Karagozian & Case (K&C) Concrete model in LS-DYNA (i.e., MAT_072)
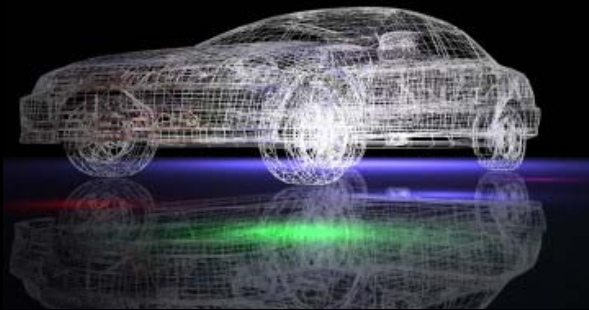
The 11th Int'l LS-DYNA® Users Conference

High Performance Computing

HPC

Global

Turkey
Bogazici Univ.

India
Oaysis

India
EASi

Dr. Sami A. Kilic
Selcuk Altay

Oaysis Team

EASi Team

Announcements

Welcome to:

Karagozian & Case: Founded in 1945 providing a unique and highly technical set of skills by providing engineering services for the design and analysis of structural and mechanical systems subjected to blast and shock effects.

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Dr. Sami A. Kilic, of the Dept. of Earthquake Engineering, at the Kandilli Observatory and Earthquake Research Institute
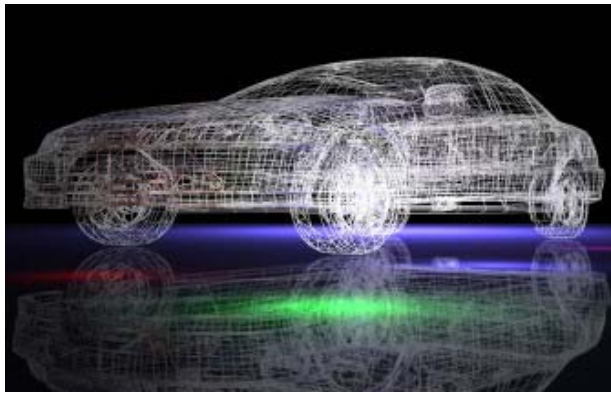
Over the next months our format will be revised monthly to meet our expectations for our October 2009 issue – our 9th anniversary of bringing you the information monthly.   Thank you for your support

FEA Information Staff

For information please contact

art@feainformation.com

The 11th International, LS-DYNA® Users Conference

June 06-08, 2010

Hosted by Livermore SoftwareTechnology Corp.

To be held at The Hyatt Regency Dearborn, MI

FIRST CALL FOR PAPERS

Abstract Due: December 4, 2009	email abstract to: **papers@lstc.com** **subject line for e-mail – Abstract LS-DYNA Conference 2010**	Notification: January 22, 2010
Paper Deadline: March 05, 2010	Conference Papers: The presenter of each accepted paper will receive free admission to the conference, provided that the presenter registers for a room at the Hyatt Regency Dearborn under LSTC Conference registration	

Application Areas Being Accepted for Paper Submission:

- Aerospace
- Automotive Crashworthiness
- Ballistic and Penetration
- Biomechanics
- Civil Engineering
- Compressible Fluid Dynamics
- Electro Magnetics

- Heat Transfer
- Impact and Drop Testing
- Manufacturing Processes
- Metal Forming
- Modeling Techniques
- Nuclear Applications
- Occupant Safety

- Seismic Engineering
- Ship Building
- Transportation
- Virtual Proving Ground

Abstract Length: Approximately 300 words, please include figures, if possible
Paper Length: Maximum of 3000 words, single-spaced, on 8-1/2" x 11" paper
Format: A MS Word template will be provided
Contact: papers@lstc.com

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High-performance computing (HPC) uses supercomputers and computer clusters to solve advanced computation problems. The future is power – connections – faster but accurate results. The importance of I/O performance and their connectivity possibilities bring to the arena a multitude of possibilities. A balance of Architecture, CPU power, Compilers, Clusters, large and small workstations, and software able to take advantage of the process is the future.

Our current website in its beginning stage is www.hpcservers.com - please feel free to send publications you wish posted and other information to the engineering community.

The TOP500 project ranks and details the 500 most powerful known computer systems in the world. The project was started in 1993 and publishes an updated list of the supercomputers twice a year. The following is from their June 2009 list.

A follow up list will be designated for September.

Listing will be published monthly until next Top500 update for CRAY, DAWNING, HEWLETT-PACKARD, FUJITSU, NEC. The full list can be viewed on their site. {www.top500.org}

Rank	Site	Computer/Year Vendor	Cores	Rmax	Rpeak	Power
2	Oak Ridge National Laboratory United States	Jaguar - Cray XT5 QC 2.3 GHz / 2008 – **Cray Inc.**	150152	1059.00	1381.40	6950.60
6	Nat. Institute for Comp. Sci./Univ. of Tennessee United States	Kraken XT5 - Cray XT5 QC 2.3 GHz / 2008 **Cray Inc.**	66000	463.30	607.20	
11	NERSC/LBNL United States	Franklin - Cray XT4 QuadCore 2.3 GHz / 2008 **Cray Inc.**	38642	266.30	355.51	1150.00
12	Oak Ridge National Laboratory United States	Jaguar - Cray XT4 QuadCore 2.1 GHz / 2008 - Cray Inc.	30976	205.00	260.20	1580.71

Rank	Site	Computer/Year Vendor	Cores	Rmax	Rpeak	Power
13	NNSA/Sandia National Laboratories United States	Red Storm - Sandia/ Cray Red Storm, XT3/4, 2.4/2.2 GHz dual/quad core / 2008 - **Cray Inc.**	38208	204.20	284.00	2506.00
15	Shanghai Supercomputer Center China	Magic Cube - Dawning 5000A, QC Opteron 1.9 Ghz, Infiniband, Windows HPC 2008 / 2008 - **Dawning**	30720	180.60	233.47	
18	Comp. Res. Lab., TATA SONS - India	EKA - Cluster Platform 3000 BL460c, Xeon 53xx 3GHz, Infiniband /2008 **Hewlett-Packard**	14384	132.80	172.61	786.00
21	Nat'l Inst. for Comp. Sci./Univ. of Tennessee United States	Athena - Cray XT4 QuadCore 2.3 GHz / 2008 **Cray Inc.**	17956	125.13	165.20	888.82
22	Japan Agency for Marine - Earth Science and Technology - Japan	Earth Simulator - Earth Simulator / 2009 - **NEC**	1280	122.40	131.07	
23	Swiss Sci. Comp. Center (CSCS) - Switzerland	Monte Rosa - Cray XT5 QC 2.4 GHz / 2009 - **Cray Inc.**	14740	117.60	141.50	
28	JAXA Japan	Fujitsu FX1, Quadcore SPARC64 VII 2.52 GHz, Infiniband DDR / 2009 - **Fujitsu**	12032	110.60	121.28	
30	Government Agency Sweden	Cluster Platform 3000 BL460c, Xeon 53xx 2.66GHz, Infiniband / 2007 - **Hewlett-Packard**	13728	102.80	146.43	
34	Pacific Northwest National Laboratory United States	Chinook - Cluster Platform 4000 DL185G5, Opteron QC 2.2 GHz, Infiniband DDR / 2008 - **Hewlett-Packard**	18176	97.07	159.95	
35	IT Service Provider Germany	Cluster Platform 3000 BL2x220, E54xx 3.0 Ghz, Infiniband / 2009 **Hewlett-Packard**				

Karagozian & Case was founded in 1945 providing a unique and highly technical set of skills by providing engineering services for the design and analysis of structural and mechanical systems subjected to blast and shock effects.

Project: Develop a barrier that can effectively prevent damage to a facility behind it where a large bomb was to detonate next to the barrier

Project: Develop conventional design drawings and specifications for constructing several buildings at Children's Hospital of Los Angeles.

The skills of the Karagozian & Case engineering staff are focused in five complementary areas:

Design/Analysis relating to Blast, Shock, and Impact Loads

K&C specializes in engineering design that reduces the threat and effects from blast loads, high-velocity impacts (e.g., from vehicles and bullets), and shock loads. K&C also offers validation testing of existing blast and impact resistant designs, and advanced computational structural dynamics analysis that simulates the actual responses that occur in blast and impact events. Design threats include terrorist bombings, accidental explosions, and high velocity impacts. In addition, for over four decades, K&C has provided designs and performed blast effects tests of hardened military structures to resist damage from both conventional and nuclear weapons. We have designed numerous test fixtures and test specimens for blast and shock effects tests.

Risk Assessment/Mitigation

K&C provides clients with risk assessment and mitigation studies associated with blast effects and high-velocity impacts. These studies define the site specific threats and vulnerabilities, cite mitigation measures and their cost, and enable clients to understand their risks and options pursuant to the countering of terrorist, explosive, and other similar threats. Assessments are performed with K&C's own assessment tools. The highly visual style of our results presentation greatly aids the client in understanding the issues involved. Our extensive experience with blast and impact testing of components and systems and the

design of blast-resistant systems has enabled K&C to deliver proven mitigation concepts that are both practical and innovative, at realistic costs.

Perimeter Defense Design and Analysis

K&C offers a comprehensive array of perimeter security services, catering to Government and private interests both in the U.S. and abroad. We have designed, tested, and implemented complete defense systems that include features such as vehicle barriers, fences, walls, gates, entry control facilities, and forced entry construction. K&C assists clients with all key aspects of design and deployment, a process that begins with site-specific threat definition analysis and a vulnerability assessment, following with functional requirements definition, and finally, system selection. Our advanced understanding of dynamic response analysis and impact effects modeling allows us to design systems compatible with such factors as historical preservation and architectural constraints, but without sacrificing protective capabilities. As an example, K&C is the only private consultant to have conceptualized, designed, and physically tested barrier systems capable of stopping vehicles weighing up to 65,000 lbs and traveling at speeds of up to 60 mph.

Conventional Structural Engineering Design

K&C also provides conventional design packages for commercial and industrial projects. Much of this work is related to retrofitting existing facilities for expanding their capacity or upgrading their strength. This experience in conventional design is highly useful when interfacing our blast-resistant design work with an existing structure or the work of conventional structural engineers, which allows our resistant designs to integrate smoothly with conventional designs.

Research and Development

K&C is one of the leading institutions in the world in providing research and development services to the Government and product manufacturers related to the development of blast and shock resistant devices and technologies. K&C uses high-fidelity physics-based (HFPB) modeling techniques to perform blast/impact effects analysis for develop designs and devices for blast and impact resistance. K&C developed and implemented the physics-based concrete model that is available in LS-DYNA (i.e., MAT_072) for performing blast and impact effects anslysis of reinforced concrete structures.

For Information Contact:

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Karagozian & Case

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Phone: (818) 240 4199;
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Fax: (818) 240 4966
E-mail: lan@kcse.com
http://www.kcse.com

A strong engineering future is forged by many factors, among them being:

- Business relationships bringing the engineering community a solid base of solutions.

- Technical support for support questions and the immediate ability to contact the main developers with specific expertise.

- Software solutions geared toward the future with price affordability, accuracy, robustness and the capability to run on the High Performance Super Computers, without add on pricing structures.

ETA and LSTC are two solid based companies continuing to build on their past 15 year business relationship:

Engineering Technology Associates (ETA)

Headquartered in Michigan.

ETA continues to offer the LS-DYNA solver with its two flagship products eta/DYNAFORM and eta/VPG. Additionally ETA utilizes the LS-DYNA solver in its engineering consulting work and its advanced product development methodology, the Accelerated Concept to Product (ACP) Process.

The ACP process incorporates the use of multiple CAE tools including modeling, application specific, solver technology, optimization and manufacturing solutions. Many design concepts under multiple load conditions are evaluated simultaneously, but are not initiated until a concept that meets all of the design and manufacturing targets emerges.

The optimized concept is then designed, analyzed and optimized using loading, manufacturing, material and cost constraints. Upon completion, the resulting CAD data is generated for an ideal production-ready design.

http://www.eta.com

Livermore Software Technology Corporation (**LSTC**)

Headquartered in California and Michigan based office offering Support, Development and Training.

LSTC continues to rapidly develop the solver LS-DYNA, with features requested by customers, and knowing future capabilities that will be needed. To meet the growing needs of its LS-DYNA customer base LSTC includes at no additional add on fees:
- LS-PrePost
- LS-OPT
- Barrier Models
- Dummy Models

ETA Achieves Significant Weight Reduction with ACP Process

Engineering Technology Associates, Inc. (ETA) recently announced its performance-driven product development technique, the Accelerated Concept to Product (ACP) process

This procedure has revolutionized and streamlined the product development process, through optimization led design. The performance-driven development process relies heavily on simulations to meet timing and budget targets, whereas the traditional processes have been built around a build-test philosophy.

The holistic, topology multi-disciplinary (MD), 3G (geometry, grade, and gage) design optimization solution was applied to significantly reduce mass for the Auto/Steel Partnership's Future Generation Passenger Compartment (FGPC) Phase 1 and Phase 2 (Validation), as well as for World Auto Steel's Future Steel Vehicle (FSV) Pilot Project.

Mass reduction was 30% for the passenger compartment in Phase 1, 15% in phase 2 and 45% over the original donor vehicle's geometry for FSV. For the FSV project, a "clean sheet" approach was utilized, meaning that the new design was not based on existing geometry, rather the design was completely generated using MD-3G techniques.

The ACP process incorporates the use of multiple CAE tools including modeling, application specific, solver technology and optimization solutions. Many design concepts under multiple load conditions are evaluated simultaneously, but are not initiated until a concept that meets all of the design and manufacturing targets emerges. The optimized concept is then designed, analyzed and optimized using loading, manufacturing, material and cost constraints. Upon completion, the resulting CAD data is generated for an ideal production-ready design.

There are many advantages to using ETA's ACP process, including the ability to disregard underlying assumptions that can inhibit the design. Additionally, the optimum load path is unconstrained by historical engineering judgment. Most importantly, it also allows for non-intuitive solutions for structural performance and can generate non-intuitive optimized shapes and component configuration.

Comprehensive goals are achievable using the ACP process as CAE/CAD designs change simultaneously, maximum mass reduction is possible, design robustness and efficiency can be significantly improved, the number of components in a system or sub-system can be reduced and manufacturing efficiency can be achieved (labor, material, tooling). Additionally, highly optimized and advanced solutions can be applied in both a linear and non-linear environment. The ACP process has unlimited potential and will be applied in a variety of industries for structural product development. Information:

Akbar (248)729-3010

July we are pleased to feature Dr. Sami A. Kilic, of the Dept. of Earthquake Engineering, at the Kandilli Observatory and Earthquake Research Institute

Parallel computing with LS-DYNA along the Bosporus Straits at Bogazici University

History of Robert College

Robert College was founded in the city of Istanbul (then called Constantinople at the time) during the rule of the Ottoman Empire by Dr. Cyrus Hamlin, an educator, inventor, technician, architect and builder, and by Mr. Christopher Rheinlander Robert, a well-known philanthropist and a wealthy merchant from New York.

Initially Dr. Cyrus Hamlin, an ingenious New Englander of versatile talents, came to the Ottoman Empire in 1839 to start a seminary school for boys, where he taught until 1860. Dr. Hamlin met Mr. Robert in 1856 during the Crimean War with Russia. As Mr. Robert's steamer was pulling into the Port of Istanbul, he noticed a boat full of delicious looking white bread. Mr. Robert found out that this bread had been baked by Dr. Cyrus Hamlin for the wounded British soldiers hospitalized at the Selimiye Barracks near the Uskudar district of Istanbul. Subsequent meetings of these two men, oddly enough both of Huguenot descent, brought about the founding of the oldest American College established outside of the United States.

On September 16, 1863, Robert College opened its doors to students with Dr.Cyrus Hamlin as its first President, and offered Bachelor of Arts Degree to its graduates. The Robert College School of Engineering was established in 1912. The Robert College Foundation went into financial trouble in the late 1960s. The College was passed on to the Republic of Turkey as a resolution to encourage the establishment an independent Turkish University as a successor to Robert College. On 10 September 1971, Bogazici University was officially established on what had been the Robert College Campus for over one hundred years.

The Observatory History

The Observatory in Istanbul was founded in 1868 in the old Pera district during the rule of the Ottoman Empire. The first systematic meteorological, seismological, and even gravimetrical type of geophysical observations in the Ottoman Empire were carried out at the Istanbul Observatory. The political turmoil of 1909 shut down the activities of the Observatory. Mr. Fatin Gokmen, who was

one of the Turkish pioneers of modern geophysical sciences, was charged with the task of reorganizing the Observatory. Mr. Gokmen relocated the Observatory Campus to the Kandilli distinct of Istanbul. The Kandilli Observatory started the systematic meteorological observations in 1911. After the collapse of the Ottoman Empire following the defeat of WW I, the Republic of Turkey was founded in 1923. By the reorganization of the higher education of Turkey in 1982, the fates of Bogazici University and the Kandilli Observatory crossed each other. The Kandilli Observatory was reorganized as a part of Bogazici University and offered M.Sc. and Ph.D. degrees in Geophysical Sciences. The Department of Earthquake Engineering as a branch of Civil Engineering was established in 1989 and offered M.S. and Ph.D. degrees in Structural and Geotechnical Earthquake Engineering.

The Kandilli Observatory and Earthquake Research Institute

Today the Observatory is called the Kandilli Observatory and Earthquake Research Institute and serves as an Institute administered by Bogazici University. A view from the Department of Earthquake Engineering is shown in Figure 1.

The Kandilli Campus is located in a very nice location in Istanbul overlooking the Bosporus Straits and both suspension bridges spanning the European and Asian continents.

Figure 1: View of the Bosporus straits from the Department of Earthquake Engineering of Kandilli Observatory.

The main Bogazici University Campus is located right across the Bosporus on the hill seen on the right hand side of the photo. The modern high rises of the new financial district of Istanbul are also seen in the distance. As a popular waterway serving the routes between the Black Sea and the Mediterranean, the Bosporus straits are populated with Romanian and Russian ships as well as others.

Dr. Sami A. Kilic

Dr. Sami A. Kilic received his B.S. degree in Civil Engineering from Bogazici University in 1989. He continued his graduate studies at the University of California at Berkeley (M.S. 1990) and Stanford University (Ph.D. 1997). He was introduced to Dyna3D by his Turkish friend Hassan Yildiz in 1993, who was then a Ph.D. candidate at the Stanford Aeronautical Engineering Department, which was enrolled in the Collaborator's program of Lawrence Livermore National Laboratory. Upon return to Istanbul, Dr. Kilic joined the faculty at Bogazici University. He obtained his first LS-DYNA license from Dr. James Kennedy through KBS2 Co. in 1998. Dr. Kilic worked as a Senior Research Scientist at the Purdue University Computing Research Institute

during his sabbatical leave in 2003. He was part of the Purdue University team that carried out the LS-DYNA simulation of the aircraft crash into the Pentagon building structure during the 9/11/2001 events. Dr. Kilic returned back to Bogazici University in 2004 and joined the faculty at the Department of Earthquake Engineering at the Kandilli Observatory and Earthquake Research Institute.

LS-DYNA & Parallel Computing

The advances in LS-DYNA and the growing complexity of modern day simulations brought up the necessity of parallel computing. Dr. Kilic applied for the funds offered by the TUBITAK Turkish Research Organization in order to set up a parallel computing cluster unit at the Kandilli Observatory and Earthquake Research Institute.

The LS-DYNA simulations at the computing cluster at the Kandilli Observatory range from blast effects on building structures within the context of blast resistant design of structural systems to modeling the seismic behavior of the 1st century A.D. Roman pedestrian bridge located in the ancient city of "Antioch" (nowadays called the city of "Antakya" as part of modern Turkey) built by the Emperor Titus of the Flavian Dynasty of the Roman Empire.

The computing cluster consists of 4 HP brand DL360G5 rack server nodes with a total of 32-cores and 52 GB of RAM memory. The cluster was realized by the grant given by the TUBITAK Turkish Research Organization in 2007. After the acquisition of the hardware for the computing cluster, the problem of finding a suitable operating system was solved by the Microsoft Corporation. The Linux vendors in Turkey did not offer a complete solution for the cluster. During the 2007

6th German LS-DYNA Users Forum in Frankenthal, Germany, Dr. Kilic was introduced to the Microsoft CCS 2003 cluster operating system. A complete solution was offered by Microsoft upon his return to Istanbul. Figure 2 shows the room where the computing cluster is located. Microsoft published a success story about the cluster and it is available at the link below. The operating system of the cluster was upgraded to Microsoft HPC 2008 in September 2008.

Figure 2: 4-node 32-core computing cluster at the Department of Earthquake Engineering at the Kandilli Observatory and Earthquake Research Institute. The cluster cabinet is shown on the left, and the two LCD monitors show the LS-prepost screens for the blast simulations (left) and the seismic behavior of the Titus Bridge (right). The desktop computer on the very right serves as a domain controller for the computing cluster. The room enjoys a good view of the Kandilli Campus.

Dr. Kilic performed the physical setup of the cluster room with the help of his Ph.D. student Selcuk Altay, who is working as a Research Assistant at the Department of Civil Engineering at Bogazici University. Figure 3 shows Dr. Kilic and Ph.D. student Selcuk Altay at the Kandilli Observatory Department of Earthquake Engineering.

The establishment of the cluster and its continued use depends critically on motivated students.

The cluster is also used by the Civil Engineering graduate students taking the "Nonlinear Structural Analysis" course offered by Dr. Kilic at Bogazici University. The students get hands on experience in using LS-Dyna on the parallel computing cluster. Today the cluster is actively used in teaching and research activities.

Figure 3: Dr. Sami A. Kilic and Ph.D. candidate Research Assistant Selcuk Altay at the department of Earthquake Engineering at the Kandilli Obervatory and Earthquake Research Institute.

Educational Community

Global Connections

July 2009 we welcome Dr. Sami A. Kilic with the Bogazici University

China

Tsinghua University
Dr. Qing Zhou

India

Indian Institute of Science
Dr. Anindya Deb

Italy

Prode – Elasis & Univ. of Napoli, Frederico II
Prof. Gennaro Monacelli

Russia

St. Petersburg State Tech. University
Dr. Alexey I. Borovkov

Turkey

Bogazici University
Dr. Sami Kilic

USA

Northwestern University
Dr. Ted Belytschko

Univ. of California – San Diego
Dr. David Benson

Ohio University
Dr. Bhavin V. Mehta

The Ohio State U – ERC/NSM
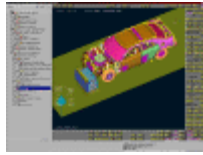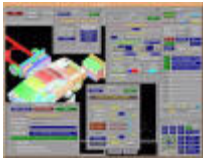Dr. Taylan Altan

University of Cincinnati
Dr. Ala Tabiei
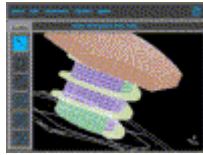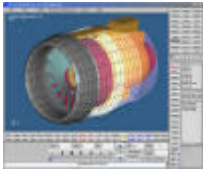
University of Nebraska
Prof. John D. Reid

Connecticut State University
Prof. Thomas Vasko

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, a thriving innovative software with special features for the high performance and effortless 3D & 2D post-processing of LS-DYNA results.

Engineering Technology Associates, Inc.

 http://www.eta.com

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

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.

Japanese Research Institute, Ltd.

http://www.jri-sol.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.

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

Software Solutions: Interfacing to, or have the LS-DYNA solver embedded within their product.

ETA – DYNAFORM

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

ETA – VPG

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

OASYS   software for LS-DYNA

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

ESI Group Visual-CRASH For DYNA

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.

APTEK

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

BETA CAE Systems S.A.– ANSA

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

BETA CAE Systems S.A.– μETA

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

Participant LS-DYNA® SMP & MPP Hardware and OS

FUJITSU	**HP**	**HP**	**HP**	**HP**
Prime Power	PA-8X00	IA-64	Opteron	Alpha
SUN OS 5.8	HP-UX 11.11. and above	HP-UX 11.22 and above	Linux	True 64

INTEL	**INTEL**	**INTEL**	**NEC**
IA32	IA64	Xeon EMT64	SX6
Linux, Windows	Linux	Linux, Windows 64	Super-UX

MPP and Interconnect MPI

CRAY	**O/S**	**HPC Interconnect**	**MPI Software**
CX1	Windows HPC Server 2008, Linux	InfiniB	MSMPI, HP MPI, INTEL MPI
XT5	Linux	SeaStar2	Cray MPI
XT5M	Linux	SeaStar1	Cray MPI
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
NEC			
NEX SX6	Super-UX		

OASYS Ltd: Markets engineering software products. Consulting engineers, planners and project managers working in all areas of the built environment.	**JSOL Corporation**: Specializing in Research & Consulting; System Consulting, Frontier Business, System Integration and Science Consulting	**HP**: Leading provider of high performance computing solutions for CAE, including workstations, servers, blades and storage..
NEC: A history of more than 100 years of leadership/innovation in the core high-technology sectors of communications, computers/electronic components	**INTEL**: For more than three decades, Intel Corporation has developed technology enabling the computer and Internet revolution that has changed the world.	**ETA:** Provides engineering & IT services & has created the streamlined simulation software packages DYNAFORM and VPG
ESI Group: A software editor for the numerical simulation of prototype and manufacturing process engineering in applied mechanics	**BETA CAE Systems S.A.**: Specialized in the development of state of the art CAE pre- and post-processing software systems.	**APTEK**: Among the software developed APTEK develops an interactive for driving LS-DYNA material models
PANASAS: High performing Parallel Storage for scalable Linux clusters. Delivering exceptional scaling in capacity and performance for High Performance Computing (HPC) organizations.	**Voltaire:** Voltaire is a leading provider of scale-out computing fabrics for data centers, high performance computing and cloud environments.	**CRAY:** A global leader in supercomputing, Cray provides innovative systems to meet both xisting and future computational challenges

LS-DYNA Distributors/Consulting
LS-DYNA® Solution Package
One Fee All Inclusive
LS-PrePost® - LS-OPT®
LSTC Dummy Models
LSTC Barrier Models

Countries not listed contact feaanswer@aol.com for a demo license or information

Australia

- **LEAP**

Canada

- **MFAC**

China

- **Arup**
- **ETA China**

France

- **Alyotech**
- **AS+**

Germany

- **CADFEM**
- **DYNAmore**

India

- **Oasys**
- **EASi**
- **CADFEM India**

Italy

- **DYNAmore**
- **ENGINSOFT**

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- **ETA**
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- **ARUP**

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A Coupling of Empirical Explosive Blast Loads to ALE Air Domains in LS-DYNA

Todd P. Slavik
Livermore Software Technology Corporation

A coupling method recently implemented in LS-DYNA® allows empirical explosive blast loads to be applied to air domains treated with the multi-material arbitrary Lagrangian-Eulerian (ALE) formulation.

Investigation of Accuracy Improvement on Crashworthiness Simulation with Pre-Simulation of Metal Forming.

Katsuhiko TAKASHINA, Kazuhiro UEDA, Takeo OHTSUKA
MITSUBISHI MOTORS CORP.

To improve the accuracy of crashworthiness simulation, it is preferable to consider the effects of metal forming.

Implementation and Validation of Frequency Response Function in LS-DYNA

Yun Huang, Livermore Software Technology Corporation

Bor-Tsuen Wang, Dept. of Mechanical Eng. College of Engineering - National Pingtung University of Science and Technology

A new feature of frequency response function (FRF) computation, has been implemented in LS-DYNA.

The paper and file is on FEA Publications - Featured

Training Courses

August & September 2009

Send listings to agiac99@aol.com

Start Date		Check company site for changes to class dates	
Aug 04	US	Intro to LS-DYNA LS-PrePost	LSTC
Aug 04	US	Intro to DYNAFORM	ETA
Aug 11	USA	Intro to Modeling with VPG PrePost	ETA
Aug 12	US	Intro to LS-DYNA	ETA
Aug 27	IN	Introduction to LS-DYNA	CADFEM
Sept 01	US	Introduction to DYNAFORM	ETA
Sept 07	US	Advance Options	LSTC
Sept 10	US	Contact	LSTC
Sept 14	UK	Fluid/Structure Interaction in LS-DYNA	OASYS
Sept 15	US	Intro to LS-DYNA LS-PrePost	LSTC
Sept 21	US	Implicit	LSTC
Sept 22	FR	Material modelling in LS-DYNA (Plasticity, Damage, Failure)	AS+
Sept 24	FR	Polymeric Material Modelling in LS-DYNA	AS+
Sept 24	US	Concrete & Geomaterial	LSTC
Sept 29	SE	LS-DYNA, Introductory course	ERAB
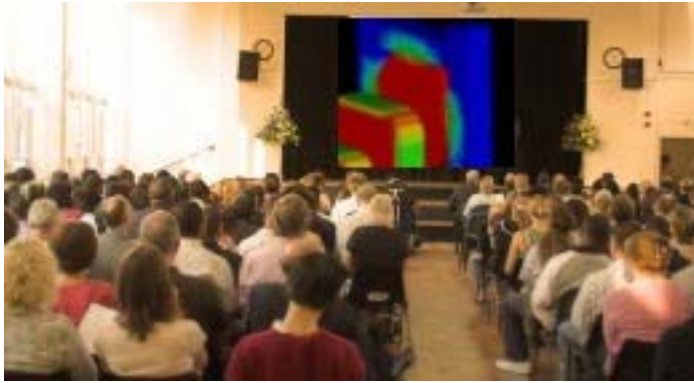
Conferences/Events

&

News Magazines

Start Day	Country	**2009**
Sept 09	Greece	3rd ANSA & **µ**ETA Int'l Con**f**
Oct 01	Italy	Enginsoft International Conference 2009
Oct 21	France	DIGIMAT USERS' MEETING 2009 - The Material Modeling Conference
Oct 23	Korea	Korean LS-DYNA User Conference 2009 (THEME) soon will be available on line
Oct 27	Japan	LS-DYNA User Conference 2009
Nov. 14	US	SC2009
Nov. 18	US	ANSYS Conf. & 27th CADFEM Users Meeting

2010

Available Newsletters   Magazines Tutorials

Direct Link to the information sign up page.

Cray   BETA CAE Systems SA

                                            ESI Group

ETA   Panasas

Tutorials and Workshops
Tutorials and Workshop Page   Oasys LS-DYNA Environment

Employment

&

Recently Hired

Recently Hired

Joining EASi India

Mr. Jithesh
Mr. Mrityunjaya R Yeli (Muthu)

Brief Introductions:

Mr. Jithesh:

Jithesh did his Masters in Tool Engineering and a Bachelor in Mechanical Engineering.

He has nearly 5 years of experience in directly supporting LS-DYNA users in India.

Please feel free to reach him @ Email: jeranche@easi.com

Hand Phone No. : +91 9972017577

Mr. Mrityunjaya R Yeli,

Muthu has done his Masters in Computer Aided Design of Structures (Gold medalist) and bachelor degree in Civil Engineering.

He worked as project trainee in Indian Space Research Organization for couple of years in Mechanical Integration Division.

He was with engineering service division of EASi Technologies past 2 years working on CAE projects and now laterally moved to Technology Support Team

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Introduction to our new section:

India

In our September issue we will focus on individual software solutions developed by:

- LSTC, US
- ETA, US
- OASYS, UK
- BETA CAE, GR

At this time we would like to introduce (in alpha order) two distributors and part of their management – sales - support team

Nhance
Engineering(ARUP)

Left to Right:
- Brian Walker-Associate Director
- Prasad NadiPalli-Director
- Lavendra Singh-Manager(Sales)
- Maruthi Kotti- Application Specialist
- Rohan Goud- Engineer
- Shankar Venkat- Sr.Engineer
- Richard Sturt-Director

EASi Engineering - India

Left to Right

- Trivikram Nanjangud, EASi
- Konstantinos Kiouptsidis,Beta CAE Systems
- Rajshekar Deosur, EASi
- Ramesh Venkatesan, EASi
- Konstantinos Kiouptsidis, Beta CAE Systems
- Komala Ramu
- Vasantha Sural, EASi
- Jay Simha, EASi
- Vadivelu Kuppusamy, EASi
- Mrityunjaya R Yeli, EAS

Future article will additionally focus on Cranes India and CADFEM India

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**Announcements
&
Press Releases**

ETA - HP - Intel
Panasas - Cray - Voltaire

Denton ATD and ETA Announce Distribution Agreement

Troy, MI—A distribution agreement between Denton ATD and Engineering Technology Associates, Inc. (ETA), allowing ETA to sell Denton Virtual Dummy products and support them through its VPG finite element modeling product, was signed July 10th. The agreement linking Denton ATD, a global leader in the development and manufacture of advanced crash dummies and safety measurement devices, and ETA, a leader in the field of virtual product development and engineering software is effective immediately.

The agreement will provide ETA, and its distribution network, the ability to distribute the Denton virtual dummy family as they are released over the next months. This agreement builds on the technical cooperation agreement that was signed between the two companies in January of 2009.

With this agreement, Denton is recognizing the customer's need for a comprehensive sales and support network related to virtual Denton products and associated products. "We are delighted to be working with ETA who has given great support to Denton since its inception of this business segment. Having ETA act as a distributor dramatically increases Denton's ability to meet the customer distribution and support demands which is a major priority associated with all Denton product," comments Dave Stein, Denton ATD President and CEO.

The agreement promises to greatly enhance ETA's future product offerings for crash simulation and occupant safety modeling. ETA President, Abe Keisoglou commented, "This agreement will not only bring our customers new opportunities to use state of the art dummy models in their simulations, but will also deliver enhanced support, training and an opportunity to access Denton's vast hardware and application knowledge."

About ETA

Engineering Technology Associates, Inc. has impacted the design and development of numerous products including automobiles, trains, aircraft, household appliances and consumer electronics. By developing software products that enable engineers to simulate the behavior of these products during manufacture or during their use, ETA has been involved in making these products safer, more durable engineers to simulate the behavior of these products during manufacture or during their use, ETA has been involved in making these products safer, more durable, lighter weight, and less expensive to develop. More information about ETA can be found at www.eta.com. ETA is a subsidiary of Cranes Software international Limited (CSIL) within the Cranes Engineering group. For more information, please go to www.eta.com or call (248) 729-3010.

About Denton ATD

Founded in 1974, Denton ATD, Inc. is an engineering company driven to provide their customers with quality occupant safety products such as multi-axis load cells, crash test dummies, and dummy models based on extensive material research, testing, and innovative design. More information about Denton ATD can be found at www.dentonatd.com.

HP Acquires IBRIX

Extend Scale-out Storage Capabilities to Global Customers

http://www.hp.com/hpinfo/newsroom/press/2009/090717xa.html

PALO ALTO, Calif., July 17, 2009

HP and IBRIX today announced a definitive agreement for HP to acquire IBRIX, a leading provider of enterprise-class file serving software that includes data protection, high-availability features and data management services for extreme scale-out, cloud and high-performance computing deployments.

Customers with large-scale, data-intensive application environments find that storage performance often becomes a bottleneck for their workflows. IBRIX's solutions allow enterprises to easily and cost-effectively store massive amounts of user-generated data.

With scalability to tens of petabytes, customers can gain control of exploding data growth and address application performance challenges in the most demanding environments. The advanced data management capability of IBRIX's Fusion software suite also allows customers to seamlessly add capacity as their data or performance needs grow.

Founded in 2000, and an HP partner for three years, IBRIX is privately held and headquartered in Billerica, Mass. It has 53 employees and more than 175 enterprise customers spanning the communications, media, entertainment, Internet, oil and gas, healthcare, life sciences, and financial services markets. The value of the transaction is not disclosed.

Adding IBRIX's software to HP's portfolio further solidifies the company's leadership in the emerging market of scale-out and high-performance computing storage, cloud storage, and fixed content archiving. This market is growing at a compound annual growth rate of 20 percent per year,(1) which is faster than both the network-attached storage and total external storage markets.(2)

"Customers need highly scalable storage solutions that efficiently and cost-effectively manage massive amounts of information," said Jeff Hausman, vice president of Unified Storage, StorageWorks Division, HP. "This acquisition expands our portfolio to better support the needs of this market segment. In addition, IBRIX's highly scalable software leverages industry-standard hardware allowing customers to fully maximize their existing investments."

IBRIX's software is currently available with HP StorageWorks storage area networks (SANs), HP ProLiant servers, HP BladeSystem, and HP ProCurve Ethernet switches and management software. The combination of IBRIX's storage software with HP's business technology portfolio offers customers a full suite of products and services from design, transformation and management of corporate data centers to the most extreme scale-out environments.

"Joining forces with HP is a natural fit for our customers, resulting in an enhanced storage solution that scales to meet their data growth," said Milan Shetti, chief executive officer, IBRIX. "The unique combination of IBRIX's file serving solutions with HP's portfolio of products and services enables customers to lower the cost of scale-out architectures while easing the process of storing, accessing and moving critical data."

The transaction is subject to certain closing conditions and is expected to be completed within the next 30 days. Following completion, the business will be integrated into the StorageWorks division in HP's Technology Solutions Group.

More information about HP StorageWorks is available at www.hp.com/go/storage.

About IBRIX

IBRIX® develops, markets and sells scale-out NAS products and solutions that help global enterprises to gain unprecedented control of unstructured data growth and application performance challenges. IBRIX's purpose-built scale-out NAS platform, IBRIX Fusion™, dramatically scales performance, capacity and manageability to deliver significant storage cost savings, application performance improvement, non-disruptive growth and infinite scalability. For more information, visit http://www.ibrix.com.

About HP: HP, the world's largest technology company, simplifies the technology experience for consumers and businesses with a portfolio that spans printing, personal computing, software, services and IT infrastructure. More information about HP (NYSE: HPQ) is available at http://www.hp.com/.

(1) Based on internal HP estimates of compound annual growth rate.
(2) Compared to percentages in the IDC Worldwide Quarterly Disk Storage Systems Forecast, June 2009

This news release contains forward-looking statements that involve risks, uncertainties and assumptions. If such risks or uncertainties materialize or such assumptions prove incorrect, the results of HP and its consolidated subsidiaries could differ materially from those expressed or implied by such forward-looking statements and assumptions. All statements other than statements of historical fact are statements that could be deemed forward-looking statements, including the expected benefits and costs of the transaction; management plans relating to the transaction; the expected timing of the completion of the transaction; any statements of expectation or belief; and any statements of assumptions underlying any of the foregoing. Risks, uncertainties and assumptions include the possibility that expected benefits may not materialize as expected; risks related to the timing or ultimate completion of the transaction; and other risks that are described in HP's Quarterly Report on Form 10-Q for the fiscal quarter ended April 30, 2009 and HP's other filings with the Securities and Exchange Commission, including but not limited to HP's Annual Report on Form 10-K for the fiscal year ended October 31, 2008. HP assumes no obligation and does not intend to update these forward-looking statements.

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Panasas, Inc.

Clemson University's Computational Center for Mobility Systems Deploys Panasas Storage to Advance Research for Automotive, Aviation, and Energy Industries

Panasas Storage Solution Drives Dramatic Performance Improvement to Accelerate Core Research for One of the Top 10 Most Powerful University Computer Systems in the U.S.

FREMONT, Calif. – June 23, 2009 – Panasas, Inc., the leading provider of high-performance storage for the world's most performance-intensive applications, today announced that the Clemson University Computational Center for Mobility Systems (CU-CCMS) has chosen the Panasas ActiveStor™ parallel storage system to help accelerate its research and innovation. CU-CCMS is a comprehensive computational engineering center dedicated to solving the most complex problems for the automotive, aviation, and energy industries. CU-CCMS uses massive-scale engineering simulation to help industry sponsors reduce development time, improve product quality and cost, and achieve success in the global marketplace. The center operates one of the top 10 most powerful university supercomputers in the United States, according to the November 2008 list of top 500 supercomputer sites (www.top500.org).

"After an exhaustive search for a fully integrated hardware-software solution to take care of our parallel I/O storage need, we chose Panasas," said Dr. James Leylek, executive director of CU-CCMS. "The fact that some of our key clients provided powerful, positive and convincing testimonials made it relatively easy for us to decide on the Panasas system. We're solving the industry's toughest engineering challenges, and we needed dramatic simulation time improvements. We're confident that with Panasas, our customers' most mission critical computer-aided engineering computations will scale to their full potential."

The CU-CCMS system consists of 430 Sun blade servers, with a total of 3,440 Intel Xeon processing cores and 14 terabytes (TB) of memory. The system completed the LINPACK benchmark at 27.3 TFLOPS, or 27.3 trillion mathematical computations per second, which ranks it among the world's most powerful computer systems. The addition of Panasas technology resulted in substantially higher levels of overall throughput due to the benefits of a parallel file system and storage architecture that enables accelerated input and output of simulation data.

"Our parallel storage is optimized to respond broadly to high performance demands and in particular to large-scale application environments," said Randy Strahan, CEO, Panasas. "Working with CU-CCMS provides an extraordinary opportunity to enable world class research engineers to test the outer boundaries of performance and help drive innovation in the transportation and energy industries."

About Clemson University and CU-CCMS

Clemson University is a nationally ranked science and technology-oriented public research university known for its emphasis on collaboration, focus, and a culture that encourages faculty and students to embrace bold ideas. Its teaching, research and outreach are driving economic development and improving quality of life in South Carolina and beyond. Clemson is a high-energy, student-centered community dedicated to intellectual leadership, innovation, service, and a determination to excel. For more information, visit

www.clemson.edu/research

The Clemson University Computational Center for Mobility Systems (CU-CCMS) is a comprehensive computational engineering center dedicated to solving problems for the automotive, aviation and energy industries. Located at Clemson University's International Center for Automotive Research (CU-ICAR), it provides unique and validated methods that yield physically realistic results for a diverse array of disciplines. Powered by a massive, dedicated high performance computing (HPC) system, CU-CCMS supplies cost-effective solutions while efficiently converting ideas into products that will compete in the global marketplace. For more information, visit www.clemson.edu/cu-ccms.

About Panasas

Panasas, Inc., the leading provider of high-performance storage for the world's most performance-intensive applications, helps commercial, government and academic organizations accelerate their time to results, leading to real-world breakthroughs that improve people's lives. Panasas high-performance storage systems enable customers to maximize the benefits of high-performance computers and clusters by eliminating the storage bottleneck created with legacy network storage technologies. Panasas ActiveStor Parallel Storage Clusters, in conjunction with the PanFS™ parallel file system, offer the most comprehensive portfolio of high-performance storage solutions for compute-intensive environments. Panasas is headquartered in Fremont, California. For more information, please visit www.panasas.com.

Panasas, ActiveScale, DirectFLOW and PanFS are trademarks or registered trademarks of Panasas, Inc. All other trademarks are the property of their respective owners.

Panasas, Inc. Media Contact

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Voltaire Ltd

www.voltaire.com/NewsAndEvents/Press_Releases/press2009/Karlsruhe_Institute_of_Tech nology_Selects_Voltaire_40_Gbps_InfiniBand_and_Unified_Fabric_Manager

Karlsruhe Institute of Technology Selects Voltaire 40 Gb/s InfiniBand and Unified Fabric Manager™ Software for Cloud Computing Research

Voltaire's New Grid Director™ 4700 Switches Interconnected with HP Supercomputer Offers Extreme Scalability and Ultra Low Latency for KIT

BILLERICA, Mass. and RA'ANANA , Israel – July 13, 2009 – Voltaire Ltd. (NASDAQ: VOLT), a leading provider of scale-out data center fabrics, today announced that the Karlsruhe Institute of Technology (KIT) has selected Voltaire 40 Gb/s InfiniBand switches and Unified Fabric Manager (UFM™) software for an HP supercomputer dedicated to cloud computing research. KIT's new supercomputer will serve as one of the centers of excellence for Open Cirrus™, an open cloud computing research testbed designed to support research into the design, provisioning and management of services at a global, multi-data center scale.

"As part of the Open Cirrus™ project, KIT's new supercomputer will build and optimize cloud applications for use in data centers around the world," said Professor Rudolf Lohner, Karlsruhe Institute of Technology. "We selected Voltaire's Grid Director™ 4700 40 Gb/s InfiniBand switches because of the high performance and extreme scalability enabled by the switch's double-density fabric boards. 40 Gb/s bandwidth coupled with Voltaire's

UFM software helps us improve application performance and offer more efficient service delivery in our multi-tenant cloud environment."

The HP supercomputer consists of 334 HP ProLiant DL2x170h G6 and HP ProLiant DL4x170h G6 servers based on the Intel Xeon processor 5500 series and is interconnected with two Voltaire Grid Director 4700 switches. The Grid Director 4700 features 324 ports of 40 Gb/s InfiniBand connectivity, with the option to double capacity to 648 ports using double-density fabric boards. The double-density fabric boards are the basis for the HyperScale™ architecture, a unique stackable architecture for building larger configurations into the hundreds and thousands of nodes, with lower latency and greater simplicity than alternative solutions.

To further optimize the supercomputer's performance and simplify management of the large, multi-tenant fabric, KIT selected Voltaire's new UFM software – the industry's first comprehensive management software that takes a fabric-wide view of the infrastructure to optimize performance.

Unlike other management software platforms that are device-oriented and involve tedious manual processes, UFM software provides IT managers with a logical view of their infrastructure. This bridges the traditional gap between servers, applications and fabric elements, creating a more effective and

business-oriented way to manage and scale out high-performance fabrics – especially critical for providing cloud services.

"KIT recognizes that the dynamic nature of cloud-based services requires a high-performance, scale-out fabric that is tightly coupled with a deeply integrated management solution," said Asaf Somekh, vice president of marketing, Voltaire. "Voltaire's 40 Gb/s InfiniBand combined with UFM software results in a uniquely well-architected fabric that delivers top performance for KIT's supercomputer as well as extended functionality, resource management and deep insight into total infrastructure activities for the cloud."

"IT researchers such as KIT need maximum server performance to advance the functionality and efficiency of cloud applications and services," said Ed Turkel, manager of business development, Scalable Computing and Infrastructure, HP. "Together with Voltaire, HP is delivering the hardware and switching infrastructure KIT needs for scale-out computing on a global level."

More information about Voltaire's Grid Director 4700 is available at www.voltaire.com/GridDirector4700 and

more information about UFM software can be found at www.voltaire.com/ufm.

About Voltaire

Voltaire (NASDAQ: VOLT) is a leading provider of scale-out computing fabrics for data centers, high performance computing and cloud environments. Voltaire's family of server and storage fabric switches and advanced management software improve performance of mission-critical applications, increase efficiency and reduce costs through infrastructure consolidation and lower power consumption. Used by more than 30 percent of the Fortune 100 and other premier organizations across many industries, including many of the TOP500 supercomputers, Voltaire products are included in server and blade offerings from Bull, HP, IBM, NEC and Sun and provide the internal server-to-storage connectivity for the HP-Oracle Database Machine. Founded in 1997, Voltaire is headquartered in Ra'anana, Israel and Billerica, Massachusetts. More information is available at www.voltaire.com or by calling 1-800-865-8247.

CRAY

News Release Cray Expands Its Entry-Level HPC Offerings With the New Cray CX1-LC Deskside Supercomputer

Starting Cost for the Latest Addition to the Cray CX1(TM) Line of Deskside Supercomputers Is Less Than $12,000

SEATTLE, WA, Jul 16, 2009 (MARKETWIRE via COMTEX) -- Global supercomputer leader Cray Inc. (NASDAQ: CRAY) today announced it has significantly reduced the entry-level pricing for its high performance computing (HPC) systems with the introduction of the company's newest product, the Cray CX1-LC(TM) deskside supercomputer. With a base price of less than $12,000, the Cray CX1-LC system will allow a larger segment of scientists and engineers to realize the benefits of Cray supercomputing, which can substantially improve scientific productivity and product development.

Available immediately, the Cray CX1-LC deskside supercomputer -- the "LC" stands for "Light Configuration" -- is designed to make using HPC systems easy and affordable for customers in a variety of situations, including:

-- An engineering team looking for its first cluster. The Cray CX1-LC system offers a state-of-the-art Cray cluster architecture at an affordable price, with familiar working environments such as Windows HPC Server 2008 and Red Hat Enterprise Linux.

-- Scientists or engineers hitting the limits of workstation performance. The Cray CX1-LC system pricing starts at levels similar to high-end workstations but provides far more performance, flexibility and headroom for growth. The Cray CX1-LC supercomputer can place the dual benefits of a high-end workstation and a small cluster at a user's desk.

-- A software developer looking for a dedicated system for development and testing. With a variety of available blades, the Cray CX1-LC deskside supercomputer allows customers to configure the system that best meets their needs.

A simulation project that is just starting but needs room to grow. -- The Cray CX1-LC system can easily be upgraded to a full Cray CX1(TM) supercomputer and beyond.

"The original Cray CX1 system has proven to be a productive, powerful and easy-to-use HPC product for a growing number of researchers and scientists that have turned to Cray for their deskside supercomputing needs, and we expect the Cray CX1-LC will extend these benefits to an even larger number of HPC users," said Ian Miller, senior vice president of the productivity and solutions group and marketing at Cray. "We specifically designed the Cray CX1 system to eliminate the barriers to adoption of HPC systems, and with the Cray CX1-LC, we have now eliminated cost barriers as well."

Available with the Intel(R) Xeon(R) Processor 5500 Series and certified as an Intel(R) Cluster Ready System, the Cray CX1-LC deskside supercomputer supports 1-4 compute blades, including visualization and GPGPU blades, in a

simplified Cray CX1 chassis. As with the original Cray CX1 system, the Cray CX1-LC product can be configured with storage options that include solid-state drives (SSDs) or large capacity, fixed-drive storage blades.

The Cray CX1-LC system introduces two new compute blades that feature lower costs than the standard blades offered in the Cray CX1 system -- one supports only Gigabit Ethernet and is oriented to the workstation user, and the other offers DDR InfiniBand and is oriented to the small cluster user.

"HPC users are always looking for better ways to gain a competitive advantage, and having a powerful, easy-to-use, mini-supercomputer for under $15,000 will broaden the use of HPC to solve technical workloads. We expect that products like the Cray CX1-LC will help ignite growth at the lower end of the technical computing market," said Earl Joseph, IDC program vice president for HPC.

"The new Cray CX1-LC combines the strength of up to eight of our new Intel(R) Xeon(R) 5500 processors, I/O performance from the Intel(R) X25-E Extreme SSD and the agility afforded by Intel(R) Cluster Ready to accelerate the time to value equation," said Richard Dracott, Intel Corporation's General Manager of High Performance Computing. "Newly designed and priced for individuals and departmental workgroups, these platform technologies combine to deliver on what Cray describes as the 'ease of everything computing,' allowing users to apply HPC power to challenging science, engineering and design problems."

Introduced in September 2008, the successful Cray CX1 deskside supercomputer is designed from the ground up to provide superior performance, functionality and cost for individuals and departmental workgroups who want to harness HPC without the complexity of traditional clusters. Equipped with state-of-the-art visualization and storage capabilities, the Cray CX1 supercomputer delivers performance leadership across a broad range of applications, all in a compact, deskside system that plugs into a standard wall outlet.

About the Cray CX1 Supercomputer

The Cray CX1 product is an affordably-priced, deskside supercomputer. Easy to configure, deploy, administer and use, it is the "right size" in performance, functionality and cost for a wide range of users, from the single user who wants a personal supercomputer to a department wanting a shared clustered resource. Equipped with powerful Intel Xeon(R) processors and Windows(R) HPC Server 2008 or Red Hat Enterprise Linux with Clustercorp Rocks+ or Platform Cluster Manager, the Cray CX1 product offers performance leadership across a broad range of applications and standard benchmarks. For organizations wanting to harness HPC without the complexity of traditional clusters, the Cray CX1 supercomputer delivers the power of a high performance cluster with the ease-of-use and seamless integration of a workstation.

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 enables 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 will result in 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.

Cray is a registered trademark, and Cray CX1 and the Cray CX1-LC are trademarks of Cray Inc. Other product and service names mentioned herein are the trademarks of their respective owners.

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SOURCE: Cray Inc.

Informational Websites

The LSTC LS-DYNA Support site: www.dynasupport.com

LS-DYNA Support Site	FEA Informationwebsites
LS-DYNA Examples (more than 100 Examples)	LS-DYNA Conference Site
TopCrunch – Benchmarks	LS-DYNA PublicationsH to Download On Line
LS-DYNA Publications	LSTC LS-PrePost Tutorials
CADFEM GmbH Portal	LS-OPT Support Site
LS-DYNA Distributors	LS-DYNA Consulting
D3 VIEW - Tracking Developments in LS-DYNA®	