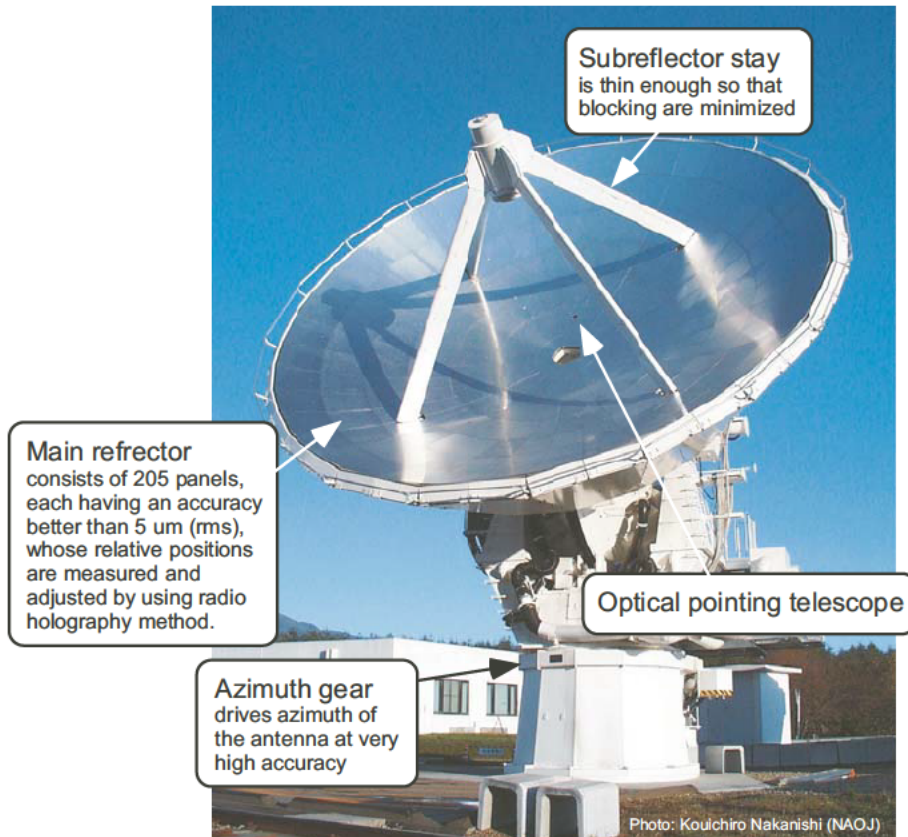


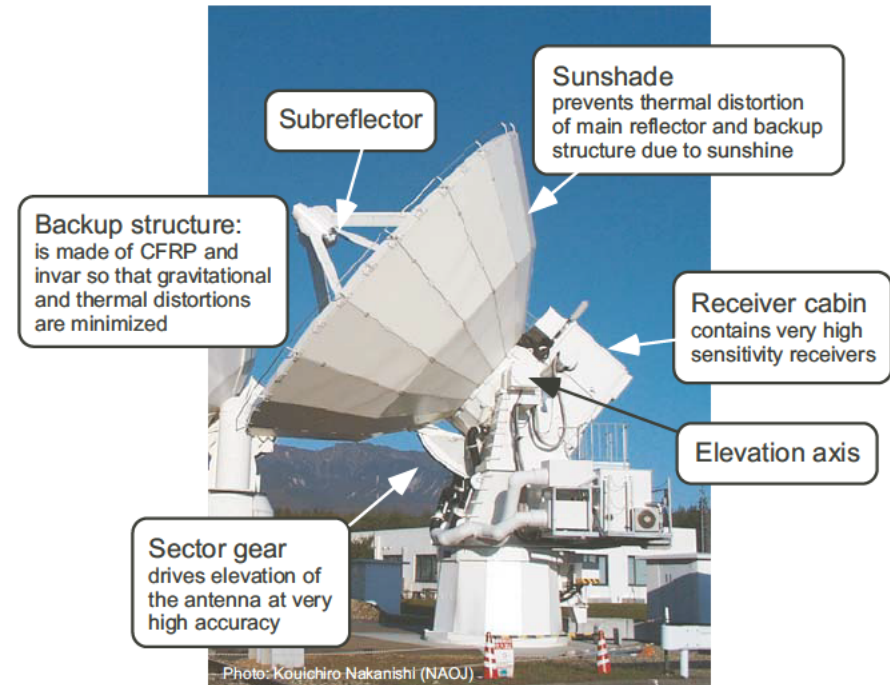
Cover story: secrets of high accuracy of ASTE 10m antenna

The ASTE Telescope observes radio wave with the wavelength of 1mm or shorter (submillimeter wave). The antenna has very high performance - for instance, each antenna has a surface accuracy better than 20 μm (root mean square). Let us learn the reason why these antennas can achieve so high performance, by making a scale model of the ASTE 10m antenna.



Specifications of the ASTE 10m antenna

Antenna diameter	10 m
Weight	90 tons
Surface error	20 μm or less
Pointing error	0.6 arcsec(1/6000 deg) or less
Observing frequency	30-950 GHz (10-0.3 mm om wavelength)
Maximum drive speed	6deg/sec (azimuth) 3deg/sec (elevation)
Mount	Alt-azimuth



Designed by Seilhi Sakamoso (NAOJ)



Let's build a paper model of ASTE 10m antenna

Tools & material: art knife, ruler, needle, white glue, coins, toothpick

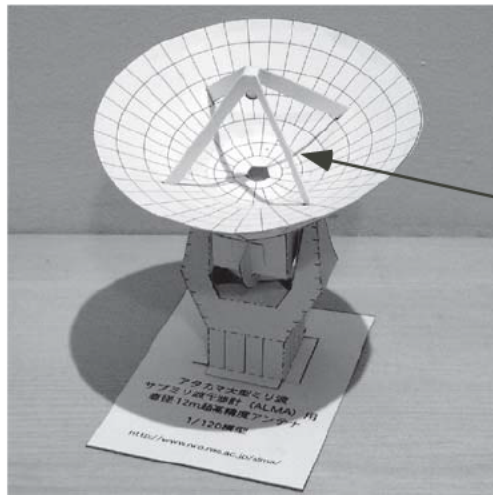
0. Copy the parts sheets onto white card stock so that the outer frame forms a 18 cm x 26.5 cm rectangle.

1. Cut out all 11 parts from the parts sheets along thick lines. Remove holes surrounded by thick lines. Score and fold backwards (mountain fold) along chain double-dashed lines. Score and fold forwards (valley fold) along dashed lines.

2. Glue and form the yolk so that it shapes like a tuning fork.

3. Attach quarter coins to the backside of the  mark as a balance weight, and assemble the box. Glue the sector gear along the line that goes through the  mark.

4. Roll up and glue the subreflector mount to form a 4 mm diameter



Subreflector stay
looks X-shaped
when seen from
the front side.

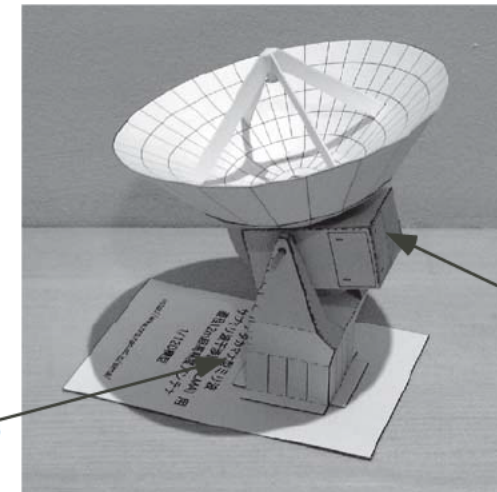
barrel. Glue the subreflector on one end of the subreflector mount. Glue the subreflector stay to form an apex. Attach the subreflector mount to the center of the subreflector stay.

5. Form two cones with inner and outer rings of sunshields so that the printing faces outside. Attach the two cones into one.

6. Form a cone with outer ring of main reflector so that the printing faces inside. Attach the inner ring to the outer ring from the inside.

7. Insert the ends of the subreflector stay into the holes on the main reflector surface and glue from the rear side. Glue the outermost ends of the main reflector surface and the sunshield and assemble into one piece.

8. Fix the yolk on the foundation in a manner that the flat side of the yolk is facing the front side. Mount the receiver cabin to the yolk with a toothpick in a manner that the larger end of the cabin is in the back side. Attach the main reflector to the + mark of the receiver cabin in a manner that the subreflector stay is X-shaped when seen from the front side.

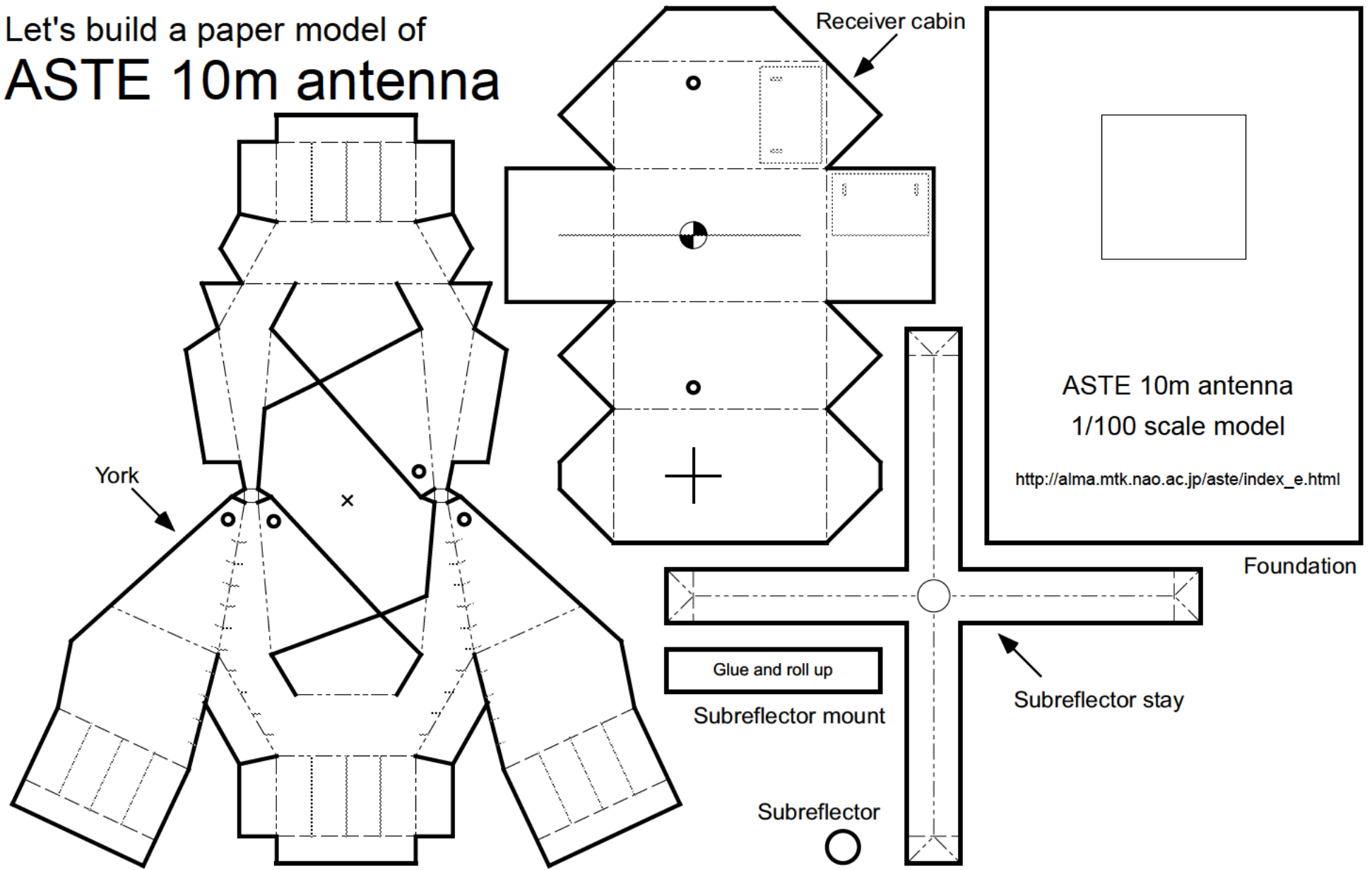


Flat side of
the yolk faces
the front side.

Larger end of
the cabin is in
the back side.

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