



First Results from the Blackstone Radar

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(Virginia Tech)



The Blackstone SuperDARN Radar

Partners in the build:

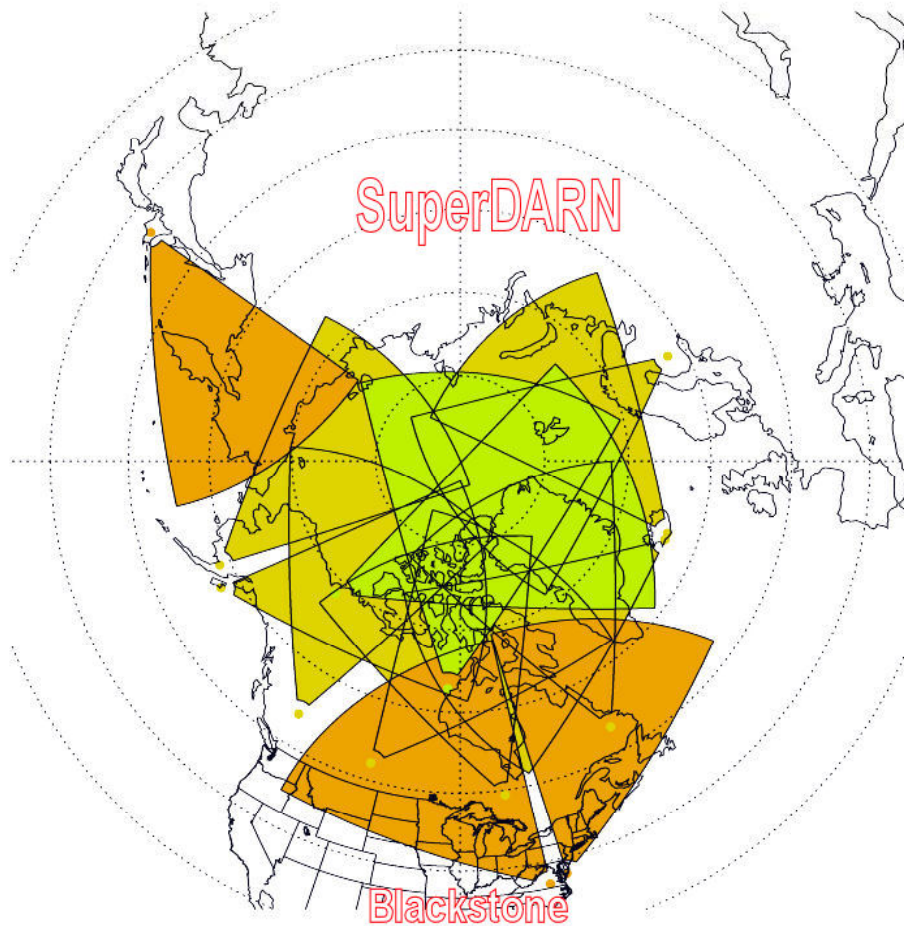
**Virginia Tech
Blacksburg VA**

**Leicester University
Leicester, UK**

**The Johns Hopkins University Applied Physics Laboratory
Laurel, MD**



Mid-Latitude SuperDARN

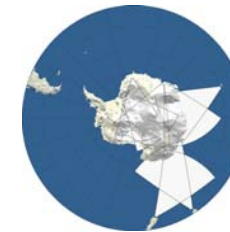


Radar builds

- Wallops Island, VA (2005)
- Hokkaido, Japan (2006)
- **Blackstone, VA (2008)**



Mid-Latitude SuperDARN Radars to measure Ionospheric Impacts of Solar Storms



Wallops Island, VA



Hokkaido, Japan



Blackstone, VA

VT Southern
Piedmont AREC





Preparation of Blackstone site











Preparation of Blackstone site

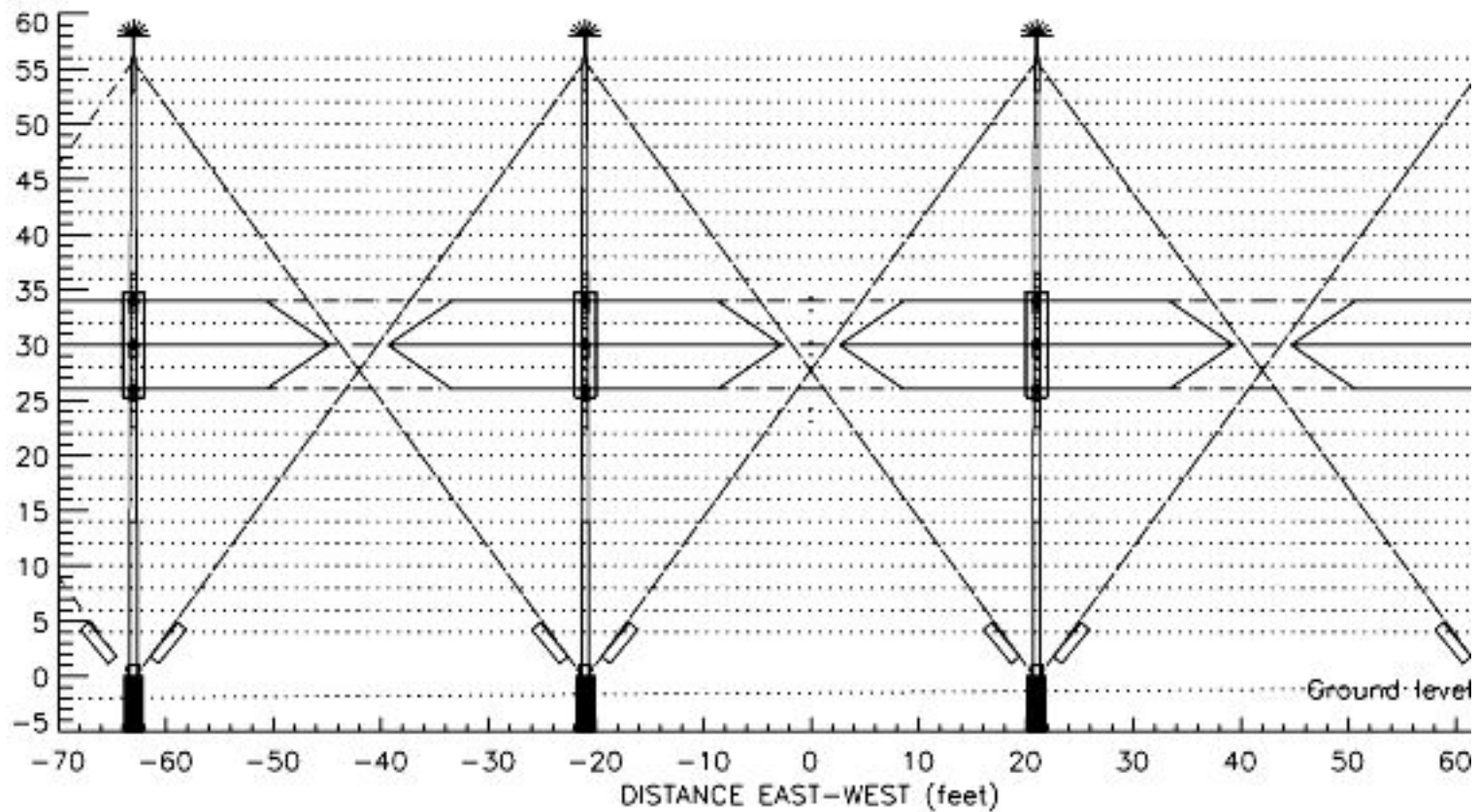






Blackstone HF RADAR – FRONT VIEW
Center of array – Tapered 56 foot poles

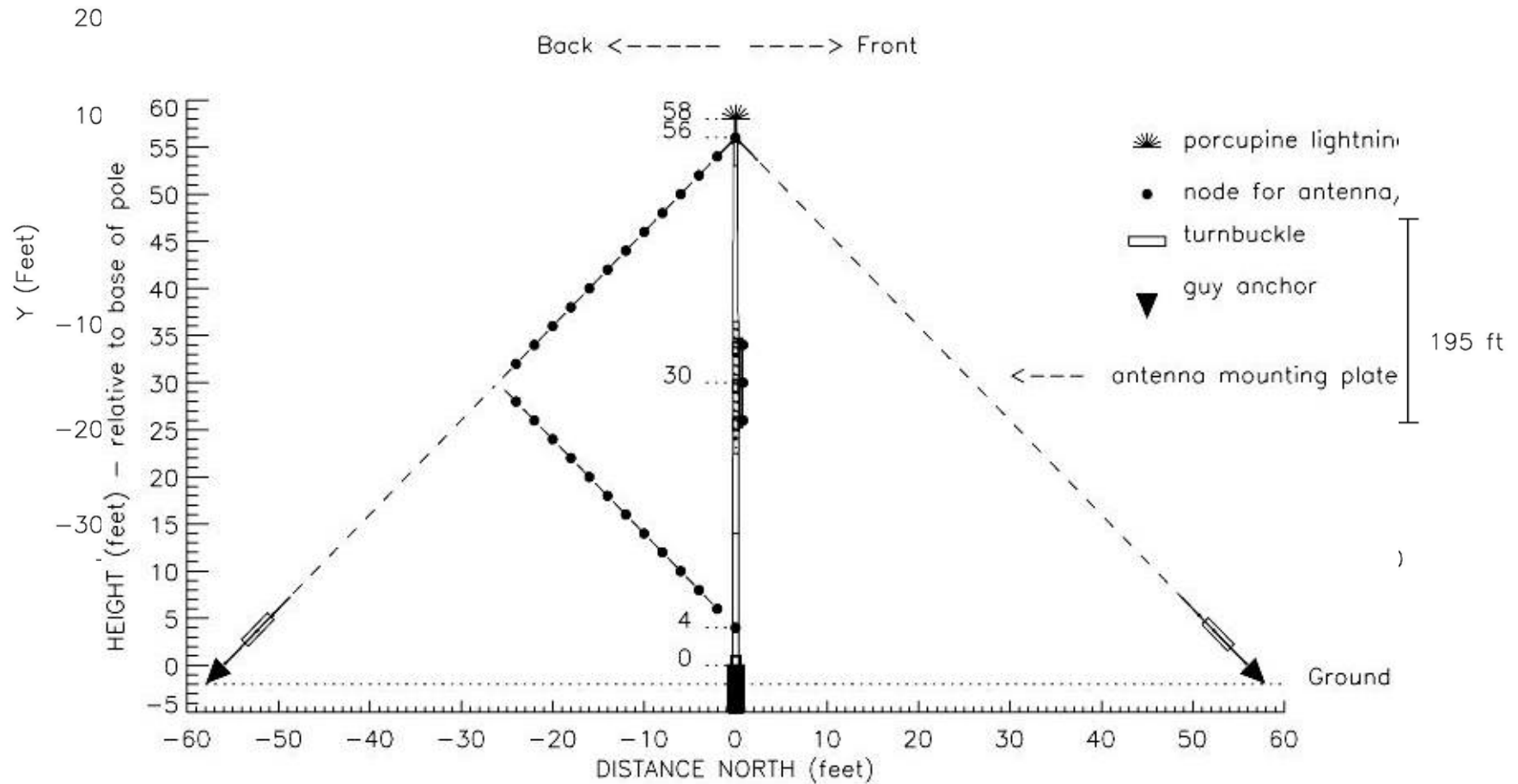
-  lightning d
-  reflector w
-  kevlar cab
-  balun/resi
-  antenna w
-  turnbuckle





BLACKSTONE HF RADAR - SIDE VIEW

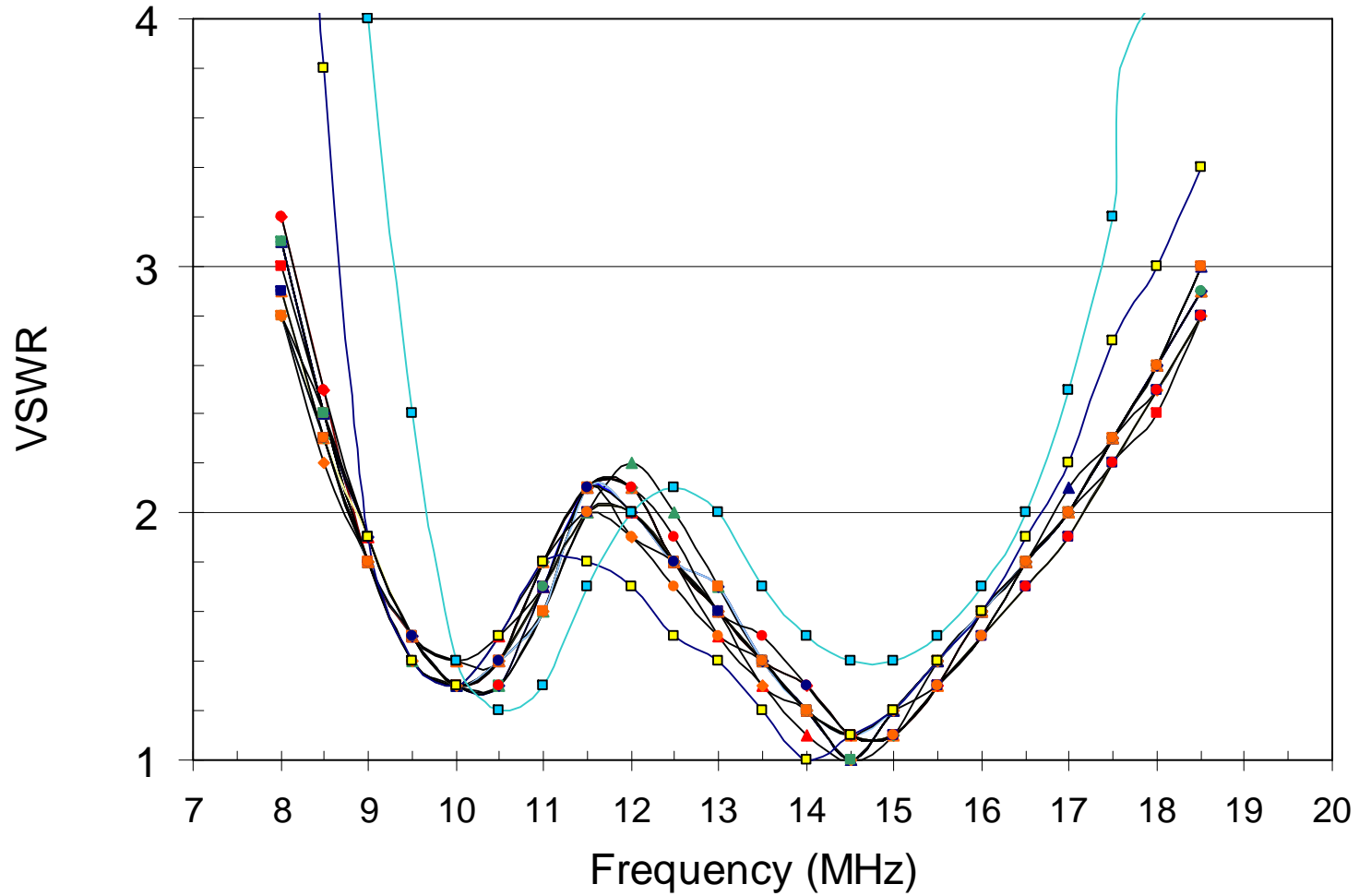
Guying of tapered 56 foot pole - Corner reflector configuration







VSWR Values: Blackstone Main Array



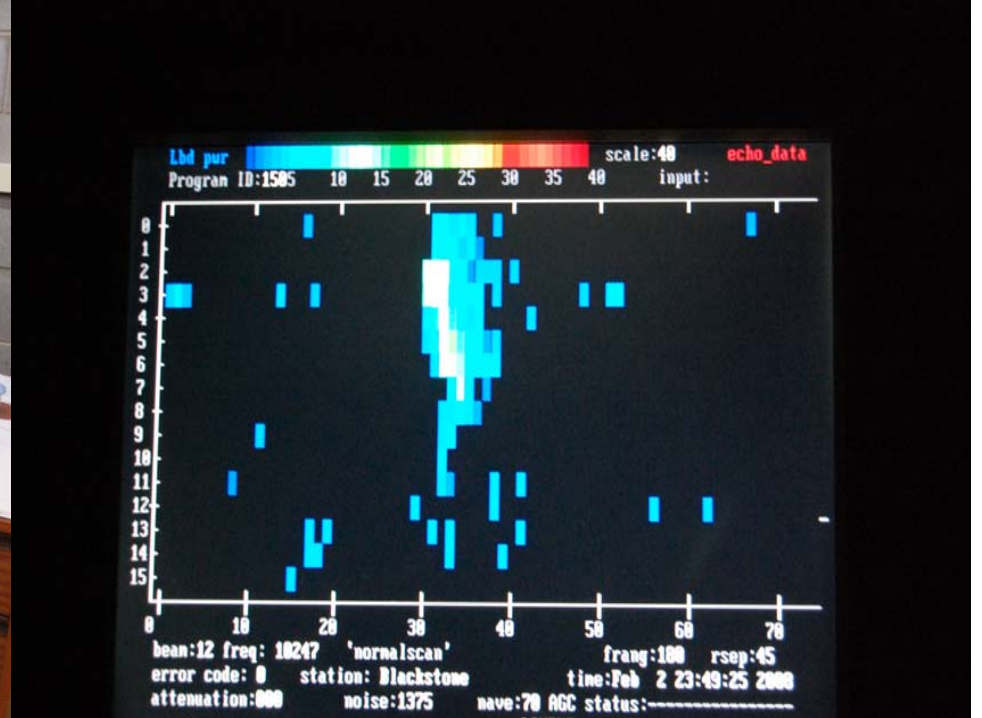
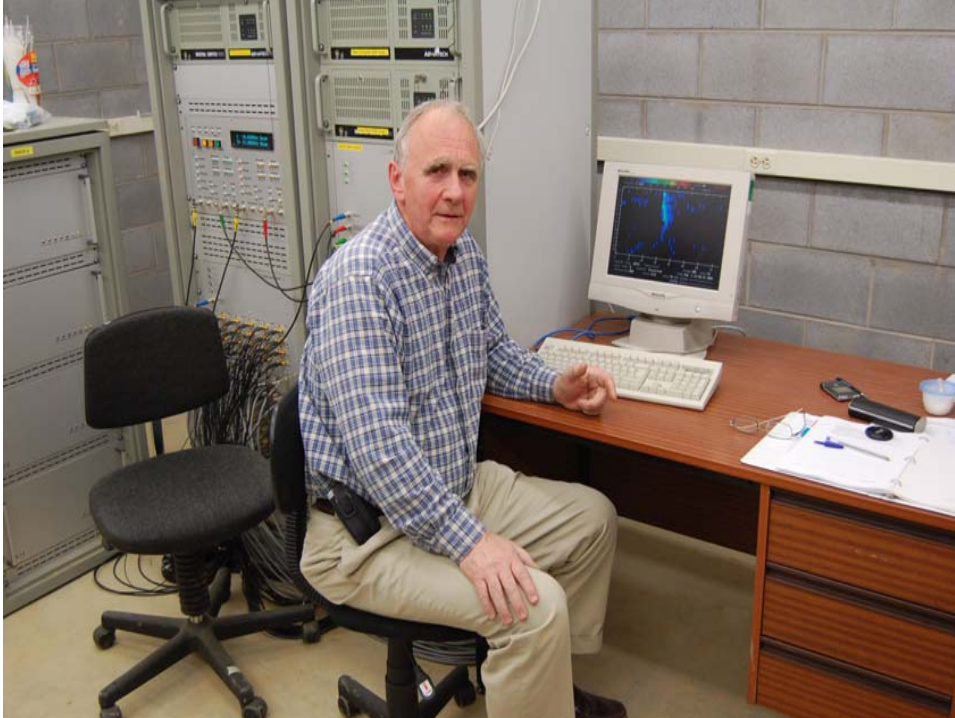
- Ant 1 (Red triangle)
- Ant 2 (Green triangle)
- Ant 3 (Blue triangle)
- Ant 4 (Orange triangle)
- Ant 5 (Red diamond)
- Ant 6 (Green diamond)
- Ant 7 (Blue diamond)
- Ant 8 (Orange diamond)
- Ant 9 (Red square)
- Ant 10 (Green square)
- Ant 11 (Yellow square)
- Ant 12 (Cyan square)
- Ant 13 (Red circle)
- Ant 14 (Green circle)
- Ant 15 (Blue circle)
- Ant 16 (Orange circle)
- Model (Yellow square)
- Wallops (Cyan square)





Blackstone – Setting up the Leicester Electronics



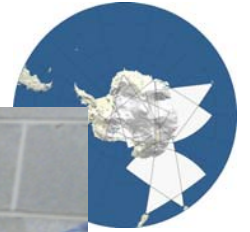






The Blackstone SuperDARN Radar

- **December - January, 2008 construction**
 - ‘race against the moon’ (THEMIS)
- **First light: February 2, 2008**
 - immediately observed well-formed ground scatter
 - error on velocity direction corrected
 - difficulties with wireless bridge resolved

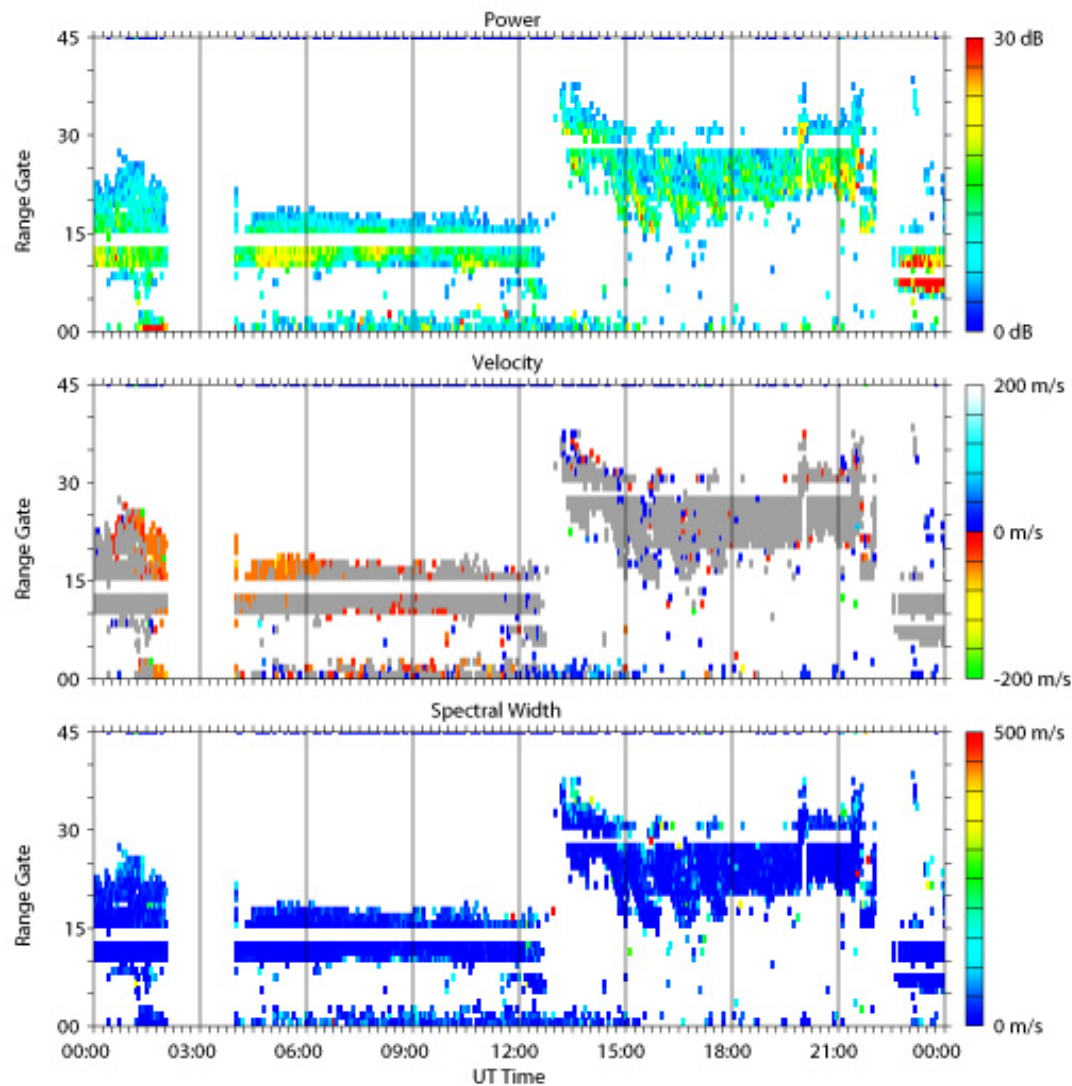
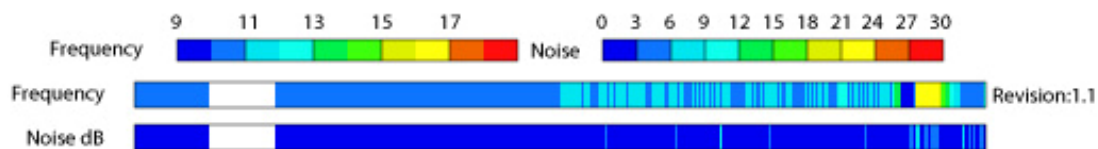




Station:Blackstone (bks)
Operated by:JHU/APL

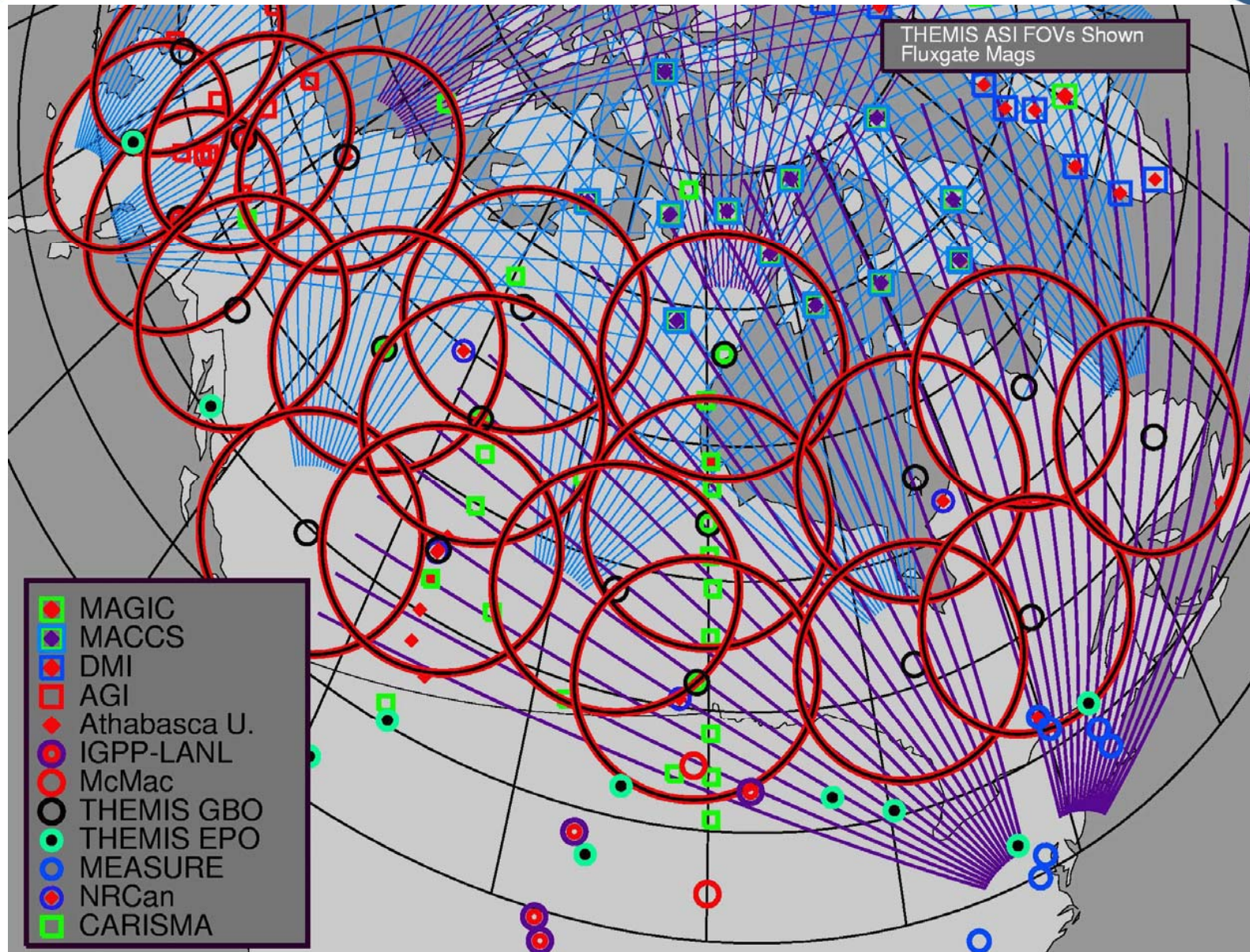
Beam 08

05, February 2008 (20080205)
Program IDs:150,-6401,-26401



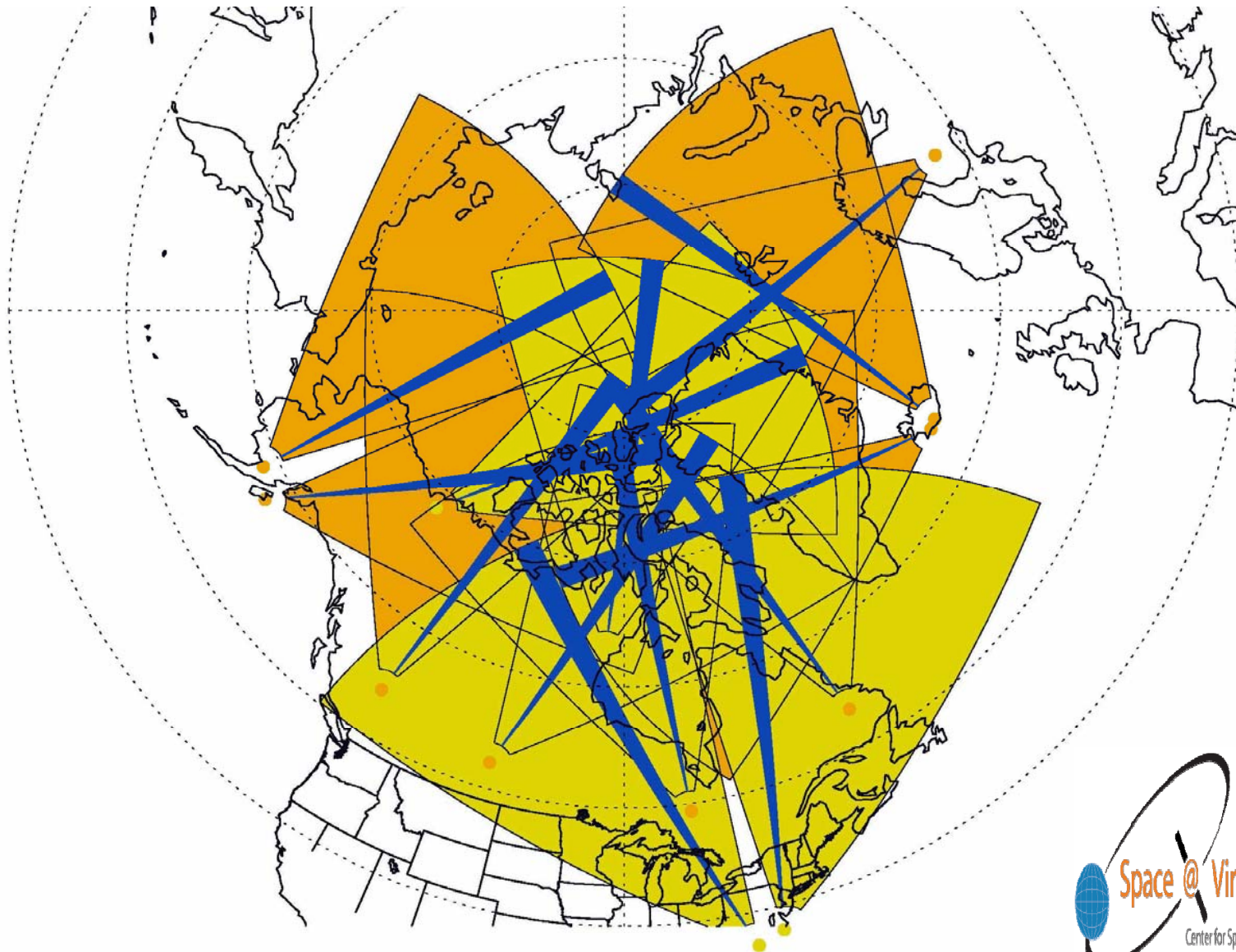


THEMIS Ground-Based Instruments



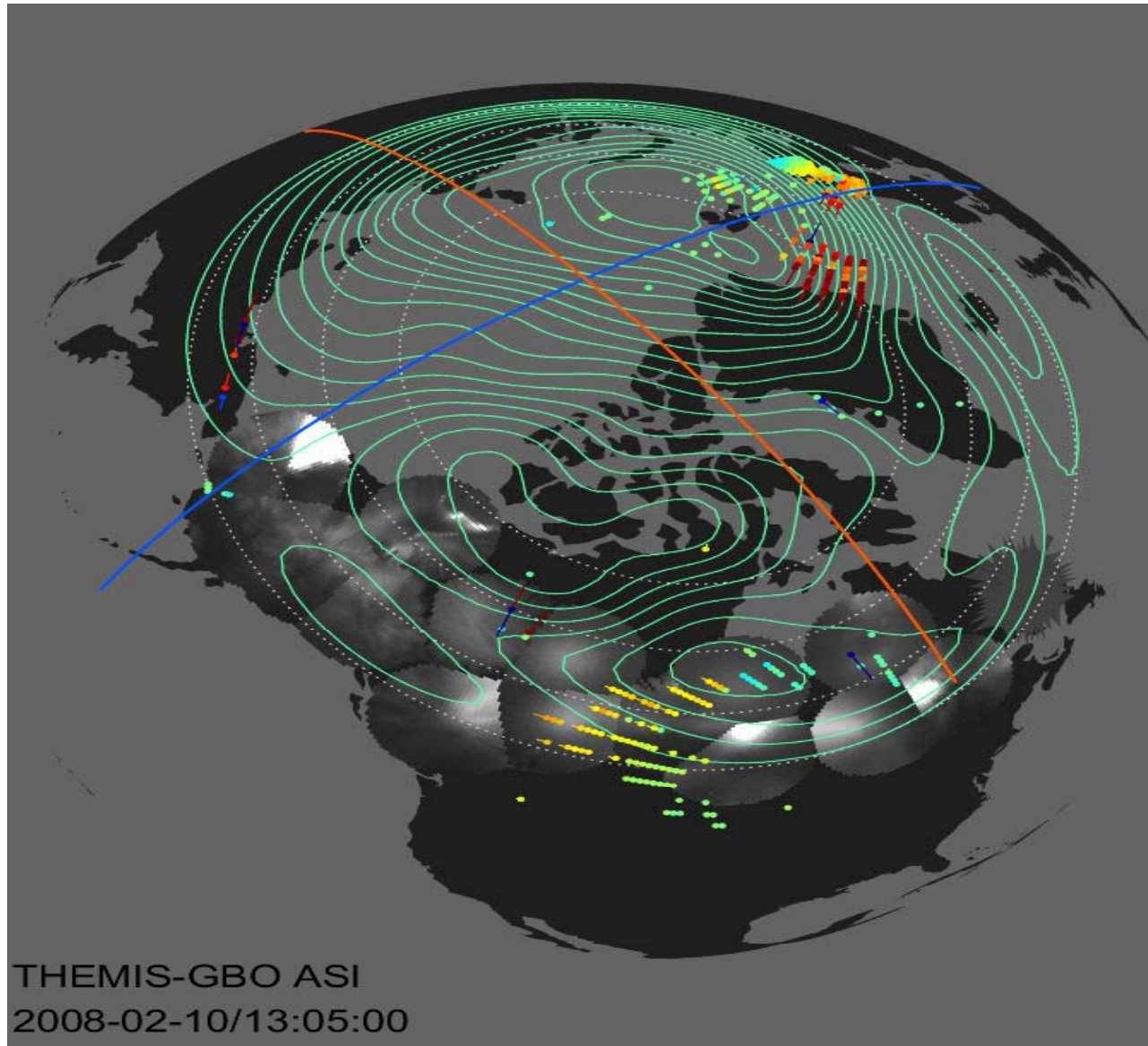


SuperDARN THEMIS Camping Beams





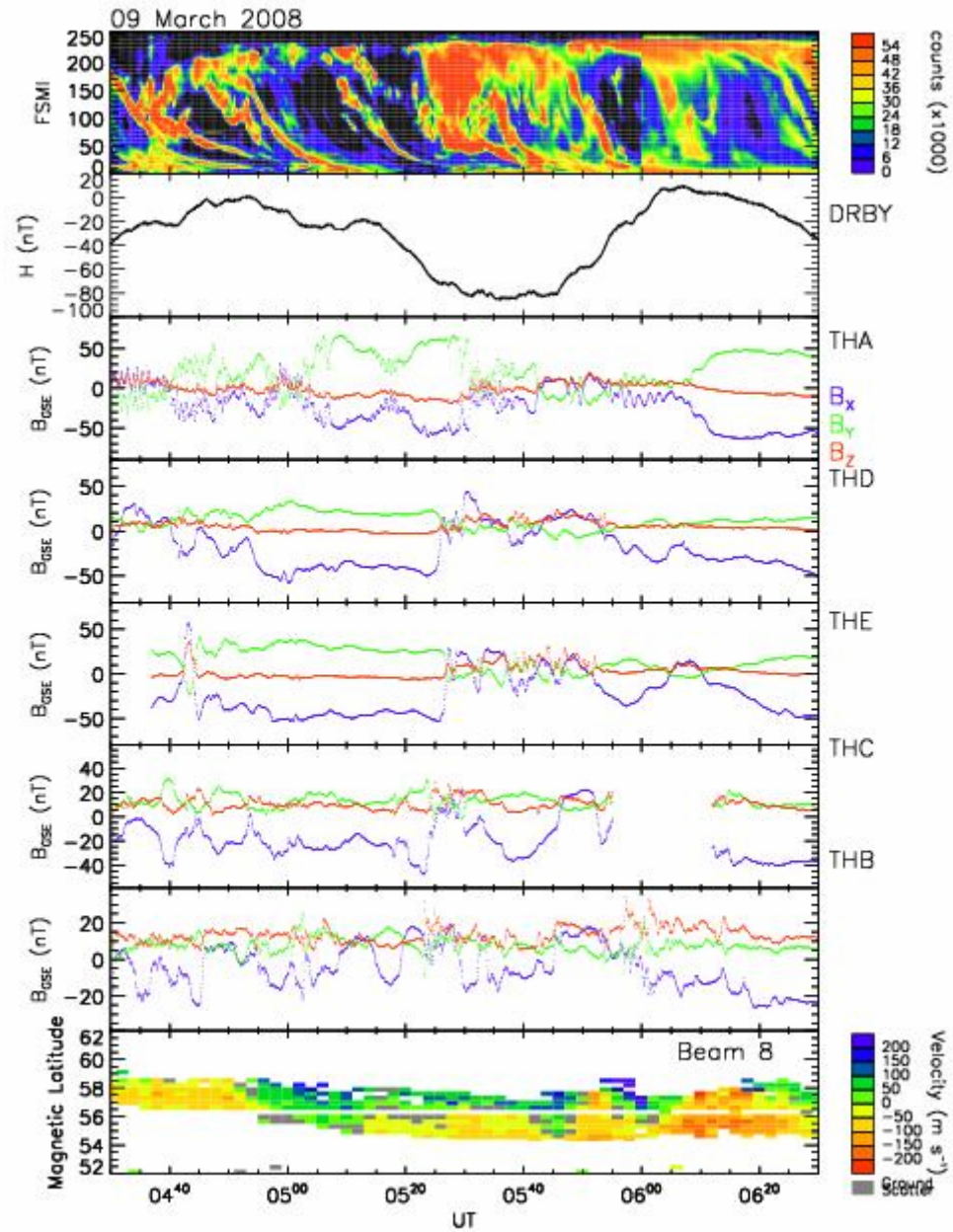
FEB 10th 2008



THEMIS-GBO ASI
2008-02-10/13:05:00



Lester et al. [2008] – ICS9 Presentation

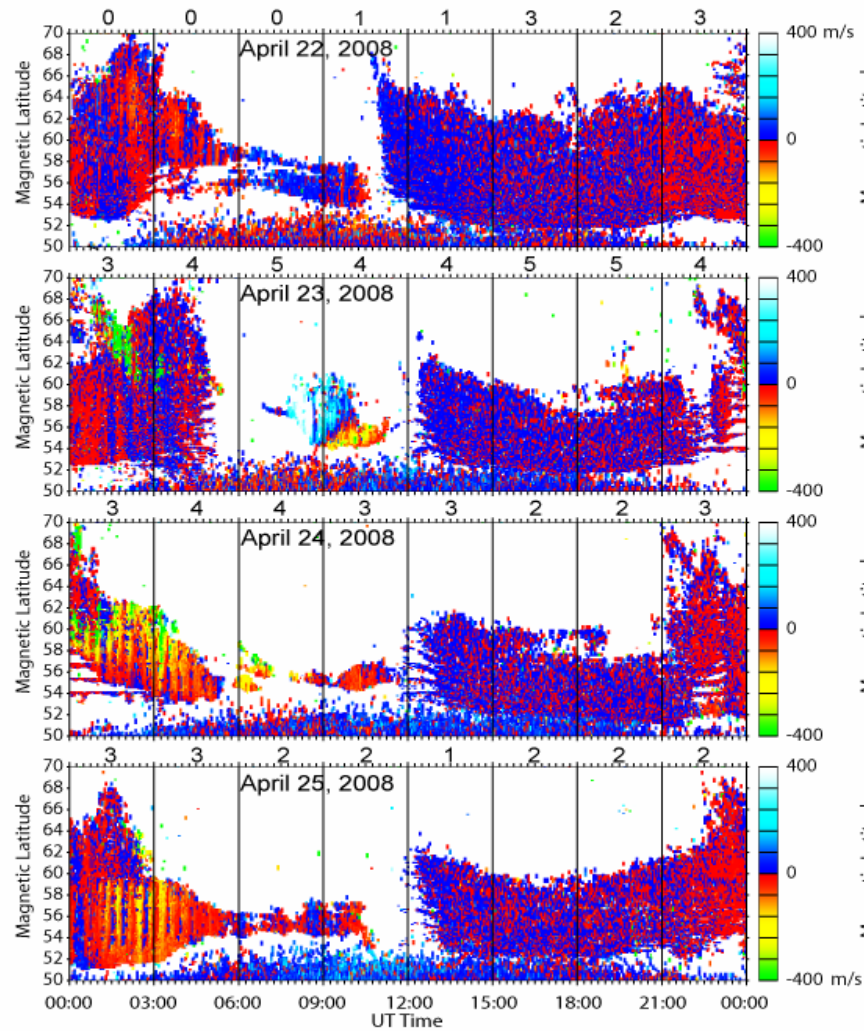




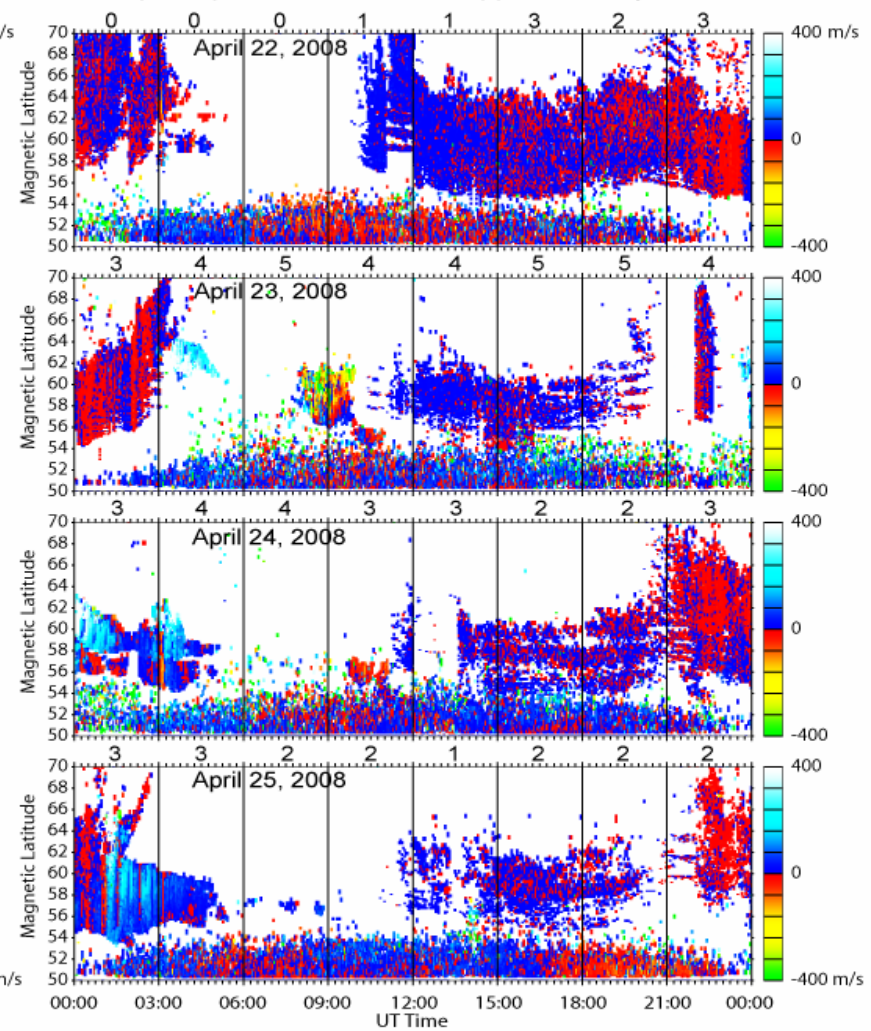
Comparison of Blackstone and Wallops Data



Blackstone SuperDARN Radar - Doppler Velocity - All Beams

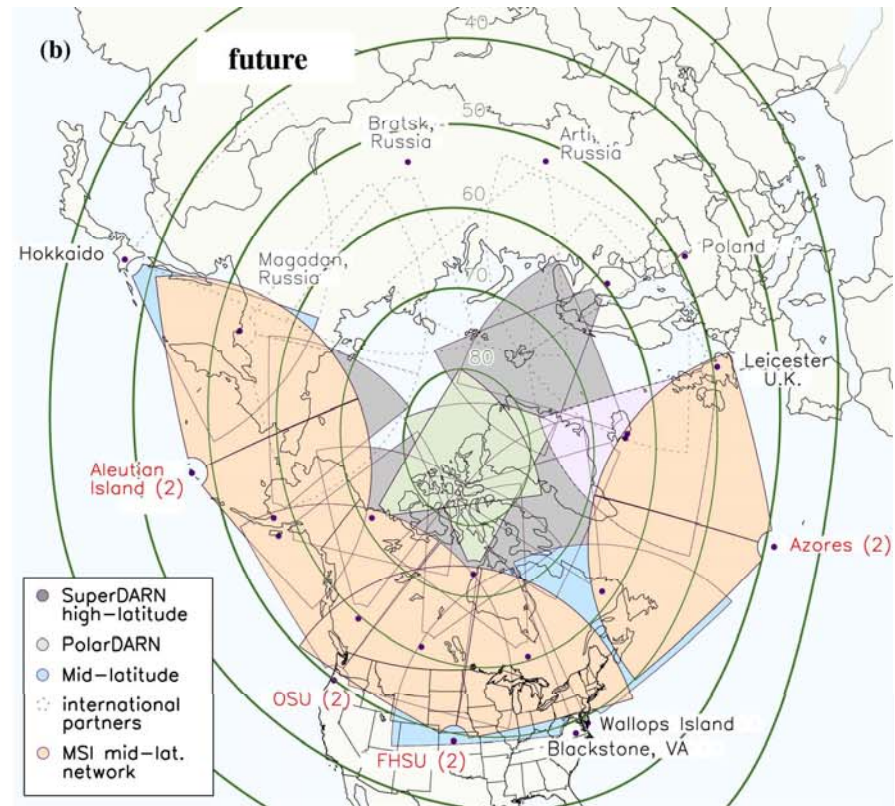


Wallops SuperDARN Radar - Doppler Velocity - All Beams





Mid-Latitude SuperDARN Chain





The Blackstone SuperDARN Radar

Summary

- Blackstone has been operational since February 2008
- Improved antenna performance
- Successful integration with Leicester electronics
- Interferometer build still ongoing
- Plans to incorporate radars into a mid-latitude chain