

BikeSim Model and License Options

This document summarizes model and license options for BikeSim 2023.0. Unless otherwise noted, all optional features are supported on all operating systems and in combination with all other features.

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.

The basic BikeSim for Windows package includes two licenses:

1. The BikeSim Solver for Windows License is needed to make a new simulation run with a math model.
2. The BikeSim Browser and Graphical User Interface License is needed to run the main GUI, manage the database, control runs, view animations, etc.

It is rare for one of the basic licenses to be provided alone; both are needed for normal operation of the software, and both are provided as part of the basic package. (The option for obtaining just one Solver license is to support custom automation capabilities for sites with many BikeSim installations.)

The BikeSim Solver for Windows License supports all BikeSim vehicle configurations based on a single unit with a sprung mass.

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.

ADAS Sensors

The optional BikeSim Sensor License allows 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.

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 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 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 2022-3 is not supported with the BikeSim 2023.0 release.

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.

Parallel Solver

This optional counted license allows additional process instances to simultaneously run BikeSim simulations on the targeted machine (process-level parallelism). This is useful for simulations involving multiple vehicle interactions orchestrated by external software such as MATLAB / Simulink, or for custom server deployments of BikeSim expected to be running many BikeSim simulations.

HPC Licenses

Like the Parallel Solver license, the HPC license is an optional counted license allowing additional process instances to simultaneously run BikeSim simulations on a targeted machine

(process-level parallelism). Where the HPC license differs is how license deployment is organized and deployed. The HPC license scales to many thousands of parallel instances. The Parallel Solver license does not support this level of scalability. HPC Licensing is best suited for large scale deployments where no single external simulation master is in control and when many thousands of simultaneous simulations are needed.

BikeSim Real Time

RT Platforms

The BikeSim installer for Windows includes support for seven RT platforms:

1. dSPACE DS1006/DS6001 and SCALEXIO
2. National Instruments LabVIEW RT/VeriStand (ETS OS and Linux RT OS)
3. ETAS LabCar RTPC
4. Opal RT-LAB (QNX RT OS and Linux RT OS)
5. Concurrent Real Time System
6. A&D Technology
7. MathWorks Speedgoat

An optional BikeSim RT license is needed to run on any of the above systems. The same set of optional licensed features that are available for the BikeSim Windows installation are also available for BikeSim RT: ADAS Sensors.

The BikeSim RT solvers do not work with the external tire models from Siemens and COSIN, with the exception that Siemens MF-Tyre/MF-Swift v2020.2 is available only for dSPACE DS1006.

Extra Live Animations

BikeSim RT supports a live animation license that supports a single connection between the math model and VS Visualizer, which in turn supports up to three monitors. If more connected computers running VS Visualizer are needed, additional live animation licenses can be purchased for all systems except dSPACE.