

# ARCHIVED REPORT

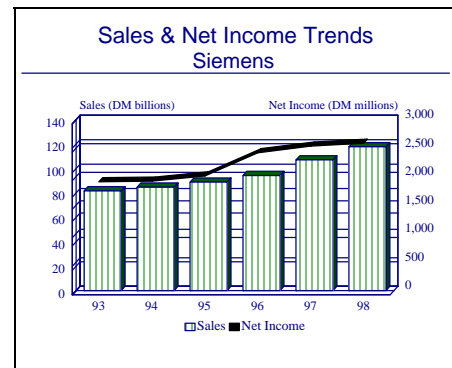
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## Siemens AG - Archived 6/2000

### Outlook

- In late 1997, DASA and British Aerospace purchased the Siemens Defense Electronics Group
- In April 1998, DaimlerChrysler Aerospace took ownership of the German defense electronics division of Siemens
- Around the same time, British Aerospace took control of its newly acquired operations in Australia and Britain
- Siemens remains a world leader in electrical and electronic systems for industrial and commercial use



### Headquarters

Siemens AG  
Wittelsbacherplatz 2  
D-80333 Munich Germany  
Telephone: (49 89) 636-33032  
Web Site: <http://www.siemens.de>

Siemens AG was first founded in 1847 as Telegraphenbauanstalt Siemens & Halske, and became an *Aktiengesellschaft (AG)*, or public stock company, in 1897. Today the company is involved in a wide spectrum of activities ranging from medical electronics to nuclear power systems.

In November 1997, DASA and British Aerospace (BAe) purchased the Defense Electronics Group (SI) of Siemens. DASA took over the remaining activities located in Munich-Unterschleissheim. Despite the joint purchase, BAe and DASA will not jointly run the businesses; they will run two separate defense electronics companies.

At the close of fiscal year 1998 (ending September), the company and its subsidiaries employed 416,000 people worldwide. Siemens' commercially registered headquarters are maintained in both Berlin-Charlottenburg and Munich.

### Structure and Personnel

#### Managing Board

Heinrich von Pierer  
President and Chief Executive Officer  
Planning & Development  
Volker Jung  
Edward G. Krubasik  
Heinz-Joachim Neubürger

Peter Pribilla  
Jürgen Radomski  
Günter Wilhelm  
Adolf Hüttl  
Roland Koch  
Ulrich Schumacher  
Claus Weyrich

### Product Areas

Siemens is a world leader in electrical and electronic systems for industrial and consumer use. It is one of the largest electrical/electronics companies in Europe; products range from television sets to railway equipment. Siemens manages its operations in the following manner:

1. Energy
  - 1.1 Power Generation
  - 1.2 Power Transmission and Distribution
2. Information & Communications
  - 2.1 Information & Communication Networks
  - 2.2 Information & Communication Products
  - 2.3 Siemens Business Services GmbH
3. Industry
  - 3.1 Industrial Projects and Technical Services
  - 3.2 Automation and Drives
  - 3.3 Production and Logistic Systems
  - 3.4 Siemens Building Technologies AG
4. Transportation
  - 4.1 Transportation Systems
  - 4.2 Automotive Systems
5. Health Care
  - 5.1 Medical Engineering
6. Components
  - 6.1 Semiconductors
  - 6.2 Passive Components and Electron Tubes
  - 6.3 Electromechanical Components
7. Lighting
  - 7.1 Osram GmbH
8. Financial Services
  - 8.1 Siemens Financial Services

#### ENERGY GROUP

**Power Generation.** The group remains one of Europe's leading manufacturers of industrial gas turbine machinery, as well as one of the most significant producers of atomic energy plants and equipment worldwide. KWU is engaged in the development of unfired combined cycle (GUD) power plants, with integrated coal gasification and gas cleaning systems. Highlights of the year included orders for the Nan Pu GUD plant in Taiwan, and the conversion of a number of plants in India and the US to combined-cycle units. In the hydroelectric sector, the order for the Bhira pumped-storage power station in India was significant, and so was the contract for the complete overhaul of three generators of Washington state in the US. The nuclear sector accounted for approximately 30 percent of the group's sales. In the new German states, the group is playing a significant role in the refurbishment of power plants and the construction of new units. The group is committed to rapid transformation of the manufacturing plants, acquired in Erfurt and Gorlitz, into facilities that can truly compete in the global

market. At the same time, the group continues its efforts to enhance the safety of Russian-designed nuclear reactors operating in Eastern Europe and the former Soviet Union.

**Power Transmission and Distribution.** This group's business activities remain as production of switching stations, switch gears, circuit breakers, meters, protection equipment, controls, and power cable. The group produced and installed the world's first stepless-controlled, three-phase series compensator for the Western Area Power Administration in the US. In Mexico, the group constructed a 420 kV gas-insulated switching station that distributes electricity from the Petacalco power plant to the region around the new port of Lazaro Cardenas.

#### INFORMATION AND COMMUNICATIONS GROUP

**Information & Communication Networks.** This unit produces communications systems for business applications. Technical adaptation of the new Hicom communication system and the ROLM 9750 is progressing well. In fact, the ROLM company became a wholly owned subsidiary, since Siemens has assumed IBM's interest during the year. Also, a new communication terminals plant was opened in Austin, Texas, during the year.

**Information & Communication Products.** The group is engaged in the design, development, manufacture and marketing of comprehensive telecommunication systems, including switching systems, EWSD switching systems, fiber-optic transmission routes, and mobile radio telephone systems.

#### INDUSTRY GROUP

**Industrial Projects and Technical Services.** This group manufactures electrical engineering systems; Siemens not only develops and manufactures engineering systems, but also acts as a systems integrator for a variety of unique applications. The Industrial and Building Systems Group specializes in providing products and associated engineering and integration services for all basic industries and capital goods sectors.

**Automation and Drives.** The specialty of the group remains manufacturing of various integrated systems for the full range of constant and variable speed drives. The group provides fully digitized drive systems, switches, conductors, controls, and distribution equipment for industrial low-level switch gear and switching systems. Industrial automation equipment is supplied to electrical engineering companies, and to other Siemens Groups including Power Generation (KWU). Automation consulting, engineering and software are also provided

by the group to customers in all sectors of the capital and consumer goods industries.

#### TRANSPORTATION GROUP

**Transportation Systems.** The group is a comprehensive supplier of rail transportation systems. It delivered 60 *InterCity Express (ICE)* high-speed railway trains ordered by Deutsche Bundesbahn during the fiscal year. Also, delivery of the first high-speed locomotives to Spain marked a milestone in the export of advanced German high-speed transportation technology. The group is capable of offering a full range of rail transport systems, including railway locomotives, cars, signaling/traffic control systems and electrification of rail lines. The group is fully committed to improving the eastern region's transportation infrastructure.

**Automotive Systems.** The primary concern shown by the group is in improving traffic safety and protection of the environment. Airbag systems, optimized engine management systems to reduce air pollution, and CFC-free cooling agents in air conditioning units are some typical examples that show the group's concerns and its efforts to improve the environment. The group intends to stay active in this very important market.

#### HEALTH CARE GROUP

**Medical Engineering.** The medical group is a famous supplier of medical diagnosis systems. It is one of the

world's pre-eminent suppliers of computer-assisted tomography (CAT) and magnetic resonance imagery (MRI) scanning machines. More than 500 CT units were sold during the fiscal year, including 60 units of Somatom CT series to People's Republic of China. In addition, the group is involved in dental systems, x-ray technology, respirators, and other sophisticated medical systems.

#### COMPONENTS GROUP

**Semiconductors.** The Semiconductor segment manufactures various electronic components for numerous systems applications.

**Passive Components and Electron Tubes.** The Passive Components/Electron Tube Group manufactures capacitors, ceramic components and electron tubes for numerous systems applications.

**Electromechanical Components.** Hybrid circuits, relays, and optical fiber components continue to remain staples of this Siemens business segment.

#### LIGHTING GROUP

**OSRAM.** OSRAM, a legally independent subsidiary company of Siemens AG, is one of Europe's leading manufacturers of lighting systems. Osram products are utilized for numerous applications, including automotive lighting systems and industrial lighting.

## Facilities

Siemens AG is headquartered in Munich and Berlin. Its manufacturing, development and administrative facilities are located throughout Germany. Major domestic and international defense operations are detailed below.

Siemens AG, Wittelsbacherplatz 2, D-80333 Munich, Germany. Telephone: (49 89) 234-0. This is the corporate headquarters.

Siemens, Defense Electronics Group, PO Box 1661, D-85705 Unterschleissheim, Germany. Telephone (49 89) 31 79 36 47. Some of this facility's products include: communication programs, surveillance systems, air traffic control systems, radar and microwave landing systems. *This operation was sold to DaimlerChrysler in late 1997.*

Siemens plc, Siemens House, Oldbury, Bracknell RG12 8FZ, England. Telephone (44 1344) 39 60 00. Headquarters of Siemens' UK-based operations.

Siemens Plessey Systems, Oakcroft Rd, Chessington, Surrey, KT9 1QZ. Telephone (44 181) 397 51 71. This operation produces air defense radar, C<sup>3</sup>I systems, and tactical communications systems. *This operation was sold to British Aerospace in late 1997.*

Siemens Corporation, 1301 Avenue of the Americas, New York, New York 10019. Telephone (212) 258-4000. This is Siemens' US Representative headquarters.

## Corporate Overview

Siemens has active interests in numerous subsidiaries in North America, Latin America, Asia, Africa, Australia and Europe. In addition, the company's subsidiaries in

Europe have been steadily growing; they are located in Austria, Belgium, Denmark, Finland, France, Greece, Ireland, Italy, the Netherlands, Norway, Spain, Sweden,

Switzerland, Turkey and the United Kingdom. With such a broad reach, Siemens AG must be considered one of the truly multinational corporations in Europe, as well as the pre-eminent electronics/electrical concern of the European Union.

### **New Products and Services**

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**Bowman.** In August 1997, ITT Defence Ltd, Racal Electronics and Siemens Plessey Systems formally opened a joint venture to develop and produce the Bowman tactical communications system. This is a man-portable and vehicle-mounted combat-net radio system designed as a replacement for the existing Clansman combat net radio used by the British Army. The joint venture, named Archer Communication Systems Ltd, was awarded a \$32 million contract to begin work on Bowman. The new radio is the largest British military communications program in more than 20 years. Initially, the joint venture partners were competing against each other. However, in December 1996 the companies decided to join together, claiming a consolidated effort would save the Ministry of Defence money. Bowman is scheduled to enter service in 2002, with production running through 2007.

**Sampson.** Sampson is a primary medium-range air and surface search radar to fulfill a Royal Navy requirement to replace the Type 996 radar. Initial platforms will be retrofitted Type 23 frigates and the Project Horizon Common New Generation Frigate. Siemens Plessey Defense Systems is the prime on this developmental program.

**Vixen.** This is an automated data processing system for processing electronic intelligence information and performing the mechanical tasks associated with electronic warfare functions. Vixen is intended to process electronic intelligence data up to 10 times faster than existing systems. Most mechanical and administrative tasks are to be automated, freeing personnel for more intellectual processes. Errors in data input will be reduced, larger amounts of corroborative data made available to analysts, and a single consistent database created. The system is under development at Siemens Plessey Defense Systems.

**AR327 Radars.** In January 1994, Siemens Plessey Systems was awarded a £20 million contract to supply long-range air defense radar to the UK's Royal Air Force. The order covers supply of three AR327 tactical mobile radars and provision of long-term support. The order is the first for radars of the AR327 type, and delivery of the systems was believed completed in late 1995.

### **Plant Expansion/Organization Update**

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**Siemens to Build Dresden Microchip Factory.** In December 1993, Siemens announced that it would invest DM2.4 billion over 10 years in a new microchip facility in Dresden. The project is one of the single largest investments in eastern Germany and the biggest in the European electronics sector in recent history. The investment is part of Siemens' strategy aimed at increasing its share of the international telecommunications market, particularly in Europe.

### **Mergers/Acquisitions/Divestitures**

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**DASA/BAe Grab Siemens Defense Units.** In November 1997, DASA and British Aerospace (BAe) purchased the Defense Electronics Group (SI) of Siemens AG. Under the joint bid, BAe offered to pay roughly \$530 million in cash for the Siemens Plessey Systems business in the UK and the Siemens Plessey Electronics Systems Australia subsidiary. DASA will take over the remaining activities located in Munich-Unterschleissheim. DASA did not disclose the value of its portion of the purchase. When the deal is completed, the Defense and Civil Systems Business Unit of DASA will have Unterschleissheim as its third location, along with Friedrichshafen and Ulm. Despite the joint purchase, BAe and DASA will not jointly run the businesses; they will run two separate defense electronics companies.

In April 1998, DaimlerChrysler Aerospace took ownership of the German defense electronics division of Siemens. Around the same time, British Aerospace took control of its newly acquired operations in Australia and Britain.

### **Teaming/Competition/Joint Ventures**

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**Airsys ATM.** This is a joint venture formed between Thomson-CSF Airsys and Siemens in June 1997. Thomson-CSF and Siemens have 60 percent and 40 percent stakes, respectively, in the new Airsys ATM. The new company will produce air-traffic-management systems. Airsys ATM says it currently holds an estimated 20 percent share of the ATM market.

**Archer.** In December 1996, ITT Defence signed an agreement in principle with Siemens Plessey Systems and Racal Radio to form an alliance to address the UK's Bowman requirement for a new \$3.2 billion battlefield communications system for the British armed forces. The companies would pool technical, manufacturing and production resources to ensure a cost-effective solution. The consortium, known as Archer Communications Systems Ltd., was formally signed in August 1997.

**Interautomatika.** In November 1993, Siemens announced that it was taking a 31 percent interest in Moscow-based Interautomatika, which would handle the engineering, sales and marketing of its instrumentation and control equipment for fossil-fueled power stations.

**KTZ.** In August 1993, Siemens KWU signed a cooperation agreement with KTZ, Russia's largest industrial turbine manufacturer, for joint production and marketing both in Russia and internationally. At the same time, Siemens KWU will hold a 10 percent share in the Russian company, which was privatized in January 1993. The deal was expected to give KWU access for the first time to the Russian market for smaller industrial turbines.

**Fujitsu.** In June 1993, Fujitsu and Siemens SNI pumped new life into their long-standing mainframe cooperation, in a pact targeting smaller, more powerful systems for networked client-server computing environments. The arrangement hoped to cut costs and development time of mainframe systems.

**Skoda.** In July 1993, Siemens KWU division announced a joint venture with the Czech group Skoda to build turbines. The two companies signed a letter of understanding under which KWU will hold 51 percent of the Skoda Energo joint venture, and Skoda will hold the remaining 49 percent. Skoda Energo will update Skoda's turbine technology as well as develop new technology with Siemens.

**Subcontracting to Aerospatiale.** Siemens provides S/UHF transponders for meteorological satellites (METEOSAT) which are produced and launched under the sponsorship of the European Meteorological Satellite Organization. Aerospatiale, Space and Ballistic Systems Division is the prime contractor, responsible for system AIT and development of mutation dampers (with Onera), and head of the COSMOS industrial consortium, which comprises DASA (structure, thermal controls and solar array), ETCA (power supply and conditioning), Marconi Space Systems Ltd (AOCS, EGSE, radiometers and amplifier equipment), SAT (telemetry equipment and solar cells), and Alenia (data transmission equipment). Four METEOSATs are in orbit: three operational and one retired. Another satellite was expected to be launched in 1993.

**Hughes.** In 1992, an agreement was reached between Hughes Aircraft and Siemens Plessey Systems to form a team for the joint development of a high-performance radar (HPR) for the US and UK military programs. An active array ground-based HPR will be developed from the Multifunction Electrically Scanned Adaptive Radar (MESAR) program sponsored by Siemens, the UK

Defence Research Agency and the US Army's Strategic Defense Command.

**Asahi.** Siemens AG has entered into an unspecified joint venture with Asahi Chemical Industry Co, Ltd of Japan.

**Computer Elektronik Dresden/Robotron.** Robotron, which was perhaps the best known manufacturer of computer systems in the former communist bloc, has been privatized and reorganized and is now known as Computer Elektronik Dresden GmbH. Computer Elektronik Dresden GmbH has been licensed by Siemens to manufacture the Siemens H60 mainframe computer.

**Daewoo Heavy Industries.** Daewoo is leading a Korean effort to develop an indigenous 30 millimeter self-propelled anti-aircraft artillery system using the Emerson Electric mount. Associated with Daewoo in this venture are Samsung Precision (optronic tracker), Goldstar Electrical in collaboration with Siemens (search radar), and Tong Il (gun barrel). Daewoo will lead the consortium and will assemble the self-propelled anti-aircraft artillery system and market it, in addition to manufacturing the turret and chassis. Also, Siemens KWU has licensed the Korean firm, Halla Engineering & Heavy Industries Ltd, to manufacture the Siemens-designed gas turbine machines.

**Euro-ART Consortium.** As a member of the Euro-ART consortium which includes Thomson-CSF, General Electric and Thorn EMI, Siemens is involved in development of a new multifunctional 3-D phased array Counter Battery Radar (COBRA). The British, French and German armies have requirements for 10, 15 and 28 units, respectively; first delivery of the prototype was planned for 1993. Production deliveries were expected in 1997.

**GPT Ltd.** Siemens AG Public Communication Networks Group is teamed with telecommunications firm GPT Ltd, based in Coventry, UK.

**Interturbo.** Siemens KWU has established a joint-venture company located in St. Petersburg, Russian Republic, for the manufacture of gas turbines. The joint venture company, known as Interturbo, has been set up in cooperation with LMZ of Russia.

**MIDSCO Inc.** MIDSCO Inc and Siemens are involved in joint development of a smaller, more advanced design than Class 2 (for USAF F-15 and USN F-14), a system designated MIDS (Multifunctional Information Distribution System) for fighter applications. A consortium of electronics companies, including Siemens (FRG), Italtel (Italy), Plessey Electronic Corp (US),

Inisel (Spain), and Computer Devices Corp (Canada) is working on FSD of MIDS.

**Nuclear Power International SNC.** Framatome SA and Siemens AG are partners in the joint-venture firm Nuclear Power International SNC, headquartered in Paris. The partnership was agreed upon in 1989, and work began on development of a nuclear power generation reactor particularly suited for export markets. The technology developed through the joint project is likely to benefit domestic users in France and Germany as well.

**PictureTel.** Siemens AG Private Communication Systems Group has teamed with PictureTel, based in Peabody, MA, USA, to offer low-cost video communication systems which are integrated with Siemens ISDN networks.

**SEL-Alcatel Standard Elektrik Lorenz.** Siemens and SEL have participated in the development of the DFS-Kopernikus satellite telecommunications system for the Deutsche Bundespost's Telekom-subsiary.

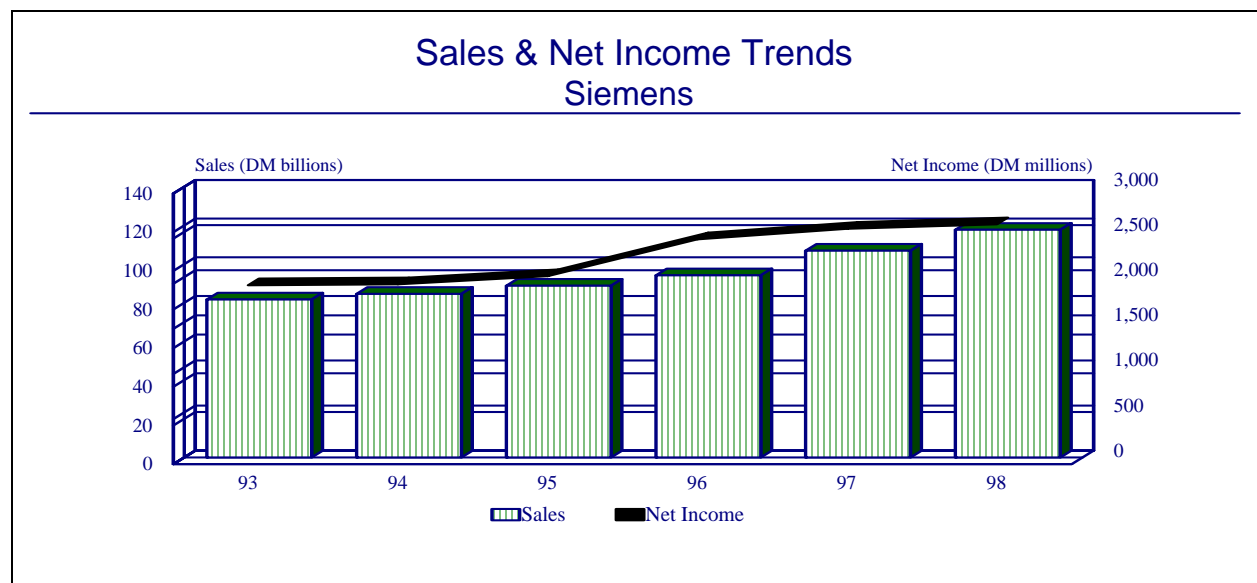
**Siemens Solar GmbH.** Under joint ownership with Bayernwerk AG (one of Bavaria's major power generation concerns), Siemens AG has jointly established Siemens Solar GmbH, a specialist manufacturer of photovoltaic cells. Siemens Solar recently received the world's largest order for solar power generating equipment, which involves the delivery of over 800 systems to be installed in five sub-Saharan countries. The cells are applied for irrigation, refrigeration, and lighting power generation.

**TST.** Telefunken Systemtechnik GmbH (TST), also a DASA subsidiary, produces many electronics systems including fire control computers, and the firm is cooperating (via subsidiary with ATM computer GmbH) in the marketing and development of military computers, with Rolm MilSpec Computer Inc of the US (now 100 percent owned by Siemens AG).

## Financial Results/Corporate Statistics

Siemens' net sales for 1998 totaled DM117.7 billion, up 10 percent from the DM106.9 billion recorded in 1997. Net income rose slightly to DM2.65 billion in 1998 from DM2.6 billion in the previous year. The latest full-year statistics are given below. US dollar figure translated as of September 30, 1998, at the rate of \$1=DM1.703.

Y/E September 30	1994	1995	1996	1997	1998	1998
(DM millions)						US\$
Sales	84598	88763	94180	106930	117696	69111
Net Income	1993	2084	2491	2608	2658	1561
New Orders	88371	91900	100805	113120	119601	70229



**Industry Segments**

A breakdown of Siemens' sales by major market segment, for the past five years, is given below.

<b>SALES</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>
(DM millions)					
Energy	13079	14252	13767	15989	17598
Industry	21437	23444	24676	26813	26647
Communications	20427	19588	23067	27068	29963
Information Systems	11669	12798	13561	15407	16952
Transportation Systems	7317	7767	8266	8582	10614
Transportation Systems	6160	7317	7767	8266	8582
Health Care	7548	6777	7136	7578	7472
Components	5750	7176	8017	9372	10817
Lighting	5442	5444	5706	6327	6558
Other	1652	2204	1708	1583	262
Intersegment	-9723	-10687	-11724	-11789	-9187
<b>TOTAL</b>	<b>84598</b>	<b>88763</b>	<b>94180</b>	<b>106930</b>	<b>117696</b>

## Strategic Outlook

With the sale of its defense electronics group, Siemens has exited the aerospace industry. Winning bidders DASA and British Aerospace have taken ownership of the Siemens businesses located in their respective countries (with BAe also taking control of Siemens' Australian unit).

While defense electronics was never a core business for Siemens, the sale of the operation will help bolster its purchasers. DASA will integrate Siemens' Unterschleissheim plant into its Defense & Civil Systems business unit, which focuses on radio systems, ground and naval systems, on-board systems and guidance and reconnaissance technology. The addition of the Siemens operations should allow DASA to maintain core competencies in this highly competitive market.

For BAe, the acquisition of the UK-based Siemens Plessey Systems was aimed at gaining advanced

military radar technology, in particular the Sampson active phased-array air defense radar which has been selected for the Royal Navy's Horizon frigate. Further leveraging its new addition, BAe plans to use Siemens Plessey as the foundation of a new Defence Systems business centered around BAeSEMA.

As to Siemens outlook, thanks in large part to its size and disparate markets, Siemens has ridden out the current European recession with relatively flat sales – which have recently begun to pick up. The company continues to tighten operations across its range of businesses through employment reductions and restructuring – methods which are expected to improve the corporation's competitiveness and productivity even further. Overall, Siemens should see continued growth in sales and earnings for the year ahead.

## Prime Award Summary

Unavailable.

## Program Activity

**Business Interests.** Siemens is a world leader in electrical and electronic systems for industrial and consumer use. The company identifies its product areas as follows:

- Power Generation
- Power Transmission and Distribution
- Industrial and Building Systems
- Drives and Standard Products
- Automation

- Private/Public Communication Systems
- Automotive Systems
- Transportation Systems
- Medical Engineering
- Semiconductors
- Passive Components and Electron Tubes
- Electromechanical Components
- Audio and Video Systems

## Space System Programs

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### DFS-Kopernikus

DFS-Kopernikus is a German domestic communications satellite system. Siemens AG, Munich, Germany, is head of Gesat GmbH, formed to market Kopernikus and is overall prime contractor. Additional contractors include Daimler-Benz Aerospace, Bremen, Germany (flight segment and ground-based control systems), ANT Nachrichtentechnik GmbH (ANT) (payload); and Standard Elektrik Lorenz (SEL) (TTCM equipment).

### Iridium

Iridium is a worldwide digital, satellite-based, cellular personal communications system. It is privately sponsored by Motorola. Motorola's Government Electronics Group, Satellite Communications Division, Chandler, AZ, is leading the effort to develop the Iridium system. Iridium Inc, a Motorola subsidiary, will own and operate the satellite and system control segments of the constellation. Siemens AG is responsible for development and supply of Iridium mobile telecommunications and switching systems and related services for terrestrial gateways.

### Meteosat

Meteosat is a family of geosynchronous meteorological satellites. Meteosats provide weather observation of Europe, Africa and the northeastern part of South America. Siemens provides S/UHF transponders for these satellites.

*Following the sale of its Defense Electronics operations the programs listed below are now owned by either DaimlerChrysler or British Aerospace (all Siemens Plessey related programs). They are listed here for historical reference.*

## Electronics Programs

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### (Airborne Electronics)

#### ECR-90

This is a multimode pulse Doppler radar tasked with air-to-air and air-to-ground combat. The ECR-90 radar will be the primary sensor aboard EFA and will be especially tailored toward air defense. It will also be

compatible with the secondary mission of air-to-surface attack. Siemens is a member of the ECR-90 consortium. The program is in prototype development.

### (C<sup>3</sup>I)

#### BICES

BICES (Battlefield Information Collection and Exploitation System) is an information collection, collation and distribution system designed to provide an umbrella system under which the current national C<sup>3</sup>I systems work together. Data collected by the sensors of different national systems will be sent to BICES and thus transferred to NATO command centers. Siemens is a member of the TRW consortium that is competing for this program.

#### Bowman

This is a man-portable and vehicle mounted combat-net radio to provide a replacement for the existing Clansman combat net radio used by the British army. Siemens-Plessey is the project leader in the Yeoman Consortium and responsible for the Jupiter communications management system, a direct development of the frequency management facility produced by Siemens Plessey Systems for the Raven program. Designed for use, primarily, with combat net radio systems, Jupiter can support HF, VHF, UHF radios, both fixed and frequency agile; ground-to-air nets; and UHF and satellite links. The Crossbow Consortium (led by ITT Defense Ltd) appears to be ahead of its rival team, Yeoman (headed by Siemens Plessey) in the competition to develop the successor to the outdated Clansman radio. A major point in favor of the Crossbow system is that its use of SINCGARS technology means that communication between the US and British armed forces will be significantly eased.

#### Clansman

Clansman is an integrated family of manpack and vehicle-mounted combat net radios designed to provide long- and short-range communication facilities for infantry, armored vehicles, gun and missile batteries, beach landings, parachute drops, and some ground-to-air links. Facilities are also provided for links to wider coverage area communications systems. Siemens Plessey Military Communications is responsible for the UK/PRC-320 and UK/PRC-344. This system is to be replaced by Bowman in the late 1990s.

#### Deltacs/Zodiac

Zodiac is a shelter-mounted system designed to provide the Royal Netherlands Army with a fully automatic digital (delta-modulation) encrypted communications system and to ensure that the system provided is fully compatible with the other systems in use within NATO. At present Siemens and Signaal have been jointly



contracted by the German and Dutch Governments to execute the project definition phase of this program.

### **HEROS**

HEROS (Heeres-Führungsinformationssystem zur rechnergestützten Operationsführung in Staben) is an automated C<sup>3</sup>I data processing system designed to support general and specialist staff areas of the German army, to provide enhanced command and control of own forces and deployment of joint intelligence systems and to expedite the fast flow of information to the army staff, the air force, and navy, as well as to NATO and allied headquarters. Siemens is the prime contractor for HEROS.

### **IUKADGE**

This is a broad-based air defense command and control system using existing commercial software, System X telephone systems and Marconi/GE/Plessey radars tasked with the operation of UK air defenses. IUKADGE radars are supplied by Marconi Radar Systems, Plessey Radar and General Electric Company. Datalinking is supplied by Ferranti Computer Systems Ltd.

### **NATO ACCS**

Automated airspace command and control system designed to provide an automated command and control system for Western European airspace in support of European air operations. NATO ACCS was also to have had a battle management function, directing both offensive and defensive air operations in NATO airspace. Siemens is a member of the ASM Consortia that is working on this system. The system is in early development.

### **NICS (NATO Integrated Communications System)**

This is a switched user voice/teletype/data system providing survivable, secure strategic communications. NICS is a strategic and operational communications system designed to coordinate NATO activities. The Pilot Secure Voice Program (PSVP) is a joint development in the hands of AEG-Telefunken, Siemens Electrovox and Page-Europa. The Initial Voice Switched Network (IVSN) is being developed by ITT-Defense Technology. Litton C<sup>3</sup>I Systems is responsible for TARE and Ford Aerospace & Communications is responsible for SATCOM.

### **Multifunctional Information Distribution System (MIDS)**

MIDS is a multinational cooperative development program intended to produce a low-volume terminal (LVT) operationally similar to the Joint Tactical Information Distribution System Class 2 terminal. It is intended to provide secure, digital, anti-jam voice

communications (in real time), and can communicate beyond the line-of-sight through automatic relay techniques. MIDS is intended for use on the F/A-18 Hornet (and the European Fighter Aircraft and French Rafale). The program is designed to grow to encompass applications on helicopters, ships, and ground sites. Siemens is a member of the MIDSCO Inc consortium.

### **Ptarmigan/MRS**

Ptarmigan is a second-generation battlefield automated tactical communications system intended to replace the existing Bruin tactical communications system and improve battlefield communications dependability, capacity and interoperability. Prime contractor and system design is the responsibility of Siemens Plessey Defense Systems.

### **Siemens Plessey System 4000**

This is a single-channel ECM-protected vehicle and man-pack radio system to provide secure, efficient radio communications between small autonomous units in fast-moving and rapidly changing tactical environments. The systems is in production and service.

### **Skynet 4**

This is a satellite communications system for the provision of worldwide C<sup>3</sup>I facilities to the British armed forces. British Aerospace is the prime contractor with Matra-Marconi responsible for the payload and Siemens Plessey Defense Systems for the ground stations. Harris Corporation is providing the satellite command and control equipment.

### **Wavell**

This is a common-user automatic data processing system assisting commanders and their staffs with the conduct of general operations and intelligence analysis at corps, division and brigade levels by automating data handling and control. Wavell provides a common user system to which all tactical command cells have access via the Ptarmigan area communications network. Automatic data processing (ADP) is employed to assist in the conduct of general operations and intelligence work. The data used by Wavell is a distillation of the detailed activities of the specialized arms and services. This makes essential the coordination of several advanced ADP systems variously dedicated to communications, fire control, air operations and engineering activities. Siemens Plessey Defense Systems is the prime contractor.

**(Radar)****AR-320/325**

The family of radars based on the AR-320 and AR-325 are advanced E/F-band, long-range air defense 3-D radars. The AR-320 is a NATO Class 1 radar. The AR-325 can be configured to act as a radar reporting post, a control and reporting post or as a command and control post. All configurations are transportable for rapid field deployment. The system incorporates very sophisticated ECCM capability and is designed to be integrated easily within an overall Air Defense Ground Environment (ADGE) system. The AR-325 is tailored specifically for the non-NATO market. It is configurable for the same missions, but incorporates less advanced ECCM facilities than the AR-320. Siemens Plessey Radar is the prime.

**Cobra**

Cobra is a multifunctional 3-D phased array radar with active gallium arsenide antenna tasked with the detection of enemy artillery, rockets and mortar rounds at long range, the classification of the round and the localization of the firing unit. Cobra is intended to detect and classify enemy artillery shells, mortar bombs, and rockets in flight, compute the origin, and provide a fire control solution for effective counter battery fire with MLRS and conventional artillery. Siemens is a member of the EURO-ART consortium. Work share between the partners will be Thomson-CSF (30 percent: prime contractor), Siemens AG (30 percent), Martin Marietta (25 percent) and Thorn-EMI (15 percent).

**MESAR**

MESAR is a jointly funded demonstrator program between the Ministry of Defense Research Agency (DRA) and Siemens Plessey Radar aimed at establishing the design, performance and production techniques for the manufacture of multifunction radars over the next 20 years. Key technology areas currently addressed in the program are the use of low-cost gallium arsenide modules, array technology, adaptive nulling for ECCM and beam management and data handling software.

**Siemens Plessey AWS-6**

This is a G-band 2-D Traveling wave tube (TWT) radar tasked with medium-/short-range multipurpose naval surveillance. The AWS-6 is suitable for fitting in ships of 400 tons displacement and over. Dolphin is configured for deployment with Seaguard CIWS. Siemens Plessey Radar is the prime contractor, while Contraves Italiana is responsible for the integration of Dolphin and Seaguard. Terma Elektronik is responsible for integration with Danish warships.

**Seaguard**

This is a complete modular naval fire control system including a close-in weapons system, optimized to provide protection against surface-to-surface and air-to-surface guided missile systems. Seaguard is an integrated shipboard point defense system intended to provide terminal protection against anti-ship missiles but with capabilities verging on a full action information system. It is deployed on Turkish MEKO-200 frigates. Siemens Plessey Radar is one of several contractors involved in this program.

**Type 996**

This is a E/F-band 3-D surveillance and target identification radar. The Type 996 provides automatic target indication for Seawolf and Sea Dart missile systems for surface ships of frigate and larger size. Capable of detecting every form of airborne threat, Type 996 provides surveillance, target identification, long-range aircraft detection and control, together with point and area defense. Siemens Plessey Defence Systems is the prime.

**Watchman**

This is a E/F-Band medium-range 2-D radar tasked with medium range Air Traffic Control (ATC) and Surveillance (and surface vessel movement for CSR version). Siemens Plessey Radar is the program prime. Watchman is in production and service.

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