



DELMI A V5 Automation: Fact Sheet R15

Overview:

Dassault Systèmes is paving the way for revolutionizing the entire industrial automation market. Using innovative technology, its new collaborative programming desktop and lifecycle management solution for the automation market will shift automated design and logic controller (PLC) programming from hardware to the virtual world, allowing users to digitally define, control, and monitor automated systems, unleashing new value in a software market expected to grow to several billion dollars by 2010.

In 2004, Dassault Systèmes launched its breakthrough automation solution through alliances with Schneider Electric (Dextus) and with OMRON Corporation, enhancing and expanding capability beyond PLM. This new technology is targeted to deliver breakthrough digital solutions to companies designing the numerical systems that control complex products ranging from packaging machines to factory assembly lines to elevators.

DELMI A V5 Automation is unique in the world of automation, representing a major source of business growth for the company. Today, automation systems are programmed in a laborious 2D graphical language and environment where they have to be validated with costly physical resources. By completely integrating this process into a 3D environment, DELMI A Automation will enable control engineers to develop and approve their PLC program and automated systems in the virtual world. In addition, this new offering provides a collaborative workspace for control and mechanical engineers to share knowledge, react to changes, and communicate within the same V5 digital environment.

During the ramp-up of production lines, as well as in the machine building business, time and risk of error have become crucial factors. DELMI A Automation helps reduce product launch time significantly by catching control logic errors well before implementation by evaluating PLC programs and/or changes in a virtual equipment instead of taking risks on the real equipment.



DELMI A V5 Automation provides a scalable solution for Controls Engineering

DELMI A V5 Automation: Smart Device Builder

Smart Device Builder turns your 3D CAD models (CATIA, Solidworks, UGS, ProE, Solidedge, and others) into actuators and sensors in defining kinematics/tasks, internal behavior and electrical I/Os. The internal device behavior is programmed using the languages supported by LCM studio making the device internal behavior definition easy for control engineers. The internal behavior can also be used to create default and abnormal conditions to validate how the PLC program would react to such conditions. Smart Devices can then be assembled to build the complete virtual equipment with the complete set of I/Os

- Smart Device can be as simple as a single clamp that can be in a cell layout, or as complex machine tool center, an entire station or manufacturing line.
- Smart Device Builder provides tools for:
 - Device Kinematics (forward or inverse)
 - Electrical Input/Output Ports
 - Internal Control Logic.
- Individual Smart Devices can be assembled into more complex systems such as machine centers, manufacturing stations or lines complete with Electrical I/Os.
- Smart Devices can be driven by an external controller such as a PLC (Programmable Logic Controller).
- Smart Device Builder provides the tools necessary to create a reference library of Smart Devices for use by downstream control engineers.
 - Instances of these referenced devices can be used by control engineers whom desire to create, edit and validate control logic using V5, 3D simulation tools.

DELMI A V5 Automation: LCM Studio

LCM Studio is a PLC programming environment using the standard languages defined in the IEC61131-3 standard. Users can create and re-use pre-defined control logic blocks.

LCM Studio makes the PLC program independent of the hardware. The resulting PLC program is downloaded to a targeted PLC through a dedicated PLC setup. PLC setup is developed by or in close collaboration with the major PLC providers (Schneider Electric, Omron, Siemens and others) using the V5 open platform (CAA V5).



- LCM Studio provides the controls engineer with structured views of the controls logic including:
 - Hierarchal views
 - SFC views
- Create, edit and debug, and validate controls logic for a component, device, station or line.
- Program and validate controls logic in the “context” of the virtual equipment designed using Smart Device.

DELMI V5 Automation: Controlled System Simulator

Controlled System Simulator allows the user to simulate, to debug, and to validate a complete PLC program against virtual equipment before any real equipment is even built.

The PLC program can be loaded to a Virtual PLC or to the real PLC. Users just need to map the PLC program I/Os defined with LCM studio to the virtual equipment I/Os defined with the Smart Device Builder and then define the simulation environment. The simulation environment is defined by an input part flow (source and sink) and such stochastic distributions for creation times and part types.

- A PLC program can be simulated using either a Virtual Controller or by using a real Programmable Logic Controller (Soft PLC or Physical PLC) using open connectivity (OPC)
- All aspects of the PLC control logic can be validated, including I/O setup, values, functions, constants and variables attributes, program branching, etc.
- Smart Devices’ internal behavior can be used to trigger default and abnormal conditions in order to validate how the PLC program will react to such conditions.
- Physical or virtual control panels can be incorporated in the system allowing the engineer to test the Human – Machine Interface (HMI).
- Controlled System Simulator performs DMU verification of motion simulations using clash detection and analysis, sectioning analysis, measurement, distance analysis and 3D geometry comparison tools.
- Controlled System Simulator can be used for virtual startup and virtual commissioning as well as machine operator training.

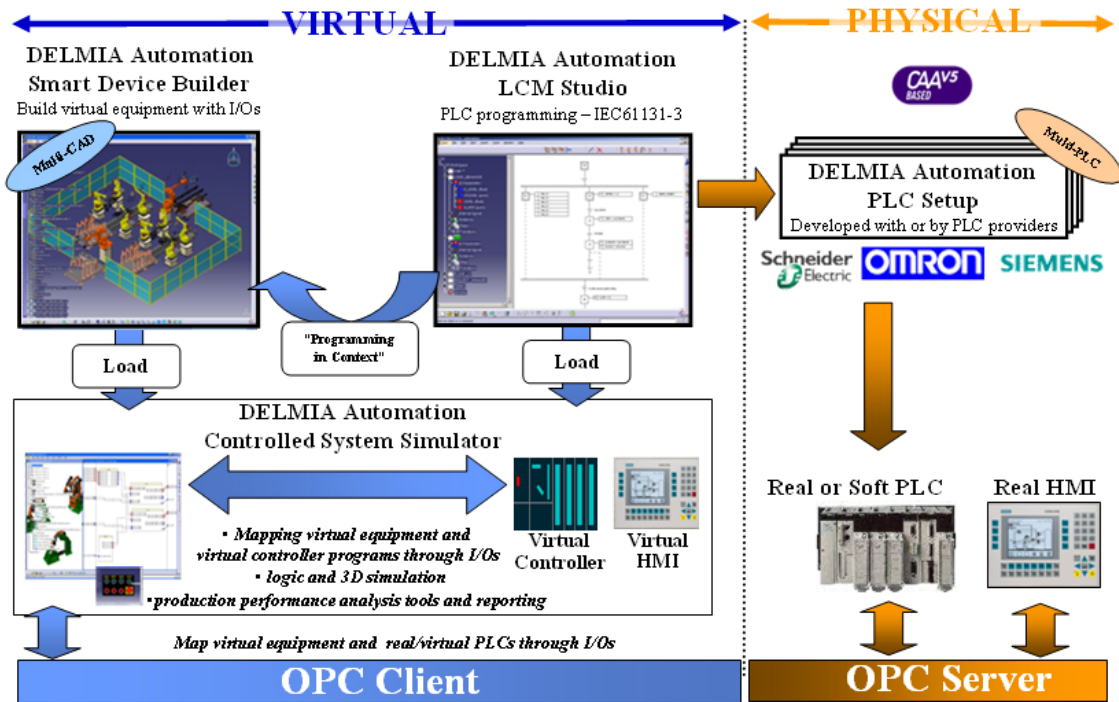


Chart Caption: PLC program validation using a virtual workcell

Add-on functionality

DELMIA V5 Automation: LCM Control Setup

LCM Control Setup is an optional add-on that provides the user with the capability to translate control logic created with LCM Studio to a PLC’s native language.

LCM Control Setup provides Dassault Systemes CAA Partners with the CAA APIs necessary to develop their PLC Setup (one per PLC provider/type) that provides the capability of downloading the PLC program developed with LCM Studio to the real PLC.

- Compile to the PLC native code and transfer to the real PLC.
- Shortens support time for new PLC hardware.
- Integrates into DELMIA Automation V5 desktop so control and maintenance engineers can download, run, stop, and debug within the same environment.
- Available with SIEMENS STEP 7 PLC Setup with SIEMENS A&D Automation Systems



DELMI A V5 Automation: Production System Analysis

Production System Analysis is an optional add-on for use with Controlled System Simulator that allows the control engineer to define the simulation environment and to analyze the production rate of the systems during the simulation. The simulation environment is defined by an input part flow (source and sink) for creation times and part types. A production system analysis and reporting can then be generated providing part-centric and resource-centric statistics.

- *Resource*: average utilization of resource, total busy time, total idle time, average content, wait time.
- *Part*: number of parts created, total number of parts entering a resource, total number of parts exiting a resource, production rate, total parts processed.

DELMI A V5 Automation: HMI Control Panel Design

HMI Control Panel Design is an optional product for use with the Smart Device Builder, LCM Studio and Controlled System Simulator to provide the user with the capability to create a virtual “human – machine interface”, such as a control panel for interactive use during control logic design, debugging validation and simulations.

This virtual control panel can incorporate any number of buttons, switches, light indicators, and gauges along with their default values