

# SIEMENS

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Ladies and gentlemen,

It's a pleasure to welcome you here at the SPS/IPC/Drives in Nuremberg. I'd like to give you an overview of the activities and innovations in the Industrial Automation Systems Division of Siemens A&D – A&D AS for short. These developments range from the Logo! logic modules and from PLCs (programmable logic controllers), PC-based automation and programming devices to distributed I/O, image processing, industrial software and control systems as well as the Simatic IT MES products (manufacturing execution systems). As you can see on the organization chart, A&D AS also includes the activities of the acquired companies Compex, Orsi and Moore.

In addition, I'd like to pick up the thread from the A&D press conference two weeks ago in Dormagen (Germany).

**Demand for integrated automation technology promotes consolidation among suppliers**

- End customers have ever more specific needs for an ever-greater diversity of products. To meet these more diversified needs, production systems must become more flexible.
- The transparency of today's global communications infrastructure increases the continuing pressure on prices at an even faster rate.
- The financial markets expect profits. Companies must respond by increasing their productivity.

While in the past automation technology was characterized by island solutions, it is now based on distributed intelligence and networking. Automation technology is converging more and more with information technology and its standards – like the Internet, for example in remote diagnostics and service, or like ERP (enterprise resource planning) systems. The standards used in information technology are becoming increasingly important in automation.

The ever-increasing complexity and the need for long-term service are taking automation technology further away from solutions based on “best-of-breed” products and toward standardized, comprehensive platform solutions. This shift enables customers to protect their investments and to reduce the costs of maintenance or of making changes. Given the multitude of required innovations, “best-of-breed” products can no longer be relied upon to produce an adequate return on investment in this competitive environment. This trend accelerates the consolidation process among automation suppliers: Companies are either acquired or they disappear from the market entirely.

## **Totally Integrated Automation – automation platform for all manufacturing industries**

At Dormagen we once again highlighted Totally Integrated Automation as the universal automation platform from Siemens for all manufacturing industries. Totally Integrated Automation provides a simple approach to achieving vertical and horizontal integration of automation technology into operational processes as it provides three-fold uniformity with integrated engineering, efficient communications and consistent data management.

To achieve horizontal integration, the same standard hardware and software components are used in the actual production process as in the upstream and downstream processes. Our customers benefit by reduced engineering, hardware, spare parts/logistics and training costs.

In vertical integration, integrated communications – from the MES level to the field level and Simatic IT – link the production area with the customer's existing IT landscape: Advantages include seamless coordination of the production and the business processes, quick reaction times to market changes – a short time to market – and, as a result of the transparent information flow, optimized warehouse logistics and supply chain management throughout the life cycle of the system.

The interfaces of Totally Integrated Automation have been designed so adaptable that they can be seamlessly and simply upgraded to support future technologies, even at a rapid pace of innovation. You are all familiar with our continual innovations, improvements and enhancements – to name just a few – like the Simatic controllers, the related I/Os, HMI (human machine interface) systems, engineering software and industrial communications networks with keywords such as Profibus, Industrial Ethernet and Profinet. A bit later I'll highlight a few of the many innovations we are presenting at this year's SPS/IPC/Drives.

## **Production management and automation – two inseparable worlds**

Another highlight at the Dormagen event was Simatic-IT, our line of MES products. In our view, the horizontal integration at the automation level has been completed in engineering terms. That doesn't mean that there will be no more innovations at any of the levels of the automation pyramid, nor that all manufacturing companies are already integrated horizontally. On the contrary, this is where progress continues unabated – with innovations and increasing horizontal integration across all industrial sectors.

In the future, the horizontal integration of a manufacturing company will no longer occur just at the level of automation technology but increasingly also at the MES level: We are using Simatic IT to integrate the often still isolated islands of automation – from receiving to the primary and secondary processes to shipping.

The nearly completed line of Simatic-IT products for MES we've introduced at Dormagen represents a great step forward in optimizing manufacturing processes. And it enables us to provide our customers with an integrated line of products and services from a single source to make their manufacturing operations more profitable. Our customers – both end customers and systems integrators – gain significant cost advantages over their competitors. To integrate this line of MES-related products as a subset into Totally Integrated Automation we have formed a new subdivision of Industrial Automation Systems "Automation Systems – MES" effective October 1. In this new business unit we'll be able to better coordinate and vigorously advance these increasingly convergent technologies. What's more, these MES products can share the well-developed global marketing channels for Simatic products and Totally Integrated Automation.

## **The four parts of a complete production process**

At Dormagen we divided production processes into four important subprocesses:

1. The input logistics
2. The actual production process or primary process
3. The follow-on process or secondary process
4. The output logistics

Automation of the input and output logistics is largely PLC-based – across all industrial sectors.

By contrast, distributed control systems (DCSs) tend to be used in the primary process, especially in process-engineering oriented industries such as Oil & Gas, chemicals and pharmaceuticals. In this context, at Dormagen we presented Version V 6.0 of PCS 7, our advanced and powerful process control system based on our standard Simatic controllers. This is one of our most important recent A&D-AS innovations, and an excellent product line for all kinds of tasks in process engineering as well as manufacturing engineering.

In the primary process of the traditional manufacturing industries – such as the auto industry – PLC technology is predominantly used, often in combination with CNC (computer numerical control) technology.

The automation of the secondary processes, which involve tasks such as packaging or bottling, is dominated by more advanced motion control technology in combination with PLC technology. This is equally true in discrete manufacturing as in the process industries.

## **Hybrid industries – increased productivity through integrated automation technology**

Many industries use a mix of different automation technologies – in different proportions depending on the particular industry. The traditional off-the-cuff classification of automation technology into process or manufacturing industries is therefore no longer useful. Instead, both the perspectives of process engineering and of discrete manufacturing must be combined in an integrated automation system for the market segment of hybrid industries. This is an especially interesting market for Siemens.

Integrated automation using Totally Integrated Automation – from receiving to the primary and the secondary process to shipping, from the field level to the ERP level – can provide the greatest opportunities for productivity increases in this market segment. Siemens is the world's only manufacturer that can supply such an integrated product line – for all manufacturing sectors from process industries to discrete manufacturing to hybrid industries.

## **SPS/IPC/Drives – innovations related to Totally Integrated Automation**

Now I'd like to continue our theme from the Dormagen conference and delve into the subject that takes center stage here at the SPS/IPC/Drives – manufacturing engineering. In other words, everything related to the field of PLC, industrial PC and drives technology – which is used more or less intensively in the four above-mentioned subprocesses of a manufacturing process.

In this field the rate of innovation continues to be very fast. The example of one typical secondary process – bottling – clearly highlights the innovation drivers in the PLC, industrial PC and drives environment. In this field the requirements continue to become more challenging, including:

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- Reduction of the engineering overhead
- High clock rates with integrated motion control
- Integration of control and HMI functions
- Integrated communications with Profibus and Ethernet
- Short downtime and changeover intervals
- Safety of people and machines through uniform safety design
- Optimized material flow control

These increasingly demanding requirements are reflected in the innovations I have selected for this year's SPS/IPC/Drives.

### **Reduction of the engineering overhead**

The new version V5.2 of our Step 7 engineering software will be another contribution to reducing engineering overhead. The new version will start shipping in December 2002 to replace Step 7 V5.1, which has been shipping since August 2000. In Step 7 V5.2 we have realized many new functions:

- To provide rapid, selective access to current information and software updates we are now linking Step 7 with our Internet product information system. All current information such as technical data, FAQs or documentation is therefore accessible with a mouseclick. Software updates too can be performed just as simply.
- To save time in planning projects, the new version supports the concurrent planning of subprojects involving several people. These subprojects can then be combined in the system.
- The new LAD/SBD/STL editor is now available as a user interface designed to reflect the latest usability knowledge. This tool excels in its ability to visualize all the important information at a glance.

## High clock rates with integrated motion control

A wide range of seamlessly complementary A&D solutions is available for high clock rates and integrated motion control – based on Simatic-S7 PLC technology, with the addition of motion control functions. Plus our Simotion system, which we presented last year, with integrated motion control functions. Joachim Zoll will be talking about this a bit later.

Here are some examples of our recent innovations:

- New CPUs for the S7-300 Series of the Simatic programmable controller. The three CPUs provide a choice of performance levels, are of particularly compact design, and provide up to three times the processing speed of the previous models. In fact, floating-point commands are executed fifteen times faster than before. As a result, these CPUs support higher machine clock rates, shorter throughput times and, consequently, higher productivity. At 40 millimeters, the new CPUs are only half as wide as the previous S7-300 CPUs.
- The FM 458-1 DP, the new application module for the S7-400 controller, can be used for the entire range of technical and control tasks in mechanical and systems engineering. It is particularly well suited for highly dynamic motion control and for the control of speed- and position-synchronous linear and rotary axes. This is also the first Simatic application module that simultaneously performs technical tasks – such as counting, measuring and positioning – and integrates cam sequencing and other control functions. Other possible uses include the synchronization of drives with multi-axis applications as well as controls for winders and hydraulic units.
- The Simatic S7-400 uses the new systems function “isochrone mode” in controlling fast processes to now also provide defined and reproducible process reaction times. The new function is especially well suited for high-speed machine applications with distributed structures. To achieve this, the entire automation solution – from the CPU to the connected I/O modules – are

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synchronized with the clock pulse of the “equidistant” Profibus. This clock pulse is then applied to all modules and ensures equidistant and synchronous signal processing. As a result, all data are communicated consistently – meaning logically and synchronous. The Step 7 engineering tool – which automatically computes the clock-pulse parameter – makes it easy to parameterize and start up a system in isochrone mode.

### **Integration of control and HMI functions**

In this context I'd like to highlight innovations in two of our product lines:

- The Simatic WinAC MP soft PLC, which can run on Windows CE on the Simatic MP 370 multifunctional platform, is the first product capable of performing control and visualization tasks on a single platform through software. Simatic WinAC MP is especially well suited for data-intensive tasks. The MP 370 contains no hard drive or fan and is realtime-capable and deterministic. This platform provides the flexibility of the PC world along with more robust hardware.
- And our control systems for controlling, operating and monitoring are becoming ever smaller and more powerful. The Simatic C7-613 for example is a low-cost device that features a four-line text display and is especially compact. Or take the Simatic C7-635 keypad: It includes a pixel-graphic 5.7-inch blue-mode display, and its powerful dual-processor design provides high performance even for hefty automation tasks.

### **Integrated communications with Profibus and Ethernet**

Profinet combines the bodies of experience on which Profibus and Industrial Ethernet are based and defines a new market standard for Ethernet-based communications. Profinet forms the basis of the Ethernet strategy of Siemens A&D. The new version 2.0 supports high-performance data exchange between intelligent devices.

Based on the Profinet standards of Profibus International we have developed Component based Automation – a solution for modular automation tasks. Benefits of this solution include shorter on-site start-up time, thanks to pre-tested systems modules and machine modules, plus convenient reuse of the user software. Component based Automation simplifies data communications between intelligent field devices and automation devices on Ethernet and on Profibus.

### **Short downtime and changeover intervals**

In this context we have added new functions to the operating system for Simatic-S7-400s, the modular high-performance controllers. One feature of the new version is “isochrone mode”. This feature is designed to boost speed and is ideal for high-speed machine applications with distributed sensors and actuators. The capability of making changes in the hardware configuration “on the fly” – with the system running – is an especially useful feature for short downtimes as well as changeover times, and for applications with a “non-stop requirement”, in other words: systems that must not be turned off. The removal or replacement of components is simplified and speeded up, for instance when process engineering changes are necessary or processes need to be optimized. Distributed peripheral equipment and I/O modules can be added, removed and reparameterized without feedback – that is, without disturbing the continuing operation of the system.

The subjects “**Safety of people and machines through integrated safety design**” and “**Optimized material flow control**” will be addressed separately today. Thomas Schott will talk about these in some detail a bit later.

In concluding I’d like to briefly discuss two subjects that also fall into my sphere of responsibility:

### **Micro Automation Sets – the Siemens answer to “low-cost automation”**

Contrary to the notion of “low-cost automation” – a theme that is often mentioned nowadays and might suggest that automation can be cheap – inferior products don’t stand a chance in this area of automation. Our line of Micro Automation Sets provides convenient and economical solutions especially for “small” automation tasks – such as compact, flexible machines that are frequently used as stand-alone equipment for small lot sizes. Micro Automation Sets are compatible and pretested combinations of automation components. They enable the user to solve automation tasks a lot faster than in the past –like temperature-controlled switching, speed changes and positioning, even wireless signaling and switching via SMS. These sets are designed for their respective application in the areas of operating and monitoring, communications, telecontrol engineering, drive technology as well as measuring and sensor technology, and they save time – from planning and purchasing to the technical implementation. Micro Automation Sets are largely based on the compact Simatic 7-200 controller or the Logo! logic module. Depending on their intended range of tasks, individual sets are assembled that may for instance contain text displays, frequency converters such as the Micromaster 420, motors, measuring instruments and sensors or communications gear.

### **PC versus PLC**

And finally a statement by the market leader regarding the eternally new and forever disputed question: “When will the PC take the place of the PLC?”

We still can confirm only that the predicted migration trend from PLC-based to PC-based solutions is continuing, but at a very slow pace. We also note the trend, for the medium term, that our unit sales of programmable logic controllers and of the comparable PC-based automation systems are both on the increase. Even though our information indicates that the entire market contracted slightly last year. You’re all familiar with the statements and reports about the state of the global economy. The

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market growth of PLCs ranges around three percent annually; and for PC-based solutions it's in the two-figures range. Our worldwide market share of PLCs is 32 percent. And we are using PC-based technology to advance even beyond the traditional PLC applications into new, additional fields of application – for instance in electric power management.

Ladies and gentlemen,

Siemens Industrial Automation systems will continue to persistently reinforce its position as the global market leader through innovations and a focus on the customer.

Thank you for your attention.

Now allow me to introduce my colleague, Thomas Schott.