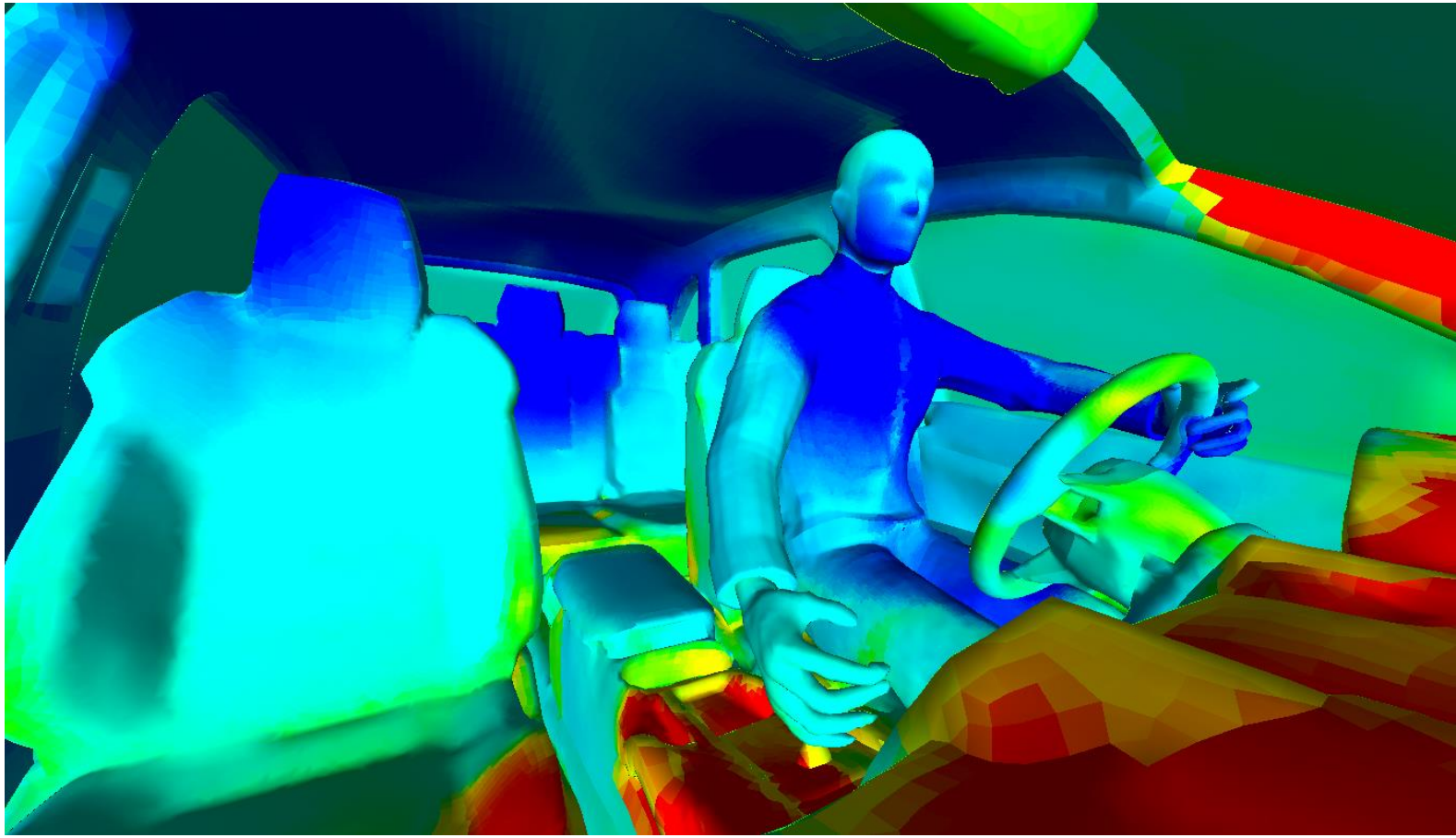
TAITherm 2021.1 New Features

Steven Patterson, Product Manager

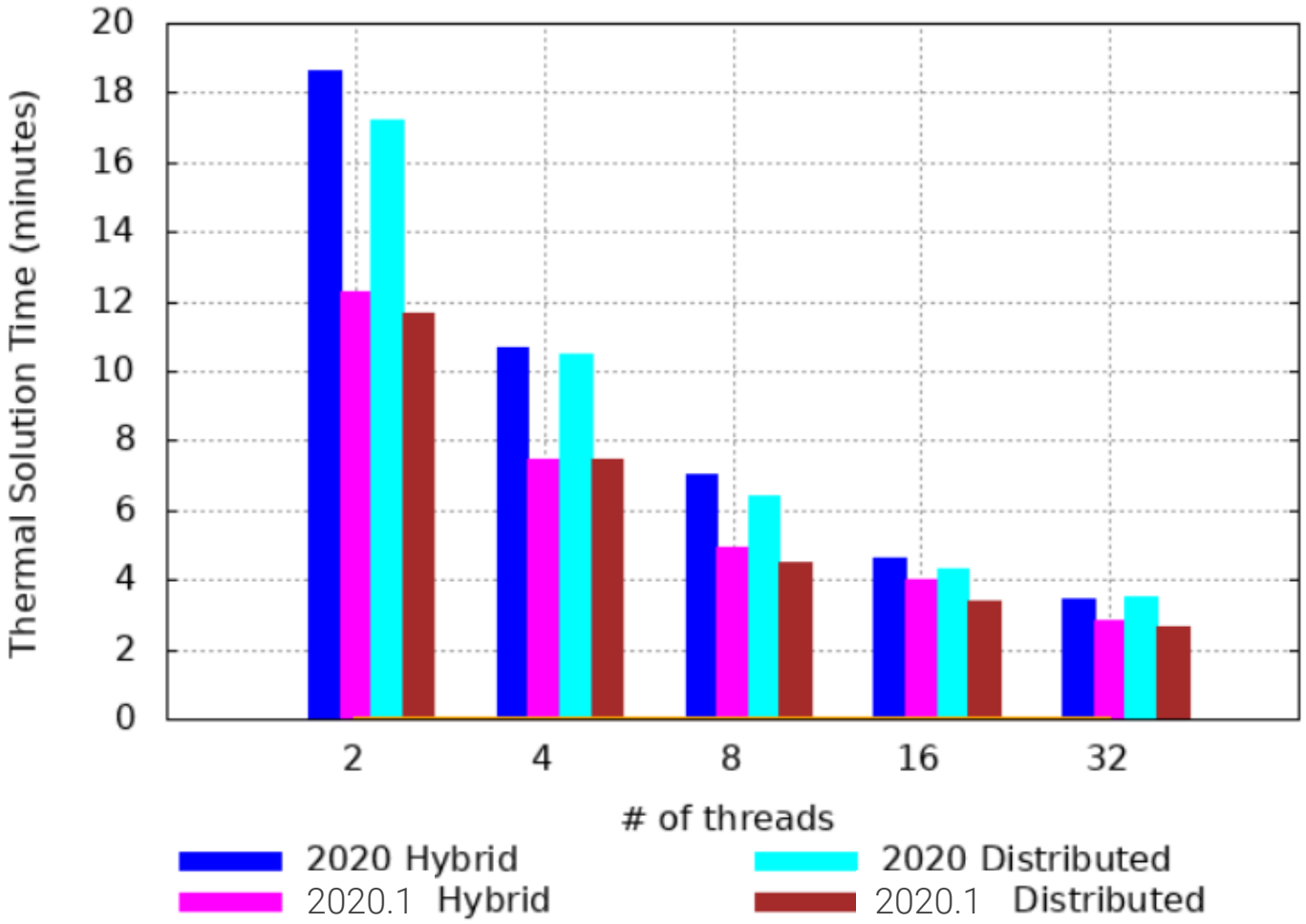
THERMO ANALYTICS

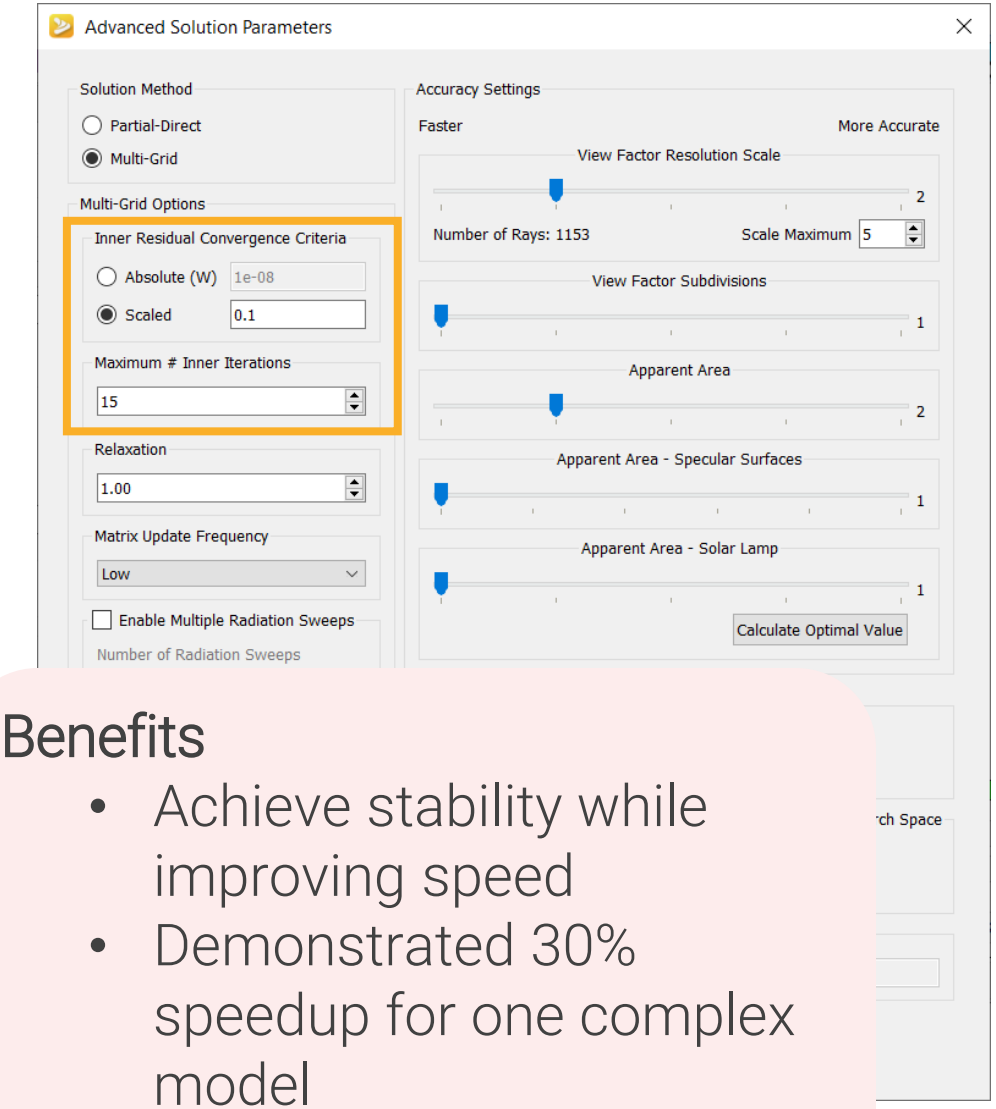
View Results in Advanced Graphics

- Display results in Advanced Graphics
  - Faster interaction
  - Lower memory requirement
  - Smooth look and feel
- *Perspective View* option
- Note: Additional features to be migrated in future releases



Multigrid Solver Convergence



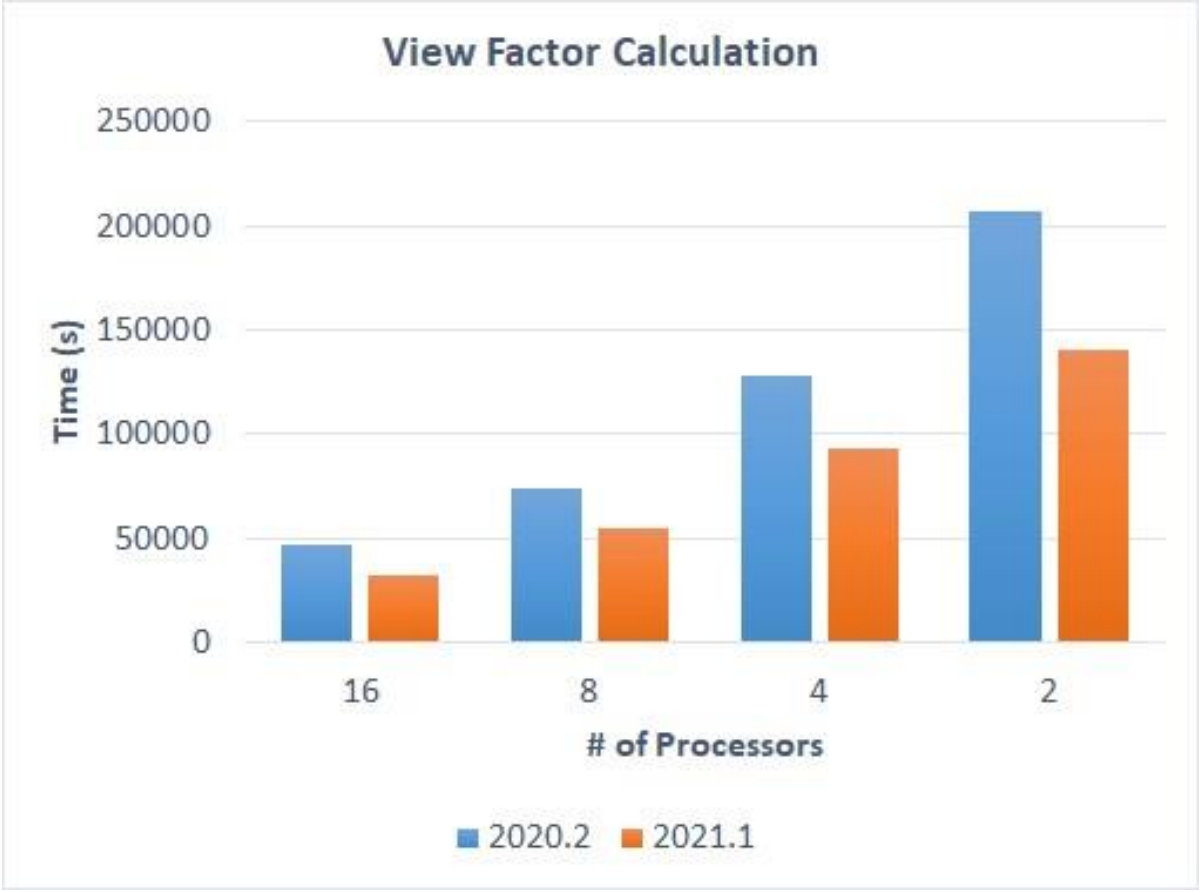


Benefits

- Achieve stability while improving speed
- Demonstrated 30% speedup for one complex model

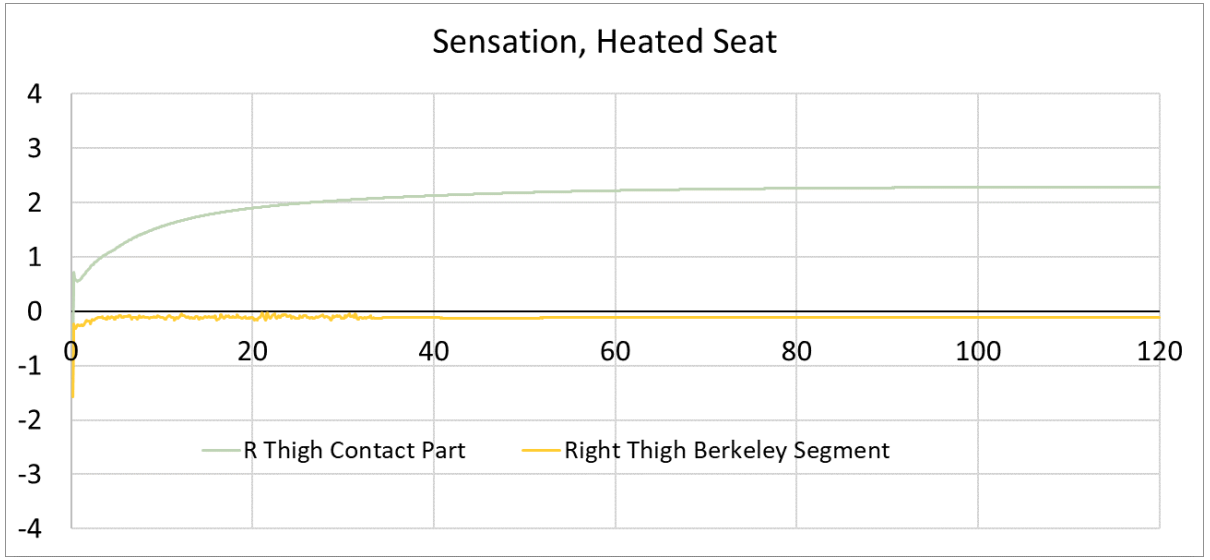
Faster View Factors & Apparent Area

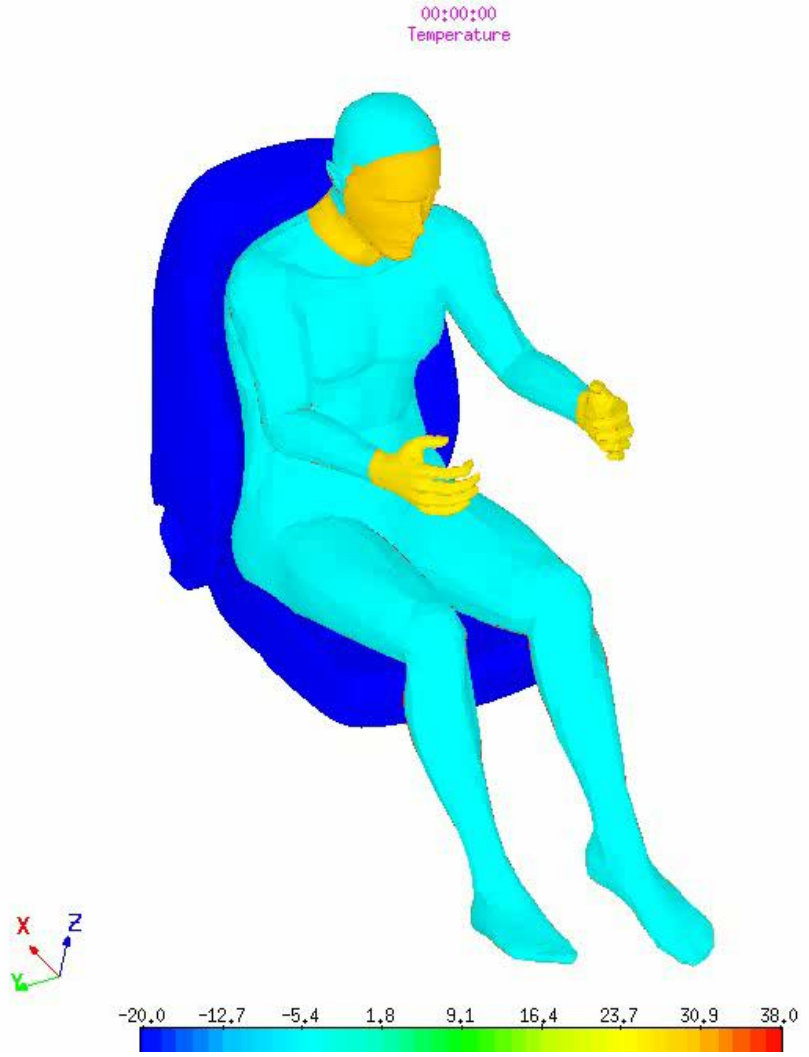
- Algorithmic optimizations improve speed
  - 10-50% VFS time reduction
  - 27% reduction demonstrated on production UH/UB model (7M elements)



Part Level (sub-segment) Local Comfort

- Report Berkeley Comfort and Sensation for each part in addition to the 19 Berkeley Segments
- Gain more insight into highly localized heating/cooling



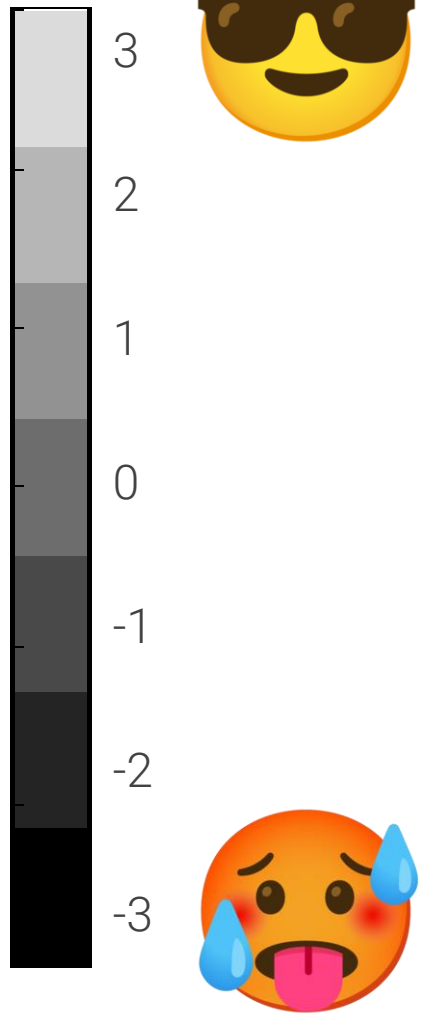


NOTE: See support site article for instructions to access this feature

Skin Wettedness and Wettedness Comfort

- Provides a 2nd opinion of comfort in warm environments
- Skin Wettedness = Q_{evap} / $Q_{evap,max}$
- Wettedness Comfort is a linear function of skin wettedness
  - Whole Body Comfort
  - Local Comfort

NOTE: See support site article for instructions to access this feature



Additional Improvements

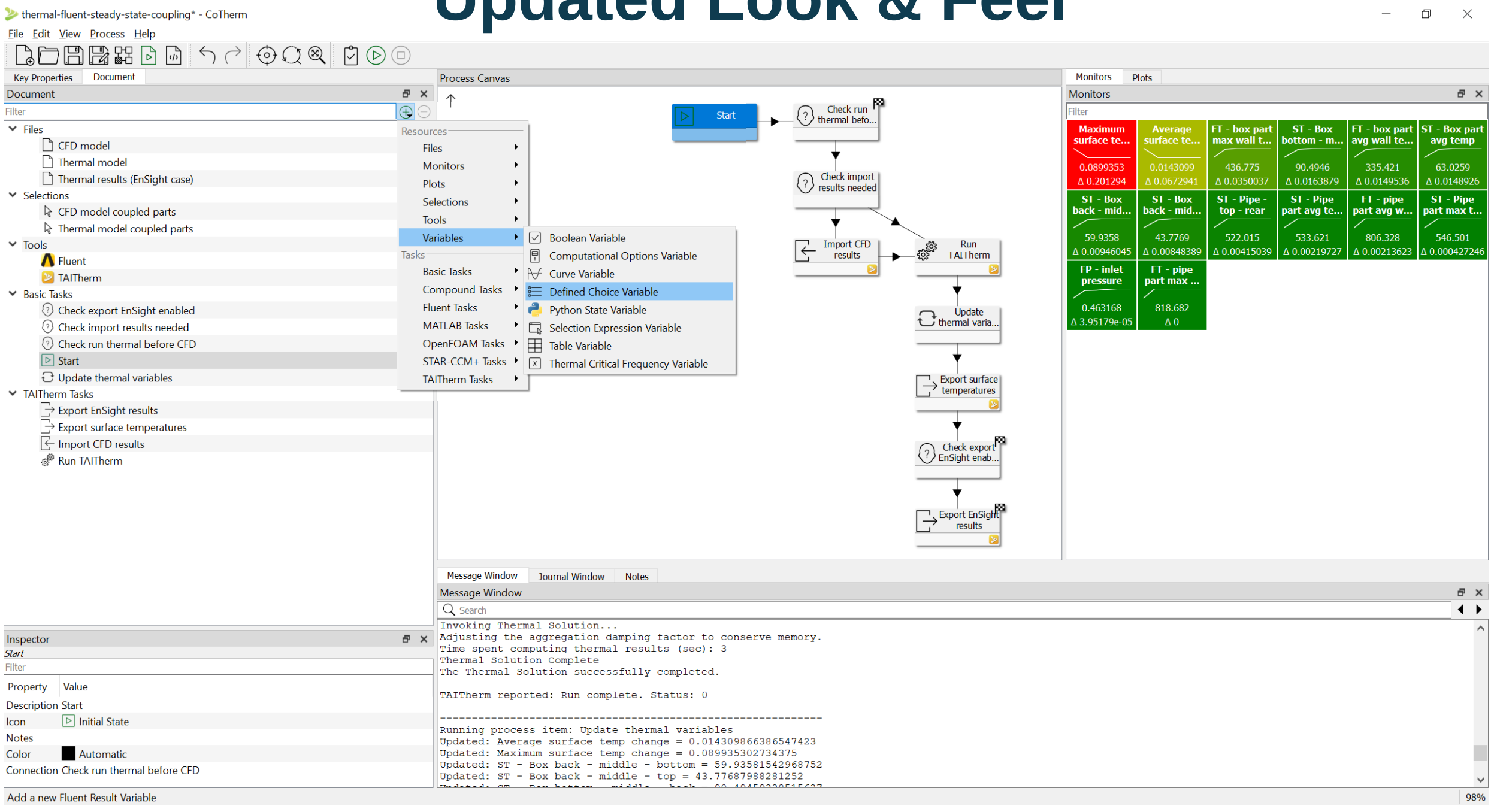
- CFD import mesh mapping accuracy
- More command line operations supported in “server mode” with CoTherm
- Python user scripts additional modules and API functions
- Berkeley Set Points Utility now supports custom file names

CoTherm 2021.1
Updates & New Features

Joshua Pryor | CoTherm Product Manager

THERMO ANALYTICS

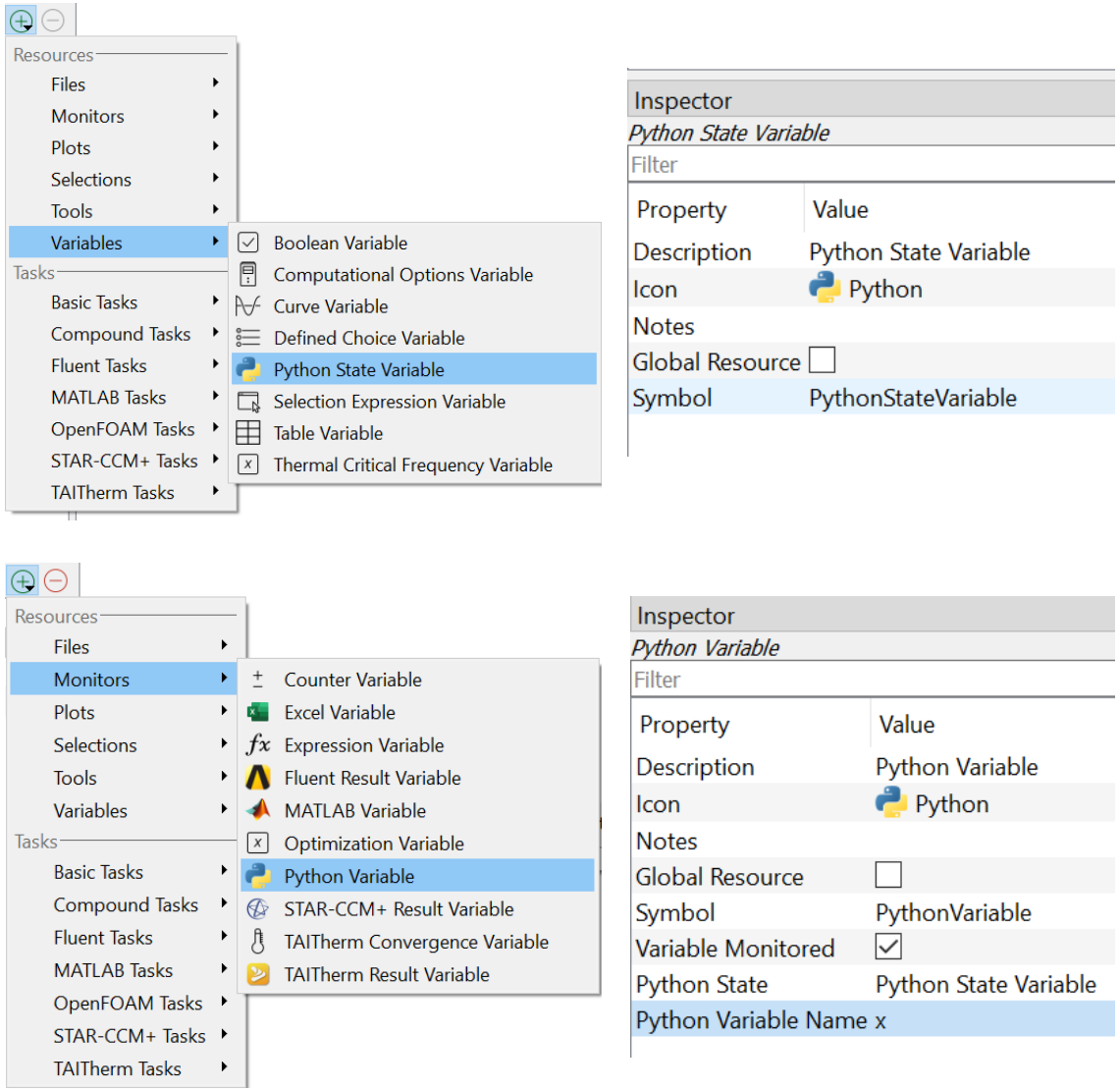
Updated Look & Feel



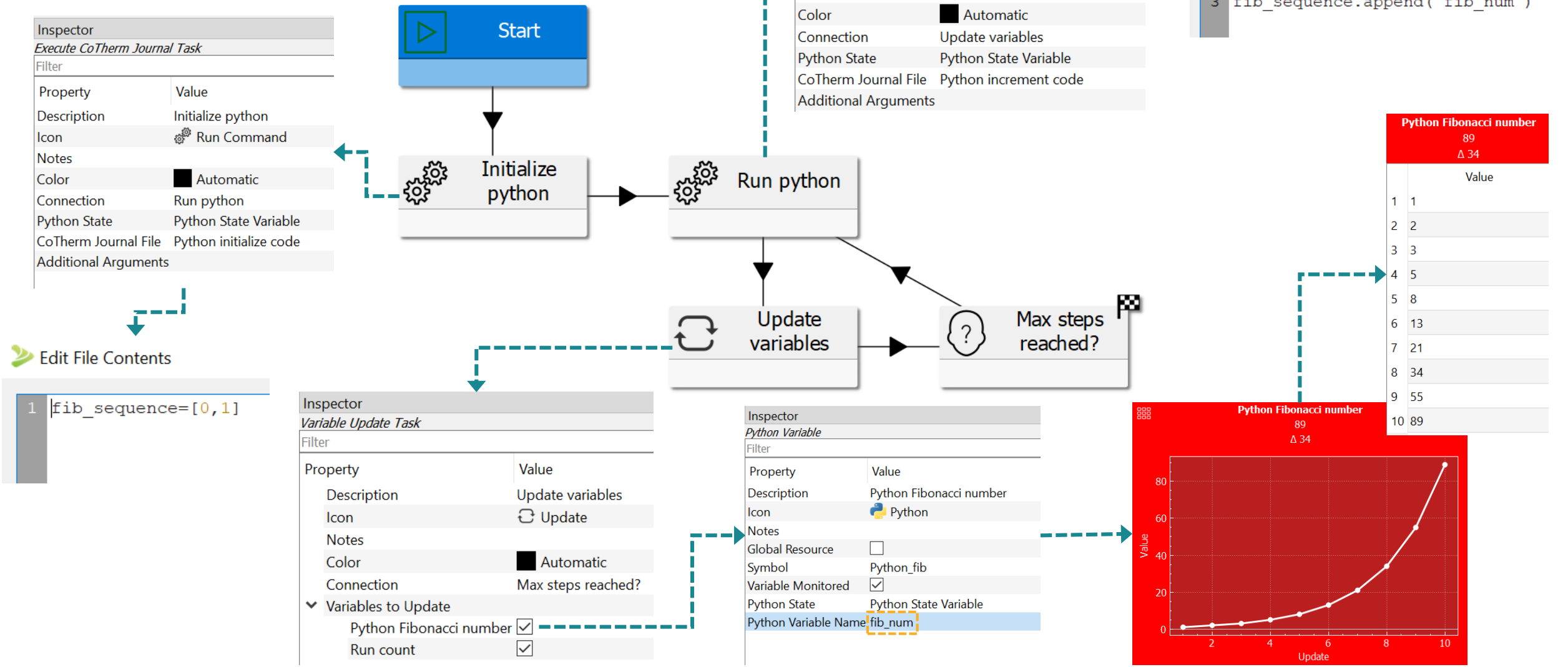
Improved Python Integration

- *Python State Variable* allows the same Python environment to be used by multiple tasks
- *Python Variable* represents a single variable within a Python state

- Benefits:
  - Python libraries and objects can represent persistent models/simulations
  - Data exchange to/from Python is much easier
  - Python output variables can be easily monitored



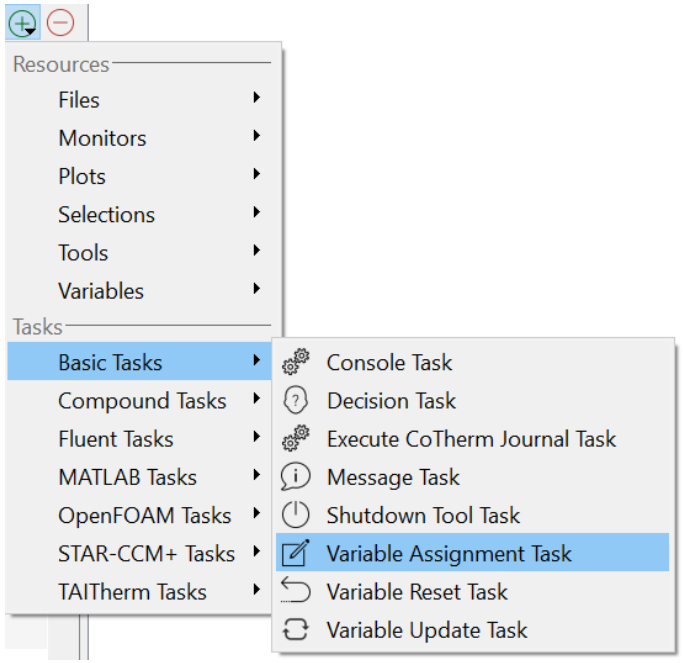
Python States & Variables Example: Fibonacci Sequence

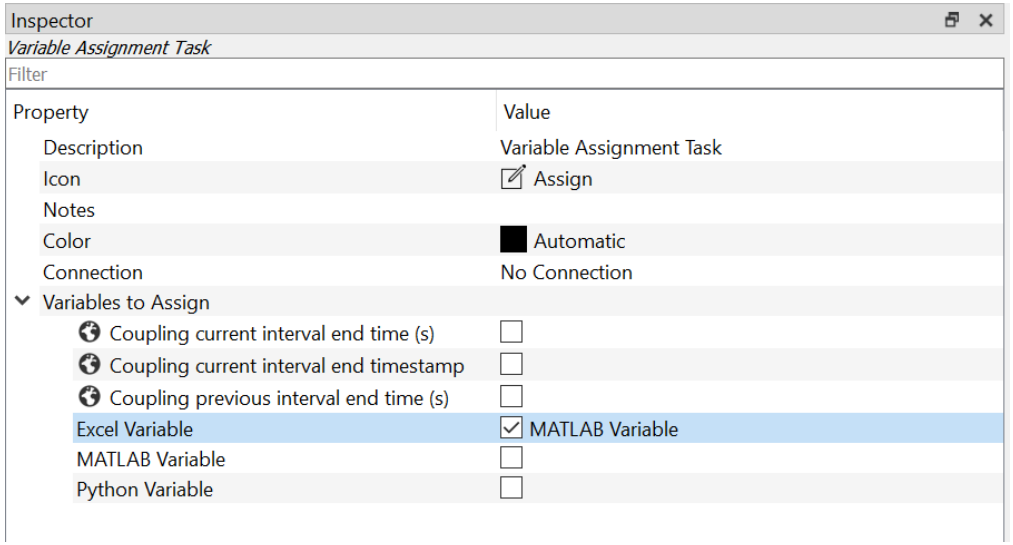


Variable Assignment

- New generic Variable Assignment Task allows a variable's value to be set and exported to the associated tool/model
  - MATLAB, Python, and Excel Variables supported (initially)
- Data type (string, integer, float, boolean, array) will be preserved when the data is written

- Benefits:
  - Data export now possible where other approaches (symbol replacement, intermediate file, or specialized task) don't work or are inconvenient
  - Simple transfer of complex array or numerical data

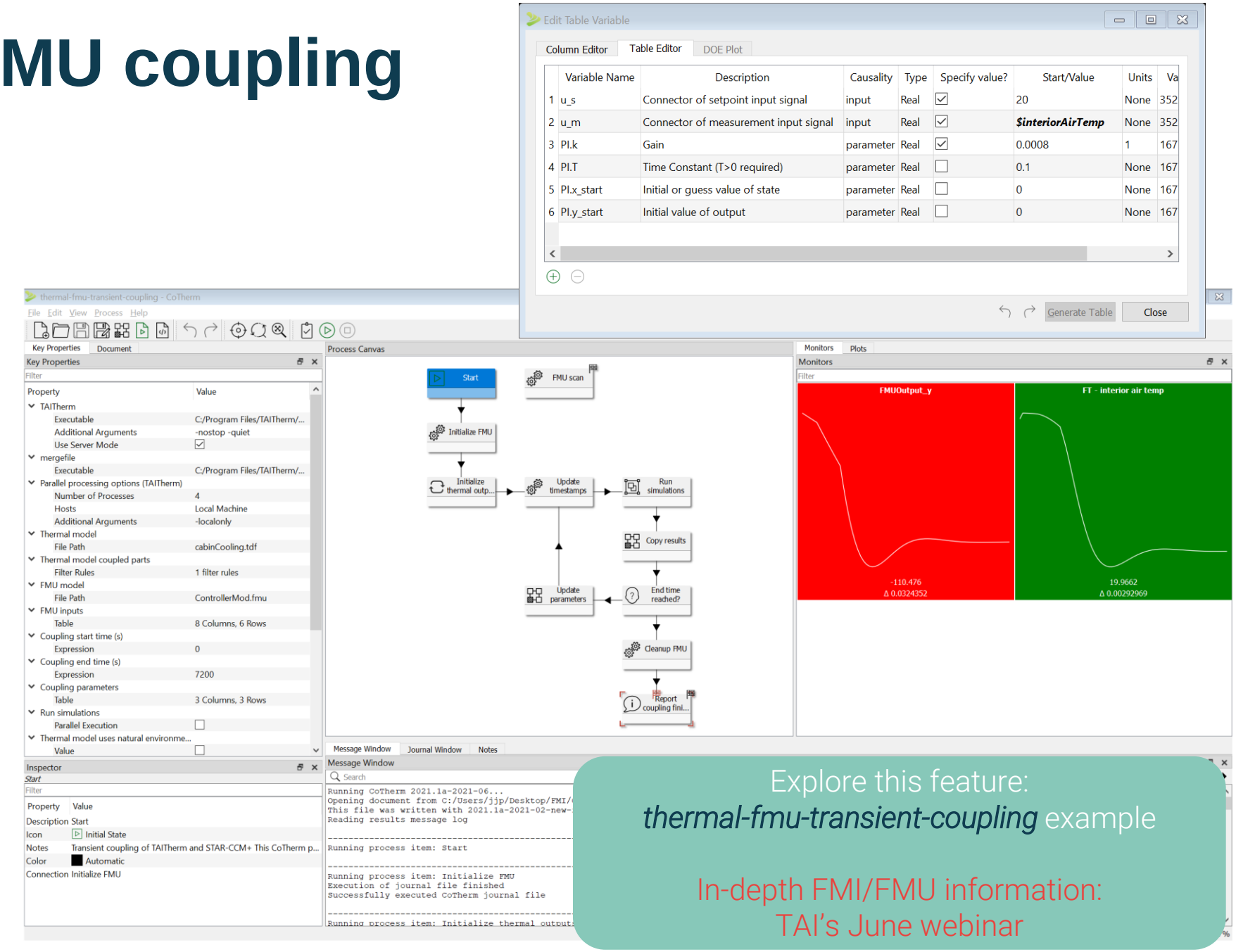




Explore this feature:
excel-matlab-python-communication example

CoTherm FMI/FMU coupling support

- FMU system models can be imported and coupled to any other CoTherm-supported model
- Example process links FMU controller to TAITherm thermal model
- Process can be extended to multiple FMUs and/or thermal-CFD coupled models



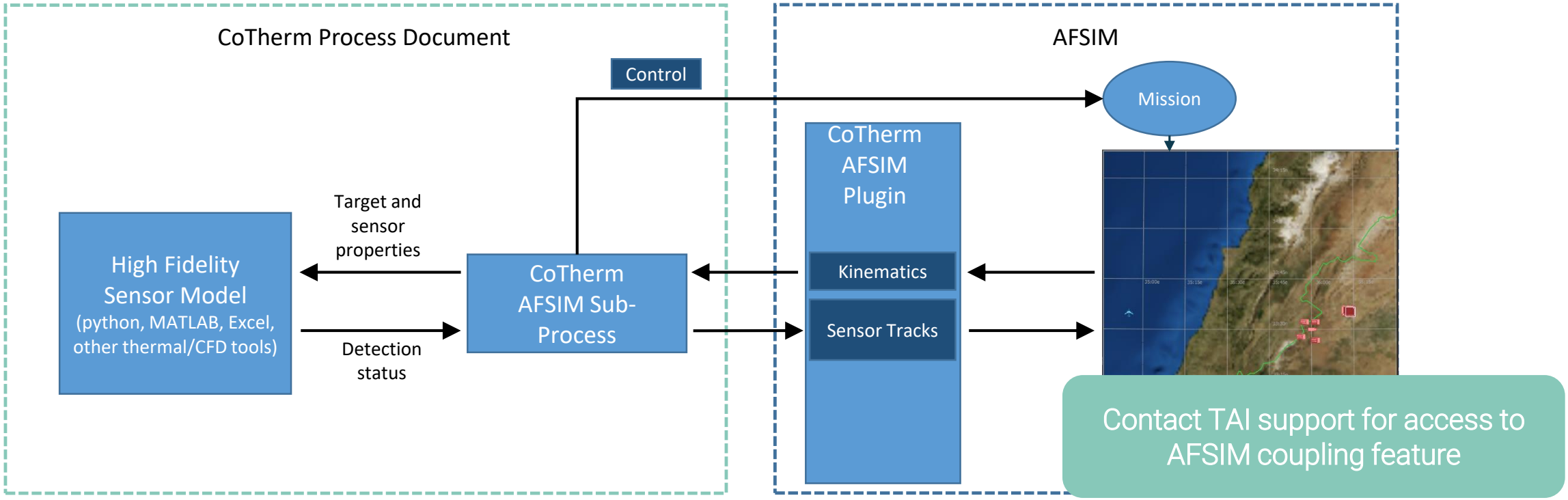
Explore this feature:
thermal-fmu-transient-coupling example

In-depth FMI/FMU information:
TAI's June webinar

CoTherm – AFSIM
High-fidelity sensor coupling capability

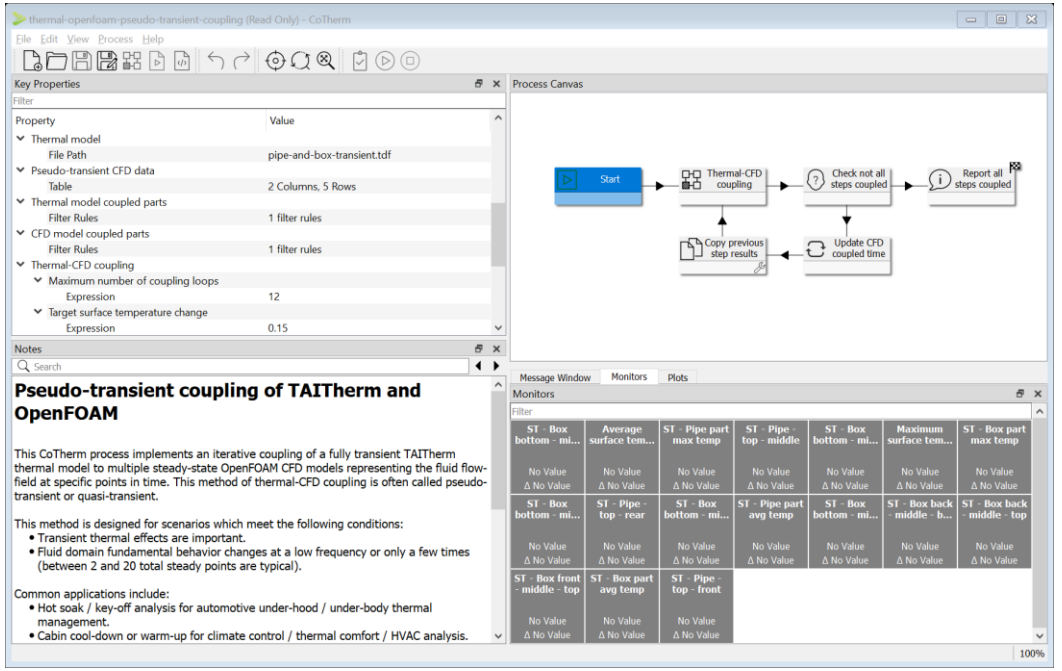
- AFSIM (Advanced Framework for Simulation, Integration, and Modeling) is widely used for defense mission-level modeling and simulation

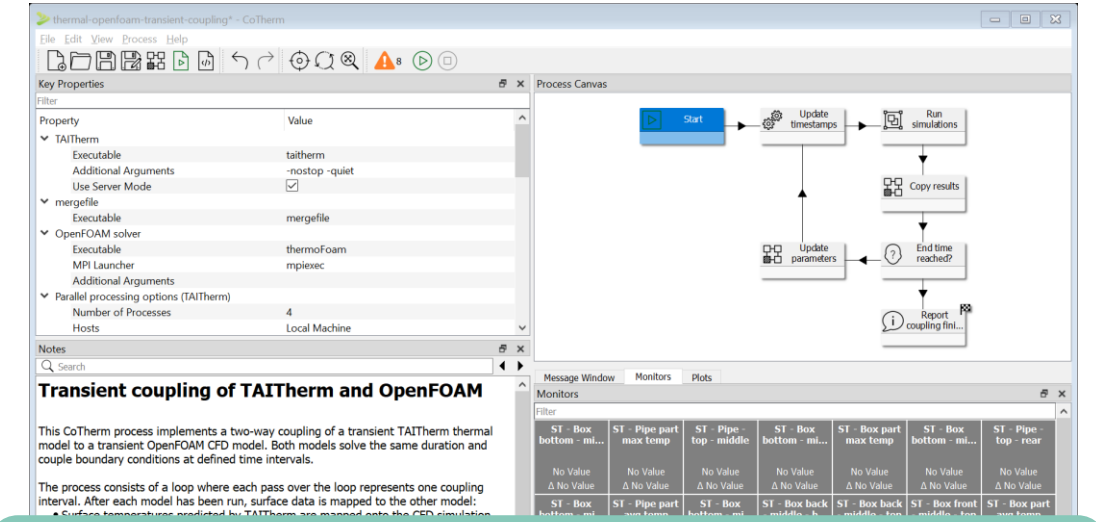
- CoTherm enables coupling high-fidelity sensor models to AFSIM scenarios
  - AFSIM-specific sub-process defines a set of CoTherm tasks that call the high-fidelity sensor
  - CoTherm symbols resolve to target and sensor properties (inputs to sensor model)
  - Designated variable stores result of detection attempt (detected/not detected)



New OpenFOAM example processes

- Example documents and models provided for:
  - Pseudo-transient coupling
    - Fully transient TAITherm, Steady OpenFOAM snapshots
  - Fully transient coupling
    - Two-way data exchange at defined intervals





Explore this feature:
thermal-openfoam-pseudo-transient-coupling example
thermal-openfoam-transient-coupling example

Thank you

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