BENTLEY Incorporates DELMIA for Assembly and Planning Management

Lockheed Martin, NASA
Build Closer Engineering Ties Using DELMIA Human

NOKIA
Uses DELMIA to Conduct Assembly Studies with CATIA 3D Models

BENTLEY
Incorporates DELMIA for Assembly and Planning Management

Featuring PLM 2.0: Online for all
Dear Valued Customers,

Dassault Systèmes Delmia Corp. continues to accomplish significant penetration and growth in key industry segments. We have recently deployed and implemented DELMIA solutions with Czech auto manufacturer Skoda, an affiliated company of the Volkswagen group, and with Wilhelm Karmann, an international supplier to the automotive industry. Our innovative solutions are reaching all areas within the aerospace domain not only with the major OEMs, but with elite aircraft manufacturers such as Hawker-Beechcraft.

The DELMIA Automation Platform is also expanding into diversified industry segments where the results are clearly showing significant savings. Dassault Systèmes DELMIA was the first PLM provider to introduce a Controls validation solution in our V5 platform 2 years ago. DELMIA continues to maintain the leading role by including the first set of Automation Solutions within the PLM Express portfolio serving the SMB markets.

We are achieving significant milestones in our strategy and planning to transform the industry with V6 PLM 2.0. The capabilities and open platform of V6 PLM 2.0 are being embraced since the introduction and availability announcement earlier this year. DELMIA has joined the other brands of Dassault Systèmes in their SOA strategy of V6 where any user can imagine, share, and experience products in the universal language of 3D.

With the revolution of the V6 Platform, we are expanding our reachable market and enhancing our existing customers’ capabilities. Dassault Systèmes Delmia Corp., together with our dynamic partners, remains committed to constant innovation helping our existing customers to maintain a competitive advantage.

Sincerely,

Philippe Charlès
CEO, Dassault Systèmes Delmia Corp.
Dassault Systèmes Unveils PLM 2.0 on V6 Platform

First customers experiencing value of PLM Online for all with V6

Dassault Systèmes (DS) recently announced PLM 2.0 and its new V6 platform. PLM 2.0—PLM online for all—is a 3D online environment for everybody to experience products virtually where all user interactions generate Intellectual Property (IP). V6 is DS’s next generation platform for PLM 2.0.

"PLM 2.0 is to PLM what Web 2.0 is to the Web, harnessing collective intelligence from online communities. Any user can imagine, share, and experience products in the universal language of 3D. PLM 2.0 brings knowledge, from idea to product experience, to life. It merges the real and virtual in an immersive, lifelike experience," explains Bernard Charlès, president and CEO, Dassault Systèmes. "With V6, IP can be put to use immediately via 'networked' PLM solutions, so that anybody can 'test drive' a virtual product in the real world."

Said Dominique Florack, senior executive vice president, Products—R&D, Dassault Systèmes, "V6 delivers a single PLM platform for all PLM business processes, available to anybody anywhere, spanning engineering groups, businesses, and end users. V6 also gives intelligent access to all IP no matter the data source location, with MatrixOne technology built into the foundation. V6 is an open platform, embracing SOA standards and is rapid to deploy."

V6 values match customers’ requirements for their PLM strategies:

■ Single PLM platform for IP management: V6 supports modeling applications spanning all engineering disciplines and Collaborative Business Processes (CBP) including end user experiences through the product lifecycle.

■ Global collaborative innovation: PLM’s future is about expanded collaboration amongst all players, so that they can bring together Requirements, Functional, Logical, and Physical (RFLP) definitions of the product.

■ Online creation and collaboration: V6 is enabled for real time, concurrent work, across multiple locations via a simple Web connection. This is critical for companies implementing global engineering and manufacturing strategies.

■ Lifelike experience: V6's interface is intuitive—any user can easily find and search information, communicate, collaborate, and experience products in 3D online—mimicking what happens in the real world.

■ Ready-to-use PLM business processes: V6 unifies engineering and enterprise processes including program and compliance management and sourcing. V6 Industry Accelerators provide industry-specific PLM best practices and capabilities, to speed deployment and cut time to ROI.

■ Lower cost of ownership: Quick ramp-up time via a single server and database for all applications dramatically reduces cost of ownership and spurs efficient collaboration. SOA standards compliance allows easy integration with existing systems and modeling of business processes with no programming skills, supporting an adaptable business model.

DS’s V6 PLM solutions (DELMIA, CATIA, SIMULIA, ENOVIA) scheduled for general availability in May 2008.

Information about Dassault Systèmes V6 at: www.3ds.com/V6
PLM 2.0 – PLM online for all, is a 3D online environment for everybody to experience products virtually where all user interactions generate Intellectual Property. V6 is Dassault Systèmes’ next generation platform for PLM 2.0. For more information, please visit www.3ds.com.

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Rockwell Automation and Dassault Systèmes to Integrate the Digital Factory and Plant Operations for a Virtual Design & Production Environment

Joint solution will redefine how the mechanical engineer and the control engineer collaborate to reduce time-to-market and drive down costs

Manufacturing operations will be commissioned faster with optimal production performance.

DELMIA Automation’s Virtual Commissioning shown

The interplay between design and manufacturing will help increase efficiencies in the design process and ultimately minimize the time between design and delivery. Engineers involved in all stages of design will have the ability to make adjustments in real-time, incorporating, preserving, and augmenting knowledge rapidly across various stages of the production lifecycle.

Information about Rockwell Automation at: www.rockwellautomation.com
DELMIA digital manufacturing solutions will enable ITER to optimize its construction, operation, and maintenance processes. It will thereby reduce downtime and lifetime cost of the facility in addition to increasing operation safety by ensuring that construction, operation, and shutdown sequences are fully compliant with the regulatory and safety constraints. By deploying the complete DS I TER, the joint international research and development project that aims to demonstrate the feasibility of fusion power, is introducing Dassault Systèmes’ DELMIA digital manufacturing solutions as its process analysis platform. As the project progresses toward construction and building of the reactor in Cadarache in southern France, process definition and validation are becoming more and more important and will be addressed using DELMIA solutions. ITER already uses CATIA and ENOVIA as its PLM Engineering platform.

Research is in progress to determine how and if reactor walls can be designed to last long enough to make a commercial power plant economically viable in the presence of the intense neutron flux. Damage can be caused by high energy neutrons knocking atoms out of their normal position in the crystal lattice.

“At this stage of the project, we are introducing DELMIA digital manufacturing solutions to simulate our most critical processes, starting from concept validation of the fusion reactor and extending to its construction, operations, and maintenance,” explains Eric Martin, head of design office, ITER. “DELMIA’s process planning, assembly, robotic simulations, and Human task solutions, as well as automatic path planning solutions from our partner KINEO CAM, provide a unique capability to help ITER solve the tremendous challenge of this complex facility,” says Bruno Latchague, executive vice president development and support, Industry Solutions, Dassault Systèmes. “This is another step in extending our collaboration with ITER into its manufacturing and operations planning.”
New ARC White Paper on DELMIA Automation
Study highlights technology application to gain competitive advantage in product launch time

The ARC Advisory Group, a leading research and advisory firm in manufacturing and supply chain solutions, recently published a new white paper titled “Discrete Manufacturers Driving Results with DELMIA V5 Automation Platform.” This 16-page study provides details on the increasingly competitive role digital manufacturing plays, with a technology overview, DELMIA Automation product specifics, customer implementations, and insightful conclusions.

The ARC White paper further illustrates the advantages of DELMIA Automation and how it significantly reduces product launch time by identifying control logic errors well before implementation on the factory floor. The ability to test the actual controls (PLC and HMI) against a Virtual Factory months before anything is built, not only reduces development time but also reduces the risk and cost involved in a production launch.

It also reveals how next generation digital manufacturing tools can enable manufacturing engineers to efficiently design and validate systems by identifying control logic errors well before the product launches and production begins, allowing engineers to review several “what if” scenarios. It also identifies how discrete manufacturers and major OEMs can improve results with this digital manufacturing technology, and gives an example of one major OEM that is already gaining a competitive advantage in using this technology for Virtual Commissioning.

“The DELMIA Automation Platform represents a major transformation enabling manufacturers to merge virtual models of production equipment with automation and controls. This allows for complete validation of all controls logic and HMI (human machine interface) functionality,” said Jim Cabe, vice president Consulting, ARC Advisory Group.

“This level of manufacturing process design and execution capability will help manufacturers compete in the intensely competitive global environment and execute ‘flawless’ launches.”

Moreover, in the paper, readers will find details on the depiction of the emergence and adoption of next generation digital manufacturing tools and how the tools are enabling manufacturing engineers to efficiently design and validate lean, agile, and intelligent systems before production begins.

It states that “the Dassault Systèmes’ DELMIA V5 Platform represents a best-in-class digital manufacturing solution set for manufacturers and offers an integrated suite of tools that provide manufacturing process design, tool and fixture design, and factory and production system design through powerful 3D visualization and virtual simulation.” It also mentions how the recent advance of the addition of the DELMIA Automation Platform represents a major transformation enabling manufacturers to design, validate, and commission their production equipment.

To find out more on how DELMIA Automation can help your company gain a competitive advantage and to receive a copy of the paper, contact DELMIA at 800-382-3199 or register to download at: www.plmv5.com/delmia_automation.

ABOUT ARC ADVISORY GROUP
Founded in 1986, ARC Advisory Group has grown to become the #1 leader in manufacturing logistics, and supply chain solutions. For the complex business issues facing organizations today, their analysts have the industry knowledge and first-hand experience to help their clients find the best answers. ARC serves many fortune 1,000 companies and has over 70 professionals worldwide servicing a multitude of business issues, technologies, and vertical industries. Their offices are located in the U.S., U.K., Germany, Japan, India, and China.

Information about ARC at: www.ARCweb.com
Recently, the AberdeenGroup, a leading provider of fact-based research focused on the global technology-driven value chain, published a report on manufacturing planning and digitalization.

The report titled, “Digital Manufacturing Planning: Concurrent Development of Product and Process” focuses on technology adoption initiatives. Although these initiatives can “reap game-changing benefits,” it states, “digitalization of the manufacturing planning process isn’t typically atop of the list.” The writer is quick to point out that it’s a phase with many activities—from generating a manufacturing bill of materials to laying out facilities to creating work instructions to programming robotics—that can be dramatically automated and simulated.

So, how are different manufacturers tackling the problem? According findings from this study, almost all manufacturers are focused on the same strategies to improve their manufacturing planning efforts, yet there is a vast difference in performance. It reveals that the “Best-in-Class” are executing the exact same strategies as the slow-moving group it calls the “Laggards” by employing radically different process activities, roles, management of knowledge, and deployment of technologies.

The AberdeenGroup report further delves into the research of digital manufacturing planning by outlining progress the “Best-in-Class” are making over those outside of this group.

Some highlights include their Five Compelling Facts:

1. The Best-in-Class are twice as likely as the Laggards to hit their deadlines by leveraging engineering 3D data to create work instructions and simulate robotics programming.
2. The Best-in-Class hit their production kick-off deadline 93% of the time by using engineering 3D data to create work instructions and simulate robotics programming.
3. The Best-in-Class hit their production kick-off quality targets 90% of the time by simulating facilities operations and robotics operations.
4. The Best-in-Class hit their manufacturing cost targets 90% of the time by finding and reusing best practice work instructions.


AberdeenGroup Creates Benchmark Report on Digital Manufacturing Planning
Study highlights benefits tied to “Best-in-class”
PLM Express
Solutions to meet the needs of small to medium-sized manufacturers

All manufacturers, regardless of size, face tremendous pressure. You must be flexible, improve quality, reduce costs, control investments—and speed time-to-market.

Product Lifecycle Management (PLM) solutions have evolved to aid organizations by achieving these shared business objectives. But, these solutions are often seen as too complex and time-consuming to deploy. DELMIA PLM Express, a complete set of digital manufacturing solutions from Dassault Systèmes, overcomes these misconceptions.

Delivered in five role-based domains, DELMIA PLM Express allows small and medium-sized manufacturers to take the first steps toward PLM. You will immediately reduce deployment time and improve your return on investment—critical efficiencies for a business of any size.

“PLM is an excellent solution to help manufacturers become more competitive,” said Philippe Charlès, CEO of Dassault Systèmes Delmia Corp. “Companies that invest in digital manufacturing for PLM can expect faster time-to-market, fewer quality problems, and lower start-up costs. Many smaller suppliers realize this value, but do not have the need to deploy a full PLM strategy at that level. DELMIA PLM Express enables these companies with the right set of PLM technologies to better focus on their targeted pain areas, to energize the supply chain and contribute to higher business value.”

Information about Dassault Systèmes’ DELMIA PLM Express at:
www.plmv5.com/delmiaplmexpress
Lockheed Martin, NASA Build Closer Engineering Ties Using DELMIA Human to Simulate Orion Mock-up

In a new government-industry collaboration, ‘soft’ and ‘hard’ crew codable mock-ups speed developments for training astronauts

Orion is a quantum advance over the Apollo space capsules that took the first humans to the moon. Three times the size of Apollo, Orion will:

■ Support up to six crew members on missions to the International Space Station.
■ Carry up to four astronauts to and from the moon.
■ Carry crewed missions to Mars and beyond.

The digital simulation is being built in Littleton, Colorado, by Chris Delnero, an LMSSC senior mechanical engineer. The simulation is to speed the development of the life-like “high fidelity” JSC physical mock-up. The Littleton simulation is also intended to cut Orion development costs by working out refinements digitally rather than with carpentry.

Delnero’s task is to come up with a technical basis and first-cut analyses for crew arrangement, crew spacing, and seat design. The simulation also helps crew trainees and NASA evaluate the design of the control systems and ensure crew members can reach the consoles. With as many as 11 crew member manikins, his simulations include things like exercise space, access to crew stowage, and getting in and out.

These simulations foster and clarify discussions among LMSSC and NASA engineers and the astronauts. In turn, these help avoid the need for repeated modifications and iterations and rebuilds of the physical mock-up in Houston.

“Prior to using DELMIA, the analyses of something this complex would have taken several weeks,” one engineering manager observed. “Analyses are now turned around in days.” LMSSC also uses DELMIA Human for ergonomics and STEP Core interface to...
The simulations and analyses also include access to spacecraft modules that require in-flight maintenance, such as life-support, as well as how to work around anything that might be blocking an astronaut’s access to any component. Hence the initial focus on human factors such as touch, feel, shapes, and spaces.

“Manikins of any size can be created and the analyses done in a matter of minutes,” Delnero reported. Delnero also modified the manikins in the DELMIA DPM and Human Complete packages to represent astronauts wearing bulky space suits and helmets, which will be required for some missions. Dynamic simulations, using animated manikins for the pilot and mission commander, are planned for later phases.

Thanks to the DELMIA simulations, Delnero said, “a day or two of work with Littleton’s ‘soft’ [digital] mock-up was the equivalent of several weeks of work on the physical mock-up. That’s a huge gain, orders of magnitude.”

On a larger scale, Lockheed Martin is striving to make Orion a model program in a new process of government-industry collaboration.

In spacecraft design, demands for volume, weight, and power have a tendency to rise exponentially, engineers pointed out. If a component or system is to be added, something else has to be set aside. The impacts on the crew and the mission must be considered carefully and in exhaustive detail. Simulations answer even the toughest of these questions.

The digital work consists of modeling the command module and simulating the astronauts and their tasks. In the initial phase of Orion development, “We are asking what is the best way to define the astronaut’s interactions with the controls of Orion,” said Delnero.

This is being done with three basic types of conceptual studies:

- Human factors analyses to ensure the astronauts’ tasks can be done given Orion’s dimensional constraints—that controls can be reached and displays seen.
- “What-if” studies answer questions about the impact of any decision that adds weight, requires more volume, or increases on-board electrical power consumption.
- Trade studies and analyses that quantify the engineers’ options.

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In its Orion program, LMSSC management is determined to build a cooperative and mutually supportive environment with NASA—and avoid the adversarial relationships of some past programs.

Speedy simulations and the ceaseless efforts of Lockheed Martin’s talented and innovative people contribute to that every day.

Information about Lockheed Martin at: www.lockheedmartin.com
Information about NASA and Orion at: www.nasa.gov/orion

NASA’s Orion crew exploratory vehicle in orbit around the Moon with Earth at lower left. Image courtesy of Lockheed Martin.
performed its own study by using DELMIA Quest to analyze throughput of the entire system, helping the company identify where bottlenecks were occurring in the 54-robot line. Trompeter Enterprises was contacted to improve throughput by adding accumulating conveyors into a part of the line affecting six robots.

"To accomplish this task," said Trompeter, "we uploaded all the existing programs into the DELMIA robotic solution and then verified each of the existing programs to check for interferences.

The company then re-designed the system, debugged the robots, and did the offline programming. Programs were uploaded and the line was ready to handle the new conveyors and eliminate the throughput issue. Without simulation, problem-solving would have stopped production for hours as the robots were re-programmed to handle the new configuration.

Trompeter Enterprises is part of the Automation Welding Alliance (AWA), a consortium of five companies formed to be a "one-stop" resource for automation system programming/debugging, welding, panel build, simulations, design and training for pressroom or welding and assembly manufacturing.

Information about Trompeter Enterprises at: www.trompeterenterprises.com

After the physical system build of a recent automated line, Trompeter was able to do a side-by-side comparison of virtual versus reality with the match between the two being almost perfect.

Trompeter Enterprises (Sterling Heights, Michigan) specializes in the development of automated robotic simulations, providing customers with the ability to evaluate and validate all areas of its processes before design and/or build. Said Matt Trompeter, president of the company, "Without simulation, companies can incur late cycle changes that increase exponentially as you get closer to manufacturing. Through use of the DELMIA Robotic solution, we can create 3D simulations to evaluate designs and processes before manufacturing and assembly. We can also run throughput analysis and correct ergonomic and safety issues before they occur."

The DELMIA robotic solution provides simulation for modeling and offline programming of automated workcells. The spot welding capability offers tools to support both traditional and fixed TCP spot welding applications along with a fully functional tooling interface for the construction and simulation of tooling and fixture device clamps. Collision-free robot trajectories are automatically determined, and numerous optimization features used to reduce process cycle times.

“We work with a number of automakers as well as Tier suppliers who design and install automated assembly systems for the OEMs,” said Trompeter. "Without simulations to validate and improve system designs prior to production, it would take months to install a new system and our customers could never meet their delivery schedules. By verifying everything in a virtual world, we get equipment up and running in time frames that don’t adversely impact production."

On a recent project, the company was able to validate a newly automated welding and assembly workcell. Previously relying upon eight operators, the new system was designed to include ten robots and only two operators. With the DELMIA solution, Trompeter identified potential tooling collisions or reachability issues, driving changes that improved the system design while still in a virtual mode. Additionally, once the virtual simulation was completed, Trompeter could reference the data for future analysis and create "what if" scenarios at minimal cost with no downtime.

The company is now working on updating an existing line for an OEM. The automaker performed its own study by using DELMIA Quest to analyze throughput of the entire system, helping the company identify where bottlenecks were occurring in the 54-robot line. Trompeter Enterprises was contacted to improve throughput by adding accumulating conveyors into a part of the line affecting six robots.

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Driven to Succeed

“Work proceeds faster and more smoothly”

Collaborative concurrent engineering at Bentley Motors produces design-to-manufacturing efficiency and the benefits of 3D communication throughout the enterprise.

Objects of Desire

With a heritage covering almost a century, Bentley Motors is among the world’s most iconic brands. Since its ownership by Volkswagen, the company has experienced renaissance and the launch of several cars that are true objects of desire.

The heady mixture of speed and luxury combine in the Continental and Arnage ranges to suit the world’s most discerning drivers. From Bentley’s Crewe, UK plant the company produces limited numbers of hand-finished cars that incorporate the famous leather and wood craftsmanship that typify the brand.

Bentley Motors has a strong PLM (Product Lifecycle Management) strategy evolved to match the company’s 21st century needs. Derek Harrison, Bentley’s I.S senior manager - Product Development Systems, described the system, “Bentley’s PLM deployment is based on Dassault Systèmes V5 technology incorporating DELMIA for assembly and planning management. Design data is managed within ENOVIA enabling enterprise wide data access. Currently we have 407 CATIA and 30 DELMIA users at Bentley and we are expanding the use of 3D across our business.”

“The ability to create, use and share 3D design data in non-design situations allows us to work both collaboratively and concurrently. Because DELMIA sits between our design and ERP technologies it provides the ‘how’ to their ‘what’ and ‘when’.”

Planned Acceleration

John Unsworth, the company’s CAD strategy manager commented, “Using DELMIA we can see designs in a manufacturing context and visualise how components can be assembled. Virtual data can be analysed in great detail to define the most efficient production process methodology. Since this information is available during the design evolution process, even before designs are completed, departments that previously worked in series (having to wait for others to complete their work) can now work in parallel. Benefits derive from designers and manufacturing engineers sharing the same visual data and having visibility of each other’s work as it progresses. Through this technique design for manufacture has improved considerably because designs are optimised for manufacture very early in the design process, even at the conceptual stage. One example of this was in the conceptual design for an instrument panel, which was modified, before mainstream design engineering was initiated. The Bentley process and systems architecture allows Manufacturing Engineers to access and comment on the proposed design, from an assembly perspective, very early in its lifecycle.”

Derek Harrison added, “Line side planning procedures have been greatly enhanced through DELMIA’s production simulation features. Because these allow us to link with
the engineering bill of materials (BOM) and assembly specifics to the virtual build it is possible to tune the process sequence for maximum efficiency. Using skeleton data and applying it to future assembly plans at Crewe we are able to plan from existing knowledge and add more detail as it is generated.”

**Fast and Smooth**

Having made an investment in DELMIA as part of its DS based PLM infrastructure, Bentley Motors is able to bring further advanced production technology into other parts of its business at low cost. Bentley is considering options for enhancing its design in context utilisation. This could include rolling out 3D DELMIA manufacturing data to the supply chain to improve manufacturability of designs, the after sales network and providing imagery for marketing purposes.

The company also uses DELMIA to enhance its virtual build, improve processes and develop staff training. Derek Harrison explained, “The earlier we can show assembly procedures to line side engineers the better they will be able to understand and learn them. Using DELMIA we are able to develop, refine and demonstrate build sequences virtually, allowing assembly engineers to visualise their work long before the parts are actually available.”

“Bentley’s are sophisticated, complex cars that represent a high point in automotive engineering. The frontal zone packaging for example is particularly refined and requires a great deal of planning and training to manufacture. By showing animated assembly sequences of real design geometry, associate training is greatly enhanced. This means that those involved are prepared and fully up to speed by the time assembly commences. Any difficulties can be resolved well in advance so that work proceeds faster and more smoothly because assembly methodology has been made available in context through DELMIA V5.”

**Top Gear**

Derek Harrison summarised the benefits of the Bentley DELMIA deployment. “The Dassault Systemes technology that we have deployed delivers the capability for concurrent, collaborative engineering. This facility provides previously separated design, engineering and planning facilities with the means of working together using the common language of 3D. Designers are able to take much more account of manufacturability while manufacturing engineers, having early access to design data, can influence designs and commence training to make their work more efficient. This allows manufacturing engineers to develop more robust, proven assembly procedures to enhance the process further. The result is increased efficiency, assembly time reduction and better communications within and beyond the enterprise.”

Bentley Motors has a glorious past and now with DELMIA it is set for great future reaping the business benefits that 3D planning and simulation can offer.

Information about Delmia and Bentley at:
www.3ds.com
www.bentleymotors.com
Assembly Support for Audi AG

How the “cockpit” gets into the car

Having an assembly-friendly design for auto components at the start of production (SOP) is a crucial prerequisite for ensuring that production meets its goals for cost, quantity and quality. DELMIA Process Engineer and DELMIA DPM Assembly planning tools are an essential part of this process. Now the entire Volkswagen Group, of which Audi is a very high-profile part, is using DELMIA software in its assembly departments.

Realistic planning

To address such a need, Audi has been working since the year 2000 on “virtual assembly” using planning tools from DELMIA, particularly the DELMIA Process Engineer and DELMIA DPM Assembly applications. DELMIA Process Engineer’s functionalities (which essentially allow structured simulation for production and process concepts) have become an integral part of Audi’s planning methodology. Formerly, it was a long-standing practice throughout the automotive industry that production planning for new models would be based on their predecessors. Companies could never exactly predict how changes—for instance, a new lighting concept or changes to the “cockpit”—would affect work rhythms, cycle times and costs. It was a matter of waiting till the first new models rolled off the assembly line.

Today, DELMIA Process Engineer gives manufactures the ability to work on the planning process while, for example, monitoring production cycle times, which represent a significant portion of the vehicle assembly process. Consequently, they can plan for the projected target objectives. The current Audi A3 model was the first project in which the company employed DELMIA Process Engineer’s planning methodology. Therefore, it was the first time it was possible to monitor cycle times during the planning process. Utilizing DELMIA Process Engineer made an effective contribution to maintaining the projected production rates even before SOP. “We have greater transparency now,” Pauleser says, citing a significant advantage. “Thanks to the tools we have at our disposal, we can plan much more accurately how long it will take to assemble one car.”
AUTOMOTIVE GERMANY

3D visualization for parts and assembly paths

Along with DELMIA Process Engineer, Audi now utilizes DPM Assembly for planning the assembly of all its vehicles. The tool generates 3D images of assembly components, groups, and resources. On this basis the company works deeply with Dassault Systemes®, where engineers can work with uniform data formats, from developing and constructing assembly components to simulating assembly processes. For example, it can perform usability analyses for individual components. Installing the "cockpit" can often present a significant challenge for developers, planners, and manufacturers, because this element tends to become more complex as more, newer functionalities are added from one model to the next. If engineers don’t determine beforehand whether the installation paths will really work, the SOP might coincide with some problems, which would in turn mean costly corrections.

DELMIA DPM Assembly’s 3D simulations of a car’s geometry allow it to be moved into place without collisions, even under certain restrictions. For that reason Audi has incorporated DPM Path Planner into its virtual product and process assurance, which is now part of all its vehicle projects. In this institutionalized set of process steps, employees from Development, the Pre-series Center, Assembly Planning and Production discuss the results of feasibility studies and derive optimizations. This ensures that assembly issues and concerns will be taken into account from the start of a new development project.

Audi’s people now want to take things a step further by implementing Kineo’s DELMIA DPM Path Planner. Part of the DELMIA brand product portfolio, this tool builds on DPM Assembly and supports the assembly planner by generating collision-free paths. Kineo CAM, headquartered in France, is the worldwide leader in collision-free path planning technologies. Using 3D data for the body, components and handling tools, the Path Planner calculates which paths and series of motions will allow a "cockpit", for example, to be moved inside and positioned without collisions or other obstructions. Moreover, assembly and disassembly can be simulated using the product. Even experienced assembly planners often need many hours to manually determine collision-free assembly paths and motions. Over a wide range of test scenarios, Audi’s engineers and planners tested how much time different path planners needed to calculate and propose an installation path. Kineo’s DELMIA DPM Path Planner—meeting the benchmark—required only 2.5 minutes for the "cockpit", a process which would have required several hours if done manually.

Refining planning opportunities

Pauliser is upbeat about the possibilities. “We plan to implement DELMIA’s Robotics and Human tools in the future,” he says, “to complement DPM Assembly and DPM Path Planner, so that we can simulate robots and people in 3D.” Additionally, The DELMIA Automatic Line Balancing (ALB) tool is slated for implementation. ALB will be used to analyze and evaluate different variations of assembly line models. This allows planners to take any existing structural restrictions into account that might deviate from an ideal layout. Given any changes to cycle times and planning, the tool shows how the position of material supplies and production space will shift.
How the seat gets into the car: DELMIA can simulate the assembly and disassembly of components, helping users find the best method.

Enhanced alignment between the virtual assembly world and the real world is helping to refine planning opportunities. The results from calculations and simulations are depicting the actual process with greater detail than ever before, making it transparent and easier to plan with exactitude. Skoda, another brand within the Volkswagen Group, has enjoyed outstanding results through implementation of the Automatic Line Balancing tool and Kineo’s collision-free Path Planner.

These are all individual projects that fall under the umbrella of Volkswagen AG’s companywide “Digital Factory” project. The goal of this corporate strategy is to achieve the complete digital simulation of all products, processes and resources. However, the challenges associated with the project are anything but trivial, particularly given the size of the company and the ever-more complicated product and manufacturing processes. It will be necessary to integrate existing IT structures at facilities around the world, as well as highly specialized software solutions for individual departments and new software tools and approaches. Nevertheless, the group is diligently pursuing its strategy for the future: companywide uniform and universal software support, from planning phase to construction and simulation, from production to the release of entire product lines. DELMIA is working closely with Volkswagen AG to successfully support its strategy, based on the appropriate planning tools.

Information about Audi at: www.audi.com
Integration scenarios

“It hasn’t been the most productive of situations,” states Erich Großmann, manager of PLM Services at CENIT AG. Großmann has headed up the company’s DELMIA and SAP integration activities since 2006, and is responsible for all DELMIA2SAP projects and the development of a DELMIA-SAP connector. Moreover, he has spearheaded CENIT’s integration efforts for ENOVIA and SAP since 1998. The company’s goal for the DELMIA-SAP environment is to develop a standard interface product that builds on Dassault Systèmes’ component application architecture and can be tailored to specific user requirements.

The benefits of this kind of interface solution are obvious. The reduction of manual effort and duplicative data entry can substantially decrease the expense in time and eliminate sources of human error. SAP values such as cycle times (generally based on experience), estimates or REFA tables can be quickly and easily replaced by DELMIA values generated through very precise simulations. This ensures consistent, uninterrupted processes, in turn having a positive effect on quality and efficiency in the use of man-hours. Principally, there are two possible integration scenarios: The first is a batch integration scenario in which the data from DELMIA tools is unidirectionally transferred to the ERP system. The second is an interactive integration scenario with a bidirectional interface, which links DELMIA and SAP tools and allows either system to obtain certain data from the other. Thus each system can capitalize upon the other’s strengths.

Transferring DELMIA data to SAP

Two customers—both level-one suppliers to the Aerospace industry—have implemented the batch scenario to date, and both have applied it to production. Both customers faced the challenge of entering DELMIA data—some from their customers’ systems and some from their own DELMIA implementation—into the SAP system as quickly as possible, seeking to ensure productivity and on-time delivery.
The unidirectional solution already poses a certain challenge, in that serious problems can arise in this regard. Initially they stem not so much from the technical implementation as from the individuals involved in an integration project. "It sounds banal," Großmann says, "but one of the biggest challenges in this kind of integration environment is the widely varying terminology to which people have become accustomed. We’re dealing with people who work at the same company, but have invested their experience in different worlds and different thought structures. When someone from the DELMIA world talks about the 'revision of a part,' the SAP people don’t necessarily think of the same thing." Therefore, the next issue is to clarify the concepts and terminologies. Most people involved realize that integration is necessary, but at first ideas about exactly what should be integrated and how it should be achieved can be very different.

In addition to using different terminologies, each of the two systems has a particular structure. The differences in systems and terminologies must become part of the communication process between SAP and DELMIA experts in order to ensure a successful integration. "It’s also extremely important," stresses Großmann, "to understand the business process governing both systems. To decide which and how objects from one side should be displayed on the other, people need to know what information is required and where it’s processed as the means to achieve a certain goal." Even if the goal is a standard interface, the functionalities of a current interface product can only be defined in collaboration with users.

Mutual exchange of data

The second scenario, interactive integration, makes this collaboration particularly important for developers at CENIT and their partners at DELMIA. The scenario allows existing data from an SAP system, such as parts lists or routing plans from previous models, to be used as the basis for digital manufacturing planning with DELMIA tools. Its graphics tools are very useful in the context of detailed planning, determining production variants, and analysing logistical and ergonomic constellations. Subsequently, the results can be made available to the ERP system, thereby creating a cycle that removes the point of user entry as a factor. An interactive integration scenario is the best solution for companies having expertise in the development of manufacturing strategies and conducting their own product and manufacturing planning, namely OEMs and their chief suppliers.

The elegance and appeal of this scenario faces a number of issues that must be resolved in addition to the challenges of unidirectional integration. Even though geometric descriptions have no role to play in batch scenarios, here one must manage different data formats. As a result, the mapping of objects is more difficult. Additionally, it's necessary to analyze and define which data belongs on which side.

From pilot projects to market-ready

Significant components of the interactive DELMIA-SAP connector developed by CENIT using its experience with DELMIA2SAP projects, as well as integration projects for CATIA-SAP and ENOVIA-SAP, are currently being marketed. "Now we need concrete, real-world scenarios," says Großmann.
Design For Manufacturing with Dassault Systèmes

Specialists from Operations and Logistics at Nokia are spearheading the drive for Design for Manufacture (DFM) by acting as facilitators between Design and Manufacturing in order to help to cut costs and improve product quality. Currently, Nokia is using CATIA for mechanical design as well as detailed design in the product development process. DELMIA is used to make the most of this CATIA data in the assembly design process, while ENOVIA SmarTeam is used to manage the resultant data. There are 60 Nokia global servers in 18 sites in the world allowing numerous clients to work in the same shared environment. (Figure 1)

A group called the Mechanics Engineering Service supports this global engineering environment. They are composed of high-skilled engineers and support the mechanical team and related business groups by establishing and maintaining an environment for mechanical design and product lifecycle management.

Before DELMIA could be implemented

Before implementing DELMIA, Nokia had two major challenges. The first was to reduce the data conversion work required to send a CATIA part data to a process study tool. Nokia was finding that the assembly study necessitated for products containing many parts required a great deal of time for data conversion, leaving little room for “real” design activities. The second challenge was to improve the creation of work instructions, as well as the speed with which documents could be updated to reflect design change.

DELMIA implementation and utilization

In order to solve these issues, Nokia implemented DELMIA DPM Assembly at the beginning of 2006. Out of 50 licenses globally, 15 licenses are used in Asia Pacific.

“Our CATIA - ENOVIA SmarTeam combined environment was already in place,” explains Nokia Corporation Technology Platforms/Mechanical Engineering Services key account specialist, Ai-Pekka Pietila. “To improve the use of our CATIA data as well as our manufacturing process integration, we were able to re-use our CATIA native data, for customizability, automation, robotic and production line simulation in DELMIA.” As a result, DELMIA products are currently used for DFM assembly study, concept design of final assembly work, creation of assembly work processes and creation of work instructions. This means that CATIA 3D data can be now directly linked to assembly process information, making assembly study or document creation more efficient. An additional advantage is that DELMIA performs concept design of assembly work by adding assembly instructions in the form of annotations. These annotations are in the form of a 3D geometry snapshot and are automatically imported into an Excel document. (Figure 2)

When an assembly study is performed in DELMIA and the design of a part is changed as a result of the study, the updates now automatically reflect the changes to the linked document. Additionally, Nokia used CATIA for 3D design mainly for concept designs of products and detailed designs of parts before the DELMIA implementation took place. Therefore, no mechanical design taking into account the manufacturability of each part was conducted in CATIA.

Thanks to DELMIA, users can now perform assembly studies with CATIA 3D models, enabling mechanical design that takes into account the ease and speed of assembly, as well as minimizing the number of parts used.
Benefits from DELMIA use

No data conversion

As DELMIA can directly load CATIA data, data conversion has been totally eliminated.

Front loading of trouble shooting

One of the big advantages of DELMIA is that assembly studies can be conducted with a 3D model, allowing problems to be communicated to the design team at an early stage.

Since the mechanical design in CATIA is linked to DELMIA, if any design change is deemed necessary as a result of a DELMIA assembly study, the manufacturing engineers can contact the designers to discuss the changes.

Prior to the implementation of DELMIA there was no close collaboration between designer and their manufacturing colleagues. After the implementation, the 3D models became communication channels, allowing defects to be fixed quickly. In addition, Nokia has found that DELMIA enables digital mockup review, reducing the number of physical prototypes, leading to time and cost reduction.

"By better utilizing DELMIA, I think we will be able to largely reduce the creation of prototypes," comments Ari-Pekka Pietila.

Document creation, efficient update

In the past, when the design of a part was changed, all documents that related to assembly needed to be updated manually, changing each corresponding part. After implementing DELMIA, there is direct link between assembly related documents and 3D models, so this change is automatically reflected in the work instructions.

"We have no quantitative measured gains to compare before and after DELMIA, as it has been only eighteen months since the implementation. However, I strongly feel that we are heading in the right direction with the implementation of DELMIA products," comments Ari-Pekka Pietila.

Next Steps

Figure 3 shows the ultimate business flow at Nokia. Nokia is currently using CATIA for product design and DELMIA DPM Assembly for assembly design. Though the company also uses DELMIA Quest for production line simulation, its integration with other processes such as product design, process design, and equipment design is something Nokia is working toward.

The ultimate goal is to realize total digital manufacturing.

"By better utilizing DELMIA, I think we will be able to largely reduce the creation of prototypes," comments Ari-Pekka Pietila.

"We have no quantitative measured gains to compare before and after DELMIA, as it has been only eighteen months since the implementation. However, I strongly feel that we are heading in the right direction with the implementation of DELMIA products," comments Ari-Pekka Pietila.

About Nokia

Nokia Corporation is the world's largest mobile phone manufacturer. In 2005, Nokia mobile phones were sold in more than 130 countries, with net sales revenue at 34,2 billion euros and ranked as the 6th most valuable brand in the world. The company has R&D centers in 11 countries, deploys manufacturing sites in eight countries and manufactures more than 1.2 million mobile phones a day.

Information about Nokia at: www.nokia.co.jp
Combining Advanced Engineering Expertise with CATIA and DELMIA

Building on its core competence in automotive plant engineering, AES Co., Ltd. has set up overseas bases in Thailand, China, India, and the U.S. to provide specialized engineering services to leading automotive manufacturers. In 1992, the company adopted DELMIA DS IGRIP (then known as Deneb/IGRIP) to conduct industrial robot simulations. Katsuharu Tanaka, manager of the company's Digital Engineering Office and was among the earliest users of Deneb/IGRIP in Japan. AES also implemented DELMIA Quest (then called Deneb/Quest) to examine its manufacturing processes through process flow simulations. These solutions helped the company to start up many new plants and improve existing production lines. AES began using DELMIA Robotics Simulation in 2004.

Utilizing 3D Models and Robot Simulations in Key Processes

AES has been using CATIA and DELMIA extensively in its entire process flow, from factory planning to production ramp-up. For stamping and body-in-white processes, AES has used DELMIA software for everything from manufacturability and feasibility tests to simultaneous engineering, and basic and detailed design tasks, including robot applicability simulations.

“In a recent project for a Chinese auto manufacturer,” Katsuharu Tanaka explains, “AES strived to practice simultaneous engineering. The conceptual designs developed by AES were compared with the client’s 3D models, allowing some 80 to 100 design flaws to be identified within just two months. These flaws were then fed back to the designers so that they could make further refinements before the prototype was manufactured.”

In simulations designed to examine the applicability of robots to specific processes, AES directly imports 3D models created with CATIA into DELMIA Robotics, and evaluates possible spot welding sequences to help in the planning of the welding processes. When adapting an existing production line to new car models, these software tools are also employed to check whether the existing robots and welding guns are applicable to the new process.

To assure greater precision of the robots’ movements, it is critical to understand exactly how the robots move, so the jig designs can be optimized. Conducting simulations with DELMIA while designing jigs with CATIA allows any errors to be identified and corrected at the same time.

“That is the single most significant advantage of using DELMIA and CATIA V5 together, and no competing products can emulate them,” says Masahiko Nakazono, deputy manager of the AES Digital Engineering Office.

AES also carries out offline programming of robot paths using personal computers. Critical in this process are the actual measurements of the shop floor, including the relative positions of equipment, the shapes and sizes of obstacles, and so on. For offline programming tasks, AES uses Robotics and 3D laser scanning technology.
to create a digital model that is tightly correlated with the actual shop floor. When the process design is evaluated and optimized through these simulations, the results are converted into machine control programs and downloaded to each piece of equipment.

“I suspect few companies go the extra mile to create virtual models that mirror the actual objects as closely as ours,” says Tanaka.

Fewer Steps to Build Simulation Models, Greater Accuracy

AES has been able to significantly reduce the time and number of steps required for importing 3D models. This is the key reason AES decided to switch to DELMIA.

While DELMIA OS IGRP required all facility and work cell models to be built with IGRP; DELMIA Robotics allows 3D models generated with CATIA and other CAD tools to be imported. Model designers can then simply rearrange the imported models and add welding guns and other equipment as needed. This means that the modeling process can now be divided into smaller tasks and outsourced to partner firms. As a result, the total number of steps required to develop simulations has been reduced, along with time-to-production.

Furthermore, the accuracy of the checks and evaluations performed during the early planning stage and after the completion of jig designs has improved significantly.

“The intricate timing for lock-and-release among multiple robots is made clearly visible, and it takes only a short while to check and verify the timing even when a large number of robots are involved,” Nakazono adds.

In the run-up to the start of production the time it takes to create design data and build production facilities has shrunk dramatically. "Compared with five years ago, the speed at which we can complete facility engineering and design has increased by a factor of at least five," Tanaka claims. "This is partly due to the improved skills of our engineers, but the efficiency and productivity gains that the CATIA and DELMIA tools have given us are equally important.”

Regarding the effects of CATIA and DELMIA on the quality of engineering services at AES, Nakazono has this to say: “Mechanical engineers picture 3D images in their heads, but conventionally these had to be rendered in 2D as drawings on paper and on 2D CAD systems. With CATIA and DELMIA, the images can be directly visualized in 3D, which facilitates design and engineering communications and vastly improves the quality of engineering.”

Prospects for the Future

To reinforce its digital engineering capabilities, AES is now contemplating the adoption of DELMIA Human. This will help AES build virtual factory models that reflect work conditions more accurately than ever before, right down to the number of workers, their movements, and even their work efficiency. This ergonomic modeling solution will be invaluable in designing streamlined production lines.

Pursuing a global business strategy, AES recently entered into an alliance with AAPICO, a Thai manufacturer of auto parts and jigs, and formed a consortium with other partners known as SAMA to initiate new services encompassing production engineering and parts delivery. Taking full advantage of its freedom from ties with specific automotive groups, AES expects to continue to enhance its engineering skills and expertise with CATIA and DELMIA to remain a successful global player.
A group of partners, a development focal point

This venture into more ambitious markets is made possible by IT, but it is also due to the creation of a group of reliable industrial partners who know each other perfectly and who share the same values. Each group member is an expert in its field, from specialist machinery to automation and fabrication through to assembly. In preliminary projects with customers.
assembly line for all customer assemblies as well as the maintenance handbook.

The DELMIA Assembly tool enables automatic modification of documents compiled during the modification of the component or means of production. It also enables work instructions to be provided to the 3D graphic electronic workstations in the 3DVIA (Dassault Systems/Microsoft) open format. With Dassault Systems integrated solutions, the smallest questions can be answered and modifications validated so the customer knows their final strategy is the best one.

**Considerable gains**

Thierry Docquier is convinced that his strategy is a winner. He said, “I am convinced that if the French industry fully exploited the benefits of the concept of an integrated digital network assembly line for all customer assemblies as well as the maintenance handbook. The DELMIA Assembly tool enables automatic modification of documents compiled during the modification of the component or means of production. It also enables work instructions to be provided to the 3D graphic electronic workstations in the 3DVIA (Dassault Systems/Microsoft) open format. With Dassault Systems integrated solutions, the smallest questions can be answered and modifications validated so the customer knows their final strategy is the best one.

**PLM is an asset**

Well equipped from his experience in various French companies, Thierry Docquier immediately understood that thinking, executing, and collaborating in 3D was the key to success: “I am convinced that if the French industry fully exploited the benefits of the concept of an integrated digital network in PLM, it would gain at least 30% in productivity and the competition presented by low-cost countries would no longer be a problem. The exploitation of the digital network can compete well with the low labor costs. Industrial knowledge remains crucial in France in many sectors. If I can get this message across, I will feel like I am sharing our vision and its benefits."

He continued: "Realistic 3D animation of the projects by DELMIA Assembly is also crucial in our relationship with our customers and is, I believe, the main asset that we have found in relation to the confidence and orders that this brings."

**Always innovating**

CADBAZ insists on always having the most powerful technology in order to be competitive. Its current setup with CATIA and DELMIA has been complemented by ENOVIA SmarTeam. The complexity of the projects that can be handled by the company now requires using a PDM that will permit research engineers to work together on sizeable projects. ENSAM in Châlon en Champagne, France, is participating in this project and is implementing a technology transfer. Dassault Systèmes is supporting this implementation on a technical level.

**Information about Cadbaz at:**

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Thierry Docquier, managing director
DELMIA Customer Conferences Provide Successful Venue for Industry Leaders
Event boasts the largest number of attendees with more than 2,040 worldwide

Attendance records were broken this year as more than 2,040 participants worldwide attended the annual DELMIA Customer Conferences. The conferences, held in the United States, Germany, and Japan, brought together leaders and users from various industries to expand their experiences in implementing PLM through the use of Dassault Systèmes’ DELMIA manufacturing simulation tools.

To start, featured presenter Philippe Charlès, CEO of Dassault Systèmes’ Delmia Corp., spoke at the North America conference. He highlighted the fact that DELMIA is positioned to meet today’s product development and manufacturing challenges. Following his presentation were high-level keynote addresses by executives at the top of their industry. Automotive keynote, Richard Woodhead, director, GME IS&S Manufacturing Engineering, General Motors, discussed his experiences in digital manufacturing at General Motors and how they leverage digital technologies in a global competitive environment. Tamio Ogata, staff engineer of production engineering, Honda Motor Company, Ltd., followed with a presentation on how Honda is bringing current production information into the DELMIA environment and mapping it to a new product.

The focus on product development continued at the European conference. Peter Schmitt, vice president sales – automotive, Dassault Systèmes Americas, opened the conference, followed by Bernard Charlès who gave his keynote address. There he was followed by other high-level industry executives. Rainer Eißrich, senior manager, in charge of digital production planning Mercedes car group at Daimler AG, presented on the topic of the digital factory at Mercedes-Benz Car Groups, which is a main lever for the implementation of efficiency increase, standardization and the advance in planning quality. In addition, Ari-Pekka Pietilä, account specialist, Nokia, spoke on systematically analyzing a product or product concept to ensure best manufacturability with Nokia’s manufacturing processes focusing on total cost and quality. Nokia is using CATIA and is implementing DELMIA as a process tool to bring 3D for other related areas with links.

At the Asia-Pacific Conference in Japan, industry leaders provided their insight on digital manufacturing. One was Masahiko Shimono, staff administrator, vehicle engineering office, strategic management BL, Honda Motor Co., Ltd., who presented on “The Realization of the Multi-Dimensions Manufacturing at Honda.” He discussed the deployment of a planned virtual factory concept and the correlations with Honda’s basic philosophy “human-centered factory.” Another tie-in with “Manufacturing in Motion” came about in a case study presented by Pei-Chao Chen, project manager, CMC Digital Factory, production engineering division, China Motor Corporation (CMC). The study revealed that CMC expended DELMIA Human on the CMC Digital Factory project. CMC needed to simplify the project and expedite the pace of the project.

The customer conferences provide a forum, including workshops and “How 2” sessions, for representatives of different industries to exchange ideas and information about the impact of digital manufacturing in product creation. Collectively, the Automotive, Aerospace, Electrical & Electronics, Fabrication & Assembly, Consumer Goods, Shipbuilding, and Academia were represented.

Dates and locations for the 2008 conferences are now available at: www.delmia-cc.com
Experience Manufacturing Excellence

October 7-8, 2008
Detroit, Michigan, USA
Detroit Marriott Renaissance Center

October 15-16, 2008
Stuttgart, Germany
SI Centrum

November 11-12, 2008
Yokohama, Japan
Pan Pacific
Yokohama Bay Hotel Tokyo

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For submission guidelines and event information, visit www.delmia-cc.com
The University of Salerno Benefits from the DELMIA Digital Factory

The University of Salerno is finding that the DELMIA digital factory (DF) is proving to be a very effective suite of tools in the analysis of production processes and the consequent improvement in system performance. The current focus of “Plant Design and Management Research Group” at the University is to employ DELMIA tools to successfully cope with different issues, such as plant organization, flux optimization, human work rationalization and process automation. The University has been pleasantly surprised at just how little effort and time has been required for the learning curve of using a digital model to:

- perform analyses,
- teach and test alternatives in a real manufacturing worldwide environment,
- get familiar with the user interface to customize.

Robots and devices, such as painting and welding gun libraries that are supplied with DELMIA software, have allowed the easy integration of digital factory tools. Prof. Alfredo Lambiase, head of the Research Group, explains: “Our students are usually introduced to real industrial environments, where they analyze possible conceptual mistakes, propose a solution and finally implement their solution within the digital manufacturing model to evaluate the possible performance improvements. DELMIA tools have helped us find more simple and agile methods for process simulation, so that now we are developing a complete Virtual Environment within the DELMIA infrastructure. Moreover, DELMIA flexibility is continuously tested by its application to a large variety of different industrial challenges.”

DELMIA simulates automotive assembly

In the automotive sector, the University has focused on work-floor analysis re-engineering of tasks in a digital mock-up of a production line. Although the principal objectives were line balancing and task ergonomic correction; workers’ tasks, their postures and walking paths, were also analyzed and completely re-engineered, leading to the subsequent rebalancing of the line.

The data exchange possibility with third party programs and the ability to execute C++ routines within the V5 environment has allowed the integration of new ergonomic indexes, developed by the University within DELMIA Human Task Analysis. “Our current challenge,” explains Prof. Lambiase, “is the expansion of DELMIA’s capabilities to encompass new Virtual Devices and/or cheaper peripherals. I am thinking of things like an optical tracksuite to map the real human motion onto virtual manikins.”

Integrated system of production

The Research Group’s pneumatic scale model of an integrated system of production allows the students to experiment with production planning techniques, stock in trade, buffers and PLC systems. The model was designed in a combination of the DELMIA DPM and Quest environments. Integration with the COMAU industrial robots on programmable axes enables the students to experiment with tasks and ideas in a real industrial scenario giving them the opportunity to study collision analysis and kinematic movement, both direct and inverse. Assembly tasks have been performed in order to evaluate collision. As a result of these process improvements, the students are able to also monitor the reduction of “dead time,” as well as evaluate cycle times.

Information about University of Salerno at: www.dimec.unisa.it
**EVENTS**

**AMERICAS**

- **2008 AACC Convention**  
  April 2-8, 2008  
  Philadelphia, PA  
  www.aacc.nche.edu

- **SAE World Congress**  
  April 14-17, 2008  
  Detroit, MI  
  www.sae.org/congress

- **COE 2008 Annual PLM Conference**  
  April 27-30, 2008  
  Orlando, FL  
  www.coe.org

- **2008 CSA Executive Conference**  
  May 1-3, 2008  
  Savannah, GA  
  www.coe.org/events/overview.html

- **Offshore Technology Conference (OTC)**  
  May 5-8, 2008  
  Houston, TX  
  www.otc.org

- **SAE Digital Human Modeling for Design and Engineering Conference**  
  June 17-19, 2008  
  Philadelphia, PA  
  www.sae.org/events/dhm

- **ASEE Annual Conference & Exposition**  
  June 24-25, 2008  
  Pittsburgh, PA  
  www.asee.org/conferences/annual2008/index.cfm

- **USA Conference**  
  June 25-27, 2008  
  Canada

- **Management Briefing Seminars (MBS)**  
  August 11-15, 2008  
  Traverse City, MI  
  www.mbsgroup.org/mbs2006/index.html

- **National Manufacturing Week**  
  September 22-25, 2008  
  Rosemont (Chicago), IL  
  www.nmw.org

- **Canadian Manufacturing Week**  
  September 23-25, 2008  
  Mississauga, ON - Canada  
  www.cmawe.com

- **COE 2008 Industry Workshop - Automotive**  
  October 15-16, 2008  
  Troy, MI  
  www.coe.org

**EUROPE**

- **Delmia Worldwide Customer Conference North America**  
  October 7-8, 2008  
  Detroit, MI  
  www.delmia.cc.com

- **COE 2008 Industry Workshop - Aerospace & Defense**  
  October 27-29, 2008  
  Wichita, KS  
  www.coe.org

- **Defense Manufacturing Conference (DMC)**  
  December 1-4, 2008  
  Orlando, FL  
  www.dmc2008.com

**ASIA**

- **The Japan International Welding Show 2008**  
  April 23-24, 2008  
  Tokyo, Japan  
  www.weldingshow.jp/english

- **2008 DS Korea PLM Executive Summit**  
  June 11, 2008  
  Seoul, Korea

- **2008 DS Korea PLM User Conference**  
  June 12, 2008  
  Seoul, Korea

- **Taimold 2008**  
  September 24-26, 2008  
  Guangzhou, China  

- **CHNEX 2008 - The 9th China International Machine Tool & Tools**  
  October 8-13, 2008  
  Beijing, China  
  www.saeextracts.org/exhibiton/exhibitionInfoReview.aspx?

- **International Conference IDMME - Virtual Concept**  
  October 13-15, 2008  
  Beijing, China  

- **The 7th China International Aviation and Aerospace Exhibition**  
  November 4-9, 2008  
  Zhuhai, Guangdong, China  
  www.airshow.com.cn/

- **Delmia Worldwide Customer Conference Asia Pacific**  
  November 11-12, 2008  
  Yokohama, Japan  
  www.delmia-cc.com
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