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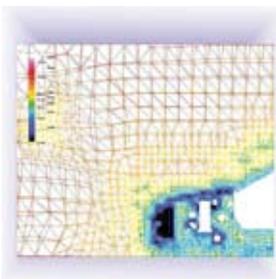
SPACEX Receives USAF
Operational License
for Cape Canaveral
Launch Site



The 13th Korean
LS-DYNA
Conference
2008



MSC Software Announces
R3 Release of FluidConnection





FEA Information Announcements:

Professor Thomas J. Vasko joins FEA Information Inc.

New Participant ENGINSOFT S.p.A and offering ENGINSOFT ACADEMY
[School website:](#)

India:

ARUP & Nhance LS-DYNA Training Centers in India – New course Announcement

Tushar Goel, LSTC, is visiting India and will be presenting in Bangalore New Developments in LS-DYNA on November 7, 2008 at an LS-DYNA India Users event, hosted by EASi Engineering, an LS-DYNA distributor. To register or learn more contact Ramesh Venkatesan +91 (80) 6614 7051 rvenkate@easi.com

BETA CAE Systems

Updated Resource and Post Processing Product Pages
"3rd ANSA & μ ETA Int'l Conference", to be held Sept. 9-11, 09, Halkidiki, Greece.

7th European LS-DYNA Conference - Call for papers

Chapter 1B of One Man's Corner by Henry H. Fong,
Consultant, San Francisco, California, USA:

Sincerely,

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Marsha Victory
Trent Eggleston
Wayne Mindle

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7th European LS-DYNA Conference - Call for papers

Uli Franz, DYNAmore

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

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

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

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

General information:

Included in the applications being covered are:

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

Accompanying Classes May 11-13th

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

Conference Paper Submission

Abstract Deadline: January 12, 2009

Acceptance: January 30, 2009

Final Paper: April 03, 2009

[Form to submit a paper:](#)

Education participant Professor Thomas J. Vasko

Central Connecticut State University, Department of Mechanical Engineering

We all know Professor Vasko from his work at United Technologies where he was a Pratt & Whitney Fellow in Computational Structural Mechanics responsible for the development, validation, training, and application of LS-DYNA analyses and procedures for bird-strike and blade containment.

Professor Vasko has more than 30 years of experience with linear and nonlinear finite element analyses and he is delighted to be teaching Finite Element Analysis and continuing his collaborations with industry as an education participant.

FEA Information Inc. Is pleased to announce to our community Tom's new career and look forward to many articles on his use of LS-DYNA.



Thomas Vasko

Title:Assistant Professor

Appointed: 2008

Office: Copernicus Hall Room 2351100

Office Phone: (860) 832-1896

E-mail: vaskothj@ccsu.edu

Among the courses being taught are:

ETM 467-01 CAE Applied Element Analysis
ET 252-01 Applied Mechanics II – Dynamics
EMT 367-01 Machine Design

SPACEX RECEIVES USAF OPERATIONAL LICENSE FOR CAPE CANAVERAL LAUNCH SITE (c) SPACEX

Reprinted Press Release with authorization of SPACEX.

The complete article with video of space launch
www.spacex.com/press.php?page=20080909

Cape Canaveral FL. – Sept. 9, 2008 – Space Exploration Technologies Corp. (SpaceX) has been granted an Operational License by the US Air Force for the use of Space Launch Complex 40 (SLC-40) at Cape Canaveral Air Force Station on the Florida coast. Receipt of the license, in conjunction with the approved Site Plan, paves the way for SpaceX to initiate Falcon 9 launch operations later this year.



Computer simulation of SpaceX's Falcon 9 and Dragon spacecraft lifting off from Space Launch Complex 40 (SLC-40) at Cape Canaveral, FL. Courtesy NASA

"We are developing Falcon 9 to be a valuable asset to the American space launch fleet," said Elon Musk, CEO and CTO of SpaceX. "The support we received from General Helms and the US Air Force has been immensely helpful in developing the pathfinder processes necessary for SpaceX to realize commercial space flights from the Cape."

"Our developments at Complex 40 continue with great speed," added Brian Mosdell, Director of Florida Launch Operations for SpaceX. "We have moved our massive oxygen storage tank into place, and expect to complete construction of our hangar later this year."

Mosdell cited other supporters instrumental to SpaceX's efforts including the members of the Florida congressional delegation, the USAF Space Command, Col. Scott Henderson, Commander, 45th Launch Group, Col. (ret.) Mark Bontrager, formerly Commander of the 45th Mission Support Group, the public-private partnership Space Florida, and the Space Coast Economic Development Commission.

In operation since 1965, and located south of NASA's launch sites for the Apollo moon missions and Space Shuttle flights, SLC-40 has hosted numerous historic launches, including the departure of two interplanetary missions: the Mars Observer satellite, and the Cassini spacecraft now exploring the rings and moons of the planet Saturn.



Extra Wide Load – A flatbed truck delivers a 125,000 gallon Liquid Oxygen Tank to the new SpaceX launch complex at SLC-40, Cape Canaveral, Florida. The tank will support fueling of the new Falcon 9 rocket, scheduled for first delivery by the end of 2008. Image: SpaceX.

About SpaceX

SpaceX is developing a family of launch vehicles, Falcon 1, Falcon 9 and Falcon 9 Heavy, to increase the reliability and cost effectiveness of both manned and unmanned

space transportation, ultimately by a factor of ten. Falcon 9 is a two-stage, liquid oxygen and rocket grade kerosene powered launch vehicle, offering breakthrough reliability derived from the nine-engine, single tank first stage configuration. Falcon 9 is the first American launch vehicle since the Saturn V to offer true engine out redundancy and reliability.

Falcon 9 can deliver up to 12,500 kg to low Earth orbit (LEO) and 4,640 kg to Geostationary Transfer Orbit (GTO), while the Falcon 9 Heavy can loft 29,610 kg to LEO and 15,010 kg to GTO. Both rockets will operate from SLC-40, and payloads to Earth and Geostationary orbits and beyond will include commercial satellites, cargo and crew supply missions to the International Space Station (ISS), and future orbiting destinations.

As a winner of the NASA Commercial Orbital Transportation Services competition (COTS), SpaceX is in a position to help fill the gap in

U.S. spaceflight to the International Space Station (ISS) when the Space Shuttle retires in 2010. Under the existing Agreement, SpaceX will conduct three flights of its Falcon 9 launch vehicle and Dragon, spacecraft for NASA, culminating in Dragon berthing with the ISS. As the only COTS contender with the capability to return cargo and crew to Earth, NASA also has an option for SpaceX to demonstrate crew transport services to the ISS.

Founded in 2002, the SpaceX team now numbers more than 500, located primarily in Hawthorne, California, with four additional locations: SpaceX's Texas Test Facility in McGregor near Waco; offices in Washington DC; and launch facilities at Cape Canaveral, Florida; and the Marshall Islands in the Central Pacific. The SpaceX manifest currently lists 11 missions, plus indefinite delivery / indefinite quantity (IDIQ) contracts with NASA and the US Air Force.

The following article reflects the opinions and observations of Henry Fong. It does not reflect any endorsements, or approvals, by FEA Information Inc. or any participating companies, or individuals.

One Man's Corner

Part 1.B Lessons Learned from My Early FEA Career



Henry H. Fong, Consultant, San Francisco, California, USA
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Introduction

This article continues the discussion of the second of four aerospace structural analysis projects in my early career: (**Part 1.B**) Evaluation of NASA's public-domain *COSMIC/NASTRAN* general-purpose, finite-element, structural analysis program – sponsored by the Office of Naval Research, and work done by Swanson Service Corporation (Dr. J. William Jones, President). This article ends with a summary of the "Finite Element Standards" work done in the 1982-1985 period, under the sponsorship of AIAA/ASME.

1.B Evaluation of *COSMIC/NASTRAN* Program

This code evaluation work was conducted by Swanson Service Corporation (SSC), and funded by the Office of Naval Research (ONR), 1978-1980. The ONR program manager was Dr. Nick Perrone, and the project's technical monitor was Dr. Robert E. Nickell* (who later was elected President of the *American Society of Mechanical Engineers*).

* *Member, U.S. National Academy of Engineering*

1.B.1 Study Objectives – and *ADINA* Code Evaluation by Chang and Padovan (1978-1980)

In 1978-1980, ONR had sponsored a series of evaluations of large-scale, structural analysis computer programs, including two codes, *ADINA* and *COSMIC/NASTRAN*.

ADINA had its roots in the *NONSAP* nonlinear structural analysis code, developed at the University of California at Berkeley, by Professors Edward L. Wilson*, and his graduate students Klaus-Jürgen Bathe and Robert H. Iding. After Bathe received his PhD, he went to MIT and became a professor of

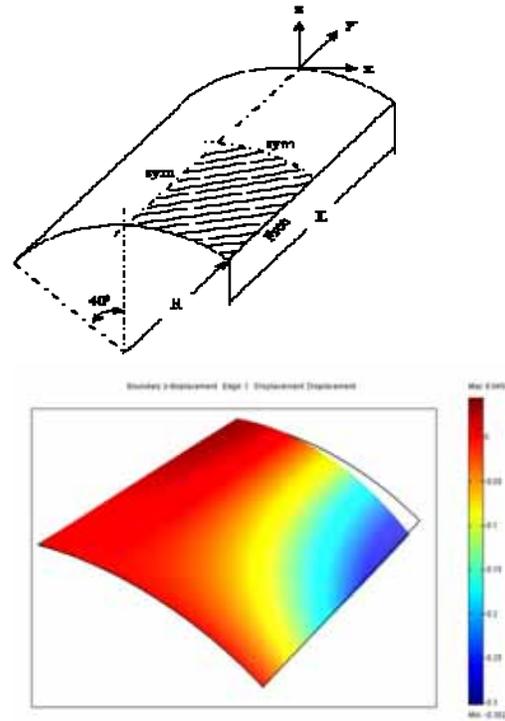
mechanical engineering, where he enhanced the code and renamed it *ADINA* (and "commercialized" it). Bathe also started his own *ADINA* code development and consulting company, in Cambridge, Massachusetts, named *ADINA Engineering*. In 1978, ONR awarded its first FEA code evaluation project to Professors Paul T.Y. Chang and Joseph Padovan, at the University of Akron, Ohio. Their *ADINA* evaluation report was published in June 1980. [Chang and Padovan, 1980].

The objectives of the *COSMIC/NASTRAN* evaluation project were to study its programming and operating characteristics, assess its user-friendliness (documentation, etc.) and strengths and weaknesses, and evaluate its numerical accuracy (by doing benchmarks and comparing results against published solutions and other FEA codes).

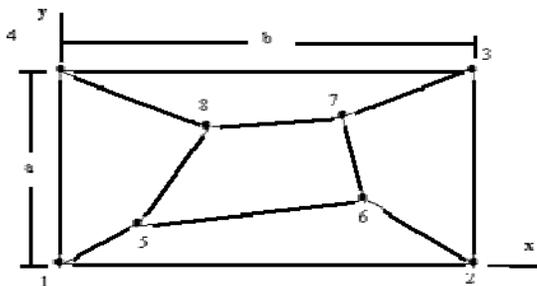
1.B.2 *COSMIC/NASTRAN* Evaluation

In 1978, I had just left McDonnell Douglas Astronautics Company, and was then working as a senior staff engineer at Hughes Aircraft Company's Electron Dynamics Division (Torrance, California), performing thermostructural analyses of traveling wave tubes (see my article, **Part 1.D**). I "moonlighted" during my spare time for Dr. J.

William ("Bill") Jones, Fellow ASME, and President, Swanson Service Corporation. At that time, SSC was the Southern California distributor of the *ANSYS* code. (Note: together with *MSC/NASTRAN*, *ANSYS* was considered in the 1970s as the two leading general-purpose, structural, dynamic, and thermal analysis FEA codes in the world.) Bill had just been awarded the *COSMIC/NASTRAN* code evaluation contract by the ONR, and needed some help. This began a two-year, enjoyable collaboration project, which led to the publication of SSC's final report in 1980 on our *COSMIC/NASTRAN* evaluation work to ONR, as well as to our jointly-authored paper published in John Robinson's book entitled, *Third World Congress on Finite Element Methods*, Beverly Hills, 1982.



Two sample benchmark problems (both considered *de-facto* standard benchmark problems to test finite element accuracy and convergence) we used to evaluate the performance of *COSMIC/NASTRAN*'s plate and shell elements are shown below:



This first figure shows the 2-D "picture window" *patch test* to test the accuracy of plate elements like *MSC/NASTRAN*'s *QUAD4* [originally attributed to FEM pioneer Bruce Irons, and later included in 1985 as one of the standard *MacNeal-Harder Problems* by Richard H. MacNeal and Robert L. Harder of The MacNeal-Schwendler Corporation (MSC)]. There is also, of course, an equivalent 3-D *patch test* for solid hexahedral elements, i.e., a small cube inside another larger cube.

These two figures on the previous page show the well-known shell benchmark problem known widely amongst finite element researchers in the 1960s-1980s as the *Scordelis-Lo barrel roof* (originally solved in closed form and by finite differences, by UC Berkeley Professor Alexander C. Scordelis and his graduate student Kam-Shing Lo, in 1969). The shell was loaded by gravity loads. Only one-fourth of the shell (because of symmetry considerations) was analyzed by finite element researchers, using various quadrilateral and triangular plate elements, and mesh refinement studies were conducted to test convergence.

ONR's Nick Perrone and Bob Nickell had special reasons to select the *COSMIC/NASTRAN* code for evaluation. It was inexpensive, easily accessible and "public-domain," versus the proprietary and much more expensive *MSC/NASTRAN* code – even though at that time, *MSC/NASTRAN* was generally regarded as having better capabilities, documentation, and support. They picked Swanson Service Corporation as the contractor to perform this code evaluation work, because they specifically wanted an experienced, professional engineer (in this case, Bill Jones) with large-scale FEA code applications experience in

industry, and who preferably was also intimately familiar with a general-purpose FEA code (in this case, *ANSYS*) other than *NASTRAN*.

Awarding this *COSMIC/NASTRAN* evaluation contract to SSC caused some consternation and concern at MSC, especially with its President, Dr. Joseph Gloudeman. (But, MSC's Chairman and Co-founder, Dr. Richard H. MacNeal*, a long-time friend of mine who also knew Drs. Perrone and Nickell quite well, responded very professionally and took this matter in stride). Nevertheless, Perrone and Nickell stood firm on their choice of SSC to do the *COSMIC/NASTRAN* evaluation work, knowing that the study might be controversial (they already knew that Professor Bathe did not care either for the *ADINA* evaluation work done by Professors Chang and Padovan). Bob Nickell carefully guided our *COSMIC/NASTRAN* evaluation study to a successful conclusion. [I can still remember in 1981, when I presented our paper at John Robinson's *Third World Congress on Finite Element Methods* conference in Beverly Hills, the very nervous Dr. Gloudeman's pacing back and forth in the back of the hall during my entire half-hour talk – making sure that I gave a "professional" presentation, and that I did not make any disparaging remarks about *MSC/NASTRAN*, or about MSC.]

For further details on this *COSMIC/NASTRAN* evaluation work, see the four references at the end of Part 1.B [Jones and Fong, 1980, 1981, 1982; Fong, 1982]:

1.B.3 AIAA/ASME *Finite Element Standards* Activity (1982-1985)

As part of the AIAA/ASME/ASCE/AHS *Structures, Structural Dynamics and Materials Conference (SDM)*, a small group led by Dr. Kevin J. Forsberg of Lockheed (who was then manager of the Space Shuttle's "thermal protection system" carbon-carbon tiles program at Lockheed) met regularly to discuss the formation of a FEA standards working group in the U.S. Also on this "Finite Element Standards"

working committee were Dr. Richard MacNeal of MSC (who volunteered to develop a standard set of finite element test problems to evaluate codes), myself (who examined the pros and cons of recommending documentation standards for FEA codes), and a few other interested individuals.

We then sponsored and organized a *Finite Element Standards* open forum, held at the 24th AIAA/ASME/ASCE/AHS *SDM* Conference in Palm Springs, California (1984) – which was attended by over 140 finite element engineers, researchers, code developers, and other interested people. Several well-known FEM researchers from academia participated in this forum, such as Professors Robert L. Taylor*, Ted H.H. Pian*, Ted B. Belytschko*, Klaus-Jürgen Bathe, and Thomas J.R. Hughes*, and presented their thoughts on "standard" finite element benchmark tests (linear elastic and static problems only). Leading commercial FEA code developers were all invited and many were present; they either made presentations (e.g., from *ABAQUS*, *MARC*, *MSC/NASTRAN*, *ANSYS*, *ADINA*, etc.) or participated in the discussions. A British representative (William Mair), from UK's nascent *NAFEMS* organization (National Agency for Finite Element Methods and Standards) based in Glasgow, also attended our forum and participated in our committee meeting.

Unfortunately, despite this excellent start of the "Finite Element Standards" activity in 1984, financial support was rather difficult to obtain from the U.S. engineering professional societies (AIAA, ASME, ASCE, etc.), or from U.S. Government organizations, and this effort eventually fizzled. The only notable work that resulted was Dr. MacNeal and Bob Harder's publication of their so-called *MacNeal-Harder Problems* to test finite element accuracy [MacNeal and Harder, 1985]. Meanwhile, the *NAFEMS* organization in UK took up the "Finite Element Standards" cause, and continues to this day as the only "international finite element standards"

activity going on anywhere in the world (to the best of my knowledge).

Lesson #6:

A good idea is like a seed. Without the proper environment (sunlight, water, air, and fertile soil – i.e., the interplay among our many socio-economic and political forces) and nutrition (food and minerals – i.e., funding), the seed will not grow and blossom into a tall, fruit-bearing tree.

Acknowledgments: The author would like to thank Dr. J. William Jones, Fellow ASME, for giving me the opportunity to assist him and his SSC colleagues in this interesting COSMIC/NASTRAN evaluation study (1978-1980) – and the unwavering support of ONR’s Nick Perrone and Bob Nickell. And, for the friendship and encouragement of Drs. Richard H. MacNeal, Bob Nickell, and Kevin J. Forsberg.

Part 1.B References:

Chang, T.Y. and J. Padovan. *Evaluation of ADINA – Part I Theory and Programming Characteristics, Part II Operating Characteristics*, University of Akron, 8 June

1980. Defense Technical Information Center, accession numbers ADA 096678, 096681.

Jones, J.W. and H. H. Fong. *Evaluation of COSMIC/NASTRAN General-Purpose Computer Program*, Swanson Service Corporation, Report #81580, submitted to Office of Naval Research, August 1980.
Jones, J.W. and H. H. Fong. An Evaluation of COSMIC/NASTRAN, *Third World Congress on Finite Element Methods* (ed. J. Robinson), 1981, pp. 324-338.

Jones, J.W. and H. H. Fong. Evaluation of NASTRAN, *Structural Mechanical Software Series IV* (ed. W. C. Pilkey), University Press of Virginia, 1982, pp. 147-237.

Fong, H.H. “An Evaluation of Eight U.S. General-Purpose Finite Element Computer Programs,” *Proc. 23rd AIAA/ASME/ASCE/AHS Structures, Structural Dynamics and Materials Conference*, AIAA Paper 1982-699, New Orleans, Louisiana, May 10-12, 1982, pp. 145-160.

MacNeal, Richard H. and Robert L. Harder. “A Proposed Standard Set of Problems to Test Finite Element Accuracy.” *Finite Elements in Analysis and Design*, vol. 1, 1985, pp. 3-20.

Disclaimer: The author would like to thank *FEA Information* for the kind invitation to write this series of articles on my career. These articles reflect my opinions and observations, and do not represent an endorsement or approval by the staff of *FEA Information*, or Livermore Software Technology Corporation. The content is based on my first-hand experiences on several structural analysis projects, lessons learned from each, observations on FEA/MCAE market trends, contact with many FEA/MCAE people in industry and academia around the world, and the very enjoyable experiences of having worked with some outstanding engineers, professors, and consultants. Any mistakes, or unintentional omissions, are strictly my own.

Excerpts From Current and Future Developments in LS-DYNA®

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In order to conserve KB size the graphics/avi's are not included –

November issue will continue New Developments

LS-OPT and LS-PrePost features and developments will be in the November Issue

Distributed with LS-DYNA and without additional fees are products LS-PrePost, LS-OPT, and our FE models. These products do not require license keys.

A 30-day demonstration license of LS-DYNA, LS-PrePost, LS-OPT is available for no fee and does include technical support from your local distributor.

1. LS-DYNA

A combined Implicit/Explicit scaleable solver for analyzing highly nonlinear transient problems enabling the solution of coupled multi-physics and multi-stage problems. Explicit/Implicit solver including •Heat Transfer •ALE •EFG, •SPH, •Airbag particle method,

Among the many applications of LS-DYNA are:

- Automotive (Crash and safety-Durability-NVH)
- Aerospace (Bird strike-Containment-Crash)
- Manufacturing (Stamping-Forging)
- Structural (Earthquake safety-Concrete structures)
- Electronics (Drop analysis-Package design-Thermal)
- Defense (Weapon design-Blast response-Penetration--Underwater shock analysis)
- Additionally, applications in biomedical, sports, consumer products, etc.

2. FE Models: Dummies, barriers, head forms

LSTC is currently developing dummy models for distribution with LS-DYNA. Contact sarba@lstc.com for more information and to obtain these dummies and updates

3. USA Developments – Underwater Shock Analysis

LSTC completed purchase of USA with all intellectual rights in 2007. Additionally, at that time, the developer and support engineer of USA, Thomas Littlewood, joined LSTC to continue development of the code and support of current and future customers.

USA Version 6.51 is released with LS971 R2

- Versions beginning with 6.29, offer “non-conformal” Doubly Asymptotic Approximation (DAA) elements
- Comparable results between nonconformal overlays, conformal overlays and 1-to-1 DAA meshes
- Cavitating Acoustic Spectral Element (CASE), a spectral volume element solver in version 6.51

Also released with LS971_R2 as executable separate from DAA solver (i.e., lsdyna.case vs.lsdyna.usa)

4. Development Goals

Reduce customer costs to encourage and enable massively parallel processing. Multicore processors have resulted in a

drastic reduction in computer hardware costs and a huge increase in LS-DYNA licenses worldwide

Two approaches used by LSTC to help reduce costs:

- **Unlimited site licenses** and steeply decreasing licensing fees per processor as the number of processors increase
- *Site License is for the smaller companies and the price break is 35 CPU's including technical support, all upgrades, machine changes, manuals on CD.*

Further reduce customer costs by increasing computational speed and improving scalability. LSTC continuously recodes existing algorithms and develops new more efficient methodologies

LSTC continues to reduce customer costs by ensuring that LS-DYNA is the fastest and most scalable software available and by providing FEA models and peripheral software

- LS-DYNA dummy and barrier models
- LS-DYNA dedicated pre and post processing software
- LS-DYNA specific optimization software

5. Ultimate Development Goals

- Simulation results accepted in place of prototype testing

This will be accomplished by LSTC's continued software improvements in LS-DYNA

- Implicit-explicit compatibility and robustness
- Constitutive models
- Contact

- FSI with SPH, ALE, Particle methods, etc.
- Sensors and control systems
- Improved element technology

- Manufacturing simulations providing the initial geometry, with stress and strain distributions
- Massively Parallel Computing

6. Future Availability – to be continued in depth in November

- Dummy models
 - Rigid/FE H3 dummies are now available
 - SID IIs alpha version is released
 - H3 NCAC 50% dummy will be available by years end
 - H3 NCAC 5% and ES-2RE dummy development are underway
 - Child dummy development will start next year
- Version R3.2
 - Many new features including groupable contact and the MPP implementation for the Airbag Particle Method

7. LSTC Commitment

- LSTC is committed to be the leader in large-scale numerical simulations
 - LS-DYNA is developed as a strongly coupled multi-physics solver rather than loosely coupled field equations
 - LSTC is committed to providing dummy, barrier, and head form models with LS-DYNA to reduce customer costs.
 - LSTC is actively working on the most challenging issues related to both hardware and software
 - Many of LSTC's innovations are well accepted by industrial users
- LSTC is not content with what has been achieved
 - New features and algorithms will be continuously implemented to

handle new challenges and applications

8. Introduction to Version 980

- Version 980 has been under development for 5 years
- Adds to the multi-physics capabilities
 - Electromagnetics
 - Incompressible fluid solver
 - Compressible fluid solver based on CESE
- Full structural and thermal coupling between solvers

9. Version 980 Incompressible Flow Solver

- Incompressible fluid solver.
- Error Control and adaptive re-meshing MPP implementation.
- Separate meshes for fluid and structure.
- Weak and strong FSI coupling depending upon the problem.

- Coupling to explicit and implicit structural solvers
- Multifluid and Free-Surface flows.
- LES and RANS turbulent models

10. CESE Method

- Advantage of CESE method for compressible flow:
 - Compressible inviscid & viscous flows
 - Hexahedra, wedges, tetrahedra
 - Flux* conservations in *space and time* nd 2 order accurate
 - Novel & simple shock-capturing strategy
 - Both strong shocks and small disturbances can be handled very well simultaneously
 - Boundary conditions can be implemented easily & accurately
 - MPP is fully implemented with excellent scalability

LS-PrePost® was designed to provide the following core functionalities:

- ▶ Full LS-DYNA® keyword support
- ▶ LS-DYNA model visualization
- ▶ LS-DYNA model creation and editing
- ▶ Advanced post-processing

18-Sep - Started work on [LS-PrePost 2.4](#) (2.3 will be updated with bug fixes, but new features will be added to 2.4 only)

18-Aug - Added Roller Hemming interface (accessible through the [Applications Menu](#))

18-Aug - Added *Project curves to elements* option to the [Curves](#) Interface

18-Aug - Added ability to pick a line endpoint to define a coordinate system

18-Aug - Added support for some additional keywords:

*BOUNDARY_PRESCRIBED_ORIENTATION_RIGID_VECTOR,
*CONTACT_TIEBREAK_SURFACE_TO_SURFACE_ONLY,
*DATABASE_DCFAIL, *DATABASE_ELOUTDET,
*DATABASE_BINARY_BINOUT,
*DATABASE_BINARY_BLSTFOR, *DATABASE_ATDOUT,
*DEFINE_CONNECTION_PROPERTIES,
*DEFINE_CONNECTION_PROPERTIES_ADD,
*DEFINE_HEX_SPOTWELD_ASSEMBLY,
*ELEMENT_BEAM_SECTION_ORIENTATION,
*ELEMENT_MASS_MATRIX,
*ELEMENT_MASS_MATRIX_NODE_SET,
*INITIAL_AXIAL_FORCE_BEAM,
*INITIAL_CESE_CONSTANT, *LOAD_SEGMENT_SET_ANGLE,
and *MAT_SPOTWELD_DAIMLERCHRYSLER

18-Aug - Added 2D ALE post-processing capabilities: display Iso surface, fringe fluid material groups, and plot group histories

18-Aug - Added thermal analysis post-processing capabilities: plot histories and fringe rate of change of temperature per node

18-Aug - Added ability to display any combination of principal stress and strain vectors (X, Y, and/or Z)

18-Aug - Added support for reading *DCFALL* in the [ASCII](#) Interface

18-Aug - Added support for reading and displaying Altair binary format files

18-Aug - Improved efficiency of binary *INTFOR* processing (minimized memory requirements for plotting nodal force histories and fixed treatment of surfaces with multiple contacts to account for displayed surfaces only)

18-Aug - Added automatic clipping for cross plotting curves with a differing time basis

Pre Post Processing Software

[Livermore Software Technology Corporation](#)

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

[Engineering Technology Associates, Inc](#)

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

[Japanese Research Institute, Ltd](#)

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

[Oasys, Ltd](#)

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

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

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

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

[Simpleware](#)

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

Participant LS-DYNA® Resource Page (alpha order)

Fully QA'd by Livermore Software Technology Corporation

SMP and MPP Hardware and OS

FUJITSU

| | |
|---------------------|---------------|
| FUJITSU Prime Power | SUN OS 5.8 |
| FUJITSU VPP | Unix_System_V |

HP

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

INTEL

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

NEC

| | |
|---------|----------|
| NEX SX6 | Super-UX |
|---------|----------|

SGI

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

Participant LS-DYNA[®] Resource Page (alpha order)

Fully QA'd by Livermore Software Technology Corporation

MPP and Interconnect MPI

FUJITSU

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

HP

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

INTEL

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

NEC

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

SGI

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

LS-DYNA® Resource Page - Participant Software

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

ANSYS - ANSYS/LS-DYNA ANSYS/LS-DYNA

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

AI *Environment:

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

ETA – DYNAFORM

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

ETA – VPG

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

MSC.Software - MSC.Dytran LS-DYNA

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

MSC.Software - MSC.Nastran/SOL 700

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

MSC.Nastran

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

MSC.Software – Gateway for LS-DYNA

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

Oasys software for LS-DYNA

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

Visual-CRASH For DYNA

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

APTEK

The MMCD is a graphics-based and menu-driven program that interfaces with the LS-DYNA library of material models and the LS-OPT optimization code. The core of the MMCD is the driver, which calculates the stress-strain behavior of material models

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

BETA CAE Systems - ANSA

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

BETA CAE Systems - μ ETA

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

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

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

JRI Solutions Ltd.: 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..

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

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

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

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.

Engineering Technology Associates, Inc.: 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.

Microsoft: For customers solving complex computational problems, Microsoft Windows Compute Cluster Server 2003 accelerates time-to-insight.

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

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

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

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

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

LS-DYNA® Software Distributors - Alphabetical order by Country

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

Consulting and Engineering Services

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

Educational & Contributing Participants
Alphabetical Order By Country

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

Informational Websites

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

| | |
|--|---|
| LS-DYNA Support Site | FEA Informationwebsites |
| LS-DYNA Examples (more than 100 Examples) | LS-DYNA Conference Site |
| TopCrunch – Benchmarks | LS-DYNA Publications to Download On Line |
| LS-DYNA Publications | LSTC LS-PrePost Tutorials |
| CADFEM GmbH Portal | LS-OPT Support Site |



LS-DYNA Training Centers in India - 2008

Oasys and nhance Engineering Solutions Pvt Ltd are pleased to announce training classes for LS-DYNA at Hyderabad, Bangalore and Pune in India.

| Training | City | Date/ Year 2008 | Duration |
|--|-----------|-------------------|----------|
| LS-DYNA Introductory Course | Hyderabad | November 05 to 06 | 2 Days |
| LS-DYNA Advanced Crash Analysis Course | Bangalore | November 19 to 21 | 3 Days |
| | Pune | December 01 to 03 | |

LS-DYNA Introductory Course: November 05 to 06 – Hyderabad – 2 Days

This course is a foundation course for all users of LS-DYNA; some prior knowledge of finite elements may be beneficial. Mesh generation is not covered in this course. Lasting two days, topics covered are as detailed below; in addition, a series of workshop examples are used to reinforce the content of the lectures:

- Background
- Data Preparation
 - Getting Started
 - Key Principles of LS-DYNA
 - Preparing a model for LS-DYNA
- Theory & Practice
 - Time integration
 - Element formulation
 - Hourglassing
 - Materials
 - Contact surfaces
 - Rigids
 - Boundary Conditions
 - Connections
 - Control & Output
- Analysis
 - Checking
 - Running
 - Post-processing

LS-DYNA Training Centers in India – 2008, continued

Oasys and nance Engineering Solutions Pvt Ltd are pleased to announce LS-DYNA Advanced Crash Analysis Course training classes for, Bangalore and Pune in India.

LS-DYNA Advanced Crash Analysis Course:

| | | |
|------------------|--------------------------|---------------|
| Bangalore | November 19 to 21 | 3 Days |
| Pune | December 01 to 03 | 3 Days |

This course has been designed with a greater emphasis on the automotive crash analysis and how LS-DYNA can be used to examine whether an automotive structure will meet the requirements. Workshops are run throughout the course, which uses the Oasys Suite of programs. Course contents are as follows:

- Overview of crash analysis
- Finite Element Modelling of vehicles in LS-DYNA
 - Guidance on mesh generation
 - Material and section data inputs
 - Connections - spotwelding, joints and springs
 - Modelling rigid parts and rigid connections
 - Defining accelerometers
 - Constraints, initial velocity and boundary conditions
 - Contacts and rigid barriers
 - LS-DYNA output definition
- Model checking
- Running LS-DYNA jobs
 - Runtime of an analysis
 - Speed-up via multi-processor runs and mass-scaling
 - Restarting analysis
- Post-processing analysis results
 - Comparison to test
 - Displacements, velocities, accelerations, deformed geometry, stress & strain, reaction forces, energy
 - Command files and automatic post-processing
 - Debugging models and trouble shooting

The size of class is limited to 10 trainees. We can also arrange training at your premises.

Details of registration, cost & venue can be obtained by contacting:

Ms. Rafia Sultana - nance Engineering Products (India) Pvt Ltd (Part of Arup Group), Plot No. 39, Ananth Info Park, Hi-tec City, Madhapur Phase 2, Hyderabad, India-500081

Tel: +91-40-44369797/98 **Fax:** +91-40-23111213 **Email:** India.support@arup.com

"The 13th Korean LS-DYNA conference 2008"
Theme Engineering, Inc - Seoul, Korea
FEA Information Inc.



Marsha Victory, President, FEA Information Inc., with Mrs. Woosik Chung attended the successful 13th Korean LS-DYNA conference, hosted by THEME Engineering Inc., LS-DYNA Distributor, Korea

The welcoming remarks, by Woosik Chung, started the conference off to a day of technical excellence. Engineers from many local and worldwide companies attended to discuss and/or present the latest in technology. With Korea one of the countries growing rapidly with the use of LS-DYNA, and the other software's represented at the conference, it was a day of meeting new people and learning new application uses.



Pictured (left to right)

- Dr. Heiner Mullerschon, DYNAMore, Germany,
- Mr. Woosik Chung, THEME
- Mrs. Woosik Chung, THEME
- Marsha Victory, FEA Information Inc.
- Arthur Tang, ETA
- Mr. Zaifei Zhou, FTSS Inc.

Among the presentations were:

- Further Developments of LS-DYNA®, Dr. John O. Hallquist, LSTC
- Virtual Prototype Software VPG, Mr. Arthur Tang, ETA
- Review of Optimization and Robustness Application with LS-OPT®, Dr. Heiner Mullerschon, DYNAMore, Germany
- Quick Process to Consider Strain hardening for Crash Analysis using HYCRASH®, Ms. Sayaka Endoh, JRI Solutions, Ltd.
- A Study on IIHS Low Speed Crash Performance Improvements, Dr. Bumjin Kim, HYUNDAI Motor Company
- Recent Developments of H350, H305, H303YO and SID2S, Mr. Zaifei Zhou, FTSS, Inc.
- A Study of Occupant Safety in FMVSS 208 Unbelted condition, Mr. Youngyoon Choi, GM DAEWOO
- ENCAP pedestrian protection analysis using LS-DYNA and analysis of

- correlation with test result, Mr. Yunki You, GM DAEWOO
- The study of Whiplash Criteria in the Euro NCAP Rear Impact, Mr. Jinyoung Nam, DYMOS Inc.
 - The Study of rear crash box design for RCAR low speed rear crash, Mr. Youngjin Cho, GM DAEWOO
 - New Features in DYNAFORM, Mr. Arthur Tang, ETA
 - Prediction Enhancement of Panel Stamping Simulation by Using the Directional Finite Element Method in CAE, Mr. Namki Sul, SSANGYONG Motor Company
 - Development of FEA Simulation Technology on Hotstamping B-Pillar using LS-DYNA, Mr. Donghak Kim, HYUNDAI HYSCO
 - The Study of Adopting the Hydroforming Method in the Front Axle of the Commercial Vehicle, Mr. Dusu Park, HYUNDAI HYSCO
 - Hot Forming and New Features in JSTAMP®/NV2.3, Dr. Byron B.Y. Ghoo, JRI Solutions Ltd.
- Development of Automotive Rear Sub-frame by Tube Hydroforming Process using LS-DYNA, Dr. Keejoo Kim, SSANGYONG Motor Company
 - Fuzzy Uncertainty Analysis of the Bird Strike Simulation on the WIG craft, Bok-woon Lee (Ph.D Candidate) KAIST
 - A Low Speed Simulation Study for RCAR Override/Underride Bumper Test, Mr. Seongsik Lim, GM Daewoo
 - An Experiment and FEA on Crashworthiness of Rolling Stock, Mr. Jiho Jeong, HYUNDAI Rotem Company

I anticipate next year being another rewarding experience attending the Korean Conference, with a larger number of attendees and presentations, as the number of LS-DYNA users and companies, universities, consultants in Korea continue to grow rapidly through 2008 and into 2009.

ANSYS POLYFLOW – © Copyright ANSYS Inc.

News Release

ANSYS POLYFLOW 3.12 Enables Improved Manufacturing Engineering Simulation and Virtual Prototyping

Software Tightens Links to Provide Smooth Interface Between Manufacturing and Mechanical Modeling

SOUTHPOINTE, Pa.--(BUSINESS WIRE)--

ANSYS, Inc. (NASDAQ: ANSS), a global innovator of simulation software and technologies designed to optimize product development processes, today announced the release of ANSYS(R) POLYFLOW(R) 3.12 software for analysis of plastic and rubber processing, glass forming, and food processing. This new version of ANSYS POLYFLOW technology is faster, more efficient and can handle larger problems than previous releases, since it includes several new solvers and modeling features tailored for specific applications. Newly built-in is the ability to provide data to structural analysis software from ANSYS, which improves the accuracy of virtual prototyping predictions.

ANSYS POLYFLOW software is particularly well known for its capability in modeling viscoelastic materials, which include many plastics, rubber, pastes and dough. These materials exhibit behaviors in between those of fluids and solids and are, therefore, difficult to simulate. Applications for which ANSYS POLYFLOW software is commonly used include blow molding for manufacturing plastic bottles; thermoforming for optimizing medical and food packaging; extrusion and inverse die design for developing rubber seals; and glass forming for designing tableware.

"The improved depth of ANSYS POLYFLOW means that users can now

apply the software to more design problems," said Chris Reid, vice president, marketing at ANSYS, Inc. "And the release addresses two important demands from our industrial users: running much larger simulations faster and with less memory than ever before, and completing the manufacturing simulation model by virtual testing with structural analysis software."

The addition of three efficient and robust solvers -- fully coupled, multifrontal and iterative -- means users can run simulations on much larger meshes than ever before. For example, 3-D simulations for dies containing more than 3 million elements have been converged on a standard high-end computer in just a few hours. Significant speed-ups regularly exceed 100 percent on large simulations compared to previous releases of ANSYS POLYFLOW software.

Faster simulation opens the door in complex rubber, plastic extrusion and coextrusion processes to optimization and automatic die balancing. This reduces trial and error time, since the die designer can query ANSYS POLYFLOW to determine which geometry leads to the best velocity profile across the die lip then finalize using the unique design capability of the code. The resulting data can be provided to structural analysis simulation software from ANSYS to perform mechanical tests and to investigate whether

manufacturing or design adjustments are necessary.

Glass forming applications, whether related to gob forming, bottle blowing, pressing or drinking glass production, increasingly use engineering simulation to provide better insight into the complex deformations and thermal patterns that occur during the process. These simulations are extremely challenging, since they involve very large deformations coupled with large variations in temperature. Cooling, the most delicate phase of the process, may introduce residual stress leading to defects. The thermal stress relaxation model in ANSYS POLYFLOW enables users to detect emerging defects in the early cooling stages, providing information that can lead to improved design.

For glass applications, ANSYS POLYFLOW has added thermal stress relaxation and Narayanaswamy models (which are also available in ANSYS(R) Mechanical(TM) software). "The Narayanaswamy model is an important addition to better understand the evolution of residual stresses that could lead to some defects. Having these models in both ANSYS POLYFLOW and ANSYS Mechanical allows us to study the whole process, from forming to residual stress development and annealing," said Matt Hyre from Emhart Glass Research Center, which is investigating new approaches toward a more efficient, more stable, and more consistent glass forming process. The organization's parent company is one of the world's leading suppliers of equipment, controls and parts to the glass container industry.

"The continuous evolution of the ANSYS POLYFLOW solvers, rheological library and interface to other leading post-processing codes has been a great help for innovation at Goodyear," noted Minwu Yao from The Goodyear Tire & Rubber Company, one of the top three tire companies in the world today. Goodyear was one of the earliest users of the software.

About ANSYS, Inc.

ANSYS, Inc., founded in 1970, develops and globally markets engineering simulation software and technologies widely used by engineers and designers across a broad spectrum of industries. The Company focuses on the development of open and flexible solutions that enable users to analyze designs directly on the desktop, providing a common platform for fast, efficient and cost-conscious product development, from design concept to final-stage testing and validation. The Company and its global network of channel partners provide sales, support and training for customers. Headquartered in Canonsburg, Pennsylvania, U.S.A., with more than 70 strategic sales locations throughout the world, ANSYS, Inc. and its subsidiaries employ approximately 1,700 people and distribute ANSYS products through a network of channel partners in over 40 countries. Visit www.ansys.com for more information.

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Source: ANSYS, Inc.

Engine Room series from HP & MTV revs up the world's most creative minds

HP 9000 Superdome Overview

In the first-ever digital artistry reality show, some of the most inventive young minds are using HP gear to accelerate creativity and amplify how digital technology can bring art to life.

Engine Room – a seven-week series brought to you by MTV, mtvU and HP – gives four teams of talented digital artists from around the world a chance to show off their cutting-edge digital art skills in a bid for global bragging rights, technology products and \$US400,000 in cash.

A Worldwide talent showcase

Engine Room is filmed in a Brooklyn, New York loft that's decked out with cutting-edge, high-performance HP personal computer, imaging and printing products.

Each week, these products unleash the 16 contestants' digital art skills as the teams work to beat the clock and master a new creative challenge – from animation, filmmaking and sound mixing to web and graphic design.

To secure a coveted spot on one of four *Engine Room* teams, contestants answered an online casting call that drew close to 20,000 works of original art from nearly 2,000 artists across more than 111 countries. A panel of iconic artists, musicians, filmmakers, celebrities and innovators judge the weekly competitions, launched on September 15th.

In addition to cash and technology prizes – and the exposure of showcasing their works on a global on-air and online MTV stage – winners get one night's programming control of MTV's HD screen in Times Square

Putting creative expression in the express lane

It takes a lot of compute power to plough through any digital content creation task. That's especially true on *Engine Room*, when tasks that would normally take professionals months to do must be done within a matter of days, or even hours.

With each episode, the dreams, drama and trauma ensue as the teams face what could be impossible challenges without the HP PCs, printers, workstations and communication tools that bring their visions to life.

High-performance PCs, workstations and notebooks power the stop-animation challenges seen in week four and the music mash ups in week three. HP DreamColor displays help keep colors consistent, from the artist's vision to the screen and the printers that deliver the brilliant results. Smartphones and handhelds keep the team connected for video talks, voice messaging and "phone a friend" chats.

Through it all, the teams rely on HP technology to showcase their creativity as they vie to set their creative visions apart from the rest.

Drop by the Loft

You can check out *Engine Room* in the U.S. on mtvU (MTV's college network) and on MTV channels around the world. You can also view it online in nine languages from the [Engine Room website](#) or download episodes to your mobile.

Be sure to watch the final episode on October 27th, when the "best of the best" battle ends and the winners are announced. Then, check out how HP technology can make *your* raw talent really cook

HP 9000 Superdome Overview



The HP 9000 Superdome delivers the highest levels of availability, performance density, memory scalability, and investment protection, along with 64-bit UNIX[®] capabilities via the robust [HP-UX 11i](#) operating environment. Powered by the PA-8900 processor and enhanced by the [HP sx2000 Super-](#)

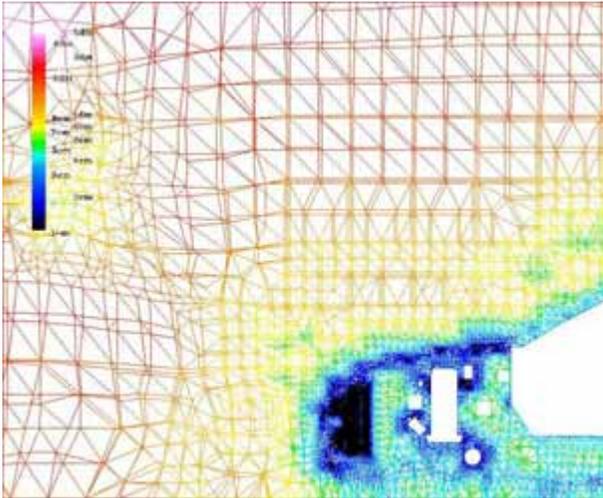
[Scalable Chipset](#), this system offers hard and soft partitioning capabilities while scaling to 128 processor cores. It also delivers enhanced reliability/availability/serviceability features along with [simplified management](#).

Plus, the [HP Virtual Server Environment \(VSE\)](#) combined with HP-UX 11i provides virtualization capabilities that let you create a pool of virtual servers that can grow or shrink based on your business priorities. These attributes offer the twin benefits of enhanced consolidation opportunities and reduced IT complexity.

As with all HP 9000 servers, the Superdome is an ideal steppingstone to [HP Integrity servers](#) based on the Intel[®] Itanium[®] 2 processor. When you're ready to transition, the HP 9000 Superdome chassis can be upgraded with Intel Itanium processors simply by swapping cell boards. The PA-8900 processor can coexist with Intel Itanium processors in the same cabinet, in separate partitions. This capability lets you test and migrate all or a portion of your infrastructure to a standards-based architecture, enabling you to continue to enjoy the world-class investment protection of your HP 9000 server as you move to the HP Integrity platform-at an affordable, incremental cost.

MSC.Software Announces R3 Release of FluidConnection to Enable Efficient, Automated CFD Simulation Processes

Webinar Scheduled for Tuesday, October 28, 2008 to Demonstrate Efficient Use of CFD for Accelerated Product Development - http://www.mscsoftware.com/events/md_form.cfm.



"The Abstract Modelling simulation templates available within FluidConnection represent a radically new approach offering several key advantages," explained Reza Sadeghi, Chief Technology Officer of MSC.Software. "

[FluidConnection Overview](#)

Revolutionary CFD Pre-Processing for Simulation Based Design

FluidConnection is ideally suited to automate CFD simulation processes improving the efficiency of product development. It is designed to work with, not replace, existing engineering software tools and supports major CAD and CFD applications. The innovative abstract modeling concept of FluidConnection combined with automatic mesh generation reduces non-value-added activities to an absolute minimum. Authoring and testing of abstract models is usually done by CFD experts. The automatic process of applying these models to any suitable CAD model does not require a simulation expert to ensure quality results, e.g. they can easily be performed by CAD designers whenever a change of the CAD model requires verification through a CFD simulation.

Abstract Models

Similar to the problem definition in a traditional CFD pre-processor, Abstract

Models define all aspects of a CFD simulation, but do this in an object-oriented way and without the need for a specific geometry (or shape). This shape-independence makes Abstract Models reusable whenever the same type of analysis is performed. When a user initiates a simulation, parameters contained in Abstract Models, like volume and boundary conditions, are automatically applied to the currently present CAD instance.

Automatic Mesh Generation

Mesh generation in FluidConnection is performed through functionality of the CAD system that created the CAD model. This means that no geometry conversion is necessary, which ensures very reliable mesh generation without "manual" user interaction. Available meshing features include among other options the creation of boundary layers, enforcement of maximum cell size and deletion of "sliver faces" to avoid discontinuity in mesh size.

Press Release

SANTA ANA, Calif., October 20, 2008 - MSC.Software (NASDAQ: MSCS), the leading global provider of enterprise simulation solutions, including simulation software and services, today announced the R3 release of FluidConnection. This ground-breaking CFD pre-processor extends the company's SimEnterprise offerings that together allow analysts, designers, and suppliers to simulate more collaboratively across the extended engineering enterprise by enabling simulation methods and procedures to be captured, automated and reused across design teams.

FluidConnection R3 significantly improves the efficiency of product development processes involving CFD. FluidConnection's *Abstract Modelling* data templates are fully geometry independent and therefore ideally suited for re-use and to capture CFD simulation best practices. In combination with comprehensive automatic mesh generation based on native CAD models, Abstract Models enable reliable automated simulation processes that don't require users to be CFD specialists. Using FluidConnection, companies can create repeatable simulation processes delivering timely and comparable results for decision making. Analysts are relieved from non-value adding tasks like geometry translation and mesh creation; they can now focus on other high-value product validation requirements during product development. The results are better simulation productivity and shorter development cycles.

The integration of FluidConnection R3 with SimManager makes the benefits of process capture and automation available to CFD applications and empowers an organization to manage entire CFD simulation processes, resources, and information across an engineering enterprise. Additionally, all simulation data (models, results, files) is captured, stored, organized and protected.

"FluidConnection's integration with SimManager is our first step to give CFD users access to the advanced capabilities of MSC.Software's SimEnterprise," said Glenn Wienkoop, President, MSC.Software. "Like in other CAE disciplines, CFD simulation processes and resources can now be systematically managed and repetitive, manually intensive tasks can be conducted automatically. Auditable simulation processes enable continuous improvement of simulation methods and procedures, resulting in less rework, less correction and confidence to use simulation in place of physical prototypes and tests, which ultimately leads to accelerated development cycles and reduced cost."

CFD productivity gains through simulation processes based on FluidConnection R3 are now also available for Fluent users. In addition to supporting Fluent® case files, the automatic mesh creation in FluidConnection has been extended to specifically address e.g. skewness requirements of the Fluent® solver. FluidConnection R3 also features enhanced AcuSolve™ capabilities by redefining all relevant attributes to align with ACUSIM's AcuSolve V1.7 command reference manual.

"The Abstract Modelling simulation templates available within FluidConnection represent a radically new approach offering several key advantages," explained Reza Sadeghi, Chief Technology Officer of MSC.Software. "The possibility to define a simulation template completely independent of a specific shape or geometry makes these templates truly reusable and an ideal container for any company's simulation know-how. Abstract Modelling templates combined with FluidConnection's automatic mesh generation that does not require geometry translations guarantee most reliable CFD simulation processes from CAD to solver input."

The company is hosting a webinar entitled "Simulate CFD More Efficiently - The

Efficient use of CFD for Accelerated Product Development" on Tuesday,, October 28, 2008 at 10 AM Pacific time. This webinar will introduce FluidConnection and demonstrate how businesses can accelerate their product development cycles through more efficient CFD simulations. The webinar will feature an example of how a FluidConnection user accelerated the development process through reliable CFD results. This webinar is part of an ongoing MD series featuring multidiscipline simulation in action. To sign up, please visit:

http://www.mscsoftware.com/events/md_form.cfm.

For full disclosure About MSC and Safe Harbor notice please visit the MSC.Software.com website. The following is an excerpt:

About MSC.Software Corporation:" MSC.Software (NASDAQ: MSCS) is the global leader of enterprise simulation solutions, that help companies make money, save time and reduce costs associated with designing and testing manufactured products. MSC.Software..."
"For additional information about MSC.Software's products and services, please visit www.mscsoftware.com.

Safe Harbor Language: "This press release contains forward-looking statements, including all statements relating to the features, benefits, capabilities and performance of MSC.Software products. These statements are subject to risks and uncertainties that could cause actual results to be materially different than expectations. Such risks and uncertainties include, but are not limited to, changes in technology, ...".

The Intel® Cluster Ready program

<http://softwarecommunity.intel.com/communities/clusterready>

The Intel(r) Cluster Ready program makes it easier to experience the power of high-performance computing (HPC). Developed in conjunction with hardware and software vendors, the Intel Cluster Ready program is designed to simplify purchasing, deployment, and management of HPC clusters.

Many of the industry's most popular applications are participating in the Intel(r) Cluster Ready Program:

- Accelrys
- Altair
- Ansys
- CD-Adapco
- EM Software & Systems
- ESI Group
- Flow Science, Inc.
- LSTC
- MAGMA
- The Mathworks
- Metacomp Technologies, Inc.
- MSC.Software
- Schlumberger
- Siemens PLM Software
- SIMULIA
- Software Cradle Co., Ltd.
- Wolfram Research, Inc.

Learn more about the Intel(r) Cluster Ready program by viewing news, articles, webinars, presentations, and videos. Discover how Intel Cluster Ready partners and customers are benefiting from the Intel Cluster Ready program by reading case studies and testimonials. And find out how you can participate in upcoming events in your area.

http://softwarecommunity.intel.com/articles/eng/3911.htm#checker_12

3rd ANSA & μETA International Conference

September 9-11, 2009
Olympic Convention Center
Porto Carras Grand Resort Hotel, Halkidiki, Greece

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

More information:

[Invitation - Call for papers - Free registration form](#)
(download pdf file (2704KB))

[Visit event's web page](#)

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email: congress@beta-cae.gr

Important dates:

- Abstracts submission: February 28, 2009
- Acceptance notification: March 14, 2009
- Final manuscripts submission: June 20, 2009
- Registration until: June 30, 2009
- Event: September 9 - 11, 2009

Mini-symposium at USNCCM_X, “CAE and industrial applications of computational mechanics”

Shen R. Wu and Lei Gu

Dear friends and colleagues:

As the organizer of Mini-symposium at USNCCM_X, “CAE and industrial applications of computational mechanics”, we sincerely invite you to participate in the 10th US National Congress on Computational Mechanics, to be held in Columbus Ohio, July 16-19, 2009. This is a new mini-symposium, whose main objective is to provide a stage of communications between engineers and researchers. Attached is the call for papers. Due to the industrial applications of new manufacturing processes and new materials, challenging problems in computational mechanics are emerging. At this symposium, the practitioners can find new development of theories and methods to support the engineering practices. The theoreticians can find the interesting industrial problems for future research.

To submit your abstract, please follow the instructions on the conference website, and find our mini-symposium:

(<http://usnccm-10.eng.ohio-state.edu/>)

The important dates are tentatively set as:

- Jan. 31, 2009 – deadline for abstract submission
- Mar. 1, 2009 – deadline and notification of abstract acceptance
- Mar. 1 – May 1, 2009 – early registration
- May 2 – June 15, 2009 – regular registration

Updated information can be found from the conference website:

(<http://usnccm-10.eng.ohio-state.edu/>)

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Japan LS-DYNA Users Conference 2008

JRI Solutions Limited – Tokyo, Japan

BY Marsha Victory, President, FEA Information Inc.

My trip to Japan started at the Japan LS-DYNA Users Conference 2008 hosted by JRI Solutions Limited, Tokyo, Japan. With the many presentations and attendees in 2008 it was apparent to all, that attended, that this conference is a widely recognized LS-DYNA event in Japan.

The Japan LS-DYNA Users Conference 2008 had worldwide attendance and presentations, from numerous application fields. Among the many presentations was the Keynote Speech:

- Lessons Learned From Crash Analysis by the Earth Simulator by Masayuki Yoshikawa – TOYOTA Motor Corporation
- Keynote Speech Preliminary Results for an Isogeometric Shell by David J. Benson – University of California, San Diego.

Among the presentations from the US were:

- Child Occupant Safety Research, and IIHS Frontal Center Pole Impact, presented by Cing-Dao Kan of George Washington University
- LS-DYNA Meshfree Methods in Solids and Structures: Current, Future and Its Industrial Applications presented by C.T. Wu of Livermore Software Technology Corporation
- New Developments in LS-DYNA presented by John O. Hallquist of Livermore Software Technology Corporation

Among the European Companies/Consulting countries the presentations were from:

- DYNAmore GmbH (Germany);
- ARUP (UK)
- World known consultant Paul Du Bois presented Simulation of Polymeric Materials in LS-DYNA.

Among the many companies present or co-authoring papers from Japan included:

- HITACHI Ltd.;
- FUJI-TECHO-Services Co., Ltd.;
- FUJI Heavy Industries Ltd.,
- Mechanical Design & Analysis Corporation;
- MITSUBISHI Motors Corporation;
- TOYOTA Auto Body;
- TERRBYTE Co., Ltd.;
- MITSUBA Corporation;
- HONDA Engineering Co., Ltd.;
- KIKUCHI Co. Ltd.;
- JRI Solutions Ltd.

Additionally, among the universities were:

- Innovative Research Initiatives, Tokyo Institute of Technology
- University of Yamanashi

IB08 Osaka – International Symposium on Structures under Earthquake, Impact, and Blast Loading.

BY Marsha Victory, President, FEA Information Inc.

After the conference in Tokyo, I traveled to Osaka and had the opportunity to attend The IB08 Osaka – International Symposium on Structures under Earthquake, Impact, and Blast Loading.

The many presentations at the International Symposium were of interest to me, since in California, where I reside, we have issues with earthquakes and after-shocks. With too many interesting presentations to list I will list the sessions.

- Session 1 Evaluation of Earthquake Wave Propagation
- Session 2 Marriage of Molecular or Micro Dynamics and Continuum Mechanics
- Session 3 Advanced Simulation in Joining and Welding
- Session 4 Real Theory and Real Hazard
- Session 5 Challenge to Large Scale Simulation by Huge Supercomputer, and Smart Structures
- Session 6 Clarification of Transient Behavior of Collision
- Session 7 Clarification of Transient Behavior of Explosion
- Session 8 Proposal of Design Guidelines against Impulsive Loads
- Special Lectures by John O. Hallquist (LSTC); and Kazuyoshi TAKAYAMA (Tohoku University)

The conference proceedings were edited by Eizaburo TACHIBANA (Osaka University); Masahide KATAYAMA (Tokyo Institute of Technology); and Yoichi MUKAI (Nara Women's University). Eizaburo TACHIBANA, Chairman, Steering Committee signed the Preface of the proceedings on September 25, 2008:

"In Japan, there are no building design codes relating to collision, or blast. The main reason is the fact that these events are very rare. Another reason may be comes from the emotional rejection of the words "collision" or "blast" because those words bring to the memory of the old Japanese the bad days of the World War II.

Recently, since we have encountered many tragedies caused by impulsive loads, the need for reference books as guidelines for building design against these loads become evident. Impulsive loads include airplane collision, gas explosion, falling rock, bomb blast, traffic collision and etc. The so called "killer pulse" which may exist in earthquake waves might be included.

In order to grasp the transitional behavior of structures, we have to solve two difficult problems. The first is to analyze the fracture of frictional mechanism of material from the microscopic viewpoints under impulsive loading. The second problem is to develop a large computer system, which can treat more than a hundred million degrees of freedom systems. Another option for understanding the impulsive behavior is obviously by introducing pure theoretical methods. If we can get an exact solution of differential equations we can see easily continuous picture around exact solution by changing a few parameters. This way is more compact and elegant. Unfortunately, we can get it only for limited boundary conditions. So, both approaches should be developed together. Our final target is to publish guide lines for impact & blast load through the Architectural Institute of Japan.

We can say most of the papers presented here are new challenges to the orthodox methods. From historical point of view, brilliant scientists such as Galileo who was blamed because of his assertion of "The earth is moving" pushed the boundaries of the limitation of orthodox methods. However, he was not heterodox, but he only opened his eyes and gazed at the real phenomena.

Eizaburo TACHIBANA, Chairman, Steering Committee 2008 September 25

Panasas Parallel Storage Drives Completion of Seismic Processing Jobs Up to Six Times Faster for Geofizyka Krakow

Geophysicists Enjoy Faster Results and Improved IT Center Manageability



LONDON — September 11, 2008 — Panasas, Inc., the global leader in parallel storage solutions, today announced that, through the deployment of a Panasas AS3000 parallel storage solution, Geofizyka Krakow is completing seismic processing jobs up to six times faster. This performance boost positively impacts its geophysicists' productivity by providing faster results and the opportunity to run more job iterations for improved imaging results. Ultimately the deployment of Panasas parallel storage also benefits Geofizyka Krakow's Oil and Gas customers' exploration efforts by providing faster project turnaround with high-quality results that will help them locate energy reserves faster.

Geofizyka Krakow, part of the Polish Oil & Gas Company (PGNiG), helps major energy exploration and production companies successfully explore hydrocarbon and geothermal water deposits, as well as monitor natural resource reservoirs throughout the world. Established in 1956, it specialises in seismic data acquisition, processing and interpretation, well logging and vertical seismic processing (VSP) services from its headquarters in Krakow, Poland. The company's field seismic crews regularly transfer large quantities of seismic survey data to its IT Center. The data files can be tens or hundreds of GBs (Gigabytes) in size. From there, various seismic processing software algorithms, using WesternGeco's OMEGA SPS application, are applied in order to form a resulting image file that represents geological layers and structures. The data is then interpreted by the company's geophysicists to help its customers locate new oil and gas reserves or to maximize production from existing wells.

"Before we deployed the Panasas AS3000, I regularly received calls from our geophysicists because they were frustrated with waiting for the results of seismic processing jobs," said Leszek Boryczko, computer systems manager at Geofizyka Krakow. "We ran several independent

seismic processing jobs simultaneously and we found that a single I/O intensive job negatively affected all jobs competing for the same storage array. Our previous storage solution was comprised of two independent NFS-based, NAS solutions that quickly became an I/O bottleneck. It became clear that we needed a storage solution that could handle our diverse workload yet retain management simplicity. Since deploying the Panasas AS3000 parallel storage solution I've found our overall IT workflow to be much more manageable. Furthermore, our geophysicists are no longer frustrated as they are experiencing a much quicker turnaround on their seismic processing jobs."

The Panasas parallel storage solution is based on the patented object-based PanFS™ parallel file system that enables customers to maximize application and workflow performance, while reducing the total cost of ownership in the storage infrastructure. A single global namespace dramatically simplifies storage management to improve IT productivity and the ability to perform more work. By offering Oil & Gas users a unified storage solution for seismic processing, reservoir modeling, and seismic interpretation applications, as well as primary and secondary storage solutions, Panasas parallel storage is unique in the

industry for its ability to streamline overall workflow processes and improve data availability.

"Oil & gas customers across the globe are turning to parallel storage solutions to solve the increasing workflow bottleneck posed by NFS-based storage solutions," said Derek Burke, international marketing director at Panasas Inc. "Panasas is the only production-ready parallel storage solution that offers commercial organizations the performance and the simplicity of management required to gain a competitive edge through improved IT performance. That's why Panasas is the leading storage supplier to the Oil & Gas industry and is currently deployed at oil and gas companies in 30 countries across six continents."

About Panasas : Panasas, Inc., the global leader in parallel storage solutions, 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 Linux clusters by eliminating the storage bottleneck created with legacy network storage technologies. Panasas ActiveStor Parallel Storage Clusters, in conjunction with the ActiveScale® Operating Environment and PanFS™ parallel file system, offer the most comprehensive portfolio of storage solutions for High Performance Computing (HPC) 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 ActiveStor 3000 Parallel Storage Clusters

Best Price/Performance for HPC Linux Cluster Storage

The requirements for HPC Linux clusters running batch applications are highly

specialized. Typical applications include seismic data processing, simulation of complex chip designs, crash and airflow simulations, motion picture rendering and financial risk analysis. These applications frequently use very large files, often in a sequential manner, and demand high bandwidth with high capacity.

The Panasas ActiveStor 3000 parallel storage solution delivers an order of magnitude greater bandwidth than leading alternatives and provides an ideal solution for Linux clusters running batch-type applications. The industry's leading solution for HPC cluster environments is further enhanced with the third generation of the Panasas ActiveScale operating environment. The new 1.5 TB StorageBlades enable 15 TB per shelf and 150 TB in the footprint of a single 42U rack, allowing an ActiveStor Storage Cluster to easily scale to Petabytes of capacity. Fully prewired and tested integrated rack systems simplify installation and offer full RoHS compliance to meet the strictest hazardous materials requirements worldwide.

The third generation of the industry leading parallel storage solution for high performance computing brings additional capabilities to the Panasas ActiveStor parallel clustered storage systems. Recent enhancements to the object-based file system and memory architecture significantly improve performance, and offer even faster time to results. ActiveScale 3.0 provides many new predictive self-management features that make it the most robust storage operating environment available today. ActiveScan ensures continuous performance by monitoring the data objects, the parity, the disk media and the disk drive attributes. If a potential problem is detected, then data can be moved to other StorageBlade modules, eliminating the need for reconstruction.

SGI - Germany's National Meteorological Service Extends Far Beyond Its Borders

www.sgi.com/company_info/features/2008/dwd.html

Meteorology today involves far more than regional weather forecasting; climate change has taken precedence as an international priority involving extremely complex political and socioeconomic challenges. These challenges call for advancements in meteorological research and service organizations worldwide. These challenges also call for data warehousing solutions capable of managing complex workloads and delivering real-time analytics for data volumes ranging into the hundreds of Terabytes.



Challenge:

DWD is launching its Ensemble Prediction System (EPS), an advanced solution for weather forecasting. DWD is one of the first meteorological organizations worldwide to undertake the challenge of operationally processing and analyzing ensemble data for extremely short-range weather forecasting. For this challenge a new database system was essential. The ensemble method allows estimating the reliability of a given forecast by averaging forecast outputs with slightly different starting conditions/measured values, taking into account the general uncertainties in modelling an extremely complex system like the atmosphere. These ensemble forecasts are planned to be recalculated every three hours. The new method involves the generation of more than 1GB per second of data. A large amount of this data is being processed by the database system and then made available for the meteorologists for further analysis. This new environment is also for one of DWD's most valuable data assets – its database of meteorological data, the National Meteorological Library.

National Meteorological Library is a gem in meteorological history. It consists of both numerical data dating back to 1966 when the DWD undertook its very first numeric weather calculations and of non-numerical data reaching back as far as to the second half of the 15th century. A wealth of recent data is used as the basis for weather forecasts and for the verification of new weather models. In order to take on the challenge of extremely short-range weather forecasts a very substantial rise in data base performance is critical.

Problem:

Germany's National Meteorological Service needed a data warehousing solution with performance and throughput capabilities capable of handling the mixed workload and complex queries generated by an unprecedented undertaking in short-range weather forecasting.

Solution:

SGI® Adaptive Data Warehouse running on Oracle® 10g, built for exceptional scalability and throughput, leverages the SGI heritage of high performance computing for today's challenging business problems.

- Rapid deployment
- Data warehousing expertise
- Simplified solution architecture
- Flexible, cost-effective configurations

Outcome:

The opportunity for Deutscher Wetterdienst to tremendously improve the reliability of extremely short-range weather predictions and contribute critical environmental analyses from its world-class ensemble weather prediction system

- Timely decision-making for meteorologists, even with massive increases in complexity
- Significantly shorter time to insight
- Increased ability to quickly make informed decisions

Growing data loads and heavy data traffic The existing data warehouse platform for meta data already strained under heavy user loads and frequent adhoc queries. Users – mainly meteorologists who process weather-related information - work with their data via a specialized application called CSOBANK developed inhouse at DWD. CSOBANK retrieves the required meta data via SQL from the meta data database which, as a next step, returns the requested real data from the file system, which holds up to 300 TB of data on disk as well as additional 1.5 PB on tape.

Weather forecasting is a very time critical business. There is nothing more outdated than yesterday's weather forecast for today. For the new extremely short-range weather ensemble prediction system DWD expects twenty simultaneous weather forecasts will be calculated every three hours. Up to now only one short-range prediction has been calculated every 3 hours; worldwide predictions had only been calculated every 6 hours. Only 10 minute-old data sets are used as foundation configurations for highlycomplex calculations up to 4 GB in size. The input stream of external and calculated data that enters the filesystem and also involves a refreshment of meta data is estimated up to 800MB/s peak. This represents an ever growing challenge to the DWD team: Bottlenecks through simultaneous extensive queries by a growing number of users were already causing delays in response times. In order to come up to the new challenge of extremely short-range weather forecasts a very substantial rise in performance was necessary.

"Operating a very large data warehouse presents extraordinary challenges that most server platforms, due to the practical limits of their I/O bandwidth, are incapable of overcoming," said Dr. Henning Weber, head of computer systems support at Deutscher Wetterdienst, Germany's National Meteorological Service, which recently purchased several SGI® Altix® systems to run an Oracle 10g data warehouse encompassing 360TB of user data. "The SGI solution will enable DWD to expand our data

warehouse while maximizing the performance of our dataintensive applications." –Dr. Henning Weber, Deutscher Wetterdienst

Requirements:

- Analytical and storage capabilities for increasing number of users and increasing analytic requirements
- Ability to consolidate multiple large and complex databases
- Increased performance and throughput in mixed workload and complex query environment
- Future system expansion: cost effective and with minimum time effort
- Rapid deployment

Solution:

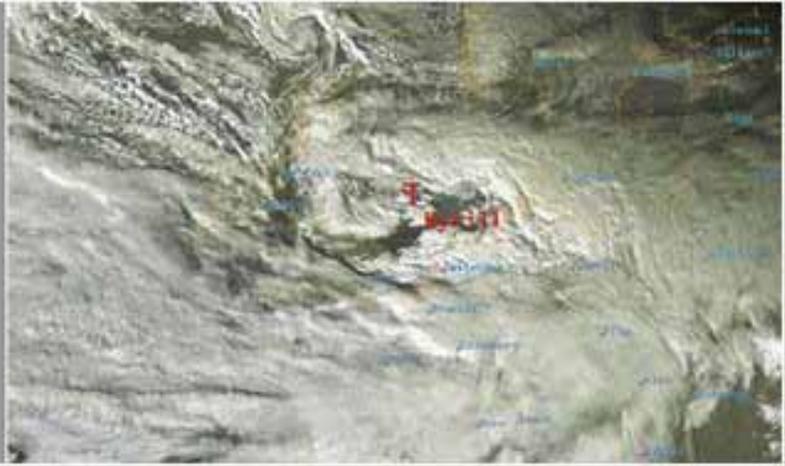
- SGI® Adaptive Data Warehouse for meteorological metadata running on Oracle® 10g, built for exceptional scalability and throughput
- Rapid deployment: the installation was completed within three months with the support of SGI experts for data warehousing projects, simplified customizations and simplified solution architecture and deployment
- Flexible configurations that enable DWD to easily grow the system; Altix can readily adapt to match individual requirements and changing needs
- Minimum platform expansion costs through sharedmemory SGI® NUMAflex® architecture: configurations can add processors, memory and I/O independently
- Longevity and protection of technology investments ensured through industry standard components
- Total of 2.8 TB of memory allow ultrafast in-memory processing on five SGI Altix 4700 data base servers and two SGI® Altix® 450 test servers: a total of 472 Intel® Itanium® cores

New Capabilities:

- Timely decision-making for meteorologists even with large increases in complexity

- Significantly shorter time to insight with up to 15x faster query results
- Increasingly varied workloads can be handled
- Faster query results with the large increases in complexity
- Increased ability to quickly make informed decisions

Windstorm Kyrill that raged throughout Germany in January 2007 demonstrated impressively that the forecasts and warning management of the Deutscher Wetterdienst meet the highest disaster management standards and help to save lives and minimize damage.



ENGINSOFT ACADEMY

TRAINING AND RECRUITMENT INITIATIVE: A COMPUTER AIDED ENGINEERING SCHOOL

EnginSoft represents a highly innovative engineering and technology organization and an important player in the European Computer Aided Engineering market.

Ever since its foundation in 1984, EnginSoft serves a loyal customer base representing various industries and academic institutions with different background.

In September 2008, EnginSoft has launched a Training & Recruitment Initiative in Europe with the aim to support the company in its home market Italy as well as its growing European Network of subsidiaries, daughter and partner companies.

Course Participants will be taught and trained in various CAE sectors by outstanding experts from both EnginSoft and partner universities.

Theoretical lessons linked to industrial applications will allow participants to gain deep insights into the world of CAE, within a relatively short period of time.

The Program of Intensive Training Courses will commence in February 2009.

The principal objectives of the Computer Aided Engineering Academy are :

- to provide a highly skilled, young and flexible expert work force which is and will be indispensable to stay competitive and to meet the demands of the future technology market.
- Course graduates will be invited to join the teams of EnginSoft and its Network and thus to work with various industries (Automotive, Aerospace, Oil&Gas, Chemical&Process, Appliances, Biotechnology and others)
- Furthermore, Course graduates will support work that is being carried out in the frame of several research projects (mainly EC funded), and in this way, help to continue and

intensify EnginSoft's strong commitment to research. The initiative also aims at PhD students.

- Course graduates with a strong interest in software may back up the EnginSoft software development team to implement new technologies.

- Our main idea is to create a 'single' community at European Level (with some extension to the USA), among the different local teams/partners of EnginSoft which are currently based in Italy, France, Germany, Spain, UK, Sweden and USA. This Community will be based on an interactive and frequent exchange of skills, competences and manpower.

Beneficiaries :

- This Call is intended for both, young graduates and/or post-docs, from faculties, such as engineering (all sectors), informatics, mathematics and physics.

Structure of the Initiative

General Information:

- in 2009, two courses will take place in February and September, the plan is to repeat the initiative on a yearly basis.
- the entire costs for Course Participants' travel and accommodation will be covered by EnginSoft
- an incentive of 2400 Euro will be offered to those Course graduates who are selected and accept to be engaged in one of the EnginSoft or Partner Offices in Europe

The long-term vision is to collaborate with TCN, an international consortium of companies and research institutes, and in this way, to support TCN's utmost ambition to transfer knowledge and education through state-of-the-art technologies from science to industry.

Content and structure of the Courses

Each Course will consist of three phases:

1. **Introductory phase** (150 hours) common to all Participants:

Virtual Prototyping applications are classified by categories of problems from both the industrial and research point of view. There will be also some training on leadership, innovation, working practices and philosophies, confidentiality issues, etc.

2. **Advanced phase** (250 hours): participants will be divided into subgroups to get advanced training in specific sectors. There will be at least two subgroups, most likely in:

- CFD
 - turbulence, multi-phase, reacting flows, fluid-structure interaction, turbo-machinery
- Process integration and optimisation
 - DOE, optimization algorithm, response surfaces, data mining, Robust Design,...
- Simulation of manufacturing processes
 - casting, forging, plastic injection, machining, ...
- Advanced mechanics applications
 - non-linearity, multi-body, impact analysis, ...

Lessons will be divided into:

- Theoretical background (with trainers from outstanding universities)
- Industry and research related topics
- Specific background of the technologies supported by EnginSoft
- Hands-on experiences

3. **Course Project** (100 hours): A specific project will be developed with each Participant, with tutoring from scientific/application staff of EnginSoft and/or partner universities. The Course project may be carried out at partner companies' sites thus allowing Participants to appraise the possible placement.

Registration and acceptance procedure

Applicants should submit a CV in electronic format by using the template provided on the website of the initiative (<http://www.enginsoft.com/academy/index.html>).

The CV is in the standard EC format but includes a table with specific questions for a self-evaluation of competences and background in the field of Virtual Prototyping. The website is open without any time limitations

KEY INFO

School website:

www.enginsoft.com/academy/index.html

Director of the School: Massimo Galbiati (school@enginsoft.com)

Coordinator of the School: Barbara Leichtenstern (b.leich@enginsoft.it)

Logistics: Mirella Prestini (m.prestini@enginsoft.it)

Scientific Committee:

The initial group of esteemed experts from European Research and Academic Institutions will include a total of up to 15 individuals and will be published on the Portal.

The Scientific Committee will form part of the Faculty. Indeed, one of the main objectives of the Initiative is to establish and subsequently promote a Faculty.