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DEVELOPMENT OF MISSION PAYLOADS FOR ARC EVENT GENERATOR AND INVESTIGATION SATELLITE HORYU-IV

Abstract

The world benefits from the expansion of space utilization. Further space development will continue to advance in the future. The electricity demand of satellites increases with the diversification of the missions onboard. When operating high voltage solar arrays it is especially advantageous to improve efficiency and decrease transmission loss. For high voltage generation, however, many arcing incidents may occur on the satellite solar array. High voltage can lead to arcing in space because of the interaction with ambient plasma. To solve these problems, we performed a space experiment. HORYU-II was launched in 2012 with the main mission of demonstrating high voltage technology on orbit. From these proof experiments, arc experiments could be carried out on orbit. Therefore, a new lean-satellite "HORYU-IV" is under development in Kyutech and is projected to be launched in 2015. The main mission of HORYU-IV is measurement of arc phenomenon (e.g. arc current, arcing point) on orbit. One of the sub-missions of this satellite is measurement of degradation of solar cells due to arcing. The improvement of technology that was developed in HORYU-II, and further system development are needed for this mission. In this paper, we will discuss the following content: 1, Development of arc experiment system. 2, Ground-based arcing tests at Kyutech. This mission will be the first measurement of arc current on orbit. When this mission has succeeded, we will be able to evaluate the validity of ground-based test systems by comparing the result of on-orbit tests with ground-based tests.