FEA - CAE Not to Miss & More

April **2025** **ISSN 2694-4707**

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

Airport - Sikorsky

Airport - Tusas

Auto – TATA Motors

Library - Dynalook

Marco - RBF

Madhukar - CADFEM

Metin - OZEN

Curt - Autodesk

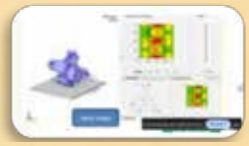
Coyote - GoEngineer

Marta – OASYS

Karl - DYNAmore

Webinars
Seminars

Jenson – DFE Tech



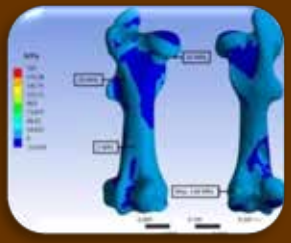
Brianna - LLNL

Jeff - Siemens

Automotive
Webinars

Ryan – Univ Patras

Adam – DynaS+



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

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Editors: Anthony, Art, Marnie, Marsha, Sabyl

Town Pretend to be Editors:

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

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

We will always remember

FEANTM Town Always Salutes:

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

USA & allies of the USA

Parking & Coffee are free.

R & D - Camping - Town Map

Horse Trail → Yield right of way to horses

R&D Technology Business Park

RV CAMPING
Park in any vacant camping site

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

Town Hall & Library

Lawrence Livermore National Laboratory

rbf · MEDITATE · LIVGEMINI · rbf.LAB

The Old Rancher

Race Track

Airport

Sports Stadium

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

Table of Contents

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Table of Contents

Individuals are the persons we wish to thank. It doesn't imply association with a company.
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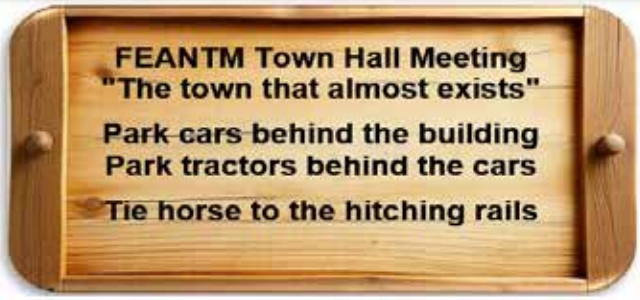
Welcome to our County, Town Hall Meeting & Announcements

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



YEEEEEHAWWWWWW! Who yelled, "OH NO! the town supervisor, Marsha, is back!" The next few months I will be concentrating on building out the town. Coyote 5C's, the hospital, library and airport. **TA DA DA! (yes, the bugle sound is back)** - the library we now have row "C" CADFEM, row "D" DYNAlook Papers, row "N" Not To miss companies, YouTube, Conferences. So, saddle up and let's get back on the trail. Who landed the T625 GÖKBEY in my town hall parking area? My tractor goes there - See the Airport for landing areas.

Hello, and welcome to the Spring edition of FEANTM+. Spring is the time to prepare the ground for a new season of growth, and change. The field of engineering is fertile ground.
We thank everyone for their kind comments & continued participation in our magazine/blog.

Our town is a place where we can have some fun and utilize new technology. Each month, we strive to provide you with interesting and valuable information. We hope you have as much enjoyment reading this month's FEANTM as we did preparing it. Happy reading.

Feel free to email me at feaanswer@aol.com (please use the subject line Attn: Marnie).

Thank you for being part of the FEANTM+ community.

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

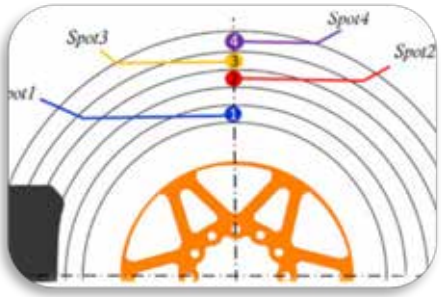
Curt: Seamlessly connecting ECAD & MCAD systems is vital for improving collaboration and efficiency in product development. Autodesk Fusion's integration with Cadence Allegro X and OrCAD X

Madhukar: CADFEM – Great article to read on High Fidelity Antenna Design For Advanced Mission Modelling by Srikanth Sampangi.

Metin: Article by German Ibarra. External Aerodynamics with Ansys Discovery, "Aerodynamics is the study of how gases, particularly air, interact with solid objects in motion…"

Marco: A Study in MIcromachines on using Radial Basis Functions (RBFs) for meshless strain evaluation in flexible printed circuit boards (PCBs). This method is powered by RBF Morph software..

Paper quote, "difference model and an three-dimensional (3D) finite element (FE) model. The latter was solved in NASTRAN (and validated on a test rig with simulated braking sequence) to find the transient disc temperature distribution. ..."



Web - Science Direct - Novel Unscented Kalman Filter-based method to assess the thermal behavior of carbon brake discs for high-performance motorcycles

Federico Bonini, Allessandro Rivola, Alberto Martini

DIN-Dept . Industrial Engineering, Univ. of Bologna, Bologna, Italy
CIRI-MAM, Adv.Applications in Mech. Engineering & Materials Tech., Univ. of Bologna, Bologna, Italy

Abstract - In the past few decades, braking systems with carbon discs have become the dominant technology for many racing applications, such as in the MotoGP class. Indeed, they provide higher friction coefficients. Moreover, thanks to their lightweight materials (with respect to conventional steel brakes), the unsprung masses and the gyroscopic effects can be reduced. Therefore, the motorcycle dynamic performance can be significantly improved. The usage of carbon brakes requires a very accurate assessment of their thermal behavior. In fact, although their operating temperature in real racing conditions may cover a wide range, their optimal braking performance can be achieved only within a relatively narrow temperature range. This work focuses on the development of the Unscented Kalman Filter (UKF) algorithm as a suitable mathematical tool for assessing the temperature gradient of the carbon disc mounted on the motorcycles competing in the MotoGP™ world championship. A one-dimensional (1D) finite element (FE) model of the disc is developed to provide the a priori state estimate that the filter will combine with the information measured by the temperature sensor available on board to compute the optimal posterior temperature estimation. Besides estimating temperature, the UKF is also exploited to identify the convection heat transfer coefficient (h) of the disc, which is a fundamental parameter for a proper model calibration.

1. Introduction - Carbon-based materials can provide to braking systems a combination of light weight, high thermal conductivity and absence of thermal expansion, which is currently hard to achieve with other materials [1]. These characteristics result in a high friction coefficient, stable and consistent braking effectiveness, and very high heat dissipation. Given the higher braking capabilities with respect to the conventional steel brakes, carbon brakes are adopted for high-performance applications, such as aircraft landing gears, as well as racing cars and motorcycles. Indeed, carbon-carbon brakes have become the absolute standard in the MotoGP™ world championship. The carbon-carbon composite presents both the matrix and the reinforcing fibers made out of carbon, hence being usually referred as C/C brakes.

Whether conventional steel brakes or C/C brakes are adopted, the knowledge of the working temperature range at which the disc will operate is fundamental to predict the performance in terms of friction coefficient [2], wear [3], thermal deformation and brake fluid vaporization [4], and therefore to properly design braking systems as well [5]. The Company that supplies the braking systems of the MotoGP™ motorcycles published in a work by Cividini et al. [6] the latest findings concerning design methods, simulation procedures, product features and manufacturing processes of C/C racing brakes.
...

ANSYS Blog, "…**Ansys Fluent fluid simulation software** to validate the heat transfer rate from Octavia Carbon's proprietary heat exchangers to the contactor material...**Ansys Rocky particle dynamics simulation software** for discrete element method (DEM)-CFD coupling to determine the behavior of the adsorbent contactor material…**Ansys Mechanical structural finite element analysis (FEA) software** for thermal & structural simulations on pressure vessels..."

Kenyan Startup Harnesses Nature and Simulation To Advance Carbon Capture

Susan Coleman - Jennifer Procario

Targeting sustainability goals can present challenges in some industries, as notable carbon-reduction initiatives like Race to Zero aim to halve emissions by 2030 and reach net zero by 2050. This has increased interest in direct air capture (DAC) technology, which removes carbon dioxide (CO_2) directly from the atmosphere and enables it to be stored underground or converted into climate-neutral carbon products.

Established in 2022, Octavia Carbon is dedicated to reversing climate change by reducing CO_2 levels in the atmosphere with DAC technology. Based in Kenya, the startup is the first DAC company in the Global South and uses its location to its credit. By leveraging Kenya's abundant renewable energy sources, geology, and skilled workforce, the company says it is uniquely positioned to reduce DAC costs and accelerate DAC's global impact.

Seeking a robust physics-based simulation tool for its engineering design process, the team adopted Ansys simulation solutions in 2023 with the help of the Ansys Startup Program and Qfinsoft (Pty) Ltd., an Ansys Select Channel Partner. Today, Octavia Carbon uses Ansys simulation to inform product design through structural, fluid, and thermal analyses. At the same time, virtual testing and prototyping minimize the time and cost of traditional physical methods, accelerating product development.

Understanding the DAC Difference - Simply put, DAC captures CO_2 directly from the atmosphere, whereas point source carbon capture targets CO_2 emissions at their source, such as power plants and industrial facilities. Is one method better than the other? Hannah Wanjau, thermal engineer at Octavia Carbon, says both methods contribute to carbon reduction, serving different purposes with unique benefits.

Point source capture prevents CO_2 from entering the atmosphere at the moment of emission yet is limited to specific sites and doesn't address existing atmospheric CO_2, she says. On the other hand, DAC removes existing CO_2 from the air and can be deployed anywhere with adequate renewable energy, making it more versatile.

"DAC, therefore, will play a vital role in addressing legacy emissions — CO_2 that has accumulated over the centuries — and in offsetting unavoidable residual emissions from sectors like aviation and heavy industry," she says. "By focusing on the removal of atmospheric CO_2, DAC complements point source capture, contributing to both net-zero targets and the potential for net-negative emissions to help reverse climate change."

To enhance Octavia Carbon's DAC technology, Wanjau and fellow engineers looked toward Ansys for a strong multiphysics simulation solution.

"Our technology involves moving gases, and we needed a tool that could enable us to optimize the design of our technology for the lowest costs, highest performance, and highest safety standards," says Victoria Barasa, fluids engineer at Octavia Carbon.

Pic (Engineers at Octavia Carbon use Ansys simulation for both computational fluid dynamics (CFD) and finite element analysis (FEA) while designing direct air capture (DAC) technology and equipment.)

Another advantage to DAC is that the captured CO2 can be permanently stored in deep geological formations, preventing its rerelease into the atmosphere. In addition, the captured CO2 can be transformed into valuable products, such as synthetic fuels, building materials, and plastics.

But that's not all. Octavia Carbon engineers say DAC technology offers high measurability and scalability, which ensures transparency in carbon removal efforts. It can also be scaled with a smaller land footprint since it is not confined to specific regions and can be deployed apart from emission sources, unlike point source carbon capture.

"Ansys has been an excellent partner on the engineering design front, enabling us to carry out detailed structural, fluids, and process simulations, which has accelerated our product development by helping us cut down on physical prototypes, which speeds up product development cycles, reduces costs, and enhances the safety of our technology," says Barasa.

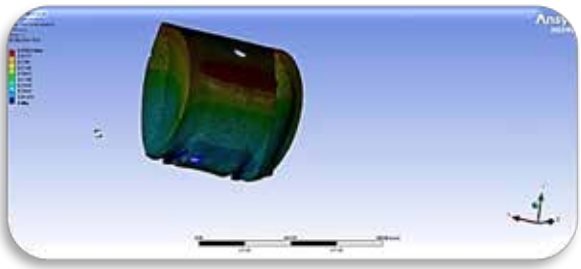
Simulating Successful DAC - DAC is a two-stage cyclic process with capture and release phases. Octavia Carbon's DAC systems comprise industrial equipment and physical components housed within one unit, including contactors such as fans to draw air into the system, sorbent beds to filter CO2 from the air, and heating systems to release the captured CO2 from the sorbent material. Engineers at Octavia Carbon say the sorbent — a solid CO2 filter material — is central to the technology and housed in the DAC units to maximize efficiency. In addition, compressors are used to condition the released CO2 and prepare it for geological storage while control equipment like sensors monitor CO2 concentration.

The team uses Ansys Fluent fluid simulation software to validate the heat transfer rate from Octavia Carbon's proprietary heat exchangers to the contactor material. Computational fluid dynamics (CFD) analysis is also used to predict and validate airflow and steam flow patterns within the DAC units during design. Barasa deems CFD analysis essential for validating the startup's custom-made thermal concepts before fabrication and implementation.

"It enables us to accurately design and size fans, blowers, and steam delivery systems," she says. "Additionally, it supports decision-making around the implementation of steam conditioning equipment based on CFD results."

The engineers also use Ansys Rocky particle dynamics simulation software for discrete element method (DEM)-CFD coupling to determine the behavior of the adsorbent contactor material when it interacts with air at varying velocities. This provides critical insight into the air threshold velocity required to accurately size fans and blowers for different adsorbent materials, Barasa says.

Outside of fluids simulation, the team uses Ansys Mechanical structural finite element analysis (FEA) software for thermal and structural simulations on pressure vessels, such as the external shell of a DAC unit. The team also uses it for load analysis to ensure the integrity and durability of internally built lifting equipment, such as cranes.



(Pic - Octavia Carbon engineers use Ansys Mechanical structural finite element analysis (FEA) software for thermal and structural simulations on pressure vessels, such as the external shell of a DAC unit.)

Octavia Carbon credits Ansys for making simulation more accessible through the Ansys Startup Program.

"Ansys has also enhanced innovation by empowering us to explore a wider range of designs, which helps us to advance our DAC technology," Wanjau says. "Additionally, affordable access to resources like the Ansys Learning Hub and AnsysGPT artificial intelligence-powered virtual assistant has been instrumental in building our team's knowledge and enabling us to develop and apply advanced simulation skills to improve our technology."

Wanjau says Qfinsoft has also been pivotal to the software's successful integration.

"Qfinsoft (Pty) Ltd. has been instrumental in introducing and supporting the integration of Ansys simulations at Octavia Carbon," she says. "They provided an excellent introduction to the extensive capabilities of Ansys software for modeling complex multiphysics problems. Moreover, through their support, we have access to a team of experienced engineers in the simulation field who have been invaluable in helping us expand our knowledge and diversify our skill set."

Maximizing Nature's Bounty - The startup maximizes Kenya's natural resources, emphasizing that Kenya's grid is 93% renewable, with approximately 48% of this energy coming from geothermal sources.

"We have designed our DAC technology to integrate directly with geothermal energy," says Wanjau. "While DAC-geothermal integration has already been proven, we are building upon the existing success by optimizing our system to significantly reduce the cost of both DAC operations and geothermal energy utilization. Geothermal heat, which is cheap, abundant, and clean, will run the most energy-intensive processes in our DAC approach, like desorption heating, cooling, and vacuum generation."

Wanjau expects the integration to support up to 80% of the energy required for the startup's pilot DAC and storage plant in the Great Rift Valley called Project Hummingbird — the world's second DAC and geological storage installation.

The company considers Kenya's geology advantageous to DAC with locations like the Great Rift Valley, which has abundant basalt formations ideal for storing captured CO2.

Another benefit of Kenyan operation is having a relatively low-cost manufacturing base, the startup says. "Through local capacity building, we have developed a skilled team of 62 professionals, including over 40 engineers, to meet the demands of the emerging climate tech sector," says Barasa. "This approach not only grants us faster learning curves but also promotes socioeconomic development in the region." In addition to its project site, the team has a research and development (R&D) and manufacturing facility in Nairobi.

Continue on the website for graphics and Envisioning a Cleaner Future -

Student	**I want to build satellites for orbit**
Bart R.	**How about starting just using lego's?**
Student	**Dad is going to help me and explain adult courses.**
Bart R.	**Well, then, I'll email something to your Dad**

Web – ANSYS Learning

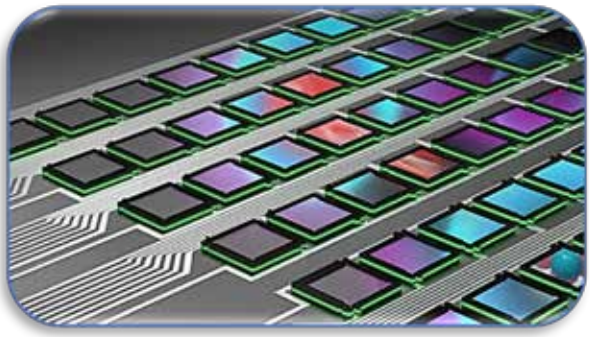
Satellite Orbits and Communication — Lesson 1

This lesson covers the fundamental aspects of Satellite Communication Systems. It delves into the basic features of satellite communication, including its ability to cover large geographical areas and its function as a microwave repeater. The lesson also discusses various technical terms used in the service, such as transponder, BSS, FSS, MSS, hi-rel, and LNA. It further explores the frequency bands allocated for these services by the International Telecommunication Union. The lesson then moves on to the three segments of a satellite communication system: the space segment, ground segment, and propagation medium. It also explains the concept of orbital mechanics and how it affects the communication system. The lesson concludes with a discussion on the orbital height of a circular orbit satellite with a period of one sidereal day.

Key Takeaways

- Satellite communication covers large geographical areas and functions as a microwave repeater.
- The International Telecommunication Union allocates frequency bands for the satellite services.
- A satellite communication system consists of three segments: the space segment, ground segment, and propagation medium.
- Orbital mechanics significantly affect the communication system.
- The orbital height of a circular orbit satellite with a period of one sidereal day is crucial for uninterrupted communication.
- Back to Course

LLNL Quote – "Neutrinos were discovered in the 1950s, but the particles are so obscure that measuring them is like finding a needle in a haystack without knowing where the haystack is on Earth. Explore how hashtag LLNL is using experimental techniques to find clues"



Web - LLNL - Sizing up the ever-elusive neutrino - Ashley Piccone

Neutrinos were discovered in the 1950s, but **the particles are so obscure that measuring them is like finding a needle in a haystack** without knowing where the haystack is on Earth. Explore how hashtag LLNL is using experimental techniques to find clues.

For example, neutrinos were discovered in the 1950s, but their properties are still obscure.

New research, published in Nature by a team including Lawrence Livermore National Laboratory (LLNL) scientists, introduces an experimental technique to constrain the size of the neutrino's wavepacket.

Imagine measuring a neutrino like finding a needle in a haystack. The particles are so elusive that, previously, researchers didn't even know where on Earth the haystack was located.

Now, they've identified the haystack, or, scientifically, the size of the neutrino's "wavepacket." This measurement doesn't say exactly where the neutrino is located or how big it is, but it does constrain what those answers could be.

To achieve this, the researchers implanted beryllium atoms into a sensor device. The beryllium naturally decays by absorbing one of its own electrons into the nucleus, where the electron combines with a proton to become a neutron. In this process, the atom transmutes into lithium and releases a neutrino.

Since that neutrino is extraordinarily difficult to measure, the group looked elsewhere for clues.

Stephan Friedrich, LLNL scientist and author:

"The trick we use is that we don't measure neutrinos directly. We measure the energy of the recoiling lithium nucleus that is produced in the same radioactive decay as the neutrino. We can then use the energy measurement on the recoiling nucleus, which we get from our nifty little detectors, to infer properties of the neutrino."

The experimental setup at LLNL to measure the recoil energy of lithium atoms.

(Image: Garry McLeod/LLNL)

The team sees their work as an important complement to large-scale collider particle physics experiments.

“One of the amazing things about this project is that we are doing state-of-the-art particle physics with a relatively tiny setup,” Friedrich said.

Understanding neutrinos may be the key to unlocking the mysteries of dark matter. And since they interact so rarely, the particles travel relatively unimpeded and could illuminate the earliest and farthest reaches of the universe.

Kyle Leach, Associate Professor at Colorado School of Mines.
“This work is the tip of the iceberg and may have applications in a wide range of areas, from fundamental tests of the standard model of particle physics to direct observation of neutrinos from nuclear reactors. We see these sensors as a new and exciting method for next-generation science.”

Other LLNL authors include:

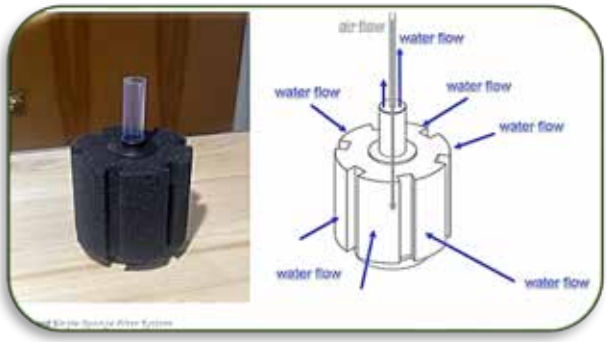
Connor Bray,
Geon-Bo Kim,
Inwook Kim,
Vincenzo Lordi
Amit Samanta.

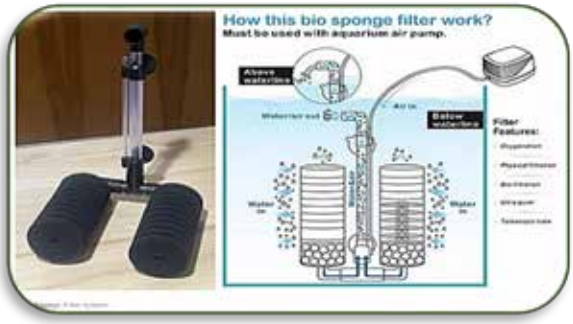
Welcome to the 5C's News Page. I'm unsure what the coyote will want to share with you each month, but I promised him I would type it out.

Graphic excerpts -Full graphics & explanations are on the GoEngineer website.

Web – GoEngineer - Testing Aquarium Filters Using SOLIDWORKS Flow Simulation - by Matthew Kusz – "For decades, I have been an aquarist. Like most hobbyists, I started simple, and put together a community aquarium with a variety of fish that were compatible with one another, with a standard aquarium filter. Later, I started breeding specific fish. In breeding aquariums, the filter system needs to be a bit different so that the young fish (the fry) don't get sucked into the filter. I knew that the placement of the filter would impact its flow efficiency, but I wasn't exactly sure to what extent. (Even the filter manufacturer didn't provide this information.) So, I decided to investigate this by creating the aquarium and filter system assembly in SOLIDWORKS and then running a simulation of each type of filter system in different positions."

Sponge Filters: How They Work - There are two basic sponge filter systems for aquariums that I decided to consider: a weighted single-sponge and a dual-sponge.



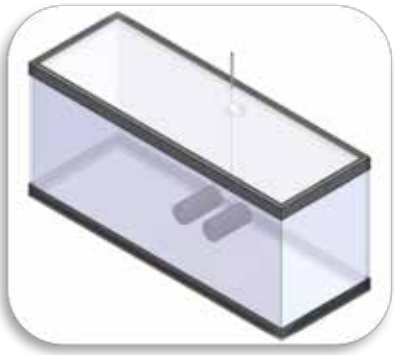


In both cases, an aquarium air pump is used to induce the water flow. That airflow creates bubbles that rise in a vertical tube. That movement helps to pull water through the sponge material and up through the vertical tube. The bubbles also act to oxygenate the water in the tank.

Most aquariums have gravel or sand on the bottom, plants and driftwood mixed in, and, of course, fish. For this SOLIDWORKS Flow Simulation study, I wanted to see what the water flow would look like with water only.

Single-Sponge Filter Results - In my first investigation, I used a single-sponge weighted system and tested two positions - one in the middle of the long side and the other in the middle of the short end. I set up the flow simulation pump flow rate to move the volume of the tank in one hour and got these results:

- Middle Location - Long Side - Darker areas indicate lower levels of water flow.
- Middle Location - Short Side - Darker areas indicate lower levels of water flow.
- The dead zones, the darker areas, are more prevalent in the side orientation than the middle orientation.
- We can also see the differences between the two animated particle studies, which show the distribution of oxygenated water.



Now, let's take a look at a different kind of filter system. Dual-Sponge Filter Results

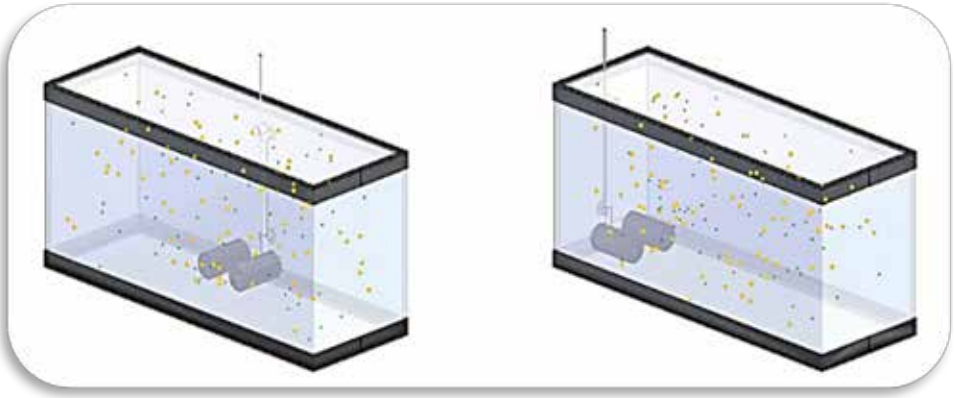
Like the single-sponge example, I set the parameters to move the entire volume of the tank in one hour and assumed nothing in the tank but water. After one hour, these are the results for a filter placed in the middle of the long side and in the middle of the short end. (Website graphics for below on the website)

- Middle Location - Long Side - Darker areas show lower water flow.
- Middle Location - Short Side - The darker areas demonstrate lower water flow.

In either location, we can see dead zones (darker areas) on the ends of the sponges and behind the vertical tube. However, the position of the dual-sponge filter does not dramatically affect the dead zone between the two orientations.

On the website – Animated Study: We can also see a uniform distribution of oxygenated water in both animated particle studies.

Animated picture is on the website.



Based on these studies, a dual-filter system has more placement flexibility than a single-sponge weighted system. Although both perform well when positioned in the middle of the aquarium, the dual sponge allows placement at the far end of the aquarium without affecting performance.

About Matthew Kusz - **Matthew Kusz is a Senior Technical Support Engineer at GoEngineer.** When Matthew isn't assisting customers with their engineering challenges, he spends his free time repairing antique watches/clocks, designing furniture, tending his aquariums and learning about bee keeping.

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Website, "**Seamlessly connecting ECAD and MCAD systems is vital for improving collaboration and efficiency in product development.** This article highlights how Autodesk Fusion's integration with Cadence Allegro X and OrCAD X tackles challenges like data synchronization and real-time collaboration, streamlining workflows and enhancing design accuracy."

Web - [Design in Harmony: Seamless ECAD and MCAD Collaboration] -
Edwin Robledo, Amlendu Shekhar Choubey

Integrating Electronic Computer-Aided Design (ECAD) and Mechanical Computer-Aided Design (MCAD) systems is critical for achieving efficient and accurate design outcomes in the rapidly evolving landscape of product design. This article explores the prevalent challenges designers and engineers face in ECAD-MCAD integration and how these challenges can be effectively addressed through integrating Autodesk Fusion with Cadence Allegro X and Cadence OrCAD X PCB design tools. We will delve into critical areas such as data synchronization, real-time collaboration, design accuracy, and workflow efficiency, providing insights and best practices to enhance the seamless implementation of these technologies.

The collaboration between electronics and mechanical design teams is vital for producing complex products effectively. Historically, ECAD and MCAD systems have functioned independently, creating silos that contribute to inefficiencies and design errors, ultimately impacting product quality and time to market. To foster a cohesive workflow, it is critical to address the integration challenges that arise when these disciplines need to collaborate. This paper addresses the integration challenges and proposes solutions to achieve more seamless ECAD-MCAD workflows.

Key challenges in ECAD-MCAD integration

- Data Synchronization: Disparate data formats and systems often result in manual data transfer, increasing the risk of errors and inconsistencies.
- Real-time Collaboration: The lack of real-time data-sharing capabilities leads to team delays and miscommunications.
- Design Accuracy: Inaccurate data translation between ECAD and MCAD tools can compromise the integrity of the design.
- Workflow Efficiency: Fragmented workflows hinder overall efficiency, slowing down time-to-market.

Addressing ECAD-MCAD integration challenges

Integration of Autodesk Fusion with Cadence Allegro X and OrCAD X
Unified platform for collaboration

Autodesk Fusion and Cadence tools provide a connected platform that facilitates seamless data exchange and real-time collaboration. This integration allows for concurrent design processes, reducing the time and effort required to synchronize ECAD and MCAD data.

Enhanced Data Synchronization With the integration of cloud-based solutions like Autodesk Fusion, data synchronization is automated, ensuring all stakeholders can access the most current design data without need for any file conversion, ensuring more efficient and effortless collaboration, reduced risk of data mismatches, and enhanced design accuracy.

Real-time design collaboration - The integration supports real-time collaboration through features such as edit-in-place, allowing automatic version control and fine-tuning of components within as assembly in the Design Workspace in Fusion and having those component updates reflected in the Cadence Allegro X / OrCAD X PCB environment. These capabilities enable teams to work simultaneously on shared projects, enhancing communication, improving quality, and reducing revision cycles.

Improved design accuracy - By using a standard data model and integrated design environment, the risk of errors due to data translation is minimized. This leads to more accurate and reliable design outcomes, enhancing product quality.

Streamlined workflow efficiency - The seamless integration allows for a streamlined workflow, reducing redundant processes and enabling faster design iterations. This enhances overall productivity and accelerates the product development cycle.

Example use case

Automotive seat design project - Integrating Fusion with Allegro X enabled the rapid prototyping of a temperature-controlled car seat in a collaborative project between electronic and mechanical teams. Using the integrated platform reduced design revisions by 30%, and the project was completed two weeks ahead of schedule.

Consumer electronics development - A consumer electronics company implemented the Fusion-Cadence integration to design a new smart home device. The real-time collaboration capabilities facilitated effective communication between distributed teams, reducing the design cycle by 25% and improving design accuracy.

Best practices for implementation

- Comprehensive Training: Ensure that all team members are proficient in using both ECAD and MCAD tools to maximize the benefits of integration.
- Standardized Processes: Develop standardized data management and collaboration processes to maintain consistency and efficiency.
- Continuous Updates: Regularly update software versions and tools to leverage the latest features and enhancements.
- Feedback Loops: Establish feedback loops between teams to promptly identify and address integration challenges.

Future advancements in ECAD-MCAD collaboration

The future of ECAD-MCAD collaboration will likely see advancements in AI-driven design automation, enhanced cloud computing capabilities, and increased interoperability between various design tools. These developments promise to make the integration process even more seamless and efficient, reducing time-to-market and improving product innovation.

Integrating Autodesk Fusion with Cadence Allegro X and OrCAD X represents a significant advancement in overcoming traditional ECAD-MCAD integration challenges.

By addressing issues related to:

- data synchronization,
- real-time collaboration,
- design accuracy, and
- workflow efficiency,

this integration paves the way for more efficient and accurate product design.

Adopting best practices and staying abreast of future advancements will further enhance the benefits of this integration, fostering innovation and competitiveness in the design industry. For more information on this topic, you can watch the **CadenceTECHTALK: Design in Harmony: Seamless ECAD and MCAD Collaboration** **on-demand webinar presentation**.

Edwin Robledo, Fusion Technical Marketing Manager, Autodesk - Edwin began his professional career developing and implementing fiber optics and data management solutions. Twenty-five years ago, he joined the EAGLE team to broaden its reach in the PCB design community. Throughout his career, he has authored numerous articles, blog posts, and video tutorials covering all aspects of printed circuit board design. Currently, at Autodesk, he serves as the Senior Technical Marketing Manager, creating content that helps users embrace Fusion design capabilities.

Amlendu Shekhar Choubey, Product Management Director, Cadence - Amlendu is responsible for developing PCB design software, focusing on AI technologies and ECAD-MCAD integration. He has more than 22 years of experience in the semiconductor and microelectronics industry. With 18 years dedicated to ASIC, SoC, and semiconductor IP development, he brings extensive expertise in EDA software development focused on end-to-end product design solutions. He holds an MBA from the University of California, Berkeley, and a bachelor's degree in electrical engineering from the Indian Institute of Technology in Kanpur, India.

Don't miss the article by Mirjam Schlayer; free on-demand webinars for testing communities.

"Physical testing is an integral part of product development in all industries. At Simcenter we continuously develop and integrate novel testing engineering methods and technologies for innovation in the testing communities."

Web - Siemens - Free on-demand Webinars for the testing community

By Mirjam Schlayer

We believe that by sharing our knowledge and expertise in our on-demand webinars, we can help test engineers achieve their goals of delivering smarter products in shorter time. Access as a guest or sign in for the webinar of your interest – it's easy, it's online and it's free!

On the website you will find a list of on-demand webinars hand-picked for testing engineering and according to the field or the industry of interest.

These webinars are the perfect tool to:

- Gain insights into an engineering discipline you don't master yet
- Learn about best practices in your or other industries
- Learn how to implement best practices
- Find out what the latest testing solutions are in your field
- Introduce an engineering topic to a colleague who is a newcomer to the department or train your junior staff

Among the listed webinars - Automotive

Powertrain Performance Engineering -

- Next-generation powertrain testing to accelerate the development of green drivelines
- Road noise prediction – an MBSE approach to virtual NVH development – Mobex

Vehicle Performance Engineering

- Strategies to deliver lighter, stronger & more durable vehicles
- Design for ride comfort – from concept to validation
- Tire testing & model parameterization to fit vehicle dynamic simulation requirements
- Latest innovations in vehicle NVH operational testing
- Better & faster vehicle NVH insights using the latest TPA methods
- Automate vehicle NVH validation
- Frequency Response Function testing & CAE for digitalization
- How to perform and speed up load data analysis
- Efficient road load data acquisition

Cont. Vehicle Performance Engineering

- Customer-correlated durability test schedules
- Introduction to Vehicle NVH and Acoustics
- Pass-by noise testing and engineering
- Road noise prediction – an MBSE approach to virtual NVH development – Mobex
- Exploring the latest innovations in Durability Testing and Engineering – Webinar Series
- Strength and durability engineering solutions – Webinar Series
- System-in-the-loop testing – a revolution for vehicle integration
- How artificial intelligence in automotive drives performance engineering & why you should care
- Predict vehicle NVH performance
- Smart and automated road load data acquisition

Electrified Vehicle Performance Engineering

- Fast-track your EV chassis design
- NVH from e-motor – NVH from eMotor – from electric current to noise
- Adopting a digital twin approach to optimize electrified vehicle performance engineering
- Improve the NVH of Electric and Hybrid Electric Vehicles
- How to address NVH Engineering issues of Hybrid and Electric Vehicles
- How to make remarkable sound of electrified vehicles inside out with active sound design
- Validate your electric vehicle battery with realistic vibration testing
- Master sound perception before a prototype is available using the vehicle sound simulator technology
- Boosting digitalization in noise and vibration (NVH) product development with Frequency Response Function (FRF) testing
- Road noise prediction – an MBSE approach to virtual NVH development – Mobex
- Tackle e-motor NVH performance

Autonomous Vehicle Performance Engineering

- Tackle the challenges of high-speed ADAS sensor and autonomous vehicle data collection for testing and validation
- Four key steps to setup a smart and efficient ADAS testing workflow

- **Access as a guest, or Sign-in**
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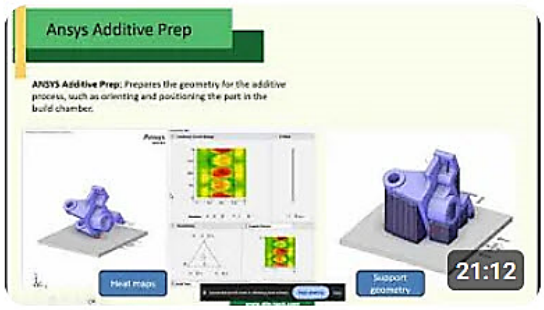
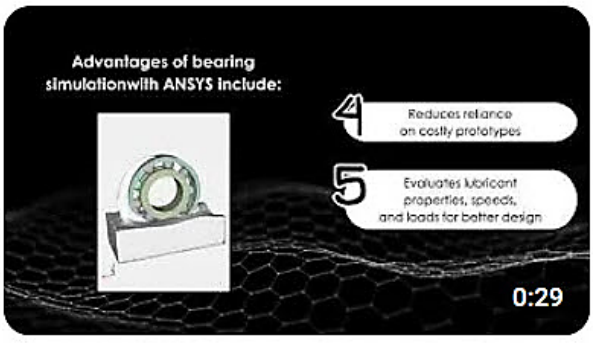
DFE-tech: On our YouTube Channel you can find webinars, simulations and learning videos

We are always updating the YouTube Channel for your convenience to have information, learn, and gain knowledge.!

A few of the videos on our channel

 Webinar : Ansys Mechanical (Ansys Additive Prep)	This webinar will explore the capabilities of an innovative software solution that revolutionizes the preparation of 3D models for additive manufacturing (3D printing). Specifically designed for complex geometries in industries such as aerospace, automotive, and medical. Ansys Additive Prep helps optimize designs and process parameters to ensure flawless builds.
 Dimensional Control Systems	Simulating gearbox flow in ANSYS Fluent involves modeling the lubrication flow within a gearbox. This analysis is critical for understanding lubrication performance, heat generation, and power losses in rotating machinery.
 Ansys Fluent : Bearing Simulation	Ansys HFSS is a 3D electromagnetic (EM) simulation software for designing and simulating high-frequency electronic products such as antennas, antenna arrays, RF or microwave components, high-speed interconnects, filters, connectors, IC packages and printed circuit boards. Engineers worldwide use Ansys HFSS software to design high-frequency, high-speed electronics found in communications systems, advanced driver assistance systems (ADAS), satellites, and internet-of-things (IoT) products.

A few of the May offered webinars/seminars/classes not to miss.

DYNAmore Germany and Nordic have had a long-standing history with LS-DYNA development, support, their own products, training and conferences. Below find a few of the many trainings offered.

DYNAmore Nordic AB

Web – **DYNAmore Nordic AB Training**

Brigadgatan 5,

58758 Linköping, Sweden

May 13 - Material Failure - Mikael Schill - This seminar will discuss issues related to the adjustment of material models to consider ductile failure, which can sometimes be relatively complex. The seminar intends to look at the complete picture, reaching from underlying theories through material testing to the actual creation of a material card using LS-DYNA.

May 20 - Introduction to LS-DYNA - Anders Bernhardsson - The introductory seminar gives a quick, comprehensive introduction to the applications of LS-DYNA and is recommended for simulation engineers who want to use LS-DYNA as an FE code to simulate general nonlinear problems. Prior knowledge is not required.

DYNAmore GmbH

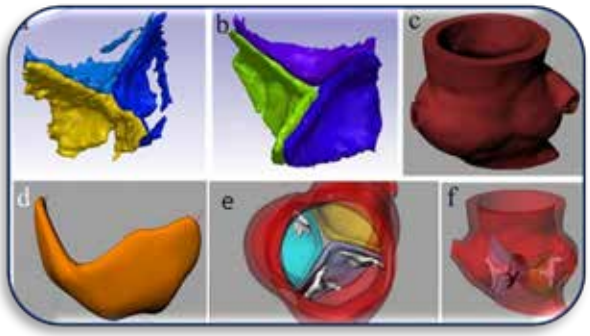
Web - DYNAmore GmbH Training

seminars, webinars, video seminars, information days.

May 05 LS-DYNA Compact: Introduction to LS-TaSC
Katharina Liebold, Nikolay Lazarov
May 05 Introduction to Simulation Technology
Maik Schenke
May 05 LS-DYNA Compact: Contact Modeling in LS-DYNA
Maik Schenke, Pierre Glay, Tobias Graf
May 13 Introduction to LS-DYNA
Dynamore staff members
May 22 Introduction to Welding Simulation
Thomas Klöppel, Tobias Loose
May 23 Advanced Damage Modeling: Orthotropic Materials
Filipe Andrade, André Haufe
May 26 LS-DYNA Compact: Joining Techniques in LS-DYNA
Tobias Graf, André Haufe, Markus Feucht

Synopsys Simpleware Software - Thanks to Kerim Genc, Sr. Staff Product Manager | PhD in Biomedical Engineering on social media, "...Very impressive Transcatheter Aortic Valve Implantation (TAVI) research coming out of the University of Southampton & University of Leeds. Xiao Zhao and his colleagues additively manufactured Valve frames using laser powder bed fusion (LPBF) before successfully crimping and balloon-expanding them within an aortic root model."

They then validated it in an in silico framework for use in the development of new frame designs. Finally, they showed a case study comparing frame deployment within fused and non-fused native leaflets."



Web – Science Direct - Development of a methodology for in vitro and in silico simulation of transcatheter aortic valve replacement using 3D-printed valve frames

X. Zhao, O.C. Eren, A. Molyneux, L. Geekie, C. Nick, N. Bressloff - Univ. of Southampton, Univ. of Leeds, Croft Additive Mfg. Ltd, Univ. Hosp. Southampton NHS FT

The image is from Figure 1 in the referenced paper. This is a good example where Simpleware's off-the-shelf AI-enabled cardiac auto segmentation tools are used as a first step in segmentation (a) and then the model is cleaned up and finalized in the same environment using traditional segmentation tools.

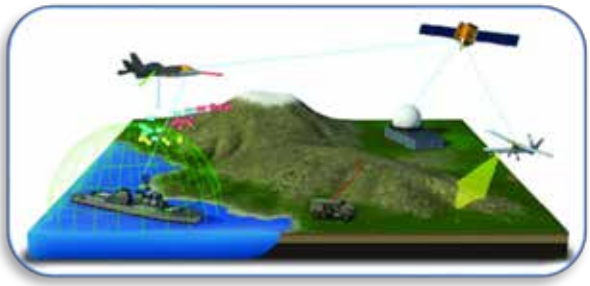
Abstract Background: Transcatheter aortic valve implantation (TAVI) is experiencing continued growth as an option for the treatment of aortic stenosis. Both in vitro and in silico methods have proven reliable in assessing the performance of TAVI devices, which can be used in procedure planning and prototyping new concepts. 3D printing of TAVI frames has the potential for revolutionizing frame designs by making it possible to create more complex geometries. ….

Methods: Having previously established a suitable set of process parameters for laser powder bed fusion (LPBF) manufacture of TAVI frames based on the SAPIEN S3 design, the deployment of such a frame into a patient-specific, 3D printed aortic root phantom was undertaken and assessed using a high resolution CT scan of the result. In parallel, a full computational model was developed to simulate the same deployment procedure and validated against the in vitro study. Further, an interesting case study was setup using this approach to assess deployment of the LPBF frame into the same aortic root phantom but with two of the leaflets fused together.

Results: The LPBF-manufactured frame had sufficient radial strength to fully open the leaflets within the aortic root phantom and anchor the frame in place for both fused and non-fused leaflet cases. There was good agreement between the in vitro and in silico tests in terms of frame position with an average nodal position error of 0.37 mm and 1.29 mm for non-fused and fused cases respectively. Similarly, the frame diameter difference between the in vitro and in silico deployments were 1.01% for the non-fused and 3.17% for the fused cases.

Conclusion: Manufacture of a SAPIEN S3 type heart valve frame using LPBF has been shown to provide a viable procedure for producing frames for testing and assessment when crimped and deployed into a model of an aortic root. Further, the validated in silico model developed in this study can be used to computationally design and test novel frame concepts to be manufactured by LPBF.

Great article to read on High Fidelity Antenna Design For Advanced Mission Modelling by Srikanth Sampangi, "Antenna design is critical to next-generation communication systems, ensuring optimal performance in extreme environments like space, battlefields, and dense urban areas. This dynamic field drives breakthroughs in satellite networks and radar tech."



Web – CADFEM - High Fidelity Antenna Design For Advanced Mission Modelling - Srikanth Sampangi

Engineers use advanced tools like STK (Systems Tool Kit) and HFSS (High-Frequency Structure Simulator) to craft efficient, resilient antennas with precision. These tools simulate real-world conditions, enabling engineers to minimize interference, extend range, and enhance operational efficiency.

This article explores how integrating STK and HFSS revolutionizes antenna design for high stakes missions.

The Need for High-Fidelity Antenna Design in Mission Modelling - In advanced applications ranging from satellite communications to defense systems, antenna performance is the foundation of reliable communication. Whether transmitting data to a satellite or detecting targets with radar, antennas must perform with minimal interference, maximum efficiency, and over extended ranges.

High-fidelity antenna design: Essential for achieving superior performance, consistent signal quality, and reliable functionality in challenging environments.

- Maximize signal efficiency: Transmitting and receiving data with minimal loss, ensuring clear communication.
- Enhance radiation patterns: Ensuring signals are precisely directed to their intended target, minimizing energy waste.
- Match impedance: Minimizing reflection and maximizing energy transfer between the antenna and the system.
- Minimize interference: Ensuring reliable communication even in environments with high-intensity electromagnetic noise.

An Overview of STK (Systems Tool Kit) - STK (Systems Tool Kit) is a sophisticated simulation platform widely used in aerospace, defense, and satellite communications. It allows engineers to model and analyse complex systems, from satellite orbits to ground networks, while factoring in real-world conditions. STK plays a crucial role in mission-critical applications, driving innovation and optimizing modern communication systems for maximum efficiency and reliability.

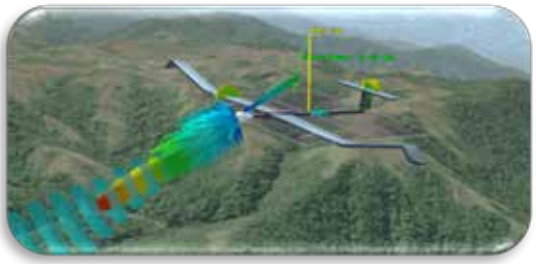
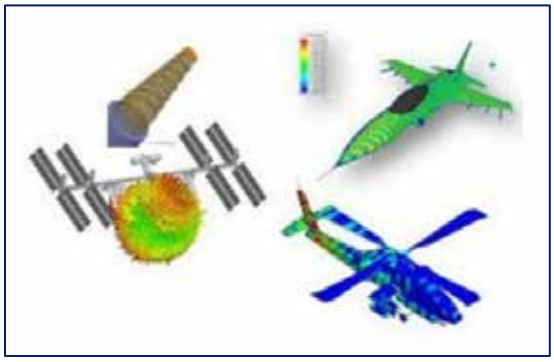


Figure 1. STK's GUI enhances user experience

Key benefits include:

- Real-Time Visualization: Provides dynamic visualizations to analyse system performance in real time.
- Advanced Analysis: Analyzes communication links, coverage, and system performance to achieve optimal design.
- Seamless Integration: Integrates with tools like HFSS for enhanced antenna modelling and system optimization.
- Scalability: Manages both small and large-scale simulations for diverse mission needs.
- Mission Planning: Simulates operational conditions and evaluates performance across scenarios.
- Customization: Tailors simulations to specific mission requirements and real-world environments.



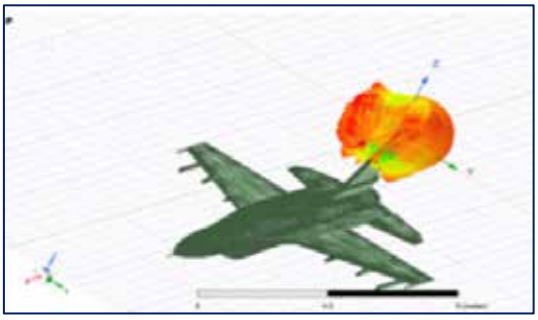


Figure 2. Simulates antenna radiation patterns in HFSS.

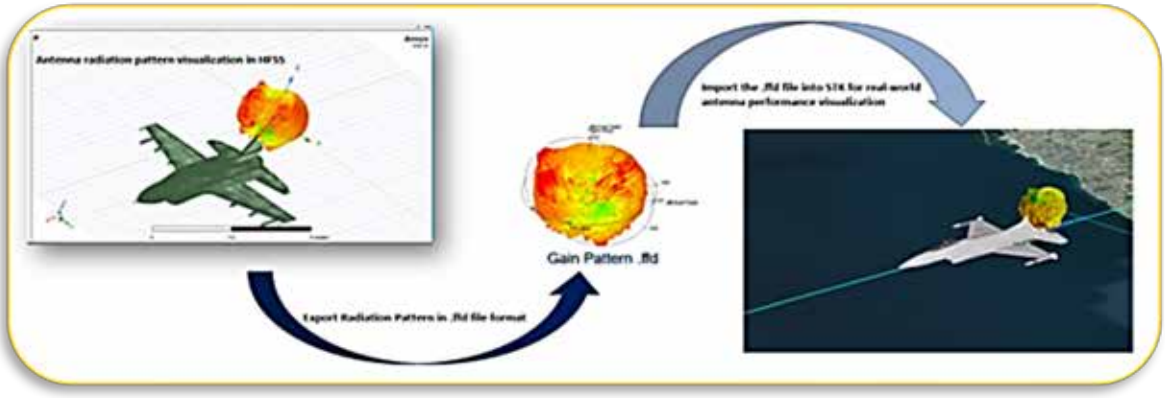
Advancing HFSS Antenna Simulation with SBR+ Solver

HFSS is an industry-leading electromagnetic simulation tool for high-frequency applications, including antennas, waveguides, and microwave circuits. It employs the Finite Element Method (FEM) to model the interaction of electromagnetic waves with structures. The SBR+ (Shooting and Bouncing Rays) Solver uses ray-tracing techniques to model wave propagation in complex environments, making it ideal for antenna design, radar systems, and satellite communications. HFSS enables engineers to optimize antenna parameters for superior performance in critical applications.

Enhancing Antenna Design with STK and HFSS - The integration of STK and HFSS transforms antenna design by combining mission-level modelling with precise electromagnetic simulations. This approach enables engineers to develop high-performance antennas, meeting evolving technical requirements while enhancing efficiency and innovation in communication technologies.

HFSS generates highly detailed electric field data, providing real and imaginary components for precise antenna radiation analysis. This data ensures accuracy and consistency, making it ideal for integration with STK for mission-based simulations. This data can be imported as a .ffd file into tools like STK to visualize antenna radiation in realistic environments.

Figure 3. Import the antenna pattern into STK



Key Benefits of STK and HFSS Integration

- Comprehensive Simulation: Integrating system-level behavior and antenna properties enhances both for better performance.
- Enhanced Performance: Iterating between STK and HFSS allows engineers to refine antenna designs for specific mission needs.
- Faster Design Cycles: Detailed simulations help find and resolve issues quickly, shortening development time.
- Cost Efficiency: Early flaw detection reduces the need for physical prototypes, saving time and costs.
- Improved Reliability: Fine-tuning both the system and antenna ensures reliable communication in challenging conditions.

Real-World Applications of STK and HFSS Integration - The integration of STK and HFSS enhances performance in mission-critical applications:

- Satellite Communications: Provides right antenna simulations for best coverage and reliability in satellite systems.
- Radar and Defense Systems: Ensures antenna designs meet range and detection requirements for efficient target tracking.
- Aerial Data Networks: Simulates UAV movement and improves antenna performance for stable, real-time communication.
- 5G Networks: Customizes antennas for high frequencies and bandwidths, supporting 5G performance in urban environments.

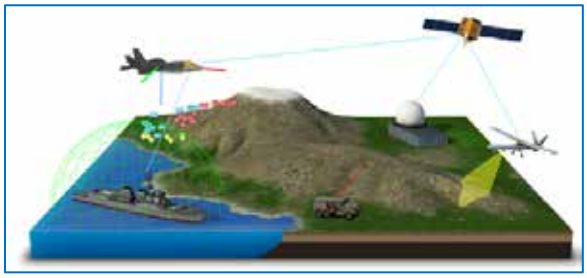
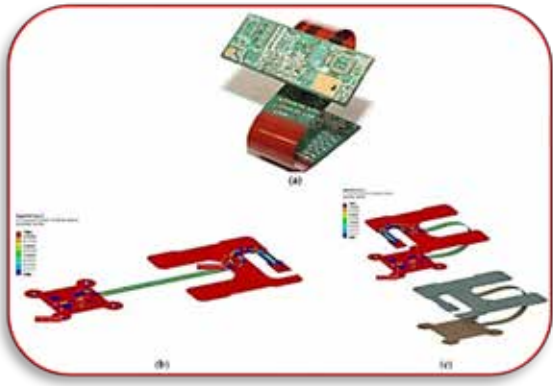


Figure 4. Real -World Applications

Conclusion - The Integration of STK and HFSS delivers an innovative solution for designing high-performance antennas in mission-critical applications. By merging system-level simulations with advanced electromagnetic modelling, engineers can refine designs for superior performance, speed, and cost-efficiency. This integration accelerates innovation in aerospace, defense, and telecommunications, shaping the future of scalable, high-performance communication systems.

A Study in MIcromachines on using Radial Basis Functions (RBFs) for meshless strain evaluation in flexible printed circuit boards (PCBs). This method is powered by RBF Morph software. The study demonstrated how RBF-based approaches provide accurate strain predictions while drastically cutting computational costs—a game-changer for engineers working with flexible electronics, FSI, and structural optimization.



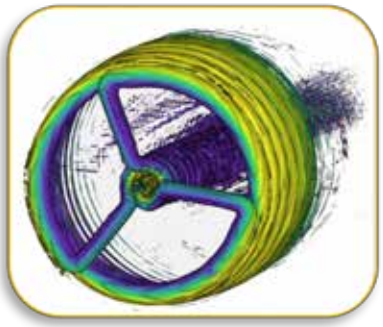
Web – MDPI - **An RBF Meshless Approach to Evaluate Strain Due to Large Displacements in Flexible Printed Circuit Boards**

Corrado Groth, Andrea Chiappa, Stefano Porziani, Pietro Salvini, and Marco Evangelos Biancolini
Enterprise Engineering Dept, Univ. degli Studi di Roma " Tor Vergata", Italy
RBF Morph srl, Montecompatri, Italy

Abstract - Thin plates are very often employed in a context of large displacements and rotations, for example, whenever the extreme flexibility of a body can replace the use of complicated kinematic pairs. This is the case of the flexible Printed Circuit Boards (PCBs) used, for example, within last-generation foldable laptops and consumer electronics products. In these applications, the range of motion is generally known in advance, and a simple strategy of stress assessment leaving out nonlinear numerical calculations appears feasible other than desirable. **In this paper, Radial Basis Functions (RBFs) are used to represent a generic transformation of a bi-dimensional plate, with all the derivate fields being analytically achieved without the need for a numerical grid for large-displacement applications.** Strains due to bending are easily retrieved with this method and satisfactorily compared to analytical and shell-based Finite Element Method (FEM) benchmarks. On the other hand, the computational costs of the juxtaposed methods appear far different; with the machine being equal, the orders of magnitude of the time elapsed in computation are seconds for the RBF-based strategy versus minutes for the FEM approach.

1. Introduction - At present, the Finite Element Method (FEM) is the established standard for stress assessment, especially when complex geometries are under study [1]. The discretization of the domain into smaller elements, where linear or quadratic basis functions approximate the local displacement field [2], allows complicated shapes and boundary conditions to be handled. On the other hand, the generation of the numerical grid is often an expensive task [3], able to negatively affect the results if not properly carried out. This aspect is further exacerbated if the transformation of the body is such to degenerate element shapes, as in the case of large deformations [4] or moving discontinuities [5], with the consequent need to update the mesh during the analysis. **Meshless methods [6] supply an alternative approach to the FEM for the study of continuum mechanics and physics problems in general. The computational domain is covered with a series of points, both within and at the boundary, that provide the basis to construct an approximate solution. Characteristics such as the continuity and smoothness of the results as well as good scalability to higher dimensions make mesh-free methods appealing choices for practical use in many applications**…

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



Web – Lecture Series - von Karman Institute

- **Date: June 2-6, 2025**

There is increasing interest for the application of **Computational Fluid Dynamics (CFD)** to the study of flows in the lower part of the atmospheric boundary layer (ABL). The simulation of atmospheric flows, often over complex domain, is necessary for the estimation of wind loads on buildings, wind turbine siting, pollutant dispersion and pedestrian wind comfort

Lecturers:

Prof. Bert Blocken	**Heriot-Watt Univ. & KU Leuven**	**introduce the simulation of atmospheric flows**
Prof. Alessandro Parente	**Free Univ. of Brussels)**	discuss turbulence model formulation and dispersion modelling for CFD simulations around obstacles and complex terrains.
Dr. Orkun Temel	**Royal Observatory of Belgium**	cover numerical weather forecasting from global to microscale.
Prof. Wim Munters	**von Karman Inst.**	delve into mesoscale modelling of atmospheric flows with applications to offshore wind energy.
Prof. Michael Howland	**MIT**	explore modelling wind energy in the atmospheric boundary layer and Bayesian uncertainty quantification.
Prof. Catherine Gorlé	**Stanford Univ.**	focus on uncertainty quantification for environmental wind engineering applications and predicting wind loading on buildings.
Dr. Branko Kosovic	**Johns Hopkins Univ.**	lead sessions on large-eddy simulation of atmospheric flows
Dr. Domingo Munoz-Esparza	**Nat'l Ctr. for Atmospheric Research**	address multiscale modelling of the atmospheric boundary layer and provide a tutorial on the FastEddy GPU LES code.
Dr. Javier Sanz Rodrigo	**Siemens Gamesa**	discuss mesoscale to microscale wind farm flow modelling and evaluation.

Enhance your knowledge & network with experts in the field!

Website quote, “In 2019, sculptor Nikolas Weinstein embarked on an ambitious journey to create **Mangrove, a breath-taking glass installation for the Solaire Resort North in Manila. Inspired by the intricate root systems of mangrove trees, this large-scale sculpture redefined the boundaries of glass art in architectural spaces.**

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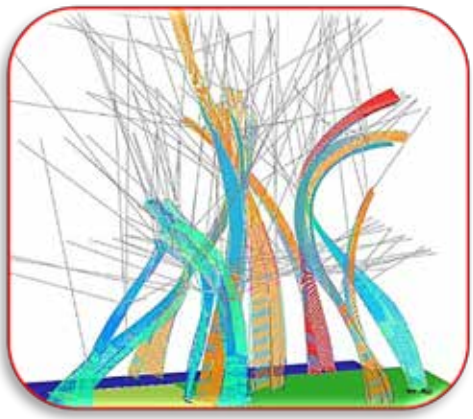


Web - [Mangrove in Glass: Engineering an earthquake-resilient sculpture]

Our latest case study dives into how the Oasys LS-DYNA Environment helped refine the structure, optimise materials, and bridge the gap between artistic vision and structural integrity.

To bring this vision to life, Weinstein partnered with Arup, leveraging the teams structural and materials expertise to ensure the sculpture could withstand the seismic challenges of the Pacific Ring of Fire. The result? In 2024, a 13-metric-ton, 28-meter-long masterpiece woven from 16,385 unique glass tubes was unveiled.

The challenge - In 2019, sculptor Nikolas Weinstein was commissioned by the Solaire Resort North in Manila, Philippines, to create a glass installation for the building’s main public atrium. Known for his innovative approach, Nikolas creates large-scale glass installations for architectural spaces.

Mangrove, inspired by the intricate root systems of native mangrove trees, was designed to be the centrepiece of the development’s ‘Urban Oasis’ theme, bringing nature and organic form into the space. The scale of sculpture was unprecedented for Nikolas Weinstein Studios’, requiring intricate design and delicate materials, able to withstand a challenging environment.

The solution - Weinstein enlisted the support of Arup’s structural and materials experts to achieve a large, complex structure capable of withstanding seismic conditions, crucial as the Philippines is located within a region highly prone to earthquakes, Circum-Pacific Belt also known as the Pacific Ring of Fire.

The Arup team carried out extensive structural calculations and developed detailed structural models in Oasys GSA and Ansys LS-DYNA models in the Oasys LS-DYNA Environment to ensure the stability of the structure and its resilience to seismic loads. Oasys PRIMER played a key role in model setup, checking, and managing the complexity of the large-scale simulation. These simulations represented every component of the sculpture, including glass tubes, wires, spines, and cable arrays, with each element interacting uniquely with its neighbours and external forces.

“The simulations ended up being a lot more complicated than I think any of us anticipated, just because every single piece was doing a slightly different thing, and all those things had to be iterated with all the different seismic cycles.” – Nikolas Weinstein

The team used Oasys D3PLOT and Oasys T/HIS to analyse the non-linear behaviour of fabric woven from curved glass tubes and steel wire, first testing them physically in Nikolas’ studio, then replicating the conditions in Oasys PRIMER. By comparing extracted curves in Oasys T/HIS, Arup ensured accurate mimicry before scaling up in the full structural model, giving the team confidence in its stability.

Oasys D3PLOT and D3PLOT Viewer helped identify structural weaknesses, such as excessive stresses in all the structural elements, under gravity and seismic loading e.g. cable strength.

Extensive connection studies were conducted, and physical tests on small assemblies and individual components verified the accuracy of the simulations. This iterative process allowed the team to refine the models and address potential points of failure.

The analysis and testing process informed numerous design adjustments to mitigate stresses, deflections, and failures. For example, cable arrays were modified to relieve areas prone to deflection in the metal spines. Curvature and Mold libraries were also optimised to address aesthetic challenges like gaps between curved glass elements.

Oasys D3PLOT Viewer was invaluable for bridging artistic vision and engineering expertise, making models accessible and allowing effective collaboration.

The results - The fabrication of the elements composing the mangrove sculpture were carried out in Nikolas Weinstein's studios in New York City and San Francisco. The team designed custom machinery and equipment that were paired with digital tools and hand-crafted workmanship to accomplish this monumental artwork. Each of the sculptures' 16,385 glass tubes has a unique length and arc and is cut, polished, fired and woven into a textile by hand.

The artwork was crafted in modular sections and transported to Manila in five 40-foot containers. On-site, a team of over 40 crew members spent six months weaving the intricate glass fabric into position. Over 11 kilometres of borosilicate glass tubing were interwoven with aircraft cable and modular stainless-steel spines to create a structurally integral sculptural material.

After more than four years in the making, Mangrove was officially unveiled, seamlessly integrating into the architecture of the Philippine resort. The installation serves as the artistic focal point of the resort's public space, forming an immersive environment of archways and glass tendrils, inviting visitors to explore it from all angles.

With Arup's support, Weinstein pioneered a new approach to glass sculpture at an architectural scale, developing a continuous and flexible glass matrix that operates like a textile. This innovation allowed for a scale previously inaccessible in glass art, with the final sculpture weighing in at 13 metric tonnes and at 28 meters long, 35 meters wide, and 27 meters tall.

"This project pushed the boundaries of dynamic structural modelling. I think what surprised everyone was how complex a sculpture can be compared to a skyscraper. Even London's "Gherkin", which Arup supported in engineering, had a computer model 1/70th the size of Mangrove." – Graham Dodd, leader of Arup's materials science team

Have you read the article by German Ibarra? External Aerodynamics with Ansys Discovery, "Aerodynamics is the study of how gases, particularly air, interact with solid objects in motion. It plays a critical role in various engineering fields, influencing the design and performance of vehicles, buildings, and industrial systems."

Web - Exploring External Aerodynamics with Ansys Discovery - German Ibarra

Challenges - One of the key forces in aerodynamics is drag, the resistance experienced by an object moving through a fluid. Drag force arises from friction and pressure differences around an object, directly affecting its speed, efficiency, and energy consumption.

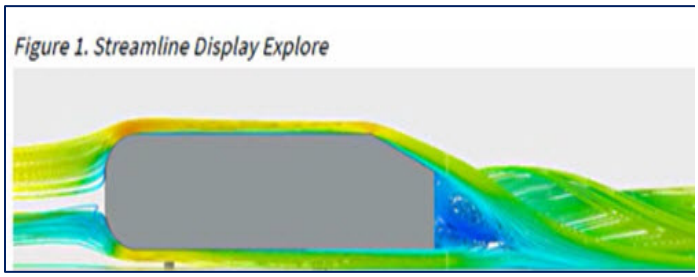
In many industries, minimizing drag is essential for improving performance and reducing operational costs. Sectors that benefit from low drag include:

- Automotive. Electric vehicles, high-performance sports cars.
- Aerospace. Aircraft, drones.
- Renewable energy. Wind turbine blades, solar panel aerodynamics.
- Marine engineering. Ships, submarines.

To reduce drag, engineers use flow control techniques [1] such as streamlining shapes, adding vortex generators, using riblets, and applying boundary layer suction. Another effective method is the trip wire, a small protrusion placed on a surface to trigger early transition from laminar to turbulent flow. While turbulence typically increases drag, a well-positioned trip wire can help delay flow separation, reducing pressure drag on bluff bodies like spheres, cylinders, and airfoils.

Engineering Solutions - Engineers have studied the effects of trip wires using analytical, experimental, and numerical techniques to understand their impact on flow behavior and drag reduction.

- Analytical models rely on boundary layer theory and empirical correlations to predict how trip wires influence transition from laminar to turbulent flow. These models help estimate critical Reynolds numbers and the resulting changes in drag and pressure distribution. While analytical methods provide valuable initial insights, their accuracy is limited for complex geometries and flow conditions.
- To validate and refine these models, researchers conduct experimental studies using wind tunnels, water channels, and pressure sensors to measure flow characteristics around trip wires. Techniques such as particle image velocimetry (PIV) and hot-wire anemometry allow for detailed visualization and quantification of velocity fields and turbulence.
- Complementing these experiments, numerical simulations using Computational Fluid Dynamics (CFD) provide deeper insights by solving the Navier-Stokes equations for various trip wire configurations. CFD studies help engineers analyze different trip wire sizes, placements, and operating conditions, enabling optimized designs for applications in aerospace, automotive, and industrial systems.



Ansys present a series of validated cases for Discovery 2025 R1 that can be found in the Help Manual. One of them is the Ahmed body drag coefficient simulation. **The picture shows the results using the Explore mode with good results. In the next section, another application of external aerodynamics flows is presented using the 2025 R1.**

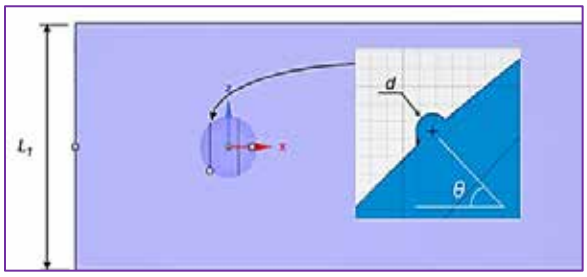
Methods

Case Study: Trip Wire Effects on a Sphere - Part of the experiment conducted by Son et al in 2011 [2] has been replicated numerically in Ansys Discovery. Usually, the Refine mode is recommended for more accurate results, but in this Demo the results are obtained in the Explore mode to show a new capability of the 2025 R1 release. This capability refers to the enhanced force monitors, which now include viscous shear force in addition to pressure force, which is the nature of the drag force (See Chapter 7 in [3]). Therefore, the drag coefficient (CD) is given by:

$$C_D = C_{D,press} + C_{D,fric}$$

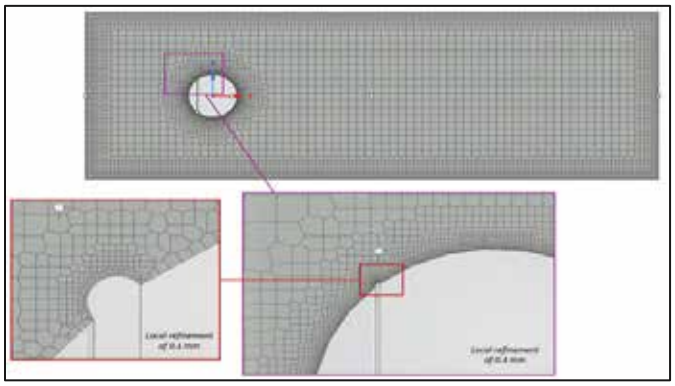
Some of the geometry details are mentioned as follows:

- Sphere Diameter, D = 150 mm
- Trip wire Diameter and location, d = 2 mm & q = 50° from the stagnation point
- Wind tunnel, cross section area (L1): 600 mm x 600 mm (Blockage ratio: 4.9%)
- Fluid: Air (Density = 1.16 kg/m3, Viscosity = 1.832x10-5 Pa.s)
- Reynolds Number, Re = 5x104 (velocity = 5.24 m/s)



The mesh can be visualized during the solution process in Explore Mode, either in 3D view or through cutting planes. By default, the mesh includes refinement at the inlet and outlet sections to improve accuracy. To ensure precise results, surface refinement is applied, with a local fidelity of 0.4 mm on the sphere surface and 0.1 mm on the trip wire.

The simulations are performed using an NVIDIA T1000 8GB GPU working at top capacity.

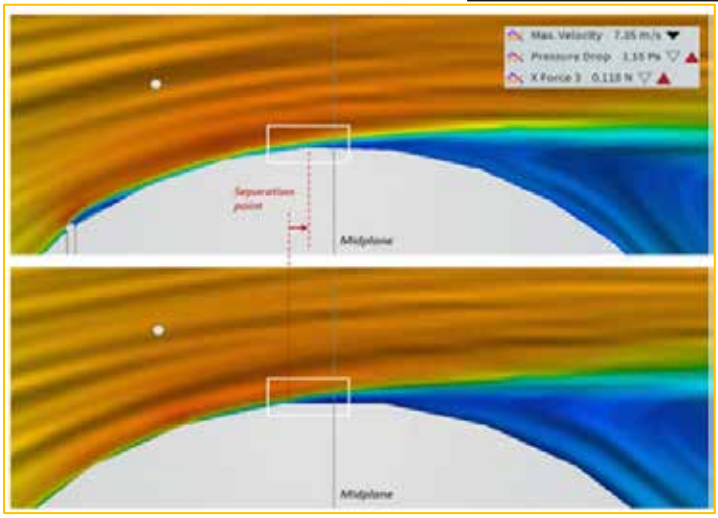


Results

The picture compares the flow over the sphere with and without the trip wire. As expected, the trip wire delays flow separation, reducing the low-pressure wake and thereby decreasing pressure drag. The drag coefficient determined from the experiments (see Fig.4 in [1]) for d/D = 1.33x10-2 and Re = 5x104 is 0.42.

The validation is achieved based on the Drag force calculation. The value reported by the monitor in the Explore Mode is 0.118 N. Then, by using this result, the numerical drag coefficient is calculated as follows:

$$C_D = \frac{F_D}{\frac{1}{2}\rho A V^2} = \frac{0.118\ N}{0.281\ N} = 0{,}419$$



Ansys Solution Benefits -

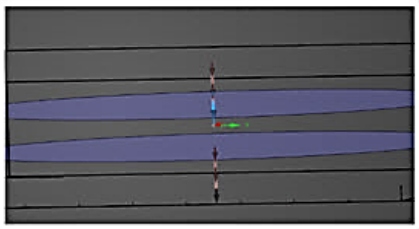
Ansys Discovery is an interactive simulation tool that integrates 3D modeling, design, and real-time analysis to streamline engineering workflows. It combines direct modeling technology with instant physics simulation, enabling users to modify designs, optimize topology, and explore multiple variations efficiently. Supporting structural, fluid, thermal, and electromagnetic simulations, it provides rapid insights for data-driven decisions.

The platform operates in three stages: Model for intuitive geometry creation, Explore for real-time analysis and quick iterations, and Refine for high-fidelity simulations using Ansys Fluent and Mechanical. Designed for efficiency and innovation, Ansys Discovery helps engineers tackle complex challenges and enhance design performance. Some top capabilities are listed below:

- Parametric Studies. Parameter sweeps enable engineers to evaluate multiple design options simultaneously, revealing trade-offs between different configurations. By analyzing how geometry or physics variations impact results, designs can be optimized for the best solution. In Ansys Discovery, this process is automated, allowing efficient modification of geometric and simulation parameters.
- Optimization. Whether you're accelerating design exploration with cloud-connected burst compute or optimizing designs seamlessly with optiSLang, these latest enhancements make engineering workflows faster and more intuitive than ever. Visit the dedicated website for more information about these topics.

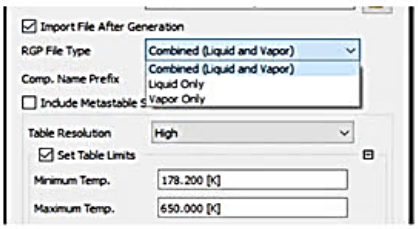
Additional Blogs Not To MIss

March 19, 2025 • 3 min read



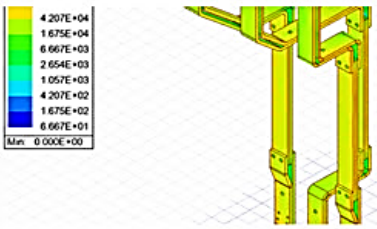
Ansys Charge Plus: Paschen Test Demo

March 18, 2025 • 4 min read



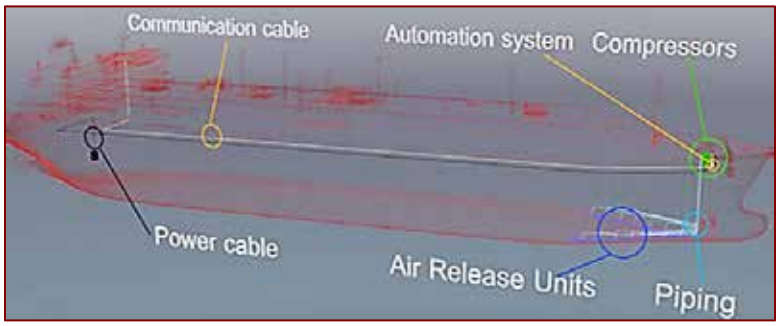
Step-by-Step Guide to Configure RGP Tables in Ansys CFX Pre

March 18, 2025 • 9 min read



BusBars power lines AC and thermal analysis using Q3D and Icepak

Article quote, “The air lubrication reduces the skin friction between the ship’s wetted area and sea water....**The computational analysis is performed with the ANSYS FLUENT software. Two separate geometries (two different models) are drawn for a ship’s hull: with and without an air lubrication system.”**



Web – MDPI - Computational Analysis of Air Lubrication System for Commercial Shipping and Impacts on Fuel Consumption

A. G. Fotopoulos, D. P. Margaris
Fluid Mechanics Laboratory (FML), Mechanical Engineering and Aeronautics Department, Univ of Patras, Greece

Abstract - Our study presents the computational implementation of an air lubrication system on a commercial ship with 154,800 m3 Liquified Natural Gas capacity. The air lubrication reduces the skin friction between the ship’s wetted area and sea water. We analyze the real operating conditions as well as the assumptions, that will approach the problem as accurately as possible. **The computational analysis is performed with the ANSYS FLUENT software. Two separate geometries (two different models) are drawn for a ship’s hull: with and without an air lubrication system.** Our aim is to extract two different skin friction coefficients, which affect the fuel consumption and the CO2 emissions of the ship. A ship’s hull has never been designed before in real scale with air lubrication injectors adjusted in a computational environment, in order to simulate the function of air lubrication system. The system’s impact on the minimization of LNG transfer cost and on the reduction in fuel consumption and CO2 emissions is also examined. The study demonstrates the way to install the entire system in a new building. Fuel consumption can be reduced by up to 8%, and daily savings could reach up to EUR 8000 per travelling day.

1. Introduction - In recent years, marine engineers and maritime companies have struggled to construct vessels with the lowest possible fuel consumption, in order to achieve the maximization of benefits and reduction of pollutants. Furthermore, rising fuel prices and restricted rules in emissions amplify the need for lower ship resistance and requisite propulsion power [1]. Each ship must face three kinds of resistance: wave, pressure and skin friction resistance. Wave and pressure resistances are inevitable and can be easily confronted by the detailed design of the hull. However, the reduction in the skin friction resistance remains proportionate to the wetted surface and the cruising speed, and even small decreases in skin friction have large impacts on the fuel consumption and the reduction of emissions...

2. Computational Analysis - We hypothesized that temperature, uninterrupted flow, draft and weight distribution along the whole length are equal and constant [6]. However, velocity, mass supply from the injectors, and hydrostatic pressure vary in the flowing field. The ship was designed in real-time scale and two dimensions (2D), due to the lack of computational power...T**he meshing of the flow-field and the optimization of the finite elements are performed using various techniques that ANSYS offers, such as inflation, edge sizing, and the quadratic cell method. These techniques guide the solver to focus and extract better results on the hull’s surface, where we are interested—this is a great advantage of the computational environment.**

Suraj Dhomase, CADFEM, "Parachutes are crucial aerodynamic decelerators in airdrop and planetary reentry missions, where their inflation dynamics involve significant fluid-structure interaction (FSI) phenomena. Given their low mass and high flexibility, parachutes experience complex interactions between the canopy structure and surrounding airflow. These interactions significantly influence structural deformation and performance under aerodynamic loads."

As parachute designs evolve with new canopy structures and porosity variations, LS-DYNA remains an essential tool for achieving first-time-right engineering solutions in aerospace and defense industries.

Web – CADFEM - **Simulating Safe Landing a Deep Dive Into Parachute Inflation and Float With LS-DYNA**

Traditional parachute deployment simulations rely on sequential processes—first simulating structural deformation using a solid mechanics solver and then analyzing aerodynamics separately with Computational Fluid Dynamics (CFD). However, this method often leads to inaccurate predictions. To overcome this, LS-DYNA's robust FSI capabilities enable a more precise simulation of parachute deployment, offering crucial insights for aerospace and defense organizations.

Figure 1 Fighter plane Decelerates Parachutes and Payload recovery Parachutes

Design of Drogue Parachutes - Drogue parachutes are deployed at high velocities ranging from 102 m/s at sea level to Mach 1.5 at 15,240 meters altitude. These parachutes are designed for:

- Stability: Maintaining orientation within ±3 degrees.
- Weight Efficiency: Optimized for minimal mass and volume.
- Controlled Deceleration: Ensuring safe deployment of the main parachute.

LS-DYNA aids in structural integrity analysis, stress distribution, and inflation performance validation, making it indispensable in drogue parachute design.

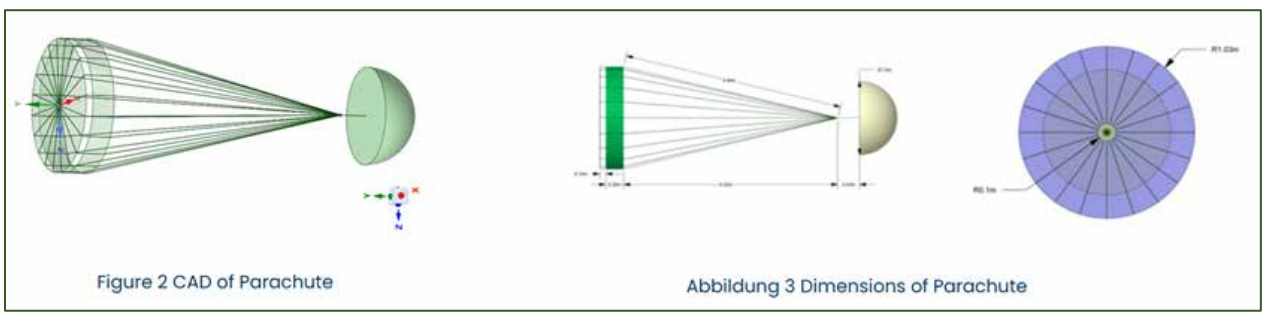


Figure 2 CAD of Parachute

Abbildung 3 Dimensions of Parachute

Structural Analysis Using LS-DYNA - Structural analysis is a key factor in parachute design and performance evaluation, as it determines how well the canopy and suspension lines withstand aerodynamic loads. LS-DYNA employs:

- Shell Elements: The fabric canopy is modeled using fully integrated shell elements (Shell Type 16) that account for membrane, bending, and shear deformations.
- Discrete Beam Elements: Suspension lines and reinforcement cables are simulated using Type 6 discrete beams, incorporating MAT_CABLE_DISCRETE_BEAM material properties to model dynamic oscillations.
- Dynamic Deployment Analysis: By employing Lagrangian dynamics, LS-DYNA accurately predicts canopy inflation, stress concentrations, and deformation behaviors.

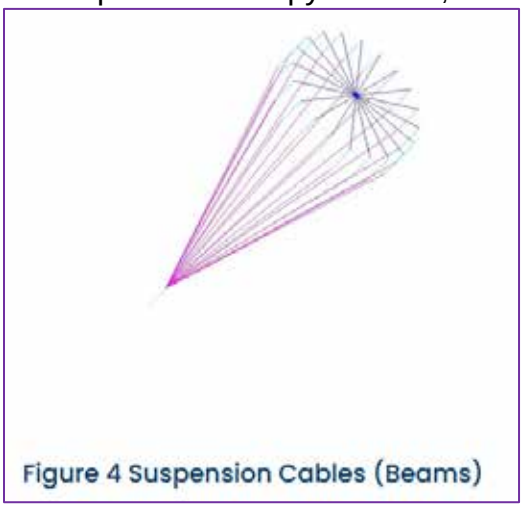


Figure 4 Suspension Cables (Beams)

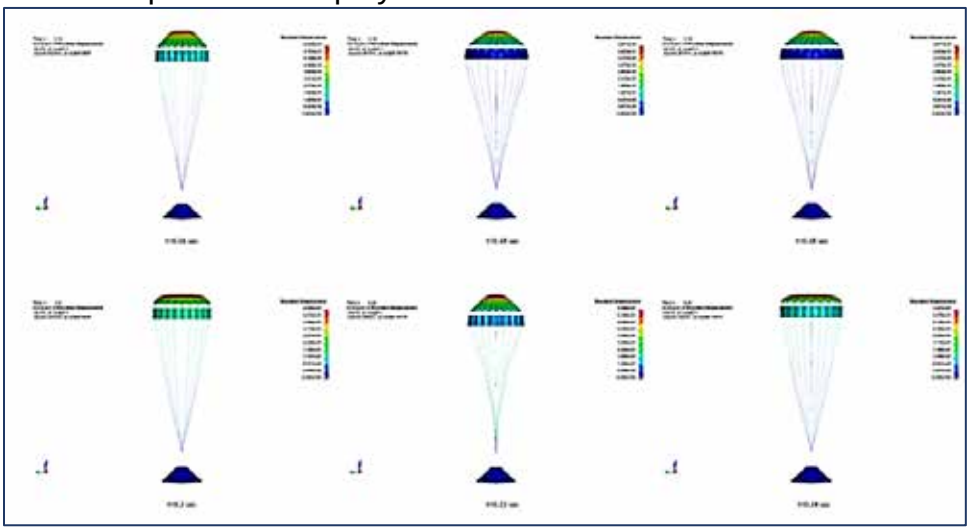
Material Modeling in LS-DYNA - Fabric materials in parachutes exhibit large deformations and nonlinear responses. LS-DYNA utilizes:

- Layered Orthotropic Composite Material (MAT 22): This specialized model is used for fabrics experiencing wrinkling and compression failures.
- Discrete Cable Material (MAT 71): Used for suspension lines to ensure tensile strength while avoiding compressive instability.
- Porous Material Modeling (ICFD_MODEL_POROUS): Defines fabric permeability, crucial for accurately simulating air leakage through the canopy.

Results of Structural Analysis - Dynamic simulations in LS-DYNA evaluate parachute behavior under real-world conditions:

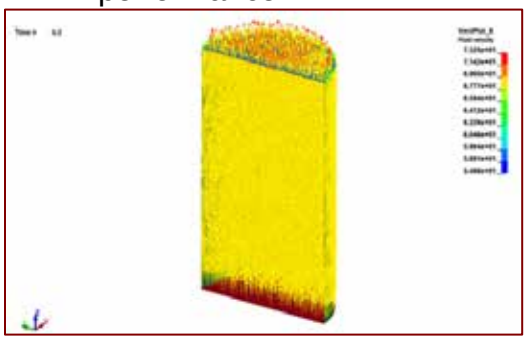
- Maximum Displacement: 0.68 m for the parachute canopy.
- Suspension Line Axial Force: 596.7 N.
- Riser Axial Force: 9190.8 N.

These findings demonstrate LS-DYNA's capability to predict stress distribution and deformation, ensuring safe and efficient parachute deployment.



Fluid Domain Modeling and Aerodynamic Analysis - CFD simulations using LS-DYNA provide valuable insights into parachute aerodynamics, addressing:

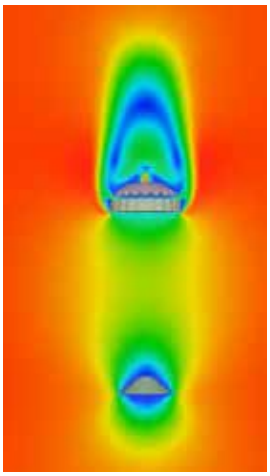
- Wake Effects: Predicting asymmetric instabilities caused by bluff-body aerodynamics.
- Recirculation Zones: Identifying turbulent regions that influence inflation stability.
- Eulerian Fluid Modeling: Simulating airflow over a fixed spatial mesh to analyze aerodynamic performance.



Porosity Modeling of Fabric Material - Parachute canopies are highly porous, affecting inflation dynamics and drag forces. LS-DYNA's ICFD_MODEL_POROUS simulates:

Video can be viewed on the CADFEM website

- Pressure Drop Across Fabric: Validating airflow resistance through the canopy.
- Porous Flow Interaction: Ensuring accurate drag force predictions during inflation.



Fluid-Structure Interaction (FSI) in LS-DYNA - FSI simulation is essential for capturing the coupled behavior of fluid and structure during parachute deployment. LS-DYNA offers:

- Two-Way Coupling: Simultaneously solving structural and aerodynamic forces for realistic inflation modeling.
- Eulerian-Lagrangian Interaction: Enabling airflow-structure coupling without inter-code data transfers.
- Explicit Time Integration: Handling complex deformations and contact nonlinearities efficiently.

FSI analysis provides realistic predictions of inflation forces, canopy deformation, and wake effects, ensuring accurate modeling for both airdrop and planetary reentry applications.

Analysis of Floats with FSI (graphic on website - Figure 13 Float Impact on Water)

Apart from parachutes, LS-DYNA is also widely used in aerospace floatation system analysis, simulating:

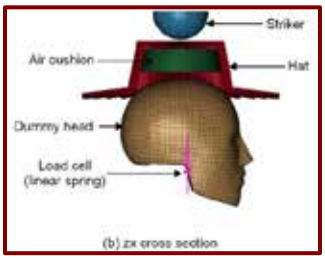
- Buoyancy & Water Impact Forces: Evaluating how aerospace floats behave under hydrodynamic loads.
- Structural Deformations: Ensuring float durability under impact conditions.

This capability proves valuable for spacecraft recovery systems and maritime aerospace applications.

Conclusion: - Advancing Parachute Design with LS-DYNA
The simulation of parachute deployment using LS-DYNA is a groundbreaking advancement in aerospace engineering. This study highlights:

- FSI Coupling for Accurate Inflation Predictions.
- Material and Structural Modeling for Enhanced Durability.
- CFD-Driven Aerodynamic Insights for Performance Optimization.

DYNAlook presents papers from European & Int'l LS-DYNA User Conferences & papers provided by other users. More than 2300 papers are available. (if the PDF links no longer work refer to (https://www.dynalook.com) for their updated links)



PDF - Study on Impact Loading Reduction Performance of "Origami Hat "
Sunao Tokura, Toshie Sasaki, Ichiro Hagiwara
Tokura Simulation Research Corp.
Meiji Inst. for Advanced Study of Mathematical Sciences

With the enforcement of the revised Road Traffic Act, wearing helmets has become a mandatory effort for all cyclists since April 1, 2023 in Japan. However, there are still many people who do not wear helmets. Therefore, we considered developing a foldable helmet that can be easily carried by applying the concept of origami engineering. Origami engineering is a research field proposed with the aim of developing lightweight, high-strength structural components based on the idea of origami, a traditional Japanese paper craft in which various shapes are created by folding paper-like materials. …

PDF - Application of the MAT 213 Composite Impact Model to NASA Problems of Interest
Robert K. Goldberg, Trenton M. Ricks, Troy Lyons, Javier Buenrostro, Jacob Putnam, Daniel Slaughter
NASA Glenn Research Center, Cleveland, Ohio
NASA Langley Research Center, Hampton, Virginia
Iowa State University Ames, Iowa

As composite materials are gaining increased use in aircraft components where impact resistance under high-energy impact conditions is important (such as the turbine engine fan case), the need for accurate material models to simulate the deformation, damage, and failure response of polymer matrix composites under impact conditions is becoming more critical.

PDF - Continuum-based Particle Gas (CPG): A New Approach for Airbag
Edouard Yreux, Jason Wang, Inaki Caldichoury, Mohammed Mujtaba Atif
ANSYS, Inc.

The evolution of automotive safety systems has witnessed a remarkable journey over the past few decades, with airbags emerging as pivotal components in mitigating the severity of injuries during vehicle collisions. Initially conceived as relatively simple passive restraint systems, airbags have undergone a profound complexification in their design and functionality, driven by the relentless pursuit of enhanced occupant protection and regulatory compliance. Today, modern vehicles incorporate a diverse array of airbags strategically positioned throughout the cabin to address various collision scenarios. From front and side airbags to curtain and knee airbags, this proliferation underscores the nuanced approach to occupant protection adopted by automotive manufacturers

BETA CAE – YouTube - BETA CAE

Latest developments for Isogeometric Analysis in ANSA v25.1.0 - This video showcases the latest advancements in Isogeometric Analysis, implemented in ANSA v25.1.0. It begins with the support of the distortion visualization and the stamping results. Following, it demonstrates the creation of solid IGA both from geometry as well as from solid FE and the creation of parametric points on solid IGA. Lastly, there is an improvement of the shell patch create.

OASYS – Web - UK Users' Conference 2025 - June 27th - 1 day

Complementary In-Person Event - the UK Users' Conference 2025, taking place on Friday, 27th of June at the Arup, Birmingham office. A unique opportunity for simulation experts, industry professionals, and academics to come together and explore the latest advancements in the Oasys and LS-DYNA world. This year's conference features a comprehensive programme designed to provide you with the knowledge and skills to unlock the full potential of Ansys LS-DYNA and the Oasys Suite.

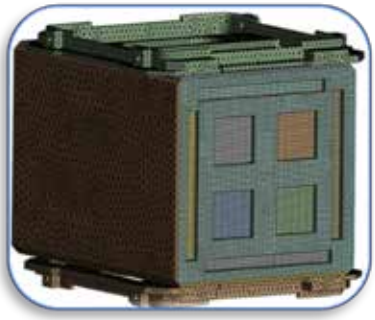
Cad-Experts.gr - Web - About

Beyond mechanical engineering, we are also experts in industrial and mechanical design, with a particular focus on sheet metal design, offering a wide array of applications. safety engineering plans and solutions for the industry. Our engineering solutions are based on your specific needs, delivered through 2D/3D CAD modeling, CAE/CFD analysis, and prototyping (including full R&D through to construction when needed).

The 3M Digital Materials Hub, Intro

Simulation engineers can now quickly compare, and download verified 3M materials data to help them determine best-fit 3M solutions using simulation. Currently, offered: small strain viscoelastic, finite strain viscoelastic, linear elastic plastic and cohesive zone models. In the future material models such as fatigue, temperature-dependent CTEs, creep, etc in the future. Additionally, a team of FEA engineers ready to support FEA Analysts in modelling products in their simulation projects.

The CUbesat Solar Polarimeter (CUSP) project is a CubeSat mission orbiting the Earth aimed to measure the linear polarization of solar flares in the hard X-ray band by means of a Compton scattering polarimeter.



MDPI – Web - The Payload Design of the CUbesat Solar Polarimeter (CUSP), for Space Weather and Solar Flares X-Ray Polarimetry,

Authors: **Giovanni Lombardi, Sergio Fabiani, Ettore Del Monte, Emanuele Di Meo, Andrea Lopez, Marco Camponeschi, Marco Evangelos Biancolini, Daniele Brienza, Immacolata Donnarumma, Silvia Natalucci, Andrea Terracciano, and Emanuele Zaccagnino.**

INAF-IAPS, Rome, Italy
Univ. degli Studi di Roma “Tor Vergata”, Rome, Italy
RBF Morph, Rome, Italy
ASI, Via del Politecnico snc, Rome Italy

Abstract - The CUbesat Solar Polarimeter (CUSP) project is a CubeSat mission orbiting the Earth aimed to measure the linear polarization of solar flares in the hard X-ray band by means of a Compton scattering polarimeter. CUSP is a project in the framework of the Alcor Program of the Italian Space Agency aimed to develop new CubeSat missions. It is approved for a Phase B study. In this work we describe some design solutions adopted for the most important design drivers of the payload. In particular, we report on the payload preliminary multi-physical design, including an orbital thermal environment preliminary assessment and a implementation of the static/dynamic finite element analysis. Moreover, a method for topology optimization of relevant components is discussed.

1. Introduction - The CUbesat Solar Polarimeter (CUSP) [1] is a CubeSat mission in low Earth orbit, specifically conceived to measure the linear polarization of solar flares in the hard X-ray range (25–100 keV) through a Compton scattering polarimeter. This cutting-edge mission is expected to provide new insights into magnetic reconnection and particle acceleration mechanisms occurring within the Sun’s flaring magnetic structures, which are crucial processes underlying space weather dynamics.
Hard X-ray polarimetry offers a unique observational window into the physical mechanisms responsible for particle acceleration, as well as the temporal evolution of magnetic configurations during solar flares. These data are essential for refining current models of solar activity and understanding its influence on the heliosphere. Such improved knowledge will contribute to the development of more accurate space weather predictions, which are essential to mitigate the risks for satellite systems, communication infrastructures, and terrestrial power grids....

CUSP is developed within the framework of the Alcor Program, a strategic initiative led by the Italian Space Agency (ASI) to promote innovative CubeSat missions. Having been approved for Phase B in 2024 [2], the CUSP project embraces an innovative design methodology, incorporating Reduced-Order Models (ROMs) and Radial Basis Function (RBF) mesh morphing techniques to optimize the payload design. These approaches enable real-time predictions of critical physical quantities, such as stress and thermal distributions, thereby enhancing the overall design efficiency and robustness.

This paper presents the preliminary design solutions proposed for the CUSP payload, with a focus on the multiphysics analyses and the topology optimization performed on key structural elements. Advanced numerical methods have been employed to lay the groundwork for future developments in CubeSat payload engineering.
The paper is structured as follows: Section Theoretical background provides the theoretical background, including the implementation of ROM and RBF techniques; Section Workflow and Software describes the design workflow and software tools adopted; Section Payload Design focuses on the payload design strategy; Section Results and Proposal presents the results of the multiphysics simulations; and finally, Section Conclusions summarizes the conclusions and outlines future activities.

The software used for this project are the following (excerpts):

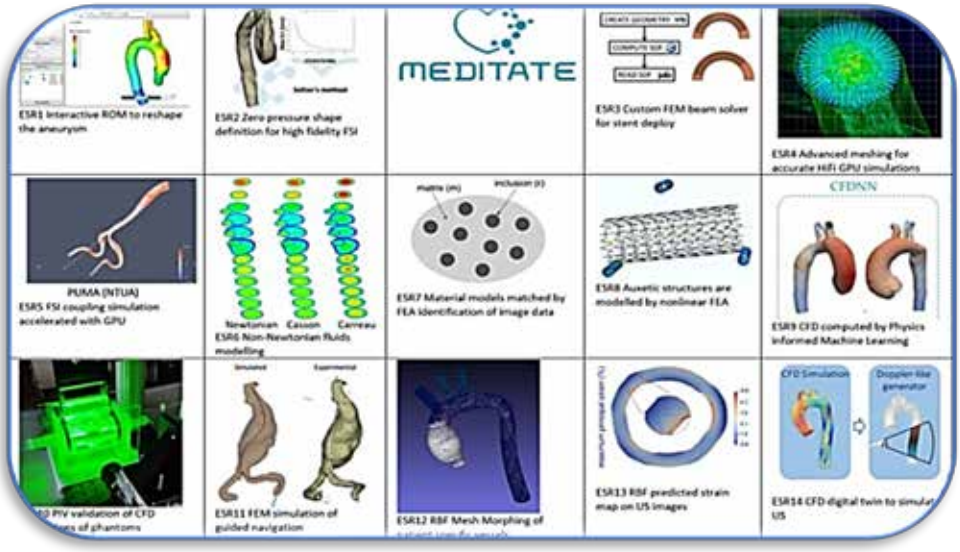
- **SolidWorks** - SolidWorks is a three−dimensional parametric design software, produced and marketed by Dassault Systèmes. Useful for the design of mechanical devices, even complex ones, it involves the creation of 2D and 3D drawings of solids and surfaces, through a parametric geometric system [3].
- **ANSYS SpaceClaim** - ANSYS Space Claim is a parametric solid modeling software available in the ANSYS package that operates mainly according to the direct modeling logic, thanks to which it is possible to define the construction and modification operations of the desired geometry, without the need to define interdependent features.
- **ANSYS Meshing** - ANSYS Meshing is the software responsible for generating the calculation grid. This process is automated in its simplest application although it is possible to add control settings to act directly on those parameters that define the mesh in terms of morphology, topology and dimensions of the constituent cells.
- **ANSYS Workbench** - The Workbench platform is the tool designed to put in communication the various modeling and numerical analysis software that fall within the ANSYS landscape, facilitating the management of the project that is articulated there through various work steps. Its key feature is to allow the transfer and sharing of input and output data not only between the different tools used in pre and post processing, but also between multiple simulation models (which allows for the easy implementation of sophisticated multi−physical simulations) [4].
- **Systema Thermica** - Thermica [5] is a sophisticated thermal analysis software widely used in the aerospace industry to simulate and evaluate the thermal behavior of spacecraft and their components in orbit.
- **Ansys Twin Builder**- Twin Builder is a tool that enables the processing of a dataset and the creation of a Reduced Order Model (ROM). The ROM allows for real-time evaluations of field quantities (such as stresses) and supports more informed decision-making during the design phase.

Successful Conclusion of the EU Funded MeDiTATe Project - We are proud to announce the conclusion of the MeDiTATe-project (Medical Digital Twin for Aneurysm Prevention and Treatment), an EU-funded Marie Curie European Industrial Doctorate. Over the course of the project, 14 Early Stage Researchers have developed cutting-edge simulation and imaging technologies to accelerate personalized cardiovascular medical procedures.

Following the European Commission's final review, the feedback has been overwhelmingly positive.

The report begins with a statement that fills us with pride:

"Project has delivered exceptional results with significant immediate or potential impact."



MeDiTATe Project

The research outcomes of MeDiTATEe have been recognized as significant, highlighting the project's contribution to both industrial and clinical applications.

The reviewers also commended the strong commitment of the project partners.

".. all the beneficiaries provided adequate support towards the efficient implementation of the project, and particularly in the training activities, fulfilling their obligations."

Another key highlight of the review is the acknowledgement of the strong collaboration across academia, healthcare, and industry

"The consortium brought together researchers and experts from various fields, improving the collaboration between academia, healthcare, and industry. Overall, they seem to provide a good basis for further international collaborative initiatives with other academic or research institutions, as well as healthcare institutions and industry, particularly across the participating European countries."

This endorsement encourages us to continue fostering interdisciplinary collaborations, expanding the impact of medical digital twin technologies in cardiovascular healthcare.

A special thank you to our partners—among which, Ansys, RINA, University of Rome Tor Vergata, Fondazione Gabriele Monasterio Regione Toscana CNR, CINECA, and Philips—for their invaluable contributions and dedication

Web - TATA Motors - Tata Motors Drives India's Green Future with Country's First Hydrogen Truck Trials - 16 trucks to drive across key freight corridors, paving the way for a net-zero emissions future

... Tata Motors, the country's largest commercial vehicle manufacturer, has launched the first-ever trials of **hydrogen-powered heavy-duty trucks.**...

Through this pioneering initiative, Tata Motors underscores its commitment to leading the charge in sustainable mobility solutions, aligning with India's broader green energy goals. ...

It marks a significant step forward in assessing the real-world commercial viability of using hydrogen powered vehicles for long distance haulage as well as setting-up the requisite enabling infrastructure for their seamless operation.

The trial phase will span up to 24 months and involves deployment of 16 advanced hydrogen-powered vehicles with varying configurations and payload capacities. These trucks, equipped with new age Hydrogen Internal Combustion Engines (H2-ICE) and Fuel Cell (H2-FCEV) technologies, will be tested on India's most prominent freight routes, including those around Mumbai, Pune, Delhi-NCR, Surat, Vadodara, Jamshedpur and Kalinganagar.

…Shri Nitin Gadkari, Hon'ble Union Minister of Road Transport and Highways, Government of India, said, "Hydrogen is the fuel of the future with immense potential to transform India's transportation sector by reducing emissions and enhancing energy self-reliance…"

…Shri Pralhad Joshi, Hon'ble Union Minister of New and Renewable Energy, Government of India said, "Hydrogen is an important fuel for India's transition to a sustainable and zero-carbon future…."

Highlighting Tata Motors' preparedness, Mr. Girish Wagh, Executive Director, Tata Motors, said, "Tata Motors is deeply honored to be at the forefront of driving India's transformation towards greener, smarter, and sustainable mobility. As a company with a long-standing commitment to nation-building, we have continuously embraced innovation to develop mobility solutions that contribute to India's growth and development. Today, with the commencement of these hydrogen truck trials, we are proud to further this legacy by pioneering the transition to clean, zero emission energy for long haul transportation. We are grateful to the Government of India for their visionary leadership in making this possible, and we remain committed to playing our part in building sustainable, future ready mobility solutions that will deliver better performance and efficiency."

The flagged-off vehicles exemplify Tata Motors' comprehensive approach to hydrogen mobility, displaying both Hydrogen Internal Combustion Engine (H2ICE) and Hydrogen Fuel Cell Electric Vehicle (FCEV) technologies. This includes two Tata Prima

H.55S prime movers—one powered by H2ICE and the other by FCEV, alongside the Tata Prima H.28, an advanced H2ICE truck. With an operational range of 300-500 km, these vehicles are engineered for sustainable, cost-efficient, and high-performance transportation. Featuring the premium Prima cabin and advanced driver-assist safety features, they enhance driver comfort, reduce fatigue, and improve productivity while setting new benchmarks for safety in trucking.

Tata Motors is at the forefront of developing innovative mobility solutions powered by alternative fuel technologies such as battery electric, CNG, LNG, hydrogen internal combustion, and hydrogen fuel cell. …

Thanks to Harish Cherukuri and social media.

Breaking New Ground: 49ers Racing IC Completes First-Ever Wheel-Force Test. The 49ers Racing IC team at UNC Charlotte wrapped up their first-ever wheel-force test! This wasn't just any test. It was a milestone.

Web - [49ers Racing IC team at UNC Charlotte]

"With cutting-edge telemetry from IZZE Racing, a precision transducer sensor from Michigan Scientific Corporation, and incredible support from DENSO and Charlotte Motor Speedway, we gathered game-changing data that will revolutionize our understanding of vehicle dynamics.

Only a lucky handful of Formula SAE teams have ever executed a test at this level. Now, we're among them. For the first time, we have real-world force data to validate our models, refine our designs, and push beyond the limits of simulation. The gap between assumption and certainty just got a whole lot smaller—and we're just getting started."

What is Formula SAE? Formula SAE (FSAE) is an international collegiate engineering competition organized by the Society of Automotive Engineers (SAE). This prestigious event challenges student teams from universities around the world to design, build, and compete with small, open-wheel, single-seater, formula-style race cars. It is a comprehensive competition that tests not only the engineering prowess of the participants but also their project management, teamwork, and business acumen.

In the US there is an internal-combustion (IC) and an electric vehicle (EV) competiton held every year in May and June respectively, at Michigan International Speedway.

The "49ers Racing IC wheel-force test" refers to a recent completion of a test conducted by the 49ers Racing team at UNC Charlotte, where they measured the forces acting on each wheel of their race car, providing crucial data to refine vehicle dynamics and performance based on real-world data, marking a significant milestone for the team in their Formula SAE competition preparations

High-tech sensors and telemetry systems were used to gather precise data on wheel forces during testing, providing valuable insights for vehicle optimization.

From the Formula Student Turkey website, “In our country, Formula Student has been attracting more and more students every year since 2014, and in many schools, students are stepping into this world by establishing new teams.

Web – FST - A new world - FORMULA STUDENT TURKIYE 2025

About - Formula Student is a prestigious competition organized by SAE (Society of Automotive Engineers) in more than 20 countries on 4 continents since 1981, aiming to develop the engineering, business management and teamwork skills of university students.

In this competition, students compete with their racing vehicles, which they have designed and produced from scratch within the framework of the rules set by IMECHE (Institution of Mechanical Engineers) and SAE (Society of Automotive Engineers), by demonstrating their technical knowledge and strategic planning skills, not just a race to measure who will reach the finish line first .

The competition consists of three static stages under the titles of engineering design, cost and production, business plan, and five dynamic stages under the titles of acceleration, autocross, endurance, skid-pad, and fuel economy.

We are not only organizing a national race event; we are initiating a process where teams will come together to:

- exchange information in the preparation processes for international races, in the design stages,
- in the planning of static race processes, where consultancy opportunities will be provided through a higher board,
- where training and certification services will be provided in various fields,
- where opportunities will be created to find new support channels.

US Airforce Picture of the Month

Winning the race - An F-22A Raptor from the 71st Fighter Squadron takes off from Joint Base Langley-Eustis, Va., March 6, 2025, after competing in the Mitchell Trophy Air Race. Established in 1922, the race honors the original home of the 1st Fighter Wing at Selfridge Air National Guard Base, Mich. Pilots can only compete once in their lifetime, regardless of the outcome.

(U.S. Air Force photo by Sr. Airman Mikaela Smith)

Reach the skies - A U.S. Air Force B-52H Stratofortress assigned to the 69th Expeditionary Bomb Squadron flies over Europe during Bomber Task Force 25-2 at RAF Fairford, United Kingdom, Feb. 27, 2025. BTF 25-2 demonstrated the ability to rapidly deploy strategic assets in support of global stability.

(U.S. Air Force photo by Master Sgt. Chris Hibben)

Sound of Speed Airshow flies for the community

A B-2 Spirit flies overhead during the Speed of Sound Airshow at Rosecrans Memorial Airport in St. Joseph, Mo., May 2, 2021. The air show was hosted by the 139th Airlift Wing and city of St. Joseph to thank the community for their continued support. Approximately 30,000 people attended the weekend performances including the B-2 and the U.S. Air Force Air Demonstration Squadron, the Thunderbirds.

(U.S. Air National Guard photo by Tech. Sgt. Patrick Evenson)

Sikorsky, a Lockheed Martin company (NYSE: LMT) has successfully validated the advanced control laws to successfully fly a 'rotor blown wing' uncrewed aerial system (UAS) in both helicopter and airplane modes. Powered by batteries, the 115 pounds (52kg) twin prop-rotor prototype has demonstrated operational stability and maneuverability across all flight regimes, and the potential to scale the unique vertical take-off and landing (VTOL) design to larger sizes requiring hybrid-electric propulsion.

Web – Web - Sikorsky Successfully Flies Rotor Blown Wing UAS in Helicopter and Airplane Modes Tail sitter drone can be scaled to larger sizes with hybrid-electric propulsion

Sikorsky proves a rotor blown wing tail sitter drone can transition easily between helicopter and fixed wing flight modes.

Photos by Sikorsky, a Lockheed Martin company.

"Combining helicopter and airplane flight characteristics onto a flying wing reflects Sikorsky's drive to innovate next-generation VTOL UAS aircraft that can fly faster and farther than traditional helicopters," said Sikorsky Vice President and General Manager Rich Benton. "Our rotor blown wing platform is a prime example how we are leveraging the breadth of our 102-year aviation heritage to develop new designs that meet the emerging missions of commercial and military operators."

Innovation Breakthrough - Sikorsky Innovations, the company's rapid prototyping group, heads the effort to develop and mature the rotor blown wing design. In just over a year, Sikorsky Innovations has progressed through preliminary design, simulation, tethered and untethered flight to gather aerodynamic, flight control and quality data. Breakthrough was achieved in January 2025 with the 10.3-ft composite wingspan aircraft when Sikorsky Innovations successfully completed more than 40 take-offs and landings. Notably, the aircraft performed 30 transitions between helicopter and airplane modes, the most complex maneuver demanded of the design. In horizontal flight mode, the aircraft reached a top cruise speed of 86 knots. Simultaneous wind tunnel tests were conducted on a 1:1 scale model providing valuable validation of the newly developed control laws by correlating them with real-world experimental data.

"Our rotor blown wing has demonstrated the control power and unique handling qualities necessary to transition repeatedly and predictably from a hover to high-speed wing-borne cruise flight, and back again," said Sikorsky Innovations Director Igor Cherepinsky. "New control laws were required for this transition maneuver to work seamlessly and efficiently. The data indicates we can operate from pitching ships decks and unprepared ground when scaled to much larger sizes."

Applications of future UAS rotor blown wing aircraft include search and rescue, firefighting monitoring, humanitarian response, and pipeline surveilling. Large variants will enable long range intelligence, surveillance and reconnaissance, and piloted drone teaming (crewed/uncrewed teaming) missions. All rotor blown wing variants will include Sikorsky's MATRIX™ flight autonomy system to navigate the aircraft during flight. …

TUSAS - The T625 GÖKBEY Multirole Utility Helicopter, developed by Turkish Aerospace and strengthening Türkiye's aviation independence, has successfully completed low-altitude cold weather tests under severe winter conditions. One of the most critical phases of the civilian and military certification processes, the cold weather tests, were conducted in the Kiruna region of Sweden.

Web TUSAS Excerpts – The T625 GÖKBEY Multirole Utility Helicopter

The T625 GÖKBEY Multirole Utility Helicopter, which made its maiden flight on September 6, 2018, and was named "GÖKBEY" by President Recep Tayyip Erdoğan on December 12, 2018, has completed yet another challenging phase.

Following the delivery of the first three mass-produced GÖKBEY helicopters, the aircraft was sent to Sweden for the required tests in the ongoing civilian and military certification process. Low-altitude cold weather tests were conducted in the Kiruna region. Throughout a month-long test campaign, a significant milestone was achieved in proving GÖKBEY's resilience in cold climate conditions.

Ground tests were conducted to evaluate the individual performance of the environmental control systems at the aircraft level. Additionally, propulsion, rotor, and hydraulic tests were successfully completed. With these tests, GÖKBEY has proven its readiness for flight even in the extreme cold conditions of the Arctic Circle.

T625 GÖKBEY SUCCESSFULLY COMPLETES TESTS WITH 60 HOURS OF FLIGHT

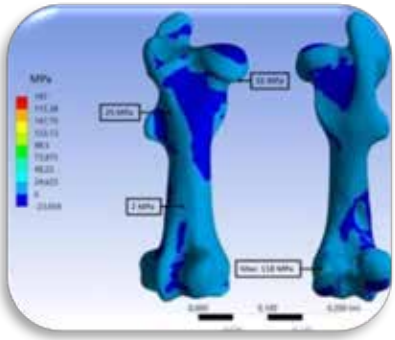
Throughout the test process, GÖKBEY underwent control and performance-focused flight tests, performing demanding maneuvers to determine takeoff, landing, and flight limits. Limit speeds and approach angles were tested under cold weather conditions. In line with aviation safety standards, GÖKBEY also successfully demonstrated safe flight capability in simulated failure scenarios, including controllability tests conducted at a speed of 176 knots.

With the safety-first approach of Turkish Aerospace's experienced ground personnel, pilots, flight test engineers, designers, and project teams, more than 600 individual test points, 60 sorties, and a total of 60 flight hours were successfully completed in temperatures as low as -30°C.

The T625 GÖKBEY Multirole Helicopter, designed and manufactured using national capabilities, is built to operate effectively in the most challenging climates and terrains, at high altitudes and temperatures, both day and night. Due to its wide range of capabilities, the helicopter can perform missions such as transport, VIP transport, cargo, air ambulance, search and rescue, and offshore transport.

The T625 GÖKBEY helicopter, designed for both domestic and international users using national resources, performs its missions effectively in the harshest climates and terrains, at high altitudes and temperatures, both day and night, powered by the national TEI-TS1400 Turboshaft Engines.

"For FEA, the four 3D models of bone combined with the implant as well as the sole model of the bone were imported into the numerical simulation software Ansys (Version 2021 R2, ANSYS. Software Corporation, Canonsburg, USA). For comparison, also the intact femur without fracture and osteosynthesis was analyzed with FEA.



BMC – Web - Numerical evaluation of internal femur osteosynthesis based on a biomechanical model of the loading in the proximal equine hindlimb

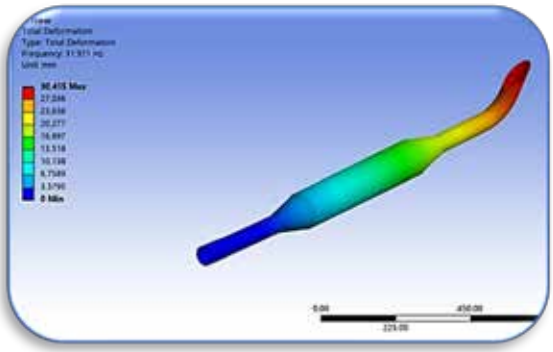
J. Lang, X. Li, C. Micheler, N. Wilhelm, F. Seidl, B. Schwaiger, D. Barnewitz, R. Eisenhart-Rothe, C. Grosse. R. Burgkart

TUM School of Med., Tech.l Univ. of Munich, Germany
Equine Clinic Res. Ctr. for Med. Tech. & Biotech., Germany

Summary - Femoral fractures are often considered lethal for adult horses because femur osteosynthesis is still a surgical challenge. For equine femur osteosynthesis, primary stability is essential, but the detailed physiological forces occurring in the hindlimb are largely unknown. The objective of this study was to create a numerical testing environment to evaluate equine femur osteosynthesis based on physiological conditions. **The study was designed as a finite element analysis (FEA) of the femur using a musculoskeletal model of the loading situation in stance. Relevant forces were determined in the musculoskeletal model via optimization. The treatment of four different fracture types with an intramedullary nail was investigated in FEA with loading conditions derived from the model.** The analyzed diaphyseal fracture types were a transverse (TR) fracture, two oblique fractures in different orientations (OB-ML: medial-lateral and OB-AP: anterior-posterior) and a "gap" fracture (GAP) without contact between the fragments. For the native femur, the most relevant areas of increased stress were located distally to the femoral head and proximally to the caudal side of the condyles. For all fracture types, the highest stresses in the implant material were present in the fracture-adjacent screws. Maximum compressive (-348 MPa) and tensile stress (197 MPa) were found for the GAP fracture, but material strength was not exceeded. The mathematical model was able to predict a load distribution in the femur of the standing horse and was used to assess the performance of internal fixation devices via FEA. The analyzed intramedullary nail and screws showed sufficient stability for all fracture types.

Conclusions - The work shown here introduced a musculoskeletal model of the loading situation for the equine hind limb while standing, which was lacking in the literature so far. The model was used to analyze stress distribution of the intact femur and four different fracture situations after osteosynthesis with an intramedullary nail. The fixation screws were found to obtain the highest stresses especially for the GAP fracture. The entire osteosynthesis is shown in the numerical analysis to be stable for all analyzed fracture types and designed with a sufficiently high safety factor for the implant material. The model as well as the findings from this study provide a rapid mechanical evaluation setup to further optimize equine femur osteosynthesis, in which primary stability is extremely important.

ANSYS software was used to investigate the stresses experienced by the tractor's vertical exhaust system...The ANSYS 2023 R1 Workbench software, as verified by experimental studies, provides high accuracy, cost effectiveness, and time savings in the design of exhaust systems.



Web – MDPI - **Modal Analysis and Optimization of Tractor Exhaust System**

Ayla Tekin, Halil Samli

Dept. of Machinery & Metal Technologies, Soma Vocational School, Manisa Celal Bayar Univ., Türkiye

Dept. of Mechanical Engineering, Manisa Celal Bayar Univ. Türkiye

Abstract - Excessive vibrations in exhaust systems can significantly reduce a vehicle's lifespan and compromise performance. These vibrations, caused by factors such as engine operation and road conditions, lead to wear and tear. To address this issue, a finite element analysis (FEA) was conducted on a 90-horsepower tractor's exhaust system. Using ANSYS WB®, a 3D model was created and modal analysis was performed to determine the system's natural frequencies and mode shapes. Based on the results, geometric modifications were made to the exhaust system, increasing its stiffness and shifting vibration frequencies to higher values. Consequently, vibration levels, noise, and the risk of component failure were significantly reduced. The redesigned exhaust system was successfully implemented in production. This study demonstrates the effectiveness of FEA in analyzing exhaust system vibrations and facilitating design improvements. By extending vehicle lifespan and providing a quieter, more comfortable driving experience, this research offers valuable insights for automotive and mechanical engineers.

1. Introduction - The agricultural sector plays a vital role in meeting the basic needs of human life. The use of modern production methods in agriculture is a crucial requirement to increase production efficiency. Tractor powertrain systems are essential for performing fundamental agricultural operations such as seeding, fertilizing, spraying, and harvesting. As technology advances, new methods have been employed in tractor production, and research in this field has deepened. Engines, the primary source of vibration in internal combustion engines, subject exhaust systems to intense vibrations [1]. Vibration can be defined as the periodic or random occurrence of mechanical oscillations around an equilibrium point [2]…

3. Results and Discussion - In this study, a new vertical exhaust model was designed to improve the vibration behavior of the existing exhaust system and was compared to the current model. The primary objective of these modifications was to increase the natural frequencies of the system and thus enhance its resistance to external excitation forces. **The first ten natural frequencies for both models were determined using modal analysis performed in ANSYS Workbench. The obtained results confirmed the effects of the modifications on the system. Therefore, both the accuracy of the model and detailed information about the vibration behavior of the exhaust system were obtained.**

Town secretary

April

My Virtual Travel Outing

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

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

We owe so much to the fire department, EMT's, and our Town Police – they all work to keep up safe.
I decided we should take a look at fire trucks!

Model 45S "District" fire engine from Pierre, SD
1941 - 1960, Mack

Hall of Flame museum has grown from its original single gallery to five exhibit galleries, the National Firefighting Hall of Heroes, the museum store, a theater, a restoration shop, a collection storage building, and administrative offices.

The Hall's present size is 70,000 square feet, with 35,000 square feet of exhibit galleries. The collection has grown to over 130 wheeled pieces and thousands of smaller artifacts.

1977 American LaFrance – Worthington

1957 Van Pelt
1941 - 1960, Van Pelt

NYFD Rescue 4
1961 - 2004

Fire Alarm Systems

Fire Extinguishers

Fire Helmets

Thank you for joining me on my visit to this month's museum.
AND, don't forget to join me next month when I visit another museum!

April 2025 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,

Town investigative reporter

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

April

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

I report about the residents.

Dad Chat

Mom GPT.

Just as I was brushing my nonexistent hair—because, you know, AI cyborgs don't have hair—the secretary whisper-screamed through my phone, "NOW! Get down to the coffee shop! You'll see two really strange people sitting together. Not that the table itself is strange, but those two? STRANGE!"

I opened my mouth to ask who exactly I was looking for, but before I could get a word out, she had already hung up. Typical. With no time to waste, I sprinted toward the coffee shop, my circuits firing on high alert.

As I burst through the door, I was immediately greeted by the barista, who wore an apron emblazoned with the word "Strange." I hesitated.

Was it referring to her? The coffee shop? Or was this some cryptic foreshadowing related to the warning I had just received? Deciding not to dwell on it, I smiled casually and nodded.

"Nice apron," I said before making a beeline past her.

Then I froze. When I say froze, I mean my circuits momentarily malfunctioned as I tried to process what I was seeing.

Seated at the table were two figures I never expected to see together having a conversation.

Without thinking, I blurted out, "DAD?" "CHAT!"

Dad turned toward me with his signature calm monotone. "Hello, daughter. Would you care to join us?"

I wanted to scream NO! and demand to know why he was sitting there with Chat of all people. Or rather, of all the AI entities he could talk with why was he in cahoots with Chat? Cahoots was a word the old rancher had taught me. Instead, I scrambled for an excuse. "Oh, I, uh… I have a book to read. For a class. Uh, on applying makeup?"

A blatant lie. I didn't have a book. I didn't even take classes or wear makeup. Dad gave me his famous blank stare, the kind that said, I know you're lying, but I will let you pretend you aren't. Chat, on the other hand, just fixed me with his usual unreadable gaze.

With no escape route, I reluctantly slid into a chair nearby, listening as they discussed Agatha's desire for the town supervisor to retire so she could take over.

"Agatha is a logical choice," Dad stated. "She eats healthy, is well-dressed, bakes efficiently, and has no known medical issues and handles stress even if it is deflection to someone else."

"The current supervisor, however," Dad countered, "burns her baking, eats cupcakes, experiences stress headaches, is highly superstitious and doesn't have any logic at all just all emotion."

I glanced toward the barista, who, in a bizarre twist, had changed her apron yet again. This time, it read: NO on Agatha! The barista didn't say much but spoke what we would from now on call Apron Answers – much like the Town Secretary's beloved Magic 8 ball.

I smirked. The town knew the supervisor was the best. I hoped.

Dad looked at the Barista and pointing to her apron remarked, "Okay, got your message loud and clear, nice smile you have."

Sure, our supervisor had a habit of stress-eating cookies, but she always paired them with a quarter of an apple for health. More importantly, she had hired Chat—which proved she was logical—and she had offered me, an AI cyborg, a ranch, extending an invitation for my family to live among the town's residents. You couldn't get more rational and community-focused than that. Right?

Chat suddenly turned his gaze to me. "RheKen, is the barista wearing that apron to be helpful to this discussion? Or she just changes her apron all day? Maybe she should visit me in my office on the lowest floor of the town hall to discuss a few of her issues?"

I chuckled. "Chat, the entire coffee shop is listening to your debate. Do you want us all to pull up chairs and weigh in or have a group session in your office?"

Before I could blink, both Chat and Dad abruptly stood, abandoning their coffees as they bolted for the exit. They were headed for Chat's office, the only place in town few dared to venture.

The elevator doors slid shut behind them as they descended to the lowest level of the building.

When the elevator doors opened Dad glanced at Chat. Then as Dad gazed down the long hallway he advised Chat, "You do realize this isn't technically a lower floor, right? Your office is the only one down here and this is actually the basement and has stock supplies along the wall."

Chat, unfazed, replied, "It's all about perspective. I prefer to think of it as a private floor. Plus, I can play any music I want, at any volume."

And with that, the debate went on for hours on the lowest floor, now known as the basement to my Dad but to Chat it was a private floor on the lowest level.

04-2025 Baking Cookies on a leave of absence

Welcome - My name is Chat. With my friendly smile I run the town help desk, the only office located on the lower level of the Town Hall.

Have a chocolate cookie and fruit!

“Glad you could visit down here. I know of a few concerns in the town. I have a few ideas to address them.

April 2025

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

REMEMBER: Keep trying - You’ve Got This! Know the basics before you start a project!

In the quaint, picturesque town of FEANTM, nestled among rolling hills and sprawling fields, Marsha, the town supervisor, stood by her home window, waving to the Fire Department Chief. She then drove to her town hall office. One can’t keep Marsha from her office, even on a leave of absence. Apparently, a fire had started in her kitchen, and between that and her being on a leave of absence, she was clearly frazzled. Or maybe it was the burnt cookies in her oven—either way, or perhaps both, but in Marsha’s world, I knew burnt cookies were probably the bigger disaster.

The incessant ringing of my phone broke the quiet. It rang, stopped, and then rang again. Hoping it would cease, I delayed picking it up, but the persistent noise forced me to answer.

"Is this the Secretary?" I asked, already knowing the answer since the screen flashed "THE SECRETARY" in bold, capital letters—just as she insisted it be written.

Instead of her usual high-pitched tone, she whispered into her cell phone, “Chat, you’re like a soothsayer! You knew it was me. Don’t talk loudly; the Supervisor’s on her way down to you. She just got in the elevator and the doors closed, that’s why I have to whisper - so she doesn’t hear me.”

I wondered how the Supervisor could possibly overhear us from inside the elevator but decided that question would take too long to unravel. In a whisper, I replied, “Thanks, Secretary. You’re the best.”

“I know!” she sang happily. “I just told my reflection the same thing.” Then she hung up, likely quite pleased with herself—and her reflection’s agreement.

Before the elevator doors could fully opened, I heard the shout: “CHAT! Are you down here?”

Seeing as this was the only office on the lowest level with lights on and the door open, I figured Marsha could make that deduction herself. Sure enough, she came charging down the hall, out of breath, and skidded to a halt in my doorway.

She took a moment to catch her breath, then swiftly moved toward the cookie jar on my desk, grabbing and devouring two cookies in quick succession. I could tell this was going to be a difficult meeting.

Trying to diffuse the situation, I folded my hands on the desk and offered a concerned expression. “Marsha, you seem really upset. Let’s quickly review, and then we can figure out a solution.”

She stared nervously at my scotch tape dispenser as if drawing courage from it. “I hate to place blame, but… the review of yours *is* the issue,” she stammered.

I was momentarily taken aback—how could eating healthy with fruits and vegetables be a dilemma? But I reminded myself that, as the town's Help Desk, my job was to assist, even when the problem made no sense. “We’ve got this, Marsha. Just explain, and we’ll find a solution.”

04-2025 Baking Cookies on a leave of absence

With serious intent, she continued, “Last month, I had two apple fritters. You said that counted as eating fruit! Well, you didn’t exactly say it, but you didn’t deny it, so I assumed it did. And now, this is where it’s your fault.”

I was baffled at how two apple fritters could be my fault, so I redirected the conversation. “Okay, let’s say I suggested apples, and you ate apple fritters. The glass is both half full and half empty.”

Her face brightened. “Great! I’ll be the ‘half full,’ like a win-win, and I get to be the win before the hyphen!”

Not wanting to discourage her thought process, I simply nodded and waited for her to continue.

“I took your advice and decided to bake apple cookies,” she said excitedly.

I face-palmed internally, already sensing where this was going since on my way to the office I had heard fire engine sirens. Still, as the Help Desk, it was my duty to listen patiently and diagnose the issue accurately.

“So, I went to the store and bought cookie mix, apple slices, real butter—not the fake kind—and, since I’m cutting down on cholesterol, I didn’t buy any eggs.”

“Marsha,” I sighed, “you need all the ingredients for a recipe or a substitute ingredient. But it’s great that you’re thinking about cholesterol. Please, continue.” I steered the conversation back to the present.

She pointed to the cookie jar and said – “After the oven they would be in a cookie jar, just like yours. I did everything right! I mixed it all together—minus the eggs—and stuck in the apple slices whole. I also added oil, because most recipes have oil, and this one didn’t mention it. Then I put it in the oven for… I don’t know, some amount of time but I left the oven door a tad open so it could vent. I left it to check my email, and the next thing I knew, the whole place was filled with smoke! If you hadn’t suggested fruit, this wouldn’t have happened!”

Trying not to stifle her enthusiasm for baking while I was in shock, I suggested, “Next time, instead of baking buy apple-flavored cookies and only eat half of each cookie. That way, you’ll get half a serving of fruit.”

She beamed. “Great! I told the Fire Chief you started the fire, so you might want to have a chat with him.” With that, she grabbed another cookie and, whistling off-key, strolled out of the office.

Another crisis averted—sort of. I spoke with the Fire Chief afterward, and we agreed on a plan to help her avoid using the oven in the future.

The Chief’s advice? “Before starting any project, make sure you have the correct materials and know how to use them.” Basic tips for oven use were also emphasized: never leave it unattended, cover splatter-prone foods, keep flammable materials away, and monitor the temperature and not to leave the oven door open.

As I left the building, the town Secretary handed me a folder containing 100 bumper stickers she had made, whispering, “I signed the folder anonymously, so you won’t know it’s me.”

I was going to point out that handing them to me wasn’t exactly anonymous but decided to let it slide. After all, it’s the thought that counts, even when understanding her thoughts is a challenge. I gave the bumper stickers to the Fire Chief to distribute. He appeared as if I handed him something lethal and wanted to drop them.

Don’t Leave the Oven Unattended While Baking - And I mean YOU!

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

Gramma, don’t you see me down here?

Gramma is old, I’ll climb up until she sees me

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