fea INFORMATION Engineering Solutions

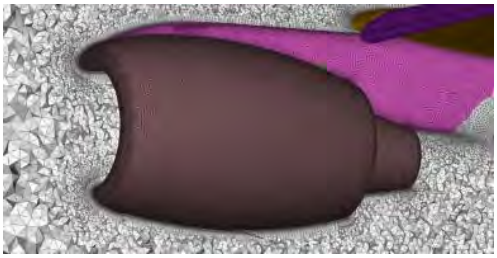
Ansys LST

Issue 3, March 2020

www.lstc.com www.ansys.com www.feapublications.com

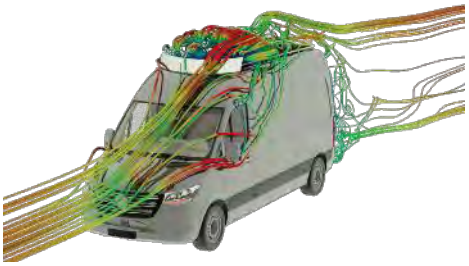
ANSYS

BETA-CAE

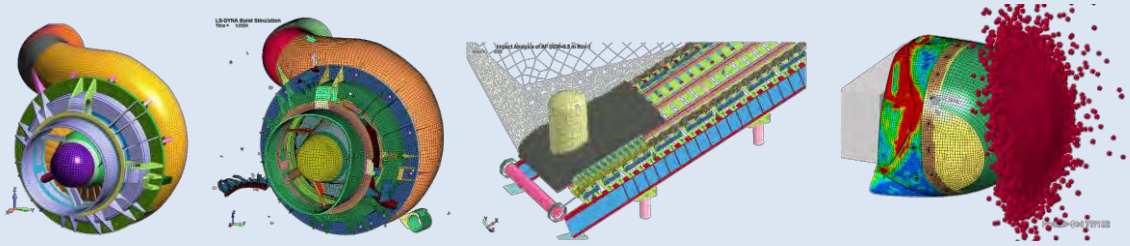


ESI Group

LST



LS-DYNA® - Predictive Engineering



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.

Livermore Software Technology, an ANSYS company

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

www.lstc.com

To sign up for the FEA News send an email - subject "subscribe" to news@feainformation.com
To be removed from the FEA News send an email - subject "Remove" to news@feainformation.com

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

Editor and Contact: Yanhua Zhao - yanhua@feainformation.com
Noi Sims – noi@feainformation.com

Platinum Particpants

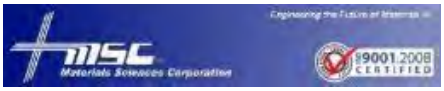


Table of contents

About ANSYS, Inc.

If you've ever seen a rocket launch, flown on an airplane, driven a car, used a computer, touched a mobile device, crossed a bridge or put on wearable technology, chances are you've used a product where ANSYS software played a critical role in its creation. ANSYS is the global leader in engineering simulation. Through our strategy of Pervasive Engineering Simulation, we help the world's most innovative companies deliver radically better products to their customers. By offering the best and broadest portfolio of engineering simulation software, we help them solve the most complex design challenges and create products limited only by imagination. Founded in 1970, ANSYS is headquartered south of Pittsburgh, Pennsylvania, U.S.A., Visit www.ansys.com for more information.

Published on February 28, 2020 by Wim Slagter
High Performance Computing, Platform, Tips and Tricks
Ansys Cloud, Ansys Cloud Partner Program, Ansys High Performance Computing, Cloud Computing, Cloud Hosting, HPC Partners, High Performance Computing (HPC)

The Truth about Ansys Simulations on the Cloud and HPC

Engineers are faced with the challenge of analyzing complex simulations while meeting tight deadlines. As a result, compute capacity is limiting the performance of many engineering organizations.

High-performance computing (HPC) and cloud deployments can clear this simulation bottleneck. However, there are still misconceptions about the reliability, complexity, licensing, cost and security of these systems.

These myths can delay, or prevent, the adoption of additional compute resources that can provide significant return on investment for product development teams.

While obstacles to cloud and HPC adoption vary by company, here are some common misunderstandings that stymie their acceptance. To learn how to dispel these misconceptions, watch the webinar: Debunking Myths of HPC, Cloud and Licensing.

Some Users Don't See the Need for HPC

While your simulation tasks may be running at acceptable speeds, research has found that 40% of engineers limit the size and detail of their models due to their compute capacity constraints.

Additionally, there is evidence that shows a predictable return on investment when running simulations on new HPC hardware.

For example, Ansys Mechanical demonstrates that simulation speeds could be improved by 59% by using the latest generation of Intel Xeon Gold processor.

Do You Need to Move Results from HPC Clusters onto a Desktop for Post-Processing?

Remote display tools and virtual desktop infrastructure (VDI) eliminate the need to transfer large files across the network. In this distributed model, engineers can rapidly access the HPC hardware and interactively post-process the simulation results from any computer.

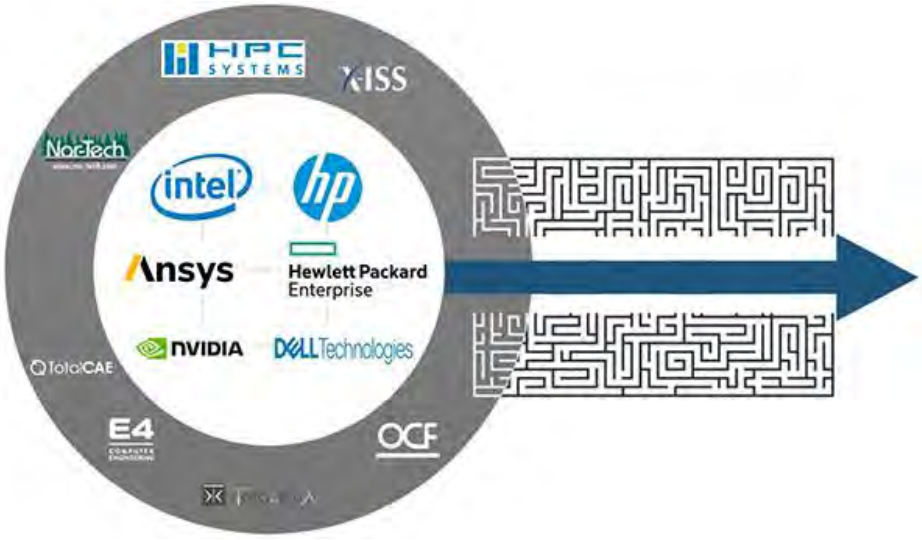
This distributed setup not only saves time, it also makes it easier to share results and collaborate across the organization.

Ansys supports the ability to access its software through remote and virtual desktop setups.

Can HPC Deployments Strain IT Resources?

It is true that many organizations struggle with sizing, integrating, provisioning and supporting HPC clusters.

However, these applications can be externally managed, so an organization's IT department doesn't have to worry about their HPC cluster. Additionally, these resources can be purchased or leased at affordable price points.



Ansys has teamed up with HPC strategic partners to make specification and deployment of HPC easier.

That is why many Ansys HPC partners offer turnkey HPC cluster appliance solutions that are optimized and preconfigured for Ansys workloads, simulation software and job management software.

Are Cloud Solutions Complex to Deploy, Manage and License?

Complex deployments may be the case when a company tries to build its own cloud infrastructure. But why would organizations do this when they can gain access to both on-premise and cloud-based license management options?

Engineers want to process their simulations as fast as possible, but they are not doing this when they are spending time deploying cloud infrastructure. It's much better to license the software for use on the cloud and to license the hardware for simple and fast deployment.

There are flexible licensing options to fit various customer needs. This way, customers can pay for what they use, or buy licenses to manage continuous workloads. For instance, organizations can use a traditional lease to cover everyday simulations and elastic licensing to meet fluctuating capacity.

As an example, the Ansys Cloud and Ansys cloud-hosting partners offer managed turnkey applications that are easy to access, deploy, manage and license.

Is the Cloud Secure Enough for Simulation Data?

The insecurity of cloud data is an old argument that is typically out of date. Data in the cloud is often more secure than it would be in an on-premise server.

This is because the technology, encryption programs and economies of scale in place for most cloud providers enables them to secure data better than the average organization. At the end of the day, the robustness of cloud security depends on the steps taken to secure the data.

Ansys Cloud, for example, was developed using Microsoft Azure. See its architecture and security overview.

Will the Cloud Always Save Money?

It is true that a cloud license could have a similar price point to an organization's current HPC solutions. However, the sole value of the cloud isn't that it shifts the cost of hardware or software maintenance to another entity — which is a significant reason why many people shift to the cloud. A total cost of ownership (TCO) should also consider the fact that instant access to greater compute resources can save a tremendous amount of time.

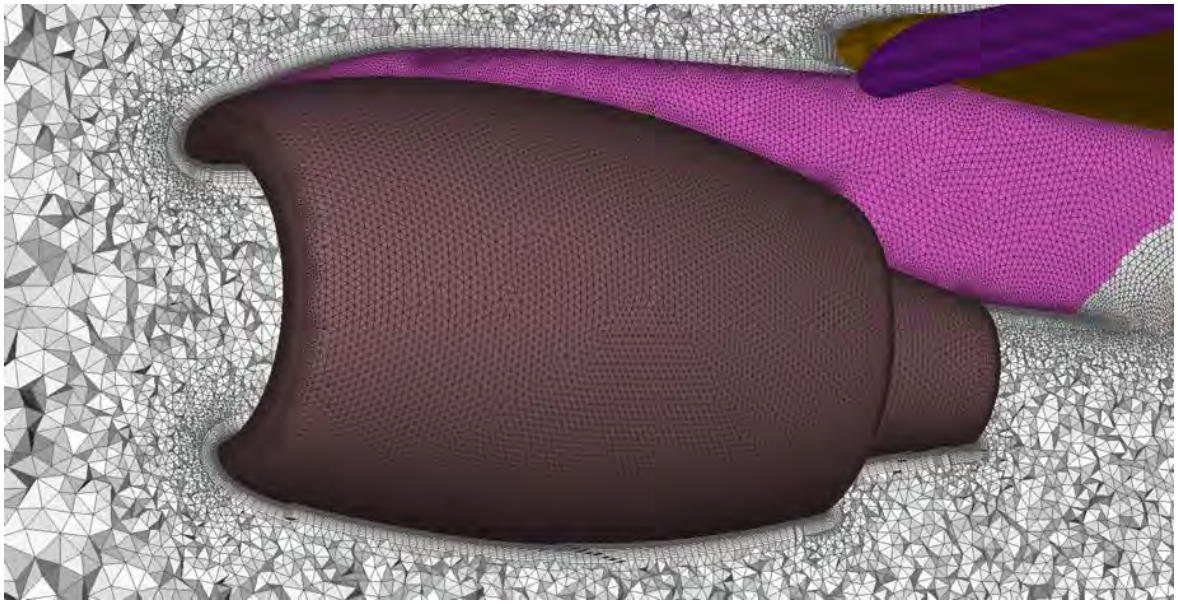
Cloud resources can be easily reconfigured, updated and scaled up — or down — on demand. That flexibility provides value because it can increase simulation throughput and accuracy without the need to buy additional hardware resources.

Remember, the use of HPC and cloud resources can provide a significant competitive advantage because it enables access to computing power and software applications that engineers need.

To learn how to debunk other cloud and HPC myths, watch the webinar: Debunking Myths of HPC, Cloud and Licensing.

To learn how to debunk other cloud and HPC myths, watch the webinar: Debunking Myths of HPC, Cloud and Licensing.Any and all ANSYS, Inc. brand, product, service and feature names, logos and slogans such as Ansys, Ansys Cloud and Ansys Mechanical are registered trademarks or trademarks of ANSYS, Inc. or its subsidiaries in the United States or other countries.

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…



March 10, 2020

BETA CAE Systems announces the release of versions 19.1.6 and 20.1.1 of the KOMVOS/ANSA/EPILYSIS/META software.

Version 19.1.6 is addressed to users who wish to continue using the v19.0.x series and not to migrate yet to v20.0.x. This version focuses on the correction of many issues of the earlier releases, while at the same time, it also incorporates selected enhancements.

Version 20.1.1 is the evolution release of its series and apart from correcting identified issues, it brings new features and performance improvements.

The most important enhancements and fixes implemented appear in the respective announcements for v19.1.6 and v20.1.1 on our web site.

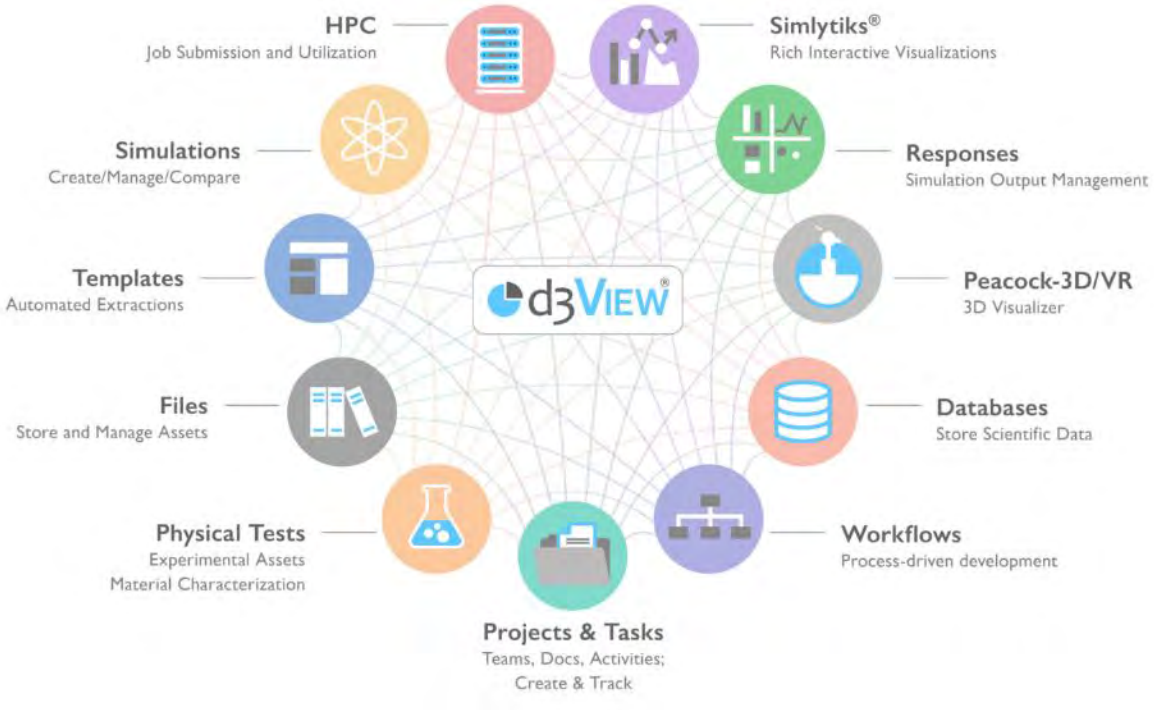
Customers who are served directly by BETA CAE Systems, or its subsidiaries, may download the new software, examples and documentation from their account on our server. They can access their account through the "user login" link at our web site. Customers who are served by a local business agent should contact the local support channel for the software distribution details. All files required for the installation of this version reside in the folder named "BETA_CAE_Systems_v19.1.6","BETA_CAE_Systems_v20.1.1" and "KOMVOS_v20.1.1" are dated as of March 10, 2020 and March 9, 2020 respectively.

DISCOVER v19.1.6 DISCOVER v20.1.1

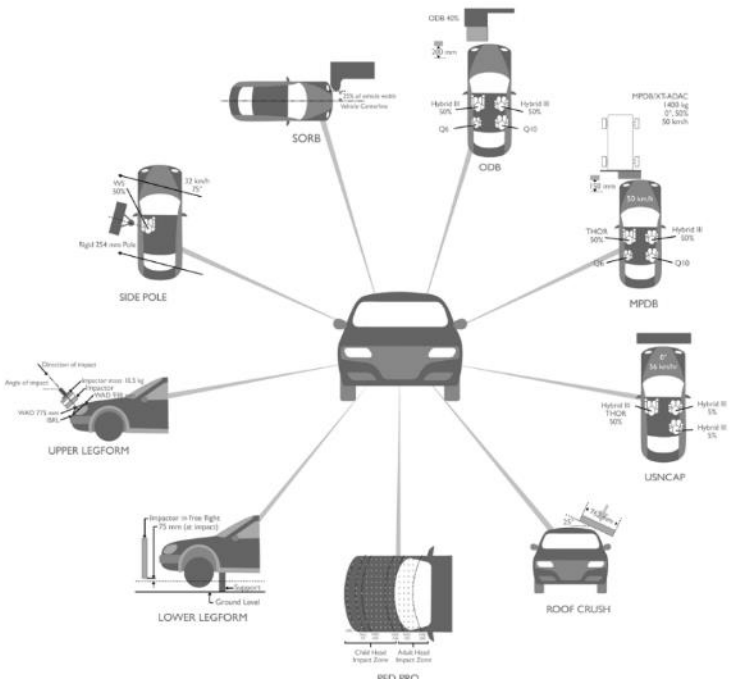
BETA CAE Systems International AG
Platz 4, 6039 Root D4, Switzerland

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 Platform Components



d3VIEW Built-In Automotive Templates



www.d3view.com.

For more information email info@d3view.com

Author: Christian Frech christian.frech@dynamore.de

Announcement and Call for Papers

16th German LS-DYNA Forum
October 7 - 9 2020, Ulm, Germany

Conference Website: www.dynamore.de/forum2020-e

Call for Papers
we kindly invite you to participate at the16th German LS-DYNA Forum and encourage you to actively contribute to the conference agenda by submitting a presentation about your experience with LS-DYNA, LS-OPT or LS-TaSC. Participation without a presentation is also worthwhile to exchange your knowledge and discuss new solution approaches with other users.

Besides presentations from users, there will be also selected keynote lectures of renowned speakers from industry and universities as well as developer presentations. The popular workshops on various topics will also be continued.

We hope that we have stimulated your interest and are looking forward to receiving your abstract and to seeing you in Ulm.

Conference languages
German and English

Venue
Maritim Hotel and Conference Center Ulm

Address:
Maritim Hotel
& Congress
Centrum Ulm

Basteistraße 40
D-89073 Ulm
Germany

Directions
Ulm can be reached easily via the airports Frankfurt, Munich and Stuttgart. From the airports are connections with the train ICE.

Abstract submission
Please submit your abstract (maximum length 2,500 characters) by E-Mail to forum@dynamore.de or online at: www.dynamore.de/abstract2020-e

Please note: A full paper is not required, only a 2-page extended abstract.

Important Dates
Abstract submission: 29 May 2020 Author notification: 3 July 2020
Two-page abstract: 7 September 2020

Participant fees
Industry speaker: 400 Euro
Academic speaker: 300 Euro
Industry: 575 Euro[1)] / 625 Euro
Academic: 380 Euro[1)] / 430 Euro
[1)] Registration before 26 June 2020. All plus VAT.

Exhibiting and sponsoring
Please request further information.

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/forum2020-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.

Improve Performance and Manufacturability of Lightweight Designs

Composites are certainly a desirable option for products today due to their reduced mass, increased strength and extended durability. However, those qualities don't exempt them from stringent certification requirements, which unfortunately arrive late in the development cycle when changes to product design, material selection, and manufacturing process are costly and will delay time to market. Working with these materials becomes risky, especially in the early design phase when the focus is product performance and the manufacturing process is not fully defined. Thereby, increasing product development cost and risk in the manufacturing processes—in the worst case, the pre-certification performance results are based on an unattainable fiber alignment or resin behavior.

ESI's Virtual Prototyping offers an End-to-End solution that enables you to identify and test the most appropriate composite material for each application and component to realize your lightweight strategy. Allowing you to confidently design and build lightweight components to full vehicle structures, that achieve the optimum performance, quality, and weight reduction, while improving your bottom line.

Come meet ESI at JEC World 2020 to see how we can help you reduce the reliance on extensive physical validation testing and limit costs with End-to-End Virtual Prototyping of structures made of composite and metals. Ultimately considering the manufacturing and assembly process for an accurate prediction of the performance.

Meet us in Paris from May 12 - 14th 2020!

Hall 5 R80 &

at our partner booth with ADI Nouvelle Aquitaine in Hall 6 FG73

https://www.esi-group.com/improve-performance-and-manufacturability-lightweight-designs

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.

NISA

NISA is a robust & comprehensive Finite Element Analysis (FEA) software toolset for engineering analysis. For over three decades scientists, engineers & researchers have come to depend on NISA to solve their most complex engineering problems. It can be used on its own or with PreSys.

NISA addresses the CAE requirements in a variety of industries including Aerospace, Automotive, Power & Energy, Oil & Gas, Electronic Packaging, Biomedical & Civil Engineering.

Offering fast, accurate & efficient FEA solutions, NISA is utilized for:

- Stress Analysis
- Laminated Composite Analysis
- Vibration Analysis
- Seismic Analysis
- Fatigue & Fracture Analysis
- Thermal Analysis
- Computational Fluid Dynamics (CFD) Analysis
- Printed Circuit Board (PCB) Analysis
- Electromagnetic Analysis
- Civil Structural Analysis & Design
- Optimization
- Rotor Dynamics
- Motion & Linkage Analysis
- The solution offers the most diverse suite of FEA tools, which are fully integrated & uses a common database. This allows the user to easily move from one program to the next, offering multidisciplinary analysis capabilities.

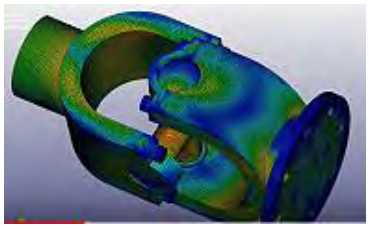
DYNAFORM is a simulation software solution, which allows organizations to bypass soft tooling, reducing overall tryout time, lowering costs, increasing productivity & providing complete confidence in die system design. It also allows for the evaluation of alternative and unconventional designs & materials.

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.

Start your Monday with coffee or tea reading our engineering blog, at the FEA Not To Miss coffee shop. Postings every Monday on what you have missed

www.feantm.com

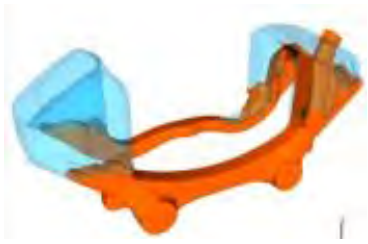
Monday 03/08/2020 - Well, since I just replaced my transmission and driveshaft in my Ford Sport Trac, the below is crucial to me! This week we will have UJV. That stands for Universal Joint Coffee and as always with a tad of chocolate! NOW, let's get jogging to YouTube for aerobics for that chocolate calorie intake! OH like an intake manifold?



LS-DYNA - Failure simulation of a universal joint

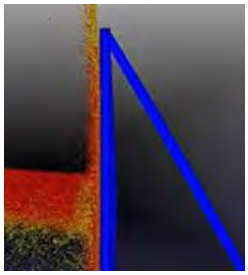
Simu-K-Inc

Monday 03/02/2020 - I like this filling simulation because my coffee cups fill like that! It would be nice to see the coffee swirl into a cup. SO off we go to YouTube at a jog, for cardio, and then we can drink coffee and have a muffin!



3D Mold filling in Ls-Dyna using level set

Monday 02/24/2020 - At times I think my coffee needs a protective screen! But it tastes so good I drink it to quickly so I guess we can just visit Simu-K Inc and their below simulation.



Simu-K Inc.- **Simulation of a protective screen for tank fail**

A multiphysique simulation with LS-Dyna. Liquid is modeled with SPH and the protective screen use finite element with material plasticity.

Shanghai Hengstar & Enhu Technology sells and supports LST's suite of products and other software solutions. These provide the Chinese automotive industry a simulation environment designed and ready multidisciplinary engineering needs, and provide a CAD/CAE/CAM service platform to enhance and optimize the product design and therefore the product quality and manufacture.

Online Training of LS-DYNA

Online Training of LS-DYNA Concrete Constitutive Models

Shanghai Enhu & Hengstar Technology will organized a Web Training of LS-DYNA Concrete Constitutive Modelson on Mar 17th-18th 2020.

Contents:

1、Brief introduction of the basic theory and background of each model

2、Detailed explanation of the keywords, meaning of major parameters and their setup approach for each model

3、（Validation of model theory）

Single element unconfined uniaxial tension and compression, triaxial extension and compression, cyclic loading

4、（Validation of accuracy and reliability）

Structural model triaxial compression, blast loading and impact penetration

5、Technical skills in modeling concrete and meanings of post-processing parameters

Instructor： Youcai Wu：Ph.D.

Graduated from the Department of Civil and Environmental Engineering, UCLA (University of California, Los Angeles) in 2005. Joined Karagozian & Case Inc. in January 2006, focusing on advanced LS-DYNA applications in structural analysis, concrete constitutive modeling and independent development of meshfree methods. Joined LSTC in 2015, focusing on development of advanced FEM and meshfree/particle methods and their applications in the integrated analysis of manufacturing and material failure and fragmentation processes.

Duration and Style:(2×3.5 hours web training)
Mar 17th (8:00AM-11:30AM) and Mar 18th (8:00AM-11:30AM)
Language: Mandarin **Training fee:**1500RMB per person
Contact: Xiaoting Shi Tell:021-61630122 **mobile:**13524954631 Email: Training@hengstar.com

Online Training on Industrial Applications of LS-DYNA Smoothed Particle Galerkin Method

Shanghai Enhu & Hengstar Technology will organized a Web Training of LS-DYNA Concrete Constitutive Modelson on Mar 31th to Apr 1st 2020.

Contents:

Application areas

1、Destructive manufacturing

Typical industry: Automobile, aerospace, electronics, consumer products, healthcare.

Typical processes: Surface grinding, metal cutting, Flow Drill Screwing (FDS), SelfPiercing Riveting (SPR), friction drilling, composite compression molding.

2、High velocity deformation

Typical industry: Defense, civil engineering

Typical processes: Impact penetration on metal, concrete and composite

Instructor： Youcai Wu： Ph.D.

Graduated from the Department of Civil and Environmental Engineering, UCLA (University of California, Los Angeles) in 2005. Joined Karagozian & Case Inc. in January 2006, focusing on advanced LS-DYNA applications in structural analysis, concrete constitutive modeling and independent development of meshfree methods. Joined LSTC in 2015, focusing on development of advanced FEM and meshfree/particle methods and their applications in the integrated analysis of manufacturing and material failure and fragmentation processes.

Duration and Style:(2×3.5 hours web training)

Mar 31th (8:00AM-11:30AM) and Apr 1st (8:00AM-11:30AM)

Language: Mandarin **Training fee:**1500RMB per person

Contact: Xiaoting Shi Tell:021-61630122 **mobile:**13524954631 Email: Training@hengstar.com

Contact us for our LS-DYNA training courses and CAD/CAE/CAM consulting service, 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.

Consulting - Besides solver specific software sales, distribution and support activities, we offer associated CAD/CAE/CAM consulting services to the Chinese automotive market.

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 CAD/CAE/CAM services, consulting and training that combine analysis and simulation using Finite Element Methods such as LS-DYNA.

Shanghai Hengstar Technology Co., Ltd

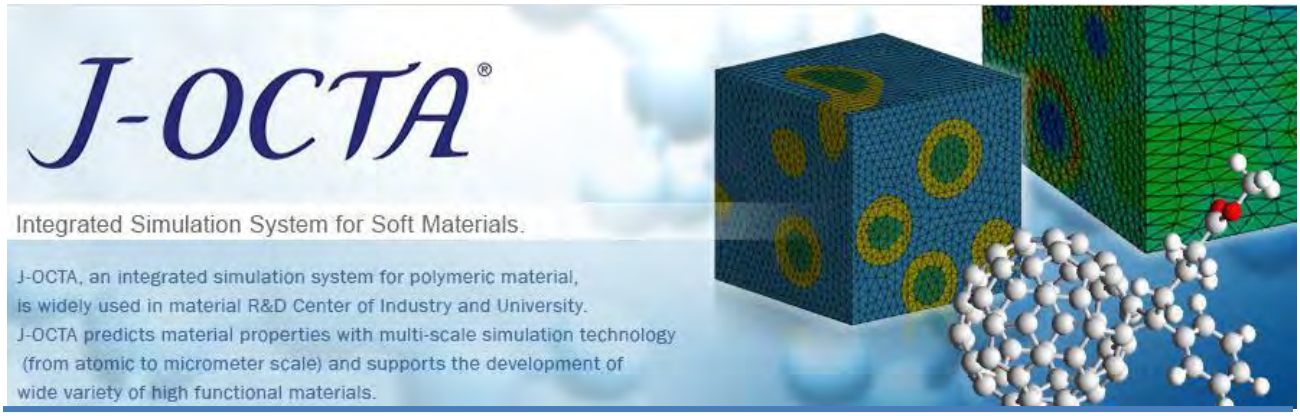
hongsheng@hengstar.com

http://www.hengstar.com

Shanghai Enhu Technology Co., Ltd

http://www.enhu.com

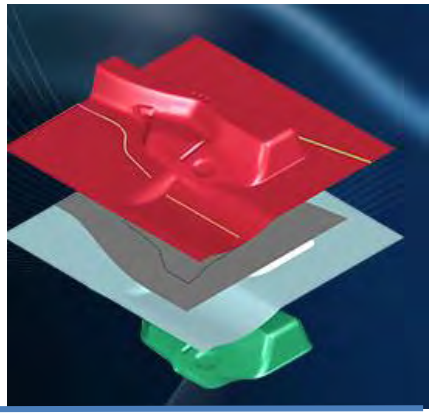
JSOL supports industries with the simulation technology of state-of-the-art. Supporting customers with providing a variety of solutions from software development to technical support, consulting, in CAE (Computer Aided Engineering) field. Sales, Support, Training.



Support tool design and process design for forming

Integrated forming simulation system JSTAMP

Sheet metal forming Simulation



JSTAMP@

- Dieface Design Support
- Blankline/trim line development
- Crack, wrinkle, and springback prediction
- CAD output of SB-compensated tool
- Material database as standard equipment

J-Composites partners - Dec 09, 2019 NEW

Mitsubishi Chemical Corporation: Cooperation in standard material database for Form Modeler

Toray Industries, Inc.: Cooperation in standard material database for Form Modeler

KAIZENAT Technologies Pvt Ltd is the leading solution provider for complex engineering applications and is founded on Feb 2012 by Dr. Ramesh Venkatesan, who carries 19 years of LS-DYNA expertise. KAIZENAT sells, supports, trains LS-DYNA customers in India. We currently have office in Bangalore, Chennai, Pune and Coimbatore.

Kaizen-DYNA App

"Kaizen-DYNA" is a mobile and web based application which is built by Kaizenat Technologies Private Limited (KTPL) to help LS-DYNA users across the world.

This powerful application helps LS-DYNA users across the world to stay connected and also help each other by sharing their knowledge.

The key feature of this application is QUERY and RESPONSE. Where a user can post and respond to queries. The best response for each query will be rewarded with a Kaizen score.

This application also gives an opportunity for the employers to float their LS-DYNA job openings and alert its user's base with a notification.

"Kaizen-DYNA" quiz program can help LS-DYNA users to update their knowledge score and trend top in the job seekers list.

It also gives an opportunity for new users to learn LS-DYNA with training materials FAQ modules.

This application also brings latest news about LS-DYNA and some useful general information.

OFFICE LOCATIONS

Chennai
14, Gandhi Main Road Shankar Nagar, Pammal
Chennai - 600075

Bangalore
B-1112, Signature Tower, Brigade Golden Triangle, Old Madras Road, Kattanallur Gate,
Bangalore - 560049

Pune
305, A wing, Aishwaryam courtyard, Near sane chowk, Akurdi-chikali road, Pimpri Chinchwad,
Pune - 411062

Contact
Email : support@kaizenat.com
Phone : +91 80 41500008

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

LS-DYNA® Incompressible CFD (ICFD) tool combines state-of-the-art numerical techniques that allow robust, scalable, and accurate simulations of fluid flows. Its ability to couple with the structural, thermal, and Discrete Element Method solvers make it an excellent option for multi-physics problems.

Applications:

- Ground vehicle aerodynamics
- Cooling analysis
- Resin Transfer Molding for manufacturing of composites
- Turbomachinery
- Fluid-Structure Interaction in the biomedical field

Features:

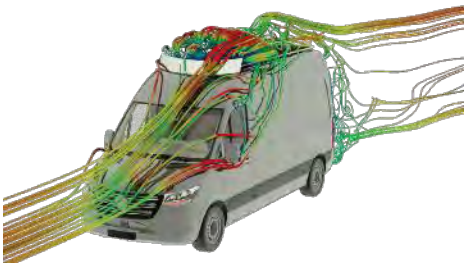
- FEM based
- Large library of RANS and LES turbulence models
- Automatic meshing and re-meshing
- Free surface flow
- Non-Newtonian flows
- Non-inertial reference frames
- Porous media models

Learn more at:

www.lstc.com/applications/icfd

YouTube:

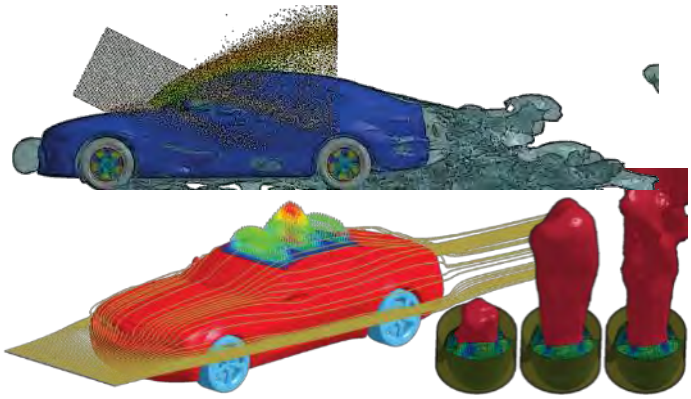
www.youtube.com/user/980LsDyna

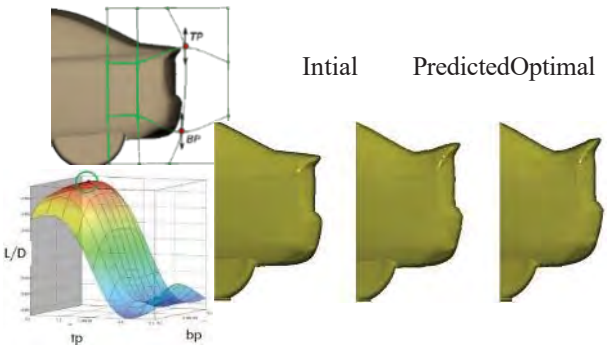


Accurate prediction of aerodynamic forces for turbulent flows

Coupling with Discrete Element Method (DEM) for water management simulations

Fluid-Structure Interaction analysis for a large number of applications including automotive and bio-medical industries





Shape optimization using ANSA® and LS-OPT®

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.

Progressive Composite Damage Modeling in LS-DYNA (MAT162 & Others)

Bazle Z. (Gama) Haque, Ph.D.
Senior Scientist, University of Delaware Center for Composite Materials (UD-CCM)
Assistant Professor of Mechanical Engineering, University of Delaware, Newark, DE 19716 P: (302) 690-4741 | E: bzhaque@udel.edu

2020 Workshops

Webinar Course Dates
March 10, 2020
July 14, 2020
November 17, 2020

In House Course Dates
March 11, 2020
July 15, 2020
November 18, 2020

Cost:
In-House Class: $695 per person
Includes: Coffee, Lunch, Parking, USB with Course Content

email Corinne Hamed for driving direction

Web Conference: $695 per person
Includes: CD with Course Content

Description:

Progressive damage modeling of composites under low velocity impact, and high velocity impact is of interest to many applications including car crash, impact on pressure vessels, perforation and penetration of thin and thick section composites. This course will provide a comparison between available composite models in LS-DYNA for shell and solid elements, e.g., MAT2, MAT54, MAT59, & MAT162. Among these material models, rate dependent progressive composite damage model MAT162 is considered as the state of the art. This short course will include the theory and practice of MAT162 composite damage model with applications to low and intermediate impact velocities, understanding the LS-DYNA programming parameters related to impact-contact, damage evolution, perforation and penetration of thin- and thick-section composites. Printed copies of all lecture notes will be provided along with a CD containing all example LS-DYNA keyword input decks used in this short course.

Topics Covered in this Short Course:
Impact and Damage Modeling of Composites
Application of MAT162 in Engineering and Research Problems
Introduction to Composite Mechanics
Introduction to Continuum Mechanics and Composite Mechanics
Composite Material Models in LS-DYNA for Shell and Solid Elements
Discussion on MAT2, MAT54, MAT59, & MAT162
Theory and Practice in MAT162 Progressive Composite Damage Model for Unidirectional and Woven Fabric Composites
MAT162 User Manual – Version 15A 2015
Progressive Damage Modeling of Plain-Weave Composites using LS-Dyna Composite Damage Model MAT162
Unit Single Element Analysis
Comparison between Different LS-DYNA Composite Models
Sphere Impact on Composite SHELL & SOLID Plates
Low Velocity Impact and Compression after Impact Applications
Modeling the Low Velocity Impact and Compression after Impact Experiments on Composites Using MAT162 in LS-DYNA
Perforation Mechanics of 2-D Membrane and Thin Composites
Penetration Mechanics of Composites and Soft-Laminates
Introduction to LS-DYNA (Document Only)

To register, email Corinne Hamed your full name, and if you're attending in house or web conference.

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.

POSTPONED
Oasys LS-DYNA Users' Meeting

New date to be announced

Due to the guidance regarding COVID-19, our annual meeting for UK Oasys LS-DYNA users planned for 30th March 2020 has now been postponed.

We recognise that our users enjoy this annual meeting and like to meet in person and likewise, this is important to us too. We are therefore planning to reschedule it for Fall 2020.

Although the event has been put on hold, we would still like to share the new features of Oasys Suite 17.0 and recent LS-DYNA developments with you. We will be sharing this updated material through a series of short interactive webinars. A timetable for these webinars and registration details will be sent shortly.

Please sign up to our newsletter here to be able to receive an update on these webinars.

If you are unable to join the live webinars, they will be recorded and posted on our website and YouTube channel.

Although we've had to change the delivery format of the update meeting, we're looking forward to seeing you dialed in.

We wish you all to stay safe and healthy!

Kind regards,

The Oasys LS-DYNA Team

If you have any questions about this event please get in touch: dyna.support@arup.com

Oasys Software Version 17 Coming Soon!

A **new user interface** for the Oasys software
Improved speed and performance
A more integrated suite of products
More expert tools and functionality

You will be able to download the new version 17 from our website here.

Oasys | LS-DYNA ENVIRONMENT

Did you know?
Top Tips for using the Oasys Software

Did you know you can create and customise your own shortcut keys to help you be more efficient when using the Oasys Suite?

See our latest Top Tips on Oasys Software

Predictive Engineering

www.predictiveengineering.com

Predictive Engineering provides FEA and CFD consulting services, software, training and support to a broad range of companies.

FINITE ELEMENT ANALYSIS
Predictive Engineering

Predictive Engineering – Western States ANSYS LS-DYNA Distributor – Your Free Coffee Cup is On Its Way!

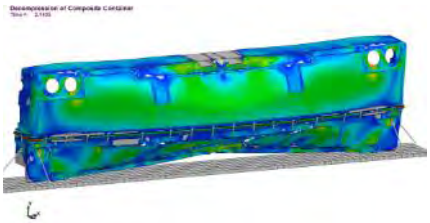
LS-DYNA has been one of Predictive's core analysis tools pretty much since we got started in 1995. It is an amazing numerical workhorse from the basic linear mechanics (think ANSYS or Nastran) to simulating well nigh the impossible. At least that is the way I feel at times when the model is not solving and spitting out arcane error messages and I'm basically questioning my sanity for accepting this project from hell that has a deadline at the end of the week. Which brings me to my favorite project management image – "trough of despair followed by wiggles of false hope then crash of ineptitude and finally the promised land" but I'll leave that for another blog.

For now, let's talk about those free coffee cups. Predictive is now the western states distributor of ANSYS LS-DYNA and provides complete sales, training and services for ANSYS LS-DYNA clients in this region. It is a continuation of our prior setup with LSTC (now ANSYS LST) with the addition of Predictive's ability to offer ANSYS Workbench with LS-DYNA and other ANSYS software tools. So where's my free coffee cup? If you are a current Predictive ANSYS LS-DYNA client, we'll be shipping'em out to you at the end of February and for our new client's – just send us an email or give us a call.

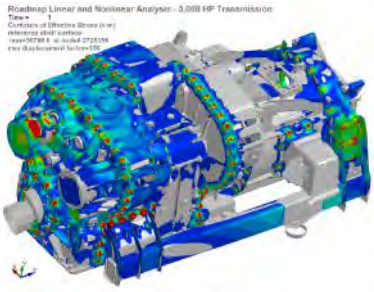
View our portfolio

FEA, CFD and LS-DYNA consulting projects

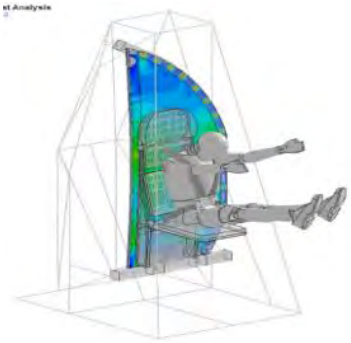
Composite Engineering



Nonlinear Dynamics



Aerospace



Contact:

Address:
2512 SE 25th Ave
Suite 205
Portland, Oregon 97202
USA

Phone:
503-206-5571
Fax:
866-215-1220
E-mail:
sales@predictiveengineering.com

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.

Modernize your SPDM strategy with Rescale and the Cloud

January 29, 2020 | Fanny Tréheux

Simulation environments face unique challenges: fragmented software and hardware, a large simulation data set, and a complex execution process. Data is isolated and managed using technology 10+ years old. For example, simulation data is managed on the engineering desktop, or at best, through a shared NAS relying heavily on naming conventions. Files are shared with remote users via email or FTP. This hurts simulation expert productivity and the ability to maintain traceability. However, recent advances in cloud technologies have made it possible to modernize Simulation Process & Data Management (SPDM).

OVERVIEW

Simulation Process & Data Management (SPDM) is a technology trend that has existed since the year 2000, aiming to build a simulation method, provide traceability and increase productivity through automation. “Despite the successes achieved with SPDM, the adoption of information systems to manage simulation data by simulation engineers is still very low at 1%-2%,” according to NAFEMS. Three major legacy inhibitors include: a) lack of openness: commercial solutions are proprietary and lack standards; b) disruption to existing systems: implementing requires major disruptions to the user experience, IT environment, and simulation processes; and c) time to deploy.

SOLUTION

Because of recent advancements in cloud technology, IT leaders can now rapidly build their own SPDM stack, avoiding vendor lock-in and minimizing disruption to mission-critical applications. A best-of-breed cloud SPDM architecture eliminates manual integration and incorporates cloud-based data stores or data lakes, modern workflow management tools, support for a wide range of commercial applications and license management, and a fully managed stack for automating how these tools integrate. This stack might like the below:

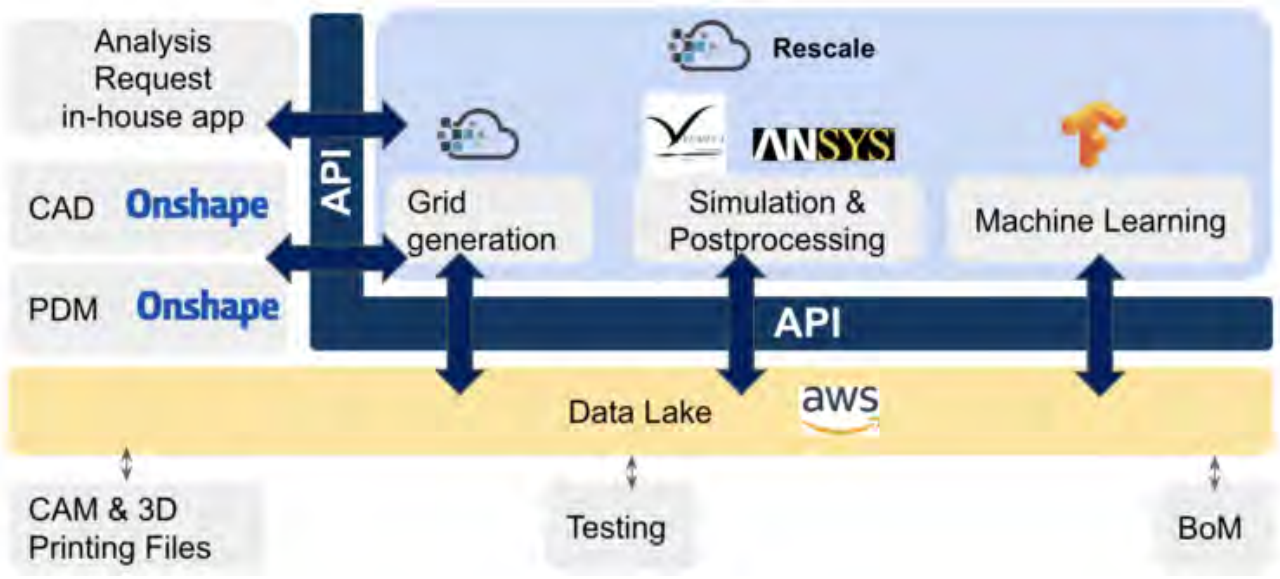


Figure 1 : Example of cloud SPDM solution stack

Rescale offers an integral component to help integrate this best-of-breed stack, and focuses on addressing all the SPDM challenges related to simulation process execution. The ScaleX platform transforms a difficult, complicated and inconvenient HPC experience into something that is easy to maintain, simple to integrate, and intuitive to use. This provides an abstraction layer that automates data movement, process orchestration, and dashboarding across application and execution environments. It lowers barriers to entry for engineers to leverage HPC resources and captures all the precious simulation information without effort from the users.

In this article, we will explore the following technology enablers that make cloud SPDM modernization possible:

- Full-stack simulation workflow formulation
- Automatic HPC data capture
- Globally optimized architecture
- Systematic governance

Read full article in website

LS-DYNA China, as the master distributor in China authorized by LST, an Ansys company, is fully responsible for the sales, marketing, technical support and engineering consulting services of LS-DYNA in China.

仿坤软件 LS-DYNA China

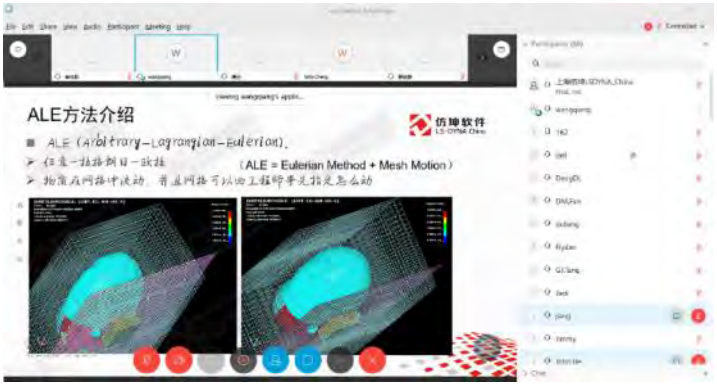
About Shanghai Fangkun Software Technology Ltd.

Address: Room 2219, Building No.1, Global Creative Center, Lane 166, Minhong Road, Minhang District, Shanghai, China 201102
Tel.: 021-61261195 4008533856
Email: sales@lsdyna-china.com
support@lsdyna-china.com
Website: www.lsdyna-china.com

Shanghai Fangkun Held Several LS-DYNA Related Webinars in the First Quarter of 2020

In order to help domestic users to learn and share advanced design strategy, design method, research ability and new functions more conveniently, Shanghai Fangkun has held a series of LS-DYNA related webinar courses since 2020. These topics covered “Introduction to MPDB”, “LS-DYNA basic training”, “Introduction to Implicit analysis”, “ALE method in LS-DYNA”, “Introduction to ICFD analysis”, “Introduction to Submodel function”, etc.

These courses have attached hundreds of attendees that came from various major fields such as Vehicle OEMs, Components factories, Die & Tooling industry, Aerospace and Electronic Industries, major colleges and universities, etc. to participate. And instructors and attendees were engaged in conversations several times during webinars and many of them said they gained a lot.



Shanghai Fangkun will continue to provide more various webinars and training courses for domestic users and will keep mission firmly in mind, devote to improving user satisfaction of LS-DYNA and providing high-quality technical support and engineering consulting services for users.

For more information please follow our Wechat ID “LSDYNA” and our website www.lsdyna-china.com.

2020 Annual Training & Workshop

Dear LS-DYNA users，

To help users to better understand LS-DYNA software and use LS-DYNA more efficiently, Shanghai Fangkun releases 2020 annual training and workshop plan as following tables. We welcome those who are interested to attend.

Date	Topic	City	Duration
20-21,Feb.	Introduction to LS-DYNA (basic training)	Shanghai	2 days
Mar.	Product design with LS-OPT	Shanghai	1 day
Apr.	Crashworthiness in LS-DYNA	Shanghai	2 days
May	Material models in LS-DYNA (composite, non-metal)	Shanghai	2 days
Jun.	Introduction to LS-DYNA (basic training)	Chongqing	2 days
Jun.	Restraint system in LS-DYNA	Shanghai	2 days
Jul.	Battery multi-physics simulation with LS-DYNA	Shanghai	1 day
Sep.	Implicit analysis in LS-DYNA	Shanghai	1 day
Oct.	Fluid structure interaction with LS-DYNA (ALE, ICFD)	Shanghai	2 days
Nov.	Introduction to LS-DYNA (basic training)	Beijing	2 days
Dec.	User-Defined Materials in LS-DYNA	Shanghai	1 day

2020 LS-DYNA online workshop plan			
Date	**Topic**	**Duration**	**Fee**
13rd Jan.	Introduction to MPDB	3 hours	Free
Apr.	Contact Modeling in LS-DYNA	2 hours	Free
May	SALE method in LS-DYNA	2 hours	Free
Jun.	Introduction to Q series dummies	2 hours	Free
Jul.	NVH, Fatigue, & Frequency Domain Analysis in LS-DYNA	2 hours	Free
Aug.	SPG method in LS-DYNA	2 hours	Free
Sep.	Introduction to LS-PrePost	2 hours	Free
Sep.	Introduction to LS-OPT	2 hours	Free
Oct.	Introduction to LS-Form & Stamp forming	2 hours	Free
Oct.	Performance analysis of bus with LS-DYNA	2 hours	Free
Nov.	LST Dummy & Barrier	2 hours	Free
Nov.	EM method in LS-DYNA	2 hours	Free
Dec.	Summary of fluid structure interaction method in LS-DYNA	2 hours	Free
Dec.	Virtual Proving Ground training	2 hours	Free

Contact: Elva Yu Tel.: 18221209107, 021-61261195 for more detail information

Email: Training@lsdyna-china.com

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.

TERRABYTE Co.,Ltd.
Customer Satisfaction by Computer Solution & Computer Simulation

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.



GM Reveals New Ultium Batteries and a Flexible Global Platform to Rapidly Grow its EV Portfolio

March 4, 2020

WARREN, Mich. – Starting today, General Motors Co. (NYSE: GM) is gathering hundreds of employees, dealers, investors, analysts, media and policymakers to share details of its strategy to grow the company's electric vehicle (EV) sales quickly, efficiently and profitably.

"Our team accepted the challenge to transform product development at GM and position our company for an all-electric future," said Mary Barra, GM chairman and CEO. "What we have done is build a multi-brand, multi-segment EV strategy with economies of scale that rival our full-size truck business with much less complexity and even more flexibility."

The heart of GM's strategy is a modular propulsion system and a highly flexible, third-generation global EV platform powered by proprietary Ultium batteries. They will allow the company to compete for nearly every customer in the market today, whether they are looking for affordable transportation, a luxury experience, work trucks or a high-performance machine.

"Thousands of GM scientists, engineers and designers are working to execute an historic reinvention of the company," said GM President Mark Reuss. "They are on the cusp of delivering a profitable EV business that can satisfy millions of customers."

Ultium Batteries and Propulsion System Highlights

- GM's new Ultium batteries are unique in the industry because the large-format, pouch-style cells can be stacked vertically or horizontally inside the battery pack. This allows engineers to optimize battery energy storage and layout for each vehicle design.
- Ultium energy options range from 50 to 200 kWh, which could enable a GM-estimated range up to 400 miles or more on a full charge with 0 to 60 mph acceleration as low as 3 seconds. Motors designed in-house will support front-wheel drive, rear-wheel drive, all-wheel drive and performance all-wheel drive applications.
- Ultium-powered EVs are designed for Level 2 and DC fast charging. Most will have 400-volt battery packs and up to 200 kW fast-charging capability while our truck platform will have 800-volt battery packs and 350 kW fast-charging capability.

GM's flexible, modular approach to EV development will drive significant economies of scale and create new revenue opportunities, including:

- Continuous Improvement in Battery Costs: GM's joint venture with LG Chem will drive battery cell costs below $100/kWh. The cells use a proprietary low cobalt chemistry and ongoing technological and manufacturing breakthroughs will drive costs even lower.
- Flexibility: GM's all-new global platform is flexible enough to build a wide range of trucks, SUVs, crossovers, cars and commercial vehicles with outstanding design, performance, packaging, range and affordability.
- Capital Efficiency: GM can spend less capital to scale its EV business because it is able to leverage existing property, including land, buildings, tools and production equipment such as body shops and paint shops.
- Complexity Reduction: The vehicle and propulsion systems were designed together to minimize complexity and part counts beyond today's EVs, which are less complex than conventional vehicles powered by internal combustion engines. For example, GM plans 19 different battery and drive unit configurations initially, compared with 550 internal combustion powertrain combinations available today.
- Rising Customer Acceptance: Third-party forecasters expect U.S. EV volumes to more than double from 2025 to 2030 to about 3 million units on average. GM believes volumes could be materially higher as more EVs are launched in popular segments, charging networks grow and the total cost of ownership to consumers continues to fall.
- New Sources of Revenue: By vertically integrating the manufacture of battery cells, the company can reach beyond its own fleet and license technology to others.

The first generation of GM's future EV program will be profitable. The initial programs will pave the way for further accretive growth. GM's technology can be scaled to meet customer demand much higher than the more than 1 million global sales the company expects mid-decade.

General Motors reveals its all-new modular platform and battery system, Ultium, Wednesday, March 4, 2020 at the Design Dome on the GM Tech Center campus in Warren, Michigan. (Photo by Steve Fecht for General Motors)

Upcoming Launches and Reveals

Chevrolet, Cadillac, GMC and Buick will all be launching new EVs starting this year. The next new Chevrolet EV will be a new version of the Bolt EV, launching in late 2020, followed by the 2022 Bolt EUV, launching Summer 2021. The Bolt EUV will be the first vehicle outside of the Cadillac brand to feature Super Cruise, the industry's first true hands-free driving technology for the highway, which GM will expand to 22 vehicles by 2023, including 10 by next year.

The Cruise Origin, a self-driving, electric shared vehicle, shown to the public in January 2020 in San Francisco, was the first product revealed using GM's third generation EV platform and Ultium batteries. Next will be the Cadillac Lyriq luxury SUV in April. Details about its launch will be shared then. The reveal of the Ultium-powered GMC HUMMER EV will follow on May 20. Production is expected to begin in Fall 2021 at GM's Detroit-Hamtramck assembly plant, GM's first assembly plant 100 percent dedicated to EV production.

Cautionary Note on Forward-Looking Statements: This press release contains forward-looking statements that represent our current judgment about possible future events. In making these statements we rely on assumptions and analysis based on our experience and perception of historical trends, current conditions and expected future developments as well as other factors we consider appropriate under the circumstances. We believe these judgments are reasonable, but these statements are not guarantees of any events or financial results, and our actual results may differ materially due to a variety of important factors, both positive and negative. A list and description of these factors can be found in our Annual Report on Form 10-K and our subsequent filings with the U.S. Securities and Exchange Commission. We caution readers not to place undue reliance on forward-looking statements. We undertake no obligation to update publicly or otherwise revise any forward-looking statements, whether as a result of new information, future events or other factors that affect the subject of these statements, except where we are expressly required to do so by law.

General Motors (NYSE: GM) is a global company committed to delivering safer, better and more sustainable ways for people to get around. General Motors, its subsidiaries and its joint venture entities sell vehicles under the Chevrolet, Buick, GMC, Cadillac, Holden, Baojun, and Wuling brands. More information on the company and its subsidiaries, including OnStar, a global leader in vehicle safety and security services, and Maven, its personal mobility brand, can be found at http://www.gm.com.

LS-DYNA - Resource Links

LS-DYNA Multiphysics YouTube

https://www.youtube.com/user/980LsDyna

FAQ LSTC

ftp.lstc.com/outgoing/support/FAQ

LS-DYNA Support Site

www.dynasupport.com

LS-OPT & LS-TaSC

www.lsoptsupport.com

LS-DYNA EXAMPLES

www.dynaexamples.com

LS-DYNA CONFERENCE PUBLICATIONS

www.dynalook.com

ATD –DUMMY MODELS

www.dummymodels.com

LSTC ATD MODELS

www.lstc.com/models www.lstc.com/products/models/mailinglist

AEROSPACE WORKING GROUP

http://awg.lstc.com

Training - Webinars

Participant's Training Classes

Webinars

Info Days

Class Directory

Directory

BETA CAE Systems	www.beta-cae.com/training.htm
DYNAmore	www.dynamore.de/en/training/seminars
Dynardo	http://www.dynardo.de/en/wost.html
ESI-Group	https://myesi.esi-group.com/trainings/schedules
ETA	http://www.eta.com/training
KOSTECH	www.kostech.co.kr
ANSYS LST	www.lstc.com/training
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

Seminars 2020

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

Selection of trainings for March/April

Introduction	
Introduction to LS-DYNA	24-26 March 31 March -2 April (Z) 1-2 April (T)
Nonlinear Implicit Analyses	3 April (T) 27 April (Z)
Crash	
Crash Analysis	17-20 March 24-27 March (G)
Joining Techniques in LS-DYNA	9-10 March 21-22 March (G)
Failure of Fiber-Reinforced Polymers	16 March
Introduction to contact definitions in LS-DYNA	30 March (V)
Passive Safety	
Introduction to Passive Safety	12-13 March
CMP Airbag Modeling	27 March
Material	
Material Failure	23-24 March (T)
Polymers/Elastomers	20-21 April
Simulation of continuous fiber reinforced composites	22-23 April
Simulation of short fiber reinforced composites	24 April
Modeling Metallic Materials	23-24 April (T)
Implicit Capabilities	
Implicit Analysis using LS-DYNA	11-12 March

Information days (free of charge)

New Features in LS-DYNA	18 March (T)
Optimization with ANSA, LS-OPT and META	23 March

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

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

www.lstc.com

April 2020

Date		Location	Course Title	Instructor(s)
Apr 1		***CA***	Introduction to LS-TaSC™	I. Gandikota
Apr 2	Apr 3	***CA***	Introduction to LS-OPT®	I. Gandikota
Apr 14	Apr 15	***CA***	Concrete & Geomaterial Modeling with LS-DYNA®	L. Schwer
Apr 15		***MI***	Airbag Particle Method (APM)	A. Gromer
Apr 20	Apr 21	***CA***	Advanced LS-PrePost®	A. Nair
Apr 22	Apr 23	***CA***	Advanced LS-DYNA®	S. Bala
Apr 28	Apr 29	***MI***	Contact Modeling in LS-DYNA®	N. Karajan

May 2020

Date		Location	Course Title	Instructor(s)
May 4	May 5	CA	User-Defined Materials in LS-DYNA®	A. Tabiei
May 5	May 8	***MI***	Introduction to LS-DYNA®	S. Adya

Recent Developments in LS-DYNA S-ALE

Hao Chen

Livermore Software Technology, an ANSYS Company

Abstract

The LS-DYNA ALE/FSI package is widely used in studying structures under blast loading. Generally, the ALE mesh is necessarily unstructured to accommodate complex geometries; however, for simple rectilinear geometries, a structured, logically regular, mesh can be utilized. Recognition of this latter case leads to algorithmic simplifications, memory reductions, and performance enhancements, which are impossible in unstructured mesh geometries.

In 2015, LSTC introduced a new structured ALE (S-ALE) solver option dedicated to solve the subset of ALE problems where a structured mesh is appropriate. As expected recognizing the logical regularity of the mesh brought a reduced simulation time for the case of identical structured and unstructured mesh definitions.

In this paper we will introduce the new developments and enhancements in LS-DYNA S-ALE for the past two years.

Mesh trimming

S-ALE supports limited types of meshes. The mesh is either of a rectangular box shape or a combination of connecting rectangular boxes (through mesh merging). This limitation is a tradeoff for the simplicity of geometry information. For certain cases, using a big box trying to cover up the structures could be quite wasteful. For example, let us say we build a model studying raindrops hitting on the windshield. On one hand, we need to make the mesh box large enough to cover the curved windshield; on the other hand, we know any element a few elements far away from the windshield is not necessary.

This motivated us to implement the mesh trimming feature. It is to trim the S-ALE mesh to bring the savings on running time and memory. Hence we introduced a new input keyword *ALE_STRUCTURED_MESH_TRIM to perform the trimming operation at the initialization phase. This keyword has two cards and could be used multiple times. In case of multiple times, each * ALE_STRUCTURED_MESH _TRIM keyword represents one “trim” or “untrim” process; and each is processed at the order of appearance in the input deck.

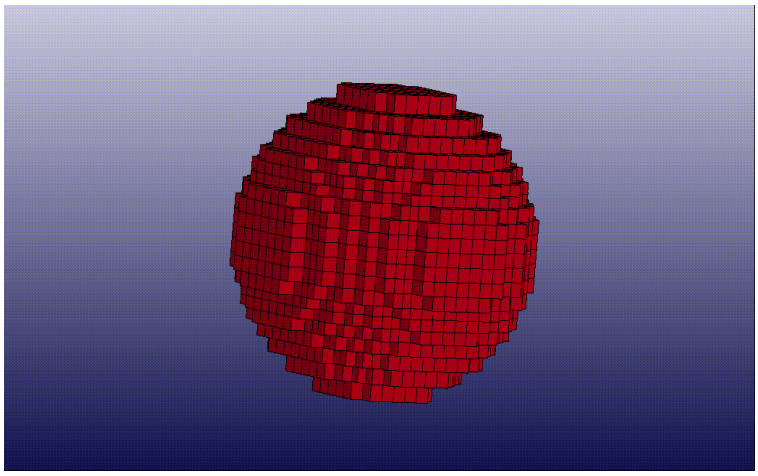
The field “oper” means “operation” and could take either “trim” or “keep”. “trim” is to trim the elements inside or outside of certain geometry. The geometry could be either simply geometry such as plane, box, cylinder, sphere, or some complex shape represented by a list of segments or shell parts. Contrarily, “keep” is to add the elements into the mesh. Those elements might or might not be trimmed by previous commands from the mesh; but are wanted in the final mesh. By combining these two operations, users could enjoy quite some flexibility in the mesh construction process.

There are currently six trimming commands. They are “PARTSET”, “SEGSET”, “PLANE”, “CYLINDER”, “BOX” and “SPHERE”. Please refer to the LS-DYNA manual for exact usage.

*ALE_STRUCTURED_MESH					
$ mshid	pid	nbid	ebid		
1	1	200001	200001		
$ cptx	cpty	cptz	nid0	lcsid	
1001	1001	1001	1	234	

*ALE_STRUCTURED_MESH_TRIM					
$ mshid	command	oper	flip	nid	radius
1	SPHERE			5	0.1
$ mshid	command	oper	flip	psetid	offset
1	PARTSET			3	0.03

Below is a figure shows a box mesh trimmed by “SPHERE”. This example input deck could be found at http://ftp.lstc.com/anonymous/outgoing/hao/sale/models/meshtrim/saletrim.tar. For this example, out of total 9261 elements, 3614 elements are deleted. This brought a nearly 40% reduction on simulation time.



Mesh motion

S-ALE does not support *ALE_REFERENCE_SYSTEM_GROUP card which is used to move the ALE mesh. Instead it allows mesh to move and rotate by prescribing the motion on the origin node (NID0) and the three nodes used to define local coordinate system (LCSID). While it satisfies most user problems we have so far, it does not allow for mesh to follow the mass center of certain fluid. So we added a mesh motion keyword *ALE_STRUCTURED_MESH_MOTION. Currently it only has one option, "FOLLOW_GC" which makes the mesh to follow mass center's motion. More mesh motion options are expected to be added per user's request; very possibly on the mesh expansion/contraction.

Below is an example using *ALE_STRUCTURED_MESH_MOTION. The input deck is available at http://ftp.lstc.com/anonymous/outgoing/hao/sale/models/meshtrim/2bagstrim.tar.

*ALE_STRUCTURED_MESH					
$ mshid	pid	nbid	ebid		
1	1	10001	10001		
$ cptx	cpty	cptz	nid0	lcsid	
1001	1001	1001	4001	234	

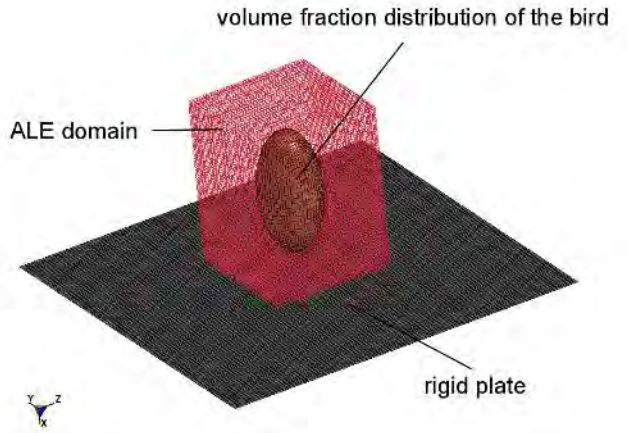
*ALE_STRUCTURED_MESH_TRIM					
$ mshid	command	oper	flip	psetid	offset
1	PARTSET			3	0.03

*ALE_STRUCTURED_MESH_MOTION					
$ mshid	option	AMMGSET			
1	FOLLOW_GC	1			

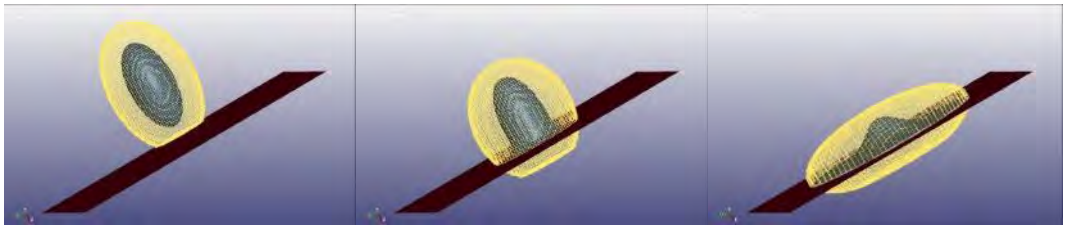
Comparison between ALE, S-ALE and trimmed S-ALE

Now we use a bird hitting plate example to show how we use trimming and mesh motion features. Also, we do a comparison on the results and running time for the three cases: ALE solver, S-ALE solver and S-ALE solver with trimmed mesh. The input deck is at http://ftp.lstc.com/anonymous/outgoing/hao/sale/models/awgbirdstrike/.

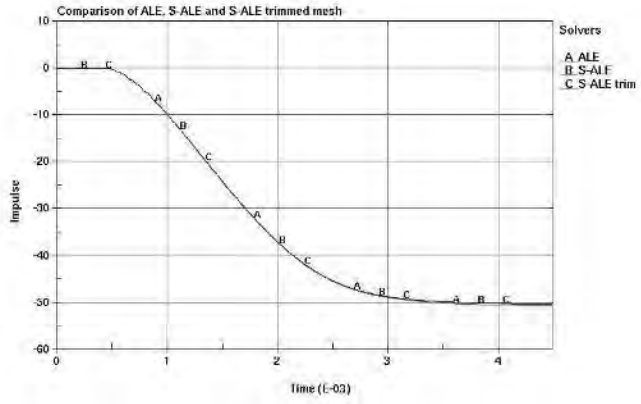
The following sketch shows the problem. A bird of ellipsoid shape is defined as ALE multi-material group (AMMG 1) in a box mesh. It is travelling at some initial speed and hit the rigid plate. In all three cases, the mesh moved the same way. We took the untrimmed ALE case as the base. And we constructed the second case with nothing changed but to use S-ALE solver. Then the third case was built by applying the trimming card.



The mesh motion for the trimmed S-ALE case could be seen in the following plots.



Below is the total impulse recorded on the rigid plate. We could see that for all three cases the curves are all on top of each other. This told us that neither the S-ALE solver nor the mesh trimming process affected the result.



Now let us look at the running time. From the following table, we could see S-ALE solver and the mesh trimming process brought huge time savings. Using S-ALE solve achieved a 40%-44% time reduction. And with mesh trimming the reduction became even bigger. It saved 65% of running time for both SMP 1core and MPP 4 cores.

METHODS	#of Elements	SMP 1 Core	SMP Savings	MPP 4 Core	MPP Savings
ALE	84800	1204 s		321 s	
S-ALE	84800	675 s	44%	191 s	40%
S-ALE trim	43219	426 s	65%	112 s	65%

Initial Volume Filling

A new keyword was added in S-ALE solver to do the volume filling in the initial S-ALE mesh -- *ALE_STRUCTURED_MESH_VOLUME_FILLING (ASMVF). It serves the same purpose as *INITIAL_VOLUME_FRACTION_GEOMETRY (IVFG) and has a quite similar format. However, it is a better and much more flexible alternative to the IVFG card.

It is different in a few ways. First, IVFG card could only appear once in the input file. Only the last one is honored and all previous appearances are simply ignored. While it might be enough for ALE simulations as ALE solver only supports one mesh, it becomes a concerning issue for S-ALE solver. We could have multiple meshes in one model but the IVFG card only allows us to perform volume filling on 1 part.

Secondly, IVFG has only 1 background material. It fills all element in the ALE mesh with that background material first. And then allows the user to put in multiple "switch" operations to switch that background material in certain geometry to certain different material. While it is sufficient as long as users know its limitation and perform the volume filling in some special model-specific way, for new users or some difficult problems it could take quite some time and a few iterations before the volume filling could be performed correctly.

Thirdly, for MPP runs, IVFG does the volume filling at PHASE 1 and stores the volume filling result which is the volume fraction for each ALE multi-material group (AMMG) in each element. Later at PHASE 4, this database is read in and stored. This process is wasteful in two ways. First, at PHASE 1 only 1 core is active. For large models, the volume filling could be very time consuming. It could easily take hours before the run could even start. Secondly, writing out and reading back the volume fraction database is also time consuming as it is I/O intensive.

Conclusions

We introduced several notable new developments in LS-DYNA Structured ALE solver in this paper. Those features are added solely to reduce the simulation time and memory usage. In recent years, we observed a rapid growth in the ALE model size and the accompanying demands in speed and memory usage. Nowadays, models as large as 60 million elements are commonly used by the S-ALE users and we expect the trend to follow. The S-ALE developer at LSTC is committed to continually work with our users to improve.

BETA CAE Systems. www.beta-cae.com

BETA CAE Systems - ANSA

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 LST, an ANSYS company to provide an integrated solution in the field of optimization.

BETA CAE Systems μETA

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

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 www.esi-group.com

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 Corporation www.jsol.co.jp/english/cae/

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.

ANSYS LST

Livermore Software Technology, an ANSYS Company
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 LST, an ANSYS company. 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.

LST, AN ANSYS COMPANY 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.

LST, AN ANSYS COMPANY 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 www.oasys-software.com/dyna

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)
- 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.

恒士达科技
Hengstar Tech.

Shanghai Hengstar www.hengstar.com

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..

Cloud - HPC Services - Subscription JSOL

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 expensive 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

Cloud - HPC Services - Subscription RESCALE

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.

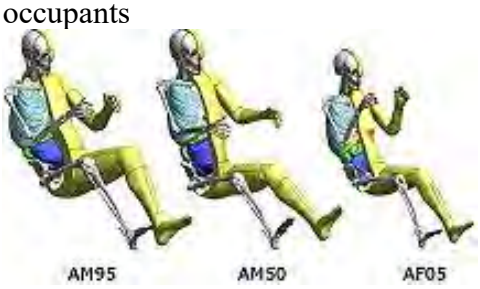
Key collaboration capabilities:

- 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

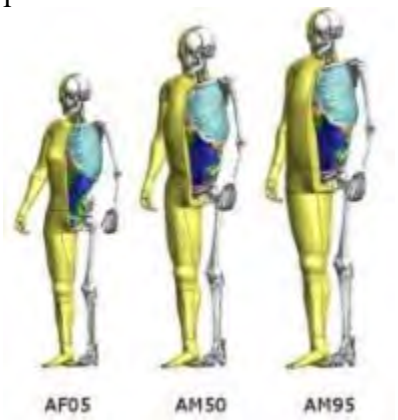
TOYOTA - Total Human Model for Safety – THUMS

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.

LST, An ANSYS Company – Dummy Models

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

LST, An ANSYS Company – 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.

FACEBOOK

BETA CAE Systems
CADFEM
ESI Group
Lenovo

TWITTER

BETA CAE Systems
ESI Group
ETA
CADFEM
Lenovo

LINKEDIN

BETA CAE Systems
CADFEM
DYNAmore Nordic
ETA
ESI Group

YOUTUBE

YOUTUBE Channel	WebSite URL
BETA CAE Systems	www.beta-cae.com
CADFEM	www.cadfem.de
ESI Group	www.esi-group.com
ETA	www.eta.com
Lancemore	www.lancemore.jp/index_en.html
Lenovo	

GOOGLE+

BETA CAE Systems