



Flexible Radio Array for Ionospheric and Atmospheric research (FRAIA)

Anders M. Jorgensen⁽¹⁾, A. Nguyen⁽²⁾, Kyler King⁽¹⁾, Willie Lopez⁽¹⁾, Alexander Mazarakis⁽¹⁾, Levi Jungling⁽¹⁾, Wesley McHaley⁽¹⁾, Delos Edick⁽¹⁾, Richard Sonnenfeld⁽¹⁾

(1) New Mexico Institute of Mining and Technology, Socorro, NM, USA

(2) IDEAS Tek, Albuquerque, NM, USA

We present the Flexible Radio Array for Ionospheric and Atmospheric research (FRAIA). FRAIA consists of 18 relocatable RF receiver stations with the capability to receive in the VLF band (0-50 kHz), the HF/VHF band (3-85 MHz), as well as at discrete beacon satellite frequencies 150, 400, and 1067 MHz. The antennas are monopole for the VLF reception, all-sky broad-band crossed dipoles for the HF/VHF band, and co-centric all-sky quadrifilar antennas for the beacon satellite bands. Each station contains a 8-core CPU and a high-end software-defined radio for real-time sampling and processing of the RF signals. Each station include GPS timing to 50 ns, and three synchronization devices allows for the 18 stations to be used together in a single phased array or up to three phased arrays. FRAIA stations can be used for observing VLF whistler waves, receiving standard VHF/UHF beacon satellite signals for ionospheric tomography, for riometry, for lightning observations and lightning interferometry, as ionosonde receivers, HF radar receivers, over-the-horizon radar receivers, and receivers for a future HF beacon satellite which we propose, for ionospheric tomography.