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Surface Sterilization of Spacecraft for Planetary Protection with Plasma Jet Array[1] JAMES PRAGER, TIMOTHY ZIEMBA, Eagle Harbor Technologies, Inc., JONATHAN MILLER, Edmonds Community College — Contamination Control for Planetary Protection is a serious issue as we explore solar system bodies with missions that have the potential for detecting life. Currently, dry heat microbial reduction (DHMR) and vapor hydrogen peroxide (VHP) are the only microbial reduction methods approved for planetary protection. DHMR is extremely time consuming and chamber time is difficult to schedule, while the use of VHP is not usable for some state-of-the-art electronics and materials. Eagle Harbor Technologies, Inc. (EHT) has developed an array of atmospheric pressure plasma jets (APPJs) to kill endospores on the surfaces spacecraft. The APPJ array is driven by an EHT Nanosecond Pulser. A microbiology lab at Edmonds Community College investigated a wide range of parameters to evaluate pulse and gas parameter efficacy for killing endospores. During the Phase I, they demonstrated a six-log reduction of endospores in petri dishes and provided preliminary evidence of real-world sterilization. Additionally, an FPGA and SDRAM continued to function after plasma exposures showing that this treatment will not impact sensitive electronics.

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