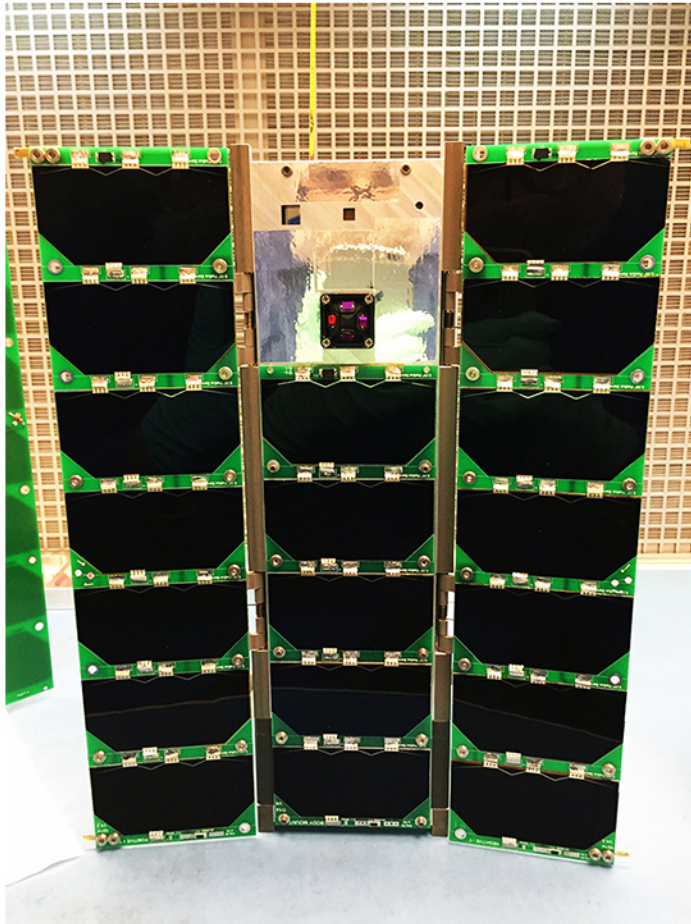


MinXss



The Miniature X-ray Solar Spectrometer (MinXSS) CubeSat was the first launched National Aeronautics and Space Administration Science Mission Directorate CubeSat with a science mission. It was designed, built, and operated primarily by students at the University of Colorado Boulder with professional mentorship and involvement from professors, scientists, and engineers in the Aerospace Engineering Sciences department and the Laboratory for Atmospheric and Space Physics, as well as Southwest Research Institute, NASA Goddard Space Flight Center, and the National Center for Atmospheric Research's High Altitude Observatory.

MinXSS launched on 2015 December 6 to the International Space Station as part of the Orbital ATK Cygnus CRS OA-4 cargo resupply mission. The launch vehicle was a United Launch Alliance Atlas V rocket in the 401 configuration. Deployment from the International Space Station was achieved with a NanoRacks CubeSat Deployer on 2016 May 16. Spacecraft beacons were picked up soon after by amateur radio operators around the world. Commissioning of the spacecraft was completed on 2016 June 14 and observations of solar flares captured nearly continuously since then.

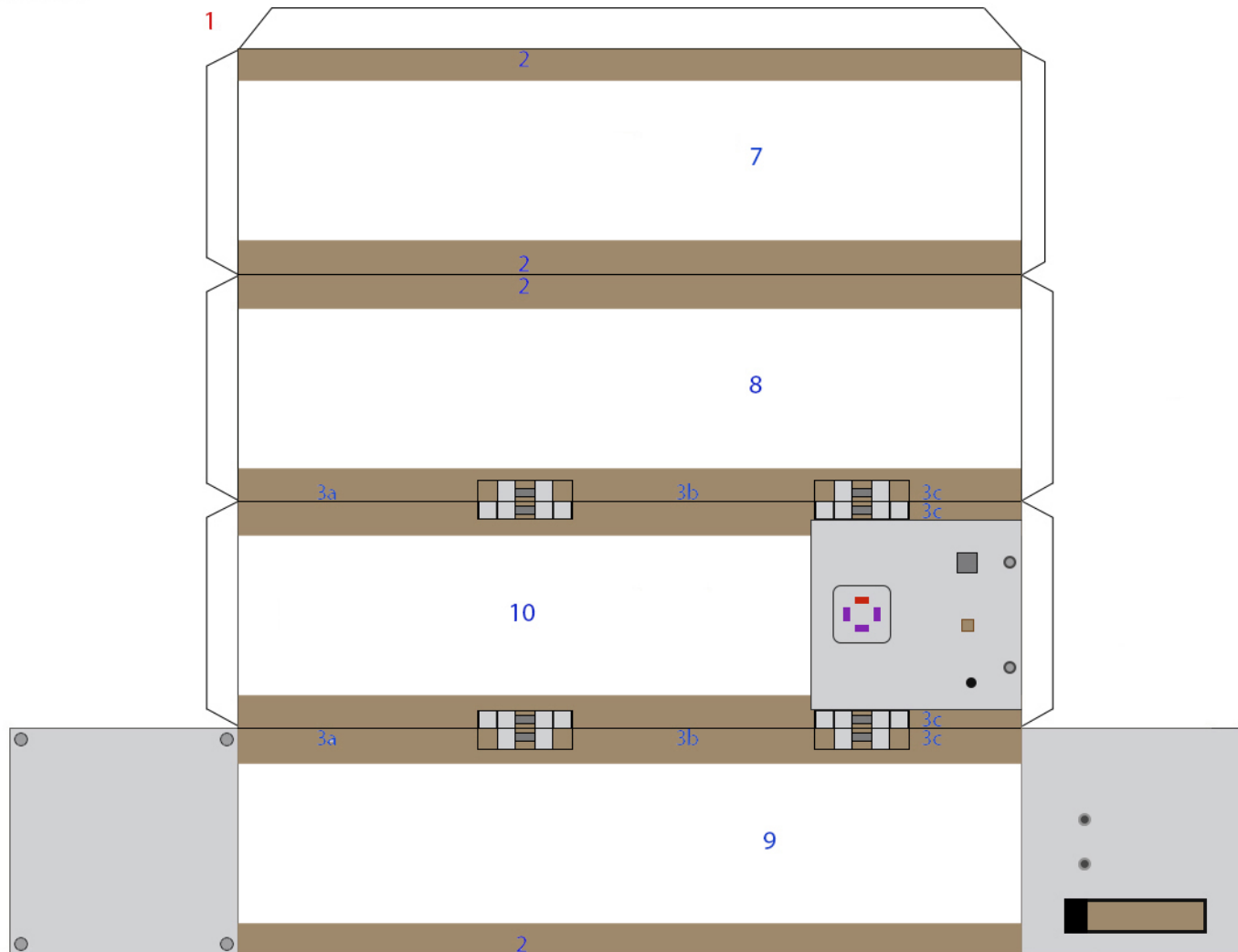
The MinXSS mission is to measure the solar soft X-ray spectrum from about 0.5 keV (25 Å) to 30 keV (0.4 Å) with ~0.15 keV FWHM spectral resolution. This part of the solarelectromagnetic spectrum is where the largest enhancement from solar flares is expected to occur. It also has an important impact on Earth ionospheric chemistry. Despite this, prior measurements have been either low-resolution broadband, or high-resolution but very narrow bandpass. The relatively recent creation of miniaturized silicon drift detectors has enabled the MinXSS measurements. MinXSS data will provide a means of probing the solar corona—especially in active regions and solar flares—and will be used as an input for models of the Earth's upper atmosphere, particularly the ionosphere, thermosphere, and mesosphere.

The structure of the nanosatellite is partitioned into three basic blocks: 1U for the instrument (COTS Amptek X123 spectrometer), 1.5U for system electronics, and 0.5U for the ADCS (Attitude Determination and Control Subsystem). There are two solar arrays to provide 20 W when in sunlight; a body-mounted solar panel (3U surface area: 10 cm x 34 cm) fixed to the solar-oriented side, and a deployed double panel (6U surface area: 20 cm x 34 cm).

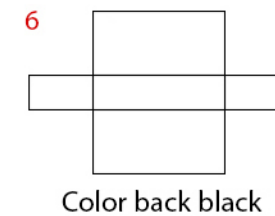
The spacecraft uses a measuring tape antenna and an AstroDev Li-1 radio. The spacecraft periodically beacons and its signal can be picked up with amateur ham radiooperator equipment.

MinXSS was chosen as the 2016 AIAA Small Satellite Mission of the Year during the 30th Annual AIAA/USU Small Satellite Conference in Logan, UT.





Glue to two layers
of cardstock



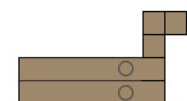
2



3a



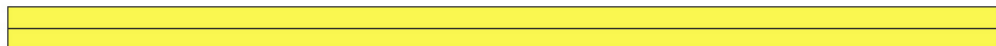
3b



3c

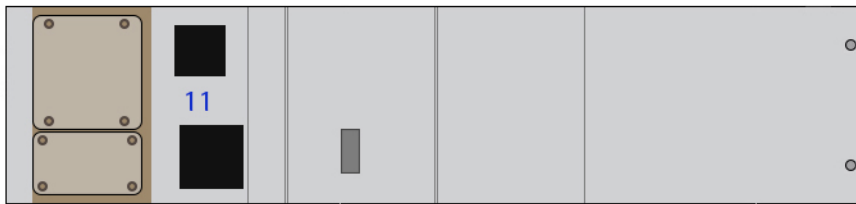


14

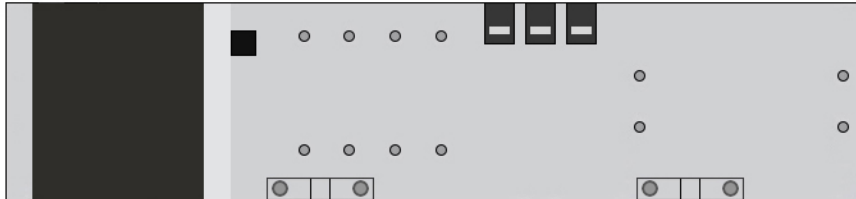


MinXss

7



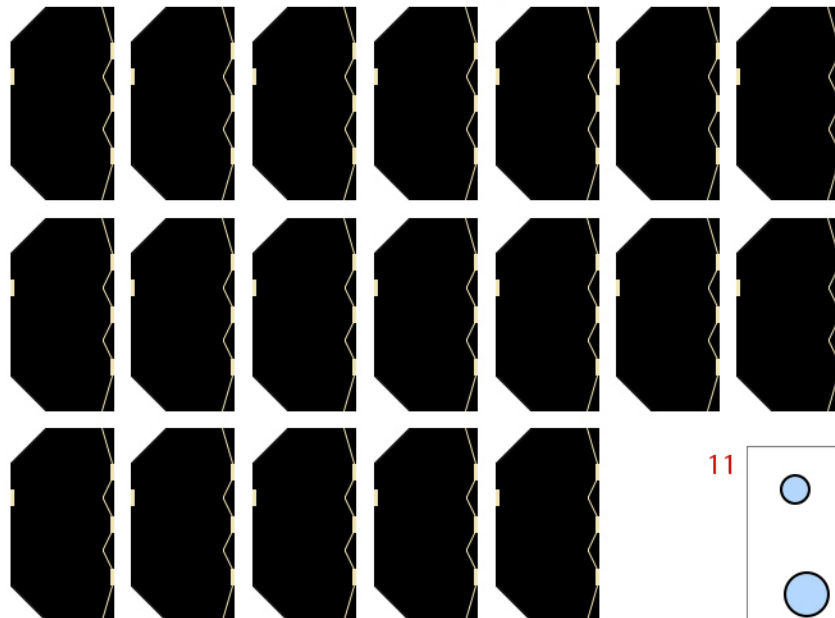
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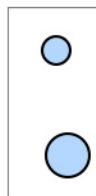
9



Optional Detail parts



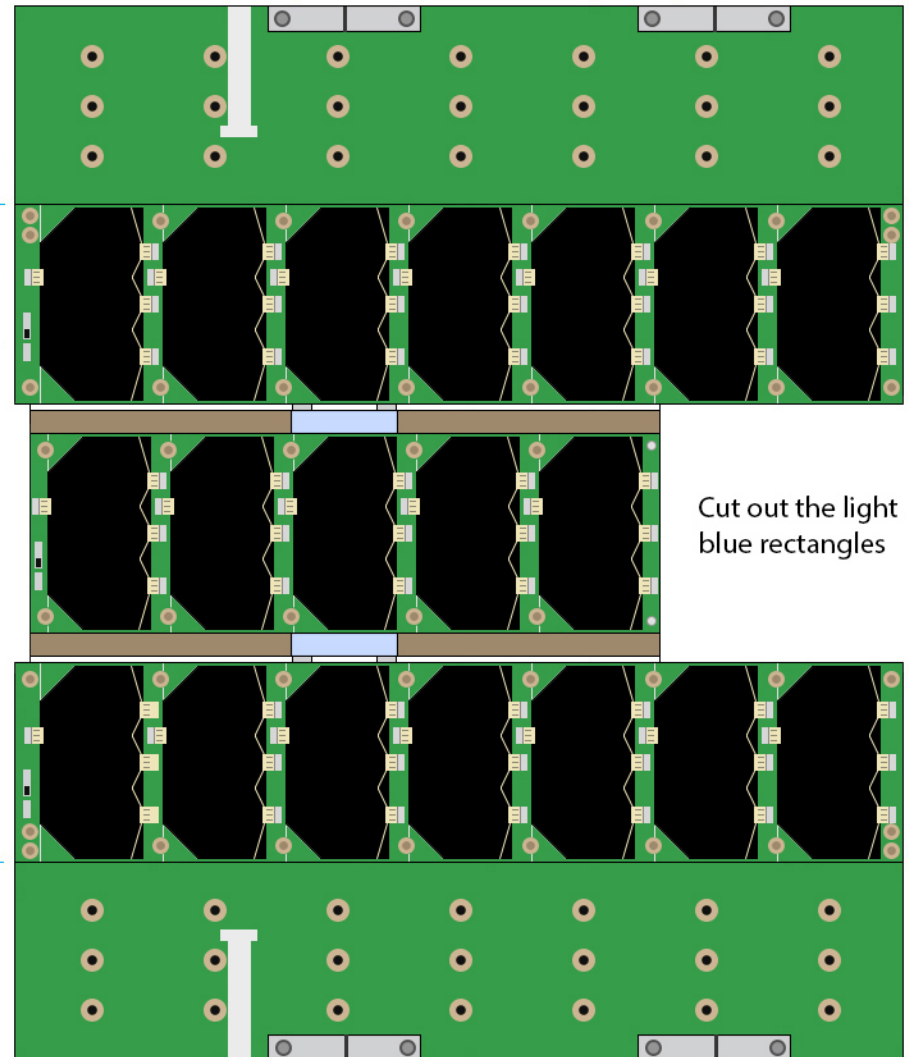
11



Cut out the light blue circles

10

Score-fold at the blue lines for graphics on both sides.



Cut out the light blue rectangles

12



13



Glue all these to cardstock