

MICROGRAVITY SCIENCES AND PROCESSES (A2)
Facilities and Operations of Microgravity Experiments (5)

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”DYNAMIC EVOLUTION ” OF KIBO PAYLOAD OPERATIONS -FEATURING FPEF MARANGONI
EXPERIMENT OPERATIONS AND SOME OTHER HOT TOPICS IN KIBO-

Abstract

One command sent from Tsukuba Space Center to the Fluid Physics Experiment Facility (FPEF) in Kibo (Japanese Experiment Module: JEM) , beyond the 400 km distance and the time of 15 years, has marked the beginning of a new era on Japan manned space environment utilization on August 22nd, 2008. Starting from just a few experiments in the increment 17, in the latest increment more than 20 variety of payload missions are ongoing fully utilizing Kibo. As well as science experiments, educational payload observation (EPO), artistic missions featuring Japanese culture and even commercial missions which utilize micro-G environment have been performed in the Kibo. Even when crew slept in the Kibo, we simultaneously accomplished micro-G experiment. This diversity of missions is one of the special features of Kibo payload operations compared to the payload missions in other International Partners' modules.

Thus aiming to “the next-door Laboratory in Space”, Kibo payload operations and telescience have shown a dynamic evolution after considerable experiences in the first two years.

In this paper, key to continued success of various payload operations in Kibo is explained from Kibo's four unique perspectives, featuring FPEF assembly/science operations, one of the most complicated crew and ground cooperation required, and some other hot topics.

1) Kibo payload operations unique structure to support micro-G experiments (Kibo flight control team and user integration function)

2) International Partner's relationship, such as International Space Station (ISS) micro-G environment measurement

3) Beyond the distance - crew and ground support personnel's close communication and telescience support system to conduct complicated on-board assembly operations -

4) Outreach for the future space utilization and micro-G experiments

These key points in the actual micro-G experiments are introduced to share the lessons learned at the front line of Kibo payload operations.