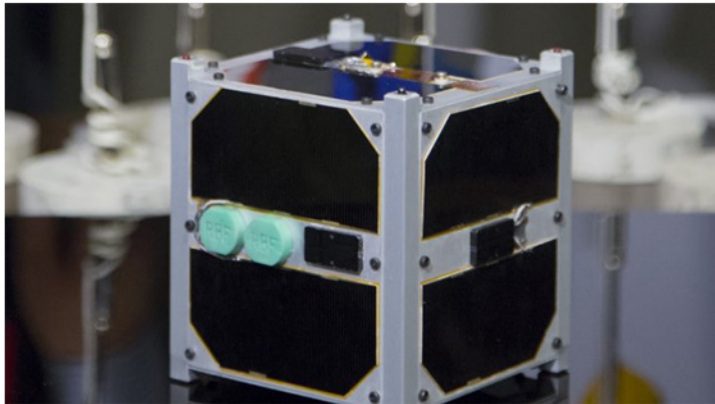




ESTCube-1 is the first Estonian satellite and first satellite in the world to attempt to use an electric solar wind sail (E-sail). Developed as part of the Estonian Student Satellite Program, it was launched on 7 May 2013 aboard a Vega carrier rocket and successfully deployed into orbit.

Student Satellite is an educational project in which university and high school students can participate. The CubeSat standard for nanosatellites was followed during the engineering of ESTCube-1, resulting in a 10x10x11.35 cm cube, with a volume of 1 liter and a mass of 1.048 kg.

While emphasis was placed on educating students during creation of ESTCube-1, it does have a scientific purpose. On board the satellite is an electric solar wind sail (E-sail) which was invented by Finnish scientist Pekka Janhunen.

During the ESTCube-1 flight, 10 meters of 20–50 micrometer thick E-sail wire, sometimes referred to as "Heytether," were deployed from the satellite. The deployment of the Heytether is detected by a decrease of the satellite's rotation speed or an onboard camera.

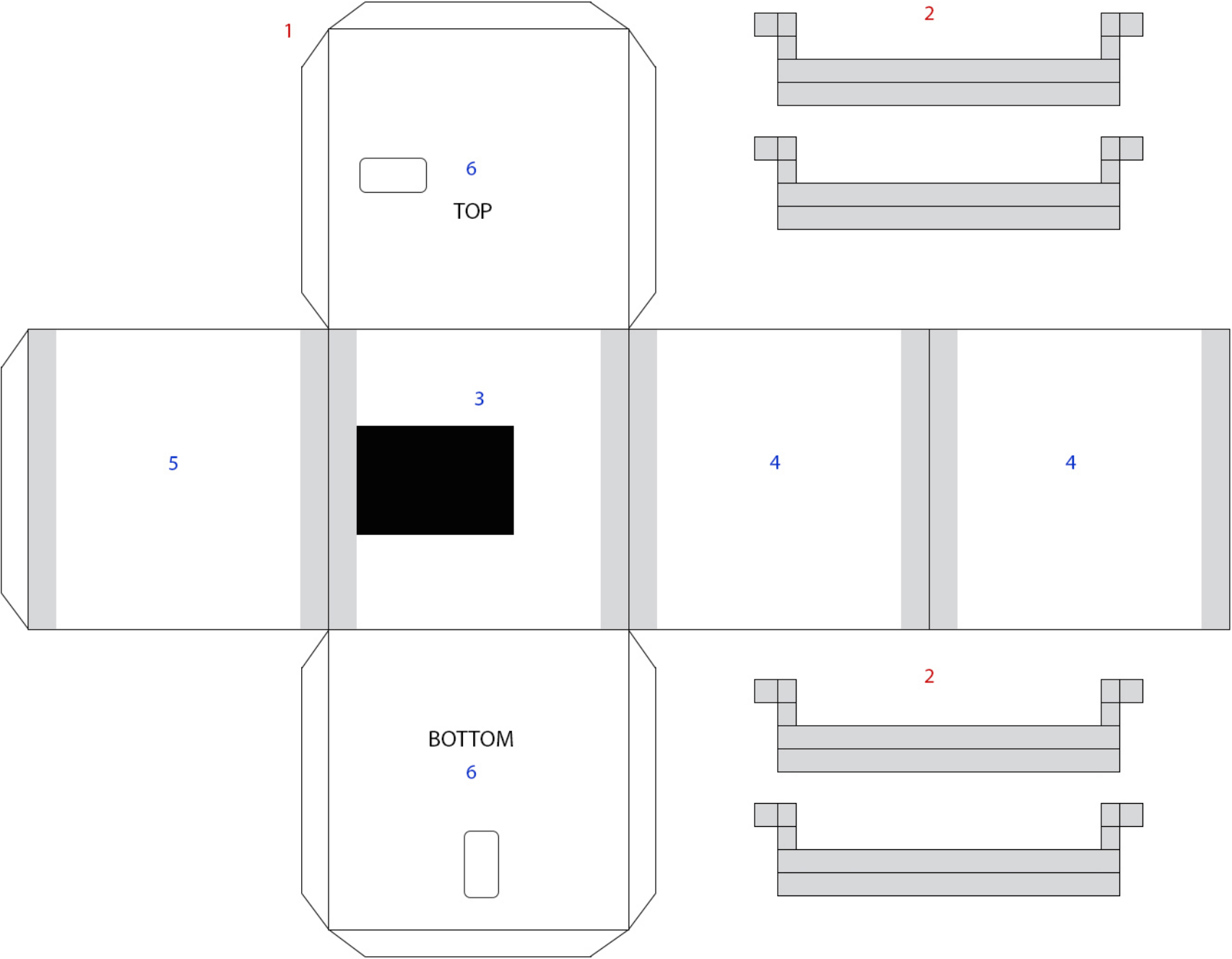
To control the E-sail element's interaction with both the plasma surrounding the Earth and the effect it has on the spacecraft's spinning speed, two nanotechnology electron emitters/guns are on board. The electron emitters are connected to the E-sail element which it loads positively to 500 volts by shooting out electrons. The positive ions in the plasma were intended to push the E-sail element and influence the satellite's rotation speed.

The effect of the plasma on the E-sail was to be measured by the change in said rotation speed. The tether was also intended to de-orbit the satellite by use as a plasma-brake to demonstrate a possibility for returning small satellites from orbit. A color CMOS camera is also on board that is capable of making RAW-format pictures with VGA-resolution. This camera is used to acquire images of Earth and to monitor deployment of the Heytether.

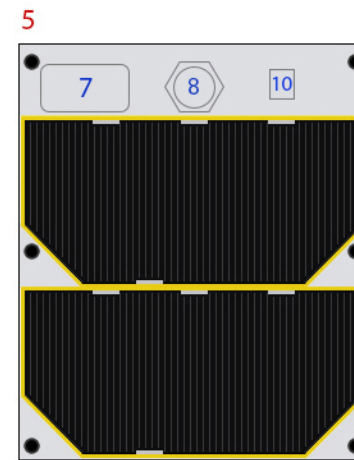
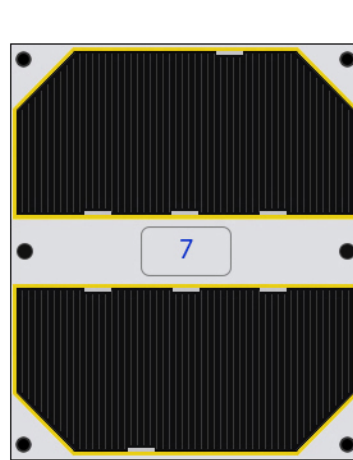
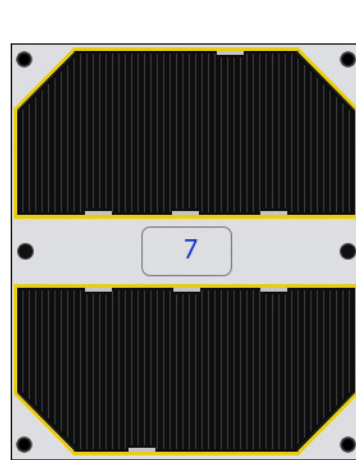
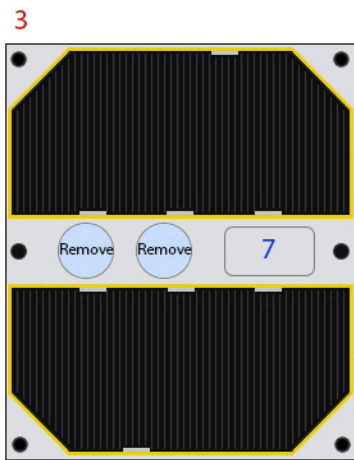
The last morse code transmission was transmitted on 17 February 2015.

The mission ended due to degradation of the photovoltaic power system and subsequently the batteries became exhausted. The plan to test a solar sail the satellite carried, failed since the sail cable unwinding mechanics did not survive the rocket takeoff vibration.

The satellite successfully demonstrated the operation of the systems in space, with a two-year operational life. The deployment of the E-sail was unsuccessful, and no measurements were taken of the E-sail or of the plasma braking deployment system.



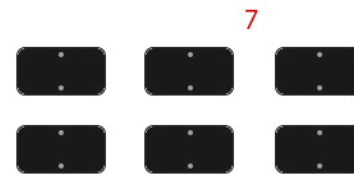
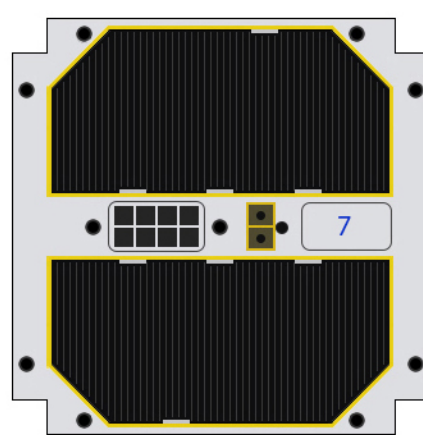
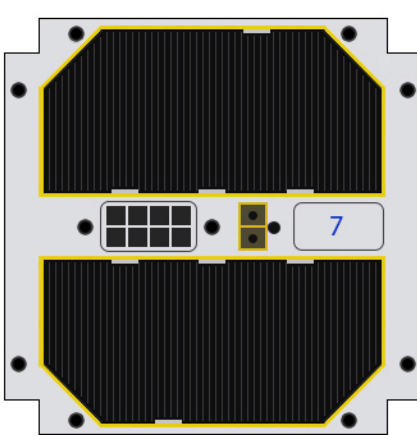
# ESTCube-1



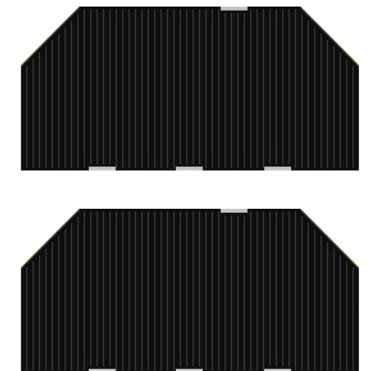
Glue to cardstock



Glue to two layers  
of cardstock



Glue these to two layer s of cardstock,  
color edges black.



Optional Detail parts

