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FEA Not To Miss+ Town

Software & Engineering Solutions

Town Hall Meeting, Blog & Gossip

AEROSPACE – Italian Airforce

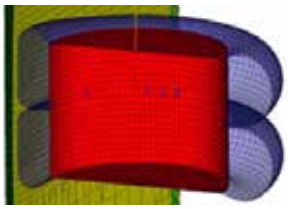
ANSYS

AUTOMOTIVE - Honda

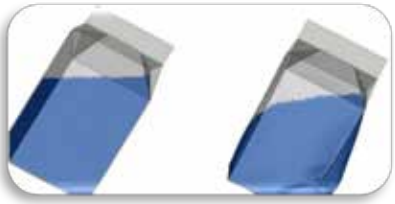
CADFEM

CATI

DYNAmore Germany



DYNAmore Nordic

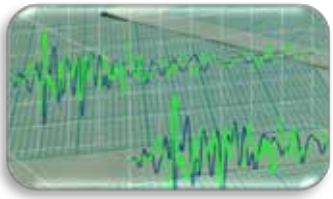


D3View

JSOL

MSC - Hexagon

OASYS



OmniQuest

OZEN

Rancher – Ford Heritage Vault

Supervisor – Gossip

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Editors: **(alpha order) Anthony, Art, Marnie, Marsha, Yanhua**

Town Pretend to be Editors

The Old Cattle Rancher - No one in town knows his name. You yell "Hey, Old Rancher."
The Old Retired Pilot - No one in town knows his name. You yell "Hey, Old Pilot."
The Old Retired Racer - No one in town knows his name. You yell "Hey, Old Racer."
They are all brothers - strange family

Contact us at feaanswer@aol.com

Map Vector & town graphics in our magazine are courtesy of vecteezy

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Author and/or person using social media, or information from the company website

- **The websites used will have the complete articles, and higher resolution graphics/videos.**
- **We always reference and link to the source listed below.**
- **This blog/magazine is a positive venue for editorial purposes and not revenue derived**

July

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Thanks to Vecteezy for our **Map Vector/town and many of the graphics in our magazine**

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Cattle Rancher – Whatever he wants

Secretary – Virtual Tours

Supervisor – Anything, never sure what will show up!

Convention Center Booths

Goodbye, AND answers to the Old Pilot Quiz

We always reference and link to the articles/information.
This blog/magazine is a positive venue, for editorial purposes, and not revenue derived

Serving coffee & M&M's - hmmmm Candy!

Our town comprises individuals interested in solutions for the future and, of course, animals and children.

Gossip is at the local coffee shop.

Pets are welcome. (Small pets, horses stay outside!) (small goats and pigs are not considered pets)

Announcement – The town welcomes new resident Computer Aided Technology (CATI) to our town, map, convention center and bringing you technical information.

As presiding town Supervisor, I call this meeting to order:

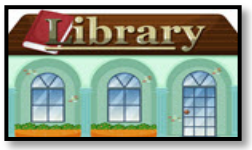
1. We have evolved into FEANTM+ (We added the "+") Why? because we have more than FEA.
2. Who just yelled, "We all knew that!" Okay then, we added the "+" because it means PLUS!
3. I have my own section. It is after the Secretary Section and is called Supervisor – Yep, that is me.
4. It will have – uh, uh, it will evolve - not sure what it will have.
5. What do I supervise? Coyote's, raccoons, vultures, owls, but they don't listen to me.

The Old Retired Rancher and the Town Secretary are arguing about a town heritage vault.

1. She started collecting old pitchforks and shovels!
2. He started collecting old hubcaps. Hubcaps he nailed to the side of his barn! (That is not a vault!)
3. The town is NOT opening a heritage vault –A real one was already created by Ford!
   See Rancher – Ford Heritage Vault is now open and a great walk down memory lane.

Visit our Research Hospital & Library

FE Analysis of Motorcycle Helmet Performance under Severe Accidents - This research investigates the structural performance of commercial motorcycle helmets in Thailand for head injury prevention using finite element analysis via LS-DYNA.



Sports Aisle

- Methods for Modeling Solid Sports Ball Impacts
- Golf Ball Impact: Material Characterization and Transient Simulations

Meeting Hall Announcement Board - Town Residents

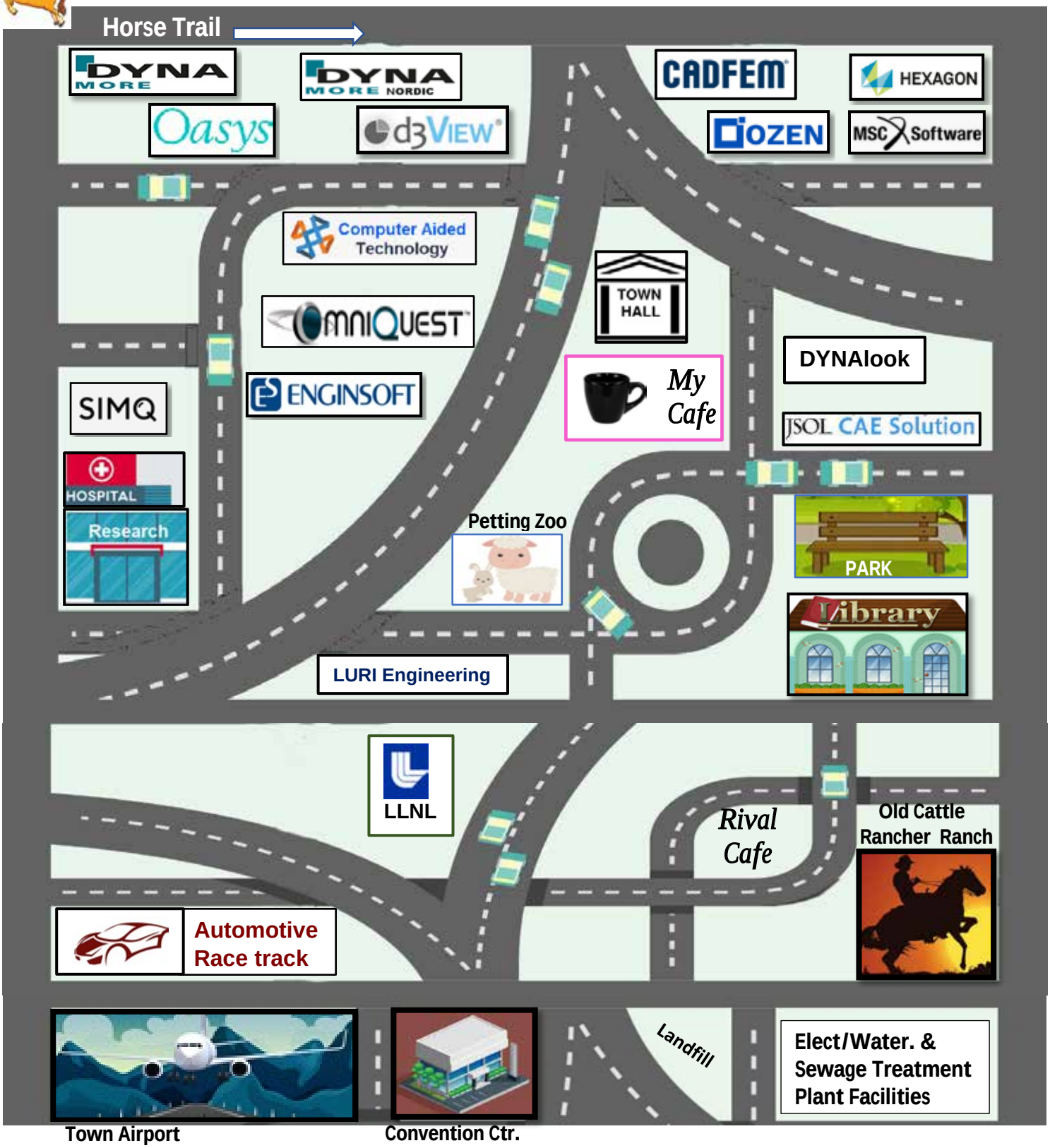
July 20, Join K. Kayvantash The use of Machine Learning in Future Transport Safety Applications

Aug 16th GHBMC Users' Workshop

Aug 17 SIMTEQ Eng. & MSC Software

-

Town Map



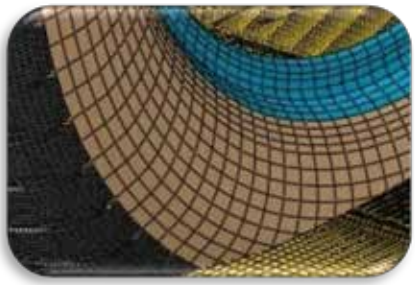
* **The logos displayed, of content in our magazine, do not represent their endorsement.**
* **To be removed, please notify feaanswer@aol.com with the request.**
* **Your town lot will be auctioned, with the Town applying all proceeds to the coffee budget.**
* **The town map changes pending information, and rotational building rentals.**

We welcome Joe Formicola, V.P., CAE Simulation Solutions of Computer Aided Technology to our town meeting for a Meet & Greet with our town residents.

At CATI we are driven by a passion for engineering, and a steadfast determination to find the right solution, every time.

Advanced Simulation - Why Simulate? Bringing a competitive new product to market is hard. Engineers have to create something the world has never seen before, and they have to be absolutely sure that it will work 100% of the time. That's a scary proposition. How do you effectively manage this risk? Failure to do so will have serious consequences: production delays, lost contracts, failure in the field, expensive recalls, reputational damage, the list goes on…

Among our Services



The CATI Advantage:
Expert Engineers
Lower Development Costs
Faster to Market

Model Generation - High-precision analyses, large assemblies, and strict FE guidelines require the advanced level of modeling capability that CATI possesses.

High-precision Analyses - While automatic meshers can often get the job done for stiffness analysis or non-critical parts, it requires preplanning and a human touch to get accurate results in sensitive areas, handle difficult CAD, or grapple with large assemblies.

Large Assemblies - Complex assemblies involving many attached or moving parts can also be difficult for the inexperienced to manage or model realistically, requiring great organizational skills, attention to detail, and understanding of FE connector behavior.

Project Analysis - "Does it pass the test?" CATI can assemble the model, design the simulation, and give you the answer. Compare your options, validate your ideas, hit your targets with confidence.

Engineering Analysis - i.e. virtual prototyping, simulation, FEA, or CAE — keeps engineers, and indeed whole companies, on the right heading as they design increasingly complex and interconnected systems.

Augment Your In-house Engineering - For those who need more heads or more computers, we've got both. If you're comfortable with the way you're doing things, we can pick up your methods and your standards as if we were another part of your team. We'll be there when you need us, and you can keep your pipeline moving smoothly, through all the peaks and troughs.

Product Design & Development - Integrated design & development services from research to production. CATI designers and engineers work side-by-side using the latest analysis and optimization tools to efficiently develop parts to specification.

Correlation & Characterization - Accuracy is essential to effective simulation, so we've made physical-to-virtual test correlation and material characterization two of our most practiced skills.

Curt Chan, Senior Product Marketing Manager, Ansys

"Among the more surprising business trends of the last decade has been the dramatic privatization of space launches and exploration. According to a recent article in The Guardian, private businesses now account for approximately 80% of the $424-billion worldwide space industry."

Excerpt - Read the full article and graphics on the website

CEA Aims to Democratize Space by 3D Printing Rocket Engines

While a handful of mega-wealthy individuals — including Richard Branson, Elon Musk, and Jeff Bezos — have received plenty of negative media attention for their efforts to establish space tourism, the potential of space for a range of business applications is enormous. From launching satellites to transporting goods, the worldwide space industry represents untapped opportunities for product and service commercialization. It may well be the "final frontier" for a new generation of ambitious entrepreneurs

(video on website - CEA's unique, single-piece rocket engine design will be manufacturable in less than six hours via 3D printing with Velo3D as a partner. It will be capable of producing kilonewtons of thrust while weighing less than 2 kilograms.)

One such entrepreneur, and a self-confessed space evangelist, is Ewan Craig, who founded Connect Everything Aerospace (CEA) in the U.K. in 2020, based on a novel idea he developed during the early months of the COVID-19 lockdown. While many of us were taking long walks, assembling puzzles, or baking bread, Craig was imagining an unexpected way to make space more accessible, more affordable, and more democratic by 3D printing rocket engines.

Less than 18 months later, with support from Ansys via its Startup Program, Craig is preparing for his first test launch. Recently, I talked with Craig about his unique vision — and how he's managed to realize it so quickly.

Q: When I hear the words "additive manufacturing," rocket engines don't seem like a natural fit. After all, we use "rocket science" to express the most extreme example of product complexity. So, how exactly did the concept for CEA originate?

A: I've always thought aerospace engineering is just the coolest thing we do as human beings. The moon landing, sending rovers to other planets, having men and women living in orbit around our planet — it's so incredible. So, during the initial COVID-19 lockdown, I did an online open course, an introduction to basic rocket science, created by the Massachusetts Institute of Technology (MIT). I just loved it. I started doing some research and I learned about an aerospike engine design that was conceived in the 1960s but never really got off the ground, pun intended. And there was a moment when I thought: "Hold on a second.

Should I try and redesign this for today?" The engine has an utterly unique design that allows it to deliver maximum thrust as it climbs through the atmosphere, self-adapting to the changes in ambient pressure to support optimum exhaust expansion. But that unique design makes it heavy, hard to manufacture, and expensive to produce using conventional materials and fabrication processes. Additive manufacturing, or 3D printing, is really the only way to produce it at scale. With 3D printing, complexity is not really an issue. As long as you optimize the design, it's just a matter of pressing a button. By combining the really modern technology of 3D printing with this rather old invention of the aerospike rocket engine, you can actually make something that's viable today, both financially and practically. And that was the genesis of CEA.

Q: Once you have the ability to mass produce rocket engines quickly and affordably, what does that make possible?

A: The opportunities for a printable rocket engine are huge. I like to think of it as similar to the Ford Model T moment in cars. If you're able to start making these things at a fraction of the price and with far less labor — and skilled labor, especially — then it means you don't need a massive, government-funded operation like NASA to put things into space. It can become a cheaper, more accessible enterprise. You can have much smaller rockets powered by cheaply built rocket engines. You can have small companies offer services like satellite launches. You could have loads of little startups popping up in the U.K. or in America or all over the world, especially in developing nations where space exploration is something that's just not happened. Right now it's a game for the richest men on the planet, and that should change. A company like CEA actually can start instigating that change.

Q: What are the business challenges you've faced as a young entrepreneur with a big, ambitious idea?

A: From the get-go, this was never really a business enterprise for me. I was doing this work out of a scientific curiosity; I was just trying to solve the technical problems. But, in doing that, I was challenged because I didn't have access to the best tools for my design exploration and simulation needs, specifically Ansys Discovery and Ansys Fluent. Being able to access Ansys software, the industry-leading software for product developers, through the startup program was incredibly important. If you imagine the internal structure of this rocket engine, it's a labyrinth of channels, passages, coolant flows, and all manner of different areas and surfaces. You can't make a million prototypes and destroy them. You have to be absolutely confident in your designs before you start printing them, and Ansys delivers that confidence quickly. I couldn't have proven my concept, founded a company, applied for patents, and identified a 3D printing partner without the credibility Ansys provided me. I've been hugely supported by Ansys throughout the engineering phase, and now it's time to start thinking about commercial viability and making a profit — whether that means manufacturing rocket engines in-house or licensing the technology to others. I like to describe CEA as being in the pre-revenue phase, but it's brilliant to imagine where this company could go. And I wouldn't be at this stage without Ansys.

CEA relied on Ansys Discovery (pictured) and Ansys Fluent in creating and verifying the design.

Visit the website for more questions and answers

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Fluid mechanics simulations help RigiTech to optimize their high-tech drones and develop innovative systems to increase reliability and range.

Electric cargo UAV solutions

RigiTech develops UAV solutions for the healthcare logistics market.

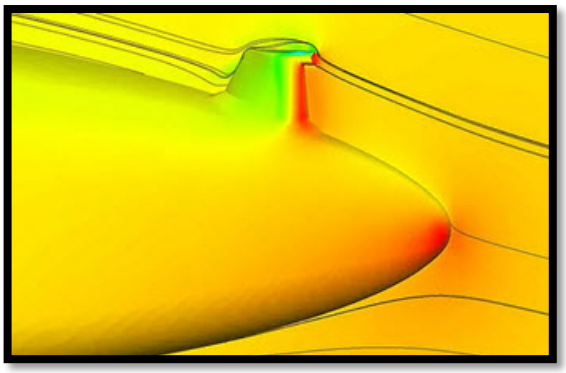
Innovative multi-function components for RigiTech UAV with ANSYS CFD

Sector: Aerospace

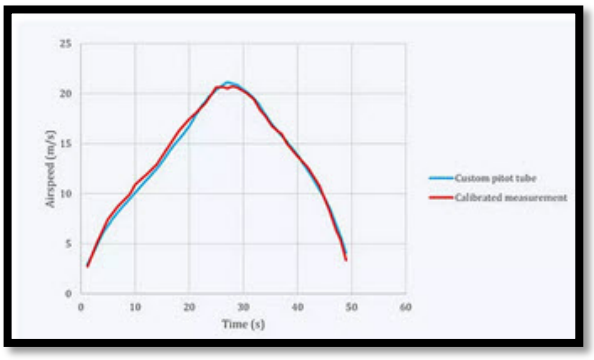
Specialist field: Fluid mechanics

Task	Solution	Customer benefits
Develop a multi-function pitot static system to measure airspeed and acts as an antenna cover. The design needs to fulfill the requirements of both systems.	The existing literature around the subject of pitot statics systems was used to design a CAD model. The latter was then tested under various conditions in Ansys Fluent. Eventually, the simulated results were compared to experimental results gathered during flight tests.	RigiTech now ships their flagship drones with the novel pitot system developed thanks to CADFEM.

Project Details - RigiTech develops innovative electric cargo UAV solutions for the healthcare logistics market. Traditionally, off the shelf UAV grade pitot static systems are prone to clogging due to dust and rain. In addition, their metallic build and slender shape represents a potential hazard for operators when using the UAV as an industrial logistics tool. The opportunity to merge this system into an existing antenna cover was used to develop a water resistant and easily changeable pitot static system. The new design needs to accurately measure the airspeed for different flow angle within the flight envelope, cover and protect the antenna, as well as meet the design requirements.



To calculate the air speed of the drone, the pressure is measured. With the help of CFD-Simulation, the measured pressure by the custom pitot tube can be simulated. Therefore, possible deviation through the wide range of the flight envelope can be determined in advanced



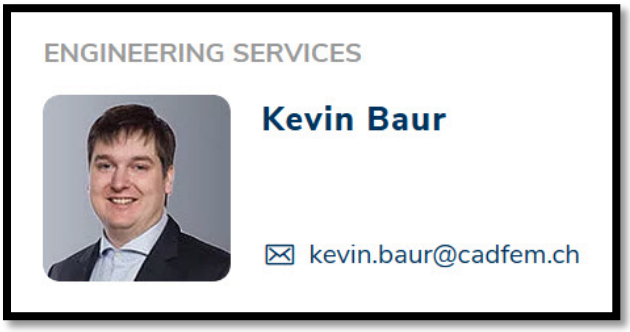
To verify and calibrate the measured data of the custom pitot tube, the measurement was compared with a calibrated device.

Solution - The performance targets of the system were firstly defined, this includes a large angle of attack operating range, improved waterproofness and minimal size. Further, the flow disturbance should be minimized to fulfill the performance target.

Using the existing literature about this topic a design was developed. It was then tested with the fuselage at different angles of attack and yaw and addition to different protrusion lengths to understand the effects at play and compare these to the theory. Through iteration and CFD testing, an optimal design was decided on. Finally, actual flight testing was carried out to confirm the simulation results which were confirmed.

Customer Benefit - Computational fluid dynamics greatly reduced the time to develop the pitot system by allowing various designs and parameters to be tested in little time. Further, it increases the success of the initial prototype, and less testing is required. This rapid iteration is a key part of developing novel product. Thanks to CADFEM, RigiTech achieved the following results:

- Reductions in prototypes and flight tests
- Determination of the flight envelope for the pitot static system
- Validation of fuselage pitot interaction (low drag)
- Develop multi-functional pitot static system for their Eiger drone which is now shipping to customers



Dan Saperstein, CATI ,"There's a reason why there's an eraser on a pencil."
Support from an experienced sim team increases the capacity of expert engineers at the customer.

How CATI's Sim Team Is Expanding Customer Capabilities

By: Zack Yates

"There's a reason why there's an eraser on a pencil." That's how Dan Saperstein, CATI's senior vice president of business systems, describes the creative, iterative process of developing a product for the real-world using simulation. In the early design stages, simulation allows companies greater leeway to experiment and innovate—to design with a pencil, rather than a pen.

"Companies traditionally brought products to market through physical testing," says Dan. "They would physically design it, build it, break it, and redesign it until it was no longer broken." It's a process that is both time consuming and expensive, and is also limiting in the type of tests that can be performed and the data it is possible to collect from them. With simulation, the story is different. "We're able to bring our customer's process to market a lot faster, allowing for better quality and better innovation. Simulation is no longer a nicety in the marketplace—it's a necessity."

Joe Formicola, CATI's vice president of CAE simulation solutions, concurs. "I see simulation becoming even more of an important tool for product development. It's becoming increasingly available because of its ease of use on the 3DEXPERIENCE Platform and the connectedness to CAD, but also because of the computational capabilities that the cloud has allowed us to have."

If the advantages that simulation brings to an engineering firm are hard to overstate, so too are the benefits that come from working with an experienced sim team.

This was the logic CATI followed in late 2020, when they acquired Caelynx, an Ann Arbor-based team of simulation consultants specializing in the Dassault Systèmes product line of simulation software, which also includes SOLIDWORKS. By bringing on a simulation team with decades of expertise in diverse fields, CATI could better support their own customer base of SOLIDWORKS users by helping them integrate their CAD workflows to a wider range of advanced simulation tools.

However, as Joe is quick to point out, an expert simulation team is an enhancement to a company's internal team, not a replacement. "We want our customer's expert engineers to have expert tools. But to create these types of easy-to-use workflows that connect to CAD and are very advanced, you need people with experience who have in-depth understanding of the physics solvers, of the CAD tools, and who are used to working with customers and helping them implement these tools."

For as impressive as all that sounds, the depth and breadth of CATI's new simulation team can best be demonstrated by introducing the individual members.

Contact our service representatives to learn more.

If your company needs simulation support, these are the people ready to assist you

JOHN HUHN, Consulting Svcs. Engineering Mgr.

CARL OSTERWISCH, Technical Manager

JIM REED, Mgr. Electromagnetics

DRAGAN MARIC, Lead Engineer

CORY OSTROW, Sr. Design Engineer

KURT KURTIN, Sr. Product Manager

MARCEL INGELS, Lead Engineer

KUNAL KHOT, Sr. CAE Engineer

JEAN-MARC GERY, Sr. Engineer for Electromagnetic Applications

ROBERT WARREN, Application Engineer Manager

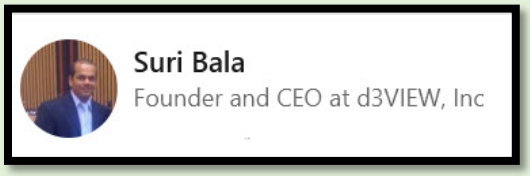
BILL REUSS, Senior Application Engineer Specialist, Simulation

MATT SHERAK, Senior Simulation Product Specialist

With the acquisition of Caelynx, CATI is able to offer something few competitors can match. Joe Formicola, the former CEO of Caelynx, has already seen the value a dedicated sim team can provide customers, and is eager to bring these services to CATI's customer base. "We can take SOLIDWORKS CAD and 3D simulation and marry the two on the 3DEXPERIENCE Platform, and then bring services to the community that are better than anything else."

In many ways, simulation as a service is following in the footsteps of SaaS models, which allow businesses to better manage their expenditures. Few companies have the resources to support a large simulation team with a skill set as diverse as CATI's. But with the CATI sim team to back them up, they can be assured of expert consultation in even the most niche fields, whenever they need it.

"In our industry, having seventeen consultants with years of experience specific to different physics-based simulation technology to help our customers is very unique," says Dan Saperstein. "It's a tremendous amount of experience, and we're really excited to be able to offer that to our customer base. Having the skill set of Caelynx and being able to offer that up to our customers is a tremendous value,,,"

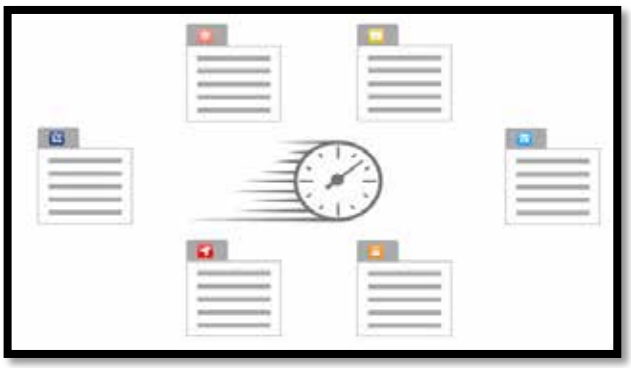


"Did you know that d3VIEW makes navigation between different applications and information simple and smooth with customizable dashboards? You can populate each dashboard with important applications to access them quickly on the same page."

[Dashboards - Design Custom Application Tabs All Under the Same Page]

Filter It Your Way - Use advanced, customized filters to only show your most relevant information and make endless amounts of application pages to fit your needs.

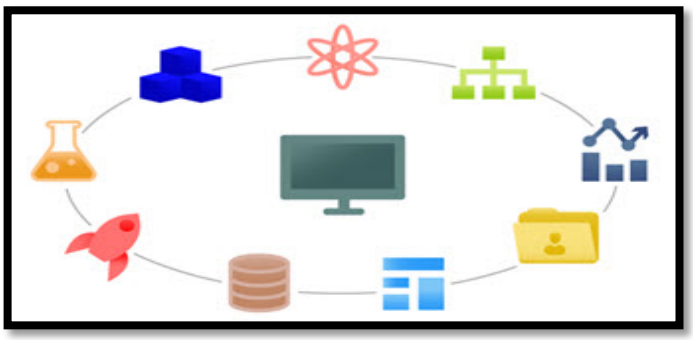
Filters stay present even after closing out of the platform.

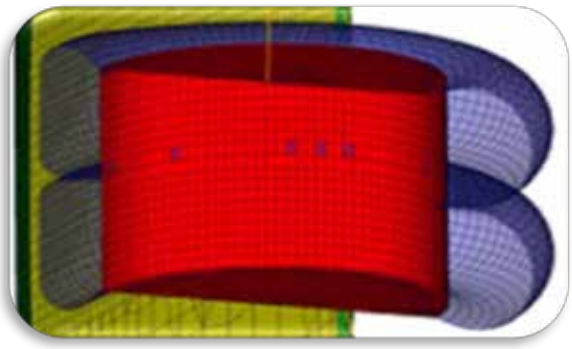


Faster Operation - With custom dashboards, you can spend less time switching between applications the traditional way (via the application menu), and spend more time reviewing, analyzing and exploring your data.

Dashboards even has a multitude of quick-access right-click options for all your records which includes sharing, deleting, editing, organizing studies and creating groups.

More Options - Dashboards even has a multitude of quick-access right-click options for all your records which includes sharing, deleting, editing, organizing studies and creating groups.





DYNAmore - Pendulum Model - Glass structures have to comply with several requirements relating to different loading scenarios and design variations. For that purpose, the deformable pendulum model was developed.

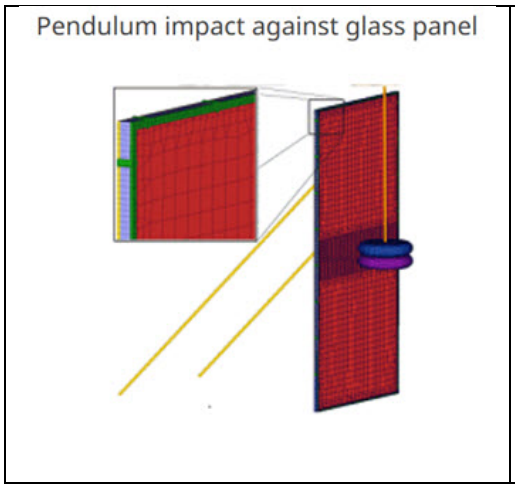
The deformable pendulum model is used to investigate different loading scenarios and design variations of glass structures as required for instance by the German building code. The model is build according to DIN EN 12600 2003-4.

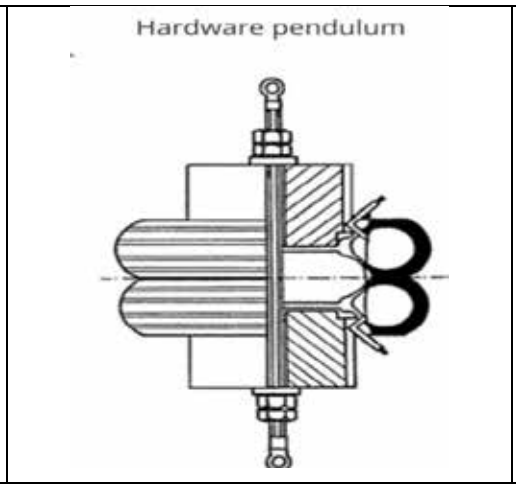
While at present it is not allowed to base the design of glass structures on simulations only, the model is used to investigate design variations.

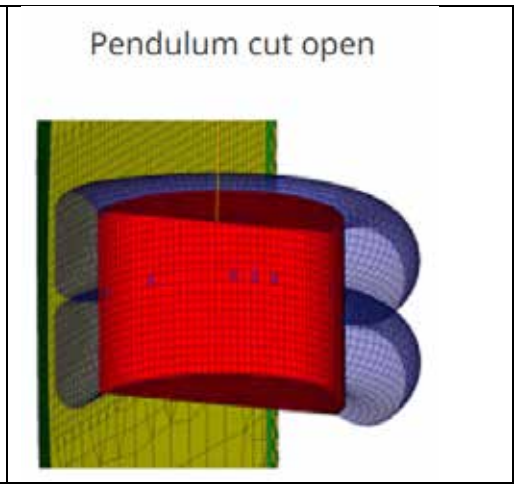
The pendulum model consists of two independent, pressure loaded tires mounted on a rigid core. It has been calibrated through a number of tests, including impact on rigid walls and glass panes with different initial heights (i.e. impact velocities).

Item	Number
Deformable discrete beams	1
Deformable shells	7840
Total deformable elements	7841
Rigid shells	3200

The model was developed, verified and validated by the first two authors of the paper:
[Brendler, S., Haufe, A., Ummenhofer, T.: Absturzsichernde monolithische Verglasungen und Mehrscheiben-Isolierverglasungen unter stoßartiger Beanspruchung: Rechnerischer Nachweis der Tragfähigkeit durch numerische Simulation des Pendelschlagversuchs. Bauingenieur 3/2005, S. 123-130, 2005]







CONTACTS:

Kathleen Fritz

@ Kathleen Fritz

Kathrin Faas
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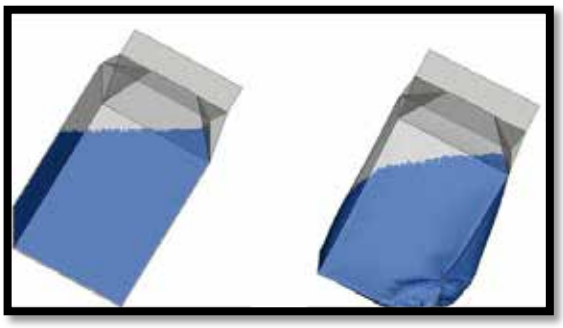
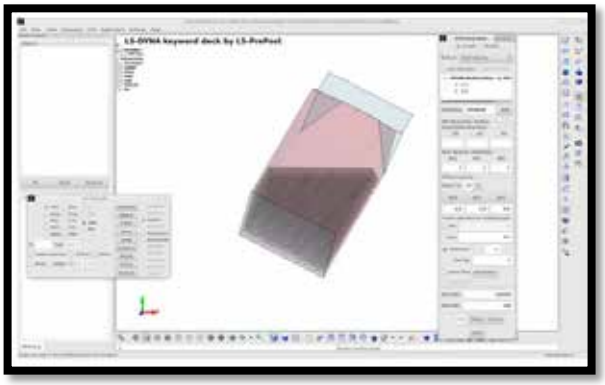
Several methods to represent fluids exist within LS-DYNA. Apart from the ICFD, ALE and CESE solvers, there are also meshless methods that can be used.



EXCERPT - Package drop test - Case study: Drop test simulation of a paperboard carton filled with water-like fluid.

For this case study, it has been chosen to explore the performances of the SPH and DES methods.

The ability of SPH to represent fluids has been explored in other case studies on this site, e.g. a tank sloshing example, whereas the abilities of the computationally efficient DES solver are perhaps more unknown.



Fluid representation - Starting with the SPH description of the fluid, this input is rather straightforward. Physical properties are assigned, viscosity and density on *MAT_NULL and speed of sound for water on e.g. *EOS_GRUNEISEN. A standard node-to-surface contact can be used for the contact with the carton, in this case it has been chosen to model it without friction or damping. Generation of the SPH particles is also a simple operation through the use of the SPH generation tool in LS-PrePost shown on the right hand side

In the DES (Discrete Element Spheres) method, the bulk behavior of a material is entirely described by the interaction between rigid spheres. By changing the friction, rolling friction and cohesion between the particles, different bulk behavior can be achieved. In this case study, water-like properties have been achieved by setting the friction between the particles very low.

It may also be noted that since there are some spaces between the DES particles, an upscaling of the particles' density is required. The random packing rate of equally sized spheres is around 63.5 %, which is used in this case according to the equation below. However, the optimal packing rate is a bit higher, about 74%, which means that one should perhaps consider using a higher value since the packing rate after settling is likely higher than the random packing rate.

Please visit our site for complete information and our conclusion -

…In conclusion - So to sum up, if you want to model a structure subjected to a fluid-like loading, the computationally efficient DES method could be a viable option. It does, however, require some additional work to make it feasible, such as calibrations of non-physical parameters, scaling of particle densities, and particle generations in a closed volume followed by a settling simulation in which some tricks are applied. One must also consider if the rigid sphere representation is valid for the application in mind…

Cimolai Technology chooses ANSYS

Cimolai Technology designs and produces special machines and plants for lifting, handling, transport and launching operations

Cimolai Technology Spa is located in Carmignano di Brenta – a few kilometers from Venice – in modern premises with a total area of 53,000 square meters.

Left: Gantry cranes on rails installed on a floating dock

ABSTRACT - Cimolai Technology, based in Carmignano di Brenta near Venice, designs and produces special machines and plants for lifting, handling, transport and launching operations. The company works closely with customers to find the right solution for any specific field and application. All machines are produced, pre-assembled and tested in the company's state-of-the-art facility which enables Cimolai Technology to offer short delivery times and guarantee a high quality 100%-Italian products.

In order to allow it to continue offer regulation-compliant, customized solutions to meet customer requests, Cimolai Technology opted to replace its previous computation system with ANSYS Workbench and Space Claim software. In this brief article, the company explains the business benefits it has achieved since the installation in terms of time savings in planning, and design, and improvements in product quality and in delivery forecast ability.

In 2004, the Cimolai family, which founded and ran the Cimolai Group, a world leader in steel construction, for nearly 60 years, decided to invest in new areas of production. The key idea was to create a new business based on the solid foundation of the Cimolai Group, and the versatility of a young group of engineers with proven experience in specialized transport and lifting systems. Thus, Cimolai Technology Spa was formed, uniting advanced technology and innovative potential with a strong and stable foundation of design and production collaboration. As a result, Cimolai Technology Spa Special Equipment has become a sought-after global partner for the study and optimization of any lifting, handling, transport or launching operations.

The company works closely with customers and is always ready to find the right solution for the specific field and application required. The customer can count on staff experienced in design, electrics and hydraulics, capable of meeting various needs. The group's considerable production capability and its state-of-the-art facility in Carmignano di Brenta – where all machines are pre-assembled and tested – enable short delivery times, and guarantee a 100% Italian-made machine that meets the highest quality standards. Furthermore, specialized assemblers are available to assist the end-user. Not only do they assemble and commission the machines, but they also guarantee a prompt after-sales service world-wide.

Cimolai Technology Spa Special Equipment is UNI EN ISO 9001, ISO 14001 and BS-OHSAS 18001 certified. The machines manufactured by the company are also UL-certified for the USA and Canada. In addition, all of the machines comply with the terms and the provisions of EEC Directive 2006/42/CE and are marked "CE". Cimolai Technology Spa Special Equipment has also been certified by SOA Nord Alpi and is qualified to participate in Italian public tenders.

Since most of these activities require a tailor-made approach to projects to meet customer requests and specifications but also to comply with stringent regulations, it is essential for Cimolai Technology to calculate and check all its metallic structures precisely. In February 2016, the company decided to replace its previous computation system with the new ANSYS WORKBENCH and SPACE CLAIM software.

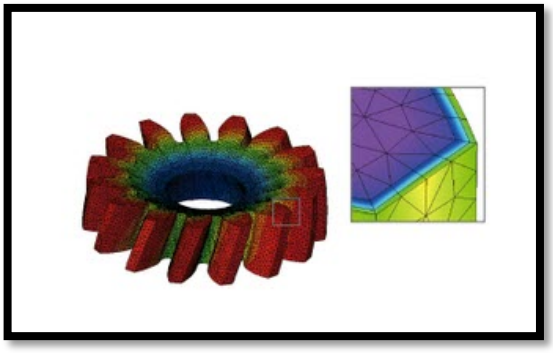
Eng. Giovanni Sabbini, who led the introduction of ANSYS into the technical department, was interviewed five months after the software installation.

He could satisfactorily affirm: **"The main benefit we have obtained by adopting the ANSYS technology in the development of our products has been that of simplifying and improving the iterative flow between design/project and computation/verification."**

The cycle can now be closed more effortlessly and the necessary enhancement iterations are easily performed. Previously, geometric modifications and preparations used to constitute 80% of the total activity, whereas now it has been reduced up to 40%, thus saving time and resources that can be oriented to the real computation. The target we are focused on now is that of reducing the refined geometric preparation by up to 20%. The other great advantages we have realized have been the quality and the velocity of the mesh capabilities that, together with new hardware installations, have allowed us to reach inconceivable overall velocities. In summary, we currently evaluate that we've saved more than 50% of the time that used to be spent on the whole calculation activity.

Furthermore, the possibility of designing complete models, including bolted joints, has allowed us to quickly achieve improved accuracy in the planning of complex structures and, therefore, to avoid having to take corrective measures during the execution phase. This element is particularly important since our structures are often unique and are assembled in the construction yard. Improved reliability in this regard enables us to be faster and more precise in forecasting delivery dates, thereby reducing unexpected events."

Eng. Giovanni Sabbini, Cimolai Technology Spa
Newsletter EnginSoft Year 14 n°1



Multiphysics JMAG-Designer Multiphysics

As computational power has increased, companies have started incorporating multiphysics models into their analyses. JMAG began offering this functionality to its users in 1994, when magnetic field/thermal coupled analysis functionality was implemented for induction heating device design. Since then, a considerable amount of development has taken place in the area of multiphysics.

Structural Analysis - Not only problems due to electromagnetic force but also vibrational phenomena due to magnetostriction can be confirmed and stress evaluation from centrifugal force can be performed. Multiple disciplines are closely integrated in JMAG and can easily incorporate multiphysics analysis in your daily analysis work.

Thermal Analysis - JMAG's thermal analysis capability allows the coupling of the magnetic field analysis with a thermal analysis with eddy currents, iron loss and joule losses of coil as heat sources. The magnetic field analysis can also include the temperature-varying properties of magnetic materials and conductors for a strong coupling.

Function Excerpts

Coupled Analysis Subcycling - A much greater degree of freedom for coupled analysis timing in JMAG!

- Choose either magnetic field or thermal analysis as time standard for coupled analysis
- Choose multiple studies in slave analysis

Multi-frequency Heating - Account for multiple frequencies in coupled magnetic field thermal analysis!

- Estimation of dual wave properties in high-frequency induction heating
- Respective losses from different superimposed frequencies can be analyzed by specifying multiple magnetic field analysis (FQ) files

Magnetostriction - Evaluation of strain and stresses from magnetostriction phenomena!

- Check for vibrations from magnetostriction with linked structural analysis
- Quantitatively evaluate contribution along with electromagnetic vibration

eigenvalue Analysis

- Vibration/noise is caused by the resonance phenomena of excitation force and eigenmode vibration.
- With JMAG's structural analysis, eigenvalue and eigen vector can be obtained.

Sound Analysis

- Motors are widely used in various applications that require smaller and lighter motors along with the reduction of vibration and noise. JMAG can be used to analyze vibration and radiation sound caused by slot harmonics and the inverter drive.

Kambiz Kayvantash, Sr. Director of AI/ML Solutions for Design and Engineering at Hexagon Manufacturing Intelligence

Join me for this very interesting presentation by Dr. Christophe Bastien on passenger safety applications of ODYSSEE.

What are the benefits of using artificial intelligence and machine learning in the design of vehicle crash structures? How about in occupant kinematics?

The use of Machine Learning in Future Transport Safety Applications

July 20, 2022 - 11:00 AM (Eastern US)

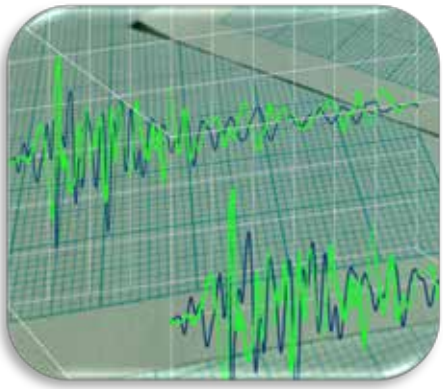
Abstract - Transport Safety computer analysis can provide useful information to researchers and engineers to design better vehicles, as well as investigate future safety concepts. Computer models are nowadays ever more complex, due to the fact that software is easier to use, algorithms more precise and solvers more powerful. Science is gaining accuracy, but the bottleneck of time is still present. Machine learning brings new opportunities to move science and engineering forward.

This webinar will highlight the benefits of using artificial intelligence in the design of vehicle crash structures as well as occupant kinematics in future autonomous vehicles. This webinar is a part of Rev-Sim's Learn From Your Peers webinar series.

Presenter: Dr. Christophe Bastien - Coventry University, Dr Christophe Bastien is an Associate Professor in Transport Safety, leading the Transport Safety and Simulation research group. He has over 27 years of industrial and academic experience in the field of vehicle safety evidenced by 21 patents, 29 journal publications and 125 citations.

Winner of the Prince Michael International Road Safety Award 2021 on "Delivering Improved Pedestrian Post Crash Triage", his research expertise relates to the field of human traumatology computation in transport settings. A recent research output is an innovative computer method, based on Peak Virtual Power (PVP), showing to predict accurately soft tissue injuries compared to post-mortem information. His group has created a trauma research method, which has been implemented worldwide as part of the Total Human Model for Safety (THUMS), developed by JSOL. He leads the trauma simulation strategy of The Central Trauma Research and Innovation Platform (C-TRIP), fostering innovation collaborations between UHCW, the University of Warwick (UoW) and Coventry University (CU). Dr Christophe Bastien lectures crashworthiness modelling using explicit finite element, as well as vehicle safety, which he teaches at undergraduate, postgraduate and industry level. Dr Bastien's interests are also in the quantification of human injury risks, trauma characterisation and comfort in future Connected Autonomous Vehicles.

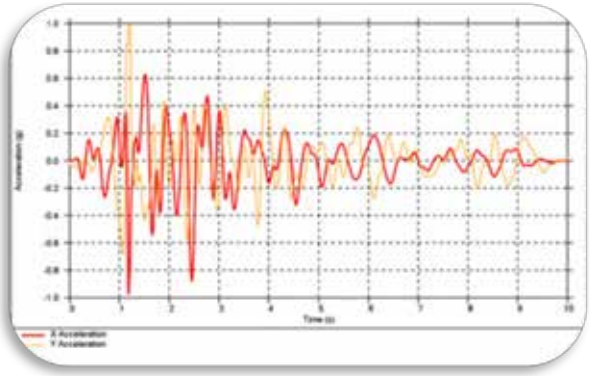
Marta Kempa, MBA - Marketing Coordinator & Seppi
Oasys LS-DYNA
Oasys Software, Tutorials & Classes Not To Miss



Oasys T/HIS is an XY data plotting package designed primarily for use with LS-DYNA.

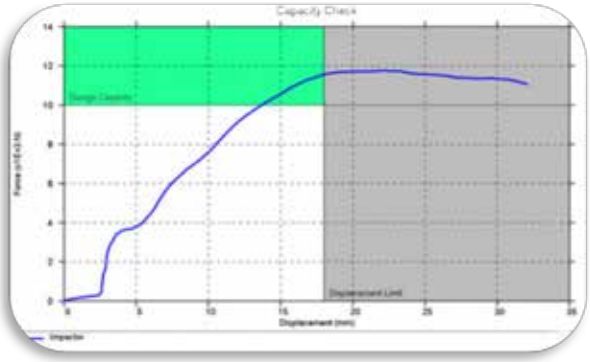
Process output data in a standalone Oasys T/HIS session or use the D3PLOT T/HIS link to view XY data side-by-side with 3D results.

Main Features	**Main Features**	**Additional Capabilities**
· XY data plotting package designed primarily for use with LS-DYNA. · Can read both the ASCII and binary results produced by LS-DYNA, basic CSV, DIAdem and ISO files. · Wide range of functions allowing manipulation of data into the format required, including basic mathematical functions, commonly used filters (e.g. CFC180), and a number of specialist functions for calculating injury criteria in automotive impact analysis (e.g. HIC, VC, THIV)	· Displays multiple graph windows across multiple pages. · Runs stand-alone or in a linked session with D3PLOT. · Timeline feature enables synchronised viewing of D3PLOT and T/HIS results. · FAST-TCF scripting language and JavaScript API for configuring automatic post-processing.	· Quick-pick menu for on-screen manipulation of curves. · On-screen manipulation of data points using the mouse. · Group curves together for easy handling.



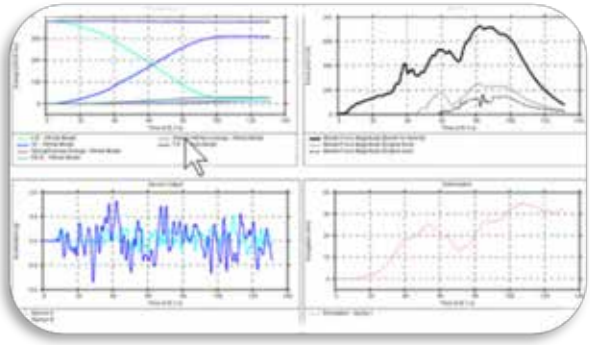
Curve History and Sampling

Curve history flow charts and FAST-TCF scripting allow you to quickly and easily postprocess analysis results.



Datum Lines

Datum lines can be added to graphs to show limits and reference curves.



Multiple Graphs and Pages

Multiple model handling and graph displays give you complete control over how the data is visualized.

Webinars · T/HIS Top-Tips · Curve Manager Tutorial · Macros Tutorial · Output Options Tutorial	· Curve Operations Tutorial · FAST-TCF Tutorial · Graph Properties Tutorial	· T/HIS Quick Pick Tutorial · Reading and Plotting Results Tutorial

Designing Better Experiments with ILIAD

When designing a digital or physical experiment with several variables (or more) it can be difficult to choose parameter value combinations that faithfully capture the design space. The distribution of design points can radically alter our perception of the behavior a system's responses. To address this challenge, ILIAD offers a wide variety of sampling algorithms or DOE designs that intelligently specify variable value permutations that are well-distributed throughout our multidimensional design-spaces.

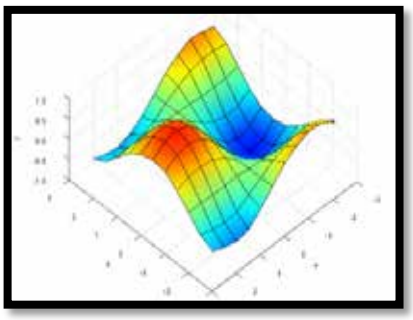


Figure 1: Example surface used as a known substitute for a generic analysis.

To illustrate this utility, we will treat the surface shown in figure 1 as our black box analysis and will sample this surface using the various design algorithms found in the Design of Experiments component. By applying a Kriging interpolation on the resultant points, we can better understand how the distribution of data dictates the statically likely shape of the underlying response surface.

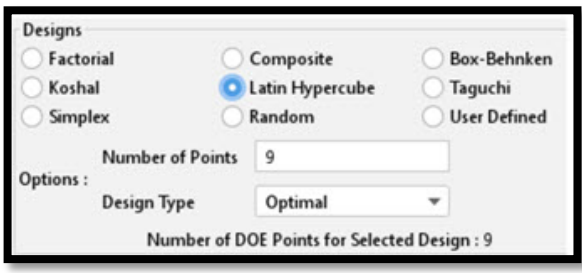


Figure 2: Sampling algorithms in ILIAD located in the 'Designs' category of the Design of Experiments component.

Unsurprisingly, each sampling algorithm has unique strengths and weaknesses that make them better suited to certain domains. While we do not need to be experts on each method to make use of them, a rudimentary understanding of their behavior allows us to choose an algorithm that best matches our needs and constraints.

SEE WEBSITE FOR FIGURE 3

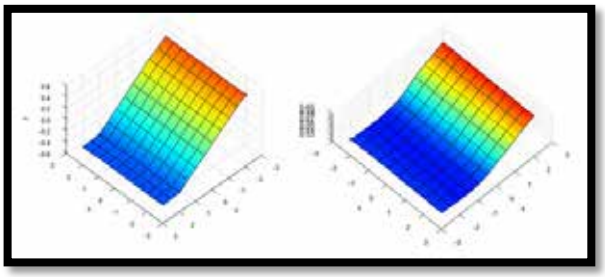
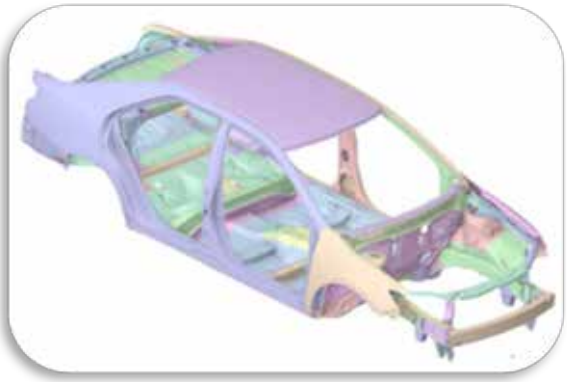


Figure 4: Kriging interpolation of points acquired from sampling the surface in figure 1 using the factorial (left) and simplex (right) methods.

In this instance, we see that both the factorial and simplex methods are too sparse to capture the complex sinusoidal behavior of the surface. The simplex method produces a slightly more accurate model of the interior of the space but does not have enough points to capture key local features.

- **Please visit the site for the full article to help illuminate ILIAD's arsenal of DOE designs and provide practical guidance for users looking to make the most out of each analysis and trial in their experiments.**
- **Check our website weekly for more tips, tricks, and deep dives into OmniQuest's software solutions!**

Metin Ozen
Principal & CEO at Ozen Engineering, Inc. and Mallett Technology, Inc.



Excerpt - **Auto Paint Process** **Do you know about AUTOMOTIVE PAINTING PROCESS SIMULATION?**

Automotive paint shop is a critical part of car manufacturing, and this is not going to change with new wave of electric and autonomous vehicles. Painting is critical because it gives a feel for quality to customers and is critical for corrosion protection in the long run. There are new manufacturers and new factories with new models, all requiring paint planning.

Modern car painting process involves multiple steps where careful preparation to achieve top quality is a must. First step is the e-coating where the body in white is dipped into an electrocoating solution, and a high voltage is applied for film build up. Follow-up is application of primer, base coat and clear coat layers via spray painting. Each of these steps include baking and cooling cycles in between. Uniform e-coat thickness is required for corrosion protection. There should not be any air entrapments or e-coat undrained during e-coating.

The baking process is required for curing of structural and cosmetic seals and proper heating is a must. Unequal or insufficient heating can result in different seal related quality problems. The uniform paint thickness at spray painting is critical as well. Too much or too less can cause orange peel or fish eye problems. All these problems can be predicted and planned in parallel with car design using Ansys tools. Multiphase fluid flow, electrostatics, particle tracking, wall film modeling, conjugate heat transfer and radiation, in other words the physics behind car paint shop can be modeled and tuned for perfection. Recent developments in Ansys tools also enables processing of complex and large automotive CAD geometries. **Ozen Engineering has completed numerous consulting projects in regards to paint process modeling and can help companies paint shop planning. Ozen Engineering makes use of cloud computing as an enabler for large and long transient runs.**

Mark your calendars! We are planning way ahead.

Our simulation conference during National Engineers week next year is on February 23, 2023.

To be held at the Computer History Museum in Mountain View, California.

Register today for updates, sponsorhip and speaker opportunities

Honda Performance Development Announces New Civic Si FE1 Race Car Will Be Available Later This Year

Santa Clarita, CA Press Release

- HPD Civic Si FE1 race car developed and tested in-house by HPD engineers
- All cars built at Honda's Performance Manufacturing Center in Marysville, Ohio
- Cars are available for order now; initial deliveries set for Autumn of 2022

Honda Performance Development (HPD), is announcing the availability of the 2022 HPD Civic Si FE1 race car. Beginning in November of 2022, the latest HPD Civic Si will be available for delivery to customers. The complete, ready-to-race car is priced at $55,000 plus tax (FOB Marysville, OH) and includes an installed roll cage; a full range of HPD-developed and homologated parts including the engine, suspension, exhaust, fuel cell, and Motec electronics packages.

HPD's newest race car, based on the 2022 North American Car of the Year, 11th generation Honda Civic Si road car has already proven to be successful scoring two race wins and multiple TCA class podium finishes in early-season SRO TC America powered by Skip Barber competition at Sonoma, and NOLA Motorsports Park

The new HPD Civic Si, follows the success of the 10th generation race car which captured the 2018 and 2020 SRO drivers' championship as well as vice champion in 2021. The new 11th generation Civic follows the same championship-winning formula with significant upgrades.

All cars will be assembled at the Performance Manufacturing Center (PMC) in Marysville, OH where the Acura NSX and PMC Edition Acura production vehicles are built. This state-of-the-art facility employs groundbreaking technologies in weld, body construction, body painting, final assembly, and quality confirmation to ensure the highest levels of precision and craftsmanship.

The HPD Civic Si FE1 is equipped with the Honda L15CA 1.5L turbocharged 4-cylinder engine and HPD strengthened 6-speed manual transmission. The race car is purpose built from a white body which deletes the 2022 Civic Si road car's sunroof, sound proofing, insulation, underbody coating and seam sealer. The car is specially constructed for racing using a selection of HPD and carefully selected partner performance and safety components.

As posted on, and thanks to, Blog Before Flight (BBF) – graphics copyright and courtesy of BFF

Italian Air Force 6th Wing welcomes first 5th Generation F-35

EXCERPT .. The Italian Air Force 6th Wing, also known as "Red Devils", yesterday received the first fifth generation F-35A (AL-16) combat aircraft. The Lightning II with tail number 6-01/serial number MM7366 reached Ghedi Air Base in northern Italy at approx. 10:30 AM LT along with three Tornado fighter-bombers assigned to each of the three home squadrons (the 154th, the 155th and the 102nd).

The ceremony was attended by General Alberto Biavati, Commander of the Air Squad (former "Red Devils" pilot), General Francesco Vestito, Commander of the 1st Air Region (former 6th Wing Commander) as well as other military and civil authorities.

The AL-16 made its first flight on April 7, 2022 at the Cameri FACO (Final Assembly & Check-Out), where the Italian and Dutch F-35s are built. The Italian FACO has also recently completed the production of the second F-35A destined for the 6th Wing (tail 6-02) which is currently conducting Functional Check Flights.

With the arrival of the first F-35, the 6th Wing enters the fifth generation era as the second and last base of the Italian Air Force to host the type. It also marks the beginning of the end for the legacy PA-200 Tornado which is expected to be retired within a few years.

Together with the 32nd Wing, the 6th Wing will contribute to increasing the fifth generation capabilities of the Italian Air Force. These capabilities are crucial to the success of the missions and to be able to operate jointly with other NATO countries and allies. The F-35 is currently in use or on order by 13 nations.

Thanks to state-of-the-art systems and sensors, considerable flexibility and low-observable technology, the F-35 is able to offer a significant increase in operational efficiency, ensuring greater levels of survival in hostile environments and a high level of awareness and knowledge of the tactical scenario. The aircraft boasts high identification capabilities and precision of engagement which, combined with innovative communication capabilities and instant sharing of key information (Net-Centric capability), allow the pilot an unprecedented management of the theater of operations, making the F-35A Lightining II a valuable aircraft suitable for modern war theaters.

The quiz was left in the suggestion box by The Old Retired Pilot. We are sending it out to the residents and guests. No one in town knows his name. You yell, "HEY, Old Pilot."

The Old Pilot and the Town Secretary are arguing about the mfg./country of planes, jets, drones.

One of them yelled, "IF IT FLIES THEN IT'S A PLANE!" (We are not saying who yelled that)

Quiz - can guess the website these were located on?

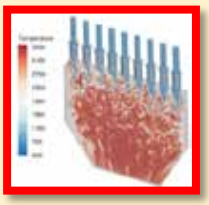
(The answers are at the bottom of the Goodbye page)

A_____

B_____

C_____

D_____



The Air Force Center of Excellence: Developing ROMS and digital twins for complex systems with accuracy - Univ. of Michigan, Aerospace Engineering…"Instead of blowing up rockets before finishing a design, what if we can do it on a computer?" asks professor Karthik Duraisamy. As director of the Air Force Center of Excellence (CoE), Duraisamy and his team, which spans five universities, are doing just that.

US Airforce Week in Pictures

The United States Air Force Air Demonstration Squadron, known as the Thunderbirds, fly over Indianapolis Motor Speedway during the opening ceremonies of the 106th running of the Indy 500 in Indianapolis, Ind., May 28, 2022. This was the second time in Indy 500 history that the Thunderbirds provided the flyover for the opening ceremonies.

(U.S. Air Force photo by Staff Sgt. Andrew D. Sarver)

Falcons assemble!

A formation of F-35A Lightning IIs and F-16 Fighting Falcons assigned to the 354th Fighter Wing assemble during a routine readiness exercise at Eielson Air Force Base, Alaska, May 20, 2022. The formation demonstrated the 354th FW's ability to rapidly mobilize and launch aircraft from its strategic arctic location.

(U.S. Air Force photo by Staff Sgt. Beaux Hebert)

An HC-130J Combat King II, assigned to the 70th Rescue Squadron, taxis down the flight line at Davis-Monthan Air Force Base, Ariz., June 7, 2022. Members of the 355th Wing returned home on two C-130s after a six-month overseas deployment.

(U.S. Air Force photo by Senior Airman Kaitlyn Ergish)

The Q = our high-quality standards.

The magnifying glass = the more detailed insights and information gained for medical device manufacturers and other medical and healthcare companies through computer simulation.

CADFEM Medical becomes Simq GmbH.

Among the reasons for this rebranding are the following:

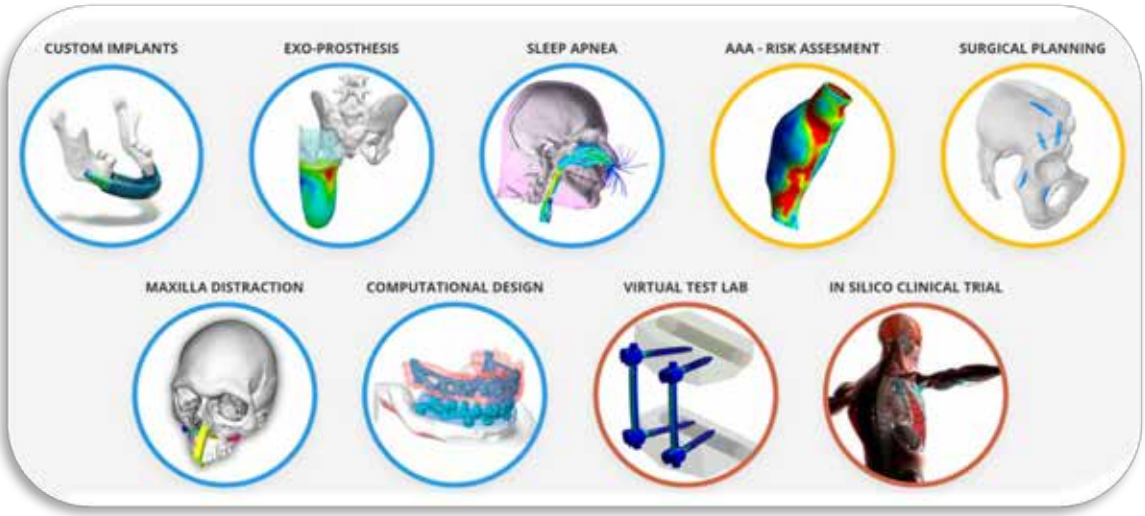
- To emphasize our independence
- To make clear our positioning for our customers
- All our innovative know-how is focused on the application of numerical simulation in medicine.

Our strength and focus are the combination of physics-based biomechanical models with AI/ML.
This allows us to enable medical device manufacturers to:

- personalize their products
- diagnoses
- therapies

In other words, to optimize them for each individual patient.

👉 Check out our new website: https://simq.de/



Thanks to open source MDPI

This research investigates the structural performance of commercial motorcycle helmets in Thailand for head injury prevention using finite element analysis via LS-DYNA.

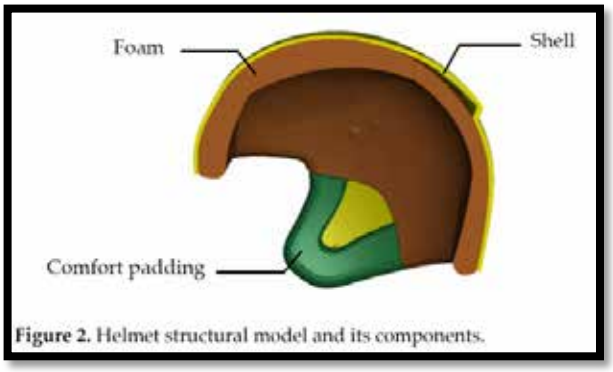


Figure 2. Helmet structural model and its components.

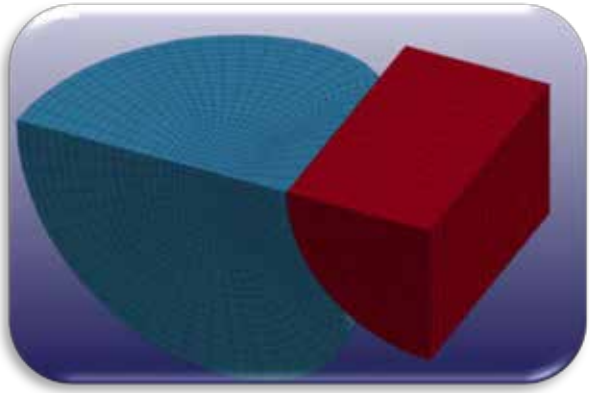
FE Analysis of Motorcycle Helmet Performance under Severe Accidents

Suphanut Kongwat and Thiraphat Nueanim
Dept. of Mechanical Engineering, Faculty of Engineering, King Mongkut's University of Technology, Thailand
Hiroshi Hasegawa
Dept. of Machinery & Control Systems, College of Systems Engineering & Science, Shibaura Inst. of Tech., Japan

Abstract **A helmet is essential protective equipment for the safety of motorcyclists and their passengers. However, motorcycle accidents can cause severe injuries and fatalities, even when wearing helmets, because the strength of motorcycle helmets lacks head protectability in actual impact accidents.** Thus, this research investigates the structural performance of commercial motorcycle helmets in Thailand for head injury prevention using finite element analysis via LS-DYNA. The helmet structural model was firstly validated under impact analysis by comparing with the test according to the TIS 369-2557 standard. The finite element results showed that the difference in maximum acceleration was only 4.8%. The protective efficacy of the helmet structure was then studied and analyzed by simulation under various velocities and impact angles according to three cases of accidents. The structural strength was investigated by assessing energy absorption, HIC, and AIS. The worst case was caused when high impact speeds and angles were applied, which showed the highest impact force and HIC. It also enabled a 100% probability of head damage according to AIS 2+, which causes fatality to passengers during impact accidents. The safest conditions in terms of head injury severity occurred when the impact angle was 45 degrees. Finally, at least 75% energy absorption of foam was further recommended for safety design to reduce head injury from motorcycle accidents.

Excerpt 1. Introduction - Motorcyclists tend to be involved in road accidents at a higher rate than other vehicle users; the highest number of fatalities occur in motorcycle accidents without the rider wearing a helmet [1]. To ride a motorcycle safely, a motorcycle helmet is an important piece of equipment for head protection. It can reduce the chance of death from a head injury by three times [2]. Furthermore, a motorcycle helmet has 12 times the performance for head protection when compared with impact accidents without a helmet [3]. Thus, helmets are essential for motorcyclists and passengers to prevent and reduce severe head injuries.

There are various types of motorcycle helmets, such as full-face, half-coverage, and open-face, which were designed to protect the heads of motorcyclists and passengers under different applications [4]. A motorcycle helmet consists of several components: shell, foam, absorptive liner, chin strap, visor, and face shield. The foam and shell are the most efficient components to reduce impact force at the head, which broadly distribute force to other components [5,6]…



Methods for Modeling Solid Sports Ball Impacts

13th Int'l LS-DYNA Conference

Finite element modeling of dynamic sports ball impacts presents a substantial challenge. This is because, rather than displaying linear-elastic behavior, many sports balls are predominantly non-linear, inelastic and rate dependent. This is true of both softballs and baseballs, which exhibit strong rate-dependence and large energy dissipation characteristics in collisions occurring under play-like conditions.

Fig 3. FE model of softball (Ball Type B) impact on cylindrical surface.

The development of finite element models of these balls is further complicated by the difficulty in measuring materials properties at strain rates and magnitudes representative of play. This work describes the development of novel ball models from data obtained under play-like conditions. Ball models were implemented in LS-DYNA® using the Low-Density Foam material model. Simulations were compared to empirical data collected over a range of ball speeds. Models displayed good agreement with experimental measures of energy dissipation and impact force and represent an improvement over commonly used viscoelastic models.

Golf Ball Impact: Material Characterization and Transient Simulation

12th Int'l LS-DYNA Conference

This paper presents an LS-DYNA simulation of the impact event when a golf club hits a golf ball. This is a challenging subject for finite element simulations because it is characterized by high strain rate behavior: the impact occurs within milliseconds and the golf ball experiences very large deformation during this period because of the ball's polymeric shell and core. The simulation strategy emphasizes on accurate material characterization and realistic model construction. Specifically, the Parallel Network Model (PNM), an advanced nonlinear viscoelastic and strain rate dependent material model from Veryst Engineering's PolyUMod TM library is calibrated with high-rate testing data to accurately capture the highly nonlinear behavior of the golf ball core material during impact. At the same time, a detailed finite element model of the golf ball is constructed with multiple layers of structure. The complex dimple pattern on the ball cover as well as the grooves on the golf club are modeled, both potentially important factors in impact response. The simulation is validated by comparing the deformed shape at maximum impact to that in real experiments. The paper then discusses two important issues in material characterization: selection of the right material model and the availability of reliable high-rate testing data. The PNM material model is compared to a linear viscoelastic (LVE) model to demonstrate its superiority.

This month I'm bringing you Rhubarb Pie and I have a question.

Did you know that Ford Motor Company made a century of their archival material available for you?

Ford established an online database called the Ford Heritage Vault.

Ford Motor Company Heritage Vault

Remember your first car? Or your parents' station wagon or pickup? Chances are you have fond memories of a Ford-built vehicle from your past. Take a trip down memory lane through the Ford Heritage Vault, our comprehensive collection offers more than 5,000 curated photographs and product brochures from Ford and Lincoln vehicles. Enjoy the ride!

Created for fans, journalists and car enthusiasts, has now made it easier to discover the company's rich heritage from anywhere in the world.

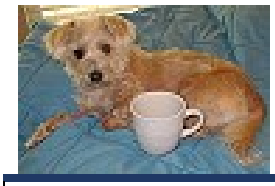
Take a trip down memory lane today with thousands of accessible artifacts downloadable for personal use, free of charge, for the first time as part of the American auto industry's most comprehensive online database:

My Virtual Travel Outing

Thank you for joining me on my visit to this month's museum. I visit a new museum every month.

Atwell Wilson Motor Museum

We are a small friendly museum situated in the heart of Wiltshire. The majority of our exhibits are cars from the 1920's onwards. We also have a collection of motorcycles, mopeds and push bikes as well as interesting motoring memorabilia and a reconstructed 1930's style garage complete with cars.



OH no! I climbed the recycle bin and now I'm on her porch. The dog gate doesn't open when you pull it.

I need to hang on and quietly climb over the railing. OH NO - I hear her waking up!

I need to lose weight! I'm too old for this climbing!

Okay, I just need to hold on to the rail and drag my bottom over this gate.

Almost have my bottom up on the gate! Now, I just need to jump to the steps and The Old Crazy Lady will never know I was on her porch.

If that stupid Coyote didn't eat all the chicken she left for me, I wouldn't be looking on her porch for food.

This is not my fault that I had to climb onto the dog area, which is a NO FERAL OR WILD ANIMAL RANCH ZONE!

Blame the Coyote! What is a ranch camera?

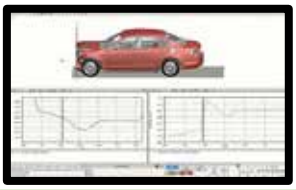
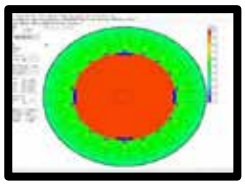
CONVENTION CENTER
YouTube Booths

July

Welcome to our Convention Center exhibit hall & Coffee Cafe. Coffee, of course vanilla, hazelnut, and other flavors are courtesy of our favorite coffee shop (not the rival coffee shop).

Current videos
from our booth visits:
On June 22nd

Free Coffee for
visiting our exhibitors

Computer Aided Technolog			BETA CAE
ANSYS			Oasys LS-DYNA
Ozen Engineering			ESI
Expert FEA			Hexagon
MEETING ROOM			DYNAmore

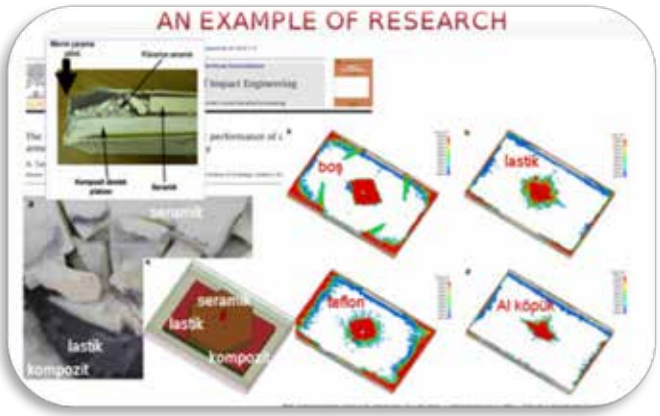
If you have a YouTube Channel, send us the URL feaanswer@aol.com

DYNAMIC TEST AND MODELLING LABORATORY
Prof. Alper Tasdemirci - Prof Mustafa Guden

It is the first and unique research laboratory in Turkey, associated with defense industries and is also called DTM-Lab.
Modelling (ANSYS/LS-DYNA & LS-DYNA)

Excerpt from Introduction to DYNAMIC TEST AND MODELLING LABORATORY (located on Research Gate)

DTM-Lab was founded in 2007 after a project entitled “New integrated armor design: development and optimization of alternative interface materials” and supported by the Department of the Development and Planning of the Turkish Government (DPT) as guided project.



The project aimed the use of foam materials as interlayer material in integrated armor structures. The project was directed by Prof. Mustafa Guden and Prof. Alper Tasdemirci.

DTM-Lab is a financially self-sufficient laboratory; operated by the funds from the projects and graduate students

DTM-LAB SERVICES

- **Modelling (ANSYS/LS-DYNA & LS-DYNA): multi-layer armor systems, crushing, explosion, strike, rolling**
- Structural equation determination: JC (metal), JH2 (ceramic),
- Mat162 (composite)
- Technical consulting: High strain rate deformation, material selection and modelling, development of new test methods
- Dynamic test system design and manufacturing : SHPB test setup (compression, tensile and shock tube)
- Project development and partnership: low-weight materials, material design with biomimetic, concrete, autoclaved aerated concrete, glass foam, composite structures

Please view the presentation for complete information on the lab and services offered.

Curt Chan, Hover Cars Podcast Host

"Thank you for joining us and listening to the podcast episodes. The podcasts are brought to you by myself, Curt Chan, and Josh Poley, with Mary Kate Joyce as your third podcast host."

(Although Curt, Josh and Mary-Kate are employees of Ansys, their views do not represent those of Ansys.)

Hover Cars Podcast

The days of tackling getting better gas mileage in the automotive industry is a one-directional approach in our rearview mirror. Now we're challenged with improving safety and autonomy and communicating with other automobiles or collecting data to help evolve the transportation industry.

Available Podcasts: Join us for this new series

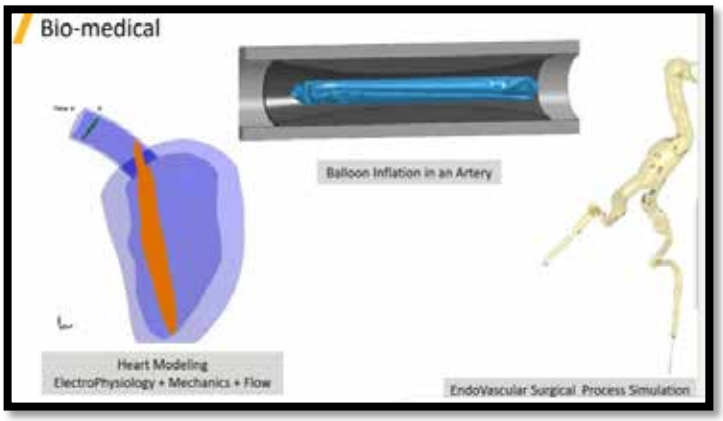
- **The need for speed though simulation – (The latest podcast not to miss!)**
- Vehicle Autonomy and Teenage Drivers
- To Digital and Beyond
- Secrets of a Tech Leader
- A Curious Case of Jane Trenaman
- Simulation and Autonomy
- Muscle Cars and Modeling
- Transforming Education and the Engineers of tomorrow

Since the dawn of time, dreamers have imagined our future, and engineers have brought these visions into reality. But it's much easier to imagine all wonderful things than it is to make them happen or to predict the future at all. Today, many of our daily gadgets and technology were unimaginable just a few years ago. And yet, things predicted 70 years ago that seemed obvious next steps still elude us today. Having a computer in your pocket seemed unobtainable yet driving to work in your hover car was almost a foregone conclusion.

But why? We don't all drive hover cars because the technology challenges are more complex than we realized. It is a challenging problem, even by today's standards.

And the number of hard problems is growing. New revolutionary technologies are being invented, causing everything to become more connected and more complex. New creations create even more complicated, hard problems to solve.

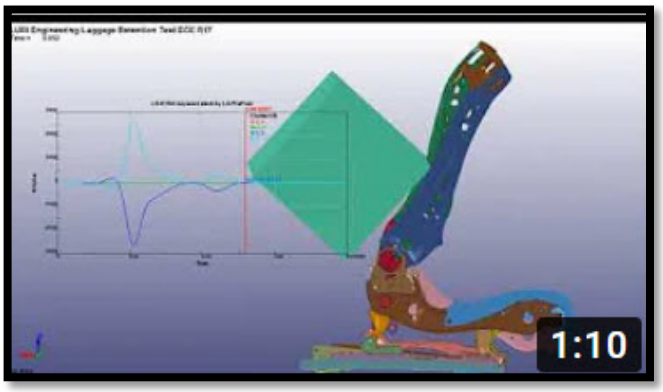
Fabian Leonov S. López - CAE Engineering Manager/COO
LURI Engineering México Automotive/ Structural Analysis FEA
Ask if you are interested in learning more- leonov.lopez@luriengineering.com.mx



Did you know that at Luri Engineering we're taking advantage of the wide range of material models within LS-DYNA. It is possible to undertake biomedical analysis of bone, soft tissue and muscle

Typical simulations include:

- Blunt trauma
- Penetrating / Sharp force injury
- Surgical processes
- Whiplash and other impact injuries
- Soft tissue, muscle and bone modelling



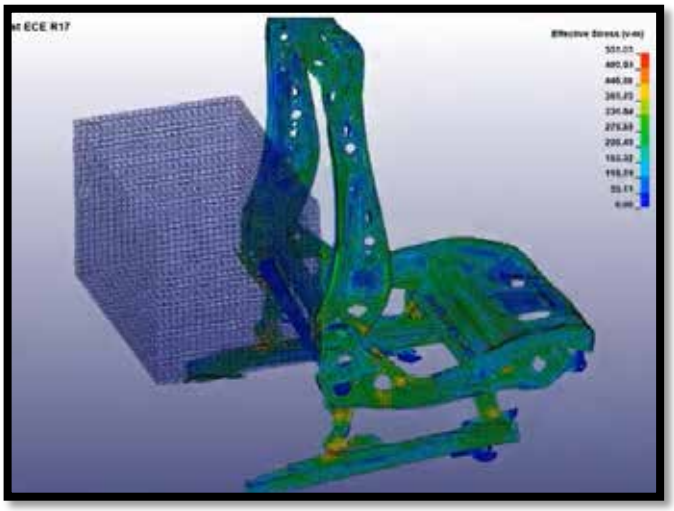
YouTube - **LURI Engineering ECE R-17 Luggage Retention Test with LS-DYNA**

(a) Vehicles of categories M1 and N1 with regard to the strength of seats and their anchorages and with regard to their head restraints;

(b) Vehicles of categories M2 and M3 with regard to seats not covered by Regulation No. 80, in respect of the strength of seats and their anchorages, and in respect of their head restraints;

(c) Vehicles of category M1 with regard to the design of the rear parts of seat backs and the design of devices intended to protect the occupants from the danger resulting from the displacement of luggage in a frontal impact.

It does not apply to vehicles with regard to side-facing or rearward-facing seats, or to any head restraint fitted to these seats.



Jenson Chen - Dyna Forming Engineering & Technology DFETECH

Ansys Autonomous Vehicle Simulation gives you a complete solution designed specifically to support development, testing and validation of safe automated driving technologies.

Ansys Autonomous Vehicle Simulation

Autonomous Vehicle (AV) & Advanced Driver Assistance Systems (ADAS) Simulation Software

This autonomous vehicle simulation solution saves significant time and costs versus traditional development and testing methods, by allowing you to test drive designs on a virtual vehicle in a real-world environment, with the driving simulator of your choice.

Virtually Experience a Test Drive

Ansys Autonomous Vehicle Simulation solutions offer a set of dedicated features for sensors and headlamps for developing ADAS and autonomous systems. Test and optimize the performance of your intelligent headlamp and sensor units. Designers can utilize component-level model-in-the-loop testing and can dynamically test physics-based sensor and lighting systems.

And by connecting to the driving simulator of your choice like IPG Automotive CarMaker or Carla, you can recreate real-world driving conditions to test systems under variable traffic, terrain, weather and lighting conditions.

Kathleen Fritz - DYNAmore GmbH

"We, Ansys and DYNAmore, cordially invite all LS-DYNA users to The 16th German LS-DYNA Forum will take place from October 11-13, 2022 in Bamberg and online.

Like last year it will be a hybrid event.

With approximately 100 technical presentations, keynotes from renowned speakers and an accompanying hardware and software exhibition, the forum is the main event dedicated to LS-DYNA in Central Europe.

Bamberg's Old Town has been on the UNESCO World Heritage List since 1993. The city grew continuously around a medieval core and today has one of the largest unspoiled old town centers in Europe.

ORGANIZERS:

Special feature of the forum: Presenters can present in English or in German.
New: You can optionally submit your abstract for the Ansys "Level-up 3.0" online conference.
Simply click on the corresponding box when submitting.

Schedule 2022

- Monday, 10 Oct. from 6 p.m.
  Get together in the exhibition and conference registration
- Tuesday, 11 Oct. from 8 a.m.
  Start of the conference
- Tuesday, 11 Oct. from 8 p.m.
  Gala Dinner
- Wednesday, 12 Oct. from 8:30 a.m.
  Second conference day
- Wednesday, 12 Oct.
  Day 1 Online Conference
- Thursday, 13 Oct.
  Day 2 Online Conference

CONVENTION CENTER
Booth - Kit MacDonald

July

Kit MacDonald, Application Engineer at Computer Aided Technology,

Nick Sweeney is your all-CAD podcast host. He will take you around the world of CAD to talk about SOLIDWORKS, PDM, 3DEXPERIENCE, 3D Printing, Simulation, and everything in between. Guests will be a fixture on the podcast as well. Professionals from around CATI and around the Dassault channel community.

CADCAST - You made a Pokemon in SOLIDWORKS??

Fun conversation with Kit McDonald, starting with his first version in 2015 in his senior year where he had all the tools at his disposal. In the episode Kit MacDonald & Nicholas Sweeney discuss designing a Pokémon in SOLIDWORKS

You don't know what Pokémon is?

(Wickpedia) Pokémon (an abbreviation for Pocket Monsters] in Japan) is a Japanese media franchise managed by The Pokémon Company, a company founded by Nintendo, Game Freak, and Creatures.

The franchise was created by Satoshi Tajiri in 1996, and is centered on fictional creatures called "Pokémon".

Listen to the podcast to learn how we made a Pokémon in Solidworks.

Did you miss the video?

CATI's James Reeher walks through how to improve the performance of your SOLIDWORKS assembly by using Performance Analysis Assembly Visualization.

Madhukar Chatiri, CEO at CADFEM India, Simulating to Engineer a better World

KTM is one of the largest motorcycle manufacturers in Europe. Its mission is to continue pushing the boundaries of performance and innovation, and to set new standards. Simulation with Ansys and CADFEM support plays a major role in all phases of development and creates new challenges in the young segment of e-motorcycles.

Excerpt: **Multiphysical simulation in battery development KTM – The Magic of e-Ride**

Many influencing factors come together in the design process of a motorcycle. KTM's research and development is therefore very simulation-driven.

This is guaranteed by an interdisciplinary simulation team with expertise in a wide range of fields like structural mechanics and composites, as well as aero- and thermodynamics. This broad spectrum of expertise makes KTM independent and allows it to tackle new challenges with high efficiency.

Due to new challenges and technical requirements, the simulation department at KTM is constantly growing and has access to all Ansys software tools thanks to an Ansys Corporate License. In addition, the company's own high-performance computing resources, such as an HPC cluster, offer all technological prerequisites for highly professional virtual product development according to current standards.

Last but not least, the long partnership with CADFEM is also a factor for the successful implementation and use of simulation. It goes far beyond the procurement of software and hardware. In addition to training and further education, it also includes hotline support, frequent professional exchange, and support with particularly tricky simulation tasks or when breaking new ground.

More than a trend: e-mobility on 2 wheels - Demand for electrically driven motorcycles is on the rise. KTM's mission is to make a splash in the field of e-mobility and to continue growing This includes achieving top performance and offering customers the best possible technical and emotional experience - without the emissions and noise of a combustion engine. These are decisive factors for a high level of acceptance, in both urban and off-road environments.

Electric, emotional, elegant: The KTM Freeride E-XC

When starting out in the field of e-mobility, KTM was able to build on its own expertise in motorcycle development, because it knows what matters when it comes to chassis and suspension construction, or generally in the design of efficient development processes. The task now was to find the best way to deal with the newly added challenges, which are essentially the design and development of the electric motor and traction battery.

Read the article for complete information - With the support of multiphysics experts from CADFEM, the KTM team successfully developed a simulation workflow within Ansys Tools

CONVENTION CENTER
Booth - Rasmus Schutzer

Rasmus Schutzer - DYNAmore Nordic AB

"It is with great pleasure we invite You to the Nordic LS-DYNA Users' Conference. The conference language is English. Keynote presentations will be held in English."

Nordic LS-DYNA Users' Conference 2022 will be held 18-19 October 2022 in Gothenburg, Sweden.

On October 18-19, LS-DYNA users from the Nordic countries, the Baltic states and the rest of Europe will meet at The Swedish Exhibition & Congress Centre (Svenska Mässan) in Gothenburg. Participation is free of charge but you must register your participation in the conference via link below Register to conference.

The central part of this event is the user presentations about the software and its usage. This event is an ideal forum to discuss your experiences on LS-DYNA and LS-OPT with other expert users in simulations of complex mechanical problems.

The conference will provide a great opportunity to share and discuss experiences, to obtain information on upcoming features in LS-DYNA, LS-OPT and LS-PrePost and to learn more about new application areas. For further information please klick on Call for Papers on link below.

If you have any questions, please contact us using e-mail: conference@dynamore.se

- In order to make the most out of these conference days we kindly ask for your cooperation and encourage you to make an oral presentation, where you talk about your experience in CAE and using simulations to facilitate your work, improve quality, reduce cost, research and any other exciting areas you may use simulations for.
- The presentation should be no more than 20 minutes and we would like to receive a short abstract of your topic for organisational purposes.
- Abstract should be submitted no later than May 20.
- Please send us your abstract using the link on our website noted above.

In addition to interesting presentations we also invite you to attend the conference dinner in the evening of the 18th. You must pre register your attendance via link Register to conference below.

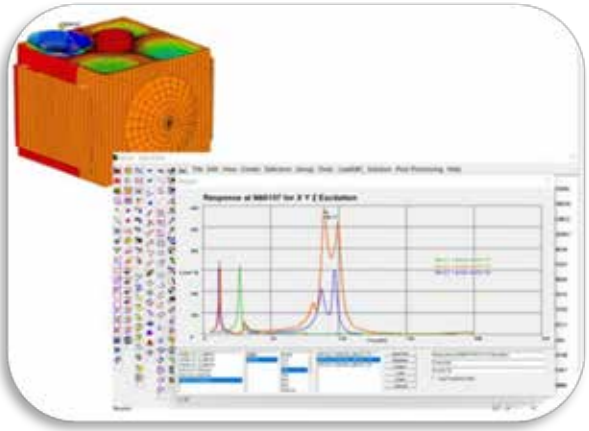
Important dates

- **Register to conference: 16 September 2022**
- Conference date: 18-19 October 2022

For more information visit our conference page - We look forward to meeting you in Gothenburg.

Roy Blows, Mechanical Engineer at BAE Systems

"M3d version 6.0 now released on the website for download. New cool graph plotting support added for Nastran response data (from sol 111)."



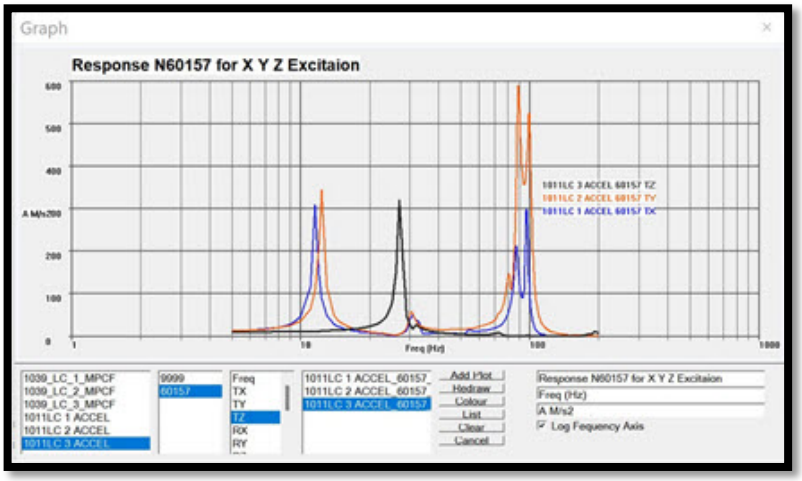
M3d the free Finite Element software package

M3d automatically collates available response data across the frequency range and displays them in the dialog box. Simply click the available response and add to the plotting window for quick and easy response visualisation.

M3d is a fully integrated Finite Element modeller, solver and post-processor in one small executable. M3d supports a basic form of command line scripting making it easy to automate basic tasks. It also has an API which can be accessed directly using MS-EXCEL visual basic. Consider M3d for bespoke integrated solutions tailored to your specific company needs.

M3d was primarily designed as a Pre and Post Processor for the Nastran finite element code and has been used on many large Aero-Space projects.

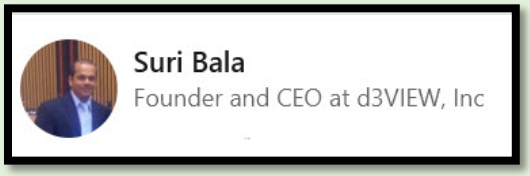
- Use M3d with MSc, NX or Autodesk Nastran.
- Read Nastran bulk data
- Write Nastran bulk data
- Read Nastran op2 results files



New graph plotting support added for Nastran response data (from sol 111). M3d automatically collates available response data across the frequency range and displays them in the dialog box. Simply click the available response and add to the plotting window for quick and easy response visualisation. The new graph response dialog feature.

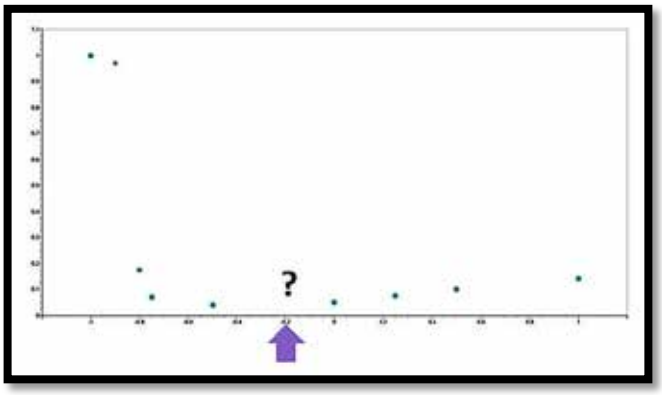
Here's the real beauty of this: everyone can have a copy, at work, home or college. None of the problems of licencing when working from home, no file compatibility issues. It's totally integrated: model, mesh, solve and post-processing all in one program.

That's a smart workflow solution and it's FREE



Please visit our blog for complete graphs and information on our booth post.

The following is an excerpt that you will find informative. We welcome questions and demo requests



Interpolation methods for time series data

It is not unusual that due to various limitations, researchers can only collect limited number of samples. Meanwhile, for many analyses, we desire a higher resolution

In two-dimension case, we have X and Y coordinates of our points. We are interested in what happens in between any of the two points.

We can draw a curve passing through these points to describe the relationship between X and Y values. With such a curve at hand, we can estimate the unobserved values in between any observed points. From this perspective, we consider interpolation as a procedure of looking for a function to describe the relationship between X and Y and using this function to estimate the values at any location.

Linear interpolation - Linear interpolation is the most straightforward and commonly used interpolation method. It comes naturally when we have two points, we connect them with a straight line to fill out the missing information in between. By doing so, we made our assumption that the points on the line represent the unobserved values. When there are more than two points, we simply connect any pair of adjacent points with straight lines. This is piecewise interpolation in the sense that on each subinterval formed by two adjacent points, we use a different line segment to represent the missing values. It is possible that all the points lie on the same line, but we still go through the procedure of connecting every individual pair of points.

In our blog we cover the following:

- Polynomial interpolation
- Piecewise cubic hermite interpolation
- Pchip, cubic spline, makima
- Compare interpolation outputs on d3VIEW
- **On d3IVEW, we have fully integrated these interpolation methods to a worker that we can add to a workflow. We can choose which method to apply and on what X values to interpolate. Instead of typing all the values manually, we can also provide an expression in the format of "start_value:end_value:increment_step".**
- Interpolation application

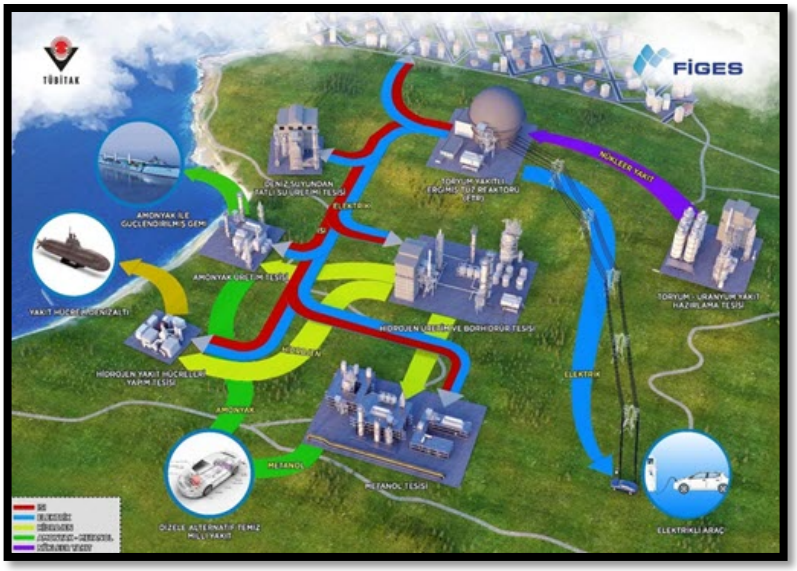
Tarık ÖĞÜT, FIGES, "What is the New-Gen reactor? Molten Salt Reactor (MSR) is the 4th Gen Nuclear Reactor technology that runs on dissolved Uranium-Thorium salts and is selected by Gen IV International Forum). One of the most notable features of the new gen MSR is that it can use the long-term wastes of the Gen III and III+ reactors (i.e., Akkuyu) as fuel in addition to thorium and uranium."

FİGES's projected MSR reactor will be situated at the center of an integrated system and allow for generating heat and/or electricity depending on the needs of various purposes.

At the Nuclear Power Plants Expo & Summit (NPPES), 8-9 June 2022 held at Pullman Istanbul Hotel & Convention Center, a memorandum of understanding was signed by:

- T.C. Sanayi ve Teknoloji Bakanlığı, Republic Of Turkey Ministry of Industry and Technology
- C Mehmet Fatih KACIR, Deputy Minister of Industry and Technology .
- President Nurettin Özdebir, Ankara Sanayi Odası
- Tarık Öğüt, FİGES A.Ş. Chairman of the Board of Directors

Following the Signing Ceremony, Ankara Sanayi Odası President Mr. Nurettin Özdebir visited the FİGES A.Ş. stand with his delegation and received information about the IV Generation Melted Salt Reactor and the Integration of Renewable Energy Sources.



The Molten Salt Reactors with thorium fuel are extremely SAFE because:

- Internal reactor pressure is 1 bar, instead for 150 bar as in PWRs.
- It is equipped with an automated working system that does not require human intervention. With the expansion vessel, extreme heating and cooling can be physically prevented.
- No nuclear core melting (serious accident) due to extreme heating, which is observed in the 3rd gen reactors, does not happen as the fuel is already molten.

Visit FGES for Complete Information on the MSR Project

Aug 16th 2022 GHBMC Users' Workshop

Aug 17 SIMTEQ Eng. & MSC Software

Sept. 06 08

Oct. 11-13 LS-DYNA

Oct. 18-19 LS-DYNA

Nov.16 – 17 Human Modeling

YSA22 - Young Stress Analyst Competition

Sponsored by AIRBUS September 07, 2022, YSA22 will take place alongside the 16th Int'l Conf. on Experimental Mechanics, 09/06-08 S 2022.

The YSA competition is separate to the main conference programme and any competition entries must be different to accepted conference paper presentations. Conference presenters that meet the eligibility criteria are more than welcome to enter the competition with a separate submission and if selected as a finalist will have their conference registration fee reimbursed.

Graphics Courtesy of Vecteezy

Goodbye and Come Back Soon

QUIZ ANSWER:

Turkish Aerospace is organized under six strategic business centers depending on the projects, including:

Structural Group,
Aircraft Group,
Helicopter Group,
Unmanned Aerial Vehicle (UAV) Systems Group,
Space Systems Group,
National Combat Aircraft (NCA) Group

Our Town Salutes our US military, NATO and Friends of the US and NATO. We salute Freedom.