Highlights:

Incorporate physical GT-SUITE models directly into the control system development process.

Transform your computer to a virtual engine test bench with GT-POWER engine models running on your PC.

Speed up your process by re-using know-how and models from the engine or vehicle group.

Supports Controls models in Simulink and ASCET

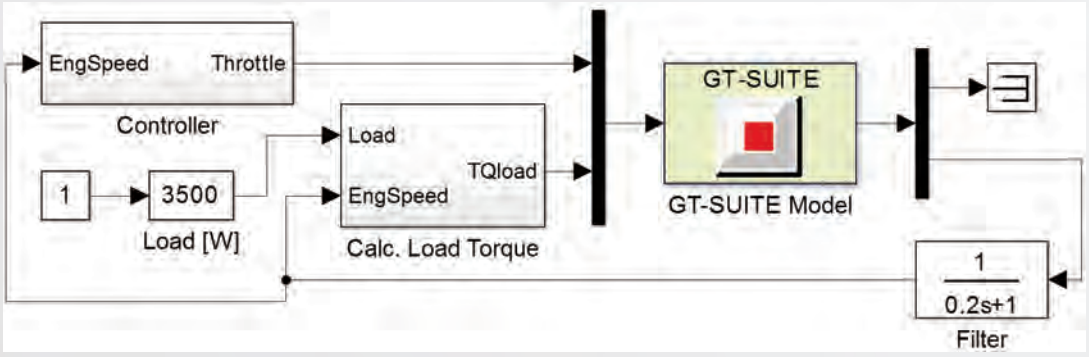
Supports SiL and HiL, including systems from ETAS, dSPACE, National Instruments, Mathworks, A&D, and more

MiL, SiL, and HiL Applications

ECU Testing and Calibration with GT-SUITE Plant Models

GT-SUITE models can be easily executed in Software-In-The-Loop (SiL) and Hardware-In-The-Loop (HiL) environments by specifying the model I/Os and transferring the model to the SiL/HiL platform. Complex control strategies can be analyzed using state-of-the art **physical GT-SUITE plant models** in the environment where Controls Engineers are most comfortable. Users have complete control over the GT model, since they can modify its parameters, its internal lookup tables, even its numeric solution settings.

Especially for Mathworks SIMULINK, the GT-SUITE S-Function block provides a turnkey solution for the simulation of GT models, as shown in the picture below. The entire Mathworks toolset, as well as tools that use SIMULINK models as a starting point, can use the GT-SUITE S-Function for the modeling of the physical system.



A similar block is provided for ETAS ASCET, thus empowering users of the ETAS tool-chain with GT modeling capabilities. On top of that, GT-SUITE has a flexible Application Programming Interface (API), allowing practically any 3rd party tool to simulate GT models.

GT-SUITE-RT is the ideal solution for HiL applications, where run time is critical. It uses the **same physics solvers as GT-SUITE,** and it provides fast execution speed and steady turn-around times by optimizing memory and computation Management. A fast executing GT-SUITE-RT model is created from a detailed GT-SUITE model with a few button clicks, providing a large saving of time and resources compared to the current conventional methods

GT-SUITE-RT supports all of the popular HiL platforms including dSPACE, ETAS, National Instruments, Mathworks and others. In addition, users who have multi-core HiL simulators can benefit from an even higher plant model and detail by splitting GT models into multiple subsystems (e.g. engine, vehicle, cooling) and executing them in parallel.

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Advanced Features and Applications:

Advanced Capabilities:

Perform sensitivity analysis by modifying the GT-SUITE model parameters from your development environment.

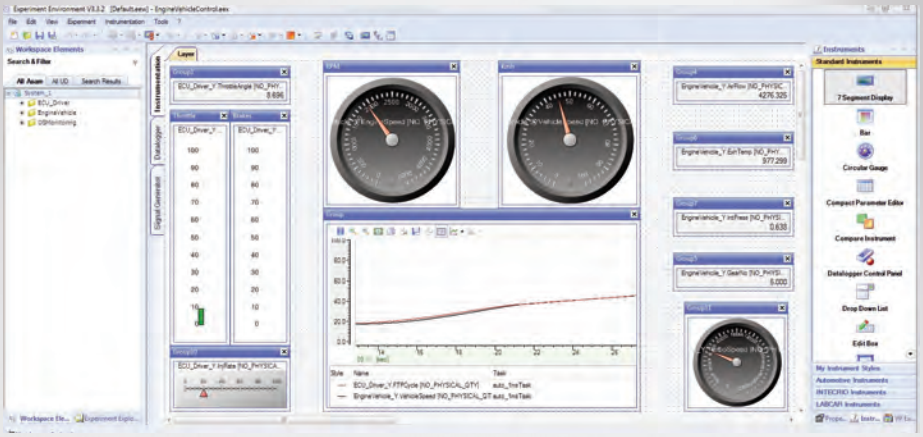
Modify entire plant model maps from the Controls environment

Display simulation results in GT-POST

Wireless Controls, allowing easy transfer of ECUs

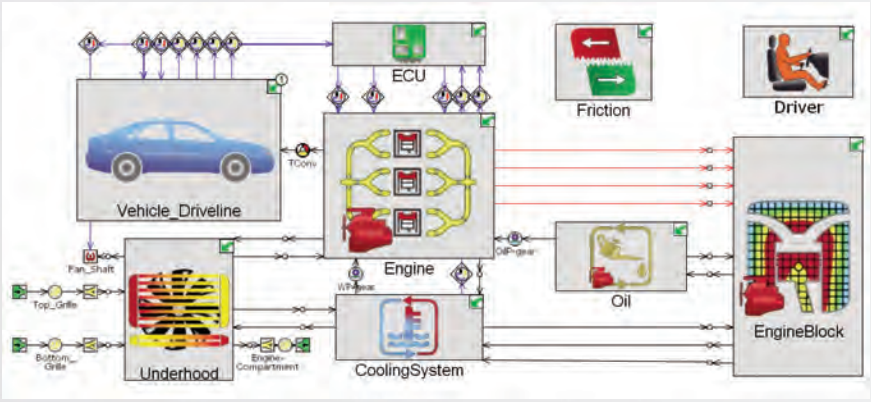
Model debugging capability through optional logging even on the HiL system

Support of multi-core HiL systems

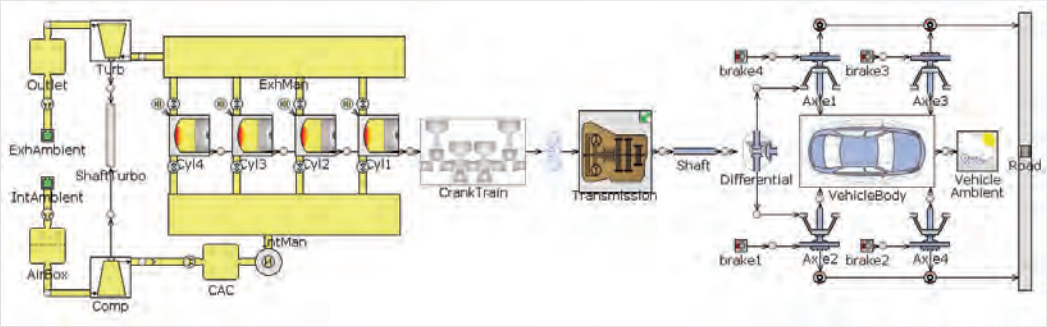


The power behind GT-SUITE's ability to run on SiL and HiL environments, is its ability to provide **multiple model levels** depending on the execution speed needs. Users can choose between fully unsteady, crank angle resolved engine models or from neural driven mean value engine models, (both either derived directly from detailed GT-POWER models or created from scratch). Similarly, users can model the vehicle with a detailed transmission, flexible axles and slipping tires or with a look-up based transmission, rigid axles and kinematic tires. In all cases, the model is still physics based, and employs all the modeling features that GT-SUITE offers, and allows for simple and meaningful modifications as the model evolves throughout the development cycle.

It is fast, and for instance, the entire vehicle system shown below (includes engine, water-jacket cooling detail, oil circuit, underhood 3D model, and controls) may be modeled for SiL applications with run times of **just 5-10 times real time**.



Similarly, an entire vehicle model with a dynamic pulsating engine shown below executes at 0.7-0.8 times real time and therefore can be used for HiL applications



The complete GT-SUITE/GT-SUITE-RT toolset ensures continuous modeling and enables users to cover the entire development cycle, **from concept to validation**, with physical plant models tailored to the specific needs of each application. The benefits it brings are: plant model development and calibration is minimized, model accuracy is improved, design iteration time is reduced and costs are slashed.

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