4th ANNIVERSARY ISSUE
Showcasing FEA Information's AVI Library
October 2004

FEA Information Inc.
Trent Eggleston & Marsha Victory

October 2004 – Announcements

Participant:

We have changed our structure to include Technical Consultants and Technical Writers. We are pleased to announce that Dr. Al Tabiei has joined FEA Information as a Technical Writer.

Travel:

Marsha Victory, in November, will be attending the 22nd CAD-FEM User's Meeting 2004 - International Congress on FEM Technology & ANSYS CFX & ICEM CFD Conference November 10 - 12, 2004, Dresden Germany.

"What is" Series:

A monthly series of up to three short introductions to software/hardware that will be technically oriented.

Correction: Website for SGI "Leading-edge Crash Simulation Solutions"
http://www.sgi.com/products/servers/altix/whitepapers/crash_form.html

Contact us to contribute to the FEA News or the FEA Websites.

Sincerely,

Trent Eggleston & Marsha Victory

Massively parallel computing ©
The future in automotive, aerospace, electronics, medical, and all industries is to obtain scalability.
Dr. Arthur B. Shapiro

What is Massively parallel computing?

Massively parallel computing refers to a large (massive) collection of computers (processors) with their own, independent memory and disks, interconnected by high speed networks. A problem is subdivided among the computers which work simultaneously (in parallel) on the computations. In the case of LS-DYNA, the high speed communication network is used to share boundary and contact data between the computers.

Many companies have already switched from vector and shared memory parallel (SMP) machines to MPP machines to reduce cost and wall clock time. However, whether a company can switch depends on their application software needs since much engineering software, unlike LS-DYNA, has not been ported to MPP machines.

Massively parallel processing affords companies that use LS-DYNA, the ability to have the option of purchasing more machines, running larger jobs and producing more efficient analysis results.

The History of Parallel Computing

In the 80's it became apparent that supercomputing in an SMP environment would not easily scale for structural analysis problems. This was due to a number of factors:

- A 5X speed-up on 8 processors was difficult to achieve – 92% parallelism (~12X on 256 CPU's).
- SMP implementation required extensive changes to the source code for multi-tasking elements, contact, constraints, etc.
- Latency in starting parallel loops and the load balancing of data processed in the loops hurt parallelism
- Many options had short loops that could not be processed efficiently in parallel
- Consistency requirement for identical run-to-run results also hurt scaling.

Scalable SMP Structural Software is a requirement for MPP Software

The solution for highly scalable SMP structural software is also a requirement for highly scalable MPP software:

- A domain decomposition at the start of the calculation that gives each processor an input file of equal size containing a unique part of the model.
- Communication between processors to exchange information for shared boundary nodes and contact interactions.
    - For SMP computers, unlike MPP computers, this communication can be done in memory.

LS-DYNA and Parallel Computing

Porting LS-DYNA started in 1992 when Intel loaned an 8 processor Delta machine to LSTC. The porting continues today for the implicit options. Many obstacles were overcome:

- Consistency-answers changed run-to-run due to changing order of operations
- Jobs often hung for no obvious reason
- Contacts algorithms were 100% rewritten using client-server model where every processor independently communicates with every other processor. All processors equally participate in global searching.
    - Today results are comparable but in the early stage because of the contact treatment, results between SMP and MPP runs often differed.

Industrial use of MPP

As the computational demands of FEM simulation have grown over the past several years, with models continuing to grow in complexity, traditional solution methods have become inadequate. Applying distributed computing techniques, LSTC had developed a version of LS-DYNA that can run today's large models in reasonable times on a wide range of available hardware. In essence, the problem to be modeled is split into pieces (domains), and each piece is simulated on a different processor. Coordination between the simulations is of course required at the domain boundaries. Contact is a particularly difficult problem, requiring cooperation between all the processors as the domains interact. The communication involved produces overhead, which increases with the number of domains.

Consequently there is a limit to the speed that can be achieved. For a given problem, the simulation time generally goes down as the number of processors increases, up to a point. The speedup will drop off and, if too many processors are used, the simulation time will begin to increase.

Currently, the largest application areas for the MPP version of LS-DYNA are in automotive crash and metal forming. One of LSTC's customers has been running production sheet metal stamping simulations using MPP-DYNA for several years. Their problems routinely have 1 million elements, and they achieve overnight turnaround times utilizing a 30 processor system.

DaimlerChrysler began a one year transition to MPP in 1998 and became the first large automotive company to complete the transition from SMP to MPP in 1999. Today all large automotive crash customers use MPP computers for crash analysis. Currently, we estimate that 95% of licensed CPU's for LS-DYNA belong to clusters. Additionally, grid computing, where unused desktop machines can be run at night over local networks, is of growing interest to save computer hardware costs. Grid computing is now supported by LS-DYNA

A decade of change

In one decade from 1994-2004 the use of explicit codes has undergone a radical transformation. From 100% serial and SMP licenses to 95% MPP with the remaining 5% of CPU's typically running smaller models on 1-8 processors. Today, serial and SMP explicit codes are becoming obsolete and will eventually be phased out.

With implicit solution techniques, it is more difficult to create an MPP version. Implicit requires much more expensive hardware at higher costs so there is less customer demand for MPP versions. However, it is safe to predict that serial and SMP implicit solvers will also become obsolete within the next decade. Implicit nonlinear calculations will require a domain decomposition where problems in linear statics and dynamics may just require an MPP sparse solver.

Parallel Implicit

Parallel implicit is more difficult. Explicit analysis does not require the following operations, which are difficult to parallelize and load balance:

- Finite element matrix assembly
- Constraint matrix generation
- Generation of the reduced equation set
- Second domain decomposition for sparse solve
- Factorization, both in and out-of-core
- Triangular solves both in and out-of-core

LSTC is developing a scalable option for the implicit solution option in LS-DYNA using sparse solver technology. Our first release of the scalable implicit option will be in version 971, which we expect to release in 2005.

“What is” Series by Trent Eggleston

ANSYS PARAMESH

http://www.ansys.com/ansys/paramesh.htm

Stiffing bracket without adding mass

What is ANSYS PARAMESH:

ANSYS ParaMesh is all about process streamlining. Inserting ANSYS ParaMesh into a typical product development process can sometimes halve the amount of time it takes to get to the best, simulation proven design. Those kind of claims are jaw dropping and hard to believe, until you see ANSYS ParaMesh in action. ANSYS ParaMesh allows you to work directly with your existing analysis model. By working only with the nodal coordinates and a variety of transformations, ParaMesh is able to morph your existing mesh into a wide array of new designs.

Why ANSYS ParaMesh?

- Very effective with legacy models; many projects re-use existing models
- Very efficient with large models that are difficult to modify by any method
- To drastically reduce the amount of time it takes you to perform a design iteration
- To give you an advantage over those that use only the traditional process
- Applications
- Perform rapid modifications of a design (evolution of existing designs)
- Perform concepts analysis at the CAE level
- Explore many design alternatives
- Perform shape optimization without CAD models
- Perform easier and more accurate Design of Experiments (DOE)

ParaBatch

ParaBatch is the "Batch Only" version of ParaMesh, which means that the GUI (Graphical User Interface) is not active. The mode of operation allows you to export deformed meshes from either a ParaMesh or a DXVT database. ParaBatch can quickly export deformed meshes automatically without any user intervention, which allows ParaBatch to be utilized in two different ways. The first one allows exporting a single mesh from a single execution of the program. The second one, which is the more powerful method, is to create multiple deformed meshes. This series of meshes can be used for DFSS studies, optimization, sensitivity analyses and what ifs! ParaBatch can be integrated into an automatic optimization loop or coupled with commercial optimization software such as Isight, Optimus, modeFRONTIER, etc., making a powerful combination.

ParaMesh Target Geometry Module

What do you do if your CAD model and your analysis model are not in sync? ParaMesh allows models that have gotten out of sync with the CAD model to be quickly and easily modified to match the current CAD geometry. The target geometry capability leverages both the work done by the analyst in setting up the analysis model as well as the work done by the CAD designer in refining the CAD model. Bringing both of these into agreement means providing the best possible answer for decision making, and with ParaMesh, this is accomplished in a very efficient manner. Also, the new target geometry capability offers an unlimited capacity for complex modifications to existing models. For example, if an automobile trunk has been redesigned for better aerodynamics, ParaMesh can be used to morph a portion of the structural analysis model to the new CAD target geometry while leaving the other portion unchanged.Find out how ANSYS ParaMesh can streamline your process and make your "Time to Best Design" faster than your competition.

ParaMesh Benefits

- Quickly makes a static FEA model parametric and modifiable for optimization or "what if" studies Parameterization of a static FEA model is easy, fast, and very flexible
- All changes are done at the nodal coordinate level, saving tremendous amounts of time over traditional methods
- Easily imports and modifies large models, including million degree of freedom aerospace airframes and automotive bodies in white
- Doesn't require a CAD license or a CAD expert's time to make modifications to a model
- Provides an almost unlimited amount of flexibility to transform and move surfaces, edges, vertices and dramatically change the shape of an FEA model
- Saves a tremendous amount of time in the design/simulate process by using an existing mesh rather than requiring the user to generate a new mesh for each design exploration cycle
- Can be used with all analysis types, structural analysis, modal analysis, Computational Fluid Dynamics, electromagnetics , acoustics, even Multiphysics
- Includes an automatic, global element shape smoothing algorithm that controls element shape quality throughout the morphing process
- Can be used with models written for all major structural analysis formats, i.e ANSYS, NASTRAN, Patran, ABAQUS
- Can be used with models written for many major CFD codes, i.e. Fluent, Star CD

“What is” Series by Trent Eggleston
***Oasys* PRIMER**
http://www.arup.com/dyna/software/primer/primer.htm

What is *Oasys* PRIMER?

Oasys PRIMER is designed to make preparation and modification of LS-DYNA models as fast and as simple as possible. With the release of version 9.0, all keywords from the latest version of LS-DYNA (Vn 970) are supported so no data will be lost or modified when reading and writing models. Keywords can be created and modified and all LS-DYNA entities visualised to help users understand exactly what a model contains and how the various entities are inter-related. And with almost 2000 separate checks as well as display of model properties the user is able to find and correct almost any error in the model.

New features in *Oasys* PRIMER *Version 9.0*

- All the features of Primer 8.3 plus...
- Full support for LS-DYNA Version 970
- File handling: mixed unix/PC systems
- Mesh-independent airbag folding
- Spotweld files: batch mode / CATIA format spotweld file
- New simple groups file

General Functionality

The Complete General Functionality List is located at:
http://www.arup.com/dyna/software/primer/general_func.htm

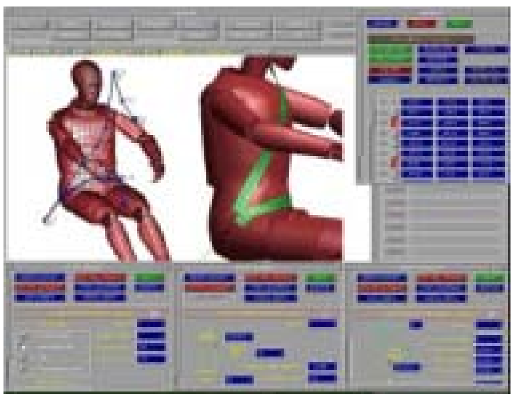
- Full LS-DYNA keyword comprehension
- Reads in LS-DYNA keyword, NASTRAN, RADIOSS, SAP 2000, IDEAS input files directly
- Visualisation of all DYNA entities and Find Attached function.
- Model manipulation by translation, reflection, rotation and scaling
- Model checking
- HTML on line manual with powerful search functions.

- Advanced model merging
- Control card and database editing facility
- Advanced deleting facility
- Advanced renumbering facility
- Contact creation and editing facility
- Contact penetration checking and visualisation

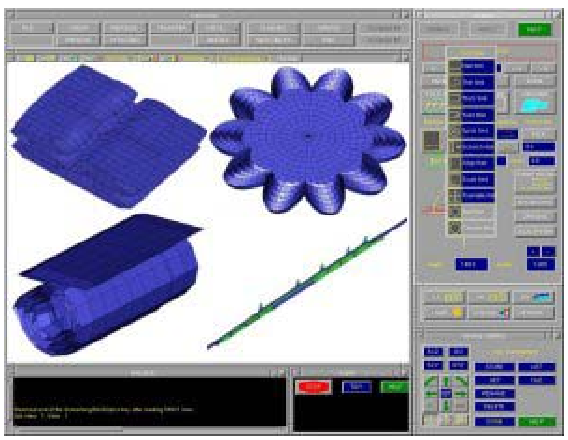
Occupant Protection Functionality

The Complete List is located at: http://www.arup.com/dyna/software/primer/occ_prot_func.htm

Dummy positioning facility that detects stop angles and rotational degress of freedom
Free Motion Headform positioner
Advanced Model Merging and Renumbering
Contact creation and editing



Seatbelt fitting
- 1D, 2D or mixed elements
- refitting belt options
- retractor, slip ring and pretensioner creation
- easy contact creation



Airbag creation and editing
Airbag folding
- 'easy -to-define' fold patterns
- can fold 2D and 3D airbags
- penetration checking
- distortion checking
- enhanced tuck folding
- full control over fold parameters
- folds can be editied easily once they have been created
- airbag positioning

"What is?" Series by Trent Eggleston

ETA/DYNAFORM

www.eta.com

What is Dynaform? THE DIGITAL PRESS : TRYOUT BEFORE TOOLING

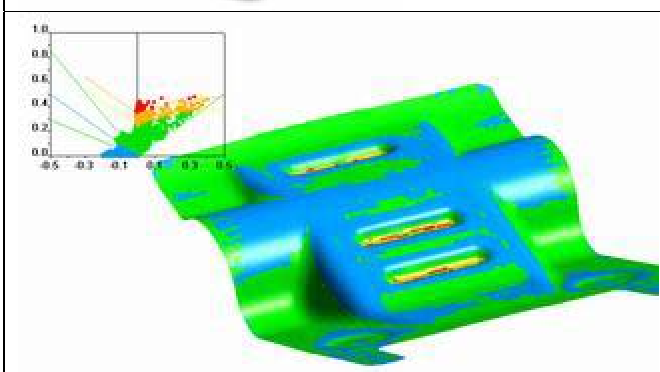
DYNAFORM drastically reduces the risk and costs associated with the die design and development cycle by predicting formability problems before tooling takes place. Flawed or marginal die designs that would cost innumerable hours of labor, press time and material to repair and correct are evaluated on the computer at a fraction of the cost. By determining splitting, wrinkling, thinning, and springback effects that would occur during the stamping process before tooling is cut, timing concerns are eliminated while customer confidence and design confidence improve. DYNAFORM is a proven, cost-effective way to improve and insure your bottom-line.

DYNAFORM is efficient and easy to use. It 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.

DYNAFORM is a LS-DYNA based CAE software package that is developed to aid in die face design layout while predicting the formability of sheet metal products in terms of cracking, wrinkling, thinning, skidmarks and springback effects

Dynaform/DFE

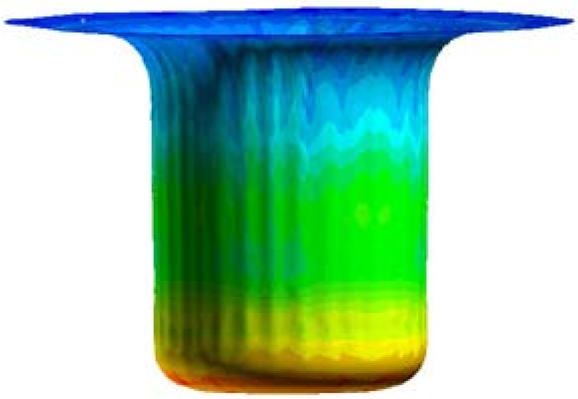
For Complete Information:
http://www.eta.com/Products/Dynaform/dfe.html

	Utilizing a series of automated, surfaced-based tools such as reverse trimming functions, tipping, and binder and addendum generators, the DFE module guides the user from part design to die design within the DYNAFORM interface
	Automated tipping, reverse trimming, draw depth, filleting, and un-flanging functions minimize the work required to design the die from the part geometry. Binder and addendum tools are included to complete the geometry

Dynaform/Formability

For Complete Information:
http://www.eta.com/Products/Dynaform/FS.html

Formability Simulation: Utilizing technology developed and used by automotives' largest OEM's for the last 20 years, DYNAFORM is mature, easy to use and accurate. Formability simulation is now considered a "best practice" throughout the stamping industry. With today's extremely fast and cost-effective computers the technology is now more available than ever.



Increased Confidence in Design

Formability simulation allows the designer to evaluate die designs that would be extremely costly to develop as hard tooling. This allows designers to experiment with alternative, cheaper designs; stations can be removed in a progressive or transfer die, alternate materials can be tried, blanks trimmed. For inexperienced designers, DYNAFORM catches potential design flaws before they hit the floor. For more experienced designers, DYNAFORM allows the freedom to try riskier, more complicated parts and unconventional designs that would take months to develop in a press.

Dynaform/QS

For Complete Information:
http://www.eta.com/Products/Dynaform/QS.html

Model setup is now faster and easier than ever before. At the heart of the process guidance approach is the "QuickSetup" interface. After meshing the model surfaces, the user selects the type of simulation and the quick setup interface graphically guides the user through the automated setup. Each component of the model is graphically represented and it's definition is color coded so the user knows what has been defined (green) and what remains to be defined (red). After selecting the model components (die, binder, drawbeads, blank), all travel curves and mating tools are automatically generated and can be previewed in motion. Submission for analysis is done directly from the Quick Setup menu

FEA Information
Asia Pacific News – China
Marsha Victory, LSTC Global Business Administrator

LSTC's China Business Unit (CBU) had a very successful trip to China, with meetings in Beijing, Chengchun and Shanghai.

"China has become a fast growing market, with LS-DYNA as the choice solver to be used in automotive crash analysis, metal forming simulation, drop testing and other industries," said Philip Ho, Manger of LSTC's LS-PrePost Development, and Manager of LSTC's newly formed China Business Unit.

LSTC's two distributors in China excel in sales, support, training, and consulting using LS-DYNA. (alpha-order)

- ANSYS Inc. - China
- MSC.Software - China

During this trip, Dr. Jason Wang, Senior Developer for LS-DYNA MPP, gave special presentations and short courses introducing the increase of scalability by using LS-DYNA MPP.

Mr. Philip Ho, presented LSTC's Future Goals and Developments, and taught a short course on LS-PrePost.

In order to support the growing demand for LS-DYNA in China, Dr. Jason Wang is returning in November to attend the MSC.Software China VPD Conference (Nov. 4,5) and teach a seminar on LS-DYNA MPP given by ANSYS Inc. China (Nov. 8).

Contact your local distributor for your 30-day demonstration license of LS-DYNA.

ANSYS Inc. China - http://www.ansys.com.cn

MSC.Software – China - http://www.mscsoftware.com.cn

Please visit www.feainformation.com
AVI Library is on the menu bar

AVI LIBRARY

The AVI's are copyright
You must contact owner for permission to use AVI
Submitted AVI's can be used by FEA Information Inc.
for marketing material
For additions/correction send to mv@feainformation.com

AVI#	*Site - AVI Name*	*Copyright (c) Courtesy of:*	*Size*
	Site: Computational Fluid Dynamics		
10	Vorticity	LSTC	633KB
11	Stream	LSTC	300KB
12	Temperature	LSTC	259KB
	Site: Crash Analysis		
21	Airbag deployment	LSTC	2.0MB
21a	Airbag folding	LSTC	4.77MB
22	Airbag deployment using eulerian mesh	LSTC	1.3MB
22a	Sled Test	PRODE G. Monacelli	5.27MB
22b	Pole Test	PRODE G. Monacelli	731KB
23	Airplane	LSTC	762KB
24	2D airbag	LSTC	555KB
25	Calibration of the leg impactor	DYNAmore	317KB
25a	Calibration of the DYNAmore USSID Dummy (not on site)	DYNAmore	655KB
26	Train Simulation - Angle View	ARA - CA	5.87MB
27	Train Simulation - Side View	ARA - CA	3.75MB
28	Train Video	ARA - CA	1.99MB
29	Impact between 2 leading locomotives	Xiangdong Xue Sheffield Univ. - UK	1.49MB
29a	Impact between locomotive and rigid wall	Xiangdong Xue Sheffield Univ. - UK	2.00MB
29b	Impact between locomotive and rigid wall and subsequent coach cars	Xiangdong Xue Sheffield Univ. - UK	728KB

29c	Impact between coach cars	Xiangdong Xue Sheffield Univ. - UK	1.5MB
200	Helicopter	J. Gabrys, J. Schatz - The Boeing Co., Structures Tech., PA. & M. Souli - Univ. of LIlle, France	937KB
201	Rectangular tube impact	Bachelor student Mr. Tihomolov- St. Petersburg State Technical University, Russia - Prof. N. Shabrov	646KB
	Site: Metal Forming Simulation		
30	Door panel	LSTC	1.06MB
30a	Manufacture Modeling Pipe	Prof. Alexander Cherniavsky Southern Ural State University Chelyabisnk, Russia	2.07MB
31	Metal Cutting	LSTC	2.9MB
32	Simulation of Camera	CAE TEAM Foxconn _CN	368KB
33	Oil Pan	ETA	931KB
34	Section Cut	ETA	648KB
35	Thickness	ETA	884KB
36	Stamping	ETA	336KB
37 38 39	Press Forming	CompMechLab & A. Borovkov	733KB 2MB 3MB
	Site: Mesh Generating		
40			
	Site: Drop Testing		
50	Cellular Phone	LSTC	2.07MB
51	Tire	ETA	557KB
52	Saw - 1	LSTC	1.14MB
53	Saw - 2	LSTC	1MB
54	Helmet	DYNAmore	641KB
56	Toy - Puppy	LSTC	3.3MB

57	Penetration of Steel Deck Structure	ACTA	867KB
58	PDA Drop Test	Shen-Yeh Chen CADMEN	4.73KB
	Site: LS-DYNA		
60	Container - water & air	LSTC	1.38MB
60a	Linear Heart Valve - animated	OASYS	
60b	Bird Strike - leading edge of wing	LSTC	637KB
60c	FAT EUROSID Model in a sled test	DYNAmore	561KB
60d	USSID dummy model in a sled test	DYNAmore	449 KB
61	Bra Analysis	OASYS	539KB
61a	Segment based automatic contact	LSTC	2.25MB
61b	Segment based automatic contact	LSTC	2.03MB
62	3D Axisymmetric Shaped Charge	LSTC	688KB
62a	Square safety net on ski slope borders	CRIL/Dynalis	3.29MB
62b	Rectangular safety net on ski slope borders	CRIL/Dynalis	6.37MB
63	Linear Shaped Charge	LSTC	9.4MB
64	"Standard" 81mm BRL Shaped Charge	LSTC	1.06MB
65	Adaptive Remeshing	LSTC	339KB
66	Adaptive Remeshing	LSTC	1.24MB
69	Metal Cutting	LSTC	1.06MB
69a	Slinky Toy	ERAB	694KB

Contact			**CompMechLab & A. Borovkov**	
601a 601b	602 603	604a 604b	605 606	4.54MB max

607	Mfg: pickup cone used in gold mining	**CompMechLab**	2.06MB
607a	Mfg: pickup cone used in gold mining	**CompMechLab**	2.92MB
608_01	Failure Analysis - Mixer Penetration	**CompMechLab**	3.17MB
608_02	Failure Analysis - Mixer Penetration	**CompMechLab**	3.36MB
608_03	Failure Analysis - Mixer Penetration	**CompMechLab**	2.22MB
	Site: Heat Transfer Analysis		
70	Extrusion	LSTC	455KB
71	Forging	LSTC	1.42MB
71a	Multi Forging	LSTC	291KB
72	Welding	LSTC	755KB
73	Casting	LSTC	3.4MB

	Site: Warhead Analysis		
62	3D Axisymmetric Shape Charge	LSTC	688KB
63	Linear Shape Charge	LSTC	9.4MB
64	"Standard" 81mm BRL Shape Charge	LSTC	1.06MB
67	Shallow Shape Charge	LSTC	707KB
80	FEA Simulations of steel plate perforations	CompMechLab & A. Borovkov	490KB
80a			843KB
81			1.26MB
81a			6.9MB
82			1.44MB
82a			5.22MB
83	3d Shape Charge using Eulerian Formulation	Alex Tynyany, Dept. of Applied Mechanics, Dynamic and Strength of Machine, Southern Ural State University	551KB
84	High explosive blast response of a 20 ft ISO Tank Container.	**TNO**, Marnix Rhijnsburger	1.89MB
	Site: Fluid-Structure Interaction		
90	Fluid Flow Between Two Glasses	CompMechLab & A. Borovkov	3.41MB
90a	Fluid Flow Between Two Glasses	CompMechLab & A. Borovkov	3.39MB

Hardware
&
Computing and Communication Products
(Listed in Alphabetical Order)

www.amd.com

www.fujitsu.com

www.hp.com

www-1.bim.com/servers/deepcomputing

www.intel.com

www.nec.com

www.sgi.com

Applied High-Performance Computing

www.paracel.com

Software Distributors

Alphabetical order by Country

Australia	**Leading Engineering Analysis Providers** **www.leapaust.au**
Canada	**Metal Forming Analysis Corporation** **www.mfac.com**
China	**ANSYS China** **www.ansys.cn**
China	**MSC. Software – China** **www.mscsoftware.com.cn**
Germany	**CAD-FEM** **www.cadfem.de**
Germany	**Dyna*More*** **www.dynamore.de**
India	**GissETA** **www.gisseta.com**
India	**Altair Engineering India** **www.altair.com**
Italy	**Altair Engineering Italy** **www.altairtorino.it**
Italy	**Numerica SRL** **www.numerica-srl.it**
Japan	**Fujitsu Limited** **www.fujitsu.com**
Japan	**The Japan Research Institute** **www.jri.co.jp**
Korea	**Korean Simulation Technlogies** **www.kostech.co.kr**
Korea	**Theme Engineering** **www.lsdyna.co.kr**

Software Distributors

Alphabetical order by Country

Russia	**State Unitary Enterprise** **www.ls-dynarussia.com**
Sweden	**Engineering Research AB** **www.erab.se**
Taiwan	**Flotrend** **www.flotrend.com.tw**
USA	**Altair Western Region** **www.altair.com**
USA	**Engineering Technology Associates** **www.eta.com**
USA	**Dynamax** **www.dynamax-inc.com**
USA	**Livermore Software Technology Corp.** **www.lstc.com**
USA	**ANSYS Inc.** **www.ansys.com**
UK	**Oasys, LTC** **www.arup.com/dyna/**

Consulting Services
Alphabetical Order By Country

Australia **Manly, NSW** **www.leapaust.com.au**	**Leading Engineering Analysis Providers** **Greg Horner info@leapaust.com.au** **02 8966 7888**
Canada **Kingston, Ontario** **www.mfac.com**	**Metal Forming Analysis Corporation** **Chris Galbraith galb@mfac.com** **(613) 547-5395**
India **Bangalore** **www.altair.com**	**Altair Engineering India** **Nelson Dias info-in@altair.com** **91 (0)80 2658-8540**
Italy **Torino** **www.altairtorino.it**	**Altair Engineering Italy** **sales@altairtorino.it**
Italy **Firenze** **www.numerica-srl.it**	**Numerica SRL** **info@numerica-srl.it** **39 055 432010**
UK **Solihull, West Midlands** **www.arup.com**	**ARUP** **Brian Walker brian.walker@arup.com** **44 (0) 121 213 3317**
USA **Irvine, CA** **www.altair.com**	**Altair Engineering Inc.Western Region** **Harold Thomas info-ca@altair.com**
USA **Windsor, CA** **www.schwer.net/SECS**	**SE&CS** **Len Schwer len@schwer.net** **(707) 837-0559**

Educational & Contributing Participants
Alphabetical Order By Counrty

China	**Dr. Quing Zhou**	**Tsinghua University**
India	**Dr. Anindya Deb**	**Indian Institute of Science**
Italy	**Professor Gennaro Monacelli**	**Prode – Elasis & Univ. of Napoli, Frederico 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	**Prof. Ala Tabiei**	**University of Cincinati**
USA	**Tony Taylor**	**Irvin Aerospace Inc.**

Informational Websites

FEA Informational websites	**www.feainformation.com**
TopCrunch – Benchmarks	**www.topcrunch.org**
LS-DYNA Examples (more than 100 Examples)	**www.dynaexamples.com**
LS-DYNA Conference Site	**www.ls-dynaconferences.com**
LS-DYNA Publications to Download On Line	**www.dynalook.com**
LS-DYNA Publications Index	**www.feapublications.com**
LS-DYNA Forum	**http://portal.ecadfem.com/Forum.1372.0.html**
LS-DYNA CADFEM Portal	**http://www.lsdyna-portal.com**

Sept. 06	**IBM**	IBM @server® BladeCenter™ JS20 64-bit PowerPC®
	Paracel	Paracel provides a range of integration services and support options to ensure that our customers' clusters meet their business requirements
	THEME	Distributor in Korea
Sept. 13	**Tsinghua Univ.**	Qing Zhou joins FEA Information as an Educational Participant
	ANSYS	ANSYS ParaMesh is all about process streamlining.
	ANSYS-China	Distributor in China
Sept. 20	**JRI America**	JRI America provides a wide range of services
	Flotrend	Distributor in Taiwan

Events

2004	
Nov 10-12	**22. CAD-FEM Users' Meeting 2004 - International Congress on FEM Technology & ANSYS CFX @ ICEM CFD Conference**
2005 & 2006	
May 25-26, 2005	**5th European LS-DYNA Conference - The ICC, Birmingham UK**
July 25-27	**8th U.S. National Congress on Computational Mechanics – Austin, Texas**
June 3, 2006	**9th LS-DYNA International Users Conference – Dearborn, Michigan**