Robotics and Automation Planning

Benefits
- Enables manufacturers to validate manufacturing systems earlier in manufacturing process development
- Compresses manufacturing planning by enabling multiple engineering disciplines to identify system integration problems significantly reducing manufacturing change orders
- Accelerates time-to-volume by providing a virtual environment for rapid and accurate system-level commissioning
- Enables more flexibility in manufacturing operations by optimizing robotic systems to support all aspects of product and process variation

Summary
Tecnomatix® Robotics and Automation Planning software enables manufacturers to virtually develop, simulate and commission robotic and automated manufacturing systems, including highly automated plants with a variable production mix. Multiple engineering disciplines use the virtual environment to plan and validate manufacturing systems ranging from single workcells to complete production lines and systems. Tecnomatix Process Simulate technologies facilitate virtual commissioning by supporting offline validation of production tooling equipment at the system level.

A 3D virtual environment for planning, optimizing and commissioning robotic and automated manufacturing systems
Tecnomatix Robotics and Automation Planning enables manufacturers to reduce the time to bring new products to market whether they are working with dedicated production lines producing a single product or in a mixed model production facility. In both of these scenarios, the Robotics and Automation Planning solution applies to facilities comprised of robotic and non-robotic automation systems. This robust solution helps manufacturers improve the ability of their plants to meet elevated quality targets while optimizing plant floor configuration and usage.
Robotics and Automation Planning

Features
Collaborative productivity
- Feature distribution and management
- Ability to coordinate workcell through station-level development
- Ability to handle robot garden manufacturing configurations
- Support for multiple model mixes and variants
Event-based simulation and validation
- Support for virtual devices with built-in logic (smart devices) that mirror the characteristics and behavior of real devices
- Teach pendant programming for manufacturer-specific robots enables engineers to utilize native language for highly accurate programming, cycle time assessment and robot trajectory with RRS integration
- Graphic user interface enables engineers to simulate configurations that provide the look and feel of the plant floor and precisely control the signals being validated
Virtual robotic and automation commissioning
- Virtual commissioning environment to optimize the build, test and installation of production tooling equipment
- Ability to optimize a complete mix of product models and production scenarios

Robotics and Automation Planning delivers these benefits through the following capabilities:
- Collaborative productivity enables engineering teams to design workcells, with complexities that range from single stations to complete lines and systems; these capabilities are provided in an open and controlled environment that expedites development and validation.
- Event-based simulation and validation provides a simulation that accurately reflects the proposed manufacturing system, as well as a tool to fine tune the mechanical, automation and electrical aspects of manufacturing systems.
- Virtual robotic and automation commissioning enables manufacturers to commission their production equipment through streamlined build, test and installation procedures that accelerate production ramp-up (time-to-volume).

Robotics and automation planning challenges
Across all major industries, market pressures and structural costs are requiring manufacturers to build flexibility into their production facilities. Individual plants need to increase the number of products they can build while exceeding their current quality targets and optimizing their shop floor footprint.

Virtual validation, simulation and validation requirements in mind, three unique capabilities distinguish the Tecnomatix Robotics and Automation Planning solution.

Collaborative productivity
When design engineers develop manufacturing systems, project data is often scattered in multiple locations, which inhibits the effective management of both engineering and manufacturing change orders. Project teams also find it difficult to coordinate the scope of a complete system.

For example, workcells are often constructed at the station level and frequently require validation against the complete manufacturing line or system. This enables you to check for the duplication or absence of key components, or to detect potential safety hazards, such as interference zones. Similarly, project teams need to validate complex scenarios for products that are meant to be produced globally and with multiple model mixes and variants.

These requirements challenge multiple manufacturing disciplines to coordinate their process and production planning activities with an eye toward reducing production ramp-up and overall time-to-market. To meet these challenges and compress these metrics, manufacturers adopt a variety of initiatives including:
- Earlier validation of their manufacturing systems designs
- Concurrent engineering of their manufacturing planning tasks
- Systems-level commissioning of their production tooling equipment
assignment status, as well as coordinate the development of workcells at the station-level including robot gardens.

Event-based simulation and validation

Getting a highly automated manufacturing system and its robotic and automation workcells up and running requires the participation of numerous engineering disciplines, including controls engineering, manufacturing engineering and robotics engineering. Traditionally, manufacturers have used manual methods or non-integrated software applications to perform the validation for this diverse set of engineering tasks. These time-consuming processes frequently failed to identify process-related issues caused by integration problems between applications.

For example, manual methods of process development can not properly convey the mechanical motion of the system’s tooling and equipment or its electrical capabilities, meaning that potential collisions can go undetected. Additionally, the inability to simulate the system’s communications protocol forces engineers to use a highly inaccurate time-based approach for completing simulations.

Robotics and Automation Planning’s event-based simulation and validation capabilities enable engineering teams to work with logic-driven devices that mirror the components installed on the physical shop floor. These virtual devices react in the same manner as their physical counterparts. This allows you to achieve greater simulation consistency and accuracy while significantly reducing time to volume.

The solution also provides manufacturer-specific robot programming teach pendants that ensure accurate programming, cycle time and robot trajectory. Robotics and Automation Planning provides a graphical user interface with a look and feel that logically extends the plant floor by providing engineers complete control over the signaling being validated. Simulation capabilities are especially valuable because they enable engineering teams to easily identify change and visually convey it to all team members.

Virtual robotic and automation commissioning

Delays in launching a new product can profoundly affect manufacturer profitability in terms of “lost” units that would otherwise be available for sale. Frequently, these delays are caused when a combination of mechanical, automation and electrical problems are identified during debug and tune-in. Ineffective communication during manufacturing development is usually the source of these problems.

For example, inefficient manufacturing processes can result in improper tool sequencing, safety violations that impact specific plant regions, invalid mixed model automation practices, inefficient tool and equipment usage, and programmable logic controller errors.

Robotics and Automation Planning’s virtual commissioning capability enables manufacturers to optimize their production tooling equipment build, test and installation procedures. This environment enables engineers to optimize their complex mix of product models and production scenarios, which in turn helps optimize time-to-volume and reduce time-to-market.

Equally important, the virtual commissioning environment lets manufacturing teams make smarter purchasing, system modification and new technology decisions before installing new systems or modifying current production.