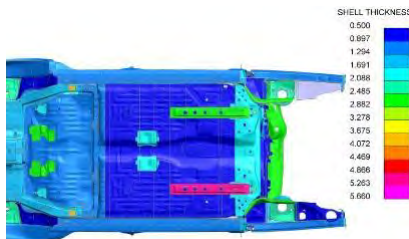**BETA CAE**

Rescale

Oasys

DYNAmore

LS-DYNA® Electromagnetics (EM) Coupled EM, Mechanical, Thermal, CFD Simulations

LS-DYNA New Features
- **Two material model updates relating to temperature-dependent behaviors**
- **Dynamic Load Balancing Algorithm for CPM in LS-DYNA**
- **Cardiac electrophysiology using LS-DYNA**

New website: Computational and Multi-scale Group: https://www.lstc-cmmg.org/

FEA Information Engineering Solutions

www.feapublications.com

The focus is engineering technical solutions/information.

FEA Information China Engineering Solutions

www.feainformation.com.cn

Simplified and Traditional Chinese

The focus is engineering technical solutions/information.

LSTC - Livermore Software Technology Corp.

Development of LS-DYNA, LS-PrePost, LS-OPT,
LS-TaSC (Topology), and LSTC's Dummy &
Barrier models for use in various industries.

www.lstc.com

Monthly FEA Information Engineering Solutions Magazine:

English Language, no fee, emailed.
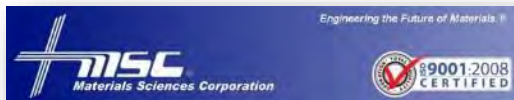Sign up, send email - subject "subscribe"
No longer wish to receive - subject "Remove"

Editor and Contact: Yanhua Zhao - yanhua@feainformation.com

Noi Sims – noi@feainformation.com

If you have any questions, suggestions or recommended changes, please contact to us.

BETA SIMULATION SOLUTIONS

DYNAMORE

eta

ESI get it right®

JSOL

恒士达科技 Hengstar Tech.

MSC Materials Sciences Corporation — Engineering the Future of Materials — ISO 9001:2008 CERTIFIED

Oasys The Software House of Arup

FINITE ELEMENT ANALYSIS Predictive Engineering

rescale

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BETA CAE Systems announces the release of the v19.0.0 of its software suite

BETA CAE Systems version 19.0.0 is officially here to elevate your CAE experience further by empowering you with the most effective software and efficient workflows. As ever, BETA CAE Systems continues to build on highly acclaimed reputation, never losing sight of our ongoing commitment to the global CAE Community and its needs. The new release of v19.0.0 goes long beyond customers' demands, by implementing a plethora of new tools and features, while continuously augmenting software quality and performance. Read more...

Course: **Progressive Composite Damage Modeling in LS-DYNA (MAT162 & Others**)
  Offered: in-house and as a web conference.
  Information: www.ccm.udel.edu/software/mat162_workshop
  Dates: Tues., **Nov.**13, 2018 | 9am-5pm
  Phone: (302) 690-4741 **| Email:** bzhaque@udel.edu

LSTC announces Workshop: Meshfree Method and Computational Mechanics

April 1-2, 2019 Livermore, CA, 94550
Hosted by Livermore Software Technology Corp.(LSTC)

This workshop will focus on recent work by a number of distinguished researchers in Meshfree Method and Computational Mechanics. It is also an opportunity to recognize Professor J.S. Chen's contribution in Computational Mechanics. Read more…

More information, please see website: https://www.lstc-cmmg.org

ESI Group Joins the United Nations Global Compact

ESI Group, leading innovator in Virtual Prototyping software and services, announces today its membership in the United Nations (UN) Global Compact.

More information, please see website: https://www.lstc-cmmg.org

Developing CAE software systems for all simulation disciplines. Products: ANSA pre-processor/ EPILYSIS solver and META post-processor suite, and SPDRM, the simulation-process-data-and-resources manager, for a range of industries, incl. the automotive, railway vehicles, aerospace, motorsports, chemical processes engineering, energy, electronics…

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Virtual Reality, already introduced in prior versions, is proven to be the absolute boost to the intercontinental co-operation in the CAE community. Today, META v19.0.0 comes up with new features in this field, such as the audio support, expanding, in this way, web collaboration capabilities towards a more progressive level.

Definitely, modularization in product development is an approach that brought significant benefits in all stages, from design to production, and even further to maintenance. ANSA v19.0.0 augments Modular Assembly potential, introducing the notion of the Connecting Subsystems, facilitating assembling strategies even more.

Besides, addressing the need of an efficient model management in NVH analysis, coupled with the reduced representation concept, definitely a prerequisite in this field, the new functionality of modular model build based on reduced representations is introduced for the creation and management of reduced representations of subsystems, directly through Model Browser. In this way, bottlenecks, such as the modal model components handling, and constraints, such as the interaction with full FE components, are successfully addressed.

From concept design to final testing, model optimization has been a necessity that undergoes any typical CAE workflow process. The set-up, run and inspection of DOE real-time results has never been more effortless with the brand new Optimization tool, automating tasks, significantly accelerating the simulation process and minimizing cost and time to market.

Closing, apart from the outstanding performance enhancements in EPILYSIS and RETOMO, these two software products have stimulated their supported capabilities and features, impressively accelerating the solution build-up workflow.

SOL200 Multidisciplinary Optimization, SOL110 Modal Complex Eigenvalue Analysis, as well as Superelement Analysis are some of the implementations that stand out in EPILYSIS, whereas the introduction of Manual Editing tools in RETOMO undoubtedly elevates the whole process, since the Automatic Segmentation result can be manually edited, incrementing in this way accuracy and upgrading the final result.

[Read more some key points about the new tools and the noticable software features of this version.](#)

d3VIEW is a data to decision platform that provides out-of-the box data extraction, transformation and interactive visualizations. Using d3VIEW, you can visualize, mine and analyze the data quickly to enable faster and better decisions.

d3VIEW is a data to decision platform that provides out-of-the box data extraction, transformation and interactive visualizations.

Using d3VIEW, you can visualize, mine and analyze the data quickly to enable faster and better decisions.

Overview - d3View can integrate with any High Performance Computing (HPC) systems to submit and track jobs, perform complex data transformations using a rich library of templates that can help turn data to information, help visualize thousands of data using rich powerful visualizations, export to reports to share and collaborate.

HPC Interactions - Using the HPC application, you can submit and track simulation or non-simulation jobs that require compute resources…

Visualize your Data - View your data using extensive library of visualizations to understand your information and to help you make decisions quickly….

Introducing Peacock beta - View your 3D data using our native Multi-threaded GPU-Powered Visualizer….

Track Key Performance Targets and Indexes
Define and track key performance targets across simulations and tests to help you identify your design performance…

Design of Experiments (DOE) Data Visualizer - Viewing data from your DOE runs can be challenging when running simulations on the cloud or on-premise HPC system..

Experimental Data - d3VIEW's data to decision framework supports storing, organizing and visualization of experimental data…

Author: Christian Frech christian.frech@dynamore.de

LS-DYNA Forum 2018 – register now!
DYNAmore France - new address

Register now for the German LS-DYNA Forum

From 15-17 October 2018 the 15th German LS-DYNA Forum will take place in Bamberg. With renowned keynote-speakers from industry and academia, more than 100 presentations and several workshops on various topics the conference is an ideal opportunity to exchange knowledge and discuss new solution approaches with other users. As always, many accompanying seminars will be offered after the conference. Register now and take the change to talk with industry experts and learn more about the software and its applications.

Exhibiting and sponsoring

In the accompanying exhibition, numerous hardware and software manufacturers offer an insight into the latest news and trends around LS-DYNA. If you want to contribute, please request additional exhibitor and sponsoring information.

Participant fees

Industry speaker: 380   Euro
Academic speaker: 280   Euro
Industry: 600   Euro
Academic: 430 Euro

Venue

Welcome Kongresshotel Bamberg
Mußstraße 7, 96047 Bamberg, Germany
www.welcome-hotels.com/welcome-kongresshotel-bamberg

DYNAmore France – new address in Versailles

DYNAmore France is pleased to announce that a new office location in Versailles has been found.
From now on you will find DYNAmore France at the following address:

DYNAmore France SAS
21 av. de Paris
78000 Versailles

The new location in the heart of Versailles offers ideal conditions for further growth and to expand and improve the services for our customers.
"At the moment, five experienced engineers are taking care of customers' needs in Versailles. But of course the offices have been chosen so that we can continue to grow and recruit new, qualified people", says Nima Edjtemai, Commercial Manager of DYNAmore France.

In addition to offices, there is also a seminar room in the building, where DYNAmore's wide range of seminars will be held.

For more information please contact our office in Versailles or our headquarters in Stuttgart.

Contact

DYNAmore GmbH
Industriestr. 2
D-70565 Stuttgart, Germany
Tel.+49 (0) 7 11 - 45 96 00 - 0
E-Mail: forum@dynamore.de
www.dynamore.de/forum2018-e

A leading innovator in Virtual Prototyping software and services. Specialist in material physics, ESI has developed a unique proficiency in helping industrial manufacturers replace physical prototypes by virtual prototypes, allowing them to virtually manufacture, assemble, test and pre-certify their future products.

ESI Group Joins the United Nations Global Compact

ESI Group, leading innovator in Virtual Prototyping software and services, announces today its membership in the United Nations (UN) Global Compact.

As a signatory of the UN Global Compact and in line with its Corporate Social Responsibility (CSR) approach, ESI Group undertakes to respect the 10 principles of the United Nations in the areas of human rights, labor, environment and anti-corruption. The Group commits to yearly communicate its progress to its stakeholders through the release of a Communication on Progress (COP).

Through the implementation of its values, ESI has distinguished itself for the past three years within the Gaïa Index for its continuous commitment toward a CSR approach, structured around four priorities:

Being a committed employer;

Being an outstanding partner for its customers, by offering innovative and sustainable solutions;

Being an environmentally friendly player;

Serving civil society.

Through its Virtual Prototyping solutions, the Group supports its customers in their industrial and operational challenges, while helping them achieve their sustainable development objectives by offering solutions that enable them to develop more environmentally friendly products. In addition, these products are launched on the market with increased safety for end consumers. ESI's virtual reality solution IC.IDO, when applied to the manufacturing sector, enables the improvement of operators' working conditions by making working environments more ergonomic.

Alain de Rouvray, Chairman and Chief Executive Officer of ESI Group, comments: "Our membership of the United Nations Global Compact is a further step in our commitment to social, societal and environmental responsibility. It demonstrates our strong beliefs and our will to act in these areas. While the 10 principles of the United Nations are already included in the Group's development strategy, we commit ourselves to amplifying our action so that these principles are disseminated and adopted more widely".

Launched in 2000, the United Nations Global Compact gathers companies and organizations of all size, as well as civil society players, around 10 universally recognized principles that are essential for the establishment of more sustainable and inclusive societies.

Read Full Pages….

ETA has impacted the design and development of numerous products - autos, trains, aircraft, household appliances, and consumer electronics. By enabling engineers to simulate the behavior of these products during manufacture or during their use, ETA has been involved in making these products safer, more durable, lighter weight, and less expensive to develop.

PreSys

PreSys is an engineering simulation solution for the development of finite element analysis models. It offers an intuitive user interface with many streamlined functions, allowing fewer operation steps with a minimum amount of data entry along the way. Using PreSys, the user can analyze product designs, view simulation results and analyze/predict how the product will perform in a given circumstance.
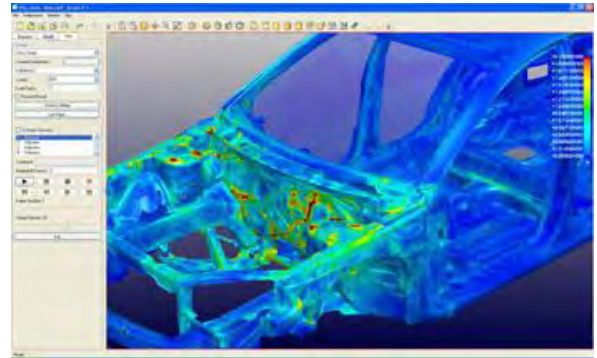
PreSys works the way you do.
The PreSys interface is fully customizable to suit user-specific needs. Also, a model explorer feature provides streamlined data navigation.

Menus, toolbars & many other user interface features can be customized by the user to streamline the guided user interface.

Developed by the leader in the creation & implementation of new CAE tools & methodology, PreSys is ETA's 4th generation Pre/Post Processor. It delivers the capability to handle finite element modeling with ease.

Why PreSys?

ETA's PreSys™ is a solver and CAD-neutral Finite Element modeling and analysis solution. A price/performance leader, the tool delivers precise modeling results with advanced graphics capabilities. With fewer steps, a customizable interface, streamlined functions and scripting access, the user can simulate and analyze designs quicker than ever. PreSys™ also offers vertical application toolsets which drill-down to application-specific requirements, including drop testing and fluid-structure interaction analysis.

FEA Not To Miss, is a weekly internet blog on helpful videos, tutorials and other Not To Miss important internet postings. Plus, a monthly email blog.

Welcome to Monday - grab a cup of coffee, tea or protein drink and join me for FEA Not To Miss Monday

Postings every Monday on what you have missed

www.feantm.com

08/06/2018 - DO not breath by an exhaust muffler and drink our coffee or tea! We are strictly serving in the shop, pretty parks, library, etc. But if you need to know about exhaust muffler simulation you can head on down the road below!
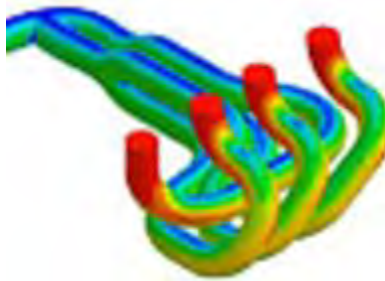
4-Exhaust Engine muffler simulation using LS-DYNA - ICFD
Kaizenat - India

07/30/2018 Served with Today's coffee aptly named Tsunami Mocha, we have a 3D version of Solitary (Tsunami) wave generation as B.C. for Free-Surface flows, and the FSI solution of a soliton impacting a flexible cylinder.

LS-DYNA CFD: Flexible cylinder impacted by a Solitary (Tsunami) wave

Time graph shows the displacement of a node on the top of the cylinder.

www.FEAntm.com   feaanswer@aol.com

Shanghai Hengstar Technology sells and supports LSTC's suite of products and other software solutions. These provide the Chinese automotive industry a simulation environment designed and ready multidisciplinary engineering needs. Sales, Consulting, Training & Support.

Shanghai Hengstar Technology

Sub-distributor in China, for FEA and CAE needs for engineers, professors, students, consultants.

Contact us for our LS-DYNA training courses, such as

- Crashworthiness Simulation with LS-DYNA
- Restraint System Design with Using LS-DYNA
- LS-DYNA MPP
- Airbag Simulation with CPM
- LS-OPT with LS-DYNA

Our classes are given by experts from LSTC USA, domestic OEMs, Germany, Japan, etc. These courses help CAE engineers to effectively use CAE tools such as LS-DYNA to improve car safety and quality, and therefore to enhance the capability of product design and innovation.

Sales & Consulting - Besides solver specific software sales, distribution and support activities, Shanghai Hengstar offers associated training and consulting services to the Chinese automotive market since April 1st, 2013

Solutions - Our software solutions provide the Chinese automotive industry, educational institutions, and other companies a mature suite of tools - powerful and expandable simulation environment designed and ready for future multidisciplinary CAE engineering needs.

Shanghai Hengstar provides engineering services, consulting and training that combine analysis and simulation using Finite Element Methods such as LS-DYNA.

hongsheng@hengstar.com **-** Shanghai Hengstar Technology Co., Ltd
http://www.hengstar.com
Enhu Technology Co., Ltd
http://www.enhu.com

JSOL supports industries with the simulation technology of state-of-the-art. Supporting customers with providing a variety of solutions from software development to technical support, consulting, in CAE (Computer Aided Engineering) field. Sales, Support, Training.

Designers can avoid the challenges of trial and error. JSTAMP provides an adequate result and reduces the lead time and cost of tool design.

JSTAMP Functions Address various tasks in tool shop

JSTAMP represents the Sheet metal forming process virtually by numerical simulation. Users can examine the simulation result, output it to CAD, and directly use the CAD as a countermeasure by using JSTAMP.

JSTAMP provides comprehensive support throughout the design process from the first trial to the final stage. The feature for addressing complicated process stages, low formability materials, and latest technologies covers various tasks in the Sheet metal forming process.

EVENTS:

LS-DYNA & JSTAMP Forum 2018
Dates : Oct..31, 2018
Venue : NAGOYA TOKYU HOTEL

JSOL Corporation holds an annual LS-DYNA & JSTAMP Forum to provide our users a wide range of information including the latest simulation technologies and case studies and also to offer the opportunity for information exchange among our users.

This year the venue of the LS-DYNA & JSTAMP Forum 2018 moves from Tokyo to Nagoya. It will be held at NAGOYA TOKYU HOTEL, on Wednesday 31 October 2018. Our engineers will showcase the latest simulation technologies and poster sessions will be held.

J-OCTA Users Conference 2018
Dates : Nov..21, 2018
Venue : Tokyo Conference Center SHINAG…

A team of engineers, mathematicians, & computer scientists develop LS-DYNA, LS-PrePost, LS-OPT, LS-TaSC, and LSTC's Dummy & Barrier models.

LS-DYNA® Electromagnetics (EM)
Coupled EM, Mechanical, Thermal, CFD Simulations

The LS-DYNA® Electromagnetic solver (EM) combines the Finite Element Method (FEM) and the Boundary Element Method (BEM) in a way that allows robust, scalable, and accurate simulations of electromagnetic processes. Strong coupling between the EM solver with the structural, thermal and Computational Fluid Dynamics (CFD) solvers makes LS-DYNA an excellent option for multi-physics problems.

Applications:
- Magnetic metal forming/welding
- Induced heating
- Rail gun
- Resistive spot welding
- Battery cells
- Cardiac electro-physiology

Features:
- FEM and BEM based
- 2 and 3 dimensional
- Available for solids, shells and composite thick shells
- EM contact
- Computation of inductances
- EM equations-of-state
- Circuit models for electro-chemistry in batteries
- Cell ionic models for electro-physiology
- Electrophysiology mono and bi-domain models

Website:
www.lstc.com/applications/EM
www.dynaexamples.com/em
YouTube:
www.youtube.com/user/980LsDyna
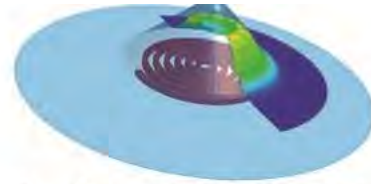
Magnetic forming of a metallic plate against a conical die.
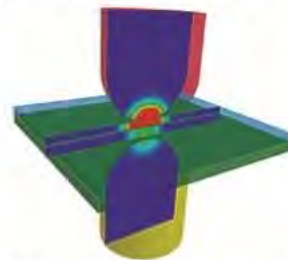
Resistive spot welding simulation, where the Joule heating due to the material and contact resistances gives the temperature needed for the weld.
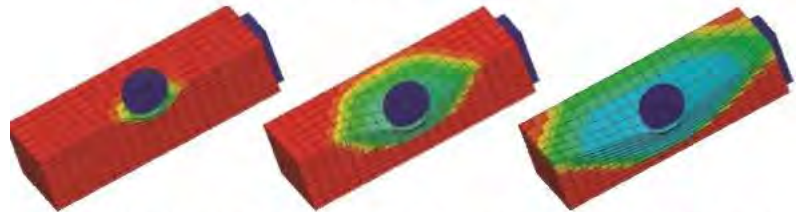
Evolution of the potential during the crush by a sphere of a module of 10 Li-ion cells.
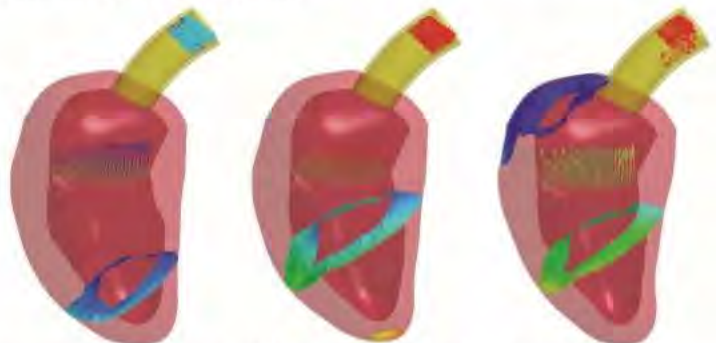
Coupled electrophysiology-mechanical-CFD simulation of a heart ventricle showing the propagation of the cell transmembrane potential, wall deformation and blood flow.

Computational and Multi-scale Mechanics Group (CMMG) was formed in 2003 at LSTC to offer the state-of-the-art capabilities of CAE tools in product design and engineering. Our research philosophy is to foster virtual product development validation by enabling materials scientists and manufacturers to integrate advanced technology into the conceptual design phase of their product development process.

Computational and Multi-scale Mechanics Group has been working closely with academia and industry on the cutting-edge technologies to solve the challenging computational problems across different spacial scales in solid and structure analyses. Our research and development have been implemented into LS-DYNA® commercial software package and widely used in various industrial applications from material design, manufacturing to structural analysis. We are actively looking for collaboration with research institutes and industries to continuously improve and advance the methodology and application of CAE software that helps design teams in their high-level product development.

Websit: **https://www.lstc-cmmg.org**

Long fiber compression molding

- MAT_277 developed by DOW and Ford for resin curing process
- MAT_278 micro mechanics model for woven prepreg compression molding
- MAT_293 non-orthogonal model for compression molding developed
- MAT_249 developed by BMW for woven prepreg forming simulation

Short fiber from molding to crash

- New interface program to utilize Moldflow and MoldEx3D molding result for LS-Dyna crash analysis is recently implemented in LS-Prepost
- MAT_157 with *INITIAL_STRESS card for elasticity tensor Cij
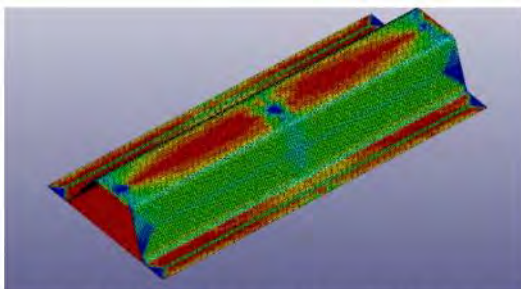
Fiber orientation result from Moldflow
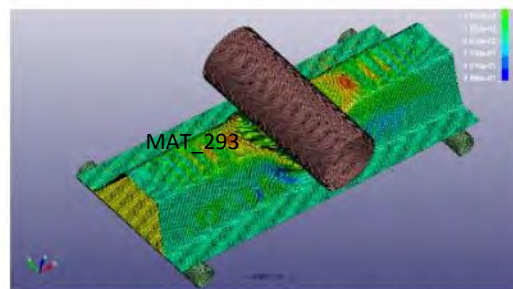
LS-Dyna 3 point bending simulation

For more information, please contact LSTC Senior software developer
John Zhao : zhao@lstc.com

MSC

Providing engineering services to the composites industry since 1970. During this time, we have participated in numerous programs that demonstrate our ability to: perform advanced composite design, analysis and testing; provide overall program management; work in a team environment; and transition new product development to the military and commercial sectors.

MAT162 is a material model for use in LS-DYNA that may be used to simulate the onset and progression of damage in unidirectional and orthotropic fabric composite continua due to 3D stress fields. This failure model can be used to effectively simulate fiber dominated failures, matrix damage, and includes a stress-based delamination failure criterion.

Course Offered - Progressive Composite Damage Modeling in LS-DYNA (MAT162 & Others)
Bazle Z. (Gama) Haque, Ph.D. - Sr. Scientist, Univ. of Delaware Ctr. for Composite Materials (UD-CCM)

2018 Workshops: Tuesday, **November** 13, 2018 | 9am-5pm
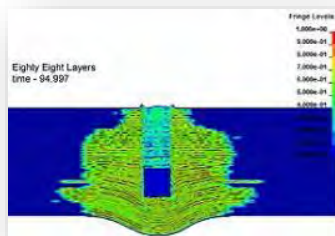
Simulation Movie

[Penetration and Perforation of Moderately Thick Composites](#)

Examples are located at [www.ccm.udel.edu/software/mat162/examples](#) /
  Example 1: Sphere Impact on a Composite Laminate
  Example 2: Sphere Impact on a Perfectly Clamped Composite Plate
  Example 3: Sphere Impact on Elliptical Carbon/Epoxy Tube
High Velocity Impact of Square Plate using MAT161/162
[www.youtube.com/watch?v=NgjncjfLKGw](#)

Oasys Ltd is the software house of Arup and distributor of the LS-DYNA software in the UK, India and China. We develop the Oasys Suite of pre- and post-processing software for use with LS-DYNA.

Oasys Post-Processing V15 Update

Jac Cross, Arup Associate and developer of the Oasys Post Processing software presents this free webinar, which describes and demonstrates some of the new and updated features in the latest Oasys D3PLOT, T/HIS, and REPORTER v15.0 release.

Please click below to view the webinar recording:
VIEW RECORDING
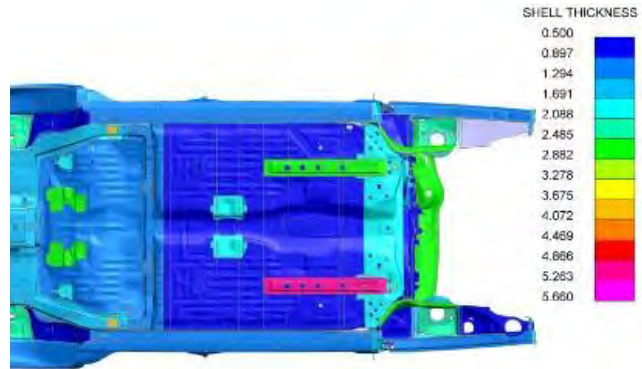
Oasys 15 Highlights New features in version 15

The following bullet points summarise the key updates which have been implemented and are now available in each of our Oasys version 15 programs.

This version of Oasys PRIMER includes:
- Support for LS-DYNA R10 keywords
- Improved model read and write speed with about 60% and 70% of the time to read and write respectively compared to V14
- A new link capability is integrated into PRIMER to use the post-processing tools D3PLOT & T/HIS
- A new combined Dummy Positioning and Seatsquash tool to automatically create simulation based LS-DYNA positioning models
- New options for the orientation and alignment of spotwelds created in PRIMER
- A new mechanism type "Coupler" has been added to handle rotation against rotation or rotation against translation or translation against translation
- Improved ability to read more ANSA comments and convert them into PRIMER mechanisms

This version of Oasys D3PLOT includes:
- Quick Find feature to search for D3PLOT functions, menus and preferences
- PDF tutorials available directly through the help menu
- PRIMER/D3PLOT integration with synchronized viewing and linked functionality
- In Link mode T/HIS can be undocked and placed anywhere on the screen
- Greatly improved support for material extra variables
- Data plotting in material axes coordinate systems
  - Enhanced support for solid elements with multiple integration points

More New Features in version 15

Predictive Engineering provides finite element analysis consulting services, software, training and support to a broad range of engineering companies across North America. We strive to exceed client expectations for accuracy, timeliness and knowledge transfer. Our process is both cost-effective and collaborative, ensuring all clients are reference clients.

16g Sled Test Analysis of Lavatory Wall with Attendant's Seat

The engineering of airplane seats is quite complex due to competing demands for lightness and the ability to survive a 16g sled test. Experimentally, a 50% percentile dummy or anthropomorphic test device (ATD) is strapped into the chair and then subjected to a 16g acceleration pulse with a half-sine pulse width of 0.18 second. The test procedure is well defined under 14 CFR Part 25.562, Amendment 25-64 and JAR Part 25.562 with guidance given under SAE AS8049 Rev. A and for the ATD under 49 CFR 572.

In this LS-DYNA FEA consulting services work, the objective was to limit the design and schedule exposure of a new design. One can think of this as FEA insurance; that is, it is must less expensive and faster to virtually test than to destroy prototypes on a 16g sled test.

The LS-DYNA model was constructed from the client's CATIA geometry. The Nomex cored sandwich panel was idealized using a combination of solid elements for the core and laminate shell elements for the composite skins. This type of 3D modeling provides accurate simulation of the progressive failure of the composite skins (see 026_Jensen,A_PAPER Broad-Spectrum Stress and Vibration Analysis of Large Composite Container.pdf). Likewise, phenolic anchor blocks were modeled with solid elements and then integrated into the wall panel. As part of the virtual manufacturing process, key fasteners were preloaded prior to analysis to enable shear transfer across bolted interfaces.

The model was first proof tested without the ATD using LS-DYNA's implicit solver to ensure that the structure was tight and could withstand the 16g sled test environment. After this verification stage, the
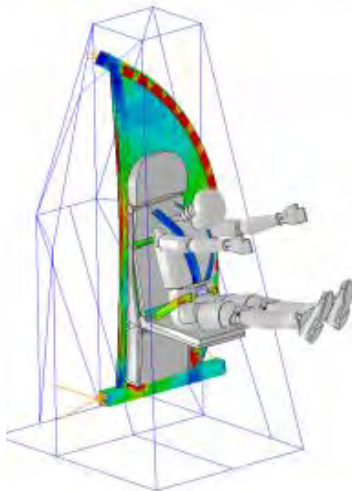
model was repurposed with an ATD for the full, nonlinear, transient explicit analysis. At the start of the transient analysis, bolts were preloaded and the ATD was allowed to settle onto the attendant's seat, once the model had stabilized, the sled's deceleration pulse was applied. Progressive composite failure was simulated using *MAT_54 with strain based failure criteria for tension, compression and shear. All metal components strength levels were based on MMPDS values. The complete transient, nonlinear simulation took about four hours to solve using 16 CPU-Cores. Results aligned well with the 16g sled test data.

For more detail information

YouTube: https://www.youtube.com/watch?v=W3_zw1gU3a0

Offering industry-leading software platforms and hardware infrastructure for companies to perform scientific and engineering simulations. Providing simulation platforms that empower engineers, scientists, developers, and CIO and IT professionals to design innovative products, develop robust applications, and transform IT into unified, agile environments.

Rescale Secures $32 Million for Enterprise Innovation Platform

Annette Dehler

Funding will accelerate development of Platform as a Service to meet increased demand for fast, secure product development

San Francisco, Calif., July 24, 2018 – Rescale, the leader in enterprise big compute in the cloud, today announced that the company completed its Series B round of $32 million in funding, raising total investment in the company to $52 million. One of the fastest growing enterprise software companies in the world, in 2017 Rescale grew 30% month over month.

The new round of funding will enable Rescale to continue to invest in talent and develop the next generation of security and platform enhancements. The investment supports Rescale's commitment to expand the largest and most powerful high performance computing infrastructure in the cloud, optimizing customers' digital transformation strategy to drive accelerated innovation.

"Rescale is transforming how today's leading enterprises innovate," said Joris Poort, Co-founder and CEO of Rescale. "With support of our Series B funding, we are further investing in our hybrid multi-cloud platform in order to help executives, IT leaders, engineers, and scientists securely manage their product innovation. The hypergrowth we are seeing demonstrates a strong commitment from our enterprise customers and highlights our leading platform solutions for big compute."

CAE software sale & customer support , initial launch-up support, periodic on-site support. Engineering Services.   Timely solutions, rapid problem set up, expert analysis . material property test Tension test, compression test, high-speed tension test and viscoelasticitiy test for plastic, rubber or foam materials. We verify the material property by LS-DYNA calculations before delivery.

CAE consulting - Software selection, CAE software sale & customer support , initial launch-up support, periodic on-site support

Engineering Services - Timely solutions, rapid problem set up, expert analysis - all with our Engineering Services. Terrabyte can provide you with a complete solution to your problem; can provide you all the tools for you to obtain the solution, or offer any intermediate level of support and software.

FE analysis
- LS-DYNA is a general-purpose FE program capable of simulating complex real world problems. It is used by the automobile, aerospace, construction, military, manufacturing and bioengineering industries.
- ACS SASSI is a state-of-the-art highly specialized finite element computer code for performing 3D nonlinear soil-structure interaction analyses for shallow, embedded, deeply embedded and buried structures under coherent and incoherent earthquake ground motions.

CFD analysis
- AMI CFD software calculates aerodynamics, hydrodynamics, propulsion and aero elasticity which covers from concept design stage of aerocraft to detailed design, test flight and accident analysis.

EM analysis
- JMAG is a comprehensive software suite for electromechanical equipment design and development. Powerful simulation and analysis technologies provide a new standard in performance and quality for product design.

Metal sheet
- JSTAMP is an integrated forming simulation system for virtual tool shop based on IT environment. JSTAMP is widely used in many companies, mainly automobile companies and suppliers, electronics, and steel/iron companies in Japan.

Pre/ Post
- **PreSys** is an engineering simulation solution for FE model development. It offers an intuitive user interface with many streamlined functions, allowing fewer operation steps with a minimum amount of data entry.
- **JVISION** - Multipurpose pre/post-processor for FE solver. It has tight interface with LS-DYNA. Users can obtain both load reduction for analysis work and model quality improvements.

Biomechanics
- **The AnyBody Modeling System™** is a software system for simulating the mechanics of the live human body working in concert with its environment.

Shanghai Fangkun Software Technology Ltd
Established in May 2018

This is to announce and confirm that effective on June 1, 2018, LSTC has appointed Dalian Fukun, as our Master Distributor in China.

Dalian Fukun, in turn, has designated Shanghai Fangkun Software Technology Ltd. as its exclusive representative. Shanghai Fangkun responsibilities will cover but not be limited to the purposes of initially processing LS-DYNA sales, marketing activities, day-to-to day management responsibilities, and for providing LS-DYNA technical support throughout China.

Shanghai Fangkun Software Technology Co., Ltd. was established in May 2018. It is fully responsible for sales, marketing, technical support and engineering consulting services of LS-DYNA software in China. It will meet this responsibility through the integration and management of various resources of LS-DYNA's Chinese sub-distributors and partners, providing expert technical support services for China's LS-DYNA users, helping customers to use LS-DYNA software more efficiently and effectively for product design and development, thereby improving the efficiency and effectiveness of LS-DYNA software usage by the customers.

The sub-distributors under Shanghai Fangkun are ARUP-China, ETA-China and Shanghai Hengstar. Through cooperation with sub-distributors and partners, Shanghai Fangkun will provide customers with a full range of LSTC products: LS-DYNA, LS-OPT, LS-PREPOST, LS-TASC and LSTC's dummy and barrier models. Shanghai Fangkun Software Technology Co., Ltd. brings together a group of top application engineers of LS-DYNA software, focusing on sales and technical support in various industries such as automotive, aerospace and general machinery.

- **Website**: http://www.lsdyna-china.com
- **Sales Email**: sales@lsdyna-china.com
- **Technical support** Email: support@lsdyna-china.com
- **Customer Service Number**: 400 853 3856 021-61261195
- **Address**: Room No. 3019, 3 Floor, No.126 YuDe Road,Xuhui District,Shanghai,China 200030

BETA CAE Systems.   **www.beta-cae.com**

BETA CAE Systems - ANSA

BETA CAE Systems µETA

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.

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

Solutions for:

Process Automation - Data Management – Meshing – Durability - Crash & Safety NVH - CFD - Thermal analysis - Optimization - Powertrain
 Products made of composite materials   -   Analysis Tools -
Maritime and Offshore Design - Aerospace engineering - Biomechanics

DatapointLabs   **www.datapointlabs.com**

Testing over 1000 materials per year for a wide range of physical properties, DatapointLabs is a center of excellence providing global support to industries engaged in new product development and R&D.

The company meets the material property needs of CAE/FEA analysts, with a specialized product line, TestPaks®, which allow CAE analysts to easily order material testing for the calibration of over 100 different material models.

DatapointLabs maintains a world-class testing facility with expertise in physical properties of plastics, rubber, food, ceramics, and metals.

Core competencies include mechanical, thermal and flow properties of materials with a focus on precision properties for use in product development and R&D.

Engineering Design Data including material model calibrations for CAE Research Support Services, your personal expert testing laboratory Lab Facilities gives you a glimpse of our extensive test facilities Test Catalog gets you instant quotes for over 200 physical properties.

ETA – Engineering Technology Associates   **www.eta.com**
etainfo@eta.com

Inventium Suite™

Inventium Suite™ is an enterprise-level CAE software solution, enabling concept to product. Inventium's first set of tools will be released soon, in the form of an advanced Pre & Post processor, called PreSys.

Inventium's unified and streamlined product architecture will provide users access to all of the suite's software tools. By design, its products will offer a high performance modeling and post-processing system, while providing a robust path for the integration of new tools and third party applications.

PreSys

Inventium's core FE modeling toolset. It is the successor to ETA's VPG/PrePost and FEMB products. PreSys offers an easy to use interface, with drop-down menus and toolbars, increased graphics speed and detailed graphics capabilities. These types of capabilities are combined with powerful, robust and accurate modeling functions.

VPG

Advanced systems analysis package. VPG delivers a unique set of tools which allow engineers to create and visualize, through its modules--structure, safety, drop test, and blast analyses.

DYNAFORM

Complete Die System Simulation Solution. The most accurate die analysis solution available today. Its formability simulation creates a "virtual tryout", predicting forming problems such as cracking, wrinkling, thinning and spring-back before any physical tooling is produced

ESI Group

get it right® **Visual-Environment** is an integrative simulation platform for simulation tools operating either concurrently or standalone for various solver. Comprehensive and integrated solutions for meshing, pre/post processing, process automation and simulation data management are available within same environment enabling seamless execution and automation of tedious workflows. This very open and versatile environment simplifies the work of CAE engineers across the enterprise by facilitating collaboration and data sharing leading to increase of productivity.

Visual-Crash DYNA provides advanced preprocessing functionality for LS-DYNA users, e.g. fast iteration and rapid model revision processes, from data input to visualization for crashworthiness simulation and design. It ensures quick model browsing, advanced mesh editing capabilities and rapid graphical assembly of system models. Visual-Crash DYNA allows graphical creation, modification and deletion of LS-DYNA entities. It comprises tools for checking model quality and simulation parameters prior to launching calculations with the solver. These tools help in correcting errors and fine-tuning the model and simulation before submitting it to the solver, thus saving time and resources.
Several high productivity tools such as advanced dummy positioning, seat morphing, belt fitting and airbag folder are provided in **Visual-Safe,** a dedicated application to safety utilities.

Visual-Mesh is a complete meshing tool supporting CAD import, 1D/2D/3D meshing and editing for linear and quadratic meshes. It supports all meshing capabilities, like shell and solid automesh, batch meshing, topo mesh, layer mesh, etc. A convenient Meshing Process guides

you to mesh the given CAD component or full vehicle automatically.

Visual-Viewer built on a multi-page/multi-plot environment, enables data grouping into pages and plots. The application allows creation of any number of pages with up to 16 windows on a single page. These windows can be plot, animation, video, model or drawing block windows. Visual-Viewer performs automated tasks and generates customized reports and thereby increasing engineers' productivity.

Visual-Process provides a whole suite of generic templates based on LS-DYNA solver (et altera). It enables seamless and interactive process automation through customizable LS-DYNA based templates for automated CAE workflows.

All generic process templates are easily accessible within the unique framework of Visual-Environment and can be customized upon request and based on customer's needs.

Visual*DSS* is a framework for Simulation Data and Process Management which connects with Visual-Environment and supports product engineering teams, irrespective of their geographic location, to make correct and realistic decisions throughout the virtual prototyping phase. Visual*DSS* supports seamless connection with various CAD/PLM systems to extract the data required for building virtual tests as well as building and chaining several virtual tests upstream and downstream to achieve an integrated process. It enables the capture, storage and reuse of enterprise knowledge and best practices, as well as the automation of repetitive and cumbersome tasks in a virtual prototyping process, the propagation of engineering changes or design changes from one domain to another.

JSOL

JSOL Corporation

HYCRASH

Easy-to-use one step solver, for Stamping-Crash Coupled Analysis. HYCRASH only requires the panels' geometry to calculate manufacturing process effect, geometry of die are not necessary. Additionally, as this is target to usage of crash/strength analysis, even forming analysis data is not needed. If only crash/strength analysis data exists and panel ids is defined. HYCRASH extract panels to calculate it's strain, thickness, and map them to the original data.

JSTAMP/NV

As an integrated press forming simulation system for virtual tool shop the JSTAMP/NV meets the various industrial needs from the areas of automobile, electronics, iron and steel, etc. The JSTAMP/NV gives satisfaction to engineers, reliability to products, and robustness to tool shop via the advanced technology of the JSOL Corporation.

JMAG

JMAG uses the latest techniques to accurately model complex geometries, material properties, and thermal and structural phenomena associated with electromagnetic fields. With its excellent analysis capabilities, JMAG assists your manufacturing process

Livermore Software Technology Corp.   **www.lstc.com**

LS-DYNA

A general-purpose finite element program capable of simulating complex real world problems. It is used by the automobile, aerospace, construction, military, manufacturing, and bioengineering industries. LS-DYNA is optimized for shared and distributed memory Unix, Linux, and Windows based, platforms, and it is fully QA'd by LSTC. The code's origins lie in highly nonlinear, transient dynamic finite element analysis using explicit time integration.

LS-PrePost: 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 Macs utilizing OpenGL graphics to achieve fast rendering and XY plotting.

LS-OPT: LS-OPT is a standalone Design Optimization and Probabilistic Analysis package with an interface to LS-DYNA. The graphical preprocessor LS-OPTui facilitates definition of the design input and the creation of a command file while the postprocessor provides output such as approximation accuracy, optimization convergence, tradeoff curves, anthill plots and the relative importance of design variables.

LS-TaSC: A Topology and Shape Computation tool. Developed for engineering analysts who need to optimize structures, LS-TaSC works with both the implicit and explicit solvers of LS-DYNA. LS-TaSC handles topology optimization of large non-linear problems, involving dynamic loads and contact conditions.

LSTC Dummy Models:

Anthropomorphic Test Devices (ATDs), as known as "crash test dummies", are life-size mannequins equipped with sensors that measure forces, moments, displacements, and accelerations.

LSTC Barrier Models: LSTC offers several Offset Deformable Barrier (ODB) and Movable Deformable Barrier (MDB) model.
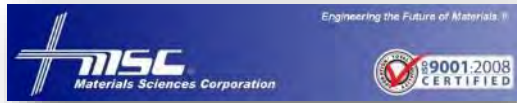
Material Sciences Corporation   www.materials-sciences.com

Materials Sciences Corporation has provided engineering services to the composites industry since 1970. During this time, we have participated in numerous programs that demonstrate our ability to: perform advanced composite design, analysis and testing; provide overall program management; work in a team environment; and transition new product development to the military and commercial sectors. MSC's corporate mission has expanded beyond basic research and development now to include transitioning its proprietary technologies from the research lab into innovative new products. This commitment is demonstrated through increased staffing and a more than 3-fold expansion of facilities to allow in-house manufacturing and testing of advanced composite materials and structures

Materials Sciences Corporation (MSC) MAT161/162 - enhanced features have been added to the Dynamic Composite Simulator module of LS-DYNA.

This enhancement to LS-DYNA, known as MAT161/162, enables the most effective and accurate dynamic progressive failure modeling of composite structures to enable the most effective and accurate dynamic progressive

failure modeling of composite structures currently available.

MSC/LS-DYNA Composite Software and Database -

Fact Sheet: http://www.materials-sciences.com/dyna-factsheet.pdf

- MSC and LSTC have joined forces in developing this powerful composite dynamic analysis code.
- For the first time, users will have the enhanced ability to simulate explicit dynamic engineering problems for composite structures.
- The integration of this module, known as 'MAT 161', into LS-DYNA allows users to account for progressive damage of various fiber, matrix and interply delamination failure modes.
- Implementing this code will result in the ability to optimize the design of composite structures, with significantly improved survivability under various blast and ballistic threats.

MSC's LS-DYNA module can be used to characterize a variety of composite structures in numerous applications—such as this composite hull under blast

Oasys Ltd. LS-DYNA Environment

The Oasys Suite of software is exclusively written for LS-DYNA® and is used worldwide by many of the largest LS-DYNA® customers. The suite comprises of:

Oasys PRIMER

Key benefits:

- Pre-Processor created specifically for LS-DYNA®
- Compatible with the latest version of LS-DYNA®
- Maintains the integrity of data
- Over 6000 checks and warnings – many auto-fixable
- Specialist tools for occupant positioning, seatbelt fitting and seat squashing (including setting up pre-simulations)
- Many features for model modification, such as part replace
- Ability to position and depenetrate impactors at multiple locations and produce many input decks automatically (e.g. pedestrian impact, interior head impact)

www.oasys-software.com/dyna

- Contact penetration checking and fixing
- Connection feature for creation and management of connection entities.
- Support for Volume III keywords and large format/long labels
- Powerful scripting capabilities allowing the user to create custom features and processes

www.oasys-software.com/dyna

Oasys D3PLOT

Key benefits:

- Powerful 3D visualization post-processor created specifically for LS-DYNA®
- Fast, high quality graphics
- Easy, in-depth access to LS-DYNA® results
- Scripting capabilities allowing the user to speed up post-processing, as well as creating user defined data components

www.predictiveengineering.com

Predictive Engineering provides finite element analysis consulting services, software, training and support to a broad range of engineering companies across North America. We strive to exceed client expectations for accuracy, timeliness and knowledge transfer. Our process is both cost-effective and collaborative, ensuring all clients are reference clients.

Our mission is to be honest brokers of information in our consulting services and the software we represent.

Our History

Since 1995, Predictive Engineering has continually expanded its client base. Our clients include many large organizations and industry leaders such as SpaceX, Nike, General Electric, Navistar, FLIR Systems, Sierra Nevada Corp, Georgia-Pacific, Intel, Messier-Dowty and more. Over the years, Predictive Engineering has successfully completed more than 800 projects, and has set itself apart on its strong FEA, CFD and LS-DYNA consulting services.
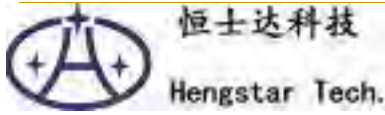
Shanghai Hengstar   <u>www.hengstar.com</u>

Center of Excellence: Hengstar Technology is the first LS-DYNA training center of excellence in China. As part of its expanding commitment to helping CAE engineers in China, Hengstar Technology will continue to organize high level training courses, seminars, workshops, forums etc., and will also continue to support CAE events such as: China CAE Annual Conference; China Conference of Automotive Safety Technology; International Forum of Automotive Traffic Safety in China; LS-DYNA China users conference etc.

On Site Training: Hengstar Technology also provides customer customized training programs on-site at the company facility. Training is tailored for customer needs using LS-DYNA such as material test and input keyword preparing; CAE process automation with customized script program; Simulation result correlation with the test result; Special topics with new LS-DYNA features etc..

Distribution & Support: Hengstar distributes and supports LS-DYNA, LS-OPT, LS-Prepost, LS-TaSC, LSTC FEA Models; Hongsheng Lu, previously was directly employed by LSTC before opening his distributorship in China for LSTC software. Hongsheng visits LSTC often to keep update on the latest software features.

Hengstar also distributes and supports d3View; Genesis, Visual DOC, ELSDYNA; Visual-Crash Dyna, Visual-Process, Visual-Environment; EnkiBonnet; and DynaX & MadyX etc.

Consulting

As a consulting company, Hengstar focuses on LS-DYNA applications such as crash and safety, durability, bird strike, stamping, forging, concrete structures, drop analysis, blast response, penetration etc with using LS-DYNA's advanced methods: FEA, ALE, SPH, EFG, DEM, ICFD, EM, CSEC..

![Lenovo logo]

Lenovo   www.lenovo.com

Lenovo is a USD39 billion personal and enterprise technology company, serving customers in more than 160 countries.

Dedicated to building exceptionally engineered PCs, mobile Internet devices and servers spanning entry through supercomputers, Lenovo has built its business on product innovation, a highly efficient global supply chain and strong strategic execution. The company develops, manufactures and markets reliable, high-quality, secure and easy-to-use technology products and services.

Lenovo acquired IBM's x86 server business in 2014. With this acquisition, Lenovo added award-winning System x enterprise server ortfolio along with HPC and CAE expertise.

Contact: JSOL Corporation Engineering Technology Division cae-info@sci.jsol.co.jp

**Cloud computing services
for
JSOL Corporation LS-DYNA users in Japan**

**JSOL Corporation is cooperating with chosen
cloud computing services**

JSOL Corporation, a Japanese LS-DYNA distributor for Japanese LS-DYNA customers.

LS-DYNA customers in industries / academia / consultancies are facing increased needs for additional LS-DYNA cores

In calculations of optimization, robustness, statistical analysis, we find that an increase in cores of LS-DYNA are needed, for short term extra projects or cores.

JSOL Corporation is cooperating with some cloud computing services for JSOL's LS-DYNA users and willing to provide short term license.

This service is offered to customers using Cloud License fee schedule, the additional fee is less epensive than purchasing yearly license.

The following services are available (only in Japanese). HPC OnLine:

NEC Solution Innovators, Ltd. - http://jpn.nec.com/manufacture/machinery/hpc_online/

Focus - Foundation for Computational Science
http://www.j-focus.or.jp

Platform Computation Cloud - CreDist.Inc.

PLEXUS CAE
Information Services International-Dentsu, Ltd. (ISID) https://portal.plexusplm.com/plexus-cae/

SCSK Corporation - http://www.scsk.jp/product/keyword/keyword07.html

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www.rescale.com

Rescale: Cloud Simulation Platform

The Power of Simulation Innovation

We believe in the power of innovation. Engineering and science designs and ideas are limitless. So why should your hardware and software be limited? You shouldn't have to choose between expanding your simulations or saving time and budget.

Using the power of cloud technology combined with LS-DYNA allows you to:
· Accelerate complex simulations and fully explore the design space
· Optimize the analysis process with hourly software and hardware resources
· Leverage agile IT resources to provide flexibility and scalability

True On-Demand, Global Infrastructure

Teams are no longer in one location, country, or even continent. However, company data centers are often in one place, and everyone must connect in, regardless of office. For engineers across different regions, this can cause connection issues, wasted time, and product delays.

Rescale has strategic/technology partnerships with infrastructure and software providers to offer the following:
· Largest global hardware footprint – GPUs, Xeon Phi, InfiniBand
· Customizable configurations to meet every simulation demand
· Worldwide resource access provides industry-leading tools to every team
· Pay-per-use business model means you only pay for the resources you use
· True on-demand resources – no more queues

ScaleX Enterprise: Transform IT, Empower Engineers, Unleash Innovation

The ScaleX Enterprise simulation platform provides scalability and flexibility to companies while offering enterprise IT and management teams the opportunity to expand and empower their organizations.

Rescale Cloud Simulation Platform   www.rescale.com

ScaleX Enterprise allows enterprise companies to stay at the leading edge of computing technology while maximizing product design and accelerating the time to market by providing:

· Collaboration tools
· Administrative control
· API/Scheduler integration
· On-premise HPC integration

Industry-Leading Security
Rescale has built proprietary, industry-leading security solutions into the platform, meeting the needs of customers in the most demanding and competitive industries and markets.

· Manage engineering teams with user authentication and administrative controls
· Data is secure every step of the way with end-to-end data encryption
· Jobs run on isolated, kernel-encrypted, private clusters
· Data centers include biometric entry authentication
· Platforms routinely submit to independent external security audits

Rescale maintains key relationships to provide LS-DYNA on demand on a global scale. If you have a need to accelerate the simulation process and be an innovative leader, contact Rescale or the following partners to begin running LS-DYNA on Rescale's industry-leading cloud simulation platform.

LSTC - DYNAmore GmbH   JSOL Corporation

Rescale, Inc. - 1-855-737-2253 (1-855-RESCALE) - info@rescale.com

 944 Market St. #300, San Francisco, CA 94102 USA

ESI Cloud Based Virtual Engineering Solutions   www.esi-group.com

ESI Cloud offers designers and engineers cloud-based computer aided engineering (CAE) solutions across physics and engineering disciplines.

ESI Cloud combines ESI's industry tested virtual engineering solutions integrated onto ESI's Cloud Platform with browser based modeling,

With ESI Cloud users can choose from two basic usage models:
- An end-to-end SaaS model: Where modeling, multi-physics solving, results visualization and collaboration are conducted in the cloud through a web browser.
- A Hybrid model: Where modeling is done on desktop with solve, visualization and collaboration done in the cloud through a web browser.

Virtual Performance Solution:

ESI Cloud offers ESI's flagship Virtual Performance Solution (VPS) for multi-domain performance simulation as a hybrid offering on its cloud platform. With this offering, users can harness the power of Virtual Performance Solution, leading multi-domain CAE solution for virtual engineering of crash, safety, comfort, NVH (noise, vibration and harshness), acoustics, stiffness and durability.

In this hybrid model, users utilize VPS on their desktop for modeling including geometry, meshing and simulation set up. ESI Cloud is then used for high performance computing with an integrated visualization and real time collaboration offering through a web browser.

The benefits of VPS hybrid on ESI Cloud include:
- Running large concurrent simulations on demand
- On demand access to scalable and secured cloud HPC resources
- Three tiered security strategy for your data
- Visualization of large simulation data sets
- Real-time browser based visualization and collaboration
- Time and cost reduction for data transfer between cloud and desktop environments
- Support, consulting and training services with ESI's engineering teams

VPS On Demand

ESI Cloud features the Virtual Performance Solution (VPS) enabling engineers to analyze and test products, components, parts or material used in different engineering domains including crash and high velocity impact, occupant safety, NVH and interior acoustics, static and dynamic load cases. The solution enables VPS users to overcome hardware limitations and to drastically reduce their simulation time by running on demand very large concurrent simulations that take advantage of the flexible nature of cloud computing.

Key solution capabilities:

- Access to various physics for multi-domain optimization
- Flexible hybrid model from desktop to cloud computing
- On demand provisioning of hardware resources
- Distributed parallel processing using MPI (Message Passing Interface) protocol
- Distributed parallel computing with 10 Gb/s high speed interconnects

Result visualization

ESI Cloud deploys both client-side and server-side rendering technologies. This enables the full interactivity needed during the simulation workflow along with the ability to handle large data generated for 3D result visualization in the browser, removing the need for time consuming data transfers. Additionally ESI Cloud visualization engine enables the comparisons of different results through a multiple window user interface design.

Key result visualization capabilities:

- CPU or GPU based client and server side rendering
- Mobility with desktop like performance through the browser
- 2D/3D VPS contour plots and animations
- Custom multi-window system for 2D plots and 3D contours
- Zooming, panning, rotating, and sectioning of multiple windows

Collaboration

To enable real time multi-user and multi company collaboration, ESI Cloud offers extensive synchronous and asynchronous collaboration capabilities. Several users can view the same project, interact with the same model results, pass control from one to another. Any markups, discussions or annotations can be archived for future reference or be assigned as tasks to other members of the team.

Key collaboration capabilities:

- Data, workflow or project asynchronous collaboration
- Multi-user, browser based collaboration for CAD, geometry, mesh and results models
- Real-time design review with notes, annotations and images archiving and retrieval
- Email invite to non ESI Cloud users for real time collaboration

mv@feainformation.com

NASA, ULA Launch Parker Solar Probe on Historic Journey to Touch Sun

The United Launch Alliance Delta IV Heavy rocket launches NASA's Parker Solar Probe to touch the Sun, Sunday, Aug. 12, 2018, from Launch Complex 37 at Cape Canaveral Air Force Station, Florida. Parker Solar Probe is humanity's first-ever mission into a part of the Sun's atmosphere called the corona. Here it will directly explore solar processes that are key to understanding and forecasting space weather events that can impact life on Earth.

Credits: NASA/Bill Ingalls

Hours before the rise of the very star it will study, NASA's Parker Solar Probe launched from Florida Sunday to begin its journey to the Sun, where it will undertake a landmark mission. The spacecraft will transmit its first science observations in December, beginning a revolution in our understanding of the star that makes life on Earth possible.

Roughly the size of a small car, the spacecraft lifted off at 3:31 a.m. EDT on a United Launch Alliance Delta IV Heavy rocket from Space Launch Complex-37 at Cape Canaveral Air Force Station. At 5:33 a.m., the mission operations manager reported that the spacecraft was healthy and operating normally. The mission's findings will help researchers improve their forecasts of space weather events, which have the potential to damage satellites and harm astronauts on orbit, disrupt radio communications and, at their most severe, overwhelm power grids.

"This mission truly marks humanity's first visit to a star that will have implications not just here on Earth, but how we better understand our universe," said Thomas Zurbuchen, associate administrator of NASA's Science Mission Directorate. "We've accomplished something that decades ago, lived solely in the realm of science fiction."

During the first week of its journey, the spacecraft will deploy its high-gain antenna and magnetometer boom. It also will perform the first of a two-part deployment of its electric field antennas. Instrument testing will begin in early September and last approximately four weeks, after which Parker Solar Probe can begin science operations.

"Today's launch was the culmination of six decades of scientific study and millions of hours of effort," said project manager Andy Driesman, of the Johns Hopkins University Applied Physics Laboratory (APL) in Laurel, Maryland. "Now, Parker Solar Probe is operating normally and on its way to begin a seven-year mission of extreme science."

Over the next two months, Parker Solar Probe will fly towards Venus, performing its first Venus gravity assist in early October – a maneuver a bit like a handbrake turn – that whips the spacecraft around the planet, using Venus's gravity to trim the spacecraft's orbit tighter around the Sun. This first flyby will place Parker Solar Probe in position in early November to fly as close as 15 million miles from the Sun – within the blazing solar atmosphere, known as the corona – closer than anything made by humanity has ever gone before.

Throughout its seven-year mission, Parker Solar Probe will make six more Venus flybys and 24 total passes by the Sun, journeying steadily closer to the Sun until it makes its closest approach at 3.8 million miles. At this point, the probe will be moving at roughly 430,000 miles per hour, setting the record for the fastest-moving object made by humanity.

Parker Solar Probe will set its sights on the corona to solve long-standing, foundational mysteries of our Sun. What is the secret of the scorching corona, which is more than 300 times hotter than the Sun's surface, thousands of miles below? What drives the supersonic solar wind – the constant stream of solar material that blows through the entire solar system? And finally, what accelerates solar energetic particles, which can reach speeds up to more than half the speed of light as they rocket away from the Sun?

Scientists have sought these answers for more than 60 years, but the investigation requires sending a probe right through the unrelenting heat of the corona. Today, this is finally possible with cutting-edge thermal engineering advances that can protect the mission on its daring journey.

"Exploring the Sun's corona with a spacecraft has been one of the hardest challenges for space exploration," said Nicola Fox, project scientist at APL. "We're finally going to be able to answer questions about the corona and solar wind raised by Gene Parker in 1958 – using a spacecraft that bears his name – and I can't wait to find out what discoveries we make. The science will be remarkable."

Parker Solar Probe carries four instrument suites designed to study magnetic fields, plasma and energetic particles, and capture images of the solar wind. The University of California, Berkeley, U.S. Naval Research Laboratory in Washington, University of Michigan in Ann Arbor, and Princeton University in New Jersey lead these investigations.

Parker Solar Probe is part of NASA's Living with a Star program to explore aspects of the Sun-Earth system that directly affect life and society. The Living with a Star program is managed by the agency's Goddard Space Flight Center in Greenbelt, Maryland, for NASA's Science Mission Directorate in Washington. APL designed and built, and operates the spacecraft.

The mission is named for Eugene Parker, the physicist who first theorized the existence of the solar wind in 1958. It's the first NASA mission to be named for a living researcher.

For more information on Parker Solar Probe, go to: https://www.nasa.gov/solarprobe

(Excerpt) Ford Drives into the Heart of China with New Midsize SUV; All-New Territory Brings Affordability, Tech to New Buyers

- New Ford Territory midsize SUV, developed with JMC, offers attractive price, great looks and a host of intuitive technologies
- A new SUV aimed at China's fastest-growing segment – SUV buyers in emerging, fast-growing cities
- Territory is available with fuel-efficient gasoline engine, 48V mild hybrid, or plug-in hybrid, and infotainment system with intuitive Mandarin voice-command function, Co-Pilot360TM suite of driver assistance technologies and FordPass Connect with embedded modem

Territory will go on sale in early 2019. Ford is also launching new versions of the popular Focus and Escort cars in the coming months as it delivers on its plan to bring 50 new vehicles to market

SHANGHAI, Aug. 8, 2018 – Ford today shared the first images of the new Territory, a mid-size SUV with the affordable price-tag, rich technology and looks to carve inroads into China's richest vein of future growth – new buyers in emerging cities.

Ford developed the Territory together with its joint venture partner, Jiangling Motors Corporation (JMC), a collaboration that melded JMC's deep insights into new Chinese customers' tastes with Ford's global expertise in vehicle design, engineering, testing and manufacturing.

"The Territory is a breakthrough for Ford in China in terms of our ability to successfully compete with Chinese automakers for millions of customers that we do not currently serve," said Peter Fleet, president, Asia Pacific and chairman & CEO, Ford China. "Territory is a key proof point for how we will grow in China. We brought Territory to market with speed, high quality and cost efficiency. It will be affordable for young families and new buyers across China, not just the coastal mega-cities. And the technology will delight customers."

JMC provided insights into Chinese customers' lifestyles and product preferences, while the Ford team leveraged its global expertise to design, engineer, and test Territory at Ford's testing centers in Nanjing, China and Melbourne, Australia. The all-new SUV will be manufactured at JMC's Xiao Lan plant, which meets Ford's meticulous global manufacturing standards.

Territory customers can choose between a fuel-efficient gasoline engine option, 48V mild hybrid with Miller-Cycle technology, and a plug-in hybrid powertrain when it goes on sale in early 2019.

It also will offer Ford's infotainment system with intuitive Mandarin voice-command function, Co-Pilot360TM suite of driver assistance technologies, incorporating features such as Adaptive Cruise Control and FordPass Connect with embedded modem.

AIMING AT THE HEART OF CHINA'S AUTO GROWTH
While China remains the world's largest automotive market, the greatest growth in demand for automobiles will come not from traditional 'Tier 1' cities such as Beijing and Shanghai, which have implemented license plate restrictions to manage traffic congestion, but rather from smaller but fast-growing cities in the interior of the country.

The number of registered passenger vehicles in Chinese cities with no license plate restrictions is expected to soar to about 23.7 million in 2020, up from 10.8 million in 2010, according to IHS Markit's latest China Provincial Forecast1. In contrast, vehicle registrations in restricted cities is expected to fall to 1.6 million in 2019, from a peak of 2.2 million in 2010.

For these buyers, the midsize SUVs such as Ford Territory is a highly popular choice. According to McKinsey's China auto consumer survey 20172, the midsize SUV segment saw an annual growth rate of 38 percent in China between 2012 to 2016. Indigenous Chinese automakers in particular have capitalized on this trend.

For the first time, Chinese customers will be able to purchase a very competitive Ford in the entry-level, mid-size SUV segment at an affordable price.

"The new Ford Territory shows what can be achieved when two global companies collaborate closely, bringing their respective strengths to meet the needs of a broad spectrum of Chinese consumers," said Qiu Tiangao, chairman of JMC.

The Territory further expands the Ford SUV family lineup, which is composed of Ford EcoSport, Ford Kuga, Ford Edge, Ford Explorer and Ford Everest, to further meet the diversified needs of Chinese consumers.

NEW DESIGN TAILORED TO CHINESE TASTES: In the Territory, Ford's design team delivers a fresh exterior appearance, instilling Ford design DNA that appeals to Chinese consumers. The front of the vehicle features the signature Ford mesh grille, flanked by LED lights. Outboard graphic features house the uniquely shaped LED daytime running lamp and turn indicators, emphasizing the vehicle's solid stance.

The rear of the vehicle is highlighted by strong horizontal lines, emphasizing the width and stance. A lower skid plate integrates outboard bright graphic elements and serves as a reminder of the Territory's SUV capability. The accent finishes on the grille and contemporary Ford color palette offer contrast, depth and a richness to the vehicle.

Ford's engineering DNA is evident in a Ford-tuned suspension, which is set for exceptional ride comfort and refinement…   For complete information:
 https://media.ford.com/content/fordmedia/fna/us/en/news/2018/08/13/ford-celebrates-car-culture-woodward-dream-cruise.html

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	eta/DYNAFORM	INVENTIUM/PreSys		

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			LSTC Barrier Models	

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		LSTC Barrier Models	

China   **Shanghai Fangkun Software Technology Ltd.**

www.lsdyna-china.com

LS-DYNA	LS-TaSC	LSTC Barrier Models
LS-PrePOST	LS-OPT	
LSTC Dummy Models		

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ANSYS	VPS	optiSLang
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http://kaizenat.com /

LS-DYNA	LS-OPT	LSTC Dummy Models	LS-PrePost
Complete LS-DYNA suite of products		LSTC Barrier Models	LS-TaSC

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	LSTC Dummy Models	LSTC Barrier Models	TOYOTA THUMS	

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	eta/DYNAFORM	DIGIMAT	Simuform	Simpack
	AxStream	TrueGrid	FEMZIP	

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Taiwan	**SiMWARE Inc..**			
	www.simware.com.tw			
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	LSTC Dummy Models	LSTC Barrier Models	eta/VPG	FCM

## TOYOTA - Total Human Model for Safety – THUMS
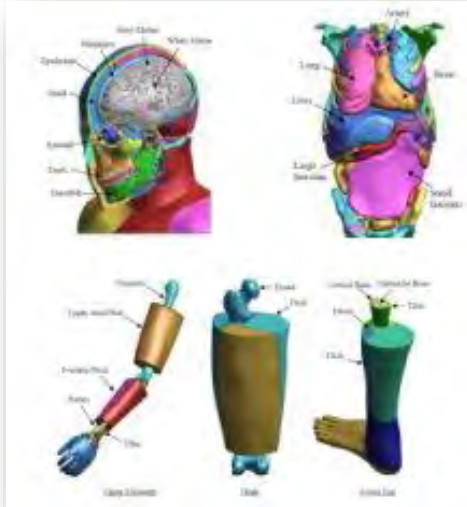
The Total Human Model for Safety, or THUMS®, is a joint development of Toyota Motor Corporation and Toyota Central R&D Labs. Unlike dummy models, which are simplified representation of humans, THUMS represents actual humans in detail, including the outer shape, but also bones, muscles, ligaments, tendons, and internal organs. Therefore, THUMS can be used in automotive crash simulations to identify safety problems and find their solutions.

Each of the different sized models is available as sitting model to represent vehicle occupants

and as standing model to represent pedestrians.
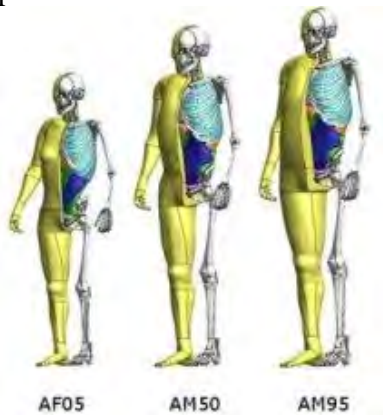
The internal organs were modeled based on high resolution CT-scans.

THUMS is limited to civilian use and may under no circumstances be used in military applications.

LSTC is the US distributor for THUMS. Commercial and academic licenses are available.

For information please contact: THUMS@lstc.com

THUMS®, is a registered trademark of Toyota Central R&D Labs.

LSTC – Dummy Models

LSTC Crash Test Dummies (ATD)

Meeting the need of their LS-DYNA users for an affordable crash test dummy (ATD), LSTC offers the LSTC developed dummies at no cost to LS-DYNA users.

LSTC continues development on the LSTC Dummy models with the help and support of their customers. Some of the models are joint developments with their partners.

 e-mail to: atds@lstc.com

Models completed and available
 (in at least an alpha version)
- Hybrid III Rigid-FE Adults
- Hybrid III 50th percentile FAST
- Hybrid III 5th percentile detailed
- Hybrid III 50th percentile detailed
- Hybrid III 50th percentile standing
- EuroSID 2
- EuroSID 2re
- SID-IIs Revision D
- USSID
- Free Motion Headform
- Pedestrian Legform Impactors

Models In Development
- Hybrid III 95th percentile detailed
- Hybrid III 3-year-old
- Hybrid II
- WorldSID 50th percentile
- THOR NT FAST
- Ejection Mitigation Headform

Planned Models
- FAA Hybrid III
- FAST version of THOR NT
- FAST version of EuroSID 2
- FAST version of EuroSID 2re
- Pedestrian Headforms
- Q-Series Child Dummies
- FLEX-PLI

LSTC – Barrier Models

Meeting the need of their LS-DYNA users for affordable barrier models, LSTC offers the LSTC developed barrier models at no cost to LS-DYNA users.

LSTC offers several Offset Deformable Barrier (ODB) and Movable Deformable Barrier (MDB) models:

- ODB modeled with shell elements
- ODB modeled with solid elements
- ODB modeled with a combination of shell and solid elements

- MDB according to FMVSS 214 modeled with shell elements
- MDB according to FMVSS 214 modeled with solid elements

- MDB according to ECE R-95 modeled with shell elements

- AE-MDB modeled with shell elements

- IIHS MDB modeled with shell elements
- IIHS MDB modeled with solid elements
- RCAR bumper barrier

- RMDB modeled with shell and solid elements

LSTC ODB and MDB models are developed to correlate to several tests provided by our customers. These tests are proprietary data and are not currently available to the public.

All current models can be obtained through our webpage in the LSTC Models download section or through your LS-DYNA distributor.

To submit questions, suggestions, or feedback about LSTC's models, please send an e-mail to: atds@lstc.com. Also, please contact us if you would like to help improve these models by sharing test data.
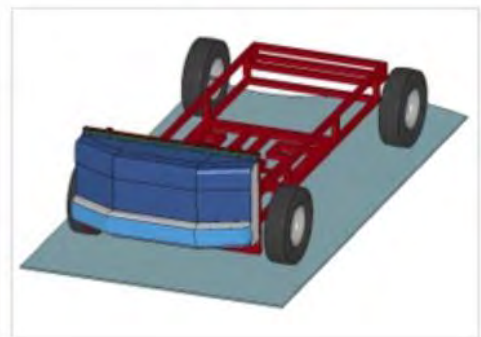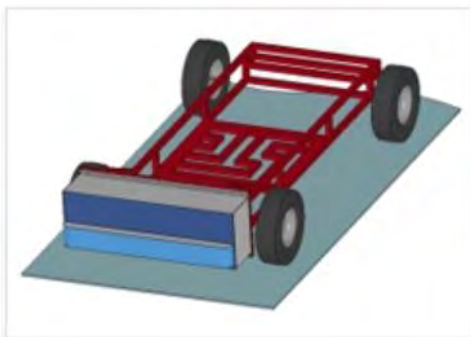
Training - Webinars - Events - Conferences

Participant's Training Classes

Webinars

Info Days

Class Directory

Directory

Arup	www.oasys-software.com/dyna/en/training
BETA CAE Systems	www.beta-cae.com/training.htm
DYNAmore	www.dynamore.de/en/training/seminars
Dynardo	http://www.dynardo.de/en/wost.html
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ETA	www.eta.com
KOSTECH	www.kostech.co.kr/
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LS-DYNA OnLine - (Al Tabiei)	www.LSDYNA-ONLINE.COM
OASYS	www.oasys-software.com/training-courses/
Predictive Engineering	www.predictiveengineering.com/support-and-training/ls-dyna-training

Training – Dynamore

Author: Christian Frech christian.frech@dynamore.de

Seminar brochure 2018

Visit the website for complete overview and registration www.dynamore.de/seminars

Download full seminar brochure (pdf): www.dynamore.de/seminarbroschure2018

Selection of trainings from September to October

Introduction
Introduction to LS-DYNA   11-13 September (Tr)
                                                                18-20 September
Introduction to LS-PrePost   10 September (T)
                                                                17 September

Crash/Short-Term Dynamics
Contact Definitions in LS-DYNA   21 September

Passive Safety
Introduction to Passive Safety   27 September

Metal Forming
Introduction to Welding Simulation   18 October (BA)

Material
Advanced Damage Modeling: Orthotropic Materials   18 October (BA)
Concrete and Geomaterial Modeling   29-30 October

Implicit Capabilities
Implicit Analysis using LS-DYNA   24-25 September
NVH, Frequency Domain, Fatigue   18 October (BA)

Particle Methods
Smoothed Particle Hydrodynamics   13-14 September
Meshfree EFG, SPG, Advanced FE   18 October (BA)

Multiphysics/Biomechanics
Electromagnetism in LS-DYNA   18 October (BA)

High energy events
Methods for Simulating Short Duration Events   18 October (BA)

Information days (free of charge)
Infoday LS-DYNA/Implicit   17 September
Infoday Optimization   24 September
Simulation of Plastics   26 September
Fatigue, Acoustics, NVH   24 October

If not otherwise stated, the event location is Stuttgart, Germany. Other event locations are:
BA = Bamberg, Germany G = Gothenburg, Sweden; L = Linköping, Sweden V = Versailles, France; T = Turin, Italy, Tr = Traboch, Austria, Z = Zurich, Switzerland

We hope that our offer will meet your needs and are looking forward to welcoming you at one of the events.

Training - LSTC

September

Date	Location	Coures Title	Instructor(s)
Sep 10 - Sep 14	CA	Crashworthiness (This class is 4 days of instruction; 5th day is an optional workshop.)	P. Du Bois, S. Bala
Sep 11 - Sep 12	*MI*	Airbag Folding	R. Chivakula
Sep 13 - Sep 14	*MI*	Airbag Modeling in LS-DYNA	A. Nair
Sep 26 - Sep 28	*MI*	Advance ALE & S-ALE Applications	I. Do

October

Date	Location	Coures Title	Instructor(s)
Oct 1	MI	Contact in LS-DYNA	S. Bala
Oct 9 – Oct 12	MI	Optimization and Probabilistic Design Analysis Using LS-OPT	A. Basudhar
Oct 22	MI	Introduction to LS-PrePost	P. Ho, Q. Yan
Oct 23 – Oct 26	MI	Introduction to LS-DYNA	A. Nair

November

Date	Location	Coures Title	Instructor(s)
Nov 5 -Nov 6	CA	NVH & Frequency Domain Analysis	Y. Huang
Nov 7 -Nov 9	CA	Introduction to Finite Element & Mesh Free Methods for Manufacturing & Failure Analysis	Y. Wu, B. Ren
Nov 5 -Nov 6	MI	Occupant Simulation in LS-DYNA	H. Devaraj
Nov 12-Nov 16	MI	Crashworthiness in LS-DYNA	P. Du Bois, S. Bala
Nov 12	CA	Introduction to LS-PrePost	P. Ho, Q. Yan
Nov 13-Nov 16	CA	Introduction to LS-DYNA	A. Nair

Introduction to LS-DYNA

Date: 1 -3 Oct, 2018   Location: The Arup Campus, Blythe Valley Park, Solihull

Price: £750 + VAT

A comprehensive practical introduction to the LS-DYNA FE code to simulate general nonlinear problems.

Course Outline: Learn more about LS-DYNA and its capabilities gaining thorough knowledge in the explicit analysis part of the software using the newest Oasys software. This course provides a thorough overview of the explicit capabilities of LS-DYNA. Furthermore, it gives an insight to the theory behind the software. After the course, the attendees will be able to go through the process of setting up a model (Pre-Processing) to getting results from LS-DYNA (Post-Processing).

Examples of workshops are used to demonstrate how to work around the software together with a PowerPoint presentation.

Course Content:

- An overview of LS-DYNA software
- An ability to prepare and run LS-DYNA input files
- An ability to debug LS-DYNA data
- An overview about post-processing the results   More information and Register interest

Introduction to JavaScript

Date: 1 Nov, 2018   **Location**: The Arup Campus, Blythe Valley Park, Solihull   **Price:** £300 + VAT

This course aims to familiarise attendees with the JavaScript language and teach them to write JavaScripts for Oasys PRIMER and Oasys D3PLOT. No previous experience of JavaScript is required but it is strongly recommended that attendees have some experience of programming or scripting in other languages.

Course Content:

- Which Oasys products have JavaScript?
- Examples of use of JavaScript
- Guidance on Core JavaScript
- Accessing, modifying and creating keyword data
- Interacting with PRIMER
- Making GUI
- Common errors and how to avoid them   More information and Register interest

Training – DynaS+

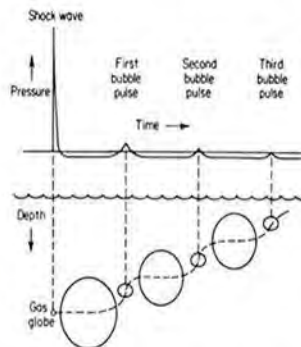DynaS+ Catalogue Formation 2018 v2.0 - Réf : T/DIV/CMI/DYNAT/17/0238/2.0

Contact information:

Training Manager: **Charlotte MICHEL**   E-mail: c.michel@dynasplus.com

Tel: +33 5 61 44 54 98 / Fax: +33 5 61 44 74 88   Website: www.dynasplus.com

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ESI Group	www.esi-group.com
ETA	www.eta.com
Lancemore	www.lancemore.jp/index_en.html
Lenovo	

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LS-DYNA Metal Forming New Features - Table 1: www.lstc.com/new_features

1-14. Two material model updates relating to temperature-dependent behaviors

Jinglin Zheng and Xinhai Zhu

Livermore Software Technology Corporation, Livermore, CA 94551, USA

Abstract

Two material model updates are presented in this paper: (1) temperature-dependent failure criteria for spot-welds; (2) rate-and-temperature-dependent hardening rule in material type 233 (MAT_CAZACU_BARLAT). Procedures of how to enable these features are given in detail in this paper.

Read Full Paper

LS-DYNA New Features - Table 2: www.lstc.com/new_features

2-17.   Dynamic Load Balancing Algorithm for CPM in LS-DYNA

Hailong Teng   Livermore Software Technology Corporation

Abstract: To achieve scalable parallel performance in particle method simulation, we introduce a new algorithm for automatic parallel load balancing and apply it to corpuscular particle method (CPM) in LS-DYNA. Load-balancing is achieved by dynamically using RCB to evenly distribute workload to processors. Several numerical tests demonstrated the efficiency of dynamic load balancing algorithm.

Read Full Paper

LS-DYNA New Features:

Cardiac electrophysiology using LS-DYNA

Pierre L'Eplattenier, Sarah Bateau-Meyer, Dave Benson, Vikas Kaul,
Carl Schu Mark Palmer, Darrell Swenson, Joshua Blauer

Abstract: Heart disease is among the leading causes of death in the Western world; hence, a deeper understanding of cardiac functioning will provide important insights for engineers and clinicians in treating cardiac pathologies. However, the heart also offers a significant set of unique challenges due to its extraordinary complexity. In this respect, some recent efforts have been made to be able to model the multiphysics of the heart using LS-DYNA.

The model starts with electrophysiology (EP) which simulates the propagation of the cell transmembrane potential in the heart. This electrical potential triggers the onset of cardiac muscle contraction, which then results in the pumping of the blood to the various organs in the body. The EP/mechanical model can be coupled with a Fluid and Structure Interaction (FSI) model to not only study the clinically relevant blood flow parameters as well as valves or cardiac devices. This paper concentrates on the EP part of the model. Other papers in this conference will present the mechanical and FSI parts.

Different propagation models, called "mono-domain" or "bi-domain", which couple the diffusion of the potential along the walls of the heart with ionic equations describing the exchanges between the inner and the outer parts of the cells have been implemented. These models were first benchmarked against published results obtained from other EP research codes on a simple cuboid heart tissue model. Other simulations were then performed on more realistic geometries. Since the potential diffusion is highly orthotropic, with much larger diffusion coefficients along the fibers of the tissue than transversally, it is important to correctly model these fibers, which creates models with very large numbers of elements (several tens to hundreds of millions of elements). We thus implemented capabilities to be able to handle such large-scale models. Some EP models will be presented and first results will be shown.

Read Full Paper

Evaluation of LS-DYNA® Corpuscular Particle Method – Passenger Airbag Applications

Chin-Hsu Lin and Yi-Pen Cheng
General Motors

Abstract: A uniform pressure method, i.e. no pressure variation on bag surface and location, in LS-DYNA has been commonly used to simulate airbag deployment and interaction of airbag with the occupants. Another newly developed LS-DYNA CPM (Corpuscular Particle Methodology) has gained recognition and acceptance recently because it considers the effect of transient gas dynamics and thermodynamics by using a particle to represent a set of air or gas molecules and then a set of particles to represent the entire air or gas molecule in the space of interest. This LS-DYNA feature has been studied in side impact airbag applications, and it is being further investigated in passenger side airbag applications to gain confidence in its application.

In this paper, a comprehensive set of sixty-liter tank tests, airbag static deployment tests, and rigid linear impactor tests with both the first stage and dual stage deployments are conducted and simulated to validate the CPM method. The correlations start with well controlled inflator closed and vented tank tests to verify the inflator characteristics from a supplier, mainly the mass flow rate and temperature curves. In the tank test validation, the steel tank's heat convection coefficient is the only parameter being adjusted to match the tank pressure in deployments. To ensure model fidelity, these validated inflator characteristics must continue to be employed into the static/dynamic airbag deployment simulations without applying any scaling factors. Other airbag fabric related parameters, such as the fabric heat convection coefficient and leakage coefficients, can be adjusted within its range, to correlate the airbag pressure measured in tests.

With the systematic approach to validate and correlate the impact tests, it results in good agreements with the overall airbag internal pressure and impactor deceleration for the suite of linear impactor tests conducted. The necessary modeling techniques to achieve a highly correlated airbag finite element model using LS-DYNA CPM method were identified in the process and the CPM can be applied to evaluate occupant performances with confidence.
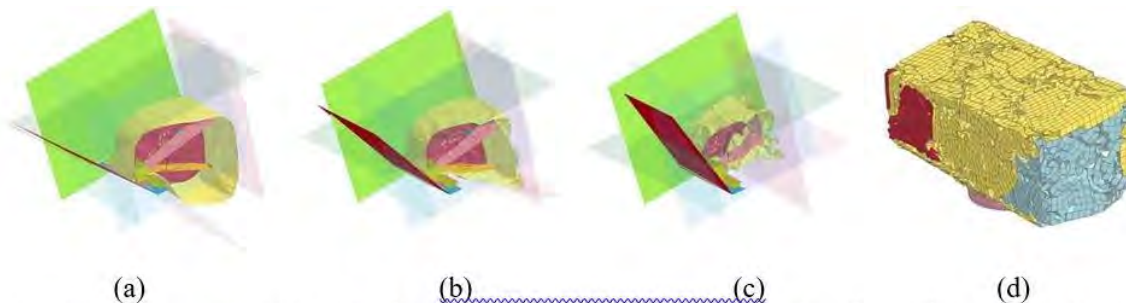
Figure 11. (a) Airbag enclosed by the plates before squashing, (b) in the mist of squashing, (c) further into the squashing process, (d) squashed and compressed airbag.

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