First Dynasonde Observations from Wallops Island

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The Air Force Research Laboratory, Space Vehicles Directorate, Space Weather Center of Excellence has been overseeing the development and deployment of a new digital ionosonde by the co-authors. The new HF Radar is a modern design of all new electronics, including coherent digital receivers and a solid state power amplifier. The system is similar to that described by Davies (2000). The data processing software is based on Dynasonde measurement and analysis techniques, enhanced to accommodate the additional data from an 8 receiver radar system.

In cooperation with the NASA Wallops Flight Facility and the NASA Sounding Rocket Program, this new ionosonde has been installed on a permanent research class antenna facility at Wallops Island, Virginia (37.9N, 75.5W). The station consists of 8 active receiving dipole antennas, arranged in a cross pattern with 100m baseline separation and located in a level field with very few electrical obstructions. The transmitting antenna is a 4-plane apex-down log periodic antenna, with over 1.5 km of wire suspended between 4 towers of 36m height, arranged in a square of 75 meters.

The first observations from this ionosonde were obtained in September 2007. While not without its various infancy problems, the raw data are of high quality and provide insight into various ionosphere and propagation phenomena not clearly evident in the older Wallops ionosonde data. In one instance, what appeared to be the start of Spread-F was revealed to be an unresolved bifurcation of smooth ionosphere traces.

This presentation consists of an introduction to the new ionosonde system, displays of the new data, a review of progress made in the interpretation of these data, and a comparison of observations between the new and old ionosonde.