

Resource Modeling & Simulation



DELMIA V5

ROBOTICSTM



*Scalable, flexible, and
easy-to-use solutions
for robotic workcell
setup, programming
and simulation.*



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ROBOTICS™

Scalable, flexible, and easy-to-use solutions for robotic workcell setup, programming and simulation.

DELMIA V5 ROBOTICS is powerful, integrated solution that enables manufacturing organizations to design, simulate, optimize, and program robotic workcells in a 3D digital factory environment.

The Value of V5 ROBOTICS

- Captures underlying intent of robotic program
- Single programming solution for all major robot vendors
- Allows intuitive 3D editing of resources and programs
- Automates repetitive work to increase efficiency
- Completely integrated with CATIA, Enovia, and all DELMIA solutions
- Enormous potential for savings. V5 end-to-end integration eliminates 40-80% of the time manufacturing engineers spend locating and translating the correct data into the required format.

The Premier Robotic Solution

DELMIA V5 ROBOTICS offers a scalable, flexible, easy-to-use solution for tooling definition, workcell layout, robot programming, and workcell simulation. DELMIA V5 ROBOTICS is much more than a basic offline programming system. It can capture the underlying philosophy of and intent of the robot programmer allowing the company to capture and reuse best practices, leverage programming knowledge, and automate the repetitive work of robot programming.

V5 ROBOTICS is ideally suited for work in the Automotive Body in White industry, specifically robot spot welding and material handling operations. It can be extended for use in other domains.

End-to-End Integration

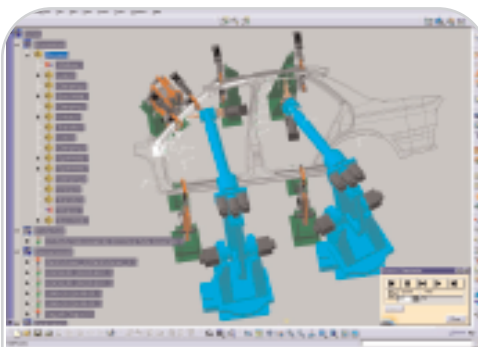
V5 ROBOTICS provides one key component of the DELMIA V5 end-to-end solution for Body in White manufacturing. V5 ROBOTICS takes the process plan as input and provides all the tools needed to define and analyze the resource behaviors necessary to implement the process

plan, describing exactly how the parts will be loaded, clamped, welded and unloaded. The user can easily and accurately validate and analyze the manufacturing process through physically based simulations of the resources. Once the workcell model is defined and validated it becomes the starting point for the next step in the process—controls programming. This reactive, resource centric simulation model is the cornerstone of DELMIA's Digital Factory as it allows users to use a single model to perform mechanical simulation, flow simulation, and controls simulation all in the same V5 environment.

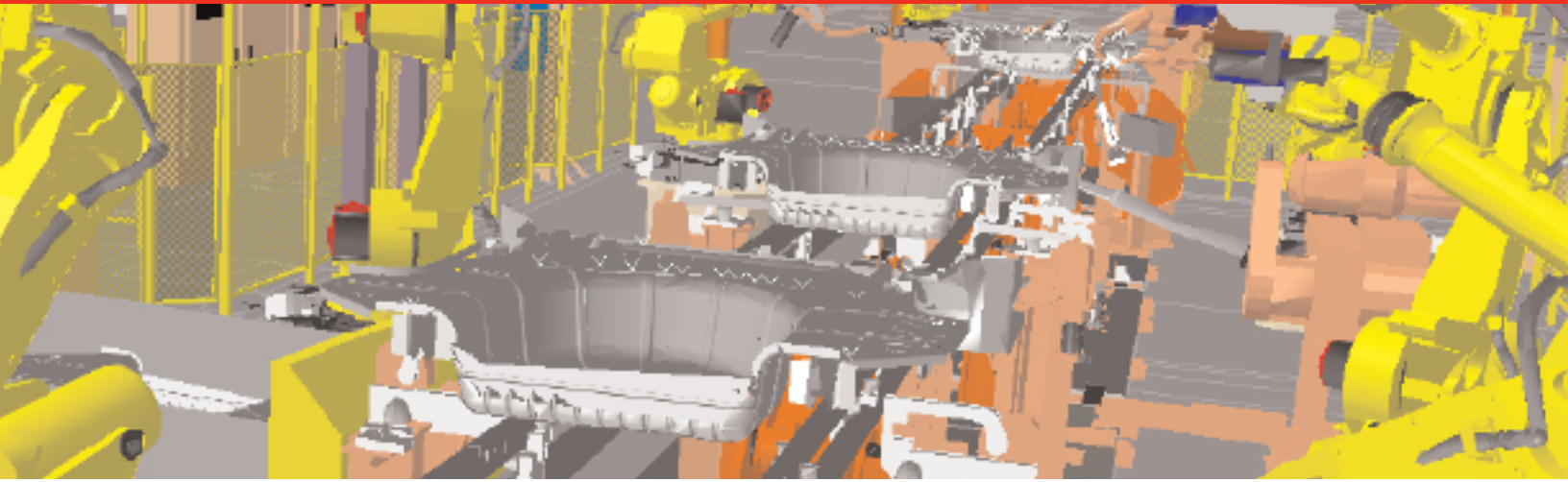
Capturing the Spirit of the Plan

Often, a process plan presents processes in steps that are not directly applicable to the actual resource processes required to produce the product. V5 ROBOTICS extends the process plan by

adding actual resource programming information to the existing process plan thereby representing the reality of the robot and resource processes required to fulfill the process plan requirements. Simulations can be controlled via the process



Robotic Workcell Sequencing allows users to assign resource tasks, define resource IO, and resource interference zones.



logic: following a single part through the resource operations, or in a resource-centric manner where resources react to parts as the parts enter the system.

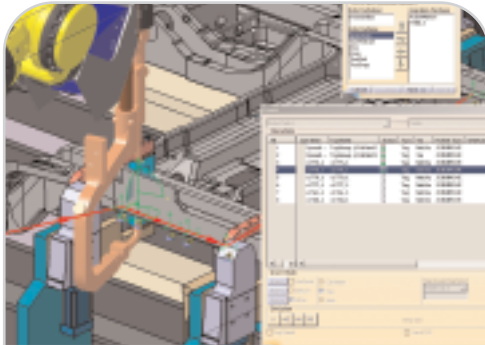
Intuitive Programming

V5 ROBOTICS has an easy-to-learn and easy-to-use graphical programming paradigm to teach and sequence robots and associated tooling. This interface allows programmers to visualize and edit many aspects of the robot program directly in the 3D view. For example, users can change the robot pose by directly moving the robot joints by dragging them with the mouse or they can modify the TCP position orientation directly by using a 6 degree of freedom "compass" widget in the 3D model. Robot target points, the sequence of points, I/O signals, and even tooling actions performed at the points can also be displayed and modified in the 3D window without having to use text or dialog boxes. This novel use of 3D-direct manipulation in a Windows standard user

interface dramatically shortens the learning curve and improves the user's efficiency.

The Robotics Family

V5 ROBOTICS is available in three powerful packages: Basic Multi-Robot Simulation, Basic Multi-Robot Simulation with CAD, Multi-Robot Simulation and OLP with CAD. Key Add-ons include: Human Task Simulation, Assembly Process Simulation, DMU Optimizer, MultiCAD Interfaces, RRS*, Offline Programming*, Tool Selection Assistant*



Robotic Task Definition allows users to "teach", verify reachability, and detect collisions, concurrently, thus saving time and improving processes.

Complete Integration

V5 ROBOTICS is fully integrated with all DELMIA digital manufacturing solutions. V5 ROBOTICS also shares the same V5 architecture with CATIA® and ENOVIA®, with a common workbench to easily integrate information

and allow companies to capture, manage and share their best practices throughout the extended enterprise.

The V5 ROBOTICS Advantage

- *Open Architecture for customization/extension*
- *Resource kinematic and logic modeling*
- *Edit in context for tooling resources*
- *Automatic interference zone computation*
- *Automatic weld feasibility analysis at the workcell level*
- *Drag and drop, direct manipulation and table based task editing*
- *Standard library containing over 700 accurate robot models*
- *RRS support for accurate trajectories and cycle times*
- *Cell and robot calibration for accurate downloads*
- *Exact, complete professional CAD capabilities*
- *Comprehensive Multi-CAD Interfaces*

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V5 ROBOTICS & the Manufacturing Hub

DELMIA's entire solution portfolio work on top a unique data model called the Manufacturing Hub, which allow manufacturers to store, manage and reuse all product, process, and resource information required throughout the product lifecycle.

The Manufacturing Hub is part of a collaborative, PPR data system that supports Dassault Systemes' Product Lifecycle Management solution. This PPR data system ensures the seamless integration between CATIA, ENOVIA, SMARTEAM and DELMIA. CATIA provides the product design solution; DELMIA provides the manufacturing engineering solution; and ENOVIA & SMARTEAM provide the life-cycle applications and decision support tools.

With DELMIA digital manufacturing solutions, companies have the power to capture, manage and share their best practices and ensure everyone has access to the right information, at the right time.

The DELMIA Digital Manufacturing Solution

DELMIA's portfolio of digital manufacturing solutions are categorized in three distinct domain suites, based on how they impact the flow of the manufacturing process. Each domain employs a set of tools that steps through the entire manufacturing process from concept to implementation.



Process Planning

Provides a comprehensive process and resource planning support environment. The resulting process diagrams can provide a clear overview of the sequences and links between processes and resources early in product design conception.

- Layout Planning
- Time Measurement
- Process & Resource Planning
- Product Evaluation
- Cost Analysis
- Line Balancing



Process Detailing & Validation

Employs the structure and diagrams of the Process Planning solutions into the application specific disciplines of manufacturing. Verify process methodologies with actual product geometry and define processes to a greater level of detail within a 3D environment.

- Manufacturing and Maintenance
- Assembly Sequences
- Factory/Cell Layouts
- Machining Operations
- Workforce Performance and Interactivity
- Shop Floor Instructions



Resource Modeling & Simulation

Provides a comprehensive process and resource planning support environment. The resulting process diagrams can provide a clear overview of the sequences and links between processes and resources early in product design conception.

- Factory Flow Simulations
- Robotic Workcell Setup and OLP
- NC Machining
- Ergonomic Analysis
- Inspection



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