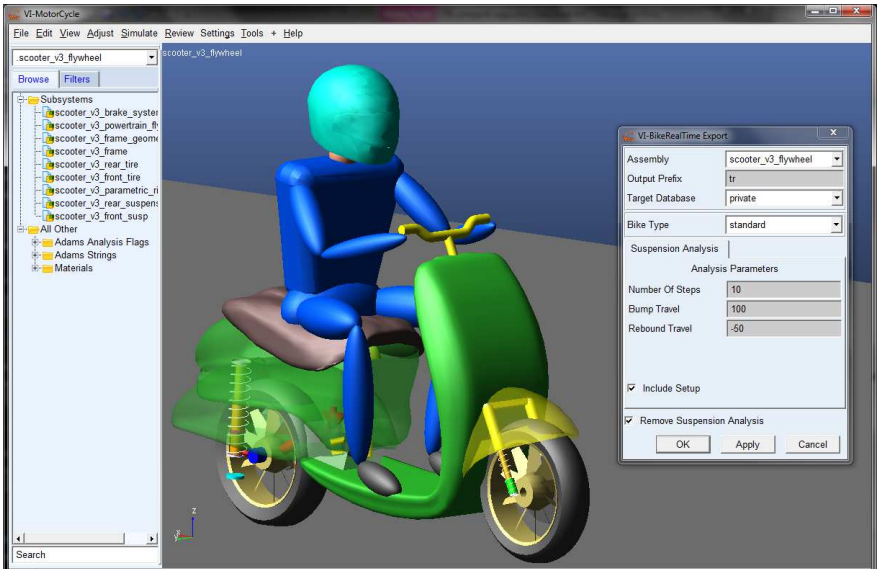
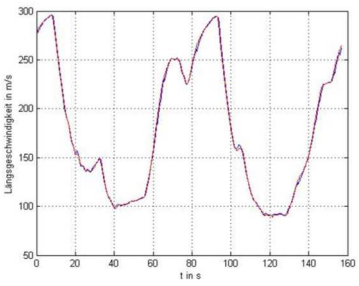
VI-BikeRealTime

VI-BikeRealTime is a modeling, post processing and real-time analysis environment for motorcycle models which allows designers, analysts and track engineers to take into account effects from the motorcycle itself as well as from the road profile and the rider.

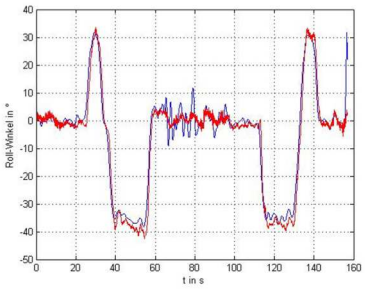
VI-BikeRealTime is interfaced with VI-Motorcycle, the ADAMS-based multibody solution for detailed motorcycle models, and therefore real-time models can be automatically derived from detailed multibody models. This approach, already proven to be successful in the automotive industry, allows users to decrease modelling time, to increase confidence in results and to maintain only one database.



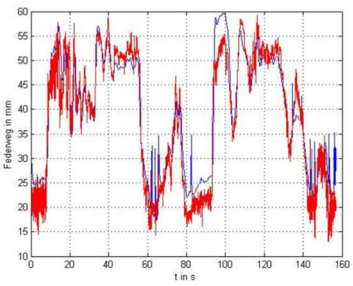
VI-BikeRealTime has been proven to deliver reliable results in several projects performed together with leading motorcycle manufacturers. Despite of the fact that the model is quite simplified, the results very well match the experimental measurements.



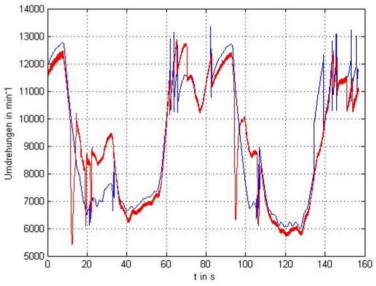
Lateral Velocity



Roll Angle



Jounce Travel



Engine RPMs

Capabilities

VI-BikeRealTime is a real-time environment for the simulation of high performance and production motorcycles and scooters.

- Automatic export from VI-Motorcycle.
- Model is divided in subsystems to make it easier to handle all input parameters. Available subsystems are: frame, front suspension, rear suspension, tires, brakes, gears, aerodynamics and powertrain.
- Easy-to-use interface with MATLAB Simulink for software-in-the-loop studies.
- VI-Tire Motorcycle tire model.
- Predefined events through VDF file.
- Possibility to run analyses on both 2D or 3D road profiles.
- Built-in postprocessing environment.

Benefits

With **VI-BikeRealTime** it is possible to make design decisions in the shortest possible time at minimum cost.

- No need to validate the model from scratch when derived from detailed assemblies in VI-Motorcycle
- Increase the number of design variations to be studied
- Understand the motorcycle behaviour in real-time

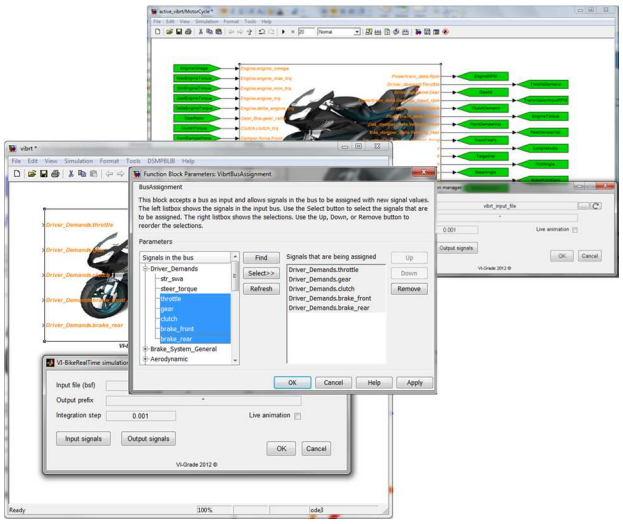
Key topics of v16

- The Max Performance Tool is now available also for the Matlab/Simulink environment, allowing to automatically identify limit vehicle speed along a given track when external control systems are connected to the vehicle model
- The rider body can now move with respect to the bike, in order to better reproduce the mass/inertia distribution
- The new VI-EventBuilder tool is now part of the VI-BikeRealTime suite, enabling the user to graphically create and edit VI-Rider event files (VDF)

Matlab Interface

VI-BikeRealTime is also the ideal platform to perform Software-in-the-Loop and Hardware-in-the-Loop activities on your motorcycle model. This is made possible thanks to the interface with MATLAB Simulink and with the most widely used HIL platforms.

These interfaces enable engineers to first develop reliable control systems in a safe environment and then test them checking how real ECUs interact with the virtual model. ECUs durability under realistic working conditions can be tested as well.



VI-Rider MaxPerformance

VI-Rider MaxPerformance combines VI-SpeedGenMoto and VI-BikeRealTime solver to automatically find the maximum speed of motorcycle on a given driverline. An online check of the speed profile feasibility is performed and local recursive corrections of the speed profile on individual track segments are determined.

The procedure is available for both the standalone module and the Matlab Simulink Interface, so the tool is able to predict the limit performance including the effects of external control systems like ABS, anti-wheelie logic, etc.

Hardware-in-the-Loop

Vehicle OEMs and suppliers are more and more required to perform failure and field warranty analyses of the embedded control system prior to the release of a new vehicle. This requires to run virtual models in real-time in conjunction with the controls hardware.

After embedding a VI-BikeRealTime model into the controls environment, it is possible to automatically build binaries for the most common platforms of HIL systems.

VI-BikeRealTime enables to validate the embedded control system on a battery of tests even before the vehicle is available. The validation of vehicle designs is difficult, time consuming and in some cases even dangerous: VI-BikeRealTime allows instead to sidestep all questions about the accuracy of the model and intellectual property rights — by using the actual hardware!

This functionality is compatible with the following platforms:

- Concurrent Computer
- dSPACE
- National Instruments

VI-BikeRealTime is developed using software standards such as ANSI-C: this also enables porting to new hardware and operating systems.

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