

# **SIEMENS**

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On the Occasion of the International Trade Show EMO

Press Conference July 7, 2005, Zurich, Switzerland

**Siemens Motion Control Systems – Success through Customer-Oriented Innovation**

- The spoken word shall apply -

## ***EMO 2005 – the leading trade fair of the metal working sector***

Since the first EMO in 1975, this European machine tool event has developed into the world's largest trade fair in the fields of metalworking and automation. Committed to tradition and progress, it shows a unique combination of mechanical engineering as well as production and automation technology.

Today, EMO provides an international platform for the presentation of innovative products and solutions that exhibit not only the technological performance of the mechanical engineering sector, but also current technical and industry trends.

By showing economic tendencies and technological trends, EMO is also an indicator of the current situation within the industrial sector. Siemens expects that this 16<sup>th</sup> EMO trade fair will be an incentive for strengthening the trust and confidence in the performance of the German and European machine tool manufacturing sector and its automation solutions partners.

### ***Overview of the Siemens A&D MC Division***

Since our last A&D MC EMO press conference, which took place in Chemnitz in September 2003, our business has successfully developed throughout the world. The name of our division indicates that we are designers of motion control concepts within the Automation and Drives group. To ensure maximum success, our Motion Control division is divided into three business units: First, we provide machine tool solutions. These solutions will be presented to you in detail shortly. Second, we deliver solutions for production machines with the main emphasis on certain sectors typically identified by Motion Control requirements such as packaging, textile, printing and plastics machines, woodworking, paper, ceramics and converting. Last, but not least, we provide solutions for hoisting devices and cranes, which has become an extremely promising business based on excellent growth rates.

Next, I will focus on the main reason for our meeting and provide you with the latest information about machine tool systems and solutions.

In this section of my report, I would like to provide you with a brief overview of the current situation of the machine tool market and explain why an even closer cooperation between machine manufacturers and automation partners is of vital importance. In the second part of my report, I will illustrate technical trends, innovations and customer orientation.

Based on the trends in the machine tool market, I will also explain the current situation of our business unit including the development of new business prospects.

However, I would first like to make some general comments pertaining to the current economic situation including market development.

## **Machine Tool Market:**

### ***Asian markets stimulate the growth of the overall industrial sector***

The current economic situation and the further development of the machine tool sector are marked by strong international competition and an economic climate of uncertainty. Based on a 12 percent growth rate and a volume of production of 36<sup>''</sup>4 euros, 2004 has turned out to be a good year for the international machine tool industry. Nevertheless, we must be aware of the fact that significant growth rates could mainly be achieved in Asian countries, whereas European markets faced a period of stagnation.

In China, Taiwan and Japan, the production of machine tools could achieve two-digit growth rates. In this situation, it is not surprising at all that China has already become number four amongst the top ten leading nations in the machine engineering sector. With regards to machine tool usage, China has maintained a leading position in the world market, followed by Japan and Germany.

Like in all other mechanical engineering sectors, the machine tool manufacturers in Europe have to struggle with the disadvantages of unfavorable currency exchange rates and high steel and oil prices making the situation even more difficult.

To be honest, it must also be admitted that certain structural problems of the machine engineering sector in some European regions are another reason for the weakened position of some European manufacturers. However, Switzerland and Germany have been able to increase their production significantly compared to the previous year and can; therefore, be mentioned as positive exceptions. Germany has been able to further extend its leading position in the European market and to strengthen its number two position in the world market.

As the machine tool manufacturing business is strongly related to the general economic situation, it has always been subjected to cyclic fluctuation. According to our analysis, this economic cycle will reach its climax in the near future. This also applies to nearly all relevant countries. Assuming that the business climate can be

considered as an early indicator for the demand for investment goods, our economic sector is currently facing a period of stagnation, and in some cases, even decline. Based on this situation, we foresee a significant slowdown in growth and possibly even in our business by the end of the year this year or at the beginning of 2006.

How can we cope with this situation?

On the one hand, the European mechanical engineering sector requires general conditions to stabilize or further strengthen its position in the world market. However, in my opinion, it is even more important that we optimally use our own potential to improve our competitive capability. In Europe, the mechanical engineering sector has proven several times that it is committed to strength in an effort to achieve this goal. Innovative and superior-quality technology, excellent cost/performance ratios, dedication to the opening of new markets, as well as meticulous customer orientation, are key success factors today – and as providers of sophisticated automation solutions, Siemens can efficiently support our partners in the mechanical engineering sector.

***Working together will give us the strength to defend our position in the world market***

As a leading supplier of automation equipment, who strives to deliver systems, solutions and services with superior customer benefits, our success is strongly linked to the situation of machine tool manufacturers. To go one step further, we consider ourselves as a partner for the European mechanical engineering sector, especially as we are facing the same general conditions, challenges and future prospects.

We are convinced that joint efforts will provide us optimum long-term conditions for sustained success in a global competitive market. We – Siemens and its European partners in the mechanical engineering sector – must focus on our innovative strength. Joint efforts will be required to design machine and system concepts with superior customer benefits – and this joint approach will be a pre-requisite for lasting success in the world market.

Which factors can stimulate success?

First, a high-quality product range provides excellent prospects for success. This capability to combine products with powerful systems and solutions to generate superior and lasting customer benefit is also of great importance. The efficient management of all processes relevant for business, cost optimization in all stages of the value-added chain, as well as further improvement of market and customer orientation will be the second key success factor. An even stronger commitment to upcoming, yet important, markets in East Asia must be the third major approach in this context. This does not at all imply that we would neglect our national markets in Europe. Those companies who cannot take action here will lose out to other market participants. This also refers to the markets of the new member countries of the European Union as well as to rapidly growing regions in Eastern Europe such as Russia.

Nevertheless, we should be aware of the fact that the growth of our industrial sector will be determined by countries like China, Taiwan, Korea and India in the years to come.

We must strive to expand and establish these markets based on customer-oriented and innovative machine and automation strategies. As I have already stated, both machine manufacturers and their automation partners will have to do their utmost to meet future challenges.

Through powerful imported machines, the European mechanical engineering sector has the chance, today, to conquer these markets and to establish itself on-site. This has already been the case for some companies. Based on market presence and many years of experience within these markets, Siemens can and will support its customers in achieving their goals.

## **Technological Trends**

The Association of German Machine Tool Manufacturers has recently outlined a future scenario and has described how the German mechanical engineering sector can maintain its competitiveness. The main aspects of this scenario can be summarized as follows:

- 1.) 30 percent of all machine tools will be equipped with features such as self-monitoring, failure prediction and remote service,
- 2.) the modular machine structure will be more and more capable of "Plug and Produce",
- 3.) (micro) electro-mechanical systems will be available as active components,
- 4.) an increasing number of software components will be implemented in machines and systems, thus increasing software security requirements and
- 5.) sales strategies must be more and more based on relationship management as technological differences will become less significant.

In general, these prospects and trends for the German mechanical engineering sector depend on technology and innovation. Advanced production technology and machine know-how are no longer sufficient in this context, but innovative automation engineering concepts and superior serviceability are gaining more and more importance. We are proud to say that Siemens has already recognized these main trends several years ago and has implemented them in their automation solutions.

Next, I would like to present you some examples of efficient concepts pertaining to these four technological trends:

### **1.) Machine Monitoring – Condition Monitoring**

According to a forecast by the association, one-third of all machine tools will soon be equipped with features such as self-monitoring, failure prediction and remote service.

Three years ago, Siemens had already launched its ePS product range for condition monitoring.

Siemens' ePS Network Services provides powerful IT infrastructure for machine manufacturers and end-users based on consistent, proven service packages. This includes eP Access for remote machine access, eP Dynamic for optimized diagnosis, and eP Performance for efficient, preventive maintenance and service.

These service packages are able to shorten maintenance interruptions; therefore, allowing downtimes to be scheduled accordingly and subsequently allowing more time for troubleshooting. They ensure a lasting and consistent reduction of the total cost of ownership no matter in which country the machine will run in the future. This benefits not only end-users, but also machine manufacturers, where manufacturers have the option to implement their own value-added services.

## ***2.) Plug & Produce Systems – Modular Design Based on Intelligent Drive and Automation Technology***

The trend towards the consistent modularization of machines continues. Intelligent standard modules can be combined for specialist applications for individual users. The modular production machine concept for special requirements has already proven to be sustainable and appropriate. In this context, I would like to point out, once again, that innovative and intelligent modules are essential for the implementation of such concepts. In the fields of control and drive technology, Siemens also occupies a leading position. Today, we are very proud to show you the results of this great tradition by presenting to you our new system platform for CNC applications, the Sinumerik solution line combined with the new Sinamics drive system.

### **3.) *Mechatronics and Short Prototype Phases – Time to Market***

The cost and time to market will gain more and more importance for the success of machine concepts. Despite increasing complexity through the combination of mechanical, electrical and software components, development times and especially prototype phases must be further reduced. At the same time, the production procedure in the machine must already be optimized within the framework of simulation.

Siemens is the only provider in the market who is able to perform comprehensive machine simulation and the production under the name “Virtual Production“. Our concept provides mechatronic support for virtual prototyping, as well as a machine simulator for the simulation of installation and start-up. It also supports virtual production features including the simulation of the actual production and of the integrated NC system with all downtimes.

Shorter times to market will reduce prototype costs as well as training costs during the start phase of production. An optimized machine that meets special requirements and is adapted to general production conditions will be the result of this innovative concept. End-users will be able to immediately increase their productivity while achieving the highest quality of manufactured parts. These users will benefit from the fact that they purchased a machine that precisely meets all requirements – right from the start. Advanced productivity is a result of precise simulation. Therefore, the machine can manufacture parts where machining times, precision and surface finish are optimally adjusted.

### **4.) *Software – Inspiration or Source of Trouble***

The software ratio and the significance of software for the innovative strength and sustainability of machines will continue to increase. According to the Association of German Machine Tool Manufacturers, this develop-

ment involves both benefits and risks. The association estimates that software problems will be the cause of 90 percent of all machine downtimes in the future. Meeting challenges such as user-friendly machine operation and the provision of sophisticated systems by only one supplier will be crucial for machine manufacturers and their automation partners.

In addition to supplying machine equipment with efficient hardware and software components, we can rely on our Motion Control Information System, also known as MCIS. As this system is fully integrated into the control system, it also ensures the smooth integration of machines into the overall manufacturing structure and the higher MES level. OEEs ratios and KPIs can be evaluated and represented individually on each machine. This is of vital importance for increasing the productivity of individual machines.

### ***Relationship Management is Gaining Importance***

Relationship management has been identified as an essential, non-technological trend... and I am convinced that we are also able to set trends in this field.

According to the association, the standardization of technology and the increasing loss of importance of differentiation criteria constitute a risk. As a result, relationship management, in contrast to purely technology-orientated marketing, will gain even greater importance in the future.

We are convinced that this approach is crucial and have already taken the appropriate steps several years ago. Reliable and lasting partnerships are a pre-requisite for intensive technological cooperation and this has always been our strength in Germany and in Europe.

Our highly-successful and well-proven mechatronic support can be cited as an excellent example of these cooperation efforts. Based on close cooperation during the machine design phase and constructive communication with the machine manufacturer, everyone is able to benefit from these simulation

capabilities for the design of machines that are optimally tailored to meeting future requirements. New mechatronic concepts in the mechanical engineering sector are the result of this approach and requirements set for these machines can be directly considered for future developments. In addition, we gain more knowledge about special requirements of the end-user market and, last but not least, we can generate advanced machine automation services based on this experience.

## **The Situation of A&D MC: Strategy and Future Prospects**

In my opinion, the fact that Siemens has already anticipated these current technological trends several years ago and has integrated them into their product and portfolio development is the reason for the excellent market position we currently hold. The Motion Control Systems division of Siemens Automation & Drives is a systems provider for both machine tool and production machines for various industrial markets as well as a provider of cranes for industrial applications and ports. Based on this vast product range, we have been able to achieve a significant growth rate as compared to the previous year. This year's business development also gives reason for optimism.

Siemens is estimating that the world market for machine tool equipment has a volume of approximately 445 € billion. Approximately 44 percent comes from Western Europe, approximately 45 percent from Pacific countries and approximately 11 percent from the American continent. During the previous year, we have been able to achieve approximately 25 percent worldwide market share (on a volume basis). We are the undisputed market leader in Europe and our main competitor worldwide is Fanuc with whom we are facing a neck-and-neck race. We have done our utmost to balance the disadvantage of unfavorable exchange rates against the U.S. Dollar and the Japanese Yen by an increased commitment on an international level and a convincing range of systems including the entire life cycle of a machine. With regards to machine tool equipment, we estimate an average real growth rate of approximately 2 percent per year for the years to come. We are striving to grow more than others in the market.

The continual improvement of our strengths includes:

- leadership in the field of innovation
- customer orientation and
- a worldwide presence

In the future, these strengths will help us to benefit from our potential for profitable growth.

Joint ventures with Yaskawa in Japan, as well as our development and manufacturing facilities in China, will be crucial for maintaining our competitiveness on an international level. In addition, we are constantly improving our solution competence in major regions of the world. For example, just last year, we have been able to proudly inaugurate motion control application centers in India and China.

### ***Productivity in Motion – Continuity and Change***

At this year's EMO, we intend to show you outstanding examples of our innovation once again. We will show our customers and end-users not only our technologies, but also our vision with regards to the new system world. The highlight, the new Sinumerik solution line, is a continual development of the highly-successful and well-proven Sinumerik powerline. This "evolutionary revolution" relies on the latest basic technologies to ensure risk-free migration using open HMI and NC concepts. It is based on the Sinamics S120 drive system designed by Siemens A&D, a drive platform which is already successfully being used by thousands of customers of our production machines business unit. Nevertheless, we also want to continue the success story of our powerline product concept. Our customers now have the choice to implement new solutions right away or at a later date... and most importantly, with no risk or compromises.

We want to further expand and intensify our activities pertaining to the vast customer segments such as the automotive and aerospace markets.

Siemens also continues to provide an advanced service concept based on latest technological developments. Our “Condition Monitoring” services, as part of ePS Network Services, is an outstanding example of this approach.

### ***Innovation Leadership and Customer Orientation***

The mechanical engineering sector is undergoing a period of technological change which can open up new productivity potentials for machine manufacturers and machine operators. Based on improved modularization options of mechatronic components, machine manufacturers can now design new machine types within even shorter development times and market them with an increased number of variants. The technological progress that has been achieved so far and is achievable in the future is marked by new mechatronic concepts, micro-electronics and software technology.

Consistent process chains, fast diagnosis and networking options are required in a modern manufacturing environment. Classical criteria for increasing machine productivity are still valid: fast rotating main spindles, high axis speeds and axis acceleration rates plus fast data transmission. Improved surface finish, shorter machining times and process security are also essential criteria for the optimization of the machining result.

These requirements from the market and these technological potentials create trends which concern both machine manufacturers and their automation partners. As an example from the field of mechanical engineering, applications such as high-speed, complete and dry machining, and subjects like distributed intelligence, horizontal and vertical inter-connection, new HMI communication options, direct drive technology as well as machine and process simulation may all be cited as examples concerning automation partners.

The challenging implementation of ideas and requirements via sophisticated systems and solutions can only be achieved in a stable and reliable partnership between the automation company, the machine manufacturer and the end-user.

The early detection of these trends, their correct evaluation and implementation by way of competitive products, solutions and services are all essential criteria of our innovation leadership.

We want to optimize:

- the entire life cycle of a machine.... from the initial machine concept, to use in production, all the way through to retrofit (total cost of ownership);
- the production process chain... from workpiece design through to the final product; and
- the integration of machine data in the manufacturing environment... from direct NC program control all the way through to tool management or even web-based maintenance management.

Innovation; therefore, is not a target by itself, but, rather, a driver for permanently increased competitiveness, productivity and profitability for our customers and end customers. Innovation without customer benefit would be a waste of R&D funds. For this reason, we attach great importance to meeting the requirements of our customers with regards to the most versatile technologies. These requirements must be the basis for any new or further development of our systems. Our many years of experience of successful cooperation with machine manufacturers and end-users are the most essential factor for our great success in today's market.

### ***Summary***

In summary, I would like to leave you with this: Siemens A&D Motion Control Systems provides an extensive range of sophisticated products, solutions and services for machine tool applications. In the field of automation solutions, we are the ideal partner for machine manufacturers. This partnership ranges from cooperation in new machine development under the name "Mechatronic Support", to around-the-clock support with spare parts and expertise – all around the world.

To successfully contribute to the value-added chains of our customers in the future, and to provide them with more efficient solutions than our competitors, Siemens will continue to implement market requirements via innovative solutions.

We are convinced that our philosophy of innovation for increased customer benefit will help us to further strengthen our position as a leading provider of advanced automation solutions.