

The 24th Session of the Asia-Pacific Regional Space Agency Forum (APRSAF-24)

Space Environment Utilization Working Group (SEUWG)

Concept Note

1. Scope and Objectives

The Space Environment Utilization Working Group (SEUWG) is intended to encourage countries in the Asia-Pacific region to use the Japanese Experiment Module (JEM), also called “Kibo,” which means “hope” in Japanese. Kibo is a human space facility that provides unique research capabilities in the International Space Station (ISS). In addition to enhancing the use of Kibo, the SEUWG aims to create cooperative projects for its utilization by participating countries.

Kibo consists of the Pressurized Module, the Exposed Facility, a Logistics Module, a Remote Manipulator System, and an Inter-Orbit Communication System unit. Various scientific and engineering research activities are conducted onboard Kibo to take advantage of the unique environment of the low Earth orbit. Research is currently conducted aboard Kibo in the fields of life science, medical science, materials science, space environment monitoring, Earth observation, and demonstrations of advanced technology. The SEUWG promotes the utilization of the Kibo Module in the Asia-Pacific region in the aforementioned fields as well as for other areas and topics.

2. Results of SEUWG Activities at APRSAF-23

See Recommendations adopted at APRSAF-23.

http://www.aprsaf.org/annual_meetings/aprsaf23/recommend.php

3. Activities and Discussion Points

Through discussion among participating nations, the SEUWG aims to

contribute to building cooperative projects for Kibo utilization and to provide a variety of benefits for the Asia-Pacific region.

■ **Opportunities for launch and deployment of microsatellites from Kibo/J-SSOD***

The demand from Asia-Pacific nations for microsatellite deployment has been increasing. Kibo has an airlock through which experiments are transferred and exposed to the external environment of space. Almost 200 satellites have been deployed from Kibo and the deployment system/J-SSOD has been attracting global attention as a new transportation system for satellites. The KiboCUBE collaboration between the JAXA and the United Nations Office for Outer Space Affairs (UNOOSA), which aims to provide educational and research institutions from developing countries with opportunities to deploy CubeSats (1U), is also in progress.

* J-SSOD: JEM Small Satellite Orbital Deployer

<http://iss.jaxa.jp/en/kiboexp/jssod/>

■ **New exposed experiment system of Kibo/ExHAM***

Using an Exposed Facility (EF) and a robotic arm, ExHAM enables experimentation for a short period of time with a lightweight existing experiment sample, and is therefore useful for satellite design. It is currently gaining wide attention from the countries in the Asia-Pacific region, with representatives of entities in Indonesia, Malaysia, and Singapore expressing interest in its utilization. The SEUWG will organize discussions about opportunities for use of ExHAM by participating nations.

* ExHAM: Experiment Handrail Attachment Mechanism

[http://iss.jaxa.jp/en/kuoa/news/pdf/10_SEKUW_Exposed_Facility_in_Kibo_\(ExHAM\).pdf](http://iss.jaxa.jp/en/kuoa/news/pdf/10_SEKUW_Exposed_Facility_in_Kibo_(ExHAM).pdf)

■ **Special joint session with the Space Technology Working Group (STWG): Utilization of J-SSOD, ExHAM, and More**

We will have a special joint session of the SEUWG and the STWG at APRSAF-24 to encourage activities in the development, launch, deployment, and applications of microsatellites. The Exposed Facilities (J-SSOD and ExHAM) are useful and readily available for application.

Further opportunities of the launch services may also be discussed.

■ **Microgravity science using Kibo's Pressurized Module and other opportunities**

Since experiments in microgravity represent unique fields of research, proposals for Kibo utilization from Asian countries, although valuable, were previously limited in number. However significant progress has recently been observed. Indonesia and Malaysia have developed plans and proposals for space experiments using the Pressurized Module and Exposed Facility of Kibo. Active discussions have facilitated effective and fruitful exchange of opinions and information among member countries. Any experimental proposal in Kibo's Pressurized Module is welcome and open for discussion at this WG.

Information of microgravity science using small rocket, parabolic flight, and drop tower will also be shared in order to expand further experiment opportunity.

■ **Space Environment and Kibo Utilization Workshop (SEKUW)**

The SEKUW is an international workshop whose purpose is to find potential space experiments to be conducted in Kibo as part of activities of the APRSAF/SEUWG.

The Third SEKUW was successfully held at the Vayupak Convention Center, Bangkok, Thailand on 9-10 February 2017. About 90 people from 36 organizations including Thai and foreign universities, institutes, government agencies and private companies participated in active discussions on Kibo utilization. As a result, an announcement of opportunity and a feasibility study of the proposals were initiated in Thailand, and the status of these activities will be reported at the SEUWG.

4. Draft Agenda

- 1) Opening session
- 2) Review of the last SEUWG meeting at APRSAF-23 in Manila
- 3) Activity reports
 - ✓ Launch and deployment of microsattellites (Kibo and launch vehicles)
 - ✓ Projects using the Exposed Facility of Kibo
 - ✓ Microgravity science (Kibo, small rocket, parabolic flight and drop

tower)

- ✓ Kibo-ABC initiative
 - ✓ Space Environment and Kibo Utilization Workshop
 - ✓ Other topics
- 4) Host country session
 - 5) Overall discussion, future work, conclusions and recommendations