SPECIAL EDITION

Contactmag

Transportation & Mobility: Accelerating innovation for a brighter future



Renault
Version 6 in practice

Jaguar Land Rover
Business transformation with Version 6

Alstom Transport
Sustainable mobility in the rail industry

DASSAULT SYSTEMES

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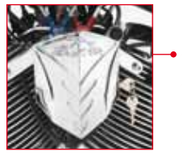


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Contact mag
Transportation & Mobility

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Publication Executive:
Emmanuelle Saby

Chief Editor:
Michael Marshall

Transportation & Mobility Editor:
Bernadette Hearne

Contributing Editors:
Sabrina Khouchane
Gregory Fournier

Editorial Board:
Olivier Sappin
Paul Silver

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This new technology allows *Contact mag* to offer you the same bonus features already available to the *Contact mag* Interactive readers. Enjoy!

Editorial

For more than 25 years, Dassault Systèmes has been instrumental in helping companies worldwide master their information to drive innovation.



Olivier Sappin
VP Transportation & Mobility Industry
Dassault Systèmes

The Transportation & Mobility Industry is at a crossroads. Times are challenging: globalization, stringent regulations, ecological concerns, increasing vehicle complexity and reduced cycle times in which to meet consumer desires have combined to create tremendous pressure.

But with great challenges come great opportunities – for those nimble enough to seize them.

Faced with a major transformation, leading actors around the globe – including Jaguar Land Rover, Renault, Great Wall Motors, McLaren Mercedes, and Tesla Motors – are fundamentally changing their PLM strategy to gain agility, speed, cost reduction, regulatory control and, perhaps most importantly, the insights that lead to innovation. Each of these companies, and hundreds more across a dozen industries, have adopted the open Version 6 platform for its unique value in helping them transform their operations to meet the industry's demanding new reality.

For more than 25 years, Dassault Systèmes has been instrumental in helping companies worldwide master their information to drive innovation. DS has consistently supported the Transportation & Mobility Industry through every step of its technological and business evolution, from 2D to 3D design and digital mock-up, then moving to lifecycle management, and now to realistic experience of the vehicle in action. We recognize that you count on our solutions to help run your business, and we are committed to your success. Earning your trust is our greatest achievement, and we strive to always be worthy of it.

Yes, the Transportation & Mobility Industry is under tremendous pressure. But pressure turns coal into diamonds. Together we can achieve the same transformation for the Transportation Industry, polishing a difficult today into a sparkling future.

The pages that follow demonstrate how DS is supporting vehicle makers and suppliers worldwide as they transform their tomorrows. We look forward to doing the same for yours. With our technology and your ingenuity, the potential is limitless.



From concept to road in 6 months



Local Motors, which specializes in crowd-based design and manufacturing, took a new military vehicle from concept to working prototype in less than six months using the Dassault Systèmes Version 6 platform.

Local Motors asked its community of more than 12,000 designers and enthusiasts to help create a military vehicle as part of the U.S. DARPA (Defense Advanced Research Projects Agency) design challenge for a crowd-derived combat-support vehicle. Using the DS Version 6 platform, individuals designed independently and then collaborated online, providing feedback on more than 150 entries.

The winner, Victor Garcia's FLYPMode design, was built into an operational prototype that incorporated concepts proposed by the peer community in the open-source process.

"Dassault Systèmes is a natural partner choice for us on this project," Local Motors CEO Jay Rogers said. "We both see the future of product creation based upon an open process where we gain wisdom from the masses in order to deliver truly relevant products. We could not have achieved the same outcome without their intuitive design and collaboration tools and support."

eCar Design Challenge stimulates creativity

NEWS



Dassault Systèmes (DS) – in collaboration with Riversimple and the 40 Fires Foundation – recently launched an online eCar Design Challenge. The competition was created to encourage global collaboration among design students by developing ideas on an open-source platform – the DS Version 6 platform.

Christopher Reitz, head designer at Riversimple, says the competition motivated young designers to match their capabilities against a wide range of competitors, helping to further hone their skills. The competition's winning designer, Ido Baruchin, accompanied Dassault Systèmes to the Frankfurt (Germany) Auto Show in September, presenting his winning "Otto" design (right) to industry professionals and the public.

Anne Asensio, vice president of Dassault Systèmes' Design Experience, believes the contest generated some exciting concepts. "We wanted to formalize in a new context a place where people feel secure and visible in their creativity," she says. This contrasts with the traditional approach of protecting designs for as long as possible, which can hinder the design and development process by creating what she calls a 'black hole effect.'

In addition to Baruchin, eCar competition finalists were: Clément Hoffner's "Flower," Ernö Péter's "Definitive," Raj Shekhar's "Hydro-Hub" and Acatrinei Lucian Nicholae's "Libertis."

For more information:
http://perspectives.3ds.com/design/ecar

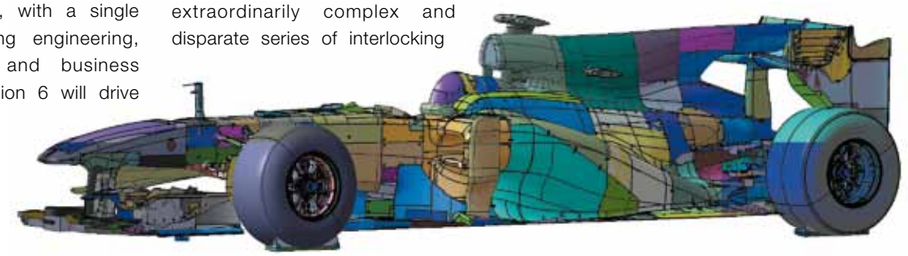
McLaren Racing to deploy Version 6

Dassault Systèmes' Version 6 collaborative PLM solutions will play a vital role in helping streamline McLaren Racing's processes.

McLaren Racing, the operating arm of the Vodafone McLaren Mercedes Formula 1 team, is turbo-charging its development efficiency with Dassault Systèmes' open Version 6 PLM solutions.

ENOVIA Version 6 powers collaborative innovation at McLaren, with a single reference for managing engineering, intellectual property and business processes. CATIA Version 6 will drive innovative design and concurrent engineering, enhancing McLaren's development efficiency.

"While it may look straightforward to guide a racing car from a 3D digital model to the racetrack, it's a process that involves an extraordinarily complex and disparate series of interlocking design, purchasing and manufacturing constituents," said Jonathan Neale, McLaren Racing's managing director. "At McLaren Racing, we are looking at every opportunity to cut our time to market – whether that's through clever design, the introduction of improved processes or, in the case of Version 6 PLM, by introducing a sophisticated product lifecycle management system to improve efficiency throughout the production cycle."



Premium automaker implements Version 6

BMW chooses Version 6 PLM solutions to develop the electrical, electronics, and embedded software (E/E) architecture of its cars.

BMW will leverage the Version 6 platform to manage the future complexity of embedded systems in its cars, providing a master architecture for all car derivations and enabling continuous modernization of car functions. The re-use of functions and the separation of hardware and software components in the development process will help BMW gain significant cost savings in the E/E domain.

Because of the flexible PLM backbone and the large degree of out-of-the-box, specialized functionality for systems engineering, thousands of BMW engineers will be using Dassault Systèmes' Version 6 platform. With the Architecture, Integration and Design for Automotive Project (AIDA), BMW will implement a seamless collaborative process to connect the various constituents and actors of the E/E process, putting BMW's customers' values at the center of its innovation initiatives. The Version 6 PLM systems design solution will be connected to the current BMW enterprise environment, demonstrating the openness of the Version 6 platform. This successful deployment, already in operation today, is the first step in a ten-year partnership between BMW and Dassault Systèmes to build the best infrastructure and applications for the E/E domain.

BMW and Dassault Systèmes have signed a ten-year partnership to build the best infrastructure and applications for the E/E domain.

"We at Dassault Systèmes are thrilled to see that BMW is using our Version 6 platform and receives all the benefits of a unified, collaborative PLM environment," said Dominic Florack, senior executive vice president, Products - R&D, Dassault Systèmes. "By strengthening Version 6 with new search technology, Dassault Systèmes provides a new class of PLM Systems Engineering Solutions, which give a strong competitive advantage to our customers."

zoom in…

Use your smartphone to read about supplier innovation

High-octane supplier innovation

Ford Motor Co. collaborates with DS, *ensuring strategic solutions to accelerate innovation in its global supplier community.*

Use your smartphone to read about systems engineering

Strategic systems engineering

Leverage insights from DS experts *and fortify your global competitive advantage.*

Use your smartphone to read about global advantage

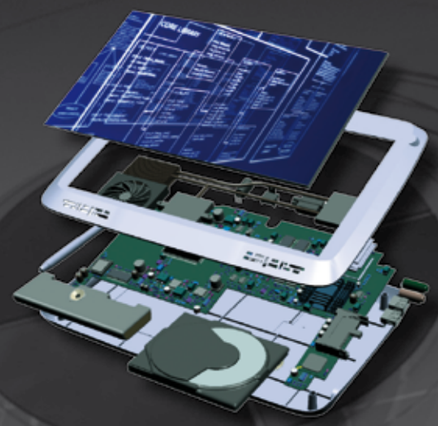
Global competitive advantage

Gain distance on the competition *by developing lighter, stronger components while ensuring optimal product performance.*

Use your smartphone to read about operational excellence

Turbocharge product development

Master operational excellence *by improving communication and standardizing processes throughout the enterprise and across the product lifecycle.*



Collaborative Systems Engineering Solution

FOSTERING INNOVATION AND MASTERING
FUTURE SUSTAINABLE PRODUCT DEVELOPMENT

At a time when:

- More than 40% projects fail due to lack of requirements and traceability capability
- More than 50% of projects fail, due to poor systems architecture validation
- 80% of costs are committed in the first 20% of product lifecycle

How can we manage Product & Process development complexity and comply to ever growing stringent industry regulations ?

The Dassault Systèmes' Collaborative Systems Engineering Solution is the answer:

- Ensuring right-to-market delivery through complete traceability from customer needs to final product validation.
- Mastering a collaborative model based systems definition unifying Requirement, Functional, Logical & Physical views.
- Assuring the right engineering decisions are made by simulating product behavior & environment, powered by a multi-engineering modeling language.

Visit www.3ds.com/automotive for more information

DASSAULT SYSTEMES

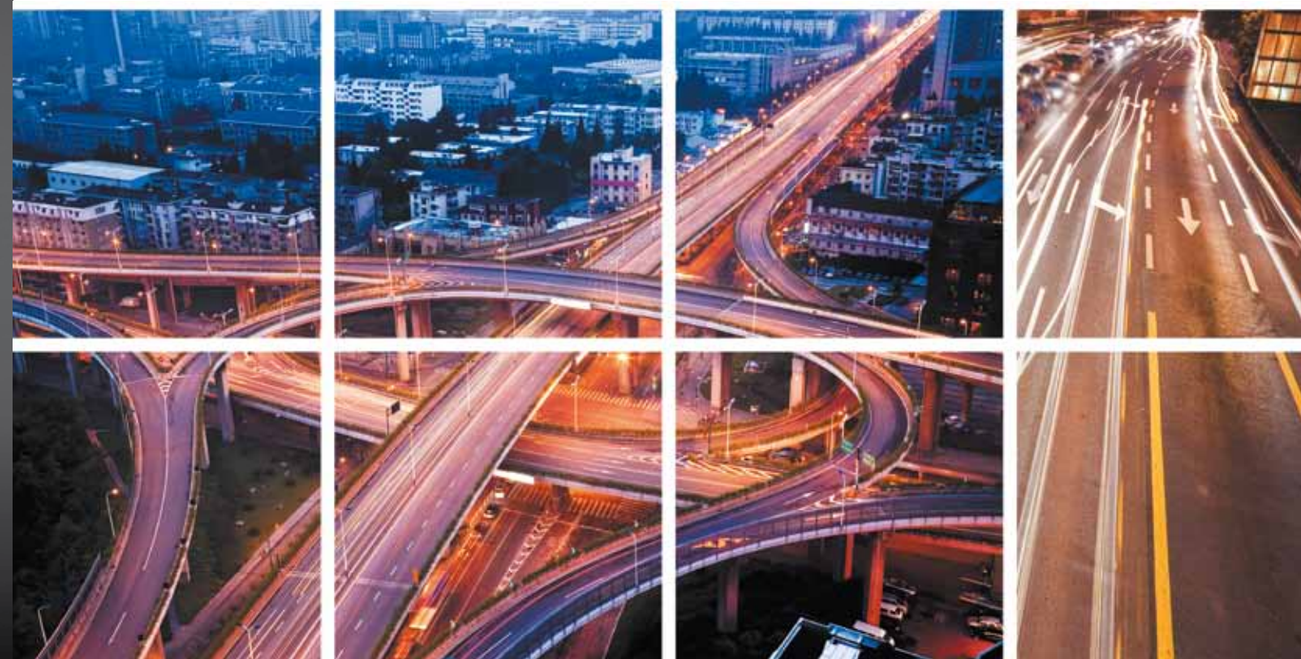
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Focus on Transportation & Mobility

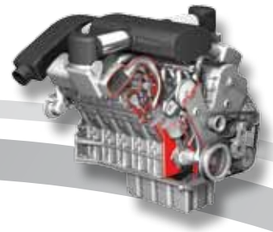
May you live in interesting times, the old saying goes. For Transportation & Mobility companies, these are not just interesting times, but challenging ones. Design cycles are shorter. Time to market is compressed. Demands to do more with less only keep growing. Clearly, old ways of working can no longer keep pace.

But interesting times can also be times of tremendous opportunity, when innovative approaches can convert difficulty into success. In this special edition, *Contact mag* looks at the transportation OEMs and suppliers that are changing the way the industry works and the Dassault Systemes solutions that are helping them thrive in interesting times.



Accelerating vehicle innovation with Version 6

By *Olivier Sappin*
Vice President
Transportation & Mobility Industry

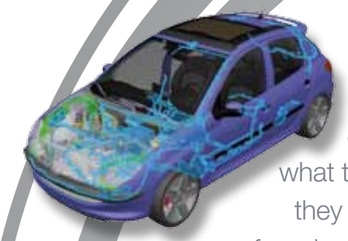


Powertrain Engineering and Manufacturing



Global Product Program Management

Vehicle Systems Architecture



Automakers are under intense pressure to improve the efficiency and effectiveness of how they design and build vehicles. OEMs must deliver what the consumer wants, when and where they want it, at an acceptable price. Only a profound evolution of the industry's infrastructure, processes and core technologies can meet this demand for new vehicle innovation.



Vehicle Design/Styling and Surfacing

For more than 20 years, manufacturers and suppliers of automobiles, motorcycles, trains, buses and more have relied on the power of Dassault Systèmes PLM to help achieve concurrent development, seamless integration, simultaneous engineering, and real-time visibility.

Today, however, automotive manufacturers and their suppliers need more from their PLM solutions. To meet requirements for global product development and increasingly complex vehicles, they must expand PLM beyond engineering and manufacturing. By including everyone with a role in a vehicle's life – from internal functions to end consumers – manufacturers can slash development times and delight retail car buyers.

ACCELERATING INNOVATION WITH VERSION 6 PLM

To achieve these goals and innovate efficiently, Transportation & Mobility companies must master disparate sources of globally distributed intellectual assets and facilitate open, frequent, ad-hoc collaboration across the enterprise and into the marketplace.

Dassault Systèmes' online, collaborative Version 6 PLM solutions enable OEMs and their suppliers to accelerate the development of innovative products with higher rates of market success. The integrated DS PLM portfolio enhances business processes and facilitates global collaboration, transforming information into actionable knowledge in a lifelike 3D environment.



Body-in-White Engineering and Manufacturing

Version 6 also provides a single platform that consolidates product-related information, making it visible and actionable by participants from all areas of the extended enterprise. With Version 6, "PLM online for all" comes to life, allowing users everywhere to work concurrently in real-time on the same data via a simple web connection to a single server.

With 3DVIA for lifelike experience, CATIA for virtual product design, ENOVIA for collaborative innovation, DELMIA for digital manufacturing, SIMULIA for realistic simulation, 3DSwYm to create dynamic online communities, Exalead for information intelligence and 3DSwYm for social innovation, automotive manufacturers and suppliers can:

- Vehicle Design/Styling and Surfacing: Master the entire vehicle design/styling workflow, including concept design, mechanical design, surfacing, refinement, and reverse engineering.
- Vehicle Systems Architecture: Manage end-to-end vehicle software architecture and systems engineering processes, including functional analysis; logical systems design; multi-physics behavior modeling and simulation; and configuration and change management.
- Global Product Program Management: Leverage intellectual capital, navigate program content, assess project performance and effectively manage strategic activities, all while collaborating with global teams and key decision makers.
- Powertrain Engineering & Manufacturing: Develop and optimize engine and transmission design; simulation and validation; structural dynamics, noise and vibration; manufacturing casting and forging, machining, and assembly planning.
- Body-in-White Engineering & Manufacturing: Accelerate BIW design, development and production, simulation, and validation. Optimize occupant safety, strength and durability.
- Regulatory Compliance Management: Deliver innovative yet environmentally compliant products that meet global market demands.



Regulatory Compliance Management

INNOVATION BEYOND SOFTWARE

As the leading PLM solutions provider to more than 70% of global automotive OEMs and their suppliers, DS experts support strategic initiatives focused on the transformation of automotive product development, manufacturing and enterprise collaboration processes to:

DS is the leading PLM solution provider to more than 70% of global automotive OEMs and their suppliers.

- Develop zero-default vehicle geometry, fit and fabrication.
- Produce the safest, high-performance vehicles with comprehensive requirements traceability.
- Design energy-efficient vehicles with permanent weight control and systems optimization.
- Accelerate new product innovation and improve quality in a "3D online for all" environment that optimizes the in-car experience with consumer feedback gained through social innovation.
- Simulate product performance in the digital stage, when changes are least expensive to make.
- Manage a single PLM platform/repository for IP management.
- Reuse design/production data and preserve methods and processes across programs.
- Enhance global collaboration at multiple sites and throughout supply chain.
- Ensure delivery of projects within performance and timing guidelines.
- Provide accurate, real-time 3D review and reporting of program status.
- Leverage proven, "ready-to-use" PLM business processes.

From vehicle design concept to embedded systems engineering and powertrain production, DS provides world-class capabilities that ensure success.

For more information:
www.3ds.com/automotive

Renault drives the customer experience with Version 6

By *Lisa Roner*

At Renault, bringing high quality, affordable vehicles that meet the market's expectations for advances in customer experience and environmental responsibility are not just lofty goals, but the key tenets of doing business. To successfully deliver on these challenges and set itself clearly apart from its competitors, Renault chose Dassault Systemes' Version 6 PLM platform as the cornerstone of its global automotive engineering processes.

VERSION 6



Use your smartphone to learn more about how Renault uses Version 6

Renault wanted an enterprise-wide PLM solution that would effectively address issues of standardization for its processes and design tools. With more than 40% of its engineers located outside of France in "technocentres" in Romania, India, Korea, South America and Spain, the company needed a global engineering tool that would allow its designers to effectively and efficiently collaborate around the globe.

"To achieve our strategic growth plans, we need to ensure our performance in R&D and investments. And that performance depends on reducing development cycle times and standardizing the components we develop," says Odile Desforges, EVP, Engineering and Quality, Renault. "It became immediately obvious to us that Dassault Systèmes, with its programs, software, and tools was the company best suited to address our needs."

Renault chose Dassault Systemes' Version 6 PLM platform as the cornerstone of its global automotive engineering processes to support an internal program called NewPDM

Olivier Colmard, *vice president, Information Systems for Engineering & Quality, Renault*

Renault also sought a solution that would allow it to easily access and manage all of the company's data – from product design and process to simulation, testing and resources information – while ensuring its traceability.

"We wanted a single PDM that could be deployed worldwide to cover all of Renault's needs for data management across product, process, simulation and performance," says Olivier Colmard, vice president, Information Systems for Engineering & Quality, at Renault. "This new tool, in addition to being modern and efficient, must facilitate collaborative design between our corporate technocentre and Renault's other technocentres around the world. In addition, we sought a solution that would support openness to outside collaborators, suppliers, our Alliance partner Nissan and other partners such as Avtovaz and Daimler as part of Renault's extended enterprise."

"Renault chose Dassault Systemes' Version 6 PLM platform as the cornerstone of its global automotive engineering processes to support an internal program called NewPDM," says Colmard. "Version 6 met these requirements, while offering a strong dose of ergonomics over older systems. It was important for us to simplify 3D navigation through a vehicle or engine that allowed access to all of our engineering documents or deliverables."

COLLABORATION WITH 3DLIVE

Colmard says through Renault's Quick Win deployment approach the company has been able to implement 3D collaboration with 3DLive among its sites. The immediate and future benefits are clear, he explains.

"First, we can measure savings in travel time. We no longer have to send our Romanian and Korean designers to France and vice versa. This saves the time, cost and the environmental impacts of travel," Colmard says. "And we also have the ability to understand each other better and interact more easily with colleagues in foreign languages through the common language of 3D drawings or scans. I think there are real benefits to working around a screen together, even if it's remotely with 3DLive."

DATA ACCESS AND MANAGEMENT WITH VERSION 6

A single database prevents problems with data reconciliation, says Jean Pierre Chatenet, NewPDM Architect & Functional Infrastructure manager at Renault. The appeal of one repository with fast response times for users regardless of geographical location, he says, was a key reason for choosing Version 6. "We needed a system that was quite independent of latency," he stresses. »



Document management also is vastly improved with Version 6, Colmard says. “Through our Doc Eng Project, we’re able to manage our engineering deliverables,” he explains. “Before, to be honest, our documents were scattered and poorly managed. With Version 6, we’ll have full traceability of all of our deliverables. The documents are easily accessible and, in some cases, even rework is avoided, since at any moment you can refer to past studies and transmit know-how and results to downstream teams.”

In the two years since its selection of Version 6, Renault has worked closely with Dassault Systèmes to enhance and implement Version 6 in a variety of pilot and production projects that are beginning to prove its integral value to Renault’s future and help keep it a step ahead of its competitors.



With PDM Test, Renault will be managing all the results of its physical or bench testing centers. And Colmard says PDM Calculation allows the company to store and manage both the input data for simulations and calculations, including aerodynamic and other tests required by regulators, and the results of each of these calculations for the different versions and configurations of the digital models its engineers use. Eventually, he says, these solutions will be deployed throughout the company.

A SINGLE PLATFORM YIELDS ONE VERSION OF THE TRUTH

Renault also sought a single, integrated platform for all of its PDM/PLM tools. “In the past, we had CATIA V5 with a variety of PDM/PLM solutions,” Chatenet says. “We saw with functional design, for instance, it was difficult to use CAD from one vendor and PLM from another. Because we had CATIA and did not want to change, Version 6 with CATIA V6 completely integrated was an obvious choice. It guarantees relationships between objects are managed and we know we’ll be able to better manage functional design.”

Being able to display the complete digital mock-up of a car or engine in real time is another key advantage, Chatenet says. “This was a dream when I started with PLM 20 year ago, but we saw three years ago that with Version 6 it was quite possible,” he says. “You can view parts, explode sections, get drawings – all in real time.”

Chatenet says because Version 6 enables even those not skilled in the use of CATIA to access and view digital mock-ups, an advantage Renault calls democratization, DMUs can be used to navigate, review and retrieve information. “You can quickly assess the level of maturity of a design and even casual users can see where there are problems or where validation is still required,” he says.

Once Version 6 is fully implemented and all engineering information is inside the same system, Chatenet says, Renault will be able to manage the associativity or digital continuity among different domains or clusters of information that today are split between different systems. “For example, today inside DMU, we manage parts, but not welding points and process information like body-in-white assembly graphs are in another system,” he explains. “With Version 6, it will be managed in the same system with relationships between process information, function and part instance through strong relationships between BOM and DMU.”

“As you know, the car has become a complex system,” Colmard explains. “With more electronics, computers and on-board telematics, we need a tool to manage all this complexity and systems engineering using NewPDM allows us to do that. Also we can manage and test physical simulation data and results to optimize our systems and processes. And the level of digital continuity Version 6 provides will allow us to leverage engineering data in marketing and even after-sales activities such as repair and diagnostics. There is a digital continuity from start to finish, from design to the customer.”

Since September 2011, Renault engineers use CATIA V6 and ENOVIA V6 for PDM on a new engine project. Chatenet says all of the parts for the motor will be designed and managed using Version 6. And plans are underway for a new vehicle project to begin using Version 6 at the beginning of 2012.

DRIVER EXPERIENCE

Renault’s end goal is always to provide its customers with the best vehicle possible at an affordable price. For drivers, Colmard says, there is a clear quality issue. “Through the kinds of tools Version 6 provides, there is an efficiency of design that allows us to ensure that we do many good things with maximum return of experience and knowledge embedded into our products,” he says. “The quality axis is very important.”

Colmard believes Version 6 can help Renault meet its responsibilities and commitments to its customers. “Our goal is to design vehicles that are both effective and as efficient as possible, while being affordable and offering maximum benefits to the passenger,” he explains. “It is clear that with a tool like Version 6, our NewPDM program will enable us to better manage different configurations and optimize the maximum weight, aerodynamics, etc., while effectively reducing our time to market and meeting our customers’ expectations.

> First, we can measure savings in travel time. We no longer have to send our Romanian and Korean designers to France and vice versa. This saves the time, cost and the environmental impacts of travel.
>
> **Olivier Colmard**, *vice president, Information Systems for Engineering & Quality, Renault*

PARTNERING WITH DS

Renault is proud of its partnership with DS to develop next generation solutions that meet the unique needs of the automotive industry. The company praises DS R&D as a strong force for innovation and believes its PDM solutions are a tipping point for the industry.

“Together, we are not doing another optimization of an existing generation of PDM, but a new generation of PLM 2.0 based on the processes and needs we have at Renault,” Colmard says. He believes Renault’s partnership with DS to develop new solutions gives his company a leg up on its competitors on implementation of Version 6.

For more information:
www.renault.com
www.3ds.com/automotive



Jaguar Land Rover: Transforming its business with Version 6

By Nick Lerner

Jaguar Land Rover, in partnership with Dassault Systèmes, is deploying Version 6 PLM across its extended enterprise. This bold move delivers important engineering, technical and commercial benefits for sustainability, business and vehicle development.

Use your smartphone to learn more about how Jaguar Land Rover uses Version 6

Jaguar Land Rover's heritage comprises some of the world's most iconic vehicles, including the Jaguar Mark II, the E-Type, and the Land Rover Defender. Having passed through the corporate hands of Ford, Jaguar Land Rover (JLR) has emerged within Tata Motors as an exciting, dynamic global enterprise.

A glance at the Jaguar C-X16, C-X75 and Land Rover DC100 shows the shape of things to come, while press acclaim greeted Range Rover's recent launch of the lighter, greener Evoque. Turning heads from Chicago to the foothills of Kanchenjunga, Nepal, Evoque is a true inheritor of its parent brand's hard-won esteem.

COMPLEX HISTORY

Due to its varied ownership history, JLR inherited a complex and mixture of auto industry software from its previous owners, not scaled or supportive of JLR's aggressive business plan.

Paul Davies, JLR's director of Product Development Operations, leads the teams that define JLR's vehicle development processes, tooling technology, and project and Product Lifecycle Management (PLM) technologies for the worldwide engineering community of 8,000 JLR people. "The challenge of expanding JLR's vehicle portfolio into segment-defining products requires strong technical foundations," Davies says. "Our IT history has generated more than 600 islands and silos of JLR legacy data. The majority is not inter-compatible. To flourish in business, all our data must be interoperably integrated and intuitively available to every JLR stakeholder."

To enhance innovation and reduce development time, JLR has partnered with Dassault Systèmes (DS) to deploy Version 6 in a business transformation program called i-PLM. "Many business users, and even suppliers of PLM strategies, fail to understand its end-to-end power," Davies says. "They see PLM as a data management system rather than a business transformation (BT) tool, as IT rather than BT. Version 6 provides a powerful yet simple out-of-the-box PLM solution with ENOVIA as its backbone and CATIA, DELMIA, SIMULIA, and 3DVIA to deliver business and engineering value across the JLR organizations."

> Immediate benefit of creating, seeing, experiencing and sharing data in a Version 6 environment, translating into time savings of up to 40% for some specific roles in product development
>
> **Paul Davies**
> *Director of Product Development Operations, Jaguar Land Rover*

JLR i-PLM covers the entire vehicle definition and features across 14 domains. These include bills of material, parts and assembly, requirements and verification, plus in-vehicle embedded software, which accounts for 60% of new car development. Electrical design, styling, and computer-aided engineering, including multi-physics and FEA, are also included. »



» “Version 6 empowers data users and managers with live 3D visualizations of all product data and manufacturing operations,” Davies says. “Assembly and disassembly routines with legislative parts and vehicle governance data are readily available in manageable formats. The immediate benefit of creating, seeing, experiencing and sharing data in a Version 6 environment is translating into time savings of up to 40% for some specific roles in product development.”

SMOOTH IS FAST

Version 6 deployment also delivers improvements in vehicle volumes and quality at JLR. For example, i-PLM produces precise cost-benefit criteria for more informed decision making. “Version 6 delivers extra time for innovation so that JLR can build more and better vehicles,” Davies remarks. “Version 6 provides a seamless operating world, with extensive Tier-One supplier involvement. These factors, and the considerable financial and business benefits that i-PLM delivers, mean that JLR can add vehicle programs and smoothly accelerate global product development.”

John Knight Gregson is i-PLM program lead at JLR. “JLR deploys DS Version 6 from vehicle design concept, through engineering and manufacturing, to marketing and sales,” Knight-Gregson says. “It’s a robust, seamless and integrated solution that delivers data consistency across suppliers, financial control and supply chains. An ERP interface provides further systems and process synchronization and management. Working with Version 6 generates a single version of the truth at JLR and brings high-percentage efficiency returns. Data that is entered once is shared and reused many times. Concurrent engineering between teams across the world generates collaboration with a guarantee of accuracy that cuts waste while improving productivity.”

i-PLM facilitates bringing 3D digital models and product definitions into context and further use by JLR and its suppliers, Knight Gregson comments. “Version 6 provides enterprise wide availability of CATIA 3D product simulation assets. This allows people to more fully engage with JLR and its spirit of innovation. Sharing designs synchronizes teams at JLR and its suppliers. Engineers, manufacturers, marketing and sales, feasibility, sourcing, and finance can collaborate earlier with the joint vision Version 6 delivers.”

3DVIA extends digital enfranchisement even further, providing accurate, live, current and fully validated 3D data within and beyond JLR. It reduces errors, losses and waste by providing accurate, timely information. These factors raise morale as people work with PLM solutions matched to their needs.

60%

JLR i-PLM covers the entire vehicle definition and features across 14 domains. These include bills of material, parts and assembly, requirements and verification, plus in-vehicle embedded software, which accounts for 60% of new car development.

TEAM CHALLENGE

As design progresses, DELMIA Version 6 simulates and validates JLR production environments virtually, including buildings, production cells and even technicians, who are represented by lifelike digital manikins. “Simulated digital representations in DELMIA enable optimization of our production environments,” Knight Gregson explains. “3D digital factory overviews, coupled with highly detailed machining operations, allow us to more fully understand and further optimize operations. This also enhances processes and their interactions at JLR. These measures augment sustainable development through efficiencies leading to reduced energy and resource usage.

ENOVIA Version 6, meanwhile, gives JLR a single source for regulatory and materials compliance data that is available to all stakeholders. This helps JLR increase scale and volume of products with confidence of compliance. ENOVIA Version 6





Program Central, for example, manages collaboration and helps to deliver business acceleration through concurrent development. “When information is open and shared, skills can be deployed more effectively,” Davies says. “This data availability means people can work up to 20% more efficiently.”

Knight-Gregson adds: “i-PLM makes better use of resources, including time. It also introduces multiple efficiencies.” For example, SIMULIA Version 6 enables JLR to perform virtual tests of vehicle and material performance in a virtual 3D environment. Errors are detected and corrected earlier to produce significant savings. “In addition, virtual build improves physical build quality and productivity through enhanced training and cognition for production engineers,” Knight Gregson says. “It also values fitted parts in real-time, providing an accurate business cost of each vehicle made.,”

i-PLM with Version 6 also extends beyond the JLR enterprise, supporting access by JLR dealers, service engineers, and customers. “This allows vehicle purchasers and drivers to more fully understand ranges and option choices for better driving, owning and servicing experiences,” Davies says.

Version 6 and i-PLM are being jointly developed by Jaguar Land Rover and Dassault Systèmes to become the automotive industry’s most advanced PLM system.

“We chose Dassault Systèmes as a partner, not just on technical or commercial merit, but because they display the same level of passion and pride in their business as Jaguar Land Rover does,” Davies says. “Together we are building a lifelike product experience system that connects us to our products and communicates throughout the enterprise using the universal language of 3D. Harnessing the power of our partnership with Dassault Systèmes, i-PLM helps Jaguar Land Rover confidently and successfully build on its heritage through Version 6 business transformation.”

For more information:
www.jaguarlandrover.com
www.3ds.com/automotive

Tesla Motors: Changing the automotive paradigm with Version 6

By Greg Rice



Use your smartphone to learn more about Tesla Motors.

Version 6 PLM is intrinsic to the way Tesla works today. It provides the common language we use in collaborative product development and production.



Paul Lomangino
Engineering Tools Director, Tesla Motors

As an automotive start-up, Tesla Motors needed to efficiently engineer a vehicle from the ground up with an electric powertrain. Collaborative design is a critical element as Tesla paves the way for market acceptance of electric vehicles.

Tesla Motors, based in Palo Alto, California, was founded in 2003 by engineers who set out to prove that electric vehicles did not have to be unattractive, slow econoboxes with limited range. Instead, they could be awesome.

The Tesla Roadster, introduced in 2008, is arguably one of the most attractive sports cars on the road and boasts performance that few expected from an electric car: 288 horsepower, a top speed of 125 miles per hour, and 0-to-60 acceleration in less than four seconds.

"Tesla has been using DS products almost since its inception," notes Paul Lomangino, Tesla's engineering tools director. "SolidWorks and ENOVIA SmarTeam helped us start this company and were critical to the success we've had to date. ENOVIA Version 6 is helping us build on that success by managing all of our existing data as well as the increased complexity of our collaborative environment and our product offerings."

VERSION 6 PLAYS CENTRAL ROLE IN TESLA'S PROCESSES

"V6 PLM is intrinsic to the way Tesla works today," Lomangino says. "It provides the common language we use in collaborative product development and production every day."

Going forward, Lomangino says Version 6 will touch nearly all aspects of Tesla's operation, from concept development to engineering, manufacturing, quality assurance, sales and marketing, so that everyone in the company can participate and contribute more effectively.

"Quality is absolutely critical to Tesla," Lomangino notes. "The ability of ENOVIA Version 6 to handle the complexity, both in our product and our process, as we move forward is very important. Its ability to unify multiple organizations under one banner and bring them all together within a common tool will help us immeasurably going forward." By standardizing on an integrated DS solution, including ENOVIA Version 6 for collaborative data management, CATIA for integrated product design, and DELMIA for digital manufacturing and production, Tesla also will no longer face the need to translate data.

Jack Brown, PLM support specialist at Tesla, says that because Version 6 eliminates data translations and other barriers to collaboration, functions throughout Tesla are realizing the benefit. "To get all departments involved early and get their feedback on the initial releases is a lot better than getting that feedback at the end, when it becomes much more expensive to incorporate those changes," Brown says.

SCALING UP FOR THE MODEL S

In developing Model S, Tesla is leveraging much of the engineering work that went into developing the Roadster.

ENOVIA Version 6 will allow Tesla to open up the collaborative process even further, making it possible to involve partner-suppliers and even customers in the development process. Meanwhile, the collaborative and interactive communication capabilities enabled by two other DS solutions, 3DLive and 3DVIA, become even more critical to delivering a detailed view of new product development.

We're not customizing Version 6 per se, so we have something that's easily upgradable but is still tailored to our needs."

Jack Brown
PLM Support Specialist
Tesla Motors

"We're already working to get supplier access into the system so there will be one source of design truth in a secure environment," Brown says. "3DLIVE and 3DVIA will help to open up the design process even further because you don't need to be a CAD expert to work with them."

Lomangino adds: "At Tesla Motors, we depend on everybody to be as creative and productive as possible. Part of the power of Version 6 is its ability to allow everybody involved in the product development process to focus on being creative and productive rather than focusing on the process and tools."

To read an expanded version of this article visit www.3ds.com/contactmag-extra

For more information:
www.teslamotors.com
www.3ds.com/automotive

The Tesla Model S is a family-sized sedan designed from the ground up as an electric vehicle.









Great Wall Motor masters materials compliance with ENOVIA Version 6 and CATIA

To diversify into international markets, GWM needed to establish an enterprise-wide compliance platform capable of ensuring adherence to eco-design standards and enhanced product quality. Using DS PLM solutions, GWM was granted the EU accreditation certificate for materials compliance for four of its models in 2009, becoming the first Chinese brand officially accredited by the EU.

Great Wall Motor Company Limited (GWM) is a privately owned automaker with headquarters in Baoding, China. With revenues of $1.2 billion and products sold in more than 120 countries, GWM was China's first private automobile enterprise listed on the Hong Kong Stock Exchange.

As the largest commercial pickup and SUV manufacturer in China, GWM wanted to improve its competitive advantage and expand into the international market. A cornerstone of its strategy was a PLM solution that would enable GWM to enhance its eco-design to meet the environmental standards and regulations of the European Union (EU). To help achieve this objective, GWM selected Dassault Systèmes' (DS) Product Lifecycle Management (PLM) solutions.



USING ENOVIA TO ACHIEVE ECO-DESIGN COMPLIANCE

To gain unrestricted access to the European market, GWM had to meet the EU's Whole Vehicle Type Approval (WVTA) certification. The EU certification consists of 48 testing items, which set high standards for vehicles in areas that include emission levels, safety, and environmental impact.

> We are focused on creating world-class vehicles and expanding our reach…DS has been a great strategic partner who understands our vision and is now playing a crucial role in helping us realize it.
>
> **Shuli Li**
> *Deputy President, GWM*

GWM chose ENOVIA Materials Compliance Central (MCC), part of the ENOVIA Version 6 platform. ENOVIA MCC is a business process application that empowers companies to adopt proactive environmental compliance strategies throughout a product's lifecycle, from design to disposal. Its strong search mechanisms and analytical capabilities allow users to verify whether materials selected during product development meet relevant regional and global regulations, and enable enterprises to collect, sort and generate part-level material verification reports and material composition data more easily.

GWM product compliance engineers can view material content information in the context of the product bill of materials and cross-reference this data against multiple regulations. "ENOVIA MCC enables us to proactively manage all of the reporting and analysis requirements for thousands of parts and the multitude of suppliers involved in the development of our products," says Shuli Li, deputy president, GWM.

RISING TO THE CHALLENGE

Particularly challenging among all the EU testing items is the Reuse, Recycle, Recovery (RRR) certification, which governs and monitors the environmental impact of an automobile. It bans the use of materials that contain heavy metals, mandates recycling design, and requires a data collection and monitoring system for all the materials in the supply chain.

To obtain the RRR certificate, GWM established an End of Life Vehicles (ELV) project team, the first of its kind In China. "ENOVIA ensured that our RRR certification program functioned smoothly," said Yuchuan Wang, deputy director of International Market Promotion Department, GWM. "Without it, we wouldn't have been able to fulfill our goal in such a short time. With ENOVIA, we can collaborate across many departments, including product design, supply chain management, manufacturing, material testing, materials data system development, and laws and regulations management."

IMPROVED DESIGN QUALITY WITH CATIA

As GWM's business continued to expand, the company chose CATIA to deliver products on time and on budget. GWM uses CATIA to perform virtual design and testing, digital mock up and digital assembly, and to reduce R&D development cycles.

"With CATIA, we can insert the driver virtually into the digital mock-up of the car," said Yong Zhang, chief of information management, GWM. "We can then optimize the simulation design to ensure that the driver will fit perfectly and be able to operate the car with maximum safety and comfort." As the deployment of 3D virtual design expanded to more departments, GWM improved the quality of its designs, avoiding mistakes in the earlier phases and reducing costs caused by mistakes.

"DS PLM solutions play a key strategic role in helping us bring the innovation process to life,"



Zhang says. "In the past, it would have taken around 20 people working together to simply design a new product. Now, less than ten people are required to complete a product design, which has helped to dramatically shorten the time to market."

In September 2009, GWM became the first Chinese automaker to receive the EU WVTA accreditation certificate. Four models received the accreditation: Florid, Coolbear, Hover 5, and Wingle 4. "Thanks to Dassault Systèmes' assistance in helping us improve the eco-design and shorten the certification process, we finally made it," Li says. "We are focused on creating world-class vehicles and expanding our reach to take advantage of new global markets. DS has been a great strategic partner who understands our vision and is now playing a crucial role in helping us realize it."

For more information:
www.gwm.com.cn/en
www.3ds.com/automotive



Automobile supplier Hella optimizes its processes with Version 6

By Heike Blödorn

Hella KGaA Hueck & Co., a CATIA user since the mid-1980s, investigated adopting Dassault Systèmes Version 6 solutions early in 2010. Through a series of workshops, together with Dassault Systèmes and Transcat PLM GmbH, Hella evaluated Version 6 both from a strategic and methodological point of view.

Hella KGaA Hueck & Co. is an automotive supplier that develops and manufactures automotive lighting systems, including headlamps and rear lamps, as well as electrical systems, including sensors and actuators or driver-assistance systems. The company employs more than 23,000 people worldwide, distributed across 70 production sites, fully owned subsidiaries and joint-ventures in 30 countries. More than 3,500 engineers and technicians are dedicated to research and development throughout the group.

Hella has an installed base of 1,300 CATIA seats worldwide, dedicated to the development of products that include headlights, lighting and front-end modules as well as body electronics, driver-assistance and climate-control systems. With CATIA, designers often manage assemblies that contain thousands of parts and subassemblies.

ALWAYS ONE STEP AHEAD

To help it meet a temporary surge in workload, designers working at Hella's headquarters in Lippstadt, Germany, are assisted by teams working in India, China, the US and across Europe. In this way projects can be rolled out in a continuous manner, 24 hours a day.

"Our vision of responding to market demands faster than our competition and anticipating future requirements are what motivates us," explains Dr. Ulrich Kertscher, who is responsible for the Design Methods & Tools used at Hella.

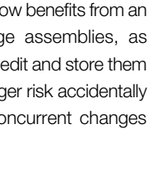
"Version 6 provides a complete PLM environment with significantly more process information available than we had before," Dr. Kertscher says. "Even though this is new territory for us, we are excited to apply its many benefits to our work and to demonstrate these benefits to our management."

OVERVIEW OF THE THEMES AND MODULES

Working with Dassault Systèmes and its partner Transcat PLM, Hella decided to carry out a "Version 6 Starter Kit" pre-project. The starter kit involved a test installation with several Version 6 test licenses of CATIA, DELMIA and ENOVIA, plus the implementation of 13 workshops lasting one to two days each. Version 6 key topics and solution modules were presented to a total of ten IT, software development, design, production and shop floor planning representatives and complemented with hands-on demonstrations to reinforce each topic.

Workshops focused on installation, configuration and user interface as well as concepts such as change management, bill of materials management, requirements management and the SAP interface. Specialists examined, for example, whether the Version 6 functionalities available in CATIA for integrated product design, DELMIA for digital manufacturing and production, and ENOVIA for global collaborative innovation, met Hella's requirements and whether the company's existing processes could be optimized. The aim of the first evaluation was to be able to ask pertinent questions regarding the implementation procedure. "We wanted to know what to expect in terms of customization, which interfaces we should implement, and how we will need to manage structures in the future," Dr. Kertscher explains. "It was also necessary to clarify how we exchange SAP objects with Version 6 through migration, conversion or infrastructure."

> Version 6 provides a complete PLM environment with significantly more process information available than we had before.
>
> **Dr. Ulrich Kertscher**
> *Design Methods & Tools*
> *Hella*



The validation phase lasted two months. Improvements were recorded in the CATIA environment, including advantages in how design data can be delivered and accessed, in simplified processing of large assemblies, as well as better support for multi-site development. The potential use of Version 6 for requirements management is facilitated by its comprehensive set of functions as well as ability to trace and manage requirements across the different functional, logical and physical views. Hella could therefore use it to avoid having to resort to a separate solution for mechanical development.



Thanks to the new database concept in Version 6, the product models are filed using metadata and are up to date; link management is significantly improved; and distributed engineering is optimized. In addition, Hella now benefits from an easier management of large assemblies, as different users can now load, edit and store them simultaneously. Users no longer risk accidentally overwriting sections, and concurrent changes can now be easily merged.

The integrated visualization features of Version 6 also may lead to a reduction of data transfer rates and could significantly reduce network peak loads. This is extremely important for Hella as it wants to improve international collaboration.

NEXT STEPS

Hella believes that the Starter Kit provides excellent support for the introduction of Version 6. "We wanted to evaluate Version 6 capabilities as well as identify what effort we would have to expect to customize the solution according to our needs," Dr. Kertscher says. "The Starter Kit allowed us to get a feel for this, and now we know which modules of the Version 6 PLM environment will be useful for us." Hella has also expressed its appreciation for the contribution made by the Dassault Systèmes and Transcat PLM employees: "Everybody involved was highly motivated in helping us learn more about Version 6." Hella therefore believes that the validation process was well worth the investment. Two more projects are planned.

In the near future, the deployment roadmap will be defined, including an assessment of the cost involved for a startup. In the first phase, a detailed project evaluation will be carried out. Additionally, the overall benefits for Hella in the field of requirements management will be evaluated.

The automotive supplier is already a step ahead of the competition: "We want to introduce Version 6 because we are convinced it will enable process improvements," Kertscher says. "We also want to be prepared as the first OEMs and partners adopt V6."

For more information:
www.hella.com
www.3ds.com/automotive

EDAG Light Car: Electric car of the future



EDAG Light car - The new generation of electric vehicles with O-LED Technology as a communication element outdoors

The EDAG Light Car has a body concept developed specifically for the new generation of electric vehicles using the latest lightweight materials, semi-finished parts and assembly sequences. With its innovative lighting concept, it is one of the first vehicles to use O-LED technology as an individually adaptable design and communication element outdoors.

EDAG Group is a partner of the international mobility industry. Its main activities include the complete development of vehicles and production facilities. Additionally, the company is positioned as a turnkey partner in plant construction and small-series production. To develop and implement this unusual, future-oriented approach for design, traffic control systems and vehicle technology, the teams at EDAG take advantage of the Product Lifecycle Management (PLM) solutions from Dassault Systèmes (DS).

Starting with the design all the way to the finished product, the process includes the entire scope of manufacturing lifecycle management and PLM. The EDAG Light Car was developed using CATIA Version 5. The production concept was realized with DELMIA Version 6 — from planning the assembly and process sequence to the setup of the manufacturing cell, robot simulation and line balancing of the EDAG Light Car manufacturing cell.

DETAILED ENGINEERING IN THREE PHASES

Karina Schäfer, a project manager and expert responsible for digital factory production solutions, explains the decision for DELMIA Version 6 with the positive experience in using DELMIA software for other EDAG projects. “The detailed engineering with EDAG basically occurs in a three-stage model,” Schäfer said. The first stage covers pre-engineering, including the definition of product standards and the investigation of influential factors. “Pre-engineering influences the product with regard to production requirements.” In the second stage of the digital factory, the concept engineering and 3D detailed engineering are depicted. Finally, the third step describes the virtual commissioning and implementation of the system. “After all, our customers are also able to inspect the system using the virtual model,” Schäfer pointed out.

This method using DELMIA Version 6 provides clear advantages by accessing an integrated data model that does not require problematic interfaces. “With EDAG Light Car, we’ve implemented DELMIA Version 6 for the first time in a pilot project,” said Torben Möller, a planner from EDAG. “The product developer generally determines the structure of how the individual parts are assembled. With Version 6, operation is simpler because through an intuitive drag and drop function, the necessary components and elements can be used and integrated, for example, into the assembly or process sequence.” DELMIA Version 6 is conceived in such a way that it permits database-supported planning in conjunction with ENOVIA. For the EDAG Light Car, the simple and intuitive operation of the planning software has been employed and tested with the database.

NEW HORIZONS WITH VERSION 6

The successful pilot project highlighted additional improvements for the day-to-day work of users. The “lifelike experience” provides users with a better overview of intermediate products and greater transparency throughout the manufacturing process. Version 6 solutions offer powerful, user-friendly search and navigation capabilities in order to access desired information from anywhere online and depict it in realistic 3D environments that people understand intuitively, because they correspond to real life. “Version 6 is reflected in the simple and intuitive representation of assembly sequences from the EBOM by drag and drop,” Möller said.

After completion of the pilot phase, the advantages of DELMIA Version 6 could be applied to day-to-day tasks. Since processes are assigned with the predefined and planned resources in 3D, this significantly simplifies project processing. “Thanks to the 3D element, application is simplified, more comprehensible and efficient for the planner,” Möller said. In particular, data acquisition can be carried out more easily. “If in fact all information is available when using Version 6, the real work of the planner — that is the creative part of his job — can be significantly expanded, since with DELMIA Version 6 the process of information acquisition is considerably more transparent for planning.”

> Version 6 is reflected in the simple and intuitive representation of assembly sequences from the EBOM by drag and drop.
>
> **Torben Möller**
> *Planner, EDAG*



Isometric view of the manufacturing cell designed with DELMIA Version 6

The successful, constructive and close cooperation between EDAG and DS continues. “We are engaged in a close dialogue with DS in order to improve DELMIA Version 6 even further for productive project implementation by drawing on experience from the EDAG Light Car project,” Schäfer added.

For more information:
www.EDAG.com
www.3ds.com/automotive

HONDA
The Power of Dreams



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Honda leverages simulation to meet changing market needs



The automotive market is in a period of great change, so model-based design that leverages 3D digital simulation (CAE) is increasingly important in helping automakers keep pace. Kazuo Sakurahara, formerly head of engine development for the Honda F1 team, is leading creation of a new development process at the Honda R&D Co., Ltd. Automobile R&D Center that relies heavily on CAE for mass-produced vehicles.

Contact mag: What effects have issues such as environmental regulations, plus rapid market growth in developing countries, had on the development workplace?

Kazuo Sakurahara: Speed is everything. Automobile manufacturers need to increase the rate of their development to the point that they can handle whatever changes arrive next, or they are not going to survive.

CM: What steps are you taking to increase the pace of development at Honda?

KS: We strive for a process that makes full use of CAE, aiming to allow for optimization of functions and measurement parameters at an early stage of advance development. We want to ensure that the development of the hardware skeleton is already complete as the vehicle goes into preparation for mass production. This model-based development (MBD) will heighten competitive power in comparison with the traditional experiment-and-experience process.

CM: Why is Honda focusing so heavily on the use of simulations with Computer-Aided Engineering (CAE)?

KS: We want to avoid building anything in the way of prototypes. It takes a lot of time to build something and then test it. We want to take it to the level that you only have to build something as the final check, so we desire greater accuracy from our CAE. Until now, there have been many very simple simulations, just at the level of "it breaks/it does not break." But in future we need to be able to test functions, capabilities, and everything using simulation.

CM: In the development process, how are you making use of CAE?

KS: In the process from selection of specifications through basic design, the designer carries out CAE using CATIA Analysis to check and optimize the specifications. In the detailed design process, the quality of prerelease designs is evaluated using CAE. Areas that are highly integrated and require a lot of time, like nonlinearity and vibration noise, are performed by specialists using SIMULIA Abaqus.

CM: What has enabled designers to apply CAE more widely?

KS: The evolution of CATIA is largely to thank for that. In particular, the fact that the mesh in CATIA can now be cut so much more easily than before is a major factor. The time it takes to cut a perfectly fitting mesh is vital when it comes to using CAE. Furthermore, using optimization tools like Isight can greatly reduce the amount of work and time CAE takes, and that's another way in which we are seeking to increase the range of design CAE.

CM: Isight is an optimization tool. When do you use it?

KS: Take, for example, the engine. There are all sorts of conflicting requirements. It needs to be as light as possible but strong; to be quiet without too much vibration yet sufficiently powerful. Somewhere you have to find a tradeoff. The existing manual process involves adjusting the model, carrying out CAE, making a judgment, and then repeating this process over and over. In the new workflow Isight processes patches, while the shape of the parametric model is changed automatically during CAE, finding the best possible shape.

CM: With the expansion of applications for CAE, what is your opinion about analytical precision?

KS: In the case of Honda, if you include every degree to which evaluation can be performed, from complete evaluation to evaluation of a compatibility to determine a general policy, we are capable of using CAE to evaluate around 70%.

CM: So calibration and evaluation are definitely required to achieve greater accuracy?

KS: That's right. What is important is to note that calibration and evalutation are seen as "tests to increase the accuracy of simulations." Feeding the statistical model obtained from the results of experiments back into the physical model allows the simulations to come closer to the real world. This allows greater precision at the start of development. At the moment, the process often goes back and forth between basic design and detailed design. We want to reduce the need to go backward by increasing the accuracy of the physical model.

CM: How is this different from the comparison between CAE and experimental results?

KS: No matter how accurate the results for a certain specific engine, there is no way of knowing whether the results are accurate for a new, totally different engine. For us to use model-based development in the future we need to feed the experimental results for all the vehicles we develop back into the physical model. In the initial phase, this will increase the number of experiments performed. But as accuracy continues to increase, the number of experiments required will decrease. Organizing this process and building it into the development flow is vital.



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For more information:
www.honda.com

Immerse yourself in the automotive world of tomorrow

By Dora Lainé


Courtesy of PSA Peugeot Citroën - Stéphane Meyer

3DVIA Virtools is an integral part of PSA Peugeot Citroën's CRV (Centre de Réalité Virtuelle or Virtual Reality Center) at the Automotive Design Network, located in Velizy, France. This virtual reality center enables designers and engineers of the group's future products to immerse themselves in the virtual 3D projection of a future car and its surroundings and to interactively test design alternatives before building any physical prototypes.

Use your smartphone and touch the future with the CRV

The Automotive Design Network (ADN) resides in a 70,000 square-meter, three-floor building. It can accommodate up to 1,100 people from all of PSA Peugeot Citroën's styling studios and innovation teams and is entirely dedicated to automobile design. The CRV houses three systems: the immersion room or CAVE™ (Cave Automatic Virtual Environment), a stereoscopic screen, and a holobench. Thanks to stereoscopic projection, designers can perceive reality in 3D and on a scale of 1:1. "The designers can put themselves in a physical driver's seat or in an operator's post in the factory as they would in the real world," says Stéphane Masfrand, Virtual Reality Center Manager at PSA. "By physically turning the steering wheel, for example, they can interact with the virtual car using peripheral equipment such as glasses, which enable them to see in 3D, and positioning sensors located on their bodies. They can see how the car and its surround-ings react via 3D simulation, providing our designers with a lifelike experience in the first person."





EXPERIENCE THE VIRTUAL AUTOMOBILE

3DVIA Virtools is used to develop and deploy a wide variety of industry-specific immersive applications at PSA Peugeot Citroën, including design reviews, assembly/disassembly applications, and collaborative project reviews. Thanks to the versatility, accessibility and performance of 3DVIA Virtools for virtual reality (VR), PSA Peugeot Citroën has developed its own powerful VR applications, which have helped better manage the production process and enhanced reactiveness.

VIRTUAL REALITY HELPS IMPROVE DRIVER AND OPERATOR EXPERIENCE

Two of the scenarios addressed using 3DVIA Virtools are review of the digital mock-up and management of operator tasks on the assembly line. The first is related to the driver's perception of the car while in the driver's seat, including ergonomics and the feeling of comfort; overall impressions such as roominess, windshield visibility, reachability of controls and buttons; and whether drivers can see details that they should not see, such as cables. "Most details that can diminish the perceived quality of the product are analyzed here," Masfrand says. "The immersive experience enables designers to verify these aspects very early in the design process."

Another scenario aims to improve the ergonomics of operator work areas so that assembly line employees can work comfortably with fewer physical constraints. Immersive virtuality can be used to study the best task sequence, for example, when welding or when installing car seats and whether the operator has proper visibility when performing these tasks. Different possibilities can be virtually tested while ergonomics specialists analyze the best task sequence for the operation. 3DVIA Virtools can also be used to train technicians on how to perform certain tasks safely and efficiently such as welding.

"Using virtual reality to explain optimum task sequences helps save time and provides operators with the means to practice these sequences before doing the actual welding," Masfrand says. Finally, using a peripheral such as a HAPTIC arm, PSA can even simulate the force felt by a person when lifting equipment.

Using 3DVIA Virtools' virtual reality technology to conceive its designs helps PSA Peugeot Citroën shorten vehicle development cycle time by reducing the number of physical prototypes, which are expensive and take time to build. "Virtual prototyping accelerates the decision-making process and enables us to explore more design possibilities, to make the right choices, and to virtually touch the car of tomorrow," Masfrand concluded.



Key figures

- **3,188,000** cars sold worldwide
- **196,000** global employees
- Europe's second largest carmaker with **14.5%** of the market
- Environmental leadership: the only European carmaker in 2009 to have sold almost **1 million** vehicles emitting less than 130g/km of CO_2
- European leader in light commercial vehicles, with market share increased to **22.4%**



Tell your story in 3D. Tell your story with 3DVIA!

3DVIA offers an innovative approach to the creation and delivery of information that enables anyone at any skill level to communicate their ideas in 3D. Breaking away from traditional 2D environments, 3DVIA solutions immerse users into lifelike experiences that allow a more natural interaction for the most vivid perceptual experiences and understanding.

The active community of more than 190,000 3DVIA enthusiasts includes enterprise professionals, graphic artists, and programmers alike – each with access to a dynamic suite of applications to rapidly create and deploy interactive 3D applications. This includes cutting-edge technologies such as virtual reality, augmented reality, gaming technologies, motion capture, and more.

Offering continuous innovation in areas of simulation, documentation, gaming, and immersive virtuality, 3DVIA software solutions realize Dassault Systèmes' vision to provide the ultimate lifelike experiences. With applications supporting technical documentation, product configuration, training, marketing, simulation, visualization, social media development, and more, 3DVIA is making an impact on how users communicate and experience products in life.

The benefits are extensive. Businesses produce content faster and deliver it with greater impact. Developers prototype, develop and publish their 3D applications more rapidly. Customers better explore products for a richer understanding and purchasing experience.

www.3dvia.com

Toyota Motor Corporation's Body Engineering division replaced its in-house CAD system with CATIA and fully implemented Computer-Aided Engineering (CAE). The division succeeded in shortening the development cycle time to one-fourth of what was previously required using templates in conjunction with the Design CAE solution embedded in CATIA.



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Linear static analysis with CATIA allows Toyota engineers to predict deformation and stresses from various loads, such as a child hanging his full weight on the locked position of a door frame.

Toyota cuts analysis time by three-quarters with CATIA

Toyota Motor Corporation (TMC) applies CAE (digital simulation and analysis) in its design and manufacturing processes. For body design, the Body Engineering division performs CAE independent from the CAE Expert team, which is tasked with crash, vibration, driving stability, and stiffness analysis.

Engineers in the Body CAD department carry out static stiffness analyses using Design CAE tools embedded in CATIA. They also perform simulation jobs that are relatively easy to do and directly related to experiments, then quickly incorporate the results to improve design quality.

Macros and templates, which were not available with the in-house CAD, have improved efficiency, especially in reducing analysis time. Incorporating macros also has eliminated errors possible with manual work methods.

DATABASES ENABLE TEST PREDICTION BY CAE

The Body Engineering division uses CATIA Analysis for linear analysis, and Abaqus for CATIA, together with SIMULIA Abaqus, for nonlinear analysis. CAE embedded in CATIA greatly reduces workload if used with customized tools such as macros, and follows geometry replacement once constraints or issues are known and defined.

The Body CAD department gathered both CAE and test results and built a database to conduct absolute evaluation or side-by-side comparative evaluation. Test data from mass-production cars, plus the CAE computation results stored in the database, allow engineers to easily predict physical test results from CAE results on new car development, making CAE absolute evaluation easier. This performance forecast is reflected in the modeling for quality improvement, a major advantage of using CAE inside a CAD modeler organization.

FULL USE OF CAE IMPROVES QUALITY

Linear static analysis assumes linear material properties and minimal deformation. For example, door analysis with a child as a load assumes a case where a child hangs on a door. If the door is not sufficiently stiff, plastic or permanent deformation might occur, which will prevent the door from opening and closing properly. So a door analysis is done with two cases in mind: open and closed. The displacement fields of the door for both cases are calculated and evaluated using CAE.

VISIBLE TOOL FACILITATES USE OF DESIGN CAE

Static linear analysis does not take into account geometric nonlinearity, however. An example of a nonlinear analysis with large deformation is an out-of-plane analysis of the outer panel of a door. For instance, when a car is being waxed, the outer body panel might buckle due to insufficient rigidity. The displacement field is checked as well as the occurrence of buckling. This type of analysis is applicable to all of the "outer panels" that form the car body.

TMC developed CATIA templates for designers to easily check out-of-plane rigidity. To create templates, TMC first determined the reason buckling occurs. Buckling analyses using CAE were done repeatedly with different model panels.

MOST ANALYSIS TIMES REDUCED TO ONE-FOURTH

Analysis time has significantly decreased with the implementation of the Design CAE tool embedded in CATIA. For instance, time to perform side door stiffness analysis was cut in half with CATIA, and then further reduced to about one-fourth with macros, compared to TMC's in-house CAD. This led to shortening the cycle time between CAE analysis and actions.

Analysis time has significantly decreased with the implementation of the Design CAE tool embedded in CATIA. For instance, time to perform side door stiffness analysis was cut in half with CATIA, and then further reduced to about one-fourth with macros.

Macros and templates, which were not available with the in-house CAD, have improved efficiency, especially in reducing analysis time. Incorporating macros also has eliminated errors possible with manual work methods. Macro analyses also always return the same results regardless of a user's skill. As a result, TMC enjoys the benefits of reduced analysis effort, quality improvement, and proper utilization of human resources.

The CATIA template based on this theoretical formula is called the "Stiffness Visibility Tool". This tool shows possible buckling areas in red during simulation. As this area matches the results of experiments (sensory tests with multiple panels), one narrows down areas where the CAE stiffness test is necessary. Test teams select where to perform stiffness computation based on results of the Stiffness Visibility tool and request the Body CAD department to provide this information as CAE computation input. With this tool, stiffness of styling design increases and ribs required in low stiffness places are put at optimal locations.

Analysis that was passive in the past became active thanks to the evolution of the Visible Out-of-plane Rigidity tool. So far, CAE has been used to prevent defects, a passive application. However, as CAE is now deeply incorporated in design, CAE can be used more proactively.

For more information:
www.toyota.com
www.3ds.com/automotive



Ford optimizes NC programming with CATIA

The casting pattern shop at Ford in Cologne, Germany, has optimized its processes, implementing CATIA numeric control (NC) with support from Dassault Systèmes (DS). The result has been a reduction in the time required to manufacture casting patterns, with a solution that will carry Ford well into the future.

When the new Ford Focus 2011 models went on display in dealer showrooms, Andreas Solberg and Arnd Lauer had long since moved on to new projects. The two numeric control (NC) specialists at Ford are responsible for programming casting patterns used in tool manufacturing – a job with very tight timelines.

"Our production is set up for making the tools as quickly as possible, which can then be used for deep drawing, trimming, and forming of the doors, side walls, or hoods," Solberg says. Lauer adds, "Every day that the start of production is delayed causes incredible cost increases."

The tooling – which can be up to five meters long for the sidewall of the Ford Galaxy – is cast in a dead-mold process. For this casting process, a Styrofoam model of the tool design is produced at a scale of 1:1.02. This pattern is embedded in sand, which is solidified using a binding agent. This produces a mold that the tool manufacturers fill with molten steel; the Styrofoam evaporates, and the cast metal part is created in its place.

NC PROGRAMMING USING A 3D MODEL

To produce the Styrofoam pattern, Solberg and his colleagues now work with a completely virtual 3D model of the tool design to be produced. Using this virtual model, they create the NC programs offline, which are then sent to the milling machines that ultimately cut the real patterns out of Styrofoam.

Until recently, the department used the NC module of the company-wide C3P program (CAD-CAM-CAE-PIM) for NC programming of the parts. This program was introduced by Ford in the mid-1990s to make development and production more efficient. This requirement still exists today, of course, but with the C3P program reaching the end of its life, Ford now uses CATIA for C3PNG (Next Generation) design.

INTEGRATED PROCESS MEANS FEWER CORRECTIONS

Ralph Hoffstadt, manager of the casting pattern department, had to decide which software applications his employees would use to create machining programs in the C3PNG program. Ford uses CATIA to design its vehicles, and a process that could integrate design and machining had obvious advantages. "The various departments, from product development to stamping engineering to toolmaking, would be linked to each other more efficiently," Hoffstadt says. "Data would no longer have to be manually transferred from one application to the next. The fewer interfaces we have, the less information loss we would experience. The result is less rework. If every department uses the same software, the costs for hardware and training also drop, and the complexity level for IT as a whole is reduced."

As part of a global development partnership with Ford, Dassault Systèmes worked with the cast model department to expand and optimize the NC module.

But Ford had put great emphasis on using its previous CAD/CAM tool, and on developing it in the area of casting pattern production. "Our casting pattern programmers worked very productively with the existing application," Hoffstadt says. "The bar was thus set very high for a new tool." In addition, CATIA NC was optimized for machining metal, but not for Styrofoam. "Styrofoam has completely different properties. This meant we had to test the new system thoroughly to identify its advantages and disadvantages. We also provided a good deal of feedback."

CLOSE PARTNERSHIP FOR DEVELOPMENT

As part of a global development partnership with Ford, Dassault Systèmes worked with the casting pattern department to successfully expand and optimize the CATIA NC module for machining Styrofoam. The department, which is set up as a profit center and produces casting patterns for the entire Ford group as well as external customers, reached the breakeven point after just 18 months. "Within a short time we were able to program the cutting paths in the new application just as fast as in the old software," Hoffstadt says.



"The goal right from the start, however, was to reduce programming time even further, which was also successful. Depending on the size and complexity of the casting pattern to be produced, production times were reduced by up to 20%. This is a tremendous step toward greater efficiency, and gives us a competitive advantage, especially in a market where time constraints are constantly getting tighter."

AUTOMATED NC PROGRAMMING

Speed matters. Together with Dassault Systèmes, Ford achieved it by standardizing and automating repetitious programming tasks and storing them in templates. The team included DS employees from the Service and Product Development departments, in addition to Ford's experts.

For example, preset parameters, such as feed rates and speeds, can be used to program clamping slots more quickly. The NC module can also automatically calculate fillet curves, which the programmer previously had to manually insert in the virtual model. These predefined templates enable the programmers to progress more quickly and without errors, because all of the parameters have been pre-checked, and also allow all programmers to use a standardized approach for orientation. One employee can thus seamlessly take over another's task, such as at a shift change, because they both use the same programming methods.

NO MORE CRASHES WITH VIDEO SIMULATION

In the course of standardization, the team of Ford and Dassault Systèmes also improved production strategies by shortening the paths that the milling heads need to travel through the air, a wasted motion.

Another factor for increasing speed is photo and video simulation, which was launched with CATIA NC. The programmers can use it to check in advance whether the raw stock can be milled cleanly, or whether residual material will be left. Until now, the NC programmers had no way to analyze whether all the areas to be machined could actually be accessed. Today, this verification step is replaced by a complete simulation on the PC. Another advantage of the simulation is that the risk of a crash, where the milling head collides with the machine tool table, can essentially be eliminated.

The tooling shop manager in Cologne, Paul R. Weissenberg, says the conversion has been completely worthwhile. "CATIA NC is so easy to use that we had almost no problems with the changeover, also thanks to the excellent method-based training from DS. The same goes for implementation, which was completed in a short time. I have been pleasantly surprised in every aspect."

Weissenberg, who was responsible for converting the process to the new system, says the potential he sees in the software is at least as important as the success that has already been achieved. "With CATIA, we are now on a technology platform that will carry us forward into the future."



20% **Depending on the size and complexity of the casting pattern to be produced, production times were reduced by up to 20%.**

For more information:
www.ford.de
www.3ds.com/automotive

Bentley Motors: When heritage meets technology

By Nick Lerner

Bentley Motors benefits from Dassault Systèmes (DS) 3D manufacturing simulation tools to communicate and optimize designs for production of the new Mulsanne.

The recently launched Bentley Mulsanne is Bentley's all-new flagship grand tourer. DS PLM solutions, including CATIA, ENOVIA, DELMIA and 3DVIA, have been deployed to allow Bentley to exploit 3D visualization and simulation techniques across the core product lifecycle processes.

The Mulsanne sets new standards for comfort, effortless performance and hand-crafted refinement – the very qualities for which Bentley is renowned. It combines a completely re-engineered V8 engine with luxury features that include sustainable hardwood veneers and specially treated leather upholstery and trim. It takes nine weeks to build a Mulsanne, bringing together and assembling approximately 10,500 separate parts to create a unique combination of luxury and performance.

In 1919, Bentley's founder, W.O. Bentley, had a vision of building "a good car, a fast car, the best in its class." More than 90 years later, Mulsanne's position at the pinnacle of the premium segment is a sign of Bentley's commitment to its founding principles.



For Bentley Mulsanne, we have been able to integrate production functions much earlier than previous projects, reducing risk, retaining knowledge and enjoying the considerable benefits of concurrent collaborative working.

John Unsworth
CAD Strategy Manager, Bentley

MULSANNE: STRAIGHT TO SUCCESS

Ian Swann, Bentley's senior virtual assurance engineer, described how Dassault Systèmes (DS) 3D technology is used to develop the Mulsanne: "We use DS manufacturing simulation tools to develop seamless introduction of new products. By modeling a total of 831 build operations across 30 stations, the complete build process was simulated in 3D. Using this simulation, a detailed assessment of the build process was then carried out, and any potential build concerns were identified and then resolved much earlier in the design process."

9 weeks

It takes nine weeks to build a Mulsanne, during which time around 10,500 separate parts are brought together and assembled.

This methodology, facilitated with DELMIA, includes 3D reviews at regular 'virtual build' meetings. The power of 3D visualization allows production build associates to make valuable contributions to the design process and influence the design based on their experience and specialist knowledge.

"Part load feasibility, clearance and tool access are crucial factors for optimized production, and these are readily reviewed and assessed using DELMIA during these cross-functional meetings," Swann says. "Using 3D visualization, any design or process changes can also be validated and optimized accordingly. Any potential problems can then be planned for and other complexities accurately assessed."

TOOLED UP

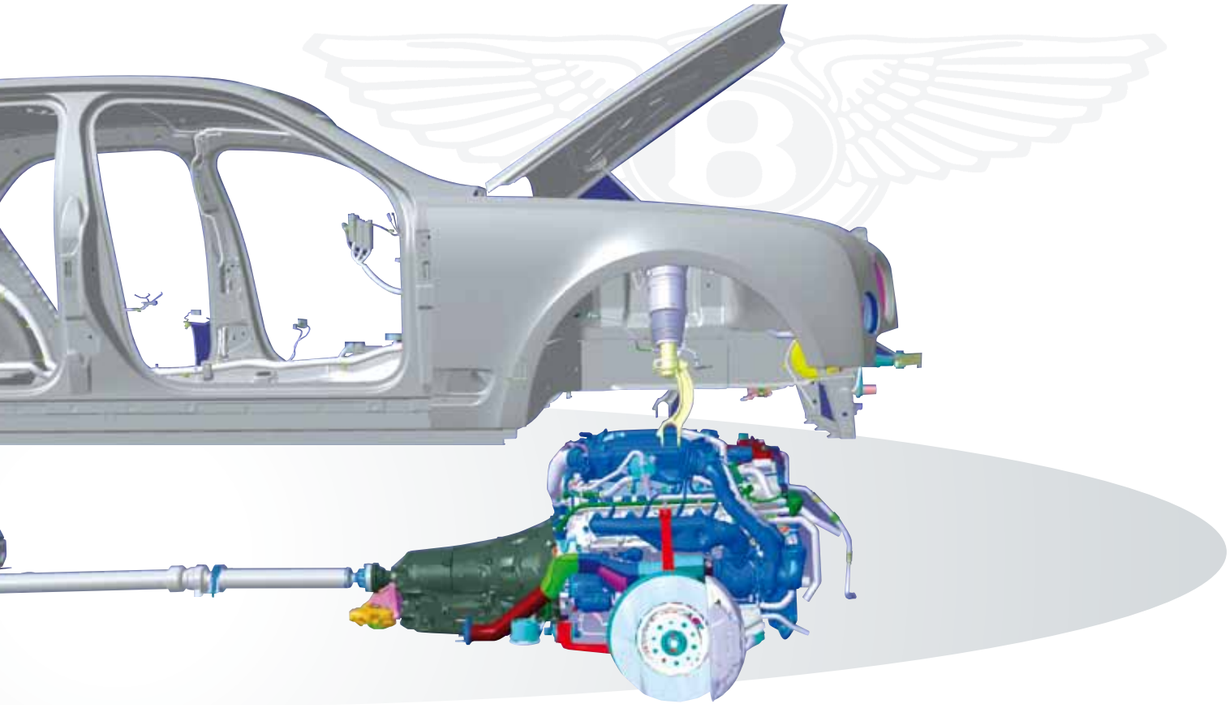
"DS PLM tools allow us to exploit improved working practices throughout the Bentley Product Lifecycle," says John Unsworth, CAD strategy manager at Bentley. "For Bentley Mulsanne, we have been able to integrate production functions much earlier than previous projects, reducing risk, retaining knowledge and enjoying the considerable benefits of concurrent collaborative working.

"3D provides greater stakeholder cognition, allowing extended input to design-and-production scenarios at the right point in time to make a difference," Unsworth continued. "We are now able to integrate wider business departments in our quest to exploit digital data. Aftersales and Service teams, for example, now have concurrent access to our evolving 3D data. This allows teams to construct technical illustrations in parallel with the design evolution process using 3DVIA Composer. This integration has saved considerable time and valuable resource and has improved cross-functional working and overall communication."

Unsworth says the foundation for exploiting these technologies revolve around Bentley's ability to manage all of its data in one database. "All data is managed in ENOVIA, and all departments access this data concurrently. The same data is presented in DELMIA, where Manufacturing associates can plan and simulate manufacturing build processes in parallel with design evolution. We have one set of data accessed by all departments from Styling, Concepts, Digital Design, Engineering and Manufacturing. No longer do we manage separate data silos across departments. All have the ability to access and author data from the ENOVIA database, making informed decisions without the need for a data preparation exercise."

ACTION PLAN

"The methodology at Bentley is an example of PLM in action," Unsworth continues. "Our unique blend of PLM exploitation now encompasses a complete virtual build. With its technical complexity, use of both traditional and new composite materials and our exacting quality standards means that the Mulsanne is like no other car. Our digital validation has helped us rectify many issues and concerns much earlier than would previously have been possible." »



Unsworth says that with DS technology, data comes to life. “3D is delivered across the enterprise in ways that bring the most benefit. 3D is being used to enhance our ability to plan and make decisions quickly and efficiently as we design and manufacture vehicles throughout all phases of the product lifecycle process.”

Bentley has about 280 active design engineers working on the PLM system and about 500 seats of DS PLM. “The PLM system was built upon a formal approach to strategy discovery, development and deployment,” Unsworth says. “The method was designed to exploit 3D and furnish the needs of the Bentley business goals. Bentley understands PLM is a journey, it has made significant steps along the way but has an in-built desire to push further. It is planned to bring more people into the PLM eco-system at Bentley as 3D becomes simpler, easier and fun to exploit.”

LIGHT SPEED

The ability to innovate and retain design intent has been enhanced with the current methodology. “The front headlamp design is an important feature for functional and styling reasons,” Swann says by way of example. “We used DELMIA to assess assembly options within the given design envelope and worked closely with engineering and production to develop an optimized solution. A 3D simulation of this assembly process was then used to provide assurance that the build sequence was feasible.”

Another interesting example is found in the doors, where 204 parts must be efficiently assembled into each aluminum-skinned door. “DELMIA was used to define an optimized assembly sequence,” Swann says. “This was shared with other departments, including production associates, whose input was valuable in developing a final design that was optimized for both function and production. Part fit clearances, tool and hand access are crucial. Without DS PLM solutions we would not be able to verify processes in advance. But with its use, we can not only verify but truly optimize the build process before any physical parts are available.”

The Mulsanne was entirely conceived, designed, developed and now produced in the integrated Bentley production facility at Crewe, England. The car incorporates Bentley heritage, advanced features and enviable performance characteristics, the assembly of which has been greatly assisted by the exemplary use of DS PLM.

For more information:
www.bentleymotors.com
www.3ds.com/ukisa

Students team virtually with Version 6

By Lisa Roner

With support from Dassault Systèmes (DS) and the Ford Motor Company Fund, dozens of high school students and teachers at two U.S. universities were able to collaborate in real time on designs using DS Version 6 and the 3DSwYm social networking solution.

Although separated by more than four U.S. states, dozens of high school students and teachers teamed virtually over the summer on design projects using Dassault Systèmes’ (DS) Version 6 and 3DSwYm community network solutions, thanks to an innovative collaboration between the Georgia Institute of Technology (Georgia Tech) and the University of Detroit Mercy (UDM).

“The students didn’t even want to take breaks,” says Pamela Todd, director of UDM’s Pre-college Programs for the College of Engineering and Science. “We couldn’t pry them away from their computers even at lunch.”





Students worked to improve designs for a wind turbine and a ground robot. (Photos ourtesy of the Georgia Institute of Technology).

The summer program helps lay the groundwork for Georgia Tech’s MENTOR Project DARPA grant, which aims to create the next-generation digital manufacturing workforce by exposing students in 1,000 high schools worldwide to careers in engineering over the next four years. The Innovation Camps brought high school students and their teachers to the Georgia Tech and UDM campuses, where they formed virtual teams using collaborative online technology to co-create and prototype renewable energy and automotive design projects.

COLLABORATIVE, CROWD-SOURCED DESIGN

To go from design to physical object in a very short time in a collaborative, crowd-source manner is at the heart of DARPA’s goals for the program, says Tony Docal, curriculum and training manager of Georgia Tech’s summer camp program. Using DS Version 6 Product Lifecycle Management (PLM) solutions and rapid prototyping technologies, students co-created, designed, built and operated team projects with the same software used by leading manufacturers worldwide.

Starting with Lego Mindstorms Wind Turbine and Ground Robot kits as their baselines, the student teams designed and built non-standard parts to enhance the efficiency and performance of both kits. Because each team had members on both campuses, collaboration occurred online with Version 6 PLM, which includes CATIA, DELMIA, ENOVIA and SIMULIA, and with the 3DSwYm platform for creating instant online communities.

Although some students were on a campus near the Canadian border while others were deep in the southern United States, Version 6 and 3DSwYm allowed them to talk about their projects and share information online in real-time design review sessions, said Dr. Dan Schrage, professor and director of the Integrated Product Lifecycle Engineering Laboratory at Georgia Tech, which conducted the summer camp. Having young people experience the excitement of working with people in other locations prepares them to become innovative global engineers of the future, adds Dr. Leo Hanifin, UDM dean of the College of Engineering and Science.

CREATING THE NEXT GENERATION OF ENGINEERS

As the program grows Georgia Tech, along with UDM and other universities, plans to introduce prize challenge competitions for students at clusters of high schools across the USA to jointly design and build moderately complex systems, much as corporate manufacturers work with their supply partners.

DS supplies the software licenses to teach participants and provides camp participants with one-year student licenses to encourage their continued interest. The Ford Fund supported the program with funding to UDM, and Ford Motors provided an exclusive plant tour and a presentation by Robert Trecapelli, Ford’s director of Digital Innovation and Global PLM.

For more information:
www.3ds.com/education/academia

Plasan Carbon Composites advances design and production with composites solutions



Plasan Carbon Composites needed to give its automotive customers fast, accurate quotes and deliver high-quality composites parts quickly, with less physical waste and improved material estimates. Plasan chose a Dassault Systèmes solutions suite that includes CATIA Composites Design, SIMULIA Abaqus Finite Element Analysis (FEA), and Simulayt fiber modeling.



Plasan Carbon Composites USA, a wholly owned subsidiary of Plasan of Israel, is a supplier of carbon composites parts to leading automotive OEMs worldwide. The company, which has made body components such as hoods, roofs and fenders for high-end sports cars including the Chevy Corvette and Dodge Viper, also is leading the charge to bring composites to automotive frame and sub-structural components, a Sustainable Innovation designed to increase strength and passenger safety while reducing weight to improve fuel efficiency.

But while its sights are firmly set on the future of automotive composites, Plasan is also focused on the design and production of state-of-the-art surface parts for today's vehicles.

STREAMLINING A HIGHLY MANUAL PROCESS

Creating carbon composite parts with an epoxy resin matrix that must be cut into precise shapes and then layered and treated with high pressure and heat is a complex process that has long been defined by trial and error. Craftsmen have traditionally used the "paper doll" method, trimming and splicing the fiber plies to fit them to the underlying shaping tools, a slow and expensive process.

To better serve its customers, Plasan wanted to eliminate the trial-and-error processes that contributed to wasted composite material. To achieve its goal, Plasan replaced its three-CAD system with an advanced composite design, manufacturing and simulation solution suite from Dassault Systèmes' (DS), which combines CATIA Composites Design, Simulayt solutions for fiber modeling and linking, and Abaqus FEA from SIMULIA for virtual testing of a design's structural integrity. Because CATIA, Simulayt and SIMULIA Abaqus are fully integrated to work within a single user interface, Plasan saves time, eliminates translation errors, and streamlines training.

With its advanced CATIA and SIMULIA ply design and analysis solutions, Plasan Carbon Composites' lay-up technicians know they can achieve smooth, clean applications of plies on the first try, eliminating waste and cutting costs.

EARLIER VISIBILITY RENDERS MORE ACCURATE ESTIMATES

With its previous software tools, Plasan could not design the carbon fiber ply kits for its composite parts until an OEM's tool molds arrived at its facilities. But with CATIA Composites Design and the Simulayt Advanced Fiber Modeler, Plasan can quickly provide accurate quotes to its customers based purely on the OEM's part data, which is available long before the lay-up tools themselves.

"This first level now takes only about 30 minutes to complete rather than half a day," says James Salerno, CAD and FEA (finite element analysis) engineer at Plasan. The result: faster, more accurate quotes that help Plasan respond more quickly and competitively to customer requests.

USING TECHNOLOGY TO IMPROVE PROCESSES

On its most recent pre-production program, Salerno says, he was able to arrive at a 100% manufacturable kit for two required parts in just two iterations using CATIA Composites Design, a 50% improvement. Much of the speed at which Plasan can do preliminary analysis comes from the ability to work in a single CATIA platform that is fully integrated with tools from Simulayt, Salerno says.

Advanced flattening and producibility simulation algorithms in Simulayt allow engineers to understand how fibers in composite materials are conforming or deforming around the complex geometries typical in automotive components. "Our customers are very concerned with inconsistencies in the surface," Salerno says. "For an automotive component going on an expensive sports car, it has to look like glass. Simulayt lets us see how far we can push our materials before they start wrinkling and causing a problem."

IMPROVED MANUFACTURING PROCESSES

Plasan also is using its new solution to develop next-generation processes that create parts faster by replacing autoclave treatments of the composites materials with pressure-based approaches; an innovation the company calls Out-of-Autoclave. The savings to date from Plasan's Out-of-Autoclave innovation include a 75% reduction in curing times, which translates into significantly decreased energy demand and faster delivery to customers.

SUPPLIERS

PLASAN CARBON COMPOSITES

Inceptra™
Delivering the Power of PLM

We're now able to virtually test the strength of our composites in a matter of minutes instead of hours, days or weeks.



Gary Lownsdale
Director of R&D, Plasan Carbon Composites USA

"We used CATIA and Abaqus throughout the process to make sure our computational tools were conforming to what we were actually measuring," says Gary Lownsdale, Plasan's director of Research & Development. "We would not have been able to have the press equipment in place today if not for those two solutions."

DS PLM solutions also help Plasan to reduce the number of plies used to produce parts, another Sustainable Innovation that saves lay-up time, improves the strength and durability of the finished part, and reduces the amount of waste fiber – an improvement that is good for the environment and the bottom line.

For more information:
www.plasanusa.com
www.inceptra.com
www.3ds.com/automotive

Orange County Choppers throttles up with SolidWorks Premium

When the reality television show "American Choppers" debuted on the Discovery Channel, orders for Orange County Choppers' custom motorcycles skyrocketed. SolidWorks Premium has helped OCC benefit from this windfall with a 75% reduction in cycle times that cut the company's time-to-market in half and eliminated several rounds of expensive physical prototyping.



Orange County Choppers relies on SolidWorks Premium software to efficiently respond to the onslaught of orders that accompany the popularity of its "American Chopper" television show.

Although many people associate Orange County Choppers (OCC) with "American Chopper," the breakthrough reality television show that debuted on the Discovery Channel in 2002, the company founded by Paul Teutul Sr. began designing and building custom motorcycles in 1999. Since then, the massive and mustachioed founder has become a celebrity, and the television show's popularity has brought worldwide fame – and a dramatic increase in business – to the custom motorcycle manufacturer.

> With SolidWorks we can refine the design and then control the production of parts with a high degree of precision. SolidWorks has become the backbone of our development effort because everything revolves around the SolidWorks model."
>
> **Jason Pohl**, *Senior Designer*

OCC outgrew two previous shops, in Rock Tavern and Montgomery, NY, and now operates a state-of-the-art factory in Newburgh. The onslaught of orders that accompanied the fame of "American Chopper" created development and production challenges that the custom shop could no longer address using its original approach. Senior Designer Jason Pohl, now a regular on the television show, was working on the prototype for a video pinball game in 2004 when Teutul contacted him about joining OCC.

"I created some virtual chopper models for the game that were loosely based on OCC designs," Pohl recalls. "Paul Sr. saw my work and realized how computer modeling could help the company evolve from a design and production standpoint. He recruited me to join OCC in a concept artist and 3D modeling capacity."

With a background in art and computer graphics, Pohl knew OCC would need a design application that could blend the artistry of chopper design with actual manufacturing techniques and engineering data. "Basically, we had any kind of software available to us but needed to choose the right package, not only to capture our ideas but also support advanced manufacturing processes in our new factory. A friend at a tool and die shop recommended SolidWorks software, so we gave it a whirl and discovered it was exactly what we needed."

OCC chose SolidWorks Premium software as its standard design platform because it is easy to use, includes design visualization and surfacing tools, and integrates well with MasterCAM computer-aided manufacturing (CAM) software, which automates machining on the company's HAAS CNC production systems.

"Every bike that we build is a 100% custom design," Pohl says. "With SolidWorks we can refine the design and then control the production of parts with a high degree of precision. SolidWorks has become the backbone of our development effort because everything revolves around the SolidWorks model."



SolidWorks design visualization tools, including PhotoView 360, enable OCC to communicate more effectively with its customers.

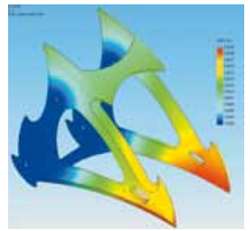
VISUALIZING COOL IDEAS ACCELERATES DESIGN

Instead of trying out different concepts in the shop using actual prototypes, the company now iterates on designs in the SolidWorks design environment, which is more efficient and cost-effective. Since implementing SolidWorks, OCC has accelerated its time-to-market by 100 percent, cut design cycles by 75 percent, and eliminated several rounds of prototyping.

"When you're modeling a bike, you can try a lot of different things to make it look really cool," Pohl explains. "The curve ball is that in addition to looking good, the design has to function, which is where SolidWorks comes in. We can thoroughly evaluate a design before parts are ordered and quickly eliminate the bad ideas that simply won't work."



3D Design



3D Design Analysis



3D Design Communication

BETTER EFFICIENCY BOOSTS THROUGHPUT, CONTROLS COSTS

By using SolidWorks software, OCC efficiently handles the increased volume of orders it now receives, both in development and during production. SolidWorks support for automated machining boosts throughput. And because manufacturing from a solid model is more accurate, OCC is able to keep its costs down. Since implementing SolidWorks software, the custom motorcycle manufacturer has cut its development costs by 50 percent.

COMMUNICATING MORE EFFECTIVELY WITH CUSTOMERS

SolidWorks software has also helped OCC interact more effectively with customers, who often want to see how the motorcycle will look before placing an order, especially for the growing number of corporate bikes made at OCC. Using SolidWorks design visualization and communications tools, including PhotoView 360, OCC can show high-quality renderings of custom motorcycle designs to clients, which helps to confirm expectations and finalize orders.

"Whether we're working with an outside vendor or in our own machine shop, SolidWorks makes it easier to efficiently create usable parts," Pohl says. "In my experience, 2D techniques hide flaws; 3D design reveals flaws. When it's time to manufacture a part, SolidWorks enables us to have confidence that the model is right. That makes our lives a whole lot easier."

"SolidWorks saves countless hours of R&D and communications back and forth with the client," Pohl says. "SolidWorks is more than a design tool for us. It's more of a design weapon because it really enables us to turn and burn."

For more information:
www.orangecountychoppers.com
www.solidworks.com

Alstom Transport: Sustainable mobility for the rail industry

Alstom Transport has united its business processes on Dassault Systèmes' ENOVIA Version 6 platform, replacing its disparate legacy applications with a single PLM solution. The goal is increased collaboration and faster time-to-market, as well as achieving the company's ambitious goals for sustainable mobility.

Use your smartphone to learn more about sustainable mobility at Alstom Transport.

As the world continues to shrink, governments are faced with the complex challenge of trying to move more people and freight while reducing energy consumption, pollution, and traffic. Delivering sustainable solutions that address 21st century mobility needs is a major goal for urban developers and transportation companies, including Alstom Transport.


© Alstom Transport / T.Miles

Pendolina Virgin train undergoing maintenance at Liverpool, UK, in June 2010.

ECOLOGICALLY AND ECONOMICALLY EFFICIENT SOLUTIONS

Alstom Transport places environmental preservation at the core of its development strategy. Through technological innovation, Alstom Transport delivers solutions that satisfy its customers' profitability, ecological, and sustainability objectives. "Sustainable mobility is a major requirement in today's world," says Jean-Louis Ricaud, chief operating officer, Alstom Transport. "Because they run on electricity and do not emit carbon dioxide, trains are one of the most environmentally friendly means of transportation today."

Alstom Transport makes great efforts to ensure the flawless integration of its trains into urban and rural landscapes, using Dassault Systèmes' PLM solutions to demonstrate digitally during the preliminary phases of a project the way its products will fit into the environment. "Through 3D simulation, our customers can experience the way our trains will blend in with their surroundings," says Mama Sougoufara, director Method and Tools and IS, Alstom Transport. "It is an innovative and powerful way to convince them that the result will meet their objectives in terms of mobility and at the same time preserve their cities' architectural heritage."

THE AGE OF REGULATORY COMPLIANCE

To achieve sustainable mobility, Alstom integrates environmental parameters early in the design stages of its products – a practice called eco-design. Environmental and recycling specifications are defined and managed in ENOVIA Version 6.

"All the norms our products have to comply with are managed with ENOVIA, such as ELV (End-of-Life Vehicles), RoHS (Restriction of Hazardous Substances), WEEE (Waste Electrical and Electronic Equipment) and REACH (Registration, Evaluation, Authorization and Restriction of Chemicals)," Ricaud says.

Alstom Transport controls and reduces the impact its products have on the environment throughout their lifecycles, from design to manufacturing and through to recycling. The results are products that are more economical to operate, consume less energy, present lower decommissioning costs, and are less detrimental to the environment and human health.

"We strive to minimize the use of materials that can be harmful to man and the environment," Ricaud explains. "For example, our Coradia Nordic regional train is 98% recyclable, thus reducing its carbon footprint to a minimum."

PHASED IMPLEMENTATION

Alstom Transport has deployed ENOVIA Version 6 at its different sites so that all stakeholders, wherever they are, can work together on customer projects and share their expertise. Through the single Version 6 platform, project teams access the latest and most up-to-date product data. "ENOVIA is the backbone on which we base engineering and manufacturing collaboration, as well as sourcing throughout the product development cycle, both within the company as well as with our suppliers and partners," Sougoufara says.

The company also will migrate from CATIA Version 5 to CATIA Version 6 to leverage all 3D mechanical design, resulting in a fully coherent system for all its activities. "With Version 6 we will enhance the level of 3D design collaboration between our different engineering centers," Sougoufara comments. "It will enable us to streamline our design-to-manufacturing processes and deliver quality products to market faster."

With Version 6, Alstom is moving full speed ahead toward fully sustainable product design and process efficiency, and helping to shape the future of rail transport.

For more information:
www.alstom.com/transport
www.3ds.com/automotive

TRAINS

ALSTOM

85%

Metropolis metros and Citadis tramways are now at least 85% recyclable, and this can rise to as high as 98% for the Coradia Nordic regional train in Stockholm.

ALSTOM TRANSPORT

As a world leader in the rail market, Alstom Transport develops and offers the rail industry's most complete range of systems, equipment and services, always keeping sustainable transport in mind. Alstom Transport manages all transport systems from rolling stock to signaling, maintenance and infrastructure, as well as turnkey solutions. During the 2010-2011 fiscal year, Alstom Transport reported sales of 5.6 billion euros. The company is present in more than 60 countries and has 26,000 employees.

Citadis Tramway in use in Rabat, Morocco, July 2011



© Alstom Transport / T.Thebault

TRAINS

AMTRAK® modernizes U.S. train travel with SolidWorks



AMTRAK®, the only U.S. high-speed rail operator, operates more than 300 trains a day, providing affordable travel to more than 500 destinations spread across 21,000 route miles in 46 states, the District of Columbia, and three Canadian provinces.

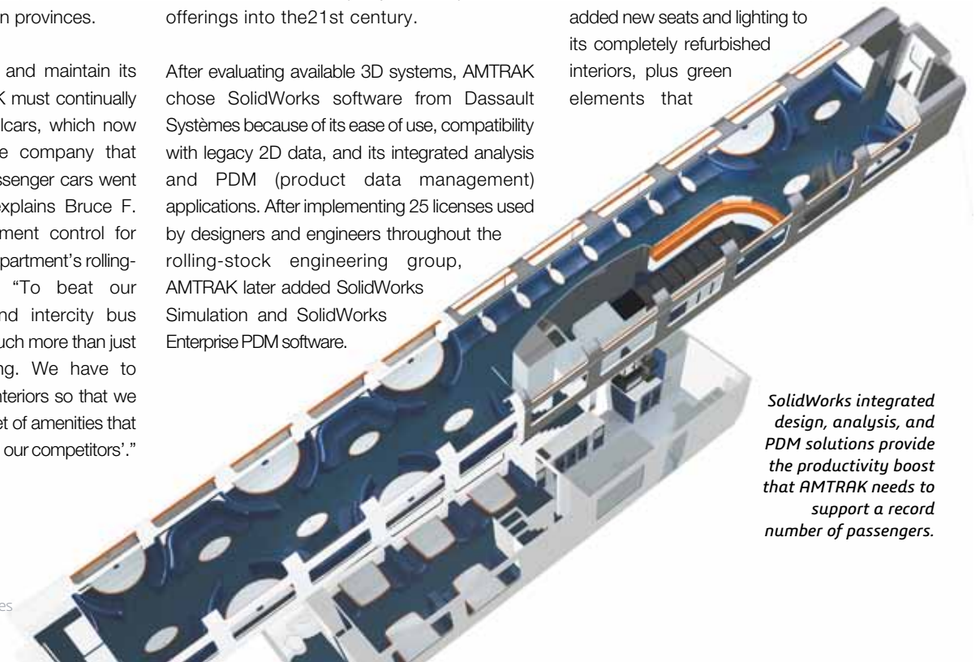
To support ridership growth and maintain its competitive position, AMTRAK must continually update and modernize its railcars, which now average 26 years old. “The company that manufactured the Amfleet passenger cars went out of business in 1986,” explains Bruce F. Hoffman, manager of document control for AMTRAK in the Mechanical Department’s rolling-stock engineering group. “To beat our competition—the airlines and intercity bus companies—we have to do much more than just keep the equipment running. We have to modernize and redesign our interiors so that we offer a level of comfort and a set of amenities that not only match, but also exceed our competitors’.”

For decades, AMTRAK’s engineers used a combination of 2D tools for their design work. But in 1999, engineering management determined that 3D solutions were necessary to take the rail company’s transportation offerings into the21st century.

After evaluating available 3D systems, AMTRAK chose SolidWorks software from Dassault Systèmes because of its ease of use, compatibility with legacy 2D data, and its integrated analysis and PDM (product data management) applications. After implementing 25 licenses used by designers and engineers throughout the rolling-stock engineering group, AMTRAK later added SolidWorks Simulation and SolidWorks Enterprise PDM software.

MODERNIZING THE PASSENGER RAIL FLEET

With SolidWorks, AMTRAK has transformed its passenger cars of old into bright, inviting, and comfortable coaches. The company added new seats and lighting to its completely refurbished interiors, plus green elements that include LED lighting and recycling bins. SolidWorks also helped AMTRAK’s designers increase productivity by 60 percent and realize time savings of 40 percent.



SolidWorks integrated design, analysis, and PDM solutions provide the productivity boost that AMTRAK needs to support a record number of passengers.

“Our goal in creating sleek, comfortable car interiors is to make rail the civilized way to travel,” notes industrial designer John Campbell. “SolidWorks has allowed us to take a railcar that is decades old and make it look like it was made within the last two years.”

> SolidWorks has allowed us to take a railcar that is decades old and make it look like it was made within the last two years.”
>
> **John Campbell**, *Industrial Designer, AMTRAK*

SIMULATION SAVES TIME AND MONEY

AMTRAK uses SolidWorks Simulation to analyze structural performance and ensure safety in critical components. Instead of contracting out much of its analysis work, as AMTRAK had done in the past, in-house designers can now validate performance during design, saving time, reducing costs, and improving quality.

“The ability to simulate and show how a part will perform is a big plus,” Campbell says. “It allows us to strengthen parts while simultaneously removing material. This saves time and money and also reduces the number of prototypes required, plus we can produce prototypes in hours instead of weeks.”

INTEGRATED PDM BOOSTS PRODUCTIVITY

The SolidWorks Enterprise PDM system is a significant contributor to AMTRAK’s productivity improvements. The rail company’s diverse project teams use the system to manage more than 500,000 design files, including engineering data, drawings, technical specifications, and procedures. The PDM system enabled AMTRAK to automate document approval processes with electronic workflows and email notifications to streamline its processes.

“We have tightened revision control, removing duplicate documents, and have benefited from fast-search capabilities, eliminating downtime,” Hoffman says. “The system, which is really simple to use and readily accepted by our users, helps us to improve quality and cut errors. It also lets us generate time and cost savings in the versioning and reuse of parts.”

For more information:
www.amtrak.com
www.solidworks.com

VISEON puts buses on the road with DS PLM

Using CATIA and ENOVIA SmarTeam, VISEON is producing more buses in less time. CATIA makes it easy to mix and match standard components to create a customized bus, while SmarTeam manages all of the versions and variations and feeds critical information to VISEON's SAP system, helping to keep corporate processes on track.



By *Heike Blödorn*

NEOPLAN brand buses have been produced in Pilsting, Germany, for more than 35 years. After the plant was purchased from its holding company, MAN/Neoplan, as part of a management buyout in April 2009, partners Joachim Reinmuth and Ernö Bartha continued the tradition with the new VISEON brand.



The plan was to connect applications for manufacturing, production and quality assurance, and to provide viewers for all downstream areas. ENOVIA SmarTeam was exactly the right system for this purpose.

Christian Dittert
Development Manager
Viseon BUS GmbH

As part of the transfer of operations, VISEON had to introduce a completely new IT landscape. The partners chose two Dassault Systèmes (DS) solutions – CATIA V5 for design and ENOVIA SmarTeam for data management – implemented by DS partner Transcat PLM GmbH.

VISEON wanted a data management solution that would be easy to handle and cover the requirements for drawing administration and change processes. "The plan was to connect applications progressively for manufacturing, production and quality control, and to provide viewers for all downstream areas," explains Christian Dittert, who is VISEON's development manager for high-floor vehicles. "ENOVIA SmarTeam was exactly the right system for this purpose."

The initial operation of CATIA in combination with ENOVIA SmarTeam was based on the Transcat Standards myV5 and SmarTCbase – a database for ENOVIA SmarTeam that was developed for instant use. myV5 facilitates the administration of different customer-specific CATIA releases, licenses and add-on products. An SAP link facilitated integration into the higher-level corporate process. A "number generator," structured to the vehicle manufacturer's specifications, allows the designer of a new component to complete an identity card that defines the component and the vehicle type. This information is used by the number generator to assign a component number that is then used by all VISEON departments throughout the development process.

COMPLETE PRODUCT RANGE WITHIN TWO YEARS

VISEON's team of 240 staff members is committed to developing buses in a short time at low cost. "We have decided on a strictly modular product range," Dittert says. "We can use our various building blocks to develop variations of existing products very quickly or to create a new product within a short time by adding a supplementary building block." The coach, the first result of the modular building set philosophy, is currently available in three different lengths.

This approach enabled the designers to handle the considerable challenge of developing a complete, proprietary product range of travel buses in three different versions: a double-decker bus, a trolley bus, and a double-decker coach for a third-party development contract. Data for an airport bus of the NEOPLAN brand, which is being produced under license, was entered into CATIA at the same time.

The individual processes, from development and prototype construction to manufacturing, strongly overlap at VISEON. This helps to speed up the overall process. Staff members involved in prototype construction and production use viewer interfaces in CATIA to navigate in a virtual model, which includes dimensions that have not yet been specified by the development department. Users can also break down and view the whole vehicle in all its construction segments, from the body shell to the paneling, to get a better understanding of the product to be manufactured.

100 BUSES IN THE FIRST YEAR OF PRODUCTION

A certain number of seat types, seat spacing options, positions and widths of doors, as well as different accessories, are available for each bus type. Sales staff members begin by discussing the basic layout, the vehicle color and the interior equipment with the customer. This determines the building specifications for the vehicle. The customer vehicle is then compiled from a bill of materials in a database. These module sets in CATIA/ENOVIA SmarTeam include the options selected. Combining the various module sets adds the customer's requirements to the basic vehicle, resulting in the final vehicle.

The two production lines currently available allow VISEON to produce three to five units per week, depending on the model mix in the production line. In the first six months of production, VISEON completed 100 vehicles, well on its way to the company's goal of 250 buses per year.

Further information:
www.viseon-bus.com
www.3ds.com/automotive



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DASSAULT SYSTEMES

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