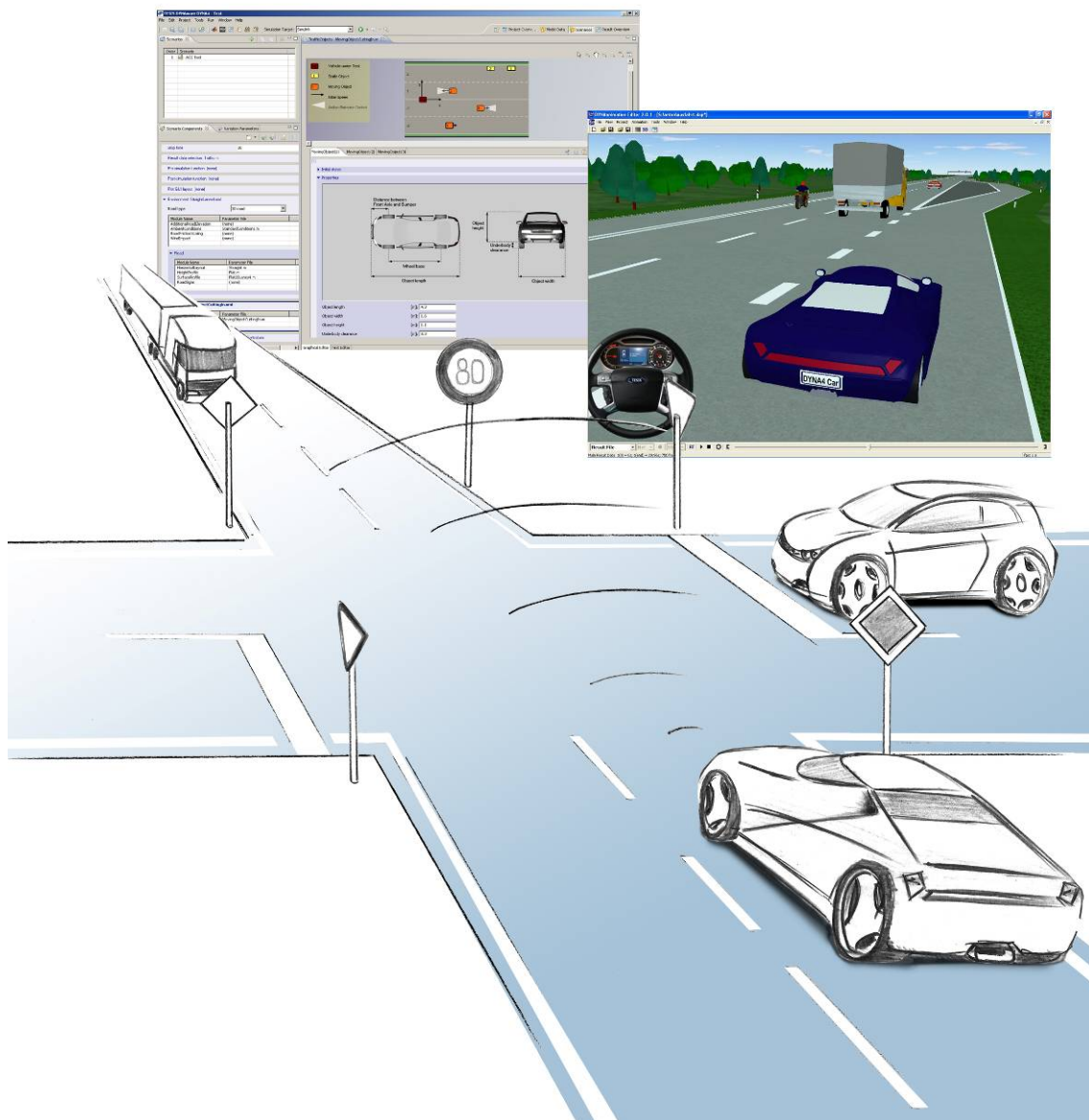


DYNA4 Driver Assistance

Conceptual Design and Testing of Safety and Driver Assistance Systems



Applications

DYNA4 Driver Assistance is a simulation environment for the development and testing of driver assistance systems under reproducible conditions in the laboratory. Model interfaces allow flexible test setups with software or hardware implementations of environment sensors and ADAS functions.

DYNA4 Driver Assistance can be used throughout all development phases, from model-based controller design on the desktop computer to real-time tests with software-in-the-loop (SIL) or hardware-in-the-loop (HIL) systems. Typical applications include:

- Support of function development for driver assistance systems, such as lane departure warning, adaptive cruise control, lane change aid, collision warning, brake assist
- Testing of camera-based functions, such as road sign recognition, lane detection, etc., using DYNAanimation visualization
- Real-time simulation for testing and verification of ECU software in software-in-the-loop setups
- Fast and cost-effective testing of functional ECU prototypes and sensors in HIL environments
- Pre-calibration of control devices by means of hardware-in-the-loop simulation
- Integrated testing of active and passive safety systems in networks
- Virtual test drives and animation in the driving simulator

DYNA4 Concept

DYNA4 Framework

The flexible framework for transparent model and data management, documentation, automation, reporting and visualization efficiently supports your simulation and testing processes.

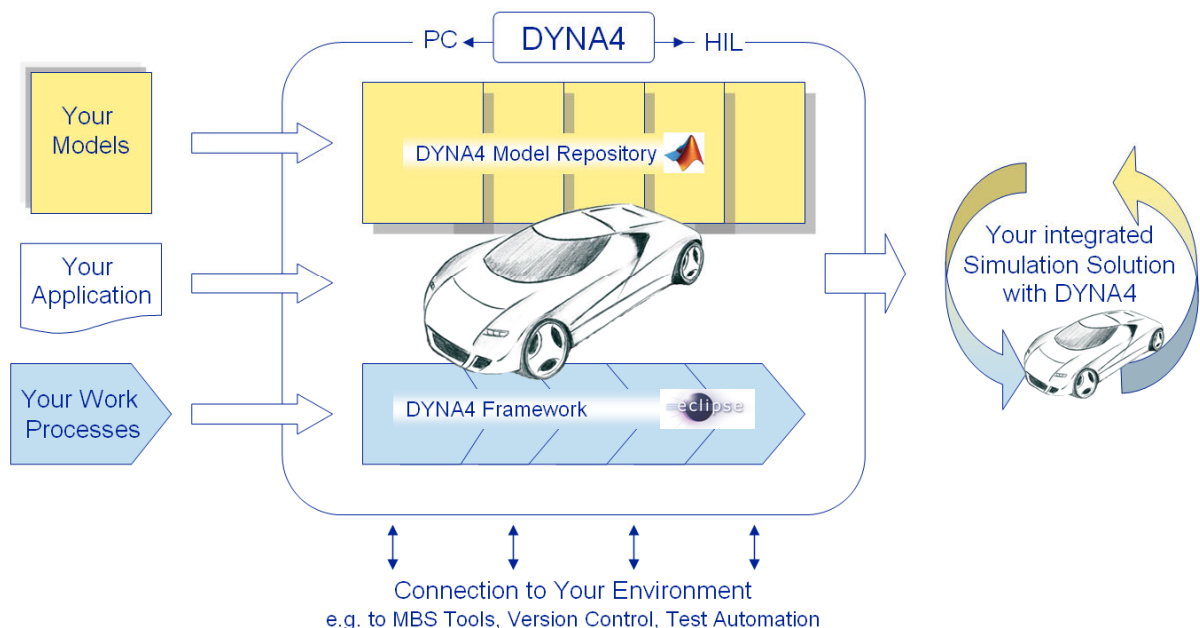
- Consistent management of models, data, simulation scenarios and results in every process step
- Useful tools for automated simulation and visualization
- Flexible adaptation to your work processes
- Interfaces for test automation, version control systems and MBS simulation tools
- HIL platform-independent, supports all major platforms

DYNA4 Model Repository

The DYNA4 Model Repository provides a clearly laid out user environment to administer and parameterize your own simulation models as well as the TESIS DYNAware model library included.

The Repository is open for the seamless integration of your models (e.g. additional traffic participants and road signs, sensors, soft ECUs, or other specialized models) into DYNA4, thus enabling you to benefit from all process-supporting Framework functions.

Read more about the Framework and additionally available models in the separate DYNA4 Framework flyer.



Model Features at a Glance

Traffic model

- Up to 40 moving and stationary traffic objects with fully configurable size and animation properties, e.g. pedestrian, car, motor cycle, heavy truck.
- Configurable driver behavior, including automatic speed choice, observance of road signs and adaptive cruise control to other traffic objects and vehicle under test.
- Configurable event-triggered driving tasks for interaction with other traffic objects and vehicle under test. Longitudinal and lateral driving tasks can be defined independently of each other.
- Frequent traffic through reappearing, moving and stationary objects.
- External control of traffic objects during simulation.

Sensor model

- Unlimited number of sensors for the detection of traffic objects.
- Emulation of different sensor types, such as ultrasonic or radar sensor.
- Field-of-view, cycle time and detection method can be defined arbitrarily.
- Animation of sensor field of vision.

Soft ECUs

- Soft ECU model of adaptive cruise control (ACC) with low-speed following and stop-and-go.
- Models for typical advanced driver assistance systems, e.g. lane departure warning, blind spot detection, lane change aid, collision warning and intelligent light systems, are available on request.

Traffic scenario manager

- Traffic scenario editor for the configuration of moving and stationary objects, including driver parameters and driving task.
- Graphical preview of traffic objects' position, speed and distance control status.

3D road model

- Multi-lane road model with separate definition of horizontal and vertical road layouts in a series of segments.
- Segment-wise definition of lane numbers and driving directions. Lane widths are linearly variable.
- Configurable lane mark colors, widths, number of lines, line types and line spacing. User-defined lane mark types, e.g. Bott's Dots, possible.
- External road models can be seamlessly integrated.

- Road signs, comprising speed limits, non-passing information and additional panels. Extendible by user-defined road signs. Road signs can be grouped and placed beside the road or in overhead gantries.
- Easy road definition via graphical road editor or navigation system data import.

Maneuver control

- Flexible maneuver definition for vehicle under test depending on traffic objects' behavior. Event-triggered switching of maneuver phases, e.g. upon cutting-in, overtaking and oncoming vehicle events.
- Driver model with observance of road signs and speed distance control with respect to traffic objects.

Ready-to-use examples

- Standard test maneuvers for vehicle under test are already preconfigured.
- Pre-defined scenarios for typical traffic situations, e.g. cutting-in of the vehicle ahead, overtaking situations and oncoming vehicles.

3D run-time animation

- Run-time animation of simulation results on all supported PC and real-time platforms with the 3D animation tool DYNAanimation.
- Visualization of the vehicle's surrounding scene for development and testing of camera-based functions.
- The optional **DYNAanimation Editor** provides various displays to highlight characteristic vehicle states and many other powerful functions for impressive presentations of results. In addition, full functionality is available remote via programmable ActiveX and DCOM interfaces.

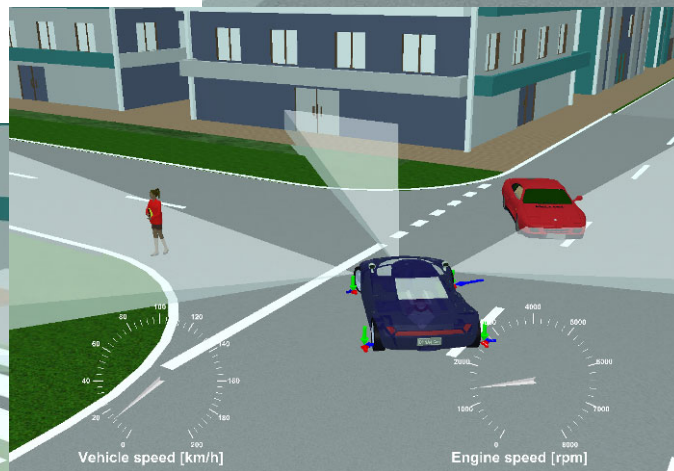


Your Benefits

- **Speed up your innovation process**
 - Ready-to-use examples
 - Comparison of different variants
 - Automation tools accelerate routine jobs
- **Flexibility**
 - Open model structure in Matlab/Simulink
 - Smooth integration of your own models and easy adjustments to your needs
 - Flexible combination with any DYNA4 model (e.g. vehicle dynamics, engine etc.)
 - Free choice of hardware platform
- **Technical safety**
 - Project and data management for more reproducibility and traceability
 - Solid professional software based on thorough modeling and real-time expertise
 - Successfully employed in numerous projects
- **Cost reduction**
 - Use the same simulation software supporting appropriate model depths for all stages throughout the control unit development and testing process
 - Reduction of prototype costs through early testing on the PC
- **Easier decision-making**

Powerful visualization and post-processing tools show the key interdependencies, e.g. by

 - Verification, evaluation and fully automated testing of ADAS systems
 - Visualization and analysis of complex traffic scenarios in 3D



Engineering and Consulting

We offer tailored consulting and engineering services to create an efficient simulation solution, comprising your models, work processes and functional requirements. Extensive knowledge from previous projects provides the basis for activities such as:

- Calibration, validation and functional safety testing of driver assistance systems
- Model and functional extensions to meet your requirements
- Configuration and commissioning of HIL systems
- Implementation in a driving simulator

Read more in our customer project reports on our website: www.thesis-dynaware.com

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