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Current status and future prospects of the EISCAT 3D project

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The European Incoherent Scatter (EISCAT) scientific association started construction of the first stage of the EISCAT 3D radar system in 2017 under international collaboration. EISCAT 3D is a new generation of incoherent scatter radar system based on phased array technology. The first stage involves operating a core site with a transmission power of approximately 3.4 MW and two receive-only remote sites. By summer 2023, all the antennas had been installed at the Skibotn core site in Norway (119 sub-arrays), the Kaiseniemi remote site in Sweden (55 sub-arrays) and the Karesuvanto remote site in Finland (54 sub-arrays). A first light with 7 sub-arrays is planned at the Skibotn core site. This will be followed by various testing and commissioning phases at the three sites, and then operations at the first stage will begin. In connection with the operation of EISCAT 3D, the EISCAT scientific association has made the strategic decision to transfer its assets, operations and commitments to EISCAT AB, a state-owned company that was established in January 2025. The EISCAT 3D radar is expected to be utilized for a variety of scientific studies, including the investigation of the transport of energy and mass from the solar wind and magnetosphere to the ionosphere and atmosphere (McCrea et al., 2016).

In collaboration with the EISCAT scientific association and ISEE Nagoya University, the National Institute of Polar Research (NIPR) has contributed to the construction of the EISCAT 3D by supplying radar transmitter power amplifiers (SSPAs). The high energy- efficient SSPAs had been used for engineering verification tests at the EISCAT sites in Tromsø and Kiruna since 2016. In 2020, NIPR concluded an MoU with EISCAT to supply sub-array transmitter units for the first stage, selected by the EISCAT headquarters through an international tender process. Alongside these contributions to the EISCAT 3D construction, NIPR established the Advanced Radar Research Promotion Center (ARRC) in April 2022. ARRC is preparing for the joint usage and collaborative research of the EISCAT 3D radar system.

This paper reports on the latest status of the EISCAT 3D project and discusses the prospect of future international collaborative studies using the EISCAT 3D radar system.

Reference

[1] McCrea, I. W., A. Aikio, L. Alfonsi, E. Belova, S. Buchert, M. Clilverd, N. Engler, B. Gustavsson, C. Heinselman, J. Kero, M. Kosch, H. Lamy, T. Leyser, Y. Ogawa, K. Oksavik, A. Pellinen-Wannberg, F. Pitout, M. Rapp, I. Stanislawski, J. Vierninen, The science case for the EISCAT 3D radar, *Progress in Earth and Planetary Science*, doi:10.1186/s40645-015-0051-8, 2015.