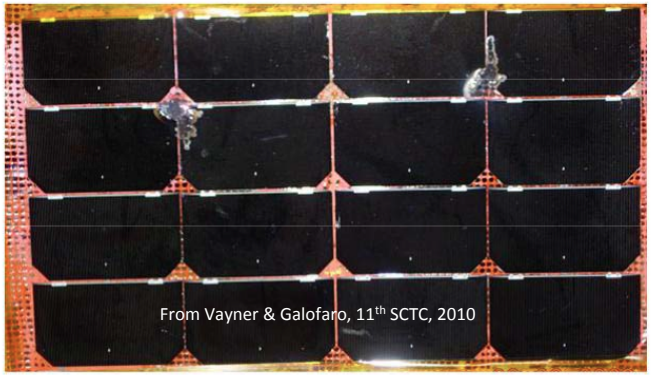
NASA SBIR/STTR Technologies

Modeling Vacuum Arcs On Spacecraft Solar Panel Arrays
Contract Number: NNX13CC58P
PI: Seth A. Veitzer
Tech-X Corporation – Boulder, CO

The innovation we in this work is a modeling tool to improve the design and performance of spacecraft solar panel arrays by mitigating the effects of electrostatic discharging. Arc discharges on solar arrays can cause catastrophic failures and numerical tools to improve these designs will ensure that NASA satellites can perform their missions in both LEO and GEO.



TRL at the end of Contract (1-9): 6

The overall objective of this work is to provide a validated modeling tool to help researchers understand and mitigate electrostatic discharges on solar arrays. By the end of the Phase II of this work, we envision providing a simulation tool that is i) validated with the latest experimental data, and ii) is easy enough to use that any researcher in this community can use it. In Phase I, we achieved two technical objectives: i) Determining that our plasma simulation codes can accurately model arc-induced plasma expansion relevant to solar panel arrays, and ii) Determined the best way to make our high-performance computing and modeling tools usable to the science community.

Other NASA missions will benefit from this work. For instance, researchers studying space weather effects, electric propulsion schemes, flow control and other plasma aerodynamic applications, or plasma electromagnetic effects for re-entry vehicles will benefit from this innovation.

This innovation is of interest to the Department of Defense, especially the Air Force, where researchers are interested in space weather effects and propulsion, and the Department of Energy, where researchers are interested in plasmas for fusion and other thermonuclear applications. Software derived here will also be of use to commercial companies, especially NASA and defense contractors.

Contact: Seth A. Veitzer veitzer@txcorp.com