

IAF HUMAN SPACEFLIGHT SYMPOSIUM (B3)
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RESEARCH ON THE SCHEME OF ON ORBIT DEPLOYING CUBESATS FROM CHINA' S SPACE
STATION

Abstract

China' s Tiangong space station is plan to finish building in about 2022. The aim of the space station is to operate as a state level space laboratory and provide essential conditions for carrying out multi-disciplinary space scientific experiments. The realization of on orbit deploying CubeSats from the space station will provide a special method of launching CubeSats for a wide range of space applications.

Tiangong space station is mainly comprised of core capsule, experiment capsule I and experiment capsule II. There is a node capsule in the front end of the core capsule. The experiment capsule I, experiment capsule II and the Shenzhou manned spaceship are connected to the node capsule. There is a dock port in the rear end of the core capsule which is used for docking of Tianzhou cargo spaceship. The space station is designed to be extendable with more capsules. The experiment capsule II has a airlock which can transport payloads from inside to outside the space station for supporting extra-vehicular experiments. The Tiangong space station have two robotic arms, the bigger one on the core capsule while the smaller one on the experiment capsule II. The two robotic arms can be used independently or collaboratively. A scheme of on orbit deploying CubeSats is developed based on the above conditions.

The CubeSats and the deployer will be transported from ground to space station by Tianzhou cargo spaceship. The astronauts in the space station will move them from the cargo spaceship to the core capsule and then to the airlock of experiment capsule II after necessary tests. The CubeSats will be assembled properly inside the deployer. The smaller robotic arm outside the experiment capsule II will fetch the deployer from the airlock and place them in the proper position and attitude outside the space station. The command of deploying the CubeSats will be sent by the astronauts after all the preparatory work has been completed.

The CubeSats and the deployer should be designed to meet the safety requirements of the cargo spaceship, the space station, and the astronauts. The size of the CubeSats can range from 1U to 12U and the deployer can adapt to the number of CubeSats from 1 to 6.