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Preliminary Results on a low-energy RMF-FRC Plasma Translation Experiment for Space Propulsion CARRIE HILL, NOLAN UCHIZONO, ERC, Inc., MICHAEL HOLMES, U.S. Air Force Research Laboratory — The U.S. Air Force Research Laboratory-Edwards has developed a new experimental test cell to study the translation physics of Field-Reversed-Configurations (FRC) formed at low-energy (<15 J/pulse). The test-cell is currently equipped with a conical Rotating Magnetic Field (RMF) source, capable of producing a burst of 10 plasmoids at 5 J/pulse. This source has been characterized at full energy with a xenon propellant at a range of flow rates (5-70 sccm), bias fields up to 500 G, and antenna phasing. Data from a suite of diagnostics has been analyzed to track plasmoid formation and axial motion. These diagnostics include voltage and current probes, axial magnetic field probes, magnetic flux loops, and Langmuir probes. A time-of-flight array measures the plasmoid's exit velocity. Emission spectroscopy using streak-imaging is also implemented. A basic global energy balance from these diagnostics is used to estimate the efficiency of the translation process and determine how it scales with magnetic field, flow rate, and antenna phasing.

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