

SIEMENS

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– Check against delivery –

Dear Ladies and Gentlemen,

I want to extend a warm welcome to you here at the SPS/IPC/Drives 2005 in Nuremberg and am pleased to be speaking to you now for the third time, after 2002 and last year, about the innovations and strategy of the A&D Division Industrial Automation Systems – or A&D AS for short.

To start with, I would like to offer an overview of figures for the Siemens Group Automation and Drives (A&D) for the past fiscal year.

In fiscal 2005, A&D experienced double-digit growth in group profit, sales and new orders. Group profit rose by 12% to €1.210 billion. In addition, A&D further dramatically expanded its business activities through its takeover of Flender Holding GmbH, a leading supplier of industrial gear units, and the Robicon Corp., a leading manufacturer of medium-voltage converters for AC motors in the USA. Both of these

takeovers were completed in the fourth quarter. Sales at A&D rose by 11% to €9.844 billion in fiscal 2005, while new orders increased by 13% to €10.190 billion. At the beginning of fiscal 2006, A&D took over the Electronics Assembly Systems Division, which had been part of the L&A Group until then.

In particular, I would like to stress our sustainable capability for innovation. A&D invested roughly €650 million in R&D during the last fiscal year. Plans are to intensify our work on research and development and on technological innovations, with a further increase in the total investment for these areas during the current fiscal year.

Industrial Automation Systems (A&D AS)

The SPS/IPC/Drives 2005 serves as a platform for showing you Siemens range of powerful, economical, flexible and safe products, systems and solutions for our customers' machines and plants. The Siemens booth this year focuses on two things: one being the latest trends and developments involving Profinet with the open and cross-vendor Industrial Ethernet standard for company-wide automation, the other being the new products and systems for gear technology added to the Siemens range through the integration of Flender.

Siemens' main exhibitor at this year's trade show is the A&D Division AS, which I am representing here. AS stands for Micro Automation, which encompasses everything from the logic modules Logo! and the mini PLCs, to programmable controllers, PC-based automation, programming devices, distributed I/Os, HMI (Human Machine Interface), industrial software and process control and even software products for "MES" which stands for "Manufacturing Execution Systems". The AS range can basically be categorized under the brand name Simatic.

Market share of programmable controllers rises to 35 percent worldwide

First off is a figure that is normally cited at the SPS/IPC/Drives fair. Business with the Simatic programmable controllers continues to be very strong. Despite tough general economic conditions, we managed to stabilize our 35 percent global share. This is a nice success story considering that we started off in 1981 as a “long shot” with a market share of just 8 percent.

Totally Integrated Automation – for all automation tasks

A&D relies on TIA (Totally Integrated Automation), our basic technology into which we integrate all our innovations and acquired technologies. The core of this technology is the Simatic S7 controller, complemented by Simatic HMI (Human Machine Interface), the process control system Simatic PCS 7, industrial communications Simatic Net and our MES (Manufacturing Execution Systems) range Simatic IT.

A trendsetter in hybrid automation

With our comprehensive TIA range, we are the only vendor to offer sound solutions for utilizing the productivity potential arising from the increasing merge between production and process automation into hybrid automation. TIA offers particular advantages especially for plants with hybrid automation, in other words those with integrated technology for production and industrial process production steps. We have consistently expanded our range of products and services and transformed it into an integrated technological range with the continuous input of pioneering technologies. That way, our customers are always using state-of-the-art automation technology and can integrate it into their plants with minimal effort. We are well-versed in the automation of production workflow and production life cycles of our customers as well as the implementation of vertical IT integration – in any imaginable industry.

Due to the limited time, I will not get into the entire breadth of our portfolio, but would like to highlight a few individual facets. You are most likely aware of our innovations and success in the area of controllers, distributed I/Os and HMI. I

want to focus on three current examples of how we are expanding our existing markets and breaking into new markets with new products.

**Discrete automation: From a digital to a real factory –
Simatic Automation Designer optimizes engineering workflow**

**Process control engineering with Simatic PCS 7 – with maximum
scalability and flexibility**

**Vertical integration with Simatic IT – integration of production and
business processes with Manufacturing Execution Systems (MES)**

Topic 1: From a digital to a real factory – Simatic Automation Designer optimizes engineering workflow

The success of a production company essentially depends on how quickly it can recognize and react to market requirements. New plants must be designed and constructed both quickly and according to a highly secure plan. At the same time, increasing pressure from the cost side forces increased productivity.

One topic of intense concern to us lately has been the “Factory of the Future” or the “Digital Factory”. We are presenting the “Automation Designer” for the very first time at this year’s trade show. This product is a crucial stepping stone from the “Digital Factory” to the “Real Factory“. Our vision for this and the task to realize this vision which we will be mastering jointly with our customers is something that I think deserves a closer look:

Basic idea of the “Digital Factory” and our vision

The basic idea for the “Digital Factory” and our vision is to set production planning entirely in the digital factory with a completely virtual display and simulation before actually implementing the plan. Products are not released until they have been run through the digital factory successfully and until all optimization possibilities for product design and production have been completely implemented.

The digital factory intertwines product development with production planning. An integrated process chain requires a seamless transition from the digital factory to the real factory. This is where automation plays an important role by filling the gap between both worlds.

Solutions that enable a universal view of the process are required to keep track of the success factors – flexibility, reusability and data consistency – in the transition from the digital factory to the real factory.

Optimizing engineering workflow in the configuration of plants is an especially interesting area for increasing savings potential. That is why we developed the Simatic Automation Designer. Aside from the generally open architecture for integrating it into existing system environments, it offers universal features such as reusable templates and an intuitive graphical configuration interface. Areas of application include any kind of material handling plants, such as those in the automotive or food and drink industries.

Existing data from the mechanically oriented planning phase can be used enriched with reusable, configurable automation components. This serves as a basis for creating the automation solution for programmable controllers and plant visualization (HMI) as well as the corresponding documentation, resulting in an integrated process chain.

The slide "Link between the virtual and real world" illustrates the workflow between the mechanical and electrical aspects and provides a small impression of areas of potential for hardware and software generation.

The decisive factor is a seamless transition from the digital process model to real production using integrated engineering. Only a seamless transition from the digital factory model to the real factory reduces commissioning times and ensures that real production hits the ground running.

So how do we transpose the digital factory into a real one?

Current weaknesses include insufficient integration of various software tools and their data. This is a problem since a universal view of all data requires interdisciplinary collaboration across the closed platforms of various tools. To achieve this level of integration, the Automation Designer runs on an open, graphical integration platform. Users get one common view of all the configured data and navigate through the integrated software tools to edit the data. The Automation Designer's special feature is its openness: it can integrate any software tool and data object as well as any user-specific system environment.

The slide entitled “Interdisciplinary collaboration in creating applications” shows what the user needs, namely solutions which “set a bracket around the employed software tools“. This requires integration of the configuration tool. Several possibilities are available to achieve this:

- Import/export interfaces (XML-based) for a “loose” link of software tools.
- Integratability into any user-specific system environment for a “tight” link. This involves the ability to synchronize common data at the “push of a button”, thereby ensuring data consistency.
- Possible integration of further software tools used in the user-specific creation process of the plant.
- Industry- and user-specific expandability.

The “Concept overview” demonstrates how you can divide the graphical plant specification into several phases:

1. Acquisition support

Method-supported tools are being used already in the acquisition phase more and more frequently to structure the accumulated data and store it in a reusable form. Solutions of this nature enable you to build on the existing data in the subsequent engineering step. With this solution, it is unnecessary to repeat data entry and prevent errors that may arise from it otherwise. That includes data concerning which automation components may be used, what equipment is necessary or the volume of project data that needs to be handled.

2. Implementation phase

The plant layout is already created during the plant’s planning phase and is employed as a central component of the user interface on the software tool. The Automation Designer can handle original CAD plans of the planned plant. This feature provides users with a transparent view of the plant structure while simultaneously enabling them to navigate into the integrated software tools.

First of all, the prepared, reusable templates for the equipment resources are assigned to graphical representatives in the CAD layout. Then, the user performs a further graphical specification of the plant by:

- Specifying the upline/downline relationships among the components and resources
- Specifying the programmable controller areas
- Specifying the mode groups
- Specifying the emergency off circuits
- Specifying the visualization (panel) areas

The projects of the connected target systems, such as programmable controller or HMI projects, and the project documentation are generated based on these templates.

3. Virtual commissioning

The digital factory already creates a very detailed digital map of the product, the equipment resources and the production process. It is also possible to simulate the digital factory based on this data. The simulation runs on a purely virtual plant model. Neither the programmable controllers nor the automation software are actually in use.

In the next step, the virtual components are successively replaced with real automation components. The virtual plant model is controlled by the real automation technology (software and hardware). That means the user can already identify and eliminate errors in the plant configuration before actual commissioning. Virtual commissioning is a crucial step for preparing real commissioning at a much higher level of quality.

First experience reports

We have already used the layout-oriented planning approach based on a cross-project engineering database in pilot projects for process plant engineering in

the automotive industry. The pilot revealed a savings potential especially in the configuration of logistical plants and plants for auto body production. Present-day logistical plants are often subject to a high degree of standardization in mechanical and control technology and are planned with layout orientation. Typical plants involve the use of skid conveyors or monorail overhead conveyors.

The most important point to remember is that the Automation Designer is just an intermediate step along the way from a digital to a real factory. Much of it is still a vision and requires more intense work. We want to join our customers in consistently forging ahead on this path.

Topic 2: Process control engineering with Simatic PCS 7 – with maximum scalability and flexibility

Now, I would like to turn to a technology which is not necessarily a focus of SPS/IPC/Drives, but which has been seeing some definitely interesting progress. Last year at this time, we reported on more than 3000 projects worldwide which were realized with our Simatic PCS 7 process control system. PCS 7 is still very much on the upswing. In the meantime, the count has risen to 4000 projects – mostly in hybrid, but also some purely process industries such as power generation. This strong demand proves that PCS 7, a key component for the primary process, has earned its place on the market as a modern and powerful process control system for all areas of application. We plan on continuing this success story based, among other things, on the industry-neutral Simatic PCS 7 Asset Management options kit. Integration of asset management into the control system erases the division which has existed to date and eliminates the need for additional hardware or software tools. Plant operators and maintenance staff can use the same tools and user interfaces with information filtered and prepared for their respective areas of work.

Topic 3: Vertical integration with Simatic IT – integration of production and business processes with Manufacturing Execution Systems (MES)

We are the only automation vendor to offer an integrated product family for integrating production and business processes – namely, Simatic IT. Our products and services are in rising demand by global companies for standardizing their processes. We are concentrating on the important markets in Europe, the USA and Asia. Industry focuses are food and drink (with dairy and tobacco), chemicals/pharmaceuticals and segments from the field of discrete automated manufacturing technology. We will be using our strong position backed by references to expand into other industries and regions.

Simatic IT has supported the industrial standard ISA-95 for several years. Among other things, this standard defines data models to transport information efficiently from one corporate level to another. Since last year, SAP has also been pushing this standard, enabling our joint implementation of data models via B2MML (business to manufacturing markup language). SAP operates at ISA-95 Level 4 with ERP, and Siemens at ISA-95 Level 3 – in other words, with MES and control systems.

The advantages of optimized interoperability between both levels generate enormous additional value for customers: it solves some of the most pressing concerns and problems facing production and plant managers at present. These include rising IT expenses both for integration and for maintenance or specifications requiring that production staff collect, monitor and control their key performance indicators (KPIs) according to demand. Aside from pure production planning, users can now also perform a special finite order planning in production. In the ERP system, the individual production orders are first created considering the resulting material and goods movements as well as the inventory. With the MES solution, the production data is prepared online in real time, guaranteeing persistent data synchronization between the defined planning and the actual status (closed loop). The MES system supports an automatic feedback loop of the production and planning status to the ERP area, where the orders undergo further processing. The integrated distribution of information ensures, for example, maximum data and information quality in real

time for employees from both the production and management area, thereby ensuring on-time production on the cost side, the optimized use of resources, minimization of the pooled capital and continuous improvements in production efficiency.

In the light of this, we have moved ahead in leaps and bounds with our MES range this year:

This summer we developed the OEE-DTM (overall equipment effectiveness and downtime management) product option for version 6.1 of its MES (manufacturing execution systems) software Simatic IT. The new software for the operational efficiency analysis of deployed machinery optimizes the return on investment (ROI) for producing companies. Whilst a world class OEE value in the manufacturing industry should be above 85 percent, today's typical value is only 60 percent. The new software helps manufacturers to increase the efficiency of his production plant.

In addition the new version (6.1) of the Simatic IT offers now complete fulfillment of ISA-95 requirements, the international standard for manufacturing operations. This is gained by three new software components:

- Client Application Builder (CAB) is a web-based, zero administration cost MES client development environment.
- Data Integration Services (DIS) is an XML-based tool to integrate control and production systems with enterprise transactional systems, i.e. SAP.
- Product Definition Manager (PDefM) is an engineering environment for translating specification into manufacturing actions.

In addition, Simatic IT version 6.1 comes with a new sales approach, referred to as Simatic IT Bundles. The new Siemens offer is scalable and “solution driven”, allowing customers to “start, learn and grow”, beginning with so-called “entry point” bundles up to bundles with a high level of functionality.

Innovation offensive:

Now, we will move on to the individual innovations that are being presented for the first time at this year's SPS/IPC/Drives:

Communicative control for high-speed machines and processes

The new CPU 319-3 PN/DP from the Simatic-S7-300 controller family of is especially fast and has three integrated communication interfaces: Profibus DP/MPI, Profibus DP and Profinet. The CPU is particularly suitable for data-intensive tasks and closed-loop control tasks requiring extremely short cycle times. Short instruction execution times and sufficiently dimensioned quantity structures, such as the 1.4MB work memory, offer high-speed response times and machine cycle times even in the case of more extensive and complex control programs. The Profinet interface maintains up to 32 simultaneous active Industrial Ethernet connections to partner devices, and up to 256 field devices can be connected via Profinet IO. The integrated Profinet ASIC Ertec 400 also generates short response times on Ethernet.

New safety-related controller with Profinet terminal

We have added another safety-related CPU with Profinet interface to its Simatic Safety Integrated product range: the Simatic S7-315F-2PN/DP. Now safety applications in the mid-performance range can be scaled even better. The CPU also has a Profibus interface for simultaneous connection to both bus systems. Simple and transparent migration of data between an existing Profibus and the new Profinet system is made possible via the IE/PB link PN IO. The user only needs one control system for standard and safety technology. The Profisafe profile is available for transmitting the safety-related data. This reduces cabling overhead, since the safety-related communication and the standard communication take place via a physical bus cable.

I/O Devices for Profinet Linear Bus Structures

We have added two new Profinet interface modules to the Simatic ET 200S product family of distributed I/O devices: the ET 200S PN header modules IM 151-3 PN Standard and IM 151-3 PN High Feature have an integral two-port switch that simplifies the establishment of Profinet linear bus structures. The IM 151-3 PN High Feature version is also suitable for Profisafe applications. I/O is provided by the standard ET 200S range, including digital and analog inputs and outputs, counters, serial interfaces, motor starters of up to 7.5 kilowatts, frequency converters of up to 4 kilowatts and pneumatics.

Distributed I/Os with motor starters

We have expanded the Simatic ET 200pro distributed I/O system for “control cabinet free” installation to include motor starters. Setting options of up to 5.5 kilowatts make it possible to cover a wide range of applications with only a few device versions. The Simatic ET 200pro motor starters, which are available as line starters and reversing starters, have extensive diagnostics options as well as electronic overload protection. They are also available with optional brake control. Switching status and motor starter status are displayed via bus and LED.

New Panel PCs for industrial applications

We are introducing two new Panel PCs: the Simatic Panel PC 577 for standard industrial requirements and the more rugged Panel PC 477 for more advanced applications. Both device types are available as 12” and 15” Key and Touch versions. The Panel PC 577 also comes in a 19” Touch version. The Panel PC 577 is equipped with a Pentium 4 with up to 2.4 GHz, the main memory can be expanded to 3 GB. The Panel PC 477 was designed to work without any rotating components, such as fans or hard disks, and is therefore especially well suited to maintenance-free, highly available applications. There is a wide selection of various Pentium processors up to 933 MHz. The main memory of 512 MB and Compact Flash cards with up to 1 GB of storage space are installed

Rack PC for high performance

We equipped our new industrial PC Simatic Rack PC IL 43 from the rugged 19" device range with the latest generation of Intel processors, chipset and memory technology. Thanks to its significantly increased computing power, the PC is especially suitable for sophisticated automation tasks such as processing large volumes of data in process visualization, metrology and test bays and in industrial image processing. The Rack PC has a high degree of EMC (electromagnetic compatibility) and is designed for industrial use at ambient temperatures up to 40 degrees Celsius.

Efficient Engineering Software for Modular Machines and Plants

We have added new functions to Version 3.0 of the engineering software Simatic iMap for Component Based Automation (CBA) and simplified its handling. In large projects, the new outline view makes navigation significantly simpler than before for users. It structures the projects in the new "chart-in-chart" display and uses the project view that has been expanded with graphical functions. Individual functions can now be activated / deactivated selectively, allowing the user to check the functionality of a component in individual steps and start it up in a flexible manner. Engineering time is reduced by copying entire plant sections. "Critical signals" are now indicated and easily diagnosed. The user also saves time thanks to program download by list, import / export functions that reduce the engineering workflow, and a command interface to higher-level CAD tools. In addition, Simatic iMap V3.0 allows several technological functions to be displayed on one device such as the Simatic S7 CPU 319-3 PN/DP controller. This more refined degree of detail allows improved technological structuring of the application.

New RFID components for logistics and distribution

We have added new components to our Simatic RF600 RFID (Radio Frequency Identification) system in the UHF band for logistics and distribution. These are the Simatic RF610M mobile UHF reader and Simatic RF620L Smartlabels. With the new Simatic IT Production Modeler, RFID data can now be directly imported into the Simatic IT Manufacturing Execution System (MES) for further processing. The Simatic 610M mobile reader is now available for the Simatic RF600 RFID system for

mobile data acquisition. As a plug-in card, it can be used with a number of mobile devices, such as PCs, notebooks or PDAs.

High-speed identification in production

With our Simatic RF300 RFID (Radio Frequency Identification) products, we offer a new identification system for use in production. Among the new items being introduced are an additional read/write device (reader) and two new data carriers (tags) which have been specially designed for high-speed identification applications in assembly lines, conveyor systems and production lines.

New additions to inductive proximity switches

We are expanding our sensor family with inductive proximity switches of the Simatic PXI210 compact range as well as a new Simatic PXI600 range for use in the Ex area. With a diameter of 4 millimeters, a metric thread of 5 millimeters, and a length of 25 or 38 millimeters in the case of the plug-in version, the PXI210 devices are suitable for installation where space is restricted. The Simatic PXI600 proximity switches of types M12, M18, M30 and C40S correspond to the Atex safety requirement in accordance with RL94/9/EU. Areas of application for the new range include paint shops, the food and beverages industry and woodworking. In the case of the plug-in version, a plastic cap provides the devices with additional protection against contamination.

Transparent analysis of the AS-Interface network

We have modified our AS-Interface analyzer and added new functions. Code tables are now evaluated by safety-related AS-i slaves. Furthermore, the respective status of the slave input is indicated. Using the trace function, status changes can be logged in order to analyze the switch response of the associated safety monitor. In addition to standard binary representation of inputs and outputs, data of analog slaves are now also decoded and displayed as decimal values. An additional new feature is the display of group faults, which facilitates the evaluation of the AS-i network stability.

Training for Automation based on Virtual Reality

We have enhanced our Sitrain training courses with Virtual Reality (VR). Learning contents, such as for maintenance, can thus be presented in an even more illustrative way than before. The first prototype of a virtual maintenance course for circuit-breakers was created in cooperation with the Magdeburg University. With these new methods, customer-specific plant situations can be represented virtually and in detail, and training periods for operators and maintenance staff are shortened considerably.

Thank you for your attention.