

||||| 特集：JAMIC の成果 |||||
(原著論文)

小型親子衛星用ドッキング機構の無重力下把持機能実験

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Microgravity Experiments of Fundamental Grasping Function of Small Docking Mechanism for Mothership-Daughtership Nano-Satellite

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Abstract

We conducted microgravity experiments to verify fundamental grasping function of a small docking mechanism for mothership-daughtership nano-satellite using the facility of Japan Micro Gravity Center (JAMIC). The mechanism was designed to grasp a daughtership nano-satellite while compensating for position and attitude control error and to release it stably under speed control in-orbit. The experiment sequences are as the followings: (1) we transmit a drop command to start dropping the rack, (2) a control program starts when note PC detects the drop command, (3) the docking mechanism starts close motion after the daughtership is released from a electro-magnet release mechanism, and (4) the docking mechanism grasps the daughtership under microgravity less than 10 s. Each drop experiment was monitored with three CCD cameras, and the position, attitude, angular velocity of the daughtership, and electric currents, close motion speed and guiding speed of the docking mechanism were measured. In the paper, we explain the experimental system including the docking mechanism, the control system, the daughtership system and the release mechanism, and describe results of microgravity experiments in JAMIC.