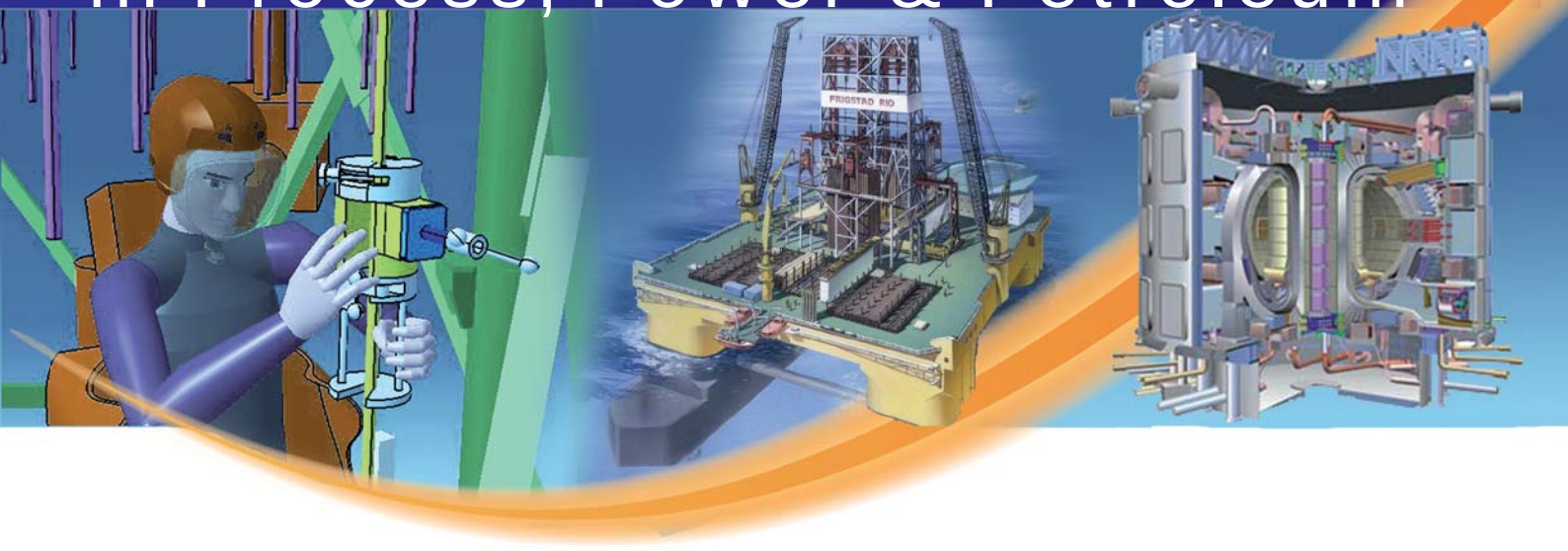
PLM Customers
in Process, Power & Petroleum



DASSAULT SYSTEMES

See what you mean

Driving Plant Engineering, Construction and Management Innovation with Product Lifecycle Management (PLM) Solutions from Dassault Systèmes

Modern plants are incredible machines. They extract minerals from ores and oil from the ocean floor and produce energy to light up entire regions. With major economies and populations relying on them for survival, the repercussions of project delays, cost overruns, and operational failures are enormous. Once online, these plants and structures must operate efficiently round the clock for at least 20-30 years. However, the economic pressures of globalization are forcing plant owner/operators, fabricators, and the Engineering Procurement and Construction (EPCs) firms responsible for design, construction and operation to "right-size" staff and outsource critical processes. Off-site fabrication and assembly is becoming the established trend, with equipment modules of 2,500 tons the norm, rather than the exception. Instead of local, facility-based operations, EPC "networks" and construction sites stretch around the globe, creating major communication and coordination challenges.

Across the entire Process, Power and Petroleum (PP&P) industry, customers have become more demanding, and regulatory standards more stringent and varied, increasing the complexity and volatility of project requirements. With trillions of dollars of assets in the field, having just one plant, generator or oil rig out of service for a few days can have a tremendous impact on already lean margins. As a result, tolerance for cost overruns, delivery delays, rework and poor quality has eroded to zero. No one can afford "business as usual".

In this high-stakes environment, owners, operators, EPCs, and industrial equipment manufacturers must undergo fundamental transformations in the way they operate. They need to reinvent their processes – from design-through-maintenance – to reduce cycle times, improve margins and provide more value to customers. Progressive Aerospace, Shipbuilding, Industrial Equipment and now PP&P organizations are leveraging Product Lifecycle Management (PLM) solutions from Dassault Systèmes (DS) to maximize the knowledge and resources of their global networks and:

- Leverage a single source of product and process lifecycle information to streamline concurrent work and facilitate collaboration among all stakeholders.
- Simulate various scenarios to accurately assess project requirements and costs before committing to long lead times and major capital equipment orders.
- Provide 360º visibility of evolving requirements to partners, contractors and downstream planning to avoid scheduling delays and cost overruns.
- Capture, validate and optimize process and design requirements, eliminating rework while maximizing design re-use and best practices from other projects.
- Optimize construction, operation and maintenance processes to reduce downtime and lifetime cost of ownership.
- Increase plant and operator safety by ensuring construction, operation and shutdown sequences are fully compliant with regulatory and safety constraints.

Here are some of their stories.

CATIA DELMIA ENOVIA

Yantai Raffles Meets the Oil Industry's Toughest Challenges

Yantai Raffles Shipyard (YRS), a shipbuilding and offshore manufacturer in Northern China, reengineered its product development processes by integrating the design, engineering, and construction of an FPSO (Floating Production, Storage, and Offloading vessel) into a single collaborative environment – from concept to construction to on-going operation and maintenance.

In an industry where 80% of projects experience near-catastrophic cost overruns and delays, there is zero tolerance for errors or downtime due to data translation or incompatible systems and processes. Leveraging virtual Product Lifecycle Management (PLM) solutions from Dassault Systèmes (CATIA, ENOVIA VPLM and DELMIA), Yantai Raffles was able to work concurrently with a Norway-based engineering company responsible for the design, to ensure the FPSO was optimized for performance, constructability, operation, and maintainability – before making capital and scheduling commitments. This gave the customer, Petrobras, a Brazilian government-owned Oil and Gas company, visibility and input into the design and behavior of the FPSO long before it was built, allowing them to finalize daily operations and maintenance planning.

Leveraging feature-rich 3D technology and a unified development environment, conceptual design time was cut by almost 70%, and the customer's learning curve dramatically improved. Yantai Raffles is now able to work closely with its customers and partners to ensure on-time, on-budget delivery of every project, strengthening relationships and competitive position.

Benefits

- Conceptual design time was reduced by almost 70%, accelerating downstream processes and planning.
- Access to unified, real-time product data allowed Yantai Raffles, and their equipment suppliers to collaborate and accelerate decision making.
- Intuitive, 3D-based instructions increased worker productivity, significantly reducing learning curves and errors.
- Financial and schedule impact analysis throughout the development and commissioning phases enabled on-time, on-budget delivery, increasing customer satisfaction.

"Worldwide industry, not just shipbuilding and energy, is at a critical juncture. Some industries, like aerospace and shipbuilding, are leading the way in using 3D and PLM to transform the way they do business. Other industries, from large manufacturers to small– to medium–sized businesses, must adopt this business paradigm or risk failure in today's globally collaborative world. PLM can simulate operating conditions, thereby enhancing quality and improving lifetime operations costs." – Brian Chang, CEO, Yantai Raffles Shipyard

Southern California Edison Extending Nuclear Plant Life with DS PLM

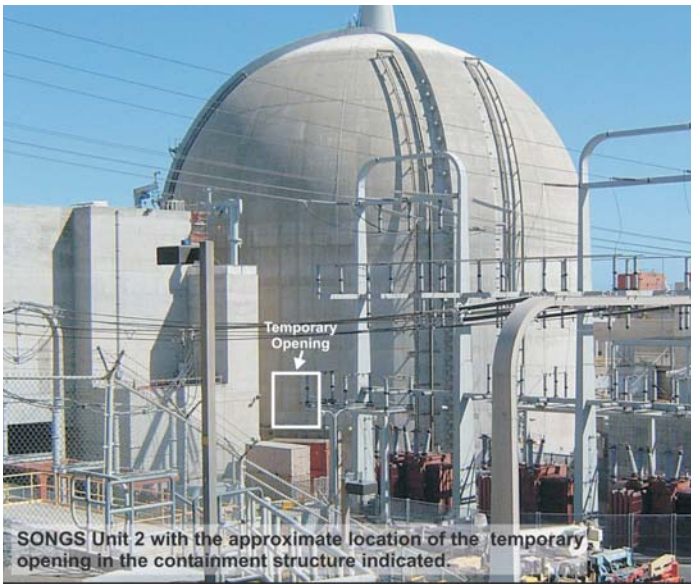
SOUTHERN CALIFORNIA EDISON®
An EDISON INTERNATIONAL® Company

San Onofre Nuclear Generating Station (SONGS) is the largest generator of electricity in Southern California, serving 2.75 million homes and generating about 20% of the power Southern California Edison (SCE) provides to its customers.

In an industry where $15.8 billion is lost every year due to operational inefficiency, $1 million-a-day plant shutdowns are a major contributor to soaring costs. Staying online and at full capacity, while managing a major upgrade, is a risky business. SONGS steam generators are massive. Measuring more than 65 feet long, 23 feet wide and weighing 621 tons each, they are much larger than those used at most nuclear plants. Replacing them, as SCE plans to do in 2009-2010 at a cost of $680 million, presents enormous challenges. For example, this project involves transporting the generators to and from the plant, extracting the old generators from the containment building and installing the new ones. Maneuvering the new generators into an opening cut into the building requires precise planning, as clearances measure mere inches in some cases. With no second chances and no trial runs, these replacement tasks must be done right the first time.

SONGS chose Dassault Systèmes PLM solutions (CATIA, ENOVIA and DELMIA) to create digital models of the equipment and facilities so the entire generator replacement process could be simulated in 3D. The models provided not only the physical dimensions of the facilities, but also weights, properties, structural capacity of flooring, motion, loads and stress capabilities of the crane used to lift the generators, loads shift stress analysis, clash, step-by-step simulation of human operations, radiation exposure analysis, etc.

With DS PLM helping to develop and test the processes and structures necessary to a successful upgrade, SONGS will continue to meet the requirements of an exploding energy market and a highly regulated, public-safety-conscious industry.



SONGS Unit 2 with the approximate location of the temporary opening in the containment structure indicated.

Benefits

- DS PLM allows SONGS to create and validate requirements and accurately assess proposals by requiring contractors to include 3D simulations in their bid requests.
- In addition to project planning, SONGS uses 3D models and simulations for training purposes, letting workers “see” the procedures they will perform during an actual project.
- Lessons learned on each routine task, such as refueling, are captured so that procedures can be studied and the most efficient sequences identified and documented.
- DS PLM enhances SONGS’ ability to perform one-of-a-kind projects efficiently, cost-effectively, and most importantly, safely.

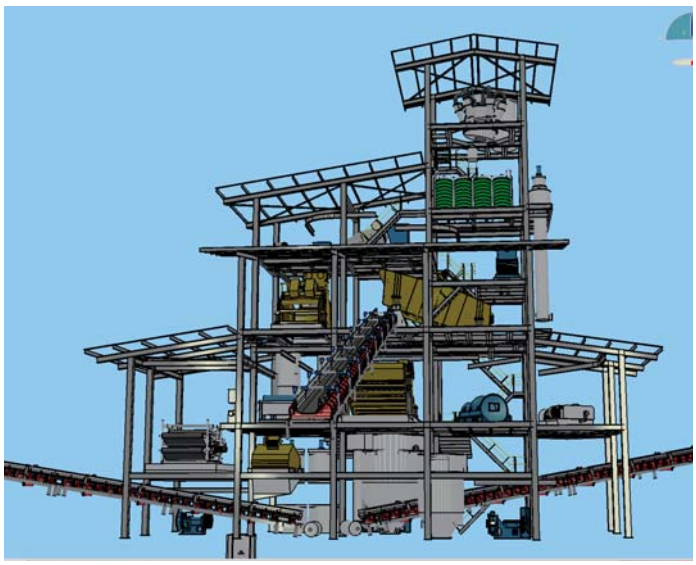
“Our design group considers V5 PLM vital to the future of SONGS. Our vision is to expand these capabilities until they encompass everything we do and then to share our models throughout the plant – with engineering for analysis, with procurement to order parts, with the operations group, with training and with construction. The applications are almost limitless.” – Steve Stephens, CATIA V5 and ENOVIA administrator, SONGS

Farnham & Pfile Boosts Competitiveness with DS PLM Solutions

Pennsylvania-based Farnham & Pfile is a turnkey engineering and contracting company that designs and constructs large industrial systems, ranging from fuel processing facilities to clean coal preparation plants. The company has earned its reputation as a pioneer in this industry by recognizing early on the business advantages of designing large, complex facilities in 3D. Farnham & Pfile was an early adopter of Dassault Systèmes CADAM applications in 1990, CATIA V4 in 1994, and is now migrating to CATIA V5.

To strengthen its competitive position, Farnham and Pfile needed to reduce or eliminate cost overruns and delays on multimillion-dollar projects. One of the biggest obstacles was timely access to real-time data so it could quickly resolve problems and collaborate with globally dispersed partners. By implementing ENOVIA Virtual Product Lifecycle Management (VPLM) capabilities, Farnham & Pfile will extend the advantages enabled by CATIA by bringing every stakeholder, regardless of system or location, into a single, real-time collaborative environment.

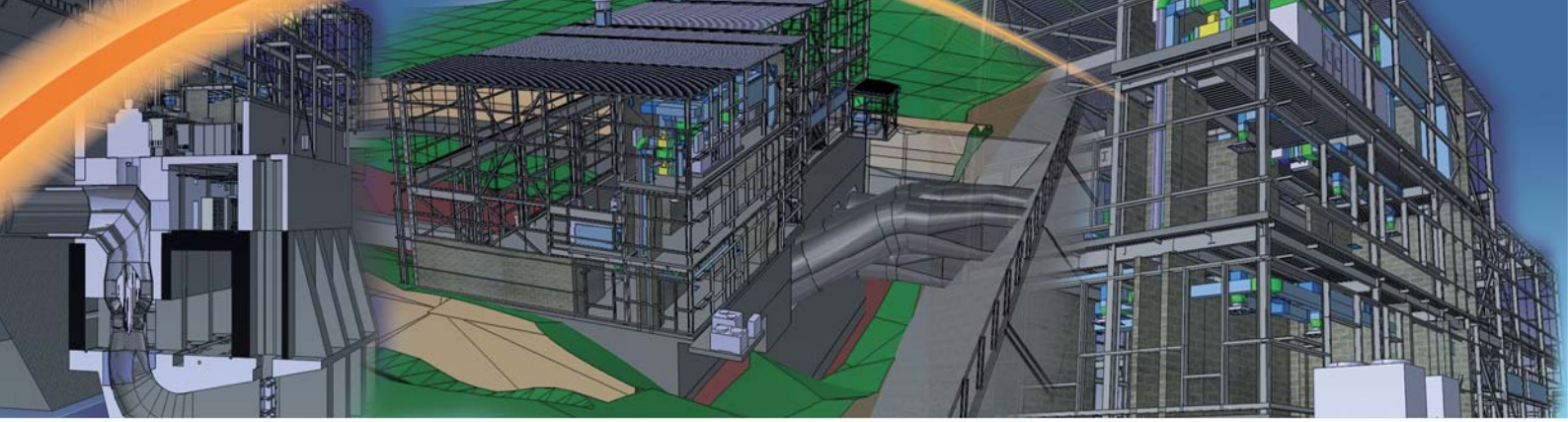
By implementing DS PLM solutions, engineers at Farnham & Pfile are now designing and building plants very differently than they would have a decade ago. They collaborate with global partners and resolve potential problems up front, before committing money and resources. Sharing knowledge during the virtual stage makes processes – and projects – more efficient, reducing late-stage errors delays, while allowing innovation to occur.



Benefits

- Leveraging a single, collaborative development environment reduced design mistakes and supplier costs by 30%.
- DS PLM helps Farnham & Pfile manage and optimize components and maximize reuse from one project to another.
- Owner/operator total lifetime costs were reduced due to increased process efficiency across the lifecycle of the plant – from design through maintenance and plant upgrades.
- Farnham & Pfile uses CATIA models to create sales presentations that win more business by showing 3D walk-throughs of proposed facilities.

"Now we design in 3D. We need the 3D design in order to achieve all the benefits of the ENOVIA virtual tour technology. Since converting to the new system, we have fewer mistakes and less time from inception to field drawings. In fact, we have better designs over all. Plus, when we are finished, we have an electronic catalog for maintenance already done." – Todd Vander Hill, Farnham & Pfile engineer



Hydro-Québec Revolutionizes the Development of Hydroelectric Projects

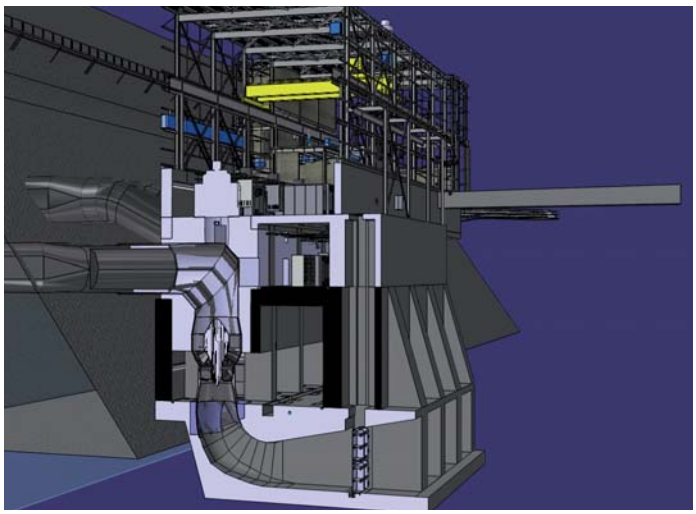
As one of the largest renewable-energy producers in North America, Hydro-Québec generates almost all the electricity consumed in Québec, Canada. To meet the increasing demand of 3.6 million and growing customers, the company needed to drastically reduce its commissioning time – currently at 10 years. The budget for all Hydro-Québec hydro dam construction projects for 2004-2014 was estimated at CDN $50 billion. Engineering costs typically account for nearly 10% of that amount.

To accelerate project lifecycles, Hydro-Québec believed that a transition from 2D paper-based to 3D digital solutions and automated workflows would streamline development processes, thereby reducing engineering costs and commissioning times. Working with 15-20 engineering consultant partners, Hydro-Québec also needed a framework that would enable effective internal and external collaboration, regardless of location or platform. Finally, faced with an escalating rate of retirement by its most experienced engineers, the company was anxious to ensure that its human and technical resources were adequate to support growth and that its engineering teams could operate continuously without the disruption of new and longer learning curves.

Hydro-Québec selected DS PLM solutions to address these challenges, including CATIA for 3D collaborative product design, ENOVIA SmarTeam for data and workflow management, and ENOVIA DMU (Digital Mock-Up) for collaborative product visualization and design review.

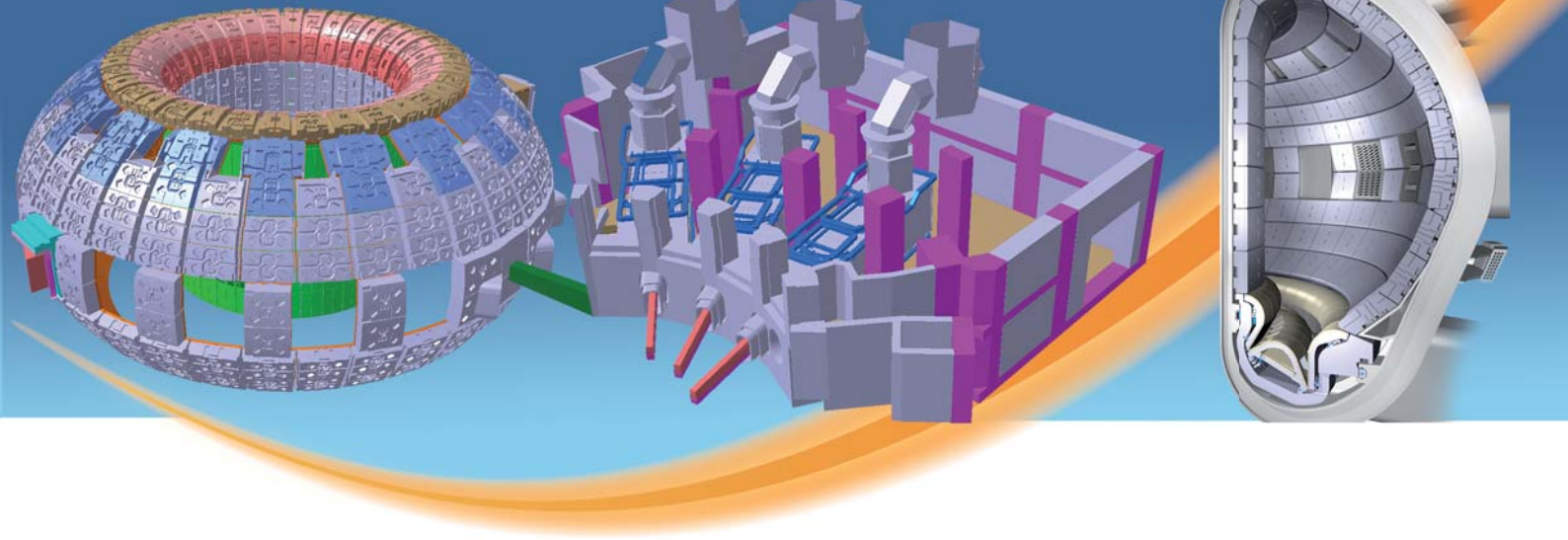
Benefits

- Hydro-Québec teams are now able to design, access and leverage multi-disciplinary 3D data – including mechanical equipment, fluid and electrical systems, and concrete and steel structures – within a single, integrated environment.
- Engineers and consulting partners can visualize and digitally validate all the components that make up a plant, taking weeks off design cycles while ensuring quality and compliance.



- Rapid problem resolution across Hydro-Québec teams and partners reduces bottlenecks, errors and rework due to poor synchronization and communication.
- ENOVIA DMU visualization and collaborative review capabilities help Hydro-Québec reduce risk early on in development and meet quality goals across the lifecycle of the project.
- Components are standardized and engineering intent captured for reuse in future projects.
- Upon completion, plant design and plan details as well as specification data can be transferred to workers for easier maintenance, increasing operational efficiency and reducing overhead.

"With CATIA V5 and ENOVIA, Hydro-Québec will be able to collaborate effectively with its partners and expedite the resolution of problems that can occur during the project development stage." – Jean-Paul Rigg, Director, Generation Engineering, Equipment division, Hydro-Québec.

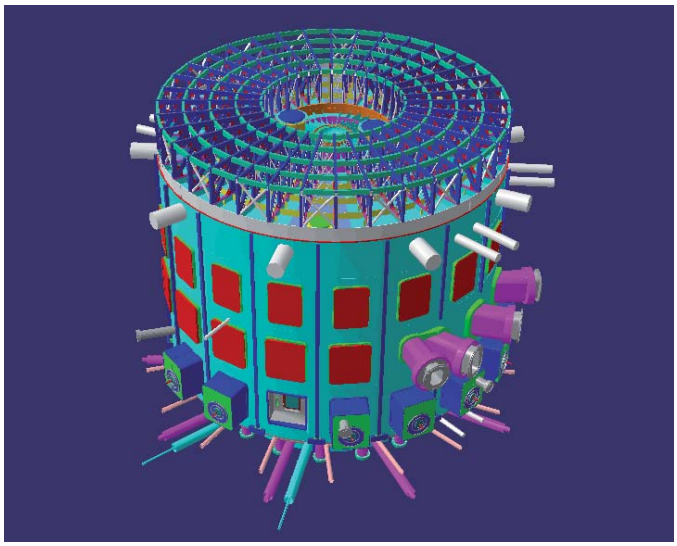


ITER Develops the Future of Electrical Power Generation with PLM Solutions from Dassault Systèmes

ITER is a joint international research and development project dedicated to the development of safe, cost-effective nuclear fusion. The research is aimed at demonstrating that fusion, which occurs naturally in the sun and the stars, can be used to produce electricity here on Earth. If proven successful, this alternative energy source could be an answer to meeting the needs of an exploding world population.

Seven partners, known as the ITER Parties, came together for this project. They are the European Union (represented by EURATOM), Japan, the People's Republic of China, India, the Republic of Korea, the Russian Federation and the USA. In June 2005, the ITER Parties decided that the fusion device would be constructed at Cadarache in southern France at an estimated cost of 5 billion Euros over a 10-year period.

The ITER engineering team has used CATIA since the beginning of the project to define the "tokamak" – the heart of the ITER machine. As the project progresses, the teams will extend the applications of CATIA to other areas such as structure and piping design. They have also chosen ENOVIA VPLM as the collaboration environment for the ITER development community. By deploying DS PLM solutions, the ITER team will be able to manage the complete project within a single environment, providing accurate, up-to-date information and streamlined processes.



Benefits

- Data coming from multiple disciplines – mechanical, fluid, electrical, concrete and steel structures, etc. – will be captured within a unified, digital product definition for rapid access and design validation.
- The ITER team will be able to manage massive amounts of data; the ITER machine alone will be made up of around 10 million parts.
- Several hundred global suppliers will be able to collaborate efficiently across the development, manufacturing, and assembly phases of the ITER machine.

"DS PLM solutions are playing a key role in the ITER project. We are working hand in hand with DS to benefit from cutting edge design and collaboration best practices that have been developed in various industries. Accuracy and reliability are crucial to this project." – Eric Martin, head of design office.

HEADQUARTERS

Dassault Systèmes
9, quai Marcel Dassault - B.P. 310
92156 Suresnes Cedex - France
www.3ds.com

BRAND WORLDWIDE HEADQUARTERS

CATIA
9, quai Marcel Dassault - B.P. 310
92156 Suresnes Cedex - France
www.3ds.com

DELMIA
900 N. Squirrel Road
Auburn Hills, MI 48326 - USA
e-mail: info@delmia.com

ENOVIA
University Research Park
10330 David Taylor Dr.
Charlotte, NC 28262 - USA
e-mail: plmus@ds-us.com

About Dassault Systèmes
As a world leader in 3D and Product Lifecycle Management (or PLM) solutions, Dassault Systèmes brings added value to more than 90,000 customers in over 80 countries. A pioneer in the 3D software market since 1981 Dassault Systèmes develops and markets PLM application software and services that support industrial processes and provide 3D vision of the entire lifecycle of products from coneption to maintenance. The Dassault Systèmes portfolio consists of CATIA for designing the virtual product- SolidWorks for global 3D mecanical design- DELMIA for virtual production- SIMULIA for virtual testing and ENOVIA for collaborative global lifecycle management, including ENOVIA VPLM, ENOVIA MatrixOne and ENOVIA SmarTeam. Dassault Systèmes is listed on the Nasdaq (DASTY) and Euronext Paris (#13065, DSY.PA) stock exchanges. For further information, visit http://www.3ds.com

Photos courtesy of Yantai Raffles, Sevan Marine, SONGS, Farnham & Pfile, Hydro-Québec, and ITER.

DASSAULT SYSTEMES

www.3ds.com

IS_B_UTJBQ_EN_200702