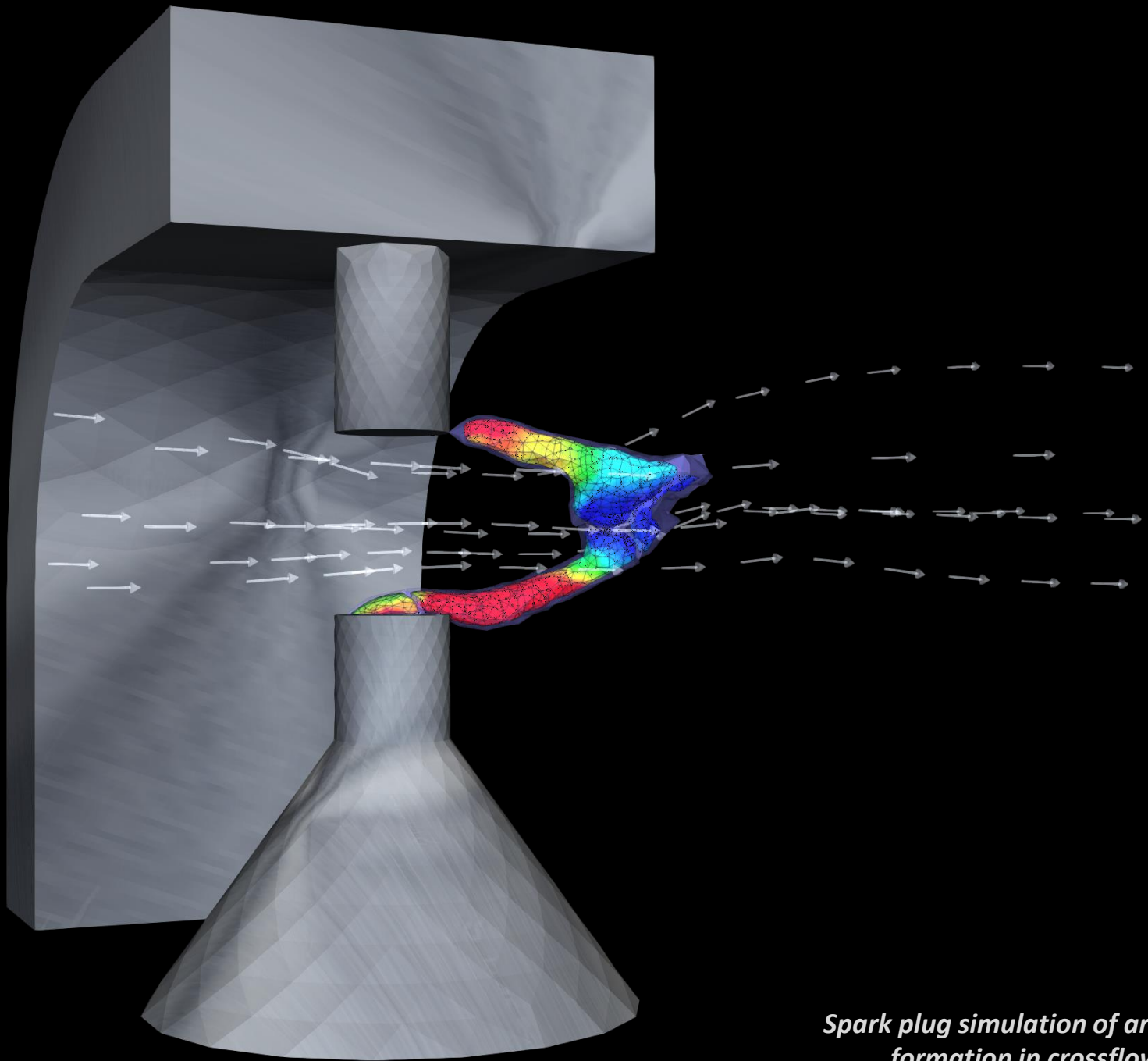


OverViz

*Glow
Spark
EM
Flow
Grain*

Multiphysics Simulation Suite



Spark plug simulation of arc formation in crossflow



EsgeeTechnologies Inc.

Analysis and Design through High-Fidelity Simulations

www.esgeetech.com

Cold Plasmas

Thermal Plasmas

Fluid flow

Heat Transfer

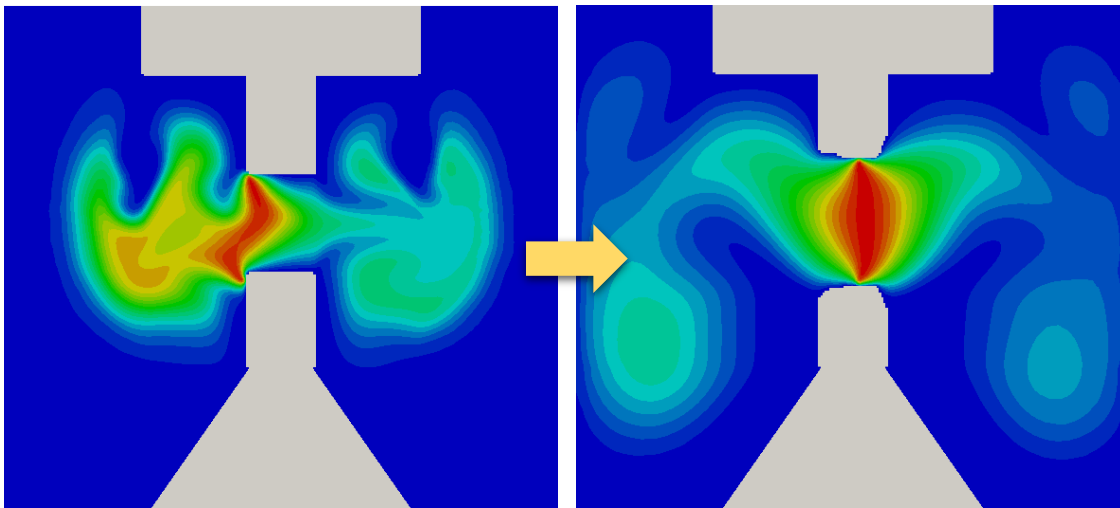
Powerful multiphysics framework for plasma-fluid-electromagnetic-particle simulations enabling real-world engineering solutions.

Particle Kinetics

Electromagnetics

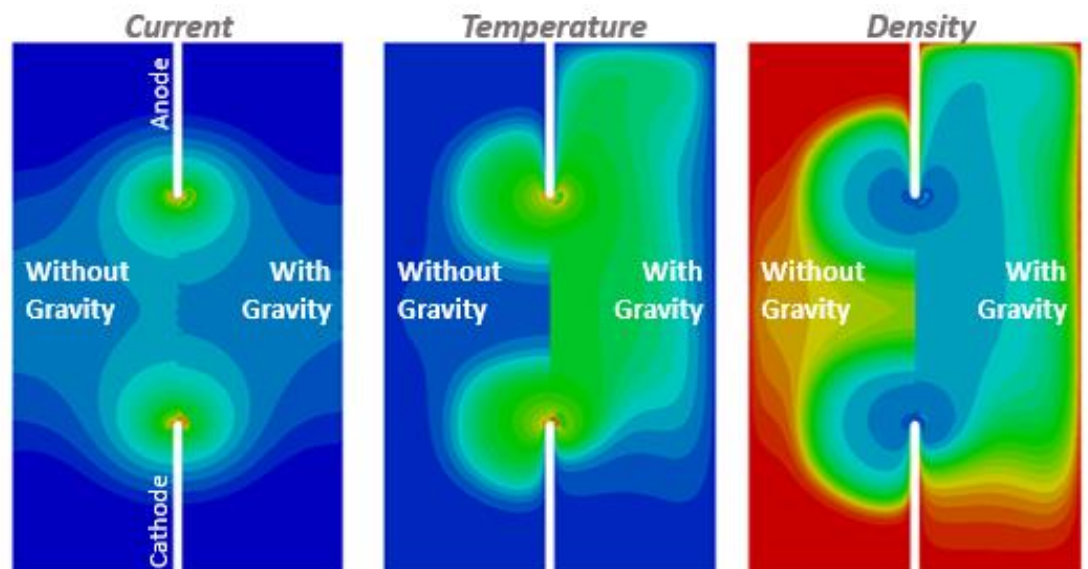
Moving Body Dynamics

Reactive Chemistries



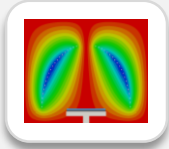
Simulation of spark plug erosion using multi-timescale framework enables predictive capability for **spark plug life**.

HID lamp simulation compares performance with and without buoyancy. Simulation used to investigate hardware failures and improve design life.



OverViz

Parallelized, scalable framework for creating 1D/2D/3D, coupled simulations using a comprehensive suite of multiphysics modules



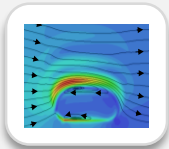
VizGlow

Non-equilibrium cold plasma systems



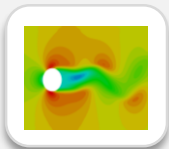
VizSpark

Thermal (arc) plasma systems



VizEM

Static and wave electromagnetic fields in both time and frequency domains



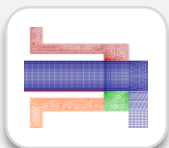
VizFlow

Robust flow modeling of applications ranging from incompressible to high-Mach compressible flows



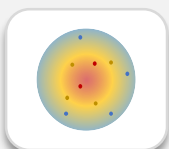
VizGrain

Gas-DSMC, PIC, hybrid-plasma / macro-particle kinetics



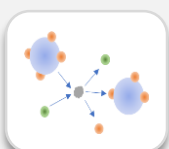
VizMesh

Hybrid unstructured 2D mesh generation tool



ChemZone

Generalized 0D fast reactor model for complex chemical reactive systems



VizData

Comprehensive database of finite-rate chemistries and equilibrium thermodynamics

Industrial Applications

The broad suite of multiphysics capabilities is used to solve complex problems across a wide range of industrial applications.

Semiconductor

Integrated-circuit manufacturing, thin film etching/deposition, capacitively coupled plasmas, inductively coupled plasmas, direct current plasmas, microwave plasmas

Flat panel displays

Plasma display panel development, thin film manufacturing uniformity and quality

Solar cell fabrication

Solar cell fabrication equipment design, multi-metal thin film processes, magnetron sputter deposition

Electrical / industrial

Circuit breakers, arc welding/cutting, plasma torches for spray coatings, AC/DC arc furnaces, arc lamps, electrical switch-gears, ablation controlled arcs

Automotive

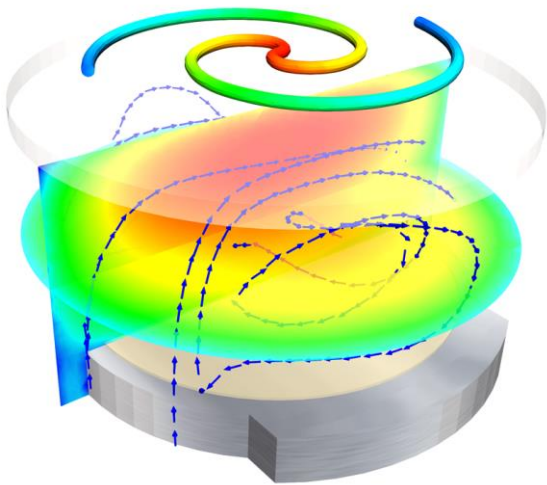
Spark plugs, plasma-combustion ignition, HID manufacturing

Oil and gas

Oil/gas flares, pipe flow systems, combustion mechanisms in complex fuels, plasma torches, plasma cutting tools and processes

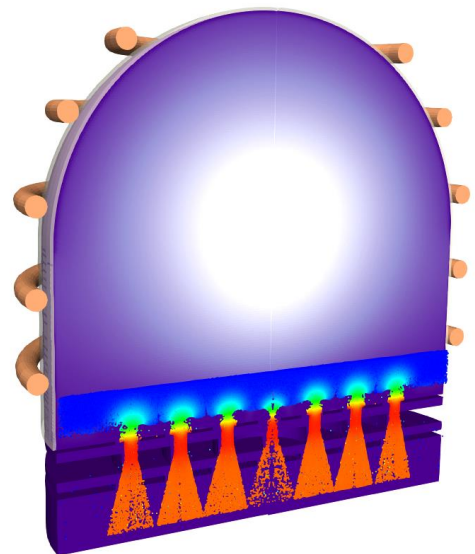
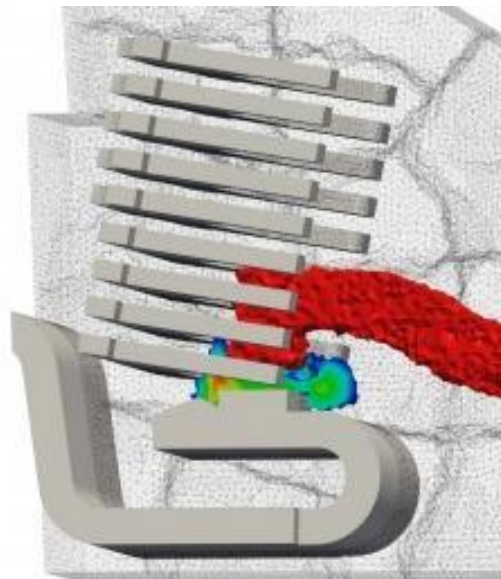
Aerospace and defense

Space vehicle charging, ion thrusters, magneto-plasma dynamic thrusters, arcjet propulsion, gas lasers, aerodynamic flow control



Inductively coupled plasma reactor includes fully coupled gas flow and electromagnetic effects.

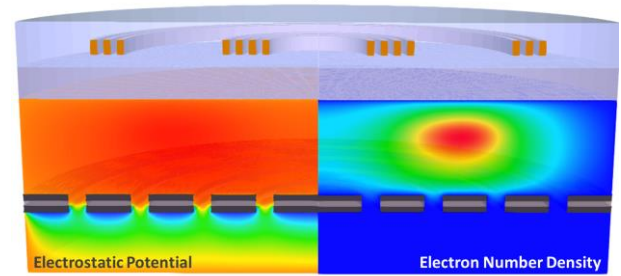
Simulation of arc formation and quench in molded circuit break with dynamic moving contact



Hybrid plasma-particle simulation of RF gridded ion thruster is used to characterize and optimize thrust performance.

Industry Leading Plasma Simulation

OverViz is a validated multiphysics tool suite, enabling customers to solve complex engineering problems. It provides comprehensive modeling of plasma physics, capable of capturing low temperature, non-equilibrium glow discharges (VizGlow) as well as thermal arcs in high temperature plasmas (VizSpark). This empowers leading customers worldwide to meet technological challenges in plasma applications.



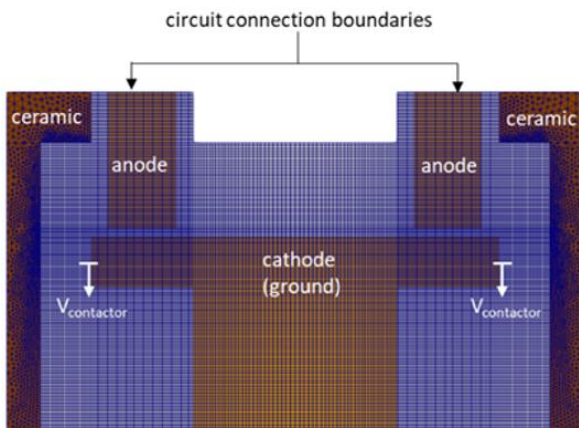
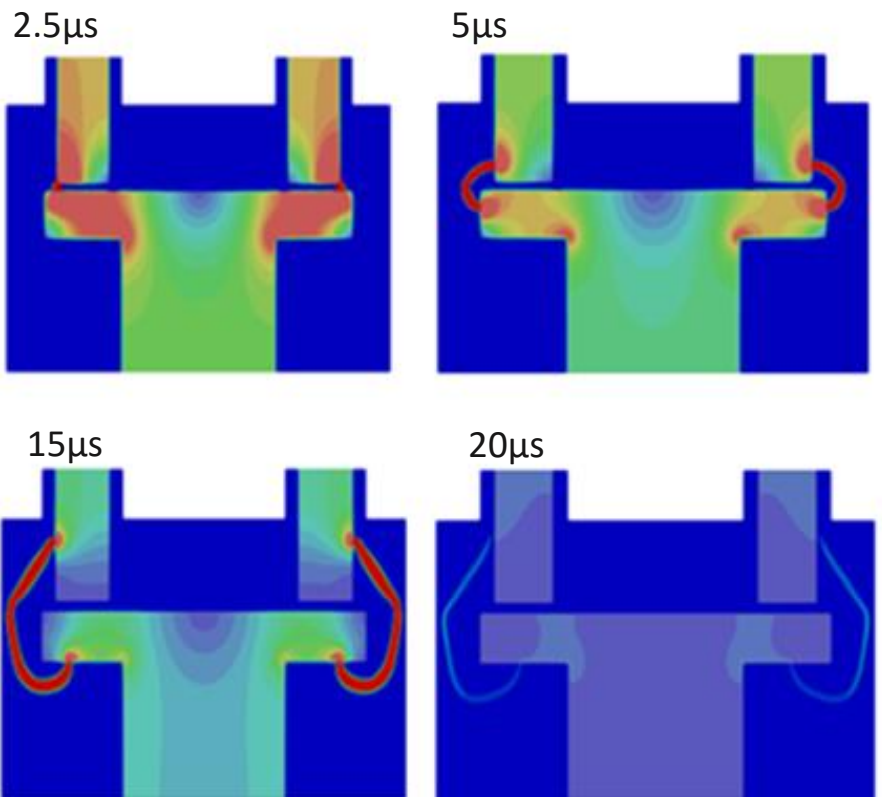
Simulation of inductively coupled plasma reactor used to explore plasma composition and uniformity for a semiconductor wafer process application.

Advanced Simulation Capabilities

New capabilities are continually added to expand the fidelity and robustness of multiphysics simulations and help address specific customer challenges. Examples include:

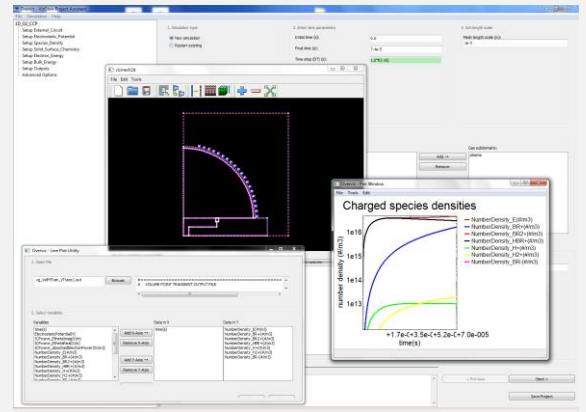
- High performance parallel computing to accelerate analysis execution
- Customizable external circuit modeling
- Particle In Cell (PIC) method for plasma particle motions
- Moving body dynamics and material ablation modeling
- Advanced state-of-the-art solvers to ensure accurate solutions on complex geometries
- Custom-User-Functions (CUF) allow users to expand and customize complex simulations

Simulation of electric vehicle relay with dynamic moving contact is used to explore effects of pressure, gas composition, and magnetic field effects on arc formation and cut-off time. Electric current densities shown at different times.

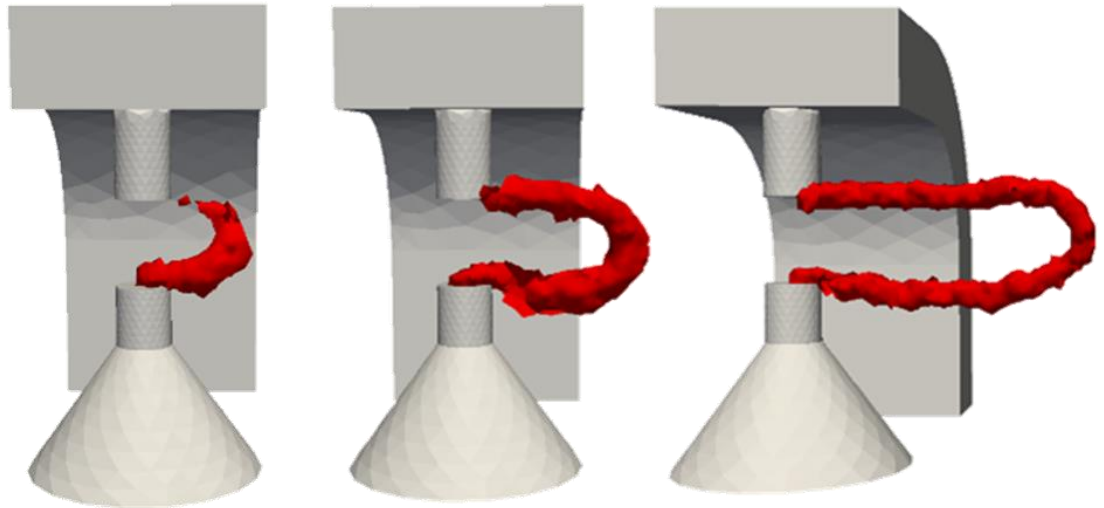


Intuitive Graphical Interface

Modules within the OverViz suite can be seamlessly integrated through an intuitive graphical user interface. This makes the tools easily accessible to a wide range of users, allowing them to quickly setup and execute complex multiphysics simulations.



Simulation of spark plug arc channel formation in a crossflow is used to investigate flame kernel sensitivity to gas composition and engine conditions.



Engineering Services

Esgee Technologies Inc. is dedicated to helping customers leverage the OverViz simulation suite to meet technical challenges, improve design performance, reduce product timelines, and improve manufacturing quality. This is accomplished through:

- **Customized training** to help get customers up to speed quickly and enable them to maximize the utility of the OverViz tool suite. Training is offered in-person at the Esgee office in Austin, TX, in-person at a customer sites, or remotely via WebEx.
- Dedicated **technical support** for all licensed customers. We are highly committed to customer satisfaction and work closely with customers to help them work effectively and efficiently in achieving their simulation goals.
- **Consulting services**, utilizing a team of highly specialized domain experts in plasmas, reactive flows, gas and surface chemistries, thermal fluids, electromagnetics and integrated hybrid plasma systems to help customers solve complex multiphysics problems.

Request an overview and demonstration via WebEx at info@esgeetech.com