

# NASA SBIR/STTR Technologies

## Benchmark numerical toolkits for High Performance Computing



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Proposal No.: 08-1 T5.01-9954

### Identification and Significance of Innovation:

- Main aim is to address lack of well defined benchmarks to test and verify numerical toolkits for large scale applications on serial/parallel machines
- Goal is to deliver a web based numerical test suite for future HPC benchmarking activities
- Innovation: Problems can be obtained from a static collection or from a dynamic creation. This dynamic creation will involve parametric input file for automated generation of test problems, have gradation of problem stiffness and cover different areas of physics

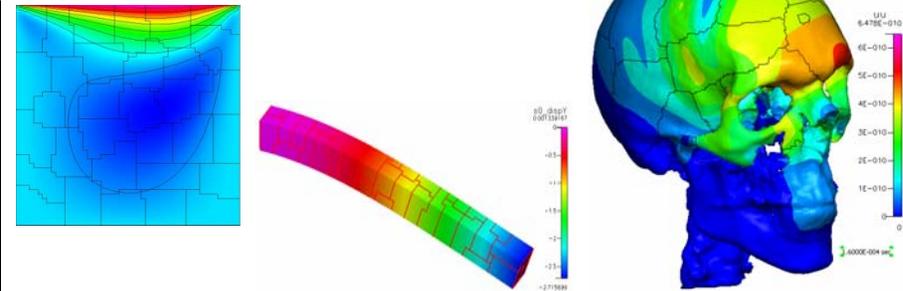
Expected TRL Range at the end of Contract (1-9):5

### Technical Objectives:

The overall objective of the proposed project is to develop, demonstrate and deliver a comprehensive numerical test suite for benchmark evaluation of linear algebra solvers for computational application software on current and future large-scale High Performance Computers

### Work Plan:

- Preparation of a Software/Data/Usability
- Critical review of existing benchmarks and selection of new test problems from selected disciplines.
- Adaptation of CFDRC and TACC computational codes for generation of test problems
- Computational Benchmark tests
- Development of a prototype web portal and demonstration of automated generation of test problems



CFDRC CoBi parallel simulation results of flow, FEM mechanics and acoustics problems

Due to the nature of the software, CFDRC plans to use the “open source” business model. This promotes access to the software by a large user base, but software adaptation, user support, and commercial application licenses are provided on a fee basis.

NASA Applications: . In particular for NASA, we anticipate a great interest from NASA Ames, JPL, and many of the other scientific and engineering NASA Centers who deal with large simulations on HPC computer platforms.

Non NASA applications: Non-NASA application potential exist from many organizations that perform compute intensive simulations such as DoD, DoE, National Laboratories (Sandia, Lawrence Livermore, Argonne National Labs, etc.), and Universities

**NON-PROPRIETARY DATA**

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