed the entire nose cap to be painted without the need for masking as well as allowing for a 3/8″ dia. styrene tube to be inserted into the completed reentry module to be used as a handle for painting.

Modifications to the heat shield (Part No. 5) included removing both attachment flanges for the retro-rocket adapter, filling the prominent center sinkhole and scribing the scale 25.8” diameter heat shield hatch.

The heat shield hatch scribed and painted.

Crew Cabin – Interior Details

Work on detailing the interior began by removing the rear bulkhead detail and seats on part 6 (Interior Bulkhead W/Seats). The edges were filed and sanded to remain flush with the inside edge of part 4 (Crew Compartment Interior). Pieces of styrene were added to the back of part 6 to extend the crew compartment interior to the contour of the heat shield. Also a 1/8” by .040” extension was added to the back edge of part 4. The rationale for this was that I didn’t know exactly how much room in the interior the new seats and rails were going to take up and part 4 allowed for this much expansion. Because of this extension, the notches for the front instrument panel ends were cut back by about 1/16”.

Modified parts 4 & 6 with new center beam and instrument panel backing pieces.

Attention was now directed to the placement of the seats and seat rails. Numerous photos were scrutinized to get a sense of how the rails and seats interfaced with the hatch openings and other interior parts. I decided to use the heat shield part as the rear bulkhead; therefore the rails would have to be mounted to it. Dry-fitting the crew compartment outer shell to the heat shield and then finding the center of each hatch opening determined the rail locations. The rails needed to sit at a 12-degree angle from the Y-axis and center in the hatch opening. The width of the back of the rails was determined and two pieces of .040” x 3/8” x 2” long styrene rectangles were glued on to the rear of the heat shield. This would give the rails a positive attach point.

The seat rail attachments (L) and rails (R).

The geometry of the rails became a somewhat complicated conglomeration of plastic. Not only did the rear edges of the sides of the rails have to match the curvature of the heat shield, but when completed the upper surface had to sit parallel to the instrument panel and have a 8 degree forward angle in relation to the vehicles X axis. I also added to the outside bottom of each rail the pivot hinge for the hatch actuator pistons. At this time I scribed the LPB hatch (A scale 25” diameter hatch) into the inside of the heat shield part. Both the inside and outside hatches were scribed using a compass with two metal points.

Two images of a seat rail the left image includes the slot for the stowage of the LPB hatch..

The seats were based on drawings of both the Gemini and Gemini B spacecraft interiors, several basic dimensions taken from the kit seats, and a three-view drawing that I did. Both seats (as well as the rails) were built at the same time with the commander’s seat being the “pathfinder”. Every effort was made to make the pair of seats as identical as possible. After the basic shapes were built, the cushions and ejector handle details were fabricated.

Left & right image, the seat carcass shape. The center image, the seat including the cushions and other details.

Next came the hatches, first the hinge pins were removed and a miniature piano hinge was employed to open and close the hatches. The major hatch modifications started by removing all of the molded detail from the inside surface. The recesses for the hatch sills were, in part, filled in with .030” x .030” strip styrene to match the smaller sills. The reason for reducing the width of the sills was to allow the hatch actuator piston hinge spars to sit as far back on the hatches as possible, as well as to allow the seats to slide in to the cabin during final assembly. The forward and rear hatch web spars were built in two sets of opposite pairs. These structures were fabricated from .020” stock with .010” strips for the stiffing spars. Special attention was devoted to the rear web spars so they wouldn’t interfere with the tops of the seat rails when the hatches were closed. The box-like structure that spans the two web spars was created out of .015” and .020” stock.

Basic hatch modifications.

The hatch details were pulled from the “spares” box. The latches were HO scale diesel parts from Detail Associates Lift Ring Switcher (LR 1105), while the linkages were MU Air Hoses (MU 1508). After these parts were painted they were attached with Aleen’s Tacky Glue. I use this product quite a lot in the final assembly of smaller, non-load bearing parts. The window frames were created out of .015” and .040” sheet styrene with Grantline # 5098 bolts attached to the insides. The windows themselves were .005” clear acetate dipped in Future floor wax. Again, Aleen’s was used to attach these parts.

Four views of the finished right-hand hatch.

After the rails, seats and hatches were basically completed and all fit adjustments were dealt with, attention shifted to the other details within the crew compartment. The center-line beam (Part 10, Upper Interior) was replaced. On this new part as well as on the rear bulkhead (Part 6), the latch receptacles were drilled out and filed to shape. Two beams were created at the forward portion of the cabin with latch receptacles also drilled and filed. These parts took some doing. The top profile needs to fit under the coves and the instrument panels sit in front of them. Several templates were created out of thin styrene stock to find the correct shape before the actual pieces were made.

View looking forward of the main instrument panels backing pieces and the forward latching receptacle beams.

The kit instrument panel (Part 11) was also replaced with several different structures. The new instrument panel consisted of a main console (center), command pilot and pilot’s panels and the lower console (to replace Part 3). Three other circuit breaker panels also needed to be fabricated. These were located on the upper center-line beam (Overhead switch/circuit-breaker panel), and the left and right hand sides of the crew compartment interior (Left and right switch/circuit-breaker panel). The basic dimensions of the four main panels were based on the kit parts. First, backing pieces were cutout, then the actual panels were cut to their respective shapes to be placed on the backing.

Main instrument and circuit
breaker panels.

Although the relative placement of the panels was the same on both the NASA Gemini and the Gemini B, the configuration of instruments and switches, especially on the four main panels was different between the two. I used as much of the surface detail of the kit instrument parts as possible. This started with sanding the back of the kit parts down to an approximate thickness of .005” and the individual components were then removed and glued onto the new panels. All dialed gauges were taken from various Waldron Instrument placards. The two prominent Attitude Director Indicators (commonly called the “eight-ball”) were created out of the swivel stand pieces (Parts 36 and 159) from the 1/48 scale Mercury and Gemini kit. These parts have raised lines on them, and when painted, have the desired three-dimensional look.

Another change on the Gemini B vehicle was that the commander and pilot’s panels have most of their switches and instruments recessed. I assume this configuration was used to protect those instruments during the transfer of the crews into the laboratory through the LPB and heat shield hatches. Because of the recesses, the construction of these panels included a much thicker top panel that what the NASA Gemini had. All switch guards were made out of .020” styrene rod. The guards were located mainly on the switch/circuit breaker panels as well as on the main console.

Finished main instrument
panels.

Various items located on the sidewalls were also scratch-built. These included the secondary Oxygen Regulators, waste storage containers and miscellaneous storage compartments. The fabric-covered containers were made out of A & B Epoxy Putty and sculpted into the appropriate shapes. The final interior parts were the quilted blankets. The seal from a yogurt container was used. This thin aluminum had an embossed diamond pattern that was almost to scale. A paper pattern was created for each piece, the pieces were then cut out and painted and the edges were covered with thin strips of paper.

View of the finished crew cabin interior with the “quilted” blankets.

Crew Cabin – Final Assembly

Final assembly began by attaching the crew compartment interior (Part 4) to the rear bulkhead (Part 6) and fairing in that seam. The reworked center-line beam and the instrument backing panels were attached as well as the pedestal backing and its supporting structure. The side panels for the pedestal were created out of .010” sheet stock. Painting began by airbrushing the interior, including the instrument panel and hatch interiors, with Testors Light Ghost Gray. The seat frames were painted Medium Gray and the cushions Camouflage Gray. The quilted blankets were painted Field Drab with the “tape” edges painted with Testors Metalizer Non-Buffing Aluminum. After detailing, the instrument panels and most of the other interior details were installed. After attaching the LPB hatch latching mechanism (Cal-Scale Freight Air Hoses #190-276 were used for the linkages) and the seat rails, the rear bulkhead/crew compartment interior assembly was attached to the heat shield.

The finished LBP hatch and

the rear bulkhead details.

The RCS and R&R sections were attached to the outer crew compartment section. (Note that the RCS section needs to be rotated so that the double row of shingles is in the TY position.) There's a bit of miss-match in diameters between the top of the crew compartment and the RCS section. This was fixed by gluing a .010" by .060" styrene strip at the lower edge of the RCS section. Now the interior and exterior assemblies were glued together. The heat shield was slightly larger in diameter in some areas and needed to be filed and sanded down to fair it up with the bottom edge of the crew compartment. Three new strap/umbilical fairings were made and then attached in the proper location to match with the adapter fairing housings. The seam between the heat shield and the crew compartment was hidden by strips of .010" x .060" styrene that had their forward edge rounded off. These were applied between the umbilical fairings and flush to the back edge of the heat shield. These strips not only hid the seam but represent the fiberite edge ring around the heat shield.

Completed crew compartment prior to painting.

After masking the hatch openings, the process of painting the exterior began. The heat shield was painted first, with the main surface was covered with Testors Camouflage Gray and the hatch area Flat White. For the shingles on the main body, a mixture of Gloss Black and Ford Engine Blue (about three parts black to one part blue) was used. After masking, the fiberite edge ring and strap fairings were painted with Floquil British Crimson.

Crew cabin showing the heat shield fiberite ring edge,

umbilical fairings and the
hatch hinge shield cover.l

The decals were taken from Scale-Master USAF Lettering, sheet #2, SM-32B, while the insignias were from the Mircoscale 72-0084, Current US Navy Insignia sheet. I used the 1/72, 20” lettering and the 30” insignia. Each letter was individually cut out with all carrier film removed and then placed on the model. Even though a lot of work, this helped tremendously in allowing the letters to conform to the shingles. The same technique was used for the insignias, with the blue field cut away.

Fabricating the oxygen hoses and restraint harnesses finished the seats. The hoses were made out of tension springs filled with an annealed wire insert with connectors from Williams Bros. Ho Scale Pipeline and Fittings kit, No. 620. The harnesses were cut from paper, painted and Waldron 1/24th Scale Standard Seat Belt Buckles and Detail Master Racing Harness-Lever type, DM 2260 parts were used for the hardware. After all of the painting and decaling of the crew cabin was finished, the few crew cabin internal details that were not installed before were now attached. This included the seats, the left and right switch/circuit-breaker panels and the hatches.

Ejection seat oxygen hoses
and harness details.

Gemini B Adapter – General

As the Gemini B adapter was so different from the kit adapter module, a completely new piece was necessary. A wooden master was turned on a lathe and the new adapter was vacuformed. The entire adapter was pulled in one piece. (The resulting shape looked a lot like a margarine tub.) The first step in transforming this into an acceptable adapter was to cut the shape to length, making sure that the top and bottom edges remained parallel. Both inner and outer surfaces were sanded with wet and dry paper, starting at 340 grit all the way down to 1,000 grit used for the final sanding. Based on a McDonnell Gemini-B Adapter shell drawing, the location of the six interior ring frames was determined and then drawn onto the inside of the adapter. Using a pair of inside calipers, the outer dimension of each ring was then established. A drawing was then generated for each frame using the dimensions taken from the adapter. The width of each frame was determined, drawn, and for rings with lightening holes, their locations were also drawn. The ring frames were cut out of .015" stock while the lightening holes were created with the Waldron Punch and Die set using the .089" size punch. The inside edge of each ring was stiffened with .010" x .030" strip styrene. The frames there then glued into the adapter with Testors liquid cement.

Equipment Section with internal ring frames and equipment support beams.

Next, the spacing for the 104 external hat section stringers was tackled. Yet another drawing was created that laid out the stringer locations as well as the 26 attachment lugs/shields on the aft end of the adapter. After this information was transferred to the adapter shell, the size and location of the three adapter fairings could be established. At this time the separation plane line between adapter sections was also located and drawn onto the adapter shell.

The adapter was then carefully cut into two sections using a razor saw and a strip of masking tape to guide the cut. The stringers were created out of .030" x .040" strip styrene. The forward edges were beveled to a 50-degree angle while the rear ends were squared off. At first I was going to use the lug shields of the Gemini adapter, but these proved to be too small to fair into the rear ends of the stringers, so the fairings were created out of .080” diameter styrene tubing from Contrail Model Aircraft.

The retro section showing the exterior stringer, interior ring frames and the retro rocket support beam.

The final two adapter ring frames, located at the outer ends of each adapter section, were dealt with in two different manners. The front edge of the retro section had a .010” x.015” styrene strip glued on edge to the outside of the shell, flush to the top, while the aft ring of the equipment section was cut from .15” sheet stock with the 26 lugs carefully carved out around the outside of the ring.

Gemini B Adapter – Retro Section

The retro section adapter fairings were constructed out of an extra adapter with enough material laminated together to create .120” thick pieces. These were shaped to fit within the three open areas between stringers and a .010” sheet-backing piece was applied. The stiffening ribs on the fairings came from .060” half round.

Left image, after the stringers are applied, the exact size of the adapter fairings could be determined. Right image, the adapter fairings.

The equipment contained within the adapter sections was mainly scratch built except for the retro-rockets and the environmental cooling unit (ECU). Several modifications were made to the retro-rockets. First, the outer edge of the nozzles (Parts 26) was thinned and the nozzle lengthened by drilling out the bottom. The locator tab on the casings (Parts 24, 25) was removed and attachment rings were inserted. Two holes were drilled into the ring of the casings that surrounds the nozzle to accept the igniters (Detail Associates, HO scale, “Motorola” Firecracker Radio Antenna RA 1805).

Completed retro rockets and the pad abort control system separation rockets.The ECU was also modified from the Gemini kit. All three parts (31, 32, 33) were used, but each was modified and several smaller sub-assemblies were added.

The environmental cooling unit modifications.

The retro-rocket support structure was constructed out of .015” sheet styrene. Both the front and back edges were stiffened with .010” x .080” strip stock. The backing panel was cut out of .010” sheet with .010” x.080” stiffeners. The mounting brackets for the retro-rockets were cut out of .015” x .030” strip for the base and .10” x .040” for the uprights. This was cut to length to make two brackets for each retro-rocket and a .025” hole was drilled in the upright to accept the mounting pins. A jig was created to position the brackets so the retro-rocket casings could be tilted to their appropriate angles.

The retro rocket support brackets installed on the support beam.

The final major component for the retro section was the crew transfer tunnel. The cylinder for this was vacuum-formed out of .040” sheet stock from a master turned to a scale 31” diameter. The heat shield hatch cavity was built out of two adjacent sides of .250” x .375” rectangular tube placed on either side of the main tunnel cylinder. The various external stiffening rings were cut out of .015” sheet stock, while the flexible seal ends were taken from .040” sheet. The lower edge of each ring frame was covered with .015” x .020” strip. I elected to attach the tunnel only to the top spar of the retro-rocket support structure.This made installation of the tunnel much easier.

The crew transfer tunnel
parts ready for painting.

Gemini B Adapter – Equipment Section

For the equipment section, the separation rockets were based on a McDonnell Gemini B interior profile drawing. The equipment support beams were constructed out of .015” styrene sheet stiffened by .015” x 3/32” strip with .060” channel used for equipment placement. The .060” channel was also used for the pick-up trusses. One side of this channel was removed to create these “L” shaped supports. The batteries were made out of .250” x .375” rectangular tube, as were portions of the encoder and guidance interface adapter while the multiplexer was created out of .187” x .312” rectangular tube. The tape memory unit was cut out of part 49 (Electronic Equipment Package) from the Gemini kit. The wiring harness connectors for all of these “boxes” were .040 styrene rod topped with Grantline 2-1/4” Nut, 5” Malleable Washers (No. 5093). The primary oxygen subsystem tanks were 1/4” diameter tube with parts 156 and 157 (Pressure Cell Half) from the 1/48 Mercury/Gemini kit used for the hemispherical ends. The cooling water tanks were created out of 7/16” diameter tube for the larger tank and 5/16” diameter tube for the smaller. The elliptical ends were filed out of .120” styrene plugs. I originally thought that the “fins” could be applied with .010” x .020” strip glued on edge to the tanks. This proved to be a mistake, so .010” sheet was used to make oversized disks (17/32” dia. and 13.32” dia. respectively). The tanks were sectioned and nine disks were glued into each tank. When these were dry, the “fins” were sanded down to a diameter just greater than the tanks.

The equipment section components.

Wiring Harnesses

The four wiring harnesses were created using a “breadboard” for each harness. The breadboards were created from the adapter equipment layout drawings with the location and number of wires needed added to the drawings. “Styrene gates” were attached to the breadboard to constrain the wires and allow portions of the bundle to breakout were necessary. Size “O” Gudebrod Bros. Silk “C” Thru Color Blending Nylon Thread was used for the wire. After all of the wires were threaded into the breadboard, the bundles were tied and paper bands glued on to allow the bundles to be attached to the adapters. The wire bundles were brush painted with thinned Testors Neutral Gray and accented with a dark gray wash. The wiring harness guillotines were made out of .125” x .015” strips with 3/64” rod.

A wiring harness breadboard.

The painting of the adapters and equipment began with the interior. A two-to-one mix of Testors Metalizer Non-Buffing Aluminum to Brass was used to paint the interior surfaces including the ring frames. Interior masking included an extra heat shield for the retro section and a disk cut for the equipment section. These were attached using a liquid masking agent while the wider ends of both sections were taped to wooden bases. The exterior was painted Dark Ghost Gray, as were the adapter fairings. A semi-gloss coat of Floquil Clear was then mixed and applied. The retro support, equipment beams, ECU frame and crew transfer tunnel were all painted Testors Medium Gray. The Oxygen tanks, water tanks, and the retro-rockets were painted Testors Non-Specular Sea Blue while the batteries were Testors European I Dark Green.

Interiors of the adapters showing the metallic paint, wiring harness and other details.

Handling Fixtures

The last elements constructed were the handling fixtures, mainly because the final dimensions of the fixtures would be determined by the finished size of the crew cabin and adapter. The first step was to figure out from the photos what these things looked like and then create a drawing for each one. The base frames of each fixture were created out of 1/8” diameter styrene tube stiffened with .062” music wire while the uprights were 3/32” diameter tube stiffened with .032” music wire. The caster support plates were .030” thick stock cut into 3/8” x 9/16” rectangles supported by .020” stiffeners.

The crew cabin handling fixture overviews.

The casters turned out to be one the hardest elements to find/create. I spent quite a bit of time looking for a ready made product but could not come up with anything. Then, I ran across Grantline’s Griffin Denver 26” Dummy Wheel Sets. With a little modification these worked out to be exactly right for the fixtures. Gluing two of these wheels together, face to face, and then sanding off the center ridge created an appropriately sized wheel. The axle was .060” styrene rod, while the yokes were made out of .187” x .312” rectangular tube. The upper plates were pieces of .020” thick styrene sheet cut into 1/4” squares with a .040” thick, .120” diameter plug between the yoke and plate. The fixtures were painted with Testors European I Gray while the casters were painted with Testors Metalizer Titanium.

Handling fixture leveling jack & caster details.

The final assembly consisted of a creating a drawing showing a plan view of all of the fixtures and their relative spacing. This was placed on the sheet styrene base and with a pin vice, holes were drilled under the caster locations to accept a .010” thick piece of music wire which attached the castors to the base. The finished modules were then attached to the fixtures and the fixtures attached to the base.

As mentioned throughout the article, quite a few drawings were perused and created of the assemblies that went into this model. These drawings supplied dimensions and allowed me to check clearances. Without these, I never would have been able to achieve a consistent level of detail and alignment.

January 2018 Meeting

We had a great meeting in January. We had a great turn-out for show n' tell. Also, the Tie Fighter Group Build held its first meeting. Ethan Idenmill gave an introduction on how to add LEDs to model kits. Jerry Jackson gave a demonstration on how to use Rottenstone for weathering.

Special thanks to longtime member Dan King for taking photographs this month!

Ethan's Presentation is here: using LEDs in model kits

Mercury Spacecraft, Freedom 7 & Friendship 7: On-Orbit Configuration

First, some history –

Project Mercury was the first human spaceflight program of the

United States, running from 1958 through 1963. Taken over from the U. S. Air Force by the newly created civilian space agency, The National Aeronautics and Space Administration (NASA), it conducted twenty unmanned developmental flights (some using animals), and six successful manned flights. The program, which took its name from Roman Mythology, cost $277 million in 1965 US dollars, and involved the work of 2 million people. The astronauts were collectively known as the “Mercury Seven” and each spacecraft was given a name ending with a “7” by its pilot.

The Mercury spacecraft design (matured) between 1958 and 1959. After bidding by potential contractors had been completed, NASA selected the (McDonnell Aircraft Corporation, St. Louis, Missouri to construct the spacecraft). The heat shield (concept) had been developed earlier in the 1950s through experiments with ballistic missiles, which had shown a blunt profile would create a shock wave that would (dissipate) most of the heat around the spacecraft. To further protect against heat, either a heat sink or an ablative material, could be added to the shield. The heat sink would (absorb the) heat inside the shock wave, whereas the ablative heat shield would remove heat by a controlled evaporation of the ablative material. After unmanned tests, the latter was chosen for manned flights. The heat shield and the stability of the spacecraft were tested in wind tunnels, and later in flight. The launch escape system (and the) development of the landing parachutes were developed through (ground testing and) unmanned flights.

The spacecraft were produced at McDonnell Aircraft in clean rooms and tested in vacuum chambers at the McDonnell plant. The spacecraft had close to 600 subcontractors, such as Garrett AiResearch, which built the spacecraft’s environmental control system. Final quality control and preparations of the spacecraft were made at Hangar S at Cape Canaveral. NASA ordered 20 production spacecraft, numbered 1 through 20. Five of the 20, Nos. 10, 12, 15, 17, and 19, were not flown,

On May 5, 1961 the U.S. launched its first astronaut, Alan Shepard (in Freedom 7), on a suborbital flight. The U.S. reached its orbital goal on February 20, 1962, when John Glenn (Friendship 7) made three orbits around the Earth. When both the Soviet Vostok and American Mercury projects had ended by June of 1963, both countries had each sent six people into space, with the Soviets greatly leading the U.S. in total orbital time (391h-45m vs. 65h-30m).

(Excerpted from Wikipedia)

The Models

Revell released the first issue of the 1:48 scale Mercury: America’s First Manned Satellite and Gemini: America’s Two-man Space Capsule set (H-1834) in 1964 and the kit has been re-released by both Revell and Monogram several times since then. The original release included the escape tower for the Mercury model and parts to display the Gemini on skids as there was a plan to land the later Gemini missions with the Rogallo paraglider. However, I decided to build two on-orbit versions of the Mercury program, both Freedom 7 and Friendship 7. I acquired two of the Monogram “Young Astronauts” kits which were a re-released version of the Revell kit in 1987. The molds were showing their age by this time and there was plenty of flash and heavily mismatched molding seems in both kits. Even though the original release of the kit was right after the Mercury program ended, there are several inaccuracies exhibited in both the Mercury and Gemini spacecraft so the RealSpace Models Mercury Update Sets were used to make both of these models.

I started with the interiors and only did a minimum amount of work, as I wasn’t going to have open hatches. The only Revell/Monogram kit parts I ended up using were the heat shield and its retro package, the posigrade rockets, interior rear bulkhead and the astronaut figure. The RealSpace Update Set includes re-worked exterior shingles around the pressure vessel and resized parachute and antenna compartments. The resin went together well with the only fiddly parts being the de-stabilizing flap on the front of the antenna canister. On my copies the flap hinges were incompletely molded so I replaced them with scratch-built ones. I also added a couple of extra supports to the bi-cone antenna “window areas” on the Freedom 7 antenna canister. I didn’t like the kit retro straps included in the kit so I scratch-built six straps and their related cables/accessories. I also added the exposed wires on the outside of the retro packs.

A mix Testors Gloss Black and a little Ford Engine Blue was used to get the tint I wanted for the outer surface of the shingles on the spacecrafts. Floquil Reefer White worked well for the bi-cone antenna “windows” on the antenna canisters. The Freedom 7 heat shield and retro pack were painted with Testors Metalizer Magnesium and dull coated with Testors Acryl Flat, while the heat shield for Friendship 7 was a mix of Testors Leather and Insignia Red, about 5 to 1 leather to red. New Ware Models out of the Czech Republic supplied the decal sheet. These are tiny models in 1/48 scale so they don’t take up much display space!