Abstract Submitted
for the GEC08 Meeting of
The American Physical Society

Parametric Studies on Thrust Produced by Pulsed DBD Plasma Actuators DMITRY OPAITS, Princeton University, ALEXANDRE LIKHANSKII, The Pennsylvania State University, SOHAIL ZAIDI, MIKHAIL SHNEIDER, Princeton University, SERGEY MACHERET, Lockheed Martin Aeronautics Company, RICHARD MILES, Princeton University — A number of works have demonstrated the utility of dielectric barrier discharge (DBD) plasma actuators for aerodynamic control. Recent experiments and computations showed that a novel voltage waveform consisting of high-voltage nanosecond repetitive pulses superimposed on a low-frequency sinusoidal voltage can produce significantly enhanced wall jets compared with those generated with conventional sinusoidal voltage. We proposed and used what is essentially a non-self-sustained discharge: the plasma is generated by repetitive short pulses, and the pushing of the gas occurs primarily due to the low frequency (bias) voltage. The advantage of this non-self-sustained discharge is that the parameters of ionizing pulses and the driving bias voltage can be varied independently, which adds flexibility to control and optimization of the actuator performance. This work will present results of parametric studies of the plasma produced thrust at different parameters of the voltage waveform, such as frequency and shape of the bias voltage and duration and repetition rate of the pulses.

Dmitry Opaits
Princeton University

Date submitted: 13 Jun 2008 Electronic form version 1.4