

ISARA (Integrated Solar Array and Reflectarray Antenna)



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The mission will demonstrate a reflectarray antenna that increases downlink data rates for CubeSats from the existing baseline rate of 9.6 kilobits per second (kbps) to more than 100 megabits per second (Mbps).

The reflectarray antenna consists of three panels, electrically tied together through hinges, which have an array of printed circuit board patches on them. The size of the patches are adjusted so that the phase of the reflected feed illumination collimates the radiation in much the same way a parabolic dish reflector would. Unlike a parabolic dish, however, the reflectarray panels are flat, which enables them to be folded down against the CubeSat. On the opposite side of the printed reflectarray antenna, solar cells have been added. This makes the overall antenna/solar array panel assembly slightly thicker, but the cells are stowed in the "dead space" between the launch rails that would have otherwise been left empty. This combination of antenna and solar cells makes for a very efficient use of CubeSat volume, leaving plenty of room for payloads such as science instruments or imaging systems.

The ISARA design is particularly unique because it incorporates 24 solar cells on the side of the panels opposite the reflectarray, so it can provide both prime spacecraft power and a high speed datalink. The ISARA design is comprised of three 33.9 cm x 8.26 cm reflectarray panels designed to achieve 33.5 dB of gain at 26 GHz.

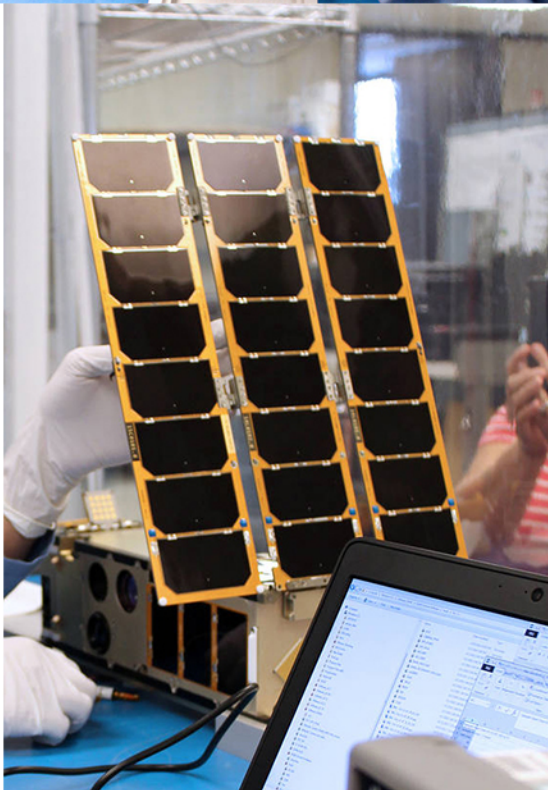
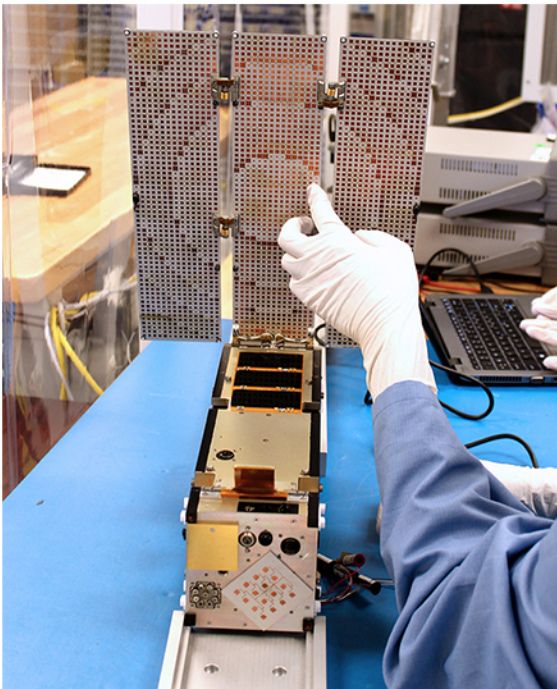
ISARA will be the first in-space demonstration of a reflectarray antenna as well as that of an integrated antenna and solar array. No reflectarray has ever flown in space. It has been discussed over the years, but now we're going to demonstrate it does work in the space environment.

Other ISARA flight firsts, including antenna gain measurement actually done in space. There's quite a significant list of technology advancements, like use of off-the-shelf camera sensors for weather and environmental monitoring.

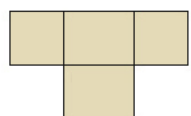
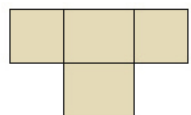
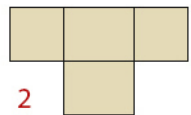
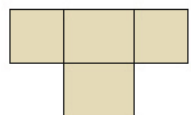
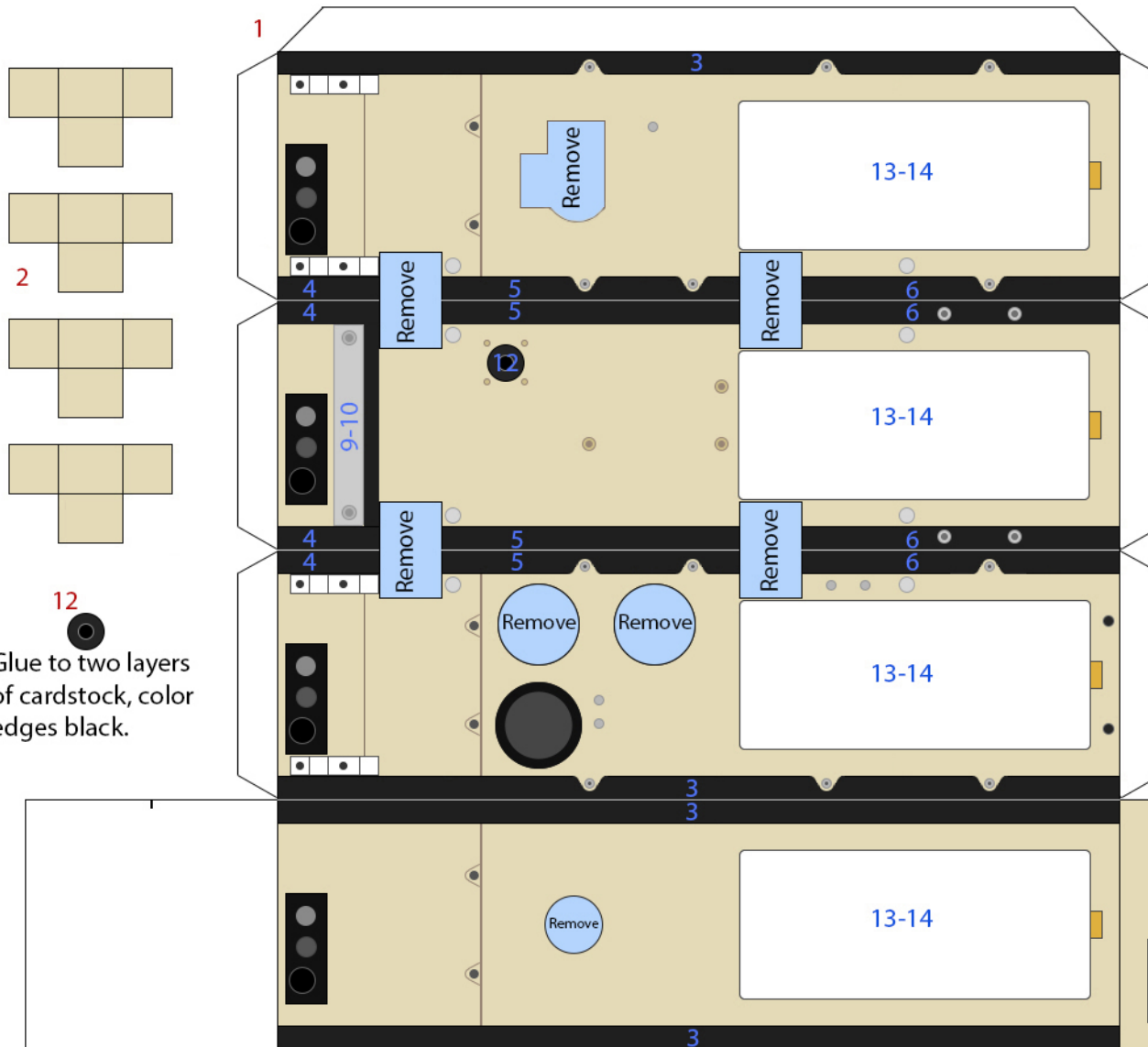
Due to efficiencies in the ISARA design that provide extra stowage volume, along with spacecraft power provided by ISARA technology, a secondary payload known as the CubeSat Multispectral Observation System (CUMULOS) is onboard - an experimental remote sensing payload from Aerospace.

The CUMULOS sensors provide a small-aperture, large field-of-view, remote sensing payload suitable for testing the performance of passively-cooled commercial sensors for weather and environmental monitoring missions. CUMULOS is designed for point-and-stare imaging and will allow almost simultaneous 3-band coverage of regions 230 x 180 kilometers (km) in size, at ground sample distances from 180 to 600 meters from an orbital altitude of 600km.

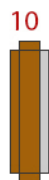
The ISARA mission was launched on November 12, 2017 on the Cygnus Orbital ATK CRS OA-8 Mission to the ISS on the upgraded Orbital ATK Antares 230 vehicle.



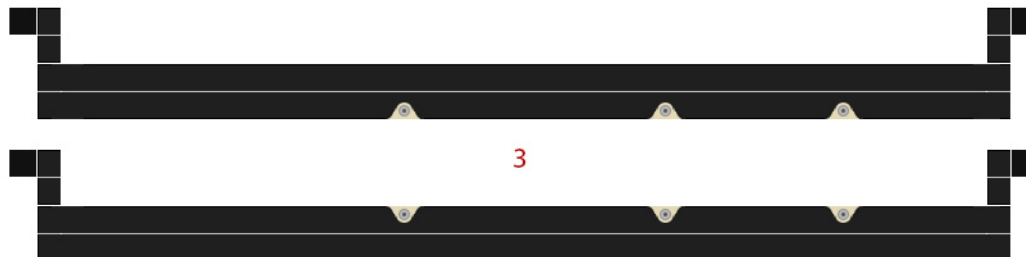
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Glue to two layers of cardstock, color edges black.



Glue to cardstock



4



5

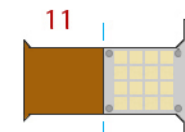


6



7

Glue to Three (3) layers of cardstock



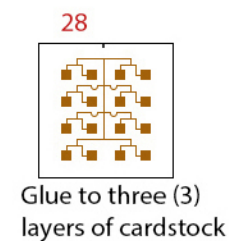
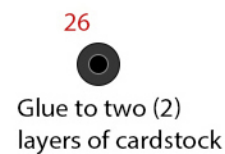
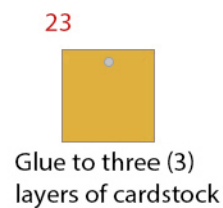
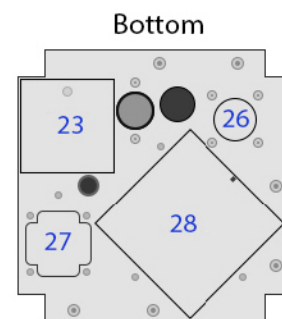
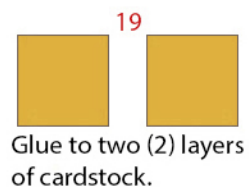
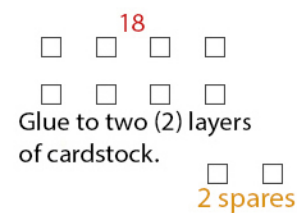
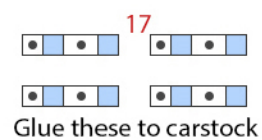
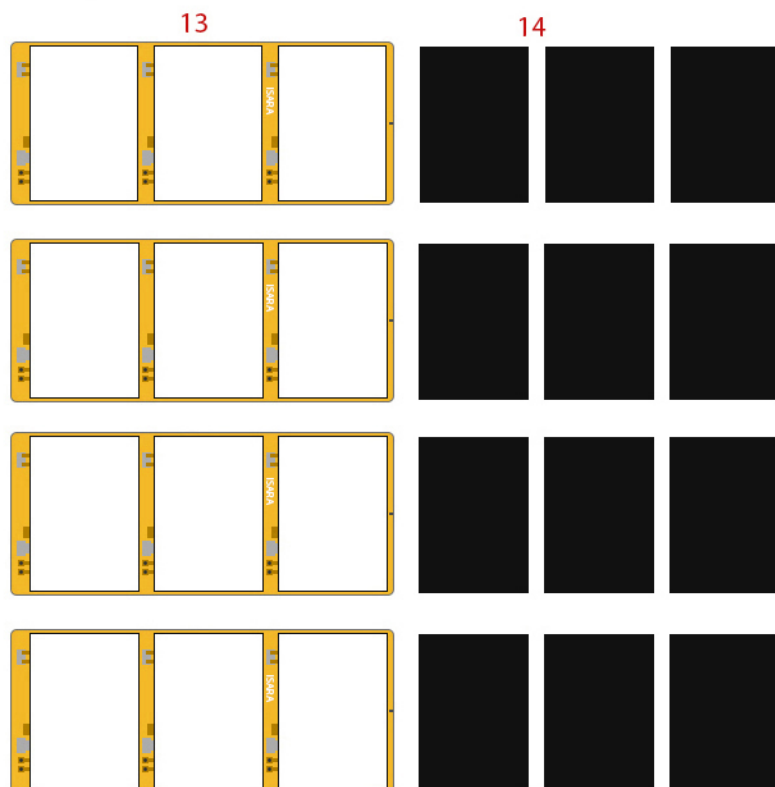
Fold-glue in half at the blue lines.



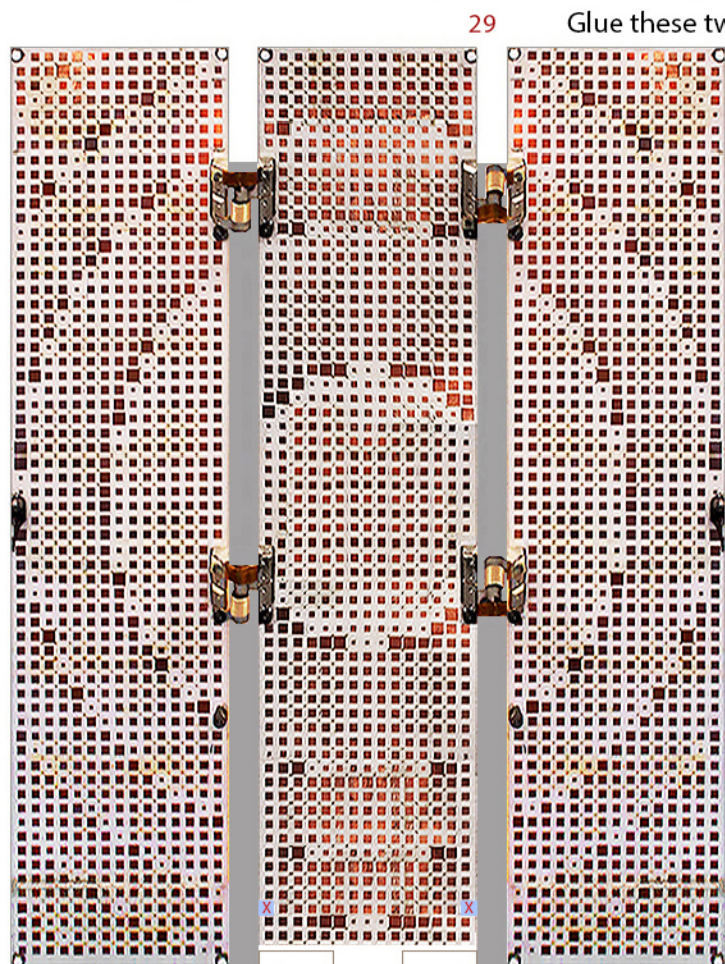
Color back light grey, roll to small rings.

2 spares

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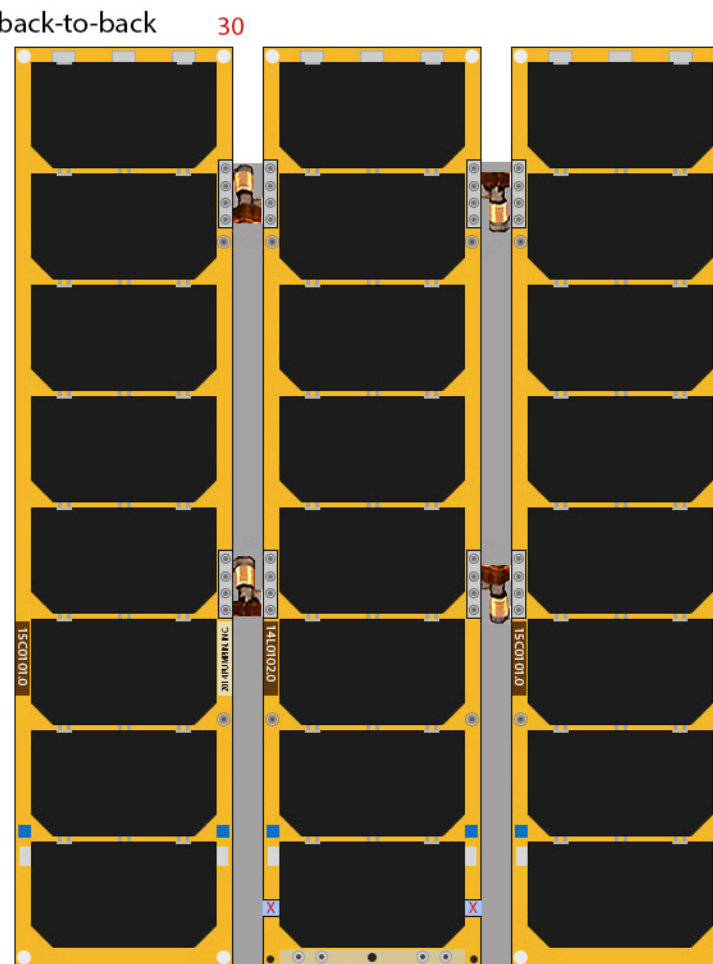


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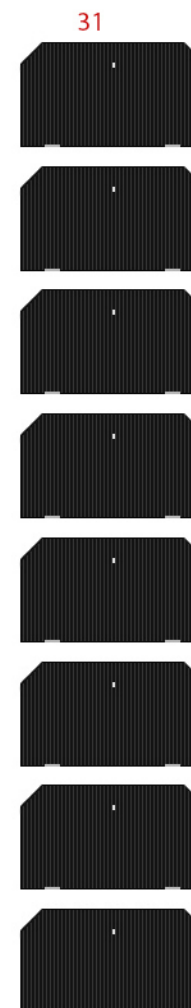
Glue tab

Cut out the two blue squares marked with an 'X' above

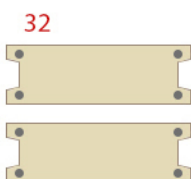


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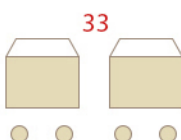
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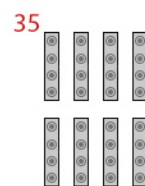
31



32



33



35



36

Glue to cardstock

Glue each to two (2) layers of cardstock, then glue one on top of the other, color edges the same color.



34

