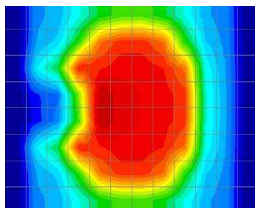
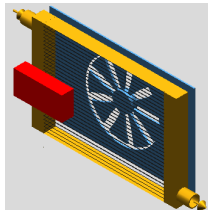


This issue of the GT-SUITE Newsletter is reporting on the following topics:

- >> [COOL3D: A Revolution in Thermal Analysis Modeling](#)
- >> [Lubrication System Simulations with GT-COOL](#)
- >> [GT-CRANK: Easy-to-use Tool for Crankshaft Design Analysis](#)
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COOL 3D: A Revolution in Thermal Analysis Modeling

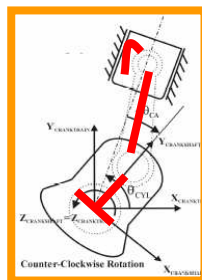
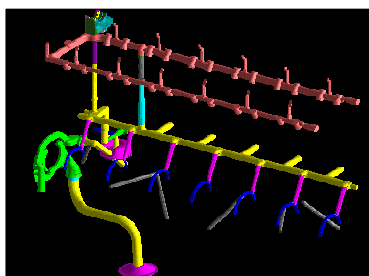


We are proud to introduce COOL 3D, which we feel will revolutionize vehicle thermal analysis by bringing a quasi-3D approach to cooling system simulations. COOL 3D, available now in the most recent update to GT-SUITE V6.2, is a CAD-based pre-processing tool that has been developed for application to under-hood heat exchanger modules. COOL 3D will allow you to quickly create your complete under-hood system including multiple heat exchangers (radiator, CAC, EGR cooler, oil/transmission cooler, A/C condenser, etc.) as well as fans and blockages. At the push of a button, COOL 3D will discretize this CAD model of the system into a GT-COOL model file, with a quasi-3D representation of all of the elements. With a few additional connections (coolant to and from engine, etc.), this model becomes integrated into a full cooling system simulation or an integrated engine/cooling system model.

COOL 3D can be opened from the Tools menu of GT-ISE. Let us know if you have any questions or feedback. Also, if you happen to be attending the upcoming **VTMS Conference** in **Nottingham, May 21-23, 2007**, please stop by and visit us at our booth.

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Lubrication System Simulations with GT-COOL



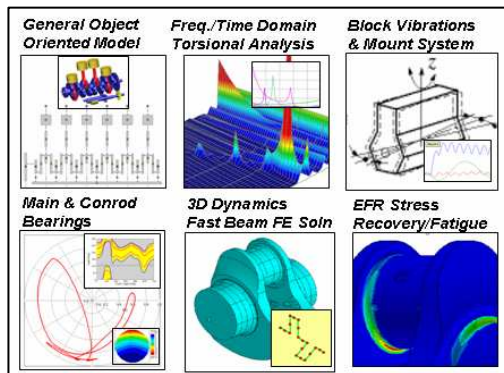
With some recent enhancements, GT-COOL has become capable of modeling full engine lubrication systems. The standard 1D flow solution already in GT-COOL can now be affected by body forces due to complex planar motions (e.g. on flow inside oil drillings in moving cranktrain parts). Further, journal bearing models are available to predict orbits

and flow rates for all bearings. The bearing models also account for thermal balance (temperature rise in oil due to frictional heating) and also for bearing groove and hole geometries. The GT-SUITE basic crank-train model (EngineCrankTrain) can be added to complete the picture by providing engine bearing speeds and loads as well as motions of all crank-train parts (crank web, conrod, piston) which may contain oil drillings.

This means that it is now possible to build a complete oil system model, including the oil sump, pump, filter, oil cooler and other oil "consumers" such as oil jets and the valve-train. This model may also be combined with a cooling system model, making GT-COOL the most powerful and integrated tool for thermo-hydraulic simulations of lubrication systems.

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GT-CRANK: Easy-to-use Tool for Crankshaft Design Analysis



The latest V6.2 release of GT-CRANK makes it a true all-in-one crankshaft concept and analysis tool. It includes engine balance, time and frequency-domain torsional vibrations (including non-linear and frequency-dependent damping), main and conrod bearing oil film analysis, and quasi-static and dynamic crankshaft bending. It also performs stress and fatigue analysis linked to 3D FE models of crankshafts. GT-CRANK offers a comprehensive set of frequency-domain torsional vibration outputs and a high degree of generality in specifying the engine configuration (I, V, W, random cylinder angles). The torsional system beyond the engine may be branched

and can even include two engines geared together, as in a marine (propeller) driveline. GT-CRANK simulations are very fast, offering opportunities for DOE and optimization. Its integration in GT-SUITE allows GT-CRANK models to be linked to multi-body dynamics of valve-trains and gear/chain drive systems (GT-VTRAIN), engine performance (GT-POWER) and vehicle drive-trains (GT-DRIVE). If you are interested in more details on GT-CRANK, please don't hesitate to contact us.

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GT-DRIVE -- RealTime Modeling with SimCreator



Recently, we have teamed up with Realtime Technologies, Inc. of Royal Oak, MI to create an integration between our GT-DRIVE vehicle library and RTI's SimCreator modeling system. These two applications have been connected to a "Ride Motion Simulator", effectively creating a real time virtual vehicle for the person sitting in the simulator's driver seat.

According to Rich Romano of RTI, "GT-DRIVE was integrated with an existing SimCreator model of a four wheel drive off-road vehicle at the vehicle half shafts. GT-DRIVE calculated the torques at the road wheels. SimCreator's multi-body library predicted the rotational speed of the wheels and fed this back to the GT-DRIVE model. GT-DRIVE co-simulated in real-time the power-train of the vehicle. The real-time capability allowed testing of the virtual vehicle using actual driver inputs in an interactive driving simulator. The model was used to predict fuel economy over a variety of on and off road courses. The fuel economy prediction was found to be very accurate when compared with test data. The model continues to be used to support design explorations of a variety of power-train configurations." For more information on RTI's products and services, please visit their website: <http://simcreator.com/index.htm>

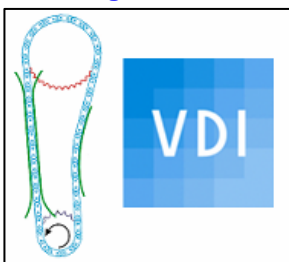
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GT-POWER / ETAS LabCar Real Time Solution to be Presented in Torino

We have teamed up with ETAS Group to offer a Real Time HIL solution where ECU and other controls hardware can be tested at "real time" using a GT-POWER model as the engine "plant". We will be presenting this solution at the **Optimizing Powertrains-Future Improvements through Controls Symposium** to be held **June 12-14, 2007**, at the **Politecnico di Torino - Multifunctional Centre at Lingotto in Torino, Italy**. In this presentation, we will show how a real time GT-POWER engine model can be incorporated into the ETAS Labcar HIL system. The novelty of our solution is that we have a well defined procedure to create this real time capable model from an available detailed engine model while maintaining the model fidelity. If you aren't able to attend this conference, and have any questions about this topic, please feel free to contact us.

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Modeling of Chain and Gear Drives to be presented in Berlin



The mechanical solution within our GT-SUITE software allows for modeling of chains and gear drives. We will be presenting a paper on this topic at the **VDI Conference "Umschlingungsgetriebe"** in **Berlin, June 20-21, 2007**. This conference will bring together around 150 specialists in this area from Germany and surrounding Europe. The paper title is "A Versatile Tool for Combined Dynamic Analysis of Chain and Gear Drive Systems". The paper describes the application of GT-SUITE Drivetrain Solution to an engine auxiliary drive system combining chain-driven sprockets with gears, for coolant and oil pumps, power steering and A/C compressor. If you are attending the conference, we look forward to meeting you there. If not, please feel free to contact us if you would like to get more information on this subject.

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Upcoming Training Classes

GT-POWER Advanced Training: GEM-3D, Seoul, South Korea, May 29, 2007

This one-day course will focus on GEM 3D, a CAD-based tool that is designed to assist users in the modeling of engine exhaust and intake systems in GT-POWER. This class will be held on day 2 of the CD Adapco Korea User's Conference.

GT-POWER: Basic Training, Detroit, Michigan, June 4-5, 2007

This two-day course is designed for new users of GT-POWER and GT-SUITE and will focus on the simulation of internal combustion engines through the use of GT-POWER.

GT-POWER: Exhaust Aftertreatment, Detroit, Michigan, June 6, 2007

This one-day course will focus on the application of newly developed exhaust aftertreatment modeling within GT-SUITE. Participants will learn to model various components such as Diesel Particulate Filters (DPF), diesel oxidation catalysts (DOC), Selective Catalytic Reactors (SCR), Lean NOX Traps (LNT) and Three Way Catalysts (TWC).

GT-POWER: Basic Training, Torino, Italy, June 19-20, 2007

This two-day course is designed for new users of GT-POWER and GT-SUITE and will focus on the simulation of internal combustion engines through the use of GT-POWER.

For more information about the above classes, please visit:

<http://www.gtisoft.com/training/training.php>

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User Conferences Announced

Asia: Three Conferences

Korea (CD Adapco Korea User's Conference) – May 28-29

Japan (CD Adapco Japan User's Conference) – May 31-June 1

China (CD Adapco China User's Conference) – June 4

Europe: New Hotel and New Format

The European User Conference will take place on the 8th of October. It will be located in Frankfurt, as usual, but this year we decided to try a new format for the conference as well as a new hotel (with a better conference room). The new format will include two concurrent conference rooms, one focusing on GT-POWER applications, and the other focusing on mechanical applications in the morning and thermal management and fuel injection applications in the afternoon. The new hotel is the Steigenberger Hotel at the Frankfurt Airport:

<http://www.airporthotel.steigenberger.de>

You can reserve a room at the hotel at the special rate of 120 Euros, all included. If you are interested in making a presentation at any of these three sessions, or have a suggestion for a topic, please contact John Silvestri with your proposal (j.silvestri@gtisoft.com).

US: New Hotel

The US User Conference will take place on the 13th of November. It will be located in the Detroit area, as usual, but this year has been moved to The Townsend Hotel in Birmingham, MI:

<http://www.townsendhotel.com>

We hope that this hotel will be more convenient for many of you as it is more centrally located with respect to our customer base in the area. If you are interested in making a presentation at this year's conference, or have a suggestion for a topic, please contact John Silvestri with your proposal (j.silvestri@gtisoft.com).

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Numerous Papers Presented at 2007 SAE Congress

Each year, we attend the SAE World Congress in Detroit to see technical papers presented that relate to our industry. We ran into some of you there at the conference, and enjoyed the chance to meet with you face to face. One of the things we note each year are the technical papers presented that use or reference our software.

We are often asked about how GT-SUITE is used in the industry, and for this reason we post a list of these papers on our website. This year, we are proud to report that there were 12 papers presented using GT-SUITE. To access the list, please go to: <http://www.gtisoft.com/publications.html>

Thanks to those of you who authored these papers. Please let us know if you are aware of a paper that we may have missed.



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QuickTip: Time RLT's --What are they, how to use them

Most of you are certainly aware that Case RLT's are created at the end of every GT-SUITE simulation, and are output for cycle averaged or once per cycle (max, min, end of cycle, etc.) quantities. Typical Case RLT's of interest include torque, volumetric efficiency, bsfc, average pressure (MAP), and total mass flow, to name just a few. There are another type of RLT that may

be optionally turned on by the user, and these are known as Time RLT's. The quantities that may be output as Time RLT's are the same as those available for Case RLT's. The difference is that Time RLT's may be output every cycle of the simulation (or more precisely, every N cycles, with N user-defined). So Time RLT's provide a convenient mechanism for viewing the time history of some RLT in a transient simulation (say bmep, volef, etc., vs simulation time), or just for viewing the convergence history in a steady state simulation (quantity vs. cycle number). Since Time RLT's are stored every cycle, there is the potential to create very large output files. Therefore, by default, Time RLT's are not stored in a GT-SUITE simulation. To turn them on, within GTise, go to Run-OutputSetup-RLT-Output. Set the Time RLT Storage Multiple to 1 (or 2 to store every other cycle, 3 for every third cycle, and so on). That's all there is to it. Now your simulation will store the Time RLT's. To view them, in GT-POST, you will have a Time RLT tab along side the normal Plots and Case RLT tabs at the top of your *.gx file. Simply click the Time RLT tab, select the part you would like to view the Time RLT's from, find the RLT of interest, and hit the view button (or F4).

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