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Author: Dr. Jianyu Lei
China Academy of Space Technology, China

Mr. Yusong Wang
Dalian University of Technology (DUT), China
Dr. Guangqing Xia
Dalian University of Technology (DUT), China
Mr. Wenlong Zhang
Dalian University of Technology (DUT), China
Prof. Xiaozhou Yu
Dalian University of Technology (DUT), China

# TIANZHOU CARGO SHIP EEXPERIMENT INTERFACE AND ITS CUBESAT DEPLOYMENT SYSTEM

**Abstract**

Tianzhou cargo ship is an important part of China's manned space project. At the beginning of its design, the research team of the Tianzhou cargo ship fully considered using the platform as a space experiment testbed to support various types of science and technology experiments. One of the main objectives is the ability to deploy the CubeSats. The Tianzhou-1 cargo ship successfully deployed a 3U CubeSat in orbit in 2017, which verified the related technology of carrying and releasing satellite by cargo ship.With the development of the new CubeSat deployment system, the cargo ship already can release multiple 1U-12U CubeSats during one mission.This article will introduce in detail the mechanical, power supply, data bus, and other interfaces of the Tianzhou cargo ship for the experiment as well as the detailed design of the CubeSat deployment system for the cargo ship.The deployment system is similar to the standard CubeSat deployer. It generates pre-pressure through the mainspring placed between the deployment system and the CubeSat and ejects the CubeSat out of the system when the door is opened.The opening and closing of the door are controlled by the memory alloy pin puller and other unlocking mechanisms.A specially designed separation control box of the deployment is designed according to the electrical interface of the cargo ship. The main function of the control box is: (1) convert the voltage from the cargo ship; (2) receive the deployment separation instructions of the satellite; (3) return the temperature and separation state telemetry parameters to the ship; (4) control the temperature inside the deployment system; (5) provide a battery charging interface to the satellite battery while in orbit.With the acceleration of the construction of China's Tiangong space station, the Tianzhou cargo ship will become the main force in the construction and transportation of the space station.Using Tianzhou cargo spacecraft to deploy CubeSat would be an effective and feasible way. It means high reliability, low cost, strong capability, and high frequency.Maybe in the future, Tianzhou cargo ship could provide the services for the international CubeSat developers.