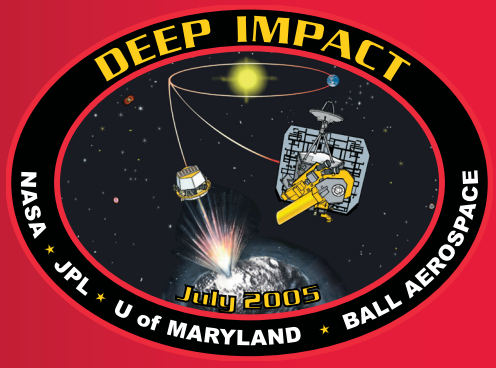


Your First Look Inside a Comet!

In January 2005, Deep Impact began its six-month journey to comet Tempel 1. Zooming along at 23,000 miles per hour, the spacecraft met the comet about 82 million miles from Earth.

The flyby spacecraft then released the impactor. For the next 24 hours, the impactor guided itself into the comet's path—until the two collided. The impact created a crater about 492 feet wide.

By peering into the crater, the flyby's telescopes and spectrometer viewed what no one has ever seen: the inside of a comet nucleus. For 15 minutes the flyby rapidly captured images and data and transmitted them back to Earth.

Meanwhile, people on Earth viewed the spectacular impact and the flying debris. The Hubble Space Telescope and other instruments in space also observed this "fireworks show," which occurred on July 4, 2005.

Comets formed 4.5 billion years ago when the solar system was forming and have changed little since then. Thus this incredible NASA mission has provided clues about our solar system's origins.

To read more about Deep Impact's science and technology, and the people who made it happen, go to

https://solarsystem.nasa.gov/deepimpact/index.cfm
www.ballaerospace.com

Or search for key words: Deep Impact home page

Model inspired by Bill Blume, Deep Impact's mission design lead

Ball Aerospace
& Technologies Corp.

Deep Impact

1/22 Scale Basic Model

Have fun building your own Deep Impact, which is really two spacecraft in one—a flyby craft and an impactor.

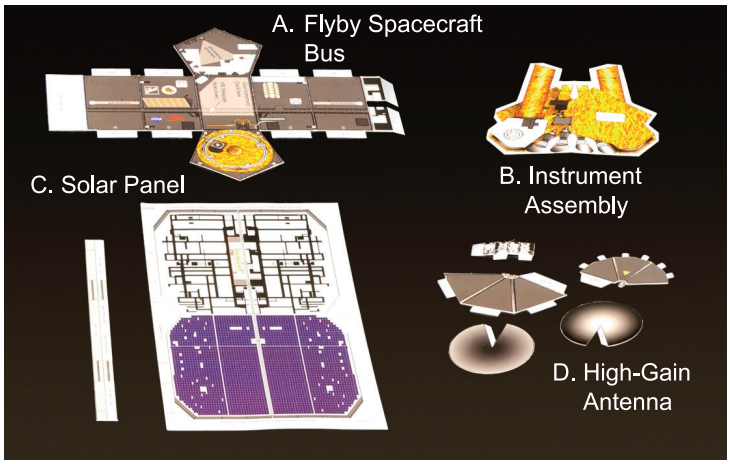
This basic model includes Deep Impact's major parts, with the telescopes and impactor pictured on it. We recommend this model for builders 12 years old and above.

General Instructions

If you work slowly and carefully, you can build an excellent Deep Impact model. Practice the techniques described below if this is your first experience with paper modeling.

Tools You'll Need

- Small scissors with 1–2 in. blade or a mat knife with a new blade
- A scriber (available at hobby stores) or large sewing needle (or you can use the back of the mat knife)
- Metal ruler
- White glue
- Glue stick
- Wax paper
- Heavy book
- Cutting board or cardboard



The Parts

The model has four major parts. Each part has an instruction page. Build the parts in the order they are lettered (A–D).

Building Techniques

1. Scoring

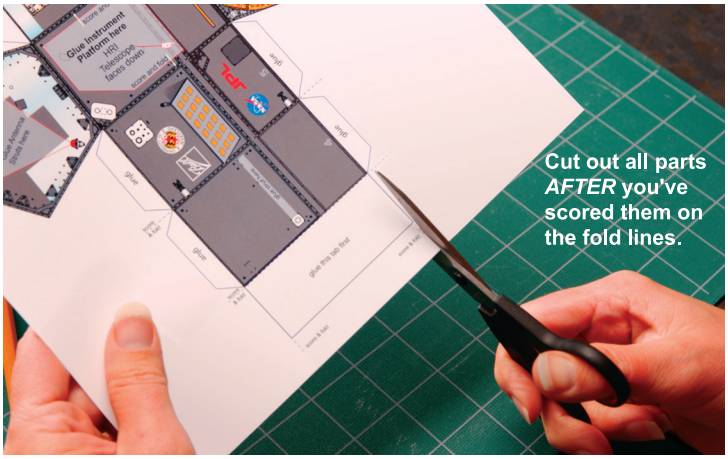
BEFORE cutting out the parts, you must score them. Scoring slightly weakens the paper, making it easier to fold. To score:

a. Lay the part page on a cutting board or on cardboard to protect your furniture.
b. Find where a fold is marked on the part with a dashed line (---).
c. Carefully line up the ruler with the dashed line.
d. Use a scriber, sewing needle, or the back of the mat knife to gently draw along the ruler.

2. Cutting

Carefully cut out the parts with scissors or with a mat knife and ruler.

Caution: ***Mat knives are extremely sharp!***



3. Folding

BEFORE gluing any parts, fold them and check their fit.

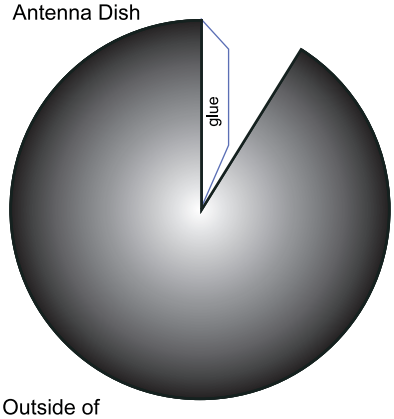
4. Gluing

Apply glue sparingly; too much glue will warp the parts. You may want to apply glue to very small pieces with toothpicks.

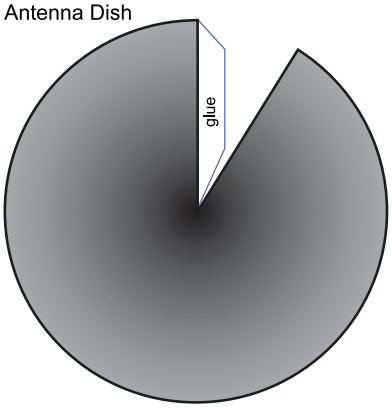
Note: Use white glue for the best results. Only the solar panel requires using a glue stick.

C. High-Gain Antenna

Inside of
Antenna Dish

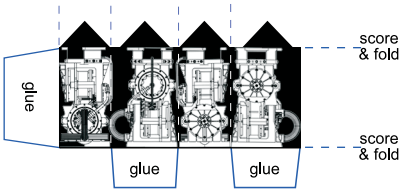


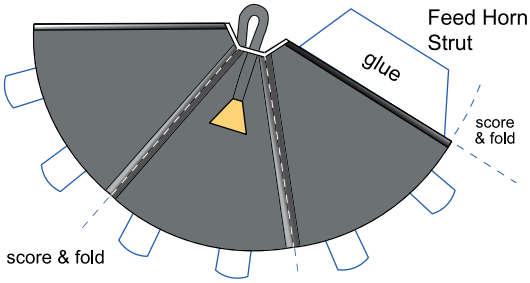
Outside of
Antenna Dish

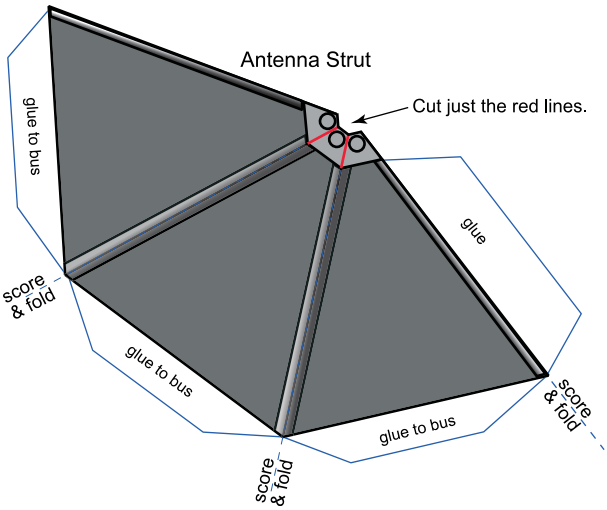


Gimbal

Score and fold black tabs out.

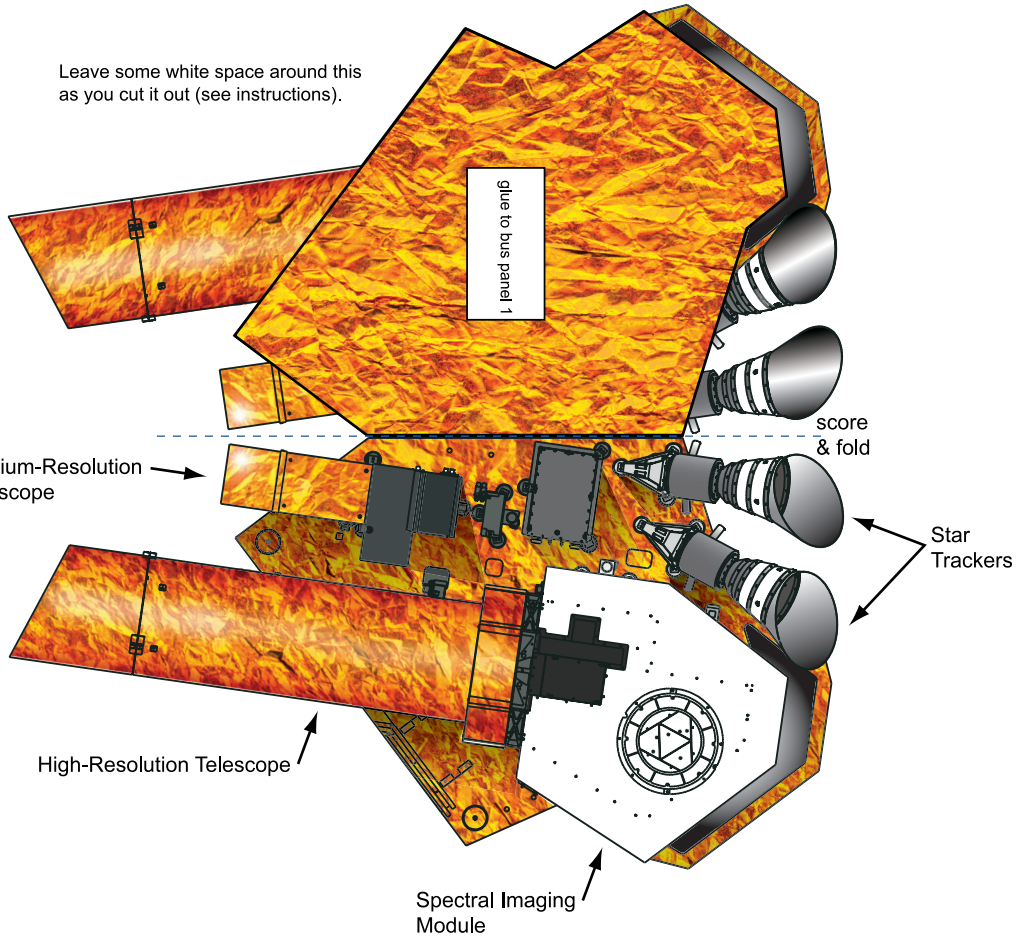


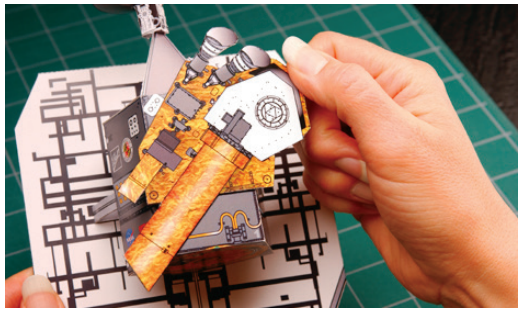


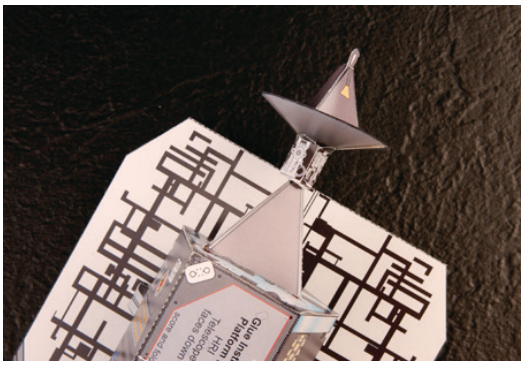


D. Instrument Assembly

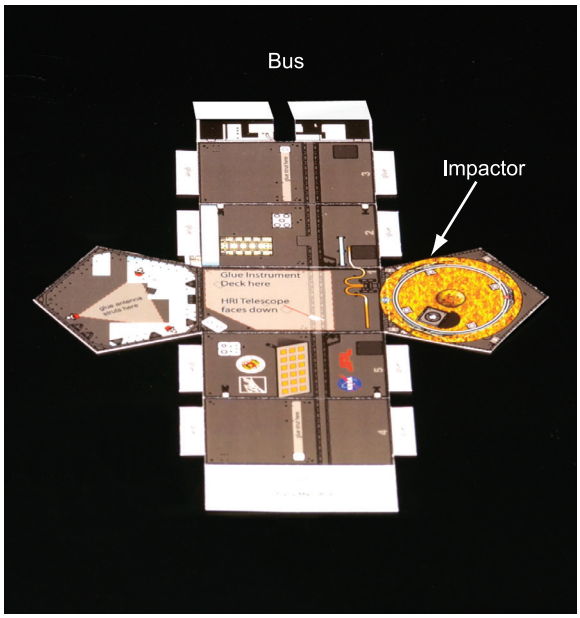
Leave some white space around this
as you cut it out (see instructions).



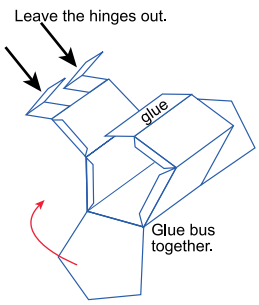




A. Flyby Spacecraft Bus

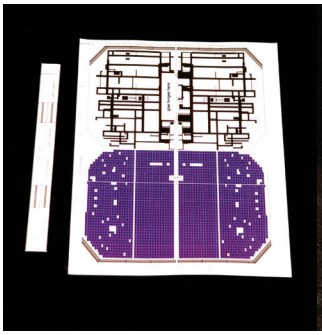


1. Score the folds. Then cut out the bus.

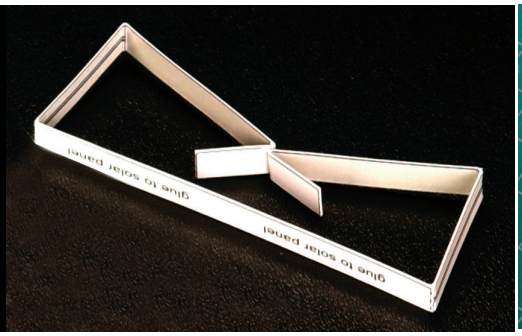


2. Fold the bus to see how it goes together. Then glue it closed, carefully lining up the sides.

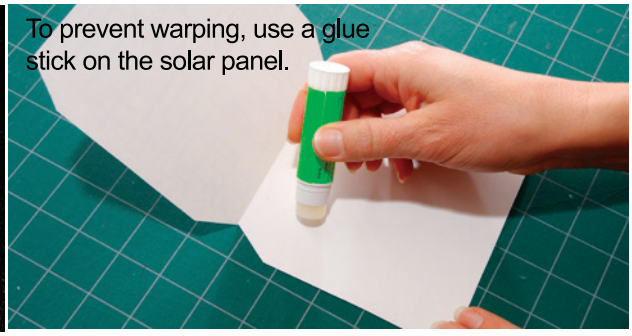
B. Solar Panel and Strut



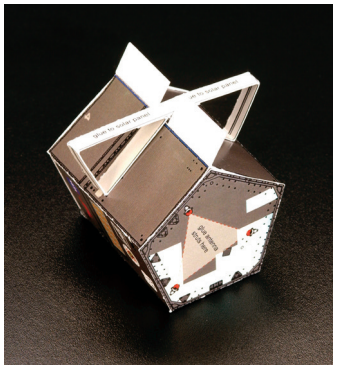
1. Score the strut and solar panel. **Important**: Cut out only the strut. Do not cut out the solar panel yet.



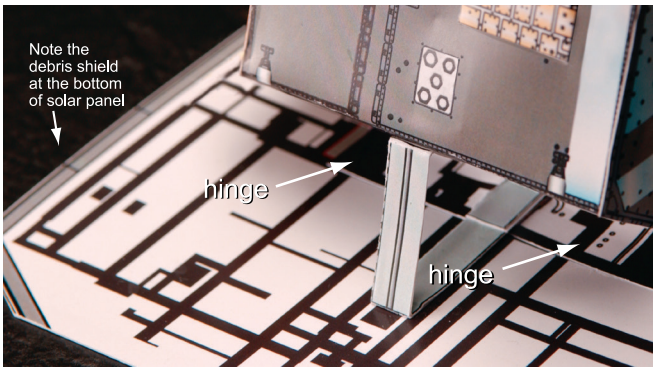
2. Fold the **strut** lengthwise and glue the halves together. Wrap it in wax paper, then press it in a heavy book until it dries. Make the remaining folds as shown.



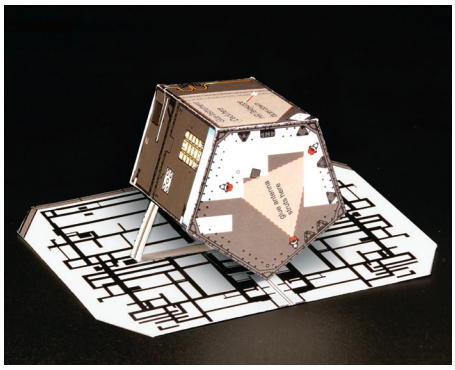
3. Fold the **solar panel**. Then use a glue stick to apply a very thin layer of glue on one inside half and glue the sides together. Wrap it in wax paper, and press it in a heavy book overnight. (For additional strength, trace one half of the panel on a blank piece of card stock. Cut it out and layer it inside the folded panel before you glue it together.) AFTER the glue dries, trim the panel.



4. Glue the strut's "1" tabs to the inside of the strut as marked. Then glue the strut to the bus.

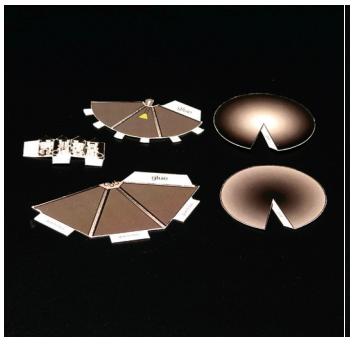


5. Apply glue to the inside of the bus's hinges and glue them closed. Then glue the solar panel to the hinges and the strut.



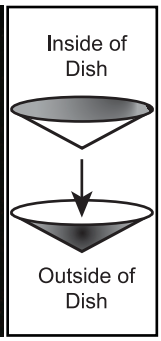
6. Here's the finished solar panel and strut attached to the bus.

C. High-Gain Antenna

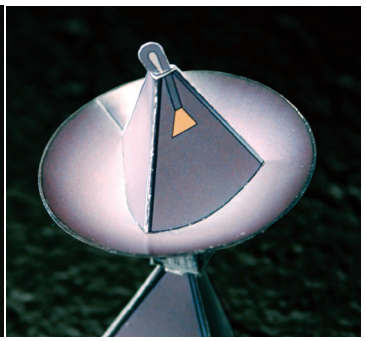


1. Score the antenna strut, feed horn strut, and gimbal. Then cut out all the antenna parts.

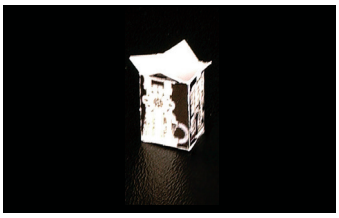
2. Fold and glue the **antenna strut** and **feed horn strut**.



3. Glue the inside of the **antenna dish** together, then glue the outside together. Next, glue the inside part to the outside part.

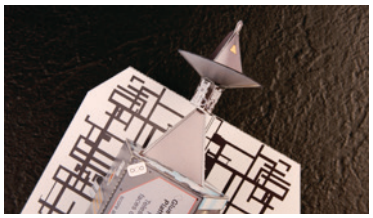


4. Glue the feed horn strut to the center of the dish.



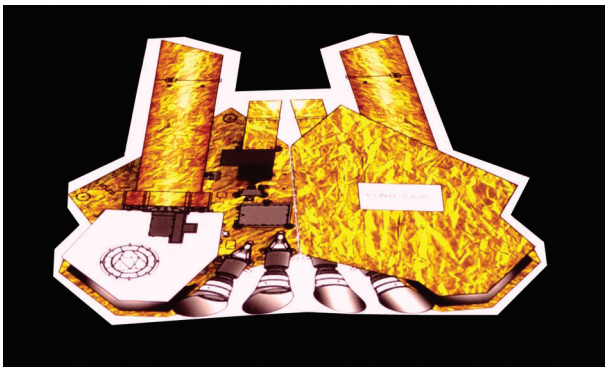
5. Fold and glue the gimbal into a box shape, leaving the end with the black tabs open. Let dry.

6. Apply glue to the closed end of the gimbal, and attach it to the antenna strut. Let dry. Then apply glue to the gimbal's black tabs and attach the antenna dish. Let dry.

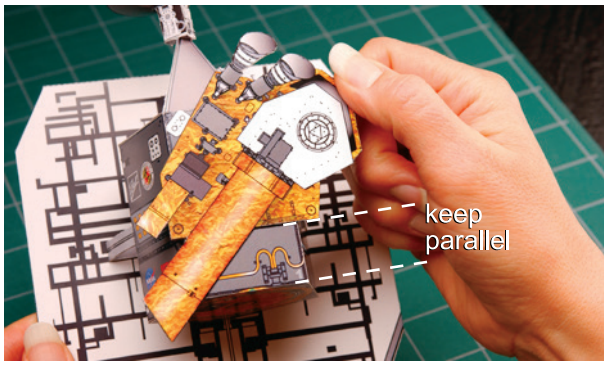


7. Glue the finished antenna to the bus where marked.

D. Instrument Assembly



1. Important: Leave some white space around the instrument assembly as you cut it out. Fold it, then glue the two halves together. Wrap it in wax paper, and press it in a heavy book overnight. Then trim it.



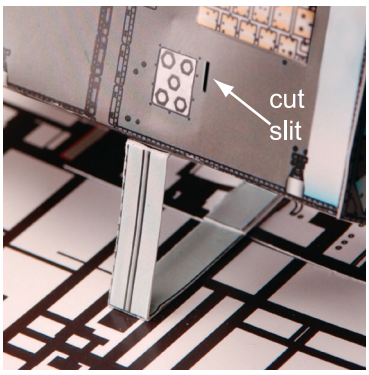
2. Glue the instrument assembly to the bus, keeping the bottom edges parallel.

Model Stand

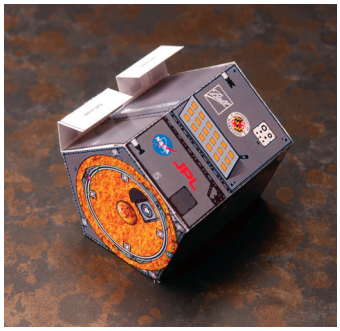
You've done it—you've built the Deep Impact spacecraft! Display your model by hanging it or mounting it on a stand. Here's one way to build a stand:

Start with a 1/16-inch diameter brass tube, about 10 inches long (available at hardware or hobby stores). Uncurl one end of a small paper clip and wedge it into the tube as shown. Secure the other end of the tube in a block of wood or other material for a stable base. Glue the model label on the base.

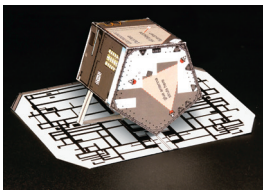
Cut a 1/4-inch slit in the bus where shown. Cut a small square of cardboard and make a 1/4-inch slit in it. Glue the cardboard inside the bus, aligning the slits. This strengthens the area where you'll insert the paper clip.



A. Flyby Spacecraft Bus



B. Solar Panel and Strut



score & fold

1

score & fold

glue to bus

score & fold

score & fold

glue to solar panel

When gluing the 1 tabs down, leave black area open so there's room for the bus to fit between them.

glue 1 here

glue 1 here

glue to solar panel

score & fold

score & fold

glue to bus

score & fold

1

Strut

glue hinges here

score & fold

Solar Panel

Label for model stand

DEEP IMPACT

NASA · JPL · U of MARYLAND · BALL AEROSPACE

1/22 scale

Ball Aerospace & Technologies Corp.

Ball