Abstract Submitted
for the DPP08 Meeting of
The American Physical Society

Creating flowing space plasma environments with VASIMR
EDGAR BERING III, BENJAMIN LONGMIER, University of Houston, TIM GLOVER, FRANKLIN CHANG-DIAZ, JARED SQUIRE, Ad Astra Rocket Company, MICHAEL BRUKARDT, University of Houston — Recent results from the operation of a 125 cubic meter space simulation chamber are presented. The primary role of the vacuum chamber is to support the operation of the Variable Specific Impulse Magnetoplasma Rocket (VASIMR), a high power magnetoplasma rocket, capable of Isp/thrust modulation at constant power. However, magnetospheric and heliospheric plasma environments can be produced with the VASIMR plasma source with a power range of 0.5 to 200 kW, producing a H, D, Ne, or Ar flowing plasma with flow velocities in excess of 20,000 km/s. The plasma is produced by a helicon discharge. The bulk of the energy is added by ion cyclotron resonance heating (ICRH.) Axial momentum is obtained by adiabatic expansion of the plasma in a magnetic nozzle. Particle flux and particle energy can be adjusted independently of each other, which is primarily achieved by the partitioning of the RF power to the helicon and ICRH systems, with the proper adjustment of the propellant flow. Ion dynamics in the flowing plasma is studied using probes, gridded energy analyzers (RPA's), microwave interferometry and optical techniques.

Benjamin Longmier
University of Houston

Date submitted: 21 Jul 2008 Electronic form version 1.4