New Features TAITherm & CoTherm 2020.2

Allison Schick, Thermal & CFD Engineer Daniel Woodford, Thermal & CFD Engineer



TAITherm 2020.2

Released October 13, 2020

New Graphics Engine

- New graphics options
 - Advanced (limited preview)
 - Legacy
 - No graphics
- New look and feel
- Faster view manipulation and part selection
- Advanced graphics currently supports pre-processing
 - Post-processing will be supported in next release



- Faster model setup
- Increased productivity
- Better quality images for reports

Example Timing Comparisons

Action	Time in TAITherm v13.0.2 (mm:ss)	Time in TAITherm v13.1.0 (mm:ss)	Time in TAITherm v2020.1.0 (mm:ss)	Time in TAITherm v2020.2 w/ Advanced Graphics (mm:ss)
Open model in GUI	2:03	0:57	0:58	0:45
Select a part	0:02	0:02	0:02	Instant
Show only one assembly	0:01	0:01	0:01	0:01
Show all parts	0:16	0:14	0:14	0:02

Example Test I	Model Statistics
Application	Underhood / Underbody
Parts	2700
Total Elements	10 million
Volume Elements	6 million

Open using "None" graphics in 2020.2 with only 33% of the memory!

TAITherm - demoship.tdf *

Design Temperature

File Edit View Tools Units Window Help

□ 🗃 🖬 🐁 실 선 선 선 님 패 - 텔 📐 🔽 😰 魚 品 河 요 💁 河 요 - 트 🕲 🎯 井 🕲 🐨 💞 🥉 🚷 🔒 🖽 🗎 🗎 🗎 🔘 🎯 ₽ × Model Size (mm): Model Browser X = 133256Editor Analyze Post Process Geometry Y = 14311.7Part Selector Z = 27547.9ID Name ~ 15 Navigation Center Ceiling 4 E Total Parts: 24 Visible Size (mm): X = 133256Parts Assembly Curves Environ Conduct Properties Scenario Y = 14311.7v Part Type Calculated Standard Z = 27547.9Transparent Electrical Input Moisture Model Latent Heat Only -----Visible Counts: Parts = 19Front Back Elements = 9322 Conduction and Capacity Material Stainless Steel, 430 Thickness (mm) 5 ~ Convection H and Tfluid Convection Type H Coefficient (W/m2-K) Value ~ 5 Fluid Temperature (°C) Value ~ 20 Enable Evaporation/Condensation Q ~ Radiation Surface Property Surface Condition ~ Steel, As Received 0.74 14 ~ Sources Imposed Heat (W) Value V 0 Initialization Display Default ~ Initial Temperature (°C) Seed Steady State ~ Advanced Messages all withprines rype. Horne Enable Water Wash 📃 Edit... 15) Graphics Type: Advanced (Limited Preview) 16) Using Quadro M500M/PCIe/SSE2

17) Graphics Type: Legacy

18) Using OpenGL Version 4.6

NVIDIA Corporation - Quadro M500M/PCIe/SSE2

× Ø

5×

~

Store Scenes

- Replaces the previous "Store Visibility" feature
- Scenes will store:
 - Part visibility
 - View angle
 - Display settings
- Ability to store multiple views



2 TAITherm - Dump_truck_edit4.tdf

N

File Edit View Tools Units Window Help

□ 🖬 🗛 化化化化四→ 웹 🔽 🕫 水晶河梁 대→ 트具の印井の日子 🥇 🔏 😘 🗄 🖿 🖿 🔍 🖉 JX

odel Browser				- 33	C,
eometry Editor Analyze Post Process					
Part Selector					
lame	ID				C
heavy_truck_loader v	1	~	E		2
otal Parts: 130					C
Parts Assembly Curves Environ Conduct Properties	Sce	nario			
Part Type Calculated V Standard					~
Moisture Model Latent Heat Only V Transparent Electrical	input				
•••[]•••					
Front Back					100
~ Conduction and Capacity					Î
Material Steel (mild)				~	
Thickness (mm) 50					
~ Convection					
Convection Type Wind				~	
Area Multiplier 1					
Enable Evaporation/Condensation					
~ Radiation					
Surface Property Surface Condition V Default Surface		0.90		~	
~ Sources					
Imposed Heat (W) Value \vee 0					
~ Initialization					
Initial Temperature (°C) Seed Steady State 🗸 20					
~ Advanced					
Enable Water Wash 🔲 Edit					
~ Design Temperature					



^

×

Thermal Links issues are now reported in Model Check

- Avoid a common model setup error
 - Thermal link to a back side that is *Insulated*
 - Thermal link to the back side of a *Solid Surface*
 - Thermal link to the back side of a multilayer set to *Solid Cylindrical* or *Solid Spherical* conduction

Model Check	>	×
	Run Model Chec	k
Error: The defined thermal link connection(s) are invalid	^	
Warning: Some face to face thermal links have not been calculated. Some checks may not be able to be performed until the links have been calculated. Run the thermal link check to calculate them.		
Please review the following link(s):		
82: Part 'PWM_Solenoids_bushings' (Front) to Part 'PWM_Engine_Valve_Cover' (Fr Warning: The link is a duplicate of another. (See link 469)	ront)	
	Close	

- Improved confidence in model accuracy
- Fewer errors during solution

TAITherm - city_bus.tdf *

File Edit View Tools Units Window Help

				D'
eometry Editor An	alyze Post Process			
Part Selector				
lame		ID		0
Seat_human_6		~ 13927	748 ∽ 🗉	
otal Parts: 266				C
Parts Assembly Cu	urves Environ Co	nduct Properties S	Scenario	
Part Type Calcula	ated 🗸 Multi-L	ayer		~
Conduction Type Planar	~			
Moisture Model Latent	Heat Only 🗸 🗌 Tra	nsparent		
Number of Layers 3	•			
Material Cotton				~
Material Cotton Thickness (mm) 1.5				~
Material Cotton Thickness (mm) 1.5				~
Material Cotton Thickness (mm) 1.5 Convection	H and Tfluid			
Material Cotton Thickness (mm) 1.5 Convection Convection Type H Coefficient (W/m2-K)	H and Tfluid	10		~
Material Cotton Thickness (mm) 1.5 Convection Convection Type H Coefficient (W/m ² -K) Eluid Transcenters (SC)	H and Tfluid Value ~	10		
Material Cotton Thickness (mm) 1.5 ~ Convection 1.5 Convection Type 1.5 H Coefficient (W/m²-K) 1.5 Fluid Temperature (°C) 5 Enable Evaporation/Conc	H and Tfluid Value ~ Fluid ~	10 110: Cabin_air		> >
Material Cotton Thickness (mm) 1.5 Convection Convection Type H Coefficient (W/m ² -K) Fluid Temperature (°C) Enable Evaporation/Cond Padiation	H and Tfluid Value ~ Fluid ~ densation	10 110: Cabin_air		
Material Cotton Thickness (mm) 1.5 Convection Convection Type H Coefficient (W/m²-K) Fluid Temperature (°C) Enable Evaporation/Cond Radiation Surface Property Surface Property	H and Tfluid Value ~ Fluid ~ densation _	10 110: Cabin_air	0.77	
Material Cotton Thickness (mm) 1.5 Convection Convection Type H Coefficient (W/m²-K) Fluid Temperature (°C) Enable Evaporation/Cond Radiation Surface Property Surface Courset 	H and Tfluid Value ~ Fluid ~ densation _ ee Condition ~ Nylon, C	10 110: Cabin_air loth	0.77	
Material Cotton Thickness (mm) 1.5 Convection Convection Type H Coefficient (W/m²-K) Fluid Temperature (°C) Enable Evaporation/Cond ✓ Radiation Surface Property Surface ✓ Sources Variation Variation	H and Tfluid Value ~ Fluid ~ densation ce Condition ~ Nylon, C	10 110: Cabin_air loth	0.77	
Material Cotton Thickness (mm) 1.5 ~ Convection 1.5 Convection Type 1.6 H Coefficient (W/m ² -K) 1.6 Fluid Temperature (°C) Enable Evaporation/Cond ~ Radiation Surface Property Surface Property Surface ~ Sources Imposed Heat (W)	H and Tfluid Value ~ Fluid ~ densation ce Condition ~ Nylon, C	10 110: Cabin_air Ioth	0.77	
Material Cotton Thickness (mm) 1.5 ~ Convection 1.5 Convection Type 1.5 H Coefficient (W/m²-K) 1.5 Fluid Temperature (°C) Enable Evaporation/Cond ~ Radiation Surface Property Surface Property Surface ~ Sources Imposed Heat (W) Value ~ Initialization	H and Tfluid Value ~ Fluid ~ densation e Condition ~ Nylon, C	10 110: Cabin_air loth	0.77	
Material Cotton Thickness (mm) 1.5 ~ Convection 1.5 Convection Type 1.6 H Coefficient (W/m²-K) 1.6 Fluid Temperature (°C) Enable Evaporation/Cond ~ Radiation Surface Property Surface ~ Sources Imposed Heat (W) Value ~ Initialization Initial Temperature (°C)	H and Tfluid Value ~ Fluid ~ densation ce Condition ~ Nylon, C e ~ 0 Seed Steady State ~	10 110: Cabin_air loth	0.77	



Display Default

Advanced Graphics (Limited Preview) does not currently support all graphics display and interaction options.

~

lessages	년 2 · · · · · · · · · · · · · · · · · ·	ζ
7) Restored scene 'Exterior' 3) Restored scene 'Humans'		120
 Restored scene 'Exterior' Restored scene 'Humans' Restored scene 'Exterior' 		

Additional Updates & Enhancements

- New Battery API functions for simulating alternators during battery charging
- H3D file read
- Improved radiation energy balance with scaled areas (humans and face-to-face thermal links)
- Improved accuracy in the calculation of heat released/absorbed during evaporation/condensation in the moisture transport model



CoTherm 2020.2

Released October 13, 2020

MATLAB Integration

- Native tool with background processing
- New CoTherm Matlab Tool, Matlab Run Task, and Matlab Variable options
- New MATLAB Coupling example process found in the CoTherm installation directory



- Edit MATLAB code directly within CoTherm complete with syntax highlighting & symbol support
- Retrieve MATLAB variables with scalar or matrix (array) data

Microsoft Excel Integration

- Directly in the CoTherm user interface...
 - View contents of an Excel Workbook
 - Retrieve cell values

» s	elect Cell Range		- 🗆	×
	Α	В	c	^
1	Time (s)	Speed (kph)	Temperature (°C)	
2	0	120	60	
3	10	120	60	
4	20	120	60	
5	30	0	75	~
<		·	>	
		0	K Cancel	

Inspector	
Excel Variable	
Filter	
Property	Value
Description	Excel Variable
Icon	Excel
Notes	
Global Resource	
Symbol	ExcelVariable
Variable Monitored	\checkmark
Excel File	Excel File
Sheet Name	TAITherm_Model_Results
Cell Range	A2:E12

- All Excel workbook information is available to view within CoTherm → increased efficiency
- Better compatibility between CoTherm and Excel files

>> matlab_excel_example - CoTherm			- a ×
File Edit View Process Help		270	
C►⊟₽₩00 ♠ ♦ QX	🛕 1 🕨 🔳		
Key Properties Document	Process Canvas	Inspector	e ×
Document	8 ×	Start	
Filter	+	Filter	
 Files BC import file Excel File Solution parameters file Thermal model Thermal model (merged) calc_heat_rate MATLAB code Monitors BC import arg Coupling end time (seconds) Coupling start time (seconds) Coupling start time (seconds) Coupling start time (seconds) Excel Variable MATLAB heat rate MATLAB heat rate curve MATLAB heat rate curve TAITherm initialization mode TAITherm start time arg TAITherm tank temperature 	Start Start Wpdate TAITherm mo TAITherm mo TAITherm mo TAITherm mo TAITherm mo	Property Description Icon Notes Color Connection	Value Start Initial State Transient thermal simulation using TAITherm and MATLAB. Automatic Run TAITherm simulation
	U V		
Monitors Plots			
Monitors	🗗 🗙 Message Window Journal Window		
Filter	Message Window		e ×
TAITherm tank MATLAB heat rate Excel Va	riable Q Search		<)
No Value No Value No Va	Running CoTherm 2020.2.0 Opening document from C:/Users/ams/Desktop/webi This file was written with 2020.2.0	.nar/matlab_excel_example.pmd	
Δ No Value Δ No Value Δ No V	alue		

Additional Updates & Enhancements

Now Compatible with the Pandas Python Library

• More options for data manipulation and analysis

New Symbol Modifiers Added

• Easily manipulate your symbols to extract desired information

All File Browsers Now Store the Relative File Path to the PMD

Move your CoTherm process across computers without needing to make edits

Calculation Time for Coupling Monitors (TAITherm Convergence Variables) is Significantly Improved

Takes less time to run coupling processes

\$symbol.rowCount \$symbol.columnCount \$symbol.at(row_index

column_index)

\$symbol[index]

Technical Support

- https://support.thermoanalytics.com
 - 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

			Scott Gibbs 🛩
	ThermoAnalytics > Knowledge Base		Q Search
		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	
	1743	Webinars	Advanced Tutorials
Here you v	will find announcem	Welcome! ents, technical resources, and the ability to	o submit support requests.
Here you v	will find announcem	Welcome! ents, technical resources, and the ability to	submit support requests.
Here you v	will find announcem Q Search	Welcome! ents, technical resources, and the ability to	o submit support requests.
Here you v	will find announceme Q Search	Welcome! ents, technical resources, and the ability to support request VIEW EXISTING REQUE	o submit support requests.
Here you v	will find announcem Q Search SUBMIT SUBMIT	Welcome! ents, technical resources, and the ability to support request	submit support requests.
Here you v Upcomi	Will find announceme Q Search SUBMIT SUBMIT SUBMIT Mebinar 2020.1	Welcome! ents, technical resources, and the ability to support request	o submit support requests.
Here you v Upcomi New Features V SPIE Defense	Will find announceme Q Search SUBMIT SUBMIT Mebinar 2020.1 + Commercial Sensing 2	Welcome! ents, technical resources, and the ability to support request VIEW EXISTING REQUE	9 submit support requests.
Here you v Upcomi New Features V SPIE Defense TAITherm Trair	will find announceme Q Search SUBMIT	Welcome! ents, technical resources, and the ability to support request VIEW EXISTING REQUE	9 submit support requests.
Here you v Upcomi New Features V SPIE Defense TAITherm Train CoTherm Train	Will find announceme Q Search SUBMIT	Welcome! ents, technical resources, and the ability to support request VIEW EXISTING REQUE	submit support requests.
Here you v Upcomi New Features V SPIE Defense TAITherm Train CoTherm Train Human Therma	Will find announceme Q Search SUBMIT	Welcome! ents, technical resources, and the ability to support request view existing reque	o submit support requests.

THERMO ANALYTICS

Questions? Thanks for attending!

US Locations

ThermoAnalytics Detroit Office 39555 Orchard Hill Place Suite 460 Novi, MI 48375

ThermoAnalytics HQ 23440 Airpark Blvd. Calumet, MI 49913

Allison Schick

Office: +1 (906) 482-9560 x158 ams@thermoanalytics.com www.thermoanalytics.com

Daniel Woodford

Office: +1 (906) 482-9560 x136 dw@thermoanalytics.com www.thermoanalytics.com

