

Visual-CFD

An Intelligent and Advanced User Interface for OpenFOAM®

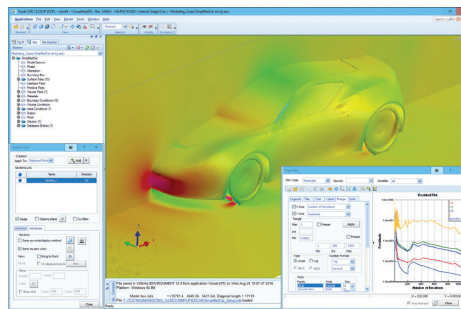
Industrial Support:

- **Automotive**
 - Exterior Aerodynamics
 - Wind Tunnel Calibration
 - HVAC & Cabin Climate Control
 - Underhood Thermal
 - Engine Cooling
- **Building HVAC & Ventilation**
- **Chemical**
 - Mixing Tanks
 - Oil/Water Separators
- **Industrial Cooling**
 - Electronics
 - Generators
- **Sprinklers**
- **Turbomachinery and Pumps**
- **Sub-sonic Aerospace Applications**

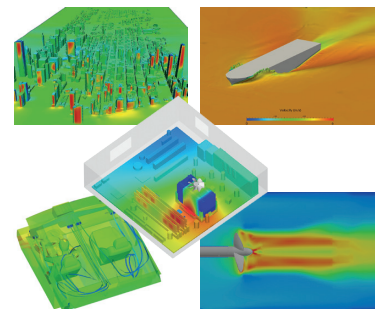
Key Features:

- Extensive CAD pre-processing
- Wrapping to support cleanup of CAD
- Steady/Transient Simulations including LES, DES
- CHT, Natural convection
- VoF, Eulerian
- Domain marker for multi-region mesh
- Dynamic/Rotating mesh
- Heat Exchanger, Heat Source/Sink
- MRF, Porous Media
- In-built post-processor
- Part rename and deletion of STL data
- Automation using Python Scripts
- Remote Computing

Open source tools are an alternative to commercial tools due to their cost-effectiveness. Most of them are very reliable but have a steep learning curve due to lack of effective documentation as well as user interface. **OpenFOAM®**, one of the most popular CFD tools on the market, is developed and released by ESI-OpenCFD. Challenges with OpenFOAM® are related to text-based editing of numerous files, which may cause runtime errors and lots of time to debug. **Visual-CFD** uses standard CFD terminology, which ensures a smooth transfer from the existing tool to **OpenFOAM®** for engineering analysis of enterprise applications. **Visual-CFD** is a part of ESI's multi-domain simulation platform and process Manager, **Visual-Environment**.



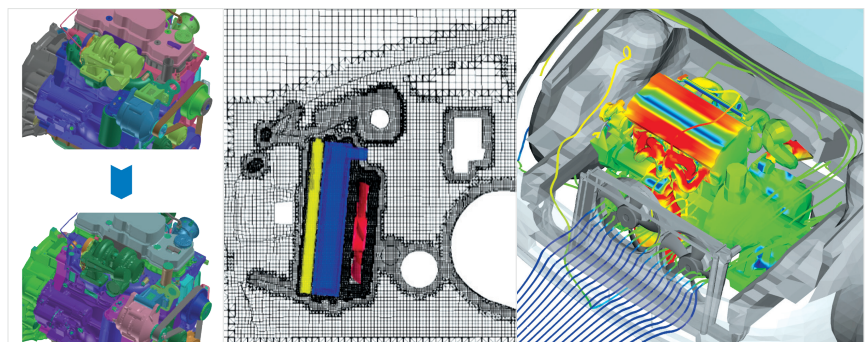
Visual-CFD Environment



Applications of Visual-CFD

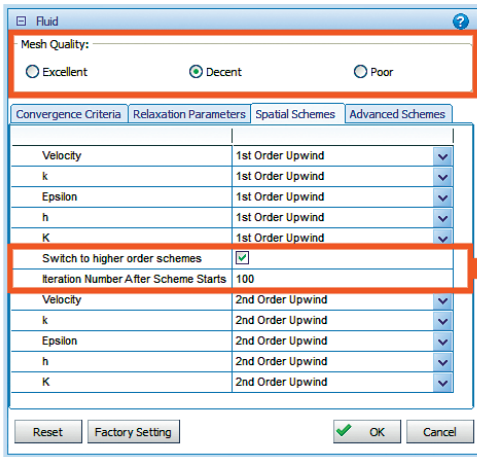
Multi-Domain/Region Meshing and Heat Exchanger Modeling

Visual-CFD is capable of handling complex underhood thermal simulations that require multi-region mesh and heat exchanger modeling with coolant side circuit. Heat transfer modeling including CHT is possible (except radiation), which enables thermal simulations. Even though models like underhood are complex in terms of number of parts, their complexity and physics, Visual-CFD handles them with ease. At the modeling level, wrapping and hole closing for complex assemblies (such as an engine) is easily possible.



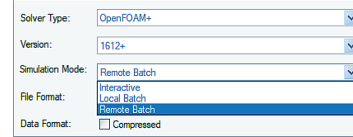
Wrapped Engine

Underhood Thermal Simulation with Visual-CFD



Mesh quality based intelligent Discretization Schemes

Automatic Switching to Higher Order Schemes



Supports ESI Open-CFD and Foundation version along with user's own version

Various modes of simulation and data write format

Platform Support:

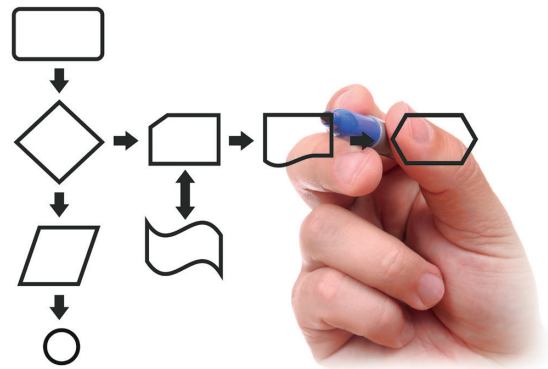
Both Windows and Linux

Supported OpenFOAM® Solvers:

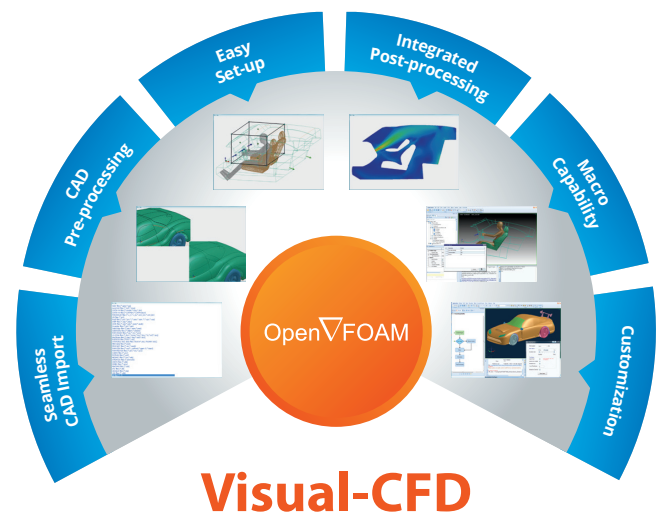
simpleFoam
 pimpleFoam
 rhoSimpleFoam
 rhoPimpleFoam
 buoyantSimpleFoam
 buoyantPimpleFoam
 interFoam
 interDyMFoam
 pimpleDyMFoam
 rhoPimpleDyMFoam
 multiPhaseEulerFoam
 chtMultiRegionSimpleFoam
 chtMultiRegionFoam
 and many more

Multi-Domain/Region Meshing and Heat Exchanger Modeling

- Imports most common CAD formats (e.g. CATIA, SolidWorks, UG, IGES, STEP) as well as STL, OBJ and Nastran
- Extensive CAD Cleanup capability including state-of-the-art wrapping technology and intelligent hole closing techniques
- Fast and efficient handling of snappyHexMesh to generate complex meshes, including multi-domain/region meshing
- Improved controls to get better mesh on close proximity parts and interactive mesh diagnostics at the highest professional level
- User defined BCs, Profile, Simulation Controls and Solvers
- Temperature dependent Material properties supported
- Automatic selection of Simulation Control Parameters based on quality of mesh and modeling physics
- Access to wide range of monitoring and post-processing tools
- Macro recording, based on Python scripting and personalized templates, allowing reuse and customization for future use
- Simulation best practices for industrial applications to help Engineers make better decisions
- Highly effective yet simple and easy-to-use tool
- Easy mesh import from most popular commercial CFD tools



Visual-Environment provides customization possibilities to automate processes



Customer Portal
 myesi.esi-group.com



ABOUT ESI GROUP

ESI Group is a leading innovator in Virtual Prototyping software and services. Specialist in material physics, ESI has developed a unique proficiency in helping industrial manufacturers replace physical prototypes by virtual prototypes, allowing them to virtually manufacture, assemble, test and pre-certify their future products. Coupled with the latest technologies, Virtual Prototyping is now anchored in the wider concept of the Product Performance Lifecycle™, which addresses the operational performance of a product during its entire lifecycle, from launch to disposal. The creation of a Hybrid Twin™, leveraging simulation, physics and data analytics, enables manufacturers to deliver smarter and connected products, to predict product performance and to anticipate maintenance needs.

ESI is a French company listed in compartment B of NYSE Euronext Paris. Present in more than 40 countries, and addressing every major industrial sector, ESI Group employs about 1200 high-level specialists around the world and reported annual sales of €141 million in 2016. For more information, please visit www.esi-group.com.