

# Galileo 1/45 Scale Model Assembly Instructions

Version 1.6



NOTE: View these instructions online at <http://www.jpl.nasa.gov/galileo/model/instructions.html>

This is a detailed scale model of the Galileo Spacecraft, one of the most complex robotic spacecraft ever flown. Assembly is a project which is probably not appropriate for people younger than about 10 years of age, depending on skill and motivation. The image above shows a completed scale model. Click on it for more views of the model. Six [Parts Sheets](#) are available to download.

## A. YOU'LL NEED THE FOLLOWING:

- A clear transparency sheet which your computer's printer will accept. These (as well as card stock sheets) are available at stationery stores and office supply stores. This is needed only for printing Parts Sheet 1.
- White paper card stock (also called "cover" stock, about the thickness of a postcard) which your computer's printer can accept. Parts Sheets 2 through 6 should be printed on this heavy white paper.
- Transparent adhesive tape, such as clear 3M Scotch Brand tape. Frosty tape will suffice if clear tape is not available.
- Scissors, to cut some parts from the parts sheets.
- An art knife, such as X-Acto #11, with a sharp new blade, and a proper pad on which to cut. This will be needed to cut some parts from the parts sheets. **Adult supervision is required**

**for children using sharp tools. Caution, one can injure oneself, as well as the furniture, with an art knife.**

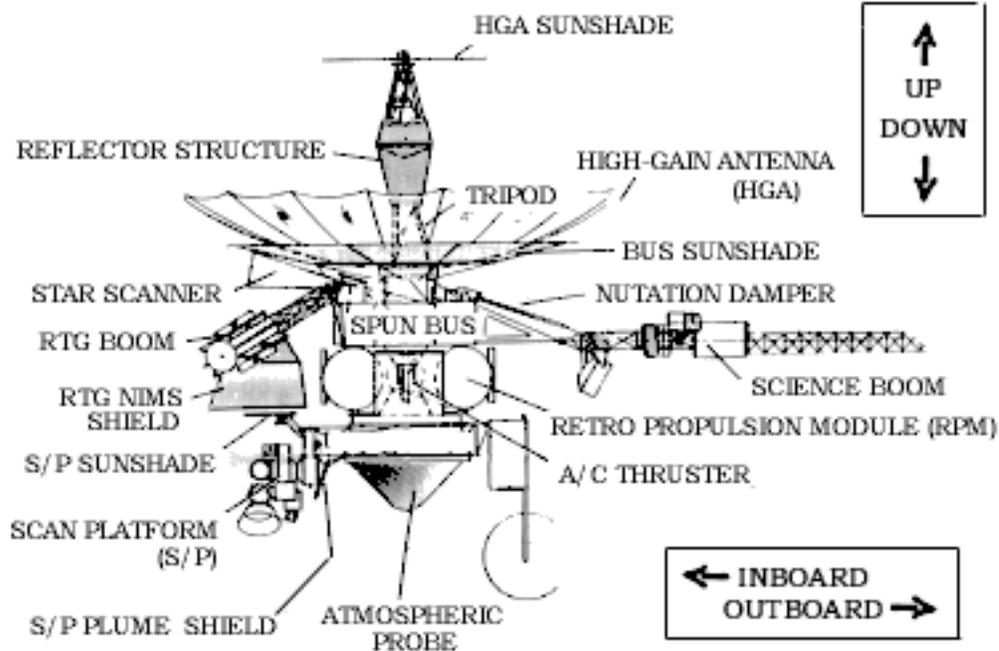
- Wooden toothpicks for applying glue.
- Glues. Use regular white glue (Elmer's Glue-All or equivalent). You might also try a thick white glue, sold in art and fabric stores, called "TACKY GLUE" (Aleen's or equivalent). For one part (the High-Gain Antenna) you'll need a different glue: BOND 527 Multi-Purpose Cement works very well. It's available in many art stores and craft stores, or from Bond Adhesives Company, Newark, NJ 07114 U.S.A. If BOND 527 isn't available, a rubber cement may be used for that part. An artist's spray glue, such as 3M Spray Mount, would be convenient for a few parts, but it is not absolutely necessary.
- A dense black felt-tip pen.
- A 35mm film can, and a beverage cup, would be convenient to support some parts while gluing.
- Space. Set up a well-lighted, comfortable work area, with room to set glued parts to dry.
- Time. Plan to set aside several hours for unhurried assembly. It may take eight hours or more to assemble your Galileo Scale Model.
- Patience. There may be some trying times. If so, remember that extra time and care will pay off with a surprisingly accurate, and handsome representation of NASA's Galileo, a very complex spacecraft.
- Optional: Some gold foil would add a good amount of realism to your model. Galileo was equipped with gold-colored sunshades as protection for the portion of its flight within the inner solar system. Obtain a small piece of gold-colored foil/paper, such as gift-wrap. A square of about 15 cm, or 6 inches, would be more than enough.

- Optional: Two straight pins may be used as parts in the model, one as [LGA2](#) , and one as the [Nutation Damper](#) .
- Optional: Spherical propellant tanks are represented in your model by flat circles. For more realism, you might want to locate or fabricate some 3-dimensional objects to replace them in your model. Bead stores, or craft stores, may be a source.
- Optional: You may wish to fashion a stand for your model. A simple stand can be made by bending a length of wire. Brass wire from a hobby store, or steel wire such as coat hanger wire, will work. About half a meter, or 18 inches, in length is plenty. Such a stand may also be convenient to support parts during assembly. If you choose to work with wire, be cautious to prevent eye injury. This image shows a stand made of soft iron wire obtained from a craft store.
- Optional: You might find it helpful to use an electric hair drier to set the glue in some places. If you do, be very careful not to blow the pieces apart.

## **B. BEFORE BEGINNING ASSEMBLY:**

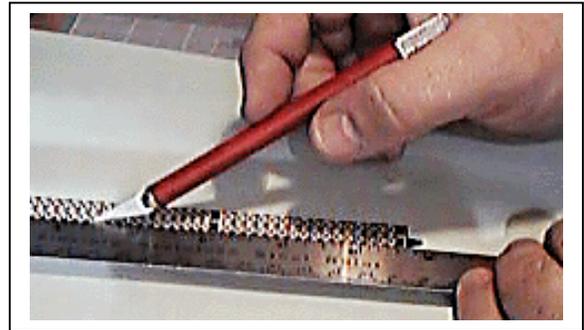
- Download and print the six [Parts Sheets](#) . Sheet 1 needs to print on a transparency, and sheets 2 through 6 need to print on white card stock. You might also wish to print these instructions, if it isn't convenient to refer to your computer during assembly.
- Examine all the parts, and read their names.
- Read all of these instructions. Compare model parts with the illustrations.
- Have a look at some [information](#) about the Galileo Spacecraft: <http://galileo.jpl.nasa.gov>

- Get your bearings: Examine the sketch of the spacecraft below. For the purpose of these instructions, "Up" will be defined as toward the HGA SUNSHADE shown in the image. "Down" will be defined as toward the ATMOSPHERIC PROBE in the drawing. This also includes references to "Top" and "bottom" in the instructions. "Inboard" is defined as toward the center of the spacecraft, and "Outboard" is defined as away from the center. You might also like to view a much larger [line drawing](#) of the spacecraft before getting started.



## C. IN GENERAL:

- Most folds will be made in the direction away from the printed side, leaving the printed side facing out. An exception to this is a part on Sheet 5 (the DESPUN BUS).
- Score for folding, where directed. The technique of scoring is suggested in some of the steps. Scoring will help make a neater model, with straight, clean folds. To score a part, place a straight edge along the line on the part as instructed, then lightly scratch along the line with an art knife, guided by the straight edge. Be careful not to cut through the paper, but just break the surface. After scoring, the fold will always be in the direction away from the scored side.



## D. TO ASSEMBLE YOUR MODEL:

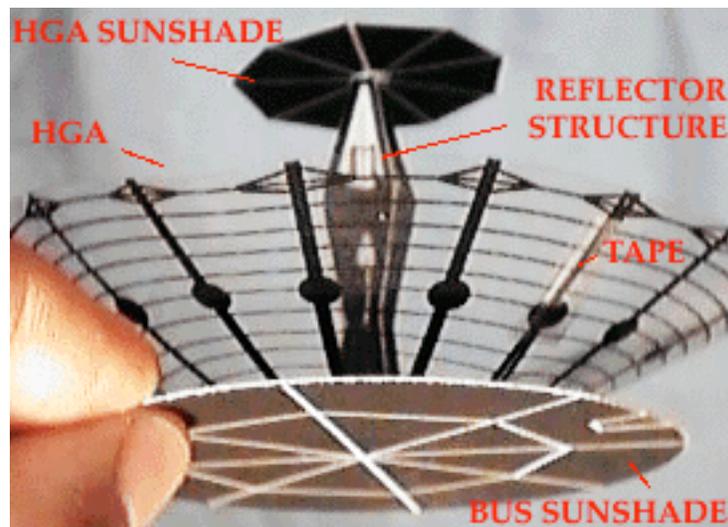
See below for illustrated step-by-step instructions. Sections marked with a \* may be accomplished at the same time if two or more people are working on assembly, or if you wish to work on one section while glue dries on another.

## \*1. Assemble the Communications Antenna.

- Print [Parts Sheet 1](#) onto a transparency sheet (the kind used on overhead projectors. Transparency sheets can be found in office supply stores and stationary stores). Notice the three clear wedges marked "Gap."
- Flatten the transparency. Printing onto the transparency probably caused it to curl. Take great care to flatten the sheet, by rolling it up opposite the direction of curl, repeatedly if necessary.
- If your printer causes too much curling, you might try printing onto paper, and then using a copy machine to make the transparency.
- Cut out the circular web-shaped object with scissors. Cut a circle, just outside the tips of the printed radial spines. Place the part on the table, and see whether it still has any tendency to curl. If it does, flatten it as above.
- Cut out the three clear wedges which were marked "Gap."
- Cut some transparent tape into three small rectangles, about half a centimeter by one centimeter, or about 1/8 by 1/4 inch.
- On the HGA, identify the "half" ribs which border three clear wedges. Overlap one of these ribs over onto the adjacent rib, so the flat circular web begins to bend up into a shallow cone. Adjust the overlap to make one rib. Inboard of the small black circle, the rib will probably be imperfect. Apply a rectangle of transparent tape to hold together. Repeat with the other two open sections. Bend the piece gently so that the antenna's shape becomes more or less symmetrical.
- Print [Parts Sheet 2](#) onto white card stock.
- Cut out the large black circular **BUS SUNSHADE TOP** and **BUS SUNSHADE BOTTOM** from [Parts Sheet 2](#). Apply glue to the white side of the slightly smaller **BUS SUNSHADE**

- BOTTOM (spray glue would be convenient; otherwise apply a very thin, even (1.10) film of white glue). Glue it to the BUS SUNSHADE TOP, white sides together. Make sure it does not curl as the glue dries.
- With scissors, trim away the white area showing behind the BUS SUNSHADE BOTTOM.
  - Cut out the black HGA SUNSHADE TOP and HGA SUNSHADE BOTTOM from Parts Sheet 2. Apply glue to the white side of the slightly smaller HGA SUNSHADE BOTTOM. Glue it to the BUS SUNSHADE TOP, white sides together, centered. Make sure it does not curl as the glue dries.
  - With scissors, trim away the white area showing behind the HGA SUNSHADE BOTTOM, retaining the 9-sided shape of the BOTTOM piece.
  - Set the BUS SUNSHADE on your table with the TOP (the side with a white circle) facing up. Apply BOND 527 glue (or rubber cement) to fill in the white circle. Set the HGA down onto the glue, its bottom black circle covering the glue, and press together until the glue dries. To make an even joint, place a coin over the HGA's black circle and press down.
  - Cut out the four REFLECTOR pieces from Parts Sheet 2. Glue the FRONT and BACK halves together, white side to white side. When the glue is dry, make a slit along the grey line on each of the two pieces. Fit the two pieces together, slit into slit, at right angles.
  - Straighten and align the REFLECTOR STRUCTURE so its halves are even and perpendicular. Set it upright on your table, with its larger, black end down. Trim the bottom, if necessary, so it will stand straight up on the table easily. Trim the top, if necessary, so you can balance the HGA SUNSHADE on top of it, parallel to the table. Apply some white glue to secure the halves together at right angles.

- Dip the bottom of the REFLECTOR STRUCTURE in BOND-527 glue (if not available use rubber cement), then stand it upright, centered within the HGA.
- Apply some glue to the HGA SUNSHADE BOTTOM where the white lines meet in the center, then set it atop the REFLECTOR STRUCTURE where it should balance. Keep it level while the glue dries.



## \*2. Assemble the Spun Bus.

- Print [Parts Sheet 3](#) onto white card stock.
- Cut out the SPUN BUS. Each of the eight segments represents an equipment bay. Lightly **score** along the two long parallel white lines, and along the eight vertical white lines.
- Bend the SPUN BUS into an octagon, with the printed details outside, by pinching a crease into each of the vertical white lines. Fold the small rectangular tab at one end, and glue it onto the opposite end of the SPUN BUS to close the octagon.
- Find a tab labeled with a white arrow on the SPUN BUS. Bend it over, toward the inside of the octagon. Bend the 7 adjacent tabs over in the same direction.

- Cut out the octagonal BUS SUPPORT, and position it up inside the SPUN BUS, to hold its shape. Its black side should face up towards the outside. Glue the bent tabs to the BUS SUPPORT. This is now the BOTTOM of the SPUN BUS.



- Bend down the eight tabs on the remaining (top) side of the SPUN BUS toward the center, forming a shelf at right angles to the walls of the bus.

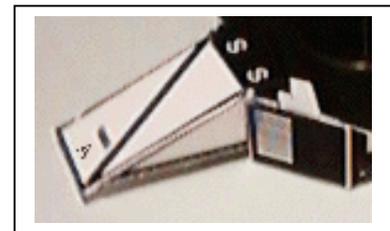


- Cut out the BOOM SUPPORT STRUCTURE. Slit along the shaded line outboard of G. Slit the small shaded line "A" outboard of S S.
- Color the white underside of tab G, using a black felt tip pen.
- Lightly **score** along both black lines which go straight out from S S.
- Fold tabs X and Y up 90 degrees toward the black side. These represent science instruments: tab X the EUV, and tab Y the HIC (see Galileo information links).
- Keep the side with the printed letters on the BOOM SUPPORT STRUCTURE facing UP. On the SPUN BUS, locate the tab marked S. Glue the BOOM SUPPORT STRUCTURE onto the top of the SPUN BUS so that the black area labeled S S aligns over the tab marked S. Align the black corners marked 1 and 2 with the corners of the SPUN BUS so it centers nicely. Allow the glue to dry.
- Cut out the part labeled STAR SCANNER. Slit along the shaded line. Color the white side black, using a felt tip pen. Slide it together at right angles, slot into slot, with its other

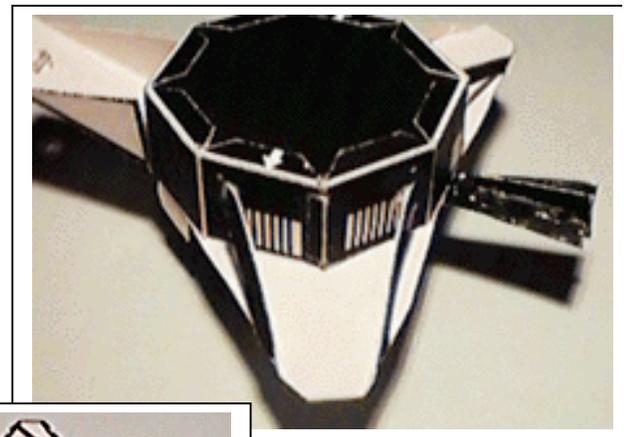
half (marked G) on the BOOM SUPPORT STRUCTURE. Secure with glue, keeping the outboard ends even and perpendicular. Apply glue where it meets the SPUN BUS top.

- The trusswork protruding from S S is the SCIENCE BOOM SUPPORT. Bend it down as far as it will go, to make a crease at S S. Lift it up again, and bend its two triangular side panels down at right angles to the center portion. Bend the SCIENCE BOOM SUPPORT down again, and glue the ends of the triangular trusses to the SPUN BUS where they touch, below each S.
- Find two small white dots near the end of the roughly triangular structure marked 2. Fold down the two black arms which are marked by these white dots. The tip of each of these arms will approach a small white dot on the SPUN BUS. Glue the end of each arm to the SPUN BUS where it touches, near the white dot.

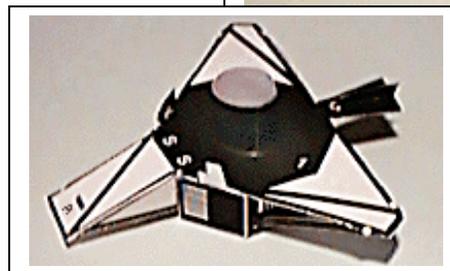
- Repeat the above step with the structure marked 1. These structures, 1 and 2, are the RTG BOOM supports.



- Cut out the HGA SUPPORT. Wrap it into a cylinder, bringing the white end around to meet the black end, keeping the black side out. Apply glue to the white end and overlap the black end onto it. Adjust its shape to be an even cylinder.



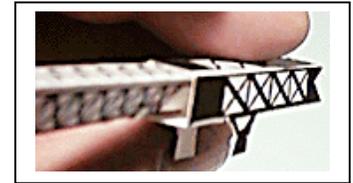
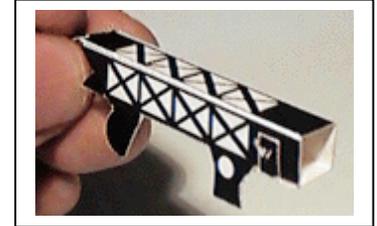
- Glue one end of the HGA SUPPORT cylinder down onto the top of the SPUN BUS, centering it over the white circle.



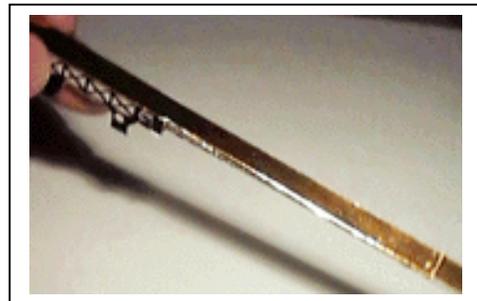
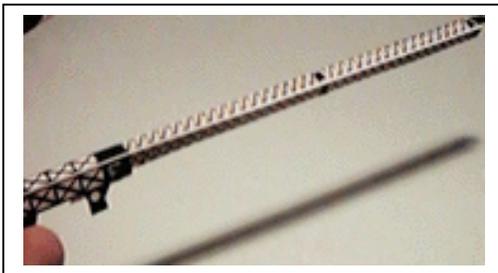
### \*3. Assemble the Science Boom.

- Print **Parts Sheet 4** onto white card stock. Sheet 4 contains parts for this step and the next.

- Cut out the **SCIENCE BOOM**. Lightly **score** lengthwise along the two white lines which separate the three trusswork panels. Fold down the two outboard truss panels away from the printed side. The boom becomes U-shaped in cross-section. Fold the remaining black rectangular panel over to close the box structure. Wrap tab A over mark B and glue.



- Cut out the **MAG BOOM** (magnetometer boom). Lightly score lengthwise along the two white lines which separate the three long trusswork panels. Fold both long truss panels down lengthwise printed side out, so the boom becomes triangular in cross section. Bend the three tabs on one side over the edge of the other side to hold the shape. Secure with glue.
- Apply some glue to mark G. Fit this end of the **MAG BOOM** into the black, square-box end of the **SCIENCE BOOM**, keeping the seam of the **MAG BOOM** facing down toward the open side of the U-shaped **SCIENCE BOOM**. Secure with glue, making sure the **MAG BOOM** extends straight out of the **SCIENCE BOOM**.



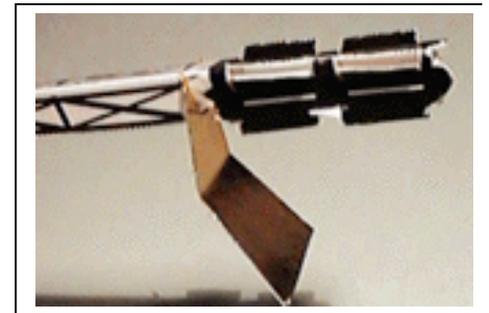
- **Optional:** Cut a strip of gold-colored foil/paper (such as gift-wrap) to fit along the top of the entire length of the **SCIENCE BOOM** and **MAG BOOM**. Glue in place covering the top of the booms.

## \*4. Assemble the RTG Booms.

- This step uses parts printed on [Parts Sheet 4](#) (white card stock).
- Cut out one RTG BOOM. There are four J-shaped shaded lines at the black end. Slit through the paper along these marks, to create fins which will pop up when the part is folded. Lightly **score** lengthwise along the two white areas which separate the three trusswork panels. Fold down the two outboard truss panels away from the printed side. The boom takes on a triangular cross-section. The four fins should pop out slightly. Bend them outward a little more.

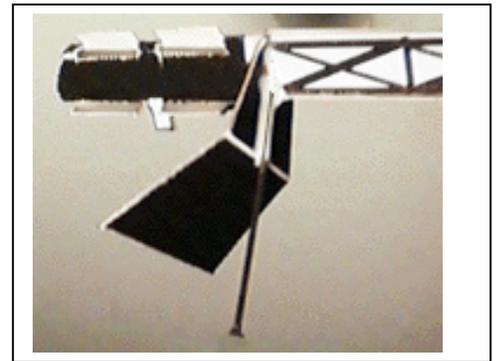


- Glue the two long black legs together, at the inboard end of the part, white to white. At the black outboard end, wrap the white tab through the notch it meets. This should hold the part together while you apply glue. Fold over the small white tab in the middle, and glue, to hold the part's triangular cross section.



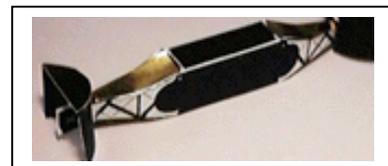
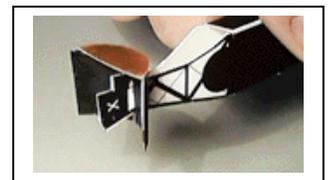
- **Optional:** Cut a strip of gold-colored foil/paper (such as gift-wrap) to fit along the top of the BOOM's trusswork. Glue in place covering the top of the boom, from the inboard end of tab A to the black, finned RTG. Don't cover tab A or the RTG.
- Cut out one RTG NIMS SHIELD. Optionally, cut and glue a piece of gold-colored foil/paper to cover the white side.
- Lightly score along the SHIELD's white line, and fold about 30 degrees, away from the black side.

- Glue the SHIELD's V-shaped notch up onto the bottom of the RTG BOOM's trusswork, at the outboard end of the truss markings (just inboard of the black, finned RTGs). The black side faces inboard. Note: the accompanying image can present an optical illusion. In reality, the bottom of the shield bends toward the outboard end, and it is being viewed from slightly outboard.
- The spacecraft's RTGs are hot. The shields prevent NIMS, which is a science instrument sensitive to infra-red, from "seeing" them.
- Repeat the above steps to make the second RTG BOOM.
- Optional: If you wish to represent Galileo's low-gain communications antenna #2 (LGA2), obtain a straight pin about 4 cm or 1.5 inches in length. Stick it into the bottom of an RTG boom, right at the back of the RTG NIMS SHIELD, where the shield meets the truss. It should extend straight down from there. Glue it to the back of the SHIELD. The RTG BOOM which supports LGA2 is designated RTG BOOM 2, and it will be installed on the SPUN BUS near the 2 mark, in a later step.



## \*5. Assemble the Retro Propulsion Module (RPM).

- Print **Parts Sheet 5** on white card stock.
- Cut out the **THRUSTER BOOMS**. Lightly **score** along the two parallel white lines near the center. Fold the two panels away from the printed side, 90 degrees each.
- At one end, glue the extremities marked **X** together, white surface to white. Repeat at the other end. Adjust so that the black sections near the center are parallel.
- Cut out one of the **THRUSTER SHIELDS** rectangles. Color the white side black with a felt-tip pen. Slit along the shaded line. Wrap the rectangle around a pencil to impart a curve, holding the pencil parallel to the slit.
- Cut out one of the **THRUSTER SHIELDS** crescents. Optional: Glue some gold-colored foil/paper (gift-wrap) on the white side, before cutting out the crescent shape.
- Adjust the curve in the rectangle to match the crescent piece's curve. Glue the crescent, black side down, to the top of the curved rectangle. The top is the end opposite the slot.
- Set the **THRUSTER BOOMS** piece down with **Q** facing up. Fit the **THRUSTER SHIELD**'s slot over one end, so that the **X** mark is enclosed within the **THRUSTER SHIELD**. The slot should be just inboard of the black **X**-marked end section. Straighten so the piece fits symmetrically. Secure with glue.
- Repeat the above four steps with the other **THRUSTER SHIELD**, and install it on the other end of the **THRUSTER BOOMS**.
- Optional: Cut two triangles of gold foil/paper (such as gift wrap) and glue atop the open areas inboard of the **THRUSTER SHIELDS**.



- Cut out the RETRO PROPULSION MODULE (RPM).  
Lightly score each of the six thin white lines: four near the circles, and two near the X-panels.
- Crease each of the X-panels by folding the panels all the way back, white side toward white. Do the same with all four circles, over onto the X-panels.
- Carefully bring the X-panels up to vertical, also pushing up the circles to vertical. The X-panels will lodge and support the circles. Apply small amounts of glue to hold this configuration, and let dry.
- Apply glue along the bottom (open) center walls of the THRUSTER BOOMS, and set it down on the RPM, inside the circles and X-panels.



## \*6. Assemble the Despun Section.

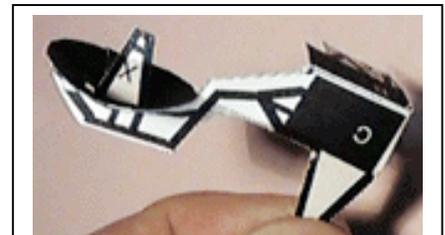
- Print **Parts Sheet 6** on white card stock.
- Cut out the **DESPUN BUS**. Bend up the tab marked **BEND** toward the black side. Apply glue to the area marked **GLUE**, and curl the piece around into a conic shape, overlapping the opposite black end onto the glue. The tab marked **BEND** will protrude from the seam.

- Fold the rectangle marked **PS** (**Plume Shield**) out about 20 degrees toward the outside. Fold the three black prongs inward about 90 degrees. Those will support the **Atmospheric Probe** later.



- Adjust the tab marked **BEND** so it stands straight out from the **DESPUN BUS** cone. Apply some glue to its crease so it will become rigid.
- Cut out the **RRH ANTENNA**. Cut out the shaded slot in the middle. Color the white side black with a felt tip pen. Apply glue to the white segment, and overlap the opposing black edge onto it, forming a shallow cone out of the circle.
- Cut out the **RADIO RELAY HARDWARE (RRH)**. Lightly **score** along the two white lines separating rectangles **B**, **C** and **D**. Fold **B** and **D** back 90 degrees to **C**. Secure with glue to hold the "open box" shape.
- Place the **RRH ANTENNA**'s central slot down over piece **X** of the **RRH**. The tip of the **RRH ANTENNA**'s cone goes in toward the **RRH**'s support, and piece **X** centers inside the cone. Adjust so the cone is aligned symmetrically, and secure with glue.

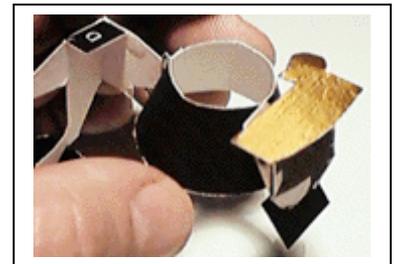
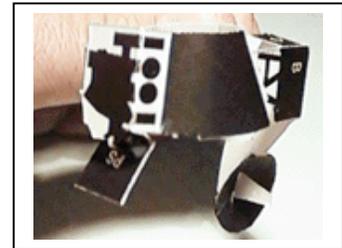
- When the glue has dried thoroughly, attach the **RRH** to the **DESPUN BUS**: Apply glue to the **A** on the **RRH**.



Press this A up against the middle of the word BEND on the DESPUN BUS's tab. The RRH ANTENNA points down. Align so that rectangle B is square with the base of the DESPUN BUS's cone. See the image.



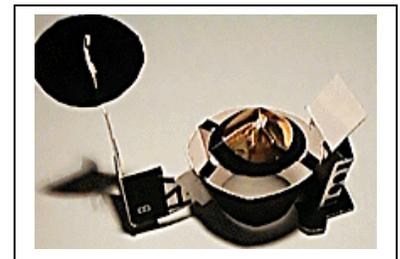
- Cut out the SCAN PLATFORM. Bend rectangle D back 90 degrees away from the printed side. This represents the apertures (front) of some optical instruments. Bend back circle C 90 degrees in the same direction. Bend back tab B 90 degrees in the same direction. Finally, bend back tab A 90 degrees in the same direction, creasing along the diagonal black line.
- Apply glue to tab A. Press tab A onto the A on the DESPUN BUS, such that the SCAN PLATFORM will be square with the bottom of the DESPUN BUS, and circle C is at the lower side, adjacent to the plume shield PS. See the image. On the spacecraft, the scan platform can swivel to point up and down, but this is not true on this model.
- Cut out the SP SUNSHADE. Optionally, cover the white side with gold foil/paper, such as gift wrap, and trim. Apply glue along the top of the SCAN PLATFORM, and set the SP SUNSHADE onto it, black side down. See image for proper orientation. Note: This is a simplification. On the spacecraft, the SP SUNSHADE is separate from the SCAN PLATFORM, and is supported from the DESPUN BUS.



Note: Galileo's main, 400-Newton rocket engine is centered within the DESPUN SECTION, but it is not represented on this model.

## 7. Assemble the Atmospheric Probe.

- **Parts Sheet 6** (white card stock) contains the part for this step.
- Cut out the **PROBE HEAT SHIELD**.
- **Option:** Cut a circle of gold foil/paper, such as gift wrap, to fit the white circular area in the **PROBE HEAT SHIELD** part. Glue it onto the white circular area, but do not cover wedge G.
- Apply glue to wedge G. Curl the opposite edge onto the glue, making a cone. Squeeze the seam until the glue dries completely.
- Crush the tip of the cone slightly, by pressing it down onto a flat surface with your finger inside the cone. Rock it around while pushing down, to blunt the tip of the cone into a rounded shape.
- Install the **PROBE HEAT SHIELD** in the **DESPUN SECTION**. Step 6 should be completed first. Turn the **DESPUN SECTION** upside down, and notice the three black prongs pointing inside the **DESPUN BUS**.
- Align the three prongs so they're parallel with the bottom plane of the **DESPUN BUS**, that is, about 80 degrees to its wall.
- Balance the **PROBE HEAT SHIELD**'s open side onto the three prongs. Adjust so the **PROBE HEAT SHIELD** is centered at the bottom of the **DESPUN BUS**. Apply glue to attach it there.

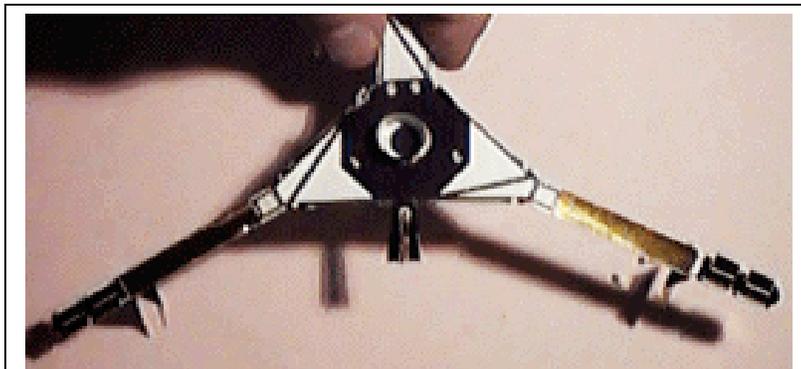
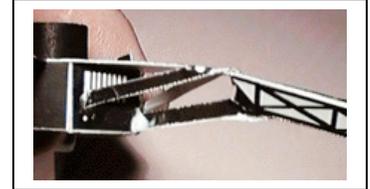


Note: (1) Galileo's Atmospheric Probe separated from the spacecraft prior to arrival at Jupiter. It is not separable on this model. (2) Galileo's main, 400-Newton rocket engine, which is centered within the **DESPUN SECTION**, is not represented on this model. It would be just above the Atmospheric Probe, unable to

operate until after the Probe had been released.

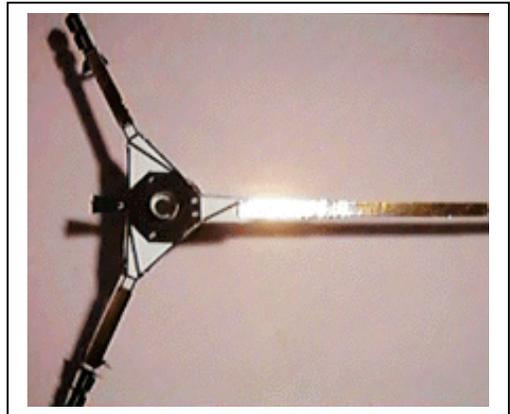
## **8. Attach the RTG Booms to the Spun Bus.**

- If you have installed the optional **LGA2**, its RTG BOOM will be installed at the support marked 2 on the SPUN BUS. Otherwise, either boom may be installed first.
- Bend tab A, at the end of an RTG BOOM, down about 20 degrees. Apply glue to tab A.
- Position tab A near the end of support 2 on the SPUN BUS, underneath the support's outboard end. Align the RTG BOOM straight out from the center of the SPUN BUS (although it angles downward somewhat), and squeeze tab A to the support to glue it in position.
- The black arm on the bottom of the RTG BOOM will now swing into contact with the bottom of the SPUN BUS. Adjust so it touches the bottom corner of two bays on the SPUN BUS. Trim off the end of this arm where it reaches the SPUN BUS. Caution: trim it a little too long to start with, then shorten again if necessary. Glue the tip of the black arm to the SPUN BUS.
- Repeat this process to attach the other RTG BOOM.



## 9. Attach the Science Boom to the Spun Bus.

- Locate the black tab C at the inboard end of the SCIENCE BOOM. Insert this tab, black side up, into slot A on the SPUN BUS. Slot A is outboard on support S S.
- As you insert the tab, two V-shaped notches approach the outboard end of support S S. Engage both notches. Apply a generous amount of glue to the notches and to tab C, and at all points of contact. Adjust the SCIENCE BOOM so it extends straight and level out from the SPUN BUS, and allow the glue to dry thoroughly.

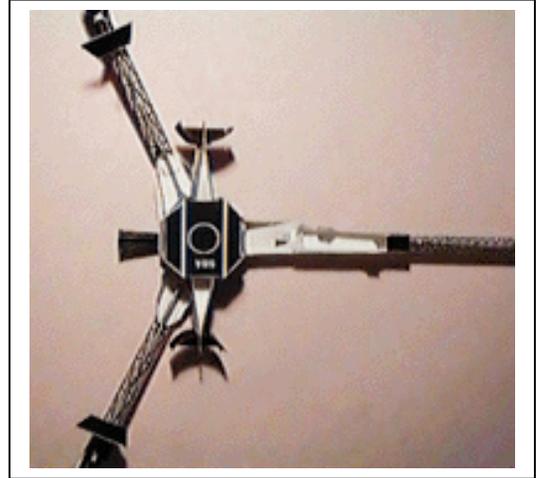


- Option: Nutation Damper. If you wish to represent the nutation damper, insert a straight pin into the upper inboard end of the SCIENCE BOOM, on the right side as viewed looking outboard. It should enter the paper just outboard of, and above, the end of support S S. Rotate the pin so that its head rests beside the nearest S on top of the SPUN BUS.



## 10. Attach the RPM to the Spun Bus.

- Apply glue to panel Q on the RPM (between the thruster booms).
- On the bottom of the SPUN BUS, locate two arrows. These designate the direction to place the RPM's thruster booms. Set panel Q onto the SPUN BUS between the arrows. Align so it is centered and symmetrical.



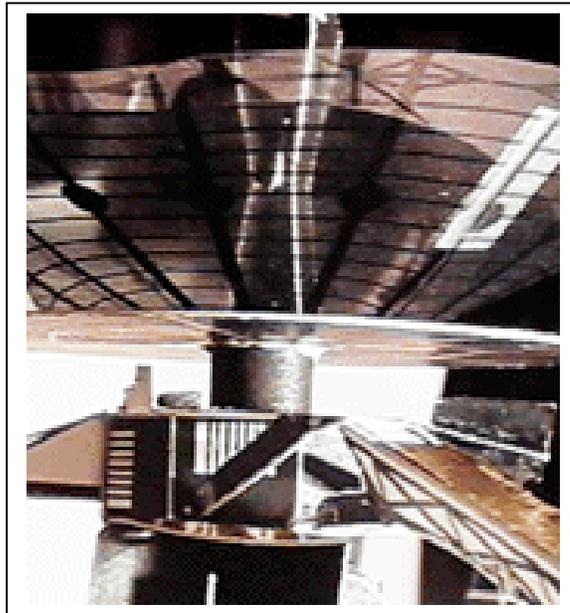
## 11. Attach the High-Gain Antenna to the Spun Bus.

- Galileo's Despun Section rotates, and so may be in any angular position. Unfortunately, this model does not permit the despun section to rotate. Set the spacecraft upside down, with the mark SBA facing up. SBA stands for Spin Bearing Assembly.
- Set the upper end of the Despun Section (opposite the Probe) down onto the SBA, so that it surrounds the white ring. Rotate it to the angular position you would like to have it. Apply glue to secure it there. Be sure it is centered as the glue dries.



## 12. Join the Spun and Despun Sections.

- Set the spacecraft right side up, supported in a beverage glass, or by some other means. The HGA SUPPORT is the cylinder in the center of the SPUN BUS.
- Apply glue to the top of the HGA SUPPORT.
- On the bottom of the HGA is the BUS SUNSHADE. Locate a white U-shaped mark near the edge on the bottom. This will align directly over the STAR SCANNER (marked G) on the SPUN BUS.
- Set the HGA down on the HGA SUPPORT with the U-shaped mark aligned correctly. Center the HGA by observing the white lines on the bottom of the BUS SUNSHADE as they relate to the HGA SUPPORT.



### 13. Optional PRA/PWS Wires

- The spacecraft has a PWS Antenna pair out at the end of the MAG BOOM. This is visible in the [line drawing](#) of the spacecraft. Scale length would be about 17 cm or 6.75 inches on your model, but it would be very difficult to model it here in Earth's gravity well. If you have an idea for mounting and displaying your model which could support the antenna, obtain an appropriate length of thin wire. Make a bend of 30 degrees at the center. Go out about halfway from the center on each side, and bend 15 degrees up. Attach the wire at the outboard end of the MAG BOOM, perpendicular with it. Caution: DO NOT install wires if your intended use of the model might present any possible hazard of eye injury.

### **E. YOU'VE FINISHED YOUR GALILEO MODEL.**

Now that you're familiar with the names of all of the spacecraft's major structures, and some of its instruments, be sure to browse the [Galileo](#) web site to learn more about the spacecraft and its mission. If you visit JPL's museum, you'll see a full-scale model of the Galileo Spacecraft up close.

### **F. ABOUT YOUR GALILEO MODEL:**

Your model's scale is approximately 1/45. Any optional PRA/PWS antenna wires must be much thicker than scale. Galileo's Atmospheric Probe separated from the spacecraft prior to arrival at Jupiter. It is not separable on this model. Galileo's main, 400-Newton rocket engine which is centered within the DESPUN SECTION, is not represented on this model. The model's MAG BOOM can support itself in one G, while the spacecraft's boom, made of thin fiberglass trusswork, cannot. The Scan Platform sunshade is attached to the Scan Platform for simplicity in this model; on the spacecraft it is supported above the Scan Platform. The Scan Platform on this model cannot swivel as it does on the spacecraft, nor can the Despun Section swivel on the model. This model does not depict the calibration target and mirror on the Science Boom, nor the sunshades for fields and particles instruments there. At this writing, the HGA on the NASA Galileo Spacecraft has not been successfully deployed to the dish-shape represented on your model. Some of the ribs are stuck to the

REFLECTOR STRUCTURE, near the top, and are likely to remain that way throughout Galileo's mission lifetime. There is probably no good way to simulate this partial deployment on your model.

Please feel free to copy this scale model, and disseminate it widely.

Have you built the [Cassini](#) Spacecraft Scale Model?

Sections marked with a \* may be accomplished at the same time if two or more people are working on assembly, or if you wish to work on one section while glue dries on another.

Model design by Dave Doody

Thanks to Leslie Lowes and Matt Landano for reviewing and polishing.

An afterhours project, not at taxpayer expense.

18 December, 1997

#### Appendix A: Views of Assembled Galileo 1/45 Scale Model

