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One Man's Corner
Part 1.A Lessons Learned from My Early FEA Career

The Intel® Cluster Ready Program

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FEA Information Announcements In This Issue:

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

> " A series of "One Man's Corner" articles in *FEA Information,* describes some of my structural analysis, FEA (finite element analysis), and MCAE (mechanical computer-aided engineering) career highlights in the Southern California aerospace industry – in the 20-year period from 1966 to 1986. Four projects are discussed, each with: background, objective, structural analysis highlights, and lessons learned."

New Participant:

> Cranes Software Ltd. Located in India is an authorized distributor of LS-DYNA®, LS-PrePost® and LS-OPT®.

Sincerely,

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One Man's Corner

Part 1.A Lessons Learned from My Early FEA Career

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Photo by Evelyn Y. Lee, 2002, in West Lake, China.

This article is dedicated to her

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.

Outline **-- Part 1**, in my series of "One Man's Corner" articles in *FEA Information,* describes some of my structural analysis, FEA (finite element analysis), and MCAE (mechanical computer-aided engineering) career highlights in the Southern California aerospace industry – in the 20-year period from 1966 to 1986. Four projects are discussed, each with: background, objective, structural analysis highlights, and lessons learned:

Part 1.A *Postbuckling Strength and Dynamic Response of Thin Shells*

Part 1.B *Evaluation of COSMIC/NASTRAN Program*

Part 1.C *Structural Analysis of Solar Energy Heliostats*

Part 1.D *Nonlinear FEA of Elastomeric Potting Materials in Traveling Wave Tubes.*

Part 2 will discuss my observations in the second half of my career, in the 20-year period, 1987-2007: FEA/MCAE market trends, computer hardware and processor advances; benchmarking; clustering in High Performance Computing (HPC); current MCAE market leaders – and why; and, cultural differences and recent HPC/MCAE achievements I saw in India and China.

Part 3 will be my crystal-ball gaze into the future – what may be in store for FEA and MCAE simulations in the future? I will attempt to hypothesize and speculate – using the frameworks posed by *New York Times* Foreign Affairs columnist Thomas L.

Friedman in his provocative book, *The World is Flat – A Brief History of the 21st Century* (2005), and artificial intelligence expert, inventor, entrepreneur, and futurist Ray Kurzweil* in his profound book, *The Singularity is Near – When Humans Transcend Biology* (2005).

Introduction

If you want to understand today, you have to research yesterday – Pearl S. Buck

With a M.S. in structural engineering from the University of California at Berkeley (and mentored by Professor Robert L. Taylor*), I was all ready in January 1966 "to set the world on fire," and tackle big engineering challenges. But, I soon learned that we engineers and scientists should never forget their lives (and indeed, their careers) can often be impacted by the "big picture" around us: *socio-economic developments* (e.g., China, India, Russia), and *political upheavals* and other events around the world (e.g., 9/11, Iraq, Afghanistan, Pakistan), that are out of our control.

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

1.A Postbuckling Strength and Dynamic Response of Thin Shells

My first two jobs in the aerospace industry both involved the stress analyses of thin shells, at General Dynamics–Convair [1966-1968] and McDonnell Douglas Astronautics Company [1968-1978]. The GD work dealt with the stress analysis, and full-scale structural testing, of the *Centaur* upper-stage launch vehicle. The MDAC work involved the dynamic analysis of the *Spartan* ABM third stage's "nuclear warhead" shell structure, along with full-scale testing using contact explosives and underground nuclear tests. Both were performed under tremendous time constraints, involving intense competition with the Soviet and Chinese space and missiles programs. Along the way, I had met some very talented (and quite colorful) engineers and consultants.

Sidebar: In 1979, as a 37-year-old Chinese-American structural engineer (born in China but raised in the U.S.), I was fascinated by the seminal buckling work of thin shells by rocket scientists Theodore von Kármán and Hsue-shen Tsien (later known as *Qian Xue-sen*, in China), done at Caltech in 1939-1941. (von Kármán also later co-founded, with others like Frank Malina and Louis Dunn, Caltech's Jet Propulsion Laboratory and Aerojet Engineering Corporation.) I was also very intrigued by the subsequent McCarthy-era, alleged spy controversy surrounding Qian's life in 1950-1955 – which led to his return to China in 1955. So, I decided to write a sincere, hand-written letter to Dr. Qian (then, aged 68), requesting his permission for me to go to China to interview him, and possibly, write a book about his memorable life and achievements. To my surprise, three months later, Dr. Qian replied – but he politely declined to be interviewed and to be biographied. [More on Dr. Qian's life later.]

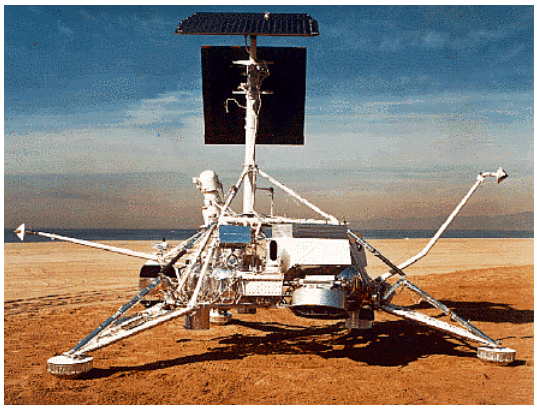
1.A.1 Postbuckling Strength of Centaur Launch Vehicle's Thin Shell [1966-1968]

Centaur upper-stage rocket

At UC Berkeley in 1965, while taking a "Flight Structures" course taught by Marc Trubert, we had used as text a 1950 book named *Aircraft Structures,* by David J. Peery at Penn State University. And, lo and behold, when I started working in January 1966 at GD in San Diego, I found out that Dr. Peery had retired from academia, and was now a

structures consultant at GD. A short, rotund, good-humored, pipe-smoking man who very much looked the part of a structural analysis "guru," he led a GD structural analysis team that did the theoretical work to calculate the postbuckling strength of the highly unusual thin shell design for the *Centaur* rocket -- an internally-pressurized, balloon-like vessel made of 0.014 inch stainless steel. It contained the highly combustible liquid nitrogen and liquid hydrogen fuels. GD's *Centaur* upper stage rocket perched atop the reliable "workhorse" GD *Atlas* first-stage launch vehicle, and its primary mission (at that time) was to launch Hughes Aircraft's *Surveyor* spacecraft into space, with the aim of soft-landing it on the lunar surface. (*Surveyor*, of course, paved the way for the later *Mercury, Gemini* and *Apollo* U.S. manned spacecraft missions in the 1960s-1970s.)

As fate would have it, on February 3, 1966, the Russians beat the Americans to the moon, with the successful soft landing of their *Luna 9* spacecraft. This early Russian success really "took the air of the GD, Hughes, and NASA engineers' balloon" – it was my first, very dramatic exposure to the sight of utter despair amongst these engineers, and seeing tears running down the cheeks of grown men. (At that time, there was not a single woman engineer in our Stress Group.) Nevertheless, the NASA/GD/Hughes team pushed on, and four months later, on June 2, 1966, *Atlas/Centaur* successfully launched the *Surveyor I* on its way to soft-land on the lunar surface.



Surveyor 1 spacecraft

I recalled there was little finite element analysis work done at GD then. This was about four **years** before NASA sponsored the development of the *(COSMIC/)NASTRAN* general-purpose, structural and dynamic analysis program. Peery and his GD colleagues had developed a standardized "template" to perform the stress analysis of such internally pressurized thin shells, and also to determine the postbuckling strength of the shell after initial wrinkling of its skin.

Full-scale structural testing was conducted at Point Loma, San Diego. It was my first experience participating in such a large-scale, expensive, structural test. The strains, skin wrinkling, and postbuckling behavior (as measured by strain gauges and displacement gauges) correlated well with our analytical predictions. There were quite a few nervous engineers, GD and NASA executives who witnessed each test, as the shell's internal pressure was gradually increased first to "flight loads," and then, to "limit loads" (which, for the *Centaur* shell design, was 30 percent higher than the flight loads). Fortunately, although the thin shell wrinkled in a certain region as predicted, it never did burst. Since liquid nitrogen and liquid oxygen were highly flammable, the San Diego Fire Department stood by. I asked Jim Jenness, the senior engineer in charge of structural testing, if this type of precaution was standard procedure. He replied: "Safety, Henry, safety! It's better to be safe than sorry." Some time later, I remember seeing this advice appear in my fortune cookie at a Chinese restaurant in San Diego.

Lesson #1: *The first responsibility of a structural engineer is to ensure that structures and components are properly designed to* safely *handle the anticipated operational loads*, *with an adequate margin of safety.*

I also quickly learned that all margins of safety in our stress analysis work were compared against material allowable strengths, as specified in that thick "granddaddy" of all material handbooks used in the U.S. aerospace industry – *MIL-HDBK-*

5C (which I had never heard of at UC Berkeley – where we only used the *AISC Steel Design Manual* and the *Uniform Building Code*). My group leader, a tall lanky Texan with a flat-top crew-cut named John Buck, laughed at my naiveté, "Awww shucks, c'mon now, young man – you'll soon learn fast enough."

1.A.2 Dynamic Response of Spartan 3rd Stage Shell Structure Subjected to Impulsive Loads [1968-1975]

It was the early 1970s. President Richard Nixon had just made his 1972 groundbreaking trip to China to meet with Chairman Mao Zedong, Premier Zhou Enlai, and other top Chinese Communist officials. This was also during the very tense days of the Cold War – and U.S. defense officials were paranoid about an "accidental" launch of ICBMs (e.g., by a "rogue" Soviet, or Chinese, general) towards the U.S. To counter this potential missile threat, Nixon and the Department of Defense came up with the *Safeguard* anti-ballistic missile (ABM) system, which was deployed at twelve remote locations across the U.S., to shield major American cities and our own key launch sites. The two Safeguard ABM contractors were: McDonnell Douglas Astronautics Company – now part of Boeing Co. (*Spartan* long-range missile, shown above, whose third stage was nuclear-armed) and Martin-Marietta Aerospace (short-range, high-velocity, terminal interceptor named *Sprint*, also nuclear-tipped).

The Safeguard ABM system was managed by the U.S. Army, assisted by various defense contractors and U.S. Government labs, such as Kaman Nuclear, Kaman Aerospace, SRI International (SRI), Lawrence Livermore National Laboratory (LLNL), Sandia National Laboratory-Livermore (SLL), and Defense Nuclear Agency (DNA). I attended some interesting Safeguard/Spartan "vulnerability working group" meetings – which were filled with top brass around the table, and PhDs in nuclear physics, chemistry, mathematics, material science, explosives, hydrodynamics, structural analysis, mechanics, underground testing, etc. – all in all, a very talented group of individuals (some of whom, as expected, were naturally quite outspoken).

Lesson #2: *What President Dwight Eisenhower called in 1956 the "military-industrial complex" really existed!* Here it was, one stark example – sitting right there in that conference room!

I was likely the most junior person at these meetings (in terms of age and experience), and always sat quietly in the last row of the huge conference room. Some meetings had over seventy attendees. I could sometimes sense the electricity in the air. As a young Chinese-American engineer, who was still rather naïve, I remembered seeing, at one such meeting, a DOD transparency that I have never forgotten to this day – a detailed map of the targeted "first-strike" missile launch sites, key industrial complexes, and cities (with estimated casualties) in Mainland China – in case World War III ever broke out. (The map was undoubtedly derived from CIA's latest intelligence sources and U.S. spy satellites' hi-res photographs). Holy cow, I said to myself, this was serious shit – we were talking about the annihilation of hundreds of thousands – if not millions – of innocent lives. The somber conference room scene reminded me of the dreaded "doomsday scenario" in Stanley Kubrick' classic 1964 movie (shot in black-and-white, for special effect), *Dr. Strangelove*.
I soon discovered that, despite all the rigorous theoretical analyses presented by the defense contractors and by "experts" from LLNL, SLL, SRI, DOD, DOE, DNA, etc., the top brass still demanded *experimental verification.*

Lesson #3: *If in doubt, test.*

My first assignment at MDAC (1968) was in the Spartan "Nuclear Effects" group led by Ken McClymonds. I had helped Ken to plan and instrument the CELT tests (contact explosive loading tests) at a remote site in Riverside County. (It was fun getting out of the office, basking in the warm sun, watching most of the hard work being done by the technicians.) Sheet explosives were carefully laid out in strips, on neoprene rubber sheets, and glued onto a mockup of the full-scale Spartan 3rd stage shell structure. *Boom* – and the whole test was over! These tests simulated (relatively inexpensively) the shock effects and impulsive loads caused by a nuclear explosion. Strain gauges and displacement gauges monitored the shell's structural response. Test data were correlated with predictions using an axisymmetric FEA shell code named *SABOR/DRASTIC III* (first developed by Stanley Klein, who had received his PhD at MIT under finite element pioneer Professor Theodore "Ted" H.H. Pian*, and then extended by Klein when he later worked at Aerospace Corporation). Ken also did simulations with something called the *PUFF* code. When I asked him what the code did, he explained that *PUFF* was a one-dimensional, wave propagation hydro-code widely used in the weapons community, to calculate material response (e.g., spallation effects) due to a shock load.

Two Outstanding Consultants – Herb Lindberg and Chuck Babcock

One of the most interesting experts I met during these Safeguard/Spartan vulnerability working group meetings was Dr. Herbert E. Lindberg of SRI International in Menlo Park, California. Herb and his SRI colleagues had done a variety of dynamic buckling tests, and had published a series of technical articles and reports on the dynamic pulse buckling of thin shells (always with experimental verification). He was highly respected at these meetings. A modest, soft-spoken and technically superb professional, Herb's comments were eloquent, to-the-point, and always "right on." Herb helped us to design and instrument the later full-scale Spartan structural tests at the underground test site in Nevada, and then to interpret the material and structural response test data obtained.

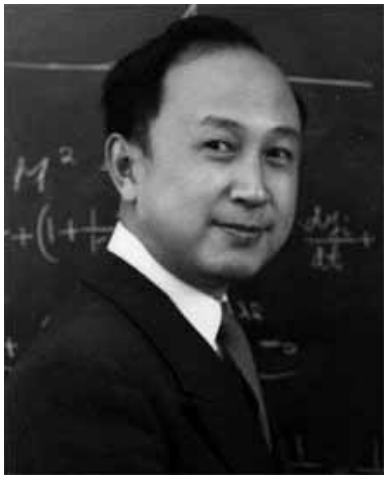
Lesson #4: *It's not* what *you know – it is* how *effectively you communicate it.*

The first structures consultant I got to know well was Professor Charles D. Babcock from Caltech. Everybody called him Chuck. He served as MDAC's shell and buckling expert consultant for much of the 1970s. Chuck had studied under famous mechanics professors at Caltech, such as Ernest E. Sechler and Yuan-cheng "Bert" Fung*. (Fung was first an outstanding aerodynamicist at Caltech, then switched to solid mechanics, and later, at UC San Diego, became a world-class pioneer in biomechanics and cardiovascular mechanics.) I remember when Chuck used to come to MDAC every other Friday, he never once carried a book. He told me: "Everything should be derived from scratch, from basic principles." I was really blown away by such raw intellect – it was all in his head. (Sadly, Chuck died in 1988 – he was only 53.)

The Story of Qian Xue-sen – "the man who knew too much"

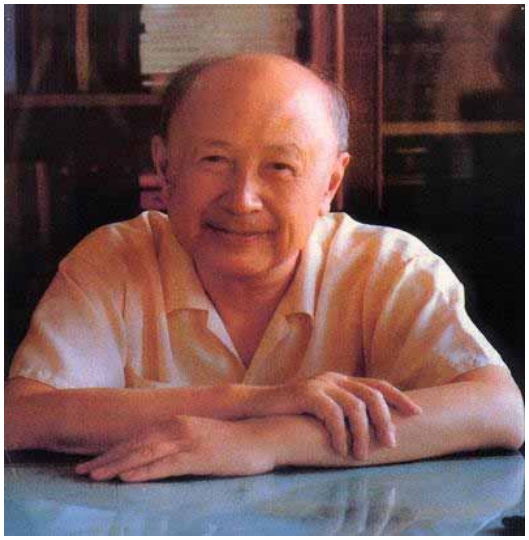
Reputedly Theodore von Kármán's top protégé, Dr. Qian Xue-sen (known as Hsue-shen Tsien, or Hsueh-shen Tsien, in his U.S. years, 1935-1955) was an eminent rocketry, jet propulsion, boundary layer, and shell buckling expert. Born in 1911, he graduated with honors from Jiaotong University in Shanghai, and came to the U.S. to study for his M.S. degree at MIT in 1935-1936. Then, Qian transferred to Caltech in October 1936 to study under the famed fluid dynamicist and rocket expert Theodore von Kármán, and received his doctorate in aviation and mathematics in 1939. He continued to teach and do outstanding research at Caltech in Pasadena, from 1939, through World War II, until 1955. [I heard recently from one

source that Dr. Qian is still living today – he would now be almost 97.]



Professor Qian Xue-sen at Caltech (1949)

The photograph shown above is Professor Qian Xue-sen shown at Caltech in 1949 (38 years old). The second photo below shows a beaming Qian, when he was honored at his 90th birthday gala in Beijing, in January 2001. The third photo is the most recent photograph I found online of Qian Xue-sen, and was taken on January 19, 2008 – showing him warmly greeting China's President Hu Jintao (1st and 2nd photos are courtesy of *China Daily*; 3rd photo *courtesy of Xinhuanet* and *Splendid China*).

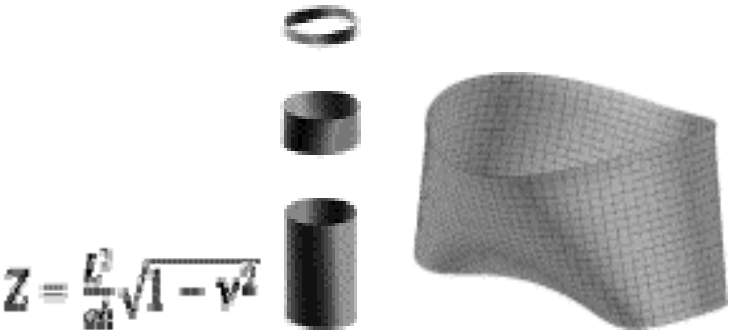


Dr. Qian Xue-sen at 90

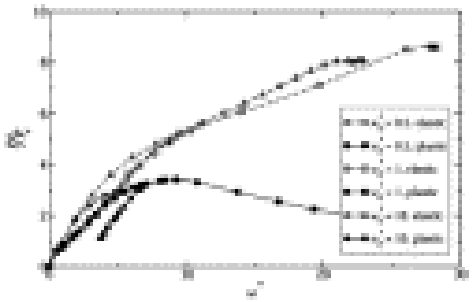
Dr. Qian Xue-sen (96)
greeting President Hu Jintao
Jan. 19, 2008

After Germany surrendered in World War II, the U.S. Army gave Qian the rank of Colonel, a security clearance, and then von Kármán and Qian were assigned to a specially picked team to debrief Dr. Wernher von Braun and his V-2 rocket team in Peenemunde, Germany – whose V-2 rockets had wreaked such havoc and caused over 5,000 deaths in Great Britain. (The U.S. Army later quietly moved the entire German V-2 team of over 125 scientists and engineers, plus their families, to Huntsville, Alabama – where they began their American rocketry research and development work at Redstone Arsenal. This effort eventually culminated in the launch of the huge *Saturn V* rocket that took the three *Apollo 11* astronauts to the moon in July 1969.)

Here are some shell buckling illustrations from Professor Qian's own files:



$$Z = \frac{l^2}{rh}\sqrt{1-\nu^2}$$



For those readers who may have not heard of Qian Xue-sen, suffice it to say that Qian has been regarded by many as *the* top man in charge of developing China's missile and space programs in the past half-century. (Qian was deported by the U.S. back to China in 1955. When interviewed by *TIME* magazine in a mid-1960s article after China launched her first ICBM, a top U.S. Army general, who was familiar with Qian's case, said that "Qian knew way too much; we should have never let him go. He was 'worth five Army divisions!' ")

The late Iris Chang, famed Chinese American journalist who later authored the sensational 1998 international bestseller *The Rape of Nanking,* earlier wrote an unauthorized biographical account of Qian's life, based on her research and interviews with people who knew him from his MIT and Caltech days. Chang's paperback is called *Thread of the Silkworm* (1995); it is the only book in English, which I am aware of, on Qian's life. **Lesson #5:** *A person should be keenly aware of the fact that sometimes in life, "big picture" events can affect his/her career, and make life take a different turn.*

A brilliant scientist and engineer, though widely known to be quite brash, Qian Xue-sen remains to this day an enigma, and a controversial figure in the U.S. The FBI lifted his security clearance in 1950, and later, placed him under "house arrest" in Pasadena (1950-1955)]. As part of secret negotiations conducted in Geneva between China and the U.S., which resulted in an exchange of Dr. Qian for several American prisoners-of-war captured during the Korean conflict, Chairman Mao Zedong (who had specified Qian Xue-sen by name) and President Dwight D. Eisenhower personally arranged a deal that resulted in Qian's return to China.

I have some relatives who lived in Los Angeles or Pasadena during those years, who had known Qian socially during this turbulent 1950-1955 Korean War and McCarthyism period. They told me that Qian never even once discussed his politics with them, nor gave any indications he was a Communist sympathizer or spy. They thought he was a "regular guy" – just another super-smart young Chinese professor at Caltech. Their recollections about Qian were that, for all his tremendous rocketry and numerous other technical contributions to the United States before, during, and after World War II, Qian felt he was treated like a "common criminal" by the U.S. Government and the FBI in the 1950-1955 period, and unjustly accused of being a Communist and "spying" (a charge which was never proven in court). This insult then slowly resulted in Qian's "growing disillusionment with America," leading to his eventual return to China in September 1955.

As I mentioned, Dr. Qian had replied to me in August 1978, but declined my request to interview him. I then made another attempt to contact him. When I attended the first-ever international finite element conference in Shanghai in August 1982, I asked some

Chinese finite element researchers (from Beijing) whom I had met there, whether they could help me arrange a meeting with Dr. Qian in Beijing. They were somewhat startled by my request, and politely informed me that Qian, as a general practice, "did not see foreign visitors."

Upon my return to the U.S., and since I possessed (at that time) a security clearance and was working at PDA Engineering (a defense contractor), it was standard procedure (for an American citizen who had traveled to a Communist bloc country) to be debriefed by the FBI upon return. The FBI asked me about the reasons for my China trip, what I saw there, and whether anybody tried to contact or recruit me while I was in China. After the FBI was satisfied with my answers, I then informed the local FBI agent that I still had, in my possession, the original letter written to me by Qian Xue-sen in 1978. The agent cordially asked if he could see and read Qian's short, 1-page, type-written letter to me, then made a copy for his files, and said he would research the matter further and get back to me. (The young man had no idea who Qian was – nor the murky circumstances that led to the FBI's accusations of his being a Chinese spy, and his deportation to China in 1955.) I politely suggested to him that FBI's headquarters probably still had, somewhere, an entire basement of classified files and boxes on the Qian investigation. The next time I saw the same FBI agent, a few months later, I noticed that (. . . much to my chagrin) his xeroxed copy of Qian's 1978 letter to me was now stamped *Top Secret.*

Acknowledgments: The author would like to thank Peter Marks and Stephen Perrenod for their careful reading of a draft of Part 1.A, and their excellent comments. In addition to those people already named, I would also like to thank these engineers for what I learned from them: Robert S. Shorey and Wellington T. Su (General Dynamics-Convair); Richard K. Wilson, Fino Calamaro, and John J. Dietrich (McDonnell Douglas Astronautics Company).

-End of Part 1.A-

Microsoft Takes Its Newest High-Performance Computing Platform to the Street - Windows HPC Server 2008 allows Wall Street firms to deploy quickly, leverage existing resources and scale from workstation to cluster — all in a familiar Windows environment.

http://www.microsoft.com/presspass/press/2008/sep08/09-22HPCLaunch08PR.mspx

NEW YORK — Sept. 22, 2008 — Microsoft Corp. today announced it has released to manufacturing its newest server — Windows HPC Server 2008, giving Wall Street firms an easy-to-deploy, cost-effective and scalable high-performance computing (HPC) solution. Today's event kicks off a series of global launch activities in the coming weeks to support the new product.

During a keynote address at the 2008 High Performance on Wall Street conference, Bill Laing, corporate vice president of Microsoft's Windows Server and Solutions Division, discussed how financial services firms are increasingly turning to HPC resources to conduct real-time and intra-day risk analysis in response to the turbulent market environment.

"Companies have to be more efficient than ever with IT resources, but need to maintain their position in a competitive marketplace. They require HPC solutions that deploy quickly, integrate in a heterogeneous environment and scale from workstation to cluster," Laing said. "The launch of Windows HPC Server 2008 is just another step in our vision to drive HPC mainstream."
In his keynote speech, Laing also noted that the company's HPC vision goes beyond traditional HPC workloads. Microsoft brings the value of an integrated HPC solution and a productive development environment to customers for whom high-performance computing has been out of reach in the past. By focusing on productivity for users, developers and administrators, Microsoft is positioned to take high-performance computing mainstream.

"IDC research shows that high-performance computing has been one of the highest-growth IT markets over the past five years," said Earl Joseph, HPC program vice president at IDC. "Microsoft has made significant advancements in its products targeted for the HPC market, especially with the launch of Windows HPC Server 2008."

Laing also talked about how Windows HPC Server 2008 gives developers the tools to use high-performance computing with the Microsoft products that businesses already own and use every day, including Office Excel and Office SharePoint Server, through a new service-oriented architecture (SOA) within HPC development.

Windows HPC Server 2008, the successor to Windows Compute Cluster Server 2003, is based on Windows Server 2008 and is designed to do the following:

- Improve productivity of systems administration and cluster interoperability by dramatically simplifying the overall deployment, administration and management over the entire system lifetime while ensuring interoperability with existing systems infrastructure.

- Rapid HPC application development through integration with Visual Studio 2008, which provides a comprehensive parallel programming environment. In addition to supporting standard interfaces such as OpenMP, multiprocessor interconnect (MPI) and Web services, Window HPC Server 2008 also supports third-party numerical library providers, performance optimizers, compilers and debugging toolkits.

- Seamlessly scale from workstation to cluster by allowing end users to harness the power of distributed computing through a familiar Windows-based desktop environment without requiring specialized skills or training.

Greater Opportunities for Customers and Partners

Close to 100 companies in various vertical industries, including Lloyds TSB Bank in financial services, participated in early evaluation and feedback programs during the development of Windows HPC Server 2008.

Morgan Stanley, a leading global financial services firm providing a wide range of investment banking, securities, investment management and wealth management services, has been working closely with Microsoft on the development of Windows HPC Server 2008.

“At Morgan Stanley, we create and develop models and systems designed to enhance our securities and investment banking businesses,” said Jay Dweck, global head of strategies and technology for the Institutional Securities Group (ISG) at Morgan Stanley. In this capacity, Dweck runs Morgan Stanley Innovative Data, Environments, Analytics & Systems (IDEAS). “We are closely evaluating Microsoft’s Windows HPC Server 2008 to provide Morgan Stanley with the ability to maintain our competitive edge.”

For partners, Windows HPC Server 2008 provides a broad platform for ISVs and an expanded playing field for OEMs to enable new innovations in high-performance computing. Microsoft is working with more than 60 partners, including Advanced Micro Devices Inc., Cray Inc., Dawning Technologies Inc., Dell Inc., HP, IBM Corp., Intel Corporation, transtec AG., Verari Systems Inc., Viglen Ltd. and VXTECH, to continue to drive high-performance computing farther into the mainstream.

“We believe that Windows HPC Server 2008 and IBM System x hardware will significantly expand the high-performance computing market,” said Dave Jursik, vice president of HPC Sales for IBM. “The combination of Microsoft’s proven software with IBM’s unique supercomputing tools and solutions gives clients industry-leading productivity and extreme, high-end performance.”

“Milliman is very proud to be the first actuarial system vendor to be integrated with Windows HPC Server 2008,” said Pat Renzi, MG-ALFA product manager at Milliman Inc. “Our recent integration continues our history of success in delivering the speed and capacity of high-performance computing from Microsoft. In addition, MG-ALFA is a highly scalable application that is extremely easy to implement and integrate into the IT infrastructure of our insurance company clients.”

Last week, Microsoft announced a new partnership with supercomputer leader Cray to introduce a new compact supercomputer, the Cray CX1. With prices starting at $25,000 (U.S. estimated retail price (ERP)), the CX1 running Windows HPC Server 2008 is easy to purchase, deploy, operate and upgrade. The solution will enable companies in various industries to unify their Windows-based desktop and server workflows.

Varmint Al's Engineer Page

A large material data base for Mat 18 (Power Law Plasticity)

Posted by M Victory

Varmint Al now has a large material data base for Mat 18 (Power Law Plasticity) on his Engineering page. It's located down near the bottom of the page.

http://www.varmintal.com/aengr.htm

- It is formatted so that a material can be directly copied and pasted into an LS-DYNA input file.
- Each material includes comment cards about each material.
- The material data base is down near the bottom of the page.

For those of you who don't know Varmint Al may I present his website, and short bio that you can read on this site:

Varmint Al: "Before retiring in 1990, I worked at the Lawrence Livermore National Lab for 30 years. The last few years I was the Advanced Engineering Analysis Group Leader in Weapons Engineering Division. We analyzed very complex structures. Physics developed the concepts and engineering made them deliverable. It was a great job and it was rewarding to help win the Cold War. Before becoming group leader, the last weapon system I worked on was the B-83."

The critical thinking required for engineering analysis is hard work, and is like weight lifting for the brain.

My favorite from Varmint's Al's website:

Comprehending Engineers –

Take Two:

> To the optimist, the glass is half full. To the pessimist, the glass is half empty. To the engineer, the glass is twice as large as necessary.

Take 2.50:

> To the engineer, the capacity of the container has been over designed by a factor of approximately 1.905 assuming a 5% volume for the sloshing safety factor.

.

LS-PrePost® UPDATE August 18, 2008

http://www.lstc.com/lspp

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, *ELMENT_BEAM_SECTION_ORIENTATION, *ELMENT_MASS_MATRIX, *ELMENT_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 *DCFAIL* 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.

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*Environement 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.NastranTM 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.

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

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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 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

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LS-DYNA® Software Distributors - Alphabetical order by Country

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

Consulting and Engineering Services

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

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

LSTC Training Classes in California & Michigan

2009 classes	California	Michigan
Advanced Impact		
Advanced Option	Sept 07-08	June 11-12 Dec 10-11
Composite Materials	June 23-24	
Concrete & Geomaterial Modeling	Sept 24-25	
Contact	March 19-20 June 25-26	Jan 19-20 Sept 10-11
Implicit	June 29-30	Sept 21-22
Intro to LS-DYNA®	Feb 03-06 May 05-08 Aug 04-07 Nov 10-13	March 17-20 June 16-19 Sept 15-18 Dec 15-18
Intro to LS-OPT®	Nov 18-21	
Material Modeling Using User Defined Options	July 01-02	

2008 Classes		
Advanced Options		Dec 15-16
Intro to LS-DYNA	Nov 11-14 LSPP Nov 10	Dec 09-12 LSPP Dec 08
Introduction to LS-OPT	Nov 18-21	

EVENTS & CLASS Announcements

2008

September 30 – October 1
7th GERMAN LS-DYNA FORUM
BAMBERG, GERMANY

October 2
The Nordic LS-DYNA Users' Forum
Gothenburg, Sweden

October 7 - October 8
JAPAN LS-DYNA Users Conference 2008
JRI Solutions, Ltd
Tokyo, Japan

October 22nd - 24th
ANSYS Conference & 26th CADFEM Users´ Meeting
Darmstadt, Germany

October 29-31
NA Regional Summit - NAFEMS
2020 Vision of Engineering Analysys and Simulation
Hampton, VA, USA

2009

May 14-15,
7th European LS-DYNA Conference
Salzburg, Austria

LS-DYNA Training 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 in India – 2008, continued

Oasys and nhance 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 - nhance 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

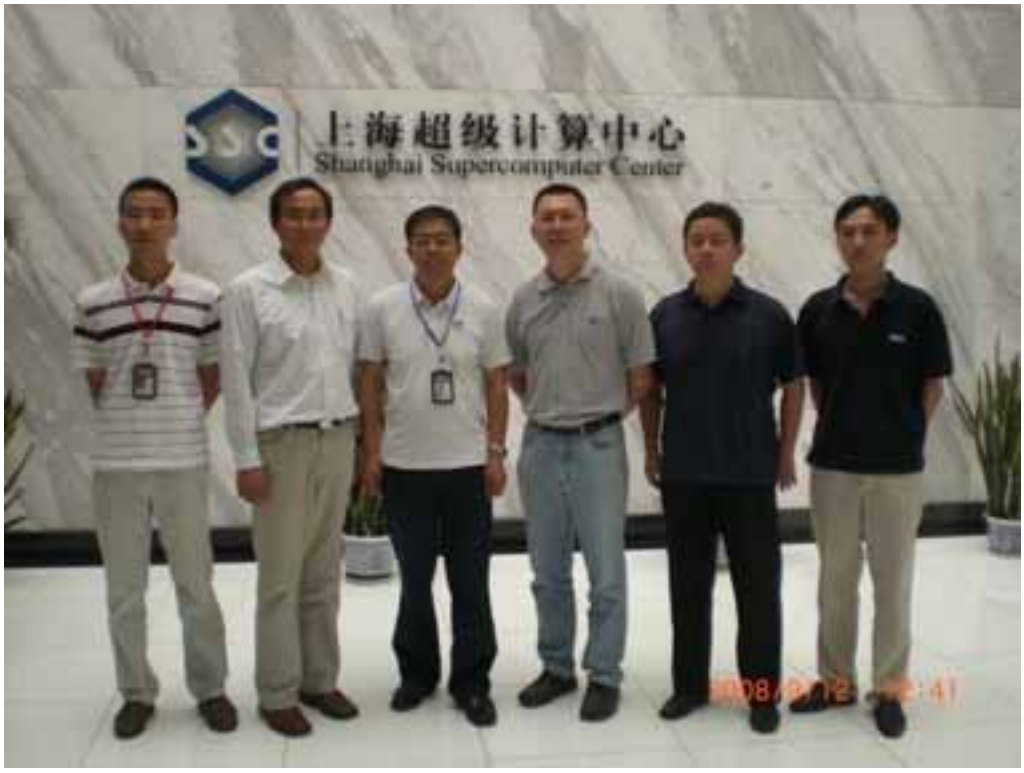
The Seminar of High Performance Computing

Grace Su, Software Customer Services ETA-China
msu@eta.com.cn

On Sep. 12, 2008, Dr. Jason Wang, of Livermore Software Technology Corporation (LSTC), visited Shanghai Supercomputer Center (SSC) and attended the Seminar of High Performance Computing, which hosted by SSC.

During the seminar, Dr. Jason Wang, pictured below 2nd from the left, introduced the trends & technical innovation of high performance computing. The seminar created an atmosphere to share and learn new ideas, and exchange knowledge to all that attended, through this "face to face" opportunity.

Martin Ma, ETA-China, pictured 3rd from the right was also invited to attend the seminar, and other ETA-CHINA engineers.



Engineering Technology Associates (China), Inc.

The Seminar of LS-DYNA Application in Steel Industry

The Seminar of LS-DYNA Application in Steel Industry will be held in University of Science & Technology Beijing (USTB) on Oct. 31, 2008. This seminar is devoted to LS-DYNA application in Metal Forming field; also, the cases of LS-DYNA bundled with eta/DYNAFORM will be introduced.

As the organizer of this seminar, ETA-China builds a platform for technical exchange and discussions in the professional field.

AGENDA (Oct.31, 2008)

08:30am - 09:00am	Guest Registration
09:00am - 10:00am	CAE Application in Steel Industry
10:00am - 10:50am	LS-DYNA software Introduction The application of LS-DYNA bundled with eta/DYNAFORM in FAW ‘s metal forming
10:50am - 11:00am	Coffee Break
11:00am- 12:00am	LS-DYN Application in Steel Industry
12:00am - 1:30pm	Lunch time
1:30pm - 2:30pm	LS-DYNA Demonstration
2:30pm - 3:30pm	Technical exchange and discussions

Note: All attendees with free registration fee.

Fujitsu to Consolidate North American IT Strengths

New Operational Structure to Generate Greater Synergies and a Broader Portfolio of Integrated Solutions

SUNNYVALE, CA -- (Marketwire) -- 09/18/08 -- Fujitsu Group today announced that it will establish a new company, Fujitsu North America Holding Inc. to strengthen Fujitsu's solutions business base in North America.

This new company is scheduled to be established on October 1, 2008, bringing together Fujitsu Consulting Inc., Fujitsu Computer Systems Corporation, and Fujitsu Transaction Solutions Inc. under one unified corporate structure.

The move is designed to generate greater synergies among the three companies by consolidating their IT strengths under one structure. This will enable the organization to respond to client needs with integrated suites of innovative, world-class IT services and solutions from Fujitsu. Bringing together the application services of Fujitsu Consulting, the system platforms of Fujitsu Computer Systems and the retailing solutions of Fujitsu Transaction Solutions will foster greater collaboration, integrate the Fujitsu Group's strengths in IT services and system platforms, and enable a unified approach in providing clients with a broad portfolio of products and services.

"Our clients will benefit from a simplified engagement model with improved accountability and greater access to the complete suite of integrated Fujitsu offerings," said Richard Christou, Corporate First Sr. Vice President, Fujitsu Limited. "This will significantly improve responsiveness to our global clients who look to Fujitsu to support their North American operations."

Fujitsu has appointed Farhat Ali to the role of President and Chief Executive Officer of the new company. In this capacity, he will lead the business synergy effort of the new operation while continuing with his current responsibilities as president of Fujitsu Computer Systems.

"With revenues approaching $2 billion annually, the combination of the three companies will rank Fujitsu among the top North American IT services and solutions companies," said Farhat Ali, President and CEO. "The benefits of a business of that scale include improved responsiveness to client needs, faster time-to-market with integrated value-added solutions, greater market presence, improved operational efficiencies and additional support from our key alliance partners."

This reorganization creates an appropriate and efficient group-wide management function that supports Fujitsu's global business strategy of developing its IT services business to meet increasing client demand.

About Fujitsu

Fujitsu is a leading provider of IT-based business solutions for the global marketplace. With approximately 160,000 employees supporting customers in 70 countries, Fujitsu combines a worldwide corps of systems and services experts with highly reliable computing and communications products and advanced microelectronics to deliver added value to customers. Headquartered in Tokyo, Fujitsu Limited (TSE: 6702) reported consolidated revenues of 5.3 trillion yen (US$53 billion) for the fiscal year ended March 31, 2008. For more information, please see: www.fujitsu.com.

Cranes Software International Ltd. – India

www.cranessoftware.com

Cranes Software International Ltd., has a strategic alliance with Livermore Software Technology Corporation(LSTC).

Cranes Software International Limited is a company that provides Enterprise Statistical Analytics and Engineering Simulation Software Products and Solutions across the globe. The Company's business interests span Products, Productized Solutions, Services and R & D in future technologies.

Authorized Distributor for the following LSTC products in India:

- LS-DYNA
- LS-OPT
- LS-PrePost

Cranes Software LS-DYNA Sales Information in India

For sales enquires in India:

lsdyna@cranessoftware.com

Authorized Distributor for the following ETA products in India

- ETA/VPG is delivered in three modules:
  - VPG/PrePost
  - VPG/Structure
  - VPG/Safety
- ETA/DYNAFORM

Additionally Cranes Software offers a range of proprietary products:

- SYSTAT,
- SigmaPlot,
- SigmaStat,
- SigmaScan,
- TableCurve 2D,
- TableCurve 3D,
- PeakFit, NISA,
- XID,
- XIP,
- Survey
- ASYST,
- iCapella,
- InventX
- And world-renowned products from reputed principals such as The Mathworks, Texas Instruments and IBM.

University of South Carolina Expands Bioinformatics Research with SGI Technology

http://www.sgi.com/company_info/newsroom/press_releases/2008/september/usc.html

Largest SGI Altix System in the State, with 10TB of SGI InfiniteStorage, Powers Major Research in Biological and Medical Research

SUNNYVALE, Calif. (September 8, 2008)

To dramatically upgrade education and research in high-performance computing, the University of South Carolina (USC) has added a powerful mix of SGI (NASDAQ: SGIC) server and storage technology. Installed in April, the SGI® Altix® system and SGI InfiniteStorage 4000 will be used primarily for bioinformatics, computational biology and medical research. The SGI® Altix® 4700 system is by far the largest shared memory system in South Carolina for academic usage, according to USC. USC plans to share the system with other universities within the state.

SGI Delivers Data-Intensive Solutions:

USC added a combination of SGI high performance compute and storage solutions for faster time to insight in bioinformatics and medical imaging research.

Because clusters limited the size and scope of the researchers' experiment models, data searches and genome sequencing efforts, USC purchased the largest shared memory system in the state, an SGI Altix 4700, for the data intensive applications their scientific research required.

"For the data intensive needs of this research we needed a shared memory system, and there aren't many out there that are true shared memory — that was the primary reason we selected SGI Altix," said Dr. Duncan Buell, chair of the Department of Computer Science and Engineering. "The Altix met our specifications while delivering superior price-performance."

Purchased through SGI-exclusive higher education reseller, James River Technical, Inc. (JRTI) with a National Science Foundation grant (PI Dr. Jijun Tang, Co-PIs Drs. John Rose, Homayoun Valafar and Song Wang, key personnel Drs. Edward Gatzke, Thanasis Papathanasiou and Jim Zheng), the SGI Altix system will initially be used for five major research projects, including:

Defining microbial genome signatures, which measure the evolutionary relationship between species;

Phylogenetic reconstruction and multiple sequence alignment, a process to determine the evolutionary relationship among organisms and their genomes;

Protein backbone structure determination using RDC (residual dipolar couplings) data, which focuses on reducing the temporal and financial cost as well as aiming to identify structurally novel proteins;

Solving computer visualization problems related to the segmentation of 2D and 3D medical image processing;

Dissecting gene regulatory networks to develop large-scale microarray data analysis incorporating comparative genomics information.

"In addition to the bioinformatics research, another reason we needed a shared memory machine is for medical image processing," added Dr. Buell. "If you're going to track a part of an image that you have identified, from one frame to the next — because people move from one frame to the next and the heartbeat causes registration problems in either video or MRIs — then you need to hold the frames in memory simultaneously. And you need to have space to store high-

resolution images, which is why we bought as much storage as we could."

As part of the projects, many researchers will be developing software code on and for the SGI Altix, such as Dr. Jijun Tang and his students. Their phylogenetic research is contributing to building what is known in the genetics community as "the Tree of Life." They will use the SGI Altix to develop and test new algorithms to enhance and extend GRAPPA (Genome Rearrangements Analysis under Parsimony and other Phylogenetic Algorithms, an open-source phylogenetics software program for reconstructing trees of evolutionary descent.

"The new system will significantly increase the available computational power that our computer clusters provide biomedical researchers in South Carolina" said Dr. Tang. "We are creating a high performance computing center to increase the availability of these computational resources to researchers in the state of South Carolina."

Multimedia Resources:

- Product Information:
- SGI Altix 4700 (PDF 146K)
- SGI InfiniteStorage 4000 (PDF 104K)
- Product Images:
- SGI Altix 4700
- SGI InfiniteStorage
- Additional Product Information:
- Performance and Productivity Breakthroughs Enabled by Globally Shared Memory (PDF 145K) - white paper
- RSS Feeds:
- My Yahoo
- Google
- Bloglines
- XML
- SGI - Innovation for Results™

SGI (NASDAQ: SGIC) is a leader in high-performance computing. SGI delivers a complete range of high-performance server, visualization and storage solutions along with industry-leading professional services and support that enable its customers to overcome the challenges of complex data-intensive workflows and accelerate breakthrough discoveries, innovation and information transformation. SGI helps customers solve significant challenges whether it's enhancing the quality of life through drug research, designing and manufacturing safer and more efficient cars and airplanes, studying global climate change, providing technologies for homeland security and defense, or helping enterprises manage large data. With offices worldwide, the company is headquartered in Sunnyvale, Calif., and can be found on the Web at sgi.com.

HP Partners with World-renowned Fashion Designer Vivienne Tam

http://www.hp.com/hpinfo/newsroom/press/2008/080909xa.html

First-ever HP digital clutch to debut on Fashion Week runway

NEW YORK, Sept. 9, 2008

HP and world-renowned designer Vivienne Tam today announced they are working together to create a special edition notebook positioned to become the ultimate tech accessory for fashionistas around the globe.

Vivienne Tam and HP unveiled the design of the new must-have digital clutch on the catwalk today at Tam's fashion show during New York's Fashion Week at Bryant Park.

The HP Vivienne Tam Special Edition notebook represents the first time a computer company has partnered with a globally renowned designer to create a notebook PC that offers all the style and power needed for a delightful technology experience. Tam also worked with HP to design the notebook's accessories and packaging.

"When I was approached by HP to create a special edition notebook, I could see the design in my head instantly," said Tam. "The notebook is a true reflection of the needs of a modern woman who cares about fashion but is also passionate about her technology. I wanted to create a notebook that would appeal to women of all ages, ethnicities and income levels across the globe."

The top of the notebook is gleaming red and bursting with peony flowers. The peony design is meticulously carried inside the notebook, under the keypad. The notebook also features a complementary embroidered storage sleeve that helps keep the exterior protected while being carried as a clutch.

The peony design features a unique blend of Asian and Western cultures, antiquity and modern style, technology and fashion. It was inspired by Tam's "China Chic" style, which is recognized from the runways in Milan to the Olympics in Beijing and represents her personal mantra to live well and be beautiful.

"The peony is the national flower of China. They are beautiful and symbolize prosperity, good fortune and happiness," said Tam. "Their many layers are similar to a modern woman who is as savvy in expressing herself with her personal style as she is with weaving technology into the fabric of her rich and multi-faceted life."

"With 'China Chic,' Vivienne Tam reinterpreted traditional Chinese art into a global fashion trend," said Satjiv Chahil, senior vice president, Worldwide Marketing, Personal Systems Group, HP. "With her spring collection, Tam has helped HP take the personal computer from a necessity to a lifestyle and fashion 'must have.'"

The HP Vivienne Tam Special Edition notebook is expected to be available early next year.

"Tech chic" virtual experience

In addition to working with Tam on the new notebook design and accessories, HP today launched a fully integrated virtual experience to help fashionistas around the globe find design inspiration online.

HP has created a virtual catwalk, a designer tour hosted by Tam, and a "design bot" gadget inspiring users to dress up their computers with Tam-designed wallpaper, screensaver and icons – all of which are available now in the United States and in early October worldwide.

The efforts were created in partnership with Glam.com and are available at www.tech-chic.com.

About Vivienne Tam

Vivienne Tam is a leading designer fashion house founded in 1994. The company produces, designs and markets women's contemporary apparel distributed in major department stores, specialty stores and independent boutiques throughout the U.S. The company also has a strong presence in the Asia Pacific region with over 30 freestanding stores and in-store boutiques.

The Vivienne Tam brand's unique positioning – designs that meld the aesthetic and feminine mystique of Asia with the spirit of the modern world – is well recognized in both the U.S. and Asia. The company's philosophy is to create harmonious clothing that enhances one's personality while at the same time provide fashionable clothing for modern women that is beautifully designed, superior in quality, wearable, easy to travel with and affordable.

About HP

HP, the world's largest technology company, provides printing and personal computing products and IT services, software and solutions that simplify the technology experience for consumers and businesses. HP completed its acquisition of EDS on Aug. 26, 2008. More information about HP (NYSE: HPQ) is available at http://www.hp.com.

This news release contains forward-looking statements that involve risks, uncertainties and assumptions. If such risks or uncertainties materialize or such assumptions prove incorrect, the results of HP and its consolidated subsidiaries could differ materially from those expressed or implied by such forward-looking statements and assumptions. All statements other than statements of historical fact are statements that could be deemed forward-looking statements, including but not limited to statements of the plans, strategies and objectives of management for future operations; any statements concerning expected development, performance or market share relating to products and services; anticipated operational and financial results; any statements of expectation or belief; and any statements of assumptions underlying any of the foregoing. Risks, uncertainties and assumptions include the execution and performance of contracts by HP and its customers, suppliers and partners; the achievement of expected results; and other risks that are described in HP's Quarterly Report on Form 10-Q for the fiscal quarter ended July 31, 2008 and HP's other filings with the Securities and Exchange Commission, including but not limited to HP's Annual Report on Form 10-K for the fiscal year ended October 31, 2007. HP assumes no obligation and does not intend to update these forward-looking statements.

APTEK - Highway Safety Studies

Three advanced material models to be used in finite element structural response codes in support of highway crash safety now available for LS-DYNA

For the Federal Highway Administration (FHWA), APTEK has developed three advanced material models to be used in finite element structural response codes in support of highway crash safety.

These three models describe the non-linear response, and are now available for commercial use using LS-DYNA:

- concrete,
- soil
- wood

under complex structural loading conditions typical of vehicle impacts of guard-rails.

The FHWA studies by APTEK also produced the Mixed Mode Constitutive Driver (MMCD) that is offered commercially by APTEK. MMCD provides the structural analyst with an automated tool to rapidly select material model parameter values based on mechanical test results. The code is described in detail in the Software/ MMCD section of the web site.

Mixed Mode Constitutive Driver (MMCD)

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

The driver helps the analysts to:

Quickly evaluate the stress-strain behavior of LS-DYNA material models to gain an understanding of their applicability and limitations.

Develop and evaluate new or user-proprietary material models (called user defined material models).

Fit the material model parameters to test data. Parameter identification is accomplished either manually through visual comparison the model's stress-strain behavior with test data or automatically via use of the LS-OPT optimization program.

Prepare the material model portion of the LS-DYNA input file (*MAT).

Prepare report-quality graphs from stored and retrieved computed results and test data.
The driver complements the performance of finite element codes like LS-DYNA. Its intended use is to help analysts efficiently fit and evaluate material models prior to performing large-scale finite element analyses. Material response may include elastic, plastic, damage, and high strain rate behaviors.

Overview

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.

The MMCD may be used in conjunction with LS-OPT optimization software for automating

the fitting procedure. The MMCD prepares the LS-OPT and MMCD input files from information supplied by the user via the MMCD GUI, executes LS-OPT and the model driver, and then gathers and plots the optimized results. Results include graphs of computed stress-strain curves fit to test data and values of fitted parameters versus LS-OPT iteration number.

Features

- Web downloadable software package providing all functionality under a single, easy to use, user interface.
- A select library of LS-DYNA material models including the user-defined material model. More models will be added as the MMCD continues to develop.
- A database of experimental results for materials such as concrete, wood, and soil. More data will be added as the MMCD continues to develop. Users wishing to contribute additional data may contact the authors.
- A read/write curve capability for incorporating and saving user-defined experimental data. This feature is useful for plotting new data or for data that is proprietary.
- An automated procedure for fitting each material model by interfacing the MMCD with the LS-OPT code.
- A library of predefined mixed-mode load histories that simulate common laboratory tests.
- An optional method for inputting user-specified load histories.
- The capability to plot 2D stress-strain (or stress-invariant) curves with and without experimental data.
- The capability to plot 3D yield surfaces, and to rotate and translate those surfaces about various axes.
- The capability to create report-quality graphics via a large selection of fonts, curve line types, symbol styles, and curve manipulations (scaling, swapping, integrating, cross-plotting, and shifting).

Advantages

- **Dedicated Software Package.** The MMCD is dedicated to the efficient development, evaluation, and parameter identification (fitting) of material models used in finite element codes. It is not cluttered with extraneous features that the user has to learn and sort through. Although many software programs focus on helping the user develop geometric model input (mesh generators for nodes and elements), the MMCD's unique focus is on material model input via parameter identification and material model evaluation.
- **More Accurate and Consistent Fits to Data.** The automated LS-OPT fitting procedure provides consistent fits from user to user that are less dependent upon the analysts experience and judgment than a manual fitting procedure.
- **Ease of Use. Pre- and post-processing and code execution are interactive and GUI-menu driven.**
- The MMCD creates the input files, executes the driver and LS-OPT, gathers the stress-strain output, and then plots the data. Thus the MMCD is easy to use, even for a beginning analyst. Little knowledge of optimization theory or the LS-OPT code is required.
- **Variety of Loading Simulations.** Unlike strain-based drivers, the MMCD will analyze both strain-based and mixed-mode behaviors. Fits to typical

test data, like those conducted under uniaxial or biaxial stress, require mixed mode capabilities (see theory).

- **Fast Turn-Around Time.** APTEK has determined that the time it takes an experienced analyst to set-up, run, and plot model output with the driver is approximately one-fifteenth that needed to perform a single element simulation. For less experienced analysts, the savings would be even greater. A number of features contribute to the fast turn-around time. First, driving a material model is quick computationally and requires less input (set-up) than a single element simulation that analysts typically use to evaluate material models. Second, the point and click features of the pre- and post-processors are extremely efficient. Additionally, the material models and experimental data are all incorporated into the same piece of software, allowing for rapid visualization. Having data readily available also saves the analyst time in searching for, and gathering experimental data. In addition, plotting yield surfaces in three dimensions is not available with most finite element post-processors. The MMCD saves time by eliminating the switch to 3D graphics plotting routines.

Benefits

- **Cost Effectiveness.** All of the above advantages result in savings in cost (time) associated with selecting and fitting material models for use in finite element applications.

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- **Better Finite Element Simulations.** Dedicated material model evaluation and accurate and consistent fits to test data will result in improved finite element simulations.

- **Educated Analysts.** Use of the MMCD will improve the analysts understanding of material model behavior.

Theory

Constitutive material models accept strain rate increments as input and output the resulting stresses. The MMCD driver passes strain rate increments directly to the material model, by-passing all the finite element coding associated with the nodal displacements, element forces, and the dynamic equations of motion. The MMCD calculates material response under both mixed-mode and strain-mode loading conditions. The term mixed mode indicates that the driver can load the material with a mixture of strain rate increments and stress-boundary conditions and then solve for the stresses through an iterative procedure. Examples of mixed-mode simulations are uniaxial and biaxial stress. Strain-mode simulations are those in which all strain components are specified, such that no free stress boundary conditions exist. In this case, no iteration is required, and the specified strain increments are the final strain increments. Examples of strain-controlled simulations are uniaxial strain and simple shear

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.

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