



Technical Transparency, Open Source V&V Automation, and Data Processing Utilities

Bryan Klein

Thunderhead Engineering



Technical Transparency



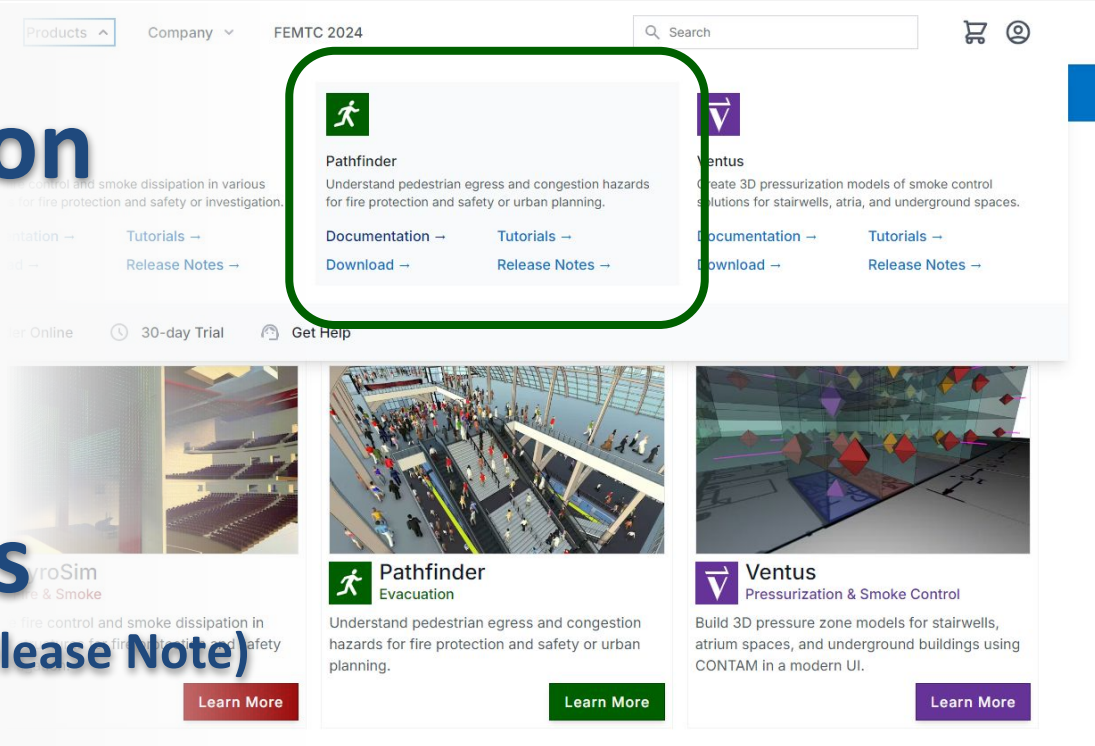
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Great for Testing!

What's New

This release fixes an issue with Behavior and Profile distributions.

There is a new version of the Thunderhead License Manager available for Floating License users. You can download the new version in our installation FAQ: [How do I install a floating license?](#)

This version of Pathfinder uses version 21.0.2+13 of the OpenJDK Java VM.

Changes since Pathfinder **2024.1.0702**:

- Fixed a bug that could cause incorrect Profile/Behavior distributions when right-clicking a Room and using the **Add Occupants** action.

This version of Pathfinder uses version 21.0.2+13 of the OpenJDK Java VM.

Changes since Pathfinder **2024.1.0702**:

- Fixed a bug that could cause incorrect Profile/Behavior distributions when right-clicking a Room and using the **Add Occupants** action.
- Fixed a bug that could cause incorrect Profile/Behavior distributions when using the rectangular occupants tool to add occupants.
- Fixed a bug that could cause incorrect Profile/Behavior distributions when editing an existing group of Occupants.
- Fixed a bug that could cause a crash when selecting multiple occupant sources with different profile/behavior distributions and attempting to edit the distributions.

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2024.1.0813 Documentation ^

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- Technical Manual
- Verification and Complexity

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- 2024.1.0702



Technical Reference Manual

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Pathfinder Technical Reference Manual

Disclaimer

Thunderhead Engineering makes no warranty, expressed or implied, to users of Pathfinder, and accepts no responsibility for its use. Users of Pathfinder assume sole responsibility under Federal law for determining the appropriateness of its use in any particular application; for any conclusions drawn from the results of its use; and for any actions taken or not taken as a result of analyses performed using these tools.

Users are warned that Pathfinder is intended for use only by those competent in the field of egress modeling. Pathfinder is intended only to supplement the informed judgment of the qualified user.

The software package is a computer model that may or may not have predictive capability when applied to a specific set of factual circumstances. Lack of accurate predictions by the model could lead to erroneous conclusions. All results should be evaluated by an informed user.





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Technical Reference Manual



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6.5. Evaluating Movement

Once the lowest cost direction has been determined, the steering velocity and acceleration are calculated that will move the occupant in the steering direction.

Along with a cost, each steering behavior calculates a maximum distance that should be traveled along the sample direction. This maximum distance is then used to determine the magnitude of the desired velocity, \bar{v}_{des} , as follows:

$$D_{stop} = \frac{\dot{v}_{curr}^2}{2a_{max}}$$

$$|\bar{v}_{des}| = \begin{cases} 0, & D_{max} \leq D_{stop} \\ v_{max}, & D_{max} > D_{stop} \end{cases}$$

$$\bar{v}_{des} = |\bar{v}_{des}| \bar{d}_{des}$$

Where:

D_{max} is the maximum distance for the lowest cost sample direction, \bar{d}_{des} is the lowest cost sample direction, and \bar{v}_{curr} is the occupant's current velocity.

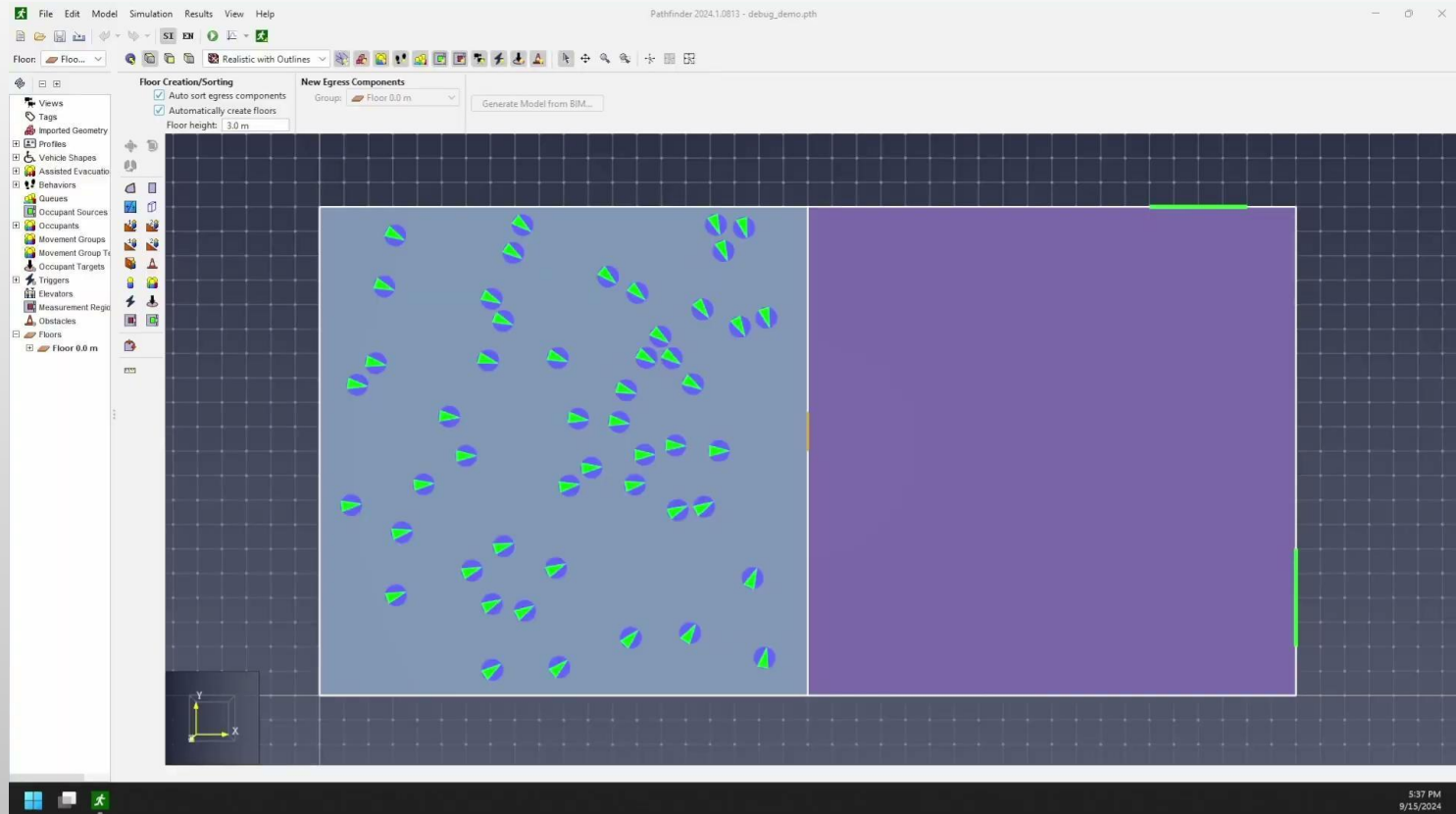


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Run in Debug Mode




Open Source V&V Automation



Verification and Validation

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Pathfinder Verification and Validation

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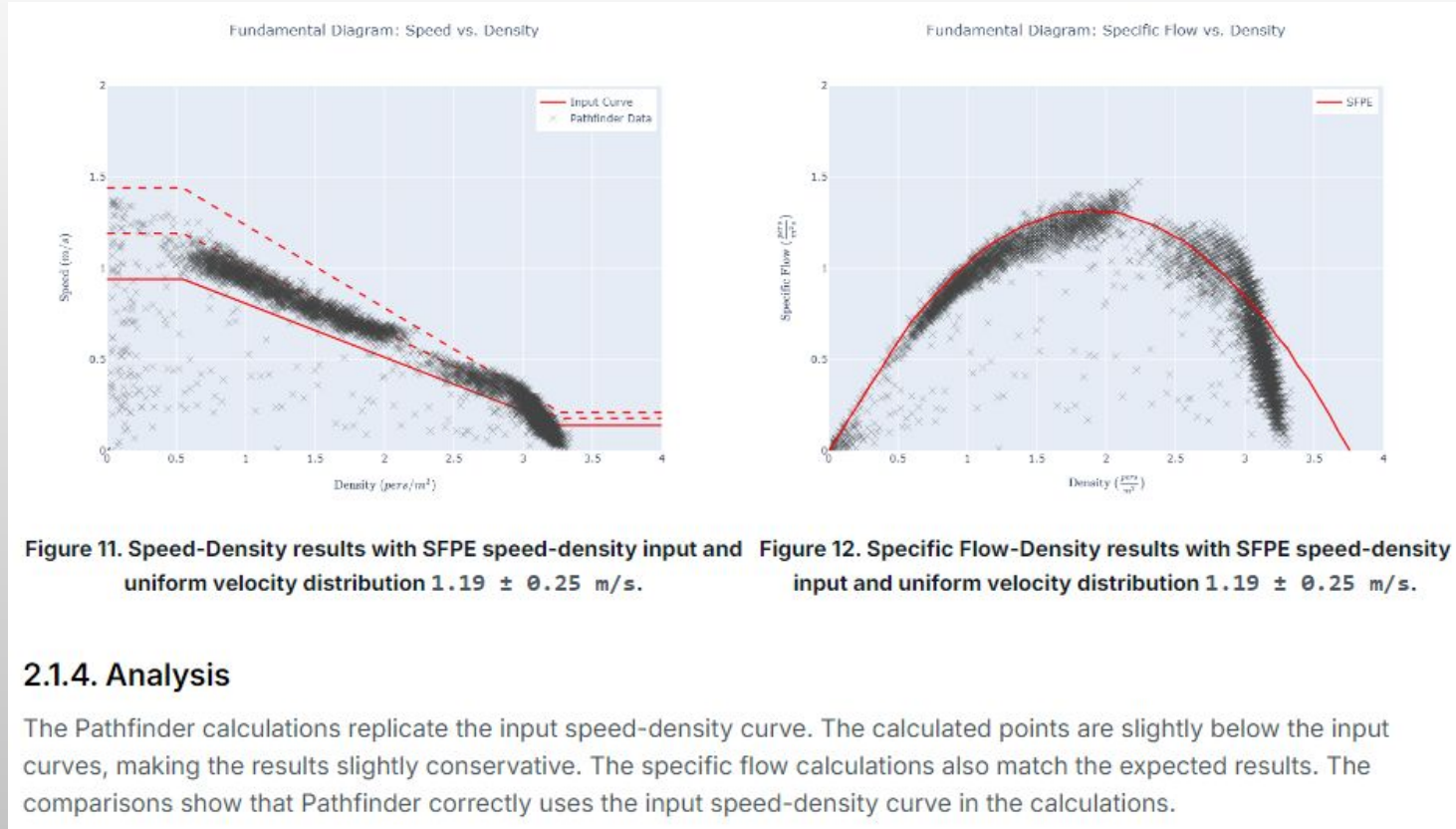


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Verification and Validation



2.1.4. Analysis

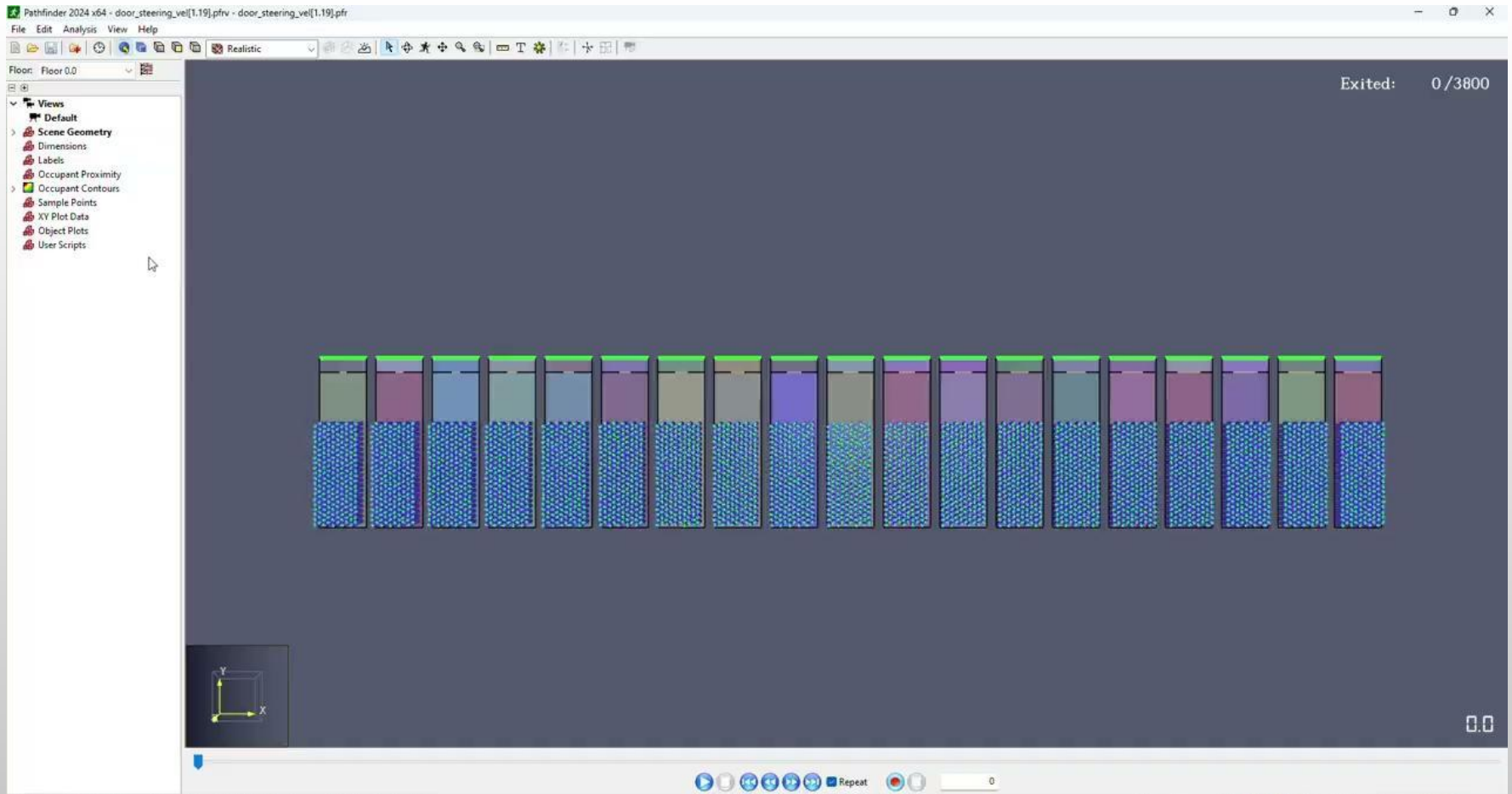
The Pathfinder calculations replicate the input speed-density curve. The calculated points are slightly below the input curves, making the results slightly conservative. The specific flow calculations also match the expected results. The comparisons show that Pathfinder correctly uses the input speed-density curve in the calculations.



Data Processing Utilities

- Results Scripting Engine built into Results Viewer, runs Python Scripts to process data and can use the PIP module for enhanced functionality. Provides general context to Python Scripts.
- Python Package (PIP, available through the Python Package Index (PyPI)) for Thunderhead Data Processing Utilities, used to process results data using context provided by Thunderhead Results. Includes a custom Pathfinder module and the "FDS Reader" Python Module (<https://github.com/FireDynamics/fdsreader>).





Click to select, Left-click+drag to select multiple, middle-click+drag to pan, right-click+drag to rotate

Stopped Time: 0:00 / 5:05 Speed: 32 X Framerate: 695.3 fps



https://support.thunderheadeng.com/docs/pathfinder/2024-1/verification-validation/#_door_flow_rates

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Open Source V&V Process

- The V&V model repository should be available on GitLab with the next release in December.
- Using the new system to Run V&V and update Pathfinder documentation.
- The Utilities can be useful for more complex analysis of model output, not limited to V&V.

