Movable Antarctic Incoherent Scatter Radar (MAISR)

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History

• The idea of an Antarctic Incoherent Scatter Radar goes back a long time and have been discussed in different configurations and by different institutions.

• The establishment of the EISCAT Svalbard radar was initially considered in the high south.

• Embry-Riddle Aeronautical university organized an Antarctic Space Sciences Workshop in September of 2007 for the US National Science Foundation, Office of Polar Programs (NSF-OPP).

• John Kelly was invited to talk about the new AMISR radars (PFISR operational since early 2007).
RISR mapped to the south

McMurdo station

RISR filed of view, mapped to the south
Rothera
Halley
Moving from idea to plan

• An two day “Antarctic ISR” workshop was held in conjunction with the 2008 URSI general assembly in Chicago with invited scientists.

• Main objective of Chicago meeting was to move the Antarctic ISR from idea to plan.
  – Generate a list of “Outstanding Questions” - both scientific and strategic - compiled from the presentations and discussions
  – Generate a document outlining the science rational for an Antarctic ISR including logistical and technical challenges and solutions.
FRIDAY 8. AUGUST

09:00 - 09:15  Welcome and opening words from the organizers.
09:15 - 09:30  Opening comments from NSF
09:30 - 10:15  Introductory presentation about the capabilities of current Incoherent Scatter Radars and a description of AMISR.
10:15 - 10:45  Coffee break

Session on Interhemispheric Studies

10:45 - 11:00  Introduction by Bob Clauer
11:00 - 11:10  Ian McCrea and Mike Lockwood "Interhemispheric comparisons of reconnection signatures as a means of understanding IMF Bx control and magnetospheric asymmetry"
11:15 - 11:25  Alex Glozer "Magnetosphere-Ionosphere Coupling - Physical Processes and Modeling"
11:30 - 11:40  Joshua Semeter "Conjugacy of Auroral M-I coupling"
11:45 - 11:55  Nikolay Østgaard "Auroral Conjugacy Studies" presented by Tony van Eyken
12:00 - 12:10  Kirsti Kauniste "Some thoughts about Antarctic ISR as a scientific instrument, technological challenges and international collaboration project" presented by Tony van Eyken
12:10 - 13:45  Lunch

Session on Interhemispheric Studies continues

13:45 - 13:55  John Foster "Conjugacy Characteristics of Polar Tongue of Ionization"
14:00 - 14:10  Ramon Lopez "Interhemispheric Ionospheric Potential Differences"
14:15 - 14:25  R. A. Vincent "Interhemispheric differences in wave dynamics and coupling into the SH MLT and above"
14:30 - 14:40  Ian McCrea et al. "Comparative observations of mesospheric echoes, winds, tides and layer height trends in the Arctic and Antarctica"
14:45 - 14:55  Ron Woodman "AMISR in Antarctica: PMSE Related Questions"
15:00 - 15:30  Coffee break
15:30 - 16:30  General discussions about the Interhemispheric Session
16:30 - 16:45  Short break
16:45 - 17:45  General discussions
19:00           Dinner at Bistro 110

SATURDAY 9. AUGUST

09:00 - 09:15  Opening comments from the organizers

Session on Uniqueness of the Southern Hemisphere

09:15 - 09:30  Introduction by Alan Rodger
09:30 - 09:40  Ryoichi Fuji "On the performance and location of a new IS radar from the viewpoint of scientific purposes and comprehensive observations"
09:45 - 09:55  Bill Bristow "Antarctic SuperDARN and AMISR"
10:00 - 10:10  A. D. M. Walker "Can AMISR Techniques Contribute to the Understanding of Short Period Ionospheric and Magnetospheric Fluctuations?"
10:15 - 10:45  Coffee break
10:45 - 10:55  Allan Weatherwax "An Overview of Existing and Planned Space Physics and Aeronomy Projects in Antarctica: Understanding the Sun's influence on Earth's Global Space Environment"
11:00 - 11:10  M.C. Kelley et al. "Detection of iron layers, PMSE and noctilucent clouds in conjunction with a Space Shuttle launch"
11:30 - 11:40  Francois Forme "Small-Scale Plasma Physics using IS radars" presented by Anja Stramme
11:45 - 12:15  General Discussions about the Southern Hemisphere Session
12:15 - 13:45  Lunch

13:45 - 14:15  Summary with a list of "Outstanding Questions" - both scientific and strategic - compiled from the presentations and discussions.
14:15 - 15:00  Round table discussions on selected "Outstanding Questions"
15:00 - 15:30  Coffee break
15:30 - 16:00  Round table discussions continues
16:00 - 16:30  Form a committee to proceed with the work
16:30 - 17:00  Concluding Remarks
The report committee...
Making sense of it all…
Proposal

- Proposal for building 2 AMISR faces to be deployed in Antarctica was submitted jointly to NSF-OPP and NSF-GEO (ATM) in January 2010
  - 1. face to McMurdo
  - 2. face to be determined
Logistics/Location

• Discussions with Antarctic logistics support contractor
  – Location
  – Power requirements
  – Frequency allocation
  – Roads/power/internet

• Site visit to McMurdo Feb 2011
Dealing with reality...

- Scaling down from two to one full face
- Adding potential international partners
- Adding potential move of parts of a northern AMISR to McMurdo as part of realizing MAISR
2. MAISR workshop

• Hosting the second MAISR workshop in conjunction to the 2011 URSI general assembly in Istanbul, Turkey

• Focus on international partners, funding strategies and management structure

• Starting the ground work for the long term future of MAISR where the relocation plan might be embedded in the initial phase.
Where are we now?

• Initial funding received FY2011 for
  – feasibility study
  – Site survey at McMurdo
  – Build international fundable entity

• Proposal including new budgets resubmitted to NSF in February 2012 initially scaling it down from two to one full radar

• Talking to potential international partners
## Current timeline

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...the “first” timeline
Possible partnerships

Prepare structure, power distribution and infrastructure on next site
Possible partnerships

Prepare structure, power distribution and infrastructure on next site

Contribute with operating costs at current site
Possible partnerships

Prepare structure, power distribution and infrastructure on next site

Contribute with operating costs at current site

Contribute with funding for panels
Possible future…
A way it could work…

|       | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Year 9 | ...
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