

FITSat-1



FITSat-1 (nickname: Niwaka) is a 1U CubeSat of the Fukuoka Institute of Technology (FIT), Fukuoka Prefecture, Japan. The overall objective is to demonstrate a high-speed transmission module for a small satellite and a visible light communication experiment using high power LEDs (Light-Emitting Diodes).

FITSat-1 is a standard 1U CubeSat with a size of 10 cm x 10 cm x 10 cm and a mass of 1.33 kg. The structure is made from a square aluminum pipe. Both ends of the cut pipe are covered with aluminum plates. The surface of the body is finished with black anodic coating. The CubeSat slide rails and side panels are not separate; they are made as a single unit. The thickness of the square pipe is 3mm, but the surfaces attached by solar cells are thinned to 1.5 mm because of the weight limit. In order to make the 8.5 mm square CubeSat rails, 5.5 mm square aluminum sticks are attached to the four corners of the square pipe.

FITSat-1/Niwaka was launched as a secondary payload on July 21, 2012 from Tanegashima, Japan aboard JAXA's HTV-3 (H-II Transfer Vehicle-3) ISS resupply mission. The HTV-3 module was launched by the H-IIB launch vehicle of Mitsubishi Heavy Industries.

FITSat-1 was launched from the ISS on October 4, 2012. The deployment from the fairly low orbit of the ISS will limit the operational life of the CubeSats to a few months due to the encounter of atmospheric drag.

On Oct. 6, 2012, the project received the first status information from FITSat-1 (voltages and currents stored in response to remote commands). These transmissions (437.445 MHz, AX.25 packet 1200 bit/s) were replies to remote command.

Oct. 20, 2012: The project received the first image from FITSat-1 / Niwaka via the 5.84 GHz link.

Nov. 26, 2012: The first experiment of the flashing LEDs was observed in Kurashiki Space Center in Japan and in Daejeon Korea. The LEDs were driven in detecting faint light mode.

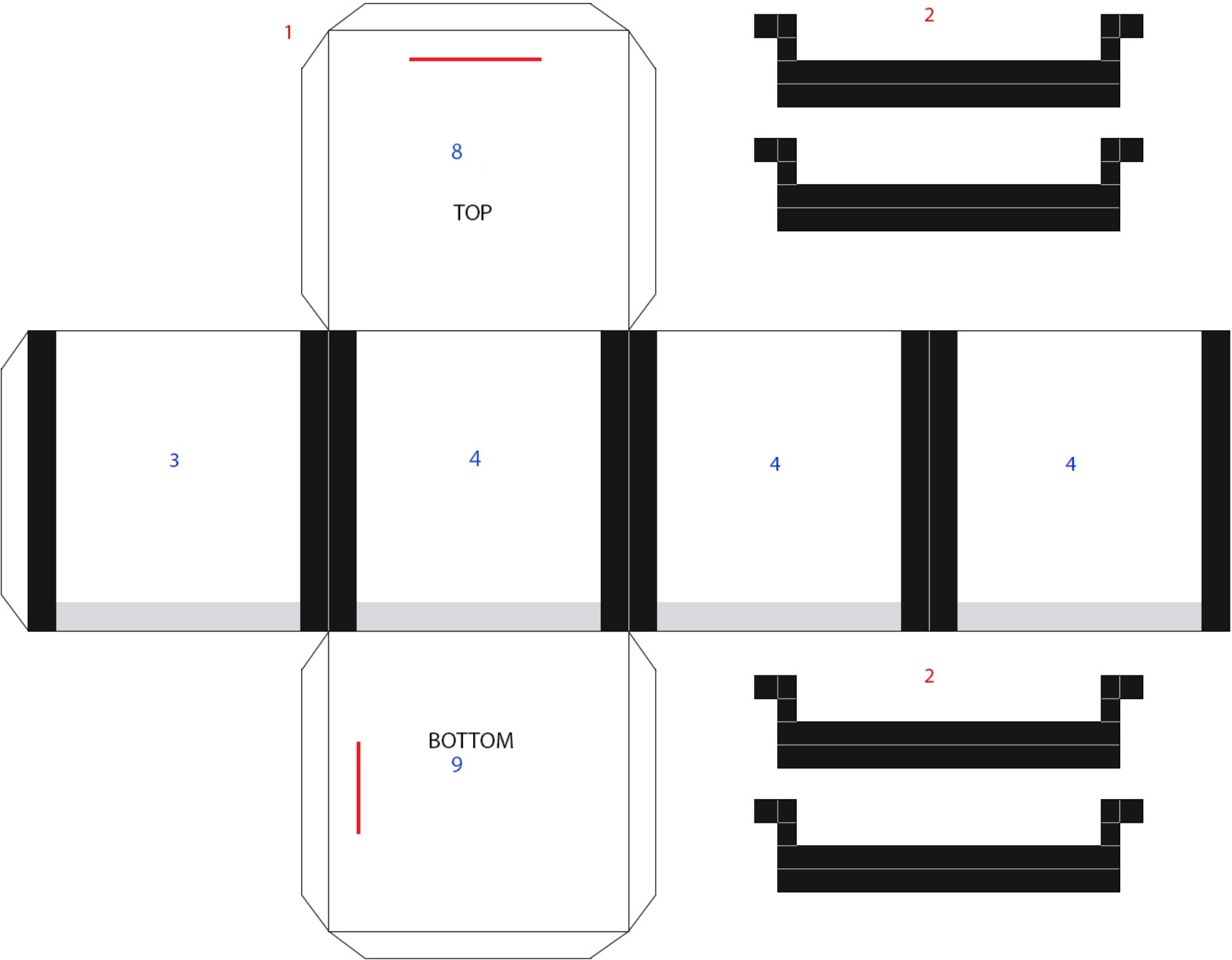
A total of 50 green LEDs are attached on the top (+Z panel) of the CubeSat body, and 32 red LEDs are attached on the bottom (-Z panel) of the CubeSat body. Since the attitude of the CubeSat is based on a magnet, the flashing green LEDs can be observed in the northern Hemisphere, while the flashing red LEDs may be observed in the southern Hemisphere.

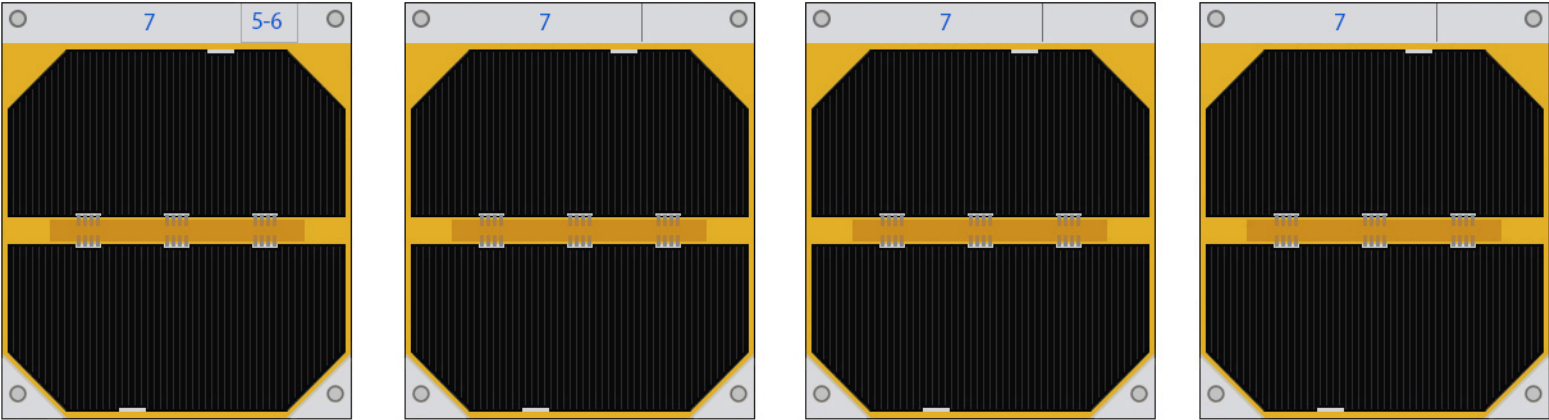
This demonstrated visible light communication between the satellite and the ground. This light from the satellite was photographed in many places.

FITSat-1 reentered Earth's atmosphere on July 4, 2013.



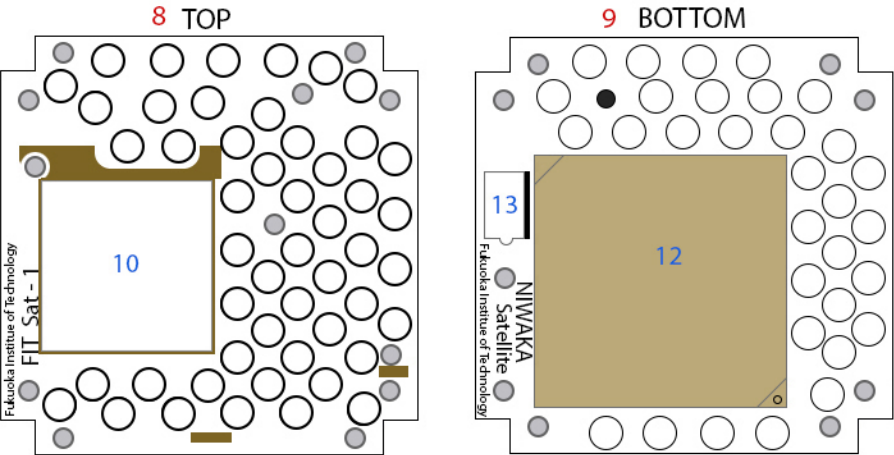
FitSat lights from the ground.



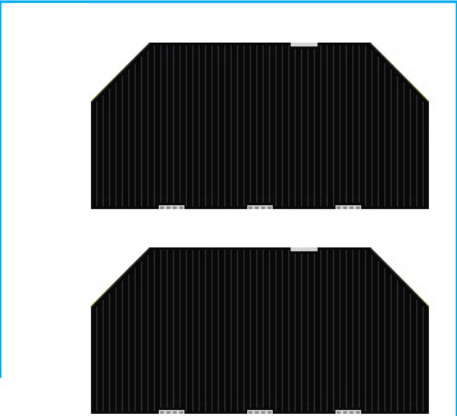
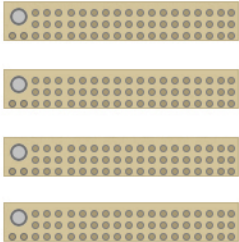


Color back black

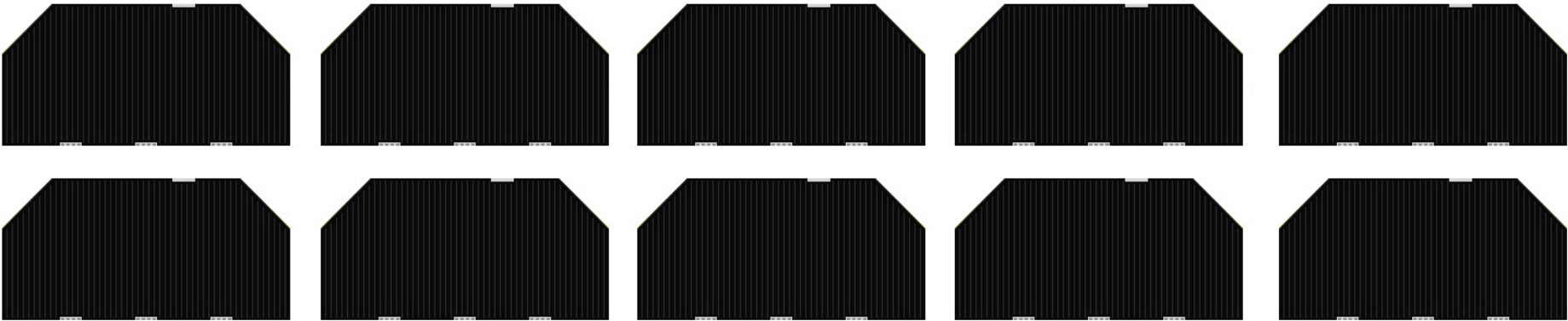
6

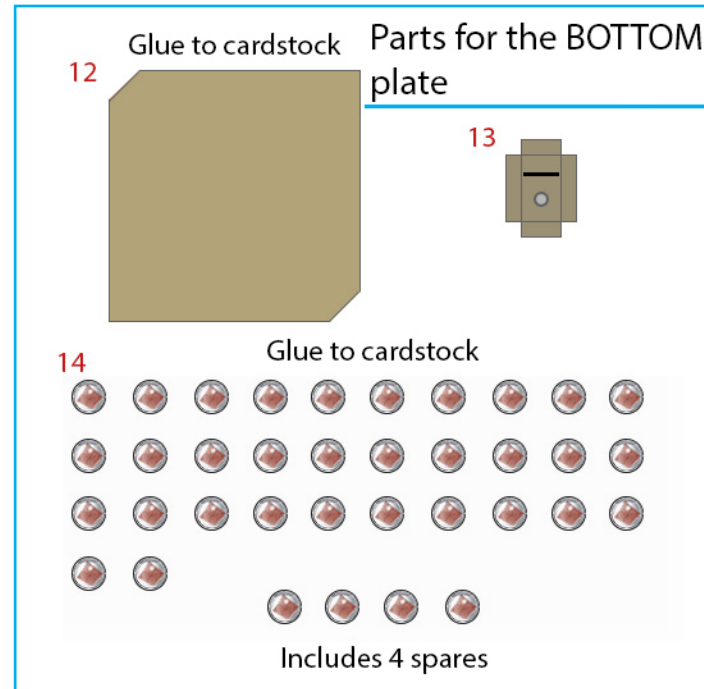
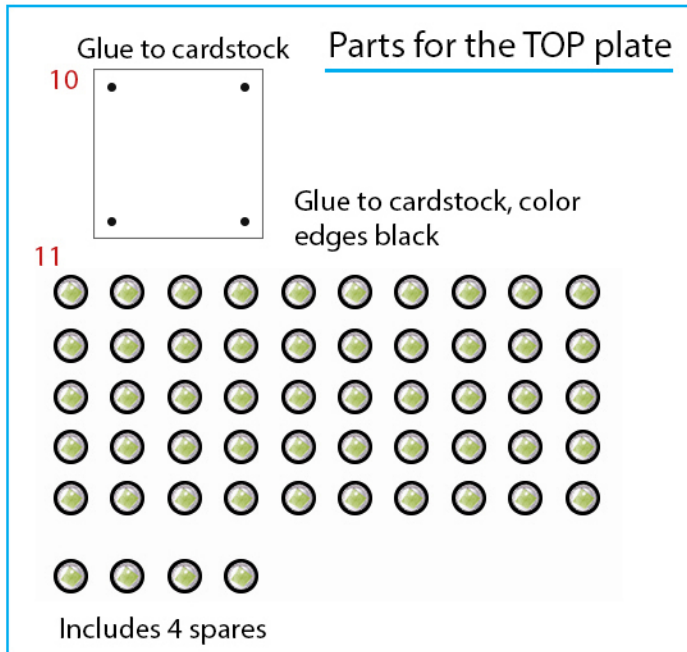


Glue to cardstock



Optional Detail parts





Antenna



Score and fold back-to-back at the middle line.