

# SIEMENS

*Ingenuity for life*

Automotive and transportation

## Comau

Industry leader and supplier to major automotive OEMs implements the virtual commissioning of assembly lines

### Product

Tecnomatix

### Business challenges

Implement an integrated engineering process

Develop assembly plants with flexible production capacity and model mix

Virtually test plants to minimize startup time

### Keys to success

Implement Tecnomatix for virtual commissioning

### Results

Certified control functionalities and cycle time before signing the contract with the customer

Validated a plant using a virtual model

Quickly implemented product modifications requested by customer during the industrialization phase

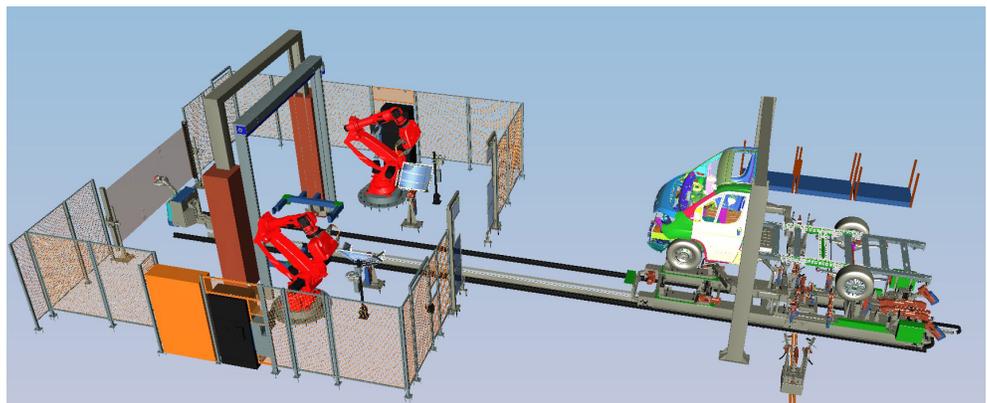
**With the Tecnomatix portfolio, Comau anticipates automation software validation and debug, leveraging a virtual representation of the plant**

### Focus on innovation

Commitment to innovation is a driving force of Comau, a global leader in industrial automation. The Italian multinational corporation supplies body-in-white welding and assembly systems and lines, engine machining and assembly systems, industrial robots for all application areas, and services for a wide range of industries. Comau has diversified expertise and leverages its know-how to approach new industries, with a solid record of projects in the automotive industry.

The Body Assembly division of Comau deals with advanced manufacturing systems for body assembly, subunits and turnkey body shops for the automotive industry. The focus on innovation drives Comau to continuously improve the design of assembly lines, increasing safety and efficiency levels.

From the Grugliasco headquarters near Turin, Comau's international network extends all over the world, offering solutions, products and services for the entire manufacturing process, from concept development, through engineering, simulation and industrialization, up to production launch and maintenance. "Our experience in welding technology and the latest assembly techniques helps us clearly identify the requirements of our customers and exceed their expectations," says Francesco Matergia, head of engineering, Automation Systems at Comau.



# *Virtual commissioning with Tecnomatix also integrates the functionalities of PLCs that control plant operation, allowing simulation and validation of an entire line and its operations.*

**“Tecnomatix responded to Comau’s request to extend simulation and validation to the whole plant operation.”**

Francesco Matergia  
Head of Engineering –  
Automation Systems  
Comau S.p.A.

## **Continuous innovation**

With its solutions, Comau has set new industry standards, constantly improving the assembly lines. Within the Body Assembly division, Matergia is in charge of robotics automation and engineering at the European level, collaborating with other Comau sites around the world to accelerate the integration of automation development processes. “The automation and robotics team deals with the concept development, design and commissioning of control systems for the body assembly plant: electric and fluid power systems, PLC, HMI, cycle programming – basically the whole intelligence of vehicle assembly plants,” Matergia explains.

In 2009, the Body Assembly division launched a pilot for the improvement of engineering and integration processes and for plant validation based on CAD models, so-called “virtual debug.” The initiative had two objectives: on one hand, to improve Comau’s engineering processes; on the other, to identify more efficient software tools to integrate the entire process. “Back in 2009, we had already realized that the engineering process had to be increasingly integrated to meet quality and time-to-market requirements,” Matergia recalls.

“We organized a number of meetings and we put a stronger focus on the evaluation of debugging systems to validate as many elements as possible in the laboratory before assembling the plant at the customer’s site.”

## **Test before delivery**

In 2011, Comau engaged Siemens PLM Software for a pilot to implement a “virtual debug” process, to bring a fully validated and tested machine to the installation site. The wish list of engineers was quite long: easy creation of objects, component and device libraries, creation of smart modules consistent with the real machine, tight integration with other engineering stages and robots.

“Comau builds huge plants and we cannot afford to assemble and test everything during installation,” Matergia remarks. “Until recently we could only simulate a few sections and some functionalities of a line, or test individual robots for plants where hundreds are used. We needed to extend validation to all operations, to check in advance that a plant could deliver a vehicle or an assembly within the requested cycle time. Furthermore, in

recent years, more and more customers have been asking us to support them with all the variants of each product. For plants that cost tens of millions euro, every single change has an impact that can make the difference between the financial success or failure of a project.”

Siemens PLM Software responded to Comau’s requests, offering a complete virtual commissioning solution in the Tecnomatix™ portfolio of digital manufacturing solutions. Besides the mechanical resources of a line (machines), virtual commissioning with Tecnomatix also integrates the functionalities of programmable logic controllers (PLCs) that control plant operation, allowing simulation and validation of an entire line and its operations.

#### **Profitable investment**

The pilot project (followed by a period of continuous operation, still under way, to measure the benefits of the solution) started from a working cell that was modeled in the Process Simulate solution in the Tecnomatix portfolio for the virtual validation of assembly projects, from the beginning to the end of production. “We performed a sort of reverse experience starting from the working process and

remodeling it virtually,” Matergia says. “To work on this project, we built a team with a huge investment of resources, initially assigning a person to each function: we created a large team for a pilot and spread discussion within our organization to see how we could improve and adapt engineering processes to maximize the benefits of the technology. With this approach we have achieved amazing results.”

So far, the adoption of Tecnomatix has been very positive. Matergia continues: “In these early years, we have seen increasing satisfaction and clear improvements in terms of time required to achieve a certain level of performance. We are already working in other directions, involving Tecnomatix experts to extend the solution to other roles and functions that are not strictly related to design.”

#### **Extended partnership**

The tools for plant lifecycle management and simulation are integrated in a Siemens automation architecture. Thus Comau can rely on a one-stop partner for synchronized development and integration: a great added value that supported the selection of Siemens.

*“For plants having very high costs like those offered by Comau, minimizing downstream errors turns into a competitive edge.”*

Francesco Matergia  
Head of Engineering – Automation Systems  
Comau S.p.A.

## Solutions/Services

Tecnomatix  
[www.siemens.it/tecnomatix](http://www.siemens.it/tecnomatix)

## Client's business

Comau is a global leader in advanced manufacturing systems for body assembly, subunits and turnkey body shops for the automotive industry.

[www.comau.com](http://www.comau.com)

## Client location

Grugliasco, Turin  
Italy

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Comau is one of the biggest users of Tecnomatix. The Siemens PLM Software solution is also used for plant layout, logistic flow analysis, production capacity analysis with the Plant Simulation solution, robot software development in the Comau Robotics division, and ergonomic analysis with Process Simulate Human. In terms of functionality breadth and number of licenses, Comau is among the product's top customers worldwide.

"The Siemens PLM Software solutions standardize many operations in the preliminary analysis and cost estimate phase, allowing us to leverage our experience, as well as real and validated data," Matergia says. "In this way, we can quickly respond to customer requests, preparing cost estimates and offers very quickly. For plants having very high costs like those offered by Comau, minimizing downstream errors turns into a competitive edge." From Grugliasco, Tecnomatix has been gradually extended to other Comau sites around the world.

## Adapting to industrial processes

"Virtual commissioning is not new in industrial automation engineering," says Roberto Vollaro, virtual commissioning coordinator at Comau. "The real challenge was to develop a process that, starting from an engineering and academic approach, can adapt to the requirements of an industrial environment. With the Tecnomatix suite, we succeeded in integrating virtual commissioning into our engineering workflow, implementing an optimized process from 3D design up to final PLC software validation. This methodology has proved very flexible and capable of matching the standards of our major customers. The extension of this method on a global scale confirms that virtual commissioning is a cornerstone of the future digital factory and witnesses to Comau's constant commitment to innovation."

***"We performed a sort of reverse experience starting from the working process and remodeling it virtually."***

Francesco Matergia  
Head of Engineering – Automation Systems  
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