DELMIA
IGRIP®

Resource Modeling & Simulation

The Robotic Simulation and Off-Line Programming Solution
DELMA IGRIP® is a physics-based, scalable robotic simulation solution for modeling and off-line programming complex, multi-device robotic workcells. Use IGRIP to quickly and graphically construct workcells for applications such as welding, painting, dispensing, material removal and machine tending.

Generate Off-Line Programs with Confidence
IGRIP’s complete line of calibration and off-line programming and post-processing tools allow users to accurately program robotic systems off-line, thus minimizing the impact on production schedules. Calibration tools let users adjust the simulation model to accurately reflect real world device relationships, while the signature interface enables programmers to easily modify robot devices to gain accurate robot motion. Finally, users download the optimized simulation programs using IGRIP’s post-processors.

Eliminate Damage and Reduce Risk
IGRIP’s standard collision detection functionality allows the user to create multiple collision and near-miss queues to ensure collision-free operation. IGRIP also includes an automatic path planner for creating collision-free robotic motion trajectories.

Open Architecture for Easy Integration
IGRIP’s open architecture allows users to program custom functions with unparalleled ease by creating menu functions, custom device kinematics and motion planning algorithms.

Built-in Geometric Modeling Environments
Built-in 3D CAD and 2D draw environments are available with IGRIP and can be used alone or in conjunction with imported geometry from IGES and DXF.

Seamless Integration
IGRIP is part of an integrated suite for Digital Manufacturing, with a range of solutions for dis-
crete event simulation and analysis, human motion programming/fast analysis, and assembly simulation. From inspiration to execution, DELMIA solutions help you manufacture high quality products quickly and efficiently at a lower cost, the first time, every time.

Analyze Real-Time Performance
Simulation cycle times can be displayed and charted. Cycle times can be automatically optimized, or an available interactive interface can be used for custom tuning. 3D graphical traces of the robot trajectory can be plotted with optional interval cycle times. Use the RRS (Realistic Robot Simulation) option to obtain extremely accurate cycle time predictions using the native robot controller algorithms.

Flexible Device Building
IGRIP’s device building capabilities offer unprecedented power and ease of use. Create complex kinematic devices and/or modify existing devices to accurately reflect the real world. IGRIP includes all the attributes necessary to model even the most complex devices. Standard kinematic and motion planner algorithms are only a button click away, while complex kinematic or motion planner routines are easily created and integrated. Also, assign user-defined attributes to devices to enhance simulation realism. Use the Dynamics option to assign dynamic properties and provide comprehensive dynamics analysis capabilities.

Rapidly Develop Workcells
IGRIP includes the most comprehensive library of robot models available, with more than 500 industrial robot models, including the latest from FANUC, ABB, Motoman and Nachi. Application-specific devices such as weld guns, work piece positioners, rails/gantries, and workpiece clamps are available in options such as Arc, Spot, and Paint.

Graphical Programming
Create complex simulation programs using IGRIP’s simple graphical programming interface. Use one interface to program an entire simulation, including multiple robots, fixtures and material handling devices. IGRIP’s teach pendant interface offers an alternative programming interface for those more comfortable using robot teach pendants.

Visualize and Communicate
Enhance realism by assigning high quality texture images to geometry, or use IGRIP’s robust lighting and material property functionality. Optimize workcells by using on-line and batch mode data reduction tools. Manipulate and visualize data-intensive workcells with ease using the built-in level of detail (LOD) management tools. Standard digital output functions for AVI, MPEG, JPEG, TIFF and VRML formats make it possible to quickly and easily visualize your data in other applications.
IGRIP OPTIONS

A full array of comprehension add-ons are available to enhance the IGRIP Solution, allowing manufactures to get maximum benefit by adding extended functionality for more detailed analysis.

Assembly Planning and Process Documentation
Visualize and validate design for assembly and disassembly. Facilitate development of multilevel assemblies, sequences, part paths and process documentation. Used in conjunction with DELMIA/ReView, simulation recordings can be distributed throughout the entire enterprise for shop floor instruction and process visualization.

Virtual Reality
The Virtual Reality option enables programmers to immerse themselves into the simulation both visually and tactically. IGRIP supports a variety of virtual reality equipment such as the cyber-glove from Virtual Technologies, Inc, and Ascension Technology Corporation’s Flock of Birds. IGRIP also provides a stereo display interface for realistic 3D stereo.

Cell Control
Design, simulate, test and enhance the performance and productivity of a workcell. With the Cell Control add-on, mechanical and manufacturing engineers can precisely design, evaluate and optimize the sequence of operations and logics of the elements within a workcell; while control engineers can simulate, validate and debug PLC programs within the same IGRIP workcell. Concurrently designing the workcell and control scheme will increase the productivity of mechanical and control engineers by enabling them to perform a large number of iterations to optimize performance and confirm targeted production rates without the cost of prototypes parts or workcell mockups.

Cell Control can be used for any type of automated workcell or production line including robotics, gantries, transfer lines and other special machines.

Human Motion and Workplace Assessment
Use the DELMIA/ERGO option to design safe working environments that accommodate a wide range of workers. Engineers use DELMIA/ERGO to address human interface issues that impact the ability of a wide range of humans to assemble and maintain a proposed product design.

Options to get the most out of IGRIP

IGRIP OPTIONS

Extend the capability to evaluate specific robotic applications such as spot welding, painting, arc welding and finishing with IGRIP options.
Spot Welding
The Spot option provides specialized tools to support both traditional and fixed TCP spot welding applications. Included in the Spot option is a fully functional tooling interface for the construction and simulation of complex tooling and fixture device clamps. Collision-free robot trajectories can be automatically determined, and numerous optimization features can be used to reduce process cycle times.

Arc Welding
Included in the Arc option is a fully functioning tooling interface that allows for the construction and simulation of complex tooling and fixture Devices. Clamps and workpiece positioning devices can be coordinated with Arc Welding robots. Collision-free robot trajectories can be automatically determined and numerous optimization features can be used to reduce process cycle times. Seam searching sequences can be automatically generated and weld “details” can be stored in a database for reuse. The unique Arc Welding macro system allows the user to define and reuse arc welding process knowledge to greatly reduce programming time.

Finishing
Use the finishing option to model any robot application including waterjet and laser cutting, material handling and deburring/ polishing applications. Complex, multi-device workcells can be quickly and graphically constructed. Application process data can be included in the simulation and accurate robot programs can be output.

Painting
Included in the Painting option is a complete set of painting simulation tools. Spray gun and paint attributes can be entered into the painting device and the results can be graphically displayed in multiple colors illustrating relative film thickness; or exact thickness can be obtained though the uses of a built-in film build gauge. Complex paint booths can be constructed, and multiple robot moving line applications can be simulated.

Realistic Robotic Simulation
RRS Simulation allows DELMIA’s simulation software to interface with a robot manufacturer’s proprietary motion planning software (called an RCS module) to provide greater accuracy in the trajectory motion and cycle time prediction.

Other Options
Please contact your account manager for more information.

Cabling: The ability to create and simulate cables.
Calibration: A robust, highly accurate module for characterizing and applying an articulated mechanical device’s signature to an individual device model.
Dynamics: Full support for dynamics analysis and simulation of multi-link, tree-structured mechanisms with any number of closed-loop kinematic chains.
Parasolids: A solid modeler, based on the Parasolid kernel, used to create part geometry.
VCE: Enables users to connect with other users, synchronize DELMIA processes, and visualize a simulation of the same workcell running on more than one workstation.
CADverters: Various import and export capabilities to the leading CAD software.
IGRIP & 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 lifecycle 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 Solutions

DELMIA’s portfolio of digital manufacturing solutions are categorized in three distinct domain suites, based on how the 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
  - Virtual Reality Scenarios
  - Ergonomic Analysis
  - Inspection