

Development and Application of HAARP

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The High Frequency Active Auroral Research Program, (HAARP), is a scientific endeavor aimed at studying the properties and behavior of the ionosphere, with particular emphasis on understand space physics, communications and VLF subsurface imaging for both civilian and defense purposes.

The HAARP facility has as its principal research tool a HF phased array occupying about 30 acres of area in Gakona, AK. The phased array is composed of 180 towers (12x15), each tower hosting four (4) sets of horizontal oriented dipoles, two sets of crossed dipoles covering the frequency band (2.8 MHz to 8 MHz) and two sets of crossed dipoles covering the frequency band (7 MHz to 10 MHz). Each set of dipole radiates up to 10 kW, the whole array radiating 3.5 MW of RF power.

The crossed dipole array can radiate in linear or circular polarization mode. The radiation beam of the array can scan from the broadside up to 30 degrees. The whole array can generate two scanning beams at different frequencies.

The operating of the whole array can be controlled either locally in Gakona or remotely through the internet.

In this presentation, we will discuss the design and development of the HAARP array, i.e., the wideband phased array feed network, the high power feed and radiating structures, and the remote/local control software systems. Various real life operating capabilities of the HAARP will be discussed. Finally, we will discuss various applications of the HAARP facility in plasma research, communication applications, underground imaging and other areas.

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