Exploration of Near Earth Asteroids (4)
Exploration of Near Earth Asteroids (1)

Author: Dr. Lin Tian
China Academy of Space Technology (CAST), China, microsat2015@163.com

Dr. Chao LIU
China Academy of Space Technology (CAST), China, microsat2015@163.com
Mr. Peng Kun
BUAA, China, bhkpeng@126.com
Dr. Xiaoguang CHEN
China Academy of Space Technology (CAST), China, microsat2015@163.com
Mrs. Linli Guo
China Academy of Space Technology (CAST), China, dandanping@sina.com

STUDY ON MANNED DEEP SPACE EXPLORATION HABITATION CABIN BASED ON RIGID AND FLEXIBLE COMBINATION STRUCTURE

Abstract

Typical manned deep space exploration mission needs large scale orbit transfer at near-Earth and exploration destination, while the flight period between Earth home and exploration destination is long. In the long-term transfer flight, large scale habitation cabin could offer comfortable work and life environment for astronauts to keep them physiology and psychology healthy. A deep space exploration habitation cabin based on expandable rigid and flexible structure combination on-orbit is proposed, and the central structure of inner cabin utilizes rigid bucket structure. On both side of the bucket there mount two docking mechanics, which makes the cabin can dock with manned spaceship, destination exploration vehicle and power segment. The rigid structure can bear force load during launch and orbit maneuver. Outside of the rigid structure there sets a flexible film structure, which expands after launch and orbit maneuver and offer astronauts huge living space. The two parts are linked through windows of rigid structure, and astronauts can enter the rigid structure rapidly for safety in the situation of urgency. The habitation cabin designed can fully utilize the near-earth launch ability, then establish the resource foundation for long-term on-orbit living and experiment equipment lay-out after on-orbit expanding huge space.