

NSAERO

Advanced Fluid Dynamics Software

The answer to all your fluid flow questions in a single code.

Focus on problem solution and not on multiple flow code inputs. Get one software product - NSAERO - for all flow speeds and Reynolds numbers, including gaseous combustion.

Rapid problem set up; flexible and general boundary conditions; structured, unstructured and hybrid grids; and many turbulence and chemistry model options give you access to the most complex applications.

OMNI3D, our interactive 3D data visualization tool and TECPLOT™, the industry standard visualization software, are recommended with NSAERO to give you immediate feedback from results and flexible display of flow properties.

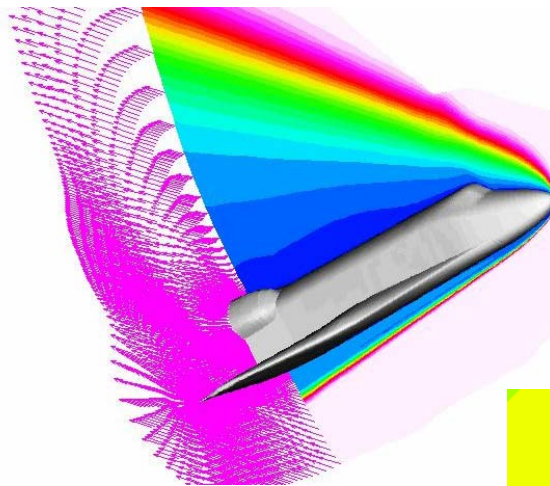
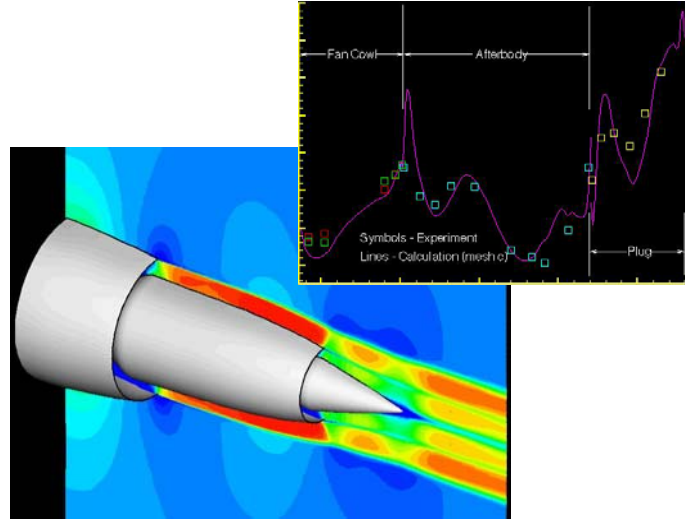
NSAERO, TECPLOT, and our Gridgen preprocessing code provide you the ideal software system for fluid dynamics analysis.



Analytical Methods, Inc.
2133 152nd Avenue NE
Redmond, WA 98052

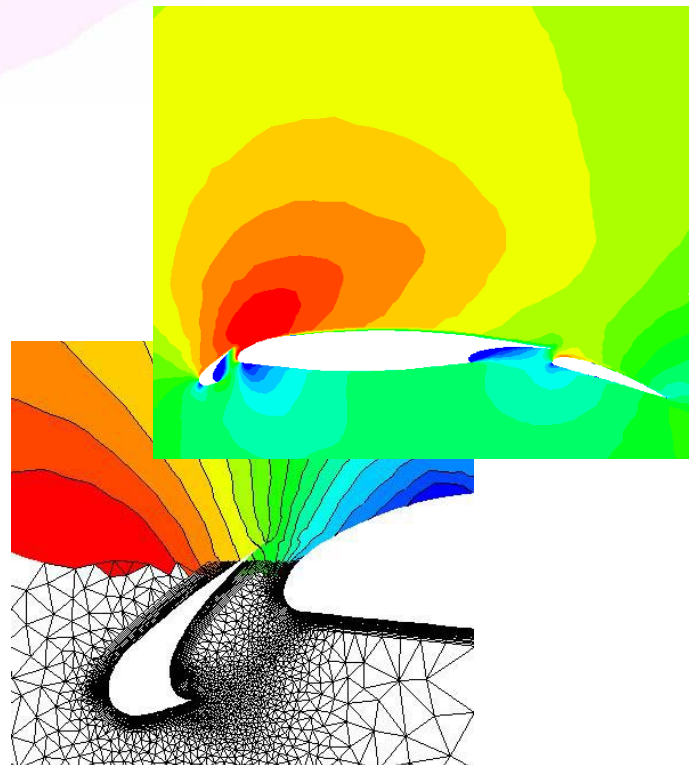
TECPLOT is a trademark of Tecplot, Inc., Bellevue, Washington. Gridgen is a trademark of Pointwise, Inc., Dallas, Texas.

Jet Engine Exhaust Nozzle, Mach Number Contours and Wall Pressure Distribution Comparison With Experimental Results



Atmosphere re-entry of a space shuttle with reacting flow

Mach Number and pressure contours for a 3 Elements Airfoil computed with hybrid grids: O-mesh structured grid around the elements and triangulated grid in the surrounding.



NSAERO is a unified fluid analysis code for aerodynamics and hydrodynamics.

Physical Models

NSAERO is ideal for both viscous and inviscid flows; 2D, axisymmetric, and 3D; steady and transient; laminar and turbulent; inert and chemically reacting gases. NSAERO includes:

- Finite rate and frozen chemistry and equilibrium air curve fits
- Thermochemical non-equilibrium
- Many algebraic, 1-equation, 2-equation turbulence models.

Numerical Methods

NSAERO uses fully conservative methods in a finite volume formulation, with either multi-block structured grids, unstructured or hybrid grids. Implicit LU-SGS, diagonal SGS, and explicit integration are available. Shock capturing is effected with Steger-Warming flux vector splitting or Yee-Harten symmetric TVD, with second-order MUSCL differencing. Choi-Merkle low Mach number preconditioning allows efficient convergence for low speed flows, and an incompressible module is offered with third order upwind biased symmetric TVD or central differencing.

Boundary Conditions

One of the greatest strengths of NSAERO is its generality of boundary conditions and ease with which they are specified by the user, especially when using the Gridgen preprocessor. NSAERO allows the face of a block, or a subsection of a face, to support any of the boundary conditions. Examples are:

- Subsonic and supersonic inflow/outflow
- Symmetry plane and axis
- No slip, free slip, rarefied gas slip walls
- Noncatalytic, partially catalytic, fully catalytic walls
- Adiabatic, isothermal, radiating/conducting walls

Your applications are modeled accurately and quickly.

Pre-Processing

A graphical interface is provided with NSAERO to expedite problem set-up, including chemistry models, intuitive variable names, and use of defaults through an extended namelist format.

NSAERO accepts grids as structured hexahedra blocks, including degenerate shapes and unstructured grids. The hybrid feature of NSAERO (mixing of structured and unstructured grids) offers to the

users a great flexibility in modeling complex geometries.

Post-Processing

TECPLOT™, the industry standard graphic visualization code, is provided with NSAERO. NSAERO also provides support to Fieldview[®] and InSight[®] through its PLOT3D format output option.

Platforms

NSAERO is available for all Unix platforms (workstation and supercomputers), Linux and Windows 95/98/NT. NSAERO also runs in parallel mode using MPI on homogeneous multi-processors (Compaq, Dec Alpha, SGI Octane, Origin 2000, Cray Fujitsu VPP300, IBP SP2) and on heterogeneous platforms as well (each processor from different platforms).

Applications

NSAERO has broad application in the aerospace, automotive, marine, petroleum, and chemical industries. The phenomena range from liquid flow through a fluidic device to the ionizing, dissociating flow around a vehicle re-entering the earth's atmosphere. NSAERO is equally suitable for aerodynamic flows, mixing dominated flows, and conjugate heat transfer applications. NSAERO's flexibility in representing the geometry and physics with high fidelity models, and enhancing problem set up and parametric studies, help ensure successful completion of your flow analysis projects.

Support and Training

Training and support are provided by the same people who develop and apply NSAERO. Contact via telephone, fax, and e-mail are at every user's disposal. Training is conducted at your facility or in the AMI office, at your convenience. Consulting is also available to assist in problem set up and analysis.

Questions?

To discuss your particular project, or to learn of specific NSAERO hardware/operating system requirements, please contact:

Analytical Methods, Inc.

2133 152nd Avenue NE

Redmond, WA 98052 USA

Telephone: 425.643.9090

Facsimile: 425.746.1299

E-Mail: info@amiwest.com

Website: <http://www.am-inc.com>