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FEA Not To Miss Software

&

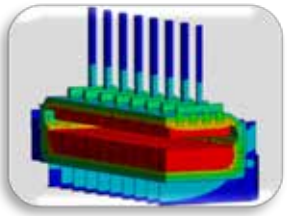
Engineering Solutions

Town Hall Meeting & Gossip

Booth - LURI

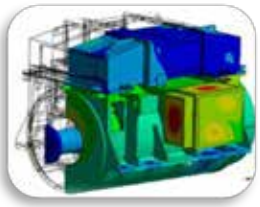
DYNAmore

CADFEM



CADFEM Medical

Enginsoft



KAIZENAT

SIEMENS

Ranch Hand

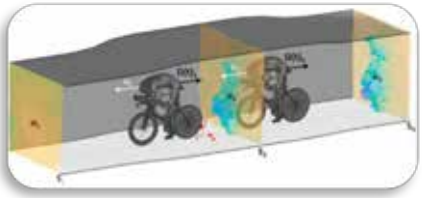
ESI-GROUP

HEXAGON

Automotive - A.Topa

Town Hall Secretary

Library



HEXAGON

Pilot - Airport

Free publication & independently owned

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Contact us at: feaanswer@aol.com

Table of contents

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

The websites will have the complete articles, and higher resolution graphics/videos.

November

Town Announcements will be in this style box throughout the magazine. And Thanks to Vecteezy for our **Map Vector/town and many of the graphics in our magazine**

Table of contents

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

Town Library - **Excerpts and links to the paper** - First named author is listed:

Old Cattle Rancher's Ranch

FEANTM

Town Hall

Convention Center

Monthly town hall meeting.
Serving - coffee & vanilla wafers!

Our town comprises companies, engineers, scientists, mathematicians, universities, professors and students, consultants, and all individuals interested in software, hardware, and solutions.
Oh, and gossip at the local coffee shop, and your pets are welcome.

Town secretary: A special hello wave to:
Fabian, Sagar, Marco, Ameen, Paulo, Tom V., Khanh B.
AND hello to our new residents with Luri Engineering

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

1. **Why is there a Hybrid Air Vehicle at our airport?**
2. I requested "air for my vehicle" meaning air in the tires.
3. I did not request an "air vehicle" like the Hybrid Air Vehicles Airlander 10
4. Someone explain "needing air for my vehicle" and "needing an air vehicle" to the old retired pilot.

Town Airport - Collins Aerospace, Hybrid Air Vehicles' Airlander 10 aircraft

Town Secretary

We requested that she deliver small packages to various locations around the town.
Why didn't she use her new bike to deliver small packages? She purchased parachutes.

1. Then she asked the Old Retired Pilot to do air drops.
2. She advised us that she thought the town would enjoy watching the parachutes landing.
3. Explain to her that we don't do random air drops all over the town. 500 parachutes?
4. Move the parachutes to Equipment. Anyone need material?

Town Hall - Town Equipment - **Parachute Deployment Simulations using LS-DYNA ICFD Solver and Strong FSI Coupling**

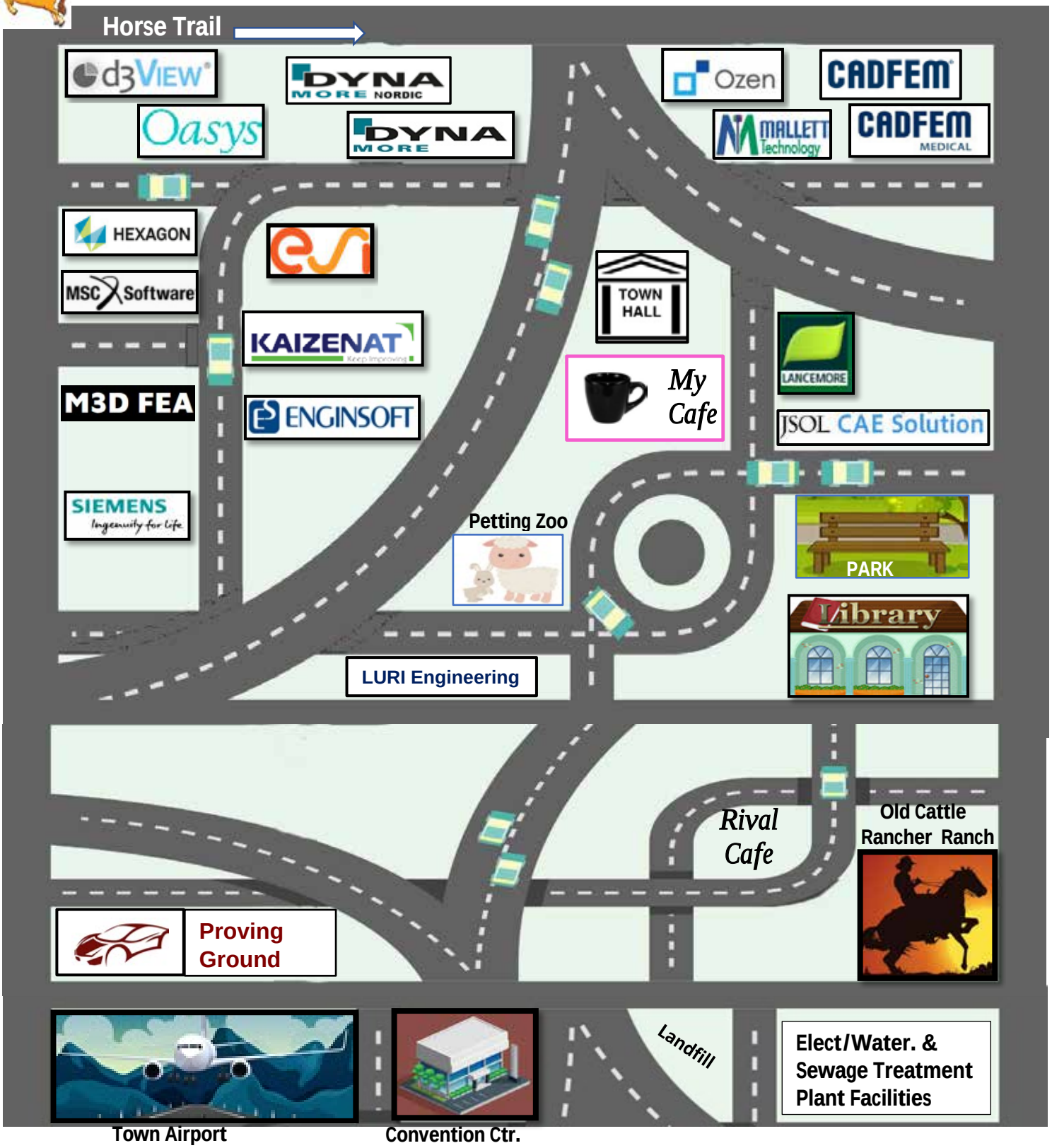
Fire Department - Heat Transfer Part 2

1. **Yes, fire produces heat. Yes, fire heat does transfer.**
   Fire is NOT the heat transfer that we were referring to.
2. Heat transfer is a discipline of thermal engineering that concerns the generation, use, conversion, and exchange of thermal energy (heat) between physical systems. Heat transfer is classified into various mechanisms, such as thermal conduction, thermal convection, thermal radiation, and transfer of energy by phase changes. Engineers also consider the transfer of mass of differing chemical species, either cold or hot, to achieve heat transfer.

. Town Hall - Fire Dept - Heat Transfer - Part 2 thermal/heat simulations

We have a new convention center management company - please visit their new design of our YouTube Booth display on page 45 and visit this month's exhibitors.

Town Map

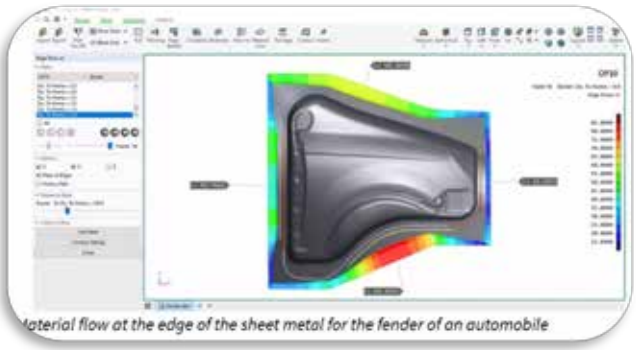


* **The logos displayed, of content in our magazine, do not represent their endorsement.**
* **To be removed, please notify feaanswer@aol.com with the request.**
* **Your town lot will be auctioned, with the Town applying all proceeds to the coffee budget.**
* **The town map changes pending information,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

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

Thanks to Kaizenat for bringing the press release to our attention

Excerpt by MV of FEANTM - Full press release on ANSYS website



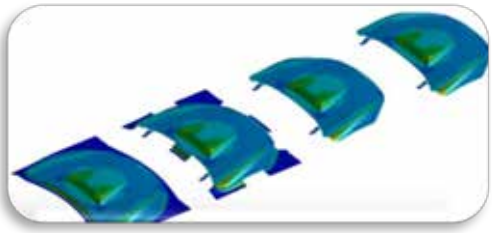
The first-ever release of Ansys Forming, end-to-end software to meet your metal stamping needs, powered by your trusted solver, LS-DYNA.

Ansys Forming — a one-stop shop for metal stamping needs

Set to release January 2022

"Ansys Forming will enhance our customers' simulation processes and lower the barrier to entry for engineers, because the interface is so easy to use," said **Ramesh Venkatesan, CEO at Kaizenat**. "The increased accessibility and improved workflow will take our users cost savings to the next level."

Kaizenat is a certified Ansys channel partner.

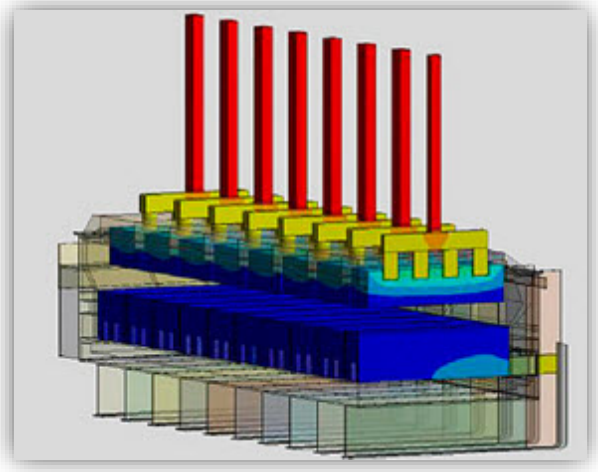


Key Highlights

- Ansys Forming meets multiple metal stamping needs within one platform
- The advanced software empowers early stage and detailed design configurations
- The product provides the fastest solve time for method and die shop engineers
- Ansys Forming uses Ansys LS-DYNA as its trusted solver, ensuring predictive accuracy

"Ansys Forming will meet the metal stamping needs of the industry, from the biggest manufacturers and suppliers to the smallest die shops," said **Shane Emswiler**, **senior vice president of products at Ansys**. "With all-in-one stamping software, manufacturing and process engineers will streamline their workflows, increase productivity, and achieve consistent solutions every time."

- …all-inclusive product equipped to meet industry needs within one platform.
- …provides predictive accuracy and a streamlined workflow to digitally design, simulate, and validate sheet metal forming throughout the metal manufacturing process.
- enables early stage and detailed design configurations by allowing users to preset varying simulation needs, including feasibility, formability and springback prediction.
- Through this end-to-end workflow, engineers can perform the entire die process on a single platform, eliminate the need for physical testing, and enhance productivity and cost savings. Ansys Forming reaches optimum performance by maintaining predictive accuracy and speed.
- delivers a tremendous detail about the design, including identifying structural weaknesses where the metal might wrinkle, tear, or buckle.



Higher energy efficiency of aluminium electrolysis furnaces

Automation of simulation processes - How to optimize furnace designs with automated modelling and simulation and how to increase the simulation quality

Specialist field: Heat Transfer, Multiphysics, Scalability of simulations

In cooperation with Hydro Aluminium Deutschland GmbH CADFEM developed an automated simulation process for the analysis of electrolysis melting furnaces. As a central goal of the joint customization project, manufacturing experts should also be able to use the solution successfully in the everyday business of furnace configuration without simulation knowledge.

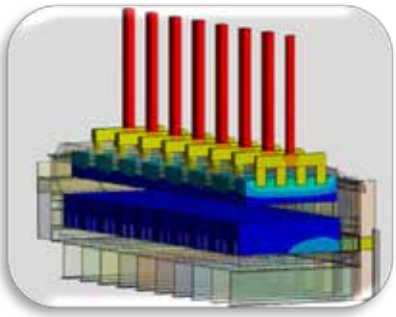
Automation of simulation processes

How to optimize furnace designs with automated modelling and simulation and how to increase the simulation quality

Task	Solution	Customer benefits
Electrolytic melting processes are used in hydrolytic melting processes for the production of aluminium. Reducing the high energy consumption required for this is one of the outstanding tasks in the further development of the production facilities. With the help of numerical simulation, energy savings of up to 25% are to be achieved in the long term.	The existing simulation processes were automated in order to achieve the objectives quickly. For this: · replaced simple geometry models by standardized detailed simulation models · Model construction and setup of the electrolysis process automated · developed a graphical user interface for simple simulation control. · 300 parameters defined to identify the best possible furnace configurations.	In addition to optimized furnace designs with reduced energy consumption, the main focus is on increasing simulation quality as a result of automation. Thanks to the simple user guidance, even employees without simulation experience are now in a position to optimize the systems. Since all employees access the same simulation process, a robust analysis result is guaranteed.

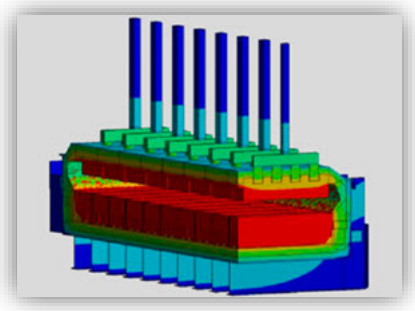
TASK - As one of the world's leading suppliers of aluminum, Hydro strives to continuously reduce the high energy consumption of the electrolytic melting process for aluminium production. Hydro's latest plants use less than 12.5 kWh to produce one kilogram of aluminium (global average: 15 kWh). In the long term, energy consumption is to be further reduced in the direction of 10 kWh/kg by means of new simulation driven designs.

The aluminium is melted in the electrolysis furnaces at approximately 960°C.



Simulation of the voltage distribution on a corner model of a furnace

SOLUTION - For a high-performance simulation tool like Ansys Workbench, the previously used simplified geometry models first had to be replaced by construction-related simulation models. In cooperation with CADFEM, the model setup of the furnace and the simulation of the electrolysis process were automated in parallel. The parametric simulation model is generated using an automated CAD interface, which serves to define the geometry and is controlled via a graphical user interface. Based on parameter studies, the user is now able to adjust the heat flow with minimum energy consumption, whereby 300 parameters can be changed per furnace model.



Optimization of energy consumption through simulation of temperature distribution.

Customer Benefits: The automated processes enable even the colleague less familiar with simulation to create a furnace model and then compute all standard tasks. This allows simulations to be used to optimize furnace design throughout a wide organization and to increase cost savings. In addition to shorter processing times, communication among the designer, simulation engineer and process specialists has been streamlined.

Further advantages:

- The automation also allows complex simulations to be carried out,
- the robustness of the entire process has been significantly increased and
- the quality of the results was improved due to the higher level of detail.

Virtual crash tests for 3D printed prosthetic feet - Mercuris

With the introduction of the new Medical Device Regulation (MDR) this year, the approval of orthopedic aids will also become more difficult. For the first time, a digital process chain is to be established that will enable preventive quality assurance of individualized prostheses and orthoses by validating a virtual load test of a 3D-printed prosthetic foot.

The task - The project “Validated simulation of a 3D-printed prosthetic foot” brings together experts from the fields of biomechanics, orthopaedic technology, 3D printing, certification, validation and simulation.

Together we check whether the calculation of the strains of the real and virtual test yield the same results. This is a crucial step in validating the simulation. The project makes it possible to digitally test patient-specific designed orthopedic products before they are 3D printed and made available to patients in the shortest possible time.

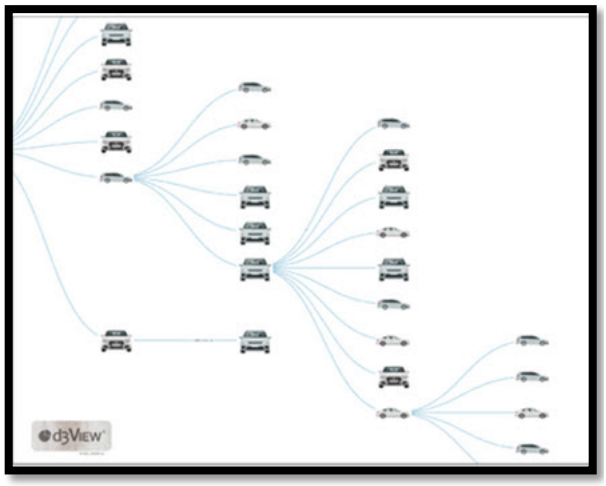
The solution - In cooperation with a physician or orthopedic technician, patient-specific parameters are determined and automatically integrated into CAD models via the Mecuris Solution platform. The medical products are manufactured in certified 3D printing centers and checked by experts before they are used.

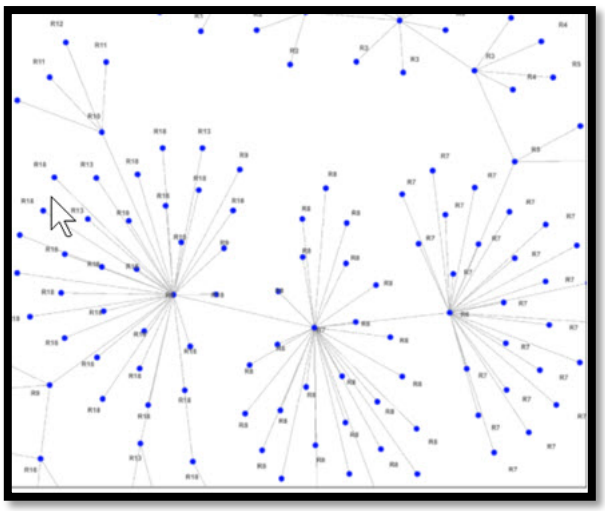
In cooperation with CADFEM Medical GmbH, an initial finite element analysis of the Mecuris “NexStep” prosthetic foot was already developed in 2016 with the boundary conditions of the static test of the test standard DIN EN ISO 10328. This standard describes the prerequisite of the mechanical stability of prostheses of the lower extremities and represents a prerequisite for the sale of the Mecuris prosthetic foot.

The result - Mecuris is supported by CADFEM Medical in setting up the internal simulation of patient-specific designed products. The current focus is on improving the material models and parameters to correctly represent the load behavior of the prosthetic foot. From the first comparisons of real and virtual strains in the “validated simulation” project, potential improvements could already be identified and iterations planned. An initial challenge has already been mastered on the basis of the tests: The fundamental suitability of strain gauges for the feasibility of the process of measurement validation of numerical simulation methods for additively manufactured medical devices was demonstrated. In order to find suitable measures that further increase the accuracy between real and virtual deformation and thus the safety of the medical device and finally the patient, CADFEM Medical is available as a central partner in the project.

About the customer - Mecuris combines a variety of 3D technologies in an intuitive solution platform, enabling orthopedic technology to step into the digital age. Mecuris is supported by CADFEM Medical in setting up the internal simulation of patient-specific designed products.

Please Visit Our D3VIEW blog for complete article and video's





d3VIEW's New Multi-User, Loadcase and Region Simulation Tracker with Built-in Analytics

In virtual product development, a single pane of glass view to track evolutionary changes across all domains in both input (variables) and its corresponding output (results) is critical for decision-making. There are two broad categories of designs that are frequently evaluated – A) Machine Generated Designs (MGD) and B) Human Generated Designs (HGD). MGD data visualization involves the viewing of a group of data such as sequential domain-reduction and is usually viewed using traditional methods such as Table View, Parallel Chart, etc to study the influence of the (inputs) variables on the outputs (results). Simlytiks, a data-visualization application in d3VIEW, has been facilitating the visualization of DOE and sequential DOE for a number of years and is well-accepted in the industry for large amounts of data (see example). However, visualization of HGD is non-trivial since the inputs are dynamic and are often associated with a dynamic timeline and outputs. In all or most companies, the tracker information is maintained by engineers using a NAS-available Excel file using traditional methods of entry and limited visualizations.

A few months ago, we started to look at this problem and designed a solution, with minimal overhead to the engineer, and created the Simulation Tracker that now encompasses both MGD and HGD tracker visualizations.

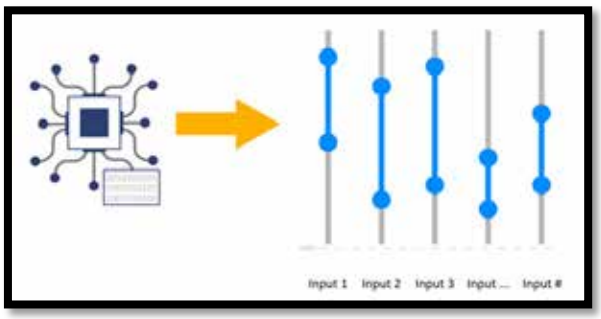


Figure 1: Machine Generated Designs have bounds to input configuration.

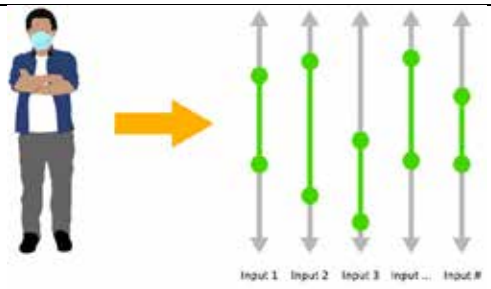
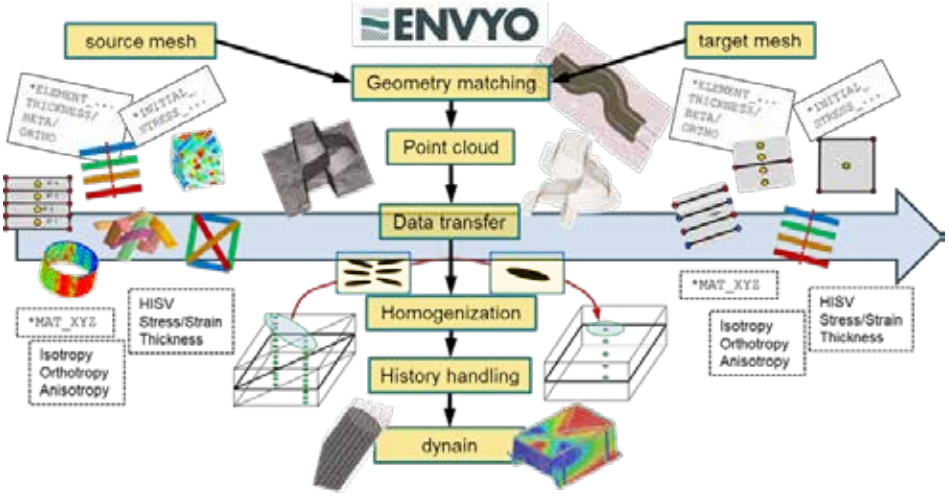


Figure 2: Human Generated Designs promote complete customization of inputs.

d3VIEW's Simulation Tracker-Visualizer allows collaborative authoring and analytics of inputs and outputs with timeline support to provide a comprehensive view of the design evolution with insights to know if the design is heading in the desired direction. Every customer can now take advantage of this with minimal overhead and use analytics that provides in-depth design information.

Christian Liebold - (DYNAmore GmbH)



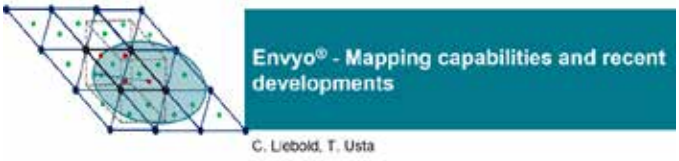
Did you know that here at DYNAmore GmbH we develop a mapping tool called Envyo.

It is licensed separately from LS-DYNA and is available for Windows and Linux operating systems.

What is Envyo? A multi-purpose mapping tool dedicated to LS-DYNA.

Envyo allows you to transfer and manipulate simulation result data even between differently discretized meshes. Results from third party software can be made accessible in the LS-DYNA specific input format. Furthermore, you can map arbitrary point cloud data (e.g. from experimental results) provided in csv format. Clustering methods based on grayscale images are also available. Envyo provides you with a wide range of possibilities to consider any kind of preliminary results in a subsequent numerical simulation with LS-DYNA.

Some standard and more automatized transformation options allow for the consideration of different length scales and coordinate systems. A GUI helps you to easily set up the mapping process.



Envyo Webinar on YouTube

Speaker: Christian Liebold, (DYNAmore GmbH)

The goal of this webinar is to demonstrate already realized mapping capabilities and to provide an overview on future plans and developments.
The general need to map simulation result data is shown with the aid of dedicated examples. Besides industrial applications such as Short Fiber Reinforced Plastics, Wood-Forming, and Bake-Hardening, an overview on research activities within the ARENA2036 and the VMAP result data standardization project will be given.

Mapping capabilities include

Injection Molding
target constitutive model: *MAT_157 or *MAT_215:
- Moldflow® → Shell / Solid
- Moldex3D® → Shell / Solid

Metal Forming:
- Shell → Shell
- Solid ↔ Shell

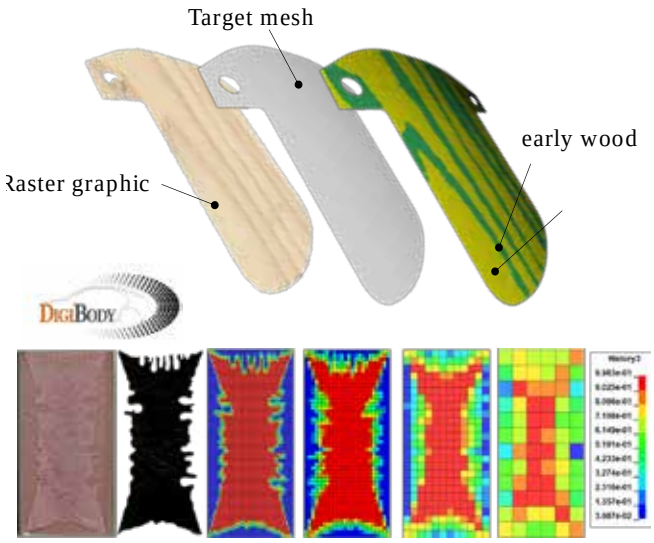
Bake Hardening
target constitutive model: with *MAT_251:
- TheseusFE® → Shell

Mapping of Micro- and Mesoscopic Models
(orientation initialization):
- Beam → Shell
- Shell → Shell
- Representative Volume Element (RVE) detection

Mapping of axisymmetric simulation results:
- 2D-SHELL → 3D-SHELL

Considering experimental data:
- Point Cloud → Shell
- Grayscale image → Shell

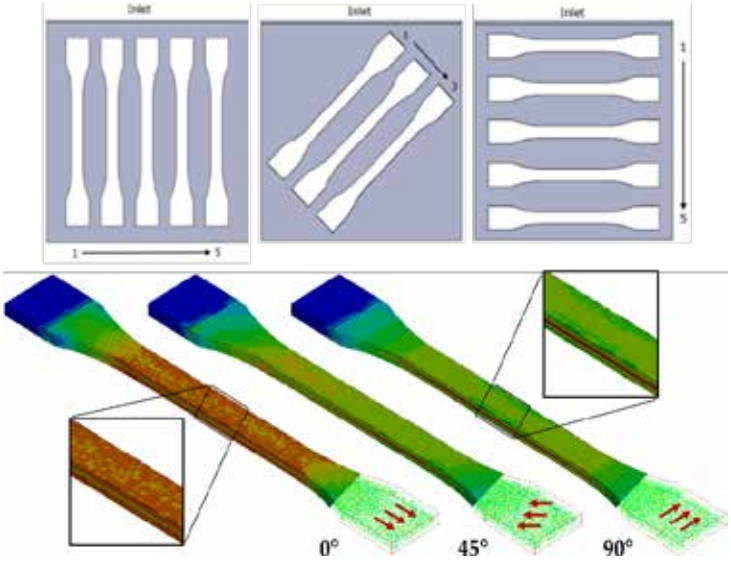
Envyo Use Cases



M. Vinot, Research Engineer at the German Aerospace Center (DLR):

“Using Envyo allows us to easily setup stochastic analysis for our virtual testing program performed at the ARENA2036. Furthermore, we can consider mesoscopic weaving process simulation results using beam or shell elements to introduce orientations into a subsequent macroscopic draping or structural analysis. A link to a material database to allow for Representative Volume Element (RVE) detection is also under development.”

Further information: https://t1p.de/eemr



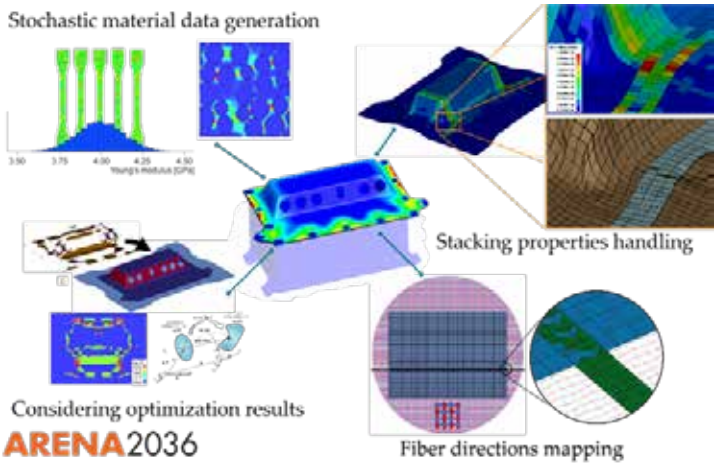
D. Zerbst, Research Engineer at the German Aerospace Center (DLR):

“The grayscale mapping technique developed together with DYNAmore allows us to consider early and late wood zones in our forming simulation of interior components in upper-class vehicles. Thereby, effects observed in the early wood zones such as higher strains to failure are properly captured.”

The developed method can also be used to map the degree of adhesive wetting in adhesive connections to different element sizes.

Further information:

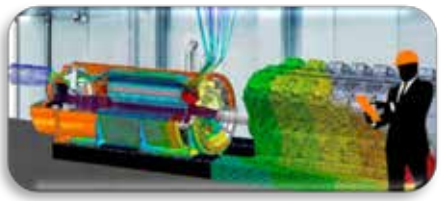
https://doi.org/10.3390/jcs5060150
https://doi.org/10.3390/ma13132993

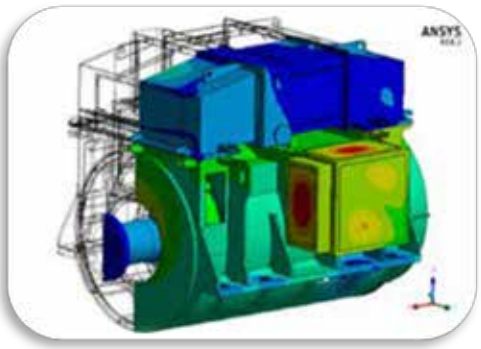


M. Gustavsson, project engineer at DYNAmore Nordic:

“In our work with Envyo together with customers, we have found it to be an essential tool in working with SFRPs. It closes the loop if one wants to simulate the complete process chain, from molding to structural load application, which we believe is necessary to make better predictions of the end product’s performance. Envyo also makes the process transparent, as LS-DYNA material models may be used, and no part of the process is therefore treated like a black box.”

EXCERPT - For this month our editors have chosen the following case study





EnginSoft wishes to acknowledge Ansys Advantage magazine as the source for this article.

Electrifying Solutions for Motors and Generators

ABSTRACT

The market for electric power generation equipment is growing more competitive every day, with customers demanding more reliable, eco-friendly products at lower cost. Marelli Motori meets these demands using Ansys Maxwell, Ansys Mechanical and Ansys CFD in multiphysics simulations to deliver the tailor-made solutions their customers have come to rely on. More recently, they have begun using Ansys Discovery Live to obtain instantaneous simulation results with every on-the-fly change to a product's geometry or operating conditions, greatly reducing design time.

Electric motors and generators contain rotating magnetic coils through which electrons flow. The resistance of electrons flowing through wires, together with the friction generated by rotating devices, causes heat to build up. Energy lost as heat is unavailable to do work, reducing the efficiency of the motors and generators. Excess heat can also cause structural problems as temperature builds up in structural components and induces stress. Heat can be dissipated with cooling airflow, but the physics of the airflow must be optimized for maximum effect.

Because all these physical effects are happening simultaneously, a multiphysics simulation approach is needed.

(Max power generator in a marine application and simulation of its alternator)

Marelli Motori engineers use Ansys multiphysics solutions to custom-design motors and generators to solve challenges in hydropower, cogeneration, oil and gas, civil and commercial marine transport, military applications, and ATEX applications involving motors and generators in explosive atmospheres, among other applications. (ATEX consists of two EU directives describing what equipment and work space is allowed in an environment with an explosive atmosphere.)

Mechanical, Flow And Electromechanical Multiphysics Solutions - Marelli Motori engineers use Ansys Mechanical to optimize the design of the frame, shields, cooling fan, motor shaft and generators. Structural simulations focus on reducing the weight of these components while optimizing stiffness. The R&D Team of Marelli Motori also simulates the response of the machine to the static and dynamic forces that are generated by the rotation of the rotor; excessive forces could lead to component failure through deformation, crack formation or fatigue. Using Ansys Workbench as a common platform to perform multiphysics simulations, Marelli Motori engineers run Ansys CFX simulations along with structural ones to determine the design that best combines optimal structural integrity, thermal efficiency and cost reduction. The rotor assembly (including single or double cooling fans, depending on the machine air circuit), the stator and the heat exchangers (when needed) are the core thermal exchange components of the motor or generator. Ansys CFX computational fluid dynamics (CFD) simulations increase the cooling efficiency and thermal exchange with the surroundings by optimizing the airflow through the machines. This reduces hot spots inside the generators and motors to increase efficiency and maximize power output.

Finally, adding Ansys Maxwell to Mechanical and CFX in multiphysics simulation completes the optimization process. The only way to reduce forces that create motor vibrations is to extract the magnetic forces using Maxwell and export them into a Mechanical analysis to evaluate the harmonic response of the frame. Maxwell is also used to identify hot spots in the coils and combine this analysis with a CFX calculation to locally optimize the design and improve the heat exchange. Ansys Multiphysics simulations yield higher-quality results in 60–70 percent less time than other simulation products that Marelli Motori engineers have used in the past.

All the CFD simulations that lead to a redesign are subsequently evaluated in a test room. Here, some of Marelli Motori's motors for industrial applications are being tested.

Manufacturing Challenges - Even after the design has been optimized using mechanical, flow and electromechanical simulations, the challenge of building the motor or generator most efficiently and effectively remains. Marelli Motori engineers want to facilitate the construction operations while keeping mechanical safety and reliability for each operating condition firmly in mind. This is the most challenging part of the engineering workflow, because while the engineers are trying to design a family of components to optimize heat extraction from the machine, they must simultaneously consider constraints regarding shape feasibility, production cost and ease of final assembly. Using Ansys Mechanical and Ansys CFX together in a multiphysics simulation guides the engineering team to the best manufacturing process. A recent project to develop a new series of small alternators with the latest technological improvements took much less time using Ansys simulation.

Visit the website for additional reading - **Application Examples**

Using Simulation For Ideation… Marelli Motori was one of the first companies to adopt Ansys Discovery Live when it was released early in 2018. … Marelli Motori realized that such rapid simulation results would help them to react to their customer's needs faster.

Andrea Gittens
Innovation & Discovery Marketing Manager bei ESI Group

It Takes Two to Act Sustainably: Zero-Emission Heavy Machines and Digital Transformation

Author: E. Kam

Hit ambitious technological, environmental and financial targets

Electrification of existing product lines while undergoing digital transformation is a challenge facing OEMs on their 'zero-emission journeys' today.

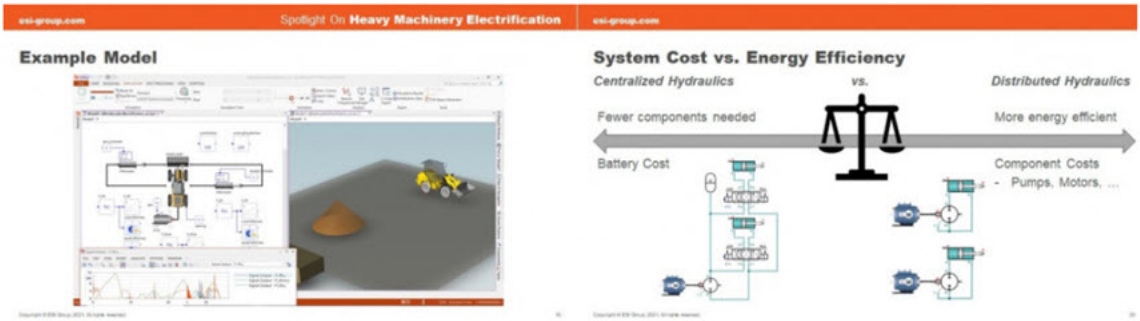
What is the overlap between these separate challenges? Many have engineered, produced, and maintained multiple generations of internal combustion (IC) products, but few have deep or broad experience with electric variants. Whether for heavy "off-highway", consumer light vehicular, or airborne mobility, digital transformation and electrification affect how we conduct business today while setting a course toward the future. Current designs blend a century of practical experience with insights gained in recent years using digital analysis. Design requirements and engineering criteria reflect our cumulative knowledge, but because we are still in our first or second generation of electric product variants, the right way to engineer, produce, operate, and maintain our electric product lines might still reside in the "undiscovered country", the future.

What most "know" about design-for-manufacturing-assembly and design-for-service is knowledge collected over several decades; engineering, assembling, operating, and maintaining internal combustion products. Some design requirements originate from digital engineering, while many others may have arrived after years of hardship, design iterations, process alternatives, and trial-and-error during production as worker populations struggle to make do with the way things were designed then trying to make them better.

- We may already know the top 10 service issues for ICE products, what about the electric variants?
- We have production data for existing products—which tasks risk injury or introduce errors or defects—does that knowledge translate when there are no more spark plugs, or fuel pumps or oil filters?
- What risks emerge when we introduce new components to install during assembly or remove/replace during service and maintenance?

There are no Pareto charts available with past years of production data yet. We lack distributed experience in maintaining products that may not arrive on the market for several years. When we envision our electric future, we cannot plan to simply exchange internal combustion powertrains for batteries and electric motors. Institutional technical memory lags in planning, engineering, and implementation of human-centric processes for these new products—procedures where people are required to interact with the proposed products during activities like assembly, maintenance, or operative use. In this post, we will consider how electrification impacts our digital engineering methodologies and how we prepare for human interaction with novel products.

The shape of things to come - The power systems of industrial heavy machinery and off-highway vehicles can determine the potential layout of a product itself where electric updates could widely influence its architecture or topology. We see that in automotive EVs with the emergence of Frunks—front trunks or cargo spaces occupying the compartments previously dedicated to IC engines—or how batteries play larger roles within the safety structure of cars. However, while the configuration of passenger cars is more about aesthetics or style, off-highway heavy industrial machines can be more functional in their layout. Conventionally, a large single ICE is connected to a transmission that converts engine rpm into rolling motion at the wheels, spins pumps for hydraulic and pneumatic systems and kinetic generators to power electrical systems; but when we electrify heavy machines will the same layout be necessary or even desirable. In a recent webinar, a colleague postulated if electric loader design could benefit from distributed hydraulic power sources rather than a single centralized supply with hoses transferring the pressurized fluid throughout the design. After all, once we remove the ICE as the source of work, we can broaden design flexibility.



Using ESI's System Simulation solution, they found arguments for and against engineering a decentralized hydraulic system coming down to cost vs. energy efficiency, analogous to the range for EV automotive engineering. Shifting to a decentralized hydraulic system creates new challenges/opportunities when it comes to the layout of the product, its manufacturing requirements, and service maintenance procedures. If this new generation of Electric Powertrain loaders was to be produced, could we produce, operate, or maintain it the way we do now?

Human-Centric Process Validation: Interact with your product before production - New risks emerge for heavy machinery manufacturers traversing digital transformation, the lack of physical product availability and pre-production environments makes commissioning the next assembly line or cells difficult. We don't have a century of experience producing electric product variants; therefore we need to consider that new products, assembly processes, and service requirements might yet exhibit sub-optimal design for safe operation, efficient maintenance, and sustainable production once people gain experience with new product variants in assembly or service processes. To accelerate discovery of and to mitigate risks, our customers perform reviews in Virtual Reality (VR) where teams experience future products within the processes where humans interact with them—what we dubbed Human-Centric Product & Process Validation.

Human-Centric Process reviews allow users to integrate new product CAD data in an immersive virtual environment with proposed tooling, production assist devices, and assembly line hardware. While in VR, the user can visualize design variants to evaluate assumptions regarding the packaging and space claim within their design envelope. Will technicians be able to see what they need to assemble or service the proposed electric product?

They can analyze the clearance required and propose new installation paths or packaging requirements. They can synthesize the performance of assembly tasks in a virtual version of the future plant and evaluate assembly order to validate production processes; they can conduct trials to remove or replace components to validate proposed service methods.

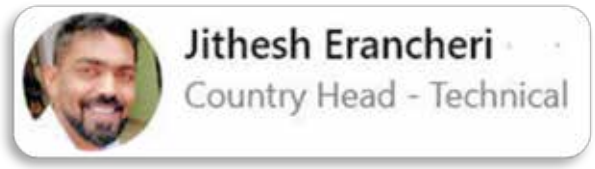
Larger graphic on website.

When we consider the ways that process plans and tooling for new products affect human workers; we recognize value toward enterprise outcomes (illustrated left):

- Packaging and space claim of solid components and elastic hoses/cables in the design
- Clearances and installation or removal/replacement paths of components
- Physical interactions of complex mechanisms with themselves, adjacent components, or human operators
- Definition, evaluation, and validation of procedures involving new products
- Evaluation, validation, and optimization of assembly tooling, assembly cells, production lines and maintenance environments
- Design for effective human factors and safe ergonomics conditions
- Collaborate with stakeholders cross functionally and around the world

Each decision regarding the Systems Design for new machines—alternative layout of systems, variant topology, addition, or elimination of componentry—potentially affects the ability of people to effectively operate, assemble, and service. A conclusive answer to the initial thesis from the systems team presented in this post, “should we decentralize the hydraulics system or rely on same topology as the ICE version”, requires not only the validation in Systems Engineering outputs but also a verification that the decision will not invalidate other aspects of process plans. In future posts, we will delve deeper into these different aspects of design validation of Human-Centric Product and Process design concerns that emerge from the consideration of electrification of a conventionally ICE product.

Eric Kam, Marketing and Alliances Director - Eric Kam is the Marketing and Alliances Director for ESI Group’s Manufacturing Business Channel, supporting their Immersive Experience (VR/AR/MR/xR) Solutions and Virtual Manufacturing Suite. He is an outspoken advocate for the ongoing transformation in Computer Aided Design, Finite Element Analysis, and Computer Aided Engineering. He has spent the bulk of the last 25 years promoting the democratization of previously “analyst-driven” technologies to bring the benefits of Virtual Engineering tools to the engineering and manufacturing practitioners themselves



Kaizenat Technologies Pvt Ltd

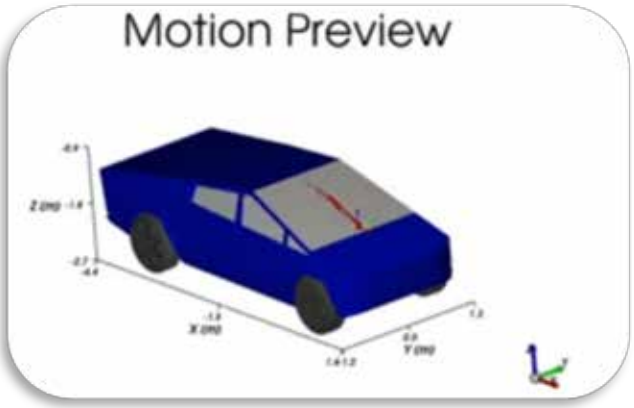
Kaizenat Features Videos

We the Technical team of Simulation engineers at Kaizenat Technologies Private Limited support and train engineers for FEA, CFD, Electronics simulations on tools like ANSYS, LS DYNA, ANSYS Discovery etc.

Do you know how Snow build-up can affect your car?

Windshield snow wiping simulation - Tool used: Rocky DEM

It is highly recommended that you at least shovel the snow from your car before it piles on during the winter time. This is because heavy amounts of snow can strain your car and cause damage.

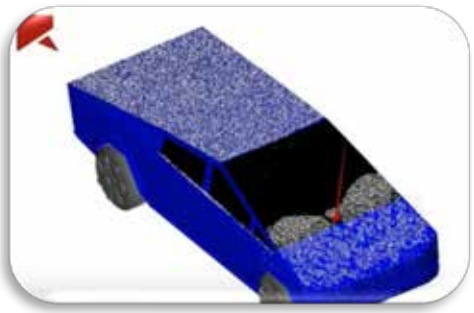


Here are three different ways that snow build up can harm your car

*** Cracks in the Windshield -** Large amounts of snow can strain your windshield. If the snow is extremely heavy, stress cracks can also emerge in the windshield.

*** Dents in the Auto Body -** If the snow gets heavy, the body of your automobile can actually become dented. This commonly occurs on the roof of your car and the hood of your car.

*** Rust Can Develop -** Water sitting on your car, including that from snow, can cause rust to form. Rust is extremely problematic to a car as it eats away at the metal in your car.



A day in the life of an applications engineer

By Richard Baldwin

Using the metrology hardware is just one aspect of the job, it's in the software where the real magic happens. You can measure a point, a plain, a circle, but what do you do with the data? A great deal of the work of an applications engineer is about demonstrating and helping people to understand the capabilities of the software.

When you ask a Hexagon applications engineer to describe their role, you'll never get the same answer twice. With an unrivalled reach and influence, Hexagon's metrology capabilities touch every aspect of engineering and manufacturing, and that's what makes the applications engineer's job so varied and interesting.

An applications engineer is, ultimately, a problem solver. These are the people who make things happen, and when things occasionally go wrong, they are there to resolve the issue. They have the enquiring mind of a scientist, the communications skills of a marketer and the intuition of a private detective. This skillset reflects the unpredictable and wide-ranging nature of the job.

A key function of the role is to be the customer-facing representative of Hexagon while on site and also feedback the client's comments to the engineering department at Hexagon. Their job is to understand the technical needs of the task at hand and advise accordingly, give aftersales support, training, servicing and even subcontract work.

"… from the mundane to the beautiful, the fantastic to the downright bizarre"

Applications engineers at Hexagon work on objects and structures from the mundane to the beautiful, the fantastic to the downright bizarre. A task may involve the measurement or quality assurance of any kind of component, the geometry of airplane wings, racing cars, through to orthopaedic implants and beyond.

At Hexagon we've two main types of applications engineer, those working with stationary equipment like the CMMs and those working with the portable equipment like the laser trackers, scanners and absolute arms. With portable metrology, application's engineers are much likely to find themselves called into unusual locations to scan or measure an object. This kind of process is great for reverse engineering objects and running simulations on the digital version rather than the real life object.

Using the metrology hardware is just one aspect of the job, it's in the software where the real magic happens. You can measure a point, a plain, a circle, but what do you do with the data? A great deal of the work of an applications engineer is about demonstrating and helping people to understand the capabilities of the software.

It's with the software where the real magic happens

When a process has particularly high tolerances it can require accuracy down to the submicron level. That's a strange world where unexpected things can happen.

Customers contact the apps team with unusual problems all the time. Afterall, if it were simple they'd fix it themselves. One customer made contact after having spent hundreds of thousands on metrology equipment, taken all the correct steps to make sure it was maintained and kept in working order, yet it was giving unusual results.

Most CMMs use air bearing technology to avoid vibration and prevent wear on the axis. They need an extremely clean operating environment to prevent ingress of dust or small particles. The customer was using high accuracy CMMs in a climate controlled, pressurised room.

The equipment had been working well except for an intermittent fault that caused unlikely readings with a strange regularity, every hour, on the hour. What was the problem? No one was sure. The customer called the apps team and so began a process of elimination. They recalibrated the machines and the probes, they checked the measurement routines, the software, nothing.

What was happening every hour, on the hour, 24 hours a day? A shift change, or more precisely, a change in the number of people in the room. The air conditioning itself was calibrated according to the volume of air in the room and the number of people working inside. Every hour, two people would come in, and two would go out. That meant, for a short period of time, there were six people in the room instead of four, and in those few minutes the temperature difference was enough to affect the measurements.

> "…the smallest, seemingly insignificant thing can be the source of an error"

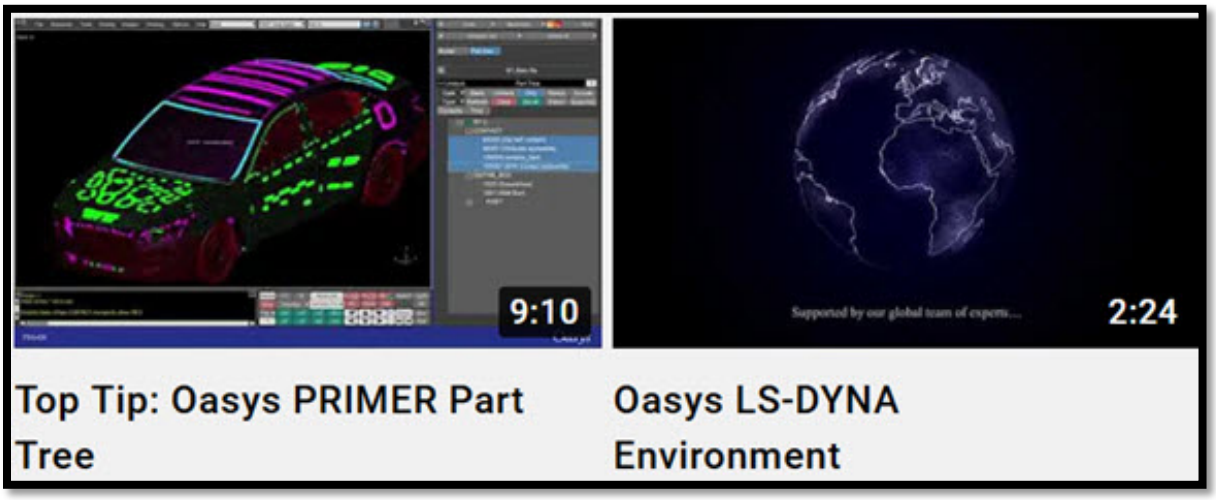
When you're working on the micronscale, the smallest, seemingly insignificant thing can be the source of an error. High accuracy CMMs have a working temperature range of just one or two degrees and the additional number of people in the room as enough to affect the metrology equipment.

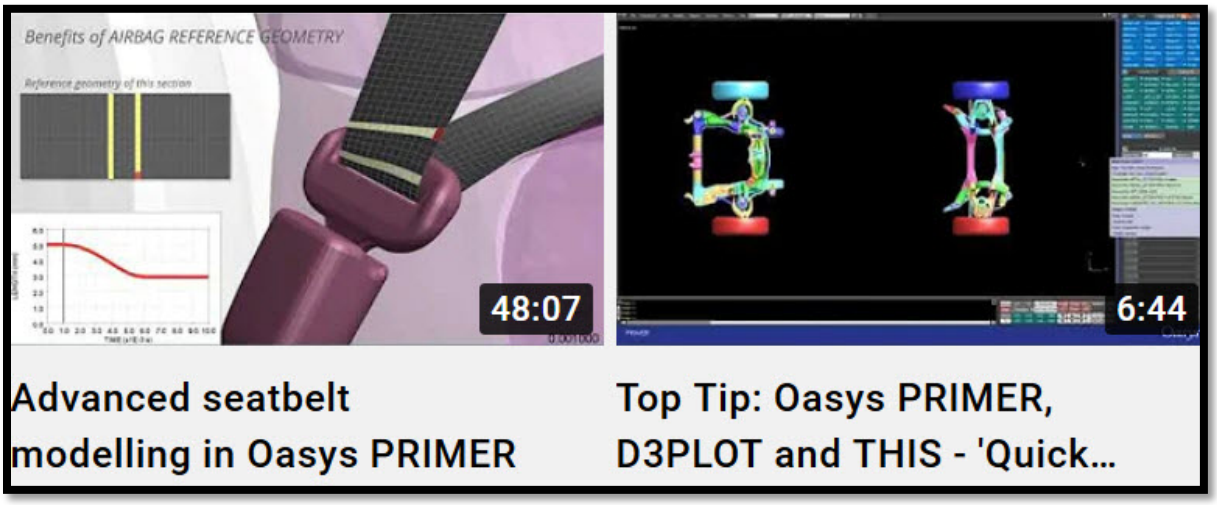
A day in the life of an applications engineer is never monotonous and it requires a good deal of thinking outside the box. It frequently means travelling around the country to visit equipment in situ, especially with the portable metrology products, like laser trackers, scanners and arms. Apps engineers can find themselves just about anywhere, measuring almost anything. One day you might be in a factory or quality room, the next under a bridge scanning for deformations in the structural bearings.

The role of an applications engineer must be one of the most interesting jobs in the company. If you're the sort of person who likes a puzzle, then an applications engineer might be the right role for you. Applications engineers are helpful people to have around (just don't give them a Rubik's cube for Christmas).

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

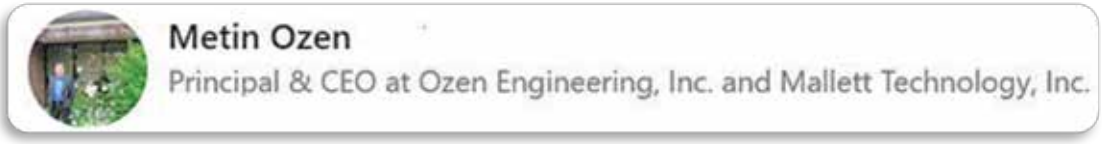
Not To Miss on YouTube

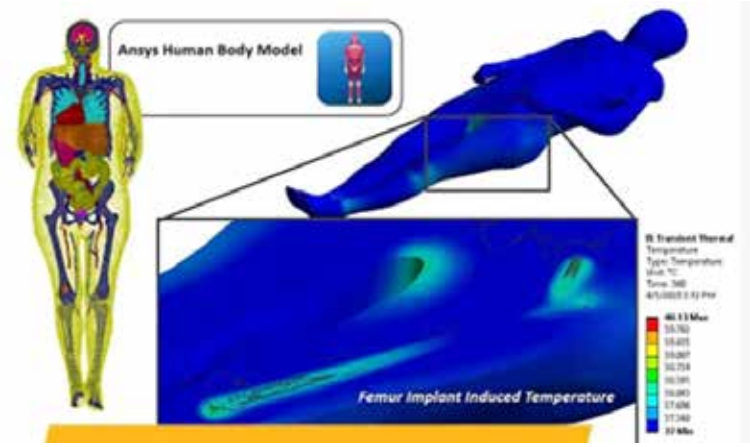




Oasys REPORTER offers automatic report generation using numerous layout tools with the ability to auto-create images through embedded D3PLOT, T/HIS and FAST-TCF scripts.

Generate your report for multiple simulations, extract key data points and combine into one document, complete with automatically collated summary tables, color coding and company logos.





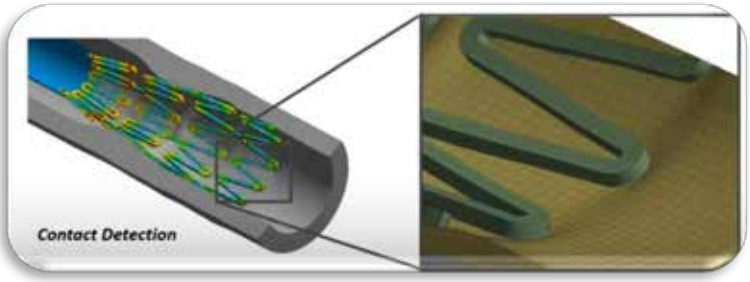
Welcome to a presentation on our Ozen Engineering YouTube channel.

Simulation Best Practices for Medical Devices Design and Development

…If you are looking to simulate your medical device design, we can help. Please contact us at info@ozeninc.com

"The use of in silicio computational modeling has provided a novel and efficient approach for assessing MR patient safety and improving information to clinicians"
Dan Moreno, DePuy Synthes Companies/Johnson & Johnson

Healthcare companies rely on the accuracy of Ansys comprehensive simulation portfolio because they work with both regulators and industry standards organizations to develop best practices for predicting medical device and medical equipment behavior on the bench and when interacting with the human body. These models facilitate adoption and accelerate the regulatory approval process. Their work is already having a significant impact. For example, their physics-based simulation solutions recently helped a leading North American medical device manufacturer shorten the time to approval and product launch by 2 years, also enabling them to reduce their cost of a single regulatory submission by $10M.



Design
Self-Expanding Stents

Customer Goals

- Open occluded vessels with minimal damage
- Optimize stent design to minimize stress/strain and fatigue
- Accelerate regulatory approval
- Evaluate patient-specific delivery

Solution

- **Fast Pre-processing**: Geometric wrapping for rapid stent creation and design optimization capabilities
- **Accurate**: Nitinol material models for stent, and hyper-elastic for vessel and plaque
- **Robustness**: Contact detection

Benefits

- Reduces stent fractures
- Minimized occurrence of restenosis
- Reduced the cost of physical testing by 10%

Due to length of article we have published excerpts

From ICE to Ice Creams - How Internal Combustion Engine (ICE) technology makes better gelato

By Prashanth Shankara

Home of alluring art, incredible history, heavenly food, stunning landscapes and phenomenal fashion, Italy epitomizes life in all its lazy, elegant brilliance. Italy is 'La Dolce Vita' – "the sweet life" – a life of heedless pleasure and luxury.

This story is a surprising marriage of two Italian things that best symbolize heedless pleasure and luxury – supercars and gelato. This is a story of how a small Italian company, well-known for their expertise in super car Internal Combustion (IC) engines, helped an ice-cream manufacturer make better gelato.

Made in Modena, Italy - Our story starts in Modena, the 'City of Engines'. This charming Italian town is also the unofficial 'supercar capital of the world'. Ferrari, Lamborghini, Maserati, Pagani and Bugatti all call Modena home.

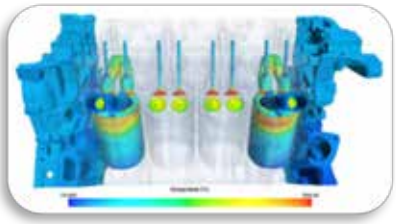
It is here, that Giuseppe Calise, a graduate of the nearby University of Modena and Reggio Emilia, established R&D CFD in 2012 with his Professor, Dr. Stefano Fontanesi. Borne out of the University's Internal Combustion Engines (ICE) research group, they do engines well. Really well.

The CFD in their name is a nod to their expertise in computational fluid dynamics (CFD) simulations. R&D CFD works with most of the supercar manufacturers around Modena helping them build better IC engines digitally using CFD simulation.

IC engine operation is complex. Combustion of air and fuel, temperatures of 4500 F (2500 C), moving pistons, hundreds of chemical species, and thousands of reactions some of which occur in a billionth of a second. All of this inside a small, dark cylinder, inside a fast supercar. How do you analyze such complexity? How do you find the best engine design?

With CFD, companies like R&D CFD build a digital engine. Every process in and outside the engine is digitally modeled, analyzed and visualized. Add in design optimization and you can evaluate hundreds of scenarios and designs digitally before building anything.

In 2019, their CFD simulation and engineering expertise caught the eye of an unlikely customer: a leading Italian gelato manufacturer.



The variegated gelato - The global ice-cream market is worth $80 billion USD and increasing every year. Nearly 80% of the ice-cream sold is machine-made, either to take home in a box or consume immediately. It's a massive market. (Pic: Simcenter STAR-CCM+ simulation showing thermal behavior of engine components,courtesy R&D CFD)

The manufacturer who worked with R&D CFD is famous for their variegated gelato. Excuse the fancy word here! A variegated gelato is merely ice-cream with a sauce swirled into it – chocolate, strawberry, caramel, fruit, peanut butter and more (Now I'm getting hungry).

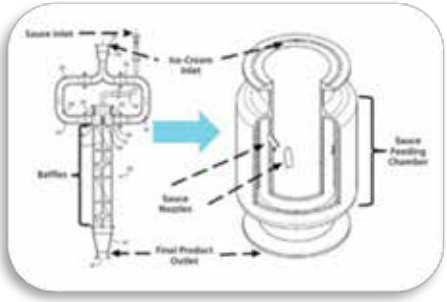
Chasing the good (looking) gelato - Ice-cream was once a dessert for kings. But thanks to capitalism and mass production, the common man can enjoy one of life's greatest delicacies. Our gelato maker was one such mass producer. Gelato in a box was their specialty. With years of mass-producing experience, the taste of their gelato was world class – creamy, rich and dense.

Good gelato needs to be good-looking. No one likes a dull, rough, garish looking ice cream. Eating ice-cream is an emotional, evocative experience. In a competitive market, the look and feel of your gelato makes all the difference. The manufacturer's list of requirements for esthetically pleasing variegated gelato was long: soft, smooth, silky, elastic, and of natural color. Improving the look will have a direct impact on sales and customer satisfaction.

"The customer wanted our help to predict how their variegated ice-cream would look at the end of their manufacturing process. People who buy this ice-cream are looking for a certain hand-made feeling. But how do you make it look hand-made in a machine?", says Giuseppe.

Top: Good variegation Bottom: Poor variegation Seriously, which one is more appealing?

A simpler design; a better swirl - The secret lies in the variegator. This machine mixes the ice-cream and the sauce, fed through different pipes….



Improving the variegator with CFD simulation - Now they needed to make the design better. They needed to predict how the ice-cream would look after manufacturing before being stored in boxes.
This is where R&D CFD's simulation and design optimization experience came in handy. They had Simcenter STAR-CCM+, a CFD Multiphysics software and Simcenter HEEDS, a design optimization software, both tools from Siemens' Simcenter portfolio.

For years, they used Simcenter STAR-CCM+ on supercar engines to understand the flow and thermal behavior of engines. Simcenter HEEDS helped them analyze the performance of hundreds of designs and scenarios.

……"In the past, we worked with other simulation software where the process was way more difficult. What we enjoy with Simcenter STAR-CCM+ is the variety of physics you can simulate, from engines to ice-creams", adds Alfonsina.

Using Design Manager, a technology within Simcenter, Alfonsina modeled 2,000 different design scenarios changing the nozzle geometry and operational physics laws to inject sauce. The software automatically found the design that produced the best sauce pattern and swirl.

Imagine having to build and test 2,000 different variegators instead!

Simulation & History of F1-Racing Helmets

Ameen Topa
Research Scientist at Universiti Teknologi PETRONAS

Head with Helmet Impact - Data Extraction

History - The Fascinating Evolution of F1 Helmets - Driver61

F1 racing helmets have changed a lot over the years. In this video, we take a look at how Formula 1 helmets have transitioned from simple leather caps to carbon fibre composites.

Driver61

Educating and entertaining racing drivers, sim racers & motorsport fans.

Autoliv - Autoliv Commercial Vehicles Seatbelts

Chet Butler - Senior Project and sales manager -

Improve safety in the commercial vehicle market while maintaining the current level of comfort. In the commercial vehicle market it is very important that those truckdrivers are comfortable.

Twenty thousand truck drivers are injured in traffic crashes annually in the U.S. alone, yet commercial vehicles do not contain as many safety protections as passenger cars. Watch how we are researching to increase occupant safety in this market.

The seatbelts have an added feature of induced slack by comfort latch - What we're her to look at is pretensioning through that slack and coupling the belt early in the crash to the occupant so that we can manage the occupant's movement.

Today we are looking at a class 8 day cab where we have implanted some advanced restraint technologies and we cold crash it multiple times while changing many of the variables in the crash event during a crash event energy management is critical the energy from the crash is transferred to the occupant and if we could rapidly control the movement of that occupant we can reduce injury potential…

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

1. We are not sure why this month he wanted an attack helicopter - It isn't like anyone goes on his property. He is known to be just a tad trigger happy.

Quiz - can you name the helicopters he requested? Additionally, there is an extra credit question!

A hint for "D" - The town supervisor makes them, and is as close to a plane or helicopter she will ever be allowed to fly.

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

.

A_____

B_____

C_____

D____YES, it does fly - directly into her wall

Collins Aerospace advances zero-emission aviation with 500KW electric motor for Hybrid Air Vehicles' Airlander 10 aircraft

SOLIHULL, U.K. Collins Aerospace, a Raytheon Technologies business (NYSE: RTX), announced it has completed critical design review and started fabrication of a 500 kilowatt electric motor for the Airlander 10 aircraft under a partnership with Hybrid Air Vehicles and the University of Nottingham.

Flight qualification testing of the motor is expected to occur in 2023, followed by hybrid-electric operation of Airlander 10 by 2025 and all-electric, zero-emission operation by 2030. To achieve these improvements, the aircraft's four fuel-burning engines will be replaced by Collins' 500 kilowatt electric motors—beginning with the two forward engines in 2025 and the two rear engines in 2030.

Collins is designing and testing the motor at its Electronic Controls and Motor Systems Center of Excellence in Solihull, U.K., where it recently invested $18 million to expand the campus and add world-class power electronics and motor development capabilities.

"Airlander 10 has the potential to be the world's first zero-emission aircraft, while pioneering game-changing electric flight technologies in the process," said Marc Holme, senior director, Electronic Controls and Motor Systems for Collins Aerospace." As the aerospace industry continues to look for ways to reduce its carbon footprint, electric propulsion offers a significant solution that will create a more sustainable future for our industry and our planet."

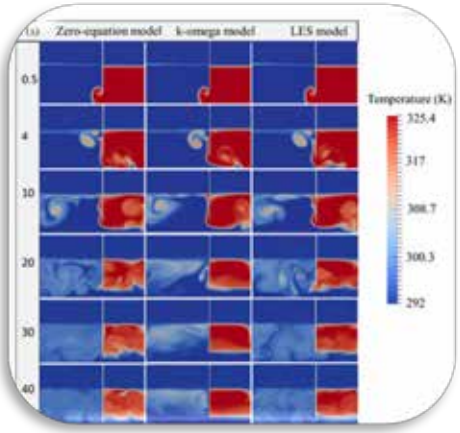
The Airlander program will address key goals of the U.K. Aerospace Technology Strategy: strengthening the UK's aerospace capabilities, positioning the UK for developing future generations of civil aircraft, and advancing a new generation of efficient propulsion technologies. The research project to develop the electric motor, E-HAV1, was co-funded by the Aerospace Technology Institute Program, a joint U.K. government and industry investment to maintain and grow the U.K.'s competitive position in civil aerospace design and manufacture. It is delivered through a partnership between the Aerospace Technology Institute, Department for Business, Energy & Industrial Strategy and Innovate U.K., and addresses technology, capability and supply chain challenges.

"The Aerospace Technology Institute has clearly identified the importance of technology developments to support sustainable aviation through the U.K. Aerospace Technology Strategy, Accelerating Ambition," said Mark Scully, the Aerospace Technology Institute's Head of Technology – Advanced Systems & Propulsion. "The Hybrid Air Vehicles Airlander 10 offers a unique opportunity to deploy innovative, high performance motor technology from Collins Aerospace initially in hybrid propulsion and, in the future, all electric propulsion configurations. These technology developments will enable economic growth and jobs in the U.K. aerospace sector."

Maj. Josh Gunderson, **F-22 Raptor** Demonstration Team pilot and commander, performs the high-speed pass during the Wings Over Houston Airshow at Ellington Airport in Houston, Oct. 10, 2021. The high-speed pass reaches speeds up to .94 the speed of sound, which is only a fraction of the aircraft's speed capability. (U.S. Air Force photo by Staff Sgt. Don Hudson)

A flock of Eagles - Three F-15C Eagles and an F-15EX Eagle II fly behind a KC-135 Stratotanker during an in-air refueling mission over Tinker Air Force Base, Okla., Oct. 15, 2021. In-air refueling allows fighter aircraft to stay airborne for longer periods of time without having to land to refuel. (U.S. Air Force photo by 2nd Lt. Mary Begy)

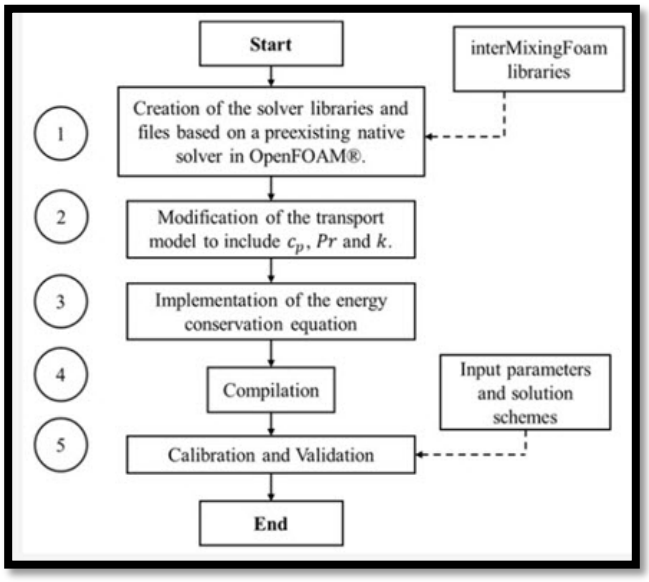
Final flight - An HH-60G Pave Hawk A6212, assigned to the 56th Rescue Squadron, sits on the runway after refueling at an airport in Croatia during its final flight before retirement, Sept. 23, 2021. A6212 is scheduled to be stripped of required components then mounted in front of the 56th Operations Rescue Squadron. (U.S. Air Force photo by Senior Airman Brooke Moeder)

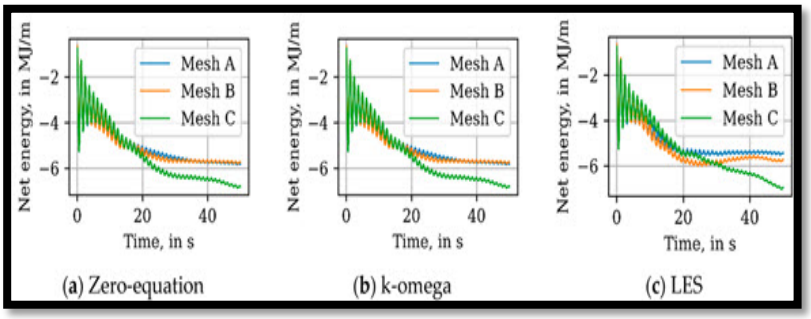


CFD Simulations of Multiphase Flows: Interaction of Miscible Liquids with Different Temperatures

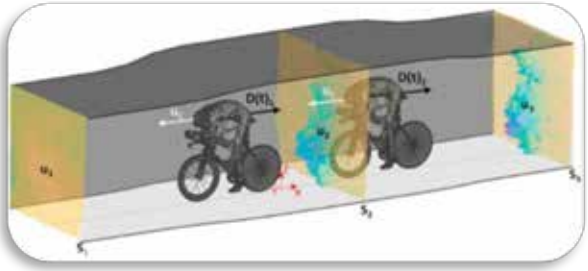
- **Paola Elizabeth Rodríguez-Ocampo - Edgar Mendoza - Rodolfo Silva - Michael Ring** - Inst. of Eng., Nat'l Autonomous Univ. of Mexico (II-UNAM), Mexico City …
- **Jassiel Vladimir Hernández-Fontes** - Dept. of Naval Eng., State Univ. of Amazonas (EST-UEA), Manaus Brazil
- **Juan Carlos Alcérreca-Huerta** - Dept. of Observation & Study of the Land, Atmosphere & the Ocean, Nat'l Council of Sci. & Tech.-The Southern Border College (CONACYT-ECOSUR), Chetumal Mexico

Abstract - The incorporation of new equations to extend the applicability of open-source computational fluid dynamics (CFD) software according to the user's needs must be complemented with code verification and validation with a representative case. This paper presents the development and validation of an OpenFOAM®-based solver suitable for simulating multiphase fluid flow considering three fluid phases with different densities and temperatures, i.e., two miscible liquids and air. A benchmark "dam-break" experiment was performed to validate the solver. Ten thermistors measured temperature variations in different locations of the experimental model and the temperature time series were compared against those of numerical probes in analogous locations. The accuracy of the temperature field assessment considered three different turbulence models: (a) zero-equation, (b) k-omega (Reynolds averaged simulation; RAS), and (c) large eddy simulation LES). The simulations exhibit a maximum time-average relative and absolute errors of 9.3% and 3.1 K, respectively; thus, the validation tests proved to achieve an adequate performance of the numerical model. The solver developed can be applied in the modeling of thermal discharges into water bodies.





Found on social media thanks to Fabio Malizia - Have you ever wondered how much energy you can save when riding your bike behind another cyclist? Have a look at this research from Alexander Spoelstra, Nikhil Mahalingesh, Andrea Sciacchitano and Fulvio Scarano.



On-site drag analysis of drafting cyclists

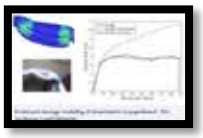
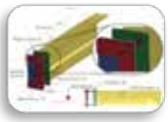
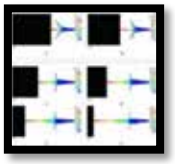
Alexander Spoelstra, Andrea Sciacchitano, Fulvio Scarano, Nikhil Mahalingesh

Aerospace Engineering Dept., Delft Univ. of Technology, Kluyverweg 2, Delft, 2629 HT, the Netherlands

Highlights

- The drag reduction felt by a trailing cyclist in a tandem configuration is measured by the Ring of Fire.
- The drag reduction decreases as the lateral and longitudinal separation increases, where the former one is the most relevant.
- Flow visualizations show that the drag reduction of the trailing rider can be ascribed to the changing inflow conditions.
- A mathematical expression is proposed that describes a model to predict the drag reduction under drafting conditions.

Abstract - The aerodynamic drag of a trailing cyclists in a tandem formation is investigated at different lateral and longitudinal separations. A Ring of Fire (RoF) experiment is conducted at the Tom Dumoulin bike park of Sittard-Geleen in the Netherlands. The method is based on stereoscopic Particle Image Velocimetry (Stereo-PIV) measurements followed by invoking the conservation of momentum expressed in a control volume to evaluate the drag force of the cyclists. Three cyclists perform a series of individual tests as well as four different drafting tests, varying their order in the group. All tests were performed at a nominal riding speed of 45 km/h; the longitudinal displacement of the drafters varied between 0.32 m and 0.85 m and the lateral displacement varied between ±0.20 m among different runs. The results from the RoF measurements show the flow field interactions between the two drafting cyclists as well as the wake of the second cyclist. It is observed that the amount of drag reduction for the trailing rider is mainly caused by the change in inflow conditions. The drag reductions of the trailing cyclist are in the range from 27% to 66% depending on the longitudinal and lateral separation from the leading rider. The aerodynamic advantage of the drafting rider decreases with increasing lateral and longitudinal separation between riders, with the lateral separation found to be more relevant. Furthermore, based on the analysis of the individual wakes, the drag reductions found by the RoF, and the drag reduction measured by Barry et al. (2014), a model is introduced that predicts the aerodynamic gain of the trailing rider based on his or her position with respect to the leading rider. Validation of the model with data from literature shows that in the near wake the model prediction is in line with literature, with an overestimation of the drag reduction when the longitudinal distance is between 0.1 m and 0.3 m.

	Material Model Development of Magnesium Alloy and Its Strength Evaluation **Wenjia Huang - Ninshu Ma - Yunwu Ma Toshiro Amaishi - Kenji Takada - Takayuki Hama**
	PDF - Determination of Impact Loads for a Tracked Military Vehicle during a Crash Scenario **B. Balaban (FNSS Savunma Sistemleri)**
	Continuum damage modeling of delamination in paperboard **Jakobsson, Erik**
	Cork Core Sandwich Plates for Blast Protection **Jesús Pernas-Sánchez, Jose A. Artero-Guerrero, David Varas, Filipe Teixeira-Dias**
	Aerodynamic drag in cycling team time trials **Bert Blocken, Yasin Toparlar, Thijs van Druenen, Thomas Andrianne,**
	Numerical Analysis and Experimental Test for the Development of a Small Shaped Charge **Piotr Malesa, Grzegorz Sławiński, Karolina Pęcherzewska**
	Computational ballistic analysis of the cranial shot to John F. Kennedy **C. Then, K. Nelson, T.J. Vogl, K.E. Roth**
	Cyclist aerodynamics through time: Better, faster, stronger **Fabio Malizia Bert Blocken**

BSIM Engineering Group & SDF

PDF Excerpts, full article visit - Leading tractor manufacturer uses Simcenter Amesim to reduce development time by up to 30 percent

SDF develops tractor lines for diverse agricultural uses and environments, among them the SAME Explorer, which has undergone continual improvements since its original design in 1983

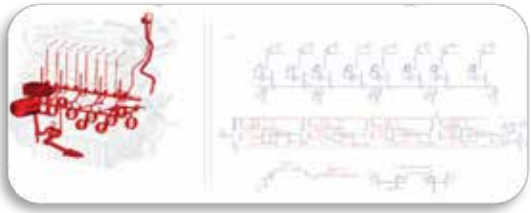
Gaining independence and flexibility SDF started using Simcenter Amesim 10 years ago to model and simulate vehicle hydraulic circuits and dynamics. … Using Simcenter Amesim for hydraulic circuit simulations (specifically, the engine oil circuit and cooling system) and mechanical simulations (specifically shaft vibrations), the SDF engine validation engineering team was readily able to target and achieve lubrication circuit optimizations.

Further, stricter environmental regulations on carbon dioxide (CO2) and nitrogen oxides (NOx), as well as customer interest in limiting fuel consumption, confirm that manufacturers need to constantly and quickly adapt their equipment offer. The latest European (Stage IV) and United States (Tier 4) regulations require an 80 percent cut in nitrogen oxides compared with previous levels, already down 50 percent compared to Stage IIIA/Tier 3. SDF is adjusting its FARMotion signature engine technology accordingly.

Delivering at the right price and time - Lubrication systems are an essential component of an engine. The systems play a fundamental role in ensuring high efficiency in fuel consumption and engine emissions as well as lowering the maintenance needs of the vehicle. Therefore, SDF continuously evaluates its traditional lubrication systems to improve the general performance of its FARMotion engine.

To complement testing and reduce development times, the SDF Engine Validation Department switched to model-based systems engineering (MBSE). MBSE enables them to considerably reduce iterations between the design and testing phases. The department started with different simulation software, but quickly decided to change to Simcenter Amesim.

FARMotion is the SDF signature engine that has been specifically designed to meet the challenges of the farming sector.



… engineers are able to import 3D modeled components and carry out fast modeling of engine lubrication systems to complete simulations

Riccardo Bonacina, Base Engine Validation and Reliability Lead Engineer SDF. "You can upload hydraulic systems, mechanical systems and electronic systems simultaneously, and from that you can generate the results you are looking for…" "To find a new solution, it only requires acting on some parameters using Simcenter Amesim and validating them during the testing phase, instead of starting the complete development phase over like we did some years ago.

We have had a VERY wet month so not much to post - mud, wind, more mud, more rain - UGH!

We have a new ranch hand that helps training Dusty and Quincy -

Dusty came home after a two week stay in the horse hospital where he was kept on IV fluids and antibiotic. We think he is now okay.

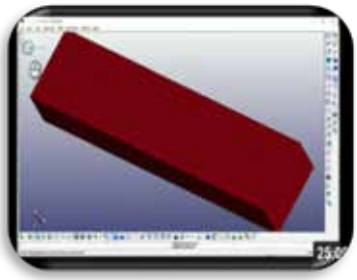
10/18/2021 - Okay I think we have Dusty under illness control and here he is with our new ranch hand that is making friends with Dusty.

Ranch hand with Dusty

Ranch hand training Quincy

Tutorials

Oaysis - Oasys PRIMER Part Tree



R.P Santiago - A simple solid beam will be used to review the basic LS-DYNA commands and get an idea of the influence of mesh density on the results

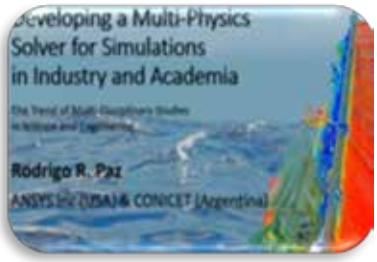
Oasys - Advanced seatbelt modelling in Oasys PRIMER

CADFEM - Ansys SCADE Student - Car Cruise Control (English)

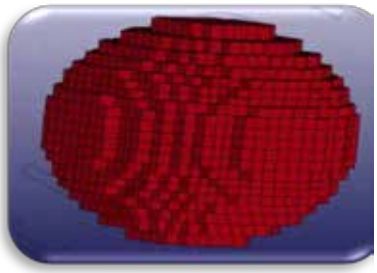
Papers

B. Balaban - FNSS - Determination of Impact Loads for a Tracked Military Vehicle during a Crash Scenario

R. Leonardi - FE approach to evaluate the dynamic friction coefficient for the transient phase of rubber-ice sliding interaction

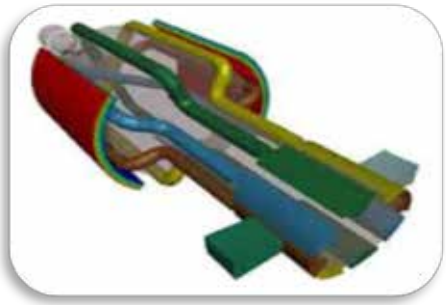


R. Paz - Developing a Multi-Physics Solver for Simulations in Industry and Academia



H. Chen - Recent Developments in LS-DYNA® S-ALE

	**Elisa - d3VIEW - New Multi-User, Loadcase and Region Simulation Tracker with Built-in Analytics**
	**R. Mitchell - ANSYS - Introducing Ansys Forming software for Your Metal Stamping Needs**
	**ESI - It Takes Two to Act Sustainably: Zero-Emission Heavy Machines and Digital Transformation**
	**Hexagon** Automotive industry needs to check its electric vehicle 'blind spot'

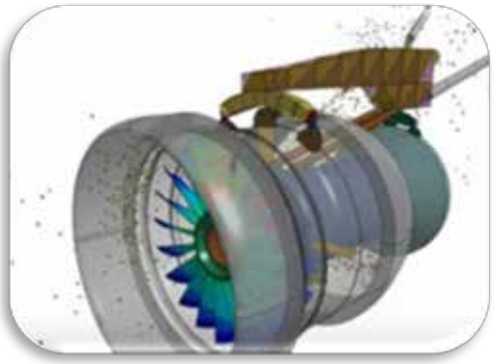


You hoped EM stood for Eclairs and Marshmellows? NOT! This is engineering - but eclairs and marshmellows really do sound more interesting with coffee. ANYWAY, back to engineering!

This videos shows some of the capabilities of the LS-DYNA EM solver

Sit back, have a nice cup of coffee and listen to Oasys about their LS-DYNA environment. And, let's have some cake...candy...cookies - anyone seen my diet? If so send it to me!!!

Oasys LS-DYNA Environment -Developed specifically for LS-DYNA



Bird strike when you are sitting drinking coffee is when you suddenly have a bird dropping land in your coffee! Oh, ruined coffee! Well, bird strike on a rotor fan ruins both the bird and the blades.

LS-DYNA SPH : Bird strike on rotor fan

Bird Strike on Ti-6Al-4V Fan Blades using SPH. Inspired from the AWG ERIF Test Case 2.1.

My Virtual Travel Outing

Thank you for voting for my page. We held the vote at 2 AM in our local bar known as Grab Your Beer Before It Spills. This month on the bar TV (really for sports) we visited the following museum.

BMW Welt. Completely unique - inside and out.

BMW Welt combines futuristic architecture with fascinating insights into the present and future of mobility. Immerse yourself in the variety of the BMW Group brand world with our exhibitions, discover our event highlights, and enjoy a range of culinary offers.

BMW Museum. 5.000 square metres BMW history.
The BMW Museum brings to life over 100 years of automotive fascination, innovation, dynamism and the joy of driving. In this fascinating permanent exhibition, all questions about BMW, brand and product history will be answered and the arc from the beginnings to the present to the future will be stretched. Look forward to a unique experience.

CONCEPT. - The new concept for the BMW Museum was developed out of the success and experience of the previous museum, whereby new emphasis was placed on stressing the importance of the BMW Museum as a brand museum.

BMW ROADSTER - No automobile arouses as much emotion as a roadster. This two-seater sports car with a light top expresses a very special lifestyle - it is an automobile with a distinctive character that conveys driving pleasure in its most intense form.

The BMW Roadster has an important place in the history of BMW automobiles. The BMW Museum presents selected exhibits at the central location in the low building.

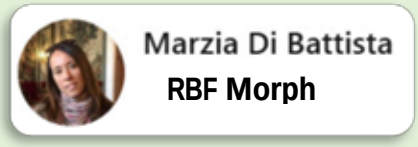
…Seven exhibition houses have been built in the low-rise building. Each of the houses has been given an individual ‘identity’ developed on the basis of the museum’s themes. This individual appearance creates a context for the exhibits and provides a set of reference points along the route through the museum, measuring approximately 1,000 metres in length. The tour route has been designed with no crossroads and takes the visitor to all 25 exhibition areas.

Thank you for joining the bar patrons and me on our visit to this month's museum.
AND, don't forget to join us next month when we visit another museum!

armyblackhawkpilot

B&W Flower Macro - All rights reserved October 17, 2021
Stanford University Coursework. Palo Alto, California.

Month	Start Date	Organized by	Conference - Symposium - Event
Nov.	11	Kostech	Kostech Users Conference 2021 Seoul Korea
Nov.	17	EnginSoft	37th Int'l CAE Conference and Exhibition - EnginSoft
Dec.	02	Cadfem Medical	Cadfem Medical Conference 2021



"Join our presentation!" Marzia Di Battista, Web marketing & Communication Specialist at RBF Morph,

"Simulation and mitigation of Vortex Induced Vibrations by means of high fidelity FSI simulation and advanced mesh morphing with M.E.Biancolini RBF Morph"

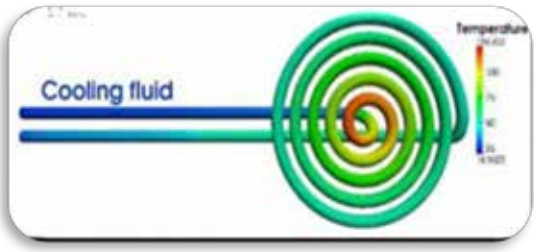
Int'l CAE Conference and Exhibition | 2021, Nov. 17 - 19 | Vicenza, Italy

What's new and what can you expect? **Hybrid event** (both physical and virtual) **Involves all participants equally** – those physically in the conference rooms or exhibition spaces and those connected remotely.

Automotive CAE|VDI Conference|VDI Wissensforum on November 9th-10th

Kambiz Kayvantash will be presenting ODYSSEE CAE and ODYSSEE A-Eye will be presented. Additionally, other presentations from the Hexagon Manufacturing Intelligence products will be presented. Please visit the Hexagon Manufacturing Intelligence booth.

Heat transfer is a discipline of thermal engineering that concerns the generation, use, conversion, and exchange of thermal energy (heat) between physical systems. Heat transfer is classified into various mechanisms, such as thermal conduction, thermal convection, thermal radiation, and transfer of energy by phase changes. Engineers also consider the transfer of mass of differing chemical species, either cold or hot, to achieve heat transfer.



LS-DYNA Multiphysics

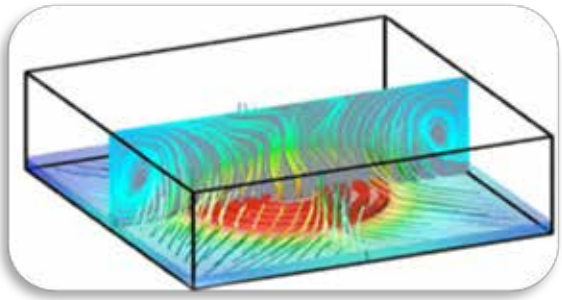
LS-DYNA conjugate heat transfer in a coil heated by an electric current

This simulation predicts the temperature of the coil to which a current is applied. To prevent excessive heating of the coil and potential melting a cooling fluid runs inside the coil.

Kaizenat

Thermal Simulation of Heat fins using ICFD – LS-DYNA

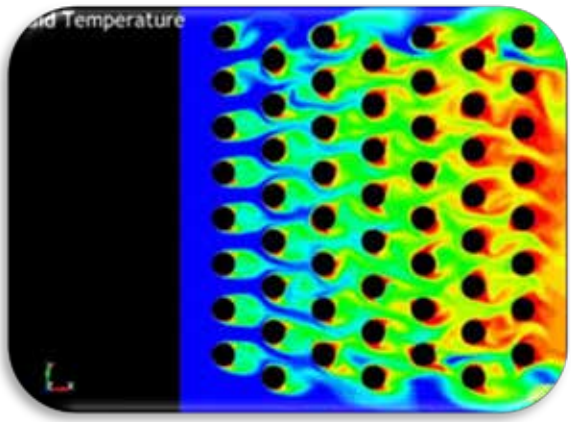
The ICFD solver of LS Dyna is capable to model and simulate the heat dissipation which is demonstrated in this video.



DYNAmore GmbH

LS-DYNA is boiling up water!

This is a fully coupled multiphysics simulation using the latest incompressible fluid solver (ICFD) in combination with the electro-magnetic field solver (EM) both coupled to the well-known thermal solver.

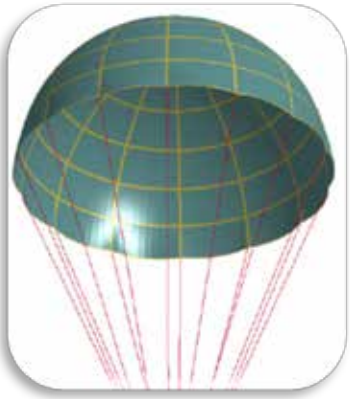


LancemoreJP

LS-DYNA Sample Model No.316 ICFD Heat Exchanger ICFD,

Incompressible Flow Solver
2D thermal fluid analysis

**Town secretary "First, the 500 parachutes were on sale. Second, we did a low-velocity airdrop to slow down the load to ensure it impacts the ground with minimal force. There was no cattle or horse stampede from the drop. One casualty - town supervisor, fainted.
The town kids and adults thought the airdrop was exciting."**



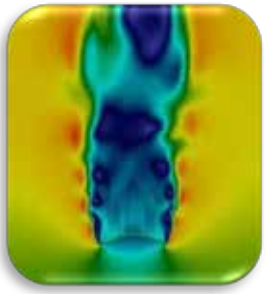
Parachute deployment simulations using LS-DYNA ICFD solver and strong FSI coupling - M. LE GARREC, A. PONCET, V. LAPOUJADE - DynaS+

The main goal of military airdrops is the accurate delivery of cargo released from a moving air vehicle via parachute. The airdrop trajectory results from the movement of the dropped package and the dynamics of the parachutes deployment. After having treated the freefall of a rigid object in the near flow of an airplane, the present paper focuses on the parachute deployment modelling and its challenges in LS-DYNA.

Simulation and Testing Assessment of Cruciform Parachutes using LS-DYNA® ALE - T. Rose, G. Noetscher, K. Bergeron
U.S. Army Natick Soldier Research, Development & Engineering Center

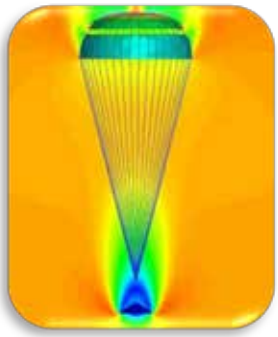
This work presents a model of the coupled aero- and structural dynamics for a cruciform parachute which can then be used to inform development of control schemes for autonomously guided airdrop systems.

Simulations:



LS-DYNA CFD: FSI modeling of Parachutes with Porous Elastic Fabrics.
Velocity field of the flow through Porous Fabrics. Parachutes modeling.

- fabric permeability=1.e-9m^2
- falling speed = 10m/s
- parachute thickness =0.1mm



LS-DYNA ICFD/FSI: 3D Porous Parachute FSI Modeling.

3D Fluid-Structure Interaction model of an actual porous parachute.

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).

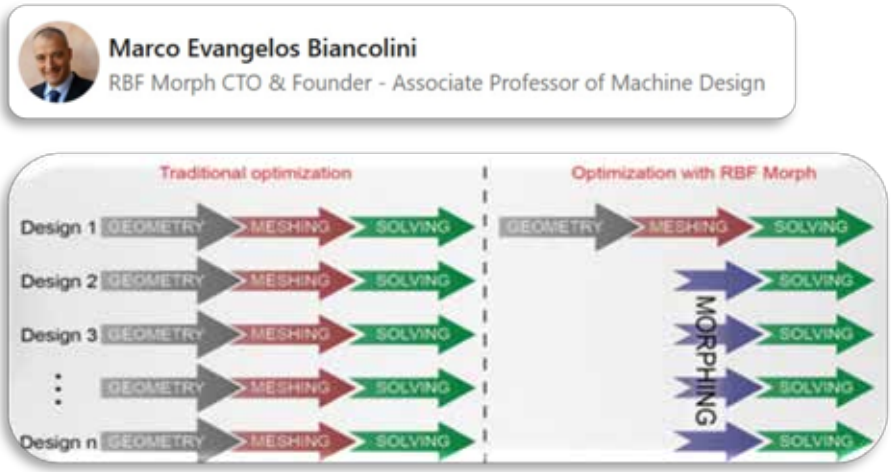
developed a book of recommendations which are the reference input for revising standards and the future regulatory framework

Applus IDIADA - AEROFLEX project - Final Event 2021

Together, we have achieved achieving SmarterMobility solutions for high-capacity long-haul **r**oad freight transport.

- implemented new technologies, concepts and architectures to improve efficiency by up to 33%, focusing on the vehicles' powertrain, aerodynamics, loading units and the front-end design of the complete vehicle.
- complete vehicles are safe, comfortable, configurable, and cost-effective, while ensuring that the varying needs of customers are satisfied by being flexible and adaptable with respect to the continuously changing operational conditions. .

YouTube - See how Predator Cycling, LLC uses Ansys to overcome some of the inherent challenges in composites.



RBF Morph technology performs fast mesh morphing using a mesh-independent approach based on state-of-the-art RBF (Radial Basis Functions) techniques. The use of such Technology allows the CFD user to perform shape modifications compatible with the mesh topology, directly in the solving stage, by just adding one single command line in the input file.

CONVENTION CENTER
YouTube Booths

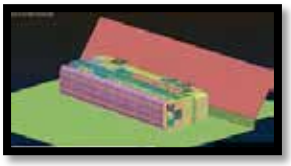
Current videos plus/minus one week: Oct 23

Free Coffee for visiting our exhibitors

Ameen Topa

Kaizenat

LURI ENG

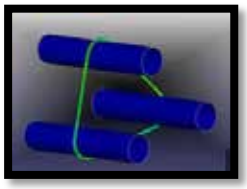


Oasys LS-DYNA

CADFEM

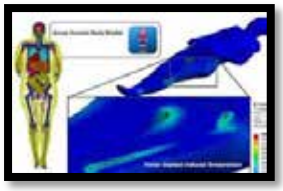
ESI Group

SIMU-K



MSC. Software

R.P Santiago



Ozen Engineering

MEETING ROOM

Vivian van der Hert

Dr. Markus Kellermeyer
Professional Development for Simulation

Alexander Nolte

Dr. -Ing. George Schelerer

Dr. Christian Romelsbergere

Months of work come to an end... These are our first English Ansys eLearning courses. Any feedback is welcome!

Test CADFEM eLearning first module of this eLearning training free of charge and without obligation. Get to know the format and make sure that everything works smoothly

- Structural Mechanics
- Fluid Mechanics
- Electromagnetics

Many more to come...

Decide for yourself when, where, and how often you undertake Ansys training. The new eLearning service from CADFEM, developed in collaboration with the ZEIT Academy, makes it possible. Benefit from tried-and-tested seminars from the CADFEM team and our Ansys speakers – the time, the place, and the intensity of your learning are all up to you.

YouTube

CADFEM eLearning goes international!

Fabian Leonov S. López - CAE Engineering Manager/COO
LURI Engineering México Automotive/ Structural Analysis FEA

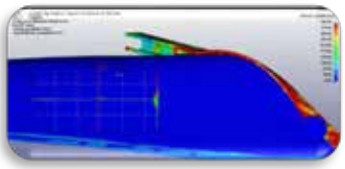
The LURI Engineering channel

"Automobile Manufacturers are required to design their vehicles for safety so that the occupants will survive a variety of crash scenarios. Computer simulated crash analysis evolved over the years to help augment the crash test programs and to give engineers insight into the crash events."

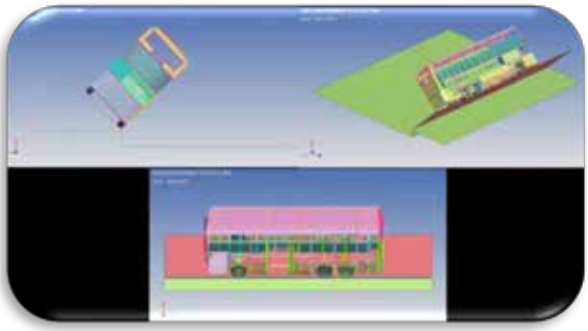
(seat belt simulation the inertia that is generated in a panic braking process)

The LURI Engineering channel is intended to share information to engineers and interested parties in the field of:

- Finite Element Analysis
- CAD modeling
- Engineering and Product Development
- Manufacturing Processes
- Smart Electronic Three-Dimensional Models
- Flexibility in Pipes
- Point cloud
- CFD

	LURI Engineering Impact Analysis of Commercial Fences
	LURI Engineering GranD Caravan NCAP Frontal Crash Test 56 Km/h This is a FEA model of a Grand Caravan subjected to NCAP Frontal Crash test impacting in a Rigid concrete barrier. Model show energy balance and pulses in several accelerometers
	LURI Engineering Crash Test Tractor Semitrailer This Tractor-Semitrailer vehicle FE model is the product of three year's work. Many hours of research were spent to determine the best and most accurate material property definitions, critical components were characterized and validated by experimental testing and countless simulations were run and rerun to test, validate and debug this vehicle model. The main focus of this work was to validate the FE model for redirective type impact scenarios which are the most prevalent use of vehicle FE simulation. Markedly different impact scenarios such as head-on, rollover, or rear impact would need similar specific validation work.

mauricio.colin@luriengineering.com.mx



"Good afternoon convention center visitors, I would like to share a little of the capabilities of the VPG suite developed by Engineering Technology Associates, Inc."

In the video I show a Rollover simulation following the regulations ECE_R66 which was quickly elaborated thanks to the help of the VPG Suite.

Additionally. I welcome you to follow Luri Engineering on LinkedIn.

VPGSuite allows users to quickly replicate real-life simulations in a virtual environment. This covers crash & safety simulations (standards/regulations, occupant safety - positioning, seat belt and pedestrian protection) or related to the reliability of the structure (suspension, chassis, steering, vehicle dynamics and durability).

VPGSuite helps engineers understand true system performance under various test conditions, providing early design validation at the system level.

LS-DYNA is the solver behind VPGSuite. Collaboration allows VPGSuite to become a robust tool that simulates various test scenarios and drives design based on test results.

LURI Engineering is a Mexican company located in Mexico City

We provide solutions that enhance the value of engineering processes and products with a complete range of solutions that cover all specialties in Structural Engineering, Automotive, Energy, Transportation, Development and Optimization of Products and/or Structures using the tools of Finite Element Analysis CAE, Computer Aided Modeling CAD, Manufacturing Processes and PLM.

Georgios (Yiorgos) Chrysomallos

Director General at cad-experts.gr® SKG
Thessaloniki Metropolitan Area

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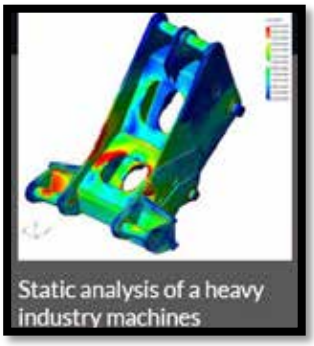
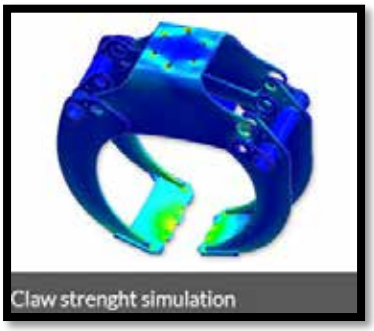
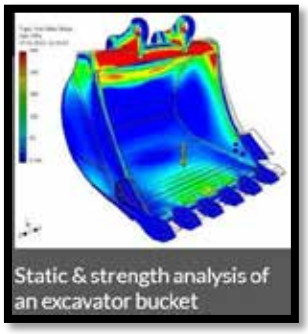
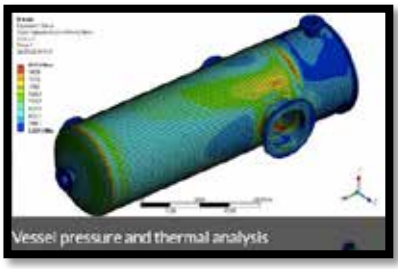
Cad-experts - We are specialist, with over two decades of experience, mechanical engineers and industrial designers, automation engineers, welding engineers and machinists. In addition we are established since 1978 till now, in the field of mechanical engineering constructions and repairs, predictive maintenance etc. Also we can offer in the industry safety engineering plans and solutions. We provide accurate engineering solutions based on your needs, through 2D/3D CAD modeling, CAE, and prototyping (and in several cases a completely R&D till construction.


Static analysis of a heavy industry machines


Claw strenght simulation


Static & strength analysis of an excavator bucket


Vessel pressure and thermal analysis

As a subcontracted member of your team, we are able to support you throughout the entire design process with the following services to ensure your project proceeds efficiently and safely:

- Advance BOM
- Shop and Assembly Drawings
- Part Drawings
- DXF/DWG Files
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- Sheet-metal Design
- DFM
- CAD/CAM/CAE-CFD
- Rapid Prototyping
- 3D Printing
- A Complete Design Folder
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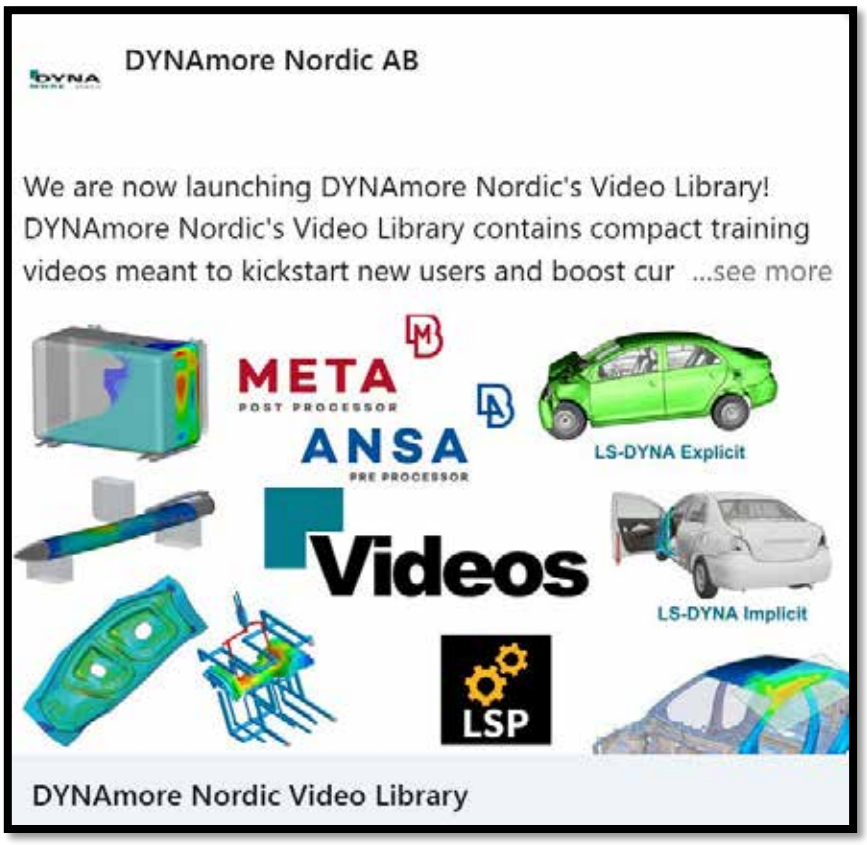
- Food Industry design & applications.

With a large experience, that allows us to versatilely coordinate all aspects of your projects to ensure your needs. You can expect nothing list less than a complete solution from our company.

If you have an idea we can design and manipulate it for you.

Thanks to Mats Landervik for bringing this to our attention

Rasmus Schützer
Project Engineer på DYNAmore Nordic AB



Welcome to DYNAmore Nordic's Short Training Video Library!

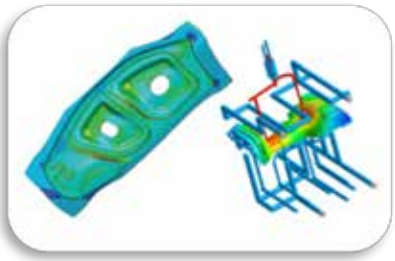
Me and my colleagues have been working for some time on a new project with the aim of bringing you knowledge and expertise regarding LS-DYNA.

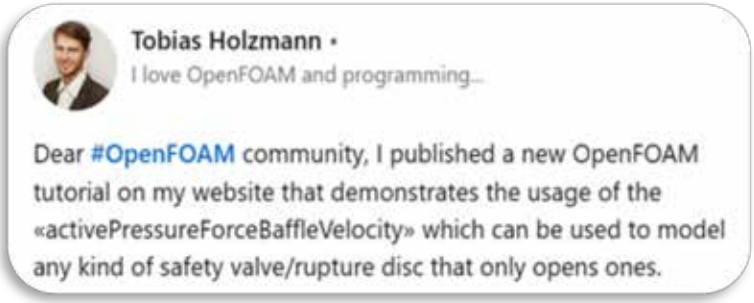
We now have a library with informative videos on topics that range from multiphysical simulation techniques to automation of the simulation process.

Make sure to check it!

Here you will find short training videos and tutorials about numerous LS-DYNA applications. Additionally, you will find all other products that DYNAmore Nordic provides. All for free, all you have to do is enter your contact info before accessing a topic. Start now, gain knowledge.

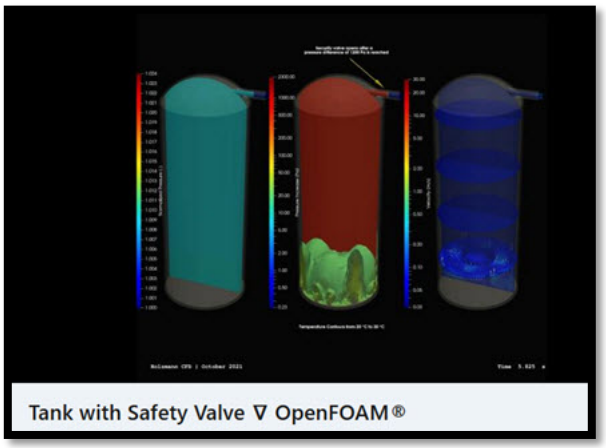
Among the Training We Offer:

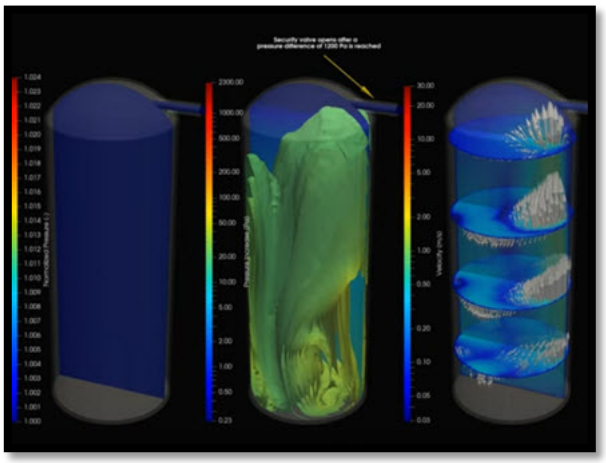
		
PROCESS Simulation	**LS-DYNA Implicit**	**DYNAmore Tools**
Here you'll find videos about process simulation and related software, sheet metal forming, welding, forging, and injection molding using LS-DYNA and other software such as FORMINGSUITE, Dynaform, Moldex3D, and Envyo.	Here you'll find videos about implicit simulation in LS-DYNA, such as introductions to our guidelines, tips on how to getting started, examples on common applications for implicit simulation, and much more.	Here you'll find videos about DYNAmore's own tools for pre- and post-processing, everything from tools for checking models prior to simulation to handling and processing output data, and more.



WEBSITE - HOLZMANN CFD - Tobias Holzmann's free available training cases for OpenFOAM® in a varity of CFD fields and techniques

Tank with Safety Valve ∇ OpenFOAM®





This OpenFOAM® tutorial was built due to the continuous and voluntary support of «Andreas Mai».

The case shows the usage of the so-called «activePressureForceBaffleVelocity» boundary condition which can be used to model a safety or release valve such as a «rapture disc» or similar devices. The focus in the tutorial is related to the mesh generation, mainly to set up the boundary condition for the «activePressureForceBaffleVelocity» by using snappyHexMesh, topoSet, and createBaffles as well as createPatch. In addition, the meshing procedure includes the automatic gapLevel refinement.

The tank is heated at the bottom by using the «externalWallHeatFluxTemperature» condition by using a Function1 time-dependent power source. As the safety valve is set to be closed, the pressure inside the vessel increases until the defined pressure drop is reached and the «activePressureForceBaffleVelocity» switches the characteristics from type wall to type cyclic. Hence, the pressure is released.

The case is available on the website https://Holzmann-cfd.com.

Enjoy and keep Foaming,
Tobias Holzmann

BOOK: Mathematics, Numerics, Derivations and OpenFOAM(R)

Graphics Courtesy of Vecteezy

Goodbye and Come Back Soon

Our Town Salutes our US military and military of friends of the US.

QUIZ Credit - Correct Answers A-C you are served doughnuts!
Correct Answer D you are served Coffee & Doughnuts!!!!

A Boeing AH-64E Apache Guardian
B Bell AH-1Z Viper
C Eurocopter Tiger
D. Our very own town supervisor, Marsha.
She calls it paper recycling.
She misses the trash can every time and flies them right into a wall.