CEReS The 30th Anniversary

Synopsis in English

1. Overview

In April 1995, CEReS was established as a national joint-use facility certified by the Ministry of Education, based on the Remote Sensing and Image Research Center, an on-campus joint-use facility. The new center consisted of three research divisions: the Sensor and Atmospheric Radiation Research Division, the Global Environmental Information Analysis Research Division, and the Database Research Division, as well as a Database Development and Operation Department to support them. Each of these divisions promoted its own basic research, and also cooperated with each other to contribute to the development of "global environmental studies" using remote sensing, and to become a research base for remote sensing in Asia. Specifically, the center set a common goal of "monitoring environmental change in Asian regions through remote sensing," and promoted the "Development of methods to estimate plant production through satellite observations" (commonly known as the Mongolia Project) as a core project across divisions.

In April 2004, national universities were incorporated, and each university was transformed from a national administrative institution established by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) into an independent legal entity, a "national university corporation." In terms of operations, a six-year mid-term goal and mid-term plan period was set, the MEXT ministry approves the plans drawn up by the universities, and a committee evaluates the progress of these plans and reflects this in the allocation of funds to the universities. With the incorporation of national universities, CEReS, which had been a national joint-use research facility with a ten-year term since its launch in 1995, was relaunched as a "national joint-use research facility listed in the mid-term goal and mid-term plan" with one year left in its term.

In April 2004, CEReS terminated the traditional departmental system and implemented a new project-based, focused research promotion system. Since then, organizational personnel management has been carried out under the research area system (Remote Sensing Fundamentals Research Area, Remote Sensing Interdisciplinary Research Area, and Satellite Data Processing Office), but research promotion, including joint use, was performed based on the project system. The four initial projects (PJs) were "PJ1: Understanding the state of changes in the Earth's surface environment using satellite data and analyzing the factors behind them", "PJ2: Research into changes in the surface, vegetation and land cover, focusing on the transition of the three-dimensional structure of vegetation on the Eurasian continent", "PJ3: Evaluation of radiation balance and long-term changes in atmospheric parameters using satellite data and ground observation networks", and "PJ4: Realization of remote sensing useful for local communities - disseminating social information through the synergy of diverse spatial information". Soon after, "PJ5:

Development of a small satellite equipped with a circularly polarized synthetic aperture radar" was added, and in October 2008, "PJ6: Global warming and the use of meteorological and oceanographic information" (research division endowed by Weathernews Inc.) was added until March 2011.

When national universities were incorporated, the explicit status of national joint-use facilities disappeared in the framework of laws and regulations. In terms of budgets, operating subsidies are allocated to individual universities and executed by each university. Therefore, a new institutional status was needed for a national joint-use system that would transcend the boundaries of universities and be run by the national research community. After several years of consideration, the MEXT ordinance was revised, and in 2008 the MEXT Minister established a new "Certification System for Joint-Use and Joint Research Centers" as a system that would cover national, public and private universities. CEReS applied to become an "Environmental Remote Sensing Research Center," and this was approved, which means that the center will carry out activities during the second mid-term goal and mid-term plan period (2010-2016). As of June 2009, 70 centers/institutes of national universities had been certified, including Chiba University's CEReS and Medical Mycology Research Center.

The second mid-term goal and mid-term plan period began in April 2010. Prior to this, in FY2009, the project research carried out during the first mid-term goal period was summarized and reviewed, and four programs were formulated as research programs to further develop and succeed these: "Creation of cutting-edge environmental information (advanced remote sensing)," "Comprehensive environmental information (information integration)," "Advanced satellite utilization," and "Global warming and utilization of meteorological and oceanographic information (endowed research division)." These programs were launched concurrently with the second period. Moreover, in 2011, CEReS positioned itself as a "core research institute on remote sensing" and defined the following three items as its mission: 1) To conduct cutting-edge research on remote sensing, 2) To develop research on Earth's surface environmental changes using remote sensing data, and 3) To conduct research to utilize remote sensing for the benefit of society.

In 2008, the Basic Space Law was enacted, which established the basic principles for space development and utilization and clarified the responsibilities of the nation. It also stipulated the creation of a Basic Space Plan and the establishment of a Space Development Strategy Headquarters, and stated in its articles that space should be used for peaceful purposes, and that the development and utilization of space should be used to improve the lives of the people and promote industry. On March 11, 2011, the Great East Japan Earthquake occurred, causing a major impact on the Tohoku region with the earthquake and tsunami, and causing an unprecedented accident at the Fukushima Daiichi Nuclear Power Plant operated by Tokyo Electric Power Company, including core meltdowns at three nuclear reactors. In response to this nuclear accident, a group of researchers from CEReS and the Graduate School of Horticulture conducted a traveling survey of air dose rates using a car equipped with a gamma ray counter shortly after the disaster,

providing data for the return of residents and the restoration of agriculture and other livelihoods.

In 2015, the final year of the second mid-term goal and mid-term plan period, the MEXT carried out a final evaluation of 77 institutes/centers at national universities. CEReS, under the leadership of Director R. Tateishi, handled the evaluation, receiving an "A" rating and being selected to continue into the third period. On November 30, 2015, the "20th Anniversary Ceremony of the Center for Environmental Remote Sensing" was held at the main hall of Chiba University's Keyaki Kaikan to commemorate the 20th anniversary of the center's establishment.

The third mid-term goal and mid-term plan period began in April 2016. Dr. Y. Yasuoka, Professor emeritus at the University of Tokyo, was invited as a special professor and served as the center director until 2018, strengthening CEReS's presence in the international programs, including Future Earth and SATREPS. In 2021, the end-of-term evaluation was carried out by the MEXT. In this evaluation, CEReS was led by Director K. Hattori, and in the results (national universities) published in October 2021, CEReS was rated "A-". Issues pointed out included expanding the related community and creating innovation through interdisciplinary research. Despite these issues, the joint use and research center in the field of environmental remote sensing will be able to continue in the fourth term starting in 2022.

With the addition of new members from 2017 to 2019, the previous three-project system (Advanced Remote Sensing, Information Integration, and Advanced Utilization) was reorganized in October 2021 to form five research divisions: Advanced Sensing Division, Environmental Diagnosis Division, Environmental Prediction Division, Integrated Analysis Division, and Social Implementation Division. This has strengthened the traditional information integration-related research area and clarified the direction of promoting the "creation of global environmental diagnosis and global environmental prediction" through the synergy of satellite remote sensing data (Earth observation big data) and information science approaches. In addition, the system has been established to contribute to related top-leader-type projects of the Interdisciplinary Advanced Research Support Program of the Chiba University International Advanced Research Core.

CEReS Directors during 30 years

1995 - 1996 Shizuo Shindo (hydrology)
1997 Tomio Asai (meteorology)
1998 - 1999 Yoshizumi Yasuda (image processing)
2000 - 2003 Tamio Takamura (atmospheric radiation)
2004 - 2005 Nobuo Takeuchi (atmospheric sensing)
2006 - 2009 Fumihiko Nishio (glaciology)

2010 - 2013 Hiroaki Kuze (atmospheric optics)
2014 - 2015 Ryutaro Tateishi (land surface remote sensing)
2016 - 2017 Yoshifumi Yasuoka (remote sensing and GIS)
2018 - 2019 Hiroaki Kuze (atmospheric optics)
2020 - Katsumi Hattori (electromagnetic sensing)

2. Joint research and educational activities

In the 30 years from the founding of CEReS in 1995 to 2024, seven self-examinations and external evaluations have been carried out. Three of these (1996, 1999, 2003) were conducted before the incorporation of national universities, and the fourth and subsequent evaluations (2008, 2012, 2015, 2020) have been conducted after the incorporation. Over the past 30 years, these evaluations have allowed CEReS to review its organizational and management concepts and policies, which often tend to maintain the status quo, with the help of external experts in closely related fields.

The joint research is divided into program research, general research including exploratory research, study groups, and international joint research, which was newly started in 2014, and every year 40 to 50 research projects are carried out on a wide range of themes, such as analysis of satellite data on the atmosphere, ocean, snow and ice, water cycle, vegetation, land cover, etc., as well as associated ground observation research. In addition, the CEReS Environmental Remote Sensing Symposium is held every year around mid-February as an opportunity to present and exchange information among the collaborating researchers.

CEReS faculty members are responsible for teaching in the School of Science, School of Engineering, and each graduate school. Since 1996, the Graduate School of Science and Technology has been established, and they have mainly taught master's programs in the Department of Life and Earth Sciences, Department of Image Science, and Department of Intelligent Information Science, and doctoral programs in the Department of Environmental Science (renamed Department of Human and Earth Environmental Science in 1998, and Department of Earth and Biosphere Science in 2004), Department of Diversity Science, and Department of Artificial System Science. As of 2003, 110 students had completed the Master's program and 43 students had completed the Doctoral program (24 of whom were foreign nationals).

In 2007, the Graduate School of Science and Technology was reorganized to establish three new graduate schools: the Graduate School of Engineering, the Graduate School of Science, and the Graduate School of Integrated Science. CEReS engineering faculty belonged to the Graduate School of Integrated Science, and taught graduate students in the Department of Information Science for both the Master's (first half of the doctoral course) and Doctoral (second half of the doctoral course) courses. In addition, science faculty taught the Master's and Doctoral courses in Earth and Life Sphere Science at the Graduate School of

Science. Between 2004 and 2015, 153 students completed master's programs and 67 students completed doctoral programs (45 of whom were foreign nationals).

In April 2017, the Graduate School of Science, Graduate School of Engineering, and Graduate School of Integrated Science were integrated to form the Graduate School of Integrated Science and Engineering as an educational organization. The research organization is the Faculty of Engineering and the Faculty of Science. Graduate students belong to the Graduate School of Integrated Science and Engineering, but faculty members belong to either the Faculty of Engineering or the Faculty of Science. CEReS faculty members belong to the Faculty of Engineering, and the administrative work of the center as a whole is handled by the School of Engineering.

The Graduate School of Science and Engineering was established with the aim of "cultivating highly specialized human resources and pioneering and leading researchers with broad academic knowledge, deep expertise, and problem-solving abilities who can view both science and engineering fields from a bird's-eye view and encourage collaboration between both fields." The graduate school consists of five divisions: Mathematics and Informatics, Earth and Environmental Sciences, Advanced Science and Engineering, Creative Engineering, and Fundamental Engineering. Of particular note is the establishment of an "Environmental Remote Sensing Course" in the Earth and Environmental Sciences Division, alongside the Earth Sciences Course and the Urban Environmental Systems Course. Over the more than 20 years of graduate education from 1995 to 2015, a total of 263 master's students and 111 doctoral students (69 of whom were foreign nationals) had completed their degree with CEReS faculty as their supervisor. Thanks to these achievements and contributions, CEReS was the first in the country to start graduate school education in "Environmental Remote Sensing," a field that literally combines science and engineering.

From 1995 to 2023, a total of 374 students have completed master's degrees, and 151 students have completed doctoral degrees (101 of which are foreign nationals). From 2006 to 2023, for which records are available, a total of 297 students have completed bachelor's degrees, including those from the Faculty of Science and the Faculty of Engineering.

Since its inception, CEReS has actively promoted internationalization in order to improve the level of research as a national joint-use institute, and has held the CEReS International Symposium every year to this day. The main theme is "Monitoring Environmental Changes in Asia," so that there are many participants from Asian countries, but there are also participants from Europe and the United States. The symposium is often held at Chiba University's Keyaki Hall or the large conference room of the Graduate School of Science and Technology, but in recent years it has also been held in Jakarta and Bali, Indonesia, in cooperation with IJJSS (Indonesia Japan Joint Scientific Symposium), an international conference organized by Chiba University and seven sister universities in Indonesia.

Main satellite data and products provided by CEReS

NOAA/AVHRR series: Data reception started on April 15, 1997, receiving equipment removed on March 13, 2017

GMS-5, MTSAT series: GMS-5 started antenna reception in 1997, MTSAT-1R started landline acquisition in June 2005

Himawari 8/9: Official operation started in July 2015, still ongoing to date

FY-2 (B/C/D/E/G) series: FY2-B has been received for several months since April 1998, and FY2-C has been received and released since the end of FY2007. Reception ended at the end of FY2023.

GOES-E, -W/Second generation series: Data provided by WNI has been processed and released, but real-time processing has ended due to the end of the second generation operation, and past data is being released through VL activities.

GOES-E, -W/Third generation series: GOES-R, GOES-S (collected and released as part of a collaborative research project with NASA Ames Research Center)

MODIS: Archive of data received by JAXA began in August 2004, but ended in March 2019. Global products have been archived since the start of Terra/Aqua.