

# SIEMENS

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on the occasion of the international trade press conference  
held on 11 September 2003  
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- Check against delivery –

## **Productivity in Motion – our commitment to technological leadership**

Ladies and Gentlemen,

Welcome to our press conference on the occasion of the 15<sup>th</sup> EMO in Milan. This preliminary press conference has already become something of a tradition for Siemens, and it is one that we wish to continue at the EMO, with the aim of informing you of the highlights and trends in our business in the run-up to the trade fair proper.

I am especially delighted to welcome you here today on two counts:

First of all, because we are gathered at a location steeped in tradition as far as the machine tools industry is concerned – the roots of machine tool manu-

facture in Germany are here in Saxony. And well-regarded machine tool manufacturers, such as Starrag-Heckert, Niles Simons and Union, to name just a few, are still operating in this region today. Chemnitz plays an important role in Siemens' overall machine equipment portfolio, both as a development location and with its machine test center and switchgear cubicle construction for machine tools.

The second reason why I am so happy to welcome you here today is that this is the first opportunity I have had to get to know and exchange views with many of you in person since my appointment as Head of the Motion Control Systems Division at A&D in January of this year.

I may be a new face at A&D, but I am certainly not a Siemens novice, and neither is the machine tools industry unfamiliar to me. I started my career at Siemens Medical Solutions (SMS) in 1992 as a production engineering graduate with a PhD in numeric simulation processes (not far removed from the MC activity of "mechatronic support"). Following spells in charge of plant engineering and production, I was appointed head of an applications division at SMS, while at the same time taking over the management of a Siemens overseas subsidiary in Sweden.

### **Integration achieves more than interfacing**

Against this backdrop, the new responsibility as far as I am concerned is the shift from machine tool OEM customer to machine tool OEM supplier. Above and beyond this, I am convinced that some patterns of the medical systems industry can also be applied to the production machines and machine tools equipment business. One example is the constantly recurring debate in both sectors as to whether the focus should be on outstanding individual components or on comprehensive solutions. The change of sector has not affected my view that product orientation and solution orientation are by no means at opposite ends of the spectrum. In simple terms, this means that we intend to win over our customers with the best components which offer the open architecture and interfaces required for integration with components from third parties, while remaining convinced that Siemens' universal all-in solutions provide an

additional benefit above and beyond everything else. My mission statement is thus: Integration achieves more than interfacing.

Ladies and Gentlemen,

I now wish to outline the activities of our Motion Control Systems Division in brief, discuss the state of the market and voice my opinions on the subjects of technological leadership, trends and innovations. Mr. Herweck will then describe several aspects of our product strategy in more detail and present innovations to be shown at the EMO.

The Motion Control Systems Division is a systems provider for automation, traditionally supplying machine tools in our Division of the same name, and, for the past few years, also in the production machines sector. The term "production machines" is used internally to refer to mechanical engineering and the various branches thereof.

### **Motion Control – Machine Tools**

The Machine Tools Division has been developing, manufacturing and marketing electrical equipment for machine tool manufacture for over 40 years. Siemens not only regards itself as a product supplier, but also as a solutions provider who can advise and support both the machine manufacturer and the machine operator throughout the entire life cycle of the machine or plant. Various products such as CNCs (Sinumerik), drives (Simodrive), servo and spindle-drive motors and mechatronic components (e.g. built-in spindles), right up to all-in machinery and equipment with ready-commissioned switchgear cubicles are provided, all supplemented with top-notch services. Today, this Division is one of the most successful in the entire Siemens Group, with a leading position in the world market. We achieved technological leadership in the field of machine tool automation in the mid-Nineties with Sinumerik and Simodrive, a position which we have successfully defended to date.

Over recent years, we have acquired new business or entered into partnerships and alliances in all the major markets in Europe, America and Asia, such as our joint venture with Yaskawa in Japan. Furthermore, we have made significant investments in

the global expansion of our sales network, enhancement of our local services and improvements in logistics.

### **Motion Control – Production Machines**

The Production Machines Division was formed in 1997 and applies the tried-and-tested recipes for success from the machine tools equipment business to other sectors. This unit provides products and all-in solutions to customers from the packaging, printing, plastics, textiles, metal-working, timber, glass, masonry, ceramics and hoisting industries. We offer specific products, such as the successful Simovert Master-drives system, large numbers of which are deployed in mechanical engineering applications, while also having recourse to the entire A&D product portfolio.

The Simotion control system was developed and launched onto the market in the autumn of 2001 especially for machines requiring a high degree of motion control of the machine axes, frequently also combined with technological functions such as the flying shear. Simotion is provided in three different hardware platforms (PC-based, controller-based and drive-based). Moreover, with the help of our modular software structure and wide range of technology packages, we are able to take specific customer requirements and implement them as tailor-made industry solutions within a very short space of time. The ideal complement to Simotion is the new Sinamics drive generation, which provides a common software and hardware platform for all drives, as well as possessing uniform configuration and commissioning tools.

### **Market for electrical equipment for production machines**

We estimate the market volume for electrical equipment for production machines in the above-mentioned sectors to be of the order of 4.4 billion euros, around two thirds of which is in Europe, with the rest equally apportioned between America and Asia. Our global market share is approximately 11 per cent. Compared with the machine tools sector, this suppliers' market is still heavily fragmented, that is to say that the market is still extremely product-oriented and the market shares of the individual competitors are relatively small. And this is precisely where we see our opportunities

for growth over the years to come. We will exploit the situation by acting as a solutions provider, just as we did so successfully for machine tools.

### **Profitable growth in the field of equipment for machine tools**

We estimate the world market for machine tools equipment – our main exhibition focus at the EMO – to have a volume of some 400 billion euros. Western Europe accounts for around 50 per cent of the market, while America has a share of 13 per cent and the Asian and Pacific region approximately 36 per cent.

Despite having to contend with an increasingly hostile economy, we were able to extend our global market share last year by two per cent to around 28 per cent in total. We have thus left the competition trailing in our wake, while simultaneously strengthening our position in all the relevant markets. We are the clear market leader in Europe and rank second in the USA and Asia. This achievement has entailed plenty of hard work – and we intend to improve our ranking further on an ongoing basis. The primary factors of performance have been, and will continue to be our innovative products, coupled with a consistent focus on the customer and the global orientation of our business in the fields of development, manufacturing, sales and service. As far as machine tools equipment is concerned, we are reckoning on average, real market growth of the order of one to two per cent per annum over the next few years. Our goal is to expand at a significantly faster rate than the market, and we intend to attain it by means of a variety of measures, which I will go into in more detail later on.

### **The machine tool manufacturing business**

The prevailing situation in and the future development of the machine tool manufacturing business will doubtless be central topics at the trade fair in Milan. It must first of all be pointed out in this context that the European machine tools industry, particularly in Germany, continues to dominate the world market, thanks largely to its innovative power, outstanding quality and consistent orientation towards both the market and the customer.

As you are aware, the machine tool manufacturing business has always been subject to cyclical changes as a result of the prevailing economic situation. These have been exacerbated further by the events of 11 September 2001 and the subsequent military conflicts in Afghanistan and Iraq. Following years of dramatic growth, machine tool production in Germany was down 17 per cent in 2002, while machine tool consumption dwindled by 16 per cent, and the order backlog was reduced to 6.7 months. But this time, the German machine tools industry was structurally much better off than during the crisis of the Nineties, and was thus better able to cope with the slump in the market. Although the economic situation is still tense, the market now appears to have bottomed out. This is reflected both in the IFP Business Climate Index, which has now risen for four months on the trot, and the gradually growing propensity of manufacturing industry to invest. Given these initial conditions, Germany's VDW has ventured a cautiously optimistic forecast for 2003. No increase is expected in terms of production value, always assuming that the slight decline in domestic sales is counterbalanced by a similar increase in export trade. The major markets of China and America will have a crucial role to play here. We are predicting moderate growth over the next three years or so.

### **Global investment essential for success**

Like any other entrepreneur, one of our major goals is to be as independent as possible of fluctuations in the economy. Suppliers without a global presence put their own livelihoods at risk, as they cannot compensate for economic fluctuations in their domestic market in the long term and, moreover, are unable to offer their customers support around the globe. For this reason, we analyse the machine tools market with great care before taking decisions on our future orientation and investment policy. Our increased level of investment, particularly in Asia, has to be viewed in this context. In addition to gaining a foothold in the Japanese market thanks to our joint venture with Yaskawa, our portfolio and our hard work in all the major Asian regions have resulted in clear progress across the board. We have significantly extended our advantage over the competition in China, India and Australia alike.

Despite the precarious economic situation, the Motion Control Systems Division was able to generate sales of 1.7 billion euros in its two divisions in fiscal year 2002; this

is roughly equivalent to the peak value in fiscal year 2001. The significant inroads made into all market segments, especially in Asia, proved crucial factors in this success. This only serves to demonstrate that our product policy of gearing our offering to customer benefits, coupled with a highly competitive business policy which targets the world market, has resulted in significant advantages for the Division.

The Motion Control Systems Division expects to see a moderate increase in our trading volume, largely as a result of exports, in the current financial year, which draws to an end on 30.09.03. We intend to grasp the opportunities for profitable growth in the future via consistent development of our major strengths:

- innovation leadership in products, solutions and services,
- consistent customer orientation, and
- our global presence.

### **Technological leadership – our commitment to our customers**

I would like to go into more detail as regards innovation leadership or technological leadership. Machine tool manufacturing is the key technology for all metal-processing branches of industry. To possess, control and promote this know-how is to be able to make a substantial contribution to safeguarding the prosperity of a national economy which cannot rely on creating value through services alone. To retain this ability, or, even better, to enhance it, requires ongoing efforts in the intelligent combination of conventional mechanical engineering with electrical equipment – which, in turn, inevitably brings with it constant technological change. The resulting innovation represents a challenge and an opportunity in equal measure.

This change is taking place at an ever-increasing pace. The driving forces come from all areas – machine manufacturing, machine application and the production environment. While flexibility, modularity, standardisation, greater dynamics and precision and short times-to-market rank top of machine manufacturers' list of priorities, users' main concerns are high productivity and availability, process and investment protection, outstanding accuracy to gage and surface quality of the workpieces on offer and environmental compatibility. The production environment requires compatible process chains from the CAD processor right up to the tool tip, the secure and powerful

networking of manufacturing plant and equipment, efficient diagnostics, and rapid fault clearance or preventive maintenance in order to reduce downtime.

From these market requirements and the current scope for technological development emerge trends which affect mechanical engineers and automation specialists in equal measure. In mechanical engineering, for instance, I need only mention the great efforts made in the fields of high-speed, complete machining and machining in a dry environment, the new machine designs based on parallel kinematics and the - closely related - all-in mechatronics approach for the efficient implementation of machine functions.

In automation, this technological change is shaped by topics such as distributed intelligence, new types of man-machine communication, horizontal and vertical networking, integrated safety engineering, direct drive technology, the simulation of machines and processes and web-based services, to name just a few. For us, technological leadership means recognising technological trends at an early stage and implementing these in the form of innovative products, solutions and services. It is not first and foremost a matter of optimising our product portfolio in order to show off our performance data, but rather of taking an all-in approach to both the life cycle of a machine – from the original machine idea right up to the retrofit – and to the process chain in production – from the design right up to the finished workpiece. Our objective is the ongoing enhancement of the competitive strength, productivity and profitability of our clients and ultimate customers. And let me repeat once again our strategic approach: Integration achieves more than interfacing.

### **Productivity in Motion – more than just a slogan**

Continuous improvements in control technology performance, coupled with the ongoing increase of servo and spindle drive power help us to enhance productivity and precision in workpiece processing. Direct drive technology already has an increasingly crucial role to play here. Linear motors with rapid acceleration and high-performance torque motors can be used to create highly dynamic controls with outstanding precision. At the same time, many mechanical components can be omitted, thus reducing wear and tear and increasing precision over the entire life cycle. Machine tools based on parallel kinematics concepts and hybrid forms with Cartesian axes go far beyond the previous dynamics

and precision limits. This is due to the reduction in the loads to be driven and to the impressive rigidity of such machines which can be achieved by means of consistent mechatronic optimisation. At the same time, however, these machines make great demands on control and drive technology, requiring, for instance, the mastery of non-linear couplings of machine axes.

But it is not enough just to look at the machine tool and its automation if we are seeking to boost productivity. Incorporation of the automated machine tool into the manufacturing environment via integration of IT management components in the CNC is just as important. This involves production data management for transparent manufacturing processes, NC program management for cost-effective support of the variety of models available and tool management for efficient reduction of non-productive time. Maintenance management encourages high productivity levels, as unscheduled machine downtime can be cut to a minimum by preventive maintenance.

### **Increase in productivity for the mechanical engineer**

Not only does the machine operator require high productivity in day-to-day operations, however, but the mechanical engineer also wants to speed up, simplify and reduce the cost of the development and construction of new models in order to achieve or extend a crucial competitive advantage for his business. Virtual prototyping is one of the technologies we employ as part of our Mechatronic Support service. Unlike the traditional approach, which entails the machine being developed, constructed and subsequently automated, the mechatronic approach involves a joint engineering and electrical design effort, with both fields operating in parallel time. The machine is simulated and its behaviour tested and optimised in the machine model, which comprises the mechanical components as well as the control and drive technology. This all-in approach enables the machine manufacturer to reduce the time-to-market, save money thanks to the elimination of prototypes and achieve a high degree of development accuracy - all before the machine is ever built, as he is familiar with the performance of the new product before it even goes into pilot run. Even the precision and surface quality attainable at the workpiece can be determined in advance. This approach has paid off handsomely in practice, especially as far as complex new machine constructions are concerned.

## **Innovations safeguard the future**

Mechanical engineering continues to harbour a great fund of creativity which will produce the future-oriented innovations required to develop new, profitable lines of business and increase productivity both within and from out of Germany – not in opposition to electronics and IT, but via their goal-driven use.

The drivers of innovation are trends in mechanical engineering, as well as the rapid progress made in the fields of microelectronics, software technology and IT. Let me give you three examples:

### **Integrated safety engineering**

The market for functional safety engineering in industrial applications is currently growing at a disproportionate rate. This is largely due to legal and insurance stipulations, to the harmonisation of safety standards within the European Union and to the adaptation of these standards in many regions around the globe. This situation affects machine manufacturers and machine operators, who are responsible for safe plant operation, in equal measure. Siemens recognised this trend at an extremely early stage and was the first CNC and drive manufacturer to present systems with integrated safety (Sinumerik Safety Integrated) at the EMO in Milan as long ago as 1995. Since this time, some 12,000 CNC machines with around 85,000 drives have been supplied with this innovative safety technology, which has been certified by Germany's trade association of iron and metal workers. As well as enhancing machine safety, Safety Integrated has also helped to simplify installation technology at the machine itself and in the switchgear cubicle. The next innovation stages were the transmission of signals relevant to safety via a standard bus (Profibus) and the provision of crash security at the vertical axes of portal machines. As trendsetters in this sector, we will be launching another new product this year – the integrated, automatic acceptance test, which Mr. Herweck will be presenting in detail shortly.

## **Internet-based services**

Although the internet hype has now come back down to earth with a bump, revolutionary information technologies continue to bring about dramatic changes in today's industrial society. In addition to the increasing transparency of the market and heightened competitiveness, both internal and external traditional processes are changing and being replaced. The pace of innovation in this sector is extremely fast, and we are investing heavily in order to be able to take advantage of the opportunities offered by these technologies and provide products and services which are of great benefit to the customer.

For instance, in 2001 we launched a web-based online service offering for machine tool users and OEMs known as e-PS Network. The basic idea behind this product is to take advantage of the machine and process data available via the CNCs/PLCs to provide various services in automated form via the internet. Static and dynamic information from the production process is entered in real time and then compressed, analysed and evaluated on the e-PS servers, all in compliance with stringent security standards. Users then receive the results in the form of data on machine status, process stability, capacity utilisation and long-term status changes. This service enables predictive, preventive and reactive maintenance to be performed at minimum cost and effort worldwide. A wide range of customer installations now bear testimony to the acceptance and performance of this new service.

Over the past two years, we have continually extended the scope of our e-PS services – Mr. Herweck will return to this point – and we still regard this field as having great potential for the future. In developing this potential, we are sticking firm by our principle of refusing to chase every keyword and fashion: We will take action wherever benefits can be generated for our customers. This is because a business can only be established on the back of this customer benefit.

## **Augmented Reality**

Augmented Reality is another future-oriented form of interaction between man and machine. Data goggles onto which any graphics or texts can be projected is one example of an Augmented Reality product. The viewer's real field of vision is thus enhanced by camera-controlled and computer-driven display options. Unlike virtual reality, which inevitably has to be based on abstract models, Augmented Reality relies on recognition of the environment as it appears in reality – supplemented and enhanced by virtual elements.

This method of representation, combined with other types of interaction such as voice processing, offers an extremely wide range of applications when supported by state-of-the-art computer systems. Such applications range from development support via production all the way to maintenance. The machine tools industry, for example, hopes that Augmented Reality will save costs and simplify processes in the fields of service and maintenance. This scalable information and diagnostic system – due to be discussed later today – will make for much more effective service in the future, which in turn will ultimately also serve to increase productivity.

When I first came into contact with Augmented Reality as the recently appointed Head of the Motion Control Systems Division, I was immediately fascinated by the idea. This may be due in part to my own personal experience: While still at university, I invested a substantial amount of time and effort in the topics of simulation and virtual reality, and later on, while in charge of production, was irritated more than once by the fact that true reality is typically so complex that virtual images quickly come up against their limits. Augmented Reality brings these two supposed antitheses together – not in technology-driven, but in application-driven fashion.

Following our preliminary EMO press conference, my colleague Timothy Shepherd will present WinCC flexible. Without taking the words out of his mouth, I would like to make a few comments on the significance of the new HMI in the machine tools sector, and illustrate with the help of another example the importance of a broad range of skills, such as those possessed by the Automation and Drives Group, for truly comprehensive solutions.

## **Win CC flexible – from the point of view of machine tool automation**

WinCC flexible is used across the board as HMI software for the three biggest A&D automation systems, Simatic, Sinumerik and Simotion. As far as machine tool and production machine automation is concerned, the crucial innovation is the extension of configurable HMI devices via the addition of Windows CE-based operator panels. Thus, for the very first time, we have a fully compatible HMI system, from the lower performance range of the CE devices right up to the PC-based systems in the high end range – for individual user interfaces, technology-oriented applications and all application areas, from the automotive industry right down to small-scale manufacture in workshops and the like.

## **Real-time Ethernet in mechanical engineering**

Interaction between the various automation components and systems would not be possible without industrial communication. For many years now, we have successfully been using Profibus at field level to guarantee rapid and reliable data exchange between the controls and local peripheral boards. Requirements in terms of the volume of data to be transmitted rose steadily as increasingly intelligent field devices emerged, highlighting the limitations of existing field bus systems. What is more, the bridge to the control level, which is typically networked with Ethernet structures, also required a system gateway from the field bus to the Ethernet, as the latter was not able to meet requirements regarding deterministics etc. at field level.

With Profinet, we at A&D – in conjunction with the Profibus User Organisation, or PNO for short – are pushing a basic technology which combines the best of both worlds, namely field bus communication and Ethernet technology. The development of Isochronous Realtime Ethernet Technology (IRT) allows the high demands placed on realtime communication, for instance in our special field of motion control applications, to be met. In the production machines sector, and for packaging and printing machines in particular, the drive axes must be synchronised in clock-controlled mode. The new IRT will enable over 100 drive axes to be controlled in clock synchronisation with a cycle time equal to or under 1 millisecond and a jitter of less than a microsecond. The special attraction of this solution is that conventional devices

(TCP/IP) communicating via the IEE 802.3 standard can be simultaneously operated alongside the new high speed technology in a single network. PNO is set to incorporate IRT in its new Profinet V3 standard, and to transform preceding standards such as the Profidrive motion control profile accordingly. Once this development has been completed, Profinet V3 will become the communication standard in mechanical engineering, as it is ideally suited for all motion control applications, while not making any concessions in terms of openness and compatibility.

## **Outlook**

Motion Control Systems has achieved its outstanding position in the market thanks to a convincing overall concept, its integration in the context of Totally Integrated Automation and the top quality of all its key components on offer. The secret of our corporate success remains the consistent translation of customer requirements into innovations designed to enhance productivity and profitability. With this in mind, we invest some six per cent of revenue in research and development every year.

This ensures that we will continue to remain innovative and quick, shape technological trends and use IT for the benefit of our customers. It is already possible for machines to automatically request service via SMS or e-mail when a malfunction occurs. In future, web-based services will monitor machine performance and optimise process quality, or simulation processes will be used to “manufacture” workpieces in order to be able to predict the precision geometry and surface quality of the finished article following the actual manufacturing process. We are confident that our philosophy will enable us to further extend our position as the leading provider of automation and drive technology – both in the machine tools industry and elsewhere.

Thank you for your kind attention.