

# NASA SBIR/STTR Technologies

## A Rapid Model Fitting Tool Suite

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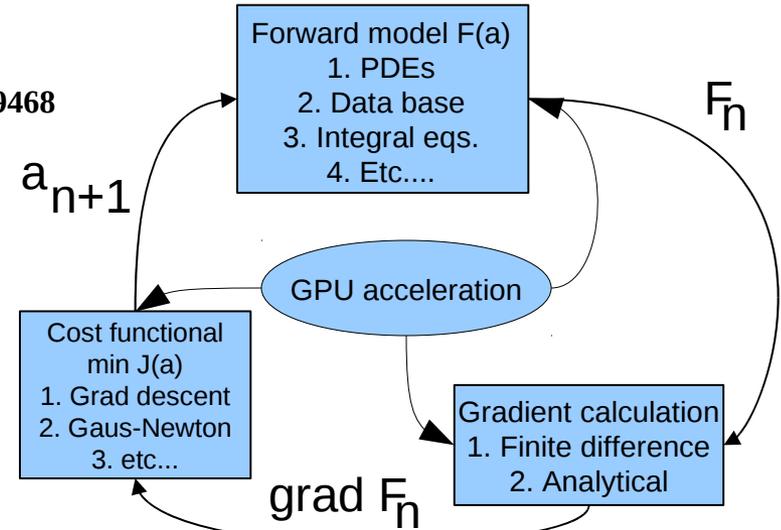
Proposal No.: S6 .03 -9468



### Identification and Significance of Innovation

Many present and future NASA missions require fitting model parameters to increasingly larger sets of data. Fitting these parameters involves evaluating forward models and minimizing functions of many variables. We propose to develop a high performance computing tool suite based on graphical processing units (GPU) for the fitting of measured data and acceleration of forward models.

Expected TRL Range at the end of Contract: 3-4



### Technical Objectives

- Demonstrate the feasibility of a parameter fitting framework on GPUs.
- Demonstrate performance benefits of using GPUs for parameter fitting problems.

### Work Plan

- Prototype two forward models on GPUs.
- Prototype a GPU finite difference Jacobian
- Prototype Levenburg-Marquardt based minimization on a GPU
- Analyze performance of GPU accelerated parameter fitting

### NASA applications

For example, the Stratospheric Aerosol and Gas Experiment (SAGE) III mission, the Solar Dynamics Observatory (SDO) and the Glory mission all use some type of model fitting to estimate parameters of interest. These and other missions will directly benefit from this project.

### Non-NASA applications

Parameter fitting is used in almost all areas, from banking and finance to computational biology and spectroscopy, to name a few. The software developed here will have broad applications.

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**NON-PROPRIETARY DATA**