

## **EISCAT\_3D: A new atmospheric research radar for the Scandinavian Arctic**

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The goal of this presentation is to stimulate the discussion on potential combined projects of radar and optical observations with EISCAT\_3D and also with the existing EISCAT radars. EISCAT\_3D (1) will be an atmospheric radar with the overall theme to study how the Earth's atmosphere is coupled to space. This high power large aperture radar with 233 MHz centre frequency will be designed for incoherent scatter observations of the atmosphere and the near-Earth space above the Scandinavian Arctic. Incoherent scatter probes the atmosphere over a wide altitude range to derive ion density, ion temperature, electron density, electron temperature, and velocities. The expected range for observing these parameters with the new system is 60 to 1200 km. The system also detects objects with high radar reflectivity, e.g. meteors, space debris and near Earth objects. The improved capabilities compared to the present EISCAT systems will also permit probing lower altitudes in a similar way as HF MST radars. EISCAT\_3D will use phased array technology, which permits investigating regions in the atmosphere with small spatial resolution as well as to image volumes in space. The system will be significantly more flexible than the present EISCAT radars and could be turned to specific observations modes in response to pre-defined conditions. All this makes the system ideal for usage in combination with optical observations and EISCAT aims to expand the user community in view of the advanced capabilities of the new system. The project is run by EISCAT Scientific Association, which is currently funded and operated by research councils and funding organizations in Norway, Sweden, Finland, Japan, China and the United Kingdom. The EISCAT systems are open for usage to researchers in these countries. Some observation time is also open to users from other countries based on the scientific merit of their submitted proposals. The European Strategy Forum on Research Infrastructures (ESFRI) selected EISCAT\_3D for inclusion in the Roadmap 2008 for Large-Scale European Research Infrastructures. As a European infrastructure in the environmental field, the project puts a strong emphasis on data management, long-term storage and access, and on interoperability with other environmental data. Complementary instrumentation at the EISCAT\_3D sites to supplement the capabilities of the new radar are an important part. Improving data formats and user access is an integral part of the project preparations and are also important for the usage of the present system. Some of the EISCAT activities in this direction will be described in another presentation during the meeting (2).

(1) EISCAT\_3D (<https://www.eiscat3d.se/>) is developed within the EISCAT user community. EU at present funds within FP7 a Preparatory Phase Project for EISCAT\_3D with contributions from: Anders Tjulin, Anita Aikio, Asgeir Brekke, Assar Westman, Björn Gustavsson, Bo Karlsson, Carl-Fredrik Enell, Cesar La Hoz, Claes Beckman, Craig Heinselman, Derek McKay-Bukowski, Esa Turunen, Gudmund Wannberg, Gunnar Isaksson, Henrik Andersson, Ian McCrea, Ilkka Virtanen, Ingemar Häggström, Ingemar Wolf, Ingrid Mann, Jimmie Adolph, Johan Borg, Jonny Johansson, Juha Vierinen, June Lunde, Jussi Markkanen, Karsten van Zwooll, Kjell Knuutinen, Lars Eliasson, Lars-Göran Vanhainen, Lassi Roininen, Leif Johansson, Magnus Friberg, Markku Lehtinen, Mats Nylén, Mikael Larsson, Mike Rietveld, Mikko Orispää, Roger Jacobsen, Stephan Buchert, Thomas Ulich, Tomi Teppo, Unni Pia Løvhaug and Vasyl Belyey.

(2) Carl-Fredrik Enell: EISCAT data search and retrieval for combined optical-radar observations of the ionosphere, in this meeting