Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

A New Facility at AFRL for Studying VLF Waves in A Magnetized Plasma MARK HOPKINS, NATE ZECHAR, Riverside Research, DANIEL MAIN, Riverside Reseach, JAMES CAPLINGER, TONY KIM, VLADIMIR SOTNIKOV, Sensors Directorate, Air Force Research Laboratory, Wright-Patterson —
An experimental facility was designed and built in the Plasma Physics Sensors Laboratory (PPSL) at AFRL for the study of very low frequency (VLF) wave generation and propagation in magnetized plasmas. Using a 6kW magnetron and electromagnets to produce fields up to 350 Gauss, a magnetized plasma will be produced inside a 0.5-m-diameter x 1.0-m-long cylindrical chamber. Langmuir probes will be used to characterize plasma parameters and static electric fields. Electromagnetic and electrostatic field strengths will be measured independently using dipole antennas and B-dot probes to characterize the radiation patterns of novel antenna designs. One application of VLF wave-plasma interaction is radiation remediation for protection of space assets. The in-situ generation of electromagnetic whistler waves in the ionosphere is a promising approach for radiation remediation via enhanced pitch angle diffusion of high-energy electrons. The majority of the radiation generated by conventional VLF antennas is quasi-electrostatic and does not propagate large distances from the source. Antenna designs using parametric wave interaction to generate whistlers may increase the percentage of power radiated into the electromagnetic part of the VLF wave spectrum.

Nate Zechar
Riverside Research

Date submitted: 23 Jul 2015 Electronic form version 1.4