

Space Studies of the Upper Atmospheres of the Earth and Planets including Reference Atmospheres (C)

Advances in Remote Sensing of the Middle and Upper Atmosphere and Ionosphere from the Ground and from Space, including Sounding Rockets and Multi-Instrument Studies (C02)

Consider for oral presentation.

EISCAT 3D: THE EUROPEAN THREE-DIMENSIONAL IMAGING RADAR FOR ATMOSPHERIC AND GEOSPACE RESEARCH

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The EISCAT Scientific Association operates three incoherent scatter radars in Tromsø (Norway) and on Svalbard. The UHF radar, which operates at 930 MHz, is the only tristatic incoherent scatter radar in the world. The transmitter is located in Tromsø and additional receiver sites are in Kiruna (Sweden) and Sodankylä (Finland). However, due to interferences with mobile communication, tristatic operation will come to an end in due time.

In the future, EISCAT will build the next generation incoherent scatter radar, which will provide comprehensive 3D monitoring of the atmosphere and ionosphere above Northern Fennoscandinavia. The EISCAT 3D radar system will consist of multiple phased arrays, using the latest digital signal processing to achieve ten times higher temporal and spatial resolution than the present radars.

The European Strategy Forum on Research Infrastructures (ESFRI) selected EISCAT 3D for the Roadmap 2008 for Large-Scale European Research Infrastructures for the next 20-30 years. The facility will be constructed as a modular system by 2015.

EISCAT 3D will be a volumetric radar capable of imaging an extended spatial area with simultaneous full-vector drift velocities, having continuous operation modes, short baseline interferometry capability for imaging sub-beamwidth scales, real-time data access for applications and extensive data archiving facilities.

The design of the antenna arrays will be modular at different scales allowing for mass-production of the components. Some arrays will be very large, in the scale of 32,000 individual antenna

elements. The receiver arrays will be located at 50-150 km distance from the illuminators, and some smaller arrays closer by to support continuous interferometric observations. The total system will comprise 100,000 elements. The actual radar sites have to be carefully chosen.

This new large-scale European research infrastructure has applications in a wide range of European research areas including Earth environment monitoring and technology solutions supporting sustainable development, well beyond atmospheric and space sciences.

Here we will give an overview of this ambitious project, report on the current status of the preparatory phase, and invite interested parties to contribute to the planning of EISCAT_3D.