



TECH-X Overview (For Discussion with OSG)

Tech-X Corporation

www.txcorp.com



Overview

- Tech-X in a nutshell
- SBIR program changes
- Change in actions
- Some ideas of possible interest to OSG



Tech-X Corporation Facts

- ~47 people, 2/3 PHDs, Boulder, Colorado
- Founded in 1994
- 220 SBIRs from DOE, NASA and DOD, 74 Phases II
- Participants of SciDAC projects (leading FACETS)
- <http://www.txcorp.com>



Relevant Areas of Expertise

- High-performance computational software for research and engineering simulation and design
- Enhancing code performance through porting to modern hardware (GPUs, MIC)
- High-performance visualization and graphical user interfaces
- Middleware for systems integration and real time data distribution

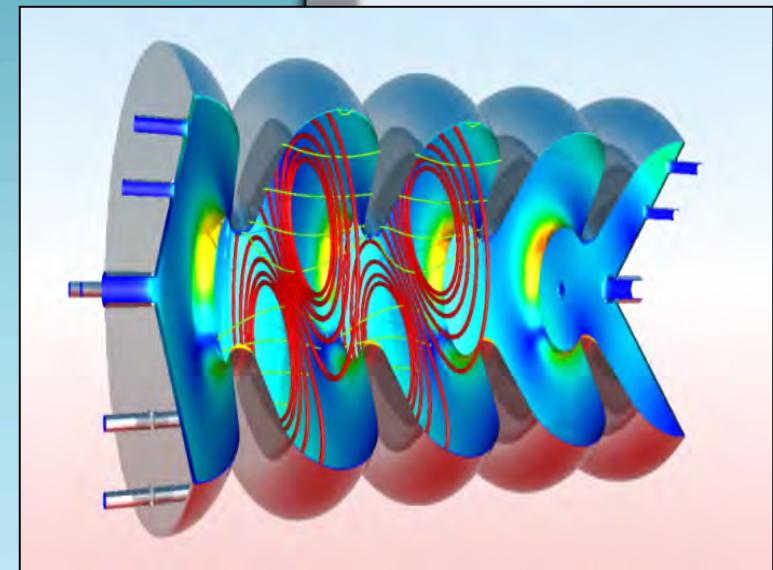


Tech-X Advantage: High Performance and High Quality

- Cutting edge algorithms for cutting edge hardware (hundreds of thousands of cores and GPU)
- Cross-platform support for ease of deployment
- Scientific approach combined with industry strength testing and validation

VSim Product: Electromagnetic and Kinetic Plasma Modeling

- VSim for Electromagnetic solutions
 - Antennas
 - Accelerator cavities
 - Photonic devices
- VSim for Microwave Devices
 - S-parameters
 - Multipacting impacts on performance
- VSim for Plasma Discharges
 - Plasma processing
 - Plasma medical devices
- VSim for Plasma Accelerator
 - Laser-plasma wakefield acceleration
 - Beam-plasma acceleration



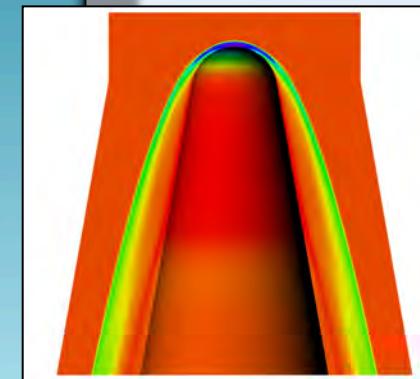
USim Product: Fluid and Plasmas Modeling Based TECH-Xon Multifluid Approach and Unstructured Meshes

- USim Hypersonics

- Navier-Stokes with anisotropy
- Reaction chemistry
- Multiple species
- Real gas equation of state
- General equation of state

- USim High Energy Dense Plasmas

- Gas dynamic MHD
- Separate evolution of electrons and ions
- General equation of state
- Full Maxwell's equations

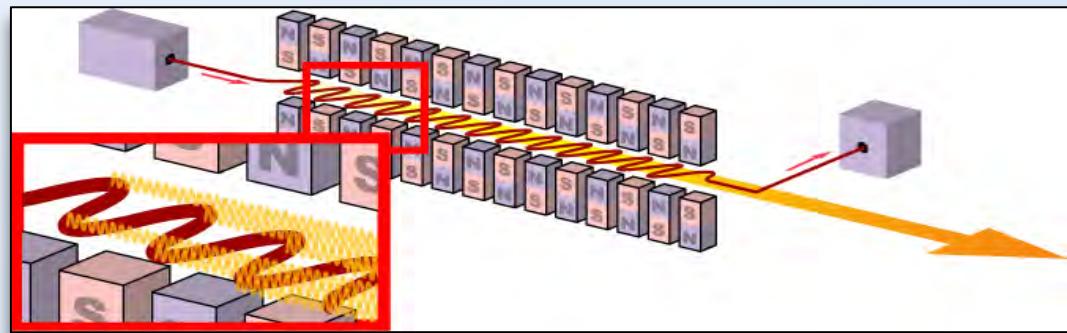


Analysis and Problem Definition

- Performance analysis
- Algorithm and code design review
- Feasibility and impact studies

Implementation and optimization

- CUDA, OpenCL, or OpenMP acceleration
- Accelerate IDL programs with GPUlib



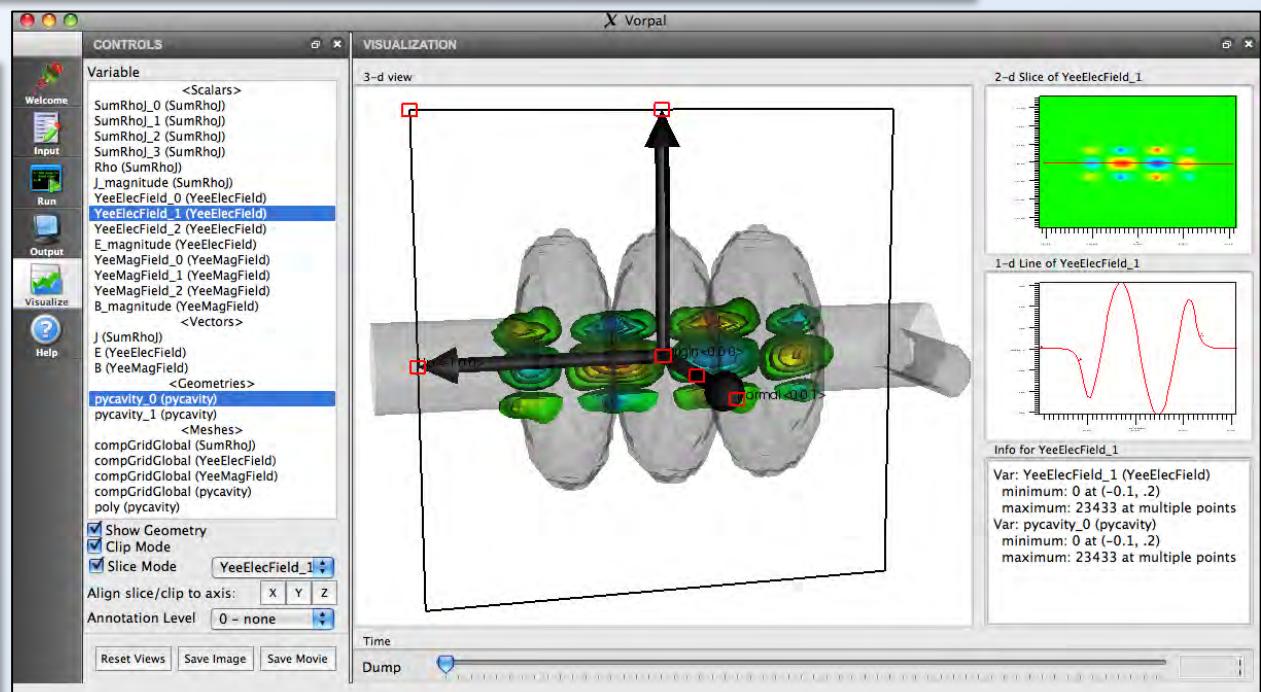
Services: High Performance Visualization and GUIs

Data Visualization

- High-end visualization
- Use VizSchema to accelerate data discovery

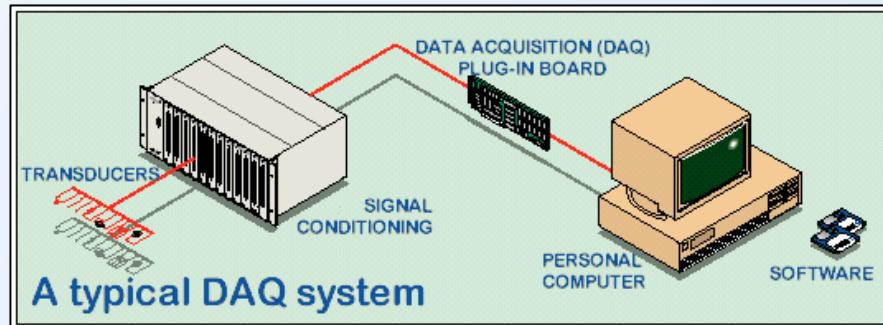
Composer Toolkit

- GUI front end for your application
- Customized workflows



Services: DDS for Systems Integration and Real Time Data Distribution

- Experts in OMG's Data Distribution Service for peer-to-peer real time data exchange
 - Components integration, new generation control systems, robotics and information awareness)
- PyDDS is in the productization stage
 - Tech-X's Python implementation of DDS for ease of prototyping and integration with analysis tools



Market Segments

- Electromagnetics



- Plasma processing



- Space physics



- Defense



- Research / education



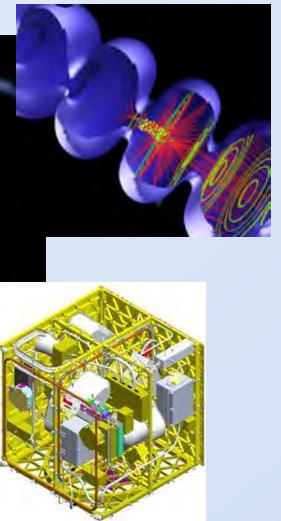
- Software development / testing

```

#pragma once
#include "MSG.h"
#ifndef _MSC_VER > 1000
#error include "MSG.h"
#endif
#include "resource.h"
// CDMotionApp:
// See CDMotionApp.h for the implementation
class CDMotionApp : public CFrameWnd
{
public:
    CDMotionApp();
    // Overrides
    // ClassWizard generated virtual function overrides
    //{{AFX_VIRTUAL(CDMotionApp)
    public:
        virtual BOOL InitInstance();
    //}}AFX_VIRTUAL

    // Implementation
    //{{AFX_MSG(CDMotionApp)
    afx_msg void OnInitialize();
    //}}AFX_MSG
    // NOTE - the class will be re-generated if
    // DO NOT EDIT anything past this point
};

```





Customers

We provide our customers with both off-the-shelf and customized solutions addressing their advanced technology needs.

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varian semiconductor equipment

UL



ARA

BOSCH

Jefferson Lab

Thomas Jefferson National Accelerator Facility

JAXA
Japan Aerospace Exploration Agency

AEROSPACE
Assuring Space Mission Success

AFRL
THE AIR FORCE RESEARCH LABORATORY
LEAD | DISCOVER | DEVELOP | DELIVER

NANYANG
TECHNOLOGICAL
UNIVERSITY

Sandia National Laboratories

JAEA

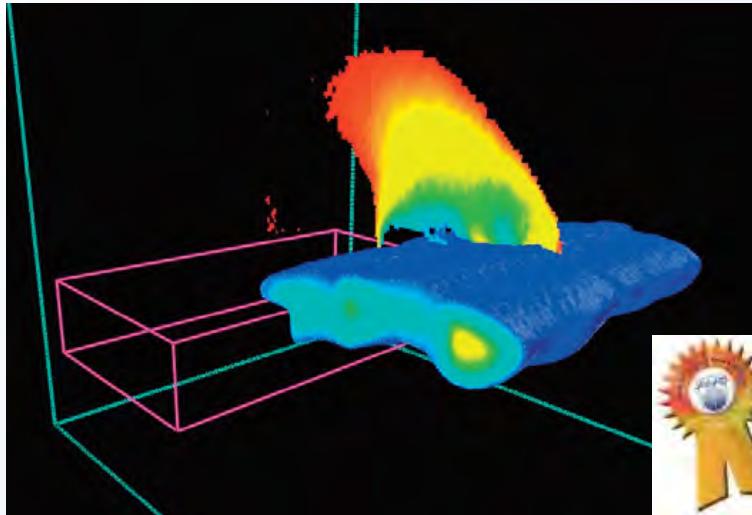
LG.PHILIPS Displays

SAIC

EDCS
CEERI

ITRI
Industrial Technology Research Institute

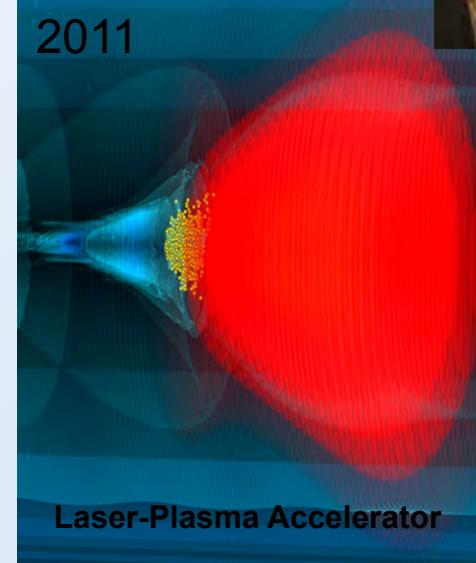
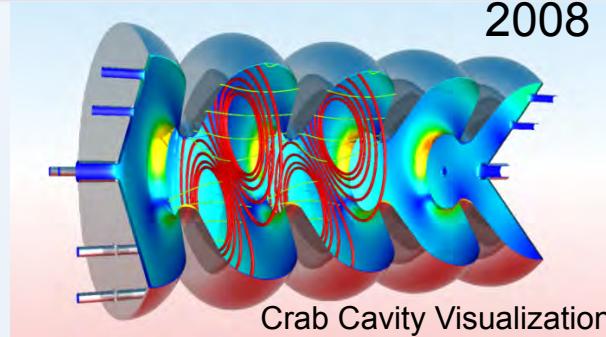
Scientific Recognition



AVS Innovation Award



Far reaching
discoveries



Department of Energy
Visualization Awards



Partners and Collaborators

Our partners and collaborators are at the leading edge of science and technology. They represent a broad spectrum of efforts to discover, describe, predict and exploit the complex behaviors of matter and energy.





Changes in DOE SBIR Program (2011)

- DOE instituted 10 proposal per company
- Emphasis on commercialization
 - An industry reviewer separate from technical reviewers
 - Commercialization score going back in time (changing the rules of game a posteriori)
- Idiosyncrasy of the program
 - The majority of topics is pretty much same (coming from the labs and hard to commercialize)
 - Expectations of 10 fold return (VC approach)



We Reacted to These Changes

- Shifting from DOE SBIR to other efforts
 - Commercialization
 - Consulting
 - Sales
 - Non-DOE SBIR (NASA and DOD)
 - Non-SBIR grants
- Reduction (47 from 70 people)
- Different choices of proposals to pursue
- Splitting the portfolio:
 - Applications-> Tech-X
 - Data and infrastructure-> start-up Bolder Solve (Svetlana Shasharina as CEO)



Possible Effects on DOE Labs

- Less participation in SBIR from Tech-X (and other established companies)
- Less of “research” in each proposal
 - Commercialization implies extra work (less research tasks and possibly higher overhead)
 - Cross-platform (windows!) installers
 - Documentation and tests
 - Business development
 - Marketing
- Choice of topics governed by possible commercial outcome

Need changes in behavior

- Working with DOE to make changes in SBIR program
 - Reverse restrictions to 10 proposal
 - More logical list of topics aligned with the new vision
 - Add comments to <http://www.regulations.gov/#!submitComment;D=SBA-2013-0008-0001>
- Treat labs like commercial customers (a la DOD with prime contractors)
 - Labs help formulate new topics
 - SBIR companies do work
 - Labs purchase the products and services, upgrades and maintenance
 - Direct subcontracts from the labs



3 SBIR proposals (Oct 15) can be OSG-related

- Adding CAD and facilitating parallel Geant4 runs (John Cary)
- Providing multi-resolution capabilities to gridFTP (Alex Pletzer)
- Satellite data served to multiple clients; data needs large storage and significant data processing (David Fillmore)