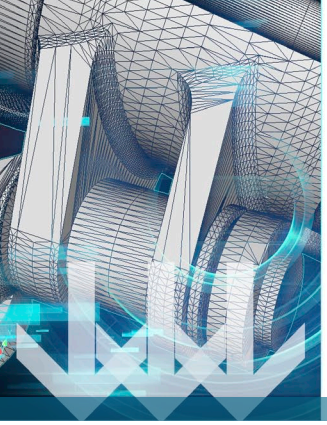
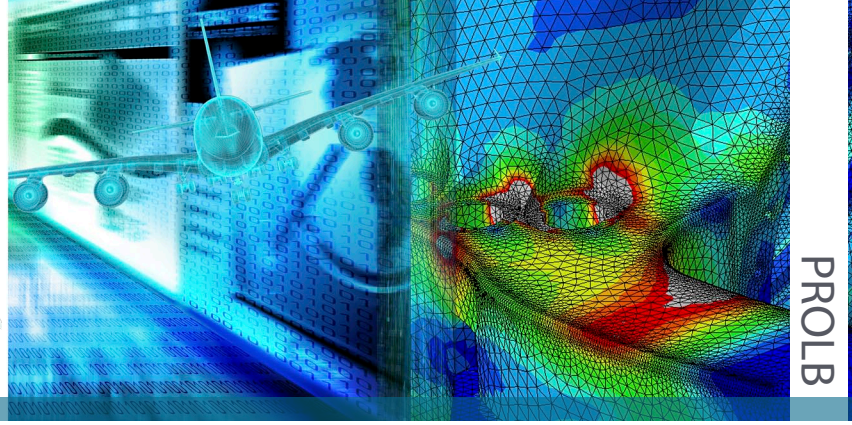
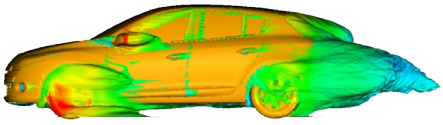


DESIGNER,
INTEGRATOR,
OPERATOR OF
MISSION-CRITICAL
SYSTEMS

The power of innovation



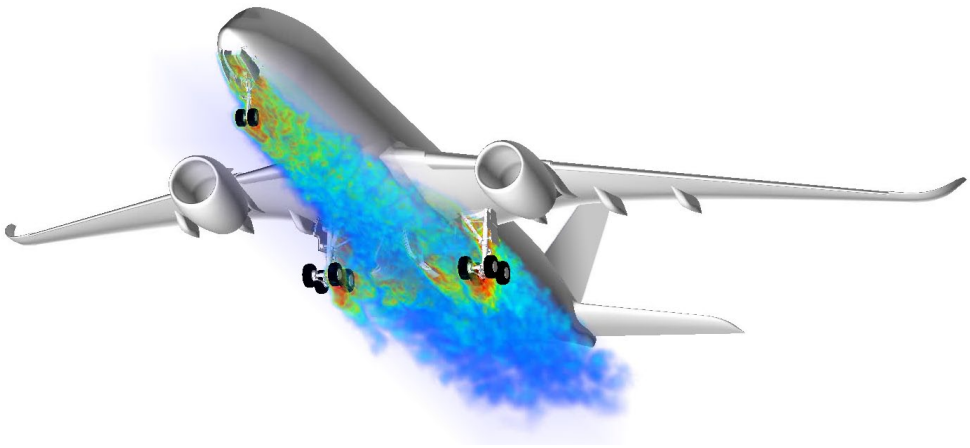
PROLB



ProLB

High-fidelity CFD in exceptional turnaround times

ProLB is an innovative Computational Fluid Dynamics (CFD) software solution. Based on the Lattice-Boltzmann method, its successfully-validated solver performs inherently transient simulations of highly complex flows with a competitive turnaround time. ProLB's accurate aerodynamic and aeroacoustic modeling allows engineers to make early design decisions that optimize and shorten the product development process.



Benefits

> High-fidelity wall-modeled Large-Eddy simulations in affordable turnaround time

> Optimized pre-processing with user-friendly GUI & automated parallel mesh generation

> Open and customizable numerical models

> Free, unlimited and automatic post-processing

> Highly competitive and flexible licensing system

Fields of application

> Automotive

> Aeronautics

> Energy

> Rail Industry

Key Features

Lattice Boltzmann method: combining performance with accuracy

ProLB is based on the lattice Boltzmann method (LBM). Highly scalable, inherently transient, this method revolutionizes Computational Fluid Dynamics by reducing computational time while at the same time increasing accuracy.

ProLB is optimized to predict unsteady flow phenomena with accuracy. Low dissipation and dispersion errors combined with state-of-the-art turbulence modeling approaches (Large Eddy Simulations), allow ProLB to perform high-fidelity aeroacoustic and aerodynamic simulations of weakly compressible flows.

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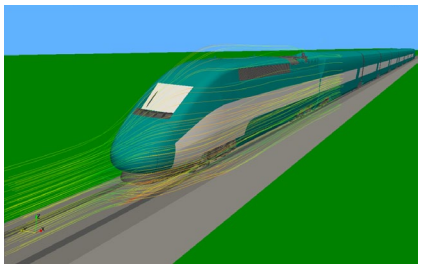
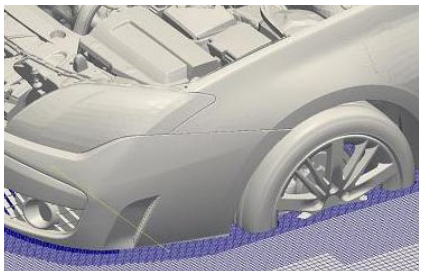
LB-Physics

ProLB users are provided with the source code for all the numerical models implemented. Expert users can implement their application-specific models or modify the existing ones: the wall-law, subgrid-scale model as well as the complete lattice Boltzmann numerical scheme.



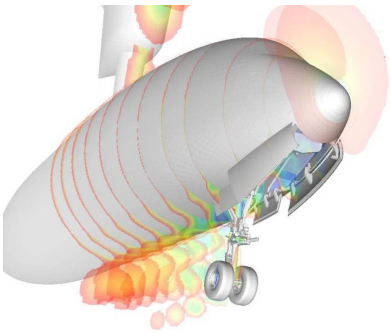
State-of-the-art turbulence modeling

LB-Solver features advanced, state-of-the-art turbulence-modeling techniques: DNS and LES. Large-Eddy Simulations are either based on the Shear-Improved Smagorinsky Model or on the Approximate Deconvolution Model. A pressure-gradient-sensitive wall-law may also be employed. It integrates a correction for the viscous sub-layer as well.



Immersed boundary model

Boundary conditions in ProLB are handled through an innovative Immersed Boundary Model. Thanks to this model, pre-processing is facilitated and most issues related to body-fitted meshes and element quality are eliminated.

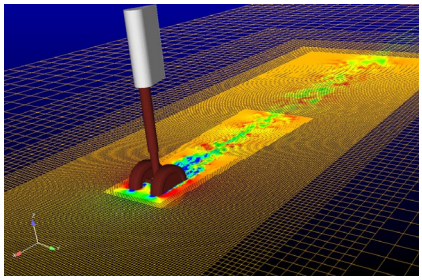


Automatic and parallel volume discretization

The time required to generate the volume mesh is substantially reduced thanks to a parallel octree mesher. The volume is then discretized following the user-defined grid refinement regions.

Fully-automatic simulation workflow

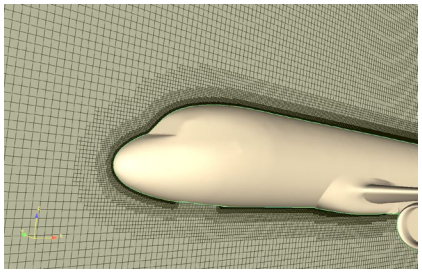
Every step of the simulation workflow in ProLB can be automated to maximize productivity. Beyond scripting of the pre-processing, templates can be created for recurrent simulations. Post-processing in ParaView is automated via scripts provided using the ProLB software suite. Engineers can now focus on solving product-related issues rather on numerical one.



Unlimited parallel processing for a fixed cost

Customers all have differing requirements. ProLB is therefore available via three licensing options:

- Annual lease: allows ProLB to be run on an unlimited number of cores for a fixed cost.
- LB-Flex: allows more flexibility. Usage is counted per day for an unlimited number of cores.
- LB-Cloud: all your simulations are performed on a public or dedicated cloud and are paid per hour of usage



www.prolb-cfd.com
contact.prolb@c-s.fr

ABOUT CS

As prime contractor in the design, integration and operation of mission-critical systems, CS is present all along the value chain for its customers. With a turnover of €176M and 1,800 employees, CS is an established supplier acknowledged by its major customers thanks to the expertise & commitment of its staff.

The power of innovation

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