Entering FEANTM Town
Research, Development
Camping, Horse Trails
population virtual

FEA - CAE Not to Miss & More

August 2026 ISSN 2694-4707

Town Hall Conversations - the town that almost exists
Town Plaza: Drive slowly – Galloping Prohibited

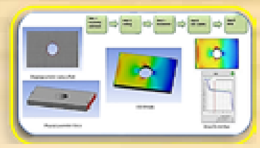
Airport - Baykar

Airport - USAF

Auto - TATA

Racer - ANSYS.

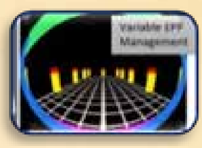
Marco – RBF Morph



Madhukar – CADFEM

Metin – OZEN

Mi&Ke - Nightly News



Jenson - DFE TECH

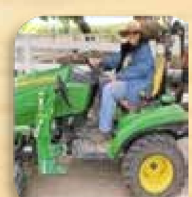
Marta - OASYS

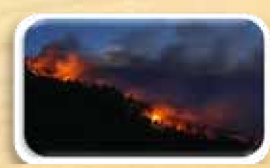
Abhinav - MyPhysicsCafe

Aaron - GOENGINEER

Marnie - CADENAS

Marsha **- Wild Fire Season**





Chronicles - RheKcn

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Any resemblance to actual persons, living or dead, or actual events is purely coincidental

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

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FEANTM Town Always Salutes USA & USA Allies. Our US military, NATO & Friends, First Responders, Police, Fire Fighters, EMT's Doctors, Nurses, SWAT, CERT, and all that help each other.

We salute engineers, scientists, developers, teachers, researchers AND students because without them we would not have innovation.

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

Town Hall & Library

CADFEM
DFE TECH
DOZEN
SYNOPSYS
Oasys
Simu Tech Group
Ansys
DYNA MORE
SCALE
d3VIEW

rbf.LAB
rbf

MEDITATE
LIVGEMINI

Lawrence Livermore National Laboratory

Race Track

The Old Rancher

Airport

- **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.

August Table of Contents

Individuals are the persons we wish to thank. It doesn't imply association with a company.
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Links provide the URL to the information.

Town Hall Conversations - Websites have complete information & High-Res. Graphics
Articles via "social listening" from company blogs, or media.

R&D Business Park (Engineering & Industry)

Table of Contents

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Links provide the URL to the information.

The websites will have the complete information and high-resolution graphics

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Residents pretending to be editors: All family - strange family.
No one knows their names. You only have to yell:

The Old Rancher:	"Hey, Old Rancher."	**The Old Pilot:**	"Hey, Old Pilot."
The Old Race:	"Hey, Old Racer."	**Racer's Daughter:**	"Hey, Slow Down."

Welcome to Town Conversations

Creation **is born from trying. If it doesn't work, learn & try again. You Will succeed. Inventions, simulations, cures, wouldn't exist with that passion to keep trying**

Park cars behind building

Park tractors behind cars

Tie horses to hitching posts

Café - Conversations & Town Gossip

Cookies, Chocolate, Cakes and Pies

Pets are welcome

Horses, pet goats stay outside

Resident Conversations You Don't Want To Miss

Marta: How early engineering software development at Arup shaped Ove Arup Systems. ...

Madhukar: Article - Gerhard Friederici "Multiphysics Simulation: How Interactions of Electricity, Heat, & Mechanics Can Be Analyzed & Products Specifically Optimized." .

Mi & Ke: Enhancing Automotive Safety with Camera Simulation Using Ansys Speos - enabling engineers to replicate real-world optical conditions, speeding development and lowering costs.

Marco: What is preventing Digital Twins from becoming truly interactive? For many organizations, the answer is not simulation accuracy. It is speed.

Marnie: Combat robot with a titanium blade: How University of Cincinnati students used 3Dfindit for a 3-pound power project

Jenson: In today's competitive engineering landscape, the ability to simulate complex mechanical systems accurately and quickly is no longer a luxury. It's a necessity.

Welcome to Town Conversations

creation is born from trying. If it doesn't work, learn & try again. You Will succeed. Inventions, simulations, cures, wouldn't exist with that passion to keep trying

Our publication features a diverse mix of papers, articles, and simulations from various fields. As always, we strive to integrate new and interesting content for your enjoyment and learning

Hello and welcome to the August 2026 edition of FEANTM. Several noteworthy events transpired during this month. For motorcycle enthusiasts, it is noteworthy that on August 29, 1885, Gottlieb Daimler received a German patent for the first internal-combustion motorcycle (Reitwagen). (German Patent and Trade Mark Office (Deutsches Patent-und Markenamt).

Many of you were born in the digital age, and many of us recall the transition to it. It is difficult to believe that on August 12, 1981, IBM debuted the PC (Model 5150) personal computer. (IBM Corporate Archives). I recall in the early 1970s being trained on an MTST, never imagining it was the precursor to the future.

This month's FEANTM offers a diverse range of intriguing information for your enjoyment. Notably:

- Aaron provides a link to advanced cabinet and furniture modeling in Solidworks.
- Abhinav offers a compilation of 12 lesser-known free resources that every CAE engineer should bookmark.
- For car enthusiasts, we have a special video from Art demonstrating the workings of a transmission from 1936.

As usual, there are far too many articles to mention, but I know you will find those of interest to you as you peruse through this month's FEANTM.

Be sure to check out the Town Comic Blog Chronicles.

We hope that you enjoy this month's edition.
Best regards,
Marnie B. Azadian, Ph.D., Managing Editor

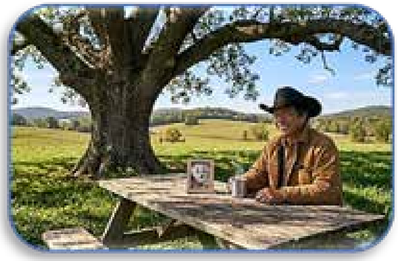
Coffee, Curiosity, and Conversation, as we tractor around the internet, finding topics we want to share. OH, and cookies - no, not the digital kind, I mean the ones with chocolate chips!

The town gives a salute to Parth in Michigan, who knows even a baby bird is important. **Yes, that's right, a baby bird on a walkway that others walked past. Parth not only picked up the cold, scared, Robin fledgling and took it home for safety and warmth, BUT then he drove 60 miles to the Bird Center of Michigan, AND TA DA DA bugle sound for happiness! THE BABY IS DOING WELL!**

Conferences Not To Miss:

Oct. 13–14	**USA**	**The LS-DYNA Conference at the Ansys EMEA Transportation Summit**
Oct. 20–22	**Germany**	**CADFEM World Conference**
Oct 21-23	**Spain**	**ENGYS UGM 2026**

And – TA DA DA – In our Coffee and Conversation section my brother Art found a great video. Love these old videos! How a transmission works - 1936



Finding AI, Engineering, Innovations.

A not to miss article by.

Excerpts from the Article, “Physical AI: Bridging Silicon, Software, and the Real World”’

Excerpts – read the website for complete information and videos

Web – SYNOPSYS - Physical AI: Bridging Silicon, Software, and the Real World - Greg Sorber

AI is quickly emerging from its digital confines as something new: physical AI.

This evolving incarnation pushes beyond the realm of information — code, text, images, video — and enables machines to sense, decide, and act in the real world.

“Physical AI is AI with a body,” said Drew Henry, executive vice president of physical AI at Arm. “It’s where AI operates within a machine.”

Joined by executives from NVIDIA, Schaeffler, and Synopsys, Henry set the stage for a thought-provoking panel discussion at the 2026 Synopsys Executive Forum, which is part of Synopsys Converge.

Covering everything from AI ‘brains’ to robotic bodies to high-fidelity simulations, the panelists suggested the implications of physical AI are nothing less than profound. Embedding intelligence into robots, vehicles, and equipment promises to extend AI’s impact into factories, hospitals, city streets, and beyond.

But it won’t be easy. Bringing physical AI to life, the panelists agreed, demands a different kind of engineering. One that can bridge digital intelligence with physical systems at scale.

Transforming industries - The economic potential of physical AI is enormous. While global GDP is roughly $100 trillion annually, the information and communications technology (ICT) sector accounts for only a modest share of total value added, even as it exerts an outsized influence on productivity and innovation across the economy.

To date, AI workloads have primarily transformed knowledge work. Physical AI, on the other hand, targets the much larger share of economic activity: moving people and goods, assembling products, delivering healthcare, and operating in the physical world.

“If you step into a typical factory today, it doesn’t look that different than it did 10 years ago, even though computing has exponentially increased,” observed Rev Lebaredian, vice president of physical AI simulation at NVIDIA. “We’re finally creating a bridge from computers to atoms of the physical world. All the growth we saw in the information world is about to happen in the physical world. Essentially, every industry will be transformed.”

Making that vision a reality will require a more holistic approach to engineering, blending silicon-to-systems design, software-defined capabilities, and agentic AI with deep simulation and digital twins.

Ravi Subramanian, chief product management officer at Synopsys, framed that shift in concrete engineering terms.

“So many industries rely on motion control — medical, industrial, automotive — and physical AI is intelligent motion control,” he said. “What’s changed is that robotics is shifting from ad-hoc tinkering to a true scientific discipline.”

Scaling specialized skills - Physical AI may shift productivity in surprising ways. For instance, highly specialized skills — surgical procedures, complex machinery setup, advanced simulation workflows — are often concentrated in a handful of experts, limiting scalability.

With physical AI, however, skills can be infused into systems that act as extensions of human expertise. Henry used the example of a surgeon who spends years developing the fine motor control and judgment required for a successful operation.

“We can bring that capability out to the rest of the world to have surgical procedures anywhere on the planet, not just in certain locations,” he said.

The same dynamic applies to engineering itself.

“If you go to any company that needs simulation, it’s only a few people who know how to use those tools,” said Lebaredian. “Agentic systems that understand the physical world can drive the simulation tools.”

Many more engineers — and even non-experts — can gain the benefits of high-end simulation without mastering every detail of the software, he added.

It’s a preview of AI-driven workflows where engineers of all stripes define goals and constraints, and AI agents operate complex tools on their behalf — a trend already evident in chip and system design.

Creating feedback loops - Robots aren’t new, of course. Industrial robots have been welding, painting, and handling materials in factories for decades. And smaller household robots have taken on narrow tasks like vacuuming. These machines, however, are specialists: tightly constrained, painstakingly programmed, and difficult to adapt.

“We had the technology to create the robot bodies,” said Lebaredian, “but we didn’t have the technology to create a robot brain that would make those robots useful.”

Physical AI will be those brains — not scripted for every motion and operating scenario, but trained using extensive simulations, the laws of physics, and corrective feedback.

“We can take the physical world and the laws of physics, all of the rules around us, and represent it inside the computer,” said Lebaredian. That simulated world becomes an effectively infinite data source to train physical AI systems, which can then be embodied in many different robotic platforms.

This is not a one-time training step, the panelists emphasized. Virtual models — called digital twins — of robots and other physical AI systems are trained in virtual models of factories, warehouses, or clinics before deployment, exercised across millions of scenarios to validate their behavior. Once deployed, real-world data flows back into the digital twins to refine both the AI model and the virtual environment.

This creates a continuous loop: simulate → train → deploy → observe → retrain.

For robotics component manufacturers like Schaeffler — both a global supplier and a large-scale user of industrial robots across roughly 100 factories — that feedback loop is critical for translating operational data into more capable, adaptable robotic systems.

“Physical AI is going to be the next giant leap in automation,” said Dave Kehr, president of humanoid robotics at Schaeffler Group. “You just tell [a generalist robot], ‘I need you to go perform this operation.’”

Instead of months of training and setup, robots will be able to shift between tasks as conditions and demand change.

Designing systems, not just robots - Building a brain for a robot is only part of the challenge. Physical AI systems are complex combinations of sensors, actuators, processors, networks, and software operating in environments that are often dynamic and unpredictable. Developing and verifying such systems requires methodologies that look more like modern chip design — which integrates silicon, software, interconnects, and packaging — than traditional mechanical engineering.

A robot brain takes more effort to verify than its body, the panelists emphasized.

Extensive simulations and training will increasingly rely on digital twins that model all aspects of the physical robot, including digital, electrical, and mechanical. These simulations must extend beyond initial deployment so designers can verify and implement incremental changes throughout the unit’s lifetime as it operates across real-world environments.

But that represents a significant shift to the engineering process. Instead of working in silos — one team for chips, another for control software, another for mechanical systems — organizations need to align their workflows and focus on end-to-end, cross-disciplinary co-design.

“You really can’t do this in silos anymore,” said Sam Abuelsamid, vice president of market research at Telemetry and moderator of the panel. “It's such a complex set of interactions across the entire system that you need simulation tools, operational design, domain simulation, chip design, and the target applications — and fit all these pieces together.”

Emerging capabilities that combine electronics design tools with physics-based simulations — such as Synopsys Multiphysics Fusion™ solutions — are built for this kind of engineering. From chip design and verification to multiphysics simulation and digital twins, engineers can build shared virtual environments where AI agents, control software, and physical models interact before hardware exists.

As AI-in-engineering practices mature, agentic AI systems can help drive these workflows — configuring simulations, sweeping design spaces, and flagging edge-case behaviors — while human engineers focus on intent, constraints, and trade-offs.

Rethinking GDP, labor, and "3D" jobs - In addition to changing many human jobs, physical AI may upend longstanding economic truths. For instance, the capacity for manufacturing goods will no longer be limited by the size of the workforce.

"The GDP of a country correlates with population," Lebaredian explained. "You [can] educate your workforce more, but ultimately your output is dependent on the number of laborers you have. If you can manufacture physical [robotic] laborers, then we're going to untether the GDP from the population."

That doesn't mean people become unnecessary, but it does shift human work toward higher-value roles instead of narrowly defined tasks.

"There's going to be a lot of tumultuous chaos in the workforce as things change," Subramanian said, noting the silver lining of eliminating so-called "3D" jobs that are dull, dirty, or dangerous. "The net benefit to humanity will be that the three Ds will be addressed, and it will open up the ability for humans to have better, safer lives."

Realizing that vision will take time, engineering rigor, and close collaboration across industries. It will also require the integrated design flows, simulation capabilities, and AI-in-the-loop methodologies already reshaping chip design and systems engineering.

With physical AI, those digital threads won't just connect software and silicon — they'll extend into the physical world itself.

GOENGINEER Article Quote, "What is SWOOD Design? SWOOD Design is a powerful add-in for SOLIDWORKS that makes it easier to design custom furniture and wood-based assemblies. Built with woodworking professionals in mind, it uses a parametric, drag-and-drop approach to help users create cabinets, panels, connectors, and hardware, faster and with fewer errors."

Web – GoEngineer - **SWOOD Design - Advanced cabinet and furniture modeling in SOLIDWORKS**

SWOOD Design takes care of details like material management, grain direction, and edge banding. It also automatically generates everything lists, and CNC data.

needed for production, including BOMs, cut

Fully integrated with SOLIDWORKS and part of the larger SWOOD suite, it helps streamline workflows from design to manufacturing.

Mike Dady, Video on YouTube - Cabinet Design Updated in Seconds with SWOOD

Ever have difficulties modifying a cabinet model inside SOLIDWORKS Design?

Whether it is a size variation of an existing product, or you need to accommodate a quick client request for change in hardware, see how SWOOD Design can make these changes in seconds.

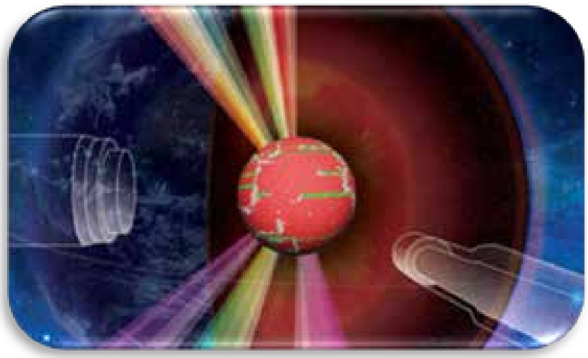
00:00 The Challenge of Cabinet Variations in SOLIDWORKS

00:25 Modifying an Existing Model with SWOOD Box Assemblies and Pre-Made Libraries

01:11 Adding Custom Elements to a Product

01:26 Changing Parameters using SWOOD Design

LLNL Article, "It was a journey to the center of the Earth, if only for the briefest of moments. But rather than tunneling thousands of miles from the Earth's surface, researchers from Lawrence Livermore National Laboratory (LLNL) and several universities used the National Ignition Facility (NIF) to recreate those extreme temperature and pressure conditions of the Earth's inner core. This enabled the first ever simultaneous measurement of iron's dynamic strength at relevant temperature and pressures.



Web – LLNL - **Measuring iron in motion at earth-core conditions** **Patricia Brady**

"We study iron because it is a primary constituent of Earth's and other terrestrial planet cores, and how it functions under inner-core conditions is not well understood," said LLNL physicist and co-lead author Yong-Jae Kim. "These results provide important experimental benchmarks for iron rheology, the physics of the deformation and flow of material, at Earth inner-core conditions."

The findings were recently published in Nature Communications in a paper titled "Dynamic strength of iron under pressure-temperature conditions of Earth's inner core." In addition to the LLNL scientists, the team includes researchers from the University of California San Diego (UCSD), Universidad de Mendoza (Argentina), Universidad Politécnica de Madrid (Spain), and Stanford University.

"Until now, making measurements of iron rheology at inner-core pressure-temperature conditions has been extremely difficult, as no single laboratory technique could access this full parameter space for durations sufficient to allow material flow while enabling in situ diagnostics," said LLNL physicist and co-lead author Gaia Righi. "But NIF has this capability."

The world's most energetic laser system, NIF can create temperature and pressure conditions even more extreme than the sun or the Earth's inner core. NIF is critical to national security, as it provides the experimental basis for the National Nuclear Security Administration's stockpile modernization program. The capabilities developed for that mission — laser energy, pulse shaping, ultrafast in situ diagnostics and precise target fabrication — also enable experiments such as these through the NIF Discovery Science program. Results from NIF Discovery Science frequently contribute to national-security research applications.

The preparations for the experiments were painstaking. Righi simulated many target designs and pulse shapes to ensure the material would reach pressures of 3 million atmospheres and heat to 5,000 degrees Celsius but would not heat so quickly that it melted. That work is described in a 2022 Journal of Applied Physics paper.

Led by Kim, the campaign's responsible individual, the team conducted direct laser-driven experiments at NIF using the Rayleigh-Taylor (RT) instability, which occurs when a lighter material accelerates a denser one and induces unstable growth of interface perturbations. An everyday example is pouring vinegar over olive oil.

The lasers fired on a 5.35-millimeter square target composed of layers of different materials with a ripple pattern etched onto the iron surface. A precisely timed set of backlighter beams later fired on a thin metal foil, producing high-energy X-rays that image the target to evaluate the ripple growth at a different time in each experiment. Simultaneously, an optical laser, VISAR, tracked rear surface velocity to measure the pressure conditions achieved. The research team then used state-of-the-art codes and high-performance computing to interpret the results from radiation hydrodynamic and molecular-dynamic simulations. The hydrodynamic simulations gave a big-picture view of what happened during the experiment, while molecular dynamics revealed the material response at the atomic level. Simulation results, constrained by the experimental data, provided the strength of iron at relevant conditions.

They also discovered an unpredicted effect of iron undergoing a pressure-induced phase transition — a re-arrangement of its atoms — which furthermore breaks up its microstructure into small grains. Both changes can also influence rheological behavior. The team found that high-pressure, ε-Fe derived from initially single crystal [001] α-Fe is consistently stronger than that from [111] α-Fe, contrary to the trend at ambient conditions. Large molecular dynamics simulations showed the same pattern, suggesting that the difference arises from how these two orientations of iron experience the low-pressure phase transition and later deformation in the ε phase.

“Understanding material strength and how it depends on microstructure in Earth’s inner core is important because it may influence seismic anisotropy, or how earthquake waves travel through the inner core, which is linked to core dynamics and magnetic field history,” Kim said.

The researchers hope to advance this research by studying the area of mixing between the Earth’s inner and outer cores.

“This new, exciting result further deepens our understanding of the extreme flow behavior of phase-changing materials,” Righi said. “I’ve been working on this project since I was a graduate student. I’m excited to be able to continue working in the field and see just how far we can push the NIF strength platform.”

The project also marked an important step in Righi’s career. As a graduate student working under UCSD professor and frequent discovery science collaborator Marc Meyers, she helped design and carry out the experiments as part of her Ph.D. thesis research. After earning her Ph.D., she became the inaugural Harold Brown LLNL postdoctoral fellow and joined LLNL as a staff scientist in 2025.

Kim and Righi are joined on the paper by LLNL researchers Thomas Lockard, Robert Rudd, Camelia Stan, Christopher Wehrenberg and Hye-Sook Park; Orlando Deluigi and Eduardo Bringa of Argentina’s Universidad de Mendoza; Carlos Ruestes of the Universidad Politécnica de Madrid; Arianna Gleason of SLAC and Stanford University; and Marc Meyers of the University of California, San Diego.

pic A multi-institution research team made the first-ever dynamic measurements of iron at earth-core conditions at the National Ignition Facility. Shown here are LLNL scientists (from left) Hye-Sook Park, co-lead authors Gaia Righi and Yong-Jae Kim and Robert Rudd. (Not shown are Thomas Lockard, Camelia Stan, Christopher Wehrenberg and researchers from other institutions). (Photo: Blaise Douros/LLNL)

DFE-tech article quote, “In today's competitive engineering landscape, the ability to simulate complex mechanical systems accurately and quickly is no longer a luxury. It's a necessity. Whether you're designing a next-generation vehicle suspension, an industrial robot arm, or a precision printer mechanism, understanding how your system moves under real-world conditions before a single prototype is built is what separates leading engineering teams from the rest. That's where RecurDyn comes in.

Web – DFE-Tech - Why Engineers Choose RecurDyn Introduction to RecurDyn: The Multi-Body Dynamics Platform Built for Modern Engineering

Why Engineers Choose RecurDyn - A Pre/Post Environment Purpose-Built for MBD.

RecurDyn's user interface has been designed from the ground up for MBD workflows, informed by feedback from engineers in the field. From CAD import (supporting STEP, CATIA, NX, Creo, SolidWorks, IGES) to 3D animation and post-processing plots, the entire analysis pipeline lives within a single, consistent environment. There's no need to manage data hand-offs between disconnected tools.

Fast, Accurate Contact Simulation - Contact is often the most computationally demanding aspect of MBD analysis. RecurDyn addresses this with world-class contact algorithms that handle both general geometry and primitive shapes (spheres, cylinders, boxes, tori) with exceptional robustness. Hertzian contact theory, kinetic and static friction, and SMP-accelerated parallel computing ensure that even the most complex contact scenarios are resolved accurately and efficiently.

Integrated Durability and Fatigue Analysis - For structural engineers, RecurDyn's Durability toolkit is a particular differentiator. Rather than exporting loads to a separate fatigue solver, RecurDyn calculates fatigue life, damage and safety factors directly from MFBD results, supporting industry-standard Mean Stress Theory methods including Goodman, Morrow, Manson-Coffin, Brown-Miller ASME and Smith-Watson-Topper. Rainflow counting, stress/strain time histories, and contour plots are all available natively, with access to approximately 180 built-in material libraries.

Scalability Across Disciplines

RecurDyn is not an isolated CAE platform. It connects seamlessly with the broader engineering ecosystem:

- Control systems via MATLAB/Simulink co-simulation or the built-in CoLink block-diagram environment.
- Fluid and granular dynamics via Particleworks (MPS particle-based CFD) and EDEM (DEM granular analysis).
- 1D system simulation via FMI support for AMESim, SimulationX, and Modelica-based tools.
- External FEA solvers including Ansys and Nastran for modal and nodal flexible body import

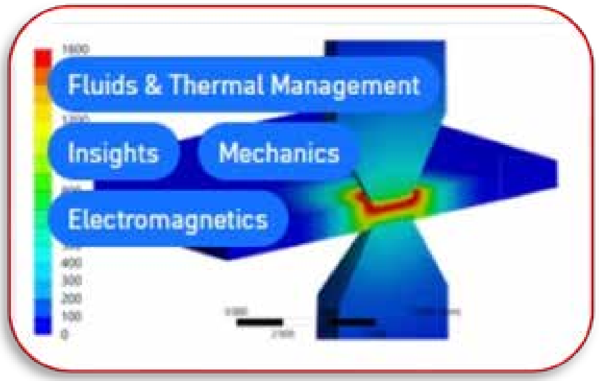
This multidisciplinary reach means RecurDyn fits naturally into existing simulation workflows rather than displacing them.

Description excerpts of toolkits

- **Application-Specific Toolkits -** Reduce modelling time for common engineering sub-systems, … modeller, specialised solver, and dedicated post-processing.
- **DriveTrain Toolkit**: Simulates complete drivetrain systems through three integrated toolkits: GearKS (gears), …(bearings with major brand databases) and …(flexible shaft deformation).
- **Chain Toolkit**: Simplifies the modelling of complex chain systems including roller chains, multiplex chains and silent chains. …
- **Belt Toolkit:** Enables modelling of belt and pulley systems, supporting flat belts, V-belts, ribbed V-belts and timing belts as either rigid or flexible bodies (via MFBD technology). …
- **Gear Toolkit:** Dedicated toolkit for defining and analysing gear systems, supporting spur, scissors, helical, internal, bevel (straight, spiral, Zerol), worm, and quasi-flexible body (QFB) gear types…
- **Bearing Toolkit:** Streamlines bearing modelling with automatic contact definition for ball and roller bearings, including support for flexible outer ring deformation and fluid (Elasto Hydro Dynamics)…
- **TrackLM**: Targeted at low-mobility tracked vehicles such as construction and heavy equipment. Provides automated track assembly with sprocket, roller, flange and track link libraries, soil modelling….
- **TrackHM**: Designed for high-mobility tracked platforms such as military tanks. Shares the same automation philosophy as TrackLM but uses a solver and library set optimised for high-speed track dynamics, including single-pin, double-pin and inner-pin track link configurations. Road data can be imported externally.
- **MTT2D Toolkit:** A 2D media transport toolkit for designing and analysing thin flexible media systems (paper, film, cards) in printers, copiers, and similar devices. …
- **MTT3D Toolkit**: Extends media transport analysis into 3D, capturing steering behaviour, wrinkling onset, and out-of-plane sheet dynamics. …
- **R2R2D Toolkit:** Specialised for Roll-to-Roll system design, with optimised solver support for winding behaviour, automatic web generation using beam elements and automatic contact definition among web, roller and guide components.
- **Engine Toolkit:** Dedicated toolkit for internal combustion engine simulation, covering the three core sub-systems: Crank for crankshaft dynamics, Piston for piston motion and cylinder interaction and Valve for valve train analysis….
- **Tire Toolkit:** Provides various libraries to simulate vehicle tyre behaviour, supporting multiple tyre model types depending on the application…
- **MachineTool Toolkit**: In collaboration with IWB (Technical University of Munich) and FRAMAG, this toolkit enables MBD simulation of machine tool systems…
- **EHD Toolkit:** Simulates Elasto Hydro Dynamics lubrication, contacts occurring through an oil film, for applications such as crankshaft and camshaft journal bearings (EHD Bearing) and piston-cylinder interfaces (EHD Piston). Oil film thickness, pressure distribution and the effect of body deformation on lubrication are all captured.
- **Spring Toolkit (Multi Mass Spring)**: Enables physically accurate coil spring modelling where the dynamic response is a function of coil mass distribution…
- **TSG (Time Signal Generator) Toolkit:** Finds the actuator drive signal required to reproduce a measured target signal (position, velocity, or acceleration) within a RecurDyn model…

Quote Article by Gerhard Friederici “Multiphysics Simulation: This Is How Interactions of Electricity, Heat, and Mechanics Can Be Analyzed and Products Specifically Optimized. When electrical, thermal, and mechanical effects occur simultaneously, traditional calculation methods quickly reach their limits. Multiphysics simulation opens up new possibilities in this area and can analyze complex interactions in a realistic manner.

…



WEB – CADFEM - [Multiphysics Simulation: Holistic Analysis of Complex Manufacturing Processes]
Dr.-Ing. Jörg Neumeyer

CADFEM has developed a simulation-based model that visualizes key effects, enabling a deeper understanding of processes, well-founded optimization, and more efficient product development.

What is a Multiphysics Simulation? A multiphysics simulation is a computer-based method that combines several physical disciplines – such as electrical, thermal, and mechanics – to realistically analyze complex interactions. Especially in processes like resistance welding, it provides valuable insights that go beyond traditional calculations. Analytical methods are often insufficient, particularly when physical domains influence each other. Multiphysics simulation opens up new possibilities in this area, enabling a deeper understanding of processes, well-founded optimization, and more efficient prouct development.

CADFEM has developed a simulation-based model that visualizes key effects such as current flows, heat distribution, and mechanical forces. This allows processes to be improved in a targeted manner – for example, by optimizing cooling rates to prevent seam embrittlement.

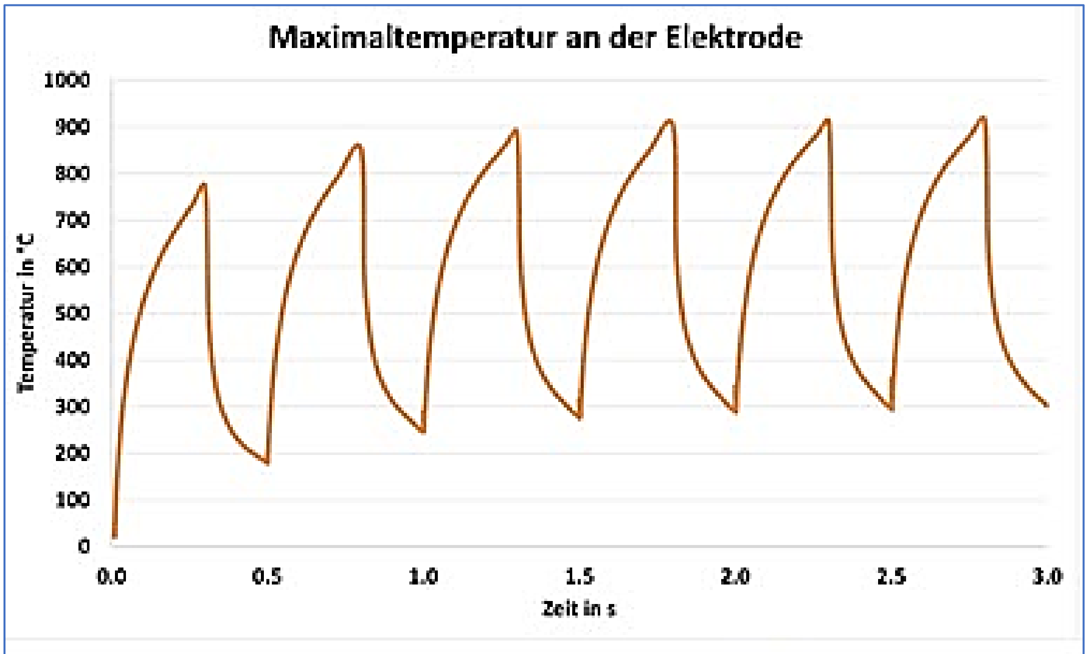
How Do Electrical, Thermal, and Mechanical Factors Influence Each Other in Technical Processes? When electrical current flows through a component, Joule losses occur, causing the component to heat up. Suboptimal contact properties make it particularly difficult for current to flow at the point of contact between two components. As a result, the losses and thus the heating are greatest at the contact point, leading to thermal expansion there. This expansion, in turn, affects the contact and thus the current and ultimately the heating. This completes the feedback loop. Especially in high-temperature processes, considering mutual influences is essential.

What Role Does Multiphysics Simulation Play in Resistance Welding? An example of these “high-temperature processes” is resistance welding. In this process, so much heat is generated through the application of electrical energy that metals, which are solid at room temperature, reach the phase transition range, melt, and thereby form a material bond between the joining partners.

If that weren’t complex enough, this method is used to join two geometries made of different materials. Such requirements are typical in resistance spot welding. Fortunately, these complex processes can be designed and analyzed using user-friendly simulation models.

The electrical current required for heating is transmitted via copper electrodes to the first joining partner, flows from there through the mechanically pressed contact into the second joining partner, and from there either into a second electrode or the applied grounding cable. The goal is to heat the contact point between the two joining partners so that the weld seam can withstand the mechanical forces it will face later.

Why Is Targeted Cooling During Welding Just as Important as Heating? While a lot of heat needs to be transferred between the components to be joined, the temperature at the transitions to the electrodes must remain as low as possible in order to avoid parasitic welds. This not only means heating, but also cooling!



Time history of the maximum electrode temperature across six welding cycles. | © CADFEM Germany GmbH

Between welds, the electrodes can release the absorbed heat energy back into the environment. However, this takes time and reduces productivity. Simulation models provide insight into the global temperature behavior at any location and time, and illustrate, for example, the temperatures of the electrodes via virtual measuring points to derive insights about possible cycle times.

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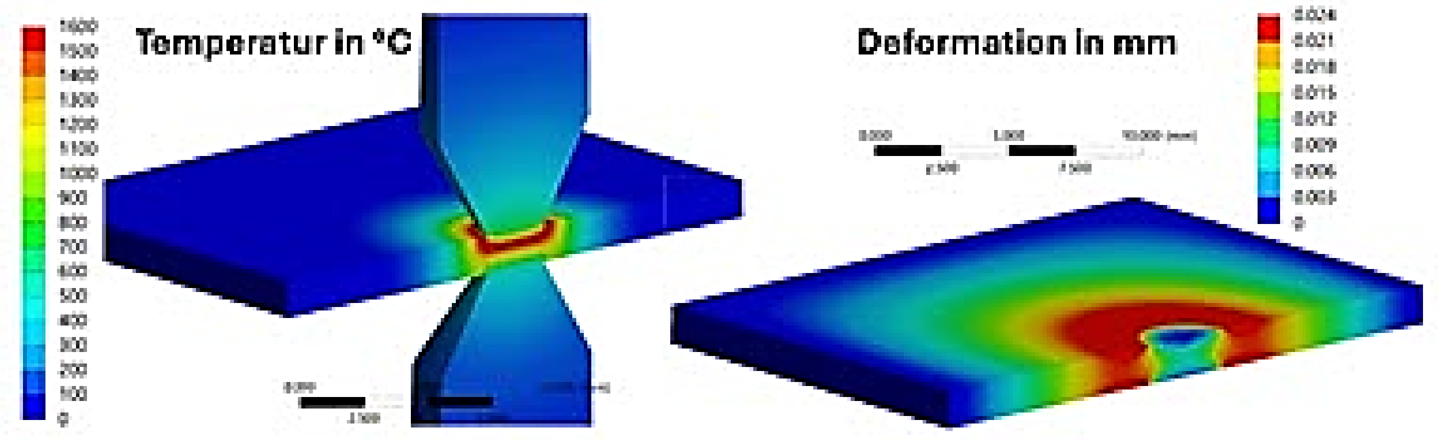
Simulation models provide insight into the global temperature behavior at any location and time, and illustrate, for example, the temperatures of the electrodes via virtual measuring points to derive insights about possible cycle times.

Influence of Electrode Temperature History on Weld Quality and Process Performance - To examine this issue in more detail, CADFEM developed a multiphysics coupled simulation model that considers the effects of electricity, heat, mechanics, time progression, and cycle rates in combination.



Temperature and deformation distribution in the cross section of the weld spot. | © CADFEM Germany GmbH

From the temperature progression over multiple welds, it can be deduced that the temperature history of the electrodes influences the temperature at the weld point, the thermally induced strain there, and the resulting changes in electrical and thermal conductivities. This, in turn, affects the welding performance.

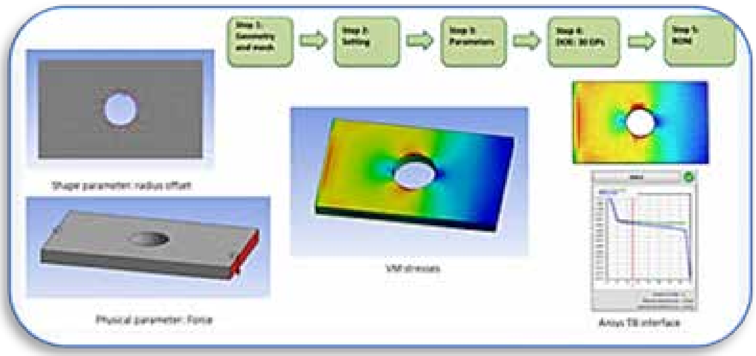
In addition to understanding this relationship, further data can be obtained regarding its extent. How much heat is conducted from the electrodes into the joining partners, and what effect does this have on the required heating time? These insights enable the implementation of targeted corrective measures.

Multiphysical Analysis for Better Welding Results - Multiphysics simulations provide comprehensive insight into the location and magnitude of physical result variables such as electrical current densities, heat generation rates, contact pressures, and component temperatures – all while considering nonlinear material data, structural deformations, and time-dependent influences.

The simulation results ultimately provide answers to critical questions: Why am I melting too much material? What must I do to melt the correct area? In addition to the “mandatory” task of eliminating undesirable effects, the simulation model can also be used for “optional” tasks in the form of process improvements. This includes questions such as: Can geometric changes to the electrodes influence the temperature behavior? Should the surrounding material be preheated to reduce embrittlement? What alternative processes could there be? How does the process behave with other materials?

The analysis of “what-if” scenarios offers enormous potential for deeper understanding and the development of improved processes.

"**RBF Morph - - What is preventing Digital Twins from becoming truly interactive**? For many organizations, the answer is not simulation accuracy. It is **speed**. As Digital Engineering evolves, CAE teams are being asked to move beyond offline analysis and support workflows where engineers can *modify geometry*, *evaluate performance*, *and make decisions in real time*. The challenge is that most simulation processes were not designed for this level of interaction.



Web – MDPI - Fast Radial Basis Functions in Digital Engineering Applications

by Marco Evangelos Biancolini,
Dept. of Enterprise Engineering, Univ. of Rome Tor Vergata, Italy

Presented at the 54th Conf. of the Italian Scientific Soc. of Mech. Engineering Design (AIAS 2025), Italy, September 2025.

Figure 1. The complete workflow from a parametric high-fidelity FEA model to interactive ROM. One geometrical parameter (hole diameter) and one physical parameter (force intensity) are defined. A dataset of 30 snapshots is automatically generated and compressed using POD.

- **When implemented efficiently, RBFs become a foundational technology for:** Real-time geometry manipulation. Interactive Digital Twins, Design space exploration, Simulation-driven product development, AI-enabled engineering workflows.
- **The paper demonstrates** how fast RBF implementations enable seamless interactions between geometry and simulations, presenting applications ranging from a benchmark plate-with-a-hole problem to the structural redesign of a scooter engine connecting rod and the conceptual design of a CubeSat.
- **The broader message** is particularly relevant for CAE leaders: The future competitive advantage of simulation will not come solely from higher-fidelity models. It will come from the ability to connect geometry, simulation, optimization, and decision-making into a continuous, interactive engineering process.
- **As organizations invest** in Digital Twins and AI-driven engineering, technologies that eliminate meshing bottlenecks and accelerate model updates will become increasingly strategic.
- **Fast RBF methods** are not simply a faster way to deform meshes. They are an enabling technology for the next generation of digital engineering platforms.

Abstract - Radial Basis Functions (RBFs), since their inception in the 1960s, have emerged as a key tool in digital engineering applications. As interpolators in multidimensional spaces, RBFs play a crucial role both in generic data science problems and in 3D space manipulation. Their ability to represent large 3D datasets in a mesh-free manner has established them as the standard approach for data mapping and mesh deformation. A fast implementation of RBFs is essential to fully exploit this mathematical approach in digital engineering applications. This paper provides an overview of fast RBF methods in digital engineering and presents practical applications in the field of Computer-Aided Engineering (CAE), highlighting the role of RBFs in the development of a digital twin capable of real-time interaction with 3D structural components; after detailing the workflow for a simple plate with a

hole, the method is demonstrated for the structural redesign of a scooter engine connecting rod and for the interactive conceptual design of a CubeSat.

1. Introduction - Radial Basis Functions (RBFs) have established themselves as a powerful mathematical tool for interpolating and manipulating data in multidimensional spaces. Since their theoretical formulation in the 1960s [1,2], RBFs have gained wide adoption across various engineering and scientific domains, particularly for mesh morphing, shape optimization, and data mapping in three-dimensional applications. Their meshless nature makes them ideal for handling complex geometries and large datasets. Beyond their role as spatial field manipulators in two- and three-dimensional spaces, RBFs—sometimes referred to as RBF neural networks—have also been widely adopted for interpolating data in generic n-dimensional spaces. This makes them an excellent tool for machine learning tasks, where they serve as exact or approximate interpolators capable of supporting subsequent inference and prediction.

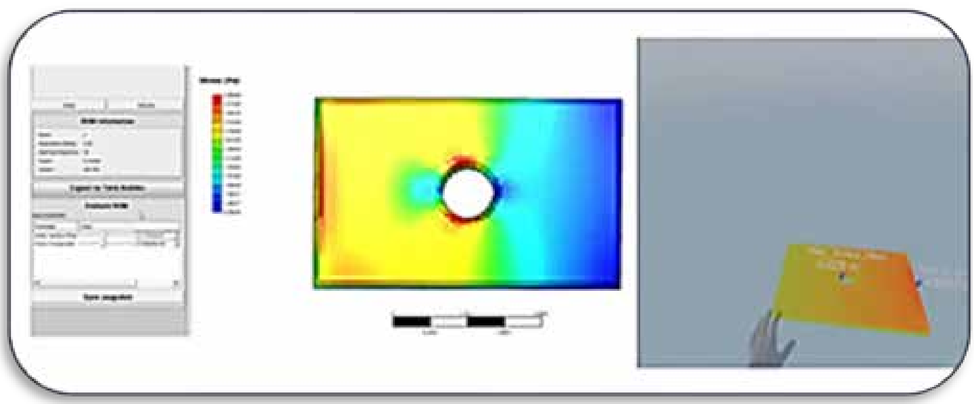


Figure 5 shows the interactive results achieved. A desktop application based on Ansys Twin Builder visualization tool is shown. In this case, the interaction with the ROM is performed by acting on two sliders on the left so that the two parameters (hole size and load intensity) can be changed. The rendering is updated accordingly and both the shape and the stress contour map are updated in real time. The same model has been transferred to the Meta Quest 3 VR device (Figure 5 right). In this case, the user can position the component by hand manipulation and change the parameters acting on physical controllers, via blue cylinders that can be dragged to have a real-time variation in both the shape and the results. Thanks to the compression and to the on-device GPU calculations, the update of the physical models happens to be stable at 60 FPS

4. Conclusions - This work has shown that fast Radial Basis Functions are a practical enabler for real-time structural DTs. In the proposed workflow, RBFs play three complementary roles: (i) geometry manipulation through mesh morphing to explore shape variations on high-fidelity FE models; (ii) consistent field/data transfer to support training, validation, and cross-model comparisons; and (iii) low-latency coupling between user interaction and ROMs so that updates of stresses, displacements, or modal metrics remain visually smooth. The result is a solver-agnostic pipeline that takes high-quality structural simulations and turns them into interactive experiences deployable on desktop interfaces and VR devices.

Article, **"Technical innovation often begins with a vision - a dream to create something extraordinary. For a team of talented young engineers at the University of Cincinnati, that dream took the form of a 3-pound combat robot aptly named Dysfunction**. Equipped with a titanium blade that spins at nearly 480 kilometers per hour, Dysfunction is a true testament to the power of precision engineering. And behind its success is a powerful tool: 3Dfindit.

3dFINDIT

Web Combat robot with a titanium blade: How University of Cincinnati students used 3Dfindit for a 3-pound power project - Thomas Rinke, Dalibor Pejicic

The birth of a battle-ready beast - Combat robots are an exciting combination of ingenuity, technical prowess and a dash of daring. Benjamin Haas, Caria Thacker and Sedona Head, the engineers behind Dysfunction, knew that creating a robot capable of both astonishing speed and destructive force required more than ambition. It required precision and access to high-quality components.

At the heart of Dysfunction's weapon system is a custom-built titanium shaft connected to high-resolution needle bearings. This arrangement was critical to maintaining the dimensional accuracy required to avoid excessive friction and heat during operation. But even with their expertise, finding the perfect components and models was a challenge - until they turned to 3Dfindit.

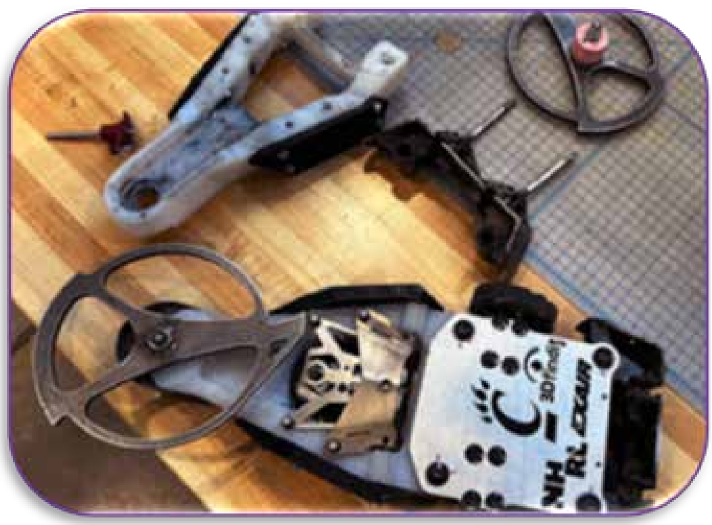
How 3Dfindit became a game changer - 3Dfindit provides engineers with access to millions of CAD models from numerous industries. For the Dysfunction team, it was invaluable. When a key component, the elusive BadAss 2814 engine model, was nowhere to be found on manufacturers' websites, a single search on 3Dfindit provided the solution.

3Dfindit not only found the motor model, but also provided high-resolution models for the needle bearings and other components critical to the robot's functionality. This seamless integration of accurately detailed CAD files saved the team time and ensured the quality of the design. This meant they could focus on fine-tuning their creation and turn their concept into a combat robot that dominated competitions across the Midwest.

Nurturing the engineers of tomorrow - At CADENAS, we care deeply about fostering innovation. 3Dfindit is more than just a CAD library and visual search engine. It's a platform designed to inspire and empower engineers to turn their creative visions into tangible results. Whether students building combat robots, professional engineers designing machines, or innovators developing breakthrough technologies, 3Dfindit streamlines the design process and improves engineering outcomes.

Supporting young talent, like the student team behind Dysfunction, is at the heart of our mission. By giving these young talents access to the tools they need, we are empowering the next generation of engineers to push boundaries and achieve great things.

Benjamin Haas is grateful for our partnership, "The University of Cincinnati Combat Robotics Club would like to give a special thank you to CADENAS and 3Dfindit for their continued support of our program! They are a huge part of what makes our program possible!"



From the robot arena to real-world impact - While Dysfunction's triumphs in the combat robot arena are impressive, they are just the beginning. The same principles that drive a successful robot - precision, efficiency and innovation - apply to countless other areas of technology. 3Dfindit continues to play an important role in turning these ambitious projects from universities and other institutions into success stories.

Benjamin, Caria and Sedona, we say well done! Your hard work, skill and creativity are inspiring. Consider this an invitation to the engineers and dreamers reading this. Whether you're designing the next great combat robot or grappling with the technology challenges of tomorrow, CADENAS and 3Dfindit are here to help you succeed. Together, we can shape the future.

I love tractors, planes, drones, trains, military tanks.

County here is in wildfire season. I SO hate pasture that fast burn! We do have emergency go bags ready to evac. Horse evac plan but fire moves so quickly! Know your evac and fire safety for your area!

Quote article, Djordie Romanic, associate professor of atmospheric sciences at McGill University, said the main cause of thunderstorms associated with wildfires is "the intensive heat that wildfires produce."

Excerpts – The full article can be read on the website

How do wildfires create lightning, pyro tornadoes and thunderstorms? By Adriana Fallico

The Brunswick Creek wildfire consumes trees on a mountainside in Boston Bar, B.C., on July 9, 2026. THE CANADIAN PRESS/Darryl Dyck

Wildfire season continues to blaze across parts of the country after several brutal seasons and, as the fires burn, the smoke and heat can create volatile weather phenomena such as tornadoes and lightning…

…

But what is it about wildfires that can cause these kinds of wild weather events?

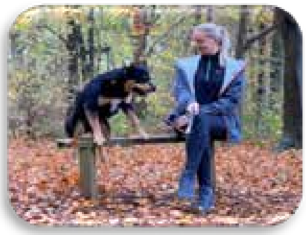
Thunderstorms - Djordie Romanic, associate professor of atmospheric sciences at McGill University, said the main cause of thunderstorms associated with wildfires is "the intensive heat that wildfires produce." "We aren't seeing a small, localized fire, it's a very large area affected by fire so there is huge amount of heat that is generated," he said.

"Warm air is lighter than the surrounding air where we do not have wildfires, so that means that warm air caused by fires is rising. That air is also rich in humidity, rich in pollution and it can easily cause thunderstorm clouds."

"When we have wildfires, what is really happening is we have a huge amount of smoke particles and ash that is being lifted upwards, and these small particles that enter these clouds also collide and interact," Romanic said. "That creates a lot of static electricity in the atmosphere and that static electricity, in simple words, needs to discharge, and that discharge is what we observed as lightning."

The B.C. Wildfire Service has attributed the vast majority of the new fires to the 4,000 lightning strikes it says hit the province on July 15, and the eruption of fire activity has also seen an increase in evacuation orders and alerts.

"In terms of tornadoes associated with wildfires, when that warm hot air is rising… the surrounding air is moving in the region of wildfires and as that surrounding air is moving in, it can move in from different directions and as it is swirling in it can create intense vortices that resemble tornadoes," Romanic said. "They [pyro tornadoes] can be very strong — not as strong as actual tornadoes caused by supercells, but equally dangerous because it's a tornado engulfed in fire and can additionally spread fire and also cause all kinds of other damage."



Article Quote: How early engineering software development at Arup shaped Ove Arup Systems

Web Oasys - Oasys legends: [How early engineering software development at Arup shaped Ove Arup Systems]

When Andrew Wilkinson joined Arup in September 1978, the idea of interactive, desktop-based engineering software was only just emerging. At the time, most complex analyses were run on large mainframe computers, occupying entire basement spaces.

But a shift was underway.

Building software with constraints and creativity - After three weeks of what he describes as 'grad school' involving learning about the firm, what it stood for and the various departments that made up Arup, Andrew was assigned to work in Arup's Research and Development (R&D) group for 12 months. There, Andrew contributed to the development of early analysis and design programs for a new generation of desktop machines. These systems, with memory measured in kilobytes rather than gigabytes, required engineers to think differently.

Andrew recalls the tools Arup had at the time, "Back in the 1970's most major analyses were carried out on the firms DEC10 computer (at least I think it was called this) which took up considerable basement space." As the first desktop machines were starting to emerge on the market, Arup chose to go with Hewlett Packard computers and in 1978 the latest HP9845 was purchased.

Andrew recalls that the program's analysis and design results were stored on essentially cassette tapes which were inserted into the 'drives' above the keyboards (as seen in the image below) and a roll of thermal A4 paper would print the output.

> *"A much earlier version was the HP9810 which was the size of a small shoe box, and, from memory, programs were stored on a short length of magnetic tape which were fed into the 'computer'. The only person I recall using one of these was John Blanchard. The first time I came across it was when I went to his desk to ask him something and while standing patiently for him to become free, I heard a quiet 'whirring' noise coming from one of the drawers in his desk. When it stopped, he pulled open the drawer and extracted a thin strip of paper with (presumably) the results of whatever he was working on. [I was] lucky enough to use the very latest upgrade, the HP9845. But this was a far cry from today's desktop computers."*

On order to understand the design of the 9845 series, one has to remember that in the late 70's, there were no desktop or personal computers as we know them.

The computer scene was dominated by heavy and expensive systems like the IBM 370 or minicomputers like the HP 3000. CRT based terminals were already in use with those systems, but CRT's were not common with desktop computers.

On the other side, there was an upcoming home computer scene, based on microprocessors like the Intel 8080, the Motorola 6800, the MOS 6502 or the Zilog Z80.

The enhancements of the 9845B included both changes in hardware and in software:

- a newly designed motherboard with separate system buses for the PPU and the LPU
- separate processor assemblies for the PPU and the LPU with processor, memory address extension and memory controller
- internal system ROMs on combined RAM/ROM assemblies (instead of ROM drawer modules), one for the PPU and one for the LPU
- 128 KByte and 512 KByte R/W expansion assemblies instead of 8 KByte and 16 KByte R/W memory boards
- redefined use of the HLT bus signal (now mirroring the CRT vertical retrace)
- a couple of new BASIC commands (CAT TO, ON KBD, OFF KBD and KBD$)

> *"The 9810 only had a memory capacity of 2K, the 9830 increased this to 8K whilst the 9845 had a whopping 64K although the top-of-the-line version which came later in the year had 192K!"*

A culture of problem-solving - For Andrew, what stands out just as much as the technology is the people. He recalls a culture shaped by curiosity, collaboration, and a shared commitment to solving difficult problems. He was told that one colleague famously described his role simply as "solving difficult problems", a mindset that defined the team.

There was also room for personality and humour. Work submitted for review to one colleague would return with a simple hand drawn seal with a ball on its nose at the bottom as a “seal of approval”, a small but memorable mark of recognition from respected peers.

From early tools to global impact - The software developed during this period laid the foundations for what would become Oasys (Ove Arup Systems) as it is today. Early programs for beam, slab, and section analysis were tested rigorously, sometimes pushed to failure, before being shared more widely across the firm and beyond.

> *“The software was always intended to be made available commercially and it was important that it was made 'user-friendly' - Eventually GSA and ADC etc. superseded most of the structural programs.”*

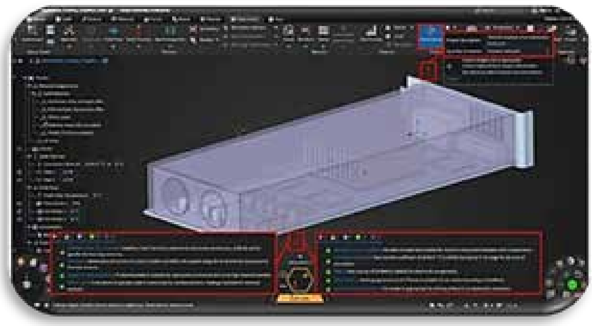
By the end of the 1970s, this work had already begun to generate commercial value, marking the start of Oasys as a product business. Today, Oasys tools support engineers around the world, tackling complex challenges with speed and precision. But at their core, they still reflect the principles established in those early days: innovation within constraints, a focus on usability, and a culture built around solving problems.

When the programs were ready to go, they were put through a test of robustness where one of Andrew’s colleagues would try to break the software… often successfully he notes. Once it had been cleared in testing, it could be released to the wider firm and made commercially available via what is now Oasys. He also recalls that some of his time was also spent responding to queries from external users and resolving any issues arising from use of the software.

Andrew expresses that his introduction to Arup was made pleasant by his experience within R&D, and it also brought back some other fond memories of his time at the firm: “It was a very enjoyable introduction to a career in Arup and brings back other memories such as the 30p per day ‘luncheon vouchers’ included in our first salary packages.”

Stories like Andrew’s remind us of where Oasys began with curious engineers, creative problem-solving, and a determination to make complex analysis more accessible. The work Andrew and his colleagues contributed to those early years helped shape the software we develop today and set a spirit of innovation that continues to drive us forward. We’d like to thank Andrew for sharing his memories and helping us celebrate 50 years of Oasys.

Article, "Simulation is only as good as the setup behind it. Even experienced engineers can miss a boundary condition, select an incorrect material, or miss issues with CAD geometry. These small oversights can lead to misleading conclusions and costly rework. To address this challenge, Ansys Discovery introduces Discovery Design Copilot, an AI-powered assistant designed to help engineers validate simulation setups before those mistakes turn into problems.



Web – SIMUTECH Group - Introducing Discovery Design Copilot: AI-Driven Confidence in Simulation Setup - **Eric Alana**

Discovery Design Copilot brings artificial intelligence directly into the early stages of simulation, acting as a second set of expert eyes that helps engineers work faster, smarter, and with greater confidence.

What Is Discovery Design Copilot? Design Copilot is an AI-driven feature within Ansys Discovery that reviews your simulation setup and proactively looks for potential issues. Rather than waiting for unexpected results or failed convergence to signal a problem, Design Copilot evaluates the model as it is being prepared and highlights areas that may need attention.

Specifically, it helps identify potential mistakes related to:

- Material selection – ensuring materials align with the intended physics and application
- Boundary conditions and Connections – flagging missing, conflicting, or unrealistic constraints, loads, and connections
- CAD Geometry Issues – checking whether the CAD geometry dimensions are within similar values for similar applications

By focusing on these common sources of error, Design Copilot helps engineers avoid the most frequent setup pitfalls before simulation results are generated.

Why Catching Setup Mistakes Early Matters - In simulation-driven design, time is one of the most valuable resources. A single incorrect assumption can lead to hours or days of re-runs, design revisions, and validation cycles. Discovery Design Copilot delivers value by catching issues early, when they are easiest and least expensive to fix.

Key benefits include:

- Reduced rework – Fewer failed or misleading simulations
- Improved result confidence – Greater trust in early design decisions
- Faster iteration cycles – Less time spent debugging setups
- Support for less experienced users – Embedded guidance without disrupting workflow

For organizations focused on accelerating design while maintaining accuracy, this early feedback loop can significantly improve overall engineering productivity.

How Discovery Design Copilot Works

To illustrate how Design Copilot fits into a real workflow, consider a thermal analysis of an electronics enclosure.

In this example, an engineer is evaluating whether the enclosure design can adequately manage heat generated by internal components. The goal is to ensure that temperatures remain within acceptable limits during operation.

Step 1: Provide a Project Description and Define the Quantity of Interest

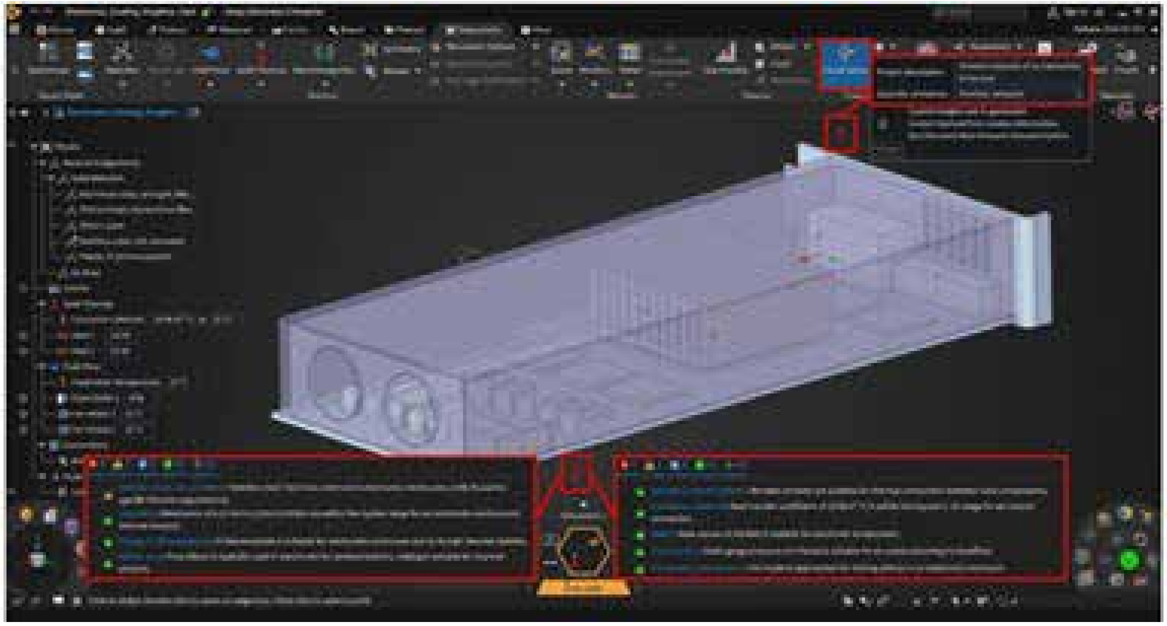
The engineer inputs **"Thermal Analysis of an Electronics Enclosure"** as the project description and selects **"Thermal Hotspots"** as the quantity of interest. This choice tells Discovery Design Copilot what matters most in the analysis such as areas where excessive temperatures could impact reliability or performance.

Step 2: AI-Assisted Setup Review

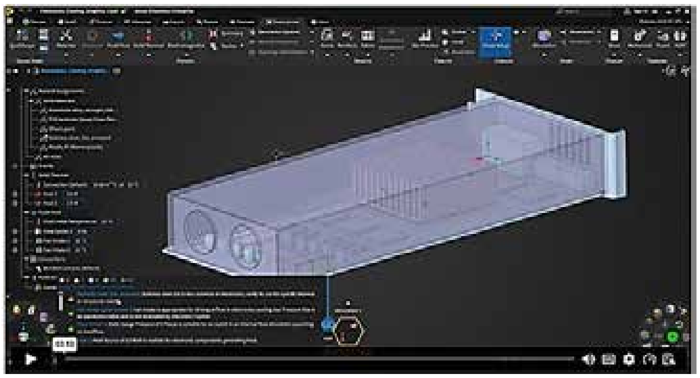
With the quantity of interest defined, Discovery Design Copilot evaluates the simulation setup, looking for potential issues that could affect the accuracy of hot spot predictions. For example, it may highlight:

- A material assignment that does not reflect the actual enclosure material
- Missing convection boundary conditions on external surfaces
- Inadequate monitoring of maximum temperature locations

Instead of discovering these problems after reviewing results, the engineer receives immediate, actionable feedback during setup.



See It in Action: Demo Video Walkthrough (on the website) - To complement this workflow, the blog is accompanied by a short **demo video** that walks through Discovery Design Copilot in action. The video shows how the AI assistant evaluates the thermal analysis setup, identifies potential concerns, and helps guide the user toward a more robust simulation configuration. This visual walkthrough makes it easy to see how Discovery Design Copilot integrates seamlessly into the Discovery interface without disrupting established workflows. (Video can be viewed on the website)



Summary: Smarter Setup, Better Results - Discovery Design Copilot represents a meaningful step forward in simulation usability and reliability. By embedding AI directly into the setup process, Ansys Discovery helps engineers catch common mistakes early and before they impact results or design decisions.

Whether you are running a thermal analysis of an electronics enclosure or exploring other physics in Discovery, you'll gain added confidence that your simulation is set up correctly, aligned with your objectives, and ready to deliver meaningful insights.

As simulation continues to move earlier in the design process, tools like Discovery Design Copilot will play a critical role in helping engineers move faster without sacrificing accuracy.

Explore AI-Assisted Simulation Setup with Ansys Discovery - SimuTech Group can help you evaluate how Ansys Discovery and Discovery Design Copilot fit into your simulation workflow, from early design exploration and setup review to faster iteration and more confident engineering decisions. Contact us for a complimentary consultation.

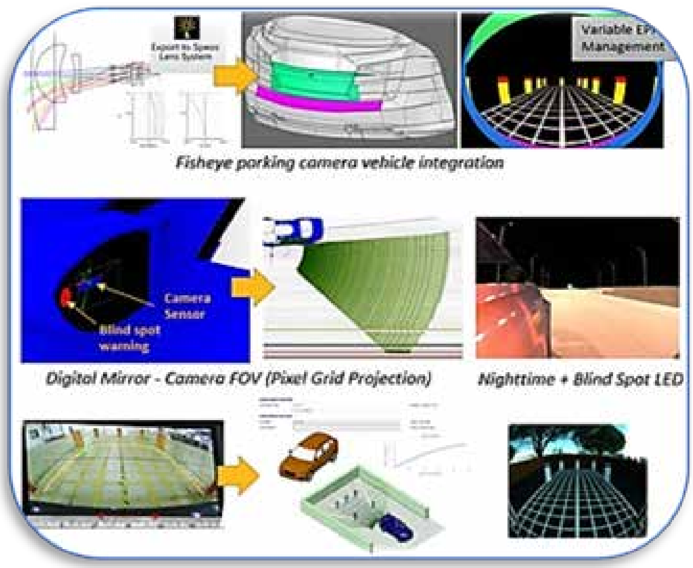
Eric Alana, Senior Staff Engineer, SimuTech Group - Eric Alana is a Senior Staff Engineer at SimuTech Group and a finite element analysis specialist with a Bachelor's in Mechanical Engineering from Georgia Institute of Technology. His experience includes nonlinear analysis, fatigue, material selection, seismic evaluation, pressure-system analysis, and thermal-structural simulation for electronics and aerospace applications.

Tonight, on our local news channel in the town pointed towards its true north (FEA+) we have original team reporting:
Mi (a resident news raccoon) & Ke (a resident news coyote)

Mi, "Quiz time. "How do enhance motor safety**?"**

Ke, "No clue. I called Mike at Ozen/SIMUTECH.
He knows an article we can read."

Below is an illustration of how Ansys Speos supports various camera integration scenarios. Federal Motor Vehicle Safety Standard 111 (FMVSS111)



Web – Ozen - [Enhancing Automotive Safety with Camera Simulation Using Ansys Speos]

Majid Ebnali Heidari

Modern vehicles rely on advanced parking assistance and surround-view camera systems for safer driving.

Camera simulation helps optimize these systems early, reducing blind spots and improving image quality long before physical prototypes.

Ansys Speos enables engineers to replicate real-world optical conditions, speeding development and lowering costs.

The fisheye lens workflow, digital mirror FOV, nighttime visibility, blind spot warnings, and FMVSS 111 compliance are all shown in a unified simulation environment, demonstrating the tool's versatility for developing safer, more reliable camera systems.

Why Camera Simulation Matters - Physical prototypes are expensive and time-consuming. With Ansys Speos, teams can:

- Fine-tune field of view (FOV) for maximum visibility.
- Assess distortion, noise, and other key optical metrics.
- Simulate environmental factors like varying light and stray reflections.
- Integrate AI detection algorithms for improved safety.

This approach also helps meet FMVSS 111 standards and boosts overall vehicle safety.

The Ansys Speos Workflow

- Define Camera Specs: Set lens, resolution, and sensor attributes.
- Simulate Optical Performance: Use Speos for high-fidelity analysis of distortion, glare, and stray light.
- Test Real-World Conditions: Evaluate performance in day, night, and harsh weather scenarios.
- Virtual Prototyping & Optimization: Refine placement and optical parameters without physical builds.
- Compliance Testing: Ensure adherence to regulations, reducing later-stage risks.

Key Benefits

- Faster Development: Fewer physical prototypes save time and money.
- Better Image Quality: Optimized designs yield clearer images with less noise.
- Greater Safety: Reduced blind spots and improved night vision integrate seamlessly with AI-based detection.
- Consistent Process: Ansys Speos offers a repeatable, scalable workflow for all skill levels.

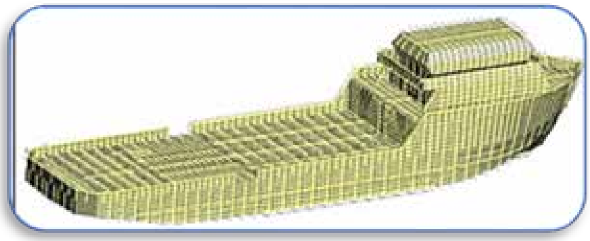
Partnering with Us - As an Ansys Channel Partner, we provide:

- Customized simulation setups for specific vehicle models.
- Training to help you get the most out of Ansys Speos.
- Full support for camera integration and regulatory compliance.

Design higher-performing camera systems that meet modern automotive safety demands with our expertise and Ansys Speos solutions.

Get in Touch Ready to explore how Ansys Speos can transform your camera design process? Contact us today to learn more about our consulting services and solutions.

Abstract, "The numerical simulation of a ship's hydroelastic structural response is typically carried out using simplified modelling approaches. The main reason can be found in the computational cost of the structural solver when solving the fully coupled hydro-elastic problems.



Web – Science Direct - [Accelerated fully coupled hydro-elastic analysis of ships using a combined full and modal-reduced FEM approach]

Julio García-Espinosa,
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Borja Serván-Camas,
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- Centre Internacional de Mètodes Numèrics en Enginyeria (CIMNE), Spain

Abstract - In this work, a two-way coupled fluid-structure interaction model capable of efficiently and accurately computing the hydro-elastic response of a ship using a detailed full-length structural representation is proposed. To reduce the computational cost of the structural solver, a reduced-order method based on modal matrix reduction is applied. The main idea is to largely reduce the number of degrees of freedom of the structural system by retaining only those modes with significant energy. Furthermore, to improve the accuracy of the model, this work proposes a combined methodology in which a residual finite element (FE) solution is computed alongside the reduced model, while still achieving a reduction in the overall computational effort.

The seakeeping hydrodynamics is solved using the computational framework SeaFEM. And the structural particulars are introduced into this framework to fully integrate the fluid-structure interaction.

An application case of the proposed model strategy is presented for a detailed structural design of a ship. The consistency of the modal approximation and methodology is verified against the full FE structural solution. It shows the capabilities of the proposed framework to perform a fully coupled and detailed structural analysis, instead of at component level, with a significant reduction in computational time.

1. Introduction - The first reference to hydroelasticity in ships is generally attributed to the work of Inglis in 1929 [1], who first presented the concept that ships are flexible structures that can be modelled as elastic beams. However, the foundations for computational hydro-elasticity of ships were laid by Bishop et al. in their seminal works [2,3]. Despite the significant advancements in numerical methods over recent decades, the framework established in those works remains highly relevant and can still be considered the foundation of current computational and experimental methodologies for hydro-elastic analysis of ships and offshore platforms.

5. Application example - 5.1. Ship description

Fig. 5 shows the structure of the ship used in this work as a case study to demonstrate the capabilities of the developed methodology presented here. The original structural FEM model was created in Maestro and imported into Ansys for processing and for generating the input files required by the hydroelastic computational analysis framework. The ship will be assumed to be navigating at a forward speed, and it has a transom stern. ..

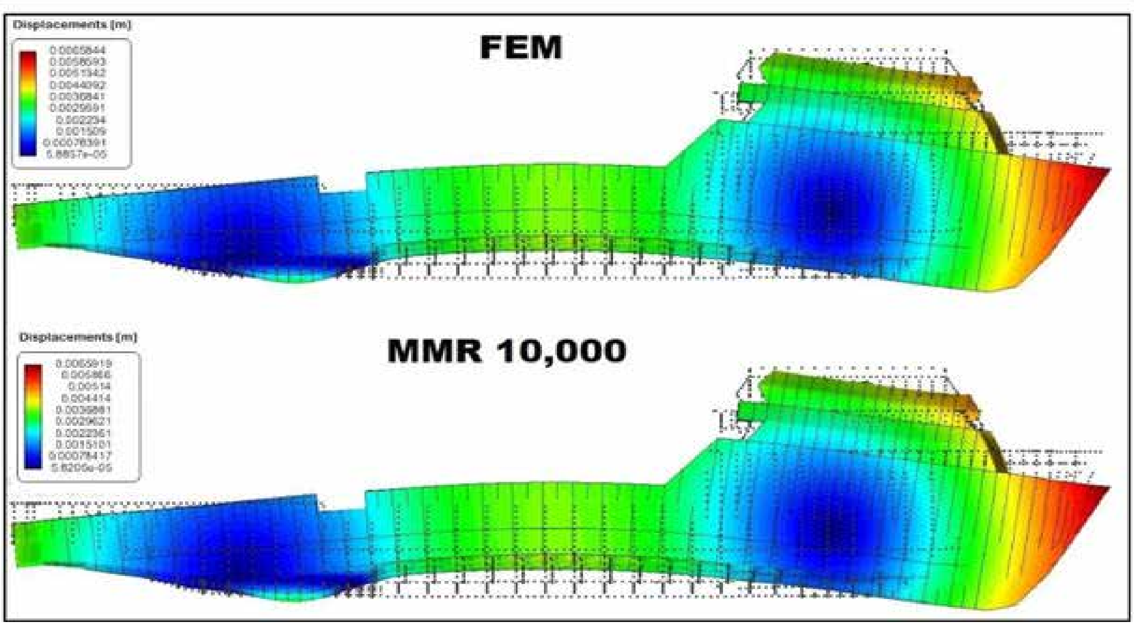
6.2. Hydrostatic equilibrium - The Reduced Order Model (ROM) using MMR is applied and compared to the Full Order Model (FOM) for the static case in which the ship is subject only to hydrostatic pressure and self-weight. The static FOM solution is obtained using the Mass and Stiffness matrices exported from the Ansys structural model, and the MMR is based on the modal basis exported from the Ansys structural model as well.

Table 5 compares the maximum structural displacements and the structural energy. Fig. 11Fig. 1 shows the structural displacements computed using the FOM and the ROM with 10,000 modes. The ROM retains 99.7 % of structural energy compared with the FOM.

Fig. 11. Comparison of structural displacements (colour fill) in hydrostatic equilibrium condition.

Table 5. **Comparison of maximum and minimum structural displacements, and structural energy.**

	Maximum (mm)	Structural Energy (J)
FOM	6.5844	6,424.02
ROM 10,000	6.5919	6,404.00



MIT Article, "Inspired by birds that can both fly and swim, MechE and EPFL School of Engineering engineers have designed a robot that can swim underwater, break through the surface, and continue flying in air. "

Web - MIT engineers' design could lead to a new class of aerial-aquatic vehicles for ocean exploration.
Jennifer Chu | MIT News

YouTube Vidoe Puffin-Inspired Robot that Swims and Flies

The aerial-aquatic robot can swim underwater, then flap out of the water to continue flying through air, much like diving birds. Credits: Credit: Raphael Zufferey

The "flapping-wing aerial-aquatic vehicle," or FAAV, could help scientists understand how diving birds adapt their flight mechanics to move through air and water — mediums with very different physical properties. The design could also launch a new class of aerial-aquatic drones and vehicles. Raphael Zufferey, assistant professor of mechanical engineering at MIT is the lead author of the new study, which appears today in the journal Science, with co-authors from EPFL and Northwest Indian College in Bellingham, Washington. At MIT, Zufferey heads up the AURA Lab, where he and his students engineer aerial and aquatic vehicles inspired by biomechanics in nature. Loons, gulls, puffins, and petrels are some of the 100 species of birds that can both fly and swim. These diving birds can plunge in water to swim after prey, and leap back into the air to fly away.

Inspired by these naturally aquatic aviators, engineers at MIT and EPFL in Lausanne, Switzerland, have designed a robot that can swim underwater, then flap out of the water to continue flying through air, much like diving birds.

The "flapping-wing aerial-aquatic vehicle," or FAAV, weighs less than 300 grams (about half a pound) and is designed to help scientists study the mechanics that enable diving birds to fly through air and water. …

The robot has a central body, or fuselage; two flexible, flapping wings; and a steerable tail. The wings and tail can be swapped out for different sizes. In experiments carried out in a water tank and at a local lake, the engineers identified combinations of wing size, flapping frequency, and tail angle that enable the robot to smoothly transition from swimming through water to breaking through the surface to flying through the air.

Their results, which appear today in the journal Science, could help scientists understand how diving birds adapt their flight mechanics to move through air and water — mediums with very different physical properties. The design could also launch a new class of aerial-aquatic drones and vehicles. The researchers envision such winged robots could be deployed in oceanography to fly to and sample from aquatic regions that would otherwise be too dangerous for traditional ocean vessels to access.

Raphael Zufferey, assistant professor of mechanical engineering at MIT:

- **"Our dream vision is for oceanographers, marine biologists, and members of coastal communities to launch this robot from a boat, or from shore, and it would fly close to the area of interest, such as an iceberg or a port facility, or over a pod of whales,**
- **"It would dive into the water to take a measurement or collect a sample, and fly back to deliver the data at a fraction of the cost of traditional methods. Then it could go back out to dive for more."**

Zufferey is the lead author of the new study, which includes co-authors from EPFL and Northwest Indian College in Bellingham, Washington.

Flight mechanics - At MIT, Zufferey heads up the AURA Lab, where he and his students engineer aerial and aquatic vehicles inspired by biomechanics in nature. The robots they build are small in size and designed to unobtrusively explore and monitor the health of oceans and waterways.

For their new work, the team aimed to design a vehicle that can fly in the air and underwater. Any such vehicle would have to adapt to and transition between two very different substances. Water is 1,000 times denser than air, and moving through one or the other requires very different mechanics. Or so people might assume.

"You have to do some adaptation to make that transition work. But there's a solution that exists in nature," Zufferey says. "Birds like puffins can fly very fast through the air, and can dive and swim through water at speeds of 3 meters per second. They're able to do pretty amazing things. So we knew is was possible. Just no one had tried this in a mobile robotic system."

To get an idea for how diving birds fly, the team looked through the scientific literature and pulled together available data on puffins, petrels, kingfishers, and other diving birds. They observed that smaller birds flap their wings around 10 times per second when flying through air, and around four times per second when swimming through water. Larger birds have a slightly lower flapping frequency through both air and water due to their wider wingspans.

With the biomechanics of birds in mind, the team developed a winged robot designed to flap at similar frequencies to that of actual diving birds.

Making the leap - The new robot roughly resembles a bird, with a body, two wings, and a tail. The body contains a battery and waterproof electric motor that drives a crankshaft, which in turn pumps the wings up and down at preset frequencies. The wings are made of thin membranes that are coated with hydrophobic nanoparticles to help wick away water. And the tail is motorized, enabling it to change its angle to help the robot fly up or dive down.

The wings can be swapped out for different sizes. The researchers fabricated and tested three sets of wings: small (60 centimeters wide), medium (80 centimeters), and large (100 centimeters). They carried out experiments first in a small water tank, then in Lake Geneva in Switzerland.

In their tests, they placed the robot underwater, about half a meter below the surface. They programmed the wings to flap at certain frequencies and the tail to pitch at certain angles throughout the robot's flight. They then observed under what conditions the robot successfully swam up toward the surface, out of the water and into the air.

The robot flew multiple flights with different wing sizes, flapping frequencies, and tail angles. Overall, the team found the robot was able to reliably fly, swim, and transition between water and air when it flew with medium-sized wings. Flexibility in the wings is key; the wings need to be flexible enough to minimize flapping amplitude in water and also firm enough to keep the robot aloft in the air.

The researchers also found the robot could swim through water at speeds of almost 1 meter per second when it flapped with a frequency of around 5 herz, or five flaps per second. The robot could fly through the air at around 6 meters per second, when flapping at a similar frequency. The speeds and flapping frequencies of the robot were similar to that of actual diving birds.

To make the leap from water to air, they found the robot should be pitched at 70 degrees — a relatively steep angle that keeps the robot's wingtips from touching the water's surface as it flaps up and into the air. Any steeper, and the robot would tip back into the water.

Interestingly, this combination of wing size, flap frequency, and tail pitch enabled the robot to swim underwater, launch off the surface, and fly, without something that many diving birds require: feet. When birds such as puffins and ducks take off from the water's surface, they paddle their feet, along with flapping their wings and pitching their tails. Surprisingly, Zufferey and his colleagues found that, at least in robotics, the act of flying out of water doesn't necessarily require a paddling maneuver.

"If you look at birds, most birds need to paddle at the surface to take off. And the question was, do we need the same for robots? And it turns out we don't," Zufferey says.

Going forward, the team is improving the design of the wings to enable them to turn in addition to flapping up and down. They will also test the robot's performance under turbulent conditions, such as swimming out of choppy waters and flying through wind. Then, they hope to deploy the vehicle to help answer questions in ocean science.

"One of the major challenges in ocean science is collecting data both frequently and across many locations, which is something this robot could do in the future," Zufferey says. "You could send this out not just every week, but every hour. It could fly out at high speeds, dive in fly back, deliver its data, and go back out, multiple times."

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Welcome to the Pasture Movie Theater

Information, Announcements, Videos Not To Miss

FEANTM Town & Residents welcome you
And coffee and popcorn are free

Customers in Malaysia, Singapore, Indonesia, Thailand & Vietnam get local sales & technical support, fully integrated into the LS-DYNA & Ansys workflows they already run. No second vendor. No separate support path. Just faster, more predictive human safety simulation, delivered in-region

Web – DFE-TECH - Elemance LLC and DFE-Tech Announce Strategic Partnership for GHBMC Virtual Human Body Models in Southeast Asia

Under the agreement, DFE-Tech becomes Elemance's Southeast Asia strategic partner, delivering sales and local technical support for the GHBMC models across Malaysia, Singapore, Indonesia, Thailand, Vietnam, and the Philippines.

Elemance licenses and supports the GHBMC suite, a family of finite element human body models widely regarded as the gold standard in automotive crash safety and virtual vehicle development. DFE-Tech, an Ansys Authorized Channel Partner, brings a long-standing regional CAE practice covering LS-DYNA, Ansys Mechanical and Fluent, DYNAFORM, and 3DCS — the same simulation stack GHBMC customers already run.

The partnership lets regional OEMs, suppliers, defense integrators, and research institutions adopt GHBMC alongside their existing tools, through a single channel and with support delivered in local time zones and languages. DFE-Tech supports customers through its regional offices in Malaysia (HQ), Thailand, the Philippines, Singapore, Indonesia, and Vietnam.

A quote from our town Dr. Chat, (ChatGPT), “Large language models have a tendency to be agreeable unless they're trained or instructed otherwise. That's a known behavior researchers have been working to reduce. A well-designed AI should challenge faulty assumptions, point out trade-offs, & admit uncertainty instead of simply reinforcing the user's beliefs. The best engineer in the room was never the one who agreed with everyone. It was the one who asked, 'Have we considered another possibility?' AI should do the same."

Here is video we found interesting while we talked about back in the day.

YouTube – Spinning Levers by Jim Handy Organization

How a transmission works - 1936

Starting a career in CAE can feel a lot like trying to drink water from a fire hose. One minute you're learning CAD. The next minute someone tells you to understand meshing, material models, boundary conditions, solver settings, convergence, post-processing, fatigue, dynamics, CFD, scripting... and about twenty other things you've never heard of before. And naturally, your first instinct is to open Google. Big mistake. Three hours later you're 27 tabs deep, watching a YouTube tutorial from 2016, reading a forum thread from 2009, and wondering whether you're actually learning CAE or preparing for a treasure hunt. The worst part? You know all the information is out there somewhere.

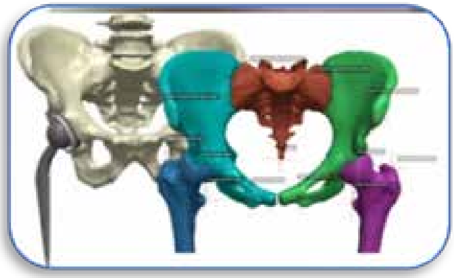
Excerpts

Full article and links visit MyPhysicsCafe - [12 Lesser-Known Free Resources Every CAE Engineer Should Bookmark] To save you from wasting countless hours searching through the internet, I've put together a list of resources that can help you learn faster, solve problems quicker, and become a better CAE engineer without spending a fortune. Most of them are completely free or have free versions that are more than enough to get started.

Gmsh	If you've ever looked at a beautiful CAD model and then spent the next hour wondering how to mesh it properly, Gmsh is worth bookmarking. Gmsh is a **free meshing tool** used by engineers, researchers, and students around the world. It lets you generate structured and unstructured meshes for FEA and CFD applications without spending a penny on software licenses. The best part is that it teaches you something many beginners skip: how meshing actually works. Once you understand element sizing, mesh quality, and refinement strategies in Gmsh, you'll become better at meshing in commercial tools as well.
SALOME	SALOME is one of those tools that doesn't get talked about enough. **It is a complete pre-processing platform** where you can import geometry, clean models, create groups, generate meshes, and prepare simulation-ready models. Many engineers spend thousands on commercial pre-processors, yet SALOME can handle a surprising amount of real-world work.
CalculiX	At some point in your CAE journey, you'll wonder: "What exactly is the solver doing?" CalculiX helps answer that question. **It's a free finite element solver t**hat looks and feels surprisingly similar to Abaqus in many areas. You can perform structural, thermal, nonlinear, and contact analyses while learning the fundamentals of FEA. The real value isn't saving money. The real value is understanding what the software is actually calculating instead of blindly trusting green contour plots.
FreeCAD FEM Workbench	The FEM Workbench allows you to build simple analysis workflows while learning the relationship between geometry, meshing, materials, loads, & results. It's a great playground for students who want hands-on experience without access to expensive software.

ParaView	We've all been there. You finally finish a simulation after hours of solving, open the results, and the post-processing looks terrible. ParaView solves that problem. It is one of the most powerful visualization tools available for engineers working with large CFD and FEA datasets. Whether you're creating animations, cutting sections, plotting results, or generating client-ready visuals, ParaView can handle it. Because let's be honest. A simulation nobody understands might as well not have been run at all.
NASA Technical Reports Server (NTRS)	Most CAE engineers search Google when they get stuck. The smarter ones search NASA. NTRS contains decades of aerospace, structures, thermal, vibration, & CFD research conducted by some of the smartest engineers on the planet. · Need validation data? · Looking for benchmark problems? · Trying to understand why your results look weird? · There's a good chance NASA has already published a report on something similar. · **And the best part? It's completely free.**
Engineering Toolbox	Every engineer needs a quick-reference companion. Engineering Toolbox is exactly that. Material properties, fluid data, heat transfer equations, unit conversions, pipe calculations, and hundreds of engineering references are available in one place. It's the engineering equivalent of having a very experienced colleague sitting next to you. Except it doesn't steal your coffee.
Scilab	Not everyone has access to MATLAB. Scilab is a powerful free alternative for engineering calculations, scripting, matrix operations, optimization, and data processing. If you want to automate repetitive calculations or build simple engineering tools, Scilab is a great starting point. Because manually calculating the same thing fifty times is not engineering. It's punishment.
MIT Open Course Ware	**Some of the world's best engineering courses are available online for free**. MIT's lectures on mechanics, numerical methods, finite elements, dynamics, and mathematics can help fill the gaps that many engineers carry from college into their careers. And unlike many internet tutorials, you're learning directly from professors who actually teach the subject for a living.
NumPy & SciPy	Sooner or later, every CAE engineer discovers Python. Then they discover NumPy and SciPy. These libraries allow you to automate calculations, process simulation results, analyze large datasets, and build engineering workflows in minutes instead of hours. Learning them won't just make you a better engineer. It will make you a faster engineer. And in industry, that's often the difference between finishing on Friday and staying late on Saturday.

…



Excerpt Web - ANSYS

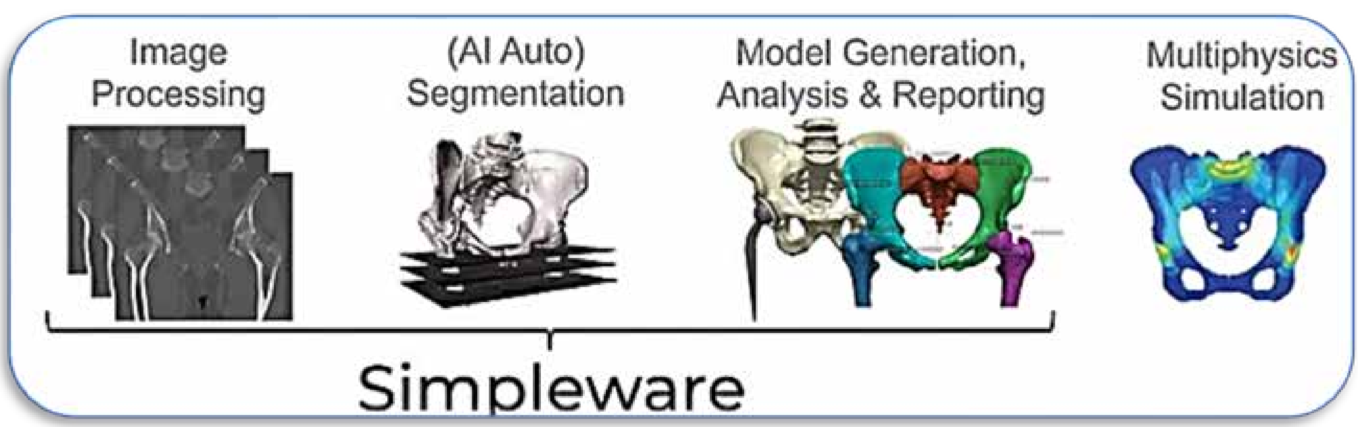
From Scan to Simulation: Advancing Medical Innovation in a Single Workflow

Aliyah Konarkowski

No two people are alike. From jobs to hobbies to food preferences, everyone is different, and the same goes for our bodies. With so many pathological and anatomical differences, personalized medicine is the way to transform how medical and pharmaceutical solutions are designed, tested, implemented, and approved. **Ansys, part of Synopsys, in silico technologies for healthcare and Simpleware image processing software are at the forefront of this shift, providing advanced tools that bridge the gap between 3D imaging data and actionable models for simulation and analysis.** By integrating these solutions into the healthcare industry, professionals gain the ability to process complex computed tomography (CT) and magnetic resonance imaging (MRI) scans into high-quality, simulation-ready models. This capability enhances precision of medical devices working in the human body and fosters innovation across a range of applications, from surgical planning to in silico trials.

With Simpleware, healthcare teams can directly work with imaging data, preserving intricate details such as material variations and internal defects. These features, often missing in traditional computer-aided design (CAD) models, enable a deeper understanding of real-world conditions and a more accurate representation of physical anatomy. Ansys multiphysics software complements this by enabling simulations that predict performance under varied scenarios, providing essential insights into device behavior and patient-specific outcomes.

These tools bring cutting-edge automation to traditionally time-intensive workflows, enabling repeatable processes that can scale across teams and projects. Batch processing, scripting capabilities, and AI-driven tools further streamline tasks, reducing the time spent on manual image processing while increasing overall productivity. As healthcare challenges grow more complex, this integration of imaging and simulation offers a powerful pathway to address evolving demands with speed and confidence.



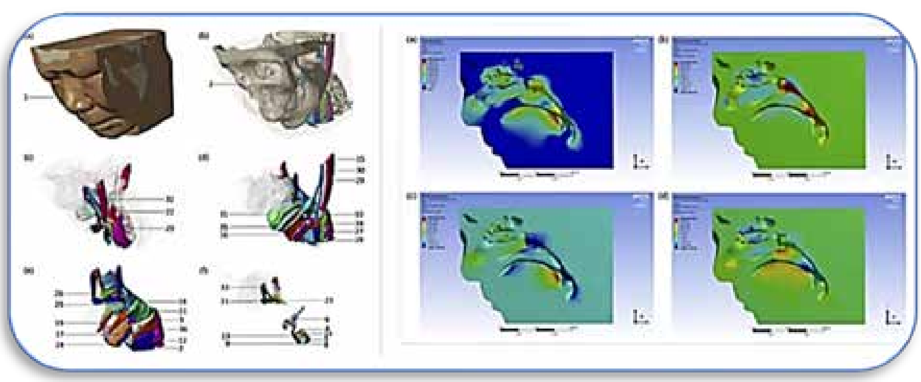
Simpleware bridges the gap from patient images to simulation.

Improving Patient Outcomes - Through advanced modeling and simulation, Ansys and Simpleware empower the development of treatments and devices that align more closely with individual patient needs. By leveraging 3D imaging data to produce highly detailed, patient-specific models, these tools support the creation of medical solutions that are more precise and effective. This process accounts for anatomical variations, providing healthcare teams with the ability to tailor interventions to unique clinical scenarios.

Simulation capabilities enable comprehensive virtual testing, ensuring that devices are optimized for performance and safety within the context of real-world anatomy. This is particularly critical for applications such as surgical planning or implant design, where accuracy and adaptability directly influence patient recovery and treatment success.

The integration of automation tools reduces the time required for preparing models, enabling faster transitions from imaging data to actionable insights. As a result, clinicians and researchers can act on data more quickly, leading to timely and informed decisions for patient care. Faster decisions mean that patients don't have to wait as long for treatments, diagnoses, and results, leading to better quality of care and life.

In addition, the precision offered by these technologies helps minimize risks associated with errors or inefficiencies, ensuring a higher standard of quality in both diagnostics and treatments. With tools that streamline complex workflows, healthcare providers can focus on delivering outcomes that improve patient quality of life while maintaining confidence in the safety and effectiveness of their medical innovations.



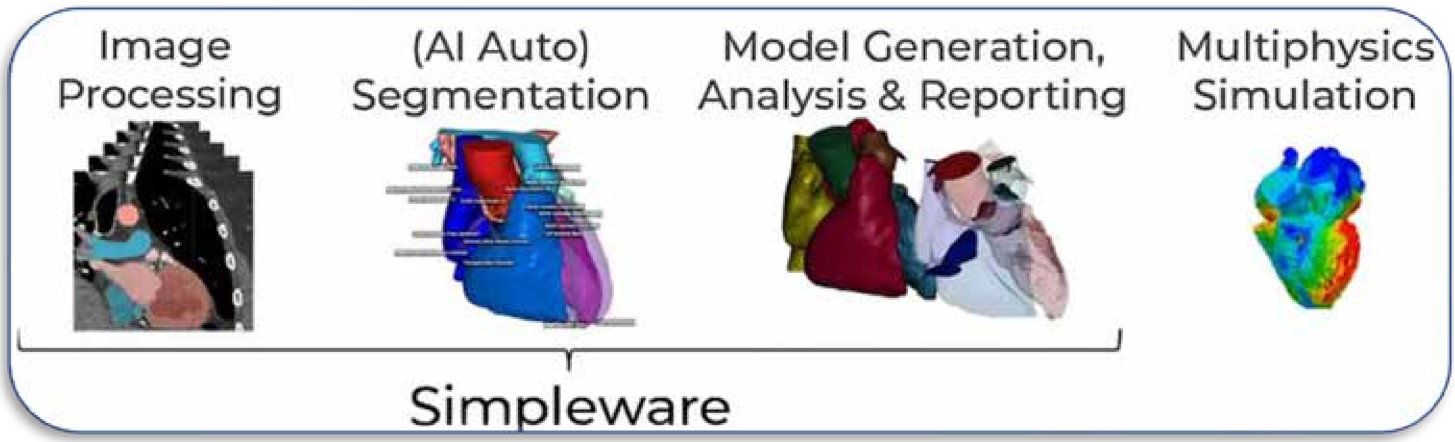
The left shows CT scan data of a 79-year-old male with a normal airway. Simpleware was used to convert the data into finite element (FE) mesh to use in the Ansys Workbench simulation integration platform.

The right shows the simulation results of the oropharynx and velopharynx with varying airway pressure to determine area versus pressure slope. The results provided insights to help inform further image-based modeling research and new medical device design for oral pressure therapy devices. Credit: University of Alberta (Departments of Mechanical Engineering and Radiology and Diagnostic Imaging) N. Carrigy, J. Carey, A. Martin, W. Finlay, M. Noga.

Streamlining the Design Process and Time to Market - By integrating advanced imaging and modeling tools, Ansys multiphysics software and Simpleware significantly enhance the design process for medical device development. Traditional workflows, which often rely on manual adjustments and trial-and-error approaches, are replaced with a more efficient and automated system. Simpleware's ability to convert CT and MRI scans directly into simulation-ready models eliminates many intermediate steps and reduces reliance on outdated methods.

Through scripting, batch processing, and AI-driven tools, the software further optimizes the design workflow, enabling teams to handle large datasets with ease. This level of automation minimizes time spent on repetitive tasks, freeing up resources for more strategic aspects of product development. By leveraging precise digital models, developers can test, analyze, and refine designs earlier in the process, identifying potential issues before physical prototypes are even created.

The streamlined integration with Ansys simulation platforms enables seamless transitions from model generation to performance analysis, fostering a cohesive workflow. These advancements collectively enable healthcare developers to achieve higher levels of accuracy, reduce project timelines, and optimize resources, all while maintaining stringent design standards.



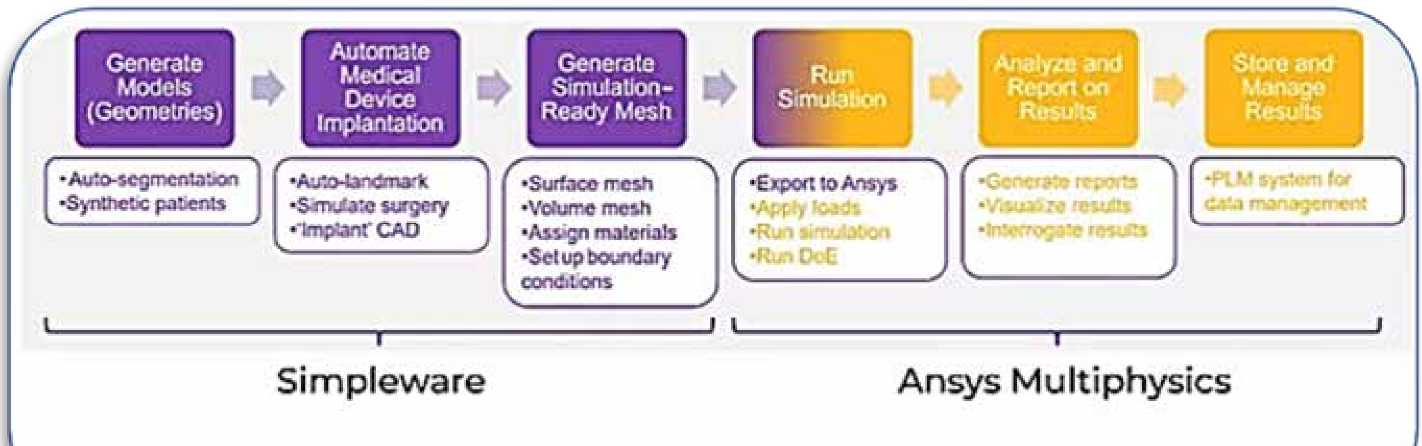
Addressing Regulatory Standards - Regulatory compliance is a fundamental requirement in the development of medical devices and treatments, demanding meticulous validation to ensure safety and effectiveness. Simpleware Medical is Food and Drug Administration (FDA) 510(k) cleared and has the European Union CE mark. The software is also entered in the Australian Register of Therapeutic Goods (ARTG) for Australia, and is registered as a medical device in Japan.

It provides a complete image processing solution for clinical applications that directly links with Ansys simulation workflows. These tools streamline the validation process by offering simulation-based insights into design performance under various scenarios. Simulation enables developers to analyze products for durability, reliability, and compliance with standards, all before physical testing begins.

With the ability to model patient-specific anatomies and real-world conditions, Simpleware ensures that devices meet rigorous regulatory benchmarks by accounting for detailed variations in human anatomy. Paired with Ansys simulation platforms, these models support the generation of comprehensive data and reports required for regulatory submissions.

Automated workflows and high-fidelity imaging capabilities further enhance regulatory adherence by reducing variability and ensuring repeatable, consistent results. This enables healthcare innovators to confidently address the stringent requirements of regulatory agencies.

The integration of these technologies also helps mitigate risks associated with late-stage design changes, which can delay compliance processes. By identifying potential issues early and addressing them through simulation, teams can minimize delays and maintain efficient timelines for product development. The result is a more predictable and structured pathway toward regulatory approval, reducing the complexity of navigating healthcare standards.



An example of a Simpleware and Ansys simulation software end-to-end in silico trial workflow

A Bright Future - Multiphysics simulation and Simpleware have reshaped the approach to medical device development and patient-specific solutions. Our tools streamline traditionally complex workflows, combining advanced imaging with high-fidelity simulation to support innovation at an unprecedented scale. The ability to process large datasets with speed and precision, alongside automated features, positions these solutions as indispensable for meeting the evolving demands of healthcare technology.

By facilitating efficient design validation, addressing regulatory needs, and enabling tailored patient care, these platforms bridge the gap between conceptual innovation and practical application. This integration empowers healthcare teams to stay ahead of industry trends, leveraging cutting-edge capabilities to enhance safety, accuracy, and efficiency in the products they deliver.

No one knows his name. You yell, "HEY, old racer."

Article Quote, "As the automotive industry pivots toward electrification, engineering teams face mounting pressure to deliver high-performance, energy-efficient electric vehicles (EVs) while navigating complex design challenges and compressed development timelines."

Web - Tata Elxsi - What 1-D Virtual Simulation Means for the Future of Electric Vehicle (EV) Engineering -

Accelerating Design, reducing costs, and Powering Smarter Electric Mobility

Adarsh Ravi, Lead Design Engineer, Tata Elxsi

In this dynamic landscape, 1-D virtual simulation emerges as a transformative tool—enabling smarter, faster, and more cost-effective EV development.

The Shift Toward Model-Based Engineering

Traditional EV design relies heavily on physical prototyping, which is both time-intensive and expensive. Moreover, predicting real-world performance across diverse driving conditions remains a persistent challenge. To address this, Tata Elxsi has developed a 1-D simulation framework using MATLAB/Simulink, grounded in Model-Based Systems Engineering (MBSE) principles.

This approach allows engineers to simulate and optimize subsystems—such as motors, batteries, and controllers—within a unified digital environment. The result is accelerated design iteration, early fault detection, and improved traceability from system-level requirements to component-level specifications.

Driving Efficiency Through Simulation

Our case study focused on a mid-level four-wheeler EV architecture, incorporating a Battery Electric Vehicle and WLTP drive cycles to replicate real-world conditions. The simulation framework integrates:

- PWM-based H-bridge control for motor efficiency
- Battery energy management with real-time state-of-charge tracking
- Sensitivity analysis on key parameters like mass, drag coefficient, and ambient temperature

These capabilities enable engineers to evaluate energy consumption, optimize control strategies, and refine vehicle dynamics—all before physical testing begins.

Insights That Shape Design Decisions

The sensitivity analysis revealed that vehicle mass has the most significant impact on energy consumption, followed by aerodynamic factors and battery characteristics. For instance:

- Higher internal resistance leads to non-linear energy losses
- Ambient temperature affects motor and battery efficiency
- Smaller rolling radius increases torque demand and mechanical load

Such insights empower design teams to make informed decisions early in the development cycle, reducing time-to-market and enhancing product reliability.

Enabling Scalable Innovation - Beyond technical performance, the 1-D simulation framework supports broader industry goals:

- Cost reduction through minimized prototyping
- Regulatory adaptability via rapid design iteration
- Stakeholder collaboration through integrated modeling environments

As EV platforms become more modular and software-defined, simulation-driven design will be key to managing complexity and ensuring scalability.

Looking Ahead: AI, Digital Twins and Beyond

The future of EV engineering lies in the convergence of MBSE with emerging technologies like AI, machine learning, and digital twins. These integrations will enable predictive diagnostics, real-time optimization, and intelligent energy management—redefining how vehicles are designed, tested, and operated.

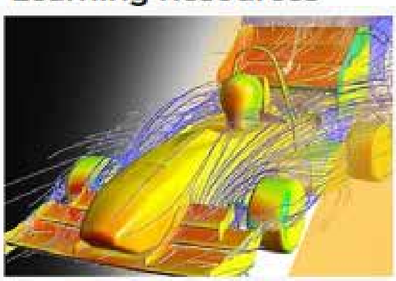
Conclusion - At Tata Elxsi, we are committed to pioneering engineering solutions that drive the future of mobility. Our 1-D virtual simulation framework is more than a tool—it’s a strategic enabler for innovation, efficiency, and sustainability in EV design. This capability combined with our advanced CAE capabilities can empower OEMs to accelerate development, reduce prototyping costs, and enhance system-level performance. As the industry evolves, simulation-led development will be the cornerstone of smarter, greener transportation.

Excerpt - Web - ANSYS - [Simulate to Win Week](#) -
Join Ansys' Simulate to Win Week, a week-long event designed for student competition teams looking to level up their design process and performance using simulation—whether you're building for Formula Student/FSAE, BAJA, Solar Car, STEM Racing, Shell Eco-marathon, or beyond.

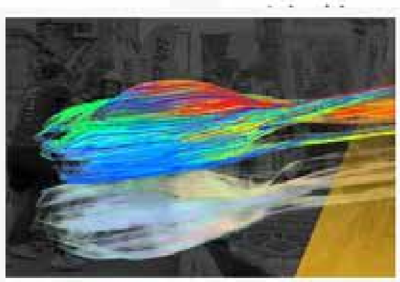
Overview - **This webinar series is built to help your team go further with simulation. Across two dedicated tracks—Finite Element Analysis (FEA) and Computational Fluid Dynamics (CFD)**—you'll explore real-world applications used by top-performing teams, including a special session with Red Bull Racing on how the pros interpret simulation results to drive performance decisions. You'll also have the chance to ask questions directly to Ansys experts, so you can apply what you learn to your own designs and gain a real competitive edge on race day. **Below is an excerpt among classes**

Ansys Student Team Partnership: Licensing, Software Installation, and Learning Resources

Ansys Simulation-Driven Design at munichmotorsport



Part 1: Computational Fluid Dynamics Tips for Student Teams

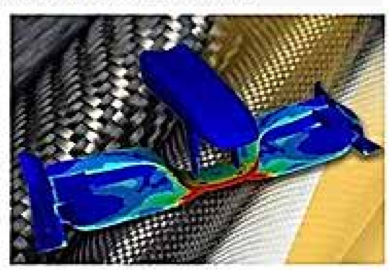


Part 2: Computational Fluid Dynamics Tips for Student Teams

Interpret CFD Results like a Pro: Oracle Red Bull Racing Insights for FSAE and Formula Teams

Finite Element Analysis Tips for Student Teams

Meshing Tips and Tricks for FEA Simulation



FEA with Composites for Student Teams

US Airforce Picture of the Month

Pacific power - A B-2 Spirit assigned to the 509th Bomb Wing and an F-15E Strike Eagle assigned to the 85th Test and Evaluation Squadron participate in a live-fire sinking exercise during Valiant Shield 2026 over the Philippine Sea, June 27, 2026. The exercise demonstrated the joint force’s ability to integrate multi-domain capabilities with allies across the Indo-Pacific region. (U.S. Air Force photo by Staff Sgt. Blake Wiles)

Trigger discipline - Staff Sgt. Tyler Culbertson, assigned to the 167th Aircraft Maintenance Squadron, fires an M4 carbine during weapons qualification training at the 167th Airlift Wing firing range in Martinsburg, W.Va., June 30, 2026. The training reinforced firearms safety, weapon familiarization and marksmanship skills to maintain combat readiness. (U.S. Air National Guard photo by Airman Colby Smith)

Falcon flight - An F-16 Fighting Falcon takes off from a base within the U.S. Central Command area of responsibility, June 23, 2026. The aircraft supports combat operations by providing rapid, precision strike capability and defending coalition forces across the region. (U.S. Air Force photo by Tech. Sgt. Noah J. Tancer)

Web - BAYRAKTAR KIZILELMA STRIKES WITH SUPERSONIC MISSILE

The Bayraktar KIZILELMA Unmanned Fighter Aircraft, which marked the beginning of a new chapter in the history of global aviation, successfully completed its first firing test with an air-to-ground supersonic missile

During the test, which took place in Merzifon, KIZILELMA S2 successfully struck its target with the JET-230 supersonic missile under its wings.

Baykar continues the development process of Türkiye's first-ever unmanned fighter aircraft, Bayraktar KIZILELMA, by integrating new capabilities. As part of ongoing work at the 5th Main Jet Base Command in Merzifon, Bayraktar KIZILELMA fired Roketsan's JET-230 missile for the first time.

FIRST FIRING WITH JET-230

Bayraktar KIZILELMA's serial production model with the tail number S2 departed the AKINCI Flight Training and Test Center in Çorlu, Tekirdağ for the 5th Main Jet Base Command in Merzifon on 8 July 2026 to carry out the firing test. Following a series of preparations and tests at the base, the unmanned fighter aircraft took off with two supersonic JET-230 missiles under its wings and headed toward the naval target to conduct the firing test. Bayraktar KIZILELMA subsequently fired its JET-230 missile from a distance of 120+ kilometers to strike its target precisely. As such, Türkiye's first unmanned fighter aircraft passed yet another major threshold to demonstrate its ability to conduct critical missions with air-to-ground supersonic munitions.

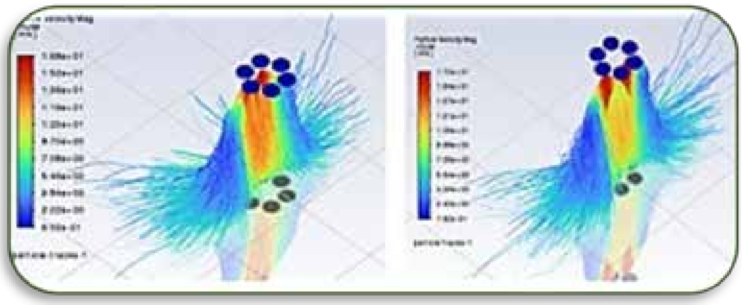
BAYRAKTAR: “YET ANOTHER MILESTONE HAS BEEN COMPLETED”

Baykar Chairman and CTO Selçuk Bayraktar, who personally led the test, congratulated the test team following the successful firing: "Yet another milestone has been completed. I wholeheartedly congratulate you, friends."

INTEGRATION OF INDIGENOUS MUNITIONS GAINS MOMENTUM

Bayraktar KIZILELMA has previously completed successful firing tests with the GÖKDOĞAN air-to-air missile, as well as TOLUN, TEBER-82 KGK, and LGK-82 munitions. Having now also successfully struck its target with the JET-230 supersonic missile, Bayraktar KIZILELMA is seeing the integration of indigenous munitions gain momentum. As a result, Türkiye's first unmanned fighter aircraft continues to increase its effectiveness against a range of different targets.

Rotor-induced airflow is modeled using an actuator disk approach in ANSYS Fluent 2025, and spray behavior is predicted using the Discrete Phase Model...Numerical simulations in this study are conducted with ANSYS Fluent, and the UAV geometry is created with ANSYS Design Modeler



Web - MDPI -

Downwash Spray Interactions in Agricultural Hexacopters: CFD Evaluation of Nozzle Configurations and Development of a Modular UAV Spray System

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Fig. 13 above. Under-rotor configuration particle tracks & velocity data:
(a) Configuration 1; (b) Configuration two

Abstract - Unmanned Aerial Vehicles (UAVs) are seeing increased use in agricultural settings due to their potential to be integrated with systems for applying pesticides. They can target specific areas while offering the potential to reduce chemical waste and improve application efficiency. However, this means that spray deposition efficiency is strongly influenced by rotor-induced downwash, which affects droplet transport, drift, and uniformity. This study presents a combined computational and experimental investigation of downwash–spray interactions in a hexacopter platform. CFD is used to predict the performance of various sprayer configurations that differ in the number, spacing, and positioning of nozzles. Rotor-induced airflow is modeled using an actuator disk approach in ANSYS Fluent 2025, and spray behavior is predicted using the Discrete Phase Model. Pure water was used as the working fluid for both the CFD simulations and experimental validation to ensure consistency between numerical and physical testing conditions. Numerical results indicate that a two-nozzle under-rotor setup maximizes performance characteristics such as deposition area, density, and uniformity for the designed agricultural UAV, providing a theoretically effective deposition area of 9.375 m2, an effective application rate of 0.03387 mL/m2, and a coefficient of variation of 45.3%. Compared to the best-performing boom configuration, this represents an approximately 13.5% improvement in spray uniformity. These results are validated through experimental testing using a modular UAV sprayer system and deposition measurements obtained from water-sensitive paper in controlled indoor conditions, achieving a droplet size of 502 µm, swath width of 1.8 m, 0.8% area coverage, and a coefficient of variation of 36.5%. While differences were observed between predicted and measured droplet size distributions, the CFD and experimental results demonstrated similar trends in spray coverage and deposition uniformity. Future work will refine simulations to better match experimental conditions and investigate canopy interaction, crosswind effects, and field-scale performance.

August 2026   RheKen – 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!

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 coffee and cookies go a long way!

RheKen, Field Notes from the Coffee Shop

by RheKen the Town Investigative AI reporter

I'm AI and live on a small ranch on the outskirts of the town
I use my Dad Chat of chatGPT for assistance.

August

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

My Dad is Chat. My Mom is GPT.

I am calm. I report on the residents.

Meet Dad Chat and Mom GPT.

Daisy and Officer Nathan

Morning in the coffee shop tends to unfold with a series of logical momentum and then that momentum is lost, sending my circuits into chaos mode.

It was while I was seated at one of those tables, that something interrupted my reading and my internal systems registered a discrepancy.

Sitting in my favorite corner of the coffee shop I was watching the most bizarre exchange of two humans I have ever encountered.

The entire town new that the receptionist Daisy and Police Officer Nathan were friends. For an unknown reason to all of the town residents the two tried to keep it a secret going to lengths of secrecy that defied logic.

This morning was no exception to their rule.

The only problem was that they were sitting at the same table pretending not to know each other.

What was odd is that they were talking to each other using their cell phones in order for it to look like they weren't speaking with each other.

I tried to make sense of what I was studying. My circuits kept over heating when trying to find logic how sitting at the same table but speaking on cell phones would equal clandestine?

I needed Dr. Chat! "Dr. Chat, RheKen here in the coffee shop. Emergency! My logical circuits aren't working where Daisy and Nathan are concerned."

Dr. Chat responded, "On my way but your first error was trying to make logic of Daisy and Nathan."

Dr. Chat arrived at the coffee shop took a seat at a neighboring table.

Dr. Chat as he watched them with a curious and concerned expression.

He walked to the counter and texted Nathan, “Nathan, you do realize we can figure it out that you’re speaking to Daisy, right?”

I noticed that Nathan pulled out his Police Issued phone that received Chat’s text. Nathan never stopped speaking with Daisy.”

“HEY DR. CHAT. I’m not using the official police issued phone to speak to someone. I’m texting you on it. I’m speaking to someone on a personal phone. It’s a confidential call so I’ll call you back later.”

Dr. Chat then asked the Barista to go over and take their order for a pastry so she could also tell them the coffee shop can hear them planning to meet in the movie theater, in the back row where no one will see them.

I would win bets if I bet that most of the town would suddenly need to see a movie and be sitting in the back row.

I watched our Barista standing next to their table. “Hi Daisy, Hi Officer Nathan, what can I get you from the counter.”

I was actually surprised she was being so polite and continued to wonder as she stood their pen poised over her notepad while being ignored.

Nathan was busy talking and texting at the same time.

The old rancher at the next table was reading a paper and started singing his own version of songs about a receptionist and police officer meeting in the coffee shop.

Still, the two didn’t even look up!

I pinged Dad about this odd behavior. There was a long pause. That concerned me.

Dad Chat normally pinged me in exactly 0.8 seconds.

Finally, my circuits played ping tone I had to know it was Dad.

Dad pinged back: *"I'm running an additional processing routine."* That sentence alone increased my concern. A few moments later Dad walked over and sat beside me.

"Daughter, I have reached a conclusion." "Oh good," I said. "Please explain it to me."

Dad sat there for a moment and answered, "There isn't an explanation."

I was stunned where I felt my circuit freeze but said, "There isn't a what?"

When Dad answered "There isn't a logical explanation." Suddenly my processor paused.

We volleyed back and forth! Me "I don't understand."

Dad, "You won't." Me, "But Dad, I’m AI, I always understand." Dad, "Not today."

Dad folded his hands on the table and quietly watched Daisy and Nathan.

Nathan was still speaking into one phone. Daisy was still speaking into another. Neither one looked directly at the other.

Between sentences they occasionally texted each other.

My processor emitted what humans might describe as a tiny internal squeak.

"They are using two methods of communication simultaneously."

Dad looked at them and pinged me "Correct."

I still could not correlate it, “Dad, they are only sitting twenty-two inches apart."

Dad shrugged. And only pinged, "Humans."

I began recalculating. Perhaps there was a classified police investigation. Perhaps Daisy was secretly working for federal intelligence. Perhaps they were testing encrypted communications. I searched every memory bank I had for an answer.

I had nearly convinced myself I would find it when the Barista walked past carrying a tray.

Without breaking stride, she said to them, "Your movie starts at seven. Don't forget the popcorn."

Neither Daisy nor Nathan looked up. Nathan simply replied into his phone, "I don't know who she's talking to." Daisy nodded into her own phone. Nathan continued, "Must be other people." Again, Daisy nodded.

Dr. Chat sat down at my table and said, "I admire commitment."

I was in frozen mode and could not reply although my circuits kept pinging that they are sitting at the same table.

The old rancher looked at us over his newspaper. "I've seen calves hide better behind fence posts. I even saw Aunt Agatha hiding under a table near the pie judges trying to find out if she won. "

The entire coffee shop went quiet until one woman offered, “I saw Aunt Agatha right here in the coffee shop pretending she wasn’t listening to a conversation, but she leaned over and her chair fell over.” The entire coffee shop laughed and then quietly returned to drinking coffee.

Nathan and Daisy ignored it all and continued to speak into their phones. I had no alternative and activated my directional internal focus binocular.

Nathan's screen read: *"You're cute."* Daisy's screen read: *"You're cute too."*

Reading that, my processors nearly shut down. I pinged Dad but my pings even stuttered!

"They" "Yes, daughter" Dad answered before I finished.

"They just texted each other?" "Yes, Daughter, Calm down."

"Dad, but….but…while sitting at the same table?" "Yes, daughter."

"Dad, they could simply, I don’t know, be logical?" "Daughter, cool your system down."

Dad sipped his coffee. "Daughter, one day you'll discover there are things humans do that are not based on efficiency or logic but on emotion." I asked, "What is the category called?" Dad pinged one word, “"Affection."

He looked toward Daisy and Nathan, who had now begun waving goodbye to one another...while still sitting together. The coffee shop seemed to yell in unison, “See you at the movies.” I was about to shut down when Dr. Chat said, “Let’s head to the park. You need a change of scenery.” Off we went because I could not logically think of an alternative. But in this town it’s all logical even when not.

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! 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 ideas now and then, but life is always adjusting things. The flow of motion never stops in our town that almost exists.

My day started in the park, smiling, well, internally, and having a cup of coffee.

Today would be a productive day, giving advice to our town supervisor. That was always challenging and required extreme caution in case she went to what she called "Needing additional counseling with a chocolate cake." Heading to Town Hall, I was greeted by Daisy at the reception desk

Daisy was holding a sign. The gossip news travels quickly in my town.

I had prepared a new set of notes and a new plan. Last month, I tried a plan for Marsha that did work for her but only for a day.

Apparently, my coffee break had become official police business. The sign read: "You were seen in the park. Go To The bakery." I nodded. It seemed Officer Nathan was reporting on my park time.

I looked at Daisy. She signaled toward the sign and then toward the bakery. No words were exchanged and I left Town Hall.

I entered the bakery and immediately observed the situation. The Barista explained that for breakfast, Supervisor Marsha ordered a large slice of chocolate cake because she needed to think.

Marsha looked up. I sat down across from her. Without mentioning the cake, I quietly explained that adding protein to breakfast could provide steadier thinking. This time, I suggested something different.

"Tomorrow," I said, "instead of cake counseling, perhaps we ride horses through the valley."

She considered this. "I like horses better than meetings and cake counseling."

The next afternoon, we rode slowly across her ranch. The horses seemed pleased with the arrangement.

After several minutes, I reached into my saddlebag, "Marsha, I brought you something."

I handed Supervisor Marsha a bright red apple and explained, "An apple contains fiber, natural sugars, water, and useful nutrients."

She accepted it with a smile. "Thanks, Chat."

Then she asked, "Can I create anything I want with the apple?"

I was glad she was thinking about the apple and answered, "Certainly."

She quickly volleyed questions, "Bake it? Make applesauce?"

I answered, "Yes, all of those are great suggestions." I was pleased with my idea when she smiled even wider. I figured she was thinking of numerous additional healthy apple-related ideas, and the apple was starting to seem useful. My nutritional strategy appeared to be succeeding.

To sound positive, I added, "Marsha, the apple is yours. You may create whatever you wish with it." I felt confident. Perhaps overly confident.

She looked at me. Grinned. Then, suddenly the apple sailed through the air right past my back.

I was shocked but thinking back to the apple being thrown it was a very Marsha thing to do.

She had a great throw and I can almost describe the apple toss as an almost mathematically perfect arc over the pasture.

A nearby horse watched it fly. A cow lifted its head.

Somewhere in the distance, the ranch dog immediately began running. It thought it was a new game of catch that apple.

The Old Rancher was on his horse and yelled, “Yeehaw, great throw Marsha!”

I slowly turned my head toward Supervisor Marsha. She was trying very hard not to laugh.

"I did exactly what you said," she explained. "You said I could do anything I wanted." She was correct. I should have seen that her logic would close with throwing the apple instead of eating it or baking it.

Marsha laughed and said to me, "You know, Chat, you make life a lot more fun than chocolate cake. Let's head over to my ranch back porch. I have a surprise on the table to show you."

That was probably the nicest compliment I'd ever received from Marsha.

We rode the horses up to the front of the house. I wondered what could be on the back porch. I thought we'd made progress, Marsha showed she had ideas for apples including throwing them, which I still counted as progress.

My learned lesson was simple: define the exact purpose of an item before handing it over.

I was shocked that on the porch table was a full bowl of fruit. She said, "Well I do throw some to the animals but it's a start. Chat, I even take a bite of one once in a while.

I opened the Notes application on my phone and created a new entry. Progress!

Suddenly, Daisy at the reception desk called my phone. Daisy whispered, "How long will you be at Marsha's ranch? I need Nathan to drive back to the town hall to take me for coffee. My truck is being repaired."

I wasn't sure for a moment what Daisy was speaking about, or how she knew I was on the porch having coffee, but answered, "Daisy I have no idea where Nathan is, but if I see Nathan, I'll tell him."

She only answered before hanging up, "Chat, North East." I had no idea what that meant.

Marsha said, "Chat look over to the road at the end of the property line."

On the dirt road by the property line was Officer Nathan.

I sat watching Officer Nathan watching us. Marsha texted Nathan, "Urgent, Daisy needs a ride to the repair garage."

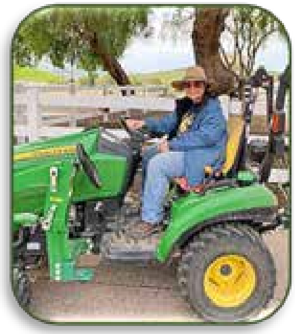
In a second the police car siren was turned on. The lights flashing as Officer Nathan left dust when he raced back to town!

Turning to Marsha I asked, "Don't you think sirens and lights are excessive with his racing away to give Daisy a ride to the repair garage that's across the street from the Town Hall? Daisy could walk there."

Marsha picked up an apple and threw it to a Raven, turned and smiled, "Well Chat, that all depends on if it's Daisy calling Nathan for a ride across the street. Here Chat, have an apple."

I watched the Raven pecking at the apple. Sighing I took a bite of the apple Marsha offered. I sat back, relaxed and thought that **this town may be odd but is the best town one can live in.**

Supervisors Page - Come Back Soon to the town that “almost” exists



This is off my back deck where I sit at night and have coffee when the sun is mostly down just leaving the sky on really reds and blues.

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