

SIEMENS

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- Check against delivery -

Ladies and Gentlemen,

I would like to bid you a most cordial welcome to this Siemens A&D press conference at the SPS/IPC/Drives 2006 fair. In view of the limited amount of time available, Dr. Rathjen and I will be discussing the technological trends, strategies and A&D's portfolio innovations which we are showing here at this fair. Therefore I would like to invite you here and now to visit us at our pavilion in Hall 9 to take a closer look.

New impetus for drive systems

All in all, our automation sector – and that includes drive systems – is presently enjoying a phase of great demand. I am sure you have seen the exact figures presented today by ZVEI, the German central association of the electrical industry.

Allow me to outline some of the key data of these statistics. Automation is in great demand in all industries and sectors. The economic cycle is currently remarkably stable and still proving resistant to the US market's initial signs of slow-down.

In electrical engineering, the business climate has clouded over slightly in the course of the autumn, yet remained at a 10-year high. Germany is generally enjoying a robust economic situation which is backed by a continuing positive outlook in the business and industrial world.

As far as our customers' sectors are concerned, VDMA is painting the 2007 picture as one of the fourth year of growth in succession. Exports of mechanical engineering companies have grown more dramatically over a longer period of time than during average upward cycles; business in the domestic market has risen significantly and this is equally true of imports.

The prevailing general corporate conditions and technological trends have resulted in a number of key indices for the automation industry. The issue of growing demand for raw materials and energy in booming countries, combined with scarce resources, have an impact on the expectations and requirements placed upon machinery and plant, and hence also on the automation and drives market.

Certainly, new markets are emerging in countries which produce raw materials in particular. This is where the demand for automation systems used in the mining, processing and transport of raw materials will continue to rise. Social changes in the newly industrialised countries are prompting great demand for consumer and capital goods. This is clearly reflected in the continued dynamism we are seeing in the BRIC countries.

Manufacturers of goods are faced with consistently high or growing demand which is also linked to the desire for increasingly innovative and complex products within ever shorter time-frames. This situation has an impact on the installation of machinery and consequently on the required automation and drive systems. The basis for future-proof innovative machine concepts lies in integrated drive and automation systems. At this point, it becomes clear just how great a contribution automation suppliers can make to the mechanical engineering industry in terms of concepts, with a view to maintaining the current rate of innovation whilst simultaneously limiting the life-cycle costs of machinery and plant.

On this note, Dr. Rathjen and I will be explaining some of the aspects of our A&D portfolio.

Challenges to automation suppliers and industry trends?

As I mentioned at the beginning of my speech, we are acting against the backdrop of scarce and increasingly expensive resources. Overall, the world market price of industrial raw materials rose by roughly a quarter between 2005 and 2006; in Germany, producer prices for copper actually increased by more than a third during this period. Whilst steel prices appear to be declining slightly from their high level, the price of aluminium is clearly on the rise. Industry's net power consumption rose by only 0.8% last year, whilst the electricity price index rose from 122 to 184. To the manufacturing industry this translates into an increase in the cost of energy of almost 50 per cent. This alone emphasises the urgent need for energy efficiency in products and systems as a major field of innovation in automation systems.

Energy efficiency as a factor of competition

Although SPS/IPC/Drives has not defined energy efficiency as a separate focus of the fair, it is nevertheless of great importance to us as automation suppliers. Politics will see energy and energy efficiency appear high on its agenda for 2007. This applies both to the G8 economic summit and to various specific EU Commission initiatives. This political sector must not be regarded as an isolated phenomenon, since it interfaces with a range of automation aspects. Alongside power generation and distribution, it is mainly energy efficiency at the power user level of manufacturing that comes into play here. As you know, over two thirds of power consumption goes into electric drives. ZVEI, the German central association of the electrical industry, predicts that improvements in electrical drive systems in Germany alone could save roughly 27.5 billion kilowatt-hours of electricity or 2.2 billion EUR per annum. Siemens A&D has therefore systematically developed solutions for reducing power consumption, both at product and system level. These include energy-saving motors, the consistent use of electronic speed governors, and the recovery of braking energy via converters.

For the recovery of braking energy and feedback into the mains, Siemens A&D provides mature technical solutions which meet utilities' stringent mains purity requirements. In motors, we are experiencing a trend towards greater levels of efficiency and the leveraging of more energy-saving potential. In this context, Siemens A&D has every reason to claim that our products shape the market. Examples of innovations include motors with a die-cast copper rotor designed for the North American market. The motor ratings exceed the requirements of the Premium Efficiency Standards of the [National Electrical Manufacturers Association](#) (NEMA) in the U.S. and Canada.

Any review of energy efficiency must be based on a systematic appraisal of the overall picture with all its ramifications. There is no point in looking at a single motor or converter for that matter. It is only the expertise used to review the complete picture of all components that results in innovative solutions. With its NEMA motors and regenerative inverters belonging to the Sinamics family, Siemens A&D provides mature and inter-coordinated products that make energy-efficient production possible.

Our range spans NEMA motors with die-cast copper rotors, energy-saving motors, the Sinamics S120 regenerative inverters, the new regenerative variation of the G120, first shown at this fair, and the Simatic Power Control software for energy management. The new NEMA range covers three-phase induction motors which are available both in an aluminium and grey cast iron housing.

What is Siemens A&D's proposition in the context of energy efficiency for its converters? When a drive operates in generator mode, its braking energy can be either converted through heat resistors or fed back into the grid via suitable devices. Such feedback saves the cost of additional cooling or heat dissipation and also reduces power consumption. Our Sinamics family of drives features two types of feedback. The standard solution is Sinamics with Smart Infeed, i.e. unregulated infeed and feedback units using IGBTs. The other is called Active Infeed, has a controlled IGBT system, and is suitable for use wherever the requirement is not only for feedback capability but also for correcting system voltage dips for drives.

At this juncture, I would like to discuss other innovations in our inverter and converter technology which are not primarily linked to the aspect of energy efficiency. Our concept of modular design ensures that the specific needs of user applications can be individually met. The new Sinamics G120 frequency converter is designed for voltages between 380 and 480 V and boasts a modular design that can be adapted to the specific requirements of each application. Both the power module and the control unit of the Sinamics G120 are designed

as separate exchangeable functional units and can be combined ad lib. In combination with a safety control unit, the drive is turned into a safety integrated drive which, for the first time and unparalleled in the market, permits the design of a safety-oriented drive system without speed sensor.

We have built innovative silicon carbide technology and LC filters into power components for 690V applications. In the version for 690 V, the Sinamics G120 is the first silicon-carbide (SiC) inverter on the market. Thanks to the new semiconductor the power module PM250 can operate with a high pulse frequency, thus only a small, integrated sinusoidal filter is required. This makes the Power Module extremely compact and easy to integrate into a system. It is also quiet and extremely efficient and energy-saving. For flexible use in the field, unshielded motor cables are available in lengths of up to 300 meters. This is concept helping to save space and costs.

The Sinamics S120 AC drives designed for single axle applications perform reliably in single axle positioning tasks. Their modular design, however, also allows for their use in multiple axle applications for demanding synchronous operation and motion control tasks. At this fair, we are also showing the liquid cooled variants used in S120 AC drives.

I mentioned earlier the significance of a holistic approach to drive solutions. Against the backdrop of the total cost of ownership approach in particular, the importance of having a drive system to suit each individual application becomes clear. We are able to provide our customers with a universal, integrated solution. With the integration of Flender AG's geared motors, Siemens is now in a position to provide a fully integrated product range, from mechanical engineering via drive components all the way to automation systems.

Exogenous addition to our strategic portfolio Flender and Robicon

With the acquisition of Robicon and Flender, we have not only broadened our technical portfolio across the entire drive train, but have also benefited significantly in terms of technology and market access.

With Robicon, we have enhanced our market leadership in the US drive system market. This acquisition not only adds to our converter portfolio, but also improves our access to major growth industries in North America, such as the key industries of oil & gas, water and waste water, and power. At the mechanical end of the drive train we have made an equally outstanding acquisition, Flender, which has also been integrated. Thus our portfolio now comprises all mechanical and electronic components; in other words, we are able to supply all our customers with tailor-made automation solutions to meet their own specific application requirements.

The advantage of integrated automation

Companies all over the world are attempting to increase their productivity via a systems-oriented approach and integrated automation solutions. Given this backdrop, automation suppliers can provide their customers with maximum benefit in the form of a complete and integrated product and system portfolio which also includes industrial information technology. We set the technological trends on the basis of TIA and TIP, providing our customers with a horizontally and vertically fully integrated automation environment across our entire product portfolio.

This explains how we can now offer our customers innovations which allow for full use of their previous investments. Our efficient and finely tuned automation technology package enables customers to bring their plant up to date in technologically and financially meaningful stages, thus enjoying state-of-the-art technology on an ongoing basis. They have access to our product and system portfolio which covers both primary and secondary processes and ranges from field level to ERP level. This is a crucial competitive advantage in hybrid automation in particular.

Transparent production – more management knowledge

Integrated automation offers decisive benefits, most notably for the knowledge element in production. Under the heading of “transparent production”, we are hearing the same demands being voiced by OEMs and users alike across all the different industry sectors. They agree on what needs to be improved, namely the depth and availability of information on products, the production process and the entire value chain of the company.

One of the reasons for this, as mentioned earlier, is the scarcity of resources, another is the operating cost: Our customers wish to make their production process as efficient as possible. They also wish to be able to track their material flows, i.e. ensure the traceability of their goods from the inbound raw material to the finished product delivered to the consumer. Not only does it provide them with information about consumer behaviour but it also helps them better comply with legal rules and regulations.

In this area, we are playing an active role in making the expertise and application-specific processes developed in one industry available to others. Examples in this field include the communication technologies from car production or the highly developed technologies used for tracing goods. The latter were largely initiated by the pharmaceutical industry, and we are now applying them increasingly in the food and beverage sector.

Knowing more about products, production and logistics has much to do with a variety of automation technologies and automation levels: from an individual sensor used in production

via optimisation potential in industrial communication to the distribution and processing of the data collected. This also involves RFID (Radio Frequency Identification) systems, mainly used in logistics processes, and MES (Manufacturing Execution Systems).

Sensors are also among the key elements in our portfolio. Together with major German sensor and automation suppliers, we are involved in a working group called IO Link, which is housed under the same roof as the Profibus user organisation (PNO). The aim of the group is to work out a consistent standard for sensors and actuators whilst maintaining the low-cost end-to-end connection between sensor and I/O module. This is intended to give the user a technological advantage, thereby creating more scope for further cost savings – in commissioning and maintenance, but also in terms of plant availability.

RFID and MES – real-time production is now becoming reality

Consumers are demanding more and more personalised goods, which must be produced and supplied at reasonable cost. This means that tasks such as one-off production, small production lots, production on demand, flexible production lines and product planning need to be managed in 'real time'. For producers and manufacturers, the route from uniform towards flexible mass production is via such key technologies as RFID and MES, which we have integrated into our product portfolio.

We have been supplying the automotive industry with RFID technology for a number of years. But RFID is also suitable for flexible mass production. One such example is the RFID-based production of Sirius contactors at our Amberg plant.

Automation Designer – for greater planning certainty

A topic on which we have been working very hard in recent years can be subsumed under the heading "factory of the future" or "digital factory". At last year's SPS/IPC/Drives fair, we launched the Simatic Automation Designer.

The success of a producing company is largely a function of how quickly it responds to new market requirements. New plants need to be set up rapidly and with great planning reliability. At the same time, cost pressure is rising and forcing everyone to increase productivity throughout the entire production life cycle. The idea of a digital factory is to virtually visualise and simulate a very detailed model of the real factory during the planning phase, before the plans are translated into reality. Designers and plant engineers initially design the virtual products on the screen, and any subsequent plant design modifications are incorporated automatically. Products are released only after having passed successfully through the digital factory and after having exhausted all optimisation options for the product design and

production process. The digital factory effectively dovetails product development and production planning.

As part of the digital factory, digital engineering will in future virtually support all production life cycle processes, ranging from planning via mechanical and electrical design, programming and commissioning of the plant all the way to its operation. Irrespective of the software in use, all data will be read and merged into the digital engineering environment. The creation of a product will be holistically mapped in the digital engineering process.

Once virtual commissioning has been completed, the data is directly applicable to the real plant, and the automation solution is generated automatically. This includes PLC programming, visualisation – including diagnostic information – and the creation of the relevant plant documentation.

The Simatic Automation Designer represents just one step towards a different digital engineering world. Much is still a vision and requires intensive work – but the foundations have been laid. Ultimately, the Simatic Automation Designer will be applied throughout the engineering process, thus supporting the entire life cycle of a production plant: From the transfer of planning data via configuration of the automation solution in line with user standards all the way to its use during the operating phase.

Dr. Rathjen is now going to present another step into the digital engineering world, at factory level.

Thank you for your kind attention.