TurboTides 2025R1 Release

TurboTides is an integrated design system that allows designers to conduct turbomachinery design on a single platform. It supports design and analysis of axial, radial, and mixed compressors, turbines, pumps, and fans. The system distinguishes itself with unique features such as calibrated 1D models through data reduction, flexible geometry parameterization, an optimization engine that can invoke any solver within TurboTides, and a centralized database to ensure efficient workflow and data management.

In this 2025R1 release, we continue to align our development roadmap with long-term strategic objectives and user feedback. Several major upgrades and general improvements have been introduced across multiple modules. Key highlights are summarized below.

1. Interface Enhancements

• A new Ribbon interface has been added, with an option to switch between the classic toolbar and Ribbon layouts. The Ribbon tabs, groups, and commands have been carefully organized to enhance usability and provide quicker access to frequently used tools.

2. System Module Enhancements

• The multi-stage compression module now supports pressurized startup and multi-operating-condition analysis, features an enhanced setup wizard, and offers improved overall stability.

3. Meanline Module Enhancements

• Added functionality to support saturated working fluid calculation across multiple machine types, including compressors, turbines, and fans (axial or radial). Users can define saturated states by pressure/temperature with quality or enthalpy increment relative to reference state.

4. Geometry Module Enhancements

• New axial blade profile editor for interactive 2D cross-section editing.

• Introduced Theta-prime construction plane to preserve blade angle during 3D mapping.

• New spline blade generation option for axial machines.

• Blade clearance definition on tip revolved surfaces with shroud offset.

• Hub and shroud curve editing extended across multiple segments.

• Redesigned volute dialog with improved feature grouping and multiple viewing options to improve usability.

• Added an asymmetric thickness option for Axial beta and thickness blade generation mode.

• A new filleted tongue option has been added, supporting elliptic symmetric cross-section designs.

• A new Volute Mixer component has been added.

• A new “Evaluate” menu has been added, providing tools for measuring and inspecting 3D geometry.

5. ThroughFlow (2D) Module Enhancements

• Introduced pressure-based throughflow solver for axial turbines.

• Added aero-thermal coupled analysis capabilities for axial turbines.

• Integrated multiple loss and deviation models (Aungier, Kacker-Okapuu, AMDC, KO-BSM, Traupel, Craig-Cox, etc.) for axial turbines.

• Added diffuser models for axial turbines.

• Support for gas/air mixture as working fluid for axial turbines.

• Enabled blade temperature estimation for axial turbines.

• Model correction through optimization is now supported.

6. Meshing Module Enhancements

• Added balancing hole meshing capability.

• Added boundary layer mesh support for multi-inlet/outlet segments.

• Introduced stretch control for clearance mesh.

• Improved automatic sizing control for secondary flow path meshes.

• Separate clearance mixing plane for each blade.

• Independent first-layer thickness control for each blade.

7. CFD Module Enhancements

• Added continuous color distribution method for post-processing visualization.

• Introduced user-defined monitor functionality for improved convergence tracking.

• Added X-axis selection option in line plot tools.

• Clearance interfaces now default to the Frozen Rotor method to enhance robustness; other interfaces allow user selection between Frozen Rotor and Mixing Plane.

8. FEA Module Enhancements

• Introduced Advanced Steps for detailed multi-condition analysis.

• Simple Steps can now be converted into Advanced Steps via 'Create Advanced Steps' option.

• Support for load applications on line zones for pressure, temperature, displacement, force, and flux.

• Dynamic analysis result display updated for clarity and completeness.

• Fixed material assignment functionality.

• Added amplitude support for static analysis.

9. Optimization Module Enhancements

• Optimization can now run via scripts, enabling integration with third-party software.

10. Database (DB3) Module Enhancements

• Added functionality for uploading, downloading, and managing files and folders.

• Support for creating data records directly through js scripts.

• Added support for defining custom record types.

• Improved user access and permission management.

• Landing page layout is now configurable.

This concludes the major feature and module updates in TurboTides 2025R1. These enhancements further strengthen TurboTides as a unified platform for comprehensive turbomachinery design, analysis, and optimization, delivering more accuracy, automation, and usability for both industrial and academic users.