WORKING GROUP SUMMARY REPORT

SPACE ENVIRONMENT UTILIZATION

APRSAF-22

SESSION CO-CHAIRS:

MS. CLARA Y. YATINI (LAPAN/INDONESIA)
MR. JUN GOMI (JAXA/JAPAN)

Number of Attendees

61 **participants from** 11 **countries,**

19 **organizations**

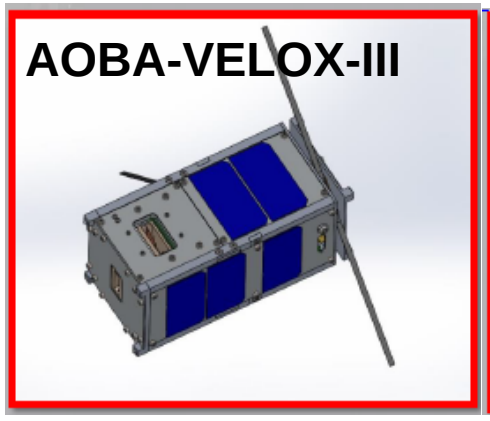
Country	# of Participants	Institutes
Germany	1	AviAsia
Indonesia	25	LAPAN, ITB, Surya Univ.
Japan	19	Tokyo Univ., Osaka univ., AES, JAMSS, JSF, JAXA
Korea	1	KARI
Malaysia	3	ANGKASA
Philippines	3	DOST-PCIEERD, NSTP
Singapore	1	SSTA
Thailand	4	GISTDA
UAE	1	UAE Space Agency
USA	2	NASA, U.S. Department of State
Vietnam	1	STI/VAST

REVIEW OF SEU RECOMMENDATION APRSAF-21 AND ACTIVITIES IN 2015

- **Promoting utilization of J-SSOD**

Work in progress ;

AOBA-VELOX-III (Singapore) will be launched in 2016.
Diwata-1 50kg class (Philippines) will be launched in 2016.
Indonesia and Malaysia are proposing the satellite deployment.



REVIEW OF SEU RECOMMENDATION APRSAF-21 AND ACTIVITIES IN 2015

- **Encouraging utilization of Kibo pressurized module**

  Work in progress ;

  Feasibility studies of Indonesian proposals started for experiments to be performed in Kibo.

SEU: COUNTRY REPORTS

- **The following 7 countries reported the space environment utilization activities :**
  - Indonesia (LAPAN)
  - Japan (JAXA)
  - Malaysia (ANGKASA)
  - Philippines (DOST)
  - Republic of Korea (KARI)
  - Thailand (GISTDA)
  - Vietnam (STI / VAST)

<Please refer to attachments for details.>

TOWARDS KIBO EXPERIMENTS

- **Preparation for Banana Ripening Experiment on-board Kibo (ITB)**
  - Current status of feasibility study has been reported.
  - The method of the study and the scientific significance of the study has been introduced.

TOWARDS KIBO EXPERIMENTS

- **Application of metabolomics for discrimination and sensory predictive modeling of food products (Osaka Univ.)**
  - The overview of the study and the result so far has been introduced.
  - Explained the metabolomics study for the Banana Ripening Experiment on-board Kibo.

SMALL SATELLITE DEPLOYMENT FROM KIBO/ISS

- **Development of Nano satellite for Education in Indonesia (Surya Univ.)**
  - The current status of development of the nano satellite was reported.
  - The satellite is planned to be deployed from Kibo J-SSOD in 2017.

KIBO/ISS UTILIZATION

- **J-SSOD: JEM Small Satellite Orbital Deployer**
  - Overview of the system and it's specification were cited. (Deployment of 50kg class satellite is now available, it's first mission is planned in 2016.)
- **ExHAM: Kibo Exposure Experiment**
  - The experiment has already started in May and November 2015.

JAXA is strongly willing to promote new mission among member countries and to provide technical support.

SPACE MEDICINE

- **ISS as a test-bed for human space exploration (JAXA)**

SPACE LAW

- **Space treaties and IGA (Tokyo University)**
  - Review of Space Treaties
  - Risk of space debris and mitigation measure was discussed.
  - Lessons learned of ISS/IGA
  - Basic understanding for space laws is necessary to promote space cooperation.

COMMERCIAL UTILIZATION

- **Commercial Protein Crystal Growth (C-PCG) Service on the ISS (Japan Space Forum)**
  - Outline, Concept and advantage of the C-PCG service, with actual successful example was introduced.
  - Over 500 Protein Crystal Growth experiments were successfully conducted so far.
  - This method is the only method which had the actual achievement in the ISS.

EXPERIMENT BUDGET FUNDING

- **Introduction to external funding and user fees (Topics include acquisition of research funds and sponsorship) (JAXA)**
  - New funding was introduced.
  - JAXA is coordinating for the details for another funding. The result of the coordination will be announced to member countries.
  - JAXA encourage the active fund-raising by member countries.

SUMMARY OF SEUWG

SUMMARY OF SEUWG

SEU working group participants:

1） Noted that “The 1st Space Exploration and Kibo Utilization for Asia Workshop” was successfully held in Jakarta, Indonesia, in cooperation with LAPAN. The feasibility study of Kibo space experiments proposed in this workshop, such as CubeSat deployment, has started. The second Space Exploration and Kibo Workshop is tentatively planned to be held in an Asian country.

SUMMARY OF SEUWG

SEU working group participants:

2) Recognized the importance of promoting feasibility studies for further Kibo utilization.

3) Recognized that experiments using the Exposed Experiment Handrail Attachment Mechanism (ExHAM) can be carried out in a short period of time with a lightweight and existing experiment sample, and that they are useful for satellite design.

SUMMARY OF SEUWG

SEU working group participants:

4) Recognized the importance of technology coordination with member countries for feasibility studies related to the development of nano and small satellites.

5) Comprehended the usefulness of external funds as one of the measures to secure funding for Kibo utilization.

RECOMMENDATION FOR KIBO-ABC AND SEUWG

RECOMMENDATION FOR KIBO-ABC

The following recommendations were provided regarding Kibo-ABC:

A) To continue activities for creating new missions based on the accumulated experience from previous efforts in each of the capacity-building programs such as SSAF, Try Zero-G and parabolic flight experiments;

B) To encourage activities for providing opportunities for more organizations to participate in the project including the planning and reviewing process for increasing Kibo utilization such as AHiS.

RECOMMENDATION FOR SEUWG

The following recommendations were provided regarding SEUWG:

A) To promote space technologies in more space agencies from Asia-Pacific countries in order to accelerate their activities towards the realization of space experiments at Kibo through building cooperation among engineers and researchers in the Asia-Pacific region;

RECOMMENDATION FOR SEUWG

The following recommendations were provided regarding SEUWG:

B) To accelerate the activities aimed at small satellite deployment using Kibo;

C) To make efforts to secure the funds to promote advanced technology and taking advantage of the opportunity of space environment utilization.

THANK YOU.

The 22nd Session of
The Asia-Pacific Regional Space Agency Forum
(APRSAF - 22)
22ND APRSAF
(APRSAF-22)
Space Environment Utilization Working Group
1 - 2 December 2015
Space Environment Utilization Working Group
The 22nd Session of
The Asia-Pacific Regional Space Agency Forum
Discovery Kartika Plaza Hotel - Bali
1 - 2 December 2015
APRSAF
ASIA-PACIFIC REGIONAL SPACE AGENCY FORUM
WWW.APRSAF.ORG

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SEUWG: COUNTRY REPORTS

- **Japan (JAXA) :**
  - Introduced the Kibo Facilities including the new facilities such as Mouse Habitat Unit and ELF(Electrostatic Levitation Furnace).
  - The current experiments have been cited along with the process of the protein crystallization experiment.
  - Introduced the next experiments and activities including the technology development projects such as ECLSS.

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SEU: COUNTRY REPORTS

- **Indonesia (LAPAN) :**
  - Reported The following space related events.
    - GALAXY FORUM
    - International School of Equatorial and Low Latitude Ionosphere (ISELION)
    - The 1st Space Exploration and Kibo Utilization Workshop for Asia
    - Space Science Festival
  - Feasibility studies of proposed experiment in KIBO with JAXA (29 May 2015 in Jakarta , 14 – 15 September 2015 in Tsukuba,Japan and 29 November 2015 in Bali, Indonesia) were reported.

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SEU: COUNTRY REPORTS

- **Malaysia (ANGKASA) :**
  - Objectives of Malaysia Microgravity Program was introduced, which are to develop local capacity and local capabilities.
  - Microgravity Program 2015 in line with above objective were reported.
    - Awareness Program

    - Try Zero-G 2015
    - Parabolic Flight & Microgravity Talk & Exhibition etc.
    - Sciences Program (Research)

    - Rice Seeds
    - Asian Herbs in Space (AHiS) etc.

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SEU: COUNTRY REPORTS

- **Philippines (DOST):**
  - The challenges of Philippine Space R&D and Space-Related Programs and Activities were introduced.
  - Areas for Future Philippine Space R&D were cited.
  - Current space related programs were reported.
    - PHL-Microsat program
    - Philippine Earth Data Resources Observatory
    - Try Zero-G

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SEU: COUNTRY REPORTS

- **Republic of Korea (KARI):**
  - The following event has been reported.

    -The 6th Korean Microgravity Society Spring Conference (April 2015)

    -The 12th Korea-Japan Joint Seminar on SEU Research (Oct. 2015)
  - The history of ISS Utilization Joint Mission with JAXA was introduced.
  - Overview of combustion Science Research using 15m Drop-Tower has been introduced.

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SEU: COUNTRY REPORTS

- **Thailand (GISTDA) :**
  - GISTDA will be in charge of a mission which was formally conducted by NSTDA.
  - Summary of NSTDA's Activities has been reported.
  - GISTDA's Roadmap has been introduced.

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SEU: COUNTRY REPORTS

- **Vietnam (STI / VAST) :**
  - Space utilization in Vietnam had been introduced.
  - Vietnam is planning for the deployment of NanoDragon and other cubesats.
  - Influences and response to space environment research activities in Vietnam had been reported.
  - Future plan, prospect and challenges were introduced, including small satellite development and other Kibo utilizing projects.