

The EISCAT_3D Preparatory Phase Project

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On behalf of the EISCAT_3D Project Consortium



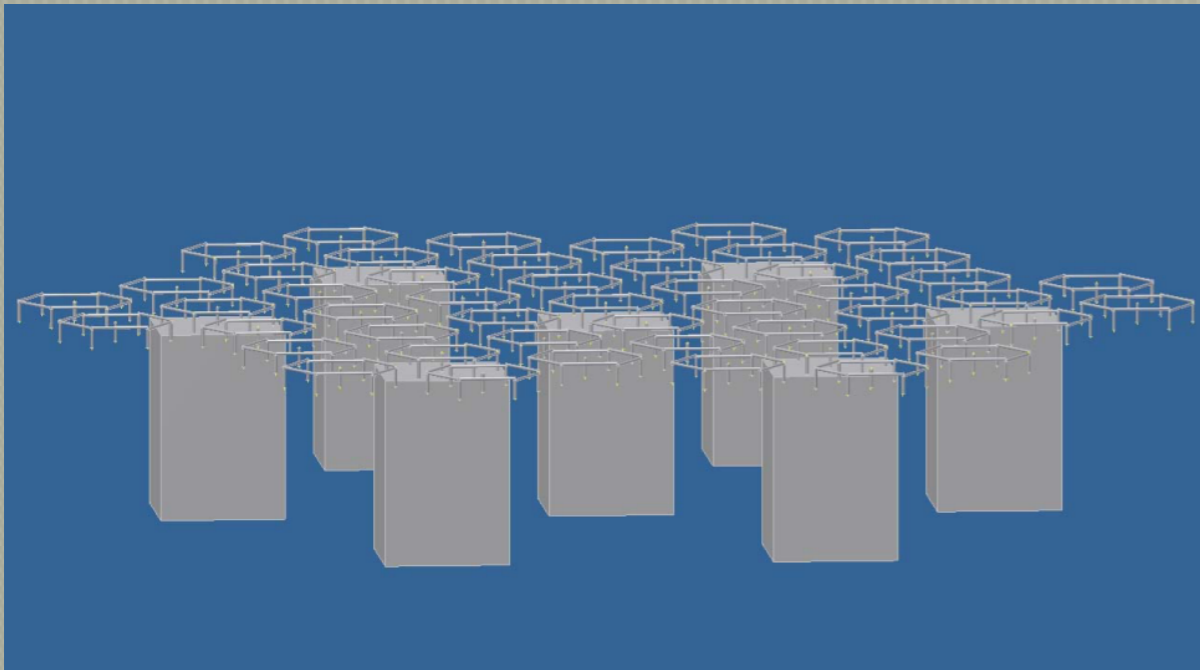
EISCAT: 5-10 years from now



The EISCAT_3D Vision

- **The most sophisticated research radar ever!**
- **Five key capabilities:**
 - Volumetric imaging and tracking
 - Aperture Synthesis imaging
 - Multistatic configuration
 - Greatly improved sensitivity
 - Transmitter flexibility
- **These abilities never before combined in a single radar**

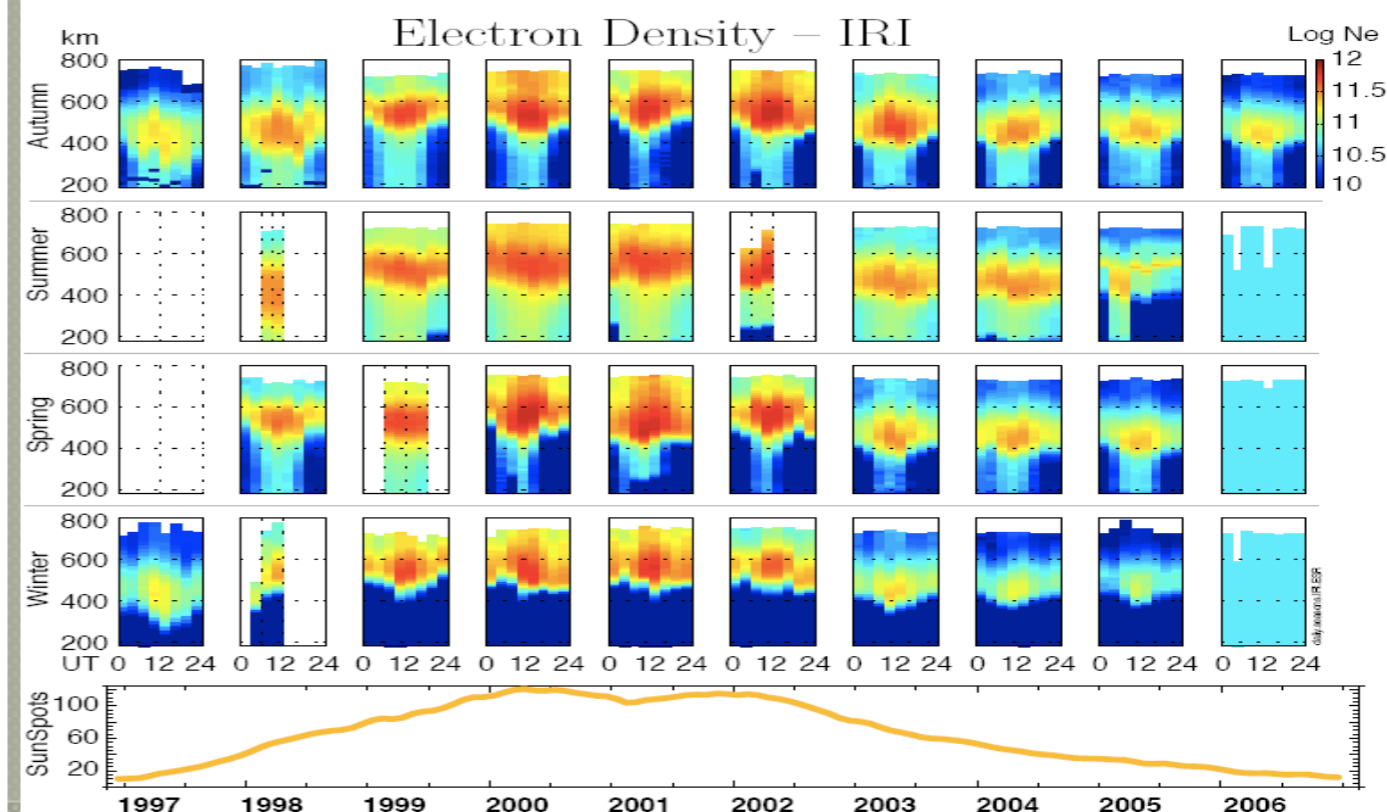
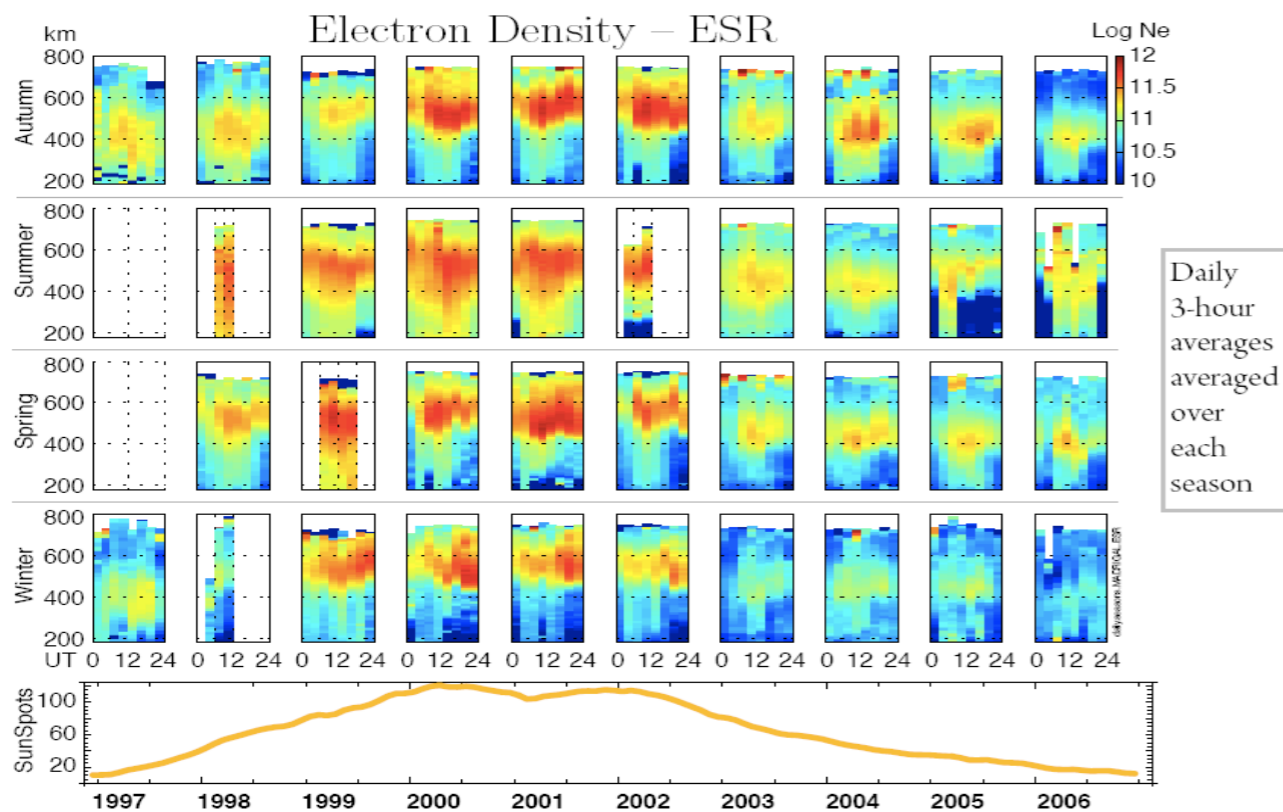
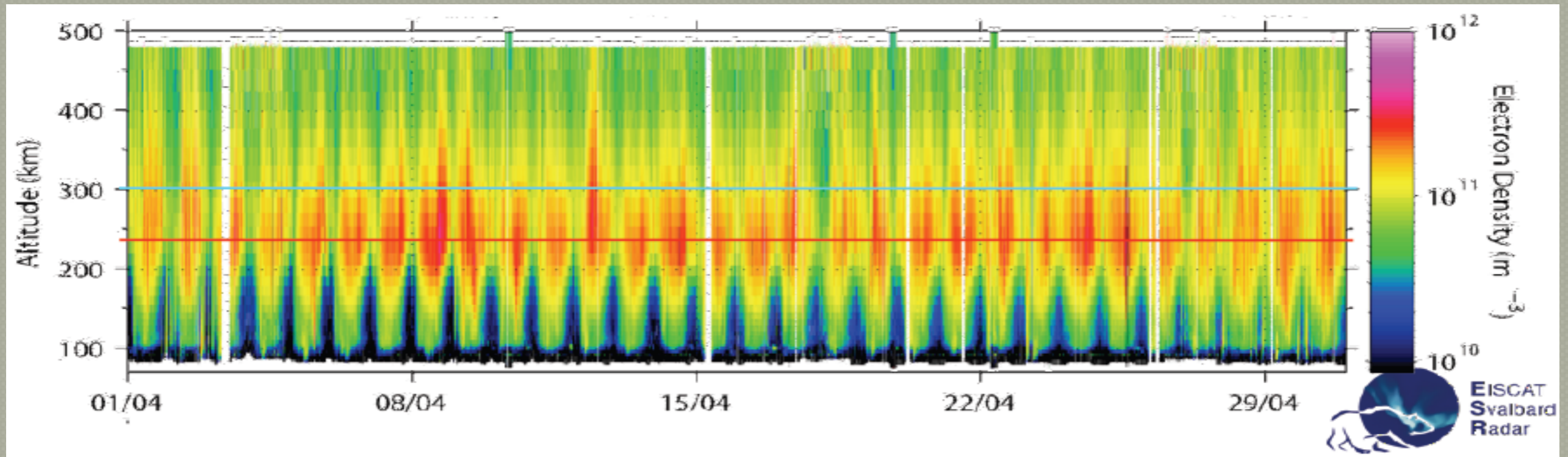
The EISCAT_3D Vision



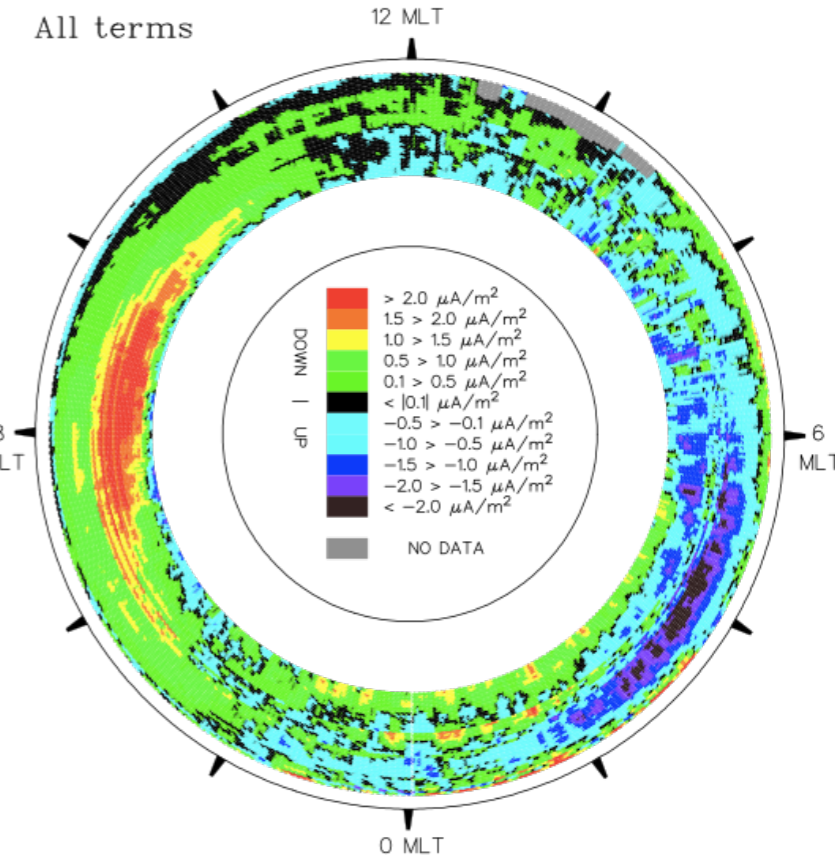
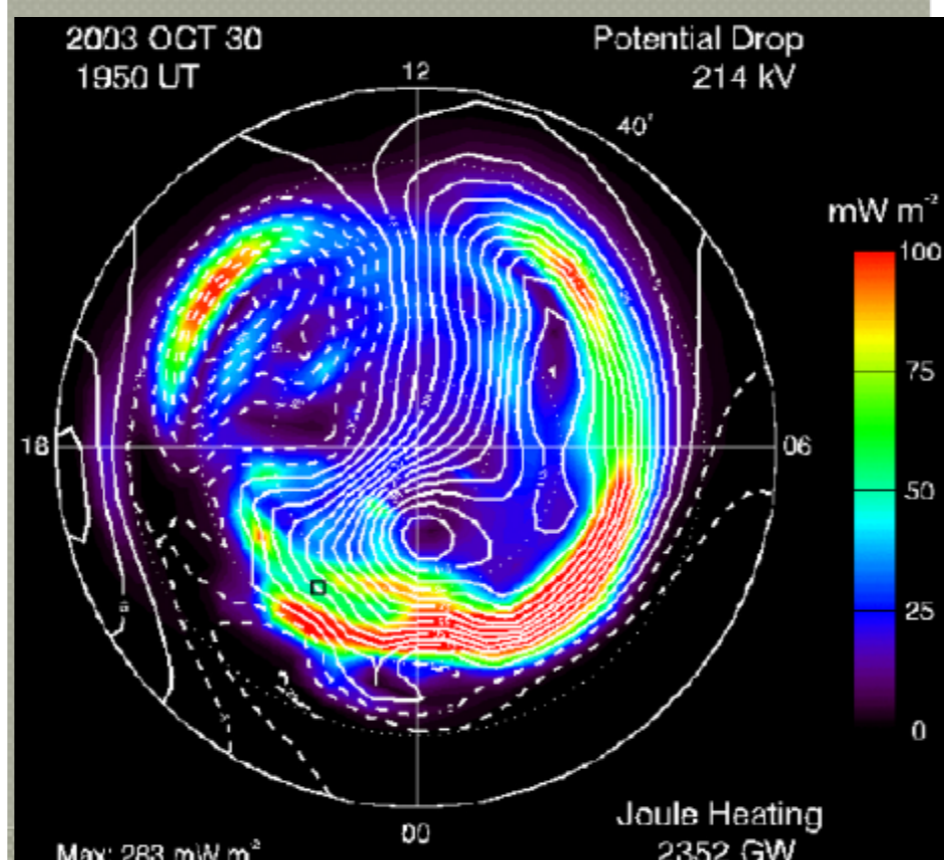
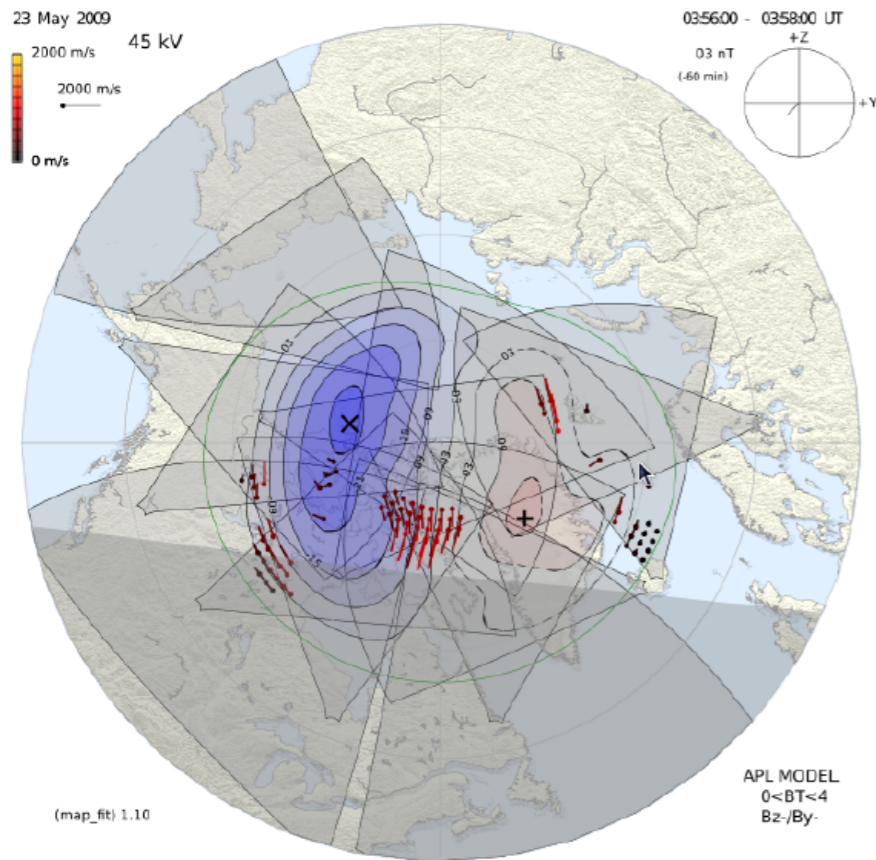
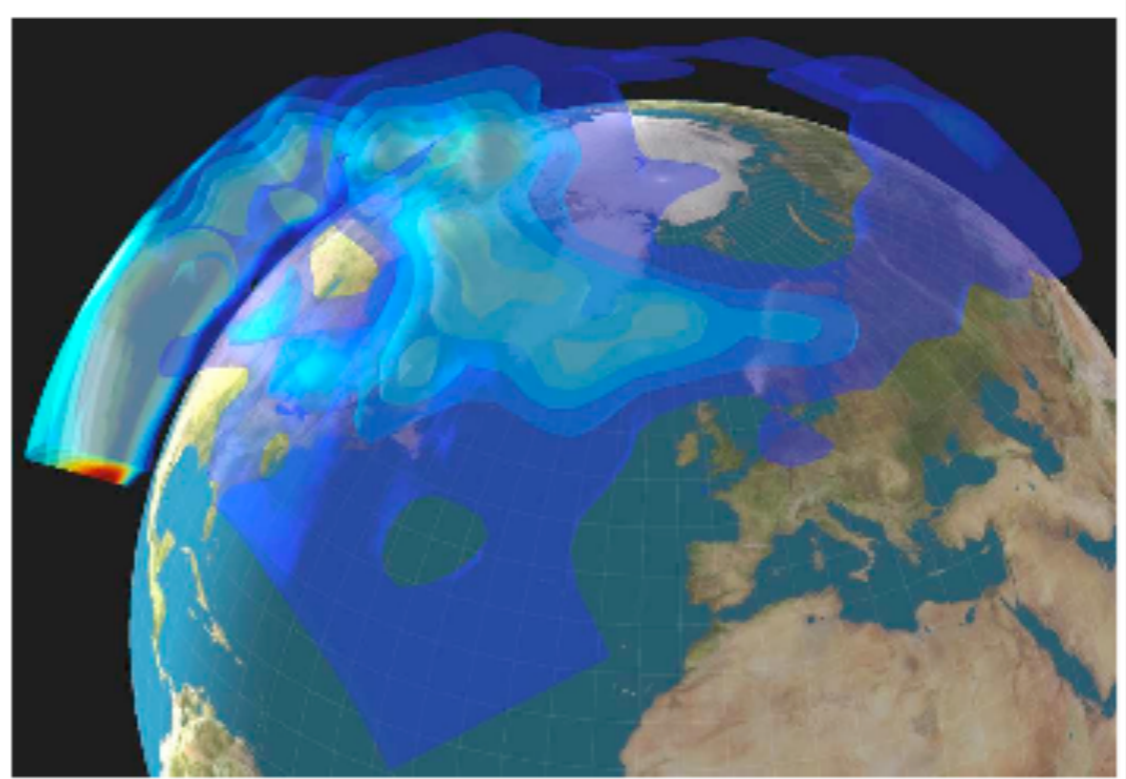
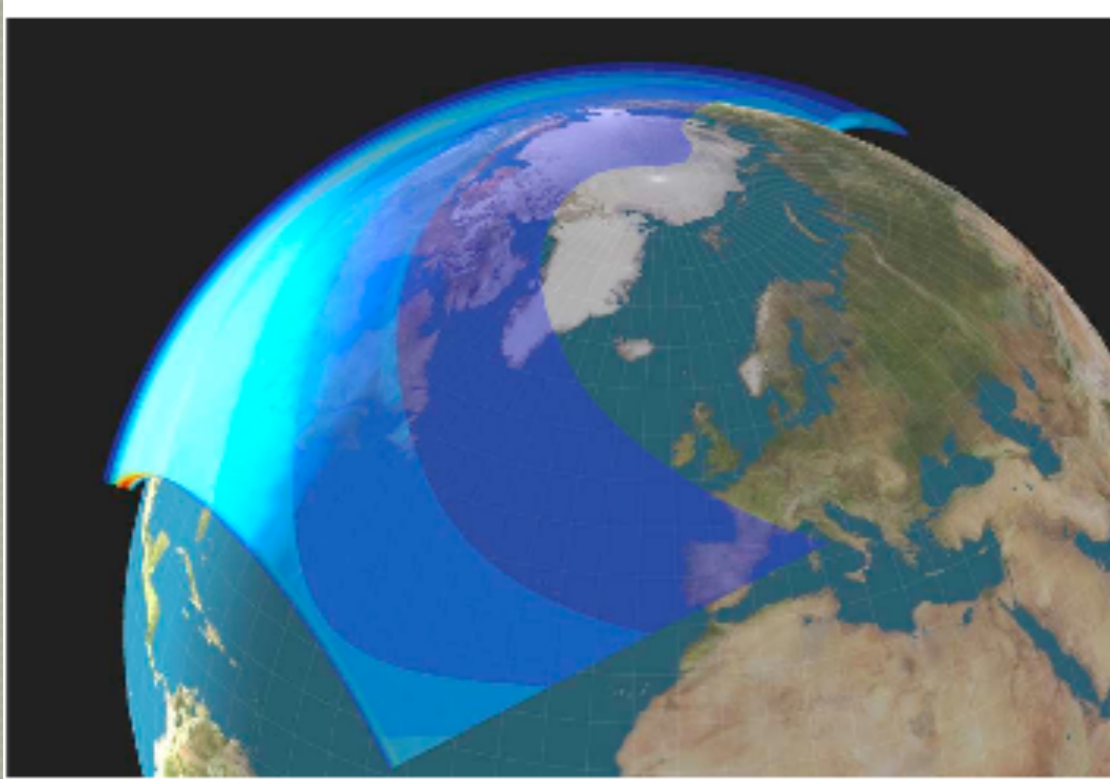
- Replace mainland system with multi-static system, comprising both transmit/receive and passive arrays
- Integrated multi-beam and imaging capabilities



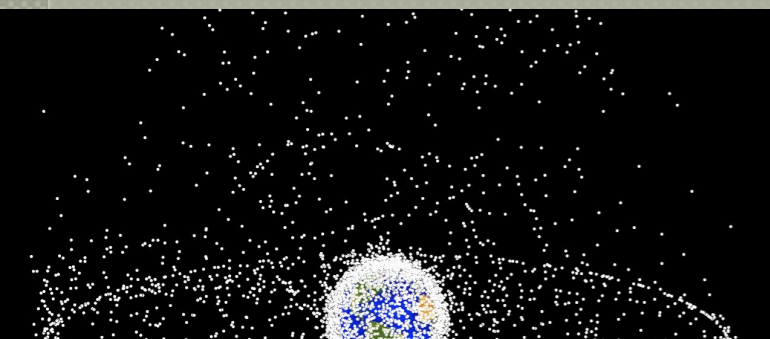
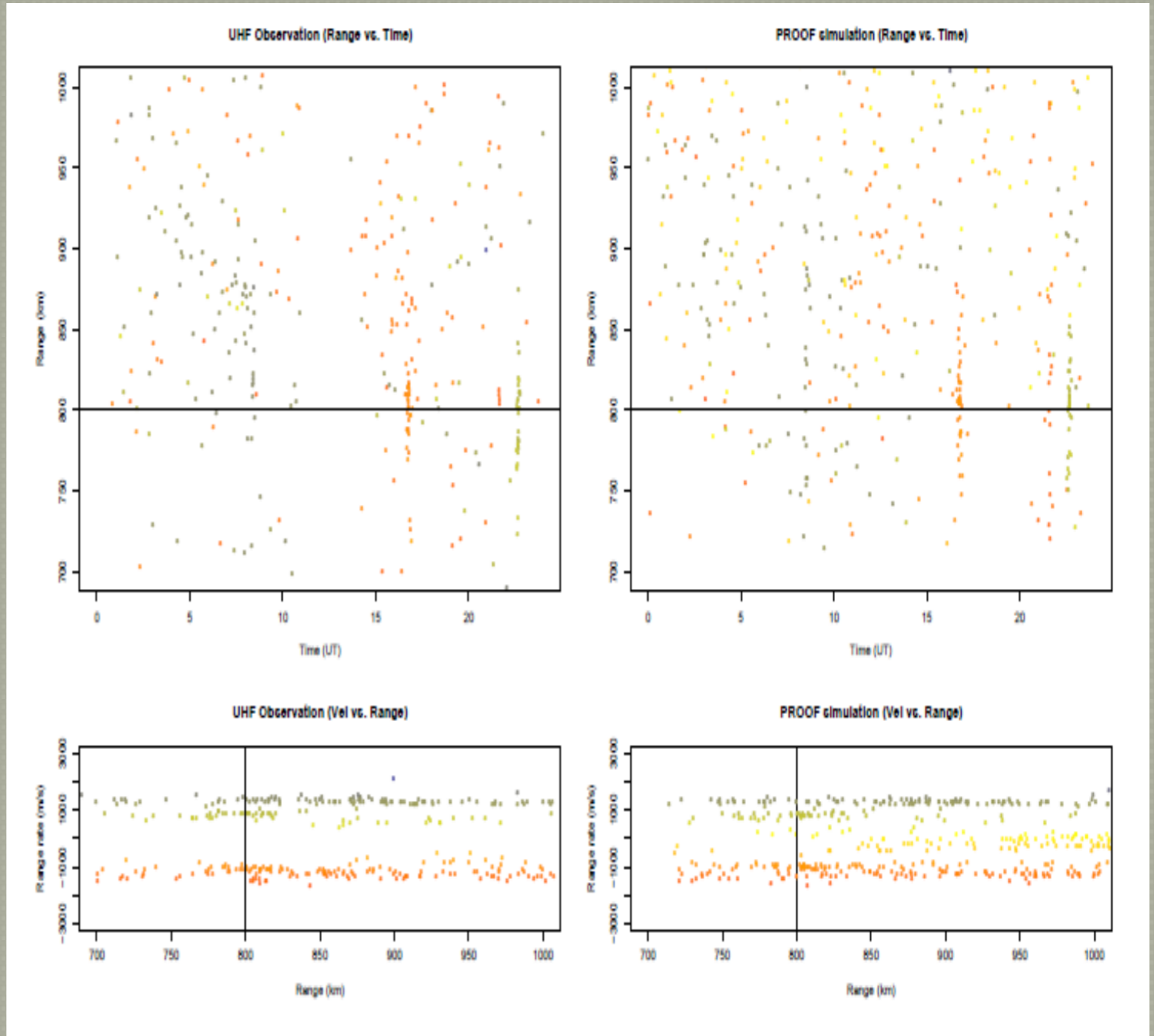
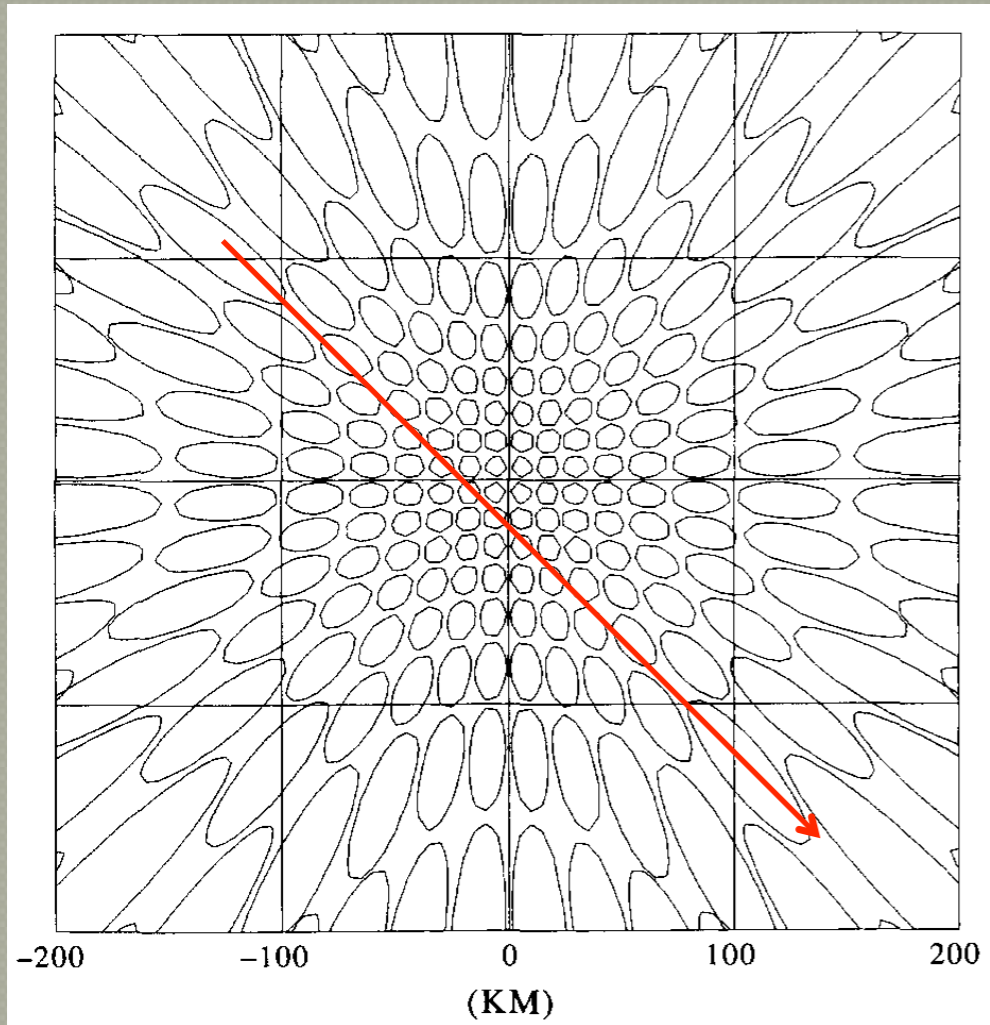
Continuous, long-period data



Large-scale monitoring



Space Situational Awareness

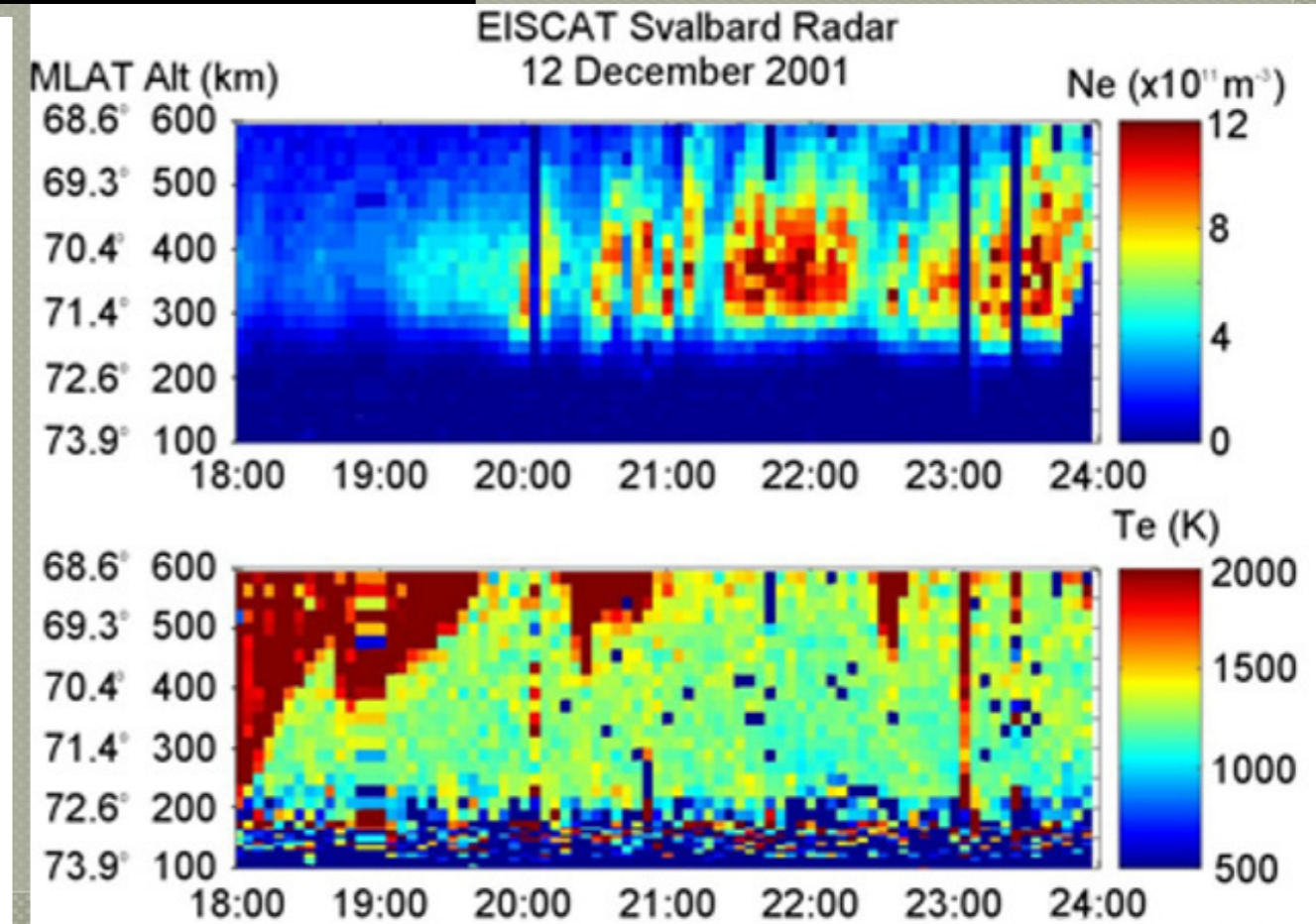
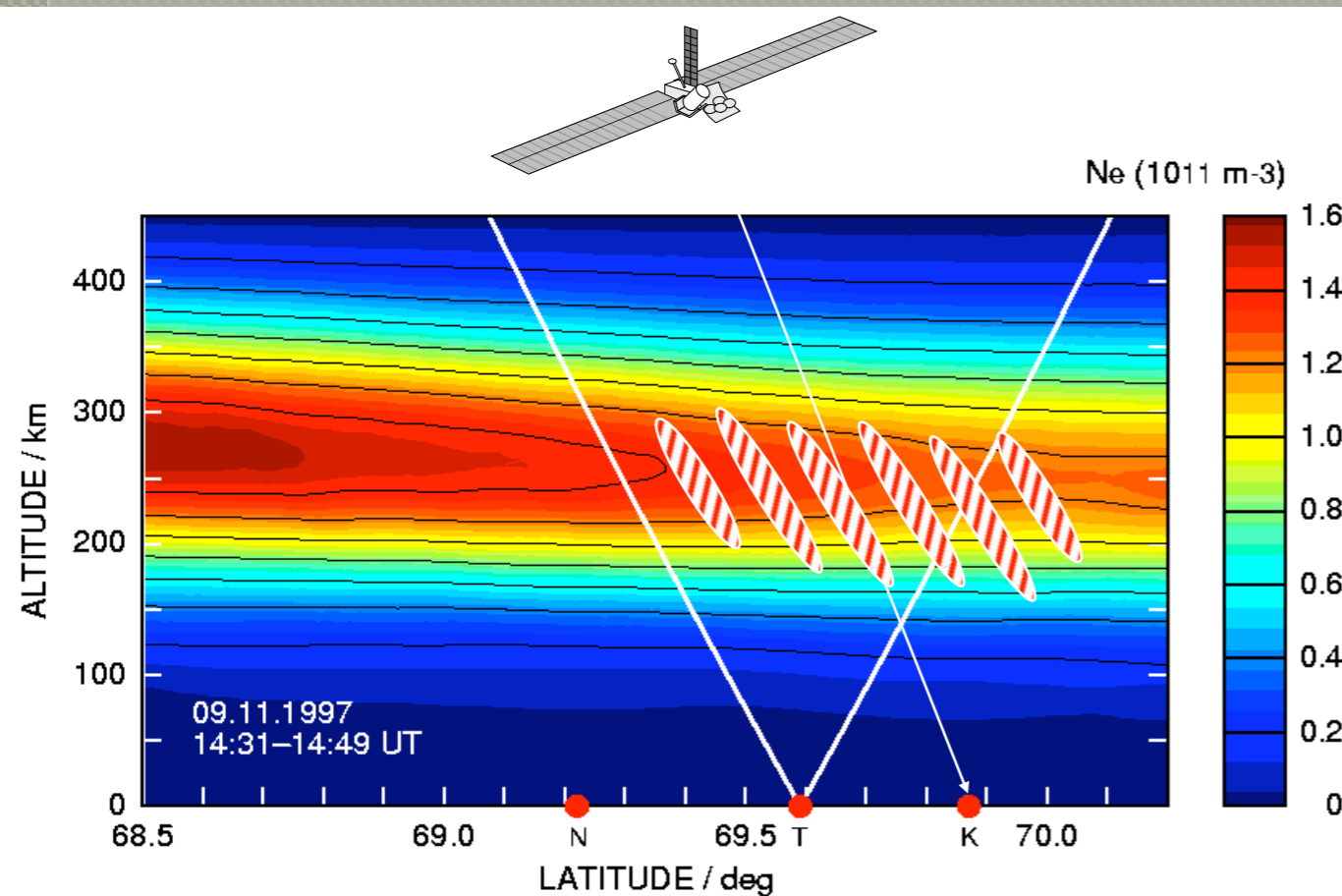
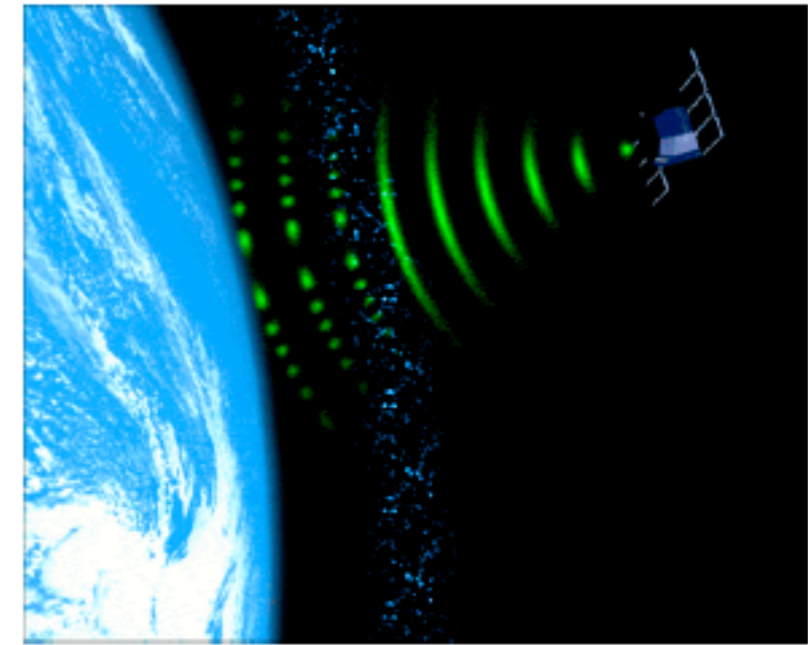
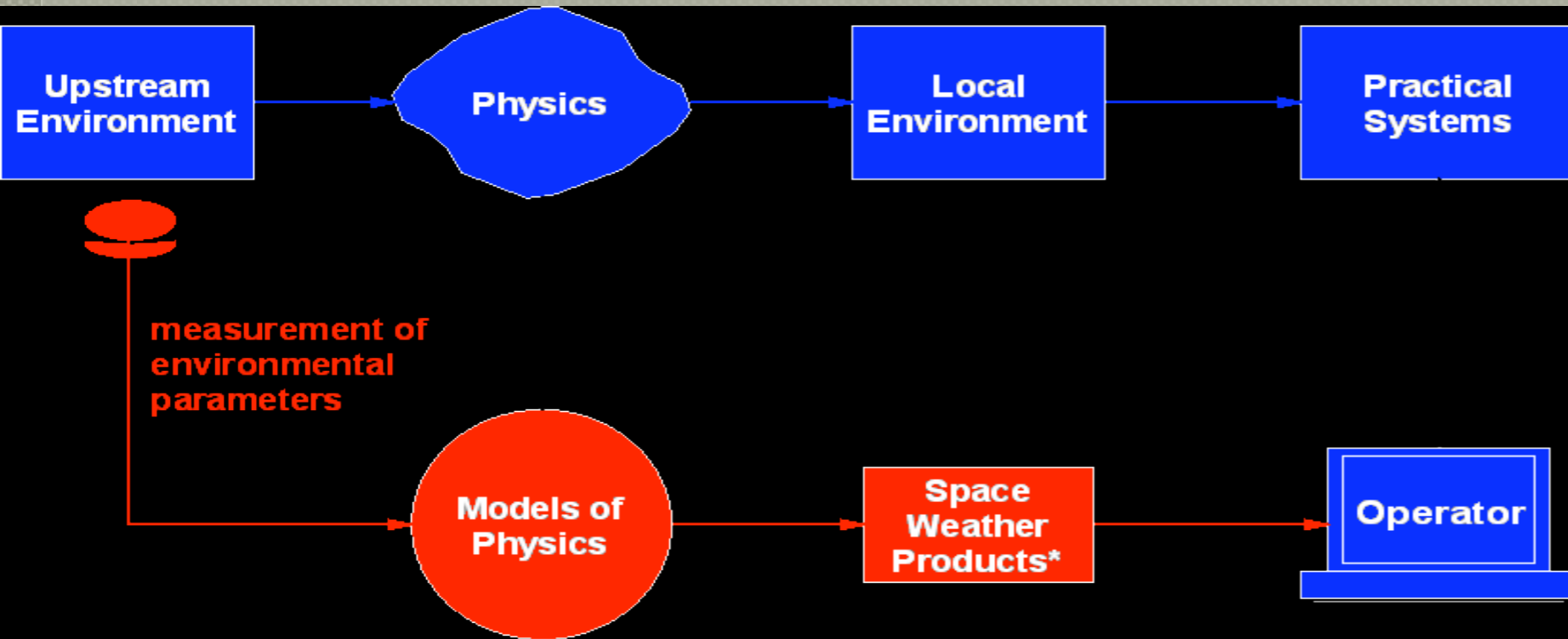


space situational awareness

European Space Agency

z-coordinate : 3357098
Latitude : 1709985
Longitude (deg) : 4343587
Longitude (deg) : 270 88967
Altitude (deg) : 112.08007
Altitude (m) : 275050
Position
z-coordinate
Latitude
Longitude

Space Weather Services



FP7 Preparatory Phase

Application : December 4 2009

14 work packages:

WP1: Management and reporting

WP2: Legal and logistical issues

WP3: Science planning

WP4: Outreach activities

WP5: Consortium building

WP6: Performance specification

WP7: Signal processing

WP8: Antenna, front end and timing

WP9: Transmitter development

WP10: Aperture synthesis imaging

WP11: Software theory & implementation

WP12: System control

WP13: Data handling & distribution

WP14: Mass-production & reliability

TOTAL: 4.5M Euros



EISCAT_3D

*A European Three-Dimensional Imaging Radar for
Atmospheric and Geospace Research*

*Application for Preparatory Phase Funding
under the European 7th Framework*

Strategic Work

We need:

- ⦿ new partners
- ⦿ publicity
- ⦿ development of science case
- ⦿ new communities to broaden science base
- ⦿ frequency permissions
- ⦿ discussions with governments, local communities...
- ⦿ sites and building permissions
- ⦿ provision of infrastructure
- ⦿ manufacturers to build the system

Financial Work

We need to:

- ◉ fully quantify the commitment needed
- ◉ build a financing consortium
- ◉ make a cost model for construction and operations
- ◉ develop material to be used in applications
- ◉ understand what, and when, the opportunities will be in each potential funding body
- ◉ decide how best to use the money we have

Technical Work

We need to:

- ◉ Revise and update Performance Specification
- ◉ Test the signal processing system
- ◉ Develop system software (DSP, coding, analysis)
- ◉ Evaluate all antenna options, test prototypes
- ◉ Develop and test front end and timing system
- ◉ Prototype and test the transmitters
- ◉ Optimise the imaging system
- ◉ Specify the data system implementation
- ◉ Clarify mass production and quality control

Roles of the Project Partners

- ◉ EISCAT: Project management and reporting, site selection, consortium building, performance specification, system control, mass production issues, outreach activities
- ◉ University of Oulu: Signal processing, software development, theory, science planning
- ◉ University of Luleå: Antenna, front end and timing synchronisation, mass production
- ◉ IRF Kiruna: Transmitter development
- ◉ University of Tromsø: Radar imaging, site selection
- ◉ STFC RAL: Science planning, performance specification, project management
- ◉ National Instruments: Signal processing and timing, mass production issues
- ◉ VR-SNIC: Data handling and distribution
- ◉ VR: Consortium building

Project started October 1st

- ⦿ Kick-off meeting (Stockholm)
- ⦿ First meetings of project committees
- ⦿ Science Working Group formed
- ⦿ Project Manager vacancy will be advertised soon



Finnish Support Action: LOFAR



Frequency range	30 - 80 MHz 120 - 240 MHz
Polarisations	2
Bandwidth	32 MHz (currently 48 MHz investigated)
Spectral channels	
Stations	18 core 18 remote
Baseline length	100 m to 1500 km
Simultaneous digital beams	8
Sample bit depth	12
Spectral resolution	0.76 kHz

LOFAR Panels at Kilpisjarvi:



Getting Involved

EISCAT_3D needs the Space Weather community!

Participate in our science working group

Become an “associate partner” of EISCAT_3D

Energise your national community

Annual Users Meetings at Uppsala, Sweden:

Next: May 18-20, 2011



Interact with the project

- **03-08.04.2011, EGU General Assembly, Vienna, Austria**
 - Session ST3.4 "Advance in ionospheric research by incoherent scatter radars, related radio methods and novel large observational systems"
- **18-20.05.2011, 3rd EISCAT_3D Users meeting, Uppsala, Sweden**
 - 1st day: Middle atmospheric science applications of EISCAT_D
 - 2nd and 3rd day: User applications of EISCAT_3D, status and actions in the Preparatory Phase Project
- **13-20.08.2011 XXX URSI General Assembly and Scientific Symposium, Istanbul Turkey**
 - Sessions G05 and G06: "Coordinated Studies with Multiple Incoherent Scatter Radars" and "Recent Developments in Incoherent Scatter Radar", respectively
- **5-9.09.2011, 15th EISCAT International Workshop, Qingdao, China**
 - Session "The EISCAT_3D and the future"
- **14-22-07.2012 39th COSPAR Scientific Assembly, Mysore, India**
 - Session C04: New Generation Middle and Upper Atmosphere Radars: Application and Development

Opportunity for young people

18-22 July, 2011:

- Joint NSF - EISCAT incoherent scatter radar school, Kangerlussuaq, Greenland

