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**A N S Y S**

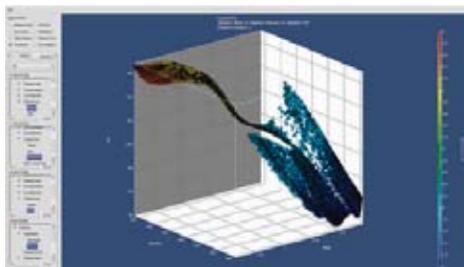
*ASAS / ASAS Offshore*



**L S T C**

*LS-OPT<sup>®</sup>*

*Version 3.4 Release*





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A full introductory article will appear in our February issue.

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**Please take note of our new cover for 2009, designed by FEA Information Inc's Graphics Design Manager, Wayne Mindle.**

Sincerely,

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**Trent Eggleston**

**Wayne Mindle**

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# LSTC Announcement LS-OPT<sup>®</sup> Version 3.4 Release

## Introduction

Since Reliability-based Design Optimization (RBDO) is rapidly becoming the standard for simulation-based design optimization, LS-OPT Version 3.4 focuses on several improved features for this design application. Significantly faster computation has been achieved by improving the reliability analysis code, introducing new optimization algorithms and optimizing the executable code. User-friendliness for both optimization and probabilistic analysis has also been improved, principally by adding a completely new wizard for analyzing LS-DYNA statistics and simplifying the choices for metamodel-based optimization. Several Viewer (post-processor) features, among others the visualization of the Pareto Optimal Frontier, have also been enhanced.

In the sections that follow, the main new features are discussed, principally (i) simplified optimization strategies, (ii) faster optimization algorithms, (iii) LS-Dyna statistics wizard and (iv) enhanced visualization of the Pareto Optimal Front.

## Strategies for metamodel-based optimization

The purpose of the new "Strategy" panel is to provide a simple choice of basic optimization setups depending on the application, while avoiding the pitfalls. There are three recommended strategies for automating the metamodel-based optimization procedure. Determining their availability is (i) whether the user wants to create a surrogate design model for design exploration (such as the creation of a Pareto Optimal Front) or (ii) whether he/she is interested in finding a single improved or optimal variable set (as e.g. for material parameter identification).

The different strategies are shown schematically in Figure 0-1. They apply to all metamodel-based optimization tasks, including RBDO and were possible in Version 3.3 but the setup was more complicated. Selecting a strategy in the new tab will change and simplify the available options in subsequent steps such as sampling, algorithm selection and running.

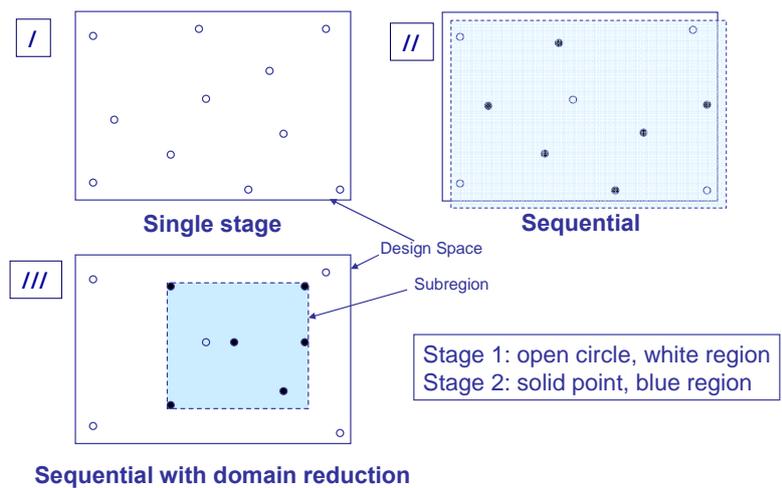


Figure 0-1: Metamodel-based optimization strategies in LS-OPT

The first selection is whether a Pareto Optimal Frontier is required. Selection of the POF then limits the available options to the *global* strategies: Single Stage and Sequential. The remaining option (Sequential with Domain Reduction) is typically only used for

optimization in which the user is only interested in the final optimum point (such as parameter identification) and not in any global exploration of the design.

### **Metamodel optimizers**

Until Version 3.4 the two optimizers available for metamodel optimization were the gradient-based algorithm LFOPC (Leapfrog Optimizer for Constrained problems) and the Genetic Algorithm (GA). The LFOPC algorithm is highly accurate and robust but can be time consuming for large optimization problems, especially when using RBDO. This deficiency is largely due to the fact that LFOPC is a local optimizer and therefore requires a multi-start approach in an attempt to find a global optimum. The GA was implemented for Version 3.3 to address multi-objective constrained optimization problems but also serves as a global optimization technique. Adaptive Simulated Annealing (ASA) has now been added to address the global optimization problem more efficiently. To further improve the accuracy of global optimization, a hybrid approach has been adopted. In this approach, a global optimizer is used with limited computational budget to drive the search to the global optimal *region*. Next, the sub-optimal solution from the global optimizer is used as the starting point for LFOPC to sharply converge to the global optimal solution.

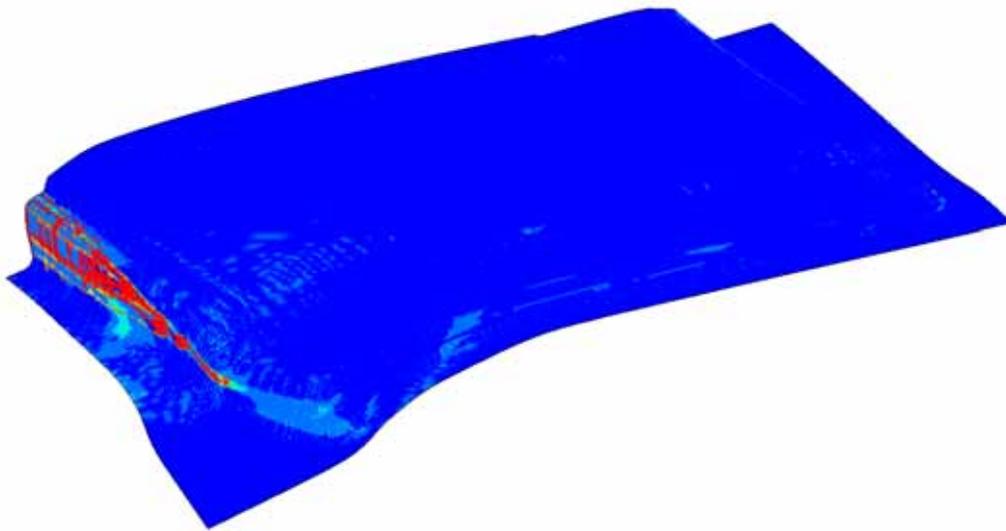
### **LS-DYNA statistics wizard**

LS-OPT can display statistical results visually in LS-PREPOST on the structure. This ability has been completely redesigned to allow:

*A shorter learning curve.* The GUI wizard and outlay guides a user through the creation of a plot.

*Increased usability.* The capability was re-organized to focus on plots as the central entity. These plots can be edited, displayed, computed in a batch fashion, and refined further (for example, in a bifurcation analysis).

*Re-use and sharing of an investigation method.* The plots created during the analysis of a structure is saved in a database. This database can be re-used in similar studies. For example, a metal forming group have to set up their investigation methodology only once and re-use this set-up for a number of similar metal forming studies.



*Figure 0-1: Standard deviation of plastic yield of a metalforming problem. The creation of plots of statistical quantities like these has been simplified by the new GUI.*

### **Visualization of the Pareto Optimal Front**

Visualizing the Pareto Optimal Front is important for choosing an appropriate design from the set of optimal designs. Displaying the Pareto optimal front for a problem with only 2 objectives is simple. However, for more objectives, more sophisticated display features are required. Two approaches are taken to visualize the Pareto Optimal Front. The first is to allow the display for problems with up to 4 objectives and has been implemented in Ver. 3.4 (see Figure 0-1 for a 4-dimensional display). The fourth quantity is displayed using a color index.

Higher dimensions require more sophisticated methods for mapping the multiple dimensions to a 2D display for selection of an appropriate optimal design. Three such methods, each with its own favorable attributes, are being implemented in Version 4.

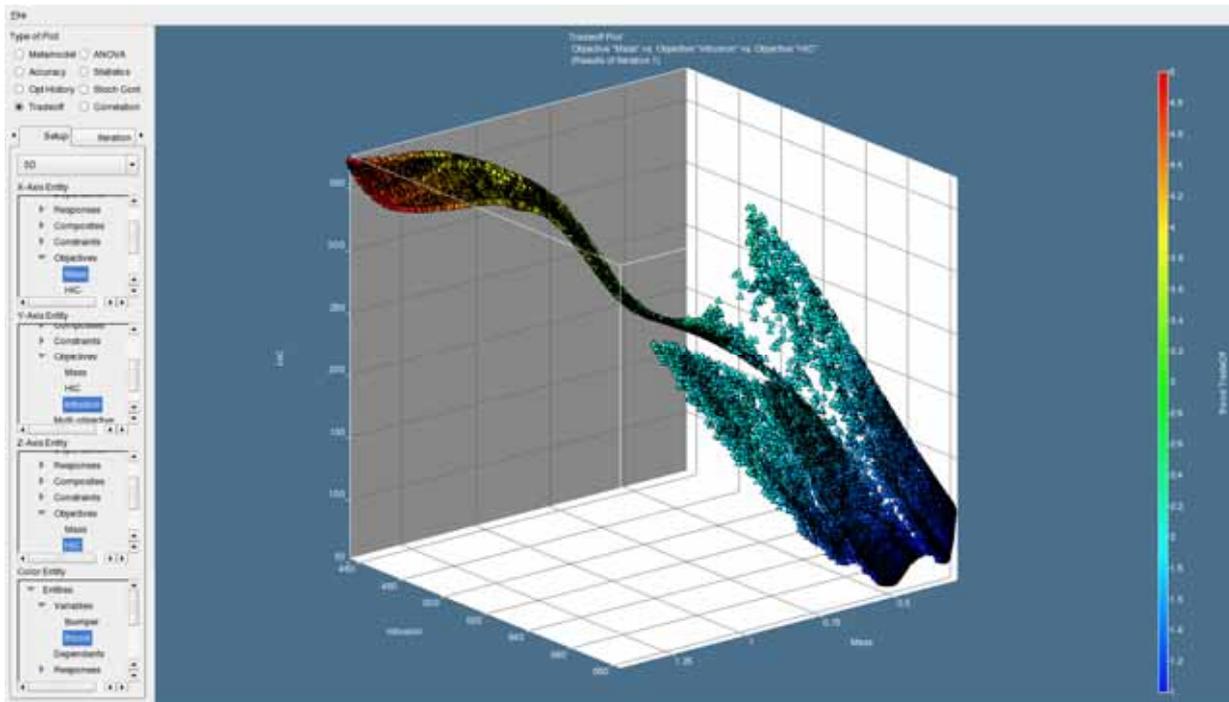


Figure 0-1: 4-Dimensional visualization of the Pareto Optimal Front for triple objective crash optimization problem: HIC (Head Injury Criterion) vs. Intrusion vs. Mass with a thickness parameter shown in color (LS-OPT GUI)

### Miscellaneous other features

1. A feature has been added to evaluate design points using an existing metamodel. A .csv file containing all the interpolated design results is produced. The feature can be selected under the "Evaluate Metamodel" tab in the "Solvers" panel. The repair feature "Analyze checkpoints" is used to do the evaluation using an existing database.
2. The methodology for sampling within a reasonable design space has been improved to make sampling constrained by geometric or other limitations more robust (so called "move" option). This feature is now also available for the direct GA optimizer.
3. More attributes are provided in the "Accuracy" plots such as clickable points to show computed/predicted values, and the feasibility status.
4. Most databases are now also available as a .csv (comma separated variables) file for importing into spreadsheet programs such as Microsoft Excel (migrated to Version 3.3).
5. Discrete sampling is also available for the Space Filling sampling scheme.
6. The detailed optimizer history is available for each algorithm (OptimizerHistory\_n.csv). These are available as .csv files, but will also be displayed in Version 4.
7. The LS-OPT database gathering feature (.zip file) has been extended to include the history data for each simulation run. These are required for the DynaStats and MeanSqErr features.
8. The summary report (Isopt\_report) files have been extended to all the tasks.
9. The Kriging metamodel has been updated for better speed performance.

## **Closure and Outlook**

LS-OPT Version 3.4 presents a significant step forward for design with LS-DYNA by providing a friendlier interface as well as refining and speeding up the existing methods for probabilistic analysis and optimization. New post-processing features such as extended visualization of the Pareto Optimal Front have been added.

Version 4 is being developed with a new generation LS-OPT post-processor which, in addition to the current features, have several new data mining features focusing on variable/response correlation, visualization of the Pareto Optimal Frontier and response history visualization. A standalone tool for nonlinear topology optimization has also been developed for release in 2009 (2<sup>nd</sup> quarter).

*Nielen Stander, Willem Roux & Tushar Goel  
December 22, 2008*

# Robustness analysis of metal forming using LS-OPT®

Willem Roux, Livermore Software Technology Corporation, [willem@lstc.com](mailto:willem@lstc.com)

*Metal forming robustness analysis is done considering the variation of the variables, stochastic fields, and Monte Carlo analysis. Here we demonstrate this process using LS-OPT and an industrial model.*

## Introduction

The LS-OPT capabilities have been expanded to analyze the robustness of metal forming. This is done by modeling the variation, an LS-DYNA Monte Carlo analyses, and postprocessing in LS-PREPOST. The required combination of features was made possible by extending the LS-OPT robust design capabilities to metal forming. Most specifically, we can display the statistics of the results on the FEA model in LS-PREPOST, thereby allowing us to investigate the robustness of the design as well as the sources of occasional failures visually.

The capabilities were evaluated with an industrial problem as shown in the figures.

## Objectives

The robustness analysis answers questions such as:

- Is the model robust?
- Which variables are responsible for the problems?
- How can the design be improved?

## Robustness analysis

### *Modeling the variation*

Typically the variation of the material properties, blank thickness, blank placement, forces, and friction are considered. The material properties are yield, hardening and anisotropy coefficient. Parameters are identified in LS-DYNA using the \*PARAMETER statement. The variation of these parameters is specified in LS-OPT using statistical distributions.

In addition the \*PERTURBATION statement in LS-DYNA can be used to create stochastic field describing geometry and shell thickness variation.

### *Monte Carlo Analysis*

A Monte Carlo analysis creates results with the same scatter of what would be expected in practice. Using the statistical distributions provided LS-OPT create a number of structures which have the expected variation of the structural properties. LS-OPT then analyze these structures using LS-DYNA. For large problems LS-OPT has the ability to use job queuing systems.

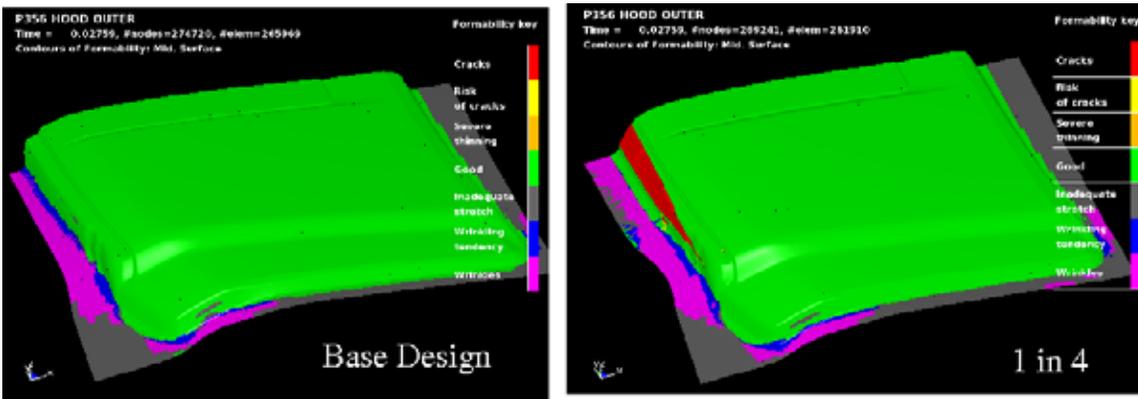


Figure 2 Plots of the formability of the piece. The analysis showed that about one piece in four could give problems.

**Visualization of results**

The visualization of metal forming results has special requirements because (i) the adaptivity will result in the different iterations having different meshes and (ii) it is more natural in metal forming to consider the results at a specific geometric location than at a specific node. The visualization was made possible by mapping all the results to the mesh of the base design. The results are therefore considered at a specific spatial location instead of a node (Eulerian system).

The mapping of results is done as shown in Figure 3.

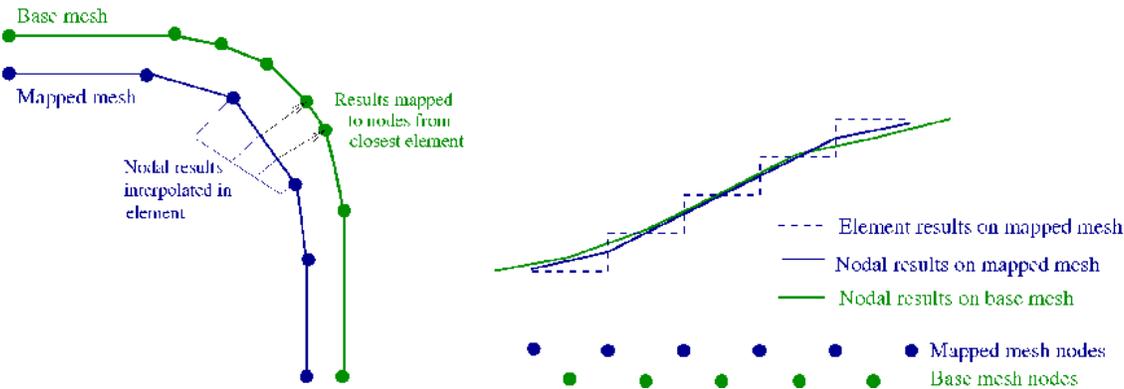


Figure 3 Mapping and interpolation of metal forming results. The figure to the left shows how the results are mapped to the base mesh by finding the closest element and interpolating internally. In the figure to the right, the results are shown as the element centroid results for the original mapped mesh, the element results averaged at the nodes for the original mapped mesh, and the results mapped to the nodes of the base mesh. It can be seen that the mapping accuracy is good if the mesh is sufficiently fine to consider smoothly varying results.

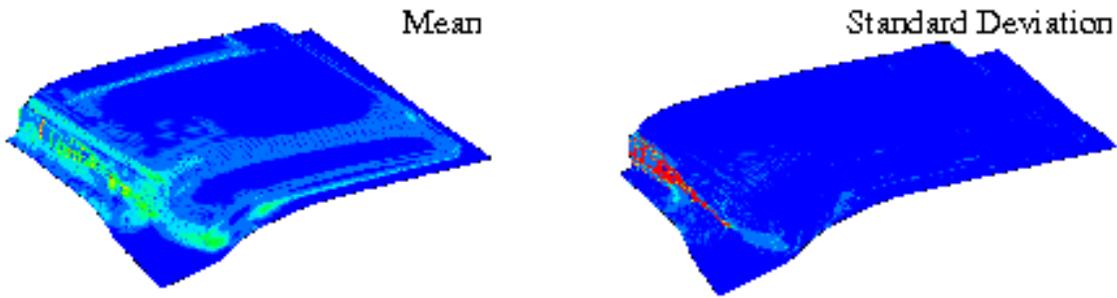


Figure 4 Plotting the mean and standard deviation of the plastic strain showed the problem areas in the structure.

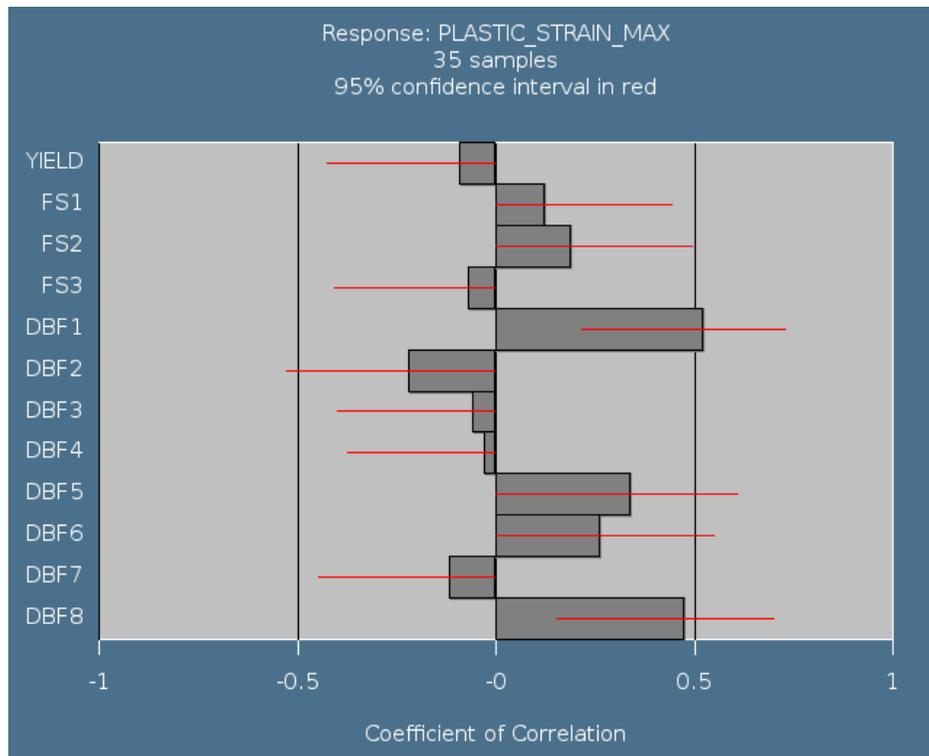


Figure 5 This plot shows the coefficient of correlation between the maximum plastic strain in the model and the variables. This plot can be used to identify the variables causing the problems. This information is used for the redesign of the structure. In this case, modifying variables DBF1 and DBF8, and re-analysing showed an improvement in robustness.

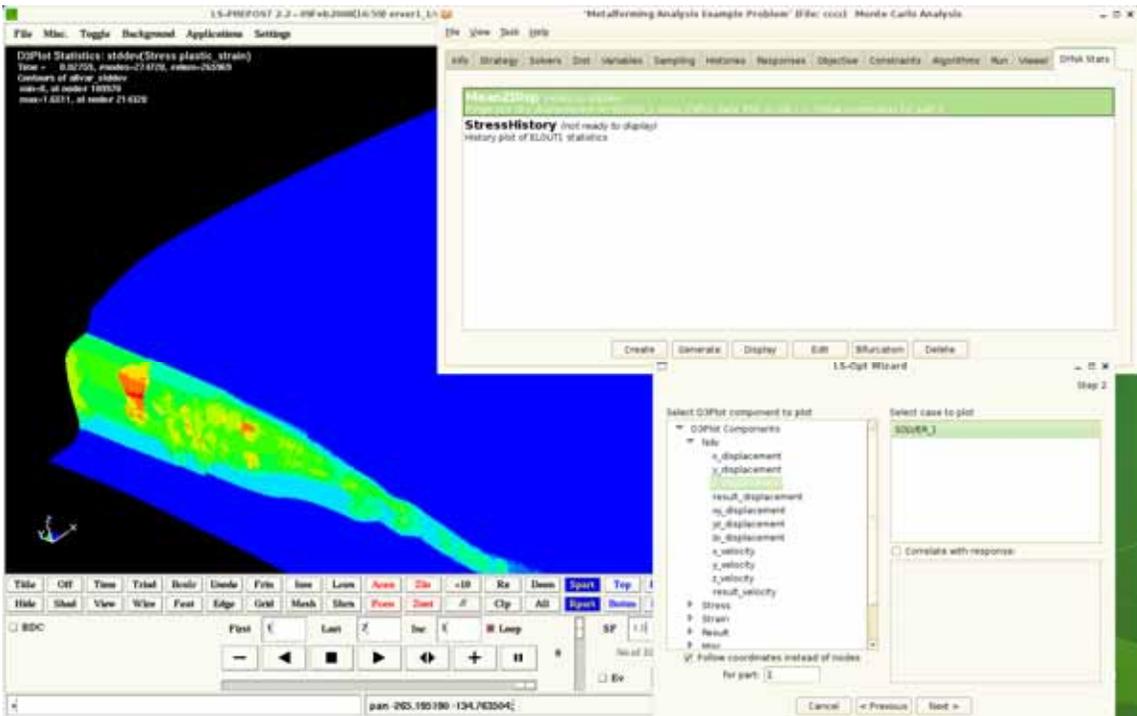


Figure 6 This plot shows the user interface for creating the plots. The definition of the plots are persistent and can be shared between projects. So once you have established a methodology of creating plots, then you can re-used the methodology between projects.

## Redesign

Once the problems and the reasons for the problems are known, then the structure can be redesigned. In this case we know from the correlation plot in Figure 5 that we should investigate variables DBF1 and DBF8. By constraining these two variables, we were able to reduce the number of failed parts in the Monte Carlo simulation by 50%.

## Summary

Robustness analysis of metal forming problems requires some specific capabilities; for example, stochastic variables and fields, Monte Carlo analysis, visualization of the statistical results of adapted parts, and the distributed execution of LS-DYNA. All of these capabilities are implemented in LS-OPT as required for the investigation of industrial problems.

## 2<sup>nd</sup> International Conference on Hot Sheet Metal Forming Of High-Performance Steel

June 15-17, Luleå, Sweden

**Abstract deadline, 30<sup>th</sup> of January, 2009**

The 2<sup>nd</sup> International Conference on Hot Sheet Metal Forming of High-Performance Steel will be held in Luleå, Sweden, from June 15 to 17, 2009. It is organised by the Swedish-German Centre of Excellence for Hot Sheet Metal Forming of High-Performance Steel, CHS<sup>2</sup>. For further information: [www.chs2.eu](http://www.chs2.eu). See also [www.ltu.se/tfm/chs2](http://www.ltu.se/tfm/chs2) and [www.metform.de](http://www.metform.de). Any questions can be addressed to Lena Olsson, [lena.m.olsson@ltu.se](mailto:lena.m.olsson@ltu.se).

The purpose of the conference is to bring technical and scientific experts from different countries together, in order to encourage the exchange of knowledge and to establish a forum for discussion of the state-of-the-art and new research results in the field of hot sheet metal forming of high-performance steel. The conference will cover the topics *Material, Process Design, Modelling & Simulation* and *Products*.

The second international conference on the topic of hot sheet metal forming of high performance steel will be held in Luleå, Sweden, where the technology of press hardening was invented and industrialized. The demand for hot sheet metal forming technology has steadily increased and, pulled by strong international driving forces such as environment and safety, we are now experiencing and unprecedented growth in automotive applications. The research concerning hot forming processes, micro-structure evolution, deformation, failure,

thermal properties and issues such as coatings, heat transfer, high temperature tribology, is intense and a strong research community is under development. This second international conference takes off from where the first in Kassel, Germany (2008) was closed. The scientific and industrial community will be further strengthened and new results and developments from the growing international research programs will be displayed. As the second in a series of international conferences, in the future to be held alternatively every second year in Kassel and Luleå, CHS<sup>2</sup> 2009 will highlight multiple aspects from a scientific as well as an industrial viewpoint.

The City of Luleå welcomes all participants to a town surrounded by water, clear skies and around-the-clock light summer nights. The airport is close to the city with hourly connections to Stockholm and the rest of the world. During spare time, visit attractions like Gammelstad Church Town, placed on the UNESCO world heritage list, or take a tour on a boat and experience the Luleå archipelago.

We are looking forward to welcoming you as an author or as a conference participant. Best regards from The Swedish-German Centre of Excellence for Hot Sheet Metal Forming of High-Performance Steel, CHS<sup>2</sup>, Kassel/Luleå

## 2009 LS-DYNA® Limited Version Available for US Unemployed LS-DYNA Engineers

LSTC has added a new Limited LS-DYNA Version available through 2009. This new limited License A is to assist US unemployed LS-DYNA engineers during the economic difficulty

Both versions include LS-DYNA, LS-PrePost and LS-OPT with manuals on CD.

### Limited License A

LS-DYNA engineers that have had discontinued employment.

No fee  
Elements are limited to 5,000  
Capabilities are not limited  
Manuals provided by download or CD  
Class in MI: will be announced  
Term: 01/01/09 – 12/31/09

Annual fee of US \$100.00  
Elements are limited to 10,000  
Manuals provided by download or CD  
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Continues to be available for anyone needing a limited version to practice, keep pace, learn new options.

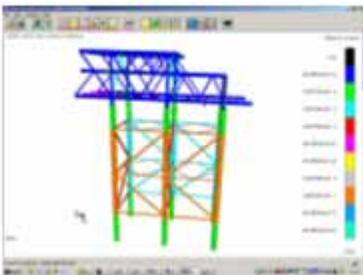
## ANSYS ASAS

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<http://www.ansys.com/products/asas.asp>

ASAS is an offshore structural finite element system with integrated modules to address the specific needs of offshore and marine engineers. It provides an integrated facility for performing structural assessment of most types of offshore/marine structures including jackets, jack-ups, concrete gravity-based platforms, risers, FPSOs, TLPs, semi-submersibles and, of course, ships.

Two packages are available. ANSYS ASAS provides a general purpose analysis capability with linear and nonlinear options including code checks for framed structures (i.e., joint checks and member checks). ANSYS ASAS Offshore extends ANSYS ASAS to include modules for wave loading, soil-pile-structure interaction and spectral fatigue due to wave, current and wind loading. Model creation can be performed via ANSYS® or with FEMGV®.



ANSYS ASAS is highly appreciated because of the following distinguishing capabilities, including:

- Coupled wave/current/wind-structure interaction with nonlinear structural response
- An integrated results database which can be accessed by MS-EXCEL® and Mathcad®
- Deterministic and spectral fatigue analysis capabilities (e.g., for jackets and flare towers) **Complete Offshore Capability**

ASAS provides comprehensive capability for offshore engineers. ASAS-OFFSHORE has been a leading system for jacket design for 30 years encompassing wave-loading, analysis, code checking, fatigue and coupled soil-pile-structure interaction. The ASAS solver has also been integrated with FEMGV to provide powerful finite element analysis facilities including modelling and post processing. Non-linear capability in ASAS(NL) also covers offshore and general FE capabilities.

### User Results Integrated Database (URSD)

In 2003 ASAS 14 was released. The main feature of this release was a common database across all modules which allow post-processors to access all results from ASAS(L) or ASAS(NL) and other post-processors. The database results are divided into four categories - Equation, Nodal, Element and Global - and are fully documented. An ASAS -Toolkit is supplied which enables user to write their own routines and extract the information for further processing.

### Direct access of ASAS results from MS-EXCEL® and Mathcad®.

When ASAS is installed additional functions are added enabling all the ASAS results to be accessed and retrieved from MS-EXCEL and Mathcad. Standard report templates can easily be created and re-used.

This facility provides a number of major benefits. Firstly it introduces a facility for the user to perform further post-processing using MS-EXCEL (including Visual Basic) and Mathcad. Secondly it provides a facility for a user to design his/her own report templates. Once designed, templates can be re-used thus saving considerable effort.

## **Coupled Wave Structure Interaction with Regular and Random Waves**

This additional feature is available in ASAS(NL) and includes the capabilities of the comprehensive wave loading program ASAS-WAVE. The significant difference is that full hydro-elastic coupling is introduced. This makes ASAS(NL) suitable for jack-ups, compliant structures, manifold installation and riser analysis.

Features include:

- Wave, current and wind load
- Regular and random waves (JONSWAP, Pierson-Moskowitz and user defined)
- Airy, Stokes 5th, Cnoidal, Stream Function and Shell New Wave plus user defined wave grid
- Tube and beam elements
- Flooded or sealed members
- Drag and inertia force
- Marine Growth
- Wave loading within the API code of practice including effects of current wave period, current stretching, current blockage factor and wave kinematics factor.
- Reynolds number effects.

## **ASAS-VISUALIZER**

The ASAS-VISUALIZER was introduced in 2003 as a replacement for the original graphical programs (PICASO, ASDIS and BEAMVIEW). It works in conjunction with the ASAS URSD and provides a highly intuitive and powerful graphical presentation capability. The GUI format is relatively common across other Century Dynamics products including AUTODYN and AutoReaGas.

Other features include:

- Display parts of a structure through sets - (directly from ASAS or user defined by list or via screen).
- Display of parts of a structure through groups, element type or material type.
- Display of beam sections
- Unity check values from a code check

- Highest unity check values across a set of load cases
- Beam offsets
- Display of point and distributed loads
- Contour plots
- Mode shapes
- Animations

## **Capacity and performance**

ASAS is often used to analyse very large structures such as ships and large concrete structures. Right from the beginning ASAS has been designed to cope with these demands. Firstly ASAS has multi level substructuring capability. This means a large structure can be broken into more manageable components. Advantage can be taken of symmetry and repeatability. ASAS can also 'stitch' together these components automatically when the model is assembled. Substructuring also permits model creation to be split across a number of engineers.

Most Finite element systems running under MS-Windows 32 bit operating systems are restricted in the size of models due to the 2.1GB addressability. Not ASAS. We have introduced a virtual addressing capability which permits very large single shot (or substructured) models whereby 64GB files can be addressed in ASAS(L) and 8GB in ASAS(NL). This capacity increase requires not changes whatsoever to the data.

## **Pressure and Motion Transfer from ANSYS AQWA**

As well as calculating pressure loads for fixed tubular structures via ASAS-WAVE it is also possible to transfer pressures and motions from an AQWA-LINE diffraction/radiation model directly to an ASAS model via AQWA-WAVE. Each combination of wave frequency, heading, height and phase becomes a quasi static load case. AQWA-WAVE is also capable of transferring wave loads for structures made up of both diffracting and tubular elements such as may occur in semi-submersibles or truss-spars.

Both the AQWA and ASAS models can be created by FEMGV and both can be different

meshes AQWA-WAVE automatically interpolating the correct pressures at the ASAS nodes. For those elements which cut the still water surface AQWA-WAVE will make appropriate corrections to the pressures.

### **Stiffened Panel Assessment**

Ships and offshore structures often generate large finite element models. As well as having many load cases the models usually involve idealisation and are performed in a linear domain. However as with framed structures the finite element analysis is only a partial solution. It is necessary to look deeper at the real structure and determine things like flange and panel buckling, spectral and deterministic fatigue and strength of individual characteristics. Both uni-directionally and orthogonally stiffened panels can be assessed.

PANEL-ENVELOPE is the interface between the PANEL-CHECK program and ASAS. Capabilities include:

- Selection of individual load cases from ASAS to be factored, selected, discarded, reversed or combined using an extensive set of logic instructions.
- Converts basics stress results to stress components (Ns, Np, Nsp, M, S)
- Forms envelopes of the maximum and minimum extreme values at selected locations.
- These envelopes can be used for strength and serviceability checks in:
- PANEL-CHECK which can be used stand-alone or interfaced to ASAS. Capabilities include:
- Ultimate limit state calculations to determine stability against buckling of various parts such as stiffener, stiffener outstands and the plate panel. Rules include DNV 301. (flat and curved), BS5400 and IDWR.
- Serviceability limit state calculations to determine the level of stress in each part of the structure and compares against acceptable limits.
- Stiffeners may be tees, angles, bulb flats or plat plates.

- Deterministic or spectral fatigue analysis.

### **Pre-Stressed Reinforced Concrete Assessment**

Analogous to stiffened panel assessment Century Dynamics also provide ASAS-CONCRETE for the assessment of pre-stressed reinforced concrete. The combination of ASAS and ASAS-CONCRETE provides a capability to perform a linear global analysis (ASAS) followed by a non-linear analysis (ASAS-CONCRETE) which uses a 'finite layer method' involving the material properties of concrete, tendons and reinforcements. Non-linearities are taken into account at a local level where the checks are to be performed. This approach greatly reduces the analysis complexity and facilitates the principle of superposition which means numerous load cases and combinations can be handled.

CONCRETE-ENVELOPE is the interface between the CONCRETE-CHECK program and ASAS. Capabilities include:

Selection of individual load cases from ASAS to be factored, selected, discarded, reversed or combined using an extensive set of logic instructions.

Converts basics stress results to stress components (Nx, Ny, Nxy, Mx, My, Mxy, Nxz, Nyz)

Forms envelopes of the maximum and minimum extreme values at selected locations.

These envelopes can be used for strength and serviceability checks in:

CONCRETE-CHECK which can be used stand-alone or interfaced to ASAS. Capabilities include:

Ultimate limit state calculations to determine stability against buckling of various parts such as stiffener, stiffener outstands and the plate panel. Rules include DNV 301. (flat and curved), BS5400 and IDWR.

Serviceability limit state calculations to determine the level of stress in each part of

the structure and compares against acceptable limits.

Stiffeners may be tees, angles, bulb flats or flat plates. Deterministic or spectral fatigue analysis. CONCRETE-PLOT is an interface program between CONCRETE-CHECK and FEMVIEW for presenting results in graphical form such as utilisation ratios.

## **SGI® Altix® Systems with Up to 8TB of Global Shared Memory Raise the Bar Again for HPC and Business Computing**

[http://www.sgi.com/company\\_info/newsroom/press\\_releases/2008/december/gsm.html](http://www.sgi.com/company_info/newsroom/press_releases/2008/december/gsm.html)

Silicon Graphics Technology Opens New Opportunities for Industrial and Research Customers

SUNNYVALE, Calif. (December 8, 2008) — Silicon Graphics, Inc. (SGI) (NASDAQ: SGIC) global shared memory architecture enables industrial, government and university researchers to gain insight into larger data sets than ever thought possible. With 8TB of global shared memory, SGI® Altix® systems are able to hold entire data sets in memory and eliminate many types of application and system I/O — accelerating scientific research and I/O bound business computing problems.

With up to 8TB of global shared memory with as few as 12 processor cores, SGI Altix 4700 systems are enabling applications for a number of important projects:

NASA's SGI Altix 4700 system, installed at the NASA Advanced Supercomputing facility at Ames Research Center at Moffett Field, Calif. in August 2007, was the first supercomputer to operate 2,048 processor cores and 4TB of memory under a single copy of the Linux® operating system - by processor count, the largest single system image (SSI) based upon the Linux operating system in the world.

At the Center for Information Services and High-Performance Computing at Technische Universität Dresden (TU Dresden), an SGI Altix 4700 system powered by 2,048 Intel® Itanium® processor cores and 6.5TB of main memory is enabling researchers throughout Germany to break through information processing barriers in a broad range of disciplines. For example, a team of German researchers is running complex simulations to determine how medical device makers might fuse biological materials with plastics

or ceramics to create the ideal hip replacement. TU Dresden's system has enabled over a 100 fold speedup in running complex simulations, with a large eddy simulation that used to take more than three months, completing overnight on the SGI Altix 4700 system.

The Institute for Molecular Science in Japan uses a 512-core SGI Altix 4700 system with 6TB shared memory and a 128-core SGI Altix 4700 with 2TB shared memory. Because of SGI's scalable architecture, both systems can be attached and create an 8TB global shared memory environment.

SGI Altix systems with 4TB to 8TB of memory are also being used to develop advanced reservoir simulation applications and models which can increase the fraction of discovered oil that can be recovered — extending their life by many years and increasing their value by billions of dollars.

"With 8TB of global shared memory on the SGI Altix 4700, scientists and engineers around the world are able to boost productivity by integrating theory, simulation and experimentation more closely than ever before," said Michael Brown, director of server and visualization marketing at Silicon Graphics. "With 8TB of global shared memory, scientists, engineers and businesses can solve problems that are 4x larger than on the largest systems from IBM and HP, and 8x larger than the largest systems available from Sun. This allows developers to link multi-disciplinary applications that operate on different scales to create more complete pictures of their work — gaining invaluable insights that lead to breakthrough results."

## **SGI® ALTIX® 4700**

<http://www.sgi.com/products/servers/altix/4000/>

### **Revolutionary Platform Delivers New Levels of Performance and Versatility in a Blade Design**

Revolutionary standards-based design delivers versatile performance for the most demanding HPC workloads and features new technology that will drive future HPC breakthroughs. SGI Altix 4700 features performance density, 'plug and solve' configurability and continues Altix systems' lead in price-performance for high end servers in a blade form factor.

Altix 4700 Advantages

### **Modular blade design for superior performance density and "plug and solve" configurability**

SGI Altix 4700 platform is comprised of modular blades - interchangeable compute, memory, I/O and special purpose blades for 'plug and solve' configuration flexibility. The innovative blade-to-NUMALink® architecture enables users to mix and match eight standardized blade choices, for perfect system right-sizing. The compact blade packaging of the Altix 4700 rack also provides excellent performance density.

### **Designed for future upgrade, expansion and integration of next-generation HPC technologies**

SGI Altix 4700 supports [Dual-Core Intel® Itanium® Processors](#) and offers easy upgrade or expansion of CPU, memory, I/O or visualization capabilities. This flexible growth path makes it possible for customers to adjust system configurations to meet current and changing requirements easily and cost-effectively; minimum risk for maximum productivity.

### **Scalable system size for simplified programming, low-cost administration**

### **and excellent sustained performance for cluster or shared memory applications**

SGI Altix 4700 incorporates the shared-memory NUMAflex® architecture, which simplifies software development, workload management and system administration. It supports up to 512 sockets or 1024 cores under one instance of Linux and as much as 128TB of [globally shared memory](#). Supporting these powerful capabilities is the [NUMALink®](#) interconnect, which leads the industry in bandwidth and latency for superior performance on cluster applications. The SGI Altix 4700 represents a versatile solution for shared or distributed memory applications of any scale.

### **Step into Multi-paradigm computing - taking HPC beyond the Limits of Moore's Law**

SGI Altix 4700 Platform also integrates SGI's Peer I/O technology which enables high-speed access to SGI's large shared memory for all system components. Through peer I/O, SGI Altix 4700 is the first SGI platform designed to support new computing paradigms, such as reconfigurable computing through SGI [RASC™](#) technology, that will take over where Moore's Law leaves off.

### **Standards-based platform and blade form factor reduces costs while delivering uncompromised performance on Linux**

Like its predecessors, the SGI Altix 4700 platform has been designed specifically for technical users based on industry standard CPU's, memory and I/O. This infrastructure is supported by a complete HPC solution stack running on industry standard [Linux®](#) operating systems with the choice of Novell® SUSE LINUX Enterprise Server 9 or Red Hat® Enterprise Linux® Advanced

Server 4 operating systems. [SGI® ProPack™](#) software provides the tools and enabling applications to optimize performance for Altix systems running SUSE LINUX OS. All of this is supplied and supported by SGI for one-stop [support](#).

## **D3 VIEW - Tracking Developments in LS-DYNA®**

<http://blog.d3view.com/>

d3VIEW is a web-based tool that extracts information from LS-DYNA generated "d3hsp" files and presents it in a concise, user-friendly format.

### **Background**

The tool was developed as a hobby project by Suri Bala to ease the review of user provided input and result files in a concise and efficient manner. Suri Bala works full-time at Livermore Software Technology Corporation.

**Among the information that can be found on the D3View is the page**

### **Documentation**

- Prony Series Document
- Contact Modeling in LS-DYNA
- TieBreak Contacts
- Dr. Benson Talk on the History of LS-DYNA
- Time Integration
- Deformable Spotwelds
  
- Deformability Switching PDF file
- Airbag, Edge2Edge and RigidBody Contact
- Airbag Leakage Modeling
  
- The best UNIX cheat sheet

## Introduction to LS-PrePost

LS-PrePost is an advanced pre and post-processor that is delivered free with LS-DYNA. The user interface is designed to be both efficient and intuitive. LS-PrePost runs on Windows, Linux, and Unix utilizing OpenGL graphics to achieve fast rendering and XY plotting. The latest builds can be downloaded from LSTC's FTP Site.

### Key Pre-Processing Features:

- \*Importing and combining multiple models
- \*Improved renumbering of model entities
- \*Model Manipulation
  - Translate, Rotate, Scale, Project,
  - Offset, Reflect
- \*LS-DYNA Entity Creation
  - Coordinate Systems, Sets, Parts,
  - Masses, CNRBs, Boxes, Spotwelds,
  - SPCs, Rigidwalls, Rivets, Initial Velocity,
  - Accelerometers, Cross Sections
- \*Special Applications
  - Airbag Folding, Dummy Positioning,
  - Seatbelt Fitting,
  - Initial Penetration Check, Spotweld
  - Generation using MAT\_100
- \*Mesh Generation
  - 2Dmesh Sketchboard, nLine Meshing,
  - Tet-Meshing,
  - Automatic surface meshing of IGES and
  - VDA data,
  - Meshing of simple geometric objects
  - (Plate, Sphere, Cylinder)

### December

- 08-Dec
  - Updated the Ident Interface to make use of
  - the General Selection panel
- 08-Dec
  - Updated the Blank Interface to make use of
  - the General Selection panel

### November

- 21-Nov
  - Added support for multiple integration points
  - per layer for \*ELEMENT\_SHELL
- 21-Nov
  - Added ability to display section force vectors
  - on a model while plotting *SECFORC* data
  - using the ASCII Interface (with *D3PLOT* files
  - loaded)
- 21-Nov
  - Added ability to write relative
  - \*BOUNDARY\_PRESCRIBED\_MOTION curves
  - using the Trace Interface while a Follow
  - point/plane is set

**LS-DYNA® Support Site: New Items & Updates –**  
<http://www.dynasupport.com>

At this site you will find answers to basic and advanced questions that might occur while using LS-DYNA.

**Additionally you can find Release Notes  
and various Tutorials**

**General**

Computational plasticity  
Contact Modeling in LS-DYNA  
Element Locking  
Getting started with LS-DYNA

LS-DYNA User's Guide

**LS-OPT**

LS-OPT introduction

# 7th European LS-DYNA® Conference

Uli Franz, DYNAmore

**The 7th European LS-DYNA® Conference, May 14-15**, will provide an ideal forum for LS-DYNA users from all over the world to share and discuss experiences, to obtain information on upcoming features of LS-DYNA, and to learn more about new application areas. The conference will be accompanied by an exhibition area featuring the latest software and hardware developments related to LS-DYNA.

It will take place at "one of the most beautiful regions on earth", as Alexander von Humboldt described Salzburg. The Old Town of Salzburg is a splendid example of baroque architecture and awarded by UNESCO as world heritage. Salzburg is also known as the birthplace of the famous composer Wolfgang Amadeus Mozart. Some may know Salzburg as the scenery of the film "The Sound of Music".

The conference venue is located in the old town of Salzburg. Salzburg can be reached easily via freeway, the high speed train ICE, and the international airports of Salzburg or Munich.

The Conference will be organized by DYNAmore with assistance from LSTC, Alyotech, Arup, and ERAB. We kindly encourage all users to present their work with LS-DYNA or LS-OPT at the conference.

## General information:

Included in the applications being covered are:

- Crash
- Occupant safety
- Metalforming
- Optimization
- Robustness
- Spotwelding, bonding
- Implicit
- Pedestrian safety
- Impact, drop test
- Plastics
- Composites
- Ballistics and penetration
- Fluid structure interaction, CFD
- CAE processes integration

## Accompanying Classes May 11-13<sup>th</sup>

Classes will be on various applications such as crash, optimization, metalforming, occupant safety and others. Information will be provided soon.

## Conference Paper Submission

Abstract Deadline: January 12, 2009

Acceptance: January 30, 2009

Final Paper: April 03, 2009

## Form to submit a paper:

## Pre Post Processing Software

### [Livermore Software Technology Corporation](#)

LS-PrePost is an advanced interactive program for preparing input data for LS-DYNA and processing the results from LS-DYNA analyses

### [Engineering Technology Associates, Inc](#)

FEMB Engineering Technology Associates' Finite Element Model Builder (FEMB) is a finite element pre- and post-processor for use with all major analysis codes and CAD Software.

### [Japanese Research Institute, Ltd](#)

JVISION is a general purpose pre-post processor for FEM software. Designed to prepare data for, as well as support, various types of analyses, and to facilitate the display of the subsequent results

### [Intelligent Light](#)

FieldView provides LS-DYNA users powerful post-processing to quickly identify important characteristics in large and complex data and allows interactive exploration to develop a thorough understanding. Examine and

compare cases, extract critical values, and make compelling presentations that make an impact.

### [Oasys, Ltd](#)

Oasys Primer is a model editor for preparation of LS-DYNA input decks.

Oasys D3Plot is a 3D visualization package for post-processing LS-DYNA analyses using OpenGL® (SGI) graphics.

### [BETA CAE Systems S.A.](#)

Provides complete CAE pre- and post-processing solutions. ANSA, the world wide standard pre-processor and full product modeler for LS-DYNA, with integrated Data Management and Task Automation. µETA, a thriving innovative software with special features for the high performance and effortless 3D & 2D post-processing of LS-DYNA results.

### [Simpleware](#)

Provides software solutions for robust, fast, and easy conversion of 3D images into high quality meshes which can be used for FEA, CFD, CAD, RP.

## Participant LS-DYNA® Resource Page (alpha order)

Fully QA'd by Livermore Software Technology Corporation

### SMP and MPP Hardware and OS

#### FUJITSU

FUJITSU Prime Power	SUN OS 5.8
FUJITSU VPP	Unix_System_V

#### HP

HP PA-8X00	HP-UX 11.11. and above
HP IA-64	HP-UX 11.22 and above
HP Opteron	Linux CP4000/XC
HP Alpha	True 64

#### INTEL

INTEL IA32	Linux, Windows
INTEL IA64	Linux
INTEL Xeon EMT64	Linux, Windows 64

#### NEC

NEX SX6	Super-UX
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#### SGI

SGI Mips	IRIX 6.5X
SGI IA64	SUSE 9 w/Propack 4 Red Hat w/ Propak 3

## Participant LS-DYNA® Resource Page (alpha order)

Fully QA'd by Livermore Software Technology Corporation

### MPP and Interconnect MPI

#### FUJITSU

	O/S	HPC Interconnect	MPI Software
FUJITSU Prime Power	SUN OS 5.8		
FUJITSU VPP	Unix_System_V		

#### HP

	O/S	HPC Interconnect	MPI Software
HP PA8000	HPUX		
HPIA64	HPUX		
HP Alpha	True 64		

#### INTEL

	O/S	HPC Interconnect	MPI Software
INTEL IA32	Linux, Windows	InfiniBand (Voltaire), MyriCom	LAM/MPI, MPICH, HP MPI, SCALI
INTEL IA64	Linux		LAM/MPI, MPICH, HP MPI
INTEL Xeon EMT 64	Linux	InfiniBand(Topspin, Voltaire), MyriCom, PathScale InfiniPath	LAM/NPI, MPICH, HP MPI, INTEL MPI, SCALI

#### NEC

	O/S	HPC Interconnect	MPI Software
NEX SX6	Super-UX		

#### SGI

SGI Mips	IRIX 6.5 X	NUMAlink	MPT
SGI IA 64	SUSE 9 w/Propack 4 RedHat w/Propack 3	Numalink, InfiniBand(Voltaire)	MPT, Intel MPI, MPICH

## **LS-DYNA® Resource Page - Participant Software**

Interfacing or Embedding LS-DYNA - Each software program can interface to all, or a very specific and limited segment of the other software program. The following list are software programs interfacing to, or have the LS-DYNA solver embedded within their product. For complete information on the software products visit the corporate website.

### **ANSYS - ANSYS/LS-DYNA ANSYS/LS-DYNA**

Built upon the successful ANSYS interface, ANSYS/LS-DYNA is an integrated pre and postprocessor for the worlds most respected explicit dynamics solver, LS-DYNA. The combination makes it possible to solve combined explicit/implicit simulations in a very efficient manner, as well as perform extensive coupled simulations in Robust Design by using mature structural, thermal, electromagnetic and CFD technologies.

### **AI \*Environment:**

A high end pre and post processor for LS-DYNA, AI\*Environment is a powerful tool for advanced modeling of complex structures found in automotive, aerospace, electronic and medical fields. Solid, Shell, Beam, Fluid and Electromagnetic meshing and mesh editing tools are included under a single interface, making AI\*Environment highly capable, yet easy to use for advanced modeling needs.

### **ETA – DYNAFORM**

Includes a complete CAD interface capable of importing, modeling and analyzing, any die design. Available for PC, LINUX and UNIX, DYNAFORM couples affordable software with today's high-end, low-cost hardware for a complete and affordable metal forming solution.

### **ETA – VPG**

Streamlined CAE software package provides an event-based simulation solution of nonlinear, dynamic problems. eta/VPG's single software package overcomes the

limitations of existing CAE analysis methods. It is designed to analyze the behavior of mechanical and structural systems as simple as linkages, and as complex as full vehicles.

### **MSC.Software - MSC.Dytran LS-DYNA**

Tightly-integrated solution that combines MSC.Dytran's advanced fluid-structure interaction capabilities with LS-DYNA's high-performance structural DMP within a common simulation environment. Innovative explicit nonlinear technology enables extreme, short-duration dynamic events to be simulated for a variety of industrial and commercial applications on UNIX, Linux, and Windows platforms.

### **MSC.Software - MSC.Nastran/SOL 700**

The MSC.Nastran™ Explicit Nonlinear product module (SOL 700) provides MSC.Nastran users the ability access the explicit nonlinear structural simulation capabilities of the MSC.Dytran LS-DYNA solver using the MSC.Nastran Bulk Data input format. This product module offers unprecedented capabilities to analyze a variety of problems involving short duration, highly dynamic events with severe geometric and material nonlinearities.

### **MSC.Nastran**

Explicit Nonlinear will allow users to work within one common modeling environment using the same Bulk Data interface. NVH, linear, and nonlinear models can be used for explicit applications such as crash, crush, and drop test simulations. This reduces the time required to build additional models for another analysis programs, lowers risk due to information transfer or translation issues, and eliminates the need for additional software training.

### **MSC.Software – Gateway for LS-DYNA**

Gateway for LS-DYNA provides you with the ability to access basic LS-DYNA simulation capabilities in a fully integrated and generative way. Accessed via a specific Crash workbench on the GPS workspace, the application enhances CATIA V5 to allow finite element analysis models to be output to LS-DYNA and then results to be displayed back in CATIA.

### **Oasys software for LS-DYNA**

Oasys software is custom-written for 100% compatibility with LS-DYNA. Oasys PRIMER offers model creation, editing and error removal, together with many specialist functions for rapid generation of error-free models. Oasys also offers post-processing software for in-depth analysis of results and automatic report generation.

### **Visual-CRASH For DYNA**

Visual-Crash for DYNA helps engineers perform crash and safety simulations in the smoothest and fastest possible way by offering an intuitive windows-based graphical interface with customizable toolbars and complete session support. Being integrated in ESI Group's Open VTOS, an open collaborative multi-disciplinary engineering framework, Visual-Crash for DYNA allows users to focus and rely on high quality digital models from start to finish. Leveraging this state of the art environment, Visual Viewer, visualization and plotting solution, helps analyze LS-DYNA results within a single user interface. Visual Viewer performs automated tasks and generates customized reports therefore increasing engineers productivity..

### **APTEK**

The MMCD is a graphics-based and menu-driven program that interfaces with the LS-DYNA library of material models and the LS-OPT optimization code. The core of the MMCD is the driver, which calculates the stress-strain behavior of material models driven by combinations of strain increments and stress boundary conditions, i.e. pure shear stress, and combinations of uniaxial, biaxial, and triaxial compression and tension. MMCD input and output is accessed via pre- and post-processors; graphical user interfaces (GUIs) for easily selecting the material model parameters and load histories, and for plotting the output in both two (stress-strain curves) and three (yield surfaces) dimensions. The pre-processor, driver, and post-processor are combined into a web downloadable software package that operates seamlessly as a single code.

### **BETA CAE Systems - ANSA**

Is an advanced multidisciplinary CAE pre-processing tool that provides all the necessary functionality for full-model build up, from CAD data to ready-to-run solver input file, in a single integrated environment. ANSA is a full product modeler for LS-DYNA, with integrated Data Management and Process Automation. ANSA can also be directly coupled with LS-OPT of LSTC to provide an integrated solution in the field of optimization.

### **BETA CAE Systems - $\mu$ ETA**

Is a multi-purpose post-processor meeting diverging needs from various CAE disciplines. It owes its success to its impressive performance, innovative features and capabilities of interaction between animations, plots, videos, reports and other objects. It offers extensive support and handling of LS-DYNA 2D and 3D results, including those compressed with SCAI's FEMZIP software.

## LS-DYNA® and Related Courses Feb. – April 2009

This is the first publication of this new area. Please check with the listed Company for accuracy of dates/courses. FEA Information participants are invited to post classes, for details contact Anthony [agiac99@aol.com](mailto:agiac99@aol.com)

<b>Courses are in Alpha Order</b>	<b>Country</b>	<b>Company</b>	<b>Date</b>
Ale/Eulerian & Fluid Structure Interaction	USA	LSTC	11-Feb
Contact Simulation	USA	LSTC	19-Mar
Contact Simulation	Germany	CADFEM	11-Mar
Introduction to LS-DYNA	USA	LSTC	3-Feb
Introduction to LS-DYNA	USA	LSTC	17-Mar
Introduction to LS-DYNA	Germany	DYNAmore	18-Mar
Introduction to LS-DYNA	Germany	DYNAmore	23-Apr
Introduction to LS-DYNA	Germany	CADFEM	18-Mar
Introduction to LS-DYNA	India	CADFEM India	26-Feb
Introduction to LS-DYNA	India	CADFEM India	28-Feb
Introduction to LS-DYNA	USA	ETA	10-Feb
Introduction to LS-DYNA	USA	ETA	26-Feb
Introduction to LS-DYNA	Sweden	ERAB	9-Mar
Introduction to LS-DYNA Explicit	France	AS+	17-Mar
Introduction to LS-DYNA Implicit	France	AS+	3-Feb
Introduction to LS-PrePost	USA	LSTC	2-Feb
Introduction to LS-PrePost	USA	LSTC	16-Mar
LS-DYNA SPH	France	AS+	1-Apr
Material Models	Germany	DYNAmore	17-Feb
Material Models	Germany	CADFEM	25-Mar

<b>Paul Du Bois LS-DYNA Courses</b>			
Blast & Penetration	USA	LSTC	1-Apr
Blast & Penetration	USA	ETA	23-Feb
Blast & Penetration	France	ALYOTECH	8-Oct
Crash Analysis	Germany	DYNAmore	11-May
Crash Analysis	Germany	DYNAmore	1-Dec
Crash Analysis	Germany	CADFEM	5-May
Crash Analysis	Germany	CADFEM	24-Nov
Crash Analysis	France	ALYOTECH	17-Mar
Crash Analysis	SWEDEN	ERAB	26-May

## **FEA Information Participants –** **Company name takes you directly to Website**

**OASYS Ltd:** Markets engineering software products. Consulting engineers, planners and project managers working in all areas of the built environment.

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**JRI Solutions Ltd.:** Specializing in Research & Consulting; System Consulting, Frontier Business, System Integration and Science Consulting.

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**HP:** Leading provider of high performance computing solutions for CAE, including workstations, servers, blades and storage..

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**ANSYS Inc.:** Develops, markets, supports and delivers collaborative analysis optimization software tools.

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**SGI:** Silicon Graphics, Inc., is a leader in high-performance computing, visualization, and storage.

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**MSC.Software:** Information technology software and services provider.. Products & services used to enhance & automate the product design/manufacturing process.

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**NEC:** A history of more than 100 years of leadership/innovation in the core high-technology sectors of communications, computers/electronic components

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**INTEL:** For more than three decades, Intel Corporation has developed technology enabling the computer and Internet revolution that has changed the world.

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**Engineering Technology Associates, Inc.:** Provides engineering & IT services & has created the streamlined simulation software packages DYNAFORM and VPG

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**ESI Group:** A software editor for the numerical simulation of prototype and manufacturing process engineering in applied mechanics.

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**BETA CAE Systems S.A.:** Specialized in the development of state of the art CAE pre- and post-processing software systems.

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**Participant page is continued on next page**

## **FEA Information Participants –** **Company name takes you directly to Website**

**APTEK**: Among the software developed APTEK develops and licenses an interactive program for driving LS-DYNA material models - the Mixed Mode Constitutive Driver (MMCD).

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**PANASAS**: High performing Parallel Storage for scalable Linux clusters. Delivering exceptional scaling in capacity and performance for High Performance Computing (HPC) organizations.

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**Intelligent Light**: A a world leader in the development and delivery of software for computational fluid dynamics (CFD) users. We help the world's best engineering and research organizations maximize the productivity and impact of their CFD capabilities

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**Voltaire**: Voltaire is a leading provider of scale-out computing fabrics for data centers, high performance computing and cloud environments. Voltaire's InfiniBand-based solutions help software applications run simulations and product-design analysis faster.

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## LS-DYNA® Software Distributors - Alphabetical order by Country

Australia	<a href="#"><u>Leading Engineering Analysis Providers</u></a>
Canada	<a href="#"><u>Metal Forming Analysis Corporation</u></a>
China	<a href="#"><u>Arup</u></a>
China	<a href="#"><u>ETA China</u></a>
France	<a href="#"><u>Alyotech</u></a>
France	<a href="#"><u>AS+</u></a>
Germany	<a href="#"><u>CAD-FEM</u></a>
Germany	<a href="#"><u>DYNAmore</u></a>
India	<a href="#"><u>Oasys, Ltd.</u></a>
India	Cranes Softwaree Ltd.
India	EASi Engineering
India	<a href="#"><u>CADFEM Engineering Services India</u></a>
Italy	<a href="#"><u>DynaMore</u></a>
Italy	<a href="#"><u>ENGINSOFT</u></a>
Japan	<a href="#"><u>The Japan Research Institute</u></a>
Japan	<a href="#"><u>ITOCHU Techno-Solutions Corporation</u></a>
Japan	<a href="#"><u>Fujitsu</u></a>
Korea	<a href="#"><u>Theme Engineering</u></a>
Netherlands	<a href="#"><u>Infinite Simulation Systems BV</u></a>
Russia	<a href="#"><u>State Unitary Enterprise - STRELA</u></a>
Sweden	<a href="#"><u>Engineering Research AB</u></a>
Taiwan	<a href="#"><u>Flotrend Corporation</u></a>
USA	<a href="#"><u>Engineering Technology Associates, Inc.</u></a>
USA	<a href="#"><u>Dynamax</u></a>
USA	<a href="#"><u>Livermore Software Technology Corp.</u></a>
UK	<a href="#"><u>ARUP</u></a>

## Consulting and Engineering Services

Australia	<u><a href="#">Leading Engineering Analysis Providers (LEAP)</a></u> Greg Horner info@leapaust.com.au 02 8966 7888
Canada	<u><a href="#">Metal Forming Analysis Corp. -</a></u> (613) 547-5395 Chris Galbraith galb@mfac.com
Canada	<u><a href="#">ROI Engineering Inc.</a></u> (416)249-1471
France	<u><a href="#">Alyotech</a></u> 33 (0)1 30 67 23 44 Nima Edjtemai nima.edjtemai@alyotech.fr
Netherlands	<u><a href="#">Infinite Simulation Systems BV</a></u> Jurgen Mathijssen j.mathijssen@infinite.nl
UK	<u><a href="#">ARUP</a></u> - 44 (0) 121 213 3317 Brian Walker brian.walker@arup.com
UK	<u><a href="#">GRM</a></u> +44 (0) 1926 889300 info@grm-consulting.co.uk
USA	KBEC L.C - (512) 363-2739 Khanh Bui kdbui@sbcglobal.net
USA	<u><a href="#">SE&amp;CS</a></u> - (707) 837-0559 Len Schwer len@schwer.net
USA	<u><a href="#">Engineering Technology Associates, Inc:</a></u> (248) 729-3010
USA	<u><a href="#">Predictive Engineering</a></u> - (1-800) 345-4671 George Laird george.laird@predictiveengineering.com
USA	<u><a href="#">Friedman Research Corporation</a></u> (805) 683-1300
USA	<u><a href="#">Structure Technology</a></u> (920).722.7060
USA	<u><a href="#">CAE Associates, Inc</a></u> (203) 758-2914

**Educational & Contributing Participants**  
**Alphabetical Order By Country**

China	Dr. Qing Zhou	Tsinghua University
India	Dr. Anindya Deb	Indian Institute of Science
Italy	Professor Gennaro Monacelli	Prode – Elasis & Univ. of Napoli, Federico II
Russia	Dr. Alexey I. Borovkov	St. Petersburg State Tech. University
USA	Dr. Ted Belytschko	Northwestern University
USA	Dr. David Benson	University of California – San Diego
USA	Dr. Bhavin V. Mehta	Ohio University
USA	Dr. Taylan Altan	The Ohio State U – ERC/NSM
USA	Dr. Ala Tabiei	University of Cincinnati
USA	Prof. John D. Reid	University of Nebraska
USA	Professor Thomas Vasko	Connecticut State University

## Informational Websites

The LSTC LS-DYNA Support site: [www.dynasupport.com](http://www.dynasupport.com)

<a href="#">LS-DYNA Support Site</a>	<a href="#">FEA Informationwebsites</a>
<a href="#">LS-DYNA Examples</a> (more than 100 Examples)	<a href="#">LS-DYNA Conference Site</a>
<a href="#">TopCrunch</a> – Benchmarks	<a href="#">LS-DYNA Publications</a> to Download On Line
<a href="#">LS-DYNA Publications</a>	<a href="#">LSTC LS-PrePost Tutorials</a>
<a href="#">CADFEM GmbH Portal</a>	<a href="#">LS-OPT Support Site</a>
<a href="#">LS-DYNA Distributors</a>	<a href="#">LS-DYNA Consulting</a>

# American Society for Engineering Education ASEE Spring 2009 Northeast Conference University of Bridgeport April 3-4, 2009 <http://www.asee2009conference.org>

## CONFERENCE OVERVIEW

The Spring 2009 Northeast ASEE Conference will be held on April 3-4, 2009 at the University of Bridgeport, Bridgeport, Connecticut, U.S.A. This year's conference theme is: Engineering in the New Global Economy.

In the coming years, our world will continue to face economical, environmental and energy related problems. How is Engineering and Engineering Technology Education responding to the needs of our society and the world? This will be the theme for an exhilarating and thought provoking weekend of professional workshops, presentations, and discussions at the University of Bridgeport.

The ASEE Northeast Section is soliciting faculty papers, student papers and student posters which address the various challenges and paradigms in this technological world through research and instructional programs in Engineering and Engineering Technology education. There are three conference tracks:

1. Regular/ faculty papers
2. Student papers and
3. Student posters

The deadline for abstract submission is February 27th, 2009. Prospective authors are invited to submit their abstracts online in Microsoft Word or Adobe PDF format through the conference website at <http://www.asee2009conference.org>

Suggested conference topics are listed below. Other innovations in course and laboratory experiences and assessments are also most welcome for submission:

- Chemical and Biological Engineering
- Civil & Environmental Engineering
- Electrical & Computer Engineering
- Engineering Technology/ Community Colleges
- Industrial, Automation and Manufacturing Engineering

- Engineering Technology and Community Colleges
- Innovations In Engineering Education
- First Year Experiences
- K-12 Education (Engineering Curriculum Integration)
- Mechanical Engineering
- Computer Science and Information Technology
- Women in Engineering and Computer Science
- Robotics
- Service Learning
- Sustainability
- Design Projects
- Engineering and Technology in the Liberal Arts
- Systems Engineering
- Globalization
- Ethics
- Diversity In Engineering
- Multidisciplinary Research

### Paper and other Proposal Submissions

Prospective authors are invited to submit their abstracts online in Microsoft Word or Adobe PDF format through the website of the conference at

<http://www.asee2009conference.org>.

Proposals for special sessions, tutorials, workshops and exhibitions are also welcome. Please check the conference website regarding instructions for these proposal submissions.

### Important Dates

Abstracts due

27th February, 2009

Acceptance notification

6th March, 2009

Final manuscript & Registration due

20th March, 2009

**Sarosh Patel**

[e-mail:info@asee2009conference.org](mailto:info@asee2009conference.org)

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## "3rd ANSA & μETA International Conference"

This is an excerpt: For full conference information visit:

[http://www.beta-cae.gr/3rd\\_conference\\_announcement.htm](http://www.beta-cae.gr/3rd_conference_announcement.htm)

Being consistent to our biannual appointment and celebrating the 10 years since the establishment of **BETA CAE Systems S.A.**, it is our pleasure to invite you to participate in the "**3rd ANSA & μETA International Conference**" to be held on September 9-11, 2009, in Porto Carras Grand Resort Hotel, Halkidiki, Greece.

The principal aims of this event are to bring the CAE Community together with **BETA CAE Systems S.A.** and to promote an international exchange of the latest concepts, knowledge and development requirements on our flagship software products, **ANSA & μETA**. Technical papers will be presented outlining the latest advances in CAE strategy, methodology, techniques and applications related to our products.

Participants will have the chance to be informed about the latest software trends, demonstrate their concepts and achievements and present new development requirements.

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...The conference will be of interest to decision makers, strategy & methodology planners, simulation experts, applications users and researchers at the forefront of the CAE simulation for various disciplines, coming from OEMs and suppliers from a wide spectrum of industrial sectors, specially from, but not limited to, the:

- automotive,
- motorsports,
- railway,
- aerospace,
- shipbuilding/offshore,
- electronics,
- energy,
- heavy machinery,
- medical/biomechanics,
- chemical processes and

- academic
- power tools,

A wide range of topics on various simulation application fields and disciplines will be covered, including:

- CAE strategy & process planning,
- Process automation,
- Product & Simulation Data Management (PDM / SDM),
- Durability,
- Crash & Rollover,
- Occupant & Pedestrian Safety,
- Dynamics,
- Noise, Vibration & Harshness,
- Computational Fluid Dynamics (CFD),
- Optimization,
- Composite materials modeling,
- Climate control,
- Engine technology,
- Heat transfer,
- Simulation results assessment, etc

Papers are invited on the outlined topics and others falling within the scope of the event.

Abstracts of approximately 250 words should be submitted for consideration by February 28, 2009. Abstracts should clearly state the purpose, results and conclusions of the work to be described in the final paper. The authors' name, organization, address, phone & fax numbers and email should be also clearly marked. The identification of the presenter among more than one authors should be also appreciated. Submission will be made electronically, by email. The language of the conference will be English. email: [congress@beta-cae.gr](mailto:congress@beta-cae.gr)

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**UPDATE** Speakers will receive free accommodation for the duration of the event, courtesy of BETA CAE Systems

S.A. Further information and instructions will be provided to those who respond to this call.

In order to keep a low overall budget for the participants, there is no participation fee.

Nevertheless, your registration is essential for the organization of the event.

Registration includes coffee breaks, dinner on September 8th, and meals on September 9th, 10th and 11th, 2009.

Return the registration form by fax or email no later than June 30, 2009, to:

**BETA CAE Systems S.A.**

fax: +30-2392-021828

email: [congress@beta-cae.gr](mailto:congress@beta-cae.gr)

Mrs. Photini Paraskevopoulou

**BETA CAE Systems S.A.**

tel: +30-2392-021914

fax: +30-2392-021828

email: [congress@beta-cae.gr](mailto:congress@beta-cae.gr)

Abstracts submission:

**February 28, 2009**

Acceptance notification:

**March 14, 2009**

Final manuscripts submission:

**June 20, 2009**

Registration until: **June 30, 2009**

Event: **September 9 - 11, 2009**

## 2nd Call for Papers

### 7<sup>th</sup> EUROPEAN LS-DYNA<sup>®</sup> CONFERENCE

14th - 15th May 2009, Salzburg, Austria



The 7<sup>th</sup> European LS-DYNA Users Conference will provide an ideal forum for LS-DYNA users from all over the world to share and discuss their experiences, to obtain information on upcoming features of LS-DYNA and to learn more about new application areas. The conference will be accompanied by an exhibition featuring the latest software and hardware developments related to LS-DYNA.

It will take place at "one of the most beautiful regions on earth", as Alexander von Humboldt described Salzburg. The Old Town of Salzburg is a splendid example of baroque architecture and is awarded as UNESCO world heritage. Salzburg is also known as the birthplace of the famous composer Wolfgang Amadeus Mozart. The conference venue is located in the centre of Salzburg. Salzburg can be reached easily via freeway, the high speed train ICE, and the international airports of Salzburg or Munich.

We kindly encourage all users to contribute by submitting a paper. For registration please use the registration form attached.

**The following keynote speakers have already confirmed their presentations:**

#### **Aircraft Industry**

Blade Retention and Bird Impact  
M. Nucci (Snecma, F)

#### **Automotive Industry**

Multi-Disciplinary Optimization – Crash, NVH ...  
Dr. T. Zeguer (Jaguar Cars Limited, UK)  
Material Modeling for Crash  
P. du Bois (Consultant, D)

#### **Impact Applications**

High Speed Impact - Test and Simulation  
Prof. S. Hiermaier (Fraunhofer Institut EMI, D)

## **Metal Forming**

Trends and Developments

Dr. W. Volk (BMW AG, D)

Deep Drawing Processes

Prof. J. Danckert (University Aalborg, DK)

## **Railway Industry**

Crashworthiness of Trains

Dr. M. Seitzberger (Siemens AG, A)

## **Research**

Modeling of Wood

Prof. J. Eberhardsteiner (TU Wien, A)

## **Validation & Verification**

Model Calibration with Experiments

Prof. M. Langseth (NTNU Trondheim, NO)

## **Development of LS-DYNA**

General Developments

Dr. J. Hallquist (LSTC, USA)

Material Models

Dr. B. Feng (LSTC, USA)

## **Development of LS-OPT**

Dr. N. Stander (LSTC, USA)

The Conference will be organized by DYNAmore with assistance from Alyotech, Arup, ERAB, and LSTC. The organizers are looking forward welcoming you in the beautiful city of Salzburg, Austria.

## **Call for Papers**

With your contribution either from industry or academia on applications on LS-DYNA and LS-OPT, we will achieve a successful User Conference in Salzburg.

## **The topics of your paper may cover the following applications:**

- Crashworthiness
- Occupant safety
- Metalforming
- Optimization
- Robustness
- Spotwelding, bonding
- Implicit
- Pedestrian safety
- Impact, drop test
- Plastics
- Composites
- Ballistics and penetration
- Fluid structure interaction, CFD
- CAE process integration

## **From the industry sectors**

- Automotive
- Aerospace
- Mechanical engineering
- Ship building / offshore
- Transportation
- Biomechanics
- Civil engineering
- Packaging industry

## **Conference Paper Submission**

Please submit your paper by sending a short abstract to:

[cf09@dynamore.de](mailto:cf09@dynamore.de).

## **Abstract deadline:**

06th February 2009

## **Acceptance notification:**

20th February 2009

## **Final paper deadline:**

03rd April 2009

## **Conference language:**

English

## Conference Venue

Salzburg Congress  
Auerspergstraße 6  
5020 Salzburg, Austria

<http://www.salzburgcongress.at>

Some seminars and meetings will be held at the Hotel Bavaria, Bad Reichenhall, Germany.

## Preliminary Conference Schedule

Wednesday, 13th May, 2009  
06:00 pm Registration (- 9:00 pm)  
06:00 pm Welcome Reception  
Thursday, 14th May, 2009  
08:00 am Registration  
09:00 am Technical Papers  
(- 6:00 pm)  
08:00 pm Conference Gala Dinner  
Friday, 15th May, 2009  
08:30 am Technical Papers  
04:00 pm End of Conference

## Exhibition / Sponsoring

If you would like to participate as an exhibitor or sponsor please ask for further information.

## Registration Fees

Industry: 560,- Euro / 510,- Euro\*  
Academic: 390,- Euro / 350,- Euro\*  
\* Early booking before 1st February 2009  
+ VAT if applicable

## Accommodation

Conference registrants can reserve a discounted room rate in hotels in Salzburg by using the congress [www.dynamore.de/conference](http://www.dynamore.de/conference)

accommodation booking service which is accessible through

[www.dynamore.de/conference](http://www.dynamore.de/conference)

## Travel Information

By air: International Airports Salzburg or Munich

By train: ICE train station Salzburg

## Outings

Optional partner program

Thursday, 14th May, 2009

- Salzburg city sightseeing
- "Fiaker" - sightseeing by horse cab
- Guided Salzburg Festival Halls tour

Friday, 15th May, 2009

- Salzburg city sightseeing
- "Fiaker" - sightseeing by horse cab
- The „Sound of Music“ dinner show
- The Mozart dinner concert
- Optional post-conference program

Saturday, 16th May, 2009

- "Sound of Music" tour
- Guided Salzburg city sightseeing tour

## Registration and Contact

DYNAMore GmbH  
Industriestr. 2  
D-70565 Stuttgart, Germany  
Tel. +49 (0) 7 11 - 45 96 00 - 0  
Fax +49 (0) 7 11 - 45 96 00 - 29  
E-mail: [cf09@dynamore.de](mailto:cf09@dynamore.de)

Additional Information

## Pre- and Post-Conference Seminars at the 7<sup>th</sup> EUROPEAN LS-DYNA CONFERENCE

14th - 15th May 2009, Salzburg, Austria

### Crashworthiness Simulation using LS-DYNA

This is an advanced course and applies to engineers which have experience in application of explicit programs or which bring along experience from the field of dynamic and nonlinear calculation with implicit programs. The aim of the course is to show how to perform a crashworthiness simulation in the automobile industry using LS-DYNA.

11th - 13th May 2009, 1.450.- Euro  
Lecturer: P. Du Bois (Consultant)

### Implicit Analyses using LS-DYNA

The seminar is designed for engineers intending to use LS-DYNA to carry out implicit analysis. Also, experienced 'explicit' users have the opportunity to learn more about the key issues to bear in mind when converting an explicit to an implicit input file.

12th - 13th May 2009, 980.- Euro  
Lecturer: Prof. Dr. M. Pitzer (University of Applied Sciences Gießen-Friedberg)

### Optimization with LS-OPT

The seminar gives an introduction to the optimization program LS-OPT and shows its possibilities and limits. LS-OPT is a powerful optimization software particularly suitable for highly nonlinear problems. LS-OPT is primarily intended to be used for general design optimization, shape optimization, parameter identification, DOE-studies and robustness or reliability analysis.

11th - 13th May 2009, 1.450.- Euro  
Lecturer: Dr. N. Stander (LSTC)

### Meshless Methods in LS-DYNA

This seminar will introduce attendees to the application of the meshless "Element-Free Galerkin" (EFG) and "Smooth Particle Hydrodynamics" (SPH) methods in LS-DYNA. The seminar will outline the theoretical bases and thoroughly refers to the settings required in the LS-DYNA input deck in order to carry out an EFG/SPH simulation.

12th - 13th May 2009, 980.- Euro  
(490,- Euro per day, can be booked separately)

Lecturers:

Dr. C.-T. Wu – EFG (LSTC),  
Dr. J. L. Lacome - SPH (Impetus-Afea)

### User Interfaces in LS-DYNA

This seminar is designed for users in both industrial and academic research who intend to integrate their own routines in LS-DYNA and to share their implementation experience with a larger audience.

11th May 2009, 490.- Euro  
Lecturer: Dr. T. Erhart (DYNAmore)

### Modeling of Geomaterials with LS-DYNA 1)

The course starts from the common ground of introductory metal plasticity modeling and successively builds on this base adding the constitutive modeling features necessary to model geomaterials.

12th - 13th May 2009, 980.- Euro  
Lecturer: Dr. L. Schwer (Schwer Engineering & Consulting Services)

### **PRIMER as a Preprocessor for LS-DYNA**

In this seminar the practical use of PRIMER is arranged for the participant. All important functions are described and demonstrated in the context of a Workshops. On the basis of many training examples the participant learns the safe operation for different areas of application.

12th - 13th May 2009, 980.- Euro  
Lecturer: R. Sturt (Arup)

### **Enhanced Possibilities and Special Settings for Metalforming Simulation in LS-DYNA**

This seminar conveys the basics of the simulation of metalforming processes with LS-DYNA and provides information and hints for the application. Thereby it is particularly focused on the specific settings and features for the forming processes in LS-DYNA.

11th - 12th May 2009, 980.- Euro  
Lecturer: Dr. A. Haufe (DYNAmore)

### **Metalforming Simulations with eta/DYNAFORM**

The seminar offers an introduction to the simulation of metal forming processes with LS-DYNA. As preprocessor eta/dynaform is presented. The seminar introduces the different procedures to set up simulations for deep drawing. It covers one and multi step operations and presents the various options to post-process a results.

13th May 2009, 490.- Euro  
Lecturer: P. Vogel (DYNAmore)

### **LS-DYNA Modeling of Blast & Penetration**

This training class is intended for the LS-DYNA analysts possessing a comfortable command of the LS-DYNA keywords and options associated with typical

Lagrangian analyses. This training class will attempt to provide the analyst with the additional tools and knowledge required to model the class of high energy events.

18th - 19th May 2009, 980.- Euro  
Lecturer: Dr. L. Schwer (Schwer Engineering & Consulting Services)

### **Structural Optimization with GENESIS 1)**

This seminar provides an introduction to the GENESIS software and the Design Studio for GENESIS graphical user interface. The individual concepts for optimization (topology, topometry, topography, sizing and shape) and fields of application will be outlined and discussed.

18th - 19th May 2009, 980.- Euro  
Lecturer: Dr. M. Liebscher (DYNAmore)

### **Seminar Information**

Venue: Salzburg, Austria;  
1) Bad Reichenhall, Germany  
Language: English

### **Reduced conference fees for seminar attendees:**

Per pre-/post-conference seminar day a discount of 50.- Euro on the registration fee for the European LS-DYNA conference in Salzburg is granted.

### **More information:**

<http://www.dynamore.de/conference>

### **Registration and Contact**

DYNAmore GmbH  
Industriestr. 2  
D-70565 Stuttgart, Germany  
Tel. +49 (0) 7 11 - 45 96 00 - 0  
Fax +49 (0) 7 11 - 45 96 00 - 29  
E-mail: [cf09@dynamore.de](mailto:cf09@dynamore.de)

### **Additional Information**

<http://www.dynamore.de/conference>

## World Wide Conferences & Events

04/03-04  
USA [American Society for Engineering Education ASEE Spring 2009 Northeast Conference](#)

04/21-22  
USA [MSC.Software 2009 Virtual Product Development Conference](#)

05/12-13  
Germany [MSC.Software 2009 Virtual Product Development Conference](#)

05/14-15  
Austria [7th European LS-DYNA Conference](#)

05/24-27  
Korea [Computational Technologies in the research of Concrete and Reinforced Concrete Structures](#)

05/25-27  
Greece [5th Int'l Conference on Fluid Structure Interaction](#)

06/8-10  
Portugal [11<sup>th</sup> International Conference on Optimum Design of Structures and Materials Engineering](#)

06/15-17  
Sweden [2nd International Conference on Hot Sheet Metal Forming Of High-Performance Steel](#)

06/16-19  
Greece [NAFEMS World Congress](#)

06/23-24  
USA [PLM Summit North America 2008](#)

07/16-19  
USA [10<sup>th</sup> US National Congress on Computational Mechanics](#)

09/09-11  
Greece [3rd ANSA &  \$\mu\$ ETA Int'l Conf](#)

11/14/-20  
USA [SC2009](#)

2010: June 8-10<sup>th</sup> - Hosted by Livermore Software Technology Corporation  
USA           The 10<sup>th</sup> International LS-DYNA<sup>®</sup> Users Conference  
                  The Hyatt Regency, Dearborn, MI