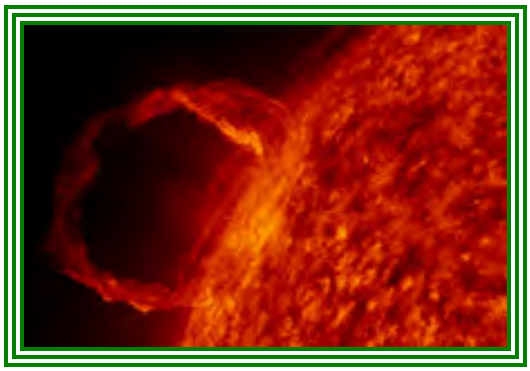
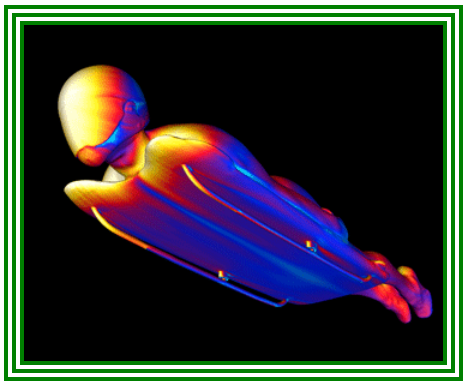
FEA Information http://www.feainformation.com

Engineering Journal and Website Resource

APRIL 2010



NASA – Solar Observatory



CEI - Bobsled Aerodynamics

SGI® - Medical Field

LSTC – LS-DYNA®, LS-PrePost®
LS-OPT®, Dummy/Barrier Models

Conference Training Courses

FTSS - Airman Dummy

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Announcements

11th International LS-DYNA® Users Conference Notice:

The discounted conference hotel rate is only in place through May 4th. The Hyatt Regency, will not have extra rooms it can offer at the conference rate. Those rooms are sold out to another conference. Make your reservations to retain the discounted rate.

Register for conference: http://www.ls-dynaconferences.com/
Side link is "Registration"

Register for your hotel reservations: http://www.ls-dynaconferences.com/
Side link is "Hotel Information"

Due to the expanding use of LS-DYNA in China,
LSTC authorized a fourth direct distributor:

Dalian Fukun Technology Development Corporation
Dalian Fukun joins LSTC Distributors in China: ARUP-China, ETA-China, NEC-China.

LSTC has sponsored April's and May's FEA Edition For their Conference News:
We will be posting special articles on their conference Sponsors.

Sincerely,
Marsha J. Victory, President,
FEA Information Inc

Pajarito – our herd's Lead Horse

FEA Information

Platinum

Participants

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MICROSOFT http://www.microsoft.com	**Voltaire:** http://www.voltaire.com	

April & May Featured: CHINA –Participants

Dalian Fukun Distribution/Training/Support	**ETA China** Distribution/Training/Support	**ARUP – China** Distribution/Training/Support
		Hengstar Tech. Co. Ltd. Training – Support

FEATURED PAPER
By S. Stahlschmidt, A Hirth

DYNALOOK
Courtesy of
LSTC & DYNAmore

The site presents papers from European and International LS-DYNA User Conferences and papers provided by other users. The papers are accessible via a search functionality. http://www.dynalook.com

Numerical Investigations to Determine Sources for the Scatter of the BioRID Dummy
S. Stahlschmidt, DYNAmore GmbH, Stuttgart, Germany
A. Hirth, Daimler AG, Sindelfingen, Germany

The BioRID v2.5 model is in a very fine validation state until now. In some new tests for further validation of the model, one can observe a very strong scatter in some major signals of the tests. Some of these signals are used to calculate injury criteria which are used to determine the quality of a seat in rear crash scenarios in consumer tests.

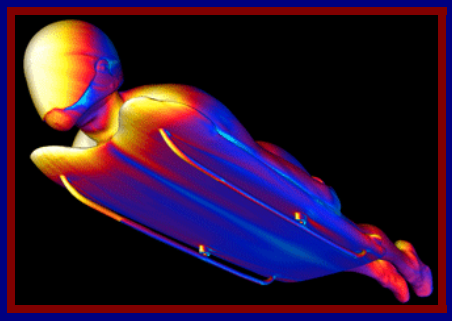
This paper describes the new validation test setup and gives an overview about the latest validation state of the BioRID model. Furthermore, the problem of scatter in tests is shown and possibilities where this scatter may come from have been studied. The main focus is on the parameters of the BioRID model which have an influence on the neck and load cell signals.

Keywords:
- BioRID
- Dummy
- Whiplash
- Robustness,
- Oscillation

...

http://www.dynalook.com/european-conf-2009/E-I-02.pdf

http://www.ls-dynaconferences.com – Join the 11th International LS-DYNA Conference for the latest Anthropomorphic Test Device Experts attending: DYNAmore, FTSS, Denton, LSTC. After the conference is offered a training course for the latest on LSTC Impact/Dummies & Barriers taught by Dilip Bhalsod, Sarba Guha and Christoph Maurath.



British team uses DSSP, extreme visualization to streamline skeleton bobsled aerodynamics

by Bob Cramblitt

Join CEI at
the 11th International LS-DYNA Users Conference

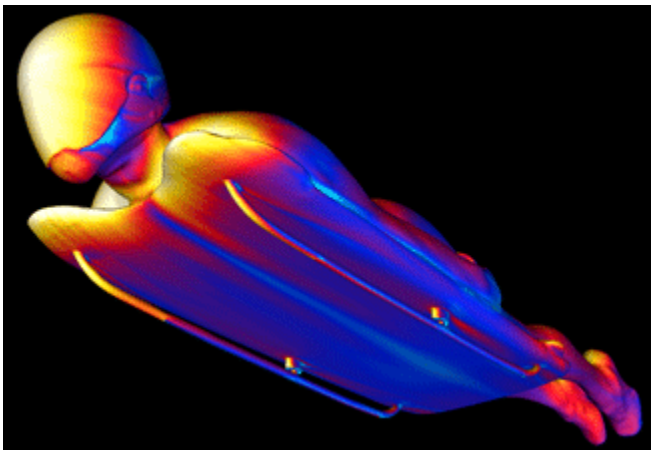
http://www.ensight.com/british-team-uses-dssp-extreme-visualization-to-streamline-skeleton-bobsled-aerodynamics.html

Strip bobsledding down to its essence – one human being and the slightest of sleds – and you have skeleton, a sport whose name comes from the bare-bone metal frames first used in 1892.

In many ways, skeleton is one of the simplest sports. After the initial push-off, the only factors determining success are the driver's skill and the external forces acting on driver and sled: gravity, airflow and friction. Yet, these forces can take on so many characteristics and have such a profound effect on performance that researchers are using advanced approaches such as digital shape sampling and processing (DSSP), computational fluid dynamics (CFD), and extreme visualization to shave off the precious tenths of seconds that can make the difference between an Olympics medal and disappointment.

From bikes to sleds

In the forefront of research on applying advanced technologies to sports that rely on the closest of man-machine interaction is Sports Engineering @ CSES, operating out of Sheffield Hallam University in Sheffield, UK. Led by Dr. John Hart, Sports Engineering @ CSES combined DSSP, CFD and extreme visualization to help the British Cycling team win four medals in the 2004 Summer Olympics in Athens.



The work of Sports Engineering @ CSES did not escape the attention of Dr. Kristan Bromley, a former engineer with British Aerospace. After leaving the aerospace industry in the mid-1990s, Bromley began applying aerospace technology such as finite element analysis (FEA) and physical and

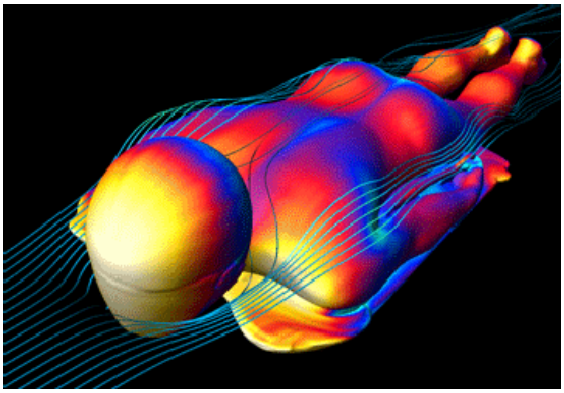
structural simulation to skeleton bobsledding. Along the way, he became a world-class athlete, competing for Great Britain in the Olympics and winning the world skeleton championship in the 2003/2004 season.

Bromley decided that the Sports Engineering group's work could be a key factor in preparing for the 2006 Winter Olympics in Turin. There was plenty of motivation for Bromley: Despite the fact that he would be going into the 2006 Olympics as the reigning skeleton champion, he had finished 13th in the 2002 Winter Olympics in Salt Lake City. While that might be an expected result for an athlete from a country devoid of mountains and snow, it was not even close to being satisfactory for Bromley.

Bromley's team, called Pro RACE, develops, manages and delivers R&D as part of a focused sled-development program. As part of that program, Pro RACE turned over the CFD simulation research to Sports Engineering @ CSES.

Capturing sled and athlete

Although they might seem vastly different on the surface, there is a lot of commonality between Sports Engineering's work with cyclists and the skeleton research: Both involve men riding on very lightweight vehicles, where the interaction of the human with the surrounding environment is just as important or more than the structural dynamics of the bike or sled. And, in both cases aerodynamics is a major performance factor.



Simulating a real-world skeleton environment required much of the same type of work that Sports Engineering @ CSES did for the British Cycling team. Sports Engineering researchers needed to capture precise geometry for the driver (also called a "slider") and the sled, create a highly accurate digital model of the two, then simulate and visualize the complex airflow factors that affect performance. Hart's digital toolbox for making that happen included a ModelMaker X70 laser scanner from 3D Scanners, Geomagic Studio digital reconstruction software, Fluent GAMBIT software for preprocessing, FLUENT software for CFD simulation, and CEI's EnSight for visualizing the myriad factors that come into play among driver, sled and environment over time.

Sports Engineering @ CSES initially scanned a skeleton sled with a mannequin to capture data and test out a few theories. But the real work was done based on a scan of Bromley in racing position on a competition sled.

"It is essential to have the true geometry of the actual athlete for whom the equipment is being designed in an event like the skeleton, where aerodynamics can be so important and so athlete-specific," says Hart. Those specifics can come down to such physical

characteristics as the size of the athlete's posterior, which can contribute significantly to the overall drag according to Hart.

Hart used the ModelMaker X70 with a FARO Gold Arm to capture the sled alone and Bromley in position on the sled. Besides the standard problems associated with scanning, such as shiny surfaces and areas difficult to access, capturing a live athlete entails other challenges, most notably trying to keep the athlete still during a process that can take around an hour.

"The athletes begin to twitch and ache, so you have to try to make them as comfortable as possible, and then make certain they get back in the correct positions if they need to get up and move about," says Hart. "It's not so much of an issue with a skeleton athlete, as their sport-specific posture is lying down."

Reconstructing the physical world

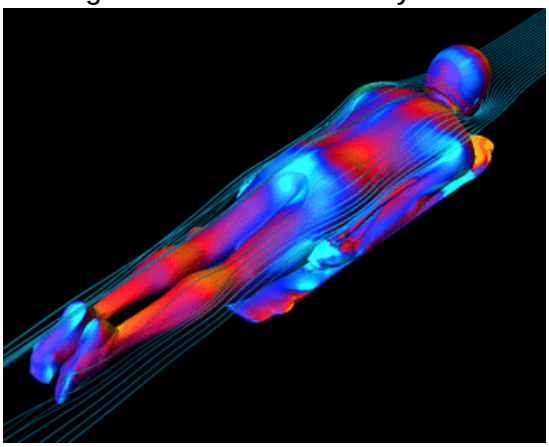
The combined scan data from the sled and Bromley on the sled was about five million points when it was brought into Geomagic Studio software for refinement and surfacing. Geomagic Studio is the central tool for realizing DSSP, a term that describes the ability to capture shape data from the physical world and duplicate it accurately in a computer so it can be used for downstream design, engineering and custom manufacturing.

Once the raw point-cloud data was imported into Geomagic Studio, it was refined to remove any noise picked up from the scanner. The data was automatically reduced to a workable size, while still maintaining dense point cloud data where needed for detail.

"Geomagic allowed us to easily clean up any imperfections in the scanned data, such as areas where Bromley might have moved inadvertently," says Hart. "The software smoothed the data, and enabled us to produce the high-quality NURBS model that we required for the simulation. No other tool could have produced these types of accurate surfaces so quickly and easily from such complex scan data."

The Geomagic model was output as an IGES file and imported into GAMBIT, Fluent's geometry and mesh-generation software. The completed mesh was imported into FLUENT CFD software, which was used by Sports Engineering to simulate the aerodynamics of the driver and sled, and to determine where improvements can be made.

Seeing the data in new ways



While FLUENT results gave Sports Engineering good data on aerodynamics, researchers needed a higher level of visualization to illuminate the CFD results. The FLUENT results were brought into EnSight for what is called "extreme visualization," not because it is used only in extreme cases, but because

the software enables interactions to be seen in new and revealing ways.

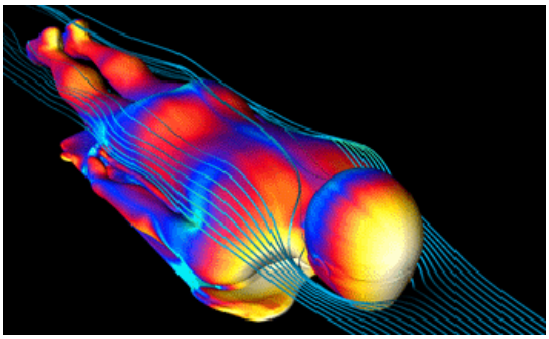
"There is no substitute for this type of visualization," says Hart. "It enables us to produce high-quality graphical output easily and quickly for detailed analysis, communication of results, and even marketing presentations."

Hart's group exported case file data directly from FLUENT into EnSight and then manipulated the model on screen to get the best views on what was taking place. To display factors such as surface pressures and surface oil flows, researchers swept clip planes through the model. This enabled them to analyze the entire model quickly. Streamlines within EnSight were used to obtain detailed information on how swirling airflows are formed and where they migrate over time.

When researchers found something interesting, they generated a reference image within EnSight or produced an animation to convey results to the client.

Although Sports Engineering often uses CEI's free EnLiten geometry viewer to distribute results to colleagues and customers, for this project results were communicated with still images for short technical reports and with animations generated directly from EnSight for face-to-face meetings.

From digital back to physical



Sports Engineering @ CSES cannot divulge details from its research for obvious competitive reasons, but Hart says results revealed some surprising regions of flow separation, and showed that certain factors have a larger influence than was previously believed.

As might be expected in a sport that entails a driver on top of a basic sled, body make-up plays a prominent role.

"Heavier sliders have an energy advantage over lighter ones, so the lighter ones will attempt to put on weight, usually through muscle bulk, which can actually have an adverse effect on drag depending on how the weight is distributed," says Hart.

The CFD visualization results, along with structural analysis, enabled Bromley to refine the sled design and implement equipment changes that increase aerodynamic efficiency. Design modifications from the digital environment were built into new sleds and equipment that were tested under training and race conditions.

"The research shows that drag can have a big impact over a typical skeleton run," says Hart. "As with all theoretical

studies, however, this relies on the slider having a near-perfect run. You can provide a slider or any athlete with the most aerodynamic piece of equipment available, but if they have an off day, any advantage quickly disappears."

In Bromley's case, it was an off day in Turin. After placing third following the first run, he fell to fifth place, out of medal contention, after the second and final run. Still, from 13th in 2002 to fifth four years later is remarkable progress, and only three-tenths of a second separated Bromley from a bronze medal.

No doubt there are other flow dynamics that can be tweaked based on DSSP and extreme CFD visualization. If there are new efficiencies to be found for skeleton bobsledding, Bromley's Pro RACE team and Sports Engineering @ CSES certainly have the tools and the know-how to find them.

More information

Engineers in many disciplines are increasingly combining DSSP, including reverse engineering, with CFD and extreme visualization to simulate real-world aerodynamics. For two recent examples:

Reverse Engineering, CFD Analysis Help British Cycling Team Sprint to Olympic Medals, british_cycling.pdf

www.geomagic.com/en/solutions/prodrive.php

For information on Sports Engineering @ CSES, visit: www.shu.ac.uk/cses /

Information on Kristan Bromley's Pro RACE group can be found at:
www.race-gbr.comm

More information on DSSP and its applications can be found at:
www.geomagic.com

SGI

In the medical field, SGI solutions enable 3D data classification, segmentation, and manipulation

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Medical Research

http://www.sgi.com/solutions/research/medical.html

With each new generation of medical scanning technology, spatial resolution has dramatically improved. Yet the unprecedented image quality and detail from the latest scanning systems mean that the amount of information that must be processed has grown exponentially, taxing the ability of standard commodity desktop workstations to process and display the data in a timely fashion. As a result, more clinicians are now looking toward volume exploration, rather than a multitude of static scans, as an efficient and more constructive use of scan data.

In medical research, real-time ray tracing plays an increasingly important role as a resource-efficient way to visualize this growing body of patient data. With the advent of high-performance, lower-cost processing technology, and sophisticated software ray tracing engines, ray tracing is now an attractive option for real-time rendering of ever larger volumes of data. Key to this transformation is the availability of cost-efficient, 64-bit HPC processors that leverage shared-memory architectures, making the entire system's memory available to render the entire data set.

In the medical field, SGI® Altix® servers, SGI® Altix® XE servers and clusters, and storage solutions enable:

3D data classification, segmentation, and manipulation, which allows surgeons to visualize key portions of patient data to enable less invasive procedures and treatments

Patient data and CAD model integration, which combines patient-specific information with implant models to assist in pre-operative planning of implant procedure

Sub-cellular analysis, which enables a microscopic and macroscopic understanding of the behavior of cancer

or other cells both at the cellular level and within the context of tissue sections
Shared access and transparent access to archive data without administrator intervention. Workflow is improved with scalable storage systems with the I/O capability necessary to move data to and from storage, without impeding productivity

For additional information and pdf's:

Tackling Large Volume Visualization Challenges with Real-Time Ray Tracing (PDF 640K)

SGI® InfiniteStorage Solutions for The Sciences: Reducing Time to Insight through Sophisticated Data Management (PDF 4.2M)

http://www.sgi.com

FTSS

Airman 50th Percentile
Live Fire Dummy - 124-0000

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http://www.ftss.com/crash-test-dummies/aerospace-military/airman

The U.S. Congressional Live Fire Testing National Defense Authorization Act for Fiscal Year 1987 prompted First Technology Safety Systems, Inc. to develop the Airman Dummy. The Act required survivability and lethality testing on weapons systems and munitions programs.

The Airman Dummy was designed to trap ballistic fragments impacting personnel in combat simulations. The fragments may be from ordinance, military equipment, or gear that has spalled or shattered due to ballistic impact. Information gathered using this dummy may be employed in design and testing of equipment and protective gear for combat personnel.

The Airman Dummy is a 50th Percentile Male anthropomorphic dummy in height. Its weight is approximately 1/3 that of the person its height simulates. Since the dummy is not designed for crash testing, the low weight is not important, and in fact makes the dummy easier to handle.

Ballistic fragments are trapped in the urethane body. Chipping of the paint helps to locate the impact points as its color contrasts to the urethane foam. Calibrations may be done on the foam to determine fragment impact velocity.

The dummy has articulated joints at the neck, shoulders, elbows, wrists, hips, knees and ankles. All joints except the shoulders and hips are pin joints allowing single axis rotary motion. The shoulders incorporate two rotations and a flexible member for added motion range. The hip joints have one rotation on a flexible shaft, which allows lateral motion. The articulation allows the dummy to be used standing or to be placed in military equipment in various operational positions.

Construction

The Airman's body parts are molded from rigid urethane foam (light tan color) painted spectrum white. The foam density is approximately 1/3 that of water yielding a dummy weight far below the 50th percentile as mentioned above.

The dummy has articulated joints at the neck, shoulders, elbows, hips, knees and ankles.

All joints except the shoulders and hips are pin joints allowing single axis rotary motion. The shoulders incorporate two rotations and a flexible member for added motion range. The hip joints have one rotation on a flexible shaft which allows lateral motion. The articulation allows the dummy to be used standing or to be placed in military equipment in various operational positions.

Use and Calibration

Ballistic fragments are trapped in the urethane body. Chipping of the paint helps to locate the impact points as its color contrasts to the urethane foam. The track of the ballistic fragment in the foam is used to determine its incoming direction and velocity. Calibration may be done by the customer with known particle masses and velocities with shapes similar to those impacting the dummy in the live fire test. The consistency of the foam density enables the relationship of incoming fragment velocity to track length in the dummy to be determined.

Product Verification

FTSS manufacturing and inspection procedures result in high quality machined and molded parts. Procedures include certification of materials, verification of dimensions, and inspection of overall appearance of finished components.

The following measurements are performed on each Airman Dummy:

- Foam Density Measurement of each finished part.
- Weight of each part.
- Assembled dimensions of complete dummy.

First Technology Safety Systems, Inc. gives careful attention to designing, manufacturing and testing state of the art anthropomorphic test devices. This attention to detail ensures that the customer receives an Airman Dummy known for its reliability, durability, repeatability and reproducibility.

For technical Specifications please visit

http://www.ftss.com/crash-test-dummies/aerospace-military/airman

CHINA
News
Distribution - Training

China, continues to have tremendous growth in the CAE industries. Along with this growth in software use, has been the expansion of industries using LSTC's suite of software products. LSTC is continuing its commitment to the China Engineering community by establishing a fourth distributor, Dalian Fukun Technology Development Corporation, located in Dalian.

Dalian Fukun Technology Development Corporation has been associated with LSTC, for a number of years. It has been the development center, in China, for LS-PrePost, under the direction of lead developer, Philip Ho. The progression from development center to adding LS-DYNA sales and distribution was a natural progression.

The Dalian office will provide demonstration licenses, sales information, direct sales and distribution of LS-DYNA, LS-PrePost, LS-OPT, and LSTC's Dummy and Barrier Models.

LSTC's additional distributors ARUP China, ETA China, NEC China, welcomed the Dalian office to the LS-DYNA distribution team. ARUP-China, ETA-China, NEC-China, additionally offer sales and services for their respective owned and developed software - hardware, inclusive of training, support, consulting

.

The manager of the LS-DYNA Dalian office is Shujuan Zhang and can be contacted at: dlfkkj888@yahoo.cn

Phone(Fax): 86-0411-8761-1110

Dalian Fukun Technology Dev. Corp.
Room B1308, Kailun building,
A_1_1, Wu Cai Cheng
Development Zone, Dalian City,
Liaoning Province, PRC 100083

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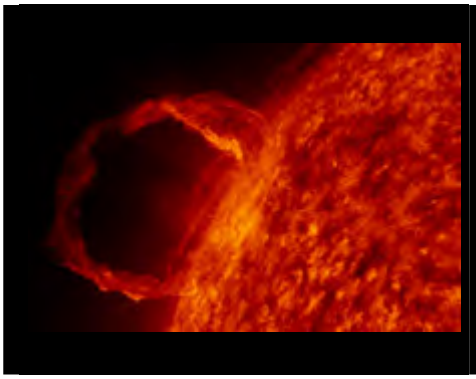
Hengstar, continues to grow as the training center of excellence evidenced by the 4 day seminar on passive safety and occupant restraint system. (Given by Mr. Rainer Hoffmann and Mr. Chaozhuo Chen) - carhs.training is a leading provider of training courses and events in the field of automotive CAE and safety. http://www.carhs.com .

Additionally, Hengstar, is assisting the Dalian office by providing technical support and sales assistance.



NASA
News

The Solar Dynamics Observatory

http://earthobservatory.nasa.gov/IOTD/view.php?id=43717

On April 21, 2010, NASA released the first-light images from its newest sun-monitoring mission, the Solar Dynamics Observatory. The mission's high-speed, IMAX-quality photography will improve predictions of solar activity that can disrupt everything from GPS satellites to high-voltage power lines.

This image was captured by the new observatory's Atmospheric Imaging Assembly on March 30, 2010. The sensor views the lower atmosphere of the Sun in ultraviolet wavelengths, and it captured this view as a massive plume of dense, cool (only compared to the rest of the solar atmosphere) plasma erupted on the Sun's surface. The plasma flows in a loop along a magnetic field line.

When these ribbons of plasma appear against the black backdrop of space, as in this image, they appear bright, and they are called solar prominences. Compared to the size and mass of the Sun, the prominence seems insubstantial. But a small white circle at the lower left corner of the image dispels the misperception: ten Earths could be stacked in a line between the Sun and the top of the loop.

The movie shows the prominence erupting. The same sequence of images is replayed several times, with a final "zoom out" to show the whole disk of the Sun. At the start of the movie, an arc of plasma arises close to the surface and balloons outward into space. Near the end of the expansion phase, the ring of plasma breaks open, and some of the plasma appears to escape the pull of the magnetic field loop. (When significant amounts of plasma escape the Sun, the event is called a coronal mass ejection.) At the end of the sequence of images, the two halves of the split prominence appear to be sucked back into deeper layers of the Sun like water pulled down a drain.

The new data from the Solar Dynamics Observatory won't just help scientists trying to predict solar "weather," like flares and coronal mass ejections, it should also help them better understand solar "climate," including what causes the solar cycle to vary in length and intensity—and at times, to apparently stop altogether. Better understanding of what causes the variability in the Sun's energy output will help scientists make better predictions about how much of a role the Sun will play in future climate change.

Top Crunch Benchmarks

http://www.topcrunch.org

TOP Crunch for LS-DYNA software benchmarks. The TopCrunch project was initiated to track the aggregate performance trends of high performance computer systems and engineering software. Instead of using a synthetic benchmark, actual engineering software applications are used with real data and are run on high performance computer systems.

Vendor/Submitter Org: INTEL/INTEL/SSG
Computer/Interconnect: Intel SR1600UR system/QDR IB
Processor: Intel® Xeon® Six Core X5670

#Nodes x #Processors per Node x #Cores Per Processor = Total #CPU	Time (Sec)	Benchmark Problem	Submission Date
4 x 2 x 6 = **48**	218	Neon refined revised	03/28/2010
2 x 2 x 6 = **24**	356	Neon refined revised	03/28/2010
1 x 2 x 6 = **12**	639	Neon refined revised	03/28/2010
16 x 2 x 6 = **192**	962	3 Vehicle Collisions	03/28/2010
8 x 2 x 6 = **96**	1509	3 Vehicle Collision	03/28/2010
4 x 2 x 6 = **48**	2637	3 Vehicle Collision	03/28/2010
64 x 2 x 6 = **768**	4009	Car2car	03/28/2010
32 x 2 x 6 = **384**	4567	Car2car	03/28/2010
2 x 2 x 6 = **24**	4608	3 Vehicle Collision	03/28/2010
16 x 2 x 6 = **192**	7690	Car2car	03/28/2010
1 x 2 x 6 = **12**	9271	3 Vehicle Collision	03/28/2010
8 x 2 x 6 = **96**	14781	car2car	03/28/2010
4 x 2 x 6 = **48**	23888	car2car	03/28/2010
2 x 2 x 6 = **24**	45828	car2car	03/28/2010
1 x 2 x 6 = **12**	89500	car2car	03/28/2010
8 x 2 x 6 = **96**	137	Neon refined revises	04/06/2010

d3View Blog

by
Suri Bala

Join Suri Bala and Satish Pathy
at The 11th International LS-DYNA® Users Conference

April 15th, 2010
http://blog.d3view.com/d3VIEW & LS-DYNA Blog

Unloading in MAT_FABRIC (MAT_034)
By Guest Author Satish Pathy, LSTC

In *MAT_FABRIC, element formulation 4 & 14 will allow you to input unloading curve for the material. Recently in a model it was noticed, that when a large compressive stress develops in the fibers, lsdyna would release some of these stresses by inverting the elements and thus leading to numerical instability. This could be avoided by activating compressive stress elimination, CSE=1. However, it still does not improve the fabric behavior with the current unloading method.

A new option was implemented to overcome this. This option can be activated by using a “negative” unload curve. Unlike the current way where the unload curve will get shifted to the yield point, the unload curve is stretched along the x-axis to intersect the current yield point, so that the first data-point is always at (0,0). This will allow the stress to follow a more physically realistic unloading path, where the stress is positive and does not return to zero until the tensile strain reaches zero. Hence, this option does not require compressive stress elimination to be active and will also give a better correlation with actual fabric behavior compared to the

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The following picture shows the typical way of defining unloading curve for negative load curve option. The initial slope should be defined which will be lower than the loading curve, then the slope can gradually increase such that it

intersects the loading curve at a positive strain value.

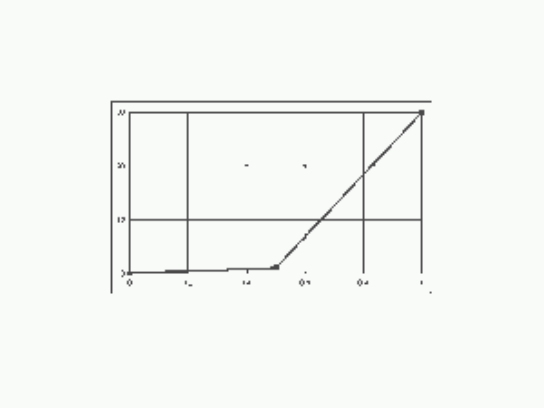


Figure 1. Unloading curve signature when using negative load curve option.

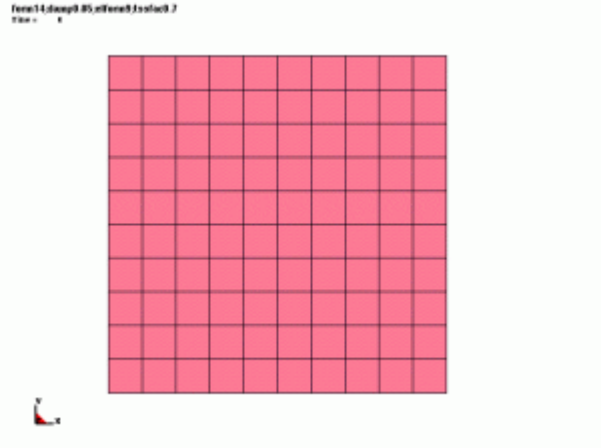


Figure 2. Animation with current input scheme for unloading.

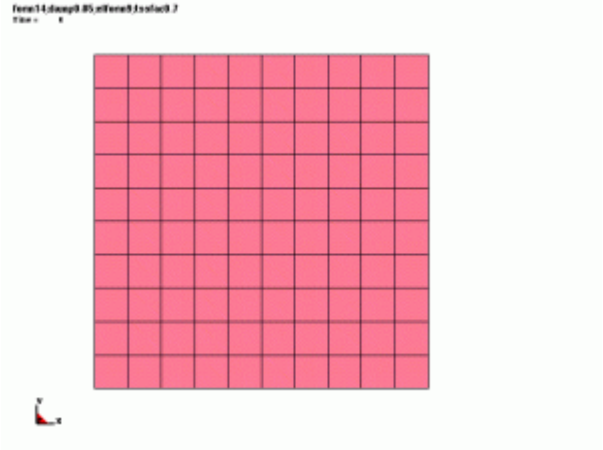
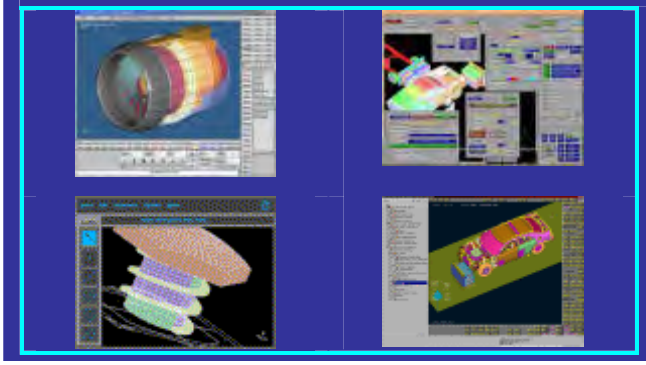


Figure 3. Animation with new input scheme (negative load curve option) for unloading.

I would like to thank Dr. Lee Bindeman for his feedback and sharing information regarding the above discussed topic.



Pre-Processing

Post Processing

Model Editing

A preprocessor is a program that processes its input data to produce output. This data is then used as input to another program.

BETA CAE Systems S.A.

http://www.beta-cae.gr/

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

Engineering Technology Associates, Inc.

http://www.inventiumsuite.com

PreSys is an advanced Pre/Post Processor. PreSys is a full-featured, core solution that can be used on its own or with a variety of available add-on applications. The system offers advanced automeshing tools to provide the highest quality mesh with little CAD data preparation. It also features a scripting interface and model explorer feature for in-depth data navigation.

Oasys, Ltd

http://www.oasys-software.com/dyna/en/

Oasys Primer is a model editor for preparation of LS-DYNA input decks. - Oasys D3Plot is a 3D visualization package for post-processing LS-DYNA analyses using OpenGL® (SGI) graphics.

JSOL Corporation

http://www.jsol.co.jp/english/cae/

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

Livermore Software Technology Corporation

http://www.lstc.com

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

LS-DYNA Distributors

LS-DYNA is delivered with
LS-OPT
LS-PrePost
LSTC Dummy & Barrier Models

Alpha Order by Country

Australia	Leading Eng. Analysis Providers - LEAP http://www.leapaust.com.au/ info@leapaust.com.au
Canada	Metal Forming Analysis Corp - MFAC http://www.mfac.com/ galb@mfac.com
China	OASYS Ltd. (software house of Arup) http://www.oasys-software.com/dyna/en stephen.zhao@arup.com
France	ALYOTECH TECH. http://www.alyotech.fr nima.edjtemai@alyotech.fr
France	ALLIANCE SVCE. PLUS - AS+ http://www.asplus.fr/ls-dyna v.lapoujade@asplus.fr
Germany	CADFEM http://www.cadfem.de/en lsdyna@cadfem.de
Germany	DYNAmore http://www.dynamore.de/ uli.franz@dynamore.de

LS-DYNA Distributors

LS-DYNA is delivered with
LS-OPT
LS-PrePost
LSTC Dummy & Barrier Models

India	OASYS Ltd. (software house of Arup) http://www.oasys-software.com/dyna/en lavendra.singh@arup.com
India	EASi Engineering http://www.easi.com/ rvenkate@easi.com
India	CADFEM Eng. Svce India http://www.cadfem.in/ info@cadfem.in
Italy	EnginSoft SpA http://www.enginsoft.it/ info@enginsoft.it
Japan	JSOL Corporation http://www.jsol.co.jp/english/cae cae-info@sci.jsol.co.jp
Japan	ITOCHU Techno-Solutions Corp. http://www.engineering-eye.com/ ls-dyna@ctc-g.co.jp
Japan	FUJITSU http://jp.fujitsu.com\solutions\hpc\app\lsdyna\

LS-DYNA Distributors

LS-DYNA is delivered with
LS-OPT
LS-PrePost
LSTC Dummy & Barrier Models

Korea	Theme Engineering http://www.lsdyna.co.kr/ wschung@kornet.com
Korea	Korea Simulation Technologies http://www.kostech.co.kr young@kostech.co.kr
Netherlands	Infinite Simulation Systems, BV http://www.infinite.nl/ j.mathijssen@infinite.nl
Sweden	Engineering Research AB http://www.erab.se/ sales@erab.se
Taiwan	Flotrend Corporation http://www.flotrend.com.tw/ gary@flotrend.tw
Russia	State Unitary Enterprise –STRELA info@ls-dynarussia.com

LS-DYNA Distributors

LS-DYNA is delivered with
LS-OPT
LS-PrePost
LSTC Dummy & Barrier Models

United Kingdom	OVE ARUP & PARTNERS http://www.oasys-software.com/dyna/en/ dyna.sales@arup.com
USA	Livermore Software Tech. Corp. - LSTC http://www.lstc.com/ sales@lstc.com
USA	Engineering Tech. Assc. Inc. – ETA http://www.eta.com/ sales@eta.com
USA	DYNAMAX http://www.dynamax-inc.com/ sales@dynamax-inc.com

Finite Element Analysis

North America

FEA Consulting/Consultants & Engineering Services

FEA Consultants use a wide range of software simulation programs. Their expertise using specific programs for their customers offers the ability for controlling the modeling and analysis of structures, systems, products and many other applications. Consultants and Engineering Services are used by government, homeland security, court trials, and a number of industries needing to have outside sources for expertise in FEA

http://www.fea-consulting.com

North America

Located: California'

Karagozian & Case - (K&C)
http://www.kcse.com

Shangrui Lan
(818) 303-1268

Located: Connecticut

CAE Associates
http://www.caeai.com

(203) 758-2914

Located: Oregon

Predictive Engineering
http://predictiveengineering.com

George Laird
(800) 345-4671

Located: California

Schwer Engineering
http://schwer.net

Len Schwer
(707) 837-0559

Located: Texas

KBEC
Khan Bui

(512) 363-2739

Located: Ohio

AEG Product Engineering Svce.

http://engineering-group.com
support@enginering-group.com

Software & Hardware Alliances

Software Solutions
SMP / MPP Hardware & OS
MPP & Interconnect MPI

ETA – DYNAFORM & VPG

http://www.eta.com

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

ETA – VPG

http://www.eta.com

Streamlined CAE software package provides an event-based simulation solution of nonlinear, dynamic problems. eta/VPG's single software package overcomes the limitations of existing CAE analysis methods. It is designed to analyze the behavior of mechanical and structural systems as simple as linkages, and as complex as full vehicles.

OASYS software for LS-DYNA

http://www.oasys-software.com/dyna/en/

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

Software & Hardware Alliances

Software Solutions
SMP / MPP Hardware & OS
MPP & Interconnect MPI

ESI Group Visual-CRASH For DYNA

http://www.esi-group.com

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

BETA CAE Systems S.A.– ANSA

http://www.beta-cae.gr

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

BETA CAE Systems S.A.– µETA

http://www.beta-cae.gr

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

SMP & MPP Hardware & OS Listing

Specifically for LS-DYNA

SMP & MPP Hardware an OS

FUJITSU

Prime Power

Sun OS 5.8

SGI

LINUX

WINDOWS

INTEL

IA 32

Linux, Windows

INTEL

IA64

Linux

INTEL

Xeon EMT64

Linux, Windows 64

HP

PA-8X00

HP-UX 11.11.
and above

HP

IA-64

HP-UX 11.22
and above

HP

Opteron

Linux

HP

Alpha

True 64

MPP And Interconnect MPI

Specifically for LS-DYNA

MPP and Interconnect MPI

Company	O/S	HPC Interconnect	MPI Software
FUJITSU			
Prime Power	SUN OS 5.8		
HP			
PA8000	HPUX		
IA64	HPUX		
INTEL			
IA32	Linux, Windows	InfiniBand (Voltaire), MyriCom	MPICH, HP MPI, OpenMPI
IA64	Linux		MPICH, HP MPI, OpenMPI
Xeon EMT 64	Linux	InfiniBand (Voltaire), MyriCom, PathScale InfiniPath	MPICH, HP MPI, OpenMPI, INTEL MPI

Continued on next Page

MPP And Interconnect MPI

Specifically for LS-DYNA

MPP and Interconnect MPI

SGI			
Altix 4700, 450	Linux	NUMAlink 4	SGI MPT, OpenMPI, Intel MPI, MPICH, Platform MPI 7 (HP-MPI)
Altix UV	Linux	NUMAlink 5	SGI MPT, OpenMPI, Intel MPI, MPICH, Platform MPI 5.6 (Scali MPI), 7 (HP-MPI)
Altix ICE	Linux	GigE QDR Mellanox Infiniband	SGI MPT, OpenMPI, Intel MPI, MPICH, Platform MPI 5.6 (Scali MPI), 7 (HP-MPI)
Altix XE	Linux & Windows	GigE QDR Mellanox Infiniband	SGI MPT, OpenMPI, Intel MPI, MPICH, Platform MPI 5.6 (Scali MPI), 7 (HP-MPI), MSMPI
CloudRack X2	Linux & Windows	GigE	SGI MPT, OpenMPI, Intel MPI, MPICH, Platform MPI 5.6 (Scali MPI), 7 (HP-MPI), MSMPI
Octane III	Linux & Windows	GigE QDR Mellanox Infiniband	SGI MPT, OpenMPI, Intel MPI, MPICH, Platform MPI 5.6 (Scali MPI), 7 (HP-MPI), MSMPI

Training Courses

Alpha Order by Country

Start dates only are shown

Germany
Dynamore
http://www.dynamore.de/seminars

Germany
CADFEM Gmbh
(See next page)

India
CADFEM India
http://www.cadfem.in/seminars/ls-dyna/introduction.html

May 25th
Contact Simulation
May 26th
Material Modeling

UK
Oasys and nhance Engineering Solutions Pvt. Ltd.
http://www.oasys-software.com/dyna/en
May 24th & 25th 2010

US
LSTC – showing start date
http://www.lstc.com
LS-PrePost
CA - 5/3/2010

Intro to LS-DYNA
CA - 5/4/2010

LS-PrePost
MI - 6/14/2010

Intro to LS-DYNA
MI - 6/15/2010

Contact in LS-DYNA
CA - 6/22/2010

Composit Materials
CA - 6/24/2010

Material Modeling Using User-Defined Options
CA - 6/28/2010

Implicit - CA
6/30/2010

Training Courses

CADFEM GmbH

Marktplatz 2 - 85567 Grafing b. München - Germany
Tel. +49 (0) 8092-7005-98; Fax: +49 (0) 8092- 7005-7; E-Mail seminar@cadfem.de

Beside the trainings on all aspects of short time dynamics we offer also various seminars on new methods available in LS-DYNA.

http://www.cadfem.de/en/seminars/ls-dyna

LS-DYNA Introduction

May 6-8

Leinfelden-Echterdingen near Stuttgart (DE)"

http://www.cadfem.de/en/seminars/ls-dyna/sem-id/260.html

Introduction to ALE- and FSI-Simulations with LS-DYNA

May 15

Grafing"

http://www.cadfem.de/en/seminars/ls-dyna/sem-id/3244.html

9th German LS-DYNA User Forum

12th – 13th October, 2010,

Bamberg, Germany

DYNAmore invites you to contribute to the 9th German LS-DYNA Forum. The conference will be held in the marvellous city of Bamberg, awarded as Unesco world cultural heritage.

The conference will be an ideal forum to share and discuss experiences, to obtain information on upcoming features, and to learn more about new application areas of LS-DYNA and LS-OPT.

All users are kindly encouraged to submit a paper on any application of LS-DYNA or LS-OPT. Dr. John Hallquist as well as other developers from LSTC already confirmed contributions on new LS-DYNA and LS-OPT features. Almost all presenters will use English slides and many of the presentations will be held in English language.

Please download a Call for Papers and further information at

http://www.dynamore.de/german-forum-2010

Deadline for Abstract Submission:
21 May 2010.

Additionally, the conference offers information about products related to LS-DYNA and LS-OPT in a comprehensive hardware and software exhibition. Please find more details about exhibition and sponsorship at

http://www.dynamore.de/conferences/upcoming/2010-german-forum/exhibition-sponsoring

We are looking forward to welcoming you either as presenter, exhibitor, sponsor, or attendee.
Please find more information at www.dynamore.de

Johannes and Stavroula,

founders of PhilonNet

4th PhilonNet CAE Conference Athens

17 June 2010

Drive Innovation With Simulation

By: FEA Information Inc., staff writer, Stacey Della Femina

PhilonNet Engineering Solutions is the direct distributor of Livermore Software Technology Corporation (LSTC) and Engineering Technology Association (ETA).

With the growing choice to use LS-DYNA, LS-PrePost, LS-OPT and the LSTC Dummy and Barrier Models with the universities and industries, as well as ETA's VPG and DYNAform products, both companies will be attending the conference and give presentations on their family of products.

Additionally, LSTC to assist sponsoring the PhilonNet conference is offering a number of Limited Licenses of LS-DYNA and suite of software products for their choice of winners.

Roger Grimes, Software Developer for LSTC, will be traveling to Athens to present Implicit Mechanics in LS-DYNA..

Roger will be providing an overview of the extensive set of capabilities for Implicit Mechanics in LS-DYNA, including

- Static and Dynamic Time Simulation
- Inertia Relief
- Vibration and Buckling Analysis
- Constraint and Attachment Modes
- Linearized Parts

These capabilities will be demonstrated with examples from aerospace, automotive and metal forming applications.

Dr. Wayne Mindle, Technical Sales & Marketing at LSTC, "We are pleased to have a representative from the US answering questions and meeting our customers in Greece as well as our future customers. I feel this will give the attending engineers a good base of knowledge to use LS-DYNA."

Representing ETA will be Abe Keisoglou, President, ETA is well known for its world class software DYNAform and VPG

Abe will be introducing Accelerated Concept to Product process (ACP).

- There are many key benefits in using ACP in the Design Process. These include a demonstrated capability to reduce product development costs by 35-40%, reduce product mass by approximately 20%, improve product performance (stiffness, NVH, crash/safety, durability) as well as reduce manufacturing and tooling cost through part consolidation.
- The ACP Process is a proprietary, performance-driven, holistic product design development

method which is based on design optimization. ACP incorporates the use of multiple CAE tools in a systematic process to generate the optimal design solution.

- Contrary to conventional methods where just one or a few design concepts are evaluated, using the ACP process, multiple load conditions are evaluated simultaneously for hundreds of design concepts. The resulting concepts are detailed, analyzed and optimized. This ensures that final product meets all performance, mass and cost targets.
- Significant efficiencies and product improvements are achievable using the ACP Process, whether it is applied on a component, sub-system or full-system. In this practice, ETA's expert team revisits process requirements and uses the most advanced technology, tools and materials to give the client the lightest possible structure.

PhilonNet http://www.philonnet.gr

Press Releases

CRAY awarded $45 Million supercomputer contract from the national nuclear security administration

Join CRAY at The 11th International LS-DYNA® Users Conference

Seattle, WA – April 01, 2010 – Global supercomputer leader Cray Inc. (Nasdaq GM: CRAY) today announced that it has signed a sub-contract with Los Alamos National Security, LLC to provide the National Nuclear Security Administration (NNSA) with a next-generation Cray supercomputer. Currently valued at more than $45 million, the multi-year, multi-phase contract can be expanded if the NNSA exercises an option for a future upgrade. The new system will create a new supercomputing platform, named Cielo, for the Advanced Simulation and Computing program at the NNSA.

The Cielo platform will support all three of the NNSA national laboratories, which include Los Alamos National Laboratory, Sandia National Laboratories and Lawrence Livermore National Laboratory. The NNSA will use the new supercomputing system to ensure the safety, security and effectiveness of the United States' nuclear stockpile, and will run the NNSA's largest and most demanding modeling and simulation workload.

"Cielo is being acquired and deployed by the NNSA's New Mexico Alliance for Computing at Extreme Scales (ACES). This is a joint partnership between Los Alamos National Laboratory and Sandia National Laboratories. Both Los Alamos and Sandia have a long history with Cray, going back to the very beginning of the supercomputing era," said John Morrison, High Performance Computing Division Leader at Los Alamos. "With the Cielo platform, that history continues with the next generation of capability computing in support of the U.S. nuclear security enterprise."

"Cielo is the culmination of a two year partnership between Sandia and LANL on ACES," said Sudip Dosanjh, Sandia co-director for ACES. "We look forward to working with Cray to create an order of magnitude increase in capability for key NNSA national security applications. Cielo will target extremely large problems that require production, petascale supercomputing."

"The NNSA plays a critical role in protecting the safety and security of our country, and we are quite proud that some of the organization's most critical scientific research will be done on a Cray supercomputer," said Peter Ungaro, Cray president and CEO. "We have had a great partnership with the NNSA

including the development of Red Storm – a collaboration that enabled the launch of our first Cray XT3 supercomputer. We are honored to be able to continue this important partnership and are encouraged that the NNSA laboratories share in the excitement around our next-generation 'Baker' supercomputer."

The next-generation Cray supercomputer will be housed at the Strategic Computing Complex at the Los Alamos National Laboratory and is expected to be delivered in the second half of 2010. Code-named "Baker," Cray's new supercomputing system will feature a new interconnect chipset known as "Gemini" and enhanced system software that improves the performance, productivity and reliability of the system. Cray's planned "Baker" supercomputer builds on the Cray XT system architecture found in the world's fastest supercomputer and improves it in every key dimension.

About the National Nuclear Security Administration: Established by Congress in 2000, NNSA is a semi-autonomous agency within the U.S. Department of Energy responsible for enhancing national security through the military application of nuclear science in the nation's national security enterprise. NNSA maintains and enhances the safety, security, reliability, and performance of the U.S. nuclear weapons stockpile without nuclear testing; reduces the global danger from weapons of mass destruction; provides the U.S. Navy with safe and effective nuclear propulsion; and responds to nuclear and radiological emergencies in the U.S. and abroad.

About Cray Inc.: As a global leader in supercomputing, Cray provides highly advanced supercomputers and world-class services and support to government, industry and academia. Cray technology is designed to enable scientists and engineers to achieve remarkable breakthroughs by accelerating performance, improving efficiency and extending the capabilities of their most demanding applications. Cray's Adaptive Supercomputing vision is focused on delivering innovative next-generation products that integrate diverse processing technologies into a unified architecture, allowing customers to surpass today's limitations and meeting the market's continued demand for realized performance. Go to www.cray.com for more information.

Safe Harbor Statement: This press release contains forward-looking statements within the meaning of Section 21E of the Securities Exchange Act of 1934 and Section 27A of the Securities Act of 1933, including, but not limited to, statements related to Cray's ability to begin commercial deliveries of its "Baker" supercomputers when expected and Cray's ability to deliver the systems required for the NNSA procurement in the second half of this year and that meet the NNSA's needs. These statements involve current expectations, forecasts of future events and other statements that are not historical facts. Inaccurate assumptions and known and unknown risks and uncertainties can affect the accuracy of forward-looking statements and cause actual results to differ materially from those anticipated by these forward-looking statements. Factors that could affect actual future events or results include, but are not limited to, the risk that Cray is not able to successfully complete its planned product research and development efforts in a timely fashion or at all, the risk that the systems delivered for the NNSA do not perform as expected and such other risks as identified in the Company's quarterly report on Form 10-K for the year ended December 31, 2009, and from time to time in other reports filed by Cray with the U.S. Securities and Exchange Commission. You should not rely unduly on these forward-looking statements, which apply only as of the date of this release. Cray undertakes no duty to publicly announce or report revisions to these statements as new information becomes available that may change the Company's expectations.

Press Releases

MELLANOX

Enables Breakthrough InfiniBand Performance On Dell Blade Servers

Join MELLANOX
at The 11th International LS-DYNA® Users Conference

40Gb/s InfiniBand Connectivity Provides IT Administrators with Critical Bandwidth, Ease-of-Use and Flexibility

SUNNYVALE, Calif. & YOKNEAM, Israel, Apr 20, 2010 (BUSINESS WIRE) -- Mellanox(R) Technologies, Ltd. (NASDAQ:MLNX)(TASE:MLNX), a leading supplier of high-performance, end-to-end connectivity solutions for data center servers and storage systems, today announced that its second generation ConnectX(R)-2 I/O mezzanine adapter card is now available through Dell(TM) for the PowerEdge(TM) M-Series Blade Servers. Mellanox's ConnectX-2 provides 40Gb/s InfiniBand connectivity with CORE-Direct(TM) to enable significant improvements in application performance and scalability and increase the productivity of compute clusters, cloud and enterprise data centers.

"Mellanox's 40Gb/s InfiniBand technology delivers the highest throughput, lowest latency and highest message rate available in networking technology ensuring major productivity benefits for enterprise and scientific computing users," said John Monson, vice president of marketing at Mellanox Technologies. "The combination of Mellanox ConnectX-2 adapters and Dell M-Series Blades provides a simplified, cost-effective solution for data center performance requirements, all while reducing capital expense."

ConnectX-2 with Virtual Intelligent Queuing (Virtual-IQ) technology provides dedicated adapter resources and guaranteed isolation and protection for virtual machines (VM) within the server. I/O virtualization over InfiniBand gives data center managers better server utilization and LAN and SAN unification while reducing cost, power, and cable complexity.

"Dell's blade servers are designed to help reduce I/O capital expenses while providing IT and cluster administrators with greater bandwidth performance, better CPU utilization, and more efficient use of their data center space, and Mellanox's InfiniBand adapter helps us to deliver these gains" said Sally Stevens, vice president, product group platform marketing at Dell. "Customers with resource-intensive application demands for high-bandwidth and low-latency can

leverage blade solutions to improve system efficiency and resource utilization, while still reducing power and overhead costs."

Availability - Mellanox ConnectX-2 I/O mezzanine adapter cards are available now through the Dell website.

About Mellanox - Mellanox Technologies is a leading supplier of end-to-end connectivity solutions for servers and storage that optimize data center performance. Mellanox products deliver market-leading bandwidth, performance, scalability, power conservation and cost-effectiveness while converging multiple legacy network technologies into one future-proof solution. For the best in performance and scalability, Mellanox is the choice for Fortune 500 data centers and the world's most powerful supercomputers. Founded in 1999, Mellanox Technologies is headquartered in Sunnyvale, California and Yokneam, Israel. For more information, visit Mellanox at www.mellanox.com.

SOURCE: Mellanox Technologiesm-
Mellanox Technologies - Brian Sparks, 408-970-3400media@mellanox.com

Press Releases

MSC.Software Releases Marc 2010

Significant Performance and Functionality Enhancements Give Users Broader Range of Nonlinear and Multiphysics Simulations

SANTA ANA, CA--(Marketwire - April 26, 2010) - MSC.Software, the leader in multidiscipline simulation solutions that accelerate product innovation, today announced that Marc 2010 is released and ready for download. This new release of Marc delivers significant advancements in performance and functionality.

Performance Improvements

New Parallel Solvers Deliver Better Performance for Nonlinear Problems
Users can now take full advantage of multi-core machines for parallelization. Significant benefits in performance are obtained at no additional software costs. The Marc multi-frontal solver now utilizes multi-threading on Windows and Linux based shared memory architectures. The Pardiso solver utilizes parallelism in a shared memory Windows and Linux environment and the MUMPS solver may be used in both a shared or distributed memory Windows and Linux environments. This provides cost effective solutions for large simulations.

"Using the Domain Decompositions Method (DDM) in combination with the new parallel solver capabilities, we have seen excellent scalability in a distributed multi-processor environment. A 300,000 DOF thermo-mechanical creep analysis of a ball grid array is analyzed 7.1 times faster with DDM on a 32-core system compared to a single CPU run, while 700,000 DOF model is run 13.6 times faster," said Sanjay Choudhry, VP Product & Release Management at MSC.Software. "This greatly improves throughput and allows an increase in the number of designs that can be evaluated."

Functionality Improvements

Contact Enhancements Improve Accuracy: A new procedure for contact based on segment-to-segment and surface-to-surface is now available. These methods provide efficiencies for assembly modeling and interference fit problems. Users can expect to see more accurate and smoother results especially near contact boundaries.

New Material Models Help You Simulate New Classes of Materials: Two new material models are added in this release to increase the accuracy of simulations. The exponential cap model may be used to model granular materials like powder metals, ceramics, and soils. The 5th order Mooney model may be used for rubber analysis. These models have applications in several industries including automotive, packaging, energy, biomedical industries, and civil engineering.

Large Deformation Enhancements Improve Convergence: Updated Lagrange analysis is improved to handle large shell and beam rotations more accurately and with improved convergence. This enhancement is beneficial for Marc users who deal with large deformation and large rotation problems.

Fracture Mechanics Enhancements Provide More Control: Enhancements have been made in the VCCT capabilities which may be used to predict both crack onset and crack propagation. Two user subroutines are also added to give users more control on simulating delamination in composite parts.

Global Adaptive Meshing Increases Efficiency: Global adaptive meshing now works with two additional features, global-local analysis and the Exclude option. Users can now make better use of global remeshing in complex contact situations. Another significant enhancement is support for DDM, giving users the ability to solve larger models that undergo large deformation and need remeshing for better results, like in 3-D seals and metal forming.

Wear Improvements Speed Solution: Users will now see more accurate calculation of wear especially for deformable-deformable contact. Benefits include a faster solution, more accurate results, and the ability to associate wear with contact bodies.

Multiphysics Enhancements for Evaluating More Designs: Marc has extended its multiphysics capabilities to solve coupled magnetostatic-thermal and magnetostatic-structural problems along with the ability to simulate electrical windings and thin laminations of thin magnetic sheets. Check out the on-demand webcast below for more details.

For more information about new features in Marc 2010, listen to the On-Demand webinar at
http://www.mscsoftware.com/events/Webcasts/Marc/Whats_New_2010/marc_2010.html

About MSC.Software: MSC.Software is a global leader of simulation solutions that help companies improve quality, save time and reduce costs associated with designing and testing manufactured products. MSC.Software works with thousands of companies worldwide to develop better products faster with simulation technology, software, and services. MSC.Software employs 1,000 people in 23 countries. For additional information about MSC.Software's products and services, please visit www.mscsoftware.com.

Article Contacts: Leslie Rickey
Email: leslie.rickey@mscsoftware.com
Phone #: (714) 444-897

Press Releases

NVIDIA
Quadro Digital Video Pipeline
Drives Real-Time 3D Broadcast Production
from Start to Finish

Complete Solution Enables Live Action 3D
Acquisition, Graphics Compositing in 3D,
Real-time Encoding

Join NVIDIA
at The 11th International LS-DYNA® Users Conference

For more information, contact: Mark Priscaro, NVIDIA Corporation
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NAB 2010, LAS VEGAS (LVCC South Hall, #SL 5629) — April 12, 2010 —Leading the next wave in broadcasting, NVIDIA today unveiled its new NVIDIA® Quadro® Digital Video Pipeline, a turnkey system which dramatically simplifies and accelerates the production of live 3D broadcasts.

The Quadro Digital Video Pipeline solves the complexity of acquiring, processing and delivering both traditional and 3D content by leveraging NVIDIA graphics processing units (GPUs). Integrated into a flexible, reliable and cost-effective computer system, the NVIDIA Quadro Digital Video Pipeline delivers advanced capabilities from production start to finish.

- Acquisition: ingests four HD-SDI feeds (or two stereoscopic 3D feeds) simultaneously, using the GPU to debayer raw camera data in real-time, so directors see the highest quality, color corrected images.
- Processing: renders and composites real-time 3D graphics, virtual effects and transitions to create the most engaging programming.
- Delivery: outputs right eye and left eye HD-SDI streams with audio, for immediate previewing and broadcasting.

With support for both DirectX and OpenGL, software developers and solution integrators are building sophisticated solutions on this flexible platform.

Brainstorm Multimedia (Booth #SL5329), Vizrt (Booth #SL5408), and Weather Services International (WSI) (Booth #SL5116) are broadcast graphics innovators working closely with NVIDIA to deliver 3D production workflows using the Quadro Digital Video Pipeline. These partners provide solutions for enhancing

live, on-air broadcasts with computer generated graphics, virtual sets and augmented reality.

“The Quadro Digital Video Pipeline delivers the essential technology to revolutionize live 3D production,” said Paul Lacombe, president at Brainstorm America. “Working with NVIDIA, we are delivering solutions to customers such as ESPN who will define the future of live 3D sports broadcasts.”

“NVIDIA Quadro is the processor of choice for our 2D and 3D graphics generation systems,” said Gerhard Lang, chief engineering officer at Vizrt. “The new Viz Engine adds support for the NVIDIA Quadro Digital Video Pipeline, and the direct access to the NVIDIA GPU gives us the ability to render more intricate 3D scenes at a higher level of detail without additional latency.”

“Delivering the highest quality on-air weather graphics and visualization would be impossible without NVIDIA technology,” said Bill Dow, vice president and general manager, Media Division, WSI. “Our TruVu Max real-time weather rendering system currently utilizes Quadro technology, and the Quadro Digital Video Pipeline will enable us to integrate four video feeds into the broadcast, a unique capability used to broadcast breaking weather reports.”

“Broadcasters who have experimented with 3D, quickly discover how ridiculously hard it is to get it right,” said Jeff Brown, general manager, Professional Solutions Group, NVIDIA. “Compared to traditional broadcasting, there are exponentially more things that could go wrong. The Quadro Digital Video Pipeline is designed to hide that complexity, and let broadcasters focus on producing truly breakthrough programming.”

The NVIDIA Quadro Digital Video Pipeline fully enables 3D workflows by processing simultaneous right eye and left eye video streams in real-time. Additionally, by pairing this pipeline with NVIDIA 3D Vision active shutter glasses, broadcast operators and directors can preview stereo 3D content at full resolution during production.

For post-production of 3D content, video professionals can edit with Adobe Premiere Pro CS5, which is accelerated by NVIDIA Quadro GPUs. A variety of plug-ins for 3D capture, compositing, and encoding enable an integrated workflow.

NVIDIA is demonstrating its new 3D Digital Video Pipeline platform as well as Adobe Creative Suite at NAB 2010, booth #SL 5629, located in the lower South Hall at the Las Vegas Convention Center, from April 12 to 15, 2010.

Pricing and Availability - The next generation of the NVIDIA Quadro Digital Video Pipeline is available now from NVIDIA Quadro value added resellers, including PNY. For more information, visit: www.nvidia.com/quadro/dvp.

Follow NVIDIA Quadro on Twitter: @NVIDIAQuadro.

About NVIDIA - NVIDIA awakened the world to the power of computer graphics when it invented the GPU in 1999. Since then, it has consistently set new standards in visual computing with breathtaking, interactive graphics available on devices ranging from tablets and portable media

players to notebooks and workstations. NVIDIA's expertise in programmable GPUs has led to breakthroughs in parallel processing which make supercomputing inexpensive and widely accessible. The company holds more than 1,100 U.S. patents, including ones covering designs and insights which are fundamental to modern computing. For more information, see www.nvidia.com.

Certain statements in this press release including, but not limited to, statements as to: the benefits, features, impact and capabilities of NVIDIA GPUs, Quadro professional graphics and the Quadro Digital Video Pipeline are forward-looking statements that are subject to risks and uncertainties that could cause results to be materially different than expectations. Important factors that could cause actual results to differ materially include: development of more efficient or faster technology; design, manufacturing or software defects; the impact of technological development and competition; changes in consumer preferences and demands; customer adoption of different standards or our competitor's products; changes in industry standards and interfaces; unexpected loss of performance of our products or technologies when integrated into systems as well as other factors detailed from time to time in the reports NVIDIA files with the Securities and Exchange Commission including its Form 10-K for the fiscal year ended January 31, 2010. Copies of reports filed with the SEC are posted on NVIDIA's website and are available from NVIDIA without charge. These forward-looking statements are not guarantees of future performance and speak only as of the date hereof, and, except as required by law, NVIDIA disclaims any obligation to update these forward-looking statements to reflect future events or circumstances.

Press Releases

Penguin Computing

Announces Availability of 12-Core AMD Opteron™ 6100 Series Processors in Altus™ High Performance Server Line

Join Penquin Computing
at The 11th International LS-DYNA® Users Conference

Fremont, Ca (March 29th, 2010)

Penguin Computing New server platforms with up to 48 processor cores address the needs of the demanding High Performance Computing landscape.

http://www.penguincomputing.com/press/press_releases/AMD_Opteron6000

Penguin Computing today announced three new products in the Altus line of High Performance servers. Introduced today are the Altus 1808, single-socket entry Web/enterprise server, Altus 1802 high density platform and Altus 1804 and 2804 quad-socket compute nodes with up to 48 processor cores. Penguin's new servers are based on the latest AMD Opteron™ 6000 Series platform

New Penguin Altus servers are slated for availability in early Q2 2010. A distinguishing feature of this new product line is the doubling of the CPU cores from six cores to 12 per socket. Models with four CPU sockets provide up to 48 "engines" in 1U (Altus 1804) or 2U (Altus 2804) rackmount form factors, pushing the limits of processing power available per rack. Other major enhancements include an updated memory subsystem with 4 RAM channels populated with DDR3 memory.

Penguin's Altus servers are targeted for High Performance Technical Computing (HPC) applications and form the core building block of Penguin's integrated Application Ready™ cluster solutions. Other key ingredients in Penguin's HPC solutions portfolio include high performance messaging and storage interconnect fabrics using InfiniBand and 10 Gigabit Ethernet and sophisticated cluster management suite based on Penguin's Scyld ClusterWare software stack.

"The latest AMD Opteron 6000 Series platform exemplifies the level of high-density, high-performance computing available today," said Patrick Patla, vice president and general manager, Server and Embedded Divisions, AMD. "Penguin Computing has vast expertise and experience for bringing this superior value proposition to the demanding High Performance Computing marketplace."

“Penguin Computing has been very excited about development of the AMD Opteron 6100 Series processor, previously code named ‘Magny-Cours,’”said Charles Wuischpard, CEO, Penguin Computing. “We believe this to be a real game changer and are confident we will serve the needs of the most demanding HPC customers, including those you’re prone to see on the Top500 list, with our cluster solutions featuring new Altus servers based on the AMD Opteron 6100 processor.”

About Penguin Computing

Penguin Computing, headquartered in San Francisco, California, specializes in complete, integrated HPC clustering solutions. Penguin has been a successful innovator for over a decade, providing Linux HPC solutions to a variety of industries. Penguin’s staff, including the originator of the Beowulf Cluster architecture, has unsurpassed experience in delivering a powerful combination of fully integrated HPC clusters, comprehensive cluster management software, and services.

For more information about Penguin Computing and Penguin products please go to www.penguincomputing.com .

11th International LS-DYNA® Users Update

From
Marsha Victory

Updated April, 26, 2010

The conference is approximately six weeks away and we're in the process of finalizing all attendee details, menu's, sessions, training classes, logistics.

We're already going to have a wonderful turnout of attendees, booth exhibitors, sponsors, plenary speakers, keynote speakers, and presentations. For those of you that have not attended one of our conferences, in the past, please decide to attend. For all of you that are returning it will be great to see you at our conference, and I'm sure you'll be pleased by the additions we'll be having this year.

Please, all attendees, sponsors, exhibit booth personnel, keynotes, training class attendees, and all attending the conference, I need you to register so that I'll have your respective name badge accurate.

HOTEL NOTICE:

The hotel is sold out on some days and we have a certain amount of reserved discounted conference rooms. Make your reservations to retain the discounted conference rate.

Register for conference:
http://www.ls-dynaconferences.com/
Side link is "Registration"

Register for your hotel reservations:
http://www.ls-dynaconferences.com/
Side link is "Hotel Information"
OR, use the direct link below:

https://resweb.passkey.com/Resweb.do?mode=welcome_ei_new&eventID=2477909

Booth Exhibitors: Contact Cathie@lstc.com for the booth packet you will need for booth services you may additionally want.

A few booths, are still available, please contact me for details. vic@lstc.com

FEA Information Inc. shall be hosting the Grand Reception:

We hope all attendees will join us for our first hosted Reception. The reception is being held on Sunday evening, between 6 PM to 8 PM.

Microsoft®

Plenary Speaker

Grand Banquet Sponsor

Take advantage of the opportunity to speak with the representatives of Microsoft, not only at their exhibit booth, but informally at the Reception and Banquet: Learn about LS-DYNA® with Microsoft® Windows® HPC Server 2008.

Windows HPC Server 2008 provides a productive, cost-effective, and high-performance computing (HPC) solution that runs on x64-bit hardware. Windows HPC Server 2008 can be deployed, managed, and extended using familiar tools and technologies.

The HPC platform from Microsoft, called Microsoft® Windows® HPC Server 2008 is a productive, cost-effective, scalable, and easy to use solution that is capable of performing intensive calculation of detailed models at enhanced processing speeds. By running LS-DYNA® on Windows® HPC Server, you can shorten the amount of time and money that is spent on design and verification, enabling you to gain a competitive edge in the marketplace.

Benefits:

- Industry-leading, multi-field simulation tools
- Simplified HPC platform
- Lower lifecycle costs
- Decreased time to market
- Enhanced security

The Combination: The LS-DYNA® suite and Microsoft® Windows® HPC Server 2008 accelerate calculation speed and reduce time to insight for a wide range of industries and applications. Windows® HPC Server provides a powerful platform for HPC, while LS-DYNA® provides a flexible simulation solution for finite element analysis. Together, users receive a simple to use, cost-effective, and robust parallel processing solution for the simulation of product testing and design that would otherwise require large system and IT resources.

Application Areas: LS-DYNA® combined with Microsoft® Windows® HPC Server 2008 high-performance computing platform provides an accelerated solution for engineers, mathemeticians, and designers in many industries, including:

- Automotive - Analyze vehicle designs and accurately predict structural integrity in a collision and the effects on the occupants
- Metal Forming - Accurately predict stresses and deformations that will occur during the manufacturing process
- Aerospace - Simulate bird strike, jet engine blade containment, and structural failure

More information:

http://www.microsoft.com/hpc/en/us/product-information.aspx

Tentative Agenda of Our Conference

The final agenda will be posted May.

Exhibitors Area will be available starting Sunday evening.

Sunday: Registration and The Grand Reception

Monday: The first day of the conference will begin with 3 well known plenary speakers, as well as information from our Platinum Sponsor, Microsoft.

Plenary Speakers:

Thomas J.R. Hughes,
University of Texas at Austin

David J. Benson,
University of California at San Diego

Thomas J. Lange,
Procter & Gamble, Ohio

Additionally, John O. Hallquist, President of LSTC will bring all attendees up to date on LS-DYNA Current and Future Developments.

From here we will have the break-out sessions for the presentations.

Monday Evening:

Microsoft, welcomes you to join them at the Grand Banquet

Tuesday:

Technical Sessions & Exhibition Hall **Plenary Sessions / Technical Session**

LS-DYNA Conference

Sponsors/Exhibitors

Marsha Victory
vic@sltc.com

Our exhibitors offer the opportunity for direct information and to ask questions concerning their products, future roadmaps, current opportunities. The exhibition area has not changed, and all should feel free to visit the booths and ask questions pertaining to their company needs. Among the booth exhibitors will be:

Microsoft® Platinum Conference Grand Banquet Sponsor	**ANSYS**	**ETA**
Oasys Ltd.	**TASS**	**ESI Group**
Data Point Labs	**SGI**	**Denton**
BETA CAE	**FEA Information**	**Penguin Computing**
FTSS	**LSTC Product Information Booth**	**CRAY**
MSC. Software	**Mellanox**	**NVIDIA**
CEI	**JSOL**	

11th Int'l LS-DYNA Users Conference

Presentation Categories And Paper Titles

As evidenced by the papers being presented the conference will again bring to the attendees knowledge on the latest technologies, software, and hardware they should be familiar with in today's market. Additionally, the conference provides a key opportunity to speak with, and exchange information with worldwide engineers, and directly with LSTC development and support staff. At this time we anticipate the following presented papers, subject to final verification.

Category	Paper Title
Aerospace / Crash	EMAS Core Material Modeling with LS-DYNA
Aerospace / Crash	LS-DYNA Analysis of a Full-Scale Helicopter Crash Test
Aerospace / Crashworthiness	Developing an Airbag System Using LSDYNA Modeling and Simulation
Aerospace / Fracture / EFG	Engine Impeller Sub-Fragmentation Simulation Using EFG Method
Aerospace / Impact	Development of hail material model for high speed impacts on aircraft engine
Aerospace / SPH	Comparison of FEM and SPH for Modeling a Crushable Foam Aircraft Arrestor Bed
Biomechanics	Investigation of LS-DYNA Modeling for Active Muscle Tissue
Blast	A study of Mapping technique for Air Blast modeling
Blast	Finite Element Simulation of Blast Mitigation Seat under High Impulse Loading Conditions
Blast / Bridges	Numerical Prediction of the Dynamic Response of Prestressed Concrete Box Girder Bridges under Blast Loads
Blast / Explosive	High Fidelity In-Bore Pressure Modeling
Blast / Head Injury	Applying the Dynamic Relaxation Step to Determine Influence on Global Model Response from Shock Tube Loading for a Mounted Hybrid III Head Neck Assembly
Blast / Vehicle Safety	Vehicle and Occupant Safety Protection CAE Simulation
Crash Safety / Dummy Models	An Integrated Process for Occupant Safety Simulations With LS-DYNA & Madymo Coupling
Crash Safety / Dummy Models	Status Update on Dummy Model Development
Crash Safety / Dummy models	Investigations of Generalized Joint Stiffness model in LSTC Hybrid III Rigid-FE Dummies

Crashworthiness / Barriers	Modeling Wire Rope used in Cable Barrier Systems
Crashworthiness / Barriers	Finite Element Modeling and Validation of Guardrail Steel Post Deflecting in Soil at Varying Embedment Depths
Crashworthiness / EFG	Applications of the meshfree method with the GMF approximation in transportation safety engineering
Crashworthiness / Impact	Improvement Of The Energy Absorption Capacity Of An Intercity Coach For Frontal Crash Accidents
Crashworthiness / Material Modeling	A Comparison of Recent Damage and Failure Models for Steel Materials in Crashworthiness Applications in LS-DYNA
Crashworthiness / Material Modeling	Crashworthiness of composite structures with various fiber architectures
Crashworthiness / Modal Analysis	Advanced Mode Analysis for Crash Simulation Results
Crashworthiness / Optimization	Safety Assessment and Multi-Objective Optimization of a Paratransit Bus Structure
Crashworthiness / Structure	Polypropylene Bracket Countermeasure for Door Trim Side Impact
Crashworthiness / Structure	Simulation of Crash Resistance, an Investigation into Vehicle Frame Stiffness in Frontal Impact Test Using LS-DYNA
Crashworthiness / Structure	Bolted joint representation in LSDYNA3D to model bolt pre-stress and failure characteristics of bolted joints in crash simulations.
Crashworthiness / Structure	Crashworthiness Analysis of Finite Element Truck Chassis Model Using LS-DYNA
Dummy Models	A New Development in Pedestrian Safety: the FLEX-PLI GTR LS-DYNA Model
Element Technology	An assessment of the new LS-DYNA multi-layered solid element: basics, patch simulation and its potential for thick composite structural analysis
Fluid Solver / CESE	How to Use the New CESE Compressible Fluid Solver in LS-DYNA
Fluid Solver / Explosion	Module development of multiphase and chemically reacting flow in compressible flow solver
Fracture / Damage	Simulation of crack propagation using damage-driven fission adaptivity coupled with node splitting and element erosion
Fracture / EFG / XFEM	Modeling of Dynamic Fracture in Solids and Structures by EFG and XFEM Methods
Frequency Response/Random Vibration, Steady State Response	Mode-based frequency response function and steady state dynamics in LS-DYNA
FSI	Development of Parachute Simulation Techniques in LS-DYNA
FSI	Fluid Structure Interactions (FSI) Applications on Disposable Diapers
FSI	Drop test into water and wave impact simulations of a novel 7-meter plastic boat with LS-DYNA®

FSI	New ALE Incompressible Material Using Implicit Pressure
FSI / ALE / SPH	Stone skipping simulation by ALE and SPH
FSI / Incompressible CFD	Discussion on the Advances and Release Features for the Incompressible CFD Solver in LS-DYNA
FSI/SPH	Structure-Fluid Interaction analysis of an existing water tank
Hardware / GPU	Performance Benefits of NVIDIA GPUs for LS-DYNA
Hardware / MPP Hybrid	New Features in LS-DYNA HYBRID Version
Hardware / MPP Hybrid	LS-DYNA® on Advanced SGI Architecture
Hydroforming	A Finite Element Comparison Between Single and Bi-layered Tube Hydroforming Processes
Impact / Ballistics	Using LS-DYNA® to Computationally Assess the V0-V100 Impact Response of Flexible Fabrics Through Probabilistic Methods
Impact / Ballistics	Simulation of Granular Ceramic Armor Under Impact from Bullets
Impact / Ballistics	Investigation of the shear thickening fluid dynamic properties and its influence on the impact resistance of multilayered fabric composite barrier.
Impact / Blast	High-velocity Fragment Impact Simulation on a Solid Steel Cable Using the Modified Johnson-Cook Model
Impact/Damage/Crash	Modeling Low Velocity Impact on Thick-Section Composite Cylinder
Implicit Solver Technology	The potential impact of GPUs on LS-DYNA Implicit Mechanics
Material Modeling	Simulation of Triaxial Braided Composite Tube Crush With a Couple – Plasticity Model
Material Modeling	Investigation of *MAT_58 for Modeling Braided Composites
Material Modeling	Detailed Material Modeling of Foams in LS-DYNA
Material Modeling	Implementation of the Tanimura-Mimura's strain rate dependence constitutive model into LS-DYNA using user defined material model
Material Modeling	On the Prony Relaxation Function
Material Modeling / Automotive	A New Strain Rate Dependent Spotweld Failure Model for Automotive Crash Applications
Metal Forming	Process Modeling of Freeform Incremental Forming Using LS-DYNA
Metal Forming	Numerical Simulation and Experimental Study of Electromagnetic Forming
Metal Forming	Prediction Springback of CNC Tube Bending Process Based on Forming Parameters
Metal Forming	Update on the Electromagnetism Module in LS-DYNA
Metal Forming	Practical application of springback calculation and compensation

Metal Forming / EFG	3D Adaptive EFG Method for Forging and Extrusion Analysis with Thermal Coupling
Metal Forming / EFG	Meshfree Interactive Adaptivity and Its Application
Metal Stamping	A simple, but efficient and robust way to do binder wrap simulation with LS-DYNA Implicit Solver
Metal Stamping	Recent Development in JSTAMP/NV for the Best Stamping Simulation Environment
Metal Stamping	Advancements in LS-DYNA® for Metal Forming Simulation (Part I)
Metal Stamping	Advancements in LS-DYNA® for Metal Forming Simulation (Part II)
Occupant Safety	Overview of LSTC's crash test dummy model development effort
Occupant Safety	WorldSID vs. ES-2. A Comparison Based on Simulations
Occupant Safety	Side Impact Occupant Modeling Practices in Comparison to Test Results
Occupant Safety / Dummy	Development and Validation of a FE Model of Thor Head-Neck Complex
Optimization	Reliability-based Multi-Objective Optimization Using Sequential Strategy on LS-OPT®
Optimization	Capabilities of Result Visualization in LS-OPT V4.1 - Demonstrated by Means of Industrial Problems
Optimization	Application of Topology Optimization for Crash with LS-OPT/Topology
Optimization	Multi-Disciplinary Optimization of a Sedan using Size and Shape Parameterization
Optimization	Variable Screening Using Global Sensitivity Analysis
Optimization	LS-OPT/Topology Version 1
Optimization / Crashworthiness	Optimization of a truck cab family
Optimization / Crashworthiness	Soft Zone Material Optimization of an Automotive B-Pillar for IIHS Side Impact using LS-DYNA with HEEDS
Optimization / LS-OPT	An Overview of LS-OPT Version 4.1
Optimization / Occupant Safety	Optimization Techniques in Conjunction with Complex ATD FE Models
Optimization/Crashworthiness	Variable Reduction in Automotive Crashworthiness Multi-Objective Optimization
Optimization/Crashworthiness	Improvement of Energy Absorption for the Side Member Using Topography Optimization
PRE/POST	LS-DYNA® Durability Loadcases: An Automated Template Driven Process Using the ANSA Task Manager
PRE/POST	LS-DYNA “Model Compare” in Visual-Environment
Simlation / Material Modeling / Concrete	Improvement to Release III of the K&C Concrete Model
Simulation	FEM Modeling of Innovative Helmet Liners

Simulation	Predicting the Dynamic Crushing Response of a Composite Honeycomb Energy Absorber using a Solid-Element-Based Model in LS-DYNA
Simulation	Response of the Enhanced Polar Outflow Probe (e-POP) Instrument under shock loading
Simulation	Usage of LS-DYNA® in the development of professional drill hammers
Simulation	A Contribution to new ALE 2D method validation
Simulation	Simulation of a thin walled aluminum tube subjected to base acceleration using LS-DYNA's vibroacoustic solver
Simulation	Mathematical modeling of asteroid falling into the ocean
Simulation	LS-DYNA and JMAG coupling simulation for change of SPM motor magnetic properties due to press-fitting
Simulation	Study of Thin-walled Box Beam's Crushing Behaviors Using LS-DYNA
Simulation /Biomedical	Facial Modelling: Imaging, Muscle Modelling and Surgery
Simulation / Aerospace / Thermal	Heat Transfer Simulation to Determine the Impact of Al and Al-5Mg Arc Sprayed Coatings onto 7075 T6 Al Alloy Fatigue Performance
Simulation / Automotive	Experimental Finite Elements in LS-DYNA®
Simulation / Civil Engineering	Analysis and Design of Large-Scale Civil Works Structures Using LS-DYNA®
Simulation / Geomaterial	A Brief Look at *MAT_NONLOCAL: A Possible Cure for Erosion Illness?
Simulation / Roadway	Performance of Thin Concrete Deck Due to Traffic Impact

Companies presenting (pending final verification): Not all companies, universities, distributors, research and consulting companies are listed

Among the companies are:

ASME, Chrysler Group LLC - ATK Space Systems / NASA Langley - Black & Decker GmbH, Denton - *ESI Group* - Ford Motor Company - Fraunhofer Institut SCAI – FTSS Hewlett-Packard Company - Honda R&D – IMMI - Karagozian & Case - Lear Corporation LMS International - National Research Council Canada - Pratt-Whitney Canada – Rafael TATA Motors Limited India - The Procter & Gamble Co. - Toyota Motor Corporation U.S. Army Corps of Engineers - U.S. Army Research Laboratory Aberdeen Proving Ground Vanderplaats R&D Inc. - Texas Transportation Institute - SimuTech Group Inc. Red Cedar Technology, Inc. – DatapointLabs - - Hamilton Sundstrand - AMEC Americas

Post Conference Training Seminars

Conducted at University of Michigan Dearborn
Registration opens at 8:30 AM
Lunch is provided

Training Courses being offered

- Impact/Dummies & Barriers -
  Sarba Guha, Dilip Bhalsod, Christoph Maurath, D.Sc.
- Heat Transfer & hot stamping -
  Arthur Shapiro, PhD.
- Implicit Analysis -
  Ala Tabiei, Ph.D
- LS-OPT -
  Nielen Stander, Ph.D
- LS-PrePost -
  Philip Ho
- Metal Forming -
  Xinhai Zhu, Ph.D
- ALE - (course content will be listed soon)
  M'hamed Souli, Ph.D
- Polymeric Material with LS-DYNA –
  Paul A. Du Bois

LS-DYNA for Heat Transfer with Hot Stamping Applications

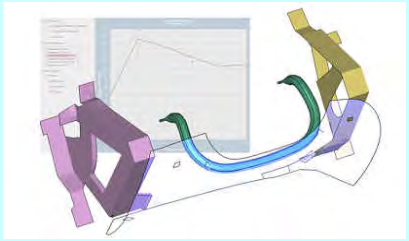
Using LS-DYNA for Heat Transfer with Hot Stamping Applications
Instructor: Dr. Arthur B. Shapiro

The course objective is to provide an understanding of computational finite element heat transfer. Presentations 1-6 focus on the various heat transfer modeling issues one must understand in using LS-DYNA. This is followed by presentations 7 and 8, which are an introduction to thermal-stress problems with a focus on sheet metal forming. Workshop problems are used to illustrate the points made in the lectures.

Presentations include:

- **Introduction** – Learn to create a KEYWORD input file to solve for the thermal expansion of an aluminum block. Learn LS-PrePost commands to display temperature and heat flux.
- **Mathematical Theory** – brief, but can't be avoided
- **Equation Solvers** - Learn the advantages and disadvantages between the Gauss direct solvers & conjugate gradient iterative solvers in LS-DYNA.
- **Time Step Control** – Learn how to select a time step size, use the variable time step option, and understand the difference between fully implicit and Crank Nicolson time integration methods.
- **Nonlinear Problems** – Learn the nonlinear heat transfer keyword parameters by solving a radiation problem and a solid-liquid phase change problem.
- **Boundary Conditions** – Learn how to define temperature, flux, convection, and radiation boundary conditions. Learn how to hand calculate a convection heat transfer coefficient.
- **Thermal Contact** – Learn thermal contact modeling issues by solving a sheet metal forming problem with thin and thick shells.
- **Thermal-stress coupling** – An introduction to coupled thermal stress modeling with a focus on sheet metal forming applications.
- **Thermal-fluids** – Learn 3 modeling techniques for pipe flow: (1) BULKFLOW, (2) pipe network flow, and (3) ALE.
- **Miscellaneous** – A quick overview of miscellaneous modeling topics (e.g., powders, welding, thermostats, MEMS, etc.).
- **Hot Forming Process** - fringes of temperature

For training inquiries contact Cathie – Cathie@lstc.com



Optimization Using LS-OPT® And LS-DYNA®

Optimization Using LS-OPT® and LS-DYNA®
Instructor: Dr. Nielen Stander

The course is to provide an understanding of simulation-based optimization and reliability using LS-DYNA. The graphical user interface is used to teach input preparation and post-processing. The newly released LS-OPT V4.1 is used, so this is an opportunity to become familiar with the new features.

Day I

Optimization Theory. Experimental Design, Metamodeling, Optimization.

Introduction to the Graphical User Interface. A demonstration of the GUI to set up a design optimization problem using LS-DYNA for simulation.

Crashworthiness optimization. Setting up and running an optimization problem with LS-DYNA.

Day II

System Identification. A problem to identify material parameters from experimental results. Confidence intervals.

Multi-disciplinary optimization. Learn how to set up an optimization problem with more than one case or discipline. Combines crashworthiness with frequency criteria in a single design.

Multi-objective optimization. Optimize a problem with more than one objective. Post-processing specific to MOO problems using scatter plots, Hyper Radial Visualization, Parallel Coordinates and Self-Organizing Maps. (Time allowing).

Reliability analysis. Use of Monte Carlo simulation to determine the reliability of a structural design. Theory and tutorial.

For training inquiries contact Cathie – Cathie@lstc.com

Polymeric Material With LS-DYNA

Polymeric Material With LS-DYNA – Instructor: Paul A. DuBois

Day 1 – Wednesday

Foam materials:
general introduction

Elastic foams :
input data generation

Special aspects of foams :
damage and porosity

Overview
the German FAT research project

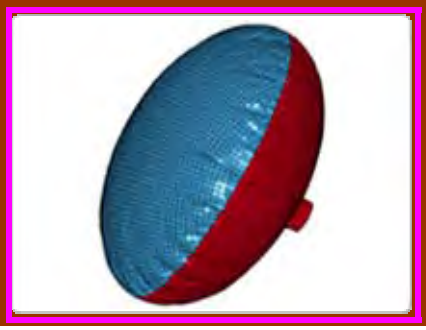
Day 2 – Thursday

Modeling
thermoplastics as visco-elastic materials

Modeling
thermoplastics as elasto-plastic materials

Elastomer and rubber modeling
LS-DYNA MAT_SAMP

For training inquiries contact Cathie – Cathie@lstc.com



LS-PrePost 3.0

LS-PrePost 3.0 Instructor: Philip Ho

Overview
- GUI layout, keyword and mouse operations
- Ls-Prepost 2.4 to 3.0 transition

Geometry Engine
- Simple geometry creation
- Points, lines, surface, solids
- Geometry cleaning before meshing

Meshing
- Simple shape creation
- Automatic meshing from Iges/Step files
- 2D meshing
- Sweeping 2D cross section into 3D solid
- Generate solid element from shell element
- Generate shell element from solid faces

Mesh Checking and editing
- Mesh quality check
- Shell element normal check and reverse
- Mesh editing and cleanup

Mesh modification and creation by
- Translation
- Transformation
- Reflection
- Scaling
- Projection
- Offset

Keyword data
- Multiple input files
- Keyword data creation and editing
- Keyword file output

LS-DYNA data creation
- Coordination system
- Constrained data
- Initial data
- Rigid wall
- Sets data

Post-Processing
- Animation
- Fringing, fringe range setting
- Showing result
- History plotting
  - D3plot files
  - Ascii file
  - User files
  - Crossplot

Output
- Movie
- Image
- Deformed geometry

Misc.
- Cross-section cutting
- Color management
- Annotation
- Measurement
- Setting
- Command file and Macro
- Configuration file

For training inquiries contact Cathie – Cathie@lstc.com

Occupant Analysis

using

LSTC Dummies and Tools

Occupant Analysis using LSTC Dummies and Tools
Course Outline is subject to minor changes next month

A) The Basic Model of the Occupant inside the Vehicle (Frontal)

- How to Position the H-III Dummy Model in a Vehicle Environment
- How to Route a Seatbelt over the Dummy and the intricacies of the Seatbelt Model. How to apply "contact" with the Dummy.
- The simple Vehicle Model for Frontal Occupant Analysis and its intricacies. How to apply Pitch, Drop and Yaw. How to apply "contact".
- How to apply pulse to the Dummy
- How to run the combined model

B) How to Post-Process

- How to see animations
- How to plot Injury Responses

C) How to Quickly Modify Existing Models

- How to reposition the Dummy for small movements in H-Point and Pelvic Angle, without rerouting the Seatbelts.
- How to modify an existing fully running model and change it into one that represents a completely different vehicle, in a different design location, thus reducing modeling time.

D) Discussion of Other Important Items

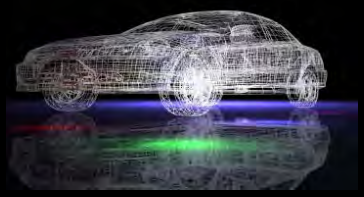
- The Steering Column Model
- The basic Airbag Model (using *Airbag_Hybrid)
- The basic Particle Method for Airbag Modeling (in brief)

E) Overview of the Current Rules and Regulations

- FMVSS (USA) and CMVSS (Canada)
- US NCAP and IIHS Offset Deformable Barrier
- European Regulatory and Euro-NCAP

F) **Other Topics** (if time permits)

- Overview of other LSTC Anthropomorphic Models
- Overview of LSTC Barrier Models



Implicit for linear and nonlinear static and dynamic analysis

Implicit for linear and nonlinear static and dynamic analysis

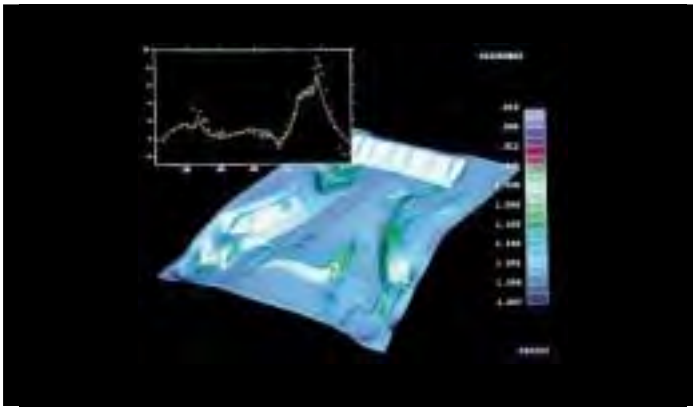
Instructor: Dr. Al Tabiei

Objective: Learn how to run LSDYNA Implicit for linear and nonlinear static and dynamic analysis. Detailed descriptions are given of the data required to run implicit analysis. Examples are used to illustrate the points made during the course.

COURSE CONTENTS

- Finite Element Modeling. Do you need Implicit or Explicit Analysis
- Current LSDYNA Implicit Capability (material models, elements, contacts, etc.)
- The Nonlinear Finite Element Static and Dynamic Equations
    - Geometric Nonlinearity
    - Material Nonlinearity
    - Contact Nonlinearity
- Nonlinear solution strategies
- Fundamental Modeling Techniques and Input Syntax
- Linear and Nonlinear Static Analysis
- Linear and Nonlinear Dynamic Analysis
- Stress Initialization Implicit/Explicit
- Contact Problems and Implicit Formulation
- Stability Problems and Non-convergence
- Understanding and Resolving Divergence Problems
- Stress Initialization Implicit/Explicit, Explicit/Implicit, and multi-steps simulations
- The difference between explicit and implicit simulations (comparison between explicit and implicit will be performed using two examples).
- Ways to battle non-convergence
- Quasi-static analysis using explicit and implicit LS-DYNA
- How to tell if your FE results are correct

For training inquiries contact Cathie – Cathie@lstc.com



Stamping Simulation

Using LS-DYNA®

Objective: The course objection is to learn how to improve prediction accuracy using LS-DYNA and correct problems that occur in stamping simulations. New features will be introduced and relevant parameters will be discussed. Several examples will be used for illustration purpose.

COURSE CONTENTS

1. Review of LSDYNA in stamping simulation
2. Some important factors affecting prediction accuracy
    a. Contact algorithm
    b. Material models
    c. Mesh size
3. some features in forming and springback analysis
    a. Mesh adaptivity
    b. Mesh coarsening
    c. Mesh check/fix
    d. Smooth contact
    e. Drawbead definition
    f. Trimming
    g. Material hardening rules
4. Implicit method
    a. Introduction of implicit method
    b. The new algorithm
    c. Some applications
5. Forming template
    a. User of parameter
    b. Automatic positioning
    c. Line die simulation
    d. set-up for some typical forming process
    e. draw-forming simulation
    f. hydro-forming simulation
    g. tube-bending simulation
    h. springback compensation