

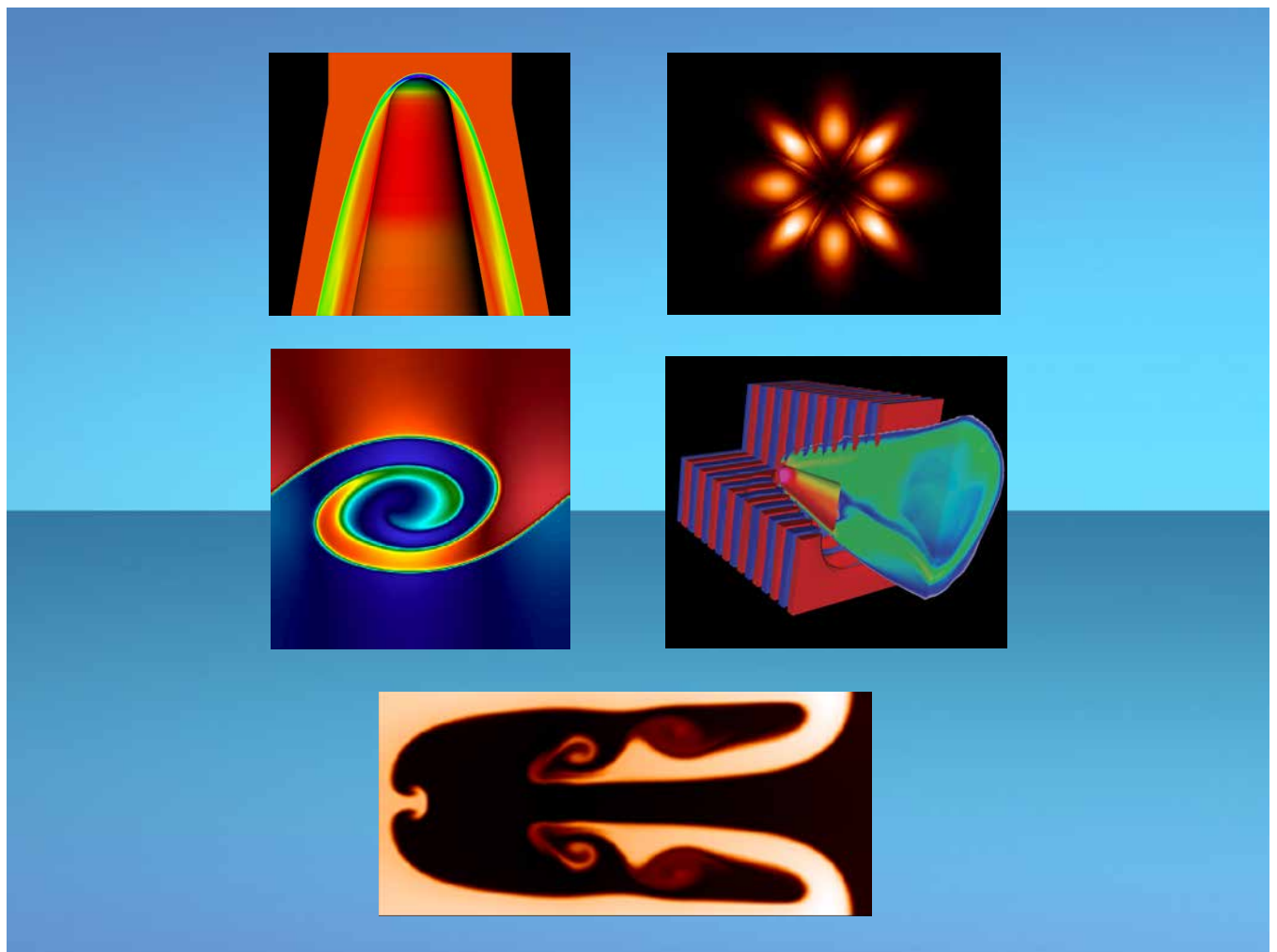


## Fluid Application Using Unstructured Meshes for Complex Geometries and Advanced Algorithms for Complex Fluids



### Powerful Software at Your Service

Simulate spacecraft re-entry at hypersonic velocities in engineering time. Study extreme plasmas with experimental geometries for commercial and defense applications. USim packages enable you to obtain tailor-made solutions to common problems. Combine packages to create a customized software package for your specific needs. Use USim for Basic Simulations to learn about shock formation in multi-dimensions then add USim for Hypersonics to understand how shocks affect spacecraft on re-entry. Later you can add USim for High Energy Density Plasmas to model interaction of electromagnetic waves with spacecraft.



# USim PACKAGES

SIMULATION FEATURES	USim BASIC SIMULATIONS	USim HYPERSONICS	USim HIGH ENERGY DENSITY PLASMAS	USim NEW IN 2.0
<b>GENERAL</b>				
Works in all dimensionalities	●	●	●	
Distributed memory parallelism	●	●	●	
Periodic boundaries	●	●	●	
Open source data format with visualization annotations	●	●	●	
Structured meshes	●	●	●	
Adaptable meshes	●	●	●	
3D unstructured meshes	●	●	●	
Cylindrical coordinates	●	●	●	
Spherical coordinates	●	●	●	
Reads Exodus II mesh format	●	●	●	●
Accelerators for time integration		●	●	●
New examples	●	●	●	●
<b>FLUID FLOW</b>				
Single-temperature compressible flow	●	●	●	
Multi-temperature compressible flow		●		
Navier-Stokes equations		●		
Reaction chemistry		●		
Accelerators for time integration		●		
Multiple species		●		
User defined chemistry tables		●		●
Turbulence model (k-epsilon)		●		●
Ablation		●		●
<b>MAGNETIZED FLOW</b>				
Ideal magnetohydrodynamics	●	●	●	
Gas dynamic magnetohydrodynamics			●	
Separate densities for ions and electrons			●	
Separate velocities for ions and electrons			●	
Separate temperatures for ions and electrons			●	
Anisotropic temperatures for ions and electrons			●	
Full Maxwell's equations			●	
Anisotropic diffusion			●	●
Species collisions			●	●
Improved MHD divergence cleaning algorithms			●	●
Isotropic and anisotropic Poisson solver (linear and non-linear)			●	●
<b>EQUATION OF STATE</b>				
Ideal gas equation of state	●	●	●	
Real gas equation of state		●		
General equation of state		●	●	

## Choose the right package for your needs.

USER INTERFACE FEATURES	USim BASIC SIMULATIONS	USim HYPERSONICS	USim HIGH ENERGY DENSITY PLASMAS	USim NEW IN 2.0
<b>ONLINE HELP</b>				
Full hierarchical documentation access	•		•	
<b>SETUP</b>				
Open existing runs	•	•	•	
Create runs from examples	•	•	•	
Easily adjust key parameters in examples	•	•	•	
Both streamlined and comprehensive input file editor availability	•	•	•	
Input file search capability	•	•	•	
Input file validation	•	•	•	
<b>RUN</b>				
Runtime parameter editing	•	•	•	
Both serial and parallel mode availability	•	•	•	
File browser	•	•	•	
Log views	•	•	•	
Enhanced standard output view	•	•	•	•
<b>VISUALIZATION</b>				
Data type and dimensionality-driven views	•	•	•	
2D slice and 1D lineout field analysis views	•	•	•	
Label, color, and rendering controls	•	•	•	
Time slider	•	•	•	
Image saving	•	•	•	
Visualization capability during runtime	•	•	•	
Vector plots	•	•	•	•

# USim PACKAGES

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## Flexible Pricing

With USim's flexible pricing model, you pay only for the capabilities you need. Whether you need to have a custom set of physics capabilities created or you want to purchase the front end graphical user interface separately from the physics engine, we will work with you to meet your requirements. For example, you can purchase USim with its GUI interface for your workstation then buy only the physics engine portion of the product to run on your cluster. This means that you do not have to pay for an extra USim workstation license to be able to use your cluster's computing power to run simulations. Our sales team is happy to answer your questions to match our product to your problem and resources.

## Scalable Simulations for Your Hardest Problems

Since USim supports massively parallel computing and scales to tens of thousands of processor cores, new problems that were previously unsolvable are now within reach. USim works on Linux, Windows, and Mac OS X platforms. Our competitive pricing means that the more computing cores you need, the less you pay per core, whether you use batch computing on clusters, or large single computing jobs.

## About Tech-X Corporation

Tech-X Corporation is committed to technical excellence and innovation. Our scientists and software engineers work together to deliver quantifiable results. We combine the academic research with a commercial software company sensibility to deliver high quality, cutting edge software that takes advantage of the latest hardware and software advances.

## Consulting Services

Tech-X offers consulting and training services for all of its simulation software. In addition to the free support that comes with every purchase of a USim product, we have our experts ready to help you use USim to its full extent possible to solve your most challenging problems.

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## USim 2 Package List

### ■ USim for Basic Simulations

*Explore the physics of fluid dynamics quickly and easily.*

### ■ USim for Hypersonics

*Perform fluid simulations of hypersonic plasma regimes, designed for problems such as spacecraft re-entry and hypersonic flight.*

### ■ USim for High Energy Density Plasmas

*Model complex lab plasmas in applications such as magnetic reconnection, plasma liner experiments, and plasma accelerators.*