

Tech
Mahindra

ENGINEERING **YOUR JOURNEY**

ACCELERATE - INVENT - TRANSFORM

#MYNEWIES

AN EXQUISITE **CASE STUDY HANDBOOK**

A collection of the most impactful Engineering success stories.



LEADING BY INNOVATION

“ This compilation of case studies, grouped under the four pillars, will give you an in-depth view of how we partnered with our customers to drive sustained success. ”

The future belongs to those who lead by Innovation.

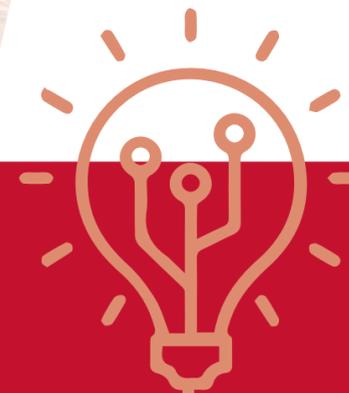
Tech Mahindra's Engineering Services (IES) division leads by developing new and exciting innovations that create lasting value for our customers. Steered by the four pillars of **DESIGN, ENGINEERING, DIGITAL AND CONSULTANCY**, we act as a catalyst for businesses seeking to stay relevant in the digital shift. In a **Connected World fuelled by Connected Experiences**, it is imperative that businesses develop solutions across dimensions, involving the digital, physical, convergent, and everything in between. And that requires the seamless and integrated technology capabilities that our 23+ years of excellence is bringing to our 350+ global customer base. Tech Mahindra today is the highest ranked non-U.S. company in the Forbes Global Digital 100 list and in the Forbes Fab 50 companies in Asia, in 2018.

This compilation of case studies, grouped

under the four pillars, will give you an in-depth view of how we partnered with our customers to drive sustained success. Learn how we applied the latest technology solutions to develop new experiences for our customer's end-users, improve their operational efficiencies and consistently drive their growth. We hope you enjoy the stories as much as we enjoyed our journey in partnering with enterprises and people alike to Rise™ in a connected world.

HAPPY READING!

**Tech
Mahindra**



ENABLING CONNECTED SOLUTIONS FOR A CONNECTED WORLD

Tech Mahindra's Journey in Unlocking Transformative Solutions

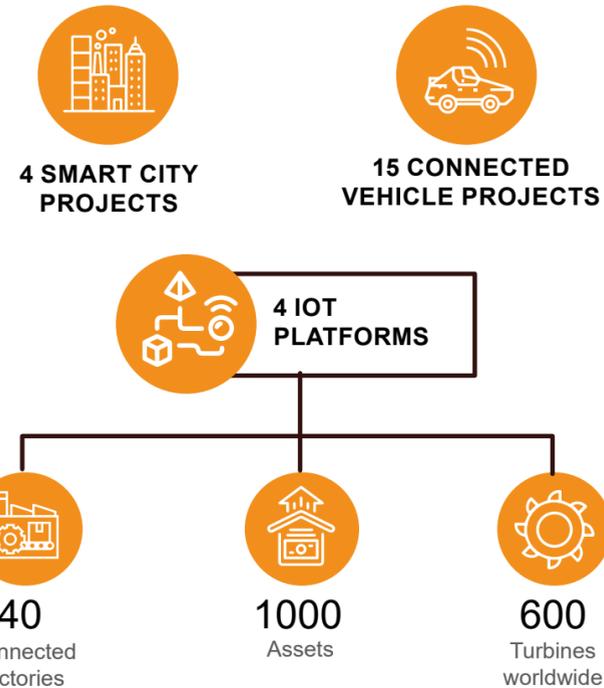
At Tech Mahindra, the journey to empower our clients with world-class integrated solutions started decades ahead. Constantly evolving over a period of 23 years, Tech Mahindra's Integrated Engineering Solutions division today creates bespoke solutions for diverse industries including aerospace, telecom, and healthcare and we now empower a 350+ global customer base. Core to our vision of enhancing our customer's brand and achieving sustainable growth are the four pillars of Design, Engineering, Digital & Consulting.

Our journey from traditional engineering to transformative partner for engineering and digital solutions have been one filled with success and accolades. Our operations commenced in 1995, in India and the US, offering Mechanical Engineering and Testing Services. In less than five years, we added our first jewel—Satven, bringing Automotive Mechanical Engineering expertise onboard to roll out Electrical Engineering and Embedded Engineering Services. Within the next five years we had started to spread wings into aerospace, transportation, semiconductor engineering and manufacturing, with footprints in China and Canada. Bio, the UK-based digital transformation firm and Pininfarina—the world-famous Italian car designer were flagship acquisitions that completed, complemented and gave us the capabilities that have made us an Engineering Solutions Company.



The incremental additions of resources and expertise have amplified our connected strategies and our solutions are testimony to this. Our intelligent and converged technologies are at work in smart cities, connected vehicles, connected factories & industry 4.0, and connected care-touching lives, driving operational excellence with evolving technologies

With Pininfarina, we leveraged the ability to create and lead concepts, and not just react to design changes. The concept car design we put together for a European carmaker was a runaway success and a smashing hit at the Geneva Motor Show. Our recent engagements in aviation include path-breaking Aircraft Health Monitoring of the C-Series aircraft of a leading Aerospace manufacturer, with constant monitoring of 52 aircraft, pulling in a combined engineering efforts that has crossed 2.5 million hours. We have helped a global consumer durables manufacturer launch more than 400 innovative products since entering into a long term strategic partnership, and continue to be an integral part of the client's success story.



The future belongs to a connected world- cars, cities, healthcare, industries, consumer products-and at Tech M our foresight and planning combined with technological expertise and ability to deliver bespoke solutions are creating exponential growth for our clients and enjoyable experiences for their customers.

ENGINEERING & DIGITAL SERVICES

across Industries





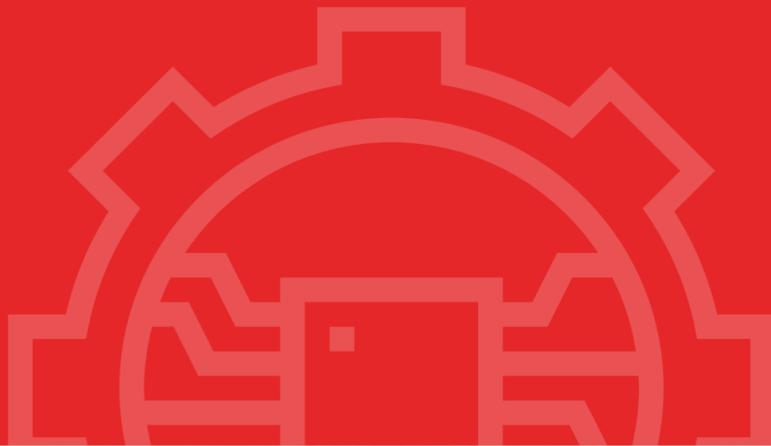
CASE STUDIES

DESIGN FOR ENHANCED
PRODUCTIVITY &
EXTRAORDINARY
CUSTOMER EXPERIENCES

ALIGNING TECHNOLOGY,
BUSINESS AND CUSTOMERS
THROUGH INNOVATIVE
FRAMEWORKS

YOUR TRUSTED
PARTNER FOR DIGITAL
TRANSFORMATION JOURNEY
TECH MAHINDRA OFFERS
END-TO-END DIGITAL
SOLUTIONS & BUSINESS MODELS.

TECH MAHINDRA
BRINGS A UNIQUE
CONSULTING LED
INNOVATION MODEL



DESIGN

ENGINEERING

DIGITAL

CONSULTING

MANUFACTURING

360° SHOP FLOOR VISIBILITY

CASE SUMMARY

The convergence of digital technologies is creating a paradigm shift, thus triggering the fourth industrial revolution in various manufacturing industries. Factory of the Future (FoF) is a product of disruptive technologies such as Artificial Intelligence (AI) and Internet of Things (IoT), rapidly transforming the manufacturing industry at a global scale. Tech Mahindra has supplemented its investments in innovation labs, talent development, research, thought leadership, and industry leading partnerships by building best-in-class solutions, frameworks, and accelerators to help clients extract higher business value from their industry 4.0 efforts.

PROBLEM STATEMENT

A North American construction product manufacturing and exporting company, aimed to gain complete visibility of the plant floor that would help create meaningful business impact across production efficiency, plant maintenance, and product quality.

SOLUTION

Tech Mahindra conducted a series of workshops with client's business and IT leadership to build a shared vision of the Factory of the Future (FoF) and the benefits of undertaking their Industry 4.0 journey for digital transformation. The success of the workshops led to a Proof Of Concept (POC) for enabling automatic data acquisition from the plant floor and building a data lake. Based on the benefits realized in the POC phase, Tech Mahindra is currently engaged with the client for a global implementation of automatic data acquisition and predictive analytics capabilities across their 50 plants

BUSINESS IMPACT

360 degree operation visibility and performance monitoring

Real-time process monitoring and predictive analytics capabilities leading to a significant reduction in wastage of raw materials

Automated visualization of statistical process control measures has resulted in 250 man-hours savings per process line

Real-time condition monitoring has enabled rapid anomaly detection, in turn ensuring consistent quality of the end product

360 DEGREE OPERATION VISIBILITY LEADING TO MEANINGFUL BUSINESS IMPACT.

“ Real-time condition monitoring has enabled rapid anomaly detection, in turn ensuring consistent quality of the end product ”

MANUFACTURING

EFFICIENTLY ENABLED THE CLIENTS TRANSFORMATION JOURNEY

“ Overall quality improvement with reduction in rejection rates and prevention of wrong process sequence at the work station level. ”

CONNECTED FACTORY

CASE SUMMARY

Advancements in data analytics, robotics and automation, and production methods such as 3-D printing are playing a critical role in reshaping manufacturing and operations, and helping companies achieve significant - even sensational - improvements in productivity.

Tech Mahindra has given to change management to smoothen out the client's transformation journey. Initiatives such as on-site support to the customers and operators, lean manufacturing training, and regular feedback during the test-phase helped achieve a smooth transition

PROBLEM STATEMENT

The client considered "Factory of the Future" an incremental long-term strategy that is critical to competitiveness in manufacturing processes and believed that rapid development is required from initial proof of concept development to real object dissemination.

SOLUTION

Tech Mahindra conducted a gap-analysis assessment to identify improvement areas and subsequently executed a Proof of Concept (PoC) to help the client understand the benefits and features of Industry 4.0 solutions and advanced analytics. The solution executed by Tech Mahindra were Machine Connectivity & Analytics Solution and Manufacturing Execution System (MES) implementation.

BUSINESS IMPACT

Overall quality improvement with reduction in rejection rates and prevention of wrong process sequence at the work station level.

Increased operational efficiency by transforming the shop floor to a predictive, cognitive manufacturing operation based on dynamic work & tool allocation.

Improved productivity with reduction in machine down-times, tool failures, setup time, rework hours and improved operator's efficiency.



FACILITATING COLLABORATION TO BUILD ENTERPRISE EFFICIENCY

“ Paperless design approval process led to 15-20% reduction in the time required to approve 3D designs ”

AI ENABLED SMART 3D VIEWER

CASE SUMMARY

Enterprises have a mandate to keep up with the fast-evolving technology landscape and launch products in an agile and responsive model. Time-to-market has become an extremely crucial determinant of product success, necessitating the manufacturing industry to adopt agile manufacturing principles.

Tech Mahindra developed a smart application that seamlessly integrates with a traditional 3D viewer and provides enterprise-wide access to 3D drawings via any web-enabled device

PROBLEM STATEMENT

The client, an automotive Tier 1 supplier, aimed to increase collaboration across their manufacturing value chain by extending access to 3D designs beyond product engineering teams. The vision was to extend access beyond 2,000 engineering personnel of the company to a workforce of ~15,000 employees. While providing 3D representations on paper would reduce the amount of information that can be shared and also be cumbersome, providing enterprise-wide access to 3D viewers would significantly increase the licensing costs.

BUSINESS IMPACT

Paperless collaboration reduced the time required for concessions process (RNC) by ~30%

Paperless design approval process led to 15-20% reduction in the time required to approve 3D designs

The primary beneficiary are manufacturing staff who can now

SOLUTION

Tech Mahindra developed a smart application that seamlessly integrates with a traditional 3D viewer and provides enterprise-wide access to 3D drawings via any web-enabled device.

Additionally, the application enhances the functionality of a 3D viewer by introducing several new features like a collaboration dashboard wherein personnel from engineering, manufacturing, stress testing, or quality control can provide their approvals and comments on 3D designs. This eliminates the need for paper-based workflows for these processes.

access 3D designs without the need to procure additional licenses for 3D viewer

The convenience of accessing these designs on the shop floor is increased with mobile devices eliminating the need for maintaining 3D viewer terminals on the shop floor

MANUFACTURING

OUTCOME FOCUSED DEVELOPMENT FOR INCREASED EFFICIENCY

“ Outcome focused development for smart metering infrastructure ”

SMART METER INFRASTRUCTURE

CASE SUMMARY

The Indian government has initiated 12 pilot projects and three full-scale projects to implement smart grids aimed at curtailing the losses of state run power distributors. Most of the pilot projects involve smart metering to reduce distribution losses.

Tech Mahindra's solution helped the client implement of smart metering solutions in India have helped increase metering efficiency by ~14% during pilot projects

PROBLEM STATEMENT

The largest networking company in the world aimed to tap this opportunity by developing an Advanced Metering Infrastructure (AMI) solution for India utilizing their proprietary knowledge in mesh generation and network security. AMI forms the backbone of smart metering by facilitating two-way communication between nodes and control centers

BUSINESS IMPACT

The target for Indian power distribution utilities is to reduce the Aggregate Technical and Commercial (AT&C) losses below 15% by 2017, below 12% by 2022, and below 10% by 2027. This goal is to be achieved by installing smart meters, among other measures. Indian government has laid down a target of installing 35 million smart meters by 2019 and up to 130 million smart meters by 2021

SOLUTION

Tech Mahindra assumed end-to-end ownership of developing the hardware, gateway, and middleware, and integrating the RF mesh secure network stack from the client into the solution. We combined our vast energy and utilities product engineering experience to come up with solution, that equips power utilities with features including remote meter reading, customer power supply control (kill switch), load control, outage

MANUFACTURING

FACTORY OF THE FUTURE

CASE SUMMARY

Convergence of Information and operational technology coupled with increased adoption of digital technologies is creating a paradigm shift, thus triggering the fourth industrial revolution.

Tech Mahindra has supplemented its investments in innovation labs, talent development, research, thought leadership, and industry leading partnerships by building best-in-class

solutions, frameworks, and accelerators to help clients extract higher business value from their industry 4.0 efforts.

PROBLEM STATEMENT

The client CEO had a vision of a system that enhances the “wisdom of the people” across the hierarchy levels. The aim was to develop multi-dimensional agility in responding to market demand fluctuations and create a fully connected ecosystem at all its 120+ global plants and supplier factories by 2020.

SOLUTION

Tech Mahindra used its proprietary FoF gap assessment tool to help the client understand its readiness to adopt Industry 4.0 solutions and the current maturity across four dimensions – digital manufacturing & Product Lifecycle Management (PLM), manufacturing operations & management, networks & collaboration and advanced analytics. Developed an end-to-end roadmap and solution encompassing technologies such as Internet of Things (IoT), AI, and big data analytics to transform the factory shop floor into an intelligent ecosystem of people, connected machines, legacy Enterprise Resource Planning (ERP)/ Supply Chain Management (SCM) systems and executive level dashboards

BUSINESS IMPACT

Improvements in the process efficiency to the tune of 25% by means of advancements in error proofing (poka-yoke), query resolution speed, and automation levels

Led to significant optimization in the energy consumption at the shop floor, thus controlling and reducing the cost of energy by 8% annually

Reduction potential of 50% in New product introduction (NPI) time based on rapid root cause failure analysis of production problems during ramp up and the elimination of rework at the end of the process

DEVELOPED MULTI-DIMENSIONAL AGILITY IN RESPONDING TO MARKET DEMAND FLUCTUATIONS

“ Led to significant optimization in the energy consumption at the shop floor, thus controlling and reducing the cost of energy by 8% annually ”

AUTOMOTIVE

TEST AUTOMATION ACCELERATOR

CASE SUMMARY

Software testing and updates in the complex automotive value chain require significant manual efforts and are highly prone to human errors and delays. Automated testing will help vehicle manufacturers meet client demands faster, improve employee experience, enhance cost-effectiveness, and improve collaboration.

Tech Mahindra's solution helped the client go beyond traditional testing for technical consistency and requirement compliance to ensure that the business and operational needs are fully met such as eliminating the need for repeated testing of entire application with small upgrades, thus helping optimize the test cycles.

PROBLEM STATEMENT

A Swedish automobile manufacturer and its associated suppliers were dealing with manual software testing and struggled to cope with shrinking product lifecycles, resulting in budget overruns and quality issues. The client aimed to develop a test automation solution that gets embedded within various phases of the product development lifecycle and is highly adaptable to the evolving client needs. The goal was to reduce human error and time-to-market while enhancing overall profitability.

BUSINESS IMPACT

The solution helped 85-90% improvement in testing efficiency and time-to-market, highly critical parameters for current digital transformation initiatives 90%. It also helped reduce the development cost of a test suite by 30% by enabling business users and testers to develop automated test scripts 30%. Automation enabled execution of more number of tests for an application, resulting in higher test coverage and significantly higher quality of the application.

SOLUTION

Tech Mahindra partnered with the client to develop a DevOps-based automation solution that sits at the core of client's testing strategy for infotainment systems and enables end-to-end automation for test ecosystems in order to sustain agile software development. The solution will enable the client in seamless organization and coordination of the multiple test scenarios across different software vendors

END-TO-END AUTOMATION TO SUSTAIN AGILE SOFTWARE DEVELOPMENT

“ The solution helped 85-90% improvement in testing efficiency and time-to-market, highly critical parameters for current digital transformation initiatives 90%. ”

AUTOMOTIVE

BUILDING BUSINESS POTENTIAL THROUGH DISCOVERY AND INNOVATION

“ Ensured the ideation of significant volume of concepts as well as a fair journey of each concept through the innovation and development process to the market. ”

CONSULTING LED-INNOVATION

CASE SUMMARY

Innovation is game changing. You create or invent a new product or a new way of doing things. You commercialize it. Customers value it. Your firm benefits through increased sales and/or usage, improved brand reputation, and better results are delivered.

Tech Mahindra has been recognized by the client as a 'Reliable Innovation Partner' with deep expertise and creativity potential to innovate and solve crucial problems across the value chain of multiple industries and functions.

PROBLEM STATEMENT

The client, a leading manufacturer of electronic products had defined an innovation-led entry strategy in the automotive segment to tap into disruptive themes such as Connected Vehicle and Autonomous Driving, and create a competitive edge in the market. It looked to collaborate with Tech Mahindra to identify key potential areas of impact, select subsequent key themes with high latent demand in the automotive market, and then develop domain-specific proprietary solutions that can be patented.

SOLUTION

Tech Mahindra brought its unique consulting-led innovation model that ensured the ideation of a significant volume of concepts as well as a fair journey of each concept through the innovation and development process to the market. A distinctive value creation methodology, S3D – Scan, Discovery, Discriminate and Disclosure, puts Tech Mahindra in a dominant position to be a leading innovation partner for the enterprises across industries and functional domains.

BUSINESS IMPACT

Tech Mahindra helped to successfully designed, incubated, and patented double the target number of patents fostering a culture within the client team to drive multifunctional teams for idea generation and capability development in these areas. 65+ ideas were brainstormed and then funneled down to 14 novel & marketable ideas with potential for high business impact and consent from all stakeholders.

AUTOMOTIVE



**EXTRAORDINARY POWER-TO-WEIGHT RATIO
MEETS EXCEPTIONALLY SLEEK DESIGN**

“ Designing an all carbon fiber supercar like no other ”

FITTIPALDI EF7 VISION GRAN TURISMO

CASE SUMMARY

The customer is an Ultra-Light Supercar manufacturer. The company is focused on creating and engineering supercars, utilizing advanced lightweight technologies, racing technologies, efficient powertrain structures, enhanced safety, autonomous vehicle intelligence etc.

A CHAMPION'S DREAM CAR - GERMAN ENGINEERING AND ITALIAN DESIGN

At the Geneva Motor Show, the much-anticipated design by Pininfarina, was revealed by this customer. The ultra-light, all carbon fiber supercar fuses the vision of a racing champion and that of an iconic Italian design company Pininfarina, by Tech Mahindra.

PROBLEM STATEMENT

A car with fierce track-racing capabilities, for drivers of all skill levels was to be engineered and developed. The exceptional yet forgiving handling & performance of this car, was achieved through a powerful V8 naturally aspirated engine, integrated gearbox, suspension and braking system; all that was developed by a German Engineering firm.

The challenge in front of Pininfarina was to come up with a commandingly sleek design, underscored by an extraordinary power-to-weight ratio.

BUSINESS IMPACT

This super car model is limited in its production, with every owner having the opportunity to benefit from personal coaching by the racing legend himself. In addition, owners will be able to join a premium Racing Club which will provide exclusive VIP high performance driving and racing experiences at some of the world's premier racing circuits, led by the legend and other racing professionals.

SOLUTION

The supercar's design theme was that of a SHARK, finding astounding aerodynamic expression in the vehicle's flowing, aggressive lines; assertive yet incredibly beautiful and pure. With ultra-lightweight, all carbon fiber chassis construction, having an exceptionally low center of gravity. The carbon fiber monocoque, is a specially designed safety capsule, for both driver and the passenger; enabling drivers to feel comfortable in the car, even while at its limits. Moreover, the balance between emotion and efficiency, which is typical of Pininfarina's design work.

AUTOMOTIVE

SKY RIDER DRONE BY PF

CASE SUMMARY

Pininfarina, the Italian company whose claim to fame includes the designing of Ferraris, has something else that might just tickle your fancy this time around – with the design of this drone that is aptly known as the Sky Rider.

It is signed by Pininfarina the drone to be built in partworks launched by DeAgostini Publishing in Italy. It is not a mere scale model, but a true gem, equipped with advanced functions and easy to assembly. It is called Sky Rider Drone, it has the GPS and the video camera integrated and it is provided with a double flight mode.

PROBLEM STATEMENT

The Pininfarina design team worked with the aim to convey a unique identity to the object in the respect of its peculiarities. The Sky Rider Drone was treated as a unique object, through marks able to characterize it in a strong and exclusive way.

SOLUTION

The collaboration between two of the most important and renowned Italian companies gave life to a real drone that, beyond flying in the sky reaching places scarcely accessible, can shoot videos and pictures, offering an original and unexpected point of view on the world. A unique object, able to satisfy people who wish to build a drone but also the ones who take in high consideration unique and original design. The Sky Rider Drone, in fact, combines the technological functions to a beyond comparison look, expressly studied and realized by Pininfarina.

BUSINESS IMPACT

Sky Rider will offer excellent maneuverability as you control it from afar, while there is also a built-in camera and GPS tracking ability. Pininfarina touts that the Sky Rider will carry with it a unique visual identity, and it has a perfect aerodynamic shape that will help minimize drag, allowing it to be as efficient as possible while it is in the air.

CRAFTING UNIQUE DESIGNS TO CREATE EXTRAORDINARY CUSTOMER EXPERIENCES

“ Sky Rider will offer excellent maneuverability as you control it from afar, while there is also a built-in camera and GPS tracking ability. ”

AEROSPACE



CREATING CUSTOMIZED PROPRIETARY SOLUTIONS TO ELEVATE CUSTOMER EXPERIENCES

“ The Vistamon solution captures an instant snapshot of aircraft health, performance, and operations via real-time monitoring, data management, notifications, and diagnostic reporting modules ”

VISTAMON: IMPROVING AIRCRAFT AVAILABILITY WITH AIRCRAFT HEALTH MONITORING SYSTEM

CASE SUMMARY

The global AHM services market is rapidly growing and projected to reach USD 4.71 billion by 2021, at a CAGR of 6.5% improve reliability of systems and provide real-time monitoring, trend analysis, and enhanced operations management that will result in reduced maintenance downtime/costs. Nowadays, airline operators as well as Maintenance, Repair, and Operations (MRO) providers are focusing on integrating AHM solutions with commercial aircrafts.

Tech Mahindra's AHMS is an integral part of the client's aircraft design, ground system and support tools. The AHMS will be available to operators at the aircraft's entry into service.

PROBLEM STATEMENT

A world's leading aircraft manufacturer aspired to enhance its market positioning and manage the increasing competitive intensity and customer demand. The client wanted a vigilance and status monitoring solution covering both prognostic and diagnostic data services to enhance efficiency, asset utilization, sustainability, and user experience of airline operations and maintenance for its customers.

SOLUTION

Tech Mahindra customized and executed its proprietary Aircraft Health Monitoring System (AHMS) - Vistamon, for the client's leading aircraft series. Vistamon is the first-ever AHMS solution developed by an engineering service provider. It is built for a multi-tenant environment and supports easy and scalable cloud based deployment with zero infrastructure obsolescence risk. The Vistamon solution captures an instant snapshot of aircraft health, performance, and operations via real-time monitoring, data management, notifications and diagnostic reporting modules.

BUSINESS IMPACT

AHMS helped in achieving 25-30% improvement in the aircraft dispatch reliability rate for the client's end customers and operators

The solution generates a potential annual saving of U.S \$330,000 per aircraft operator fleet based on reduced Aircraft On Ground (AOG) time and better aircraft availability with less flight disruptions

Effective troubleshooting via advanced analytics delivered up to 25% savings for the monitoring and maintenance functions

OIL & GAS

OPTIMIZED DESIGN FOR ENHANCED PRODUCTIVITY

“ The “active sensor” technology helps end customers eliminate the setup time for each test, estimated at 30-40 minutes. ”

HIGH PRESSURE HIGH TEMPERATURE VISCOMETER

CASE SUMMARY

Viscometers have traditionally been characterized by bulky floor-mount designs and limited built-in features. Equipment providers are now leveraging newer design principles to not only optimize the footprint of these instruments but also enhance the day to day experience and productivity. Tech Mahindra used design thinking principles to identify the unmet needs of the end users and subsequently developed a prototype with significantly enhanced capabilities and features.

PROBLEM STATEMENT

The client, a global oilfield products and services firm aimed to reengineer its viscometers to stay competitive in the market. Time-to-market and availability of in-house talent were two key challenges faced by the client to reengineer the product in-house.

SOLUTION

Tech Mahindra started with a teardown of competitor products to define “hygiene” and “differentiating” features for the client’s viscometer and also to arrive at the required operational ranges for drilling speed, temperature, and pressure. Tech Mahindra developed a patented “active sensor” technology, eliminating the need for manually selecting and replacing spring to conduct tests across the available viscosity range along with a modular Human Machine Interface (HMI) as a unique feature for the client’s viscometer.

BUSINESS IMPACT

The “active sensor” technology helps end customers eliminate the setup time for each test, estimated at 30-40 minutes, eliminating the need for having a specialist technician for adjusting spring connections after each test. The modular Human Machine Interface (HMI) developed for this viscometer has ensured greater Productivity. The client is currently running a pilot project with the world’s second-largest oil exploration company.



**Tech
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Connected World.
Connected Experiences.