

## **Plans for an MF/HF antenna array for ionospheric radio and radar imaging**

Brett Isham\*<sup>1</sup> and Tamara Vega<sup>2</sup>

<sup>1</sup> Interamerican University of Puerto Rico, Bayamón, PR, USA

<sup>2</sup> Trigon Digital Inc., Quebradillas, PR, USA

The Interamerican Radio Array, or Aguadilla array, is planned to be located at the Interamerican University Aguadilla Campus, located in northwestern Puerto Rico. The planned instrumentation consists of a 30-element medium and high frequency (MF/HF) radio receiving array and all associated electronics for high-time-resolution, wide-band, wide-angle, phase-coherent, multi-channel radio measurements.

A principle purpose of the array would be use as a bistatic receiver for 2 to 25-MHz transmissions from the the University of Colorado Versatile Interferometric Pulsed Ionospheric Radar (VIPIR) radar located in Cayey, Puerto Rico, 110 km distant, for both routine observations and special-purpose experiments. The VIPIR radar produces detailed ionospheric parameters which can be used for studies of phenomena such as atmospheric gravity waves, plasma irregularities, and monitoring of upper atmospheric weather and climate. Many projects can be done in collaboration with the Arecibo Observatory, a U.S. national facility, which lies on the direct line-of-sight between the transmitter in Cayey and the proposed receiver in Aguadilla, and with other local and regional instruments.

The Cayey-Aguadilla bistatic VIPIR capability would join a global network of HF, and in particular of VIPIR, radar systems, including a north-south chain of VIPIR radars, located in Virginia, Puerto Rico, Peru, and Bolivia, and being constructed in Venezuela, Brazil, and Argentina. These radars contribute to a world-wide database of atmospheric phenomena and regional and global interconnections.

The Aguadilla array would also be used in collaboration with a new high-power high-frequency radio transmitter at Arecibo Observatory for controlled studies of ionospheric plasma irregularities and turbulence through high-resolution measurements of ionospheric radio emissions created by the high-power transmissions.

The array is currently in the design phase. The goals of the project include space and atmospheric research; the development of radio sounding, polarization, interferometry, and imaging techniques; and training of students at the university and high school levels.