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MEMORANDUM FOR PRS (In-House/Contractor Publication)

FROM: PROI (STINFO) 22 July 2002

SUBJECT: Authorization for Release of Technical Information, Control Number: **AFRL-PR-ED-AB-2002-190**
James Haas (AFRL/PRSS) et al., "Thrust, Ion Current Density, and Energy Distribution Measurements of the BPT-4000 Hall Effect Thruster" (abstract only)

55502

28th Int'l Electric Propulsion Conference **(Statement A)**
(Toulouse, France, 17-21 March 2003) (Deadline: 14 August 2002)

Thrust, Ion Current Density and Energy Distribution Measurements of the BPT-4000 Hall Effect Thruster

James Haas, Scott Engelman, and Ronald Spores
Air Force Research Laboratory
Edwards AFB, CA

Kristi de Grys, David King, and Fred Wilson
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Redmond, WA

ABSTRACT

On-going General Dynamics (GD) and Air Force Research Laboratory (AFRL) research is presented, attempting to better understand the causes of the observed Beginning of Life (BOL) performance degradation of the BPT-4000 Hall thruster. Although current thruster performance meets the minimal mission requirements for average performance, reduction or elimination of the performance decrease could yield a mission average performance increase of up to 6%. Extensive thrust stand measurements will be made to establish baseline thruster performance, verify performance degradation, and evaluate the effect of thruster modifications. Three-dimensional Faraday probe maps of the ion current density will be made 1 m from the thruster. This will provide crucial information on beam divergence and propellant utilization, two possible explanations for the performance degradation. Ion energy distribution profiles will be obtained on thruster centerline using a retarding potential analyzer (RPA). This will provide information on the accelerating potential experienced by the primary discharge ions, a third possible explanation for the performance drop.