VIRTUALDYNAMICS

FEV

POWERTRAIN AND DRIVELINE DYNAMICS
IN YOUR HANDS
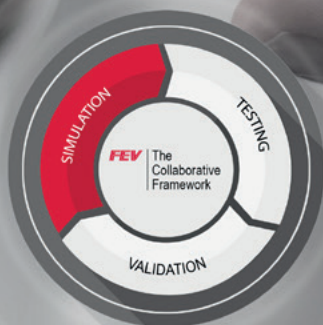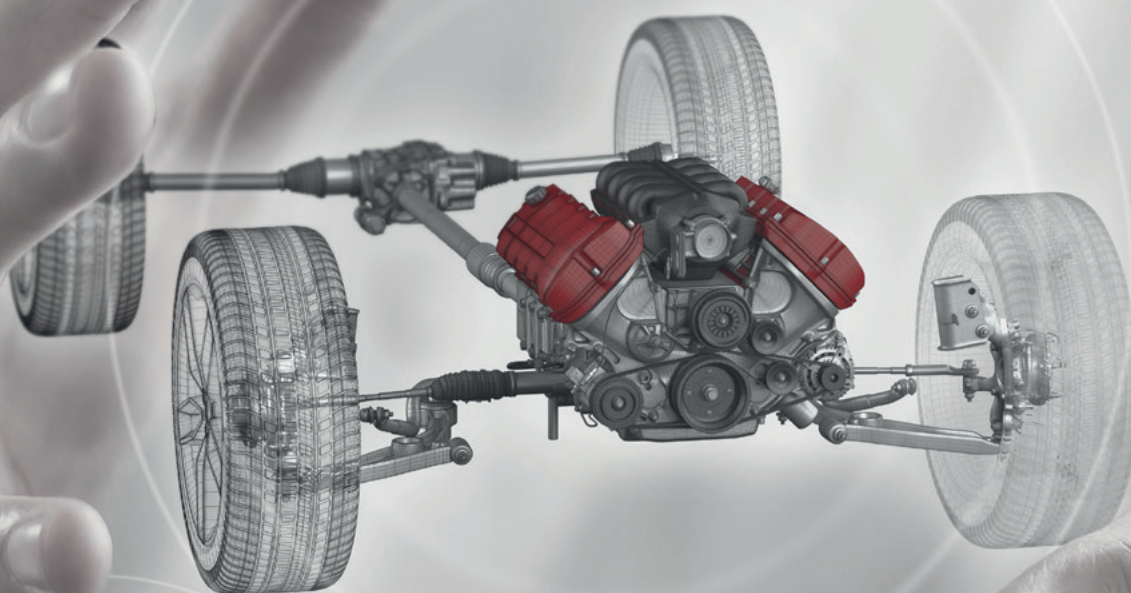
SIMULATION

TESTING

FEV | The Collaborative Framework

VALIDATION

VIRTUALDYNAMICS
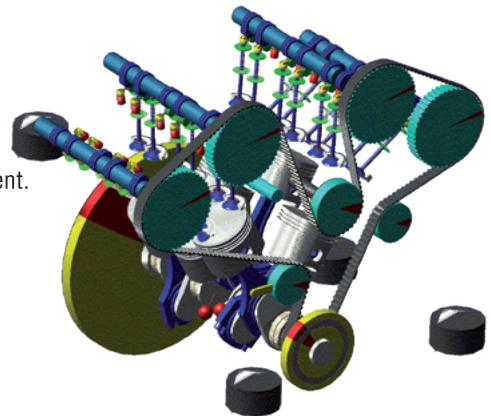
VIRTUALDYNAMICS

VIRTUALENGINE
VIRTUALGEARBOX

BENEFITS AT A GLANCE

From project kick off to start of production

With its advanced simulation tool Virtual Dynamics FEV provides

> In shorter time
> Low cost
> High quality

Powertrain and driveline development.

INNOVATIVE KEY FEATURES

From powertrain engineers for powertrain engineers

Based on the state of the art GUI, solver and post-processing technologies of MSC Adams, Virtual Dynamics is

> Easy to use in:
  > Model set up and simulation
  > Post-processing and result reporting
> Intuitive in workflows, fitting powertrain engineers' needs
> Integrated easily into existing processes
> One for all:
  > One environment for all analysis
  > One model for all phases of the development
> Proven technology: fast, reliable, and validated

UNIQUE TECHNOLOGY

From component to system level

The unique communicator technology and the template-based architecture support modular modeling.

- Easy model setup
- Re-usability
- Quality assurance

Consistency
Template-based architecture

Flexibility
Flexible refinement

- One environment
- One base model
- Diverse fidelities

Communicator technology

Modularity & Scalabilty

- Components
- Subsystems
- Assembly

HIGH QUALITIY SIMULATION - RAPID LOW-COST POWERTRAIN AND DRIVELINE DEVELOPMENT

What is Virtual Dynamics?

Virtual Dynamics is an advanced simulation software for dynamic analysis of powertrain, driveline and their components. It is a suite of products composed of Virtual Engine and Virtual Gearbox together providing all building blocks needed to create dynamic models of engine, transmission, conventional and hybrid-electric drivelines. Virtual Dynamics uses the core technology of the world leading Multi-Body-Simulation Software MSC Adams as numerical integrator, pre- and post-processing features. The template based architecture perfectly combines the advantages of single purpose software - ease of use and multi-purpose software - no limitations in extendibility.

Virtual Dynamics is a truly open system – featuring a powerful scripting language for task automation, the ability to customize the user interface, support for own solver routines and extending the modeling component library with own user-defined elements. Wizards automate and accelerate the creation of complex models
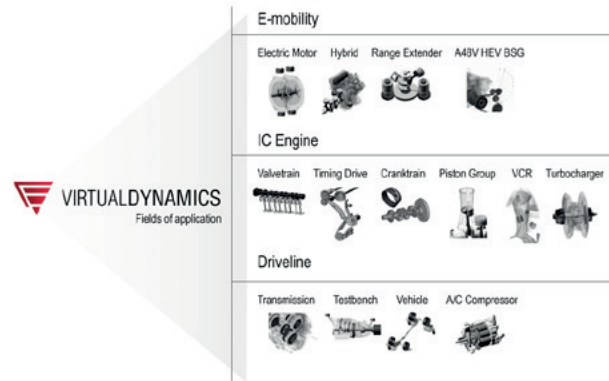

like crank and drive trains. Models and corresponding data are organized in databases, strengthening data management even for global scale companies. Advanced generic 3D contacts plus fast analytical approaches for powertrain-specific contacts ensure a vast scope of application.

From components to system level simulation

Virtual Dynamics provides a modular modeling approach. One can build and analyze individual subsystems, which may consist of one component only or more. Virtual Dynamics is a so-called template-based product: every subsystem is derived from a template, which acts as blueprint for the subsystem and defines it's topology. Subsystems can be adjusted and refined to different fidelities as appropriate for the desired analysis. The unique communicator technology and the exceptional template-based architecture enable both modular and scalable modeling that correspond to both user's experience and functional

simulation demands. Using the communicator technology complete powertrain can be built with the subsystems and run as a fully coupled model.
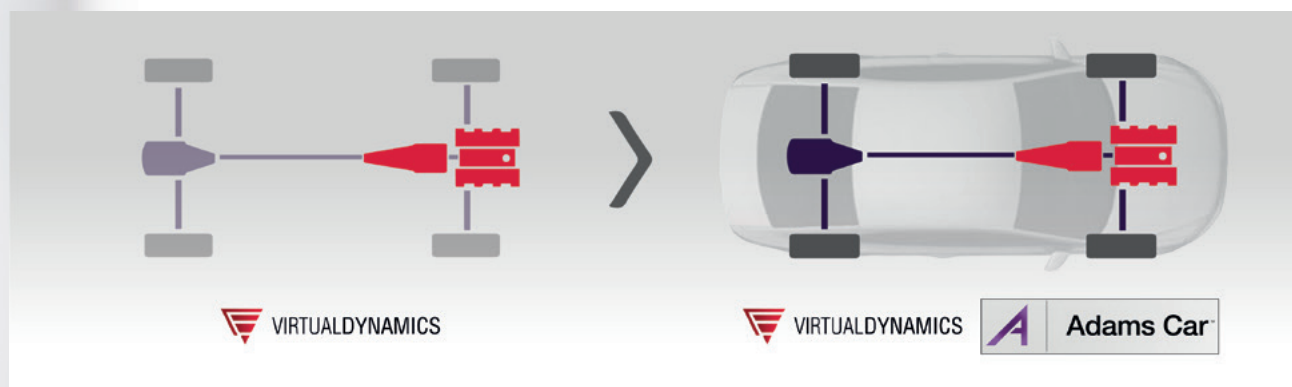

From components to system level simulation

Virtual Dynamics and Adams Car share the template based architecture that perfectly combines the advantages of single purpose software - ease of use and multi-purpose software - no limitations in extendibility. Given the same template based architecture and communicator

technology Virtual Dynamics powertrain model can be directly coupled to Adams Car`s vehicle model and this complete powertrain and vehicle system level model can be simulated dynamically.

VIRTUAL DYNAMICS PROVIDES SPECIALIZED PRODUCTS FOLLOWING YOUR TASKS

⩔ VIRTUAL**ENGINE**

**Modelling and simulation of all parts of the Engine**
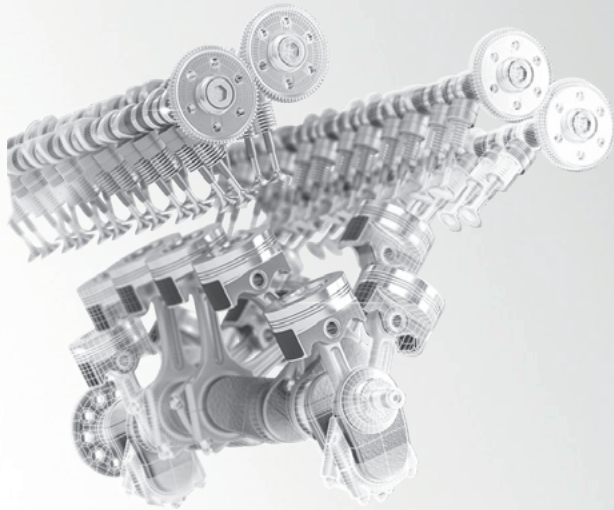
Virtual Engine, as a member of Virtual Dynamics suite, provides all building blocks needed to create dynamic models of engine including cranktrain, valvetrain, piston and rings, bearings, timing and accessory drive, and geartrain. It supports modelling of all conventional and novel engine designs including inline, V-type, VR-type, W-type or Boxer-type engines. The simulation can be run in a single or series of steady-state operations as well as in speed sweeps and ramp-ups. A built-in virtual testing feature allows estimating design parameters under-critical operations. An Integrated Gas Force Wizard provides an option to create cylinder pressure curves from basic thermodynamic parameters, if cylinder pressures are not available.

> Cranktrain
> Valvetrain
> Piston and Ringpack
> Timing and Accessory Drive
> Geartrain
> TEHD Bearing analysis
> Load prediction
> Firing order optimization
> Friction and wear prediction
> NVH analysis

⩔ VIRTUAL**GEARBOX**

Complete tool set to build any type of geartrains and transmissions
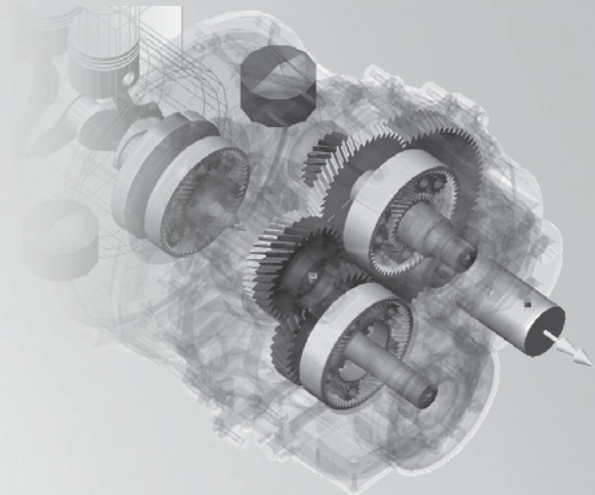
Virtual Gearbox, as a member of Virtual Dynamics suite, provides complete tool set to build any type of gearboxes and transmissions analyze them using either 2D or 3D advanced gear contacts and assemble them with other subsystems. Gears can be used to build gearboxes or transmissions, but can also be part of multi-staged timing or accessory drives. External or internal, spur, helical, scissors and planetary gear sets can be modeled along with transmission shafts, roller bearings and transmission casing using fully parametric rigid or fully flexible modeling elements.

> Load prediction
> Backlash studies
> Tooth flank modifications
> Fully flexible gears
> Roller bearings
> Transmission error and resulting speed irregularities
> Gear whine & rattle
> NVH analysis
> Time domain solution

Are you interested in innovative and trend-setting software solutions?

Please contact us!

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