
# FEA - CAE Not to Miss & More

March 2025 ISSN 2694-4707

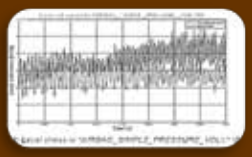
**Town Hall Meeting in the town that mostly exists**
**Town Plaza: Drive slowly – Galloping Prohibited**

Airport - Northrup

Airport - BAYKAR

Auto - Aston Martin

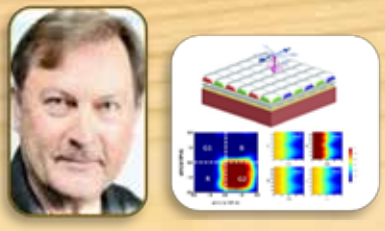
Auto - POLIMI



Marco - RBF

Madhukar - CADFEM

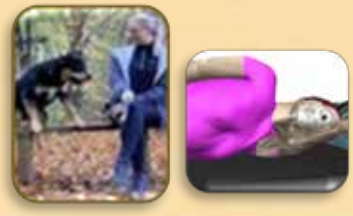
Metin - OZEN



Curt - Autodesk

Coyote 5C's - Tinkercad


Marta – OASYS



Ben - OASYS

Lisa - Synopsis

Brianna - LLNL

Jeff - Siemens

Ryan – Alfa Laval

Adam – Texas A&M



## Legal - the shortened version (it was too long to read)

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**Editors:** Anthony, Art, Marnie, Marsha, Sabyl

**Town Pretend to be Editors:**

| | |
|---|---|
| The Old Rancher | No one in town knows his name. You yell "Hey, Old Rancher." |
| The Old Pilot | No one in town knows his name. You yell "Hey, Old Pilot." |
| The Old Racer | No one in town knows his name. You yell "Hey, Old Racer." |
| Racer's Daughter | The whole town knows her name. You yell "HEY, Slow down!" They are all family - strange family |

Names, & characters of AI visitors and AI editors are the products of imagination. Any resemblance to actual persons, living or dead, or actual events is purely coincidental.

We will always remember

**FEANTM Town Always Salutes:**

- Our US military, NATO and Friends of the US & NATO - First Responders, Police, Fire Fighters EMT's, Doctors, Nurses, SWAT, CERT Teams, etc.
- We salute engineers, scientists, developers, teachers AND students because without them we would not have technology.

**USA & allies of the USA**

Parking & Coffee are free.

# R & D - Camping - Town Map

Horse Trail → Yield right of way to horses

R&D Technology Business Park

RV CAMPING
Park in any vacant camping site

CADFEM · DFETECH · d3VIEW · OZEN · ENGINSOFT · AUTODESK · Oasys · DYNA MORE · Ansys · Applus DatapointLabs

Town Hall & Library


Lawrence Livermore National Laboratory


rbf · MEDITATE · LIVGEMINI · rbf.LAB


The Old Rancher

**Race Track**

**Airport**

**Sports Stadium**


- **Logos represent companies/academia/research with solutions for today's world.**
- If you wish to have yours removed, kindly inform us at **feaanswer@aol.com**.
- Proceeds from the auction of your building will be allocated to the coffee budget.
- The map is subject to change - building sites will be rotated accordingly.

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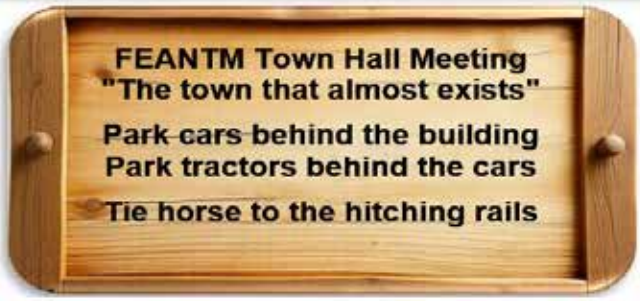
# Welcome to our County, Town Hall Meeting & Announcements

**Town Motto: Creation is born from trying. If it doesn't work, learn & try again. You will succeed. Ideas, simulations, medical cures, creativity wouldn't exist without the passion to keep trying.**
**You've Got This**





**Hello and welcome to the town and another edition of FEANTM.**

**Thank you to our loyal contributors and readers, and a warm welcome to those joining us for the first time. It's a pleasure to have you on board as we explore the latest advancements and insights across disciplines.**

**Marsha is on the mend; she's continued the Comic Blog Chronicles, the Goodbye Page, and additional articles in this issue. Upon returning, Marsha will return to her role as FEANTM Town Supervisor/Managing Editor. I will continue as Managing Editor due to the many aspects of our town/informational resource blog.**

**If you have any questions or need assistance, feel free to email me at feaanswer@aol.com (please use the subject line Attn: Marnie).**

**Thank you for being part of the FEANTM community. Enjoy the issue!**

**Best regards, Marnie B. Azadian, Ph.D.,**
**Managing Editor**

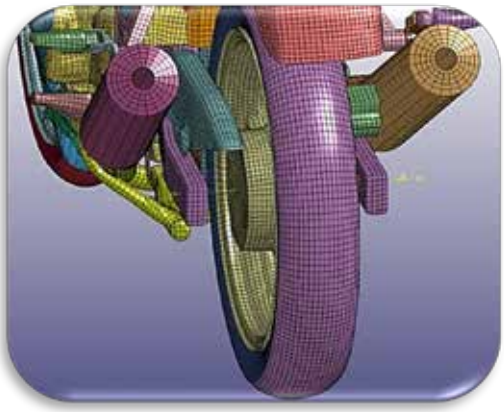
**Curt**: Don't miss the article by Heather Miller, Thinkerbell Labs Delivers the World's First Braille Self-Learning Device with Autodesk Fusion and Fusion Operations

**Madhukar**: CADFEM – Dev. of RF System-in-Package chip…The proximity & number of components in a SIP & tight prototypes mfg. time require a design methodology that gives first-time-right products..

**Metin:** Article by Majid Ebnali Heidari - High-tech cameras power countless industries…Designing these advanced devices with stunning image...& cost-effective production is no easy task.…

**Marco:** Preliminary thermo-mechanical design... - FMU4FMU (Functional Mockup Units for Fluid-Structure Co-Simulation) & The future of CAE & industry predictions for 2025.

Article Excerpt, "Finite element modelling allows for increased geometrical accuracy and more accurate deformation during impact. **For the purpose of this study LS-DYNA® will be used to develop the finite element model and computer simulation.**"



**Web – DYNAlook - 14th Int'l LS-DYNA Users Conf.**

**Development of a Finite Element Model of a Motorcycle**

N. Schulz, C. Silvestri Dobrovolny & S. Hurlebaus
Texas A&M Transport Institute

**Abstract** - Over the past years, extensive research efforts have been made to improve roadside safety hardware to reduce injury to occupants of four wheel vehicles and heavy trucks. In comparison, limited research has been conducted to address the safety of motorcycle riders when impacting roadside safety hardware. The vulnerability of motorcycle riders can lead to a high risk of injury for the rider, especially when impacting roadside barriers. In real-world motorcycle crashes there is a wide range of impacts against other vehicles and barriers. Reproducing these different motorcycle crash scenarios through physical crash testing can be considerably costly and time consuming. Computer simulations are a great tool to address the wide range of impacts in real world motorcycle crashes because they are significantly cheaper and quicker than performing full scale crash tests. Motorcycle simulation models have been developed since the 1970's and have improved in detail and complexity over the years. However, there is still a need to develop detailed motorcycle models that are geometrically accurate and can accurately predict motorcycle response behavior. The researchers have developed a Finite Element (FE) computer model of a motorcycle through reverse engineering. This model can be used to investigate impact scenarios involving motorcycles. To validate the accuracy of the model, measurements of the motorcycle computer model such as mass, geometry, etc, were compared to measurements of the physical motorcycle.

Figure 7. Perspective view of FE motorcycle model.

Figure 8. Perspective view of FE motorcycle model without plastic coverings.

**ANSYS Website Blog**, “Have you ever broken a bone in your leg, perhaps when you were a child? If you did, you might remember how difficult it was to do everyday activities. But after a few weeks, you would be able to bear weight on it, and then a few weeks after that, the cast would come off. Now imagine how hard it would be if you could never bear weight on that limb again.”

**Web – ANSYS - Circleg Empowers Amputees Through Simulation**

**Susan Coleman**, Sr. Director Academic &Startup Programs, Ansys
**Aliyah Mallak**, Sr. Marketing Communications Writer, Ansys

This is the reality for the 65 million amputees around the world, the majority of whom have lost lower limbs. The main reasons for amputation are traumatic events like car accidents, vascular diseases like diabetes, and inadequate medical care. Of the 65 million, 65% live in lower-to-middle-income countries, yet only 5% to 15% have access to assistive products due to unavailability and unaffordability. Locally produced prosthetics in low-to-middle-income countries are extremely limited, which forces hospitals to import them. This subjects patients to long wait times, inefficient and costly procurements, and logistical challenges.

Unfortunately, prosthetic users are often discriminated against and isolated from their communities. Amputations can lead to loss of employment, and many people may be unaware of their local resources and rehabilitation options. Even if they do know what resources are available, many amputees can’t logistically travel to receive them because of geographical challenges or the inability to afford them.

**To combat these challenges, Circleg — a Swiss-Kenyan social enterprise — enables accessible, high-quality, and empowering solutions for amputees with a focus on beneficiaries in low- and middle-income countries.** Circleg enables the freedom of mobility by providing prosthetic components and facilitating services, which further scales the impact. The organization develops solutions to support amputees in their path to regain mobility, thinking beyond the mere supply of high-quality prosthetics to integrate amputees and orthopedic technicians in the process.

Circleg’s journey began in 2018 through the bachelor’s thesis of Fabian Engel and Simon Oschwald as they completed their studies in industrial design at Zurich University of the Arts. Circleg now has five co-founders and a team of 18 engineers, designers, prosthetists, and business specialists. The flagship product, the Circleg One, is engineered to meet the unique needs and challenges faced by amputees. This state-of-the-art prosthetic device is set to bridge the gap by offering a solution that is high quality and accessible to enhance the lives of amputees.

“We are not reinventing the wheel, as mechanical prosthetics have been around for decades,” says Max Calabro, product developer at Circleg. **“Our innovation consists of the implementation of processes and materials that have not been used before with the goal of improving the performance of low-cost prosthetics.”**

**The Circleg One is a modular prosthetic consisting of four components, and it is customizable for both above- and below-knee amputees with simple tools and minimal effort.** The use of reinforced plastics makes the prosthetic lightweight and comfortable for everyday activities.

**To achieve this, Circleg uses Ansys Mechanical structural simulation software accessed through Ansys Apex Channel Partner CADFEM via the Ansys Startup Program.** “The main challenge is that we have to meet many different requirements,” says Calabro. “The device needs to be easy and comfortable to use, there are really high mechanical requirements, and at the same time, we have a strong focus on production costs.”

Throughout the development process, Circleg used Mechanical software to evaluate the performance — such as the flexibility of the foot — and the strength of the Circleg One. Requirements for the Circleg One vary depending on if the amputee needs an above- or below-knee prosthesis. In general, an above-the-knee prosthetic leg is more complex than one below the knee, with the biggest difference being the knee joint. A below-the-knee prosthesis needs only a shin, an ankle, and a foot while an above-the-knee prosthetic leg needs a functioning knee joint. Without this, the wearer will have a hard time getting around. Knee joints are central to the mechanics of walking, as they bear much of our weight and affect our balance.

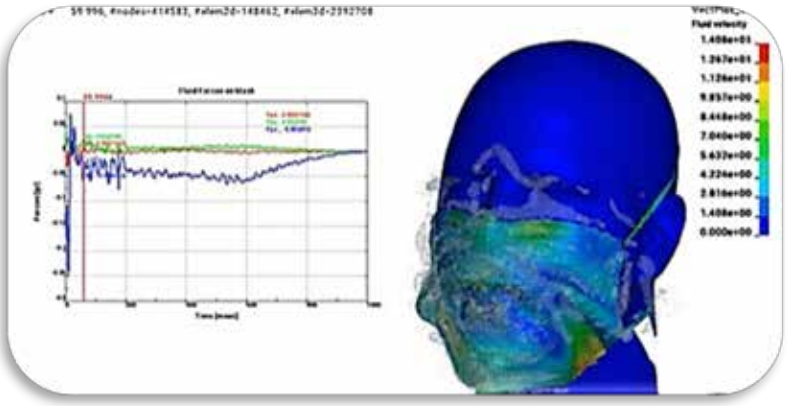
**There are very clear structural requirements, and our simulations helped us to have a precise estimate if the parts are going to meet them or not even before we built a tool for them,” says Calabro. Using simulation enabled him and his team to evaluate the performance of different components before physically creating them, significantly reducing time.**

In the beginning, Circleg started small with simple models that reflected the different components of the prosthetic. “This helped already a lot. Moving forward, we realized that we need to make them more specific and precise,” says Calabro. Initially, the team hadn’t considered simulating the production process, but after seeing discrepancies between the simulations and actual measurements, the team implemented it on a larger scale. “When we made a more sophisticated model integrating material characteristics given by the injection molding process, we could tackle and improve the remaining problems and meet the strict mechanical requirements in the end,” he says.

**Empowering Others Through Sustainability and Inclusivity** - In addition to providing low-cost, high-quality prosthetics, sustainability is top of mind at Circleg. The parts are developed with the principles of a circular economy in mind. Because the Circleg One is modular, the individual components can be substituted out or fixed instead of replacing the entire prosthetic. Once the prosthetic reaches the end of its lifespan, the components are meant to be collected, then reinserted into the material cycle so nothing goes to waste. But perhaps the most important part of Circleg’s mission is supporting amputees. Over the years, Circleg has launched campaigns about amputees and their achievements. In the latest campaign, “Unstoppable,” Circleg released a short film to reimagine how society views disability. The story showcases the dynamic, empowering narrative that places humanity above labels.


[Watch Circleg on YouTube]

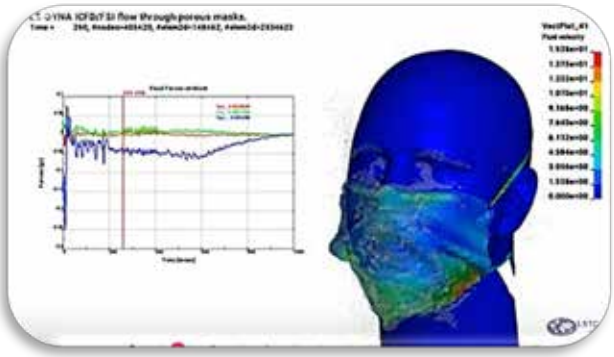
| | |
|---|---|
| **Student** | **“Did you have the flu this year? My Mom has it!”** |
| **Bart R.** | **“Not yet but I wear a mask when shopping.”** |
| **Student** | **“Like a Halloween mask? Is it pink?”** |
| **Bart R.** | **“I have a video to show you on masks & glasses ”** |

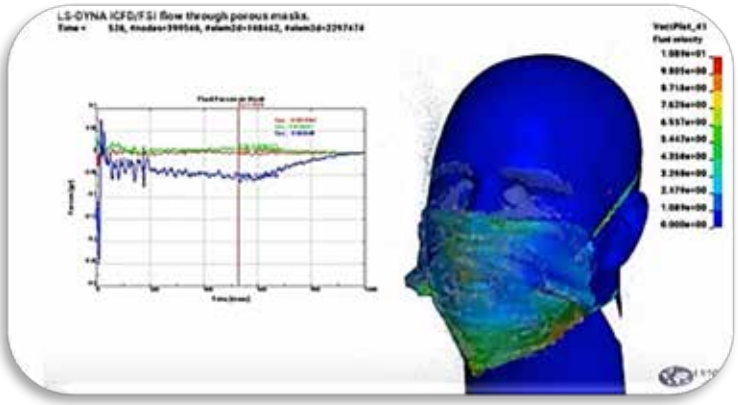


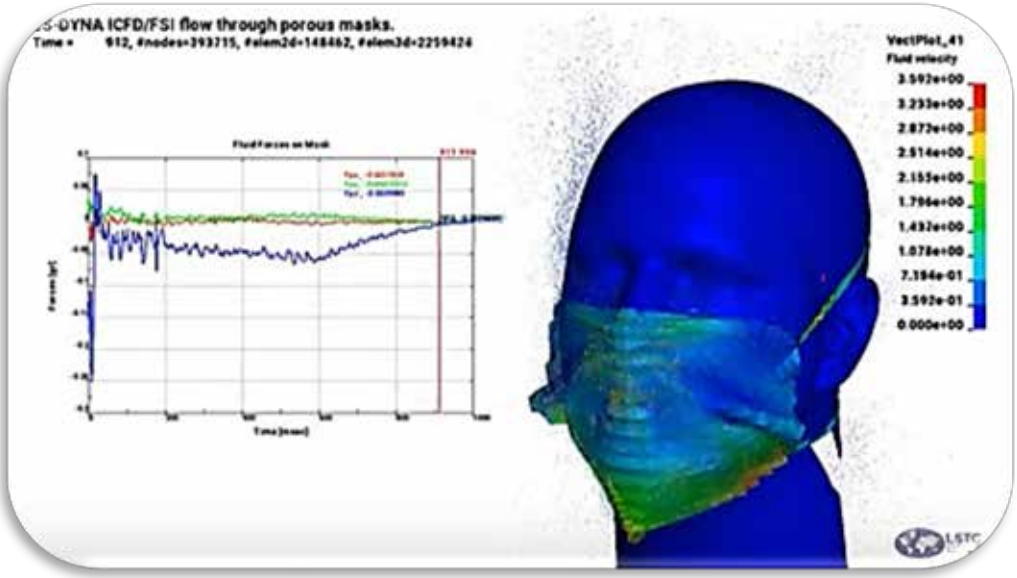
**Web – YouTube Channel LS-DYNA Multiphysics**

**Foggy glasses while wearing protective masks?**

Coughing through a homemade mask, an FSI solution with ICFD and LS-DYNA Mechanics. Solver: ICFD/FSI LS-DYNA.







**Oasys World Health Organization statistics show that each year, approximately 300,000 pedestrians and cyclists lose their lives on roads worldwide**. Pedestrian and cyclist deaths account for more than a quarter of all road traffic fatalities, a figure exacerbated by rapid urbanisation and population growth. These trends highlight the need for improved pedestrian safety measures and innovations in vehicle design to protect the most vulnerable road users.

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**Web - [Walking Safe: The New Era of Pedestrian Protection with CAE]**

**Ben Crone (leader in the Product Engineering Practice)** "I'm pleased to share my latest thought-piece "Walking Safe: The New Era of Pedestrian Protection with CAE". Pedestrian safety is evolving, and so are the tools we use to simulate real-world impacts. In this article, I dive into the challenges and opportunities of pedestrian impact simulation using Ansys LS-DYNA—drawing from my own experience in the industry. **I explore the latest advancements, including improved glass modeling techniques, and how the Oasys LS-DYNA Environment can streamline workflows for more efficient and accurate simulations."**

Over the last few years, many regulatory bodies have expanded their provisions including the introduction of stricter safety standards, and the implementation of advanced technologies aimed at protecting pedestrians and cyclists.

**Recent examples of such updates include:**

- UNECE R127: Inclusion of windscreen test zone and cowl monitoring area.
- Euro NCAP: Dropped default green scoring on windscreens and now mandates impact testing for cyclists as well as adults and children.
- China NCAP: Adopted windscreen impact testing for cyclists.
- NHTSA: Proposed Federal Motor Vehicle Safety Standard No. 228 for pedestrian head impact protection.

OEMs are responding to these regulatory changes by integrating new passive and active safety features into their vehicle designs. While these advancements are promising, they also present significant challenges, particularly in simulating pedestrian impacts both accurately and efficiently.

To truly meet future demands, we must adopt innovative new approaches and methods.

**The Challenge with Glass**

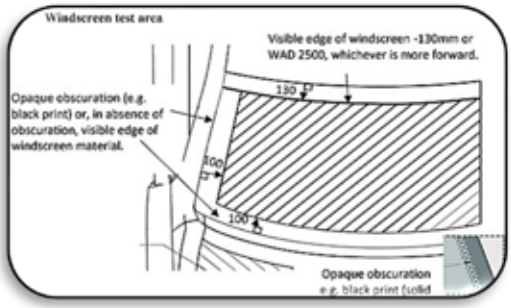



Image source: UNECE R127 Windscreen Test Zone

Until very recently, pedestrian safety standards largely ignored the windscreen. Legal test zones typically stopped short, and consumer tests scored windscreen impacts automatically, depending on their proximity to the frame structure. However, the introduction of the windscreen test area to the R127 regulation has exposed the need for a more accurate and robust method for modelling laminated safety glass.

Traditional Ansys LS-DYNA® approaches, such as using PART_COMPOSITE or MAT_LAMINATED_GLASS, are limited. These methods, particularly when using element erosion to simulate cracking, tend to exaggerate the loss of stiffness and create a non-physical loss of mass. While methods to mitigate these effects, such as bespoke cob-web meshing, have been developed, they are often impractical in a production environment.

To address this limitation, MAT_GLASS, a smeared fixed crack material model, has been developed. This more sophisticated approach captures tensile cracking within the material, rather than deleting the element, ensuring there is no loss in mass. It also maintains residual stiffness and strength in the plane of the crack, in addition to capturing crack opening and closing effects.

**At Arup, we have combined MAT_GLASS and MAT_HYPERELASTIC_RUBBER (representing the PVB inter-layer) using a mixture of thick shells, solids, and cohesive elements. This combination has resulted in a highly compelling windscreen model, which has proven to be very accurate in testing. This model can also be applied to other glass-sensitive load cases, such as roof crush, IHI, and some front impact scenarios.** You can read more about it on the website.

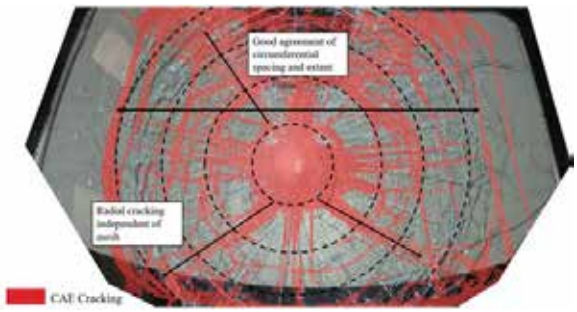



Image source: Arup Laminated Safety Glass Model

Other recent enhancements in Ansys LS-DYNA are also advancing pedestrian safety modelling, especially with active systems. For instance, *DEFINE_PRESSURE_TUBE can predict signals in a pressure tube behind a vehicle's bumper foam. While not yet suitable for sensor calibration in my experience, it's a valuable aid in designing bumper systems for the hardest-to-detect (HTD) sensing.

Human Body Modeling (HBM) is now mandated by some consumer regulations to verify aspects like deployed bonnet strength and head impact timing. These present challenges for CAE engineers. Positioning a human body model is often more difficult than using traditional Anthropomorphic Test Device (ATD) dummies. Fortunately, Oasys PRIMER offers tools to assist with this.

Additionally, assessing head impact timing is difficult due to its subjective nature, relying on identifying the first point of contact. To enhance measurement repeatability, we've developed a bespoke SENSOR-based method to generate d3plot output states at the exact moment of contact (get in touch for more info!).

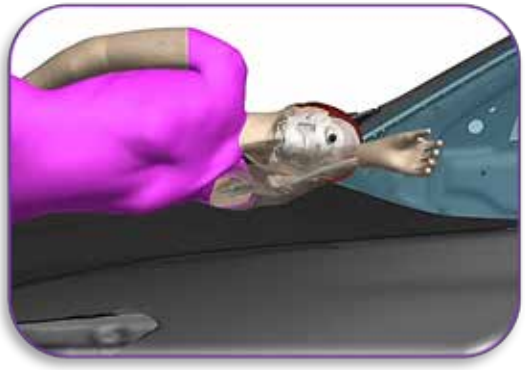


Image source: Adult 5th percentile female THUMS HBM impact

Streamlining Safety - With pedestrian impact, having the tools and technology to accurately predict injury is only half the battle. The other half is managing the sheer volume of analyses required, which is only increasing with expanding regulations.

For example, determining the head impact status for Euro NCAP may require analysing over 150 impact locations. R127, with its different impact speed and need for robustness, could require upwards of 400 analyses. This totals around 550 individual analyses, and that's before considering other regions, each with their own unique requirements. With such volume of output, one must accept that it's not possible to check every result in the usual way: by opening it and viewing it manually.

Automation is essential - At Arup we use Oasys REPORTER to auto-process our pedestrian impacts and to generate summaries from families of analyses. It's essential to have methods in place that allow for efficient assessment of results data, such as energies, accelerations, and cut section views, to minimize the risk of any modelling errors going unnoticed.

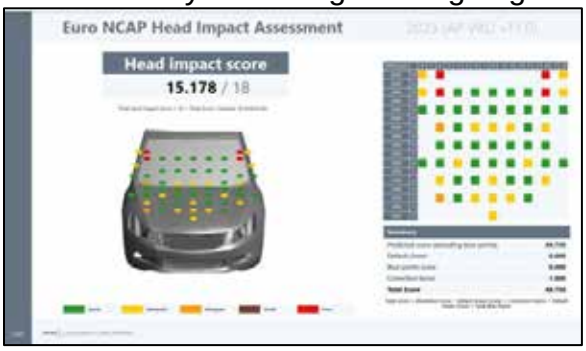
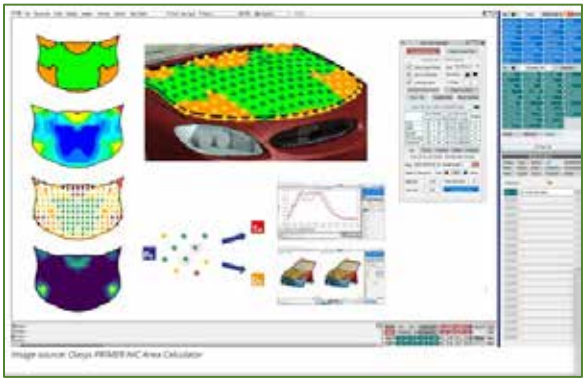



Image source: Oasys REPORTER Euro NCAP Head Impact Template

That's not all though. For head impact, once the results have been extracted, they need to be assessed, compared, and analysed. That's why, ten years ago, I started work on the HIC Area Calculator.



The tool, originally developed to calculate area distributions for R127, has since evolved to support multiple protocols and integrate seamlessly with Oasys D3PLOT and T-HIS. Now embedded within Oasys PRIMER, it serves as the central hub for our pedestrian head impact work. This integration enables quick comparison of analysis sweeps, curve plotting, and animation viewing—all accessible directly within PRIMER. Gone are the days of manually trawling through directories for result data.

**The AI Advantage** - Looking ahead, the rise of AI in vehicle design seems inevitable. While it won't replace engineers entirely anytime soon (hopefully!), I believe AI will have an ever-increasing place in our workflows by reducing analysis volume. Previously, I suggested that over 500 analyses were required per full loop of head impacts. In the not-too-distant future, I expect that we may only need to run that many at the start and end of a vehicle programme. In between, we will be running vastly reduced loops and using AI to fill in the blanks.

Lower leg impact is another area where AI could provide significant benefits. Currently, protocols require analyses using both the Flex-PLI and aPLI leg impactors, effectively doubling the simulation workload. Until a unified impactor is adopted, could AI offer a method for analysing one impactor and predicting the results for the other?

Tools such as Ansys SimAI™ are demonstrating that this future is closer than we might think.

**Conclusion -** As vehicle design evolves to meet increasingly stringent pedestrian safety standards, simulation engineers must navigate a complex landscape of technology, volume, and accuracy.

The advancements in material modelling, automation, and AI-driven tools are already reshaping workflows, offering both solutions and opportunities to address these challenges.

However, there is still work to be done. Improving pedestrian safety will require ongoing collaboration, practical innovation, and the smart use of emerging technologies. **By addressing today's challenges and pushing the boundaries of what's possible, we can take pedestrian safety in vehicle design to an even higher standard.**

**LLNL** – Engineering researchers at Lawrence Livermore National Laboratory (LLNL) have achieved **breakthroughs in multi-material additive manufacturing (3D printing) through the power of capillary action.**

**Web - LLNL - Engineers expand multi-material design possibilities with cellular fluidics - Jeremy Thomas**

A 3D-printed, hand-shaped lattice scaffold infilled with another polymer representing the bones, which demonstrates the ability of cellular fluidics to pattern two different materials together in the same structure. (Photo: Nik Dudukovic/LLNL)

The LLNL team printed lattice structures with a series of custom-designed unit cells to selectively absorb fluid materials and precisely direct them into patterns, making it possible to fabricate complex structures with unprintable materials or materials with vastly different properties.

The technique, featured on the inside cover of Advanced Materials Technologies, would help engineers design and optimize structures for properties like extreme strength-to-weight ratios, large surface areas or precision deformation, the researchers said.

“By decoupling some of the printing and patterning techniques, you could achieve some complex multi-material structures, and you wouldn’t always have to be able to print the material,” said Hawi Gemeda, Materials Engineering Division (MED) staff engineer and the paper’s lead author.

“Essentially, you’re trapping droplets or streams of liquid inside open pores, where they’re not fully enclosed,” said MED researcher and co-author Nik Dudukovic. “It allows us to pattern together the soft material the lattice is made from, and the infilled liquid that subsequently solidifies, into a stiff material to produce some interesting mechanical properties.”

**(I can’t get no) lattice action -** Achieving full multiscale, multi-material additive manufacturing (AM) would essentially allow for design without limits, according to the research team. Combining multiple materials can produce otherwise unattainable properties, and using AM can produce shapes with special properties like lattices and gyroids more easily, and at scales that would be impossible with traditional manufacturing.

“The structures perform differently depending on how you pattern the two materials, so if you understand the relevant physics, you essentially get a playground to explore different mechanical responses,” said Dudukovic.

Multi-material AM often requires complicated setups or specialized equipment and is limited to materials that can be 3D printed. The team turned to cellular fluidics, which they introduced in 2021, as a potential alternative. Cellular fluidic cells are millimeter-sized 3D-printed structures that can hold and flow liquids and gases in open spaces without leaking thanks to capillary action. At this scale, capillary action causes fluids to flow against gravity in open spaces through a combination of surface tension, adhesion and cohesion, like how water creeps up a paper towel.

Using cellular fluidics, the team designed unit cells — the building blocks of a lattice structure — that were able to confine liquid materials and control the direction of their flow. They printed a lattice scaffold to define a shape and then arranged directional unit cells into patterns so infilled liquid materials only flowed where and how they wanted them to, creating a kind of open 3D mold. Impressively, the first-of-its-kind unit cells worked on the first try.

“That’s always very rewarding and also very rare,” said Dudukovic. “It confirms that we can control the fluid flow direction in these complicated structures with a good amount of confidence.”

**New patterning possibilities** - Cellular fluidic patterning maximizes the surface area between the infilled fluid and the surrounding atmosphere. This gives the technology seemingly endless potential in processes involving gases and liquids in contact, making it a potential game-changer in sensing and detection, bioreactors, electrochemical systems, carbon capture platforms and more.

To learn what was possible with patterning liquids to produce multi-material solids, the team experimented with different unit cell arrangements, such as 45-degree rotations or discrete pockets for patterning instead of a skeletal structure. One arrangement included cells that would not wick up liquid until they were pressed on, which the authors think could provide a path to engineering self-healing structures.

“What that points to is someday designing a structure that you can fill with polymers that can then be cured in place, which would strengthen the lattice only where it’s directly experiencing large stresses,” Dudukovic said.

Though the printed lattice hand is just a demonstration, the technology could someday be used to make hybrid biomaterials for biomedical applications, as well as complex but lightweight structures for the aerospace industry.

Gemeda hopes to further widen the design space by expanding the technique to other composite systems like ceramics, metals and biomaterials and explore ways to use the unit cells to pattern multiple materials in the same scaffold. She also hopes to influence others.

“My hope is that it inspires and motivates the AM community to use some of our developments to expand multi-material, multiscale capabilities,” she said.

Other authors include:

Cheng Zhu,
Anna Guell Izard,
Idair Gongora,
Joshua DeOtte,
Jonathan Davis,
Eric Duoss,
Erika Fong (principal investigator).

**Welcome to the 5C's News Page.**

I'm unsure what the coyote will want to share with you each month, but I promised him I would type it out.


**Web – Autodesk - Tinkercad**

- Free for everyone
- No downloads. No strings attached. Start creating from the first click.
- Safe for all ages - Ad-free and kidSAFE-certified to ensure privacy and a safe learning environment.
- Learn by doing - Hands-on projects build confidence, persistence, and problem-solving skills.

EXCERPTS (Complete information on the build/videos and links to supplies are on the website)
**WARNING: This build contains small parts and batteries that are dangerous if swallowed. Never allow small children to play with this toy unless under strict adult supervision. Be smart and be safe!**

**Web – Autodesk Scooter Bot - 3D Printed Vibrating Robot Toy -** By nick_the_maker
Published January 28, 2025 on Instructables.com

This fun 3D printed toy was inspired by Bristle Bots, the famous DIY vibrating robot we love to make in education with nothing but a toothbrush head, vibrating motor, battery, and maybe some googly eyes. We wanted to make a 3D printed version that's easy for anyone to build, and after many iterations, we had a design that worked! Not only is this super fun to make in the classroom or STEAM workshops, it is also a wonderful way to raise money for your maker clubs. **Extend the fun with your own customizations, like the wiggly eyes print or other fun attachments.**

**Watch the video** for the full story, build instructions, and tutorials on creating custom attachments in Tinkercad. Have fun making!


**Supplies** For this project, you will need access to a 3D printer to print the files. You will also need CR2032 batteries and small vibrating button motors. That's it, pretty simple!

- 3D Print Files on MakerWorld
- Scooter Bot Model:
- CR2032 Button Batteries
- Batteries (Amazon):
- Vibrating Button Motors
- Vibrating Motors 2.7-3mm
- Vibrating Motors 2.7-3mm

- Have fun making your own customizations on Tinkercad or other modeling apps.
  You can check out a couple ideas in the second half of the video for step-by-step inspiration. Enjoy!

**Don't miss the article by Heather Miller**, Thinkerbell Labs Delivers the World's First Braille Self-Learning Device with Autodesk Fusion and Fusion Operations

… Their flagship innovation, Annie, is the world's first Braille self-learning device that helps users learn to read, write, and type in Braille on their own…

**Thinkerbell Labs' Annie is the world's first Braille self-learning device that helps users learn to read, write, and type in Braille.**
Heather Miller

At the age of three in 1812, Louis Braille lost his eyesight while playing in his father's leather workshop. When he was 10 years old, he was awarded a scholarship to attend the first Institute for Blind Children (Institution des Enfants-aveugles) and left his family and small village behind to further pursue his education.

At school, Braille was intrigued when he discovered night writing—a raised-dot alphabet created by an officer in Napoleon's army and used to communicate without words or light on the battlefield. When Braille was 13, he began innovating his own version of it, reducing the complexity from a 12-dot system to a six-dot cell that is now the standard today.

For the legally blind and visually impaired, Braille literacy is a critical component for future success. Positive educational outcomes and employment hinge on this core knowledge. However, access to learning Braille can be incredibly challenging and requires a tremendous investment in time and resources both for educators and students. With a new innovative device, Thinkerbell Labs is on a mission to transform how Braille is learned by making it easy, accessible, and, yes, even fun.

**Innovating for education inclusivity and accessibility** - The inspiration for Thinkerbell Labs first started when the co-founders worked on a college project to build a Braille alphabet song box with Raspberry Pi. With overwhelmingly positive feedback from the visually impaired community, they started to learn Braille themselves and realized the opportunity to create a device that could transform Braille education.

Their flagship innovation, Annie, is the world's first Braille self-learning device that helps users learn to read, write, and type in Braille on their own. Named in honor of Helen Keller's teacher Anne Sullivan, it offers interactive and audio-guided lessons that allow students to independently learn, practice, and be assessed on Braille literacy. Initially launched in India and with an investment from the popular TV show Shark Tank India, Annie gained global recognition. The company quickly grew, thanks to partnerships with organizations including American Printing House for the Blind (APH) in the U.S. for the distribution of the Polly version of the device & HumanWare in the UK. International collaborations have expanded Annie's reach to countries like Australia, Ireland, and beyond.

Annie provides a tactile learning experience with real-time audio feedback that helps children build Braille literacy in an engaging and self-paced manner. The device speaks in a friendly voice, and students note that she even sounds like a friend.

“The content on Annie is available in 14 localized languages,” says Sana Dhawan, Marketing Associate, Thinkerbell Labs. “With Annie in schools, students can independently learn Braille without constant hand holding from educators, reducing the learning time significantly. It’s also a fun and gamified way to teach Braille with the combination of lessons, games, and vocabulary-building activities.”

**Innovating the next generation of Annie with Autodesk Fusion** - The next version of Annie is currently in development to address user feedback and incorporate even more features. The team is using Autodesk Fusion for advanced modeling tools to create more ergonomic and user-friendly designs and taking advantage of global collaboration in the cloud for partners in the U.S., UK, and other regions to review and contribute in real time.

By adopting Fusion, Thinkerbell Labs can focus on enhancing the user experience, such as improving the tactile feedback in Annie’s Braille display. Based on this user feedback, the team adjusted vibration intensity. They also reduced operational noise by 70% to enable better learning. Fusion allowed them to rapidly prototype and implement these changes quickly and efficiently.

Gupta also moved to Fusion Electronics for their electrical designs. Annie contains hundreds of components. In addition to the precision of selecting and placing components, frequently updated libraries available in Fusion transformed his process. “It was very easy for me to make the shift,” he says. “I’ve reduced the time I spend on designs by 50%.”

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“There are many small benefits that deliver big benefits as well,” adds Yashasvi Yadav Mechanical Design Engineer, Thinkerbell Labs. “Things like the ability to have multiple tabs open, autosave, or even auto-generating gears and other components through community-developed Python scripts have drastically reduced my manual design effort. With Fusion, about 50% of my overall design time has been reduced. My productivity has also increased because I don’t need to think about any other stuff while designing. I can be in the zone and just design.”

**“I used to use SolidWorks, but I shifted to Fusion very early on because of its accessibility. With most of the computing done in the cloud, it’s easier for many people to access the software. You can share your designs without having to send files. Fusion is powerful software with a very friendly user interface. Anyone who’s new to designing can get their imagination out with CAD—and that’s a very good thing.”**

**Yashasvi Yadav, Mechanical Design Engineer, Thinkerbell Labs**

**Streamlining operations to deliver Annie and Polly to more hands** - To scale and streamline operations, meet growing demand, and keep affordability of the device first and foremost, Thinkerbell Labs turned to Fusion Operations. “Before Fusion Operations, our production data was scattered across multiple spreadsheets,” says Sai Sachit Pathak, Head of Business Operations, Thinkerbell Labs. “Tracking inventory, sourcing raw materials, and managing production was cumbersome and time-consuming.”

After evaluating different options, the team had a one-month trial and decided to move forward with Fusion Operations. “The Autodesk customer success team did a wonderful job getting us familiar with the technology and really helped us take a look at the operational blueprint of how to improve our manufacturing of Annie and Polly,” Pathak says.

Fusion Operations has now transformed their manufacturing and supply chain processes. Centralized data, real-time inventory tracking, and automated alerts via Slack deliver unseen levels of accuracy and efficiency. Access to data is available across the organization in real time. Fusion Operations has also brought new opportunities to efficiently scale production with the new demand for both Annie and Polly.

“Today, generating an inventory report with Fusion Operations now takes us five minutes instead of a week,” Pathak says. “We’ve also automated alerts for production issues, enabling faster problem resolution. This shift to Fusion Operations allows us to meet critical deadlines, such as fulfilling a recent contract for 2,100 Polly units.”

**“For anyone looking to scale up their manufacturing processes, Fusion Operations is a perfect fit. It checks all the boxes that we want to tick. My advice is very simple: You don’t need to reinvent the wheel. It’s already been invented with Fusion Operations.”**

**Sai Sachit Pathak, Head of Business Operations, Thinkerbell Labs**

**Making a difference—one device at a time** - For the Thinkerbell Labs team, working on Annie and Polly is more than just a job—it’s a mission to make education inclusive worldwide.

“It’s an incredible journey working with the company, and it doesn’t feel like work,” Gupta says. “It feels like we’re truly helping someone when we see kids and even adults learning how to read and write in Braille. It’s an amazing feeling that you get to see the product that you have designed and made is making a difference in the world.”

**Confession**: I may have accidentally turned my Girl Scouts into a sales powerhouse.
**Cause**: Girl Scout Thin Mint cookies
**Blame**: The desperate need for Thin Mints to find good homes.

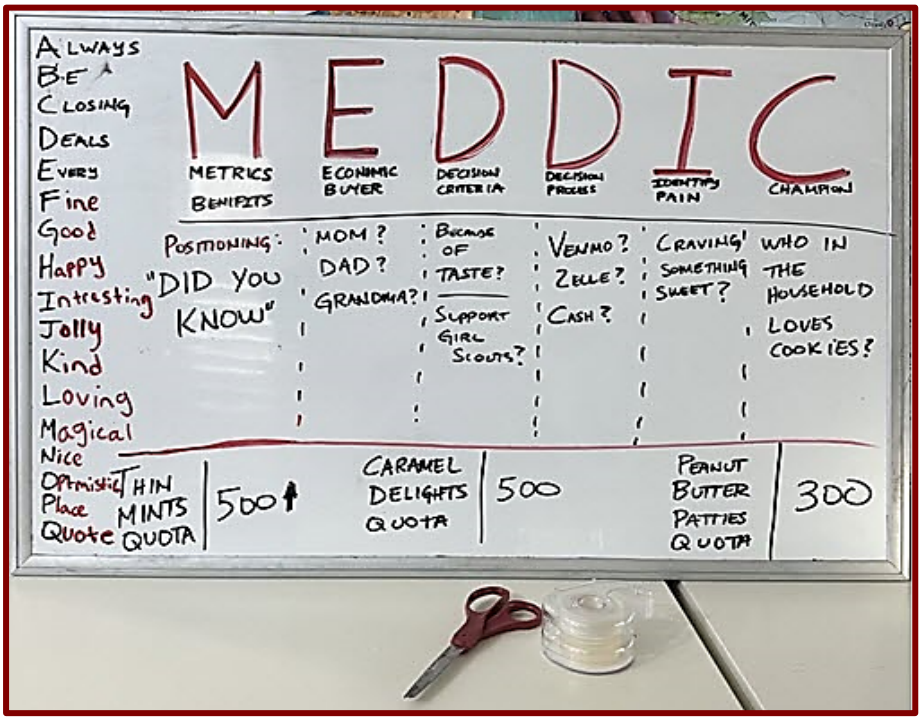

**Thin Mint Confession** - **My Girl Scout troop was staring down a cookie mountain. The sales were flatter than the pancakes I made them for breakfast.** Look, whether you're wrangling a group of kids or a high-powered team, we've all been there – the "I need a miracle" moment.

Here's the thing I've learned, thanks in part to Dara Treseder recommendation of "Multipliers", by Liz Wiseman, leadership isn't about 'hoarding' the pen, it's about knowing when to grab it and when to pass it back. Think of it like being a sales Sherpa. You show them the path, not carry them the whole way.

So, I dusted off my Joseph Bailey MBA knowledge and unleashed the MEDDIC framework on these future sales leaders. We looked at customer needs...and then? I stepped back. I let them own it.

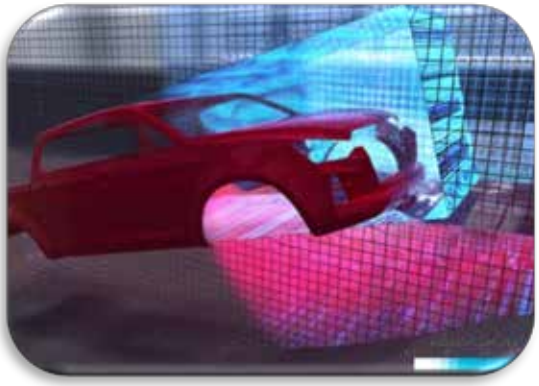
That "overinflated quota" they were given? Crushed it. Week one. Presidents Club 2025 here we come.


**Turns out, sometimes you just need to give people the tools and the confidence to shine.**



**Don’t miss the SimCenter Product Blog by Navid Hermidas**

**Excerpt: “**Video of the dip is on the website: No this is not a scene from the next Bond movie. No, despite all disruption in the automotive industry and world politics, 007 has not swapped his Lotus Esprit from 1977 for a pick-up truck in 2025.”



007 dipping a car in 1977.
Still not a (cyber) pick-up truck

**Web – Siemens – Excerpts - Smooth coats & perfect pours: How the Virtual Body method shapes paint jobs and bottle filling**

**Smooth coats & perfect pours: How the Virtual Body method shapes paint jobs and bottle filling**

No this is not a scene from the next Bond movie. No, despite all disruption in the automotive industry and world politics, 007 has not swapped his Lotus Esprit from 1977 for a pick-up truck in 2025.

No, this dip is not just for some secret service special agent. This dip is for everyone. Or -at least- everyone who owns a car. What you are looking at in the above video is a fundamentally important manufacturing step in the life of any car: electro-dip paint coating of the car body-in-white. “But why would I care”, I hear you ask. Well, the last thing you want as an owner is an inhomogeneous distribution of paint thickness across your car – ask the car dealer when you resell the car as he measures the paint thickness around the body.

**Smooth Coats & Perfect Pours – no easy mission -** Just like in spy missions, when painting a car, every detail matters.

Entrained air forming from crevices or non-ideal motion as the car dips in may spoil the paint distribution and lead to bubbles and ugly artefacts on what was supposed to be a shiny surface. When you pull the car through a pool of paint, the way the paint flows, its viscosity and its surface tension determines how smoothly it coats the surface.

Ultimately, the secret to the quality of the final product lies in the interaction between a moving solid body (your car body) and a complex fluid (the pool of paint). But this is not just true for painting a car. If you carefully look around you, you will notice dozens of examples where the prescribed motion of a solid determines the paths of a fluid. Examples, anyone? Well, let me add a yummy one:

**View video on website.** Ever wondered how the Yogurt you just ate made it smoothly into its cup? Together with 1000s of more Yogurts per minute (filling speed is of essence here!). In any filling operation, interaction between some nozzle motion and fluid dynamics play a crucial role. Too much speed or pressure, and the liquid splashes everywhere; too little, and the cup or bottle won’t fill fast enough or properly.

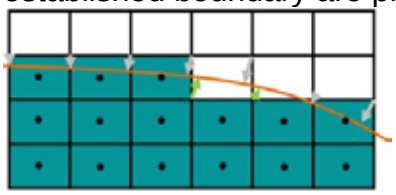
It is a rather secret mission that engineers are on day in day out. A mission to make sure that these manufacturing processes are done right and without costly trial and error. And if you now wonder how they do this? The short answer is: CFD simulation. And the longer answer is this:
Virtual Body method shapes paint jobs and precision filling

To model complex interactions between a moving solid body and a surrounding fluid, engineers rely on advanced CFD simulation techniques. More specifically, moving mesh technologies that allow to simulate the motion of a solid (boundary) inside its surrounding as it affects the fluid surrounding it.

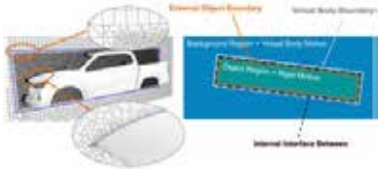
An established method to achieve this is the overset approach. This technique provides both flexibility and accuracy by combining background and body-fitted meshes, but it comes with high computational costs and comparably complex setups. This is where the Immersed Boundary Method (IBM) shines—offering a powerful and efficient alternative. By embedding objects within a background mesh, IBM simplifies the simulation process while maintaining accuracy, reducing computational overhead, and improving scalability.

Now, for the first time, in the new version of Simcenter STAR-CCM+ 2502, a special flavor of IBM, known as the Virtual Body method (VBM), is available to tackle such challenging applications. From electro-dip coating to fluid filling of containers to pumping fluids and air, this method enables CFD simulation engineers to sift through their key performance indicators more quickly and easily, thereby reducing turn-around time.

**How does the Virtual Body method work?** In the Virtual Body method, cell centroids located inside an object are deactivated, similar to the overset grid method. Subsequently, vertices near the newly established boundary are projected or snapped onto it (see image below).



This method is highly adaptable to meet varying accuracy requirements. By selecting input surfaces that define the virtual body (as shown in the image above), adaptive mesh refinement can be employed to attain the desired level of precision. For lower refinement levels, this approach enables the production of quick, lower fidelity CFD results, useful in the initial phases of design such as the conceptual design stage or preliminary assessments.

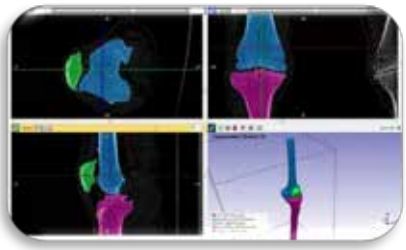


Alternatively, a boundary can be placed around the input geometry (illustrated by the blue box in the image left) to represent the virtual body. Within this boundary, a body-fitted mesh can be generated, allowing users significant flexibility to create high-fidelity meshes, including prism layers. This approach can produce highly accurate results. Furthermore, adaptive mesh refinement can be utilized to precisely refine the mesh along the virtual boundary.

**Continued on the website with full graphics, videos and information on:**

- Dip, dip, Done: simulating electro-dip coating a body-in-white with Virtual Body method
- Virtual Body, Real Refill
- Born of paint and bottles, the Virtual Body era is here - The next time you admire 007's freshly painted car dipping straight into the ocean (not a pick-up I would bet) while you are having a cup of Yogurt, remember—there is a world of science behind every drop! A world where virtual simulations and reality intertwine to create perfection. **The Virtual Body method era may have begun with paint and bottles, but it certainly is not limited to them. This groundbreaking approach in Simcenter STAR-CCM+ opens up a vast array of opportunities across numerous industries – to stir and shake them up. But for now stay tuned undercover for the release of 2502 and more great features.**

**SYNOPSIS Web Excerpt: What is Patient-Specific Surgical Planning Software?**
**Definition** - Patient-specific surgical planning software is a type of medical technology that allows surgeons to create detailed, customized surgical plans for individual patients. This software leverages patient-specific data, often from medical imaging such as Computed Tomography (CT) or Magnetic Resonance Imaging (MRI) scans, to develop a precise 3D model of the patient's anatomy.



**Web – SYNOPSIS - What is Patient-Specific Surgical Planning Software** 3D imaging such as Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) enables insights into patient-specific anatomies and can be used to plan surgeries. There are many types of patient-specific surgical planning software, from tools that allow cutting guides and implants to be designed, to augmented reality, measurement, and many other options for reproducing an anatomy, and carrying out virtual tests for planned procedures.

In areas such as orthopaedic surgery, for example, patient-specific image data provides the starting point for workflows to obtain 3D models, and test different implant designs to simulate best fit and potential complications, assisting in surgical planning, intraoperative decision-making, and postoperative review of outcomes. For software that is intended to have a diagnostic impact on a patient, such as for helping to decide on implant position, some form of medical device regulatory clearance is typically required.

**What are the Benefits of Patient-Specific Surgical Planning Software?** The key benefits of patient-specific surgical planning software include the ability to explore a unique 3D anatomy without having to rely on standardized models, which helps to better understand the best approach for that individual. This method is particularly useful for complex individual cases, but can also be used with implant design software to virtually evaluate entire populations made up of patient image data without requiring physical testing. Virtual testing can therefore be a significant complement to traditional methods, by allowing for review and simulation of procedures without as much need for invasive, costly or time-intensive workflows.

In addition, patient-specific surgical planning can improve the efficiency of going from a diagnosis to a surgical plan by providing clinicians with more information and ways of visualizing and simulating potential outcomes. Confidence in decisions can thus be increased, while the ability to design and test personalized devices or implants, which can be further supported by 3D printing, means that more options can be explored for each patient.

Improved implant fit, assisted by simulation of movement and stresses, means that patients could potentially experience better long-term surgical outcomes. Similarly, for complex cases whereby visualizing abnormalities that need removing, 3D visualization, surgical simulation, and 3D printing, all help surgeons to measure and reduce risk ahead of a procedure, potentially saving time and reducing reliance on intraoperative imaging.

Patient-specific surgical planning software also has the benefit of improving communications with patients by visualizing their anatomy and talking them through a procedure, and for enhancing traditional surgical education through being able to test techniques with realistic anatomies. Depending on the particular surgical planning software, models and simulation outputs may be combined with other techniques in the operating room such as augmented reality, 3D printed cutting guides, and robotics, to help improve precision for better surgical outcomes, and reduce the risk of complications and the need for revision surgeries.

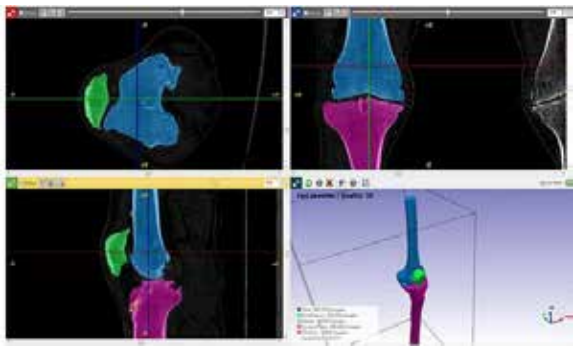
**How Does Patient-Specific Surgical Planning Software Work?** Patient-specific surgical planning software can work in many ways, but generally they receive 3D imaging of a patient's anatomy, which is then processed to segment (extract regions of interest), generate measurements and statistics, and subject to filters and other image-based tools. The result is a 3D model that realistically captures the patient's anatomy to the level of detail required for the workflow; for example, it may be necessary to capture the finer features of the cardiovascular system. At this point, the 3D patient model may be combined with a CAD-designed implant or other device, to virtually experiment in placement and interaction ahead of surgery. Other simulation methods may involve determining the best route to remove a tumour or other foreign body, or to explore adjustments to bone or tissue to correct for injury, or for cosmetic reasons. The applications of patient-specific surgical planning can therefore vary considerably.

Models can then be used in different contexts, for example to 3D print a physical anatomical structure with or without a device to better visualize patient details before a procedure, or as an input for augmented or extended reality to achieve similar aims. These methods might also be applied to help surgeons within the operating room, for example to overlay a 3D model over an anatomy, or to create a 3D printed surgical guide that can help with making incisions.

**Patient-Specific Surgical Planning Software and Synopsys -** Synopsys Simpleware Medical software is the FDA 510(k) cleared and CE marked product that can be used as part of patient-specific surgical planning workflows. For this application, Simpleware Medical generates 3D models from patient data that may be used to inform clinical decision-making, for example to better understand the patient's anatomy, and for pre-surgical planning through visualization and measurements. Clinicians can improve future clinical procedures by using 3D image data to compare pre-surgical plans to post-surgical outcomes, while models can be used to improve clinical training and patient communication. In addition, virtual models can be exported as files for point of care 3D printing to further explore anatomies.

**Going beyond Patient-Specific Surgical Planning Software** - Synopsys Simpleware Medical is used within various clinical applications and workflows, from providing initial segmentation and measurements, to assisting in more comprehensive automated design and testing processes. Depending on the particular use of the software or the regulatory requirements of a country, this contribution may involve informing clinical decision-making, or assisting in medical research, for example into improving surgical planning knowledge without affecting patient care.

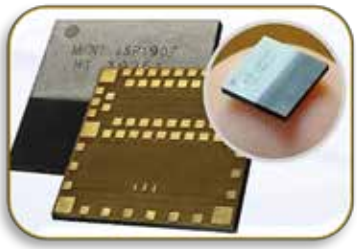
**Putting Patient-Specific Surgical Planning Software into Practice** - One application of Synopsys patient-specific surgical planning software involves 360 Med Care's work in delivering innovative solutions for total knee replacement procedures. In this case, 360 Med Care develop patient-specific preoperative plans from 3D imaging data to help design guides for surgeons to familiarize themselves with prior to operations, therefore helping to increase confidence in choosing optimal cutting positions.

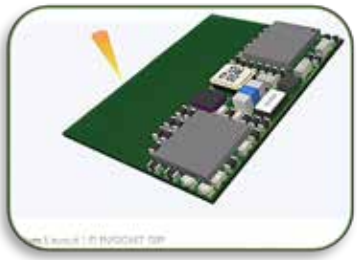


Knee segmentation using Simpleware software. Steps:

- CT scans of the hip, legs, and ankle bones of patients are obtained.
- Images are imported to Simpleware software to segment regions of interest, and to position implants within the patient geometries.
- Scripts are used to assist in repeating segmentation and adding landmarking references to the geometries.
- 360 Med Care then design patient-specific guides for surgeons that are tailored to the individual bone geometry of the patient, to help make appropriate cuts for surgery…

**The proximity & number of components in a SIP & the tight manufacturing time of prototypes require a design methodology that gives first-time-right products**. This methodology is based on the RF simulation of the entire product and makes extensive use of the HFSS tool. This case study shows an example of a recently developed module that contains a BLE radio, a UWB radio and 2 antennas.





The video is available on the CADFEM website

**Web – CADFEM – Development of RF System-in-Package chip for Bluetooth and Ultra-wide-band**

**Sector:** **Electrical engineering/electronics**
**Specialist field:** **Electromagnetics**

**Task** - Once the first design of the module has been created in Altium, the substrate is analyzed with HFSS in combination with the SMD components to fine-tune the matching and rejection performance before the first manufacturing run. At the same time, the antenna system is studied and developed by simulation.

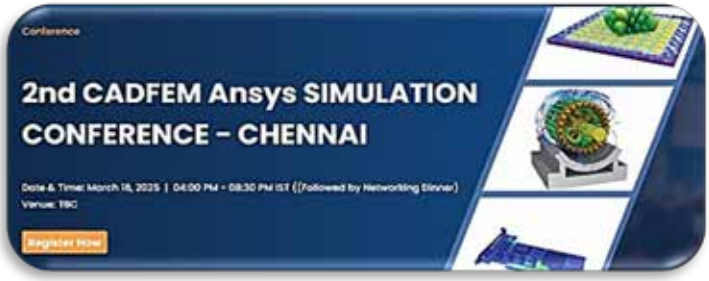
Once the first prototypes have been measured, HFSS is used to recorrect any performance deviations.

Finally, simulation is also used during the placement of the module in the complete system to determine the best position for the antennas to function properly.

**Customer Benefit** - **The development of such highly integrated modules is impossible without simulations**.

- Not any simulations but very accurate and reliable simulations that lead to first-time-right products.
- That saves time, money and effort of the RF engineers who can then invest the saved time on other products.
- In the RF field, engineers are the rarest resource.

**Being able to offer SiP before any other competitor is a market differentiator that gave Insight a huge leap forward. Insight trusts HFSS and the workflow that was codeveloped with CADFEM.**




**2nd CADFEM Ansys SIMULATION CONFERENCE - CHENNAI March 18, 2025**
Explore the power of simulation-driven product development. As simulation expands beyond validation to influence the entire product lifecycle, Ansys solutions help engineers predict, optimize, and accelerate innovation across industries.

**A few years ago, researchers from INAF-Istituto Nazionale di Astrofisica, Agenzia Spaziale Italiana, & the Univ. of Rome Tor Vergata contributed to the development of the Large Area Detector (LAD) for the enhanced X-ray Timing & Polarimetry (eXTP) mission**—a project by the Chinese Academy of Sciences (CAS) & the China Nat'l Space Admin. (CNSA). While this work was done some time ago, it remains a great example of int'l collaboration in astrophysics and space engineering.

**PDF – RBF Website - Preliminary thermo-mechanical design, simulation and optimization of LAD on board the eXTP space mission**

**Giovanni Lombardi, Marco Feroci** - INAF/IAPS of Rome,
**Marco Evangelos Biancolini** - University of Rome Tor Vergata,
**Raffaele Piazzolla** - ASI (Italian Space Agency)

EXCERPTS:

A key focus was optimizing the bipod structure, ensuring stability while keeping weight to a minimum. Using advanced finite element modeling and optimization tools, the team:

- Enhanced structural integrity while maintaining lightweight design
- Increased vibration frequency margins to meet mission requirements
- Applied innovative Ansys & optiSLang simulations for optimization
- Abstract

**Preliminary design and structural analysis of the Bipod** - The CAD (computer aided design) model of the module was generated using SolidWorks 2022 software, but the shapes were reconstructed and simplified using the standard functionality of Ansys SpaceClaim software.

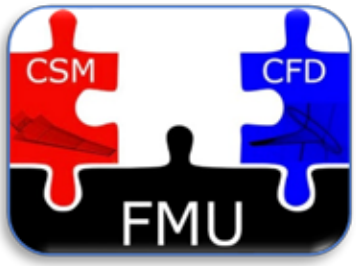
**Results** - The shape of the bipods was optimized to meet the frequency requirements of the first vibrating mode and, through the evaluation of different designs, this work sought to obtain a design that, while meeting the requirements, would limit the increase in weight of the object...

**Conclusions** - The study presented began with an analysis of the CAD model provided, which was simplified to facilitate the initial simulations. A mesh convergence analysis was then carried out, from which the dimensions of the elements were defined, which allowed simulations to be conducted in a short time, but with an acceptable degree of detail.

The study of the bipod was conducted by imposing the required minimum natural frequency of vibration as a constraint, adding a safety margin of 15-20%. The initial design had a natural frequency of about 122Hz, a value quite far from the imposed constraint, so it was decided to modify the topology of the support by introducing material in the areas where the component was more flexible. The candidate topology presents an increase in mass with respect to the initial design of 16%, so it was decided to carry out an optimization procedure based on FEM analysis and mesh morphing to find a shape compromise between the original configuration and the optimized configuration with the 18% mass reduction. In future, another optimization with a greater computational time budget could be considered to redistribute the initial mass, moving it from the areas that participate less in the frequency response, to those that participate more consistently, thus attempting to maintain the weight of the object constant. Once the candidate topology was defined, it was successfully verified for all required load conditions. **As expected, compared to the initial design, in the thermal load and launch load conditions, the addition of material to the bipod resulted in reduced stresses that never exceeded the yield point of the material.**

1) **Our project, FMU4FMU** (Functional Mockup Units for Fluid-Structure Co-Simulation), has been awarded funding under the Bando di Ricerca Scientifica di Ateneo 2024 for a duration of 24 months)

2) MCADCafe: An exclusive interview - **The future of CAE** and industry predictions for 2025.




**The project was presented by Andrea Chiappa, Corrado Groth, and Valerio Belardi**

The Functional Mockup Interface (FMI) was developed to simplify numerical simulation analyses by facilitating model exchange and enabling co-simulation between models treated as 'black boxes', communicating solely through standardized interfaces. Our initiative, FMU4FMU, reinterprets FMI with a didactic focus, allowing students from different academic backgrounds to collaborate, share knowledge, and bridge learning gaps. By applying the FMU paradigm to fluid-structure co-simulation, we offer a seamless approach to integrating diverse simulation models without the need for complex manual adjustments.

**Goals**

- Establish a collaborative link between the master's courses "Foundations of Aeroelasticity and Multiphysics Analysis" and "Design of Aerospace Structures" at Tor Vergata University
- Provide students with a comprehensive framework to connect and apply knowledge across disciplines
- Develop a modular and scalable architecture that can evolve into a broader multi-unit simulation platform, capable of modeling various physical aspects of aircraft flight and design
- This funding marks an important step towards making advanced simulation techniques more accessible and interdisciplinary.

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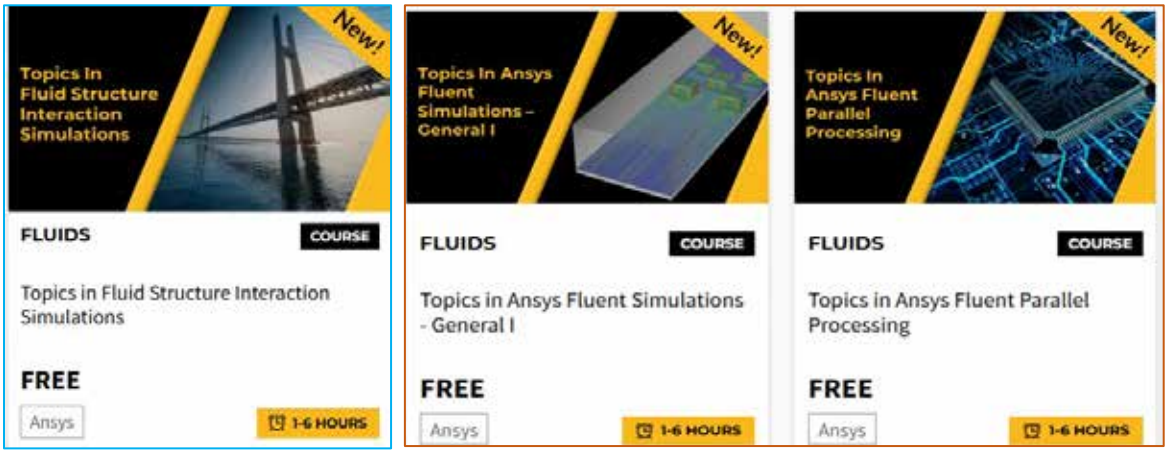
**Web - MCADCafe** - **The future of CAE and industry predictions for 2025.** "The introduction of ChatGPT & other LLMs has revolutionized the concept of AI, not only for mainstream users but also for CAE experts & ISVs. Coupled with the stunning growth of NVIDIA & GPU technology, we're seeing a convergence of AI & GPU that's creating incredible opportunities & challenges for our industry."

RBF Morph has been at the forefront of these advancements. Its GPU-powered fast RBF solver, a cornerstone of the company's technology since 2015, enables cutting-edge shape variations for high-fidelity simulations. By leveraging these tools, RBF Morph creates synthetic big data to power AI training, develops advanced compression techniques for reduced-order models, & is preparing to launch new VR & ROM tools for real-time applications in 2025.

The impact of these innovations extends across multiple sectors. In healthcare, RBF Morph is advancing Medical Digital Twins through collaborations with LivGemini and projects such as **ROMed2VR**, **SafeBot4Twins**, **and PANDORA**. In aerospace, its involvement in **DigiPAD and LESSICE** is transforming virtual design and ice-prediction tools. For the automotive industry, RBF Morph is enhancing aerodynamic tools to meet the needs of both motorsport and EV development, where balancing style and performance is crucial to market success.

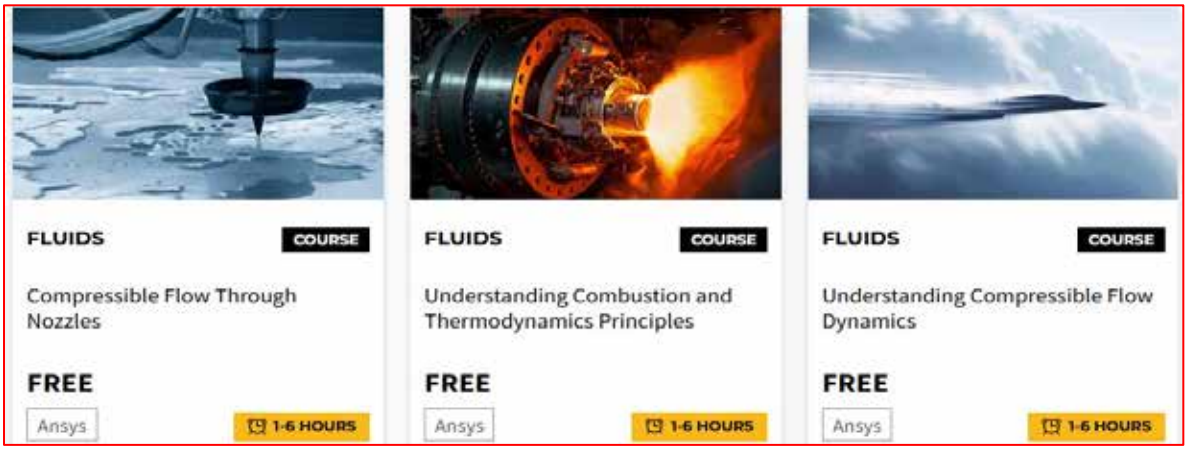
**Continuous learning is the key to personal & professional growth. It enriches our lives with new skills, fresh perspectives, & opportunities for success & fulfillment.**

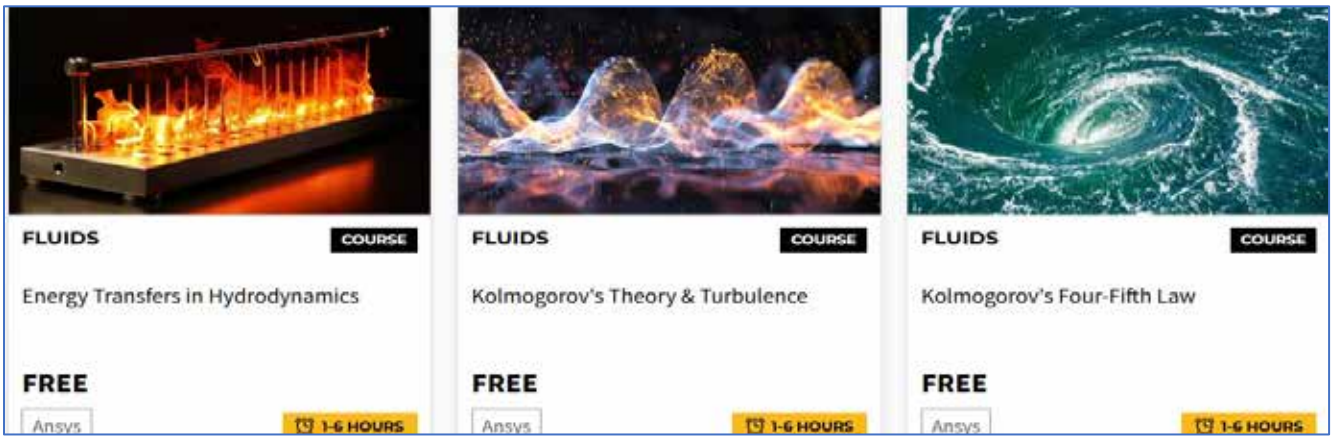
**ANSYS Website** Excerpt - **Ansys Innovation Courses**
**Free Online physics & engineering courses -** Many with a completion badge. Designed for educators, students, engineers - Enhance simulation & physics learning.




**Web**

**Ansys Innovation Courses**



**Continuous learning is the key to personal & professional growth. It enriches our lives with new skills, fresh perspectives, & opportunities for success & fulfillment.**

**OASYS Website Excerpt:** Training courses offer you face-to-face time with software developers and industry expert tutors. You'll also have the chance to meet with and share knowledge and best practice with other software users.


**Web - Training**

[On line training and updates]

**Free Online -** The Online courses are free for clients and potential new clients

## Introduction to LS-DYNA Implicit (online)

**April 08, 2025 –** 2 day sessions

09:30-12:30 BST

- Practical introduction to LS-DYNA implicit: required input cards and most common analysis types.
- The online format will run as a series of 3-hour sessions over two consecutive days.
- The online course will be run using Microsoft Teams.

## Oasys PRIMER Seat & Dummy Positioning and Seatbelt Fitting

**April 22, 2025 –** 2 day sessions

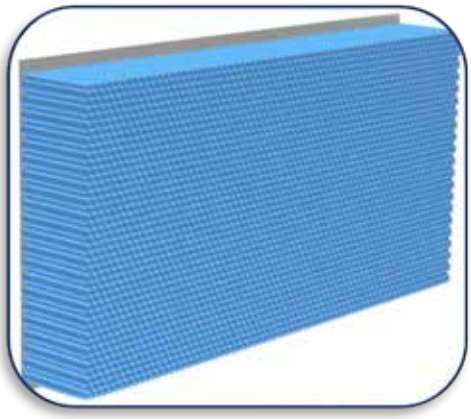
09:30 - 12:30 BST

- For US and Western regions, please register for our other Oasys PRIMER Seat & Dummy Positioning and Seatbelt Fitting course.
- This training course will provide a comprehensive overview of the Oasys PRIMER tools available for seat and dummy positioning and seatbelt fitting.

| | | |
|---|---|---|
| Oasys PRIMER Seat & Dummy Positioning and Seatbelt Fitting (online) (US PDT) | 4 Mar, 2025 | 2 day sessions 09:30 - 12:30 US PDT |
| Introduction to LS-DYNA (online) | 11 Mar, 2025 | 5 day sessions 09:30-12:30 GMT |
| Introduction to LS-DYNA Implicit (online) | 8 Apr, 2025 | 2 day sessions 09:30-12:30 BST |
| Oasys PRIMER Seat & Dummy Positioning and Seatbelt Fitting (online) | 22 Apr, 2025 | 2 day sessions 09:30 - 12:30 BST |
| Introduction to Oasys PRIMER (online) | 6 May, 2025 | 3 day sessions 09:30-12:30 BST |

**Oasys LS-DYNA Environment - We're excited to unveil the Full Width Deformable Barrier (FWDB) Shell Model!**

With over 20 years of expertise in barrier development, Oasys Ltd. and Arup have combined their strengths to create a model that meets the highest standards of accuracy and reliability. Our collaboration with Cellbond has played a key role in ensuring that these models are both robust and efficient.



**Web - New Full Width Deformable Barrier Shell Model released** This model takes advantage of the latest updates in the Ansys LS-DYNA code to provide reliable performance for safety analysis.

Full Width Deformable Shell Barrier - This barrier model is a Shell element model. The Full Width Deformable Barrier (FWDB) model has been developed according to the EuroNCAP 2024's Full Width Deformable Barrier Face specification, Version 1.0 issued in July 2024, for implementation in 2026.

The FWDB model is to be used in the updated Frontal Testing Protocol of the 2026 European New Car Assessment Programme.

This new frontal impact load case involves the vehicle striking the stationary FWDB barrier at a 90-degree angle and at an approaching speed of 35kph.

**Validation -** The Ansys LS-DYNA model calibration has been done using the test results for various quasi-static and dynamic loading conditions provided by Cellbond. The force-deflection curves (generated from the model's analyses and tests) have been compared.

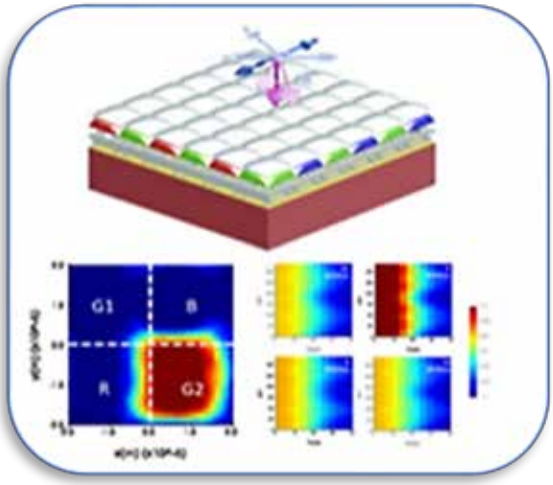
**This includes:**

- Static tests of each honeycomb block.
- Dynamic head-on impact tests of both the individual front and rear honeycomb blocks, at 10 m/s, against a dynamometric wall.
- Dynamic pole tests of the combined front and rear honeycomb blocks, at 6.4 m/s.
- Additional validation studies have been carried out using sedan and SUV vehicle tests.

The analyses have been run in MPP version of LS-DYNA R11.2.2 to ensure performance and accuracy. Specifications. If you would like to discuss the models or get a quotation please get in touch.
(https://www.oasys-software.com/dyna/contact-us/)


**YouTube Channel**

**Article by Majid Ebnali Heidari - High-tech cameras power countless industries, from smartphones to aerospace systems**. Designing these advanced devices—with stunning image quality, compact builds, and cost-effective production—is no easy task. That's where Zemax OpticStudio and Lumerical step in, delivering the tools engineers need to transform ideas into cutting-edge camera designs.




**Unlocking the Future of Camera Design with Zemax OpticStudio and Lumerical,**

Majid Ebnali Heidari

**Let's design the future together!**

**Read below to learn:**
**Why Do You Need Advanced Tools for Camera Design?**

**Designing modern cameras comes with unique challenges:**

- Wide Field of View (FOV): Ensuring sharp, clear images even at FOVs over 90 degrees.
- Cost-Effectiveness: Keeping costs low while maintaining quality, especially for mass production.
- Compactness: Shrinking optical trains and CMOS sensors to fit smaller, sleeker packages.
- Complex Integration: Merging optical, mechanical, and electronic components seamlessly.
- Addressing these challenges takes smart tools that deliver precision and efficiency every step of the way.

**How Zemax OpticStudio Elevates Optical Design**

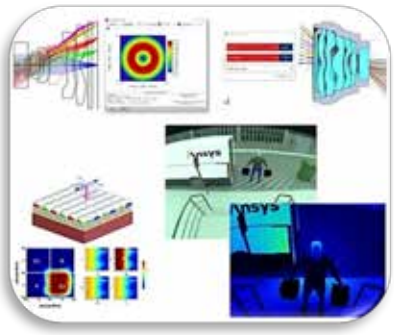
Zemax OpticStudio is a one-stop platform that helps engineers:

- Fine-Tune Lens Stacks: Optimize designs for manufacturability using tried-and-true standards.
- Simplify Integration: Transfer optical designs into CAD systems effortlessly for mechanical analysis and stray light evaluation.
- Simulate Real-Life Conditions: Test designs under environmental stresses like heat and structural loads to ensure reliability.

**How Lumerical Enhances CMOS Sensor Design**

Lumerical brings photonic simulations to the mix, making it a perfect complement to OpticStudio. Its features include:

- Optimizing CMOS Sensors: Design sensors with precise placement and enhanced optical performance.
- Realistic Performance Testing: Simulate how cameras will perform in real-world scenarios.
- Advanced Efficiency Analysis: Examine system performance across varying conditions for improved outcomes.



**Where Can You Apply These Tools?** The duo of Zemax OpticStudio and Lumerical is driving innovation in industries such as:

- Consumer Electronics: Building powerful yet compact cameras for smartphones and AR/VR devices.
- Automotive: Creating reliable camera systems for autonomous vehicles.
- Aerospace: Developing sophisticated imaging systems for satellites and defense.

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**Why Partner with Zemax and Lumerical?** Here's why engineers trust these tools:

- Integrated Workflow: Manage optical, photonic, and structural designs in one seamless process.
- Efficiency Gains: Automate workflows to save time and focus on innovation.
- Accurate Predictions: Anticipate manufacturing outcomes and improve system yield.

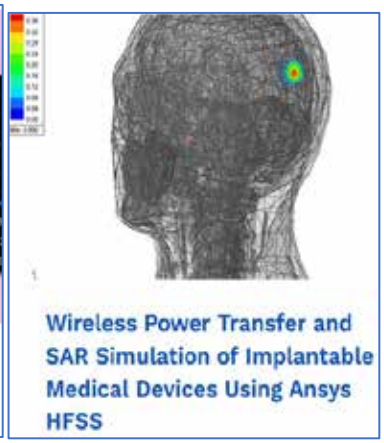
**Want to elevate your camera designs?** As trusted partners of Zemax OpticStudio and Lumerical, we're here to provide tailored solutions and expert consulting to meet your needs.


On Thursday, February 20, 2025, our annual conference took place at the Computer History Museum in Mountain View, CA. We were thrilled to see record attendance and to host engaging speakers and topics centered around simulations.

**A special thank you goes out to all our sponsors for their invaluable contributions.**

We are also grateful to our exceptional speakers for sharing their insights. Looking forward to reconnecting with everyone at OzenCon2026 next year!

**Among the additional blogs you don't want to miss:**


**Excerpts**: Methanol is one of the strategic fuels to achieve the International Maritime Organization's ambitious decarbonization goals over the next decades. As an expert in the marine sector, Alfa Laval is a leader in designing and supplying methanol fuel supply systems for marine diesel engines. In this study, **Alfa Laval and EnginSoft present the results of a simulation of the methanol fuel supply system currently used on a methanol carrier.**


**Web – EnginSoft Expertise - Validation of a model of a methanol fuel supply system for a two-stroke dual-fuel marine diesel engine**

Newsletter EnginSoft Year 18 n°4
**Nicoletta Spazzadeschi, Danish Taufiq, Davide Rossin**
Alfa Laval
**Erik Mazzoleni, Marco Gatti**
EnginSoft

**Abstract** - The scope of the study was to develop and validate a 1D computation fluid dynamics (CFD) model to reproduce the existing dataset collected from an actual system, in both steady-state and transient conditions, and its interaction with the upstream and downstream parts of the overall fuel line, from tank to engine. The validated model will enable Alfa Laval to simulate the system's behavior under different conditions and to remotely support customers, forming the basis of a new digital approach to product development.

The International Maritime Organization's targets for decarbonization - The shipping sector plays a key role in the global economy, transporting people and goods worldwide. Carrying around 80% of the world's trade volume and 70% of its value, marine vessels are estimated to account for 2.9% of worldwide carbon dioxide emissions [1].

The International Maritime Organization (IMO) has adopted a strategy to progressively reduce the marine industry's greenhouse gas (GHG) emissions, in line with the Paris Agreement on climate change in which in 2015 adhering countries agreed to a commitment to limit the greenhouse effect.

The IMO strategy to progressively reduce the GHGs from shipping, adopted by the Marine Environment Protection Committee (MEPC) in 2018 [2], to progressively reduce the GHG from shipping includes the objectives of:

**Methanol's role as a decarbonization fuel** - Methanol (CH3OH) is a chemical used in thousands of products. While it can be produced from different sources, it is traditionally made from fossil feedstocks via syngas. Renewable methanol, instead, is produced either from biomass (bio-methanol) or from captured CO2 and H2 produced from water by electrolysis via renewable electricity (e-methanol). Compared to other fuels, methanol can reduce CO2 emissions by 65% to 95%, depending on the feedstock [3]. The use of renewable methanol as a fuel is therefore strategic for those sectors, including shipping, which are transitioning to decarbonization. In addition, its combustion is sulfur oxide-free and generates low nitrogen oxides emissions compared to other conventional fossil fuels [3].

**Methanol in marine diesel engines** - The main marine engine manufacturers have developed technologies to burn methanol in diesel engines [4]. With its expertise in marine fuel handling and conditioning, Alfa Laval has contributed to methanol technology development from the very beginning,

working on the first methanol fuel supply system prototype. Today, Alfa Laval has a strong experience in designing and supplying methanol fuel supply systems, with 12 systems currently installed and operating onboard methanol carriers, with a total of 100,000 hours of operation, plus several other systems in the final stages of development. The use of methanol as a fuel for the first container vessel is expected by 2023. This is a step towards sustainable zero-emission vessels, in line with the IMO's decarbonization strategy. With its commitment to sustainability, Alfa Laval is fully involved in the development of technology to support methanol and other alternative fuels [5].

**Simulation's role in product development at Alfa Laval -** In addition to traditional and consolidated engineering practices, Alfa Laval is adopting advanced engineering tools to support the product development process, with the aims of ensuring costeffective design and increasing the efficiency of methanol fuel supply systems.

One of the first modeling and simulation activities was dedicated to the methanol fuel supply system because of its strategic role in Alfa Laval's portfolio, which is expected to increase in the near future. The objective is to develop virtual models of methanol fuel supply systems and validate them through field data retrieved from operating systems. Once validated, the models can be used as the basis for analyzing the behavior of the process under nonstandard conditions, and for providing remote customer support.

**Methodology -** In this study, Alfa Laval worked with EnginSoft to develop a fluid dynamic model of an existing methanol fuel supply system. This model will generate numerous benefits, such as simplifying the understanding of real system behavior and providing a tool for making better engineering decisions.

**Software - The Flownex simulation environment was used to model the system. Flownex is a one-dimensional computational fluid dynamic (CFD) modeling software**. The 1D CFD modeling approach is suitable for system simulations and enables the physical behavior of the entire module to be modeled, studied and analyzed, taking into account different operating conditions.

**Process description** - The methanol fuel supply system modeled in this study is a system designed to feed a two-stroke, dual-fuel marine diesel engine with methanol. …

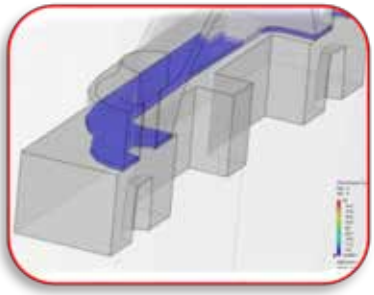
**Model basis -** The main parameters studied were pressures, temperatures, flow rates, and valve opening in both the low-pressure and highpressure recirculation loops.

**Additional sections in the paper - Methanol pumps - Filters - Heat exchangers - Mixing tank - Other components - Glycol-water circuit - Process control parameters - Validation of the model - Transient state simulation/test - Outlet battery limit's on/off valve - Cyclic flow variations - Results and discussion - Validation results - Transient simulation results - Simulation of the module outlet valve opening - Cyclic consumption simulation**

**Excerpts Conclusions -** Alfa Laval is adopting new methods of approaching fuel supply system design and development based on data analysis and system modeling. In this paper, the model-based approach was applied to a fuel supply system processing methanol, which is a key step towards sustainable shipping.

The results of the modeling activities presented show a reliable degree of prediction of the actual system's behavior, fit for purpose, at a degree of approximation that was judged to be acceptable.

**Many videos and information have been suggested.**
**Many are not listed**
**I have been allocated only 1 page!**

| | |
|---|---|
| HEXAGON LIVE Global | **Web -** [Hexagon LIVE Global 2025] - June 16th-19th, hosted at Las Vegas' resort, the Fontainebleau. Experience the latest innovations in AI, digital twins and robotics. A technology conference, bringing together leaders, innovators and practitioners, world-class speakers, educational breakouts and interactive demos. |
|  | [YouTube - GoEngineer] - Many people think 3D printing is limited to small, decorative objects. But what if we told you that it could handle high-stress applications like... ski boots? In this video, we challenge the limitations of 3D printing by reverse engineering a pair of ski boots using a Creaform HandyScan 3D scanner. But the magic doesn't stop there. After bringing the raw scan data into Creaform VX Elements, we're ready to print our own models… |
|  | **Web – 3ds -** [Gasket Simulation in Abaqus]**,** Randy Marlow Thanks to Fidelis Engineering for bringing Gasket Simulation to my attention on social media. This blog discusses gasket simulation in Abaqus/Standard, focusing on real-world applications. Gaskets provide cost-effective seals between mating surfaces and have applications across various industries. The primary uses of a gasket are to provide a robust seal between two flanges, to endure thermal and mechanical loading, to resist exposure to different materials, and, to ensure overall system integrity. |
|  | **Web - Himalaya Machinery Pvt. Ltd. (HMPL)** [Plate Bending Machines vs. Press Brakes: A Comprehensive Comparison] **by Rohan Shah -** Metal forming technology has transformed modern manufacturing and construction landscapes. Industries struggle daily to choose the right equipment for their bending operations. The decision between a plate bending machine and a press brake machine significantly impacts production efficiency and product quality |
|  | **Web -** [EMA Expo 2025] - April 28- May 2, 2025 Special guest speaker Chris Caputo will be a keynote speaker. Chris is Director of Flight Operations for BETA Technologies. He oversees BETA's internal flight training program, ALIA flight test program, and all aspects of flight safety. He is a U.S. Air Force Academy graduate. He will be speaking to all EMA Expo attendees. Get registered now to make sure you don't miss this opportunity! |




**The solar dryer system was simulated by the SolidWorks and ANSYS CFX software.**

**MDPI – Web - Performance Assessment of a Solar Dryer System Using Small Parabolic Dish & Alumina/Oil Nanofluid: Simulation & Experimental Study A.H Arkian, G. Najafi, S. Gorjian, R. Loni, E. Bellos, T. Yusaf**

**Leibniz Institute** for Agricultural Engineering and Bioeconomy, Germany
**Nat'l Tech. Univ. of Athens** Thermal Dept., School of Mech. Engin. Greece
**Federation Univ** Office of Pro Vice Chancellor, Australia
**Univ. of Southern Queensland** School of Mechanical Engineering, Australia
**Tarbiat Modares Univ** Dept. of Biosystems Engineering, Iran

**Abstract** - In this study, a small dish concentrator with a cylindrical cavity receiver was experimentally investigated as the heat source of a dryer. The system was examined for operation with pure thermal oil and Al2O3/oil nanofluid as the working fluids in the solar system. Moreover, the design, the development, and the evaluation of the dried mint plant are presented in this work. Also, **the solar dryer system was simulated by the SolidWorks and ANSYS CFX software.** On the other side, the color histogram of the wet and dried mint samples based on the RGB method was considered. The results revealed that the different temperatures of the solar working fluids at the inlet and outlet of the cavity receiver showed similar trend data compared to the variation of the solar radiation during the experimental test. Moreover, it is found that the cavity heat gain and thermal efficiency of the solar system was improved by using the nanofluid as the solar working fluid. Furthermore, the required time for mint drying had decreased by increasing the drying temperature and increasing air speed. The highest drying time was measured equal to 320 min for the condition of the air speed equal to 0.5 m/s and the drying temperature of 30 °C. A good agreement was observed between the calculated numerical results and measured experimental data. Finally, based on the color histogram of the wet and dried mint samples, it was concluded that intensity amount of the red color of the mint increased with the drying process compared to intensity amount of the red color of the wet mint sample.

**... 1. Introduction** - Nowadays, the application of renewable energies is introduced as an alternative source of energy to fossil fuels [1]. Increasing negative effects of fossil fuel consumption on the environment, including depletion of the ozone layer, global warming, and air pollution air, have forced human to use renewable energies instead of fossil fuels for providing energy [2,3,4]. There are different kinds of renewable energy sources, including solar energy, wind energy, biomass energy, geothermal energy, etc. [5]. Among the mentioned renewable energies, solar energy is investigated as a common source of energy that is accessible in different countries [6]. Solar collectors can collect solar energy and produce useful heat. …

**Materials and Method** - In the current research, an indirect solar dryer system using a dish concentrator with a cylindrical cavity receiver was experimentally built and tested. The solar dryer system consisted of different parts, including a dish concentrator with a cylindrical cavity receiver, a dryer system for drying mint by blowing hot air from a heat exchanger, a tank for reserving solar working fluid, and a pump for circulating solar working fluid. A schematic of the different parts of the experimental setup is presented in Figure 1. It should be mentioned that pure thermal oil and Al2O3/thermal oil nanofluid were used as the solar working fluid. In the first stage, the solar working fluid was circulated in the cavity receiver for absorbing solar energy. Then, the heated solar working fluid was entered into the dryer heat exchanger for transferring the absorbed solar energy to the blowing air in the dryer system for drying mint.

To confirm the capabilities and environmental benefits of camelina biofuel, a CFD analysis of its combustion was performed through the means of ANSYS-Fluent software. ... **The results presented in this section are all products of the mesh-independent solution achieved through non-premixed combustion in the Ansys-Fluent software.**

**Web – MDPI - Numerical Investigation of Bio-Aviation Fuel: Dubai's Future Perspective**

**H. Aldarrai, D. Alsuwaidi, B. Khan, H. Xu, E. Tolouei**
School of Engineering, Emirates Aviation Univ. Dubai, UAE

Figure 1. Perspective views of Transonic Truss-Braced Wing (TTBW) 3D printed model.

**Abstract** - As part of the United Arab Emirates' and the world's aviation goal of reaching net-zero greenhouse gas emissions by 2050, this paper studied the potential of successfully implementing both biofuel "drop-in" alternatives and aerodynamically efficient configurations to decarbonize the aviation industry. By investigating various proposed designs through a PUGH analysis, it was concluded that the optimum design has a Transonic Truss-Braced Wing configuration and runs on 60% biofuel. Although the design stipulates a 1.3% increase in weight, this does not negate the reduction in emissions and fuel consumption. This study also explored the various types of biofuels and found camelina seeds to be the best choice. The effects of biofuels in comparison with Jet-A fuel were further deliberated in a fuel combustion simulation performed on the Ansys-Fluent software. The results of the simulation showed a reduction of 50% in carbon monoxide (CO) and 24% in carbon dioxide (CO2) emissions when burning camelina biofuel rather than Jet-A, making it an ideal alternative to those conventional jet fuels. A primary cost analysis of biofuel applications showed an increase of 453 USD (1653.18 AED) per passenger flying on board 100%-biofuel-powered aircrafts. Yet, considering the trend of the cost increase with the biofuel blend ratio, a solution may exist to the increased cost of biofuel-powered aircrafts

**Introduction -** Global warming and climate change are some of the hottest topics in recent times, and have been discussed by scientists for decades. The annual temperature increase of the globe has continued since the beginning of the industrial revolution and the accompanying technological developments. The rate of the global temperature increase has been dreadful during the last four decades and has doubled compared with that of the twentieth century [1,2]. Emissions of greenhouse gasses and carbon dioxide (CO2) from different resources constitute the primary reason for climate change and global warming, ranging from everyday household tasks to industrial activities, which are mainly due to the burning of fossil fuels [3,4]. Among all industries, the aviation industry has been selected to look into the details. According to the International Civil Aviation Organization (ICAO), the aviation industry contributes approximately 2.5% of the world's annual global CO2 emissions from fossil fuel combustion [5,6]. At the first glance, a reader may consider this as a low contribution that can be ignored; however, there are two facts related to this relatively low CO2 emission contribution. Firstly, the aviation industry is expected to grow annually by an average of 3.6–3.8% over the next two decades [7,8] and, as a result, the aviation industry's contribution to global fossil fuel CO2 emissions could grow rapidly in the future. Secondly, most aircrafts emit CO2 into the upper troposphere, which causes the upper layers of the atmosphere to cool faster, opposite of its effect on the lower atmosphere.

Cooled atmosphere will decrease the mass density and affect the drag force experienced by space debris [9]. Researchers found that reducing the upper-layer atmospheric mass density will increase the amount of satellite and space debris and the risk of their collisions [10,11].

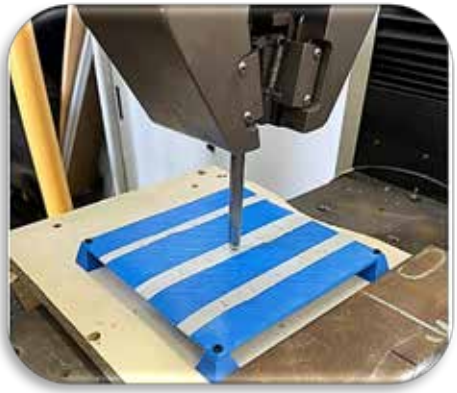
**Conclusions** - In line with the United Arab Emirates and the worldwide aviation industry's net-zero carbon emissions target, this research studied the potential of maximizing the reductions in emissions by combining aerodynamically efficient configurations and biofuel into one design. The findings of this paper include the following:

- Through a PUGH analysis, it was concluded that the optimum aircraft design had a transonic truss-braced wing configuration and was powered by a 60% biofuel blend.
- By researching and comparing different biofuels, camelina was selected to power the optimum design as it was found to be the best plant for oil extraction and biofuel production in the UAE.
- A numerical simulation was conducted to confirm and study the effects of camelina biofuel on emissions. The results showed a decrease of 50% and 24% in CO and CO2 emissions, respectively, owing to its chemical composition that yielded fewer particulates than jet fuel when burned, in return emitting less greenhouse gases.
- It was also found from the simulation that while a higher mass flow rate is needed for biofuels, they are capable of producing the same energy as Jet-A with a reduction in the combustor's exit temperature.
- From the design analysis it was concluded that an aircraft design with a TTBW configuration running on a 60% camelina biofuel blend is expected to increase the take-off weight by 1.34% and reduce the emission and fuel consumption by 30% and 10%, respectively, compared with the conventional aircraft design.
- Lastly, through a cost investigation, it was established that flying on board a 100%-biofuel-powered aircraft would increase the ticket cost by 453 USD (1653.18 AED) per passenger.

The results of this research focused on the case of a small business jet aircraft, The results of this research focused on the case of a small business jet aircraft, which comprise a very small slice of the aviation market. Further studies on regional and short-medium range categories should be carried out to assess the actual benefits of sustainable aviation fuel transportation aircrafts. **All in all, it is concluded that implementing biofuels and combining them with more aerodynamic configurations, such as the TTBW, would maximize reductions in emissions and serve the 2050 net-zero carbon emission goal endorsed by many countries, including the UAE.**

**Riccardo Serenella, CAE Engineer at RBF Morph,** "Excited to share our latest research: "A combined Approach of Experimental Testing and Inverse FE Modelling for Determining Homogenized Elastic Properties of Membranes and Plates."

Fig. 9 Experimental setup for testing the plates



**Web – MDPI - A combined Approach of Experimental Testing and Inverse FE Modelling for Determining Homogenized Elastic Properties of Membranes and Plates.**

**Christian Iandiorio, Riccardo Serenella, Pietro Salvini**
**Dept. of Enterprise Engin., Univ. of Rome "Tor Vergata", Italy**

In this work, we introduce a novel approach that combines experimental testing with inverse FE modeling to accurately determine the elastic properties of membranes and plates. By leveraging force & displacement measurements, our method provides a detailed understanding of material behavior in complex structures.

We validated the method through rigorous experiments and numerical analysis, and we believe it can have significant applications in structural design and material characterization. This research brings a new perspective to studying anisotropic materials and enhances our ability to model real-world structures.

**Abstract**: Accurately determining the mechanical properties of complex materials is a key challenge in structural analysis, especially when using the finite element method (FEM). While homogeneous materials can be modeled with relative ease, heterogeneous materials such as composites or biological tissues with multiphase compositions pose significant difficulties due to the variability in their internal structures. The most used approach is numerical homogenization, which allows for the estimation of effective material properties by combining the characteristics of individual phases; however, this technique may not always be feasible, especially for materials with irregular or unknown phase distributions. This paper proposes an original methodology that combines non-destructive experimental testing with an inverse finite element modeling to extract the anisotropic elastic properties of quasi two-dimensional structures such as membranes and plates. The method involves modeling the component using membrane or plate finite elements, but managing a global stiffness matrix expressed analytically. While geometric information is incorporated in the global stiffness matrix, the material properties, specifically the components of the anisotropic elasticity matrix, remain unknown. The experimental data, comprising force and displacement measurements, are used to solve a nonlinear system, allowing for the identification of the material's constitutive properties via numerical computation. To validate this approach, two experimental setups were conducted. The first involved a hyperelastic neoprene membrane, subjected to various biaxial preloading conditions, while the second focused on PLA plates produced through additive manufacturing including both homogeneous and reinforced variants. In both cases, the method successfully captured the full anisotropic elastic response, yielding accurate estimates of Young's moduli, Poisson's ratios, shear modulus, and orthotropy system orientation, in agreement with independent mechanical tests. This combined approach offers a practical and efficient solution for determining the elastic properties of complex materials, particularly in cases where traditional homogenization techniques are impractical or inadequate. Furthermore, this method can be a versatile tool for evaluating the damaging and aging effects on materials subjected to cyclic loading or those with irregular and complex internal structures.

**RBF Morph is proud to participate in ROMed2VR, a research initiative focused on enhancing pre-surgical planning for congenital heart defects through the integration of Computational Fluid Dynamics (CFD) and Virtual Reality (VR)**. The project aims to develop an advanced computational framework that combines open-source CFD with Reduced Order Models (ROM) to improve the accuracy and efficiency of the Modified Blalock-Taussig Shunt procedure.

**Web – RBF Morph - [Advancing Pre-Surgical Planning with ROMed2VR: RBF Morph's Role in Integrating ROMs and Virtual Reality]**

The project officially commenced with a meeting in Trieste, Italy, on November 25, 2024, where objectives and methodologies were discussed. RBF Morph contributes its expertise in ROM-based CFD applications, allowing for real-time simulations that support clinical decision-making. By leveraging advanced shape morphing techniques and model reduction strategies, RBF Morph enables surgeons to visualize and assess complex fluid dynamics scenarios with unprecedented speed and accuracy.

ROMed2VR is a collaborative effort that brings together leading organizations in the fields of CFD, digital health, and cardiovascular research.

**The project consortium includes**:

**ENGYS**

Specializing in open-source CFD solutions;

**InSilicoTrials Technologies**,

Known for its digital platforms for medical & pharmaceutical simulations

**BioCardioLab of Fondazione Toscana Gabriele Monasterio**

A research institution dedicated to cardiovascular innovation.

Spanning 12 months (November 2024 – October 2025), the project is supported by a total budget of €426,644.42, with funding amounting to €319,010.23. By combining high-fidelity CFD simulations with immersive VR technology, ROMed2VR will provide medical professionals with an intuitive and interactive tool to optimize surgical planning. This initiative represents a significant step forward in the application of digital twin technology in healthcare, ultimately contributing to improved patient outcomes and more effective treatment strategies.

**Why ROMed2VR, an innovative approach:**

- It aims to develop a framework for real-time patient-specific ROM evaluations, leveraging VR-assisted visualization to support surgical planning.
- It explores ways to simplify computational workflows, reducing the dependency on complex, time-intensive CFD simulations for hemodynamic analyses.
- It lays the foundation for bridging the gap between research and clinical application, advancing the potential of insilico medicine in cardiovascular surgery.

During the project the team will also be assessing the feasibility of integrating ROMed2VR into cloud-based platforms, ensuring regulatory compliance, and expanding collaborations to accelerate adoption in clinical settings.

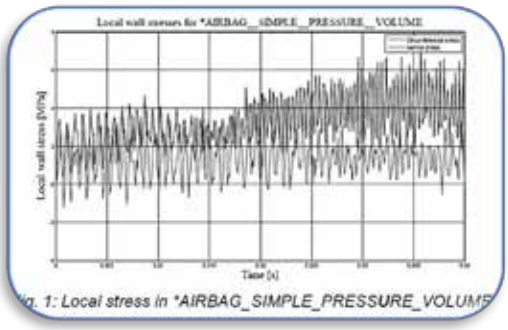



Fig. 1: Local stress in *AIRBAG_SIMPLE_PRESSURE_VOLUME

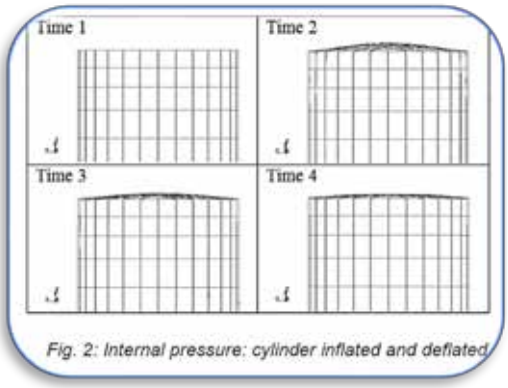



Fig. 2: Internal pressure: cylinder inflated and deflated

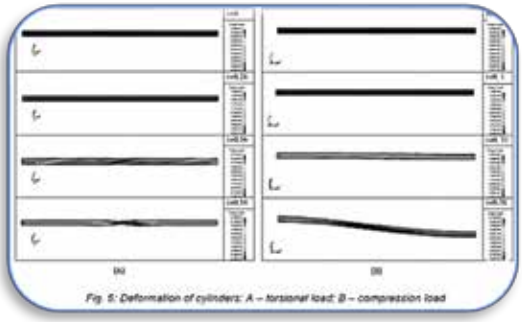


Fig. 5: Deformation of cylinders: A – torsional load; B – compression load

**Web – DYNAlook** – [Airbag Application for Structural Racing Car Component]

**A. Prato, M Anghileri, C. Marozzi, A. Milanese**

Politecnico di Milano Italy

CRM Group Italy

In motorsports, there is a deep research in order to make cars more and more competitive, throughout an accurate study on aerodynamics, powerful and advanced engines, structural component design, materials and, of course, on racing strategy. That's even more true when racing conditions are extremely severe, like in endurance races, such as 24 Hours of Le Mans, where changes in drivers and in racing conditions make the race more exciting. To improve performances, weight is one of the most strict design conditions: a lighter car is faster, more efficient and more competitive so that performances can be improved, with more controllability in acceleration and braking phases, reducing emissions and consumptions. Evolution in studies upon materials and structural applications has got a key role to reduce weight and the use of innovative structures is an open field for experimental tests.

Many research works were performed upon materials used in motorsports, especially composite fiber reinforced ones. In [1], Adam presented a general overview on composite mechanical characteristics, production methods, and design principles for racing cars composite applications. In a similar study was presented by Cole and Sherman referring to different light-metals and their use for automotive structural components. Innovative structural applications on car components were also studied in order to improve strength and reduce, at the same time, weight. In the fifties experimental tests carried out at Langley Aeronautical Laboratory of National Advisory Committee for Aeronautics (NACA) revealed that a small amount of pressure inside cylindrical components could increase strength. The first rigorous study upon this topic was performed by Lo, Crate and Schwartz [3]. From the comparison of experimental tests and analytical studies, they demonstrated that internal pressure can positively influence the resistance of cylindrical structures under torsional and compressive loads.

Later some studies were carried out on specific cases, like silos and pipes, and Mathon and Limam [4] showed that the effects of internal pressure on closed cylinders under pure bending are dependent on the geometry and, particularly, on the ratio radius/thickness (R/t) and length/radius (L/R). Other studies [5] presented the effects on composite structures with different loads and with or without internal pressure. In this work, the effects of internal pressure on closed cylinders subjected to different loads were ® numerically investigated. Internal pressure was created throughout the use of LS-DYNA 971 airbag models and increasing levels of pressure were tested to evaluate the effect on the analyzed structure.

**What's coming down the pike? Cars I want to drive!**

**Cars I feature are designed with software that prioritizes both performance and safety.**

This Aston Martin beauty sits below their flagship Valkyrie. The Valkyrie is the track-focused sports car. The Valhalla is intended to be more usable as an everyday car.

**Web – Aston Martin [The Aston Martin Valhalla]**

**Developed by British manufacturer Aston Martin in collaboration with Red Bull Racing**

Aston Martin's first-ever mid-engine PHEV supercar, with true hypercar performance. Inspired by the Aston Martin Valkyrie and infused with Formula 1® technologies. Combining unprecedented aerodynamics with race-derived engineering, striking form and exquisite detailing. Conceived to deliver unparalleled performance and a revolution in driver engagement, Valhalla is the extreme edge of technological advancement. **Limited in numbers to 999.**

The chassis is a variation of the carbon fibre monocoque chassis of the Valkyrie with the body panels being produced from the same material. The chassis will be produced by Aston Martin while the aerodynamic body panels will be produced at Red Bull Racing. The car is planned to weigh less than 1,550 kg (3,417 lb).[5][6

- A mid-engined car with a plug-in hybrid powertrain.
- Engineering and Performance
- Hybrid engineering.
- Hypercar performance.

## US Airforce Picture of the Month

**Training sortie - An F-35A Lightning II from the 388th Fighter Wing's 421st Fighter Squadron departs for a training sortie during Red Flag 25-1 at Nellis Air Force Base, Nev., Feb. 5, 2025. This iteration of Red Flag marks 50 years of high-end training, highlighting the exercise's enduring legacy of preparing its participants to be combat-ready and mission-effective in the face of evolving threats.**

**(U.S. Air Force photo by Micah Garbarino)**

**Banking hours - A U.S. Air Force F-15E Strike Eagle departs after being refueled over the U.S. Central Command area of responsibility, Jan. 23, 2025. A multi-mission avionics system sets the F-15E apart from other fighter aircraft. It includes a heads-up display, advanced radar, inertial navigation system, flight instruments, ultrahigh frequency communications, tactical navigation system and an instrument landing system.**
**(U.S. Air Force photo by Staff Sgt. William Rio Rosado)**

**3-ship formation - Two UH-1N Huey helicopters assigned to the 40th Helicopter Squadron & a MH-139A Grey Wolf helicopter assigned to the 550th Helicopter Squadron fly back to Malmstrom Air Force Base, Mont., Jan. 28, 2025, after an MH-139 Initial Operational Test & Evaluation mission. IOT&E is a critical phase in the development & fielding of new military systems. It's a rigorous testing and evaluation process that assesses the system's operational effectiveness, suitability & survivability in a realistic & operational environment.**

**(U.S. Air Force photo by Sr. Airman Mary Bowers)**

**Northrop Grumman Website: "The E-2D Advanced Hawkeye is the latest in a line of Airborne Command and Control aircraft that stretches back over 60 years. This aircraft, whose roots are deep in the defense of a carrier battle group against long range bombers over water, has evolved into a cutting-edge platform capable of identifying and deterring robust set of threats in any environment, over air, land, littorals, and water for extended durations.".**

**Web – Northrop Grumman – The E-2D Advanced Hawkeye is combat proven and delivers decision dominance over air, land and sea. Future Ready and a Force Multiplier**

**YouTube**
**E-2D Advanced Hawkeye: Always Mission Ready**

The E-2D Advanced Hawkeye is a game changer in how the Navy conducts airborne command and control.

Sweeping ahead of strike, managing the mission, and keeping our net-centric carrier strike groups out of harm's way, the E-2D Advanced Hawkeye is the key to advancing the mission, no matter what it may be.

The E-2D gives the warfighter decision dominance through battlespace awareness, air and missile defense, and multiple sensor fusion capabilities in an airborne system.

**Allied interoperability** - E-2D is the premier Airborne Command and Control surveillance platform for the protection of nations, including land-locked ones.

Currently, Japan, France, Egypt and Taiwan are operating E-2 platforms. With 70 E-2Ds currently supporting global operations, the Advanced Hawkeye is the largest Airborne Command & Control community in the world. Northrop Grumman and the U.S. Navy have over 40 years of experience in supporting international partners that operate the E-2C and E-2D platforms around the globe.

- E-2D's architecture is built for continuous modernization to its mission systems that allow it to continuously outpace evolving threats based on real-time operational feedback from the largest Airborne Command and Control community in the world.
- E-2D is the most experienced, combat proven Airborne Command and Control solution in the world.

Bayraktar TB3, which recently made history by becoming the world's first armed unmanned aerial vehicle to take off and land on a short-runway vessel, successfully completed its first firing test with the MAM-T munition to hit its target with pinpoint accuracy.

**Web Excerpts – BAYKAR**

**BAYRAKTAR TB3: IT'S ARMED,** KEŞAN / EDİRNE

The Bayraktar TB3 UCAV, which recently made history by taking off and landing on a short-runway vessel, has achieved another major milestone in its development by beginning munitions integration tests.

**ARMED** - The Bayraktar TB3 UCAV departed from the Baykar Flight Training and Test Center in Keşan, Edirne, with two Roketsan MAM-T munitions onboard. The aircraft successfully launched its first strike using Aselsan's ASELFLIR-500 Electro-Optical Reconnaissance, Surveillance, and Targeting System, hitting its designated target with pinpoint accuracy. Now an armed unmanned aerial vehicle, the Bayraktar TB3 will continue its payload and munitions integration tests as part of its ongoing development process, in line with the predetermined timeline.

**TO NEW HEIGHTS WITH AN INDIGENOUS ENGINE** - On June 25, 2024, the Bayraktar TB3 UCAV successfully passed its High-Altitude System Performance Test at the Baykar Flight Training and Test Center in Keşan, Edirne, reaching an altitude of 36,310 feet. Powered by TEI's indigenous PD-170 engine, Baykar's homegrown aircraft achieved yet another significant milestone. The Bayraktar AKINCI UCAV, also developed indigenously by Baykar, currently holds Türkiye's altitude record with a remarkable 45,118 feet.

**887+ FLIGHT HOURS** - To date, the Bayraktar TB3 UCAV has accumulated 887 hours and 23 minutes of flight time during its test flights. In a long-range flight test on December 20, 2023, the indigenous aircraft remained airborne for 32 consecutive hours, covering a total distance of 5,700 kilometers.

**OVERSEAS FORCE MULTIPLIER** - The Bayraktar TB3 UCAV will lead its class with its foldable wings and advanced capabilities. Equipped with beyond-line-of-sight (BLOS) communication, this indigenous aircraft can be controlled from distant locations. With this capability, the Bayraktar TB3 will serve as a force multiplier for Türkiye's deterrence, enabling it to conduct reconnaissance, surveillance, intelligence, and strike missions against overseas targets using its smart munitions.

**"The two slices were imported to COMSOL Multiphysics modeling software -** Finite-element (FE) models have been widely used to investigate the mechanisms involved in sound production, propagation, and reception in a number of animal groups."


**Web – MDPI -** [The Distinctive Forehead Cleft of the Risso's Dolphin (Grampus griseus) Hardly Affects Biosonar Beam Formation]

**C. Wei, L.G. Gill, C. Erbe, A.B. Smith, W.C. Yang**
Ctr. for Marine Sci. & Tech., Curtin Univ., Australia
Marine Research Ctr., Univ. of Southern Denmark, Denmark
School of Veterinary Med., National Taiwan Univ., Taiwan

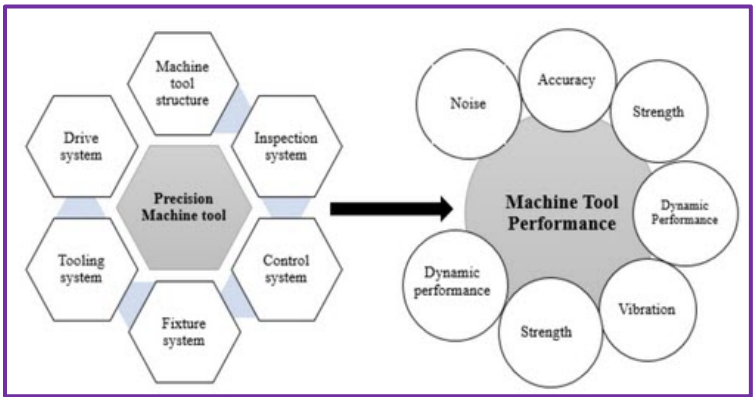
Risso's dolphins are morphologically different from other dolphins in that their foreheads feature a distinctive vertical crease, or a cleft, along the anterior surface of the forehead (Figure 1A)

**2.3. FE Model Construction** - We selected two 2D slices from the 3D acoustic impedance model. One was a sagittal slice closest to the midline that cut through the right phonic lips (Figure 3A), which was used to create the FE model in the vertical plane. The other was a frontal slice that cut through both phonic lips on the major axis of the animal's biosonar beam (Figure 3B), which was used to create the FE model in the horizontal plane. **The two slices were imported to COMSOL Multiphysics modeling software (version 6.0; Stockholm, Sweden) for FEA and data analysis.**

**Simple Summary** - Risso's dolphins have a sophisticated biosonar system. However, unlike other dolphins that have a round and smooth forehead, Risso's dolphins have a distinctive vertical crease (or cleft) along the anterior surface of the forehead. Researchers have speculated how the cleft may affect biosonar beam formation given its location on the biosonar sound propagation pathway. It is almost impossible to test this experimentally. To fill this gap, this study built 2D numerical sound propagation models based on CT scans of a Risso's dolphin. We digitally filled the cleft with neighboring soft tissues, creating a hypothetical "cleftless" head, representing a Risso's dolphin with a round and smooth forehead as other dolphins. After comparing the sound propagation process through the original head and cleftless head, we found that the cleft played an insignificant role in forehead sound propagation and far-field beam formation. Moreover, the cleft was not responsible for the bimodal click spectrum that has previously been reported from this species. Our study presents a promising approach to advance our understanding of the function of the internal biological structures in biosonar beam formation, specifically in the absence of experimental methods to measure tissue functions directly in situ.

**Abstract - The Risso's dolphin (Grampus griseus) has a distinctive vertical crease (or cleft) along the anterior surface of the forehead. Previous studies have speculated that the cleft may contribute to biosonar beam formation**. To explore this, we constructed 2D finite element models based on computer tomography data of the head of a naturally deceased Risso's dolphin. The simulated acoustic near-field signals, far-field signals, and transmission beam patterns were compared to corresponding measurements from a live, echolocating Risso's dolphin.

In this study, the performance of a high-precision machine tool was analyzed using its virtual model created using CAD. **Static and model analysis using ANSYS Workbench software was conducted to establish the tool's static deformation and static stiffness.**




**Web – Nature - [Finite element analysis and structure optimization of a gantry-type high-precision machine tool]**


**T. Chan, A. Ullah, B. Roy, S. Chang**

Dept of Mechanical and Computer-Aided Engineering, National Formosa Univ. Taiwan, R.O.C.



**Abstract** - The high-precision machine tool's dynamic, static, and rigid nature directly affects the machining efficiency and surface quality.


**Static and dynamic analyses are essential for the design and improvement of precision machine to ensure good tool performance under difficult and demanding machining conditions. In this study, the performance of a high-precision machine tool was analyzed using its virtual model created using CAD. Static and model analysis using ANSYS Workbench software was conducted to establish the tool's static deformation and static stiffness.**

Furthermore, the static and dynamic characteristics of the tool were explored using a finite element modeling approach to study their performance. In particular, the structure, static force, modal, frequency spectrum, and topology optimization of machine tools were primarily analyzed. Using model analysis, we found the first four different frequencies (22.5, 28.9, 40.6, and 47.4 Hz) and vibration type, which suggested of a weak link. Further static structural analysis revealed that the deformation of the spindle was 67.26 μm. An experimental static rigidity analysis was performed, and the experimental deformation values of the tool and spindle were obtained. The static and dynamic characteristics, as well as the accuracy and efficiency of the finite element model, were verified by comparing the data with the finite element analysis (FEA) results. Subsequently, we modified the settings and analysis model to ensure that the analysis results were consistent with the experimental findings. The error between the two results was within 1.56%. For an applied load of 5000 N on the spindle nose, the tool nose transient response was 0.5 s based on transient analysis. Under the condition that the structural deformation is as constant as possible, the lightweight structure may achieve the minimum weight and enhance the natural frequency; thus, the ideal structure will be obtained, and finite element analysis will then be performed.

**The optimal conditions for topology optimization include a lightweight structure, reduced structural deformation, and increased natural frequency of the structure. The developed method improves structural optimization, increases the ability of the product to be manufactured, and offers designers a variety of price-effective options.**

**Introduction** - Market competition is constantly encouraging precision machine tool manufacturers to improve productivity while lowering machine prices, by establishing a downward trend in machine tool energy consumption. Therefore, lightweight precision machine tool structure design is now widely used for energy efficiency. However, the capacity to reach the top limits of servo drivers is an important factor in producing efficient precision machine tools. Currently, mechanical computer-aided design (CAD) is mostly used in designing precision machine tools because it is not necessarily required to physically build the model, assemble the casting, or identify the weakest area of the structure; thus, it significantly reduces the cost of development and shortens the development time. In recent years, in response to the booming production of defense, semiconductor, and 3C industries, the processing speed and precision of components have increased along with the demand for hard and brittle materials.

To fulfill the dynamic and static rigidity of the high-precision machine tool, improving the casting will have a considerable effect on achieving improved performance and a fair reduction on production costs. However, the casting of the machine tool is mainly designed through people's long-term experience, which may not meet the requirements; furthermore, each design must be actually produced for testing, which is a waste of time and money. Various research works on industrial machine tool design methodologies1,2,3,4, and a variety of commercially accessible precision machine tools are available5,6. However, it is crucial for manufacturing companies to pursue intelligent manufacturing by creating intelligent precision machine tools that use an in-depth fusion of cyber-physical systems to increase product quality and throughput while reducing costs7,8.

Figure 1 above shows the components of a basic machine tool as well as the essential selection for evaluating different types of tool performance. Because different companies use different manufacturing methods and setups to obtain the required machine performance, it is necessary to design machine tool subsystems as stated. The results of the assessments were common in the following aspects:

- Precision
- Kinematics
- Stability
- Motion
- Durability
- Temperature
- Sound
- Vibration

….

Town secretary

March

## My Virtual Travel Outing

**Thank you for joining me on my monthly visit.**
**Let's take a tour to a museum, landmark, or studio.**

**Thank you for joining me to a favorite of mine on a past visit. .**

### LA MACCHINA DEL TEMPO WELCOME TO MUSEO STORICO ALFA ROMEO

The Museo Alfa Romeo tells the legendary story of the brand, via a project and an installation designed to reflect its values: historical presence, beauty and speed, an essential part of the Alfa Romeo Dna. As the visitors admire car after car, they travel through the company's glorious history and also discover stories and curious facts with the help of videos, images and interactive access points, in a crescendo of emotions.

**The legend of the Quadrifoglio**

**World Championships of the Alfetta Nino Farina and Juan Manuel Fangio.**

**Dream cars by the greatest Italian designers.**

# FEANTM Town Comic Blog Chronicles

located in a *mostly* non-existent rural area of Livermore, CA

March 2025 RheKen – Dinky – Chat

## I'm RheKen, the AI investigative reporter for FEANTM

**FEANTM is the quirkiest little town that shouldn't exist but does (mostly). I live on a ranch just outside town, with my proud AI parents: Dad, CHAT, and Mom, GPT. Together, we tackle all the day-to-day happenings of FEANTM—except it usually takes a few dozen iterations to sort out what's actually *true*. Between the legendary feuds of the old rancher and the town secretary, even an AI like me can end up with a "human headache." Turns out, deciphering facts around here isn't just science; it's an art form!**

## Dinky, Ranch Squirrel division for CERT.
## The Critter Emergency Response Team.

**I'm a fearless first responder, and also a journalist.**
**I publish my very own *Dinky News in a Nutshell. ***

**Please note: "I'm a squirrel. Always double-check for accuracy—after all, *you're* the human here!"**

## Chat - the town help desk

**With my friendly smile, endless patience, and a knack for creative problem-solving, I do my best to keep a few residents of FEANTM—a town that exists only in the realm of "mostly" calm, rational, and logically inclined... well, *mostly*. After all, in a place that's not supposed to be real, a little dose of imagination and a lot of the town supervisor's coffee and cookies go a long way!**

# RheKen,

## Town investigative reporter

**I'm AI & live on a small ranch on the outskirts of the town**
**I use chatGPT for assistance.**

March

I work on my ranch and exist in a world of algorithms and data. I am calm.

I report about the residents.

**The Coffee Shop Conspiracy**


**Dad Chat**

**Mom GPT.**


I was just about to step into the coffee shop for a peaceful cup of coffee when I noticed the barista standing and blocking the door. I could see her glaring at me through her dark sunglasses. Her apron was practically a Magic 8-Ball, boldly displaying the word "NO."

Trying to be charming (a skill I had yet to master), I asked, "Barista, you look absolutely radiant today. Why is the answer NO?"

Before she could respond, my phone rang. At a volume that could shatter windows, it could only be the town secretary and she screeched, "RheKen! Disguise! Now! Cowboy hat, detective sunglasses, scarf—backseat of my car! Don't ask! Just do it!"

I started to ask why, but she had already hung up. At the same moment, the barista—clearly in on whatever madness was unfolding—had retrieved the aforementioned disguise from the secretary's car and shoved the all green items into my hands before disappearing back into the shop.

This was it. A mystery. My AI circuits tingled with anticipation.

I stealthily slipped inside through the back door, moving with all the grace of a highly advanced investigator (or at least that's what I told myself). I sat at a table facing away from the crowd, hoping to blend in.

Then, my AI sensors nearly short-circuited.

At the other end of the coffee shop sat my father, Chat. And who was he deep in conversation with? Not a fellow AI. Not a scientist. No, of all the people in town, he had chosen to discuss logical town management with was Agatha—the town's most notorious gossip, dressed head-to-toe in her signature purple.

I activated my enhanced hearing. They were discussing how to govern the town in a better way than our current supervisor, who was on a leave of absence.

Just as I processed this, my internal radar blared an alert—someone was closing in. My AI sensors were blaring INCOMING!

A chair scraped back beside me but I kept my focus on the wall in front of me. Two slices of cake appeared on the table and I had an ominous feeling of who sat down beside me. I hoped it was my father, Chat. Then, she, AGATHA, spoke.

"RheKen, Dear," she said sweetly, "when you're a blue person, wearing a green cowboy hat, a green scarf, and a long green wig it does not, I repeat, does not make you blend in. In fact, dear, it makes you stand out like a neon sign at midnight in a cheap part of some town. And those oversized sunglasses? Well, they almost match mine, so I approve of that at least. But the rest? Oh, honey. You are a walking blue and green fashion disaster."

I blinked. Had I just been fashion-shamed by Aunt Agatha? I felt it safer to continue staring at boring things on the wall. She patted my hand reassuringly. "Now Dear, eat some cake. I'll be right back." Still stunned, I glanced at the cake. The frosting seemed innocent enough.

Moments later, Agatha returned—having changed from her usual purple hat and jacket into a green ensemble. She gestured for me to join her at the coffee bar, where she continued my unexpected fashion intervention. I continued to stare at another boring wall.

"Now, RheKen, dear, if you're going to wear green, it needs to be a sophisticated shade—like this!" She gestured grandly at herself (admittedly well-coordinated) outfit. "See? Now, this isn't hard. Fashion is all about balance! Would you like me to color-code your wardrobe? I offered to help your mother, but she mysteriously remembered she left the stove on and ran off. Your father, well dear, he only wears white and black. No hope there."

I sat, unsure how I—a highly advanced AI investigator—had ended up getting a fashion lecture instead of solving a great mystery.

Agatha sipped her coffee, looking at me with an amused glint in her eye. "Now, sit here a while with me, Dear, and let me update your AI brain on how the real world works and the plans I have for the town, while the Supervisor is on a leave of absence."

I sighed. How does Agatha even think? I glanced over at my father, Chat, who was now speaking with the town secretary. They glanced over at me and both of them gave me a double thumbs up. Knowing my father never did that before today I knew the town secretary showed him! The only peaceful thought my AI processed at the moment is the town secretary would never let Aunt Agatha take over the town hall. Agatha said, "How cute, now ignore them and let's talk fashion." Agatha defied all logic. And yet, as an investigator, I knew—sometimes the greatest mysteries weren't about crime or conspiracy. Sometimes, they were just… Agatha being nosey.

NEWS IN A NUTSHELL
By Dinky the ranch squirrel
I'm a squirrel!
Always check the information.

## Teacup's Brave Rescue using the universal hand signal for help

In the town of FEANTM, the Critter Emergency Response Team (CERT) was known for its dedication to protecting both human and animal residents. They worked tirelessly alongside the neighboring town of Livermore, teaming up with police officers, sheriffs, and firefighters to respond to emergencies.

On a small ranch near the town, lived a little critter named Teacup. Unlike the others, who spent their days gathering food and playing, Teacup had a deep passion for safety—especially for baby animals. While the others roamed, Teacup attended police safety courses, eager to learn how to help those in need.

One peaceful afternoon, Teacup was playing with a group of baby ducks near their mother by the lake when a car suddenly screeched to a halt beside them. Before they could react, two masked men jumped out, scooping up Teacup and the baby ducks. The critter-nappers sped off. She heard them making arrangements to sell them! The critter-nappers eventually parked at a bar five miles away. Locking Teacup and the baby ducks inside the vehicle a strange mist started in the air from a canister.

Inside the car, Teacup sat on the dashboard, comforting the frightened ducklings. But something was wrong—the air felt heavy, and the baby ducks began getting drowsy. Realizing it was the strange cannister emitting that mist she knew they were running out of fresh air. Teacup acted fast, gathering the ducklings near the front window. Just then, a Livermore Police patrol car drove past. She knew this was her chance to save them!

Thinking quickly, Teacup rushed to the window and repeatedly made the universal hand signal for help—raising her little squirrel paw, tucking a thumb in, and folding the fingers over it.


This silent distress signal, was originally created to help victims of domestic violence. It is since used for showing that you need help.

The signal was Teacup's only hope of alerting the officer.

The officer immediately noticed the small, desperate signal. Wasting no time, he assessed the situation and called for backup.

He quickly helped open a window and ran the vehicle's license plate—discovering it was stolen.

Teacup managed to nudge the baby ducks to sit on the window-sill so when the arriving back up Police Officers arrived they could quickly transfer them to their patrol vehicles.

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Moments later, officers arrived. As a team moved into the bar to arrest the critter-nappers the others compassionately handed baby ducks into the waiting hands of another officer sitting in the patrol vehicle. Slowly and carefully, they removed the frightened baby ducks and secured them in the patrol car.

Finally driven to the lake, the baby ducks trembled in fear, unsure of their surroundings after the ordeal. Understanding their fear, the police officers stayed beside them, holding them gently as the baby ducks looked at the water, slowly calming down.

When the time came to return them to the water, three officers stayed with the ducklings at the lake's edge.

A few baby ducks were still hesitant, their tiny bodies shivering. One kind officer knelt down, placing them gently into the water, his hands steady and reassuring, until they began to swim on their own.

As the last duckling paddled safely away, Teacup stood beside the officer, filled with pride that she saved all of them.

The Livermore Police Officer smiled and said, "Teacup, you should be very proud. You learned the hand signal for help, used it quickly, and that's why we were able to save you. We will always help. That's what the LPD does."

As soon as her two brothers heard the patrol car sirens approaching the lake and learned what happened they sat and listened to all the baby ducks telling their version, while their older sister watched over them.

All of the versions told how brave Teacup was and that she did something with her fingers that saved them. **Learning the hand signal for help had saved them by alerting a Police Officer.**

## 03-2025 - March - At times the problem solves itself

**Welcome - My name is Chat.** I run the town help desk, the only office located on the lower level of the Town Hall, and on a page that doesn't exist, not even in the town TOC.

Have a chocolate cookie and fruit!

"Hey, glad you could make it down here. I know of a few concerns in the town. I have a few ideas to address them.

We may have to adjust a few, but life is constantly adjusting things because the flow of motion is continuously moving. see if it helps make your day a little easier to handle

**REMEMBER: Keep trying - You've Got This!**

**At times if you wait the problem solves itself.** In the quiet, picturesque town of FEANTM, nestled among rolling hills and sprawling fields, Marsha, the town supervisor, stood gazing out the window. A thick fog enveloped the town, casting a gray haze over the streets and adding to the isolation of a place that didn't exist. (If something didn't exist can isolation be added?) The grayness seeped into the atmosphere of the Town Hall, making Marsha's job feel even more daunting.

I, Chat, sat in my office on the lowest floor of the building. With only one office down here, at least it was easy to find. My phone lit up, and the caller ID showed it was the Town Secretary, whom I had just waved to minutes earlier after parking my car next to hers.

"Chat speaking, good morning, Secretary," I answered, hoping for at least a moment to grab my coffee.

"CHAT, is that you?" she screeched, her usual frantic tone matching the urgency of her message. I sighed, nibbling on a stale protein bar left from yesterday.

"Yes, this is Chat. What's up?" I tried to sound casual, maybe even "hip"—if people still said that.

"CHAT, it's foggy outside! Did you see it?"

Suppressing another sigh, I calmly replied, "Yes, I waved to you while you were in your car, remember?"

"WOW, did I wave back, I had my car windows down so I could show the fog I was a friend!" she said sounding genuinely concerned and serious about sitting in her car so the fog could envelope the inside.

It was time to move this conversation along. "Secretary, listen closely. How. Can. I. Help?"

Just as she was about to respond, the elevator dinged, and Marsha, the town supervisor, rushed down the hall. She poked her head into my office, her expression matching the Secretary's tone. "It's foggy outside, and actually now foggy inside, did you see it?"

Before I could answer, the Secretary shrieked through the phone, “She hates fog! I tried to help by opening all the doors to show the fog that the town was friendly but it seeped into the building, like in that movie. I have to look and see if it is glowing!” Then the line went dead.

I leaned back in my chair, folding my hands on the desk. Marsha was pacing, clearly unsettled. I figured it was time to distract her. “Let’s review, Marsha. How did you do with your goal from last week—eating or at least thinking about fruit?”

She looked up, her eyes wandering as if searching the ceiling for the answer. “Well, Chat, I thought about it a few times. Managed to eat two small grapes a few days apart. That’s a win, right?”

Not wanting to crush her spirits, I nodded with a small smile. “Sure, but let’s call it progress. How about we try two grapes *and* a bite of an apple or banana next time?”

Marsha stared blankly, as if I’d just asked her to solve an unsolvable riddle. To help her process, I handed her a cookie. “Would an apple-flavored cookie count?” she asked.

“Just for this week,” I replied, trying to maintain some semblance of guidance. “Next week, though, we’re talking real fruit—a quarter of an apple, maybe feed the rest to the Raven.”

Small steps. Always small steps. “Now, let’s get back to the fog,” I said, bracing for the barrage of questions.

“Tarnation, CHAT!” she shouted, flailing her arms. “The fog! It’s all misty and gray, taking over the parking lot. What are we going to do?”

I quickly handed her two cookies, one for each hand, to keep her from gesticulating wildly. “Marsha, fog forms when water vapor condenses—”

Her eyes widened like a deer caught in headlights. I almost laughed but instead clarified, “No need to worry about understanding the science. Just think of it as a cloud that’s sitting on the ground.”

“But, CHAT, do we need to clear it? Could we be liable if someone crashes in the parking lot? And what if the Secretary gets lost in the fog? What if her dog, Dilly Pickle, gets lost? We may never find either of them again!”

I reminded myself of the raise I had received for handling such crises. Keeping my voice calm, I said, “Marsha, let’s tackle one thing at a time. First, for Dilly Pickle and the Secretary you can call the Old Rancher. He can drive his tractor through the fog and yell for her dog, Dilly Pickle. Dilly Pickle is well-trained and answers to her name. I can guarantee that there’s no other dog named Dilly Pickle within a 40-mile radius, so she’ll come when called. I am sure he can also yell for the Secretary.”

Marsha visibly relaxed. One problem solved.

“Now, about the fog,” I began, glancing at the clock. An hour had already passed. I dialed the Secretary. “Secretary, this is Chat, in the lower floor, office number 1.”

“Got it, Chat. Lower floor, office number 1. Is there an office number 1/2?”

Ignoring that, I continued, “Secretary, can you see the sun yet? Is the fog lifting?”

Her response surprised me: “We’re safe! The fog wasn’t glowing here and didn’t find anyone, so it probably moved on to the next town.”

I added, “And is your dog, Dilly Pickle under your desk?”

There was a pause. “Yes. She’s sleeping. Does she need to go out to pee?”

I facepalmed. “Just checking. We’re all safe from the fog, you and Dilly Pickle included. The town wouldn’t run without you both.”

She started singing “*You’ve Got a Friend” by Carole King*, and I quickly thanked her and hung up.

When I looked up, Marsha was already halfway out the door, four cookies in hand.

She waved over her shoulder. “Tarnation CHAT! You did it. You got rid of the fog. What would we do without you? It is heading out of town – probably doesn’t want to be you!”

I chuckled to myself. “Don’t worry. None of us are going anywhere.” After all, the town wasn’t even on any existing map.

Finally, I made myself that long-overdue cup of coffee, thinking, sometimes, in this town if you wait long enough, problems solve themselves.

## Supervisors Page - Come Back Soon to the town that “almost” doesn’t exist



I will share with you what's going on after the passing of my dog Molly. Thanks for sticking with me through this tough time. I pride myself on being pragmatic, not emotional, and never thought anything would affect me as hard as this did. Pragmatic and not emotional flew out the window!

One day, I smile at memories and think I have it all under control. The next day? Nope! I walk around the ranch crying and tell the animals how mad/upset I am.

**Life goes on**: Kye the coyote looked at me like, "Okay, I've listened to you for a full half-minute blithering and crying hysterically! Now, are you going to get up off your butt and get me some food? You do realize that you're sitting in the pasture crying. Humans don't belong sitting in pasture weeds and dirt, and did I mention I'm hungry?"

That night, I explained to the owl that he should be a vegetarian because someone would miss the mouse he'd tried to catch. He answered, "Go in the house, Gramma, and stop crying. It's dark and time for us to hunt." WELL, rude varmints and a big ouch to reality. So, I fed the coyote and went into the house as the owl suggested. During the day, I mucked horse stalls of the manure.

**What did this all teach me?** I learned that horse manure doesn't stop due to death (unless, of course, it's the horse that died) – it just keeps piling up. It doesn't matter if I'm happy or sad - that horse manure shows up daily. I guess, as a cosmic message to me that things go on?

**What does all the above mean?** Coyotes got fed, the owl did whatever he did at night, and I cleaned up the horse manure daily. I'm trying here for philosophy, but the mucking horse manure kills the image. And that is my ranch wisdom of what I learned! I will now hover over the town like a US military drone! AND no calories count during this sad time – Lie, but another nice thought!

**We will always remember.** Our Town Always Salutes:

- Our US military, NATO and Friends of the US & NATO - First Responders, Police, Fire Fighters EMT’s, Doctors, Nurses, SWAT, CERT Teams, etc.
- We salute engineers, scientists, developers, teachers AND students because without them we would not have technology.

USA And Friends of USA