

A MID-LATITUDE BISTATIC INCOHERENT SCATTER RADAR SYSTEM

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A new Millstone Hill / Green Bank Bistatic Incoherent Scatter project currently under way will create a bistatic mid-latitude incoherent scatter radar (ISR) system on the east coast of North America. The system uses the Millstone Hill UHF ISR system at MIT Haystack Observatory in Massachusetts with its 150 foot and 220 foot antennas as the transmitter site and the 140 foot radio telescope at the Green Bank, West Virginia National Radio Astronomy Observatory facility as the receiver site. Green Bank is located at mid-latitudes in close proximity to Millstone Hill (approximately 450 km south and 900 km west), and the ionospheric fields of view of instruments at both sites overlap well. The bistatic incoherent scatter configuration will allow studies of E region thermosphere/ionosphere coupling and F region flows near sub-auroral polarization streams in the dusk sector. Significantly enhanced bistatic link sensitivity to E region coherent backscatter will also serve as a UHF diagnostic of mid-latitude electric field structuring during geomagnetically disturbed events.

The core platform for the remote Green Bank site, denoted MIDAS-Mobile, is a high performance software radio system designed to be easily portable and capable of operation as a flexible, high coherence data acquisition, signal processing, and analysis platform. This instrumentation has been developed through the Intercepted Signals for Ionospheric Science (ISIS) project. The installation of ISIS node 001 at Green Bank/NRAO is the first field deployment for the ISIS array and will enable both bistatic incoherent and coherent scatter observations.

We will discuss project plans, describe expected system capabilities, and present initial results.

Abstract Submission Form

2006 National Radio Science Meeting

Abstract: erickson23864

Date Received: September 16, 2005

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2. G - Ionospheric Radio and Propagation
3. (a) S-G1
4. C - Contributed Paper, Program chair: F D Lind / J D Sahr
5. No special instructions