

The EISCAT_3D project

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The EISCAT (European Incoherent SCATter) Scientific Association is an international research organization, which operates incoherent scatter (IS) radars in northern Scandinavia and Svalbard for studies of physical and environmental processes in the middle/upper atmosphere and near-Earth space. Since 1996, National Institute of Polar Research, in collaboration with STEL, Nagoya University, has promoted EISCAT collaborations for the user community in Japan to utilize the EISCAT facility as well as EISCAT data for their scientific subjects. Japanese scientists have been studying several scientific topics such as 3-D ionospheric current system, aurora dynamics, ion upflow, neutral wind dynamics, using EISCAT data, and published 110 papers from 1995 to 2013.

EISCAT_3D is the major upgrade of the existing EISCAT radars in northern Scandinavia. The EISCAT_3D radar is a new phased array IS radar using the center frequency 233 MHz. The idea was firstly presented as 'E-prime' in 2003. The EISCAT community has been doing large efforts to make it happen since then. The design study was conducted from 2005 to 2009, and the preparatory phase program has been conducting since 2009 (until September 2014). With a multi static phased array system composed of one central active (transmitter-receiver) site and four receiver sites, the EISCAT 3D system is expected to provide us 10 times higher temporal and spatial resolution and capabilities than the present EISCAT radars. Furthermore, continuous observations can be made, and will provide us with long-term data sets of the polar ionosphere, which can be used to investigate variations of the ionosphere as well as the neutral wind dynamics (in particular, studies of planetary waves and tidal waves). In this presentation, we will overview the EISCAT_3D project, and present our strategic plan of national funding for the EISCAT_3D as well as science targets.

Keywords: EISCAT_3D, Incoherent Scatter radar, polar ionosphere, Magnetosphere-Ionosphere-Thermosphere coupling, 3D imaging observation, Mesosphere

