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RA II WIGOS Project Newsletter

DEVELOPING SUPPORT FOR NATIONAL METEOROLOGICAL AND HYDROLOGICAL SERVICES IN SATELLITE DATA, PRODUCTS AND TRAINING

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The 8th Asia/Oceania Meteorological Satellite Users' Conference

The Eighth Asia/Oceania Meteorological Satellite Users' Conference (AOMSUC-8) was held in Vladivostok, Russia from 16 to 21 October 2017. AOMSUC-8 was hosted and sponsored by Roshydromet and Roscosmos of the Russian Federation, and was co-sponsored by the China Meteorological Administration (CMA), the Japan Meteorological Administration (JMA), the Korean Meteorological Agency (KMA), the Indonesian Agency for Meteorological, Climatological and Geophysics (BMKG), the Australian Bureau of Meteorology (AuBOM), the India Meteorological Department (IMD) and the India Space Research Organization (ISRO) of India, the World Meteorological Organization (WMO), and the Group on Earth Observations (GEO).

AOMSUC-8 began with a two-day training event that brought together participants from WMO Regions II and V. The next three days AOMSUC-8 were the Conference itself consisting of 68 oral and 51 poster presentations and was attended by over 170 people from 27 countries (Australia, Bahrain, China (including Hong Kong), Germany, Great Britain, India, Indonesia, Kazakhstan, Kirghizia, Malaysia, Maldives, Mongolia, Myanmar, New Zealand, Norway, Oman, Pakistan, Republic of Korea, Russia, Sri Lanka, Switzerland, UAE, USA, Thailand, Turkmenistan, Japan). The final day of the AOMSUC-8 was a focused meeting of the Coordination group of the WMO RA II WIGOS project to develop support for NMHSs in satellite data, products and training.

Dr. James F.W. Purdom, Chair of the AOMSUC International Conference Steering Committee welcomed the participants and iterated the four main goals of the AOMSUC: (1) Promote the importance of satellite observations and promote their utility; (2) Advance satellite remote sensing by fostering scientist to scientist interaction; (3) Provide a means for satellite operators to interact directly with the user community; and, (4) Engage young people entering the field. In the welcome addresses all the co-sponsors spoke to the opportunities afforded to Asia/Oceania with the greatly improved observing capabilities presented by the new generation of geostationary and polar satellites being introduced over the next few years complimented them for their good efforts in sharing data and information across the region.

The Conference portion of AOMSUC-8 was divided into eight oral sessions and one poster session; however, the term poster session is an understatement since posters were set up in the coffee break area, which allowed for their viewing during break times as well as during a dedicated poster session. The eight oral presentation sessions covered the following topical areas:

1. Current and future meteorological satellite programs and user activities/plans within Asia/Oceania;
2. Facilitation of data access and utilization, including training activities;
3. Atmospheric parameters derived from satellite observations;
4. Application of satellite data to numerical weather prediction;
5. Application of satellite data to weather analysis and disaster monitoring;
6. Application of satellite data for climate and environmental monitoring;
7. Land surface and ocean parameters derived from satellite observations;
8. Global Spaced-based Inter-Calibration System (GSICS).

Both oral and poster presentations were of the highest quality without exception. The conference was very successful in meeting the four major conference goals as set forth by Dr. Purdom in his welcoming remarks. It was evident throughout the Conference that the new generation of geostationary and polar orbiting satellites have already had a major impact across the globe – great scientific adventures await us as we move forward with science and product development and new applications with these data: the satellite operators are meeting their commitment as we inaugurate this new era in the Space Based Component of the WMO Integrated Global Observing System (WIGOS).

At the end of the Conference, BMKG announced a plan to host the Ninth Asia/Oceania Meteorological Satellite Users' Conference in the fall of 2018 in Jakarta.

(Zoya Andreeva, SRC Planeta/ ROSHYDROMET)

The fifth Meeting of the Coordinating Group of the WMO Regional Association II (RA II) WIGOS Project to Develop Support for National Meteorological and Hydrological Services(NMHSs) in Satellite Data, Products and Training

The fifth meeting of the Coordinating Group of this Project was held on the Campus of Far Eastern Federal University (FEFU) on Russky Island, Vladivostok, Russia on 21 October 2017 in conjunction with the 8th Asia/Oceania Meteorological Satellite Users' Conference (AOMSUC-8). The meeting was attended by the Coordinating Group members (China, India, Japan, Korea and Russia), most participant countries of the Project in RA II (Bahrain, Hong Kong, Kyrgyz, Malaysia, Maldives, Myanmar, Oman, Pakistan, Thailand and UAE) and RA V (Australia and Indonesia), WMO and the Chair of the AOMSUC International Conference Steering Committee as an observer.

The meeting opened with addresses from Alexander A. Vasilyev (Principal scientist, Hydrometcentre of Russia / Roshydromet) and Fernando Belda (Director, WMO Observing and Information Systems Department). The following topics were discussed at the meeting to review the status of the Project and relevant activities including WMO projects (the affiliations of the presenters are indicated in parentheses). In addition, the meeting discussed the future work plan of the Project.

- Accomplishment, Current Status and Work Plan of the Project (JMA)
- WMO Space Programme update (WMO)
- Review of AOMSUC-8 Results and Country Report (Roshydromet)
- User Requirements for Satellite Data Utilization and for the Training Events during AOMSUC
  - ✓ Survey on WMO RA II / RA V Training Event (Roshydromet)
  - ✓ Results from the WMO 2016 Survey (WMO)
  - ✓ RA II Project Questionnaire Survey (JMA)
- Requirements for Severe Weather Forecasting (SWFDP)
  - ✓ Survey Study of Using Multi-geo-satellites (KMA)
  - ✓ SCOPE-Nowcasting (WMO)
  - ✓ SWFDP Current Status (WMO)
- Relevant Training Activities in Cooperation with RA II and RA V (KMA)
- Development of the Protocol for Himawari-8/-9 Request-driven Rapid Scan in RA II and RA V (JMA)
- Work plan 2017-2020 (JMA)

Presentation materials are available on the web page of the Project (http://www.jma.go.jp/jma/jma-eng/satellite/ra2wigosproject/ra2wigosproject-intro_en_jma.html#meetings), and the final report of the meeting will be uploaded on the web page soon.

(Ryo Yoshida, JMA)

KSEM, Ready for its First Step to Geostationary Orbit

Two major milestones of SOSMAG HAR and KSEM PSR have been achieved in July and August of 2017, respectively.

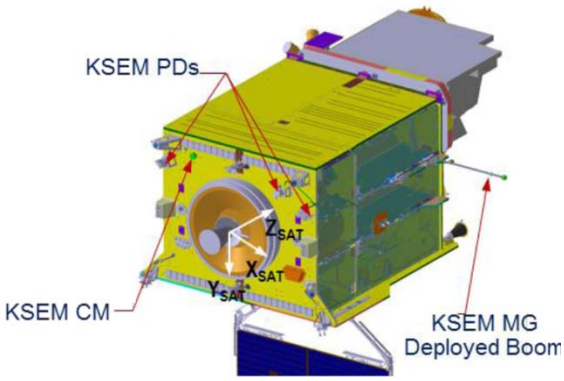

Figure 1. Accommodation of the KSEM on GEO-KOMPSAT-2A

KSEM is a suite of particle detector (PD), magnetometer (SOSMAG, Service Oriented Spacecraft Magnetometer) and satellite charging monitor (CM).

Kyunghee university received contract to develop KSEM with the extensive cooperation of SatrecI Inc., U.C. Berkeley and ESA. KSEM experienced the major design change with magnetometer during SDR. Finally the design change to a boom type of magnetometer was decided, which body mount type of magnetometer was initially proposed by Kyunghee university. ESA joined KSEM project to provide SOSMAG as CFI.

KSEM OVERVIEW

KSEM is going to monitor the space environment with the severe space weather information of high-impact space storms, the radiation environment hazardous to spacecraft, aircraft and radio communication for 24 hours/7days during 10 years of mission life time.

After SOSMAG HAR, SOSMAG was delivered to KARI and PSR successfully completed in August of 2017. Now KSEM is in the phase of integration with GK2A satellite and ready for satellite level environment test.

KSEM design was carefully verified:

PD is inherited from THEMIS SST design. PD has six telescopes, or sensor heads. Each telescope has a stack of three sensors. These sensors in a telescope are identified F, T and O sensors. The sensor arrangements in the sensor heads are identical. When a particle hits a sensor, the particle deposits its energy in whole or in part on the sensor. As a result, the sensor produces a signal with a relative sharp rising and a long trailing. The SST electronics are designed to capture these pulses, measure the pulse heights that are directly related to the exchanged energy between the particles and the sensors, and assemble these events by their energy levels for further study. PD measures the energy flux of electron and ion with the energy range of 100 keV and 2MeV.

SOSMAG system has the following basic design:

① four sensors of 2 fluxgate sensors on short boom, 2 AMR sensors on spacecraft body,
② a boom of 1m with deployment mechanism,
③ a mounting interface for the boom without specific requirements on spacecraft structure,
④ the associated electronics.

To clean the artificial magnetic field variation generated by the spacecraft is the key of SOSMAG. The set of 2 fluxgate sensors on the boom and 2 additional sensors on the spacecraft body are expected to reduce the influence of the magnetic contamination by spacecraft on the measurement of the natural magnetic field variation in space.

CM is to monitor the internal charging of spacecraft. Internal charging refers to the accumulation of electrical charge on interior of ungrounded metals or dielectric materials inside spacecraft. This could intermittently result in electrostatic discharge (ESD) within the dielectric material and lead to system failure. CM is composed of 1 Al plate to measure the internal charge. Its design concept of CM refers to ERM (Engineering Radiation Monitor) of Van Allen Probes (RBSP) and SURF of Merlin space weather monitor on Giove-A.

The following table briefly presents KSEM specification with measurement range and resolution.

Sensor	Specification
Particle Detector	Energy range (Electron/Proton): 100keV ~ 2 MeV Angular Resolution(pitch angle): 60° at least
SOSMAG	Measurement range : ± 6,400nT Field resolution : 1nT at least (on orbit)
Satellite Charging Monitor	Current range: ± 3pA/cm^2 Measurement resolution : 0.01pA/cm^2

Magnetic AC source characterization of Spacecraft

There was major activity of the spacecraft AC magnetic environment to specify a key parameter for the successful performance of the magnetometer in Nov. 2017. During the conducted EMC test, two more fluxgates installed outside of spacecraft in addition to SOSMAG to monitor the interference sources on spacecraft. And this conducted EMC test provides very good opportunity to measure local AC-sources of spacecraft because instrument and sub-systems are switched on sequentially. The measurement was very successfully made and it is expected to be ease the future SOSMAG data processing.

Future Plan

KSEM integration with GK2A will be finished by the end of November and GK2A level environment test is scheduled to finish by mid of 2018. After that, GK2A will move to launch site. And the first Korean space weather mission for geostationary orbit will be launched at the end of 2018.

(Hyesook Lee, NMSC/KMA)

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From the Co-editors

The co-editors invite contributions to the newsletter. Although it is assumed that the major contributors for the time being will be satellite operators, we also welcome articles (short contributions of less than a page are fine) from all RA II Members, regardless of whether they are registered with the WMO Secretariat as members of the WIGOS Project Coordinating Group. We look forward to receiving your contributions to the newsletter.
(Dohyeong KIM, KMA, and Hiroshi KUNIMATSU, JMA)

RA II WIGOS Project Home Page

http://www.jma.go.jp/jma/jma-eng/satellite/ra2wigosproject/ra2wigosproject-intro_en_jma.html

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