New Features

TAITherm & CoTherm 2020.1

Scott Gibbs, Thermal & EO-IR Engineer

THERMO ANALYTICS

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New Branding

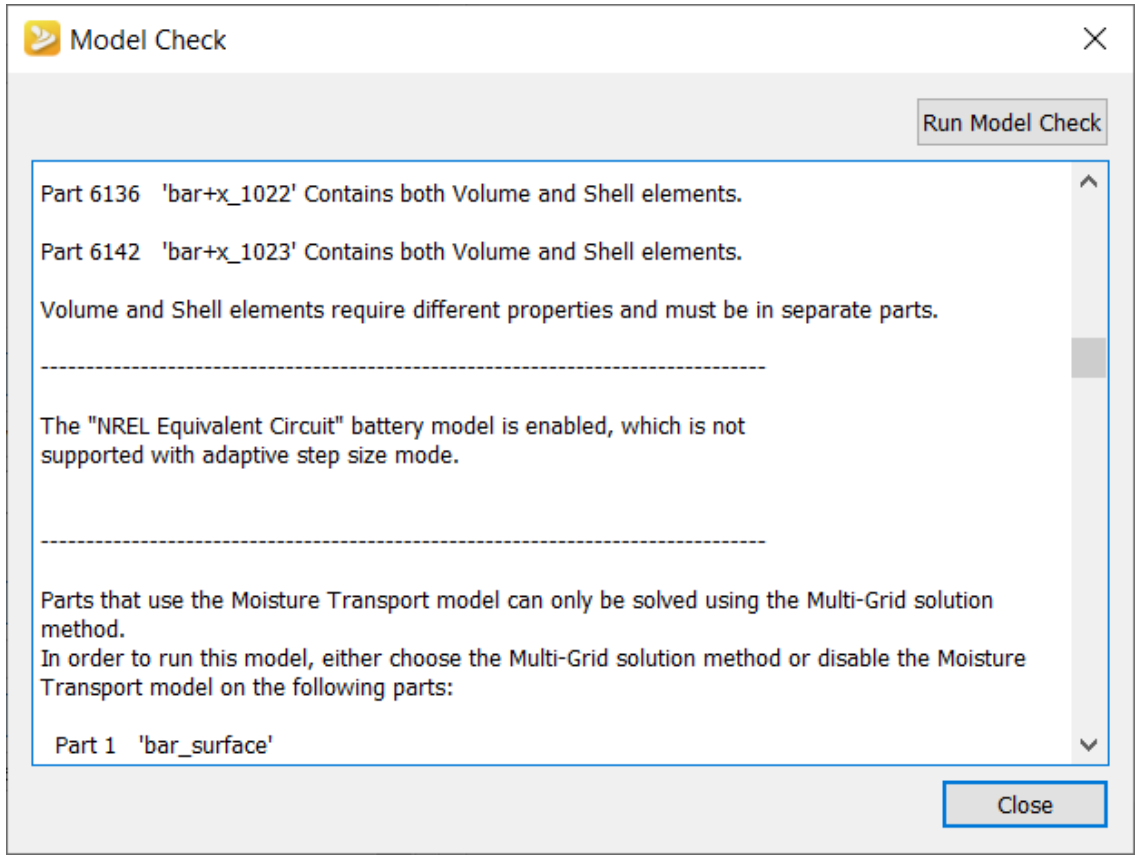
- New Numbering Scheme!
  - YYYY.r.m

TAITherm 2020.1

Released April 21st

Model Setup Check

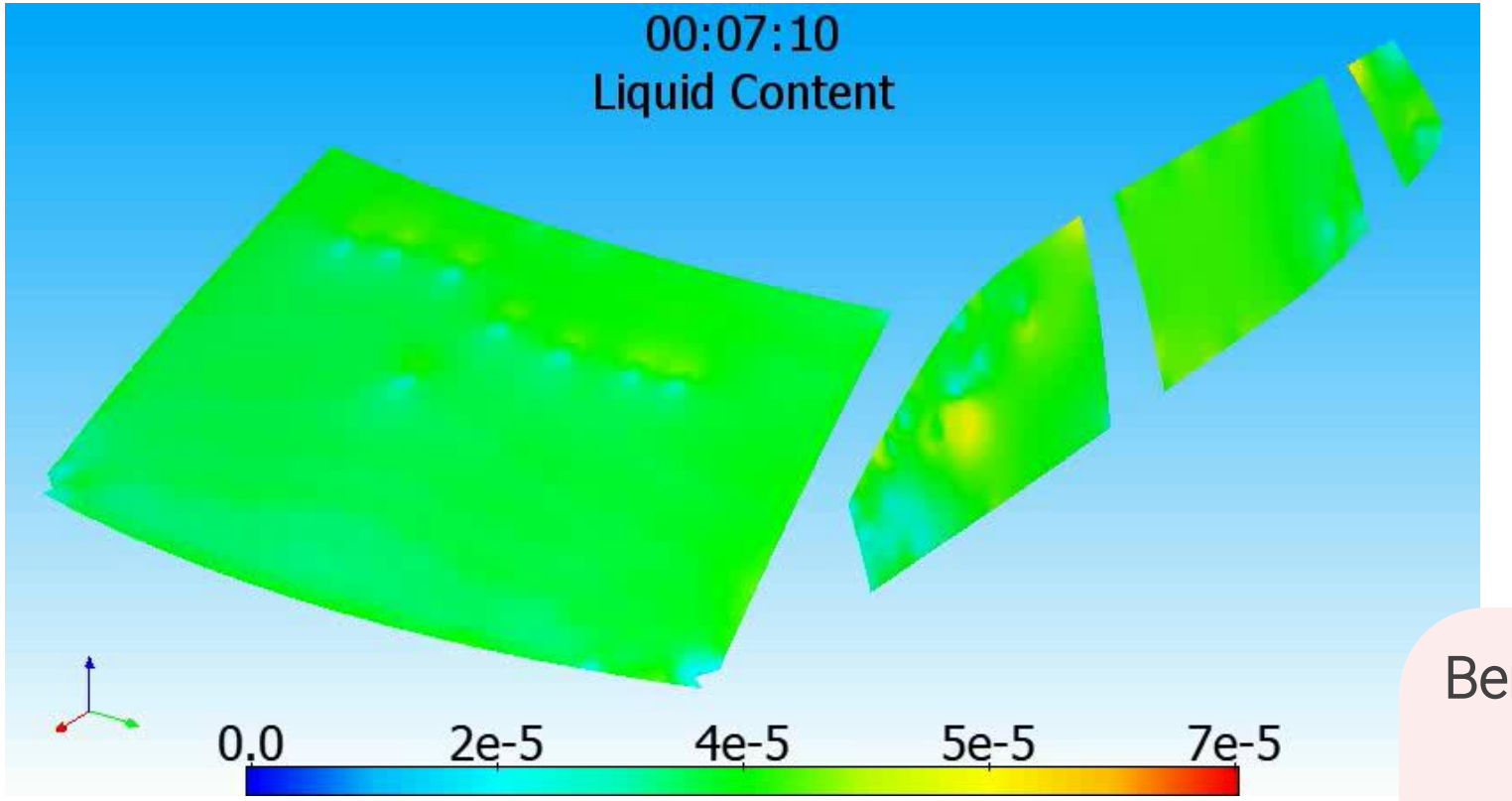
- Run checks on model validity before submitting a model for analysis
- Additional parameters will be checked in future releases



Benefits

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

Visualize Moisture Results

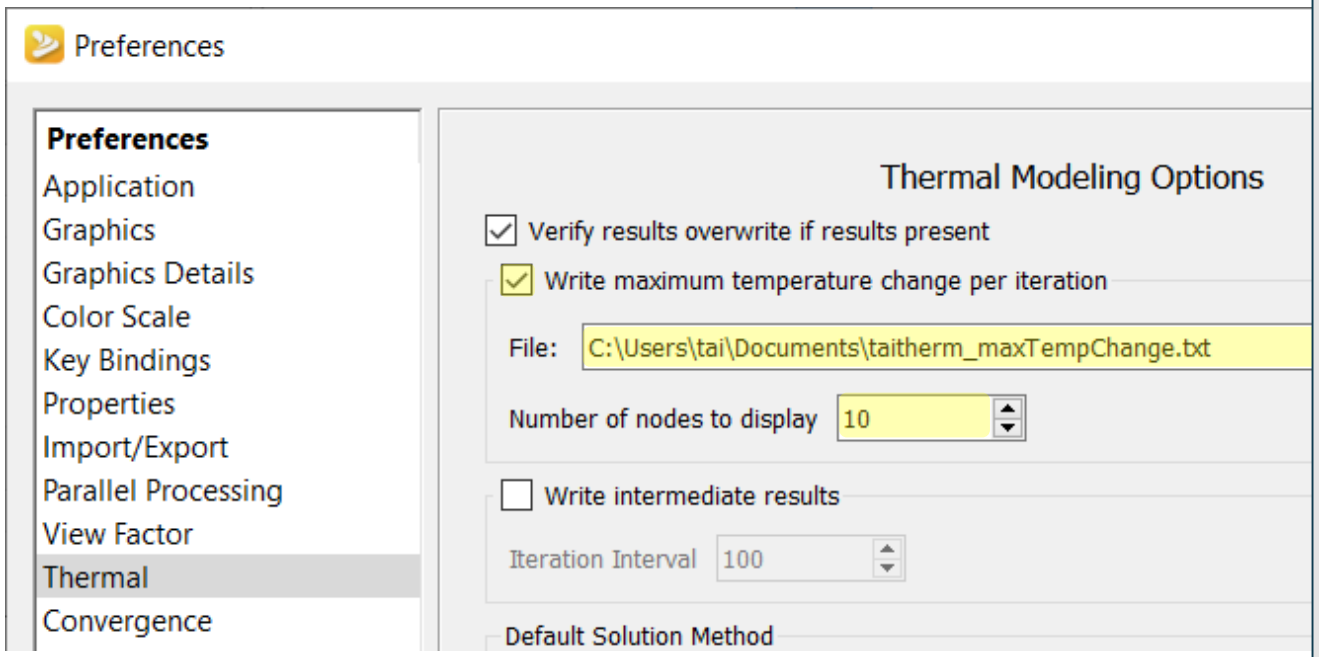


- Moisture Content (Liters)
- Relative Humidity
- Humidity Ratio

Benefits

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

Track Nodes with Slowest Convergence Each Iteration

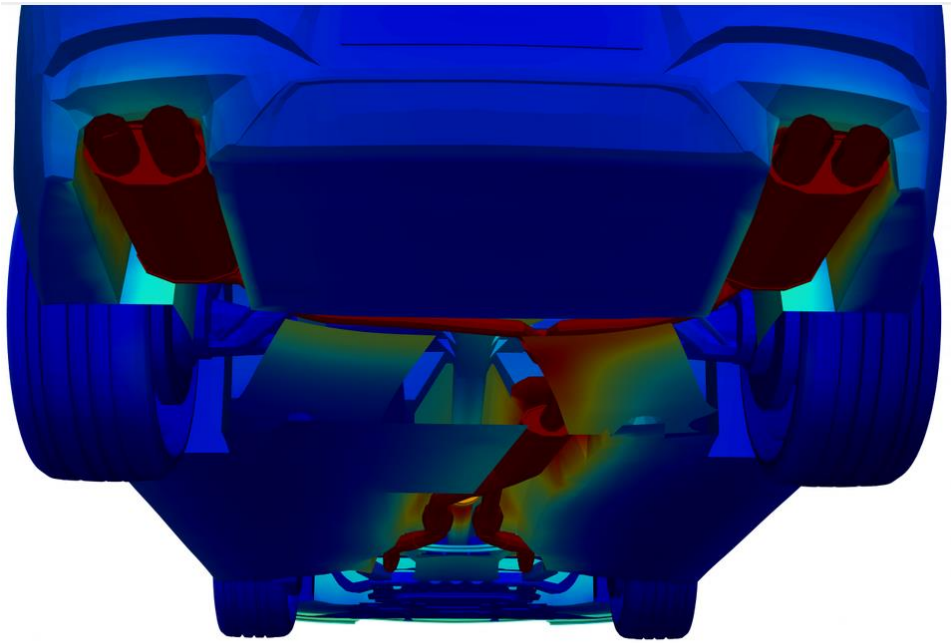



```
169  Nodes with max temperature change
170  Time Step 0,  Iteration 13
171       Node   Part   Elem      Tol.
172    731673 1801040  25908     31.121521
173    25538 1801040  25908     31.083008
174    1160536 1801054 841998     29.299866
175    431856 1801054 841998     29.242523
176    744393 1801054  30607     26.351746
177
178  Nodes with max temperature change
179  Time Step 0,  Iteration 14
180       Node   Part   Elem      Tol.
181    1201277 1801071 932029     17.275452
182    1201271 1801071 932023     17.213989
183    1201293 1801071 932045     17.173035
184    460054 1801071 932029     17.149048
185    460048 1801071 932023     17.129028
```

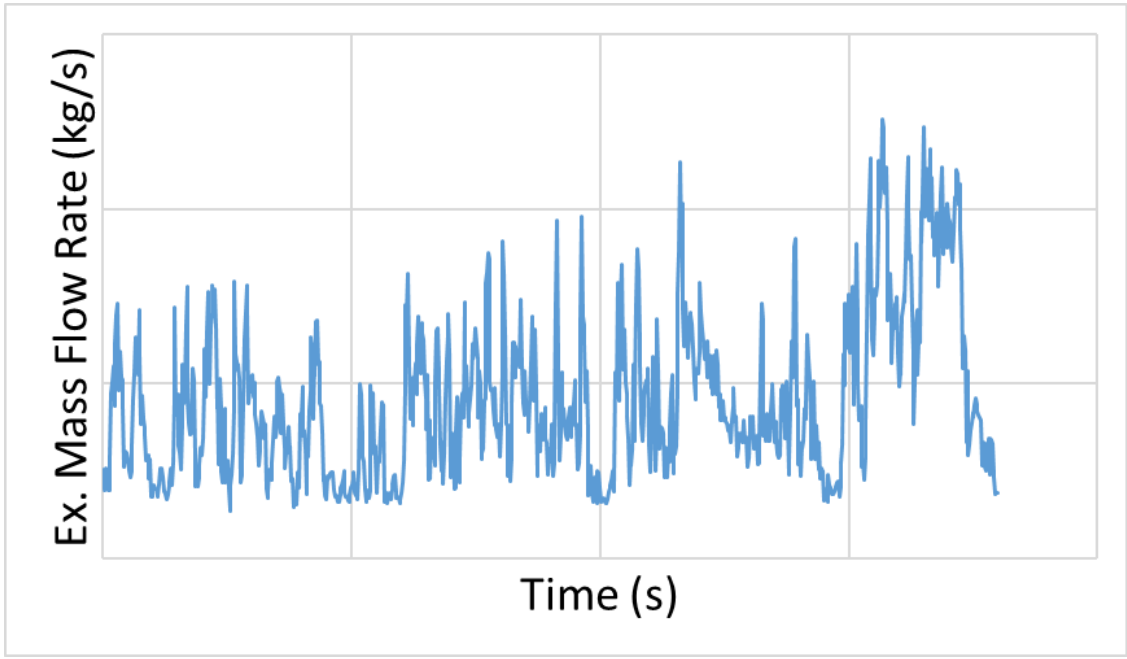
Benefits

- Quickly locate the problem in unstable models

Improved Transient Solver Stability



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

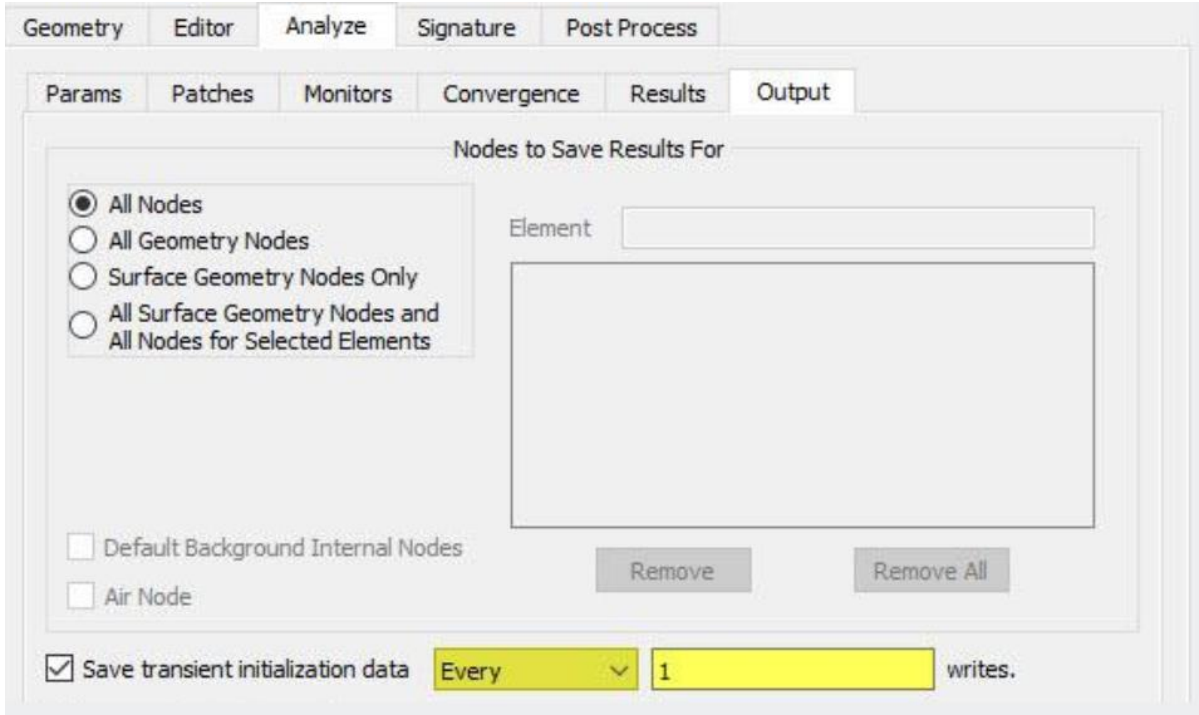


Benefits

- More robust transient solution
- Fewer simulation failures

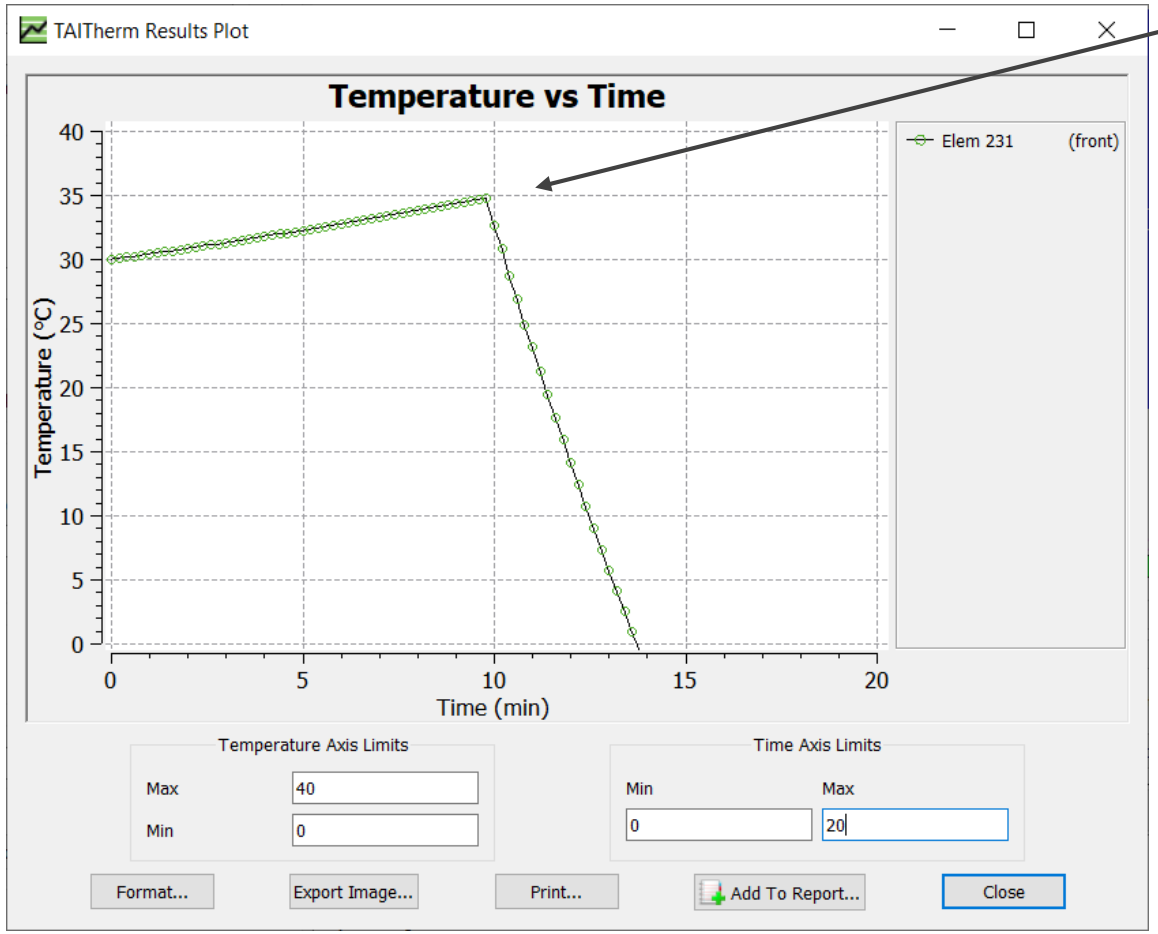
Transient Restart from Intermediate Timesteps

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



Transient Restart from Intermediate Timesteps

- Example usage:

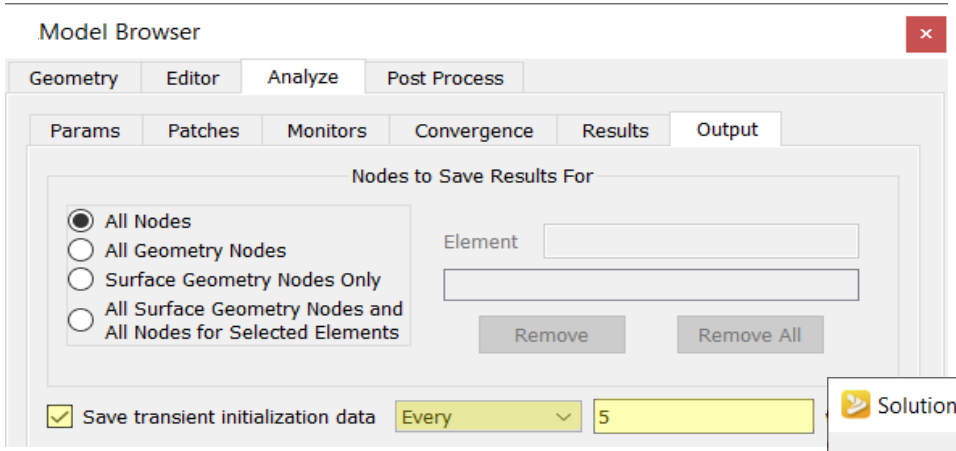


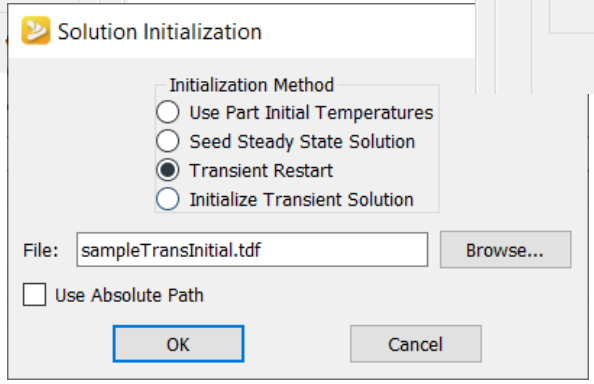
Unexpected trend or divergence starting at 10 minutes

Can the good results prior to that be used to seed a corrected simulation?

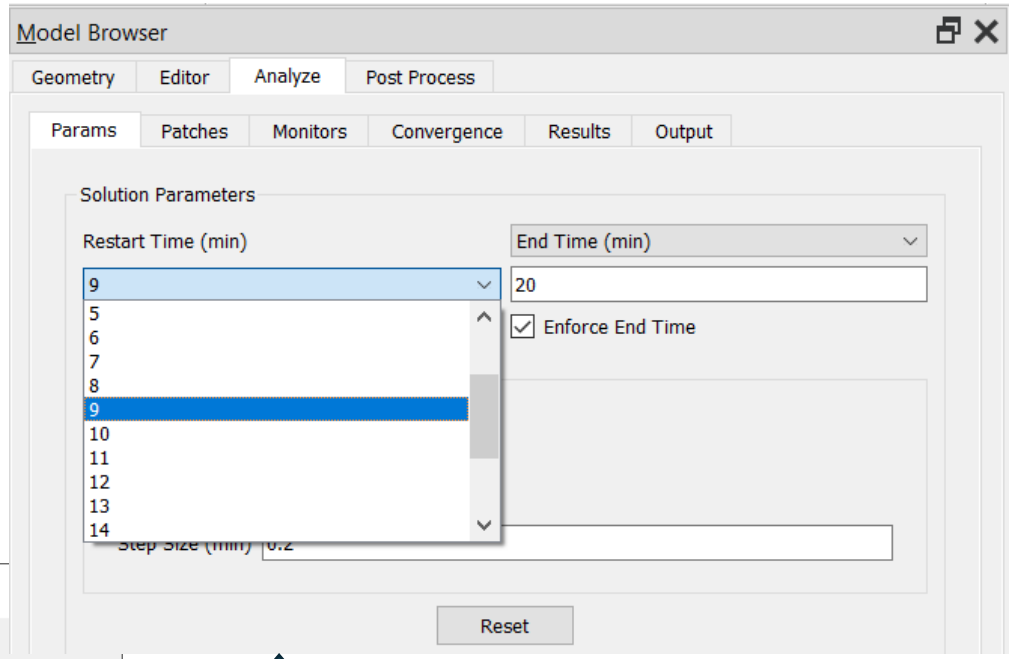
Transient Restart from Intermediate Timesteps

Setting enabled on old diverging model



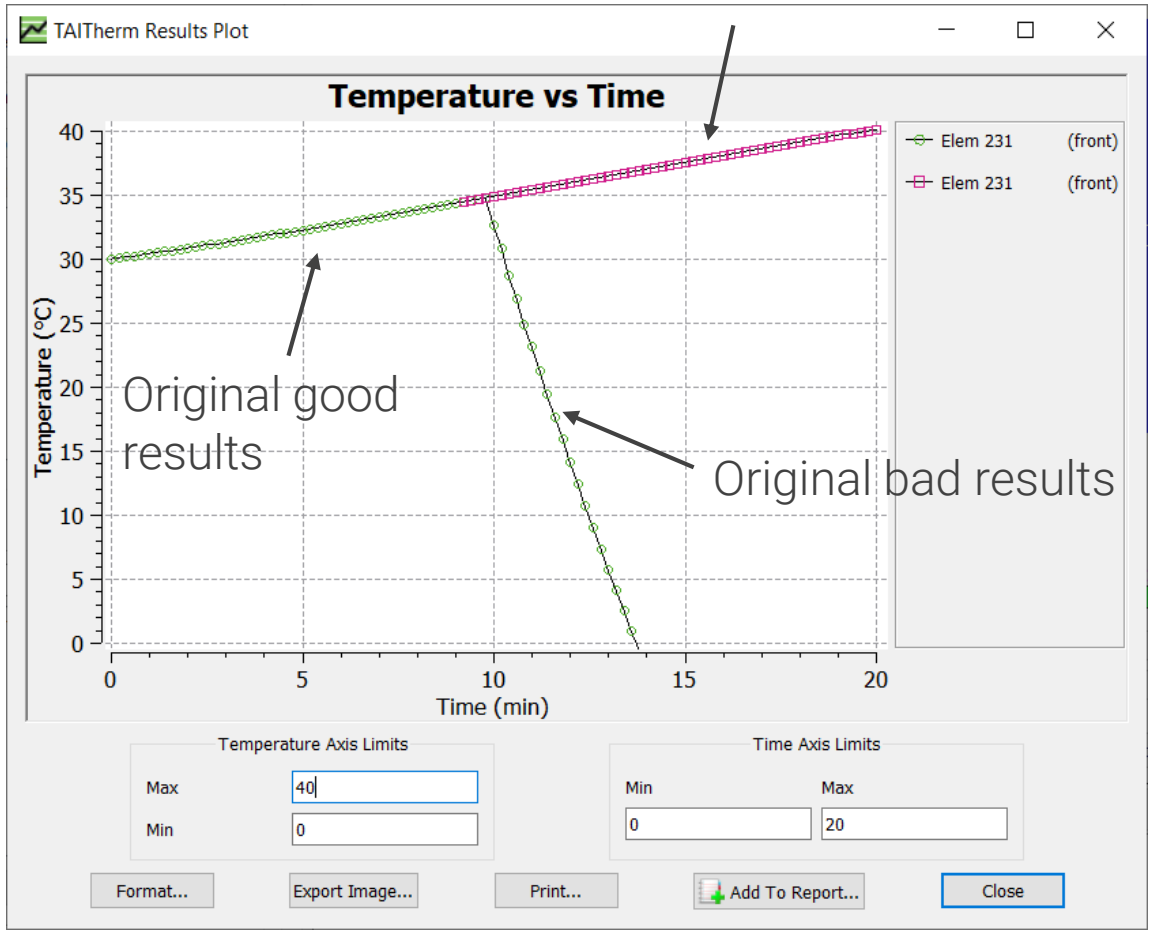


Fixed model seeded w/ salvaged data



Transient Restart from Intermediate Timesteps

Corrected model restarted from good results



Benefits

- 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

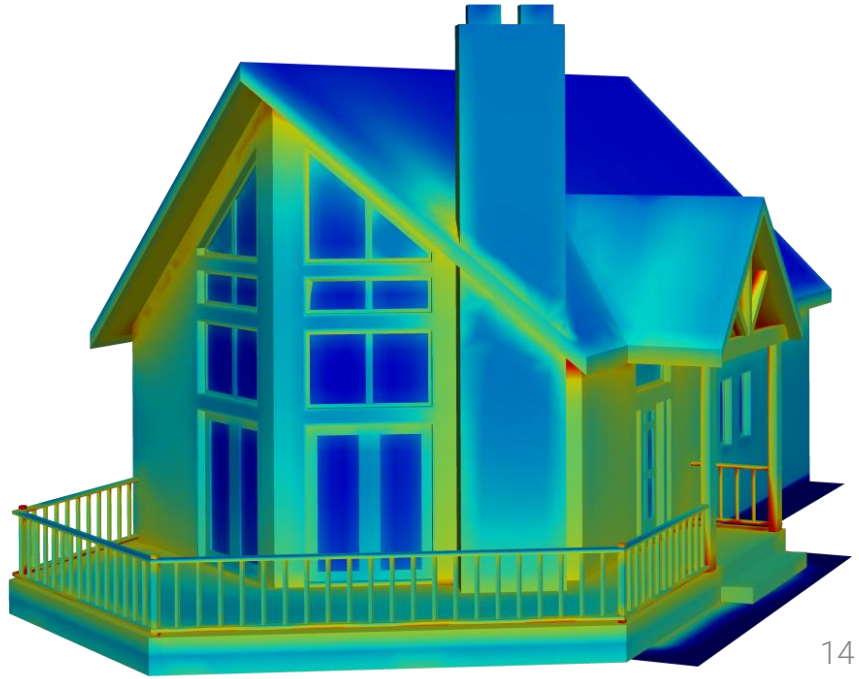
Report Advanced Solver Parameters to Console

- 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

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

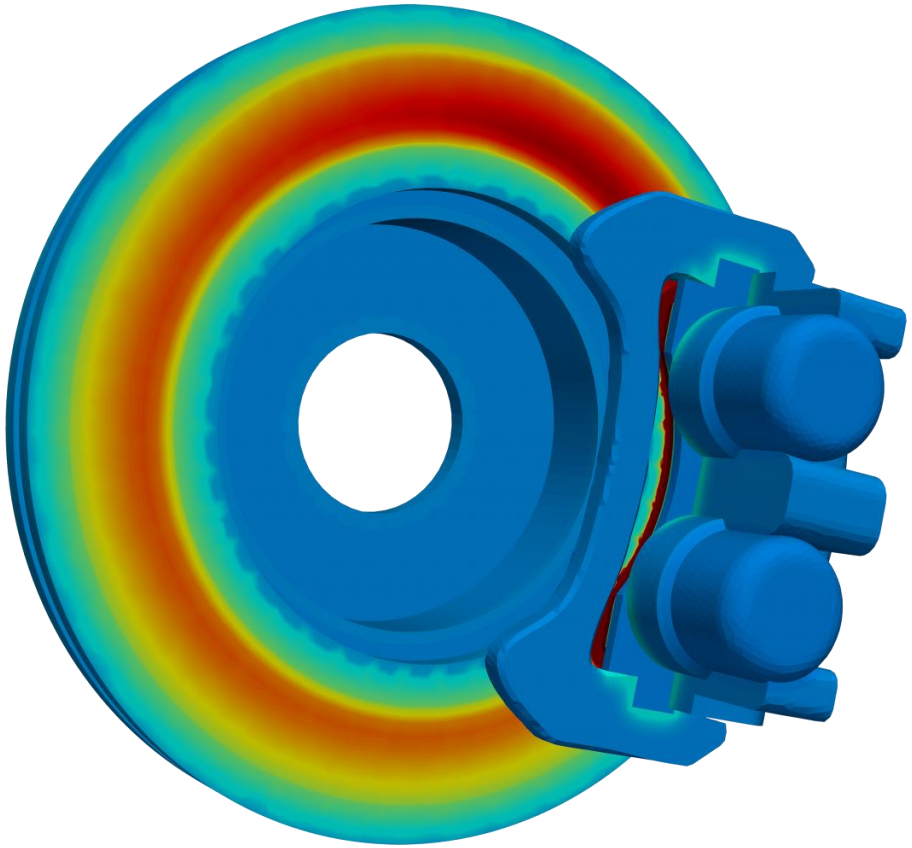
Benefits

- Provide valuable troubleshooting information for debugging



Read Additional Element Types from Abaqus INP File

- Read additional linear element types found in Abaqus INP file format



Benefits

- 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

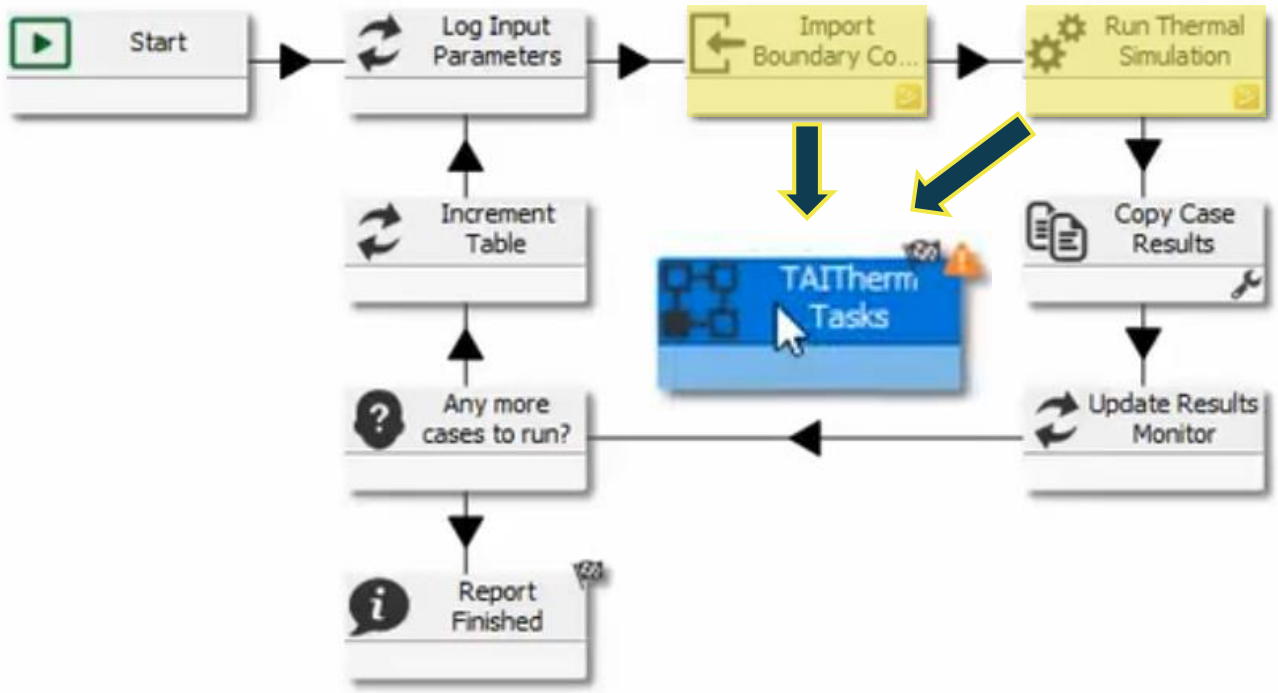
TAITherm Demo

CoTherm 2020.1

Released April 21st

Drag & Drop into a Sub-Process

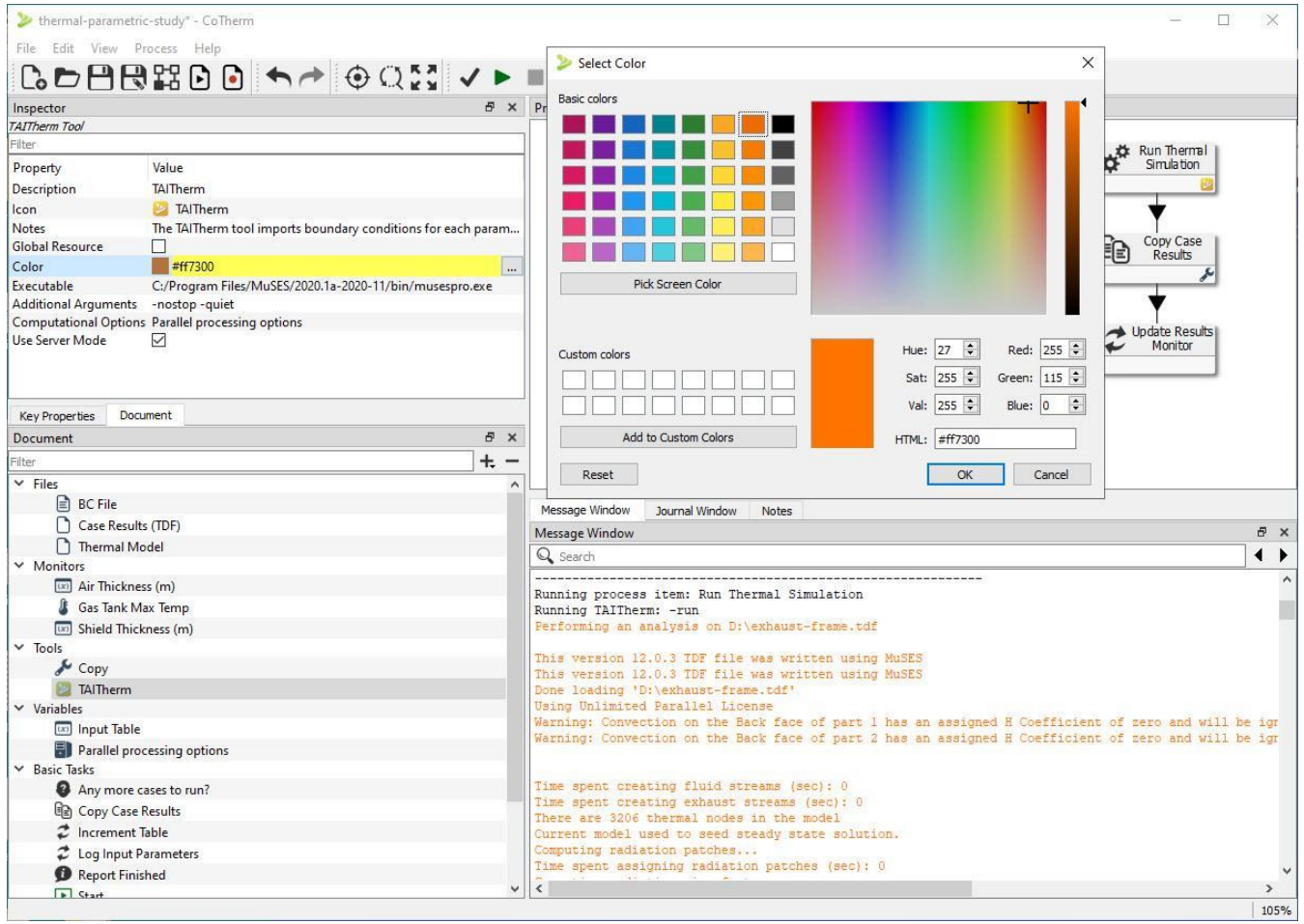
- Drag and drop sets of tasks into sub-processes
- Organize resources with a single mouse click



Benefits

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

Customize Message Colors Based on Associated Tool or Task



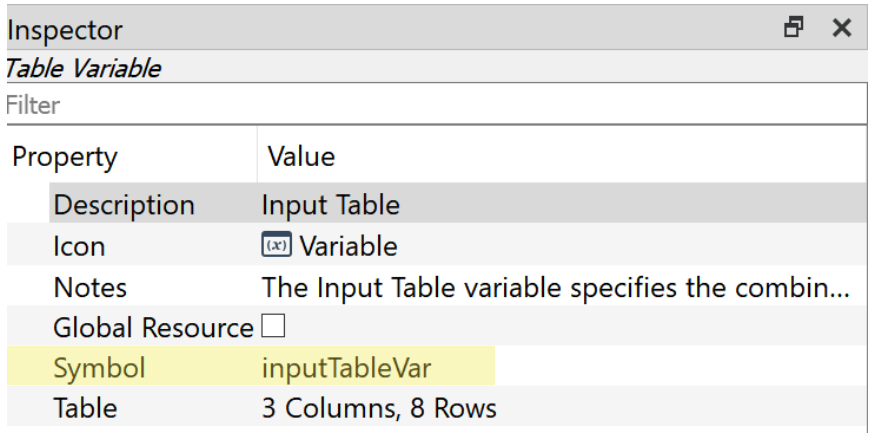
- Associate a text coloring scheme for any tool, task, or sub-process
- Reporting will display in that color within Messages window

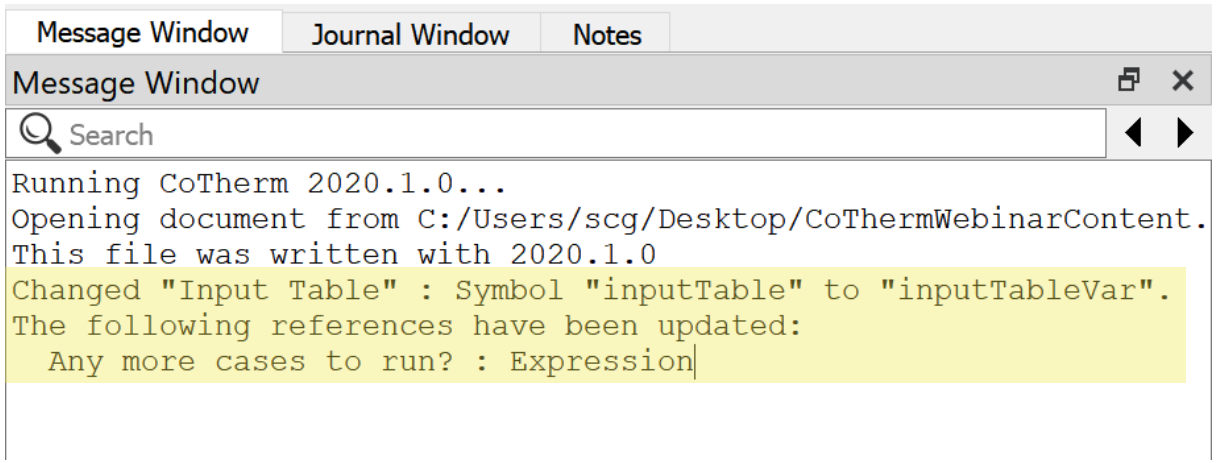
Benefits

- 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





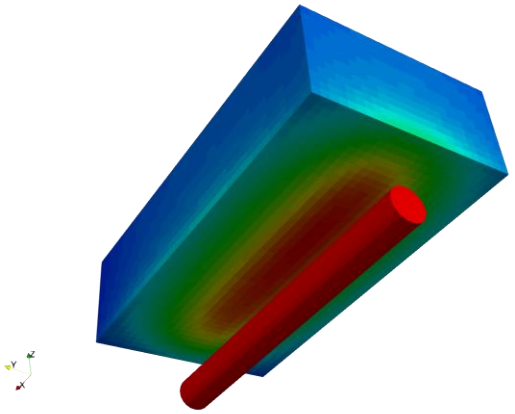
Benefits

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

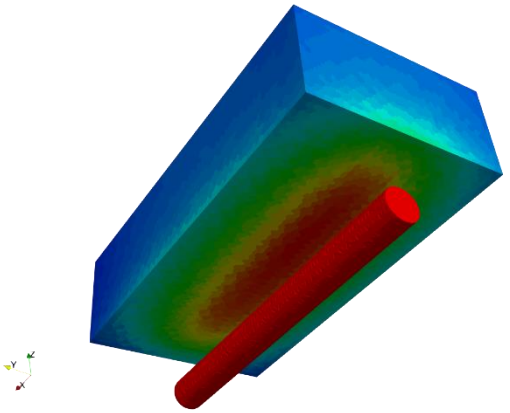
OpenFOAM Support on Windows

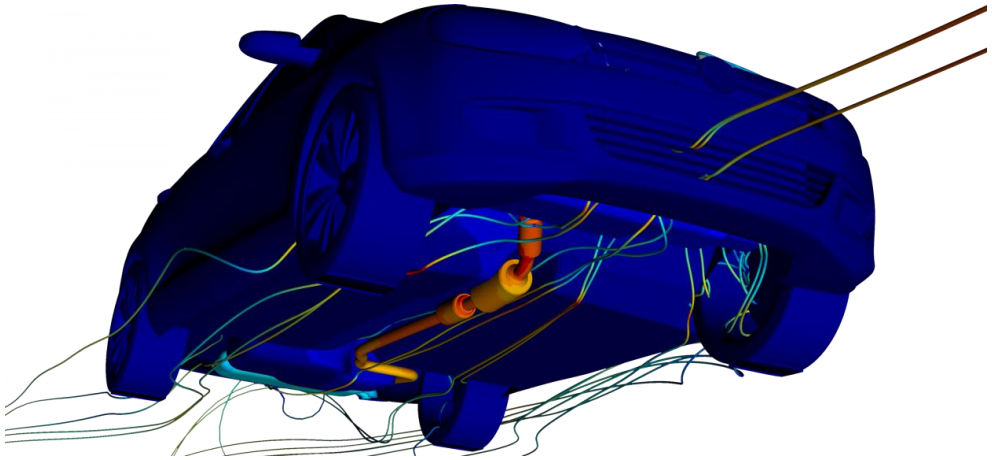
- CoTherm now supports OpenFOAM on Windows OS
- Compatible with any OpenFOAM Windows installation

Temperatures predicted by TAITherm



Temperatures mapped to OpenFOAM





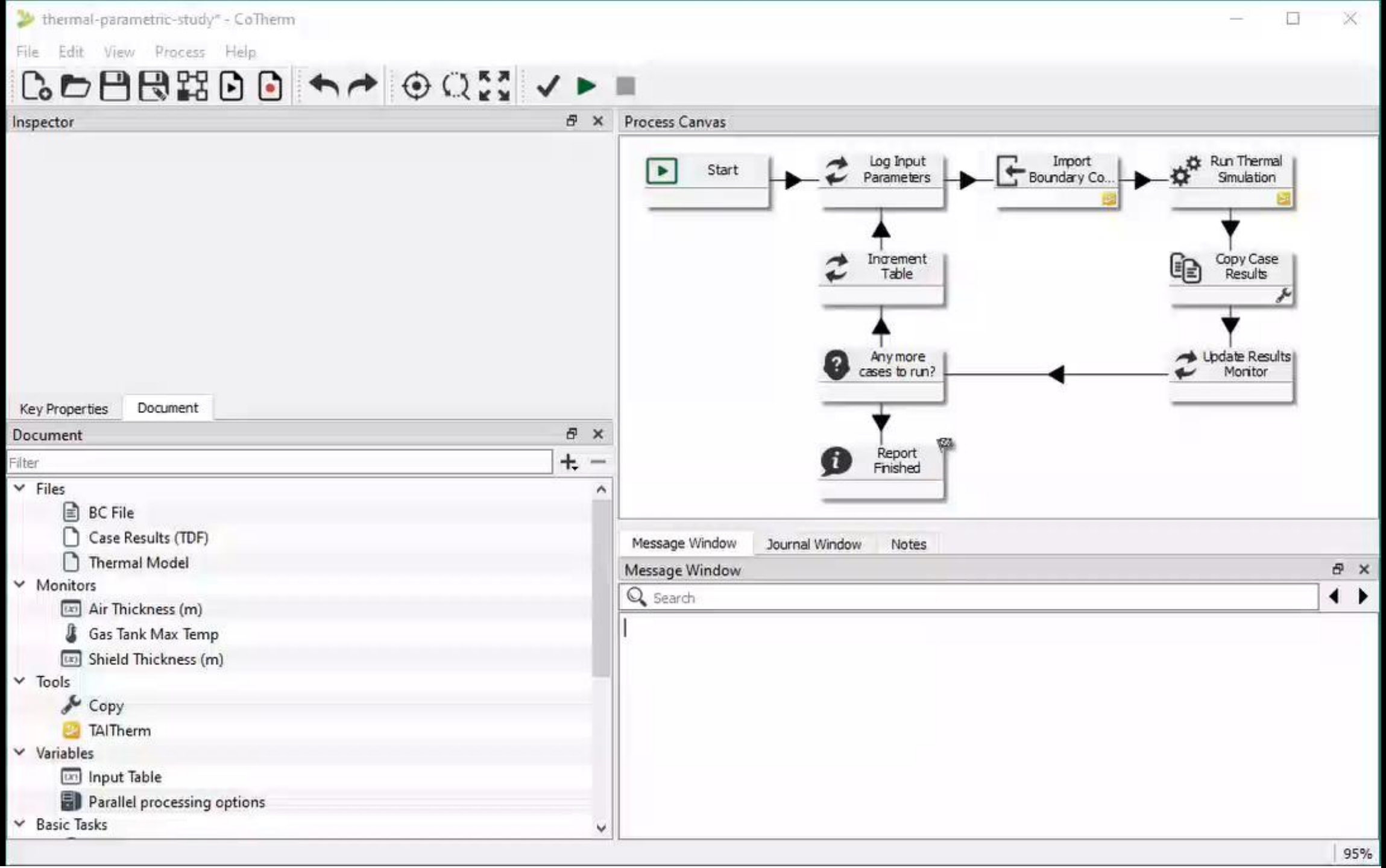
Benefits

- 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
Edit
View
Process
Help
Inspector
Key Properties
Document
Document
Filter
Files
BC File
Case Results (TDF)
Thermal Model
Monitors
Air Thickness (m)
Gas Tank Max Temp
Shield Thickness (m)
Tools
Copy
TAITherm
Variables
Input Table
Parallel processing options
Basic Tasks
Process Canvas
Start
Log Input Parameters
Import Boundary Co...
Run Thermal Simulation
Increment Table
Copy Case Results
Any more cases to run?
Update Results Monitor
Report Finished
Message Window
Journal Window
Notes
Message Window
Search
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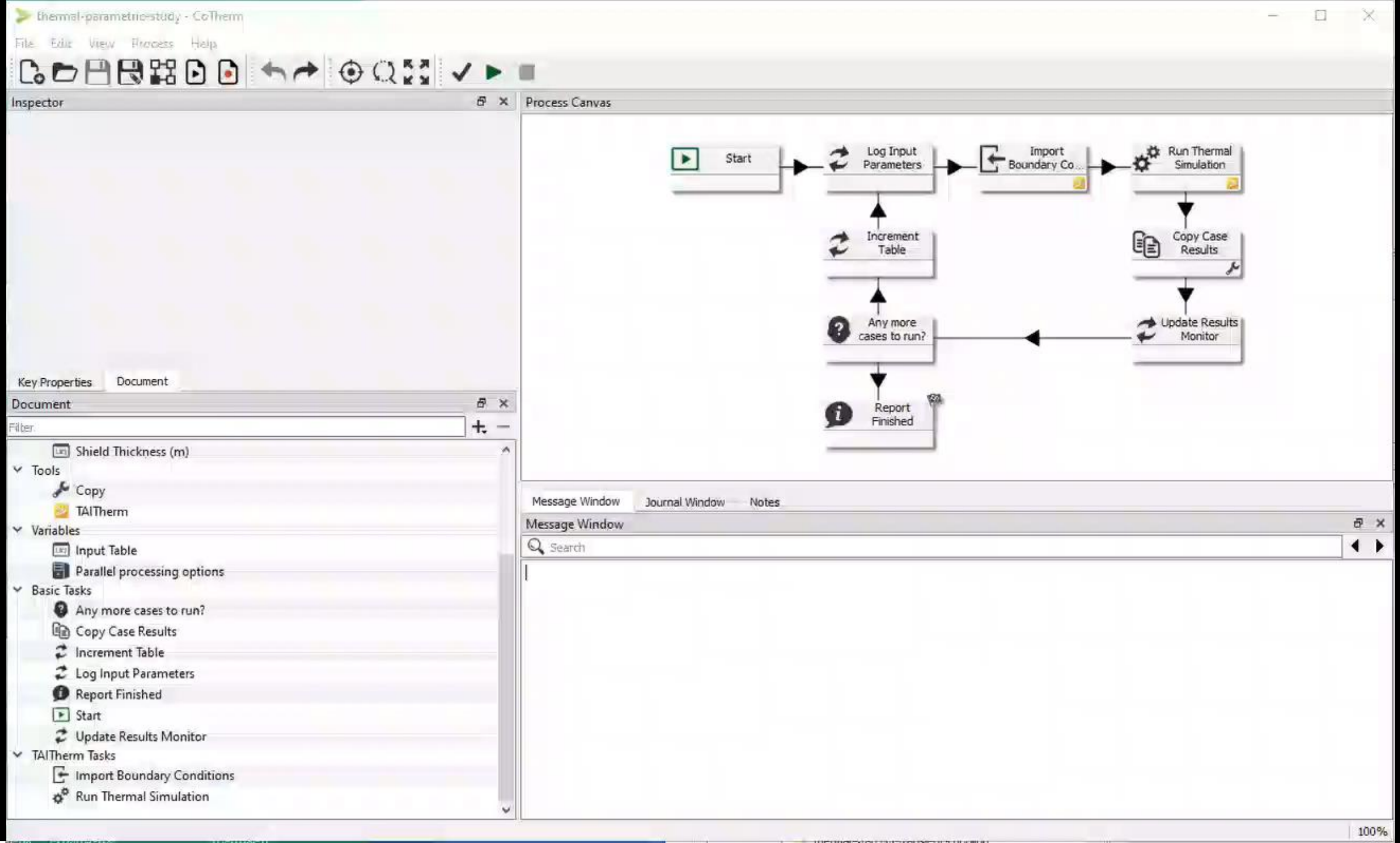
thermal-parametric-study - CoTherm
File Edit View Process Help
Inspector
Process Canvas
Start
Log Input Parameters
Import Boundary Co...
Run Thermal Simulation
Increment Table
Copy Case Results
Any more cases to run?
Update Results Monitor
Report Finished
Key Properties
Document
Document
Filter
Shield Thickness (m)
Tools
Copy
TAITherm
Variables
Input Table
Parallel processing options
Basic Tasks
Any more cases to run?
Copy Case Results
Increment Table
Log Input Parameters
Report Finished
Start
Update Results Monitor
TAITherm Tasks
Import Boundary Conditions
Run Thermal Simulation
Message Window
Journal Window
Notes
Message Window
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100%

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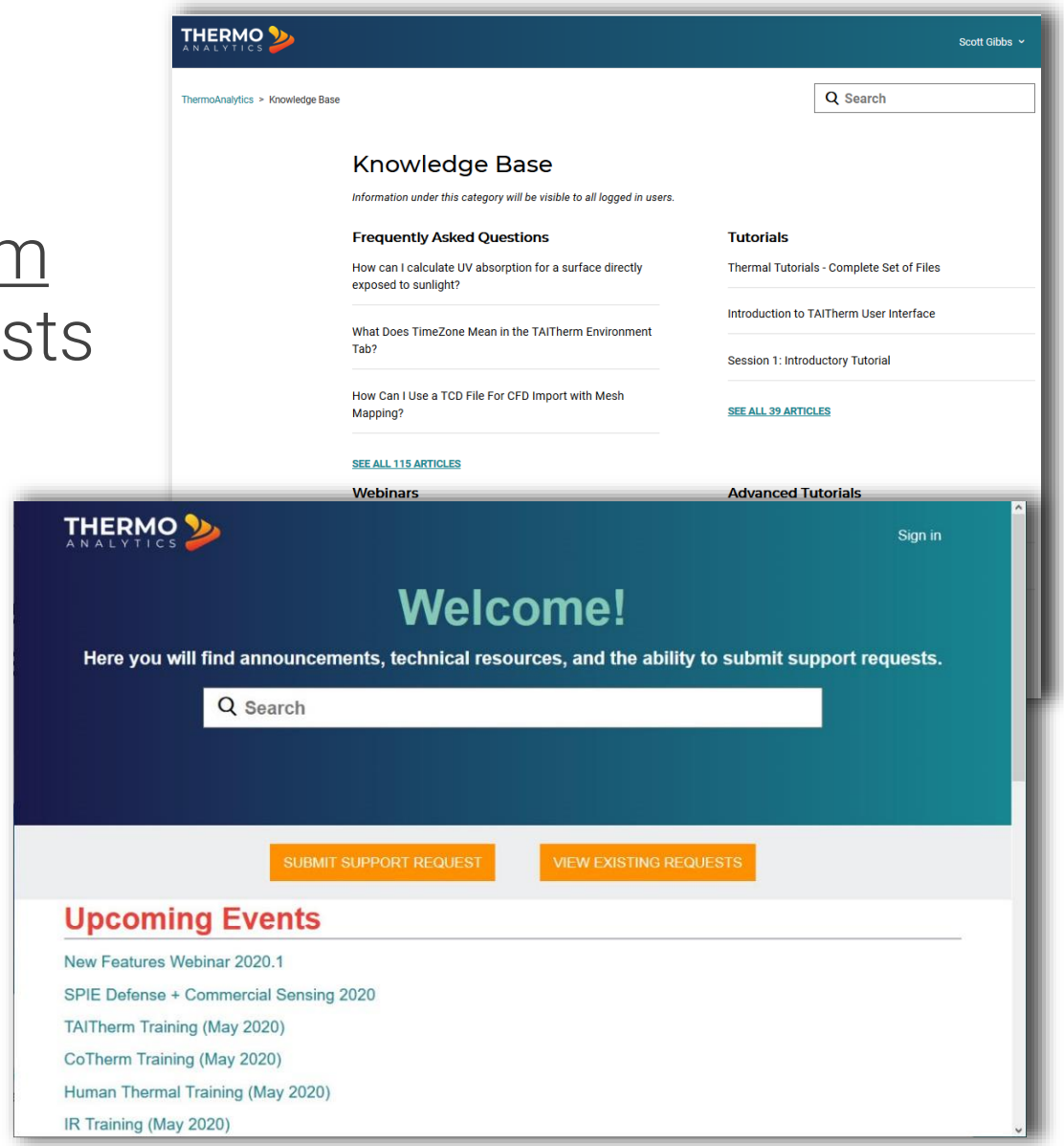

Questions?
Thanks for attending!

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