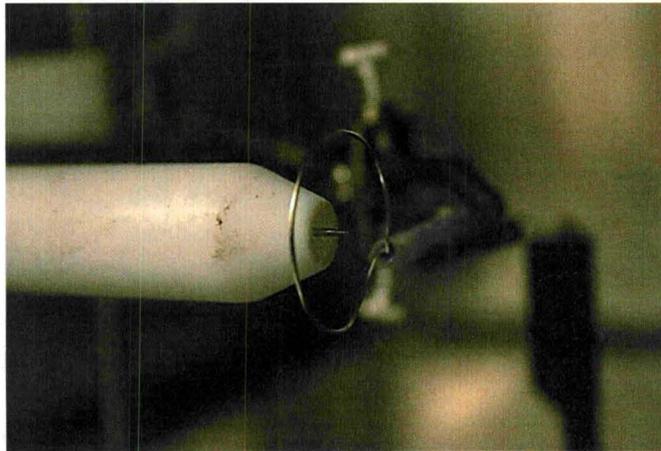


Martian Atmospheric Pressure Static Charge Elimination Tool

A Martian pressure static charge elimination tool is currently in development in the Electrostatics and Surface Physics Laboratory (ESPL) at NASA's Kennedy Space Center. In standard Earth atmosphere conditions, static charge can be neutralized from an insulating surface using air ionizers. These air ionizers generate ions through corona breakdown. The Martian atmosphere is 7 Torr of mostly carbon dioxide, which makes it inherently difficult to use similar methods as those used for standard atmosphere static elimination tools.

An initial prototype has been developed to show feasibility of static charge elimination at low pressure, using corona discharge. A needle point and thin wire loop are used as the corona generating electrodes. A photo of the test apparatus is shown below.



Positive and negative high voltage pulses are sent to the needle point. This creates positive and negative ions that can be used for static charge neutralization. In a preliminary test, a floating metal plate was charged to approximately 600 volts under Martian atmospheric conditions. The static elimination tool was enabled and the voltage on the metal plate dropped rapidly to -100 volts. This test data is displayed below. Optimization is necessary to improve the electrostatic balance of the static elimination tool.

