SoluNox

COMPANY PROFILE

An R&D engineering company which pushes the technological boundaries in the Aerospace, Automobile, Maritime, and Renewable Energy Sectors. We have a unique and diverse range of products that provide solutions to complicated engineering problems and applications. We offer 3D modeling and simulation services in computer aided engineering to support overall product life-cycle management.

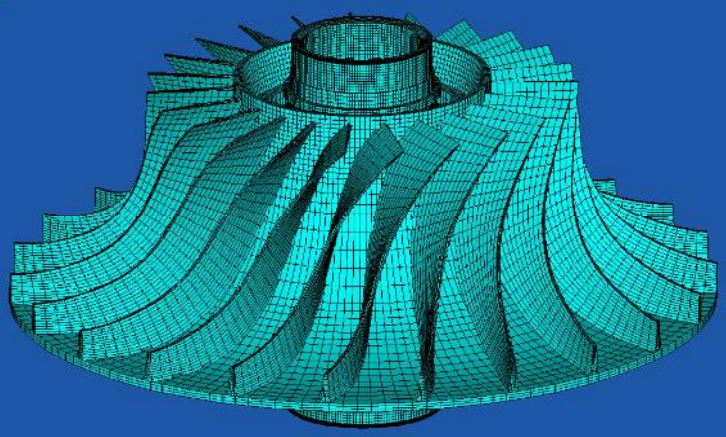
Solution-Driven Leadership

+92(21)353-06403

info@solunox.com.pk

www.solunox.com.pk

www.solunox.com.pk

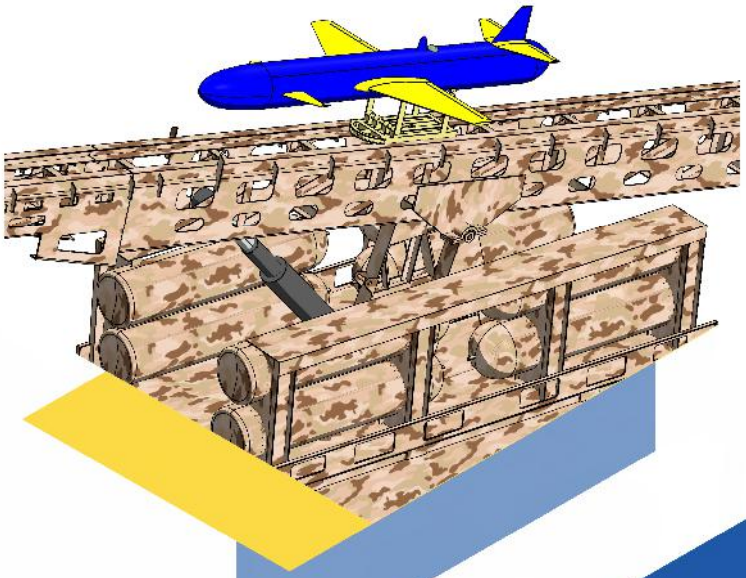


The Company

Our organization is recognized worldwide for technical excellence and the development of innovative products.

SoluNox UAV Solutions and Launching Systems has the expertise in the design and development of fourth generation launching systems for High Speed Large Mass Target Drones.

We have designed and developed UAVs and Quad/Hex copters for military applications such as training, reconnaissance, offensive/defensive operations and commercial applications like pesticide spraying, crop survey, underwater and offshore operations.



Our Mission

Lead an indigenous, innovative and sustainable R&D with the help of in-country and international partners on reciprocal exchange bases

Offer solution for economic growth through R&D in Space, Aerospace, Marine and Terrestrial domains

Our Vision

To discover, innovate and invent technologies of the future for the benefit of humankind

About Us

SoluNox Pvt. Ltd. is a trademark-registered company which got approval to initiate its business in March 2017 by the Security Exchange Commission of Pakistan (SECP). In the same year, it was also registered at the Karachi Chambers of Commerce & Industry (KCCI). The company started with a multi-faceted mandate to undertake Research & Development in the Aerospace and Maritime sectors and thereby establishing itself as a pioneer in the private sector.

We have a pool of dedicated and highly experienced engineers in aerospace, avionics, mechanical, mechatronics, marine design, naval architecture, and IT.

The company has its corporate offices in Karachi and the Federal Capital Islamabad. Partnered technical, manufacturing and maintenance facilities are located in Karachi, Lahore and Islamabad.

Our Team

Our team has an outstanding background and record of accomplishments in developing practical and cost effective solutions to a wide range of engineering problems.

SoluNox has a proven track record in developing new designs and products from concept to full production. Our design team is supported by our comprehensive analysis and testing capabilities.

Capt (R) Sajid Ali Khan Tareen

CEO, SoluNox

Engr. Capt. (R) Sajid Ali Khan Tareen PEng BEng, AMRINA, Member ASME Member ASTM , Member IEEE and Member IEP, is a retired naval captain and has proficiently served the Pakistan Navy for the last 30 years .

He is a Graduate in Mechanical Engineering from NED University of Engineering and MSc in Maritime Studies. He also holds a Diploma in Contract Management, Project Management and Strategic Management. With a unique vision, Mr. Sajid Tareen focuses on youth empowerment and inspirational leadership, with the drive to initiate change for the betterment of tomorrow.

"You just have to be goal oriented and humble to change the world."

"Our Team Is Our Strength"

Mustafa Pasha

COO

Director Projects & Development

Mustafa is a mechanical engineer who has specialized in computational mechanics.

He has twenty years of experience in Turbo-machinery (Rotor-Dynamics), Structural Mechanics (Non Linear Static, Buckling, Crash Mechanics, and Bio-Mechanics), Structural Dynamics (Modal, Harmonic, Transient, Spectrum, Random Vibrations, Shock Propagation/Isolation), Cryogenics, & CAD with reputable international companies. Mustafa did his bachelors in mechanical engineering from GIKI and went on to do a master's degree in Computer Aided Engineering from the University of Southern California, USA.

He is a former Dassault Systèmes (USA) application engineer and has helped the company in developing the CATIA and ENOVIA suite of PLM products. He has also worked in NESCOM as a structural dynamicist on advance weapon technology and retaliatory defensive applications.

He has been an assistant professor for the last eight years at various universities and continues his lectureship through visiting positions.

Zuhair Mahmud

CTO

General Manager Systems

Zuhair is a mechanical engineer who has specialized in wind energy and aerospace engineering from DTU, Denmark and TU Delft, Netherlands. He is experienced in AI, machine learning, renewable energy (win turbine technology), Aeroelasticity (turbine blade design and aerodynamics), and composite structures (honeycomb panels).

Daniyal S. Malik

CMO

General Manager Projects

Daniyal has a Bachelors Degree in Space and a Masters Degree in Aerospace Engineering from the University of Pisa, Italy. He has worked on plasma micro thrusters, asteroid impact mitigation systems, & the Space X Falcon 9 Block 5. His research area focuses on green propellants for rocket upper stage propulsion. Rockets and Satellites are his passion.

Hamza Bakhshi

CFO

Hamza is an accounting and finance graduate from IBA, Pakistan. He is a chartered certified accountant (ACCA) and has a diploma in Islamic finance. He oversees the financial health of the organization and helps ensure its continued viability. His specialty is in financial risk management, financial modeling, project fundraising, capital investment, taxation, and labor laws.

Our Research Domains

Innovation enables the future

Our research domains are very diversified and relevant to a greener and demanding tomorrow. From the deep ocean depths to the frontiers of space; from the zero carbon emission of our electric vehicles to the autonomous intelligence of our drones and the resilience of its launching platform, SoluNox continues to push the boundaries of innovative technology and engineering application.

We envision the eco-system of each product and then materialize it through a complete PLM.

SoluNox has multiple advanced technology products in the market of today. Our UAV launcher is a 4th generation high speed heavy launching platform. We have augmented this product to be mobile and combat intensive in our truck mounted model and amphibious in our deck mounted model. We have pushed the envelope of UAV launching speeds through powerful accelerating mechanisms and new generation braking mechanisms. Our MGTEs power sophisticated UAVs at high speeds capable of evasive maneuvers and complex missions. They are fully autonomous and are equipped with AI and computer vision. Our renewable energy solutions have attracted foreign interests and collaborations. Our Bio-tech products have changed the lives of many patients. We have adventured and established technologies in Cryogenics and Space exploration. At our core we continue to learn and discover.

Learn.
Discover.
Invent.
REPEAT...

Aerospace

UAV Launchers, Drones, Quad/Hex Copters, MGTEs, & Flight Simulators

SoluNox established itself with its flagship product, the high speed heavy mass UAV launching platform, *Manjneeq*. We consequently invested in drone technologies and micro gas turbine engines (mgte). We can design and manufacture various drones and quad/hex copters, and have our own series of mgtes which offers thrust upto 800N. We also design flight simulators and use mixed reality for aircraft maintenance and training.

Marine

UUVs, Submarine Technology, Ship & Naval Architecture, Propulsion Systems, & Naval Weapon Systems

SoluNox's team comprises of highly skilled and experienced naval architects, submarine engineers and technicians. We have designed and developed UUVs, and offer real time technical support in naval vessel technology and maritime applications. SoluNox has also developed a deck mounted UAV launching platform to augment naval operations around the world.

www.solunox.com.pk

In pursuing our research domains, SoluNox has invested heavily into the best and brightest engineers and scientist. We utilize the best software and employ the latest testing facilities. We have a dedicated high performance simulation center at our head quarters in Clifton - Karachi, a design and testing facility in Islamabad, and a fabrication center for light and heavy jobs at Steel Mill - Karachi.

Our engineers and designers have extensive experience in machining, welding, tooling, and other manufacturing processes used in the fabrication of a broad range of mechanical and structural equipment. We utilize state of the art computer-aided design software tools to support our design and development activities.

Renewable Energy

Electric Vehicles, Smart Micro-Grid Stations, Wind Turbines, Solar Energy Grid, Fuel Cells, & Bio-fueled MGTEs

SoluNox has designed a range of electric vehicles at its design HQ which implements UK based EV technology. We offer solutions to the pandemic energy crises through our smart micro grid stations and renewable technologies in Fuel cells and Bio-fueled MGTEs. Our wind turbines are optimized to generate a maximum power output and our solar energy solutions utilize the latest cutting edge technology.

Space

Plasma Engines, Micro Satellites, Delivery Systems, and Ground Control Stations

SoluNox has taken the bold initiative to launch Pakistan's first private satellite. In this venture we have partnered with renowned international partners. We have a dedicated research center in space sciences with a talented foreign qualified team.

Cryogenics

Cryogenic Containment Trucks, Mobile Containment Tanks, & Storage Vessels

SoluNox's most recent endeavor and investment is in Cryogenic containment technology. We design and fabricate containment trucks, tanks, and storage vessels with stringent manufacturing standards and codes to meet reliability and safety. Our products come with the highest tested quality and established credibility in the LOx and LN2 market. We implement dedicated quality assurance and after sale support for each of our products.

AI & IOT

Surveillance, Cyber Security, Crop Management, Bio-Technology, Target Recognition & Tracking

SoluNox's electronic and control systems team offers specialized services and products. They have designed, fabricated, and tested tremor mitigation wearable devices in medical patients, vital sign monitoring systems in hospitals, surveillance systems for target recognition and tracking with AI, topological scanning and crop management through computer vision in drones.

Working Process

Virtual Prototyping in Conceptual Design

We have invested in every aspect of product life cycle management to ensure the best and brightest concept is conceived, digitized, simulated, and fabricated into being. It is engineered to last and it is engineered to perform.

1

Design

3D Parametric CAD
Best Modellers

2

Analysis

FEA/CFD/FSI
Leading Solvers

3

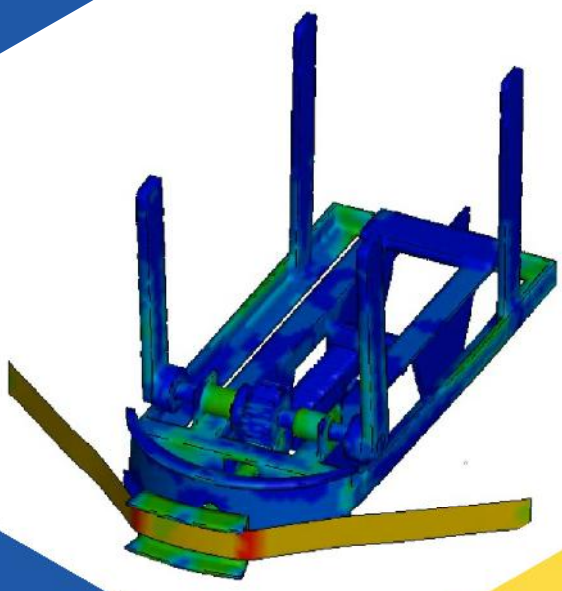
Fabrication

Precision, Assembly, & Production
Hi Tech Facilities

We implement a detailed and rigorous conceptual design cycle focusing on creating high fidelity 3D CAD models. We extensively test the virtual models in the latest FEA/CFD/FSI, tools and push for validation and verification. When rapid iteration to a converged goal or outcome is achieved, it is closely examined and approved by a technical expert. A physical prototype is developed to show a *proof-of-concept* to the customer and any 3rd party auditor. Production is started at our facilities to ensure the best quality is delivered.

Our Capabilities

- Structural Analysis in Mechanics & Dynamics
- Fluid & Thermal Analysis
- Design & Product Development
- Mechanical & Flow Testing
- Machine Learning & Artificial Intelligence
- Mathematical Modeling & Software Development
- ASME, API, ANSI Code Analysis
- Prototype Development, Testing, & Evaluation
- Independent Third-Party Analyses & Reviews
- Failure Analysis, Forensic Studies, & Fracture Mechanics



www.solunox.com.pk

Why Choose Us?

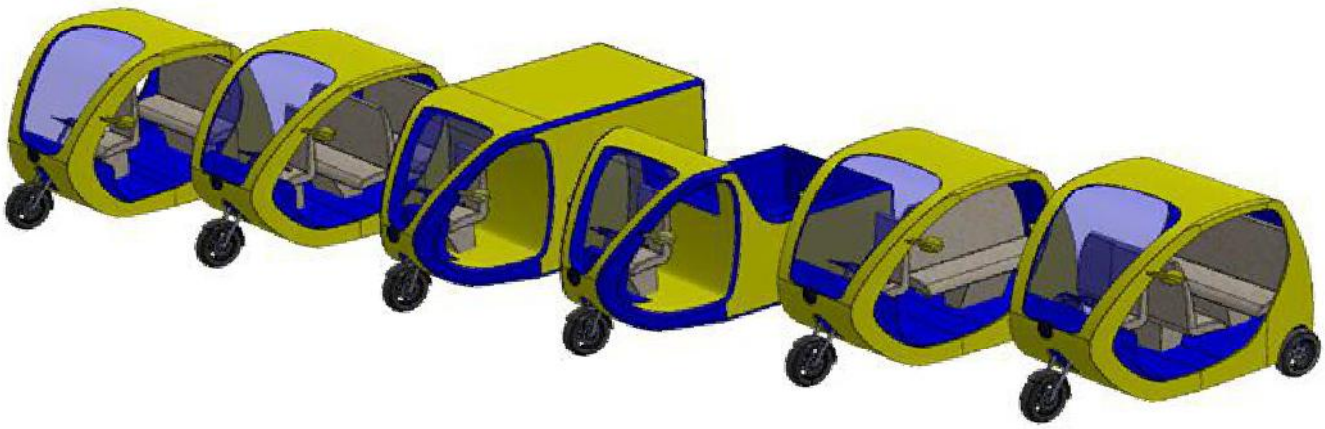
Our design and fabrication product strategy guarantees the services of dedicated technical experts adept in their specialization, a high performance server class multi-core computing facility, & a stringent data management protection policy.

Simulation Driven Design

Specialized Simulations

- Electric Vehicle Design and Crashworthiness
- Heavy Vehicle Design with Standards Evaluation/Testing
- Vehicle Crash Analysis for Standard and Unique Crash/Accident Scenarios
- Fluid structure Interaction for Blade Flutter and Forced Response Analysis of Turbines
- Modal and Transient Dynamic Analysis of Centrifugal Compressors
- Random Vibration Analysis of Aerospace Structures and Components
- Vibration/Shock Analysis and Isolation against Explosions or Blasts
- Valve and Seal Technology for Cryogenic and Underwater Applications
- Structural Optimization using Advanced Topological Algorithms
- Rotor-Dynamics of Turbomachinery
- Pressure Vessel Design, Evaluation, and Testing
- Modeling, Simulation, and Fabrication of Artificial Limbs, Organs, Prosthesis, and Hard/Soft Tissue, using Corporeal SoluNox Bio-materials
- Optimization of Baffles and Bulk Head Design to Minimize Sloshing, Surging, and Dynamic Roll-Over of Tanker Trucks

SoluNox has strategic partnerships with international companies and is part of technological clusters in Europe, Africa, Middle East, and the Asia Pacific regions. We have invested in our relationships to build upon a strong and trust worthy network of technologically advanced centers of excellence in engineering design and industrial production.



Our Technical Expertise Panel for Vehicle Engineering

Dr. Raja Mazuir

Dr. Raja has 24 years of experience in automotive research (academia and industry). His research interests include: Hybrid powertrain-vehicle dynamic interaction, powertrain system modelling, driveline low frequency response, real-time modelling and hardware-in-the-loop, energy storage systems, micro gas turbines, and advanced propulsion systems.

He has worked in e-powertrains and thermal management systems for electric vehicles at ARRIVAL as a research engineering specialist, at NAZA AUTOMOTIVE MANUFACTURING as the head of Homologation and Testing, and as a project manager at Proton & Lotus Engineering. He continues his professional and academic experience as an Associate Professor at Coventry University, UK.

Dr. Omer Masood Qureshi

Dr. Omer has 18 years of experience in automotive crashworthiness, vehicle crash investigations, fleet safety management, vehicle safety, and its regulations.

He has worked as a researcher at Ferrari MillieChille Lab, Italy, on various chassis design and optimization projects on vehicle crashworthiness. His PhD research was on the geometric optimization of Aluminum frontal crash absorbers for a sports car chassis. He is the Founder and CEO of ADCR, a company that specializes in vehicle crashworthiness, forensic crash investigations, vehicle safety, and road regualtions.

Syed Najiullah Hussaini

Najiullah has 9 years of academic and professional experience focusing on electric vehicle design, NVH, engineering dynamics and mechanical vibrations. His master's degree in automotive engineering from RMIT University, Australia, and he has specialized is in automotive dynamics and vehicle suspension dynamics. He is the currently heads Mode Mobility as Cofounder and Chief Product Officer of Mode Mobility. Mode Mobility is developing a line of battery-electric scooters as a sustainable solution for urban mobility.

Vehicle Crash Analysis Capabilities

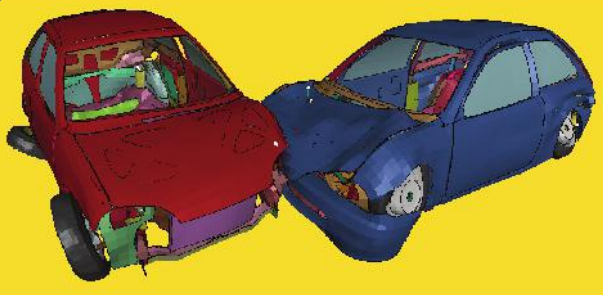
Crash test analysis is a simulation method used to assess the safety of the vehicle in the event of a collision and measure its effect on the vehicle and its occupants. The results of these tests are used to identify areas where the vehicle may need improvement and to increase the vehicle safety, as well as assess the company's ability to address these issues.

Our simulations and mathematical models predict how the vehicle would perform in a crash. These simulations will take into account factors such as the vehicle's weight, size, and design, as well as the type of crash and the speed at which it occurs. The simulation environment is conducive to almost any type of load case scenario. The following industrial standard test are usually simulated for rigid, deformable, and moving barriers.

Frontal-impact tests: deformable or rigid barriers (ECE-R 94, RCAR, FMVSS 208, 305 581 and similar), Rear-impact tests: Rear collision as per RCAR or similar, Side collision with moving barriers: (ECE-R95, FMVSS 214, IIHS and similar), Moderate to small overlap tests, Side-impact tests, Pole-impact tests (FMVSS 214 and similar), Roll-over tests for static and dynamic: (FMVSS 208, 301, or similar), Roadside hardware crash tests, RCAR bumper test, NVH, Design Optimization Studies: (structural, mass, shape topological, geometric parametric, or lattice), Forensic Study Simulations, and unique crash load cases on client's request.

Typically, we provide results in Effective Plastic Strain, Kinetic/Internal Energies, Acceleration, Velocity, Displacement Time Histories, Head Injury Index, Chest Injury Index, Crash Zones and Crumple Zones Plots, Stresses, Strains & Failure Criteria (Von Mises, Principals, Deviatoric, Tresca, etc.), or even client specified plots.

Vechicle Engineering
&
Crashworthiness



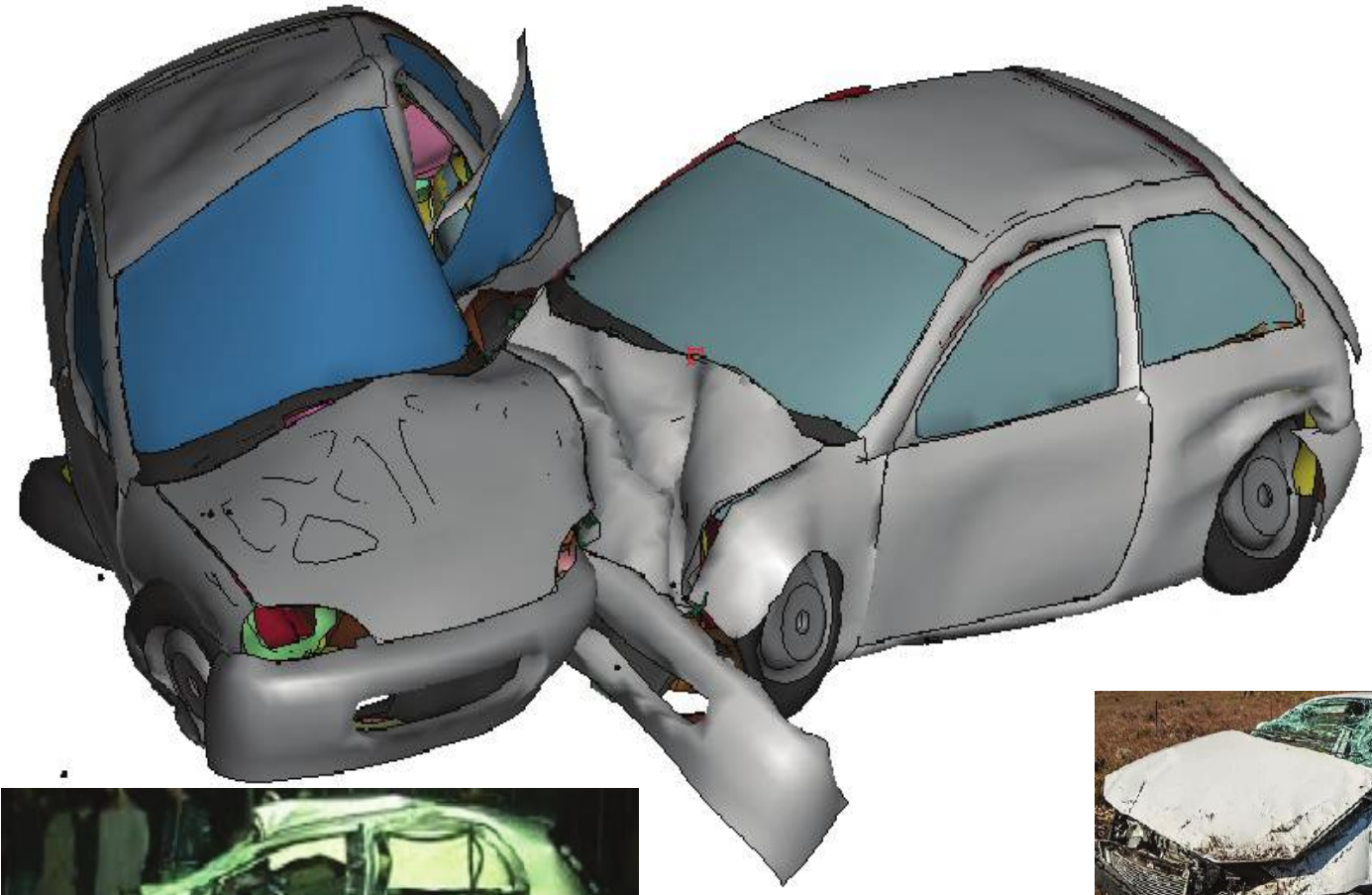
CASE STUDY 1

Forensic Study of a Fatal Broadside Impact

SoluNox conducted a forensic explicit dynamics study into a fatal broadside impact car accident. The purpose of the study was to determine the rigid body acceleration of the vehicles and the survivability of the occupants.

Two cars of approximately one ton each collide at a T-bone intersection at a speed of approximately 100 kph. Driving, weather, lighting, and environment conditions were normal and conducive for safe driving. The apparent cause of the accident is determined to be violation of traffic signal/stop sign by the on-coming car, shown below as the dark grey car in the image on the left. The driver of the other car, shown on the right in white, could not react in time to divert the course of his vehicle. A FEA explicit dynamic model was created of approximately 50k elements and 57k nodes. The simulation was solved on 24 physical cores using the LS-DYNA code.

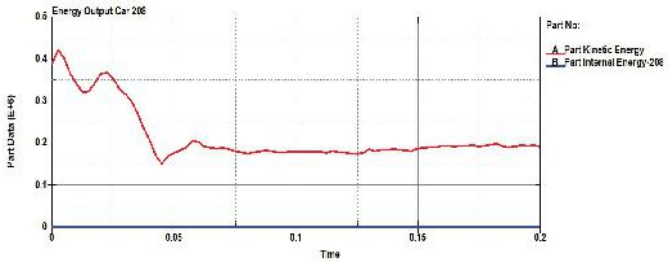
Disclaimer: The images, data, and details have been modified and changed to protect the client's identity, data, property and history.

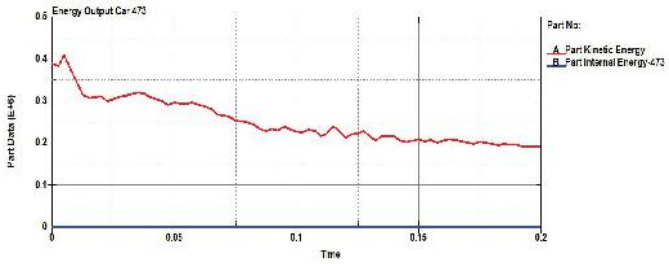


Results & Discussion

Kenetic and Internal Part Energy

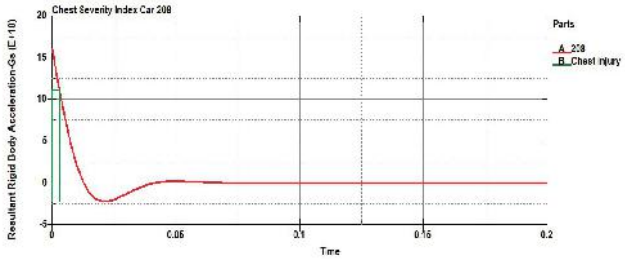
Energy plots show stability of dynamic solution and convergence accuracy for both vehicles. There are no errors or hour-glass energy traces.

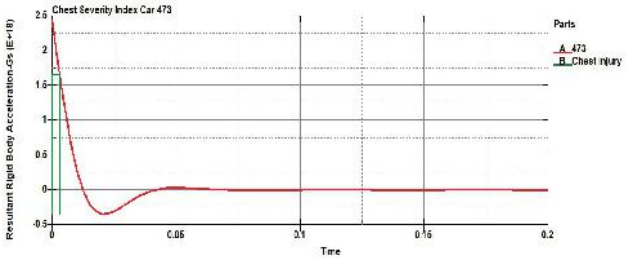




Chest Injury Index

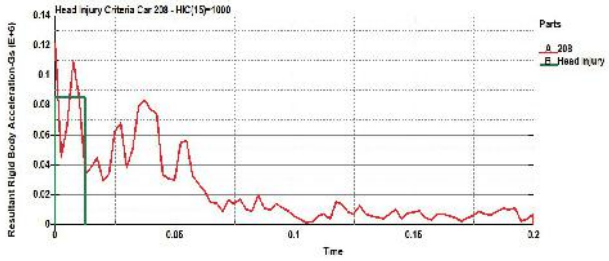
The Chest Severity Index plots show that the occupants in both vehicles sustained severe shocks which were much larger in amplitude then the safety index limits. At these levels hard tissue damage maybe probable and even fatal.

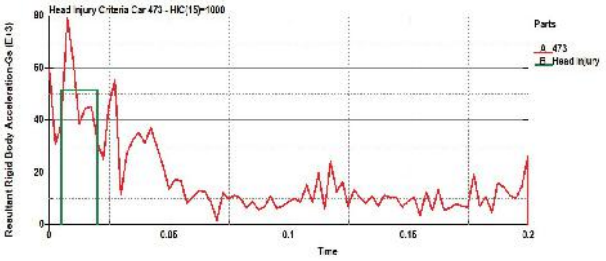




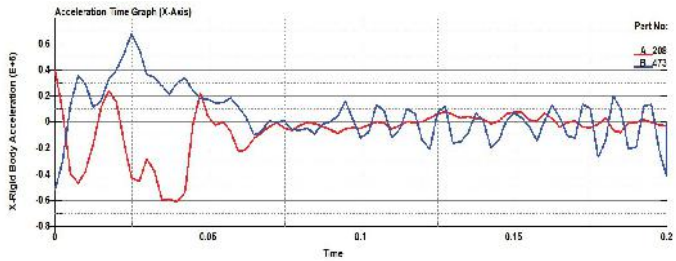
Head Injury Index

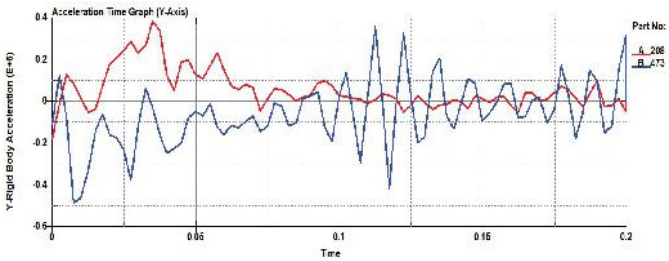
The Head Severity Index criteria chosen for this analysis was HIC-15 due to the shock pulse duration being more than 40Hz. Occupants of both vehicles sustained severe shocks which were much higher than the safety index dictated by the standard criteria. At these levels hard tissue damage maybe probable and even fatal.





Acceleration Plots in Axis of Motion



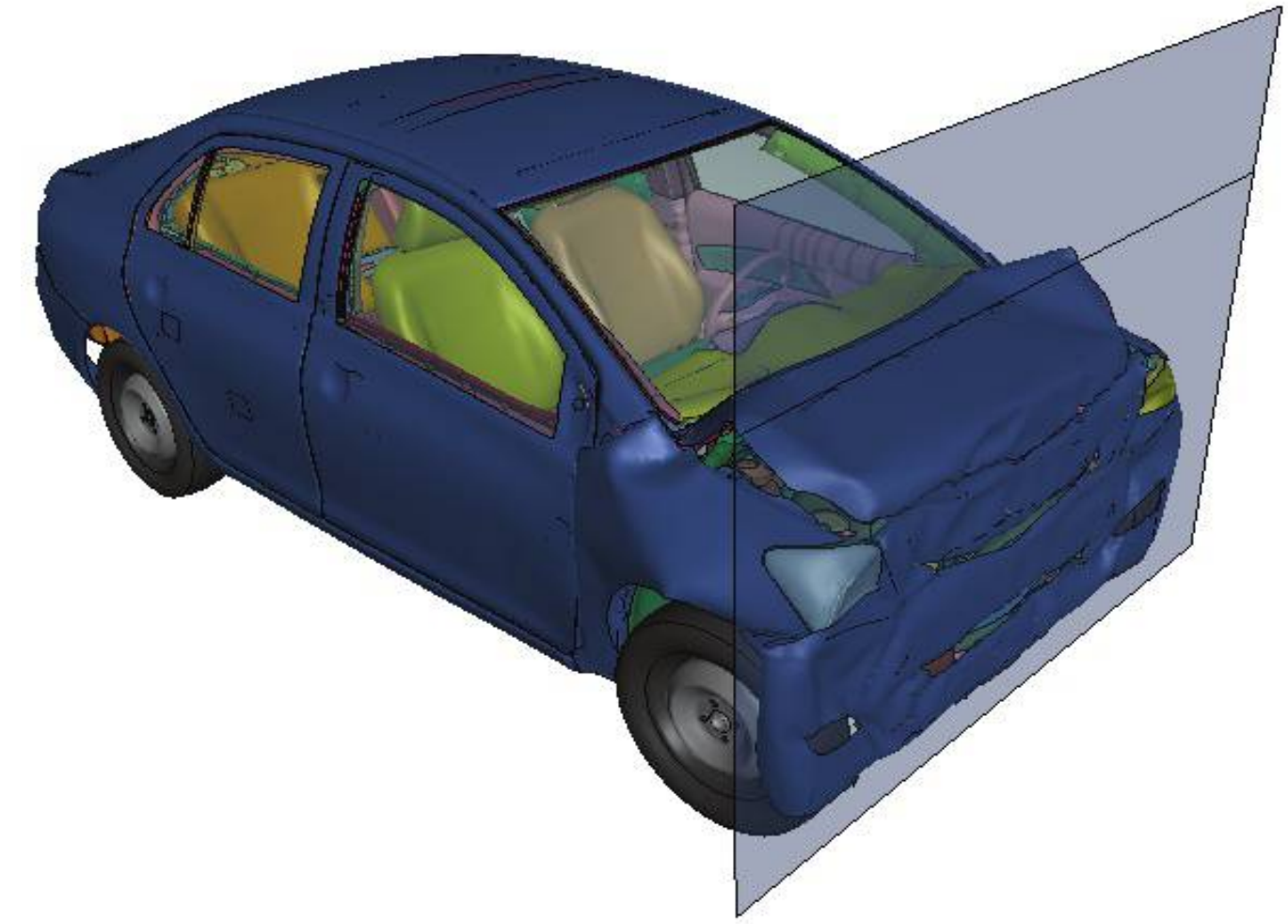


CASE STUDY 2

Optimization of Vehicle Structure for Frontal Impact of Mid Size Sedan Protoype-X

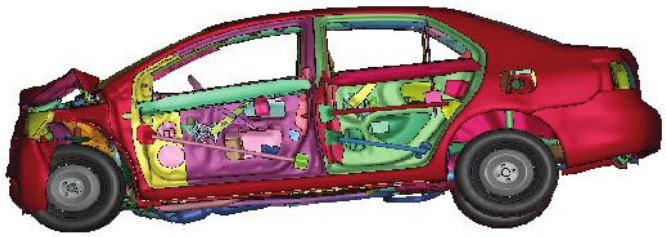
SoluNox conducted an explicit dynamics study optimizing the mass of a mid-size sedan, Prototype-X, for a frontal impact crash test scenario. This load case is equivalent to a frontal impact with a rigid barrier in FMVSS-208. The purpose of this study is to optimize the FEA model for weight reduction without compromising on torsional and flexural rigidity. The default FEA model without any optimization has 378K elements and 393K nodes. The re-designed optimized FEA model has 370K elements and 386K nodes. The explicit dynamic simulation for both vehicles was solved on 24 physical cores using the LS-DYNA code. The optimization study achieved a reduction of 14% of vehicle kerb weight with advantageous reduction in rigid body acceleration and displacement. Excerpts of the results and discussion are briefly summarized on the adjacent page.

Disclaimer: The images, data, and details have been deliberately modified/changed for propriety reasons.

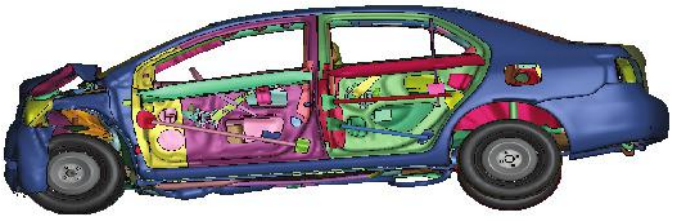


Results & Discussion

Default Vehicle at 1092kg Kerb Weight

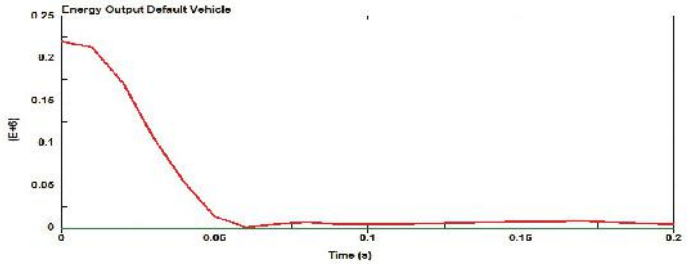


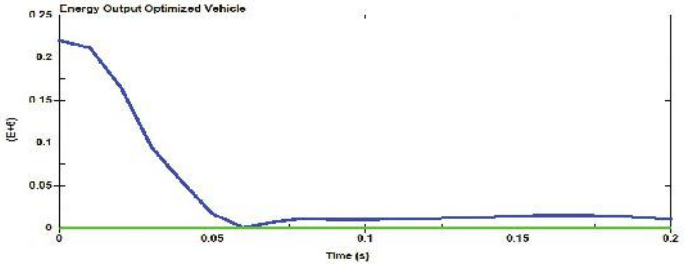
Optimized Vehicle at 935kg Kerb Weight



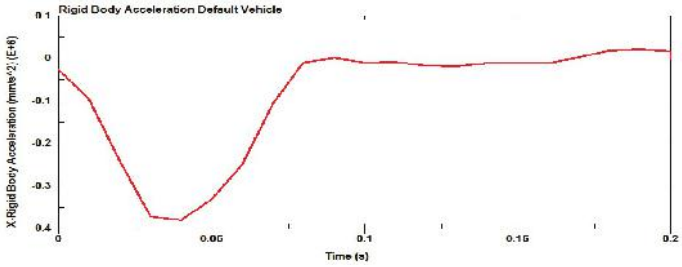
Kenetic and Internal Part Energy

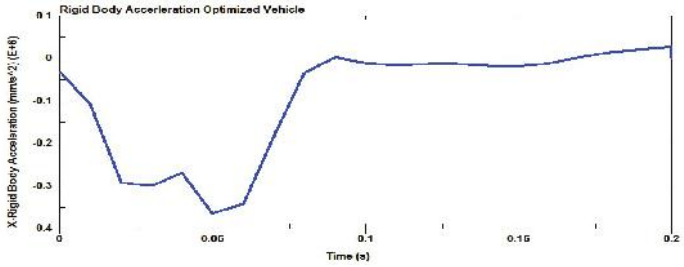
Energy plots show stability of dynamic solution and convergence accuracy for both vehicles. There are no errors or hour-glass energy traces.



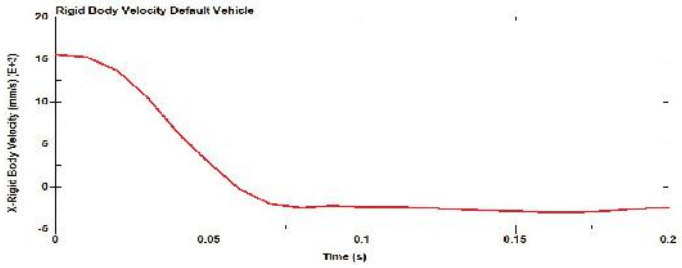


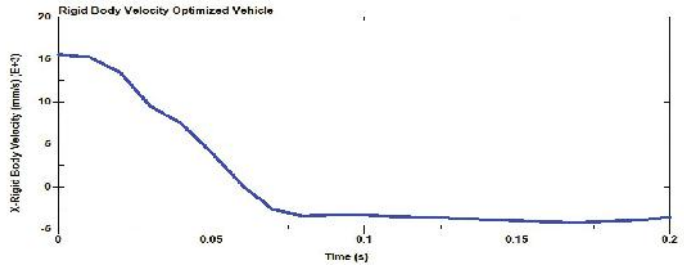
Acceleration History



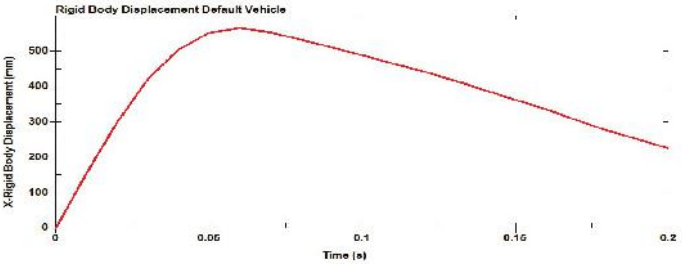


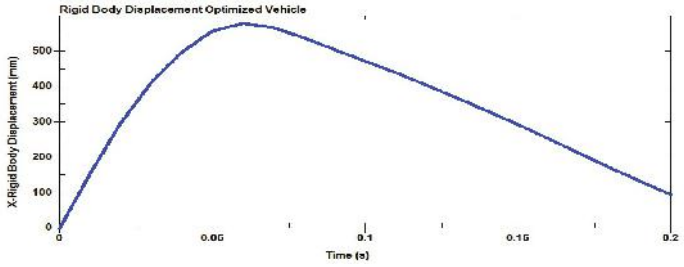
Velocity History





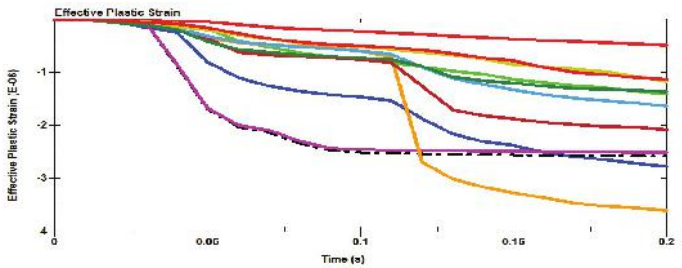
Displacement History

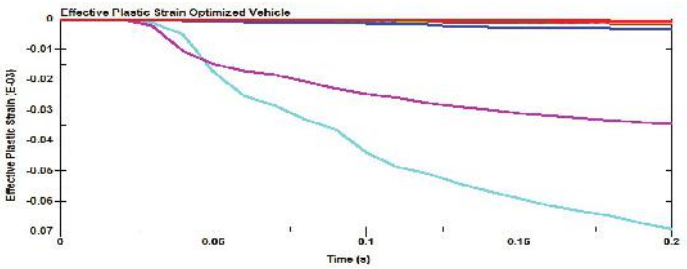




Effective Plastic Strain

Significant reduction in material actively yielding on yielding surface.

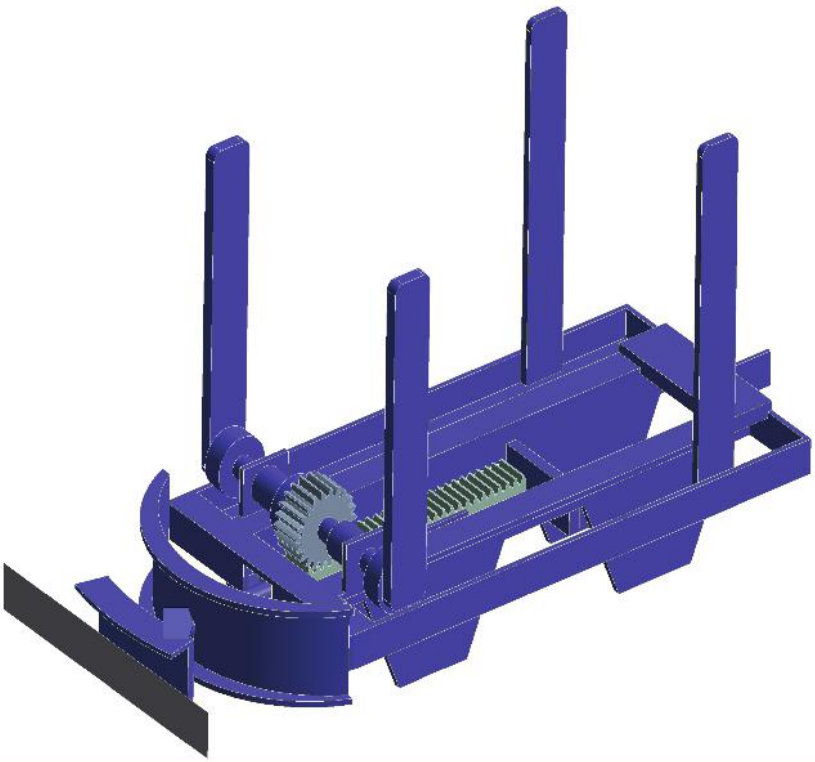




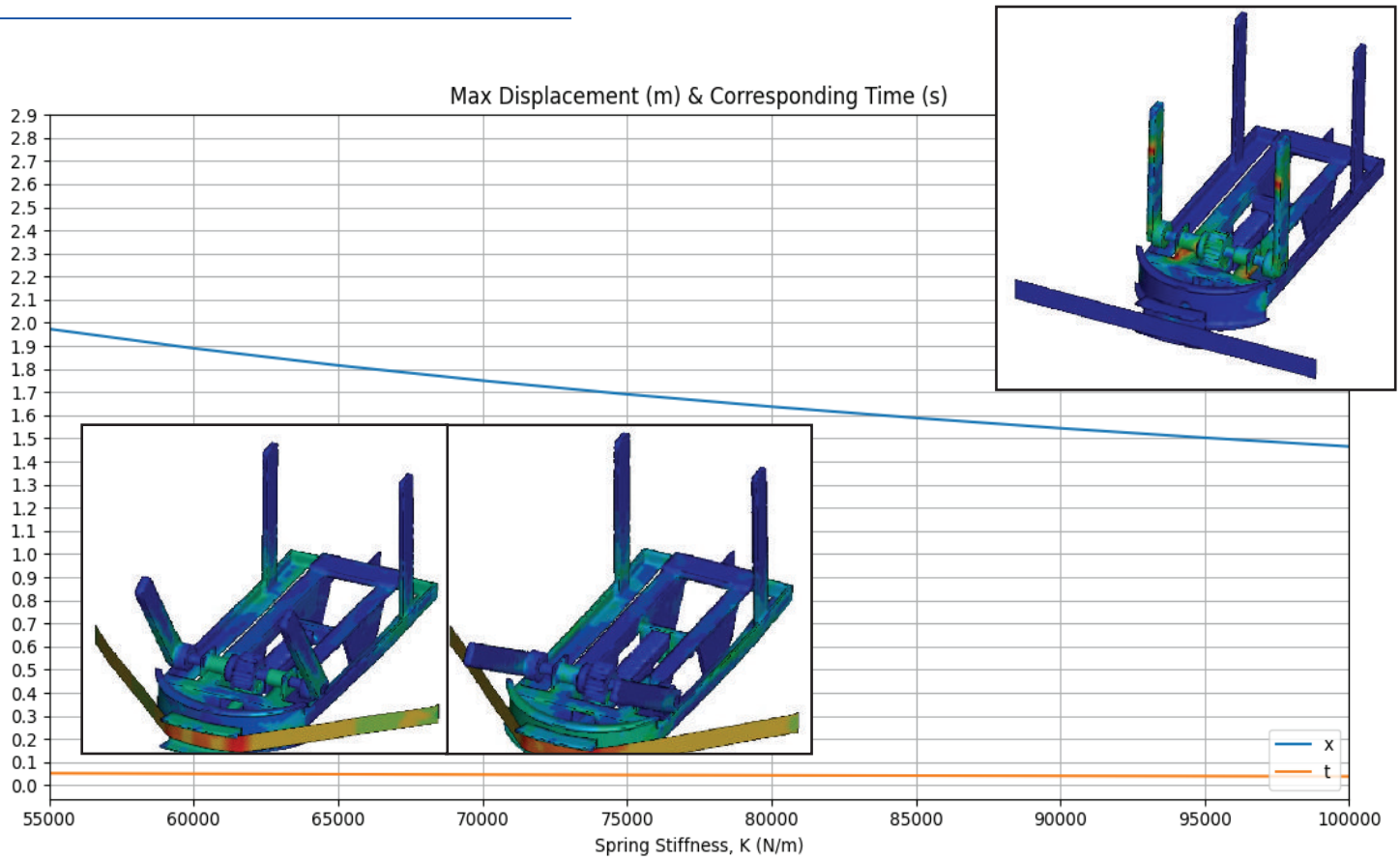
CASE STUDY 3

Explicit Dynamic Analysis of UAV Shuttle

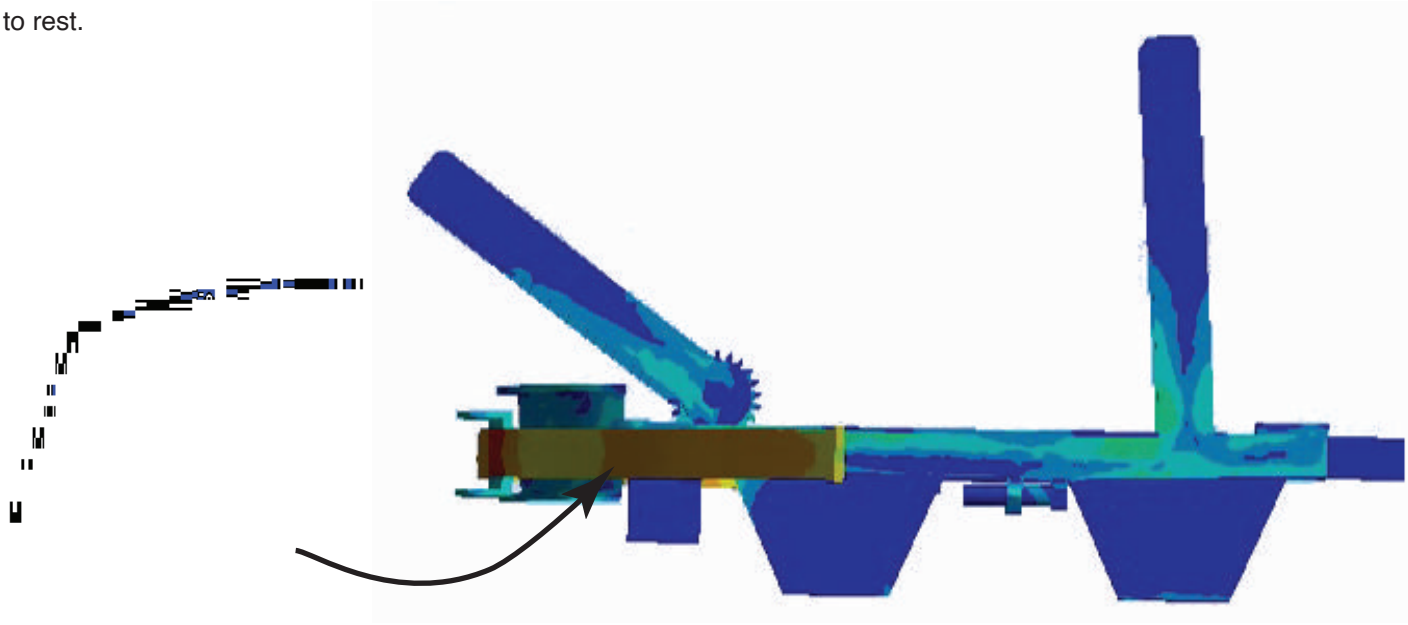
SoluNox conducted a FEA explicit dynamic study into a specialized shuttle used for launching high speed drones. This study is very unique and computationally expensive as it focusses on the shuttle's rapid acceleration and severe deacceleration within a very short time period. The explicit dynamic analysis was also very involved and challenging because it required the FEA model to interact with a moving flexible barrier of non-linear material properties. A customized mathematical material model was created for the non-linear barrier through empirical data and curve fitting techniques. The shuttle itself consists of a series of sub-assemblies which work in a sequence with the deceleration process. A rack and pinion mechanism is suppressed by the change in momentum of the shuttle when it collides with the flexible barrier which in turn deploys the front arm mechanism to release the drone at its desired exit velocity. The implementation of this crucial deployment mechanism in the simulation was instrumental in accurately depicting the involved structural dynamics. The shuttle is accelerated to 50 m/s in 75ms and decelerated to zero velocity within 25ms. This extreme change in momentum generates a shock wave of almost 20 tons of force at full performance. The explicit dynamic FEA helped identify stress concentrations in the structure and prompted the fabrication team to reinforce all such weak points in the actual prototype. The FEA model consisted of over 600K elements and over 154k nodes. Excerpts from the study is shown on the adjacent page.



Results & Discussion



The Von-Mises stresses shown in in the FEA images, *shown above and below*, depicts the maximum distortion criterion for the ductile material used in the shuttle as it impacts the flexible barrier. Stress distribution is also seen the flexible barrier as it elongates to absorb the kinetic energy of the shuttle. As the kinetic energy of the shuttle is absorbed by the barrier, its own internal strain energy drastically increases towards failure. A polynomial curve fitting technique is applied, *shown below*, to capture the empirical non-linear material behavior of the barrier and to ensure accurate strain energy calculations in the simulation. Stress concentrations and load paths for the energy can be visualized throughout the shuttle as it rapidly decelerates. The above graph was further calculated through mathematical modeling to determine the shuttle braking distance, equivalent stiffness of barrier, and time required to completely arrest the shuttle and bring it to rest.

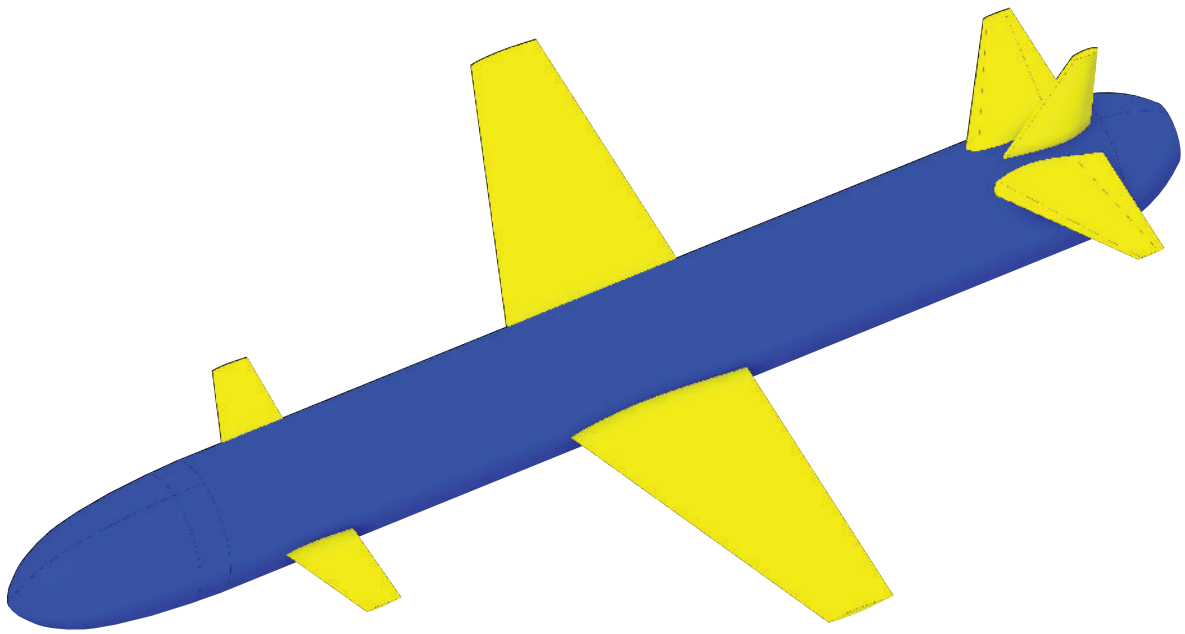


CASE STUDY 4

A CFD Analysis on the effect of canard wings for a HSTD

The orthodox design philosophy in the aircraft industry is to replace the horizontal stabilizers of an aircraft with canard wings preceding the main wings for enhanced maneuverability, dynamic stability, and longitudinal equilibrium. We investigate the effect of canard wings in addition to the rear stabilizer on a client's HSTD. This highlights the consequence of its design on the velocity streamlines and pressure distribution. CFD augments the ability to optimize aerodynamic performance and it assists in calculating the lift, drag, and stall of the HSTD. In particular it is very important to identify turbulent flow and the creation of vortices at the trailing edges of the canard and main wings. As expected, the nose and leading edges of the canard wing, main wings, horizontal stabilizers, and tail show high pressure zones. All of the lifting surfaces show positive lift with reduced pressure on the top surface. The velocity profiles are streamlined with the body at minimal boundary layer separation which show a reduction in drag. The canard wings seem to form a disruption in the velocity flow as the streamline hits the leading edge of the main wing assembly. The disruption is not prominent and should not create vortices due to the fact that there is a high-pressure region on the leading edge of the main wings. The canard wings seem to favor a higher dynamic stability and longitudinal streamline reduction in drag.

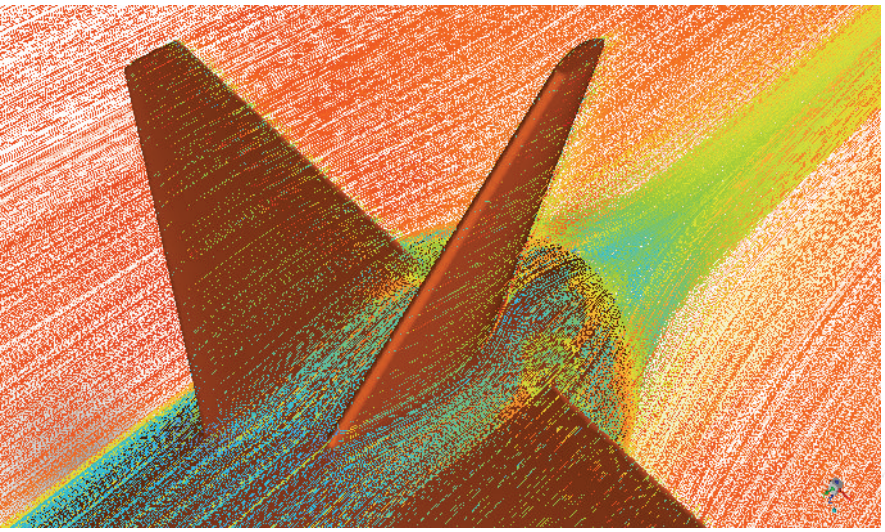
Disclaimer: The images, data, and details have been deliberately modified/changed for propriety reasons.



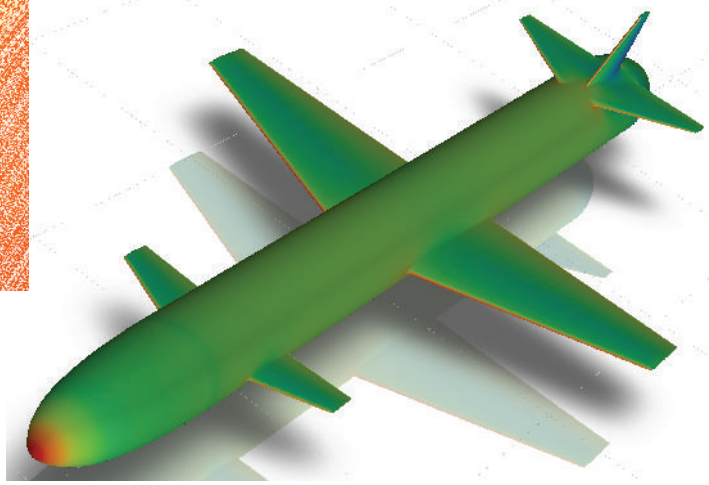
Results & Discussion

Velocity Streamlines of HSTD – Longitudinal Axis

The overall velocity field plot shows an enhanced aerodynamically streamlined body. The canard wing configuration promote reduced drag which is apparent in this CFD plot. The drop in velocity over the latter part of the fuselage and its corresponding drop in pressure is a hint of possible eddy current generation. This can be of concern and needs to be investigated further.



There is minimal boundary layer separation, especially at the horizontal stabilizers and tail section. The wake shows good detachment of streamlines and supports the dynamic stability and horizontal equilibrium of the HSTD at this velocity and angle of attack.

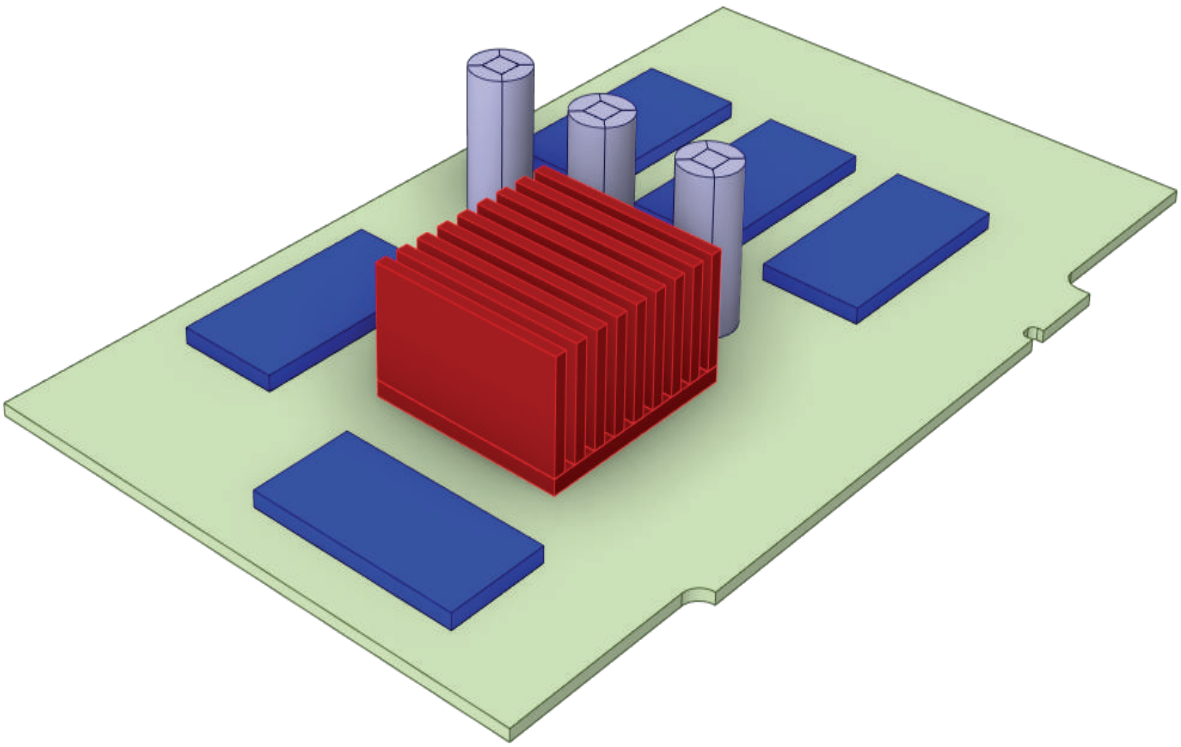


Pressure distribution, as seen on the left, exposes all the high- and low-pressure regions to assist in calculations of lift, stall, and drag.

CASE STUDY 5

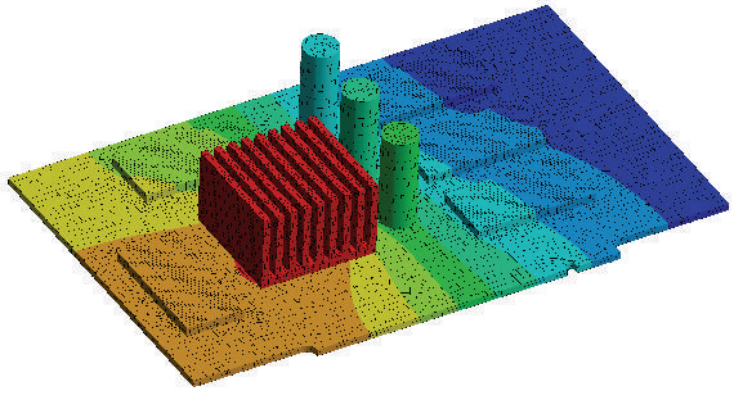
Transient Thermal Anlysis and Drop Test Simulation of Consumer Electronics PCB

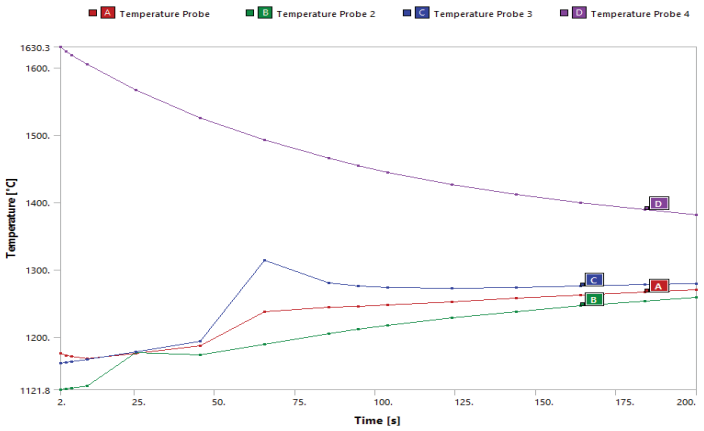
SoluNox conducted a steady state thermal analysis on the main processor of a consumer electronics PCB. Consequently, a transient thermal analysis was also conducted on selected micro processors that had variable power consumption during operation. These types of analysis expose the temperature distribution, thermal dissipative design, and help the OEM with PCB reliability, performance, and safety. Electronic components are then optimized for their design by introducing dissipative mechanisms like heat sinks, thermal resistance, fin arrangements, cavities, and conductive plates. Thermal plots for the PCB and temperature gradients at temperature probes have been shared visualization. Drop test simulation is particularly important in the electronics industry, where electronics assemblies are often subjected to handling and transportation during their life cycle. SoluNox conducted an explicit dynamic analysis to mimic a drop test. We have identified potential issues and optimized the design of the PCB to improve its mechanical reliability and ensure that it can withstand real-world drop events. This reduces the risk of component damage and improves the overall reliability of the electronic system. In particular, the hourglass energy of the PCB is minimum up to the point of impact. The kinetic energy depicts the free fall time and contact forces in the major axis are shared for visualization of the peak failure event.

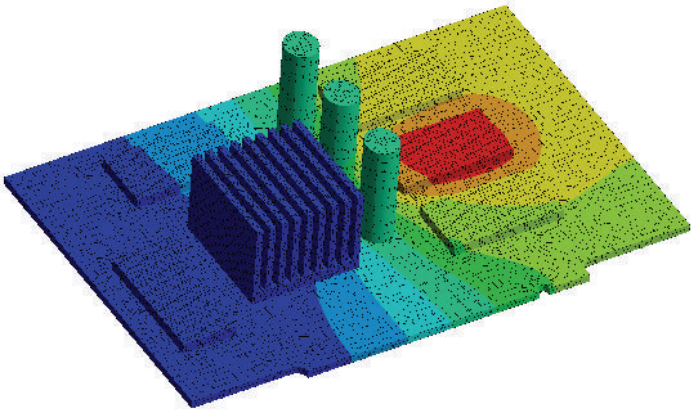


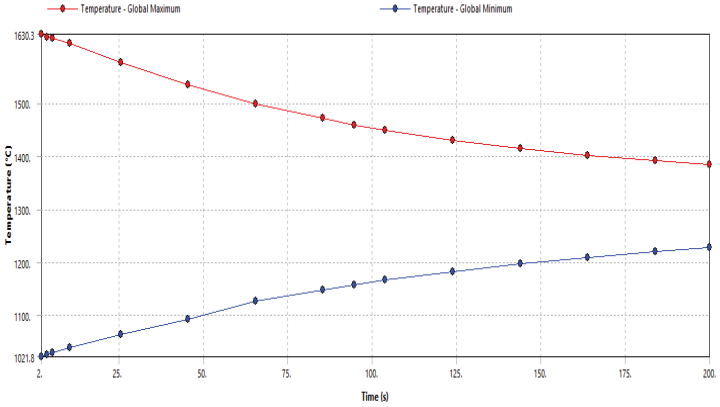
Results & Discussion

Thermal Gradients of PCB and Temperature Probes of Heat Source Components.



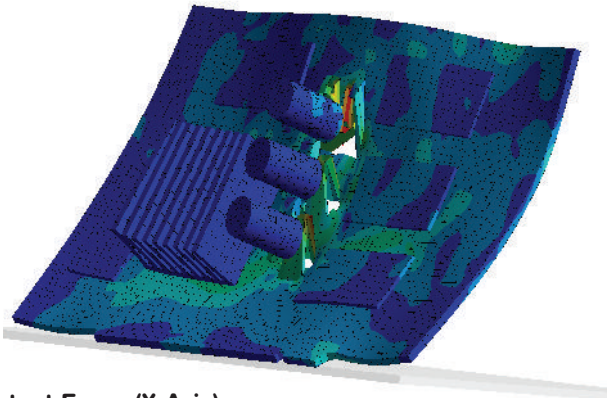




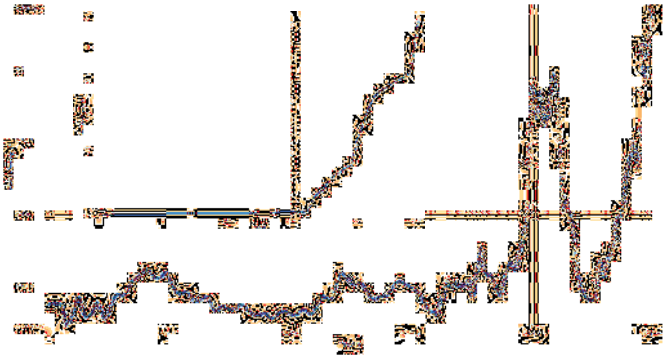


Temperature probes indicate a high generation of initial temperature and inefficient dissipative thermal load steady state convergence for time period of 200 seconds.

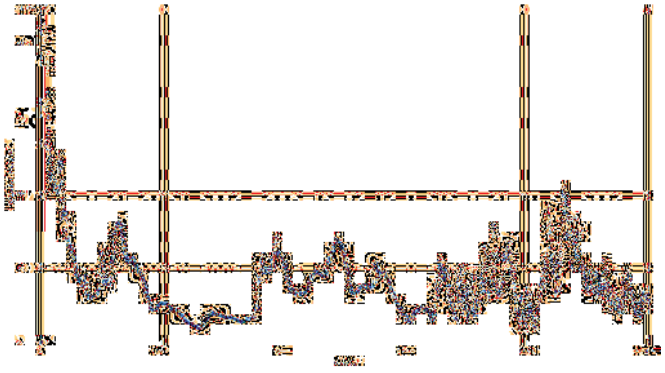
Drop Test Simulation of PCB



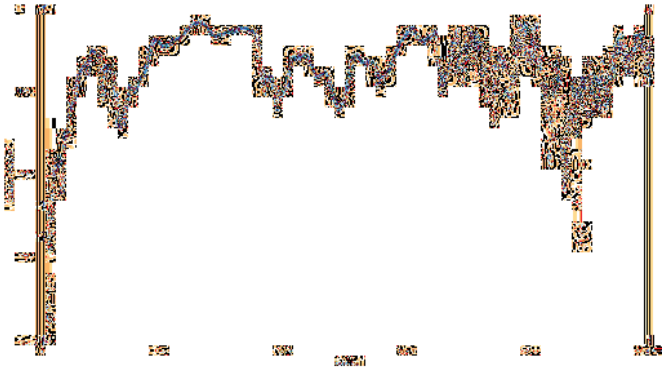
Kinetic Energy & Hourglass Energy



Contact Force (X-Axis)

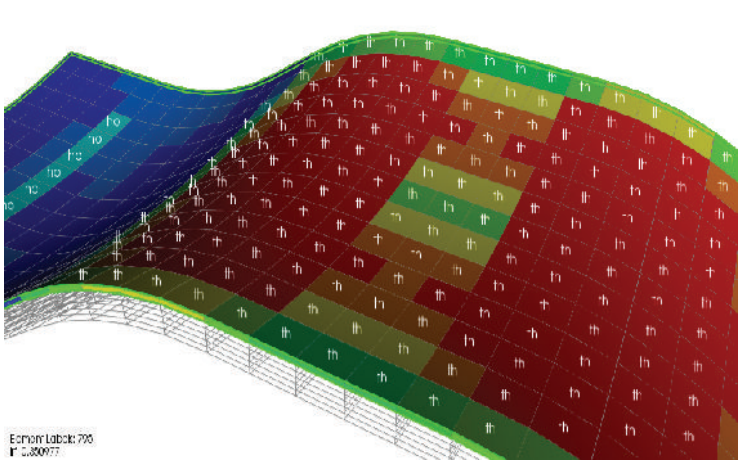


Contact Force (Z-Axis)



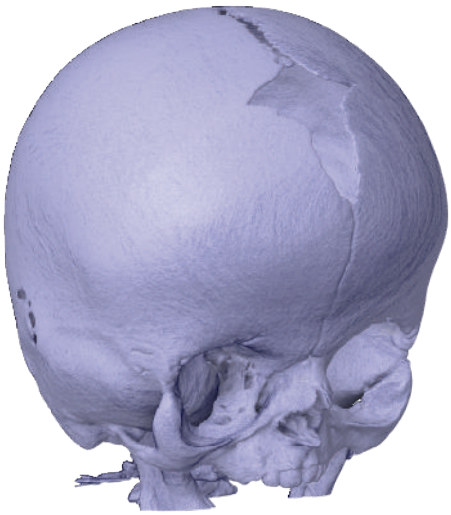
Specialized Simulation & Fabrication Facilities

Composite Honey Comb Sandwich Panel - Simulation and Fabrication



These panels are designed specifically for enhancing flexural rigidity and compressive strength at a remarkably low weight. Such panels are used extensively in the aerospace and automotive sectors. The image on the left depicts a panel after excessive axial loading.

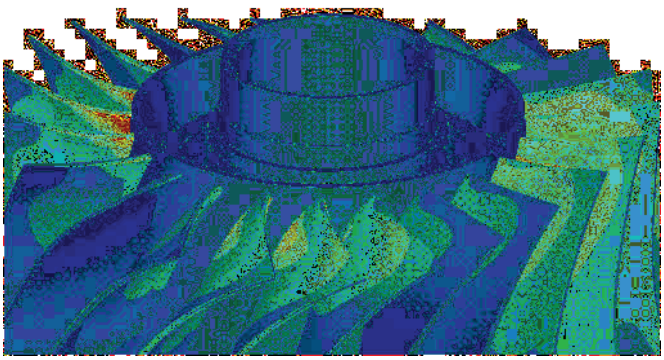
Biomedical Simulations - Project Zohra



Project Zohra was used by a specialist cranial plastic surgeon on planning for a cranioplasty of a baby with the Apert Syndrome. In words of the plastic surgeon himself, “I have to figure out how to rearrange the pieces of the skull during the actual surgery, it’s like a jig-saw puzzle”. After close consultation with the surgeon our team recreated the actual baby’s skull through advanced scanning and processing. The 3D skull was so accurate that it even had the intricate minor details of each canal, passage, recess, and pathway. The surgeon was able to plan his surgical game plan on the provided 3D mock-up in the comfort of his office without even touching a scalpel or the patient. We are so happy and proud that the surgery was a major success and the baby has started to grow and function in a normal capacity since then.

Turbomachinery (Centrigugal Compressor) - Rotor-dynamics and Fatigue Analysis

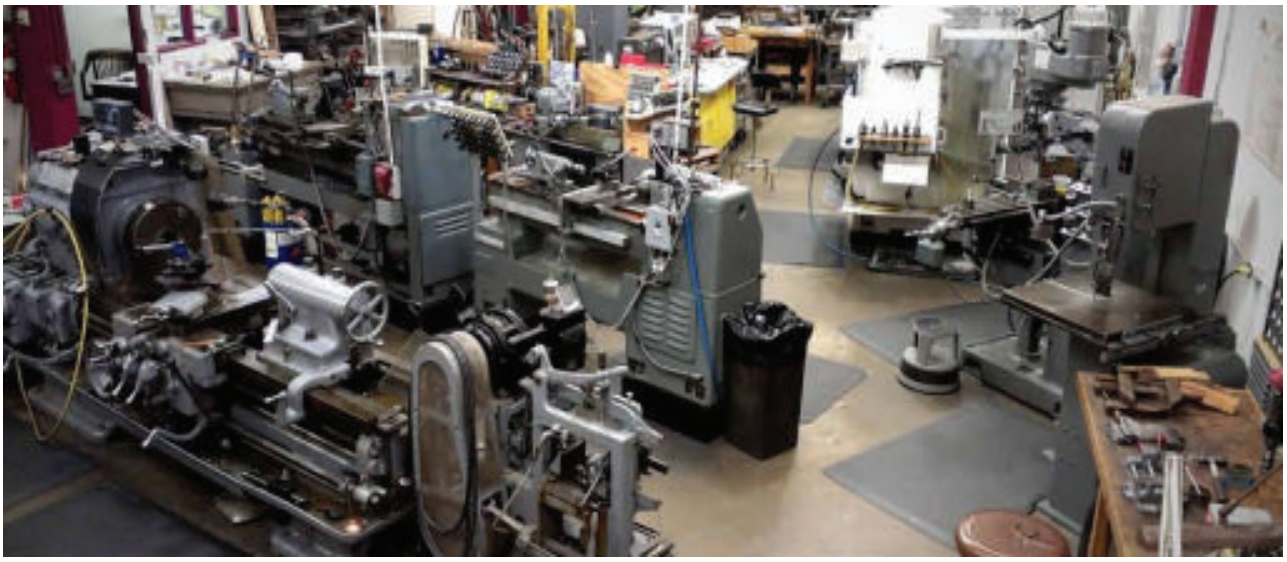
A rotor-dynamic analysis investigating a possible scenario that led to the chipped main vane of a centrifugal compressor shown. A subsequent fatigue analysis is routinely conducted to predict LCF and HCF. The simulation on the left explores the possibility of increasing the main vanes, while eliminating the split vanes.



Fabrication Facilities and Equipment

SoluNox is part of the local industrial supply chain and plays an active part in technological clusters around the globe.

Our primary fabrication facility includes a light fabrication workshop, heavy fabrication workshop, & precision engineering workshops. For fabrication work we utilize overhead cranes (up to 15 tons), heavy shears, hydraulic presses, benders, laser metal cutting, and welding machines (submerged arc welding, TIG, MIG, etc). We have up to 5-axis CNC machines (machining center, milling, lathe, wire-EDM, engraving), lathes, Capstan lathes, vertical lathes, boring machines, radial drill machines, surface grinding, cylindrical grinding, center-less grinding, dynamic balancing, shapers, planners, and copying attachments (milling and lathe). Our fabrication team consists of seasoned supervisors that have been working in the heavy metal fabrication industry for most of their professional lives, Class-A welders that have performed excellent welding jobs on large naval structures and underwater applications. We have a dedicated crew of experienced technical staff.



Steel stamping dies that have been used for motorcycle chassis, muffler silencer, and automotive chassis floors. The following dies have been used for Honda CD71 chassis, Honda CD125, NJ Super Bike, and Toyota Corolla floor carpet