



Ministry of Environment

**National Institute of
Environmental Research**

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To: Philippe Brunet

CC: Astrid Koch(CEOS Chair Point of Contact), Steven Hosford (CEOS Executive Officer)

We are writing to you as the current Chair of the Committee on Earth Observation Satellites to express the National Institute of Environmental Research's (NIER) desire to become a member of CEOS.

As a result of rapid industrialization and urbanization in the 1970s, environmental pollution has emerged as a serious social problem in Korea. In response to the various environmental challenges of the time, the National Environmental Protection Institute (NEPI) was established by the Korean government, the Ministry of Environment, in July 1978. In 2005, NEPI was expanded and renamed as the National Institute of Environmental Research (NIER) with more researchers, research infrastructures and equipment. NIER has consolidated its position as a leading government-run research institute dedicated to environmental studies by streamlining its organization and reinforcing its research capacity. NIER remains committed to better fulfilling its role and mission which are vital to the development and implementation of Korea's environmental policies and pollution prevention programs. NIER conducts research in a wide range of fields including environmental health, climate & air quality, water, resources, energy, indoor environment and soil and has developed the Geostationary Environment Monitoring Spectrometer (GEMS) to improve capabilities to monitor and forecast climate change and air quality in the Korean Peninsula and East Asia.

GEMS onboard GEOstationary KOREAN Multi-Purpose SATellite 2B (GEO-KOMPSAT2B), which will be launched in 2019, is the world's first geostationary sensor for mainly monitoring atmospheric environment. All the satellite related works are carried out by the NIER. NIER's satellite development plan has been established and implemented in accordance with the Korean government's space development plan. Currently, the GEMS payload has been completely developed and is now on the assembly stage with GEO-KOMPSAT2B. GEMS atmospheric products such as SO₂, NO₂, O₃, HCHO and aerosols are expected to greatly improve our capabilities to monitor and forecast climate change. Furthermore, formation-flying with other future geostationary environmental satellites, TEMPO of the USA and Sentinel-4 of Europe, which are planned to be launched after 2019, is expected to create synergistic effects: better understanding of worldwide changes in atmospheric environment.

After GEO-KOMPSAT2B launch and commissioning, the Environmental Satellite Center (ESC), recently established for operating GEMS in NIER, will process received data from GEMS into useful forms and serve consistently and indiscriminately to the public step by step according to the stabilization phase. In addition, NIER ESC is expected to play a leading role in environmental remote



observation over East Asia through further missions focused on air quality, greenhouse gas, and other environmental fields.

For the regional cooperation, NIER has participated and held the joint research project together with neighboring countries, China and Japan, since 2000 in an effort to make a policy to reduce air pollutants using observed and simulated data. Through the project, NIER has encouraged cooperation for air pollutants observation over East Asia. NIER is expecting that environmental satellite data including GEMS will be utilized for the research to investigate air quality properties such as long range transboundary air pollutants in Northeast Asia.

NIER ESC has been focusing on producing air pollutants concentration from satellite and those in surface level such as PM_{2.5}. Since 2012, ESC has held the science workshop to enhance accuracy of GEMS products. In operation phase of GEMS, ESC will continue holding the harmonization programs to expand the utilization field and verify products. In addition, since 2016, ESC has taken leading a data convergence of Aerosol with Korean Meteorological Administration and Ministry of Oceans and Fisheries in Korea. It is also considering multi-lateral coordination of satellite observation through joining CEOS and signing an memorandum of understanding with another satellite owner institute.

Since the 12th CEOS AC-VC meeting in Seoul, South Korea in 2015, NIER has been participating in the annual AC-VC meeting and sharing the information on GEMS development status and operation plan. NIER would now like to extend its participation in CEOS and become a member.

Among other contributions to CEOS, NIER will use reasonable efforts to achieve in the following ways:

- Improving GEMS data quality through collaboration with CEOS members in instrument calibration and algorithm development;
- Maximizing the efficiency in service improvement, utilization expansion, and policy contribution by data release and feedback according to the data stabilization phase;
- Improving the accessibility of GEMS data through the standardization of data and its format between the existing and future environmental satellites;
- Maximizing the mutual synergy of data utilization by the release of the standardized data observed from GEMS to be launched in the future in accordance with the stabilization phase;

NIER's contribution to CEOS is as follows:

- Reflecting the global atmospheric environment issues discussed in CEOS meetings on the mission plan of future satellite development;
- Contributing to developing the joint improvement plan through sharing the experience between CEOS member organizations on satellite development process, e.g. development of retrieval algorithm, validation results of retrievals, and so on;
- Supporting the analysis researches about air pollutants and causes of climate change from the formation-flying with existing and future environmental satellites;
- Supporting the international user community for international collaboration on the observation activities from environmental satellites;



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- Collaborating to resolve the issues on global atmospheric environment and strengthening the inter-complementarity and compatibility between global satellites by sharing the observation system and technical information of environmental satellites under development through constant participation in the CEOS meetings.

In order to achieve this, NIER would like to apply for membership of CEOS and nominate the following two representatives.

Principal Representative: Dr. Sangkyun Kim (Director of Environmental Satellite Center, NIER)

Contact Point: Ara Cho (Researcher of Environmental Satellite Center, NIER),

Dr. Jongmin Yoon (Senior Researcher of Environmental Satellite Center, NIER)

Sincerely yours,

Seung Do YU, Ph.D

Seung Do Yu

Acting President of NIER

Director General of Environmental Health Research Department
National Institute of Environmental Research
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