New Features TAITherm & CoTherm 2020.1

Scott Gibbs, Thermal & EO-IR Engineer







New Branding

- New Numbering Scheme!
 - YYYY.r.m



TAITherm 2020.1

Released April 21st

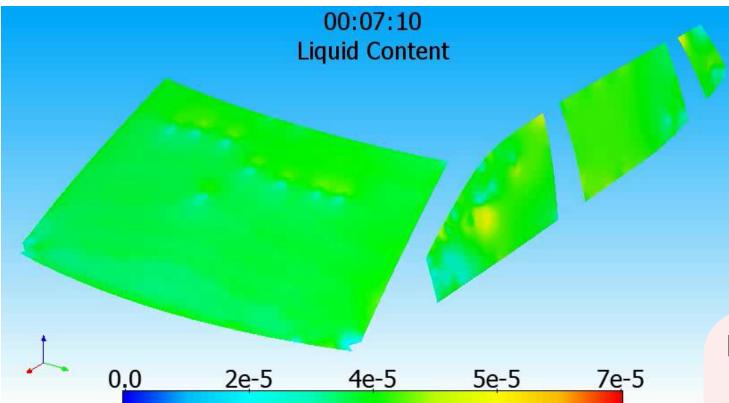
Model Setup Check

- Run checks on model validity before submitting a model for analysis
- Additional parameters will be checked in future releases

Nodel Check	×
[Run Model Check
Part 6136 'bar+x_1022' Contains both Volume and Shell elements.	^
Part 6142 'bar+x_1023' Contains both Volume and Shell elements.	
Volume and Shell elements require different properties and must be in separate parts	s.
The "NREL Equivalent Circuit" battery model is enabled, which is not supported with adaptive step size mode.	
Parts that use the Moisture Transport model can only be solved using the Multi-Grid s method. In order to run this model, either choose the Multi-Grid solution method or disable the	
Transport model on the following parts:	
Part 1 'bar_surface'	~
	Close

- Gain confidence that a model will run the first time
- Save time by avoiding costly simulation stoppages

Visualize Moisture Results



- Moisture Content (Liters)
- Relative Humidity
- Humidity Ratio

- Clearly communicate
 results
- See contours of moisture content and humidity

Track Nodes with Slowest Convergence Each Iteration

Preferences	
Application	Thermal Modeling Options
Graphics	Verify results overwrite if results present
Graphics Details	Write maximum temperature change per iteration
Color Scale	
Key Bindings	File: C:\Users\tai\Documents\taitherm_maxTempChange.txt
Properties	Number of nodes to display 10
Import/Export	
Parallel Processing	Write intermediate results
View Factor	
Thermal	Iteration Interval 100
Convergence	Default Solution Method
-	Default Solution Method

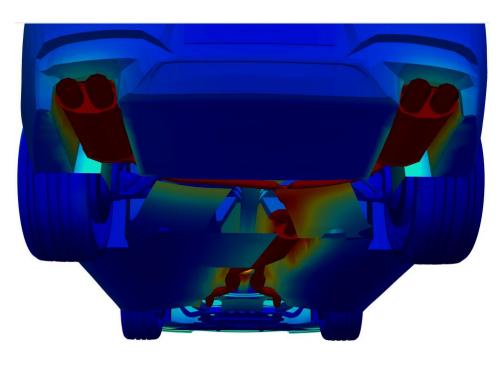
9	Nodes with max temperature	change
0	Time Step 0, Iteration 13	
1	Node Part Elem	Tol.
1 2	731673 1801040 25908	31.121521
3	25538 1801040 25908	31.083008
4	1160536 1801054 841998	29.299866
5	431856 1801054 841998	29.242523
6	744393 1801054 30607	26.351746
7		
8	Nodes with max temperature	change
9	Time Step 0, Iteration 14	
0	Node Part Elem	Tol.
1 2	1201277 1801071 932029	17.275452
2	1201271 1801071 932023	17.213989
3	1201293 1801071 932045	17.173035
4	460054 1801071 932029	17.149048
5	460048 1801071 932023	17.129028
~		

Benefits

20

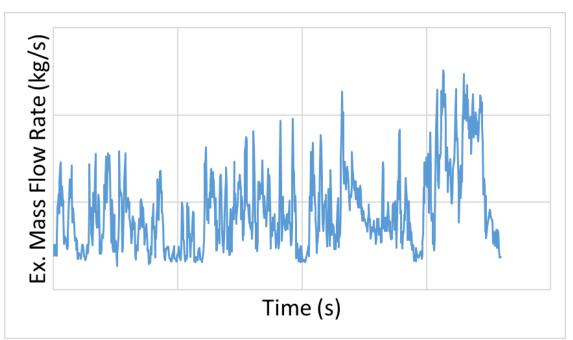
• Quickly locate the problem in unstable models

Improved Transient Solver Stability



- More robust transient solution
- Fewer simulation failures

- Multi-grid solver stability improved for transient models
- Improvement is most often noticed in models which include exhaust streams with variable mass flow rates

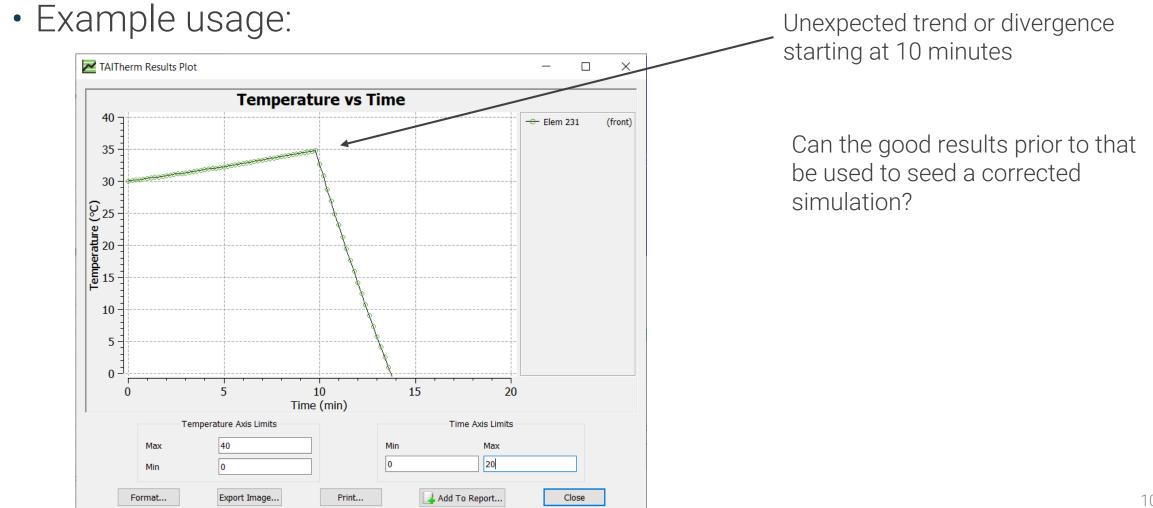


Transient Restart from Intermediate Timesteps

- Save transient restart data at intermediate time steps
- Initialize other transient models from any time step containing appropriate transient restart data

Params	Patches	Monitors	Converge	ence	Results	Output	
			Nodes to	Save	Results For		
	Nodes Geometry No face Geome	odes try Nodes On		ment			
O All	Surface Geo	metry Nodes elected Eleme	and				

Transient Restart from Intermediate Timesteps



Transient Restart from Intermediate Timesteps Model Browser

Setting enabled on old diverging model	Geometry Editor Analyze Post Process Params Patches Monitors Convergence Results Output
Model Browser × Geometry Editor Analyze Post Process	Solution Parameters Restart Time (min) End Time (min) 9 V
Params Patches Monitors Convergence Results Output Nodes to Save Results For Nodes Image: Convergence Results Output Image: All Nodes All Geometry Nodes Element Image: Convergence Remove Remove All Image: Save transient initialization data Every 5 Solution Initialization	S 6 6 7 8 9 10 11 12 13 14 Step Size (mint) 0.2 Reset
Use Part Ini Seed Stead Transient R	tial Temperatures ly State Solution

 $\mathbf{P} \times \mathbf{B}$

Transient Restart from Intermediate Timesteps

Corrected model restarted from good results



- Save computation time
- Recover good results from models that later diverged

IR Enhancements

Import Plume data from Ensight Gold file Format easily created from all major CFD tools

Benefits

 Easily import plume data from StarCCM+ and other CFD solvers

Report Advanced Solver Parameters to Console

- Console output now includes Multigrid solver advanced settings
 - Provides a record in console log file of what settings were used
 - Output also printed to Messages dialog

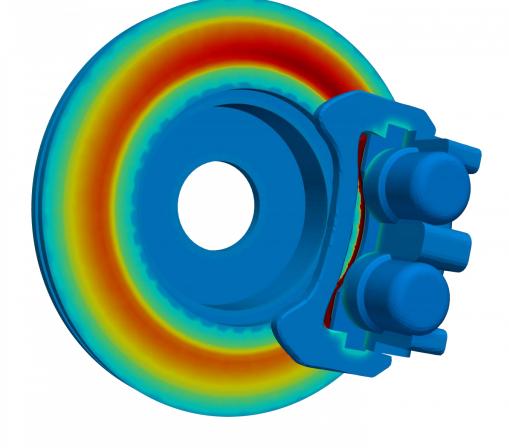
Benefits

• Provide valuable troubleshooting information for debugging

Number of Threads Used:	
View Factor Calculation	
Thermal Solution	4
Convergence Criteria Reach	ned:
Solution Method	Multi-Grid
Loop Count	40
Temperature Change (°C)	0.00363159
Steady State Residual (W)	0

Read Additional Element Types from Abaqus INP File

 Read additional linear element types found in Abaqus INP file format



- Directly re-use mesh from finite element models
- Increased productivity for thermal/structural analysts

Other TAITherm Enhancements

- Define custom headers for CFD CSV import
- Improved interpolation for multivariable drive cycle convection data
- Faster interaction with the summary table

TAITherm Demo

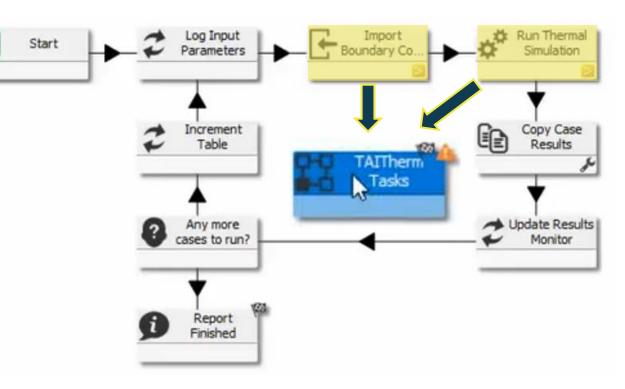
CoTherm 2020.1

Released April 21st

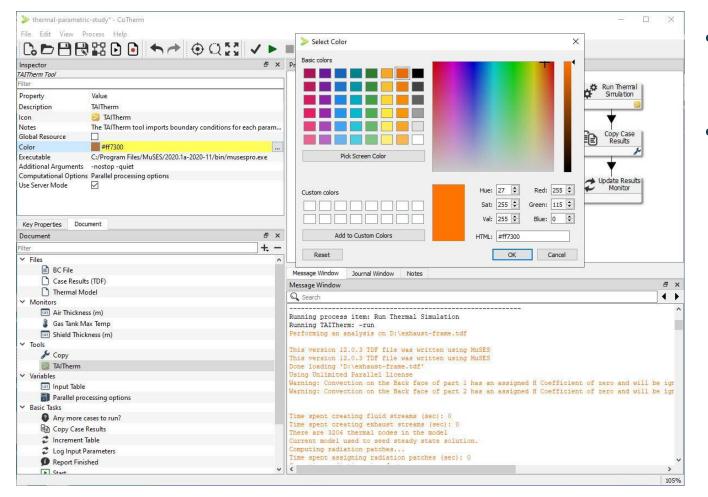
Drag & Drop into a Sub-Process

- Drag and drop sets of tasks into sub-processes
- Organize resources with a single mouse click

- Efficiently group sets of tasks that accomplish a goal
- Spend less time organizing processes



Customize Message Colors Based on Associated Tool or Task



- Associate a text coloring scheme for any tool, task, or sub-process
- Reporting will display in that color within Messages window

- Make message output easier to read
- Spend less time deciphering process log information

Update All Symbol References in One Easy Step

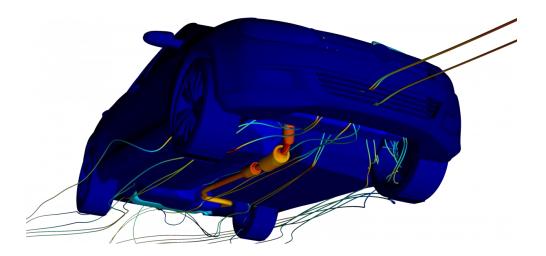
 Automatically change each symbol reference when a resource symbol is updated

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- Confidently ensure PMD remains correctly linked
- Increased productivity for • thermal analysts

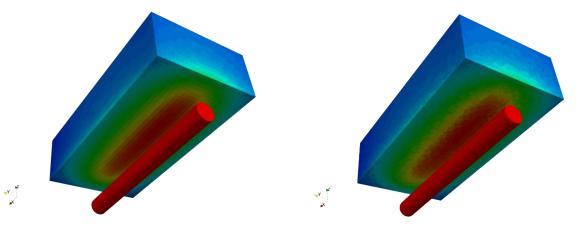
OpenFOAM Support on Windows

- CoTherm now supports OpenFOAM on Windows OS
- Compatible with any
 OpenFOAM Windows
 installation



Temperatures predicted by TAITherm

Temperatures mapped to OpenFOAM



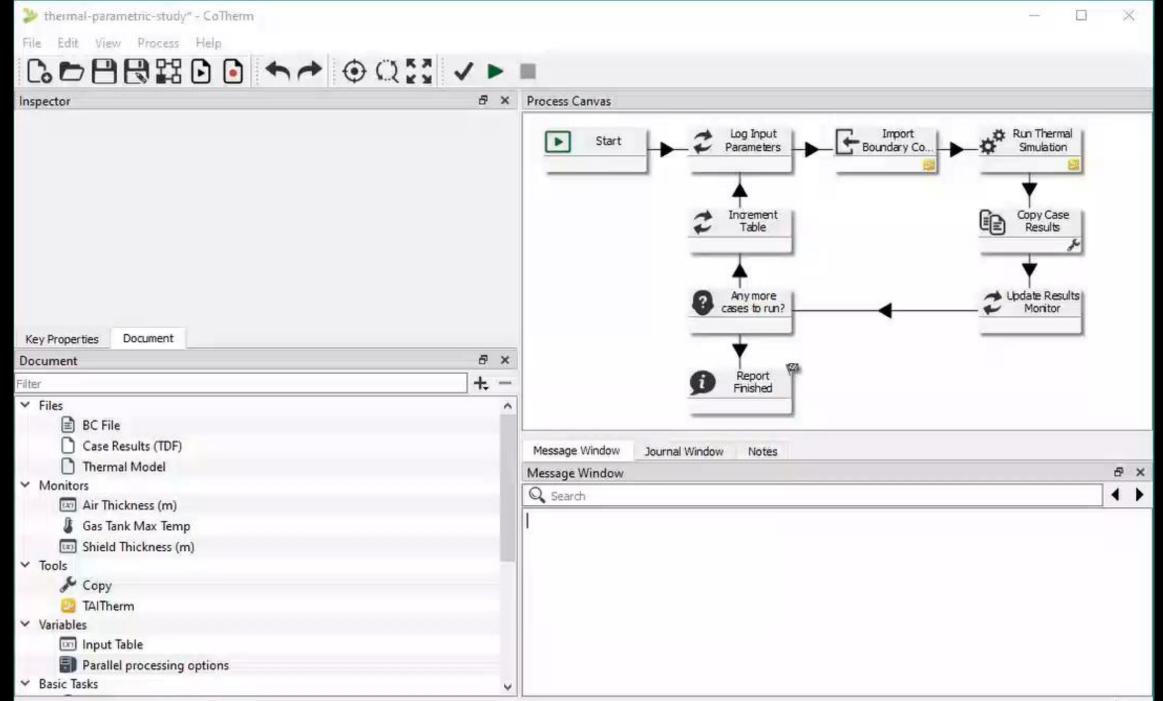
Benefits

 Additional software options provided for CFD coupling and simulation

Other CoTherm Enhancements

- Automatically update global resource conflicts with Sub-Process import
- Export CSV results in Star-CCM+ export tasks
- Reference custom field functions in Fluent export tasks

CoTherm Demo



> thermal-parametric-study - CoTherm	-	
File Educ View Hrocess Help		
Inspector & X	Process Canvas	
	Start Log Input Parameters Boundary Co. Run Thermal Simulation	
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Report Finished		
▶ Start		
Update Results Monitor		
Y TAITherm Tasks		
Import Boundary Conditions		
🗬 Run Thermal Simulation		
~		100%

Technical Support

- <u>https://support.thermoanalytics.com</u>
 - Submit & Check Status of Requests
 - techsupport@thermoanalytics.com
 - Secure Large File Uploads
 - Software Downloads
 - Technical Library
 - Webinar Videos
 - FAQs
 - Papers & Presentations
 - Spreadsheet Tools
 - Training Videos
 - Feature Requests

	ANALYTICS		Scott Gibbs ∽
	ThermoAnalytics > Knowledge Base		Q Search
		Kanada dan Dana	
		Knowledge Base	
		Information under this category will be visible to all logged in users.	
		Frequently Asked Questions	Tutorials
		How can I calculate UV absorption for a surface directly exposed to sunlight?	Thermal Tutorials - Complete Set of Files
S		What Does TimeZone Mean in the TAITherm Environment Tab?	Introduction to TAITherm User Interface
		How Can I Use a TCD File For CFD Import with Mesh	
		Mapping?	SEE ALL 39 ARTICLES
		SEE ALL 115 ARTICLES	
		Webinars	Advanced Tutorials
Here you v		Welcome! ents, technical resources, and the ability to	o submit support requests.
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THERMO ANALYTICS

Questions? Thanks for attending!

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