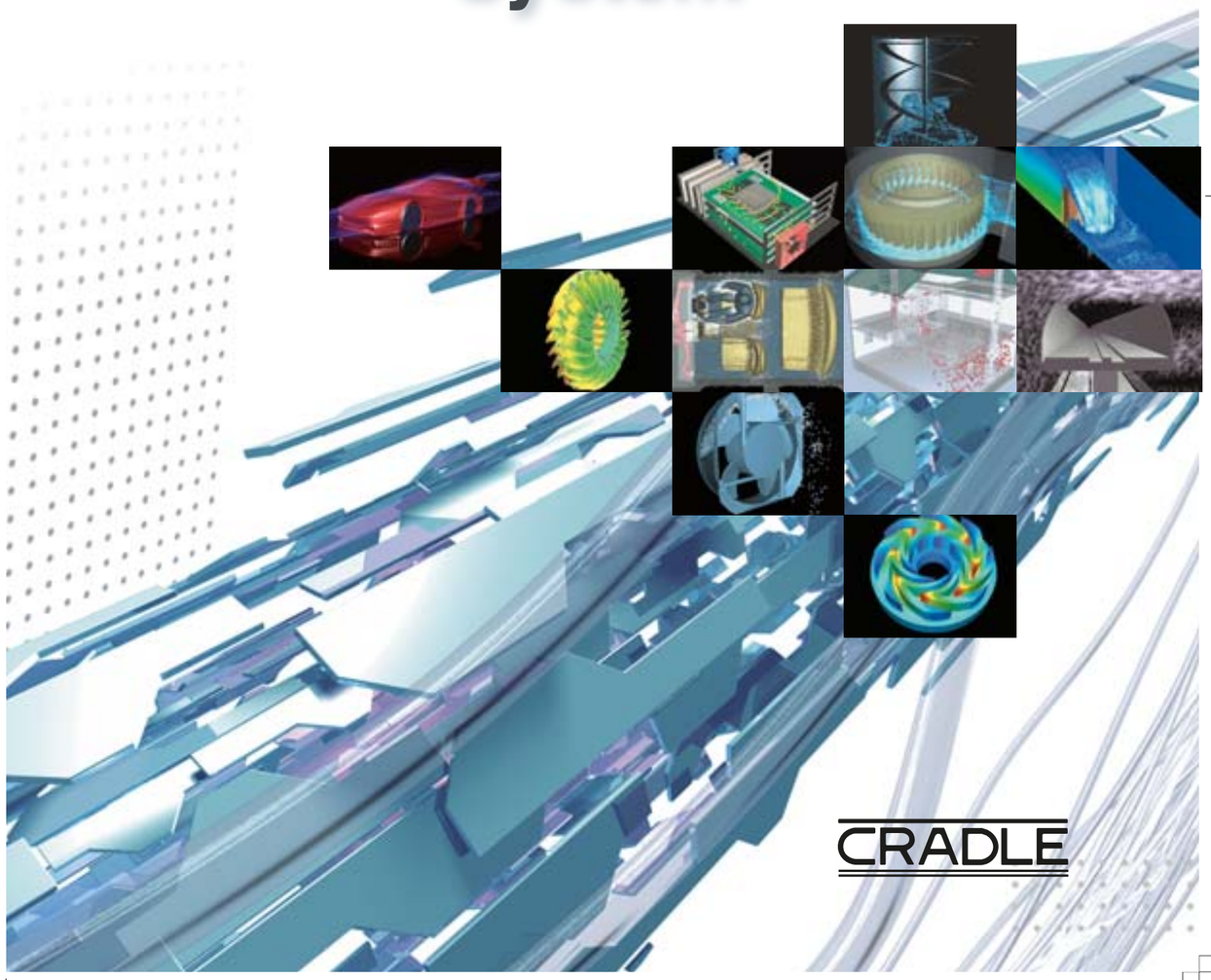
PRODUCTS GUIDE

CFD
Computational Fluid Dynamics

Thermofluid Analysis System



CRADLE Cradle North America Inc.

493 Joshi Research Center, 3640 Colonel Glenn Hwy., Dayton, OH 45435 PHONE:+1-937-775-5202 FAX:+1-937-775-5204

http://www.cradle-cfd.com/

【2009,10】

CFD
Computational Fluid Dynamics

Thermofluid Analysis System

CRADLE

Philosophy

Since the establishment and starting the sales of STREAM in 1984, Software Cradle has been dedicated to developing the practical CFD software and providing total services including sales, customer support, training, seminars, customizing and engineering services. We can provide the best suited program from our suite of products, custom tailored training, and customized program to better meet the needs of specific applications. We are dedicated to not only providing the software but also providing the solution that can bring benefits to a customer using our products.

Mission

We can help you to go to the next level of CFD simulation.

Today's advancement of hardware performance is outstanding. Therefore, we are dedicated to providing the software which can maximize the performance of the hardware, which can be used with confidence, and which can be used by wide a wide variety of people such as design engineers as well as CFD experts and researchers as a practical and useful tool.

Products

For engineers in construction, architects, civil, electronics and electrical appliances industry

Structured mesh (Cartesian and cylindrical coordinates)
STREAM
Windows and Linux

For electronics cooling (Cartesian Coordinate)
HEAT Designer
Windows

A part and its material property are managed as one component for the intuitive usability. With the advantages of using a structured mesh and solver, STREAM and HEAT Designer can provide extraordinary performance in meshing speed, computation speed, stability, memory consumption, and accuracy. In addition to flow and temperature simulation, complicated phenomena such as chemical reaction, multi-phase, solidification, and more can be simulated.

For engineers in automotive, machinery, turbo-machinery, aerospace, power plants, and chemical industry

Unstructured Mesh (Tetrahedron, pentahedron and hexahedron)
SC/Tetra
Windows and Linux

For fluid dynamic bearing
Fluid Bearing Designer
Windows

SC/Tetra can precisely handle curvature using a hybrid mesh. Advantages of SC/Tetra are the ability to handle a complicated geometry with robust and flexible mesh control and a moving object having an active or reactive motion in addition to computation speed and low memory usage. SC/Tetra can also simulate chemical reaction, multi-phase, solidification, aero acoustics, thermoregulation of a human body, linear stress analysis and more.

For engineers who wants to utilize CAD data for CFD

CAD-CFD data translator
CADthru
Windows

CADthru takes your CAD data, translates it, cleans it up and makes it ready for CFD simulation.

Training

Various seminars from introductory to advanced level are periodically held.

We provide various training courses suitable for your needs and applications. For the first time user of CFD, we provide a seminar in which the basics of CFD are taught along with the basic operation of our product. For experienced user, we provide Advanced courses and the Theory of CFD.

- Basic seminar for each product (Basics of CFD and basic operation of a product)
- Advanced courses (Specific theory, approaches and operations for specific applications)
- Theory of CFD (Theory of numerical simulation for fluid and thermal dynamics and explanation of particular schemes, methods, and models)

Support

[Technical support]

For a question about the basic operation to certain approaches to your application
We provide the total service.

We support your CFD project by quickly answering any questions you may have, from basic questions to advanced questions. We release updated versions of our software every month to fix bugs and to include enhanced functions.

- E-mail, FAX and Phone call inquiry
- Information at User's page at our Web site (FAQ, latest program, bug information)

These technical support services are provided to our users and it is required to register prior to using these services.

[Seminar]

We provide various seminars such as new version seminars to explain new functions and User conferences in which our users present how they are utilizing our software in their product development.

- User Conference
- New Version seminar
- Specific application seminar

[Free seminar]

A free seminar is available for those who are looking for CFD software, for those who want to get familiar with CFD, and for those who are looking for better suited software for their applications.

- HEAT Designer
  - Creating a model, setting conditions and creating a mesh with Preprocessor
  - Running the simulation with the Solver
  - Visualizing the simulated data with Postprocessor
- SC/Tetra
  - Importing geometry, setting conditions, creating a mesh with Preprocessor
  - Running the simulation with the Solver
  - Visualizing the simulated data with Postprocessor

CFD
Computational Fluid Dynamics

Structured mesh (Cartesian and cylindrical coordinates)

STREAM

Windows and Linux

CRADLE

▶What is STREAM?

STREAM is thermal-fluid analysis software based on Cartesian mesh. Since its first release in 1984, STREAM has been developed into a user-friendly software with sophisticated usability and high speed computation to simulate the behaviors of thermal and fluid flows that are crucial in a product development in a variety of industries.

[Features]

❶Utilizing CAD data

STREAM can drastically shorten the modeling time by importing Solid model from 3D CAD. It can also import SHAPE file from GIS (Geographic Information System) and Gerber data (for the wiring pattern of a printed circuit board) from ECAD. Furthermore, a list of material properties and conditions written in CSV format can be imported so that you can reduce the condition setting time.

❷Creating a part and Parts Library

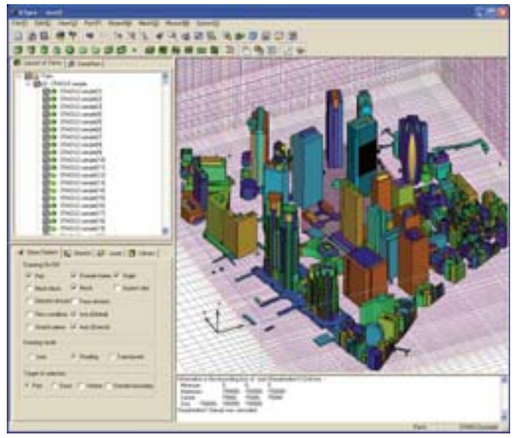
STREAM is equipped with convenient models such as anemostat models for airflow simulation of a room, a fan model for considering a P-Q curve with swirl effect, duct models, and more in addition to basic primitives. For a frequently-used-part, you can register it in the Parts Library and reuse it to reduce the operation time.

❸Physical fuctions and easy-to-use Navigation Wizard

STREAM can simulate many kinds of phenomenon such as diffusion, multi-phase flow, chemical reaction, particle tracking, solidification, and more. Those functions can be selected in the initial Wizard and the Navigation system will guide you only through necessary settings and help you complete the condition settings in a short time without any confusion.

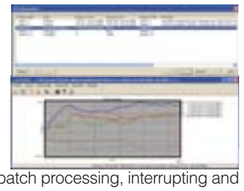
❹Multi-block and auto meshing

With the Multi-block method, a block of finer mesh can be applied to a specific part or location so that the total number of mesh memory consumption and computation time can be reduced. For example, an airflow inside a house surrounded by many other buildings can be simulated using a finer block applied to just the house. This approach is also useful for an electronic case in which the detailed design of a particular component needs to be precisely simulated.



❺Fast and robust solver

The advantages of the matrix solver based on Cartesian grids are its outstanding computation speed and robustness. Therefore, you can simulate many design ideas in the limited time. A JOB status & edit window allows you to check the calculation status and to execute the batch processing, interrupting and restarting the calculation.



❻Cutting edge visualization

Postprocessor enables you to visualize the simulated data as well as extracting predicted physical values. Since sharing simulation results with colleagues and customers is an important design process, it enables to create high quality images and animations. In addition, utility tools are equipped to handle extremely large files, to quickly visualize and to share your 3D data using a license-free viewer.

[Applications]

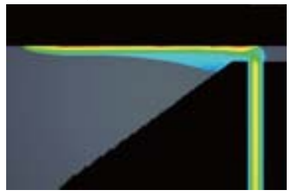
●Building, Environment and Facility
- Room ventilation
- Thermal analysis of the data center
- Air flow control in the clean room
- Thermal and flow analysis inside a factory
- Assessment of dew condensation on a wall surface

●Civil Engineering
- Air flow around buildings
- Analysis of a "heat island" phenomena.
- Verification of breakwater effect
- Analysis of air pollution
- Analysis of flooding

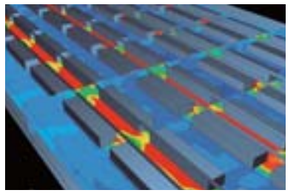
●Electronics and Electrical appliances
- Thermal design inside an LCD projector
- Thermal design of car electronics
- Thermal analysis of power devices

●Automotive
- Radiator ventilation analysis
- Analysis of engine compartment
- Flow Analysis of under floor
- Flow analysis of a painting booth

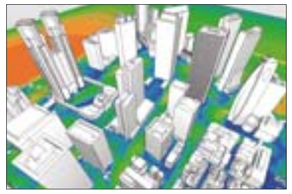
●Dye-coating



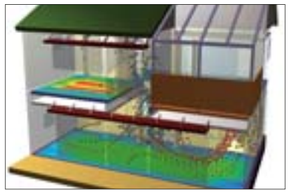
●Thermal analysis of the data center



●Air flow around the buildings

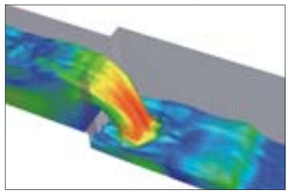


●Thermal design of household considering insolation

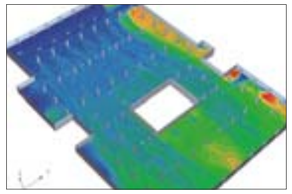


●Pouring water using free surface function

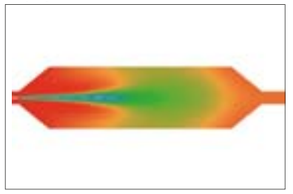
●Water overflow at the water gate



●Air ventilation of underground parking area



●Spray diffusion



*1) Interface for circuit design CAD
Zuken : CR5000/Board Designer
Cadence : ALLEGRO(RS274X only)

Utility Tools

●LFileView
Real-time graphical output of the values listed from Solver.
Arithmetic operations are implemented for listed parameters.
Arithmetic operation is flexibly executed using any parameters listed from Solver.
●CradleViewer
Free results viewer

Items included in the Package

●STREAM Installation DVD
●User's Guide
- Basics of CFD Analysis
- Reference(Preprocessor / Solver / Postprocessor)
- Operation Manual • Exercise

System Requirements

●Windows
- XP Professional, XP Professional x64 Edition
  Vista Business, Vista Ultimate
  (Open GL compliant graphics board is recommended)
- Compatible with Intel

●Linux
- RedHat Linux Enterprise 4 and 5
- SuSE Linux Enterprise Server 9 and10

Please contact us for the supported machine information

●Required spec. for 1 million mesh analysis
512 MB or more memory
1GB or more available disc capacity

Products

Platforms \ Package	PRE/SOL/POST	SOL	PRE/POST
Windows (Standard)	○	○	○
Windows (HPC)	—	○	○
Linux (Standard / HPC)	—	○	—

●Contract Type: Rental / Lump Sum.
●License Type: Floating

Related product

●3D Thermal-fluid Analysis System specialized for electronics cooling
- HEAT Designer

STREAM is a SolidWorks Partner Product.

CFD Computational Fluid Dynamics

For electronics cooling (Cartesian Coordinate)

HEAT Designer

Windows

CRADLE

What is HEAT Designer?

HEAT Designer is a compact thermal-fluid analysis tool specially developed for designing electronics. HEAT Designer provides a seamless usability from model setup to the visualization of results. Its sophisticated usablity allows you to obtain the results easily and quickly without prior knowledge of CFD.

[Features]

❶Utilizing CAD data

HEAT Designer can drastically shorten the modeling time by importing Solid model from 3D CAD. It can also import Gerber data (for the wiring pattern of a printed circuit board) from ECAD. Furthermore, a list of material properties and conditions written in CSV format can be imported so that you can reduce the condition setting time.

❷Creating a part and Parts Library

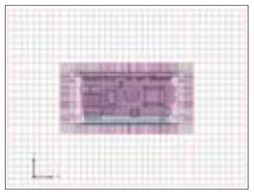
HEAT Designer is equipped with convenient models such as heat dissipating fin models, a fan model for considering a P-Q curve with swirl effect, slit models and more in addition to basic primitives. For a frequently-used-part, you can register it in the Parts Library and reuse it to reduce the operation time.

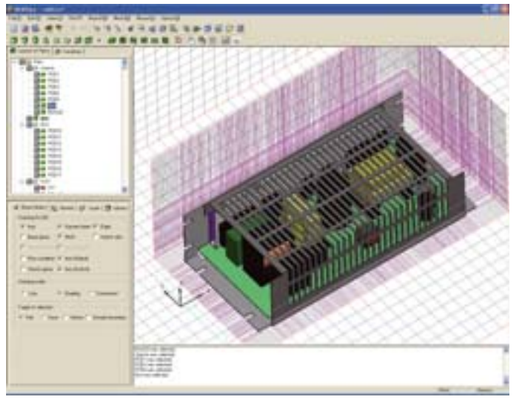
❸Easy-to-use Navigation Wizard

Heat and flow are the main functions that HEAT Designer enables. The Navigation system will guide you only to necessary settings and help you complete the condition setting in a short time without any confusion.

❹Multi-block and auto meshing

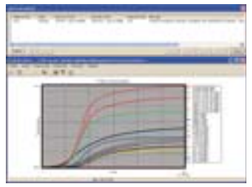
With the Multi-block method, a block of finer mesh can beapplied to a specific part or location so that the total number of mesh, and in turn, the memory consumption and computation time, can be reduced. For example, particular electronic component in an electronic case which requires finer resolution can be simulated using a finer block applied to just the component.





❺Fast and robust solver

The advantages of the matrix solver based on Cartesian grids are its outstanding computational speed and robustness. Therefore, you can simulate many design ideas in the limited time, A JOB status & edit window allows you to check the calculation status and to execute the batch processing, interruption and restarting the calculation.



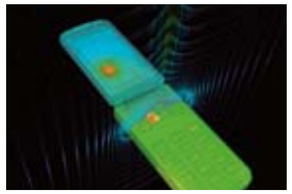
❻Cutting edge visualization

Postprocessor enables you to visualize the simulated data as well as extracting predicted physical values. Since sharing simulation results with colleagues and customers is an important design process, it enables to create high quality images and animations. In addition, utility tools are equipped to handle extremely large files, to quickly visualize and to share your 3D data using a license-free viewer.

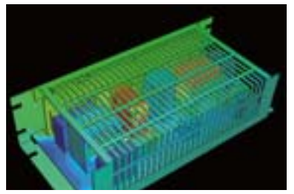
[Applications]

- LED (package device)
- Thermal design inside an LCD projector
- Thermal analysis of a server rack and a cabinet
- Performance assessment of the heat dissipating fin
- Heat radiation analysis of an oven
- Thermal analysis for the power unit / AC adaptor
- Heat dissipation of the DVD unit
- Thermal design of flat-screen TV
- Thermal Analysis of the car audio and car navigation system
- Heat dissipation of laptop and desktop PCs
- Thermal design of the cell phone

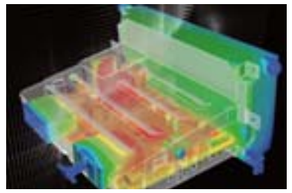
●Cell phone



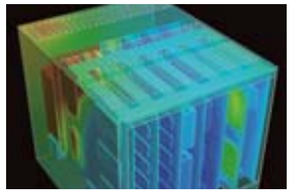
●Power unit



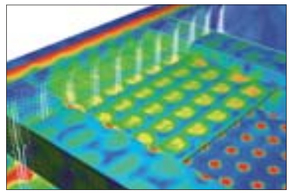
●Car Navigation system



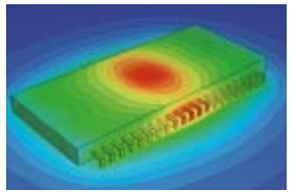
●Board computer



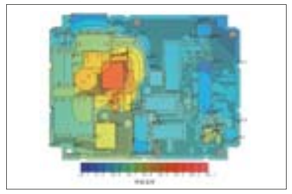
●Reflow equpment



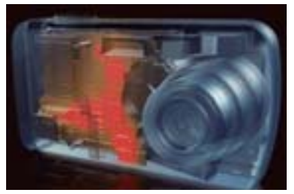
●Electronic device



●Heat dissipation of PCB



●Digital camera



*1) Interface for circuit design CAD
Zuken : CR5000/Board Designer
Cadence : ALLEGRO(RS274X only)

Utility Tools

- LFileView
  The simulated values listed in L file can be viewed and drawn as a graph in a real time.
  Arithmetic operation is flexibly executed using any parameters from the L file.
- CradleViewer
  Free results viewer

System Requirements

- Windows
  - XP Professional, XP Professional x64 Edition
    Vista Business, Vista Ultimate
    (Open GL compliant graphics board is recommended)
- CPU
  - Compatible with Intel
  - 512 MB or more memory
  - 1GB or more available disc capacity

License

- Contract Type: Rental / Lump Sum.
- License Type: Floating

Items included in the Package

- HEAT Designer Installation DVD
- User's Guide
  - Basics of CFD Analysis
  - Reference (Preprocessor / Solver / Postprocessor)
  - Operation Manual

Related product

- General purpose Thermal-fluid analysis system
  - STREAM

HEAT Designer is a SolidWorks Partner Product.

CFD
Computational Fluid Dynamics

Unstructured Mesh
(Tetrahedron, pentahedron and hexahedron)

SC/Tetra

Windows and Linux

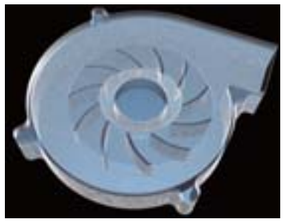
CRADLE

What is SC/Tetra?

SC/Tetra is an all-in-one package CFD (Computational Fluid Dynamics) software using unstructured mesh (tetrahedron, pentahedron and hexahedron). It was developed in 1998 with the concept as "Enabling the calculation of a complex geometry easily".

[Features]

❶Practical use of CAD data



Assuming that the CAD data for the product design will be directly used as the analysis model, SC/Tetra has many useful functions for repairing and wrapping the geometry and checking the CAD data for any errors or detects. Simple geometries such as the computational domain can also be made directly in SC/Tetra.

❷Robust Auto-mesh generation function

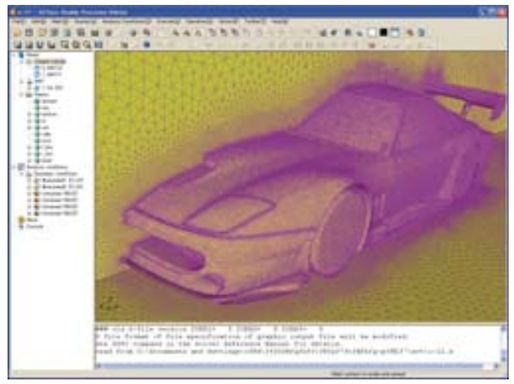
The robust auto mesh generator can handle any kind of complex geometry. The prism mesh will be fitted automatically to improve calculation accuracy. In addition, the adaptive mesh refinement function automatically generates adaptive mesh by repeating the simulation and considering the previous analysis result.

❸Interactive wizard for analysis condition settings

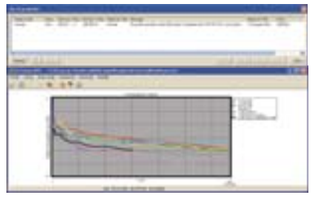
The steps you need to take is shown as tree bar in the wizard. Therefore, the setting can be done smoothly and it prevents data input omission.

❹Ample of analysis functions

SC/Tetra can solve not only flow or temperature analysis, but also the analysis for diffusive species, free surface, chemical reaction, particle tracking, and rotation / translation of an object considering the fluid effects. Furthermore, it is able to evaluate the aero acoustic problem and physiological factors of human body.



❺Low memory usage and high computational speed



SC/Tetra achieves low memory usage and high speed computations by using the cell vertex based scheme, FVM (Finite Volume Method). With this, even a Windows PC with 64 GB of RAM memory can handle more than 300 million elements. The calculation is controlled by a JOB status & edit window which allow you to check the calculation status and to execute the batch processing, interruption and restarting the calculation.

❻Cutting edge visualization

Postprocessor enables you to visualize the simulated data as well as extracting predicted physical values. Since sharing simulation results with colleagues and customers is an important design process, it enables to create high quality images and animations. In addition, utility tools are equipped to handle extremely large files, to quickly visualize and to share your 3D data using a license-free viewer.

[Applications]

●Automotive industry
- Vehicle body aerodynamics
- Cabin climate control
- Thermofluid analysis of engine rooms
- Internal flow analysis in engine cylinders
- Intake and exhaust efficiency assessment
- Disc brake cooling analysis
- Torque converter performance evaluation
- Hydrodynamic analysis in water jackets

●Machinery industry
- Performance evaluation of rotating equipments (fan, pump, turbine)
- Internal flow through turbine rotor blades
- Temperature and concentration analysis in a mixing tank
- Heat radiation analysis in a reverberatory furnace
- Performance investigation of CVD device

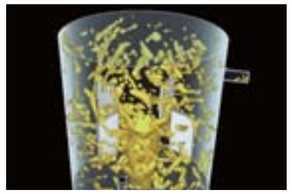
●Electrical and precision equipment
- Heat dissipation analysis of the liquid crystal projector
- Cooling design of electronic devices
- Thermal analysis of power units and circulation in an electronic chassis
- Natural and forced convection in an electrical components

●Construction and civil engineering
- Estimation of wind turbulence around skyscrapers and assessment of urban planning
- Wind loading effects on buildings

●Environment and facilities
- Indoor air conditioning and environmental assessment
- Temperature distribution in a hot water storage tank
- Lift and drag force estimation of a propeller blade

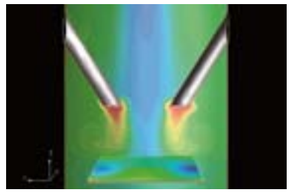
●Cabin climate control

●Mixing tank

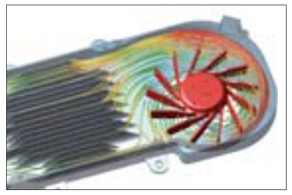


●Fan

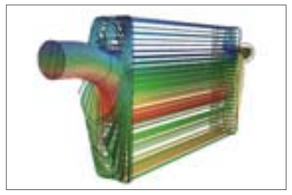
●CVD



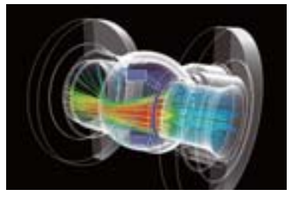
●Dissipation Fin with Fan



●Heat exchanger



●Valve



●Vehicle body aerodynamics

Utility Tools

●LFileView
Real-time graphical output of the values listed from Solver. Arithmetic operations are implemented for listed parameters.Arithmetic operation is flexibly executed using any parameters listed from Solver.
●FLDutil
Data mapping to structual analysis system such as ABAQUS, ANSYS I-DEAS, NASTRAN.
●CradleViewer : Free results viewer

Items included in the Package

●SC/Tetra installation DVD
●User's guide
- Basics of CFD Analysis
- Reference Preprocessor / Solver / Postprocessor
- Operation Manual • Exercise

System Requirements

●Windows
- XP Professional, XP Professional x64 Edition Vista Business, Vista Ultimate (Open GL compliant graphics board is recommended)
- Intel compatible CPU

●Linux
- RedHat Linux Enterprise 4 and 5
- SuSE Linux Enterprise Server 9 and10

●512 MB or more memory
●1GB or more available disc capacity

Products

Platforms \ Package	PRE/SOL/POST	SOL	PRE/POST
Windows (Standard)	○	○	○
Windows (HPC)	—	○	○
Linux (Standard / HPC)	—	○	—

●Contract Type: Rental / Lump Sum.
●License Type: Floating

Options

●CAD-CFD geometry data translator
- CADthru

●Fluid bearing design package
- Fluid Bearing Designer

CFD Computational Fluid Dynamics

CAD-CFD data translator

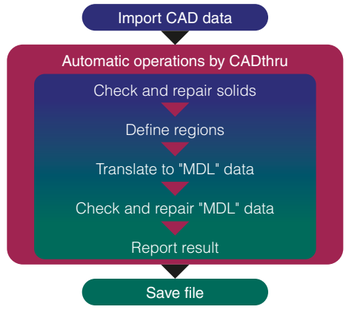
CADthru

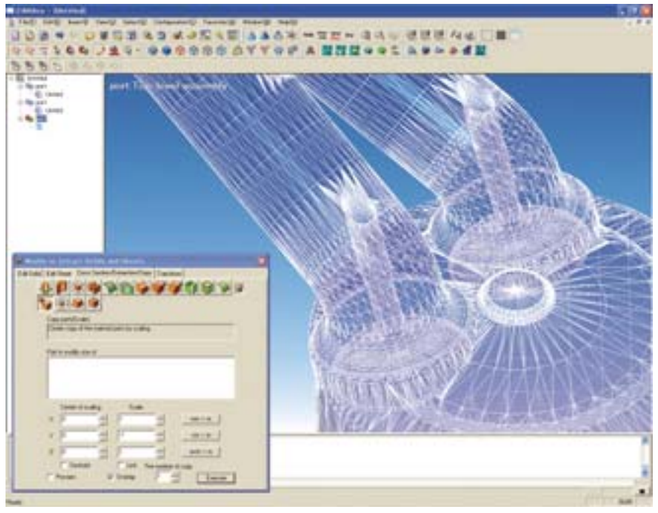
Windows

CRADLE

What is CADthru?

CADthru is a data translation tool to convert CAD data for CFD analysis purposes. CADthru's robust functions enable speedy and automatic repair of geometric and topological data defects in the original CAD data. With its abilities, CADthru helps to reduce cumbersome re-editing processes in the original CAD system, and enables seamless translation from CAD data to CFD data.



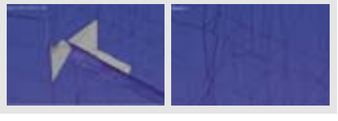


[Features]

❶MDL Wizard: CAD data to SC/Tetra

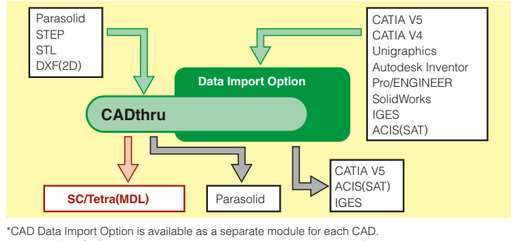
Through the user-friendly MDL Wizard, CADthru diagnoses CAD data issues, fixes problematic features and outputs model data that is compatible with SC/Tetra.

Auto Cleaning Function



❷CAD Data Import Option

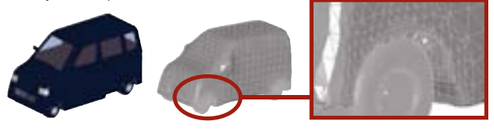
In addition to intermediate files such as Parasolid, STEP and STL formats, Native formats of 3D CAD data can be imported directly with optional features. The geometry editing functions of CADthru can be fully used for these Native formats.



*CAD Data Import Option is available as a separate module for each CAD.
*Names of the CAD systems are trademarks or registered trademarks of their respective companies.

❸Wrapping Function

It enables to simplify complicated geometry and to make imperfect geometry repaired automatically by "Wrapping" as if wrapping the geometry with a piece of cloth.



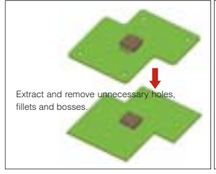
[Functions]

CADthru	Data interface	Import	Parasolid XT, STEP, STL, DXF(2D)
			SC/Tetra(MDL, PRE, FLD : Editable geometry data)
			Native CAD Format(Optional)
		Export	SC/Tetra(MDL), Parasolid
			CATIA V5, ACIS(SAT), IGES (Optional)
	Import functions	Information	Assembly data
			Color & attributes information
		File merging	
		Solid assistant	Reconstructible assembly structure before importing
		STEP assistant	Speedy conversion by multi-processing
	Data check & recovery	Auto configuration Wizard	Detect/fill missing faces
			Detect/remove layered faces & coincident edges
			Detect/configure ridges
			Detect/remove intersecting faces
			Detect/remove narrow faces
			Adjust normal vector of faces
			Control tolerance
			Report recovery information & illegal shape
	Geometry edit	Create geometries	Line, Serface(Sheet), Solid
		Modification of vertexes, edges and faces	Curves : Project onto parts,Trim unnecessary edges
			Create edge intersections
		Modify sheets	Duplicate faces, Untrim
		Modify solid shape(assembly parts)	Joint sheets, Fill holes
			Joint models & Boolean operations (Unite, Subtract, Intersect)
			Simplify model shapes (Trim, Bound by cuboid, Align)
			Recognize and remove pattern shapes
			Connect surfaces around gaps or steps (Remove close faces)
			Cylindricalize, Thicken, Offset
		Modification of MDL surface	Extract empty regions
			Wrapping, Boolean operations
			Auto Cleaning function of MDL surface
	Automated Pre-Processing	Recognition & registration of closed space and surface/volume region	Automatic-definition filter for material boundaries(macro)
		Registration of boundary regions	Automatic-definition filter for condition boundaries(macro)
	Output	Resolution control	Control facets of MDL data
	Operation and control environment	Measurement(Tool Box)	Volume, Surface area, Distance, Normal vector
		Customize function	Solid menu, Context menu, Configuration
		Display function	Save/reproduce model and viewpoint status
		VB Interface	CADthru can be controlled with Visual Basic.

[Applications]

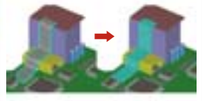
CADthru is a SolidWorks Partner Product.

●Pattern recognition and auto-deletion



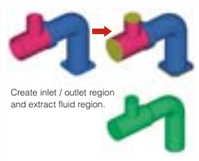
Extract and remove unnecessary holes, fillets and bosses.

●Solid assistant



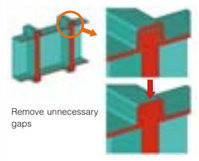
Transform the complicated data into simplified data upon importing it into CADthru

●Extract of fluid region



Create inlet / outlet region and extract fluid region.

●Removal of close faces



Remove unnecessary gaps

●Active HELP and Operational Advisor

Active help and purpose-driven advice are available.

Items included in the package

●CADthru installation CD
●User's Guide

License

●Contract Type:
Rental / Lump Sum
* CAD Data Import Option is for rental only.
●License Type:
Node-Locked / Floating

System Requirements

●Windows
• XP Professional
• XP Professional x64 Edition
• Vista Business
• Vista Ultimate
(Open GL compliant graphics board is recommended.)
• Intel or compatible CPU
●512MB or more memory
●1GB of available hard disk space

CAD Data Import / Export Options

	Import	Export
SC/Tetra (MDL)	○	○
SC/Tetra (PRE)	○	-
SC/Tetra (FLD)	○	-
Parasolid	○	○
STEP	○	-
STL	○	○
DXF (2D)	○	-
CATIA V5	OP	OP
Unigraphics	OP	-
Autodesk Inventor	OP	-
Pro/ENGINEER	OP	-
SolidWorks	OP	-
CATIA V4	OP	-
IGES	OP	OP
ACIS (SAT)	OP	OP

○ : Provided OP : Optional

* Optional features are available separately according to your choice of CAD system.
* ACIS (SAT) option comes free with any other option.
* Names of the CAD systems are trademarks or registered trademarks of their respective companies.

CFD
Computational Fluid Dynamics

Thermofluid Analysis System

Specification

Following programs (pre, solver and post processors) can be controlled with Visual Basic.

CRADLE

Functions

			STREAM	HEAT Designer	SC/Tetra
Preprocessor	Modeling	CAD data interface (import)	Parasolid XT, STEP, STL, DXF (2D, 3D-face), XGL, NASTRAN, IDF, SHAPE, Gerber data (RS-274D, RS-274X) *1	Parasolid XT, STEP, STL, XGL, IDF, Gerber data (RS-274D, RS-274X) *1	Parasolid XT, STEP, STL, DXF (3D-face), ABAQUS (.inp), ANSYS (.cdb), I-DEAS (.unv), Design Space (.dat), NASTRAN (.nas)
		CAD data interface (export)	Parasolid XT, STL	Parasolid XT, STL	STL, ANSYS (.cdb), NASTRAN (.nas)
		Primitives	Cuboid, Hexagon, Cylinder, Cone, Sphere, Slanted Plate, Point, Panel (Orthogonal, Quadrilateral, Slanted), 2.5D solid part, Fan, Anemostat model, Pipe, Electronics (case, PCB, fin)	Cuboid, Hexagon, Cylinder, Cone, Slanted Plate, Point, Panel (Orthogonal, Quadrilateral, Slanted), 2.5D solid part, Fan, Pipe, Electronics (case, PCB, fin)	Cuboid, Cylinder, Panel
		Geometry modification	Boolean operation (Sum, Subtract, Multiply, Cutting), Shape simplification (Deformer, Filling hole, Projection deletion, R fillet deletion), Copy, Mirror copy	Boolean operation (Sum, Subtract, Multiply, Cutting), Shape simplification (Deformer, Filling hole, Projection deletion, R fillet deletion), Copy, Mirror copy	Detection/modification of face overlap/ face intersection/edge isolation/ fractional edges and faces, Swept elements generation, Wrapping
		Registration of parts library	●	●	
	Mesh generation	Tetrahedron			●
		Pentahedron (Prism, Pyramid)			●
		Hexahedron	○(In the case of cylindrical coordinate system)		○(Manual setting)
		Cuboid	●	●	●(In the case of creating hexahedron elements internally)
	Conditions	Easy set-up through wizard	●	●	●
		Default condition setting	●	●	
		Navigated wizard to set conditions	●	●	●
		Settings of undefined region	●	●	●
		Material property library (creatable)	●	●	●
		Creation of laminated materials	●	●	
	Operation and control environment	VB interface	●	●	●
		Consecutive execution			●
		Macro for operations (history function)			●
		Customizable keyboard mapping			●
		Selectable mouse operation mode	●	●	●
Solver	Mesh	Structured mesh	●(Cartesian or cylindrical coordinate)	●(Cartesian coordinate)	
		Unstructured mesh			●
		Overset mesh			●
		Discontinuous mesh interface			●
		Mesh adaptation			●
		Moving objects	●		
		ALE (Stretch, Rotation and Translation)			●
		Dynamical moving objects			●
		Multiblock	●	●	
		Zooming	●		●
	Numerical scheme	Finite volume method	●	●	●
		Finite element method	○(Moving objects)		
		Pressure correction	SIMPLEC	SIMPLEC	SIMPLEC
		Convection term accuracy	1st/3rd order (QUICK) upwind scheme	1st/3rd order (QUICK) upwind scheme	1st/2nd order (MUSCL) upwind scheme
		Matrix solver	JACOBI , SOR , MICCG , ILUCR , ILUCGS , FMGCG	MICCG , ILUCR , ILUCGS	MILUCG-STAB, AMG (multigrid), AMGCG-STAB
		Steady-state/Transient analyses	●	●	●
	Flow types	Incompressible fluid	●	●	●
		Compressible fluid	●		●
		Non-Newtonian fluid	●		●
		Buoyancy (Boussinesq approximation)	●	●	●
		Multiple fluids	●		●
		Gas mixing	●		●
		Foaming resin model	●		
	Turbulence models	High Reynolds Number k-ε model	Standard, RNG, MP	Standard	Standard, RNG, MP
		Low Reynolds number (linear) k-ε model	AKN	AKN	AKN , MPAKN , GPC
		Low Reynolds number (nonlinear) k-ε model	AKN		BCG
		Two-equation heat transfer model	NK , AKN		
		Realizable k-ε model			●
		SST k-ω model			●
		One-equation model			Spalart-Allmaras
		LES (Smagorinsky model)			●
		Hybrid turbulent model of RANS and LES			VLES , DES
	Thermal analysis	Heat conduction (fluid/solid)	●	●	●
		Heat transfer (Convective/Turbulent heat transfer)	●	●	●
		Heat transfer (Boiling heat transfer)			●
		Heat radiation (view factor)	●	●	●
		Heat radiation (flux method)	●		●
		Heat conduction panel, Heat transfer, Heat radiation	●	●	●
		Insolation	●		●
		Joule heat	●		●
		Space distribution of mean radiation temperature (MRT)	●		
	Diffusion analysis	Diffusivity	●		●
		Sedimentation rate	●		●
		SORET effect	●		
	Index for ventilation efficiency	Age of air, Life expectancy of air, Inlet contribution rate	●		
	Thermal comfort models	PMV / SET*	●		
	Humidity/ Dew condensation analysis	Relative humidity/Absolute humidity	●		●
		Dew condensation	●		●
		Vapour pressure under humidity analysis			●
	Reaction analysis	Chemical reaction	●		●
		Combustion	●Eddy-dissipation model		●Eddy-dissipation model
		Solidification/Melting analysis	●		
		Thermal CVD analysis			●
	Particle analysis	Marker particle	●		●
		Mass particle	●		●
		Chemical reaction for particles	●		●
		Spray model	●		●
	Multiphase flow analysis	Free surface	●(VOF method, MARS method)		●(VOF method, improved MAC method)
		Dispersed multiphase flow			●
		Cavitation			●
	Aerodynamic noise analysis	Flowcs Williams & Hawkings' equation			●
		Weak compressible flow model			●
		Sound source detection method			●
	Thermoregulation-Model	JOS			●
	Thermal circuit model	Two-resistor model	●	●	
	Flow conditions	Velocity	●	●	●
		Volume flow rate	●	●	
		Mass flow rate			●
		Pressure	●	●	●

			STREAM	HEAT Designer	SC/Tetra
Solver	Flow conditions	Air conditioner model	●		
		Fan model	●	●	●
	Heat conditions	Fixed temperature	●	●	●
		Amount of heat generation	●	●	●
		Heat transfer coefficient	●	●	●
		Contact heat transfer coefficient	●	●	
	Wall conditions	No-slip (Stationary wall)	●	●	●
		Free-slip (symmetry wall)	●	●	●
		Log-law condition	●	●	●
		Power-low condition	●		●
		Surface roughness	●		●
	Pressure conditions	Fixed pressure	●	●	●
		Pressure loss	●	●	●
		Porous media	●	●(Fin model)	●
	User-defined conditions	Variables table	●	●	●
		User-defined function (compiling is necessary)	●		●
	Calculation control environment	Job management	●	●	●
		Monitoring the calculation status	●	●	●
		E-mail notification of the calculation completion	●	●	●
		VB interface	●	●	●
		Relaxation coefficient	●	●	●
	Output post files		Cradle post files (FLD, iFLD)	Cradle post files (FLD, iFLD)	Cradle post files (FLD, iFLD), Field View, AVS, EnSight
	Output for third-party software				NASTRAN , ANSYS ,ABAQUS , I-DEAS ,SYSNOISE , KULI
Postprocessor	Drawing functions	Mesh, Vector, Contour plots	●		
		Isosurface, Streamline	●		
		Geometry display	●(Neutral file, STL file)		
		2D graph	●		
		Mirror/Periodical copy	●		
	Geometrical data handling	Arbitrary plane, Surface, Entire volume, Cylinder	●		
		Streamline, Isosurface	●		
		Arbitrary scaling	●		
		Specify by value or picking	●(Scalar/Vector value)		
	Special effects	Oil flow	●(On plane/surface)		
		Texture mapping	●(On plane/surface)		
		Lighting, Luster, Gradation	●(Preset, Arbitrary)		
		Transparency, Water-like expression	●		
	Animation	Vector animation	●		
		Plane automove	●		
		Marker particle	●(Turbulent diffusion effect)		
		Automatic translation of view point	●(View/Focus points can be set)		
		Key-frame animation	●		
		Animation interpolated between cycles	●		
	Analysis of the result	Variable registration	●		
		Integration function	●(Scalar/Vector integration)		
		Comparative visualization	●		
		Projected area calculation	●		
		Automatic search of the local Max/Min positions	●		
		Import of CSV data	●		
		Automatic change of color bar	●(Preset, Arbitrary)		
	Data image output	BMP , JPG	●(Size, Resolution adjustable)		
		CradleViewer	●(Support steady-state/transient animation, Attach to Office applications)		
		AVI	●		
		VRML	●		
	Operation and control environment	Load partially trimmed FLD file	●		
		Selectable help function	●		
		OpenGL emulation	●		
		VB interface	●		
		Selectable mouse operation modes	●		

*1) Please use the CAD supported

[System Configuration]

			STREAM	HEAT Designer	SC/Tetra
Operation & License	Platforms	One package (PRE/SOLVER/POST)		Windows XP, Windows Vista	
		PRE/POST	Windows XP, Windows Vista		Windows XP, Windows Vista
		SOLVER	Windows XP, Windows Vista, Linux (RedHat/SuSE)		Windows XP, Windows Vista, Linux (RedHat/SuSE)
		HPC (Floating)	Windows XP, Windows Vista, Linux (RedHat/SuSE)		Windows XP, Windows Vista, Linux (RedHat/SuSE)
	License Type	Floating		Windows XP, Windows Vista, Linux (RedHat/SuSE)	

- Windows XP → Windows XP Professional(32bit/64bit)
- Windows Vista → Windows Vista Business / Ultimate(32bit/64bit)
- Linux (RedHat/SuSE) → RedHat Linux(64bit) , SuSE Linux(64bit)

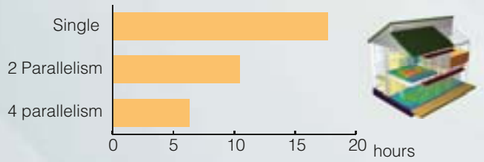
CFD Computational Fluid Dynamics

Parallel Computing

High speed parallel computing for large-scale analysis

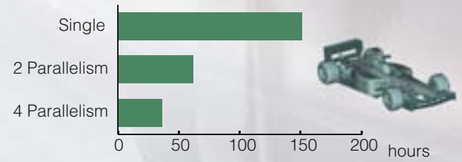
[Analysis of air-conditioning system]

Number of elements : around 20,000,000
Calculation cycle : 1,000 cycles
Processor : AMD Opteron 885 (2.6GHz) DualCore × 4Way × 1node



[Aerodynamic analysis of formula car]

Number of elements : around 15,000,000
Calculation cycle : 1,000 cycles
Processor : AMD Opteron 885 (2.6GHz) DualCore × 4Way × 1node



[HPC edition (parallel computing) line-up]

Products	Max. parallelism	Max. # of Jobs	Floating	Supported OS	Solver	PrePost
MP4	4	1	●	Windows XP Windows Vista	●	✻
MP8	8	1	●		●	✻
MP4	4	1	●	Windows XP (32bit, 64bit) Windows Vista (32bit, 64bit) RedHat Linux (64bit) SuSE Linux (64bit)	●	
MP8	8	1	●		●	
MP16	16	2	●		●	
MP24	24	3	●		●	
MP32	32	4	●		●	
MP40	40	5	●		●	
MP48	48	6	●		●	
MP56	56	7	●		●	
MP64	64	8	●		●	
Can be increased by 8 parallelism per job						

Note: There are a few physical functions for which HPC solver cannot be used.
The parallel efficiency depends on the model geometry and the analysis conditions.
*) To be released in December 2009 and available for SMP machine.

[Simple machine setting and operational environment]

In parallel computing on Windows, the same dialog of JOB Status & Edit as the standard edition can be used. Analysis execution, parallelism setting and registration of the host machine can be done by the dialog.

Engineering Services

CRADLE

▶ Consulting

[Engineering services]

Our dedicated team of the specialists provides high-standard engineering services to meet your analysis needs.

Examples

- ●Analysis of thermal environment in commercial building
- ●Analysis of exhaust heat in a data center
- ●Diffusional analysis of smoke in a smoking room
- ●Airflow analysis of a paint booth
- ●Thermal analysis of an electronic chassis
- ●Thermal analysis of a circuit breaker
- ●Airflow analysis of a CVD
- ●Thermal analysis of a semiconductor manufacturing equipment
- ●Thermal analysis of a heat exchanger (Over 200 projects of engineering services every year)
- ●Analysis on thermal environment of the atrium in a building complex
- ●Thermal and flow analysis inside a factory and a warehouse
- ●Analysis of the effect of outdoor wind environment
- ●Analysis of flow around a water gate
- ●Flow analysis of a fan
- ●Thermal analysis of head lamps
- ●Thermal analysis of flow inside a medical equipment
- ●Fluid and chemical reaction analysis of a reactive container
- ●Aerodynamic analysis of vehicles

▶ Customize

[Development and customizing services]

We also provide the enhanced services of customization, automation and optimization.

Examples

- ●Automated mapping utility program of fluid-structure integration
- ●System to import the layout of parts
- ●Automated operation system for parametric study
- ●Automated program of visualization and analysis reports
- ●Data mapping tool
- ●Automated analysis system
- ●User-Defined functions