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BikeSim Model and License Options

This document summarizes model and license options for BikeSim 2025.0. Unless otherwise noted, all features are supported on all operating systems.

BikeSim for Windows

The basic BikeSim installer provides a database and browser with a user interface, plotter, animator, both 32-bit and 64-bit math model solver programs, extensive documentation, and many example vehicles, procedures, and simulations.

The BikeSim math model supports 2- and 3-wheeled motorcycles, using any combination of rigid or flexible options for the fixed-caster and variable-caster front suspensions, and swing-arm rear suspensions. The model works as-is and can optionally be extended with the built-in scripting language (VS Commands), Simulink, and LabVIEW. The math model can also be extended using external programs written in MATLAB, Visual Basic, C/C++, Python, and other languages that can interact with Windows DLLs. Up to 200 built-in moving objects can be controlled to simulate traffic and safety-related scenarios.

The 32-bit and 64-bit versions of the BikeSim math models run at the same speed, with the two versions being provided to support compatibility with third-party software. When BikeSim is used alone, all calculations are performed using the 32-bit solvers for compatibility with the BikeSim main GUI; when used with third-party 64-bit software (e.g., 64-bit Simulink), the 64-bit BikeSim solvers must be used.

BikeSim for Linux

BikeSim for Linux is identical to BikeSim for Windows with two major differences; it does not include the BikeSim browser, and the math model is 64-bit only.

BikeSim for Linux includes a database, plotter, animator, math model solver programs, extensive documentation, and many example vehicles, procedures, and simulations.

BikeSim for Linux is mostly used for automation for sites with many BikeSim installations.

BikeSim 2025.0 License Options

Starting in 2025.0, BikeSim license managers will only accept a limited number of new licenses. Each of these new licenses will have access to what previously would have required multiple license checkouts. The intent is to streamline the licensing process by requiring only a single license checkout from the license manager. See below for the list of acceptable licenses in 2025.0 and newer license managers.

Table 1. New BikeSim Feature Codes in 2025.0

Feature Name	Feature Code	Includes
BikeSim Math Model Only	bikesim	BikeSim Math Model
BikeSim Base	bikesimbase	All standard functionality including VS Browser and BikeSim Math Model
BikeSim with Options	bikesimoptions	Everything in BikeSim Base as well as all add-on features in BikeSim (excluding Real-Time)
BikeSim Real-Time Base	bikesimbasert	Everything in BikeSim Base as well as access to all supported Real-Time Operating Systems
BikeSim Real-Time with Options	bikesimoptionsrt	Everything in BikeSim Real-Time Base as well as access to all add-on features in BikeSim
BikeSim Headless	bikesimheadless	All the functionality HPC licenses previously provided with the addition of access to all BikeSim add-on features

BikeSim Math Model Only

Grants access to basic solver functionality (no additional features), without access to the BikeSim VS Browser. The BikeSim solver supports all BikeSim vehicle configurations based on a single unit with a sprung mass. Since this license does not grant access to VS Browser, it is not available for checkout from the VS Browser License Manager.

BikeSim Base

Grants access to basic solver functionality as well as BikeSim VS Browser.

BikeSim with Options

Grants access to all functionality provided in BikeSim Base with the addition of ADAS sensors. With this license, users are allowed activation of up to 99 built-in range and tracking sensors to sense moving objects (up to 200). Calculated sensor detection variables can be sent to external controller models in Simulink, LabVIEW, or other environments.

BikeSim Real-Time Base

Grants access to all functionality provided in BikeSim Base with the additional ability to run on all supported Real-Time Operating Systems.

BikeSim Real-Time with Options

Grants access to all functionality provided in BikeSim with Options with the additional ability to run on all supported Real-Time Operating Systems.

BikeSim Headless

This license allows additional process instances to simultaneously run BikeSim simulations on a targeted machine (process-level parallelism). When distributed from a license server, it provides a lightweight licensing mechanism well-suited for High-Performance computing. Headless licensing is best suited for large scale deployments where no single external simulation master is in control and when several (up to thousands) of simultaneous simulations are needed. While this license provides similar functionality to the HPC license formerly used in BikeSim, a key difference is the Headless license also includes ADAS sensor compatibility. This license can only be checked out from the CLI license manager (bs-lm-cli).

Third-Party Tire Models (Siemens and COSIN)

The BikeSim Windows installation includes interfaces for tire models from Siemens (MF-Tyre/MF-Swift), and COSIN (FTire). Example datasets are included for each of these tire model options. The license options are:

1. Siemens MF-Tyre v2212 natively connected with BikeSim runs under any BikeSim license together with all options except the **Enveloping contact**, **Rigid-ring**, **Turnslip,** and **Temperature** options that run only under Windows and Linux OS.
2. Siemens MF-Swift v2212 (including **Enveloping contact**, **Rigid-ring**, **Turnslip,** and **Temperature** option) requires an optional paid license from Siemens in addition to a basic BikeSim license. With this license the MF-Tyre/MF-Swift model will work together with all options that run under Windows and Linux OS.
3. COSIN FTire requires an optional paid license from COSIN in addition to a basic BikeSim license. With this license the FTire model will work together with all options that run under Windows OS. Any version older than FTire 2021-3 is not supported.

These external tire models support 32-bit and 64-bit versions of their respective solvers.

Siemens MF-Tyre/MF-Swift v2212 is also available for real-time (RT) use on dSPACE DS1006. The RT version requires a paid license from Siemens.

BikeSim currently supports COSIN FTire model in standard operation mode on Windows. Accelerated FTire/HIL execution mode is currently being considered for future interface extension.

BikeSim Real-Time

RT Platforms

The BikeSim installer for Windows includes support for seven Real-Time platforms:

1. dSPACE DS1006/DS6001 and SCALEXIO

2. National Instruments LabVIEW RT/VeriStand (ETS OS and Linux RT OS)
3. Opal RT-LAB (QNX RT OS and Linux RT OS)
4. Concurrent Real Time System
5. A&D Technology
6. MathWorks Speedgoat
7. Vector CANoe

Either a BikeSim Real-Time Base or BikeSim Real-Time with Options license is needed to run on any of the above systems.

Extra Live Animations

Included in BikeSim Base and BikeSim Real-Time Base licenses is support for a single connection between the math model and VS Visualizer. If more instances of VS Visualizer are required on the same or across multiple machines, BikeSim with Options or BikeSim Real-Time with Options both support up to eight such connections for all systems except dSPACE 1006.