

**Volume 4, Issue 07, July 2015**

**ANSA &  $\mu$ ETA v15.3.1**



**Relion 1904GT GPU**



**ESI's IC.IDO - MAN and the Univ.  
Applied Science Upper Aus tria**



**Dassault Aviation Delivers First Rafales**





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The logo features a blue and yellow globe on the left, followed by the text "FEA Information" in a large blue font and "Platinum Participants" in a smaller blue font below it. The background is a light blue and green gradient with a stylized arrow pointing right.

# FEA Information

Platinum Participants

logo courtesy - Lancemore

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**LSTC - Pierre L'eplattenier, will be attending the 12FG Workshop Electromagnetic Pulse Forming & Joining at the The Belgian Welding Institute npo**

[www.bil-ibs.be/en/opleiding/i2fg-workshop-electromagnetic-pulse-forming-joining](http://www.bil-ibs.be/en/opleiding/i2fg-workshop-electromagnetic-pulse-forming-joining)

On October 5 and 6, 2015, a workshop concerning electromagnetic forming and joining will be organised in the frame of the international impulse forming group ([www.i2fg.org](http://www.i2fg.org)).

This event will take place at the Institute of Forming Technology and Lightweight Construction (IUL), Dortmund, Germany.

**6th BETA CAE Systems International Conference Proceeding now available**

[www.beta-cae.gr/conference06.htm](http://www.beta-cae.gr/conference06.htm)

**Marnie Azadian** – we would like to welcome Marnie Azadian. Starting in August Marnie will be editing the news, choosing articles for the special interest area and showcasing participant blog's.

*Sincerely, Marsha Victory – Trent Eggleston – Suri Bala – Marnie Azadian*

*FEA Information Engineering Solutions US Edition*

## **BETA CAE Systems S.A. Announces the release of ANSA & μETA v15.3.1**



### **About this release**

BETA CAE System S.A. announces the release of v15.3.1 of ANSA / μETA pre- and post- processing suite.

New features have been added and corrections have been made for identified issues

The most important additions and fixes are listed below:

### Understanding the Software Release Schedule

#### The plan

We are committed in delivering improved and enhanced software releases, the soonest possible, in order to meet the requirement of our customers for the continuous improvement of their experience and work. Therefore, we are working in releasing new software versions with code corrections, new software features and enhancements, in regular, frequent intervals.

- A major software version is released every year.

- First point releases, such as v15.1.0, v15.2.0, v15.3.0 and so on, with code corrections but also with additional software features and enhancements are released every three months.

- Second point releases, such as v15.2.1, v15.2.2, v15.2.3 mainly with code corrections only upon their parent first point release, are scheduled on a monthly basis.

Each software release is accompanied by a detailed description of the introduced corrections and/or additions so that our customers can decide whether it is critical to implement this release in their environment.

**This release**

This release of v15.3.1 implements code corrections on v15.3.0.

**Known issues resolved in ANSA****Connection Manager**

Bolt-specific options were missing from the Auto Edit Parameters window.

Typing “?” in the TID field of the FE Rep. Settings, while in Clipboard mode could result in unexpected termination.

**Volume Mesh**

Applying the Map function, using 2nd order shell elements on Master and Slave areas, without Round area, could result in the generation of incomplete solid elements.

The user could not move the model, after a “more than one possible Master areas” warning.

**NVH Console**

Relocate Files: Super Elements might be ignored by the function.

**Morph**

Files contained a DFM>Align parameter that used a plane target could not be re-opened.

**Decks**

NASTRAN: RBE2GS entities would not be affected by the Transform [Copy] function.

LS-DYNA: Definitions of type “-PARAMETER” in card fields, would not be read correctly.

Abaqus: Applying Checks>Massless Nodes in Abaqus deck, when the model contained FASTENERS, could result in unexpected termination.

For more details about the new software features, enhancements and corrections please, refer to the Release Notes document.

## **New features and known issues resolved in $\mu$ ETA**

### **New features in $\mu$ ETA**

#### **User Toolbars**

The Occupant Safety toolbar supports processing results from Q10 v1.3 dummies.

### **Known issues resolved in $\mu$ ETA**

#### **Supported Interfaces**

Loading FEMZIP-compressed LS-DYNA files could lead to unexpected termination.

Loading LS-DYNA files that included the AIRBAG\_PARTICLE\_ID keyword could lead to unexpected termination.

Loading certain a3db files could lead to unexpected termination.

Nodal Von Mises results were not read from ASCII column files.

#### **General**

The animation of streamlines could lead to unexpected termination.

Results from ASCII files were not saved correctly in  $\mu$ ETA Projects.

#### **Annotations**

Creating annotations synchronized with states could cause  $\mu$ ETA to block.

The editing of report tables could lead to saving corrupted .pptx files.

For more details about the new software features, enhancements and corrections please, refer to the Release Notes document.

## Compatibility and Supported Platforms

ANSA files saved by all the first and second point releases of a major version are compatible to each other. New major versions can read files saved by previous ones but not vice versa.

The .metadb files saved with  $\mu$ ETA version 15.3.1 are compatible and can be opened by earlier versions of  $\mu$ ETA.

Support for 32-bit platform has been discontinued for all operating systems.

## Download - Where to download from

Customers who are served directly by BETA CAE Systems, or its subsidiaries, may download the new software, examples and documentation from their account on our server. They can access their account through the "user login" link at our web site <http://www.beta-cae.gr>

Contact us if you miss your account details. The [ PublicDir ] link will give you access to the public downloads area.

Customers who are served by a local business agent should contact the local support channel for software distribution details.

## What to download

All files required for the installation of this version reside in the folder named "BETA\_CAE\_Systems\_v15.3.1" and are dated

as of July 3, 2015. These files should replace any pre-releases or other files downloaded prior to that date.

The distribution of this version of our pre- and post-processing suite is packaged in one, single, unified installation file, that invokes the respective installer and guides the procedure for the installation of the required components.

For the installation of the software on each platform type, the.sh installer file residing in the folder with respective platform name, for Linux and MacOS or the respective .msi installer file for Windows, 64bit, have to be downloaded.

In addition to the above, optionally, the  $\mu$ ETA Viewer is available to be downloaded for each supported platform.

The tutorials and the example files reside in the folder named "TUTORIALS". This folder includes the complete package of the tutorials and example files, and a package with only the updated ones.

The Abaqus libraries required for the post-processing of Abaqus .odb files are included in the installation package and can be optionally unpacked.

Earlier software releases are also available in the sub-directory called "old" or in a folder named after the product and version number.



### **Penguin Computing Announces Its Densest 1U GPU Server Relion 1904GT GPU Server Powered by NVIDIA Tesla K80 Dual-GPU Accelerators**

FRANKFURT, GERMANY; ISC 2015; July 13, 2015...Penguin Computing, provider of high performance computing, enterprise data center and cloud solutions, today announced the Relion 1904GT server, which packs four GPU accelerators in a 1U form factor.

“We redesigned this system with a completely new layout of the motherboard,” said William Wu, senior product manager, Penguin Computing. “The result not only paid dividends with a fourth GPU into a 1U server, but also an improved thermal-optimized architecture to support even higher core count Intel® Xeon® E5-2600 v3 processors.”

Penguin Computing provides turnkey, ready-to-run HPC clusters combining this new GPU platform with storage and cluster interconnects. The Relion 1904GT server implements NVIDIA® Tesla® K80 dual-GPU accelerators, providing extremely high levels of computational performance and energy efficiency. The Tesla K80 dual-GPU is the flagship offering of the Tesla Accelerated

Computing Platform, the leading platform for discovery and insight at scale. The Tesla K80 delivers nearly two times higher performance and double the memory bandwidth of its predecessor, and 10 times higher performance than today’s fastest CPU on hundreds of applications.

#### **Relion 1904GT server features include:**

- Innovative motherboard layout design allows support for higher core count Intel Xeon E5-2600 v3 processors
- Exceptional 2 CPU:8 GPU ratio implementing NVIDIA Tesla K80 dual-GPU accelerators
- Faster Local Machine – SAS/SATA and NVMe
- Management and monitoring tools for server and installed GPUs
- Dual 2000W redundant high efficiency power supplies
- Improved sensors for environmental measurement

“HPC users are increasingly turning to higher density computing solutions to power their deep learning, engineering and scientific computing workloads,” said Roy Kim, group manager of Accelerated Computing at NVIDIA. “Packing four Tesla K80 GPU accelerators into a compact 1U form factor, Penguin’s new Relion system provides HPC customers with new levels of energy-efficient performance for their most pressing computing challenges.”

Relion is an exceptional platform for running scientific and engineering applications that support GPU technology and the platform suits compute-intensive customer segments, such as the oil and gas industry among other sectors. Please visit <http://www.penguincomputing.com/products/rackmount-servers/relion-servers/relion-1904gt> for more information.

**POD (Penguin Computing on Demand) offers software including LSTC’s LS-DYNA**

[www.penguincomputing.com/services/hpc-cloud](http://www.penguincomputing.com/services/hpc-cloud)

**Penguin HPC clusters are optimized for engineering workloads and offer:**

- Instant access to an HPC Cloud Cluster
- High performance InfiniBand bare-metal compute
- Free support from HPC experts
- No charges for network transfers
- Cost-effective, pay-per-use billing model
- Secure environment for private data
- Detailed billing reports for user groups and projects



## **Should I Become a Design Engineer or an Engineering Analyst?**

**July 17, 2015 By: Peter Barrett**

Roughly twenty-five years ago when finite element analysis was becoming mainstream, the career path for a young engineer led to a distinct fork in the road: Are you going to become a designer or an analyst? The designer's role was to lay out the new and innovative design concepts. The analyst's job was to make sure they worked. The designer was the idea guy who would create on the back of an envelope. The analyst was the guy who could derive partial differential equations and cleverly simplify complex problems into 2-d analytical models.

With today's advances in software and hardware, the difference between designer and analyst is a lot less clear-cut. The most effective designers leverage early adoption of analytical models, such that the first pass prototypes are more efficient and reliable. The

analyst can take advantage of tools like design optimization to not just provide a pass/fail response, but play a major role in shaping the final design. In both scenarios, the key to success is proper education in their expanded roles. The designer needs to understand the physics behind the FEA / CFD solutions and the analyst needs to understand the "big picture" design goals.

With the continued adoption of 3D Printing, many limitations related to fabrication have been removed. More innovative analytical-based geometrical solutions can now become real design solutions. Analytical tools have become faster and easier to use so that the combined designer and analyst can quickly assess a prototype's viability.

The new AIM platform launched by ANSYS is a tool specifically developed for this type of application. In this example, the SpaceClaim concept modeling geometry tool is coupled with the ANSYS Multiphysics analytical tool to allow the engineer to expand their capabilities into both domains. New analysis-based geometry can be ported directly to the 3D Printer. Up-front analytical modeling will reduce the physical prototyping and produce a more reliable product. For example, local stress concentration areas susceptible to early fatigue failure can be engineered out of the part from the start.

The blurring of the dividing line between analyst and designer is also showing up in the current job market. Educational requirements and pay for entry level opportunities for both design engineers and engineering analysts are very similar. (Not that pay should be a determining factor in entering any profession!)

I once was asked by a young engineer: “Which would pay me more in the long term? Continue with my education and get my Ph.D., or start working now after I just finished my Masters?” My response: “Go get an MBA instead and go into finance if all you care about is money, because unless you love solving problems you should not be an engineer!” I am not saying that you can’t make an excellent living as an engineer, but finding a profession that you love is much more important than money for happiness.

So, for all those problem solvers out there, the future looks bright! With a host of new tools available to innovate, whether you decide to call yourself a designer or an analyst, educate yourself first on the fundamentals and then embrace these new tools. We need your creativity to develop better engineered innovations.



## MAN and the University of Applied Science Upper Austria

### Design a Truck Assembly Line using

ESI's IC.IDO

”With rapid data preparation in virtual reality workshops, powerful assembly functionalities and user friendliness, ESI's IC.IDO proved to be the right choice for this collaboration. IC.IDO's usability, physical calculation and real-time detection of parts colliding during the assembly process matched MAN's needs. Not to mention, what previously took us two weeks can now be completed in just one day”.

Dipl.-Ing. (FH) Franz Obermair, Professor at the University of Applied Sciences Upper Austria

**Challenge:** MAN Truck & Bus Österreich AG strived to create a more efficient design for a truck assembly line. They were interested in anticipating the assembly sequence, looking to improve the assembly process significantly and make the operations faster and more efficient.

**Story:** In a rapidly globalizing market environment, commercial vehicle OEMs and their suppliers are facing a very dynamic business climate. Innovative virtual product engineering technologies have definitely become a precondition to sustain and improve their competitiveness, growth and quality standards.

**Benefits:** MAN was able to simplify the set-up process of the assembly line while also making it run more efficiently than ever before. This was possible because the designers, operators, and subcontractors were able to exchange views about a 3D prototype before the manufacturing facility was in place. They were also able to reduce the time to launch and the cost by bringing line testing operations down from two weeks to one single day.

July News Release (For complete article visit [www.cray.com](http://www.cray.com) News)



## Texas Advanced Computing Center (TACC) Selects Cray XC40 Supercomputer for Next Lonestar System

SEATTLE, WA and FRANKFURT, GERMANY -- (Marketwired) -- 07/13/15 -- At the 2015 International Supercomputing Conference in Frankfurt, Germany, global supercomputer leader Cray Inc. (NASDAQ: CRAY) today announced the Company has been awarded a contract to provide a Cray® XC40™ supercomputer to the Texas Advanced Computing Center (TACC). This contract marks the first ever Cray supercomputer to be installed at TACC.

The Cray XC40 system at TACC will be located at the University of Texas at Austin's J.J. Pickle Research Campus, and is the latest addition to the Center's legacy of Lonestar supercomputers. Named "Lonestar5," the new Cray system will have a peak performance of more than 1.2 petaflops, and will serve as the primary high performance computing resource in the UT Research Cyberinfrastructure (UTRC) initiative.

Sponsored by the University of Texas System, the UTRC provides new capabilities that advance current and future research across all University of Texas institutions. The UTRC enables researchers in all 15 UT System institutions to collaborate with each other and compete at the forefront of science and discovery.

"We are very pleased to add this exciting Cray supercomputing architecture as a part of our ecosystem," said Bill Barth, Director of High Performance Computing at TACC. "We expect Lonestar5 to be the workhorse system for computational science researchers across the University of Texas."

TACC is one of the premier high performance computing centers in the United States, and is highly regarded for the application of supercomputing and big data to basic and applied sciences. The Cray XC40 system is expected to be deployed in 2015.

"Both TACC and Cray share a common vision for how supercomputers can have profound impacts on our daily lives by powering scientific discoveries that change the world," said Peter Ungaro, president and CEO of Cray. "This belief in the power of supercomputing is what drives us to provide our customers with advanced, innovative technologies for taking on the most difficult challenges. We are very excited that TACC has added a Cray to the Lonestar lineage, and we look forward to providing their users with a powerful tool for achieving scientific breakthroughs."

Cray XC40 supercomputers are engineered to meet the performance challenges of today's most demanding HPC users. Special features of the Cray XC40 supercomputer include: the industry-leading Aries system interconnect; a Dragonfly network topology that frees applications from locality constraints; optional DataWarp applications I/O flash SSD accelerator technology; innovative cooling systems to lower customers' total cost of ownership; the next-generation of the scalable, high performance and tightly integrated Cray Linux Environment that supports a wide range of applications; Cray's HPC optimized programming environment for improved performance and programmability, and the

ability to handle a wide variety of processor types, including Intel® Xeon® processors, Intel® Xeon Phi™ coprocessors, and NVIDIA® Tesla® GPU accelerators.

For more information on the Cray XC™ series of supercomputers please visit the Cray website at [www.cray.com](http://www.cray.com).

**About Cray Inc.** - Global supercomputing leader Cray Inc. (NASDAQ: CRAY) provides innovative systems and solutions enabling scientists and engineers in industry, academia and government to meet existing and future simulation and analytics challenges. Leveraging more than 40 years of experience in developing and servicing the world's most advanced supercomputers, Cray offers a comprehensive portfolio of supercomputers and big data storage and analytics solutions delivering unrivaled performance, efficiency and scalability. Cray's Adaptive Supercomputing vision is focused on delivering innovative next-generation products that integrate diverse processing technologies into a unified architecture, allowing customers to meet the market's continued demand for realized performance. Go to [www.cray.com](http://www.cray.com) for more information.

**Safe Harbor Statement** - This press release contains forward-looking statements within the meaning of Section 21E of the Securities Exchange Act of 1934 and Section 27A of the Securities Act of 1933, including, but not limited to, statements related to the timing of deployment of the systems purchased by TACC and Cray's ability to deliver systems that meet TACC's requirements. These statements involve current expectations, forecasts of future events and other statements that are not historical facts. Inaccurate assumptions and known and unknown risks and uncertainties can affect the accuracy of forward-looking statements and cause actual results to differ materially from those anticipated by these forward-looking statements. Factors that could affect actual future events or results include, but are not limited to, the risk that the systems required by PGS are not delivered in a timely fashion or do not perform as expected and such other risks as identified in the Company's quarterly report on Form 10-Q] for the quarter ended March 31, 2015, and from time to time in other reports filed by Cray with the U.S.

Securities and Exchange Commission. You should not rely unduly on these forward-looking statements, which apply only as of the date of this release. Cray undertakes no duty to publicly announce or report revisions to these statements as new information becomes available that may change the Company's expectations.

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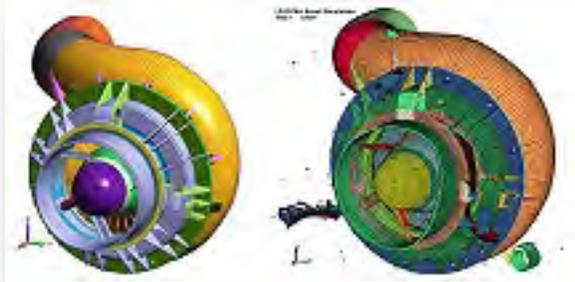
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## UPCOMING LS-DYNA TRAINING CLASS

The foundation of our LS-DYNA training is to provide a hands-on, practical experience for the student that is faced with the challenge of building LS-DYNA models in a commercial environment where time is of the essence and accuracy is paramount.

### Sept. 28 - Oct. 2, 2015      LS-DYNA Analysis for Structural Mechanics - Short Course Explicit, Nonlinear, Large Deformation Analysis for Structural Mechanics

**Date:** Sept. 28 - Oct. 2, 2015  
**Duration:** 5 days (optional 5th day)  
**Location:** Portland, Oregon, United States

#### Who the class will benefit:

This week-long course is directed toward the engineering professional simulating highly nonlinear, transient dynamic problems involving large deformations and contact between multiple bodies. What this means in more layman terms is that we will provide a realistic foundation toward the practical usage of LS-DYNA as taught by practicing engineers.

The course is fast paced and follows a workshop format with theory, practice and Q&A sessions.

#### What's Included:

- Course training manual,
- notes and workshop video files will be provided on a flash drive for post-class refresher training.
- At least one lunch and one social event are provided to encourage class interaction with fellow users. Course provides certification of 32 hours of professional continuing education credits.

**Extensive set of Class Reference Notes**

One of the treasures of our class is an extensive set of Class Reference Notes.

This noteset is something we use internally within Predictive Engineering and contains condensed reference material, from element formulation to DEM / SPH usage to recommended practices for implicit analysis. Our intent with this LS-DYNA training class is to provide a high-quality learning experience via a combination of theory, workshops and Q&A during the class, but also to provide the tools such that the student can continue learning at their own pace.

**Cost:**

\$2380/user (four days).

Students attending the Analysis for Structural Mechanics training (four days) have the option of DEM/CFD/FSI training on the fifth day for an additional \$680.

**Registration:**

Early registration is encouraged since space is limited to 18 students and it is expected that the class will fill.

**What's Covered:**

Day 1: Theoretical Foundation

Day 2: LSPP & Material Modeling

Day 3: Contact & Load Initialization

Day 4: Drop Test, Damping & Bird Strike (SPH)

Day 5: Multiphysics with LS-DYNA (DEM/CFD/FSI) (Optional day)

[jconnelly@appliedcax.com](mailto:jconnelly@appliedcax.com) - if you have questions about course material, class registration/availability or group rates.

**Training Flyer:**

<http://www.predictiveengineering.com/sites/default/files/training/Predictive-Engineering-LS-DYNA-Training-Opportunity-Sept-28-Oct-02-2015.pdf>

**Lockheed Martin to Acquire Sikorsky Aircraft and Conduct Strategic Review of IT and Technical Services Businesses**

**Source:**  
**Lockheed Martin;**  
**issued July 20, 2015)**

Lockheed is taking a sizeable gamble on Sikorsky, as its new products are either troubled, like this CH-148 Cyclone, or untested, while its H-60 cash cow is heading towards the end of its long production run. (RCAF photo)

BETHESDA, Md. --- Lockheed Martin has entered into a definitive agreement to acquire Sikorsky Aircraft, a world leader in military and commercial rotary-wing aircraft, for \$9.0 billion. The price is effectively reduced to approximately \$7.1 billion, after taking into account tax benefits resulting from the transaction.

“Sikorsky is a natural fit for Lockheed Martin and complements our broad portfolio of world-class aerospace and defense products and

technologies,” said Marillyn Hewson, Lockheed Martin chairman, president and CEO. “I’m confident this acquisition will help us extend our core business into the growing areas of helicopter production and sustainment. Together, we’ll offer a strong portfolio of helicopter solutions to our global customers and accelerate the pace of innovation and new technology development.”

The acquisition is subject to customary conditions, including securing regulatory approvals, and is expected to close by late fourth quarter 2015 or early first quarter 2016. The transaction will have no impact on the company’s previously stated commitments to return cash to shareholders through dividends and to reduce outstanding share count to below 300 million shares by the end of 2017.

Lockheed Martin and United Technologies Corporation have agreed to make a joint election under Section 338(h)(10) of the Internal Revenue Code, which treats the transaction as an asset purchase for tax purposes. The election generates a tax benefit with an estimated present value of \$1.9 billion for Lockheed Martin and its shareholders.

The Corporation plans to align Sikorsky under the Lockheed Martin Mission Systems and Training (MST) business segment. MST and Stratford, Conn., based Sikorsky currently partner on a number of critical programs, including the VH-92 Presidential Helicopter, Combat Rescue Helicopter and the Naval MH-60 Helicopter.

Separately, Lockheed Martin will conduct a strategic review of alternatives for its government IT and technical services businesses, primarily in the Information Systems & Global Solutions business segment and a portion of the Missiles and Fire Control business segment. The programs to be reviewed represent roughly \$6 billion in estimated 2015 annual sales and more than 17,000 employees.

“As global security market dynamics shift, this review will strengthen our competitive posture, enabling sustained, profitable growth and positioning Lockheed Martin to deliver value for customers, shareholders and employees,” Hewson said.

Lockheed Martin is a leading IT and technical services provider around the globe, and with a series of recent wins in the U.S., Europe and Australia, the business is well positioned for the future. However, following recent shifts in market dynamics, Lockheed Martin will explore whether the businesses can achieve greater growth and create more value for customers and shareholders outside of the Corporation. The strategic review is expected to result in a spin-off to Lockheed Martin shareholders or sale of these components.

The IS&GS programs that are not included in the strategic review are mostly focused on defense and intelligence customers and will be realigned into the Corporation’s other four business segments following completion of the review.

For more information and updates on the Sikorsky Aircraft acquisition, visit: [lockheedmartin.com/sikorsky](http://lockheedmartin.com/sikorsky).

Headquartered in Bethesda, Maryland, Lockheed Martin is a global security and aerospace company that employs approximately 112,000 people worldwide and is principally engaged in the research, design, development, manufacture, integration and sustainment of advanced technology systems, products and services. The Corporation’s net sales for 2014 were \$45.6 billion.



**More comfortable than ever,  
as sporty as ever:**

### **New-generation A-Class**

Mercedes-AMG A 45 AMG (AMG Exclusive),  
jupiter red, interior black

Stuttgart. Striking contours, dynamically sweeping surfaces and coupé-like window lines characterise the exterior of the A-Class. With a new, more arrow-shaped front bumper, new LED High Performance headlamps and modified tail lights, the new generation emphasises the sportiness and dynamism of the successful compact-class model series. The equipment range has been expanded in many areas: new features include DYNAMIC SELECT, suspension with Adaptive Damping System and smartphone integration via Apple® CarPlay® and MirrorLink®[1]. The A-Class is available in a fresh new "on-trend" colour elbaite green metallic, and there is a special "Motorsport Edition" model, which will particularly appeal to motor racing aficionados. The new-generation A-Class is available to order now, priced from 23,746.45 euros[2]. Depending on the model, the moderate increase in price is somewhere between 184.45 and 892.50 euros (Mercedes-AMG A 45 4MATIC). The first models will be in dealer showrooms at the end of September.

The new entry-level model in the expanded A-Class model range is the A 160 with 75 kW

(102 hp). With the addition of this model, the A-Class price list now starts at 23,746.45 euros. The new efficiency champion is the 80 kW (109 hp) A 180 d BlueEFFICIENCY Edition, which gets by on NEDC fuel consumption of just 3.5 l/100 km. CO2 emissions are 89 g/km. The A 180 d BlueEFFICIENCY Edition is available from 27,851.95 euros.

With its dramatic design in the style of the successful MERCEDES AMG PETRONAS Formula 1 team, the special "Motorsport Edition" model will particularly appeal to motor racing fans. Areas of the front and rear bumper trim are painted in petrol green. The same colour adorns the rim flanges of the AMG light-alloy wheels. Eye-catching details in the interior include the petrol green surrounds of the air vents and the contrasting topstitching in petrol green. The "Motorsport Edition" is available for all engine variants from A 200/A 200 d (with the exception of the Mercedes-AMG A 45 4MATIC). Depending on the engine variant, it will cost an additional 4849.25 to 6307.00 euros

The engine, transmission and steering characteristics of the A-Class can now be adjusted at the touch of a button with the optional extra DYNAMIC SELECT. The driver can select one of four driving modes: Comfort, Sport, Eco and Individual. The A 200 d 4MATIC, A 220 4MATIC, A 220 d, A 220 d 4MATIC, A 250 4MATIC, A 250 Sport and A 250 Sport 4MATIC models are equipped with DYNAMIC SELECT as standard. The system is also included as standard on all models with 7G-DCT, AMG Line, lowered suspension or the new suspension with Adaptive Damping System. DYNAMIC SELECT is optionally available for all other engine variants, except the two BlueEFFICIENCY Edition models, for an additional 95.20 euros.

DYNAMIC SELECT allows a particularly broad range of setting options in combination with the new suspension with Adaptive Damping System (optional extra, from 892.50 euros). In this case the driver is able to modify the vehicle's damping characteristics using the DYNAMIC SELECT switch. There is a choice between Comfort mode with comfortable damping characteristics and Sport mode for a sporty and more taut damper setup.

The new-generation A-Class is the first Mercedes-Benz model to be available with comprehensive smartphone integration. From the beginning of 2016 the Apple® CarPlay® (for iPhone® owners) and MirrorLink® infotainment systems will be available. MirrorLink® allows compatible smartphones to be integrated into the vehicle and

smartphone content to be shown on the A-Class display. MirrorLink® is a standard developed by a consortium of companies from the automotive and IT industries to promote a standardised interface for transmitting display content and control commands. Devices and apps are certified accordingly by the Car Connectivity Consortium.

Orders can already be placed for the infotainment systems. From the beginning of 2016, smartphone integration will be a standard feature in combination with COMAND Online and available on request in conjunction with Audio 20 (smartphone integration package including micro USB and iPhone® Lightning cables for Audio 20: 357 euros).

Apart from their distinctive look, the LED High Performance headlamps (1041.25 euros, standard for Mercedes-AMG A 45 4MATIC) offer added safety at night thanks to their wide beam pattern, a light which has a colour similar to daylight and low energy consumption. On unlocking the vehicle, the driver is welcomed by the "coming home" function with its unusual light show. The daytime running lamps first light up in blue, followed by a soft transition to white.

Ambient lighting, available on request (142.80 euros), creates a unique and pleasant atmosphere inside the vehicle with twelve different colours which can be dimmed in five stages. On entering the vehicle the driver is also welcomed by a sophisticated lighting effect

The A-Class is available in a fresh new "on-trend" colour elbaite green metallic (666.40 euros).

Mercedes-AMG A 45 4MATIC: the world's most powerful compact sports model

The Mercedes-AMG A 45 4MATIC (51,051.00 euros) has also benefited from the facelift. Now with peak output of 280 kW (381 hp) and maximum torque of 475 Nm, the entry-level model from Mercedes-AMG is the world's most powerful compact sports model, delivering 15 kW or 21 hp more than its predecessor.

Standard features of the Mercedes-AMG A 45 4MATIC include LED High Performance headlamps and the new AMG DYNAMIC SELECT driving modes "Comfort", "Sport", "Sport +" and "Individual". The standard all-wheel drive and the optional front axle differential, available for the first time, ensure the best possible traction, even on tight bends

(part of the AMG DYNAMIC PLUS package for 2618.00 euros).

Success story: two out of three customers new to Mercedes-Benz

The new A-Class was launched on the market in September 2012. Owing to the great success enjoyed by this model around the world, it is manufactured not only in Rastatt, but, since August 2013, also by the Finnish production specialist Valmet Automotive. Its popularity soared by over 46% in the United Kingdom last year, and by over 51% in the growth market China. However, most A-Class vehicles continue to be sold to customers in Germany. Around one in two drivers of a Mercedes-Benz A-Class or B-Class, GLA or CLA in Germany and Western Europe previously drove a rival vehicle. In the case of the A-Class, no less than two out of three European customers come from competing brands.

[1] Available from the beginning of 2016

## NASA, Partners Test Engine Health Monitoring System

(Source: NASA; issued July 20, 2015)



Oil smoke billows from the right inboard engine of the C-17, while a probe collects emissions data, during engine health monitoring tests that resume this week when ash will be fed into an engine.

(NASA Photo)

Most people are careful to maintain their cars and keep the engine clean and out of the repair shop. However, this week a joint NASA, government and industry project team seeks to purposely feed volcanic ash into an engine to create problems.

That's one way to see if a new engine health monitoring system can detect failures before they happen. If the tests are successful, the system capable of predicting engine challenges and improving fuel economy could become available for the next generation of commercial airline engines.

A July 9 panel discussion at NASA Armstrong Flight Research Center on Edwards Air Force Base, California, detailed the Vehicle Integrated Propulsion Research (VIPR) project. The concept is to test and evaluate a system that incorporates smart sensors and advanced diagnostic techniques. Speakers included Paul Krasa, VIPR project manager, John Lekki, VIPR principal investigator, Jack Hoying, U.S.

Air Force volcanic ash environment principal investigator and Cheng Moua, Armstrong VIPR project manager.

"The ash will degrade the engine and allow us to see in real time what's happening and how well the health monitoring system works," said Lekki, who is based at NASA's Glenn Research Center in Cleveland.

Volcanic ash was chosen for the final of a three-phase research project because atmospheric particulates have become of interest to military and civil aviation authorities that have to assess the airworthiness of engines that have encountered the ash. Eruptions in Iceland over the last five years, especially in 2010, disrupted air traffic worldwide and cost airline companies more than \$1 billion due to cancelled or rerouted flights. The new sensors are expected to detect the degradation caused by the volcanic ash, quantify the significance of the event, and aid in identifying which components might require maintenance.

The Air Force Test Center at Edwards Air Force Base provides the C-17 military transport and NASA Armstrong contributes two F-117 engines for this research. The engines are a variant of an engine used in a Boeing Company commercial aircraft.

A rig called the spider will blow the ash into the engine for the tests. Researchers hope to gain a better understanding of how ash degrades an engine using the new system to observe low levels of ash blowing into the engine that can't be seen with the human eye and then feeding the power plant more moderate levels of ash with particulates that can be seen.

The engine health monitoring system's sensors also will measure emissions and combustion and can detect the effect of the ash on the engine in real time and research the prognostic capabilities that could predict how long it will take for an issue to emerge, Lekki said.

The sensors include a sensor that evolved from one that was used for the space shuttle main engines, high-temperature fiber optics, high-temperature thin film sensors and acoustic microphone arrays. Also included is a microwave tip clearance sensor developed through the Small Business Innovative Research program that measures the complex gap from the outer wall of the turbine to the tips of the blades, he explained.

"Compressor blade erosion and turbine ash deposits are what is damaging the engine," added Hoying, who is based at the Air Force Research Laboratory at Wright-Patterson Air Force Base in Ohio. "The tests can answer questions about how close we can fly to these volcanic plumes."

After the tests are over, the investigation will continue as the research engine is taken apart and evaluated, Moua added.

Improved sensors also could identify changes in vibration, speed, temperature and emissions that are symptomatic of engine problems before they become serious safety concerns. Notifications would be provided to ground crews of potential problems that could be fixed by preventive maintenance or alert pilots to changes in engine health thereby allowing time to prevent engine damage in flight.

To reduce risk, all such testing is conducted on the ground under controlled conditions.

The VIPR project began in 2011 with a baseline test to lay the groundwork for more complex experiments. The engine detected simulated faults, including an oil leak. A second test in early 2013 verified that sensors could detect actuator faults over a range of operating conditions.

"It will be a huge benefit economically and provide new diagnostic technologies to foster engine innovation in reliability," Lekki said.

In addition to the Air Force and the Federal Aviation Administration, NASA's partners on the project include Boeing Research & Technology, Pratt & Whitney, General Electric Aviation and Rolls-Royce Liberty Works, with assistance from the U.S. Geological Survey. Researchers from four NASA aeronautics centers – Armstrong, Glenn, Langley Research Center in Hampton, Virginia and Ames Research Center at Moffett Field, California – are involved in research and testing.

**Dassault Aviation Delivers First Rafales to the Arab Republic of Egypt**



It's been a long time coming, but today Dassault Aviation delivered the first three export Rafale fighters to Egypt, the type's first foreign customer. Deliveries to Qatar are to begin in 2018, while deliveries to India are as yet undecided. (Dassault photo)

ST-CLOUD, France --- The official ceremony marking the acceptance by the Arab Republic of Egypt of its first three Rafales was held today at the Dassault Aviation flight test center in Istres, under the patronage of His Excellency Mr. Ehab Badawy, Egyptian Ambassador to France, and in the presence of Dassault Aviation Chairman & CEO Eric Trappier.

This first delivery comes just five months after the Egyptian decision to acquire 24 Rafales (16 two-seaters and 8 single-seaters) in order to equip its Air Force with a latest-generation multirole fighter capable of meeting the country's operational requirements and enabling Egypt, with full sovereignty, to secure its geostrategic position in the region.

At the same time, an initial group of Egyptian users has been trained in France. Egyptian pilots, trained by the French Air Force, will fly the first three Rafales to Cairo on the day after the ceremony.

Eric Trappier declared: "This contract constitutes a new milestone in the cooperation between Dassault Aviation and Egypt since the 1970s – more than 40 years of an exemplary partnership marked by commitment and mutual

trust. After the Mirage 5, the Alpha Jet and the Mirage 2000, the Rafale is the fourth Dassault aircraft to fly in Egyptian colors, and Egypt is the first export customer for the Rafale, as it was for the Mirage 2000.

"We are very pleased with this partnership, which over time has shown its solidity and ensured the durability of the historical links between our two countries. On behalf of Dassault Aviation and its 8,000 employees, its partners Thales and Snecma and the 500 subcontractors, I thank the Egyptian authorities, for the trust they have placed in us once again, and also the authorities and the French armed forces, without whose support this success would not have been possible."

With more than 8,000 military and civil aircraft delivered to 90 countries over the past 60 years, and having logged nearly 28 million flight hours to date, Dassault Aviation can offer recognized know-how and experience in the design, development, sale and support of all types of aircraft, from the Rafale fighter to the Falcon range of high-end business jets, as well as military unmanned air systems.

**Chinese Rocket Launchers to Debut At Peru's National Day Parade**

**Peru will exhibit for the first time the Type 90 multiple rocket launchers that it has obtained from during its National Day parade on July 29. (People's Daily photo)**

Chinese 122mm Type 90 Multi-Barrel Rocket Launchers will appear at the upcoming National Day parade in Peru on July 29. This is the first time that Peru has imported China's weapons, the Global Times reports on Wednesday.

China handed over 27 122mm Type 90 Multi-Barrel Rocket Launchers to Peru in a delivery ceremony on July 18 and Peruvian President Ollanta Humala, defense minister and commanders of the armed force were all

presented at the event, Peru's local media reports.

Under China-Peru comprehensive strategic partnership, the two sides witnessed a steady improvement in bilateral ties and foreign trade. Peru's purchase of China's weapons will further promote the mutual trust.

With the increasing development of China's military industry, China will sell more and more weapons overseas.

Jul 17, 2015 | AACHEN, Germany

(M. Azadian)

<https://media.ford.com/content/fordmedia/fna/us/en/news/2015/07/17/ford-developing-advanced-headlights.html>



### **Ford Developing Advanced Headlights that Point Out People, Animals in the Dark, and Widen Beams at Tricky Junctions**

- Ford is developing advanced lighting technology that enables drivers to more easily see potential hazards when driving at night
- Camera-Based Advanced Front Lighting System widens beam at junctions and roundabouts after interpreting traffic signs
- GPS-enabled system uses forward-facing camera to remember roadways and direct lighting to help drivers better see bends in the road – effectively lighting the way home on previously travelled routes
- Spot Lighting uses infra-red camera to detect pedestrians, cyclists, and animals, and highlight the potential hazards; system can detect up to eight potential hazards and highlight two highest priorities using specially designed headlights and on-screen display

**AACHEN, Germany, July 17, 2015** – Driving at night, particularly on unlit roads, can be a nerve-wracking experience. Ford is developing new lighting technologies that will enable drivers to more easily identify potential hazards, including pedestrians, cyclists and animals.

Ford's Camera-Based Advanced Front Lighting System can widen the beam at junctions and roundabouts to better illuminate hazards that are not in the direction of travel. New Spot Lighting technology helps draw the driver's

attention to pedestrians, cyclists and even large animals in the vehicle's path or even just off the road.

“Many people who drive at night have had to quickly react to someone or something suddenly appearing in the road – as if from nowhere. Ford's Camera-Based Advanced Front Lighting System and Spot Lighting help ensure the driver is quickly alerted to people or animals that could present a danger,” said Ken Washington, vice president, Ford Research and Advanced Engineering.

Camera-Based Advanced Front Lighting System builds upon Ford's Adaptive Front Lighting System and Traffic Sign Recognition, which are already available in Ford vehicles, to provide drivers with improved visibility at roundabouts, stop, and give way or yield signs.

The system also uses GPS information to better illuminate bends and dips on a chosen route. Where GPS information is not available the technology uses a forward-facing video camera mounted in the rear-view mirror base to detect lane markings and predict the road's curvature, using the information to illuminate the area more effectively.

In a further evolutionary step, in those instances, the camera stores the information in the navigation system. When next the driver uses the same road again, the headlights adapt to the course of the road automatically to better light the way.

Camera-Based Advanced Front Lighting System was developed at Ford's European Research and Innovation Centre in Aachen, Germany, and Ford expects the technology to be available for customers in the near term.

Spot Lighting – currently in the pre-development phase with Ford engineers in Aachen – uses an infra-red camera in the front grille to simultaneously locate and track up to eight people and bigger animals, including larger dogs, at a range of up to 120 metres.

The system can spotlight two hazards for the driver with a spot and a stripe on the road surface, illuminated by two special LED lamps next to the fog lights. The highlighted objects are displayed on the screen inside the car, marked in a red or yellow frame, according to the proximity of the object and the level of danger presented.

“Camera-Based Advanced Front Lighting can help make it easier for the driver to travel at night in unfamiliar surroundings, and to more easily see unexpected hazards. At roundabouts, for example, our system helps the driver to clearly see the exits – and check if cyclists and pedestrians are crossing the road,” said Michael Koherr, research engineer, Lighting Systems, Ford of Europe. “Spot Lighting makes potential hazards in the road ahead more easily visible to the driver – whether that is a pedestrian, a cyclist, or even a large animal.”

Road safety reports show that on unlit roads there is a significantly increased likelihood of accidents, and that such accidents could involve personal injuries, or fatalities.\* Ford is a leading innovator in lighting technology. Systems currently available on Ford vehicles include:

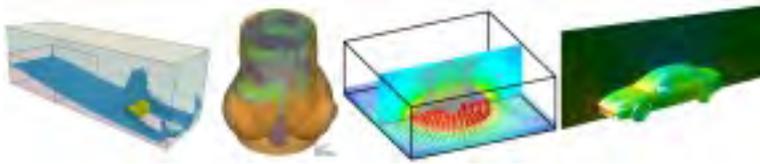
- **Dynamic LED Headlights** which combines full-LED headlamps offering daylight-mimicking light clarity with Ford's Adaptive Front Lighting System. The system adjusts the headlight beam angle and intensity to match the driving environment. It can choose one of seven settings according to vehicle speed, ambient light conditions, steering angle, distance to the vehicle in front and windscreen wiper activation
- **Glare-Free Highbeam** technology for the adaptive LED headlamps. The system detects vehicles ahead and fades out light that could dazzle oncoming drivers, while retaining maximum illumination for other areas
- **Auto High Beam Control** detects oncoming vehicles and automatically switches to dipped beam, before switching back to high beam once it detects the vehicle has passed

\* The Handbook of Road Safety Measures, Elvik

### About Ford Motor Company

Ford Motor Company, a global automotive industry leader based in Dearborn, Michigan, manufactures or distributes automobiles across six continents. With about 194,000 employees and 66 plants worldwide, the company's automotive brands include Ford and Lincoln. The company provides financial services through Ford Motor Credit Company. For more information regarding Ford and its products worldwide, please visit <http://corporate.ford.com>.

**Ford of Europe** is responsible for producing, selling and servicing Ford brand vehicles in 50 individual markets and employs approximately 53,000 employees at its wholly owned facilities and approximately 67,000 people when joint ventures and unconsolidated businesses are included. In addition to Ford Motor Credit Company, Ford Europe operations include Ford Customer Service Division and 23 manufacturing facilities (15 wholly owned or consolidated joint venture facilities and 8 unconsolidated joint venture facilities). The first Ford cars were shipped to Europe in 1903 – the same year Ford Motor Company was founded. European production started in 1911.



### **LS-DYNA SUPPORT SITE - July**

The LS-DYNA Support Site is for answers to basic and advanced questions that might occur while using LS-DYNA.

### **Recent Changes**

**July 14, 2015**

**History Variables for Certain Material Models**

Jun 08, 2015

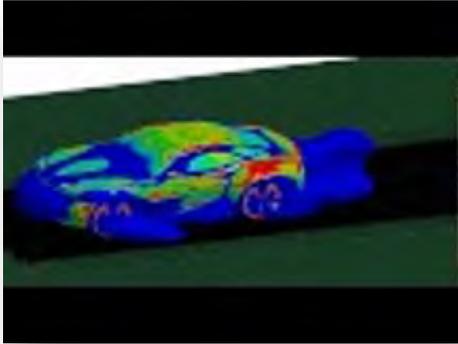
Some guidelines for implicit analyses using LS-DYNA

May 29, 2015

Contact Energy Discrete Beam Mar 20, 2015

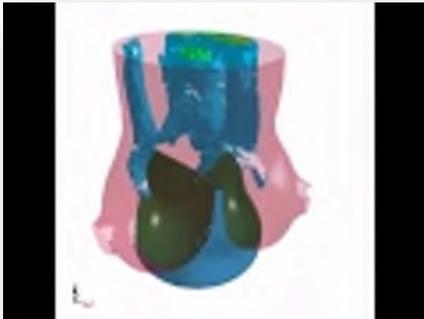
Jan 15, 2015

LS-DYNA R7.1.2 (R7.95028) released



**Turbulent CFD analysis for drag and lift coefficient prediction of the GMC Camaro model. The animation shows the isosurface of velocity colored by the vorticity field.**

[www.youtube.com/watch?v=x8rdo5b7lx8&index=1&list=PLBcXmzqlnOg0yxX6tl6ONkc2mX-g8cn0J](http://www.youtube.com/watch?v=x8rdo5b7lx8&index=1&list=PLBcXmzqlnOg0yxX6tl6ONkc2mX-g8cn0J)



**LS-DYNA R7 : Strong FSI coupling - Heart Valve Opening and closing**

[www.youtube.com/watch?v=rKGpu-3vLIQ&list=PLBcXmzqlnOg0yxX6tl6ONkc2mX-g8cn0J&index=7](http://www.youtube.com/watch?v=rKGpu-3vLIQ&list=PLBcXmzqlnOg0yxX6tl6ONkc2mX-g8cn0J&index=7)

**2015 2nd China LS-DYNA User's conference**

The 2nd conference will echo the success of the well-participated 1st China User's Conference , 2013.

The conference aims to prompt the interaction and communication between developers and end users.

**Hosts:**

Livermore Software Technology Corp.  
Dalian Fukun Technology Development Corp.

**Date:** Nov. 9th -11th , 2015

**Training:** Nov. 12th -13th , 2015

**Location:**

InterContinental Shanghai Pudong,  
Shanghai, China

The conference organizers wholeheartedly welcome your paper submission and attendance.

**Paper submission:**

Please send your one to two page abstract or full paper to [chinaconf@lstc.com](mailto:chinaconf@lstc.com) .

- Submission can be in Chinese or English.

- Submission of both Chinese and English versions are greatly appreciated but not mandatory.
- Include email address.

**Abstract submission deadline:**

Aug.10th , 2015

**Notice of acceptance deadline:**

Sept. 10th , 2015

**Full paper submission deadline:**

Oct. 10th , 2015

**Conference website:** <http://www.lsdyna.cn>

**Contact us:** [chinaconf@lstc.com](mailto:chinaconf@lstc.com)

**In association with:**

- ETA, Shanghai, China
- ARUP, Shanghai, China
- Hengstar Technology, Shanghai, China

**Participation – Exhibits**

Reserve your participation at the 2<sup>nd</sup> China LS-DYNA Users' Conference.

Contact: [chinaconf@lstc.com](mailto:chinaconf@lstc.com)

<p><a href="http://www.dynasupport.com/">www.dynasupport.com/</a> <b>LS-DYNA Support</b></p>	<p>Answers to basic and advanced questions that might occur while using LS-DYNA. New releases/ongoing developments.</p>
<p><a href="http://www.dynalook.com/">www.dynalook.com/</a> <b>Papers</b></p>	<p>Papers from LS-DYNA User Conferences with search option.</p>
<p><a href="http://www.lsoptsupport.com/">www.lsoptsupport.com/</a> <b>LS-OPT</b></p>	<p>LS-OPT, developed by LSTC to interface with LS-DYNA</p>
<p><a href="http://www.dummymodels.com/">www.dummymodels.com/</a> <b>Dummy Models</b></p>	<p>Detailed information on dummy models for LS-DYNA</p>
<p><a href="http://www.topcrunch.org/">www.topcrunch.org/</a> <b>Benchmarks</b></p>	<p>Track the aggregate performance trends of high performance computer systems, with real data</p>
<p><a href="http://www.dynaexamples.com/keyword-search">www.dynaexamples.com/keyword-search</a> <b>LS-DYNA Examples</b></p>	<p>Examples for specific LS-DYNA keywords, with search option</p>



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**BETA CAE Systems S.A.**

[www.beta-cae.gr](http://www.beta-cae.gr)

**BETA CAE Systems S.A.– ANSA**

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

**Solutions for:**

Process Automation - Data Management – Meshing – Durability - Crash & Safety NVH - CFD - Thermal analysis - Optimization - Powertrain Products made of composite materials - Analysis Tools - Maritime and Offshore Design - Aerospace engineering - Biomechanics

**BETA CAE Systems S.A.– μETA**

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



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**CRAY**[www.cray.com](http://www.cray.com)**THE CRAY® XC™ SERIES: ADAPTIVE SUPERCOMPUTING ARCHITECTURE**

The Cray® XC™ series delivers on Cray's commitment to an adaptive supercomputing architecture that provides both extreme scalability and sustained performance. The flexibility of the Cray XC platform ensures that users can precisely configure the machines that will meet their specific requirements today, and remain confident they can upgrade and enhance their systems to address the demands of the future.

Cray® XC40™ and XC40-AC™ supercomputers are enabled by a robust Intel® Xeon® processor road map, Aries high performance interconnect and flexible Dragonfly network topology, providing low latency and scalable global bandwidth to satisfy the most challenging multi-petaflops applications.

While the extreme-scaling Cray XC40 supercomputer is a transverse air-flow liquid-cooled architecture, the Cray XC40-AC air-cooled model provides slightly smaller and less dense supercomputing cabinets with no requirement for liquid coolants or extra blower cabinets. A reduced network topology lowers costs, and the system is compatible with the compute technology, OS, ISV and software stack support of high-end XC40 systems.

**MAXIMIZE PRODUCTIVITY WITH CRAY CS SERIES SUPERCOMPUTERS**

Understanding the need for nimble, reliable and cost-effective high performance computing (HPC), we developed the Cray® CS™ cluster supercomputer series. These systems are industry-standards-based, highly customizable, and expressly designed to handle the broadest range of medium- to large-scale simulation and data analytics workloads.

All CS components have been carefully selected, optimized and integrated to create a powerful HPC environment. Flexible node configurations featuring the latest processor and interconnect technologies mean you can tailor a system to your specific need — from an all-purpose cluster to one suited for shared memory, large memory or accelerator-based tasks.

Innovations in packaging, power, cooling and density translate to superior energy efficiency and compelling price/performance. Expertly engineered system management software instantly boosts your productivity by simplifying system administration and maintenance.

Maximize your productivity with flexible, high-performing Cray CS series cluster supercomputers.

CRAY

[www.cray.com](http://www.cray.com)**CRAY® SONEXION® SCALE-OUT LUSTRE® STORAGE SYSTEM**

Brought to you by Cray, the world's leading experts in parallel storage solutions for HPC and technical enterprise, the Cray® Sonexion® 2000 system provides a Lustre®-ready solution for popular x86 Linux® clusters and supercomputers through Cray Cluster Connect™. As a leader in open systems and parallel file systems, Cray builds on open source Lustre to unlock any industry-standard x86 Linux compute cluster using InfiniBand™ or 10/40 GbE utilizing proven Cray storage architectures.

The Cray Sonexion 2000 system provides 50 percent more performance and capacity than the Sonexion 1600 system in the same footprint.

**Simplify**

- Through its fully-integrated and pre-configured design, Cray Sonexion storage gets customers deployed faster and reduces the total number of components to manage.
- The Sonexion system's compact design reduces the total hardware footprint of petascale systems by 50 percent over component-based solutions.

**Scale**

- Performance scales from 7.5 GB/s to 1.7 TB/s in a single file system.
- Capacity scales in modular increments; the Sonexion 2000 system stores over two usable petabytes in a single rack. Fewer drives and components reduce capital costs as capacity grows.

**Protect**

- New software-based GridRAID offers higher levels of data protection and up to 3.5 times faster rebuild times than traditional RAID6 and MD-RAID storage.
- Cray ensures quality, reliability and stability at scale through exhaustive thermal and real-world stress testing, system hardening and availability, and tight hardware and software integration.

**OPEN ARCHIVE AND TIERED STORAGE SYSTEM FOR BIG DATA AND SUPERCOMPUTING**

Cray Tiered Adaptive Storage (TAS), powered by Versity, is designed to meet the expansive data preservation and access needs driven by big data, where data needs to migrate fluidly from high performance storage to deep tape archives, while always being accessible to users.

**With Cray TAS you can:**

- Deploy tiered storage and archives faster
- Feel confident preserving and protecting data into the future, using Linux®
- Simplify managing data using familiar tools for years to come

**CRAY® URIKA-XA™ EXTREME ANALYTICS PLATFORM**

Pre-integrated, open platform for high performance analytics delivers valuable business insights now and into the future

The flexible, multi-use Cray® Urika-XA™ extreme analytics platform addresses perhaps the most critical obstacle in data analytics today — limitation. Analytics problems are getting more varied and complex but the available solution technologies have significant constraints. Traditional analytics appliances lock you into a single approach and building a custom solution in-house is so difficult and time consuming that the business value derived from analytics fails to materialize.

In contrast, the Urika-XA platform is open, high performing and cost effective, serving a

wide range of analytics tools with varying computing demands in a single environment. Pre-integrated with the Apache Hadoop® and Apache Spark™ frameworks, the Urika-XA system combines the benefits of a turnkey analytics appliance with a flexible, open platform that you can modify for future analytics workloads. This single-platform consolidation of workloads reduces your analytics footprint and total cost of ownership.

Based on pioneering work combining high-performance analytics and supercomputing technologies, the Urika-XA platform features next-generation capabilities. Optimized for compute-heavy, memory-centric analytics, it incorporates innovative use of memory-storage hierarchies and fast interconnects, which translates to excellent performance at scale on current as well as emerging analytics applications.

Additionally, the enterprise-ready Urika-XA platform eases the system management burden with a single point of support, standards-based software stack and compliance with enterprise standards so you can focus on extracting valuable business insights, not on managing your environment.

CRAY

[www.cray.com](http://www.cray.com)

**THE URIKA-GD™ GRAPH DISCOVERY APPLIANCE IS A PURPOSE-BUILT SOLUTION FOR BIG DATA RELATIONSHIP ANALYTICS.**

The Urika-GD™ appliance enables enterprises to:

- Discover unknown and hidden relationships and patterns in big data
- Build a relationship warehouse, supporting inferencing/deduction, pattern-based queries and intuitive visualization
- Perform real-time analytics on the largest and most complex graph problems

The Urika-GD system is a high performance graph appliance with a large shared memory and massively multithreaded custom processor designed for graph processing and scalable I/O.

With its industry-standard, open-source software stack enabling reuse of existing skill sets and no lock in, the Urika-GD appliance is easy to adopt.

The Urika-GD appliance complements an existing data warehouse or Hadoop® cluster by offloading graph workloads and interoperating within the existing enterprise analytics workflow.

Realize rapid time to powerful new insights.



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## DatapointLabs

[www.datapointlabs.com](http://www.datapointlabs.com)

Testing over 1000 materials per year for a wide range of physical properties, DatapointLabs is a center of excellence providing global support to industries engaged in new product development and R&D.

The company meets the material property needs of CAE/FEA analysts, with a specialized product line, TestPaks®, which allow CAE analysts to easily order material testing for the calibration of over 100 different material models.

DatapointLabs maintains a world-class testing facility with expertise in physical properties of plastics, rubber, food, ceramics, and metals.

Core competencies include mechanical, thermal and flow properties of materials with a focus on precision properties for use in product development and R&D.

Engineering Design Data including material model calibrations for CAE Research Support Services, your personal expert testing laboratory Lab Facilities gives you a glimpse of our extensive test facilities Test Catalog gets you instant quotes for over 200 physical properties.



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**ETA – Engineering Technology Associates**  
[etainfo@eta.com](mailto:etainfo@eta.com)

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### **Invention Suite™**

Invention Suite™ is an enterprise-level CAE software solution, enabling concept to product. Invention's first set of tools will be released soon, in the form of an advanced Pre & Post processor, called PreSys.

Invention's unified and streamlined product architecture will provide users access to all of the suite's software tools. By design, its products will offer a high performance modeling and post-processing system, while providing a robust path for the integration of new tools and third party applications.

### **PreSys**

Invention's core FE modeling toolset. It is the successor to ETA's VPG/PrePost and FEMB products. PreSys offers an easy to use interface, with drop-down menus and toolbars,

increased graphics speed and detailed graphics capabilities. These types of capabilities are combined with powerful, robust and accurate modeling functions.

### **VPG**

Advanced systems analysis package. VPG delivers a unique set of tools which allow engineers to create and visualize, through its modules--structure, safety, drop test, and blast analyses.

### **DYNAFORM**

Complete Die System Simulation Solution. The most accurate die analysis solution available today. Its formability simulation creates a "virtual tryout", predicting forming problems such as cracking, wrinkling, thinning and spring-back before any physical tooling is produced



## ESI Group

**Visual-Environment:** An integrated suite of solutions which operate either concurrently or standalone within a common environment. It aims at delivering an open collaborative engineering framework. As such, it is constantly evolving to address various disciplines and available solvers.

**Visual-Crash is a dedicated environment for crash simulation:** It helps engineers get their job done in the smoothest and fastest possible way by offering an intuitive windows-based graphical interface with customizable toolbars and complete session support.

For LS-DYNA users, Visual-Crash DYNA allows to focus and rely on high quality digital models, from start to finish as it addresses the coupling with competitive finite element or rigid body based software. This very open and versatile environment simplifies the work of CAE engineers across the enterprise by facilitating collaboration and data sharing.

Further tools are integrated in Visual-Environment enhancing CAE engineers work tasks most efficiently.

[www.esi-group.com](http://www.esi-group.com)

**Visual-Mesh** generates 1D, 2D and 3D elements for any kind of simulation. Visual-Mesh provides automatic and guided surfaces clean up, application specific mesh generation and intuitive post mesh editing features..

**Visual-Viewer** is a complete, productive and innovative post-processing environment for CAE applications.

Visual-Viewer delivers a dedicated plotting and animation control solution. It offers a multi page, multi plot environment, allowing to group data into pages and plots. It is designed with a Windows GUI based on an intuitive and sleek user interface.

**Visual-Process Executive** is an advanced CAE environment for process customization and automation.

**VisualDSS** is an End-to-End Decision Support System for CAE. Manufacturers widely resort to Simulation-Based Design to gain a competitive edge in product development.



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**Compute on demand®/ Gridcore AB Sweden**  
**[www.gompute.com](http://www.gompute.com)**

Compute is owned, developed and operated by Gridcore AB in Sweden. Founded in 2002, Gridcore is active in three areas: Systems Integration, Research & Development and HPC as a service.

Gridcore has wide experience of different industries and applications, developed a stable product portfolio to simplify an engineer/scientist's use of computers, and has established a large network of partners and collaborations, where we together solve the most demanding computing tasks for our customers. Gridcore has offices in Gothenburg

**[www.gridcore.se](http://www.gridcore.se)**

(Sweden), Stuttgart (Germany), Durham NC (USA) and sales operations in The Netherlands and Norway.

The Gridcore developed E-Gompute software for internal HPC resources gives end users (the engineers) an easy-to-use and complete environment when using HPC resources in their daily work, and enables collaboration, advanced application integrations, remote pre/post, accounting/billing of multiple teams, license tracking, and more, accelerating our customers usage of virtual prototyping

**JSOL Corporation**

[www.jsol.co.jp/english/cae/](http://www.jsol.co.jp/english/cae/)

**HYCRASH**

Easy-to-use one step solver, for Stamping-Crash Coupled Analysis. HYCRASH only requires the panels' geometry to calculate manufacturing process effect, geometry of die are not necessary. Additionally, as this is target to usage of crash/strength analysis, even forming analysis data is not needed. If only crash/strength analysis data exists and panel ids is defined. HYCRASH extract panels to calculate it's strain, thickness, and map them to the original data.

**JSTAMP/NV**

As an integrated press forming simulation system for virtual tool shop

the JSTAMP/NV meets the various industrial needs from the areas of automobile, electronics, iron and steel, etc. The JSTAMP/NV gives satisfaction to engineers, reliability to products, and robustness to tool shop via the advanced technology of the JSOL Corporation.

**JMAG**

JMAG uses the latest techniques to accurately model complex geometries, material properties, and thermal and structural phenomena associated with electromagnetic fields. With its excellent analysis capabilities, JMAG assists your manufacturing process



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## Livermore Software Technology Corp.

[www.lstc.com](http://www.lstc.com)

### LS-DYNA

A general-purpose finite element program capable of simulating complex real world problems. It is used by the automobile, aerospace, construction, military, manufacturing, and bioengineering industries. LS-DYNA is optimized for shared and distributed memory Unix, Linux, and Windows based, platforms, and it is fully QA'd by LSTC. The code's origins lie in highly nonlinear, transient dynamic finite element analysis using explicit time integration.

**LS-PrePost:** An advanced pre and post-processor that is delivered free with LS-DYNA. The user interface is designed to be both efficient and intuitive. LS-PrePost runs on Windows, Linux, and Macs utilizing OpenGL graphics to achieve fast rendering and XY plotting.

**LS-OPT:** LS-OPT is a standalone Design Optimization and Probabilistic Analysis package with an interface to LS-DYNA. The graphical preprocessor LS-OPTui facilitates

definition of the design input and the creation of a command file while the postprocessor provides output such as approximation accuracy, optimization convergence, tradeoff curves, anthill plots and the relative importance of design variables.

**LS-TaSC:** A Topology and Shape Computation tool. Developed for engineering analysts who need to optimize structures, LS-TaSC works with both the implicit and explicit solvers of LS-DYNA. LS-TaSC handles topology optimization of large non-linear problems, involving dynamic loads and contact conditions.

### LSTC Dummy Models:

Anthropomorphic Test Devices (ATDs), as known as "crash test dummies", are life-size mannequins equipped with sensors that measure forces, moments, displacements, and accelerations.

**LSTC Barrier Models:** LSTC offers several Offset Deformable Barrier (ODB) and Movable Deformable Barrier (MDB) model.



## Oasys Ltd. LS-DYNA Environment

[www.oasys-software.com/dyna](http://www.oasys-software.com/dyna)

The Oasys Suite of software is exclusively written for LS-DYNA® and is used worldwide by many of the largest LS-DYNA® customers. The suite comprises of:

### Oasys PRIMER

Key benefits:

- Pre-Processor created specifically for LS-DYNA®
- Compatible with the latest version of LS-DYNA®
- Maintains the integrity of data
- Over 6000 checks and warnings – many auto-fixable
- Specialist tools for occupant positioning, seatbelt fitting and seat squashing (including setting up pre-simulations)
- Many features for model modification, such as part replace
- Ability to position and de-penetrate impactors at multiple locations and produce many input decks

- automatically (e.g. pedestrian impact, interior head impact)
- Contact penetration checking and fixing
- Connection feature for creation and management of connection entities.
- Support for Volume III keywords and large format/long labels
- Powerful scripting capabilities allowing the user to create custom features and processes

[www.oasys-software.com/dyna](http://www.oasys-software.com/dyna)

### Oasys D3PLOT

Key benefits:

- Powerful 3D visualization post-processor created specifically for LS-DYNA®
- Fast, high quality graphics
- Easy, in-depth access to LS-DYNA® results
- Scripting capabilities allowing the user to speed up post-processing, as well as creating user defined data components



### **Oasys T/HIS**

Key benefits:

- Graphical post-processor created specifically for LS-DYNA®
- Automatically reads all LS-DYNA® results
- Wide range of functions and injury criteria
- Easy handling of data from multiple models
- Scripting capabilities for fast post-processing

### **Oasys REPORTER**

Key benefits:

- Automatic report generation tool created specifically for LS-DYNA®
- Automatically post-process and summarize multiple analyses
- Built-in report templates for easy automatic post-processing of many standard impact tests



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## Shanghai Hengstar

**Center of Excellence:** Hengstar Technology is the first LS-DYNA training center of excellence in China. As part of its expanding commitment to helping CAE engineers in China, Hengstar Technology will continue to organize high level training courses, seminars, workshops, forums etc., and will also continue to support CAE events such as: China CAE Annual Conference; China Conference of Automotive Safety Technology; International Forum of Automotive Traffic Safety in China; LS-DYNA China users conference etc.

**On Site Training:** Hengstar Technology also provides customer customized training programs on-site at the company facility. Training is tailored for customer needs using LS-DYNA such as material test and input keyword preparing; CAE process automation with customized script program; Simulation result correlation with the test result; Special topics with new LS-DYNA features etc..

[www.hengstar.com](http://www.hengstar.com)

**Distribution & Support:** Hengstar distributes and supports LS-DYNA, LS-OPT, LS-Prepost, LS-TaSC, LSTC FEA Models; Hongsheng Lu, previously was directly employed by LSTC before opening his distributorship in China for LSTC software. Hongsheng visits LSTC often to keep update on the latest software features.

Hengstar also distributes and supports d3View; Genesis, Visual DOC, ELSDYNA; Visual-Crash Dyna, Visual-Process, Visual-Environment; EnkiBonnet; and DynaX & MadyX etc.

## Consulting

As a consulting company, Hengstar focus on LS-DYNA applications such as crash and safety, durability, bird strike, stamping, forging, concrete structures, drop analysis, blast response, penetration etc with using LS-DYNA's advanced methods: FEA, ALE, SPH, EFG, DEM, ICFD, EM, CSEC..



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**Lenovo**[www.lenovo.com](http://www.lenovo.com)

Lenovo is a USD39 billion personal and enterprise technology company, serving customers in more than 160 countries.

Dedicated to building exceptionally engineered PCs, mobile Internet devices and servers spanning entry through supercomputers, Lenovo has built its business on product innovation, a highly efficient global supply

chain and strong strategic execution. The company develops, manufactures and markets reliable, high-quality, secure and easy-to-use technology products and services.

Lenovo acquired IBM's x86 server business in 2014. With this acquisition, Lenovo added award-winning System x enterprise server portfolio along with HPC and CAE expertise.



[www.penguincomputing.com](http://www.penguincomputing.com)

Penguin Computing provides customized build-to-order server solutions for enterprises and institutions with special hardware requirements. We complement our hardware and software solutions with Penguin Computing on Demand (POD)—a public HPC cloud that provides supercomputing capabilities on-demand on a pay-as-you-go basis.

Penguin is a one-stop shop for HPC and enterprise customers, providing solutions for a wide array of computing needs and user profiles:

- HPC and cloud solutions optimized for industry-specific uses

- High-powered workstations for individual power users

- Highly power-efficient server platforms for enterprise computing

- Private and public cloud solutions, including hybrid options.

Focus

Penguin Computing is strictly focused on delivering Linux-optimized enterprise solutions. We use a thorough, proven hardware qualification and testing process to ensure that our solutions deliver optimal performance and robustness.

Penguin's in-house development team is dedicated to providing a complete highly interoperable software stack that is tuned for Penguin hardware. As a result our solutions are easy-to-use and "just work." Our integrated approach even extends to our hybrid compute solutions, which combine local and cloud computing resources, taking ease-of-use and cost-effectiveness to the next level. Penguin customers can reduce capital expenditures by right-sizing clusters for average resource utilization and easily and quickly offload excess workload into the cloud.

Penguin also offers a full range of services and support that is backed by a seasoned team of Linux, HPC and application experts.

Canada      **Metal Forming Analysis Corp MFAC**      [galb@mfac.com](mailto:galb@mfac.com)

[www.mfac.com](http://www.mfac.com)

LS-DYNA	LS-OPT	LS-PrePost	LS-TaSC
LSTC Dummy Models	LSTC Barrier Models	eta/VPG	
eta/DYNAFORM	INVENTIUM/PreSys		

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United States      **CAE Associates Inc.**      [info@caeai.com](mailto:info@caeai.com)  
[www.caeai.com](http://www.caeai.com)

ANSYS Products	CivilFem	Consulting ANSYS
		Consulting LS-DYNA

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United States      **DYNAMAX**      [sales@dynamax-inc.com](mailto:sales@dynamax-inc.com)  
[www.dynamax-inc.com](http://www.dynamax-inc.com)

LS-DYNA	LS-OPT	LS-PrePost	LS-TaSC
LSTC Dummy Models		LSTC Barrier Models	

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United  
States

**ESI-Group N.A**

[www.esi-group.com](http://www.esi-group.com)

QuikCAST

SYSWELD

PAM-RTM

PAM-CEM

VA One

CFD-ACE+

ProCAST  
Process

Visual-

VisualDSS

Weld Planner

Visual-Environment

IC.IDO

United  
States

**Engineering Technology Associates – ETA**

[etainfo@eta.com](mailto:etainfo@eta.com)

[www.eta.com](http://www.eta.com)

INVENTIUM/PreSy

NISA

VPG

LS-DYNA

LS-OPT

DYNAform

United  
States

**Gompute**

[info@gompute.com](mailto:info@gompute.com)

[www.gompute.com](http://www.gompute.com)

LS-DYNA Cloud Service

Additional software

Additional Services

United  
States

**Comet Solutions**

[steve.brown@cometsolutions.com](mailto:steve.brown@cometsolutions.com)

Comet Software

United  
States

**Livermore Software Technology Corp**

[sales@lstc.com](mailto:sales@lstc.com)

**LSTC** [www.lstc.com](http://www.lstc.com)

LS-DYNA

LS-OPT

LS-PrePost

LS-TaSC

LSTC Dummy Models

LSTC Barrier Models

TOYOTA THUMS

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United  
States

**Predictive Engineering**

[george.laird@predictiveengineering.com](mailto:george.laird@predictiveengineering.com)

[www.predictiveengineering.com](http://www.predictiveengineering.com)

FEMAP

NX Nastran

LS-DYNA

LS-OPT

LS-PrePost

LS-TaSC

LSTC Dummy Models

LSTC Barrier Models

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**France****DynaS+**[v.lapoujade@dynasplus.com](mailto:v.lapoujade@dynasplus.com)[www.dynasplus.com](http://www.dynasplus.com)

Oasys Suite

LS-DYNA

LS-OPT

LS-PrePost

LS-TaSC

DYNAFORM

VPG

MEDINA

LSTC Dummy Models

LSTC Barrier Models

**Germany****CADFEM GmbH**[lsdyna@cadfem.de](mailto:lsdyna@cadfem.de)[www.cadfem.de](http://www.cadfem.de)

ANSYS

LS-DYNA

optiSLang

ESAComp

AnyBody

ANSYS/LS-DYNA

**Germany****DYNAmore GmbH**[uli.franz@dynamore.de](mailto:uli.franz@dynamore.de)[www.dynamore.de](http://www.dynamore.de)

PRIMER	LS-DYNA	FTSS	VisualDoc
LS-OPT	LS-PrePost	LS-TaSC	DYNAFORM
Primer	FEMZIP	GENESIS	Oasys Suite
TOYOTA THUMS		LSTC Dummy & Barrier Models	

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**The Netherlands****Infinite Simulation Systems B.V**[j.mathijssen@infinite.nl](mailto:j.mathijssen@infinite.nl)[www.infinite.nl](http://www.infinite.nl)

ANSYS Products	CivilFem	CFX	Fluent
LS-DYNA	LS-PrePost	LS-OPT	LS-TaSC

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<b>Italy</b>	<b>EnginSoft SpA</b>	<a href="mailto:info@enginsoft.it">info@enginsoft.it</a>		
	<a href="http://www.enginsoft.it">www.enginsoft.it</a>			
	ANSYS	MAGMA	Flowmaster	FORGE
	CADfix	LS-DYNA	Dynaform	Sculptor
	ESAComp	AnyBody	FTI Software	
	AdvantEdge	Straus7	LMS Virtual.Lab	ModeFRONTIER
<hr/>				
<b>Russia</b>	<b>STRELA</b>	<a href="mailto:info@dynamore.com">info@dynamore.com</a>		
	LS-DYNA	LS-TaSC	LS-OPT	LS-PrePost
	LSTC Dummy Models		LSTC Barrier Models	
<hr/>				
<b>Sweden</b>	<b>DYNAmore Nordic</b>	<a href="mailto:marcus.redhe@dynamore.se">marcus.redhe@dynamore.se</a>		
	<a href="http://www.dynamore.se">www.dynamore.se</a>	Oasys Suite		
	ANSA	μETA	LS-DYNA	LS-OPT
	LS-PrePost	LS-TaSC	FastFORM	DYNAform
	FormingSuite	LSTC Dummy Models		LSTC Barrier Models
<hr/>				
<b>Sweden</b>	<b>GOMPUTE</b>	<a href="mailto:info@gridcore.com">info@gridcore.com</a>		
	<a href="http://www.gridcore.se">www.gridcore.se</a>	<a href="http://www.gompute.com">www.gompute.com</a>		
	LS-DYNA Cloud Service	Additional software		

<b>Switzerland</b>	<b>DYNAmoreSwiss GmbH</b>	<a href="mailto:info@dynamore.ch">info@dynamore.ch</a>	
		<a href="http://www.dynamore.ch">www.dynamore.ch</a>	
	LS-DYNA	LS-OPT	LS-PrePost
	LS-TaSC	LSTC Dummy Models	
		LSTC Barrier Models	

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<b>UK</b>	<b>Ove Arup &amp; Partners</b>	<a href="mailto:dyna.sales@arup.com">dyna.sales@arup.com</a>		
		<a href="http://www.oasys-software.com/dyna">www.oasys-software.com/dyna</a>		
	LS-DYNA	TOYOTA THUMS		
	LS-TaSC	PRIMER	LS-PrePost	
	REPORTER	SHELL	D3PLOT	T/HIS
	DIGIMAT	Simpleware	FEMZIP	HYCRASH
		LSTC Dummy Models		
		LSTC Barrier Models		

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<b>China</b>	<b>ETA – China</b>		<a href="mailto:lma@eta.com.cn">lma@eta.com.cn</a>		
	<a href="http://www.eta.com/cn">www.eta.com/cn</a>				
	Inventium	VPG	DYNAFORM	NISA	
	LS-DYNA	LS-OPT	LSTC Dummy Models	LS-PrePost	
			LSTC Barrier Models	LS-TaSC	
<b>China</b>	<b>Oasys Ltd. China</b>		<a href="mailto:Stephen.zhao@arup.com">Stephen.zhao@arup.com</a>		
	<a href="http://www.oasys-software.com/dyna">www.oasys-software.com/dyna</a>				
	PRIMER	D3PLOT	HYCRASH	T/HIS REPORTER	SHELL
	LS-DYNA		LS-OPT	LSTC Dummy Models	LS-PrePost
	DIGIMAT		FEMZIP	LSTC Barrier Models	LS-TaSC
<b>China</b>	<b>Shanghai Hengstar Technology</b>		<a href="mailto:info@hengstar.com">info@hengstar.com</a>		
	<a href="http://www.hengstar.com">www.hengstar.com</a>				
	LS-DYNA	LS-TaSC	LSTC Barrier Models	D3VIEW	
	LS-PrePOST	LS-OPT	LSTC Dummy Models		
	Genesis	VisualDoc		ELSDYNA	
	Visual-Crahs DYNA	Visual-Proeces		DynaX & MadyX	
	Enki Bonnet	Visual Environement			

<b>India</b>	<b>Oasys Ltd. India</b>	<a href="mailto:lavendra.singh@arup.com">lavendra.singh@arup.com</a>		
	<a href="http://www.oasys-software.com/dyna">www.oasys-software.com/dyna</a>			
	PRIMER	D3PLOT	T/HIS	
			LS-OPT	LSTC Dummy Models
				LS-PrePost
			LS-DYNA	LSTC Barrier Models
				LS-TaSC

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<b>India</b>	<b>CADFEM Eng. Svce</b>	<a href="mailto:info@cadfem.in">info@cadfem.in</a>		
	<a href="http://www.cadfem.in">www.cadfem.in</a>			
	ANSYS	VPS	ESAComp	optiSLang
	LS-DYNA	LS-OPT	LS-PrePost	

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<b>India</b>	<b>Kaizenat Technologies Pvt. Ltd</b>	<a href="mailto:support@kaizenat.com">support@kaizenat.com</a>		
	<a href="http://kaizenat.com/">http://kaizenat.com/</a>			
	LS-DYNA	LS-OPT	LSTC Dummy Models	LS-PrePost
	Complete LS-DYNA suite of products		LSTC Barrier Models	LS-TaSC

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Distribution/Consulting	Asia Pacific	Distribution/Consulting
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<b>Japan</b>	<b>CTC</b>	LS-dyna@ctc-g.co.jp		
	<a href="http://www.engineering-eye.com">www.engineering-eye.com</a>			
	LS-DYNA	LS-OPT	LS-PrePost	LS-TaSC
	LSTC Dummy Models	LSTC Barrier Models	CmWAVE	

<b>Japan</b>	<b>JSOL</b>			Oasys Suite
	<a href="http://www.jsol.co.jp/english/cae">www.jsol.co.jp/english/cae</a>			JMAG
	JSTAMP	HYCRASH	LS-PrePost	LS-TaSC
	LS-DYNA	LS-OPT		
	LSTC Dummy Models	LSTC Barrier Models	TOYOTA THUMS	

<b>Japan</b>	<b>FUJITSU</b>			
	<a href="http://jp.fujitsu.com/solutions/hpc/app/lsdyna">http://jp.fujitsu.com/solutions/hpc/app/lsdyna</a>			
	LS-DYNA	LS-OPT	LS-PrePost	LS-TaSC
	LSTC Dummy Models	LSTC Barrier Models	CLOUD Services	

<b>Japan</b>	<b>LANCEMORE</b>	<a href="mailto:info@lancemore.jp">info@lancemore.jp</a>		
	<a href="http://www.lancemore.jp/index_en.html">www.lancemore.jp/index_en.html</a>			
	<b>Consulting</b>			
	LS-DYNA	LS-OPT	LS-PrePost	LS-TaSC
	LSTC Dummy Models	LSTC Barrier Models		

<b>Japan</b>	<b>Terrabyte</b>	<b>English:</b>		
	<a href="http://www.terrabyte.co.jp">www.terrabyte.co.jp</a>	<a href="http://www.terrabyte.co.jp/english/index.htm">www.terrabyte.co.jp/english/index.htm</a>		
	<b>Consulting</b>			
	LS-DYNA	LS-OPT	LS-PrePost	LS-TaSC
	LSTC Dummy Models	LSTC Barrier Models	AnyBody	

<b>Korea</b>	<b>THEME</b>	<a href="mailto:wschung@kornet.com">wschung@kornet.com</a>		
	<a href="http://www.lsdyna.co.kr">www.lsdyna.co.kr</a>		Oasys Suite	
	LS-DYNA	LS-OPT	LS-PrePost	LS-TaSC
	LSTC Dummy Models	LSTC Barrier Models	eta/VPG	Planets
	eta/DYNAFORM	FormingSuite	Simblow	TrueGRID
	JSTAMP/NV	Scan IP	Scan FE	Scan CAD
	FEMZIP			

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<b>Korea</b>	<b>KOSTECH</b>	<a href="mailto:young@kostech.co.kr">young@kostech.co.kr</a>		
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	LS-DYNA	LS-OPT	LS-PrePost	LS-TaSC
	LSTC Dummy Models	LSTC Barrier Models	eta/VPG	FCM
	eta/DYNAFORM	DIGIMAT	Simuform	Simpack
	AxStream	TrueGrid	FEMZIP	

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**Taiwan****Flotrend**[gary@flotrend.tw](mailto:gary@flotrend.tw)[www.flotrend.com.tw](http://www.flotrend.com.tw)

LS-DYNA

LS-OPT

LS-PrePost

LS-TaSC

LSTC Dummy Models

LSTC Barrier Models

eta/VPG

FCM

**Taiwan****APIC**[www.apic.com.tw](http://www.apic.com.tw)

LS-DYNA

LS-OPT

LS-PrePost

LS-TaSC

LSTC Dummy Models

LSTC Barrier Models

eta/VPG

FCM



### HPC on-demand for academic users

**Run your LS-DYNA simulations and pay for what you use  
on a turn-key environment**



- For LSTC academic customers.
- Run your simulations from 0.05 €/CCH without reservation
- Remote visualization using LS-PrePost
- Avoid installation and maintenance costs
- Other simulation applications also ready to use
- Global connectivity, remote graphics and collaborative environment
- Large number of cores available

For more information please visit: [www.gompute.com](http://www.gompute.com)

Price for computing-core/hour (CCH). Licenses and account set up are not included. Pricing valid only for universities, academic centers and research institutes. The following are trademarks or registered trademarks of Livermore Software Technology Corporation in the United States and/or other countries: LS-DYNA, LS-OPT, LS-PrePost, LS-TaSC. Gompute is owned and operated by Gridcore AB, 2012. All rights reserved.

[www.gompute.com/services](http://www.gompute.com/services)



**Managed hosting:** Gompute delivers managed hosting services for your infrastructure. We have long experience of managing demanding environments, and with our own Datacenter, have thorough control of the facilities.

**HPC Advisory services:** We are working closely with your team, to investigate, plan and propose action for your HPC environment. Gompute has large understanding of the needs and facts that needs to be targeted to ensure a successful project, taking into account key metrics for IT Dep, C-level exec and most importantly: the final users - the engineers

**Training & Education:** Gompute offers training on several HPC and Engineering topics.

Gompute offers a wide range of services enabling our customers to get the most out their HPC investments, enabling higher productivity. With our background and portfolio, we are well prepared to deliver true end to end solutions for you HPC environment.

## COMPREHENSIVE HIGH PERFORMANCE COMPUTING

Gompute is designed and developed to provide all the nuts, bolts and pre-fabricated solutions required to make your HPC a success.

Gompute provides cost effective solutions for a wide variety of problems experienced in enterprise HPC environments.

Enterprise HPC involves extensive planning, implementation and operation costs. Lot of these costs are incurred trying to make sure you have all the components required for a successful HPC environment and finally, hoping that the choices you made integrate seamlessly with each other to form a united HPC environment.

Gompute is the answer to tackle this problem, by providing all the solutions required to make your HPC a success, in one pre-integrated package. This will tremendously increase the ROI for your HPC resources.



**POD (Penguin Computing on Demand) offers software including LSTC's LS-DYNA**

[www.penguincomputing.com/services/hpc-cloud](http://www.penguincomputing.com/services/hpc-cloud)

**Penguin HPC clusters are optimized for engineering workloads and offer:**

- Instant access to an HPC Cloud Cluster
- High performance InfiniBand bare-metal compute
- Free support from HPC experts
- No charges for network transfers
- Cost-effective, pay-per-use billing model
- Secure environment for private data
- Detailed billing reports for user groups and projects

**Self Registration Portal – featuring rich--documentation, wiki, FAQ, pricing and more.**

<https://pod.penguincomputing.com/>

**POD Software Applications and Libraries (visit site for complete listing)**

#### **FEA, CFD and FDTD Modeling**

- **LS-DYNA / LS-PrePost** LS-DYNA is an advanced general-purpose multiphysics simulation software package. Its core-competency lie in highly nonlinear transient dynamic finite element analysis (FEA) using explicit time integration. LS-PrePost is an advanced pre and post-processor that is delivered free with LS-DYNA.
- **OpenFoam:** OpenFOAM (Open source Field Operation And Manipulation) is a C++ toolbox for the development of customized numerical solvers, and pre-/post-processing utilities for the solution of continuum mechanics problems, including computational fluid dynamics (CFD).



- **ANSYS HFSS:** ANSYS HFSS software is the industry standard for simulating 3-D full-wave electromagnetic fields. Its gold-standard accuracy, advanced solver and compute technology have made it an essential tool for engineers designing high-frequency and high-speed electronic components.
- **ANSYS Fluent** ANSYS Fluent software contains the broad physical modeling capabilities needed to model flow, turbulence, heat transfer, and reactions for industrial applications.
- **Star-CD and Star-CCM+:** STAR-CCM+ is CD-adapco's newest CFD software product. It uses the well established CFD solver technologies available in STAR-CD, and it employs a new client-server architecture and object oriented user interface to provide a highly integrated and powerful CFD analysis environment to users.
- **Convergent:** CONVERGE is a Computational Fluid Dynamics (CFD) code that completely eliminates the user time needed to generate a mesh through an innovative run-time mesh generation technique.
- **Lumerical:** Simulation tools that implement FDTD algorithms.



**Cloud computing services  
for  
JSOL Corporation LS-DYNA users in Japan**

**JSOL Corporation is cooperating with chosen  
cloud computing services**

**JSOL Corporation, a Japanese LS-DYNA distributor for Japanese LS-DYNA customers.**

LS-DYNA customers in industries / academia / consultancies are facing to the increase use of LS-DYNA more and more in recent years.

In calculations of optimization, robustness, statistical analysis, larger amount of LS-DYNA license in short term are required.

JSOL Corporation is cooperating with some cloud computing services for JSOL's LS-DYNA users and willing to provide large in short term license.

This service is offered to the customers by the additional price to existence on-premises license, which is relatively inexpensive than purchasing yearly license.

**The following services are available**

**Contact; JSOL Corporation Engineering Technology Division [cae-info@sci.jsol.co.jp](mailto:cae-info@sci.jsol.co.jp)**

**(only in Japanese).**

**HPC OnLine**

NEC Solution Innovators, Ltd.

[http://jpn.nec.com/manufacture/machinery/hpc\\_online/](http://jpn.nec.com/manufacture/machinery/hpc_online/)

**Focus**

Foundation for Computational Science

<http://www.j-focus.or.jp>

**Platform Computation Cloud**

CreDist.Inc.

<http://www.credist.co.jp/>

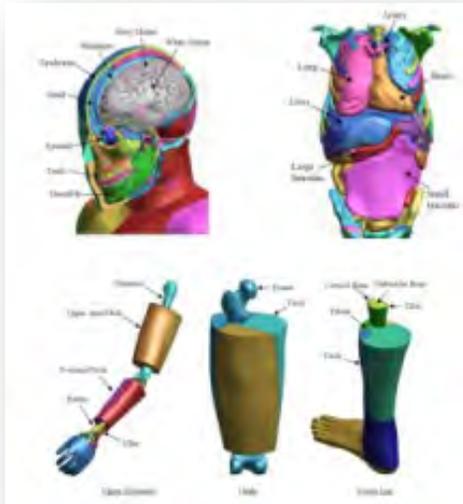
**PLEXUS CAE**

Information Services International-Dentsu, Ltd.  
(ISID) <https://portal.plexusplm.com/plexus-cae/>

**SCSK Corporation**

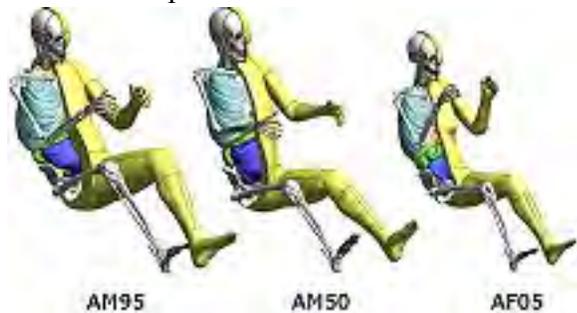
<http://www.scsk.jp/product/keyword/keyword07.html>

**TOYOTA - Total Human Model for Safety – THUMS**

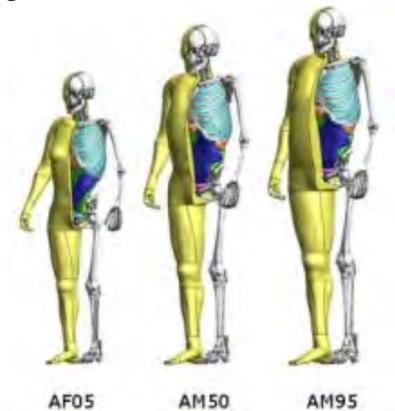


The Total Human Model for Safety, or THUMS®, is a joint development of Toyota Motor Corporation and Toyota Central R&D Labs. Unlike dummy models, which are simplified representation of humans, THUMS represents actual humans in detail, including the outer shape, but also bones, muscles, ligaments, tendons, and internal organs. Therefore, THUMS can be used in automotive crash simulations to identify safety problems and find their solutions.

Each of the different sized models is available as sitting model to represent vehicle occupants



and as standing model to represent pedestrians.



The internal organs were modeled based on high resolution CT-scans.

THUMS is limited to civilian use and may under no circumstances be used in military applications.

**LSTC is the US distributor for THUMS.** Commercial and academic licenses are available.

For information please contact: [THUMS@lstc.com](mailto:THUMS@lstc.com)

THUMS®, is a registered trademark of Toyota Central R&D Labs.

## LSTC – Dummy Models

### LSTC Crash Test Dummies (ATD)

Meeting the need of their LS-DYNA users for an affordable crash test dummy (ATD), LSTC offers the LSTC developed dummies at no cost to LS-DYNA users.

LSTC continues development on the LSTC Dummy models with the help and support of their customers. Some of the models are joint developments with their partners.

e-mail to: [atds@lstc.com](mailto:atds@lstc.com)

#### Models completed and available (in at least an alpha version)

- Hybrid III Rigid-FE Adults
- Hybrid III 50th percentile FAST
- Hybrid III 5th percentile detailed
- Hybrid III 50th percentile detailed
- Hybrid III 50th percentile standing
- EuroSID 2
- EuroSID 2re
- SID-IIs Revision D
- USSID
- Free Motion Headform
- Pedestrian Legform Impactors

#### Models In Development

- Hybrid III 95th percentile detailed
- Hybrid III 3-year-old
- Hybrid II
- WorldSID 50th percentile
- THOR NT FAST
- Ejection Mitigation Headform

#### Planned Models

- FAA Hybrid III
- FAST version of THOR NT
- FAST version of EuroSID 2
- FAST version of EuroSID 2re
- Pedestrian Headforms
- Q-Series Child Dummies
- FLEX-PLI

## LSTC – Barrier Models

Meeting the need of their LS-DYNA users for affordable barrier models, LSTC offers the LSTC developed barrier models at no cost to LS-DYNA users.

LSTC offers several Offset Deformable Barrier (ODB) and Movable Deformable Barrier (MDB) models:

- ODB modeled with shell elements
- ODB modeled with solid elements
- ODB modeled with a combination of shell and solid elements
- MDB according to FMVSS 214 modeled with shell elements
- MDB according to FMVSS 214 modeled with solid elements

- MDB according to ECE R-95 modeled with shell elements
- AE-MDB modeled with shell elements

- IIHS MDB modeled with shell elements
- IIHS MDB modeled with solid elements
- RCAR bumper barrier

- RMDB modeled with shell and solid elements

e-mail to: [atds@lstc.com](mailto:atds@lstc.com).



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**NEWS FEEDS**

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<a href="#">CADFEM</a>	<a href="http://www.cadfem.de">www.cadfem.de</a>
<a href="#">Cray Inc.</a>	<a href="http://www.cray.com">www.cray.com</a>
<a href="#">ESI Group</a>	<a href="http://www.esi-group.com">www.esi-group.com</a>
<a href="#">ETA</a>	<a href="http://www.eta.com">www.eta.com</a>
<a href="#">Lancemore</a>	<a href="http://www.lancemore.jp/index_en.html">www.lancemore.jp/index_en.html</a>
<a href="#">Lenovo</a>	

Webinars and Videos on BETA Site and more On BETA CAE YouTube Channel:

<https://www.youtube.com/betacae>



### Webinar on μETA for CFD

Introduction to the use of μETA for CFD post-processing through a live demonstration



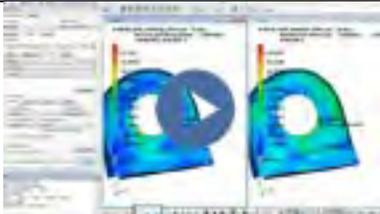
### ANSA/μETA features for CFD pre- and post-processing

Overview presentation of the functionality of ANSA/μETA for CFD pre- and post-processing



### Introductory webinar on ANSA for CFD pre-processing

Introduction of the use of ANSA for CFD pre-processing through a live demonstration



### μETA Tutorials - How To Guides Playlist

Step-by-step tutorials - for post-processing tasks with μETA



### Introduction to the ANSA Kinetics Tool

Introductory presentation of the capabilities of the new ANSA Kinetics Tool



**Fracture, Damage and Failure Using LS-DYNA - NEW COURSE OFFERING**

This course will allow LS-DYNA users to model Fracture, Damage, and Failure. The different methodology to model failure and fracture in LS-DYNA will be presented and discussed. All formulation in LS-DYNA including Lagrangian, Eulerian, SPH, SPG, XFEM, EFG, and the DEM methods etc. will be discussed. Various examples will be presented.

**Course Outline**

- Chapter-1  
Introduction & Historical Review
  - Brittle Failure
  - Ductile Failure
- Chapter-2  
Fundamental Theoretical Concepts
  - Failure Theories
  - Damage Models
  - Fracture Mechanics
- Chapter-3  
Material Models with Failure & Damage
- Chapter-4  
Fracture & Computational Methods
- Chapter-5  
Element Erosion; Advantages & Short Comings
- Chapter-6  
Current Capabilities to Model Failure & Damage
  - Lagrangian
  - Eulerian & ALE
  - SPH
  - SPG
  - XFEM
  - EFG
  - DEM
- Chapter-7  
Current Capabilities to Model Fracture
- Chapter-8  
Damage Verification Examples
- Chapter-9  
Fracture Verification Examples

**California**

**Intro to LS-PrePost -**  
**August 3**

**Adva. Impact Options in LS-DYNA**  
**Aug 11-12**

**Contact LS-DYNA -**  
**Aug 13-14**

**ALE/Eulerian & Fluid/Structure**  
**Interaction in LS-DYNA Aug 17-19**

**SPH: Smoothed Particle Hydrodynamics**  
**in LS-DYNA Aug 20-21**

<b>Germany</b>	<b>CADFEM GmbH</b>	<a href="http://www.cadfem.de">www.cadfem.de</a>
<b>Germany</b>	<b>DYNAMore</b>	<a href="http://www.dynamore.de/en">www.dynamore.de/en</a>
<b>US</b>	<b>LSTC</b>	<a href="http://www.lstc.com">www.lstc.com</a>
<b>US</b>	<b>ETA</b>	<a href="http://www.eta.com">www.eta.com</a>
<b>US</b>	<b>Cae Associates</b>	<a href="http://www.caeai.com">www.caeai.com</a>
<b>Sweden</b>	<b>DYNAMORE Nordic</b>	<a href="http://www.dynamore.se">www.dynamore.se</a>
<b>France</b>	<b>DynAS+</b>	<a href="http://www.dynasplus.com">www.dynasplus.com</a>
<b>Thailand</b>	<b>DFE-Tech</b>	<a href="http://www.dfe-tech.com/training.html">www.dfe-tech.com/training.html</a>
<b>UK</b>	<b>ARUP</b>	<a href="http://www.oasys-software.com/dyna/en/training">www.oasys-software.com/dyna/en/training</a>

## Freeware LS-DYNA MPP Program Manager for Windows



Predictive Engineering is pleased to introduce the LS-DYNA MPP Windows Interface

Originally developed for their LS-DYNA consulting project work, Predictive Engineering realized it would be useful to the LS-DYNA community and is offering it to LS-DYNA Users.

LS-DYNA MPP Windows Interface is based upon the excellent functionality of LSTC's LS-DYNA Program Manager (SMP).

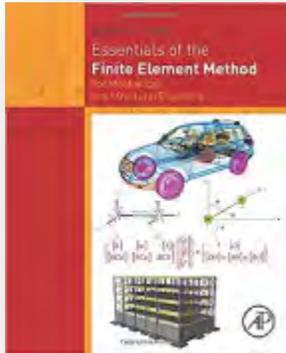
The program allows the user to:

- Run LS-DYNA jobs easily by clicking on file names and not worrying about "spaces"
  - Direct the output
  - Pick any solver via a Windows dialog
  - Rerun jobs with a click
  - Save analysis scripts to Windows auto-execute bat files
- Set Windows affinity
  - Advanced file options for LS-DYNA
  - Separate entry of extra MPI and LS-DYNA commands
  - Ability to set LS-DYNA license environment variables within the MPI program
  - Restart jobs
  - Use all the SMP CTRL-C switches with the click of a button

Visit Predictive Engineering - download LS-DYNA MPP Program Manager for Windows [www.predictiveengineering.com/content/free-ls-dyna-mpp-program-manager-windows](http://www.predictiveengineering.com/content/free-ls-dyna-mpp-program-manager-windows)

**Predictive Engineering** provides finite element analysis consulting services, software, training and support to a broad range of engineering companies across North America. They strive to exceed client expectations for accuracy, timeliness and knowledge transfer. Their process is both cost-effective and collaborative, ensuring all clients are reference clients.

Visit their website to view their portfolio of [FEA, CFD and LS-DYNA consulting projects](#)



### [Essentials of the Finite Element Method: For Mechanical and Structural Engineers](#)

Paperback – July 28, 2015

by Dimitrios G Pavlou (Author)

Fundamental coverage, analytic mathematics, and up-to-date software applications are hard to find in a single text on the finite element method (FEM). Dimitrios Pavlou's *Essentials of the Finite Element Method: For Structural and Mechanical Engineers* makes the search easier by providing a comprehensive but concise text for those new to FEM, or just in need of a refresher on the essentials.

*Essentials of the Finite Element Method* explains the basics of FEM, then relates these basics to a number of practical engineering applications. Specific topics covered include linear spring elements, bar elements, trusses, beams and frames, heat transfer, and structural dynamics. Throughout the text, readers are shown step-by-step detailed analyses for finite element equations development. The text also demonstrates how FEM is programmed, with examples in MATLAB, CALFEM, and ANSYS allowing readers to learn how to develop their own computer code.

Suitable for everyone from first-time BSc/MSc students to practicing mechanical/structural engineers, *Essentials of the Finite Element*

*Method* presents a complete reference text for the modern engineer.

- Provides complete and unified coverage of the fundamentals of finite element analysis
- Covers stiffness matrices for widely used elements in mechanical and civil engineering practice
- Offers detailed and integrated solutions of engineering examples and computer algorithms in ANSYS, CALFEM, and MATLAB

**About the Author** - Dimitrios Pavlou is a Professor in the Department of Mechanical and Structural Engineering and Materials Science at the University of Stavanger in Norway. In 2014 he was elected a full member of the Norwegian Academy of Technological Sciences. He has had twenty years of teaching and research experience in the fields of finite elements, boundary elements, mechanics of solids, and fracture mechanics. Prof. Pavlou has published many research publications and authored/edited five books and conference proceedings...