

INCOHERENT SCATTER WITH THE AMISR PROTOTYPES

Heinselmann, C.J., Valentic, T.A., Kelly, J.D.

SRI International, 333 Ravenswood Ave., Menlo Park, CA 94025

The first face of the Advanced Modular Incoherent Scatter Radar (AMISR) is presently under construction at the Poker Flat Research Range north of Fairbanks, Alaska. This system, a phased-array radar for ionospheric studies, has been under development for the National Science Foundation for several years and that development has progressed in a staged manner with several prototype systems fielded and tested at different geographic locations. The first panels of the system were field tested near SRI's facility at the Big Dish above the Stanford University campus in California. Subsequent system testing occurred at the Jicamarca Radio Observatory in Peru, near Gakona in Alaska, and at the Poker Flat Research Range.

As the name implies, the full AMISR systems will have sufficient sensitivity to probe the ionospheric plasma via incoherent scattering of radio waves. These initial prototype AMISR systems, however, were not expected to have sufficient sensitivity to make incoherent scatter measurements at scientifically interesting time scales. The Stanford deployment, for example, consisted of just two out of the 128 total panels that make up a nominal radar face. Roughly speaking, the sensitivity of AMISR (signal to noise ratio of the return) scales as the square of the number of panels assembled, so the two panels at Stanford had a sensitivity approximately 0.02 % that of a full face. Those panels were, however, sufficient to validate aspects of the design via tropospheric wind measurements.

A threshold for practical incoherent scatter measurements with integration times of less than an hour lies around the sixteen panel mark. The processing of data from such long time series requires the careful removal of many sources of interference (e.g. range-aliased satellite returns or aircraft in antenna side lobes) but it is practical. This presentation will show results from such processing and, more importantly, will extrapolate those results to the expected sensitivity of the full AMISR system.

Abstract Submission Form

2006 National Radio Science Meeting

Abstract: heinselmann1731

Date Received: September 16, 2005

1. (a) Craig Heinselmann
SRI International
333 Ravenswood Ave.
Menlo Park, CA
94025 USA
craig.heinselmann@sri.c
(b) 650-859-3777
(c) 650-322-2318
2. G - Ionospheric Radio and Propagation
3. (a) S-G1
4. C - Contributed Paper, Program chair: F. Lind
5. No special instructions