

The Advanced Modular Incoherent Scatter Radar (AMISR)

Project Review and Initial Results

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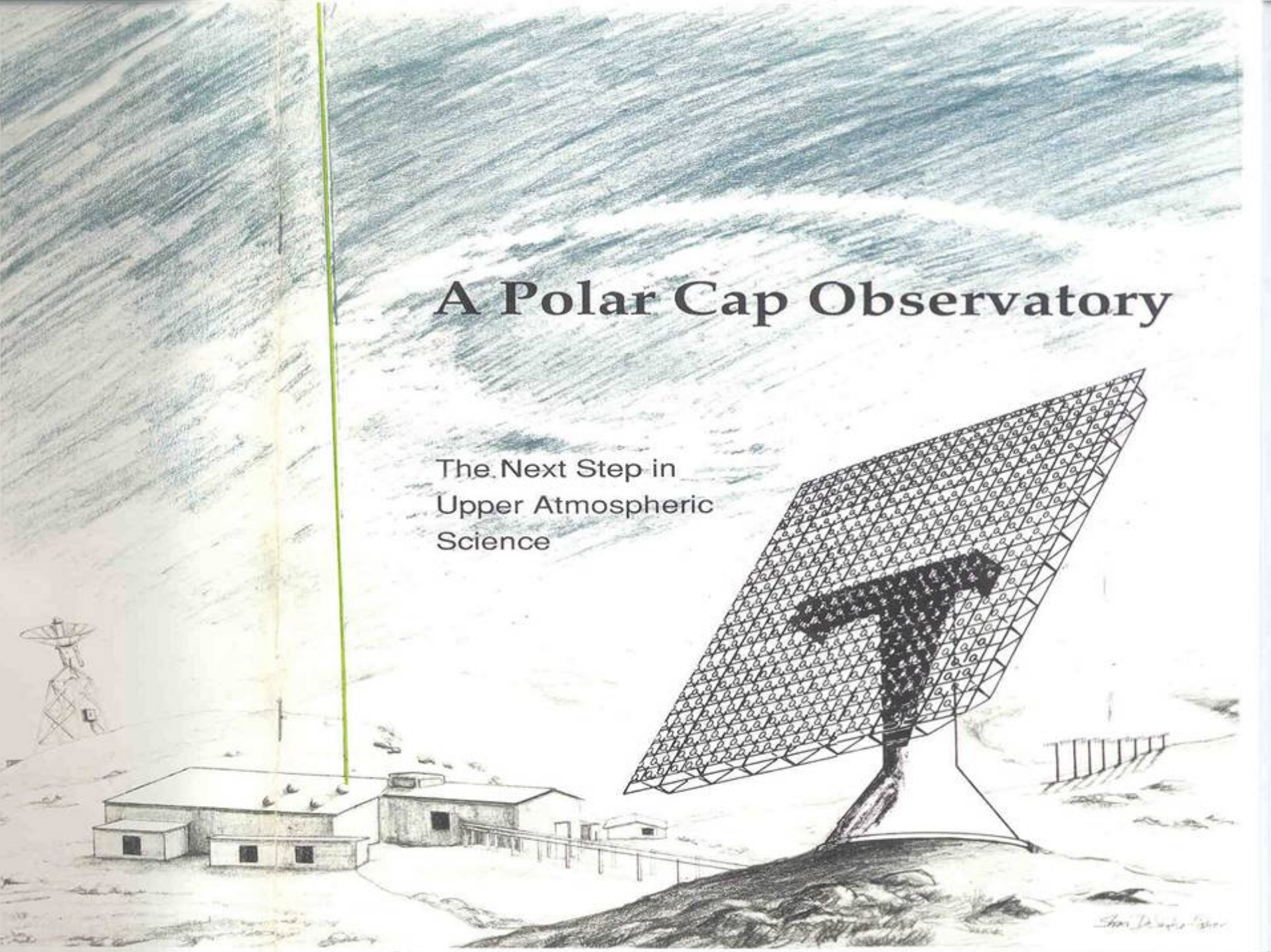
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A Polar Cap Observatory

The Next Step in
Upper Atmospheric
Science



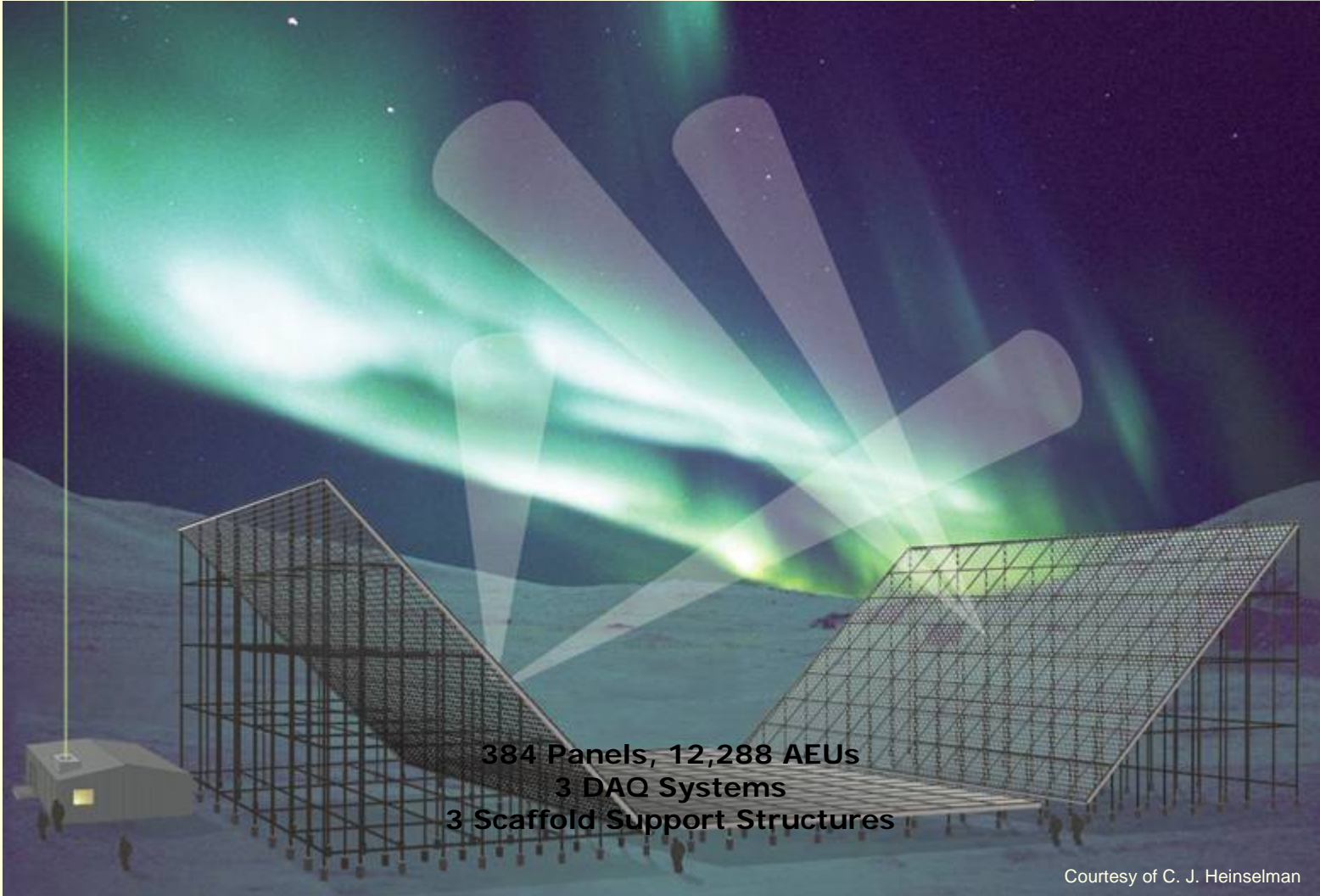
John Deane Fisher

AMISR Acronyms and Terms



- AMISR: Advanced Modular Incoherent Scatter Radar
- AEU: Antenna element unit
- PCU: Panel Control Unit
- Panel: Smallest building block
- Group: Set of Panels
- Face: Set of Groups

AMISR



384 Panels, 12,288 AEUs
3 DAQ Systems
3 Scaffold Support Structures

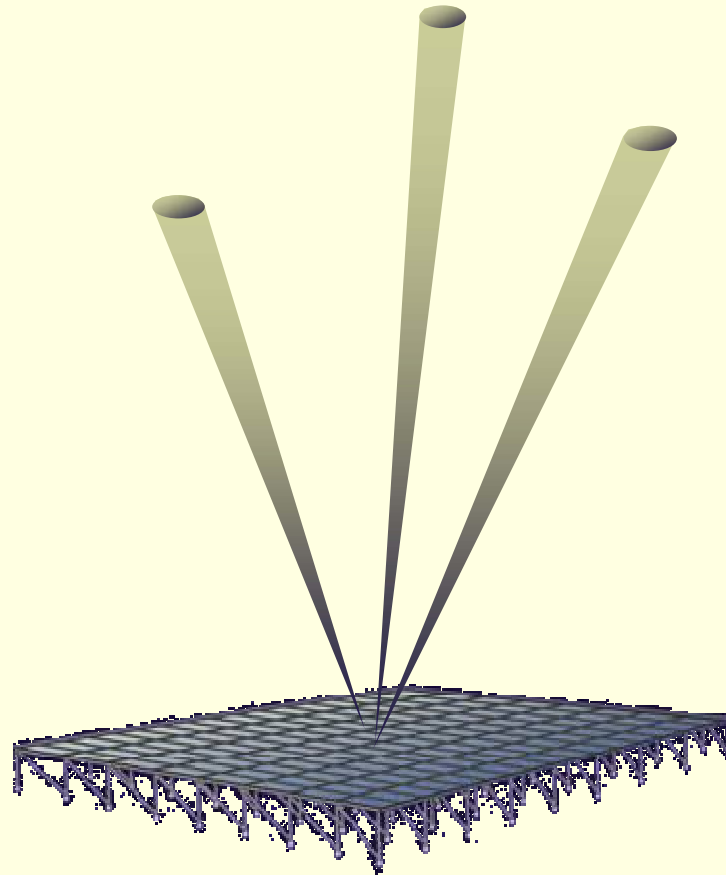
Courtesy of C. J. Heinselman

AMISR



- Three new IS radars
- Modular / transportable / reconfigurable
- Phased array / rapid steering
- Solid state / no warm-up
- Heavily networked / graceful degradation
- 430-450 MHz TX frequency range
- ~2MW peak power per radar (10% duty)
- 1 μ s to 2ms pulses

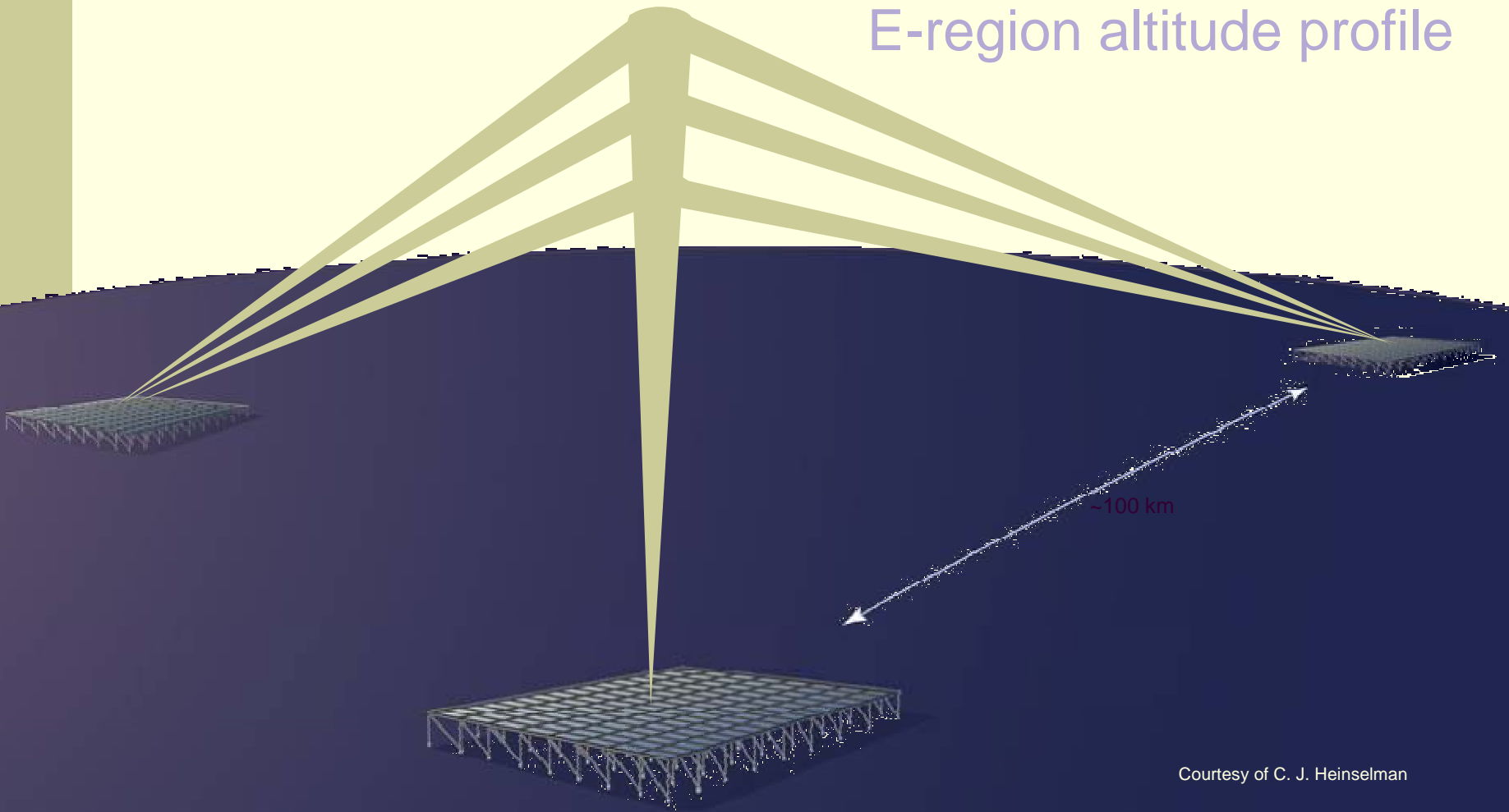
AMISR Ion Velocity Estimation



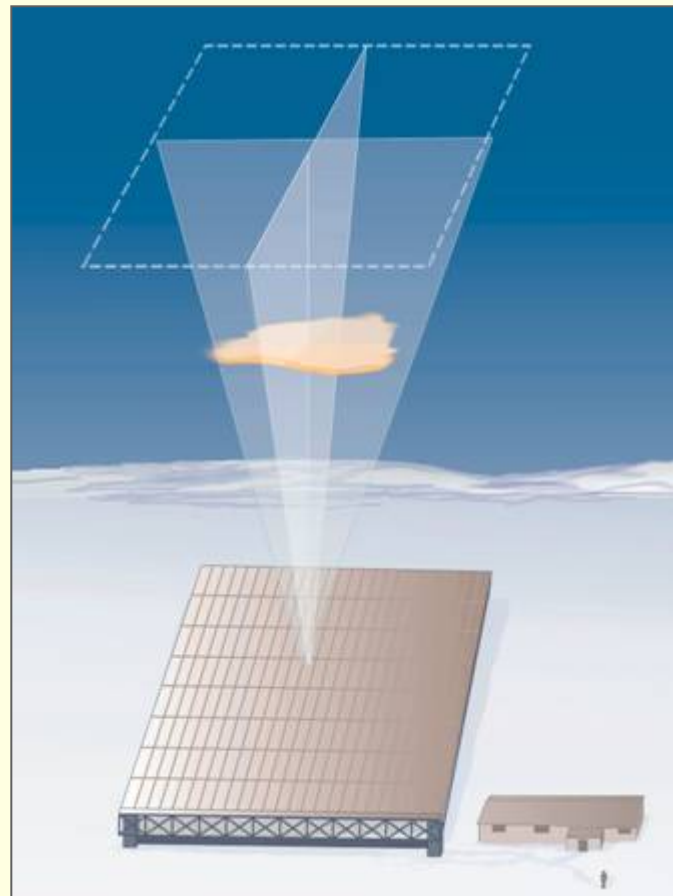
Tristatic Configuration



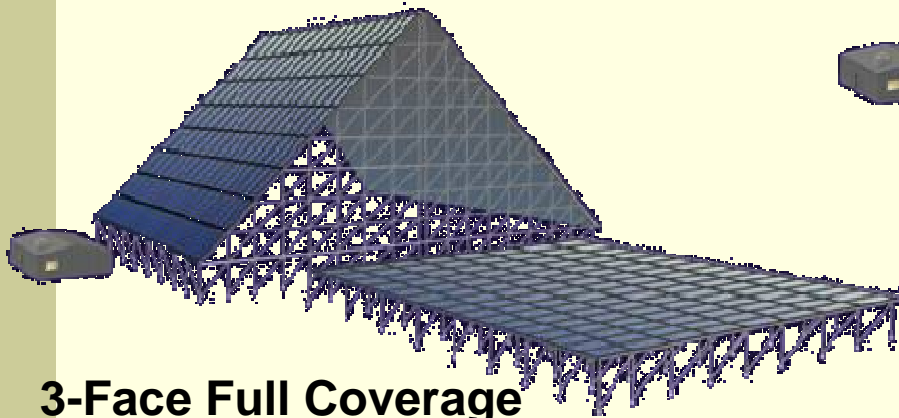
E-region altitude profile



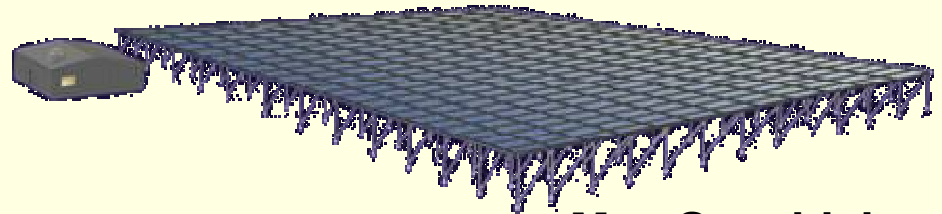
Imaging Ionospheric Structure



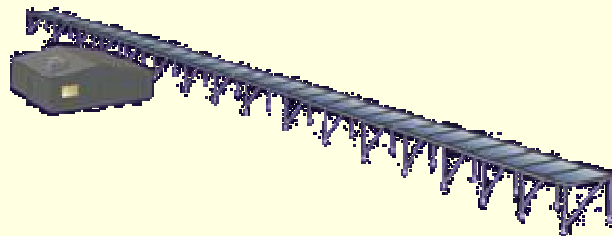
Future Configurations



3-Face Full Coverage
16 x 8 panels per face



Max Sensitivity
12 x 24 panels

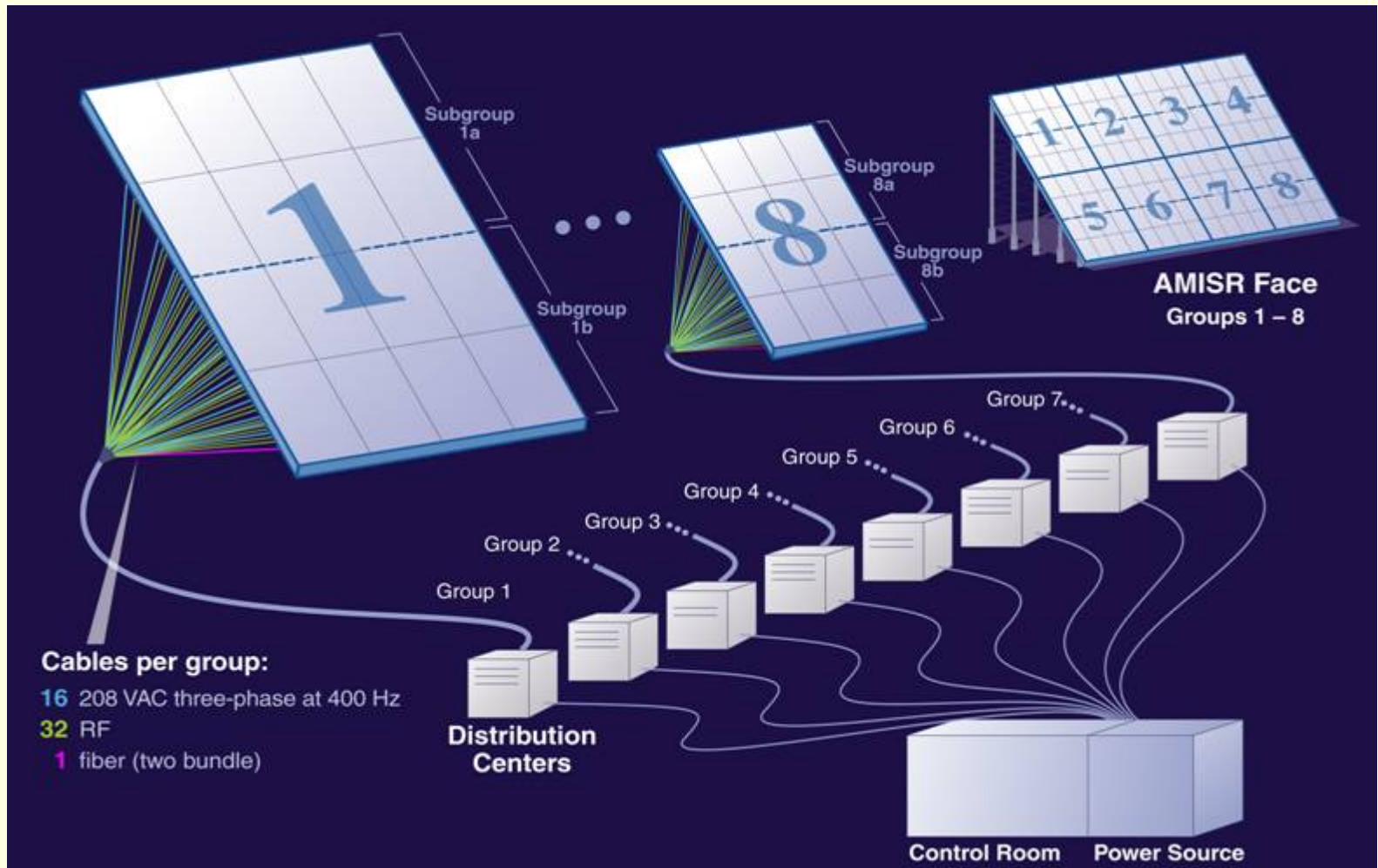


Equatorial
32 x 1 panel



**PMSE Radar/
Wind Profiler**
2 x 4 panel

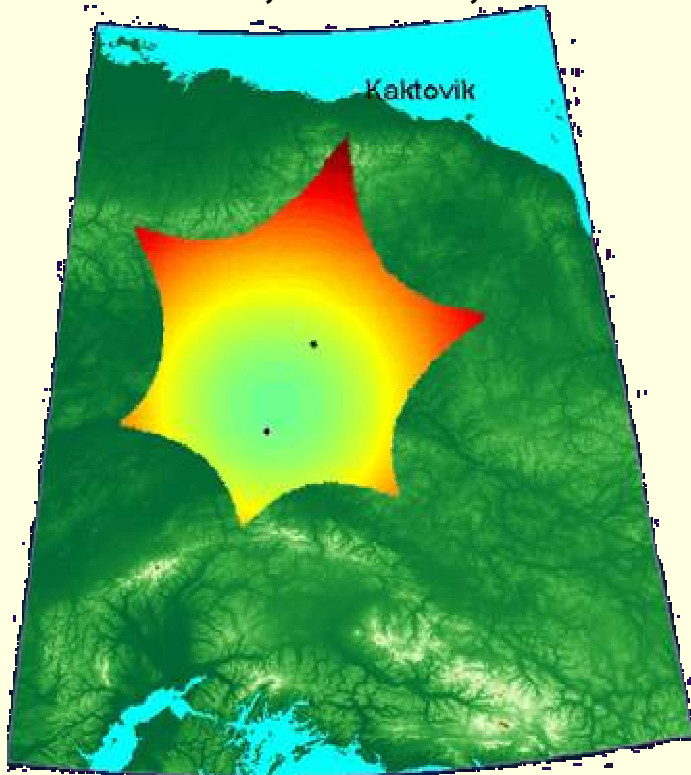
AMCSR – Advanced Modular Coherent Scatter Radar (Interferometry)



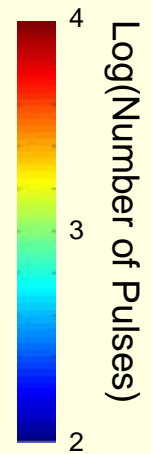
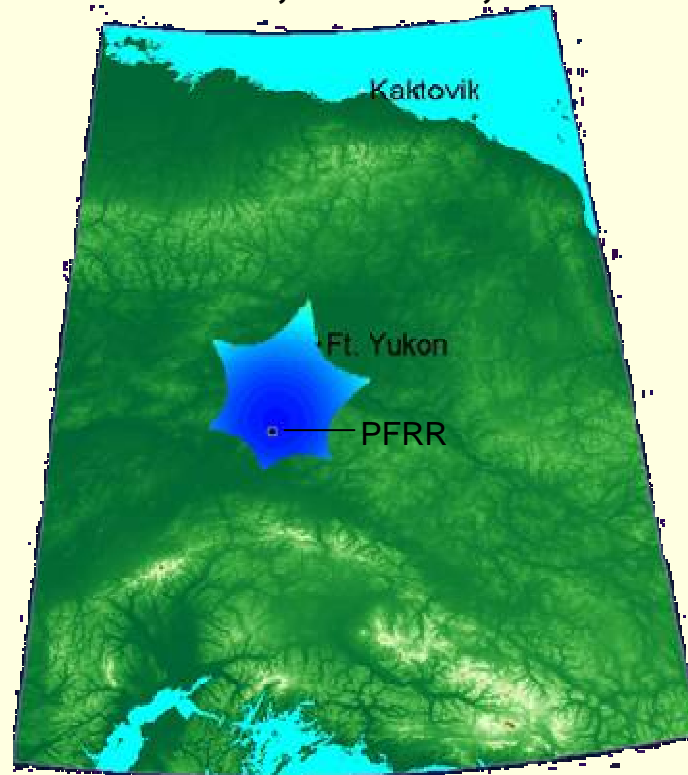
AMISR Coverage – Poker Flat



350 km, 1×10^{11} , 10%



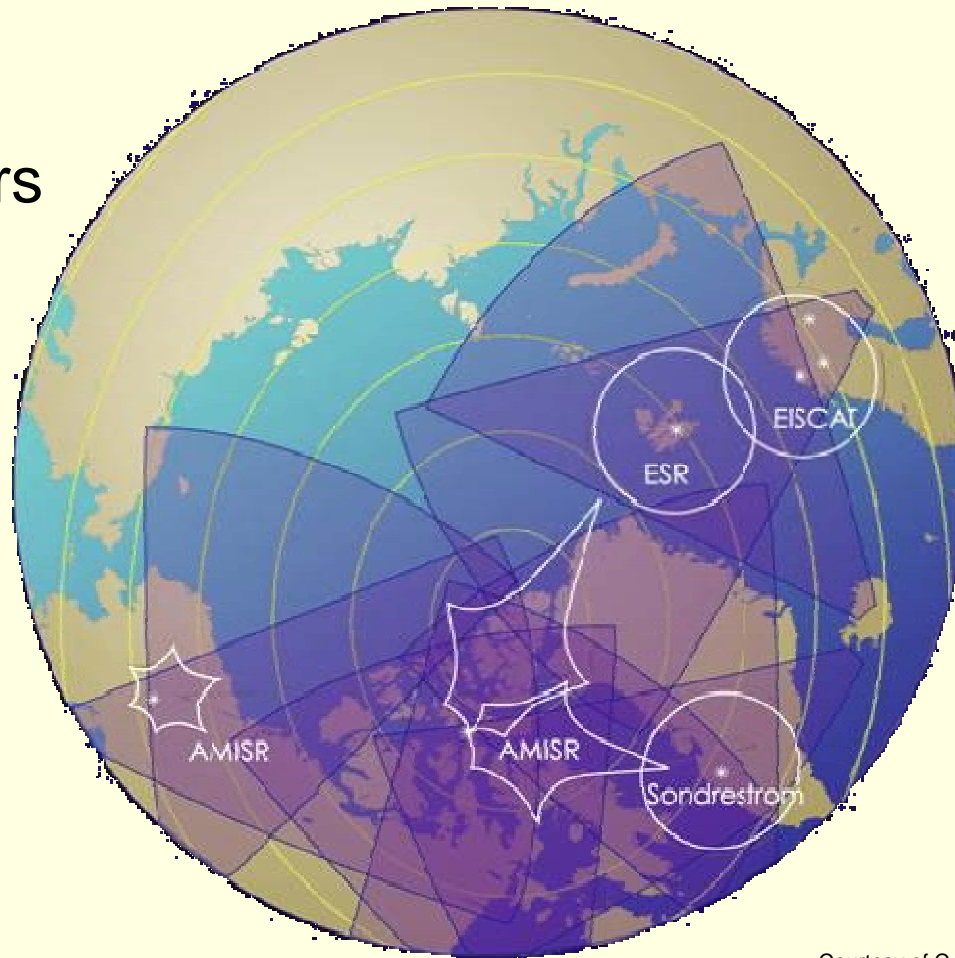
150 km, 1×10^{11} , 10%



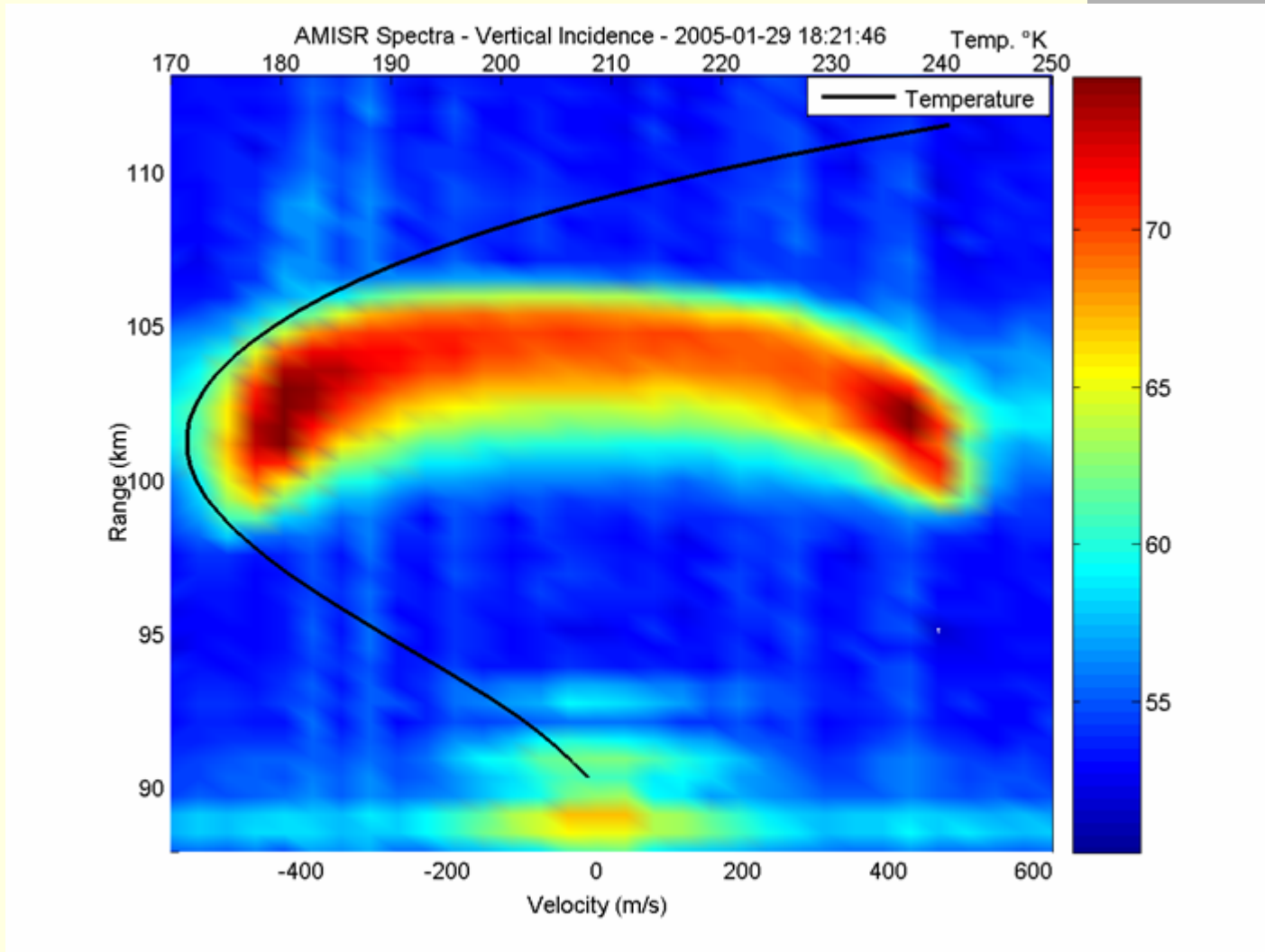
AMISR Coverage – Global Context



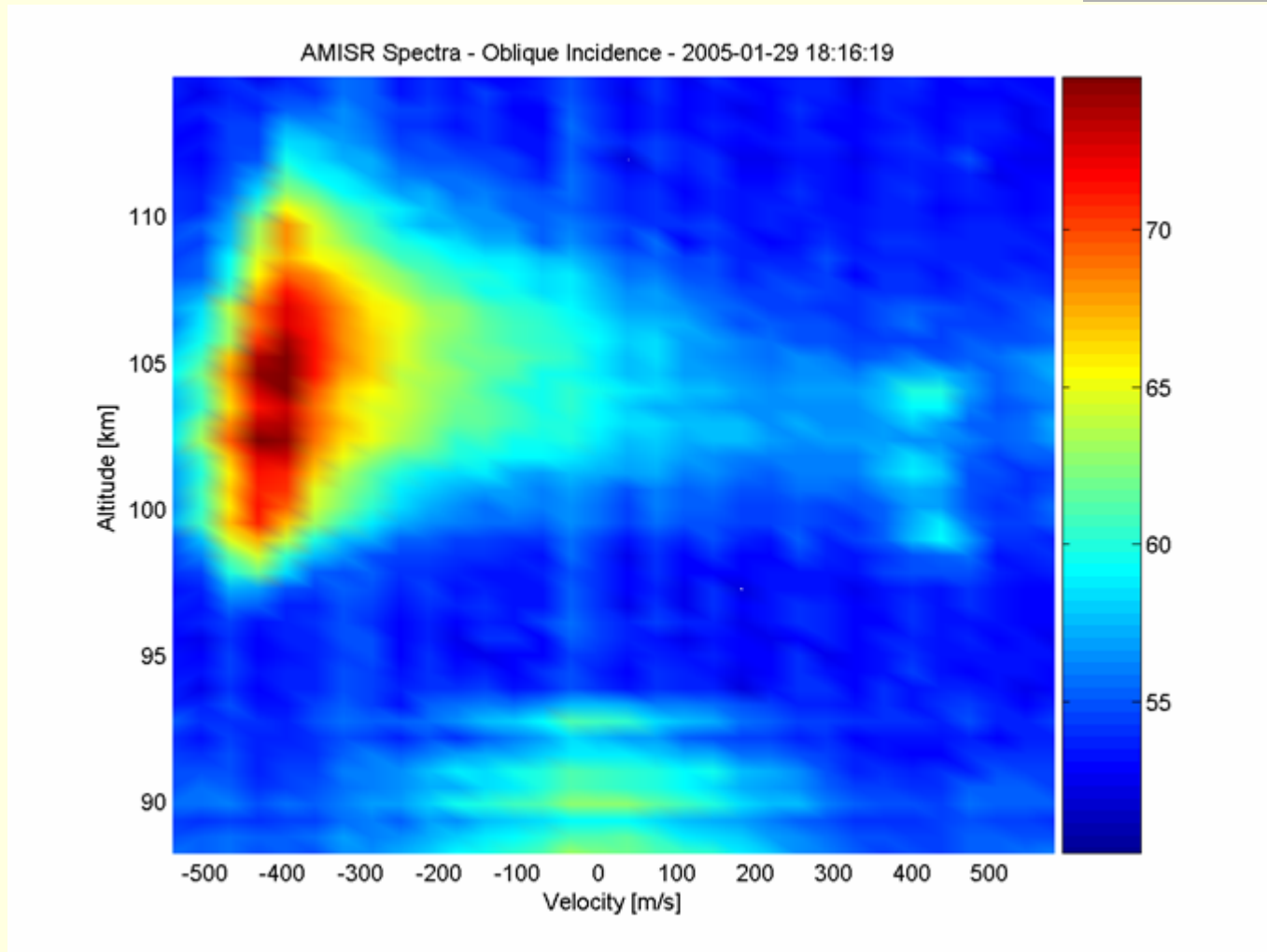
- ISRs
- SuperDarn
- Allsky Imagers
- Satellites



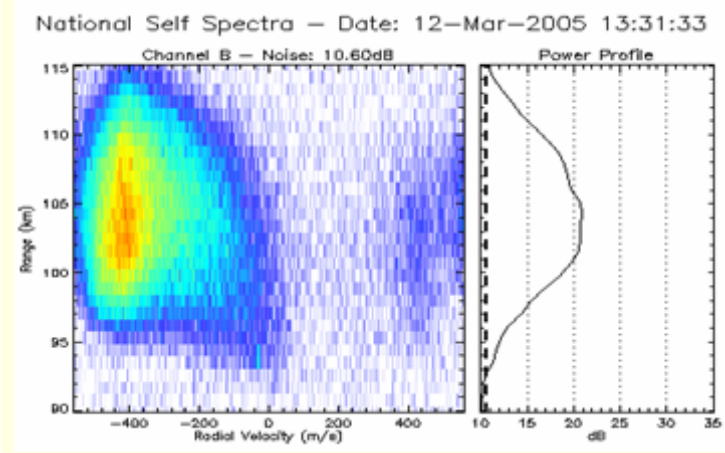
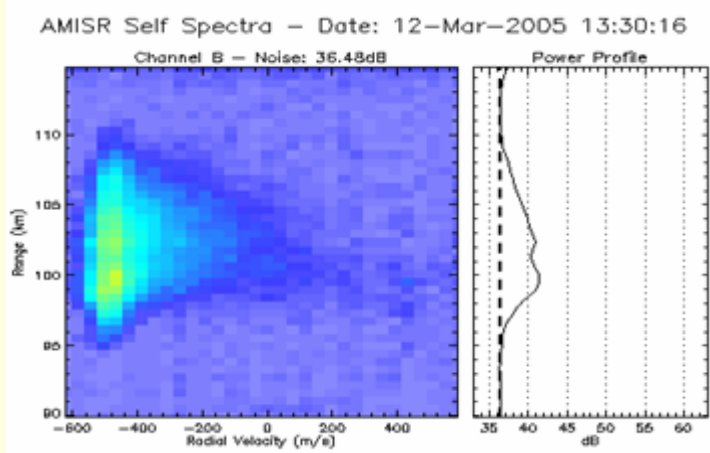
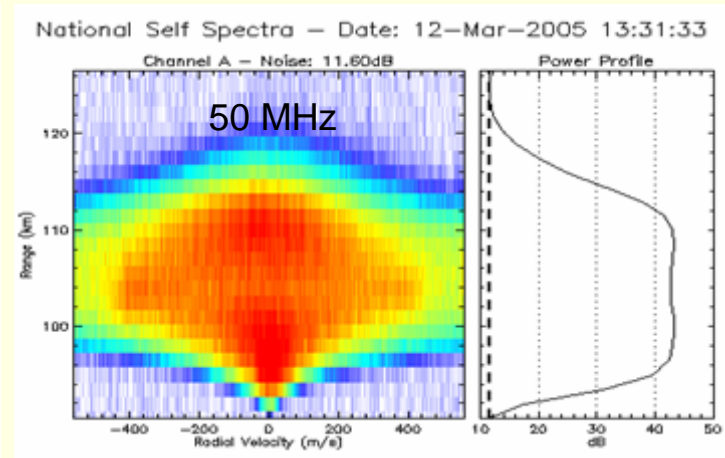
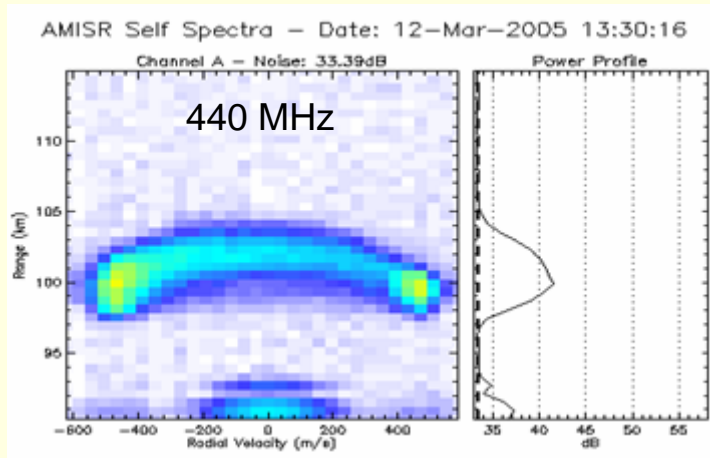
AMISR at Jicamarca - Results



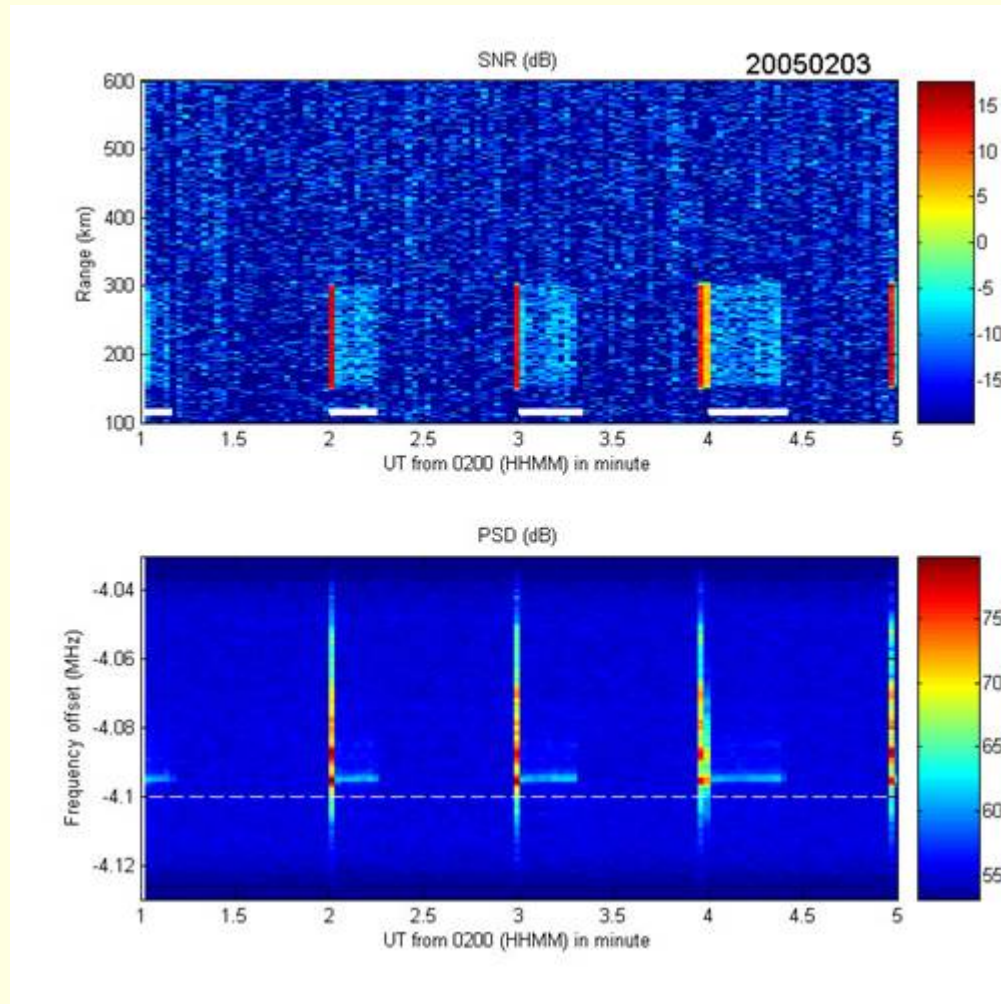
AMISR at Jicamarca - Results



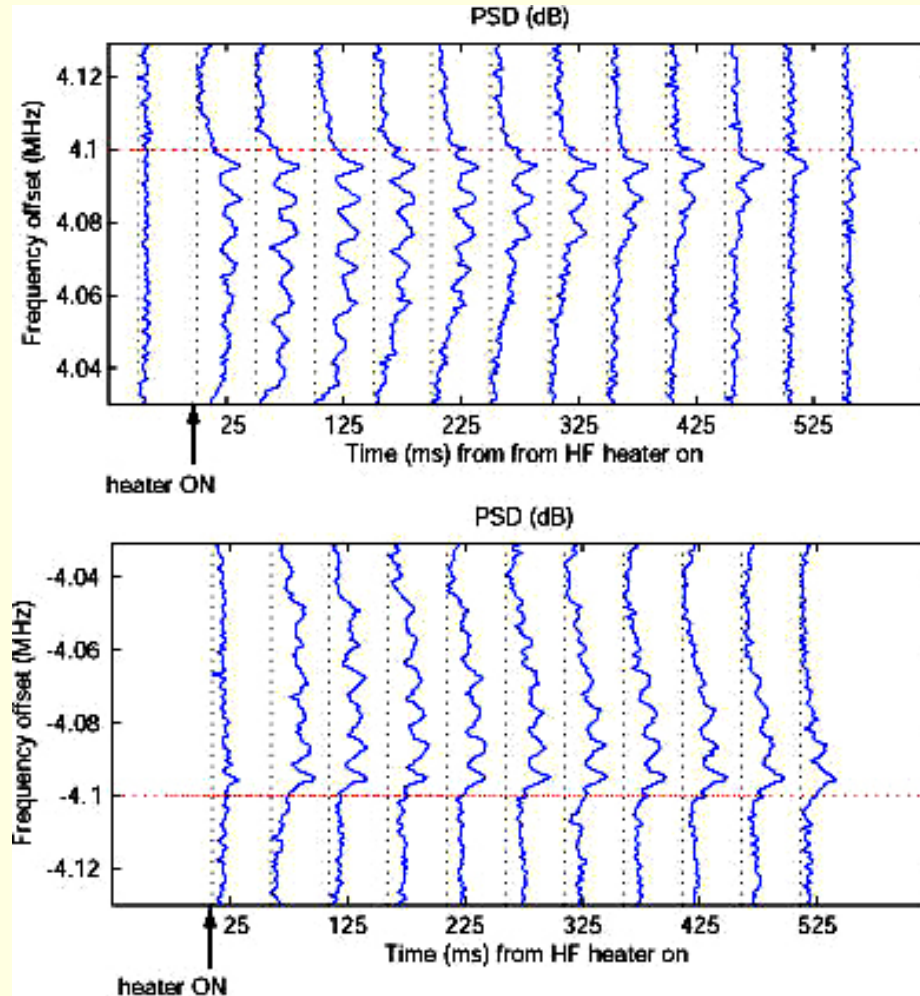
AMISR at Jicamarca - Results



AMISR at HAARP - Results



AMISR at HAARP - Results



AMISR at HAARP - Results

