



ESI CFD CONSULTING SERVICES

SOLUTIONS FOR CFD/MULTIPHYSICS APPLICATIONS

HIGHLIGHTS

- More than 20 years of experience in CFD and FEA simulation technologies
- On shore and off shore engineering support
- Expertise with ESI software solutions and other industry standard tools
- Root Cause Analysis with 'Design of Experiments' methodology
- Innovative design and development solutions
- Data mining and management

BENEFITS

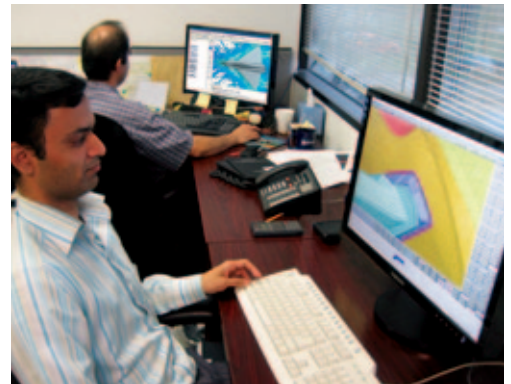
- Access to experienced engineers and project managers
- Worldwide resource availability in various engineering disciplines
- State-of-the-art physics implementation with latest technologies
- Cost effectiveness with high quality results

UNIQUE CAPABILITIES

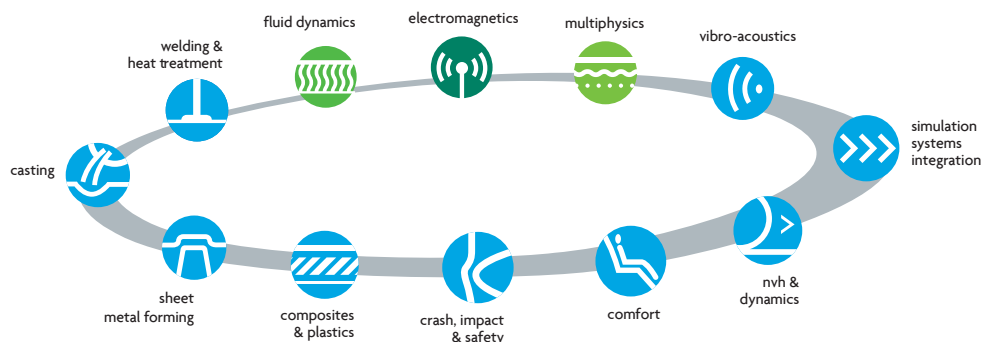
- 1D modeling
- 1D-3D coupling
- Expertise in open source technology
- Custom application development
- CFD Adjoint Solver for sensitivity analysis and shape optimization

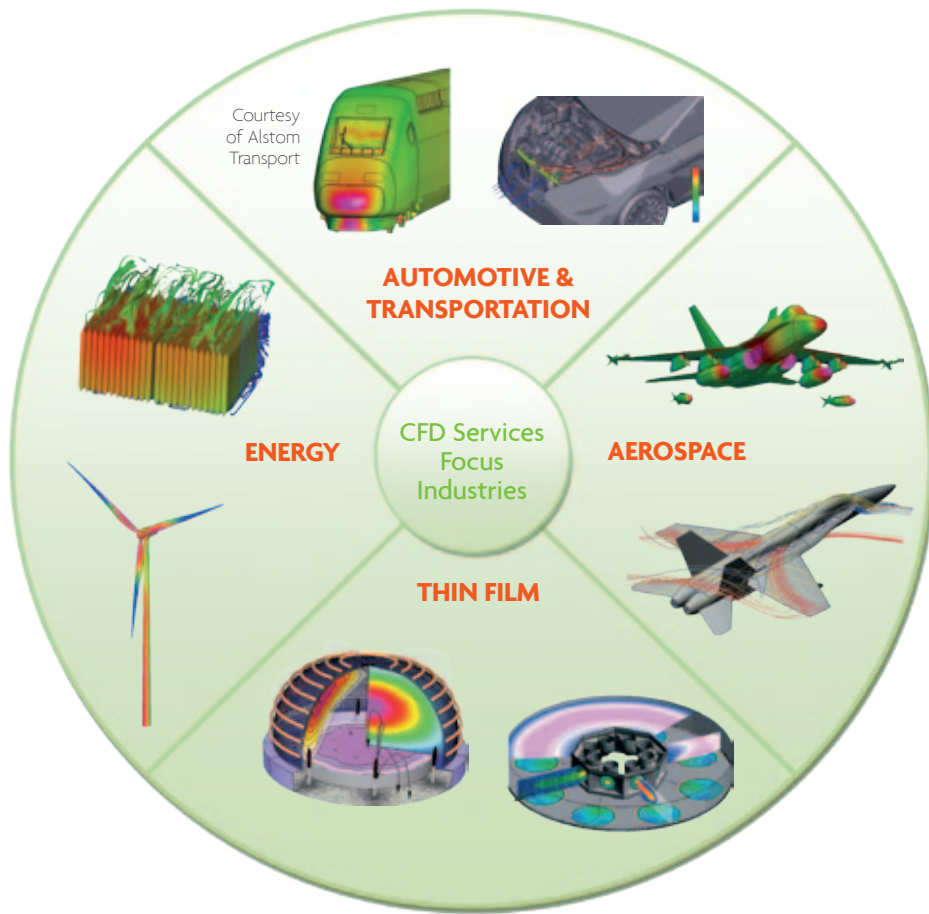
ESI CFD Consulting Services are comprised of over 100 engineers with offices in North America, India and Europe. In addition to a highly specialized team of engineers and scientists in all areas of CFD / Multiphysics, you have access to most commercial solvers, including ESI's Multiphysics ACE+ Suite. This team of experts across the globe can address any type of project and develop customized solutions, delivering value and productivity to the customer, while being cost effective.

ESI CFD Consulting Services solve real world problems by providing innovative solutions to complex product design challenges. The services team has provided results for a multitude of companies in industries such as **Aerospace, Automotive, Energy and Thin Film.**



ESI integrates CFD consulting services within its offering to provide end-to-end solutions. ESI has a comprehensive simulation expertise covering a broad range of engineering disciplines, including Fluid Dynamics, Electromagnetics, and Multiphysics.





COMPLEMENTING SERVICES:

- CAD services
- Reverse engineering / benchmarking
- Training services
- Technical support
- Process automation
- R&D projects

INFRASTRUCTURE:

- High Performance Computing clusters
- High speed parallel processing
- Secured firewall and FTP servers
- VPN connection for remote management
- Data integrity and security
- Project tracking tool

APPLICATION AREAS:

TRANSPORTATION

- Underhood thermal**
 - Transient and steady state temperature
 - Heat shields
 - Hybrids: battery cooling and motor controls
- Aerodynamics**
 - External aerodynamics
 - Adjoint optimization
- Powertrain**
 - Engine airflow
 - Turbocharger performance
 - Hybrids: fuel cell & batteries
 - Exhaust
 - Spark plugs
 - Snow ingestion
- Comfort**
 - Passenger temperature
 - Duct flow

AEROSPACE

- Flight aerodynamics**
 - Lift/drag
 - Store separation (missile launch)
 - High mach and low speed flight
- Spacecraft re-entry**
 - Surface heating due to re-entry
 - Survivability of electronics/crew due to capsule heating
- Launch and separation**
 - Fuel tank slosh
 - Fuel tank or stage separation
 - Engine combustion
- Cabin and cockpit comfort**
 - Cooling and/or heating
 - Pressurization

ENERGY

- Fuel cell performance**
 - Electrochemical function
 - Water management
 - Ion pollution
 - PEM, DSMC, and SOFC experience
- Nuclear**
 - Heat exchange modeling
- Wind energy**
 - Blade design and deformation
- Thermal management**
 - Heating/ cooling of assembled units or packs
 - Packaging
- Battery performance**
 - Steady state simulation
 - Electrochemical performance
 - Local heating

THIN FILM

- Semiconductor manufacturers**
 - Chemical vapor deposition processes
 - Plasma enhanced processes
 - Electroplating
 - Nano-scale simulation of surface features
- Solar**
 - Thin-film photovoltaic manufacturing
- Industrial coatings**
 - Surface coatings for surgical instruments
 - Bearing surfaces
- MicroElectroMechanical (MEMS) devices**
 - Lab-on-a-chip for biotech applications
 - Micro-mirrors

ABOUT ESI GROUP



ESI is a pioneer and world-leading provider in virtual prototyping that takes into account the physics of materials. ESI has developed an extensive suite of coherent, industry-oriented applications to realistically simulate a product's behavior during testing, to fine-tune manufacturing processes in accordance with desired product performance, and to evaluate the environment's impact on performance. ESI's solutions fit into a single collaborative and open environment for End-to-End Virtual Prototyping, thus eliminating the need for physical prototypes during product development. The company employs over 800 high-level specialists worldwide covering more than 30 countries.

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