

Easy5 2010



Welcome to Easy5 2010

With this release of the Easy5 product, MSC.Software proudly presents extensions to recent innovations, exciting new capabilities and continued speed of use improvements. Major areas of focus for this release include the following:

Application Library Updates

Easy5's unique, powerful and popular suite of application libraries has been updated with new components, new configurations and enhanced component models. The thermal hydraulics, gas dynamics, multi-phase fluid and general purpose libraries all have important extensions in Easy5 2010. These updates provide Easy5 users with expanded modeling capability, increased model sophistication and faster model construction.

Usability and Productivity

Easy5 2010 features functionality to improve the model management experience. External model data updating allows one to update model data from an external CSV file manipulated, for example, in Microsoft Excel® reducing the time this process takes by half. The model simulation library was expanded allowing for a more detailed Watch List which provides better information at runtime. Also in this release, Easy5 now automatically generates a model I/O file for better tracking, debugging and sharing.

Performance

Improved code generation was implemented and increases the maximum possible model size by 25%. Analysis startup time has been reduced by as much as 45%. A switch to Python as the shell scripting language has increased the execution speed of batch commands and simultaneously provides users with more flexibility in scripting. And, with this 2010 release, Easy5 now provides 64-bit Linux compiler support unlocking the potential performance gains of 64-bit Linux.

Integration Updates

Easy5 2010 supports the latest releases of the Adams product line, MSC Adams 2010 and MD Adams 2010. Also, Easy5 2010 provides support for r2009 of MATLAB/Simulink®.

In summary, this Easy5 release combines functionality extensions and enhancements with new capability innovation all aimed at enabling you to do more, faster with your Easy5 investment.

Thank you very much for your continued support of Easy5.

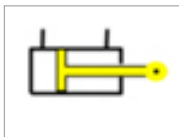
The MSC.Software Product team

Application Library Updates

Easy5's unique, powerful and popular suite of application libraries has been updated with new components, new configurations and enhanced component models. The thermal hydraulics, gas dynamics, multi-phase fluid and general purpose libraries all have important updates in Easy5 2010.

The specific types of updates include the addition of wholly new components, new configuration options for existing component types and the inclusion of new demo models. Naturally with a new release, quality and documentation improvements have been made too.

These application library updates benefit Easy5 users in three ways. First, they provide expanded modeling capability as new physical components and phenomena can be represented. Secondly, they provide increased model sophistication via the new options and configurations that have been applied to existing components. Finally, with an expanded suite of pre-built items from which to work, Easy5 users need to build fewer custom components and therefore faster overall model construction is possible.



Thermal Hydraulics (hc)

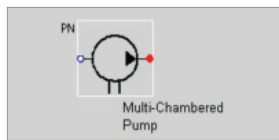
New Component Configurations

The following new configurations have been added to components in the thermal hydraulics library:

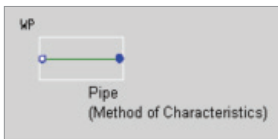
New Configuration	Component
Caged spring	Spring (hc/SF)
Suction Cavitation	Multi-Chambered Pump (hc/SF)
Roughness	Pipe (hc/WP)
Transient Flow Forces	Poppet Valve (hc/PV)
Direct Heat Input and Flow Control	Generalized Resistance (hc/QP)
Transition dP Control	Fixed Orifice (hc/OR)



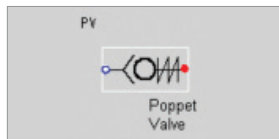
Caged Spring



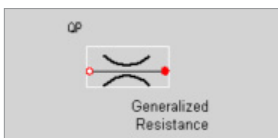
Suction Cavitation



Roughness



Transient Flow Forces



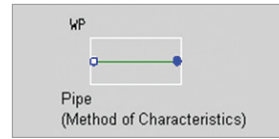
Direct Heat Input and Flow Control



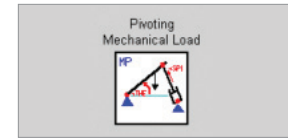
Transition dP Control

Quality Improvements

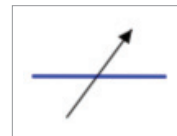
Significant quality improvements have been made to the pipe (method of characteristics) and moving mass components.



Method of Characteristics Pipe



Moving Mass



Gas Dynamics (gd)

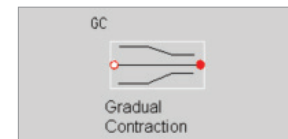
New Components

The following new components have been added to the gas dynamics library:

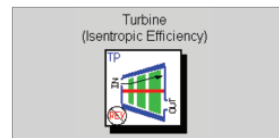
New Component	Description
Elliptical Pipe Bend (gd/EB)	Elliptical duct with tabulated K-factor correlations. It can be configured with either resistive or storage/resistive architecture, meaning it can be easily connected to other gas dynamics library components in your model.
Gas Turbine (gd/TP)	Simple gas turbine, based on isentropic efficiency data
Gradual Contraction (gd/GC)	Gradual contraction in a circular duct with tabulated K-factor correlations



Elliptical Pipe Bend



Gradual Contraction

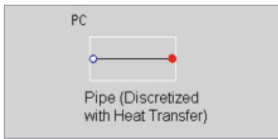


Gas Turbine

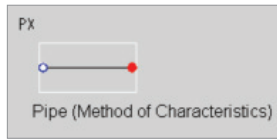
New Configurations

The following new configurations have been added to components in the gas dynamics library:

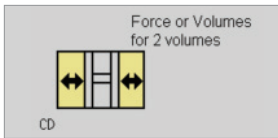
New Configuration	Component(s)
Colebrook Friction Factor Options	Pipe [Discretized with Heat Transfer] (gd/PC) Pipe [Method of Characteristics] (gd/PI)
Single Volume, Single Moving Mass	Force or Volumes for 2 Volumes (gd/CD)
Two Volumes Bounded by Three Moving Masses	Force or Volumes for 2 Volumes (gd/CD)
Belleville Spring Feature	Spring (gd/SF)



Colebrook Friction Factor Options



Single Volume, Single Moving Mass



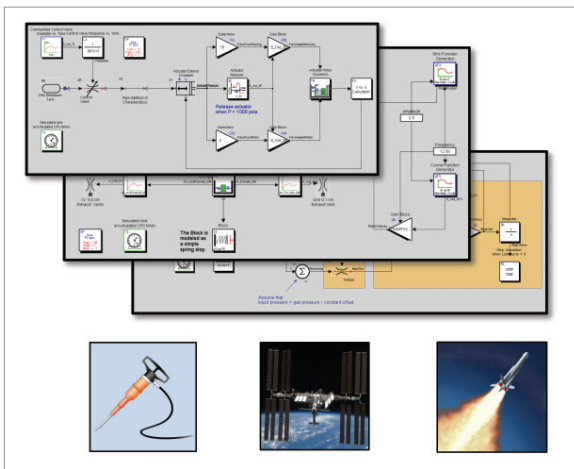
Two Volumes Bounded by Three Moving Masses



Belleville Spring Feature

New Demo Models

The new demo models for a pneumatic air hammer, telescopic actuator and propellant expulsion from a pressurized tank provide useful examples of how to model these popular gas dynamics systems.

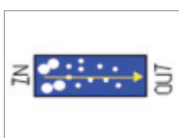


New Built-In Gas Tables

This library also features the addition of new built-in tables for the following gases:

- Methane
- Hydrogen
- Argon

This provides a more accurate representation of the physical properties of these gases when compared with ideal or perfect gas representations or with a generalized tabular correlation model.

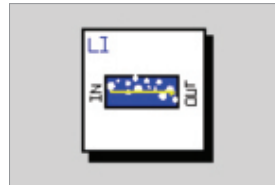


Multi-Phase Fluid (vc)

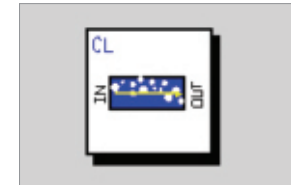
New Components

Two new components have been added to the multi-phase fluid library:

New Component	Description
Discretized Refrigerant Line (vc/LI)	Discretized, steady-momentum refrigerant line
Implicit Loop Breaker (vc/CL)	Used to break so-called "implicit loops" inadvertently introduced to models by a re-entrant loop parameter, which typically occurs when modeling closed-loop circuits



Discretized Refrigerant Line



Implicit Loop Breaker

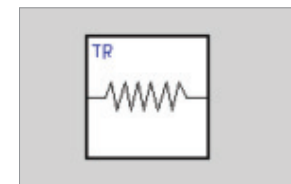
New Configurations

The following new configurations have been added to components in the multi-phase fluid library:

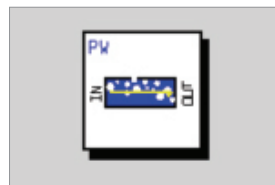
New Configuration	Component(s)
Ability to Model Multiple Fluid Loops	Fluid Properties (vc/FP)
Radiation Optional	Thermal Conductance (TR)
Elevation Gain	Pipe [Discretized with Heat Transfer] (vc/PW)
Increased Wall Ports	Refrigerant Line (vc/RL)
Thermal Inputs	Tank (vc/TK)



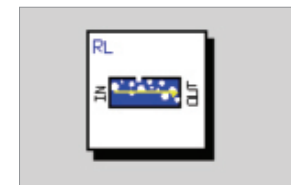
Ability to Model Multiple Fluid Loops



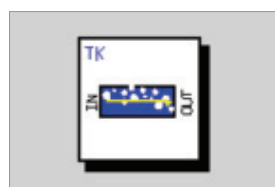
Radiation Optional



Elevation Gain



Increased Wall Ports



Thermal Inputs



General Purpose (gp)

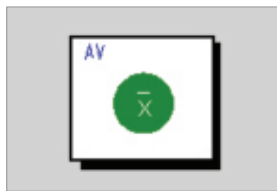
New Components

Two new components have been added to the general purpose library:

New Component	Description
Asynchronous Sample and Hold (gp/AH)	Utilizes so-called "switch states" instead of sampled-data states to model discontinuous phenomena (i.e. not occurring at regular time intervals)
Rolling Average (vc/AV)	Stores N data points (user configurable) – one for each increment of time, TINC – to compute a "local" average that advances with time



Asynchronous Sample and Hold



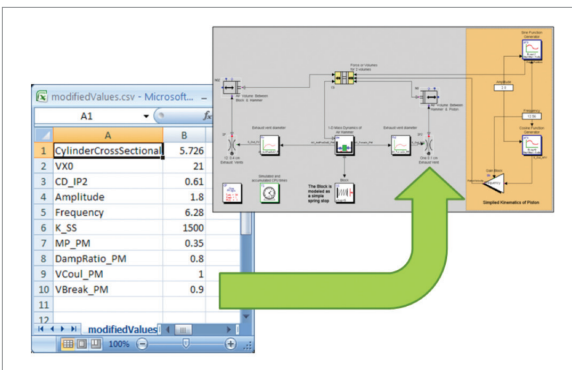
Rolling Average

Usability and Productivity

External Model Data Update

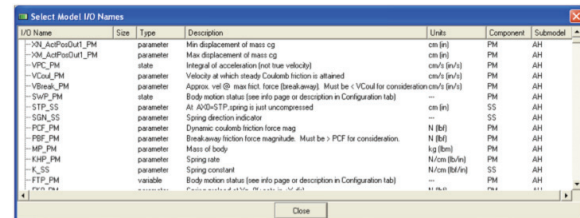
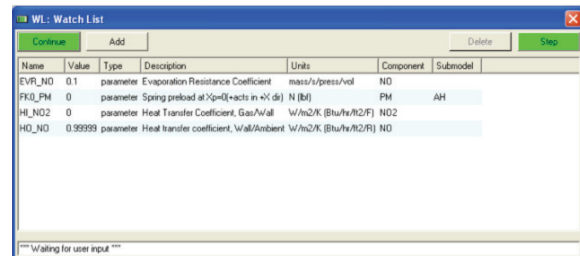
“ Design iteration is much faster with the new external model data update capability in Easy5 2010 which reduces the time this process takes us by half. – Easy5 User, Major Energy Company ”

One can now update a model's data via a simple comma-separated file from the command line. This is an alternative to using the temporary setting editor to set model data from the command line. Many users have requested this capability since they're often already working with model data in Excel. Being able to use these files to set, manage and drive model changes rather than opening Easy5 each time cuts the time this process takes in half.



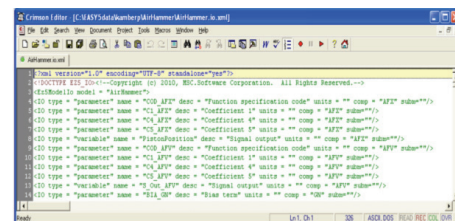
Improved Interactive Simulation Library

The watch list, which allows one to interactively get and set data during a simulation, has been enhanced via improvements to the interactive simulation library. The watch list now displays descriptions, units and model hierarchy data. This provides much better information at run-time making it easier for you to track and adjust your models during simulation. This extra information is especially useful when someone other than the model author is running it. Similarly, the I/O selection dialog, which displays all model I/O names, is improved as well. It can now be sorted by any of the column headers making model interrogation much faster, especially for large models.



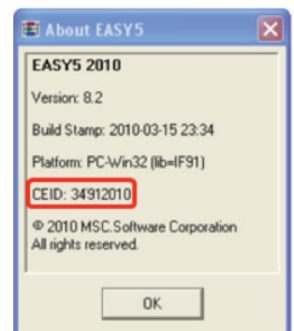
Model I/O File

The new model I/O file is an xml-based file of model data which gets written out automatically. This improves the detail of the audit trail saving time in debugging and saving time in environments where Easy5 simulation tasks are shared within an organization or need to be understood later by people other than those who originally built and/or ran the model.



Updated Licensing Support

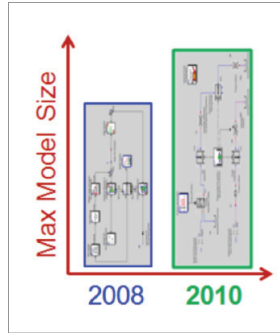
Licensing is now based on FlexIm v11.6 from Flexera™, offering many advantages including native 64-bit installation support and additional security and convenience features such as support for ENH usage records, support for multi-group features including the new GRP token, and the automatic display of one's Customer Entitlement ID from both the GUI (via the About Easy5 menu) and in all Easy5 output listings and log files so as to speed the customer support process.



Performance

Improved Code Generation

The model code generation is now completed using two source files to help reduce the overhead on compiler memory limits. This increases the maximum model size possible by approximately 25%! All UI and background processes automatically deal with the presence of the two model source files for build and export operations. In addition, for Windows, the link step is now performed using a command file so that the build log is more readable.



Analysis Startup Time

Due to a combination of improvements in this release, analysis startup time has been reduced significantly. Reductions of as much as 45% have been observed on large models.

Python Scripting

All existing Korn/Bourne Shell “backend” scripts have been converted to Python scripts. Python is an open-source, interpreted, object-oriented, high-level programming language. Version 2.6.2 is included with Easy5 2010. This conversion, which applies for Windows platforms only, increases the execution speed of batch commands. Because of this Python conversion, the MKS Toolkit has been removed so Windows users must now use the default command shell environment or can use Python and take advantage of its increased flexibility and the fact that the MSC-authored Easy5 scripts are now in Python.



64-bit Linux Compiler Support

64-bit compilers for Linux are now supported with this release. This includes new compiler variants for g77 and Intel Visual Fortran® 10 for 32-bit as well as 64-bit systems. While most Easy5 models don't approach the 2-4GB limit inherent in 32-bit architecture, this does make for easier setup on 64-bit Linux which is common hardware being purchased by our users these days and it allows one to take advantage of solution performance gains enabled by these newer machines.

Compiler Variant	Compiler	Platform
lib_lx32_g77	g77	LX86
lib_lx64_g77	g77	LX8664
lib_lx32_IF10	Intel Visual Fortran 10.x	LX86
lib_lx64_IF10	Intel Visual Fortran 10.x	LX8664

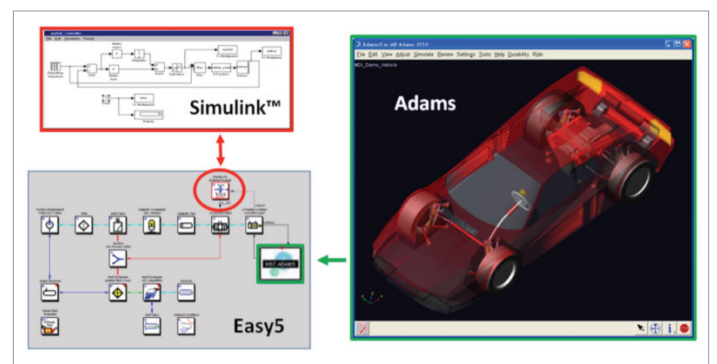
Windows Compiler Updates

With regard to Windows compilers, there are new variants for Intel Visual Fortran® 10.x and 11.x for both 32-bit and 64-bit systems. Older compilers such as Intel Visual Fortran® 8 and 9 are also still supported. With newer compiler versions comes enhancements and quality improvements such as the performance gain seen in the leap from Intel Visual Fortran® 9 to Intel Visual Fortran® 10. Also, Easy5 2010 can be run on Windows7™ systems also unlocking potential for performance gains.

Compiler Variant	Fortran Compiler	Platform	C Compiler
lib_nt_GNU	gnu/g77 3.2.3	Win-IA32	Gnu/gcc 3.2.3
lib_nt_DVF6	Compaq Visual Fortran 6.x	Win-IA32	MSVC6
lib_nt_IF8	Intel Visual Fortran 8.x	Win-IA32	MSVC7
lib_nt_IF91	Intel Visual Fortran 9.x, 10.x, 11.x	Win-IA32	MSVC8
lib_em64t_IF91	Intel Visual Fortran 9.x, 10.x, 11.x	Win-8664	MSVC8

Integration Updates

Integrating with Adams for a sophisticated multibody dynamics representation of mechanical systems and integrating with existing electronic controls models from the popular MATLAB/Simulink® package are important parts of the simulation process for many Easy5 users. Easy5 2010 supports the latest releases of the Adams product line, MSC Adams 2010 and MD Adams 2010. Also, Easy5 2010 provides support for r2009 of MATLAB/Simulink®. This allows one to take advantage of the latest enhancements to these CAE tools.



MSC's Commitment to Easy5 Users

With your continued support, MSC.Software remains committed to the continuing advancement of Easy5 to provide increased benefit to our valued customers. The content of this release demonstrates that commitment.

Customer Driven

We take requests. MSC Many of the new capabilities and enhancements in this release are a direct result of customer feedback. The application library updates, usability and productivity enhancements, performance gains and integration updates all help our customers build better products, faster.

Leading Edge Innovation

We push the envelope. MSC continues to bring exciting new capability to the Easy5 application libraries. The Easy5 2010 updates to the gas dynamics, thermal hydraulics and multi-phase fluid libraries prove that as our customers encounter needs we develop the high-fidelity, ready-to-use system blocks to get the job done quickly and accurately.

Speed of Use

We help you go faster. MSC is focused on helping you get the job of CAE analysis done more efficiently. For many of our customers it is no longer enough to simply use simulation to accelerate product development. The process of simulation, itself, must now be accelerated. The numerous ease-of-use enhancements in the interface and performance improvements featured in this release of Easy5 are there for this reason.

Thank You

MSC.Software appreciates the confidence and trust that you, our customers, have placed in our products all these years. This is also demonstrated by the custom libraries you create and by the level of integration of our products into your CAE processes. We, as always, are pleased to have you as a customer and partner in pushing simulation forward.

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