# NASA SBIR/STTR Technologies

## NNX11CC57C - Next-Generation Ion Thruster Design Tool to Support Future Space Missions


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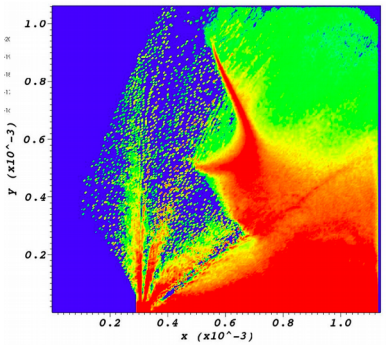
Identification and Significance of Innovation

Ion thrusters are being studied for high-power and high-power-to-thruster operating conditions and thus anything that can be done to improve the understanding of these devices and to make designing them easier is a benefit. Computational modeling would significantly reduce the expenses for NASA in testing and designing ion engines.

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




Simulated Xe+ ion number density after 2.6 ns for the NEXT ion thruster operating at TL-35 condition

Technical Objectives and Work Plan

Make the fully coupled PIC-MCC ion thruster discharge chamber model developed in Phase I stable.
Reduce the runtime of the fully coupled PIC-MCC ion thruster discharge chamber model developed in Phase I.
Make the fully coupled PIC-MCC ion thruster discharge chamber model developed in Phase I easier to use.

Implement non-uniform grid,s two-dimensional domain decomposition, particle fragmentation and merging, semi-implicit numerical procedures, add a GUI interface to the computer code so that it is easier to use.

NASA and Non-NASA Applications

The purpose of this work was to make the fully coupled PIC-MCC ion thruster discharge chamber model developed in Phase I user friendly so that NASA could easily use it to design future ion thrusters.

Accurate plasma modeling and sputter erosion tools have applications in other government organizations, as well as the aerospace, satellite, ion source and plasma processing industries.

Firm Contacts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**NON-PROPRIETARY DATA**