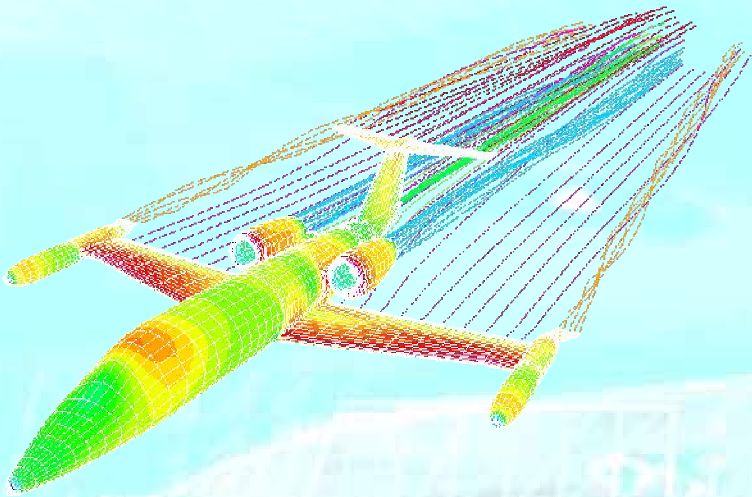
Applied Computing & Engineering Ltd

Design & Manufacturing Simulation

Analytical Methods, Inc.

Non-Linear Aero-/Hydro-dynamic Analyses

VSAero

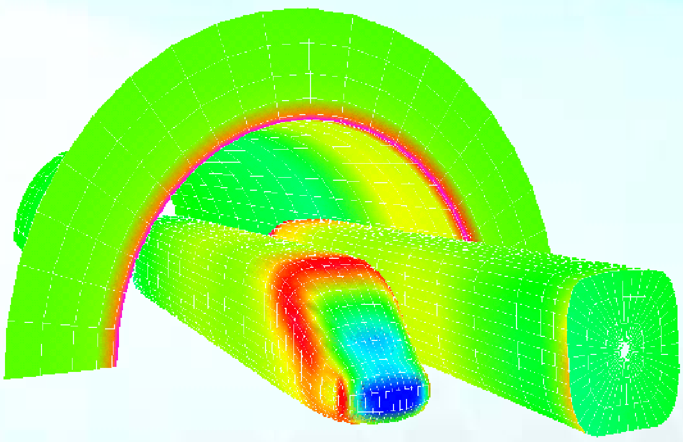


Achieve desktop CFD in minutes – VSAero couples integral methods for potential and boundary layer flows for low runtimes – a complete Boeing 727 in 300 seconds. Flowfield properties are computed for off-body velocity surveys and on/off-body streamlines. The ability to calculate internal and external flows, non-uniform inflow and body rotation makes VSAERO applicable to fluid flow problems in aerospace, automotive and marine engineering.

Special purpose modules FSWave and Rotor expand VSAero's simulation capabilities to include non-linear hydrodynamic wave effects on ships and helicopter rotor/fuselage interactions. Zonal coupling to Navier-Stokes codes is also available. Running on a wide variety of computers, from Cray supercomputers to desktop PCs, VSAero is used worldwide.

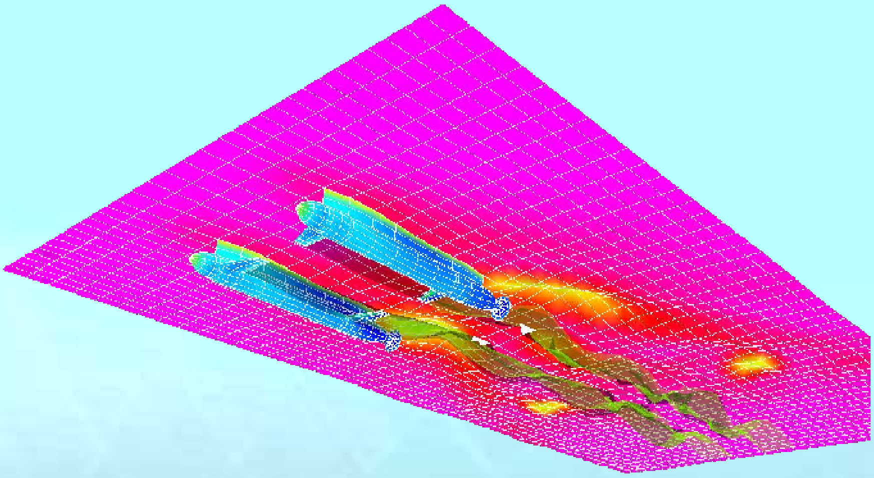
VSAero has been a key factor in the development of notable air/land/sea craft, including Rutan Voyager and Beech Starship aircraft, the Stars and Stripes racing yachts and the Sunraycer solar automobile.

USAero



Challenged by relative motion aerodynamic or hydrodynamic simulations? Multi-store release from a complex aircraft? Trains passing in a tunnel? Ships with rotating propellers operating near the free surface? USAero is the engineer's choice for these and other transient calculations. USAero's unique coupling of potential flow and boundary layer methods with a time-stepping procedure for arbitrary motions assures timely and cost effective assessments of unsteady surface pressures and loads.

FSWave



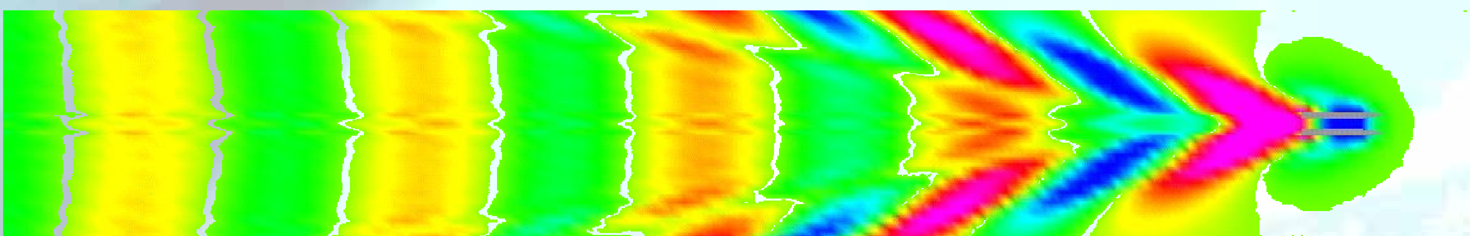
FSWave is a computer program which calculates the non-linear free surface characteristics of a free surface distributed by an arbitrary hull configuration. The hull configuration can either be completely submerged or surface piercing. Multiple hulls may also be modeled. The program is written as a plug-in module, which couples with the VSAero panel code.

VSAero patches on the ship hull provide the pressure and skin friction distributions and the hydrodynamic forces. Special FSWave patches constructed with 'desingularized' panels above the free water surface can satisfy the non-linear boundary condition on the free surface. The procedure can predict the wave forms produced by and the wave resistance of floating and submerged bodies traveling through calm water with a constant forward speed. The flow past a ship performing a steady circular turn on the free surface may also be modeled.

Recent successful applications of FSWave include a detailed study of the wake wash generated by a series of high speed catamaran ferries and an examination of the free surface effects on tank measurements of submarine models.

MSES

Quickly translate your design requirements into an optimum design. MSES is a two dimensional code driven with X-Window GUI allowing rapid geometry changes, parametric flow studies and configuration development for multi-element airfoils in subsonic and transonic flow. MSES is a coupled viscous/inviscid Euler method and offers inverse design, forced and natural transition, and direct and interactive boundary layer methods. Grid generation is automatic using a streamline Coordinate solution, allowing the grid to adapt to the evolving flow field. MISES is a related code for airfoils in a transonic cascade.



Other programs available: Ice, Lee Noise, NSAero, MGAero and CAMRAD II

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Document Reference: CB-BC060603
Revision: A01