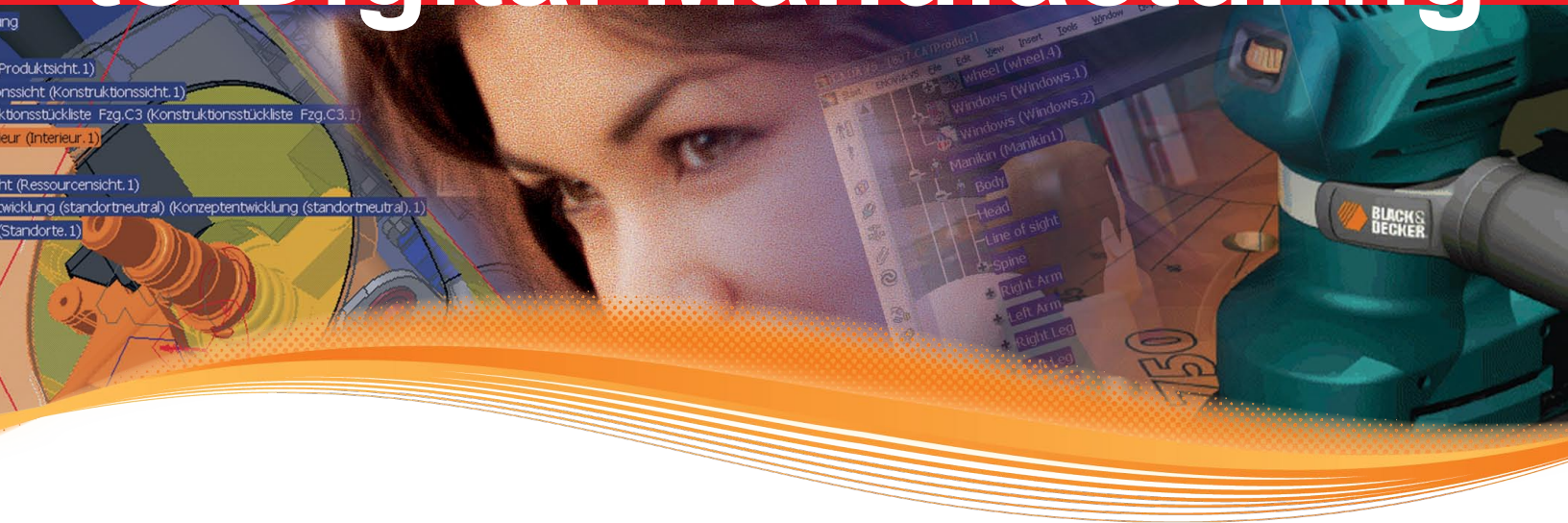


The PLM Approach to Digital Manufacturing





The Business Challenge of “Manufacturing Ready” for Maximum Profitability

As best of breed manufacturers digitize their design and engineering processes to meet the innovation challenge, they now face making their manufacturing operations equally competitive. Companies need to guarantee that their innovative new products are “manufacturing ready” before actually launching into production. In a highly competitive marketplace, companies are also challenged to further reduce time-to-market, while boosting product quality across variable volumes and maximize their returns on investments.

Ensuring this level of product manufacturability and profitability is, however, extremely difficult in a mainstream environment of expensive physical prototypes and delicate machinery. A production line itself can be a constant source of hold-ups, quality errors, and human performance constraints.

The ultimate goal, then, is to ensure that “100% manufacturing ready” becomes a standard design and engineering deliverable. The PLM (Product Lifecycle Management) approach to the entire design-manufacture-market strategy offers a radical solution to the quality, cost and time pressures of modern production applications and ensures a solid business model for any enterprise.

With PLM, digital products exist as rich information circulating in a highly collaborative work environment. Virtual design and engineering mockups can be used not just to craft a physical object, but to actually define, plan, and validate the way products are manufactured.

Empowering your company with digital manufacturing as part of an overall PLM strategy can revolutionize the product lifecycle by creating new value and innovation at each stage of the process.

When constant innovation is a survival strategy, digital manufacturing will accelerate design creativity and revolutionize production planning. Design and manufacturing will be able to collaborate

simultaneously in a concurrent engineering environment, allowing manufacturing engineers to be involved early in the design stage to ensure manufacturing readiness.

Dassault Systèmes offers a powerful technology, with metrics in place to help manufacturers address their most vital manufacturing needs, and provides a rich, collaborative environment for sharing and reusing relevant product information among all stakeholders in the process.

Key benefits of digital manufacturing for PLM

- Comprehensive process planning in the early design phase
- Validate and simulate production requirements
- Anticipate and remedy potential problems in the pipeline
- Train human operators and line staff more quickly and effectively
- Collaborative environment for concurrent design and manufacturing engineering
- Reuse of best practices and enterprise knowledge
- Reduce production costs
- Reduce overall time-to-market



Engineering Lean Digital Manufacturing with DELMIA Solutions

Dassault Systèmes' DELMIA software suite offers a complete solution to the "manufacturing ready" challenge in a PLM-enabled environment for manufacturing. As a key component of Dassault Systèmes' V5 PLM portfolio, with CATIA, ENOVIA and SIMULIA brands, DELMIA solutions deliver a digital manufacturing process environment to optimize production systems before moving to physical implementation, at the convenience of a desktop.

DELMIA solutions allow manufacturers in any industry to virtually define, plan, create, monitor and control all processes. From early process planning and assembly simulation to modeling welding lines, robot and cell programming to a complete definition of the production facility and equipment, DELMIA digital manufacturing solutions assist companies in achieving maximum production efficiency, lowering cost, improving quality and reducing time-to-market.

Like all Dassault Systèmes V5 PLM solutions, DELMIA leverages the proven benefits of treating the entire manufacturing process as a digital pipeline. A complete digital realization of the entire manufacturing environment, from process planning to shop floor implementation, allows manufacturing engineers to utilize the latest product design data to anticipate and optimize specific production processes and requirements. This makes it easier to define, plan and validate, well in advance of any physical implementation.

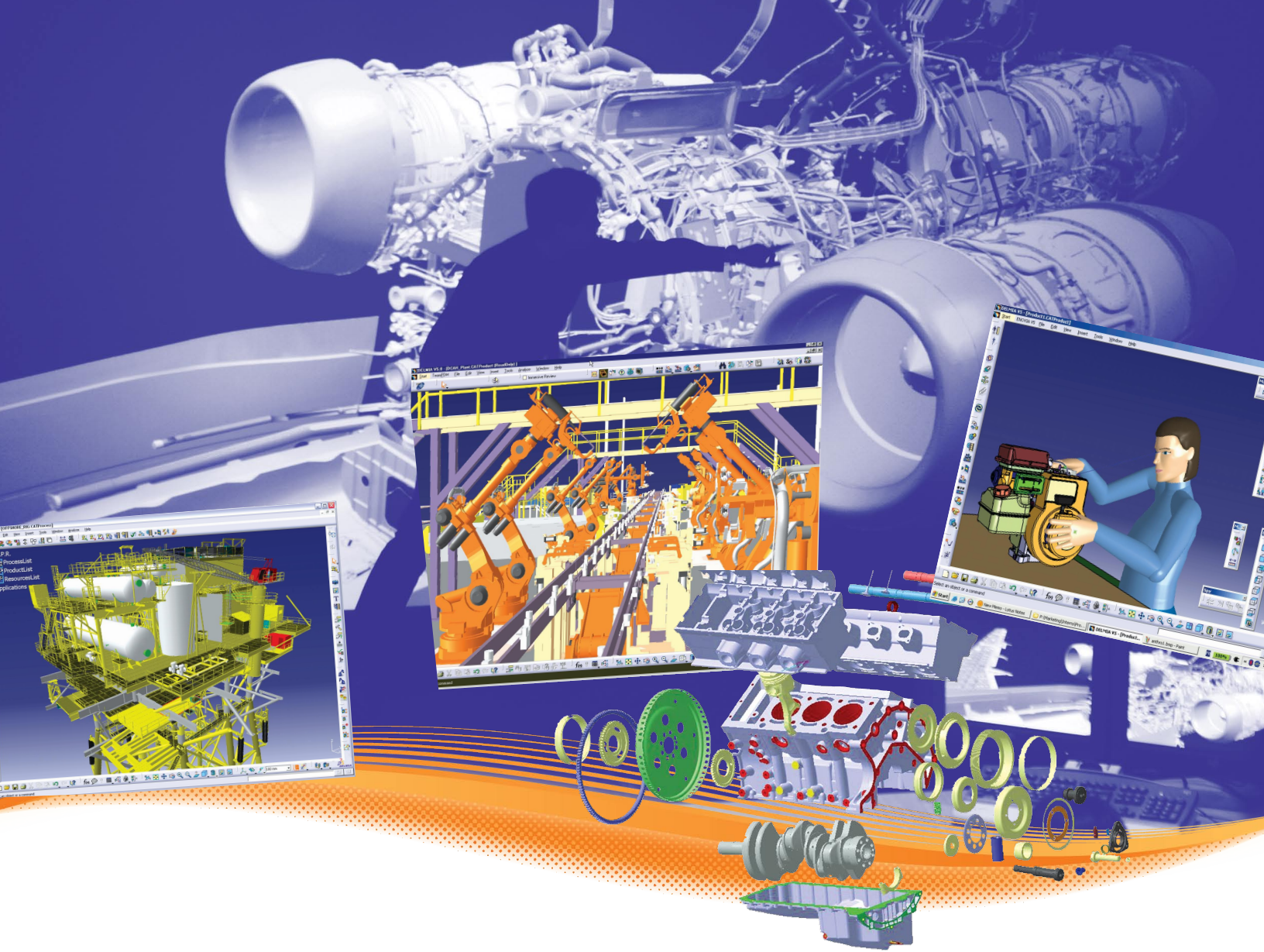
Manufacturing a product is a thousand times more information rich than the product itself. Information can be analyzed via a digital 3D interface to boost understanding and rapidly test alternative scenarios within the digital manufacturing environment. Production processes will not only run more efficiently, but more competitively in terms of product quality and time-to-market.

Digital manufacturing will empower your workforce to achieve greater innovation in design and engineering to assure the physical compatibility of materials and components in the final product without costly prototype building, and eliminate errors during actual production.

Independent analyses of the DELMIA digital manufacturing approach show that production costs can be systematically cut by up to 15%. It is realized that digital manufacturing is a required core technology for those companies seeking to establish a leadership position in the highly competitive worldwide manufacturing marketplace. It is an essential component of PLM and an enabling technology for any enterprise.

Seven key reasons to embrace digital manufacturing

- Provides a strategic planning tool to define and analyze in 3D the production processes early in the product development cycle
- Provides a concurrent view of all engineering disciplines and intelligence to all stakeholders throughout the production process
- Reduces time to product launch and time to volume
- Gain higher return on investment and increase product quality
- Collaborative planning environment for supplier integration
- Fosters standardization to reduce part variation
- Optimize workforce productivity in a safer working environment



Unique Solutions for Your Industry

DELMIA digital manufacturing meets all your needs

Automotive. Aerospace and defense. Fabrication and assembly. Electrical and electronic. Consumer goods. Shipbuilding. Process, power and petroleum, and building industry. No matter what the industry or the size of the company, DELMIA has a flexible offering to meet your individual manufacturing needs. Manufacturers can virtually define, plan, create, monitor and control all processes, from early process planning and assembly simulation to modeling welding lines, robot and cell programming, to a complete definition of the production facility and equipment.

Additionally, suppliers within various manufacturing industries, at all tier levels such as part suppliers, engineering firms, and others, benefit largely from DELMIA solutions that are detailed to meet their specific needs.

DELMIA digital manufacturing solutions offer two unique suites of applications to put the power to succeed in your hands.

The DELMIA PLM for manufacturing enables concurrent engineering from the conceptual phase of product and process design, through simulation and monitoring of manufacturing processes, to shop floor operations.

DELMIA Automation allows control engineers to design automation systems and describe the PLC program in a logic modeler language, then validate the logic against the 3D model of the cell, machine or an entire line.

Working in parallel, these two approaches simulate total production systems in a completely virtual environment to explore and optimize processes for effective manufacturing operations.



Create a Virtual Workforce

DELMIA Human modeling for manufacturing

DELMIA Human Factors for PLM offers a fully featured human modeling bundle to define, validate, and optimize the human “workers” in the manufacturing environment. Users can create and manipulate advanced, user-defined digital human manikins in a DELMIA V5 DPM environment for human/product interaction and worker process analysis early in the product lifecycle.

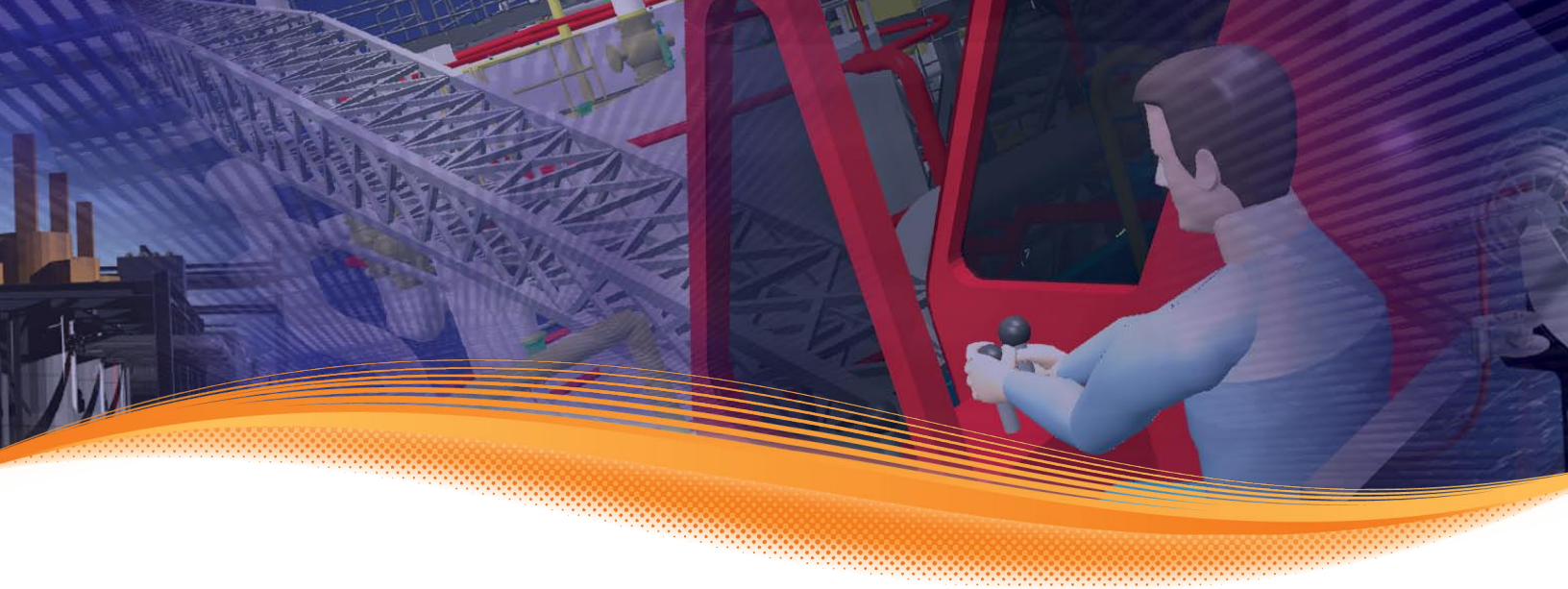
Creating and developing products based on the capabilities and limitations of people is not a new concept. Human Factors (HF) engineering has proven that every stage of a product lifecycle has a common component—people. People who manufacture, people who install, people who operate, people who maintain.

Ensuring that employees are used to their maximum potential—in a safe, ergonomically efficient environment—can be determined by combining DELMIA’s extensive Human Solutions portfolio with an organization’s human factors “know-how.”

Digital human modeling technology can assist a designer in determining the performance of people in the context of a workplace or a product before it exists and throughout its entire lifecycle.

The Human Solutions Advantage

- Introduces Human Factors into the product lifecycle earlier
- Ensures conformance to relevant health and safety standards
- Accelerates time-to-market
- Reduces design timeframe and associated costs
- Improves employee satisfaction
- Optimizes workplaces and work cell design
- Increases productivity



DELMIA PLM for Manufacturing

Value-add tools for implementing the digital factory

DELMIA PLM for Manufacturing provides a comprehensive suite of tools you need to plan in advance and better forecast your manufacturing needs, to study the “what ifs” and to avoid the unexpected. DELMIA PLM combines knowledge-sharing with resource-planning to capture best practices throughout your enterprise, helping you realize your design vision with maximum efficiency and profitability. By leveraging all the benefits of a proven PLM strategy and the digital manufacturing tools, DELMIA extends the coverage from the conceptual phase of product and process design, through simulation and monitoring of manufacturing processes, to shop floor operations such as capacity planning, implementation and electronic work instructions.

DELMIA PLM Express extends PLM to small to medium based suppliers within various manufacturing industries, such as part suppliers, engineering and tooling firms. DELMIA PLM Express empowers suppliers with the same powerful V5 tools, in the way they need it, to better connect with larger organizations within the manufacturing industry.

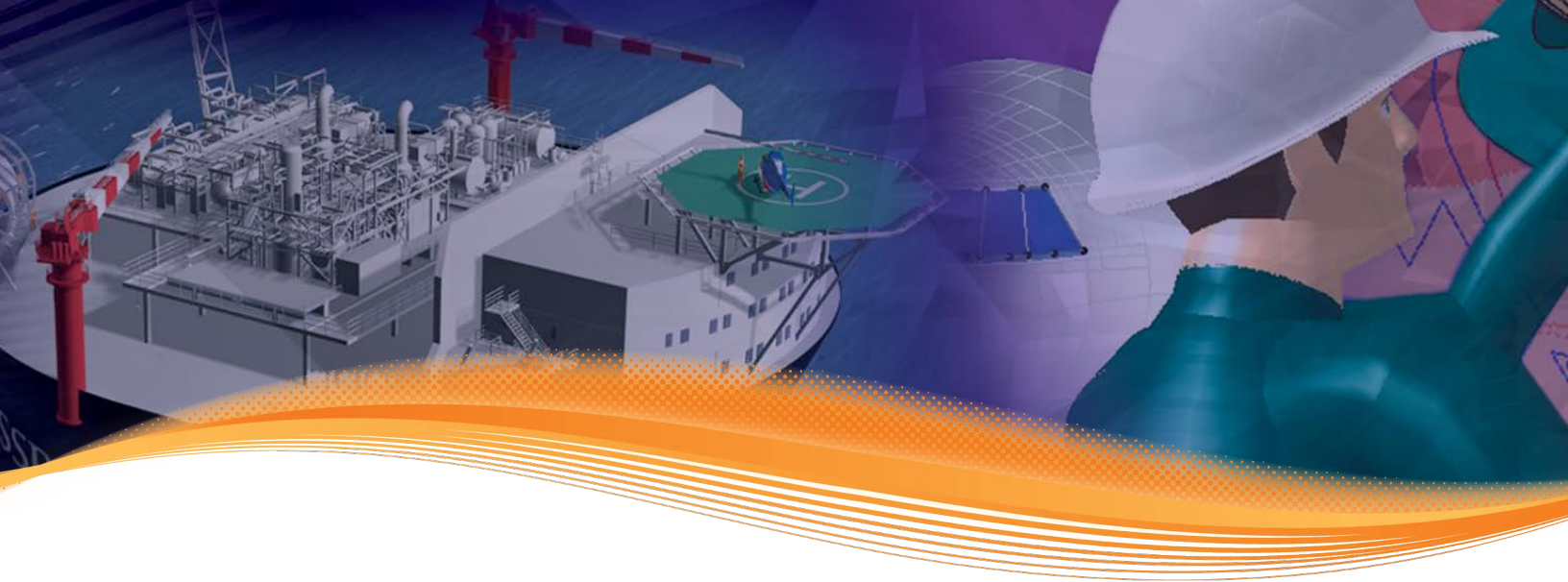
DELMIA Human Factors for PLM enhances your PLM environment with specific Human Factors (HF) tools to ensure the latest technological innovations are being designed from the perspective of the people who actually build, maintain, install, and operate them. From a factory worker to an aircraft pilot—today’s manufacturers must consider these Human Factors early in the product lifecycle.

Flexible Offering for Solid Deployment

Whether stand alone or combining our technologies for a targeted industry solution, DELMIA delivers a combination of proven industry practices, knowledge, and business process, along with a best-in-class digital manufacturing portfolio to design the right solution to address your specific needs.

Key technology enablers for PLM

- Provide a clear overview of the sequences and links between processes and resources early in product design conception
- Verify process methodologies with actual product geometry, and define processes with a greater level of detail within a 3D environment
- Human Factors solutions for validating workforce performance and interactivity within defined processes
- Tools to develop, create and implement resources, application routines and mechanical programming
- Complete digital manufacturing environment for robots, tooling, fixtures, machinery, automation and ergonomics
- 3D digital factory tools for process flow simulation and production performance analysis
- Production Management and Execution tools to assist with factory activities such as authoring 3D-based work instructions for the shop floor



DELMIA Automation

Extending beyond PLM with Automation Lifecycle Management solutions for the control engineering industry

To enhance and expand beyond PLM, DELMIA Automation provides a new paradigm that allows control engineers to digitally design, test, and validate the control of a machine, workcell, or an entire factory line through a collaborative programming desktop.

Today, automation systems are programmed in a laborious 2D graphical language and environment and have to be validated with costly physical resources. By completely virtualizing this process, DELMIA Automation will enable control engineers to develop and approve their Programmable Logic Controller program and automated systems in the virtual world for a complete Automation Lifecycle Management solution.

With its unique Logic Control Modeler software, DELMIA Automation allows designers to digitally monitor all kinds of automated systems in enterprises ranging from the automotive and semiconductor to the electrical equipment and food industries.

During the ramp-up of production lines, as well as in the machine building business, time and risk of error have become crucial factors. DELMIA Automation cuts ramp-up time significantly by catching logic errors well beforehand, evaluating PLC program changes on the virtual equipment instead of taking risks on the real equipment.

This will reduce development time, drive down costs, and increase total factory productivity in a global sector employing five million programmers.

Whereas PLM solutions simplify and enhance end-to-end product management, automation solutions use control logic to design the internal behavior of control systems. The breakthrough technology, known as Logic Control Modeler, emerged from 20 years of French research and was acquired by Dassault Systèmes in 2003.

In essence, it generates a mathematical model describing a machine that then enables a control engineer to model the whole behavior of

a given manufacturing cell. This technology therefore establishes a new paradigm in PLC programming.

In addition, this offering provides a collaborative workspace for control and mechanical engineers to share knowledge, react to changes, and communicate within the same V5 digital environment.

Key Features of DELMIA Automation Solutions

- Collaborative programming desktop to validate performance of automatic and manual operations and interlocks
- Identifies potential collisions or emergency stop and reset functions
- Enables the creation and re-use of pre-defined control logic components
- Complete PLC programs can be downloaded to the physical PLC to test against the virtual workcell
- Enables the control of both logic data and electrical data in a single data model
- Turns 3D CAD models into actuators and sensors when defining kinematics tasks, internal behavior and electrical I/Os
- Offers a dedicated programming environment using IEC61131-3 standard languages

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About Dassault Systèmes

As a world leader in 3D and Product Lifecycle Management (PLM) solutions, Dassault Systèmes brings value to more than 90,000 customers in 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 a 3D vision of the entire lifecycle of products from conception to maintenance. The Dassault Systèmes portfolio consists of CATIA for designing the virtual product - SolidWorks for 3D mechanical design - DELMIA for virtual production - SIMULIA for virtual testing and ENOVIA for global collaborative 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 more information, visit <http://www.3ds.com>

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