
Realizing visions every day in every industry.
totally integrated
automation

SIEMENS

You are reaching for ...

... higher manufacturing speeds, tighter integration between machines, 24/7 operations and more. While cost pressures are forcing you to increase your productivity and reduce life cycle costs, you must continuously optimize processes in order to achieve sustained improvements in competitiveness. You need Totally Integrated Automation (TIA).

Reduced time-to-market

With Totally Integrated Automation, you engineer your system in one integrated development environment. You not only have a more intuitive overview of your complete project, but the same look and feel is used by all development tools for each of the system components including operator interfaces, controllers, drives, I/O and communication devices. TIA provides for this tight integration. You will design, configure, program and test your system quicker and deliver products sooner with this unique approach.

Higher productivity

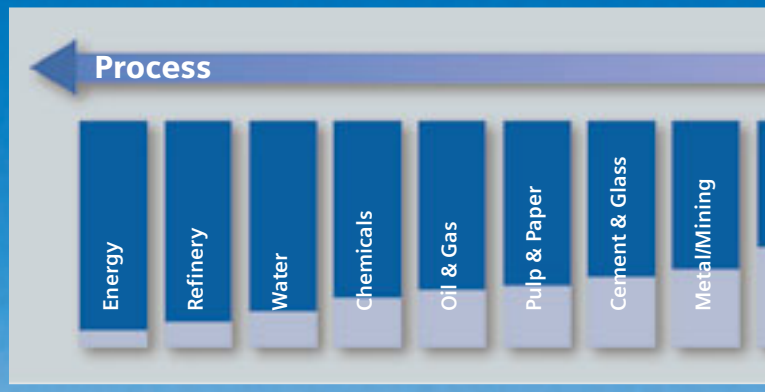
Whether you're interested in boosting the performance of an individual machine or optimizing your entire plant, Totally Integrated Automation, the foundation for your individual automation solutions, provides all the technologies from the sensors up to the complete process control system, including the MES solution for connecting to the corporate management level. Scalable and expandable for all applications and across the entire production workflow from incoming materials to outgoing finished products. Totally Integrated Automation offers you unique ways of increasing your productivity. All the components and engineering tools are designed to support your process throughout its Production Life Cycle and reduce your total life cycle costs.

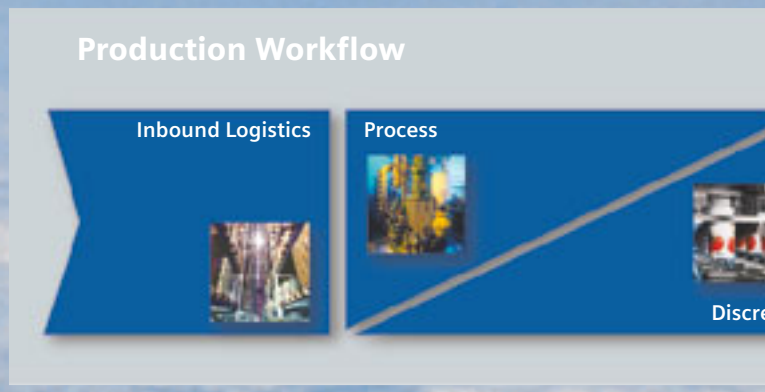
Increased interoperability and reduced complexity

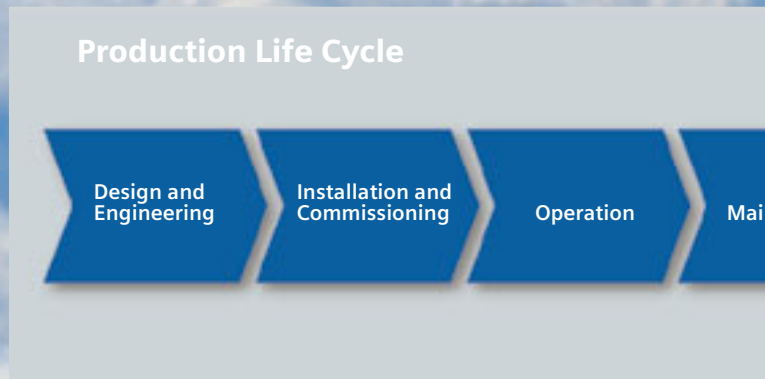
The concept of interoperability is designed into every product early in its requirement definition. This minimizes the engineering effort required when designing, programming, and debugging your system and guarantees that all the components interact seamlessly and transparently with each other. You achieve significant reductions in engineering costs. For example, when using SIMATIC components, you reduce the number of software tools required to develop and configure your system. All SIMATIC engineering tools access a single database that encompasses the entire project, eliminating redundant data entry and minimizing potential sources of error.

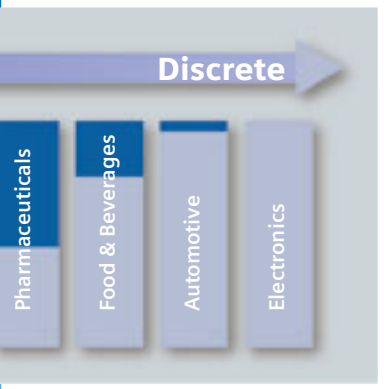
Increased investment security

Secure your investment across its entire life cycle. From discrete automation to process control, only Totally Integrated Automation allows you to break new ground in your individual automation solution while investing in a shared development environment. There's no need to invest in different development environments and maintain separate engineering toolsets. You win by leveraging our product and technology developments. In addition, by using a single, continuously improved technology platform, the knowledge base you create can be maintained and secured.







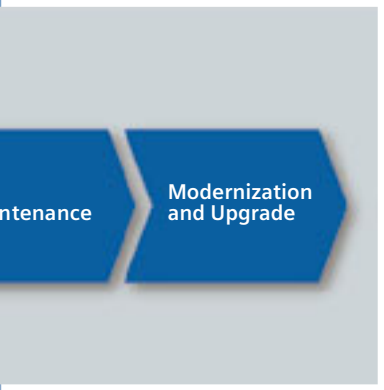


For every industry

Whether you're in a process industry, a discrete industry, or something in between, Totally Integrated Automation forms a unique foundation for customized automation solutions in all industries.

Production workflow

Totally Integrated Automation is the foundation for the control of your entire production line – from incoming materials to outgoing products and will make a significant contribution to the optimization of your production systems.



Production life cycle

Totally Integrated Automation uses integrated engineering, programming, communications, and diagnostics to secure your investment from conception through maintenance. Your system benefits throughout its life and your intellectual investments are secured through modernization.

... Totally Integrated Automation enabling improved competitiveness for all industries

Totally Integrated Automation combines your objectives with Siemens products and technologies. Siemens is the only supplier to offer an integrated foundation for implementing customized automation solutions, in all industries.

Totally Integrated Automation provides interoperability and transparency to the entire manufacturing enterprise. This level of integration guarantees seamless data flow – from every field device to every controller up to your business systems.

Using Totally Integrated Automation, you will optimize your entire production life cycle

You benefit from the seamless interoperability and transparency of Totally Integrated Automation during the entire life cycle of your plant. All components and engineering tools are designed to provide you with the support you need during every stage of your system's life cycle.

Design and engineering

Increasing your engineering efficiency will enable you to tap into significant savings. The SIMATIC PCS 7 Distributed Control System is one example of how the principles of Totally Integrated Automation come together. Not only does the PCS 7 system use the standard controller and visualization software, but it is also configured with the same development environment. The same hardware platform can now provide you with both process and discrete control. This reduces maintenance overhead, and spare parts management.
There are also powerful pre-engineered software modules available for specific applications.
Through automatically generated operator screens and messages, you can quickly create systems for visualizing your plant operations.

Installation and commissioning

You need to reduce start-up and commissioning time and get your system up and running as quickly as possible. Surprises can't be tolerated. Any misstep, and your project is behind schedule.

The integrated engineering environment in Totally Integrated Automation enables you access to all components of your automation system across all of your networks from any available communications point. Component Based Automation, based upon PROFINET, the Industrial Ethernet standard, enables you to design seamless interoperability into your systems. Complete sections of a plant can be developed in parallel and tested in advance. When the sections arrive on-site, they are fully functional and can be connected using standard Ethernet communications components. This leads to significantly reduced start-up time and gets you to market more quickly.

Operation

Modernization and Upgrade

Maintenance

Using Totally Integrated Automation, you will optimize your entire production life cycle

Operation

It's everyone's responsibility to improve productivity. Not only do you need to optimize individual processes, but you need to coordinate across multiple processes and coordinate with business systems.

Using Totally Integrated Automation, you can model and optimize plants and production processes. Our MES applications provide you with all the necessary tools in the production process such as archiving, quality assurance, product data definition, and materials management. They are integrated into a framework and communicate quickly, securely, and efficiently within the company and outside the company. In addition, they minimize downtime by informing you immediately about the status of your plant no matter where you are.

Alarms and fault messages are automatically routed to the visualization systems or to trigger activity in other plant or business systems. Not only do you save programming effort, you also improve the visibility and efficiency of your operations.

Maintenance

Managing a service and maintenance organization is complex, and any process simplification will save you time and money. With Totally Integrated Automation, you can use the same components throughout your operations, significantly reducing training for your service personnel.

Fail-safe versions of our controllers are available as are high-availability versions in redundant design. Hot swappable modules allow maintenance during operation. And user parameters can be loaded over the network at the press of a button, without additional overhead.

Even if the system experiences faults, there is a wealth of fault detection and troubleshooting tools available to you. For example, you can perform remote diagnostics of your

Design and Engineering

Installation and Commissioning

Operation

Production Life Cycle

automation system via telephone or Internet. In many cases, service personnel don't even have to be on site to eliminate faults. The result is an increase in your plant's availability, while you save time and money.

Modernization and upgrade

Respond faster and more flexibly to changing market requirements. Totally Integrated Automation enables you to expand or convert your plant without interrupting operations. Distributed I/O devices for integrating new drives, valves, instruments or sensors can be added or removed on the fly. This allows you to take advantage of our advances in technology during your retrofit, because new TIA product generations are integrated easily into existing systems. The unique integration of Totally Integrated Automation is a defining feature right back at the development stage of our products and systems. This guarantees system compatibility and ensures that you can continue to work with the familiar engineering tools.

Also, with Component Based Automation – a technology integrated within the SIMATIC family to simplify object-oriented modular design – you can modernize or adapt your production lines to new products particularly quickly. Machines or production areas can be replaced or added plug & play. New machines can be integrated into the existing plant networks easily on-site, without changing the control program and without affecting already tested functions.

Modernization and Upgrade

Maintenance

With Totally Integrated Automation you can optimize your entire production workflow

Enterprise Resource Planning (ERP)

Management Level

Operations Level

Control and Field Level

Controllers, Distributed I/O, Human Machine Interface

Motion Control, Computer Numeric Control

Industrial Controls and Switching Devices

Totally Integrated Automation

Inbound Logistics

Process

Manufacturing Execution Systems (MES)

Process Control, SCADA System, Industrial Software

Industrial Software

Industrial Communication (PROFIBUS,
PROFINET/Industrial Ethernet, AS-Interface)

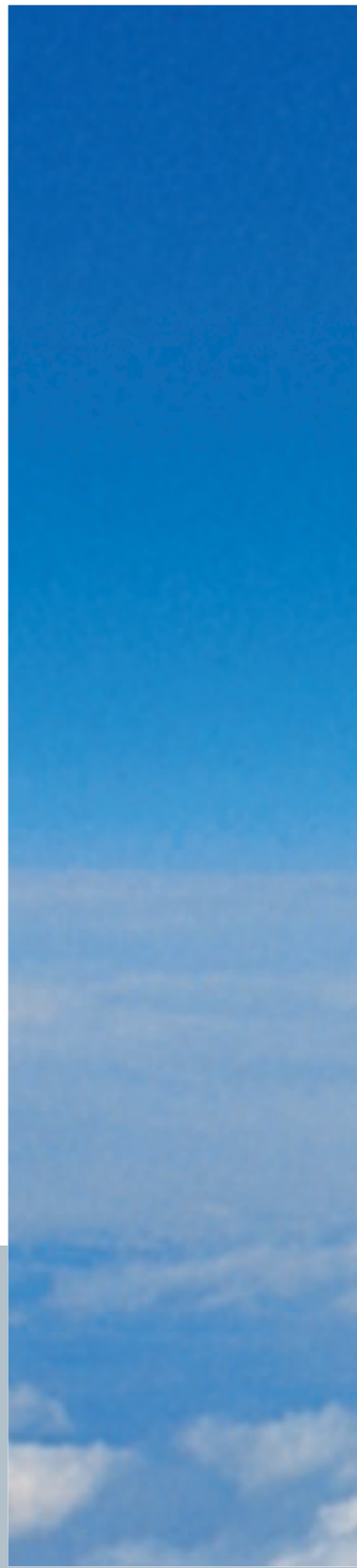
Sensor Systems, Drive Systems,
Safety Integrated

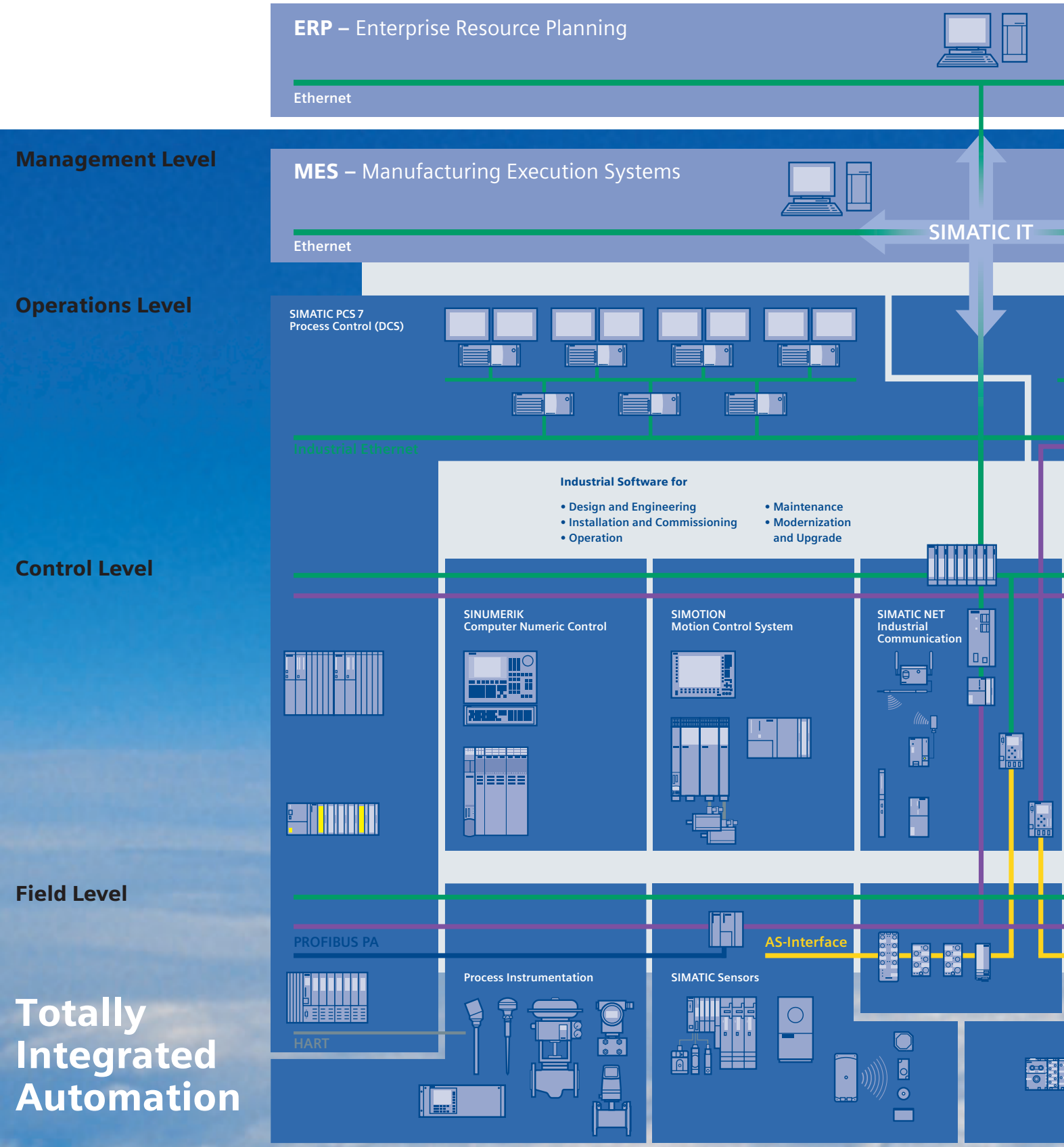
Discrete

Outbound Logistics

With Totally Integrated Automation, you can secure your current investment while still taking advantage of further innovations

Your company's intellectual capital is more valuable than ever in today's highly competitive business environment. Strategic decisions surrounding the future of automation technology become a key factor in sustaining your competitive edge. By using Totally Integrated Automation, you preserve the investments you've made in capital and intellectual property by guaranteeing compatibility across different generations of products and different types of applications. The interoperability of Totally Integrated Automation ensures the highest level of system compatibility in our current and future products and systems. You will benefit from Totally Integrated Automation now and throughout the life of your system.





Totally Integrated Automation


SIMATIC WinCC
SCADA-System
SIMATIC Controllers
Modular / Embedded / PC-based
SIMATIC HMI
Human Machine Interface
Safety Integrated
SIRIUS Industrial Controls
SENTRON Switching Devices
SIMOCODE pro
Motor Management System
SIMATIC Distributed I/O
SINAMICS Drive Systems
PROFINET
Industrial Ethernet
PROFIBUS
AS-Interface
Totally
Integrated
Power
KNX/EIB
GAMMA instabus

SIMATIC: Totally Integrated Automation in practice

SIMATIC, the most installed automation platform in the world, is based upon the principles of Totally Integrated Automation: seamless interoperability and transparency. Three core design elements, common data management, common communications, and common engineering environment, allow SIMATIC users to achieve the benefits of Totally Integrated Automation.

Core elements of SIMATIC
Common data management

Through SIMATIC's common data management, you reduce time-consuming, redundant data entry tasks and eliminate faults caused by incorrectly entered data. All software tools share the same integrated data. This eliminates redundant data entries, and thus, potential sources of error.

Huge savings in time result. You only have to create symbolic references in one place, so those defined in any tool are understood by all the other tools within the integrated engineering environment. And thanks to built-in multiuser capability, data consistency is guaranteed even when several people are working simultaneously on one project. In addition, defined parameters are passed on in the engineering system across network boundaries to the field level including sensors, actuators and drives – even via the Internet.

Common communications

You can create a highly integrated manufacturing facility by optimizing information flow. With SIMATIC, all the hardware and software components speak the same language. For this reason, it is extremely easy to configure data flow, even across different physical networks and all systems such as SIMATIC, SIMOTION and drive systems.

PROFIBUS and PROFINET/Industrial Ethernet, for example, are treated identically. Changing from one to the other requires only that the communications processor is changed – without modifying the user program and without additional engineering overhead. The integrated communications system, from the corporate management level to the field level, is based on internationally recognized standards like PROFINET/Industrial Ethernet, PROFIBUS and AS-Interface. And it supports global information flow with Internet technologies.

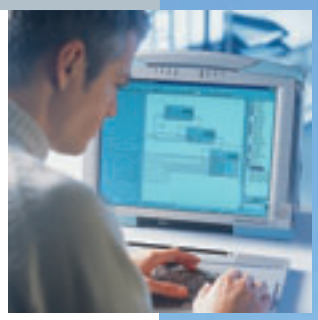
Common engineering environment

You can reduce your programming overhead through the use of a common engineering system. Within the SIMATIC family all of the engineering tools, from diagnostics to configuration, are integrated within a project manager. The hardware components and the communication system are centrally configured, and all software tools are coordinated to work with each other. All of this supports you during the complete engineering process for the entire life of your systems.

Whether you are programming a PLC or a PC-based solution, configuring a human machine interface, defining communication links or implementing motion controls, all the tools work seamlessly together. Our PLC and PC-based systems use the same engineering tools as our process control system. And when you create control and visualization components for one platform, they are seamlessly available across all platforms.

This modular concept makes applying otherwise complex technologies much easier. Software libraries we supply can simplify the implementation and integration of MES components. Our MES components are coordinated by SIMATIC IT Framework and are easily integrated with plant floor and back-office/front-office systems.

Totally Integrated Automation at work



SIMATIC Software

“Only precise diagnostics enable plant availability approaching 100 %.”

When BMW was looking to start the new production lines of the 5 series and 7 series automobiles, they needed a way to reduce system downtime to stay ahead in a very competitive marketplace. By deciding to use IEC 61131-compliant programming languages, they were assured that control logic was quickly understood and extremely easy to analyze by their engineers, especially during troubleshooting. And by choosing SIMATIC Industrial Software, BMW was able to optimize their engineering and maintenance processes for additional downtime reduction by relying on an integrated systems approach to diagnostics that automatically generates and displays fault messages on the user’s operator panels. SIMATIC’s open standards, powerful diagnostics and an integrated engineering environment improve plant availability today to over 99 %.

SIMATIC Controllers

“Safety, the linchpin of unrivaled reliability and availability, takes top priority where the runway lighting at airports is concerned.”

With five takeoff and landing runways totalling over 14 miles, Boston’s Logan Airport is one of the busiest airports on the east coast of the United States. To ensure runway safety, Logan, which was built in 1923, had to update the automation system for its runway lighting. Bids were to focus primarily on reliability, user-friendliness and extensive diagnostic options so that problems could be resolved more quickly. These are precisely the advantages offered by the high-performance SIMATIC S7-400 family from Siemens. Redundancy on a large scale helps maintain the high availability and reliability of the S7-400. The new facility in Boston has since made a significant contribution to air safety in this metropolitan city.

SIMATIC PCS 7 – Process Control System

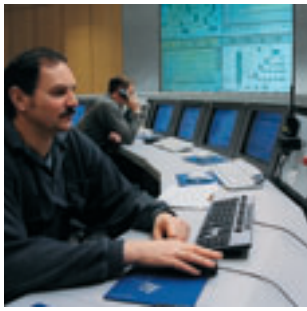
“In the pharmaceutical industry, seamless documentation of all data, even in the case of small batches, is indispensable to validation.”

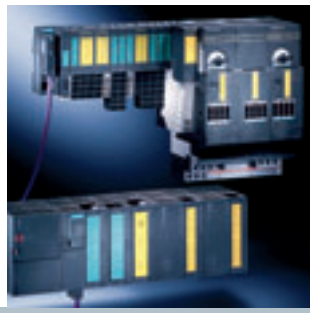
Cost-effective implementation of international standards is essential for even small-scale manufacturing. So when Novartis needed to modernize a pharmaceutical pilot plant, SIMATIC PCS 7 was the system of choice. Since active pharmaceutical ingredients are manufactured in the plant which are also to be sold in the USA, FDA-compliance is required – even for production lines outside the US. SIMATIC PCS 7 automated the entire process and guaranteed seamless collection and documentation of all relevant information.

Safety Integrated

“Safe, efficient automation of critical processes is easy and cost-effective with Totally Integrated Automation.”

Cost-effective, easy to implement safety for personnel, machinery, and plant was critical for one of the largest processors of crude oil in the world. Shell used Safety Integrated to implement a refinery-wide modernization. The system was brought up to the very latest standards of safety, in some cases even exceeding levels required by law. Twenty-five percent of the distributed inputs and outputs are now automated with Siemens fail-safe technology. Safety Integrated provides a very cost-effective solution by incorporating the principles of Totally Integrated Automation.





SIMATIC IT

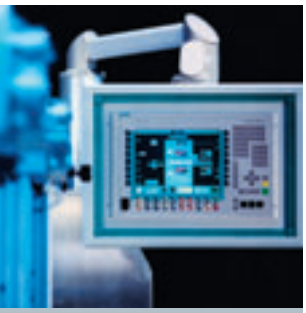
“Only flexible production systems make it possible to get new products to market faster.”

Improving plant utilization and reducing time-to-market for new products are just two of the results of having a flexible production system. SIMATIC IT delivered Bayer Crop Science AG these advantages in the face of stiff competition in the pesticides market. The design of their new multipurpose plant enables extremely flexible production. A seamless electronic link between the control system and their new SAP system was also required to achieve the desired solution. A totally integrated production control system – from process automation with SIMATIC PCS 7 right up to the MES solution with SIMATIC IT – coordinates and controls all processes in the plant, maintains all information from the plant and coordinates it automatically with the corporate SAP system.

SIMATIC HMI – Human Machine Interface

“When you have a host of different recipes, changing from one to the other without losing time while maintaining consistently high quality is crucial to success.”

Sometimes the need for safety extends far outside the factory walls. Continental, one of the world’s largest tire manufacturers, has people’s lives depending on the security of their tested recipes. And to maintain the safety and security of these recipes, Continental turned to SIMATIC HMI. Continental needed a strategy to maintain over 100 recipes used in the production of tire rubber. And these recipes have to be ready at any time for use on the plant floor. All the recipe details and the collected quality data are stored centrally in one database, secure but ready to be called up on demand.



SIMATIC NET – Industrial Communications

"Faster new plant construction is a significant contribution towards reducing time-to-market."

SAB Miller (South African Breweries) used SIMATIC NET to go from management approval to production in a new brewery in just 18 months. As a global player and market leader, SAB Miller wanted to construct the most technically advanced brewery in the shortest possible time. Consistent use of distributed automation on PROFIBUS and AS-Interface along with reductions in the cabling overhead guaranteed that the ambitious project goals with regard to installation time and costs could be achieved. Over 1,000 different field devices are networked in the brewery using PROFIBUS. This included over 400 servodrives in the packaging hall alone. Thanks to the use of intelligent field devices such as the SIMOCODE motor protection relay, maintenance personnel can call up diagnostics information from the field devices from the central control room.

SIMOTION – Motion Control System

"The highest possible levels of precision and minimum use of materials in preproduction are the be-all and end-all for competitive end products."

Dimeco used SIMOTION to reduce waste in their new flexible punching and bending machines. Dimeco developed the first mechatronic roller feed based on the SIMOTION Motion Control System and Siemens drives. SIMOTION combines complex motion control, logic and technology functions within a single controller. All engineering tasks are implemented with the integrated graphical engineering tool SCOUT. All production parameters are stored in the SIMOTION memory along with up to 200 machine recipes. SIMOTION guarantees continuous and reproducible manufacturing precision of ± 0.05 mm. The multiaxis design also enables zigzag control of the roller feed in order to interleave complex cutting patterns.

SIMATIC Sensors

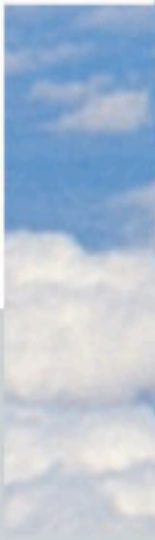
“RFID systems optimize material flow and logistics.”

Skoda relies on Siemens RFID systems to reliably identify vehicle bodies in its automotive production. From vehicle body construction to the paint shop and assembly, mobile data memory devices – so-called transponders – are found on all skids, which carry the individual vehicle bodies. Each transponder contains all the necessary production data for the individual vehicle bodies such as vehicle color, type and order number. This data is read at each step in the production process and updated again after the step is completed. Special high-temperature data memory devices are used to cope with the especially harsh environmental conditions in the paint shop. Thanks to the RFID system, the updated production data of each individual vehicle is available at each production step throughout the entire production process. The permanent availability of this data enables maximum production quality.

SITRANS – Process Instrumentation

“Detailed fault messages are indispensable for early, precise fault detection.”

DuPont Performance Coatings uses PROFIBUS to maintain reliable instrumentation in hazardous areas. In their state-of-the-art water-based paint factory, DuPont Performance Coatings’ engineers are constantly searching for more efficient, safe, and reliable production strategies.
The SITRANS process instruments feature simple installation and outstanding communication and diagnostics capabilities. These devices have become established standards for pressure and temperature measurement. The use of these instruments resulted in significant time savings in critical areas such as project planning, documentation, and start-up. It is particularly easy to integrate the SITRANS field devices into SIMATIC PCS 7. The engineer can read the current diagnostics status of the field device at any time over PROFIBUS. In the event of a fault, operators receive a detailed message that quickly directs them straight to the problem.



Using Totally Integrated Automation you will benefit from our complete service and support

Totally Integrated Automation is at home no matter where in the world your plant is located or where you deliver your machinery. Our service and support is available to you and your customers everywhere. And we provide comprehensive support from planning, through start-up, to modernization, for all of your automation solution needs.

Design and Engineering → Installation and Commissioning → Operation → Maintenance → Modernization and Upgrade

Online support

Online support is available 24/7 via the Internet.

Technical support

Technical support is available to help you get the answers to the questions you may have concerning our products and technologies.

Technical consulting

Consulting services can be used to help apply the latest technology and product into your new and existing systems.

Configuration and software engineering

A full range of configuration and programming services can be employed to help you during system implementation and maintenance.

Field service

Leverage commissioning and maintenance services to meet your machine availability requirements.

Repairs and spare parts

Complete spare parts planning helps you maintain equipment availability that meet your production requirements.

Optimization and modernization

Services to help you maintain the operating conditions and improve performance during the systems operating life.

Always up to date

Totally Integrated Automation
www.siemens.com/totally-integrated-automation

Solutions for your Industry
www.siemens.com/industrysuites

Service and Support
www.siemens.com/automation/service&support

Products, Systems and Contacts
www.siemens.com/automation

PUBLICIS

Subject to change without prior notice 10/07 | Order No. E20001-A140-M101-X-7600 | DISPO 21507 | 21/XXXX MK.GC.LT.YTIA.52.8.01 WS 10073. | Printed in Germany | © Siemens AG 2007

Siemens AG

Automation and Drives

w w w . s i e m e n s . c o m / a u t o m a t i o n