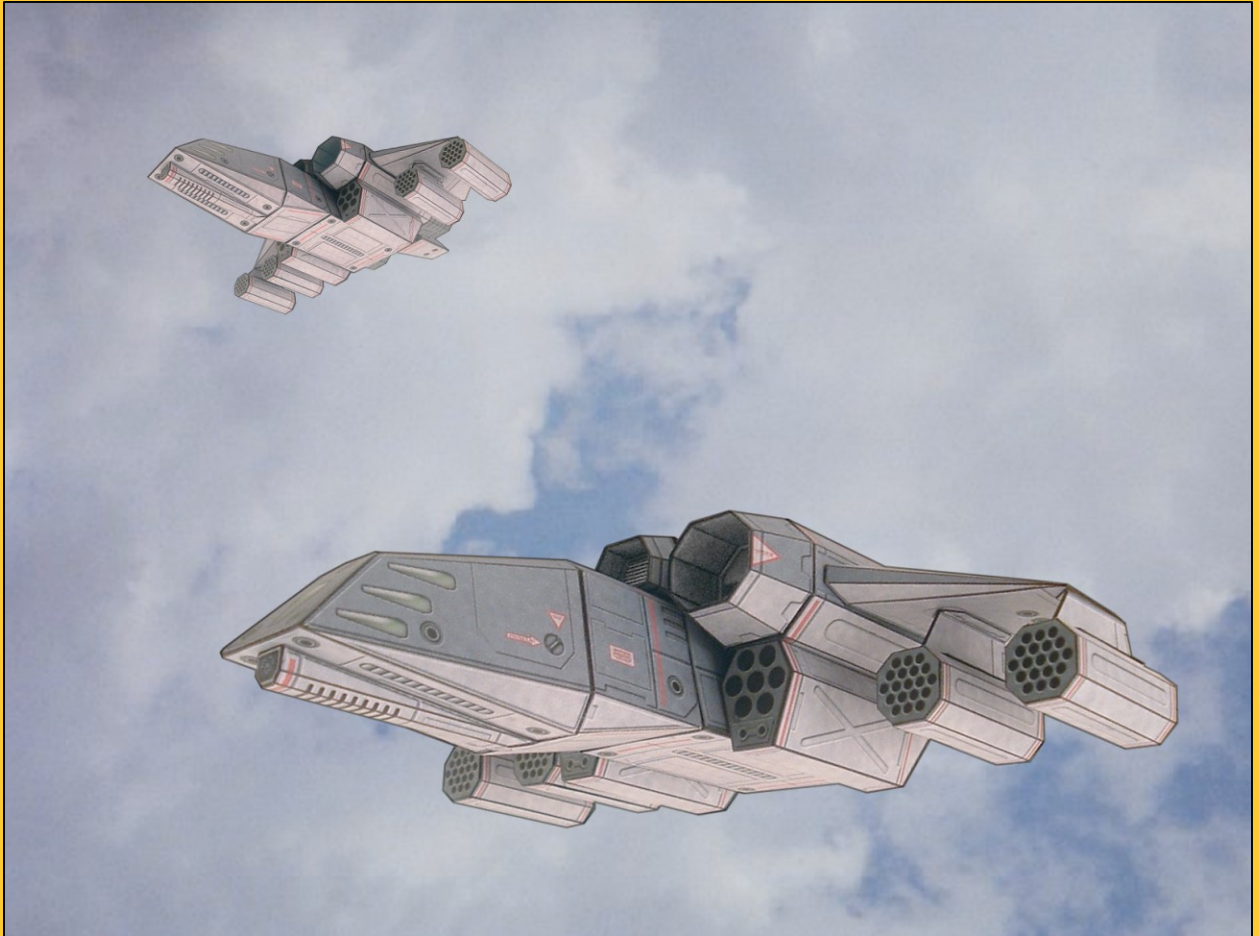


T/A-133 GYRFALCON CLOSE AIR SUPPORT FIGHTER

KIT ASSEMBLY INSTRUCTIONS



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THE BASICS OF PAPER MODELING: TOOLS AND EQUIPMENT



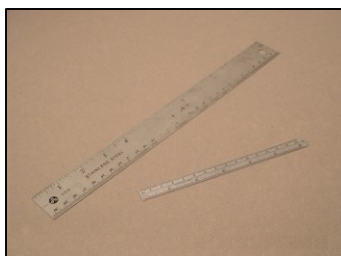
GLUE

There are a variety of glues and adhesives on the market, some of which are nicely suited to building paper models. White glue (also known as PVA glue), glue sticks, Uhu office pens, tacky craft glue, and sometimes even superglue (cyanoacrylate adhesives) all have their own uses. For the great majority of the time, however, you can get by just fine with white glue alone.



SCORING AND CUTTING TOOLS

You'll want to have, at the very least, a sharp hobby knife for cutting parts out of the printed sheet. Scissors are not recommended. For scoring, you can either gently drag the hobby knife across the fold (not recommended), or use specialty tools for scoring without cutting into the paper. Embossing tools such as the ball stylus, an empty ballpoint pen, a scrapbooking bone folder, or even secondhand sculpting tools with smooth and dull blades are great tools for scoring without breaking the paper.



STEEL RULERS

To precisely guide your cuts or scoring, steel rulers come in very handy. Unlike plastic or wood rulers, steel rulers are resistant to sharp hobby knives. You can get by with just a normal 12-inch steel ruler, but you may find that a smaller 6-inch steel ruler is a lot handier and easier to deal with when making small cuts. Along larger parts, steel rulers can also be used as a bending brake.



HOBBY TWEEZERS

Sometimes you'll encounter folds that seem too small to do with your fingers alone. In this situation, a pair of hobby tweezers like the one shown to the left is very handy. In effect, they act as a set of tiny fingers and a miniature bending brake, allowing you to crisply fold very small parts.



BLACK, GRAY, OR DARK GRAY MARKERS

When you cut parts out of the sheet, the edges are naked white. This generally results in a less than pleasing visual effect when the model is fully built, and this is dealt with by a technique called "edging". When edging parts, you will be doing two things: coloring the actual edge itself, and coloring in a portion of the glue tabs. The best marker to use for edging is one that has a soft chisel tip, and which doesn't bleed through thin cardstock. The markers pictured to the left are calligraphy markers with 2mm and 3.5mm chisel tips.



CUTTING PAD/MAT

A good self-healing cutting mat will help your hobby knife blades stay sharp longer, and protect your work surface from damage.

THE BASICS OF PAPER MODELING: TIPS AND TECHNIQUES

Basic Techniques

- 1. Scoring:** Scoring is a technique used to make folding easier by pre-creasing the paper along a fold line. The most common method of scoring is to lightly drag a knife blade across the fold line, slicing through the upper layers of the paper. The recommended method is to instead use an empty ballpoint pen or a ball stylus tool to gently compress the paper along the fold lines. This prevents the appearance of unsightly naked edges and makes for a much stronger model.
- 2. Cutting:** Cutting may seem to be a glaringly obvious technique, but a few pointers are essential. For the majority of cutting where paper models are concerned, a sharp knife and a steel ruler are far more precise and efficient than a pair of scissors. Save the scissors for separating individual parts or groups of parts from the rest of the sheet.
- 3. Burnishing:** Often, you will be building parts that are composed of flat fold-overs. In order to ensure that they stay straight and do not delaminate after building, you will want to burnish the two halves together. You can use your finger, a smooth and flat tool, or even a little rolling pin. Burnishing forces the two layers in a flat fold-over together, spreading out the glue even further and squeezing it into the paper fibers for additional bite.
- 4. Edging:** Edging improves the appearance of paper models considerably by hiding the naked edges of cut parts. Anything from color markers to soft pencils and various types of paints may be used to edge parts. However, in most cases, matching the color exactly is less of a concern than simply matching the contrast. For most purposes, three or four shades of gray from lightest to darkest will more than suffice.
- 5. Folding and Gluing:** Depending on the thickness of the paper or cardstock used, some parts may be difficult to assemble with fingers alone. In this situation, a pair of tweezers is worth more than its weight in gold. Tweezers come in a wide variety of sizes and jaw shapes, and some of the more exotic shapes are fantastically useful for assembling tiny parts. Tweezers can be used to fold tiny flaps and clamp them in place while the glue sets, as well as making it much easier to attach small parts to other parts.

Special Notes

- 1. Gluing Tabs:** This model includes integral gluing tabs for joining certain parts together. However, the utility of gluing tabs decreases proportionally as the thickness of the paper or cardstock increases. Thick cardstock or paper can be used for printing this model, but it is recommended that you try a test assembly before committing wholly to assembling a model. If the gluing tabs won't fit or otherwise throw off the tolerances of the finished test assembly, leave them off the parts entirely and cut your own gluing tabs out of scrap cardstock.

These separate gluing tabs should overlap both of the parts to be joined, and glued to the unprinted surface along the joining edges of both parts. This is called "backing", and a side effect of this is that parts will fit more or less flush. Backing parts with separate gluing tabs also generally yields better modeling results, but the integral gluing tabs are retained for the convenience of beginners and those who prefer to use thinner media for their paper models.

- 2. Sealing:** In most cases, sealing the model with varnish or other form of spray sealant isn't necessary. However, if you want to add further detail to the model with decals or paint, you may want to seal the model with several light coats of a waterproof glossy clear sealant first. This will protect the model from a moderate level of moisture, and the smooth surface will facilitate the application of decals. You can also apply a final coat of a matte clear sealant to kill the gloss afterwards. Keep in mind that the simple act of sealing a model does not necessarily render it waterproof, and that any application of waterslide decals needs to be done with great care.
- 3. Reinforcing:** At times you may need to reinforce large pieces, either to make them heavier or to increase their strength. To do this, you may wish to glue toothpicks, craft sticks, or other suitable items to the interior of a model.
- 4. Weighting:** If you find that your models are too light, you can weigh them down by gluing various ballast items to the inside of the model. Some items that come to mind include pennies, ball bearings, and washers. Affixing these items to the unprinted side of a model before folding and gluing it into shape will give the model a significant amount of heft and weight.

DESIGNER'S NOTES

This model is a 11-year-old design of mine that formerly existed only in old sketches and 3D renderings dating back to the mid-1990s. I wanted the next model to be a close air support fighter, so I dusted off the old Gyrfalcon design and brought it up to date visually. I also simplified some of the lines and shapes to both make it easier to build as a paper model, and to bring it more in line with the hard-angled look and feel of the current model line.

You may have noticed that the nose section of the Gyrfalcon bears a striking resemblance to that of the classic Type 18 Mobile Gun Platform. When I was working on the Type 18, I stole the armored virtual cockpit from the original Gyrfalcon design and used it on the Type 18, along with a chin sensor turret, in an attempt to portray the Type 18 as a manned vehicle, rather than an autonomous robot like the classic MQ-3A Murphy. I didn't feel that a glass cockpit on a manned mecha made sense, and the armored cockpit from the Gyrfalcon was the perfect answer.

Back in the old days when the Gyrfalcon was first sketched, I was more of a writer than anything else, and I had built up this huge collection of fictional technologies and future weapon systems, along with copious notes and pedantic essays. Fortunately for the literary sensibilities of the world, I grew out of this phase and moved on to other things. However, there are some features on the updated Gyrfalcon model that I feel merit some explanation, since saying nothing would have denied the model its original context, and some things may not have made sense immediately.

First, the armored cockpit. The basic idea is that the pilot sits inside a bubble or cocoon, the inner surface of which is essentially a very large wraparound visual display. The wraparound displays present the pilot with a fully immersing view of the environment outside of the fighter, created by collating and compositing data from the sensor clusters on the outside of the nose. In a sense, the pilot feels as if he or she is sitting in a chair floating in midair. Important flight instrumentation values and targeting data is routed to the pilot's helmet, creating a HUD overlay that moves with the pilot's head and eyes. A conventional set of multifunction displays and touchscreens on a console attached to the pilot's seat back up the helmet displays and the cockpit displays, and provide some form of redundancy.

Next, the propulsion systems. The Gyrfalcon had always been some form of VTOL-capable craft in my mind, and the means to that particular end have changed a bit over the years. Currently, I see it as using electrogravitics for primary atmospheric lift, which allows it to behave with a flight profile remarkably similar to that of a helicopter. To make the updated Gyrfalcon fit in with the rest of the model line, the electrogravitic lift systems are represented by coil arrays textured along the bottom of the airframe. Tilting the "thrust plane" of the electrogravitic lifters and increasing or decreasing power to them through a fly-by-wire system yield results fairly close to that of a conventional helicopter's stick-and-collective input. For linear acceleration, the two large engines provide the necessary thrust, and allow more of the output of the electrogravitic lifters to be reserved for vertical lift, rather than splitting power between lift and acceleration.

The wings on the model are both a cosmetic and a somewhat functional touch. They are cosmetic in the sense that I wanted it to look like an airplane, and functional in the sense that they provide a place from which to hang various types of ordnance. They aren't used as control surfaces, and aren't used as a means of lift. In a sense, I suppose they're oversized versions of the stub wings on an AH-64 Apache or a Mi-24 Hind.

The Gyrfalcon was also supposed to be a transatmospheric vehicle from day one, and in order for that to make sense mechanically, it had to use a hybrid propulsion system. In space, the engines expel reaction mass as you would expect, but act in a similar manner to a direct-cycle nuclear jet engine while in an atmosphere, using superheated air for thrust. The little round ports dotting the Gyrfalcon's surfaces are reaction control system thrusters, and are used for maneuvering in space.

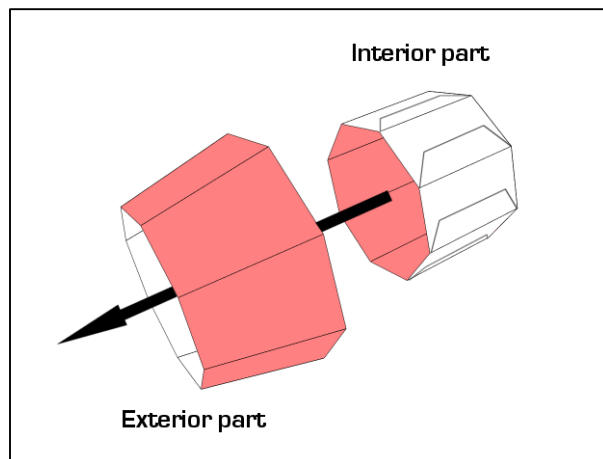
One concession I had to make to simplicity of build was to do something about the landing gear. In the original design, the landing gear was a complex articulated system that would have been extremely fiddly to build in cardstock at this scale. Since I prefer that my models be 100% buildable with just cardstock and glue, I went through several redesigns of the landing gear. All of these redesigns were either structurally flimsy or irritating to build, and I didn't feel it made sense to spend a lot of build time on parts that weren't visible from above. Inspiration came to me while I was working on the family car: the gearshift had an interesting-looking ribbed rubber boot on it. After thinking about it, I decided to put a similar kind of boot on the new Gyrfalcon's landing gear assemblies.

Putting boots on the landing gear achieves two things. First, in background terms, it keeps dirt and grit out of the airframe when landing in less-than-optimal terrain, and in modeling terms, it vastly simplifies the build while increasing the structural strength of the landing gear system by a significant degree. So, if you were wondering why the landing gear struts looked strange, now you have an answer.

CONCAVE PARTS

I want to explain a bit about a new type of part that I've recently started using on models with large intakes and thrusters. The interiors of the intakes and thrusters are now actual physical features, rather than simply texturing the area black and calling it a day.

These are 2-part assemblies, with an interior and an exterior piece. The interior piece folds in on itself so that the unprinted side faces outwards, and the printed side faces inwards. The folded-up interior piece is then inserted into the exterior piece from behind, as shown in the diagram to the right. The areas in red represent the printed side, while the white areas are the unprinted side. This model has 5 components of this type: the center fuselage intake, the left and right engine intakes, and the left and right main thrusters.



BASING FLYING MODELS



While this kit comes with landing gear, a lot of folks prefer to build their aircraft models in a flying state. To this end, there are several options available on the market.

Some companies like Games Workshop sell bags of 2-part clear plastic flight bases with wide bottoms and stems of varying lengths. However, due to the thin stems, these bases tend to be fairly flimsy and do not offer much in the way of contact area for glue.

Another solution is to use clear, disposable plastic party glasses such as the 2-part margarita glasses shown to the left. The bottom part of these glasses make terrific one-piece flying stands, and are roughly 100mm/4 inches tall. These glasses are usually found in the same grocery store aisle as other disposable eating goods like paper plates and plastic flatware, or at stores that sell party goods.



The photo to the left demonstrates how the disposable glass flying base looks when attached to the model. There are a variety of ways to attach the model to the flying base. First, find the model's center of gravity by balancing it on the flying base. When the model does not fall off the base, you have found the model's center of gravity, and this is where you should attach the flying base.

Next, you can use a hot glue gun, regular white glue, or even powerful rare-earth magnets to attach the model to the flying base. If you opt for the magnetic route, you will want to glue some sort of magnetically-receptive material to the unprinted side of the fuselage bottom, and affix the magnet to the stem of the flight base itself. The magnet should be large and strong enough to get a good "bite", allowing you to slide the model off the base with some effort, but with enough grip to keep the model from shifting or falling off during casual handling.

ASSEMBLY INSTRUCTIONS



NOSE, STEP 1

Fold up and glue the nose gun pod (Part 02, Page 1) to the nose (Part 01, Page 1) as shown to the left.

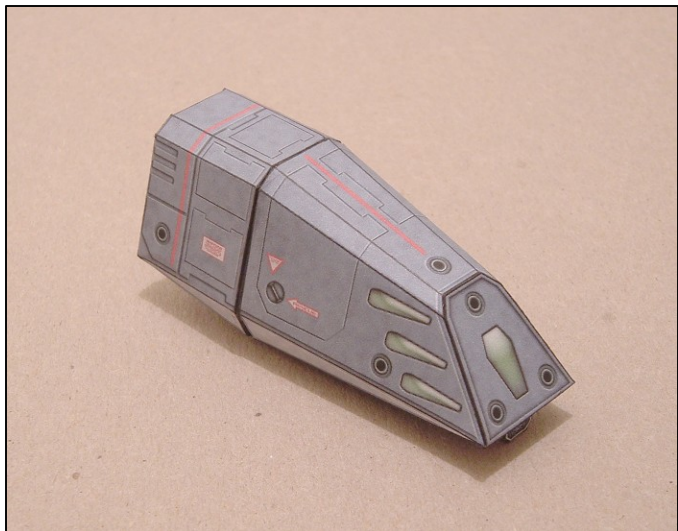
Make sure that you score Part 01 before gluing the nose gun pod into place.

Because the nose gun part has several very small folds, the use of tweezers is strongly recommended.



NOSE, STEP 2

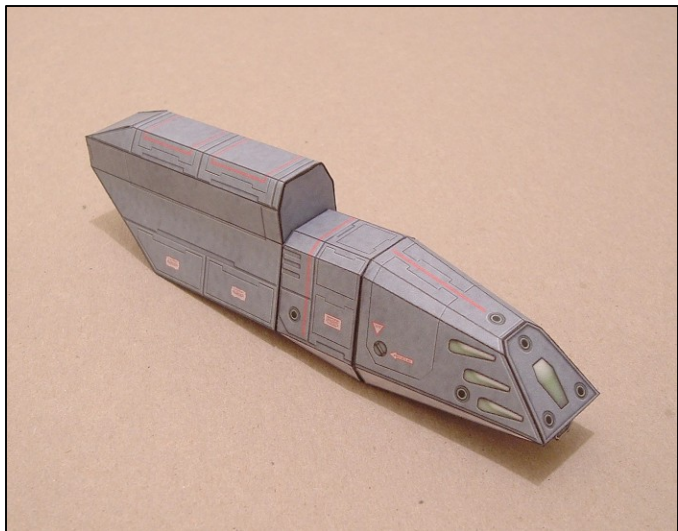
Fold up and glue the nose together as shown to the left.



NOSE, STEP 3

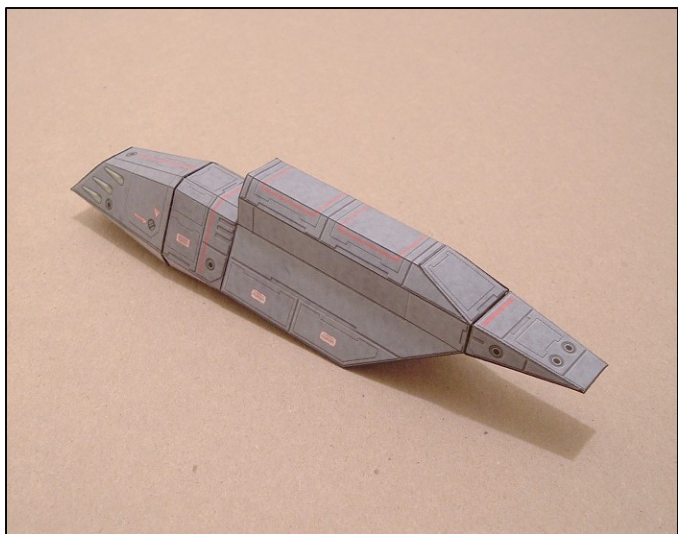
Fold up and glue the rear nose piece (Part 08, Page 2) to the back of the nose assembly as shown to the left. Set aside the completed nose assembly for now.

ASSEMBLY INSTRUCTIONS



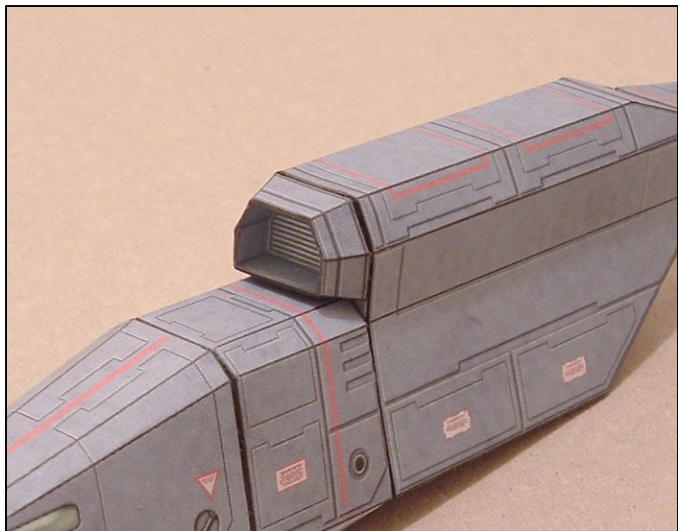
FUSELAGE, STEP 1

Fold up and glue the fuselage (Part 03, Page 1) together, then glue the nose assembly to the front of the fuselage, as shown to the left.



FUSELAGE, STEP 2

Glue the tail (Part 09, Page 2) to the rear of the fuselage as shown to the left.



FUSELAGE, STEP 3

Fold up and glue the fuselage intake shroud (Part 05, Page 1) into a closed loop. Next, fold up and glue the fuselage intake inlet (Part 04, Page 1) to the inside of the fuselage intake shroud, inserting it from behind.

Next, glue the completed fuselage intake to the front of the fuselage hump as shown to the left.

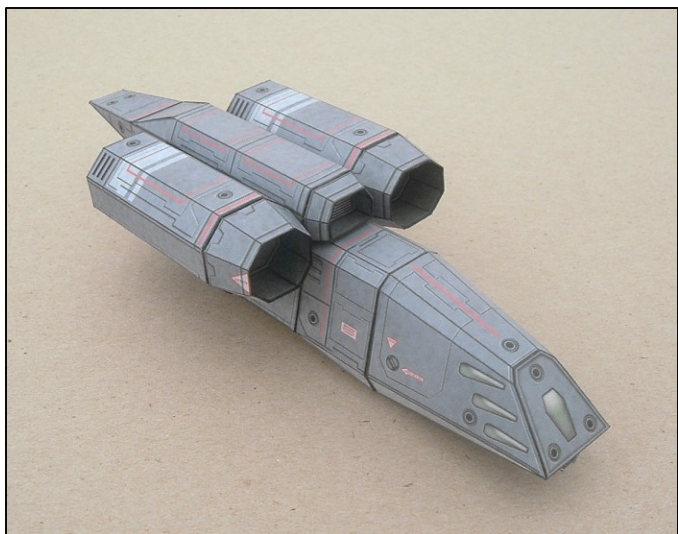
Set aside the completed fuselage assembly for now.

ASSEMBLY INSTRUCTIONS



ENGINES, STEP 1

Build the left side engine pod (Part 17, Page 3) and the right side engine pod (Part 16, Page 3), then glue each engine pod to the appropriate side of the fuselage, as shown to the left.

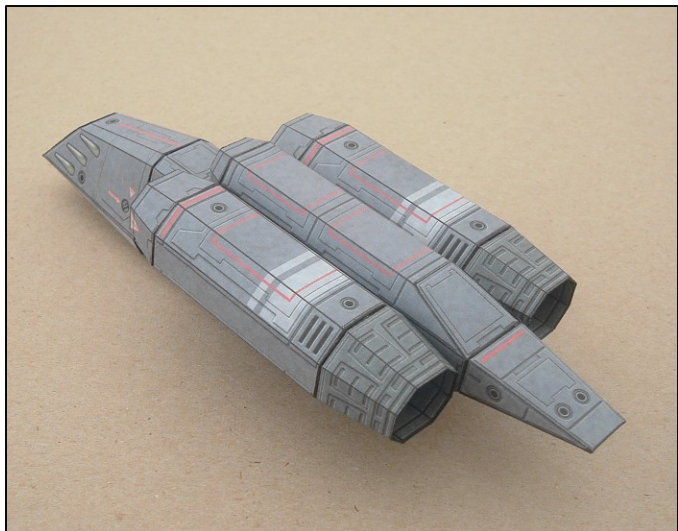


ENGINES, STEP 2

Build the left and right intakes according to the diagram on the Designer's Notes page, and glue them to the front of the engine pods as shown to the left.

Intake inlets: Part 12, Page 3 (right), Part 13, Page 3 (left)

Intake shrouds: Part 18, Page 3 (right), Part 19, Page 3 (left)



ENGINES, STEP 3

Build the left and right thrusters according to the diagram on the Designer's Notes page, and glue them to the rear of the engine pods as shown to the left.

Thruster outlets: Part 15, Page 3 (right), Part 14, Page 3 (left)

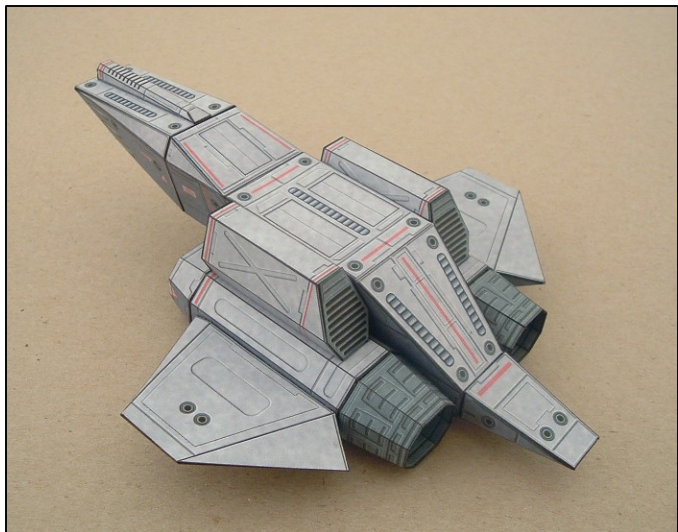
Thruster shrouds: Part 20, Page 3 (right), Part 21, Page 3 (left)

ASSEMBLY INSTRUCTIONS



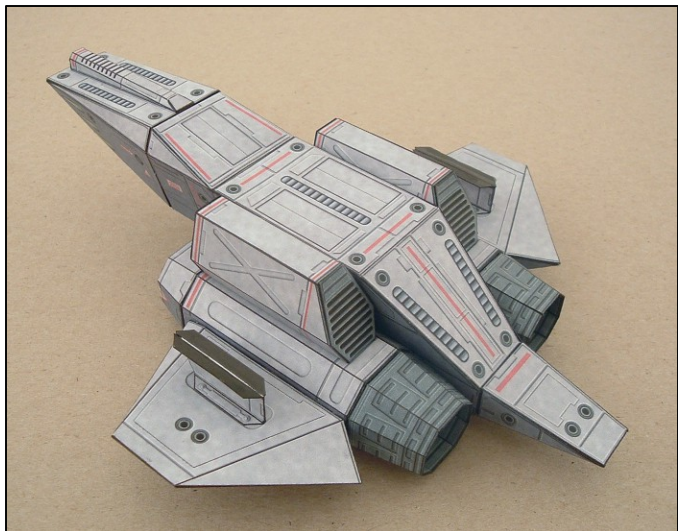
WINGS, STEP 1

Fold up and glue the left wing (Part 10, Page 2) and the right wing (Part 11, Page 2) to the corresponding engine pods, as shown to the left.



ORDNANCE, STEP 1

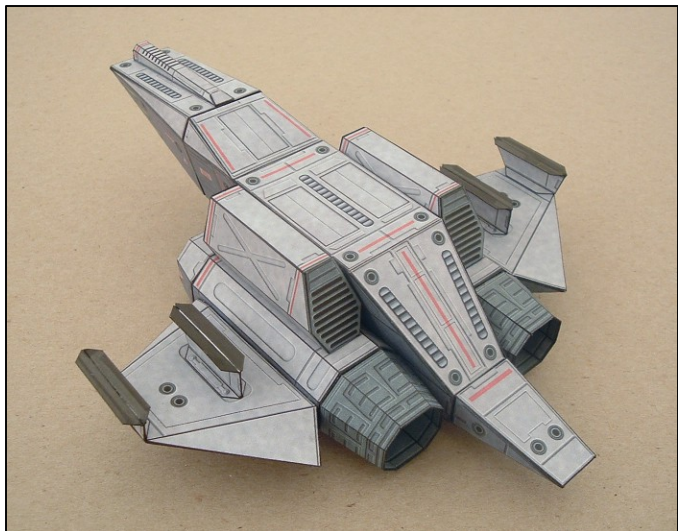
Glue the left and right antitank missile pods (Parts 04A and 04B on the Ground Attack Munitions Frame 1, respectively) to the underside of the corresponding engine pods as shown to the left.



ORDNANCE, STEP 2

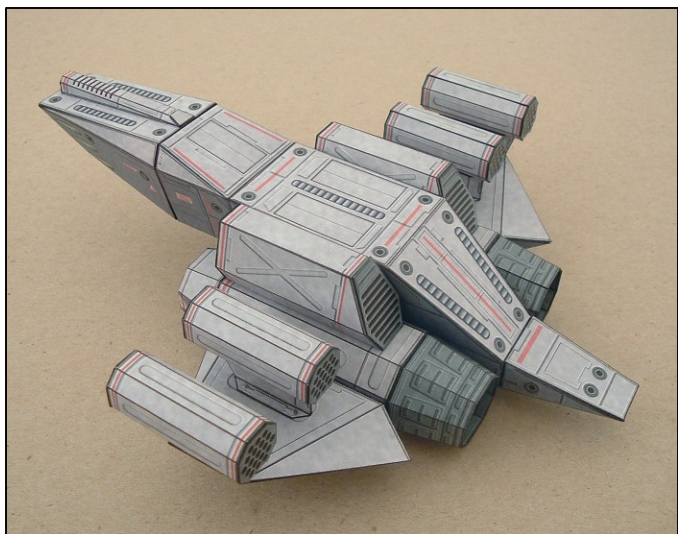
Fold up and glue the left and right center wing pylons (Parts 02A and 02B on the Ground Attack Munitions Frame 1, respectively) to the wings as shown to the left.

ASSEMBLY INSTRUCTIONS



ORDNANCE, STEP 3

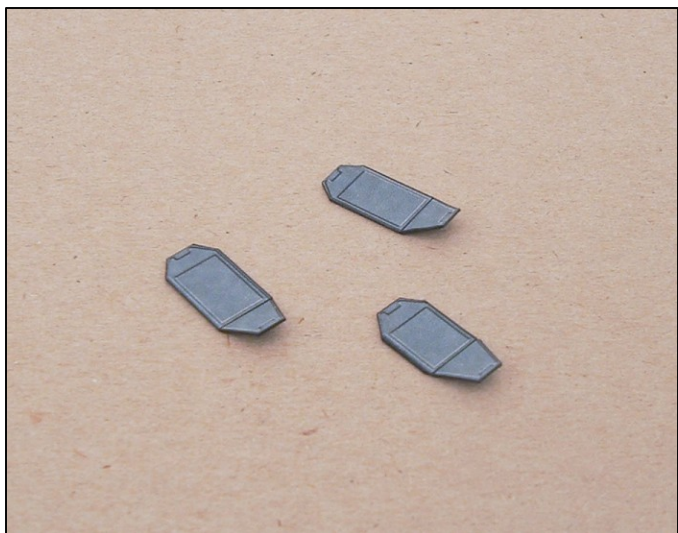
Fold up and glue the left and right outer wing pylons (Parts 03B and 03A on the Ground Attack Munitions Frame 1, respectively) to the wings as shown to the left.



ORDNANCE, STEP 4

Glue the four rocket pods (Parts 04A, 04B, 04C, and 04D on the Ground Attack Munitions Frame 1) to the pylons as shown to the left.

If you do not want to install the landing gear, the model is now complete.



LANDING GEAR, STEP 1

Trim out the nose landing gear footpad (Part 07, Page 1), the left rear landing gear footpad (Part 25, Page 3), and the right rear landing gear footpad (Part 24, Page 3), then fold and glue them over onto themselves. Bend the front of each footpad upwards at a slight angle as shown to the left.

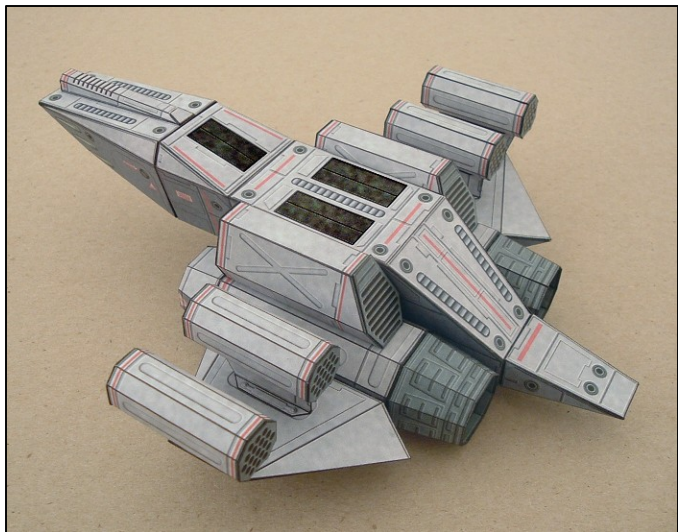
ASSEMBLY INSTRUCTIONS



LANDING GEAR, STEP 2

The landing gear boots all assemble in an identical manner. Each of them is trimmed out, then formed into a loop that resembles a truncated cone. Note that the left rear and right rear landing gear boots are designed to splay outwards from the fuselage.

Glue the left rear landing gear boot (Part 23, Page 3), the right rear landing gear boot (Part 22, Page 3), and the nose landing gear boot (Part 06, Page 1) to the corresponding footpad as shown to the left.



LANDING GEAR, STEP 3

If you choose to install the landing gear, you will want to take a black marker and carefully color the three landing gear wells black, to represent the gear well doors in their open and retracted state, as shown to the left.

Next, glue each of the three landing gear assemblies to its corresponding location, in the same configuration that they are displayed in the photo for Step 2 above.

The model is now complete.

REFERENCE IMAGES AND NOTES

